

# Technical Memorandum

March 23, 2022

Work Order 22-14K

To: Sarah Kraum, Senior Transportation Planner  
Space Coast Transportation Planning Organization  
2725 Judge Fran Jamieson Way, Building B  
Melbourne, FL 32940

From: Travis Hills, P.E., RSP<sub>1</sub>, and Daniel Torre, P.E.

RE: Fiske Boulevard & Roy Wall Boulevard Intersection Analysis

## SIGNAL WARRANT ANALYSIS RESULTS

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### Introduction

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Kittelison & Associates, Inc. (KAI) has been retained by the Space Coast Transportation Planning Organization (SCTPO) to complete an Intersection Control Evaluation (ICE) for the intersection of Fiske Boulevard and Roy Wall Boulevard/Martin Road. Prior to initiating the ICE, a warrant analysis was performed to determine if a traffic signal is warranted at this intersection. If a signal is warranted, signalized intersection forms can be explored in the ICE. The remainder of this technical memorandum summarizes the results of the signal warrant analysis.

12-hour turning movement counts were collected on Wednesday, February 23 and Wednesday, March 2, 2022 at the study intersection. The collected traffic counts were then seasonally adjusted for use in the signal warrant analysis.

The seasonally adjusted turning movement volumes were then evaluated under Warrant 1 – Eight-Hour Vehicular Volume and Warrant 2 – Four-Hour Vehicular Volume, as outlined in the 2021 FDOT Manual on Uniform Traffic Studies (MUTS) and the 2009 Manual on Uniform Traffic Control Devices (MUTCD).

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### Warrant 1 – Eight-Hour Vehicular Volume

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The intersection of Fiske Boulevard and Roy Wall Boulevard/Martin Road has the following characteristics utilized in the signal warrant analysis:

- Major Street: Fiske Boulevard (Two lanes in each direction)
- Minor Streets: Roy Wall Boulevard (Two lanes in approach), Martin Road (One lane in approach)

- Posted Speed Limit Along Major Street: 45 MPH

As the posted speed limit along Fiske Boulevard is above 40 MPH, the intersection volumes can be assessed by the 70 percent volume thresholds in the warrant analysis. The seasonally adjusted turning movement volumes were compared against the 70 percent thresholds for Warrant 1 Condition A – Minimum Vehicular Volume, as shown in **Table 1**. In this condition, only two of the eight hours exceed the 70 percent volume thresholds for both the major and minor roads, thus Warrant 1 Condition A is not satisfied.

**Table 1: Fiske Boulevard & Roy Wall Boulevard/Martin Road Warrant 1 Condition A**

Selected Hour	Vehicles Per Hour on Major Street	Vehicles Per Hour on Minor Street	Warrant 1 Major Street Volume 70% Threshold	Warrant 1 Minor Street Volume 70% Threshold	Is Warrant Met?
7:00 - 8:00 AM	1,967	92	420	140	No
8:00 - 9:00 AM	1,854	97	420	140	No
9:00 - 10:00 AM	1,672	79	420	140	No
12:00 - 1:00 PM	1,584	118	420	140	No
2:00 - 3:00 PM	1,664	118	420	140	No
3:00 - 4:00 PM	1,879	137	420	140	No
4:00 - 5:00 PM	2,119	189	420	140	Yes
5:00 - 6:00 PM	2,184	190	420	140	Yes

As Warrant 1 Condition A was not satisfied, the intersection was then evaluated against the 70 percent thresholds for Warrant 1 Condition B – Interruption of Continuous Traffic as shown in **Table 2**. In this condition, all eight of the selected hours exceeded the 70 percent volume thresholds for both the major and minor roads, thus Warrant 1 Condition B is satisfied.

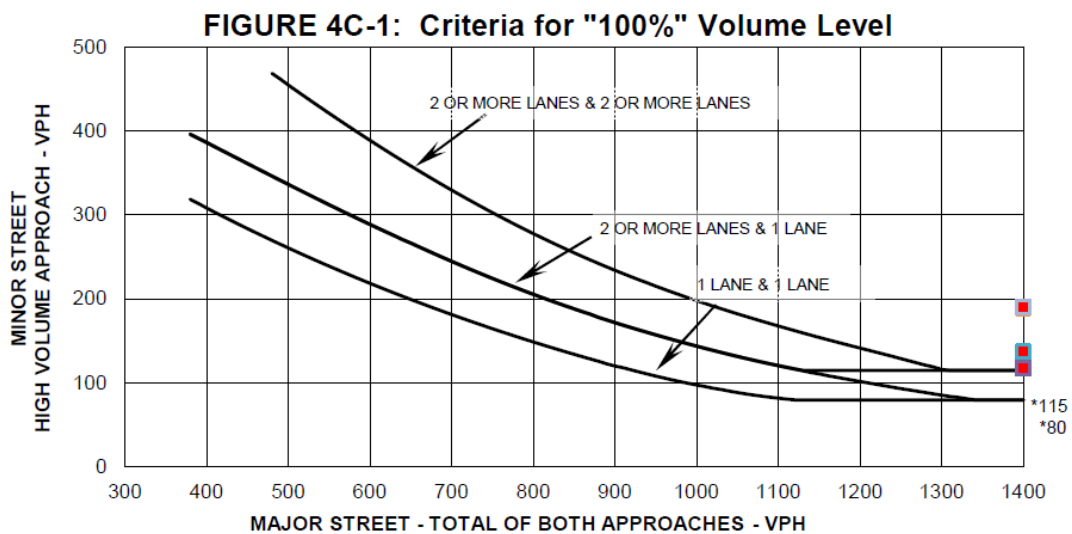
Under the FDOT MUTS and MUTCD, Warrant 1 is satisfied by meeting the volume thresholds for either Condition A or Condition B. As a result, the intersection turning movement volumes satisfy Warrant 1.

**Table 2: Fiske Boulevard & Roy Wall Boulevard/Martin Road Warrant 1 Condition B**

Selected Hour	Vehicles Per Hour on Major Street	Vehicles Per Hour on Minor Street	Warrant 1 Major Street Volume 70% Threshold	Warrant 1 Minor Street Volume 70% Threshold	Is Warrant Met?
7:00 - 8:00 AM	1,967	92	630	70	Yes
8:00 - 9:00 AM	1,854	97	630	70	Yes
9:00 - 10:00 AM	1,672	79	630	70	Yes
12:00 - 1:00 PM	1,584	118	630	70	Yes
2:00 - 3:00 PM	1,664	118	630	70	Yes
3:00 - 4:00 PM	1,879	137	630	70	Yes
4:00 - 5:00 PM	2,119	189	630	70	Yes
5:00 - 6:00 PM	2,184	190	630	70	Yes

## Warrant 2 – Four-Hour Vehicular Volume

The intersection of Fiske Boulevard and Roy Wall Boulevard/Martin Road was also evaluated under Warrant 2 – Four-Hour Vehicular Volume. The seasonally adjusted turning movement volumes were compared to the 100 percent volume thresholds as shown in **Figure 1** and **Table 3** below.



*\* Note: 115 ph. applies as the lower threshold volume for a minor street approach with two or more lanes and 80 mph applies as the lower threshold volume threshold for a minor street approach with one lane.*

**Figure 1: Warrant 2 Criteria for 100% Volume Level**

**Table 3: Fiske Boulevard & Roy Wall Boulevard/Martin Road Warrant 2**

Selected Hour	Vehicles Per Hour on Major Street	Vehicles Per Hour on Minor Street	Warrant 2 Major Street Volume 100% Threshold	Warrant 2 Minor Street Volume 100% Threshold	Is Warrant Met?
2:00 - 3:00 PM	1,664	118	1,400	115	Yes
3:00 - 4:00 PM	1,879	137	1,400	115	Yes
4:00 - 5:00 PM	2,119	189	1,400	115	Yes
5:00 - 6:00 PM	2,184	190	1,400	115	Yes

Under the FDOT MUTS and MUTCD, Warrant 2 is satisfied by meeting the four-hour volume thresholds.

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## Conclusion

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Under the FDOT MUTS and MUTCD, Warrant 1 is satisfied by meeting the volume thresholds for either Condition A or Condition B. As a result, the intersection turning movement volumes satisfy Warrant 1. Warrant 2 is also satisfied by meeting the four-hour volume thresholds.

The MUTCD specifies only one warrant needs to be met, thus signalized intersection forms can be explored in the ICE for the Fiske Boulevard and Roy Wall Boulevard/Martin Road intersection. The FDOT Traffic Signal Warrant Summary forms, showing the results for Warrants 1 and 2, are attached to this memorandum.

## TRAFFIC SIGNAL WARRANT SUMMARY

City: Rockledge, FL  
 County: 70 – Brevard  
 District: Five

Engineer: KAI  
 Date: March 23, 2022

Major Street: Fiske Boulevard Lanes: 4 Major Approach Speed: 45  
 Minor Street: Roy Wall Boulevard Lanes: 2 Minor Approach Speed: 35

MUTCD Electronic Reference to Chapter 4: <http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf>

### Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph?  Yes  No
2. Is the intersection in a built-up area of an isolated community with a population < 10,000?  Yes  No
- "70%" volume level **may** be used if Question 1 **or** 2 above is answered "Yes"  MAY  70%  100%

### WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A **or** Condition B is "100%" satisfied for eight hours.  Yes  No

Warrant 1 is also satisfied if both Condition A **and** Condition B are "80%" satisfied (should only be applied after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems).  Yes  No

Warrant 1 is satisfied if Condition A **or** Condition B is "70%" satisfied for eight hours.  Yes  No

#### Condition A - 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.

- Applicable:  Yes  No  
 100% Satisfied:  Yes  No  
 80% Satisfied:  Yes  No  
 70% Satisfied:  Yes  No

Number of Lanes for moving traffic on each approach		Vehicles per hour on major-street (total of both approaches)			Vehicles per hour on minor-street (one direction only)		
Major	Minor	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>
1	1	500	400	350	150	120	105
2 or more	1	600	480	420	150	120	105
2 or more	2 or more	600	480	420	200	160	140
1	2 or more	500	400	350	200	160	140

<sup>a</sup> Basic Minimum hourly volume

<sup>b</sup> Used for combination of Conditions A and B after adequate trial of other remedial measures

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

Record 8 highest hours and the corresponding major-street and minor-street volumes in the Instructions Sheet.

Street	Eight Highest Hours							
	7:00 - 8:00 AM	8:00 - 9:00 AM	9:00 - 10:00 AM	12:00 - 1:00 PM	2:00 - 3:00 PM	3:00 - 4:00 PM	4:00 - 5:00 PM	5:00 - 6:00 PM
Major	1,967	1,854	1,672	1,584	1,664	1,879	2,119	2,184
Minor	92	97	79	118	118	137	189	190

Existing Volumes

State of Florida Department of Transportation  
**TRAFFIC SIGNAL WARRANT SUMMARY**

**Condition B - Interruption of Continuous Traffic**

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

Applicable:	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
100% Satisfied:	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
80% Satisfied:	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
70% Satisfied:	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No

Number of Lanes for moving traffic on each approach		Vehicles per hour on major-street (total of both approaches)			Vehicles per hour on minor-street (one direction only)		
Major	Minor	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>	100% <sup>a</sup>	80% <sup>b</sup>	70% <sup>c</sup>
1	1	750	600	525	75	60	53
2 or more	1	900	720	630	75	60	53
2 or more	2 or more	900	720	630	100	80	70
1	2 or more	750	600	525	100	80	70

<sup>a</sup> Basic Minimum hourly volume

<sup>b</sup> Used for combination of Conditions A and B after adequate trial of other remedial measures

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

Record 8 highest hours and the corresponding major-street and minor-street volumes in the Instructions Sheet.

Eight Highest Hours								
Street	7:00 - 8:00 AM	8:00 - 9:00 AM	9:00 - 10:00 AM	12:00 - 1:00 PM	2:00 - 3:00 PM	3:00 - 4:00 PM	4:00 - 5:00 PM	5:00 - 6:00 PM
Major	1,967	1,854	1,672	1,584	1,664	1,879	2,119	2,184
Minor	92	97	79	118	118	137	189	190

Existing Volumes

# TRAFFIC SIGNAL WARRANT SUMMARY

City: **Rockledge, FL**  
County: **70 – Brevard**  
District: **Five**

Engineer: **KAI**  
Date: **March 23, 2022**

Major Street: **Fiske Boulevard** Lanes: **4** Major Approach Speed: **45**  
Minor Street: **Roy Wall Boulevard** Lanes: **2** Minor Approach Speed: **35**

MUTCD Electronic Reference to Chapter 4: <http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf>

### Volume Level Criteria

- Is the posted speed or 85th-percentile of major street > 40 mph?  Yes  No
  - Is the intersection in a built-up area of an isolated community with a population < 10,000?  Yes  No
- "70%" volume level may be used if Question 1 or 2 above is answered "Yes"  MAY  70%  100%

### WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

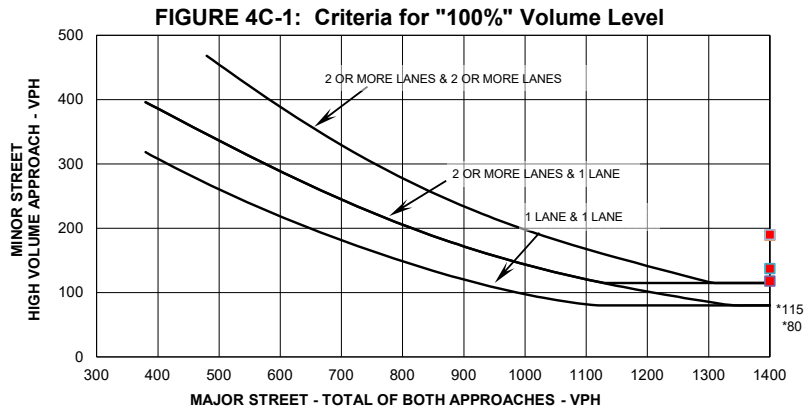
If all four points lie above the applicable line, then the warrant is satisfied.

Applicable:  Yes  No  
Satisfied:  Yes  No

Plot four volume combinations on the applicable figure below.

#### 100% Volume Level

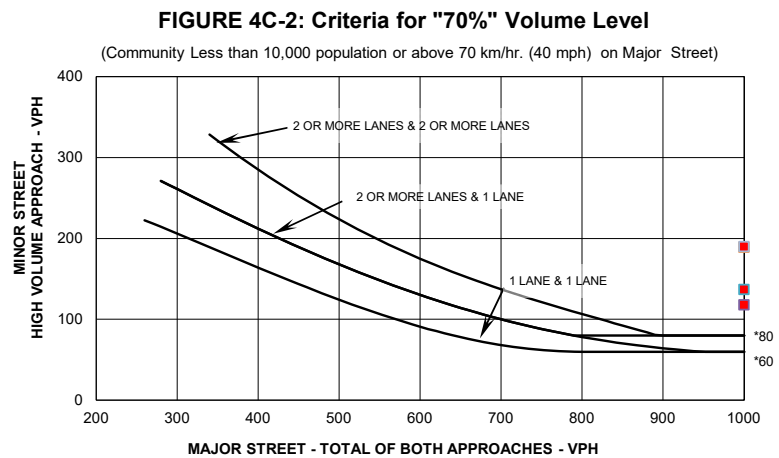
Four Highest Hours	Volumes	
	Major Street	Minor Street
2:00 - 3:00 PM	1664	118
3:00 - 4:00 PM	1879	137
4:00 - 5:00 PM	2119	189
5:00 - 6:00 PM	2184	190



\* Note: 115 ph. applies as the lower threshold volume for a minor street approach with two or more lanes and 80 mph applies as the lower threshold volume threshold for a minor street approach with one lane.

#### 70% Volume Level

Four Highest Hours	Volumes	
	Major Street	Minor Street
2:00 - 3:00 PM	1664	118
3:00 - 4:00 PM	1879	137
4:00 - 5:00 PM	2119	189
5:00 - 6:00 PM	2184	190



\* Note: 80 ph. applies as the lower threshold volume for a minor street approach with two or more lanes and 60 ph. applies as the lower threshold volume threshold for a minor street approach with one lane.