

**Catalina Pointe  
Deltona, Florida**

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# **Traffic Impact Analysis**

**Prepared for: MAS Development  
By: LTG, Inc.  
August 2022**



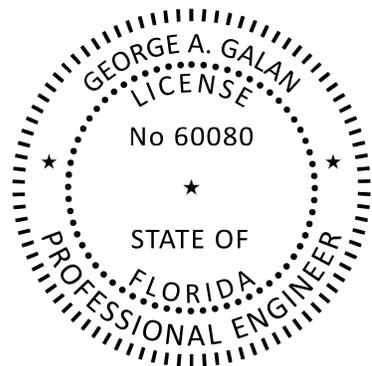
**PROFESSIONAL ENGINEERING CERTIFICATION**

I hereby certify that I am a Professional Engineer properly registered in the State of Florida practicing with LTG, Inc., a corporation authorized to operate as an engineering business, by the State of Florida Department of Professional Regulation, Board of Professional Engineers, and that I have prepared or approved the evaluations, findings, opinions, conclusions, or technical advice attached hereto for:

**PROJECT:** Catalina Pointe – Traffic Impact Analysis  
**LOCATION:** Deltona, Florida  
**CLIENT:** MAS Development  
**JOB #:** 5519.03

I hereby acknowledge that the procedures and references used to develop the results contained in these computations are standard to the professional practice of Transportation Engineering as applied through professional judgment and experience.

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# 1

## INTRODUCTION

LTG, Inc. (LTG) has been retained by MAS Development to prepare a Traffic Impact Analysis (TIA) for the proposed Catalina Pointe development, located southeast of Howland Boulevard and Dr. Martin Luther King Boulevard in the City of Deltona. Figure 1 shows the location of the project relative to the surrounding road network.

This TIA has been conducted simultaneous with a rezoning application that proposes to rezone a portion of the subject property from Business Planned Unit Development (BPUD) and Retail Commercial District (C-1) to Planned Unit Development (PUD), with residential uses that will represent a significant decrease in potential trip generation of the property. The proposed development consists of 6,000 square feet (SF) of Quality Restaurants and 277 multifamily dwelling units. A preliminary site plan is attached as Appendix A. Access to the development is proposed as follows:

- Commercial-Only Access (2): One full access driveway on Dr. Martin Luther King Boulevard that will be shared with existing commercial development in the southeast quadrant of Howland Boulevard/ Dr. Martin Luther King Boulevard; one right-in/right-out driveway on Howland Boulevard.
- Residential-Only Access (3): One full access driveway on Dr. Martin Luther King Boulevard, east of the existing roundabout; one right-in/right-out driveway on Howland Boulevard; one full access driveway on Catalina Boulevard.

The anticipated build-out year of the proposed development is 2025.

### Study Area

The following roadway segments and intersections are as follows (per the approved methodology in Appendix B):

#### Intersections:

1. Howland Blvd at Catalina Blvd
2. Howland Blvd at Dr. Martin Luther King Blvd
3. Howland Blvd at Wolf Pack Run
4. Catalina Boulevard at Eustace Avenue
5. Howland Blvd at Right-in/Right-Out Commercial Project access driveway
6. Howland Blvd at Right-in/Right-Out Residential Project access driveway
7. Dr. Martin Luther King Blvd at Roundabout/Project access driveway
8. Catalina Blvd at Project access driveway

#### Roadway Segments:

- Howland Blvd from I-4/SR 472 to Wolf Pack Run (Vested Critical)
- Howland Blvd from Wolf Pack Run to Catalina Blvd (Near Critical)
- Catalina Blvd from Wolfpack Run to Howland Blvd (Project Access)
- W. Volusia Bltwy (Kentucky Ave)/ (Dr MLK Jr) from Orange Camp Rd. to Cassadaga Rd (Vested Near Critical)
- W. Volusia Bltwy (Kentucky Ave)/ (Dr MLK Jr) from Cassadaga Rd to SR 472 (Near Critical)
- W. Volusia Bltwy (Kentucky Ave)/ (Dr MLK Jr) from SR 472 to Graves Ave (Near Critical)
- Graves Ave from Veteran's Memorial Pkwy to Kentucky Ave (Critical)
- Graves Ave from Kentucky Ave to Howland Blvd (Near Critical)
- Veterans Memorial Pkwy from Rhode Island to Graves Ave (Vested Critical)
- Providence Blvd from Ft Smith Blvd. to Elkcam Blvd (Critical)
- Saxon Blvd from Finland Dr. to Normandy Blvd (Near Critical)
- Lake Helen-Osteen Rd from Haulover Blvd to Catalina Blvd (Near Critical)
- DR. Martin Luther King Blvd from Project driveway/Roundabout to Howland Blvd (Significant)



<b>Catalina Pointe</b>	 NTS	<b>Project Location</b>		
		Project No.: 5519.03	Figure: 1	

**Study Procedures**

Standard engineering and planning procedures were used to determine the impacts of the proposed project. Reference data was obtained from the Florida Department of Transportation (FDOT), the Volusia County Traffic Engineering Department, the City of Deltona and/or Development Services Departments, the Institute of Transportation Engineers (ITE), and the River to Sea Transportation Planning Organization (R2CTPO).

**Planned Roadway Improvements**

Programmed or planned roadway improvements in the area of interest included in the FDOT Five-Year Work Program and the R2CTPO Long Range Transportation Plan were reviewed. Based on information obtained, Graves Avenue will be widened from 2 lanes to 3 lanes included in the R2CTPO Transportation Improvement program 2024/2025.

# 2

## EXISTING ROADWAY ANALYSIS

Turning movement counts (TMCs) were conducted during the AM and PM peak-hours on May 12<sup>st</sup>, May 24<sup>th</sup> and June 29 of 2022, at the study area intersections (see Appendix C). FDOT's 2021 Seasonal Factors (SF) for the corresponding dates were applied to the existing counts. Please note, if the FDOT SF was less than 1.0, a minimum SF of 1.0 was applied to the counts. The spreadsheet used to develop the existing, background and build-out traffic volumes is also located in Appendix C. The existing AM and PM peak-hour traffic volumes used in the analysis are depicted in Figure 2.

### Unsignalized Intersection Analysis

The existing operating conditions at the unsignalized intersection were analyzed using *Synchro 11* software. This software utilizes the procedures outlined in Chapter 20 of the Highway Capacity Manual 6<sup>th</sup> Edition titled, "Two-Way Stop-Controlled Intersections". Table 1 shows the existing AM and PM peak-hour level of service (LOS) at the study area intersection. The HCS summary sheets are attached as Appendix D.

**Table 1  
Existing AM and PM Peak-Hour LOS - Unsignalized Intersection  
Catalina Pointe**

Intersection	Adopted LOS	AM Peak-Hour			PM Peak-Hour		
		Critical Approach	Delay	LOS	Critical Approach	Delay	LOS
Catalina Boulevard at Eustace Avenue	D	NB	12.0	B	NB	11.9	B

As indicated, the unsignalized intersection is currently operating within the adopted level of service.

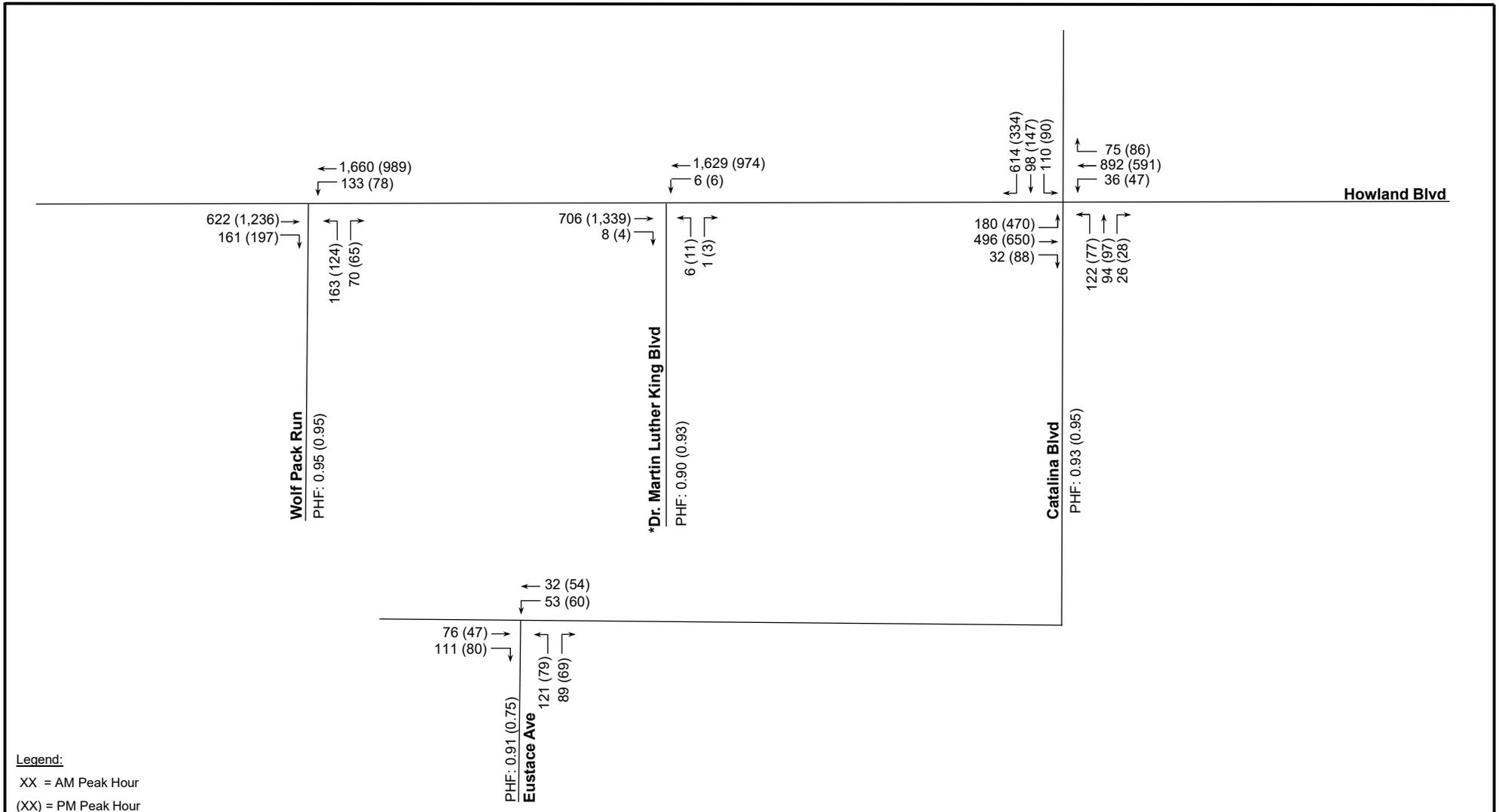
### Signalized Intersection Analysis

The existing operating conditions at the signalized intersections were analyzed using *Synchro 11*, which utilizes the procedures outlined in Chapter 19 of the *Highway Capacity Manual 6<sup>th</sup> Edition*, titled "Signalized Intersections". Table 2 shows the existing LOS and volume to capacity ratios (v/c) at the study area intersections. The signal timings are provided in Appendix E and the Synchro summary sheets are provided in Appendix F.

**Table 2  
Existing AM and PM Peak-Hour LOS - Signalized Intersections  
Catalina Pointe**

Intersection	Adopted LOS	AM Peak-Hour			PM Peak-Hour		
		Delay (sec.)	LOS	V/C greater than 1.0?	Delay (sec.)	LOS	V/C greater than 1.0?
1. Howland Blvd at Catalina Blvd	E	55.0	D	Yes	34.6	C	No
2. Howland Blvd at Dr. Martin Luther King Blvd	E	14.7	B	No	20.1	C	No
3. Howland Blvd at Wolf Pack Run	E	12.9	B	No	12.2	B	No

As indicated, the intersection of Howland Boulevard at Catalina Boulevard is currently operating with v/c ratios over 1.00 during the a.m. peak-hours. Improvements to allow this intersection to operate with v/c ratios less than 1.00 will be recommended under background conditions (please refer to the **2025 BACKGROUND ROADWAY ANALYSIS** section of the report).



\* The a.m. peak-hour eastbound and westbound through volumes at Howland Blvd./MLK Blvd. have been factored up based on the upstream and downstream intersection volumes because this TMC was collected in June, when schools were out of session.

### Roadway Segment Analysis

Roadway LOS describes the operating condition determined from the number of vehicles passing over a given section of roadway during a specified time period. It is a qualitative measure of several factors which include speed, travel time, traffic interruptions, freedom to maneuver, driver comfort, convenience, safety and vehicle operating costs. Six LOS categories have been established as standards by which to gauge roadway performance, designated by the letters A through F. The LOS categories are defined as follows:

- Level of Service A: Free flow, individual users virtually unaffected by the presence of others
- Level of Service B: Stable flow with a high degree of freedom to select operating conditions
- Level of Service C: Flow remains stable, but with significant interactions with others
- Level of Service D: High-density stable flow in which the freedom to maneuver is severely restricted
- Level of Service E: This condition represents the capacity level of the road
- Level of Service F: Forced flow in which the traffic exceeds the amount that can be served

The Average Annual Daily Traffic (AADT) for the study roadway segments was obtained from the Volusia County 2021 Average Annual Daily Traffic & Historical Counts spreadsheet. The existing LOS for the study area road segments during the peak-hour are provided in Table 3.

**Table 3  
Existing PM Peak-Hour LOS - Roadway Segments  
Catalina Pointe**

Roadway	Segment		No. of Lanes	Adopted LOS	Peak-Hour Two-Way Capacity at Adopted LOS	2021 AADT	Existing PM Peak-Hour Two-Way Volume	Existing PM Volume Exceed Adopted LOS?
Howland Blvd	I-4/SR 472	Wolf Pack Run	4	E	3,410	31,360	2,530	No
	Wolf Pack Run	Catalina Blvd	4	E	3,410	28,510	2,310	No
Catalina Blvd	Wolfpack Run	Howland Blvd	2	D	960	5,378	484 <sup>2</sup>	No
W. Volusia Bldwy (Kentucky Ave)/ (Dr MLK Jr)	Orange Camp Rd.	Cassadaga Rd	2	E	1,540	11,450	990	No
	Cassadaga Rd	SR 472	2	E	1,540	12,640	1,040	No
	SR 472	Graves Ave	2	E	1,540	10,830	910	No
Graves Ave	Veteran's Memorial Pkwy	Kentucky Ave	2	E	1,620	19,750	1,640	Yes
	Kentucky Ave	Howland Blvd	2	E	1,620	16,370	1,420	No
Veterans Memorial Pkwy	Rhode Island	Graves Ave	2	E	1,620	14,870	1,200	No
Providence Blvd	Ft Smith Blvd.	Elkcam Blvd	2	E	1,020	13,360	1,130	Yes
Saxon Blvd	Finland Dr.	Normandy Blvd	4	E	3,410	38,310	3,140	No
Lake Helen-Osteen Rd	Haulover Blvd	Catalina Blvd	2	E	1,230	12,740	1,090	No
Dr. Martin Luther King Blvd	Project driveway/Roundabout	Howland Blvd	2	D	960 <sup>2</sup>	267	24 <sup>2</sup>	No

<sup>1</sup>Adopted LOS, capacity, existing AADT, and existing PM Peak-Hour Two-Way Volume obtained from the 2021 Volusia County Traffic Count Spreadsheet

<sup>2</sup>Capacity based upon capacity of comparable roadway segments reported in Volusia County's AADT Table. The Existing PM Peak-Hour Two-Way Volume is derived from TMCs at the adjacent intersections.

As indicated, the segments of Graves Avenue between Veterans Memorial Pkwy and Kentucky Ave and Providence Boulevard between Ft Smith Boulevard and Elkcam Boulevard are currently operating outside of the adopted LOS.

# 3

## FUTURE TRAFFIC CONDITIONS

Traffic in the area is expected to grow due to local government approvals. The following section documents the methods used to project future 2025 traffic conditions by using either historical growth rates and/or vested trip information and anticipated project traffic.

### 2025 Background Traffic

The growth rates for each study area roadway segment will be determined using the following method:

- Historic growth trends calculated based upon the last five years of historic count data to determine a roadway segment's applicable trend growth rate using the best fitted regression analysis.
- If the  $R^2$  value is less than 0.70, then ten (10) years of historical traffic data will be used to determine the trends growth rate using the best fitted regressions analysis.
- If the  $R^2$  is still less than 0.70, the  $R^2$  for the adjoining northbound and southbound segments will be analyzed to determine the average growth rate of adjoining segments can be utilized.
- Then the growth rate shall be determined by the trend fitted curve. If the overall trend fitted curve is positive, 2% shall be used. If the overall trend fitted curve is negative, then a 1% growth rate will be applied.
- In no case shall the growth rate be negative.
- Vested trips will be applied in addition to growth rates where applicable.
- If the  $R^2$  value is greater than 70%, and the growth rate is greater than 3%, the background growth will be determined using either vested trips or the growth rate, whichever is more conservative.
- If the  $R^2$  value is greater than 70%, and the growth rate is greater than 3%, and there is a high number of vested trips to be applied by multiple vested projects with various land uses, a request may be made to reduce vested traffic by 30% if the vested traffic is 30% of the total background growth.

The growth comparison and applied growth used in the analysis are provided in Table 4. The FDOT *Traffic Trends* analysis worksheets are attached as Appendix G. The vested trip information provided by Volusia County is attached as Appendix H.

**Table 4  
Historical Growth Rates and Vested Traffic  
Catalina Pointe**

Roadway	Limits		5-Year			10-Year			Applied Growth Rate	Applied Growth If Using Adjacent Segment	High Growth? Y/N	Vested Trips	Existing Peak-Hour Volume	Existing AADT Year	2024 Build-Out Year	Growth Rate (# of Trips)	Growth Method Applied	Total Growth Applied (# of Trips)	Estimated Background Volume	Vested % of Estimated Background Traffic	Vested Trips after 30% Reduction (If Applicable)	Total Background Traffic
	From	To	Best Fit Regression	R <sup>2</sup> Value	Historical Growth Rate	Best Fit Regression	R <sup>2</sup> Value	Historical Growth Rate														
Howland Blvd.	I-4/SR 472	Wolf Pack Run	Linear	21.2%	-2.14%	Decaying Exp.	27.2%	0.09%	Check adjacent	1.00%	N	868	2,530	2021	2025	101	Historical + Vested	969	3,499	24.81%	-	3,499
	Wolf Pack Run	Catalina Blvd.	Linear	37.2%	-1.14%	Decaying Exp.	30.3%	0.00%	Check adjacent	1.00%	N	783	2,310	2021	2025	92	Historical + Vested	875	3,185	24.58%	-	3,185
Catalina Blvd	Wolf Pack Run	Howland Blvd.	Linear	21.4%	1.25%	Decaying Exp.	57.6%	0.20%	Check adjacent	1.00%	N	0	484	2022	2025	15	Historical Growth	15	499	0.00%	-	499
W. Volusia Bltwy (Kentucky Ave)/ (Dr MLK Jr)	Orange Camp Rd.	Cassadaga Rd	Linear	0.5%	-0.28%	Decaying Exp.	69.7%	0.00%	Check adjacent	1.00%	N	382	990	2021	2025	40	Historical + Vested	422	1,412	27.05%	-	1,412
	Cassadaga Rd	SR 472	Decaying Exp.	2.8%	0.26%	Decaying Exp.	70.9%	-0.25%	1.00%	1.00%	N	271	1,040	2021	2025	42	Historical + Vested	313	1,353	20.03%	-	1,353
	SR 472	Graves Ave	Linear	40.1%	0.61%	Decaying Exp.	92.8%	-0.29%	1.00%	-	N	270	910	2021	2025	36	Historical + Vested	306	1,216	22.20%	-	1,216
Graves Ave	Veteran's Memorial Pkwy	Kentucky Ave.	Decaying Exp.	33.9%	0.48%	Linear	74.7%	1.90%	1.90%	-	N	470	1,640	2021	2025	125	Historical + Vested	595	2,235	21.03%	-	2,235
	Kentucky Ave.	Howland Blvd.	Linear	61.6%	2.02%	Linear	78.7%	2.42%	2.42%	-	N	992	1,420	2021	2025	137	Historical + Vested	1,129	2,549	38.92%	694	2,251
Veterans Memorial Pkwy	Rhode Island	Graves Ave	Decaying Exp.	2.8%	-0.44%	Decaying Exp.	3.1%	0.65%	Check adjacent	1.00%	N	335	1,200	2021	2025	48	Historical + Vested	383	1,583	21.16%	-	1,583
Providence Blvd.	Ft Smith Blvd.	Elkcam Blvd.	Decaying Exp.	74.2%	-0.51%	-	-	-	1.00%	1.00%	N	60	1,130	2021	2025	45	Historical + Vested	105	1,235	4.86%	-	1,235
Saxon Blvd	Finland Dr.	Normandy Blvd.	Linear	22.8%	0.77%	Linear	37.0%	1.35%	Check adjacent	1.00%	N	262	3,140	2021	2025	126	Historical + Vested	388	3,528	7.43%	-	3,528
Lake Helen-Osteen Rd.	Haulover Blvd.	Catalina Blvd.	Decaying Exp.	48.0%	0.53%	Linear	78.5%	2.40%	2.40%	1.00%	N	61	1,090	2021	2025	105	Historical + Vested	166	1,256	4.86%	-	1,256
DR. Martin Luther King Blvd	Project driveway/Roundabout	Howland Blvd	-	-	-	-	-	-	-	2.00%	Y	0	-	2022	2025	-	Historical Growth	-	-	-	-	-

\* Per Volusia County request, only linear growth was utilized in areas with significant growth from vested development.

\*\* Per Volusia County request Beresford Residential, Catalina Craven, and 18064 Howland Property project traffic have been excluded from the vested trip totals.

# 4

## 2025 BACKGROUND ROADWAY ANALYSIS

The study area intersections and roadway segments were analyzed based on the future roadway conditions to determine potential impacts and to investigate mitigation requirements. Figures 3A and 3B graphically depict the 2025 background volumes. The results of the analysis are presented below.

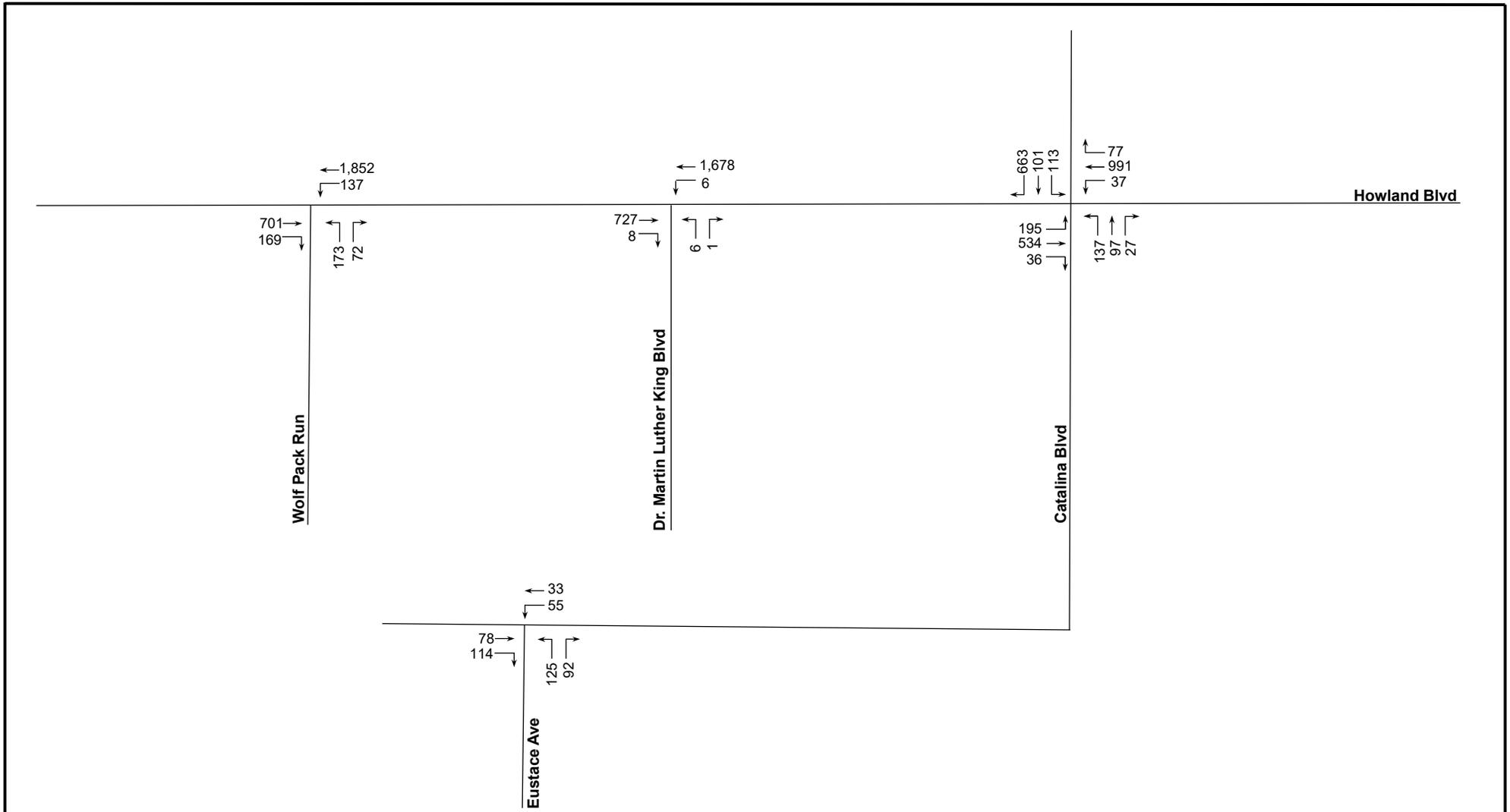
### 2025 Background – Unsignalized Intersection Analysis

The unsignalized intersection was analyzed to determine the operating condition under 2025 background conditions and the results are presented in Table 5. The Synchro summary sheets are included in Appendix I.

**Table 5**  
**2025 Background AM and PM Peak-Hour LOS - Unsignalized Intersection**  
**Catalina Pointe**

Intersection	Adopted LOS	AM Peak-Hour			PM Peak-Hour		
		Critical Approach	Delay	LOS	Critical Approach	Delay	LOS
Catalina Boulevard at Eustace Avenue	D	NB	12.3	B	NB	12.1	B

As indicated, the unsignalized intersection is currently operating within the adopted level of service.



\* The a.m. vested trips for Halifax Crossing BPUD TIA has been reduced by 37% based on vested trips database.

**Catalina Pointe**



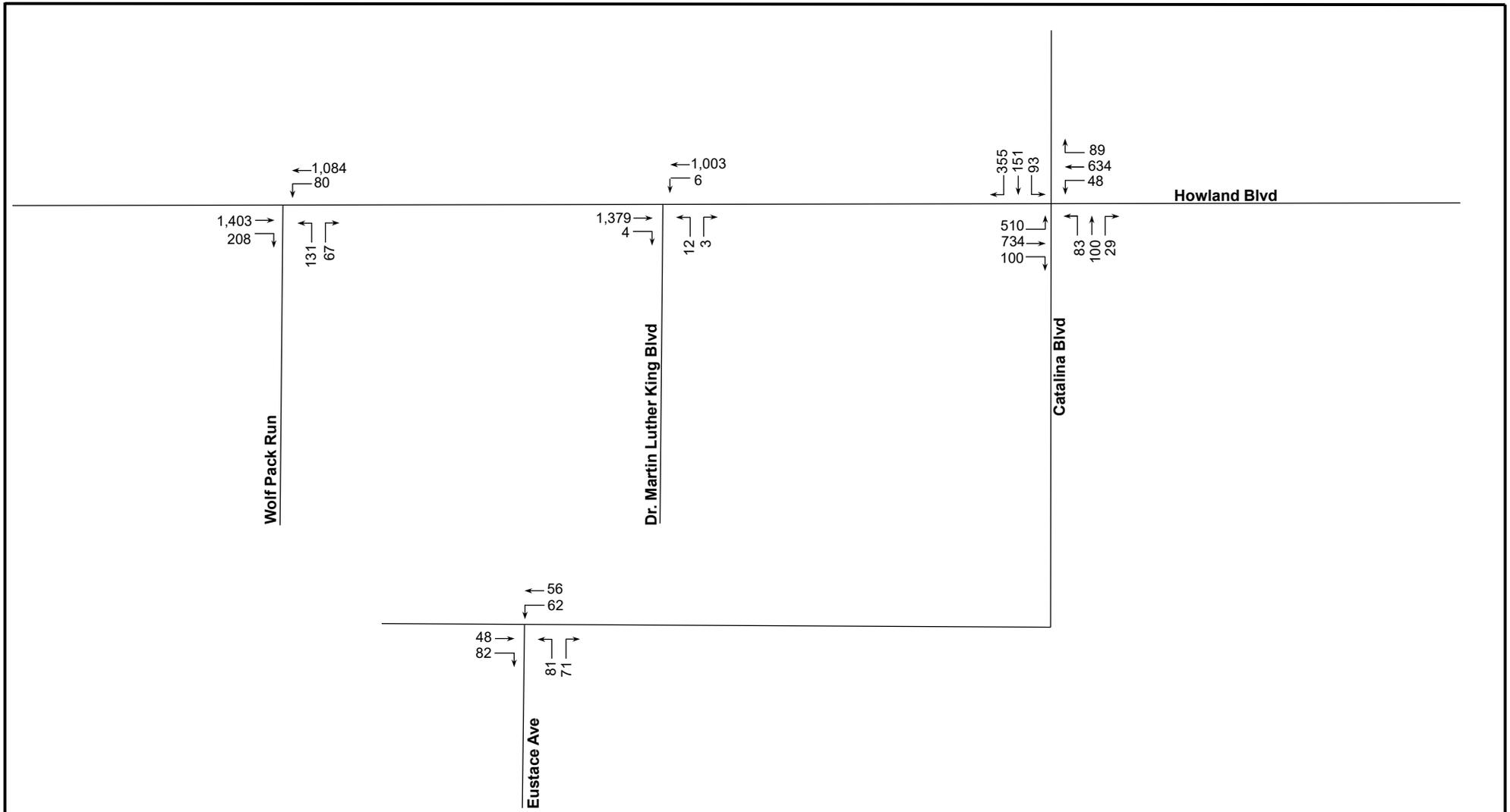
**2025 Background AM Peak-Hour  
Traffic Volumes**

Project Number: 5519.03

Figure 3A

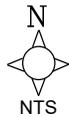


1049 Eber Boulevard Suite 104 – Melbourne, Florida 32904  
Telephone: 321.499.4679 Fax: 321.499.4680



\* The p.m. vested trips for Halifax Crossing BPUD TIA has been reduced by 37% based on vested trips database.

**Catalina Pointe**



**2025 Background PM Peak-Hour  
Traffic Volumes**

Project Number: 5519.03

Figure 3B



1049 Eber Boulevard Suite 104 – Melbourne, Florida 32904  
Telephone: 321.499.4679 Fax: 321.499.4680

**2025 Background – Signalized Intersection Analysis**

The signalized intersections were analyzed to determine the operating conditions under 2025 background conditions and the results are presented in Table 6. The Synchro summary sheets are included in Appendix J.

**Table 6  
2025 Background AM and PM Peak-Hour LOS - Signalized Intersections  
Catalina Pointe**

Intersection	Adopted LOS	AM Peak-Hour			PM Peak-Hour		
		Delay (sec.)	LOS	V/C greater than 1.0?	Delay (sec.)	LOS	V/C greater than 1.0?
1. Howland Blvd at Catalina Blvd	E	70.0	E	Yes	37.9	D	No
2. Howland Blvd at Dr. Martin Luther King Blvd	E	15.3	B	No	20.5	C	No
3. Howland Blvd at Wolf Pack Run	E	14.0	B	No	13.5	B	No

As indicated in the table above, under background conditions, the intersection of Howland Boulevard at Catalina Boulevard is anticipated to operate with v/c ratio greater than 1.0 during a.m. peak. The following improvements are recommended to achieve a v/c ratio less than 1.0:

Howland Boulevard at Catalina Boulevard

- Add overlap phase to the southbound right approach
- Optimize signal timing splits

The analysis of the intersection with the proposed improvements is provided in Table 7. The Synchro summary sheets are located in Appendix K.

**Table 7  
2025 Background AM and PM Peak-Hour LOS - Signalized Intersection Improved  
Catalina Pointe**

Intersection	Adopted LOS	AM Peak-Hour			PM Peak-Hour		
		Delay (sec.)	LOS	V/C greater than 1.0?	Delay (sec.)	LOS	V/C greater than 1.0?
1. Howland Blvd at Catalina Blvd	E	48.4	D	No	34.2	C	No

As indicated in the table, the signalized intersection is anticipated to operate with v/c ratios less than 1.0 with the recommended improvements under background conditions.

## **2025 Background – Roadway Segment Analysis**

The study area roadway segments were analyzed under 2025 background conditions to determine the anticipated two-way peak-hour LOS. Note that improvements that are funded within the next three years have been included in the 2025 background analysis. The results are provided in Table 8. As indicated, the study segments of Howland Boulevard, Graves Avenue, Providence Boulevard, Saxon Boulevard and Lake Helen Road will not operate within the adopted service levels under 2025 background conditions. The following improvements are recommended to achieve acceptable levels of service along these segments:

### Howland Blvd from I-4/SR 472 to Wolf Pack Run

- Widen from 4-lanes to 6-lanes

### Graves Ave from Veteran's Memorial Pkwy to Kentucky Ave

- Widen from 2-lanes to 4-lanes

### Graves Ave from Kentucky Ave to Howland Blvd

- Widen from 2-lanes to 4-lanes

### Providence Blvd from Ft Smith Blvd. to Elkcam Blvd

- Widen from 2-lanes to 4-lanes

### Saxon Blvd from Finland Dr. to Normandy Blvd

- Widen from 4-lanes to 6-lanes

### Lake Helen-Osteen Rd from Haulover Blvd to Catalina Blvd

- Widen from 2-lanes to 4-lanes

The improved roadway segment analysis for the deficient segments is also provided in Table 8.

**Table 8  
2025 Background PM Peak-Hour LOS - Roadway Segments\*  
Catalina Pointe**

Roadway	Segment		No. of Lanes	Adopted LOS	Peak-Hour Two-Way Capacity at Adopted LOS	Existing PM Peak-Hour Two-Way Volume	Applied Growth Rate	High Growth? Y/N	Vested Trips	2025 Estimated Background Volume	Vested % of Estimated Background Traffic	Vested Trips after 30% Reduction (if Applicable)	2025 Total Background Volume	Background PM Volume Exceed Adopted LOS?
Howland Blvd	I-4/SR 472	Wolf Pack Run	4	E	3,410	2,530	1.00%	N	868	3,499	24.81%	-	3,499	Yes
	Wolf Pack Run	Catalina Blvd	4	E	3,410	2,310	1.00%	N	783	3,185	24.58%	-	3,185	No
Catalina Blvd	Wolfpack Run	Howland Blvd	2	D	960	484	1.00%	N	0	499	0.00%	-	499	No
W. Volusia Bltwy (Kentucky Ave)/ (Dr MLK Jr)	Orange Camp Rd.	Cassadaga Rd	2	E	1,540	990	1.00%	N	382	1,412	27.05%	-	1,412	No
	Cassadaga Rd	SR 472	2	E	1,540	1,040	1.00%	N	271	1,353	20.03%	-	1,353	No
	SR 472	Graves Ave	2	E	1,540	910	1.00%	N	270	1,216	22.20%	-	1,216	No
Graves Ave	Veteran's Memorial Pkwy	Kentucky Ave	2	E	1,620	1,640	1.90%	N	470	2,235	21.03%	-	2,235	Yes
	Kentucky Ave	Howland Blvd	2	E	1,620	1,420	2.42%	N	992	2,549	38.92%	694	2,251	Yes
Veterans Memorial Pkwy	Rhode Island	Graves Ave	2	E	1,620	1,200	1.00%	N	335	1,583	21.16%	-	1,583	No
Providence Blvd	Ft Smith Blvd.	Elkcam Blvd	2	E	1,020	1,130	1.00%	N	60	1,235	4.86%	-	1,235	Yes
Saxon Blvd	Finland Dr.	Normandy Blvd	4	E	3,410	3,140	1.00%	N	262	3,528	7.43%	-	3,528	Yes
Lake Helen-Osteen Rd	Haulover Blvd	Catalina Blvd	2	E	1,230	1,090	2.40%	N	61	1,256	4.86%	-	1,256	Yes
Dr. Martin Luther King Blvd	Project driveway/Roundabout	Howland Blvd	2	D	960	24	2.00%	N	0	25	0.00%	-	25	No
<b>Segments - Improved**</b>														
Roadway	Segment		No. of Lanes	Adopted LOS	Peak-Hour Two-Way Capacity at Adopted LOS	Existing PM Peak-Hour Two-Way Volume	Applied Growth Rate	High Growth? Y/N	Vested Trips	Estimated Background Volume	Vested % of Estimated Background Traffic	Vested Trips after 30% Reduction (if Applicable)	Total Background Volume	Background PM Volume Exceed Adopted LOS?
Howland Blvd	I-4/SR 472	Wolf Pack Run	6	E	5,120	2,530	1.00%	N	868	3,499	24.81%	-	3,499	No
Graves Ave	Veteran's Memorial Pkwy	Kentucky Ave	4	E	3,410	1,640	1.90%	N	470	2,235	21.03%	-	2,235	No
Graves Ave	Kentucky Ave	Howland Blvd	4	E	3,410	1,420	2.42%	N	992	2,549	38.92%	694	2,251	No
Providence Blvd**	Ft Smith Blvd.	Elkcam Blvd	4	E	3,410	1,130	1.00%	N	60	1,235	4.86%	-	1,235	No
Saxon Blvd**	Finland Dr.	Normandy Blvd	6	E	4,851	3,140	1.00%	N	262	3,528	7.43%	-	3,528	No
Lake Helen-Osteen Rd	Haulover Blvd	Catalina Blvd	4	E	3,410	1,090	2.40%	N	61	1,256	4.86%	-	1,256	No

\*Includes planned and programmed roadway improvements

\*Improved capacity based upon capacity of comparable roadway segments reported in Volusia County's AADT Table and/or FDOT Q/LOS

\*\*Includes recommended improvements that are not currently funded.

# 5

## 2025 BUILD-OUT - FUTURE ROADWAY ANALYSIS

The study area intersections and roadway segments were analyzed based on the roadway conditions at the time of project build-out to determine potential impacts of project-generated trips and identify mitigation requirements. The improvements recommended in background conditions have been included in the 2025 build-out analysis for those applicable intersections and roadway segments.

### Project Trip Generation

The daily, a.m., and p.m. peak hour trip generation for the development presented in Table 9 was determined using the Institute of Transportation Engineers (ITE) 11<sup>th</sup> Edition of the *Trip Generation Manual*.

**Table 9  
Gross Project Trip Generation  
Catalina Pointe**

Time Period	Land Use	ITE LUC	Trip Rate Equation	Size	Units	Percent Entering	Percent Exiting	Trips Entering	Trips Exiting	Total Trips
Daily	Low-Rise Multifamily Residential	220	$T = 6.41(X) + 75.31$	277	DU	50%	50%	926	925	1,851
	Quality Restaurant	931	$T=83.84(X)$	6.0	KSF	50%	50%	252	251	503
<b>Totals:</b>								<b>1,178</b>	<b>1,176</b>	<b>2,354</b>
AM Peak-Hour	Low-Rise Multifamily Residential	220	$T = 0.31(X) + 22.85$	277	DU	24%	76%	26	83	109
	Quality Restaurant	931	$T = 0.73(X)$	6.0	KSF	50%*	50%*	2	2	4
<b>Totals:</b>								<b>28</b>	<b>85</b>	<b>113</b>
PM Peak-Hour	Low-Rise Multifamily Residential	220	$T=0.43(X)+20.55$	277	DU	63%	37%	88	52	140
	Quality Restaurant	931	$T=7.80(X)$	6.0	KSF	67%	33%	31	16	47
<b>Totals:</b>								<b>119</b>	<b>68</b>	<b>187</b>

\*The AM entering/exiting percentages were not available in the ITE Trip Generation Manual, 11<sup>th</sup> edition for this use; therefore, a 50/50 split was used.

A certain portion of trips generated by the restaurant will be attracted from existing traffic already on the adjacent roadway. The pass-by trips for the quality restaurant use were given as 44 percent in the ITE Trip Generation Handbook, 3rd Edition and reviewed to ensure that they did not exceed the established threshold of 14% of the adjacent roadway traffic volume for County facilities. Pass-by trips were deducted from the gross trip generation and the resulting net new external a.m. and p.m. peak-hour trips are provided in Table 10.

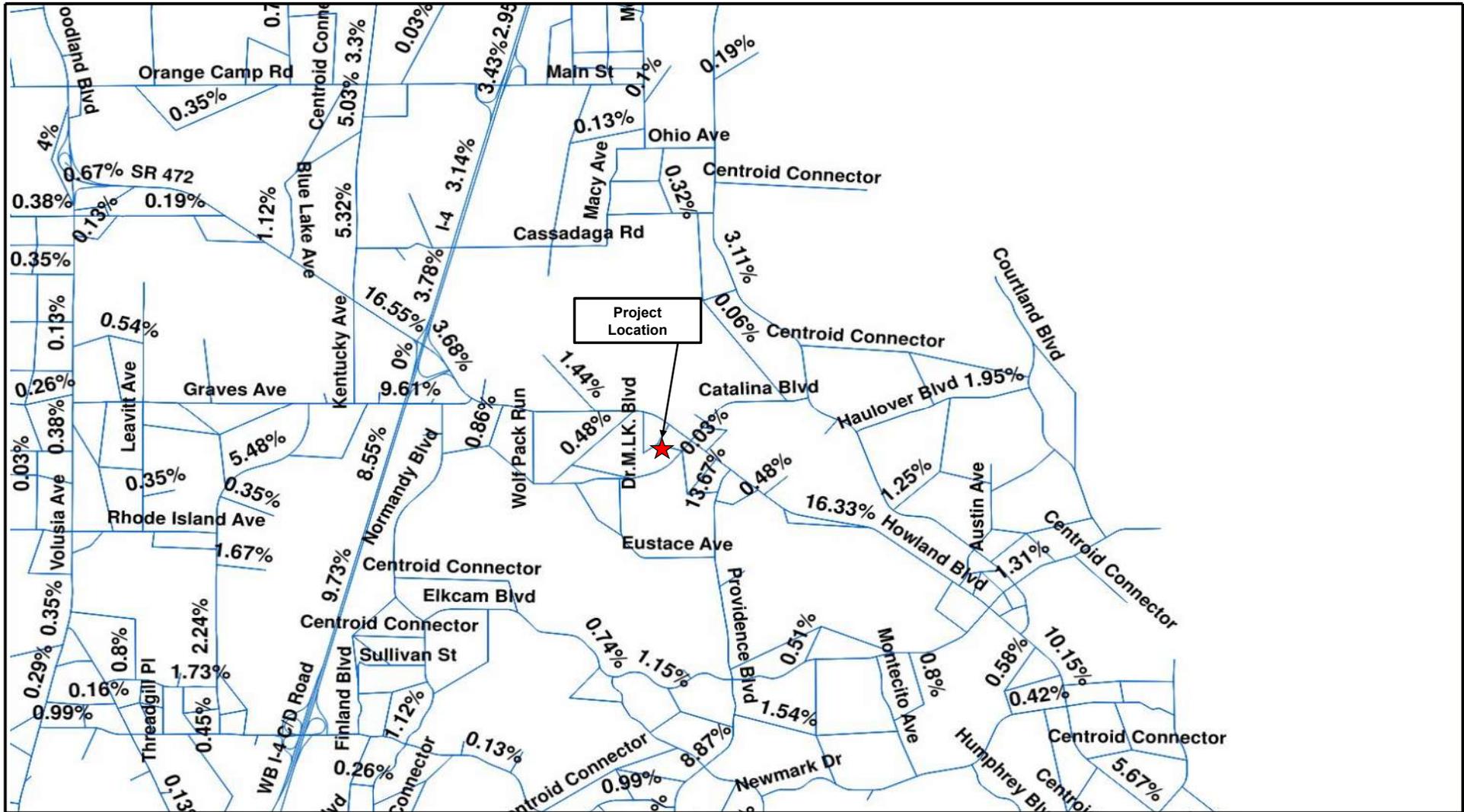
**Table 10  
Net Trip Generation  
Catalina Pointe**

Time Period	Land Use	Total Trips			Pass-by Trips			New External Trips		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
Daily	Low-Rise Multifamily Residential	926	925	1,851	0	0	0	926	925	1,851
	Quality Restaurant	252	251	503	111	110	221	141	141	282
<b>Totals:</b>		<b>1,178</b>	<b>1,176</b>	<b>2,354</b>	<b>111</b>	<b>110</b>	<b>221</b>	<b>1,067</b>	<b>1,066</b>	<b>2,133</b>
AM Peak-Hour	Low-Rise Multifamily Residential	26	83	109	0	0	0	26	83	109
	Quality Restaurant	2	2	4	0	0	0	2	2	4
<b>Totals:</b>		<b>28</b>	<b>85</b>	<b>113</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>28</b>	<b>85</b>	<b>113</b>
PM Peak-Hour	Low-Rise Multifamily Residential	88	52	140	0	0	0	88	52	140
	Quality Restaurant	31	16	47	14	7	21	17	9	26
<b>Totals:</b>		<b>119</b>	<b>68</b>	<b>187</b>	<b>14</b>	<b>7</b>	<b>21</b>	<b>105</b>	<b>61</b>	<b>166</b>

## **Project Trip Distribution**

The Central Florida Regional Planning Model, version 7 (CFRPM) was used to obtain the project trip distribution for the proposed development. A select zone analysis was completed and resulted in the project trip distribution shown in Figure 4A. Figure 4B provides a closer view of the model output in the vicinity of the site. Manual modifications were made to the model distribution in the vicinity of the site driveways, based on engineering judgement, to account for the turn restrictions at the Howland Boulevard Driveways and vehicular access to the commercial parcels only via the shared access driveway on Martin Luther King Boulevard and the right-in/right-out driveway on Howland Boulevard (with no connectivity for vehicles between the commercial and residential components). These modifications are further detailed in Figure 4C.

Using the trip distribution, the a.m. and p.m. peak hour project trips were assigned to the study area roadway network. Figures 5A and 5B graphically depict the 2025 total build-out traffic at the study area intersections. Note that the commercial and residential project trips have been separately identified due to the slight differences in development access.



Catalina Point

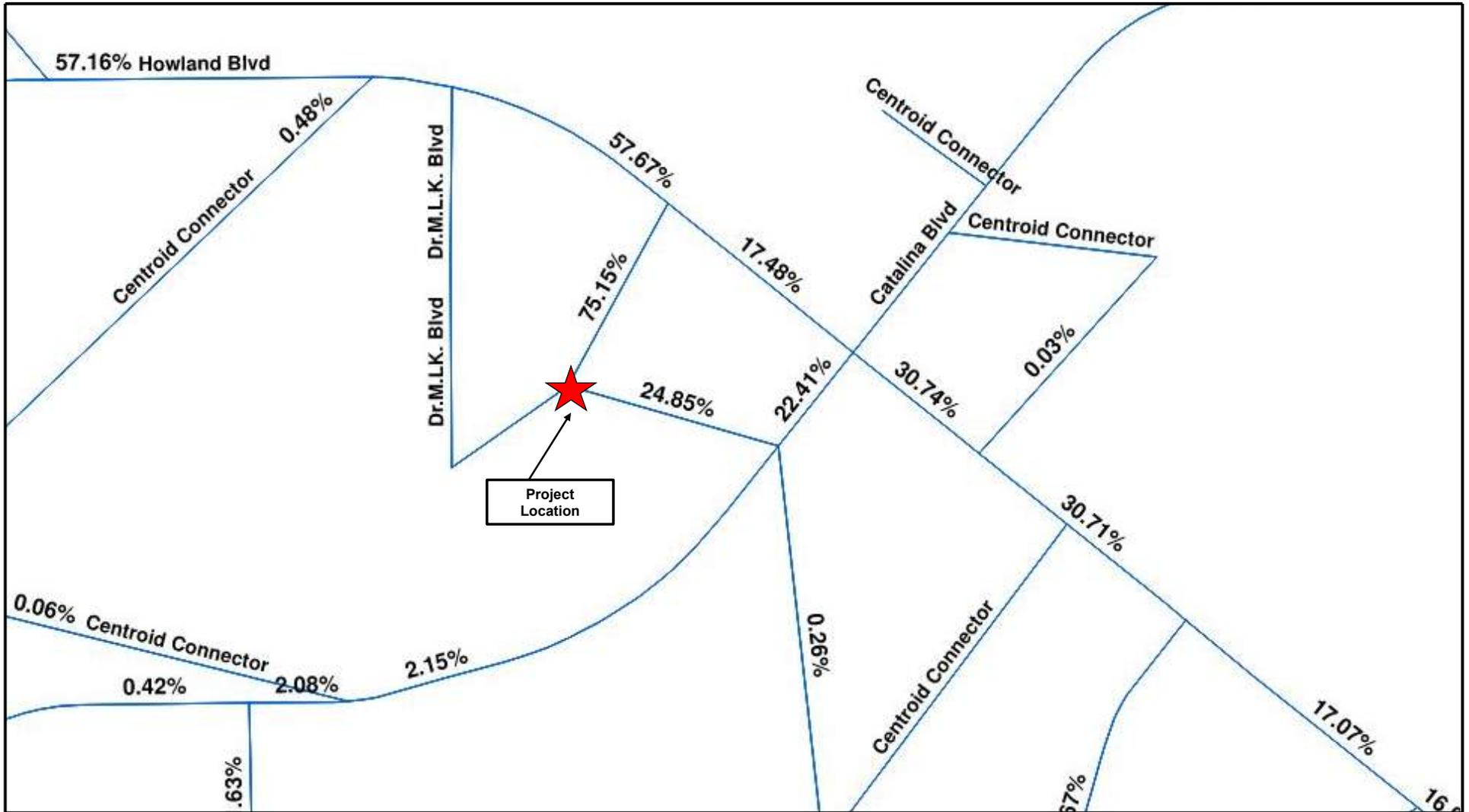


1450 West Granada Boulevard, Suite 2, Ormond Beach, Florida 32174  
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Project Trip Distribution

Project No.: 5519.03

Figure: 4A



Catalina Point

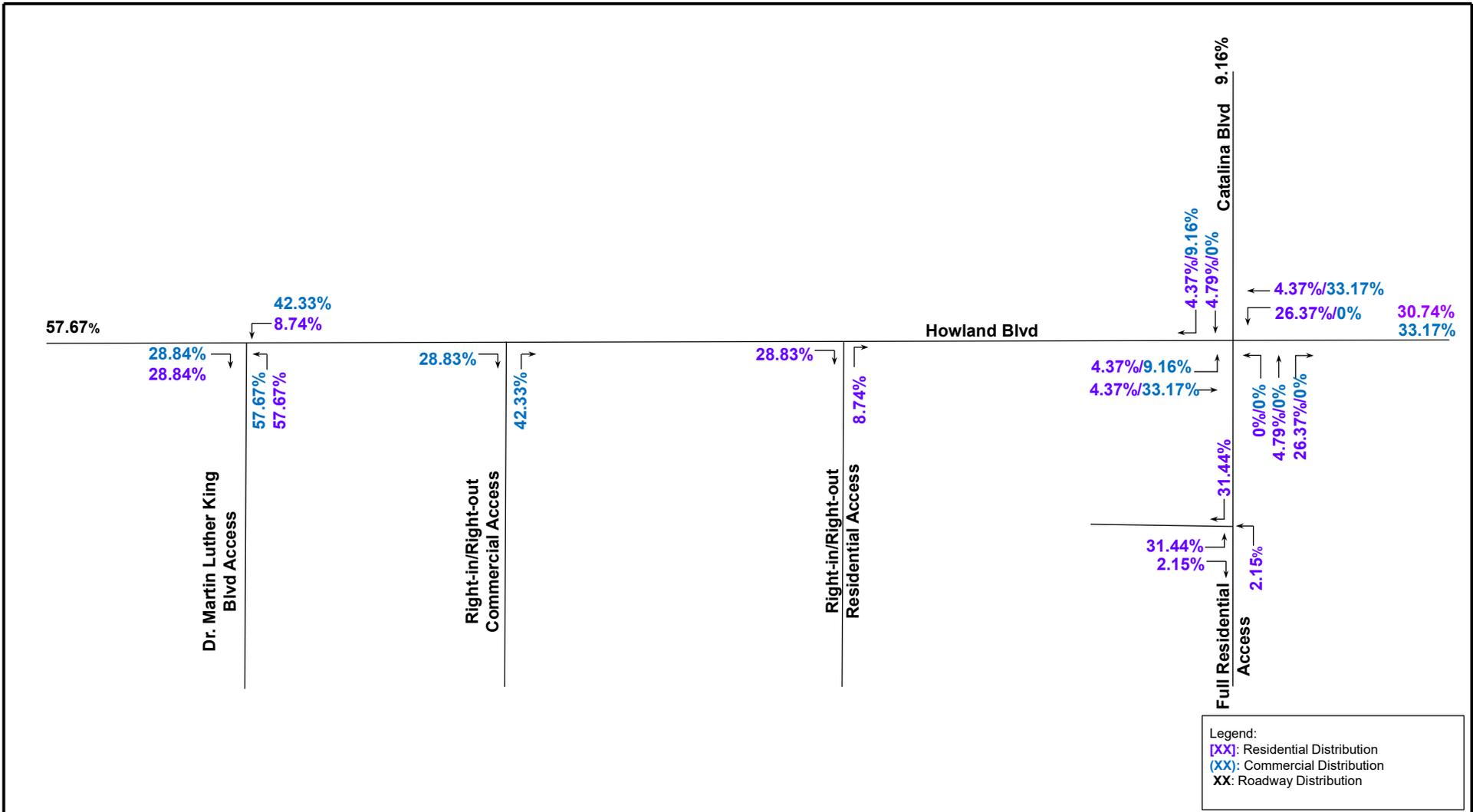


1450 West Granada Boulevard, Suite 2, Ormond Beach, Florida 32174  
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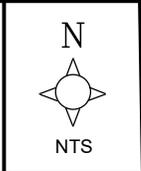
Project Trip Distribution

Project No.: 5519.03

Figure: 4B

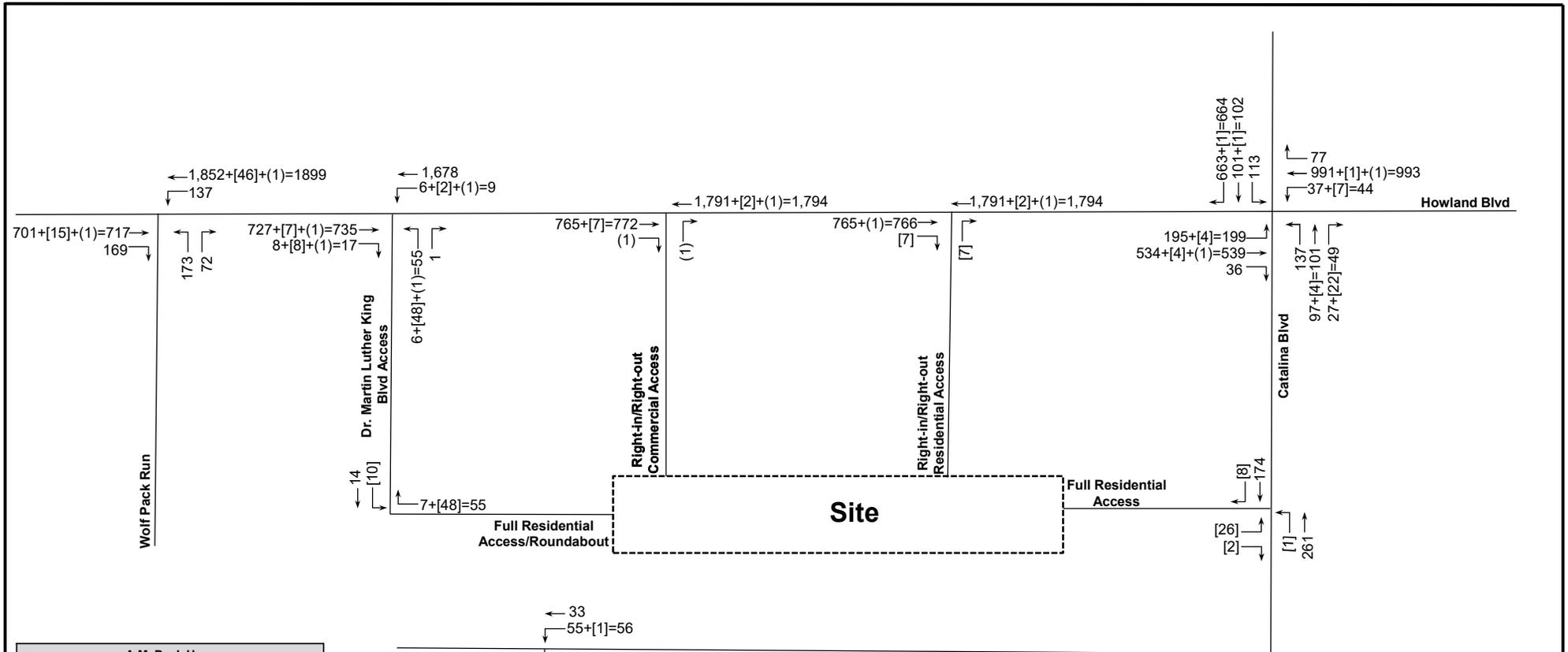


Catalina Point



**LTG Engineering & Planning**  
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**Project Driveway Distribution**  
 Project No.: 5519.03  
 Figure: 4C



A.M. Peak Hour			
	Enter	Exit	Total
Residential Trips	26	83	109
Commercial Trips	2	2	4

**Legend:**

$XX + [XX] + (XX) = XX$   
 ↑ ↑ ↑ ↑  
 2025 Build-Out Traffic  
 Commercial Trips  
 Residential Trips  
 2025 Background Traffic

**Catalina Pointe**



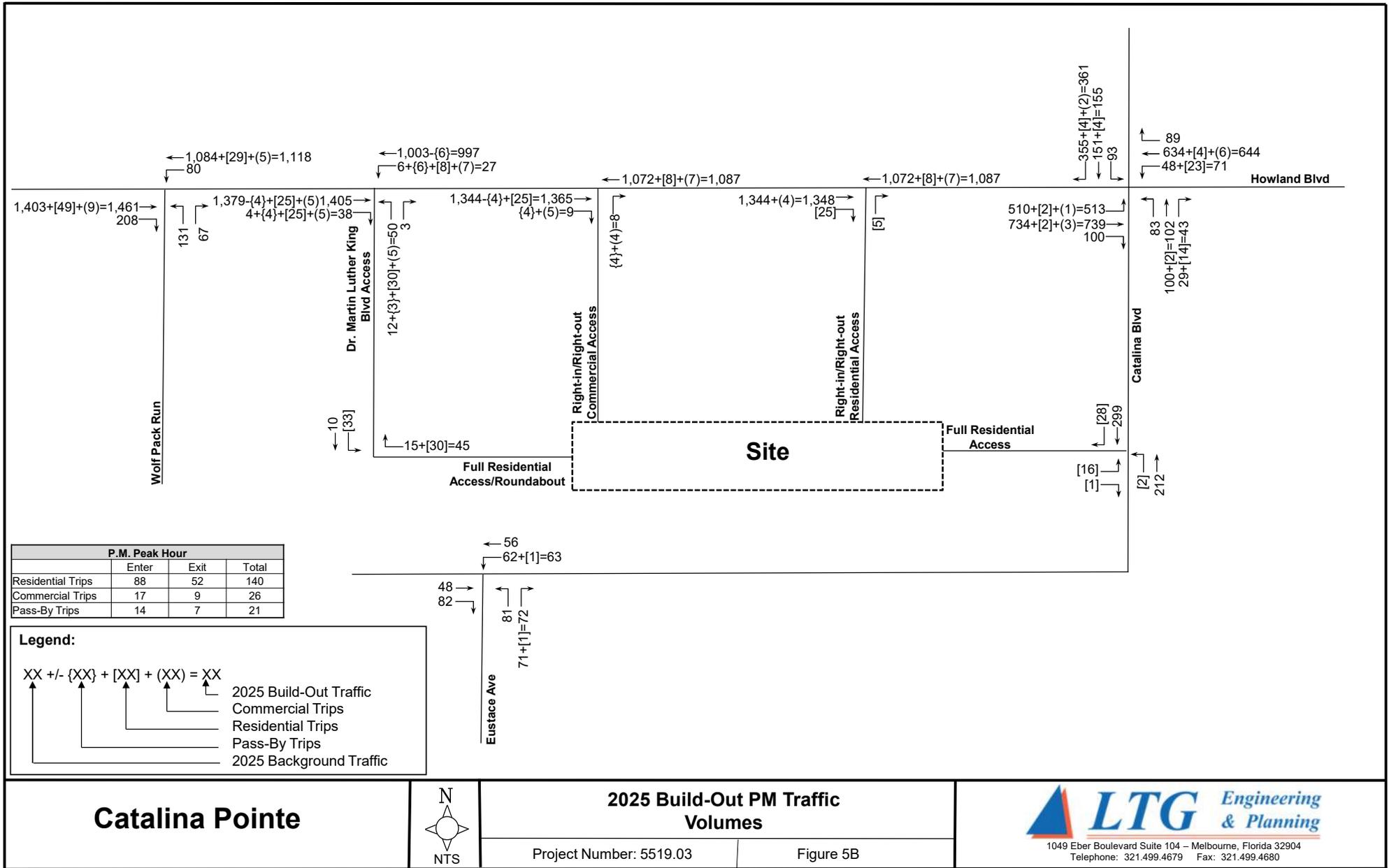
**2025 Build-Out AM Traffic Volumes**

Project Number: 5519.03

Figure 5A



1049 Eber Boulevard Suite 104 – Melbourne, Florida 32904  
 Telephone: 321.499.4679 Fax: 321.499.4680

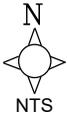


P.M. Peak Hour			
	Enter	Exit	Total
Residential Trips	88	52	140
Commercial Trips	17	9	26
Pass-By Trips	14	7	21

**Legend:**

$XX \text{ +/- } \{XX\} + [XX] + (XX) = XX$   
 ↑ 2025 Build-Out Traffic  
 ↑ Commercial Trips  
 ↑ Residential Trips  
 ↑ Pass-By Trips  
 ↑ 2025 Background Traffic

**Catalina Pointe**



**2025 Build-Out PM Traffic Volumes**

Project Number: 5519.03      Figure 5B



1049 Eber Boulevard Suite 104 – Melbourne, Florida 32904  
 Telephone: 321.499.4679 Fax: 321.499.4680

**2025 Build-Out – Unsignalized Intersection Analysis**

The unsignalized intersections and project driveways were analyzed to determine the operating conditions under 2025 build-out conditions, and the results are presented in Table 11. The Synchro summary sheets are included in Appendix L.

**Table 11  
2025 Build-Out AM and PM Peak-Hour LOS – Unsignalized Intersections  
Catalina Pointe**

Intersection	Adopted LOS	AM Peak-Hour			PM Peak-Hour		
		Critical Approach	Delay	LOS	Critical Approach	Delay	LOS
4. Catalina Boulevard at Eustace Avenue	D	NB	12.3	B	NB	12.1	B
5. Howland Blvd at Right-in/Right-Out Commercial Project access driveway	E	NB	11.2	B	NB	15.3	C
6. Howland Blvd at Right-in/Right-Out Residential Project access driveway	E	NB	11.2	B	NB	15.1	C
7. Dr. Martin Luther King Blvd at Roundabout/Project access driveway	E	WB	3	A	WB	2.9	A
8. Catalina Blvd at Full Residential Project access driveway	E	EB	10.8	B	EB	12.7	B

As indicated, under build-out conditions, the unsignalized intersections are anticipated to operate with an acceptable LOS.

**2025 Build-Out – Signalized Intersections Analysis**

The signalized intersections were analyzed to determine the operational LOS under build-out conditions, including the improvements identified under 2025 background conditions, and the results are presented in Table 12. The Synchro summary sheets are contained in Appendix M.

**Table 12  
2025 Build-Out AM and PM Peak-Hour LOS - Signalized Intersections  
Catalina Pointe**

Intersection	Adopted LOS	AM Peak-Hour			PM Peak-Hour		
		Delay (sec.)	LOS	V/C greater than 1.0?	Delay (sec.)	LOS	V/C greater than 1.0?
1. Howland Blvd at Catalina Blvd	E	48.4	D	No	35.2	D	No
2. Howland Blvd at Dr. Martin Luther King Blvd	E	22.9	C	No	20.9	C	No
3. Howland Blvd at Wolf Pack Run	E	14.2	B	No	13.9	B	No

As indicated in Table 12, all signalized intersections are anticipated to operate within their adopted level of service and with v/c ratios less 1.0 under build-out conditions.

**2025 Build-Out Roadway Segment Analysis**

The study area roadway segments were analyzed under build-out conditions, including the improvements identified during 2025 background conditions, to determine the anticipated LOS and the results are presented in Table 13. As indicated, all study area roadway segments are expected to operate within the adopted LOS.

**Table 13  
Build-Out PM Peak-Hour LOS - Roadway Segments\*  
Catalina Pointe**

Roadway	Segment		No. of Lanes	Adopted LOS	Peak-Hour Two-Way Capacity at Adopted LOS	Existing PM Peak-Hour Two-Way Volume	2025 Background Volume	Project Distribution	Project Trips	2025 Total Build-Out Volume	2025 Build-Out Volume Exceed Adopted LOS?
Howland Blvd	I-4/SR 472	Wolf Pack Run	6	E	5,120	2,530	3,499	55.72%	92	3,591	No
	Wolf Pack Run	Catalina Blvd	4	E	3,410	2,310	3,185	57.67%	96	3,281	No
Catalina Blvd	Wolfpack Run	Howland Blvd	2	D	960	484	499	22.41%	37	536	No
W. Volusia Bltwy (Kentucky Ave)/ (Dr MLK Jr)	Orange Camp Rd.	Cassadaga Rd	2	E	1,540	990	1,412	5.32%	9	1,421	No
	Cassadaga Rd	SR 472	2	E	1,540	1,040	1,353	5.32%	9	1,362	No
	SR 472	Graves Ave	2	E	1,540	910	1,216	0.00%	0	1,216	No
Graves Ave	Veteran's Memorial Pkwy	Kentucky Ave	4	E	3,410	1,640	2,235	9.61%	16	2,251	No
	Kentucky Ave	Howland Blvd	4	E	3,410	1,420	2,251	9.61%	16	2,267	No
Veterans Memorial Pkwy	Rhode Island	Graves Ave	2	E	1,620	1,200	1,583	5.48%	9	1,592	No
Providence Blvd	Ft Smith Blvd.	Elkcam Blvd	4	E	3,410	1,130	1,235	10.34%	17	1,252	No
Saxon Blvd	Finland Dr.	Normandy Blvd	6	E	4,851	3,140	3,528	0.11%	0	3,528	No
Lake Helen-Osteen Rd	Haulover Blvd	Catalina Blvd	4	E	3,410	1,090	1,256	3.39%	6	1,262	No
Dr. Martin Luther King Blvd	Project driveway/Roundabout	Howland Blvd	2	D	960	24	25	57.67%	35	60	No

\*Includes improvements recommended in background conditions, which are not currently funded for construction.

## **Queue Length and Turn Lane Analysis**

A queue length analysis was conducted to determine recommended storage lengths for existing turn lanes at the study area intersections that are impacted by project traffic. The Synchro results were used to obtain the 95<sup>th</sup> percentile queue lengths expected for each exclusive turn lane during the AM and PM peak-hours. Turn lane requirements were evaluated using the Volusia County LDC Section 72-619, Table VI and FDOT Design Manual 212. The resulting recommended turn lane lengths for the intersections are provided in Table 14. As indicated in the table, all turn lanes that do not meet the required standard lengths do so in existing conditions or due to background conditions in either the AM or PM peak-hours and not due to project trips except for the following turn lanes:

### Howland Blvd at Dr. Martin Luther King Blvd

- Extend northbound left-turn lane by 50 feet
- Extend westbound left-turn lane by 25 feet

## **Alternate Mode Analysis**

An alternative mode analysis has been conducted to determine existing and proposed alternate modes of transportation within the immediate project study area.

Votran, Volusia County's public transportation system, provides transportation alternatives to all urban areas of the county via fixed route buses and paratransit vehicles. The frequency of most routes is one hour, with a few operating on the half-hour. Standard daily service is provided from 6:00 a.m. to 7:00 p.m., Monday through Saturday, with a limited fixed route service at night and on Sunday. Currently, there are no bus stops within walking distance of the development.

Deltona High School, Galaxy Middle School, Timbercrest Elementary, and Deltona Lakes Elementary are within the 2-mile walk zone of the proposed development, as shown in Figure 6. There are sidewalks on both the north and south sides of Catalina Boulevard from the proposed development access westward to Wolf Pack Run. This is anticipated to be the primary route from the proposed development to Deltona Lakes High School or the YMCA and the route that facilitates access to the network of existing local streets from which Timbercrest Elementary and Galaxy Middle school can be accessed. Currently there are no Votran services available to the site and Votran eliminated Route 25, which provided service between DuPont Lakes and Halifax Crossings, but Votran has no plans to extend or reinstate the Howland Blvd service or re-instate service to that section of Howland Blvd. Votran has been contacted in effort to coordinate whether provision of a bus stop or bus stop amenities is required and has advised that no extension of bus services is proposed in the vicinity of the site. A copy of that correspondence is included in Appendix N.

**Table 14  
Build-Out AM and PM Peak-Hour - Queue Length and Turn Lane Recommendations  
Catalina Pointe**

Intersection	Turn Lane	Posted Speed Limit (mph)	Existing Lane Length (ft)	Required Deceleration (ft)*	Existing				Background				Build-Out				Project Trips	
					# Of Lanes	95th Percentile Queue Length (veh x 25 ft)	Total Required Turn Lane Length (ft)	Lane Length Deficiency (ft)	# Of Lanes	95th Percentile Queue Length (veh x 25 ft)	Total Required Turn Lane Length (ft)	Lane Length Deficiency (ft)	# Of Lanes	95th Percentile Queue Length (veh x 25 ft)	Total Required Turn Lane Length (ft)	Lane Length Deficiency (ft)		Lane Length Deficiency Difference from Background to Build-Out (ft)
<b>AM</b>																		
Howland Blvd at Catalina Blvd	EBL	45	370	240	1	275	515	145	1	225	465	0	1	225	465	0	0	4
	WBL	45	270	240	1	50	290	20	1	50	290	20	1	50	290	20	0	7
	NBL	30	170	145	1	150	295	125	1	200	345	175	1	200	345	175	0	0
	SBL	30	240	145	1	175	320	80	1	200	345	105	1	200	345	105	0	0
	SBR	30	420	145	1	775	920	500	1	825	970	550	1	825	970	550	0	1
Howland Blvd at Dr. Martin Luther King Blvd	EBR	45	235	240	1	25	265	30	1	25	265	30	1	25	265	30	0	9
	WBL	45	280	240	1	25	265	0	1	25	265	0	1	25	265	0	0	3
	NBL	30	180	145	1	25	170	0	1	25	170	0	1	75	220	40	50	49
	NBR	30	180	145	1	25	170	0	1	25	170	0	1	25	170	0	0	0
Howland Blvd at Wolf Pack Run	WBL	45	250	240	1	50	290	40	1	50	290	40	1	50	290	40	0	0
	NBL	35	410	155	1	150	305	0		150	305	0		150	305	0	0	0
<b>PM</b>																		
Howland Blvd at Catalina Blvd	EBL	45	370	240	1	550	790	420	1	450	690	0	1	450	690	0	0	3
	WBL	45	270	240	1	50	290	20	1	50	290	20	1	50	290	20	0	23
	NBL	30	170	145	1	125	270	100	1	125	270	100	1	125	270	100	0	0
	SBL	30	240	145	1	150	295	55	1	175	320	80	1	175	320	80	0	0
	SBR	30	420	145	1	100	245	0	1	250	395	0	1	275	420	0	0	6
Howland Blvd at Dr. Martin Luther King Blvd	EBR	45	235	240	1	25	265	30	1	25	265	30	1	25	265	30	0	34
	WBL	45	280	240	1	25	265	0	1	25	265	0	1	50	290	10	25	21
	NBL	30	180	145	1	25	170	0	1	50	195	15	1	75	220	40	25	38
	NBR	30	180	145	1	25	170	0	1	25	170	0	1	25	170	0	0	0
Howland Blvd at Wolf Pack Run	WBL	45	250	240	1	50	290	40	1	50	290	40	1	50	290	40	0	0
	NBL	35	410	155	1	125	280	0	0	125	280	0	0	125	280	0	0	0

\*Based upon Volusia County LDC Section 72-619 Table VI and FDOT Design Manual 212



<b>Catalina Pointe</b>		<b>2-Mile School Walk Zone</b>		 1450 W. Granada Blvd., Suite 2, Ormond Beach, Florida 32174 Telephone: 386.257.2571 Fax: 386.257.6996
		Project No.: 5519.03	Figure: 6	

## Site Access Analysis

The proposed development is located southeast of Howland Boulevard and Dr. Martin Luther King Boulevard. Access to the development is proposed as follows:

- Commercial-Only Access (2): One full access driveway on Dr. Martin Luther King Boulevard that will be shared with existing commercial development in the southeast quadrant of Howland Boulevard/ Dr. Martin Luther King Boulevard; one right-in/right-out driveway on Howland Boulevard.
- Residential-Only Access (3): One full access driveway on Dr. Martin Luther King Boulevard, east of the existing roundabout; one right-in/right-out driveway on Howland Boulevard; one full access driveway on Catalina Boulevard.

Howland Boulevard is currently maintained by Volusia County and are therefore required to meet current driveway criteria provided within Volusia County Land Development Code (LDC) Section 72-619.

Section 72-619 of the LDC states that a right-turn lane of 12 feet in width, conforming to Table VI shall be provided at each driveway when the speed limit equals or exceeds 35 miles per hour or if the development will generate 100 or more right-turn movements during the peak hour. Based on these criteria, a 240-ft. eastbound right turn lane is required at both right-in/right-out access driveways on Howland Boulevard.

The developer understands conceptual plans used as exhibits in approved TIA methodologies and TIAs are considered supplemental information. Items, such as driveway requirements, turn lane requirements, right of way improvements, etc., will be determined through the civil design process of the development. During the civil design process, the approved general locations of driveways (in accordance with Use Permit No. 2022-P-USE-0357) shall not be significantly modified. Any access control will occur independent of the TIA review and will be determined only through the actual plans review process.

## Proportionate Share (PS)

Based on the current Florida Statue and procedures outlined in the R2CTPO TIA guidelines, the proportionate share shall be calculated based upon the number of trips from the proposed development being approved. The project traffic is then divided by the change in roadway capacity resulting from the recommended improvements to result in a PS percentage. The total estimated construction cost for the improvement is multiplied by the PS percentage to determine the applicant's PS contribution.

The PS formula is to be applied only to those facilities that are determined to be significantly impacted by the project traffic under review. The recommended improvements eligible for PS determination, the estimated improvements costs and PS calculation are to be negotiated once the TIA has been approved.

# 6

## CONCLUSION AND RECOMMENDATIONS

This study was conducted to evaluate the impact the proposed Catalina Pointe development would have on the surrounding roadway network in the City of Deltona. The development will generate 113 AM peak-hour and 166 PM peak-hour new trips. The results of the study are summarized in Tables 15 and 16, below.

**Table 15  
Recommended Improvements - Roadway Segments  
Catalina Pointe**

Roadway	Segment		When Improvement Required	
	To	From	2025 Background	Build-Out
Howland Blvd	I-4/SR 472	Wolf Pack Run	6L	-
Graves Ave	Veteran's Memorial Pkwy	Kentucky Ave	4L	-
Graves Ave	Kentucky Ave	Howland Blvd	4L	-
Providence Blvd	Ft Smith Blvd.	Elkcam Blvd	4L	-
Saxon Blvd	Finland Dr.	Normandy Blvd	6L	-
Lake Helen-Osteen Rd	Haulover Blvd	Catalina Blvd	4L	-

**Table 16  
Recommended Improvements - Intersections  
Catalina Pointe**

Intersection	When Improvement Required	
	2025 Background	Build-out
1. Howland Blvd at Catalina Blvd	<ul style="list-style-type: none"> <li>• Add overlap phase to the southbound right approach</li> <li>• Optimize signal timing splits</li> </ul>	-

The following turn lanes are expected to be deficient in length under build-out conditions due to project trips:

Howland Blvd at Dr. Martin Luther King Blvd

- Extend northbound left-turn lane by 50 feet
- Extend westbound left-turn lane by 25 feet

Based on the Volusia County Land Development Code (LDC), a 240-ft. eastbound right turn lane is required at both right-in/right-out site access driveways on Howland Boulevard.

If deemed necessary by the agencies, the recommended improvements eligible for proportionate share (PS), the estimated improvement cost, and PS calculations are to be negotiated once the TIA results are accepted by the City of Deltona and Volusia County. Based on the results of the TIA and recommended improvements, the proposed Catalina Pointe development is recommended for approval.

# **APPENDICES**

# **APPENDIX A**

## **Preliminary Site Plan**



- DEVELOPMENT NOTES:**
1. ALL INTERNAL STREETS SHALL BE PRIVATE STREETS.
  2. SOLID WASTE WILL BE SERVED BY DUMPSTERS
  3. ALL SANITARY SEWER MAIN LINES AND MANHOLES SHALL BE DEDICATED TO VOLUSIA COUNTY.
  4. ALL PORTABLE WATER MAIN LINES SHALL BE DEDICATED TO VOLUSIA COUNTY.
  5. UNDERGROUND UTILITIES WILL BE REQUIRED TO SERVE THIS PROJECT.
  6. STORM WATER TRACTS SHALL BE OWNED AND MAINTAINED BY THE HOA.
  7. RECREATION/OPEN SPACE TRACTS SHALL BE OWNED AND MAINTAINED BY THE HOA.
  8. PROJECT WILL REQUIRE A ST. JOHN'S RIVER WATER MANAGEMENT DISTRICT CONSTRUCTION PERMIT.
  9. ALL STRUCTURES AND PIPES WITHIN THE ON-SITE DRAINAGE EASMENTS ARE TO BE OWNED AND MAINTAINED BY THE HOA.
  10. MAIL KIOSK IS LOCATED AT THE AMENITY CLUBHOUSE/POOL.
  11. RETENTION POND AREAS ARE APPROXIMATE.

**SITE DATA**

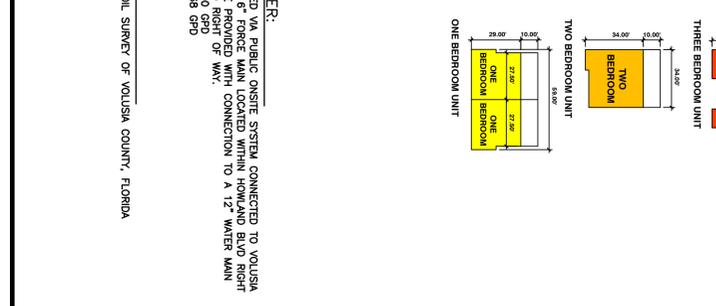
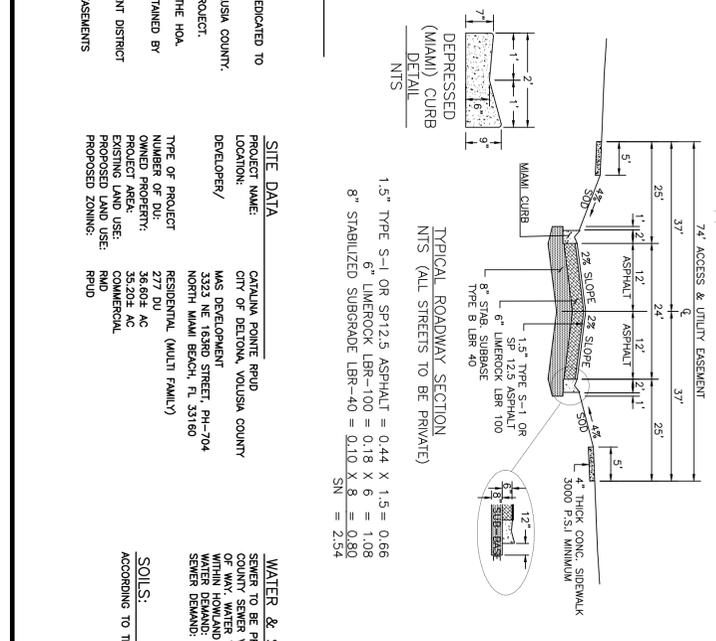
PROJECT NAME: CATALINA POINTE RPUD  
 LOCATION: CITY OF DELTONA, VOLUSIA COUNTY  
 DEVELOPER/MS DEVELOPMENT: 3323 NE 183RD STREET, PH-704  
 NORTH MIAMI BEACH, FL 33180  
 RESIDENTIAL (MULTI FAMILY)  
 NUMBER OF DU: 277 DU  
 OWNED PROPERTY: 36,604 AC  
 EXISTING LAND USE: COMMERCIAL  
 PROPOSED LAND USE: RPUD

**WATER & SEWER:**

SEWER TO BE PROVIDED VIA PUBLIC ON-SITE SYSTEM CONNECTED TO VOLUSIA COUNTY SANITARY SEWER MAIN LINES. NO SANITARY SEWER MAIN LINES OR MANHOLES TO BE PROVIDED WITHIN HOWLAND BLVD RIGHT OF WAY.  
 WATER DEMAND: 83,100 GPD  
 WATER DEMAND: 28,089 GPD

**SOILS:**

ACCORDING TO THE SOIL SURVEY OF VOLUSIA COUNTY, FLORIDA



UNIT MIX	UNIT TYPE	COUNT	PERCENTAGE
TOWNHOME	88	NOT INCLUDED	
1 BEDROOM (DUPLEX)	32	17%	
2 BEDROOM	125	66%	
3 BEDROOM	32	17%	
277 TOTAL UNITS			

**SITE DIMENSIONS / INFORMATION:**

- OVERALL SITE APPROXIMATELY 34.6 ACRES (TO BE VERIFIED BY SURVEY)
- 1.56 ACRES RETENTION PROPOSED
- 0.8 ACRES AMENITY CLUBHOUSE / POOL
- 1.4 ACRES COMMERCIAL
- 5.9 ACRES TREE PRESERVATION (INCLUDES BUFFER SETBACK AREAS)

**SETTLEMENT DIMENSIONS:**

- 20' SETBACK ALONG SIDE (EAST/WEST) PROPERTY LINES
- 25' MINIMUM SETBACK FROM HOWLAND BLVD. PROPERTY LINE
- 25' MINIMUM SETBACK FROM CATALINA BLVD. PROPERTY LINE
- MINIMUM 10' BETWEEN UNITS

**COTTAGE PARKING:**

- 180 UNITS
- (23) 1 BEDROOM UNITS (48 SPACES REQ'D)
- (23) 2 BEDROOM UNITS (64 SPACES REQ'D)
- (34) 3 BEDROOM UNITS (64 SPACES REQ'D)
- 516 SPACES REQUIRED
- 332 SPACES PROVIDED
- 179 SPACES REQUIRED FOR TOWNHOMES (TWO PER UNIT)
- 200 PROVIDED (179 SPACES)

**DISCLAIMER:** ALL PROPOSED SITE WORK IS APPROXIMATE - AN OFFICIAL SURVEY OF THE PROPERTY IS REQUIRED IN ORDER TO VERIFY INFORMATION SHOWN.

**CATALINA POINTE**  
 DELTONA, FLORIDA  
 SECTION 9, TWP 18, RNG 31  
 VOLUSIA COUNTY, FL

**SITE PLAN**

DATE: 07-20-2022  
 PROJECT #: 21FL021  
 SCALE: 1"=50'  
 DRAWN BY: EHH  
 APPROVED BY: DRB

**REVISIONS**

DATE	NO.	DESCRIPTION	NAME

**PRELIMINARY**

DAVID BOOHER P.E. #78186 DATE

CA#: 30924

600 N BROADWAY AVE, STE. 301  
 BARTOW, FL 33830  
 863-422-5517  
 www.quiggeengineering.com

**QEI**  
 QUIGG ENGINEERING INC

**3.0**

SHEET NUMBER

# **APPENDIX B**

## **Approved Methodology**



Via Email: ([rparadise@deltonafl.gov](mailto:rparadise@deltonafl.gov)) and ([JCheney@Volusia.org](mailto:JCheney@Volusia.org))

Ref: 5519.01

June 20, 2022

Ron Paradise  
Planning Director  
City of Deltona  
2345 Providence Boulevard  
Deltona, FL 32725

Mr. Jon Cheney, PE  
Traffic Engineer  
Volusia County Public Works – 4<sup>th</sup> Floor  
123 W. Indiana Ave. Room 240  
Deland, FL 32720

Re: Catalina Pointe - Traffic Impact Analysis (TIA) Methodology  
City of Deltona, Florida

Dear Mr. Paradise and Mr. Cheney:

LTG, Inc. (LTG) has been retained by MAS Development to prepare a Traffic Impact Analysis (TIA) for the proposed Catalina Pointe development. The proposed development is located southeast of Howland Boulevard and Dr. Martin Luther King Boulevard in the City of Deltona, Florida. Figure 1 shows the location of the project relative to the surrounding road network. The development will consist of 6,000 square feet (SF) of Quality Restaurants and 277 multifamily dwelling units. Access to the development is proposed as follows:

- A full access commercial driveway on Dr. Martin Luther King Boulevard that will be shared with existing commercial development in the southeast quadrant of Howland Boulevard/ Dr. Martin Luther King Boulevard
- A full access residential driveway on Dr. Martin Luther King Boulevard, east of the existing roundabout
- A right-in/right-out commercial driveway on Howland Boulevard
- A right-in/right-out residential driveway on Howland Boulevard
- A full access driveway on Catalina Boulevard

The anticipated build-out year is 2025. A preliminary site plan is included as Exhibit A.

The City of Deltona has adopted the River to Sea Transportation Planning Organization (R2CTPO) Transportation Impact Analysis (TIA) guidelines. In accordance with these guidelines, this letter outlines the proposed methodology by which the analysis will be conducted. The analysis will be based on the latest concurrency information as obtained from City of Deltona, and from Volusia County Traffic Engineering Department.

### **Analysis Period**

Roadway segments will be analyzed based on p.m. peak-hour two-way traffic and intersections will be analyzed for a.m. and p.m. peak-hours. The analysis will be conducted under 2022 existing conditions, 2025 background conditions and 2025 build-out conditions. The a.m. and p.m. peak-hour turning movement counts will be collected on a typical weekday (Tuesday, Wednesday, or Thursday) between the hours of 7:00-9:00 a.m. and 4:30-6:30 p.m. The existing traffic counts will be adjusted by the FDOT **2019** Seasonal Factor (SF) specified for the week the data is collected.



<b>Catalina Pointe</b>	 NTS	<b>Project Location</b>		
		Project No.: 5519.01	Figure: 1	

**Project Trip Generation**

The daily, AM, and PM peak-hour trip generation for the proposed development was determined using the trip generation rates published by the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 11<sup>th</sup> Edition. The gross trip generation is presented in Table 1.

**Table 1  
 Gross Trip Generation  
 Catalina Pointe**

Time Period	Land Use	ITE LUC	Trip Rate Equation	Size	Units	Percent Entering	Percent Exiting	Trips Entering	Trips Exiting	Total Trips
Daily	Low-Rise Multifamily Residential	220	$T = 6.41(X) + 75.31$	277	DU	50%	50%	926	925	1,851
	Quality Restaurant	931	$T=83.84(X)$	6.0	KSF	50%	50%	252	251	503
<b>Totals:</b>								<b>1,178</b>	<b>1,176</b>	<b>2,354</b>
AM Peak-Hour	Low-Rise Multifamily Residential	220	$T = 0.31(X) + 22.85$	277	DU	24%	76%	26	83	109
	Quality Restaurant	931	$T = 0.73(X)$	6.0	KSF	50%*	50%*	2	2	4
<b>Totals:</b>								<b>28</b>	<b>85</b>	<b>113</b>
PM Peak-Hour	Low-Rise Multifamily Residential	220	$T=0.43(X)+20.55$	277	DU	63%	37%	88	52	140
	Quality Restaurant	931	$T=7.80(X)$	6.0	KSF	67%	33%	31	16	47
<b>Totals:</b>								<b>119</b>	<b>68</b>	<b>187</b>

\*The AM entering/exiting percentages were not available in the ITE Trip Generation Handbook 3rd edition; therefore, a 50/50 split was used.

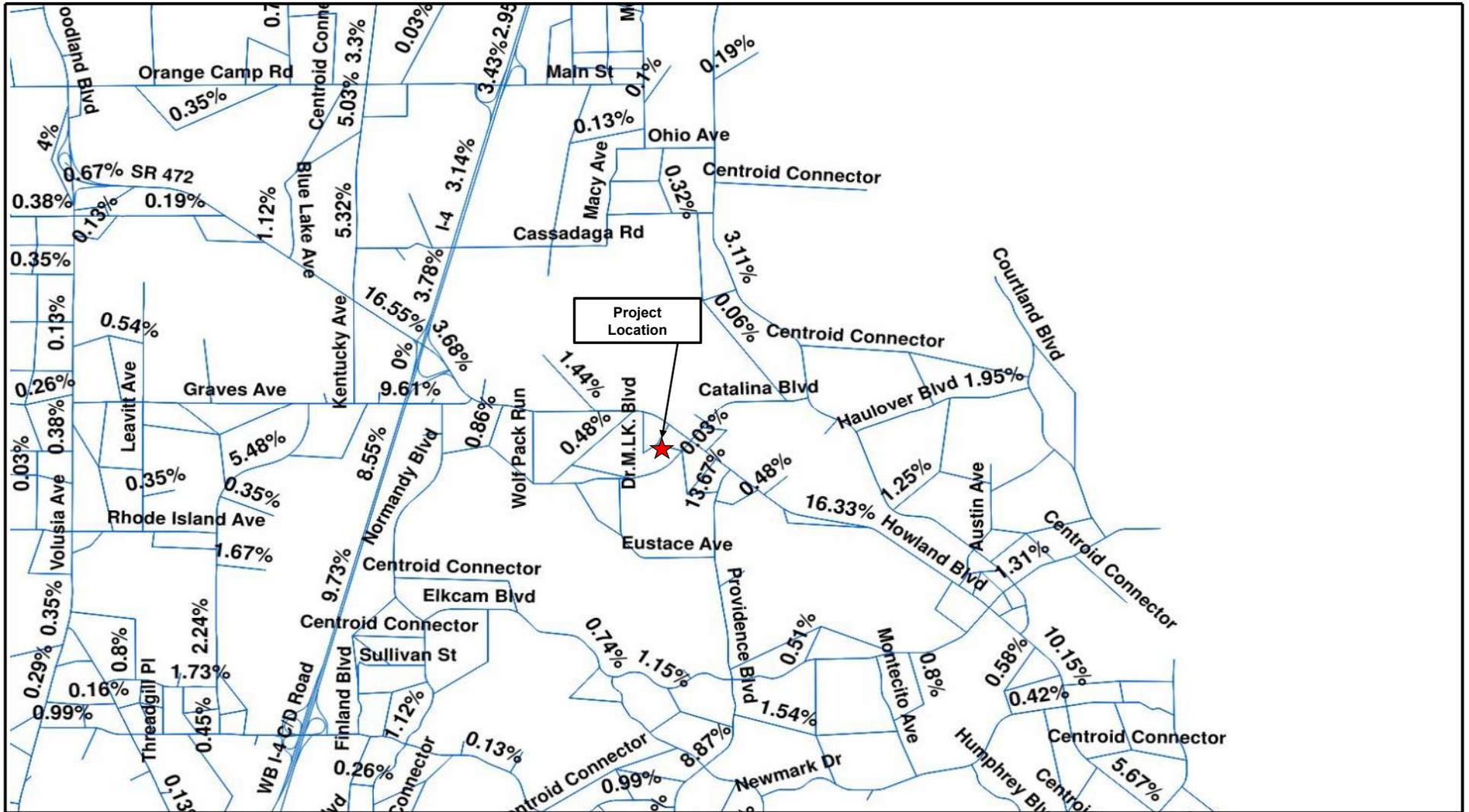
A certain portion of trips generated by the restaurant will be attracted from existing traffic already on the adjacent roadway. The pass-by trips for the quality restaurant use were given as 44 percent in the ITE Trip Generation Handbook, 3rd Edition and reviewed to ensure that they did not exceed the established threshold of 14% of the adjacent roadway traffic volume for County facilities. Pass-by trips were deducted from the gross trip generation and the resulting net new external a.m. and p.m. peak-hour trips are provided in Table 2.

**Table 2  
 Net Trip Generation  
 Catalina Pointe**

Time Period	Land Use	Total Trips			Internal Capture			Pass-by Trips			New External Trips		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
Daily	Low-Rise Multifamily Residential	926	925	1,851	0	0	0	0	0	0	926	925	1,851
	Quality Restaurant	252	251	503	0	0	0	111	110	221	141	141	282
	<b>Totals:</b>	<b>1,178</b>	<b>1,176</b>	<b>2,354</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>111</b>	<b>110</b>	<b>221</b>	<b>1,067</b>	<b>1,066</b>	<b>2,133</b>
AM Peak-Hour	Low-Rise Multifamily Residential	26	83	109	0	0	0	0	0	0	26	83	109
	Quality Restaurant	2	2	4	0	0	0	0	0	0	2	2	4
	<b>Totals:</b>	<b>28</b>	<b>85</b>	<b>113</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>28</b>	<b>85</b>	<b>113</b>
PM Peak-Hour	Low-Rise Multifamily Residential	88	52	140	0	0	0	0	0	0	88	52	140
	Quality Restaurant	31	16	47	0	0	0	14	7	21	17	9	26
	<b>Totals:</b>	<b>119</b>	<b>68</b>	<b>187</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>14</b>	<b>7</b>	<b>21</b>	<b>105</b>	<b>61</b>	<b>166</b>

### **Project Trip Distribution**

The Central Florida Regional Planning Model, version 7 (CFRPM) was used to obtain the project trip distribution for the proposed development. A select zone analysis was completed and resulted in the project trip distribution shown in Figure 2a. Figure 2b provides a closer view of the model output in the vicinity of the site. Manual modifications were made to the model distribution in the vicinity of the site driveways, based on engineering judgement, to account for the turn restrictions at the Howland Boulevard Driveways and vehicular access to the commercial parcels only via the Dr. shared access driveway on Martin Luther King Boulevard and the right-in/right-out driveway on Howland Boulevard (with no connectivity for vehicles between the commercial and residential components). These modifications are further detailed in Figure 2c.



Catalina Point

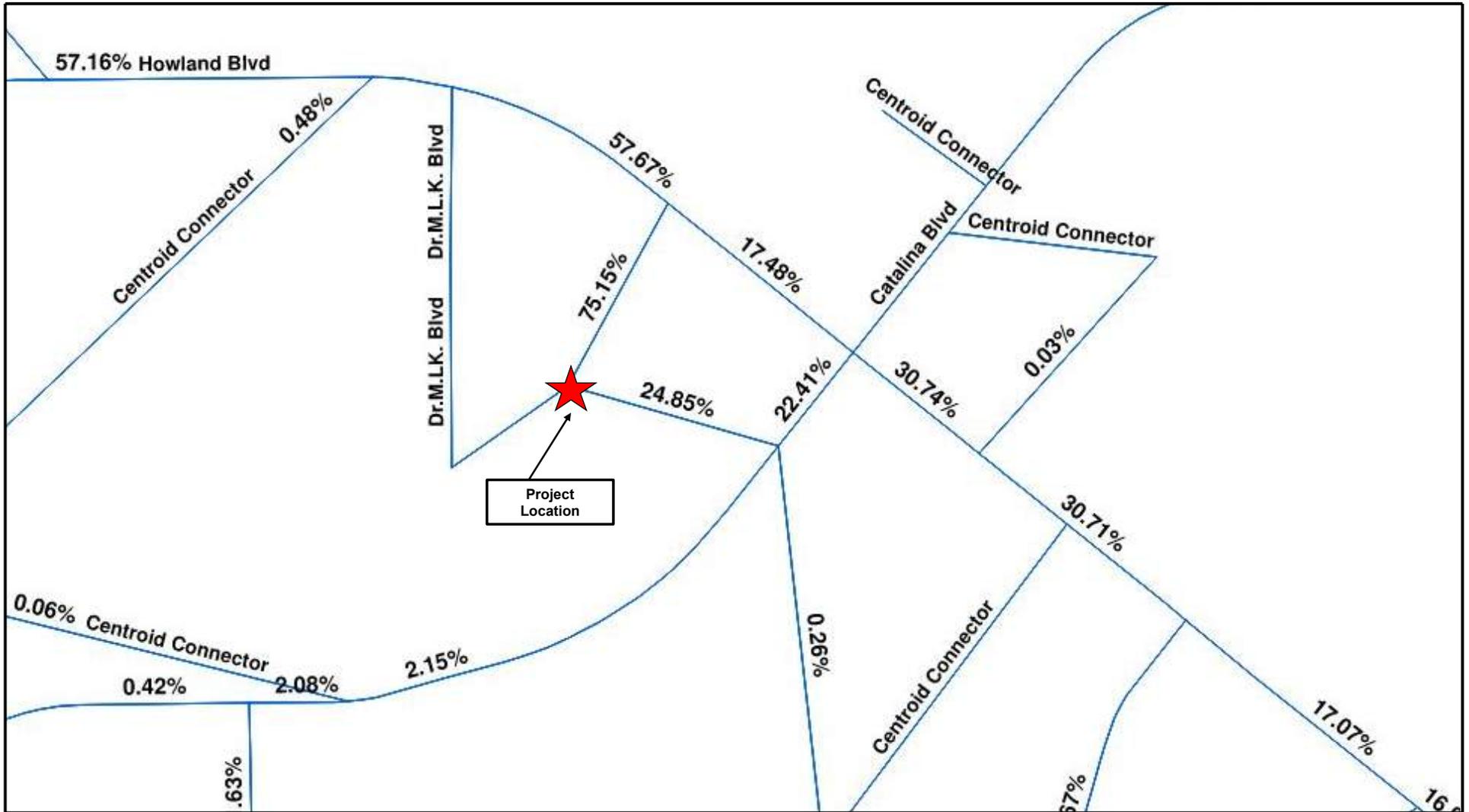


1450 West Granada Boulevard, Suite 2, Ormond Beach, Florida 32174  
 Telephone: 386.257.2571 Fax: 386.257.6996

Project Trip Distribution

Project No.: 5519.01

Figure: 2a



Catalina Point

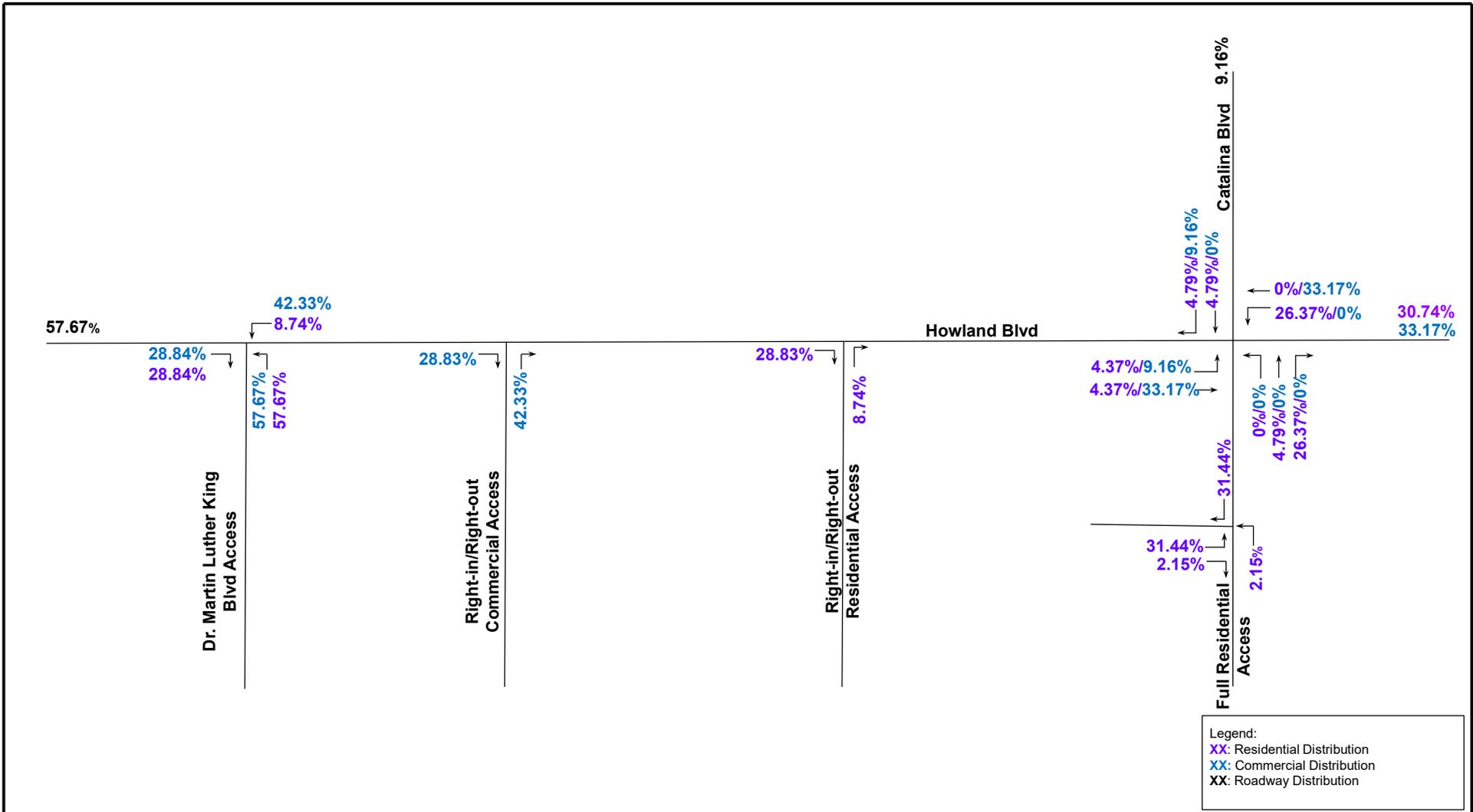


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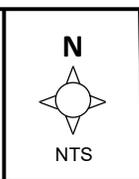
Project Trip Distribution

Project No.: 5519.01

Figure: 2b



Catalina Pointe




  
 1450 West Granada Boulevard, Suite 2, Ormond Beach, Florida 32174  
 Telephone: 386.257.2571 Fax: 386.257.6996

**Project Driveway Distribution**

Project No.: 5519.01      Figure: 2c

## Study Area

Per the R2CTPO guidelines, projects must include all roadway segments to which the site has direct connections, which are impacted by the proposed project to within three percent or greater of the peak-hour two-way adopted level of service (LOS) capacity, major intersections along the significant segments, and roadway segments that have been designated as “critical” or “near critical” within the site traffic influenced segments.

Critical and near critical roadways are defined by Volusia County as roadways with a volume to capacity (v/c) ratio that is equal to or greater than 1.0 and 0.90, respectively. Figure 3 depicts the critical and near critical roadway segments within the area.

Using the project trip distribution, p.m. peak-hour project trips were assigned to the roadway network to determine the roadway segments that are impacted by the proposed project to within three percent or greater of the peak-hour two-way adopted level of service (LOS) capacity. Table 3 presents the significance test on area roadways for the proposed development. The following intersections and roadway segments will be included in the study:

### Intersections

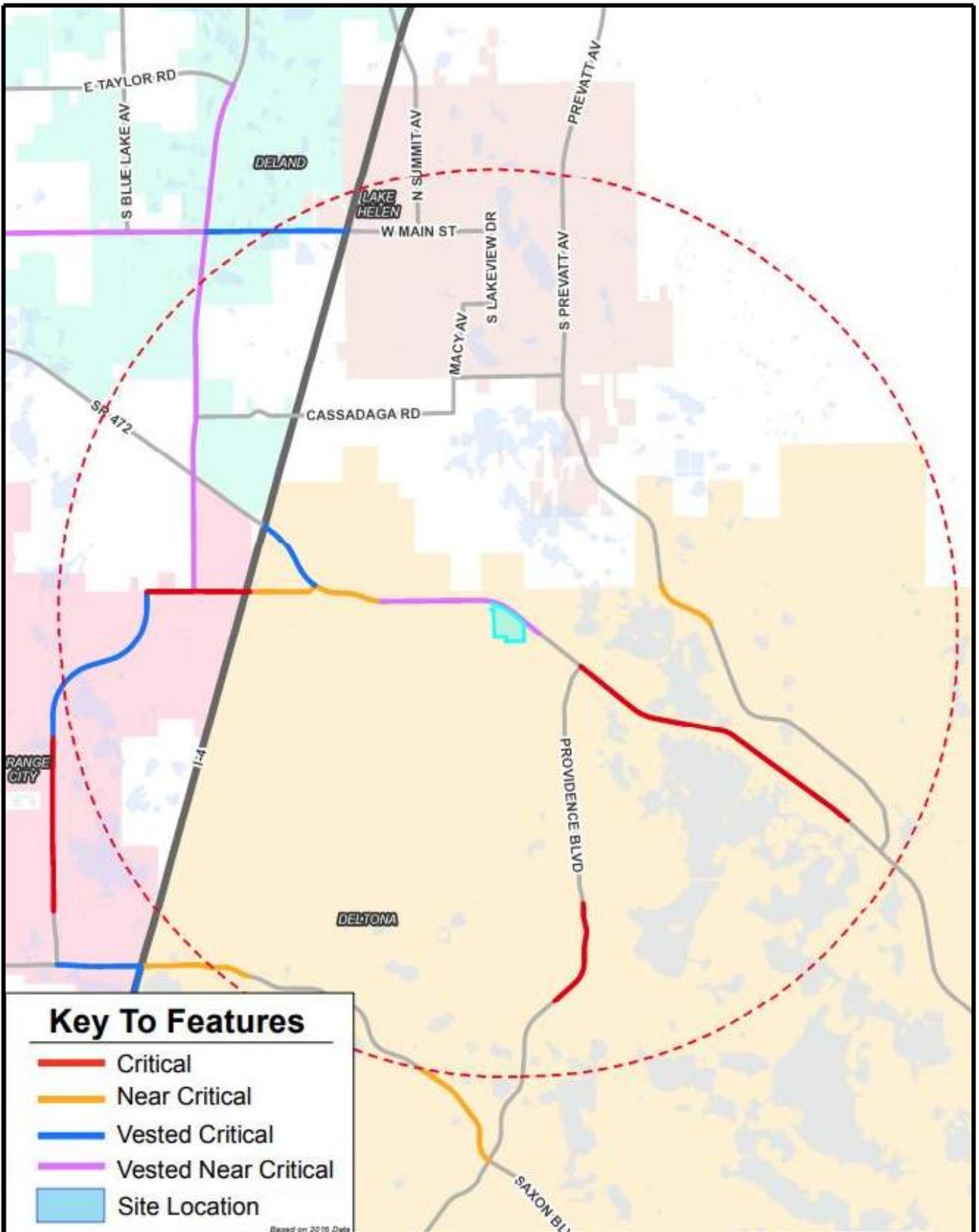
1. Howland Blvd at Catalina Blvd
2. Howland Blvd at Dr. Martin Luther King Blvd
3. Howland Blvd at Wolf Pack Run
4. Catalina Boulevard at Eustace Avenue
5. Howland Blvd at Right-in/Right-Out Commercial Project access driveway
6. Howland Blvd at Right-in/Right-Out Residential Project access driveway
7. Dr. Martin Luther King Blvd at Roundabout/Project access driveway
8. Catalina Blvd at Project access driveway

### Roadway Segments

- Howland Blvd from I-4/SR 472 to Wolf Pack Run (Vested Critical)
- Howland Blvd from Wolf Pack Run to Catalina Blvd (Near Critical)
- Catalina Blvd from Wolfpack Run to Howland Blvd (Project Access)
- W. Volusia Bldwy (Kentucky Ave)/ (Dr MLK Jr) from Orange Camp Rd. to Cassadaga Rd (Vested Near Critical)
- W. Volusia Bldwy (Kentucky Ave)/ (Dr MLK Jr) from Cassadaga Rd to SR 472 (Near Critical)
- W. Volusia Bldwy (Kentucky Ave)/ (Dr MLK Jr) from SR 472 to Graves Ave (Near Critical)
- Graves Ave from Veteran's Memorial Pkwy to Kentucky Ave (Critical)
- Graves Ave from Kentucky Ave to Howland Blvd (Near Critical)
- Veterans Memorial Pkwy from Rhode Island to Graves Ave (Vested Critical)
- Providence Blvd from Ft Smith Blvd. to Elkcam Blvd (Critical)
- Saxon Blvd from Finland Dr. to Normandy Blvd (Near Critical)
- Lake Helen-Osteen Rd from Haulover Blvd to Catalina Blvd (Near Critical)
- DR. Martin Luther King Blvd from Project driveway/Roundabout to Howland Blvd (Significant)

## Planned Roadway Improvements

Programmed or planned roadway improvements in the area of interest included in the FDOT Five-Year Work Program and the R2CTPO Long Range Transportation Plan were reviewed. Based on information obtained, Graves Avenue will be widened from 2 lanes to 3 lanes included in the R2CTPO Transportation Improvement program 2024/2025.



**Key To Features**

- Critical
- Near Critical
- Vested Critical
- Vested Near Critical
- Site Location

Catalina Pointe



NTS

**Critical  
Near Critical Map**



Project No.: 5519.01

Figure: 3

1450 West Granada Boulevard Suite 2, Ormond Beach, Florida 32174  
Telephone: 386.257.2571 Fax: 386.257.6996

**Table 3  
 Significance Test  
 Catalina Pointe**

Roadway	Limits		No. of Lanes	Adopted LOS <sup>1</sup>	Peak-Hour Two-Way Capacity at Adopted LOS <sup>2</sup>	Build Out Project Distribution	PM Peak-Hour Two-Way		
	From	To					Project Trips	Impact of LOS	3% Significant?
How land Blvd.	I-4/SR 472	Wolf Pack Run	4	E	3,410	55.72%	92	2.70%	No
	Wolf Pack Run	Catalina Blvd.	4	E	3,410	57.67%	96	2.82%	No
	Catalina Blvd	Providence Blvd.	4	E	3,410	30.74%	51	1.50%	No
	Providence Blvd	Elkcam Blvd	2	E	1,230	17.07%	28	2.28%	No
Catalina Blvd*	Elkcam Blvd	Lake Helen-Osteen Rd	4	E	3,410	10.15%	17	0.50%	No
	Wolfpack Run	How land Blvd	2	D	960	22.41%	37	3.85%	No
	How land Blvd	Sixma Rd	2	D	960	9.16%	15	1.56%	No
SR 472	Sixma Rd	Lake Helen-Osteen Rd	2	D	960	8.65%	14	1.46%	No
	US 17/92	CR 4101/MLK Blvd	4	D	5,960	11.23%	19	0.32%	No
Orange Camp Rd	CR 4101/MLK Blvd	I-4 (end of state road)	4	D	3,580	10.11%	17	0.47%	No
	W Volusia Bltw y	I-4	2	E	1,540	0.05%	0	0.00%	No
I-4	Saxon Blvd	SR 472	6	D	10,510	18.28%	30	0.29%	No
	SR 472	Orange Camp Rd.	6	D	10,510	6.92%	11	0.10%	No
W. Volusia Bltw y (Kentucky Ave)/ (Dr MLK Jr)	Orange Camp Rd.	Cassadaga Rd	2	E	1,540	5.32%	9	0.58%	No
	Cassadaga Rd	SR 472	2	E	1,540	5.32%	9	0.58%	No
	SR 472	Graves Ave	2	E	1,540	0.00%	0	0.00%	No
Graves Ave	Leavitt Ave	Veteran's Memorial Pkw y	2	E	3,400	4.13%	7	0.21%	No
	Veteran's Memorial Pkw y	Kentucky Ave.	3	E	1,620	9.61%	16	0.99%	No
	Kentucky Ave.	How land Blvd.	2	E	1,620	9.61%	16	0.99%	No
Veterans Memorial Pkw y	Rhode Island	Graves Ave	2	E	1,620	5.48%	9	0.56%	No
Providence Blvd.	Saxon Blvd	Tivoli Dr.	2	E	1,330	4.26%	7	0.53%	No
	Tivoli Dr.	Ft Smith Blvd.	4	E	2,740	5.66%	9	0.33%	No
	Ft Smith Blvd.	Elkcam Blvd.	2	E	1,020	10.34%	17	1.67%	No
	Elkcam Blvd.	How land Blvd.	2	E	1,270	13.67%	23	1.81%	No
Saxon Blvd	Finland Dr.	Normandy Blvd.	4	E	3,410	0.11%	0	0.00%	No
	Normandy Blvd.	Tivoli Dr.	4	E	2,120	0.13%	0	0.00%	No
	Tivoli Dr.	Providence Blvd.	4	E	980	0.00%	0	0.00%	No
Lake Helen-Osteen Rd.	How land Blvd.	Elkcam Blvd.	2	E	1,020	1.21%	2	0.20%	No
	Elkcam Blvd.	Haulover Blvd.	2	E	1,230	2.14%	4	0.33%	No
	Haulover Blvd.	Catalina Blvd.	2	E	1,230	3.39%	6	0.49%	No
	Catalina Blvd.	Captain Dr	2	E	1,230	5.25%	9	0.73%	No
Elkcam Blvd.*	Captain Dr.	Kicklighter Rd.	2	E	1,230	2.47%	4	0.33%	No
	Normandy Blvd.	Ft. Smith Blvd.	2	D	960	0.74%	1	0.10%	No
	Ft. Smith Blvd.	Providence Blvd.	2	D	960	2.15%	4	0.42%	No
	Providence Blvd.	Montecito Ave.	2	D	960	1.64%	3	0.31%	No
Normandy Blvd*	Montecito Ave.	How land Blvd.	2	D	960	0.84%	1	0.10%	No
	How land Blvd.	Lake Helen-Osteen Rd	2	D	1,260	1.31%	2	0.16%	No
Wolf Pack Run*	Graves (old How land)	Rhode Island Ave.	2	D	1,150	2.63%	4	0.35%	No
DR. Martin Luther King Blvd*	Catalina Blvd	How land Blvd	2	D	960	1.95%	3	0.31%	No
DR. Martin Luther King Blvd*	Project driveway/Roundabout	How land Blvd	2	D	960	57.67%	35	3.65%	Yes

<sup>1</sup>Per Comprehensive Plan of Jurisdiction

<sup>2</sup>Per 2019 VC AADT Spreadsheet

Critical  
 Near Critical  
 Vested Critical  
 Vested Near Critical

### **Build-Out Traffic**

The build-out traffic will be developed by the sum of the background traffic (derived from historical growth rates and vested trips as identified by Volusia County and the estimated project traffic. Growth rates for each study area roadway segment will be determined using the following method:

- Historic growth trends calculated based upon the last five years of historic count data to determine a roadway segment's applicable trend growth rate using the best fitted regression analysis.
- If the  $R^2$  value is less than 0.70, then ten (10) years of historical traffic data will be used to determine the trends growth rate using the best fitted regressions analysis.
- If the  $R^2$  is still less than 0.70, the  $R^2$  for the adjoining northbound and southbound segments will be analyzed. Then the growth rate shall be determined by the trend fitted curve. If the overall trend fitted curve is positive, 1% or 2% shall be used. If the overall trend fitted curve is negative, then a 1% growth rate will be applied.
- In no case shall the growth rate be negative.
- Vested trips will be applied in addition to growth rates where applicable.
- If the  $R^2$  value is greater than 70%, and the growth rate is greater than 3%, the background growth will be determined using either vested trips or the growth rate, whichever is more conservative.
- If the  $R^2$  value is greater than 70%, and the growth rate is greater than 3%, and there is a high number of vested trips to be applied by multiple vested projects with various land uses, a request may be made to reduce vested traffic by 30% if the vested traffic is 30% of the total background growth.

The growth comparison and applied growth used in the analysis are provided in Table 4. The FDOT *Traffic Trends* analysis worksheets are attached as Exhibit B. The vested trip information obtained from the January 2022 *Volusia County*. All improvements funded for construction within the first three years of the five-year work program will be considered in the future analysis. It is understood that this methodology will remain valid for a period of six (6) months from the date of approval.

**Table 4**  
**Historical Growth and Vested Trips**  
**Catalina Pointe**

Roadway	Limits		5-Year			10-Year			Applied Growth Rate	Applied Growth If Using Adjacent Segment	High Growth? Y/N	Vested Trips	Existing Peak Hour Volume	Existing AADT Year	2024 Build-Out Year	Growth Rate (# of Trips)	Growth Method Applied	Total Growth Applied (# of Trips)	Estimated Background Volume	Vested % of Estimated Background Traffic	Vested Trips after 30% Reduction (If Applicable)	Total Background Traffic
	From	To	Best Fit Regression	R <sup>2</sup> Value	Historical Growth Rate	Best Fit Regression	R <sup>2</sup> Value	Historical Growth Rate														
Howland Blvd.	I-4/SR 472	Wolf Pack Run	Linear	21.2%	-2.14%	Decaying Exp.	27.2%	0.09%	Check adjacent	1.00%	N	1,003	2,530	2021	2025	101	Historical + Vested	1,104	3,634	27.60%	-	3,634
	Wolf Pack Run	Catalina Blvd.	Linear	37.2%	-1.14%	Decaying Exp.	30.3%	0.00%	Check adjacent	1.00%	N	911	2,310	2021	2025	92	Historical + Vested	1,003	3,313	27.50%	-	3,313
W. Volusia Btlwy (Kentucky Ave)/ (Dr MLK Jr)	Orange Camp Rd.	Cassadaga Rd	Linear	0.5%	-0.28%	Decaying Exp.	69.7%	0.00%	Check adjacent	1.00%	N	466	990	2021	2025	40	Historical + Vested	506	1,496	31.15%	326	1,356
	Cassadaga Rd	SR 472	Decaying Exp.	2.8%	0.26%	Decaying Exp.	70.9%	-0.25%	1.00%	1.00%	N	386	1,040	2021	2025	42	Historical + Vested	428	1,468	26.29%	-	1,468
Graves Ave	SR 472	Graves Ave	Linear	40.1%	0.61%	Decaying Exp.	92.8%	-0.29%	1.00%	-	N	370	910	2021	2025	36	Historical + Vested	406	1,316	28.12%	-	1,316
	Veteran's Memorial Pkwy	Kentucky Ave.	Decaying Exp.	33.9%	0.48%	Linear	74.7%	1.90%	1.90%	-	N	524	1,640	2021	2025	125	Historical + Vested	649	2,289	22.89%	-	2,289
Graves Ave	Kentucky Ave.	Howland Blvd.	Linear	61.6%	2.02%	Linear	78.7%	2.42%	2.42%	-	N	1,175	1,420	2021	2025	137	Historical + Vested	1,312	2,732	43.01%	823	2,380
Veterans Memorial Pkwy	Rhode Island	Graves Ave	Decaying Exp.	2.8%	-0.44%	Decaying Exp.	3.1%	0.65%	Check adjacent	1.00%	N	342	1,200	2021	2025	48	Historical + Vested	390	1,590	21.51%	-	1,590
Providence Blvd.	Ft Smith Blvd.	Elkcam Blvd.	Decaying Exp.	74.2%	-0.51%	-	-	-	1.00%	1.00%	N	70	1,130	2021	2025	45	Historical + Vested	115	1,245	5.62%	-	1,245
Saxon Blvd	Finland Dr.	Normandy Blvd.	Linear	22.8%	0.77%	Linear	37.0%	1.35%	Check adjacent	1.00%	N	333	3,140	2021	2025	126	Historical + Vested	459	3,599	9.25%	-	3,599
Lake Helen-Osteen Rd.	Haulover Blvd.	Catalina Blvd.	Decaying Exp.	48.0%	0.53%	Linear	78.5%	2.40%	2.40%	1.00%	N	75	1,090	2021	2025	105	Historical + Vested	180	1,270	5.91%	-	1,270
DR. Martin Luther King Blvd	driveway/Roundabout	Howland Blvd	-	-	-	-	-	-	-	2.00%	Y	0	-	2021	2025	-	Historical Growth	-	-	-	-	-

\*Per Volusia County request, only linear growth was utilized in areas with significant growth from vested development.

### **Segment Analysis – Existing, Background and Build-Out Conditions**

Segment analyses will be conducted under p.m. peak-hour two way conditions. If the future projected volume is expected to exceed the maximum service volume of a roadway segment, a transportation analysis may be conducted to determine service volume specific to that segment. The procedures documented in the latest version of the FDOT *Quality/Level of Service Handbook* will be used to determine specific capacity, if necessary.

### **Intersection Analysis – AM and PM Peak-Hour (Existing, Background and Build-Out Conditions)**

Intersections will be analyzed under both a.m. and p.m. peak-hour conditions. The operating conditions for both the existing and future conditions at the unsignalized intersections will be analyzed using *Synchro 10* (Synchro) software. Synchro utilizes the procedures outlined in Chapter 20 of the HCM 6<sup>th</sup> Edition *Highway Capacity Manual*, titled “Two-Way Stop Control Intersections”.

The operating conditions for both the existing and future conditions at the signalized intersections will be evaluated using the *Synchro 10* (Synchro) software. This software utilizes the methodology outlined in Chapter 19 of the HCM 6<sup>th</sup> Edition *Highway Capacity Manual*, titled “Signalized Intersections”.

### **Alternative Mode Analysis**

An alternate mode analysis will be conducted which will evaluate present and programmed bike, pedestrian, and transit mobility options within ¼ mile of the site, provisions for sidewalks adjacent to public roads within the limits of the site and sidewalk connectivity between parcels. Student/pedestrian access will be evaluated for roadway segments within the two-mile walk zone along the anticipated walking path from the proposed development to the local schools (Deltona High School, Galaxy Middle School, Timbercrest Elementary, and Deltona Lakes Elementary) a graphic identifying walking path from the development to the school will be included. Voltran, Volusia County’s public transportation system, will be consulted to coordinate transit access needs and the results of that coordination will be incorporated into the report. Access to parks and trails, including the YMCA at Wolf Pack Run/Catalina Blvd intersection, will also be reviewed in the TIA.

### **Improvements**

All improvements funded for construction within the first three years of the Volusia County and FDOT five-year work programs will be considered in the analysis. If warranted, appropriate roadway and intersection improvements will be identified. Conditions will be analyzed for improvements that are required for mitigation. Proportionate share calculations will be based on construction costs approved by Volusia County Engineering and Construction Division. Site access needs in terms of turn lane storage and deceleration shall be identified.

### **Conceptual Site Plan Usage and Approval**

The TIA will state that the developer understands conceptual plans used as exhibits in TIA methodologies and TIAs are considered supplemental information. It will also state that items, such as driveway requirements, turn lane requirements, right of way improvements, etc., will be determined through the civil design process of the development. During the civil design process, the approved general locations of driveways (in accordance with Use Permit No. 2022-P-USE-0357) shall not be significantly modified. Any access control will occur independent of the TIA review and will be determined only through the actual plans review process.

Mr. Paradise and Mr. Jon Cheney, PE  
June 20, 2022  
Page 14

Please review and advise if in agreement with this proposed methodology or provide comments relating to preferred revisions. If you have any questions, please contact me at 386.257.2571.

Sincerely,  
LTG, Inc.

Crystal Mercedes  
Senior Transportation Planner

Attachments:

Exhibit A: Conceptual Site Plan  
Exhibit B: FDOT Traffic Trends

c: Melissa Winsett, Volusia County Traffic Engineering ([mwinsett@volusia.org](mailto:mwinsett@volusia.org))  
Nika Zyryanova, MAS Development, ([nika@masdevelopment.com](mailto:nika@masdevelopment.com))

**Exhibit A**  
**Preliminary Site Plan**

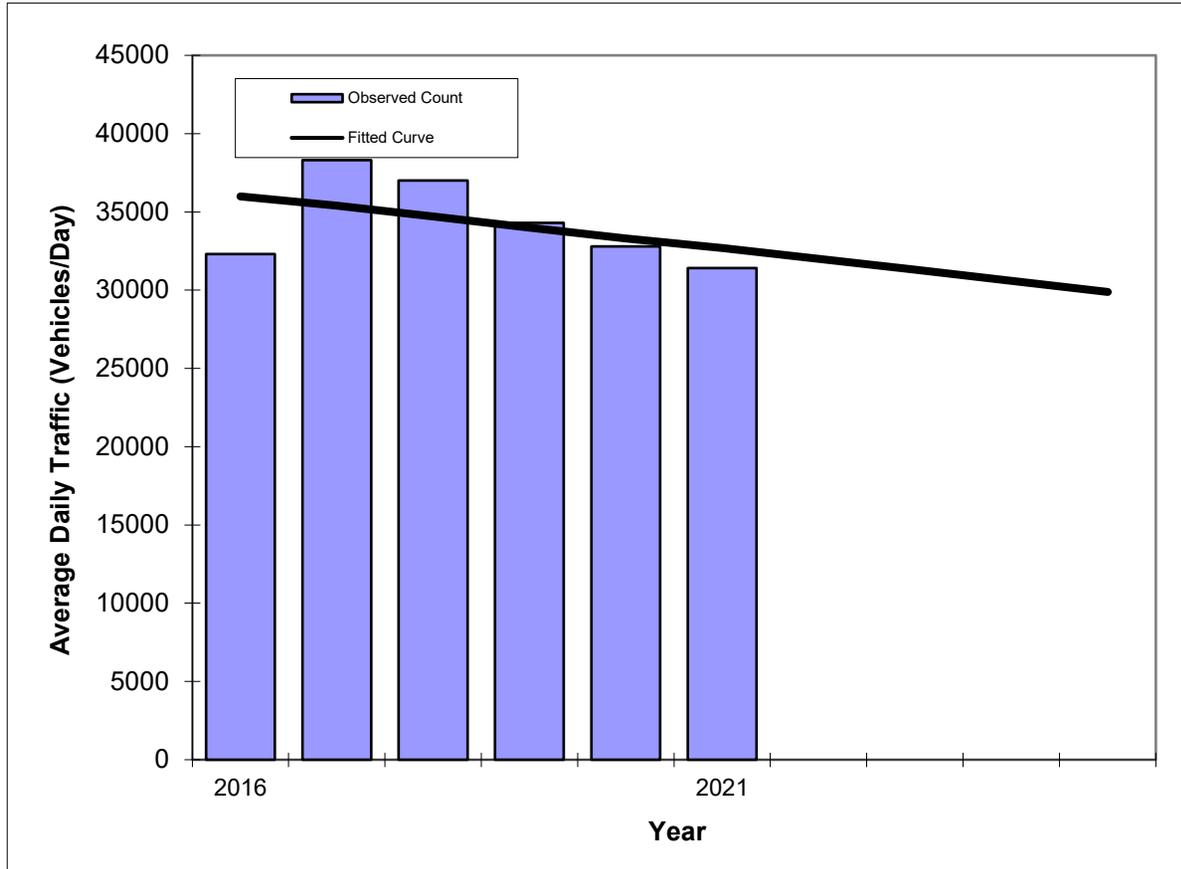


**Exhibit B**  
**FDOT Traffic Trends**

# TRAFFIC TRENDS

Howland Blvd -- I-4 to Wolf Pack Run

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Howland Blvd



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	32300	36000
2017	38300	35400
2018	37000	34700
2019	34300	34000
2020	32800	33300
2021	31400	32700
<b>2022 Opening Year Trend</b>		
2022	N/A	32000
<b>2023 Mid-Year Trend</b>		
2023	N/A	31300
<b>2024 Design Year Trend</b>		
2024	N/A	30600
<b>TRANPLAN Forecasts/Trends</b>		

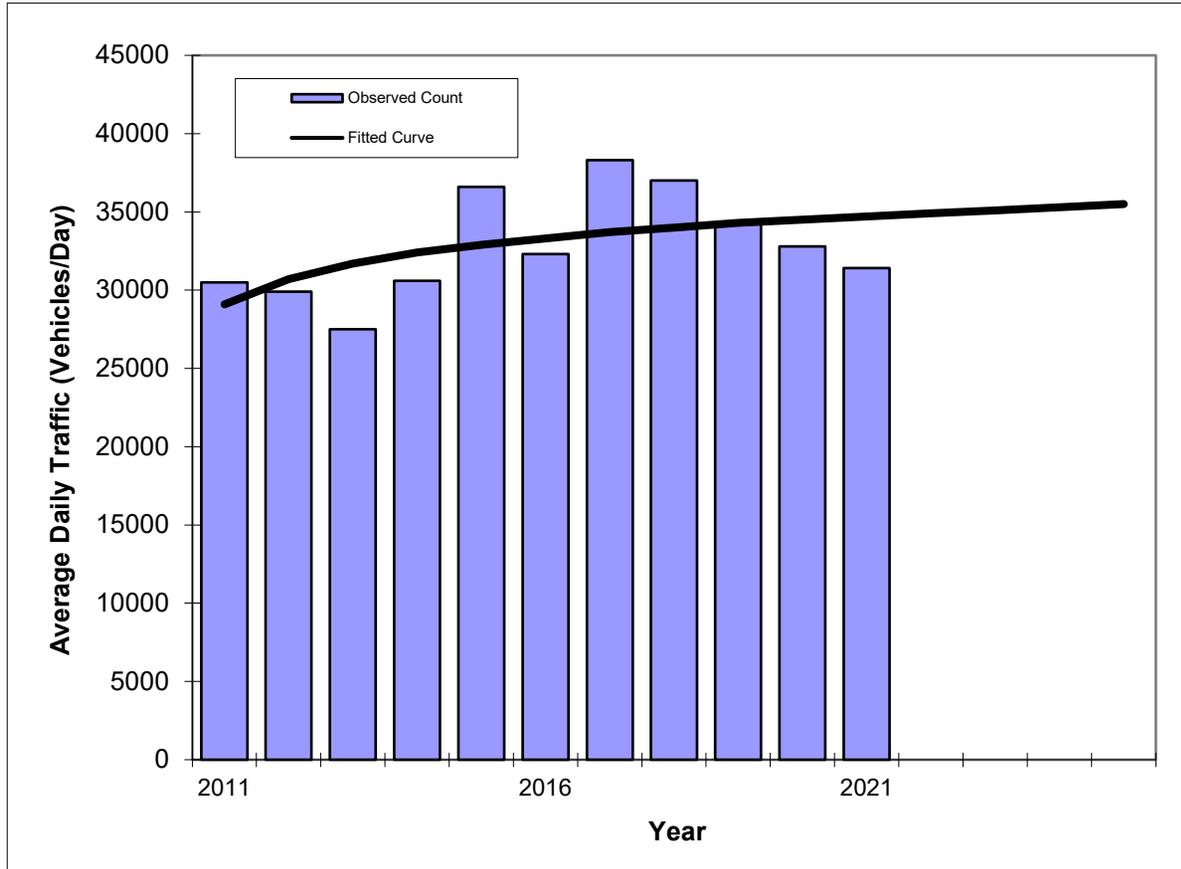
<b>** Annual Trend Increase:</b>	-677
<b>Trend R-squared:</b>	21.2%
<b>Trend Annual Historic Growth Rate:</b>	-1.83%
<b>Trend Growth Rate (2021 to Design Year):</b>	-2.14%
<b>Printed:</b>	2-May-22
<b>Straight Line Growth Option</b>	

\*Axle-Adjusted

# TRAFFIC TRENDS

Howland Blvd -- I-4 to Wolf Pack Run

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Howland Blvd



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2011	30500	29100
2012	29900	30700
2013	27500	31700
2014	30600	32400
2015	36600	32900
2016	32300	33300
2017	38300	33700
2018	37000	34000
2019	34300	34300
2020	32800	34500
2021	31400	34700
<b>2022 Opening Year Trend</b>		
2022	N/A	34900
<b>2023 Mid-Year Trend</b>		
2023	N/A	35100
<b>2024 Design Year Trend</b>		
2024	N/A	35300
<b>TRANPLAN Forecasts/Trends</b>		

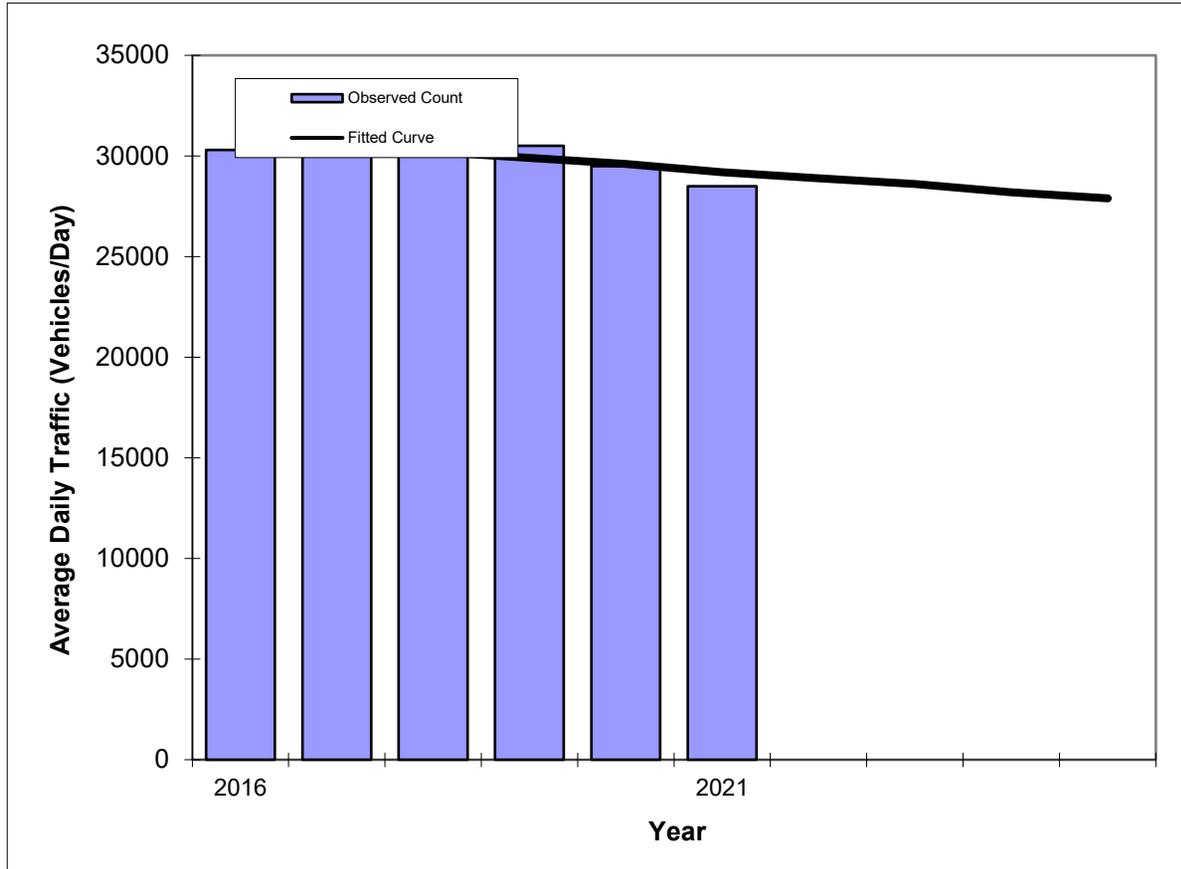
Trend R-squared: 27.2%  
 Compounded Annual Historic Growth Rate: 1.44%  
 Compounded Growth Rate (2021 to Design Year): 0.09%  
 Printed: 2-May-22  
**Decaying Exponential Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

Howland Blvd -- Wolf Pack Run to Catalina Blvd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Howland Blvd



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	30300	30900
2017	30000	30500
2018	31500	30200
2019	30500	29900
2020	29500	29600
2021	28500	29200
<b>2022 Opening Year Trend</b>		
2022	N/A	28900
<b>2023 Mid-Year Trend</b>		
2023	N/A	28600
<b>2024 Design Year Trend</b>		
2024	N/A	28200
<b>TRANPLAN Forecasts/Trends</b>		

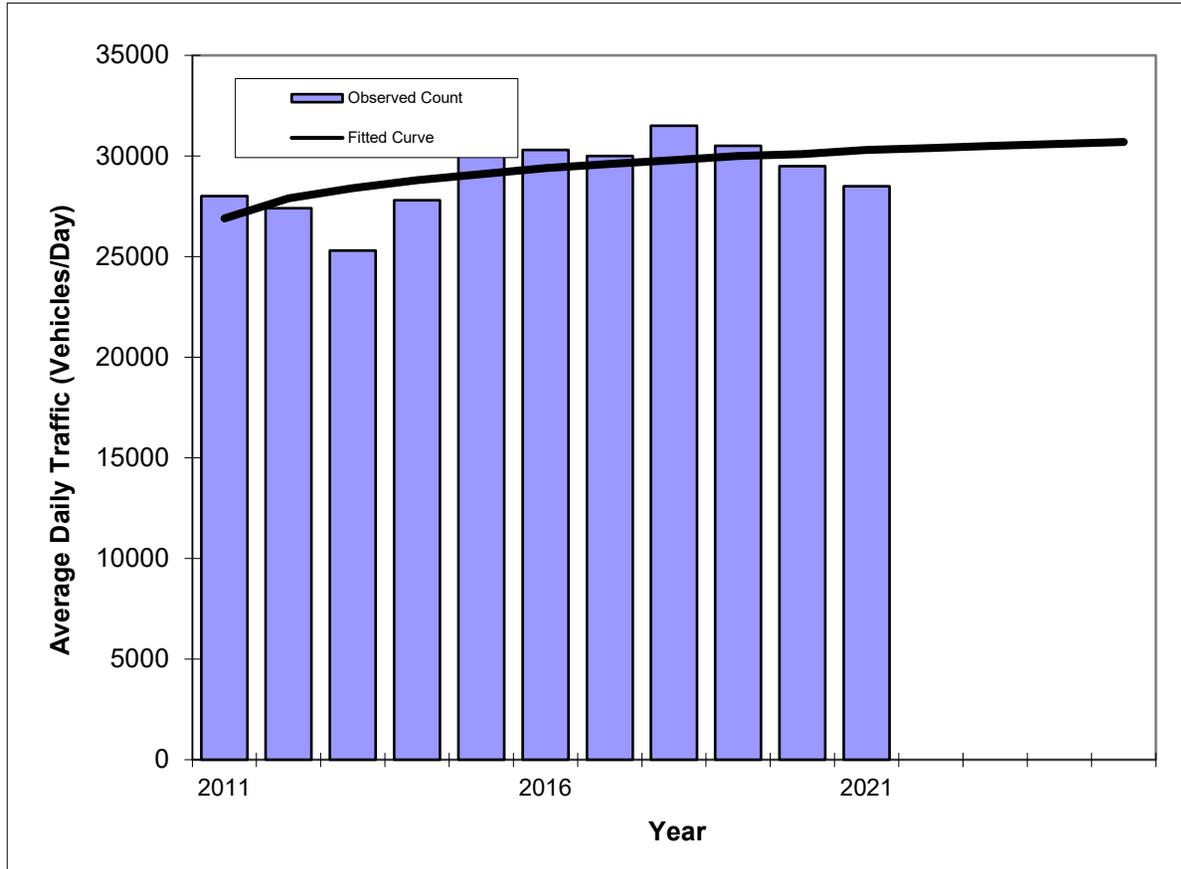
**\*\* Annual Trend Increase:** -329  
**Trend R-squared:** 37.2%  
**Trend Annual Historic Growth Rate:** -1.10%  
**Trend Growth Rate (2021 to Design Year):** -1.14%  
**Printed:** 2-May-22  
**Straight Line Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

Howland Blvd -- Wolf Pack Run to Catalina Blvd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Howland Blvd



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2011	28000	26900
2012	27400	27900
2013	25300	28400
2014	27800	28800
2015	31500	29100
2016	30300	29400
2017	30000	29600
2018	31500	29800
2019	30500	30000
2020	29500	30100
2021	28500	30300
<b>2022 Opening Year Trend</b>		
2022	N/A	30400
<b>2023 Mid-Year Trend</b>		
2023	N/A	30500
<b>2024 Design Year Trend</b>		
2024	N/A	30600
<b>TRANPLAN Forecasts/Trends</b>		

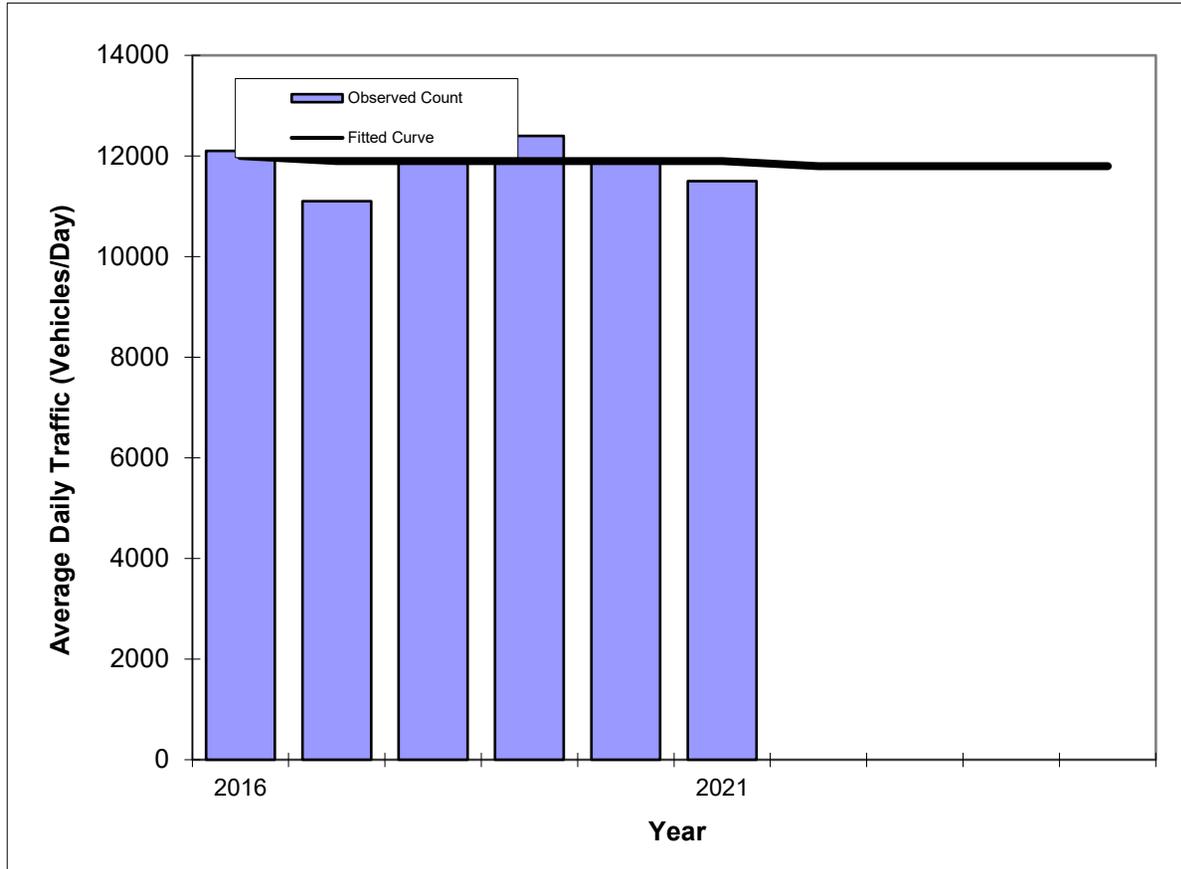
Trend R-squared: 30.3%  
 Compounded Annual Historic Growth Rate: 1.04%  
 Compounded Growth Rate (2021 to Design Year): 0.00%  
 Printed: 2-May-22  
**Decaying Exponential Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

W Volusia Bltwy -- Orange Camp Rd to Cassadaga Rd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	W Volusia Bltwy



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	12100	12000
2017	11100	11900
2018	12500	11900
2019	12400	11900
2020	11900	11900
2021	11500	11900
<b>2022 Opening Year Trend</b>		
2022	N/A	11800
<b>2023 Mid-Year Trend</b>		
2023	N/A	11800
<b>2024 Design Year Trend</b>		
2024	N/A	11800
<b>TRANPLAN Forecasts/Trends</b>		

**\*\* Annual Trend Increase:** -20  
**Trend R-squared:** 0.5%  
**Trend Annual Historic Growth Rate:** -0.17%  
**Trend Growth Rate (2021 to Design Year):** -0.28%  
**Printed:** 2-May-22

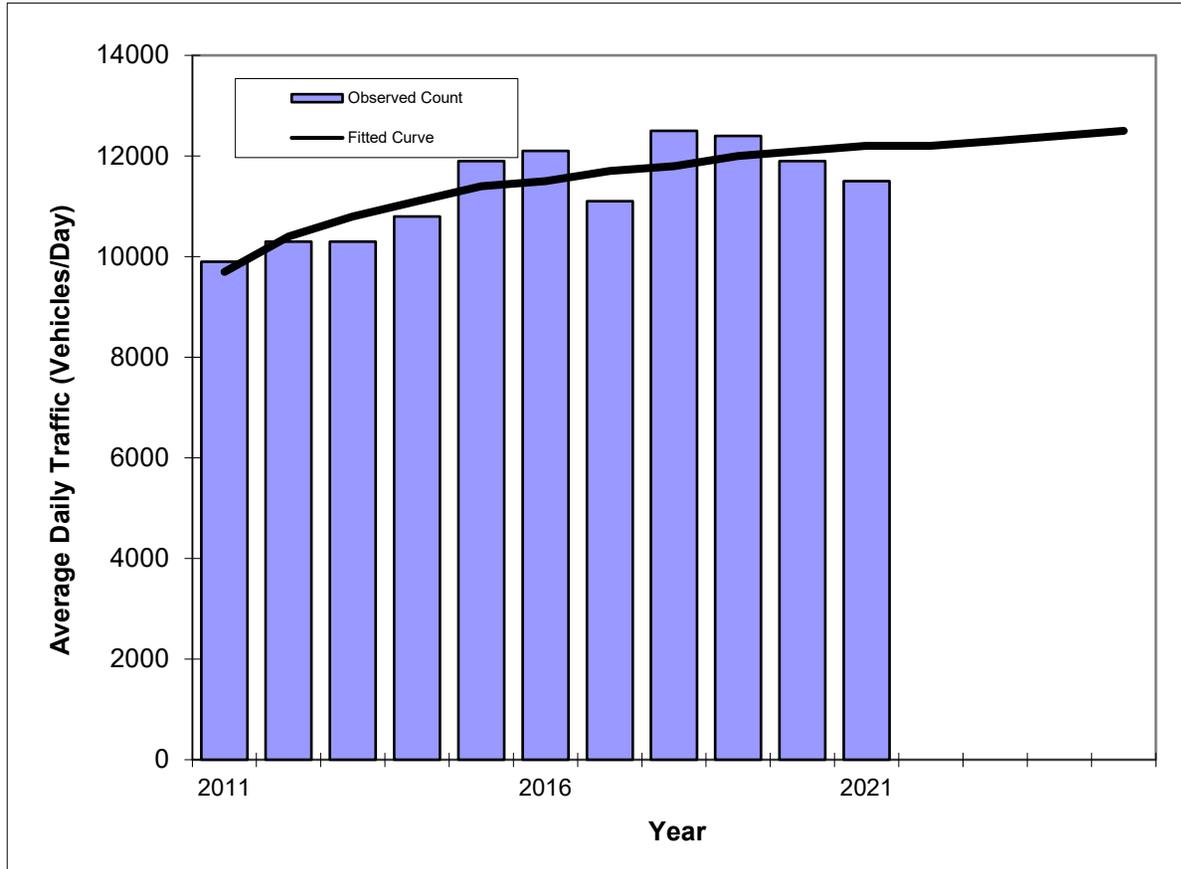
**Straight Line Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

W Volusia Bltwy -- Orange Camp Rd to Cassadaga Rd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	W Volusia Bltwy



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2011	9900	9700
2012	10300	10400
2013	10300	10800
2014	10800	11100
2015	11900	11400
2016	12100	11500
2017	11100	11700
2018	12500	11800
2019	12400	12000
2020	11900	12100
2021	11500	12200
<b>2022 Opening Year Trend</b>		
2022	N/A	12200
<b>2023 Mid-Year Trend</b>		
2023	N/A	12300
<b>2024 Design Year Trend</b>		
2024	N/A	12400
<b>TRANPLAN Forecasts/Trends</b>		

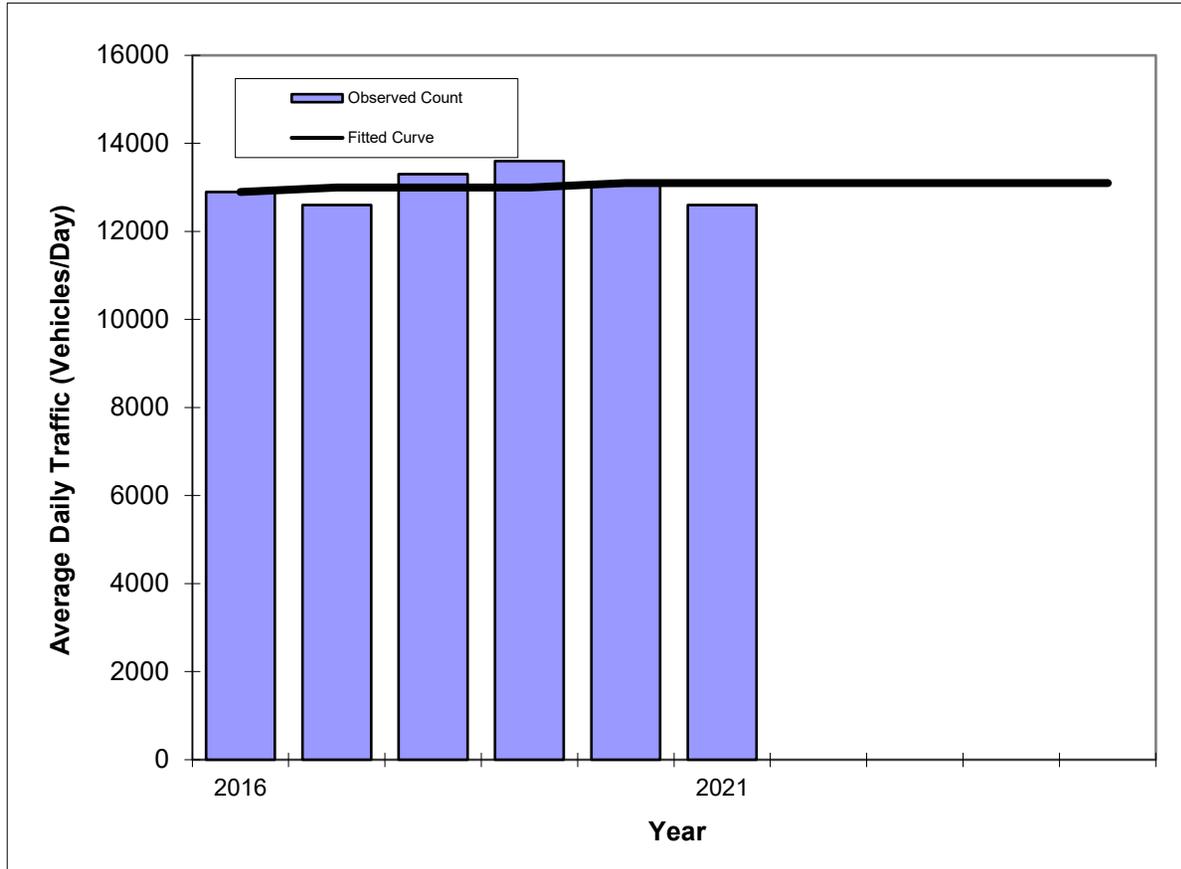
Trend R-squared:	69.7%
Compounded Annual Historic Growth Rate:	1.87%
Compounded Growth Rate (2021 to Design Year):	0.00%
Printed:	2-May-22
<b>Decaying Exponential Growth Option</b>	

\*Axle-Adjusted

# TRAFFIC TRENDS

W Volusia Bltwy -- Cassadaga Rd to SR 472

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	W Volusia Bltwy



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	12900	12900
2017	12600	13000
2018	13300	13000
2019	13600	13000
2020	13100	13100
2021	12600	13100
<b>2022 Opening Year Trend</b>		
2022	N/A	13100
<b>2023 Mid-Year Trend</b>		
2023	N/A	13100
<b>2024 Design Year Trend</b>		
2024	N/A	13100
<b>TRANPLAN Forecasts/Trends</b>		

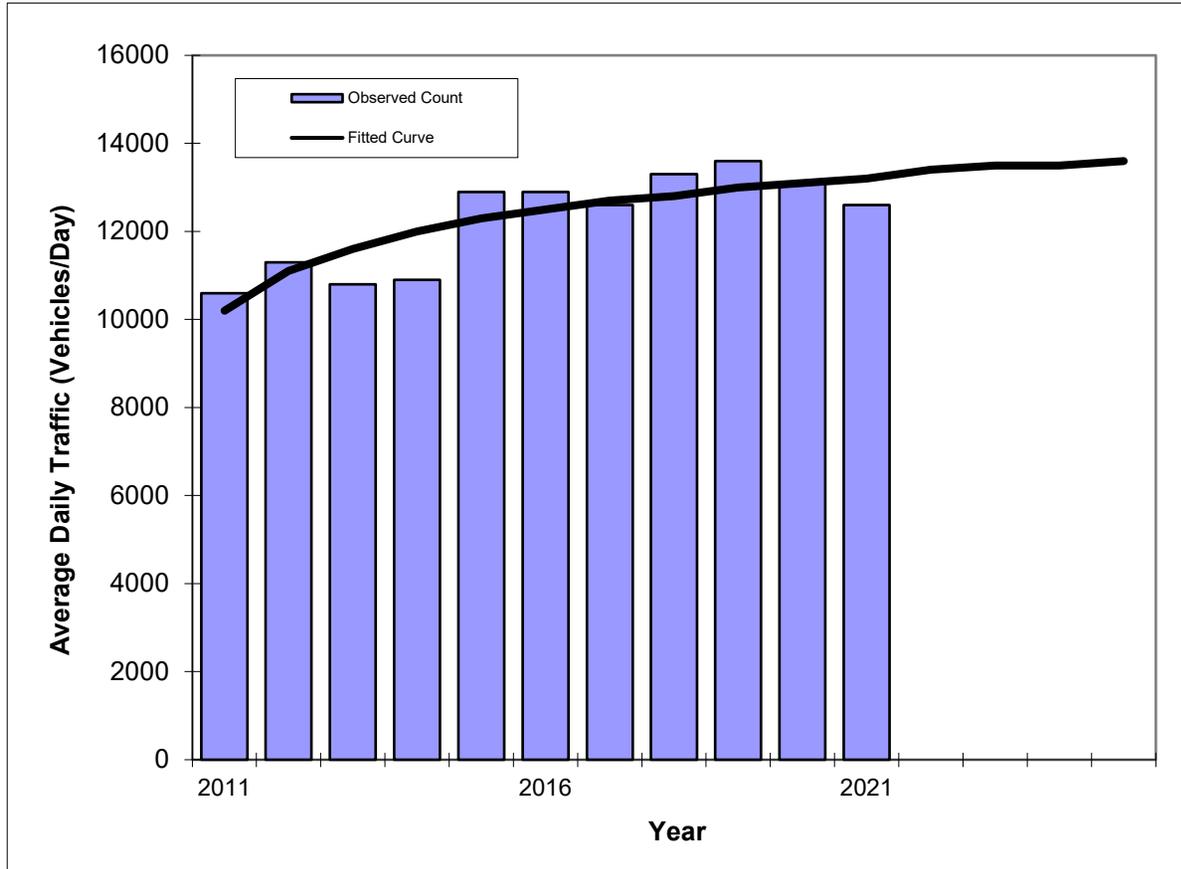
Trend R-squared: 2.8%  
 Compounded Annual Historic Growth Rate: 0.00%  
 Compounded Growth Rate (2021 to Design Year): 0.26%  
 Printed: 2-May-22  
**Decaying Exponential Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

W Volusia Bltwy -- Cassadaga Rd to SR 472

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	W Volusia Bltwy



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2011	10600	10200
2012	11300	11100
2013	10800	11600
2014	10900	12000
2015	12900	12300
2016	12900	12500
2017	12600	12700
2018	13300	12800
2019	13600	13000
2020	13100	13100
2021	12600	13200
<b>2022 Opening Year Trend</b>		
2022	N/A	13400
<b>2023 Mid-Year Trend</b>		
2023	N/A	13500
<b>2024 Design Year Trend</b>		
2024	N/A	13500
<b>TRANPLAN Forecasts/Trends</b>		

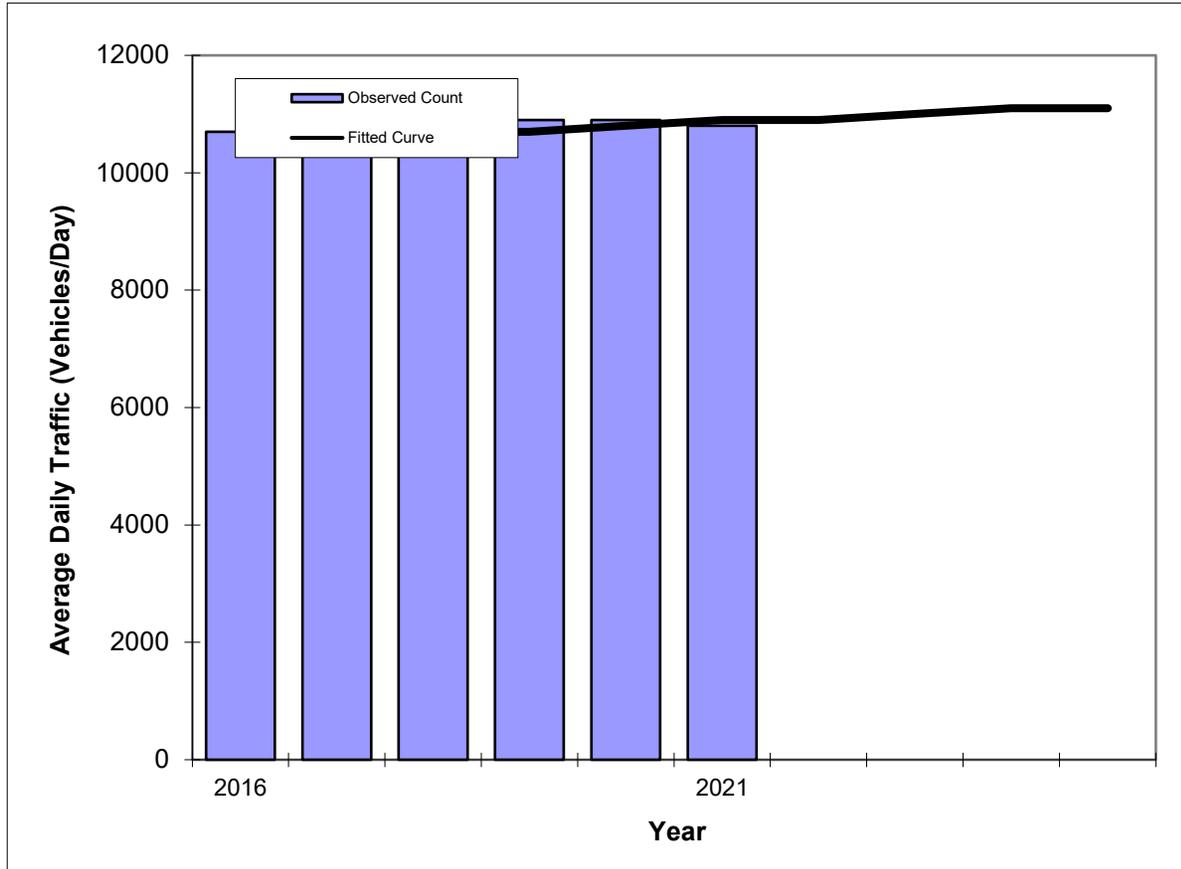
Trend R-squared: 70.9%  
 Compounded Annual Historic Growth Rate: 2.24%  
 Compounded Growth Rate (2021 to Design Year): -0.25%  
 Printed: 2-May-22  
**Decaying Exponential Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

W Volusia Bltwy -- SR 472 to Graves Ave

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	W Volusia Bltwy



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	10700	10600
2017	10400	10600
2018	10600	10700
2019	10900	10700
2020	10900	10800
2021	10800	10900
<b>2022 Opening Year Trend</b>		
2022	N/A	10900
<b>2023 Mid-Year Trend</b>		
2023	N/A	11000
<b>2024 Design Year Trend</b>		
2024	N/A	11100
<b>TRANPLAN Forecasts/Trends</b>		

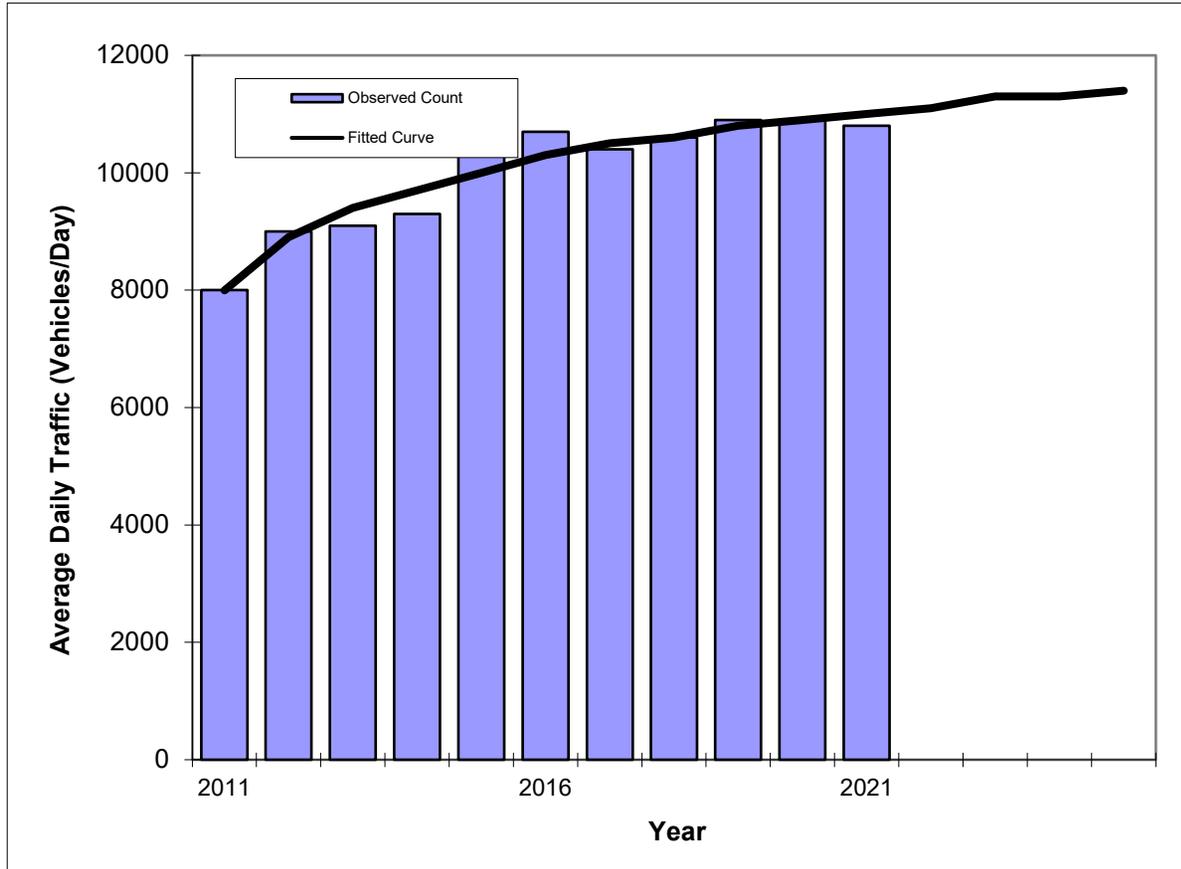
<b>** Annual Trend Increase:</b>	66
<b>Trend R-squared:</b>	40.1%
<b>Trend Annual Historic Growth Rate:</b>	0.57%
<b>Trend Growth Rate (2021 to Design Year):</b>	0.61%
<b>Printed:</b>	2-May-22
<b>Straight Line Growth Option</b>	

\*Axle-Adjusted

# TRAFFIC TRENDS

W Volusia Bltwy -- SR 472 to Graves Ave

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	W Volusia Bltwy



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2011	8000	8000
2012	9000	8900
2013	9100	9400
2014	9300	9700
2015	10400	10000
2016	10700	10300
2017	10400	10500
2018	10600	10600
2019	10900	10800
2020	10900	10900
2021	10800	11000
<b>2022 Opening Year Trend</b>		
2022	N/A	11100
<b>2023 Mid-Year Trend</b>		
2023	N/A	11300
<b>2024 Design Year Trend</b>		
2024	N/A	11300
<b>TRANPLAN Forecasts/Trends</b>		

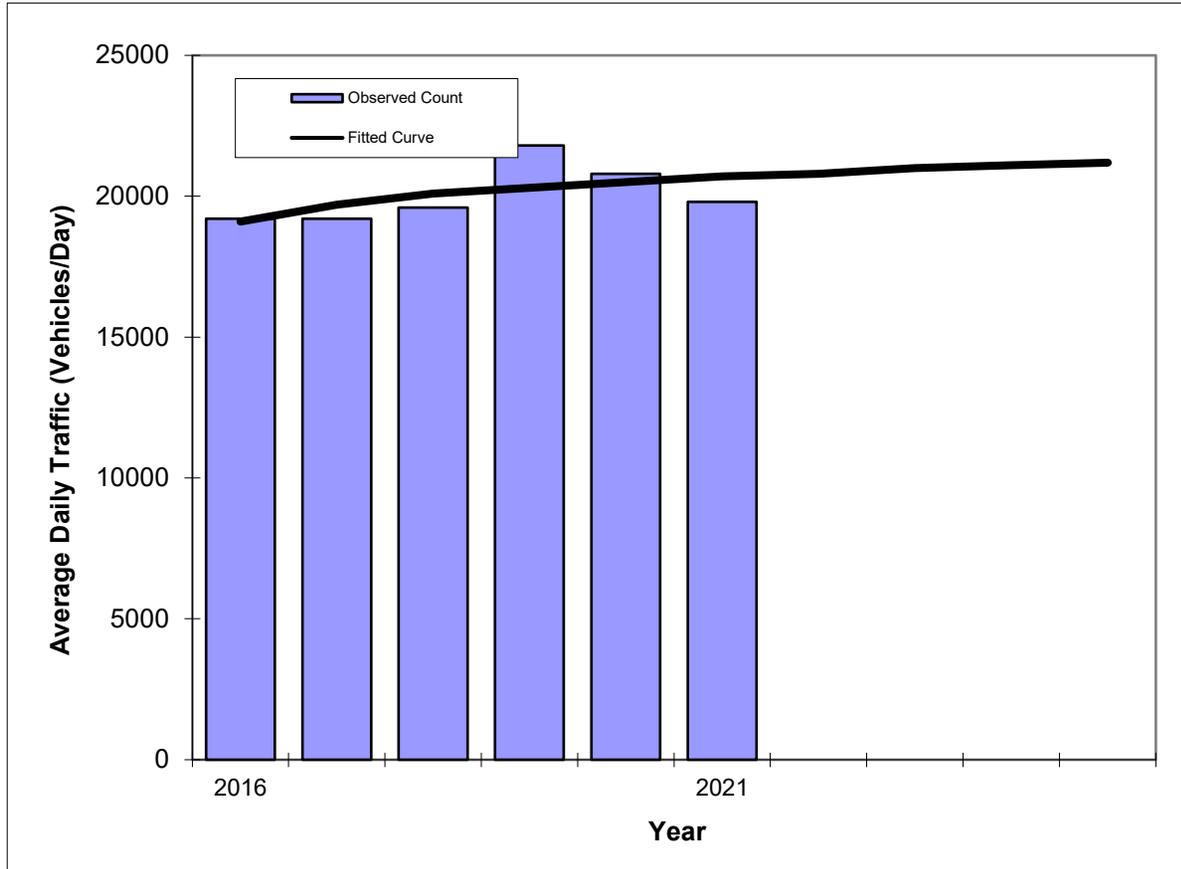
Trend R-squared: 92.8%  
 Compounded Annual Historic Growth Rate: 2.74%  
 Compounded Growth Rate (2021 to Design Year): -0.29%  
 Printed: 2-May-22  
**Decaying Exponential Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

## Graves Ave -- VMP to Kentucky Ave

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Graves Ave



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	19200	19100
2017	19200	19700
2018	19600	20100
2019	21800	20300
2020	20800	20500
2021	19800	20700
<b>2022 Opening Year Trend</b>		
2022	N/A	20800
<b>2023 Mid-Year Trend</b>		
2023	N/A	21000
<b>2024 Design Year Trend</b>		
2024	N/A	21100
<b>TRANPLAN Forecasts/Trends</b>		

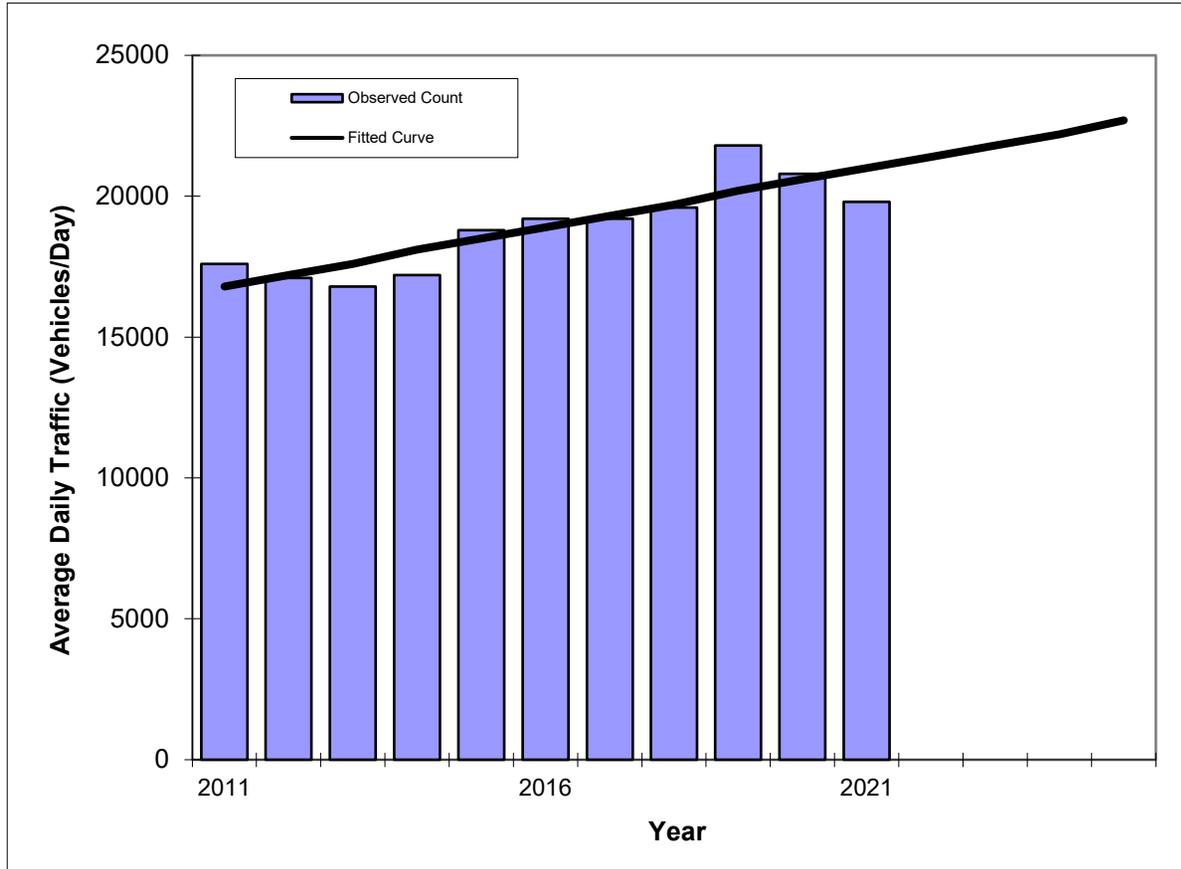
Trend R-squared:	33.9%
Compounded Annual Historic Growth Rate:	1.40%
Compounded Growth Rate (2021 to Design Year):	0.48%
Printed:	2-May-22
<b>Decaying Exponential Growth Option</b>	

\*Axle-Adjusted

# TRAFFIC TRENDS

## Graves Ave -- VMP to Kentucky Ave

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Graves Ave



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2011	17600	16800
2012	17100	17200
2013	16800	17600
2014	17200	18100
2015	18800	18500
2016	19200	18900
2017	19200	19300
2018	19600	19700
2019	21800	20200
2020	20800	20600
2021	19800	21000
<b>2022 Opening Year Trend</b>		
2022	N/A	21400
<b>2023 Mid-Year Trend</b>		
2023	N/A	21800
<b>2024 Design Year Trend</b>		
2024	N/A	22200
<b>TRANPLAN Forecasts/Trends</b>		

**\*\* Annual Trend Increase:** 418  
**Trend R-squared:** 74.7%  
**Trend Annual Historic Growth Rate:** 2.50%  
**Trend Growth Rate (2021 to Design Year):** 1.90%  
**Printed:** 2-May-22

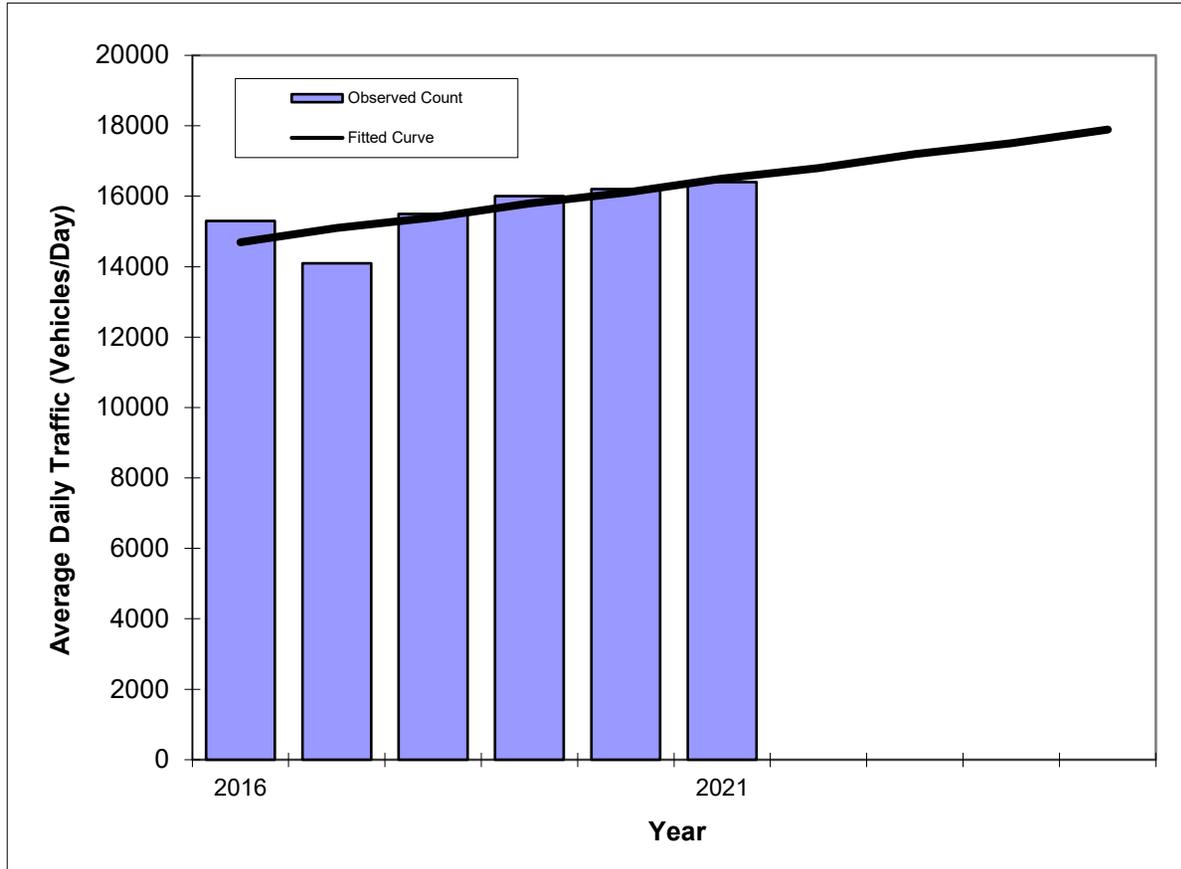
**Straight Line Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

Graves Ave -- Kentucky Ave to Howland Blvd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Graves Ave



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	15300	14700
2017	14100	15100
2018	15500	15400
2019	16000	15800
2020	16200	16100
2021	16400	16500
<b>2022 Opening Year Trend</b>		
2022	N/A	16800
<b>2023 Mid-Year Trend</b>		
2023	N/A	17200
<b>2024 Design Year Trend</b>		
2024	N/A	17500
<b>TRANPLAN Forecasts/Trends</b>		

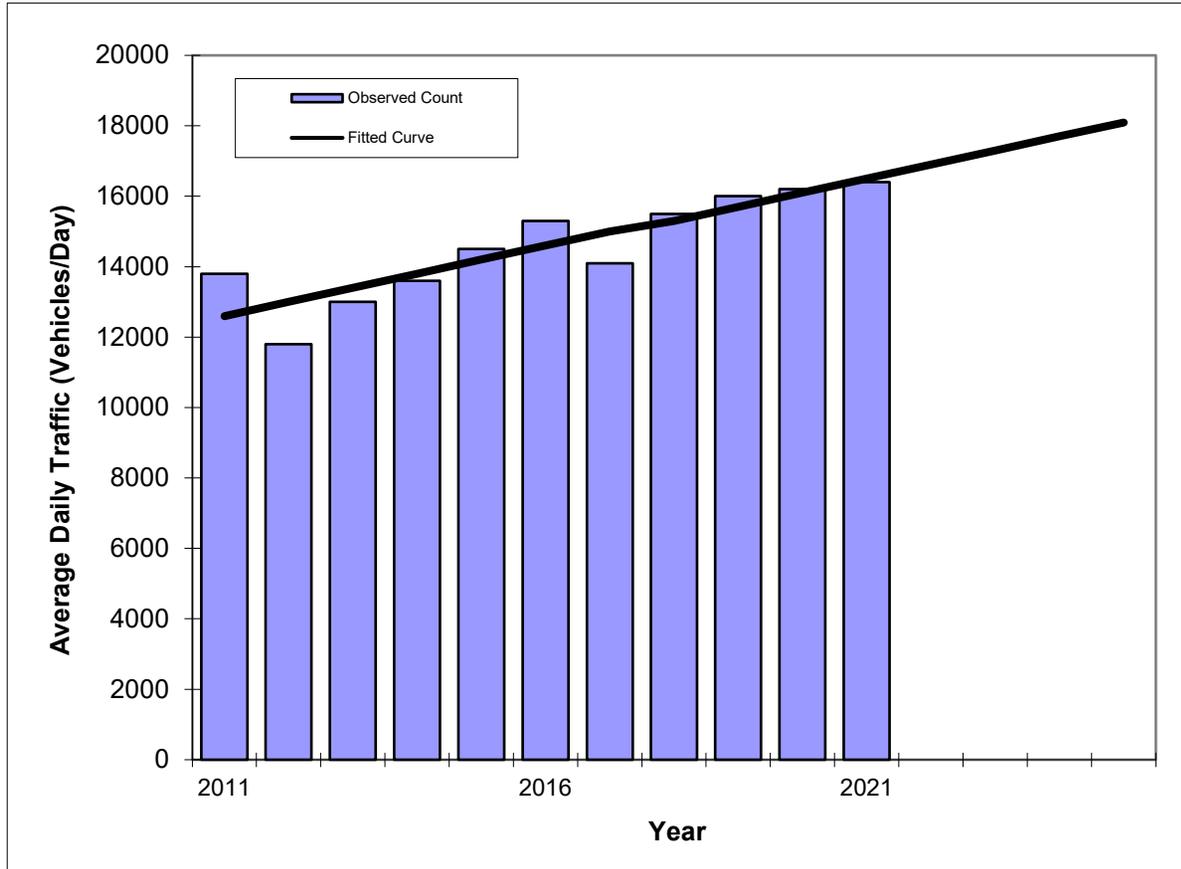
**\*\* Annual Trend Increase:** 351  
**Trend R-squared:** 61.6%  
**Trend Annual Historic Growth Rate:** 2.45%  
**Trend Growth Rate (2021 to Design Year):** 2.02%  
**Printed:** 2-May-22  
**Straight Line Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

Graves Ave -- Kentucky Ave to Howland Blvd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Graves Ave



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2011	13800	12600
2012	11800	13000
2013	13000	13400
2014	13600	13800
2015	14500	14200
2016	15300	14600
2017	14100	15000
2018	15500	15300
2019	16000	15700
2020	16200	16100
2021	16400	16500
<b>2022 Opening Year Trend</b>		
2022	N/A	16900
<b>2023 Mid-Year Trend</b>		
2023	N/A	17300
<b>2024 Design Year Trend</b>		
2024	N/A	17700
<b>TRANPLAN Forecasts/Trends</b>		

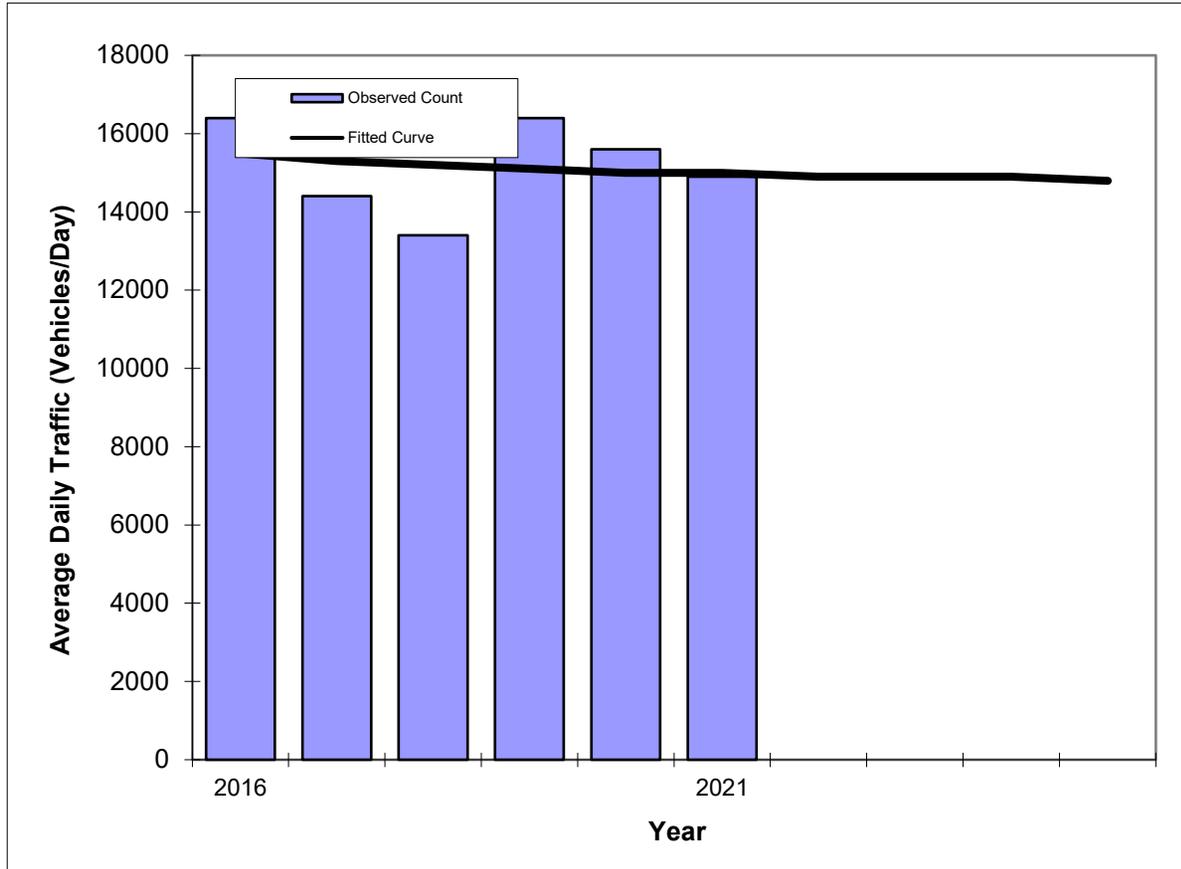
<b>** Annual Trend Increase:</b>	391
<b>Trend R-squared:</b>	78.7%
<b>Trend Annual Historic Growth Rate:</b>	3.10%
<b>Trend Growth Rate (2021 to Design Year):</b>	2.42%
<b>Printed:</b>	2-May-22
<b>Straight Line Growth Option</b>	

\*Axle-Adjusted

# TRAFFIC TRENDS

Veterans Memorial Pkwy -- Rhode Island to Graves Ave

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Veterans Memorial Pkwy



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	16400	15500
2017	14400	15300
2018	13400	15200
2019	16400	15100
2020	15600	15000
2021	14900	15000
<b>2022 Opening Year Trend</b>		
2022	N/A	14900
<b>2023 Mid-Year Trend</b>		
2023	N/A	14900
<b>2024 Design Year Trend</b>		
2024	N/A	14900
<b>TRANPLAN Forecasts/Trends</b>		

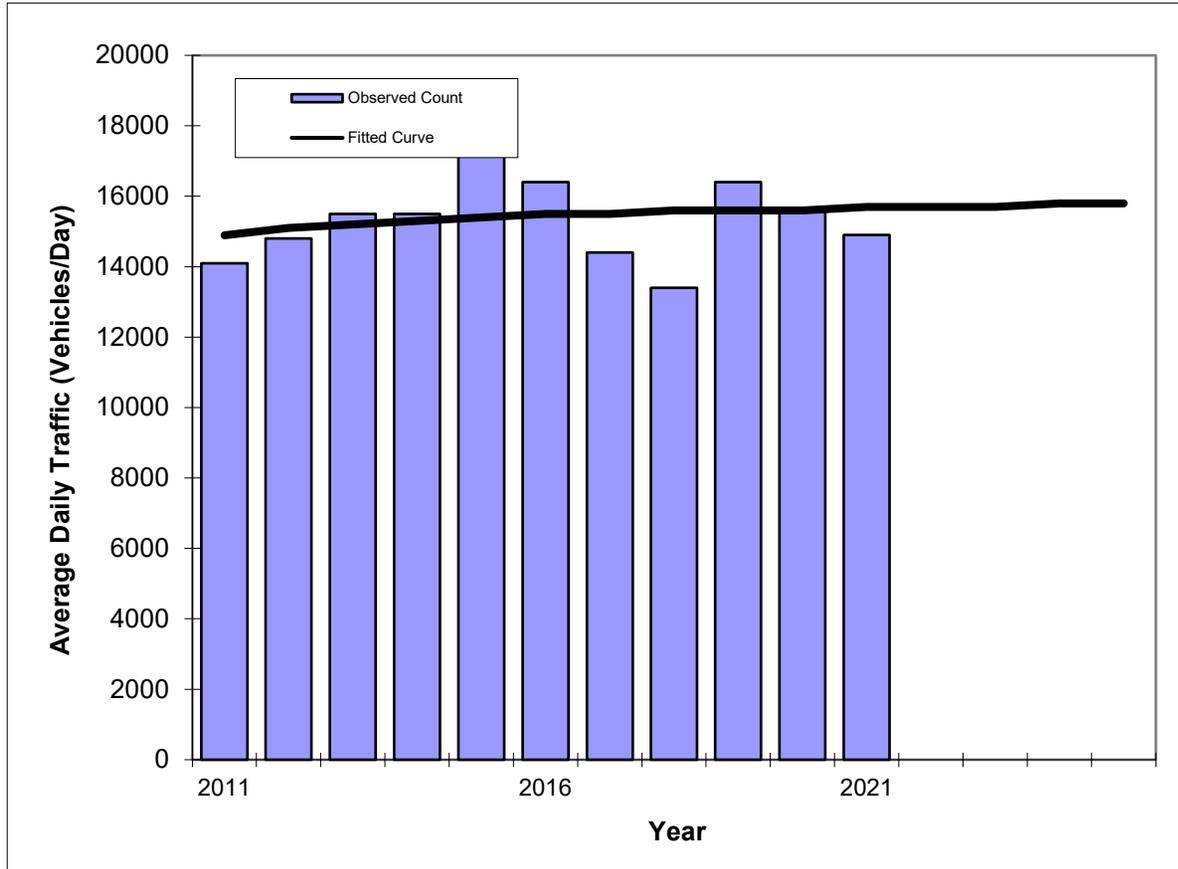
Trend R-squared: 2.8%  
 Compounded Annual Historic Growth Rate: -0.13%  
 Compounded Growth Rate (2021 to Design Year): -0.44%  
 Printed: 2-May-22  
**Decaying Exponential Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

Veterans Memorial Pkwy -- Rhode Island to Graves Ave

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Veterans Memorial Pkwy



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2011	14100	14900
2012	14800	15100
2013	15500	15200
2014	15500	15300
2015	18500	15400
2016	16400	15500
2017	14400	15500
2018	13400	15600
2019	16400	15600
2020	15600	15600
2021	14900	15700
<b>2022 Opening Year Trend</b>		
2022	N/A	15700
<b>2023 Mid-Year Trend</b>		
2023	N/A	15700
<b>2024 Design Year Trend</b>		
2024	N/A	15800
<b>TRANPLAN Forecasts/Trends</b>		

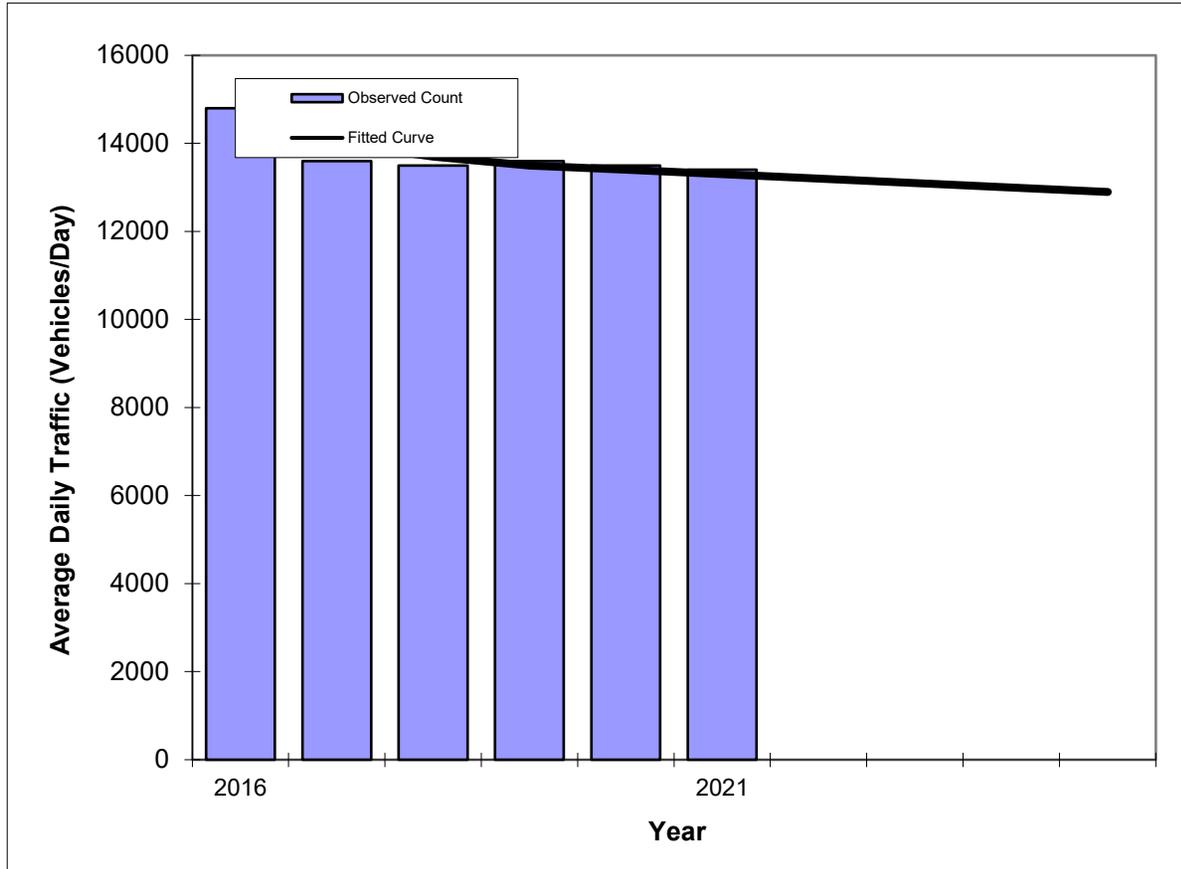
Trend R-squared:	3.1%
Compounded Annual Historic Growth Rate:	0.13%
Compounded Growth Rate (2021 to Design Year):	0.65%
Printed:	2-May-22
<b>Decaying Exponential Growth Option</b>	

\*Axle-Adjusted

# TRAFFIC TRENDS

Providence Blvd -- Ft. Smith to Elkcam Blvd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Providence Blvd



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	14800	14500
2017	13600	14000
2018	13500	13700
2019	13600	13500
2020	13500	13400
2021	13400	13300
<b>2022 Opening Year Trend</b>		
2022	N/A	13200
<b>2023 Mid-Year Trend</b>		
2023	N/A	13100
<b>2024 Design Year Trend</b>		
2024	N/A	13000
<b>TRANPLAN Forecasts/Trends</b>		

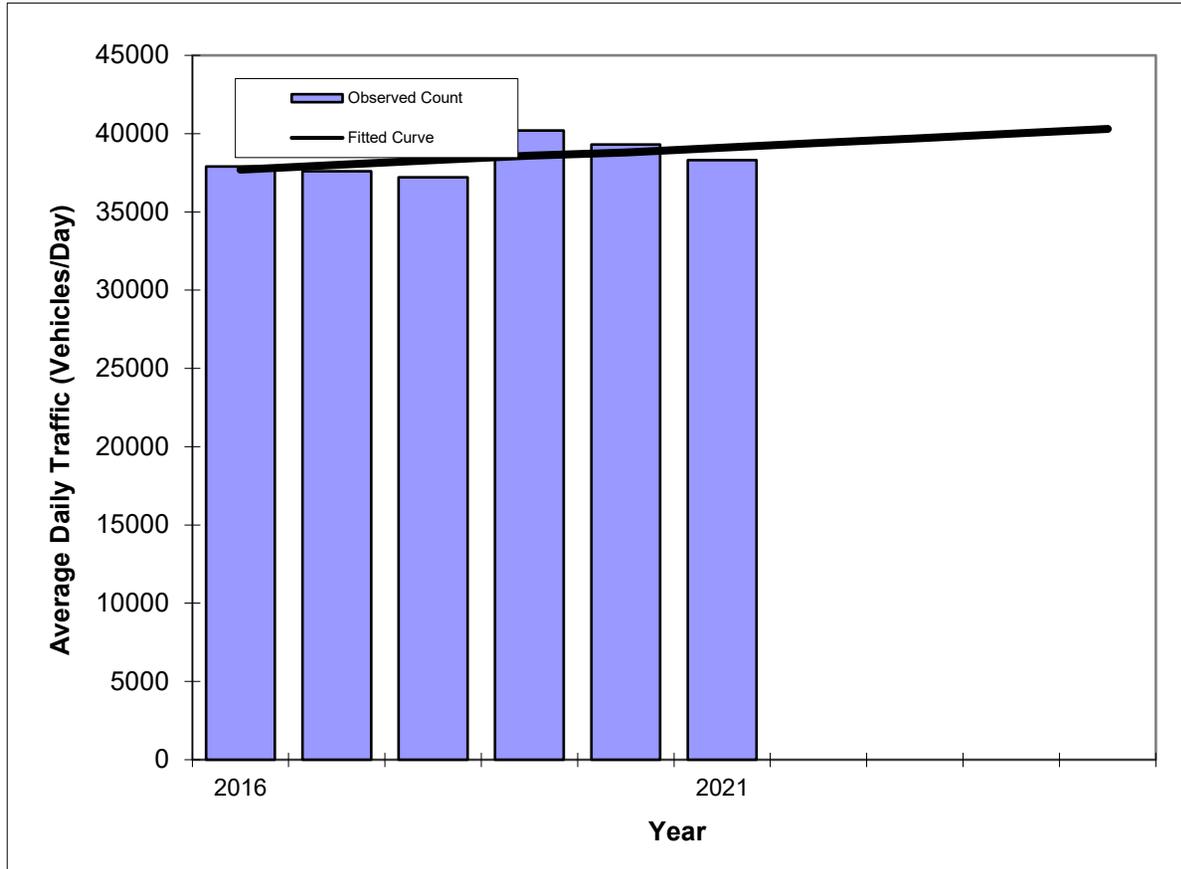
**Trend R-squared:** 74.2%  
**Compounded Annual Historic Growth Rate:** -1.45%  
**Compounded Growth Rate (2021 to Design Year):** -0.51%  
**Printed:** 2-May-22  
**Decaying Exponential Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

Saxon Blvd -- Finland Dr to Normandy Blvd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Saxon Blvd



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	37900	37700
2017	37600	38000
2018	37200	38300
2019	40200	38600
2020	39300	38800
2021	38300	39100
<b>2022 Opening Year Trend</b>		
2022	N/A	39400
<b>2023 Mid-Year Trend</b>		
2023	N/A	39700
<b>2024 Design Year Trend</b>		
2024	N/A	40000
<b>TRANPLAN Forecasts/Trends</b>		

**\*\* Annual Trend Increase:** 289  
**Trend R-squared:** 22.8%  
**Trend Annual Historic Growth Rate:** 0.74%  
**Trend Growth Rate (2021 to Design Year):** 0.77%  
**Printed:** 2-May-22

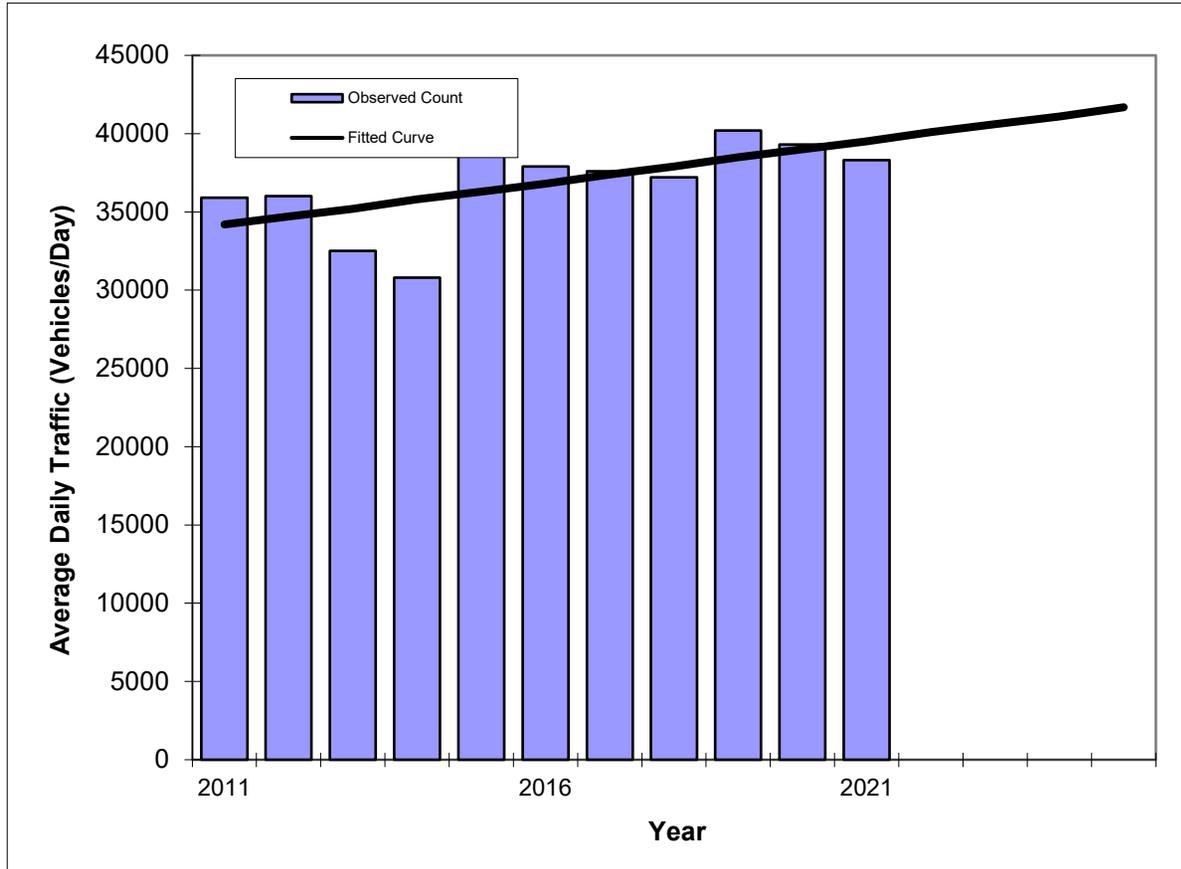
**Straight Line Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

Saxon Blvd -- Finland Dr to Normandy Blvd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Saxon Blvd



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2011	35900	34200
2012	36000	34700
2013	32500	35200
2014	30800	35800
2015	39600	36300
2016	37900	36800
2017	37600	37400
2018	37200	37900
2019	40200	38500
2020	39300	39000
2021	38300	39500
<b>2022 Opening Year Trend</b>		
2022	N/A	40100
<b>2023 Mid-Year Trend</b>		
2023	N/A	40600
<b>2024 Design Year Trend</b>		
2024	N/A	41100
<b>TRANPLAN Forecasts/Trends</b>		

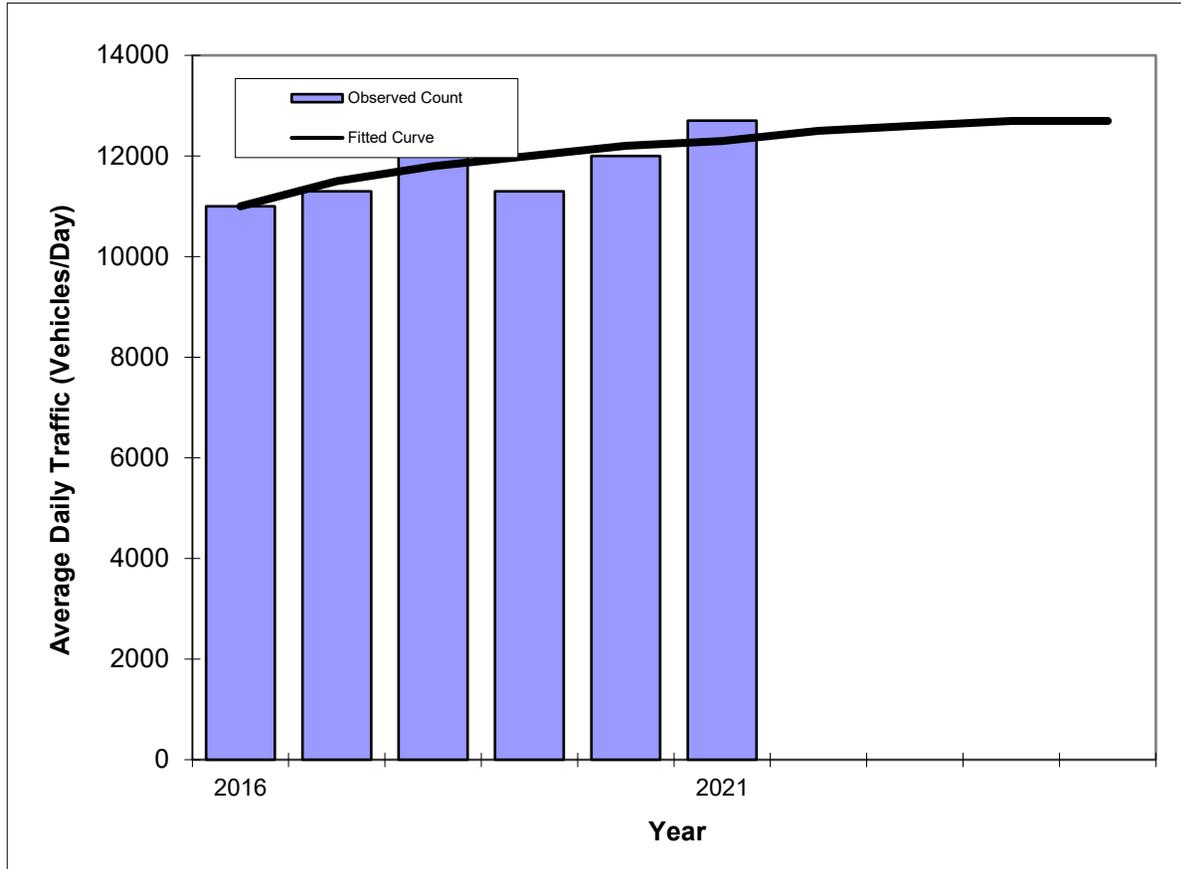
**\*\* Annual Trend Increase:** 537  
**Trend R-squared:** 37.0%  
**Trend Annual Historic Growth Rate:** 1.55%  
**Trend Growth Rate (2021 to Design Year):** 1.35%  
**Printed:** 2-May-22  
**Straight Line Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

Lake Helen Osteen Rd -- Haulover Blvd to Catalina Blvd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Lake Helen Osteen Rd



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	11000	11000
2017	11300	11500
2018	12600	11800
2019	11300	12000
2020	12000	12200
2021	12700	12300
<b>2022 Opening Year Trend</b>		
2022	N/A	12500
<b>2023 Mid-Year Trend</b>		
2023	N/A	12600
<b>2024 Design Year Trend</b>		
2024	N/A	12700
<b>TRANPLAN Forecasts/Trends</b>		

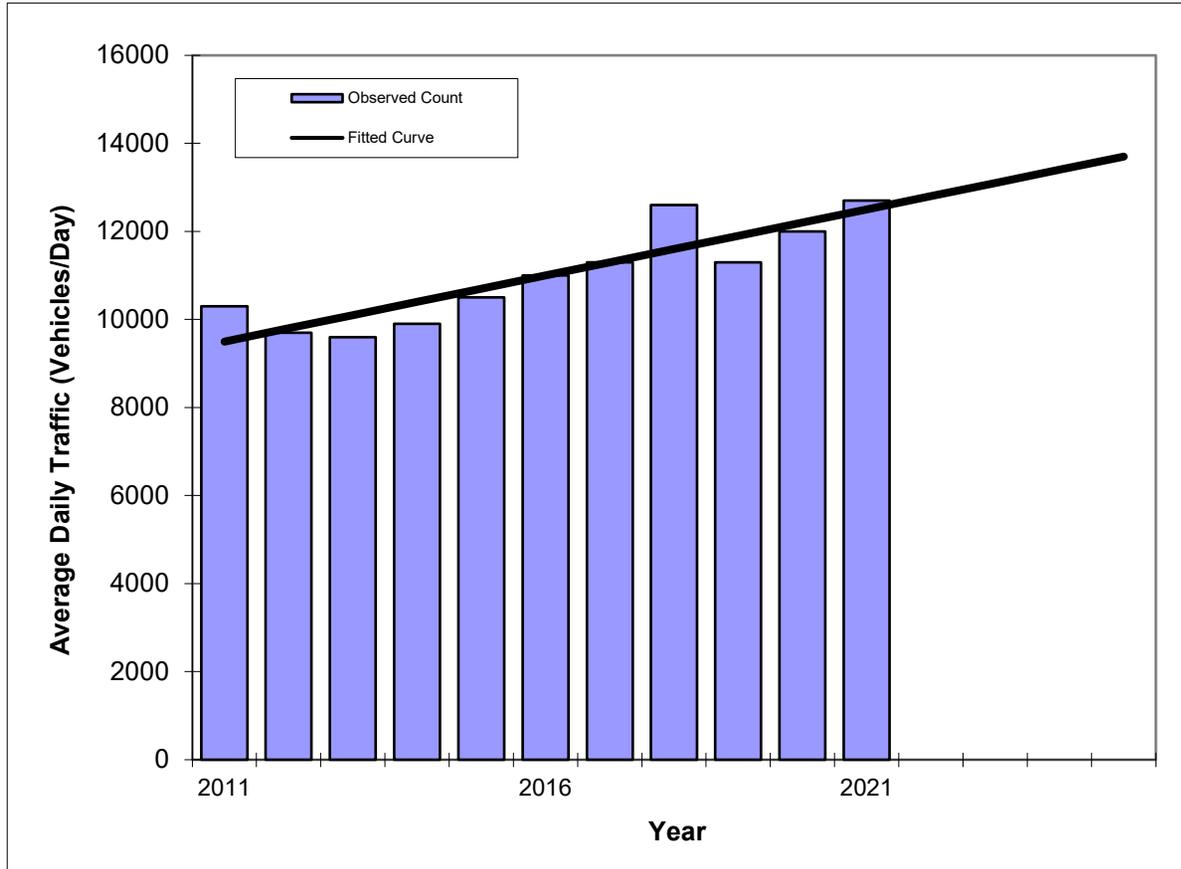
Trend R-squared:	48.0%
Compounded Annual Historic Growth Rate:	2.22%
Compounded Growth Rate (2021 to Design Year):	0.53%
Printed:	2-May-22
<b>Decaying Exponential Growth Option</b>	

\*Axle-Adjusted

# TRAFFIC TRENDS

Lake Helen Osteen Rd -- Haulover Blvd to Catalina Blvd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Lake Helen Osteen Rd



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2011	10300	9500
2012	9700	9800
2013	9600	10100
2014	9900	10400
2015	10500	10700
2016	11000	11000
2017	11300	11300
2018	12600	11600
2019	11300	11900
2020	12000	12200
2021	12700	12500
<b>2022 Opening Year Trend</b>		
2022	N/A	12800
<b>2023 Mid-Year Trend</b>		
2023	N/A	13100
<b>2024 Design Year Trend</b>		
2024	N/A	13400
<b>TRANPLAN Forecasts/Trends</b>		

**\*\* Annual Trend Increase:** 295  
**Trend R-squared:** 78.5%  
**Trend Annual Historic Growth Rate:** 3.16%  
**Trend Growth Rate (2021 to Design Year):** 2.40%  
**Printed:** 2-May-22  
**Straight Line Growth Option**

\*Axle-Adjusted

# **APPENDIX C**

## **Turning Movement Count Data, FDOT's Seasonal Factor**

# DE TRAFFIC

detraffic.com

(386) 341-4186

Catalina Blvd at Howland Blvd

Volusia County, FL

File Name : Howland at Catalina

Site Code : 00000001

Start Date : 5/12/2022

Page No : 1

## Groups Printed- Automobiles - Commercial

Start Time	Catalina Blvd Southbound				Howland Blvd Westbound				Catalina Blvd Northbound				Howland Blvd Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	13	18	135	166	2	191	6	199	17	9	7	33	35	115	6	156	554
07:15 AM	24	22	163	209	9	226	23	258	37	20	8	65	41	139	7	187	719
07:30 AM	34	27	171	232	5	223	31	259	34	26	9	69	38	139	9	186	746
07:45 AM	35	27	139	201	9	228	12	249	25	30	3	58	44	106	7	157	665
Total	106	94	608	808	25	868	72	965	113	85	27	225	158	499	29	686	2684
08:00 AM	17	22	141	180	13	215	9	237	26	18	6	50	57	112	9	178	645
08:15 AM	13	13	114	140	3	179	6	188	28	21	5	54	46	122	8	176	558
08:30 AM	13	20	129	162	6	167	8	181	14	15	6	35	52	97	3	152	530
08:45 AM	10	37	89	136	3	163	6	172	20	17	6	43	45	96	12	153	504
Total	53	92	473	618	25	724	29	778	88	71	23	182	200	427	32	659	2237
04:00 PM	13	25	79	117	17	124	18	159	8	21	3	32	99	155	26	280	588
04:15 PM	14	21	64	99	9	124	25	158	16	32	9	57	109	158	17	284	598
04:30 PM	14	32	87	133	11	116	23	150	19	26	8	53	107	156	12	275	611
04:45 PM	18	18	86	122	13	125	18	156	15	19	6	40	108	171	17	296	614
Total	59	96	316	471	50	489	84	623	58	98	26	182	423	640	72	1135	2411
05:00 PM	29	21	70	120	9	123	16	148	22	21	3	46	127	189	27	343	657
05:15 PM	14	25	76	115	8	166	14	188	24	24	3	51	114	192	15	321	675
05:30 PM	14	25	82	121	11	137	6	154	16	11	3	30	136	203	21	360	665
05:45 PM	23	18	80	121	12	184	13	209	16	15	8	39	111	188	11	310	679
Total	80	89	308	477	40	610	49	699	78	71	17	166	488	772	74	1334	2676
Grand Total	298	371	1705	2374	140	2691	234	3065	337	325	93	755	1269	2338	207	3814	10008
Apprch %	12.6	15.6	71.8		4.6	87.8	7.6		44.6	43	12.3		33.3	61.3	5.4		
Total %	3	3.7	17	23.7	1.4	26.9	2.3	30.6	3.4	3.2	0.9	7.5	12.7	23.4	2.1	38.1	
Automobiles	294	359	1689	2342	138	2637	231	3006	332	319	92	743	1258	2278	205	3741	9832
% Automobiles	98.7	96.8	99.1	98.7	98.6	98	98.7	98.1	98.5	98.2	98.9	98.4	99.1	97.4	99	98.1	98.2
Commercial	4	12	16	32	2	54	3	59	5	6	1	12	11	60	2	73	176
% Commercial	1.3	3.2	0.9	1.3	1.4	2	1.3	1.9	1.5	1.8	1.1	1.6	0.9	2.6	1	1.9	1.8

# DE TRAFFIC

detraffic.com

(386) 341-4186

Catalina Blvd at Howland Blvd

Volusia County, FL

File Name : Howland at Catalina

Site Code : 00000001

Start Date : 5/12/2022

Page No : 2

Start Time	Catalina Blvd Southbound				Howland Blvd Westbound				Catalina Blvd Northbound				Howland Blvd Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	24	22	163	209	9	226	23	258	37	20	8	65	41	139	7	187	719
07:30 AM	34	27	171	232	5	223	31	259	34	26	9	69	38	139	9	186	746
07:45 AM	35	27	139	201	9	228	12	249	25	30	3	58	44	106	7	157	665
08:00 AM	17	22	141	180	13	215	9	237	26	18	6	50	57	112	9	178	645
Total Volume	110	98	614	822	36	892	75	1003	122	94	26	242	180	496	32	708	2775
% App. Total	13.4	11.9	74.7		3.6	88.9	7.5		50.4	38.8	10.7		25.4	70.1	4.5		
PHF	.786	.907	.898	.886	.692	.978	.605	.968	.824	.783	.722	.877	.789	.892	.889	.947	.930
Automobiles	109	95	605	809	35	880	73	988	120	93	25	238	176	469	32	677	2712
% Automobiles	99.1	96.9	98.5	98.4	97.2	98.7	97.3	98.5	98.4	98.9	96.2	98.3	97.8	94.6	100	95.6	97.7
Commercial	1	3	9	13	1	12	2	15	2	1	1	4	4	27	0	31	63
% Commercial	0.9	3.1	1.5	1.6	2.8	1.3	2.7	1.5	1.6	1.1	3.8	1.7	2.2	5.4	0	4.4	2.3

# DE TRAFFIC

detraffic.com

(386) 341-4186

Catalina Blvd at Howland Blvd

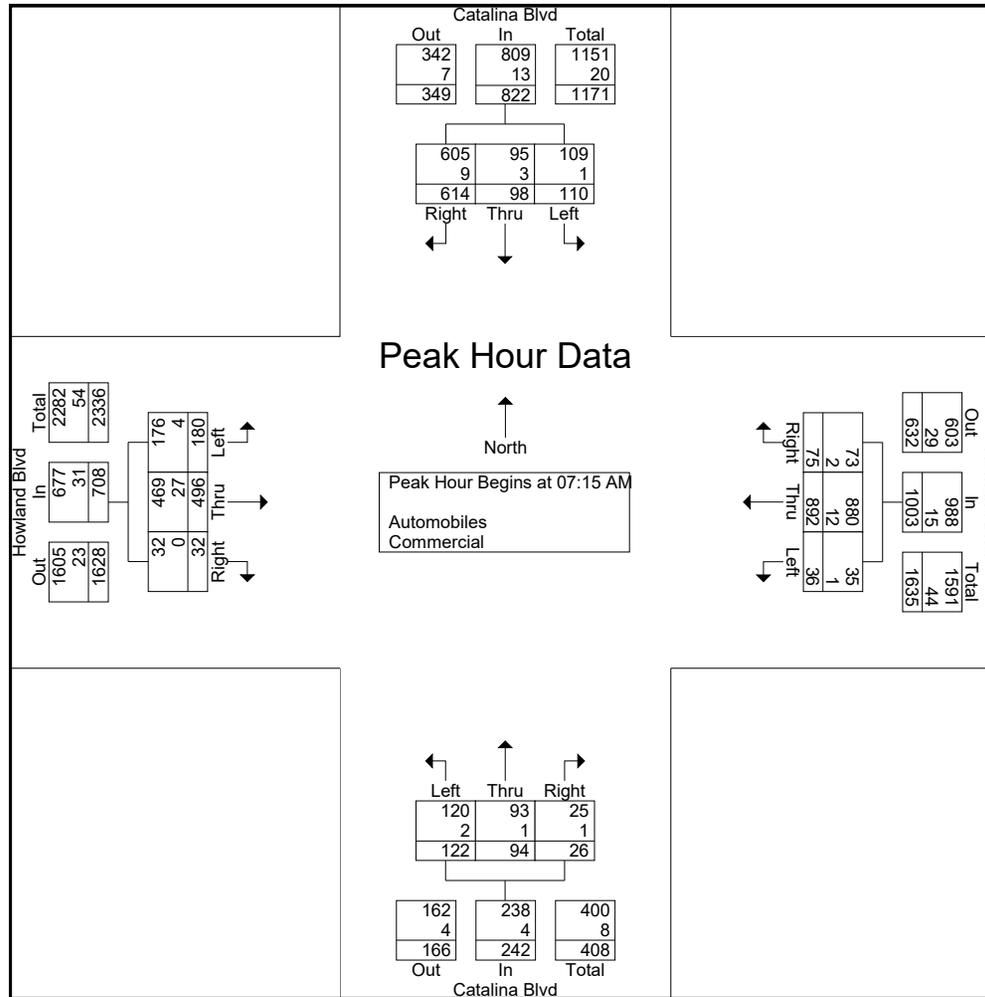
Volusia County, FL

File Name : Howland at Catalina

Site Code : 00000001

Start Date : 5/12/2022

Page No : 3



# DE TRAFFIC

detraffic.com

(386) 341-4186

Catalina Blvd at Howland Blvd

Volusia County, FL

File Name : Howland at Catalina

Site Code : 00000001

Start Date : 5/12/2022

Page No : 4

Start Time	Catalina Blvd Southbound				Howland Blvd Westbound				Catalina Blvd Northbound				Howland Blvd Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	29	21	70	120	9	123	16	148	22	21	3	46	127	189	27	343	657
05:15 PM	14	25	76	115	8	166	14	188	24	24	3	51	114	192	15	321	675
05:30 PM	14	25	82	121	11	137	6	154	16	11	3	30	136	203	21	360	665
05:45 PM	23	18	80	121	12	184	13	209	16	15	8	39	111	188	11	310	679
Total Volume	80	89	308	477	40	610	49	699	78	71	17	166	488	772	74	1334	2676
% App. Total	16.8	18.7	64.6		5.7	87.3	7		47	42.8	10.2		36.6	57.9	5.5		
PHF	.690	.890	.939	.986	.833	.829	.766	.836	.813	.740	.531	.814	.897	.951	.685	.926	.985
Automobiles	80	86	303	469	40	601	49	690	78	71	17	166	484	761	74	1319	2644
% Automobiles	100	96.6	98.4	98.3	100	98.5	100	98.7	100	100	100	100	99.2	98.6	100	98.9	98.8
Commercial	0	3	5	8	0	9	0	9	0	0	0	0	4	11	0	15	32
% Commercial	0	3.4	1.6	1.7	0	1.5	0	1.3	0	0	0	0	0.8	1.4	0	1.1	1.2

# DE TRAFFIC

detraffic.com

(386) 341-4186

Catalina Blvd at Howland Blvd

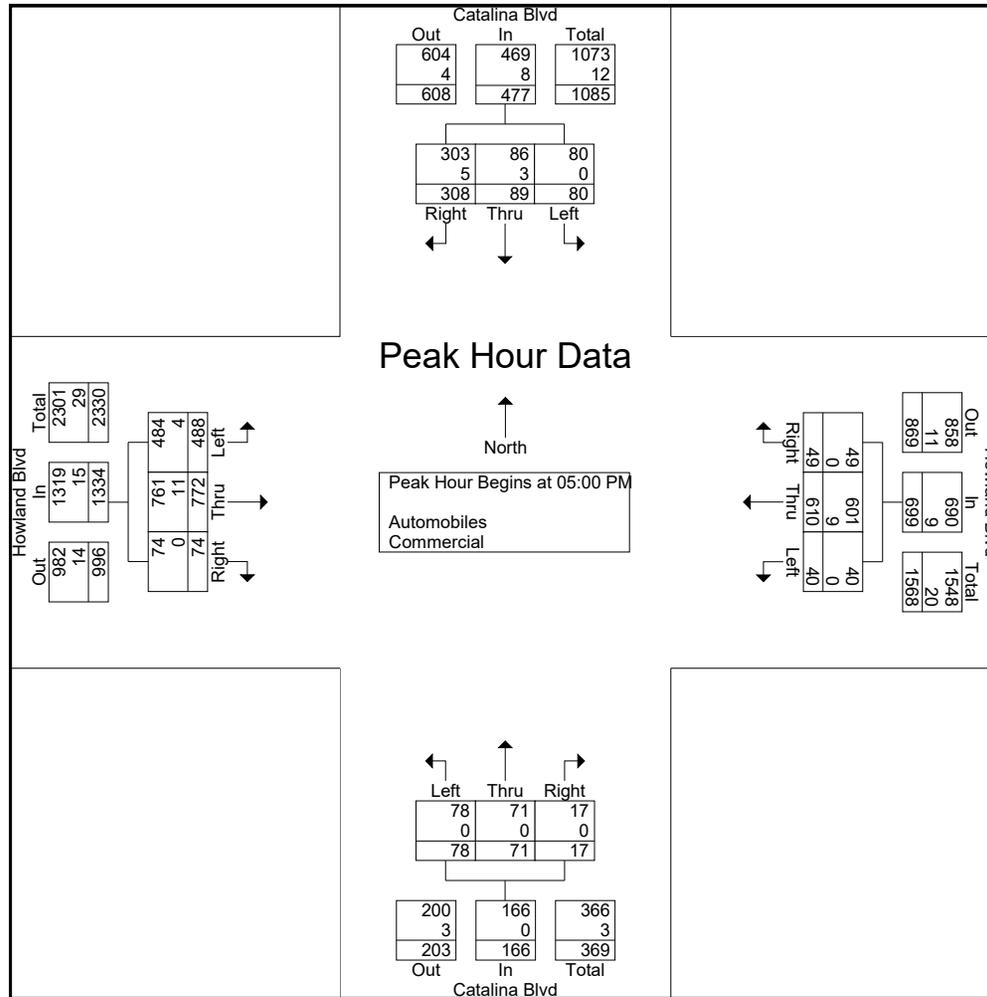
Volusia County, FL

File Name : Howland at Catalina

Site Code : 00000001

Start Date : 5/12/2022

Page No : 5



# DE TRAFFIC

detraffic.com

(386) 341-4186

Catalina Blvd at Howland Blvd

Volusia County, FL

File Name : Howland at Catalina

Site Code : 00000001

Start Date : 5/12/2022

Page No : 6

## Groups Printed- Peds

Start Time	Catalina Blvd Southbound					Howland Blvd Westbound					Catalina Blvd Northbound					Howland Blvd Eastbound					Int. Total	
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total		
07:30 AM	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
Total	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	1	3
08:00 AM	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	2	2	2	4
08:15 AM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	0	1	1	0	0	0	2	2	0	0	0	0	0	0	0	0	2	2	2	5
04:45 PM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2
Total	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2
05:00 PM	0	0	0	2	2	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	1	4
05:15 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
Total	0	0	0	2	2	0	0	0	1	1	0	0	0	1	1	0	0	0	2	2	2	6
Grand Total	0	0	0	5	5	0	0	0	4	4	0	0	0	2	2	0	0	0	5	5	5	16
Apprch %	0	0	0	100		0	0	0	100		0	0	0	100		0	0	0	100			
Total %	0	0	0	31.2	31.2	0	0	0	25	25	0	0	0	12.5	12.5	0	0	0	31.2	31.2		

# DE TRAFFIC

detraffic.com

(386) 341-4186

Dr. MLK Blvd at Howland Blvd

Volusia County, FL

File Name : howland at MLK

Site Code : 00000001

Start Date : 6/29/2022

Page No : 1

## Groups Printed- Automobiles - Commercial

Start Time	N/A Southbound				Howland Blvd Westbound				Dr. MLK Blvd Northbound				Howland Blvd Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	0	0	0	0	2	319	0	321	0	0	2	2	0	99	3	102	425
07:15 AM	0	0	0	0	1	325	0	326	0	0	0	0	0	93	1	94	420
07:30 AM	0	0	0	0	1	380	0	381	2	0	0	2	0	126	2	128	511
07:45 AM	0	0	0	0	3	355	0	358	2	0	1	3	0	111	3	114	475
Total	0	0	0	0	7	1379	0	1386	4	0	3	7	0	429	9	438	1831
08:00 AM	0	0	0	0	1	317	0	318	2	0	0	2	0	114	2	116	436
08:15 AM	0	0	0	0	1	252	0	253	3	0	1	4	0	139	1	140	397
08:30 AM	0	0	0	0	6	247	0	253	0	0	1	1	0	102	3	105	359
08:45 AM	0	0	0	0	2	262	0	264	0	0	0	0	0	153	1	154	418
Total	0	0	0	0	10	1078	0	1088	5	0	2	7	0	508	7	515	1610
04:30 PM	0	0	0	0	0	147	0	147	1	0	0	1	0	317	5	322	470
04:45 PM	0	0	0	0	2	193	0	195	1	0	2	3	0	305	3	308	506
Total	0	0	0	0	2	340	0	342	2	0	2	4	0	622	8	630	976
05:00 PM	0	0	0	0	1	186	0	187	3	0	1	4	0	299	2	301	492
05:15 PM	0	0	0	0	0	201	0	201	2	0	3	5	0	309	1	310	516
05:30 PM	0	0	0	0	1	245	0	246	5	0	1	6	0	314	3	317	569
05:45 PM	0	0	0	0	1	256	0	257	4	0	1	5	0	356	1	357	619
Total	0	0	0	0	3	888	0	891	14	0	6	20	0	1278	7	1285	2196
06:00 PM	0	0	0	0	2	237	0	239	1	0	1	2	0	317	0	317	558
06:15 PM	0	0	0	0	2	217	0	219	1	0	0	1	0	326	0	326	546
Grand Total	0	0	0	0	26	4139	0	4165	27	0	14	41	0	3480	31	3511	7717
Apprch %	0	0	0		0.6	99.4	0		65.9	0	34.1		0	99.1	0.9		
Total %	0	0	0		0.3	53.6	0	54	0.3	0	0.2	0.5	0	45.1	0.4	45.5	
Automobiles	0	0	0	0	23	4088	0	4111	26	0	12	38	0	3432	29	3461	7610
% Automobiles	0	0	0	0	88.5	98.8	0	98.7	96.3	0	85.7	92.7	0	98.6	93.5	98.6	98.6
Commercial	0	0	0	0	3	51	0	54	1	0	2	3	0	48	2	50	107
% Commercial	0	0	0	0	11.5	1.2	0	1.3	3.7	0	14.3	7.3	0	1.4	6.5	1.4	1.4

# DE TRAFFIC

detraffic.com

(386) 341-4186

Dr. MLK Blvd at Howland Blvd

Volusia County, FL

File Name : howland at MLK

Site Code : 00000001

Start Date : 6/29/2022

Page No : 2

Start Time	N/A Southbound				Howland Blvd Westbound				Dr. MLK Blvd Northbound				Howland Blvd Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	1	325	0	326	0	0	0	0	0	93	1	94	420
07:30 AM	0	0	0	0	1	380	0	381	2	0	0	2	0	126	2	128	511
07:45 AM	0	0	0	0	3	355	0	358	2	0	1	3	0	111	3	114	475
08:00 AM	0	0	0	0	1	317	0	318	2	0	0	2	0	114	2	116	436
Total Volume	0	0	0	0	6	1377	0	1383	6	0	1	7	0	444	8	452	1842
% App. Total	0	0	0	0	0.4	99.6	0		85.7	0	14.3		0	98.2	1.8		
PHF	.000	.000	.000	.000	.500	.906	.000	.907	.750	.000	.250	.583	.000	.881	.667	.883	.901
Automobiles	0	0	0	0	6	1358	0	1364	6	0	1	7	0	428	8	436	1807
% Automobiles	0	0	0	0	100	98.6	0	98.6	100	0	100	100	0	96.4	100	96.5	98.1
Commercial	0	0	0	0	0	19	0	19	0	0	0	0	0	16	0	16	35
% Commercial	0	0	0	0	0	1.4	0	1.4	0	0	0	0	0	3.6	0	3.5	1.9

# DE TRAFFIC

detraffic.com

(386) 341-4186

Dr. MLK Blvd at Howland Blvd

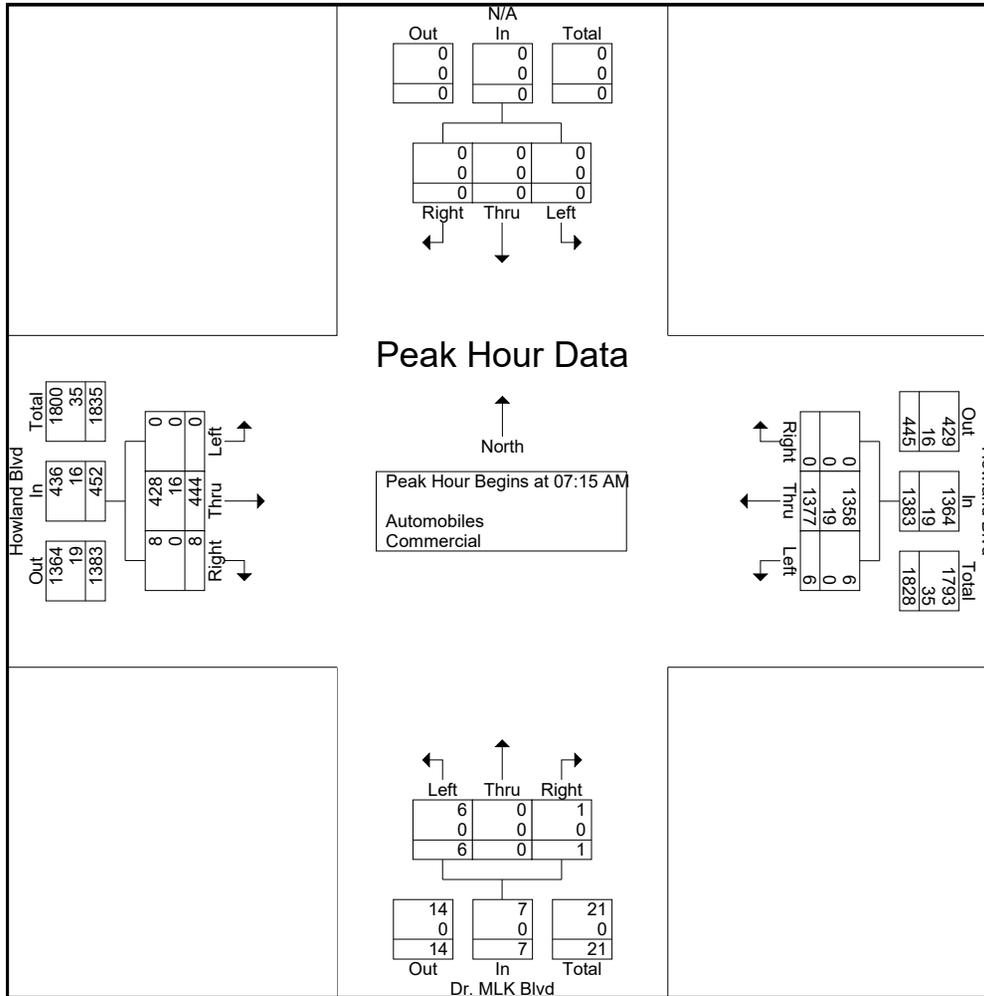
Volusia County, FL

File Name : howland at MLK

Site Code : 00000001

Start Date : 6/29/2022

Page No : 3



# DE TRAFFIC

detraffic.com

(386) 341-4186

Dr. MLK Blvd at Howland Blvd

Volusia County, FL

File Name : howland at MLK

Site Code : 00000001

Start Date : 6/29/2022

Page No : 4

Start Time	N/A Southbound				Howland Blvd Westbound				Dr. MLK Blvd Northbound				Howland Blvd Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:30 PM to 06:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:30 PM																	
05:30 PM	0	0	0	0	1	245	0	246	5	0	1	6	0	314	3	317	569
05:45 PM	0	0	0	0	1	256	0	257	4	0	1	5	0	356	1	357	619
06:00 PM	0	0	0	0	2	237	0	239	1	0	1	2	0	317	0	317	558
06:15 PM	0	0	0	0	2	217	0	219	1	0	0	1	0	326	0	326	546
Total Volume	0	0	0	0	6	955	0	961	11	0	3	14	0	1313	4	1317	2292
% App. Total	0	0	0	0	0.6	99.4	0	99.1	78.6	0	21.4	92.9	0	99.7	0.3	99.3	99.2
PHF	.000	.000	.000	.000	.750	.933	.000	.935	.550	.000	.750	.583	.000	.922	.333	.922	.926
Automobiles	0	0	0	0	5	947	0	952	10	0	3	13	0	1305	3	1308	2273
% Automobiles	0	0	0	0	83.3	99.2	0	99.1	90.9	0	100	92.9	0	99.4	75.0	99.3	99.2
Commercial	0	0	0	0	1	8	0	9	1	0	0	1	0	8	1	9	19
% Commercial	0	0	0	0	16.7	0.8	0	0.9	9.1	0	0	7.1	0	0.6	25.0	0.7	0.8

# DE TRAFFIC

detraffic.com

(386) 341-4186

Dr. MLK Blvd at Howland Blvd

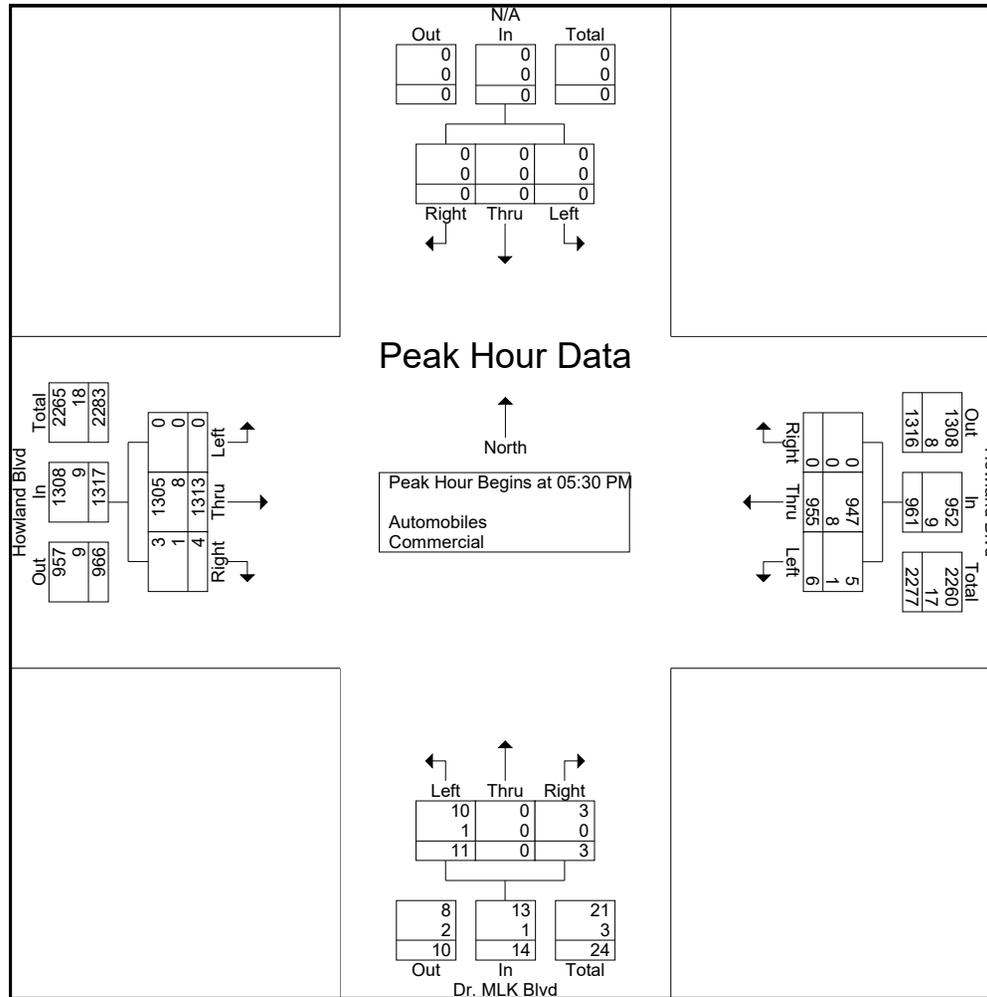
Volusia County, FL

File Name : howland at MLK

Site Code : 00000001

Start Date : 6/29/2022

Page No : 5





# DE TRAFFIC

detraffic.com

(386) 341-4186

Wolf Pack Run at Howland Blvd

Volusia County, FL

File Name : Wolf pack at Howland

Site Code : 00000002

Start Date : 5/12/2022

Page No : 1

## Groups Printed- Automobiles - Commercial

Start Time	N/A Southbound				Howland Blvd Westbound				Wolf Pack Run Northbound				Howland Blvd Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
07:00 AM	0	0	0	0	11	346	0	357	21	0	11	32	0	146	22	168	557
07:15 AM	0	0	0	0	20	419	0	439	34	0	10	44	0	158	36	194	677
07:30 AM	0	0	0	0	36	441	0	477	42	0	20	62	0	154	42	196	735
07:45 AM	0	0	0	0	41	406	0	447	36	0	21	57	0	147	35	182	686
Total	0	0	0	0	108	1612	0	1720	133	0	62	195	0	605	135	740	2655
08:00 AM	0	0	0	0	36	394	0	430	51	0	19	70	0	163	48	211	711
08:15 AM	0	0	0	0	25	334	0	359	43	0	19	62	0	148	24	172	593
08:30 AM	0	0	0	0	21	335	0	356	36	0	21	57	0	143	17	160	573
08:45 AM	0	0	0	0	23	281	0	304	39	0	12	51	0	149	13	162	517
Total	0	0	0	0	105	1344	0	1449	169	0	71	240	0	603	102	705	2394
04:00 PM	0	0	0	0	13	227	0	240	19	0	9	28	0	264	17	281	549
04:15 PM	0	0	0	0	16	214	0	230	34	0	11	45	0	279	28	307	582
04:30 PM	0	0	0	0	11	228	0	239	27	0	16	43	0	286	34	320	602
04:45 PM	0	0	0	0	20	241	0	261	26	0	13	39	0	280	42	322	622
Total	0	0	0	0	60	910	0	970	106	0	49	155	0	1109	121	1230	2355
05:00 PM	0	0	0	0	17	244	0	261	34	0	14	48	0	318	53	371	680
05:15 PM	0	0	0	0	18	270	0	288	29	0	14	43	0	332	43	375	706
05:30 PM	0	0	0	0	9	250	0	259	23	0	14	37	0	365	54	419	715
05:45 PM	0	0	0	0	13	288	0	301	26	0	13	39	0	318	47	365	705
Total	0	0	0	0	57	1052	0	1109	112	0	55	167	0	1333	197	1530	2806
Grand Total	0	0	0	0	330	4918	0	5248	520	0	237	757	0	3650	555	4205	10210
Apprch %	0	0	0		6.3	93.7	0		68.7	0	31.3		0	86.8	13.2		
Total %	0	0	0	0	3.2	48.2	0	51.4	5.1	0	2.3	7.4	0	35.7	5.4	41.2	
Automobiles	0	0	0	0	318	4815	0	5133	509	0	228	737	0	3570	539	4109	9979
% Automobiles	0	0	0	0	96.4	97.9	0	97.8	97.9	0	96.2	97.4	0	97.8	97.1	97.7	97.7
Commercial	0	0	0	0	12	103	0	115	11	0	9	20	0	80	16	96	231
% Commercial	0	0	0	0	3.6	2.1	0	2.2	2.1	0	3.8	2.6	0	2.2	2.9	2.3	2.3

# DE TRAFFIC

detraffic.com

(386) 341-4186

Wolf Pack Run at Howland Blvd

Volusia County, FL

File Name : Wolf pack at Howland

Site Code : 00000002

Start Date : 5/12/2022

Page No : 2

Start Time	N/A Southbound				Howland Blvd Westbound				Wolf Pack Run Northbound				Howland Blvd Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	20	419	0	439	34	0	10	44	0	158	36	194	677
07:30 AM	0	0	0	0	36	441	0	477	42	0	20	62	0	154	42	196	735
07:45 AM	0	0	0	0	41	406	0	447	36	0	21	57	0	147	35	182	686
08:00 AM	0	0	0	0	36	394	0	430	51	0	19	70	0	163	48	211	711
Total Volume	0	0	0	0	133	1660	0	1793	163	0	70	233	0	622	161	783	2809
% App. Total	0	0	0	0	7.4	92.6	0		70	0	30		0	79.4	20.6		
PHF	.000	.000	.000	.000	.811	.941	.000	.940	.799	.000	.833	.832	.000	.954	.839	.928	.955
Automobiles	0	0	0	0	128	1630	0	1758	161	0	66	227	0	593	155	748	2733
% Automobiles	0	0	0	0	96.2	98.2	0	98.0	98.8	0	94.3	97.4	0	95.3	96.3	95.5	97.3
Commercial	0	0	0	0	5	30	0	35	2	0	4	6	0	29	6	35	76
% Commercial	0	0	0	0	3.8	1.8	0	2.0	1.2	0	5.7	2.6	0	4.7	3.7	4.5	2.7

# DE TRAFFIC

detraffic.com

(386) 341-4186

Wolf Pack Run at Howland Blvd

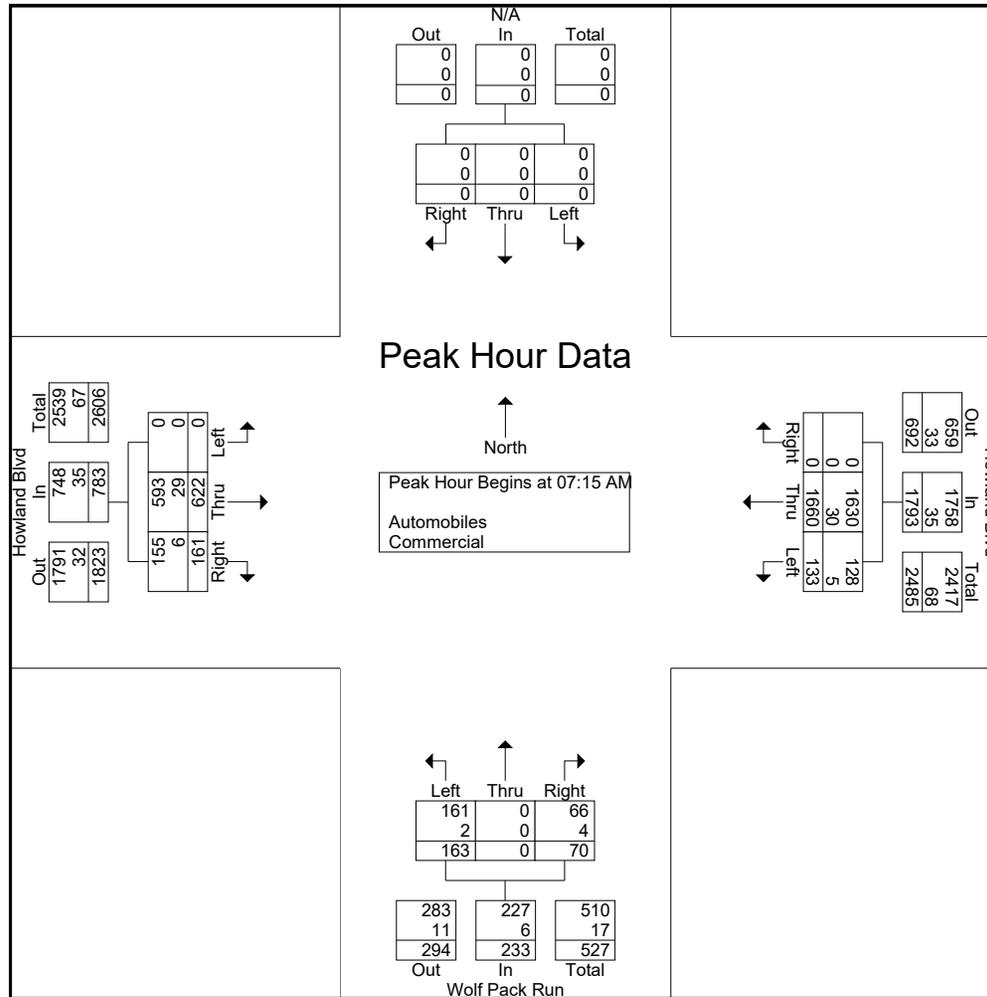
Volusia County, FL

File Name : Wolf pack at Howland

Site Code : 00000002

Start Date : 5/12/2022

Page No : 3



# DE TRAFFIC

detraffic.com

(386) 341-4186

Wolf Pack Run at Howland Blvd

Volusia County, FL

File Name : Wolf pack at Howland

Site Code : 00000002

Start Date : 5/12/2022

Page No : 4

Start Time	N/A Southbound				Howland Blvd Westbound				Wolf Pack Run Northbound				Howland Blvd Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	17	244	0	261	34	0	14	48	0	318	53	371	680
05:15 PM	0	0	0	0	18	270	0	288	29	0	14	43	0	332	43	375	706
05:30 PM	0	0	0	0	9	250	0	259	23	0	14	37	0	365	54	419	715
05:45 PM	0	0	0	0	13	288	0	301	26	0	13	39	0	318	47	365	705
Total Volume	0	0	0	0	57	1052	0	1109	112	0	55	167	0	1333	197	1530	2806
% App. Total	0	0	0	0	5.1	94.9	0		67.1	0	32.9		0	87.1	12.9		
PHF	.000	.000	.000	.000	.792	.913	.000	.921	.824	.000	.982	.870	.000	.913	.912	.913	.981
Automobiles	0	0	0	0	53	1032	0	1085	109	0	54	163	0	1319	192	1511	2759
% Automobiles	0	0	0	0	93.0	98.1	0	97.8	97.3	0	98.2	97.6	0	98.9	97.5	98.8	98.3
Commercial	0	0	0	0	4	20	0	24	3	0	1	4	0	14	5	19	47
% Commercial	0	0	0	0	7.0	1.9	0	2.2	2.7	0	1.8	2.4	0	1.1	2.5	1.2	1.7

# DE TRAFFIC

detraffic.com

(386) 341-4186

Wolf Pack Run at Howland Blvd

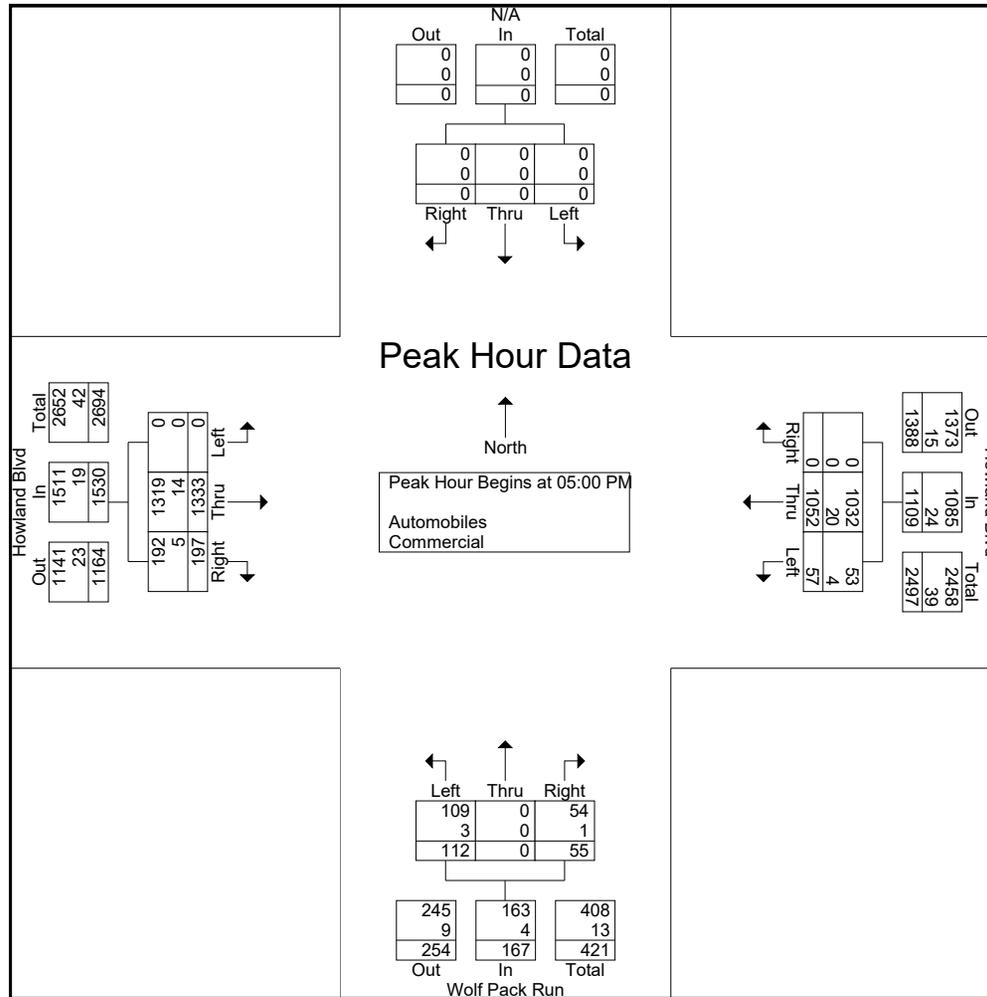
Volusia County, FL

File Name : Wolf pack at Howland

Site Code : 00000002

Start Date : 5/12/2022

Page No : 5



# DE TRAFFIC

detraffic.com

(386) 341-4186

Wolf Pack Run at Howland Blvd

Volusia County, FL

File Name : Wolf pack at Howland

Site Code : 00000002

Start Date : 5/12/2022

Page No : 6

## Groups Printed- Peds

Start Time	N/A Southbound					Howland Blvd Westbound					Wolf Pack Run Northbound					Howland Blvd Eastbound					Int. Total	
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total		
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0			
07:15 AM	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	3
07:30 AM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2	2	0	3
07:45 AM	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	2
Total	0	0	0	0	0	0	0	0	6	6	0	0	0	0	0	0	0	0	2	2	0	8
08:00 AM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2	2	0	3
08:15 AM	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	2	2	0	4
08:30 AM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1
08:45 AM	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	1	1	0	3
Total	0	0	0	0	0	0	0	0	6	6	0	0	0	0	0	0	0	0	5	5	0	11
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	2
04:45 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	2
Total	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	4	4	0	5
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	2
05:15 PM	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	2
05:30 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	2
Total	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	3	3	0	6
Grand Total	0	0	0	0	0	0	0	0	16	16	0	0	0	0	0	0	0	0	14	14	0	30
Apprch %	0	0	0	0	0	0	0	0	100	100	0	0	0	0	0	0	0	0	100	100	0	
Total %	0	0	0	0	0	0	0	0	53.3	53.3	0	0	0	0	0	0	0	0	46.7	46.7	0	



NB Approach



SB Approach



EB Approach



WB Approach



Catalina Blvd  
at Howland Blvd

Volusia County

[www.de-traffic.com](http://www.de-traffic.com)

299 McGregor Rd. DeLand FL. 32720

Project  
Number: L22-34

Sheet  
Number: 3



NB Approach



EB Approach



WB Approach



Dr. Martin Luther King Blvd  
at Howland Blvd

Volusia County

[www.de-traffic.com](http://www.de-traffic.com)

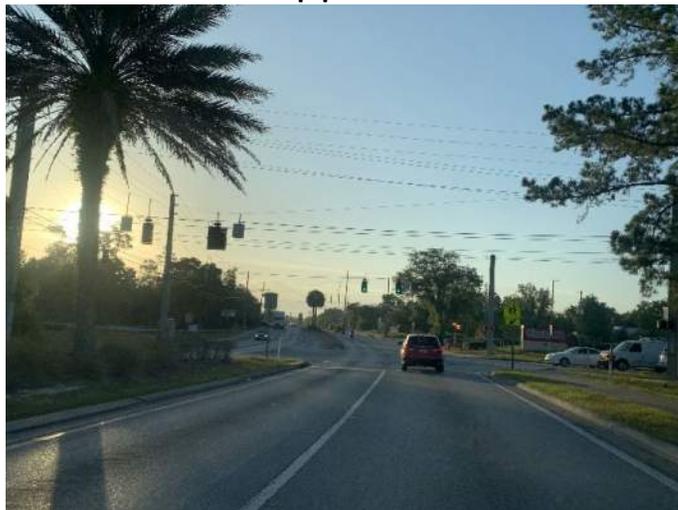
299 McGregor Rd. DeLand FL 32720

Project  
Number: L22-34

Sheet  
Number: 4



NB Approach



EB Approach



WB Approach



Wolf Pack Run  
at Howland Blvd

Volusia County

[www.de-traffic.com](http://www.de-traffic.com)

299 McGregor Rd. DeLand Fl. 32720

Project  
Number: L22-34

Sheet  
Number: 2

# DE TRAFFIC

detraffic.com

(386) 341-4186

Catalina Blvd at Howland Blvd

Volusia County, FL

File Name : Howland at Catalina PM

Site Code : 00000001

Start Date : 5/24/2022

Page No : 1

## Groups Printed- Automobiles - Commercial

Start Time	Catalina Blvd Southbound				Howland Blvd Westbound				Catalina Blvd Northbound				Howland Blvd Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:30 PM	9	20	81	110	15	143	21	179	24	11	3	38	124	162	24	310	637
04:45 PM	11	36	76	123	16	164	20	200	18	16	10	44	141	174	27	342	709
Total	20	56	157	233	31	307	41	379	42	27	13	82	265	336	51	652	1346
05:00 PM	19	35	95	149	12	142	24	178	19	23	8	50	115	146	24	285	662
05:15 PM	25	42	76	143	8	133	24	165	22	31	7	60	110	144	18	272	640
05:30 PM	35	34	87	156	11	152	18	181	18	27	3	48	104	186	19	309	694
05:45 PM	34	25	64	123	8	141	17	166	17	29	3	49	84	154	21	259	597
Total	113	136	322	571	39	568	83	690	76	110	21	207	413	630	82	1125	2593
06:00 PM	26	26	76	128	7	146	20	173	19	19	3	41	75	119	16	210	552
06:15 PM	34	25	53	112	8	130	11	149	9	11	8	28	64	105	14	183	472
Grand Total	193	243	608	1044	85	1151	155	1391	146	167	45	358	817	1190	163	2170	4963
Apprch %	18.5	23.3	58.2		6.1	82.7	11.1		40.8	46.6	12.6		37.6	54.8	7.5		
Total %	3.9	4.9	12.3	21	1.7	23.2	3.1	28	2.9	3.4	0.9	7.2	16.5	24	3.3	43.7	
Automobiles	191	237	604	1032	82	1142	153	1377	144	166	43	353	816	1173	161	2150	4912
% Automobiles	99	97.5	99.3	98.9	96.5	99.2	98.7	99	98.6	99.4	95.6	98.6	99.9	98.6	98.8	99.1	99
Commercial	2	6	4	12	3	9	2	14	2	1	2	5	1	17	2	20	51
% Commercial	1	2.5	0.7	1.1	3.5	0.8	1.3	1	1.4	0.6	4.4	1.4	0.1	1.4	1.2	0.9	1

# DE TRAFFIC

detraffic.com

(386) 341-4186

Catalina Blvd at Howland Blvd

Volusia County, FL

File Name : Howland at Catalina PM

Site Code : 00000001

Start Date : 5/24/2022

Page No : 2

Start Time	Catalina Blvd Southbound				Howland Blvd Westbound				Catalina Blvd Northbound				Howland Blvd Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:30 PM to 06:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	11	36	76	123	16	164	20	200	18	16	10	44	141	174	27	342	709
05:00 PM	19	35	95	149	12	142	24	178	19	23	8	50	115	146	24	285	662
05:15 PM	25	42	76	143	8	133	24	165	22	31	7	60	110	144	18	272	640
05:30 PM	35	34	87	156	11	152	18	181	18	27	3	48	104	186	19	309	694
Total Volume	90	147	334	571	47	591	86	724	77	97	28	202	470	650	88	1208	2705
% App. Total	15.8	25.7	58.5		6.5	81.6	11.9		38.1	48	13.9		38.9	53.8	7.3		
PHF	.643	.875	.879	.915	.734	.901	.896	.905	.875	.782	.700	.842	.833	.874	.815	.883	.954
Automobiles	88	145	332	565	44	588	85	717	76	97	26	199	469	643	87	1199	2680
% Automobiles	97.8	98.6	99.4	98.9	93.6	99.5	98.8	99.0	98.7	100	92.9	98.5	99.8	98.9	98.9	99.3	99.1
Commercial	2	2	2	6	3	3	1	7	1	0	2	3	1	7	1	9	25
% Commercial	2.2	1.4	0.6	1.1	6.4	0.5	1.2	1.0	1.3	0	7.1	1.5	0.2	1.1	1.1	0.7	0.9

# DE TRAFFIC

detraffic.com

(386) 341-4186

Catalina Blvd at Howland Blvd

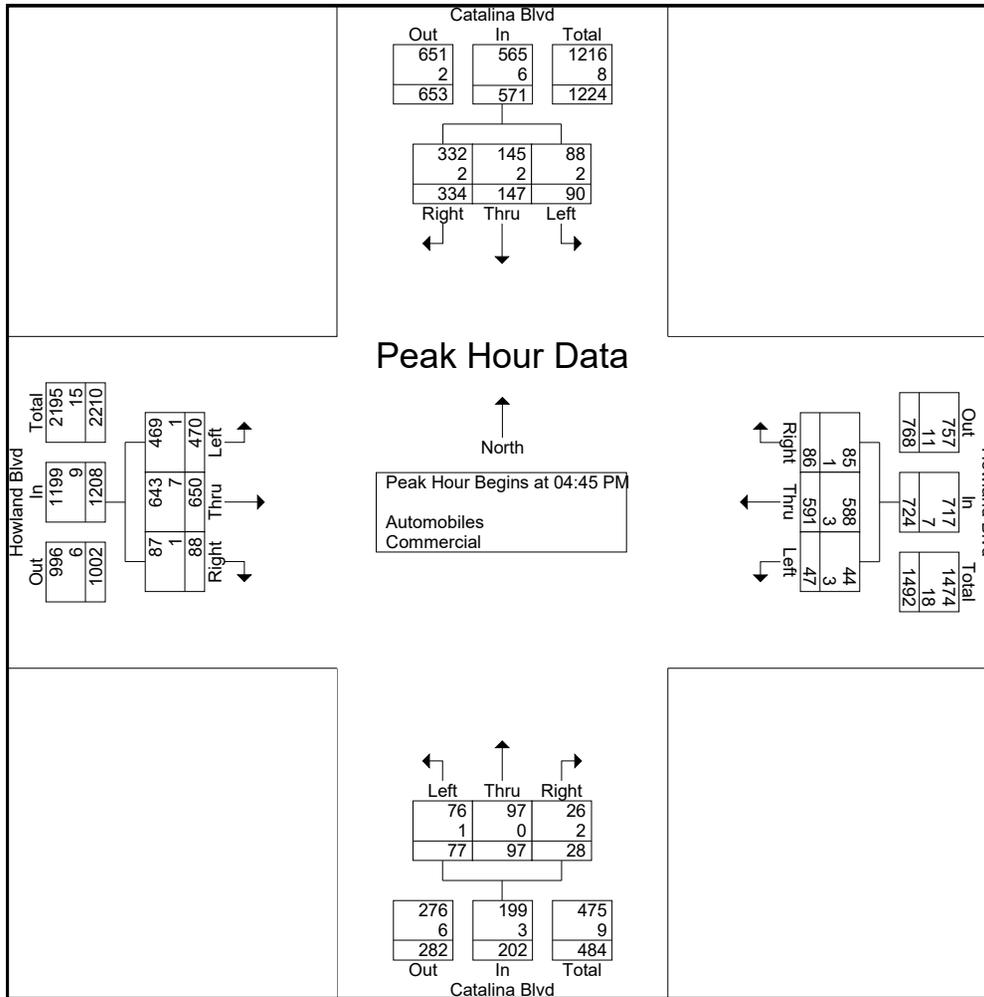
Volusia County, FL

File Name : Howland at Catalina PM

Site Code : 00000001

Start Date : 5/24/2022

Page No : 3



# DE TRAFFIC

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(386) 341-4186

Catalina Blvd at Howland Blvd

Volusia County, FL

File Name : Howland at Catalina PM

Site Code : 00000001

Start Date : 5/24/2022

Page No : 4

## Groups Printed- Peds

Start Time	Catalina Blvd Southbound					Howland Blvd Westbound					Catalina Blvd Northbound					Howland Blvd Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
05:15 PM	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	1	1	3
05:30 PM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1
Total	0	0	0	1	1	0	0	0	2	2	0	0	0	1	1	0	0	0	1	1	5
06:00 PM	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Grand Total	0	0	0	2	2	0	0	0	2	2	0	0	0	1	1	0	0	0	1	1	6
Apprch %	0	0	0	100		0	0	0	100		0	0	0	100		0	0	0	100		
Total %	0	0	0	33.3	33.3	0	0	0	33.3	33.3	0	0	0	16.7	16.7	0	0	0	16.7	16.7	

# DE TRAFFIC

detraffic.com

(386) 341-4186

Wolf Pack Run at Howland Blvd

Volusia County, FL

File Name : Wolf pack at Howland

Site Code : 00000002

Start Date : 5/24/2022

Page No : 1

## Groups Printed- Automobiles - Commercial

Start Time	N/A Southbound				Howland Blvd Westbound				Wolf Pack Run Northbound				Howland Blvd Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
04:30 PM	0	0	0	0	21	238	0	259	31	0	19	50	0	319	45	364	673
04:45 PM	0	0	0	0	22	255	0	277	28	0	18	46	0	309	59	368	691
Total	0	0	0	0	43	493	0	536	59	0	37	96	0	628	104	732	1364
05:00 PM	0	0	0	0	18	241	0	259	39	0	15	54	0	303	51	354	667
05:15 PM	0	0	0	0	17	255	0	272	26	0	13	39	0	305	42	347	658
05:30 PM	0	0	0	0	15	221	0	236	24	0	14	38	0	280	24	304	578
05:45 PM	0	0	0	0	5	232	0	237	26	0	11	37	0	339	16	355	629
Total	0	0	0	0	55	949	0	1004	115	0	53	168	0	1227	133	1360	2532
06:00 PM	0	0	0	0	6	255	0	261	20	0	10	30	0	295	15	310	601
06:15 PM	0	0	0	0	4	248	0	252	22	0	11	33	0	271	15	286	571
Grand Total	0	0	0	0	108	1945	0	2053	216	0	111	327	0	2421	267	2688	5068
Apprch %	0	0	0		5.3	94.7	0		66.1	0	33.9		0	90.1	9.9		
Total %	0	0	0		2.1	38.4	0	40.5	4.3	0	2.2	6.5	0	47.8	5.3	53	
Automobiles	0	0	0	0	103	1905	0	2008	210	0	109	319	0	2386	261	2647	4974
% Automobiles	0	0	0	0	95.4	97.9	0	97.8	97.2	0	98.2	97.6	0	98.6	97.8	98.5	98.1
Commercial	0	0	0	0	5	40	0	45	6	0	2	8	0	35	6	41	94
% Commercial	0	0	0	0	4.6	2.1	0	2.2	2.8	0	1.8	2.4	0	1.4	2.2	1.5	1.9

# DE TRAFFIC

detraffic.com

(386) 341-4186

Wolf Pack Run at Howland Blvd

Volusia County, FL

File Name : Wolf pack at Howland

Site Code : 00000002

Start Date : 5/24/2022

Page No : 2

Start Time	N/A Southbound				Howland Blvd Westbound				Wolf Pack Run Northbound				Howland Blvd Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:30 PM to 06:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	21	238	0	259	31	0	19	50	0	319	45	364	673
04:45 PM	0	0	0	0	22	255	0	277	28	0	18	46	0	309	59	368	691
05:00 PM	0	0	0	0	18	241	0	259	39	0	15	54	0	303	51	354	667
05:15 PM	0	0	0	0	17	255	0	272	26	0	13	39	0	305	42	347	658
Total Volume	0	0	0	0	78	989	0	1067	124	0	65	189	0	1236	197	1433	2689
% App. Total	0	0	0	0	7.3	92.7	0		65.6	0	34.4		0	86.3	13.7		
PHF	.000	.000	.000	.000	.886	.970	.000	.963	.795	.000	.855	.875	.000	.969	.835	.974	.973
Automobiles	0	0	0	0	74	971	0	1045	121	0	64	185	0	1220	192	1412	2642
% Automobiles	0	0	0	0	94.9	98.2	0	97.9	97.6	0	98.5	97.9	0	98.7	97.5	98.5	98.3
Commercial	0	0	0	0	4	18	0	22	3	0	1	4	0	16	5	21	47
% Commercial	0	0	0	0	5.1	1.8	0	2.1	2.4	0	1.5	2.1	0	1.3	2.5	1.5	1.7

# DE TRAFFIC

detraffic.com

(386) 341-4186

Wolf Pack Run at Howland Blvd

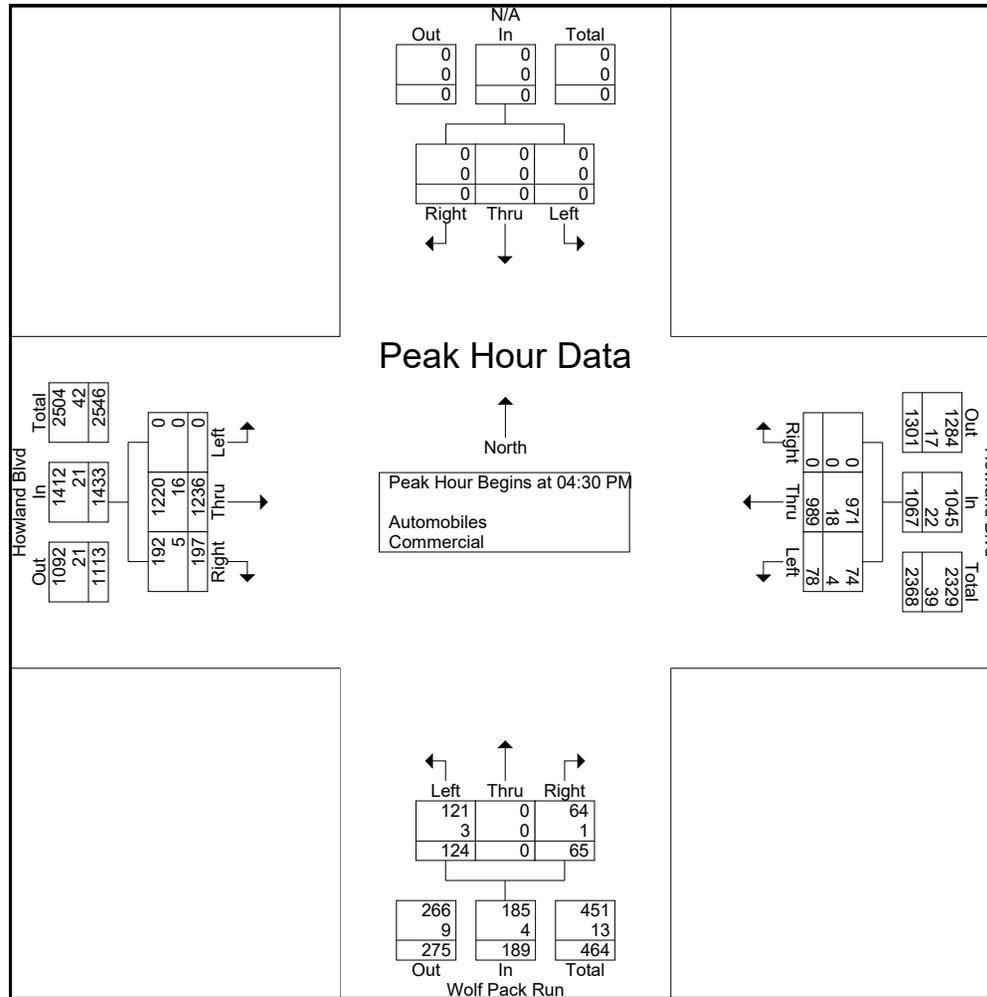
Volusia County, FL

File Name : Wolf pack at Howland

Site Code : 00000002

Start Date : 5/24/2022

Page No : 3



# DE TRAFFIC

detraffic.com

(386) 341-4186

Wolf Pack Run at Howland Blvd

Volusia County, FL

File Name : Wolf pack at Howland

Site Code : 00000002

Start Date : 5/24/2022

Page No : 4

## Groups Printed- Peds

Start Time	N/A Southbound					Howland Blvd Westbound					Wolf Pack Run Northbound					Howland Blvd Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2
05:15 PM	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	2
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3
Total	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	7	7	9
Grand Total	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	7	7	9
Apprch %	0	0	0	0		0	0	0	100		0	0	0	0		0	0	0	100		
Total %	0	0	0	0		0	0	0	22.2	22.2	0	0	0	0		0	0	0	77.8	77.8	

# DE TRAFFIC

detraffic.com

(386) 341-4186

Catalina Blvd at Eustace Ave

Volusia County, FL

File Name : Eustace at catalina

Site Code : 00000004

Start Date : 5/24/2022

Page No : 1

## Groups Printed- Automobiles - Commercial

Start Time	N/A Southbound				Catalina Blvd Westbound				Eustace Ave Northbound				Catalina Blvd Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	0	0	0	0	6	6	0	12	19	0	18	37	0	19	20	39	88
07:15 AM	0	0	0	0	16	5	0	21	25	0	22	47	0	18	27	45	113
07:30 AM	0	0	0	0	16	8	0	24	20	0	22	42	0	23	44	67	133
07:45 AM	0	0	0	0	12	10	0	22	35	0	26	61	0	18	22	40	123
Total	0	0	0	0	50	29	0	79	99	0	88	187	0	78	113	191	457
08:00 AM	0	0	0	0	9	9	0	18	41	0	19	60	0	17	18	35	113
08:15 AM	0	0	0	0	8	8	0	16	34	0	25	59	0	19	18	37	112
08:30 AM	0	0	0	0	8	8	0	16	27	0	26	53	0	21	12	33	102
08:45 AM	0	0	0	0	8	11	0	19	24	0	22	46	0	12	16	28	93
Total	0	0	0	0	33	36	0	69	126	0	92	218	0	69	64	133	420
04:30 PM	0	0	0	0	11	16	0	27	34	0	33	67	0	10	28	38	132
04:45 PM	0	0	0	0	16	16	0	32	17	0	15	32	0	11	8	19	83
Total	0	0	0	0	27	32	0	59	51	0	48	99	0	21	36	57	215
05:00 PM	0	0	0	0	15	8	0	23	13	0	8	21	0	12	23	35	79
05:15 PM	0	0	0	0	18	14	0	32	15	0	13	28	0	14	21	35	95
05:30 PM	0	0	0	0	13	15	0	28	18	0	7	25	0	12	32	44	97
05:45 PM	0	0	0	0	19	11	0	30	19	0	14	33	0	21	25	46	109
Total	0	0	0	0	65	48	0	113	65	0	42	107	0	59	101	160	380
06:00 PM	0	0	0	0	11	13	0	24	7	0	3	10	0	11	14	25	59
06:15 PM	0	0	0	0	11	12	0	23	4	0	12	16	0	10	15	25	64
Grand Total	0	0	0	0	197	170	0	367	352	0	285	637	0	248	343	591	1595
Aprch %	0	0	0		53.7	46.3	0		55.3	0	44.7		0	42	58		
Total %	0	0	0		12.4	10.7	0		22.1	0	17.9		0	15.5	21.5		
Automobiles	0	0	0	0	177	166	0	343	344	0	273	617	0	240	328	568	1528
% Automobiles	0	0	0	0	89.8	97.6	0	93.5	97.7	0	95.8	96.9	0	96.8	95.6	96.1	95.8
Commercial	0	0	0	0	20	4	0	24	8	0	12	20	0	8	15	23	67
% Commercial	0	0	0	0	10.2	2.4	0	6.5	2.3	0	4.2	3.1	0	3.2	4.4	3.9	4.2

# DE TRAFFIC

detraffic.com

(386) 341-4186

Catalina Blvd at Eustace Ave

Volusia County, FL

File Name : Eustace at catalina

Site Code : 00000004

Start Date : 5/24/2022

Page No : 2

Start Time	N/A Southbound				Catalina Blvd Westbound				Eustace Ave Northbound				Catalina Blvd Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	16	5	0	21	25	0	22	47	0	18	27	45	113
07:30 AM	0	0	0	0	16	8	0	24	20	0	22	42	0	23	44	67	133
07:45 AM	0	0	0	0	12	10	0	22	35	0	26	61	0	18	22	40	123
08:00 AM	0	0	0	0	9	9	0	18	41	0	19	60	0	17	18	35	113
Total Volume	0	0	0	0	53	32	0	85	121	0	89	210	0	76	111	187	482
% App. Total	0	0	0	0	62.4	37.6	0		57.6	0	42.4		0	40.6	59.4		
PHF	.000	.000	.000	.000	.828	.800	.000	.885	.738	.000	.856	.861	.000	.826	.631	.698	.906
Automobiles	0	0	0	0	42	29	0	71	117	0	83	200	0	74	102	176	447
% Automobiles	0	0	0	0	79.2	90.6	0	83.5	96.7	0	93.3	95.2	0	97.4	91.9	94.1	92.7
Commercial	0	0	0	0	11	3	0	14	4	0	6	10	0	2	9	11	35
% Commercial	0	0	0	0	20.8	9.4	0	16.5	3.3	0	6.7	4.8	0	2.6	8.1	5.9	7.3

# DE TRAFFIC

detraffic.com

(386) 341-4186

Catalina Blvd at Eustace Ave

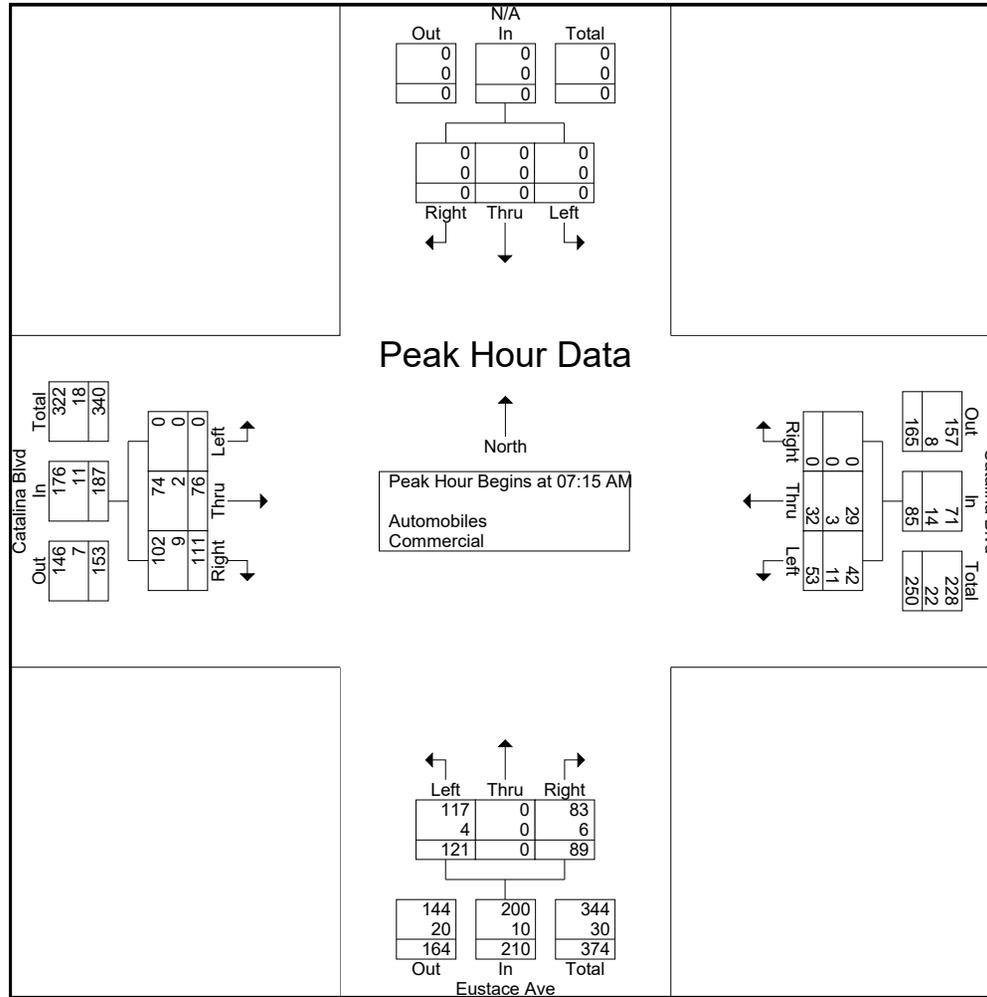
Volusia County, FL

File Name : Eustace at catalina

Site Code : 00000004

Start Date : 5/24/2022

Page No : 3



# DE TRAFFIC

detraffic.com

(386) 341-4186

Catalina Blvd at Eustace Ave

Volusia County, FL

File Name : Eustace at catalina

Site Code : 00000004

Start Date : 5/24/2022

Page No : 4

Start Time	N/A Southbound				Catalina Blvd Westbound				Eustace Ave Northbound				Catalina Blvd Eastbound				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:30 PM to 06:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	11	16	0	27	34	0	33	67	0	10	28	38	132
04:45 PM	0	0	0	0	16	16	0	32	17	0	15	32	0	11	8	19	83
05:00 PM	0	0	0	0	15	8	0	23	13	0	8	21	0	12	23	35	79
05:15 PM	0	0	0	0	18	14	0	32	15	0	13	28	0	14	21	35	95
Total Volume	0	0	0	0	60	54	0	114	79	0	69	148	0	47	80	127	389
% App. Total	0	0	0	0	52.6	47.4	0		53.4	0	46.6		0	37	63		
PHF	.000	.000	.000	.000	.833	.844	.000	.891	.581	.000	.523	.552	.000	.839	.714	.836	.737
Automobiles	0	0	0	0	55	54	0	109	76	0	64	140	0	45	76	121	370
% Automobiles	0	0	0	0	91.7	100	0	95.6	96.2	0	92.8	94.6	0	95.7	95.0	95.3	95.1
Commercial	0	0	0	0	5	0	0	5	3	0	5	8	0	2	4	6	19
% Commercial	0	0	0	0	8.3	0	0	4.4	3.8	0	7.2	5.4	0	4.3	5.0	4.7	4.9

# DE TRAFFIC

detraffic.com

(386) 341-4186

Catalina Blvd at Eustace Ave

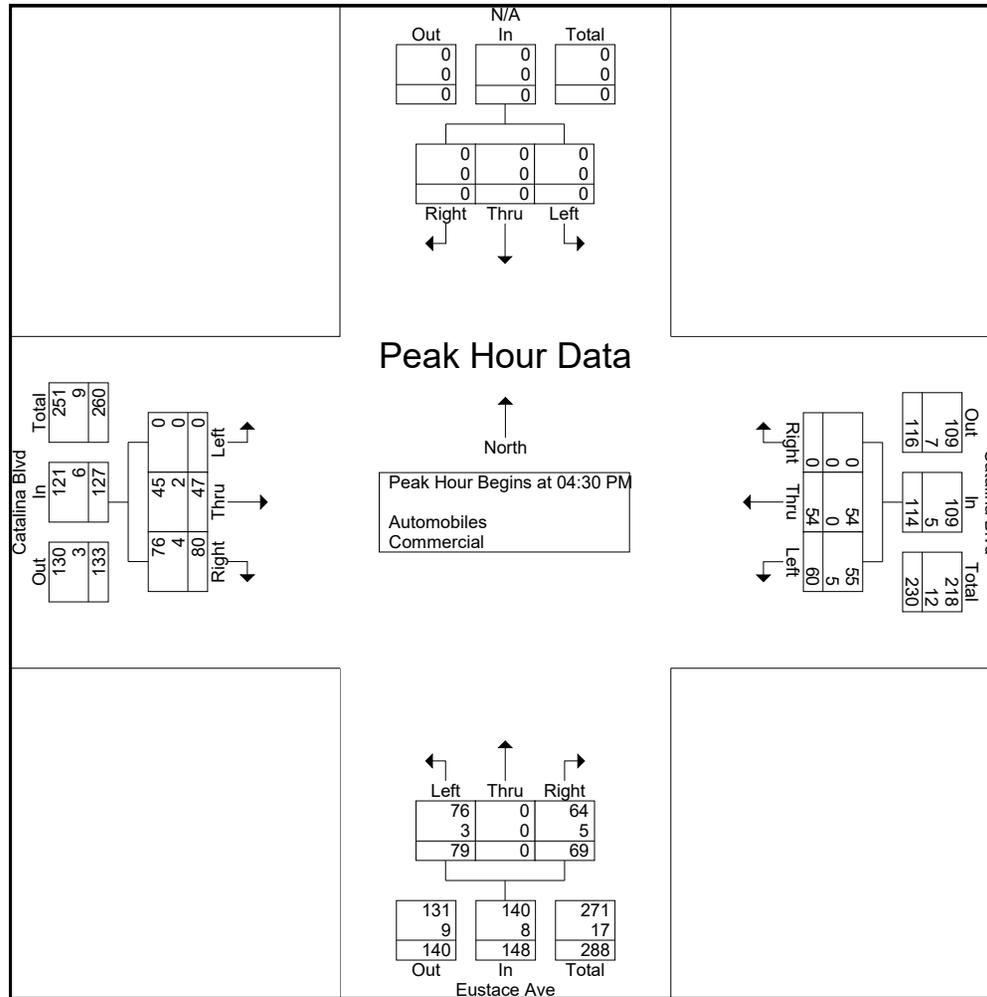
Volusia County, FL

File Name : Eustace at catalina

Site Code : 00000004

Start Date : 5/24/2022

Page No : 5



# DE TRAFFIC

detraffic.com

(386) 341-4186

Catalina Blvd at Eustace Ave

Volusia County, FL

File Name : Eustace at catalina

Site Code : 00000004

Start Date : 5/24/2022

Page No : 6

## Groups Printed- Peds

Start Time	N/A Southbound					Catalina Blvd Westbound					Eustace Ave Northbound					Catalina Blvd Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
07:15 AM	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	3	3	5
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
07:45 AM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	4	4	7
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2
08:15 AM	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	3	3	6
Total	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	5	5	8
05:00 PM	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	3
05:15 PM	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	3	3	5
05:30 PM	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	2	2	4
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Total	0	0	0	0	0	0	0	0	7	7	0	0	0	0	0	0	0	0	6	6	13
06:00 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1
Grand Total	0	0	0	0	0	0	0	0	14	14	0	0	0	0	0	0	0	0	15	15	29
Apprch %	0	0	0	0	0	0	0	0	100	100	0	0	0	0	0	0	0	0	100	100	
Total %	0	0	0	0	0	0	0	0	48.3	48.3	0	0	0	0	0	0	0	0	51.7	51.7	



NB Approach



SB Approach



EB Approach



WB Approach



Catalina Blvd  
at Howland Blvd

Volusia County

[www.de-traffic.com](http://www.de-traffic.com)

299 McGregor Rd. DeLand FL. 32720

Project  
Number: L22-34

Sheet  
Number: 3



NB Approach



EB Approach



WB Approach



Wolf Pack Run  
at Howland Blvd

Volusia County

[www.de-traffic.com](http://www.de-traffic.com)

299 McGregor Rd. DeLand Fl. 32720

Project  
Number: L22-34

Sheet  
Number: 2



NB Approach



EB Approach



WB Approach



Catalina Blvd  
at Eustace Ave

Volusia County

[www.de-traffic.com](http://www.de-traffic.com)

299 McGregor Rd. DeLand Fl. 32720

Project  
Number: L22-34

Sheet  
Number: 4

2021 PEAK SEASON FACTOR CATEGORY REPORT - REPORT TYPE: ALL  
 CATEGORY: 7900 VOLUSIA COUNTYWIDE

MOCF: 0.97

WEEK	DATES	SF	PSCF
1	01/01/2021 - 01/02/2021	1.01	1.04
2	01/03/2021 - 01/09/2021	1.04	1.07
3	01/10/2021 - 01/16/2021	1.06	1.09
4	01/17/2021 - 01/23/2021	1.05	1.08
5	01/24/2021 - 01/30/2021	1.04	1.07
6	01/31/2021 - 02/06/2021	1.03	1.06
7	02/07/2021 - 02/13/2021	1.02	1.05
8	02/14/2021 - 02/20/2021	1.00	1.03
9	02/21/2021 - 02/27/2021	0.99	1.02
*10	02/28/2021 - 03/06/2021	0.97	1.00
*11	03/07/2021 - 03/13/2021	0.95	0.98
*12	03/14/2021 - 03/20/2021	0.94	0.97
*13	03/21/2021 - 03/27/2021	0.95	0.98
*14	03/28/2021 - 04/03/2021	0.95	0.98
*15	04/04/2021 - 04/10/2021	0.96	0.99
*16	04/11/2021 - 04/17/2021	0.97	1.00
*17	04/18/2021 - 04/24/2021	0.98	1.01
*18	04/25/2021 - 05/01/2021	0.98	1.01
*19	05/02/2021 - 05/08/2021	0.98	1.01
*20	05/09/2021 - 05/15/2021	0.99	1.02
*21	05/16/2021 - 05/22/2021	0.99	1.02
*22	05/23/2021 - 05/29/2021	0.99	1.02
23	05/30/2021 - 06/05/2021	0.99	1.02
24	06/06/2021 - 06/12/2021	1.00	1.03
25	06/13/2021 - 06/19/2021	1.00	1.03
26	06/20/2021 - 06/26/2021	1.01	1.04
27	06/27/2021 - 07/03/2021	1.02	1.05
28	07/04/2021 - 07/10/2021	1.04	1.07
29	07/11/2021 - 07/17/2021	1.05	1.08
30	07/18/2021 - 07/24/2021	1.05	1.08
31	07/25/2021 - 07/31/2021	1.05	1.08
32	08/01/2021 - 08/07/2021	1.05	1.08
33	08/08/2021 - 08/14/2021	1.05	1.08
34	08/15/2021 - 08/21/2021	1.05	1.08
35	08/22/2021 - 08/28/2021	1.05	1.08
36	08/29/2021 - 09/04/2021	1.04	1.07
37	09/05/2021 - 09/11/2021	1.04	1.07
38	09/12/2021 - 09/18/2021	1.03	1.06
39	09/19/2021 - 09/25/2021	1.02	1.05
40	09/26/2021 - 10/02/2021	1.00	1.03
41	10/03/2021 - 10/09/2021	0.99	1.02
42	10/10/2021 - 10/16/2021	0.98	1.01
43	10/17/2021 - 10/23/2021	0.98	1.01
44	10/24/2021 - 10/30/2021	0.99	1.02
45	10/31/2021 - 11/06/2021	0.99	1.02
46	11/07/2021 - 11/13/2021	1.00	1.03
47	11/14/2021 - 11/20/2021	1.00	1.03
48	11/21/2021 - 11/27/2021	1.00	1.03
49	11/28/2021 - 12/04/2021	1.01	1.04
50	12/05/2021 - 12/11/2021	1.01	1.04
51	12/12/2021 - 12/18/2021	1.01	1.04
52	12/19/2021 - 12/25/2021	1.04	1.07
53	12/26/2021 - 12/31/2021	1.06	1.09

\* PEAK SEASON

08-MAR-2022 12:36:28

830UPD

5\_7900\_PKSEASON.TXT

**AM Peak-Hour Factored Volumes**

\*Note:  
Peak-Hour Factor  
Min = 0.75 Max = 0.95

Intersection	Approach	Mvmn'L	Existing Traffic			Background Traffic			Build-Out Traffic							Peak-Hour Factor				
			Raw Count	Raw Truck Count	Seasonal Factor	TMC Volume	% Heavy Vehicles	Approach Growth Rate	Background Volume w/o Vested	Vested Traffic	Applied Growth Method	Total Background Volume	%Residential Model Distribution	%Commercial Model Distribution	Trip Direction		Residential Trips	Commercial Trips	Total Project Trips	Total Build-Out Volume
1. Howland Blvd at Catalina Blvd	Eastbound	U-Turn				0	0%	1.00%	0	0	Historical	0				0	0	0	0	
		Left	180	4		180	2%		185	10	Historical	195	4.37%	9.18%	out	4	0	4	199	
		Through	496	27		496	5%		511	23	+ Vested	534	4.37%	33.17%	out	4	1	5	539	
	Westbound	Right	32	0		32	0%		33	3		36			out	0	0	0	36	
		U-Turn				0	0%		0	0		0				0	0	0	0	
		Left	36	1		36	3%	1.00%	37	0	Historical	37	26.37%		in	7	0	7	44	
	Northbound	Through	892	12		892	1%		919	72	+ Vested	991	4.37%	33.17%	in	1	1	2	993	
		Right	75	2		75	3%		77	0		77			in	0	0	0	77	
		U-Turn				0	0%		0	0		0				0	0	0	0	
	Southbound	Left	122	2		122	2%	1.00%	126	11	Historical	137			out	0	0	0	137	
		Through	94	1		94	1%		97	0	+ Vested	97	4.79%		out	4	0	4	101	
		Right	26	1		26	4%		27	0		27	26.37%		out	22	0	22	49	
	U-Turn				0	0%		0	0		0				0	0	0	0		
	Left	110	1		110	1%	1.00%	113	0	Historical	113			in	0	0	0	113		
	Through	98	3		98	3%		101	0	+ Vested	101	4.79%		in	1	0	1	102		
	Right	614	9		614	1%		632	30		663	4.37%	9.16%	in	1	0	1	664		

Intersection	Approach	Mvmn'L	Existing Traffic			Background Traffic			Build-Out Traffic							Peak-Hour Factor				
			Raw Count	Raw Truck Count	Seasonal Factor	TMC Volume	% Heavy Vehicles	Approach Growth Rate	Background Volume w/o Vested	Vested Traffic	Applied Growth Method	Total Background Volume	%Residential Model Distribution	%Commercial Model Distribution	Trip Direction		Residential Trips	Commercial Trips	Total Project Trips	Total Build-Out Volume
2. Howland Blvd at Dr. Martin Luther King Blvd	Eastbound	U-Turn				0	0%	1.00%	0	0	Historical	0				0	0	0	0	
		Left				0	0%		0	0	Historical	0				0	0	0	0	
		Through	444	16		444	4%		460	16	+ Vested	476	28.84%	28.84%	in	7	1	8	735	
	Westbound	Right	8	0		8	0%		8	0		8	28.84%	28.84%	in	8	1	9	17	
		U-Turn				0	0%		0	0		0				0	0	0	0	
		Left	6	0		6	0%	1.00%	6	0	Historical	6	8.74%	42.33%	in	2	1	3	9	
	Northbound	Through	1377	19		1377	1%		1406	29	+ Vested	1435			out	0	0	0	1435	
		Right				0	0%		0	0		0				0	0	0	0	
		U-Turn				0	0%		0	0		0				0	0	0	0	
	Southbound	Left	6	0		6	0%	2.00%	6	0	Historical	6	57.67%	57.67%	out	48	1	49	55	
		Through				0	0%		0	0	Growth	0			out	0	0	0	0	
		Right	1	0		1	0%		1	0		1			out	0	0	0	1	
	U-Turn				0	0%		0	0		0				0	0	0	0		
	Left				0	0%		0	0	Historical	0				0	0	0	0		
	Through				0	0%		0	0	Growth	0				0	0	0	0		
	Right				0	0%		0	0		0				0	0	0	0		

Intersection	Approach	Mvmn'L	Existing Traffic			Background Traffic			Build-Out Traffic							Peak-Hour Factor				
			Raw Count	Raw Truck Count	Seasonal Factor	TMC Volume	% Heavy Vehicles	Approach Growth Rate	Background Volume w/o Vested	Vested Traffic	Applied Growth Method	Total Background Volume	%Residential Model Distribution	%Commercial Model Distribution	Trip Direction		Residential Trips	Commercial Trips	Total Project Trips	Total Build-Out Volume
3. Howland Blvd at Wolf Pack Run	Eastbound	U-Turn				0	0%	1.00%	0	0	Historical	0				0	0	0	0	
		Left				0	0%		0	0	Historical	0				0	0	0	0	
		Through	622	29		622	5%		641	60	+ Vested	701	55.72%	55.72%	in	15	1	16	717	
	Westbound	Right	161	6		161	4%		166	3		169			out	0	0	0	169	
		U-Turn				0	0%		0	0		0				0	0	0	0	
		Left	133	5		133	4%	1.00%	137	0	Historical	137			out	0	0	0	137	
	Northbound	Through	1660	30		1660	2%		1710	142	+ Vested	1852	55.72%	55.72%	out	46	1	47	1899	
		Right				0	0%		0	0		0				0	0	0	0	
		U-Turn				0	0%		0	0		0				0	0	0	0	
	Southbound	Left	163	2		163	1%	1.00%	168	5	Historical	173			out	0	0	0	173	
		Through				0	0%		0	0	+ Vested	0			out	0	0	0	0	
		Right	70	4		70	6%		72	0		72			out	0	0	0	72	
	U-Turn				0	0%		0	0		0				0	0	0	0		
	Left				0	0%		0	0	Historical	0				0	0	0	0		
	Through				0	0%		0	0	+ Vested	0				0	0	0	0		
	Right				0	0%		0	0		0				0	0	0	0		

Intersection	Approach	Mvmn'L	Existing Traffic			Background Traffic			Build-Out Traffic							Peak-Hour Factor				
			Raw Count	Raw Truck Count	Seasonal Factor	TMC Volume	% Heavy Vehicles	Approach Growth Rate	Background Volume w/o Vested	Vested Traffic	Applied Growth Method	Total Background Volume	%Residential Model Distribution	%Commercial Model Distribution	Trip Direction		Residential Trips	Commercial Trips	Total Project Trips	Total Build-Out Volume
4. Catalina Boulevard at Eustace Avenue	Eastbound	U-Turn				0	0%	1.00%	0	0	Historical	0				0	0	0	0	
		Left				0	0%		0	0	Historical	0				0	0	0	0	
		Through	76	2		76	3%		78	0	Growth	78	0.42%	0.42%	in	0	0	0	78	
	Westbound	Right	111	9		111	8%		114	0		114			out	0	0	0	114	
		U-Turn				0	0%		0	0		0				0	0	0	0	
		Left	53	11		53	21%	1.00%	55	0	Historical	55	1.63%	1.63%	out	1	0	1	56	
	Northbound	Through	32	3		32	9%		33	0	Growth	33	0.42%	0.42%	out	0	0	0	33	
		Right				0	0%		0	0		0				0	0	0	0	
		U-Turn				0	0%		0	0		0				0	0	0	0	
	Southbound	Left	121	4		121	3%	1.00%	125	0	Historical	125			in	0	0	0	125	
		Through				0	0%		0	0	Growth	0			in	0	0	0	0	
		Right	89	6		89	7%		92	0		92	1.63%	1.63%	in	1	0	1	93	
	U-Turn				0	0%		0	0	Historical	0				0	0	0	0		
	Left				0	0%		0	0		0				0	0	0	0		
	Through				0	0%		0	0	Growth	0				0	0	0	0		
	Right				0	0%		0	0		0				0	0	0	0		

Intersection	Approach	Mvmn'L	Existing Traffic			Background Traffic			Build-Out Traffic							Peak-Hour Factor				
			Raw Count	Raw Truck Count	Seasonal Factor	TMC Volume	% Heavy Vehicles	Approach Growth Rate	Background Volume w/o Vested	Vested Traffic	Applied Growth Method	Total Background Volume	%Residential Model Distribution	%Commercial Model Distribution	Trip Direction		Residential Trips	Commercial Trips	Total Project Trips	Total Build-Out Volume
5. Howland Blvd at Right-In/Right-Out Commercial Project access driveway	Eastbound	U-Turn				0	0%	1.00%	0	0	Historical	0				0	0	0	0	
		Left				0	0%		0	0	Historical	0				0	0	0	0	
		Through				0	0%		0	0	+ Vested	765	28.83%		in	7	0	7	772	
	Westbound	Right				0	0%		0	0		0	28.83%		in	0	1	1	1	
		U-Turn				0	0%		0	0		0				0	0	0	0	
		Left				0	0%		0	0	Historical	0				0	0	0	0	
	Northbound	Through				0	0%	1.00%	0	0	+ Vested	1,791	8.74%	42.33%	in	2	1	3	1,794	
		Right				0	0%		0	0		0				0	0	0	0	
		U-Turn				0	0%		0	0		0				0	0	0	0	
	Southbound	Left				0	0%	1.00%	0	0	Historical	0				0	0	0	0	
		Through				0	0%		0	0	+ Vested	0			out	0	0	0	0	
		Right				0	0%		0	0		0	42.33%		out	0	0	0	0	



# **APPENDIX D**

## **Unsignalized Intersections**

### **Synchro Summary Sheet - Existing Conditions**

**Intersection**

Int Delay, s/veh 5.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	47	80	60	54	79	69
Future Vol, veh/h	47	80	60	54	79	69
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	- None		- None		- None	
Storage Length	-	-	-	-	0	-
Veh in Median Storage0#	-	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	4	5	8	0	4	7
Mvmt Flow	63	107	80	72	105	92

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	170
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.18
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-2.272	-3.536
Pot Cap-1 Maneuver	-	-	1372
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1372
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.1	11.9
HCM LOS			B

Minor Lane/Major Mvm	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	720	-	-	1372	-
HCM Lane V/C Ratio	0.274	-	-	0.058	-
HCM Control Delay (s)	11.9	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.1	-	-	0.2	-

**Intersection**

Int Delay, s/veh 6.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	76	111	53	32	121	89
Future Vol, veh/h	76	111	53	32	121	89
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	- None		- None		- None	
Storage Length	-	-	-	-	0	-
Veh in Median Storage0#	-	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	3	8	21	9	3	7
Mvmt Flow	84	122	58	35	133	98

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0 206	0 296 145
Stage 1	-	-	- 145 -
Stage 2	-	-	- 151 -
Critical Hdwy	-	- 4.31	- 6.43 6.27
Critical Hdwy Stg 1	-	-	- 5.43 -
Critical Hdwy Stg 2	-	-	- 5.43 -
Follow-up Hdwy	-	- 2.389	- 3.527 3.363
Pot Cap-1 Maneuver	-	- 1260	- 693 889
Stage 1	-	-	- 880 -
Stage 2	-	-	- 874 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	- 1260	- 660 889
Mov Cap-2 Maneuver	-	-	- 660 -
Stage 1	-	-	- 880 -
Stage 2	-	-	- 833 -

Approach	EB	WB	NB
HCM Control Delay, s	0	5	12
HCM LOS			B

Minor Lane/Major MvmNBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	741	-	- 1260	-
HCM Lane V/C Ratio	0.311	-	- 0.046	-
HCM Control Delay (s)	12	-	- 8	0
HCM Lane LOS	B	-	- A	A
HCM 95th %tile Q(veh)	1.3	-	- 0.1	-

# **APPENDIX E**

## **Signal Timing Sheets**

## COUNTY OF VOLUSIA TRAFFIC SIGNAL TIMING SHEET

LOCATION: Howland Blvd @ Catalina Blvd  
Deltona

FREE:

DATE: 5/18/2022



SIGNAL #: 250

CO-ORD:  X

Design By: Sean Castello

NETWORK #: Deltona Area Network # 90

### Controller Timing Chart

PHASE	1	2	3	4	5	6	7	8
DIRECTION	EBL	WB	-	NB	WBL	EB	NBL	SB
TURN TYPE	PERM/PROT	-	-	-	PERM/PROT	-	PERM/PROT	-
MIN GREEN	5	11		7	5	11	5	7
EXTENSION	3	4		3	3	4	3	4
YELLOW	5.0	5.0		4.0	5.0	5.0	4.0	4.0
RED CLR	3.5	3.5		3.0	3.5	3.5	3.0	3.0
WALK		7		7		7		7
PED CLR		23		23		23		23
MAX 1	30	45		25	20	45	20	35
MAX 2								
MAX 3		-		-		-		-
DYM MAX		90						50
DYM STP		10						10
RECALL		MIN		-		MIN		-
DETECTOR	NON-LOCK	LOCK		NON-LOCK	NON-LOCK	LOCK	NON-LOCK	NON-LOCK
FLASH	-	YELLOW		RED	-	YELLOW	-	RED

### COORDINATION TIMINGS

PATTERN	1	2	3	4	5	6	7	8
CYCLE	150	150	150	-	-	-	-	-
OFFSET	0	0	0	-	-	-	-	-

PHASE	1	2	3	4	5	6	7	8
PATTERN 1	24	59		67	18	65	24	43
PATTERN 2	31	59		60	20	65	25	40
PATTERN 3	30	60		60	20	65	20	45
PATTERN 4	-	-	-	-	-	-	-	-
PATTERN 5	-	-	-	-	-	-	-	-
PATTERN 6	-	-	-	-	-	-	-	-
PATTERN 7	-	-	-	-	-	-	-	-

Controller IP		Switch IP		Camera IP	
Controller Gateway		Switch Gateway		Camera Gateway	

**REMARKS:**

Phase #6 advanced loop bad, Temp. Removed dynamic max time for Phase #6



## COUNTY OF VOLUSIA TRAFFIC SIGNAL TIMING SHEET

LOCATION: Howland Blvd & MLK Blvd / Firestation  
Deltona

FREE:  X

DATE: 5/18/2022

SIGNAL #: 439

CO-ORD:

Design By: Sean Castello

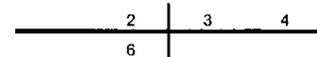
System #: -

### Controller Timing Chart Timing Plan #1

PHASE	1	2	3 preempt	4	5	6	7	8
DIRECTION	-	EB	NB	NB	-	WB	-	-
TURN TYPE	-	-	-	-	-	-	-	-
MIN GREEN	-	25	6	6	-	25	-	-
EXTENSION	-	4	3	3	-	4	-	-
CLEARANCE	-	4.8	4.0	4.0	-	4.8	-	-
ALL RED	-	2.7	3.4	3.4	-	2.7	-	-
WALK	-	-	-	7	-	7	-	-
FDW	-	-	-	24	-	14	-	-
MAX 1	-	90	14	23	-	90	-	-
MAX 2	-	-	-	-	-	-	-	-
D-MAX	-	120	-	-	-	120	-	-
ADJUST	-	10	-	-	-	10	-	-
RECALL	-	MIN	-	-	-	MIN	-	-
DETECTOR	-	LOCK	NON-LOCK	NON-LOCK	-	LOCK	-	-
FLASH	-	YELLOW	RED	RED	-	YELLOW	-	-
SET	-	-	-	-	-	-	-	-
CLEAR	-	-	-	-	-	-	-	-
BASE DAY	1	2	3	4	5	6	7	
MON #1	TIME	00:00-07:00	07:00-00:00					Crosswalk Length
	PLAN	FLASH TP #2	FREE TP #1					
TUES#1	TIME	00:00-07:00	07:00-00:00					P2
	PLAN	FLASH TP #2	FREE TP #1					
WED #1	TIME	00:00-07:00	07:00-00:00					-
	PLAN	FLASH TP #2	FREE TP #1					
THU #1	TIME	00:00-07:00	07:00-00:00					P4
	PLAN	FLASH TP #2	FREE TP #1					
FRI #1	TIME	00:00-07:00	07:00-00:00					-
	PLAN	FLASH TP #2	FREE TP #1					
SAT #1	TIME	00:00-07:00	07:00-00:00					P6
	PLAN	FLASH TP #2	FREE TP #1					
SUN #1	TIME	00:00-07:00	07:00-00:00					-
	PLAN	FLASH TP #2	FREE TP #1					
CONTROLLER TYPE		CONDITION OF OVERHEAD		Good		PROM NUMBER		P8
Econolite ASC/3		OVERHEAD STREET NAMES		NO				-
PHASES:	8Φ	ILLUMINATED STREET NAMES		YES				SIGNAL OWNER <sup>4</sup>
CABINET TYPE	V	PRE-EMPTION		YES		IP ADDRESS		City
CABINET DATE	11/2009	PRE-EMPTION TYPE		PUSH BUTTON				LED YES

REMARKS:

Special timing plan #2 during Flashing operation



## COUNTY OF VOLUSIA TRAFFIC SIGNAL TIMING SHEET

LOCATION: Howland Blvd @ Wolf Pack Run  
Deltona

FREE:

DATE: 5/18/2022



SIGNAL #: 354

CO-ORD:  X

Design By: Sean Castello

NETWORK #: Deltona Area Network # 90

### Controller Timing Chart

PHASE	1	2	3	4	5	6	7	8
DIRECTION	-	WB	-	NB	WBL	EB	-	-
TURN TYPE	-	-	-	-	PERM/PROT	-	-	-
MIN GREEN		15		7	5	15		
EXTENSION		4		3	3	4		
YELLOW		5.0		4.0	5.0	5.0		
RED CLR		3.5		3.5	3.5	3.5		
WALK				7		7		
PED CLR				20		20		
MAX 1		60		30	25	60		
MAX 2								
MAX 3		-		-		-		
DYM MAX		90				90		
DYM STP		10				10		
RECALL		MIN		-		MIN		
DETECTOR		LOCK		NON-LOCK	NON-LOCK	LOCK		
FLASH		YELLOW		RED	-	YELLOW		

### COORDINATION TIMINGS

PATTERN	1	2	3	4	5	6	7	8
CYCLE	150	130	150	-	-	-	-	-
OFFSET	78	81	111	-	-	-	-	-

PHASE	1	2	3	4	5	6	7	8
PATTERN 1		105		45	45	60		45
PATTERN 2		90		40	30	60		40
PATTERN 3		100		50	40	60		50
PATTERN 4	-	-	-	-	-	-	-	-
PATTERN 5	-	-	-	-	-	-	-	-
PATTERN 6	-	-	-	-	-	-	-	-
PATTERN 7	-	-	-	-	-	-	-	-

<b>Controller IP</b>	<b>Switch IP</b>	<b>Radio IP</b>
<b>Controller Gateway</b>	<b>Switch Gateway</b>	<b>Radio Gateway</b>

REMARKS:  
 7 seconds delay phase 6 (advanced walk)



# **APPENDIX F**

## **Signalized Intersections Synchro Summary Sheets – Existing Conditions**

Lanes, Volumes, Timings  
10: Catalina Blvd & Howland Blvd

06/30/2022

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	180	496	32	36	892	75	122	94	26	110	98	614
Future Volume (vph)	180	496	32	36	892	75	122	94	26	110	98	614
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		0	231		0	138		0	378		461
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.988			0.967				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3417	0	1752	3526	0	1770	1807	0	1787	1845	1599
Flt Permitted	0.077			0.431			0.582			0.674		
Satd. Flow (perm)	143	3417	0	795	3526	0	1084	1807	0	1268	1845	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			6			11				284
Link Speed (mph)		45			45			30				30
Link Distance (ft)		485			498			704				612
Travel Time (s)		7.3			7.5			16.0				13.9
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	2%	5%	0%	3%	1%	3%	2%	1%	4%	1%	3%	1%
Adj. Flow (vph)	194	533	34	39	959	81	131	101	28	118	105	660
Shared Lane Traffic (%)												
Lane Group Flow (vph)	194	567	0	39	1040	0	131	129	0	118	105	660
Enter Blocked Intersection	No	No	No	No	No	No						
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	1	6		5	2		7	4				8

Lanes, Volumes, Timings  
10: Catalina Blvd & Howland Blvd

06/30/2022



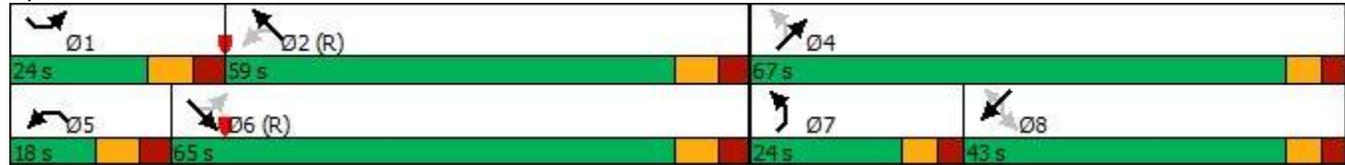
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Permitted Phases	6			2			4			8		8
Detector Phase	1	6		5	2		7	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	11.0		5.0	11.0		5.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.5	26.5		13.5	26.5		12.0	25.0		25.0	25.0	25.0
Total Split (s)	24.0	65.0		18.0	59.0		24.0	67.0		43.0	43.0	43.0
Total Split (%)	16.0%	43.3%		12.0%	39.3%		16.0%	44.7%		28.7%	28.7%	28.7%
Maximum Green (s)	15.5	56.5		9.5	50.5		17.0	60.0		36.0	36.0	36.0
Yellow Time (s)	5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	3.5	3.5		3.5	3.5		3.0	3.0		3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	8.5	8.5		8.5	8.5		7.0	7.0		7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	None
Walk Time (s)		7.0			7.0			7.0		7.0	7.0	7.0
Flash Dont Walk (s)		11.0			11.0			11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0			0		0	0	0
Act Effct Green (s)	73.9	61.6		58.6	51.4		60.0	60.0		38.0	38.0	38.0
Actuated g/C Ratio	0.49	0.41		0.39	0.34		0.40	0.40		0.25	0.25	0.25
v/c Ratio	0.85	0.40		0.11	0.86		0.26	0.18		0.37	0.22	1.07
Control Delay	66.0	32.9		21.2	54.2		30.8	27.3		50.9	46.7	86.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	66.0	32.9		21.2	54.2		30.8	27.3		50.9	46.7	86.2
LOS	E	C		C	D		C	C		D	D	F
Approach Delay		41.4			53.0			29.0			76.8	
Approach LOS		D			D			C			E	
Queue Length 50th (ft)	129	209		19	501		82	74		97	83	~504
Queue Length 95th (ft)	#262	269		40	595		132	123		162	140	#754
Internal Link Dist (ft)		405			418			624			532	
Turn Bay Length (ft)	330			231			138			378		461
Base Capacity (vph)	238	1405		383	1211		511	729		321	467	617
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.82	0.40		0.10	0.86		0.26	0.18		0.37	0.22	1.07

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	0 (0%), Referenced to phase 2:NWTL and 6:SETL, Start of Green
Natural Cycle:	130
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.07
Intersection Signal Delay:	55.0
Intersection LOS:	D
Intersection Capacity Utilization:	90.6%
ICU Level of Service:	E
Analysis Period (min):	15

- ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 10: Catalina Blvd & Howland Blvd



Lanes, Volumes, Timings  
 90: Dr. Martin Luther King Blvd & Howland Blvd

07/01/2022

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↘	↑↑	↘	↗
Traffic Volume (vph)	706	8	6	1629	6	1
Future Volume (vph)	706	8	6	1629	6	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		195	236		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3471	1583	1770	3539	1770	1583
Flt Permitted			0.328		0.950	
Satd. Flow (perm)	3471	1583	611	3539	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		9				1
Link Speed (mph)	45			45	30	
Link Distance (ft)	501			427	1222	
Travel Time (s)	7.6			6.5	27.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	4%	2%	2%	2%	2%	2%
Adj. Flow (vph)	784	9	7	1810	7	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	784	9	7	1810	7	1
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)		9	15		15	9
Number of Detectors	2	1	1	2	1	1
Detector Template	Thru	Right	Left	Thru	Left	Right
Leading Detector (ft)	100	20	20	100	20	20
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	6	20	20	6	20	20
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	Perm	NAcustom	Prot	
Protected Phases	2			6	3	4

Lanes, Volumes, Timings  
 90: Dr. Martin Luther King Blvd & Howland Blvd

07/01/2022



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases		2	6		4	
Detector Phase	2	2	6	6	3	4
Switch Phase						
Minimum Initial (s)	25.0	25.0	25.0	25.0	6.0	6.0
Minimum Split (s)	32.5	32.5	32.5	32.5	25.4	25.4
Total Split (s)	90.0	90.0	90.0	90.0	25.4	30.0
Total Split (%)	61.9%	61.9%	61.9%	61.9%	17.5%	20.6%
Maximum Green (s)	82.5	82.5	82.5	82.5	18.0	22.6
Yellow Time (s)	4.8	4.8	4.8	4.8	4.0	4.0
All-Red Time (s)	2.7	2.7	2.7	2.7	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	7.4	7.4
Lead/Lag					Lead	Lag
Lead-Lag Optimize?					Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	None	None	None	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	82.6	82.6	82.6	82.6	25.2	22.6
Actuated g/C Ratio	0.67	0.67	0.67	0.67	0.21	0.18
v/c Ratio	0.34	0.01	0.02	0.76	0.02	0.00
Control Delay	9.4	4.5	8.3	16.9	37.8	34.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.4	4.5	8.3	16.9	37.8	34.0
LOS	A	A	A	B	D	C
Approach Delay	9.4			16.9	37.4	
Approach LOS	A			B	D	
Queue Length 50th (ft)	116	0	2	426	4	0
Queue Length 95th (ft)	209	7	9	730	17	6
Internal Link Dist (ft)	421			347	1142	
Turn Bay Length (ft)		195	236			
Base Capacity (vph)	2335	1068	411	2381	363	292
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.01	0.02	0.76	0.02	0.00
<b>Intersection Summary</b>						
Area Type:	Other					
Cycle Length:	145.4					
Actuated Cycle Length:	122.8					
Natural Cycle:	115					
Control Type:	Actuated-Uncoordinated					
Maximum v/c Ratio:	0.76					
Intersection Signal Delay:	14.7			Intersection LOS: B		
Intersection Capacity Utilization	62.4%			ICU Level of Service B		
Analysis Period (min)	15					

Lanes, Volumes, Timings

90: Dr. Martin Luther King Blvd & Howland Blvd

07/01/2022

Splits and Phases: 90: Dr. Martin Luther King Blvd & Howland Blvd

→ Ø2	↶ Ø3	↷ Ø4
90 s	25.4 s	30 s
← Ø6		
90 s		

Lanes, Volumes, Timings  
1: Wolf Pack Run & Howland Blvd

06/30/2022

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑↑	↖↖	
Traffic Volume (vph)	622	161	133	1660	163	70
Future Volume (vph)	622	161	133	1660	163	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	204		414	414
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	0.95	1.00	0.95	0.97	0.95
Frt	0.969				0.955	
Flt Protected			0.950		0.966	
Satd. Flow (prot)	3338	0	1736	3539	3317	0
Flt Permitted			0.295		0.966	
Satd. Flow (perm)	3338	0	539	3539	3317	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	23				45	
Link Speed (mph)	45			45	35	
Link Distance (ft)	365			639	3058	
Travel Time (s)	5.5			9.7	59.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	4%	4%	2%	1%	6%
Adj. Flow (vph)	655	169	140	1747	172	74
Shared Lane Traffic (%)						
Lane Group Flow (vph)	824	0	140	1747	246	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
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)		9	15		15	9
Number of Detectors	2		1	2	1	
Detector Template	Thru		Left	Thru	Left	
Leading Detector (ft)	100		20	100	20	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	6		20	6	20	
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		pm+pt	NA	Prot	
Protected Phases	6		5	2	4	

Lanes, Volumes, Timings  
 1: Wolf Pack Run & Howland Blvd

06/30/2022

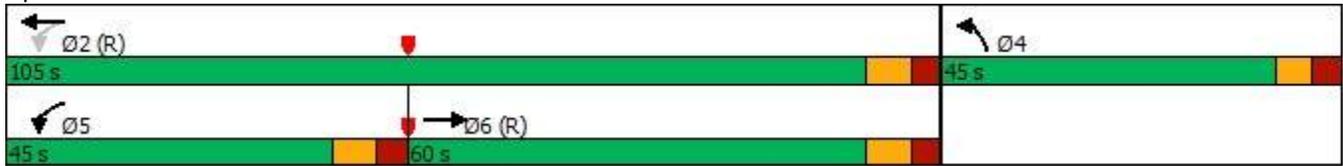


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases			2			
Detector Phase	6		5	2	4	
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	7.0	
Minimum Split (s)	26.5		13.5	26.5	25.5	
Total Split (s)	60.0		45.0	105.0	45.0	
Total Split (%)	40.0%		30.0%	70.0%	30.0%	
Maximum Green (s)	51.5		36.5	96.5	37.5	
Yellow Time (s)	5.0		5.0	5.0	4.0	
All-Red Time (s)	3.5		3.5	3.5	3.5	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	8.5		8.5	8.5	7.5	
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	C-Max		None	C-Max	None	
Walk Time (s)	7.0			7.0	7.0	
Flash Dont Walk (s)	11.0			11.0	11.0	
Pedestrian Calls (#/hr)	0			0	0	
Act Effct Green (s)	102.6		119.4	119.4	14.6	
Actuated g/C Ratio	0.68		0.80	0.80	0.10	
v/c Ratio	0.36		0.28	0.62	0.68	
Control Delay	10.6		5.2	7.6	62.5	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	10.6		5.2	7.6	62.5	
LOS	B		A	A	E	
Approach Delay	10.6			7.5	62.5	
Approach LOS	B			A	E	
Queue Length 50th (ft)	160		26	310	99	
Queue Length 95th (ft)	226		49	424	143	
Internal Link Dist (ft)	285			559	2978	
Turn Bay Length (ft)			204		414	
Base Capacity (vph)	2290		720	2817	863	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.36		0.19	0.62	0.29	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	0 (0%), Referenced to phase 2:WBTL and 6:EBT, Start of Green
Natural Cycle:	75
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.68
Intersection Signal Delay:	12.9
Intersection LOS:	B
Intersection Capacity Utilization:	66.1%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 1: Wolf Pack Run & Howland Blvd



Lanes, Volumes, Timings  
10: Catalina Blvd & Howland Blvd

06/30/2022

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	470	650	88	47	591	86	77	97	28	90	147	334
Future Volume (vph)	470	650	88	47	591	86	77	97	28	90	147	334
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		0	231		0	138		0	378		461
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982			0.981			0.967				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3510	0	1703	3506	0	1787	1809	0	1770	1881	1599
Flt Permitted	0.207			0.357			0.340			0.673		
Satd. Flow (perm)	393	3510	0	640	3506	0	640	1809	0	1254	1881	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			11			11				349
Link Speed (mph)		45			45			30				30
Link Distance (ft)		485			498			704				612
Travel Time (s)		7.3			7.5			16.0				13.9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	1%	1%	6%	1%	1%	1%	0%	7%	2%	1%	1%
Adj. Flow (vph)	495	684	93	49	622	91	81	102	29	95	155	352
Shared Lane Traffic (%)												
Lane Group Flow (vph)	495	777	0	49	713	0	81	131	0	95	155	352
Enter Blocked Intersection	No	No	No	No	No	No						
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	1	6		5	2		7	4				8

Lanes, Volumes, Timings  
10: Catalina Blvd & Howland Blvd

06/30/2022



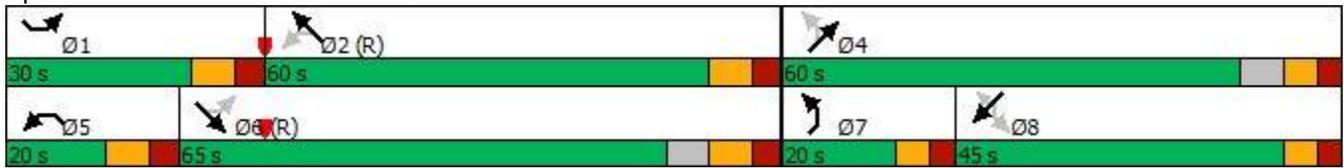
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Permitted Phases	6			2			4			8		8
Detector Phase	1	6		5	2		7	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	11.0		5.0	11.0		5.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.5	26.5		13.5	26.5		12.0	25.0		25.0	25.0	25.0
Total Split (s)	30.0	65.0		20.0	60.0		20.0	60.0		45.0	45.0	45.0
Total Split (%)	19.4%	41.9%		12.9%	38.7%		12.9%	38.7%		29.0%	29.0%	29.0%
Maximum Green (s)	21.5	56.5		11.5	51.5		13.0	53.0		38.0	38.0	38.0
Yellow Time (s)	5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	3.5	3.5		3.5	3.5		3.0	3.0		3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	8.5	8.5		8.5	8.5		7.0	7.0		7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	None
Walk Time (s)		7.0			7.0			7.0		7.0	7.0	7.0
Flash Dont Walk (s)		11.0			11.0			11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0			0		0	0	0
Act Effct Green (s)	102.0	89.1		58.7	51.5		37.5	37.5		19.4	19.4	19.4
Actuated g/C Ratio	0.66	0.57		0.38	0.33		0.24	0.24		0.13	0.13	0.13
v/c Ratio	0.77	0.38		0.17	0.61		0.34	0.29		0.61	0.66	0.70
Control Delay	31.9	20.3		17.7	45.3		48.4	43.7		79.3	77.3	13.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	31.9	20.3		17.7	45.3		48.4	43.7		79.3	77.3	13.5
LOS	C	C		B	D		D	D		E	E	B
Approach Delay		24.8			43.5			45.5			40.3	
Approach LOS		C			D			D			D	
Queue Length 50th (ft)	284	226		17	313		65	99		93	153	3
Queue Length 95th (ft)	#550	322		39	383		105	150		150	221	100
Internal Link Dist (ft)		405			418			624			532	
Turn Bay Length (ft)	330			231			138			378		461
Base Capacity (vph)	640	2022		338	1172		251	683		307	461	655
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.77	0.38		0.14	0.61		0.32	0.19		0.31	0.34	0.54

Intersection Summary

Area Type:	Other
Cycle Length:	155
Actuated Cycle Length:	155
Offset:	0 (0%), Referenced to phase 2:NWTL and 6:SETL, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.77
Intersection Signal Delay:	34.6
Intersection LOS:	C
Intersection Capacity Utilization:	83.6%
ICU Level of Service:	E
Analysis Period (min):	15

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 10: Catalina Blvd & Howland Blvd



Lanes, Volumes, Timings  
 90: Dr. Martin Luther King Blvd & Howland Blvd

07/01/2022

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↙	↑↑	↙	↗
Traffic Volume (vph)	1339	4	6	974	11	3
Future Volume (vph)	1339	4	6	974	11	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		195	236		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3574	1292	1543	3574	1656	1583
Flt Permitted			0.111		0.950	
Satd. Flow (perm)	3574	1292	180	3574	1656	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		3				3
Link Speed (mph)	45			45	30	
Link Distance (ft)	501			427	1222	
Travel Time (s)	7.6			6.5	27.8	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	25%	17%	1%	9%	2%
Adj. Flow (vph)	1440	4	6	1047	12	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1440	4	6	1047	12	3
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)		9	15		15	9
Number of Detectors	2	1	1	2	1	1
Detector Template	Thru	Right	Left	Thru	Left	Right
Leading Detector (ft)	100	20	20	100	20	20
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	6	20	20	6	20	20
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	Perm	NAcustom	Prot	
Protected Phases	2			6	3	4

Lanes, Volumes, Timings  
 90: Dr. Martin Luther King Blvd & Howland Blvd

07/01/2022



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases		2	6		4	
Detector Phase	2	2	6	6	3	4
Switch Phase						
Minimum Initial (s)	25.0	25.0	25.0	25.0	6.0	6.0
Minimum Split (s)	32.5	32.5	32.5	32.5	25.4	25.4
Total Split (s)	98.0	98.0	98.0	98.0	26.0	26.0
Total Split (%)	65.3%	65.3%	65.3%	65.3%	17.3%	17.3%
Maximum Green (s)	90.5	90.5	90.5	90.5	18.6	18.6
Yellow Time (s)	4.8	4.8	4.8	4.8	4.0	4.0
All-Red Time (s)	2.7	2.7	2.7	2.7	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	7.4	7.4
Lead/Lag					Lead	Lag
Lead-Lag Optimize?					Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	None	None	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	90.5	90.5	90.5	90.5	44.6	18.6
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.30	0.12
v/c Ratio	0.67	0.01	0.06	0.49	0.02	0.02
Control Delay	21.7	8.2	14.0	17.6	37.6	36.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	8.2	14.0	17.6	37.6	36.3
LOS	C	A	B	B	D	D
Approach Delay	21.7			17.6	37.4	
Approach LOS	C			B	D	
Queue Length 50th (ft)	472	0	2	289	8	0
Queue Length 95th (ft)	548	6	10	343	25	11
Internal Link Dist (ft)	421			347	1142	
Turn Bay Length (ft)		195	236			
Base Capacity (vph)	2156	780	108	2156	492	198
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.01	0.06	0.49	0.02	0.02

Intersection Summary

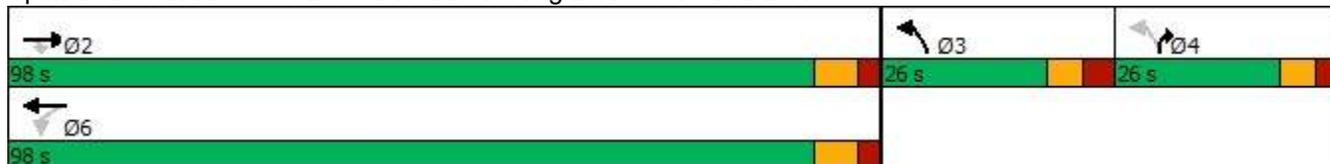
Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Natural Cycle:	95
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.67
Intersection Signal Delay:	20.1
Intersection LOS:	C
Intersection Capacity Utilization:	54.4%
ICU Level of Service:	A
Analysis Period (min):	15

Lanes, Volumes, Timings

90: Dr. Martin Luther King Blvd & Howland Blvd

07/01/2022

Splits and Phases: 90: Dr. Martin Luther King Blvd & Howland Blvd



Lanes, Volumes, Timings  
1: Wolf Pack Run & Howland Blvd

06/30/2022

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↘	↑↑	↖↖	
Traffic Volume (vph)	1236	197	78	989	124	65
Future Volume (vph)	1236	197	78	989	124	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	204		414	414
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	0.95	1.00	0.95	0.97	0.95
Frt	0.979				0.949	
Flt Protected			0.950		0.968	
Satd. Flow (prot)	3490	0	1719	3539	3320	0
Flt Permitted			0.121		0.968	
Satd. Flow (perm)	3490	0	219	3539	3320	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	13				65	
Link Speed (mph)	45			45	35	
Link Distance (ft)	365			639	3058	
Travel Time (s)	5.5			9.7	59.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	3%	5%	2%	2%	2%
Adj. Flow (vph)	1301	207	82	1041	131	68
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1508	0	82	1041	199	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
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)		9	15		15	9
Number of Detectors	2		1	2	1	
Detector Template	Thru		Left	Thru	Left	
Leading Detector (ft)	100		20	100	20	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	6		20	6	20	
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		pm+pt	NA	Prot	
Protected Phases	6		5	2	4	

Lanes, Volumes, Timings  
1: Wolf Pack Run & Howland Blvd

06/30/2022

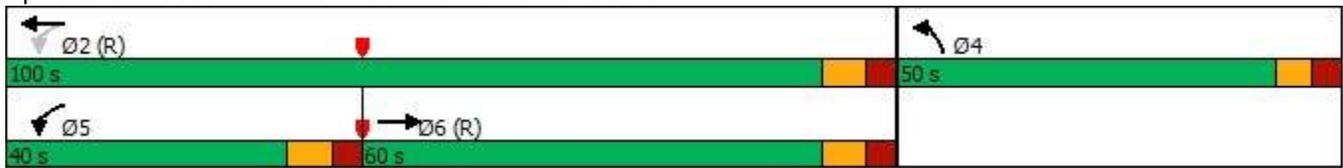


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases			2			
Detector Phase	6		5	2	4	
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	7.0	
Minimum Split (s)	26.5		13.5	26.5	25.5	
Total Split (s)	60.0		40.0	100.0	50.0	
Total Split (%)	40.0%		26.7%	66.7%	33.3%	
Maximum Green (s)	51.5		31.5	91.5	42.5	
Yellow Time (s)	5.0		5.0	5.0	4.0	
All-Red Time (s)	3.5		3.5	3.5	3.5	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	8.5		8.5	8.5	7.5	
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	C-Max		None	C-Max	None	
Walk Time (s)	7.0			7.0	7.0	
Flash Dont Walk (s)	11.0			11.0	11.0	
Pedestrian Calls (#/hr)	0			0	0	
Act Effct Green (s)	106.8		122.4	122.4	11.6	
Actuated g/C Ratio	0.71		0.82	0.82	0.08	
v/c Ratio	0.61		0.33	0.36	0.63	
Control Delay	12.6		6.5	4.2	53.6	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	12.6		6.5	4.2	53.6	
LOS	B		A	A	D	
Approach Delay	12.6			4.3	53.6	
Approach LOS	B			A	D	
Queue Length 50th (ft)	354		13	116	65	
Queue Length 95th (ft)	488		27	164	107	
Internal Link Dist (ft)	285			559	2978	
Turn Bay Length (ft)			204		414	
Base Capacity (vph)	2487		493	2888	987	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.61		0.17	0.36	0.20	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	0 (0%), Referenced to phase 2:WBTL and 6:EBT, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.63
Intersection Signal Delay:	12.2
Intersection LOS:	B
Intersection Capacity Utilization:	71.0%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 1: Wolf Pack Run & Howland Blvd



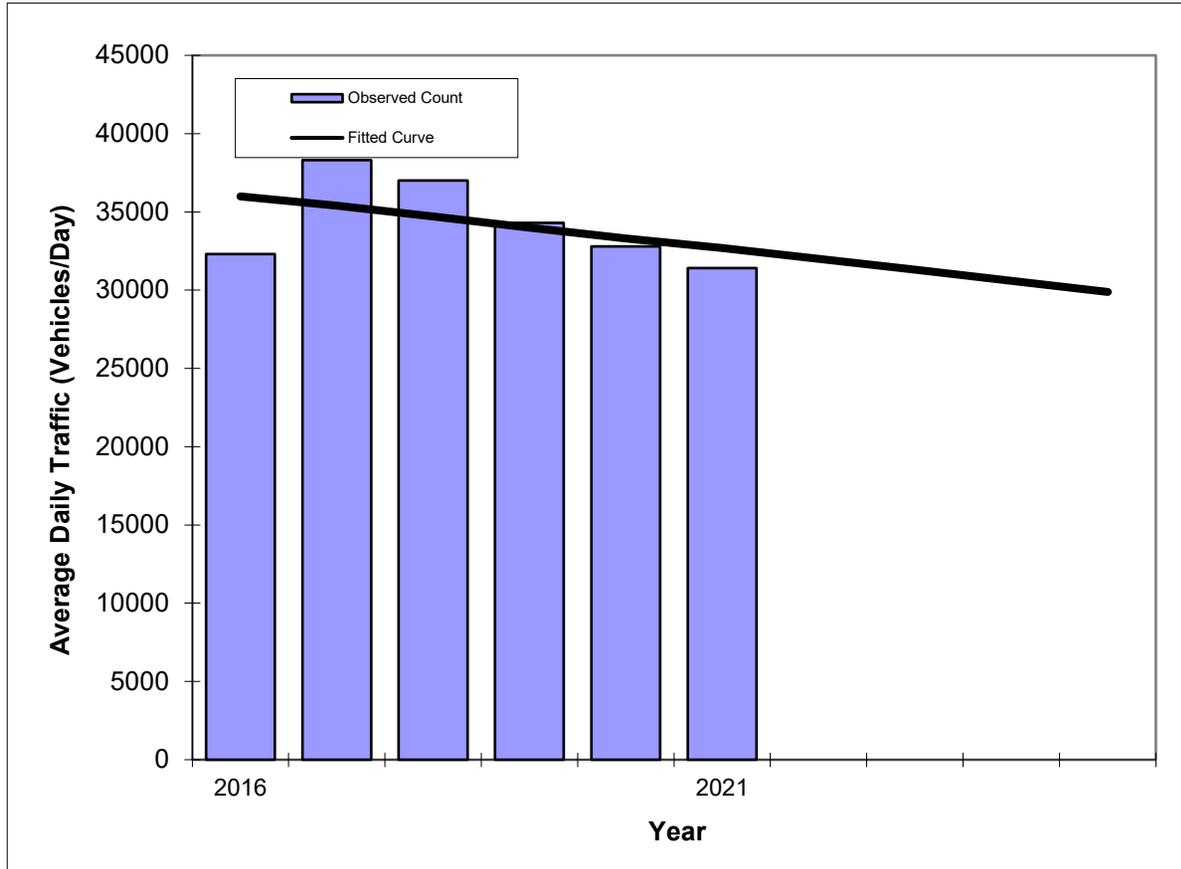
# **APPENDIX G**

## **FDOT Traffic Trends**

# TRAFFIC TRENDS

Howland Blvd -- I-4 to Wolf Pack Run

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Howland Blvd



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	32300	36000
2017	38300	35400
2018	37000	34700
2019	34300	34000
2020	32800	33300
2021	31400	32700
<b>2022 Opening Year Trend</b>		
2022	N/A	32000
<b>2023 Mid-Year Trend</b>		
2023	N/A	31300
<b>2024 Design Year Trend</b>		
2024	N/A	30600
<b>TRANPLAN Forecasts/Trends</b>		

**\*\* Annual Trend Increase:** -677  
**Trend R-squared:** 21.2%  
**Trend Annual Historic Growth Rate:** -1.83%  
**Trend Growth Rate (2021 to Design Year):** -2.14%  
**Printed:** 2-May-22

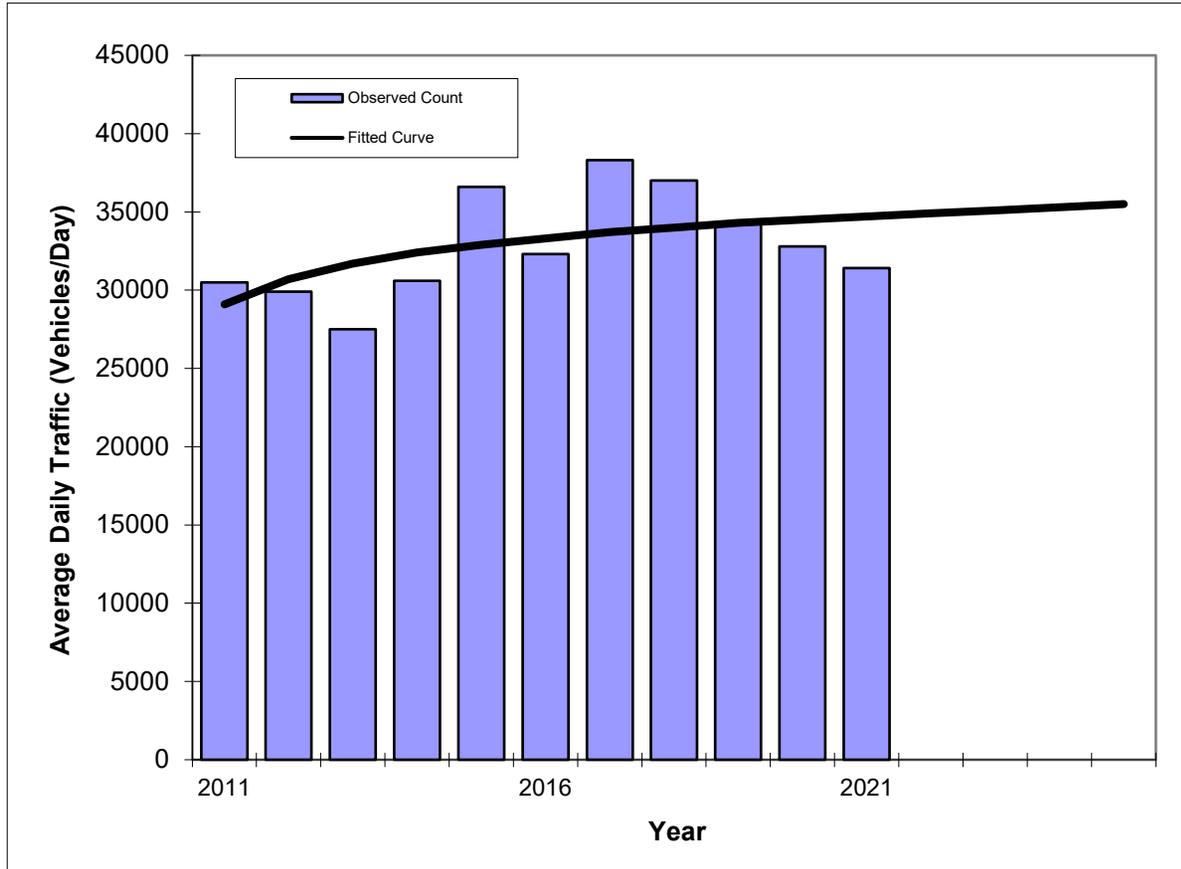
**Straight Line Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

Howland Blvd -- I-4 to Wolf Pack Run

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Howland Blvd



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2011	30500	29100
2012	29900	30700
2013	27500	31700
2014	30600	32400
2015	36600	32900
2016	32300	33300
2017	38300	33700
2018	37000	34000
2019	34300	34300
2020	32800	34500
2021	31400	34700
<b>2022 Opening Year Trend</b>		
2022	N/A	34900
<b>2023 Mid-Year Trend</b>		
2023	N/A	35100
<b>2024 Design Year Trend</b>		
2024	N/A	35300
<b>TRANPLAN Forecasts/Trends</b>		

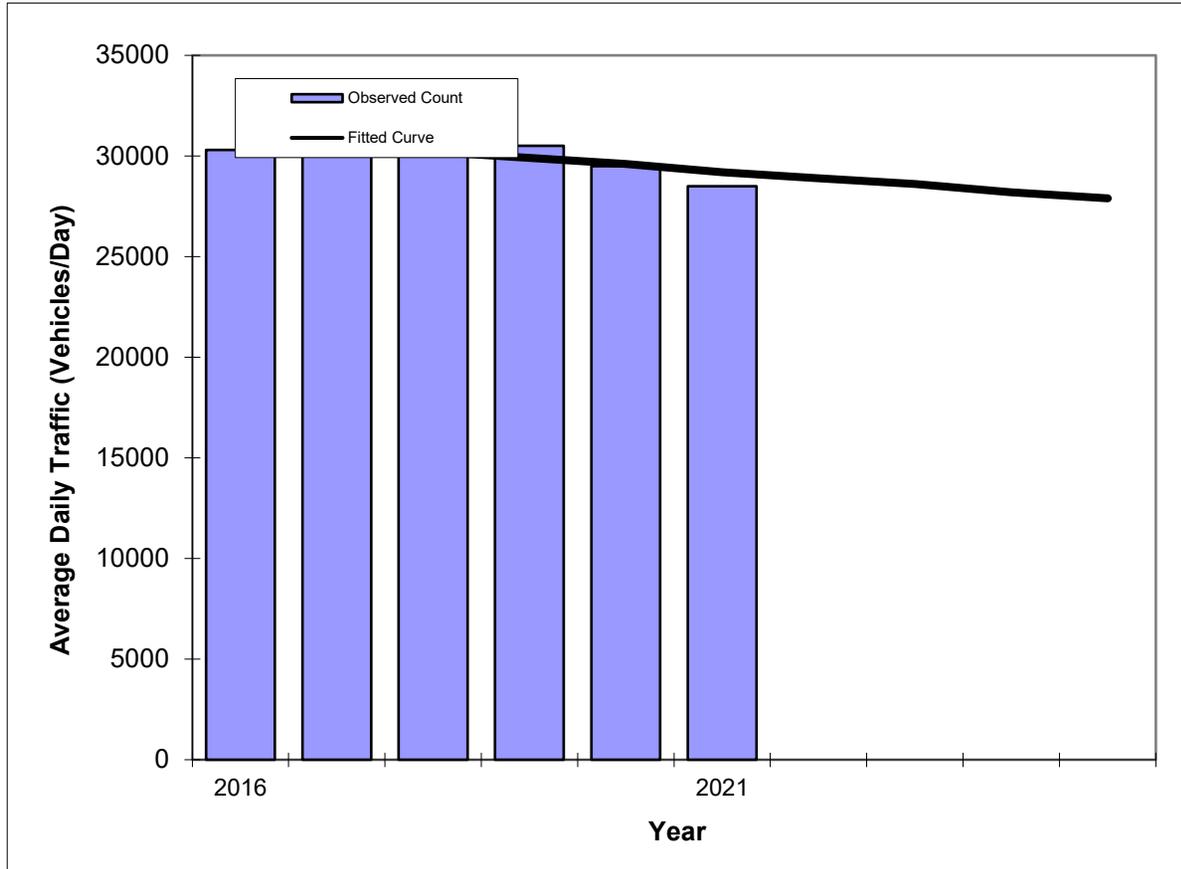
Trend R-squared: 27.2%  
 Compounded Annual Historic Growth Rate: 1.44%  
 Compounded Growth Rate (2021 to Design Year): 0.09%  
 Printed: 2-May-22  
**Decaying Exponential Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

Howland Blvd -- Wolf Pack Run to Catalina Blvd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Howland Blvd



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	30300	30900
2017	30000	30500
2018	31500	30200
2019	30500	29900
2020	29500	29600
2021	28500	29200
<b>2022 Opening Year Trend</b>		
2022	N/A	28900
<b>2023 Mid-Year Trend</b>		
2023	N/A	28600
<b>2024 Design Year Trend</b>		
2024	N/A	28200
<b>TRANPLAN Forecasts/Trends</b>		

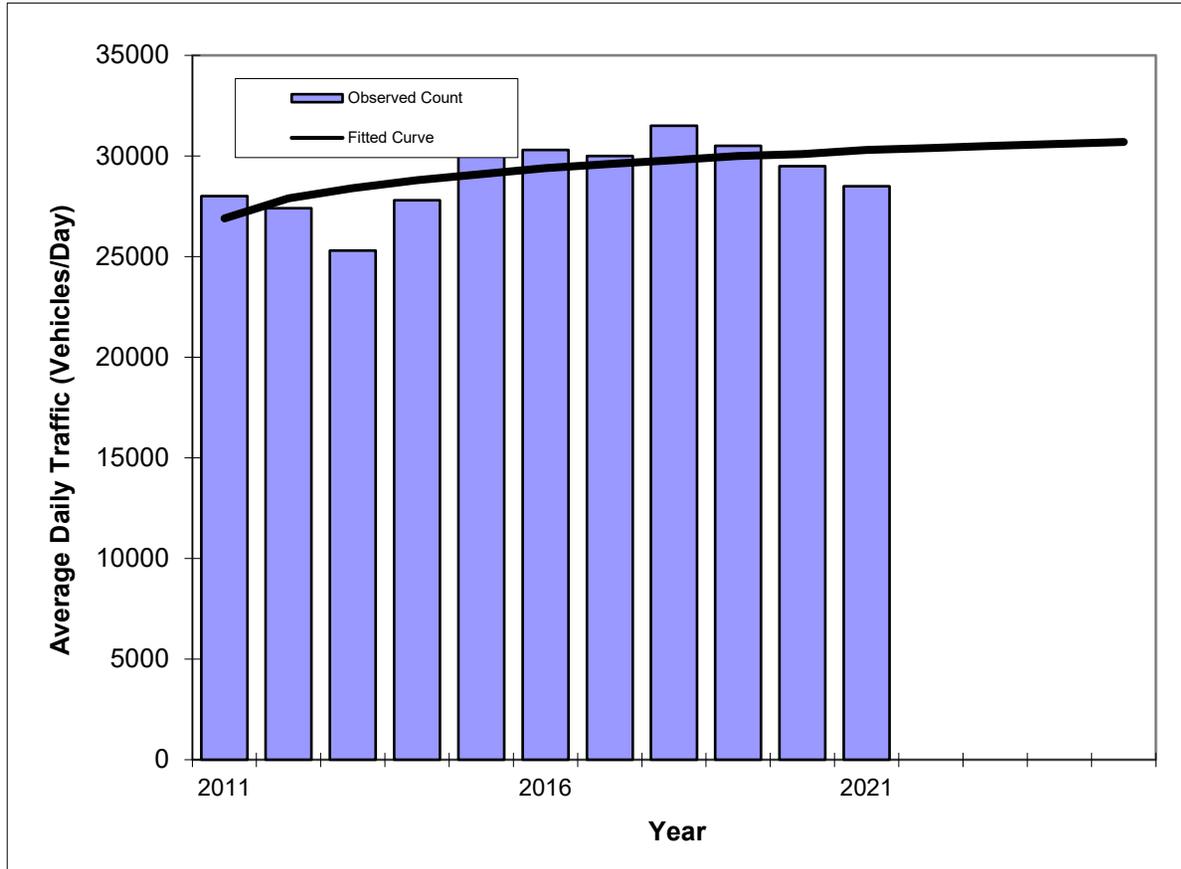
**\*\* Annual Trend Increase:** -329  
**Trend R-squared:** 37.2%  
**Trend Annual Historic Growth Rate:** -1.10%  
**Trend Growth Rate (2021 to Design Year):** -1.14%  
**Printed:** 2-May-22  
**Straight Line Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

Howland Blvd -- Wolf Pack Run to Catalina Blvd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Howland Blvd



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2011	28000	26900
2012	27400	27900
2013	25300	28400
2014	27800	28800
2015	31500	29100
2016	30300	29400
2017	30000	29600
2018	31500	29800
2019	30500	30000
2020	29500	30100
2021	28500	30300
<b>2022 Opening Year Trend</b>		
2022	N/A	30400
<b>2023 Mid-Year Trend</b>		
2023	N/A	30500
<b>2024 Design Year Trend</b>		
2024	N/A	30600
<b>TRANPLAN Forecasts/Trends</b>		

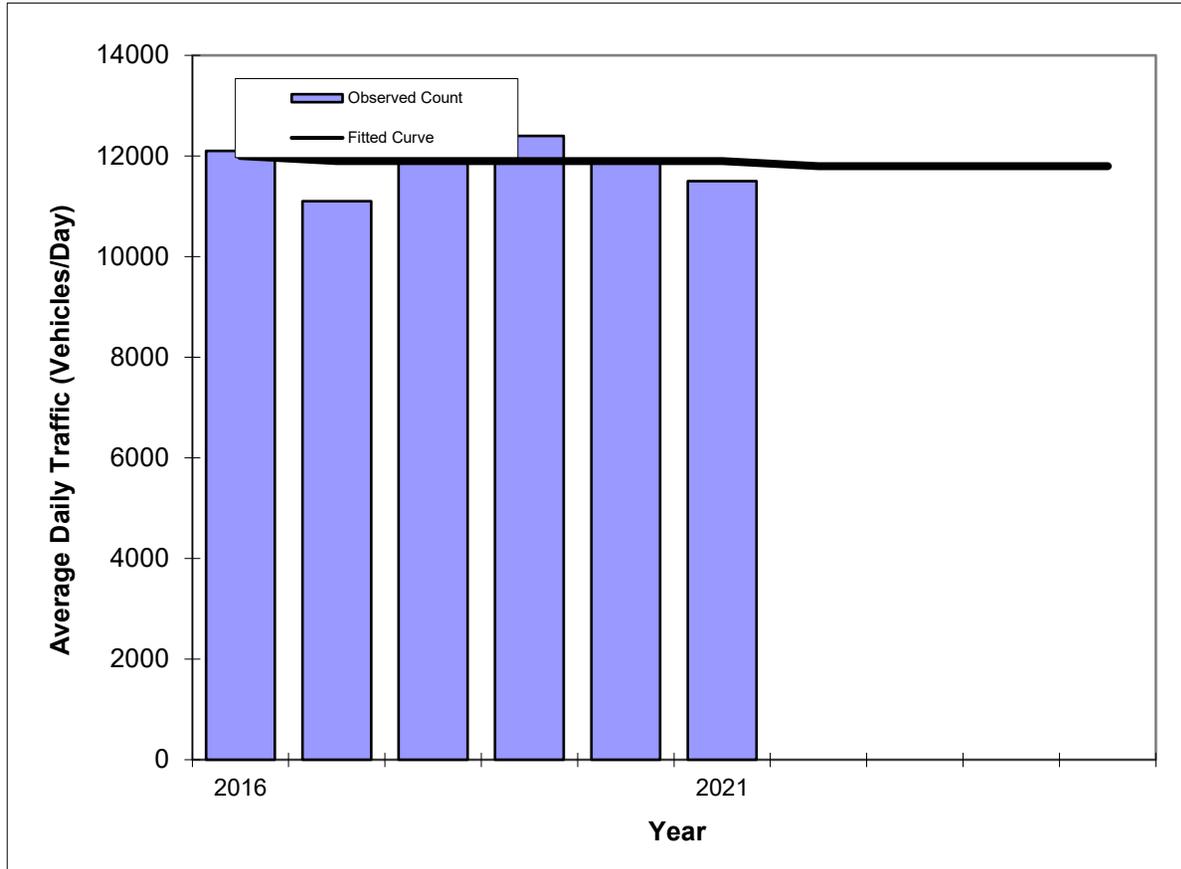
Trend R-squared: 30.3%  
 Compounded Annual Historic Growth Rate: 1.04%  
 Compounded Growth Rate (2021 to Design Year): 0.00%  
 Printed: 2-May-22  
**Decaying Exponential Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

W Volusia Bltwy -- Orange Camp Rd to Cassadaga Rd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	W Volusia Bltwy



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	12100	12000
2017	11100	11900
2018	12500	11900
2019	12400	11900
2020	11900	11900
2021	11500	11900
<b>2022 Opening Year Trend</b>		
2022	N/A	11800
<b>2023 Mid-Year Trend</b>		
2023	N/A	11800
<b>2024 Design Year Trend</b>		
2024	N/A	11800
<b>TRANPLAN Forecasts/Trends</b>		

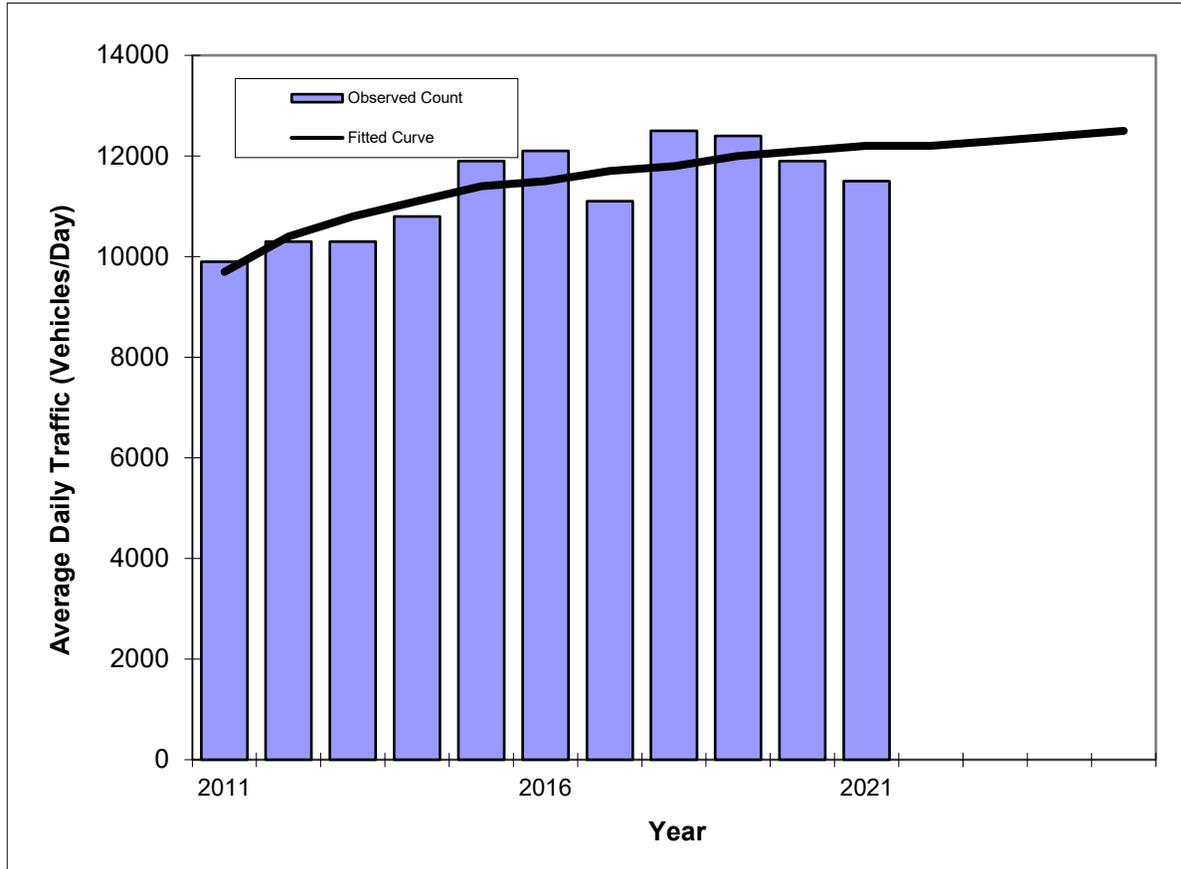
**\*\* Annual Trend Increase:** -20  
**Trend R-squared:** 0.5%  
**Trend Annual Historic Growth Rate:** -0.17%  
**Trend Growth Rate (2021 to Design Year):** -0.28%  
**Printed:** 2-May-22  
**Straight Line Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

W Volusia Bltwy -- Orange Camp Rd to Cassadaga Rd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	W Volusia Bltwy



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2011	9900	9700
2012	10300	10400
2013	10300	10800
2014	10800	11100
2015	11900	11400
2016	12100	11500
2017	11100	11700
2018	12500	11800
2019	12400	12000
2020	11900	12100
2021	11500	12200
<b>2022 Opening Year Trend</b>		
2022	N/A	12200
<b>2023 Mid-Year Trend</b>		
2023	N/A	12300
<b>2024 Design Year Trend</b>		
2024	N/A	12400
<b>TRANPLAN Forecasts/Trends</b>		

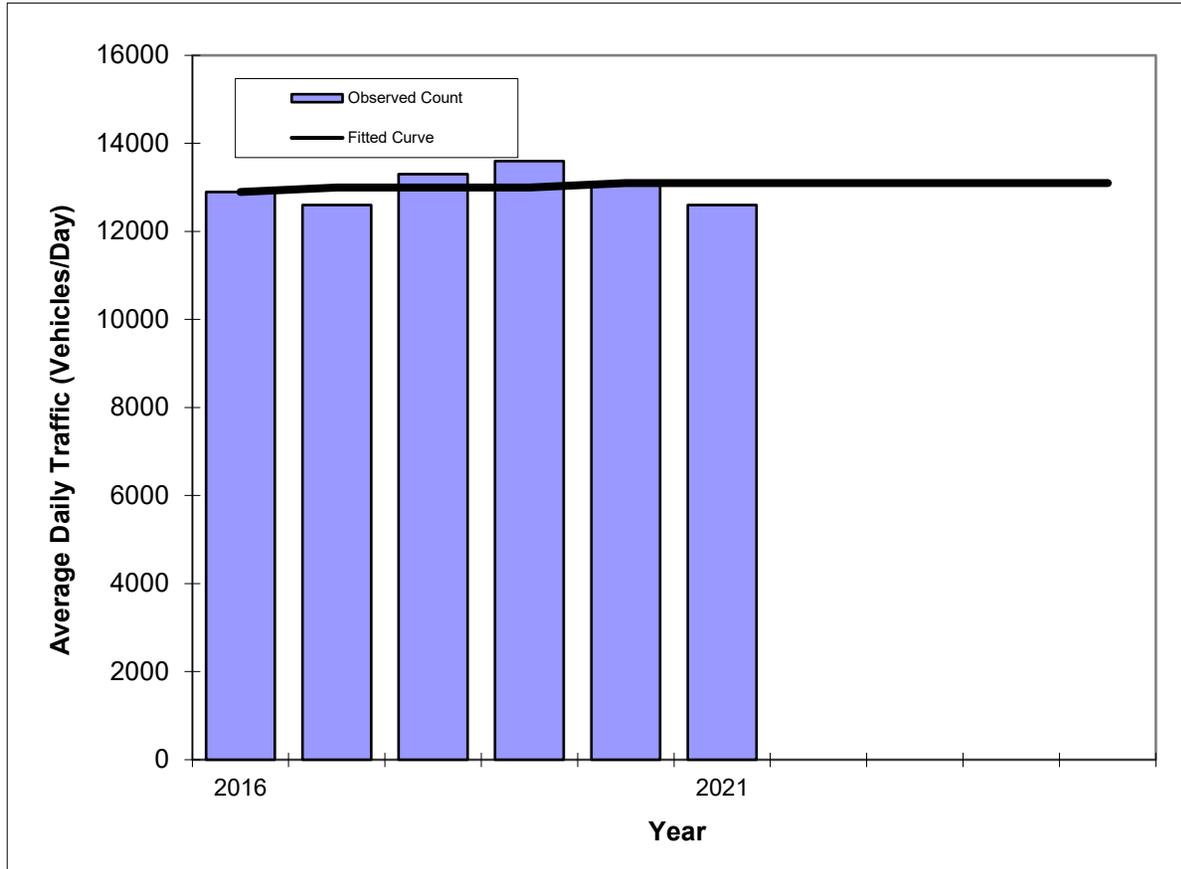
Trend R-squared: 69.7%  
 Compounded Annual Historic Growth Rate: 1.87%  
 Compounded Growth Rate (2021 to Design Year): 0.00%  
 Printed: 2-May-22  
**Decaying Exponential Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

W Volusia Bltwy -- Cassadaga Rd to SR 472

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	W Volusia Bltwy



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	12900	12900
2017	12600	13000
2018	13300	13000
2019	13600	13000
2020	13100	13100
2021	12600	13100
<b>2022 Opening Year Trend</b>		
2022	N/A	13100
<b>2023 Mid-Year Trend</b>		
2023	N/A	13100
<b>2024 Design Year Trend</b>		
2024	N/A	13100
<b>TRANPLAN Forecasts/Trends</b>		

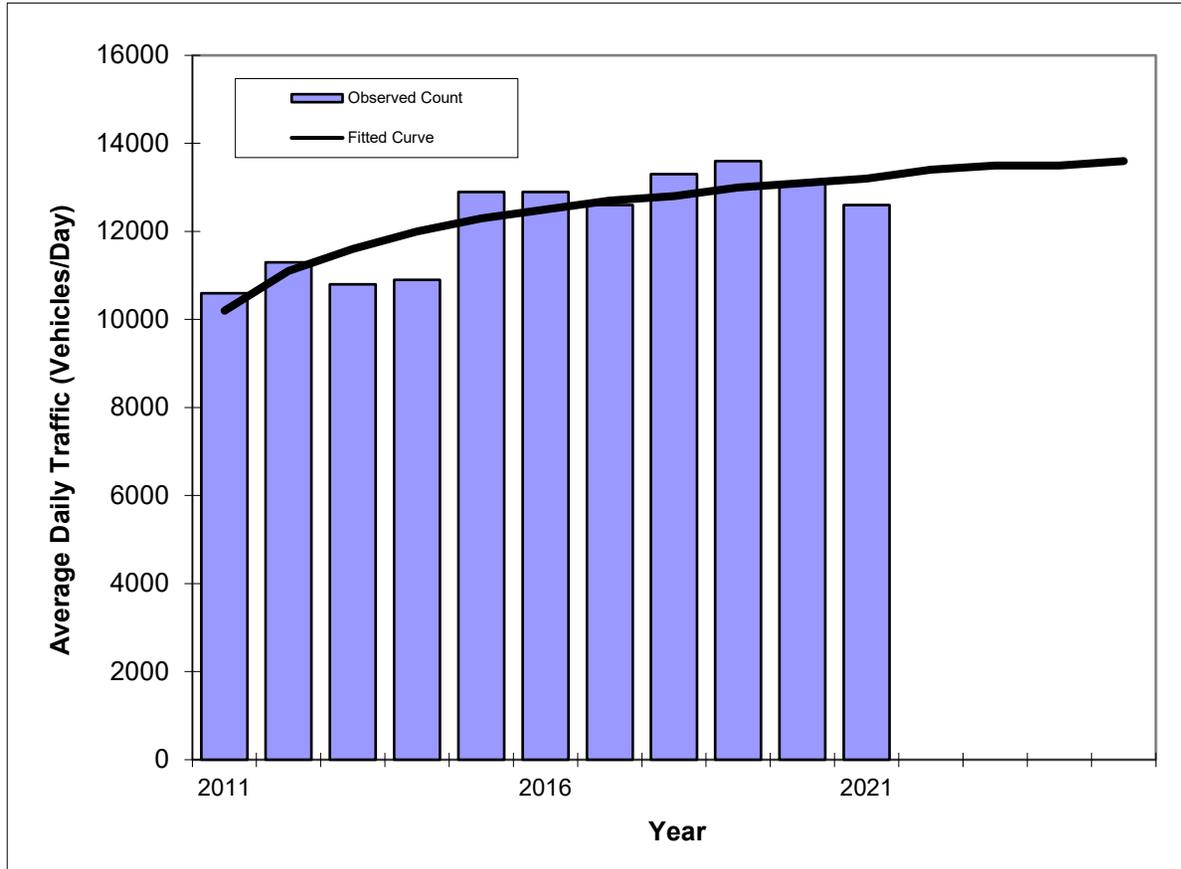
Trend R-squared: 2.8%  
 Compounded Annual Historic Growth Rate: 0.00%  
 Compounded Growth Rate (2021 to Design Year): 0.26%  
 Printed: 2-May-22  
**Decaying Exponential Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

W Volusia Bltwy -- Cassadaga Rd to SR 472

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	W Volusia Bltwy



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2011	10600	10200
2012	11300	11100
2013	10800	11600
2014	10900	12000
2015	12900	12300
2016	12900	12500
2017	12600	12700
2018	13300	12800
2019	13600	13000
2020	13100	13100
2021	12600	13200
<b>2022 Opening Year Trend</b>		
2022	N/A	13400
<b>2023 Mid-Year Trend</b>		
2023	N/A	13500
<b>2024 Design Year Trend</b>		
2024	N/A	13500
<b>TRANPLAN Forecasts/Trends</b>		

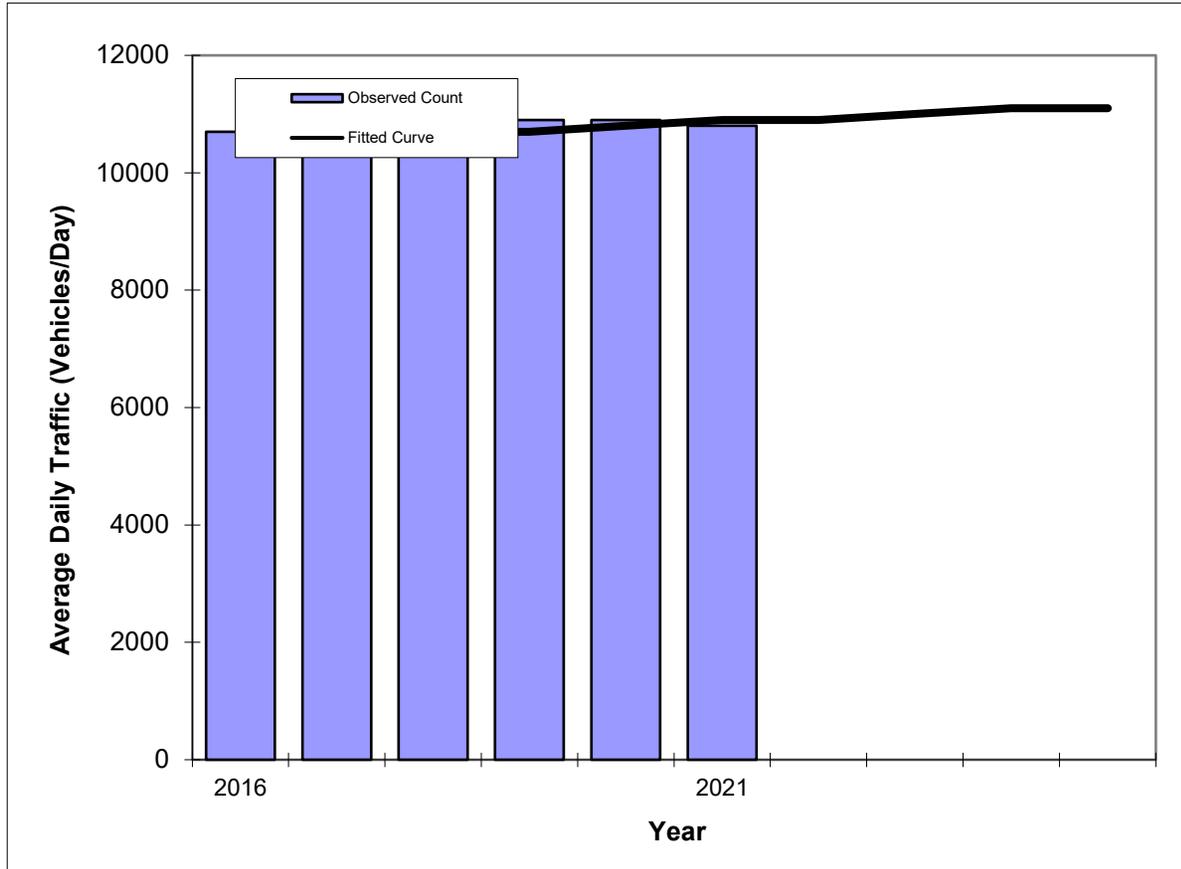
Trend R-squared: 70.9%  
 Compounded Annual Historic Growth Rate: 2.24%  
 Compounded Growth Rate (2021 to Design Year): -0.25%  
 Printed: 2-May-22  
**Decaying Exponential Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

W Volusia Bltwy -- SR 472 to Graves Ave

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	W Volusia Bltwy



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	10700	10600
2017	10400	10600
2018	10600	10700
2019	10900	10700
2020	10900	10800
2021	10800	10900
<b>2022 Opening Year Trend</b>		
2022	N/A	10900
<b>2023 Mid-Year Trend</b>		
2023	N/A	11000
<b>2024 Design Year Trend</b>		
2024	N/A	11100
<b>TRANPLAN Forecasts/Trends</b>		

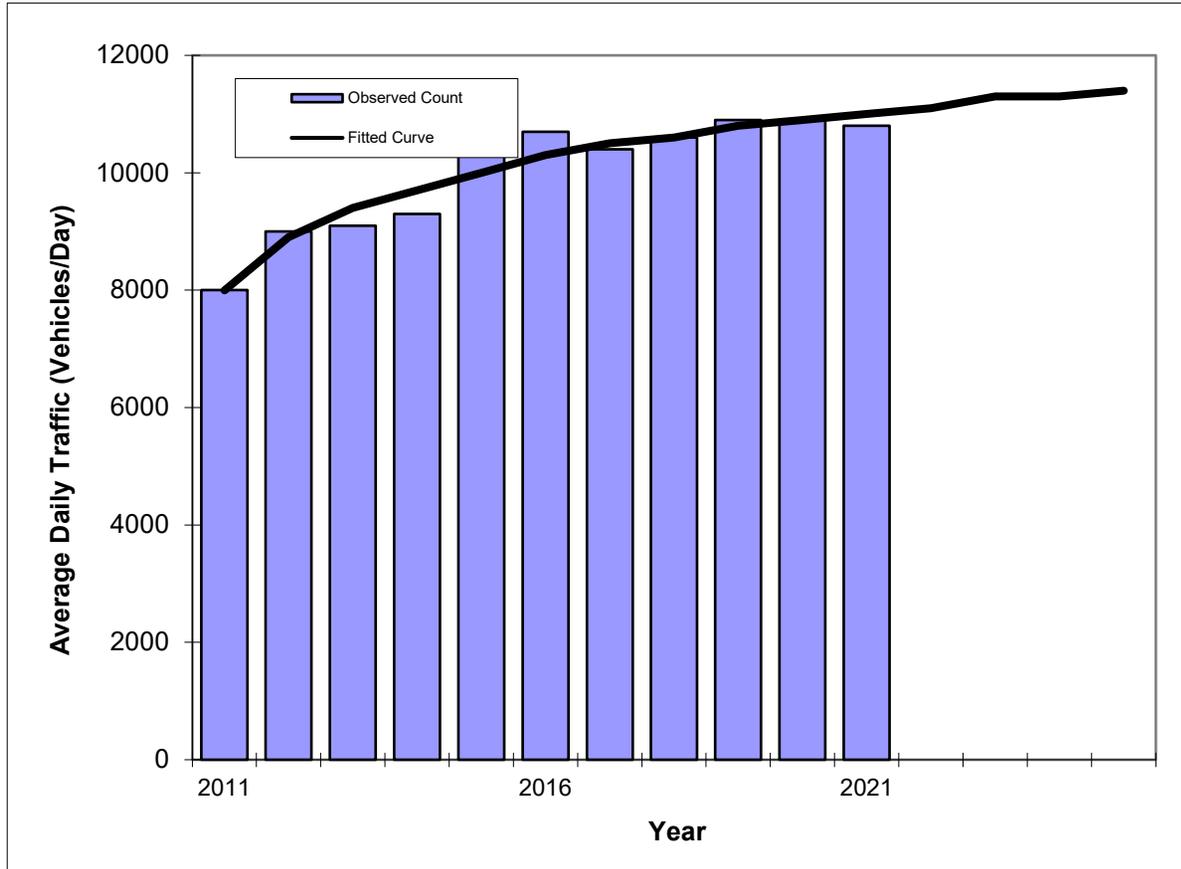
<b>** Annual Trend Increase:</b>	66
<b>Trend R-squared:</b>	40.1%
<b>Trend Annual Historic Growth Rate:</b>	0.57%
<b>Trend Growth Rate (2021 to Design Year):</b>	0.61%
<b>Printed:</b>	2-May-22
<b>Straight Line Growth Option</b>	

\*Axle-Adjusted

# TRAFFIC TRENDS

W Volusia Bltwy -- SR 472 to Graves Ave

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	W Volusia Bltwy



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2011	8000	8000
2012	9000	8900
2013	9100	9400
2014	9300	9700
2015	10400	10000
2016	10700	10300
2017	10400	10500
2018	10600	10600
2019	10900	10800
2020	10900	10900
2021	10800	11000
<b>2022 Opening Year Trend</b>		
2022	N/A	11100
<b>2023 Mid-Year Trend</b>		
2023	N/A	11300
<b>2024 Design Year Trend</b>		
2024	N/A	11300
<b>TRANPLAN Forecasts/Trends</b>		

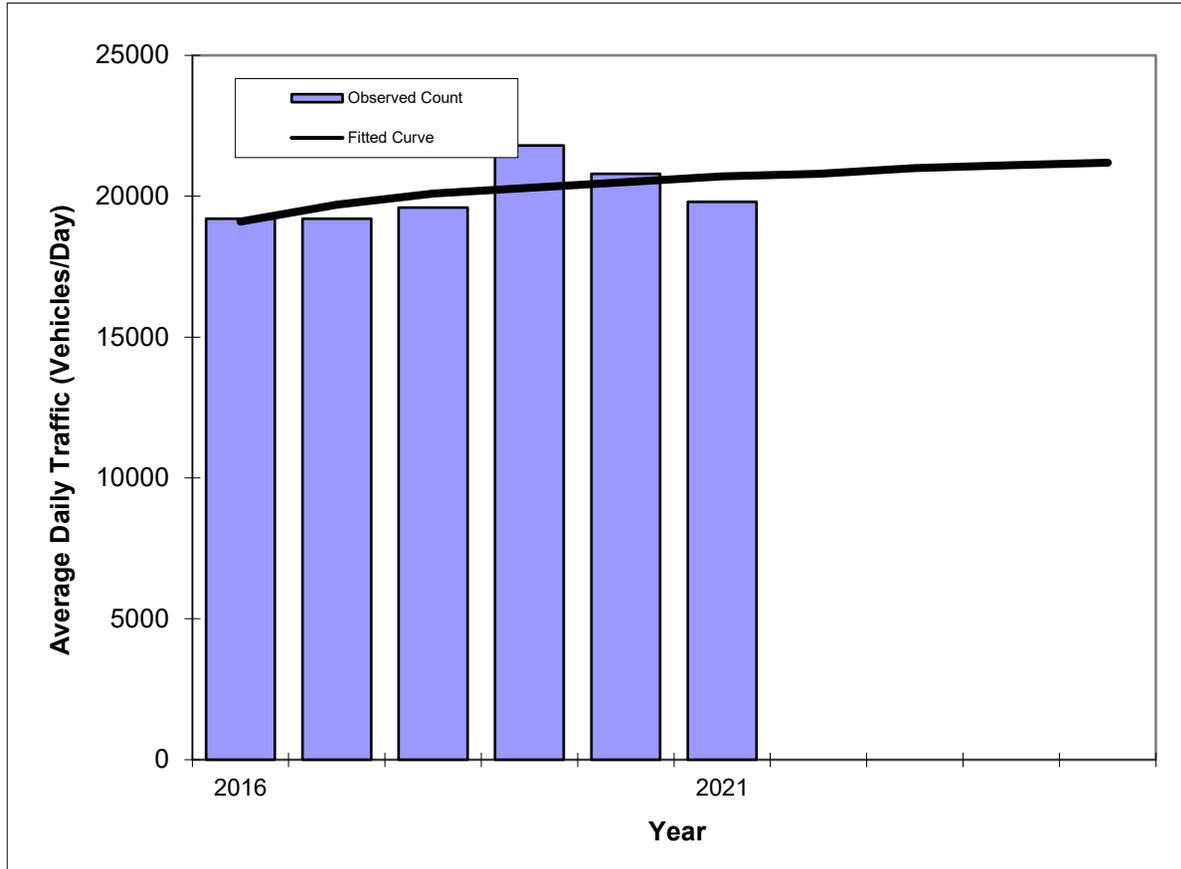
Trend R-squared: 92.8%  
 Compounded Annual Historic Growth Rate: 2.74%  
 Compounded Growth Rate (2021 to Design Year): -0.29%  
 Printed: 2-May-22  
**Decaying Exponential Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

## Graves Ave -- VMP to Kentucky Ave

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Graves Ave



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	19200	19100
2017	19200	19700
2018	19600	20100
2019	21800	20300
2020	20800	20500
2021	19800	20700
<b>2022 Opening Year Trend</b>		
2022	N/A	20800
<b>2023 Mid-Year Trend</b>		
2023	N/A	21000
<b>2024 Design Year Trend</b>		
2024	N/A	21100
<b>TRANPLAN Forecasts/Trends</b>		

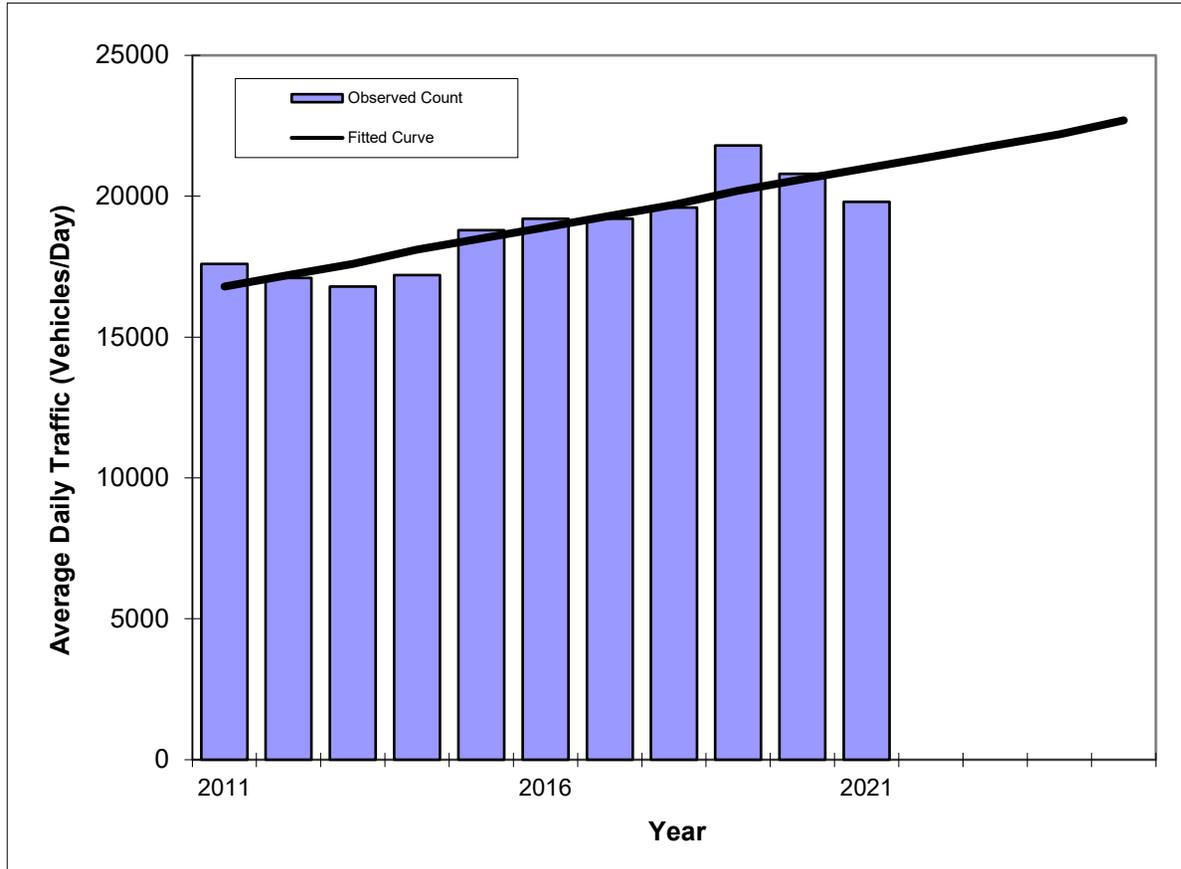
Trend R-squared:	33.9%
Compounded Annual Historic Growth Rate:	1.40%
Compounded Growth Rate (2021 to Design Year):	0.48%
Printed:	2-May-22
<b>Decaying Exponential Growth Option</b>	

\*Axle-Adjusted

# TRAFFIC TRENDS

## Graves Ave -- VMP to Kentucky Ave

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Graves Ave



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2011	17600	16800
2012	17100	17200
2013	16800	17600
2014	17200	18100
2015	18800	18500
2016	19200	18900
2017	19200	19300
2018	19600	19700
2019	21800	20200
2020	20800	20600
2021	19800	21000
<b>2022 Opening Year Trend</b>		
2022	N/A	21400
<b>2023 Mid-Year Trend</b>		
2023	N/A	21800
<b>2024 Design Year Trend</b>		
2024	N/A	22200
<b>TRANPLAN Forecasts/Trends</b>		

**\*\* Annual Trend Increase:** 418  
**Trend R-squared:** 74.7%  
**Trend Annual Historic Growth Rate:** 2.50%  
**Trend Growth Rate (2021 to Design Year):** 1.90%  
**Printed:** 2-May-22

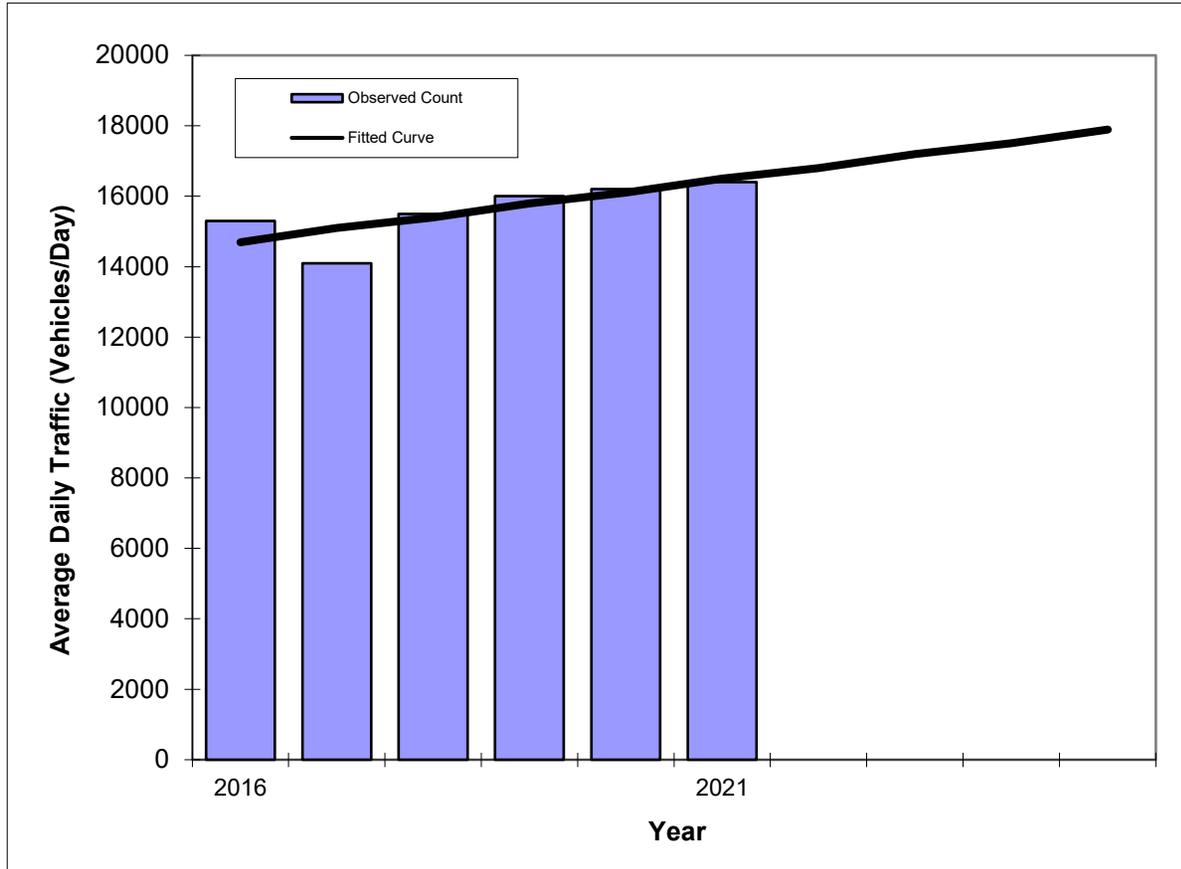
**Straight Line Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

Graves Ave -- Kentucky Ave to Howland Blvd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Graves Ave



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	15300	14700
2017	14100	15100
2018	15500	15400
2019	16000	15800
2020	16200	16100
2021	16400	16500
<b>2022 Opening Year Trend</b>		
2022	N/A	16800
<b>2023 Mid-Year Trend</b>		
2023	N/A	17200
<b>2024 Design Year Trend</b>		
2024	N/A	17500
<b>TRANPLAN Forecasts/Trends</b>		

**\*\* Annual Trend Increase:** 351  
**Trend R-squared:** 61.6%  
**Trend Annual Historic Growth Rate:** 2.45%  
**Trend Growth Rate (2021 to Design Year):** 2.02%  
**Printed:** 2-May-22

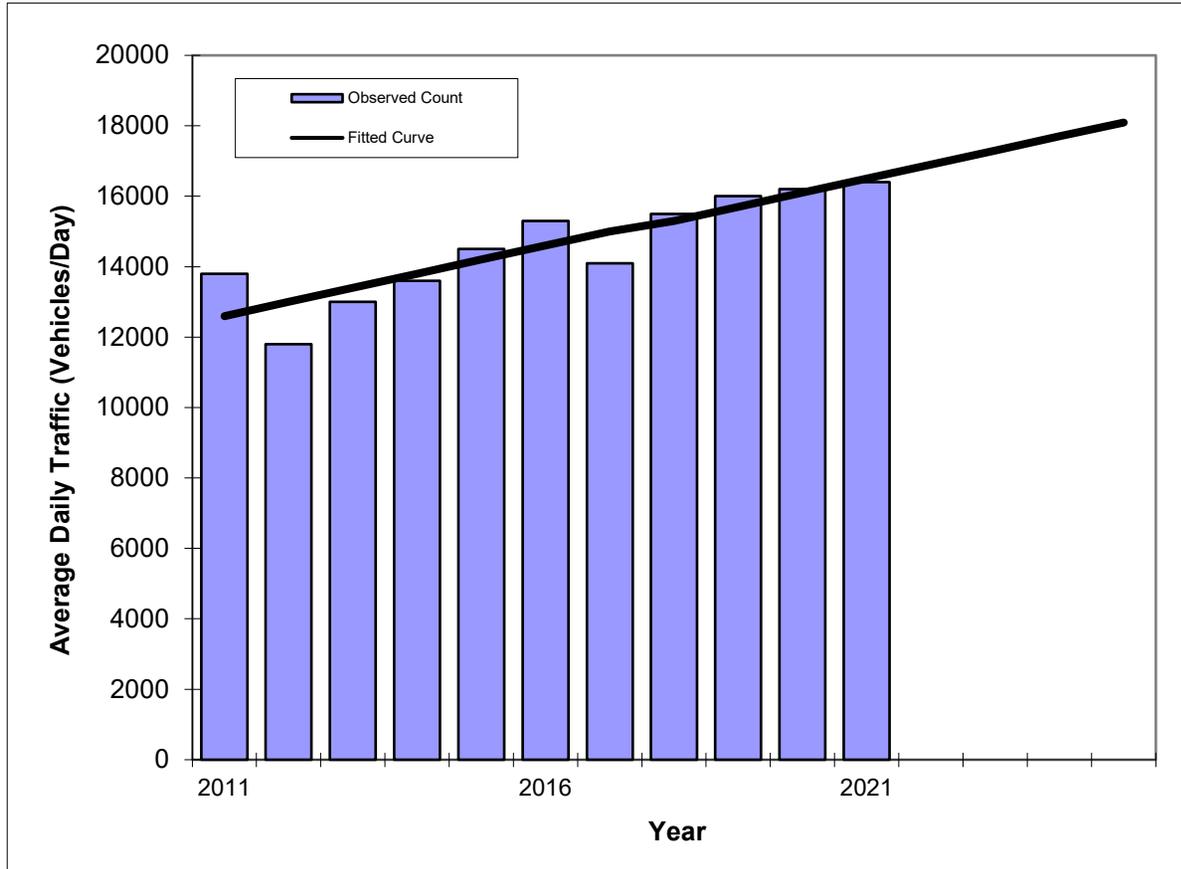
**Straight Line Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

Graves Ave -- Kentucky Ave to Howland Blvd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Graves Ave



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2011	13800	12600
2012	11800	13000
2013	13000	13400
2014	13600	13800
2015	14500	14200
2016	15300	14600
2017	14100	15000
2018	15500	15300
2019	16000	15700
2020	16200	16100
2021	16400	16500
<b>2022 Opening Year Trend</b>		
2022	N/A	16900
<b>2023 Mid-Year Trend</b>		
2023	N/A	17300
<b>2024 Design Year Trend</b>		
2024	N/A	17700
<b>TRANPLAN Forecasts/Trends</b>		

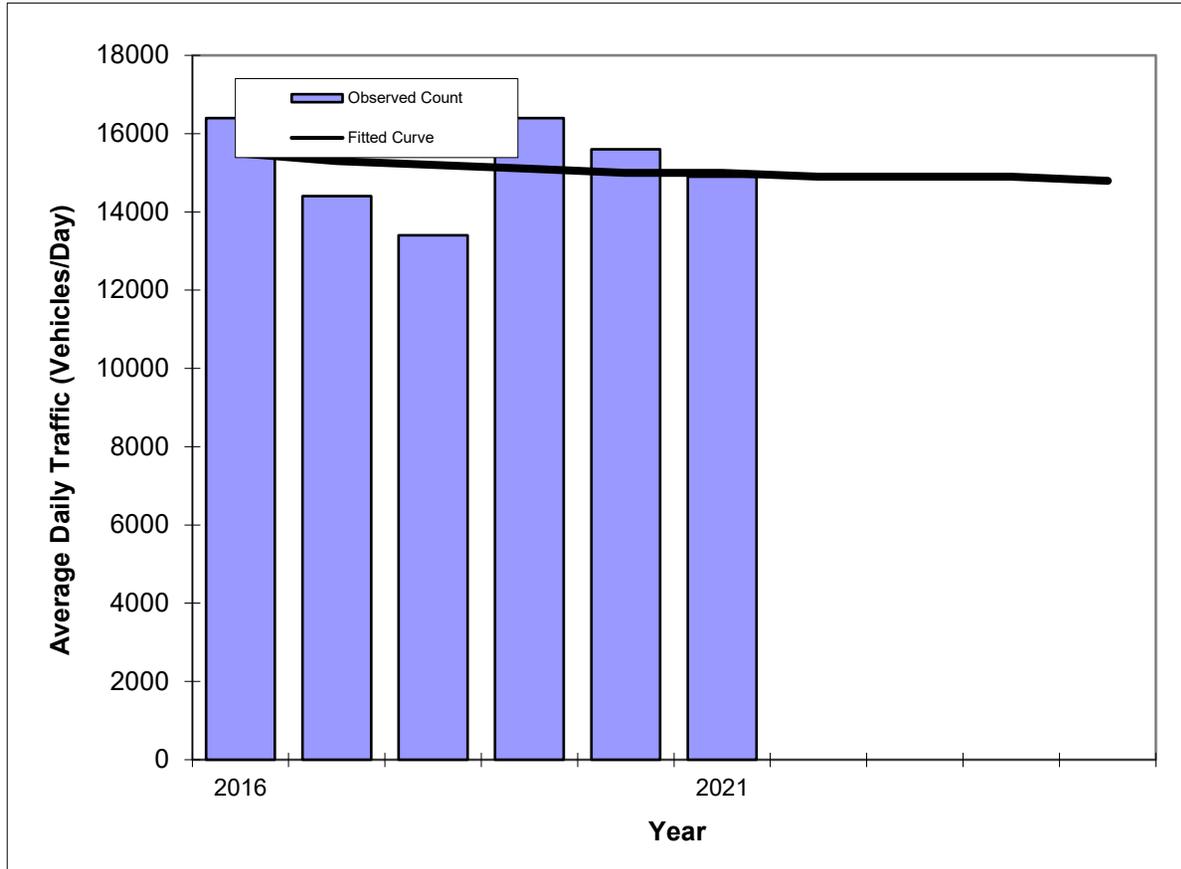
**\*\* Annual Trend Increase:** 391  
**Trend R-squared:** 78.7%  
**Trend Annual Historic Growth Rate:** 3.10%  
**Trend Growth Rate (2021 to Design Year):** 2.42%  
**Printed:** 2-May-22  
**Straight Line Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

Veterans Memorial Pkwy -- Rhode Island to Graves Ave

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Veterans Memorial Pkwy



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	16400	15500
2017	14400	15300
2018	13400	15200
2019	16400	15100
2020	15600	15000
2021	14900	15000
<b>2022 Opening Year Trend</b>		
2022	N/A	14900
<b>2023 Mid-Year Trend</b>		
2023	N/A	14900
<b>2024 Design Year Trend</b>		
2024	N/A	14900
<b>TRANPLAN Forecasts/Trends</b>		

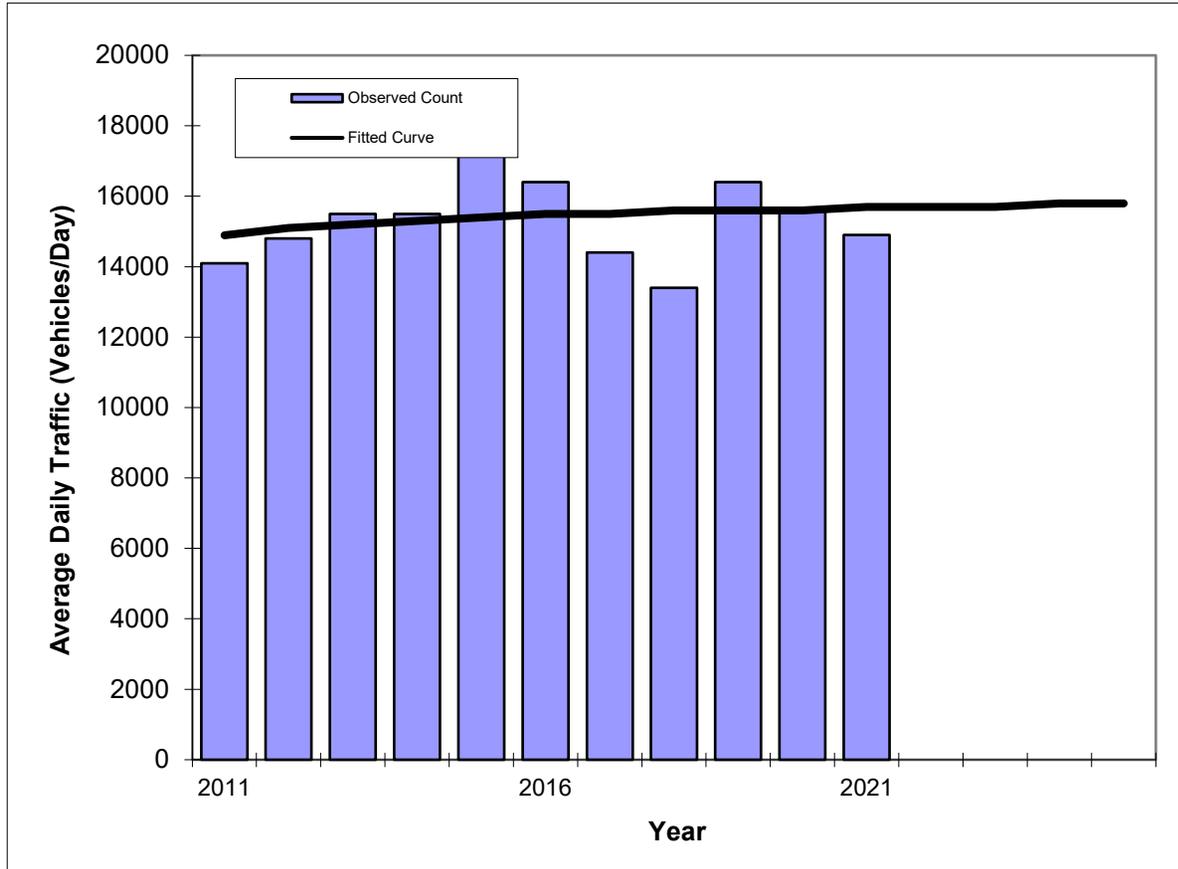
Trend R-squared:	2.8%
Compounded Annual Historic Growth Rate:	-0.13%
Compounded Growth Rate (2021 to Design Year):	-0.44%
Printed:	2-May-22
<b>Decaying Exponential Growth Option</b>	

\*Axle-Adjusted

# TRAFFIC TRENDS

Veterans Memorial Pkwy -- Rhode Island to Graves Ave

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Veterans Memorial Pkwy



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2011	14100	14900
2012	14800	15100
2013	15500	15200
2014	15500	15300
2015	18500	15400
2016	16400	15500
2017	14400	15500
2018	13400	15600
2019	16400	15600
2020	15600	15600
2021	14900	15700
<b>2022 Opening Year Trend</b>		
2022	N/A	15700
<b>2023 Mid-Year Trend</b>		
2023	N/A	15700
<b>2024 Design Year Trend</b>		
2024	N/A	15800
<b>TRANPLAN Forecasts/Trends</b>		

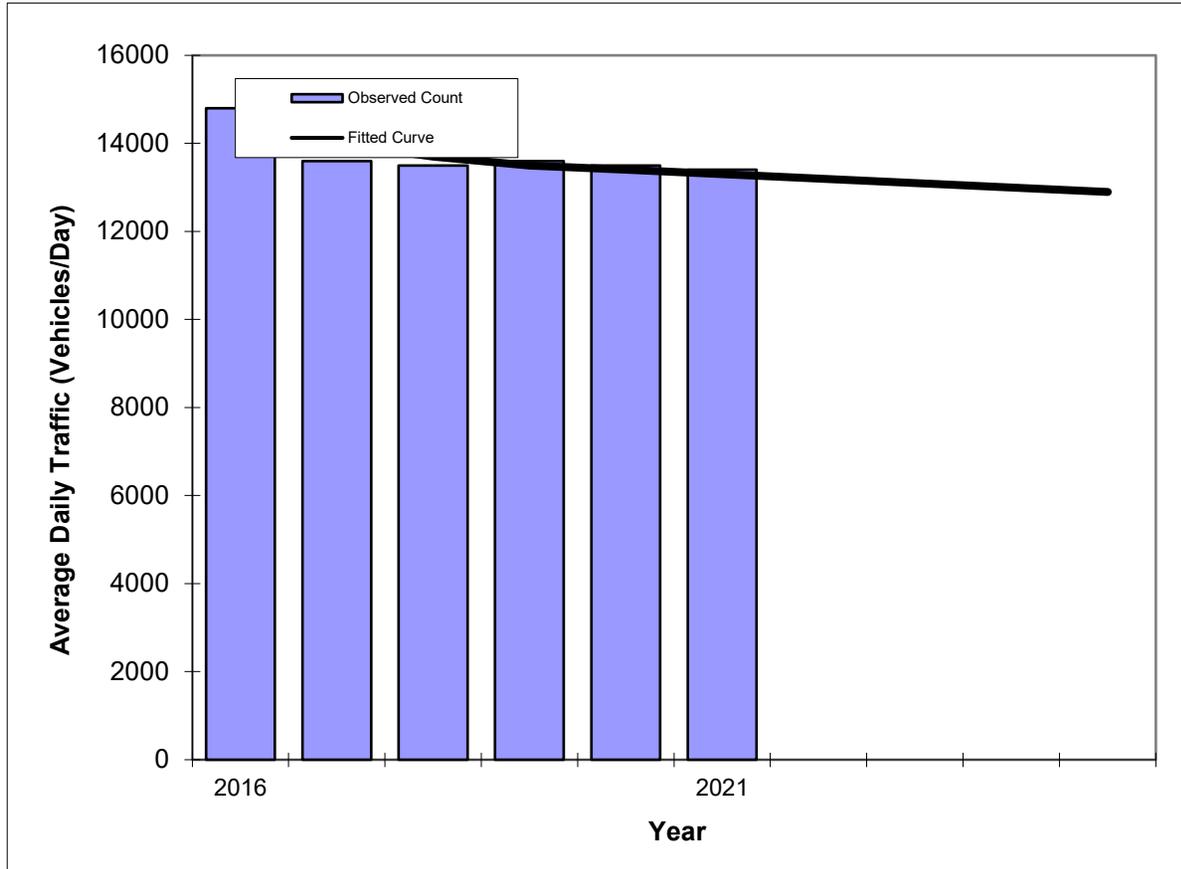
Trend R-squared:	3.1%
Compounded Annual Historic Growth Rate:	0.13%
Compounded Growth Rate (2021 to Design Year):	0.65%
Printed:	2-May-22
<b>Decaying Exponential Growth Option</b>	

\*Axle-Adjusted

# TRAFFIC TRENDS

Providence Blvd -- Ft. Smith to Elkcam Blvd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Providence Blvd



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	14800	14500
2017	13600	14000
2018	13500	13700
2019	13600	13500
2020	13500	13400
2021	13400	13300
<b>2022 Opening Year Trend</b>		
2022	N/A	13200
<b>2023 Mid-Year Trend</b>		
2023	N/A	13100
<b>2024 Design Year Trend</b>		
2024	N/A	13000
<b>TRANPLAN Forecasts/Trends</b>		

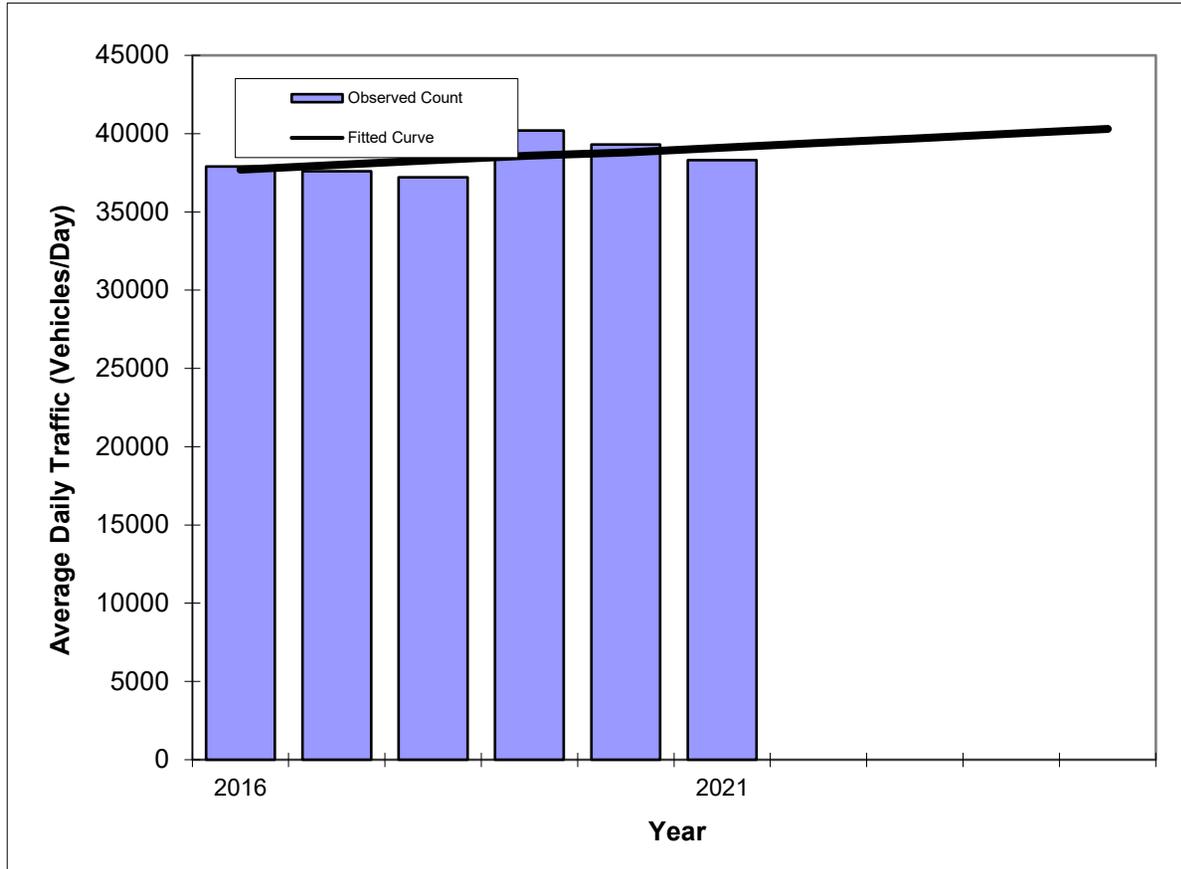
**Trend R-squared:** 74.2%  
**Compounded Annual Historic Growth Rate:** -1.45%  
**Compounded Growth Rate (2021 to Design Year):** -0.51%  
**Printed:** 2-May-22  
**Decaying Exponential Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

Saxon Blvd -- Finland Dr to Normandy Blvd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Saxon Blvd



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	37900	37700
2017	37600	38000
2018	37200	38300
2019	40200	38600
2020	39300	38800
2021	38300	39100
<b>2022 Opening Year Trend</b>		
2022	N/A	39400
<b>2023 Mid-Year Trend</b>		
2023	N/A	39700
<b>2024 Design Year Trend</b>		
2024	N/A	40000
<b>TRANPLAN Forecasts/Trends</b>		

**\*\* Annual Trend Increase:** 289  
**Trend R-squared:** 22.8%  
**Trend Annual Historic Growth Rate:** 0.74%  
**Trend Growth Rate (2021 to Design Year):** 0.77%  
**Printed:** 2-May-22

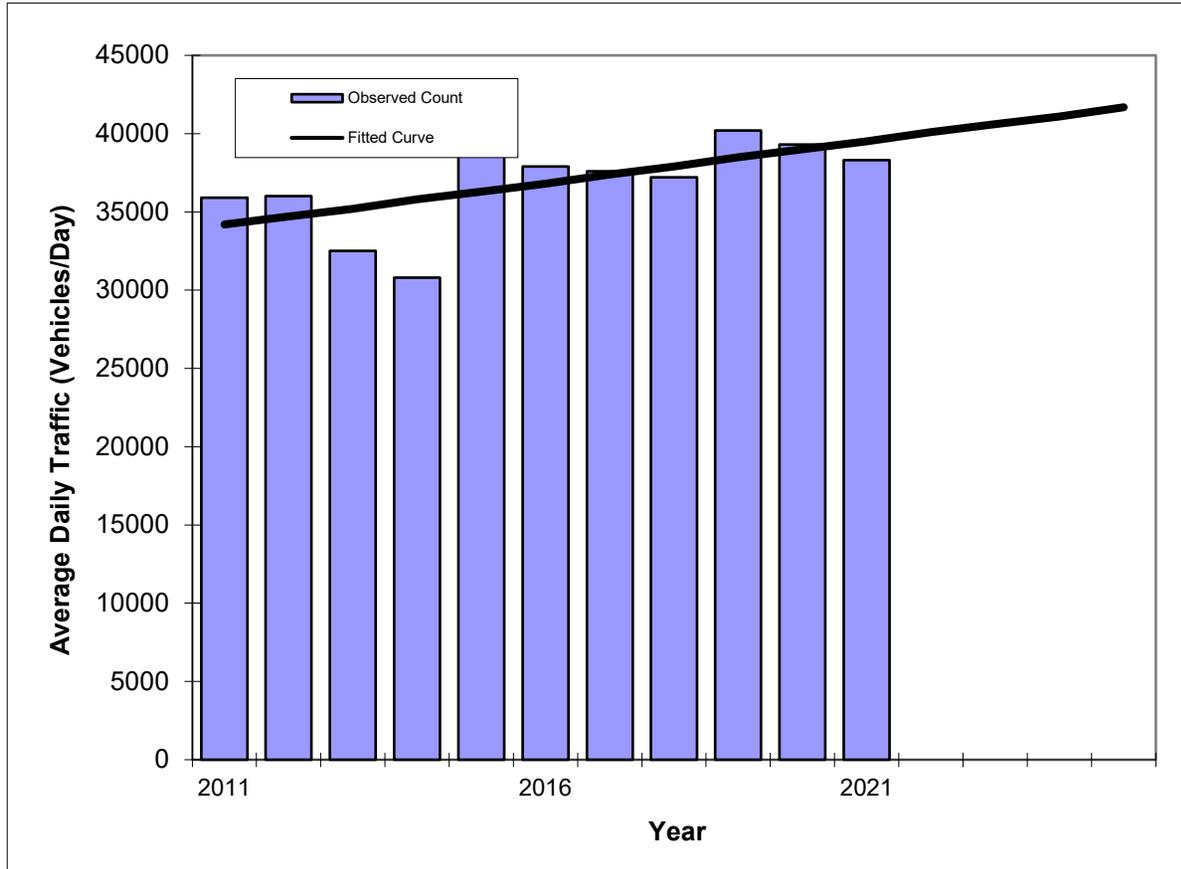
**Straight Line Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

Saxon Blvd -- Finland Dr to Normandy Blvd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Saxon Blvd



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2011	35900	34200
2012	36000	34700
2013	32500	35200
2014	30800	35800
2015	39600	36300
2016	37900	36800
2017	37600	37400
2018	37200	37900
2019	40200	38500
2020	39300	39000
2021	38300	39500
<b>2022 Opening Year Trend</b>		
2022	N/A	40100
<b>2023 Mid-Year Trend</b>		
2023	N/A	40600
<b>2024 Design Year Trend</b>		
2024	N/A	41100
<b>TRANPLAN Forecasts/Trends</b>		

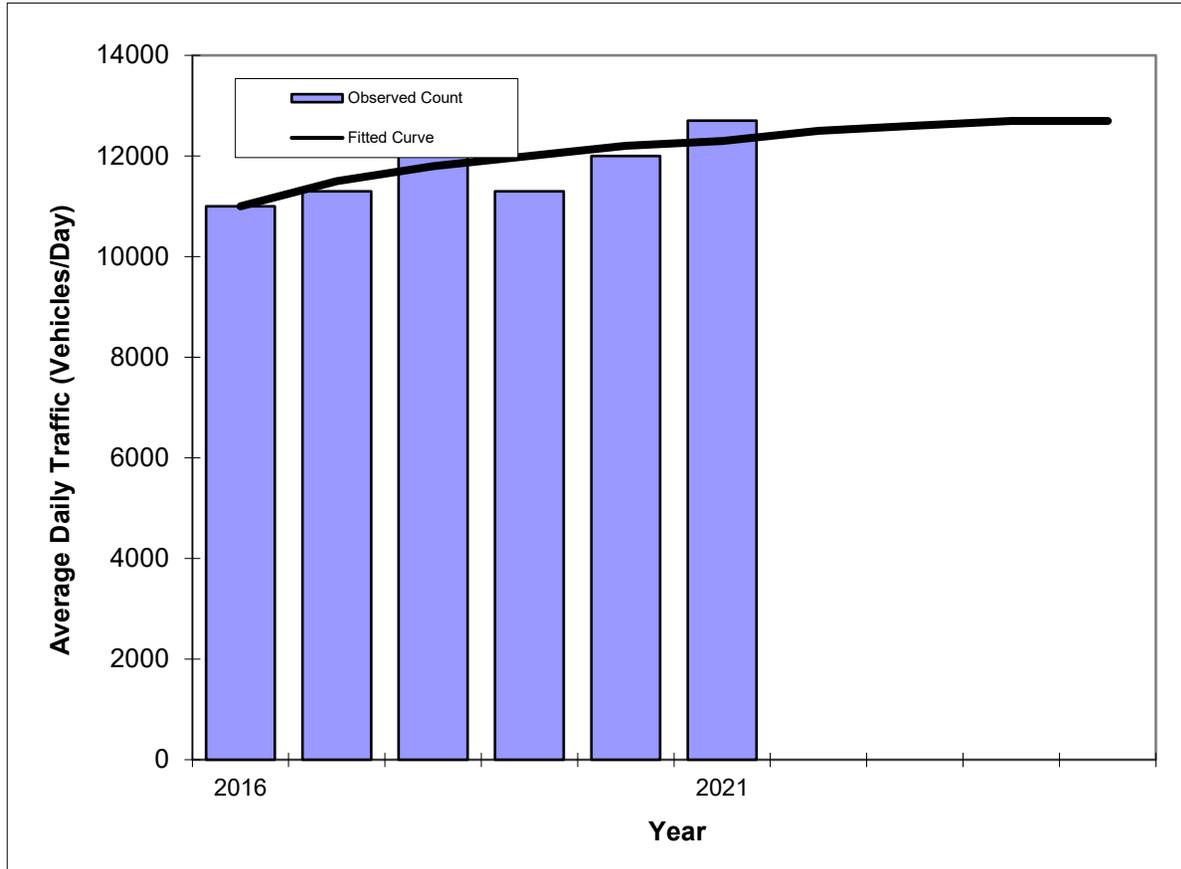
**\*\* Annual Trend Increase:** 537  
**Trend R-squared:** 37.0%  
**Trend Annual Historic Growth Rate:** 1.55%  
**Trend Growth Rate (2021 to Design Year):** 1.35%  
**Printed:** 2-May-22  
**Straight Line Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

Lake Helen Osteen Rd -- Haulover Blvd to Catalina Blvd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Lake Helen Osteen Rd



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	11000	11000
2017	11300	11500
2018	12600	11800
2019	11300	12000
2020	12000	12200
2021	12700	12300
<b>2022 Opening Year Trend</b>		
2022	N/A	12500
<b>2023 Mid-Year Trend</b>		
2023	N/A	12600
<b>2024 Design Year Trend</b>		
2024	N/A	12700
<b>TRANPLAN Forecasts/Trends</b>		

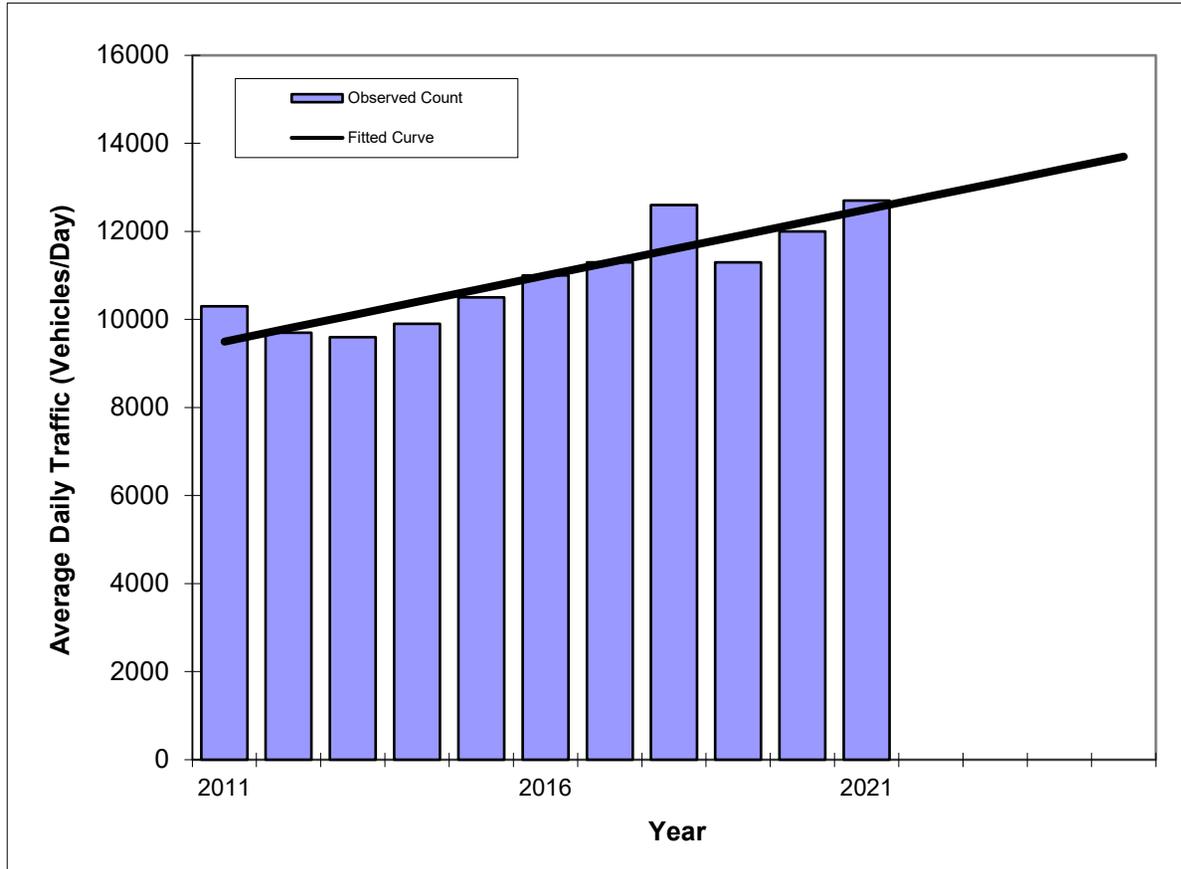
Trend R-squared:	48.0%
Compounded Annual Historic Growth Rate:	2.22%
Compounded Growth Rate (2021 to Design Year):	0.53%
Printed:	2-May-22
<b>Decaying Exponential Growth Option</b>	

\*Axle-Adjusted

# TRAFFIC TRENDS

Lake Helen Osteen Rd -- Haulover Blvd to Catalina Blvd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Lake Helen Osteen Rd



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2011	10300	9500
2012	9700	9800
2013	9600	10100
2014	9900	10400
2015	10500	10700
2016	11000	11000
2017	11300	11300
2018	12600	11600
2019	11300	11900
2020	12000	12200
2021	12700	12500
<b>2022 Opening Year Trend</b>		
2022	N/A	12800
<b>2023 Mid-Year Trend</b>		
2023	N/A	13100
<b>2024 Design Year Trend</b>		
2024	N/A	13400
<b>TRANPLAN Forecasts/Trends</b>		

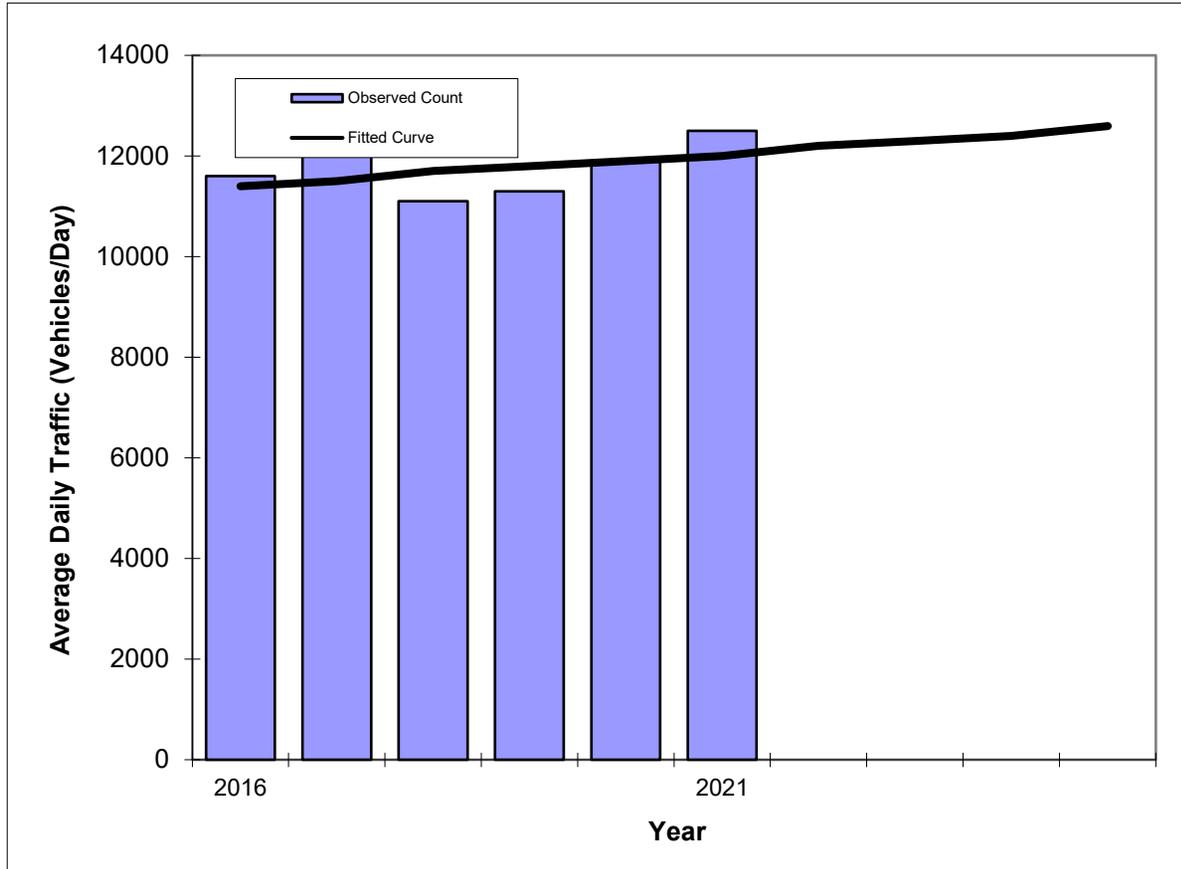
**\*\* Annual Trend Increase:** 295  
**Trend R-squared:** 78.5%  
**Trend Annual Historic Growth Rate:** 3.16%  
**Trend Growth Rate (2021 to Design Year):** 2.40%  
**Printed:** 2-May-22  
**Straight Line Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

Catalina Blvd -- Wolf Pack Run to Howland Blvd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Catalina Blvd



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	11600	11400
2017	12000	11500
2018	11100	11700
2019	11300	11800
2020	11900	11900
2021	12500	12000
<b>2022 Opening Year Trend</b>		
2022	N/A	12200
<b>2023 Mid-Year Trend</b>		
2023	N/A	12300
<b>2025 Design Year Trend</b>		
2025	N/A	12600
<b>TRANPLAN Forecasts/Trends</b>		

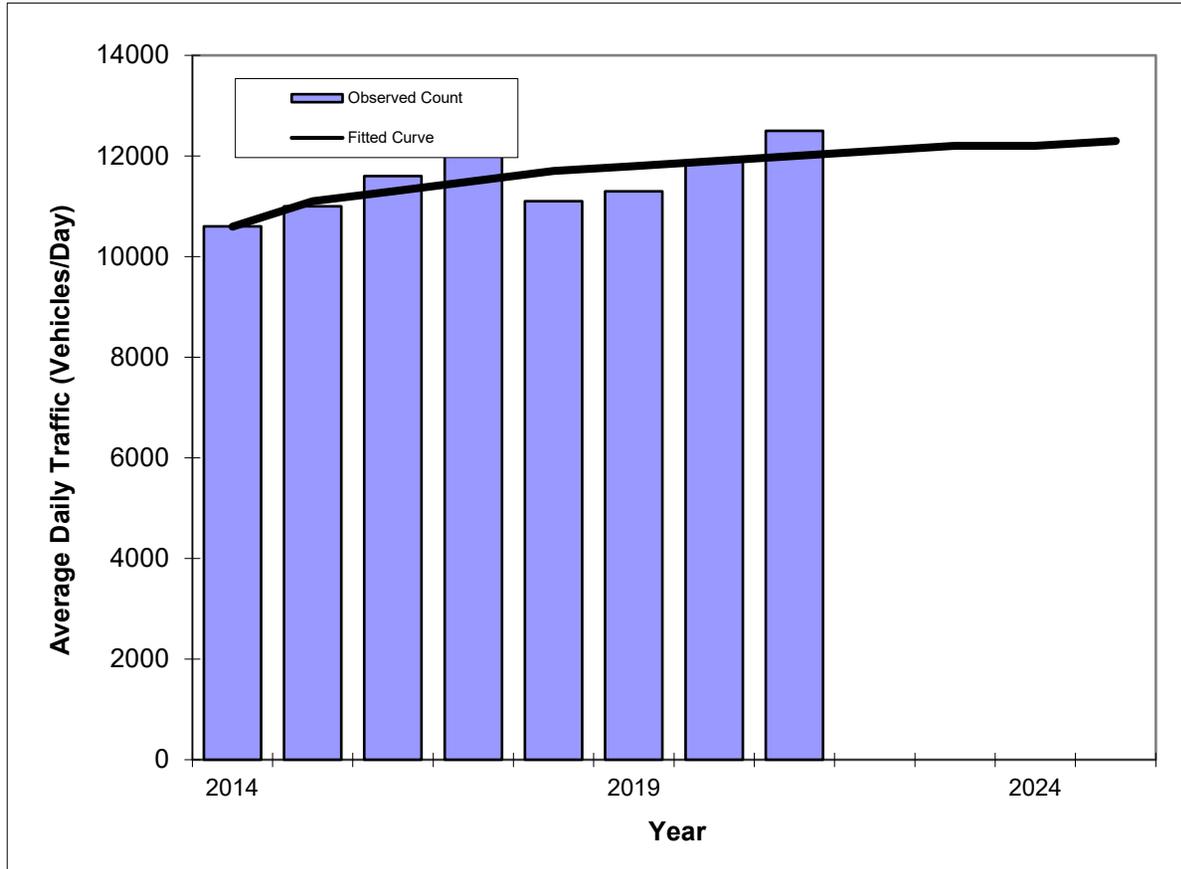
**\*\* Annual Trend Increase:** 126  
**Trend R-squared:** 21.4%  
**Trend Annual Historic Growth Rate:** 1.05%  
**Trend Growth Rate (2021 to Design Year):** 1.25%  
**Printed:** 28-Jun-22  
**Straight Line Growth Option**

\*Axle-Adjusted

# TRAFFIC TRENDS

Catalina Blvd -- Wolf Pack Run to Howland Blvd

<b>County:</b>	Volusia
<b>Station #:</b>	530
<b>Highway:</b>	Catalina Blvd



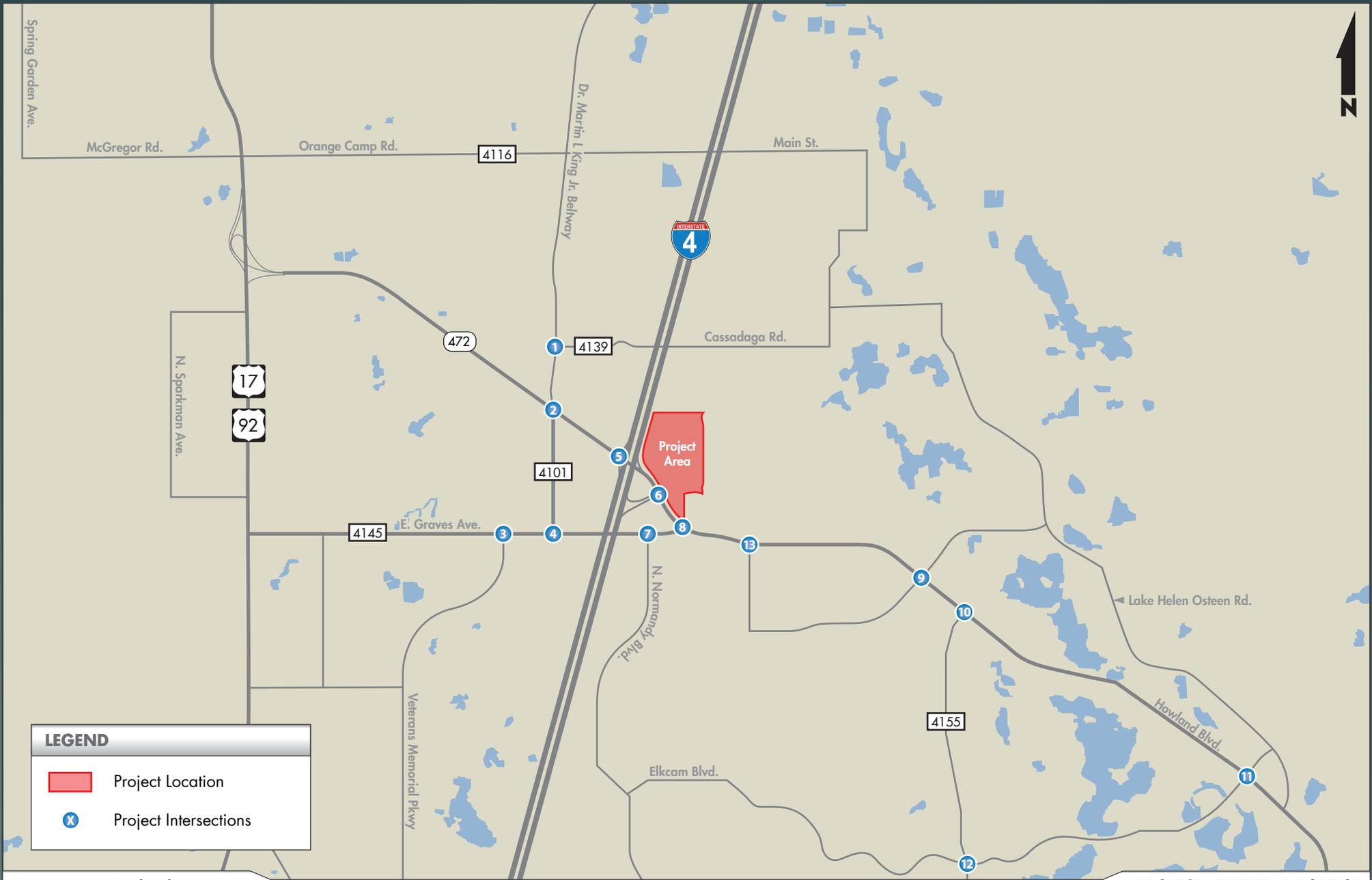
Year	Traffic (ADT/AADT)	
	Count*	Trend**
2014	10600	10600
2015	11000	11100
2016	11600	11300
2017	12000	11500
2018	11100	11700
2019	11300	11800
2020	11900	11900
2021	12500	12000
<b>2022 Opening Year Trend</b>		
2022	N/A	12100
<b>2023 Mid-Year Trend</b>		
2023	N/A	12200
<b>2025 Design Year Trend</b>		
2025	N/A	12300
<b>TRANPLAN Forecasts/Trends</b>		

Trend R-squared: 57.6%  
 Compounded Annual Historic Growth Rate: 1.76%  
 Compounded Growth Rate (2021 to Design Year): 0.20%  
 Printed: 28-Jun-22  
**Decaying Exponential Growth Option**

\*Axle-Adjusted

# **APPENDIX H**

## **Vested Trip Information**

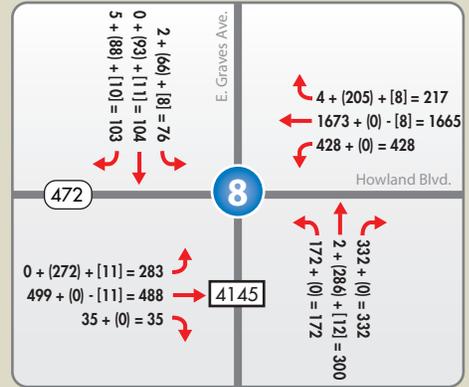
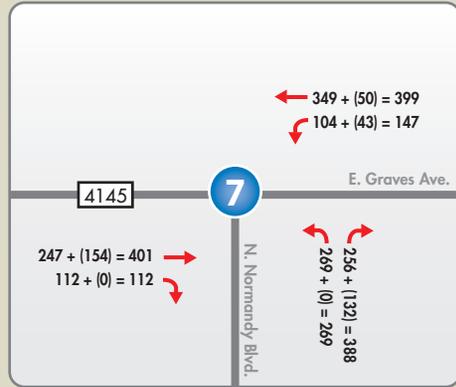
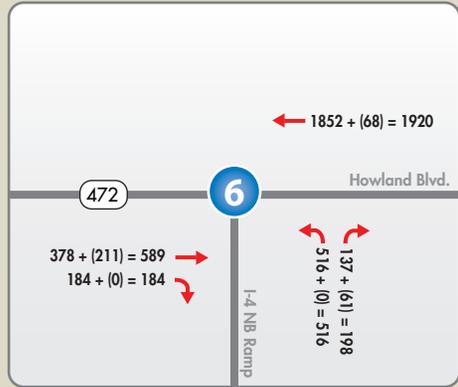
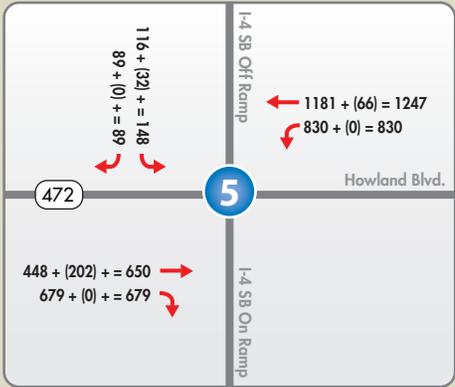
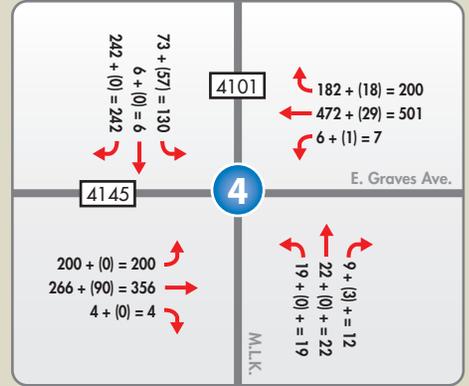
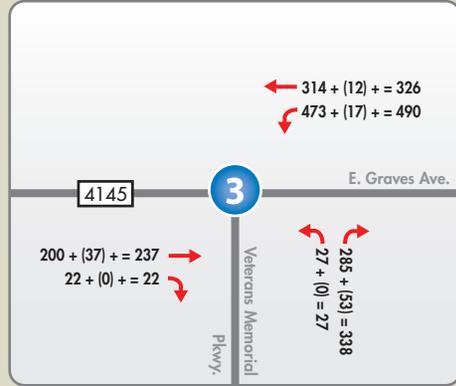
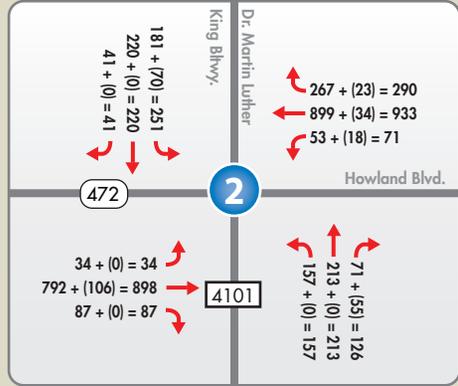
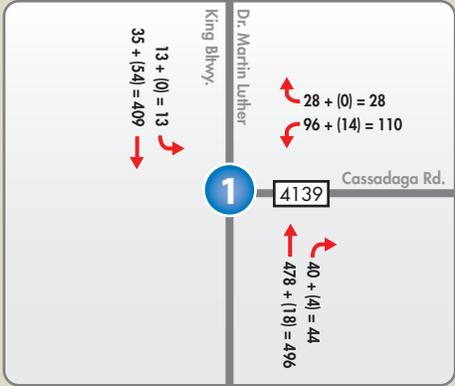


DATE CREATED: 7/08/2014

PROJECT NUMBER: 14-017.01

# Halifax Crossings BPUD

**FIGURE 5A**  
Year 2020 AM Peak Total Traffic Volumes



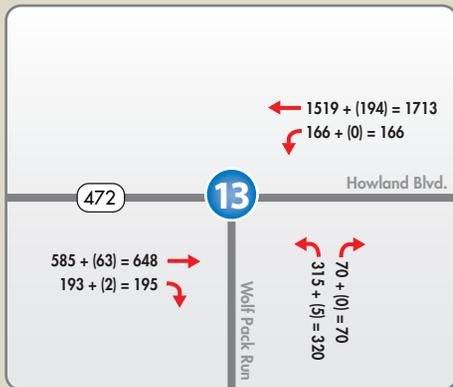
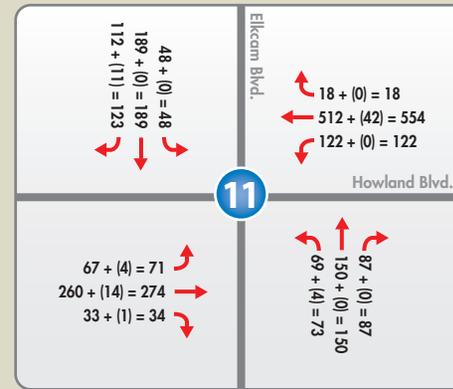
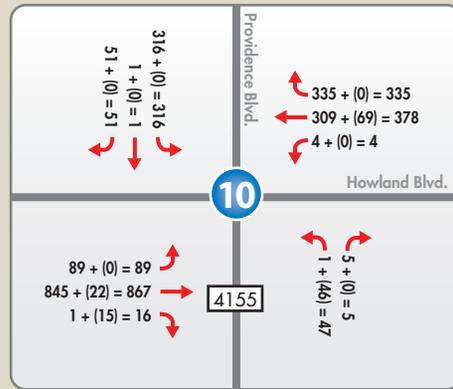
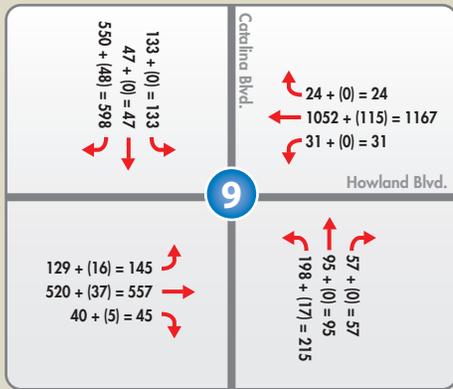
**LEGEND**

Traffic Direction

$X + (X) + [X] = \text{Total Trips}$

- Passby Trips
- Project Trips
- Background Traffic





**LEGEND**

Traffic Direction

$X + (X) + [X] = \text{Total Trips}$

- $X$  — Passby Trips
- $(X)$  — Project Trips
- $[X]$  — Background Traffic

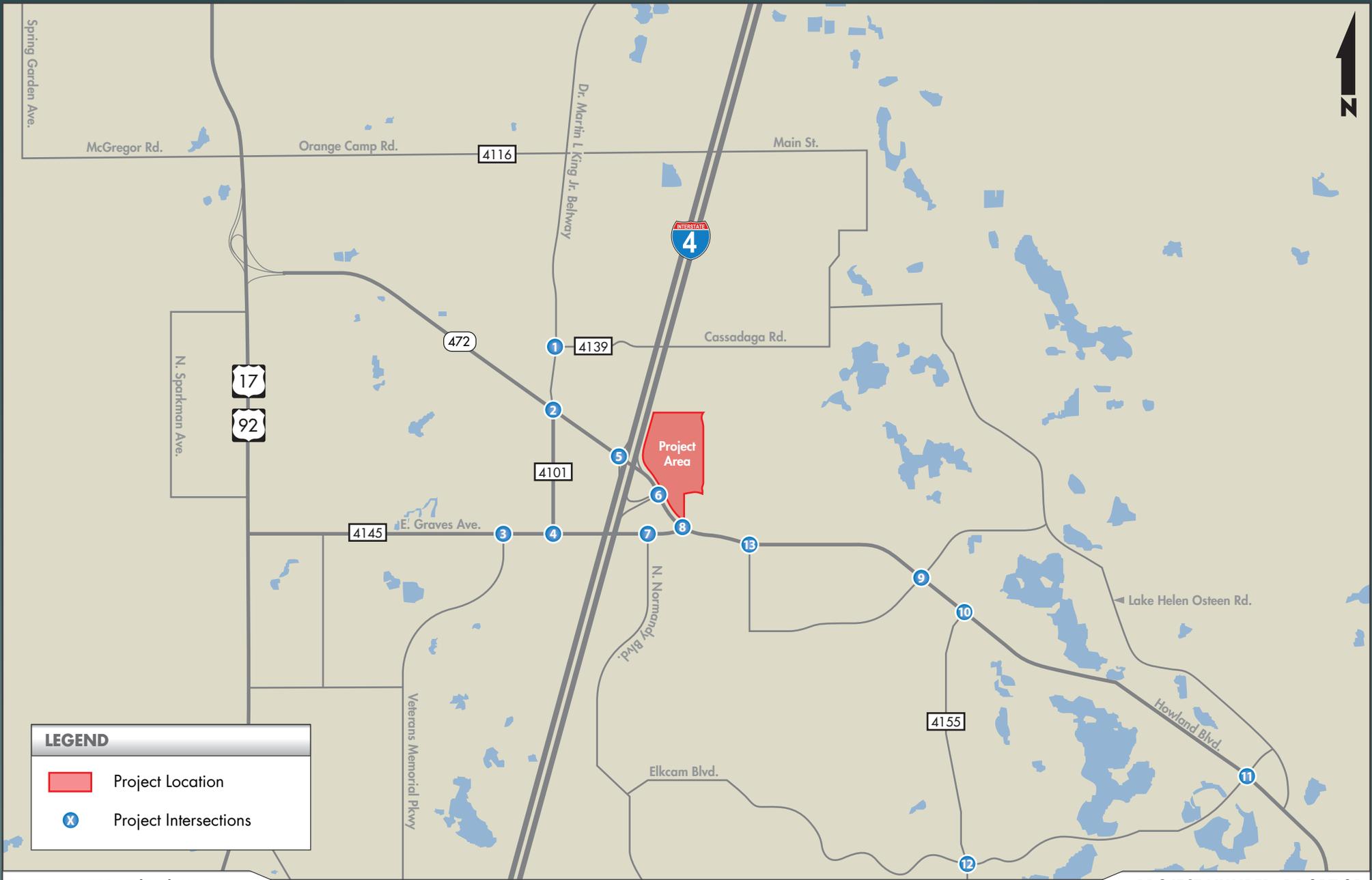
DATE CREATED: 7/08/2014

PROJECT NUMBER: 14-017.01

# Halifax Crossings BPUD

**FIGURE 5C**  
Year 2020 AM Peak Total Traffic Volumes



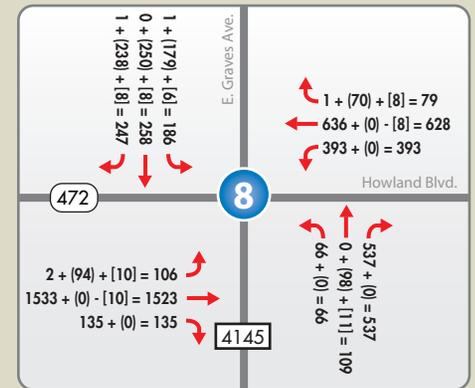
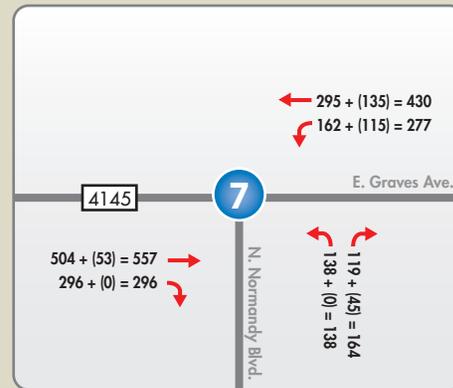
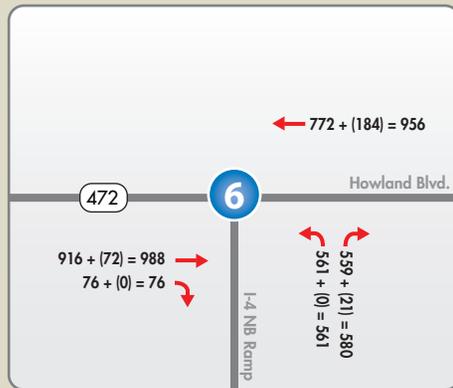
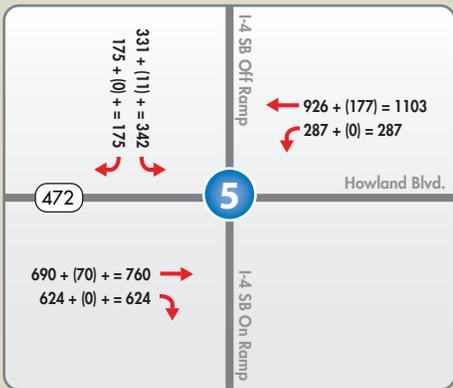
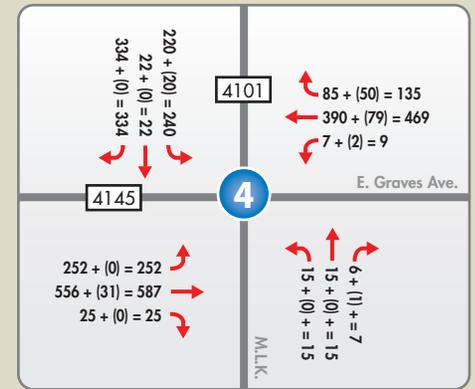
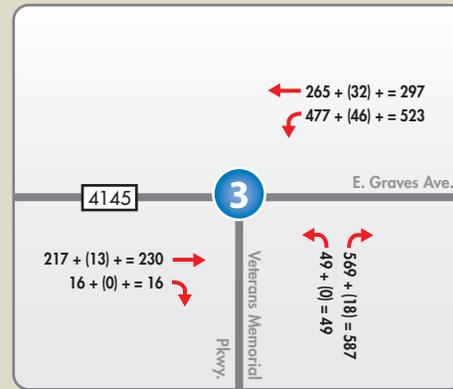
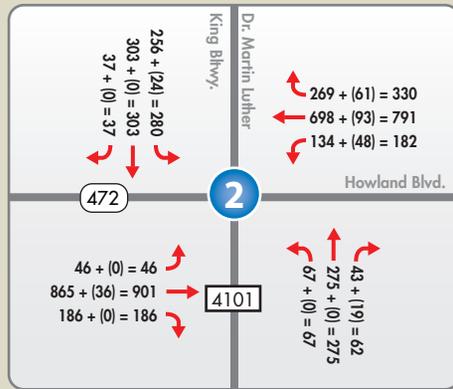
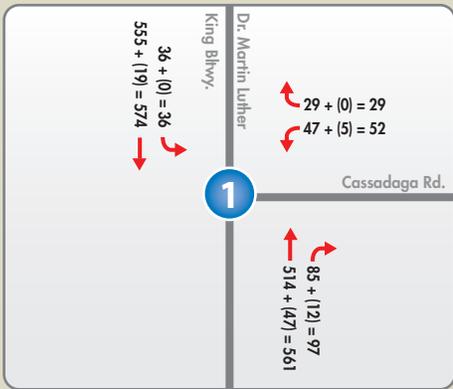


DATE CREATED: 7/08/2014

PROJECT NUMBER: 14-017.01

# Halifax Crossings BPUD

**FIGURE 6A**  
Year 2020 PM Peak Total Traffic Volumes



**LEGEND**

Traffic Direction

$X + (X) + [X] = \text{Total Trips}$

- Passby Trips
- Project Trips
- Background Traffic

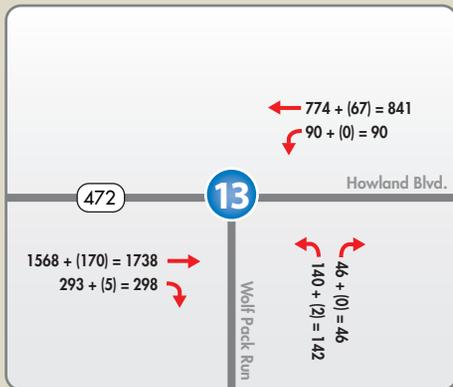
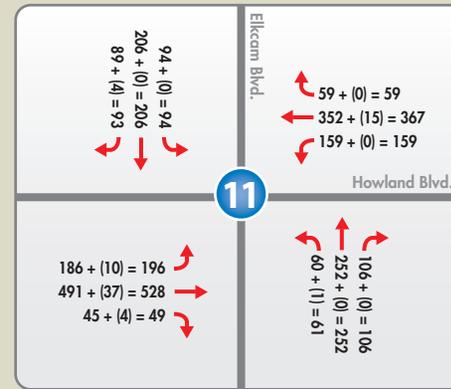
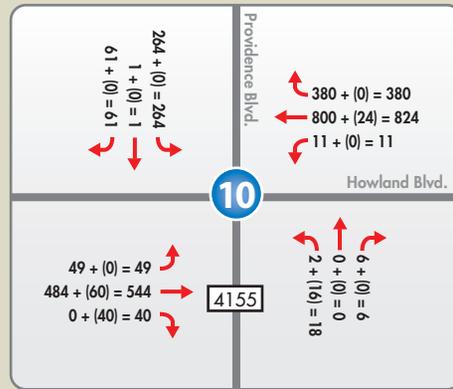
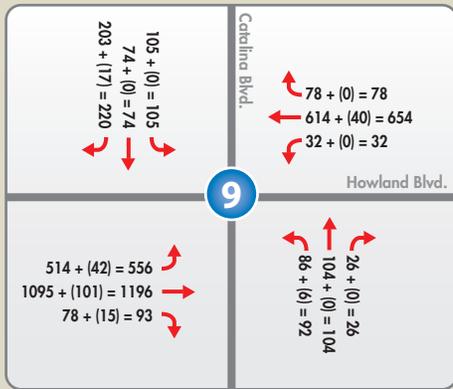


DATE CREATED: 7/08/2014

PROJECT NUMBER: 14-017.01

# Halifax Crossings BPUD

**FIGURE 6B**  
Year 2020 PM Peak Total Traffic Volumes



**LEGEND**

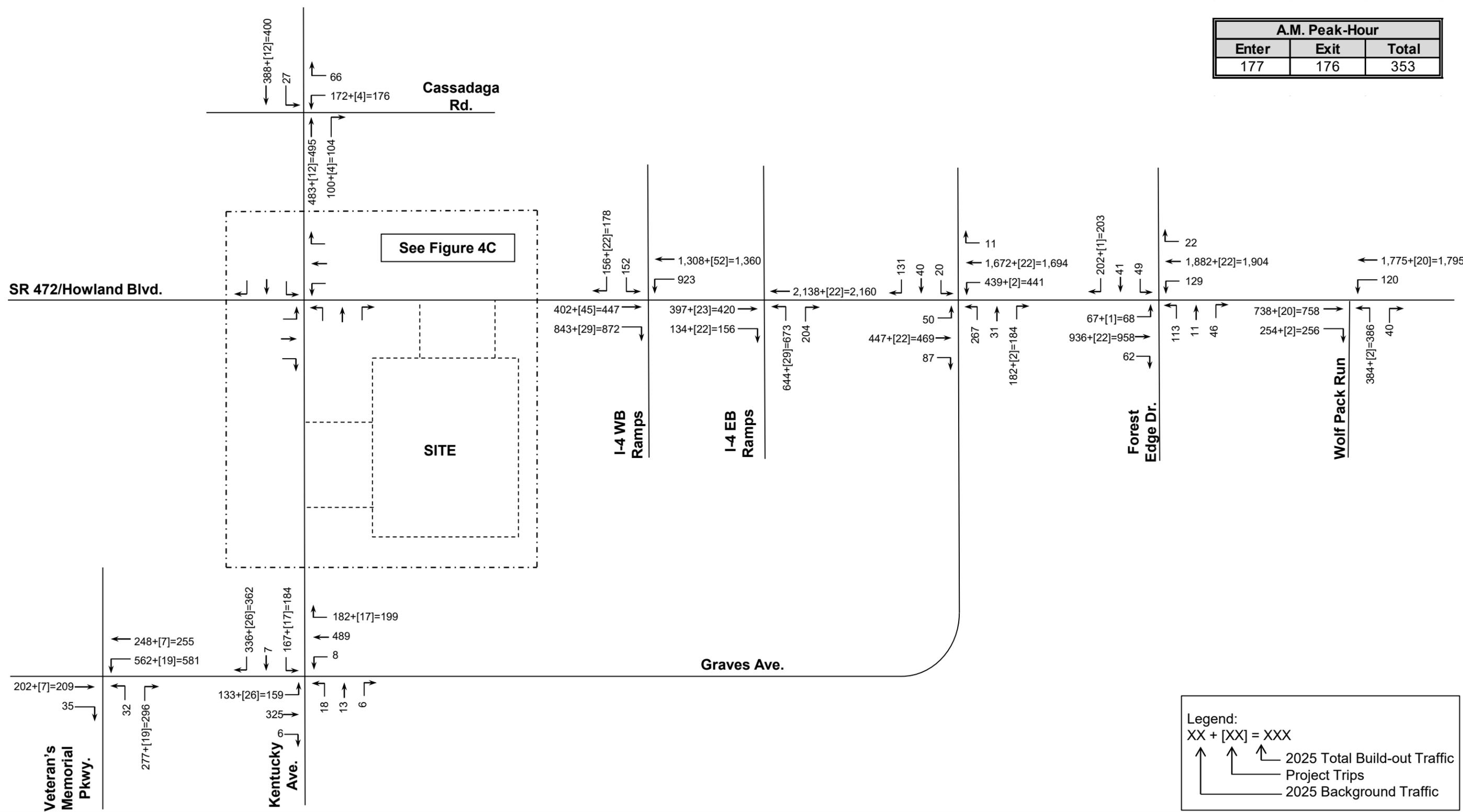
Traffic Direction

$X + (X) + [X] = \text{Total Trips}$

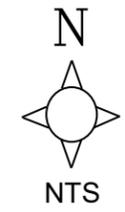
- $X$  Passby Trips
- $(X)$  Project Trips
- $[X]$  Background Traffic



A.M. Peak-Hour		
Enter	Exit	Total
177	176	353



West Volusia Crossings



2025 Build-Out  
A.M. Peak-Hour Volumes

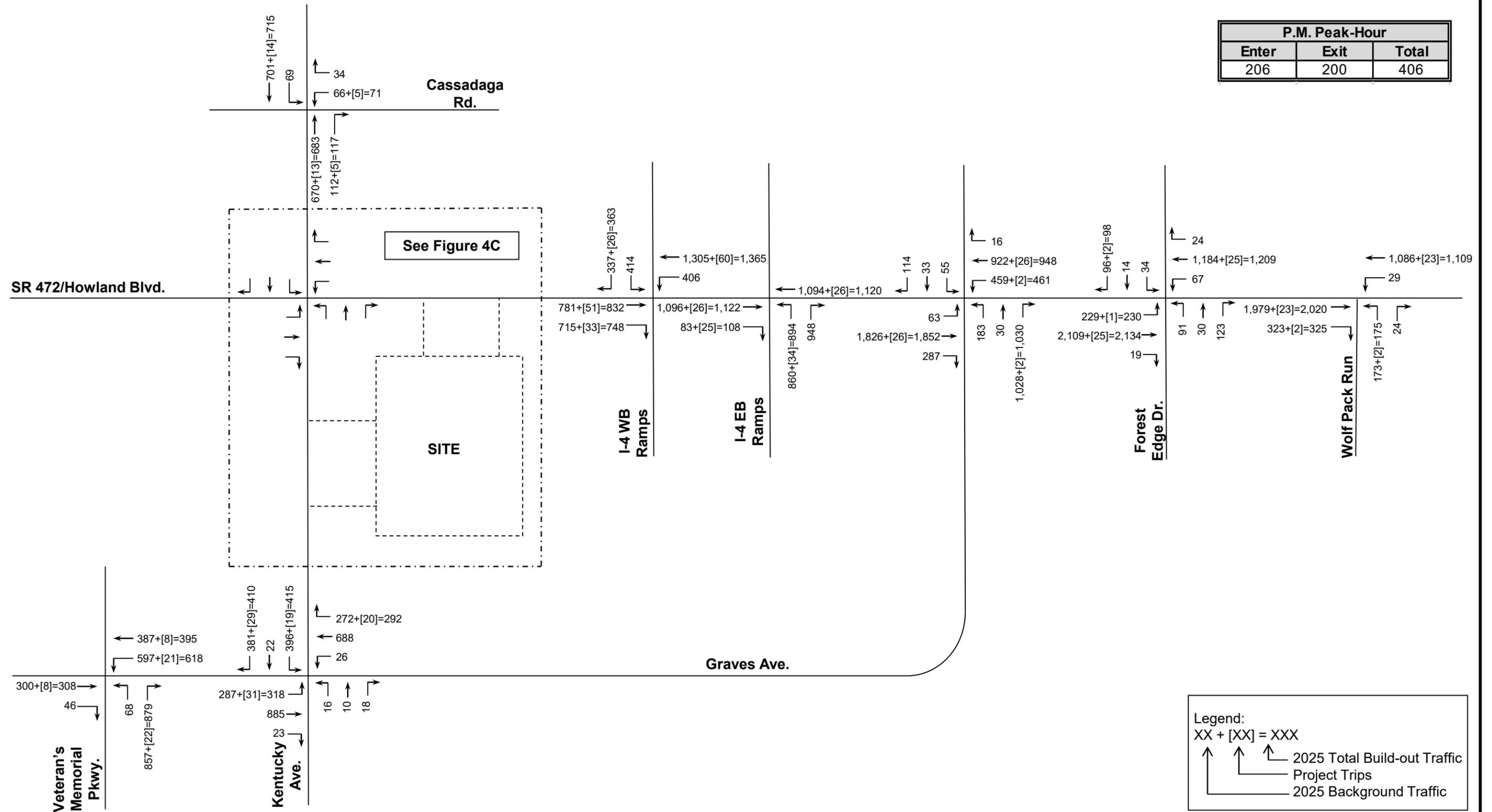
Project Number: 4888.05

Figure 4A



1450 W. Granada Blvd, Suite 2 – Ormond Beach, Florida 32174  
Telephone: 386.257.2571 Fax: 386.257.6996 EB# 0009227

P.M. Peak-Hour		
Enter	Exit	Total
206	200	406



West Volusia Crossings



2025 Build-Out  
P.M. Peak-Hour Volumes

Project Number: 4888.05

Figure 4B



1450 W. Granada Blvd, Suite 2 – Ormond Beach, Florida 32174  
Telephone: 386.257.2571 Fax: 386.257.6996 EB# 0009227



# **APPENDIX I**

## **Unsignalized Intersections Synchro Summary Sheets – Background Conditions**

**Intersection**

Int Delay, s/veh 6.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	78	114	55	33	125	92
Future Vol, veh/h	78	114	55	33	125	92
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	- None		- None		- None	
Storage Length	-	-	-	-	0	-
Veh in Median Storage0#	-	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	3	8	21	9	3	7
Mvmt Flow	86	125	60	36	137	101

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	211
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.31
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-2.389	-3.527
Pot Cap-1 Maneuver	-	-	1254
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1254
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5	12.3
HCM LOS			B

Minor Lane/Major MvmNBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	733	-	-	1254
HCM Lane V/C Ratio	0.325	-	-	0.048
HCM Control Delay (s)	12.3	-	-	8
HCM Lane LOS	B	-	-	A
HCM 95th %tile Q(veh)	1.4	-	-	0.2

**Intersection**

Int Delay, s/veh 5.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	48	82	62	56	81	71
Future Vol, veh/h	48	82	62	56	81	71
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	- None		- None		- None	
Storage Length	-	-	-	-	0	-
Veh in Median Storage0#	-	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	4	5	8	0	4	7
Mvmt Flow	64	109	83	75	108	95

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	173
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.18
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-2.272	-3.536
Pot Cap-1 Maneuver	-	-	1368
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1368
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.1	12.1
HCM LOS			B

Minor Lane/Major MvmNBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	712	-	-	1368
HCM Lane V/C Ratio	0.285	-	-	0.06
HCM Control Delay (s)	12.1	-	-	7.8
HCM Lane LOS	B	-	-	A
HCM 95th %tile Q(veh)	1.2	-	-	0.2

# **APPENDIX J**

## **Signalized Intersections**

### **Summary Sheets – Background Conditions**

Lanes, Volumes, Timings  
 10: Catalina Blvd & Howland Blvd

07/05/2022

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	195	534	36	37	991	77	137	97	27	113	101	663
Future Volume (vph)	195	534	36	37	991	77	137	97	27	113	101	663
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		0	231		0	138		0	378		461
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990			0.989			0.967				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3414	0	1752	3530	0	1770	1807	0	1787	1845	1599
Flt Permitted	0.067			0.403			0.575			0.672		
Satd. Flow (perm)	125	3414	0	743	3530	0	1071	1807	0	1264	1845	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			6			11				269
Link Speed (mph)		45			45			30				30
Link Distance (ft)		485			498			704				612
Travel Time (s)		7.3			7.5			16.0				13.9
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	2%	5%	0%	3%	1%	3%	2%	1%	4%	1%	3%	1%
Adj. Flow (vph)	210	574	39	40	1066	83	147	104	29	122	109	713
Shared Lane Traffic (%)												
Lane Group Flow (vph)	210	613	0	40	1149	0	147	133	0	122	109	713
Enter Blocked Intersection	No	No	No	No	No	No						
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	1	6		5	2		7	4				8

Lanes, Volumes, Timings  
 10: Catalina Blvd & Howland Blvd

07/05/2022



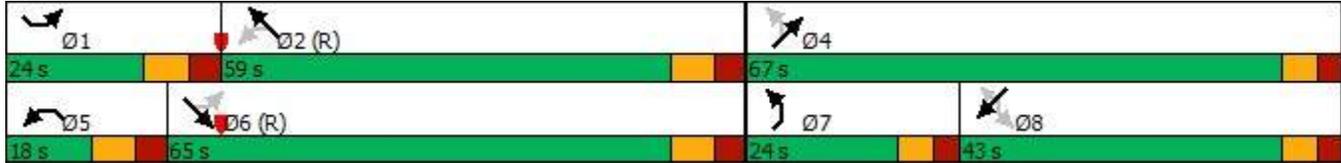
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Permitted Phases	6			2			4			8		8
Detector Phase	1	6		5	2		7	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	11.0		5.0	11.0		5.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.5	26.5		13.5	26.5		12.0	25.0		25.0	25.0	25.0
Total Split (s)	24.0	65.0		18.0	59.0		24.0	67.0		43.0	43.0	43.0
Total Split (%)	16.0%	43.3%		12.0%	39.3%		16.0%	44.7%		28.7%	28.7%	28.7%
Maximum Green (s)	15.5	56.5		9.5	50.5		17.0	60.0		36.0	36.0	36.0
Yellow Time (s)	5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	3.5	3.5		3.5	3.5		3.0	3.0		3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	8.5	8.5		8.5	8.5		7.0	7.0		7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	None
Walk Time (s)		7.0			7.0			7.0		7.0	7.0	7.0
Flash Dont Walk (s)		11.0			11.0			11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0			0		0	0	0
Act Effct Green (s)	73.9	61.6		58.1	50.8		60.0	60.0		37.5	37.5	37.5
Actuated g/C Ratio	0.49	0.41		0.39	0.34		0.40	0.40		0.25	0.25	0.25
v/c Ratio	0.93	0.44		0.12	0.96		0.29	0.18		0.39	0.24	1.19
Control Delay	82.8	33.6		21.3	65.7		31.3	27.4		51.7	47.2	129.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	82.8	33.6		21.3	65.7		31.3	27.4		51.7	47.2	129.7
LOS	F	C		C	E		C	C		D	D	F
Approach Delay		46.2			64.2			29.5			110.1	
Approach LOS		D			E			C			F	
Queue Length 50th (ft)	155	230		20	578		94	76		101	87	~640
Queue Length 95th (ft)	#315	294		42	#728		147	126		168	144	#891
Internal Link Dist (ft)		405			418			624			532	
Turn Bay Length (ft)	330			231			138			378		461
Base Capacity (vph)	231	1404		363	1200		507	729		315	460	601
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.91	0.44		0.11	0.96		0.29	0.18		0.39	0.24	1.19

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	0 (0%), Referenced to phase 2:NWTL and 6:SETL, Start of Green
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.19
Intersection Signal Delay:	70.0
Intersection LOS:	E
Intersection Capacity Utilization:	97.2%
ICU Level of Service:	F
Analysis Period (min):	15

- ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 10: Catalina Blvd & Howland Blvd



Lanes, Volumes, Timings  
 90: Dr. Martin Luther King Blvd & Howland Blvd

07/05/2022

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↙	↑↑	↖	↗
Traffic Volume (vph)	727	8	6	1678	6	1
Future Volume (vph)	727	8	6	1678	6	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		195	236		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3471	1583	1770	3539	1770	1583
Flt Permitted			0.318		0.950	
Satd. Flow (perm)	3471	1583	592	3539	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		9				1
Link Speed (mph)	45			45	30	
Link Distance (ft)	501			427	1222	
Travel Time (s)	7.6			6.5	27.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	4%	2%	2%	2%	2%	2%
Adj. Flow (vph)	808	9	7	1864	7	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	808	9	7	1864	7	1
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)		9	15		15	9
Number of Detectors	2	1	1	2	1	1
Detector Template	Thru	Right	Left	Thru	Left	Right
Leading Detector (ft)	100	20	20	100	20	20
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	6	20	20	6	20	20
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	Perm	NAcustom	Prot	
Protected Phases	2			6	3	4

Lanes, Volumes, Timings  
 90: Dr. Martin Luther King Blvd & Howland Blvd

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Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases		2	6		4	
Detector Phase	2	2	6	6	3	4
Switch Phase						
Minimum Initial (s)	25.0	25.0	25.0	25.0	6.0	6.0
Minimum Split (s)	32.5	32.5	32.5	32.5	25.4	25.4
Total Split (s)	90.0	90.0	90.0	90.0	25.4	30.0
Total Split (%)	61.9%	61.9%	61.9%	61.9%	17.5%	20.6%
Maximum Green (s)	82.5	82.5	82.5	82.5	18.0	22.6
Yellow Time (s)	4.8	4.8	4.8	4.8	4.0	4.0
All-Red Time (s)	2.7	2.7	2.7	2.7	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	7.4	7.4
Lead/Lag					Lead	Lag
Lead-Lag Optimize?					Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	None	None	None	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	82.6	82.6	82.6	82.6	25.2	22.6
Actuated g/C Ratio	0.67	0.67	0.67	0.67	0.21	0.18
v/c Ratio	0.35	0.01	0.02	0.78	0.02	0.00
Control Delay	9.5	4.5	8.3	17.8	37.8	34.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.5	4.5	8.3	17.8	37.8	34.0
LOS	A	A	A	B	D	C
Approach Delay	9.5			17.7	37.4	
Approach LOS	A			B	D	
Queue Length 50th (ft)	121	0	2	454	4	0
Queue Length 95th (ft)	216	7	9	775	17	6
Internal Link Dist (ft)	421			347	1142	
Turn Bay Length (ft)		195	236			
Base Capacity (vph)	2335	1068	398	2381	363	292
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.01	0.02	0.78	0.02	0.00
<b>Intersection Summary</b>						
Area Type:	Other					
Cycle Length:	145.4					
Actuated Cycle Length:	122.8					
Natural Cycle:	115					
Control Type:	Actuated-Uncoordinated					
Maximum v/c Ratio:	0.78					
Intersection Signal Delay:	15.3			Intersection LOS: B		
Intersection Capacity Utilization	63.8%			ICU Level of Service B		
Analysis Period (min)	15					

Lanes, Volumes, Timings

90: Dr. Martin Luther King Blvd & Howland Blvd

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Splits and Phases: 90: Dr. Martin Luther King Blvd & Howland Blvd

→ Ø2	↖ Ø3	↖ Ø4
90 s	25.4 s	30 s
← Ø6		
90 s		

Lanes, Volumes, Timings  
1: Wolf Pack Run & Howland Blvd

07/05/2022

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↖↗	
Traffic Volume (vph)	701	169	137	1852	173	72
Future Volume (vph)	701	169	137	1852	173	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	204		414	414
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	0.95	1.00	0.95	0.97	0.95
Frt	0.971				0.956	
Flt Protected			0.950		0.966	
Satd. Flow (prot)	3345	0	1736	3539	3322	0
Flt Permitted			0.262		0.966	
Satd. Flow (perm)	3345	0	479	3539	3322	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	21				43	
Link Speed (mph)	45			45	35	
Link Distance (ft)	365			639	3058	
Travel Time (s)	5.5			9.7	59.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	4%	4%	2%	1%	6%
Adj. Flow (vph)	738	178	144	1949	182	76
Shared Lane Traffic (%)						
Lane Group Flow (vph)	916	0	144	1949	258	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
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)		9	15		15	9
Number of Detectors	2		1	2	1	
Detector Template	Thru		Left	Thru	Left	
Leading Detector (ft)	100		20	100	20	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	6		20	6	20	
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		pm+pt	NA	Prot	
Protected Phases	6		5	2	4	

Lanes, Volumes, Timings  
1: Wolf Pack Run & Howland Blvd

07/05/2022

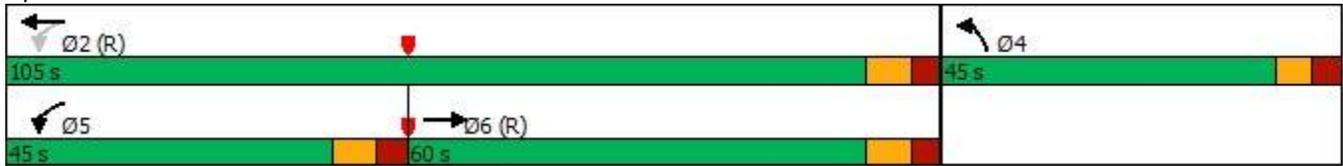


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases			2			
Detector Phase	6		5	2	4	
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	7.0	
Minimum Split (s)	26.5		13.5	26.5	25.5	
Total Split (s)	60.0		45.0	105.0	45.0	
Total Split (%)	40.0%		30.0%	70.0%	30.0%	
Maximum Green (s)	51.5		36.5	96.5	37.5	
Yellow Time (s)	5.0		5.0	5.0	4.0	
All-Red Time (s)	3.5		3.5	3.5	3.5	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	8.5		8.5	8.5	7.5	
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	C-Max		None	C-Max	None	
Walk Time (s)	7.0			7.0	7.0	
Flash Dont Walk (s)	11.0			11.0	11.0	
Pedestrian Calls (#/hr)	0			0	0	
Act Effct Green (s)	101.9		118.8	118.8	15.2	
Actuated g/C Ratio	0.68		0.79	0.79	0.10	
v/c Ratio	0.40		0.32	0.70	0.69	
Control Delay	11.4		5.8	9.3	63.5	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	11.4		5.8	9.3	63.5	
LOS	B		A	A	E	
Approach Delay	11.4			9.0	63.5	
Approach LOS	B			A	E	
Queue Length 50th (ft)	188		28	400	106	
Queue Length 95th (ft)	265		51	547	150	
Internal Link Dist (ft)	285			559	2978	
Turn Bay Length (ft)			204		414	
Base Capacity (vph)	2278		685	2802	862	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.40		0.21	0.70	0.30	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	0 (0%), Referenced to phase 2:WBTL and 6:EBT, Start of Green
Natural Cycle:	80
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.70
Intersection Signal Delay:	14.0
Intersection LOS:	B
Intersection Capacity Utilization:	71.7%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 1: Wolf Pack Run & Howland Blvd



Lanes, Volumes, Timings  
 10: Catalina Blvd & Howland Blvd

07/05/2022

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	510	734	100	48	634	89	83	100	29	93	151	355
Future Volume (vph)	510	734	100	48	634	89	83	100	29	93	151	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		0	231		0	138		0	378		461
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982			0.981			0.966				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3510	0	1703	3506	0	1787	1807	0	1770	1881	1599
Flt Permitted	0.184			0.323			0.335			0.670		
Satd. Flow (perm)	350	3510	0	579	3506	0	630	1807	0	1248	1881	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			11			11				333
Link Speed (mph)		45			45			30				30
Link Distance (ft)		485			498			704				612
Travel Time (s)		7.3			7.5			16.0				13.9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	1%	1%	6%	1%	1%	1%	0%	7%	2%	1%	1%
Adj. Flow (vph)	537	773	105	51	667	94	87	105	31	98	159	374
Shared Lane Traffic (%)												
Lane Group Flow (vph)	537	878	0	51	761	0	87	136	0	98	159	374
Enter Blocked Intersection	No	No	No	No	No	No						
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	1	6		5	2		7	4				8

Lanes, Volumes, Timings  
10: Catalina Blvd & Howland Blvd

07/05/2022



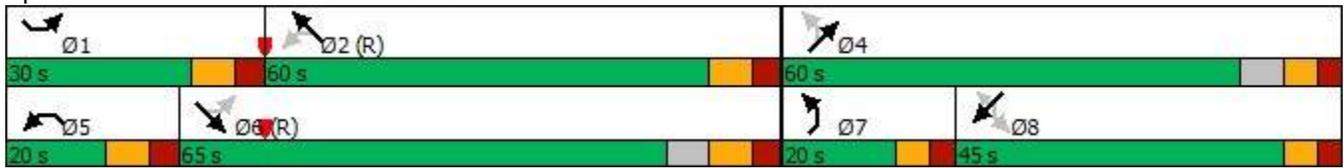
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Permitted Phases	6			2			4			8		8
Detector Phase	1	6		5	2		7	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	11.0		5.0	11.0		5.0	7.0		7.0	7.0	7.0
Minimum Split (s)	13.5	26.5		13.5	26.5		12.0	25.0		25.0	25.0	25.0
Total Split (s)	30.0	65.0		20.0	60.0		20.0	60.0		45.0	45.0	45.0
Total Split (%)	19.4%	41.9%		12.9%	38.7%		12.9%	38.7%		29.0%	29.0%	29.0%
Maximum Green (s)	21.5	56.5		11.5	51.5		13.0	53.0		38.0	38.0	38.0
Yellow Time (s)	5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	3.5	3.5		3.5	3.5		3.0	3.0		3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	8.5	8.5		8.5	8.5		7.0	7.0		7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	None
Walk Time (s)		7.0			7.0			7.0		7.0	7.0	7.0
Flash Dont Walk (s)		11.0			11.0			11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0			0		0	0	0
Act Effct Green (s)	101.3	88.4		58.7	51.5		38.2	38.2		19.8	19.8	19.8
Actuated g/C Ratio	0.65	0.57		0.38	0.33		0.25	0.25		0.13	0.13	0.13
v/c Ratio	0.87	0.44		0.19	0.65		0.36	0.30		0.62	0.67	0.76
Control Delay	44.6	21.7		18.2	46.5		48.4	43.6		79.4	77.0	19.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	44.6	21.7		18.2	46.5		48.4	43.6		79.4	77.0	19.7
LOS	D	C		B	D		D	D		E	E	B
Approach Delay		30.4			44.7			45.5			43.4	
Approach LOS		C			D			D			D	
Queue Length 50th (ft)	369	270		18	341		70	103		96	156	38
Queue Length 95th (ft)	#689	379		41	414		111	153		152	224	149
Internal Link Dist (ft)		405			418			624			532	
Turn Bay Length (ft)	330			231			138			378		461
Base Capacity (vph)	616	2005		318	1172		252	683		305	461	643
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.87	0.44		0.16	0.65		0.35	0.20		0.32	0.34	0.58

Intersection Summary

Area Type:	Other
Cycle Length:	155
Actuated Cycle Length:	155
Offset:	0 (0%), Referenced to phase 2:NWTL and 6:SETL, Start of Green
Natural Cycle:	100
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.87
Intersection Signal Delay:	37.9
Intersection LOS:	D
Intersection Capacity Utilization:	87.3%
ICU Level of Service:	E
Analysis Period (min):	15

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 10: Catalina Blvd & Howland Blvd



Lanes, Volumes, Timings  
 90: Dr. Martin Luther King Blvd & Howland Blvd

07/05/2022

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↗	↙	↑↑	↖	↗
Traffic Volume (vph)	1379	4	6	1003	12	3
Future Volume (vph)	1379	4	6	1003	12	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		195	236		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3574	1292	1543	3574	1656	1583
Flt Permitted			0.102		0.950	
Satd. Flow (perm)	3574	1292	166	3574	1656	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		3				3
Link Speed (mph)	45			45	30	
Link Distance (ft)	501			427	1222	
Travel Time (s)	7.6			6.5	27.8	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	25%	17%	1%	9%	2%
Adj. Flow (vph)	1483	4	6	1078	13	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1483	4	6	1078	13	3
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)		9	15		15	9
Number of Detectors	2	1	1	2	1	1
Detector Template	Thru	Right	Left	Thru	Left	Right
Leading Detector (ft)	100	20	20	100	20	20
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	6	20	20	6	20	20
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	Perm	NAcustom	Prot	
Protected Phases	2			6	3	4

Lanes, Volumes, Timings  
 90: Dr. Martin Luther King Blvd & Howland Blvd

07/05/2022



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases		2	6		4	
Detector Phase	2	2	6	6	3	4
Switch Phase						
Minimum Initial (s)	25.0	25.0	25.0	25.0	6.0	6.0
Minimum Split (s)	32.5	32.5	32.5	32.5	25.4	25.4
Total Split (s)	98.0	98.0	98.0	98.0	26.0	26.0
Total Split (%)	65.3%	65.3%	65.3%	65.3%	17.3%	17.3%
Maximum Green (s)	90.5	90.5	90.5	90.5	18.6	18.6
Yellow Time (s)	4.8	4.8	4.8	4.8	4.0	4.0
All-Red Time (s)	2.7	2.7	2.7	2.7	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	7.4	7.4
Lead/Lag					Lead	Lag
Lead-Lag Optimize?					Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	None	None	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	90.5	90.5	90.5	90.5	44.6	18.6
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.30	0.12
v/c Ratio	0.69	0.01	0.06	0.50	0.03	0.02
Control Delay	22.3	8.2	14.2	17.9	37.7	36.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.3	8.2	14.2	17.9	37.7	36.3
LOS	C	A	B	B	D	D
Approach Delay	22.2			17.9	37.4	
Approach LOS	C			B	D	
Queue Length 50th (ft)	495	0	2	301	9	0
Queue Length 95th (ft)	575	6	10	357	27	11
Internal Link Dist (ft)	421			347	1142	
Turn Bay Length (ft)		195	236			
Base Capacity (vph)	2156	780	100	2156	492	198
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.01	0.06	0.50	0.03	0.02

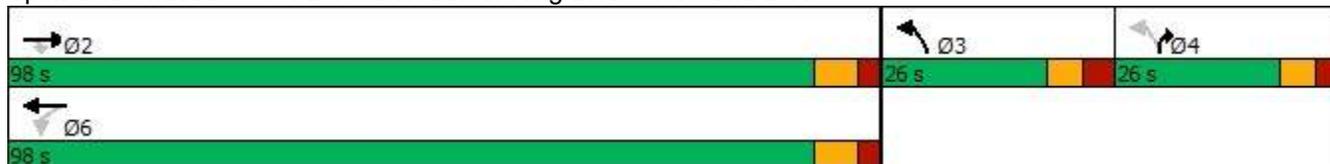
Intersection Summary	
Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Natural Cycle:	95
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.69
Intersection Signal Delay:	20.5
Intersection LOS:	C
Intersection Capacity Utilization:	55.5%
ICU Level of Service:	B
Analysis Period (min):	15

Lanes, Volumes, Timings

90: Dr. Martin Luther King Blvd & Howland Blvd

07/05/2022

Splits and Phases: 90: Dr. Martin Luther King Blvd & Howland Blvd



Lanes, Volumes, Timings  
1: Wolf Pack Run & Howland Blvd

07/05/2022

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↖↗	
Traffic Volume (vph)	1403	208	80	1084	131	67
Future Volume (vph)	1403	208	80	1084	131	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	204		414	414
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	0.95	1.00	0.95	0.97	0.95
Frt	0.981				0.949	
Flt Protected			0.950		0.968	
Satd. Flow (prot)	3497	0	1719	3539	3320	0
Flt Permitted			0.088		0.968	
Satd. Flow (perm)	3497	0	159	3539	3320	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	12				64	
Link Speed (mph)	45			45	35	
Link Distance (ft)	365			639	3058	
Travel Time (s)	5.5			9.7	59.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	3%	5%	2%	2%	2%
Adj. Flow (vph)	1477	219	84	1141	138	71
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1696	0	84	1141	209	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
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)		9	15		15	9
Number of Detectors	2		1	2	1	
Detector Template	Thru		Left	Thru	Left	
Leading Detector (ft)	100		20	100	20	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	6		20	6	20	
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		pm+pt	NA	Prot	
Protected Phases	6		5	2	4	

Lanes, Volumes, Timings  
1: Wolf Pack Run & Howland Blvd

07/05/2022

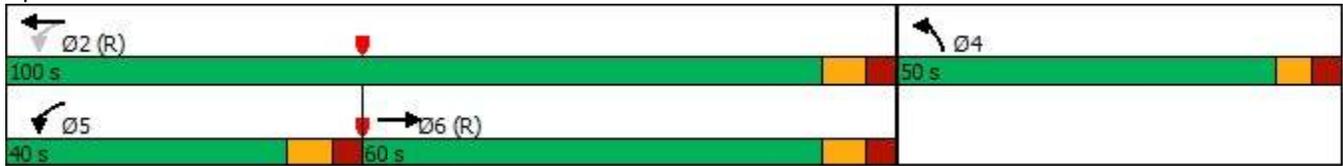


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases			2			
Detector Phase	6		5	2	4	
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	7.0	
Minimum Split (s)	26.5		13.5	26.5	25.5	
Total Split (s)	60.0		40.0	100.0	50.0	
Total Split (%)	40.0%		26.7%	66.7%	33.3%	
Maximum Green (s)	51.5		31.5	91.5	42.5	
Yellow Time (s)	5.0		5.0	5.0	4.0	
All-Red Time (s)	3.5		3.5	3.5	3.5	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	8.5		8.5	8.5	7.5	
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	C-Max		None	C-Max	None	
Walk Time (s)	7.0			7.0	7.0	
Flash Dont Walk (s)	11.0			11.0	11.0	
Pedestrian Calls (#/hr)	0			0	0	
Act Effct Green (s)	106.1		121.9	121.9	12.1	
Actuated g/C Ratio	0.71		0.81	0.81	0.08	
v/c Ratio	0.68		0.41	0.40	0.64	
Control Delay	14.7		9.1	4.5	54.9	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	14.7		9.1	4.5	54.9	
LOS	B		A	A	D	
Approach Delay	14.7			4.8	54.9	
Approach LOS	B			A	D	
Queue Length 50th (ft)	447		14	136	71	
Queue Length 95th (ft)	617		28	191	113	
Internal Link Dist (ft)	285			559	2978	
Turn Bay Length (ft)			204		414	
Base Capacity (vph)	2478		456	2876	986	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.68		0.18	0.40	0.21	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	0 (0%), Referenced to phase 2:WBTL and 6:EBT, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.68
Intersection Signal Delay:	13.5
Intersection LOS:	B
Intersection Capacity Utilization:	76.1%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 1: Wolf Pack Run & Howland Blvd



# **APPENDIX K**

**Signalized Intersections**

**Synchro Summary Sheets –  
Background Conditions- Improved**

Lanes, Volumes, Timings  
 10: Catalina Blvd & Howland Blvd

07/05/2022

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	195	534	36	37	991	77	137	97	27	113	101	663
Future Volume (vph)	195	534	36	37	991	77	137	97	27	113	101	663
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		0	231		0	138		0	378		461
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.990			0.989			0.967				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3414	0	1752	3530	0	1770	1807	0	1787	1845	1599
Flt Permitted	0.067			0.420			0.474			0.672		
Satd. Flow (perm)	125	3414	0	775	3530	0	883	1807	0	1264	1845	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			6			11				91
Link Speed (mph)		45			45			30				30
Link Distance (ft)		485			498			704				612
Travel Time (s)		7.3			7.5			16.0				13.9
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	2%	5%	0%	3%	1%	3%	2%	1%	4%	1%	3%	1%
Adj. Flow (vph)	210	574	39	40	1066	83	147	104	29	122	109	713
Shared Lane Traffic (%)												
Lane Group Flow (vph)	210	613	0	40	1149	0	147	133	0	122	109	713
Enter Blocked Intersection	No	No	No	No	No	No						
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov
Protected Phases	1	6		5	2		7	4			8	1

Lanes, Volumes, Timings  
10: Catalina Blvd & Howland Blvd

07/05/2022



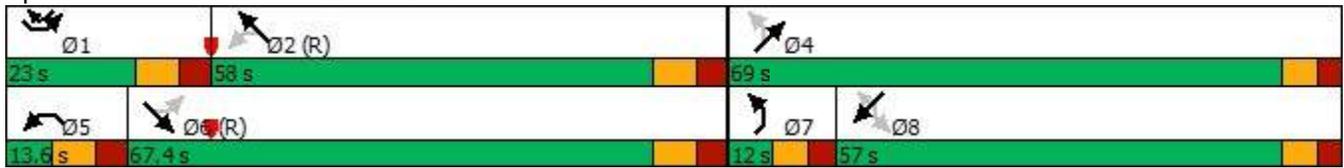
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Permitted Phases	6			2			4			8		8
Detector Phase	1	6		5	2		7	4		8	8	1
Switch Phase												
Minimum Initial (s)	5.0	11.0		5.0	11.0		5.0	7.0		7.0	7.0	5.0
Minimum Split (s)	13.5	26.5		13.5	26.5		12.0	25.0		45.0	45.0	13.5
Total Split (s)	23.0	67.4		13.6	58.0		12.0	69.0		57.0	57.0	23.0
Total Split (%)	15.3%	44.9%		9.1%	38.7%		8.0%	46.0%		38.0%	38.0%	15.3%
Maximum Green (s)	14.5	58.9		5.1	49.5		5.0	62.0		50.0	50.0	14.5
Yellow Time (s)	5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0	5.0
All-Red Time (s)	3.5	3.5		3.5	3.5		3.0	3.0		3.0	3.0	3.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	8.5	8.5		8.5	8.5		7.0	7.0		7.0	7.0	8.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead			Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	None
Walk Time (s)		7.0			7.0			7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0			11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0			0		0	0	
Act Effct Green (s)	102.5	90.1		58.2	51.6		32.0	32.0		20.0	20.0	69.4
Actuated g/C Ratio	0.68	0.60		0.39	0.34		0.21	0.21		0.13	0.13	0.46
v/c Ratio	0.38	0.30		0.12	0.94		0.68	0.34		0.73	0.44	0.90
Control Delay	26.1	16.5		16.2	63.2		67.1	46.7		84.9	64.0	48.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	26.1	16.5		16.2	63.2		67.1	46.7		84.9	64.0	48.2
LOS	C	B		B	E		E	D		F	E	D
Approach Delay		18.9			61.6			57.4			54.8	
Approach LOS		B			E			E			D	
Queue Length 50th (ft)	108	153		12	585		125	102		116	100	559
Queue Length 95th (ft)	204	224		30	#742		182	155		180	154	#824
Internal Link Dist (ft)		405			418			624			532	
Turn Bay Length (ft)	330			231			138			378		461
Base Capacity (vph)	550	2052		344	1217		217	753		421	615	788
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.38	0.30		0.12	0.94		0.68	0.18		0.29	0.18	0.90

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	0 (0%), Referenced to phase 2:NWTL and 6:SETL, Start of Green
Natural Cycle:	140
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.94
Intersection Signal Delay:	48.4
Intersection LOS:	D
Intersection Capacity Utilization:	98.5%
ICU Level of Service:	F
Analysis Period (min):	15

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 10: Catalina Blvd & Howland Blvd



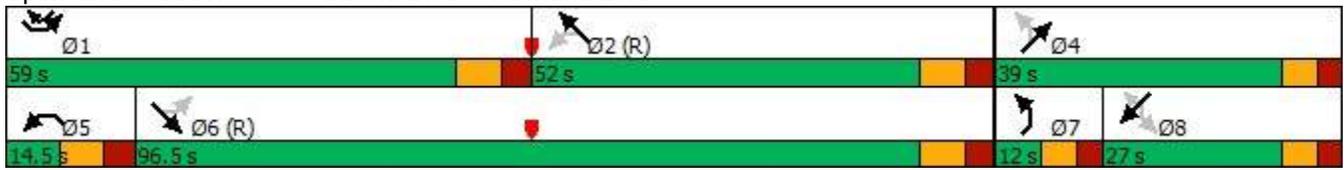
Lanes, Volumes, Timings  
 10: Catalina Blvd & Howland Blvd

07/06/2022

												
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	510	734	100	48	634	89	83	100	29	93	151	355
Future Volume (vph)	510	734	100	48	634	89	83	100	29	93	151	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		0	231		0	138		0	378		461
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982			0.981			0.966				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3510	0	1703	3506	0	1787	1807	0	1770	1881	1599
Flt Permitted	0.220			0.323			0.304			0.670		
Satd. Flow (perm)	418	3510	0	579	3506	0	572	1807	0	1248	1881	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			10			9				91
Link Speed (mph)		45			45			30				30
Link Distance (ft)		485			498			704				612
Travel Time (s)		7.3			7.5			16.0				13.9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	1%	1%	6%	1%	1%	1%	0%	7%	2%	1%	1%
Adj. Flow (vph)	537	773	105	51	667	94	87	105	31	98	159	374
Shared Lane Traffic (%)												
Lane Group Flow (vph)	537	878	0	51	761	0	87	136	0	98	159	374
Enter Blocked Intersection	No	No	No	No	No	No						
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov
Protected Phases	1	6		5	2		7	4			8	1



Splits and Phases: 10: Catalina Blvd & Howland Blvd



# **APPENDIX L**

## **Unsignalized Intersections Synchro Summary Sheets – Build-Out Conditions**

**Intersection**

Int Delay, s/veh 6.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	↑
Traffic Vol, veh/h	78	114	56	33	125	93
Future Vol, veh/h	78	114	56	33	125	93
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	- None		- None		- None	
Storage Length	-	-	-	-	0	-
Veh in Median Storage0#	-	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	3	8	21	9	3	7
Mvmt Flow	86	125	62	36	137	102

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	211
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.31
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.389
Pot Cap-1 Maneuver	-	-	1254
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1254
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	5	12.3
HCM LOS			B

Minor Lane/Major MvmNBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	731	-	-	1254
HCM Lane V/C Ratio	0.328	-	-	0.049
HCM Control Delay (s)	12.3	-	-	8
HCM Lane LOS	B	-	-	A
HCM 95th %tile Q(veh)	1.4	-	-	0.2

Intersection			
Intersection Delay, s/veh	2.9		
Intersection LOS	A		
Approach	WB	NB	SB
Entry Lanes	1	0	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	60	0	26
Demand Flow Rate, veh/h	61	0	26
Vehicles Circulating, veh/h	0	11	0
Vehicles Exiting, veh/h	11	15	61
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	3.0	0.0	2.8
Approach LOS	A	-	A
Lane	Left	Left	
Designated Moves	R	LT	
Assumed Moves	R	LT	
RT Channelized			
Lane Util	1.000	1.000	
Follow-Up Headway, s	2.609	2.609	
Critical Headway, s	4.976	4.976	
Entry Flow, veh/h	61	26	
Cap Entry Lane, veh/h	1380	1380	
Entry HV Adj Factor	0.984	0.989	
Flow Entry, veh/h	60	26	
Cap Entry, veh/h	1357	1364	
V/C Ratio	0.044	0.019	
Control Delay, s/veh	3.0	2.8	
LOS	A	A	
95th %tile Queue, veh	0	0	

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑		↑
Traffic Vol, veh/h	772	1	0	1794	0	1
Future Vol, veh/h	772	1	0	1794	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	- None		- None		- None	
Storage Length	-	0	-	-	-	0
Veh in Median Storage0#	-	-	-	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	839	1	0	1950	0	1

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	-	-	-	420
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	582
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	582
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.2
HCM LOS			B

Minor Lane/Major MvmNBLn1	EBT	EBR	WBT
Capacity (veh/h)	582	-	-
HCM Lane V/C Ratio	0.002	-	-
HCM Control Delay (s)	11.2	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0	-	-

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑		↑
Traffic Vol, veh/h	766	7	0	1794	0	7
Future Vol, veh/h	766	7	0	1794	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	- None		- None		- None	
Storage Length	-	0	-	-	-	0
Veh in Median Storage#	-	-	-	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	833	8	0	1950	0	8

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	-	-	-	417
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	585
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	585
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.2
HCM LOS			B

Minor Lane/Major Mvm	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	585	-	-	-
HCM Lane V/C Ratio	0.013	-	-	-
HCM Control Delay (s)	11.2	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

**Intersection**

Int Delay, s/veh 0.6

**Movement** SEL SER NEL NET SWT SWR

Lane Configurations	Y			↑↑	↑↑	
Traffic Vol, veh/h	26	2	1	261	174	8
Future Vol, veh/h	26	2	1	261	174	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage#	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	28	2	1	284	189	9

**Major/Minor** Minor2 Major1 Major2

Conflicting Flow All	338	99	198	0	-	0
Stage 1	194	-	-	-	-	-
Stage 2	144	-	-	-	-	-
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 Maneuve	632	937	1372	-	-	-
Stage 1	820	-	-	-	-	-
Stage 2	868	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuve	631	937	1372	-	-	-
Mov Cap-2 Maneuve	631	-	-	-	-	-
Stage 1	819	-	-	-	-	-
Stage 2	868	-	-	-	-	-

**Approach** SE NE SW

HCM Control Delay, s 10.8 0 0  
 HCM LOS B

**Minor Lane/Major Mvmt** NEL NETSELn1 SWT SWR

Capacity (veh/h)	1372	-	646	-	-
HCM Lane V/C Ratio	0.001	-	0.047	-	-
HCM Control Delay (s)	7.6	0	10.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

**Intersection**

Int Delay, s/veh 5.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	48	82	63	56	81	72
Future Vol, veh/h	48	82	63	56	81	72
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	- None		- None		- None	
Storage Length	-	-	-	-	0	-
Veh in Median Storage0#	-	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	75	75	75	75	75
Heavy Vehicles, %	4	5	8	0	4	7
Mvmt Flow	64	109	84	75	108	96

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	173
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.18
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-2.272	-3.536
Pot Cap-1 Maneuver	-	-	1368
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	1368
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	4.1	12.1
HCM LOS			B

Minor Lane/Major MvmNBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	711	-	-	1368
HCM Lane V/C Ratio	0.287	-	-	0.061
HCM Control Delay (s)	12.1	-	-	7.8
HCM Lane LOS	B	-	-	A
HCM 95th %tile Q(veh)	1.2	-	-	0.2

Intersection			
Intersection Delay, s/veh	2.9		
Intersection LOS	A		
Approach	WB	NB	SB
Entry Lanes	1	0	1
Conflicting Circle Lanes	1	1	1
Adj Approach Flow, veh/h	49	0	47
Demand Flow Rate, veh/h	50	0	48
Vehicles Circulating, veh/h	0	37	0
Vehicles Exiting, veh/h	37	11	50
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	2.9	0.0	2.9
Approach LOS	A	-	A
Lane	Left	Left	
Designated Moves	R	LT	
Assumed Moves	R	LT	
RT Channelized			
Lane Util	1.000	1.000	
Follow-Up Headway, s	2.609	2.609	
Critical Headway, s	4.976	4.976	
Entry Flow, veh/h	50	48	
Cap Entry Lane, veh/h	1380	1380	
Entry HV Adj Factor	0.980	0.975	
Flow Entry, veh/h	49	47	
Cap Entry, veh/h	1352	1345	
V/C Ratio	0.036	0.035	
Control Delay, s/veh	2.9	2.9	
LOS	A	A	
95th %tile Queue, veh	0	0	

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑		↑
Traffic Vol, veh/h	1365	9	0	1087	0	8
Future Vol, veh/h	1365	9	0	1087	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	- None		- None		- None	
Storage Length	-	0	-	-	-	0
Veh in Median Storage#	-	-	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	1484	10	0	1182	0	9

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	-	-	- 742
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	-	-	-	- 6.94
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	- 3.32
Pot Cap-1 Maneuver	-	-	0	-	0 358
Stage 1	-	-	0	-	0
Stage 2	-	-	0	-	0
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	- 358
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	15.3
HCM LOS			C

Minor Lane/Major Mvm	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	358	-	-	-
HCM Lane V/C Ratio	0.024	-	-	-
HCM Control Delay (s)	15.3	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑		↑↑		↑
Traffic Vol, veh/h	1348	25	0	1087	0	5
Future Vol, veh/h	1348	25	0	1087	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	- None		- None		- None	
Storage Length	-	0	-	-	-	0
Veh in Median Storage0#	-	-	-	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	1465	27	0	1182	0	5

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	-	-	-	733
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	363
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	363
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	15.1
HCM LOS			C

Minor Lane/Major MvmNBLn1	EBT	EBR	WBT
Capacity (veh/h)	363	-	-
HCM Lane V/C Ratio	0.015	-	-
HCM Control Delay (s)	15.1	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	0	-	-

**Intersection**

Int Delay, s/veh 0.4

**Movement** SEL SER NEL NET SWT SWR

Lane Configurations	Y			4	1	
Traffic Vol, veh/h	16	1	2	212	299	28
Future Vol, veh/h	16	1	2	212	299	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage#	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	1	2	230	325	30

**Major/Minor** Minor2 Major1 Major2

Conflicting Flow All	574	340	355	0	-	0
Stage 1	340	-	-	-	-	-
Stage 2	234	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	480	702	1204	-	-	-
Stage 1	721	-	-	-	-	-
Stage 2	805	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	479	702	1204	-	-	-
Mov Cap-2 Maneuver	479	-	-	-	-	-
Stage 1	720	-	-	-	-	-
Stage 2	805	-	-	-	-	-

**Approach** SE NE SW

HCM Control Delay, s 12.7 0.1 0  
 HCM LOS B

**Minor Lane/Major Mvmt** NEL NETSELn1 SWT SWR

Capacity (veh/h)	1204	-	488	-	-
HCM Lane V/C Ratio	0.002	-	0.038	-	-
HCM Control Delay (s)	8	0	12.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

# **APPENDIX M**

## **Signalized Intersections Synchro Summary Sheets – Build-Out Conditions**

Lanes, Volumes, Timings  
 10: Catalina Blvd & Howland Blvd

07/06/2022

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	199	539	36	44	993	77	137	101	49	113	102	664
Future Volume (vph)	199	539	36	44	993	77	137	101	49	113	102	664
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		0	231		0	138		0	378		461
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.989			0.951				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3417	0	1752	3530	0	1770	1772	0	1787	1845	1599
Flt Permitted	0.067			0.417			0.475			0.654		
Satd. Flow (perm)	125	3417	0	769	3530	0	885	1772	0	1230	1845	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			6			20				91
Link Speed (mph)		45			45			30				30
Link Distance (ft)		485			498			525				612
Travel Time (s)		7.3			7.5			11.9				13.9
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	2%	5%	0%	3%	1%	3%	2%	1%	4%	1%	3%	1%
Adj. Flow (vph)	214	580	39	47	1068	83	147	109	53	122	110	714
Shared Lane Traffic (%)												
Lane Group Flow (vph)	214	619	0	47	1151	0	147	162	0	122	110	714
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov
Protected Phases	1	6		5	2		7	4			8	1

Lanes, Volumes, Timings  
 10: Catalina Blvd & Howland Blvd

07/06/2022



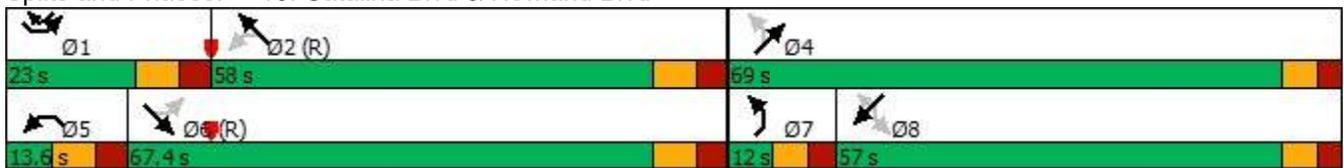
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Permitted Phases	6			2			4			8		8
Detector Phase	1	6		5	2		7	4		8	8	1
Switch Phase												
Minimum Initial (s)	5.0	11.0		5.0	11.0		5.0	7.0		7.0	7.0	5.0
Minimum Split (s)	13.5	26.5		13.5	26.5		12.0	25.0		45.0	45.0	13.5
Total Split (s)	23.0	67.4		13.6	58.0		12.0	69.0		57.0	57.0	23.0
Total Split (%)	15.3%	44.9%		9.1%	38.7%		8.0%	46.0%		38.0%	38.0%	15.3%
Maximum Green (s)	14.5	58.9		5.1	49.5		5.0	62.0		50.0	50.0	14.5
Yellow Time (s)	5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0	5.0
All-Red Time (s)	3.5	3.5		3.5	3.5		3.0	3.0		3.0	3.0	3.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	8.5	8.5		8.5	8.5		7.0	7.0		7.0	7.0	8.5
Lead/Lag	Lead	Lag		Lead	Lag		Lead			Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	None
Walk Time (s)		7.0			7.0			7.0		7.0	7.0	
Flash Dont Walk (s)		11.0			11.0			11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0			0			0		0	0	
Act Effct Green (s)	102.1	89.5		58.4	51.5		32.4	32.4		20.4	20.4	69.5
Actuated g/C Ratio	0.68	0.60		0.39	0.34		0.22	0.22		0.14	0.14	0.46
v/c Ratio	0.39	0.30		0.14	0.95		0.67	0.41		0.73	0.44	0.90
Control Delay	26.8	16.9		16.3	63.5		66.0	45.9		85.4	63.5	48.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	26.8	16.9		16.3	63.5		66.0	45.9		85.4	63.5	48.3
LOS	C	B		B	E		E	D		F	E	D
Approach Delay		19.4			61.7			55.4			54.9	
Approach LOS		B			E			E			D	
Queue Length 50th (ft)	112	156		14	586		124	120		116	100	560
Queue Length 95th (ft)	211	230		34	#744		181	180		180	155	#826
Internal Link Dist (ft)		405			418			445			532	
Turn Bay Length (ft)	330			231			138			378		461
Base Capacity (vph)	546	2040		344	1216		220	744		410	615	789
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.39	0.30		0.14	0.95		0.67	0.22		0.30	0.18	0.90

Intersection Summary

Area Type: Other  
 Cycle Length: 150  
 Actuated Cycle Length: 150  
 Offset: 0 (0%), Referenced to phase 2:NWTL and 6:SETL, Start of Green  
 Natural Cycle: 140  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.95  
 Intersection Signal Delay: 48.4                      Intersection LOS: D  
 Intersection Capacity Utilization 98.6%                      ICU Level of Service F  
 Analysis Period (min) 15

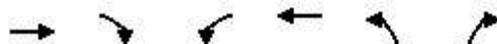
# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 10: Catalina Blvd & Howland Blvd



Lanes, Volumes, Timings  
 90: Dr. Martin Luther King Blvd & Howland Blvd

07/06/2022



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	↑
Traffic Volume (vph)	735	17	9	1678	55	1
Future Volume (vph)	735	17	9	1678	55	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		195	236		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3471	1583	1770	3539	1770	1583
Flt Permitted			0.306		0.950	
Satd. Flow (perm)	3471	1583	570	3539	1770	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		19				1
Link Speed (mph)	45			45	30	
Link Distance (ft)	501			427	1199	
Travel Time (s)	7.6			6.5	27.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	4%	2%	2%	2%	2%	2%
Adj. Flow (vph)	817	19	10	1864	61	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	817	19	10	1864	61	1
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)		9	15		15	9
Number of Detectors	2	1	1	2	1	1
Detector Template	Thru	Right	Left	Thru	Left	Right
Leading Detector (ft)	100	20	20	100	20	20
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	6	20	20	6	20	20
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	Perm	NAcustom	Prot	
Protected Phases	2			6	3	4

Lanes, Volumes, Timings  
 90: Dr. Martin Luther King Blvd & Howland Blvd

07/06/2022



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases		2	6		4	
Detector Phase	2	2	6	6	3	4
Switch Phase						
Minimum Initial (s)	25.0	25.0	25.0	25.0	6.0	6.0
Minimum Split (s)	32.5	32.5	32.5	32.5	25.4	25.4
Total Split (s)	90.0	90.0	90.0	90.0	25.4	30.0
Total Split (%)	61.9%	61.9%	61.9%	61.9%	17.5%	20.6%
Maximum Green (s)	82.5	82.5	82.5	82.5	18.0	22.6
Yellow Time (s)	4.8	4.8	4.8	4.8	4.0	4.0
All-Red Time (s)	2.7	2.7	2.7	2.7	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	7.4	7.4
Lead/Lag					Lead	Lag
Lead-Lag Optimize?					Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	None	None	None	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	82.8	82.8	82.8	82.8	36.0	22.7
Actuated g/C Ratio	0.62	0.62	0.62	0.62	0.27	0.17
v/c Ratio	0.38	0.02	0.03	0.85	0.13	0.00
Control Delay	14.0	4.5	11.9	26.5	36.8	38.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.0	4.5	11.9	26.5	36.8	38.0
LOS	B	A	B	C	D	D
Approach Delay	13.8			26.4	36.8	
Approach LOS	B			C	D	
Queue Length 50th (ft)	186	0	3	688	40	0
Queue Length 95th (ft)	243	11	12	858	77	5
Internal Link Dist (ft)	421			347	1119	
Turn Bay Length (ft)		195	236			
Base Capacity (vph)	2148	987	352	2190	473	269
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.02	0.03	0.85	0.13	0.00
<b>Intersection Summary</b>						
Area Type:	Other					
Cycle Length:	145.4					
Actuated Cycle Length:	133.7					
Natural Cycle:	115					
Control Type:	Actuated-Uncoordinated					
Maximum v/c Ratio:	0.85					
Intersection Signal Delay:	22.9			Intersection LOS: C		
Intersection Capacity Utilization	63.8%			ICU Level of Service B		
Analysis Period (min)	15					

Lanes, Volumes, Timings

90: Dr. Martin Luther King Blvd & Howland Blvd

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Splits and Phases: 90: Dr. Martin Luther King Blvd & Howland Blvd

→ Ø2	↶ Ø3	↷ Ø4
90 s	25.4 s	30 s
← Ø6		
90 s		

Lanes, Volumes, Timings  
1: Wolf Pack Run & Howland Blvd

07/06/2022

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↖↗	
Traffic Volume (vph)	717	169	137	1899	173	72
Future Volume (vph)	717	169	137	1899	173	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	204		414	414
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	0.95	1.00	0.95	0.97	0.95
Frt	0.971				0.956	
Flt Protected			0.950		0.966	
Satd. Flow (prot)	3344	0	1736	3539	3322	0
Flt Permitted			0.256		0.966	
Satd. Flow (perm)	3344	0	468	3539	3322	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	21				43	
Link Speed (mph)	45			45	35	
Link Distance (ft)	365			639	3058	
Travel Time (s)	5.5			9.7	59.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	4%	4%	2%	1%	6%
Adj. Flow (vph)	755	178	144	1999	182	76
Shared Lane Traffic (%)						
Lane Group Flow (vph)	933	0	144	1999	258	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
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)		9	15		15	9
Number of Detectors	2		1	2	1	
Detector Template	Thru		Left	Thru	Left	
Leading Detector (ft)	100		20	100	20	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	6		20	6	20	
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		pm+pt	NA	Prot	
Protected Phases	6		5	2	4	

Lanes, Volumes, Timings  
1: Wolf Pack Run & Howland Blvd

07/06/2022

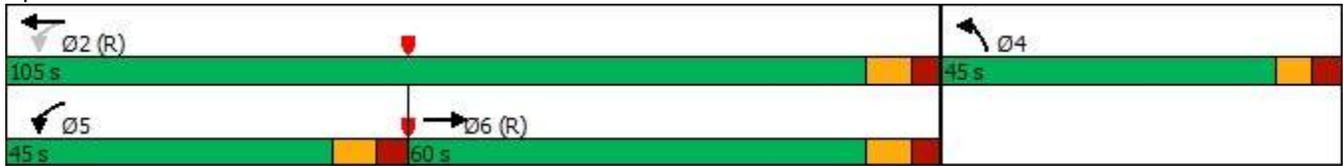


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases			2			
Detector Phase	6		5	2	4	
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	7.0	
Minimum Split (s)	26.5		13.5	26.5	25.5	
Total Split (s)	60.0		45.0	105.0	45.0	
Total Split (%)	40.0%		30.0%	70.0%	30.0%	
Maximum Green (s)	51.5		36.5	96.5	37.5	
Yellow Time (s)	5.0		5.0	5.0	4.0	
All-Red Time (s)	3.5		3.5	3.5	3.5	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	8.5		8.5	8.5	7.5	
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	C-Max		None	C-Max	None	
Walk Time (s)	7.0			7.0	7.0	
Flash Dont Walk (s)	11.0			11.0	11.0	
Pedestrian Calls (#/hr)	0			0	0	
Act Effct Green (s)	101.8		118.8	118.8	15.2	
Actuated g/C Ratio	0.68		0.79	0.79	0.10	
v/c Ratio	0.41		0.33	0.71	0.69	
Control Delay	11.6		5.9	9.7	63.5	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	11.6		5.9	9.7	63.5	
LOS	B		A	A	E	
Approach Delay	11.6			9.4	63.5	
Approach LOS	B			A	E	
Queue Length 50th (ft)	193		28	423	106	
Queue Length 95th (ft)	272		51	578	150	
Internal Link Dist (ft)	285			559	2978	
Turn Bay Length (ft)			204		414	
Base Capacity (vph)	2276		679	2802	862	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.41		0.21	0.71	0.30	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	0 (0%), Referenced to phase 2:WBTL and 6:EBT, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.71
Intersection Signal Delay:	14.2
Intersection LOS:	B
Intersection Capacity Utilization:	73.0%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 1: Wolf Pack Run & Howland Blvd



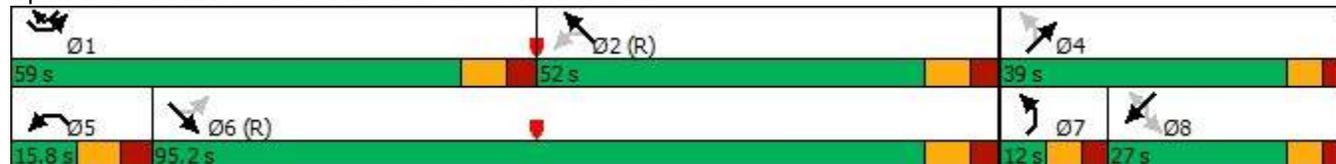
Lanes, Volumes, Timings  
 10: Catalina Blvd & Howland Blvd

07/06/2022

Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	513	739	100	71	644	89	83	102	43	93	155	361
Future Volume (vph)	513	739	100	71	644	89	83	102	43	93	155	361
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		0	231		0	138		0	378		461
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982			0.982			0.956				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3510	0	1703	3510	0	1787	1780	0	1770	1881	1599
Flt Permitted	0.212			0.322			0.297			0.660		
Satd. Flow (perm)	403	3510	0	577	3510	0	559	1780	0	1229	1881	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			10			13				91
Link Speed (mph)		45			45			30				30
Link Distance (ft)		485			498			530				612
Travel Time (s)		7.3			7.5			12.0				13.9
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	1%	1%	6%	1%	1%	1%	0%	7%	2%	1%	1%
Adj. Flow (vph)	540	778	105	75	678	94	87	107	45	98	163	380
Shared Lane Traffic (%)												
Lane Group Flow (vph)	540	883	0	75	772	0	87	152	0	98	163	380
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	20
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94				94
Detector 2 Size(ft)		6			6			6				6
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex				CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov
Protected Phases	1	6		5	2		7	4			8	1



Splits and Phases: 10: Catalina Blvd & Howland Blvd



Lanes, Volumes, Timings  
 90: Dr. Martin Luther King Blvd & Howland Blvd

07/06/2022

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	↓
Traffic Volume (vph)	1405	38	27	997	50	3
Future Volume (vph)	1405	38	27	997	50	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		195	236		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	3574	1292	1543	3574	1656	1583
Flt Permitted			0.096		0.950	
Satd. Flow (perm)	3574	1292	156	3574	1656	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		27				3
Link Speed (mph)	45			45	30	
Link Distance (ft)	501			488	1209	
Travel Time (s)	7.6			7.4	27.5	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	1%	25%	17%	1%	9%	2%
Adj. Flow (vph)	1511	41	29	1072	54	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1511	41	29	1072	54	3
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)		9	15		15	9
Number of Detectors	2	1	1	2	1	1
Detector Template	Thru	Right	Left	Thru	Left	Right
Leading Detector (ft)	100	20	20	100	20	20
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	6	20	20	6	20	20
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA	Perm	Perm	NAcustom	Prot	
Protected Phases	2			6	3	4

Lanes, Volumes, Timings  
 90: Dr. Martin Luther King Blvd & Howland Blvd

07/06/2022



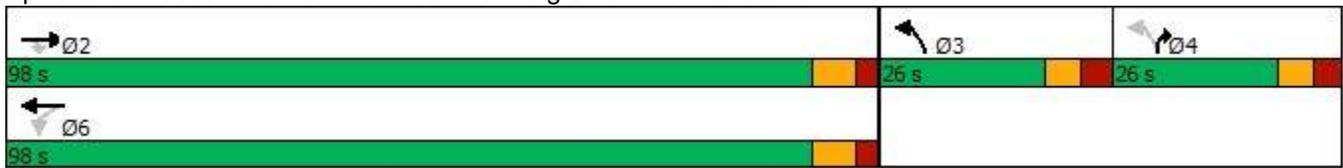
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases		2	6		4	
Detector Phase	2	2	6	6	3	4
Switch Phase						
Minimum Initial (s)	25.0	25.0	25.0	25.0	6.0	6.0
Minimum Split (s)	32.5	32.5	32.5	32.5	25.4	25.4
Total Split (s)	98.0	98.0	98.0	98.0	26.0	26.0
Total Split (%)	65.3%	65.3%	65.3%	65.3%	17.3%	17.3%
Maximum Green (s)	90.5	90.5	90.5	90.5	18.6	18.6
Yellow Time (s)	4.8	4.8	4.8	4.8	4.0	4.0
All-Red Time (s)	2.7	2.7	2.7	2.7	3.4	3.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	7.4	7.4
Lead/Lag					Lead	Lag
Lead-Lag Optimize?					Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	None	None	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	90.5	90.5	90.5	90.5	44.6	18.6
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.30	0.12
v/c Ratio	0.70	0.05	0.31	0.50	0.11	0.02
Control Delay	22.7	5.9	25.4	17.8	39.2	36.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.7	5.9	25.4	17.8	39.2	36.3
LOS	C	A	C	B	D	D
Approach Delay	22.2			18.0	39.0	
Approach LOS	C			B	D	
Queue Length 50th (ft)	511	5	13	299	39	0
Queue Length 95th (ft)	594	22	41	354	75	11
Internal Link Dist (ft)	421			408	1129	
Turn Bay Length (ft)		195	236			
Base Capacity (vph)	2156	790	94	2156	492	198
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.05	0.31	0.50	0.11	0.02
<b>Intersection Summary</b>						
Area Type:	Other					
Cycle Length:	150					
Actuated Cycle Length:	150					
Natural Cycle:	95					
Control Type:	Actuated-Uncoordinated					
Maximum v/c Ratio:	0.70					
Intersection Signal Delay:	20.9			Intersection LOS: C		
Intersection Capacity Utilization	56.3%			ICU Level of Service B		
Analysis Period (min)	15					

Lanes, Volumes, Timings

90: Dr. Martin Luther King Blvd & Howland Blvd

07/06/2022

Splits and Phases: 90: Dr. Martin Luther King Blvd & Howland Blvd



Lanes, Volumes, Timings  
1: Wolf Pack Run & Howland Blvd

07/06/2022

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↙	↑↑	↖↖	
Traffic Volume (vph)	1461	208	80	1118	131	67
Future Volume (vph)	1461	208	80	1118	131	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	204		414	414
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Lane Util. Factor	0.95	0.95	1.00	0.95	0.97	0.95
Frt	0.981				0.949	
Flt Protected			0.950		0.968	
Satd. Flow (prot)	3498	0	1719	3539	3320	0
Flt Permitted			0.079		0.968	
Satd. Flow (perm)	3498	0	143	3539	3320	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	11				64	
Link Speed (mph)	45			45	35	
Link Distance (ft)	365			639	3058	
Travel Time (s)	5.5			9.7	59.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	1%	3%	5%	2%	2%	2%
Adj. Flow (vph)	1538	219	84	1177	138	71
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1757	0	84	1177	209	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	24	
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)		9	15		15	9
Number of Detectors	2		1	2	1	
Detector Template	Thru		Left	Thru	Left	
Leading Detector (ft)	100		20	100	20	
Trailing Detector (ft)	0		0	0	0	
Detector 1 Position(ft)	0		0	0	0	
Detector 1 Size(ft)	6		20	6	20	
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	
Detector 2 Position(ft)	94			94		
Detector 2 Size(ft)	6			6		
Detector 2 Type	CI+Ex			CI+Ex		
Detector 2 Channel						
Detector 2 Extend (s)	0.0			0.0		
Turn Type	NA		pm+pt	NA	Prot	
Protected Phases	6		5	2	4	

Lanes, Volumes, Timings  
1: Wolf Pack Run & Howland Blvd

07/06/2022

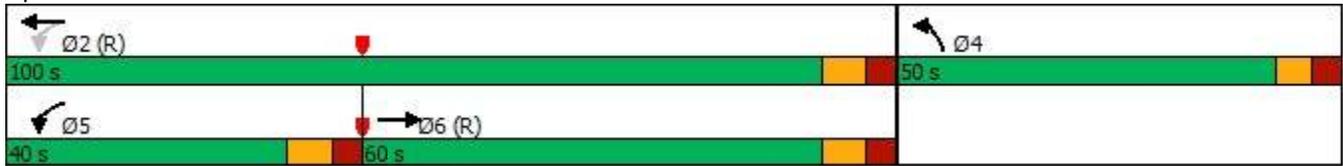


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases			2			
Detector Phase	6		5	2	4	
Switch Phase						
Minimum Initial (s)	15.0		5.0	15.0	7.0	
Minimum Split (s)	26.5		13.5	26.5	25.5	
Total Split (s)	60.0		40.0	100.0	50.0	
Total Split (%)	40.0%		26.7%	66.7%	33.3%	
Maximum Green (s)	51.5		31.5	91.5	42.5	
Yellow Time (s)	5.0		5.0	5.0	4.0	
All-Red Time (s)	3.5		3.5	3.5	3.5	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	8.5		8.5	8.5	7.5	
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?	Yes		Yes			
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Recall Mode	C-Max		None	C-Max	None	
Walk Time (s)	7.0			7.0	7.0	
Flash Dont Walk (s)	11.0			11.0	11.0	
Pedestrian Calls (#/hr)	0			0	0	
Act Effct Green (s)	106.1		121.9	121.9	12.1	
Actuated g/C Ratio	0.71		0.81	0.81	0.08	
v/c Ratio	0.71		0.44	0.41	0.64	
Control Delay	15.4		10.2	4.6	54.9	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	15.4		10.2	4.6	54.9	
LOS	B		B	A	D	
Approach Delay	15.4			5.0	54.9	
Approach LOS	B			A	D	
Queue Length 50th (ft)	481		14	142	71	
Queue Length 95th (ft)	662		28	199	113	
Internal Link Dist (ft)	285			559	2978	
Turn Bay Length (ft)			204		414	
Base Capacity (vph)	2478		447	2876	986	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.71		0.19	0.41	0.21	

Intersection Summary

Area Type:	Other
Cycle Length:	150
Actuated Cycle Length:	150
Offset:	0 (0%), Referenced to phase 2:WBTL and 6:EBT, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.71
Intersection Signal Delay:	13.9
Intersection LOS:	B
Intersection Capacity Utilization:	77.7%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 1: Wolf Pack Run & Howland Blvd



# **APPENDIX N**

## **Votran Coordination**

## Bakhan Hamagharib

---

**From:** John Cotton <jcotton@volusia.org>  
**Sent:** Friday, July 8, 2022 7:54 AM  
**To:** Bakhan Hamagharib  
**Cc:** Crystal Mercedes; Ralf Heseler  
**Subject:** Re: [EX] Votran Service Stops

Good Morning,

Votran has no plans to extend service or re-instate service to that section of Howland Blvd. You will notice that there are bus stops pads along Howland Blvd, but Votran had to eliminate the Route 25 providing service from Dupont Lakes to Halifax Medical Center - Deltona.

Let me know if Votran can be of further assistance.

### John D. Cotton

#### Votran

Transit Analyst /

Commuter Assistance Program Coordinator

Ph: 386-756-7496 x4111

Fax: 386-756-7496

>>> Bakhan Hamagharib <bhamagharib@ltg-inc.us> 7/7/2022 10:07 AM >>>

**CAUTION:** This email originated from outside Volusia County's email system. DO NOT CLICK links or attachments unless you recognize the sender and/or know the content is safe.

Good morning,

I hope all is well. We are working on a Traffic Impact Analysis for the proposed Catalina pointe located southeast of Howland Boulevard and Dr. Martin Luther King Boulevard in the City of Deltona. Are there any plans to extend bus routes 21 and/or 22, or by chance any new plans for new bus routes in that area?

Thank you so much for your assistance

Sincerely,

**Bakhan Hamagharib**  
Senior Transportation Analyst



LTG, Inc.  
1450 West Granada Boulevard, Suite 2  
Ormond Beach, FL 32174  
P. 386.257.2571 / FX: 386.257.6996  
[bhamagharib@ltg-inc.us](mailto:bhamagharib@ltg-inc.us) / [www.ltg-inc.us](http://www.ltg-inc.us)

**Exhibit B**  
**Response to County Comments Letter**

Via Email: ([TKasbeer@volusia.org](mailto:TKasbeer@volusia.org))

Ref: 5519.03

August 16, 2022

Tadd Kasbeer, P.E.  
Volusia County Traffic Engineering  
123 W Indiana Avenue  
Room 402  
DeLand, FL 32720

**Re: Catalina Pointe TIA – Response to Comments  
Deltona, Florida**

Dear Mr. Kasbeer:

LTG, Inc. is in receipt of County comments dated August 12, 2022, regarding the TIA developed for the proposed Catalina Pointe Development. The County comments are presented below in plain text with our responses in **bold** text.

**Comments Received from Volusia County dated 8/12/2022:**

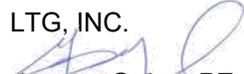
- 1.) County Comment: Table 13, Buildout PM Peak Hour LOS – Roadway Segments:
- A. Also related to Table 8 (Background PM Peak Hour LOS analysis), the West Volusia Parkway segment between SR 472 and Graves Ave shows a capacity of 5,140 indicating that the segment needs to be six lanes. Please confirm this is correct considering the current capacity is 1620.
  - B. Veterans Memorial Parkway (from Rhode Island Ave to Graves Ave): The county currently has 335 vested trips. These added to the 2021 traffic count of 1,420 equals 1,755, which includes no growth rate adjustment. This is significantly higher than 1,583, so please modify.
- Response:**
- A. The West Volusia Parkway from SR 472 to Graves Avenue Capacity has been revised to 1,540 based on the recent capacity shown in 2021 AADT Spreadsheet received on July 28<sup>th</sup>, 2022, and confirmed by County staff.**
  - B. It was confirmed with County staff that the Existing two-way P.M. Peak Volume shown for the roadway segment of Veterans Memorial Parkway from Rhode Island Avenue to Graves Avenue in the report is consistent with the County's current 2021 AADT spreadsheet received July 28<sup>th</sup>, 2022. Therefore, no response is required.**
- 2.) County Comment: Alternative Mode Analysis: The TIA discusses Votran's overall services; however, please describe the current or planned transit service that would be available to the site. State in the TIA that Votran eliminated Route 25, which provided service between DuPont Lakes and Halifax Crossings, but has no plans to extend or reinstate the Howland Blvd service or re-instate service to that section of Howland Blvd.
- Response: Comment noted, the Votran overall services and Votran Route 25 of current and planned services have been added to the revised TIA.**

Tadd Kasbeer, P.E.  
August 16, 2022  
Page 2

If you have any questions or comments regarding our responses and/or revised analysis, please feel free to call me at (386) 257-2571.

Sincerely,

LTG, INC.



**George Galan, PE**  
**Director of Traffic Operations**

C: Ron Paradise, City of Deltona ([rparadise@deltonafl.gov](mailto:rparadise@deltonafl.gov))  
Jon Cheney, Volusia County ([jcheney@volusia.org](mailto:jcheney@volusia.org))

## **Exhibit C**

### **ITE Excerpt – Gate Storage Length**

### ***Gated Development***

The storage distance in advance of the gate needs to be of sufficient length to have a very high probability of storing all arriving vehicles. A 98 percent probability is suggested for gated access for a major arterial. A lower probability, 90 percent or 95 percent, might be acceptable for roadways of lower classification. Queuing analysis can be used to calculate the storage length based on the traffic characteristics (the number of entering vehicles in a peak 15-min. interval expressed in vehicles per hour) and the time it takes for vehicles to enter the development after stopping in advance of the gate. Table 13-5 shows suggested minimum storage lengths.

**Table 13-5. Gate Storage Lengths**

Number of Dwelling Units	Minimum Storage	
	ft.	m
< 50	50	15
50-100	75	25
> 100	100	30

A turn-around in advance of the gate is necessary for those who inadvertently turn into the access connection. This often requires a distance from the edge of the roadway to the gate that is much longer than the storage length.

### **Residential Street Layout**

Street layout is an integral part of creating building sites that are functional and marketable at reasonable cost for the intended clientele. The designer must simultaneously consider several factors, including the following: 1) soil and environmental constraints, 2) the size and orientation of the structure to be placed on each lot, 3) surface drainage, 4) utility installation and maintenance, 5) interaction between neighbors, 6) pedestrians and bicyclists—especially children, 7) traffic speeds and volumes, 8) emergency services and 9) solid waste collection and deliveries.