TRAFFIC IMPACT ANALYSIS

THREE ISLAND LAKE NORTH
CITY OF DELTONA, FLORIDA

Prepared for:

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Revised September 2021

TPD № 5458

PROFESSIONAL ENGINEERING CERTIFICATION

I hereby certify that I am a Professional Engineer properly registered in the State of Florida practicing with Traffic Planning & Design, Inc., a corporation authorized to operate as an engineering business, EB-3702, 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: Three Island Lake North

LOCATION: City of Deltona, Florida

CLIENT: VP Land – PIB Land

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.

NAME: Turgut Dervish

P.E. No.: 20400

DATE: August 17, 2021

SIGNATURE:

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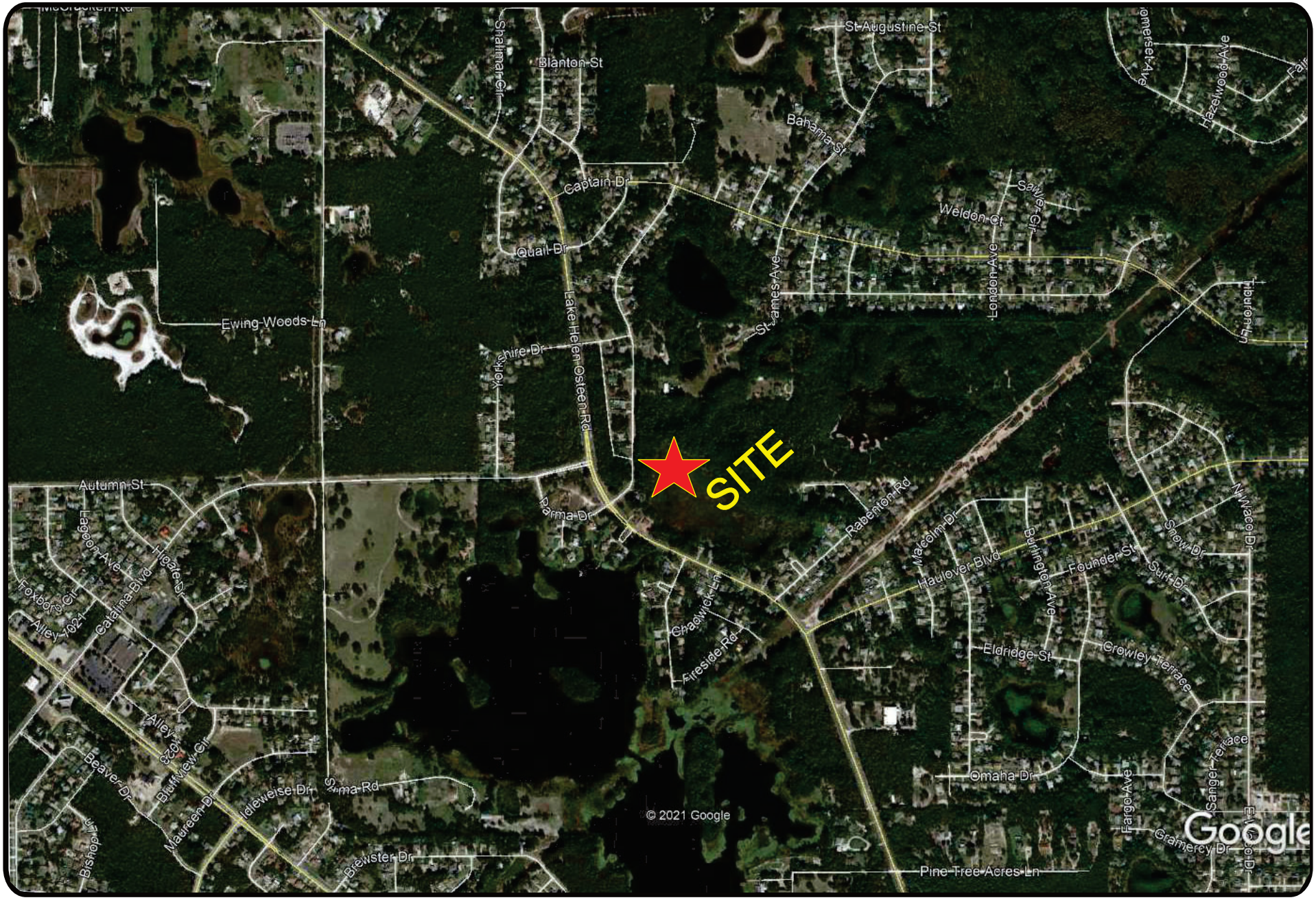
INTRODUCTION

This traffic analysis was performed to assess the impact of the proposed Three Island Lake North residential project in the City of Deltona, Florida. The proposed development consists of a 52-unit single family subdivision. The development is located on the east side of Parma Drive, approximately 600 feet east of Lake Helen-Osteen Road. **Figure 1** depicts the site location. The site will be served via a full access driveway on Parma Drive. **Figure 2** depicts the site plan and its access configuration. The project buildout year is anticipated to be 2022.

The traffic analysis was conducted in accordance with the River to Sea TPO guidelines. Per these guidelines, a traffic study is not required for projects generating less than 100 peak hour trips. As per ITE, this project is expected to generate 54 peak hour trips. Nonetheless, a traffic study was performed to demonstrate the impact of this project on the nearby roadway facilities. This was discussed with the City's Director of Planning and Development Services prior to the conduct of the study and no written methodology was prepared. Reference data used in the analysis were obtained from the City of Deltona, Volusia County, and the Institute of Transportation Engineers (ITE). Additionally, A.M./P.M. peak hour intersection traffic data were obtained by TPD personnel.



Three Island Lake North
Project № 5458
Figure 1

Site Location

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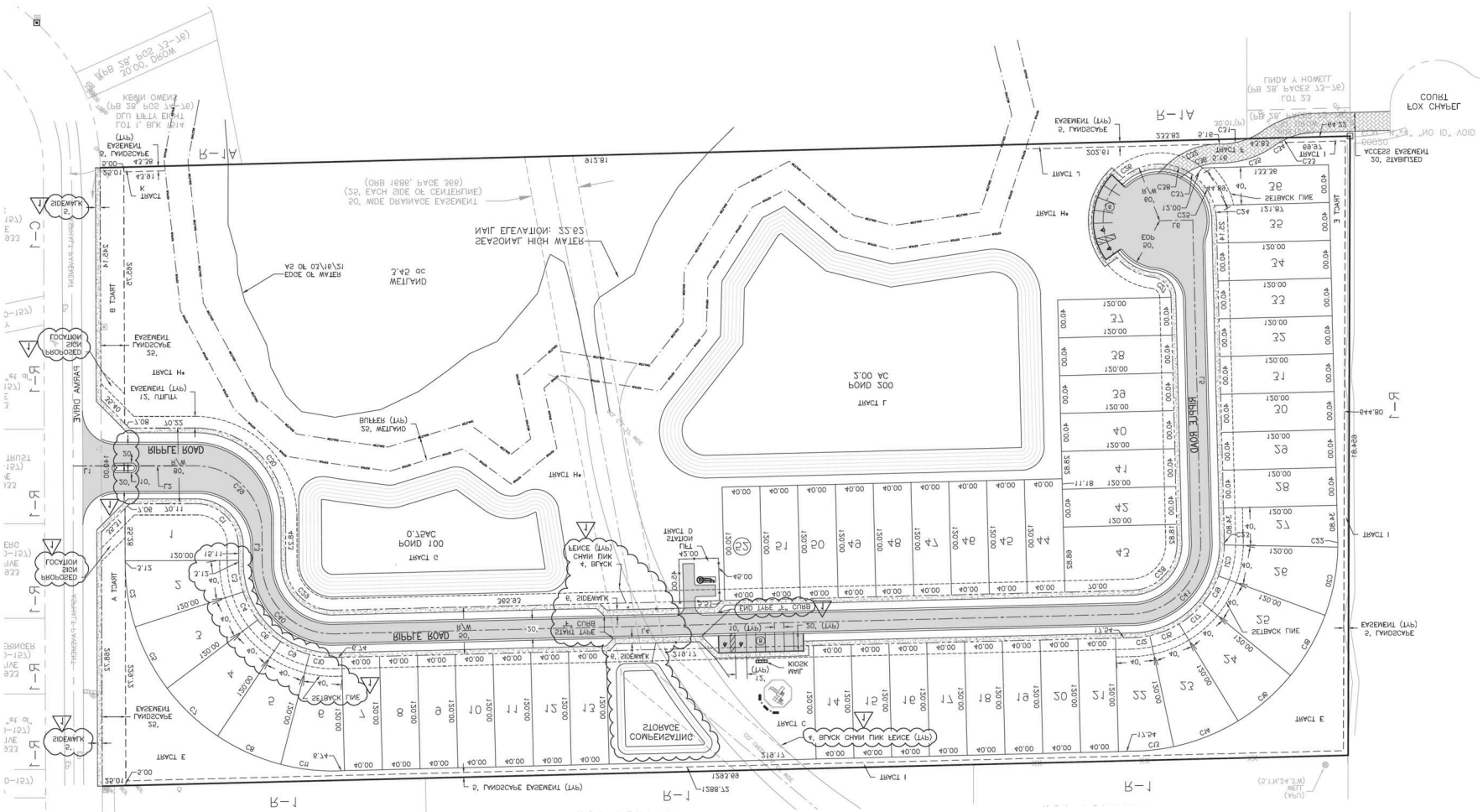

Three Island Lake North
Project № 5458
Figure 2

Site Plan

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EXISTING CONDITIONS ANALYSIS

The existing conditions analysis was conducted for roadway segments and intersections within a study area delineated as per the 3% significance threshold required by the County's TIA procedures. Based upon the significance test conducted under the subsequent section of this report, the following classified roadway segment and intersections will be included in the analysis:

Roadway Segments

- Lake Helen-Osteen Road
    - Haulover Boulevard to Catalina Boulevard

Intersections

- Lake Helen-Osteen Road and Catalina Boulevard
- Lake Helen-Osteen Road and Parma Drive

The roadway analysis was conducted for the P.M. peak hour with data on Lake Helen- Osteen Road obtained from the Volusia 2018 Average Annual Daily Traffic and Historical Counts spreadsheets. The intersections were analyzed for the A.M. and P.M. peak hours with 7-9 A.M. and 4-6 P.M. turning movement counts made at the study intersections.

Roadway Segment Analysis

The roadway segment was analyzed by comparing the existing two-way P.M. peak hour volumes for the roadway segment with the corresponding peak hour capacity at the adopted Level of Service (LOS) standard. Existing P.M. peak hour volumes and peak hour capacities were obtained from the Volusia County 2019 AADT Spreadsheet. A summary of the existing roadway capacity analysis is presented in **Table 1**, which shows that the study roadway segment is currently operating at a satisfactory Level of Service.

Intersection Analysis

A capacity analysis was conducted for each intersection using the HCS 7.8 software in accordance with the procedures of the Highway *Capacity Manual (HCM 6E)*. The capacity analysis was performed using the existing intersection geometry, traffic volumes during the A.M. and P.M. peak hours and signal timing/phasing data obtained from Volusia County. Existing turning movement counts were obtained by TPD on March 18, 2021 when FDOT's seasonal factors for Volusia County was less than 1.00. These counts were compared with the County's 2019 data which showed that the 2021 counts were higher and were not adjusted for the pandemic. **Figures 3a** and **3b** depict the intersection volumes used in the A.M. and P.M. peak hour analysis. The intersection counts made by 15-minute intervals are included in **Appendix A** along with signal timing data and FDOT's seasonal factors.

The intersection capacity analysis results are summarized in **Table 2**. The results indicate that the study intersections currently operate at satisfactory overall Levels of Service. Detailed HCS analysis worksheets are included in **Appendix B**.

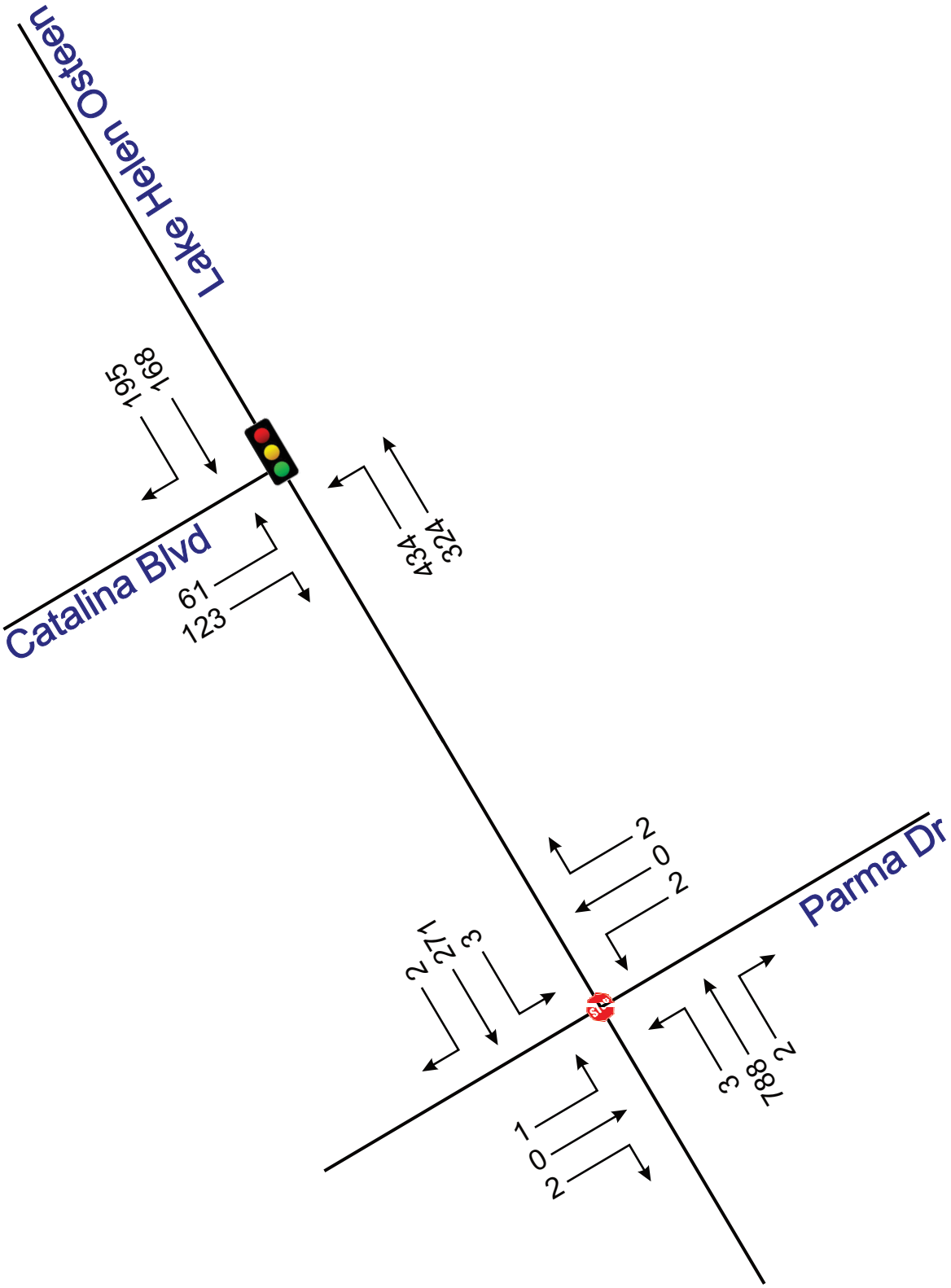
Table 1
Existing Roadway Capacity Analysis

Roadway Segment	Seg Num	Functional Class	# of Lns	Peak Hour 2-Way Capacity[1]	LOS Std	Existing PM 2-Way Peak Hour Volume	V/C Ratio	Existing LOS
Lake Helen-Osteen Road								
Haulover Blvd to Catalina Blvd	1072	Minor Arterial	2	1,020	E	960	0.94	E

[1] Obtained from 2019 Volusia County AADT & Historical Counts

Table 2
Existing Intersection Capacity Analysis

Intersection	Control	Time Period	EB		WB		NB		SB		Overall	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Lake Helen-Osteen Rd to Catalina Blvd	Signal	A.M.	40.6	D	---	---	6.5	A	14.2	B	13.4	B
		P.M.	63.1	E	---	---	12.9	B	25.4	C	35.9	D
Lake Helen-Osteen Rd to Parma Dr	STOP	A.M.	17.2	C	24.1	C	7.9	A	10.0	A	---	---
		P.M.	21.8	C	20.5	C	9.2	A	8.3	A	---	---



Three Island North
Project № 5458
Figure 3a

Existing A.M. Peak Hour Traffic Volumes

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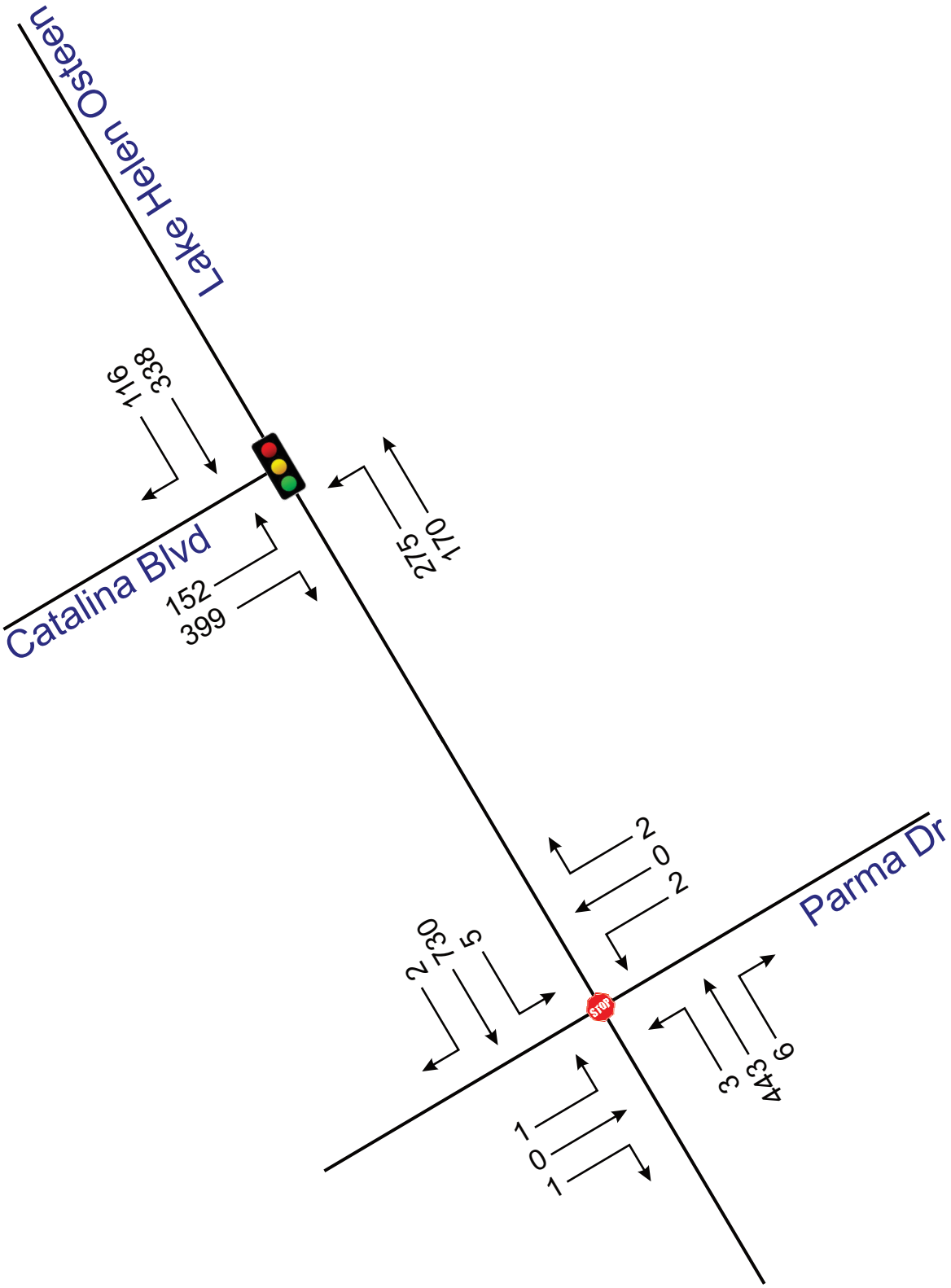

Three Island North
Project № 5458
Figure 3b

Existing P.M. Peak Hour Traffic Volumes

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PROPOSED DEVELOPMENT AND TRIP GENERATION

The proposed development consists of a 52-unit single family subdivision. To determine the impact of this development, an analysis of its trip generation characteristics was conducted. This included the determination of the trips to be generated as well as their distribution and assignment to the surrounding roadways.

Trip Generation

Trip generation rates were obtained from the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10th Edition*. A summary of the trip generation of the proposed development is shown in **Table 3**. The development is expected to generate 570 daily trips, of which 42 will occur in the A.M. peak hour and 54 will occur in the P.M. peak hour. ITE Trip Generation worksheets are included in the **Appendix C**.

Table 3
Trip Generation Summary

ITE Code	Land Use	Size	Daily		A.M. Peak Hour				P.M. Peak Hour			
			Rate*	Trips	Rate*	Enter	Exit	Total	Rate*	Enter	Exit	Total
210	Single Family Residential	52 DU	10.96	570	0.81	11	31	42	1.04	34	20	54

**The ITE equations were used as the R-squared correlation coefficient was greater than 0.75*

Trip Distribution/Trip Assignment

The trip distribution pattern was estimated based upon the existing A.M./P.M. peak hour counts at the study intersections. A distribution worksheet is included in Appendix C. The distribution thus obtained is shown in **Figure 4**. Using this distribution, the project trips were assigned to the area roadways also shown in Figure 4.

Three Island Lake North
Project № 5458
Figure 4

Trip Distribution/Assignment

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Significance Analysis

As per R2CTPO procedures and requirements, the influence area of the proposed project will include those roadway segments where project trips consume 3% or more of the adopted Level of Service. Based upon the significance test performed, as shown in **Table 4**, the project will consume 3% or more of the adopted LOS on one (1) of the roadway segments, which is the adjacent roadway segment of Lake Helen-Osteen Road. Therefore, this roadway segment was included in the analysis along with two intersections as follows:

Roadway Segments

- Lake Helen-Osteen Road
    - Haulover Boulevard to Catalina Boulevard

Intersections

- Lake Helen-Osteen Road and Catalina Boulevard
- Lake Helen-Osteen Road and Parma Drive

Table 4
Significance Analysis

Roadway Segment	Seg Num	Functional Class	# of Lns	PH 2-Way Capacity[1]	LOS Std	Project Distribution[2]	Project Trips	Significance
Lake Helen-Osteen Road								
Haulover Blvd to Catalina Blvd	1072	Minor Arterial	2	1,020	E	58%	31	3.04%
Catalina Blvd to Captain Dr	1073	Minor Arterial	2	1,020	E	26%	14	1.37%
Catalina Boulevard								
Lake Helen-Osteen Rd to Sixma Rd	42	Minor Collector	2	1,020	E	32%	17	1.67%
Sixma Rd to Howland Blvd	43	Minor Arterial	2	1,020	E	32%	17	1.67%

[1] Obtained from 2019 Volusia County AADT & Historical Counts
[2] Highest % distribution on the segment

PROJECTED TRAFFIC CONDITIONS

Projected traffic conditions for the project buildout in 2022 were analyzed using P.M. peak hour traffic volumes for the study roadway segments and A.M./P.M. peak hour counts for the study intersections. The analysis was conducted for the projected traffic volumes consisting of background traffic volumes plus project trips.

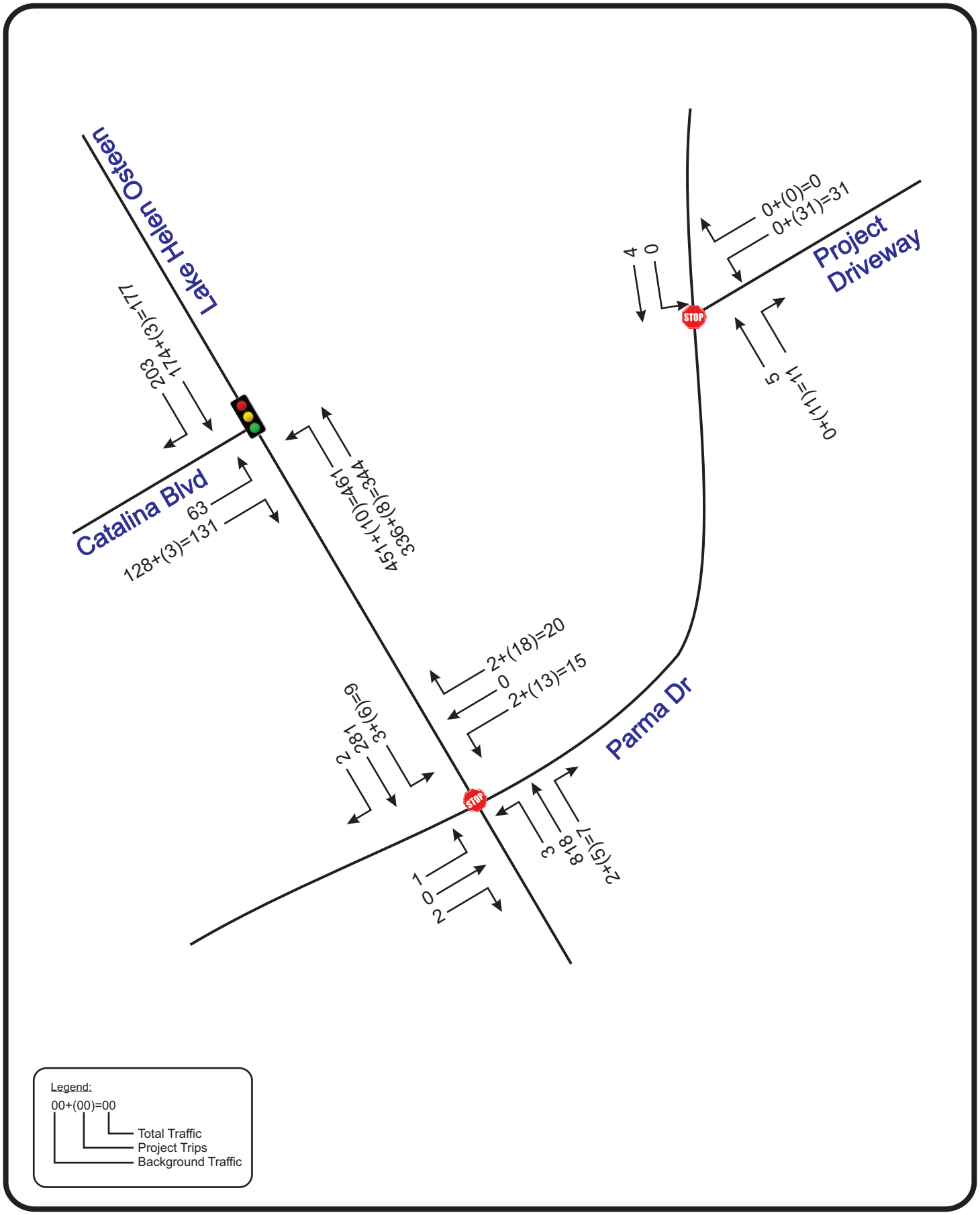
As per the County's guidelines, background traffic is estimated by adding existing traffic volumes to vested trips from approved developments in the vicinity. Where vested trips are not available, background traffic volumes are determined by expanding existing peak hour traffic volumes to the buildout year using annual growth rates. A historical trend analysis was conducted for the study roadway based on the Annual Average Daily Traffic (AADT) data obtained in the vicinity of the project. This analysis indicated an annual growth rate of 3.85%. This was applied to the existing traffic volumes in order to determine the background volumes in the project buildout year. Trends analysis worksheet is included in **Appendix D**.

Roadway Segment Analysis

The projected roadway segment analysis was performed by comparing the projected traffic volume of the segment with the respective capacity at the adopted LOS standard. The analysis as summarized in **Table 5** revealed that the study roadway segment is projected to operate slightly over capacity based upon the generalized capacity values. As will be documented subsequently, the peak hour analysis of the signalized intersection of Lake Helen Osteen Road and Catalina Boulevard indicated that the northbound/southbound approaches of Lake Helen Osteen Road are projected to operate at LOS C or better.

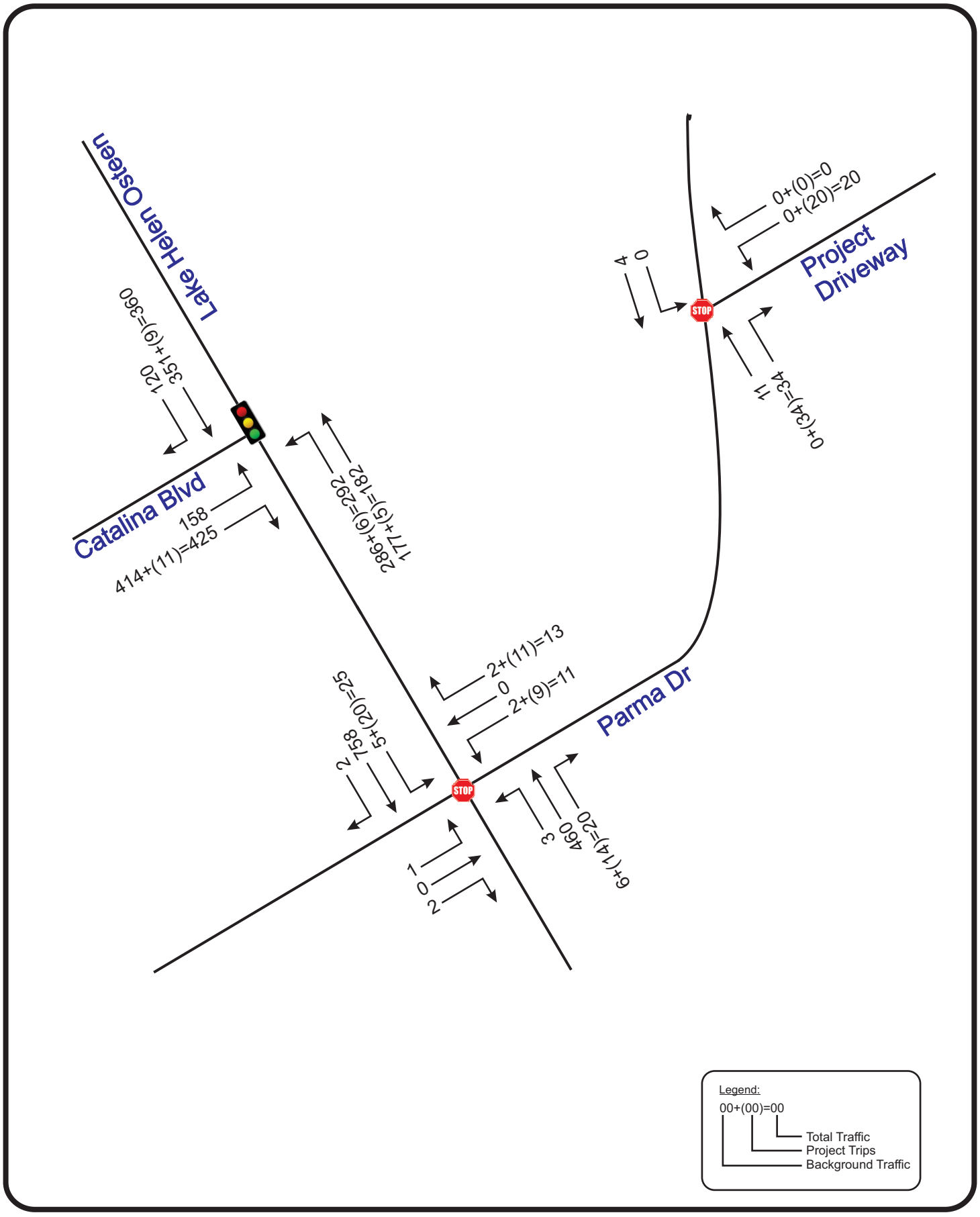
Intersection Analysis

A capacity analysis was conducted at the study intersections utilizing projected traffic volumes and existing intersection geometry as shown in **Figures 5a** and **5b**. This was accomplished utilizing *Highway Capacity Software (HCS)*. The results of this analysis, as included in **Appendix E** and summarized in **Table 6**, indicate satisfactory traffic operating conditions at the study intersections.



Three Island North
Project № 5458
Figure 5a

Projected A.M. Peak Hour Traffic Volumes



Three Island North
Project № 5458
Figure 5b

Projected P.M. Peak Hour Traffic Volumes

Table 5
Projected Roadway Capacity Analysis

Roadway Segment Limits	Seg Num	# of Lns	PH 2-Way Capacity[1]	LOS Std	Two-Way Peak Hour Volumes				
					Existing Vol	Bckr'd Growth[2]	% Dist[3]	Project Trips	Total
Lake Helen-Osteen Road									
Haulover Blvd to Catalina Blvd	1072	2	1,020	E	960	1,034	42%	23	1,057

(1) Obtained from 2019 Volusia County AADT & Historical Counts
(2) Existing x 1.077
(3) Highest % distribution on the segment

Table 6
Projected Intersection Capacity Analysis

Intersection	Control	Time Period	EB		WB		NB		SB		Overall	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Lake Helen-Osteen Rd & Catalina Blvd	Signal	A.M.	40.5	D	---	---	6.9	A	15.1	B	13.9	B
		P.M.	72.7	E	---	---	16.5	B	30.4	C	42.1	D
Lake Helen-Osteen Rd & Parma Dr	Stop	A.M.	16.7	C	24.5	C	7.9	A	9.8	B	--	--
		P.M.	22.3	C	24.9	C	9.4	A	8.5	A	---	---
Parma Dr and Site Driveway	Stop	A.M.	---	---	8.7	A	---	---	7.2	A	---	---
		P.M.	---	---	8.7	A	---	---	7.3	A	---	---

Turn Lane Analysis

The need for right and left turn lanes at the site entrance was evaluated based upon the NCHRP Report 457 criteria included in **Appendix F**. This evaluation indicated that turn lanes would not be warranted for the projected volumes and speed limit of 30 mph.

At the Lake Helen-Osteen Road/Parma Drive intersection, a southbound left turn lane is warranted. The southbound approach should be restriped to provide a minimum 100-125 foot (50-foot taper included) left turn lane. There is currently a striped median at this approach.

MULTI-MODAL ANALYSIS

A review was conducted of available multi-modal transportation options for increased mobility in the vicinity of the site. This included a review of the available bicycle, pedestrian and transit facilities. This review revealed the availability of such facilities in the project vicinity as follows:

- Sidewalks exist on the west side on Lake Helen Osteen Road north of Catalina Boulevard. There is also a short sidewalk on the east side north of Yorkshire Drive.

- Sidewalks exist on the south side of Catalina Boulevard from Lake Helen Osteen Road to Howland Boulevard. On Howland Boulevard, there are sidewalks on both sides.

- There is a pedestrian crossing along Lake Helen Osteen Road at the Catalina Boulevard intersection.

- There are no designated bicycle facilities on any roadway in the area.

- The closest transit service to the project site is along Providence Boulevard-Howland Boulevard to DuPont Lakes Shopping Center.

There are schools within two miles of the project site. The students will be driven or use other modes of transportation.

STUDY CONCLUSIONS

This traffic analysis was performed to assess the impact of the Three Island Lake North residential project in the City of Deltona, Florida. The proposed development consists of a 52-unit single family subdivision and is located on the east side of Lake Helen-Osteen Road, approximately 600 feet east of Lake Helen-Osteen Road. The project is anticipated to be built in 2022. The results of the study as documented herein are summarized below:

- The proposed development is expected to generate 570 daily trips, of which 42 will occur in the A.M. peak hour and 54 will occur in the P.M. peak hour.

- The impacted segment of Lake Helen-Osteen Road and two nearby intersections were included in the analysis along with the proposed access connection.

- The study roadway segment currently operates at a satisfactory Level of Service and will continue to do so when project trips are added.

- The intersection analysis indicated that the study intersections currently operate at acceptable Levels of Service and are projected to continue to do so upon project buildout.

- The southbound approach at Lake Helen-Osteen Road/Parma Drive intersection should be restriped to provide a 100-125 foot left turn lane.

- The proposed development will be served by one access driveway on Parma Drive. This driveway is projected to operate at satisfactory Levels of Service.

APPENDICES

APPENDIX A

Traffic Count Data, Signal Timing Data &
FDOT Seasonal Adjustment Factors

Highbridge Rd.	Walter Boardman Ln. to John Anders	871		County	Yes	1.60	2	30	RDA_UFH_2W_2L_U_0L	Major Collector - Rural	2,370	2,130	1,830	12,710	2,100	1,750	2,020	2,480	2,770	2,210	2,570	3,160	C	12,300	0.26	C	250	1,090
Highbridge Rd.	John Anderson Dr. to SR A1A	872		County	Yes	0.20	2	30	UA_NSSRC2_2W_2L_U_0L	Major Collector - Urban	1,920	1,730	1,520	12,710	1,780	1,490	1,660	2,170	2,380	2,120	2,110	2,680	E	13,640	0.20	C	210	1,020
Hill Ave.	Taylor Rd. to Beresford Ave.	878		County	Yes	1.00	2	30	UA_NSSRC2_2W_2L_U_0L	n/c	-	-	430	12,710	480	550	820	-	1,070	1,030	1,260	1,140	E	13,640	0.08	C	110	1,020
Hill Ave.	Beresford Ave. to Voorhis Ave.	881		County	Yes	0.75	2	30	UA_NSSRC2_2W_2L_U_0L	Major Collector - Urban	2,080	2,130	2,310	12,710	2,370	2,200	2,510	-	2,680	2,780	2,840	2,980	E	13,640	0.22	C	280	1,020
Hill Ave.	Voorhis Ave. to SR 44	882		County	Yes	0.25	2	30	UA_NSSRC2_2W_2L_U_0L	Major Collector - Urban	2,290	2,400	2,530	12,710	2,780	2,540	2,760	-	3,220	3,150	3,710	3,590	E	13,640	0.26	C	330	1,020
Hill Ave. (DeLand)	SR 44 to Minnesota Ave.	883		City	Yes	0.50	2	30	UA_NSSRC2_2W_2L_U_0L	Major Collector - Urban	3,800	3,810	4,060	12,710	4,010	3,800	-	-	-	-	2,800		E	13,640	0.26	C	-	1,020
Hill Ave. (DeLand)	Minnesota Ave. to Plymouth Ave.	885		City	Yes	0.50	2	30	UA_NSSRC2_2W_2L_U_0L	Major Collector - Urban	4,700	4,340	5,240	12,710	5,020	4,890	5,210	-	5,850	5,800	6,770	5,980	E	13,640	0.44	C	540	1,020
Hill Ave./Jacobs Rd.	Plymouth Ave. to US 92	950		County	Yes	0.85	2	40	UA_NSSRC1_2W_2L_U_0L	Major Collector - Urban	5,100	6,190	5,870	12,710	5,190	5,820	5,900	6,170	7,590	7,510	8,420	8,270	E	13,640	0.61	C	740	1,230
Hontoon Rd.	end of road to Botts Landing Rd.	890		County		2.00	2	35	UA_NSSRC2_2W_2L_U_0L	Minor Collector - Urban	780	920	870	8,010	790	840	880	1,000	1,090	1,040	930	970	C	13,640	0.07	C	80	470
Hontoon Rd.	Botts Landing Rd. to Old New York A	891		County		1.15	2	40	UA_NSSRC1_2W_2L_U_0L	Minor Collector - Urban	2,930	2,930	3,050	8,010	2,840	2,820	2,990	3,180	3,450	3,240	3,020	3,190	C	13,640	0.23	C	240	1,090
Howland Blvd.	I-4/SR 472 to Wolf Pack Run	901		FDOT	Yes	0.40	4	45	UA_NSSRC1_2W_4L_D_WL	Minor Arterial - Urban	28,290	30,330	30,490	35,010	29,890	27,480	30,590	36,570	32,320	38,300	36,990	34,320	E	37,970	0.90	D	2,680	3,410
Howland Blvd.	Wolf Pack Run to Catalina Blvd.	903		County	Yes	1.15	4	45	UA_NSSRC1_2W_4L_D_WL	Minor Arterial - Urban	25,260	27,640	28,010	35,010	27,440	25,280	27,770	31,520	30,270	30,040	31,480	30,520	E	37,970	0.80	C	2,510	3,410
Howland Blvd.	Catalina Blvd. to Providence Blvd.	905		County	Yes	0.35	4	45	UA_NSSRC1_2W_4L_D_WL	Minor Arterial - Urban	19,640	21,390	22,110	35,010	21,930	20,070	22,700	23,710	23,950	25,520	23,110	23,670	E	37,970	0.62	C	1,950	3,410
Howland Blvd.	Providence Blvd. to Elkcam Blvd.	906		County	Yes	2.10	2	45	UA_NSSRC1_2W_2L_U_0L	Minor Arterial - Urban	13,380	15,390		12,710	14,140							17,430	E	13,640	1.28	F	1,420	1,230
Howland Blvd.	Elkcam Blvd. to Lake Helen-Osteen	908		County	Yes	0.30	4	45/40	UA_NSSRC1_2W_4L_D_WL	Minor Arterial - Urban	15,250	15,030	15,300	35,010	15,620	14,220	15,090	16,530	15,940	18,760	18,190	17,500	E	37,970	0.46	C	1,380	3,410
Howland Blvd.	Lake Helen-Osteen Rd. to Newmark	909		County	Yes	0.70	4	40	UA_NSSRC1_2W_4L_D_WL	Minor Arterial - Urban	16,330	19,340	20,350	35,010	20,990	19,330	19,900	19,690	21,360	25,290	23,160	21,860	E	37,970	0.58	C	1,910	3,410
Howland Blvd.	Newmark Dr. to Courtland Blvd.	911		County	Yes	1.15	4	45	UA_NSSRC1_2W_4L_D_WL	Minor Arterial - Urban	13,640	16,250	16,640	35,010	16,990	15,600	15,490	16,060	17,440	20,200	18,130	20,630	E	37,970	0.54	C	1,800	3,410
Howland Blvd.	Courtland Blvd. to Ft Smith Blvd.	913		County	Yes	1.80	4	45	UA_NSSRC1_2W_4L_D_WL	Minor Arterial - Urban	11,570	12,820	13,280	15,890	12,920	11,770	11,240	10,990	12,000	16,230	14,620	14,080	E	37,970	0.37	C	1,250	3,410
Howland Blvd.	Ft Smith Blvd. to SR 415	915		County	Yes	0.65	4	45	UA_NSSRC1_2W_4L_D_WL	Minor Arterial - Urban	11,580	12,770	12,650	15,890	12,180	12,530	12,960	14,030	13,600	18,230	16,400	17,200	E	37,970	0.45	C	1,490	3,410
Indian Lake Rd.	Tiger Bay Rd. to US 92	935		County		0.80	2	40	UA_NSSRC1_2W_2L_U_0L	n/c	5,380	5,020	6,090	9,180	5,550	5,180	5,150	5,870	6,660	6,590	6,370	6,470	E	12,740	0.51	C	530	1,230
John Anderson Dr.	Halifax Dr to Lynnhurst	972		County	Yes	0.85	2	30	UA_NSSRC2_2W_2L_U_0L	Major Collector - Urban	5,620	5,220	5,390	12,710	5,520	6,730	4,370	5,180	5,790	5,520	5,200	5,570	E	13,640	0.41	D	430	1,020
John Anderson Dr.	Lynnhurst to Highbridge Rd.	974		County	Yes	7.40	2	35	UA_NSSRC2_2W_2L_U_0L	Major Collector - Urban	4,080	3,880	3,590	12,710	3,960	4,570	3,240	3,700	4,190	4,080	3,870	3,940	E	13,640	0.29	C	320	1,020
John Anderson Hwy.	Walter Boardman Lane to Flagler Co	990		County	Yes	1.00	2	5 NB / 30 S	RDA_UFH_2W_2L_U_0L	Minor Collector - Rural	1,040	960	1,000	12,710	1,140	900	950	1,150	1,190	1,170	1,200	1,180	C	12,300	0.10	B	100	1,150
Josephine St./10th St.	Old Mission Rd. to Tatum Blvd.	1000		County	Yes	0.30	2	30	UA_NSSRC2_2W_2L_U_0L	Major Collector - Urban	6,370	6,000	5,810	12,710	5,860	5,910	5,820	4,830	6,650	6,230	5,590	7,020	E	13,640	0.51	D	660	1,020
Josephine St./10th St. (N	Tatum Blvd. to US 1	1002		City	Yes	1.80	2	35	UA_NSSRC2_2W_2L_U_WL	Major Collector - Urban	7,400	7,310	7,350	15,890	7,140	-	-	4,940	6,990	-	-	-	E	14,040		-	-	1,270
Kathy Dr. (N. Penin.)	John Anderson Dr. to SR A1A	1011		County		0.44	2	30	UA_NSSRC2_2W_2L_U_0L	n/c	420	470	420	9,180	460	470	460	410	500	410	440	430	E	13,640	0.03	C	40	1,020
Kennedy Pkwy (Old SR 3	US 1 to Park Entrance	1020		Federal		4.00	2	55	RUA_UFH_2W_2L_U_0L	Major Collector - Rural	930	1,040	700	6,480	660	-	-	-	-	-	850	850	C	6,300		-		590
Kicklighter Rd.	Macy Ave. to Lake Helen-Osteen/Pr	1051		County	Yes	0.75	2	30	UA_NSSRC2_2W_2L_U_0L	Minor Collector - Urban	1,770	1,930	2,080	12,710	1,810	1,690	1,680	1,820	2,020	2,100	2,190	2,110	E	13,640	0.15	C	190	1,020
Lake George Rd.	Bream Dr. to US 17	1062		County		3.90	2	30	RUA_UFH_2W_2L_U_0L	n/c	1,010	780	860	6,480	820	740	780	810	810	850	880	790	C	6,300	0.13	B	70	590
Lake Helen-Osteen Rd.	Howland Blvd. to Elkcam Blvd.	1070		County	Yes	0.40	2	35	UA_NSSRC2_2W_2L_U_0L	Minor Arterial - Urban	3,440	5,490	6,140	12,710	6,050	6,060	5,920	6,140	6,360	7,430	7,800	6,910	E	13,640	0.51	D	680	1,020
Lake Helen-Osteen Rd.	Elkcam Blvd. to Haulover Blvd.	1071		County	Yes	1.75	2	45	UA_NSSRC1_2W_2L_U_0L	Minor Arterial - Urban	7,000	7,470	7,690	12,710	7,540	7,220	6,920	5,440	5,680	5,490	9,500	8,270	E	13,640	0.61	D	770	1,020
Lake Helen-Osteen Rd.	Haulover Blvd. to Catalina Blvd.	1072		County	Yes	0.50	2	45	UA_NSSRC1_2W_2L_U_0L	Minor Arterial - Urban	9,430	10,200	10,320	12,710	9,740	9,570	9,850	10,510	11,000	11,260	12,610	11,300	E	13,640	0.83	E	960	1,020
Lake Helen-Osteen Rd.	Catalina Blvd. to Captain Dr	1073		County	Yes	0.40	2	45	UA_NSSRC1_2W_2L_U_0L	Minor Arterial - Urban	6,990	7,390	7,410	12,710	7,090	6,840	7,110	7,420	7,700	7,830	8,560	7,580	E	13,640	0.56	D	670	1,020
Lake Helen-Osteen Rd.	Captain Dr. to Kicklighter Rd.	1076		County	Yes	1.40	2	40	UA_NSSRC1_2W_2L_U_0L	Minor Arterial - Urban	7,310	7,020	7,030	12,710	6,570	6,750	6,760	6,990	7,280	7,910	7,590	8,260	E	13,640	0.61	D	810	1,020
Prevatt Ave.	Kicklighter Rd to Lake Pearl Dr.	1520		County	Yes	1.50	2	40	UA_NSSRC1_2W_2L_U_WL	Minor Arterial - Urban	5,020	4,500	4,800	15,890	4,390	4,570	3,910	-	4,640	5,070	5,220	4,600	C	17,050	0.27	C	490	1,360
Prevatt Ave.	Lake Pearl Dr. to SR 44	1523		County	Yes	1.80	2	55	UA_NSSRC1_2W_2L_U_WL	Minor Arterial - Urban	4,960	4,130	4,630	14,640	4,230	4,470	4,200	4,570	5,680	5,510	4,800	4,700	E	17,050	0.28	C	470	1,540
Lake Winona Rd.	CR 3 to US 17	1080		County	Yes	0.15	2	35	RUA_UFH_2W_2L_U_0L	n/c	180	160	160	6,480	170	170	220	-	350	290	260	200	C	6,300	0.03	B	20	590
Lake Winona Rd.	US 17 to Blackwelder Rd.	1081		County	Yes	2.25	2	35	RUA_UFH_2W_2L_U_0L	Minor Collector - Rural	910	860	880	6,480	800	800	980	-	1,030	980	1,110	1,130	C	6,300	0.18	B	90	590
Lake Winona Rd.	Blackwelder Rd. to SR 40	1082		County	Yes	3.70	2	35	RUA_UFH_2W_2L_U_0L	Minor Collector - Rural	180	180	150	6,480	120	140	160	-	200	170	190	200	C	6,300	0.03	B	20	590
Children's Way/Lakeshore	Main St. to Providence Blvd.	1090		County	Yes	0.70	2	30	UA_NSSRC2_2W_2L_U_0L	n/c	2,080	1,220	1,000	12,710	960	900	870	940	1,000	1,000	840	830	E	13,640	0.06	C	90	1,020
Lakeshore Dr.	Providence Blvd. to Garfield Rd	1092		County	Yes	0.45	2	30	UA_NSSRC2_2W_2L_U_0L	n/c	2,860	2,680	2,590	12,710	2,610	2,520	2,570	2,820	3,170	3,180	2,970	3,120	E	13,640	0.23	C	330	1,020
Lakeview Dr. (LH)	Ohio Ave. to Main St.	1100		County	Yes	0.50	2	30	UA_NSSRC2_2W_2L_U_0L	Major Collector - Urban	2,300	2,900	2,600	11,090	2,790	2,740	3,280	3,690	3,280	4,330	4,390	3,890	C	13,640	0.29	C	400	470
Lakeview Dr. (LH)	Main St. to New York Ave.	1101		County		0.25	2	30	UA_NSSRC2_2W_2L_U_0L	Minor Collector - Urban	1,080	1,100	1,130	7,336	1,190	1,110	1,140	1,250	1,150	1,420	1,170	1,120	C	13,640	0.08	C	100	470
Lemon Bluff Rd.	SR 415 to end of road	1111		County		4.60	2	45	RUA_UFH_2W_2L_U_0L	n/c	960	990	1,000	6,480	980	880	820	1,010	1,140	1,030	1,100	1,060	C	6,300	0.17	B	110	590
Little Brown Church Rd.	US 17 to Cowart Rd.	1120		County		0.65	2	40	RUA_UFH_2W_2L_U_0L	n/c	630	640	510	6,480	460	450	560	520	490	600	630	450	C	6,300	0.07	B	40	590
LPGA Blvd. (DB)	Tomoka Farms Rd. to US 92			County	Yes	3.67	0	55	RDA_UFH_2W_2L_U_WL	n/c	-	-	-	15,890	-	-	-	-	-	-	-	-	-	-		-	-	-
LPGA Blvd. (DB)	US 92 to International Golf Dr	1130		County	Yes	2.75	2	55	UA_NSSRC1_2W_2L_U_WL	Minor Arterial - Urban	6,180	6,590	5,830	15,890	6,440	6,250	6,840	6,680	8,990	9,280	10,210	8,940	E	26,900	0.33	C	760	2,420
LPGA Blvd. (DB)	International Golf Dr to Tymber Cree	1131		County	Yes	1.50	2	55	UA_NSSRC1_2W_2L_U_WL	Minor Arterial - Urban	7,740	7,800	8,390	15,890	8,620	8,270	9,290	9,540	11,170	11,910	13,730	14,190	E	26,900	0.53	C	1,170	2,420
LPGA Blvd. (DB)	Tymber Creek Rd to Tomoka Farms	1131		County	Yes	0.70	2	55	UA_NSSRC1_2W_2L_U_WL	Minor Arterial - Urban	7,740	7,800	8,390	15,890	8,620	8,270	9,290	9,540	11,170	11,910	13,730	14,190	E	17,050	0.83	C	1,170	1,540
LPGA Blvd. (DB)	Tomoka Farms Rd to I-95	1133a		County	Yes	0.30	4	45	UA_NSSRC1_2W_4L_D_WL	Minor Arterial - Urban	23,330	24,180	23,210	35,010	24,500	24,420	24,130	27,030	27,390	31,150	30,500	30,030	E	17,050	1.76	F	2,410	3,410
LPGA Blvd. (DB)	I-95 to Technology/Outlet	1133b -NEW	Yes	County	Yes	0.40	4														38,400	30,030	E	37,970	0.79	C	2,410	3,080
LPGA Blvd. (DB)	Technology/Outlet to Williamson Blv	1133c -NEW	Yes	County	Yes	0.25	4														38,400	30,030	E	37,970	0.79	C	2,410	3,080
LPGA Blvd. (DB)	Williamson Blvd. to Clyde Morris Blv	1134	Yes	County	Yes	0.50	4	50	UA_NSSRC1_2W_4L_D_WL	Minor Arterial - Urban	19,490	21,030	19,240	35,010	20,640	21,180	20,790	24,300	23,320	25,810	26,740	32,360	E	37,970	0.85	C	2,610	3,410
LPGA Blvd. (DB)	Clyde Morris Blvd. to Jimmy Ann Dr.	1136	Yes	County	Yes	1.10	4	45	UA_NSSRC1_2W_4L_D_WL	Minor Arterial - Urban	14,400	13,850	14,080	35,010	15,410	15,650	15,740	17,110	18,490	18,700	21,400	22,050	E	37,970	0.58	C	1,780	3,410
LPGA Blvd. (DB)	Jimmy Ann Dr. to Derbyshire Rd.	1137	Yes	County	Yes	0.25	4	35	UA_NSSRC2_2W_4L_D_WL	Minor Arterial - Urban	16,430	15,700	15,950	15,890	17,300	18,010	17,870	19,580	20,370	19,570	17,820	23,890	E	30,420	0.79	D	2,030	2,740
LPGA Blvd. (CO)	Derbyshire Rd. to SR5A/Nova Rd.	1139	Yes	County	Yes	0.55	4	35	UA_NSSRC2_2W_4L_D_WL	Minor Arterial - Urban	12,930	13,080	11,140	35,010	13,160	14,000	14,000	16,000	16,300	13,090	10,670	18,070	E	30,420	0.59	D	1,510	2,740
LPGA Blvd. (HH)	SR5A/Nova Rd. to US 1	1141	Yes	County	Yes	1.10	2	30	UA_NSSRC2_2W_2L_U_WL	Minor Arterial - Urban	9,850	10,260	9,350	15,890	9,570	9,830	9,730	9,060	10,990	9,210	10,670	10,790	E	14,040	0.77	D	960	1,270
Macy Ave.	Ohio St. to Cassadaga Rd.	1150		County	Yes	0.75	2	30	UA_NSSRC2_2W_2L_U_0L	Major Collector - Urban	1,230	1,350	1,210	11,090	1,230	1,170	1,130	1,350	1,400	1,500	1,640	1,310	C	13,640	0.10	C	120	470
Main St. (Enterprise)	Jacob Brock Ave to DeBary Ave.	1174		County	Yes	0.35	2	30	UA_NSSRC2_2W_2L_U_0L	n/c	4,880	2,830	2,920	12,710	2,660	2,370	2,370	1,830	2,340	2,750	2,430	2,550	E	13,640	0.19	C	260	1,020
Main St. (Enterprise)	DeBary Ave. to Lakeshore Dr.	1173		County	Yes	0.20	2	30	UA_NSSRC2_2W_2L_U_0L	Urban Local	2,540	-	-	12,710	-	-					-	-	E	13,640	-			
Main St. (Lake Helen)	I-4 to Lakeview Dr.	1176		County	Yes	0.95	2	35	UA_NSSRC2_2W_2L_U_0L	Major Collector - Urban	5,390	5,600	5,500	11,090	5,550	5,310	6,190	6,210	7,500	8,420	8,720	8,410	D	10,660	0.79	D	750	960
Marsh Rd.	US 92 to Carter Rd.	1180		County	Yes	2.05	2	35	UA_NSSRC2_2W_2L_U_0L	Minor Collector - Urban	2,140	2,430	2,330	12,710	2,340	2,390	2,230	2,840	2,780	2,700	3,130	2,890	E	13,640	0.21	C	210	1,020
Marsh Rd.	Carter Rd. to Daugharty Rd.	1183		County	Yes	3.00	2	40	RDA_UFH_2W_2L_U_0L	Minor Collector - Rural	710	720	5,500	11,360	680	670	720	-	910	920	1,030	1,030	C	12,300	0.08	-	80	1,160
Mason Ave.	Williamson Blvd. to Fentress Blvd.	1190		County	Yes	0.60	2	45	UA_NSSRC1_2W_2L_D_WL	Minor Arterial - Urban	8,400	8,360	8,300	16,680	8,450	8,650	8,380	10,670	10,250	11,210	11,720	12,210	E	17,900	0.68	C	1,030	1,620
Mason Ave.	Fentress Blvd. to Bill France Blvd.	1191		County	Yes	0.50	2	40	UA_NSSRC1_2W_2L_D_WL	Minor Arterial - Urban	10,680	10,580	9,320	16,680	9,760	8,460	9,870	12,340	10,320	12,300	14,040	14,920	E	17,900	0.83	C	1,290	1,620
Mason Ave.	Bill France Blvd. to Jimmy Ann Dr.	1193		County	Yes	0.30	4	40	UA_NSSRC1_2W_4L_D_WL	Minor Arterial - Urban	12,140	12,900	11,750	31,590	12,520	11,660	11,550	13,030	13,480	13,800	14,180	13,160	E	37,970	0.35	C	1,060	3,410
Mason Ave.	Jimmy Ann Dr. to SR 483/Clyde Mor	1194		County	Yes	0.50	4	40	UA_NSSRC1_2W_4L_D_WL	Minor Arterial - Urban	13,150	13,530	12,120	31,590	12,330	11,940	11,820	13,340	13,030	13,710	13,770	14,430	E	37,970	0.38	C	1,200	3,410
Maytown Rd.	New Smyrna Blvd. to Pell Rd.	1196		County		5.60	2	50	RDA_UFH_2W_2L_U_0L	Minor Collector - Rural	3,360	3,120	3,350	11,360	3,270	3,120	2,730	3,400	3,640	3,540	3,590	3,910	C	12,300	0.32	B	360	1,160
Maytown Rd.	Pell Rd. to Beacon Light Rd.	1198		County		12.90	2	45	RUA_UFH_2W_2L_U_0L	Minor Collector - Rural	670	650	730	6,480	600	700	690	780	840	730	770	840	C	6,300	0.13	B	80	590
Maytown Rd./Halifax Ave	Beacon Light Rd. to US 1	790		County	Yes	1.10	2	35	RDA_UFH_2W_2L_U_0L	Minor Collector - Rural	1,650	1,650	1,770	11,360	1,680	1,620	1,720	1,730	2,060	1,780	1,960	1,930	C	12,300	0.16	B	200	1,160
McBride Rd.	US 17 to Lake George Rd.	1200		County		3.00	2	35	RUA_UFH_2W_2L_U_0L	n/c	290	310	300	6,480	220	220	250	250	280	220	260	300	C	6,300	0.05	B	30	590
McGregor Rd.	Westside Con./Fatio to Spring Garde	1210		County	Yes	0.70	2	40	UA_NSSRC1_2W_2L_U_0L	Minor Collector - Urban	-	-	1,600	12,710	1,600	1,570	1,610	-	2,010	2,040	2,390	2,460	E	13,640	0.18	C	240	1,230
McGregor Rd.	Spring Garden Ave. to US17/92	1211		County	Yes	1.40	2	40	UA_NSSRC1_2W_2L_U_0L	Major Collector - Urban	4,730	4,600	8,110	12,710	8,850	6,250	7,630	3,900	4,110	4,650	4,730	4,740	E	13,640	0.35	C	440	1,230
Mercers Fernery Rd.	Glenwood Rd. to SR 15A	1221		County	Yes	1.45	2	35	UA_NSSRC2_2W_2L_U_0L	n/c	910	860	980	12,710	950	1,010	920	-	1,100	980	1,240	1,150	E	13,640	0.08	C	110	1,020
Mercers Fernery Rd.	SR 15A to US 17	1223		County	Yes	1.25	2	35	UA_NSSRC2_2W_2L_U_0L	n/c	1,350	1,370	1,580	12,710	1,520	1,470	1,420	-	1,940	1,570	1,800	1,740	E	13,640	0.13	C	130	1,020
Midway Ave.	Williamson Blvd. to US 92	1230		County	Yes	2.00	4	40	UA_NSSRC1_2W_4L_D_WL	Minor Collector - Urban	2,420	2,530	2,380	35,010	2,440	2,630	2,450	3,280	2,880	3,220	4,240	3,690	E	37,970	0.10	C	330	3,410
Minnesota Ave. (Orange C	Sparkman Ave. to US 17/92	1241		County		0.50	2	30	UA_NSSRC2_2W_2L_U_0L	n/c	1,860	1,810	1,930	9,180	1,950	2,090	2,150	-	2,010	2,450	2,680	3,080	E	13,640	0.23	C	310	1,020
Minnesota Ave. (Orange C	US 17/92 to Leavitt Ave.	1242		County		0.50	2	25	UA_NSSRC2_2W_2L_U_0L	Minor Collector - Urban	1,400	1,470	1,360	9,180	1,390	1,410	1,380	-	1,750	1,700	1,730	1,670	E	13,640	0.12	C	160	1,020
Minnesota Ave. (Orange C	Leavitt Ave. to SR 472	1243		County		0.50	2	30	UA_NSSRC2_2W_2L_U_0L	Minor Collector - Urban	1,340	1,430	1,170	9,180	1,180	1,230	1,240	-	1,420	1,650	1,470	1,590	E	13,640	0.12	C	150	1,020
Minnesota Ave. (DeLand)	Grand Ave. to SR 15A	1245		County	Yes	1.35	2	35	UA_NSSRC2_2W_2L_U_0L	Minor Collector - Urban	2,670	2,670	2,650	12,710	2,850	2,800	3,440	3,340	3,610	3,500	4,100	3,500	E	13,640	0.26	C	320	1,020
Minnesota Ave. (DeLand)	SR 15A to US 17/92	1247		County	Yes	1.25	2	30	UA_NSSRC2_2W_2L_U_0L	Major Collector - Urban	1,240	1,090	1,100	12,710	900	970	1,220	-	1,610	1,290	1,430	1,580	E	13,640	0.12	C	150	1,020
Minnesota Ave. (DeLand)	Amelia Ave. to Hill Ave	1249		County	Yes	0.75	2	30	UA_NSSRC2_2W_2L_U_0L	Major Collector - Urban	2,280	2,170	2,300	12,710	2,110	2,060	2,080	-	2,350	2,280	2,110	2,080	E	13,640	0.15	C	180	1,020
Minnesota Ave. (DeLand)	Hill Ave. to Blue Lake Ave.	1250		County	Yes	0.50	2	30	UA_NSSRC2_2W_2L_U_0L	Major Collector - Urban	2,840	2,680	2,770	12,710	2,650	2,520	2,680	-	2,310	2,630	3,230	2,610	E	13,640	0.19	C	230	1,020
Minnesota Ave. (DeLand)	Blue Lake Ave. to Kepler Rd.	1251		County	Yes	0.85	2	40	UA_NSSRC1_2W_2L_U_0L	Major Collector - Urban	4,500	3,530	4,530	12,710	4,170	4,000	3,390	4,420	4,940	4,890	5,650	4,440	E	13,640	0.33	C	390	1,230
New Hampshire Ave.	SR 15A to Adelle Ave	1270		County		0.15	2	30	UA_NSSRC2_2W_2L_U_0L	Minor Collector - Urban	2,110	2,210	2,280	9,180	2,260	2,470	2,720	-	3,040	2,490	3,220	2,970	E	13,640	0.22	C	320	1,020
New Hampshire Ave.	Adelle Ave to Clara Ave.	1271		County		0.50	2	30	UA_NSSRC2_2W_2L_U_0L	Minor Collector - Urban	2,540	2,480	2,630	9,180	2,780	2,760	3,070	-	3,260	3,560	3,770	4,040	E	13,640	0.30	C	360	1,020
New Hampshire Ave.	Clara Ave. to US 17/92	1272		County		0.25	2	30	UA_NSSRC2_2W_2L_U_0L	Minor Collector - Urban	2,640	2,640	2,790	9,180	2,850	2,830	3,180	-	3,250	3,600	4,040	4,760	E	13,640	0.35	C	410	1,020
New York Ave. (Orange C	Westside Pkwy/Hamilton Ave. to Spa	1281		County		0.50	2	30	UA_NSSRC2_2W_2L_U_0L	Minor Collector - Urban	3,750	3,850	4,230	9,180	3,880	3,990	4,190	-	5,060	4,700	4,880	5,180	E	13,640	0.38	C	480	1,020
New York Ave. (Orange C	Sparkman Ave. to Carpenter Ave	1283		County		0.30	2	30	UA_NSSRC2_2W_2L_U_0L	Minor Collector - Urban	4,560	4,770	5,230	9,180	4,990	4,850	4,860	-	5,960	5,510	6,320	5,840	E	13,640	0.43	D	520	1,020
New York Ave. (Orange C	Carpenter Ave. to US 17/92	1284		County		0.25	2	30	UA_NSSRC2_2W_2L_U_0L	Minor Collector - Urban	5,300	5,580	6,090	9,180	5,640	5,770	6,010	6,270	6,820	6,330	6,690	6,710	E	13,640	0.49	D	570	1,020
New York Ave. (Lake Hel	Summit Ave. to Lakeview Dr.	1285		County		0.50	2	30	UA_NSSRC2_2W_2L_U_0L	Minor Collector - Urban	850	920	900	8,010	970	890	900	1,010	1,020	980	1,040	1,020	C	13,640	0.07	C	100	470
Ohio Ave. (LH)	Macy Ave. to Lakeview Dr.	1320		County	Yes	0.20	2	30	UA_NSSRC2_2W_2L_U_0L	Major Collector - Urban	610	710	640	12,710	730	680	650	770	760	900	800	1,150	C	13,640	0.08	C	110	470
Old Dixie Hwy.	Ingelsia to Pine Tree Dr.	1330		County	Yes	0.50	2	35	UA_NSSRC2_2W_2L_U_0L	Major Collector - Urban	1,970	2,170	1,710	12,710	1,890	1,710	2,240	1,950	2,390	2,040	2,470	2,340	E	13,640	0.17	C	190	1,020
Old Dixie Hwy.	Pine Tree Dr. to Walter Boardman Ln	1332		County	Yes	5.10	2	45	UA_NSSRC1_2W_2L_U_0L	Major Collector - Urban	2,340	2,240	1,890	12,710	2,060	1,810	2,220	-	2,750	2,490	2,180	2,710	E	13,640	0.20	C	230	1,230
Old Dixie Hwy.	Walter Boardman Ln. to Old Kings R	1333		County	Yes	0.55	2	45	UA_NSSRC1_2W_2L_U_0L	Major Collector - Urban	3,490	3,210	3,080	12,710	3,390	2,990	3,410	3,840	4,340	4,230	4,160	4,500	E	13,640	0.33	C	380	1,230
Old Dixie Hwy.	Old Kings Rd. to I-95	1334		County	Yes	0.60	2	45	UA_NSSRC1_2W_2L_U_0L	Major Collector - Urban	7,250	7,750	7,480	12,710	7,430	7,260	7,190	8,710	9,200	8,890	9,950	9,320	E	13,640	0.68	C	750	1,230
Old Kings Rd.	Old Dixie Hwy. to Flagler Co.	1340		County	Yes	0.60	2	50	UA_NSSRC1_2W_2L_U_0L	Major Collector - Urban	3,110	2,980	3,050	12,710	3,150	2,960	3,160	3,200	3,680	3,880	3,990	3,880	E	13,640	0.28	C	330	1,230
Old Mission Rd.	SR 44/Mission Dr. to Old Mission Rd	1356		County	Yes	0.60	2	40	UA_NSSRC1_2W_2L_U_0L	n/c		1,120	1,100	9,180	1,080	1,120	1,160	1,040	1,330	1,330	1,300	810	E	13,640	0.06	C	80	1,230
Old New York Ave.	SR 44 to Hontoon Rd.	1360		County	Yes	1.40	2	40	RDA_UFH_2W_2L_U_0L	n/c	720	870	940	11,360	810	820	850	840	1,030	1,130	1,090	1,050	C	12,300	0.09	B	110	1,160
Old New York Ave.	Hontoon Rd. to Lakeview Dr.	1361		County	Yes	0.40	2	40	UA_NSSRC1_2W_2L_U_0L	Minor Collector - Urban	2,820	3,250	3,540	11,090	3,190	3,170	3,420	3,550	3,970	3,870	4,140	3,810	C	13,640	0.28	C	320	1,090
Old New York Ave.	Lakeview Dr. to Grand Ave.	1362		County	Yes	0.50	2	40	UA_NSSRC1_2W_2L_U_0L	Minor Collector - Urban	3,860	4,130	4,210	12,710	3,990	4,010	4,390	4,650	5,140	4,630	4,600	4,430	E	13,640	0.32	C	390	1,230

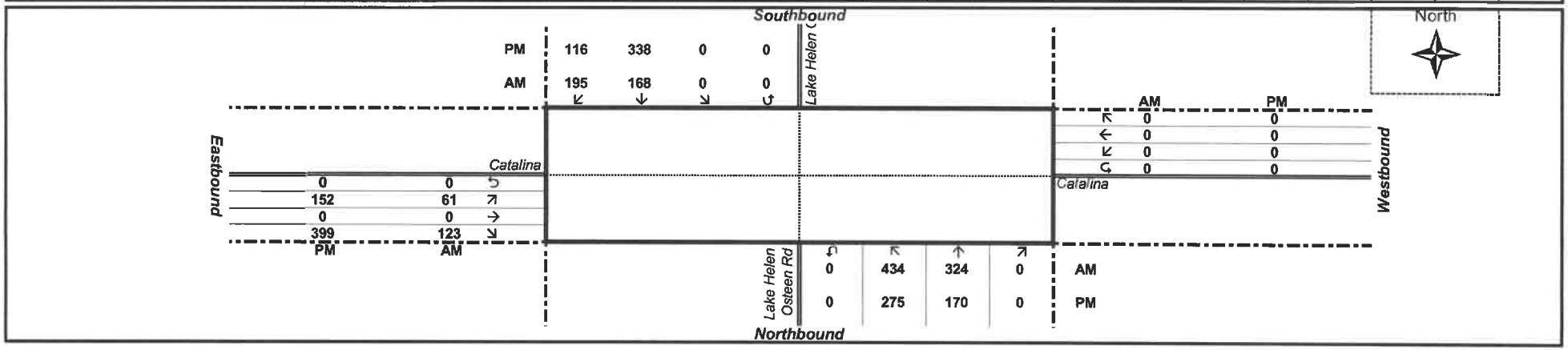
15 MINUTE TURNING MOVEMENT COUNTS

(Cars and Trucks)

DATE: March 18, 2021 (Thursday) **CITY:** Deltona **LATITUDE:** 0

LOCATION: Lake Helen Osteen Rd & Catalina **COUNTY:** Volusia County **LONGITUDE:** 0

	Lake Helen Osteen Rd					Lake Helen Osteen Rd						Catalina						Catalina						
TIME BEGIN	NORTHBOUND					SOUTHBOUND					N/S TOTAL	EASTBOUND					E/W TOTAL	WESTBOUND					E/W TOTAL	GRAND TOTAL
	L	T	R	*U-turn*	TOTAL	L	T	R	*U-turn*	TOTAL		L	T	R	*U-turn*	TOTAL		L	T	R	*U-turn*	TOTAL		
07:00 AM	105	67	0	0	172	0	37	21	0	58	230	10	0	20	0	30	30	0	0	0	0	0	30	260
07:15 AM	138	92	0	0	230	0	32	52	0	84	314	16	0	17	0	33	33	0	0	0	0	0	33	347
07:30 AM	111	118	0	0	229	0	42	40	0	82	311	11	0	41	0	52	52	0	0	0	0	0	52	363
07:45 AM	98	63	0	0	161	0	53	51	0	104	265	18	0	33	0	51	51	0	0	0	0	0	51	316
TOTAL	452	340	0	0	792	0	164	164	0	328	1,120	55	0	111	0	166	166	0	0	0	0	0	166	1,286
08:00 AM	87	51	0	0	138	0	41	52	0	93	231	16	0	32	0	48	48	0	0	0	0	0	48	279
08:15 AM	86	40	0	0	126	0	20	27	0	47	173	16	0	36	0	52	52	0	0	0	0	0	52	225
08:30 AM	82	36	0	0	118	0	21	28	0	49	167	17	0	38	0	55	55	0	0	0	0	0	55	222
08:45 AM	68	41	0	0	109	0	28	31	0	59	168	13	0	35	0	48	48	0	0	0	0	0	48	216
TOTAL	323	168	0	0	491	0	110	138	0	248	739	62	0	141	0	203	203	0	0	0	0	0	203	942
04:00 PM	65	22	0	0	87	0	70	21	0	91	178	43	0	86	0	129	129	0	0	0	0	0	129	307
04:15 PM	63	44	0	0	107	0	71	25	0	96	203	33	0	70	0	103	103	0	0	0	0	0	103	306
04:30 PM	46	46	0	0	92	0	68	29	0	97	189	46	0	100	0	146	146	0	0	0	0	0	146	335
04:45 PM	69	61	0	0	130	0	69	16	0	85	215	35	0	83	0	118	118	0	0	0	0	0	118	333
TOTAL	243	173	0	0	416	0	278	91	0	369	785	157	0	339	0	496	496	0	0	0	0	0	496	1,281
05:00 PM	64	50	0	0	114	0	81	33	0	114	228	39	0	100	0	139	139	0	0	0	0	0	139	367
05:15 PM	79	39	0	0	118	0	78	30	0	108	226	34	0	83	0	117	117	0	0	0	0	0	117	343
05:30 PM	66	40	0	0	106	0	100	31	0	131	237	38	0	108	0	146	146	0	0	0	0	0	146	383
05:45 PM	66	41	0	0	107	0	79	22	0	101	208	41	0	108	0	149	149	0	0	0	0	0	149	357
TOTAL	275	170	0	0	445	0	338	116	0	454	899	152	0	399	0	551	551	0	0	0	0	0	551	1,450
AM Peak																							**Peak Hour Factor:**	0.899
07:15 AM to 08:15 AM	434	324	0	0	758	0	168	195	0	363	1,121	61	0	123	0	184	184	0	0	0	0	0	184	1,305
PM Peak																							**Peak Hour Factor:**	0.946
05:00 PM to 06:00 PM	275	170	0	0	445	0	338	116	0	454	899	152	0	399	0	551	551	0	0	0	0	0	551	1,450



15 MINUTE TURNING MOVEMENT COUNTS

(Trucks Only)

DATE: March 18, 2021 (Thursday) **CITY:** Deltona **LATITUDE:** 0

LOCATION: Lake Helen Osteen Rd & Catalina **COUNTY:** Volusia County **LONGITUDE:** 0

	Lake Helen Osteen Rd					Lake Helen Osteen Rd						Catalina					Catalina						
TIME	NORTHBOUND					SOUTHBOUND					N/S	EASTBOUND					WESTBOUND					E/W	GRAND
BEGIN	L	T	R	*U-turn*	TOTAL	L	T	R	*U-turn*	TOTAL	TOTAL	L	T	R	*U-turn*	TOTAL	L	T	R	*U-turn*	TOTAL	TOTAL	TOTAL
07:00 AM	0	1	0	0	**1**	0	0	1	0	**1**	**2**	0	0	2	0	**2**	0	0	0	0	**0**	**2**	**4**
07:15 AM	1	2	0	0	**3**	0	2	1	0	**3**	**6**	2	0	1	0	**3**	0	0	0	0	**0**	**3**	**9**
07:30 AM	0	0	0	0	**0**	0	2	0	0	**2**	**2**	0	0	2	0	**2**	0	0	0	0	**0**	**2**	**4**
07:45 AM	1	1	0	0	**2**	0	2	0	0	**2**	**4**	1	0	2	0	**3**	0	0	0	0	**0**	**3**	**7**
TOTAL	2	4	0	0	**6**	0	6	2	0	**8**	**14**	3	0	7	0	**10**	0	0	0	0	**0**	**10**	**24**
08:00 AM	0	0	0	0	**0**	0	0	2	0	**2**	**2**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**2**
08:15 AM	2	0	0	0	**2**	0	1	3	0	**4**	**6**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**6**
08:30 AM	0	0	0	0	**0**	0	0	1	0	**1**	**1**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**1**
08:45 AM	4	0	0	0	**4**	0	1	2	0	**3**	**7**	1	0	1	0	**2**	0	0	0	0	**0**	**2**	**9**
TOTAL	6	0	0	0	**6**	0	2	8	0	**10**	**16**	1	0	1	0	**2**	0	0	0	0	**0**	**2**	**18**
04:00 PM	2	0	0	0	**2**	0	1	1	0	**2**	**4**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**4**
04:15 PM	1	0	0	0	**1**	0	0	0	0	**0**	**1**	4	0	1	0	**5**	0	0	0	0	**0**	**5**	**6**
04:30 PM	1	0	0	0	**1**	0	0	2	0	**2**	**3**	1	0	3	0	**4**	0	0	0	0	**0**	**4**	**7**
04:45 PM	3	0	0	0	**3**	0	1	1	0	**2**	**5**	0	0	1	0	**1**	0	0	0	0	**0**	**1**	**6**
TOTAL	7	0	0	0	**7**	0	2	4	0	**6**	**13**	5	0	5	0	**10**	0	0	0	0	**0**	**10**	**23**
05:00 PM	2	0	0	0	**2**	0	0	0	0	**0**	**2**	0	0	1	0	**1**	0	0	0	0	**0**	**1**	**3**
05:15 PM	1	0	0	0	**1**	0	0	1	0	**1**	**2**	0	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	1	0	**1**	0	0	0	0	**0**	**1**	**1**
05:45 PM	0	1	0	0	**1**	0	0	0	0	**0**	**1**	0	0	1	0	**1**	0	0	0	0	**0**	**1**	**2**
TOTAL	3	1	0	0	**4**	0	0	1	0	**1**	**5**	0	0	3	0	**3**	0	0	0	0	**0**	**3**	**8**
AM Peak 07:15 AM to 08:15 AM	2	3	0	0	**5**	0	6	3	0	**9**	**14**	3	0	5	0	**8**	0	0	0	0	**0**	**8**	**22**
PM Peak 05:00 PM to 06:00 PM	3	1	0	0	**4**	0	0	1	0	**1**	**5**	0	0	3	0	**3**	0	0	0	0	**0**	**3**	**8**

N

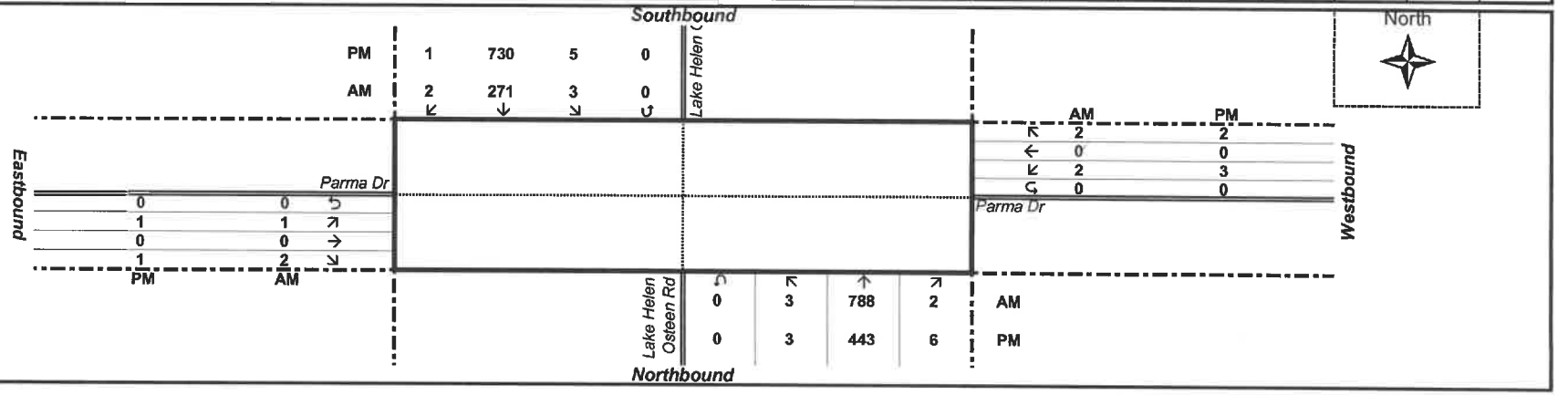
15 MINUTE TURNING MOVEMENT COUNTS

(Cars and Trucks)

DATE: March 18, 2021 (Thursday) CITY: Deltona LATITUDE: 0

LOCATION: Lake Helen Osteen Rd & Parma Dr COUNTY: Volusia County LONGITUDE: 0

	Lake Helen Osteen Rd					Lake Helen Osteen Rd						Parma Dr						Parma Dr						
TIME BEGIN	NORTHBOUND					SOUTHBOUND					N/S	EASTBOUND					WESTBOUND					E/W	GRAND
	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL	TOTAL	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL	TOTAL	TOTAL
07:00 AM	0	176	0	0	176	0	56	0	0	56	232	0	0	0	0	0	2	0	0	0	2	2	234
07:15 AM	1	229	0	0	230	0	47	0	0	47	277	1	0	0	0	1	0	0	0	0	0	1	278
07:30 AM	0	228	1	0	229	2	85	2	0	89	318	0	0	2	0	2	0	0	2	0	2	4	322
07:45 AM	2	155	1	0	158	1	83	0	0	84	242	0	0	0	0	0	0	0	0	0	0	0	242
TOTAL	3	788	2	0	793	3	271	2	0	276	1,069	1	0	2	0	3	2	0	2	0	4	7	1,076
08:00 AM	1	137	0	0	138	0	73	0	0	73	211	0	0	0	0	0	0	0	0	0	0	0	211
08:15 AM	0	128	1	0	129	3	54	0	0	57	186	0	0	1	0	1	0	0	1	0	1	2	188
08:30 AM	0	115	0	0	115	0	60	0	0	60	175	0	0	0	0	0	0	0	0	0	0	0	175
08:45 AM	0	108	0	0	108	0	62	0	0	62	170	0	0	0	0	0	0	0	0	0	0	0	170
TOTAL	1	488	1	0	490	3	249	0	0	252	742	0	0	1	0	1	0	0	1	0	1	2	744
04:00 PM	0	95	0	0	95	3	152	0	0	155	250	0	0	0	0	0	0	0	0	0	0	0	250
04:15 PM	0	106	0	0	106	1	138	0	0	139	245	0	0	0	0	0	1	0	0	0	1	1	246
04:30 PM	1	90	2	0	93	3	164	0	0	167	260	0	0	1	0	1	0	0	0	0	0	1	261
04:45 PM	0	125	1	0	126	1	153	0	0	154	280	0	0	1	0	1	1	0	0	0	1	2	282
TOTAL	1	416	3	0	420	8	607	0	0	615	1,035	0	0	2	0	2	2	0	0	0	2	4	1,039
05:00 PM	0	115	1	0	116	1	178	0	0	179	295	0	0	0	0	0	1	0	0	0	1	1	296
05:15 PM	1	121	1	0	123	1	159	1	0	161	284	0	0	0	0	0	1	0	0	0	1	1	285
05:30 PM	2	104	2	0	108	1	202	0	0	203	311	0	0	1	0	1	1	0	2	0	3	4	315
05:45 PM	0	103	2	0	105	2	191	0	0	193	298	1	0	0	0	1	0	0	0	0	0	1	299
TOTAL	3	443	6	0	452	5	730	1	0	736	1,188	1	0	1	0	2	3	0	2	0	5	7	1,195
AM Peak 07:00 AM to 08:00 AM	3	788	2	0	793	3	271	2	0	276	1,069	1	0	2	0	3	2	0	2	0	4	7	1,076
Peak Hour Factor: 0.835																							
PM Peak 05:00 PM to 06:00 PM	3	443	6	0	452	5	730	1	0	736	1,188	1	0	1	0	2	3	0	2	0	5	7	1,195
Peak Hour Factor: 0.948																							



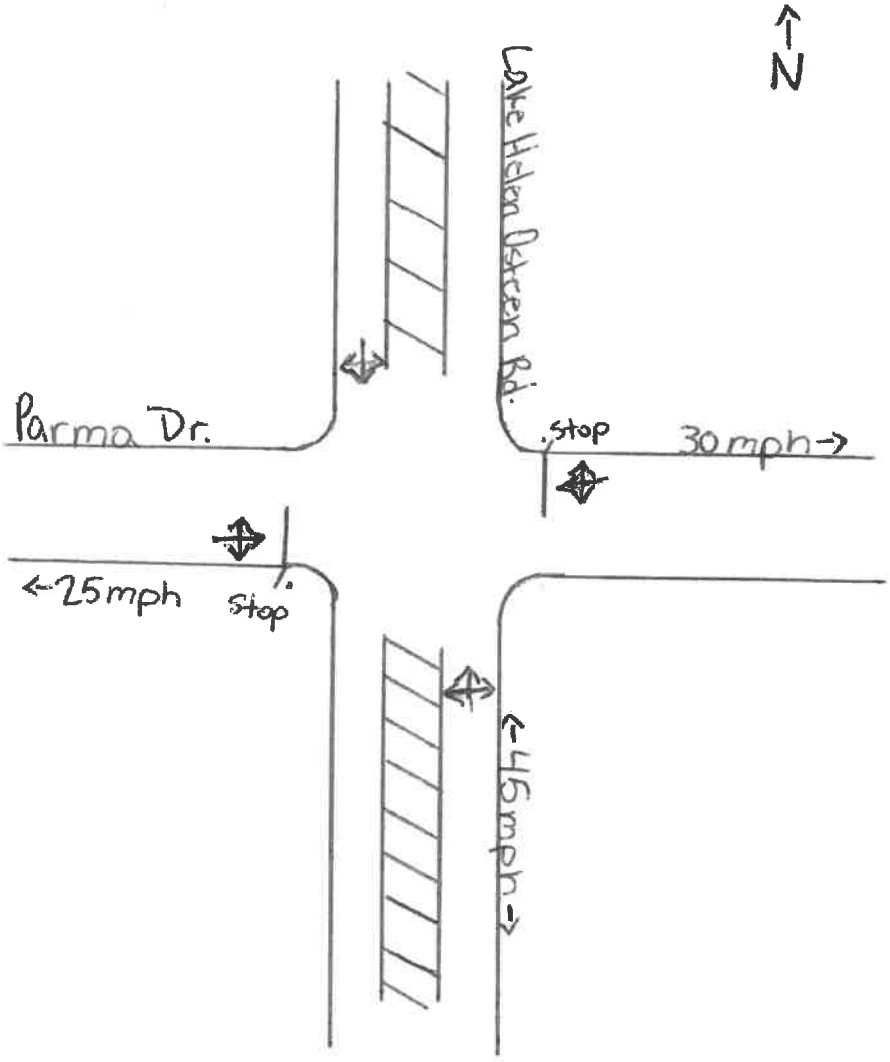
15 MINUTE TURNING MOVEMENT COUNTS

(Trucks Only)

DATE: March 18, 2021 (Thursday) **CITY:** Deltona **LATITUDE:** 0

LOCATION: Lake Helen Osteen Rd & Parma Dr **COUNTY:** Volusia County **LONGITUDE:** 0

	Lake Helen Osteen Rd					Lake Helen Osteen Rd						Parma Dr					Parma Dr						
TIME BEGIN	NORTHBOUND					SOUTHBOUND					N/S	EASTBOUND					WESTBOUND					E/W	GRAND
	L	T	R	*U-turn*	TOTAL	L	T	R	*U-turn*	TOTAL	TOTAL	L	T	R	*U-turn*	TOTAL	L	T	R	*U-turn*	TOTAL	TOTAL	TOTAL
07:00 AM	0	1	0	0	**1**	0	3	0	0	**3**	**4**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**4**
07:15 AM	0	3	0	0	**3**	0	3	0	0	**3**	**6**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**6**
07:30 AM	0	0	0	0	**0**	0	4	0	0	**4**	**4**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**4**
07:45 AM	0	2	0	0	**2**	0	4	0	0	**4**	**6**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**6**
TOTAL	0	6	0	0	**6**	0	14	0	0	**14**	**20**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**20**
08:00 AM	0	0	0	0	**0**	0	0	0	0	**0**	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**0**
08:15 AM	0	2	0	0	**2**	0	1	0	0	**1**	**3**	0	0	1	0	**1**	0	0	0	0	**0**	**1**	**4**
08:30 AM	0	0	0	0	**0**	0	0	0	0	**0**	**0**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**0**
08:45 AM	0	4	0	0	**4**	0	2	0	0	**2**	**6**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**6**
TOTAL	0	6	0	0	**6**	0	3	0	0	**3**	**9**	0	0	1	0	**1**	0	0	0	0	**0**	**1**	**10**
04:00 PM	0	2	0	0	**2**	0	1	0	0	**1**	**3**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**3**
04:15 PM	0	1	0	0	**1**	0	1	0	0	**1**	**2**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**2**
04:30 PM	0	1	0	0	**1**	0	3	0	0	**3**	**4**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**4**
04:45 PM	0	3	0	0	**3**	0	2	0	0	**2**	**5**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**5**
TOTAL	0	7	0	0	**7**	0	7	0	0	**7**	**14**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**14**
05:00 PM	0	2	0	0	**2**	0	1	0	0	**1**	**3**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**3**
05:15 PM	0	1	0	0	**1**	0	0	0	0	**0**	**1**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**1**
05:30 PM	0	0	0	0	**0**	0	1	0	0	**1**	**1**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**1**
05:45 PM	0	1	0	0	**1**	0	1	0	0	**1**	**2**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**2**
TOTAL	0	4	0	0	**4**	0	3	0	0	**3**	**7**	0	0	0	0	**0**	0	0	0	0	**0**	**0**	**7**
AM Peak 07:00 AM to 08:00 AM	**0**	**6**	**0**	**0**	**6**	**0**	**14**	**0**	**0**	**14**	**20**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**20**
PM Peak 05:00 PM to 06:00 PM	**0**	**4**	**0**	**0**	**4**	**0**	**3**	**0**	**0**	**3**	**7**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**7**


N
Lake Helen Osteen Rd.
Parma Dr.
stop
30 mph →
← 25 mph
stop
← 45 mph →

COUNTY OF VOLUSIA TRAFFIC SIGNAL TIMING SHEET

LOCATION: Lake Helen-Osteen Rd & Catalina Blvd
Deltona

ISOLATED: X

DATE: 3/22/2021

SIGNAL #: 400

CO-ORD:

Design By: Sean Castello

System #: -

Controller Timing Chart

PHASE	1	2	3	4	5	6	7	8
DIRECTION	NBL	SB	-	-	-	NB	-	EB
TURN TYPE	PERM/PROT	-	-	-	-	-	-	-
MIN GREEN	5	15				15		5
EXTENSION	5	5				5		5
CLEARANCE	4.5	4.5				4.5		4.5
ALL RED	2.0	2.0				2.0		2.0
WALK	-	-				-		-
FDW	-	-				-		-
MAX 1	20	30				30		20
MAX 2	-	-				-		-
MAX 3	-	-				-		-
ADJUST	-	-				-		-
RECALL	-	MIN				MIN		-
DETECTOR	NON-LOCK	LOCK				LOCK		NON-LOCK
FLASH	-	YELLOW				YELLOW		RED
SET	-	-				-		-
CLEAR	-	-				-		-

BASE DAY		1	2	3	4	5	6	7
MON #1	TIME	00:01-00:00						
	PLAN	FREE						
TUES#1	TIME	00:01-00:00						
	PLAN	FREE						
WED #1	TIME	00:01-00:00						
	PLAN	FREE						
THU #1	TIME	00:01-00:00						
	PLAN	FREE						
FRI #1	TIME	00:01-00:00						
	PLAN	FREE						
SAT #2	TIME	00:01-00:00						
	PLAN	FREE						
SUN #3	TIME	00:01-00:00						
	PLAN	FREE						

Crosswalk Length
P2
-
P4
-
P6
-
P8
-

CONTROLLER TYPE	CONDITION OF OVERHEAD	OK	PROM NUMBER
Ecomnolite ASC/3	OVERHEAD STREET NAMES	NO	
PHASES: 8Φ	ILLUMINATED STREET NAMES	YES	02.63.00
CABINET TYPE V	PRE-EMPTION	NO	IP ADDRESS
CABINET DATE 2016	PRE-EMPTION TYPE	N/A	-

SIGNAL OWNER: County

LED: YES

REMARKS:

Omit PH 1 when PH 2 is active

1	2	
6		8

2019 PEAK SEASON FACTOR CATEGORY REPORT - REPORT TYPE: ALL
CATEGORY: 7900 VOLUSIA COUNTYWIDE

WEEK	DATES	SF	MOCF: 0.95 PSCF
1	01/01/2019 - 01/05/2019	1.02	1.07
2	01/06/2019 - 01/12/2019	1.02	1.07
3	01/13/2019 - 01/19/2019	1.02	1.07
4	01/20/2019 - 01/26/2019	1.00	1.05
5	01/27/2019 - 02/02/2019	0.99	1.04
* 6	02/03/2019 - 02/09/2019	0.97	1.02
* 7	02/10/2019 - 02/16/2019	0.95	1.00
* 8	02/17/2019 - 02/23/2019	0.94	0.99
* 9	02/24/2019 - 03/02/2019	0.94	0.99
*10	03/03/2019 - 03/09/2019	0.93	0.98
*11	03/10/2019 - 03/16/2019	0.92	0.97
*12	03/17/2019 - 03/23/2019	0.93	0.98
*13	03/24/2019 - 03/30/2019	0.93	0.98
*14	03/31/2019 - 04/06/2019	0.94	0.99
*15	04/07/2019 - 04/13/2019	0.95	1.00
*16	04/14/2019 - 04/20/2019	0.96	1.01
*17	04/21/2019 - 04/27/2019	0.97	1.02
*18	04/28/2019 - 05/04/2019	0.98	1.03
19	05/05/2019 - 05/11/2019	0.99	1.04
20	05/12/2019 - 05/18/2019	1.00	1.05
21	05/19/2019 - 05/25/2019	1.00	1.05
22	05/26/2019 - 06/01/2019	1.01	1.06
23	06/02/2019 - 06/08/2019	1.02	1.07
24	06/09/2019 - 06/15/2019	1.02	1.07
25	06/16/2019 - 06/22/2019	1.03	1.08
26	06/23/2019 - 06/29/2019	1.04	1.09
27	06/30/2019 - 07/06/2019	1.04	1.09
28	07/07/2019 - 07/13/2019	1.05	1.11
29	07/14/2019 - 07/20/2019	1.06	1.12
30	07/21/2019 - 07/27/2019	1.05	1.11
31	07/28/2019 - 08/03/2019	1.04	1.09
32	08/04/2019 - 08/10/2019	1.03	1.08
33	08/11/2019 - 08/17/2019	1.02	1.07
34	08/18/2019 - 08/24/2019	1.03	1.08
35	08/25/2019 - 08/31/2019	1.05	1.11
36	09/01/2019 - 09/07/2019	1.06	1.12
37	09/08/2019 - 09/14/2019	1.08	1.14
38	09/15/2019 - 09/21/2019	1.09	1.15
39	09/22/2019 - 09/28/2019	1.07	1.13
40	09/29/2019 - 10/05/2019	1.04	1.09
41	10/06/2019 - 10/12/2019	1.02	1.07
42	10/13/2019 - 10/19/2019	0.99	1.04
43	10/20/2019 - 10/26/2019	1.00	1.05
44	10/27/2019 - 11/02/2019	1.00	1.05
45	11/03/2019 - 11/09/2019	1.01	1.06
46	11/10/2019 - 11/16/2019	1.01	1.06
47	11/17/2019 - 11/23/2019	1.01	1.06
48	11/24/2019 - 11/30/2019	1.02	1.07
49	12/01/2019 - 12/07/2019	1.02	1.07
50	12/08/2019 - 12/14/2019	1.02	1.07
51	12/15/2019 - 12/21/2019	1.02	1.07
52	12/22/2019 - 12/28/2019	1.02	1.07
53	12/29/2019 - 12/31/2019	1.02	1.07

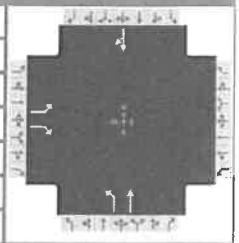
* PEAK SEASON

APPENDIX B

Existing Conditions Capacity Analysis Worksheets

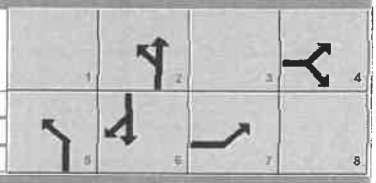
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Volusia County			Duration, h	0.25
Analyst	TPD/jd	Analysis Date	Sep 21, 2021	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak Hour	PHF	0.90
Urban Street	Lake Helen Osteen Rd	Analysis Year	2021	Analysis Period	1> 7:00
Intersection	Lake Helen Osteen Rd...	File Name	Lake Helen Osteen Rd and Catalina Blvd Existing...		
Project Description	Existing AM PeakHour				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	61		123				434	324			168	195

Signal Information					EB			WB			NB		
Cycle, s	90.0	Reference Phase	2										
Offset, s	0	Reference Point	End	Green	12.7	48.1		9.7	0.0	0.0	0.0		
Uncoordinated	No	Simult. Gap E/W	On	Yellow	4.5	4.5		4.5	0.0	0.0	0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0		2.0	0.0	0.0	0.0		



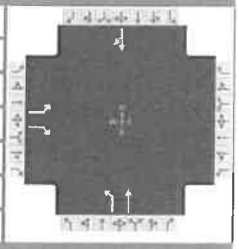
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			5	2		6
Case Number		9.0			1.0	4.0		8.3
Phase Duration, s		16.2			19.2	73.8		54.6
Change Period, ($Y+R_c$), s		6.5			6.5	6.5		6.5
Max Allow Headway (*MAH*), s		3.2			3.0	0.0		0.0
Queue Clearance Time (g_s), s		9.4			11.9			
Green Extension Time (g_e), s		0.3			0.8	0.0		0.0
Phase Call Probability		0.99			1.00			
Max Out Probability		0.00			0.00			

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				5	2			6	16
Adjusted Flow Rate (*v*), veh/h	68		137				482	360			403	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810		1610				1810	1900			1732	
Queue Service Time (g_s), s	3.1		7.4				9.9	5.3			12.7	
Cycle Queue Clearance Time (g_c), s	3.1		7.4				9.9	5.3			12.7	
Green Ratio (*g/C*)	0.11		0.11				0.70	0.75			0.53	
Capacity (*c*), veh/h	195		174				727	1421			926	
Volume-to-Capacity Ratio (*X*)	0.348		0.788				0.663	0.253			0.436	
Back of Queue (*Q*), ft/ln (95 th percentile)	60.4		132.4				120.5	62.1			204.4	
Back of Queue (*Q*), veh/ln (95 th percentile)	2.4		5.3				4.8	2.5			8.2	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00		0.00				0.00	0.00			0.00	
Uniform Delay (d_1), s/veh	37.2		39.1				7.9	3.5			12.7	
Incremental Delay (d_2), s/veh	0.4		3.0				0.4	0.4			1.5	
Initial Queue Delay (d_3), s/veh	0.0		0.0				0.0	0.0			0.0	
Control Delay (*d*), s/veh	37.6		42.1				8.3	4.0			14.2	
Level of Service (LOS)	D		D				A	A			B	
Approach Delay, s/veh / LOS	40.6	D		0.0			6.5	A		14.2	B	
Intersection Delay, s/veh / LOS	13.4						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.96	B	1.73	B	0.64	A	1.89	B
Bicycle LOS Score / LOS		F			1.88	B	1.15	A

HCS7 Signalized Intersection Results Summary

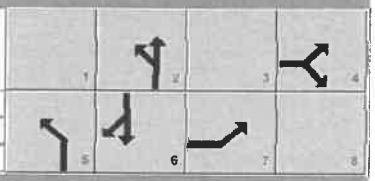
General Information				Intersection Information	
Agency	Volusia County			Duration, h	0.25
Analyst	TPD/jd	Analysis Date	Sep 21, 2021	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak Hour	PHF	0.95
Urban Street	Lake Helen Osteen Rd	Analysis Year	2021	Analysis Period	1> 14:30
Intersection	Lake Helen Osteen Rd...	File Name	Lake Helen Osteen Rd and Catalina Blvd Existing...		
Project Description	Existing PM PeakHour				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	152		399				275	170			338	116

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	37.0	23.5	0.0	0.0	0.0		
Yellow	4.5	4.5	4.5	0.0	0.0	0.0		
Red	2.0	2.0	2.0	0.0	0.0	0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			5	2		6
Case Number		9.0			1.0	4.0		8.3
Phase Duration, s		30.0			16.5	60.0		43.5
Change Period, ($Y+R_c$), s		6.5			6.5	6.5		6.5
Max Allow Headway (*MAH*), s		3.2			3.0	0.0		0.0
Queue Clearance Time (g_s), s		25.5			9.8			
Green Extension Time (g_e), s		0.0			0.2	0.0		0.0
Phase Call Probability		1.00			1.00			
Max Out Probability		1.00			0.56			

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				5	2			6	16
Adjusted Flow Rate (*v*), veh/h	160		420				289	179			478	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810		1610				1810	1900			1816	
Queue Service Time (g_s), s	6.5		23.5				7.8	3.8			18.9	
Cycle Queue Clearance Time (g_c), s	6.5		23.5				7.8	3.8			18.9	
Green Ratio (*g/C*)	0.26		0.26				0.54	0.59			0.41	
Capacity (*c*), veh/h	472		420				468	1129			747	
Volume-to-Capacity Ratio (*X*)	0.339		0.999				0.618	0.158			0.640	
Back of Queue (*Q*), ft/ln (95 th percentile)	118.5		490				126.3	62.4			319.7	
Back of Queue (*Q*), veh/ln (95 th percentile)	4.7		19.6				5.1	2.5			12.8	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00		0.00				0.00	0.00			0.00	
Uniform Delay (d_1), s/veh	27.0		33.2				14.6	8.2			21.2	
Incremental Delay (d_2), s/veh	0.2		43.6				0.9	0.3			4.2	
Initial Queue Delay (d_3), s/veh	0.0		0.0				0.0	0.0			0.0	
Control Delay (*d*), s/veh	27.1		76.8				15.6	8.5			25.4	
Level of Service (LOS)	C		E				B	A			C	
Approach Delay, s/veh / LOS	63.1		E	0.0			12.9		B	25.4		C
Intersection Delay, s/veh / LOS	35.9						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.96	B	1.73	B	0.68	A	1.91	B
Bicycle LOS Score / LOS		F			1.26	A	1.28	A

HCS7 Two-Way Stop-Control Report

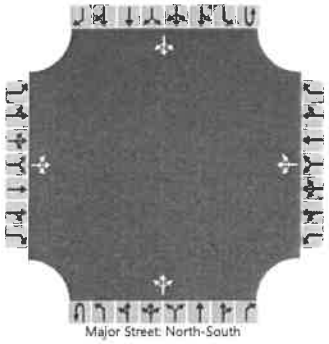
General Information

Analyst	TPD/jd
Agency/Co.	Volusia County
Date Performed	9/21/2021
Analysis Year	2021
Time Analyzed	Existing AM Peak Hour
Intersection Orientation	North-South
Project Description	Three Island North

Site Information

Intersection	Lake Helen/Parma Dr
Jurisdiction	Volusia County
East/West Street	Parma Drive
North/South Street	Lake Helen Osteen Road
Peak Hour Factor	0.83
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		1	0	2		2	0	2		3	788	2		3	271	2
Percent Heavy Vehicles (%)		0	0	0		0	0	0		0				0		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.10	6.50	6.20		4.10				4.10		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.50	4.00	3.30		2.20				2.20		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			4				5			4				4		
Capacity, c (veh/h)			300				194			1242				730		
v/c Ratio			0.01				0.02			0.00				0.00		
95% Queue Length, Q_{95} (veh)			0.0				0.1			0.0				0.0		
Control Delay (s/veh)			17.2				24.1			7.9				10.0		
Level of Service (LOS)			C				C			A				A		
Approach Delay (s/veh)		17.2				24.1				0.1				0.2		
Approach LOS		C				C										

HCS7 Two-Way Stop-Control Report

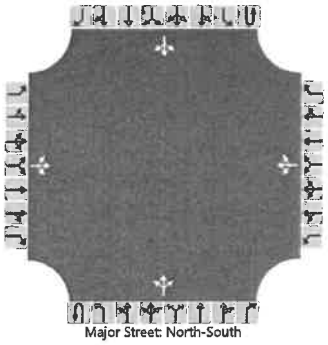
General Information

Analyst	TPD/jd
Agency/Co.	Volusia County
Date Performed	9/21/2021
Analysis Year	2021
Time Analyzed	Existing PM Peak Hour
Intersection Orientation	North-South
Project Description	Three Island North

Site Information

Intersection	Lake Helen/Parma Dr
Jurisdiction	Volusia County
East/West Street	Parma Drive
North/South Street	Lake Helen Osteen Road
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		1	0	1		2	0	2		3	443	6		5	730	2
Percent Heavy Vehicles (%)		0	0	0		0	0	0		0				0		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.10	6.50	6.20		4.10				4.10		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.50	4.00	3.30		2.20				2.20		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			2				4			3				5		
Capacity, c (veh/h)			216				237			853				1100		
v/c Ratio			0.01				0.02			0.00				0.00		
95% Queue Length, Q_{95} (veh)			0.0				0.1			0.0				0.0		
Control Delay (s/veh)			21.8				20.5			9.2				8.3		
Level of Service (LOS)			C				C			A				A		
Approach Delay (s/veh)		21.8				20.5				0.1				0.1		
Approach LOS		C				C										

APPENDIX C

ITE Trip Generation Worksheets

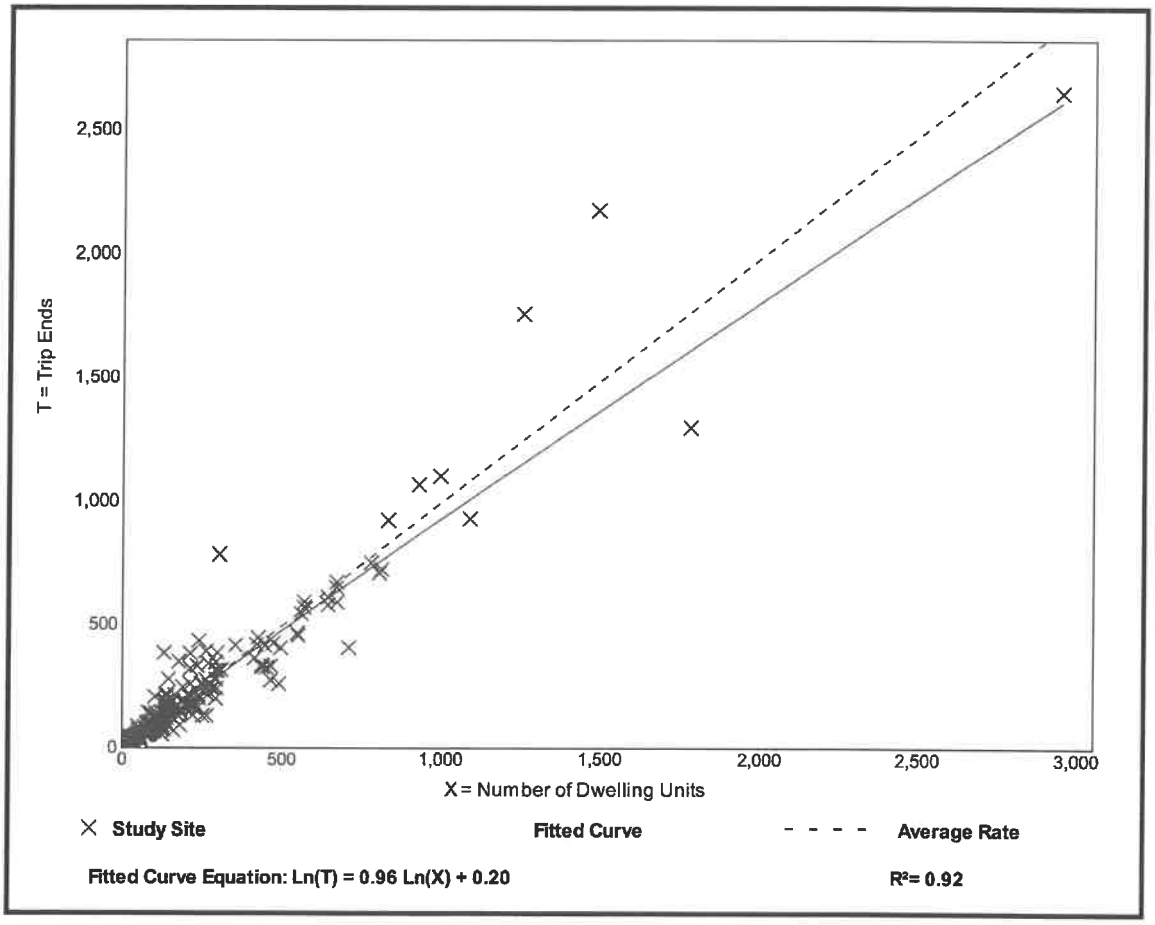
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 190
Avg. Num. of Dwelling Units: 242
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.99	0.44 - 2.98	0.31

Data Plot and Equation



Single-Family Detached Housing
(210)

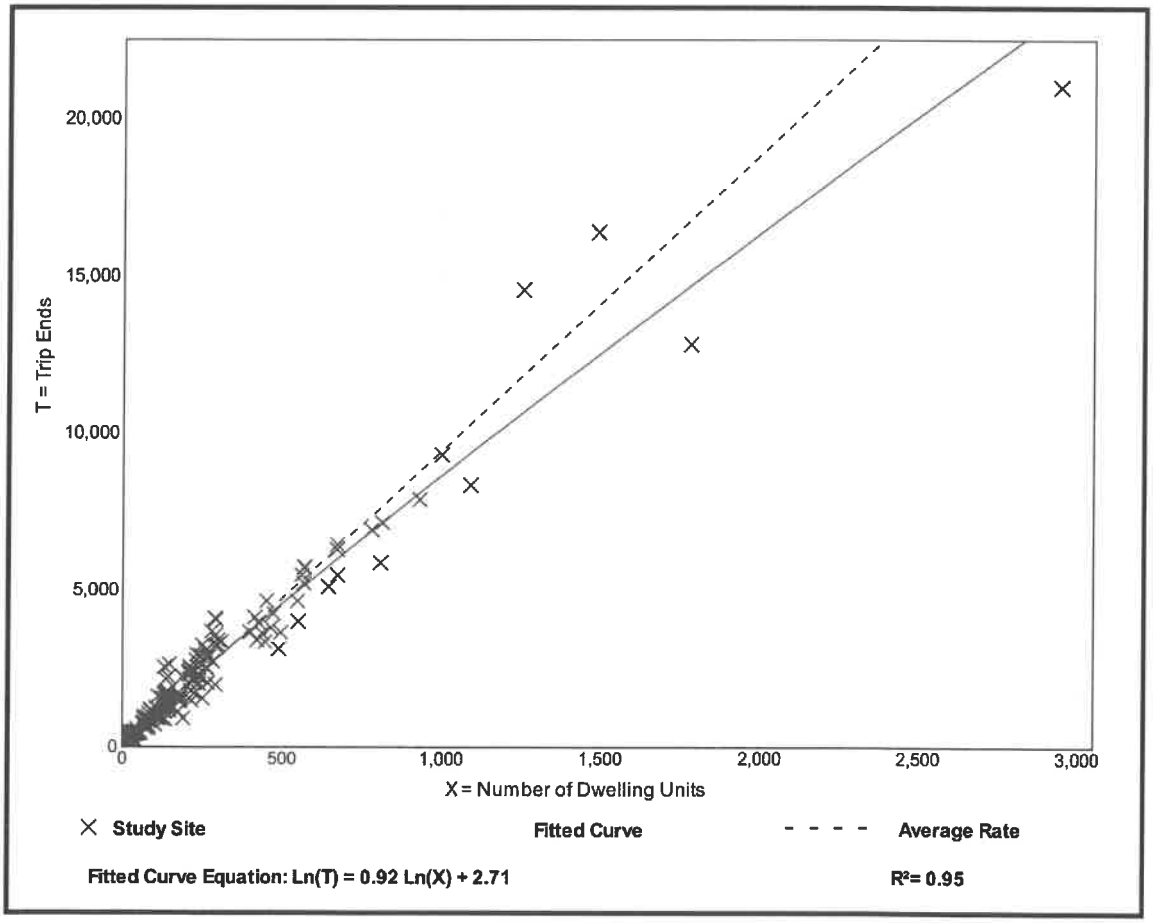
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 159
Avg. Num. of Dwelling Units: 264
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.44	4.81 - 19.39	2.10

Data Plot and Equation



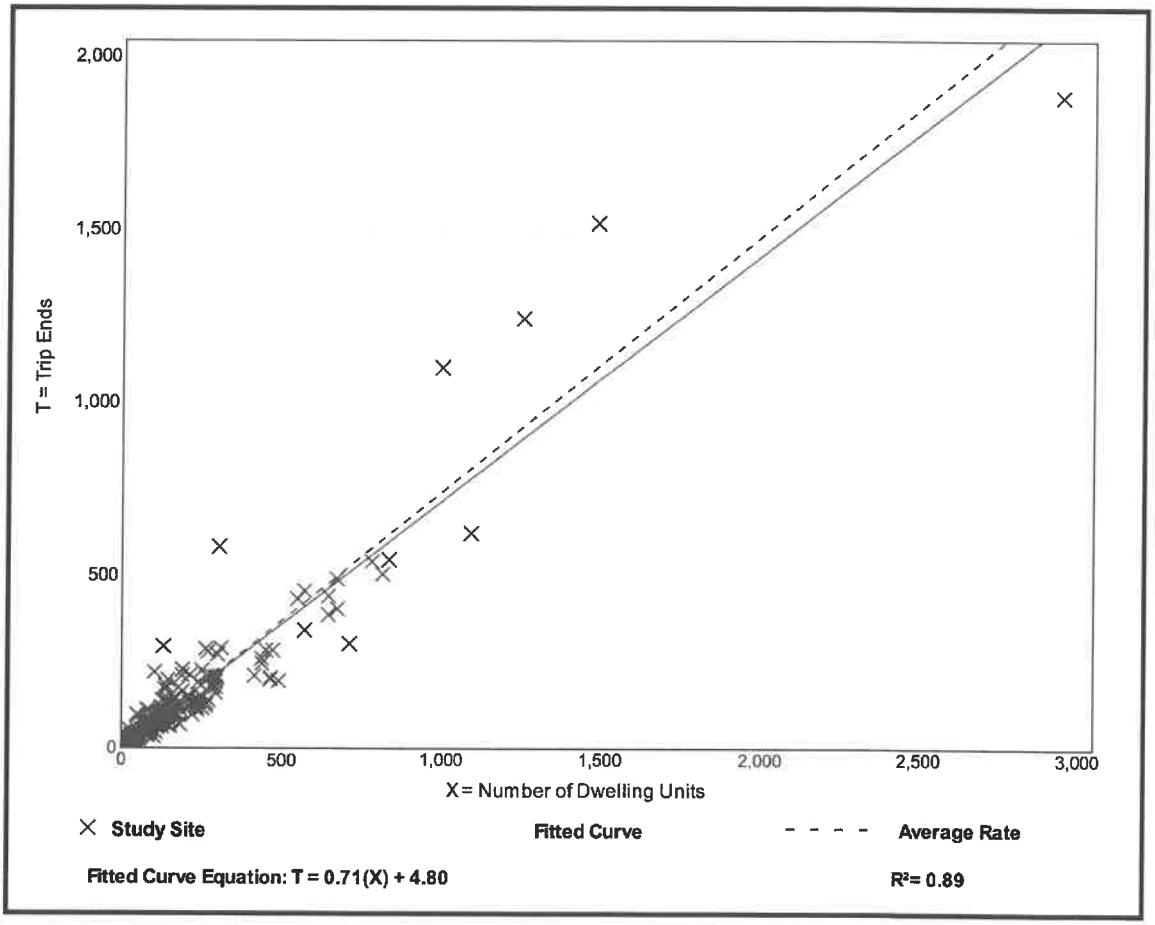
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 173
Avg. Num. of Dwelling Units: 219
Directional Distribution: 25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

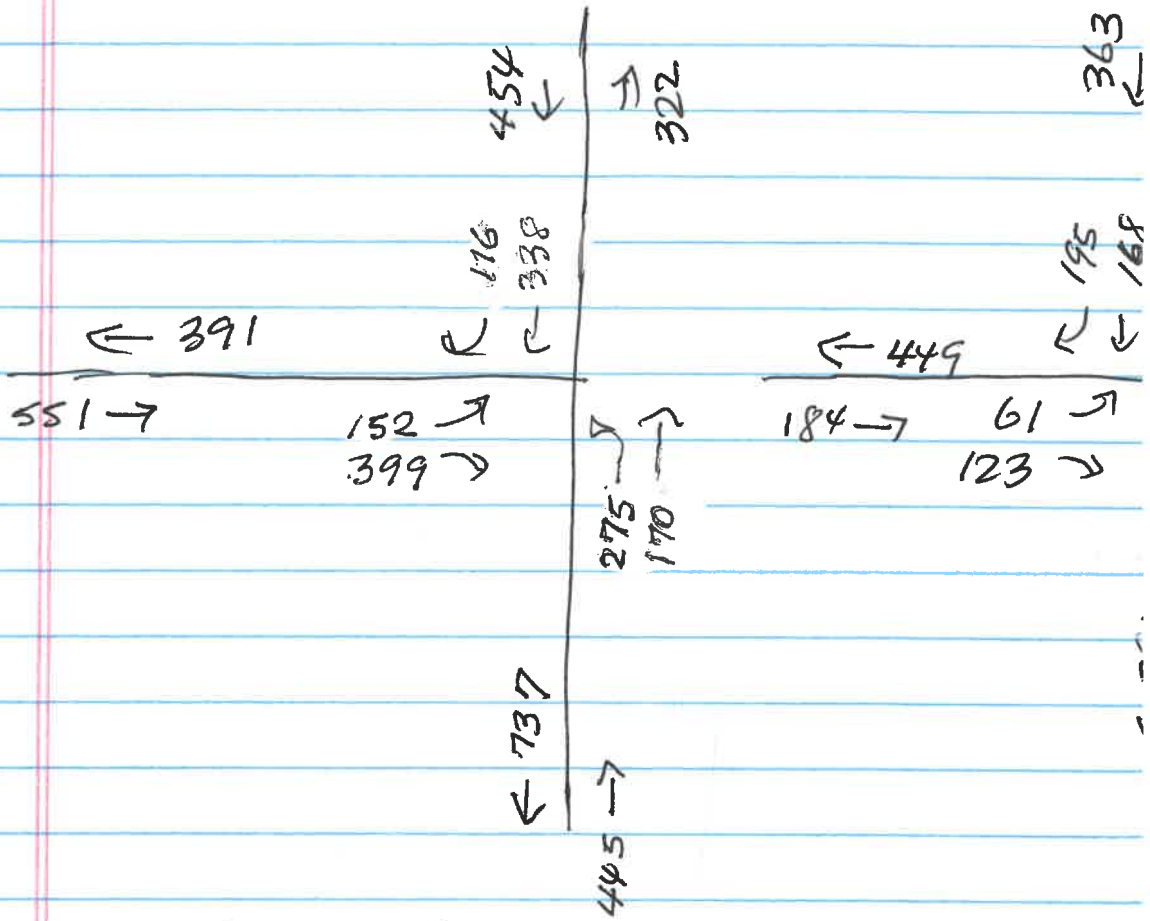
Average Rate	Range of Rates	Standard Deviation
0.74	0.33 - 2.27	0.27

Data Plot and Equation



THREE ISLAND LAKE

Trip Distribution based upon AM & PM Peak Hour Counts



To/From (PM)			To/From (AM	
North	776	27%	748	26
West	942	32%	633	31
South	1182	41%		43
	≈ 2900	100%	≈ 2430	10

USE ⇒ 26% To/From North

42% " South

32% " West

APPENDIX D

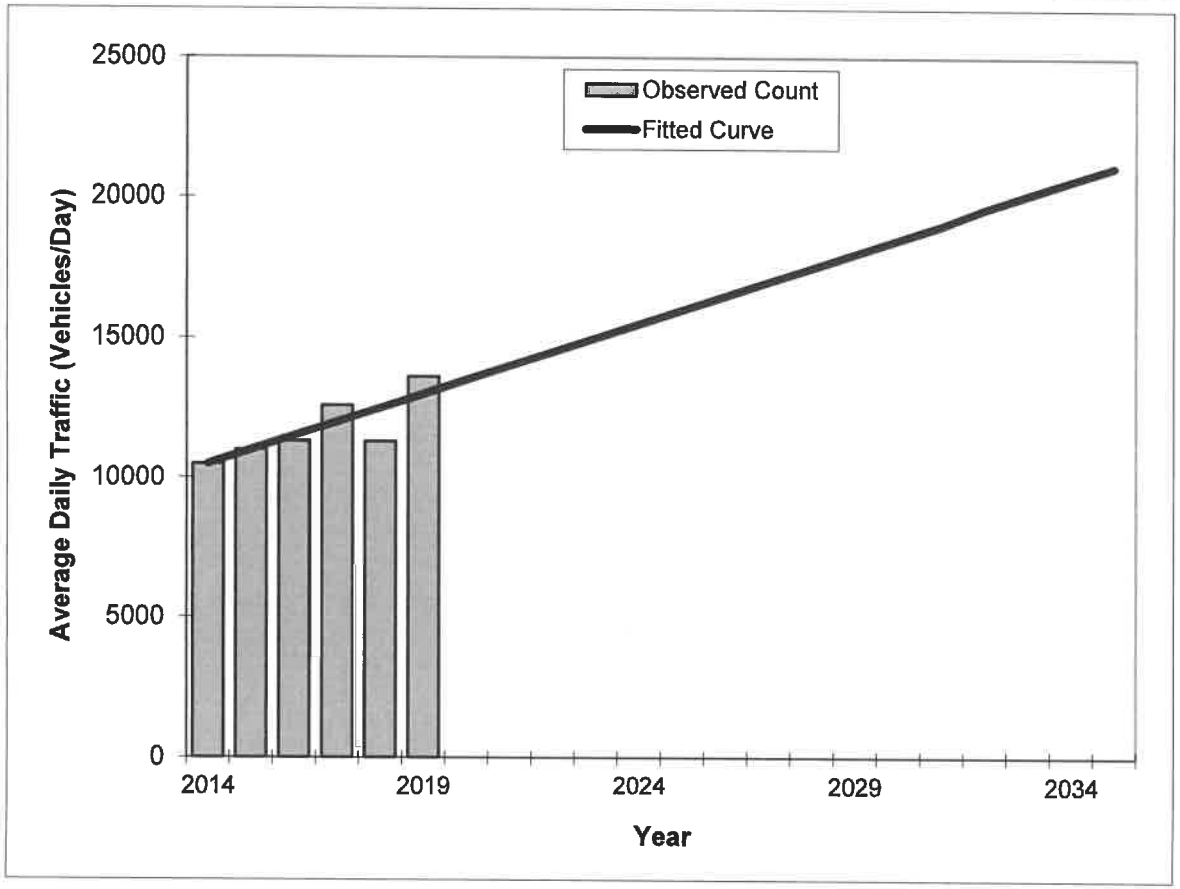
Trends Analysis Worksheets

Traffic Trends - V3.0

LAKE HELEN/OSTEEN RD --

FIN#	1234
Location	1

County:	Volusia (79)
Station #:	0
Highway:	LAKE HELEN/OSTEEN RD



Year	Traffic (ADT/AADT) Count*	Trend**
2014	10500	10500
2015	11000	11000
2016	11300	11500
2017	12600	12000
2018	11300	12500
2019	13600	13000
2021 Opening Year Trend		
2021	N/A	14000
2023 Mid-Year Trend		
2023	N/A	15000
2025 Design Year Trend		
2025	N/A	16000
TRANPLAN Forecasts/Trends		

*Axle-Adjusted

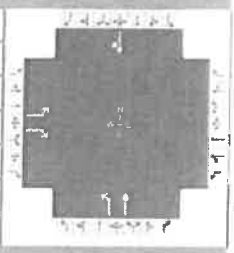
** Annual Trend Increase:	506
Trend R-squared:	67.12%
Trend Annual Historic Growth Rate:	4.76%
Trend Growth Rate (2019 to Design Year):	3.85%
Printed:	23-Mar-21
Straight Line Growth Option	

APPENDIX E

Projected Conditions Capacity Analysis Worksheets

HCS7 Signalized Intersection Results Summary

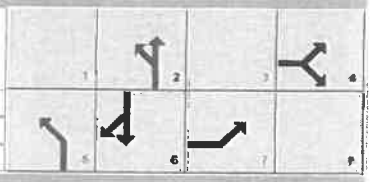
General Information				Intersection Information	
Agency	Volusia County			Duration, h	0.25
Analyst	TPD/jd	Analysis Date	Mar 30, 2021	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak Houor	PHF	0.92
Urban Street	Lake Helen Osteen Rd	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	Lake Helen Osteen Rd...	File Name	Lake Helen Osteen Rd and Catalina Blvd Project...		
Project Description	Projected AM PeakHour				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	63		131				460	343			177	203

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	13.4	47.1	10.0	0.0	0.0	0.0		
Yellow	4.5	4.5	4.5	0.0	0.0	0.0		
Red	2.0	2.0	2.0	0.0	0.0	0.0		



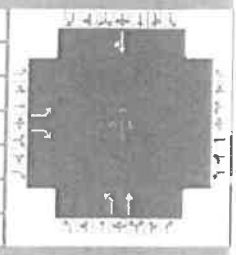
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			5	2		6
Case Number		9.0			1.0	4.0		8.3
Phase Duration, s		16.5			19.9	73.5		53.6
Change Period, (*Y+R c*), s		6.5			6.5	6.5		6.5
Max Allow Headway (*MAH*), s		3.2			3.0	0.0		0.0
Queue Clearance Time (*g s*), s		9.8			12.5			
Green Extension Time (*g e*), s		0.3			0.9	0.0		0.0
Phase Call Probability		0.99			1.00			
Max Out Probability		0.00			0.00			

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				5	2			6	16
Adjusted Flow Rate (*v*), veh/h	68		142				500	373			413	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810		1610				1810	1900			1733	
Queue Service Time (*g s*), s	3.1		7.8				10.5	5.6			13.4	
Cycle Queue Clearance Time (*g c*), s	3.1		7.8				10.5	5.6			13.4	
Green Ratio (*g/C*)	0.11		0.11				0.69	0.74			0.52	
Capacity (*c*), veh/h	202		179				719	1414			907	
Volume-to-Capacity Ratio (*X*)	0.340		0.794				0.696	0.264			0.455	
Back of Queue (*Q*), ft/ln (95 th percentile)	60.6		137.9				130.1	67.2			214.9	
Back of Queue (*Q*), veh/ln (95 th percentile)	2.4		5.5				5.2	2.7			8.6	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00		0.00				0.00	0.00			0.00	
Uniform Delay (*d 1*), s/veh	36.9		39.0				8.5	3.7			13.4	
Incremental Delay (*d 2*), s/veh	0.4		3.0				0.5	0.5			1.6	
Initial Queue Delay (*d 3*), s/veh	0.0		0.0				0.0	0.0			0.0	
Control Delay (*d*), s/veh	37.3		42.0				9.0	4.1			15.1	
Level of Service (LOS)	D		D				A	A			B	
Approach Delay, s/veh / LOS	40.5		D	0.0			6.9		A	15.1		B
Intersection Delay, s/veh / LOS	13.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.96	B	1.73	B	0.64	A	1.89	B
Bicycle LOS Score / LOS		F			1.93	B	1.17	A

HCS7 Signalized Intersection Results Summary

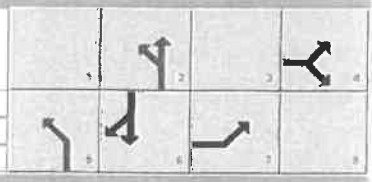
General Information				Intersection Information	
Agency	Volusia County			Duration, h	0.25
Analyst	TPD/jd	Analysis Date	Mar 30, 2021	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak Houor	PHF	0.92
Urban Street	Lake Helen Osteen Rd	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	Lake Helen Osteen Rd...	File Name	Lake Helen Osteen Rd and Catalina Blvd Project...		
Project Description	Projected PM PeakHour				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	158		424				292	182			358	120

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	11.1	34.9	24.5	0.0	0.0	0.0	
Yellow	4.5	4.5	4.5	0.0	0.0	0.0	
Red	2.0	2.0	2.0	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4			5	2		6
Case Number		9.0			1.0	4.0		8.3
Phase Duration, s		31.0			17.6	59.0		41.4
Change Period, (*Y+R c*), s		6.5			6.5	6.5		6.5
Max Allow Headway (*MAH*), s		3.2			3.0	0.0		0.0
Queue Clearance Time (*g s*), s		26.5			10.9			
Green Extension Time (*g e*), s		0.0			0.2	0.0		0.0
Phase Call Probability		1.00			1.00			
Max Out Probability		1.00			1.00			

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7		14				5	2			6	16
Adjusted Flow Rate (*v*), veh/h	172		461				317	198			520	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1810		1610				1810	1900			1818	
Queue Service Time (*g s*), s	6.9		24.5				8.9	4.4			22.1	
Cycle Queue Clearance Time (*g c*), s	6.9		24.5				8.9	4.4			22.1	
Green Ratio (*g/C*)	0.27		0.27				0.53	0.58			0.39	
Capacity (*c*), veh/h	493		438				431	1108			705	
Volume-to-Capacity Ratio (*X*)	0.349		1.051				0.736	0.178			0.737	
Back of Queue (*Q*), ft/ln (95 th percentile)	125.7		574.1				162.6	72.6			376	
Back of Queue (*Q*), veh/ln (95 th percentile)	5.0		23.0				6.5	2.9			15.0	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00		0.00				0.00	0.00			0.00	
Uniform Delay (*d 1*), s/veh	26.3		32.8				16.9	8.7			23.6	
Incremental Delay (*d 2*), s/veh	0.2		57.1				4.3	0.4			6.8	
Initial Queue Delay (*d 3*), s/veh	0.0		0.0				0.0	0.0			0.0	
Control Delay (*d*), s/veh	26.5		89.9				21.1	9.1			30.4	
Level of Service (LOS)	C		F				C	A			C	
Approach Delay, s/veh / LOS	72.7		E	0.0			16.5		B	30.4		C
Intersection Delay, s/veh / LOS	42.1						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.96	B	1.73	B	0.68	A	1.91	B
Bicycle LOS Score / LOS		F			1.34	A	1.34	A

HCS7 Two-Way Stop-Control Report

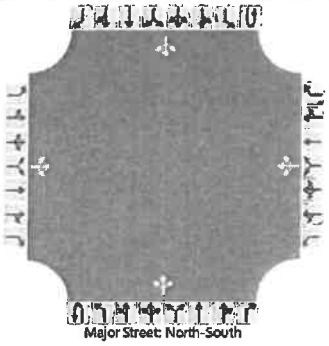
General Information

Analyst	TPD/jd
Agency/Co.	Volusia County
Date Performed	3/30/2021
Analysis Year	2022
Time Analyzed	Projected AM Peak Hour
Intersection Orientation	North-South
Project Description	Three Island North

Site Information

Intersection	Lake Helen/Parma Dr
Jurisdiction	Volusia County
East/West Street	Parma Drive
North/South Street	Lake Helen Osteen Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		1	0	2		15	0	18		3	818	6		9	281	2
Percent Heavy Vehicles (%)		0	0	0		0	0	0		0				0		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.10	6.50	6.20		4.10				4.10		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.50	4.00	3.30		2.20				2.20		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			3				36			3				10		
Capacity, c (veh/h)			310				220			1264				766		
v/c Ratio			0.01				0.16			0.00				0.01		
95% Queue Length, Q_{95} (veh)			0.0				0.6			0.0				0.0		
Control Delay (s/veh)			16.7				24.5			7.9				9.8		
Level of Service (LOS)			C				C			A				A		
Approach Delay (s/veh)		16.7				24.5				0.1				0.4		
Approach LOS		C				C										

HCS7 Two-Way Stop-Control Report

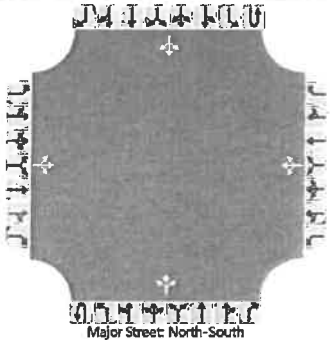
General Information

Analyst	TPD/jd
Agency/Co.	Volusia County
Date Performed	3/30/2021
Analysis Year	2022
Time Analyzed	Projected PM Peak Hour
Intersection Orientation	North-South
Project Description	Three Island North

Site Information

Intersection	Lake Helen/Parma Dr
Jurisdiction	Volusia County
East/West Street	Parma Drive
North/South Street	Lake Helen Osteen Road
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		1	0	2		10	0	12		3	460	20		22	758	2
Percent Heavy Vehicles (%)		0	0	0		0	0	0		0				0		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.10	6.50	6.20		7.10	6.50	6.20		4.10				4.10		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.50	4.00	3.30		3.50	4.00	3.30		2.20				2.20		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			3				24			3				24		
Capacity, c (veh/h)			211				204			813				1055		
v/c Ratio			0.02				0.12			0.00				0.02		
95% Queue Length, Q_{95} (veh)			0.0				0.4			0.0				0.1		
Control Delay (s/veh)			22.3				24.9			9.4				8.5		
Level of Service (LOS)			C				C			A				A		
Approach Delay (s/veh)		22.3				24.9				0.1				0.6		
Approach LOS		C				C										

HCS7 Two-Way Stop-Control Report

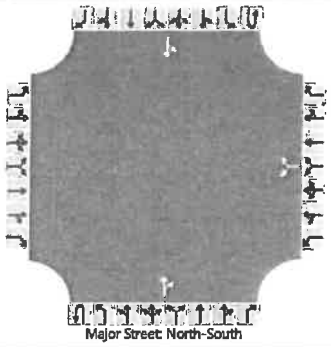
General Information

Analyst	TPD/jd
Agency/Co.	Volusia County
Date Performed	3/30/2021
Analysis Year	2022
Time Analyzed	Projected AM Peak Hout
Intersection Orientation	North-South
Project Description	Three Island North

Site Information

Intersection	Parma Dr & Site Driveway
Jurisdiction	Volusia County
East/West Street	Site Driveway
North/South Street	Parma Drive
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						29		0			5	10		0	4	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.40		6.20						4.10		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.50		3.30						2.20		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							32							0		
Capacity, c (veh/h)							1009							1614		
v/c Ratio							0.03							0.00		
95% Queue Length, Q_{95} (veh)							0.1							0.0		
Control Delay (s/veh)							8.7							7.2		
Level of Service (LOS)							A							A		
Approach Delay (s/veh)					8.7								0.0			
Approach LOS					A											

HCS7 Two-Way Stop-Control Report

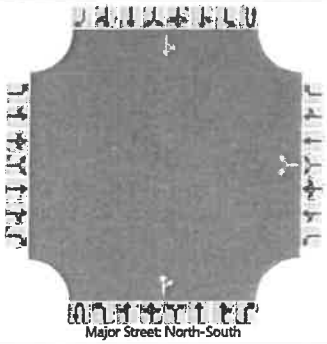
General Information

Analyst	TPD/jd
Agency/Co.	Volusia County
Date Performed	3/30/2021
Analysis Year	2022
Time Analyzed	Projected PM Peak Hout
Intersection Orientation	North-South
Project Description	Three Island North

Site Information

Intersection	Parma Dr & Site Driveway
Jurisdiction	Volusia County
East/West Street	Site Driveway
North/South Street	Parma Drive
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						18		0			11	31		0	4	
Percent Heavy Vehicles (%)						0		0						0		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.40		6.20						4.10		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.50		3.30						2.20		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							20							0		
Capacity, c (veh/h)							985							1575		
v/c Ratio							0.02							0.00		
95% Queue Length, Q_{95} (veh)							0.1							0.0		
Control Delay (s/veh)							8.7							7.3		
Level of Service (LOS)							A							A		
Approach Delay (s/veh)					8.7								0.0			
Approach LOS					A											

APPENDIX F

NCHRP 457 Turn Lane Worksheets

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

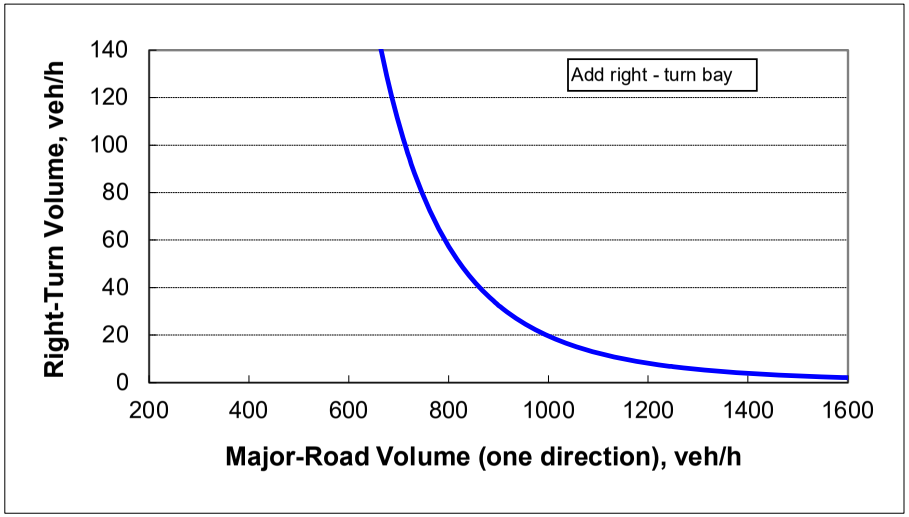
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	30
Major-road volume (one direction), veh/h:	45
Right-turn volume, veh/h:	34

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	60408365
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Source: National Cooperative Highway Research Program (NCHRP) Report 457- Evaluating Intersection Improvements: An Engineering Study Guide

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

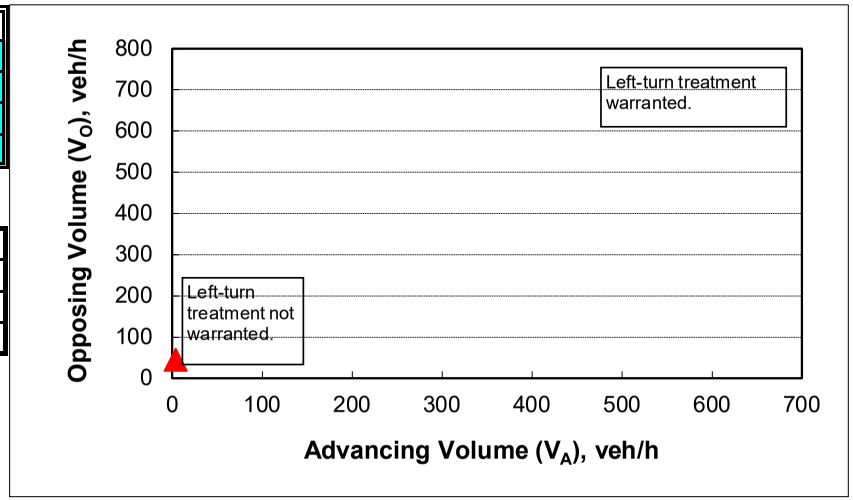
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	30
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	4
Opposing volume (V_O), veh/h:	45

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	1851
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Source: National Cooperative Highway Research Program (NCHRP) Report 457- Evaluating Intersection Improvements: An Engineering Study Guide

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

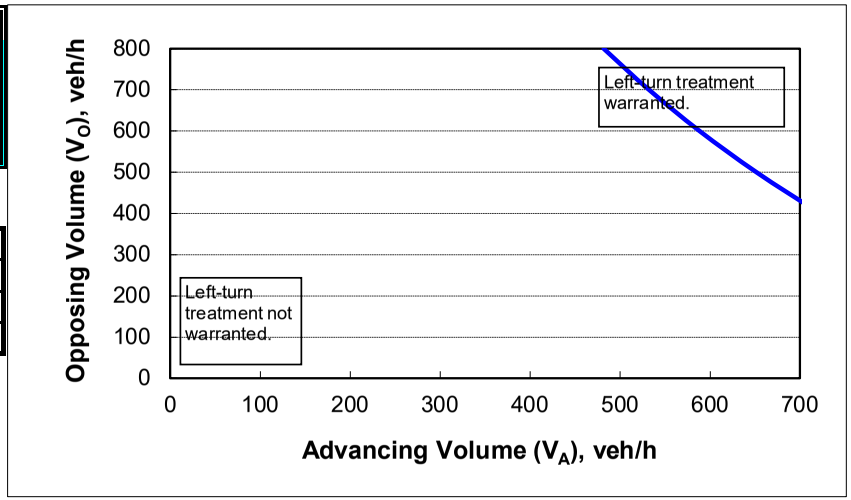
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	30
Percent of left-turns in advancing volume (V_A), %:	3%
Advancing volume (V_A), veh/h:	292
Opposing volume (V_O), veh/h:	828

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	469
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Source: National Cooperative Highway Research Program (NCHRP) Report 457- Evaluating Intersection Improvements: An Engineering Study Guide

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

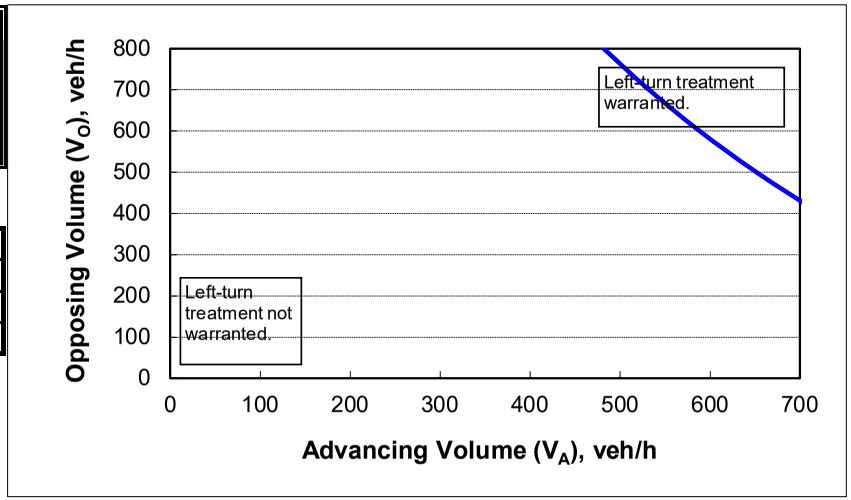
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	30
Percent of left-turns in advancing volume (V_A), %:	3%
Advancing volume (V_A), veh/h:	785
Opposing volume (V_O), veh/h:	483

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	663
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Source: National Cooperative Highway Research Program (NCHRP) Report 457- Evaluating Intersection Improvements: An Engineering Study Guide