To: Ron Ruthven, AICP
Town of Westlake, Texas

From: Briallen Rees, PE, PTOE

Date: October 23, 2023

Subject: Traffic Signal Warrant Analysis at Solana Boulevard and Cortes Drive in the Town of Westlake, Texas

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Dear Mr. Ruthven:

The purpose of this traffic signal warrant analysis is to analyze the existing traffic volumes at the intersection of Solana Boulevard and Cortes Drive to determine is a traffic signal is warranted today. The intersection is one of the primary access points for the Westlake Entrada development and is currently unsignalized. A vicinity map in included in **Figure 1**.

Figure 1: Vicinity Map

Traffic Signal Warrant Analysis

A traffic signal warrant analysis (TSWA) was performed for the intersection of Solana Boulevard and Cortes Drive in the Town of Westlake, Texas for existing conditions. The intersection is one of the primary access points for the Westlake Entrada development and thus, is anticipated to experience high volumes of traffic upon completion of the development. Traffic data was collected at this intersection on Wednesday, October 11, 2023 during the AM and PM peak hours, traffic data sheets are included as an **Attachment**. In order to perform a full TSWA, 24-hour counts are needed; in order to calculate the remaining traffic data, ITE time of day traffic distribution percentages were used.

This traffic signal warrant was conducted based on the Texas *Manual on Uniform Traffic Control Devices* (TMUTCD). The TMUTCD provides the necessary requirements to warrant a traffic signal control. The TSWA worksheet including analysis of each of the warrants is included as an **Attachment**.

The investigation of the need for a traffic control signal shall include an analysis of factors related to the existing operation and safety at the study location and the potential to improve these conditions, and the applicable factors contained in the following traffic signal warrants:

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

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

A traffic control signal should not be installed unless an engineering study indicates that installing a traffic control signal will improve the overall safety and/or operation of the intersection. A traffic control signal should not be installed if it will seriously disrupt progressive traffic flow.

The study should consider the effects of the right turn vehicles from the minor street approaches. Engineering judgment should be used to determine what, if any, portion of the right turn traffic is subtracted from the minor street count when evaluating the signal warrants. The following paragraphs provide a brief description of each of the signal warrants in the TMUTCD.

Warrant 1, Eight-Hour Vehicular Volume

The Minimum Vehicular Volume, Condition A, is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

The Interruption of Continuous Traffic, Condition B, is intended for application at locations where Condition A is not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.

The results of the eight-hour vehicular volume warrant indicate that only about 45% of the volume is currently present to meet this warrant. The requirement is 420 vehicles on the main road (Solana Boulevard) during the eighth highest hour, and currently there are only 274 vehicles; on the minor road, 105 vehicles should be present during the eighth highest hour and currently there are only 28 vehicles. Warrant 1 is not satisfied.

Warrant 2, Four-Hour Vehicular Volume

The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

The results of the four-hour vehicular volume warrant indicate that the minor street volumes (Cortes Drive) is too low to meet the warrant requirements. Graphs are provided in the TMUTCD depicting the relationship between the major and minor road, see **Figure 2**. As shown in the graph, the volumes on both the major and minor road approaches are too low and therefore warrant 2 is not satisfied.

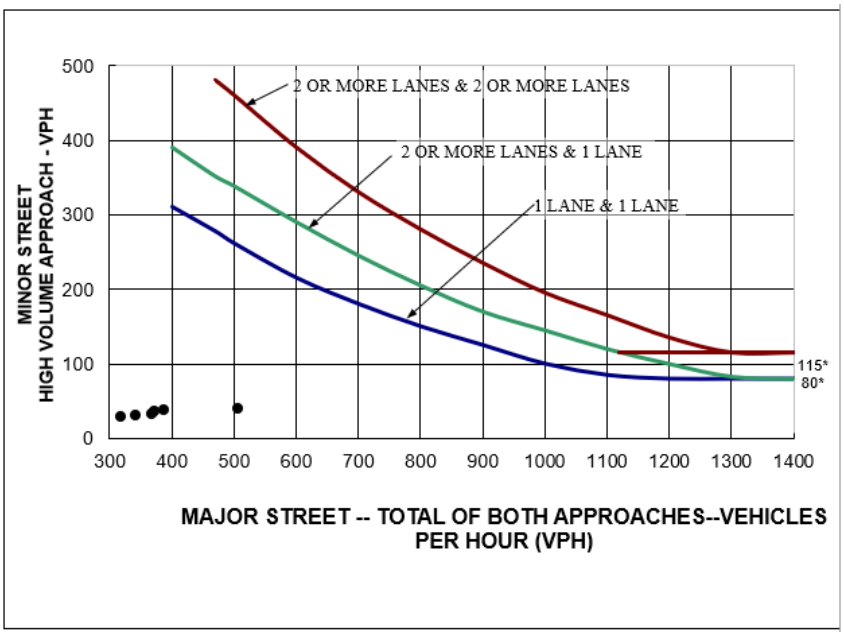

Figure 2: Four-Hour Volume Warrant Summary

Warrant 3, Peak Hour

The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street.

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

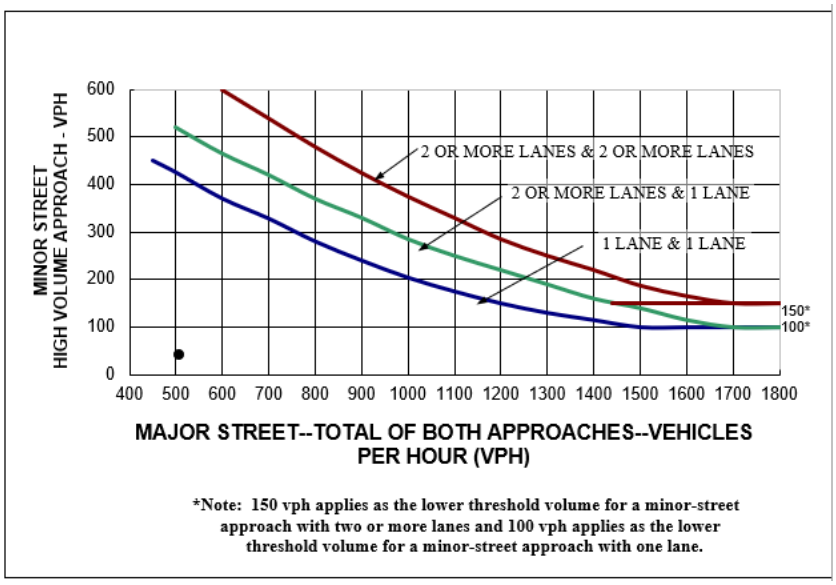

Figure 3: Peak Hour Volume Warrant Summary

Since the anticipated land use of the Westlake Entrada development does not fall under one of the categories listed, warrant 3 is not applicable and therefore not satisfied. Even if the land uses for Entrada were aligned with the lane uses listed in the TMUTCD, the traffic volumes would not satisfy the peak hour warrant. Another graph is provided in the manual depicting the relationship between major and minor road traffic, see **Figure 3.**

Warrant 4, Pedestrian Volume

The Pedestrian Volume signal warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

The Pedestrian Volume signal warrant shall not 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 feet unless the proposed traffic control signal will not restrict the progressive movement of traffic.

Pedestrian traffic volumes at this intersection were low enough to be considered insignificant. Warrant 4 is not satisfied.

Warrant 5, School Crossing

The School Crossing signal warrant is intended for application where the fact that school children cross the major street is the principal reason to consider installing a traffic control signal. For the purposes of this warrant, the word "school children" includes elementary through high school students.

Since no schools are present within the vicinity of the site, warrant 5 is not applicable and therefore not satisfied.

Warrant 6, Coordinated Signal System

Progressive movement in a coordinated signal system sometimes necessitates installing traffic control signals at intersections where they would not otherwise be needed in order to maintain proper platooning of vehicles.

The Coordinated Signal System signal warrant should not be applied where the resultant spacing of traffic control signals would be less than 1,000 feet.

The nearest traffic signal to the intersection of Solana Boulevard and Cortes Drive is the intersection of Davis Boulevard and Solana Boulevard, which is approximately 1,350 feet northwest of our intersection. Since the existing volume along Solana Boulevard is relatively low, there is likely no issue with vehicle plantooning. Warrant 6 is not satisfied.

Warrant 7, Crash Experience

The Crash Experience signal warrant conditions are intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal.

BGE reviewed the TxDOT Crash Records Information System (CRIS) database for historic crash data at the intersection of Solana Boulevard and Cortes Drive. Records were searched from 2018 to 2023 and no crashes had been reported during this time period. It typically takes a few months for the database to be updated with recent crashes, so any new crashes occurring in the Summer or Fall of 2023 have likely not been put into the database. However, in order for warrant 7 to be considered or met, warrant 1 must first be satisfied; since warrant 1 is not yet satisfied, even if recent crashes occurred at the intersection, the warrant would not be satisfied.

Warrant 8, Roadway Network

Installing a traffic control signal at some intersections might be justified to encourage concentration and organization of traffic flow on a roadway network. The need for a traffic control signal shall be considered if an engineering study finds that the common intersection of two or more major routes meets specific traffic volume criteria stated in the warrant.

In order for warrant 8 to be satisfied, the total approach volume on all approaches should be greater than 1,000 vehicles for a single peak hour. The highest total approach volume that has been calculated for this intersection in existing conditions is 561 vehicles. Warrant 8 is not satisfied.

Warrant 9, Intersection Near a Grade Crossing

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

This signal warrant should be applied only after adequate consideration has been given to other alternatives or after a trial of an alternative has failed to alleviate the safety concerns associated with the grade crossing.

The intersection of Solana Boulevard and Cortes Drive is not near a rail crossing. Warrant 9 is not satisfied.

Conclusion

The purpose of this traffic signal warrant analysis was to analyze existing traffic volumes and conditions at the intersection of Solana Boulevard and Cortes Drive to determine if a traffic signal is warranted today. The traffic warrant methodology presented in the Texas *Manual on Uniform Traffic Control Devices* (TMUTCD) was used to determine the need for a traffic signal. The results of the warrant analysis determined that none of the nine signal warrants presented in the TMUTCD were satisfied under existing conditions. A traffic signal is not warranted or recommended at this time.

Sincerely,

Briallen Rees, PE, PTOE
Project Manager
brees@bgeinc.com
(972) 528-8457

GRAM Traffic NTX Inc.
1120 W. Lovers Lane

Arlington, Texas, United States 76013
817.265.8968 chase@gramntx.com

Count Name: CORTES DR @ SOLANA BLVD
Site Code:
Start Date: 10/11/2023

Turning Movement Data

Start Time	SOLANA BLVD Southbound					CORTES DR Westbound					SOLANA BLVD Northbound					GRANADA TRL Eastbound					
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
7:00 AM	0	49	3	0	52	3	0	0	0	3	0	6	0	0	6	2	0	2	0	4	65
7:15 AM	2	43	1	1	47	1	0	2	0	3	0	7	1	0	8	4	0	5	0	9	67
7:30 AM	0	89	0	1	90	2	0	0	0	2	2	13	1	0	16	3	0	6	0	9	117
7:45 AM	3	126	3	0	132	2	0	1	0	3	4	18	0	0	22	7	0	7	0	14	171
Hourly Total	5	307	7	2	321	8	0	3	0	11	6	44	2	0	52	16	0	20	0	36	420
8:00 AM	4	130	2	1	137	2	0	1	0	3	5	21	2	0	28	6	0	8	0	14	182
8:15 AM	1	114	1	2	118	2	0	2	0	4	1	20	2	0	23	3	0	6	0	9	154
8:30 AM	3	92	3	0	98	0	0	3	0	3	0	14	0	0	14	2	0	7	0	9	124
8:45 AM	4	67	0	1	72	0	1	2	0	3	1	16	1	0	18	5	1	2	0	8	101
Hourly Total	12	403	6	4	425	4	1	8	0	13	7	71	5	0	83	16	1	23	0	40	561
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	1	18	5	0	24	2	0	1	0	3	4	50	0	0	54	4	1	5	0	10	91
4:15 PM	0	29	4	1	34	1	0	2	0	3	1	41	0	0	42	8	0	3	0	11	90
4:30 PM	2	19	7	1	29	1	0	1	0	2	3	32	1	0	36	3	0	4	0	7	74
4:45 PM	2	20	3	0	25	2	0	2	0	4	1	35	0	0	36	1	0	3	0	4	69
Hourly Total	5	86	19	2	112	6	0	6	0	12	9	158	1	0	168	16	1	15	0	32	324
5:00 PM	1	25	2	2	30	1	0	3	0	4	2	86	3	0	91	5	0	1	0	6	131
5:15 PM	2	32	5	0	39	4	0	3	0	7	2	63	2	0	67	3	0	3	0	6	119
5:30 PM	3	25	4	0	32	2	0	0	0	2	0	54	1	0	55	3	1	3	0	7	96
5:45 PM	5	37	5	3	50	2	0	3	0	5	1	23	1	0	25	12	0	6	0	18	98
Hourly Total	11	119	16	5	151	9	0	9	0	18	5	226	7	0	238	23	1	13	0	37	444
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	33	915	48	13	1009	27	1	26	0	54	27	499	15	0	541	71	3	71	0	145	1749
Approach %	3.3	90.7	4.8	1.3	-	50.0	1.9	48.1	0.0	-	5.0	92.2	2.8	0.0	-	49.0	2.1	49.0	0.0	-	-
Total %	1.9	52.3	2.7	0.7	57.7	1.5	0.1	1.5	0.0	3.1	1.5	28.5	0.9	0.0	30.9	4.1	0.2	4.1	0.0	8.3	-
Lights	33	903	47	13	996	26	1	24	0	51	25	488	14	0	527	71	3	67	0	141	1715
% Lights	100.0	98.7	97.9	100.0	98.7	96.3	100.0	92.3	-	94.4	92.6	97.8	93.3	-	97.4	100.0	100.0	94.4	-	97.2	98.1
Mediums	0	11	1	0	12	1	0	2	0	3	2	9	1	0	12	0	0	4	0	4	31
% Mediums	0.0	1.2	2.1	0.0	1.2	3.7	0.0	7.7	-	5.6	7.4	1.8	6.7	-	2.2	0.0	0.0	5.6	-	2.8	1.8
Articulated Trucks	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	3
% Articulated Trucks	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	-	0.0	0.0	0.4	0.0	-	0.4	0.0	0.0	0.0	-	0.0	0.2

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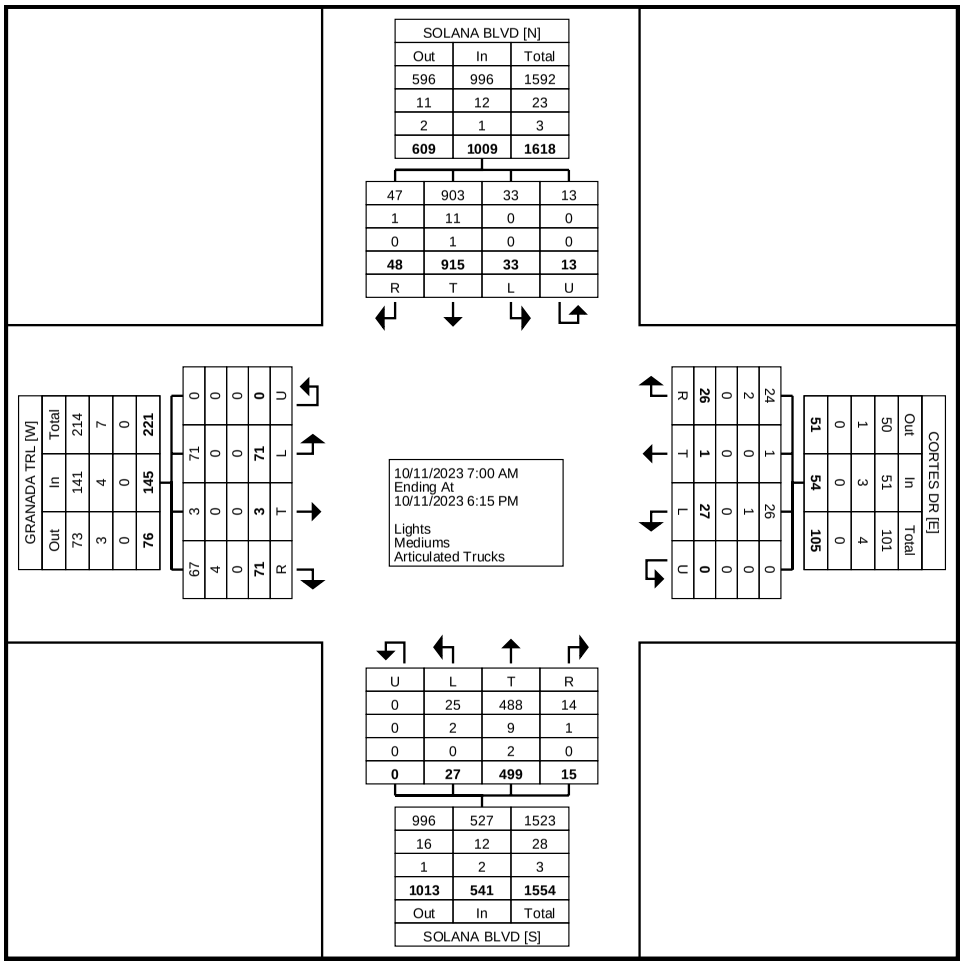

Turning Movement Data Plot

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Count Name: CORTES DR @ SOLANA BLVD
Site Code:
Start Date: 10/11/2023

Turning Movement Peak Hour Data (7:45 AM)

Start Time	SOLANA BLVD Southbound					CORTES DR Westbound					SOLANA BLVD Northbound					GRANADA TRL Eastbound					
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
7:45 AM	3	126	3	0	132	2	0	1	0	3	4	18	0	0	22	7	0	7	0	14	171
8:00 AM	4	130	2	1	137	2	0	1	0	3	5	21	2	0	28	6	0	8	0	14	182
8:15 AM	1	114	1	2	118	2	0	2	0	4	1	20	2	0	23	3	0	6	0	9	154
8:30 AM	3	92	3	0	98	0	0	3	0	3	0	14	0	0	14	2	0	7	0	9	124
Total	11	462	9	3	485	6	0	7	0	13	10	73	4	0	87	18	0	28	0	46	631
Approach %	2.3	95.3	1.9	0.6	-	46.2	0.0	53.8	0.0	-	11.5	83.9	4.6	0.0	-	39.1	0.0	60.9	0.0	-	-
Total %	1.7	73.2	1.4	0.5	76.9	1.0	0.0	1.1	0.0	2.1	1.6	11.6	0.6	0.0	13.8	2.9	0.0	4.4	0.0	7.3	-
PHF	0.688	0.888	0.750	0.375	0.885	0.750	0.000	0.583	0.000	0.813	0.500	0.869	0.500	0.000	0.777	0.643	0.000	0.875	0.000	0.821	0.867
Lights	11	456	9	3	479	6	0	6	0	12	10	67	3	0	80	18	0	28	0	46	617
% Lights	100.0	98.7	100.0	100.0	98.8	100.0	-	85.7	-	92.3	100.0	91.8	75.0	-	92.0	100.0	-	100.0	-	100.0	97.8
Mediums	0	6	0	0	6	0	0	1	0	1	0	6	1	0	7	0	0	0	0	0	14
% Mediums	0.0	1.3	0.0	0.0	1.2	0.0	-	14.3	-	7.7	0.0	8.2	25.0	-	8.0	0.0	-	0.0	-	0.0	2.2
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	-	0.0	-	0.0	0.0

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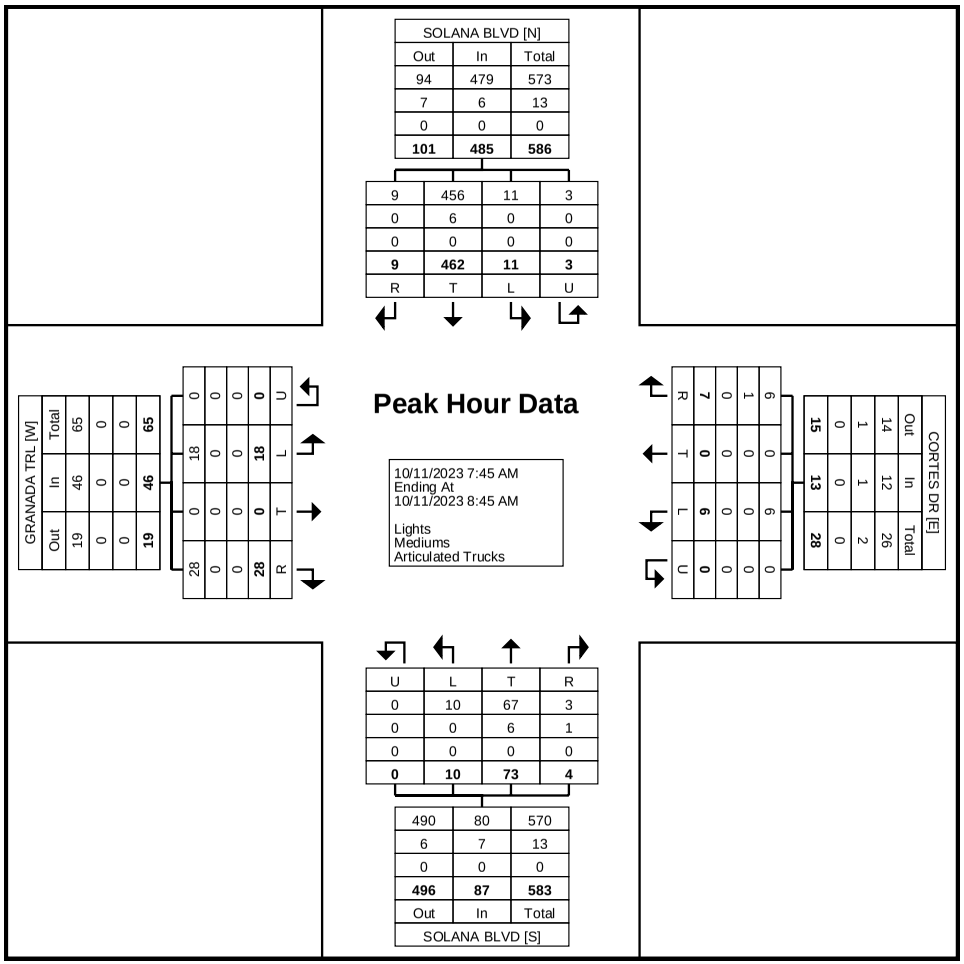

Turning Movement Peak Hour Data Plot (7:45 AM)

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Count Name: CORTES DR @ SOLANA BLVD
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Start Date: 10/11/2023

Turning Movement Peak Hour Data (5:00 PM)

Start Time	SOLANA BLVD Southbound					CORTES DR Westbound					SOLANA BLVD Northbound					GRANADA TRL Eastbound					
	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Left	Thru	Right	U-Turn	App. Total	Int. Total
5:00 PM	1	25	2	2	30	1	0	3	0	4	2	86	3	0	91	5	0	1	0	6	131
5:15 PM	2	32	5	0	39	4	0	3	0	7	2	63	2	0	67	3	0	3	0	6	119
5:30 PM	3	25	4	0	32	2	0	0	0	2	0	54	1	0	55	3	1	3	0	7	96
5:45 PM	5	37	5	3	50	2	0	3	0	5	1	23	1	0	25	12	0	6	0	18	98
Total	11	119	16	5	151	9	0	9	0	18	5	226	7	0	238	23	1	13	0	37	444
Approach %	7.3	78.8	10.6	3.3	-	50.0	0.0	50.0	0.0	-	2.1	95.0	2.9	0.0	-	62.2	2.7	35.1	0.0	-	-
Total %	2.5	26.8	3.6	1.1	34.0	2.0	0.0	2.0	0.0	4.1	1.1	50.9	1.6	0.0	53.6	5.2	0.2	2.9	0.0	8.3	-
PHF	0.550	0.804	0.800	0.417	0.755	0.563	0.000	0.750	0.000	0.643	0.625	0.657	0.583	0.000	0.654	0.479	0.250	0.542	0.000	0.514	0.847
Lights	11	119	16	5	151	9	0	9	0	18	5	226	7	0	238	23	1	13	0	37	444
% Lights	100.0	100.0	100.0	100.0	100.0	100.0	-	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0	100.0	100.0	-	100.0	100.0
Mediums	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Mediums	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Articulated Trucks	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0

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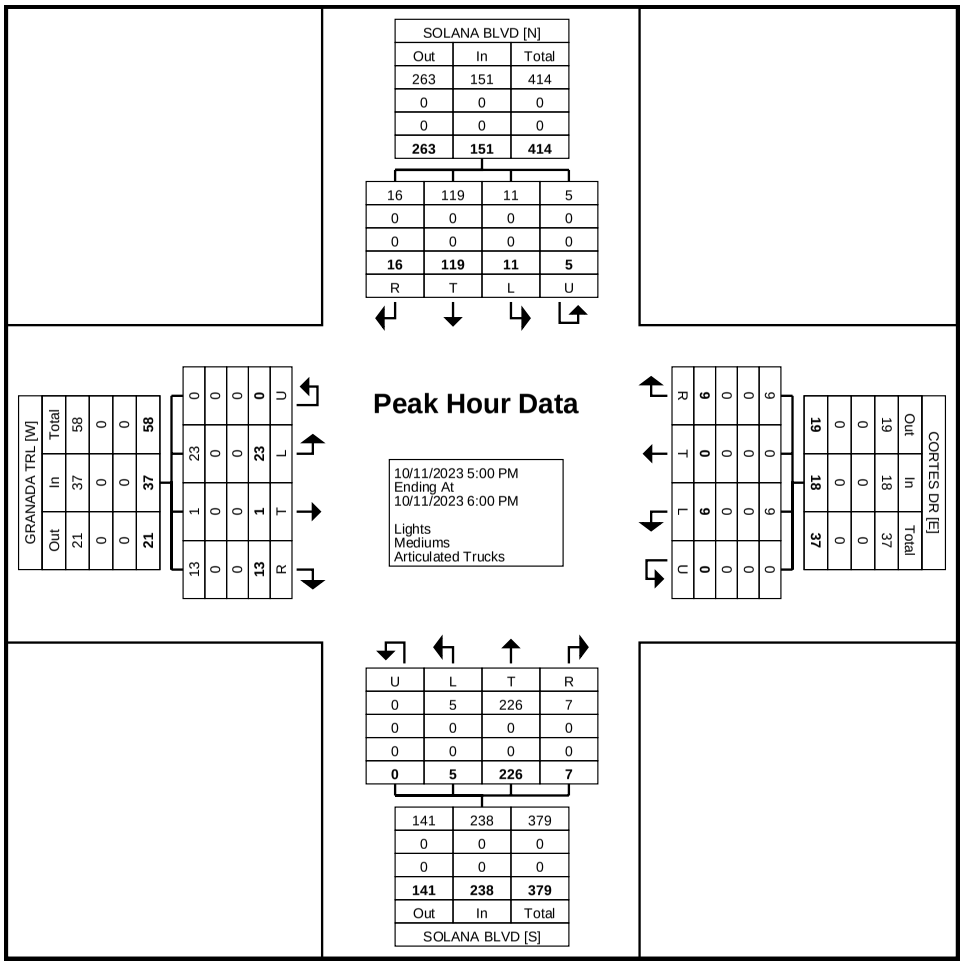


Turning Movement Peak Hour Data Plot (5:00 PM)

Traffic Survey — Count Analysis

Form Revised 2/27/2012

2011 TMUTCD Warrants

County: _____ District: Ft = ort!

City: = estla@e Population: 15700 Survey Date: 10/11/202,

		- ame	Control	Section	"* 1 Speed
Major		Solana 8lvd			,* MP>
Minor		Cortes Dr			

Eight Highest Hours: nclude t!e same " !ours #or t!e Major and Minor St$ volumes$

%ime	Major St$ 3 8ot!) pp$		Minor St$ 3 >i$ ' ol$) pp$	
&nds	' e!$ %otal	Ped$ %otal	' e!$ %otal	Ped$ %otal
(:00) M	*0"		/0	
+:00 PM	,"(		,7	
":00) M	,7,		,+	
12 - . . -	,+"		,2	
11:00) M	,1(		2"	
10:00) M	2"*		,0	
/:00 PM	2"0		,2	
*:00 PM	27/		2(	

Comments:

Warrant 1. Eight Hour Vehicular Volume

☐ 0es ☑ - o Meets 70 1 [c] 2and major3street speed e4ceeds /0 mp! or population less t!an 105000 6 *or* 100 1 [a] 2re7ardless o# speed6 o# Condition) $

– or –

☐ 0es ☑ - o Meets 70 1 [c] 2and major3street speed e4ceeds /0 mp! or population less t!an 105000 6 *or* 100 1 [a] 2re7ardless o# speed6 o# Condition 8$

– or –

☐ 0es ☑ - o Meets "0 1 [9] o# Conditions) and 8$

– or –

☐ 0es ☑ - o Meets *+ 1 [d] o# Conditions) and 8 2and major3street speed e4ceeds /0 mp! or population less t!an 105000 6$

Condition A - Minimum Vehicle Volume

- um9er o# ?anes		' e!icles per !our on Major St 2%otal o# 8ot!) pproac!es6					' e!icles per !our on !i7!er3volume Minor St approac! 2 . ne Direction . nly6				
Major	Minor	Re;uired				&4istin7	Re;uired				&4istin7
Street	Street	100 1 [a]	"0 1 [9]	70 1 [c]	*+ 1 [d]	/*$7 1	100 1 [a]	"0 1 [9]	70 1 [c]	*+ 1 [d]	1"$7 1
1	1	*00	/00	,*0	2"0		1*0	120	10*	"/	
2 or more	1	+00	/"0	/20	, ,+	27/	1*0	120	10*	"/	2"
2 or more	2 or more	+00	/"0	/20	, ,+		200	1+0	1/0	112	
1	2 or more	*00	/00	,*0	2"0		200	1+0	1/0	112	

Condition B - Interruption of Continuous Traffic

- um9er o# ?anes		' e!icles per !our on Major St 2%otal o# 8ot!) pproac!es6					' e!icles per !our on !i7!er3volume Minor St approac! 2 . ne Direction . nly6				
Major	Minor	Re;uired				&4istin7	Re;uired				&4istin7
Street	Street	100 1 [a]	"0 1 [9]	70 1 [c]	*+ 1 [d]	,0$/ 1	100 1 [a]	"0 1 [9]	70 1 [c]	*+ 1 [d]	,7$, 1
1	1	7*0	+00	*2*	/20		7*	+0	*,	/2	
2 or more	1	(00	720	+,0	*0/	27/	7*	+0	*,	/2	2"
2 or more	2 or more	(00	720	+,0	*0/		100	"0	70	*+	
1	2 or more	7*0	+00	*2*	/20		100	"0	70	*+	

[a] 8asic minimum !ourly volume$

[9] : sed #or com9ination o# Conditions) and 8 a#ter ade;uate trial o# ot!er remedial measures$

[c] May 9e used < !en t!e major3street speed e4ceeds /0 mp! or in a community <it! a population o# less t!an 105000$

[d] May 9e used #or com9ination o# Conditions) and 8 a#ter ade;uat trial o# ot!er remedial measures < !en major street e4ceeds /0 mp! or in an isolated community <it! a population o# less t!an 105000$

Warrant 5. School Crossing

☐	0es	☑	- o s t!e num9er o# ade;uate 7aps in tra##ic stream durin7 t!e period <!en t!e c!ildren are usin7 t!e crossin7 less t!an t!e num9er o# minutes in t!e same periodB
			– and –
☐	0es	☑	- o s t!ere a minimum o# 20 students durin7 t!e !i7!est crossin7 !ourB
			– and –
☐	0es	☑	- o s t!e nearest si7nal located more t!an ,00 #eet a<ayB
			2%!is <arrant may 9e applied5 i# t!e proposed si7nal is less t!an ,00 #eet and does not restrict t!e pro7ressive movement o# tra##ic$6

Warrant 6. Coordinated Signal System

☐	0es	☑	- o . n a one3<ay street or a street <it! tra##ic predominantly in one direction5 are t!e adjacent si7nals #ar enou7! apart t!at t!e necessary de7ree o# ve!icle platoonin7 does not occurB
			– or –
☐	0es	☑	- o . n a t<o3<ay street5 are t!e adjacent si7nals #ar enou7! appart t!at t!e necessary de7ree o# ve!icle platoonin7 does not occur and <ould t!e proposed and adjacent tra##ic control si7nal provide a pro7ressive operationB

Warrant 7. Crash Experience

☐	0es	☑	- o s one o# t!e #ollo<in7 conditions metB:
	N/A		♦ "0 1 o# Condition) or Condition 8 in =arrant 1 ♦ *+ 1 o# Condition) or 8 in =arrant 1 2major3street speed e4ceedin7 /0 mp! or population less t!an 105000 6 ♦ "0 1 or more o# =arrant / metB
			– and –
☐	0es	☑	- o >ave t!ere 9een * or more reporta9le cras!es suscepti9le to correction 9y a tra##ic si7nal <it!in a 12 mont! periodB

Warrant 8. Roadway Network

☐	0es	☑	- o s t!e total e4istin75 or immediately projected5 enterin7 volume on all approac!es 7reater t!an 1000 ve!icles #or eac! o# any * !ours o# a Saturday and/or Sunday$
			– or –
☐	0es	☑	- o s t!e total e4istin75 or immediately projected5 enterin7 volume 7reater t!an 1000 ve!icles #or t!e pea@ !our o# a typical <ee@day5 and do t!e * year projected tra##ic volumes meet one or more o# =arrants 15 25 and , durin7 an avera7e <ee@dayB

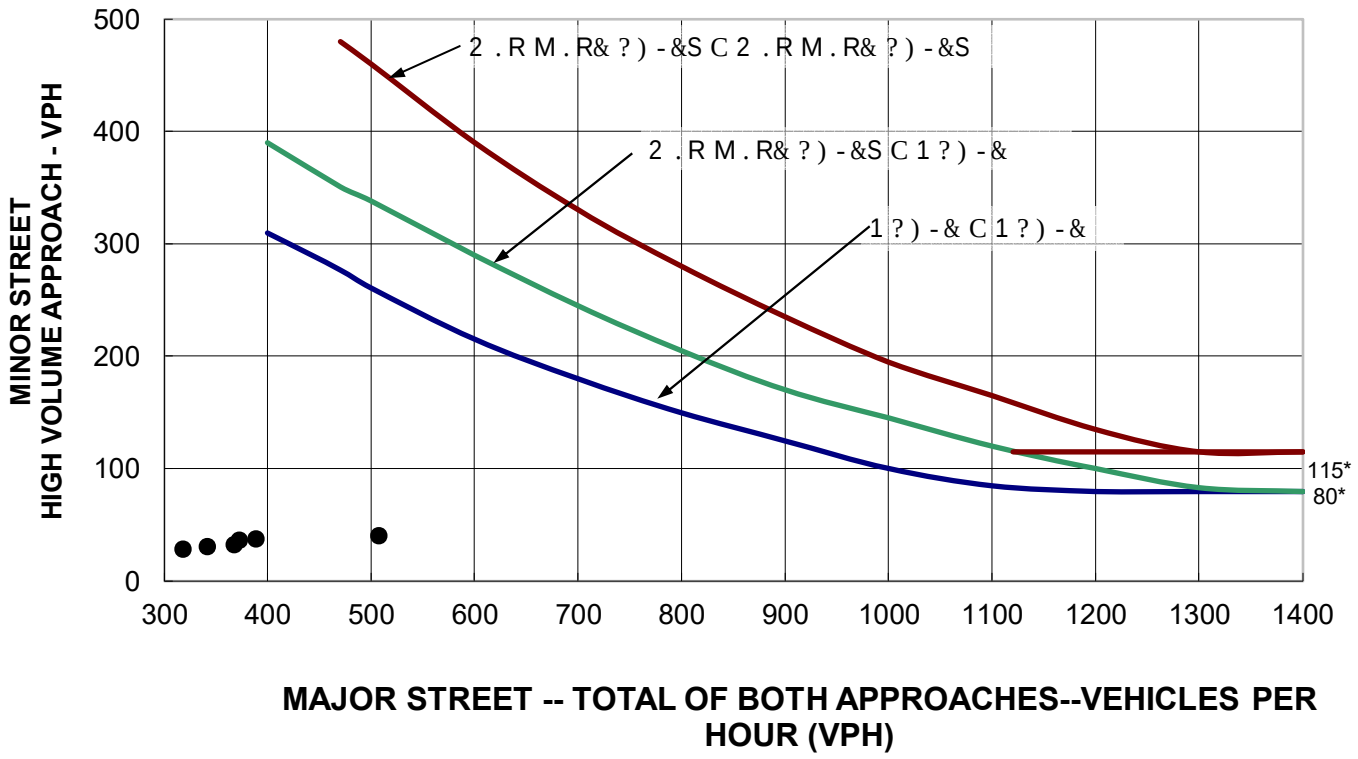
C!ec@ applica9le c!aracteristics o# eac! route:

Major Street	Minor Street	
☑	☐	t is part o# street or !i7! <ay system t!at serves as t!e principal road<ay net<or@ #or t!rou7! tra##ic #lo<$
☐	☐	t includes rural or su9ur9an !i7! <ays outside5 enterin75 or traversin7 a city$
☑	☐	t appears as a major route on an o##icial plan suc! as a major street plan in an ur9an area tra##ic and transportation study$

Remarks:

Warrant 2. Four Hour Volumes

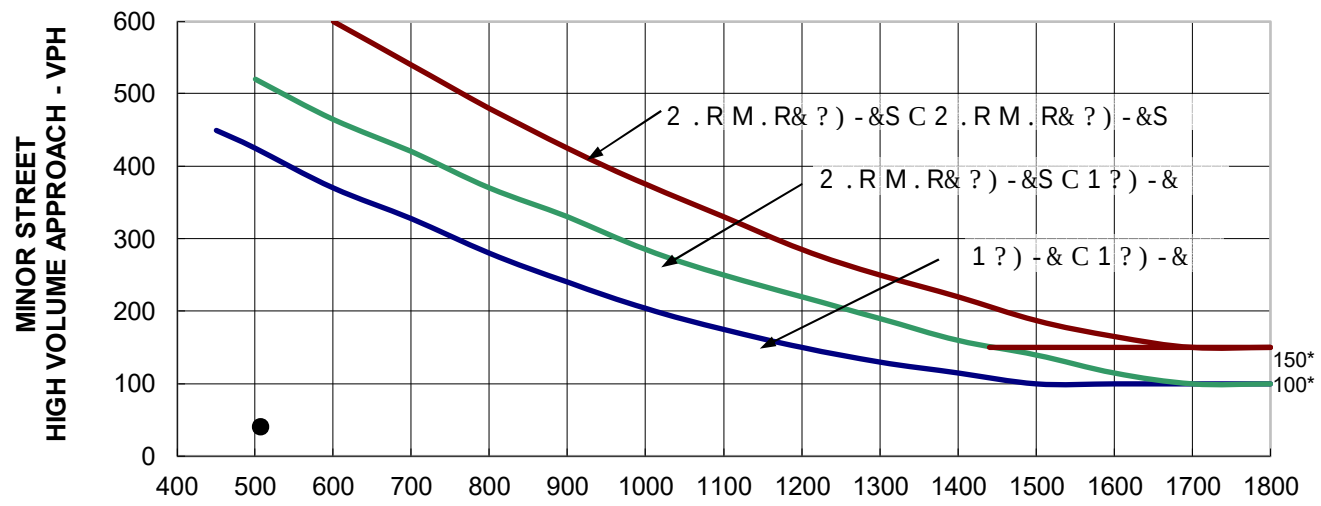
☐ 0es ☑ - o	Meets eac! o# / >i7!est >ours 2 = arrant 2 A see Fi7ure 16$



Fi7ure 1$ Four3!our volume <arrant$ 2 = arrant 2$6

Warrant 3. Peak Hour

☐ 0es ☐ - o	) re all o# t!e #ollo<in7 conditions true #or any #our consecutive 1* minute periodsB 1$ %!e total stopped time delay e4perienced 9y t!e tra##ic on one minor street approac! 2one direction only6 controlled 9y a stop si7n e;uals or e4ceeds / ve!icle3!ours #or a one3lane approac! and * ve!icle3!ours #or a t<o3lane approac!5 *and* 2$ %!e volume o# t!e same minor street approac! 2one direction only6 e;uals or e4ceeds 100 vp! #or one movin7 lane o# tra##ic or 1*0 vp! #or t<o movin7 lanes5 *and* ,$ %!e total enterin7 volume serviced durin7 t!e !our e;uals or e4ceeds +*0 vp! #or intersections <it! t!ree approac!es or "00 vp! #or intersections <it! #our 2or more6 approac!es$
	– or –
☑ 0es ☐ - o	Meets one >i7! >our 2 = arrant , A see Fi7ure 26$



***Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.**

Fi7ure 2$ Pea@ !our volume <arrant$ 2 = arrant ,$6