Traffic Signal Warrant Analysis

For the Intersection of FM 455 and Oak Hollow Lane City of Anna, Texas

Prepared for:
City of Anna
3223 North Powell Parkway
Anna, Texas 75409

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T1793.02

INTRODUCTION

The City of Anna has requested that an analysis be conducted for the intersection of FM 455 and Oak Hollow Lane to determine if signalization is warranted. This report summarizes the results of the traffic signal warrant analysis conducted for this intersection.

The analysis was performed using existing turning movement volumes collected over a 24-hour period on Tuesday, November 16, 2021, which are summarized in **Table 1** with the raw data presented in the Appendix.

The traffic signal warrant analysis presented in this report is based on the traffic signal warrants contained in Chapter 4C, "Traffic Control Signal Needs Studies," of the *2011 Texas Manual on Uniform Traffic Control Devices*. Nine warrants are included in the manual for warranting a traffic signal installation. These warrants are:

Warrant 1 – Eight-Hour Vehicular Volume;
Warrant 2 – Four-Hour Vehicular Volume;
Warrant 3 – Peak Hour;
Warrant 4 – Pedestrian Volume;
Warrant 5 – School Crossing;
Warrant 6 – Coordinated Signal System;
Warrant 7 – Crash Experience;
Warrant 8 – Roadway Network;
Warrant 9 – Intersection Near a Grade Crossing

The current 2020 population estimate for the City of Anna is 16,896 (*Source: https://www.census.gov/quickfacts/annacitytexas*).

FM 455 (White Street) is a four-lane divided eastbound-westbound roadway with a posted speed limit of 45 miles per hour (mph) and a wide median (approximately 42-feet wide). At the study intersection, FM 455 has a left-turn lane in each direction and a westbound right-turn lane. Oak Hollow Lane is the northbound approach to the intersection, and is a two-lane undivided residential roadway with a posted speed limit of 25 mph. The northbound approach widens to include a raised median approximately 125-feet south of FM 455. The southbound approach to the intersection is a commercial driveway which is striped to include a shared left-turn/through lane and a right-turn only lane for approximately 60 feet. The intersection of these two streets is currently stop-controlled on the Oak Hollow Lane/driveway approaches. Based on the traffic volumes at this intersection, FM 455 is considered the *Major Roadway* for this analysis with multi-lane approaches. Oak Hollow Lane will be considered a *Minor Roadway* with single lane approaches.

A vicinity map of the intersection is provided in **Figure 1** and an aerial photograph of the intersection is provided in **Figure 2**.

Table 1: Volume Summary

Hour Begin	FM 455			Oak Hollow Lane				Total Minor Volume	Pedestrians Crossing Major Roadway
	EB Volume	WB Volume	Total Volume	NB Volume		SB Volume			
				Thru/LT	RT	Thru/LT	RT		
0:00	60	19	79	1	0	0	0	1	0
1:00	31	20	51	4	0	2	0	6	0
2:00	12	27	39	4	0	1	0	5	0
3:00	27	47	74	11	1	2	0	14	0
4:00	35	107	142	19	1	2	0	22	0
5:00	68	297	365	38	0	5	1	44	1
6:00	319	615	934	106	13	12	2	133	0
7:00	562	1,008	1,570	119	61	25	17	222	0
8:00	518	897	1,415	69	37	19	18	143	0
9:00	474	629	1,103	45	9	18	12	84	0
10:00	511	589	1,100	40	22	17	11	90	0
11:00	667	686	1,353	58	23	20	14	115	0
12:00	729	723	1,452	48	32	24	15	119	0
13:00	744	631	1,375	49	37	17	15	118	1
14:00	785	666	1,451	52	39	22	13	126	0
15:00	895	735	1,630	54	36	13	8	111	0
16:00	1,171	941	2,112	59	36	19	11	125	0
17:00	1,322	1,038	2,360	66	41	25	25	157	3
18:00	994	715	1,709	62	26	27	6	121	0
19:00	809	421	1,230	30	13	16	7	66	0
20:00	510	270	780	28	12	13	2	55	0
21:00	337	188	525	19	4	14	1	38	0
22:00	237	113	350	13	5	6	1	25	0
23:00	142	51	193	5	2	5	0	12	0
TOTAL	**11,959**	**11,433**	**23,392**	**999**	**450**	**324**	**179**	**1,952**	**5**

It should be noted that the collected volumes do not appear to need adjustment due to the COVID-19 pandemic. Historical TxDOT volumes on FM 455 west of the study intersection (just east of US 75) included:

- An AADT of 17,391 vehicles in 2019 (total of both directions); and
- An AADT of 10,281 vehicles in 2014 (total of both directions)[1].

This represents an annual growth rate of approximately 11.1% on FM 455. If this growth rate were applied to the above 2019 volume to obtain estimated 2021 data, the AADT would be 21,460 vehicles. However, the 2021 collected data results in 23,436 vehicles in a day on FM 455 west of Oak Hollow Lane, which is higher. Thus, the collected volumes were not adjusted.

[1] *Source: https://txdot.public.ms2soft.com/tcds/tsearch.asp?loc=Txdot&mod=TCDS*

Figure 1: Vicinity Map

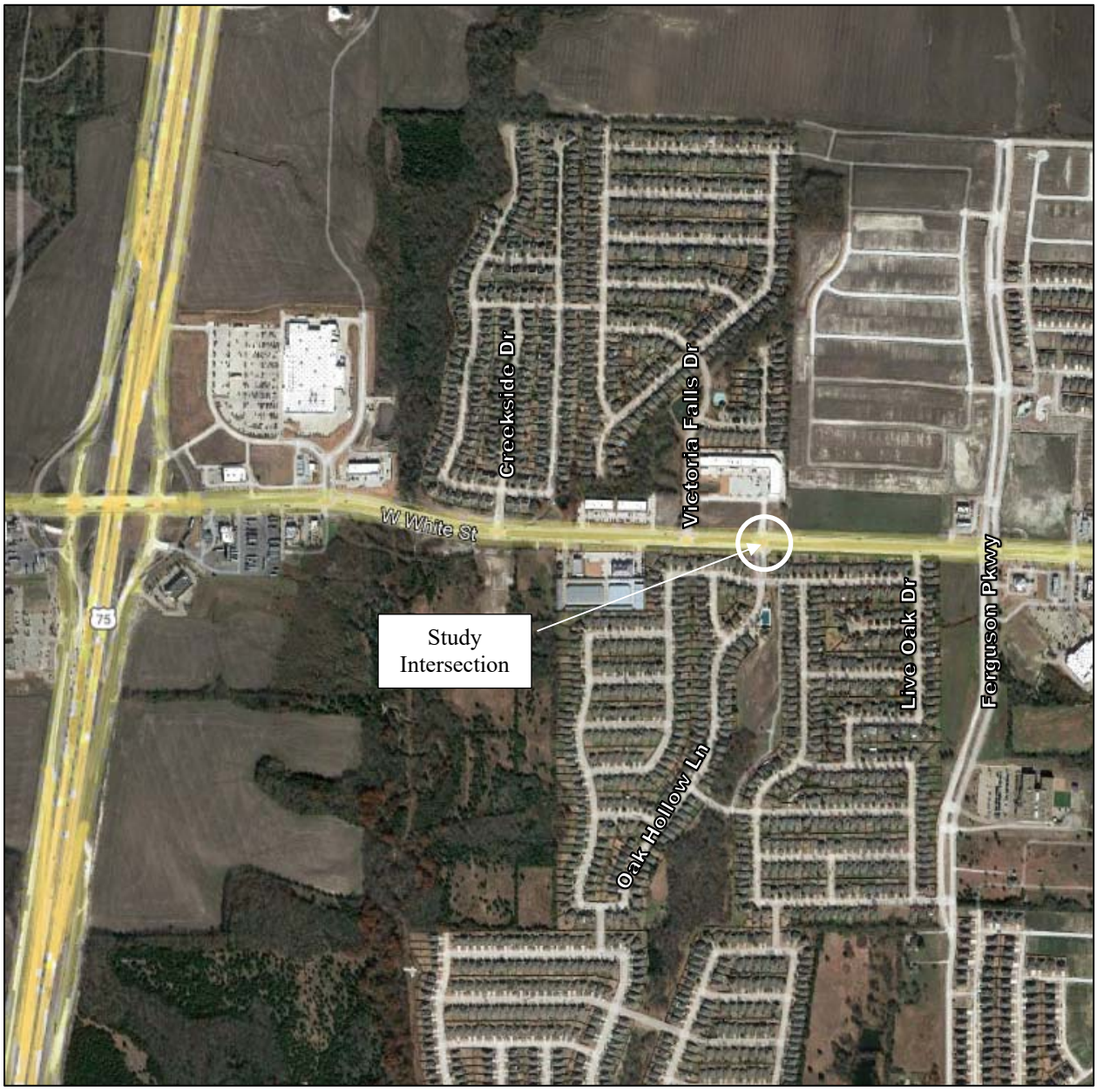
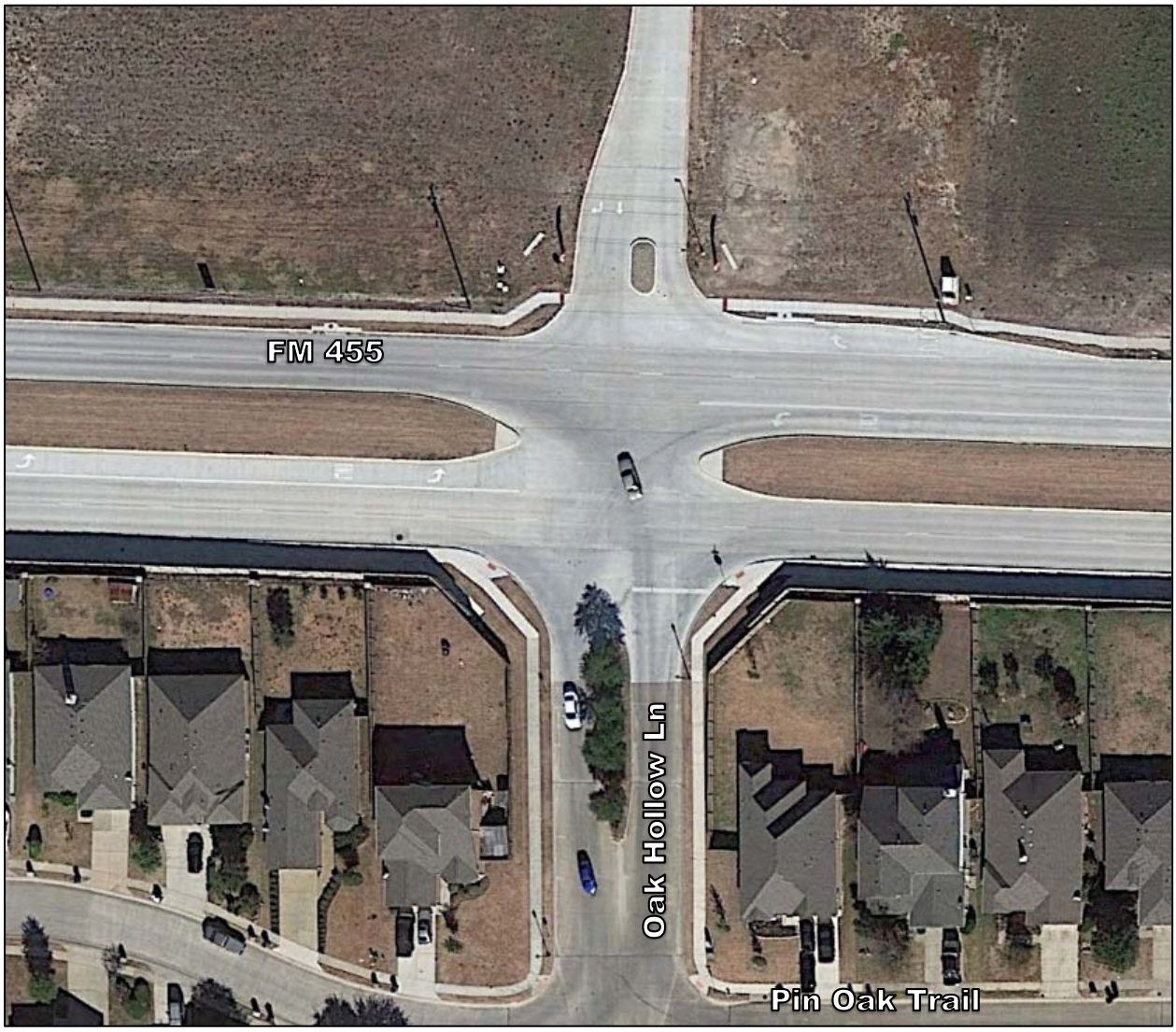


Figure 2: FM 455 at Oak Hollow Lane



The Texas *MUTCD* recommends consideration of the effects of right turn volumes on the minor street approach if the movement enters the major street with minimal conflict, primarily with the presence of a right turn lane. For this analysis, right turn traffic volumes were excluded from the minor street approach volumes, and the minor street was evaluated as a single lane approach. As stated previously, the southbound approach includes a right-turn lane. The northbound approach is likely wide enough to function as a two-lane approach. **Table 2** summarizes the volume warrant results, as discussed in the next section.

Table 2: Volume for Analysis and Warrant Summary

Hour Begin	FM 455			Oak Hollow Lane		Max Volume	Meets Warrants?				
	EB Volume	WB Volume	Total Volume	NB Thru/LT Volume	SB Thru/LT Volume		1A	1B	7-56% Volume Threshold		2
									A	B	
0:00	60	19	79	1	0	1	0	0	0	0	0
1:00	31	20	51	4	2	4	0	0	0	0	0
2:00	12	27	39	4	1	4	0	0	0	0	0
3:00	27	47	74	11	2	11	0	0	0	0	0
4:00	35	107	142	19	2	19	0	0	0	0	0
5:00	68	297	365	38	5	38	0	0	0	0	0
6:00	319	615	934	106	12	106	1	1	1	1	1
7:00	562	1,008	1,570	119	25	119	1	1	1	1	1
8:00	518	897	1,415	69	19	69	0	1	0	1	1
9:00	474	629	1,103	45	18	45	0	0	0	1	0
10:00	511	589	1,100	40	17	40	0	0	0	0	0
11:00	667	686	1,353	58	20	58	0	1	0	1	0
12:00	729	723	1,452	48	24	48	0	0	0	1	0
13:00	744	631	1,375	49	17	49	0	0	0	1	0
14:00	785	666	1,451	52	22	52	0	0	0	1	0
15:00	895	735	1,630	54	13	54	0	1	0	1	0
16:00	1,171	941	2,112	59	19	59	0	1	0	1	0
17:00	1,322	1,038	2,360	66	25	66	0	1	0	1	1
18:00	994	715	1,709	62	27	62	0	1	0	1	1
19:00	809	421	1,230	30	16	30	0	0	0	0	0
20:00	510	270	780	28	13	28	0	0	0	0	0
21:00	337	188	525	19	14	19	0	0	0	0	0
22:00	237	113	350	13	6	13	0	0	0	0	0
23:00	142	51	193	5	5	5	0	0	0	0	0
TOTAL	**11,959**	**11,433**	**23,392**	**999**	**324**	**999**	**2**	**8**	**2**	**12**	**5**
									2		

TRAFFIC SIGNAL WARRANT ANALYSIS

Warrant 1 – Eight-Hour Vehicular Volume

Warrant 1 is based on the volumes from both approaches on the major street and the higher approach volume on the minor street. It also uses the number of lanes for moving traffic on each approach. Either Condition A or Condition B of this warrant must be met for Warrant 1 to be satisfied.

The *Texas MUTCD* allows for the use of a reduced warranting threshold (70%) for intersections where the posted or 85th-percentile speed exceeds 40 mph or if the intersection is located in a community with a population under 10,000. Since the posted speed limit on the major street (FM 455) is greater than 40 mph (45 mph), the reduced warranting threshold was used for this warrant.

Condition A of Warrant 1 is met when, for each of any eight hours of an average day, the warranting volumes exist on the major street and on the higher-volume minor street approach to the intersection during the same eight hours. The warranting threshold for an approach with two or more lanes on the major street and an approach with one lane on the minor street is:

Major Street: 420 vph (total for both directions)
Minor Street: 105 vph (higher volume approach)

Warrant 1A threshold volumes are exceeded for two (2) hours of the day. Eight (8) hours are required for this warrant condition. Warrant 1A is not satisfied at this location.

Condition B of Warrant 1 applies to operating conditions where the major street traffic is so heavy that it creates excessive delay or hazardous conditions for minor street traffic when entering or crossing the major street. The warrant condition is met when, for each of any eight hours of an average day, the warranting volumes exist on the major street and on the higher-volume minor street approach to an intersection. The warranting threshold for an approach with two or more lanes on the major street and an approach with one lane on the minor street is:

Major Street: 630 vph (total for both directions)
Minor Street: 53 vph (higher volume approach)

Warrant 1B threshold volumes are exceeded for eight (8) hours of the day. Eight (8) hours are required for this warrant condition. Warrant 1B is satisfied at this location.

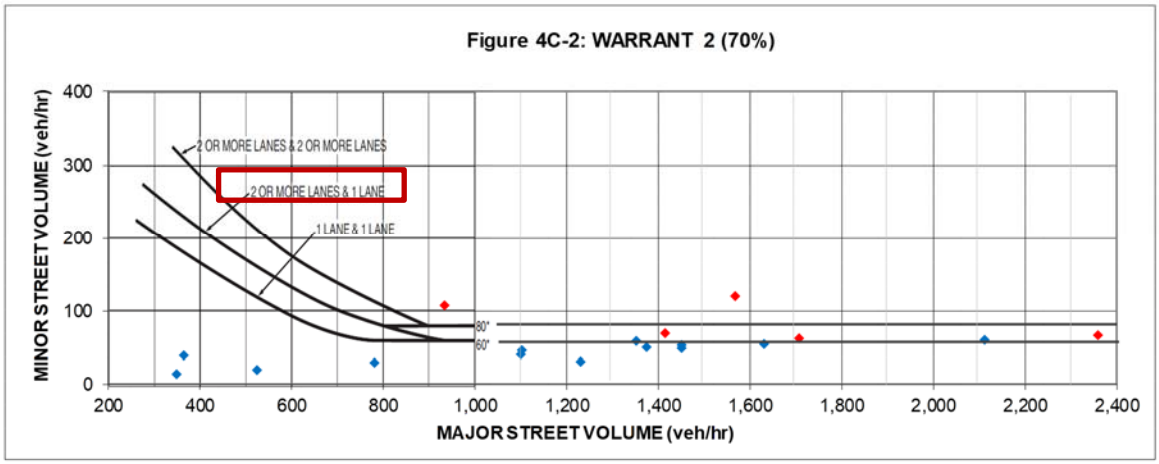
Based on these results and as shown in Table 2, **Warrant 1 is MET for this intersection** with minor street right-turn volumes removed from analysis and the minor street analyzed as a single-lane approach.

Warrant 2 – Four-Hour Volumes

Warrant 2 is satisfied when the volumes for any four (4) hours of an average day, when plotted on Figure 4C-1 (or 4C-2 when applicable) of the *Texas MUTCD*, fall above the curve for the appropriate number of lanes. **Figure 3** shows the results of this analysis. Since the posted speed limit on the major street (FM 455) is greater than 40 mph (45 mph), the reduced warranting threshold was used for this warrant and Figure 4C-2 was used for this analysis.

Based on the traffic volumes presented in Table 2 and plotted in Figure 3, five (5) hours of the day fall above the curve for the appropriate number of lanes when plotted on Figure 4C-2 of the *Texas MUTCD* for this intersection. Four (4) hours are required for this warrant condition. Under these circumstances, **Warrant 2 is MET for this intersection** with minor street right-turn volumes removed from analysis and the minor street analyzed as a single-lane approach.

Figure 3: Four-Hour Vehicular Volume Warrant (Warrant 2) – FM 455 and Oak Hollow Lane



Warrant 3 – Peak Hour Volume

Warrant 3 is intended for application when traffic conditions are such that for at least one (1) hour of the day, the minor street traffic experiences undue delays entering or crossing the major street. Warrant 3 is satisfied when either of the following conditions is met:

1. If all three of the following conditions exist for the same 1 hour (any four consecutive 15-minute periods) of an average day:
    a. The delay experienced by the traffic on the minor-street approach controlled by a STOP sign equals or exceeds 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach, and
    b. The volume on the same minor-street approach equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes, and
    c. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.
2. The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 (or Figure 4C-4) for the existing combination of approach lanes.

As further specified in the *Texas MUTCD*:

> **"This signal warrant shall be applied only in unusual cases such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time."**

Traffic characteristics at this intersection do not fall under the unusual cases identified above. Therefore, **Warrant 3 is NOT APPLICABLE for this intersection and was not evaluated**.

Warrant 4 – Minimum Pedestrian Volume

Warrant 4 applies to conditions where the major street traffic is so heavy that pedestrians experience excessive delay in crossing the major street. It is intended for application at an intersection or midblock location and requires that one (1) of the following conditions be met:

1. For each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) fall above the curve in Figure 4C-5 (or Figure 4C-6 for speeds greater than 35 mph); or
2. For one (1) hour (any four consecutive 15-minute periods) of an average day, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) fall above the curve in Figure 4C-7 (or Figure 4C-8 for speeds greater than 35 mph).

This warrant applies only to those locations where the nearest traffic signal along the major street is greater than 300 feet away and where a new traffic signal at the study intersection would not unduly restrict platooned flow of traffic.

Based on the pedestrian volumes crossing FM 455, as shown in Table 1, very few pedestrians cross FM 455, and the threshold volumes (75 pedestrians during the 4th-highest hour or 93 pedestrians during the peak hour) are not met. **Warrant 4 was NOT MET at this intersection.**

Warrant 5 – School Crossing

This warrant applies at an established school crossing where a traffic engineering study of the frequency and adequacy of gaps in the vehicular traffic stream as related to the number and size of groups of school children at the school crossing shows that the number of adequate gaps in the traffic during the period when the children are using the crossing is less than the number of minutes in the same period.

Since this intersection is not an established school crossing, **Warrant 5 was NOT APPLICABLE.**

Warrant 6 – Coordinated Signal System

Progressive movement control sometimes requires traffic signal installations at intersections where they would not otherwise be warranted in order to maintain proper platooning of vehicles and effectively regulate group speed. This warrant is met when one (1) of the following requirements are met:

1. On a one-way street or a street which has predominantly unidirectional traffic, the adjacent signals are so far apart that they do not provide the required degree of platooning.
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning and the proposed and adjacent signals could constitute a progressive signal system.

This warrant should not be applied where the ultimate signal spacing would be less than 1,000 feet. The nearest signalized intersections along FM 455 are located approximately 1,350 feet to the east (at Ferguson Parkway) and approximately 2,750 feet to the west (at the Walmart driveway). At this time, it is not clear whether a coordinated system is in place along FM 455. As a traffic signal at the intersection of FM 455 and Oak Hollow Lane is not anticipated to be necessary for a progressive signal system, **Warrant 6 is NOT MET at this intersection.**

Warrant 7 – Crash Experience

The warrant is satisfied when:

1. Adequate trial of less restrictive remedies with satisfactory observance and enforcement has failed to reduce the crash frequency; and

2. Five or more reported crashes, of types susceptible to correction by traffic signal control, have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for a reportable crash; and
3. For each of any 8 hours of an average day, the vehicles per hour (vph) given in both of the 80 percent columns of Condition A in Table 4C-1, or the vph in both of the 80 percent columns of Condition B in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection, or the volume of pedestrian traffic is not less than 80 percent of the requirements specified in the Pedestrian Volume warrant. These major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours. If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent columns.

Lee Engineering obtained crash records from TxDOT's online Crash Records Information System (CRIS) for crashes that have occurred at the study intersections between 2017 and early 2021, as summarized below in **Table 3**. Additional data for each crash is included in the Appendix.

Based on this data, there were twenty-four (24) reported crashes in the vicinity of this intersection between 2017 and 2021, with eighteen (18) of these crashes potentially susceptible to correction by traffic signal control. A maximum of eight (8) crashes susceptible to correction by traffic signal control occurred within a 12-month period (December 2018 to November 2019). In addition, five (5) crashes susceptible to correction by traffic signal control occurred between December 2020 and October 2021.

In addition, vehicular volumes do meet the threshold volumes in the 56 percent columns in Table 4C-1 for Condition B for more than eight hours of the day (12 hours), as shown in Table 2. Based on the crash data provided and the collected volumes, **Warrant 7 is MET at this intersection.**

Table 3: Crash Data Summary – FM 455 at Oak Hollow Lane

Crash ID	Date	Vehicle Travel Directions	Crash Type	Contributing Factors	Potentially Correctable by Signal Control?
15566741	1/28/2017	West-West	Rear End	None; Construction Zone (Not Related to Crash)	No
15742629	4/17/2017	West-West	Non Intersection	Failed To Control Speed; Construction Zone (Not Related to Crash)	No
15887192	7/28/2017	North-East	Right Angle	Failed To Yield Right Of Way - Stop Sign; Construction Zone (Related to Crash)	YES
16683064	10/10/2018	North-East	Right Angle	Impaired Visibility (Vision Obstructed by Headlight or Sun Glare)	YES
16752866	11/21/2018	North-East	Right Angle	Failed To Yield Right Of Way - Stop Sign	YES
16783372	12/6/2018	North-East	Right Angle	Disregard Stop Sign Or Light; Failed To Control Speed; Faulty Evasive Action	YES
16907279	2/18/2019	North-East	Right Angle	None	YES
16937163	3/3/2019	North-East	Right Angle	Disregard Stop Sign Or Light	YES
16977189	3/30/2019	North-East	Right Angle	Failed To Yield Right Of Way - Turning Left	YES
17022747	4/16/2019	North-West	Right Angle	None	YES
17035826	4/26/2019	North-East	Right Angle	Failed To Yield Right Of Way - Turning Left	YES
17150649	6/21/2019	North-East	Right Angle	Failed To Yield Right Of Way - Stop Sign	YES
17390576	11/3/2019	North-East	Right Angle	Failed To Yield Right Of Way - Stop Sign	YES
17687837	5/11/2020	West-North	Right Angle	Driver Inattention;Failed To Yield Right Of Way - Turning Left	YES
17869690	9/20/2020	East-N/A	Fixed Object	Distraction In Vehicle	No
17921368	10/21/2020	North-N/A	Pedalcyclist	Driver Inattention	YES
18038133	12/23/2020	North-East	Right Angle	Disregard Stop Sign Or Light;Other (Explain In Narrative)	YES
18041708	12/30/2020	North-East	Right Angle	Failed To Yield Right Of Way - Stop Sign	YES
18146956	3/9/2021	East-North	Right Angle	Faulty Evasive Action; Slowing/Stopping for Officer, Flagman, or Traffic Control	YES
18347188	7/1/2021	North-East	Right Angle	None	YES
18347548	7/3/2021	North-North	Rear End	Failed To Control Speed; Slowing/Stopping to Make Left Turn	No
18419469	8/14/2021	North-East	Fixed Object	Disregard Stop Sign Or Light; Driver Inattention; Swerved or Veered Avoiding Vehicle Entering Road	No
18532181	10/14/2021	North-East	Right Angle	Failed To Yield Right Of Way - Stop Sign	YES
18588269	11/13/2021	West-West	Rear End	Failed To Control Speed;Failed To Yield Right Of Way - Stop Sign	No

Warrant 8 – Roadway Network

The systems warrant is intended to encourage concentration and organization of traffic flow networks. This warrant is applicable when the common intersection of two major routes:

1. Has a total existing, or immediately projected, entering volume of at least 1,000 vehicles during the peak hour of a typical weekday and has five-year projected traffic volumes, based on an engineering study, which meet one or more of Warrants 1, 2, and 3 during an average weekday; or
2. Has a total existing or immediately projected entering volume of at least 1,000 vehicles for each of any five hours of a Saturday and/or Sunday.

A major route as used in this signal warrant shall have one or more of the following characteristics:

1. It is part of the street or highway system that serves as the principal roadway network for through traffic flow; or
2. It includes rural or suburban highways outside, entering or traversing a City; or
3. It appears as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study; or
4. It connects areas of principal traffic generation; or
5. It has street freeway or expressway ramp terminals.

In the City of Anna *2045 Master Thoroughfare Plan*, FM 455 is classified as a Major Arterial (120' ROW). However, Oak Hollow Lane is considered a local roadway in the thoroughfare plan and cannot be considered a major route. Therefore, **Warrant 8 is NOT MET at this intersection.**

Warrant 9 – Intersection Near a Grade Crossing

This signal warrant is intended for use at a location where none of the conditions described in the other eight traffic signal warrants are met, but the proximity to the intersection of a grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic control signal.

The need for a traffic control signal shall be considered if an engineering study finds that both of the following criteria are met:

1. A grade crossing exists on an approach controlled by a STOP or YIELD sign and the center of the track nearest to the intersection is within 140 feet of the stop line or yield line on the approach; and
2. During the highest traffic volume hour during which rail traffic uses the crossing, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the minor-street approach that crosses the track (one direction only, approaching the intersection) falls above the applicable curve in Figure 4C-9 or 4C-10 for the existing combination of approach lanes over the track and the distance D, which is the clear storage distance as defined in Section 1A.13 of the Texas MUTCD.

A railroad grade crossing is not located within 140 feet of this intersection. **Warrant 9 is NOT APPLICABLE for this intersection**.

INTERSECTION SIGHT DISTANCE

As part of this study, sight distance on the minor street (Oak Hollow Lane) approaches to the intersection was assessed. On the stop-controlled approaches, the motorist should be able to see if and when adequate gaps exist to perform their desired maneuver.

The desirable intersection sight distance for the stop-controlled approaches was estimated using the procedures developed by the American Association of State Highway and Transportation Officials (AASHTO) and published in the 2018 edition of *A Policy on Geometric Design of Highways and Streets.* **Table 4** presents the required and available sight distance for vehicles turning onto FM 455 at Oak Hollow Lane.

Table 4: Intersection Sight Distance Evaluation

Major Roadway	FM 455	
Posted Speed Limit	45 mph	
Minor Roadway	Oak Hollow Lane	Driveway
Approach	Northbound	Southbound
Recommended Intersection Sight Distance	650’	
Available Sight Distance to the Left	>750 feet	600 feet
Available Sight Distance to the Right	665 feet	700 feet
Sight Distance Available > Recommended		
To the Left	Yes	No
To the Right	Yes	Yes

As shown in Table 4 and based on a comparison of the field investigation results of the available sight distance to the required sight distance, sight distance for the southbound driveway approach is less than recommended based on the posted speed limit on FM 455. Sight distance to the left is obstructed by the vertical curvature of FM 455. Sight distance to the right meets the recommended distance. However, it should be noted that vegetation may obscure sight distance to the right if it grows taller. It is recommended to keep vegetation trimmed.

In addition, the stopping sight distance for vehicles on FM 455 was assessed. Motorists traveling along the major road should have adequate time to react and bring their vehicle to a stop after they see a vehicle enter the roadway from the minor street. The required stopping sight distance for a design speed of 45 mph is 360 feet, based on the 2018 edition of *A Policy on Geometric Design of Highways and Streets* published by the American Association of State Highway and Transportation Officials (AASHTO). **Table 5** presents the available stopping sight distance for motorists on FM 455.

Table 5: Stopping Sight Distance Evaluation

Major Roadway	FM 455	
Posted Speed Limit	45 mph	
Minor Roadway	Oak Hollow Lane	
Approach	Eastbound	Westbound
Required Stopping Sight Distance	350 feet	
Available Stopping Sight Distance	700 feet	600 feet
Sight Distance Available > Required	Yes	Yes

As shown in Table 5 and based on the field investigation results, available stopping sight distance is greater than the minimum required for the posted speed of 45 mph. Thus, a vehicle traveling on FM 455 at the posted speed should be able to stop if a vehicle enters the roadway from Oak Hollow Lane (or the southbound driveway), assuming typical perception-reaction time and deceleration.

CONCLUSION

Based on the existing traffic volumes and this traffic signal warrant analysis, traffic signal Warrant 1, Warrant 2, and Warrant 7 are satisfied for the intersection of FM 455 and Oak Hollow Lane. A summary of the traffic signal warrants is provided in **Table 6**.

Table 6: Warrant Summary – FM 455 and Oak Hollow Lane

Warrant	Warrant Met?	Notes
1 – Eight-Hour Vehicular Volume	**YES**	Condition A – 2 hours met (8 required)
		Condition B – 8 hours met (8 required)
2 – Four-Hour Vehicular Volume	**YES**	**5 hours met (4 required)**
3 – Peak Hour	N/A	Not a "special generator"
4 – Pedestrian Volume	NO	0 hours met for 4-hour and peak hour
5 – School Crossing	N/A	Not an established school crossing
6 – Coordinated Signal System	NO	Not needed for progressive signal system
7 – Crash Experience	**YES**	**Crash history exceeds warrants for two time periods and volume requirements are met**
8 – Roadway Network	NO	Not an intersection of two major routes
9 – Near a Grade Crossing	N/A	Not adjacent to a grade crossing

Based on the results of this traffic signal warrant analysis, the installation of a traffic signal is recommended at this intersection at this time.

It should be noted that the intersection was analyzed with all minor street right-turn volumes removed and the minor street was assumed with single-lane approaches. However, if right-turn volumes were included and the minor street was assumed with multi-lane approaches, volume warrants would be *met* with additional hours of the day exceeding thresholds.

If you have any comments or questions regarding this study, please feel free to contact us at your convenience.

APPENDIX

GRAM Traffic NTX Inc.
1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: FM 455 @ OAK HOLLOW LN
Site Code:
Start Date: 11/16/2021

Turning Movement Data

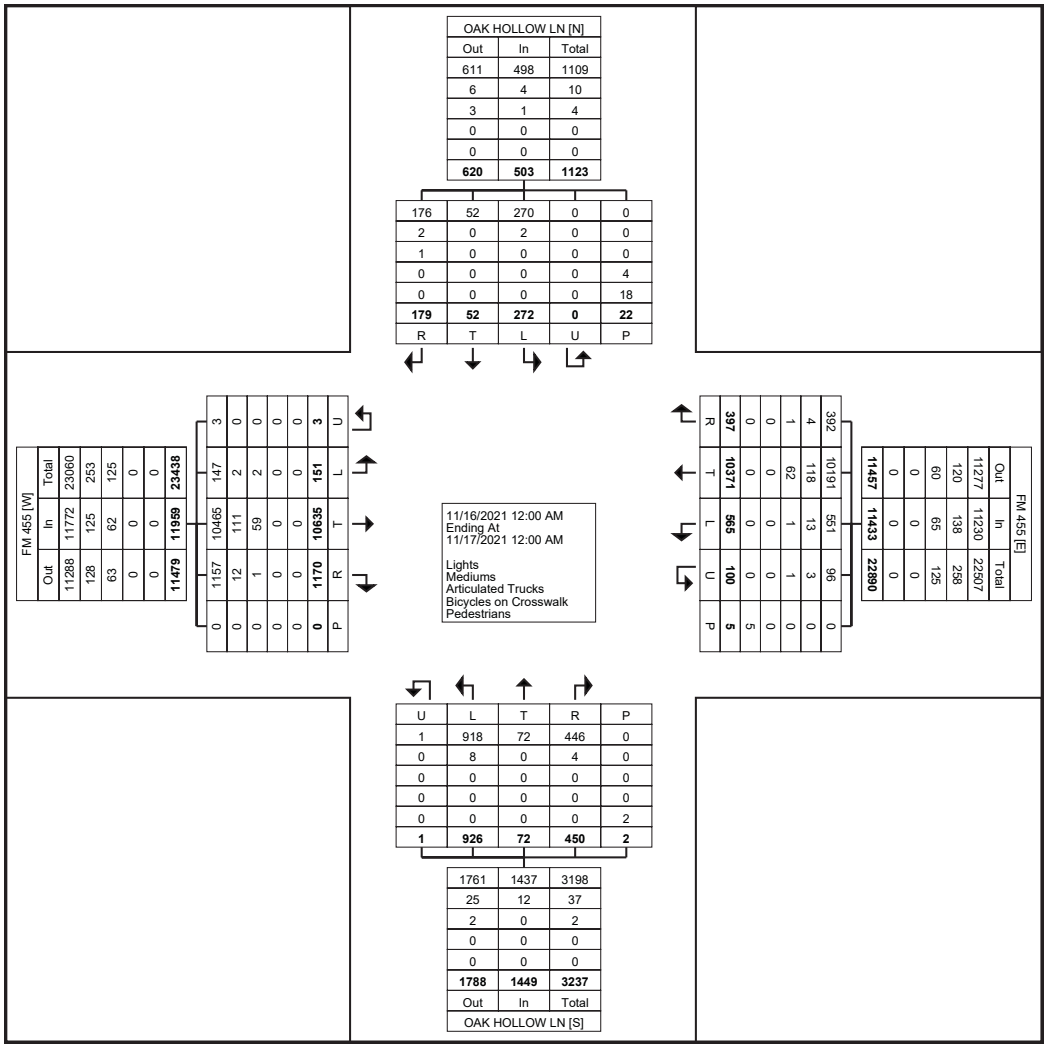
Start Time	OAK HOLLOW LN Southbound						FM 455 Westbound						OAK HOLLOW LN Northbound						FM 455 Eastbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:00 AM	0	0	0	0	0	0	0	6	2	0	0	8	0	0	0	0	0	0	0	14	4	0	0	18	26
12:15 AM	0	0	0	0	0	0	0	5	1	0	0	6	0	0	0	0	0	0	0	10	1	0	0	11	17
12:30 AM	0	0	0	0	0	0	0	4	0	0	0	4	0	0	0	0	0	0	0	16	4	0	0	20	24
12:45 AM	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	1	0	11	0	0	0	11	13
Hourly Total	0	0	0	0	0	0	0	16	3	0	0	19	1	0	0	0	0	1	0	51	9	0	0	60	80
1:00 AM	2	0	0	0	0	2	0	3	0	0	0	3	0	0	0	0	0	0	0	7	1	0	0	8	13
1:15 AM	0	0	0	0	0	0	1	9	0	0	0	10	1	0	0	0	0	1	0	7	0	0	0	7	18
1:30 AM	0	0	0	0	0	0	0	3	0	0	0	3	1	0	0	0	0	1	0	13	2	0	0	15	19
1:45 AM	0	0	0	0	0	0	1	3	0	0	0	4	2	0	0	0	0	2	0	0	1	0	0	1	7
Hourly Total	2	0	0	0	0	2	2	18	0	0	0	20	4	0	0	0	0	4	0	27	4	0	0	31	57
2:00 AM	0	0	0	0	0	0	1	4	0	0	0	5	1	0	0	0	0	1	0	5	0	0	0	5	11
2:15 AM	1	0	0	0	0	1	0	6	0	0	0	6	1	1	0	0	0	2	0	1	0	0	0	1	10
2:30 AM	0	0	0	0	0	0	0	11	0	0	0	11	1	0	0	0	0	1	0	1	2	0	0	3	15
2:45 AM	0	0	0	0	0	0	1	4	0	0	0	5	0	0	0	0	0	0	0	3	0	0	0	3	8
Hourly Total	1	0	0	0	0	1	2	25	0	0	0	27	3	1	0	0	0	4	0	10	2	0	0	12	44
3:00 AM	0	0	0	0	0	0	0	6	1	0	0	7	4	0	0	0	0	4	0	2	1	0	0	3	14
3:15 AM	0	1	0	0	0	1	0	5	1	0	0	6	2	0	1	0	0	3	0	8	0	0	0	8	18
3:30 AM	0	0	0	0	0	0	0	15	0	1	0	16	3	0	0	0	0	3	1	6	0	0	0	7	26
3:45 AM	1	0	0	0	0	1	0	18	0	0	0	18	2	0	0	0	0	2	0	7	2	0	0	9	30
Hourly Total	1	1	0	0	0	2	0	44	2	1	0	47	11	0	1	0	0	12	1	23	3	0	0	27	88
4:00 AM	0	0	0	0	0	0	0	14	1	0	0	15	3	0	0	0	0	3	0	7	0	0	0	7	25
4:15 AM	0	0	0	0	0	0	0	20	3	0	0	23	3	1	0	0	0	4	0	9	0	0	0	9	36
4:30 AM	1	0	0	0	0	1	0	30	0	0	0	30	4	0	0	0	0	4	0	5	2	0	0	7	42
4:45 AM	1	0	0	0	0	1	0	37	2	0	0	39	8	0	1	0	0	9	0	9	3	0	0	12	61
Hourly Total	2	0	0	0	0	2	0	101	6	0	0	107	18	1	1	0	0	20	0	30	5	0	0	35	164
5:00 AM	2	0	0	0	0	2	0	53	2	1	0	56	12	0	0	0	0	12	0	3	1	0	0	4	74
5:15 AM	1	0	0	0	0	1	0	61	6	0	0	67	8	1	0	0	0	9	1	14	1	0	0	16	93
5:30 AM	1	0	0	0	1	1	1	72	0	0	1	73	14	1	0	0	0	15	0	20	0	0	0	20	109
5:45 AM	1	0	1	0	1	2	1	95	3	2	0	101	2	0	0	0	0	2	0	28	0	0	0	28	133
Hourly Total	5	0	1	0	2	6	2	281	11	3	1	297	36	2	0	0	0	38	1	65	2	0	0	68	409
6:00 AM	1	1	0	0	1	2	2	126	3	0	0	131	22	0	1	0	0	23	1	28	0	0	0	29	185
6:15 AM	2	1	0	0	1	3	0	130	3	0	0	133	20	0	4	0	0	24	0	63	4	0	0	67	227
6:30 AM	3	1	2	0	0	6	4	132	7	1	0	144	32	0	3	0	0	35	1	84	3	0	0	88	273
6:45 AM	3	0	0	0	1	3	7	192	7	1	0	207	32	0	5	0	0	37	0	128	7	0	0	135	382
Hourly Total	9	3	2	0	3	14	13	580	20	2	0	615	106	0	13	0	0	119	2	303	14	0	0	319	1067
7:00 AM	5	1	1	0	0	7	12	219	6	1	0	238	31	2	11	0	0	44	4	137	7	0	0	148	437
7:15 AM	0	0	6	0	0	6	12	254	7	2	0	275	29	2	22	0	0	53	4	125	11	0	0	140	474
7:30 AM	7	1	5	0	0	13	19	236	9	1	0	265	27	2	10	0	0	39	4	130	6	0	0	140	457
7:45 AM	10	1	5	0	0	16	7	215	7	1	0	230	26	0	18	0	0	44	2	120	12	0	0	134	424
Hourly Total	22	3	17	0	0	42	50	924	29	5	0	1008	113	6	61	0	0	180	14	512	36	0	0	562	1792
8:00 AM	5	1	8	0	0	14	11	224	3	4	0	242	20	0	24	1	0	45	6	125	7	0	0	138	439
8:15 AM	6	0	4	0	0	10	22	230	18	3	0	273	13	0	4	0	0	17	2	122	11	0	0	135	435
8:30 AM	4	0	1	0	1	5	5	177	8	2	0	192	18	2	2	0	0	22	1	101	10	0	0	112	331
8:45 AM	1	2	5	0	1	8	6	174	9	1	0	190	14	1	7	0	0	22	8	120	5	0	0	133	353
Hourly Total	16	3	18	0	2	37	44	805	38	10	0	897	65	3	37	1	0	106	17	468	33	0	0	518	1558
9:00 AM	3	2	2	0	0	7	3	165	2	0	0	170	9	0	0	0	0	9	1	126	10	0	0	137	323
9:15 AM	4	0	5	0	0	9	6	152	6	1	0	165	12	1	2	0	0	15	2	84	8	0	0	94	283
9:30 AM	6	1	4	0	0	11	5	148	5	1	0	159	9	1	5	0	0	15	1	100	7	0	0	108	293
9:45 AM	2	0	1	0	0	3	1	128	5	1	0	135	13	0	2	0	0	15	4	119	12	0	0	135	288
Hourly Total	15	3	12	0	0	30	15	593	18	3	0	629	43	2	9	0	0	54	8	429	37	0	0	474	1187
10:00 AM	7	0	2	0	0	9	8	137	4	2	0	151	10	0	9	0	1	19	0	110	10	0	0	120	299
10:15 AM	5	0	2	0	0	7	6	124	11	0	0	141	9	2	6	0	0	17	1	101	14	0	0	116	281
10:30 AM	2	0	2	0	0	4	3	122	7	1	0	133	7	1	6	0	0	14	2	123	17	0	0	142	293
10:45 AM	3	0	5	0	0	8	5	150	9	0	0	164	11	0	1	0	0	12	3	113	17	0	0	133	317
Hourly Total	17	0	11	0	0	28	22	533	31	3	0	589	37	3	22	0	1	62	6	447	58	0	0	511	1190
11:00 AM	6	1	1	0	1	8	4	156	8	2	0	170	11	1	8	0	1	20	2	133	12	0	0	147	345
11:15 AM	4	0	2	0	0	6	3	145	9	1	0	158	11	0	8	0	0	19	2	146	20	0	0	168	351
11:30 AM	3	1	4	0	0	8	4	157	8	1	0	170	19	3	3	0	0	25	5	156	11	1	0	173	376
11:45 AM	5	0	7	0	0	12	2	178	6	2	0	188	12	1	4	0	0	17	2	161	16	0	0	179	396
Hourly Total	18	2	14	0	1	34	13	636	31	6	0	686	53	5	23	0	1	81	11	596	59	1	0	667	1468
12:00 PM	8	1	5	0	0	14	10	178	11	3	0	202	10	1	6	0	0	17	3	170	17	0	0	190	423
12:15 PM	4	1	3	0	0	8	4	186	6	2	0	198	6	4	8	0	0	18	2	164	6	0	0	172	396

12:30 PM	3	1	2	0	1	6	4	149	5	2	0	160	11	0	7	0	0	18	2	165	20	0	0	187	371
12:45 PM	4	2	5	0	0	11	6	150	7	0	0	163	14	2	11	0	0	27	4	154	22	0	0	180	381
Hourly Total	19	5	15	0	1	39	24	663	29	7	0	723	41	7	32	0	0	80	11	653	65	0	0	729	1571
1:00 PM	4	1	5	0	0	10	8	144	9	1	0	162	15	4	6	0	0	25	1	185	21	0	0	207	404
1:15 PM	0	0	3	0	0	3	2	152	5	1	0	160	6	0	8	0	0	14	2	172	25	0	0	199	376
1:30 PM	6	0	2	0	1	8	7	152	9	2	1	170	6	1	9	0	0	16	2	161	17	0	0	180	374
1:45 PM	5	1	5	0	0	11	3	129	6	1	0	139	16	1	14	0	0	31	1	142	15	0	0	158	339
Hourly Total	15	2	15	0	1	32	20	577	29	5	1	631	43	6	37	0	0	86	6	660	78	0	0	744	1493
2:00 PM	4	0	4	0	0	8	2	149	3	1	0	155	12	2	16	0	0	30	1	173	15	0	0	189	382
2:15 PM	4	1	2	0	0	7	10	153	4	1	0	168	14	2	7	0	0	23	2	147	15	0	0	164	362
2:30 PM	7	0	3	0	0	10	7	173	6	2	0	188	13	4	12	0	0	29	3	200	12	0	0	215	442
2:45 PM	5	1	4	0	1	10	7	139	5	4	0	155	4	1	4	0	0	9	2	180	35	0	0	217	391
Hourly Total	20	2	13	0	1	35	26	614	18	8	0	666	43	9	39	0	0	91	8	700	77	0	0	785	1577
3:00 PM	3	0	1	0	0	4	18	154	4	1	0	177	14	0	11	0	0	25	0	174	15	0	0	189	395
3:15 PM	2	0	2	0	0	4	11	160	6	2	0	179	14	1	7	0	0	22	2	198	25	1	0	226	431
3:30 PM	1	3	2	0	0	6	15	192	4	1	0	212	15	1	10	0	0	26	3	204	26	0	0	233	477
3:45 PM	3	1	3	0	1	7	7	152	5	3	0	167	9	0	8	0	0	17	4	223	20	0	0	247	438
Hourly Total	9	4	8	0	1	21	51	658	19	7	0	735	52	2	36	0	0	90	9	799	86	1	0	895	1741
4:00 PM	7	1	4	0	0	12	9	152	10	1	0	172	10	2	8	0	0	20	4	223	36	1	0	264	468
4:15 PM	1	1	1	0	0	3	25	241	4	2	0	272	14	1	4	0	0	19	2	246	34	0	0	282	576
4:30 PM	1	0	2	0	1	3	23	225	5	8	0	261	13	2	14	0	0	29	6	258	40	0	0	304	597
4:45 PM	7	1	4	0	1	12	14	209	10	3	0	236	15	2	10	0	0	27	8	271	42	0	0	321	596
Hourly Total	16	3	11	0	2	30	71	827	29	14	0	941	52	7	36	0	0	95	20	998	152	1	0	1171	2237
5:00 PM	3	0	7	0	0	10	25	235	6	8	0	274	19	2	11	0	0	32	4	276	38	0	0	318	634
5:15 PM	7	3	5	0	1	15	16	233	7	2	2	258	20	1	8	0	0	29	4	295	29	0	0	328	630
5:30 PM	1	2	7	0	0	10	7	232	7	4	1	250	10	0	15	0	0	25	5	308	35	0	0	348	633
5:45 PM	9	0	6	0	1	15	20	228	5	3	0	256	12	2	7	0	0	21	2	290	36	0	0	328	620
Hourly Total	20	5	25	0	2	50	68	928	25	17	3	1038	61	5	41	0	0	107	15	1169	138	0	0	1322	2517
6:00 PM	6	0	2	0	1	8	17	203	7	0	0	227	14	2	7	0	0	23	1	226	25	0	0	252	510
6:15 PM	6	3	0	0	2	9	10	161	3	3	0	177	10	1	7	0	0	18	0	230	30	0	0	260	464
6:30 PM	2	2	4	0	0	8	12	136	6	0	0	154	13	0	6	0	0	19	3	217	28	0	0	248	429
6:45 PM	7	1	0	0	0	8	10	141	6	0	0	157	20	2	6	0	0	28	1	206	27	0	0	234	427
Hourly Total	21	6	6	0	3	33	49	641	22	3	0	715	57	5	26	0	0	88	5	879	110	0	0	994	1830
7:00 PM	2	0	2	0	0	4	14	106	5	0	0	125	6	0	5	0	0	11	3	178	28	0	0	209	349
7:15 PM	4	2	3	0	0	9	7	95	3	0	0	105	7	1	3	0	0	11	4	194	24	0	0	222	347
7:30 PM	6	0	2	0	0	8	8	90	5	0	0	103	5	0	3	0	0	8	0	163	22	0	0	185	304
7:45 PM	2	0	0	0	0	2	5	79	4	0	0	88	9	2	2	0	0	13	0	162	31	0	0	193	296
Hourly Total	14	2	7	0	0	23	34	370	17	0	0	421	27	3	13	0	0	43	7	697	105	0	0	809	1296
8:00 PM	4	0	0	0	0	4	10	79	5	0	0	94	7	0	6	0	0	13	2	132	9	0	0	143	254
8:15 PM	3	0	1	0	0	4	9	64	3	0	0	76	6	1	1	0	0	8	1	129	7	0	0	137	225
8:30 PM	2	1	0	0	0	3	9	46	0	2	0	57	7	2	4	0	0	13	2	124	5	0	0	131	204
8:45 PM	2	1	1	0	0	4	0	42	1	0	0	43	5	0	1	0	0	6	0	92	7	0	0	99	152
Hourly Total	11	2	2	0	0	15	28	231	9	2	0	270	25	3	12	0	0	40	5	477	28	0	0	510	835
9:00 PM	5	0	1	0	1	6	7	52	1	1	0	61	4	0	1	0	0	5	2	91	6	0	0	99	171
9:15 PM	1	0	0	0	0	1	4	35	3	0	0	42	3	0	1	0	0	4	0	79	13	0	0	92	139
9:30 PM	5	0	0	0	0	5	1	41	0	0	0	42	6	0	1	0	0	7	0	79	1	0	0	80	134
9:45 PM	2	1	0	0	1	3	2	38	3	0	0	43	6	0	1	0	0	7	0	61	5	0	0	66	119
Hourly Total	13	1	1	0	2	15	14	166	7	1	0	188	19	0	4	0	0	23	2	310	25	0	0	337	563
10:00 PM	0	0	0	0	1	0	4	35	1	0	0	40	4	0	1	0	0	5	2	65	8	0	0	75	120
10:15 PM	4	0	0	0	0	4	3	23	2	0	0	28	1	2	0	0	0	3	0	58	4	0	0	62	97
10:30 PM	0	1	1	0	0	2	0	20	0	0	0	20	1	0	2	0	0	3	0	50	9	0	0	59	84
10:45 PM	0	1	0	0	0	1	2	22	1	0	0	25	5	0	2	0	0	7	0	36	5	0	0	41	74
Hourly Total	4	2	1	0	1	7	9	100	4	0	0	113	11	2	5	0	0	18	2	209	26	0	0	237	375
11:00 PM	0	1	0	0	0	1	3	11	0	0	0	14	1	0	1	0	0	2	0	46	6	0	0	52	69
11:15 PM	0	2	0	0	0	2	2	9	0	1	0	12	3	0	0	0	0	3	1	31	4	0	0	36	53
11:30 PM	1	0	0	0	0	1	1	13	0	1	0	15	1	0	0	0	0	1	0	23	5	0	0	28	45
11:45 PM	1	0	0	0	0	1	2	7	0	1	0	10	0	0	1	0	0	1	0	23	3	0	0	26	38
Hourly Total	2	3	0	0	0	5	8	40	0	3	0	51	5	0	2	0	0	7	1	123	18	0	0	142	205
Grand Total	272	52	179	0	22	503	565	10371	397	100	5	11433	926	72	450	1	2	1449	151	10635	1170	3	0	11959	25344
Approach %	54.1	10.3	35.6	0.0	-	-	4.9	90.7	3.5	0.9	-	-	63.9	5.0	31.1	0.1	-	-	1.3	88.9	9.8	0.0	-	-	-
Total %	1.1	0.2	0.7	0.0	-	2.0	2.2	40.9	1.6	0.4	-	45.1	3.7	0.3	1.8	0.0	-	5.7	0.6	42.0	4.6	0.0	-	47.2	-
Lights	270	52	176	0	-	498	551	10191	392	96	-	11230	918	72	446	1	-	1437	147	10465	1157	3	-	11772	24937
% Lights	99.3	100.0	98.3	-	-	99.0	97.5	98.3	98.7	96.0	-	98.2	99.1	100.0	99.1	100.0	-	99.2	97.4	98.4	98.9	100.0	-	98.4	98.4
Mediums	2	0	2	0	-	4	13	118	4	3	-	138	8	0	4	0	-	12	2	111	12	0	-	125	279
% Mediums	0.7	0.0	1.1	-	-	0.8	2.3	1.1	1.0	3.0	-	1.2	0.9	0.0	0.9	0.0	-	0.8	1.3	1.0	1.0	0.0	-	1.0	1.1
Articulated Trucks	0	0	1	0	-	1	1	62	1	1	-	65	0	0	0	0	-	0	2	59	1	0	-	62	128
% Articulated Trucks	0.0	0.0	0.6	-	-	0.2	0.2	0.6	0.3	1.0	-	0.6	0.0	0.0	0.0	0.0	-	0.0	1.3	0.6	0.1	0.0	-	0.5	0.5
Bicycles on Crosswalk	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	18.2	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	18	-	-	-	-	-	5	-	-	-	-	-	2	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	81.8	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

GRAM Traffic NTX Inc.
1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: FM 455 @ OAK HOLLOW LN
Site Code:
Start Date: 11/16/2021
Page No: 3



Turning Movement Data Plot

GRAM Traffic NTX Inc.
1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: FM 455 @ OAK HOLLOW LN
Site Code:
Start Date: 11/16/2021

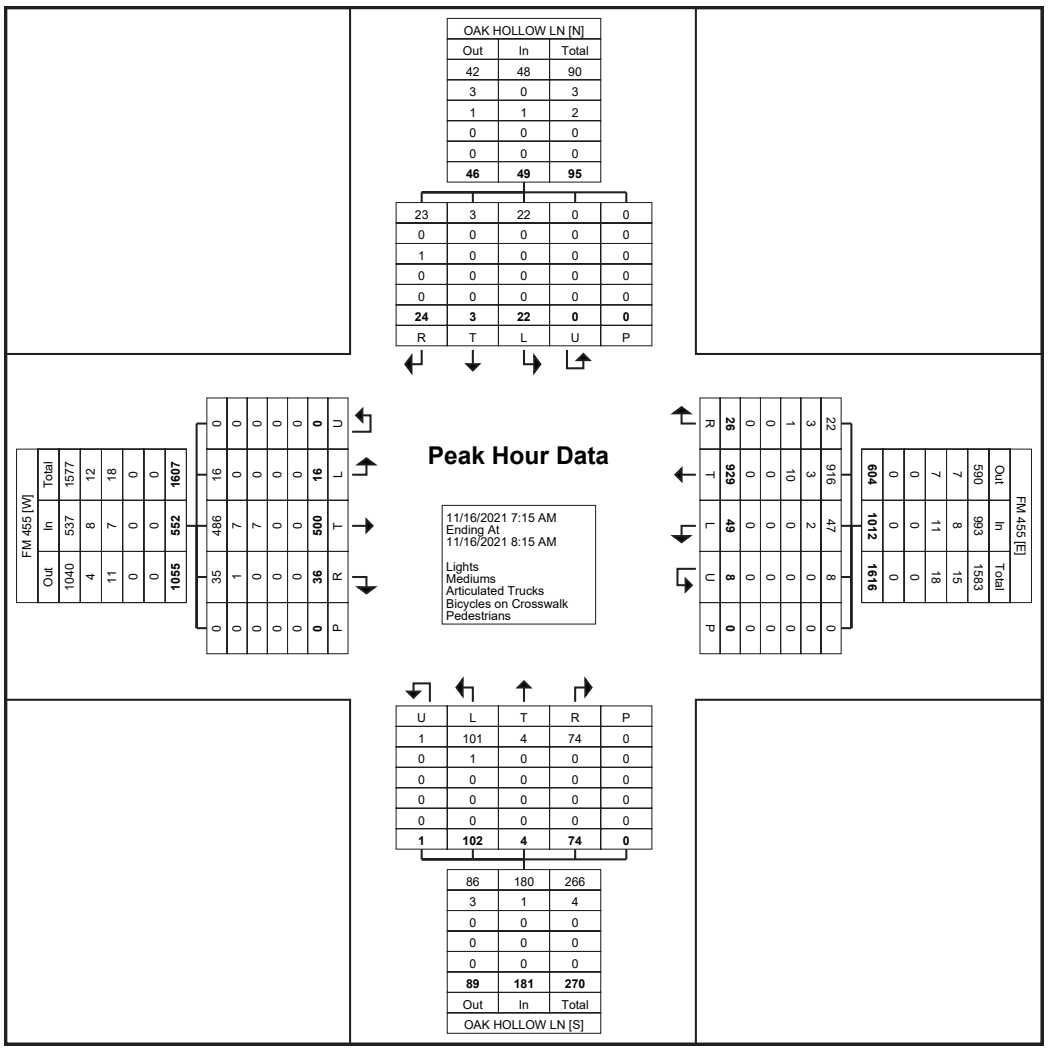
Turning Movement Peak Hour Data (7:15 AM)

Start Time	OAK HOLLOW LN Southbound						FM 455 Westbound						OAK HOLLOW LN Northbound						FM 455 Eastbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:15 AM	0	0	6	0	0	6	12	254	7	2	0	275	29	2	22	0	0	53	4	125	11	0	0	140	474
7:30 AM	7	1	5	0	0	13	19	236	9	1	0	265	27	2	10	0	0	39	4	130	6	0	0	140	457
7:45 AM	10	1	5	0	0	16	7	215	7	1	0	230	26	0	18	0	0	44	2	120	12	0	0	134	424
8:00 AM	5	1	8	0	0	14	11	224	3	4	0	242	20	0	24	1	0	45	6	125	7	0	0	138	439
Total	22	3	24	0	0	49	49	929	26	8	0	1012	102	4	74	1	0	181	16	500	36	0	0	552	1794
Approach %	44.9	6.1	49.0	0.0	-	-	4.8	91.8	2.6	0.8	-	-	56.4	2.2	40.9	0.6	-	-	2.9	90.6	6.5	0.0	-	-	-
Total %	1.2	0.2	1.3	0.0	-	2.7	2.7	51.8	1.4	0.4	-	56.4	5.7	0.2	4.1	0.1	-	10.1	0.9	27.9	2.0	0.0	-	30.8	-
PHF	0.550	0.750	0.750	0.000	-	0.766	0.645	0.914	0.722	0.500	-	0.920	0.879	0.500	0.771	0.250	-	0.854	0.667	0.962	0.750	0.000	-	0.986	0.946
Lights	22	3	23	0	-	48	47	916	22	8	-	993	101	4	74	1	-	180	16	486	35	0	-	537	1758
% Lights	100.0	100.0	95.8	-	-	98.0	95.9	98.6	84.6	100.0	-	98.1	99.0	100.0	100.0	100.0	-	99.4	100.0	97.2	97.2	-	-	97.3	98.0
Mediums	0	0	0	0	-	0	2	3	3	0	-	8	1	0	0	0	-	1	0	7	1	0	-	8	17
% Mediums	0.0	0.0	0.0	-	-	0.0	4.1	0.3	11.5	0.0	-	0.8	1.0	0.0	0.0	0.0	-	0.6	0.0	1.4	2.8	-	-	1.4	0.9
Articulated Trucks	0	0	1	0	-	1	0	10	1	0	-	11	0	0	0	0	-	0	0	7	0	0	-	7	19
% Articulated Trucks	0.0	0.0	4.2	-	-	2.0	0.0	1.1	3.8	0.0	-	1.1	0.0	0.0	0.0	0.0	-	0.0	0.0	1.4	0.0	-	-	1.3	1.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

GRAM Traffic NTX Inc.
1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: FM 455 @ OAK HOLLOW LN
Site Code:
Start Date: 11/16/2021



Turning Movement Peak Hour Data Plot (7:15 AM)

GRAM Traffic NTX Inc.
1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968

Count Name: FM 455 @ OAK HOLLOW LN
Site Code:
Start Date: 11/16/2021

Turning Movement Peak Hour Data (5:00 PM)

Start Time	OAK HOLLOW LN Southbound						FM 455 Westbound						OAK HOLLOW LN Northbound						FM 455 Eastbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
5:00 PM	3	0	7	0	0	10	25	235	6	8	0	274	19	2	11	0	0	32	4	276	38	0	0	318	634
5:15 PM	7	3	5	0	1	15	16	233	7	2	2	258	20	1	8	0	0	29	4	295	29	0	0	328	630
5:30 PM	1	2	7	0	0	10	7	232	7	4	1	250	10	0	15	0	0	25	5	308	35	0	0	348	633
5:45 PM	9	0	6	0	1	15	20	228	5	3	0	256	12	2	7	0	0	21	2	290	36	0	0	328	620
Total	20	5	25	0	2	50	68	928	25	17	3	1038	61	5	41	0	0	107	15	1169	138	0	0	1322	2517
Approach %	40.0	10.0	50.0	0.0	-	-	6.6	89.4	2.4	1.6	-	-	57.0	4.7	38.3	0.0	-	-	1.1	88.4	10.4	0.0	-	-	-
Total %	0.8	0.2	1.0	0.0	-	2.0	2.7	36.9	1.0	0.7	-	41.2	2.4	0.2	1.6	0.0	-	4.3	0.6	46.4	5.5	0.0	-	52.5	-
PHF	0.556	0.417	0.893	0.000	-	0.833	0.680	0.987	0.893	0.531	-	0.947	0.763	0.625	0.683	0.000	-	0.836	0.750	0.949	0.908	0.000	-	0.950	0.993
Lights	20	5	24	0	-	49	66	923	25	17	-	1031	61	5	41	0	-	107	14	1161	136	0	-	1311	2498
% Lights	100.0	100.0	96.0	-	-	98.0	97.1	99.5	100.0	100.0	-	99.3	100.0	100.0	100.0	-	-	100.0	93.3	99.3	98.6	-	-	99.2	99.2
Mediums	0	0	1	0	-	1	2	5	0	0	-	7	0	0	0	0	-	0	1	5	2	0	-	8	16
% Mediums	0.0	0.0	4.0	-	-	2.0	2.9	0.5	0.0	0.0	-	0.7	0.0	0.0	0.0	-	-	0.0	6.7	0.4	1.4	-	-	0.6	0.6
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	3	0	0	-	3	3
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.3	0.0	-	-	0.2	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

GRAM Traffic NTX Inc.
1120 W. Lovers Lane

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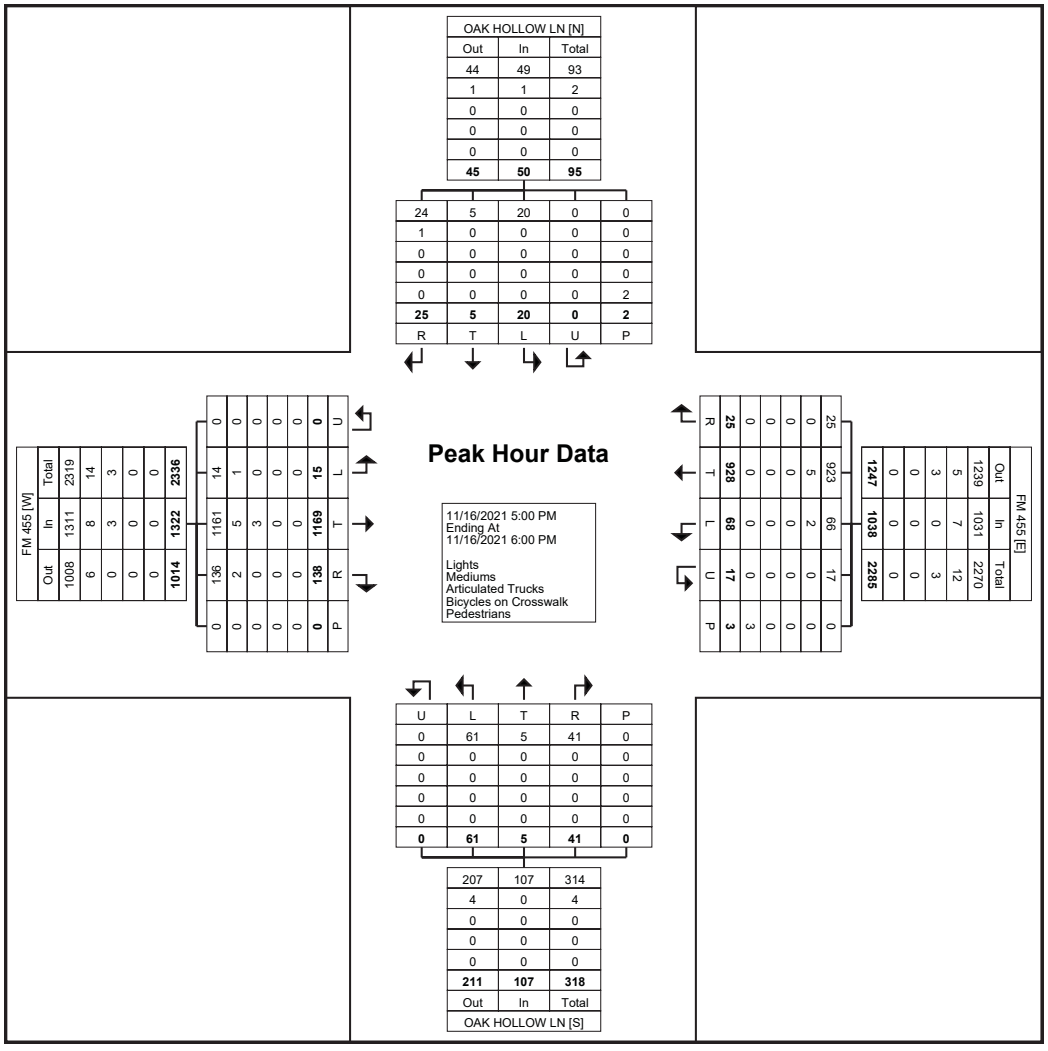

Turning Movement Peak Hour Data Plot (5:00 PM)

Crash ID	Street Name	Intersecting Street Name	Crash Date	Day of Week	Crash Time	Intersection Related	Crash Severity	Manner of Collision	First Harmful Event	Object Struck	Contributing Factors	Other Factor	Light Condition	Surface Condition	Weather Condition	Vehicle Travel Direction 1	Vehicle Travel Direction 2
15566741	FM0455	OAK HOLLOW LN	1/28/2017	SATURDAY	1045	INTERSECTION RELATED	N - NOT INJURED	SAME DIRECTION - ONE STRAIGHT-ONE STOPPED	MOTOR VEHICLE IN TRANSPORT	NOT APPLICABLE	NONE	CONSTRUCTION - WITHIN POSTED ROAD CONSTRUCTION ZONE (NOT RELATED TO CRASH)	1 - DAYLIGHT	1 - DRY	1 - CLEAR	W - WEST	W - WEST
15742629	FM0455	N/A	4/17/2017	MONDAY	1248	NON INTERSECTION	N - NOT INJURED	SAME DIRECTION - ONE STRAIGHT-ONE STOPPED	MOTOR VEHICLE IN TRANSPORT	NOT APPLICABLE	FAILED TO CONTROL SPEED	CONSTRUCTION - WITHIN POSTED ROAD CONSTRUCTION ZONE (NOT RELATED TO CRASH)	1 - DAYLIGHT	2 - WET	2 - CLOUDY	W - WEST	W - WEST
15887192	FM0455	OAK HOLLOW LN	7/28/2017	FRIDAY	2145	INTERSECTION	N - NOT INJURED	ANGLE - BOTH GOING STRAIGHT	MOTOR VEHICLE IN TRANSPORT	NOT APPLICABLE	FAILED TO YIELD RIGHT OF WAY - STOP SIGN	CONSTRUCTION-IN OTHER CONSTRUCTION MAINTENANCE AREA (RELATED TO CRASH)	3 - DARK, LIGHTED	1 - DRY	1 - CLEAR	N - NORTH	E - EAST
16683064	FM0455	OAK HOLLOW LN	10/10/2018	WEDNESDAY	1830	INTERSECTION	N - NOT INJURED	ANGLE - BOTH GOING STRAIGHT	MOTOR VEHICLE IN TRANSPORT	NOT APPLICABLE	IMPAIRED VISIBILITY (EXPLAIN IN NARRATIVE)	VISION OBSTRUCTED BY HEADLIGHT OR SUN GLARE	1 - DAYLIGHT	1 - DRY	1 - CLEAR	N - NORTH	E - EAST
16752866	FM0455	OAK HOLLOW LN	11/21/2018	WEDNESDAY	1744	INTERSECTION	N - NOT INJURED	ANGLE - ONE STRAIGHT-ONE LEFT TURN	MOTOR VEHICLE IN TRANSPORT	NOT APPLICABLE	FAILED TO YIELD RIGHT OF WAY - STOP SIGN	NOT APPLICABLE	3 - DARK, LIGHTED	1 - DRY	1 - CLEAR	N - NORTH	E - EAST
16783372	FM0455	OAK HOLLOW LN	12/6/2018	THURSDAY	1552	INTERSECTION	N - NOT INJURED	ANGLE - BOTH GOING STRAIGHT	MOTOR VEHICLE IN TRANSPORT	HIT RETAINING WALL	DISREGARD STOP SIGN OR LIGHT; FAILED TO CONTROL SPEED; FAULTY EVASIVE ACTION	NOT APPLICABLE	1 - DAYLIGHT	2 - WET	3 - RAIN	N - NORTH	E - EAST
16907279	W WHITE ST	OAK HOLLOW LN	2/18/2019	MONDAY	1615	INTERSECTION	N - NOT INJURED	ANGLE - BOTH GOING STRAIGHT	MOTOR VEHICLE IN TRANSPORT	NOT APPLICABLE	NONE	NOT APPLICABLE	1 - DAYLIGHT	1 - DRY	2 - CLOUDY	N - NORTH	E - EAST
16937163	FM0455	OAK HOLLOW LN	3/3/2019	SUNDAY	1924	INTERSECTION	N - NOT INJURED	ANGLE - BOTH GOING STRAIGHT	MOTOR VEHICLE IN TRANSPORT	NOT APPLICABLE	DISREGARD STOP SIGN OR LIGHT	NOT APPLICABLE	2 - DARK, NOT LIGHTED	1 - DRY	2 - CLOUDY	N - NORTH	E - EAST
16977189	FM0455	OAK HOLLOW LN	3/30/2019	SATURDAY	1945	INTERSECTION	C - POSSIBLE INJURY	ANGLE - ONE STRAIGHT-ONE LEFT TURN	MOTOR VEHICLE IN TRANSPORT	NOT APPLICABLE	FAILED TO YIELD RIGHT OF WAY - TURNING LEFT	NOT APPLICABLE	3 - DARK, LIGHTED	1 - DRY	1 - CLEAR	N - NORTH	E - EAST
17022747	W WHITE ST	OAK HOLLOW LN	4/16/2019	TUESDAY	1237	INTERSECTION	N - NOT INJURED	ANGLE - ONE STRAIGHT-ONE LEFT TURN	MOTOR VEHICLE IN TRANSPORT	NOT APPLICABLE	NONE	NOT APPLICABLE	1 - DAYLIGHT	1 - DRY	1 - CLEAR	N - NORTH	W - WEST
17035826	FM0455	OAK HOLLOW LN	4/26/2019	FRIDAY	1912	INTERSECTION	N - NOT INJURED	ANGLE - ONE STRAIGHT-ONE LEFT TURN	MOTOR VEHICLE IN TRANSPORT	NOT APPLICABLE	FAILED TO YIELD RIGHT OF WAY - TURNING LEFT	NOT APPLICABLE	1 - DAYLIGHT	1 - DRY	1 - CLEAR	N - NORTH	E - EAST
17150649	FM0455	OAK HOLLOW LN	6/21/2019	FRIDAY	1522	INTERSECTION	N - NOT INJURED	ANGLE - BOTH GOING STRAIGHT	MOTOR VEHICLE IN TRANSPORT	NOT APPLICABLE	FAILED TO YIELD RIGHT OF WAY - STOP SIGN	NOT APPLICABLE	1 - DAYLIGHT	1 - DRY	1 - CLEAR	N - NORTH	E - EAST
17390576	W WHITE ST	OAK HOLLOW LN	11/3/2019	SUNDAY	1830	INTERSECTION	C - POSSIBLE INJURY	ANGLE - BOTH GOING STRAIGHT	MOTOR VEHICLE IN TRANSPORT	NOT APPLICABLE	FAILED TO YIELD RIGHT OF WAY - STOP SIGN	NOT APPLICABLE	2 - DARK, NOT LIGHTED	1 - DRY	1 - CLEAR	N - NORTH	E - EAST
17687837	W WHITE ST	OAK HOLLOW LN	5/11/2020	MONDAY	1814	INTERSECTION	C - POSSIBLE INJURY	ANGLE - ONE STRAIGHT-ONE LEFT TURN	MOTOR VEHICLE IN TRANSPORT	NOT APPLICABLE	DRIVER INATTENTION;FAILED TO YIELD RIGHT OF WAY - TURNING LEFT	ATTENTION DIVERTED FROM DRIVING	1 - DAYLIGHT	1 - DRY	1 - CLEAR	W - WEST	N - NORTH
17869690	FM0455	OAK HOLLOW LN	9/20/2020	SUNDAY	225	INTERSECTION RELATED	N - NOT INJURED	ONE MOTOR VEHICLE - GOING STRAIGHT	FIXED OBJECT	HIT FENCE	DISTRACTION IN VEHICLE	ATTENTION DIVERTED FROM DRIVING	3 - DARK, LIGHTED	1 - DRY	1 - CLEAR	E - EAST	
17921368	OAK HOLLOW LN	N/A	10/21/2020	WEDNESDAY	1823	NON INTERSECTION	C - POSSIBLE INJURY	ONE MOTOR VEHICLE - GOING STRAIGHT	PEDALCYCLIST	NOT APPLICABLE	DRIVER INATTENTION	ATTENTION DIVERTED FROM DRIVING	1 - DAYLIGHT	1 - DRY	1 - CLEAR	N - NORTH	NA - NOT APPLICABLE
18038133	FM0455	OAK HOLLOW LN	12/23/2020	WEDNESDAY	1835	INTERSECTION	N - NOT INJURED	ANGLE - BOTH GOING STRAIGHT	MOTOR VEHICLE IN TRANSPORT	NOT APPLICABLE	DISREGARD STOP SIGN OR LIGHT;OTHER (EXPLAIN IN NARRATIVE)	NOT APPLICABLE	2 - DARK, NOT LIGHTED	1 - DRY	1 - CLEAR	N - NORTH	E - EAST
18041708	FM0455	OAK HOLLOW LN	12/30/2020	WEDNESDAY	1320	INTERSECTION	N - NOT INJURED	ANGLE - ONE STRAIGHT-ONE LEFT TURN	MOTOR VEHICLE IN TRANSPORT	NOT APPLICABLE	FAILED TO YIELD RIGHT OF WAY - STOP SIGN	NOT APPLICABLE	1 - DAYLIGHT	2 - WET	3 - RAIN	N - NORTH	E - EAST
18146956	FM0455	OAK HOLLOW LN	3/9/2021	TUESDAY	730	INTERSECTION RELATED	N - NOT INJURED	ANGLE - ONE STRAIGHT-ONE STOPPED	MOTOR VEHICLE IN TRANSPORT	NOT APPLICABLE	FAULTY EVASIVE ACTION	SLOWING/STOPPING - FOR OFFICER, FLAGMAN, OR TRAFFIC CONTROL	1 - DAYLIGHT	1 - DRY	1 - CLEAR	E - EAST	N - NORTH
18347188	FM0455	OAK HOLLOW LN	7/1/2021	THURSDAY	1550	INTERSECTION	C - POSSIBLE INJURY	ANGLE - ONE STRAIGHT-ONE LEFT TURN	MOTOR VEHICLE IN TRANSPORT	NOT APPLICABLE	NONE	NOT APPLICABLE	1 - DAYLIGHT	1 - DRY	1 - CLEAR	N - NORTH	E - EAST
18347548	FM0455	OAK HOLLOW LN	7/3/2021	SATURDAY	1215	INTERSECTION	N - NOT INJURED	SAME DIRECTION - ONE STRAIGHT-ONE STOPPED	MOTOR VEHICLE IN TRANSPORT	NOT APPLICABLE	FAILED TO CONTROL SPEED	SLOWING/STOPPING-TO MAKE LEFT TURN	1 - DAYLIGHT	1 - DRY	1 - CLEAR	N - NORTH	N - NORTH
18419469	FM0455	OAK HOLLOW LN	8/14/2021	SATURDAY	1744	INTERSECTION RELATED	N - NOT INJURED	ONE MOTOR VEHICLE - GOING STRAIGHT	FIXED OBJECT	HIT MEDIAN BARRIER (CONCRETE OR CABLE)	DISREGARD STOP SIGN OR LIGHT; DRIVER INATTENTION	SWERVED OR VEERED-AVOIDING VEHICLE ENTERING ROAD	1 - DAYLIGHT	1 - DRY	1 - CLEAR	N - NORTH	E - EAST
18532181	FM0455	OAK HOLLOW LN	10/14/2021	THURSDAY	1634	INTERSECTION	N - NOT INJURED	ANGLE - BOTH GOING STRAIGHT	MOTOR VEHICLE IN TRANSPORT	NOT APPLICABLE	FAILED TO YIELD RIGHT OF WAY - STOP SIGN	NOT APPLICABLE	1 - DAYLIGHT	1 - DRY	1 - CLEAR	N - NORTH	E - EAST
18588269	FM0455	OAK HOLLOW LN	11/13/2021	SATURDAY	1631	INTERSECTION	N - NOT INJURED	SAME DIRECTION - ONE STRAIGHT-ONE LEFT TURN	MOTOR VEHICLE IN TRANSPORT	NOT APPLICABLE	FAILED TO CONTROL SPEED;FAILED TO YIELD RIGHT OF WAY - STOP SIGN	NOT APPLICABLE	1 - DAYLIGHT	1 - DRY	1 - CLEAR	W - WEST	W - WEST