



Traffic Impact Analysis

Birdsong Phase 3

Mansfield, Texas

14 June 2021



TRAFFIC IMPACT
GROUP, LLC

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Executive Summary

Project Description

The third phase of Birdsong is proposed to be developed in Mansfield, Texas. The proposed development will consist of 220 single-family lots. The site is located north of Lone Star Road (FM 157) and east of Flying L Lane.

The property will have a full-access connection to Flying L Lane.

TxDOT has prepared plans to realign and widen FM 157 in the project area and that improvement is included in the Full Build analysis.

Trip Generation

The proposed new development is expected to generate 2,148 daily trips, with 40 entering trips and 121 exiting trips in the AM peak hour, and 137 entering and 80 exiting trips in the PM peak hour.

Turn Lanes/Access Management

According to City of Mansfield guidelines, no turn lanes are required at the project access.

Traffic Impacts

Analysis shows that the intersections in the study area are projected to continue to operate acceptably. No improvements are recommended.



Birdsong Phase 3 - Mansfield

I hereby certify that this report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Texas.



 6/14/2021

Scott P. Israelson, P.E., PTOE
License No. 116712

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I. Introduction

The third phase of Birdsong is proposed to be developed in Mansfield, Texas. The site is located north of Lone Star Road (FM 157) and east of Flying L Lane.

The *Birdsong Development TIA* that includes previous phases of the development was prepared in November 2019. Phase 3 of the Birdsong development is proposed to consist of 220 single-family lots. The property will have a full-access connection to Flying L Lane.

TxDOT has prepared plans to realign and widen FM 157 in the project area and that improvement is included in the Full Build analysis.

The study area included the following intersections:

- Main Street (Business 287) & Flying L Lane
- Lone Star Road (FM 157) & Flying L Lane
- Flying L Lane & Project Access

The study analyzed the following scenarios:

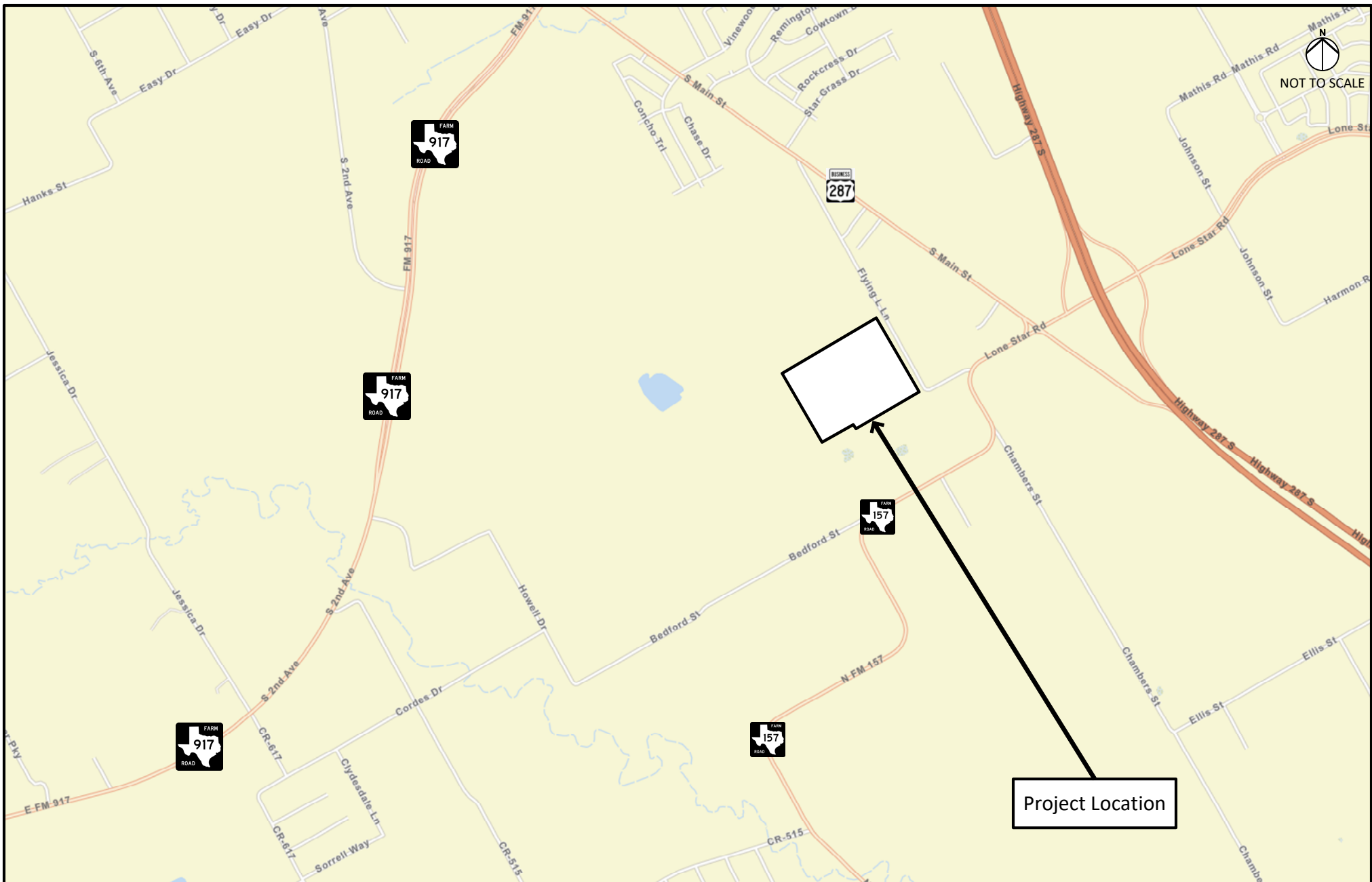
- 2021 Existing Conditions
- Full Build 2022 Conditions

The AM peak hour and PM peak hour were analyzed.

Figure 1 shows the most recent site plan. **Figure 2** shows the project vicinity map.



Flying L Lane - looking south



Vicinity Map

Figure 2

Birdsong Phase 3 - Mansfield

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II. Existing Conditions

A. Existing Roadway Conditions

Table 2.1 presents a summary of the existing roadway conditions in the study area.

Table 2.1 - Existing Roadways				
Street Name	Functional Class	Typical Section	Posted Speed	AADT
Main St (Bus 287)	Major Arterial	Three-lane with two-way left-turn lane (TWTL)	50 mph	5,518
Lone Star Rd (FM 157)	Major Collector	Two-lane undivided	50 mph	6,987
Flying L Lane	Local Street	Two-lane undivided	30 mph	n/a

FM 157 will be realigned and improved from a two-lane major collector to a four-lane arterial in the vicinity of the site. The schematic plans included in the Appendix shows the proposed realignment and the geometric configuration at Flying L Lane. This improvement is included in the analysis.

The *Mansfield Master Thoroughfare Plan* shows that Flying L Lane will be improved to a three-lane undivided minor collector. It is noted that this improvement will occur after full build out of the proposed development and is not included in the analysis.

B. Existing Intersection Geometry

Main Street (Business 287) & Flying L Lane is unsignalized. Main Street (Business 287) is a three-lane roadway with a center two-way left-turn lane (TWTL).

Lone Star Road (FM 157) & Flying L Lane is an unsignalized T-intersection consisting of a single lane on all approaches. The north leg of this intersection is a driveway for the Texan RV Ranch.

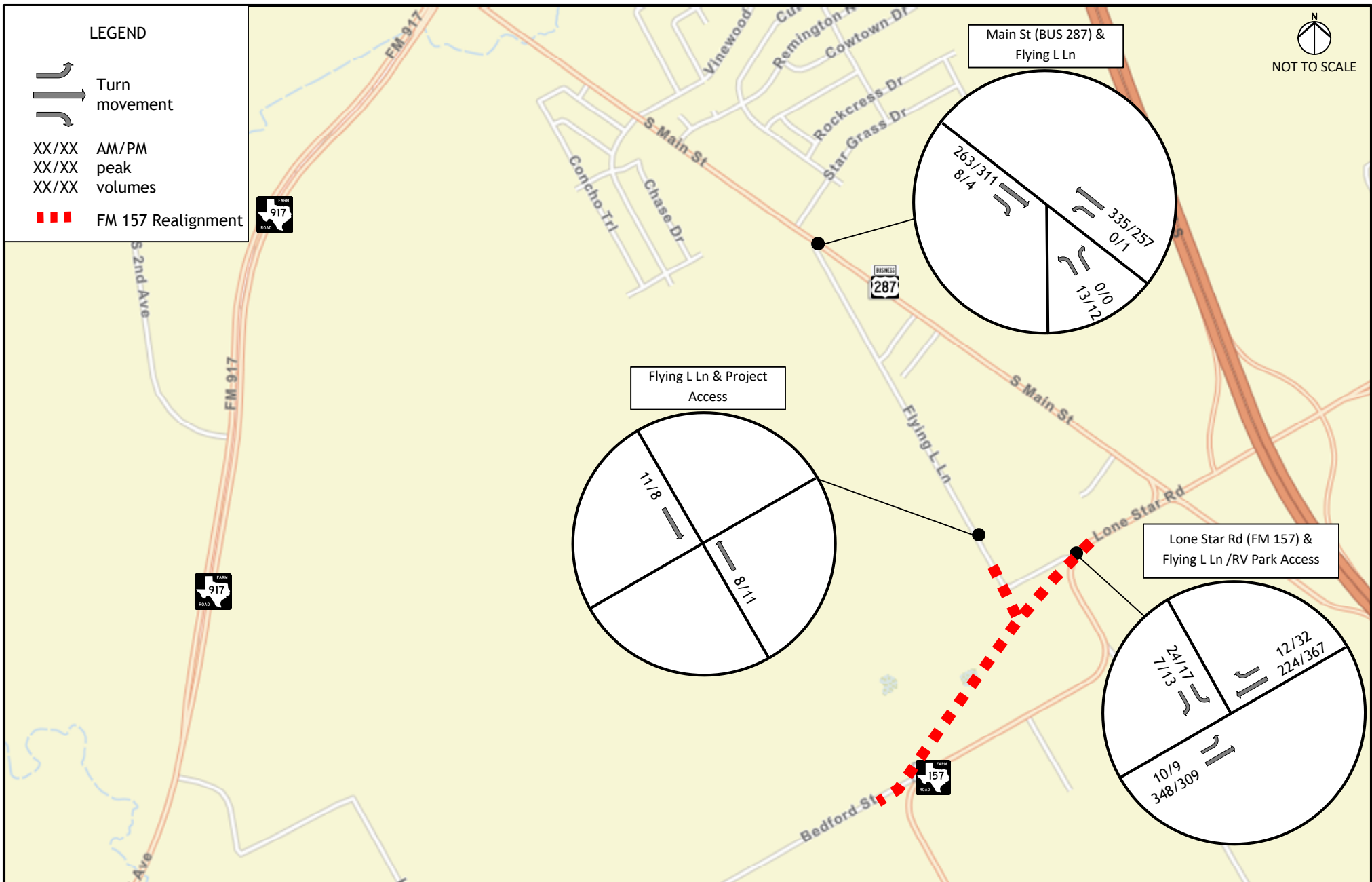
The FM 157 project will relocate the intersection west of its current location. FM 157 will be a four-lane divided roadway with left- and right-turn lanes at the intersection.

The project access is proposed to be a full access driveway to Flying L Lane. It will be located approximately 800 feet north of Lone Star Road (FM 157).

C. Traffic Volumes

Traffic data collection for study area intersections was performed on May 19, 2021. **Figure 3** displays existing traffic volumes. These volumes can be found in the Appendix.

The most recent Average Annual Daily Traffic (AADT) volumes were retrieved from the TxDOT Planning Office website.



Existing Traffic Volumes

Figure 3

Birdsong Phase 3 - Mansfield

Date: 14 June 2021

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III. Methodology

A. Base Assumptions

Intersection capacity analysis was conducted using Synchro v10.0. Trip generation was calculated using the 10th edition of the Institute of Transportation Engineers (ITE) *Trip Generation Manual*. Turn lanes on local roadways were examined using the City of Mansfield *Roadway Design Manual*.

B. Background Growth

The average annual background growth rate is calculated using historical AADT volumes. Calculations show that the background growth on Lone Star Road (FM 157) is 2.88% per year. These calculations can be found in the Appendix.

Existing volumes were increased by 3% to estimate background growth for Full Build 2022 conditions.

C. Trip Generation

The development is proposed to consist of 220 single family units.

The *ITE Trip Generation Manual, 10th Edition* was used to estimate the projected trips by this development.

Table 3.1 contains the summary of the land uses and sizes used for trip generation estimates.

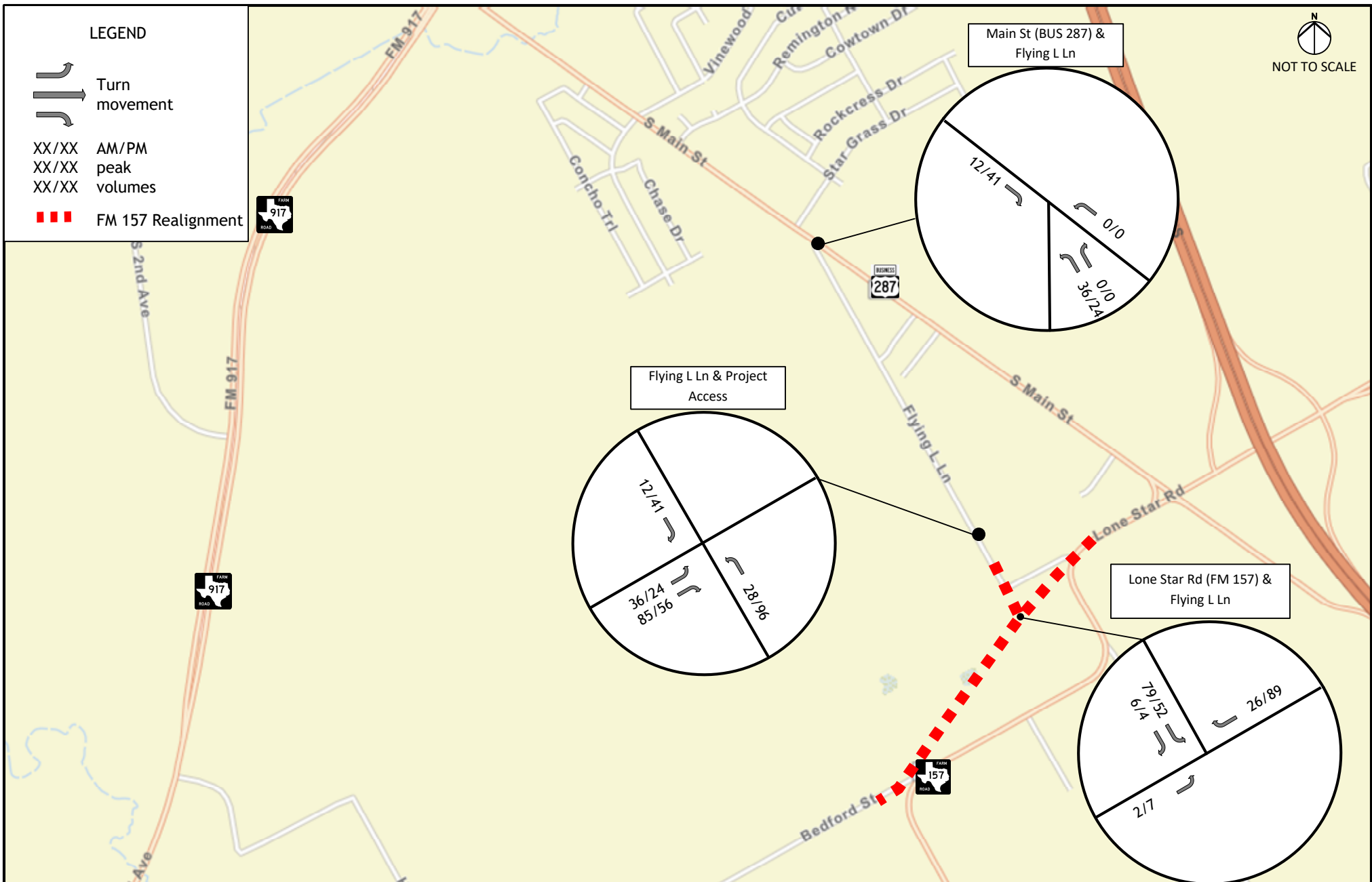
Table 3.1 - ITE Trip Generation								
Average Weekday Driveway Volumes					AM Peak Hour		PM Peak Hour	
Land Use	ITE Code	Size		Daily Trips	Enter	Exit	Enter	Exit
Single-Family Detached Housing	210	220	Dwelling Units	2148	40	121	137	80

D. Trip Distribution

Trips for this proposed development were assigned to the surrounding roadway network based on existing traffic patterns as well as the *Birdsong Development TIA*. The proposed trip distribution for the project is:

- 30% to/from the north on Main Street (Business 287)
- 65% to/from the east on FM 157
- 5% to/from the west on FM 157

The projected site trips are shown in **Figure 4** and Full Build 2022 volumes are shown in **Figure 5**.

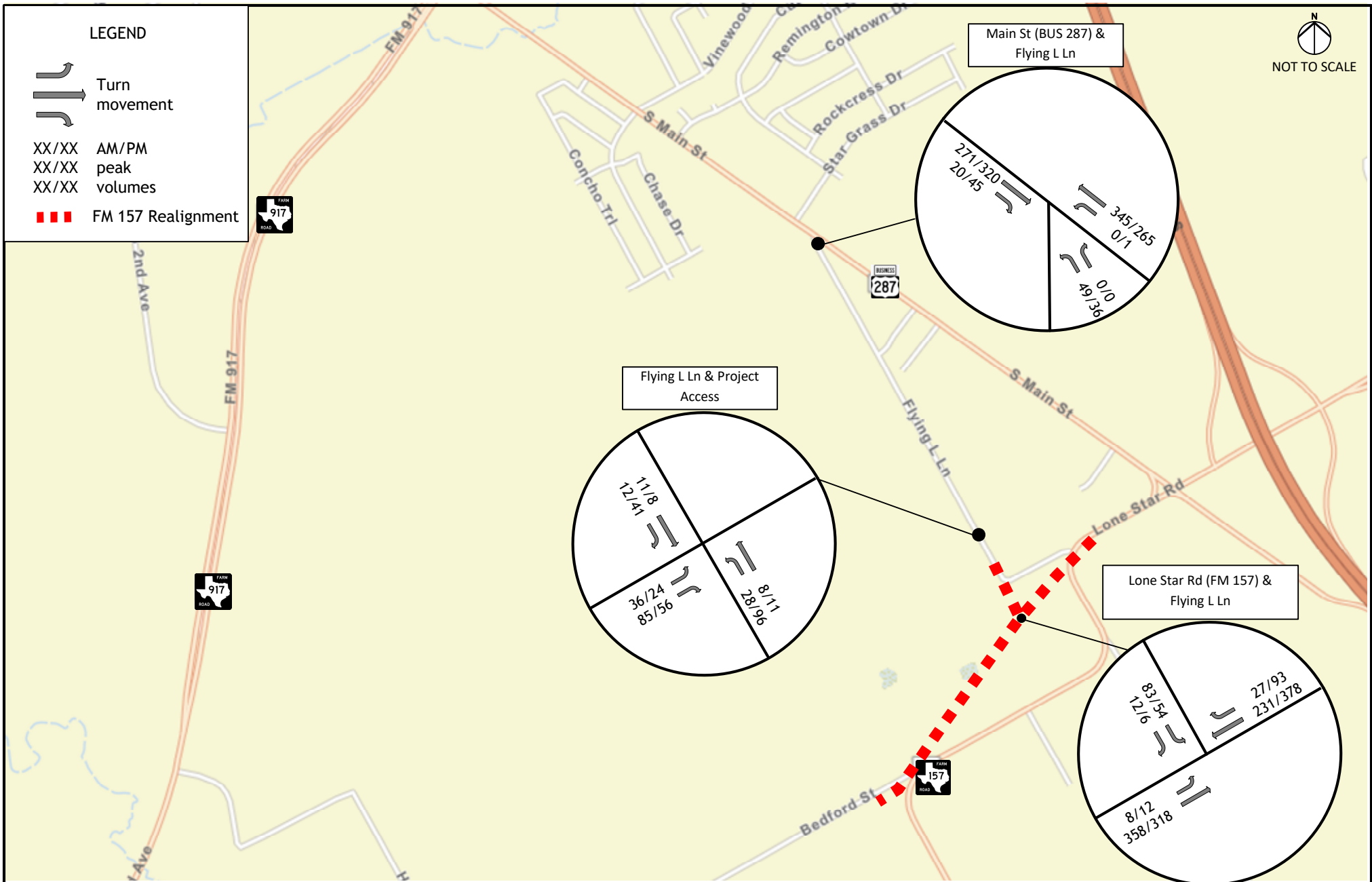


Site Trips

Figure 4

Birdsong Phase 3 - Mansfield

Date: 14 June 2021



Full Build 2022 Volumes

Figure 5

Birdsong Phase 3 - Mansfield

Date: 14 June 2021

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IV. Turn Lane/Access Management

A. Right-Turn Lanes

The City of Mansfield *Roadway Design Manual* provides guidelines for auxiliary lanes. The City requires a turn lane where right turn volumes exceed 50 vehicles per hour (vph) on a major street facility.

Table 4.1 shows the Full Build 2022 volumes used in the analysis.

Table 4.1 Right-Turn Lane Analysis					
Driveway	Approach Posted Speed	Hourly Threshold	AM RT volume	PM RT volume	Turn Lane needed?
Flying L Ln & Project Access	SB	50	12	41	No

Analysis shows that based on Full Build 2022 volumes, no right-turn lane from Flying L Lane is required for the project access connection.

B. Left-Turn Lanes

For left-turn lanes, the City requires a turn lane where driveways and public/private streets align with median opening. Based on this requirement, no left-turn lane from Flying L Lane is required for the project access connection.

As earlier noted, the *Mansfield Master Thoroughfare Plan* shows that Flying L Lane will be improved to a three-lane undivided minor collector. The planned improvements may provide opportunity for a center two-way left-turn lane (TWTL) at the proposed project access connection.

C. Intersection Sight Distance

The table below shows required ISD for posted speeds based on AASHTO Greenbook standards.

Speed (mph)	Stopping Sight Distance (ft.)	Design Intersection Sight Distance (ft.)
25	155	280
30	200	335
35	250	390
40	305	445
45	360	500
50	425	555
55	495	610
60	570	665
65	645	720

Source: *A Policy on Geometric Design of Highway and Streets*, 5th Edition, American Association of State Highway and Transportation Officials (AASHTO), 2004.

There are no sight distance obstructions that obscure the view of vehicles at the proposed access driveway.



Flying L Lane - looking north



Flying L Lane - looking south

V. Capacity Analysis

The Transportation Research Board's Highway Capacity Manual (HCM) utilizes a term "level of service" (LOS) to measure how traffic operates in intersections. There are currently six levels of service ranging from A to F. Level of Service "A" represents the best conditions and Level of Service "F" represents the worst. Synchro software was used to determine the level of service for intersections in the study area. All worksheet reports from the analyses can be found in the Appendix.

Table 5.1 shows the control delay per vehicle associated with LOS A through F for signalized and unsignalized intersections.

Table 5.1 - Highway Capacity Manual Levels of Service and Control Delay			
Signalized Intersection		Unsignalized Intersection	
Level of Service	Control Delay per Vehicle (sec)	Level of Service	Control Delay per Vehicle (sec)
A	≤ 10	A	≤ 10
B	> 10 and ≤ 20	B	> 10 and ≤ 15
C	> 20 and ≤ 35	C	> 15 and ≤ 25
D	> 35 and ≤ 55	D	> 25 and ≤ 35
E	> 55 and ≤ 80	E	> 35 and ≤ 50
F	> 80	F	> 50

A. Main Street (Business 287) & Flying L Lane

Table 5.2 shows the current LOS, control delay, and 95th percentile queue length for existing conditions.

Table 5.2 - Intersection LOS, Delay, and Queue by Movement - 2021 Existing								
Intersection	Approach	Movement	AM			PM		
			LOS	Delay	Queue	LOS	Delay	Queue
Main St (BUS 287) & Flying L Ln	SEB	TH	Free					
		RT						
	NWB	LT	Free					
		TH						
	NB	LT	C	15.3	-	B	13.1	-
		RT						

Table 5.3 shows the expected LOS, control delay, and 95th percentile queue length for Full Build 2022 conditions.

Table 5.3 - Intersection LOS, Delay, and Queue by Movement - 2022 Full Build								
Intersection	Approach	Movement	AM			PM		
			LOS	Delay	Queue	LOS	Delay	Queue
Main St (BUS 287) & Flying L Ln	SEB	TH	Free					
		RT						
	NWB	LT	Free					
		TH						
	NB	LT	C	17.5	18'	B	14.1	8'
		RT						

Analysis shows that acceptable levels of service are maintained with the 2022 Full Build Development Traffic.



Main Street (Business 287) at Flying L Lane

B. Lone Star Road (FM 157) & Flying L Lane

The FM 157 project will relocate the intersection west of its current location. FM 157 will be a four-lane divided roadway with left- and right-turn lanes at the intersection. This planned improvement is included in the Full Build 2022 scenario.

Table 5.4 shows the current LOS, control delay, and 95th percentile queue length for existing conditions.

Table 5.4 - Intersection LOS, Delay, and Queue by Movement - 2021 Existing								
Intersection	Approach	Movement	AM			PM		
			LOS	Delay	Queue	LOS	Delay	Queue
Lone Star Rd (FM 157) & Flying L Ln	EB	LT	Free					
		TH						
	WB	TH	Free					
		RT						
	SB	LT	B	13.8	8'	B	13.2	5'
		RT						

Table 5.5 shows the expected LOS, control delay, and 95th percentile queue length for Full Build 2022 conditions.

Table 5.5 - Intersection LOS, Delay, and Queue by Movement - 2022 Full Build								
Intersection	Approach	Movement	AM			PM		
			LOS	Delay	Queue	LOS	Delay	Queue
Lone Star Rd (FM 157) & Flying L Ln	EB	LT	Free					
		TH						
	WB	TH	Free					
		RT						
	SB	LT	B	13.8	20'	B	13.9	13'
		RT						

Analysis shows that acceptable levels of service are maintained with the 2022 Full Build Development Traffic

C. Flying L Lane & Project Access

The project access is proposed to be a full access driveway to Flying L Lane. It will be located approximately 800 feet north of Lone Star Road (FM 157).

Table 5.6 shows the expected LOS, control delay, and 95th percentile queue length for Full Build 2022 conditions.

Table 5.6 - Intersection LOS, Delay, and Queue by Movement - 2022 Full Build								
Intersection	Approach	Movement	AM			PM		
			LOS	Delay	Queue	LOS	Delay	Queue
Flying L Ln & Project Access	EB	LT	A	9.1	13'	A	9.4	8'
		RT						
	NB	LT	Free					
		TH						
	SB	TH	Free					
		RT						

Analysis shows that the proposed access connection to Flying L Lane is expected to operate acceptably with 2022 Full Build development traffic.



Flying L Lane - looking south

VI. Summary and Conclusion

This study serves as an analysis of the traffic impacts from Phase 3 of the Birdsong development in Mansfield, Texas.

Trip Generation

The proposed new development is expected to generate 2,148 daily trips, with 40 entering trips and 121 exiting trips in the AM peak hour, and 137 entering and 80 exiting trips in the PM peak hour.

Turn Lanes/Access Management

According to City of Mansfield guidelines, no turn lanes are required at the project access.

Traffic Impacts

Analysis shows that the intersections in the study area are projected to continue to operate acceptably. No improvements are recommended.



Main Street (Business 287) & Flying L Lane - looking south

Appendix

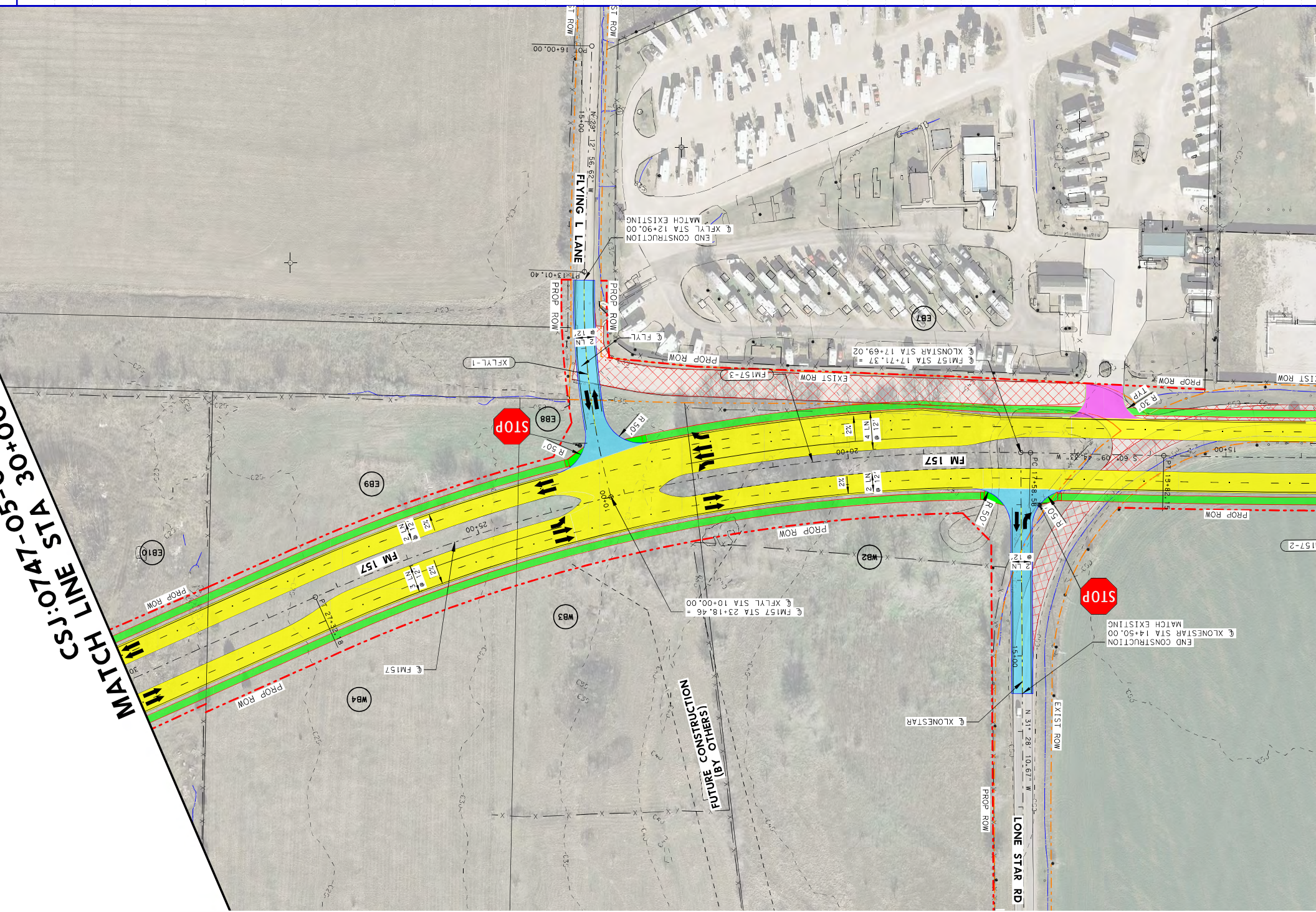
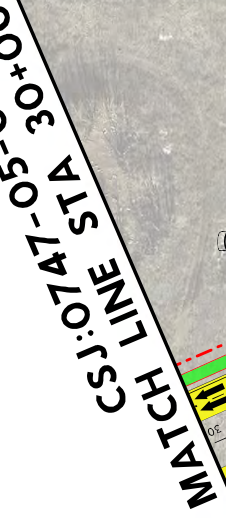
Background Information

Traffic Volumes

Trip Generation

Capacity Analysis

BACKGROUND INFORMATION

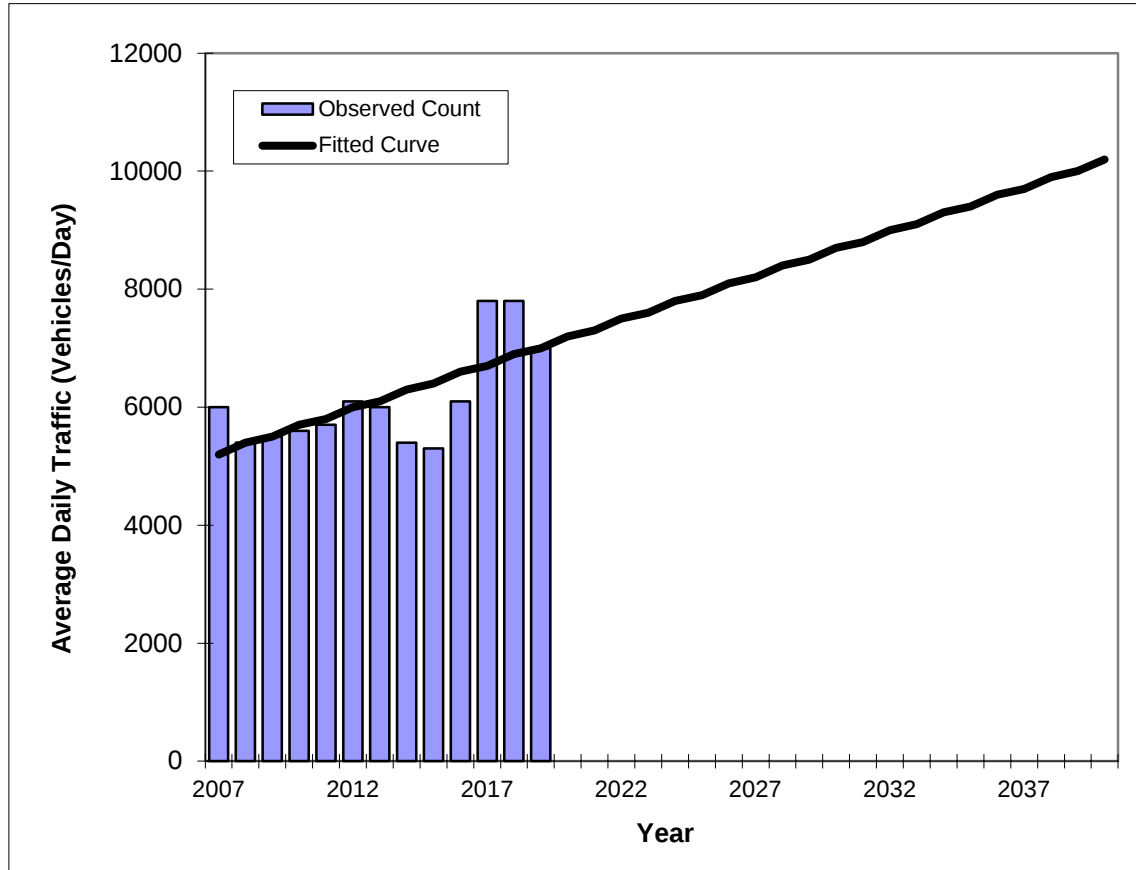


Traffic Trends - V2.0

FM 157 (Lone Star Rd) -- south of Flying Lane

Location	0
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County:	Johnson
Station #:	127H35
Highway:	FM 157 (Lone Star Rd)



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2007	6000	5200
2008	5400	5400
2009	5500	5500
2010	5600	5700
2011	5700	5800
2012	6100	6000
2013	6000	6100
2014	5400	6300
2015	5300	6400
2016	6100	6600
2017	7800	6700
2018	7800	6900
2019	7000	7000
2007 Opening Year Trend		
2007	N/A	5200
2020 Mid-Year Trend		
2020	N/A	7200
2022 Design Year Trend		
2022	N/A	7500
TRANPLAN Forecasts/Trends		

** Annual Trend Increase:	149
Trend R-squared:	45.23%
Trend Annual Historic Growth Rate:	2.88%
Trend Growth Rate (2019 to Design Year):	2.38%
Printed:	14-Jun-21
Straight Line Growth Option	

*Axle-Adjusted

TRAFFIC VOLUMES

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: FLYING L LN @
RV PARK @ LONE STAR RD
Site Code:
Start Date: 05/19/2021
Page No: 3

Turning Movement Peak Hour Data (7:15 AM)

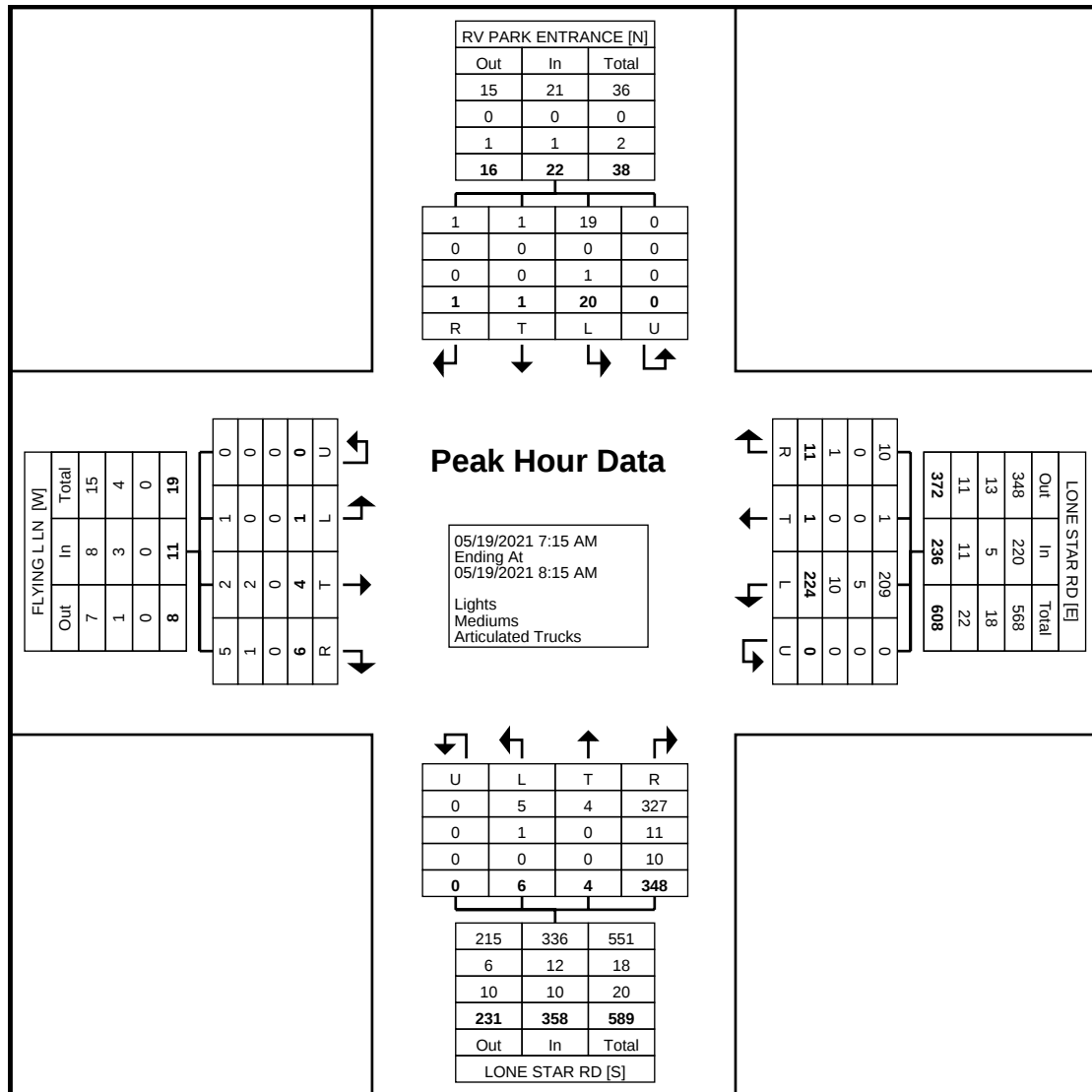
Start Time	RV PARK ENTRANCE Southbound					LONE STAR RD Westbound					LONE STAR RD Northbound					FLYING L LN Eastbound					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
7:15 AM	5	1	0	0	6	29	0	2	0	31	0	0	86	0	86	0	0	0	0	0	123
7:30 AM	9	0	0	0	9	63	0	2	0	65	3	0	106	0	109	0	1	1	0	2	185
7:45 AM	2	0	0	0	2	65	0	3	0	68	3	3	92	0	98	1	1	5	0	7	175
8:00 AM	4	0	1	0	5	67	1	4	0	72	0	1	64	0	65	0	2	0	0	2	144
Total	20	1	1	0	22	224	1	11	0	236	6	4	348	0	358	1	4	6	0	11	627
Approach %	90.9	4.5	4.5	0.0	-	94.9	0.4	4.7	0.0	-	1.7	1.1	97.2	0.0	-	9.1	36.4	54.5	0.0	-	-
Total %	3.2	0.2	0.2	0.0	3.5	35.7	0.2	1.8	0.0	37.6	1.0	0.6	55.5	0.0	57.1	0.2	0.6	1.0	0.0	1.8	-
PHF	0.556	0.250	0.250	0.000	0.611	0.836	0.250	0.688	0.000	0.819	0.500	0.333	0.821	0.000	0.821	0.250	0.500	0.300	0.000	0.393	0.847
Lights	19	1	1	0	21	209	1	10	0	220	5	4	327	0	336	1	2	5	0	8	585
% Lights	95.0	100.0	100.0	-	95.5	93.3	100.0	90.9	-	93.2	83.3	100.0	94.0	-	93.9	100.0	50.0	83.3	-	72.7	93.3
Mediums	0	0	0	0	0	5	0	0	0	5	1	0	11	0	12	0	2	1	0	3	20
% Mediums	0.0	0.0	0.0	-	0.0	2.2	0.0	0.0	-	2.1	16.7	0.0	3.2	-	3.4	0.0	50.0	16.7	-	27.3	3.2
Articulated Trucks	1	0	0	0	1	10	0	1	0	11	0	0	10	0	10	0	0	0	0	0	22
% Articulated Trucks	5.0	0.0	0.0	-	4.5	4.5	0.0	9.1	-	4.7	0.0	0.0	2.9	-	2.8	0.0	0.0	0.0	-	0.0	3.5

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: FLYING L LN @
RV PARK @ LONE STAR RD
Site Code:
Start Date: 05/19/2021
Page No: 4



GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: FLYING L LN @
RV PARK @ LONE STAR RD
Site Code:
Start Date: 05/19/2021
Page No: 5

Turning Movement Peak Hour Data (4:45 PM)

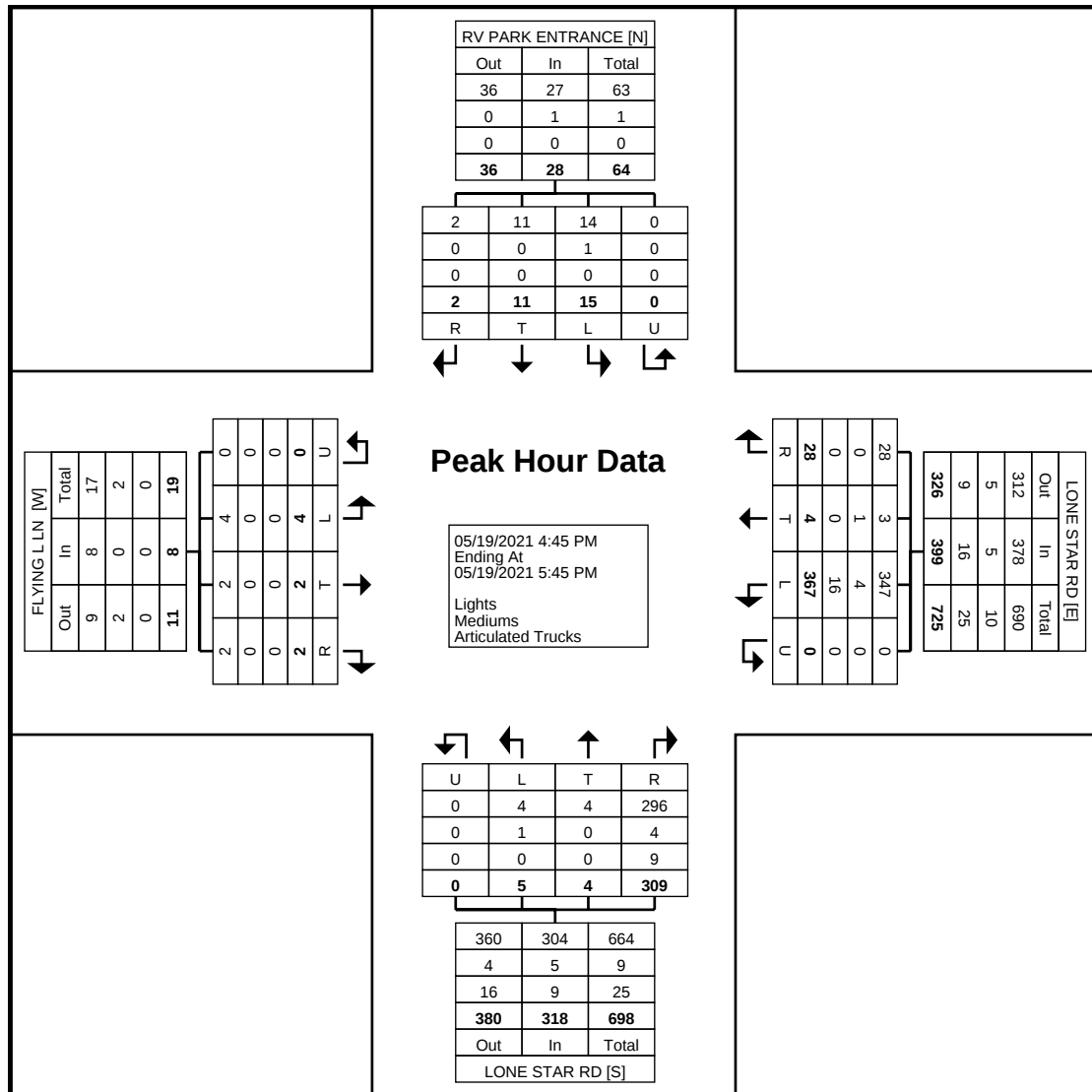
Start Time	RV PARK ENTRANCE Southbound					LONE STAR RD Westbound					LONE STAR RD Northbound					FLYING L LN Eastbound					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
4:45 PM	4	3	2	0	9	91	1	7	0	99	2	1	79	0	82	1	0	0	0	1	191
5:00 PM	5	1	0	0	6	74	2	9	0	85	0	1	90	0	91	1	0	1	0	2	184
5:15 PM	4	3	0	0	7	95	0	7	0	102	2	1	80	0	83	1	0	1	0	2	194
5:30 PM	2	4	0	0	6	107	1	5	0	113	1	1	60	0	62	1	2	0	0	3	184
Total	15	11	2	0	28	367	4	28	0	399	5	4	309	0	318	4	2	2	0	8	753
Approach %	53.6	39.3	7.1	0.0	-	92.0	1.0	7.0	0.0	-	1.6	1.3	97.2	0.0	-	50.0	25.0	25.0	0.0	-	-
Total %	2.0	1.5	0.3	0.0	3.7	48.7	0.5	3.7	0.0	53.0	0.7	0.5	41.0	0.0	42.2	0.5	0.3	0.3	0.0	1.1	-
PHF	0.750	0.688	0.250	0.000	0.778	0.857	0.500	0.778	0.000	0.883	0.625	1.000	0.858	0.000	0.874	1.000	0.250	0.500	0.000	0.667	0.970
Lights	14	11	2	0	27	347	3	28	0	378	4	4	296	0	304	4	2	2	0	8	717
% Lights	93.3	100.0	100.0	-	96.4	94.6	75.0	100.0	-	94.7	80.0	100.0	95.8	-	95.6	100.0	100.0	100.0	-	100.0	95.2
Mediums	1	0	0	0	1	4	1	0	0	5	1	0	4	0	5	0	0	0	0	0	11
% Mediums	6.7	0.0	0.0	-	3.6	1.1	25.0	0.0	-	1.3	20.0	0.0	1.3	-	1.6	0.0	0.0	0.0	-	0.0	1.5
Articulated Trucks	0	0	0	0	0	16	0	0	0	16	0	0	9	0	9	0	0	0	0	0	25
% Articulated Trucks	0.0	0.0	0.0	-	0.0	4.4	0.0	0.0	-	4.0	0.0	0.0	2.9	-	2.8	0.0	0.0	0.0	-	0.0	3.3

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1120 W. Lovers Lane

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Count Name: FLYING L LN @
RV PARK @ LONE STAR RD
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Page No: 6



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1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: S MAIN ST @
FLYING L LN
Site Code:
Start Date: 05/19/2021
Page No: 3

Turning Movement Peak Hour Data (7:00 AM)

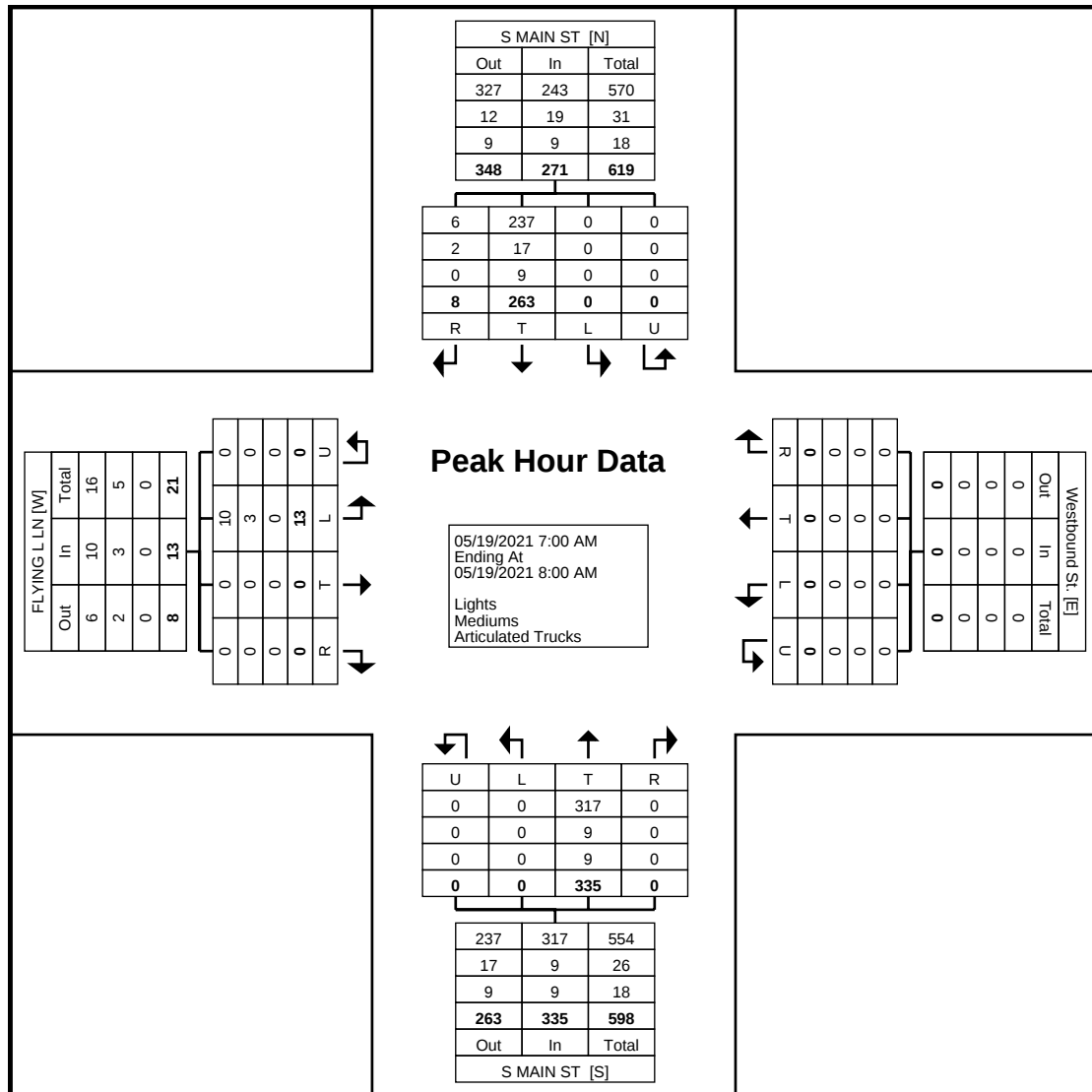
Start Time	S MAIN ST Southbound					Westbound St. Westbound					S MAIN ST Northbound					FLYING L LN Eastbound					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
7:00 AM	0	58	0	0	58	0	0	0	0	0	0	54	0	0	54	4	0	0	0	4	116
7:15 AM	0	45	0	0	45	0	0	0	0	0	0	82	0	0	82	1	0	0	0	1	128
7:30 AM	0	72	1	0	73	0	0	0	0	0	0	97	0	0	97	5	0	0	0	5	175
7:45 AM	0	88	7	0	95	0	0	0	0	0	0	102	0	0	102	3	0	0	0	3	200
Total	0	263	8	0	271	0	0	0	0	0	0	335	0	0	335	13	0	0	0	13	619
Approach %	0.0	97.0	3.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	100.0	0.0	0.0	-	100.0	0.0	0.0	0.0	-	-
Total %	0.0	42.5	1.3	0.0	43.8	0.0	0.0	0.0	0.0	0.0	0.0	54.1	0.0	0.0	54.1	2.1	0.0	0.0	0.0	2.1	-
PHF	0.000	0.747	0.286	0.000	0.713	0.000	0.000	0.000	0.000	0.000	0.000	0.821	0.000	0.000	0.821	0.650	0.000	0.000	0.000	0.650	0.774
Lights	0	237	6	0	243	0	0	0	0	0	0	317	0	0	317	10	0	0	0	10	570
% Lights	-	90.1	75.0	-	89.7	-	-	-	-	-	-	94.6	-	-	94.6	76.9	-	-	-	76.9	92.1
Mediums	0	17	2	0	19	0	0	0	0	0	0	9	0	0	9	3	0	0	0	3	31
% Mediums	-	6.5	25.0	-	7.0	-	-	-	-	-	-	2.7	-	-	2.7	23.1	-	-	-	23.1	5.0
Articulated Trucks	0	9	0	0	9	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	18
% Articulated Trucks	-	3.4	0.0	-	3.3	-	-	-	-	-	-	2.7	-	-	2.7	0.0	-	-	-	0.0	2.9

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: S MAIN ST @
FLYING L LN
Site Code:
Start Date: 05/19/2021
Page No: 4



Turning Movement Peak Hour Data Plot (7:00 AM)

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: S MAIN ST @
FLYING L LN
Site Code:
Start Date: 05/19/2021
Page No: 5

Turning Movement Peak Hour Data (4:30 PM)

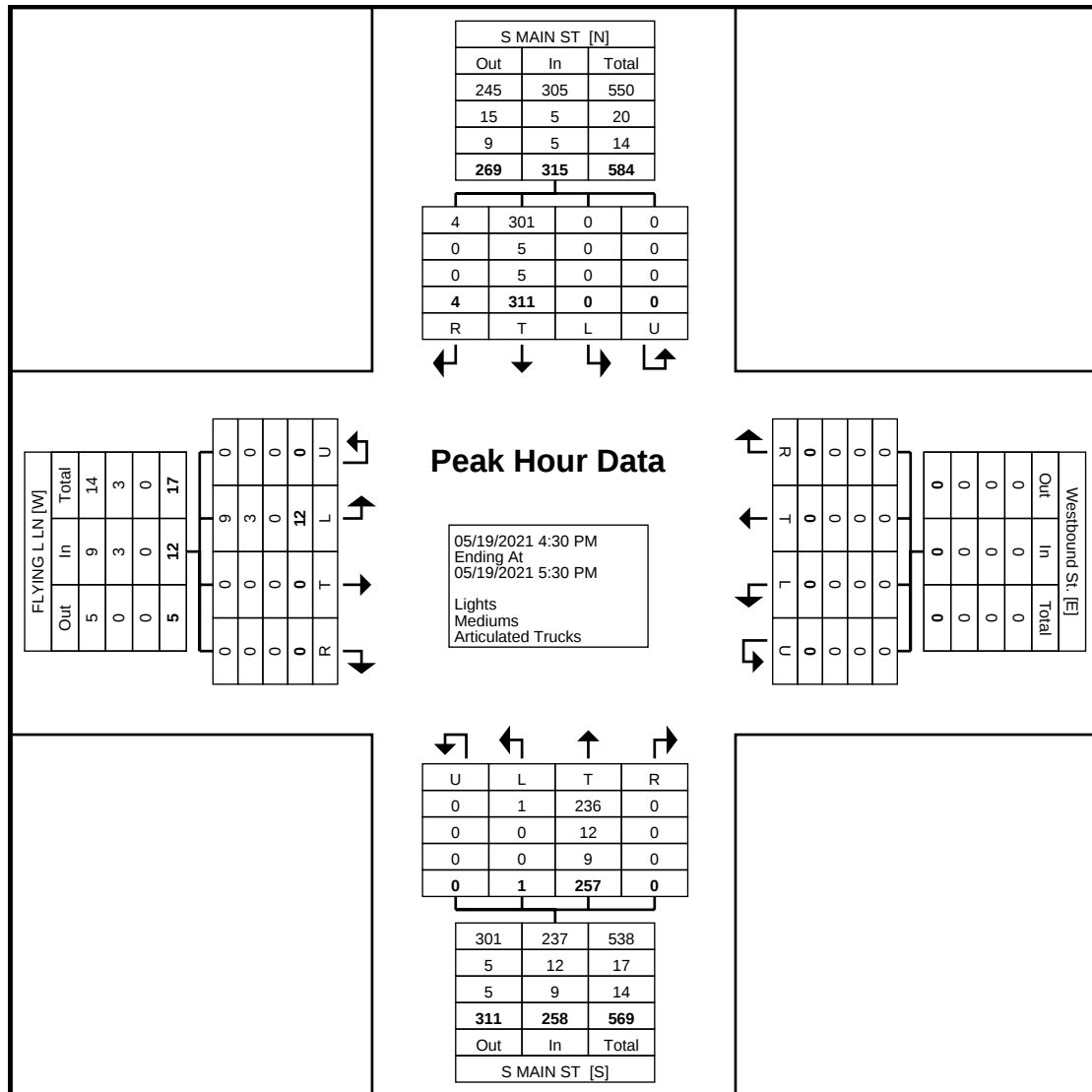
Start Time	S MAIN ST Southbound					Westbound St. Westbound					S MAIN ST Northbound					FLYING L LN Eastbound					Int. Total
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	
4:30 PM	0	87	0	0	87	0	0	0	0	0	0	58	0	0	58	2	0	0	0	2	147
4:45 PM	0	59	2	0	61	0	0	0	0	0	0	67	0	0	67	4	0	0	0	4	132
5:00 PM	0	82	2	0	84	0	0	0	0	0	0	62	0	0	62	3	0	0	0	3	149
5:15 PM	0	83	0	0	83	0	0	0	0	0	1	70	0	0	71	3	0	0	0	3	157
Total	0	311	4	0	315	0	0	0	0	0	1	257	0	0	258	12	0	0	0	12	585
Approach %	0.0	98.7	1.3	0.0	-	0.0	0.0	0.0	0.0	-	0.4	99.6	0.0	0.0	-	100.0	0.0	0.0	0.0	-	-
Total %	0.0	53.2	0.7	0.0	53.8	0.0	0.0	0.0	0.0	0.0	0.2	43.9	0.0	0.0	44.1	2.1	0.0	0.0	0.0	2.1	-
PHF	0.000	0.894	0.500	0.000	0.905	0.000	0.000	0.000	0.000	0.000	0.250	0.918	0.000	0.000	0.908	0.750	0.000	0.000	0.000	0.750	0.932
Lights	0	301	4	0	305	0	0	0	0	0	1	236	0	0	237	9	0	0	0	9	551
% Lights	-	96.8	100.0	-	96.8	-	-	-	-	-	100.0	91.8	-	-	91.9	75.0	-	-	-	75.0	94.2
Mediums	0	5	0	0	5	0	0	0	0	0	0	12	0	0	12	3	0	0	0	3	20
% Mediums	-	1.6	0.0	-	1.6	-	-	-	-	-	0.0	4.7	-	-	4.7	25.0	-	-	-	25.0	3.4
Articulated Trucks	0	5	0	0	5	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	14
% Articulated Trucks	-	1.6	0.0	-	1.6	-	-	-	-	-	0.0	3.5	-	-	3.5	0.0	-	-	-	0.0	2.4

GRAM Traffic NTX Inc.

1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: S MAIN ST @
FLYING L LN
Site Code:
Start Date: 05/19/2021
Page No: 6



Turning Movement Peak Hour Data Plot (4:30 PM)

Birdsong Phase 3 - Mansfield

Vistro File: C:\...\Birdsong3 vistro.vistro

Scenario 1 AM

Report File: C:\...\vistro AM.pdf

6/10/2021

Turning Movement Volume: Detail

ID	Intersection Name	Volume Type	Northbound		Eastbound		Westbound		Total Volume
			Thru	Right	Thru	Right	Left	Thru	
1	Main St & Flying L Ln	Final Base	13	0	263	8	0	335	619
		Growth Factor	1.03	1.03	1.03	1.03	1.03	1.03	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	36	0	0	12	0	0	48
		Other	0	0	0	0	0	0	0
		Future Total	49	0	271	20	0	345	685

ID	Intersection Name	Volume Type	Northbound		Southbound		Eastbound		Total Volume
			Left	Thru	Thru	Right	Left	Right	
2	Flying L Ln & Access	Final Base	0	8	11	0	0	0	19
		Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	28	0	0	12	36	85	161
		Other	0	0	0	0	0	0	0
		Future Total	28	8	11	12	36	85	180

ID	Intersection Name	Volume Type	Southbound		Eastbound		Westbound		Total Volume
			Left	Right	Left	Thru	Thru	Right	
3	FM 157 & Flying L Ln	Final Base	4	6	6	348	224	1	589
		Growth Factor	1.03	1.03	1.03	1.03	1.03	1.03	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	79	6	2	0	0	26	113
		Other	0	0	0	0	0	0	0
		Future Total	83	12	8	358	231	27	719

Vistro File: C:\...\Birdsong3 vistro.vistro

Report File: C:\...\vistro PM.pdf

Scenario 2 PM

6/8/2021

Turning Movement Volume: Detail

ID	Intersection Name	Volume Type	Northbound		Eastbound		Westbound		Total Volume
			Thru	Right	Thru	Right	Left	Thru	
1	Main St & Flying L Ln	Final Base	12	0	311	4	1	257	585
		Growth Factor	1.03	1.03	1.03	1.03	1.03	1.03	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	24	0	0	41	0	0	65
		Other	0	0	0	0	0	0	0
		Future Total	36	0	320	45	1	265	667

ID	Intersection Name	Volume Type	Northbound		Southbound		Eastbound		Total Volume
			Left	Thru	Thru	Right	Left	Right	
2	Flying L Ln & Access	Final Base	0	11	8	0	0	0	19
		Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	96	0	0	41	24	56	217
		Other	0	0	0	0	0	0	0
		Future Total	96	11	8	41	24	56	236

ID	Intersection Name	Volume Type	Southbound		Eastbound		Westbound		Total Volume
			Left	Right	Left	Thru	Thru	Right	
3	FM 157 & Flying L Ln	Final Base	2	2	5	309	367	4	689
		Growth Factor	1.03	1.03	1.03	1.03	1.03	1.03	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	52	4	7	0	0	89	152
		Other	0	0	0	0	0	0	0
		Future Total	54	6	12	318	378	93	861

TRIP GENERATION

Project Information	
Project Name:	Birdsong Phase 3
No:	
Date:	5/23/2021
City:	Mansfield
State/Province:	TX
Zip/Postal Code:	
Country:	
Client Name:	JBI Partners
Analyst's Name:	GN
Edition:	Trip Gen Manual, 10th Ed

Land Use	Size	Daily		AM		PM	
		Entry	Exit	Entry	Exit	Entry	Exit
210 - Single-Family Detached Housing (General Urban/Suburban)	220 Dwelling Units	1074	1074	40	121	137	80
Reduction		0	0	0	0	0	0
Internal		0	0	0	0	0	0
Pass-by		0	0	0	0	0	0
Non-pass-by		1074	1074	40	121	137	80
Total		1074	1074	40	121	137	80
Total Reduction		0	0	0	0	0	0
Total Internal		0	0	0	0	0	0
Total Pass-by		0	0	0	0	0	0
Total Non-pass-by		1074	1074	40	121	137	80

CAPACITY ANALYSIS

Existing Conditions

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	348	224	12	24	7
Future Vol, veh/h	10	348	224	12	24	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	- None		- None		- None	
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	0	-	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	3	5	10	4	0
Mvmt Flow	12	409	264	14	28	8
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	278	0	-	0	704	271
Stage 1	-	-	-	-	271	-
Stage 2	-	-	-	-	433	-
Critical Hdwy	4.1	-	-	-	6.44	6.2
Critical Hdwy Stg 1	-	-	-	-	5.44	-
Critical Hdwy Stg 2	-	-	-	-	5.44	-
Follow-up Hdwy	2.2	-	-	-	3.536	3.3
Pot Cap-1 Maneuver	1296	-	-	-	400	773
Stage 1	-	-	-	-	770	-
Stage 2	-	-	-	-	650	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1296	-	-	-	395	773
Mov Cap-2 Maneuver	-	-	-	-	395	-
Stage 1	-	-	-	-	761	-
Stage 2	-	-	-	-	650	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.2	0		13.8		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1296	-	-	-	444	
HCM Lane V/C Ratio	0.009	-	-	-	0.082	
HCM Control Delay (s)	7.8	0	-	-	13.8	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.3	

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	9	309	367	32	17	13
Future Vol, veh/h	9	309	367	32	17	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	- None		- None		- None	
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0		0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	0	3	4	10	0	0
Mvmt Flow	9	319	378	33	18	13
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	411	0	-	0	732	395
Stage 1	-	-	-	-	395	-
Stage 2	-	-	-	-	337	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1159	-	-	-	391	659
Stage 1	-	-	-	-	685	-
Stage 2	-	-	-	-	728	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1159	-	-	-	387	659
Mov Cap-2 Maneuver	-	-	-	-	387	-
Stage 1	-	-	-	-	679	-
Stage 2	-	-	-	-	728	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.2	0		13.2		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1159	-	-	-	471	
HCM Lane V/C Ratio	0.008	-	-	-	0.066	
HCM Control Delay (s)	8.1	0	-	-	13.2	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.2	

Intersection						
Int Delay, s/veh	0.3					
Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Vol, veh/h	13	0	263	8	0	335
Future Vol, veh/h	13	0	263	8	0	335
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	- None		- None		- None	
Storage Length	0	-	-	-	200	-
Veh in Median Storage	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	77	77	77	77	77	77
Heavy Vehicles, %	0	0	3	0	0	3
Mvmt Flow	17	0	342	10	0	435

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	782	347	0	0	352	0
Stage 1	347	-	-	-	-	-
Stage 2	435	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	366	701	-	-	1218	-
Stage 1	720	-	-	-	-	-
Stage 2	657	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	366	701	-	-	1218	-
Mov Cap-2 Maneuver	366	-	-	-	-	-
Stage 1	720	-	-	-	-	-
Stage 2	657	-	-	-	-	-

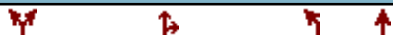
Approach	NB	SE	NW
HCM Control Delay, s	15.3	0	0
HCM LOS	C		

Minor Lane/Major Mvm	NBLn1	NWL	NWT	SET	SER
Capacity (veh/h)	366	1218	-	-	-
HCM Lane V/C Ratio	0.046	-	-	-	-
HCM Control Delay (s)	15.3	0	-	-	-
HCM Lane LOS	C	A	-	-	-
HCM 95th %tile Q(veh)	0.1	0	-	-	-

Intersection

Int Delay, s/veh 0.3

Movement NBL NBR SET SER NWL NWT

Lane Configurations 

Traffic Vol, veh/h 12 0 311 4 1 257

Future Vol, veh/h 12 0 311 4 1 257

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Stop Stop Free Free Free Free

RT Channelized - None - None - None

Storage Length 0 - - - 200 -

Veh in Median Storage 0# - 0 - - 0

Grade, % 0 - 0 - - 0

Peak Hour Factor 93 93 93 93 93 93

Heavy Vehicles, % 0 0 2 0 0 4

Mvmt Flow 13 0 334 4 1 276

Major/Minor Minor1 Major1 Major2

Conflicting Flow All 614 336 0 0 338 0

Stage 1 336 - - - - -

Stage 2 278 - - - - -

Critical Hdwy 6.4 6.2 - - 4.1 -

Critical Hdwy Stg 1 5.4 - - - - -

Critical Hdwy Stg 2 5.4 - - - - -

Follow-up Hdwy 3.5 3.3 - - 2.2 -

Pot Cap-1 Maneuver 459 711 - - 1232 -

Stage 1 728 - - - - -

Stage 2 774 - - - - -

Platoon blocked, % - - - - -

Mov Cap-1 Maneuver 459 711 - - 1232 -

Mov Cap-2 Maneuver 459 - - - - -

Stage 1 728 - - - - -

Stage 2 773 - - - - -

Approach NB SE NW

HCM Control Delay, s 13.1 0 0

HCM LOS B

Minor Lane/Major MvmNBLn1 NWL NWT SET SER

Capacity (veh/h) 459 1232 - - -

HCM Lane V/C Ratio 0.028 0.001 - - -

HCM Control Delay (s) 13.1 7.9 - - -

HCM Lane LOS B A - - -

HCM 95th %tile Q(veh) 0.1 0 - - -

Full Build 2022 Conditions

Intersection

Int Delay, s/veh 1.3

Movement NBL NBR SET SER NWL NWT

Lane Configurations						
Traffic Vol, veh/h	49	0	271	20	0	345
Future Vol, veh/h	49	0	271	20	0	345
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	200	-
Veh in Median Storage	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	77	77	77	77	77	77
Heavy Vehicles, %	0	0	3	0	0	3
Mvmt Flow	64	0	352	26	0	448

Major/Minor Minor1 Major1 Major2

Conflicting Flow All	813	365	0	0	378	0
Stage 1	365	-	-	-	-	-
Stage 2	448	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	351	685	-	-	1192	-
Stage 1	707	-	-	-	-	-
Stage 2	648	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	351	685	-	-	1192	-
Mov Cap-2 Maneuver	351	-	-	-	-	-
Stage 1	707	-	-	-	-	-
Stage 2	648	-	-	-	-	-

Approach NB SE NW

HCM Control Delay, s	17.5	0	0
HCM LOS	C		

Minor Lane/Major MvmNBLn1 NWL NWT SET SER

Capacity (veh/h)	351	1192	-	-	-
HCM Lane V/C Ratio	0.181	-	-	-	-
HCM Control Delay (s)	17.5	0	-	-	-
HCM Lane LOS	C	A	-	-	-
HCM 95th %tile Q(veh)	0.7	0	-	-	-

Intersection						
Int Delay, s/veh	1.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	358	231	27	83	12
Future Vol, veh/h	8	358	231	27	83	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None		-	None	
Storage Length	200	-	-	200	0	-
Veh in Median Storage, #	0	0	-	0	-	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	3	5	10	4	0
Mvmt Flow	9	421	272	32	98	14
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	304	0	-	0	501	136
Stage 1	-	-	-	-	272	-
Stage 2	-	-	-	-	229	-
Critical Hdwy	4.1	-	-	-	6.88	6.9
Critical Hdwy Stg 1	-	-	-	-	5.88	-
Critical Hdwy Stg 2	-	-	-	-	5.88	-
Follow-up Hdwy	2.2	-	-	-	3.54	3.3
Pot Cap-1 Maneuver	1268	-	-	-	494	894
Stage 1	-	-	-	-	743	-
Stage 2	-	-	-	-	781	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1268	-	-	-	491	894
Mov Cap-2 Maneuver	-	-	-	-	491	-
Stage 1	-	-	-	-	738	-
Stage 2	-	-	-	-	781	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.2	0		13.8		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1268	-	-	-	521	
HCM Lane V/C Ratio	0.007	-	-	-	0.215	
HCM Control Delay (s)	7.9	-	-	-	13.8	
HCM Lane LOS	A	-	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.8	

Intersection

Int Delay, s/veh 7.3

Movement EBL EBR NBL NBT SBT SBR

Lane Configurations	W				W	W
Traffic Vol, veh/h	36	85	28	8	11	12
Future Vol, veh/h	36	85	28	8	11	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	40	94	31	9	12	13

Major/Minor Minor2 Major1 Major2

Conflicting Flow All	90	19	25	0	-	0
Stage 1	19	-	-	-	-	-
Stage 2	71	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	915	1065	1603	-	-	-
Stage 1	1009	-	-	-	-	-
Stage 2	957	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	898	1065	1603	-	-	-
Mov Cap-2 Maneuver	898	-	-	-	-	-
Stage 1	990	-	-	-	-	-
Stage 2	957	-	-	-	-	-

Approach EB NB SB

HCM Control Delay, s	9.1	5.7	0
HCM LOS	A		

Minor Lane/Major Mvmt NBL NBT EBLn1 SBT SBR

Capacity (veh/h)	1603	-	1009	-	-
HCM Lane V/C Ratio	0.019	-	0.133	-	-
HCM Control Delay (s)	7.3	0	9.1	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	318	378	93	54	6
Future Vol, veh/h	12	318	378	93	54	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	- None		- None		- None	
Storage Length	200	-	-	200	0	-
Veh in Median Storage, #	0		0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	0	3	4	10	0	0
Mvmt Flow	12	328	390	96	56	6
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	486	0	-	0	578	195
Stage 1	-	-	-	-	390	-
Stage 2	-	-	-	-	188	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1087	-	-	-	451	820
Stage 1	-	-	-	-	659	-
Stage 2	-	-	-	-	831	-
Platoon blocked, %	-		-	-		
Mov Cap-1 Maneuver	1087	-	-	-	446	820
Mov Cap-2 Maneuver	-	-	-	-	446	-
Stage 1	-	-	-	-	652	-
Stage 2	-	-	-	-	831	-
Approach	EB	WB		SB		
HCM Control Delay, s	8.3	0		13.9		
HCM LOS	B					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1087	-	-	-	467	
HCM Lane V/C Ratio	0.011	-	-	-	0.132	
HCM Control Delay (s)	8.3	-	-	-	13.9	
HCM Lane LOS	A	-	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.5	

Intersection

Int Delay, s/veh 6.2

Movement EBL EBR NBL NBT SBT SBR

Lane Configurations 

Traffic Vol, veh/h 24 56 96 11 8 41

Future Vol, veh/h 24 56 96 11 8 41

Conflicting Peds, #/hr 0 0 0 0 0 0

Sign Control Stop Stop Free Free Free Free

RT Channelized - None - None - None

Storage Length 0 - - - - -

Veh in Median Storage 0# - - 0 0 -

Grade, % 0 - - 0 0 -

Peak Hour Factor 90 90 90 90 90 90

Heavy Vehicles, % 0 0 0 0 0 0

Mvmt Flow 27 62 107 12 9 46

Major/Minor Minor2 Major1 Major2

Conflicting Flow All 258 32 55 0 - 0

Stage 1 32 - - - - -

Stage 2 226 - - - - -

Critical Hdwy 6.4 6.2 4.1 - - -

Critical Hdwy Stg 1 5.4 - - - - -

Critical Hdwy Stg 2 5.4 - - - - -

Follow-up Hdwy 3.5 3.3 2.2 - - -

Pot Cap-1 Maneuver 735 1048 1563 - - -

Stage 1 996 - - - - -

Stage 2 816 - - - - -

Platoon blocked, % - - -

Mov Cap-1 Maneuver 684 1048 1563 - - -

Mov Cap-2 Maneuver 684 - - - - -

Stage 1 927 - - - - -

Stage 2 816 - - - - -

Approach EB NB SB

HCM Control Delay, s 9.4 6.7 0

HCM LOS A

Minor Lane/Major Mvmt NBL NBT EBLn1 SBT SBR

Capacity (veh/h) 1563 - 904 - -

HCM Lane V/C Ratio 0.068 - 0.098 - -

HCM Control Delay (s) 7.5 0 9.4 - -

HCM Lane LOS A A A - -

HCM 95th %tile Q(veh) 0.2 - 0.3 - -