City of Killeen

Traffic Signal Warrant Analysis

Rosewood Drive & Fawn Drive
and
Rosewood Drive & Aspen Drive

November 3, 2022

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City of Killeen

Rosewood Drive & Fawn Drive
Rosewood Drive & Aspen Drive

November 3, 2022

Prepared By:

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EXECUTIVE SUMMARY

The objective of this analysis is to determine whether a traffic signal is warranted at either the unsignalized intersection of Rosewood Drive & Fawn Drive or the unsignalized intersection of Rosewood Drive & Aspen Drive.

The methodology used for the traffic signal warrant analysis is based on the procedure in the Texas Manual on Uniform Traffic Control Devices (TMUTCD) and is summarized below:

- Turning movement counts were collected both intersections in 15-minute increments for twelve hours on Wednesday August 31, 2022. Tube counts were collected along Rosewood Drive, Fawn Drive, and Aspen Drive for twenty-four hours on the same day. Hourly volumes were analyzed for each warrant volume criteria to determine if a minimum volume was met.
- A site visit was conducted to determine existing traffic controls, posted speed limits, lane widths, lane assignments, pedestrian facilities, and existing utilities.
- Crash data were analyzed, and crash diagrams were developed to determine if significant volumes of collisions occurred which would otherwise be preventable by the presence of a traffic signal.
- This study assumes the speed limit along Rosewood Drive will be raised to 45mph per City staff.

Table 1 below summarizes results of the traffic warrant analysis for the study intersection.

Table 1: Summary of Traffic Signal Warrant Analysis

Warrant Number	Warrant Description	Rosewood Drive & Fawn Drive	Rosewood Drive & Aspen Drive
Warrant 1	Eight-Hour Vehicular Volume	No	No
Warrant 2	Four-Hour Vehicular Volume	**Yes**	No
Warrant 3	Peak-Hour Vehicular Volume	**Yes (Warrant B)**	**Yes (Warrant B)**
Warrant 4	Pedestrian Volume	No	No
Warrant 5	School Crossing	No	No
Warrant 6	Coordinated Signal System	No	No
Warrant 7	Crash Experience	No	No
Warrant 8	Roadway Network	No	No
Warrant 9	Intersection Near a Railroad Grade Crossing	No	No

Based on the criteria, a traffic signal is recommended at both the intersection of Rosewood Drive & Fawn Drive and at the intersection of Rosewood Drive & Aspen Drive.

INTRODUCTION

PURPOSE

Kimley-Horn and Associates, Inc. was retained to conduct an analysis is to determine whether a traffic signal is warranted at either the unsignalized intersection of Rosewood Drive & Fawn Drive, and the unsignalized intersection of Rosewood Drive & Aspen Drive. These intersections are located in the City of Killeen, Bell County, Texas.

EXISTING CONDITIONS

SITE LOCATION

The intersections of Rosewood Drive & Fawn Drive and of Rosewood Drive & Aspen Drive are located in Bell County within the city limits of Killeen. ***Figure 1*** shows the site location and indicates the locations of existing signalized intersection within one mile of the study intersections along Rosewood Drive.

STUDY ROADWAYS

The major study area roadways are described below.

Rosewood Drive - is currently a five-lane undivided roadway, with two lanes in each direction of travel and a two-way left turn lane. The roadway is classified by the City of Killeen as a minor arterial. There is a posted speed limit of 35 mph in the northbound and southbound directions in the analysis vicinity. The City is taking ordinance forward to increase the speed limit to 45 mph. With this ordinance going forward, this study assumes a speed limit of 45 mph for Rosewood Drive. There is a 5-foot sidewalk on the westside of the roadway and no bike lanes in the study vicinity.

Fawn Drive - is currently a two-lane undivided roadway, with one lane in each direction of travel. The roadway is classified by the City of Killeen as a local street. There is a posted speed limit of 30 mph in the eastbound and westbound directions. There are 5-foot sidewalks on both sides of the street and no bike lanes in the study vicinity.

Aspen Drive - is currently a two-lane undivided roadway, with one lane in each direction of travel. The roadway is classified by City of Killeen as collector. There is a posted speed limit of 30 mph in the eastbound and westbound directions There are 5-foot sidewalks on both sides of the street and no bike lanes in the study vicinity.

INTERSECTION CONDITIONS

The intersection of Rosewood Drive & Fawn Drive is currently a three-leg intersection with the major road, Rosewood Drive, running in the north-south direction and the minor road, Aspen Drive, running in the east-west direction. The minor approach is stop-controlled while the two major approaches are free. In both the northbound and southbound direction, there is a two-way left-turn lane at the intersection. ***Figure 2*** is an aerial view of the intersection showing existing geometry, lane assignments, and traffic control.

The intersection of Rosewood Drive & Aspen Drive is currently a three-leg intersection with the major road, Rosewood Drive, running in the north-south direction and the minor road, Aspen Drive, running in the east-west direction. The minor approach is stop-controlled while the two major approaches are free. In both the northbound and southbound direction, there is a two-way left-turn lane at the intersection. ***Figure 3*** is an aerial view of the intersection showing existing geometry, lane assignments, and traffic control.

A site visit was conducted to determine posted speed limits, lane widths, pedestrian facilities, and utilities. In addition, photographs of each intersection approach were taken for verification of field data. Photos of each approach leg are provided in ***Appendix C.*** There are no existing school zone related speed reductions along any study roadways.

Figure 1: Site Location and Signalized Intersections

Figure 2: Rosewood Drive & Fawn Drive Lane Assignments and Stop-Control

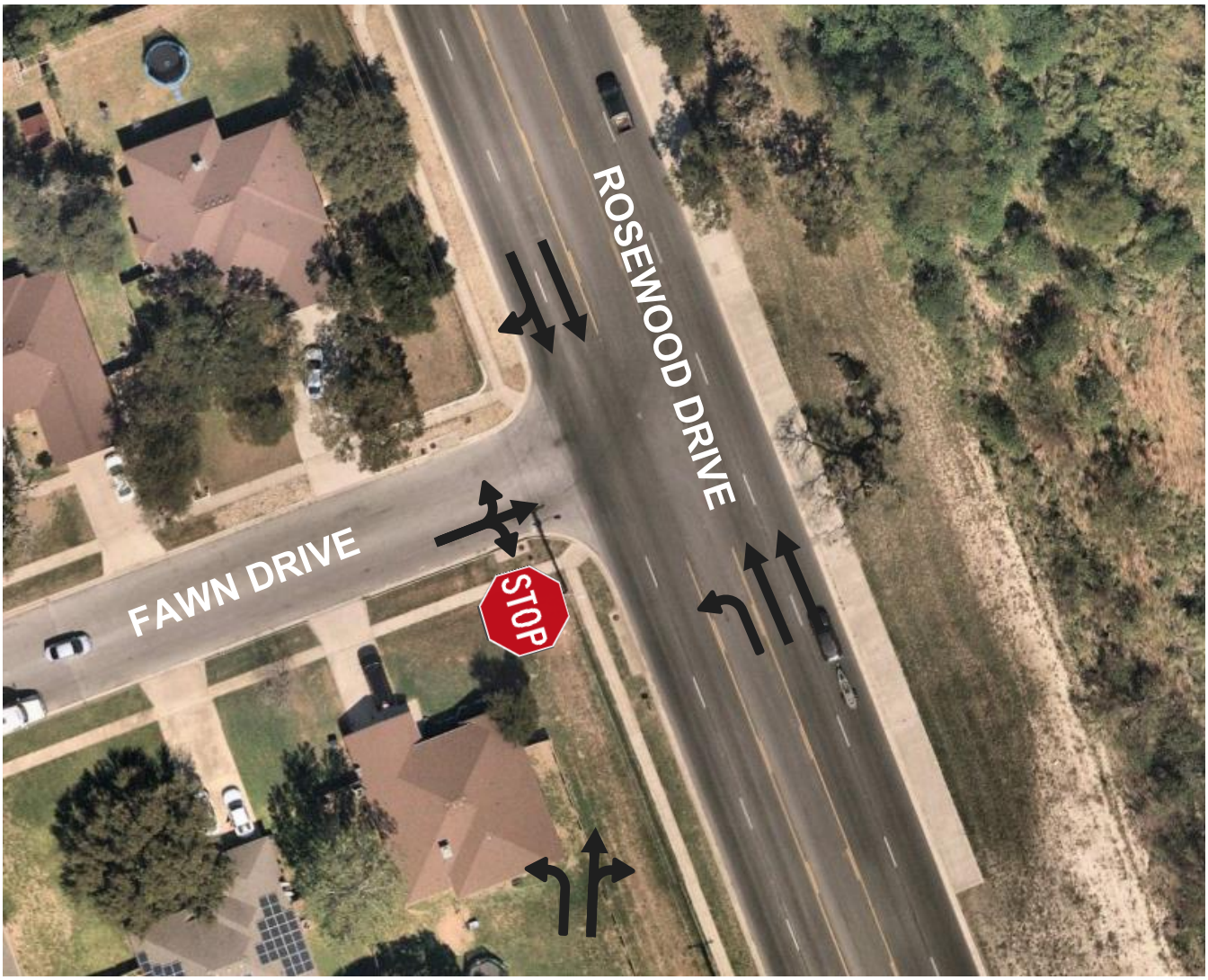


Figure 3: Rosewood Drive & Aspen Drive Lane Assignments and Stop-Control

TRAFFIC VOLUMES

Existing turning movement counts were collected at three intersections during twelve (12) hours from 6:30 am to 6:30 pm on Wednesday, August 31, 2022. Existing tube counts were collected along Rosewood Drive, Fawn Drive, and Aspen Drive during twenty-four (24) hours from 12:00 am to 11:59 pm on the same date. Traffic count data is included in ***Appendix B*****.**

1. Rosewood Drive & Fawn Drive
    - AM Peak Hour: 7:00 AM – 8:00 AM
    - PM Peak Hour: 5:00 PM – 6:00 PM
2. Rosewood Drive & Aspen Drive
    - AM Peak Hour: 7:00 AM – 8:00 AM
    - PM Peak Hour: 5:00 PM – 6:00 PM

TRAFFIC SIGNAL WARRANT ANALYSIS – ROSEWOOD DRIVE & FAWN DRIVE

This study documents the results of a traffic signal warrant analysis for the intersection of Rosewood Drive & Fawn Drive in the City of Killeen in Bell County, Texas.

ASSUMPTIONS

Several assumptions were made to analyze the data collected at each study intersection.

- Fawn Drive is treated as an eastbound-westbound roadway and Rosewood Drive is treated as a northbound-southbound roadway.
- The peak hour was determined to be the hour with the greatest vehicular volume. The AM peak and overall intersection peak was determined to be 7:00-8:00 AM, while the PM peak was determined to be 5:00-6:00 PM.
- For warrant analysis at the study intersection, the higher of the two minor street approach volumes was used.

STUDY PROCEDURE AND ANALYSIS RESULTS

The *Texas Manual of Uniform Traffic Control Devices* (Texas MUTCD, 2011 Edition) defines nine (9) warrants, or justifying set of conditions, at least one of which should be fully satisfied before signalization is considered as an option for traffic control. Factors included in the evaluation of these warrants include vehicle and pedestrian traffic volumes, the number of traffic lanes, the prevailing traffic speeds, traffic crash history, and measured delay for minor street traffic. The individual warrants are listed below, followed by a short description and analysis of each.

- Warrant 1, Eight-Hour Vehicular Volume
- Warrant 2, Four-Hour Vehicular Volume
- Warrant 3, Peak Hour Vehicular Volume
- 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 Railroad Grade Crossing

WARRANT 1 – EIGHT HOUR VEHICULAR VOLUME

As the title implies, this criterion is applied to the eight highest demand hours of the day for the major and minor street. At least eight hours of the day must exceed the thresholds required in order to warrant a traffic signal using Warrant 1.

Two criteria are checked. Condition A is based on minimum vehicular volumes. Condition B is based on interruption of continuous traffic. For both conditions, there are several reduction factors that may be taken if Condition A or Condition B is not satisfied. The combination of Conditions A & B is intended for application after trial of other alternatives that could cause less delay and inconvenience of traffic has failed to solve the traffic problems. The warrant is satisfied if both Conditions A and B are met with an 80% reduction. If the 85th percentile speed on the major street is greater than 40 mph, or if the intersection lies within the built-up area of an isolated community having a population less than 10,000, the criteria can be reduced by 70% of the original values for Condition A and Condition B or for the combination of Conditions A and B (resulting in 56% of the original value of Condition A and Condition B for the combined case).

Table 2 and ***Table 3***, as well as ***Figure 4***, ***Figure 5***, and ***Figure 6*** show the warrant criteria and traffic counts as they apply to that criteria.

Table 2: Warrant 1 – Eight Hour Vehicular Volume

Condition A—Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	56%[d]	100%[a]	80%[b]	70%[c]	56%[d]
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

Condition B—Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	56%[d]	100%[a]	80%[b]	70%[c]	56%[d]
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

[a] Basic minimum hourly volume

[b] Used for combination of Conditions A and B after adequate trial of other remedial measures

[c] May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

[d] May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

***Source: 2011 TMUTCD Table 4C-1*

Table 3: Warrant 1 – Eight Hour Vehicular Volume Worksheet

Texas Manual on Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 1: Eight-Hour Vehicular Volume

Intersection:	Rosewood Drive & Fawn Drive		
Date	10/31/2022	by	Kimley-Horn

3	: No. of Lanes on Major St?
1	: No. of Lanes on Minor St?
45	: Speed limit or 85th Percentile? (MPH)
NO	: Is the intersection within an Isolated community?
	: if answer 4 is Yes, then what is the population of the isolated community?
NO	: Have other remedial measures been tried?

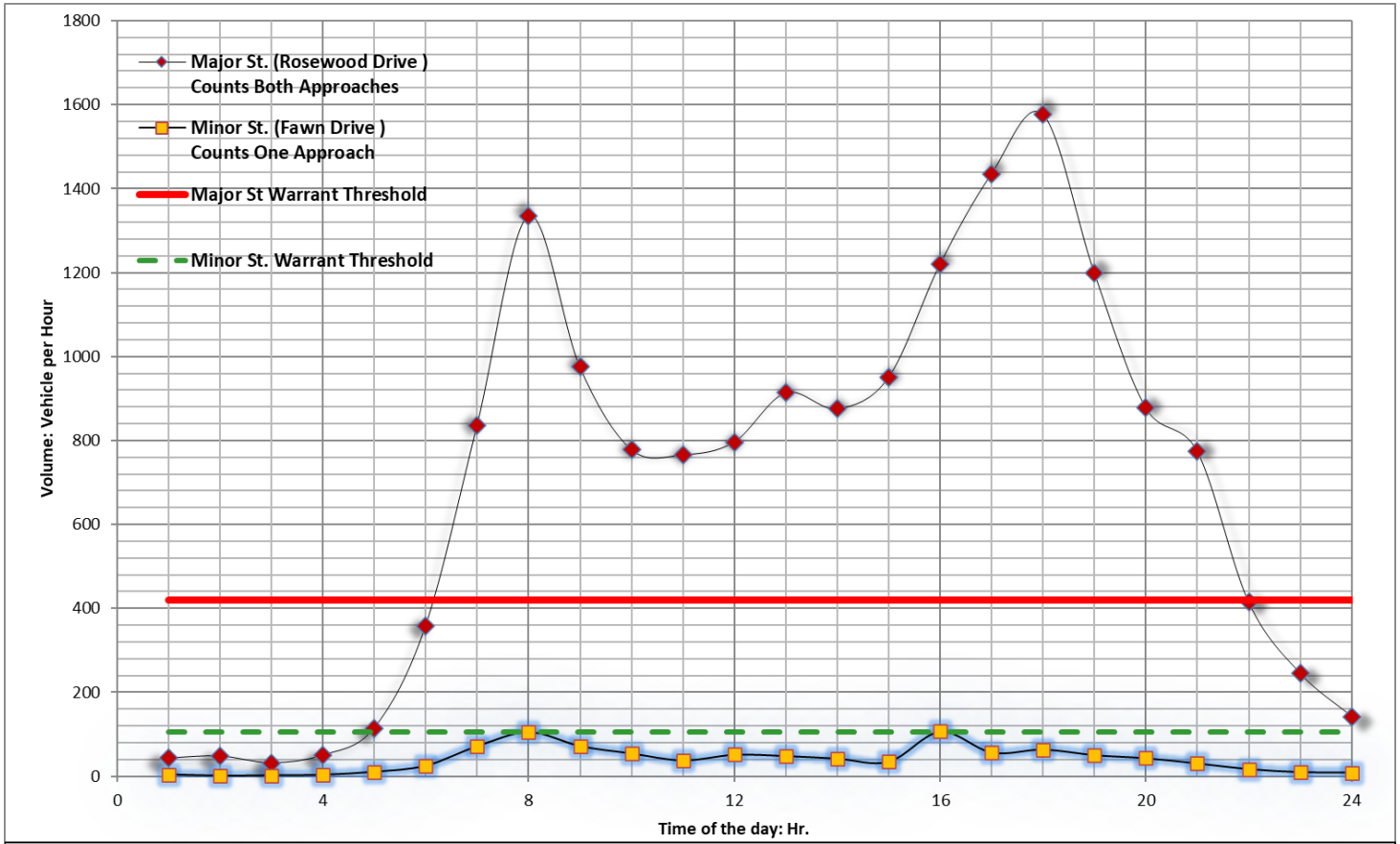
USE 70% WARRANTS 1A AND 1B. DO NOT USE COMBINATION OF A & B

	Major Volume (Both Apr.)	Minor Volume (One Apr.)	Condition A Major Volume	Condition A Minor Volume	Warrant Condition A Met?	Condition B Major Volume	Condition B Minor Volume	Warrant Condition B Met?	Combination Major A	Combination Minor A	Combination Major B	Combination Minor B	Warrant Condition A&B met?
Time	N-S	E-W	70%	70%		70%	70%		56%	56%	56%	56%	
00:01 - 01:00	43	4	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
01:00 - 02:00	48	1	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
02:00 - 03:00	32	2	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
03:00 - 04:00	50	3	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
04:00 - 05:00	114	10	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
05:00 - 06:00	358	25	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
06:00 - 07:00	835	72	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
07:00 - 08:00	1336	106	420	105	YES	630	53	YES	N/A	N/A	N/A	N/A	N/A
08:00 - 09:00	975	72	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
09:00 - 10:00	778	55	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
10:00 - 11:00	766	38	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
11:00 - 12:00	796	51	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
12:00 - 13:00	914	48	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
13:00 - 14:00	876	42	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
14:00 - 15:00	950	35	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
15:00 - 16:00	1220	107	420	105	YES	630	53	YES	N/A	N/A	N/A	N/A	N/A
16:00 - 17:00	1435	57	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
17:00 - 18:00	1578	64	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
18:00 - 19:00	1200	50	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
19:00 - 20:00	878	43	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
20:00 - 21:00	774	30	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
21:00 - 22:00	415	17	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
22:00 - 23:00	245	9	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
23:00 - 24:00	142	8	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A

Number of Hours that met the Warrant 1A =	2
Number of Hours that met the Warrant 1B =	7
Number of Hours that met the Combination Warrant 1A & 1B =	0

A. Is the Minimum Vehicular Volume Warrant Met? (Condition A)	NO
B. Is the Interruption of Continuous Traffic Met? (Condition B)	NO
C. Combination of Warrants A and B Criteria Met?	N/A

Figure 4: Warrant 1A



WARRANT **1A**

IS THERE A REDUCTION IN THE WARRANT THRESHOLDS TO 70% ...

1- DUE TO SPEED? YES

2- DUE TO ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000? NO

Spot Number: 1

Rosewood Drive & Fawn Drive

NO. OF LANES ON MAJOR ST.? 3

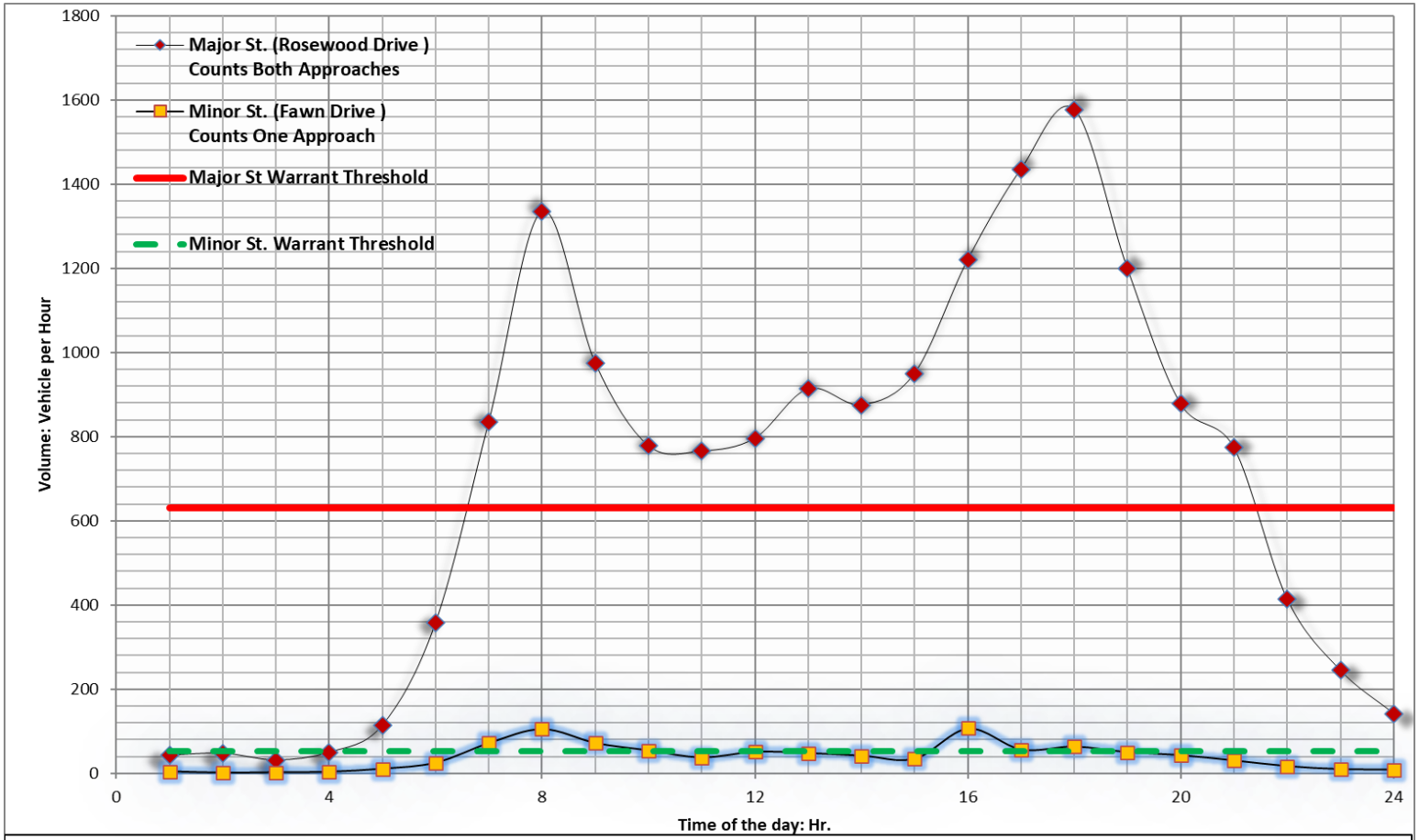
NO. OF LANES ON MINOR ST.? 1

Number of Hours that met the Warrant: 2

Does this intersection meet Warrant 1A for signal installation? NO

Data Collection Date: 12/8/2021

Figure 5: Warrant 1B



WARRANT **1B**

IS THERE A REDUCTION IN THE WARRANT THRESHOLDS TO 70% ...

1- DUE TO SPEED? YES

2- DUE TO ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000? NO

Spot Number: 1

Rosewood Drive & Fawn Drive

NO. OF LANES ON MAJOR ST.? 3

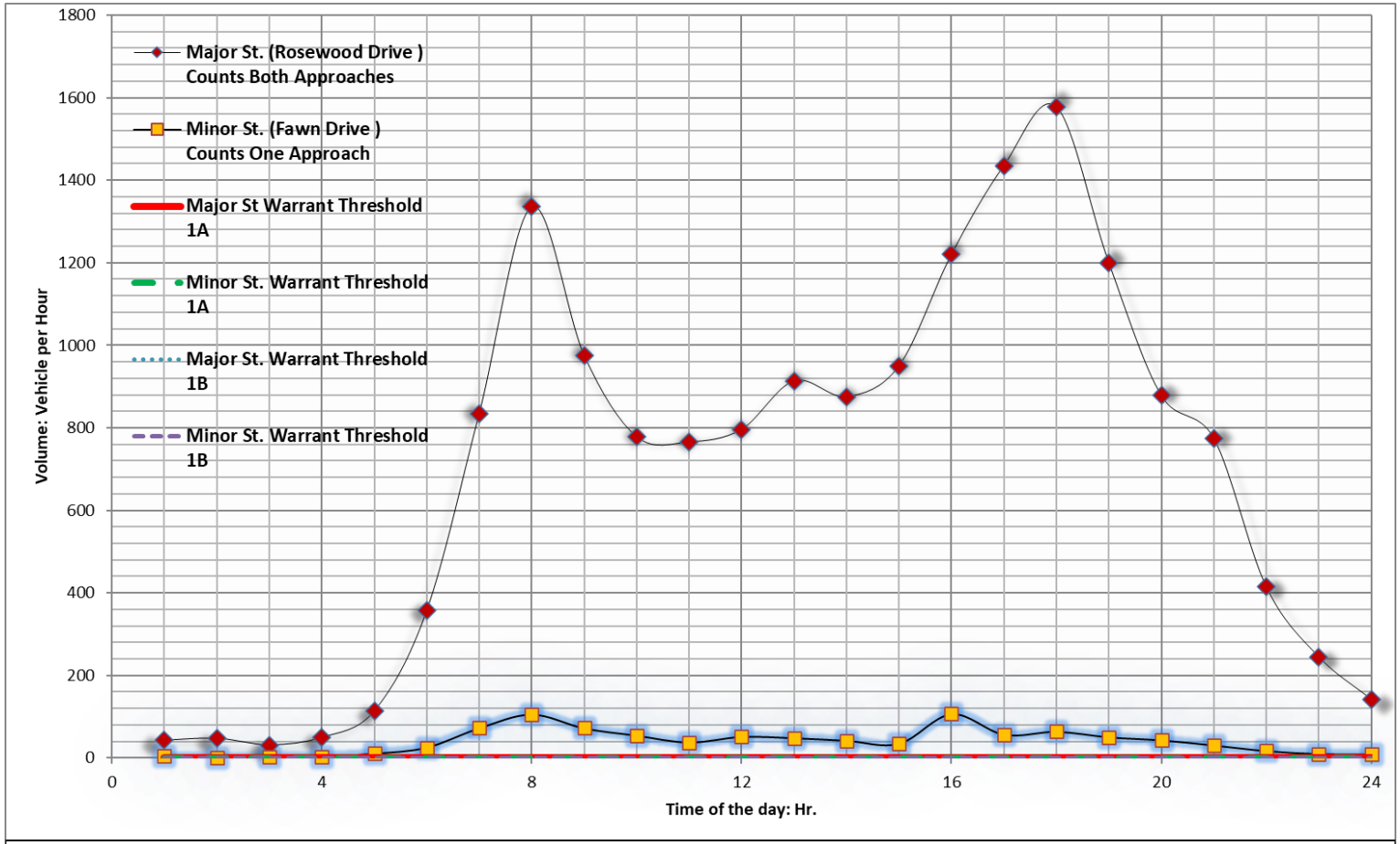
NO. OF LANES ON MINOR ST.? 1

Number of Hours that met the Warrant: 7

Does this intersection meet Warrant 1B for signal installation? NO

Data Collection Date: 12/8/2021

Figure 6: Warrant 1A&B



WARRANT **1A&B**

IS THERE A REDUCTION IN THE WARRANT THRESHOLDS TO 56% ...

1- DUE TO SPEED? YES

2- DUE TO ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000? NO

Spot Number: 1

Rosewood Drive & Fawn Drive

NO. OF LANES ON MAJOR ST.? 3

NO. OF LANES ON MINOR ST.? 1

Number of Hours that met the Warrant: 0

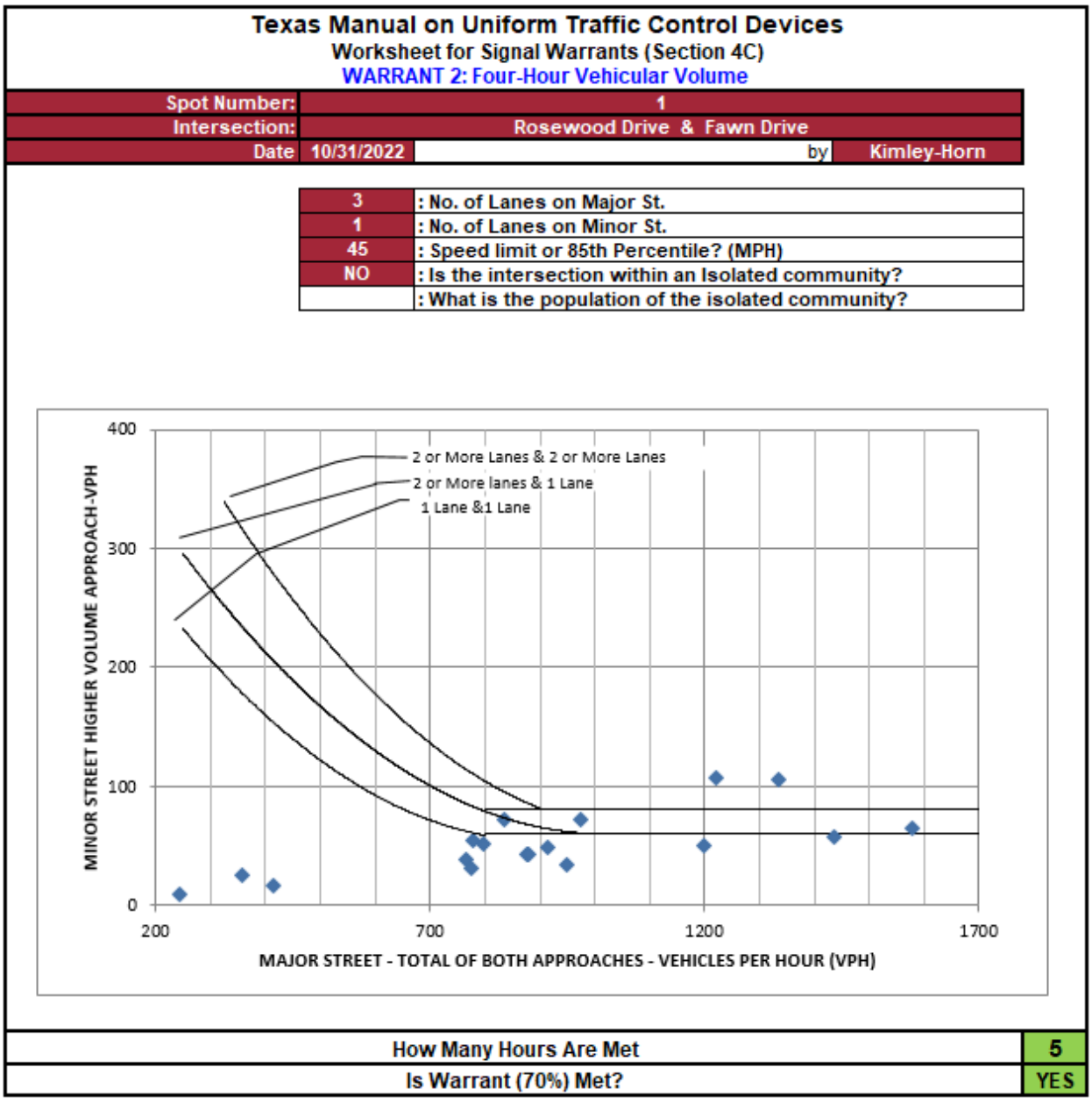
Does this intersection meet Warrant 1A&B for signal installation? N/A

Data Collection Date: 12/8/2021

WARRANT 2 – FOUR HOUR VEHICULAR VOLUME

This warrant is similar to the eight-hour warrant and is based on traffic volumes during the highest four hours of the day. Traffic volumes are plotted on a graph to determine if they fall above the warrant curves. The reduction criteria are similar. If one of the two conditions apply, then a second graph with lower curves is used. ***Figure 7*** shows the data applied to Warrant 2. The traffic signal does meet the requirements of Warrant 2.

Figure 7: Warrant 2 (70%) - Four Hour Vehicular Volume



WARRANT 3 – PEAK HOUR VOLUME

This warrant is intended for use at a location where traffic conditions create undue delay to the side street for one or more hours during the day. Total stopped time delay for the side street must be documented to use this warrant. Reduction criteria and graphs similar to those in Warrant 2 are applied. Total stop time delays for the side street were determined using the Synchro™ simulation model. The Synchro™ report is provided in ***Appendix D***, and ***Figure 8*** shows the application of data to Warrant 3 for the study intersection and the intersection does not satisfy Warrant 3A.

As ***Figure 8*** shows, the intersection satisfied Warrant 3B where there was at one hour when the minor street volume exceeded the threshold to meet the signal warrant criteria.

Figure 8: Warrant 3A (70%) - Peak Hour Volume

Texas Manual on Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 3 A: Peak-Hour Vehicular Volume

Spot Number:	1		
Intersection:	Rosewood Drive & Fawn Drive		
Date	10/31/2022	by	Kimley-Horn

	49.7	: Total Stop Time Delay (hrs)
	1	: Minor Street Approach Lanes
	3	: Total Approaches
NOT MET	64	: Minor Approach Volume
	1642	: Total Entering Volume
	17:00 - 18:00	: Peak Hour

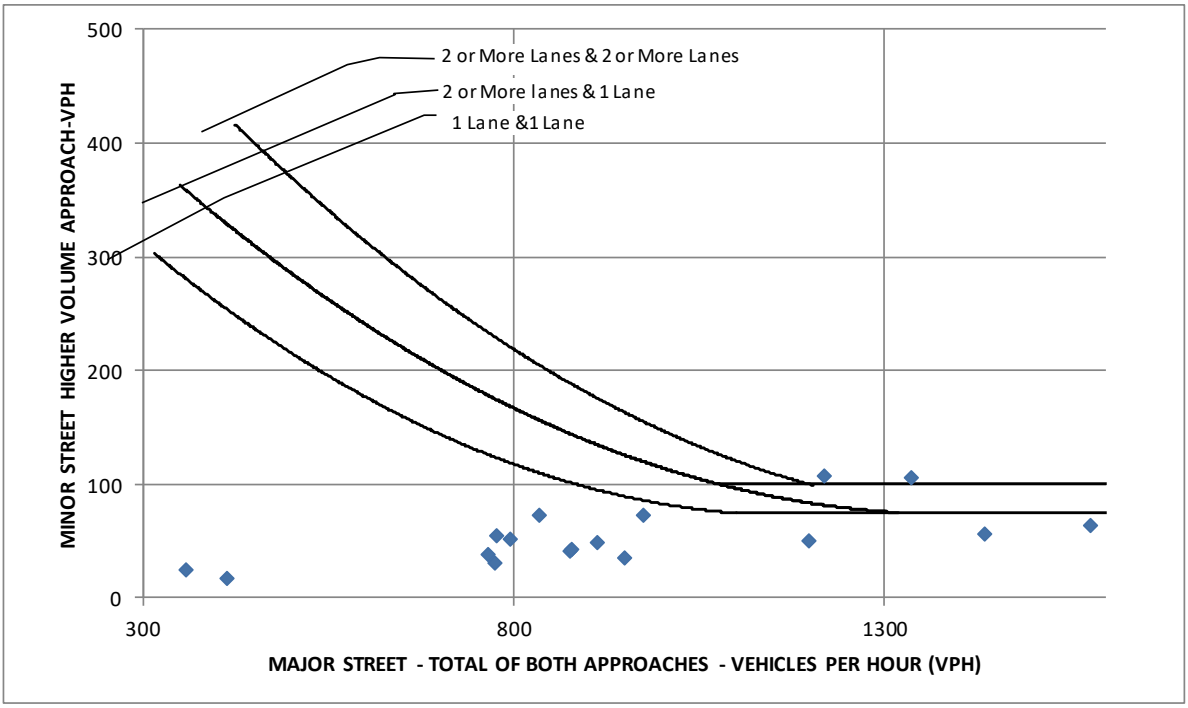
Is Warrant 3 A Met?	NO

Figure 9: Warrant 3B (70%) - Peak Hour Volume

Texas Manual on Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 3 B(70%): Peak-Hour Vehicular Volume

Spot Number:	1		
Intersection:	Rosewood Drive & Fawn Drive		
Date	10/31/2022	by	Kimley-Horn

3	: No. of Lanes on Major St.
1	: No. of Lanes on Minor St.
45	: Speed limit or 85th Percentile? (MPH)
NO	: Is the intersection within an Isolated community?
	: What is the population of the isolated community?



How Many Hours Are Met	2
Is Warrant (70%) Met?	YES

WARRANT 4 – PEDESTRIAN VOLUME

This warrant is intended when heavy traffic on the major street causes pedestrians to experience excessive delay in crossing the major street. Based on guidelines in TMUTCD Section 4C.05.04 - this warrant is not intended to be applied at locations where the distance to the nearest traffic control signal or Stop sign controlling the street that pedestrians desire to cross is less than 300', unless the proposed traffic control signal will not restrict the progressive movement of traffic. Based on pedestrian volumes collected during an 8-hour period, it was determined that pedestrian volumes across the major street did not meet minimum volume requirements of 75 pedestrians an hour at this intersection. Peak-hour pedestrian volumes are shown in ***Appendix B***.

WARRANT 5 – SCHOOL CROSSING

This warrant is used where the fact that school children cross the major street is the principal reason to consider installing a signal. A minimum of 20 school children (elementary through high school) must cross during the highest hour and a study must show that the number of adequate gaps in the vehicle stream does not exist. Before installing a signal under this warrant, other remedial measures must be considered (i.e. warning signs and flashers, school speed zones, crossing guards, grade separation, etc.). No schools are located at the intersection. Therefore, the intersection does not meet Warrant 5.

WARRANT 6 – COORDINATED SIGNAL SYSTEM

If vehicle platoons in a coordinated system tend to "spread out" and need to be regrouped, this warrant may be considered. However, this warrant should not be applied where the resultant spacing of traffic control signals will be less than 1,000'. This intersection is not part of a coordinated signal system, therefore, Warrant 6 does not apply.

WARRANT 7 – CRASH EXPERIENCE

Warrant 7 requires that five or more reported crashes, correctible by a traffic signal, to have occurred in the last 12 months to satisfy Condition B of the warrant. There are minimum volume requirements for vehicles or pedestrians as well under Condition A of Warrant 7. Accident data was collected for the study intersection (within a 150' radius) from the TxDOT Crash Records Information System. This data was analyzed, and a crash diagram was developed for the study intersection. The collision types and their rate of occurrence within one year are listed in ***Table 4***.

Table 4: Collision Types 2019-2022

Collision Type	2019	2020	2021	2022
One Motor Vehicle – Going Straight			1	
Same Direction – Both Going Straight – Sideswipe	1			
Angle – One Straight-One Left Turn	1		1	
Angle – Both Going Straight				1
Total Collisions Reported	2	0	2	1

The highlighted cells above indicate crashes that may be avoided by a traffic signal. In 2019, 2021 and 20212 each, there was one crash that may be potentially preventable with a traffic signal. Moreover, as summarized in ***Table 5,*** the side street traffic volume did not meet the minimum threshold as stated in Texas MUTCD 2011 Edition for Warrant 7 Conditions A or B to warrant a traffic signal. Therefore, the study intersection does not meet Warrant 7.

Table 5: Warrant 7 – Crash Experience

Texas Manual on Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 7: Crash Experience

Spot Number:	1	
Intersection:	Rosewood Drive & Fawn Drive	
Date	10/31/2022	by Kimley-Horn

3	: No. of Lanes on Major St?
1	: No. of Lanes on Minor St?
NO	: Has adequate trial of remedial measure with adequate enforcement been tried?
NO	: Are there 5 or more Crashes Susceptable to Correction by Signalization in a 12 Month Period?

Time	Major Volume (Both Apr.) N-S	Minor Volume (One Apr.) E-W	Condition A Major Volume	Condition A Minor Volume	Warrant Condition A Met?	Condition B Major Volume	Condition B Minor Volume	Warrant Condition B Met?
00:00 - 01:00	43	4	336	84	NO	504	42	NO
01:00 - 02:00	48	1	336	84	NO	504	42	NO
02:00 - 03:00	32	2	336	84	NO	504	42	NO
03:00 - 04:00	50	3	336	84	NO	504	42	NO
04:00 - 05:00	114	10	336	84	NO	504	42	NO
05:00 - 06:00	358	25	336	84	NO	504	42	NO
06:00 - 07:00	835	72	336	84	NO	504	42	YES
07:00 - 08:00	1336	106	336	84	YES	504	42	YES
08:00 - 09:00	975	72	336	84	NO	504	42	YES
09:00 - 10:00	778	55	336	84	NO	504	42	YES
10:00 - 11:00	766	38	336	84	NO	504	42	NO
11:00 - 12:00	796	51	336	84	NO	504	42	YES
12:00 - 13:00	914	48	336	84	NO	504	42	YES
13:00 - 14:00	876	42	336	84	NO	504	42	NO
14:00 - 15:00	950	35	336	84	NO	504	42	NO
15:00 - 16:00	1220	107	336	84	YES	504	42	YES
16:00 - 17:00	1435	57	336	84	NO	504	42	YES
17:00 - 18:00	1578	64	336	84	NO	504	42	YES
18:00 - 19:00	1200	50	336	84	NO	504	42	YES
19:00 - 20:00	878	43	336	84	NO	504	42	YES
20:00 - 21:00	774	30	336	84	NO	504	42	NO
21:00 - 22:00	415	17	336	84	NO	504	42	NO
22:00 - 23:00	245	9	336	84	NO	504	42	NO
23:00 - 24:00	142	8	336	84	NO	504	42	NO

Is there a reduction in the warrant thresholds to 56% =	NO
Number of Hours that met the warrant 7A =	2
Number of Hours that met the warrant 7B =	11

A. Is the Minimum Vehicular Volume Warrant Met Based on Crash Patterns? (Condition A)	NO
B. Is the Interruption of Continuous Traffic Met Based on Crash Patterns? (Condition B)	NO

WARRANT 8 – ROADWAY NETWORK

This warrant is used to encourage concentration and organization of traffic flow on a roadway network. It must be used on a principal through street and meet minimum volume requirements. Certain criteria must also be met for a roadway to be considered a major route. This intersection does not meet the criteria for Warrant 8.

WARRANT 9 – INTERSECTION NEAR A GRADE CROSSING

If an intersection is less than 140 feet from an at grade railroad crossing, and certain minimum traffic volumes are present, a signal with track preemption is required, only after other alternatives have been considered. Warrant 9 does not apply at the study intersection because there is no at grade railroad crossing near this location.

TRAFFIC SIGNAL WARRANT ANALYSIS SUMMARY

The following summarizes the results of the existing conditions analysis. The summaries of results are listed in ***Table 6***.

Table 6: Summary of Warrants

Summary of Warrants			
Intersection:	1		
Major Street:	Rosewood Drive	**Minor Street:**	Fawn Drive
Intersection:	Rosewood Drive & Fawn Drive		
City/Twp:	Austin ETJ		
Date Performed:	10/31/2022	**Performed By:**	Kimley-Horn
Date Volumes Collected:	12/8/2021		

Warrant	Condition	Is Warrant Met
WARRANT 1: Eight-Hour Vehicular Volume		**NO**
	Condition A	NO
	Condition B	NO
	Condition A&B	N/A
WARRANT 2: Four-Hour Vehicular Volume	(70%)	**YES**
WARRANT 3: Peak-Hour Vehicular Volume	(70%)	**YES**
	Condition A	NO
	Condition B	YES
WARRANT 4: Pedestrian Volume	(70%)	**NO**
	Four Hour	NO
	Peak Hour	NO
WARRANT 5: School Crossing		**N/A**
WARRANT 6: Coordinated Signal System		**NO**
WARRANT 7: Crash Experience		**NO**
	Condition A	NO
	Condition B	NO
WARRANT 8: Roadway Network		**NO**
WARRANT 9: Intersection Near a Grade Crossing		**NO**

Issue to Be Addressed by Signalization:
Reduce stop delay at intersection during peak weekday hours and mitigate safety issues correctible by a traffic signal.

TRAFFIC SIGNAL WARRANT ANALYSIS – ROSEWOOD DRIVE & ASPEN DRIVE

This study documents the results of a traffic signal warrant analysis for the intersection of Rosewood Drive & Aspen Drive in the City of Killeen in Bell County, Texas.

ASSUMPTIONS

Several assumptions were made to analyze the data collected at each study intersection.

- Aspen Drive is treated as an eastbound-westbound roadway and Rosewood Drive is treated as a northbound-southbound roadway.
- The peak hour was determined to be the hour with the greatest vehicular volume. The AM peak was determined to be 7:00-8:00 AM, while the PM peak and overall intersection peak was determined to be 5:00-6:00 PM.
- For warrant analysis at the study intersection, the higher of the two minor street approach volumes was used.

STUDY PROCEDURE AND ANALYSIS RESULTS

The *Texas Manual of Uniform Traffic Control Devices* (Texas MUTCD, 2011 Edition) defines nine (9) warrants, or justifying set of conditions, at least one of which should be fully satisfied before signalization is considered as an option for traffic control. Factors included in the evaluation of these warrants include vehicle and pedestrian traffic volumes, the number of traffic lanes, the prevailing traffic speeds, traffic crash history, and measured delay for minor street traffic. The individual warrants are listed below, followed by a short description and analysis of each.

- Warrant 1, Eight-Hour Vehicular Volume
- Warrant 2, Four-Hour Vehicular Volume
- Warrant 3, Peak Hour Vehicular Volume
- 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 Railroad Grade Crossing

WARRANT 1 – EIGHT HOUR VEHICULAR VOLUME

As the title implies, this criterion is applied to the eight highest demand hours of the day for the major and minor street. At least eight hours of the day must exceed the thresholds required in order to warrant a traffic signal using Warrant 1.

Two criteria are checked. Condition A is based on minimum vehicular volumes. Condition B is based on interruption of continuous traffic. For both conditions, there are several reduction factors that may be taken if Condition A or Condition B is not satisfied. The combination of Conditions A & B is intended for application after trial of other alternatives that could cause less delay and inconvenience of traffic has failed to solve the traffic problems. The warrant is satisfied if both Conditions A and B are met with an 80% reduction. If the 85th percentile speed on the major street is greater than 40 mph, or if the intersection lies within the built-up area of an isolated community having a population less than 10,000, the criteria can be reduced by 70% of the original values for Condition A and Condition B or for the combination of Conditions A and B (resulting in 56% of the original value of Condition A and Condition B for the combined case).

Table 7 and ***Table 8***, as well as ***Figure 10***, ***Figure 11***, and ***Figure 12***, show the warrant criteria and traffic counts as they apply to that criteria.

Table 7: Warrant 1 – Eight Hour Vehicular Volume

Condition A—Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	56%[d]	100%[a]	80%[b]	70%[c]	56%[d]
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

Condition B—Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	56%[d]	100%[a]	80%[b]	70%[c]	56%[d]
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

[a] Basic minimum hourly volume

[b] Used for combination of Conditions A and B after adequate trial of other remedial measures

[c] May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

[d] May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

***Source: 2011 TMUTCD Table 4C-1*

Table 8: Warrant 1 – Eight Hour Vehicular Volume Worksheet

Texas Manual on Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 1: Eight-Hour Vehicular Volume

Intersection:	Rosewood Drive & Aspen Drive		
Date	10/10/2022	by	Kimley-Horn

3	: No. of Lanes on Major St?
1	: No. of Lanes on Minor St?
45	: Speed limit or 85th Percentile? (MPH)
NO	: Is the intersection within an Isolated community?
	: if answer 4 is Yes, then what is the population of the isolated community?
NO	: Have other remedial measures been tried?

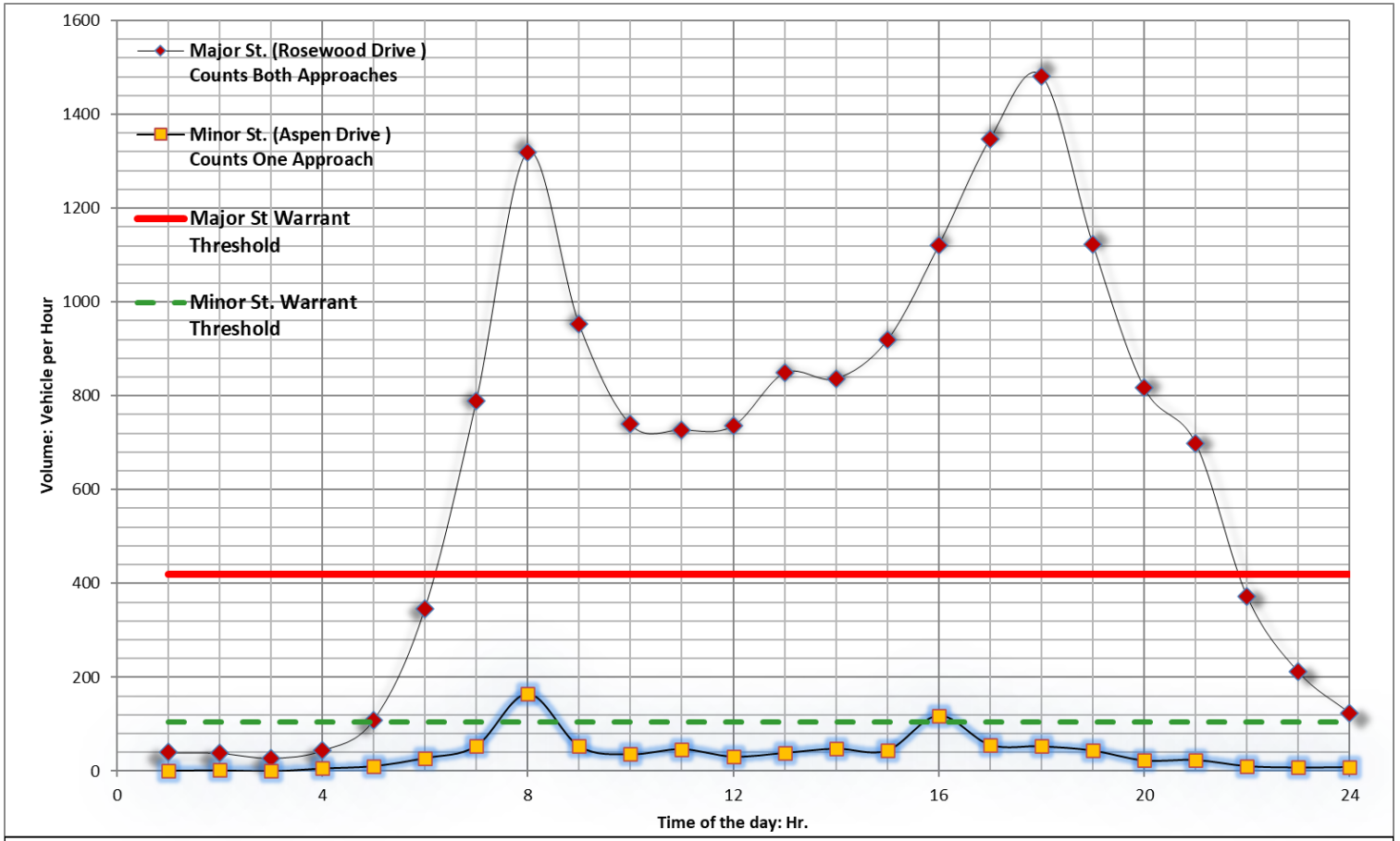
USE 70% WARRANTS 1A AND 1B. DO NOT USE COMBINATION OF A & B

	Major Volume (Both Apr.)	Minor Volume (One Apr.)	Condition A Major Volume	Condition A Minor Volume	Warrant Condition A Met?	Condition B Major Volume	Condition B Minor Volume	Warrant Condition B Met?	Combination Major A	Combination Minor A	Combination Major B	Combination Minor B	Warrant Condition A&B met?
Time	N-S	E-W	70%	70%		70%	70%		56%	56%	56%	56%	
00:01 - 01:00	40	1	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
01:00 - 02:00	38	2	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
02:00 - 03:00	28	0	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
03:00 - 04:00	44	6	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
04:00 - 05:00	109	11	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
05:00 - 06:00	347	28	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
06:00 - 07:00	789	54	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
07:00 - 08:00	1319	164	420	105	YES	630	53	YES	N/A	N/A	N/A	N/A	N/A
08:00 - 09:00	953	53	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
09:00 - 10:00	739	36	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
10:00 - 11:00	728	47	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
11:00 - 12:00	736	31	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
12:00 - 13:00	849	39	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
13:00 - 14:00	837	48	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
14:00 - 15:00	919	44	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
15:00 - 16:00	1120	118	420	105	YES	630	53	YES	N/A	N/A	N/A	N/A	N/A
16:00 - 17:00	1348	56	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
17:00 - 18:00	1482	53	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
18:00 - 19:00	1123	44	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
19:00 - 20:00	817	23	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
20:00 - 21:00	699	24	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
21:00 - 22:00	373	11	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
22:00 - 23:00	212	8	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
23:00 - 24:00	124	9	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A

Number of Hours that met the Warrant 1A =	2
Number of Hours that met the Warrant 1B =	6
Number of Hours that met the Combination Warrant 1A & 1B =	0

A. Is the Minimum Vehicular Volume Warrant Met? (Condition A)	NO
B. Is the Interruption of Continuous Traffic Met? (Condition B)	NO
C. Combination of Warrants A and B Criteria Met?	N/A

Figure 10: Warrant 1A



WARRANT **1A**

IS THERE A REDUCTION IN THE WARRANT THRESHOLDS TO 70% ...

1- DUE TO SPEED? YES

2- DUE TO ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000? NO

Spot Number: 2

Rosewood Drive & Aspen Drive

NO. OF LANES ON MAJOR ST.? 3

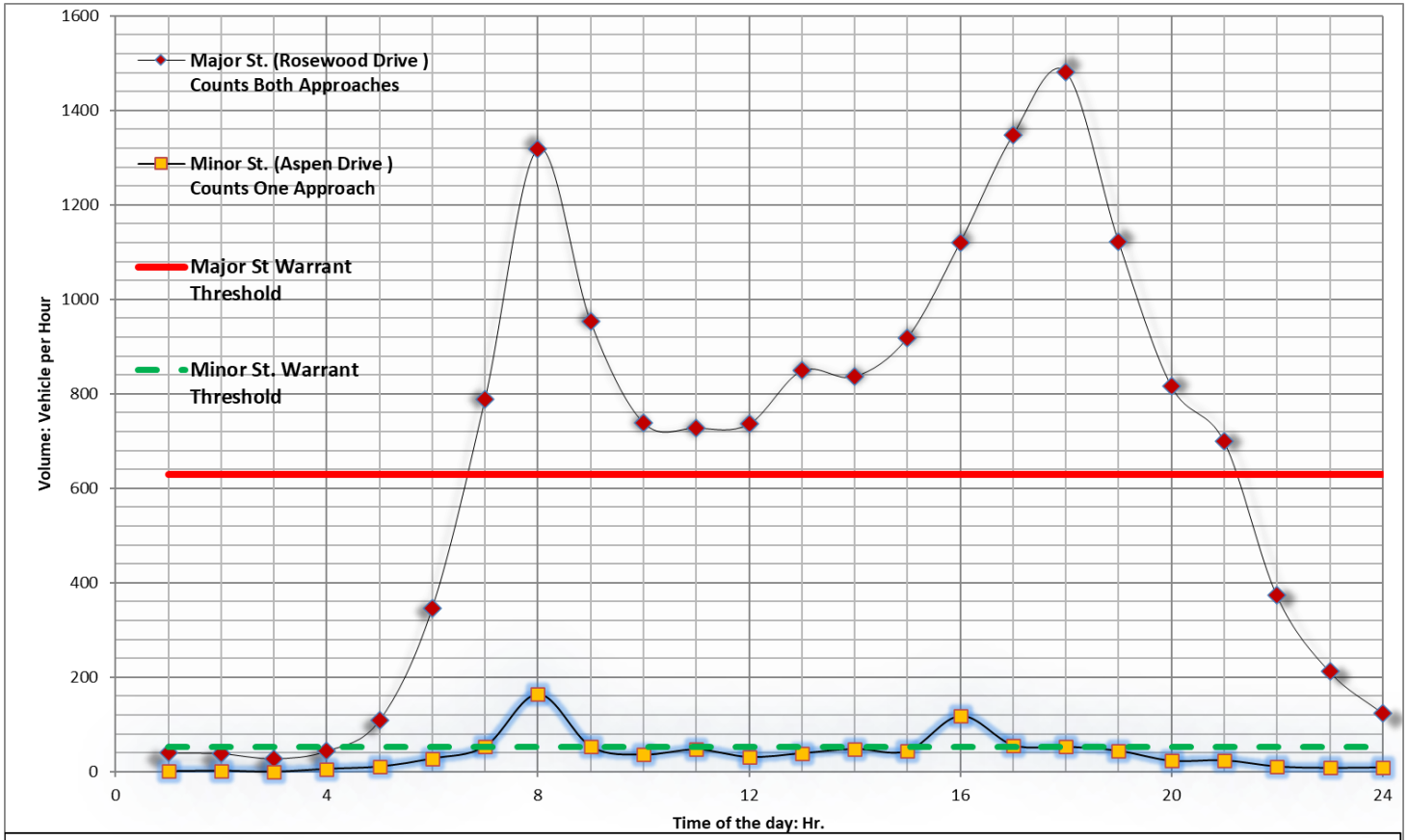
NO. OF LANES ON MINOR ST.? 1

Number of Hours that met the Warrant: 2

Does this intersection meet Warrant 1A for signal installation? NO

Data Collection Date: 8/31/2022

Figure 11: Warrant 1B



WARRANT **1B**

IS THERE A REDUCTION IN THE WARRANT THRESHOLDS TO 70% ...

1- DUE TO SPEED? YES

2- DUE TO ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000? NO

Spot Number: 2

Rosewood Drive & Aspen Drive

NO. OF LANES ON MAJOR ST.? 3

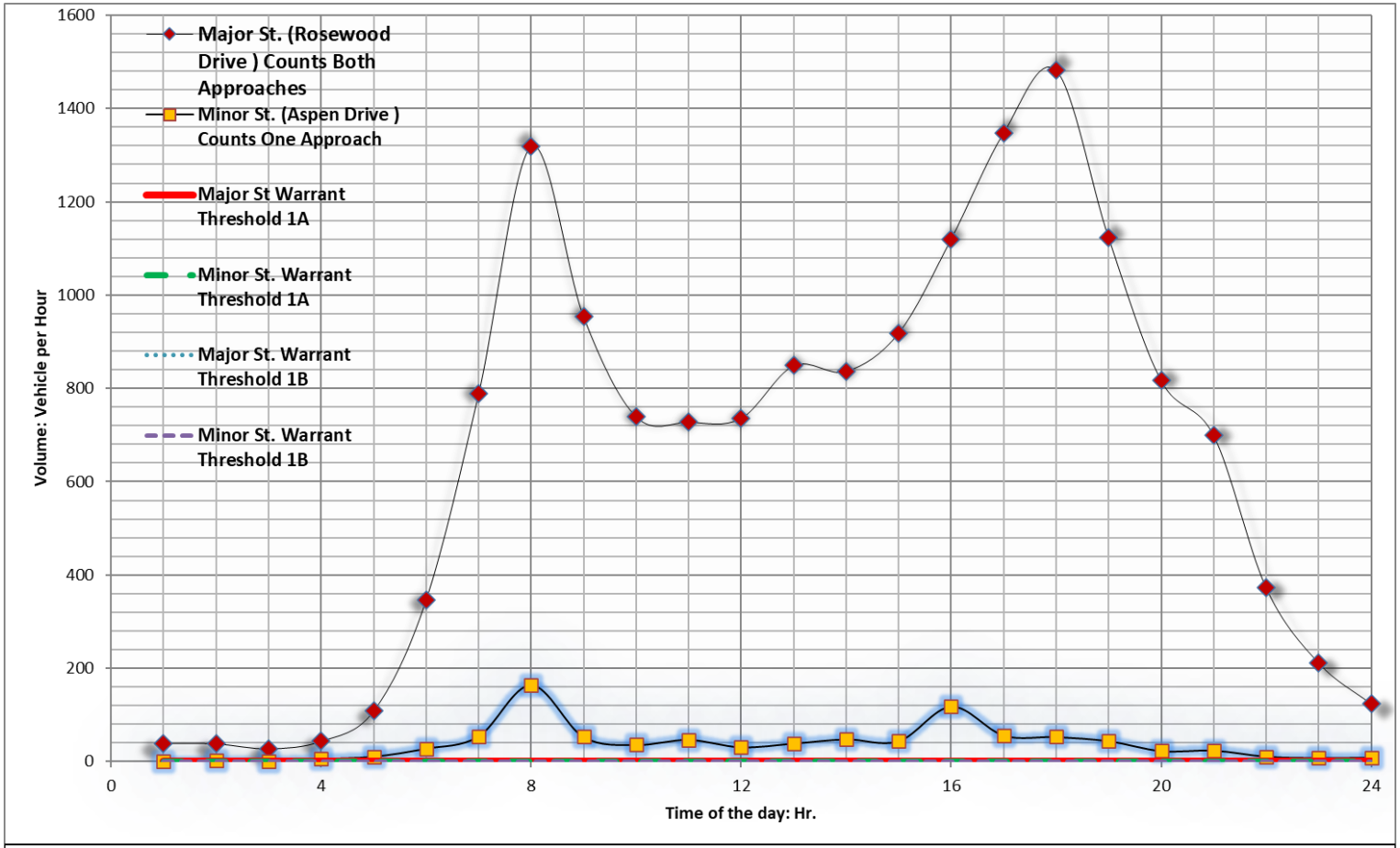
NO. OF LANES ON MINOR ST.? 1

Number of Hours that met the Warrant: 6

Does this intersection meet Warrant 1B for signal installation? NO

Data Collection Date: 8/31/2022

Figure 12: Warrant 1A&B



WARRANT **1A&B**

IS THERE A REDUCTION IN THE WARRANT THRESHOLDS TO 56% ...

1- DUE TO SPEED? YES

2- DUE TO ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000? NO

Spot Number: 2

Rosewood Drive & Aspen Drive

NO. OF LANES ON MAJOR ST.? 3

NO. OF LANES ON MINOR ST.? 1

Number of Hours that met the Warrant: 0

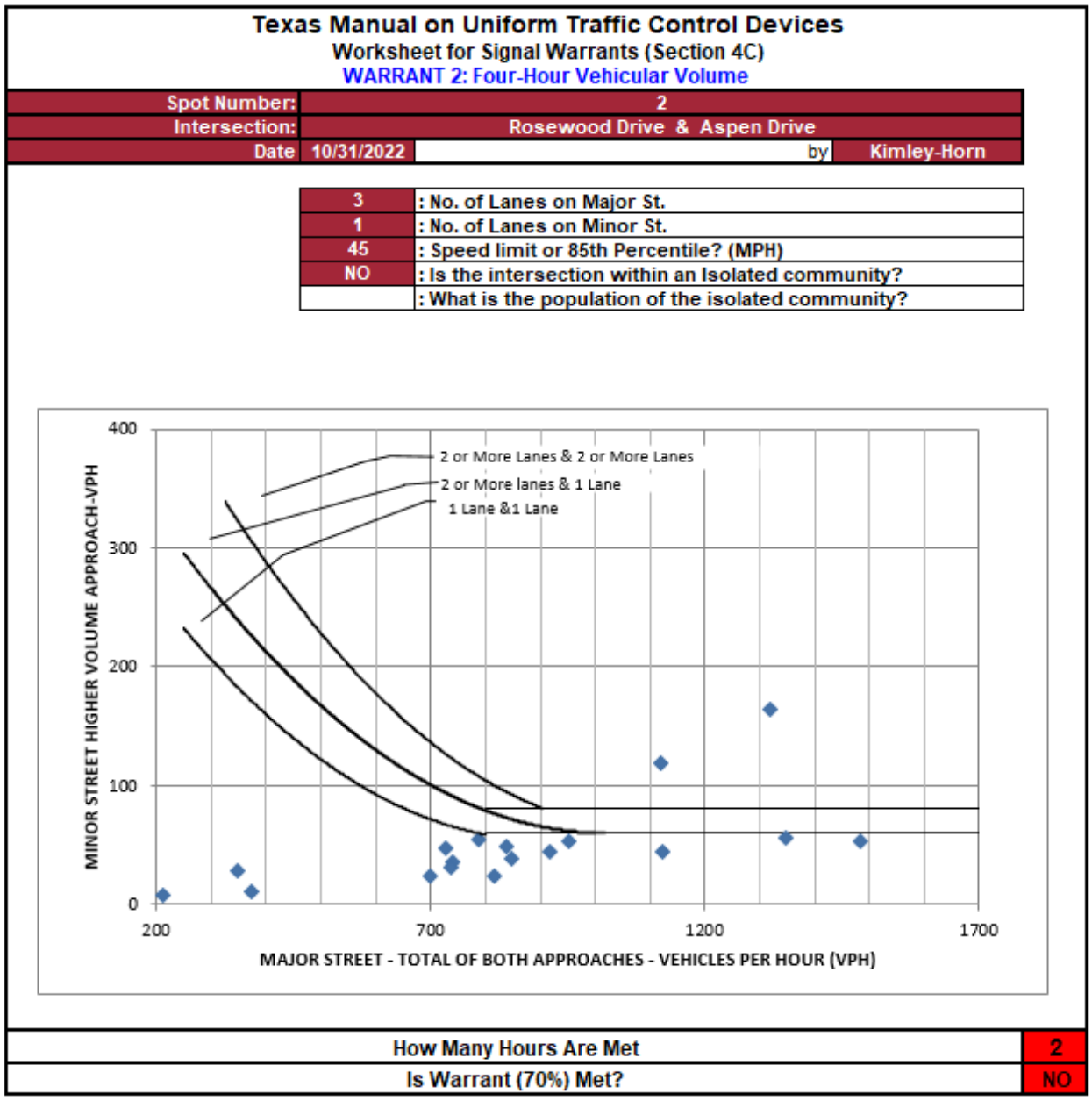
Does this intersection meet Warrant 1A&B for signal installation? N/A

Data Collection Date: 8/31/2022

WARRANT 2 – FOUR HOUR VEHICULAR VOLUME

This warrant is similar to the eight-hour warrant and is based on traffic volumes during the highest four hours of the day. Traffic volumes are plotted on a graph to determine if they fall above the warrant curves. The reduction criteria are similar. If one of the two conditions apply, then a second graph with lower curves is used. ***Figure 13*** shows the data applied to Warrant 2.

Figure 13: Warrant 2 (70%) - Four Hour Vehicular Volume



WARRANT 3 – PEAK HOUR VOLUME

This warrant is intended for use at a location where traffic conditions create undue delay to the side street for one or more hours during the day. Total stopped time delay for the side street must be documented to use this warrant. Reduction criteria and graphs similar to those in Warrant 2 are applied. Total stop time delays for the side street were determined using the Synchro™ simulation model. The Synchro™ report is provided in ***Appendix D***, and ***Figure 14*** shows the application of data to Warrant 3 for the study intersection and the intersection does not satisfy Warrant 3A.

As ***Figure 14*** shows, the intersection satisfied Warrant 3B where there was at one hour when the minor street volume exceeded the threshold to meet the signal warrant criteria.

Figure 14: Warrant 3A (70%) - Peak Hour Volume

Texas Manual on Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 3 A: Peak-Hour Vehicular Volume

Spot Number:	2		
Intersection:	Rosewood Drive & Aspen Drive		
Date	10/10/2022	by	Kimley-Horn

	31.2	: Total Stop Time Delay (hrs)
	1	: Minor Street Approach Lanes
	3	: Total Approaches
NOT MET	53	: Minor Approach Volume
	1535	: Total Entering Volume
	17:00 - 18:00	: Peak Hour

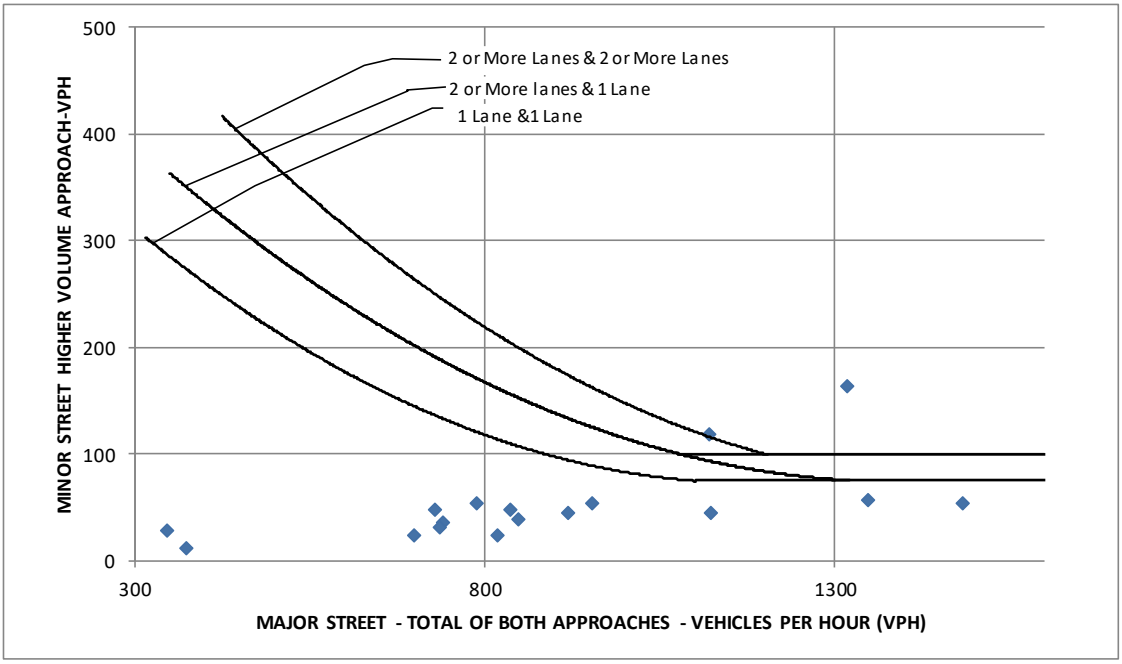
Is Warrant 3 A Met?	NO

Figure 15: Warrant 3B (70%) - Peak Hour Volume

Texas Manual on Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 3 B(70%): Peak-Hour Vehicular Volume

Spot Number:	2		
Intersection:	Rosewood Drive & Aspen Drive		
Date	10/10/2022	by	Kimley-Horn

3	: No. of Lanes on Major St.
1	: No. of Lanes on Minor St.
45	: Speed limit or 85th Percentile? (MPH)
NO	: Is the intersection within an Isolated community?
	: What is the population of the isolated community?



How Many Hours Are Met	2
Is Warrant (70%) Met?	YES

WARRANT 4 – PEDESTRIAN VOLUME

This warrant is intended when heavy traffic on the major street causes pedestrians to experience excessive delay in crossing the major street. Based on guidelines in TMUTCD Section 4C.05.04 - this warrant is not intended to be applied at locations where the distance to the nearest traffic control signal or Stop sign controlling the street that pedestrians desire to cross is less than 300', unless the proposed traffic control signal will not restrict the progressive movement of traffic. Based on pedestrian volumes collected during an 8-hour period, it was determined that pedestrian volumes across the major street did not meet minimum volume requirements of 75 pedestrians an hour at this intersection. Peak-hour pedestrian volumes are shown in ***Appendix B***.

WARRANT 5 – SCHOOL CROSSING

This warrant is used where the fact that school children cross the major street is the principal reason to consider installing a signal. A minimum of 20 school children (elementary through high school) must cross during the highest hour and a study must show that the number of adequate gaps in the vehicle stream does not exist. Before installing a signal under this warrant, other remedial measures must be considered (i.e. warning signs and flashers, school speed zones, crossing guards, grade separation, etc.). No schools are located at the intersection. Therefore, the intersection does not meet Warrant 5.

WARRANT 6 – COORDINATED SIGNAL SYSTEM

If vehicle platoons in a coordinated system tend to "spread out" and need to be regrouped, this warrant may be considered. However, this warrant should not be applied where the resultant spacing of traffic control signals will be less than 1,000'. This intersection is not part of a coordinated signal system, therefore, Warrant 6 does not apply.

WARRANT 7 – CRASH EXPERIENCE

Warrant 7 requires that five or more reported crashes, correctible by a traffic signal, to have occurred in the last 12 months to satisfy Condition B of the warrant. There are minimum volume requirements for vehicles or pedestrians as well under Condition A of Warrant 7. Accident data was collected for the study intersection (within a 150' radius) from the TxDOT Crash Records Information System. This data was analyzed, and a crash diagram was developed for the study intersection. The collision types and their rate of occurrence within one year are listed in ***Table 9***.

Table 9: Collision Types 2019-2022

Collision Type	2019	2020	2021	2022
One Motor Vehicle – Going Straight		1		
One Motor Vehicle – Turning Right				
Same Direction – Both Going Straight Rear-End			1	1
Same Direction – One Straight One Stopped	1	1		
Angle – One Right One Stopped		1		
Angle – One Straight-One Left Turn		2		
Angle – Both Going Straight	1		1	
Total Collisions Reported	2	5	2	1

The highlighted cells above indicate crashes that may be avoided by a traffic signal. In 2020 there were three crashes that may be potentially preventable with a traffic signal, while in 2019 as in 2021 each, there was one crash that may be potentially preventable with a traffic signal. Moreover, as summarized in ***Table 10***, the side street traffic volume did not meet the minimum threshold as stated in Texas MUTCD 2011 Edition for Warrant 7 Conditions A or B to warrant a traffic signal. Therefore, the study intersection does meet Warrant 7.

Table 10: Warrant 7 – Crash Experience

Texas Manual on Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 7: Crash Experience

Spot Number:	2		
Intersection:	Rosewood Drive & Aspen Drive		
Date	10/10/2022	by	Kimley-Horn

3	: No. of Lanes on Major St?
1	: No. of Lanes on Minor St?
NO	: Has adequate trial of remedial measure with adequate enforcement been tried?
NO	: Are there 5 or more Crashes Susceptable to Correction by Signalization in a 12 Month Period?

	Major Volume (Both Apr.)	Minor Volume (One Apr.)	Condition A Major Volume	Condition A Minor Volume	Warrant Condition A Met?	Condition B Major Volume	Condition B Minor Volume	Warrant Condition B Met?
Time	N-S	E-W						
00:00 - 01:00	40	1	336	84	NO	504	42	NO
01:00 - 02:00	38	2	336	84	NO	504	42	NO
02:00 - 03:00	28	0	336	84	NO	504	42	NO
03:00 - 04:00	44	6	336	84	NO	504	42	NO
04:00 - 05:00	109	11	336	84	NO	504	42	NO
05:00 - 06:00	347	28	336	84	NO	504	42	NO
06:00 - 07:00	789	54	336	84	NO	504	42	YES
07:00 - 08:00	1319	164	336	84	YES	504	42	YES
08:00 - 09:00	953	53	336	84	NO	504	42	YES
09:00 - 10:00	739	36	336	84	NO	504	42	NO
10:00 - 11:00	728	47	336	84	NO	504	42	YES
11:00 - 12:00	736	31	336	84	NO	504	42	NO
12:00 - 13:00	849	39	336	84	NO	504	42	NO
13:00 - 14:00	837	48	336	84	NO	504	42	YES
14:00 - 15:00	919	44	336	84	NO	504	42	YES
15:00 - 16:00	1120	118	336	84	YES	504	42	YES
16:00 - 17:00	1348	56	336	84	NO	504	42	YES
17:00 - 18:00	1482	53	336	84	NO	504	42	YES
18:00 - 19:00	1123	44	336	84	NO	504	42	YES
19:00 - 20:00	817	23	336	84	NO	504	42	NO
20:00 - 21:00	699	24	336	84	NO	504	42	NO
21:00 - 22:00	373	11	336	84	NO	504	42	NO
22:00 - 23:00	212	8	336	84	NO	504	42	NO
23:00 - 24:00	124	9	336	84	NO	504	42	NO

Is there a reduction in the warrant thresholds to 56% =	NO
Number of Hours that met the warrant 7A =	2
Number of Hours that met the warrant 7B =	10

A. Is the Minimum Vehicular Volume Warrant Met Based on Crash Patterns? (Condition A)	NO
B. Is the Interruption of Continuous Traffic Met Based on Crash Patterns? (Condition B)	NO

WARRANT 8 – ROADWAY NETWORK

This warrant is used to encourage concentration and organization of traffic flow on a roadway network. It must be used on a principal through street and meet minimum volume requirements. Certain criteria must also be met for a roadway to be considered a major route. This intersection does not meet the criteria for Warrant 8.

WARRANT 9 – INTERSECTION NEAR A GRADE CROSSING

If an intersection is less than 140 feet from an at grade railroad crossing, and certain minimum traffic volumes are present, a signal with track preemption is required, only after other alternatives have been considered. Warrant 9 does not apply at the study intersection because there is no at grade railroad crossing near this location.

TRAFFIC SIGNAL WARRANT ANALYSIS SUMMARY

The following summarizes the results of the existing conditions analysis. The summaries of results are listed in ***Table 11***.

Table 11: Summary of Warrants

Summary of Warrants			
Intersection:	2		
Major Street:	Rosewood Drive	**Minor Street:**	Aspen Drive
Intersection:	Rosewood Drive & Aspen Drive		
City/Twp:	Austin ETJ		
Date Performed:	10/10/2022	**Performed By:**	Kimley-Horn
Date Volumes Collected:	8/31/2022		

Warrant	Condition	Is Warrant Met
WARRANT 1: Eight-Hour Vehicular Volume		**NO**
	Condition A	NO
	Condition B	NO
	Condition A&B	N/A
WARRANT 2: Four-Hour Vehicular Volume	(70%)	**NO**
WARRANT 3: Peak-Hour Vehicular Volume	(70%)	**YES**
	Condition A	**NO**
	Condition B	**YES**
WARRANT 4: Pedestrian Volume	(70%)	**NO**
	Four Hour	NO
	Peak Hour	NO
WARRANT 5: School Crossing		**N/A**
WARRANT 6: Coordinated Signal System		**NO**
WARRANT 7: Crash Experience		**NO**
	Condition A	NO
	Condition B	NO
WARRANT 8: Roadway Network		**NO**
WARRANT 9: Intersection Near a Grade Crossing		**NO**

Issue to Be Addressed by Signalization:

Reduce stop delay at intersection during peak weekday hours and mitigate safety issues correctible by a traffic signal.

CONCLUSION AND RECOMMENDATIONS

The 2011 Edition of the TMUTCD contains nine warrants for traffic signals. The intersection analyzed currently meets the following warrants as shown in ***Table 12***.

Table 12: Summary of Traffic Signal Warrant Analysis

Warrant Number	Warrant Description	Intersection	
		Rosewood Drive & Fawn Drive	Rosewood Drive & Aspen Drive
Warrant 1	Eight-Hour Vehicular Volume	No	No
Warrant 2	Four-Hour Vehicular Volume	**Yes**	No
Warrant 3	Peak-Hour Vehicular Volume	**Yes (Warrant B)**	**Yes (Warrant B)**
Warrant 4	Pedestrian Volume	No	No
Warrant 5	School Crossing	No	No
Warrant 6	Coordinated Signal System	No	No
Warrant 7	Crash Experience	No	No
Warrant 8	Roadway Network	No	No
Warrant 9	Intersection Near a Railroad Grade Crossing	No	No

Based on the criteria ,Kimley-Horn recommends a traffic signal at the intersections of Rosewood Drive & Fawn Drive and Rosewood Drive & Aspen Drive.

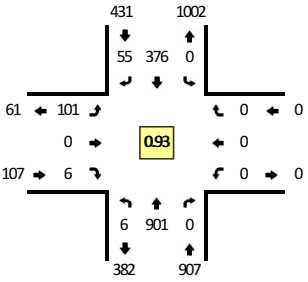
Appendix

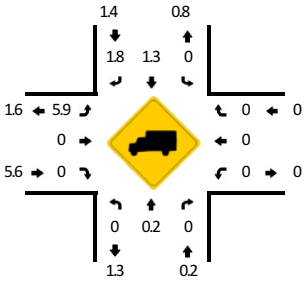
Appendix A: 2022 Existing Traffic Counts

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

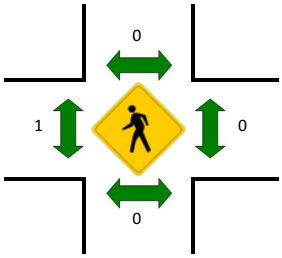
LOCATION: Rosewood Dr -- Fawn Dr | **QC JOB #:** 15913130
CITY/STATE: Killeen, TX | **DATE:** Wed, Aug 31 2022

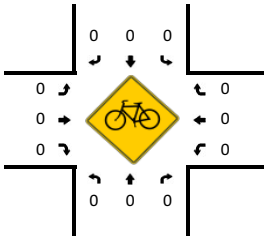
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:15 AM -- 7:30 AM

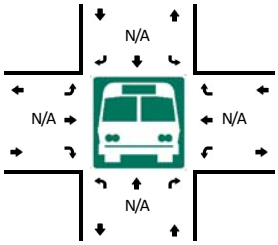


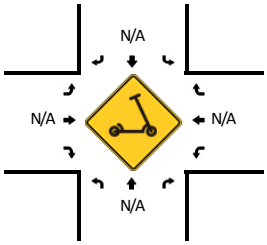


Quality Counts
DATA THAT DRIVES COMMUNITIES









15-Min Count Period Beginning At	Rosewood Dr (Northbound)				Rosewood Dr (Southbound)				Fawn Dr (Eastbound)				Fawn Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	232	0	0	0	84	18	0	33	0	2	0	0	0	0	0	369	
7:15 AM	4	258	0	0	0	74	19	0	32	0	2	0	0	0	0	0	389	
7:30 AM	1	220	0	0	0	99	11	0	17	0	0	0	0	0	0	0	348	
7:45 AM	1	191	0	0	0	119	7	0	19	0	2	0	0	0	0	0	339	1445
8:00 AM	3	137	0	0	0	80	8	0	19	0	3	0	0	0	0	0	250	1326
8:15 AM	0	169	0	0	0	75	5	0	17	0	3	0	0	0	0	0	269	1206
8:30 AM	0	197	0	0	0	66	4	0	15	0	0	0	0	0	0	0	282	1140
8:45 AM	1	188	0	0	0	58	6	0	12	0	0	0	0	0	0	0	265	1066

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	16	1032	0	0	0	296	76	0	128	0	8	0	0	0	0	0	1556
Heavy Trucks	0	0	0		0	0	0		8	0	0		0	0	0		8
Buses																	
Pedestrians		0				0				4				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

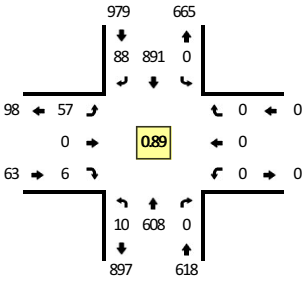
Comments:

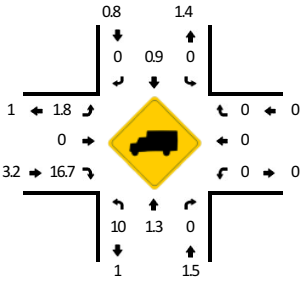
Report generated on 9/14/2022 11:26 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

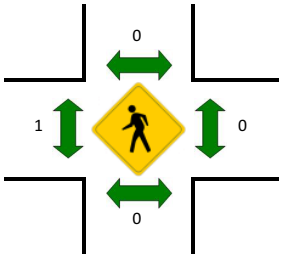
LOCATION: Rosewood Dr -- Fawn Dr | **QC JOB #:** 15913131
CITY/STATE: Killeen, TX | **DATE:** Wed, Aug 31 2022

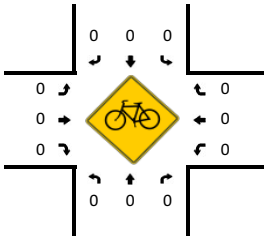
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

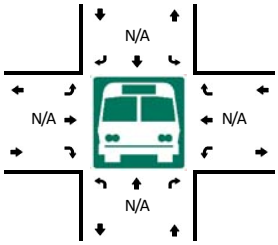


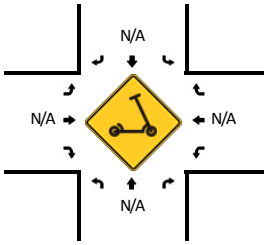


Quality Counts
DATA THAT DRIVES COMMUNITIES









15-Min Count Period Beginning At	Rosewood Dr (Northbound)				Rosewood Dr (Southbound)				Fawn Dr (Eastbound)				Fawn Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	132	0	0	0	189	17	0	7	0	3	0	0	0	0	0	350	
4:15 PM	1	138	0	0	0	216	25	0	11	0	1	0	0	0	0	0	392	
4:30 PM	2	146	0	0	0	216	10	0	15	0	1	0	0	0	0	0	390	
4:45 PM	4	107	0	0	0	239	16	0	17	0	0	0	0	0	0	0	383	1515
5:00 PM	3	140	0	0	0	227	20	0	8	0	1	0	0	0	0	0	399	1564
5:15 PM	4	167	0	0	0	247	28	0	19	0	2	0	0	0	0	0	467	1639
5:30 PM	1	146	0	0	0	217	21	0	19	0	2	0	0	0	0	0	406	1655
5:45 PM	2	155	0	0	0	200	19	0	11	0	1	0	0	0	0	0	388	1660

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	16	668	0	0	0	988	112	0	76	0	8	0	0	0	0	0	1868
Heavy Trucks	0	4	0		0	16	0		0	0	0		0	0	0		20
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

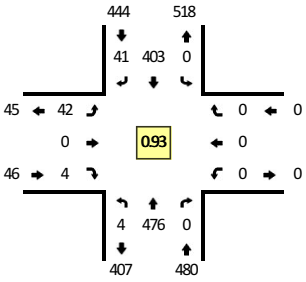
Comments:

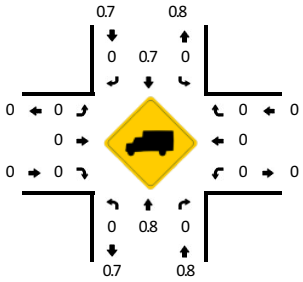
Report generated on 9/14/2022 11:26 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

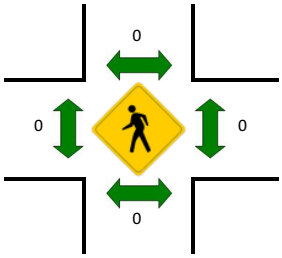
LOCATION: Rosewood Dr -- Fawn Dr | **QC JOB #:** 15913132
CITY/STATE: Killeen, TX | **DATE:** Wed, Aug 31 2022

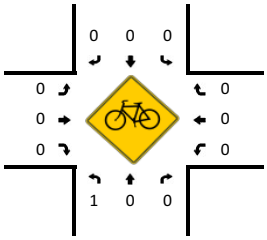
Peak-Hour: 12:00 PM -- 1:00 PM
Peak 15-Min: 12:45 PM -- 1:00 PM

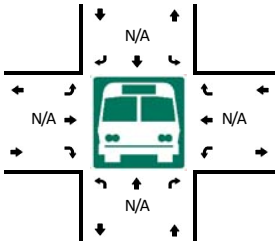


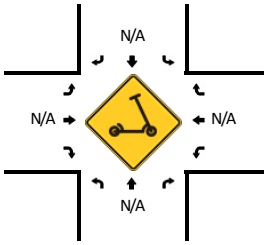


Quality Counts
DATA THAT DRIVES COMMUNITIES









15-Min Count Period Beginning At	Rosewood Dr (Northbound)				Rosewood Dr (Southbound)				Fawn Dr (Eastbound)				Fawn Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:00 AM	1	88	0	0	0	77	9	0	12	0	0	0	0	0	0	0	187	
11:15 AM	0	104	0	0	0	78	9	0	10	0	1	0	0	0	0	0	202	
11:30 AM	0	97	0	0	0	87	10	0	15	0	1	0	0	0	0	0	210	
11:45 AM	2	115	0	0	0	112	6	0	9	0	1	0	0	0	0	0	245	844
12:00 PM	0	94	0	0	0	98	17	0	9	0	0	0	0	0	0	0	218	875
12:15 PM	0	131	0	0	0	97	6	0	8	0	2	0	0	0	0	0	244	917
12:30 PM	2	141	0	0	0	87	6	0	12	0	0	0	0	0	0	0	248	955
12:45 PM	2	110	0	0	0	121	12	0	13	0	2	0	0	0	0	0	260	970

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	8	440	0	0	0	484	48	0	52	0	8	0	0	0	0	0	1040
Heavy Trucks	0	0	0		0	4	0		0	0	0		0	0	0		4
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 9/14/2022 11:26 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

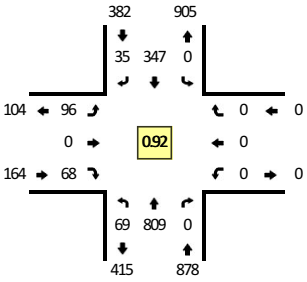
Type of peak hour being reported: Intersection Peak

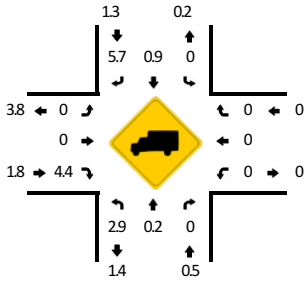
Method for determining peak hour: Total Entering Volume

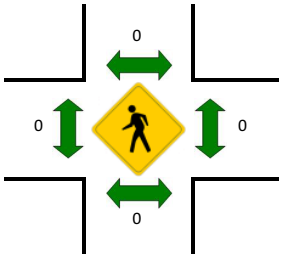
LOCATION: Rosewood Dr -- Aspen Dr
CITY/STATE: Killeen, TX

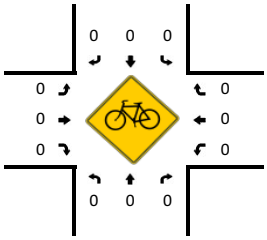
QC JOB #: 15913133
DATE: Wed, Aug 31 2022

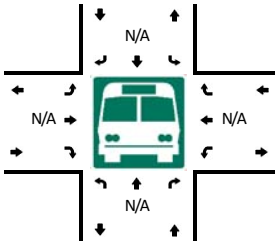
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:15 AM -- 7:30 AM

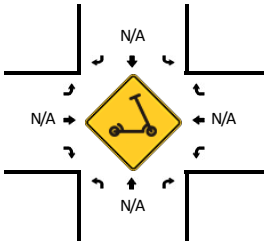












15-Min Count Period Beginning At	Rosewood Dr (Northbound)				Rosewood Dr (Southbound)				Aspen Dr (Eastbound)				Aspen Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	34	210	0	0	0	70	14	0	27	0	26	0	0	0	0	0	381	
7:15 AM	24	218	0	0	0	69	6	0	39	0	32	0	0	0	0	0	388	
7:30 AM	3	210	0	0	0	91	7	0	16	0	4	0	0	0	0	0	331	
7:45 AM	8	171	0	0	0	117	8	0	14	0	6	0	0	0	0	0	324	1424
8:00 AM	2	138	0	0	0	77	4	0	7	0	6	0	0	0	0	0	234	1277
8:15 AM	2	148	0	0	0	76	1	0	13	0	1	0	0	0	0	0	241	1130
8:30 AM	1	183	0	0	0	62	7	0	13	0	3	0	0	0	0	0	269	1068
8:45 AM	3	179	0	0	0	54	2	0	9	0	1	0	0	0	0	0	248	992

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	96	872	0	0	0	276	24	0	156	0	128	0	0	0	0	0	1552
Heavy Trucks	0	0	0		0	0	0		0	0	4		0	0	0		4
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

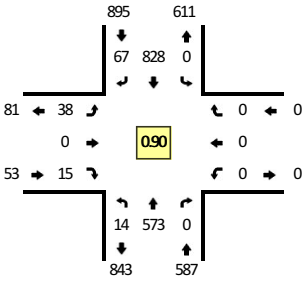
Report generated on 9/14/2022 11:26 AM

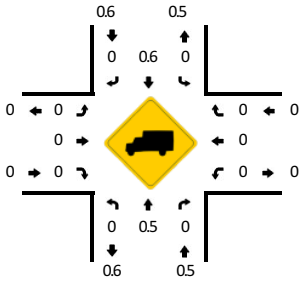
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

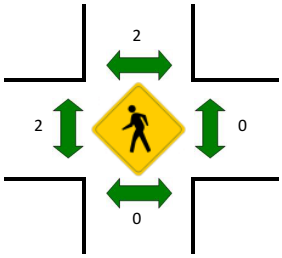
LOCATION: Rosewood Dr -- Aspen Dr | **QC JOB #:** 15913134
CITY/STATE: Killeen, TX | **DATE:** Wed, Aug 31 2022

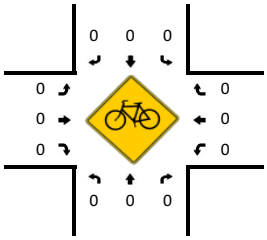
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

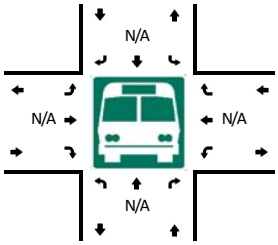


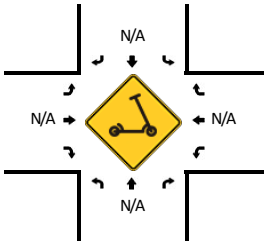


Quality Counts
DATA THAT DRIVES COMMUNITIES









15-Min Count Period Beginning At	Rosewood Dr (Northbound)				Rosewood Dr (Southbound)				Aspen Dr (Eastbound)				Aspen Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	3	113	0	0	0	181	15	0	16	0	1	0	0	0	0	0	329	
4:15 PM	3	126	0	0	0	203	15	0	13	0	1	0	0	0	0	0	361	
4:30 PM	7	133	0	0	0	202	14	0	12	0	0	0	0	0	0	0	368	
4:45 PM	3	102	0	0	0	215	17	0	8	0	5	0	0	0	0	0	350	1408
5:00 PM	1	135	0	0	0	212	17	0	11	0	4	0	0	0	0	0	380	1459
5:15 PM	4	159	0	0	0	230	20	0	11	0	2	0	0	0	0	0	426	1524
5:30 PM	5	137	0	0	0	202	15	0	7	0	6	0	0	0	0	0	372	1528
5:45 PM	4	142	0	0	0	184	15	0	9	0	3	0	0	0	0	0	357	1535

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	16	636	0	0	0	920	80	0	44	0	8	0	0	0	0	0	1704
Heavy Trucks	0	0	0		0	12	0		0	0	0		0	0	0		12
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

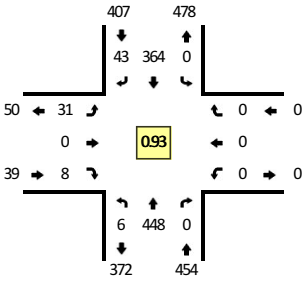
Comments:

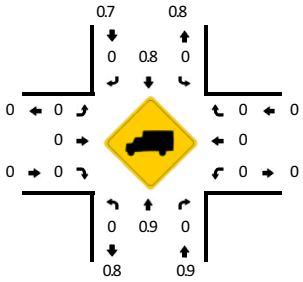
Report generated on 9/14/2022 11:26 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

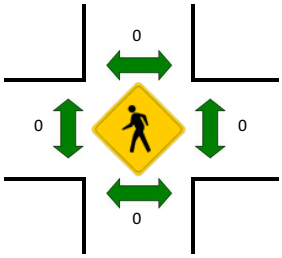
LOCATION: Rosewood Dr -- Aspen Dr | **QC JOB #:** 15913135
CITY/STATE: Killeen, TX | **DATE:** Wed, Aug 31 2022

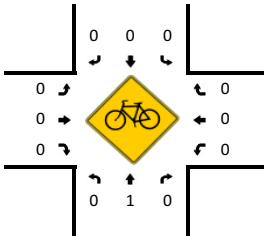
Peak-Hour: 12:00 PM -- 1:00 PM
Peak 15-Min: 12:45 PM -- 1:00 PM

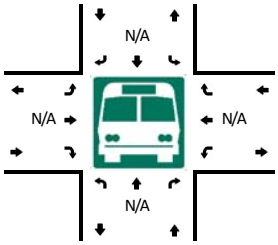


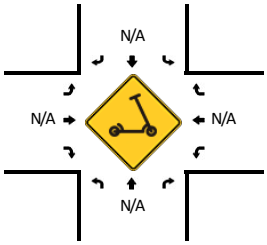


Quality Counts
DATA THAT DRIVES COMMUNITIES









15-Min Count Period Beginning At	Rosewood Dr (Northbound)				Rosewood Dr (Southbound)				Aspen Dr (Eastbound)				Aspen Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:00 AM	1	82	0	0	0	67	10	0	5	0	1	0	0	0	0	0	166	
11:15 AM	4	98	0	0	0	67	11	0	7	0	1	0	0	0	0	0	188	
11:30 AM	2	91	0	0	0	82	7	0	5	0	1	0	0	0	0	0	188	
11:45 AM	4	112	0	0	0	103	5	0	11	0	0	0	0	0	0	0	235	777
12:00 PM	1	90	0	0	0	87	9	0	6	0	2	0	0	0	0	0	195	806
12:15 PM	3	117	0	0	0	90	10	0	6	0	2	0	0	0	0	0	228	846
12:30 PM	2	135	0	0	0	80	7	0	8	0	2	1	0	0	0	0	235	893
12:45 PM	0	106	0	0	0	107	17	0	10	0	2	0	0	0	0	0	242	900

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	424	0	0	0	428	68	0	40	0	8	0	0	0	0	0	968
Heavy Trucks	0	4	0		0	4	0		0	0	0		0	0	0		8
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 9/14/2022 11:26 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

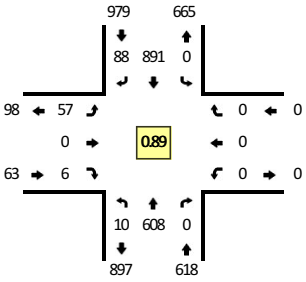
Type of peak hour being reported: Intersection Peak

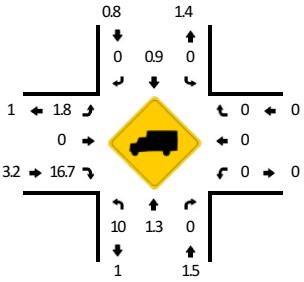
Method for determining peak hour: Total Entering Volume

LOCATION: Rosewood Dr -- Fawn Dr
CITY/STATE: Killeen, TX

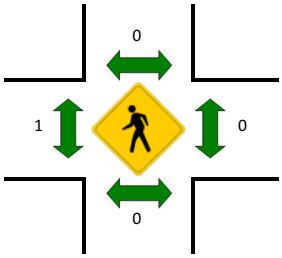
QC JOB #: 15913109
DATE: Wed, Aug 31 2022

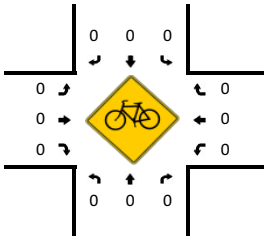
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

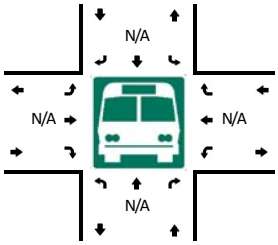


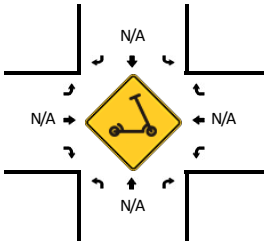


Quality Counts
DATA THAT DRIVES COMMUNITIES









15-Min Count Period Beginning At	Rosewood Dr (Northbound)				Rosewood Dr (Southbound)				Fawn Dr (Eastbound)				Fawn Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	0	166	0	0	0	64	10	0	21	0	0	0	0	0	0	0	261	
6:45 AM	7	184	0	0	0	91	14	0	22	0	1	0	0	0	0	0	319	
7:00 AM	0	232	0	0	0	84	18	0	33	0	2	0	0	0	0	0	369	
7:15 AM	4	258	0	0	0	74	19	0	32	0	2	0	0	0	0	0	389	1338
7:30 AM	1	220	0	0	0	99	11	0	17	0	0	0	0	0	0	0	348	1425
7:45 AM	1	191	0	0	0	119	7	0	19	0	2	0	0	0	0	0	339	1445
8:00 AM	3	137	0	0	0	80	8	0	19	0	3	0	0	0	0	0	250	1326
8:15 AM	0	169	0	0	0	75	5	0	17	0	3	0	0	0	0	0	269	1206
8:30 AM	0	197	0	0	0	66	4	0	15	0	0	0	0	0	0	0	282	1140
8:45 AM	1	188	0	0	0	58	6	0	12	0	0	0	0	0	0	0	265	1066
9:00 AM	1	139	0	0	0	76	3	0	11	0	0	0	0	0	0	0	230	1046
9:15 AM	0	120	0	0	0	51	4	0	16	0	0	0	0	0	0	0	191	968
9:30 AM	1	119	0	0	0	64	7	0	13	0	1	0	0	0	0	0	205	891
9:45 AM	2	121	0	0	0	70	8	0	11	0	0	0	0	0	0	0	212	838
10:00 AM	2	118	0	0	0	77	5	0	7	0	1	0	0	0	0	0	210	818
10:15 AM	1	85	0	0	0	87	11	0	9	0	1	0	0	0	0	0	194	821
10:30 AM	0	118	0	0	0	80	4	0	9	0	1	0	0	0	0	0	212	828
10:45 AM	1	107	0	0	0	78	8	0	8	0	0	0	0	0	0	0	202	818
11:00 AM	1	88	0	0	0	77	9	0	12	0	0	0	0	0	0	0	187	795
11:15 AM	0	104	0	0	0	78	9	0	10	0	1	0	0	0	0	0	202	803
11:30 AM	0	97	0	0	0	87	10	0	15	0	1	0	0	0	0	0	210	801
11:45 AM	2	115	0	0	0	112	6	0	9	0	1	0	0	0	0	0	245	844
12:00 PM	0	94	0	0	0	98	17	0	9	0	0	0	0	0	0	0	218	875
12:15 PM	0	131	0	0	0	97	6	0	8	0	2	0	0	0	0	0	244	917
12:30 PM	2	141	0	0	0	87	6	0	12	0	0	0	0	0	0	0	248	955
12:45 PM	2	110	0	0	0	121	12	0	13	0	2	0	0	0	0	0	260	970
1:00 PM	1	121	0	0	0	114	7	0	6	0	1	0	0	0	0	0	250	1002
1:15 PM	3	100	0	0	0	108	10	0	13	0	0	0	0	0	0	0	234	992
1:30 PM	1	105	0	0	0	95	8	0	8	0	1	0	0	0	0	0	218	962
1:45 PM	1	106	0	0	0	112	9	0	10	0	1	0	0	0	0	0	239	941
2:00 PM	1	94	0	0	0	107	7	0	7	0	1	0	0	0	0	0	217	908
2:15 PM	3	103	0	0	0	115	15	0	9	0	0	0	0	0	0	0	245	919
2:30 PM	4	103	0	0	0	149	12	0	4	0	0	0	0	0	0	0	272	973
2:45 PM	1	120	0	0	0	138	16	0	6	0	6	0	0	0	0	0	287	1021
3:00 PM	3	137	0	0	0	143	29	0	27	0	10	0	0	0	0	0	349	1153
3:15 PM	2	139	0	0	0	131	19	0	21	0	1	0	0	0	0	0	313	1221
3:30 PM	0	135	0	0	0	164	15	0	25	0	4	0	0	0	0	0	343	1292
3:45 PM	2	113	0	0	0	157	23	0	19	0	1	0	0	0	0	0	315	1320
4:00 PM	2	132	0	0	0	189	17	0	7	0	3	0	0	0	0	0	350	1321

15-Min Count Period Beginning At	Rosewood Dr (Northbound)				Rosewood Dr (Southbound)				Fawn Dr (Eastbound)				Fawn Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:15 PM	1	138	0	0	0	216	25	0	11	0	1	0	0	0	0	0	392	1400
4:30 PM	2	146	0	0	0	216	10	0	15	0	1	0	0	0	0	0	390	1447
4:45 PM	4	107	0	0	0	239	16	0	17	0	0	0	0	0	0	0	383	1515
5:00 PM	3	140	0	0	0	227	20	0	8	0	1	0	0	0	0	0	399	1564
5:15 PM	4	167	0	0	0	247	28	0	19	0	2	0	0	0	0	0	467	1639
5:30 PM	1	146	0	0	0	217	21	0	19	0	2	0	0	0	0	0	406	1655
5:45 PM	2	155	0	0	0	200	19	0	11	0	1	0	0	0	0	0	388	1660
6:00 PM	0	132	0	0	0	165	18	0	18	0	0	0	0	0	0	0	333	1594
6:15 PM	2	156	0	0	0	152	17	0	9	0	1	0	0	0	0	0	337	1464

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	16	668	0	0	0	988	112	0	76	0	8	0	0	0	0	0	1868
Heavy Trucks	0	4	0		0	16	0		0	0	0		0	0	0		20
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 9/14/2022 11:30 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Rosewood Dr -- Aspen Dr

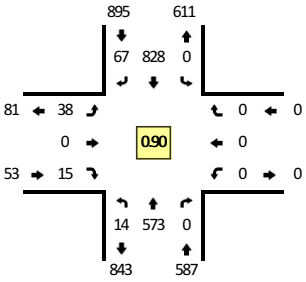
CITY/STATE: Killeen, TX

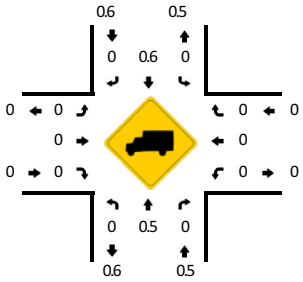
QC JOB #: 15913110

DATE: Wed, Aug 31 2022

Peak-Hour: 5:00 PM -- 6:00 PM

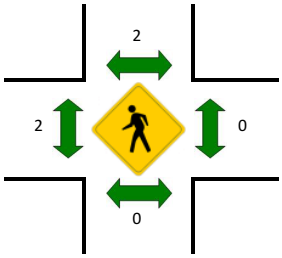
Peak 15-Min: 5:15 PM -- 5:30 PM

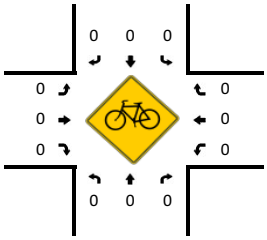


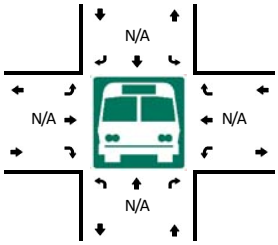


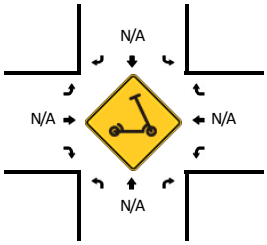
Quality Counts

DATA THAT DRIVES COMMUNITIES









15-Min Count Period Beginning At	Rosewood Dr (Northbound)				Rosewood Dr (Southbound)				Aspen Dr (Eastbound)				Aspen Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	8	153	0	0	0	56	10	0	11	0	6	0	0	0	0	0	244	
6:45 AM	25	190	0	0	0	68	26	0	12	0	0	0	0	0	0	0	321	
7:00 AM	34	210	0	0	0	70	14	0	27	0	26	0	0	0	0	0	381	
7:15 AM	24	218	0	0	0	69	6	0	39	0	32	0	0	0	0	0	388	1334
7:30 AM	3	210	0	0	0	91	7	0	16	0	4	0	0	0	0	0	331	1421
7:45 AM	8	171	0	0	0	117	8	0	14	0	6	0	0	0	0	0	324	1424
8:00 AM	2	138	0	0	0	77	4	0	7	0	6	0	0	0	0	0	234	1277
8:15 AM	2	148	0	0	0	76	1	0	13	0	1	0	0	0	0	0	241	1130
8:30 AM	1	183	0	0	0	62	7	0	13	0	3	0	0	0	0	0	269	1068
8:45 AM	3	179	0	0	0	54	2	0	9	0	1	0	0	0	0	0	248	992
9:00 AM	1	127	0	0	0	73	5	0	10	0	1	0	0	0	0	0	217	975
9:15 AM	3	117	0	0	0	45	5	0	8	0	0	0	0	0	0	0	178	912
9:30 AM	3	106	0	0	0	61	4	0	4	0	0	0	0	0	0	0	178	821
9:45 AM	2	116	0	0	0	66	4	0	10	0	3	0	0	0	0	0	201	774
10:00 AM	1	107	0	0	0	68	9	0	12	0	2	0	0	0	0	0	199	756
10:15 AM	2	79	0	0	0	78	8	0	9	0	2	0	0	0	0	0	178	756
10:30 AM	2	111	0	0	0	76	5	0	9	0	1	0	0	0	0	0	204	782
10:45 AM	1	103	0	0	0	72	8	0	7	0	4	1	0	0	0	0	196	777
11:00 AM	1	82	0	0	0	67	10	0	5	0	1	0	0	0	0	0	166	744
11:15 AM	4	98	0	0	0	67	11	0	7	0	1	0	0	0	0	0	188	754
11:30 AM	2	91	0	0	0	82	7	0	5	0	1	0	0	0	0	0	188	738
11:45 AM	4	112	0	0	0	103	5	0	11	0	0	0	0	0	0	0	235	777
12:00 PM	1	90	0	0	0	87	9	0	6	0	2	0	0	0	0	0	195	806
12:15 PM	3	117	0	0	0	90	10	0	6	0	2	0	0	0	0	0	228	846
12:30 PM	2	135	0	0	0	80	7	0	8	0	2	1	0	0	0	0	235	893
12:45 PM	0	106	0	0	0	107	17	0	10	0	2	0	0	0	0	0	242	900
1:00 PM	4	114	0	0	0	103	10	0	10	0	4	0	0	0	0	0	245	950
1:15 PM	3	84	0	0	0	100	10	0	12	0	2	0	0	0	0	0	211	933
1:30 PM	3	102	0	0	0	87	7	0	5	0	0	0	0	0	0	0	204	902
1:45 PM	5	96	0	0	0	101	9	0	11	0	4	0	0	0	0	0	226	886
2:00 PM	2	86	0	0	0	95	13	0	10	0	2	0	0	0	0	0	208	849
2:15 PM	2	97	0	0	0	103	13	0	10	0	2	0	0	0	0	0	227	865
2:30 PM	11	101	0	0	0	137	12	0	10	0	0	0	0	0	0	0	271	932
2:45 PM	10	114	0	0	0	123	18	0	5	0	5	0	0	0	0	0	275	981
3:00 PM	4	115	0	0	0	137	19	0	26	0	38	0	0	0	0	0	339	1112
3:15 PM	1	128	0	0	0	122	10	0	12	0	4	0	0	0	0	0	277	1162
3:30 PM	5	121	0	0	0	148	19	0	10	0	4	0	0	0	0	0	307	1198
3:45 PM	3	101	0	0	0	145	6	0	17	0	7	0	0	0	0	0	279	1202
4:00 PM	3	113	0	0	0	181	15	0	16	0	1	0	0	0	0	0	329	1192

15-Min Count Period Beginning At	Rosewood Dr (Northbound)				Rosewood Dr (Southbound)				Aspen Dr (Eastbound)				Aspen Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:15 PM	3	126	0	0	0	203	15	0	13	0	1	0	0	0	0	0	361	1276
4:30 PM	7	133	0	0	0	202	14	0	12	0	0	0	0	0	0	0	368	1337
4:45 PM	3	102	0	0	0	215	17	0	8	0	5	0	0	0	0	0	350	1408
5:00 PM	1	135	0	0	0	212	17	0	11	0	4	0	0	0	0	0	380	1459
5:15 PM	4	159	0	0	0	230	20	0	11	0	2	0	0	0	0	0	426	1524
5:30 PM	5	137	0	0	0	202	15	0	7	0	6	0	0	0	0	0	372	1528
5:45 PM	4	142	0	0	0	184	15	0	9	0	3	0	0	0	0	0	357	1535
6:00 PM	4	125	0	0	0	152	14	0	8	0	2	0	0	0	0	0	305	1460
6:15 PM	3	148	0	0	0	133	16	0	11	0	3	0	0	0	0	0	314	1348

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	16	636	0	0	0	920	80	0	44	0	8	0	0	0	0	0	1704
Heavy Trucks	0	0	0		0	12	0		0	0	0		0	0	0		12
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 9/14/2022 11:30 AM

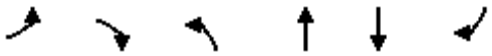
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Appendix B: Photo Log

Rosewood Drive & Fawn Drive – Eastbound Approach

Rosewood Drive & Fawn Drive – Southbound Approach

Appendix C: Synchro Reports



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	101	6	6	901	376	55
Future Volume (vph)	101	6	6	901	376	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	200			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt	0.992				0.981	
Flt Protected	0.955		0.950			
Satd. Flow (prot)	1765	0	1770	3539	3472	0
Flt Permitted	0.955		0.950			
Satd. Flow (perm)	1765	0	1770	3539	3472	0
Link Speed (mph)	30			35	35	
Link Distance (ft)	863			1592	448	
Travel Time (s)	19.6			31.0	8.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	110	7	7	979	409	60
Shared Lane Traffic (%)						
Lane Group Flow (vph)	117	0	7	979	469	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 37.5%		ICU Level of Service A	
Analysis Period (min) 15			

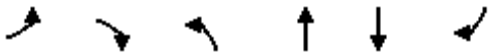
Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	101	6	6	901	376	55
Future Vol, veh/h	101	6	6	901	376	55
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	110	7	7	979	409	60

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	943	235	469	0	-	0
Stage 1	439	-	-	-	-	-
Stage 2	504	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	261	767	1089	-	-	-
Stage 1	617	-	-	-	-	-
Stage 2	572	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	259	767	1089	-	-	-
Mov Cap-2 Maneuver	259	-	-	-	-	-
Stage 1	613	-	-	-	-	-
Stage 2	572	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	28.2	0.1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1089	-	269	-	-
HCM Lane V/C Ratio	0.006	-	0.432	-	-
HCM Control Delay (s)	8.3	-	28.2	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0	-	2.1	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	96	68	69	809	347	35
Future Volume (vph)	96	68	69	809	347	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	200			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt	0.944				0.986	
Flt Protected	0.972		0.950			
Satd. Flow (prot)	1709	0	1770	3539	3490	0
Flt Permitted	0.972		0.950			
Satd. Flow (perm)	1709	0	1770	3539	3490	0
Link Speed (mph)	30			35	35	
Link Distance (ft)	1027			649	1592	
Travel Time (s)	23.3			12.6	31.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	104	74	75	879	377	38
Shared Lane Traffic (%)						
Lane Group Flow (vph)	178	0	75	879	415	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 38.5%		ICU Level of Service A	
Analysis Period (min) 15			

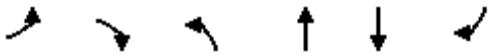
Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	96	68	69	809	347	35
Future Vol, veh/h	96	68	69	809	347	35
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	104	74	75	879	377	38

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	986	208	415	0	-	0
Stage 1	396	-	-	-	-	-
Stage 2	590	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	245	798	1140	-	-	-
Stage 1	649	-	-	-	-	-
Stage 2	517	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	229	798	1140	-	-	-
Mov Cap-2 Maneuver	229	-	-	-	-	-
Stage 1	606	-	-	-	-	-
Stage 2	517	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	28.7	0.7	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1140	-	325	-	-
HCM Lane V/C Ratio	0.066	-	0.548	-	-
HCM Control Delay (s)	8.4	-	28.7	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0.2	-	3.1	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	57	6	10	608	891	88
Future Volume (vph)	57	6	10	608	891	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	200			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt	0.986				0.986	
Flt Protected	0.957		0.950			
Satd. Flow (prot)	1758	0	1770	3539	3490	0
Flt Permitted	0.957		0.950			
Satd. Flow (perm)	1758	0	1770	3539	3490	0
Link Speed (mph)	30			35	35	
Link Distance (ft)	863			1592	448	
Travel Time (s)	19.6			31.0	8.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	62	7	11	661	968	96
Shared Lane Traffic (%)						
Lane Group Flow (vph)	69	0	11	661	1064	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 37.6%		ICU Level of Service A	
Analysis Period (min) 15			

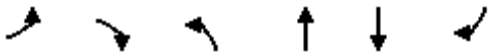
Intersection	
Int Delay, s/veh	2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	57	6	10	608	891	88
Future Vol, veh/h	57	6	10	608	891	88
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	62	7	11	661	968	96

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1369	532	1064	0	-	0
Stage 1	1016	-	-	-	-	-
Stage 2	353	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	138	492	651	-	-	-
Stage 1	310	-	-	-	-	-
Stage 2	682	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	136	492	651	-	-	-
Mov Cap-2 Maneuver	136	-	-	-	-	-
Stage 1	305	-	-	-	-	-
Stage 2	682	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	49.7	0.2	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	651	-	146	-	-
HCM Lane V/C Ratio	0.017	-	0.469	-	-
HCM Control Delay (s)	10.6	-	49.7	-	-
HCM Lane LOS	B	-	E	-	-
HCM 95th %tile Q(veh)	0.1	-	2.2	-	-



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	38	15	14	573	828	67
Future Volume (vph)	38	15	14	573	828	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	200			0
Storage Lanes	1	0	1			0
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt	0.962				0.989	
Flt Protected	0.965		0.950			
Satd. Flow (prot)	1729	0	1770	3539	3500	0
Flt Permitted	0.965		0.950			
Satd. Flow (perm)	1729	0	1770	3539	3500	0
Link Speed (mph)	30			35	35	
Link Distance (ft)	1027			649	1592	
Travel Time (s)	23.3			12.6	31.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	16	15	623	900	73
Shared Lane Traffic (%)						
Lane Group Flow (vph)	57	0	15	623	973	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 35.0%		ICU Level of Service A	
Analysis Period (min) 15			

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	38	15	14	573	828	67
Future Vol, veh/h	38	15	14	573	828	67
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	16	15	623	900	73

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1279	487	973	0	-	0
Stage 1	937	-	-	-	-	-
Stage 2	342	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	158	526	704	-	-	-
Stage 1	342	-	-	-	-	-
Stage 2	691	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	155	526	704	-	-	-
Mov Cap-2 Maneuver	155	-	-	-	-	-
Stage 1	335	-	-	-	-	-
Stage 2	691	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	31.2	0.2	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	704	-	194	-	-
HCM Lane V/C Ratio	0.022	-	0.297	-	-
HCM Control Delay (s)	10.2	-	31.2	-	-
HCM Lane LOS	B	-	D	-	-
HCM 95th %tile Q(veh)	0.1	-	1.2	-	-

Appendix D: Signal Warrants

Summary of Warrants

Intersection:	1		
Major Street:	Rosewood Drive	**Minor Street:**	Fawn Drive
Intersection:	Rosewood Drive & Fawn Drive		
City/Twp:	Austin ETJ		
Date Performed:	10/31/2022	**Performed By:**	Kimley-Horn
Date Volumes Collected:	12/8/2021		

Warrant	Condition	Is Warrant Met
WARRANT 1: Eight-Hour Vehicular Volume		**NO**
	Condition A	NO
	Condition B	NO
	Condition A&B	N/A
WARRANT 2: Four-Hour Vehicular Volume	(70%)	**YES**
WARRANT 3: Peak-Hour Vehicular Volume	(70%)	**YES**
	Condition A	**NO**
	Condition B	**YES**
WARRANT 4: Pedestrian Volume	(70%)	**NO**
	Four Hour	NO
	Peak Hour	NO
WARRANT 5: School Crossing		**N/A**
WARRANT 6: Coordinated Signal System		**NO**
WARRANT 7: Crash Experience		**NO**
	Condition A	NO
	Condition B	NO
WARRANT 8: Roadway Network		**NO**
WARRANT 9: Intersection Near a Grade Crossing		**NO**

Issue to Be Addressed by Signalization:

Reduce stop delay at intersection during peak weekday hours and mitigate safety issues correctible by a traffic signal.

Texas Manual on Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 1: Eight-Hour Vehicular Volume

Intersection:	Rosewood Drive & Fawn Drive		
Date	10/31/2022	by	Kimley-Horn

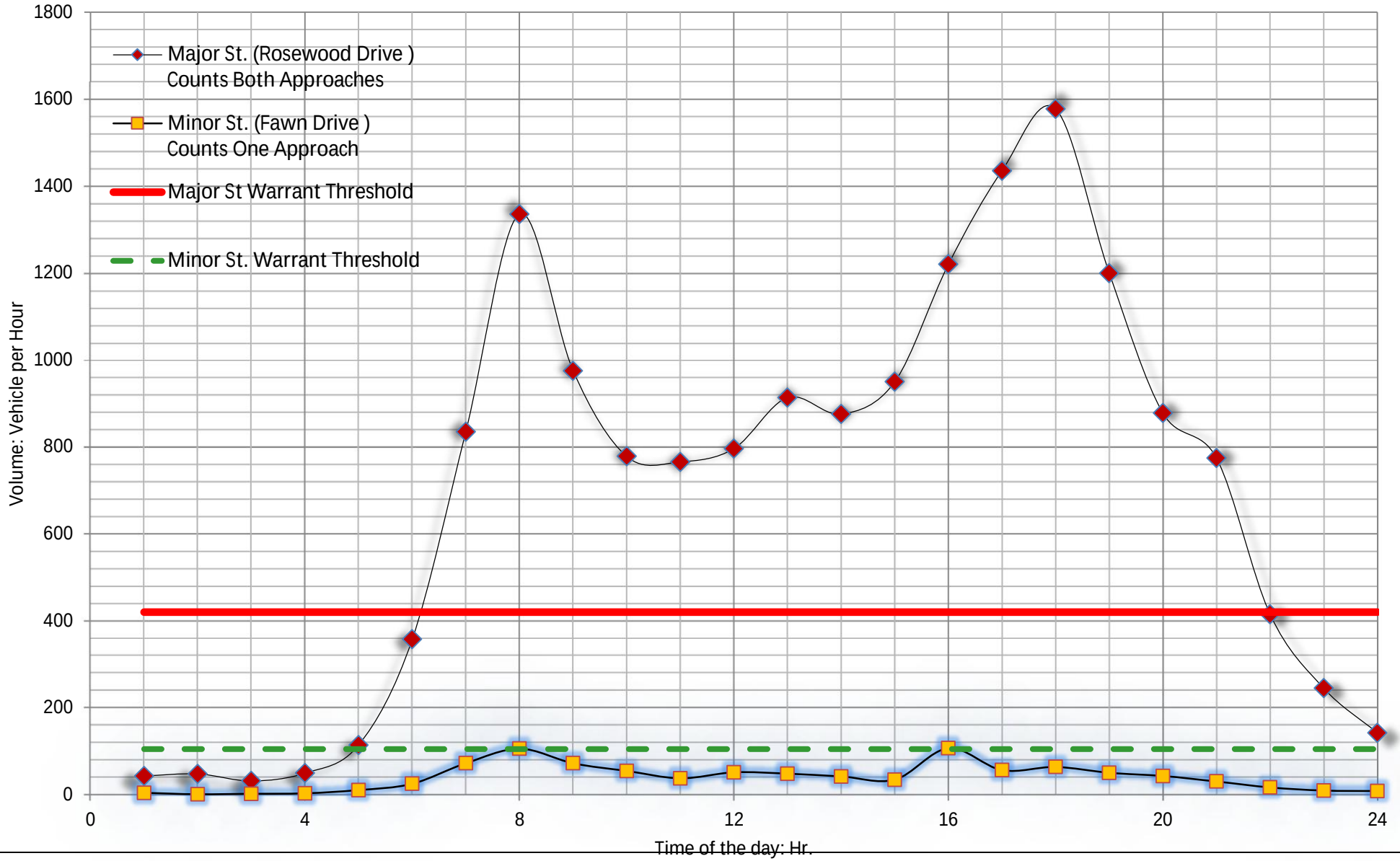
3	: No. of Lanes on Major St?
1	: No. of Lanes on Minor St?
45	: Speed limit or 85th Percentile? (MPH)
NO	: Is the intersection within an Isolated community?
	: if answer 4 is Yes, then what is the population of the isolated community?
NO	: Have other remedial measures been tried?

USE 70% WARRANTS 1A AND 1B. DO NOT USE COMBINATION OF A & B

	Major Volume (Both Apr.)	Minor Volume (One Apr.)	Condition A Major Volume	Condition A Minor Volume	Warrant Condition A Met?	Condition B Major Volume	Condition B Minor Volume	Warrant Condition B Met?	Combination Major A	Combination Minor A	Combination Major B	Combination Minor B	Warrant Condition A&B met?
Time	N-S	E-W	70%	70%		70%	70%		56%	56%	56%	56%	
00:01 - 01:00	43	4	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
01:00 - 02:00	48	1	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
02:00 - 03:00	32	2	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
03:00 - 04:00	50	3	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
04:00 - 05:00	114	10	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
05:00 - 06:00	358	25	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
06:00 - 07:00	835	72	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
07:00 - 08:00	1336	106	420	105	YES	630	53	YES	N/A	N/A	N/A	N/A	N/A
08:00 - 09:00	975	72	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
09:00 - 10:00	778	55	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
10:00 - 11:00	766	38	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
11:00 - 12:00	796	51	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
12:00 - 13:00	914	48	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
13:00 - 14:00	876	42	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
14:00 - 15:00	950	35	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
15:00 - 16:00	1220	107	420	105	YES	630	53	YES	N/A	N/A	N/A	N/A	N/A
16:00 - 17:00	1435	57	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
17:00 - 18:00	1578	64	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
18:00 - 19:00	1200	50	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
19:00 - 20:00	878	43	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
20:00 - 21:00	774	30	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
21:00 - 22:00	415	17	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
22:00 - 23:00	245	9	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
23:00 - 24:00	142	8	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A

Number of Hours that met the Warrant 1A =	2
Number of Hours that met the Warrant 1B =	7
Number of Hours that met the Combination Warrant 1A & 1B =	0

A. Is the Minimum Vehicular Volume Warrant Met? (Condition A)	NO
B. Is the Interruption of Continuous Traffic Met? (Condition B)	NO
C. Combination of Warrants A and B Criteria Met?	N/A



WARRANT 1A

IS THERE A REDUCTION IN THE WARRANT THRESHOLDS TO 70% ...

1- DUE TO SPEED? **YES**

2- DUE TO ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000? **NO**

Spot Number: **1**

Rosewood Drive & Fawn Drive

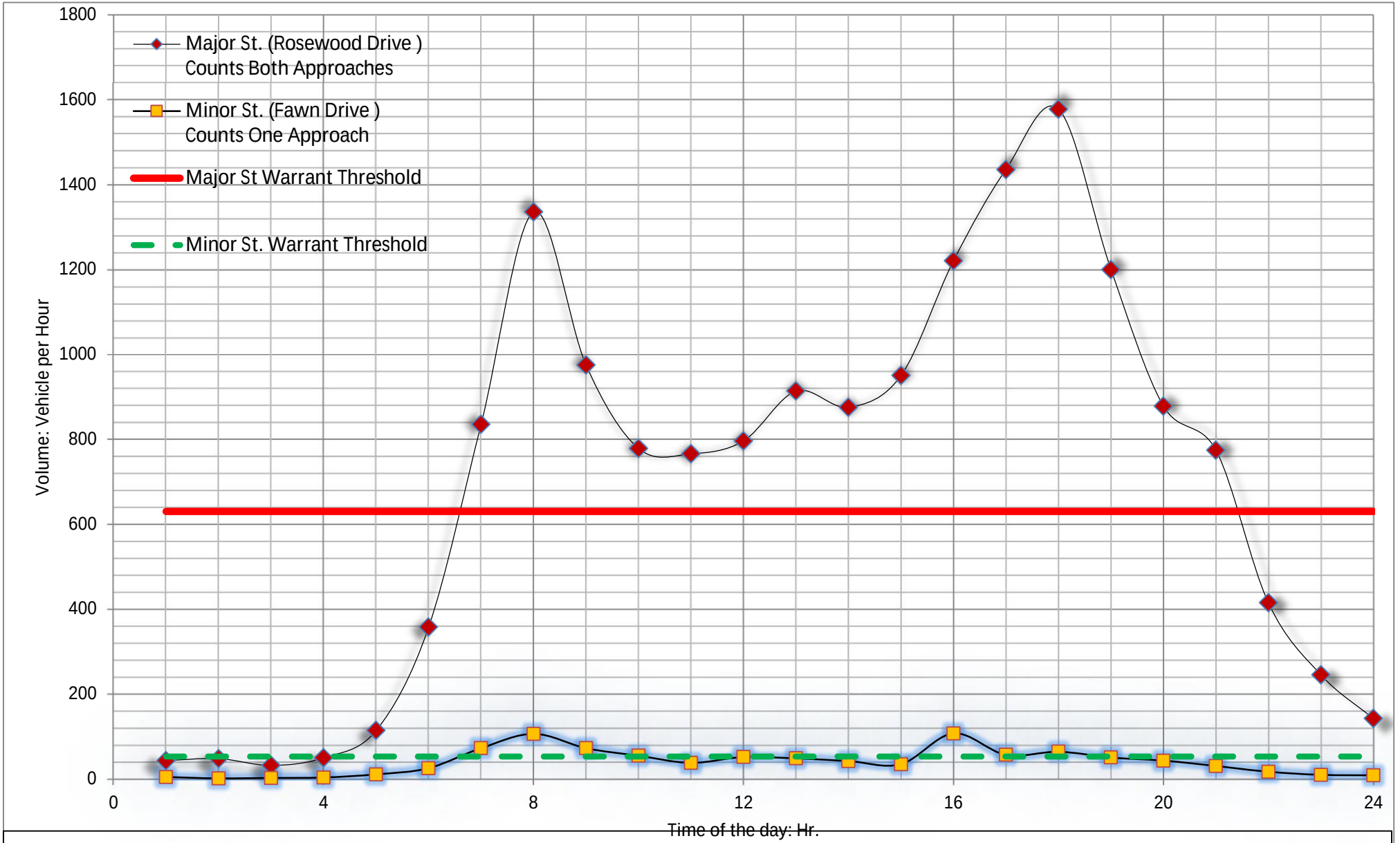
NO. OF LANES ON MAJOR ST.? **3**

NO. OF LANES ON MINOR ST.? **1**

Number of Hours that met the Warrant: **2**

Does this intersection meet Warrant 1A for signal installation? **NO**

Data Collection Date: **12/8/2021**



WARRANT 1B

IS THERE A REDUCTION IN THE WARRANT THRESHOLDS TO 70% ...

1- DUE TO SPEED? **YES**

2- DUE TO ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000? **NO**

Spot Number: **1**

Rosewood Drive & Fawn Drive

NO. OF LANES ON MAJOR ST.? **3**

NO. OF LANES ON MINOR ST.? **1**

Number of Hours that met the Warrant: **7**

Does this intersection meet Warrant 1B for signal installation? **NO**

Data Collection Date: **12/8/2021**

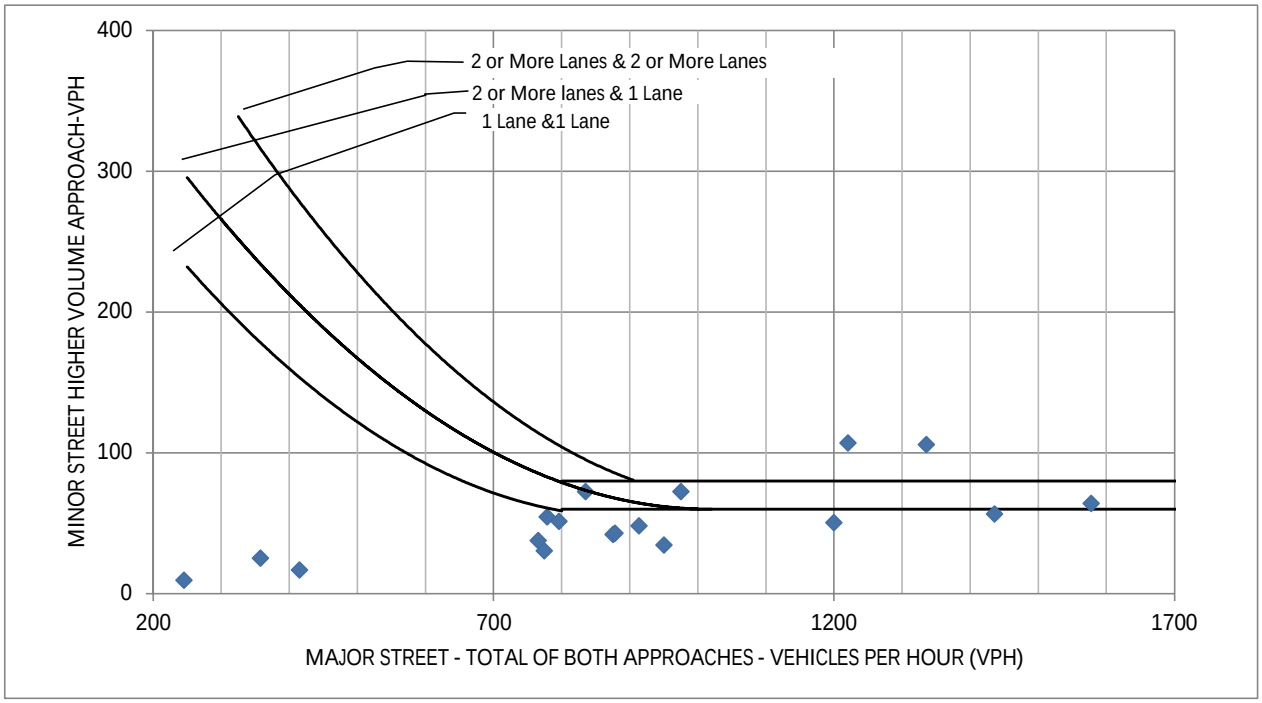
Texas Manual on Uniform Traffic Control Devices

Worksheet for Signal Warrants (Section 4C)

WARRANT 2: Four-Hour Vehicular Volume

Spot Number:	1		
Intersection:	Rosewood Drive & Fawn Drive		
Date	10/31/2022	by	Kimley-Horn

3	: No. of Lanes on Major St.
1	: No. of Lanes on Minor St.
45	: Speed limit or 85th Percentile? (MPH)
NO	: Is the intersection within an Isolated community?
	: What is the population of the isolated community?



How Many Hours Are Met	5
Is Warrant (70%) Met?	YES

Texas Manual on Uniform Traffic Control Devices

Worksheet for Signal Warrants (Section 4C)

WARRANT 3 A: Peak-Hour Vehicular Volume

Spot Number:	**1**		
Intersection:	**Rosewood Drive & Fawn Drive**		
Date	**10/31/2022**	by	**Kimley-Horn**

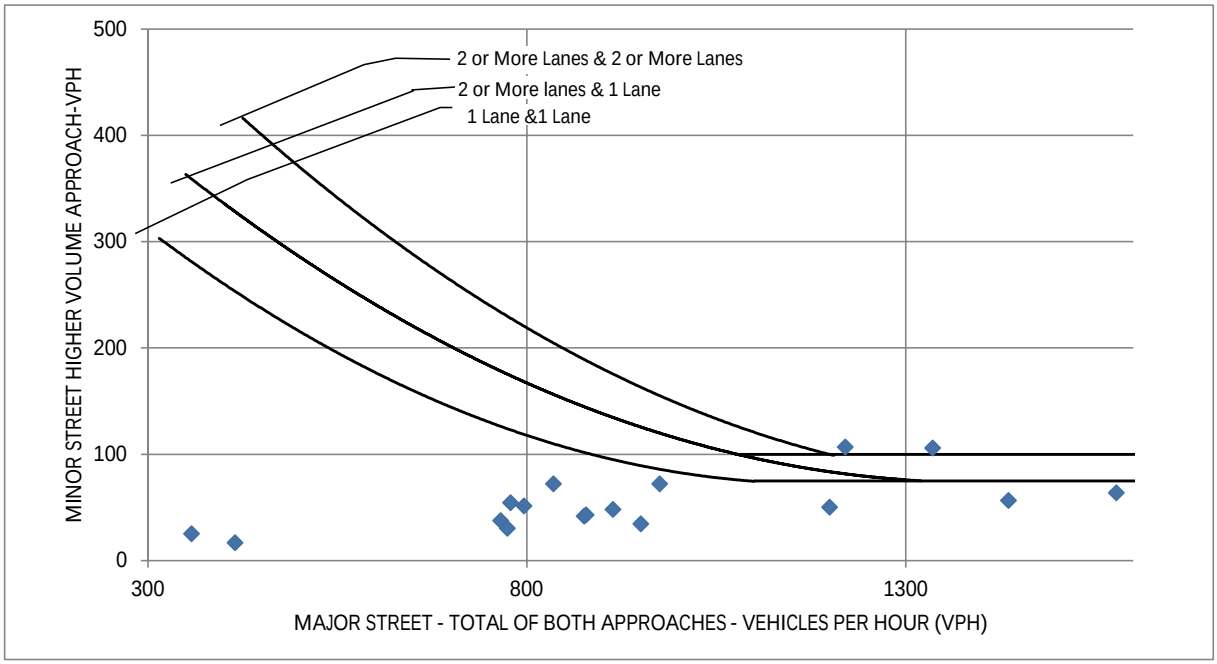
	49.7	**: Total Stop Time Delay (hrs)**
	1	**: Minor Street Approach Lanes**
	3	**: Total Approaches**
NOT MET	**64**	**: Minor Approach Volume**
	1642	**: Total Entering Volume**
	17:00 - 18:00	**: Peak Hour**

Is Warrant 3 A Met?	**NO**

Texas Manual on Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 3 B(70%): Peak-Hour Vehicular Volume

Spot Number:	1		
Intersection:	Rosewood Drive & Fawn Drive		
Date	10/31/2022	by	Kimley-Horn

3	: No. of Lanes on Major St.
1	: No. of Lanes on Minor St.
45	: Speed limit or 85th Percentile? (MPH)
NO	: Is the intersection within an Isolated community?
	: What is the population of the isolated community?



How Many Hours Are Met	2
Is Warrant (70%) Met?	YES

Texas Manual on Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 7: Crash Experience

Spot Number:	**1**		
Intersection:	**Rosewood Drive & Fawn Drive**		
Date	**10/31/2022**	**by**	**Kimley-Horn**

3	**: No. of Lanes on Major St?**
1	**: No. of Lanes on Minor St?**
NO	**: Has adequate trial of remedial measure with adequate enforcement been tried?**
NO	**: Are there 5 or more Crashes Susceptable to Correction by Signalization in a 12 Month Period?**

	Major Volume (Both Apr.)	Minor Volume (One Apr.)	Condition A Major Volume	Condition A Minor Volume	Warrant Condition A Met?	Condition B Major Volume	Condition B Minor Volume	Warrant Condition B Met?
Time	**N-S**	E-W						
00:00 - 01:00	43	4	336	84	**NO**	504	42	**NO**
01:00 - 02:00	48	1	336	84	**NO**	504	42	**NO**
02:00 - 03:00	32	2	336	84	**NO**	504	42	**NO**
03:00 - 04:00	50	3	336	84	**NO**	504	42	**NO**
04:00 - 05:00	114	10	336	84	**NO**	504	42	**NO**
05:00 - 06:00	358	25	336	84	**NO**	504	42	**NO**
06:00 - 07:00	835	72	336	84	**NO**	504	42	**YES**
07:00 - 08:00	1336	106	336	84	**YES**	504	42	**YES**
08:00 - 09:00	975	72	336	84	**NO**	504	42	**YES**
09:00 - 10:00	778	55	336	84	**NO**	504	42	**YES**
10:00 - 11:00	766	38	336	84	**NO**	504	42	**NO**
11:00 - 12:00	796	51	336	84	**NO**	504	42	**YES**
12:00 - 13:00	914	48	336	84	**NO**	504	42	**YES**
13:00 - 14:00	876	42	336	84	**NO**	504	42	**NO**
14:00 - 15:00	950	35	336	84	**NO**	504	42	**NO**
15:00 - 16:00	1220	107	336	84	**YES**	504	42	**YES**
16:00 - 17:00	1435	57	336	84	**NO**	504	42	**YES**
17:00 - 18:00	1578	64	336	84	**NO**	504	42	**YES**
18:00 - 19:00	1200	50	336	84	**NO**	504	42	**YES**
19:00 - 20:00	878	43	336	84	**NO**	504	42	**YES**
20:00 - 21:00	774	30	336	84	**NO**	504	42	**NO**
21:00 - 22:00	415	17	336	84	**NO**	504	42	**NO**
22:00 - 23:00	245	9	336	84	**NO**	504	42	**NO**
23:00 - 24:00	142	8	336	84	**NO**	504	42	**NO**

Is there a reduction in the warrant thresholds to 56% =	**NO**
Number of Hours that met the warrant 7A =	**2**
Number of Hours that met the warrant 7B =	**11**

A. Is the Minimum Vehicular Volume Warrant Met Based on Crash Patterns? (Condition A)	**NO**
B. Is the Interruption of Continuous Traffic Met Based on Crash Patterns? (Condition B)	**NO**

Summary of Warrants

Intersection:	2		
Major Street:	Rosewood Drive	**Minor Street:**	Aspen Drive
Intersection:	Rosewood Drive & Aspen Drive		
City/Twp:	Austin ETJ		
Date Performed:	10/31/2022	**Performed By:**	Kimley-Horn
Date Volumes Collected:	8/31/2022		

Warrant	Condition	Is Warrant Met
WARRANT 1: Eight-Hour Vehicular Volume		**NO**
	Condition A	NO
	Condition B	NO
	Condition A&B	N/A
WARRANT 2: Four-Hour Vehicular Volume	(70%)	**NO**
WARRANT 3: Peak-Hour Vehicular Volume	(70%)	**YES**
	Condition A	**NO**
	Condition B	**YES**
WARRANT 4: Pedestrian Volume	(70%)	**NO**
	Four Hour	NO
	Peak Hour	NO
WARRANT 5: School Crossing		**N/A**
WARRANT 6: Coordinated Signal System		**NO**
WARRANT 7: Crash Experience		**NO**
	Condition A	NO
	Condition B	NO
WARRANT 8: Roadway Network		**NO**
WARRANT 9: Intersection Near a Grade Crossing		**NO**

Issue to Be Addressed by Signalization:

Reduce stop delay at intersection during peak weekday hours and mitigate safety issues correctible by a traffic signal.

Texas Manual on Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 1: Eight-Hour Vehicular Volume

Intersection:	Rosewood Drive & Aspen Drive		
Date	10/31/2022	by	Kimley-Horn

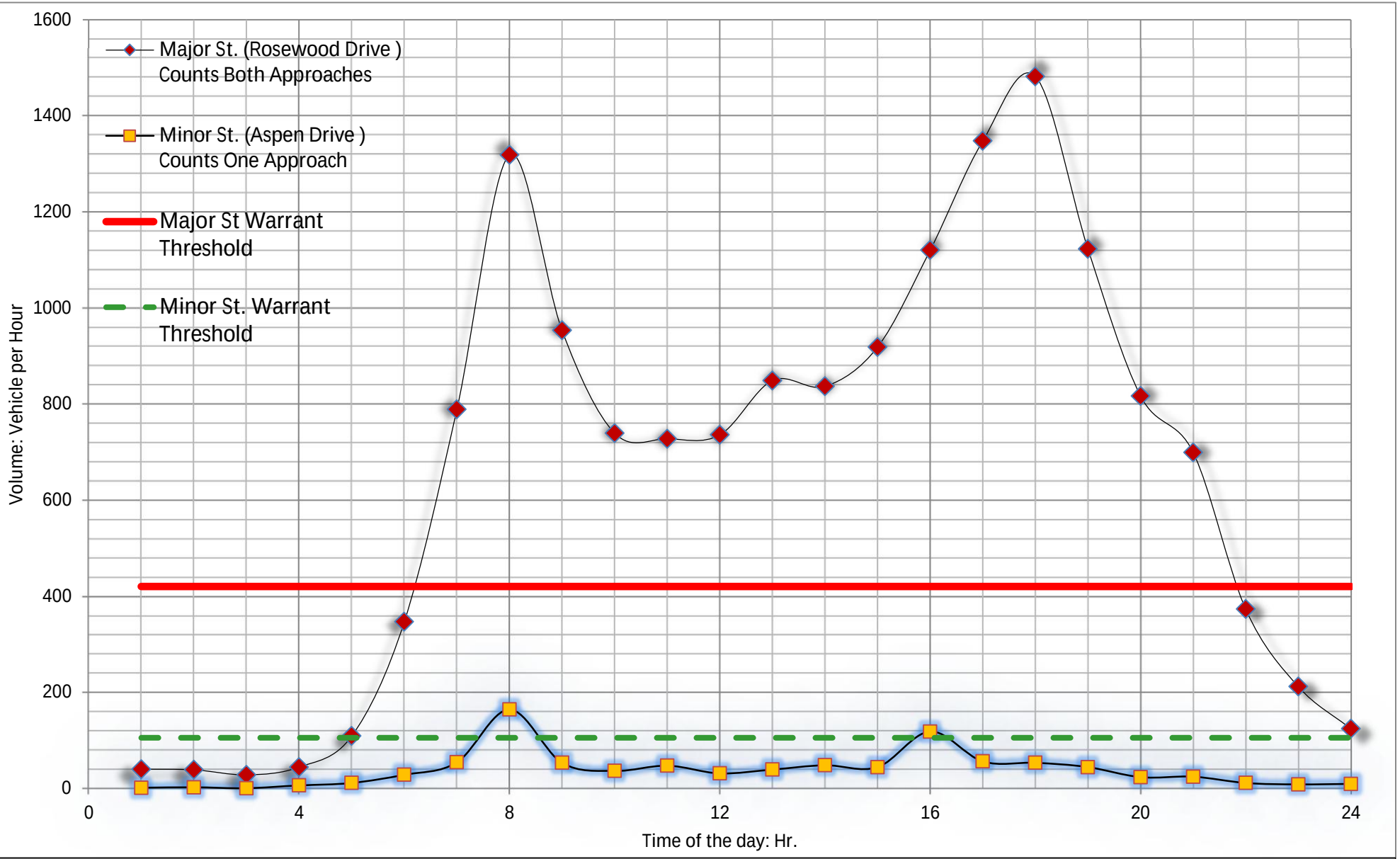
3	: No. of Lanes on Major St?
1	: No. of Lanes on Minor St?
45	: Speed limit or 85th Percentile? (MPH)
NO	: Is the intersection within an Isolated community?
	: if answer 4 is Yes, then what is the population of the isolated community?
NO	: Have other remedial measures been tried?

USE 70% WARRANTS 1A AND 1B. DO NOT USE COMBINATION OF A & B

	Major Volume (Both Apr.)	Minor Volume (One Apr.)	Condition A Major Volume	Condition A Minor Volume	Warrant Condition A Met?	Condition B Major Volume	Condition B Minor Volume	Warrant Condition B Met?	Combination Major A	Combination Minor A	Combination Major B	Combination Minor B	Warrant Condition A&B met?
Time	N-S	E-W	70%	70%		70%	70%		56%	56%	56%	56%	
00:01 - 01:00	40	1	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
01:00 - 02:00	38	2	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
02:00 - 03:00	28	0	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
03:00 - 04:00	44	6	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
04:00 - 05:00	109	11	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
05:00 - 06:00	347	28	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
06:00 - 07:00	789	54	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
07:00 - 08:00	1319	164	420	105	YES	630	53	YES	N/A	N/A	N/A	N/A	N/A
08:00 - 09:00	953	53	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
09:00 - 10:00	739	36	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
10:00 - 11:00	728	47	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
11:00 - 12:00	736	31	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
12:00 - 13:00	849	39	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
13:00 - 14:00	837	48	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
14:00 - 15:00	919	44	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
15:00 - 16:00	1120	118	420	105	YES	630	53	YES	N/A	N/A	N/A	N/A	N/A
16:00 - 17:00	1348	56	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
17:00 - 18:00	1482	53	420	105	NO	630	53	YES	N/A	N/A	N/A	N/A	N/A
18:00 - 19:00	1123	44	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
19:00 - 20:00	817	23	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
20:00 - 21:00	699	24	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
21:00 - 22:00	373	11	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
22:00 - 23:00	212	8	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A
23:00 - 24:00	124	9	420	105	NO	630	53	NO	N/A	N/A	N/A	N/A	N/A

Number of Hours that met the Warrant 1A =	2
Number of Hours that met the Warrant 1B =	6
Number of Hours that met the Combination Warrant 1A & 1B =	0

A. Is the Minimum Vehicular Volume Warrant Met? (Condition A)	NO
B. Is the Interruption of Continuous Traffic Met? (Condition B)	NO
C. Combination of Warrants A and B Criteria Met?	N/A



WARRANT 1A

IS THERE A REDUCTION IN THE WARRANT THRESHOLDS TO 70% ...

1- DUE TO SPEED? **YES**

2- DUE TO ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000? **NO**

Spot Number: **2**

Rosewood Drive & Aspen Drive

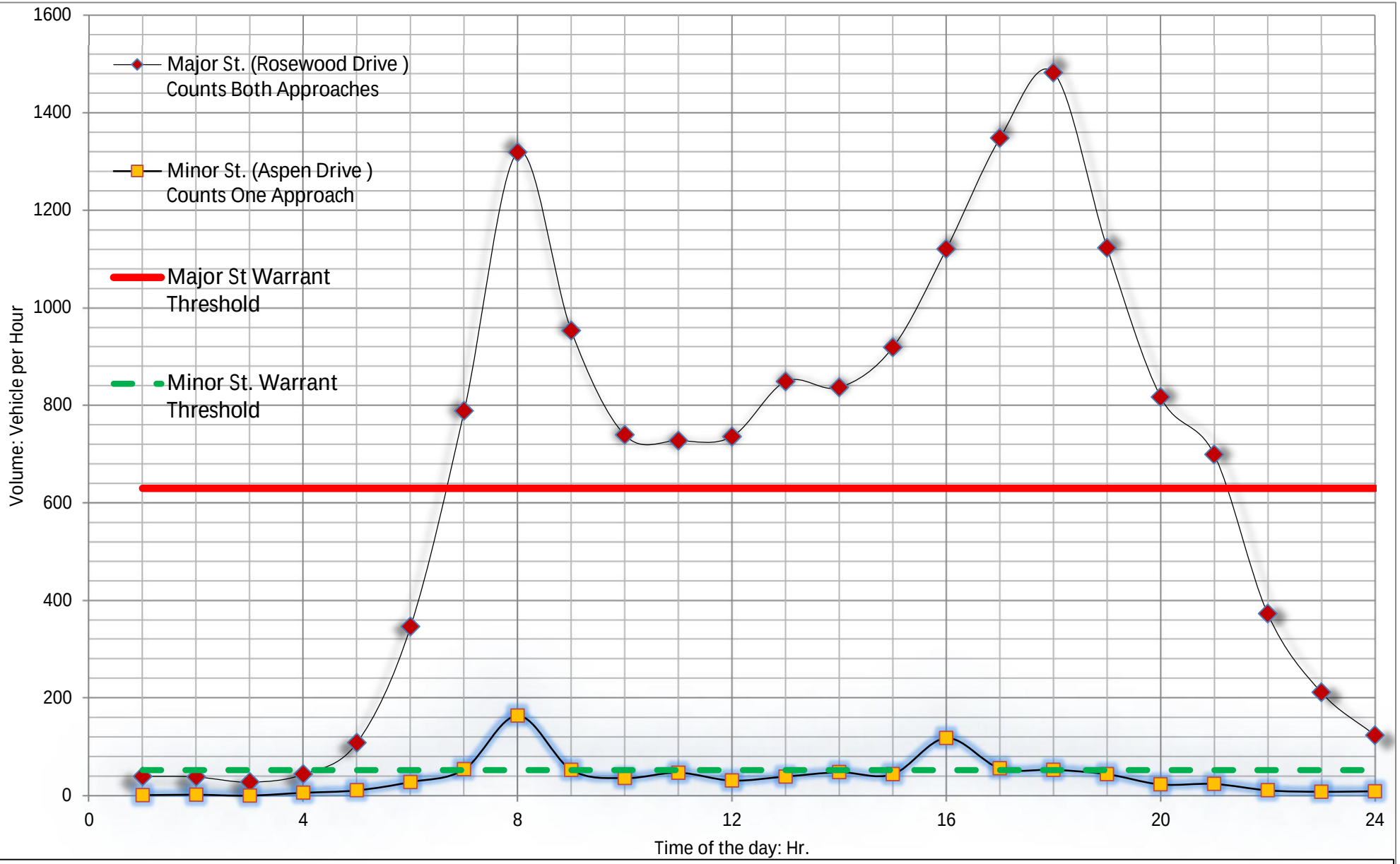
NO. OF LANES ON MAJOR ST.? **3**

NO. OF LANES ON MINOR ST.? **1**

Number of Hours that met the Warrant: **2**

Does this intersection meet Warrant 1A for signal installation? **NO**

Data Collection Date: **8/31/2022**



WARRANT 1B

IS THERE A REDUCTION IN THE WARRANT THRESHOLDS TO 70% ...

1- DUE TO SPEED? **YES**

2- DUE TO ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000? **NO**

Spot Number: **2**

Rosewood Drive & Aspen Drive

NO. OF LANES ON MAJOR ST.? **3**

NO. OF LANES ON MINOR ST.? **1**

Number of Hours that met the Warrant: **6**

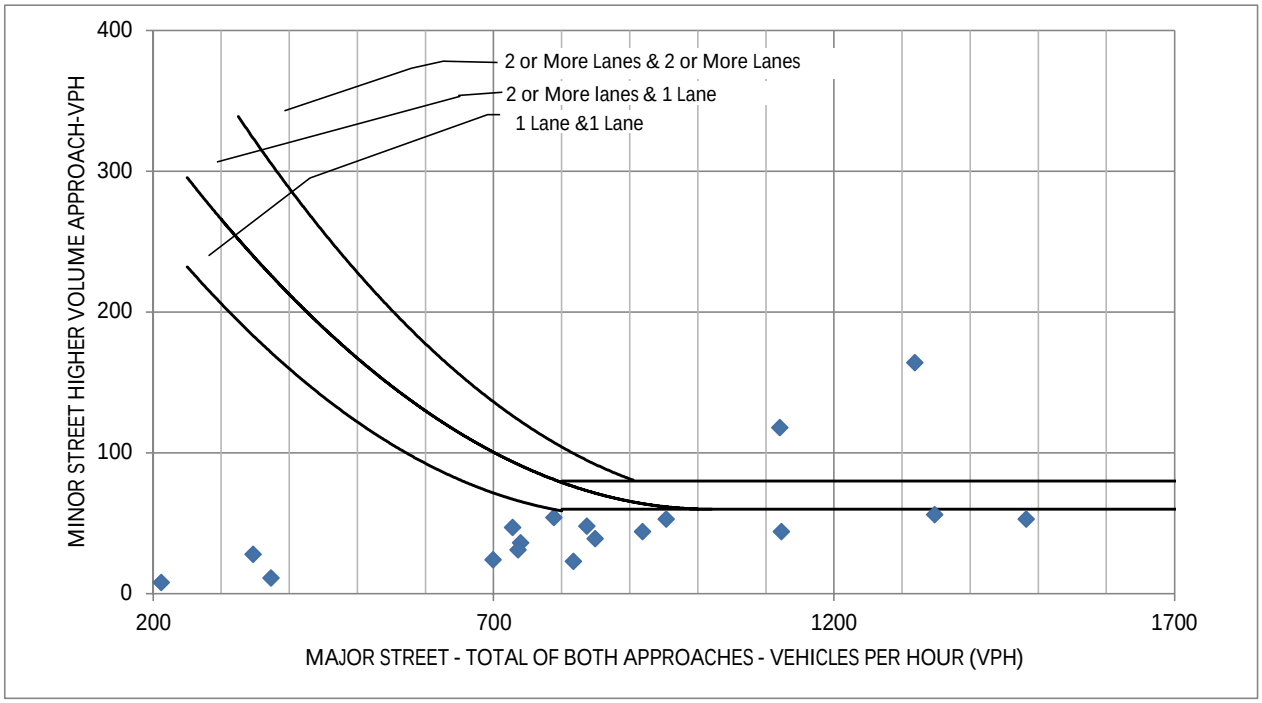
Does this intersection meet Warrant 1B for signal installation? **NO**

Data Collection Date: **8/31/2022**

Texas Manual on Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 2: Four-Hour Vehicular Volume

Spot Number:	2		
Intersection:	Rosewood Drive & Aspen Drive		
Date	10/31/2022	by	Kimley-Horn

3	: No. of Lanes on Major St.
1	: No. of Lanes on Minor St.
45	: Speed limit or 85th Percentile? (MPH)
NO	: Is the intersection within an Isolated community?
	: What is the population of the isolated community?



How Many Hours Are Met	2
Is Warrant (70%) Met?	NO

Texas Manual on Uniform Traffic Control Devices

Worksheet for Signal Warrants (Section 4C)

WARRANT 3 A: Peak-Hour Vehicular Volume

Spot Number:	**2**		
Intersection:	**Rosewood Drive & Aspen Drive**		
Date	**10/31/2022**	by	**Kimley-Horn**

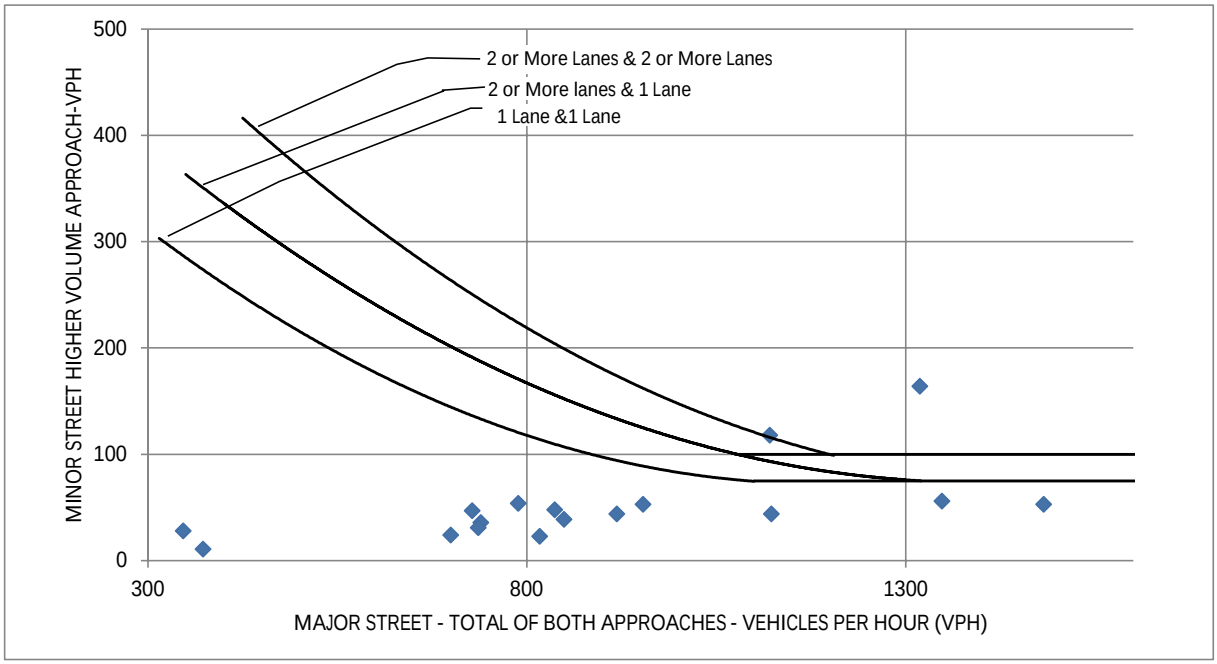
	31.2	**: Total Stop Time Delay (hrs)**
	1	**: Minor Street Approach Lanes**
	3	**: Total Approaches**
NOT MET	**53**	**: Minor Approach Volume**
	1535	**: Total Entering Volume**
	17:00 - 18:00	**: Peak Hour**

Is Warrant 3 A Met?	**NO**

Texas Manual on Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 3 B(70%): Peak-Hour Vehicular Volume

Spot Number:	2		
Intersection:	Rosewood Drive & Aspen Drive		
Date	10/31/2022	by	Kimley-Horn

3	: No. of Lanes on Major St.
1	: No. of Lanes on Minor St.
45	: Speed limit or 85th Percentile? (MPH)
NO	: Is the intersection within an Isolated community?
	: What is the population of the isolated community?



How Many Hours Are Met	2
Is Warrant (70%) Met?	YES

Texas Manual on Uniform Traffic Control Devices
Worksheet for Signal Warrants (Section 4C)
WARRANT 7: Crash Experience

Spot Number:	**2**		
Intersection:	**Rosewood Drive & Aspen Drive**		
Date	**10/31/2022**	**by**	**Kimley-Horn**

3	**: No. of Lanes on Major St?**
1	**: No. of Lanes on Minor St?**
NO	**: Has adequate trial of remedial measure with adequate enforcement been tried?**
NO	**: Are there 5 or more Crashes Susceptable to Correction by Signalization in a 12 Month Period?**

	Major Volume (Both Apr.)	Minor Volume (One Apr.)	Condition A Major Volume	Condition A Minor Volume	Warrant Condition A Met?	Condition B Major Volume	Condition B Minor Volume	Warrant Condition B Met?
Time	**N-S**	E-W						
00:00 - 01:00	40	1	336	84	**NO**	504	42	**NO**
01:00 - 02:00	38	2	336	84	**NO**	504	42	**NO**
02:00 - 03:00	28	0	336	84	**NO**	504	42	**NO**
03:00 - 04:00	44	6	336	84	**NO**	504	42	**NO**
04:00 - 05:00	109	11	336	84	**NO**	504	42	**NO**
05:00 - 06:00	347	28	336	84	**NO**	504	42	**NO**
06:00 - 07:00	789	54	336	84	**NO**	504	42	**YES**
07:00 - 08:00	1319	164	336	84	**YES**	504	42	**YES**
08:00 - 09:00	953	53	336	84	**NO**	504	42	**YES**
09:00 - 10:00	739	36	336	84	**NO**	504	42	**NO**
10:00 - 11:00	728	47	336	84	**NO**	504	42	**YES**
11:00 - 12:00	736	31	336	84	**NO**	504	42	**NO**
12:00 - 13:00	849	39	336	84	**NO**	504	42	**NO**
13:00 - 14:00	837	48	336	84	**NO**	504	42	**YES**
14:00 - 15:00	919	44	336	84	**NO**	504	42	**YES**
15:00 - 16:00	1120	118	336	84	**YES**	504	42	**YES**
16:00 - 17:00	1348	56	336	84	**NO**	504	42	**YES**
17:00 - 18:00	1482	53	336	84	**NO**	504	42	**YES**
18:00 - 19:00	1123	44	336	84	**NO**	504	42	**YES**
19:00 - 20:00	817	23	336	84	**NO**	504	42	**NO**
20:00 - 21:00	699	24	336	84	**NO**	504	42	**NO**
21:00 - 22:00	373	11	336	84	**NO**	504	42	**NO**
22:00 - 23:00	212	8	336	84	**NO**	504	42	**NO**
23:00 - 24:00	124	9	336	84	**NO**	504	42	**NO**

Is there a reduction in the warrant thresholds to 56% =	**NO**
Number of Hours that met the warrant 7A =	**2**
Number of Hours that met the warrant 7B =	**10**

A. Is the Minimum Vehicular Volume Warrant Met Based on Crash Patterns? (Condition A)	**NO**
B. Is the Interruption of Continuous Traffic Met Based on Crash Patterns? (Condition B)	**NO**