Transportation Impact Analysis (TIA)

For Submittal to the City of Deltona & Volusia County

Saxon Sterling Silver BPUD

Retail Center

NE and NW Corners of Saxon Blvd. & Sterling Silver Blvd.
Deltona, FL

Prepared for:

WRS, Inc.
550 Long Point Road
Mount Pleasant, SC 29464

November 2013

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RAGHU K. VETURI, P.E.

68918

P.E. Number

Date

CERTIFICATION BY PROFESSIONAL ENGINEER

I hereby certify that I am a Professional Engineer in the State of Florida and have been trained in Traffic Engineering and that I was responsible for and in charge of the preparation of this Transportation Impact Analysis (TIA).

Raghu K. Veturi, P.E.
Florida PE Number: 68918

TRANSPORTATION IMPACT ANALYSIS SUBMISSION CHECKLIST

	DESCRIPTION	INFORMATION INCLUDED			
		YES	NO	N/A	Remarks[1]
TRANSPORTATION IMPACT ANALYSIS REPORT DATA	4 Printed TIA Copies Signed and Sealed by Professional Engineer				
	1 Electronic version of the TIA & all analysis computer files				
	Site Location relative to surrounding roadway network (map)				
	Description of proposed land uses				
	Proposed Build-out schedule				
	Study area boundaries including all Thoroughfare Road segments and intersections within appropriate radius (map)				
	Existing Traffic Volumes				
	Existing roadway segment analysis				
	Existing intersection analysis				
	List scheduled improvements within first three years of County, FDOT, and/or City Capital Improvement Programs				
	Proposed development trip generation/internal capture/pass by capture				
	Proposed development trip distribution and assignment (map)				
	Future Background Traffic Volume Estimates				
	Projected future roadway segment analysis				
	Future Total Peak-Hour(s) Traffic Volume Estimates (Background + Vested + Project Trips)				
	Projected future Peak-Hour(s) roadway intersection analysis including proposed turn lanes and signals				
	Projected Future Roadway Concurrency Analysis				
	Conclusions and Recommended Improvements				
	Site access recommendations				
	Concurrency mitigation strategy				
APPENDIX DATA	Methodology Documentation & Conceptual Site Plan				
	Traffic Count Data & Inventory of Existing Road Conditions				
	Confirmation of Scheduled Improvements (Copy of Appropriate CIE)				
	Existing Conditions Analysis Worksheets (HCS Printouts)				
	Background Traffic Growth Worksheets				
	Trip Generation, Internal Capture, Pass-By Capture Worksheets				
	Future Conditions Analysis Worksheets (HCS Printouts)				
	Turn Lanes Analysis Worksheets (Queue Length)				
	Signal Warrant Analysis				
	Multi Way STOP Warrant Analysis				

1 – Remarks: Justify “NO” and “N/A”

Submitted By:_____ Printed Name:_____

Date:_____

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1.0 Executive Summary

The applicant proposes to develop a retail center in the northeast quadrant and northwest quadrant of the intersection of Saxon Boulevard and Sterling Silver Boulevard in City of Deltona, Volusia County, Florida. The Retail Center will consist of the following developments:

Northeast Corner of Saxon Boulevard and Sterling Silver Boulevard

- 44,000 square foot (sf) Supermarket; and
- 5,700 square foot (sf) Convenience Market with Gasoline Pumps.

Northwest Corner of Saxon Boulevard and Sterling Silver Boulevard

- 14,000 square foot (sf) Shopping Center;
- 4,500 square foot (sf) Fast Food Restaurant with Drive-Through Window; and
- 4,500 square foot (sf) Fast Food Restaurant with Drive-Through Window.

The two sites are currently vacant. The project is anticipated to be complete and operational in the year 2016. Access from the site to the roadway network is proposed through: two (2) right-in/right-out driveways on Saxon Boulevard, one (1) full access driveway on Sterling Silver Boulevard, one (1) right-in/right-out/left-in driveway on Sterling Silver Boulevard, two (2) full access driveways on Alabaster Way, and one (1) right-in driveway on Alabaster Way.

The study area roadways are expected to operate at acceptable levels of service with the exception of the following roadway segments:

- Saxon Boulevard from I-4 to Finland Drive; and
- Saxon Boulevard from Finland Drive to Normandy Boulevard.

These two roadway segments are classified as critical roadways and are deficient in existing conditions. The proposed project impact on these two roadways is 3.7%, which is not a significant impact.

The study area signalized intersections are expected to operate at acceptable LOS with the exception of the following for future conditions:

- Saxon Boulevard & Finland Drive in AM peak hour; and
- Saxon Boulevard & Normandy Boulevard in AM peak hour.

The intersection of Saxon Boulevard & Finland Drive is currently operating at a 120 seconds cycle length during the AM peak hour. By modifying the cycle length to 125 seconds this intersection is expected to operate at acceptable levels of service.

The intersection of Saxon Boulevard & Normandy Boulevard is operating at LOS F in existing and future background conditions. In future total conditions, with the addition of project traffic this intersection continues to operate at LOS F. However, the intersection delay is anticipated to increase by only 4.6 seconds, which is less than 5% of the future background conditions intersection delay.

The study area unsignalized intersections are expected to operate at acceptable LOS with the exception of Saxon Boulevard & Sterling Silver Boulevard.

The following improvements are recommended as a result of this analysis:

- for the intersection of Saxon Boulevard & Finland Drive, modify am peak hour cycle length from 120 seconds to 125 seconds;
- for the intersection of Saxon Boulevard & Sterling Silver Boulevard, add second southbound left-turn lane at Saxon Boulevard & Sterling Silver Boulevard and provide signalization;
- a 185’ Westbound right-turn lane at Saxon Boulevard & Driveway 1;
- a 185’ Westbound right-turn lane at Saxon Boulevard & Driveway 2;
- a 170’ Northbound left-turn lane at Sterling Silver Boulevard & Alabaster Way; and
- a 145’ Northbound right-turn lane at Sterling Silver Boulevard & Alabaster Way.

2.0 Introduction

The applicant proposes to develop a retail center in the northeast quadrant and northwest quadrant of the intersection of Saxon Boulevard and Sterling Silver Boulevard in City of Deltona, Volusia County, Florida. The proposed retail center will consist of the following land uses:

Northeast Corner of Saxon Boulevard and Sterling Silver Boulevard

- 44,000 square foot (sf) Supermarket; and
- 5,700 square foot (sf) Convenience Market with Gasoline Pumps.

Northwest Corner of Saxon Boulevard and Sterling Silver Boulevard

- 14,000 square foot (sf) Shopping Center;
- 4,500 square foot (sf) Fast Food Restaurant with Drive-Through Window; and
- 4,500 square foot (sf) Fast Food Restaurant with Drive-Through Window.

Please see Figures 2-1 and Figure 2-2 for site location map and site plan for reference. The two sites are currently vacant. The project is anticipated to be completed and operational in the year 2016. The report is being provided in accordance with City of Deltona and Volusia County requirements for transportation impact analysis (TIA). This report addresses the following:

1. traffic impacts of the project;
2. traffic concurrency requirements;
3. specific recommendations for safe and adequate access to and from the site; and
4. traffic signal warrant analysis at the intersection of Saxon Boulevard & Sterling Silver Boulevard based upon projected traffic volumes.

CPH has coordinated with the City of Deltona and Volusia County staff prior to commencing the study and submitted a TIA methodology.

2.1 Site Access

Access to the project site is proposed through the following driveways:

- two (2) right-in/right-out driveways on Saxon Boulevard (Driveway 1 and Driveway 2);
- one (1) full access driveway on Sterling Silver Boulevard (Driveway 3);
- one (1) right-in/right-out/left-in driveway on Sterling Silver Boulevard (Driveway 4);
- two (2) full access driveways on Alabaster Way; and
- one (1) right-in driveway on Alabaster Way.

Saxon Boulevard is a four-lane divided roadway with a posted speed limit of 40 miles per hour and is under the jurisdiction of Volusia County. Sterling Silver Boulevard is a two-lane divided roadway which is under the jurisdiction of City of Deltona. Alabaster Way is a two-lane undivided local road under the jurisdiction of City of Deltona.

2.2 Traffic Study Methodology

CPH has coordinated with the City of Deltona and Volusia County staff prior to commencing the analysis and submitted a TIA methodology. This analysis has been prepared to be consistent with Volusia County and City of Deltona TIA requirements and the agreed upon methodology. Please see the attached methodology correspondence in Appendix A for reference.

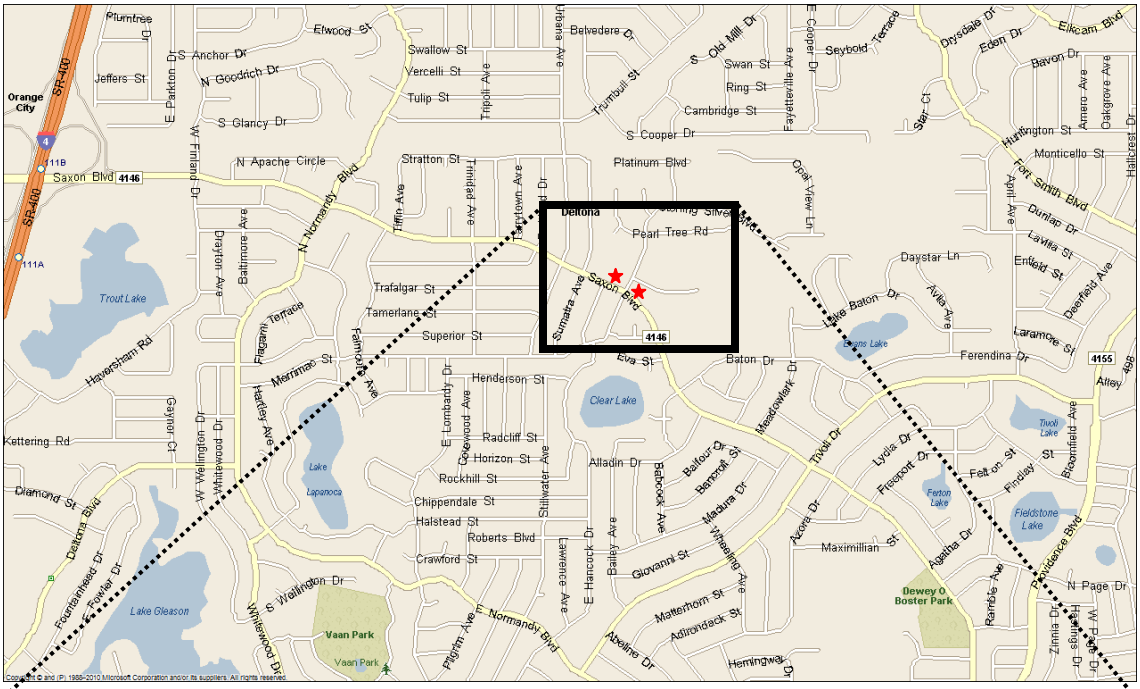
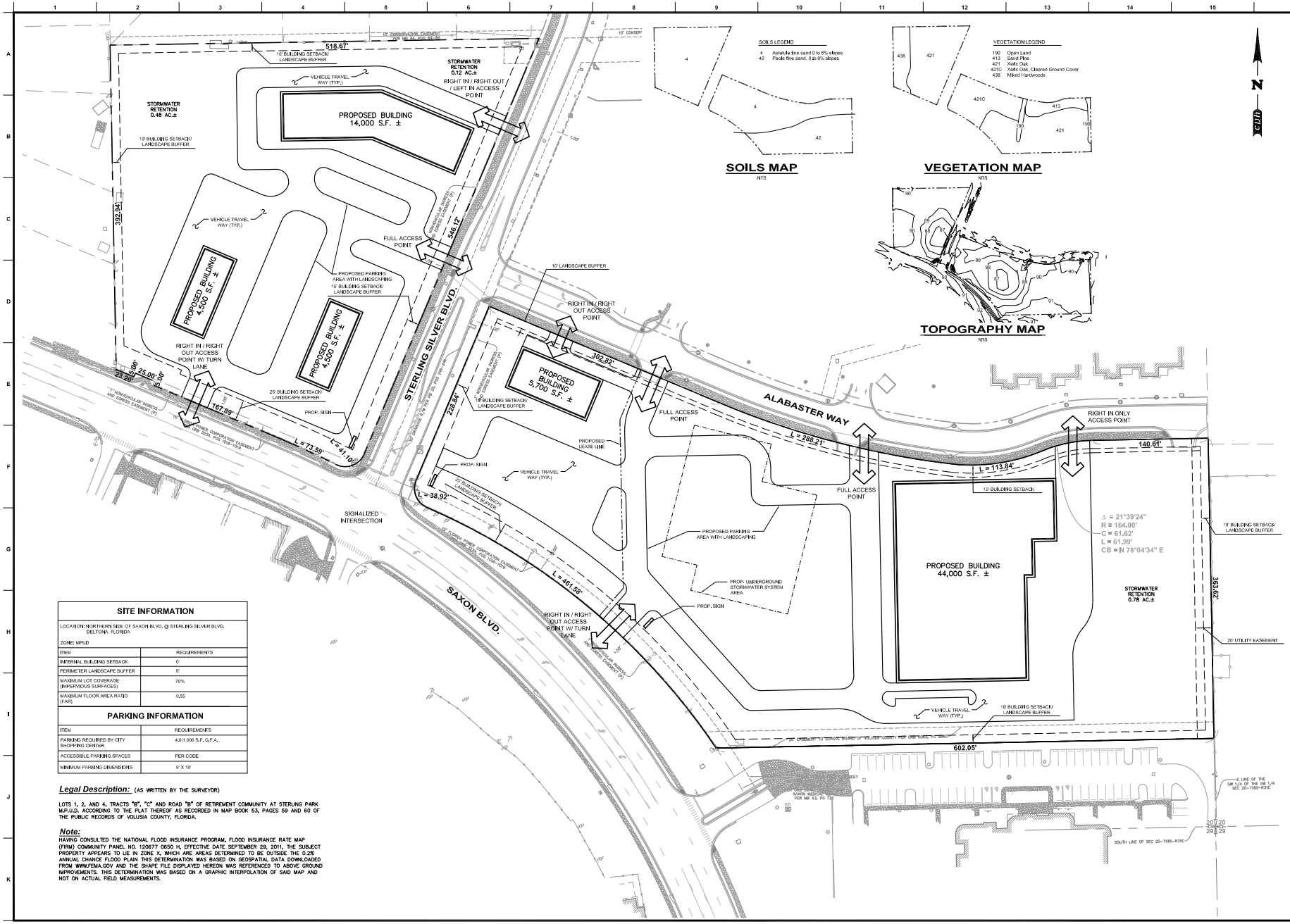


Figure 2-1 Site Location Map
Saxon Sterling Silver - BPUD
NE and NW Corners of Saxon Blvd. & Sterling Silver Blvd.
Deltona, Florida

cph
Engineers
Architects
Planners
Landscape Architects
Transportation/Traffic
Surveyors
Environmental Scientists
Construction Management



SITE INFORMATION

LOCATION: NORTHERN SIDE OF SAXON BLVD. @ STERLING SILVER BLVD. DELTONA, FLORIDA

ZONE: MPUD

ITEM	REQUIREMENTS
INTERNAL BUILDING SETBACK	0'
PERIMETER LANDSCAPE BUFFER	0'
MAXIMUM LOT COVERAGE (IMPERVIOUS SURFACES)	70%
MAXIMUM FLOOR AREA RATIO (FAR)	0.55

PARKING INFORMATION

ITEM	REQUIREMENTS
PARKING REQUIRED BY CITY SHOPPING CENTER	4.2/1,000 S.F. G.F.A.
ACCESSIBLE PARKING SPACES	PER CODE
MINIMUM PARKING DIMENSIONS	9' X 19'

Legal Description: (AS WRITTEN BY THE SURVEYOR)

LOTS 1, 2, AND 4, TRACTS "B", "C" AND ROAD "B" OF RETIREMENT COMMUNITY AT STERLING PARK M.P.U.D. ACCORDING TO THE PLAT THEREOF AS RECORDED IN MAP BOOK 53, PAGES 59 AND 60 OF THE PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA.

Note:

HAVING CONSULTED THE NATIONAL FLOOD INSURANCE PROGRAM, FLOOD INSURANCE RATE MAP (FIRM) COMMUNITY PANEL NO. 120677 0650 H, EFFECTIVE DATE SEPTEMBER 29, 2011, THE SUBJECT PROPERTY APPEARS TO LIE IN ZONE X, WHICH ARE AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOOD PLAIN THIS DETERMINATION WAS BASED ON GEOSPATIAL DATA DOWNLOADED FROM WWW.FEMA.GOV AND THE SHAPE FILE DISPLAYED HEREON WAS REFERENCED TO ABOVE GROUND IMPROVEMENTS. THIS DETERMINATION WAS BASED ON A GRAPHIC INTERPOLATION OF SAID MAP AND NOT ON ACTUAL FIELD MEASUREMENTS.

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MASTER DEVELOPMENT PLAN

SAXON STERLING SILVER BPUD

DELTONA, FLORIDA

Sheet No.
C-2

J:\W9401-1\CMD\WG\BPUD Preliminary Plans\W9401-1 BPUD SITE PLAN.dwg Nov 07, 2013 - 2:07pm rcarpenter

3.0 Trip Generation

The trip generation potential for the proposed project was determined based upon the *Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition.* Internal capture and pass-by rates were applied based upon *ITE Trip Generation Handbook*. Pass-by trips were checked to be less than 14% of the adjacent street peak hour traffic. Tables 3-1 and 3-2, shows a summary of ITE Trip Generation. Please see Appendix B for trip generation worksheets.

Table 3-1 ITE Trip Generation (Gross Trips)

Land Use		ITE Land Use Code	Size (ksf)	Gross Daily	AM Peak Hour	PM Peak Hour
NE Corner	Supermarket	850	44.0	4,499	150	417
	Convenience Market with Gasoline Pumps	853	5.7	4,820	233	290
	Sub-Total			9,318	383	707
NW Corner	Shopping Center	820	14.0	1,892	13	160
	Fast Food Restaurant with Drive-Through Window	934	4.5	2,233	204	147
	Fast Food Restaurant with Drive-Through Window	934	4.5	2,233	204	147
	Sub-Total			6,357	422	454
TOTAL				**15,676**	**805**	**1,162**

Note: ksf = thousand square feet.

Table 3-2 ITE Trip Generation (Net-New Trips)

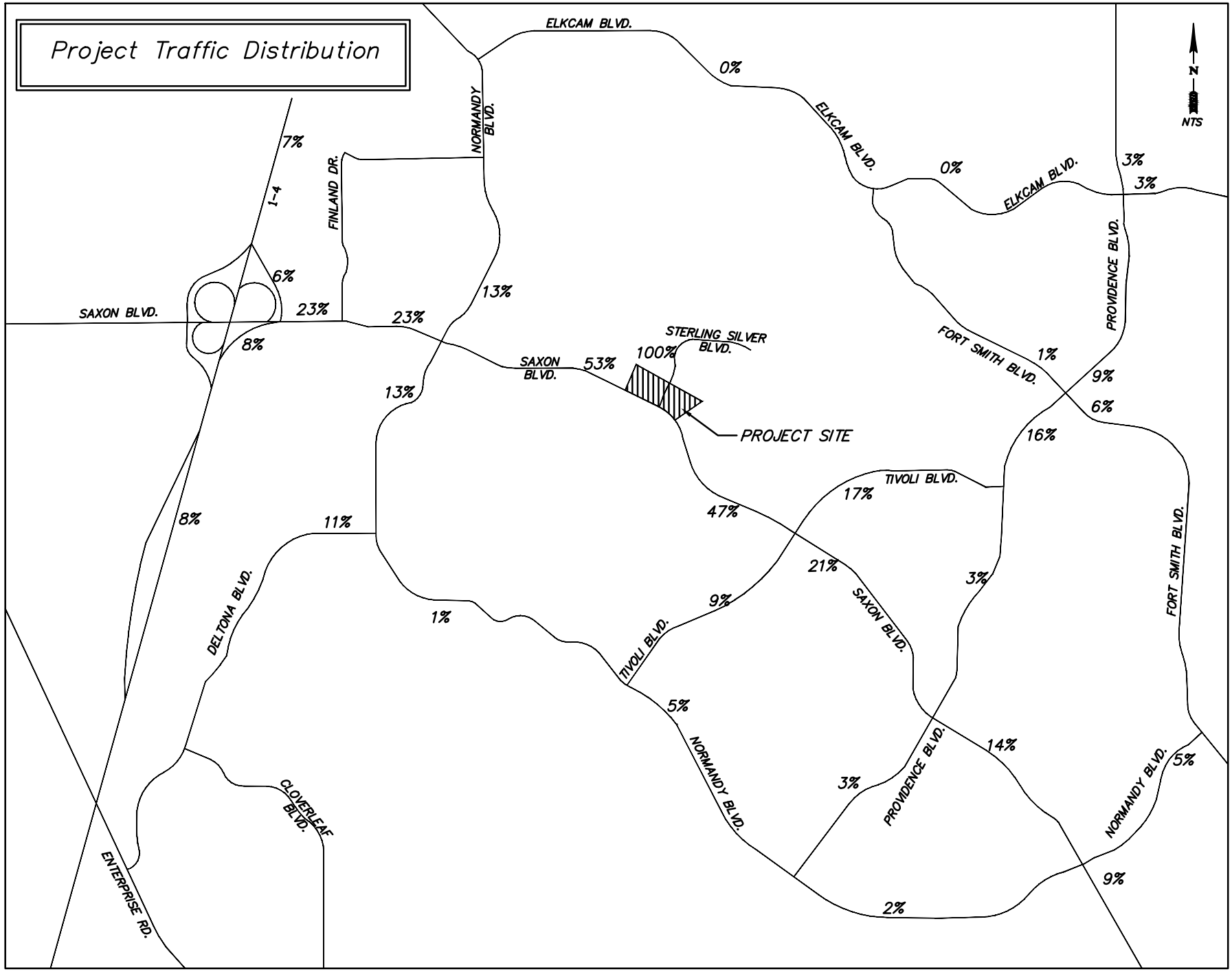
Land Use		ITE Land Use Code	Size (ksf)	AM Peak Hour	PM Peak Hour
NE Corner	Supermarket	850	44.0	77	230
	Convenience Market with Gasoline Pumps	853	5.7	75	79
	Sub-Total			152	309
NW Corner	Shopping Center	820	14.0	7	85
	Fast Food Restaurant with Drive-Through Window	934	4.5	103	65
	Fast Food Restaurant with Drive-Through Window	934	4.5	103	65
	Sub-Total			213	215
TOTAL				**365**	**524**

Note: ksf = thousand square feet.

Based upon trip generation projection, it is anticipated that the proposed project will generate approximately 15,676 gross daily trips with 365 net-new trips during AM peak hour and 524 net-new trips during PM peak hour.

4.0 Trip Distribution and Assignment

Trip distribution for the proposed project was determined based upon *Florida Standard Urban Transportation Model Structure (FSUTMS)* using *Central Florida Regional Planning Model (CFRPM) version 5.2*. Please see Figure 4-1 for project traffic distribution. Distribution plot and detailed traffic distribution by movement at the study area intersections are shown in traffic volume figures attached in Appendix D.


Project Traffic Distribution
N
NTS
ELKCAM BLVD.
0%
ELKCAM BLVD.
0%
ELKCAM BLVD.
3%
3%
NORMANDY BLVD.
FINLAND DR.
I-4
7%
6%
SAXON BLVD.
23%
23%
8%
13%
13%
SAXON BLVD.
53%
100%
STERLING SILVER BLVD.
PROJECT SITE
FORT SMITH BLVD.
1%
PROVIDENCE BLVD.
9%
6%
16%
TIVOLI BLVD.
17%
47%
8%
11%
DELTONA BLVD.
1%
9%
21%
3%
SAXON BLVD.
FORT SMITH BLVD.
TIVOLI BLVD.
5%
NORMANDY BLVD.
14%
PROVIDENCE BLVD.
3%
NORMANDY BLVD.
5%
CLOVERLEAF BLVD.
ENTERPRISE RD.
2%
9%

4.1 Significance Test

The study area for the proposed project was determined based upon a link significance test per Volusia County TIA Requirements. Please see Table 4-1 for link significance test.

Table 4-1 Significance Test

Roadway	From	To	Number of Lanes	Area Type	Adopted LOS	Peak Hour Two-Way Capacity	Project Distribution (%)	Project Trips	% Significance
Saxon Boulevard	I-4	Finland Drive	4L	UA	E	3,222	23%	120	3.71%
	Finland Drive	Normandy Boulevard	4L	UA	E	3,222	23%	120	3.71%
	Normandy Boulevard	Sterling Silver Boulevard	4L	UA	E	3,222	53%	275	8.55%
	Sterling Silver Boulevard	Tivoli Drive	4L	UA	E	3,222	47%	244	7.58%
	Tivoli Drive	Providence Boulevard	2L	UA	E	1,015	21%	109	10.75%
	Providence Boulevard	Normandy Boulevard	2L	UA	E	1,015	14%	73	7.17%
	Normandy Boulevard	Doyle Road	2L	UA	E	1,152	9%	47	4.06%
Tivoli Drive	Normandy Boulevard	Saxon Boulevard	2L	UA	E	1,015	9%	47	4.61%
	Saxon Boulevard	Providence Boulevard	2L	UA	E	1,015	17%	88	8.70%
Normandy Boulevard	Elckam Boulevard	Saxon Boulevard	4L	UA	E	2,736	13%	68	2.47%
	Saxon Boulevard	Deltona Boulevard	2L	UA	E	1,015	13%	68	6.65%
	Deltona Boulevard	Tivoli Drive	3L	UA	E	1,015	1%	5	0.51%
	Tivoli Drive	Providence Boulevard	3L	UA	E	1,015	5%	26	2.56%
	Providence Boulevard	Saxon Boulevard	2L	UA	E	1,269	2%	10	0.82%
Deltona Boulevard	Normandy Boulevard	Cloverleaf Boulevard	4L	UA	E	2,736	11%	57	2.09%
Providence Boulevard	Fort Smith Boulevard	Tivoli Drive	4L	UA	E	2,736	16%	83	3.04%
	Tivoli Drive	Saxon Boulevard	2L	UA	E	1,269	3%	16	1.23%
	Saxon Boulevard	Normandy Boulevard	2L	UA	E	1,015	3%	16	1.54%

Peak Hour Two-Way Capacities were derived from FDOT LOS Tables 2012

4.2 Study Area

Based upon the link significance test and agreed upon methodology, the following roadway segments and intersections were included in the analysis:

Intersections

- Saxon Boulevard & Finland Drive;
- Saxon Boulevard & Normandy Boulevard;
- Saxon Boulevard & Sterling Siler Boulevard;
- Saxon Boulevard & Tivoli Drive;
- Providence Boulevard & Tivoli Drive; and
- All project entrances.

Roadway Segments

- Saxon Boulevard from Enterprise Road to Veterans Memorial Parkway;
- Saxon Boulevard from Veterans Memorial Parkway to FDOT Park & Ride;
- Saxon Boulevard from FDOT Park & Ride to I-4;
- Saxon Boulevard from I-4 to Finland Drive;
- Saxon Boulevard from Finland Drive to Normandy Boulevard;
- Saxon Boulevard from Normandy Boulevard to Sterling Silver Boulevard;
- Saxon Boulevard from Sterling Silver Boulevard to Tivoli Drive;
- Saxon Boulevard from Tivoli Drive to Providence Boulevard;
- Saxon Boulevard from Providence Boulevard to Normandy Boulevard;
- Tivoli Drive from Saxon Boulevard to Providence Boulevard; and
- Normandy Boulevard from Saxon Boulevard to Deltona Boulevard.

4.3 Traffic Data Collection

AM peak hour (7am to 9am) and PM peak hour (4pm to 6pm) turning movement count data were collected at the study area intersections. Raw turning movement count data for the study area intersections are attached in the Appendix C. Appropriate Peak Season Correction Factor (PSCF) was applied to the raw turning movement counts based upon PSCF factors published by FDOT for Volusia County. Please see the attached PSCF sheet in Appendix C.

In addition, 24 hour road tube counts were collected on Saxon Boulevard, east and west of Sterling Silver Boulevard and on Sterling Silver Boulevard, north of Saxon Boulevard. The 24 hour tube counts were collected for the signal warrant analysis at the intersection of Saxon Boulevard and Sterling Silver Boulevard. Please see the attached raw tube counts in Appendix H.

5.0 Analysis Scenarios

Existing Traffic Conditions

The year 2013 is considered the base year traffic conditions or existing conditions. Based upon discussions with staff, existing condition vehicle turning movements were collected. Appropriate peak season correction factors were applied to the raw turning movement counts to account for the seasonal variations in the traffic. The analysis for the existing conditions was performed for AM peak hour and PM peak hour. Please see traffic volume figures in Appendix D for reference. A copy of the peak season correction factor that was used in this analysis is attached in Appendix C.

Future Background Traffic Conditions

The proposed project is anticipated to be completed for construction and operational in the year 2016. Future background traffic conditions, also referred to as future non-project traffic conditions, are those present in the study area in the year 2016, prior to the construction and operation of the proposed project. Future background volumes were determined based upon a growth rate of 2.5% per year. Future background traffic volumes were calculated by applying a 2.5% background growth per year to the existing AM peak hour and PM peak hour, peak season traffic volumes. Please see traffic volume figures in Appendix D for reference.

Future Total Traffic Conditions

The AM peak hour and PM peak hour future total traffic volumes were calculated by adding the future background traffic volumes and project traffic volumes. Please see traffic volume figures in Appendix D for reference.

5.1 Scheduled/Planned/Funded/Improvements

Based upon review of FDOT five-year work program and *Volusia County Capital Improvement Element (CIE)*, the following improvements were identified. Please see Appendix G for pages from *Volusia County CIP*.

- Widening of Saxon Boulevard from Enterprise Road to I-4 from 4-lanes to 6-lanes. This project is currently under construction.

5.2 Roadway Analysis

Peak hour roadway segment capacity analysis was conducted for the study area roadway segments based upon traffic information available from Volusia County 2012 Annual Average Daily Traffic. Please see Table 5-1, for Peak Hour Two-Way Roadway Analysis.

Table 5-1 PM Peak Hour Two-Way Roadway Analysis

Roadway	Number of Lanes	LOS Standard	LOS Standard Service Volume	Existing		Future Background		Project Trips		Future Total		Critical/Near Critical Road
				Volume	Deficient (Yes/No)?	Volume	Deficient (Yes/No)?	Distribution (%)	Trips	Volume	Deficient (Yes/No)?	
Saxon Blvd from Enterprise Road to Veterans Memorial Parkway	6LD	E	4,851	2,887	No	3,109	No	2%	10	3,119	No	-
Saxon Boulevard from Veterans Memorial Parkway to FDOT Park & Ride	6LD	E	4,851	3,796	No	4,088	No	8%	42	4,130	No	Near Critical
Saxon Boulevard from FDOT Park & Ride to I-4	6LD	E	4,851	4,028	No	4,337	No	8%	42	4,379	No	Critical
Saxon Boulevard from I-4 to Finland Drive	4LD	E	3,222	3,843	Yes	4,138	Yes	23%	120	4,258	Yes	Critical
Saxon Boulevard from Finland Drive to Normandy Boulevard	4LD	E	3,222	3,357	Yes	3,615	Yes	23%	120	3,735	Yes	Critical
Saxon Boulevard from Normandy Boulevard to Sterling Silver Boulevard	4LD	E	3,222	2,239	No	2,411	No	53%	276	2,686	No	-
Saxon Boulevard from Sterling Silver Boulevard to Tivoli Drive	2LN	E	1,269	896	No	965	No	47%	244	1,210	No	-
Saxon Boulevard from Tivoli Drive to Providence Boulevard	2LN	E	1,269	771	No	831	No	21%	109	940	No	-
Saxon Boulevard from Providence Boulevard to Normandy Boulevard	2LN	E	1,269	509	No	548	No	14%	73	621	No	-
Tivoli Drive from Saxon Boulevard to Providence Boulevard	2LN	E	1,269	979	No	1,054	No	17%	88	1,143	No	-
Normandy Boulevard from Saxon Boulevard to Deltona Boulevard	2LN	E	1,269	693	No	746	No	13%	68	814	No	-

Existing Volumes were obtained from Volusia County 2012 Average Annual Daily Traffic (K-Factor = 0.091)

For roadways where traffic data is not available, roadway data was obtained from turning movement counts

LOS Standard Service Volumes from FDOT 2012 LOS Tables

Based upon the roadway segment capacity analysis, the study area roadways are expected to operate at acceptable levels of service with the exception of the following roadway segments:

- Saxon Boulevard from I-4 to Finland Drive; and
- Saxon Boulevard from Finland Drive to Normandy Boulevard.

These two roadway segments are classified as critical roadways and are deficient in existing conditions. The proposed project impact on these two roadways is 3.7%, which is not a significant impact.

5.3 Intersection Analysis

The intersections were analyzed for each traffic condition based upon methodologies published in the *Highway Capacity Manual (HCM), 2010* using Highway Capacity Software (HCS 2010) version 6.5. The signalized intersection level of service and delay for each traffic condition is shown in Table 5-2 for AM/PM Peak Hour. The intersection analysis worksheets are attached in Appendix E.

Table 5-2 AM/PM Peak Hour Signalized Intersection LOS and Delay

Intersection	LOS Standard	Existing		Future Background		Future Total	
		LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
Saxon Boulevard & Finland Drive	E	D/D	48.0/35.8	E/D	75.0/51.2	F/E	85.6/65.6
Saxon Boulevard & Normandy Boulevard	E	F/C	86.8 /31.9	F/D	95.2/35.5	F/D	99.8/40.8
Saxon Boulevard & Tivoli Drive	E	D/B	42.6 /18.9	E/C	55.9/24.6	E/D	79.2/47.5
Providence Boulevard & Tivoli Drive	E	B/C	14.9 /24.0	B/C	15.6/28.8	B/C	17.0/34.7
Saxon Boulevard & Sterling Silver Boulevard*	E	-	-	-	-	C/C	26.7/20.8

*LOS and Delay with proposed signalization improvements
F/C = AM LOS/PM LOS; 86.8/31.9 = AM Delay/PM Delay

Based upon the above analysis, the study area signalized intersections are expected to operate at acceptable LOS with the exception of the following:

- Saxon Boulevard & Finland Drive in AM peak hour; and
- Saxon Boulevard & Normandy Boulevard in AM peak hour.

The intersection of Saxon Boulevard & Finland Drive is currently operating at a 120 seconds cycle length during the AM peak hour. By modifying the cycle length to 125 seconds this intersection is expected to operate at acceptable levels of service.

The intersection of Saxon Boulevard & Normandy Boulevard is operating at LOS F in existing and future background conditions. In future total conditions, with the addition of project traffic this intersection continues to operate at LOS F. However, the intersection delay is anticipated to increase by only 4.6 seconds, which is less than 5% of the future background conditions intersection delay.

Table 5-3 below shows the unsignalized intersections approach levels of service for AM and PM peak hours. The intersection analysis worksheets are attached in Appendix E for reference.

Table 5-3 AM/PM Peak Hour Unsginalized Intersection Approach Levels of Service

Intersection	Existing				Future Background				Future Total			
	EB	WB	NB	SB	EB	WB	NB	SB	EB	WB	NB	SB
Saxon Boulevard & Sterling Silver Boulevard	-	-	D/E	E/C	-	-	D/F	F/D	-	-	F/F	F/F
Sterling Silver Boulevard & Alabaster Way (Driveway 3)	-	A/A	-	-	-	A/A	-	-	A/A	E/E	-	-
Saxon Boulevard & Driveway 1	-	-	-	-	-	-	-	-	-	-	-	C/B
Saxon Boulevard & Driveway 2	-	-	-	-	-	-	-	-	-	-	-	C/B
Sterling Silver Boulevard & Driveway 4	-	-	-	-	-	-	-	-	A/A	-	-	-

-Indicates no approach or free-flow approach; D/E = AM LOS/PM LOS

Based upon the above analysis, the study area unsignalized intersections are expected to operate at acceptable LOS with the exception of Saxon Boulevard & Sterling Silver Boulevard. Therefore, a signal warrant analysis was performed at the intersection of Saxon Boulevard & Sterling Silver Boulevard. Please see Section 6.0 for traffic signal warrant analysis.

6.0 Traffic Signal Warrant Analyses

6.1 Field Observations and Data Collection

- 24-hour tube counts were collected at Saxon Boulevard & Sterling Silver Boulevard on September 11, 2013 (traffic counts attached in Appendix H);
- the posted speed on the Saxon Boulevard (major street) is 40 miles per hour (mph) ;
- the lane geometry on each of the major approaches is 2 lanes or more (2 lanes) ;
- the posted speed limit on Sterling Silver Boulevard (minor street) is 25 mph; and
- the lane geometry on the highest minor street (south leg) approach is 1 lane.

6.2 Signal Warrant Analysis

24 hour machine (tube) counts were collected at the location of the proposed signalized intersection of Saxon Boulevard (major street) and Sterling Silver Boulevard (minor street). The data was collected on September 11, 2013 for a 24 hour period in one-hour intervals. The data collected was then processed and a determination was made to identify the eight highest hourly volumes at the proposed intersections. In addition, the projected traffic data from Sterling Silver Boulevard were split into hourly volumes using daily Shopping Center (ITE Land Use Code: 820) traffic distribution (See Appendix H) data to determine the approach volumes from Sterling Silver Boulevard to be used as minor street approach input.

The eight highest hourly volumes from minor street approaches, Sterling Silver Boulevard were determined, and used as input for the analysis, along with the traffic counts for the same eight highest hours on the major street approaches (processed tube counts). The traffic projected from the proposed retail center was added to the minor street volumes.

The total approach volumes of the minor streets were considered as input for signal warrant analysis given the magnitude of left and right turn traffic volumes. The eight highest hours determined were between 7:00 am to 8:00 am and 12:00 pm to 7:00 pm. The raw machine counts (tube counts) are included in Appendix H. Per the MUTCD criteria for traffic signal warrant analysis the minor street approach volumes may be considered to be sum of traffic on the approach (left, thru and right) or a combination of select movements based on engineering judgment.

The traffic signal warrant analysis was conducted for the intersection of Saxon Boulevard & Sterling Silver Boulevard based upon the procedures in *MUTCD*. Table 6-1, below shows a summary of the results.

Table 6-1 Traffic Signal Warrant Analysis Results

Warrants and Conditions	Are Warrant and Condition Criteria Met?			Is the Warrant Met?
Warrant 1	**Eight-Hour Vehicular Volume**			No
	100%	**80%**	**70%**	
Condition A	No	N/A*	N/A^	
Condition B	No	N/A*	N/A^	
Combination A& B	N/A**	N/A*	N/A**	
Warrant 2	**Four-Hour Vehicular Volume**			No
	100%		70%	
MUTCD Graphs 4C-1 and 4C-2	No		N/A^	

* Does not apply;
^Does not apply as the posted speed limit on major street is 40 mph;
** Combination A& B of Warrant 1 applies only to 80 % case.

6.3 Crash Analysis

The crash analysis consists of analyzing the traffic collision history within three hundred feet of the intersection for the crash data obtained from 2009 to 2011 (approximately three years). Crash history for the intersection of Saxon Boulevard & Sterling Silver Boulevard was obtained from Volusia County Traffic Engineering Department. The overall crash analysis for this intersection indicated that there were a total 7 crashes occurred during the three year period. None of these 7 crashes are signal correctible.

6.4 Results

Based upon the results of traffic signal warrant analysis, for the intersection of Saxon Boulevard & Sterling Silver Boulevard:

- Warrant 1 was not met for 100% criteria; and
- Warrant 2 was not met for 100% criteria.

The warrant criteria for warrant 1 were not met for one hour. For the remaining seven hours the criteria was met. The minor street volumes were significantly more than the *MUTCD* threshold. Similarly, the warrant criteria for warrant 2 were not met for one hour. For the remaining three hours the criteria was met. The minor street volumes were significantly more than the *MUTCD* threshold. Therefore, a traffic signal is recommended for installation at this intersection.

Please see the attached warrant analysis worksheets in Appendix H for reference.

7.0 Turn Lane Analysis

Turn lane warrant analysis was conducted at the project driveways based upon the requirements published in *Volusia County Land Development Code* and *FDOT Design Standards, Index 301.* Please see the turn lane warrant analysis worksheets for reference in Appendix F. Based upon the turn lane warrant analysis at the project driveways, the following turn lanes were warranted:

- westbound right-turn lane at Saxon Boulevard & Driveway 1;
- westbound right-turn at Saxon Boulevard & Driveway 2;
- northbound right-turn at Sterling Silver Boulevard & Alabaster Way (Driveway 3); and
- northbound left-turn at Sterling Silver Boulevard & Alabaster Way (Driveway 3).

Table 7-1 below shows the peak hour turn lane length data.

Table 7-1 Peak Hour Turn Lane Length Data

Intersection	Movement	Number of Lanes	Turning Volume (vph)	Posted Speed (mph)	Design Speed (mph)	Deceleration Length (feet)	95th Percentile BOQ (vehicle-lengths)	Queue Length (Feet)	Total Length (feet)
Saxon Boulevard & Driveway 1	WBR	1	64	40	45	185	-	-	185
Saxon Boulevard & Driveway 2	WBR	1	46	40	45	185	-	-	185
Sterling Silver Boulevard & Alabaster Way (Driveway 3)	NBL	1	136	25	30	145	0.36	25	170
	NBR	1	242	25	30	145	-	-	145
Saxon Boulevard & Sterling Silver Boulevard	EBL	1	326	40	45	185	6.1	153	338
	SBL	2	282	25	30	145	6.1	153	298

-indicates no queue storage for free-flow right turning movement.

8.0 Recommendations

Based upon the above analysis the following improvements are recommended:

- for the intersection of Saxon Boulevard & Finland Drive, modify am peak hour cycle length from 120 seconds to 125 seconds;
- for the intersection of Saxon Boulevard & Sterling Silver Boulevard, add second southbound left-turn lane at Saxon Boulevard & Sterling Silver Boulevard and provide signalization;
- a 185’ Westbound right-turn lane at Saxon Boulevard & Driveway 1;
- a 185’ Westbound right-turn lane at Saxon Boulevard & Driveway 2;
- a 170’ Northbound left-turn lane at Sterling Silver Boulevard & Alabaster Way; and
- a 145’ Northbound right-turn lane at Sterling Silver Boulevard & Alabaster Way.

9.0 Conclusions

The applicant proposes to develop a retail center in the northeast quadrant and northwest quadrant of the intersection of Saxon Boulevard and Sterling Silver Boulevard in City of Deltona, Volusia County, Florida. The Retail Center will consist of the following developments:

Northeast Corner of Saxon Boulevard and Sterling Silver Boulevard

- 44,000 square foot (sf) Supermarket; and
- 5,700 square foot (sf) Convenience Market with Gasoline Pumps.

Northwest Corner of Saxon Boulevard and Sterling Silver Boulevard

- 14,000 square foot (sf) Shopping Center;
- 4,500 square foot (sf) Fast Food Restaurant with Drive-Through Window; and
- 4,500 square foot (sf) Fast Food Restaurant with Drive-Through Window.

The two sites are currently vacant. The project is anticipated to be complete and operational in the year 2016. Access from the site to the roadway network is proposed through:

- two (2) right-in/right-out driveways on Saxon Boulevard;
- one (1) full access driveway on Sterling Silver Boulevard;
- one (1) right-in/right-out/left-in driveway on Sterling Silver Boulevard;
- two (2) full access driveways on Alabaster Way; and
- one (1) right-in driveway on Alabaster Way.

The study area roadways are expected to operate at acceptable levels of service with the exception of the following roadway segments:

- Saxon Boulevard from I-4 to Finland Drive; and
- Saxon Boulevard from Finland Drive to Normandy Boulevard.

These two roadway segments are classified as critical roadways and are deficient in existing conditions. The proposed project impact on these two roadways is 3.7%, which is not a significant impact.

The study area signalized intersections are expected to operate at acceptable LOS with the exception of the following:

- Saxon Boulevard & Finland Drive in AM peak hour; and
- Saxon Boulevard & Normandy Boulevard in AM peak hour.

The intersection of Saxon Boulevard & Finland Drive is currently operating at a 120 seconds cycle length during the AM peak hour. By modifying the cycle length to 125 seconds this intersection is expected to operate at acceptable levels of service.

The intersection of Saxon Boulevard & Normandy Boulevard is operating at LOS F in existing and future background conditions. In future total conditions, with the addition of project traffic this intersection continues to operate at LOS F. However, the intersection delay is anticipated to increase by only 4.6 seconds, which is less than 5% of the future background conditions intersection delay.

The study area unsignalized intersections are expected to operate at acceptable LOS with the exception of Saxon Boulevard & Sterling Silver Boulevard.

The following improvements are recommended as a result of the above analysis:

- for the intersection of Saxon Boulevard & Finland Drive, modify am peak hour cycle length from 120 seconds to 125 seconds;
- for the intersection of Saxon Boulevard & Sterling Silver Boulevard, add second southbound left-turn lane at Saxon Boulevard & Sterling Silver Boulevard and provide signalization;
- a 185’ Westbound right-turn lane at Saxon Boulevard & Driveway 1;
- a 185’ Westbound right-turn lane at Saxon Boulevard & Driveway 2;
- a 170’ Northbound left-turn lane at Sterling Silver Boulevard & Alabaster Way; and
- a 145’ Northbound right-turn lane at Sterling Silver Boulevard & Alabaster Way.

APPENDIX A

METHODOLOGY CORRESPONDENCE

Veturi, Raghu P.E.

From: Melissa Winsett [mwinsett@volusia.org]
Sent: Friday, October 11, 2013 4:37 PM
To: Veturi, Raghu P.E.
Cc: Wray, H. Larry (P.E.); CBowley@deltonafl.gov; Ron Paradise
Subject: RE: Sterling Silver BPUD Revised Methodology

Raghu,

We have reviewed the revised methodology and find it acceptable.

Melissa K. Winsett
Traffic Engineering Supervisor
Transportation Planning, Engineering Studies, Development Review

Volusia County Traffic Engineering
123 W. Indiana Ave., Room 400
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mwinsett@volusia.org
386-736-5968 x12322 (DeLand Area)
386-257-6000 x12322 (Daytona Area)
386-423-3300 x12322 (New Smyrna Area)

Fax 386-740-5242

>>> "Veturi, Raghu P.E." <rveturi@cphcorp.com> 10/4/2013 3:16 PM >>>

Chris, Ron, and Melissa,

Per our telephone coordination, attached is the revised methodology letter per recent square footage changes. Please review and let me know if you have any comments or questions.

Thank you,

Raghu K. Veturi, P.E., PTOE

Sr. Traffic Engineer

CPH, Inc.

Phone: (813) 288-0233 x2406

From: Melissa Winsett [mailto:mwinsett@volusia.org]
Sent: Tuesday, August 20, 2013 8:55 AM
To: Veturi, Raghu P.E.
Cc: CBowley@deltonafl.gov; Ron Paradise
Subject: Sterling Silver BPUD Revised Methodology

Raghu,

We have reviewed your revised methodology and find it acceptable. Good luck with the TIA, and please feel free to call me if you have any questions. ~Melissa

Melissa K. Winsett
Traffic Engineering Supervisor
Transportation Planning, Engineering Studies, Development Review

Volusia County Traffic Engineering
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Fax: 813.288.0433

October 3, 2013

Chris Bowley, AICP
Director
Department of Planning & Development Services
2345 Providence Boulevard
Deltona, Florida 32725

RE: Retail Center – Saxon Sterling Silver BPUD
Northeast and Northwest Corners of Saxon Boulevard & Sterling Silver Boulevard
City of Deltona, Florida
CPH Project Number: W9401.1
Transportation Impact Analysis (TIA) Methodology Letter- 2nd Revision

Dear Mr. Bowley:

Provided here for your review and comment is a Transportation Impact Analysis (TIA) methodology for the above referenced project. The methodology has been prepared to be consistent with the *City of Deltona and Volusia County Transportation Impact Analysis (TIA) guidelines* and our discussions with you regarding this project.

Introduction

The following methodology outlines the procedures and data that will be used to evaluate the projected transportation impacts of a proposed retail center located in the northeast and northwest quadrants of the intersection of Saxon Boulevard & Sterling Silver Boulevard in the City of Deltona, Florida. The following methodology describes the procedures and assumptions that will be used to prepare a transportation impact analysis. Please see the attached site location map for reference. The proposed site consists of the following uses:

Northeast Corner of Saxon Boulevard Sterling Silver Boulevard

- 44,000 sf Supermarket
- 5,700 sf Convenience Market with Gasoline Pumps

Northwest Corner of Saxon Boulevard Sterling Silver Boulevard

- 14,000 sf Shopping Center
- Two (2) 4,500 sf Fast Food Restaurants with Drive-Through Windows

Site Access

Access to the site is proposed through the following driveways:

- two (2) right-in/right-out driveways on Saxon Boulevard;
- a full-access driveway on Sterling Silver Boulevard;
- a right-in/right-out/left-in driveway on Sterling Silver Boulevard;
- two (2) full access driveway on Alabaster Way; and
- a right-in driveway on Alabaster Way.

The build-out year for the proposed project is 2016.

Trip Generation

The trip generation potential for the proposed project will be determined based upon the *Institute of Transportation Engineers (ITE) Trip Generation, 9th Edition.* Internal capture and pass-by rates will be applied based upon *ITE Trip Generation Handbook.* Pass-by trips will be checked to be less than 14% of the adjacent street peak hour traffic.

Based upon preliminary trip generation projection, it is anticipated that the proposed project will generate 15,676 daily trips, 365 net-new am peak hour trips, and 524 net-new pm peak hour trips. Please see the attached trip generation worksheets for reference.

Project Trip Distribution

Trip distribution for the proposed project will be determined based upon *Florida Standard Urban Transportation Model Structure (FSUTMS)* using Central Florida Regional Planning Model (CFRPM). Model files will be obtained from *Florida Department of Transportation (FDOT).* Please see the attached trip distribution plot and trip distribution figure for reference.

Study Area

Based upon Volusia County TIA guidelines for significance test, the study area includes the following intersections and roadway segments. Please see the attached significance test.

Intersections

- Saxon Boulevard & Finland Drive;
- Saxon Boulevard & Sterling Silver Boulevard;
- Saxon Boulevard & Normandy Boulevard;
- Saxon Boulevard & Tivoli Drive
- Providence Boulevard & Tivoli Drive; and
- All project entrances.

Roadway Segments

- Saxon Boulevard from Enterprise Road to Veterans Memorial Parkway;
- Saxon Boulevard from Veterans Memorial Parkway to FDOT Park & Ride;
- Saxon Boulevard from FDOT Park & Ride to I-4;
- Saxon Boulevard from I-4 to Finland Drive;
- Saxon Boulevard from Finland Drive to Normandy Boulevard;
- Saxon Boulevard from Normandy Boulevard to Sterling Silver Boulevard;
- Saxon Boulevard from Sterling Silver Boulevard to Tivoli Drive;
- Saxon Boulevard from Tivoli Drive to Providence Boulevard;
- Saxon Boulevard from Providence Boulevard to Normandy Boulevard;
- Tivoli Drive from Saxon Boulevard to Providence Boulevard; and
- Normandy Boulevard from Saxon Boulevard to Deltona Boulevard.

The critical/near-critical roadway segments per County's five-mile radius map within the study area will be included in the future conditions analysis. Please see the attached five-mile radius map for reference.

Analysis Scenarios

The future analysis year will be 2016, given the anticipated date for completion of construction of the proposed project. Analysis will be conducted for the existing, future background and future total traffic conditions.

Background (Vested) Traffic

Background traffic volumes will be calculated based upon historical traffic data available on Saxon Boulevard from I-4 to Tivoli Drive. Background growth rate calculations yielded a growth rate of les than 1%. Per coordination with the City staff, a growth rate of 2.5% per year will be used for analysis purposes. Please see the attached traffic trends sheets for reference.

Traffic Count Data
AM peak hour (7am to 9am) and PM peak hour (4pm to 6pm) manual traffic counts will be conducted at study area intersections. Traffic volumes (counts) will be adjusted to peak-season conditions using Florida Department of Transportation (FDOT) peak season correction factors (PSCF) for Volusia County. Traffic data will be collected during the school season.

Scheduled/Planned/Funded Improvements
Planned/scheduled/funded roadway improvements information available from FDOT/Volusia County/City of Deltona will be included in the analysis.

Traffic Analysis
Intersection capacity analysis for the study area intersections will be conducted using Highway Capacity Software (HCS) or Synchro software for existing, future background, and future total traffic conditions for AM and PM peak hour conditions. Traffic signal timing data for study area signalized intersections will be obtained from Volusia County Traffic Engineering.

Roadway segment capacity analysis will be conducted for study area roadways at a generalized level using traffic data available from Volusia County 2011 Average Annual Daily Traffic & Historical Counts and FDOT LOS tables. For roadways found to be deficient detailed arterial analysis will be conducted using ARTPLAN or HCS or Synchro software. All electronic files of all intersection and arterial analysis will be included in the TIA.

In addition a traffic signal warrant analysis will be conducted at the intersection of Sterling Silver Boulevard based upon projected traffic volumes.

Turn Lane Analysis
A review of the turn lane requirements at project driveways, and design as applicable, will be performed based upon the requirements published in Volusia County Land Development Code.

Report
A signed and sealed report which details the procedures, data, and results of the traffic analysis outlined above will be provided to the City and County staff for review and comment. Two (2) hard copies of the TIA with revised methodology and electronic file (in pdf format) will be provided.

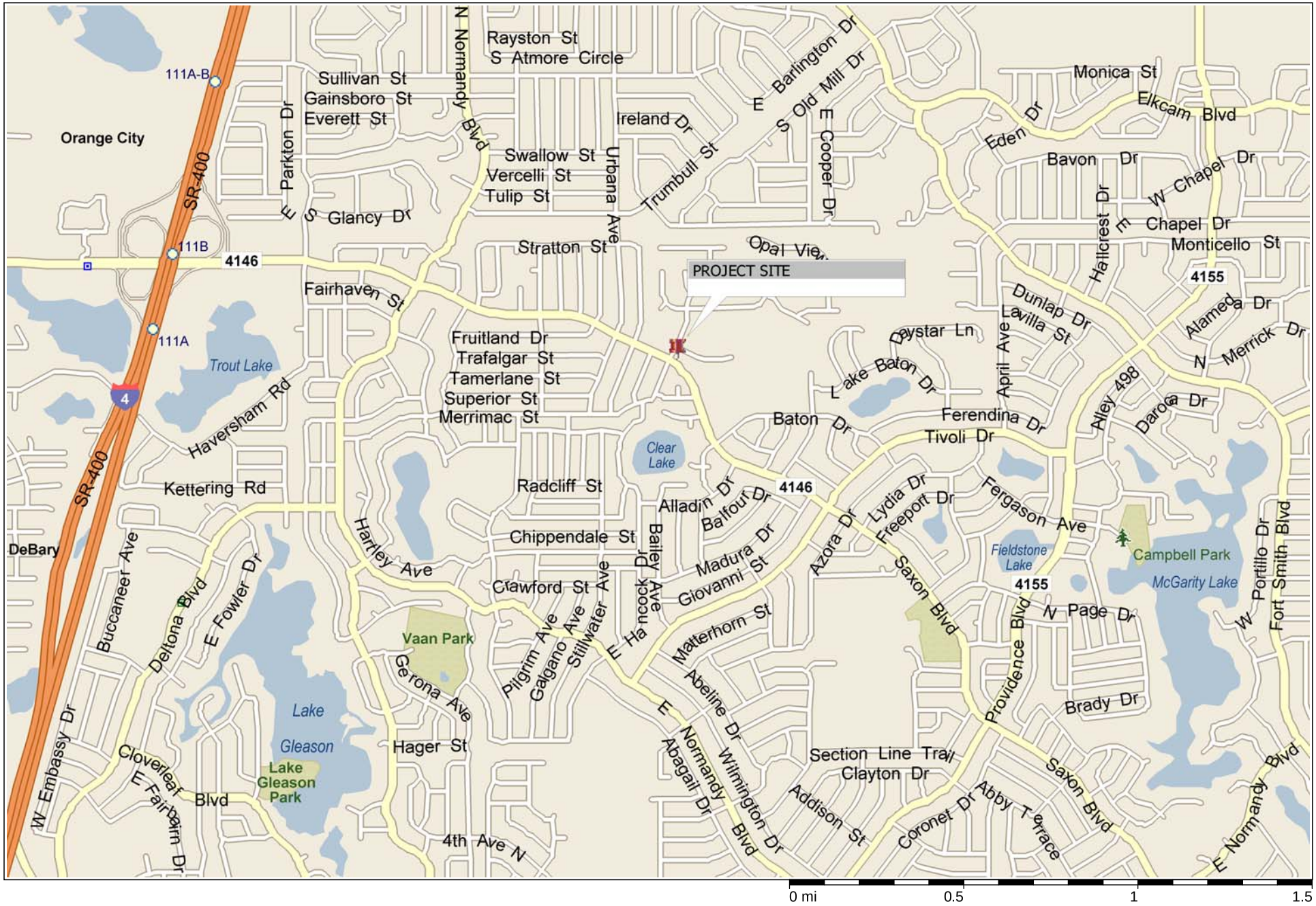
Please feel free to contact me at (813) 288-0233 if you have any questions or comments regarding this proposed methodology or require additional information.

Sincerely,
CPH, Inc.

Raghu K. Veturi, P.E.
Sr. Traffic Engineer

cc:
Melissa Winsett, Volusia County
Thomas Pauls, AICP, City of Deltona
Ron Paradise, City of Deltona
Larry Wray, P.E., CPH, Inc.

Site Location Map



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ITE TRIP GENERATION

DAILY

Land Use		ITE Land Use Code	Size (ksf)	Rate	Directional Distribution		Gross Daily		
					Enter	Exit	Enter	Exit	Total
NE Corner	Supermarket	850	44.0	102.24	50%	50%	2,249	2,249	4,499
	Convenience Market with Gasoline Pumps	853	5.7	845.60	50%	50%	2,410	2,410	4,820
	Sub-Total						4,659	4,659	9,318
NW Corner	Shopping Center	820	14.0	Ln(T)=0.65 LN (X)+5.83	50%	50%	946	946	1,892
	Fast Food Restaurant with Drive-Through Window	934	4.5	496.12	50%	50%	1,116	1,116	2,233
	Fast Food Restaurant with Drive-Through Window	934	4.5	496.12	50%	50%	1,116	1,116	2,233
	Sub-Total						3,179	3,179	6,357
TOTAL							7,838	7,838	15,676

AM PEAK

Land Use		ITE Land Use Code	Size (ksf)	Rate	Directional Distribution		Gross Peak Hour			Internal Capture		External Trips			Pass-By		Net-New Trips		
					Enter	Exit	Enter	Exit	Total	Rate	Trips	Enter	Exit	Total	Rate	Trips	Enter	Exit	Total
NE Corner	Supermarket	850	44.0	3.40	62%	38%	93	57	150	20.00%	30	74	45	120	36%	43	47	29	77
	Convenience Market with Gasoline Pumps	853	5.7	40.92	50%	50%	117	117	233	13.00%	30	101	101	203	63%	128	38	38	75
	Sub-Total						209	173	383	15.74%	60	176	147	323	53%	171	85	67	152
NW Corner	Shopping Center	820	14.0	0.96	62%	38%	8	5	13	23.00%	3	6	4	10	34%	4	4	3	7
	Fast Food Restaurant with Drive-Through Window	934	4.5	45.42	51%	49%	104	100	204	1.00%	2	103	99	202	49%	99	53	51	103
	Fast Food Restaurant with Drive-Through Window	934	4.5	45.42	51%	49%	104	100	204	1.00%	2	103	99	202	49%	99	53	51	103
	Sub-Total						217	205	422	1.70%	7	213	202	415	49%	202	109	104	213
TOTAL							426	379	805		67	388	349	738		373	**195**	**170**	**365**

PM PEAK

Land Use		ITE Land Use Code	Size (ksf)	Rate	Directional Distribution		Gross Peak Hour			Internal Capture		External Trips			Pass-By		Net-New Trips		
					Enter	Exit	Enter	Exit	Total	Rate	Trips	Enter	Exit	Total	Rate	Trips	Enter	Exit	Total
NE Corner	Supermarket	850	44.0	9.48	51%	49%	213	204	417	14.00%	58	183	176	359	36%	129	117	112	230
	Convenience Market with Gasoline Pumps	853	5.7	50.92	50%	50%	145	145	290	20.00%	58	116	116	232	66%	153	39	39	79
	Sub-Total						358	350	707	16.46%	116	299	292	591	48%	282	157	152	309
NW Corner	Shopping Center	820	14.0	Ln(T)=0.67 LN (X)+3.31	48%	52%	77	83	160	20.00%	32	62	67	128	34%	44	41	44	85
	Fast Food Restaurant with Drive-Through Window	934	4.5	32.65	52%	48%	76	71	147	11.00%	16	68	63	131	50%	65	34	31	65
	Fast Food Restaurant with Drive-Through Window	934	4.5	32.65	52%	48%	76	71	147	11.00%	16	68	63	131	50%	65	34	31	65
	Sub-Total						230	224	454	14.18%	64	198	192	390	45%	174	109	107	215
TOTAL							588	574	1,162		181	497	484	981		457	**265**	**259**	**524**

Pass-By Check

Adjacent Roadway	Saxon Boulevard from Normandy Boulevard to Tivoli Drive
2011 AADT	24,160
K-Factor	0.0920
2011 PHT	2,223
14% of PHT	311

Internal Capture Summary [NE Corner]

Date: 10/03/13
Development Name: Retail Center Deltona
Time: AM

inputs

Land Use:	Supermarket		
ITE LU Code:	850		
Size:	44 ksf		
	Total	Internal	External
Enter	93	19	74
Exit	57	11	46
Total	150	30	120
%	100%	20%	80%

20%	11	20%	19	20%	11	20%	19
Demand		Demand		Demand		Demand	
11		19		0		0	
Balanced		Balanced		Balanced		Balanced	
20%	23	20%	23	20%	0	20%	0
Demand		Demand		Demand		Demand	

Land Use:	Conv Market with Gas		
ITE LU Code:	853		
Size:	5.7 ksf		
	Total	Internal	External
Enter	117	11	106
Exit	117	19	98
Total	234	30	204
%	100%	13%	87%

Land Use:			
ITE LU Code:			
Size:			
	Total	Internal	External
Enter	0	0	0
Exit	0	0	0
Total	0	0	0
%	#DIV/0!	#DIV/0!	#DIV/0!

Demand		Balanced	Demand	
20%	23	0	20%	0
20%	23	0	20%	0
Demand		Balanced	Demand	

Net External Trips for Multi-Use Development

	Supermarket	Conv Market with Gas	0	Total	
Enter	74	106	0	180	
Exit	46	98	0	144	
Total	120	204	0	324	Internal Capture
Single-Use Trip Gen. Est.	150	234	0	384	15.6%

Internal Capture Summary [NE Corner]

Date: 10/03/13
Development Name: Retail Center Deltona
Time: PM

inputs

Land Use:	Supermarket		
ITE LU Code:	850		
Size:	44 ksf		
	Total	Internal	External
Enter	213	29	184
Exit	204	29	175
Total	417	58	359
%	100%	14%	86%

Land Use:	Conv Market with Gas		
ITE LU Code:	853		
Size:	5.7 ksf		
	Total	Internal	External
Enter	145	29	116
Exit	145	29	116
Total	290	58	232
%	100%	20%	80%

Land Use:			
ITE LU Code:			
Size:			
	Total	Internal	External
Enter	0	0	0
Exit	0	0	0
Total	0	0	0
%	#DIV/0!	#DIV/0!	#DIV/0!

20%	41	20%	43	20%	41
Demand		Demand		Demand	
29		29		0	
Balanced		Balanced		Balanced	
20%	29	20%	29	20%	0
Demand		Demand		Demand	

20%	43	20%	0	20%	0
Demand		Demand		Demand	
0		0		0	
Balanced		Balanced		Balanced	
20%	0	20%	0	20%	0
Demand		Demand		Demand	

		Demand		Balanced	
20%	29			0	
		Demand		Balanced	
20%	29			0	
		Demand		Balanced	
20%	0			0	
		Demand		Balanced	
20%	0			0	
		Demand		Balanced	

Net External Trips for Multi-Use Development

	Supermarket	Conv Market with Gas	0	Total	
Enter	184	116	0	300	
Exit	175	116	0	291	
Total	359	232	0	591	Internal Capture
Single-Use Trip Gen. Est.	417	290	0	707	16.4%

Internal Capture Summary [NW Corner]

Date: 10/03/13
Development Name: Retail Center Deltona
Time: AM

inputs

Land Use:	Shopping Center		
ITE LU Code:	820		
Size:	14 ksf		
	Total	Internal	External
Enter	8	2	6
Exit	5	1	4
Total	13	3	10
%	100%	23%	77%

20%	1	20%	2	20%	1	20%	2
Demand		Demand		Demand		Demand	
1		2		0		0	
Balanced		Balanced		Balanced		Balanced	
20%	42	20%	40	20%	0	20%	0
Demand		Demand		Demand		Demand	

Land Use:	2 FFRS		
ITE LU Code:	934		
Size:	4.5 ksf, 4.5 ksf		
	Total	Internal	External
Enter	208	1	207
Exit	200	2	198
Total	408	3	405
%	100%	1%	99%

	Demand		Balanced		Demand
20%	42		0	20%	0
20%	40		0	20%	0
	Demand		Balanced		Demand

Land Use:			
ITE LU Code:			
Size:			
	Total	Internal	External
Enter		0	0
Exit		0	0
Total	0	0	0
%	#DIV/0!	#DIV/0!	#DIV/0!

Net External Trips for Multi-Use Development

	Shopping Center	2 FFRS	0	Total	
Enter	6	207	0	213	
Exit	4	198	0	202	
Total	10	405	0	415	Internal Capture
Single-Use Trip Gen. Est.	13	408	0	421	1.4%

Internal Capture Summary [NW Corner]

Date: 10/03/13
Development Name: Retail Center Deltona
Time: PM

inputs

Land Use:	Shopping Center		
ITE LU Code:	820		
Size:	14 ksf		
	Total	Internal	External
Enter	77	15	62
Exit	83	17	66
Total	160	32	128
%	100%	20%	80%

20%	17	20%	15	20%	17	20%	15
Demand		Demand		Demand		Demand	
17		15		0		0	
Balanced		Balanced		Balanced		Balanced	
20%	30	20%	28	20%	0	20%	0
Demand		Demand		Demand		Demand	

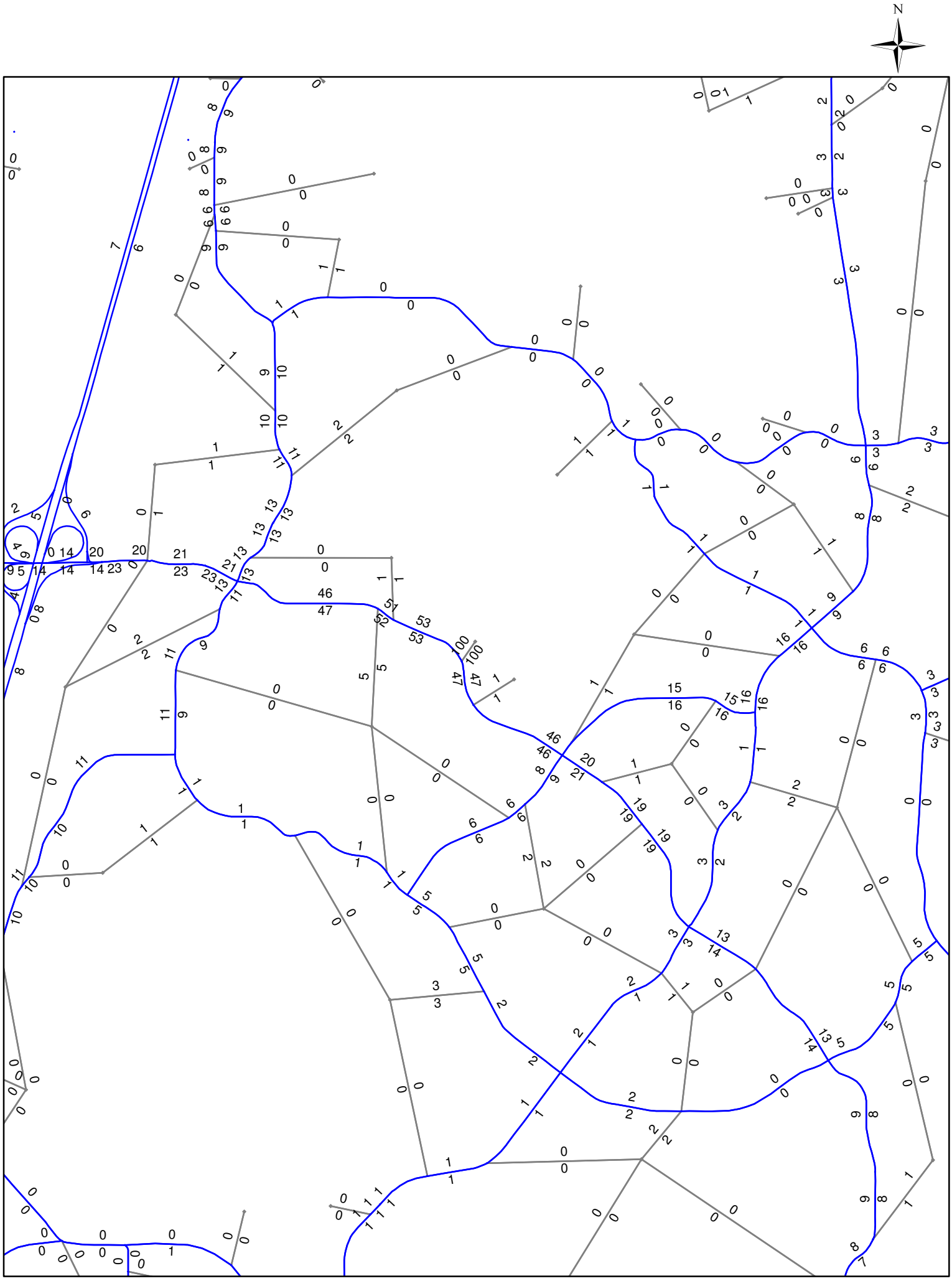
Land Use:	2 FFRS		
ITE LU Code:	934		
Size:	4.5 ksf, 4.5 ksf		
	Total	Internal	External
Enter	152	17	135
Exit	142	15	127
Total	294	32	262
%	100%	11%	89%

	Demand		Balanced		Demand
20%	30		0	20%	0
20%	28		0	20%	0
	Demand		Balanced		Demand

Land Use:			
ITE LU Code:			
Size:			
	Total	Internal	External
Enter		0	0
Exit		0	0
Total	0	0	0
%	#DIV/0!	#DIV/0!	#DIV/0!

Net External Trips for Multi-Use Development

	Shopping Center	2 FFRS	0	Total	
Enter	62	135	0	197	
Exit	66	127	0	193	
Total	128	262	0	390	Internal Capture
Single-Use Trip Gen. Est.	160	294	0	454	14.1%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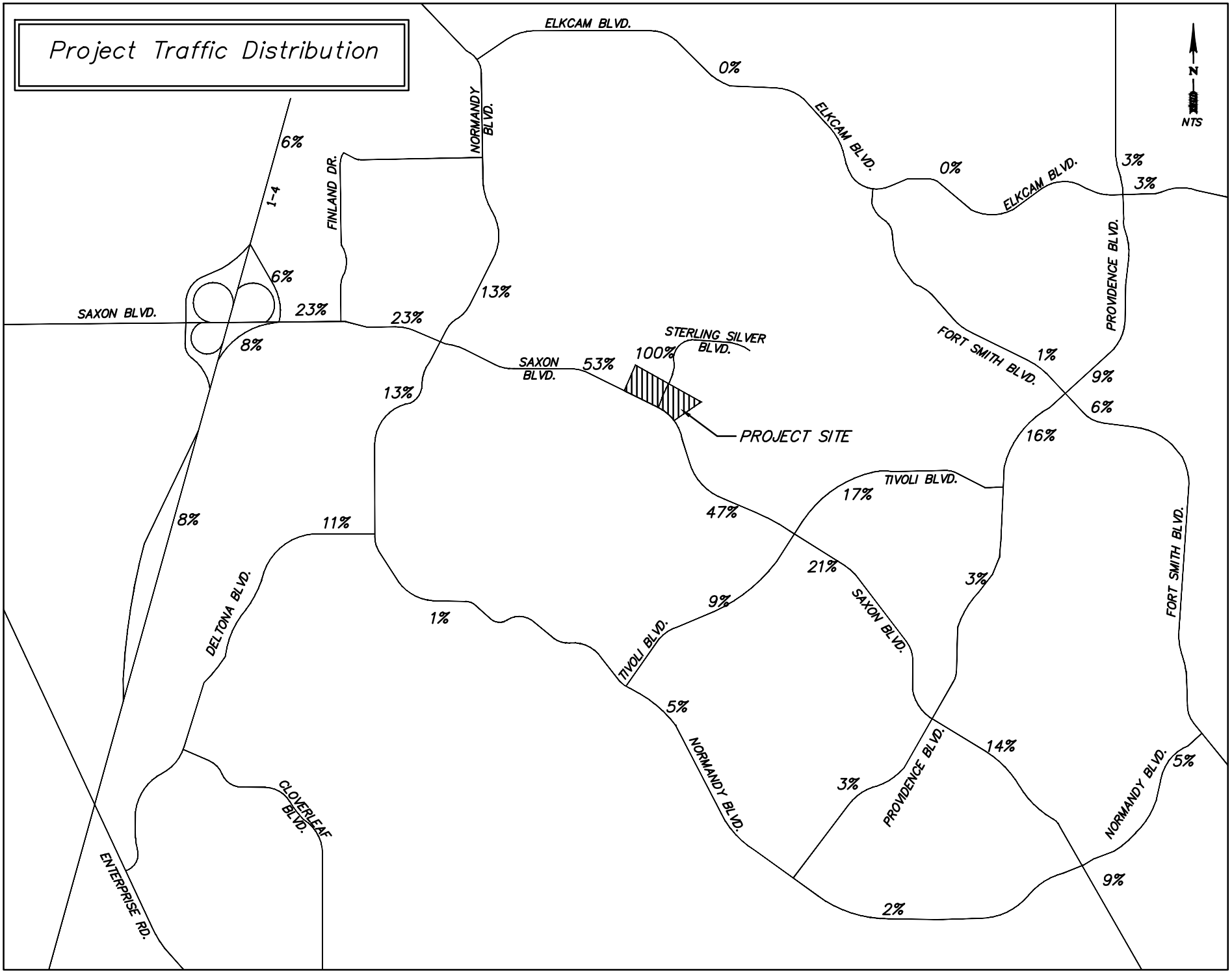
Project Traffic Distribution



PM PEAK HOUR SIGNIFICANCE TEST

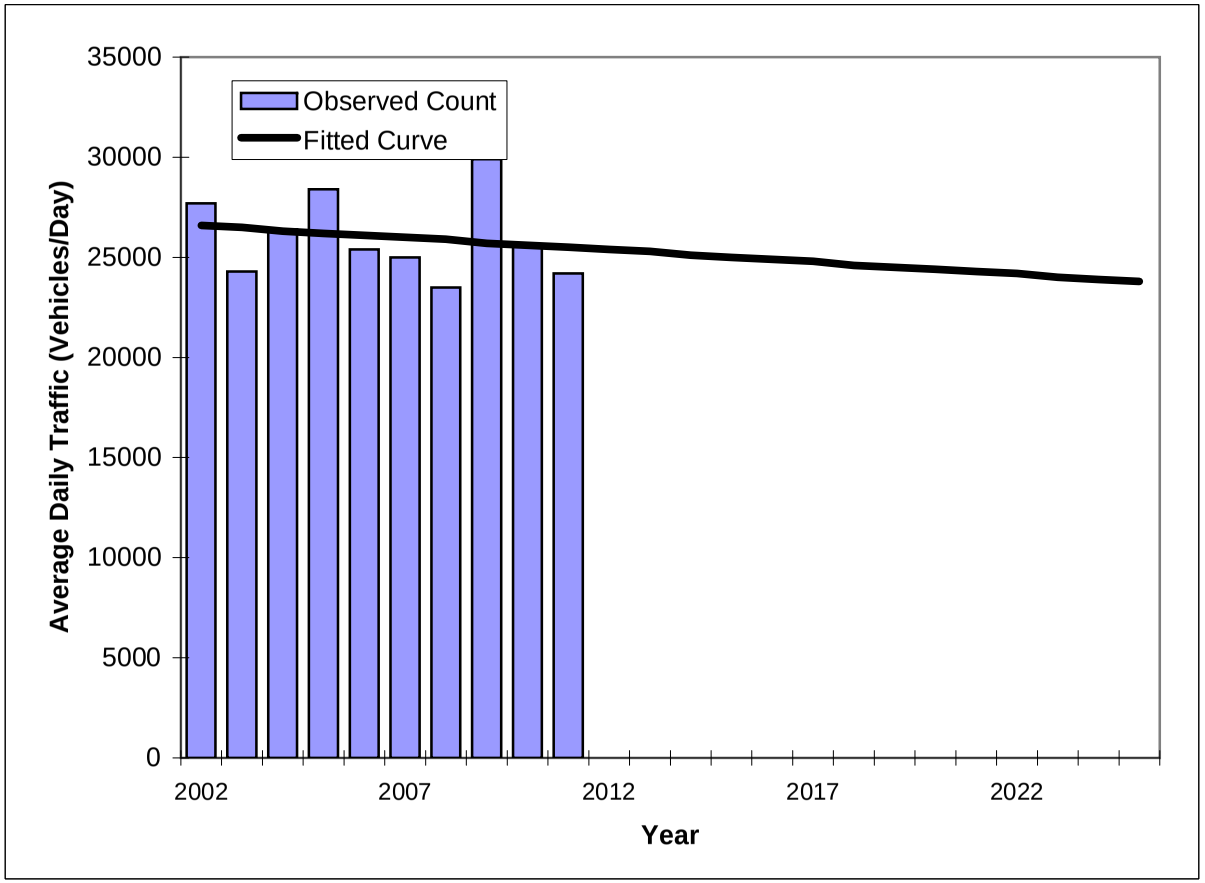
Roadway	From	To	Number of Lanes	Area Type	Adopted LOS	Peak Hour Two-Way Capacity	Project Distribution (%)	Project Trips	% Significance
Saxon Boulevard	I-4	Finland Drive	4L	UA	E	3,222	23%	121	3.74%
	Finland Drive	Normandy Boulevard	4L	UA	E	3,222	23%	121	3.74%
	Normandy Boulevard	Sterling Silver Boulevard	4L	UA	E	3,222	53%	278	8.62%
	Sterling Silver Boulevard	Tivoli Drive	4L	UA	E	3,222	47%	246	7.65%
	Tivoli Drive	Providence Boulevard	2L	UA	E	1,015	21%	110	10.84%
	Providence Boulevard	Normandy Boulevard	2L	UA	E	1,015	14%	73	7.23%
	Normandy Boulevard	Doyle Road	2L	UA	E	1,152	9%	47	4.10%
Tivoli Drive	Normandy Boulevard	Saxon Boulevard	2L	UA	E	1,015	9%	47	4.65%
	Saxon Boulevard	Providence Boulevard	2L	UA	E	1,015	17%	89	8.78%
Normandy Boulevard	Elckam Boulevard	Saxon Boulevard	4L	UA	E	2,736	13%	68	2.49%
	Saxon Boulevard	Deltona Boulevard	2L	UA	E	1,015	13%	68	6.71%
	Deltona Boulevard	Tivoli Drive	3L	UA	E	1,015	1%	5	0.52%
	Tivoli Drive	Providence Boulevard	3L	UA	E	1,015	5%	26	2.58%
	Providence Boulevard	Saxon Boulevard	2L	UA	E	1,269	2%	10	0.83%
Deltona Boulevard	Normandy Boulevard	Cloverleaf Boulevard	4L	UA	E	2,736	11%	58	2.11%
Providence Boulevard	Fort Smith Boulevard	Tivoli Drive	4L	UA	E	2,736	16%	84	3.07%
	Tivoli Drive	Saxon Boulevard	2L	UA	E	1,269	3%	16	1.24%
	Saxon Boulevard	Normandy Boulevard	2L	UA	E	1,015	3%	16	1.55%

Peak Hour Two-Way Capacities dervied from FDOT LOS Tables 2012

TRAFFIC TRENDS

Saxon Blvd. -- Normandy Blvd. to Tivoli Drive

County:	Volusia
Station #:	1677
Highway:	Saxon Blvd.



Year	Traffic (ADT/AADT) Count*	Trend**
2002	27700	26600
2003	24300	26500
2004	26400	26300
2005	28400	26200
2006	25400	26100
2007	25000	26000
2008	23500	25900
2009	29900	25700
2010	25600	25600
2011	24200	25500
2015 Opening Year Trend		
2015	N/A	25000
2016 Mid-Year Trend		
2016	N/A	24900
2020 Design Year Trend		
2020	N/A	24400
TRANPLAN Forecasts/Trends		

*Axle-Adjusted

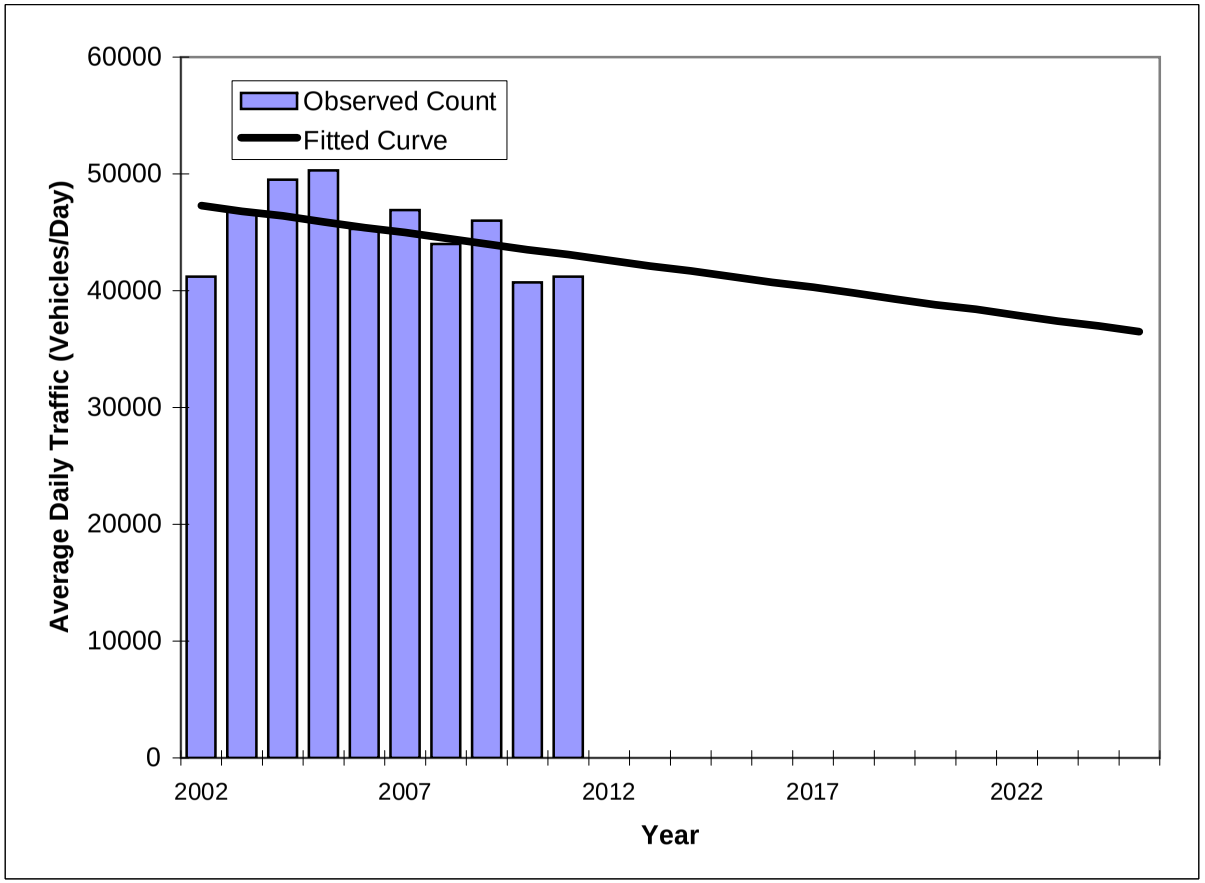
** Annual Trend Increase:	-121
Trend R-squared:	3.2%
Trend Annual Historic Growth Rate:	-0.46%
Trend Growth Rate (2011 to Design Year):	-0.48%
Printed:	23-Jul-13

Straight Line Growth Option

TRAFFIC TRENDS

Saxon Blvd. -- I-4 to Finland

County:	Volusia
Station #:	1675
Highway:	Saxon Blvd.



Year	Traffic (ADT/AADT) Count*	Trend**
2002	41200	47300
2003	46800	46800
2004	49500	46400
2005	50300	45900
2006	45300	45400
2007	46900	45000
2008	44000	44500
2009	46000	44000
2010	40700	43500
2011	41200	43100
2015 Opening Year Trend		
2015	N/A	41200
2016 Mid-Year Trend		
2016	N/A	40700
2020 Design Year Trend		
2020	N/A	38800
TRANPLAN Forecasts/Trends		

*Axle-Adjusted

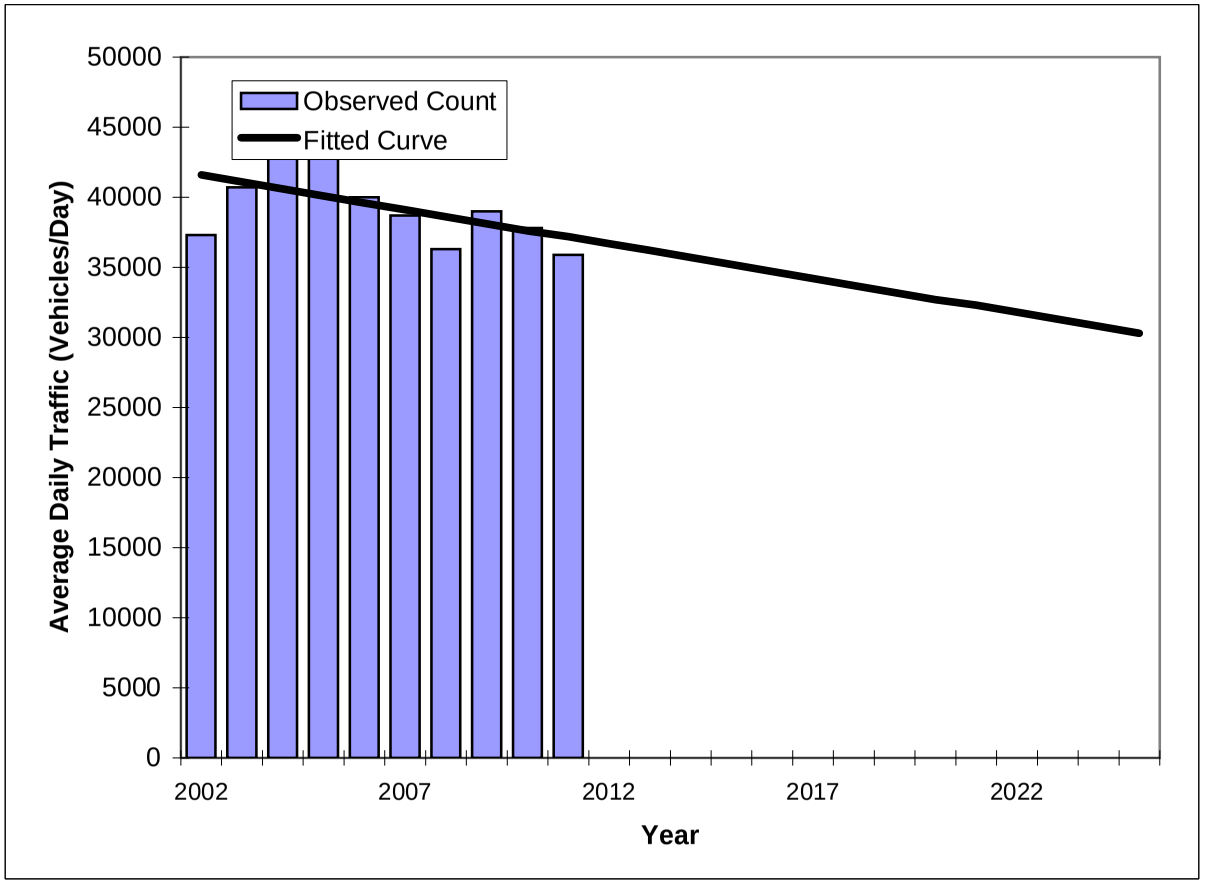
** Annual Trend Increase:	-470
Trend R-squared:	17.5%
Trend Annual Historic Growth Rate:	-0.99%
Trend Growth Rate (2011 to Design Year):	-1.11%
Printed:	5-Aug-13

Straight Line Growth Option

TRAFFIC TRENDS

Saxon Blvd. -- Finland to Normandy

County:	Volusia
Station #:	1676
Highway:	Saxon Blvd.

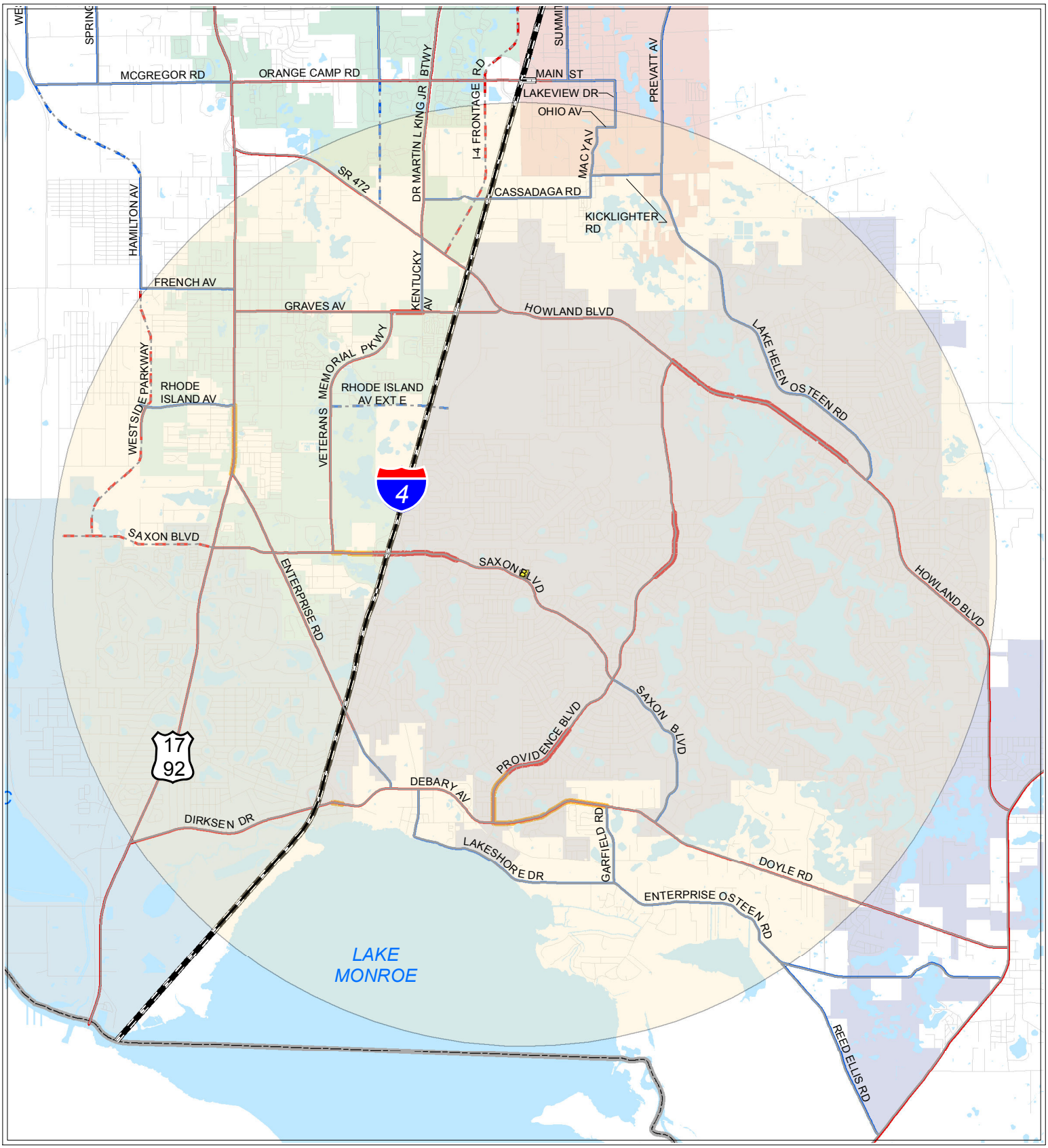


Year	Traffic (ADT/AADT) Count*	Trend**
2002	37300	41600
2003	40700	41100
2004	43400	40600
2005	44500	40100
2006	40000	39600
2007	38700	39100
2008	36300	38600
2009	39000	38100
2010	37800	37600
2011	35900	37200
2015 Opening Year Trend		
2015	N/A	35200
2016 Mid-Year Trend		
2016	N/A	34700
2020 Design Year Trend		
2020	N/A	32700
TRANPLAN Forecasts/Trends		

*Axle-Adjusted

** Annual Trend Increase:	-490
Trend R-squared:	26.9%
Trend Annual Historic Growth Rate:	-1.18%
Trend Growth Rate (2011 to Design Year):	-1.34%
Printed:	5-Aug-13

Straight Line Growth Option



Legend

- buffer
- 8130-78-00-0010
- Hydrology
- LOS2011_NearCritical
- LOS2011_Critical

Impact Area - 5 mile radius

8130-78-00-0010

N
W E
S

APPENDIX B

ITE TRIP GENERATION

ITE TRIP GENERATION

DAILY

Land Use		ITE Land Use Code	Size (ksf)	Rate	Directional Distribution		Gross Daily		
					Enter	Exit	Enter	Exit	Total
NE Corner	Supermarket	850	44.0	102.24	50%	50%	2,249	2,249	4,499
	Convenience Market with Gasoline Pumps	853	5.7	845.60	50%	50%	2,410	2,410	4,820
	Sub-Total						4,659	4,659	9,318
NW Corner	Shopping Center	820	14.0	Ln(T)=0.65 LN (X)+5.83	50%	50%	946	946	1,892
	Fast Food Restaurant with Drive-Through Window	934	4.5	496.12	50%	50%	1,116	1,116	2,233
	Fast Food Restaurant with Drive-Through Window	934	4.5	496.12	50%	50%	1,116	1,116	2,233
	Sub-Total						3,179	3,179	6,357
TOTAL							7,838	7,838	15,676

AM PEAK

Land Use		ITE Land Use Code	Size (ksf)	Rate	Directional Distribution		Gross Peak Hour			Internal Capture		External Trips			Pass-By		Net-New Trips		
					Enter	Exit	Enter	Exit	Total	Rate	Trips	Enter	Exit	Total	Rate	Trips	Enter	Exit	Total
NE Corner	Supermarket	850	44.0	3.40	62%	38%	93	57	150	20.00%	30	74	45	120	36%	43	47	29	77
	Convenience Market with Gasoline Pumps	853	5.7	40.92	50%	50%	117	117	233	13.00%	30	101	101	203	63%	128	38	38	75
	Sub-Total						209	173	383	15.74%	60	176	147	323	53%	171	85	67	152
NW Corner	Shopping Center	820	14.0	0.96	62%	38%	8	5	13	23.00%	3	6	4	10	34%	4	4	3	7
	Fast Food Restaurant with Drive-Through Window	934	4.5	45.42	51%	49%	104	100	204	1.00%	2	103	99	202	49%	99	53	51	103
	Fast Food Restaurant with Drive-Through Window	934	4.5	45.42	51%	49%	104	100	204	1.00%	2	103	99	202	49%	99	53	51	103
	Sub-Total						217	205	422	1.70%	7	213	202	415	49%	202	109	104	213
TOTAL							426	379	805		67	388	349	738		373	**195**	**170**	**365**

PM PEAK

Land Use		ITE Land Use Code	Size (ksf)	Rate	Directional Distribution		Gross Peak Hour			Internal Capture		External Trips			Pass-By		Net-New Trips		
					Enter	Exit	Enter	Exit	Total	Rate	Trips	Enter	Exit	Total	Rate	Trips	Enter	Exit	Total
NE Corner	Supermarket	850	44.0	9.48	51%	49%	213	204	417	14.00%	58	183	176	359	36%	129	117	112	230
	Convenience Market with Gasoline Pumps	853	5.7	50.92	50%	50%	145	145	290	20.00%	58	116	116	232	66%	153	39	39	79
	Sub-Total						358	350	707	16.46%	116	299	292	591	48%	282	157	152	309
NW Corner	Shopping Center	820	14.0	Ln(T)=0.67 LN (X)+3.31	48%	52%	77	83	160	20.00%	32	62	67	128	34%	44	41	44	85
	Fast Food Restaurant with Drive-Through Window	934	4.5	32.65	52%	48%	76	71	147	11.00%	16	68	63	131	50%	65	34	31	65
	Fast Food Restaurant with Drive-Through Window	934	4.5	32.65	52%	48%	76	71	147	11.00%	16	68	63	131	50%	65	34	31	65
	Sub-Total						230	224	454	14.18%	64	198	192	390	45%	174	109	107	215
TOTAL							588	574	1,162		181	497	484	981		457	**265**	**259**	**524**

Pass-By Check

Adjacent Roadway	Saxon Boulevard from Normandy Boulevard to Tivoli Drive
2011 AADT	24,160
K-Factor	0.0920
2011 PHT	2,223
14% of PHT	311

Internal Capture Summary [NE Corner]

Date: 10/03/13
Development Name: Retail Center Deltona
Time: AM

inputs

Land Use:	Supermarket		
ITE LU Code:	850		
Size:	44 ksf		
	Total	Internal	External
Enter	93	19	74
Exit	57	11	46
Total	150	30	120
%	100%	20%	80%

20%	11	20%	19	20%	11	20%	19
Demand		Demand		Demand		Demand	
11		19		0		0	
Balanced		Balanced		Balanced		Balanced	
20%	23	20%	23	20%	0	20%	0
Demand		Demand		Demand		Demand	

Land Use:	Conv Market with Gas		
ITE LU Code:	853		
Size:	5.7 ksf		
	Total	Internal	External
Enter	117	11	106
Exit	117	19	98
Total	234	30	204
%	100%	13%	87%

Land Use:			
ITE LU Code:			
Size:			
	Total	Internal	External
Enter	0	0	0
Exit	0	0	0
Total	0	0	0
%	#DIV/0!	#DIV/0!	#DIV/0!

Demand		Balanced	Demand	
20%	23	0	20%	0
20%	23	0	20%	0
Demand		Balanced	Demand	

Net External Trips for Multi-Use Development

	Supermarket	Conv Market with Gas	0	Total	
Enter	74	106	0	180	
Exit	46	98	0	144	
Total	120	204	0	324	Internal Capture
Single-Use Trip Gen. Est.	150	234	0	384	15.6%

Internal Capture Summary [NE Corner]

Date: 10/03/13
Development Name: Retail Center Deltona
Time: PM

inputs

Land Use:	Supermarket		
ITE LU Code:	850		
Size:	44 ksf		
	Total	Internal	External
Enter	213	29	184
Exit	204	29	175
Total	417	58	359
%	100%	14%	86%

Land Use:	Conv Market with Gas		
ITE LU Code:	853		
Size:	5.7 ksf		
	Total	Internal	External
Enter	145	29	116
Exit	145	29	116
Total	290	58	232
%	100%	20%	80%

Land Use:			
ITE LU Code:			
Size:			
	Total	Internal	External
Enter	0	0	0
Exit	0	0	0
Total	0	0	0
%	#DIV/0!	#DIV/0!	#DIV/0!

20%	41	20%	43	20%	41
Demand		Demand		Demand	
29		29		0	
Balanced		Balanced		Balanced	
20%	29	20%	29	20%	0
Demand		Demand		Demand	

20%	43	20%	0	20%	0
Demand		Demand		Demand	
0		0		0	
Balanced		Balanced		Balanced	
20%	0	20%	0	20%	0
Demand		Demand		Demand	

		Demand		Balanced	
20%	29			0	
		Demand		Balanced	
20%	29			0	
		Demand		Balanced	
20%	0			0	
		Demand		Balanced	
20%	0			0	
		Demand		Balanced	

Net External Trips for Multi-Use Development

	Supermarket	Conv Market with Gas	0	Total	
Enter	184	116	0	300	
Exit	175	116	0	291	
Total	359	232	0	591	Internal Capture
Single-Use Trip Gen. Est.	417	290	0	707	16.4%

Internal Capture Summary [NW Corner]

Date: 10/03/13
Development Name: Retail Center Deltona
Time: AM

inputs

Land Use:	Shopping Center		
ITE LU Code:	820		
Size:	14 ksf		
	Total	Internal	External
Enter	8	2	6
Exit	5	1	4
Total	13	3	10
%	100%	23%	77%

20%	1	20%	2	20%	1	20%	2
Demand		Demand		Demand		Demand	
1		2		0		0	
Balanced		Balanced		Balanced		Balanced	
20%	42	20%	40	20%	0	20%	0
Demand		Demand		Demand		Demand	

Land Use:	2 FFRS		
ITE LU Code:	934		
Size:	4.5 ksf, 4.5 ksf		
	Total	Internal	External
Enter	208	1	207
Exit	200	2	198
Total	408	3	405
%	100%	1%	99%

	Demand		Balanced		Demand
20%	42		0	20%	0
20%	40		0	20%	0
	Demand		Balanced		Demand

Land Use:			
ITE LU Code:			
Size:			
	Total	Internal	External
Enter		0	0
Exit		0	0
Total	0	0	0
%	#DIV/0!	#DIV/0!	#DIV/0!

Net External Trips for Multi-Use Development

	Shopping Center	2 FFRS	0	Total	
Enter	6	207	0	213	
Exit	4	198	0	202	
Total	10	405	0	415	Internal Capture
Single-Use Trip Gen. Est.	13	408	0	421	1.4%

Internal Capture Summary [NW Corner]

Date: 10/03/13
Development Name: Retail Center Deltona
Time: PM

inputs

Land Use:	Shopping Center		
ITE LU Code:	820		
Size:	14 ksf		
	Total	Internal	External
Enter	77	15	62
Exit	83	17	66
Total	160	32	128
%	100%	20%	80%

20%	17	20%	15	20%	17	20%	15
Demand		Demand		Demand		Demand	
17		15		0		0	
Balanced		Balanced		Balanced		Balanced	
20%	30	20%	28	20%	0	20%	0
Demand		Demand		Demand		Demand	

Land Use:	2 FFRS		
ITE LU Code:	934		
Size:	4.5 ksf, 4.5 ksf		
	Total	Internal	External
Enter	152	17	135
Exit	142	15	127
Total	294	32	262
%	100%	11%	89%

	Demand		Balanced		Demand
20%	30		0	20%	0
20%	28		0	20%	0
	Demand		Balanced		Demand

Land Use:			
ITE LU Code:			
Size:			
	Total	Internal	External
Enter		0	0
Exit		0	0
Total	0	0	0
%	#DIV/0!	#DIV/0!	#DIV/0!

Net External Trips for Multi-Use Development

	Shopping Center	2 FFRS	0	Total	
Enter	62	135	0	197	
Exit	66	127	0	193	
Total	128	262	0	390	Internal Capture
Single-Use Trip Gen. Est.	160	294	0	454	14.1%

APPENDIX C

TRAFFIC DATA COLLECTION

2012 PEAK SEASON FACTOR CATEGORY REPORT - REPORT TYPE: ALL
CATEGORY: 7900 VOLUSIA COUNTYWIDE

MOCF: 0.95

WEEK	DATES	SF	PSCF
1	01/01/2012 - 01/07/2012	1.01	1.07
2	01/08/2012 - 01/14/2012	1.00	1.06
3	01/15/2012 - 01/21/2012	1.00	1.06
4	01/22/2012 - 01/28/2012	0.98	1.04
* 5	01/29/2012 - 02/04/2012	0.97	1.03
* 6	02/05/2012 - 02/11/2012	0.95	1.00
* 7	02/12/2012 - 02/18/2012	0.94	0.99
* 8	02/19/2012 - 02/25/2012	0.93	0.98
* 9	02/26/2012 - 03/03/2012	0.93	0.98
*10	03/04/2012 - 03/10/2012	0.93	0.98
*11	03/11/2012 - 03/17/2012	0.92	0.97
*12	03/18/2012 - 03/24/2012	0.93	0.98
*13	03/25/2012 - 03/31/2012	0.94	0.99
*14	04/01/2012 - 04/07/2012	0.95	1.00
*15	04/08/2012 - 04/14/2012	0.96	1.01
*16	04/15/2012 - 04/21/2012	0.97	1.03
*17	04/22/2012 - 04/28/2012	0.98	1.04
18	04/29/2012 - 05/05/2012	0.99	1.05
19	05/06/2012 - 05/12/2012	1.00	1.06
20	05/13/2012 - 05/19/2012	1.01	1.07
21	05/20/2012 - 05/26/2012	1.02	1.08
22	05/27/2012 - 06/02/2012	1.02	1.08
23	06/03/2012 - 06/09/2012	1.02	1.08
24	06/10/2012 - 06/16/2012	1.03	1.09
25	06/17/2012 - 06/23/2012	1.03	1.09
26	06/24/2012 - 06/30/2012	1.04	1.10
27	07/01/2012 - 07/07/2012	1.04	1.10
28	07/08/2012 - 07/14/2012	1.04	1.10
29	07/15/2012 - 07/21/2012	1.05	1.11
30	07/22/2012 - 07/28/2012	1.05	1.11
31	07/29/2012 - 08/04/2012	1.05	1.11
32	08/05/2012 - 08/11/2012	1.05	1.11
33	08/12/2012 - 08/18/2012	1.05	1.11
34	08/19/2012 - 08/25/2012	1.05	1.11
35	08/26/2012 - 09/01/2012	1.04	1.10
36	09/02/2012 - 09/08/2012	1.04	1.10
37	09/09/2012 - 09/15/2012	1.04	1.10
38	09/16/2012 - 09/22/2012	1.03	1.09
39	09/23/2012 - 09/29/2012	1.02	1.08
40	09/30/2012 - 10/06/2012	1.01	1.07
41	10/07/2012 - 10/13/2012	1.00	1.06
42	10/14/2012 - 10/20/2012	0.99	1.05
43	10/21/2012 - 10/27/2012	1.00	1.06
44	10/28/2012 - 11/03/2012	1.00	1.06
45	11/04/2012 - 11/10/2012	1.00	1.06
46	11/11/2012 - 11/17/2012	1.00	1.06
47	11/18/2012 - 11/24/2012	1.01	1.07
48	11/25/2012 - 12/01/2012	1.01	1.07
49	12/02/2012 - 12/08/2012	1.01	1.07
50	12/09/2012 - 12/15/2012	1.01	1.07
51	12/16/2012 - 12/22/2012	1.01	1.07
52	12/23/2012 - 12/29/2012	1.00	1.06
53	12/30/2012 - 12/31/2012	1.00	1.06

* PEAK SEASON

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Site Code: 11213801 & 02

Date: 9-11-13

Weather: Clear

City: Deltona

County: Volusia

Count Times: 7:00AM - 9:00AM & 4:00PM - 6:00PM

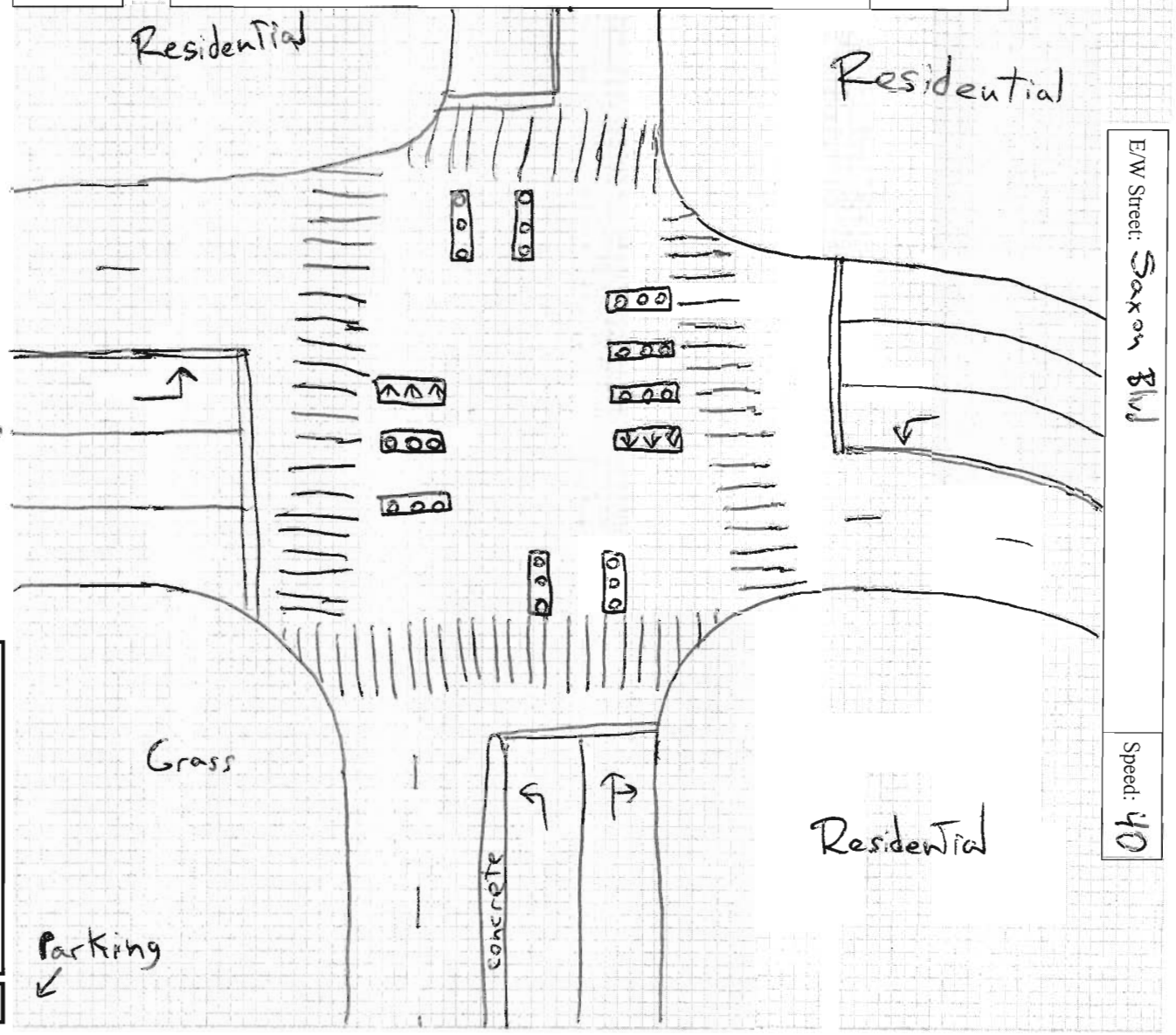
N Δ

N/S Street: Finland Dr

Speed: 30

E/W Street: Saxon Blvd

Speed: 40



	AM			PM		
A B C	1	2	3	1	2	3
	:13	X	X	:14	:14	:18
	A :07	X	A :22	A :10	A :11	A :08
	1:19	1:23	1:00	1:21	1:12	1:16
	:33	:34	:30	:30	:23	:38
Total	2:12	1:57	1:52	2:15	2:00	2:20

COUNTY OF VOLUSIA TRAFFIC SIGNAL TIMING SHEET

LOCATION: Saxon Boulevard & Finland Drive
Deltona

ISOLATED:

DATE: 5/2/2013

SIGNAL #: 321

CO-ORD: X

Design By: M. Rodriguez

System #: 18

Controller Timing Chart

PHASE	1	2	3	4	5	6	7	8
DIRECTION	WBL	EB		SB	EBL	WB		NB
TURN TYPE	PROT	-		-	PROT	-		-
MIN GREEN	5	11		6	5	11		6
EXTENSION	3	4		4	3	4		4
CLEARANCE	4.5	4.5		4.0	4.5	4.5		4.0
ALL RED	2.0	2.0		2.5	2.0	2.0		2.5
WALK	-	7		7	-	7		7
FDW	-	22		24	-	22		24
MAX 1	20	60		25	20	60		25
MAX 2								
MAX 3	-	85		-	-	85		-
ADJUST	-	10		-	-	10		-
RECALL	-	MIN		-	-	MIN		-
DETECTOR	NON-LOCK	LOCK		NON-LOCK	NON-LOCK	LOCK		NON-LOCK
FLASH	RED	YELLOW		RED	RED	YELLOW		RED
SET	-	2		-	-	2		-
CLEAR	-	2		-	-	2		-

BASE DAY		1	2	3	4	5	6	7
MON #1	TIME	00:01-06:30	06:30-09:30	09:30-15:30	15:30-20:00	20:00-00:00		
	PLAN	FREE	C1O1S1	FREE	C2O1S1	FREE		
TUES#1	TIME	00:01-06:30	06:30-09:30	09:30-15:30	15:30-20:00	20:00-00:00		
	PLAN	FREE	C1O1S1	FREE	C2O1S1	FREE		
WED #1	TIME	00:01-06:30	06:30-09:30	09:30-15:30	15:30-20:00	20:00-00:00		
	PLAN	FREE	C1O1S1	FREE	C2O1S1	FREE		
THU #1	TIME	00:01-06:30	06:30-09:30	09:30-15:30	15:30-20:00	20:00-00:00		
	PLAN	FREE	C1O1S1	FREE	C2O1S1	FREE		
FRI #1	TIME	00:01-06:30	06:30-09:30	09:30-15:30	15:30-20:00	20:00-00:00		
	PLAN	FREE	C1O1S1	FREE	C2O1S1	FREE		
SAT #2	TIME	00:01-00:00						
	PLAN	FREE						
SUN #3	TIME	00:01-00:00						
	PLAN	FREE						

Crosswalk Length
P2
75 Feet
P4
81 Feet
P6
64 Feet
P8
74 Feet

CONTROLLER TYPE		CONDITION OF OVERHEAD	OK	PROM NUMBER	
3000E		OVERHEAD STREET NAMES	NO		
PHASES:	8Φ	ILLUMINATED STREET NAMES	YES	8216A 3.7.3	SIGNAL OWNER
CABINET TYPE	V	PRE-EMPTION	NO	IP ADDRESS	County
CABINET DATE	06/1994	PRE-EMPTION TYPE	N/A	10.77.8.38	LED YES

REMARKS:

1	2	4
5	6	8

VOLUSIA COUNTY TRAFFIC ENGINEERING
SYSTEM INVENTORY

Switch IP.# 10.77.8.6
Controller IP.# 10.77.8.38
Camera IP # -

DATE: 5/2/2013 DESIGNED BY: M. Rodriguez

LOCATION: Saxon Boulevard & Finland Drive

CITY: Deltona ID NO: 321 SYSTEM ID: 18

CONTROLLER TIME CHART

TP# 1

MVMNT	MIN	EXT	CLR	A.R.	WALK	FDW	MAX1	MAX2	MAX3	ADJST	REC	DET	FL	SET	CLR
1	5	3	4.5	2	-	-	20	-	-	-	-	NL	R	-	-
2	11	4	4.5	2	7	22	60	-	85	10	MIN	L	Y	2	2
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	6	4	4	2.5	7	24	25	-	-	-	-	NL	R	-	-
5	5	3	4.5	2	-	-	20	-	-	-	-	NL	R	-	-
6	11	4	4.5	2	7	22	60	-	85	10	MIN	L	Y	2	2
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	6	4	4	2.5	7	24	25	-	-	-	-	NL	R	-	-

CO-ORDINATION

PLAN	C1/S1	C2/S1	C3/S1	C4/S1	C5/S1	C6/S1		
CYCLE	120	130						
OFF 1	55	77						
OFF 2								
OFF 3								
OFF 4								
OFF 5								
PERM	10%	10%	10%	10%	10%	10%	10%	10%

PHASE SPLITS (seconds)

CY/SP	C1/S1	C2/S1	C3/S1	C4/S1	C5/S1	C6/S1		
PH 1	20	21	-	-	-	-		
PH 2	64	79	-	-	-	-		
PH 3	-	-	-	-	-	-		
PH 4	36	30	-	-	-	-		
PH 5	20	25	-	-	-	-		
PH 6	64	75	-	-	-	-		
PH 7	-	-	-	-	-	-		
PH 8	36	30	-	-	-	-		

1	2	4
5	6	8

BASE DAY		1	2	3	4	5	6	7	8	9	10	11
MON #1	TIME	00:01-06:30	06:30-09:30	09:30-15:30	15:30-20:00	20:00-00:00						
	PLAN	FREE	C1O1S1	FREE	C2O1S1	FREE						
TUES#1	TIME	00:01-06:30	06:30-09:30	09:30-15:30	15:30-20:00	20:00-00:00						
	PLAN	FREE	C1O1S1	FREE	C2O1S1	FREE						
WED #1	TIME	00:01-06:30	06:30-09:30	09:30-15:30	15:30-20:00	20:00-00:00						
	PLAN	FREE	C1O1S1	FREE	C2O1S1	FREE						
THU #1	TIME	00:01-06:30	06:30-09:30	09:30-15:30	15:30-20:00	20:00-00:00						
	PLAN	FREE	C1O1S1	FREE	C2O1S1	FREE						
FRI #1	TIME	00:01-06:30	06:30-09:30	09:30-15:30	15:30-20:00	20:00-00:00						
	PLAN	FREE	C1O1S1	FREE	C2O1S1	FREE						
SAT	TIME	00:01-00:00										
	PLAN	FREE										
SUN	TIME	00:01-00:00										
	PLAN	FREE										

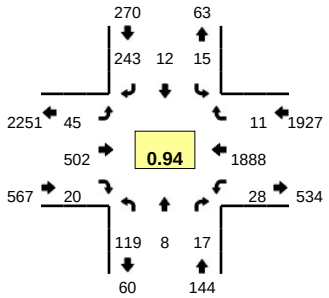
Type of peak hour being reported: Intersection Peak

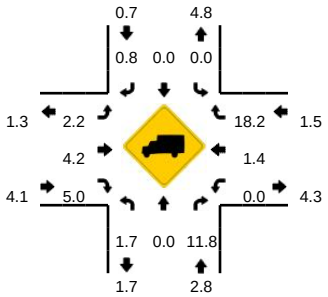
Method for determining peak hour: Total Entering Volume

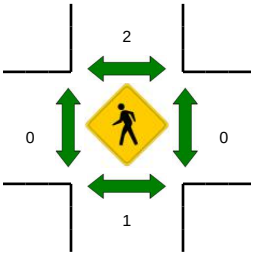
LOCATION: Finland Dr -- Saxon Blvd
CITY/STATE: Deltona, FL

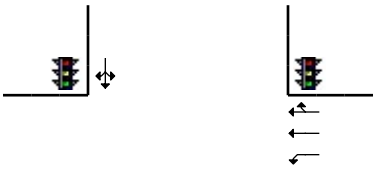
QC JOB #: 11213801
DATE: Wed, Sep 11 2013

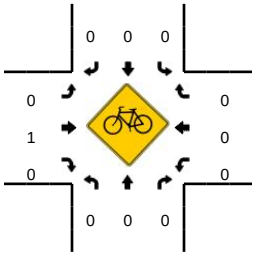
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

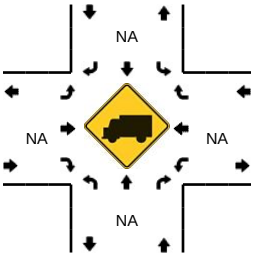


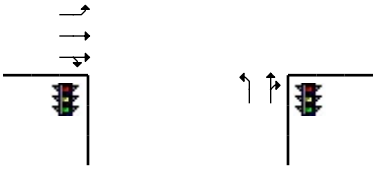


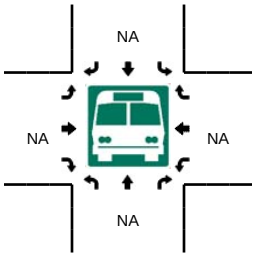












R* = RTOR

15-Min Count Period Beginning At	Finland Dr (Northbound)					Finland Dr (Southbound)					Saxon Blvd (Eastbound)					Saxon Blvd (Westbound)					Total	Hourly Totals
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*		
7:00 AM	21	0	0	0	2	4	4	37	0	18	11	119	2	0	0	3	377	4	0	0	602	
7:15 AM	30	0	1	0	1	4	1	36	0	14	6	139	6	0	0	6	441	1	0	0	686	
7:30 AM	41	3	3	0	3	7	4	50	0	11	12	127	1	0	0	4	504	1	0	0	771	
7:45 AM	23	3	3	0	4	2	1	62	0	9	15	115	4	0	0	11	492	6	0	0	750	2809
8:00 AM	25	2	1	0	1	2	6	54	0	7	11	121	8	1	1	7	451	3	0	0	701	2908
8:15 AM	25	2	2	0	4	3	1	31	0	23	9	116	4	0	1	3	367	2	0	0	593	2815
8:30 AM	16	1	0	0	3	6	1	22	0	27	11	153	7	1	2	2	324	1	0	1	578	2622
8:45 AM	12	2	1	0	3	5	5	22	0	10	14	154	4	0	0	2	328	4	0	0	566	2438

Peak 15-Min Flowrates	Northbound					Southbound					Eastbound					Westbound					Total
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	
All Vehicles	164	12	12	0	12	28	16	200	0	44	48	508	4	0	0	16	2016	4	0	0	3084
Heavy Trucks	0	0	0			0	0	8			0	4	0			0	24	0			36
Pedestrians		0					0					0					0				0
Bicycles	0	0	0			0	0	0			0	1	0			0	0	0			1
Railroad																					
Stopped Buses																					

Comments:

Report generated on 9/17/2013 7:30 AM

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

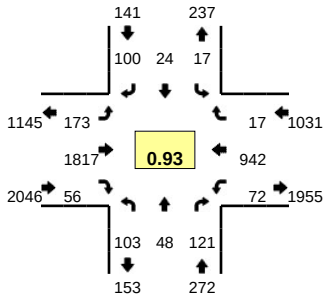
Type of peak hour being reported: Intersection Peak

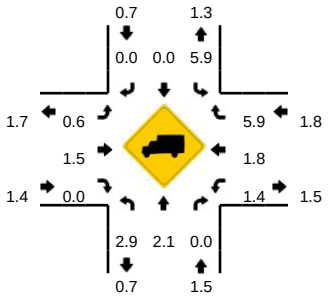
Method for determining peak hour: Total Entering Volume

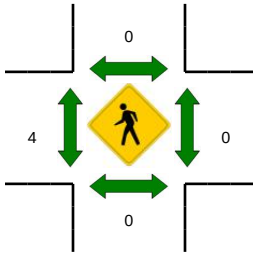
LOCATION: Finland Dr -- Saxon Blvd
CITY/STATE: Deltona, FL

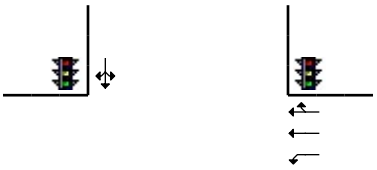
QC JOB #: 11213802
DATE: Wed, Sep 11 2013

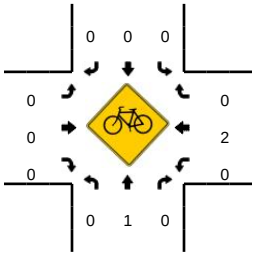
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

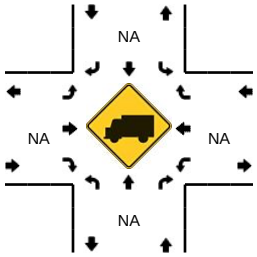


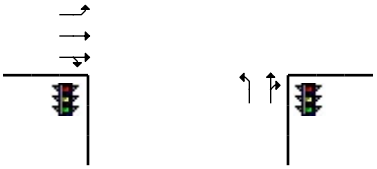


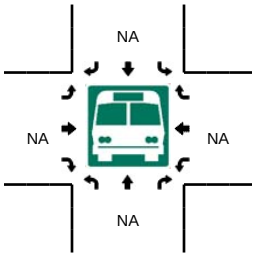












R* = RTOR

15-Min Count Period Beginning At	Finland Dr (Northbound)					Finland Dr (Southbound)					Saxon Blvd (Eastbound)					Saxon Blvd (Westbound)					Total	Hourly Totals
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*		
4:00 PM	15	12	20	0	12	3	7	12	0	5	33	363	14	0	1	19	192	6	0	0	714	
4:15 PM	21	9	14	0	9	2	2	11	0	11	29	378	7	0	0	16	214	6	0	0	729	
4:30 PM	26	13	26	0	10	0	6	14	0	11	39	396	13	0	2	11	249	1	0	0	817	
4:45 PM	21	12	16	1	4	4	9	14	0	13	39	460	9	0	0	12	243	2	0	0	859	3119
5:00 PM	24	15	25	0	6	4	1	2	0	17	42	444	9	1	1	21	239	2	0	0	853	3258
5:15 PM	31	10	26	0	6	5	8	9	0	18	52	486	18	0	2	17	245	8	0	0	941	3470
5:30 PM	26	11	32	0	6	4	6	10	0	17	39	427	17	0	0	22	215	5	0	0	837	3490
5:45 PM	18	13	26	0	4	6	4	7	0	21	35	435	8	0	1	21	221	3	0	0	823	3454

Peak 15-Min Flowrates	Northbound					Southbound					Eastbound					Westbound					Total
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	
All Vehicles	124	40	104	0	24	20	32	36	0	72	208	1944	72	0	8	68	980	32	0	0	3764
Heavy Trucks	4	0	0			4	0	0			0	32	0			0	20	0			60
Pedestrians		0					0					0					0				0
Bicycles	0	0	0			0	0	0			0	0	0			0	0	0			0
Railroad																					
Stopped Buses																					

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICE

Site Code: 11213803 + 04

Date: 9-11-13

Weather: Clear

City: Deltona

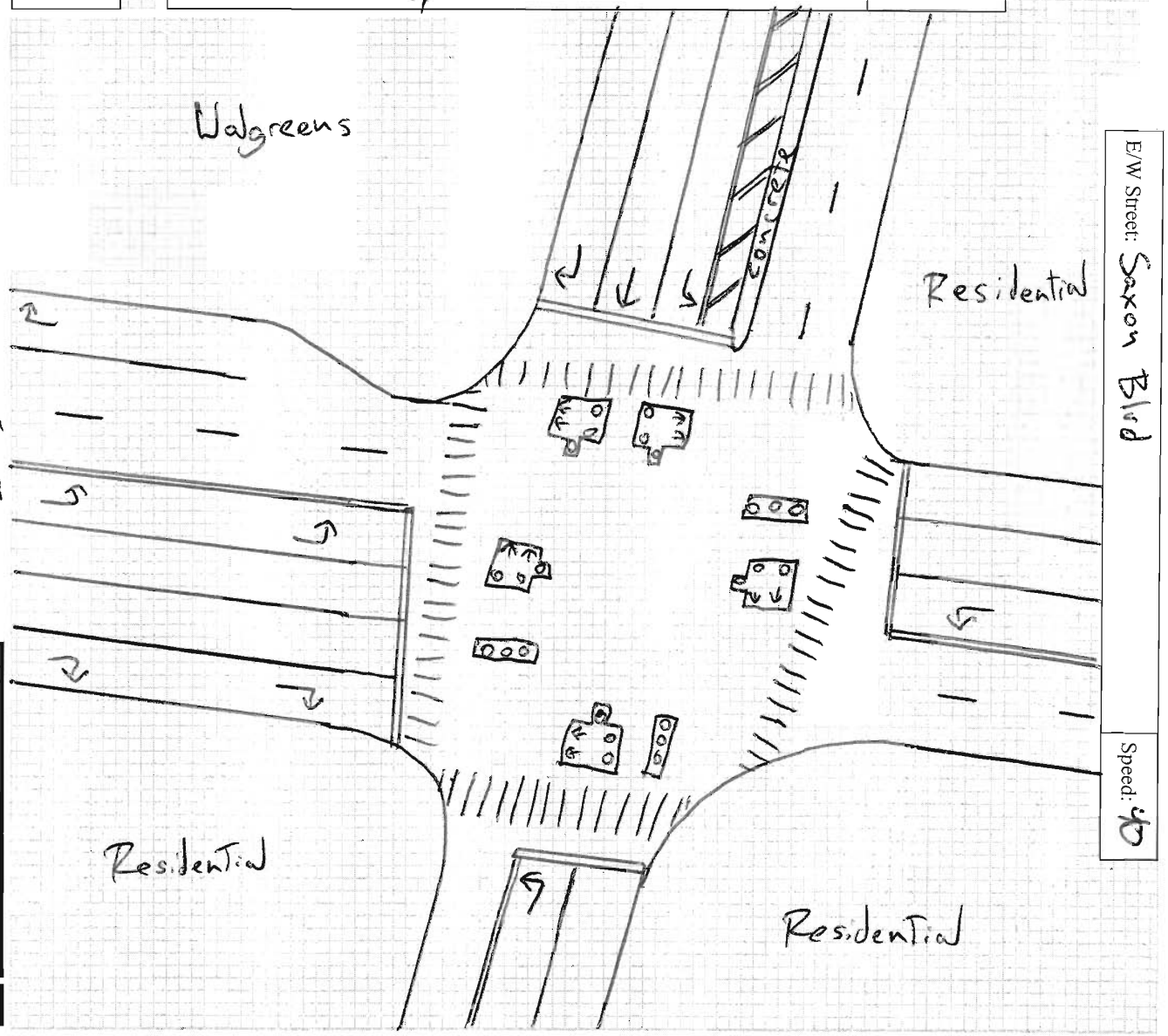
County: Volusia

Count Times: 7:00AM-9:00AM
4:00PM-6:00PM

N Δ

N/S Street: Normandy Blvd

Speed: 35



E/W Street: Saxon Blvd

Speed: 40

	A	B	C	AM 1	AM 2	AM 3	PM 1	PM 2	PM 3
				:17	X	X	:19	X	X
				:05	:16	:16	:22	:24	:16
				:46	:54	:54	:40	:56	1:10
				X	X	:18	:15	:16	:18
				:24	:24	:05	:07	:08	:05
				:22	:21	:22	:22	:22	:23
Total				1:54	1:55	1:55	2:05	2:06	2:12

COUNTY OF VOLUSIA TRAFFIC SIGNAL TIMING SHEET

LOCATION: Saxon Blvd & N. Normandy Blvd
Deltona

ISOLATED:

DATE: 5/2/2013

SIGNAL #: 157

CO-ORD: X

Design By: M. Rodriguez

System #: 18

Controller Timing Chart

PHASE	1	2	3	4	5	6	7	8
DIRECTION	EBL	WB	SBL	NB	WBL	EB	NBL	SB
TURN TYPE	PERM/PROT	-	PERM/PROT	-	PERM/PROT	-	PERM/PROT	-
MIN GREEN	5	11	5	6	5	11	5	6
EXTENSION	3	4	3	4	3	4	3	4
CLEARANCE	4.5	4.5	4.0	4.0	4.5	4.5	4.0	4.0
ALL RED	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
WALK	-	7	-	7	-	7	-	7
FDW	-	29	-	23	-	18	-	23
MAX 1	20	45	20	40	20	45	20	40
MAX 2	-	-	-	-	-	-	-	-
MAX 3	40	60	-	-	-	60	-	-
ADJUST	5	5	-	-	-	5	-	-
RECALL	-	MIN	-	-	-	MIN	-	-
DETECTOR	NON-LOCK	LOCK	NON-LOCK	NON-LOCK	NON-LOCK	LOCK	NON-LOCK	NON-LOCK
FLASH	-	YELLOW	-	RED	-	YELLOW	-	RED
SET	2	2	-	-	-	2	-	-
CLEAR	2	2	-	-	-	2	-	-

BASE DAY		1	2	3	4	5	6	7
MON #1	TIME	00:01-06:30	06:30-09:30	09:30-15:30	15:30-20:00	20:00-00:00		
	PLAN	FREE	C1O1S1	FREE	C2O1S1	FREE		
TUES#1	TIME	00:01-06:30	06:30-09:30	09:30-15:30	15:30-20:00	20:00-00:00		
	PLAN	FREE	C1O1S1	FREE	C2O1S1	FREE		
WED #1	TIME	00:01-06:30	06:30-09:30	09:30-15:30	15:30-20:00	20:00-00:00		
	PLAN	FREE	C1O1S1	FREE	C2O1S1	FREE		
THU #1	TIME	00:01-06:30	06:30-09:30	09:30-15:30	15:30-20:00	20:00-00:00		
	PLAN	FREE	C1O1S1	FREE	C2O1S1	FREE		
FRI #1	TIME	00:01-06:30	06:30-09:30	09:30-15:30	15:30-20:00	20:00-00:00		
	PLAN	FREE	C1O1S1	FREE	C2O1S1	FREE		
SAT #2	TIME	00:01-00:00						
	PLAN	FREE						
SUN #3	TIME	00:01-00:00						
	PLAN	FREE						

Crosswalk Length
P2
100 Feet
P4
75 Feet
P6
60 Feet
P8
80 Feet

CONTROLLER TYPE		CONDITION OF OVERHEAD	Ok	PROM NUMBER	
3000E		OVERHEAD STREET NAMES	NO		
PHASES:	8Φ	ILLUMINATED STREET NAMES	NO	8216A 3.7.3	SIGNAL OWNER
CABINET TYPE	V	PRE-EMPTION	NO	IP ADDRESS	County
CABINET DATE	06/1992	PRE-EMPTION TYPE	N/A	10.77.8.37	LED YES

REMARKS:

1	2	3	4
5	6	7	8

VOLUSIA COUNTY TRAFFIC ENGINEERING
SYSTEM INVENTORY

Switch IP.#	10.77.8.5
Controller IP.#	10.77.8.37
Camera IP #	10.77.8.67

DATE: 5/2/2013 DESIGNED BY: M. Rodriguez

LOCATION: Saxon Blvd & N. Normandy Blvd

CITY: Deltona SIGNAL ID NO: 157 SYSTEM ID: 18

CONTROLLER TIME CHART

MVMNT	MIN	EXT	CLR	A.R.	WALK	FDW	MAX1	MAX2	MAX3	ADJST	REC	DET	FL	SET	CLR
1	5	3	4.5	3	-	-	20	-	40	5	-	NL	-	2	2
2	11	4	4.5	3	7	29	45	-	60	5	MIN	L	Y	2	2
3	5	3	4	3	-	-	20	-	-	-	-	NL	-	-	-
4	6	4	4	3	7	23	40	-	-	-	-	NL	R	-	-
5	5	3	4.5	3	-	-	20	-	-	-	-	NL	-	-	-
6	11	4	4.5	3	7	18	45	-	60	5	MIN	L	Y	2	2
7	5	3	4	3	-	-	20	-	-	-	-	NL	-	-	-
8	6	4	4	3	7	23	40	-	-	-	-	NL	R	-	-

TP# 1

CO-ORDINATION

PLAN	C1/S1	C2/S1	C3/S1	C4/S1	C5/S1	C6/S1		
CYCLE	120	130						
OFF 1	20	92						
OFF 2								
OFF 3								
OFF 4								
OFF 5								
PERM	10%	10%	10%	10%	10%	10%	10%	10%

PHASE SPLITS (seconds)

CY/SP	C1/S1	C2/S1	C3/S1	C4/S1	C5/S1	C6/S1		
PH 1	18	42	-	-	-	-		
PH 2	56	42	-	-	-	-		
PH 3	18	16	-	-	-	-		
PH 4	28	30	-	-	-	-		
PH 5	18	20	-	-	-	-		
PH 6	56	64	-	-	-	-		
PH 7	24	23	-	-	-	-		
PH 8	22	23	-	-	-	-		

1	2	3	4
5	6	7	8

BASE DAY		1	2	3	4	5	6	7	8	9	10	11
MON #1	TIME	00:01-06:30	06:30-09:30	09:30-15:30	15:30-20:00	20:00-00:00						
	PLAN	FREE	C1O1S1	FREE	C2O1S1	FREE						
TUES#1	TIME	00:01-06:30	06:30-09:30	09:30-15:30	15:30-20:00	20:00-00:00						
	PLAN	FREE	C1O1S1	FREE	C2O1S1	FREE						
WED #1	TIME	00:01-06:30	06:30-09:30	09:30-15:30	15:30-20:00	20:00-00:00						
	PLAN	FREE	C1O1S1	FREE	C2O1S1	FREE						
THU #1	TIME	00:01-06:30	06:30-09:30	09:30-15:30	15:30-20:00	20:00-00:00						
	PLAN	FREE	C1O1S1	FREE	C2O1S1	FREE						
FRI #1	TIME	00:01-06:30	06:30-09:30	09:30-15:30	15:30-20:00	20:00-00:00						
	PLAN	FREE	C1O1S1	FREE	C2O1S1	FREE						
SAT	TIME	00:01-00:00										
	PLAN	FREE										
SUN	TIME	00:01-00:00										
	PLAN	FREE										

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

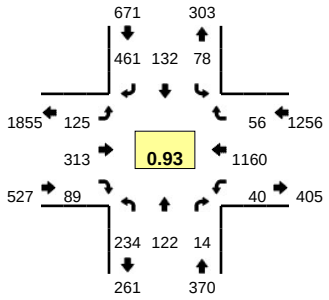
LOCATION: Normandy Blvd -- Saxon Blvd

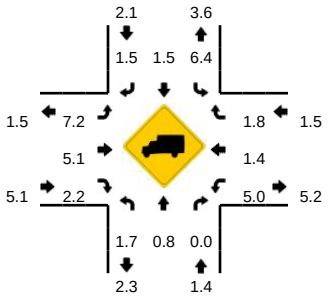
CITY/STATE: Deltona, FL

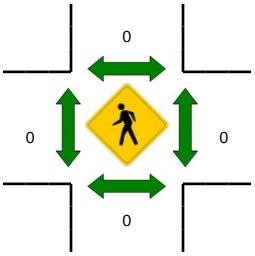
QC JOB #: 11213803

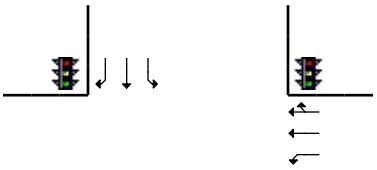
DATE: Wed, Sep 11 2013

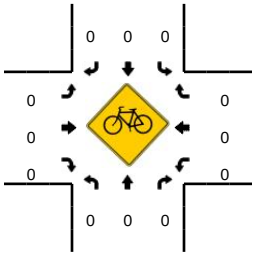
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

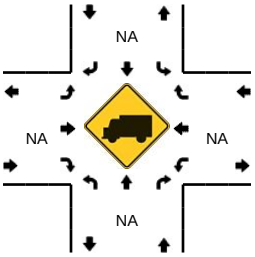


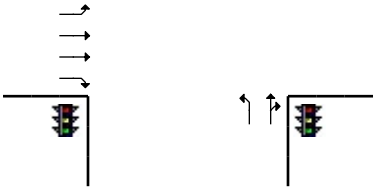


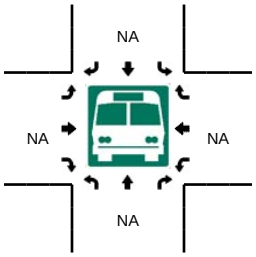












R* = RTOR

15-Min Count Period Beginning At	Normandy Blvd (Northbound)					Normandy Blvd (Southbound)					Saxon Blvd (Eastbound)					Saxon Blvd (Westbound)					Total	Hourly Totals
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*		
7:00 AM	49	19	4	0	3	5	16	67	0	24	25	47	4	0	6	7	261	18	0	0	555	
7:15 AM	62	41	0	0	0	25	24	84	0	22	27	80	13	0	13	7	256	14	0	0	668	
7:30 AM	55	27	4	0	4	31	28	109	0	15	40	81	12	0	11	10	314	14	0	1	756	
7:45 AM	72	32	3	0	0	17	35	103	0	13	34	67	8	0	14	12	300	14	0	0	724	2703
8:00 AM	45	22	3	0	0	5	45	98	0	17	24	85	4	0	14	11	290	12	0	1	676	2824
8:15 AM	68	30	4	0	1	11	39	63	0	26	22	72	19	0	5	17	191	6	0	1	575	2731
8:30 AM	43	37	3	0	2	9	11	51	0	25	26	85	22	0	15	7	210	20	0	0	566	2541
8:45 AM	46	31	6	0	1	17	44	54	0	14	36	92	9	0	14	14	178	6	0	1	563	2380

Peak 15-Min Flowrates	Northbound					Southbound					Eastbound					Westbound					Total
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	
All Vehicles	220	108	16	0	16	124	112	436	0	60	160	324	48	0	44	40	1256	56	0	4	3024
Heavy Trucks	0	0	0			4	0	4			0	0	0			0	20	0			28
Pedestrians		0					0					0					0				0
Bicycles	0	0	0			0	0	0			0	0	0			0	0	0			0
Railroad																					
Stopped Buses																					

Comments:

Report generated on 9/17/2013 7:30 AM

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

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

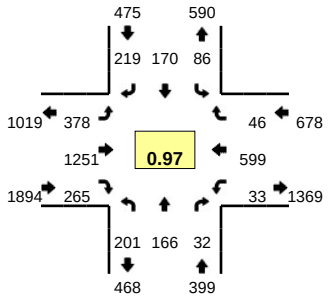
LOCATION: Normandy Blvd -- Saxon Blvd

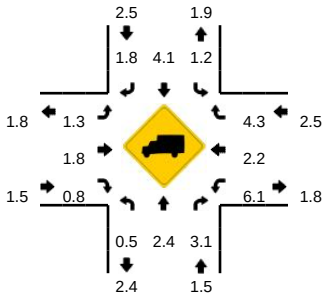
CITY/STATE: Deltona, FL

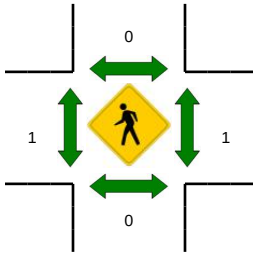
QC JOB #: 11213804

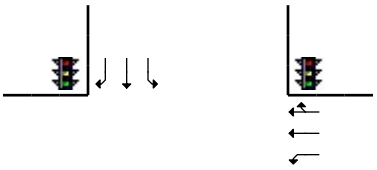
DATE: Wed, Sep 11 2013

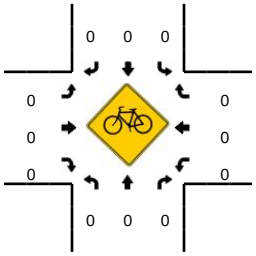
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

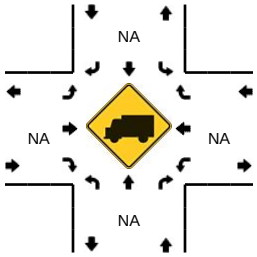


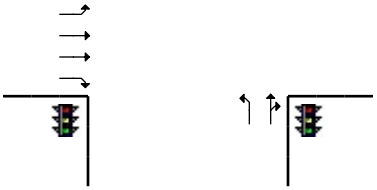


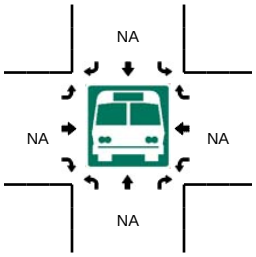












R* = RTOR

15-Min Count Period Beginning At	Normandy Blvd (Northbound)					Normandy Blvd (Southbound)					Saxon Blvd (Eastbound)					Saxon Blvd (Westbound)					Total	Hourly Totals
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*		
4:00 PM	40	28	5	0	2	13	33	23	0	11	77	261	48	0	9	8	141	8	0	0	707	
4:15 PM	43	32	3	0	1	12	33	48	0	13	91	237	54	0	13	4	123	9	0	0	716	
4:30 PM	52	39	6	0	1	11	31	35	0	20	80	272	47	0	14	7	148	9	0	0	772	
4:45 PM	40	35	10	0	3	23	35	36	0	18	98	293	48	0	22	6	150	5	0	2	824	3019
5:00 PM	47	47	5	0	0	19	35	33	0	12	93	297	40	0	22	7	181	11	0	1	850	3162
5:15 PM	56	37	7	0	1	22	52	51	0	16	93	315	50	0	18	11	146	12	0	0	887	3333
5:30 PM	50	44	10	0	1	21	35	41	0	12	89	320	54	0	17	7	142	10	0	2	855	3416
5:45 PM	48	38	8	0	0	24	48	36	0	18	103	319	48	0	16	8	130	8	0	2	854	3446

Peak 15-Min Flowrates	Northbound					Southbound					Eastbound					Westbound					Total
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	
All Vehicles	224	148	28	0	4	88	208	204	0	64	372	1260	200	0	72	44	584	48	0	0	3548
Heavy Trucks	0	0	0			0	0	8			8	36	0			4	12	4			72
Pedestrians		0					0					0					4				4
Bicycles	0	0	0			0	0	0			0	0	0			0	0	0			0
Railroad																					
Stopped Buses																					

Comments:

Report generated on 9/17/2013 7:30 AM

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

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Site Code: 11213805 + 06

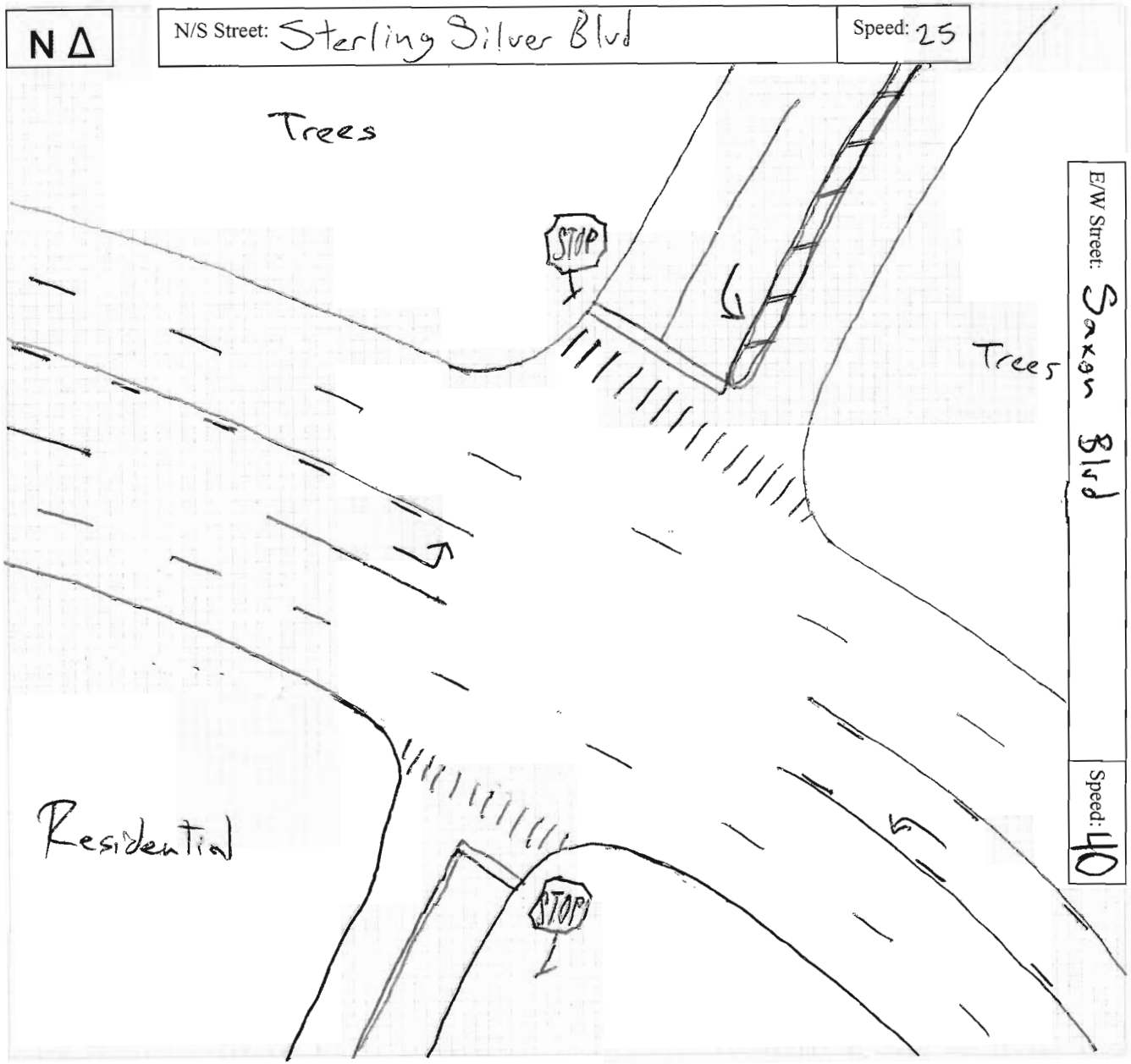
Date: 9-11-13

Weather: Clear

City: Deltona

County: Volusia

Count Times: 7:00AM - 9:00AM
&
4:00PM - 6:00PM



Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

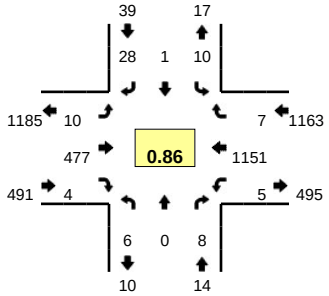
LOCATION: Sterling Silver Blvd -- Saxon Blvd

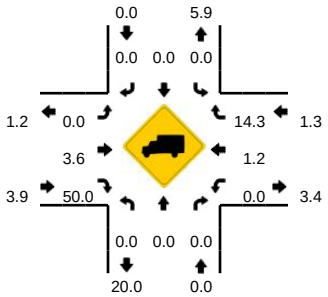
QC JOB #: 11213805

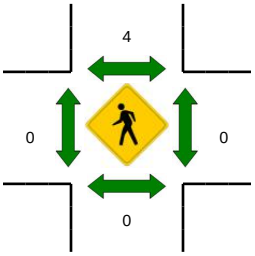
CITY/STATE: Deltona, FL

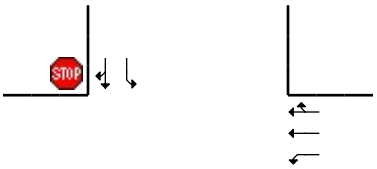
DATE: Wed, Sep 11 2013

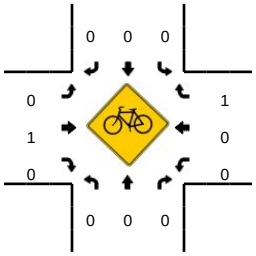
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

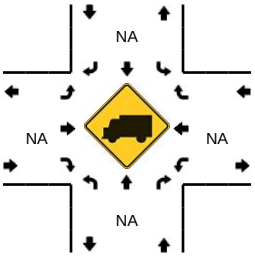


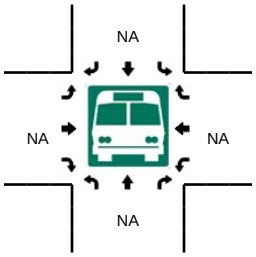












R* = RTOR

15-Min Count Period Beginning At	Sterling Silver Blvd (Northbound)					Sterling Silver Blvd (Southbound)					Saxon Blvd (Eastbound)					Saxon Blvd (Westbound)					Total	Hourly Totals
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*		
7:00 AM	0	0	1	0	0	1	0	6	0	0	1	79	0	0	0	0	231	3	0	0	322	
7:15 AM	1	0	2	0	0	2	0	10	0	0	0	135	2	0	0	1	248	0	0	0	401	
7:30 AM	3	0	3	0	0	2	0	2	0	0	3	164	0	0	0	1	314	3	0	0	495	
7:45 AM	1	0	2	0	0	4	0	9	0	0	7	101	1	0	0	0	318	3	0	0	446	1664
8:00 AM	1	0	1	0	0	2	1	7	0	0	0	77	1	0	0	3	271	1	0	0	365	1707
8:15 AM	2	0	0	0	0	0	0	7	0	0	1	95	1	0	0	1	199	4	0	0	310	1616
8:30 AM	2	1	4	0	0	0	0	5	0	0	1	78	1	0	0	1	198	0	0	0	291	1412
8:45 AM	2	0	0	0	0	1	0	4	0	0	6	111	1	0	0	1	179	2	0	0	307	1273

Peak 15-Min Flowrates	Northbound					Southbound					Eastbound					Westbound					Total
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	
All Vehicles	12	0	12	0	0	8	0	8	0	0	12	656	0	0	0	4	1256	12	0	0	1980
Heavy Trucks	0	0	0			0	0	0			0	12	0			0	16	0			28
Pedestrians		0					4					0					0				4
Bicycles	0	0	0			0	0	0			0	0	0			0	0	0			0
Railroad																					
Stopped Buses																					

Comments:

Report generated on 9/17/2013 7:30 AM

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

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

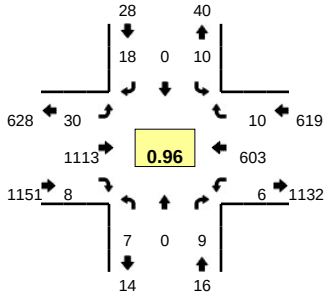
LOCATION: Sterling Silver Blvd -- Saxon Blvd

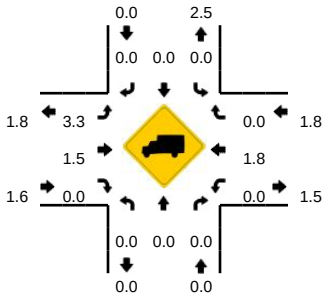
QC JOB #: 11213806

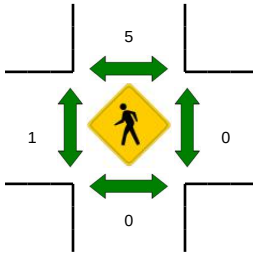
CITY/STATE: Deltona, FL

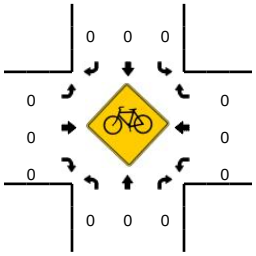
DATE: Wed, Sep 11 2013

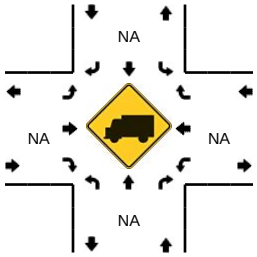
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

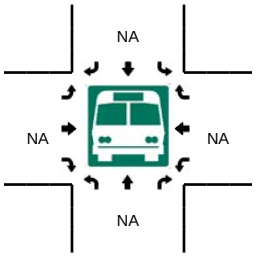












R* = RTOR

15-Min Count Period Beginning At	Sterling Silver Blvd (Northbound)					Sterling Silver Blvd (Southbound)					Saxon Blvd (Eastbound)					Saxon Blvd (Westbound)					Total	Hourly Totals
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*		
4:00 PM	1	1	1	0	0	2	0	7	0	0	4	225	3	0	0	1	126	1	0	0	372	
4:15 PM	0	0	2	0	0	2	0	3	0	0	2	223	3	0	0	3	132	2	1	0	373	
4:30 PM	5	0	1	0	0	2	0	6	0	0	3	237	3	0	0	0	158	1	0	0	416	
4:45 PM	1	0	2	0	0	0	0	2	0	0	8	257	4	0	0	1	155	3	0	0	433	1594
5:00 PM	2	0	2	0	0	3	0	7	0	0	7	272	2	0	0	6	168	4	0	0	473	1695
5:15 PM	1	0	2	0	0	1	0	3	0	0	8	273	0	0	0	0	155	2	0	0	445	1767
5:30 PM	1	0	2	0	0	3	0	2	0	0	8	288	2	0	0	0	151	1	0	0	458	1809
5:45 PM	3	0	3	0	0	3	0	6	0	0	7	280	4	0	0	0	129	3	0	0	438	1814

Peak 15-Min Flowrates	Northbound					Southbound					Eastbound					Westbound					Total
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	
All Vehicles	8	0	8	0	0	12	0	28	0	0	28	1088	8	0	0	24	672	16	0	0	1892
Heavy Trucks	0	0	0			0	0	0			0	24	0			0	0	0			24
Pedestrians		0					8					0					0				8
Bicycles	0	0	0			0	0	0			0	0	0			0	0	0			0
Railroad																					
Stopped Buses																					

Comments:

Report generated on 9/17/2013 7:30 AM

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

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Site Code: 11213807 + 08

Date: 9-11-13

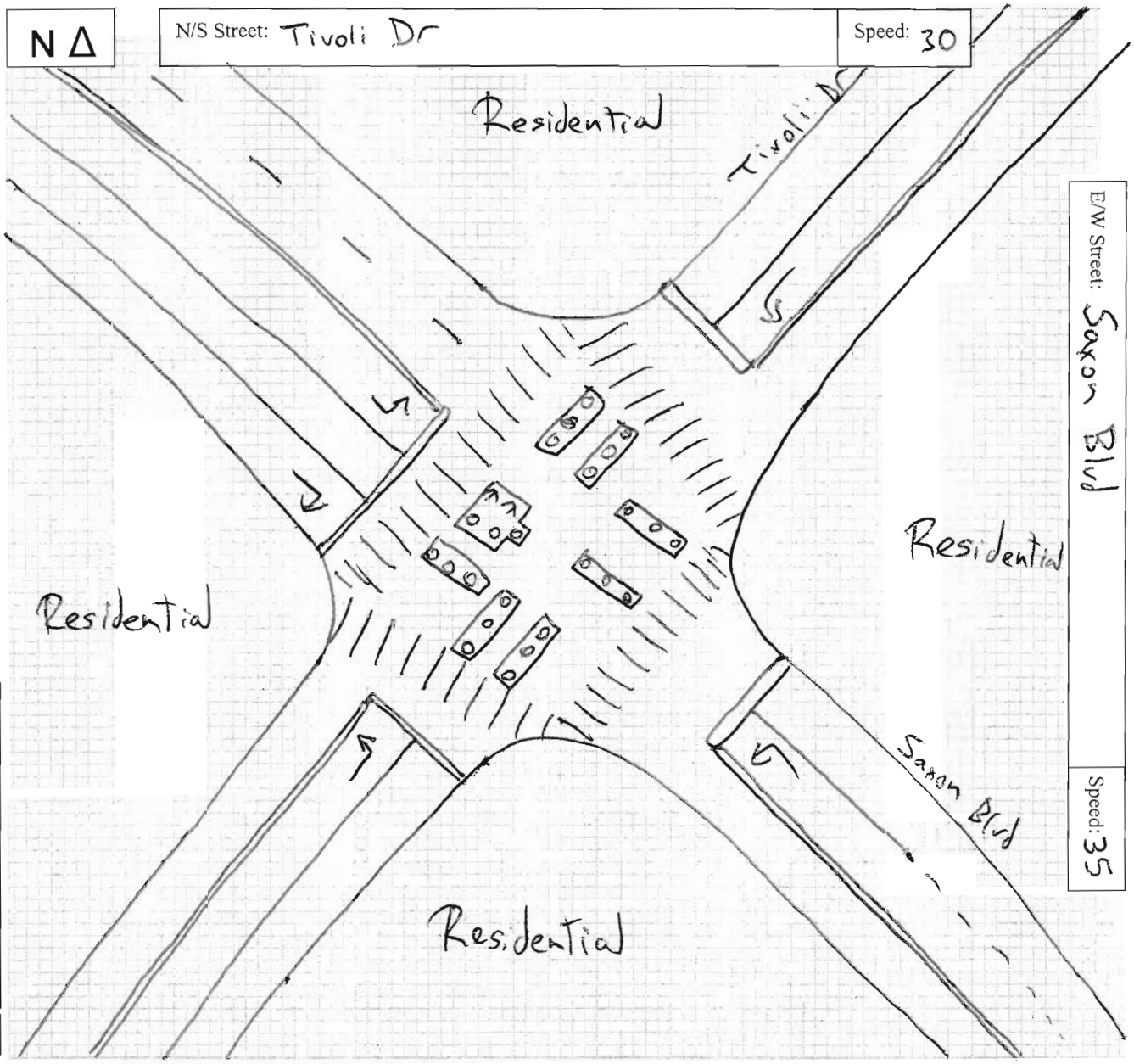
Weather: Clear

City: Deltona

County: Volusia

Count Times: 7:00AM-9:00AM + 4:00PM-6:00PM

	A	B	C	AM 1	AM 2	AM 3	PM 1	PM 2	PM 3
				:12	:19	X	:31	:29	:25
				:22	:25	:22	:21	:22	:23
				:34	:15	:15	:16	:13	:26
Total				1:08	:59	:37	1:08	1:09	1:14



COUNTY OF VOLUSIA TRAFFIC SIGNAL TIMING SHEET

LOCATION: Saxon Blvd & Tivoli Drive
Deltona

ISOLATED: X

DATE: 5/23/2012

SIGNAL #: 232

CO-ORD:

Design By: M. Rodriguez

System #: -

Controller Timing Chart

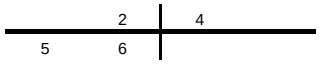
PHASE	1	2	3	4	5	6	7	8
DIRECTION	-	EB	-	NB/SB	EBL	WB	-	-
TURN TYPE	-	-	-	-	PERM/PROT	-	-	-
MIN GREEN		11		5	5	11		
EXTENSION		4		3	3	4		
CLEARANCE		4.0		4.0	4.0	4.0		
ALL RED		2.0		2.5	2.0	2.0		
WALK		7		7	-	7		
FDW		16		20	-	16		
MAX 1		30		30	15	30		
MAX 2		-		-	-	-		
MAX 3		-		40	30	-		
ADJUST		-		5	5	-		
RECALL		MIN		-	-	MIN		
DETECTOR		LOCK		NON-LOCK	NON-LOCK	LOCK		
FLASH		YELLOW		RED	-	YELLOW		
SET		-		2	2	-		
CLEAR		-		2	2	-		

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
55 Feet
P4
52 Feet
P6
53 Feet
P8
69 Feet

CONTROLLER TYPE		CONDITION OF OVERHEAD	OK	PROM NUMBER	
1880 EL		OVERHEAD STREET NAMES	NO		
PHASES:	8Φ	ILLUMINATED STREET NAMES	YES	92R09	SIGNAL OWNER
CABINET TYPE	V	PRE-EMPTION	NO	IP ADDRESS	County
CABINET DATE	10/2003	PRE-EMPTION TYPE	N/A	-	LED -

REMARKS:



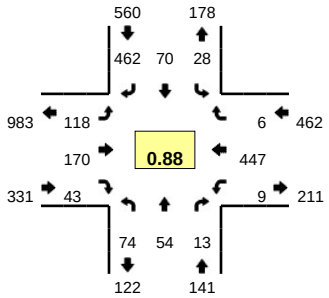
Type of peak hour being reported: Intersection Peak

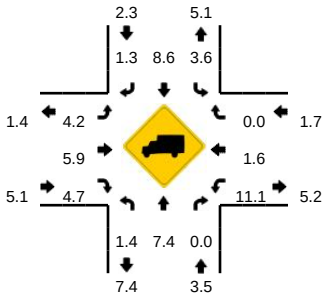
Method for determining peak hour: Total Entering Volume

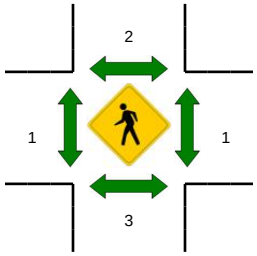
LOCATION: Tivoli Dr -- Saxon Blvd
CITY/STATE: Deltona, FL

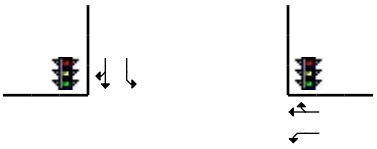
QC JOB #: 11213807
DATE: Wed, Sep 11 2013

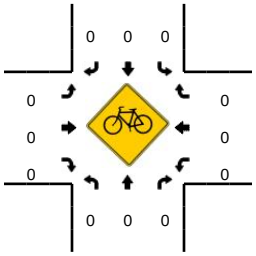
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

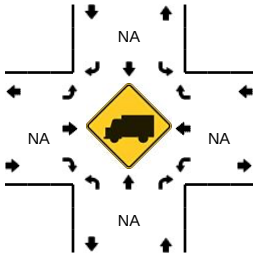


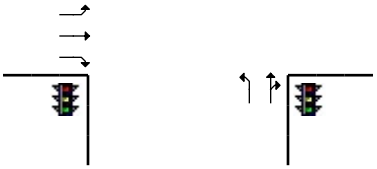


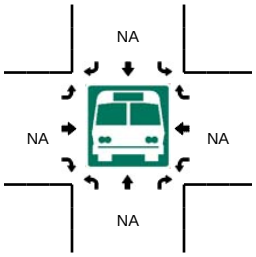












R* = RTOR

15-Min Count Period Beginning At	Tivoli Dr (Northbound)					Tivoli Dr (Southbound)					Saxon Blvd (Eastbound)					Saxon Blvd (Westbound)					Total	Hourly Totals
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*		
7:00 AM	15	7	1	0	0	0	9	76	0	20	28	27	0	0	2	0	100	0	0	0	285	
7:15 AM	17	15	1	0	1	3	12	81	0	28	30	41	4	0	7	1	111	2	0	1	355	
7:30 AM	23	19	2	0	2	8	21	114	0	16	27	53	8	0	7	2	123	0	0	0	425	
7:45 AM	20	9	3	0	0	10	14	100	0	23	26	32	5	0	3	2	110	2	0	1	360	1425
8:00 AM	14	11	2	0	2	7	23	81	0	19	35	44	7	0	2	4	103	0	0	0	354	1494
8:15 AM	12	10	2	0	0	4	17	63	0	20	36	31	7	0	1	1	86	1	0	0	291	1430
8:30 AM	22	21	0	0	1	2	18	54	0	23	34	30	4	0	2	2	100	5	0	0	318	1323
8:45 AM	10	15	0	0	0	0	18	49	0	26	42	44	2	0	1	1	88	4	0	1	301	1264

Peak 15-Min Flowrates	Northbound					Southbound					Eastbound					Westbound					Total
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	
All Vehicles	92	76	8	0	8	32	84	456	0	64	108	212	32	0	28	8	492	0	0	0	1700
Heavy Trucks	0	8	0			0	8	8			8	4	0			0	8	0			44
Pedestrians		8					8					0					0				16
Bicycles	0	0	0			0	0	0			0	0	0			0	0	0			0
Railroad																					
Stopped Buses																					

Comments:

Report generated on 9/17/2013 7:30 AM

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

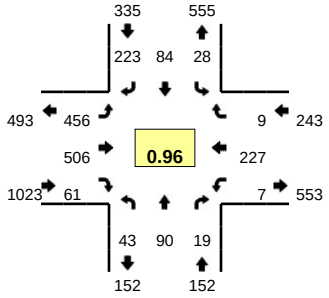
Type of peak hour being reported: Intersection Peak

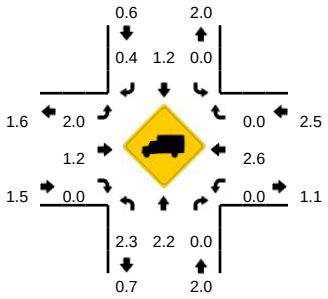
Method for determining peak hour: Total Entering Volume

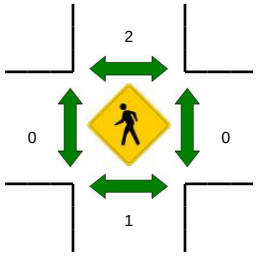
LOCATION: Tivoli Dr -- Saxon Blvd
CITY/STATE: Deltona, FL

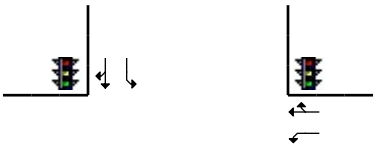
QC JOB #: 11213808
DATE: Wed, Sep 11 2013

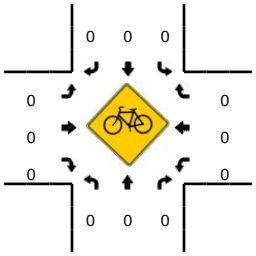
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:30 PM -- 5:45 PM

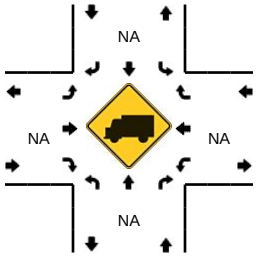


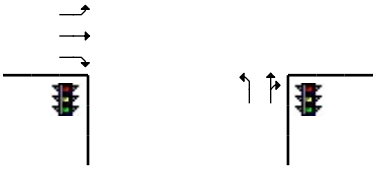


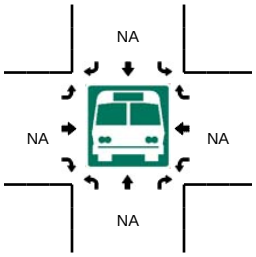












R* = RTOR

15-Min Count Period Beginning At	Tivoli Dr (Northbound)					Tivoli Dr (Southbound)					Saxon Blvd (Eastbound)					Saxon Blvd (Westbound)					Total	Hourly Totals
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*		
4:00 PM	3	23	1	0	1	2	16	22	0	18	114	84	5	0	4	2	73	1	0	0	369	
4:15 PM	8	25	1	0	0	3	18	26	0	26	106	98	10	0	3	2	62	0	0	0	388	
4:30 PM	10	24	1	0	0	7	15	45	0	15	97	108	9	0	4	1	69	1	0	0	406	
4:45 PM	11	16	0	0	0	2	21	38	0	25	101	102	8	0	7	4	68	1	0	0	404	1567
5:00 PM	7	24	0	0	3	3	28	40	0	19	116	117	8	0	6	1	67	3	0	0	442	1640
5:15 PM	12	17	1	0	1	1	10	15	0	33	123	118	9	0	2	2	63	2	0	0	409	1661
5:30 PM	12	22	8	0	0	10	23	37	0	22	126	128	6	0	5	3	49	4	0	0	455	1710
5:45 PM	12	27	4	0	2	14	23	39	0	18	91	143	16	0	9	1	48	0	0	0	447	1753

Peak 15-Min Flowrates	Northbound					Southbound					Eastbound					Westbound					Total
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	
All Vehicles	48	88	32	0	0	40	92	148	0	88	504	512	24	0	20	12	196	16	0	0	1820
Heavy Trucks	0	4	0			0	0	0			8	12	0			0	8	0			32
Pedestrians		4					0					0					0				4
Bicycles	0	0	0			0	0	0			0	0	0			0	0	0			0
Railroad																					
Stopped Buses																					

Comments:

Report generated on 9/17/2013 7:30 AM

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

COUNTY OF VOLUSIA TRAFFIC SIGNAL TIMING SHEET

LOCATION: Providence Blvd & Tivoli Drive
Deltona

ISOLATED: X

DATE: 5/25/2012

SIGNAL #: 310

CO-ORD:

Design By: M. Rodriguez

System #: 28

Controller Timing Chart

PHASE	1	2	3	4	5	6	7	8
DIRECTION	-	NB	-	EB	-	SB	-	WB
TURN TYPE	-	-	-	SPLIT LEAD	-	-	-	SPLIT LEAD
MIN GREEN		7		7		7		7
EXTENSION		3		3		3		3
CLEARANCE		4.0		4.0		4.0		4.0
ALL RED		2.0		2.5		2.0		2.5
WALK		7		7		7		7
FDW		16		20		16		20
MAX 1		35		35		35		35
MAX 2		-		-		-		-
MAX 3		-		-		-		-
ADJUST		-		-		-		-
RECALL		MIN		-		MIN		-
DETECTOR		LOCK		NON-LOCK		LOCK		NON-LOCK
FLASH		YELLOW		RED		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
47 Feet
P4
63 Feet
P6
54 Feet
P8
67 Feet

CONTROLLER TYPE		CONDITION OF OVERHEAD	Good	PROM NUMBER	
3000E		OVERHEAD STREET NAMES	NO		SIGNAL OWNER
PHASES:	8Φ	ILLUMINATED STREET NAMES	YES	8216A 3.7.3	
CABINET TYPE	V	PRE-EMPTION	NO	IP ADDRESS	County
CABINET DATE	05/1991	PRE-EMPTION TYPE	N/A	10.86.30.128	LED YES

REMARKS:

2 4 8
6

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Site Code: 11213809 + 10

Date: 9-11-13

Weather: Clear

City: Deltona

County: Volusia

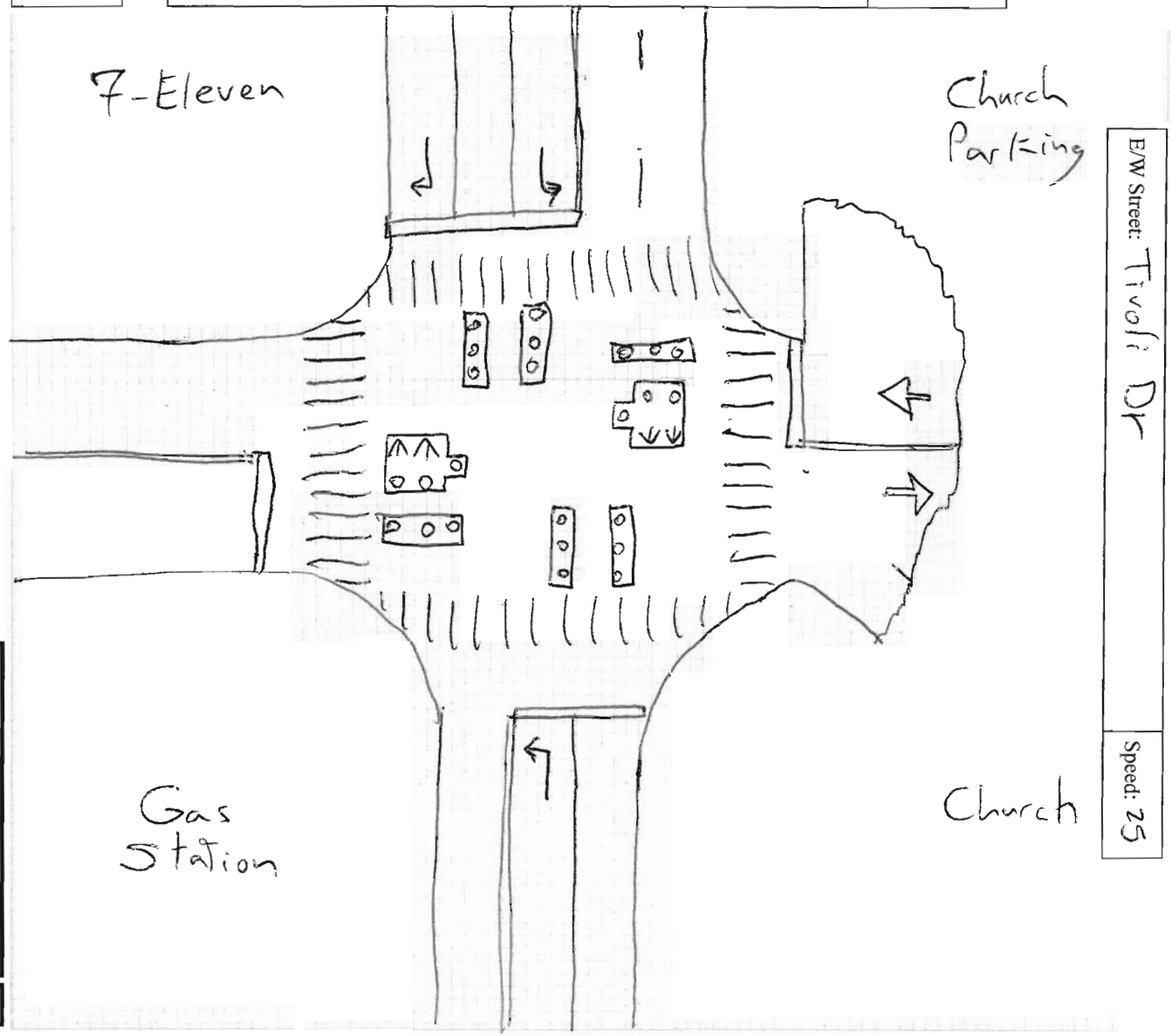
Count Times: 7:00AM-9:00AM + 4:00PM-6:00PM

A	B	C	AM 1	AM 2	AM 3	PM 1	PM 2	PM 3
↰↑			1:00	:43	:21	:42	:42	:49
↱↑			:15	:15	:18	:25	:28	:32
↰↱			X	X	X	:21	X	:17
Total			1:15	:58	:39	1:28	1:10	1:38

N Δ

N/S Street: Providence Blvd

Speed: 35



E/W Street: Tivoli Dr

Speed: 25

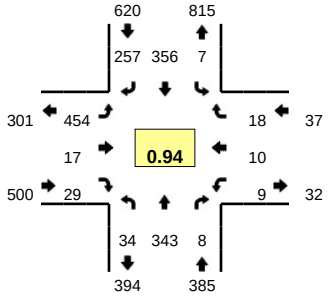
Type of peak hour being reported: Intersection Peak

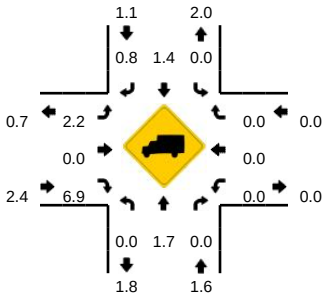
Method for determining peak hour: Total Entering Volume

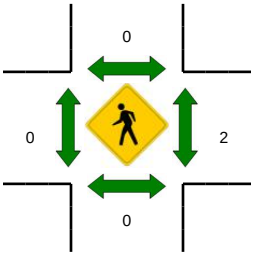
LOCATION: Providence Blvd -- Tivoli Dr
CITY/STATE: Deltona, FL

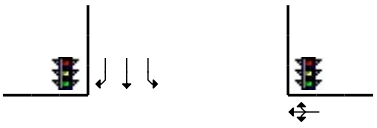
QC JOB #: 11213810
DATE: Wed, Sep 11 2013

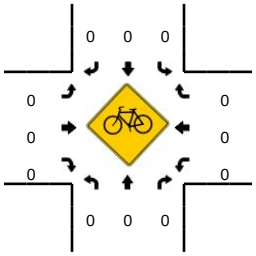
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:30 PM -- 5:45 PM

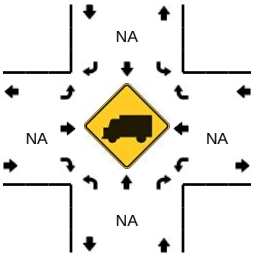


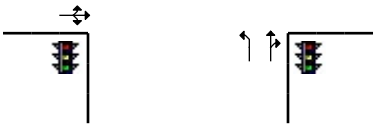


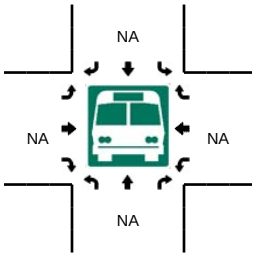












R* = RTOR

15-Min Count Period Beginning At	Providence Blvd (Northbound)					Providence Blvd (Southbound)					Tivoli Dr (Eastbound)					Tivoli Dr (Westbound)					Total	Hourly Totals
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*		
4:00 PM	9	54	1	0	0	3	60	23	0	26	119	3	3	0	1	2	1	3	0	0	308	
4:15 PM	5	56	1	0	0	1	77	31	0	22	116	2	4	0	1	2	0	2	0	1	321	
4:30 PM	3	53	1	0	0	0	69	31	0	22	92	3	9	0	1	2	1	2	0	0	289	
4:45 PM	6	98	3	0	1	5	59	43	0	26	97	5	4	0	1	1	2	2	0	3	356	1274
5:00 PM	5	77	6	0	0	2	73	30	0	33	102	4	13	0	0	6	3	3	0	2	359	1325
5:15 PM	8	75	1	0	0	2	85	22	0	28	133	5	4	0	0	1	4	4	0	3	375	1379
5:30 PM	11	92	0	0	0	1	101	31	0	38	122	5	5	0	1	1	0	2	0	1	411	1501
5:45 PM	10	99	1	0	0	2	97	40	0	35	97	3	6	0	0	1	3	2	0	1	397	1542

Peak 15-Min Flowrates	Northbound					Southbound					Eastbound					Westbound					Total
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	
All Vehicles	44	368	0	0	0	4	404	124	0	152	488	20	20	0	4	4	0	8	0	4	1644
Heavy Trucks	0	0	0			0	4	0			8	0	0			0	0	0			12
Pedestrians		0					0					0					4				4
Bicycles	0	0	0			0	0	0			0	0	0			0	0	0			0
Railroad																					
Stopped Buses																					

Comments:

Report generated on 9/17/2013 7:30 AM

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

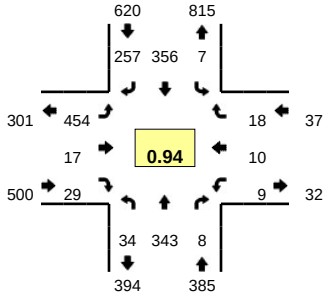
Type of peak hour being reported: Intersection Peak

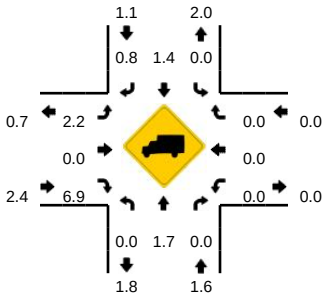
Method for determining peak hour: Total Entering Volume

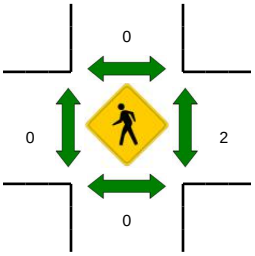
LOCATION: Providence Blvd -- Tivoli Dr
CITY/STATE: Deltona, FL

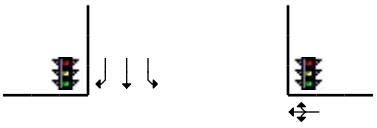
QC JOB #: 11213810
DATE: Wed, Sep 11 2013

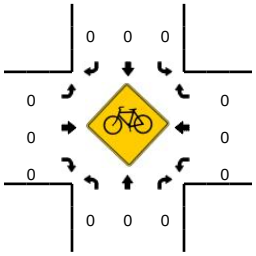
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:30 PM -- 5:45 PM

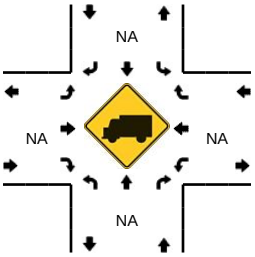


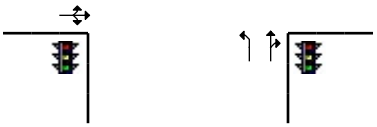


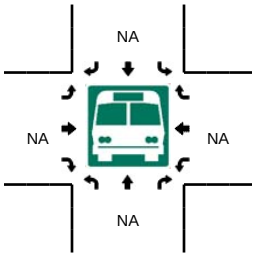












R* = RTOR

15-Min Count Period Beginning At	Providence Blvd (Northbound)					Providence Blvd (Southbound)					Tivoli Dr (Eastbound)					Tivoli Dr (Westbound)					Total	Hourly Totals
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*		
4:00 PM	9	54	1	0	0	3	60	23	0	26	119	3	3	0	1	2	1	3	0	0	308	
4:15 PM	5	56	1	0	0	1	77	31	0	22	116	2	4	0	1	2	0	2	0	1	321	
4:30 PM	3	53	1	0	0	0	69	31	0	22	92	3	9	0	1	2	1	2	0	0	289	
4:45 PM	6	98	3	0	1	5	59	43	0	26	97	5	4	0	1	1	2	2	0	3	356	1274
5:00 PM	5	77	6	0	0	2	73	30	0	33	102	4	13	0	0	6	3	3	0	2	359	1325
5:15 PM	8	75	1	0	0	2	85	22	0	28	133	5	4	0	0	1	4	4	0	3	375	1379
5:30 PM	11	92	0	0	0	1	101	31	0	38	122	5	5	0	1	1	0	2	0	1	411	1501
5:45 PM	10	99	1	0	0	2	97	40	0	35	97	3	6	0	0	1	3	2	0	1	397	1542

Peak 15-Min Flowrates	Northbound					Southbound					Eastbound					Westbound					Total
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	
All Vehicles	44	368	0	0	0	4	404	124	0	152	488	20	20	0	4	4	0	8	0	4	1644
Heavy Trucks	0	0	0			0	4	0			8	0	0			0	0	0			12
Pedestrians		0					0					0					4				4
Bicycles	0	0	0			0	0	0			0	0	0			0	0	0			0
Railroad																					
Stopped Buses																					

Comments:

Report generated on 9/17/2013 7:30 AM

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

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

Site Code: 11213811 +12

Date: 9-11-13

Weather: Clear

City: Deltona

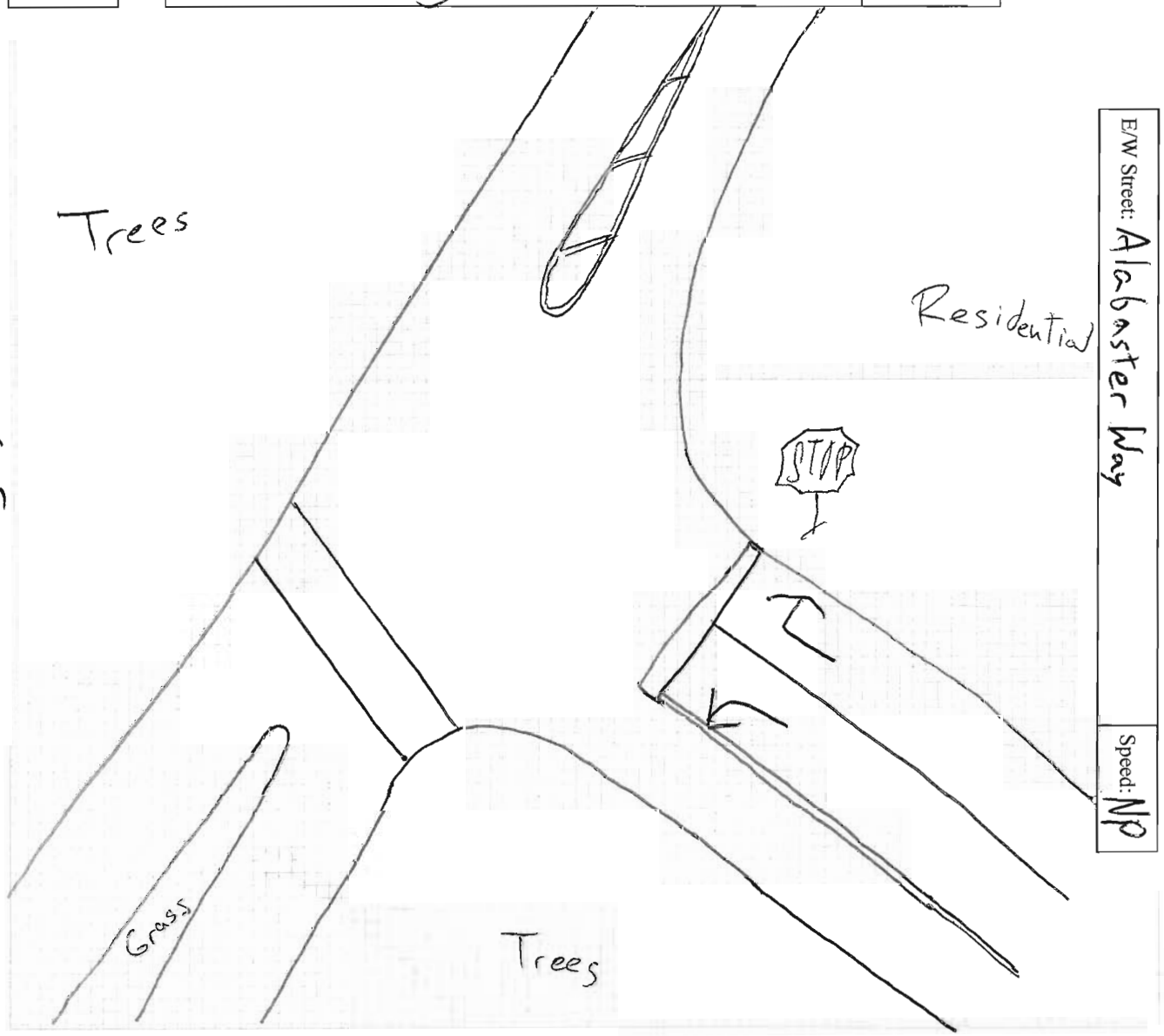
County: Volusia

Count Times: 7:00AM-9:00AM
+
4:00PM-6:00PM

N Δ

N/S Street: Sterling Silver Blvd

Speed: 25



E/W Street: Alabaster Way

Speed: NP

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

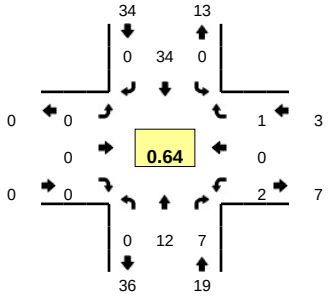
LOCATION: Sterling Silver Blvd -- Alabaster Way

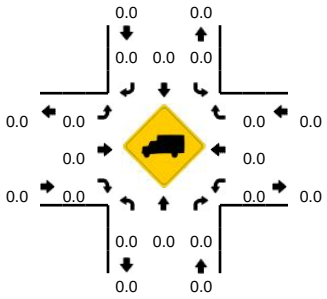
CITY/STATE: Deltona, FL

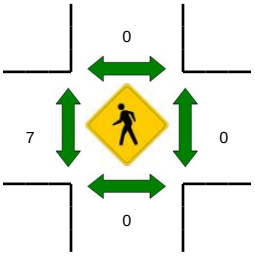
QC JOB #: 11213811

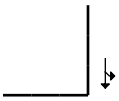
DATE: Wed, Sep 11 2013

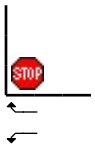
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

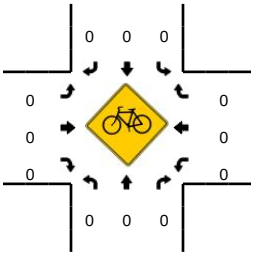


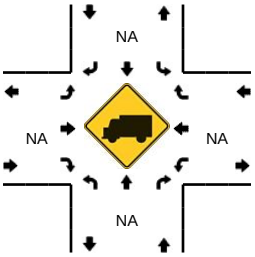


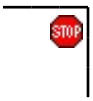


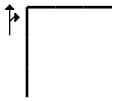


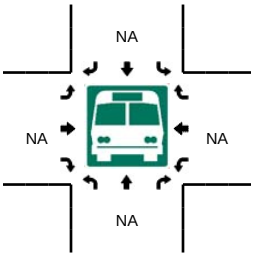












R* = RTOR

15-Min Count Period Beginning At	Sterling Silver Blvd (Northbound)					Sterling Silver Blvd (Southbound)					Alabaster Way (Eastbound)					Alabaster Way (Westbound)					Total	Hourly Totals
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*		
7:00 AM	0	4	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	11	
7:15 AM	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	12	
7:30 AM	0	3	2	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	11	
7:45 AM	0	5	5	0	0	0	9	0	0	0	0	0	0	0	0	2	0	1	0	0	22	56
8:00 AM	0	1	0	0	0	0	8	0	0	0	0	0	0	0	0	2	0	0	0	0	11	56
8:15 AM	0	3	2	0	0	0	5	0	0	0	0	0	0	0	0	2	0	0	0	0	12	56
8:30 AM	0	1	1	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	7	52
8:45 AM	0	3	4	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	12	42

Peak 15-Min Flowrates	Northbound					Southbound					Eastbound					Westbound					Total
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	
All Vehicles	0	20	20	0	0	0	36	0	0	0	0	0	0	0	0	8	0	4	0	0	88
Heavy Trucks	0	0	0			0	0	0			0	0	0			0	0	0			0
Pedestrians		0					0					8					0				8
Bicycles	0	0	0			0	0	0			0	0	0			0	0	0			0
Railroad																					
Stopped Buses																					

Comments:

Report generated on 9/17/2013 7:30 AM

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

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

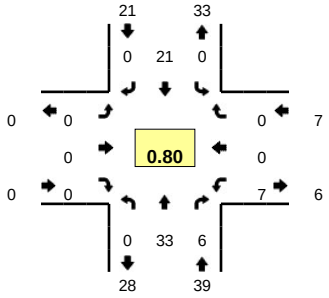
LOCATION: Sterling Silver Blvd -- Alabaster Way

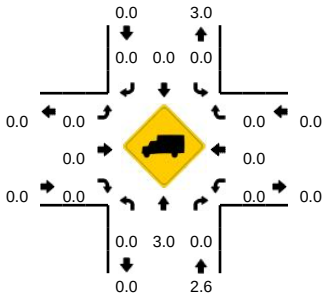
CITY/STATE: Deltona, FL

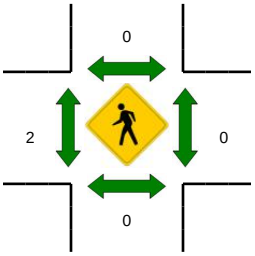
QC JOB #: 11213812

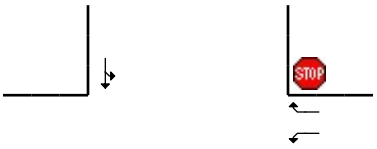
DATE: Wed, Sep 11 2013

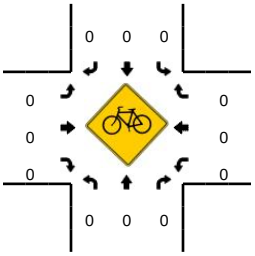
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

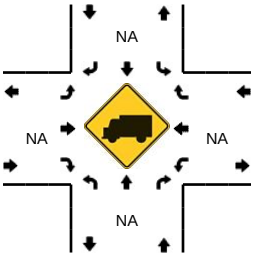


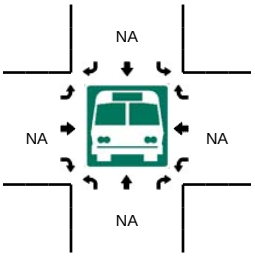












R* = RTOR

15-Min Count Period Beginning At	Sterling Silver Blvd (Northbound)					Sterling Silver Blvd (Southbound)					Alabaster Way (Eastbound)					Alabaster Way (Westbound)					Total	Hourly Totals
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*		
4:00 PM	0	4	3	0	0	0	2	0	0	0	0	0	0	0	0	8	0	0	0	0	17	
4:15 PM	0	4	0	0	0	0	4	0	0	0	0	0	0	0	0	1	0	0	0	0	9	
4:30 PM	0	2	2	0	0	0	4	0	0	0	0	0	0	0	0	4	0	0	0	0	12	
4:45 PM	0	11	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	14	52
5:00 PM	0	8	3	0	0	0	8	0	0	0	0	0	0	0	0	2	0	0	0	0	21	56
5:15 PM	0	7	3	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	14	61
5:30 PM	0	8	0	0	0	0	4	0	0	0	0	0	0	0	0	1	0	0	0	0	13	62
5:45 PM	0	10	0	0	0	0	5	0	0	0	0	0	0	0	0	4	0	0	0	0	19	67

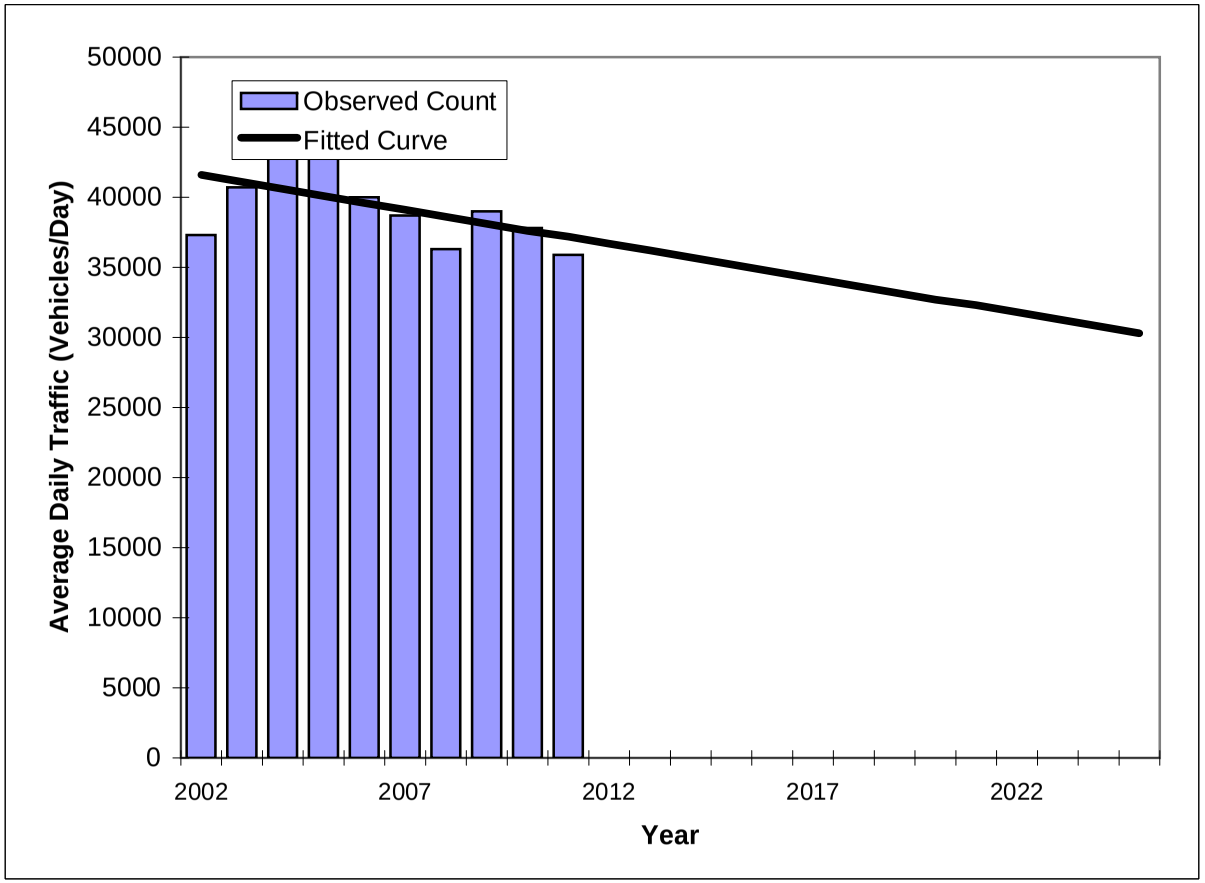
Peak 15-Min Flowrates	Northbound					Southbound					Eastbound					Westbound					Total
	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	Left	Thru	Right	U	R*	
All Vehicles	0	32	12	0	0	0	32	0	0	0	0	0	0	0	0	8	0	0	0	0	84
Heavy Trucks	0	0	0			0	0	0			0	0	0			0	0	0			0
Pedestrians		0					0					0					0				0
Bicycles	0	0	0			0	0	0			0	0	0			0	0	0			0
Railroad																					
Stopped Buses																					

Comments:

TRAFFIC TRENDS

Saxon Blvd. -- Finland to Normandy

County:	Volusia
Station #:	1676
Highway:	Saxon Blvd.



Year	Traffic (ADT/AADT) Count*	Trend**
2002	37300	41600
2003	40700	41100
2004	43400	40600
2005	44500	40100
2006	40000	39600
2007	38700	39100
2008	36300	38600
2009	39000	38100
2010	37800	37600
2011	35900	37200
2015 Opening Year Trend		
2015	N/A	35200
2016 Mid-Year Trend		
2016	N/A	34700
2020 Design Year Trend		
2020	N/A	32700
TRANPLAN Forecasts/Trends		

*Axle-Adjusted

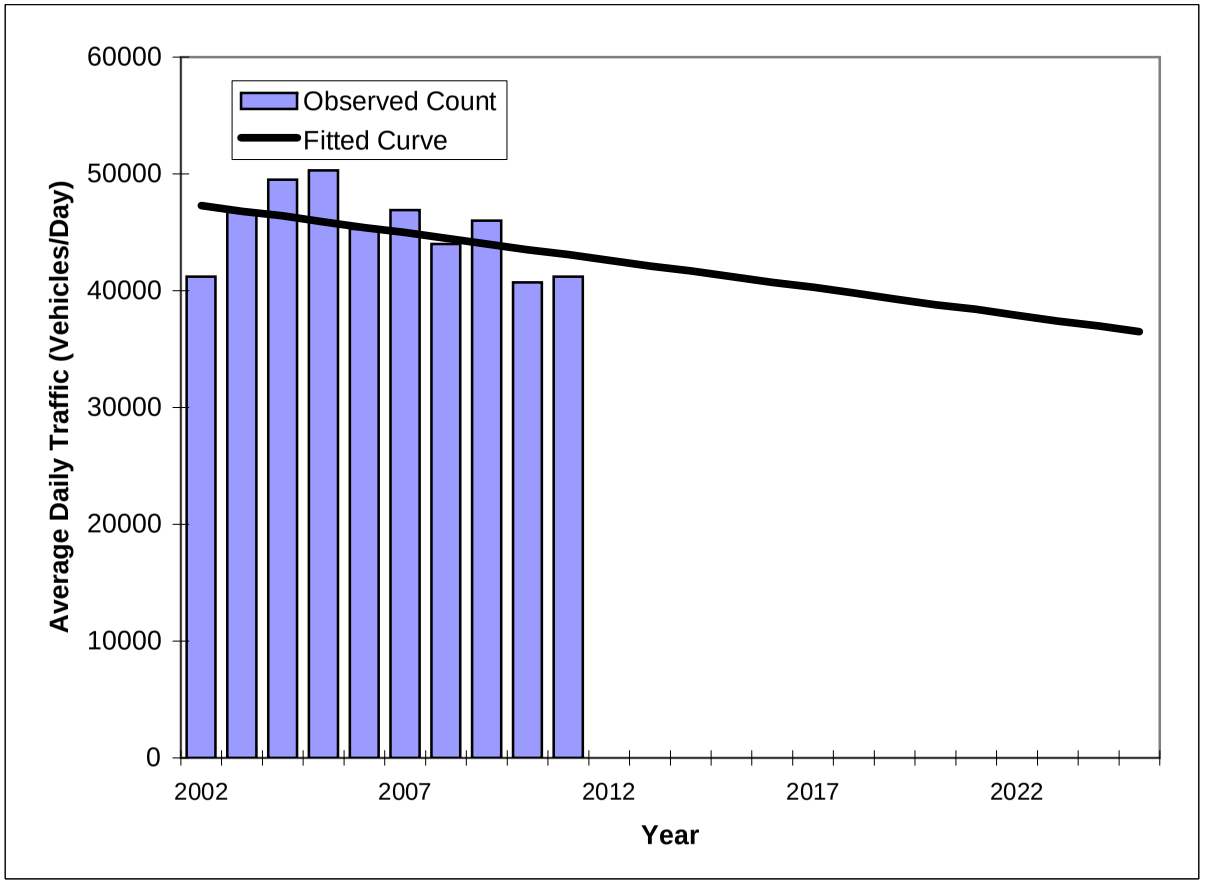
** Annual Trend Increase:	-490
Trend R-squared:	26.9%
Trend Annual Historic Growth Rate:	-1.18%
Trend Growth Rate (2011 to Design Year):	-1.34%
Printed:	5-Aug-13

Straight Line Growth Option

TRAFFIC TRENDS

Saxon Blvd. -- I-4 to Finland

County:	Volusia
Station #:	1675
Highway:	Saxon Blvd.



Year	Traffic (ADT/AADT) Count*	Trend**
2002	41200	47300
2003	46800	46800
2004	49500	46400
2005	50300	45900
2006	45300	45400
2007	46900	45000
2008	44000	44500
2009	46000	44000
2010	40700	43500
2011	41200	43100
2015 Opening Year Trend		
2015	N/A	41200
2016 Mid-Year Trend		
2016	N/A	40700
2020 Design Year Trend		
2020	N/A	38800
TRANPLAN Forecasts/Trends		

*Axle-Adjusted

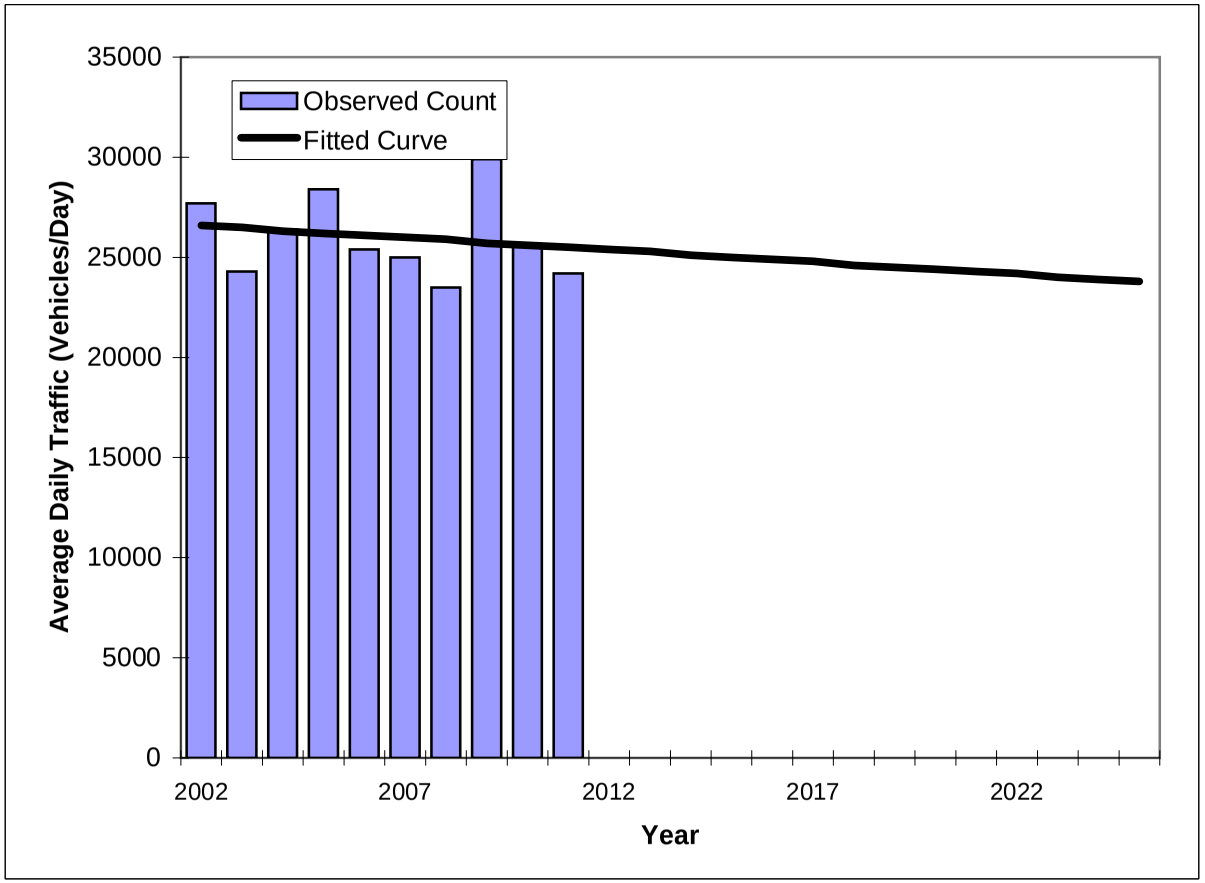
** Annual Trend Increase:	-470
Trend R-squared:	17.5%
Trend Annual Historic Growth Rate:	-0.99%
Trend Growth Rate (2011 to Design Year):	-1.11%
Printed:	5-Aug-13

Straight Line Growth Option

TRAFFIC TRENDS

Saxon Blvd. -- Normandy Blvd. to Tivoli Drive

County:	Volusia
Station #:	1677
Highway:	Saxon Blvd.



Year	Traffic (ADT/AADT) Count*	Trend**
2002	27700	26600
2003	24300	26500
2004	26400	26300
2005	28400	26200
2006	25400	26100
2007	25000	26000
2008	23500	25900
2009	29900	25700
2010	25600	25600
2011	24200	25500
2015 Opening Year Trend		
2015	N/A	25000
2016 Mid-Year Trend		
2016	N/A	24900
2020 Design Year Trend		
2020	N/A	24400
TRANPLAN Forecasts/Trends		

*Axle-Adjusted

** Annual Trend Increase:	-121
Trend R-squared:	3.2%
Trend Annual Historic Growth Rate:	-0.46%
Trend Growth Rate (2011 to Design Year):	-0.48%
Printed:	23-Jul-13

Straight Line Growth Option

APPENDIX D

TRAFFIC VOLUME FIGURES

AM PEAK HOUR

FIGURE 1, AM PEAK HOUR PEAK SESON EXISTING TRAFFIC

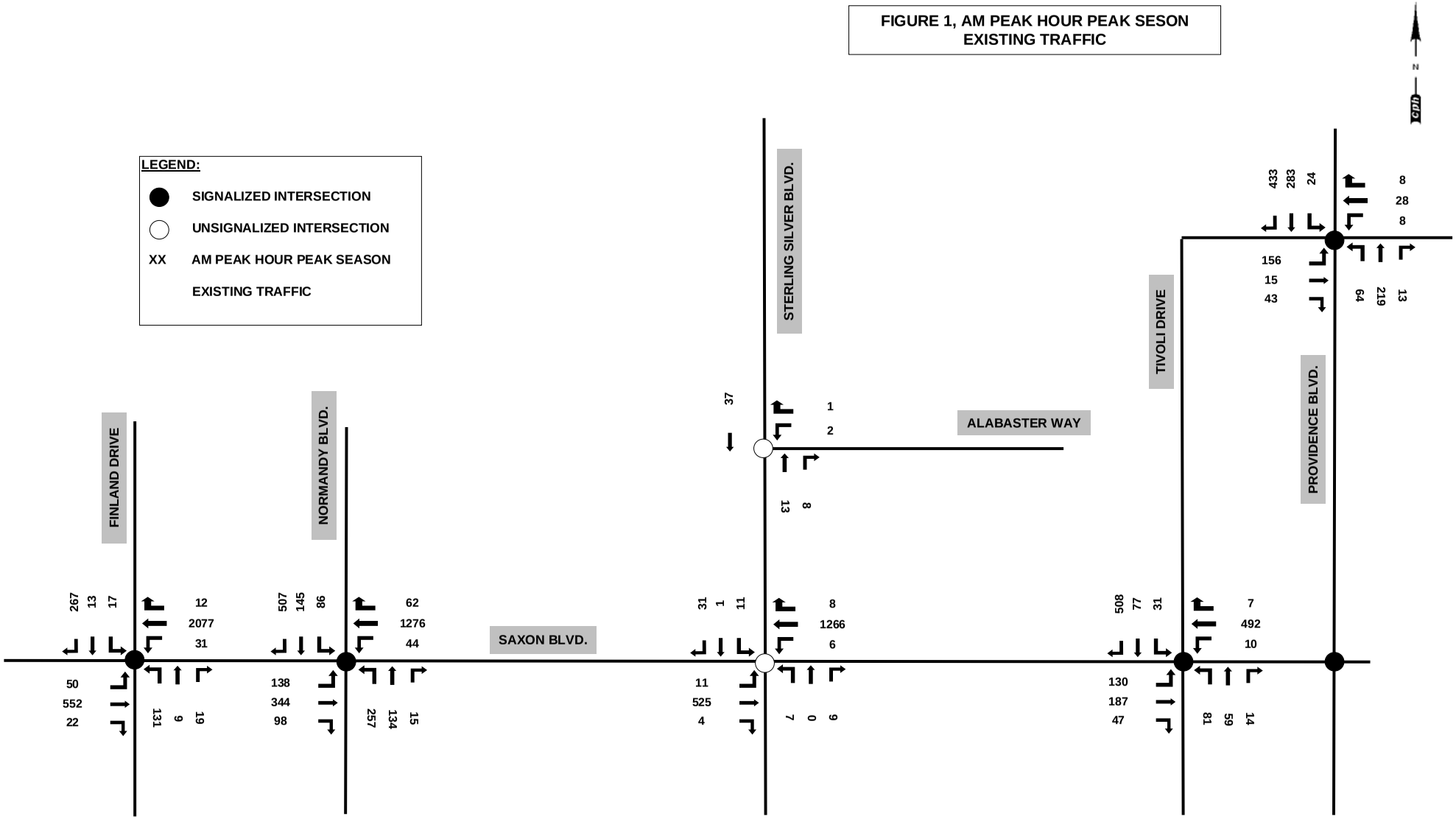


FIGURE 2, AM PEAK HOUR FUTURE BACKGROUND TRAFFIC

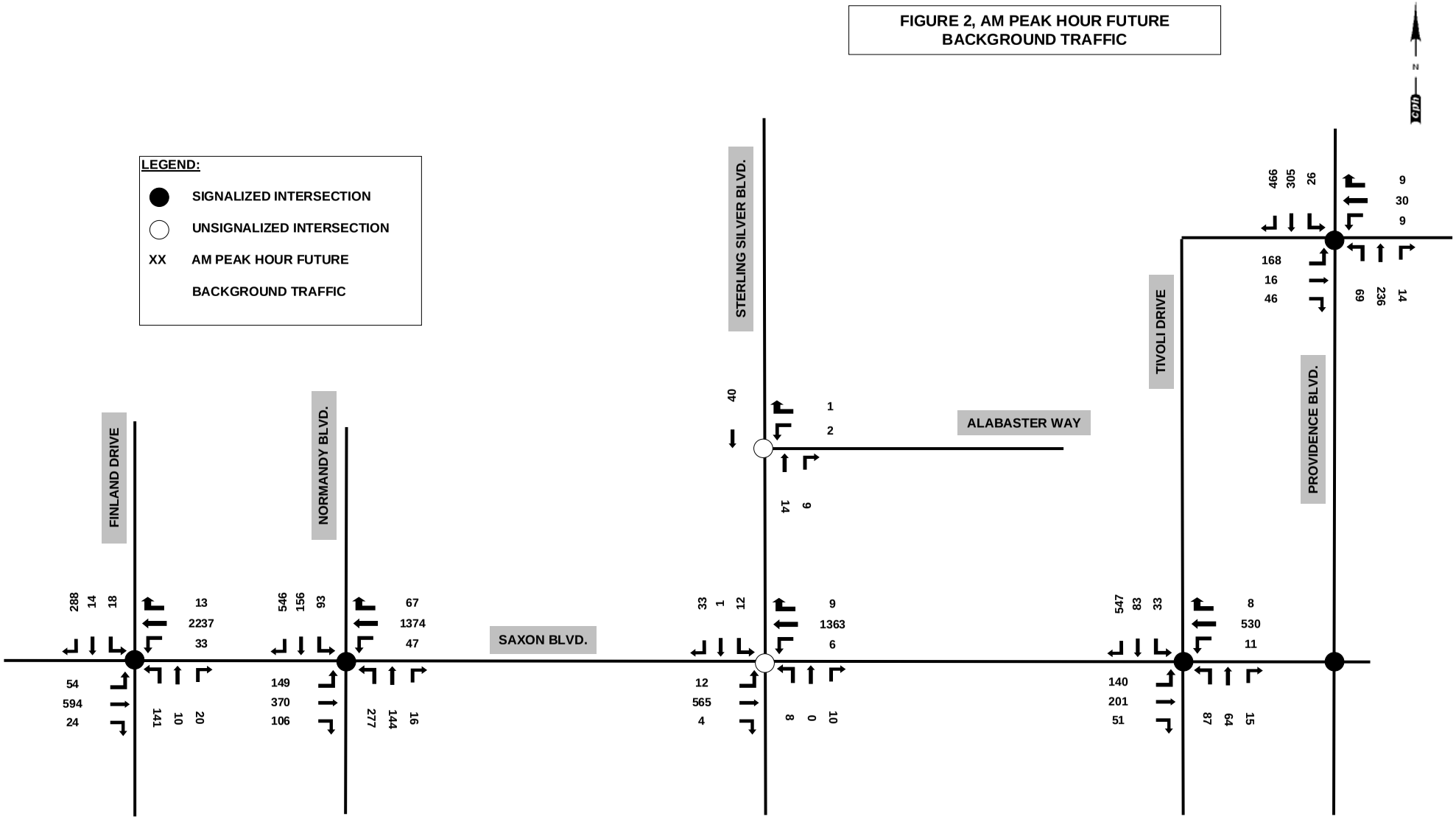


FIGURE 3A, AM PEAK HOUR NET-NEW DISTRIBUTION (NE CORNER)

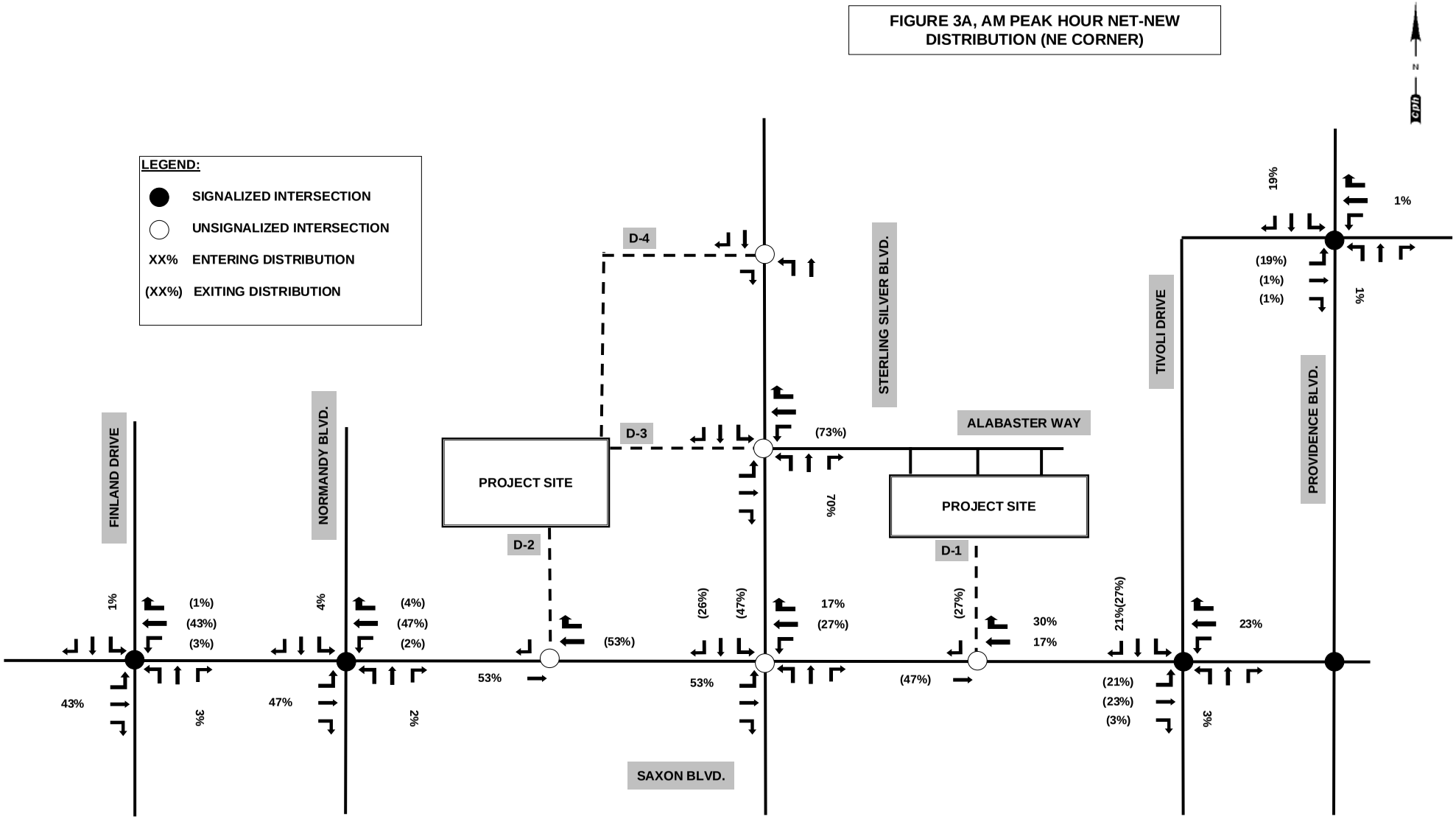


FIGURE 4A, AM PEAK HOUR PASS-BY TRAFFIC DISTRIBUTION (NE CORNER)

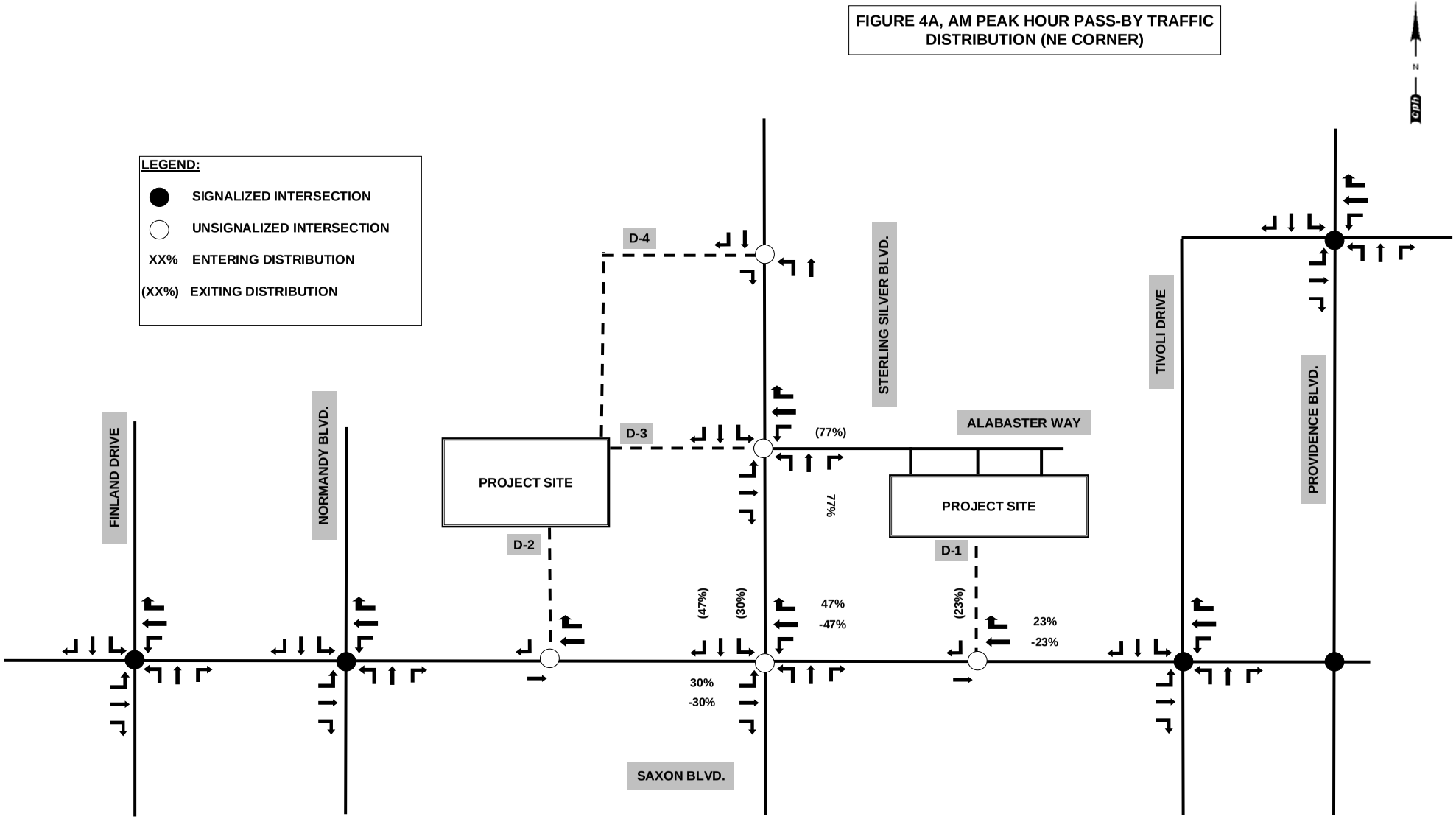


FIGURE 5A, AM PEAK HOUR PROJECT TRAFFIC
(NE CORNER)

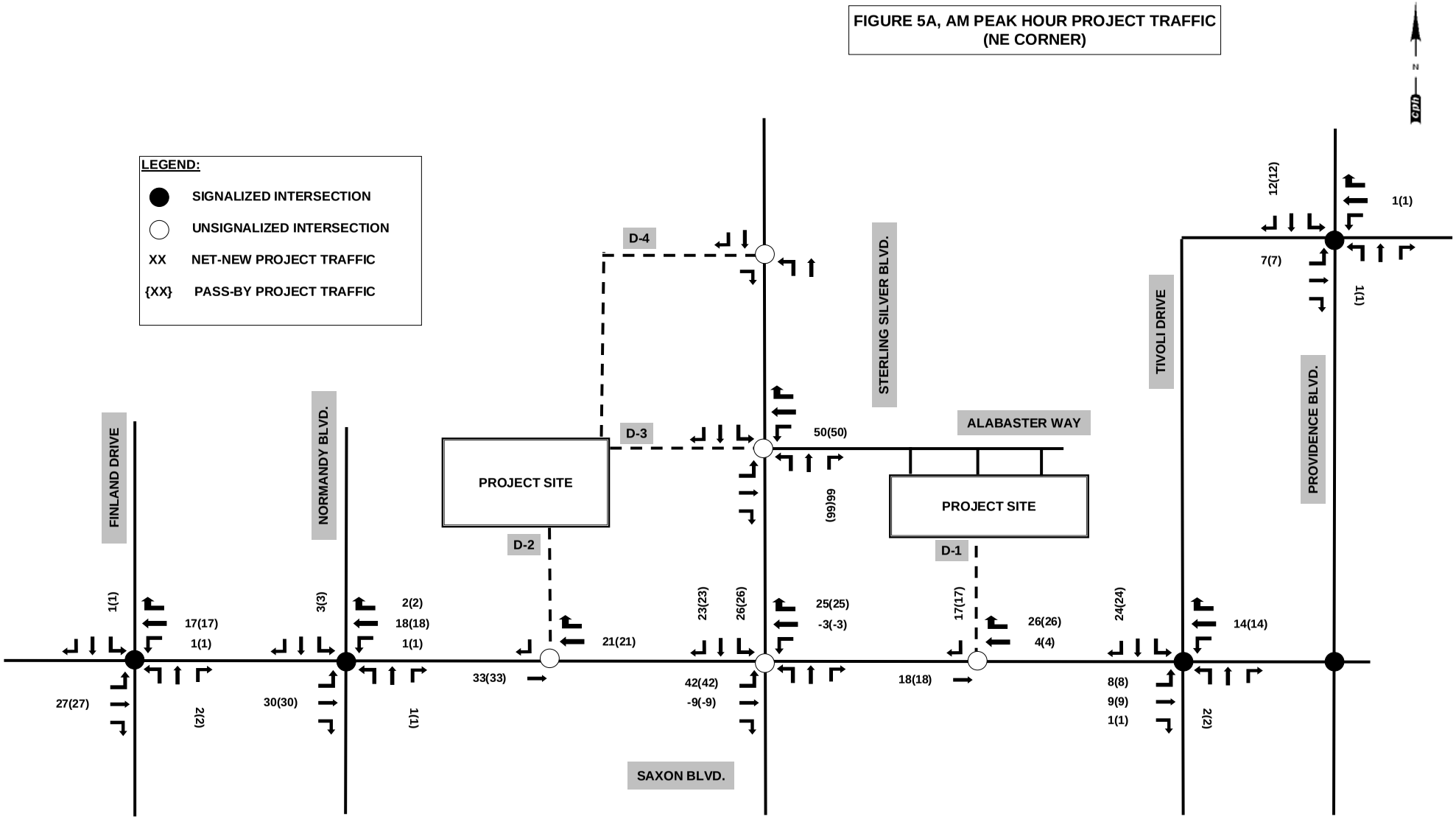


FIGURE 3B, AM PEAK HOUR NET-NEW PROJECT TRAFFIC DISTRIBUTION (NW CORNER)

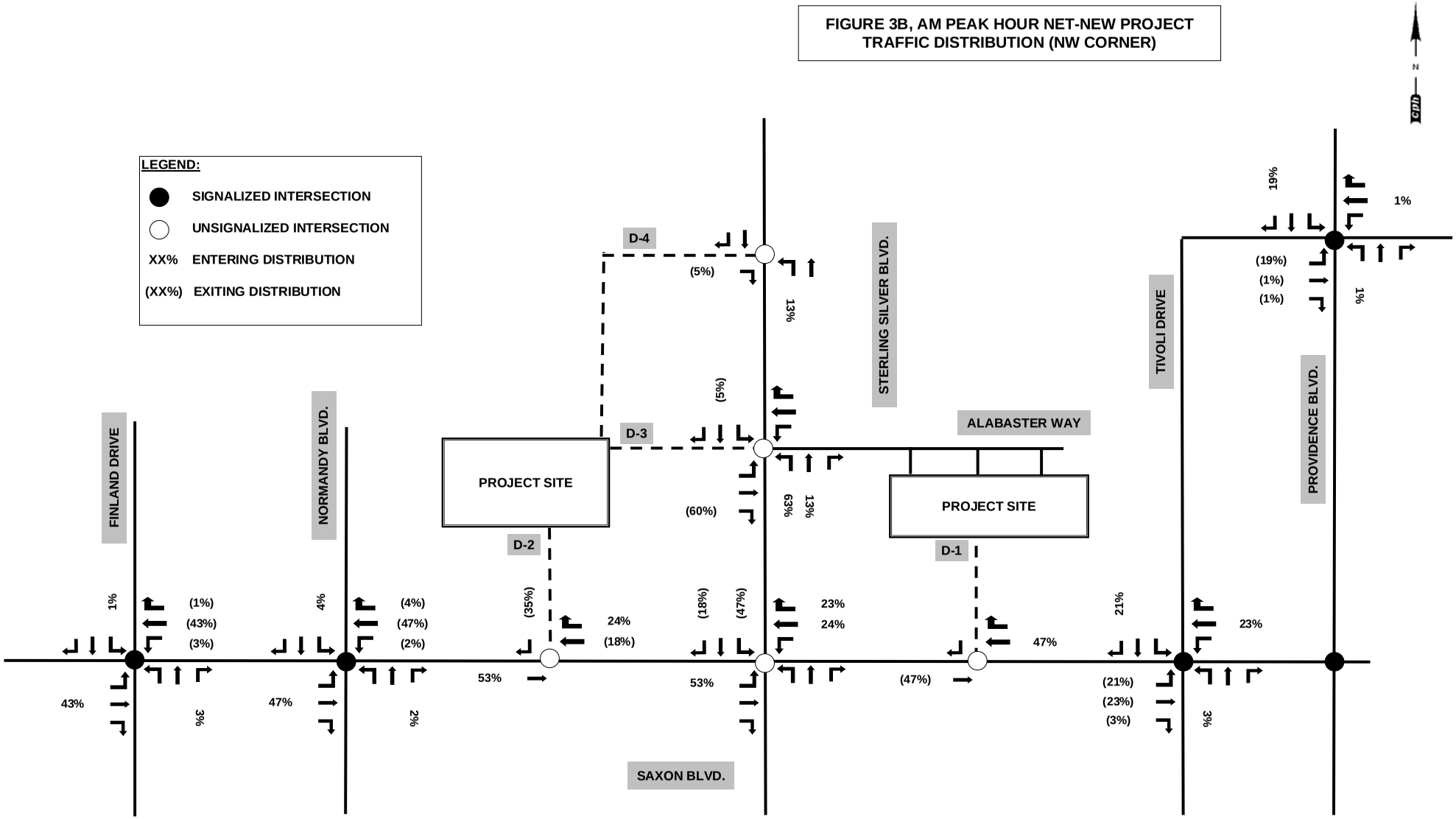


FIGURE 4B, AM PEAK HOUR PASS-BY PROJECT TRAFFIC DISTRIBUTION (NW CORNER)

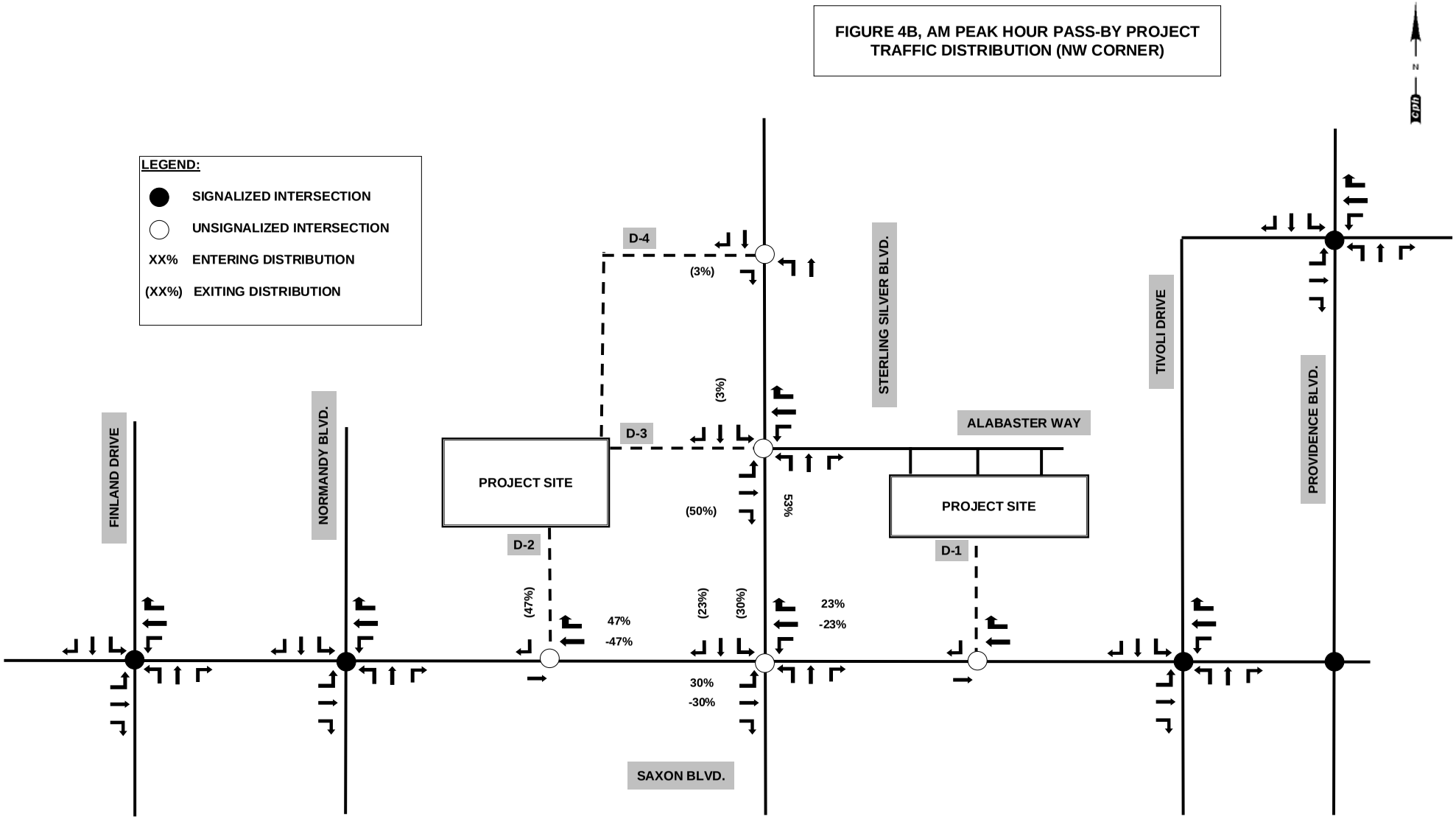


FIGURE 5B, AM PEAK HOUR PROJECT TRAFFIC (NW CORNER)

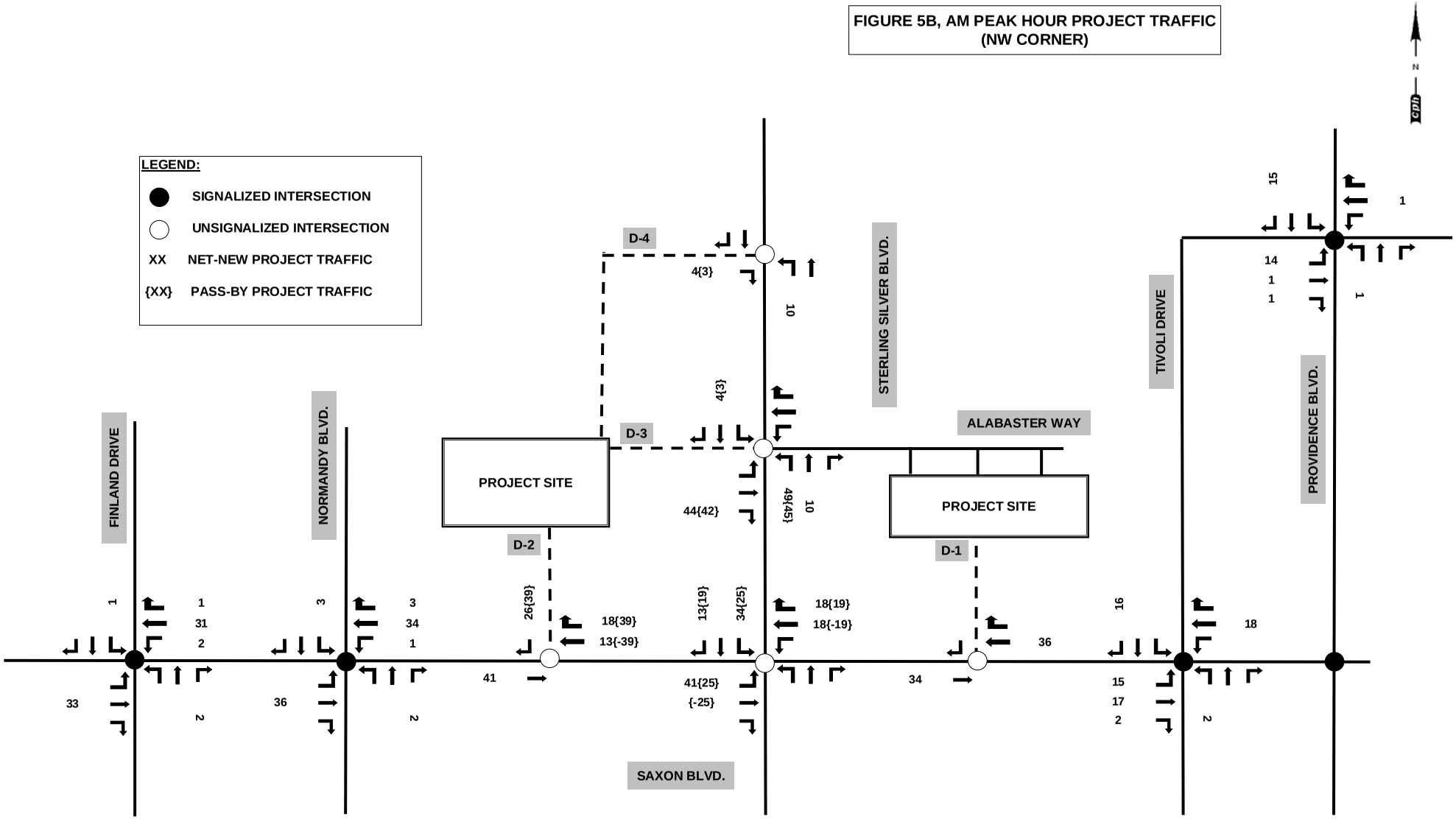
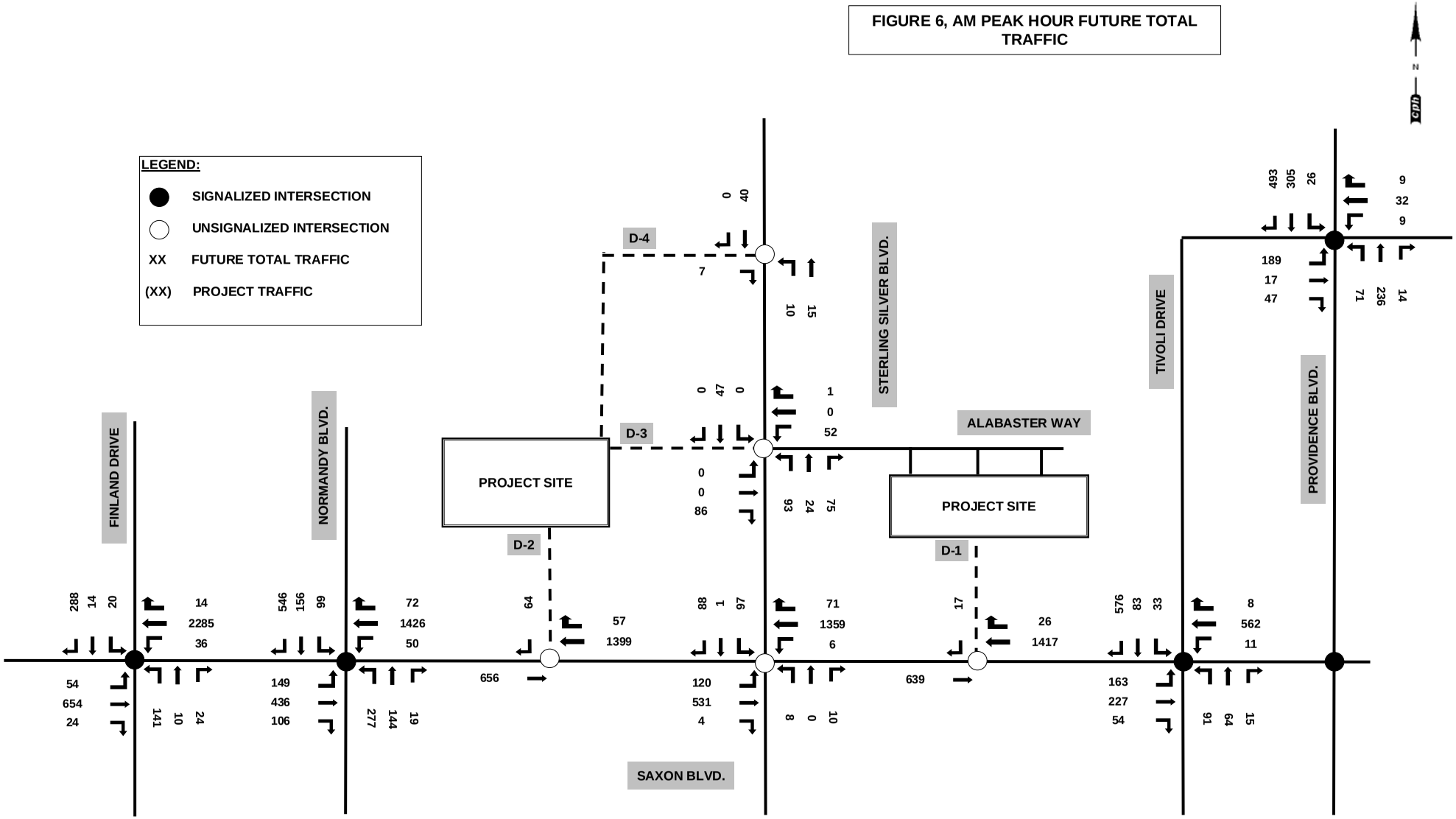


FIGURE 6, AM PEAK HOUR FUTURE TOTAL TRAFFIC



PM PEAK HOUR

FIGURE 1, PM PEAK HOUR PEAK SESON EXISTING TRAFFIC

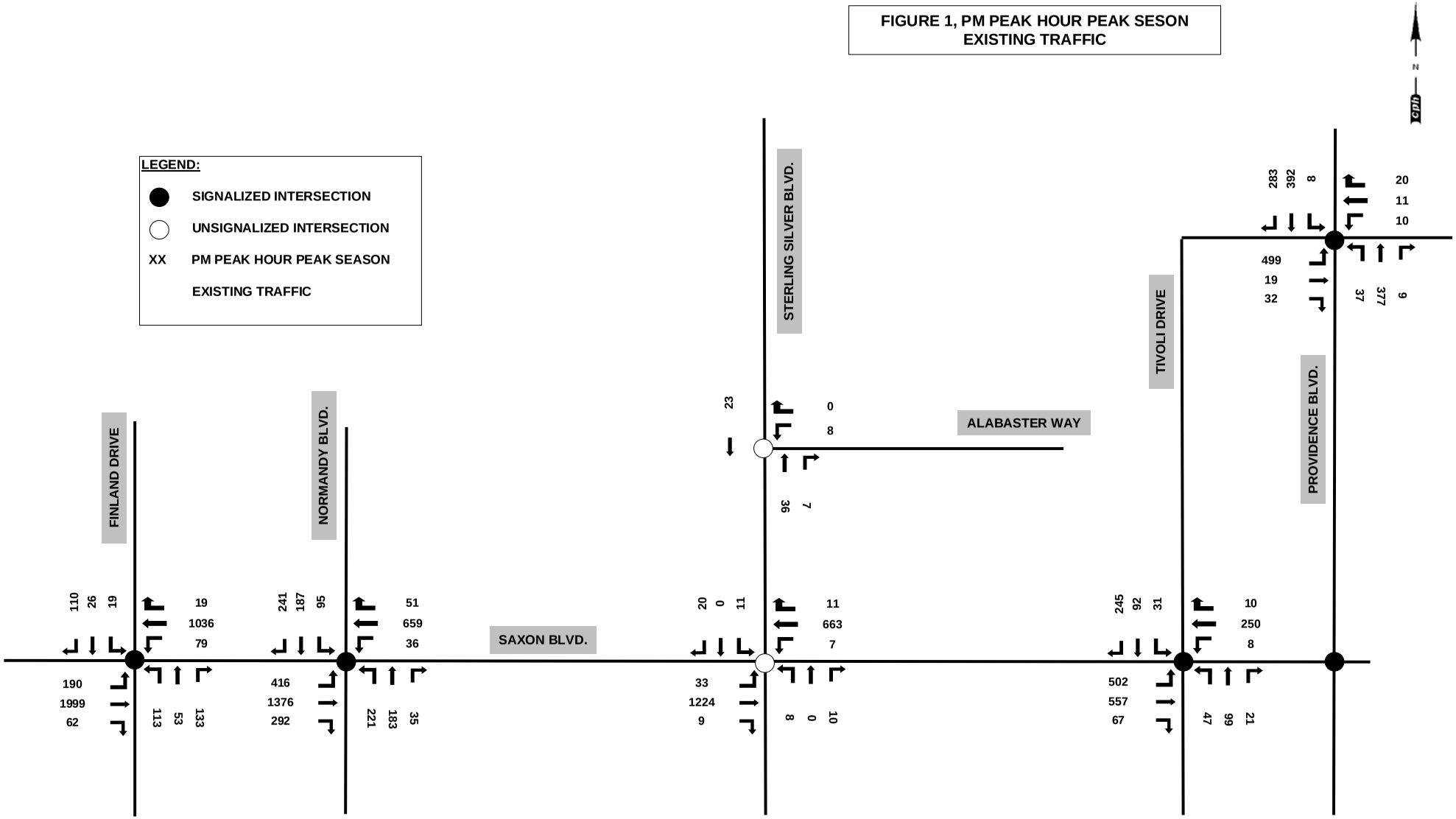


FIGURE 2, PM PEAK HOUR FUTURE BACKGROUND TRAFFIC

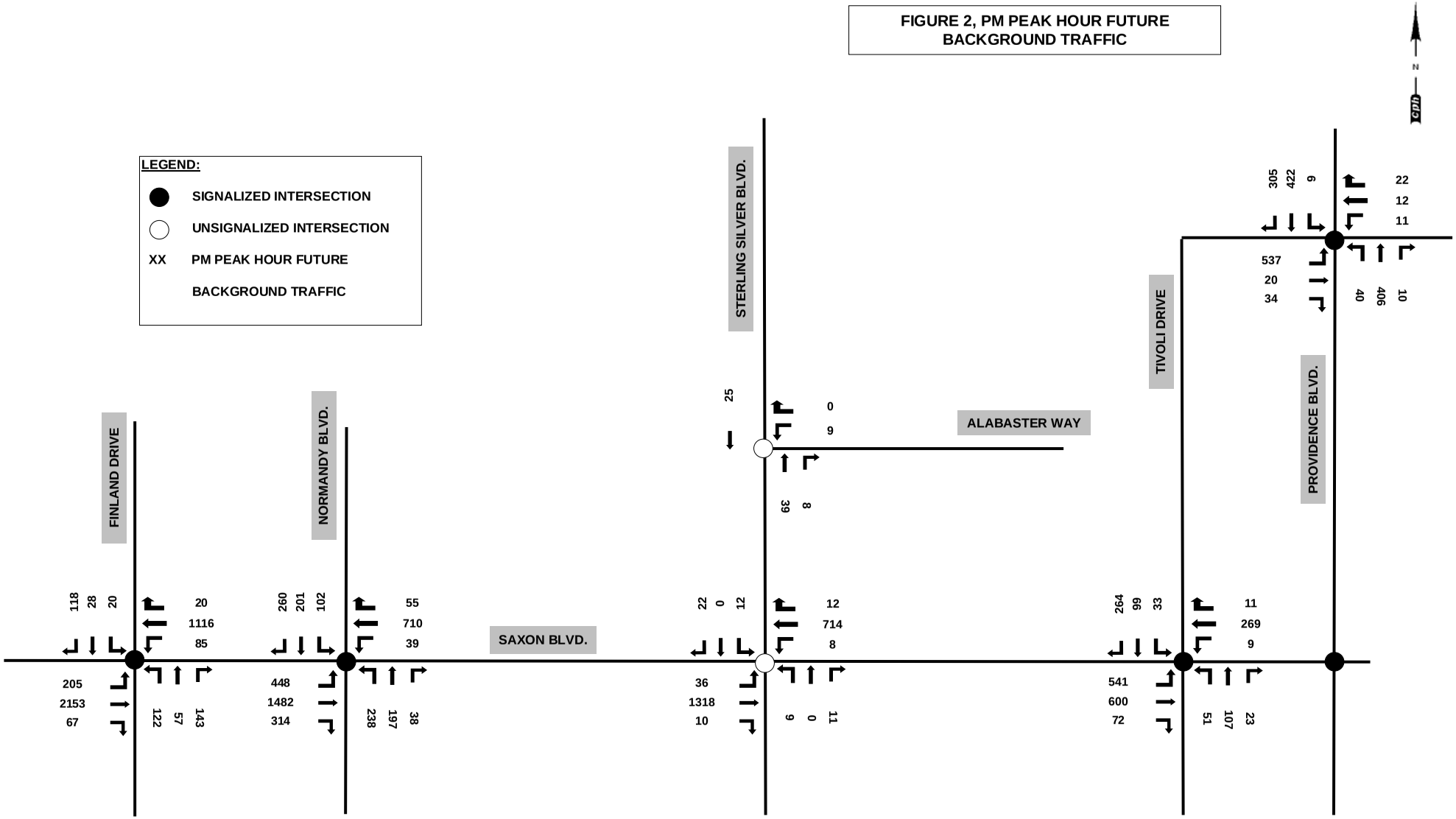


FIGURE 3A, PM PEAK HOUR NET-NEW DISTRIBUTION (NE CORNER)

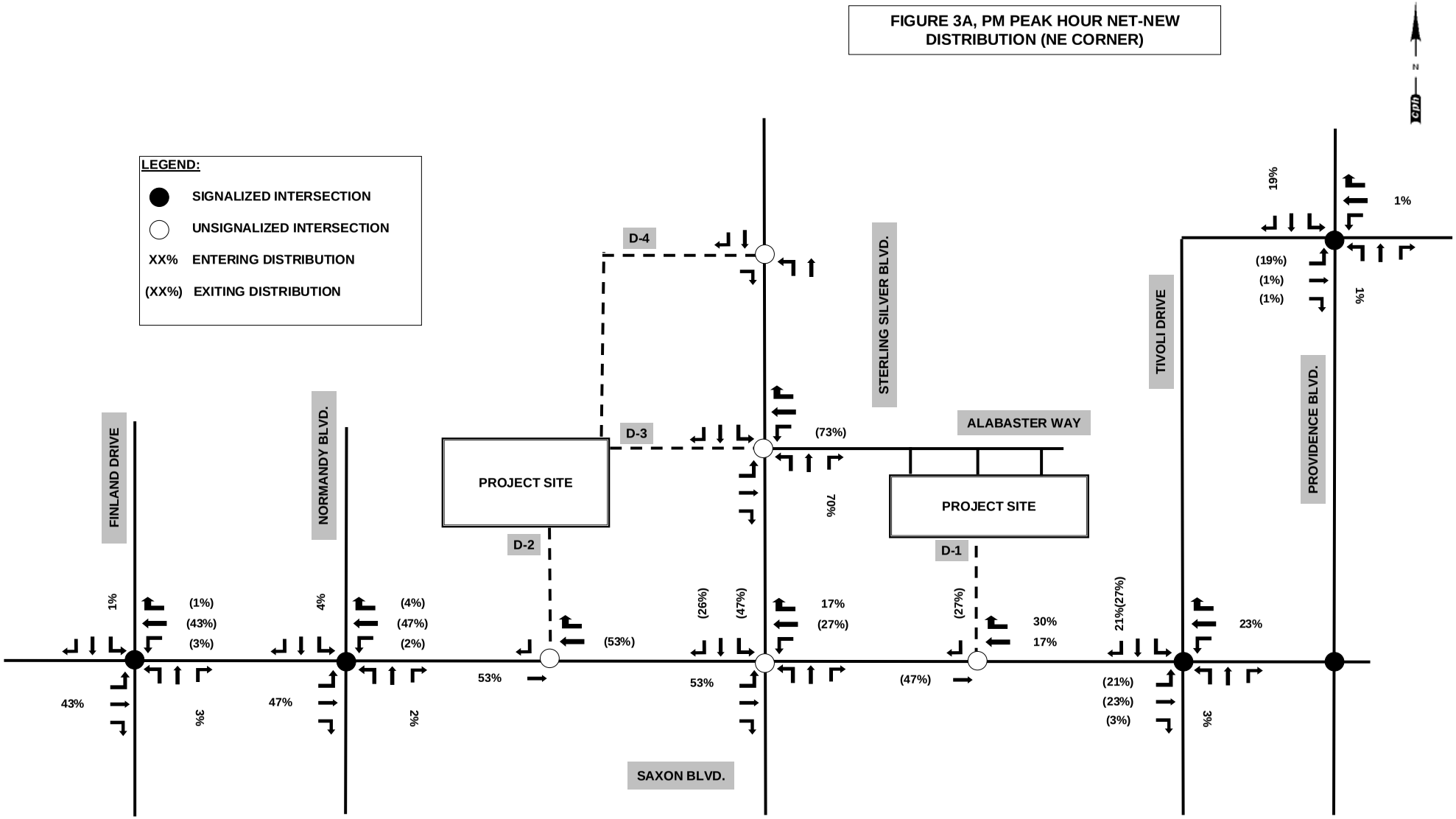


FIGURE 3B, PM PEAK HOUR NET-NEW PROJECT TRAFFIC DISTRIBUTION (NW CORNER)

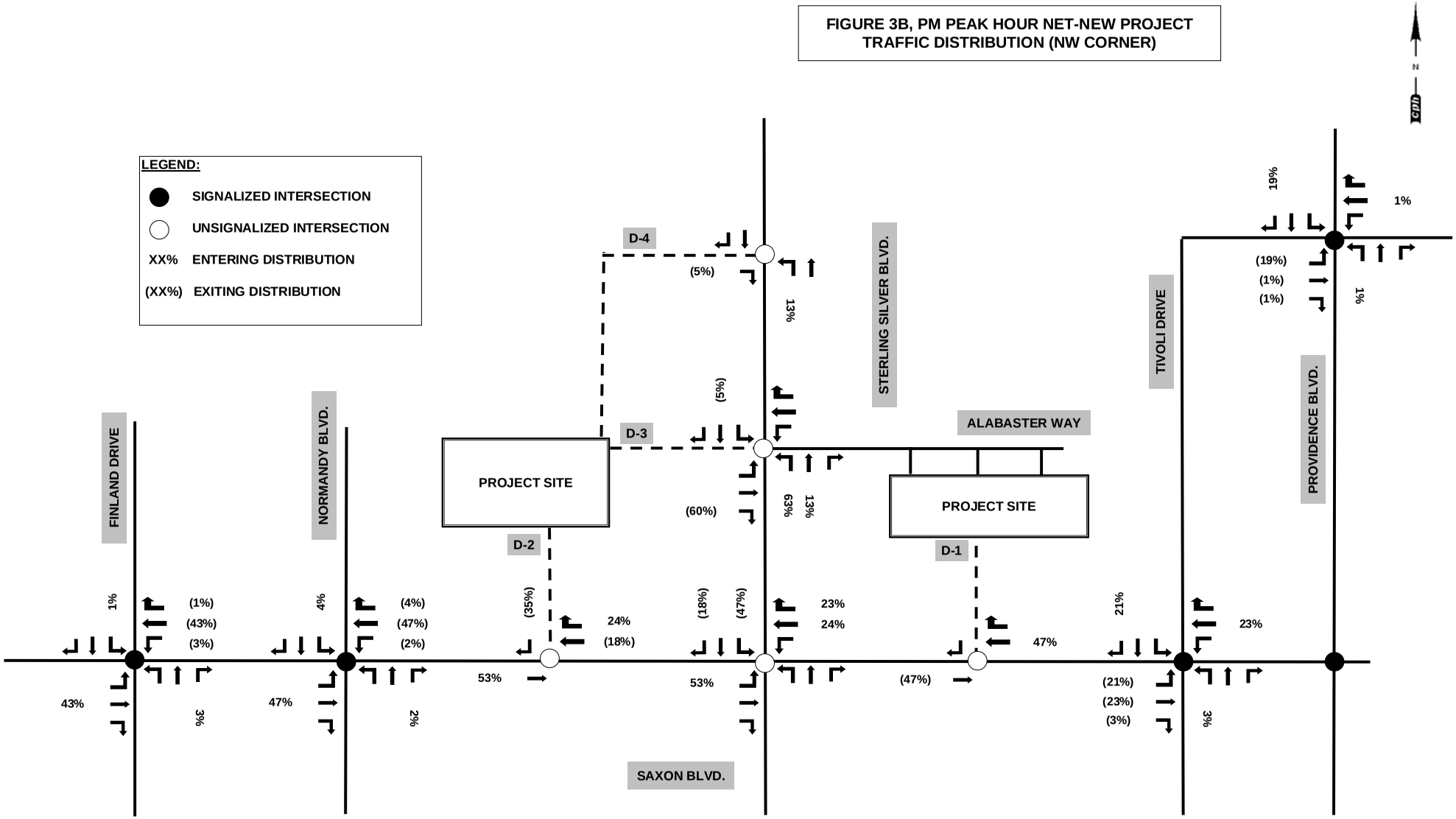


FIGURE 4A, PM PEAK HOUR PASS-BY TRAFFIC DISTRIBUTION (NE CORNER)

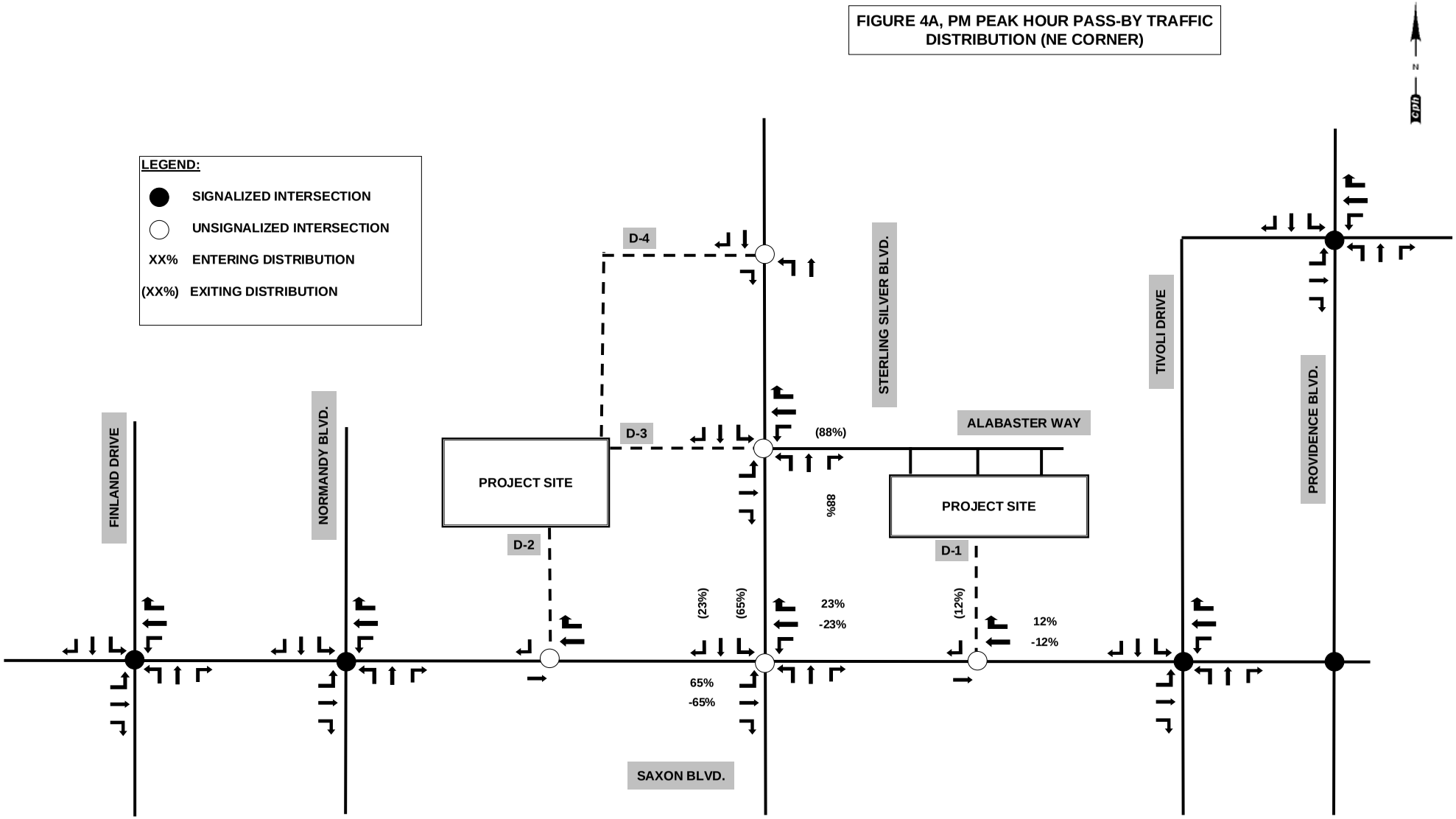


FIGURE 4B, PM PEAK HOUR PASS-BY PROJECT TRAFFIC DISTRIBUTION (NW CORNER)

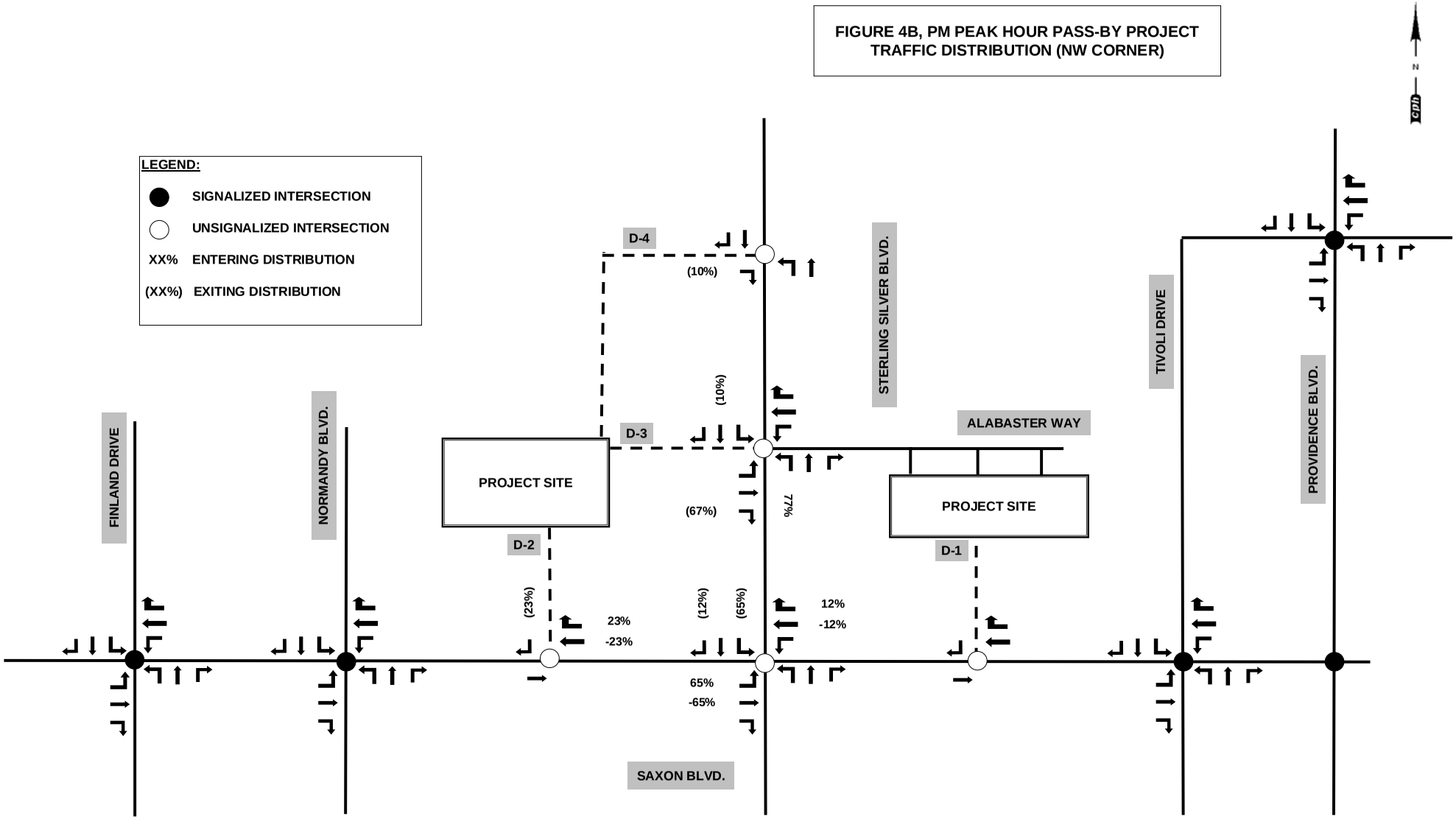


FIGURE 5A, PM PEAK HOUR PROJECT TRAFFIC (NE CORNER)

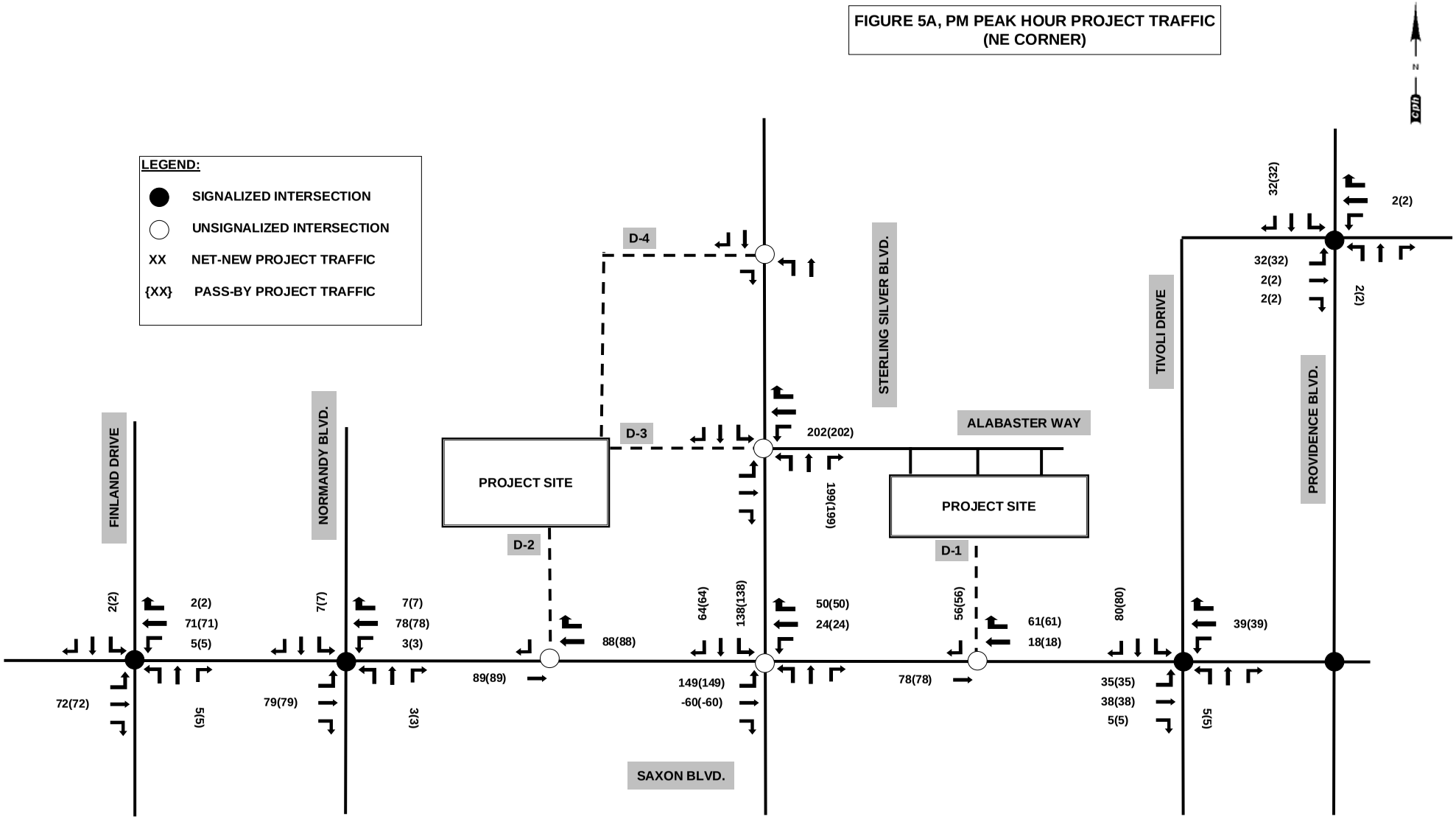


FIGURE 5B, PM PEAK HOUR PROJECT TRAFFIC (NW CORNER)

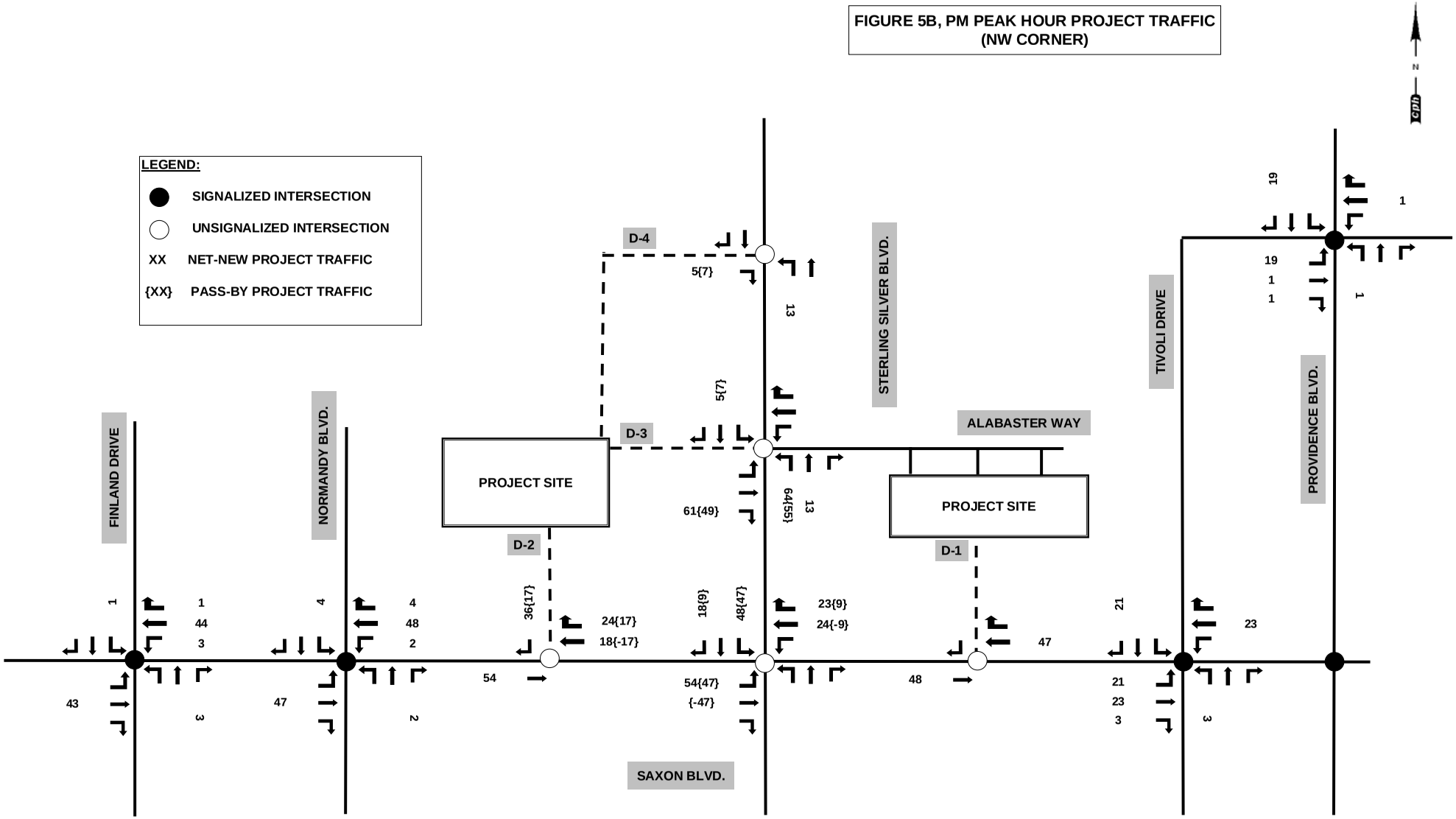
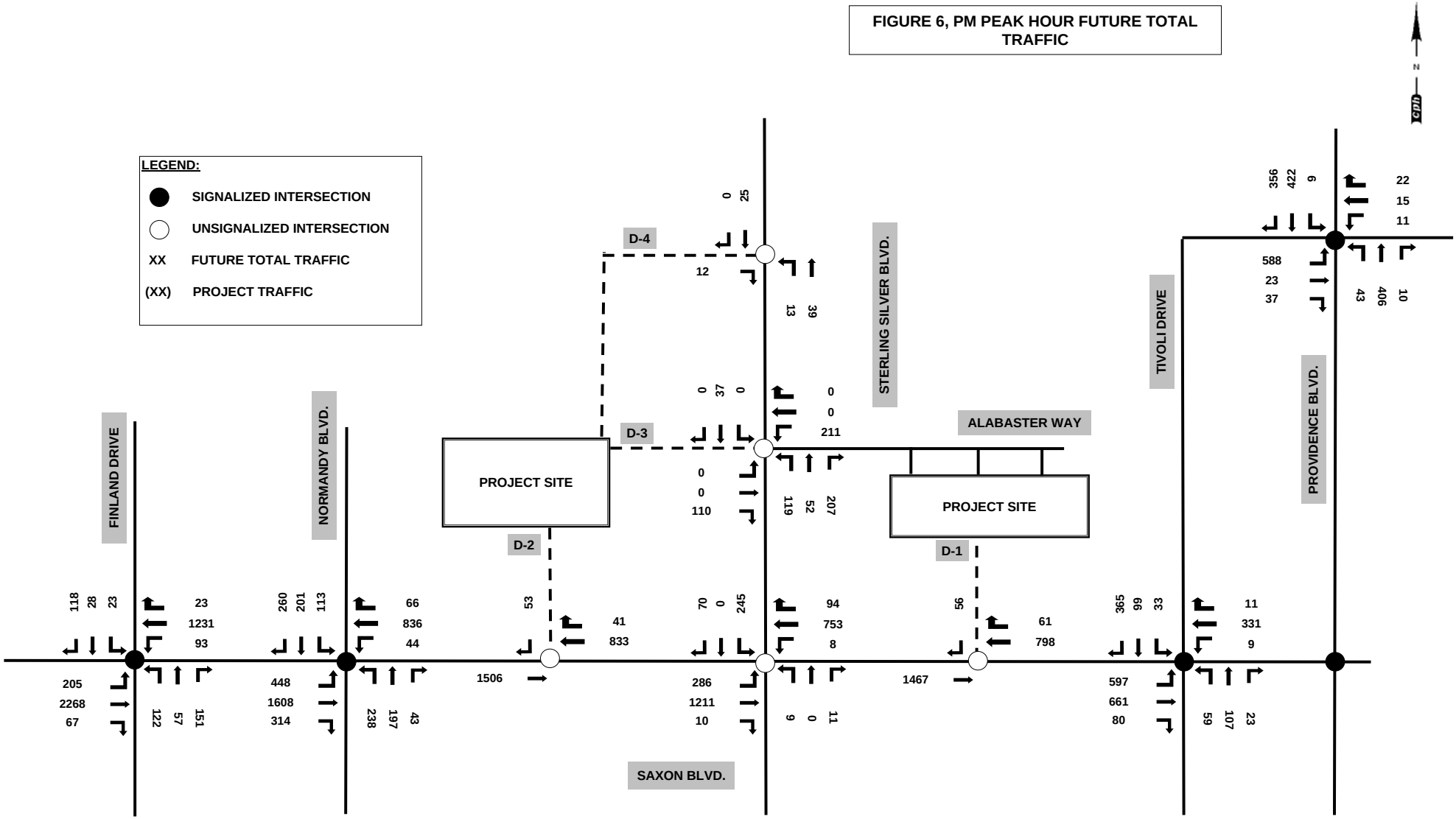


FIGURE 6, PM PEAK HOUR FUTURE TOTAL TRAFFIC



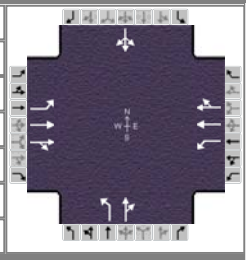
APPENDIX E

INTERSECTION ANALYSIS WORKSHEETS

EXISTING CONDITIONS
(AM PEAK HOUR)

HCS 2010 Signalized Intersection Input Data

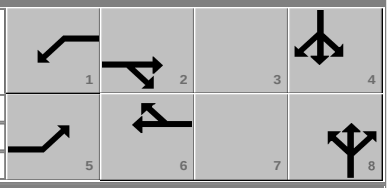
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.94
Intersection	Saxon & Finland	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Saxon Blvd & Finland Dr.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	50	552	22	31	2077	12	131	9	19	17	13	267

Signal Information			
Cycle, s	120.0	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	3.3	1.3	66.3	29.5	0.0	0.0
Yellow	4.5	0.0	4.5	4.0	0.0	0.0
Red	2.0	0.0	2.0	2.5	0.0	0.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	50	552	22	31	2077	12	131	9	19	17	13	267
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	2	2		2	2		2	2			2	
Ped / Bike / RTOR, /h	0	0	1	0	0	0	0	0	10	0	0	45
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	3	4	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	0.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0		12.0	12.0		12.0	12.0			12.0	
Turn Bay Length, ft	350	0		105	0		350	0			0	
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	40	40	40	40	40	40	30	30	30	30	30	30

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	20.0	64.0	20.0	64.0		36.0		36.0
Yellow Change Interval (*Y*), s	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	2.0	2.0	2.0	2.0	1.0	2.5	1.0	2.5
Minimum Green (G_{min}), s	5	11	5	11	5	6	5	6
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	3.0	4.0	2.0	4.0	2.0	4.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	22.0	0.0	22.0	0.0	24.0	0.0	24.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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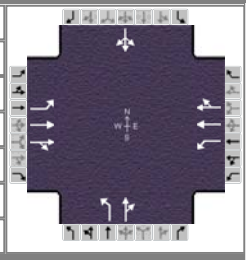
HCS 2010 Signalized Intersection Results Summary

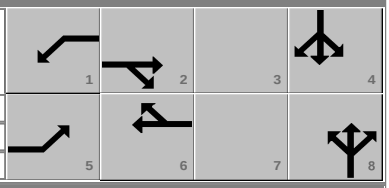
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.94
Intersection	Saxon & Finland	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Saxon Blvd & Finland Dr.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	50	552	22	31	2077	12	131	9	19	17	13	267

Signal Information			
Cycle, s	120.0	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	3.3	1.3	66.3	29.5	0.0	0.0
Yellow	4.5	0.0	4.5	4.0	0.0	0.0
Red	2.0	0.0	2.0	2.5	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	4.0	2.0	4.0		6.0		8.0
Phase Duration, s	11.2	74.2	9.8	72.8		36.0		36.0
Change Period, ($Y+R_c$), s	6.5	6.5	6.5	6.5		6.5		6.5
Max Allow Headway (*MAH*), s	4.1	0.0	4.1	0.0		5.5		5.5
Queue Clearance Time (g_s), s	5.6		4.2			31.5		20.2
Green Extension Time (g_e), s	0.1	0.0	0.0	0.0		0.0		1.8
Phase Call Probability	0.83		0.67			1.00		1.00
Max Out Probability	0.01		0.00			1.00		0.36

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	53	307	303	33	1111	1111	139	19			268	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1774	1863	1838	1774	1863	1859	1125	1709			1591	
Queue Service Time (g_s), s	3.6	6.3	6.6	2.2	66.3	66.3	11.3	1.0			4.4	
Cycle Queue Clearance Time (g_c), s	3.6	6.3	6.6	2.2	66.3	66.3	29.5	1.0			18.2	
Green Ratio (*g/C*)	0.04	0.56	0.56	0.03	0.55	0.55	0.25	0.25			0.25	
Capacity (*c*), veh/h	69	1050	1037	49	1030	1028	166	420			423	
Volume-to-Capacity Ratio (*X*)	0.771	0.292	0.292	0.669	1.079	1.081	0.840	0.046			0.634	
Available Capacity (c_a), veh/h	200	1050	1037	200	1030	1028	166	420			423	
Back of Queue (*Q*), veh/ln (50th percentile)	1.9	2.4	2.5	1.0	28.3	28.7	5.7	0.4			7.6	
Queue Storage Ratio (*RQ*) (50th percentile)	0.14	0.00	0.00	0.25	0.00	0.00	0.41	0.00			0.00	
Uniform Delay (d_1), s/veh	57.1	7.3	7.7	57.8	15.8	15.9	55.7	34.5			41.0	
Incremental Delay (d_2), s/veh	16.4	0.7	0.7	3.1	39.9	40.8	31.1	0.1			3.5	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Control Delay (*d*), s/veh	73.5	8.0	8.4	60.9	55.6	56.7	86.8	34.6			44.5	
Level of Service (LOS)	E	A	A	E	F	F	F	C			D	
Approach Delay, s/veh / LOS	13.5	B		56.2	E		80.5	F		44.5	D	
Intersection Delay, s/veh / LOS	48.0						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.2	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.0	A	2.3	B	0.7	A	0.9	A

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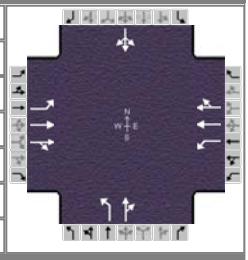
HCS 2010 Signalized Intersection Intermediate Values

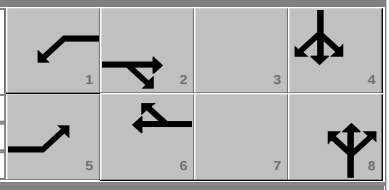
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.94
Intersection	Saxon & Finland	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Saxon Blvd & Finland Dr.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	50	552	22	31	2077	12	131	9	19	17	13	267

Signal Information			
Cycle, s	120.0	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	3.3	1.3	66.3	29.5	0.0	0.0
Yellow	4.5	0.0	4.5	4.0	0.0	0.0
Red	2.0	0.0	2.0	2.5	0.0	0.0



	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.980	0.980	1.000	0.980	0.980	1.000	0.980	0.980	1.000	1.000	0.980	1.000
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000			0.000			0.854	
Right-Turn Adjustment Factor (f_{RT})		0.987			0.998			0.917			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h	1774	3566		1774	3700			854			81	
Platoon Ratio (R_p)	1.00	1.33		1.00	1.33			1.00			1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)	0.11	0.50	0.50	0.11	0.50	0.50	0.39	0.15			0.25	

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	6.5	6.5	6.5	6.5		6.5		6.5
Green Ratio (*g/C*)	0.04	0.56	0.03	0.55		0.25		0.25
Permitted Saturation Flow Rate (s_p), veh/h/ln	0	0	0	0		1125		1415
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								0
Permitted Effective Green Time (g_p), s	0.0	0.0	0.0	0.0		29.5		29.5
Permitted Service Time (g_u), s	0.0	0.0	0.0	0.0		11.3		28.5
Permitted Queue Service Time (g_{ps}), s						11.3		4.4
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0		0.0		13.8
Queue Service Time Before Blockage (g_{fs}), s								13.8
Protected Right Saturation Flow (s_R), veh/h/ln								
Protected Right Effective Green Time (g_R), s								

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.01	1.389	0.06	2.107	0.00	2.107	0.00
Pedestrian F_s / F_{delay}	0.000	0.098	0.000	0.100	0.000	0.142	0.000	0.142
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	1127.75	11.41	1105.59	12.00	491.67	34.13	491.67	34.13
Bicycle F_w / F_v	-3.64	0.55	-3.64	1.86	-3.64	0.26	-3.64	0.44

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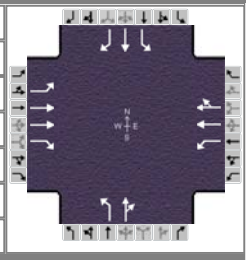
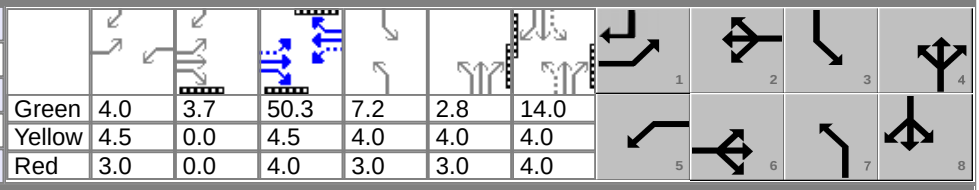
HCS 2010 Signalized Intersection Input Data

General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.93
Intersection	Saxon & Normandy	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Saxon Blvd & Normandy Blvd.xus				
Project Description	W9401.1 Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	138	344	98	44	1276	62	257	134	15	86	145	507

Signal Information			
Cycle, s	120.0	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	4.0	3.7	50.3	7.2	2.8	14.0						
Yellow	4.5	0.0	4.5	4.0	4.0	4.0						
Red	3.0	0.0	4.0	3.0	3.0	4.0						

Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	138	344	98	44	1276	62	257	134	15	86	145	507
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	2	2	2	2	2		2	2		2	2	0
Ped / Bike / RTOR, /h	0	0	57	0	0	2	0	0	4	0	0	74
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	4	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	12.0
Turn Bay Length, ft	540	0	265	200	0		290	0		295	0	380
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	40	40	40	40	40	40	35	35	35	35	35	35

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	18.0	56.0	18.0	56.0	24.0	28.0	18.0	22.0
Yellow Change Interval (*Y*), s	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
Minimum Green (G_{min}), s	5	11	5	11	5	6	5	6
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	18.0	0.0	29.0	0.0	23.0	0.0	23.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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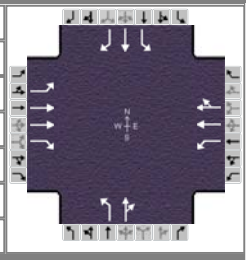
HCS 2010 Signalized Intersection Results Summary

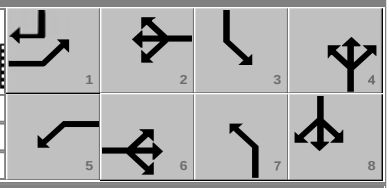
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.93
Intersection	Saxon & Normandy	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Saxon Blvd & Normandy Blvd.xus				
Project Description	W9401.1 Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	138	344	98	44	1276	62	257	134	15	86	145	507

Signal Information			
Cycle, s	120.0	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	4.0	3.7	50.3	7.2	2.8	14.0
Yellow	4.5	0.0	4.5	4.0	4.0	4.0
Red	3.0	0.0	4.0	3.0	3.0	4.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	1	6	5	2	7	4	3	8
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	3.0
Phase Duration, s	15.2	62.5	11.5	58.8	24.0	31.8	14.2	22.0
Change Period, ($Y+R_c$), s	7.5	8.5	7.5	8.5	7.0	8.0	7.0	8.0
Max Allow Headway (*MAH*), s	4.1	0.0	4.1	0.0	4.1	5.2	4.1	5.2
Queue Clearance Time (g_s), s	7.7		3.8		18.1	10.9	7.4	16.0
Green Extension Time (g_e), s	0.1	0.0	0.0	0.0	0.0	4.0	0.1	0.0
Phase Call Probability	0.99		0.79		1.00	1.00	0.95	1.00
Max Out Probability	1.00		0.04		1.00	0.30	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	1	6	16	5	2	12	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	148	370	44	47	723	714	276	156		92	156	466
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1774	1773	1579	1774	1863	1833	1774	1838		1774	1863	1610
Queue Service Time (g_s), s	5.7	5.8	1.9	1.8	44.2	44.5	16.1	8.9		5.4	9.7	14.0
Cycle Queue Clearance Time (g_c), s	5.7	5.8	1.9	1.8	44.2	44.5	16.1	8.9		5.4	9.7	14.0
Green Ratio (*g/C*)	0.48	0.45	0.45	0.45	0.42	0.42	0.28	0.20		0.18	0.12	0.18
Capacity (*c*), veh/h	192	1597	711	507	781	768	355	365		298	217	291
Volume-to-Capacity Ratio (*X*)	0.773	0.232	0.062	0.093	0.926	0.929	0.778	0.427		0.310	0.717	1.598
Available Capacity (c_a), veh/h	233	1597	711	604	781	768	355	365		355	217	291
Back of Queue (*Q*), veh/ln (50th percentile)	2.9	2.3	0.7	0.7	22.9	22.9	7.9	4.1		2.4	5.2	31.6
Queue Storage Ratio (*RQ*) (50th percentile)	0.14	0.00	0.07	0.09	0.00	0.00	0.69	0.00		0.21	0.00	2.08
Uniform Delay (d_1), s/veh	27.7	14.3	18.7	18.4	33.1	33.2	38.1	42.1		43.0	51.1	49.1
Incremental Delay (d_2), s/veh	11.9	0.3	0.2	0.1	18.5	19.2	10.4	1.1		0.6	11.7	284.8
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	39.6	14.7	18.8	18.4	51.6	52.4	48.5	43.2		43.5	62.8	333.9
Level of Service (LOS)	D	B	B	B	D	D	D	D		D	E	F
Approach Delay, s/veh / LOS	21.6	C		50.9	D		46.6	D		237.1	F	
Intersection Delay, s/veh / LOS	86.8						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.5	B	2.9	C	3.1	C
Bicycle LOS Score / LOS	1.0	A	1.7	A	1.2	A	1.7	A

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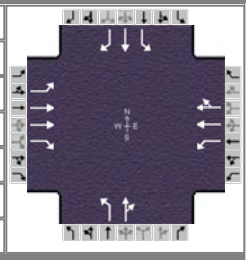
HCS 2010 Signalized Intersection Intermediate Values

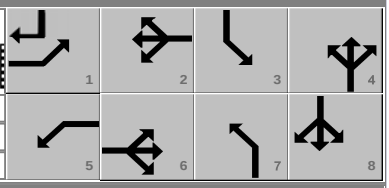
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.93
Intersection	Saxon & Normandy	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Saxon Blvd & Normandy Blvd.xus				
Project Description	W9401.1 Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	138	344	98	44	1276	62	257	134	15	86	145	507

Signal Information			
Cycle, s	120.0	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	4.0	3.7	50.3	7.2	2.8	14.0
Yellow	4.5	0.0	4.5	4.0	4.0	4.0
Red	3.0	0.0	4.0	3.0	3.0	4.0



	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.980	0.980	0.980	0.980	0.980	1.000	0.980	0.980	1.000	0.980	0.980	1.000
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.984			0.987			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h	1774	3547		1774	3531		1774	1698		1774	1863	
Platoon Ratio (R_p)	1.00	1.33		1.33	1.00		1.00	1.00		1.00	1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)	0.21	0.50	0.50	0.11	0.50	0.50	0.33	0.15		0.11	0.30	0.50

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	7.5	8.5	7.5	8.5	7.0	8.0	7.0	8.0
Green Ratio (*g/C*)	0.48	0.45	0.45	0.42	0.28	0.20	0.18	0.12
Permitted Saturation Flow Rate (s_p), veh/h/ln	370	0	1008	0	1226	0	1226	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	50.3	0.0	50.3	0.0	16.0	0.0	14.0	0.0
Permitted Service Time (g_u), s	5.8	0.0	46.2	0.0	4.3	0.0	12.9	0.0
Permitted Queue Service Time (g_{ps}), s	5.8		0.2		3.4		0.1	
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln		0						1610
Protected Right Effective Green Time (g_R), s		0.0						7.7

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.01	1.710	0.11	2.107	0.00	2.224	0.08
Pedestrian F_s / F_{delay}	0.000	0.116	0.000	0.121	0.000	0.146	0.000	0.154
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	900.55	18.13	838.14	20.25	397.38	38.53	233.33	46.82
Bicycle F_w / F_v	-3.64	0.46	-3.64	1.22	-3.64	0.71	-3.64	1.18

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	GR	Intersection	Saxon and Sterling Silver
Agency/Co.	CPH	Jurisdiction	Volusia County
Date Performed	9/20/2013	Analysis Year	Existing
Analysis Time Period	AM Peak		

Project Description *W9401.1-Retail Deltona*

East/West Street: *Saxon Boulevard* | North/South Street: *Sterling Silver Boulevard*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	11	525	4	6	1266	8
Peak-Hour Factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86
Hourly Flow Rate, HFR (veh/h)	12	610	4	6	1472	9
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	1	2	0	1	2	0
Configuration	L	T	TR	L	T	TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	7	0	9	11	1	31
Peak-Hour Factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86
Hourly Flow Rate, HFR (veh/h)	8	0	10	12	1	36
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)	0			0		
Flared Approach		N			Y	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	1	1	0
Configuration		LTR		L		TR

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L		LTR		L		TR
v (veh/h)	12	6		18		12		37
C (m) (veh/h)	450	961		175		47		343
v/c	0.03	0.01		0.10		0.26		0.11
95% queue length	0.08	0.02		0.34		0.86		0.36
Control Delay (s/veh)	13.2	8.8		27.9		106.1		16.8
LOS	B	A		D		F		C
Approach Delay (s/veh)	--	--	27.9			38.6		
Approach LOS	--	--	D			E		

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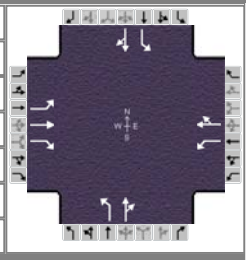
HCS 2010 Signalized Intersection Input Data

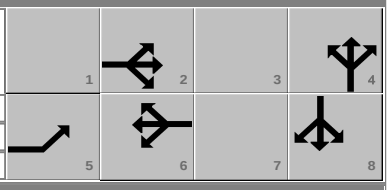
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.88
Intersection	Saxon & Tivoli	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Saxon Blvd & Tivoli Dr.xus				
Project Description	W9501.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	130	187	47	10	492	7	81	59	14	31	77	508

Signal Information			
Cycle, s	82.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.3	27.2	30.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.5	0.0	0.0	0.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	130	187	47	10	492	7	81	59	14	31	77	508
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	2	2	2	2	2		2	2		2	2	
Ped / Bike / RTOR, /h	0	0	21	0	0	2	0	0	5	0	0	95
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	3	3	3	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	
Turn Bay Length, ft	315	0	205	120	0		270	0		80	0	
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	40	40	40	35	35	35	30	30	30	35	35	35

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	15.0	30.0		30.0		30.0		30.0
Yellow Change Interval (*Y*), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	2.0	2.0	1.0	2.0	1.0	2.5	1.0	2.5
Minimum Green (G_{min}), s	5	11	5	11	5	5	5	5
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	2.0	4.0	2.0	4.0	2.0	4.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	16.0	0.0	16.0	0.0	20.0	0.0	20.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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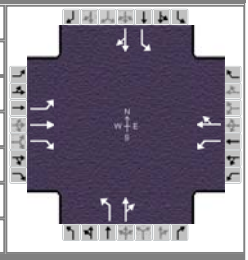
HCS 2010 Signalized Intersection Results Summary

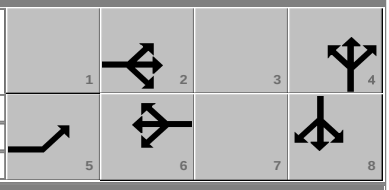
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.88
Intersection	Saxon & Tivoli	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Saxon Blvd & Tivoli Dr.xus				
Project Description	W9501.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	130	187	47	10	492	7	81	59	14	31	77	508

Signal Information			
Cycle, s	82.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.3	27.2	30.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.5	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		4		8
Case Number	1.0	3.0		6.3		6.0		6.0
Phase Duration, s	12.3	45.5		33.2		36.5		36.5
Change Period, ($Y+R_c$), s	6.0	6.0		6.0		6.5		6.5
Max Allow Headway (*MAH*), s	4.1	5.0		5.0		5.5		5.5
Queue Clearance Time (g_s), s	6.2	7.5		25.9		32.0		32.0
Green Extension Time (g_e), s	0.3	5.1		1.3		0.0		0.0
Phase Call Probability	0.97	1.00		1.00		1.00		1.00
Max Out Probability	0.02	0.06		1.00		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	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	148	213	30	11	565		92	77		35	557	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1774	1863	1579	1164	1859		849	1819		1316	1617	
Queue Service Time (g_s), s	4.2	5.5	0.8	0.5	23.9		0.0	2.3		1.5	27.3	
Cycle Queue Clearance Time (g_c), s	4.2	5.5	0.8	0.5	23.9		30.0	2.3		3.8	27.3	
Green Ratio (*g/C*)	0.43	0.48	0.48	0.33	0.33		0.37	0.37		0.37	0.37	
Capacity (*c*), veh/h	258	897	760	474	617		88	666		532	592	
Volume-to-Capacity Ratio (*X*)	0.573	0.237	0.039	0.024	0.915		1.048	0.116		0.066	0.941	
Available Capacity (c_a), veh/h	447	897	760	514	680		88	666		532	592	
Back of Queue (*Q*), veh/ln (50th percentile)	1.7	2.1	0.3	0.1	12.7		4.4	1.0		0.4	13.5	
Queue Storage Ratio (*RQ*) (50th percentile)	0.14	0.00	0.03	0.03	0.00		0.42	0.00		0.14	0.00	
Uniform Delay (d_1), s/veh	19.2	12.4	11.2	18.5	26.3		41.0	17.2		18.5	25.1	
Incremental Delay (d_2), s/veh	2.0	0.2	0.0	0.0	16.7		109.7	0.1		0.1	23.6	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	21.2	12.6	11.3	18.5	43.0		150.7	17.3		18.5	48.7	
Level of Service (LOS)	C	B	B	B	D		F	B		B	D	
Approach Delay, s/veh / LOS	15.8	B		42.5	D		89.9	F		46.9	D	
Intersection Delay, s/veh / LOS	42.6						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.4	B	2.3	B	2.5	B
Bicycle LOS Score / LOS	1.1	A	1.4	A	0.8	A	1.5	A

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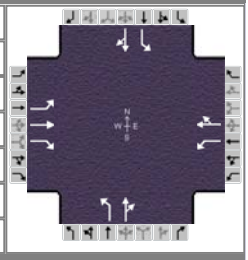
HCS 2010 Signalized Intersection Intermediate Values

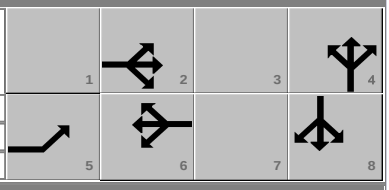
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.88
Intersection	Saxon & Tivoli	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Saxon Blvd & Tivoli Dr.xus				
Project Description	W9501.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	130	187	47	10	492	7	81	59	14	31	77	508

Signal Information			
Cycle, s	82.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.3	27.2	30.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.5	0.0	0.0	0.0



	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.980	0.980	0.980	0.980	0.980	1.000	0.980	0.980	1.000	0.980	0.980	1.000
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000			0.000			0.000			0.000	
Right-Turn Adjustment Factor (f_{RT})		0.995			0.998			0.977			0.868	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h	1774	1863			1841			1579			254	
Platoon Ratio (R_p)	1.00	1.00			1.00			1.00			1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)	0.11	0.15	0.15	0.15	0.38		0.50	0.15		0.15	0.46	

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	6.0	6.0		6.0		6.5		6.5
Green Ratio (*g/C*)	0.43	0.48		0.33		0.37		0.37
Permitted Saturation Flow Rate (s_p), veh/h/ln	842	842		1164		849		1316
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	29.2	30.0		27.2		30.0		30.0
Permitted Service Time (g_u), s	3.3	0.0		27.2		0.0		27.7
Permitted Queue Service Time (g_{ps}), s	3.3			0.5		0.0		1.5
Time to First Blockage (g_f), s	0.0	0.0		0.0		0.0		0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln		0						
Protected Right Effective Green Time (g_R), s		0.0						

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.01	1.557	0.14	1.557	0.00	1.710	0.03
Pedestrian F_s / F_{delay}	0.000	0.096	0.000	0.117	0.000	0.112	0.000	0.112
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	963.21	11.02	664.03	18.29	731.84	16.48	731.84	16.48
Bicycle F_w / F_v	-3.64	0.64	-3.64	0.95	-3.64	0.28	-3.64	0.98

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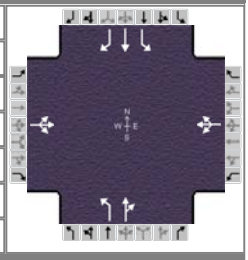
HCS 2010 Signalized Intersection Input Data

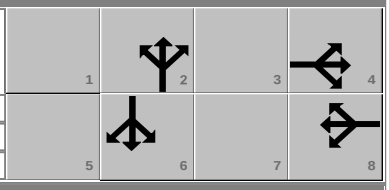
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/18/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.95
Intersection	Providence Blvd. & Tivoli D	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Providence Blvd & Tivoli Dr.xus				
Project Description	W9401.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	156	15	43	8	28	8	64	219	13	24	283	433

Signal Information			
Cycle, s	47.3	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	17.4	7.9	3.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.5	2.5	0.0	0.0	0.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	156	15	43	8	28	8	64	219	13	24	283	433
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %		2			2		2	2		2	2	2
Ped / Bike / RTOR, /h	0	0	9	0	0	3	0	0	0	0	0	31
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	3	3	3	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft		12.0			12.0		12.0	12.0		12.0	12.0	12.0
Turn Bay Length, ft		0			0		65	0		330	0	0
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	30	30	30	30	30	30	35	35	35	35	35	35

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s		35.0		35.0		35.0		35.0
Yellow Change Interval (*Y*), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	1.0	2.5	1.0	2.5	1.0	2.0	1.0	2.0
Minimum Green (G_{min}), s	5	7	5	7	5	7	5	7
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0
Recall Mode	Min	Off	Min	Off	Off	Min	Off	Min
Dual Entry	No	No	No	No	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	20.0	0.0	20.0	0.0	16.0	0.0	16.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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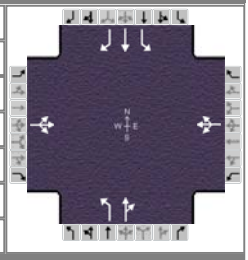
HCS 2010 Signalized Intersection Results Summary

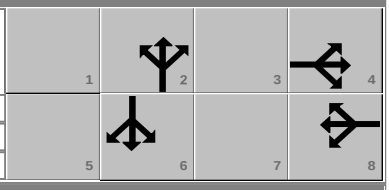
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/18/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.95
Intersection	Providence Blvd. & Tivoli D	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Providence Blvd & Tivoli Dr.xus				
Project Description	W9401.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	156	15	43	8	28	8	64	219	13	24	283	433

Signal Information			
Cycle, s	47.3	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	17.4	7.9	3.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.5	2.5	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		12.0		12.0		6.0		5.0
Phase Duration, s		14.4		9.5		23.4		23.4
Change Period, ($Y+R_c$), s		6.5		6.5		6.0		6.0
Max Allow Headway (*MAH*), s		4.2		4.1		4.2		4.2
Queue Clearance Time (g_s), s		7.6		3.1		10.0		13.0
Green Extension Time (g_e), s		0.8		0.1		4.5		4.4
Phase Call Probability		0.94		0.43		1.00		1.00
Max Out Probability		0.00		0.00		0.03		0.05

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		216			43		67	244		25	298	423
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1744			1805		1077	1844		1131	1863	1579
Queue Service Time (g_s), s		5.6			1.1		2.4	4.6		0.8	5.7	11.0
Cycle Queue Clearance Time (g_c), s		5.6			1.1		8.0	4.6		5.3	5.7	11.0
Green Ratio (*g/C*)		0.17			0.06		0.37	0.37		0.37	0.37	0.37
Capacity (*c*), veh/h		291			116		420	678		461	685	581
Volume-to-Capacity Ratio (*X*)		0.741			0.371		0.160	0.360		0.055	0.435	0.729
Available Capacity (c_a), veh/h		1287			1333		819	1361		879	1375	1165
Back of Queue (*Q*), veh/ln (50th percentile)		2.3			0.5		0.5	1.5		0.2	1.9	3.3
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00		0.20	0.00		0.01	0.00	0.00
Uniform Delay (d_1), s/veh		18.8			21.3		14.3	10.9		12.8	11.3	12.9
Incremental Delay (d_2), s/veh		3.7			2.0		0.2	0.3		0.0	0.4	1.8
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh		22.5			23.2		14.4	11.2		12.9	11.7	14.7
Level of Service (LOS)		C			C		B	B		B	B	B
Approach Delay, s/veh / LOS	22.5	C		23.2	C		11.9	B		13.5	B	
Intersection Delay, s/veh / LOS	14.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.5	B	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.8	A	0.6	A	1.0	A	1.7	A

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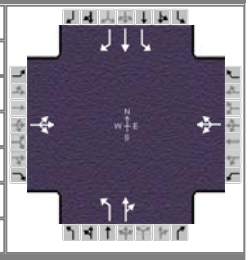
HCS 2010 Signalized Intersection Intermediate Values

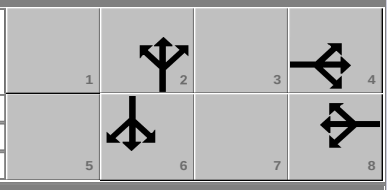
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/18/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.95
Intersection	Providence Blvd. & Tivoli D	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Providence Blvd & Tivoli Dr.xus				
Project Description	W9401.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	156	15	43	8	28	8	64	219	13	24	283	433

Signal Information			
Cycle, s	47.3	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	17.4	7.9	3.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.5	2.5	0.0	0.0	0.0



	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	1.000	0.980	1.000	1.000	0.980	1.000	0.980	0.980	1.000	0.980	0.980	0.980
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})		0.936			0.969			0.000			0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.000			0.990			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h		128			1233			1741			1863	
Platoon Ratio (R_p)		1.00			1.00			1.00			1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)		0.11			0.11		0.11	0.11		0.11	0.11	0.11

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)		5.0		6.5		6.0		6.0
Green Ratio (*g/C*)		0.17		0.06		0.37		0.37
Permitted Saturation Flow Rate (s_p), veh/h/ln		0		0		1077		1131
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s		0.0		0.0		17.4		17.4
Permitted Service Time (g_u), s		0.0		0.0		11.8		12.9
Permitted Queue Service Time (g_{ps}), s						2.4		0.8
Time to First Blockage (g_f), s		0.0		0.0		0.0		0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln								0
Protected Right Effective Green Time (g_R), s								0.0

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.00	1.710	0.04	1.389	0.00	1.389	0.01
Pedestrian F_s / F_{delay}	0.000	0.122	0.000	0.139	0.000	0.090	0.000	0.090
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	128.74	20.72	-316.85	31.76	735.07	9.47	735.07	9.47
Bicycle F_w / F_v	-3.64	0.36	-3.64	0.07	-3.64	0.51	-3.64	1.23

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*GR*
Agency/Co.	*CPH*
Date Performed	*9/20/2013*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Sterling Silver and Alabaster*
Jurisdiction	*Volusia County*
Analysis Year	*Existing*

Project Description *W9401.1-Retail Deltona*

East/West Street: *Alabaster Way* | North/South Street: *Sterling Silver Boulevard*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*13*	*8*	*0*	*37*	
Peak-Hour Factor, PHF	*0.64*	*0.64*	*0.64*	*0.64*	*0.64*	*0.64*
Hourly Flow Rate, HFR (veh/h)	*0*	*20*	*12*	*0*	*57*	*0*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*		*0*	*2*		*1*
Peak-Hour Factor, PHF	*0.64*	*0.64*	*0.64*	*0.64*	*0.64*	*0.64*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*3*	*0*	*1*
Percent Heavy Vehicles	*2*	*0*	*0*	*2*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration		*LR*		*L*		*R*

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*	*L*		*R*		*LR*	
v (veh/h)		*0*	*3*		*1*		*0*	
C (m) (veh/h)		*1580*	*904*		*1056*			
v/c		*0.00*	*0.00*		*0.00*			
95% queue length		*0.00*	*0.01*		*0.00*			
Control Delay (s/veh)		*7.3*	*9.0*		*8.4*			
LOS		*A*	*A*		*A*			
Approach Delay (s/veh)	--	--	*8.8*					
Approach LOS	--	--	*A*					

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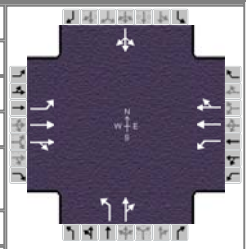
FUTURE BACKGROUND CONDITIONS
(AM PEAK HOUR)

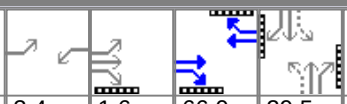
HCS 2010 Signalized Intersection Input Data

General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.94
Intersection	Saxon & Finland	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Saxon Blvd & Finland Dr.xus				
Project Description	W9401.1-Retail Deltona				

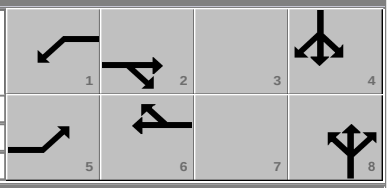


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	54	594	24	33	2237	13	141	10	20	18	14	288

Signal Information			
Cycle, s	120.0	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	3.4	1.6	66.0	29.5	0.0	0.0
Yellow	4.5	0.0	4.5	4.0	0.0	0.0
Red	2.0	0.0	2.0	2.5	0.0	0.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	54	594	24	33	2237	13	141	10	20	18	14	288
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	2	2		2	2		2	2			2	
Ped / Bike / RTOR, /h	0	0	1	0	0	0	0	0	11	0	0	49
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	3	4	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	0.09	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0		12.0	12.0		12.0	12.0			12.0	
Turn Bay Length, ft	350	0		105	0		350	0			0	
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	40	40	40	40	40	40	30	30	30	30	30	30

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	20.0	64.0	20.0	64.0		36.0		36.0
Yellow Change Interval (*Y*), s	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	2.0	2.0	2.0	2.0	1.0	2.5	1.0	2.5
Minimum Green (G_{min}), s	5	11	5	11	5	6	5	6
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	3.0	4.0	2.0	4.0	2.0	4.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	22.0	0.0	22.0	0.0	24.0	0.0	24.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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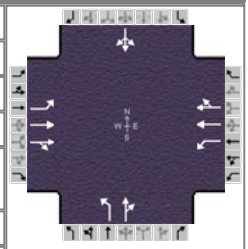
HCS 2010 Signalized Intersection Results Summary

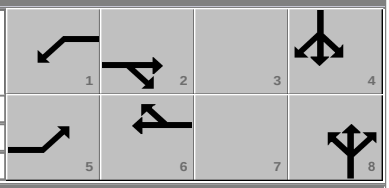
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.94
Intersection	Saxon & Finland	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Saxon Blvd & Finland Dr.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	54	594	24	33	2237	13	141	10	20	18	14	288

Signal Information			
Cycle, s	120.0	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	3.4	1.6	66.0	29.5	0.0	0.0
Yellow	4.5	0.0	4.5	4.0	0.0	0.0
Red	2.0	0.0	2.0	2.5	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	4.0	2.0	4.0		6.0		8.0
Phase Duration, s	11.5	74.1	9.9	72.5		36.0		36.0
Change Period, ($Y+R_c$), s	6.5	6.5	6.5	6.5		6.5		6.5
Max Allow Headway (*MAH*), s	4.1	0.0	4.1	0.0		5.5		5.5
Queue Clearance Time (g_s), s	5.8		4.4			31.5		21.9
Green Extension Time (g_e), s	0.1	0.0	0.0	0.0		0.0		1.8
Phase Call Probability	0.85		0.69			1.00		1.00
Max Out Probability	0.01		0.00			1.00		0.60

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	57	330	326	35	1197	1197	150	20			288	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1774	1863	1838	1774	1863	1859	1106	1716			1591	
Queue Service Time (g_s), s	3.8	6.9	7.3	2.4	66.0	66.0	9.6	1.1			6.5	
Cycle Queue Clearance Time (g_c), s	3.8	6.9	7.3	2.4	66.0	66.0	29.5	1.1			19.9	
Green Ratio (*g/C*)	0.04	0.56	0.56	0.03	0.55	0.55	0.25	0.25			0.25	
Capacity (*c*), veh/h	74	1049	1035	51	1024	1022	148	422			423	
Volume-to-Capacity Ratio (*X*)	0.772	0.315	0.315	0.688	1.169	1.171	1.012	0.048			0.682	
Available Capacity (c_a), veh/h	200	1049	1035	200	1024	1022	148	422			423	
Back of Queue (*Q*), veh/ln (50th percentile)	2.0	2.6	2.7	1.1	39.0	39.4	7.7	0.5			8.4	
Queue Storage Ratio (*RQ*) (50th percentile)	0.15	0.00	0.00	0.26	0.00	0.00	0.56	0.00			0.00	
Uniform Delay (d_1), s/veh	56.9	7.4	7.9	57.7	16.0	16.2	57.2	34.5			41.6	
Incremental Delay (d_2), s/veh	15.4	0.8	0.8	1.5	77.0	78.1	77.2	0.1			4.9	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Control Delay (*d*), s/veh	72.3	8.2	8.7	59.2	93.1	94.3	134.4	34.6			46.5	
Level of Service (LOS)	E	A	A	E	F	F	F	C			D	
Approach Delay, s/veh / LOS	13.6	B		93.2	F		122.5	F		46.5	D	
Intersection Delay, s/veh / LOS	75.0						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.2	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.1	A	2.5	B	0.8	A	1.0	A

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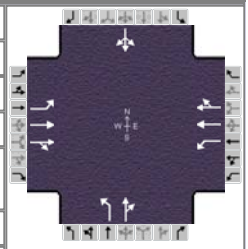
HCS 2010 Signalized Intersection Intermediate Values

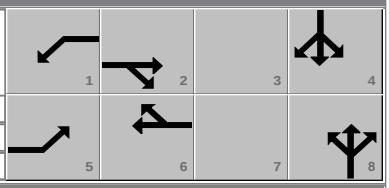
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.94
Intersection	Saxon & Finland	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Saxon Blvd & Finland Dr.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	54	594	24	33	2237	13	141	10	20	18	14	288

Signal Information			
Cycle, s	120.0	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	3.4	1.6	66.0	29.5	0.0	0.0
Yellow	4.5	0.0	4.5	4.0	0.0	0.0
Red	2.0	0.0	2.0	2.5	0.0	0.0



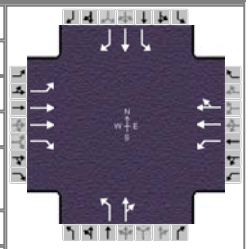
	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.980	0.980	1.000	0.980	0.980	1.000	0.980	0.980	1.000	1.000	0.980	1.000
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000			0.000			0.854	
Right-Turn Adjustment Factor (f_{RT})		0.987			0.998			0.921			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h	1774	3564		1774	3700			903			81	
Platoon Ratio (R_p)	1.00	1.33		1.00	1.33			1.00			1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)	0.11	0.50	0.50	0.11	0.50	0.50	0.50	0.15			0.28	

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	6.5	6.5	6.5	6.5		6.5		6.5
Green Ratio (*g/C*)	0.04	0.56	0.03	0.55		0.25		0.25
Permitted Saturation Flow Rate (s_p), veh/h/ln	0	0	0	0		1106		1414
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								0
Permitted Effective Green Time (g_p), s	0.0	0.0	0.0	0.0		29.5		29.5
Permitted Service Time (g_u), s	0.0	0.0	0.0	0.0		9.6		28.4
Permitted Queue Service Time (g_{ps}), s						9.6		6.5
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0		0.0		13.4
Queue Service Time Before Blockage (g_{fs}), s								13.4
Protected Right Saturation Flow (s_R), veh/h/ln								
Protected Right Effective Green Time (g_R), s								

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.02	1.389	0.07	2.107	0.00	2.107	0.00
Pedestrian F_s / F_{delay}	0.000	0.098	0.000	0.100	0.000	0.142	0.000	0.142
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	1125.85	11.46	1099.41	12.17	491.67	34.13	491.67	34.13
Bicycle F_w / F_v	-3.64	0.59	-3.64	2.00	-3.64	0.28	-3.64	0.48

HCS 2010 Signalized Intersection Input Data

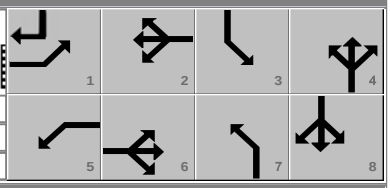
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.93
Intersection	Saxon and Normandy	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Saxon Blvd & Normandy Blvd.xus				
Project Description	W9401.1 Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	149	370	106	47	1374	67	277	144	16	93	156	546

Signal Information			
Cycle, s	120.0	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	4.1	4.6	50.4	7.6	2.4	15.0
Yellow	4.5	0.0	4.5	4.0	4.0	4.0
Red	3.0	0.0	3.0	3.0	3.0	3.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	149	370	106	47	1374	67	277	144	16	93	156	546
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	2	2	2	2	2		2	2		2	2	2
Ped / Bike / RTOR, /h	0	0	62	0	0	2	0	0	5	0	0	79
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	4	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	12.0
Turn Bay Length, ft	540	0	265	200	0		290	0		295	0	380
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	40	40	40	40	40	40	35	35	35	35	35	35

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	18.0	56.0	18.0	56.0	24.0	28.0	18.0	22.0
Yellow Change Interval (*Y*), s	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Green (G_{min}), s	5	11	5	11	5	6	5	6
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	18.0	0.0	29.0	0.0	23.0	0.0	23.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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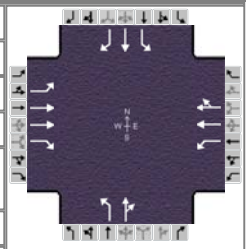
HCS 2010 Signalized Intersection Results Summary

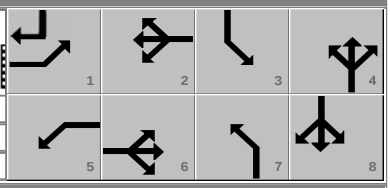
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.93
Intersection	Saxon and Normandy	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Saxon Blvd & Normandy Blvd.xus				
Project Description	W9401.1 Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	149	370	106	47	1374	67	277	144	16	93	156	546

Signal Information			
Cycle, s	120.0	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	4.1	4.6	50.4	7.6	2.4	15.0
Yellow	4.5	0.0	4.5	4.0	4.0	4.0
Red	3.0	0.0	3.0	3.0	3.0	3.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	1	6	5	2	7	4	3	8
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	3.0
Phase Duration, s	16.1	62.4	11.6	57.9	24.0	31.4	14.6	22.0
Change Period, ($Y+R_c$), s	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0
Max Allow Headway (*MAH*), s	4.1	0.0	4.1	0.0	4.1	5.2	4.1	5.2
Queue Clearance Time (g_s), s	8.6		3.9		19.0	11.5	7.8	17.0
Green Extension Time (g_e), s	0.1	0.0	0.0	0.0	0.0	4.3	0.1	0.0
Phase Call Probability	1.00		0.81		1.00	1.00	0.96	1.00
Max Out Probability	1.00		0.04		1.00	0.33	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	1	6	16	5	2	12	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	160	398	47	51	778	770	298	167		100	168	502
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1774	1773	1579	1774	1863	1833	1774	1839		1774	1863	1579
Queue Service Time (g_s), s	6.6	6.2	2.0	1.9	49.9	50.4	17.0	9.5		5.8	10.4	15.0
Cycle Queue Clearance Time (g_c), s	6.6	6.2	2.0	1.9	49.9	50.4	17.0	9.5		5.8	10.4	15.0
Green Ratio (*g/C*)	0.49	0.46	0.46	0.45	0.42	0.42	0.28	0.20		0.19	0.12	0.20
Capacity (*c*), veh/h	188	1623	723	503	782	769	358	374		303	233	311
Volume-to-Capacity Ratio (*X*)	0.854	0.245	0.065	0.100	0.995	1.000	0.832	0.446		0.330	0.720	1.615
Available Capacity (c_a), veh/h	215	1623	723	598	782	769	358	374		353	233	311
Back of Queue (*Q*), veh/ln (50th percentile)	3.9	2.4	0.8	0.8	28.1	28.2	8.9	4.4		2.6	5.5	34.3
Queue Storage Ratio (*RQ*) (50th percentile)	0.18	0.00	0.07	0.10	0.00	0.00	0.78	0.00		0.22	0.00	2.29
Uniform Delay (d_1), s/veh	30.7	13.9	18.2	18.3	34.7	34.8	38.1	41.9		41.9	50.5	48.2
Incremental Delay (d_2), s/veh	23.3	0.3	0.2	0.1	31.0	32.6	15.3	1.2		0.6	11.2	291.2
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	53.9	14.2	18.4	18.4	65.7	67.4	53.4	43.1		42.5	61.7	339.4
Level of Service (LOS)	D	B	B	B	E	F	D	D		D	E	F
Approach Delay, s/veh / LOS	25.1	C		65.0	E		49.7	D		240.3	F	
Intersection Delay, s/veh / LOS	95.2						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.5	B	2.9	C	3.1	C
Bicycle LOS Score / LOS	1.0	A	1.8	A	1.3	A	1.8	A

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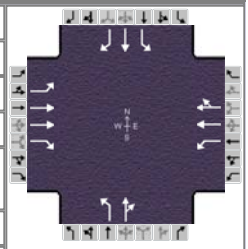
HCS 2010 Signalized Intersection Intermediate Values

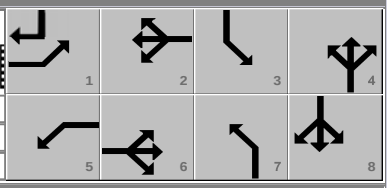
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.93
Intersection	Saxon and Normandy	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Saxon Blvd & Normandy Blvd.xus				
Project Description	W9401.1 Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	149	370	106	47	1374	67	277	144	16	93	156	546

Signal Information			
Cycle, s	120.0	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	4.1	4.6	50.4	7.6	2.4	15.0
Yellow	4.5	0.0	4.5	4.0	4.0	4.0
Red	3.0	0.0	3.0	3.0	3.0	3.0



	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.980	0.980	0.980	0.980	0.980	1.000	0.980	0.980	1.000	0.980	0.980	0.980
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.984			0.987			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h	1774	3547		1774	3530		1774	1709		1774	1863	
Platoon Ratio (R_p)	1.00	1.33		1.33	1.00		1.00	1.00		1.00	1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)	0.30	0.50	0.50	0.11	0.50	0.50	0.37	0.15		0.11	0.31	0.50

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0
Green Ratio (*g/C*)	0.49	0.46	0.45	0.42	0.28	0.20	0.19	0.13
Permitted Saturation Flow Rate (s_p), veh/h/ln	333	0	983	0	1213	0	1214	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	50.4	0.0	50.4	0.0	17.0	0.0	15.0	0.0
Permitted Service Time (g_u), s	0.0	0.0	46.8	0.0	4.6	0.0	12.9	0.0
Permitted Queue Service Time (g_{ps}), s	0.0		0.2		4.6		0.2	
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln		0						1579
Protected Right Effective Green Time (g_R), s		0.0						8.6

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.01	1.710	0.11	2.107	0.00	2.224	0.09
Pedestrian F_s / F_{delay}	0.000	0.115	0.000	0.121	0.000	0.146	0.000	0.153
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	915.46	17.64	839.39	20.21	406.61	38.08	250.00	45.94
Bicycle F_w / F_v	-3.64	0.50	-3.64	1.32	-3.64	0.77	-3.64	1.27

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*GR*
Agency/Co.	*CPH*
Date Performed	*9/20/2013*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Saxon and Sterling Silver*
Jurisdiction	*Volusia County*
Analysis Year	*Future Background*

Project Description *W9401.1-Retail Deltona*

East/West Street: *Saxon Boulevard* | North/South Street: *Sterling Silver Boulevard*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*12*	*565*	*4*	*6*	*1363*	*9*
Peak-Hour Factor, PHF	*0.86*	*0.86*	*0.86*	*0.86*	*0.86*	*0.86*
Hourly Flow Rate, HFR (veh/h)	*13*	*656*	*4*	*6*	*1584*	*10*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*1*	*2*	*0*
Configuration	*L*	*T*	*TR*	*L*	*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*8*	*0*	*10*	*12*	*1*	*33*
Peak-Hour Factor, PHF	*0.86*	*0.86*	*0.86*	*0.86*	*0.86*	*0.86*
Hourly Flow Rate, HFR (veh/h)	*9*	*0*	*11*	*13*	*1*	*38*
Percent Heavy Vehicles	*2*	*2*	*2*	*2*	*2*	*2*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*Y*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*1*	*1*	*0*
Configuration		*LTR*		*L*		*TR*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*	*L*		*LTR*		*L*		*TR*
v (veh/h)	*13*	*6*		*20*		*13*		*39*
C (m) (veh/h)	*407*	*924*		*146*		*36*		*312*
v/c	*0.03*	*0.01*		*0.14*		*0.36*		*0.13*
95% queue length	*0.10*	*0.02*		*0.46*		*1.20*		*0.42*
Control Delay (s/veh)	*14.1*	*8.9*		*33.5*		*153.4*		*18.2*
LOS	*B*	*A*		*D*		*F*		*C*
Approach Delay (s/veh)	--	--	*33.5*			*52.0*		
Approach LOS	--	--	*D*			*F*		

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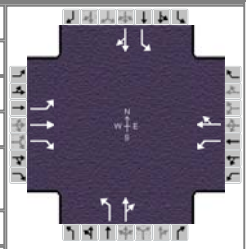
HCS 2010 Signalized Intersection Input Data

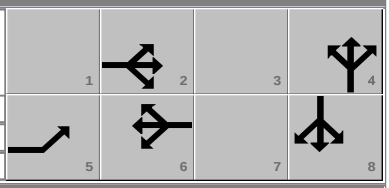
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.88
Intersection	Saxon and Tivoli	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Saxon Blvd & Tivoli Dr.xus				
Project Description	W9501.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	140	201	51	11	530	8	87	64	15	33	83	547

Signal Information			
Cycle, s	84.5	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.7	29.3	30.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.5	0.0	0.0	0.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	140	201	51	11	530	8	87	64	15	33	83	547
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	2	2	2	2	2		2	2		2	2	
Ped / Bike / RTOR, /h	0	0	23	0	0	3	0	0	6	0	0	102
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	3	3	3	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	
Turn Bay Length, ft	315	0	205	120	0		270	0		80	0	
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	40	40	40	35	35	35	30	30	30	35	35	35

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	15.0	30.0		30.0		30.0		30.0
Yellow Change Interval (*Y*), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	2.0	2.0	1.0	2.0	1.0	2.5	1.0	2.5
Minimum Green (G_{min}), s	5	11	5	11	5	5	5	5
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	2.0	4.0	2.0	3.0	2.0	3.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	16.0	0.0	16.0	0.0	20.0	0.0	20.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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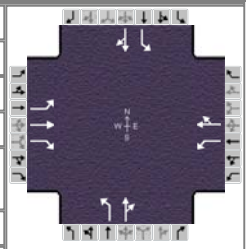
HCS 2010 Signalized Intersection Results Summary

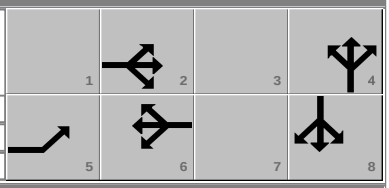
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.88
Intersection	Saxon and Tivoli	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Saxon Blvd & Tivoli Dr.xus				
Project Description	W9501.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	140	201	51	11	530	8	87	64	15	33	83	547

Signal Information			
Cycle, s	84.5	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.7	29.3	30.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.5	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		4		8
Case Number	1.0	3.0		6.3		6.0		6.0
Phase Duration, s	12.7	48.0		35.3		36.5		36.5
Change Period, ($Y+R_c$), s	6.0	6.0		6.0		6.5		6.5
Max Allow Headway (*MAH*), s	4.1	5.0		5.0		4.5		4.5
Queue Clearance Time (g_s), s	6.6	7.9		28.8		32.0		32.0
Green Extension Time (g_e), s	0.3	5.5		0.5		0.0		0.0
Phase Call Probability	0.98	1.00		1.00		1.00		1.00
Max Out Probability	0.03	0.09		1.00		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	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	159	228	32	13	608		99	83		38	600	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1774	1863	1579	1148	1860		815	1822		1310	1617	
Queue Service Time (g_s), s	4.6	5.9	0.9	0.6	26.8		0.0	2.6		1.7	30.0	
Cycle Queue Clearance Time (g_c), s	4.6	5.9	0.9	0.6	26.8		30.0	2.6		4.3	30.0	
Green Ratio (*g/C*)	0.45	0.50	0.50	0.35	0.35		0.36	0.36		0.36	0.36	
Capacity (*c*), veh/h	250	926	785	483	645		85	647		510	574	
Volume-to-Capacity Ratio (*X*)	0.637	0.247	0.041	0.026	0.943		1.160	0.128		0.074	1.045	
Available Capacity (c_a), veh/h	424	926	785	493	660		85	647		510	574	
Back of Queue (*Q*), veh/ln (50th percentile)	1.9	2.3	0.3	0.2	15.0		5.2	1.1		0.5	18.6	
Queue Storage Ratio (*RQ*) (50th percentile)	0.15	0.00	0.03	0.03	0.00		0.49	0.00		0.16	0.00	
Uniform Delay (d_1), s/veh	19.7	12.2	10.9	18.2	26.8		42.2	18.4		19.9	27.2	
Incremental Delay (d_2), s/veh	2.7	0.2	0.0	0.0	22.1		147.1	0.1		0.1	49.8	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	22.4	12.4	10.9	18.3	48.9		189.3	18.5		19.9	77.0	
Level of Service (LOS)	C	B	B	B	D		F	B		B	F	
Approach Delay, s/veh / LOS	16.1	B		48.3	D		111.4	F		73.6	E	
Intersection Delay, s/veh / LOS	55.9						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.4	B	2.3	B	2.5	B
Bicycle LOS Score / LOS	1.2	A	1.5	A	0.8	A	1.5	A

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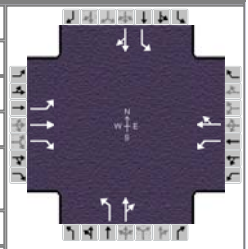
HCS 2010 Signalized Intersection Intermediate Values

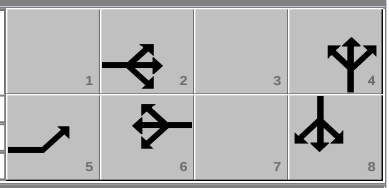
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.88
Intersection	Saxon and Tivoli	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Saxon Blvd & Tivoli Dr.xus				
Project Description	W9501.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	140	201	51	11	530	8	87	64	15	33	83	547

Signal Information			
Cycle, s	84.5	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	6.7	29.3	30.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.5	0.0	0.0	0.0



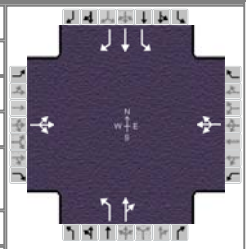
	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.980	0.980	0.980	0.980	0.980	1.000	0.980	0.980	1.000	0.980	0.980	1.000
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000			0.000			0.000			0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.998			0.978			0.868	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h	1774	1863			1842			1598			254	
Platoon Ratio (R_p)	1.00	1.00			1.00			1.00			1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)	0.11	0.15	0.15	0.15	0.45		0.50	0.11		0.11	0.50	

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	6.0	6.0		6.0		6.5		6.5
Green Ratio (*g/C*)	0.45	0.50		0.35		0.36		0.36
Permitted Saturation Flow Rate (s_p), veh/h/ln	809	0		1148		815		1310
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	31.3	0.0		29.3		30.0		30.0
Permitted Service Time (g_u), s	2.5	0.0		29.3		0.0		27.4
Permitted Queue Service Time (g_{ps}), s	2.5			0.6		0.0		1.7
Time to First Blockage (g_f), s	0.0	0.0		0.0		0.0		0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln		0						
Protected Right Effective Green Time (g_R), s		0.0						

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.01	1.557	0.15	1.557	0.00	1.710	0.03
Pedestrian F_s / F_{delay}	0.000	0.095	0.000	0.116	0.000	0.115	0.000	0.115
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	993.92	10.69	693.24	18.03	710.16	17.57	710.16	17.57
Bicycle F_w / F_v	-3.64	0.69	-3.64	1.02	-3.64	0.30	-3.64	1.05

HCS 2010 Signalized Intersection Input Data

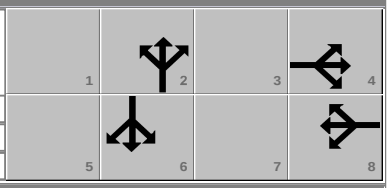
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/18/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.95
Intersection	Providence & Tivoli	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Providence Blvd & Tivoli Dr.xus				
Project Description	W9401.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	168	16	46	9	30	9	69	236	14	26	305	466

Signal Information			
Cycle, s	50.9	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	19.5	9.0	3.4	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.5	2.5	0.0	0.0	0.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	168	16	46	9	30	9	69	236	14	26	305	466
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %		2			2		2	2		2	2	2
Ped / Bike / RTOR, /h	0	0	9	0	0	4	0	0	1	0	0	33
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	3	3	3	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft		12.0			12.0		12.0	12.0		12.0	12.0	12.0
Turn Bay Length, ft		0			0		65	0		330	0	0
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	30	30	30	30	30	30	35	35	35	35	35	35

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s		35.0		35.0		35.0		35.0
Yellow Change Interval (*Y*), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	1.0	2.5	1.0	2.5	1.0	2.0	1.0	2.0
Minimum Green (G_{min}), s	5	7	5	7	5	7	5	7
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0
Recall Mode	Min	Off	Min	Off	Off	Min	Off	Min
Dual Entry	No	No	No	No	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	20.0	0.0	20.0	0.0	16.0	0.0	16.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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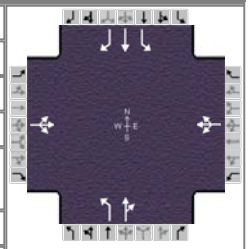
HCS 2010 Signalized Intersection Results Summary

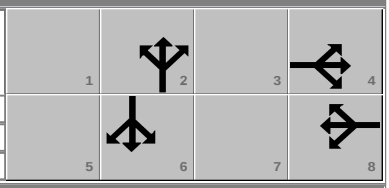
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/18/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.95
Intersection	Providence & Tivoli	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Providence Blvd & Tivoli Dr.xus				
Project Description	W9401.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	168	16	46	9	30	9	69	236	14	26	305	466

Signal Information			
Cycle, s	50.9	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	19.5	9.0	3.4	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.5	2.5	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		12.0		12.0		6.0		5.0
Phase Duration, s		15.5		9.9		25.5		25.5
Change Period, ($Y+R_c$), s		6.5		6.5		6.0		6.0
Max Allow Headway (*MAH*), s		4.2		4.1		4.2		4.2
Queue Clearance Time (g_s), s		8.5		3.3		11.3		14.7
Green Extension Time (g_e), s		0.8		0.1		4.9		4.7
Phase Call Probability		0.96		0.48		1.00		1.00
Max Out Probability		0.00		0.00		0.05		0.08

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		233			46		73	262		27	321	456
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1744			1807		1054	1845		1113	1863	1579
Queue Service Time (g_s), s		6.5			1.3		2.8	5.2		0.9	6.5	12.7
Cycle Queue Clearance Time (g_c), s		6.5			1.3		9.3	5.2		6.0	6.5	12.7
Green Ratio (*g/C*)		0.18			0.07		0.38	0.38		0.38	0.38	0.38
Capacity (*c*), veh/h		308			120		412	708		457	715	606
Volume-to-Capacity Ratio (*X*)		0.754			0.385		0.176	0.370		0.060	0.449	0.752
Available Capacity (c_a), veh/h		1198			1241		732	1267		794	1279	1084
Back of Queue (*Q*), veh/ln (50th percentile)		2.7			0.6		0.6	1.8		0.2	2.3	3.9
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00		0.23	0.00		0.02	0.00	0.00
Uniform Delay (d_1), s/veh		19.9			22.8		15.1	11.3		13.4	11.7	13.6
Incremental Delay (d_2), s/veh		3.7			2.0		0.2	0.3		0.1	0.4	1.9
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh		23.7			24.8		15.3	11.6		13.5	12.1	15.5
Level of Service (LOS)		C			C		B	B		B	B	B
Approach Delay, s/veh / LOS	23.7	C		24.8	C		12.4	B		14.1	B	
Intersection Delay, s/veh / LOS	15.6						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.5	B	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.9	A	0.6	A	1.0	A	1.8	A

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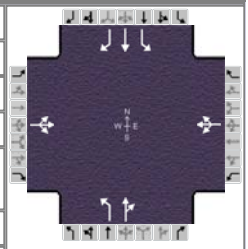
HCS 2010 Signalized Intersection Intermediate Values

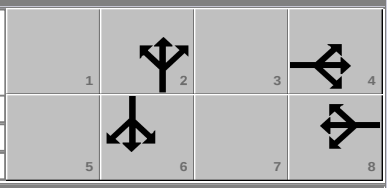
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/18/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.95
Intersection	Providence & Tivoli	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Providence Blvd & Tivoli Dr.xus				
Project Description	W9401.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	168	16	46	9	30	9	69	236	14	26	305	466

Signal Information			
Cycle, s	50.9	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	19.5	9.0	3.4	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.5	2.5	0.0	0.0	0.0



	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	1.000	0.980	1.000	1.000	0.980	1.000	0.980	0.980	1.000	0.980	0.980	0.980
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})		0.936			0.970			0.000			0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.000			0.991			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h		126			1232			1749			1863	
Platoon Ratio (R_p)		1.00			1.00			1.00			1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)		0.11			0.11		0.11	0.11		0.11	0.11	0.11

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)		5.0		6.5		6.0		6.0
Green Ratio (*g/C*)		0.18		0.07		0.38		0.38
Permitted Saturation Flow Rate (s_p), veh/h/ln		0		0		1054		1113
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s		0.0		0.0		19.6		19.6
Permitted Service Time (g_u), s		0.0		0.0		13.1		14.4
Permitted Queue Service Time (g_{ps}), s						2.8		0.9
Time to First Blockage (g_f), s		0.0		0.0		0.0		0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln								0
Protected Right Effective Green Time (g_R), s								0.0

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.00	1.710	0.05	1.389	0.01	1.389	0.01
Pedestrian F_s / F_{delay}	0.000	0.124	0.000	0.141	0.000	0.091	0.000	0.091
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	132.82	22.17	-294.86	33.49	767.00	9.67	767.00	9.67
Bicycle F_w / F_v	-3.64	0.38	-3.64	0.08	-3.64	0.55	-3.64	1.33

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*GR*
Agency/Co.	*CPH*
Date Performed	*9/20/2013*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Sterling Silver and Alabaster*
Jurisdiction	*Volusia County*
Analysis Year	*Future Background*

Project Description *W9401.1-Retail Deltona*

East/West Street: *Alabaster Way* | North/South Street: *Sterling Silver Boulevard*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*14*	*9*	*0*	*40*	
Peak-Hour Factor, PHF	*0.64*	*0.64*	*0.64*	*0.64*	*0.64*	*0.64*
Hourly Flow Rate, HFR (veh/h)	*0*	*21*	*14*	*0*	*62*	*0*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*		*0*	*2*		*1*
Peak-Hour Factor, PHF	*0.64*	*0.64*	*0.64*	*0.64*	*0.64*	*0.64*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*3*	*0*	*1*
Percent Heavy Vehicles	*2*	*0*	*0*	*2*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration		*LR*		*L*		*R*

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*	*L*		*R*		*LR*	
v (veh/h)		*0*	*3*		*1*		*0*	
C (m) (veh/h)		*1576*	*895*		*1053*			
v/c		*0.00*	*0.00*		*0.00*			
95% queue length		*0.00*	*0.01*		*0.00*			
Control Delay (s/veh)		*7.3*	*9.0*		*8.4*			
LOS		*A*	*A*		*A*			
Approach Delay (s/veh)	--	--	*8.9*					
Approach LOS	--	--	*A*					

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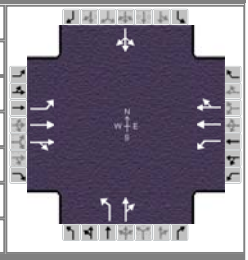
FUTURE TOTAL CONDITIONS
(AM PEAK HOUR)

HCS 2010 Signalized Intersection Input Data

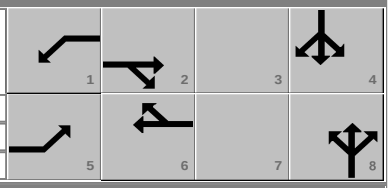
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.94
Intersection	Saxon & Finland	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Saxon Blvd & Finland Dr.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	54	678	24	38	2311	15	141	10	26	20	14	288

Signal Information			
Cycle, s	120.0	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	3.7	1.3	66.0	29.5	0.0	0.0
Yellow	4.5	0.0	4.5	4.0	0.0	0.0
Red	2.0	0.0	2.0	2.5	0.0	0.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	54	678	24	38	2311	15	141	10	26	20	14	288
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	2	2		2	2		2	2			2	
Ped / Bike / RTOR, /h	0	0	1	0	0	0	0	0	14	0	0	49
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	3	4	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	0.09	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0		12.0	12.0		12.0	12.0			12.0	
Turn Bay Length, ft	350	0		105	0		350	0			0	
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	40	40	40	40	40	40	30	30	30	30	30	30

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	20.0	64.0	20.0	64.0		36.0		36.0
Yellow Change Interval (*Y*), s	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	2.0	2.0	2.0	2.0	1.0	2.5	1.0	2.5
Minimum Green (G_{min}), s	5	11	5	11	5	6	5	6
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	3.0	4.0	2.0	4.0	2.0	4.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	22.0	0.0	22.0	0.0	24.0	0.0	24.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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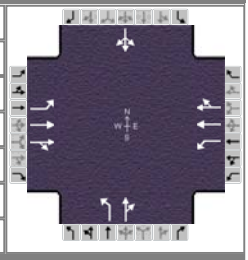
HCS 2010 Signalized Intersection Results Summary

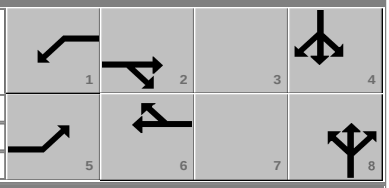
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.94
Intersection	Saxon & Finland	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Saxon Blvd & Finland Dr.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	54	678	24	38	2311	15	141	10	26	20	14	288

Signal Information			
Cycle, s	120.0	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	3.7	1.3	66.0	29.5	0.0	0.0
Yellow	4.5	0.0	4.5	4.0	0.0	0.0
Red	2.0	0.0	2.0	2.5	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	4.0	2.0	4.0		6.0		8.0
Phase Duration, s	11.5	73.8	10.2	72.5		36.0		36.0
Change Period, ($Y+R_c$), s	6.5	6.5	6.5	6.5		6.5		6.5
Max Allow Headway (*MAH*), s	4.1	0.0	4.1	0.0		5.5		5.5
Queue Clearance Time (g_s), s	5.8		4.7			31.5		22.1
Green Extension Time (g_e), s	0.1	0.0	0.0	0.0		0.0		1.7
Phase Call Probability	0.85		0.74			1.00		1.00
Max Out Probability	0.01		0.00			1.00		0.63

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	57	375	371	40	1237	1237	150	23			290	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1774	1863	1841	1774	1863	1858	1106	1696			1590	
Queue Service Time (g_s), s	3.8	8.3	8.7	2.7	66.0	66.0	9.4	1.3			7.4	
Cycle Queue Clearance Time (g_c), s	3.8	8.3	8.7	2.7	66.0	66.0	29.5	1.3			20.1	
Green Ratio (*g/C*)	0.04	0.56	0.56	0.03	0.55	0.55	0.25	0.25			0.25	
Capacity (*c*), veh/h	74	1045	1032	55	1024	1022	146	417			423	
Volume-to-Capacity Ratio (*X*)	0.772	0.359	0.359	0.739	1.208	1.211	1.025	0.056			0.687	
Available Capacity (c_a), veh/h	200	1045	1032	200	1024	1022	146	417			423	
Back of Queue (*Q*), veh/ln (50th percentile)	2.0	3.0	3.2	1.2	44.0	44.5	7.7	0.5			8.5	
Queue Storage Ratio (*RQ*) (50th percentile)	0.15	0.00	0.00	0.30	0.00	0.00	0.56	0.00			0.00	
Uniform Delay (d_1), s/veh	56.9	7.7	8.1	57.7	16.0	16.2	57.2	34.6			41.7	
Incremental Delay (d_2), s/veh	15.4	1.0	1.0	1.8	94.6	95.9	81.1	0.1			5.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Control Delay (*d*), s/veh	72.3	8.7	9.1	59.5	110.7	112.1	138.3	34.7			46.8	
Level of Service (LOS)	E	A	A	E	F	F	F	C			D	
Approach Delay, s/veh / LOS	13.4	B		110.5	F		124.3	F		46.8	D	
Intersection Delay, s/veh / LOS	85.6						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.2	B	2.8	C	2.8	C
Bicycle LOS Score / LOS	1.2	A	2.6	B	0.8	A	1.0	A

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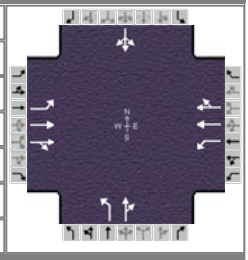
HCS 2010 Signalized Intersection Intermediate Values

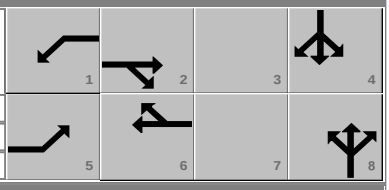
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.94
Intersection	Saxon & Finland	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Saxon Blvd & Finland Dr.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	54	678	24	38	2311	15	141	10	26	20	14	288

Signal Information			
Cycle, s	120.0	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	3.7	1.3	66.0	29.5	0.0	0.0
Yellow	4.5	0.0	4.5	4.0	0.0	0.0
Red	2.0	0.0	2.0	2.5	0.0	0.0



	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.980	0.980	1.000	0.980	0.980	1.000	0.980	0.980	1.000	1.000	0.980	1.000
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000			0.000			0.853	
Right-Turn Adjustment Factor (f_{RT})		0.988			0.998			0.911			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h	1774	3583		1774	3697			771			81	
Platoon Ratio (R_p)	1.00	1.33		1.00	1.33			1.00			1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)	0.11	0.50	0.50	0.11	0.50	0.50	0.50	0.15			0.28	

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	6.5	6.5	6.5	6.5		6.5		6.5
Green Ratio (*g/C*)	0.04	0.56	0.03	0.55		0.25		0.25
Permitted Saturation Flow Rate (s_p), veh/h/ln	0	0	0	0		1106		1410
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								0
Permitted Effective Green Time (g_p), s	0.0	0.0	0.0	0.0		29.5		29.5
Permitted Service Time (g_u), s	0.0	0.0	0.0	0.0		9.4		28.2
Permitted Queue Service Time (g_{ps}), s						9.4		7.4
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0		0.0		12.8
Queue Service Time Before Blockage (g_{fs}), s								12.8
Protected Right Saturation Flow (s_R), veh/h/ln								
Protected Right Effective Green Time (g_R), s								

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.02	1.389	0.07	2.107	0.00	2.107	0.00
Pedestrian F_s / F_{delay}	0.000	0.098	0.000	0.100	0.000	0.142	0.000	0.142
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	1121.65	11.57	1099.41	12.17	491.67	34.13	491.67	34.13
Bicycle F_w / F_v	-3.64	0.66	-3.64	2.07	-3.64	0.29	-3.64	0.48

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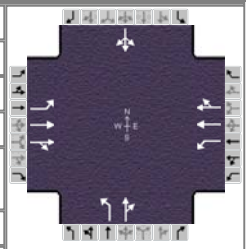
HCS 2010 Signalized Intersection Input Data

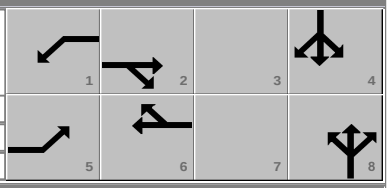
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.94
Intersection	Saxon & Finland	Analysis Year	Future Total Improved	Analysis Period	1> 7:00
File Name	Saxon Blvd & Finland Dr Improved.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	54	678	24	38	2311	15	141	10	26	20	14	288

Signal Information			
Cycle, s	125.0	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	3.8	1.5	70.8	29.5	0.0	0.0
Yellow	4.5	0.0	4.5	4.0	0.0	0.0
Red	2.0	0.0	2.0	2.5	0.0	0.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	54	678	24	38	2311	15	141	10	26	20	14	288
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	2	2		2	2		2	2			2	
Ped / Bike / RTOR, /h	0	0	1	0	0	0	0	0	14	0	0	49
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	3	4	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	0.09	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0		12.0	12.0		12.0	12.0			12.0	
Turn Bay Length, ft	350	0		105	0		350	0			0	
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	40	40	40	40	40	40	30	30	30	30	30	30

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	20.0	69.0	20.0	69.0		36.0		36.0
Yellow Change Interval (*Y*), s	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	2.0	2.0	2.0	2.0	1.0	2.5	1.0	2.5
Minimum Green (G_{min}), s	5	11	5	11	5	6	5	6
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	3.0	4.0	2.0	4.0	2.0	4.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	22.0	0.0	22.0	0.0	24.0	0.0	24.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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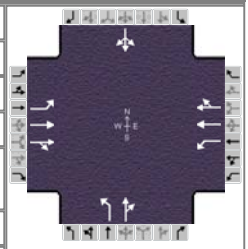
HCS 2010 Signalized Intersection Results Summary

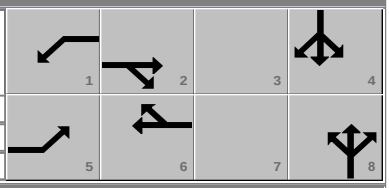
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.94
Intersection	Saxon & Finland	Analysis Year	Future Total Improved	Analysis Period	1> 7:00
File Name	Saxon Blvd & Finland Dr Improved.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	54	678	24	38	2311	15	141	10	26	20	14	288

Signal Information			
Cycle, s	125.0	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	3.8	1.5	70.8	29.5	0.0	0.0
Yellow	4.5	0.0	4.5	4.0	0.0	0.0
Red	2.0	0.0	2.0	2.5	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	4.0	2.0	4.0		6.0		8.0
Phase Duration, s	11.7	78.7	10.3	77.3		36.0		36.0
Change Period, ($Y+R_c$), s	6.5	6.5	6.5	6.5		6.5		6.5
Max Allow Headway (*MAH*), s	4.1	0.0	4.1	0.0		5.5		5.5
Queue Clearance Time (g_s), s	6.0		4.8			31.5		23.3
Green Extension Time (g_e), s	0.1	0.0	0.0	0.0		0.0		1.5
Phase Call Probability	0.86		0.75			1.00		1.00
Max Out Probability	0.02		0.00			1.00		0.84

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	57	375	371	40	1237	1237	150	23			290	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1774	1863	1841	1774	1863	1858	1106	1696			1589	
Queue Service Time (g_s), s	4.0	7.9	8.3	2.8	70.8	70.8	8.2	1.3			8.8	
Cycle Queue Clearance Time (g_c), s	4.0	7.9	8.3	2.8	70.8	70.8	29.5	1.3			21.3	
Green Ratio (*g/C*)	0.04	0.58	0.58	0.03	0.57	0.57	0.24	0.24			0.24	
Capacity (*c*), veh/h	74	1076	1064	54	1054	1052	130	400			406	
Volume-to-Capacity Ratio (*X*)	0.772	0.348	0.349	0.755	1.173	1.176	1.150	0.058			0.715	
Available Capacity (c_a), veh/h	192	1076	1064	192	1054	1052	130	400			406	
Back of Queue (*Q*), veh/ln (50th percentile)	2.1	2.9	3.0	1.3	40.7	41.1	8.7	0.6			9.1	
Queue Storage Ratio (*RQ*) (50th percentile)	0.15	0.00	0.00	0.31	0.00	0.00	0.63	0.00			0.00	
Uniform Delay (d_1), s/veh	59.3	7.0	7.4	60.2	15.3	15.5	60.2	37.0			44.6	
Incremental Delay (d_2), s/veh	15.4	0.9	0.9	2.0	79.0	80.2	124.7	0.1			6.4	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Control Delay (*d*), s/veh	74.7	7.9	8.3	62.1	94.4	95.7	184.9	37.1			51.0	
Level of Service (LOS)	E	A	A	E	F	F	F	D			D	
Approach Delay, s/veh / LOS	12.8	B		94.5	F		164.9	F		51.0	D	
Intersection Delay, s/veh / LOS	77.0						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.2	B	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.2	A	2.6	B	0.8	A	1.0	A

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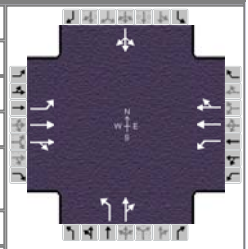
HCS 2010 Signalized Intersection Intermediate Values

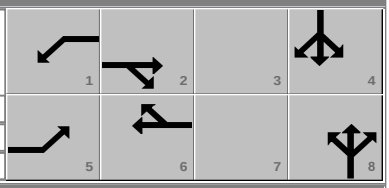
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.94
Intersection	Saxon & Finland	Analysis Year	Future Total Improved	Analysis Period	1> 7:00
File Name	Saxon Blvd & Finland Dr Improved.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	54	678	24	38	2311	15	141	10	26	20	14	288

Signal Information			
Cycle, s	125.0	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	3.8	1.5	70.8	29.5	0.0	0.0
Yellow	4.5	0.0	4.5	4.0	0.0	0.0
Red	2.0	0.0	2.0	2.5	0.0	0.0



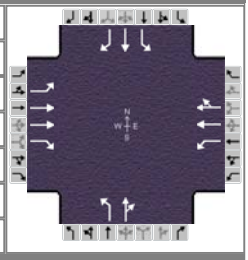
	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.980	0.980	1.000	0.980	0.980	1.000	0.980	0.980	1.000	1.000	0.980	1.000
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000			0.000			0.853	
Right-Turn Adjustment Factor (f_{RT})		0.988			0.998			0.911			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h	1774	3583		1774	3697			771			81	
Platoon Ratio (R_p)	1.00	1.33		1.00	1.33			1.00			1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)	0.11	0.50	0.50	0.11	0.50	0.50	0.50	0.15			0.30	

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	6.5	6.5	6.5	6.5		6.5		6.5
Green Ratio (*g/C*)	0.04	0.58	0.03	0.57		0.24		0.24
Permitted Saturation Flow Rate (s_p), veh/h/ln	0	0	0	0		1106		1410
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								0
Permitted Effective Green Time (g_p), s	0.0	0.0	0.0	0.0		29.5		29.5
Permitted Service Time (g_u), s	0.0	0.0	0.0	0.0		8.2		28.2
Permitted Queue Service Time (g_{ps}), s						8.2		8.8
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0		0.0		12.5
Queue Service Time Before Blockage (g_{fs}), s								12.5
Protected Right Saturation Flow (s_R), veh/h/ln								
Protected Right Effective Green Time (g_R), s								

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.02	1.389	0.07	2.107	0.00	2.107	0.00
Pedestrian F_s / F_{delay}	0.000	0.097	0.000	0.099	0.000	0.144	0.000	0.144
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	1155.65	11.14	1132.16	11.77	472.00	36.48	472.00	36.48
Bicycle F_w / F_v	-3.64	0.66	-3.64	2.07	-3.64	0.29	-3.64	0.48

HCS 2010 Signalized Intersection Input Data

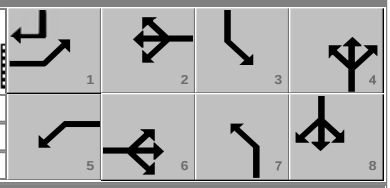
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.93
Intersection	Saxon and Normandy	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Saxon Blvd & Normandy Blvd.xus				
Project Description	W9401.1 Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	149	461	106	50	1454	74	277	144	20	100	156	546

Signal Information			
Cycle, s	120.0	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	4.2	4.5	50.4	8.1	1.9	15.0
Yellow	4.5	0.0	4.5	4.0	4.0	4.0
Red	3.0	0.0	3.0	3.0	3.0	3.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	149	461	106	50	1454	74	277	144	20	100	156	546
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	2	2	2	2	2		2	2		2	2	2
Ped / Bike / RTOR, /h	0	0	62	0	0	3	0	0	6	0	0	79
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	4	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	12.0
Turn Bay Length, ft	540	0	265	200	0		290	0		295	0	380
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	40	40	40	40	40	40	35	35	35	35	35	35

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	18.0	56.0	18.0	56.0	24.0	28.0	18.0	22.0
Yellow Change Interval (*Y*), s	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Green (G_{min}), s	5	11	5	11	5	6	5	6
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	18.0	0.0	29.0	0.0	23.0	0.0	23.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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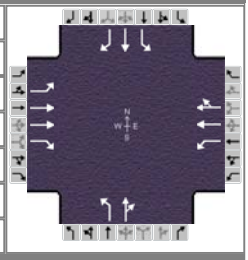
HCS 2010 Signalized Intersection Results Summary

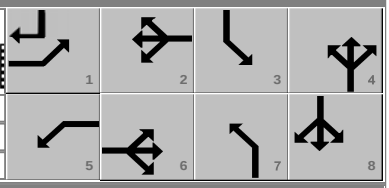
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.93
Intersection	Saxon and Normandy	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Saxon Blvd & Normandy Blvd.xus				
Project Description	W9401.1 Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	149	461	106	50	1454	74	277	144	20	100	156	546

Signal Information			
Cycle, s	120.0	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	4.2	4.5	50.4	8.1	1.9	15.0
Yellow	4.5	0.0	4.5	4.0	4.0	4.0
Red	3.0	0.0	3.0	3.0	3.0	3.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	1	6	5	2	7	4	3	8
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	3.0
Phase Duration, s	16.1	62.3	11.7	57.9	24.0	30.9	15.1	22.0
Change Period, ($Y+R_c$), s	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0
Max Allow Headway (*MAH*), s	4.1	0.0	4.1	0.0	4.1	5.2	4.1	5.2
Queue Clearance Time (g_s), s	8.6		4.0		19.0	11.8	8.3	17.0
Green Extension Time (g_e), s	0.1	0.0	0.0	0.0	0.0	4.2	0.1	0.0
Phase Call Probability	1.00		0.83		1.00	1.00	0.97	1.00
Max Out Probability	1.00		0.05		1.00	0.37	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	1	6	16	5	2	12	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	160	496	47	54	824	816	298	170		108	168	502
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1774	1773	1579	1774	1863	1832	1774	1834		1774	1863	1579
Queue Service Time (g_s), s	6.6	8.1	2.0	2.0	50.4	50.4	17.0	9.8		6.3	10.4	15.0
Cycle Queue Clearance Time (g_c), s	6.6	8.1	2.0	2.0	50.4	50.4	17.0	9.8		6.3	10.4	15.0
Green Ratio (*g/C*)	0.49	0.46	0.46	0.45	0.42	0.42	0.28	0.20		0.19	0.12	0.20
Capacity (*c*), veh/h	188	1621	721	457	782	769	358	365		302	233	311
Volume-to-Capacity Ratio (*X*)	0.854	0.306	0.066	0.118	1.053	1.062	0.832	0.465		0.357	0.720	1.615
Available Capacity (c_a), veh/h	215	1621	721	550	782	769	358	365		345	233	311
Back of Queue (*Q*), veh/ln (50th percentile)	3.9	3.0	0.8	0.8	31.8	31.9	8.9	4.5		2.8	5.5	34.3
Queue Storage Ratio (*RQ*) (50th percentile)	0.18	0.00	0.07	0.10	0.00	0.00	0.78	0.00		0.24	0.00	2.29
Uniform Delay (d_1), s/veh	30.7	14.3	18.2	18.3	34.8	34.8	38.1	42.4		41.7	50.5	48.2
Incremental Delay (d_2), s/veh	23.3	0.5	0.2	0.1	47.2	50.1	15.3	1.3		0.7	11.2	291.2
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	53.9	14.8	18.4	18.4	82.0	84.9	53.4	43.7		42.4	61.7	339.4
Level of Service (LOS)	D	B	B	B	F	F	D	D		D	E	F
Approach Delay, s/veh / LOS	23.9	C		81.4	F		49.9	D		238.4	F	
Intersection Delay, s/veh / LOS	99.8						F					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.5	B	2.9	C	3.1	C
Bicycle LOS Score / LOS	1.1	A	1.9	A	1.3	A	1.8	A

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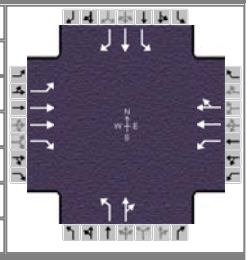
HCS 2010 Signalized Intersection Intermediate Values

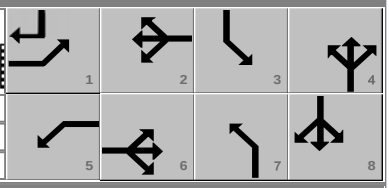
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.93
Intersection	Saxon and Normandy	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Saxon Blvd & Normandy Blvd.xus				
Project Description	W9401.1 Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	149	461	106	50	1454	74	277	144	20	100	156	546

Signal Information			
Cycle, s	120.0	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	4.2	4.5	50.4	8.1	1.9	15.0
Yellow	4.5	0.0	4.5	4.0	4.0	4.0
Red	3.0	0.0	3.0	3.0	3.0	3.0



	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.980	0.980	0.980	0.980	0.980	1.000	0.980	0.980	1.000	0.980	0.980	0.980
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.983			0.984			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h	1774	3547		1774	3524		1774	1671		1774	1863	
Platoon Ratio (R_p)	1.00	1.33		1.33	1.00		1.00	1.00		1.00	1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)	0.30	0.50	0.50	0.11	0.50	0.50	0.37	0.15		0.11	0.31	0.50

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0
Green Ratio (*g/C*)	0.49	0.46	0.45	0.42	0.28	0.20	0.19	0.13
Permitted Saturation Flow Rate (s_p), veh/h/ln	305	0	898	0	1213	0	1210	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	50.4	0.0	50.4	0.0	17.0	0.0	15.0	0.0
Permitted Service Time (g_u), s	0.0	0.0	44.8	0.0	4.6	0.0	12.1	0.0
Permitted Queue Service Time (g_{ps}), s	0.0		0.4		4.6		0.3	
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln		0						1579
Protected Right Effective Green Time (g_R), s		0.0						8.6

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.01	1.710	0.11	2.107	0.00	2.224	0.09
Pedestrian F_s / F_{delay}	0.000	0.115	0.000	0.121	0.000	0.146	0.000	0.153
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	913.88	17.69	839.39	20.21	398.54	38.47	250.00	45.94
Bicycle F_w / F_v	-3.64	0.58	-3.64	1.40	-3.64	0.77	-3.64	1.28

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*GR*	Intersection	*Saxon and Driveway 2*
Agency/Co.	*CPH*	Jurisdiction	*Volusia County*
Date Performed	*9/23/2013*	Analysis Year	*Future Total*
Analysis Time Period	*AM Peak*		

Project Description *W9401.1-Retail, Deltona*

East/West Street: *Saxon Blvd.* North/South Street: *Diveway 2*

Intersection Orientation: *East-West* Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*685*			*1412*	*73*
Peak-Hour Factor, PHF	*1.00*	*0.95*	*1.00*	*1.00*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*721*	*0*	*0*	*1486*	*76*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*			*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)						*83*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*87*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*2*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
v (veh/h)								*87*
C (m) (veh/h)								*393*
v/c								*0.22*
95% queue length								*0.83*
Control Delay (s/veh)								*16.7*
LOS								*C*
Approach Delay (s/veh)	--	--				*16.7*		
Approach LOS	--	--				*C*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	GR	Intersection	Saxon and Sterling Silver
Agency/Co.	CPH	Jurisdiction	Volusia County
Date Performed	9/20/2013	Analysis Year	Future Total
Analysis Time Period	AM Peak		

Project Description *W9401.1-Retail Deltona*

East/West Street: *Saxon Boulevard*	North/South Street: *Sterling Silver Boulevard*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	171	509	4	6	1344	111
Peak-Hour Factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86
Hourly Flow Rate, HFR (veh/h)	198	591	4	6	1562	129
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	1	2	0	1	2	0
Configuration	L	T	TR	L	T	TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	8	0	10	148	1	132
Peak-Hour Factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86
Hourly Flow Rate, HFR (veh/h)	9	0	11	172	1	153
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)	0			0		
Flared Approach		N			Y	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	1	1	0
Configuration		LTR		L		TR

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L		LTR		L		TR
v (veh/h)	198	6		20		172		154
C (m) (veh/h)	374	977		35		11		299
v/c	0.53	0.01		0.57		15.64		0.52
95% queue length	2.97	0.02		1.96		22.94		2.76
Control Delay (s/veh)	25.0	8.7		200.5		7251		29.2
LOS	C	A		F		F		D
Approach Delay (s/veh)	--	--	200.5			3840		
Approach LOS	--	--	F			F		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*GR*
Agency/Co.	*CPH*
Date Performed	*9/23/2013*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Saxon and Driveway 1*
Jurisdiction	*Volusia County*
Analysis Year	*Future Total*

Project Description *W9401.1-Retail, Deltona*

East/West Street: *Saxon Blvd.* | North/South Street: *Driveway 1*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*667*			*1422*	*46*
Peak-Hour Factor, PHF	*1.00*	*0.95*	*1.00*	*1.00*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*702*	*0*	*0*	*1496*	*48*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*			*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)						*38*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*40*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*2*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
v (veh/h)								*40*
C (m) (veh/h)								*398*
v/c								*0.10*
95% queue length								*0.33*
Control Delay (s/veh)								*15.1*
LOS								*C*
Approach Delay (s/veh)	--	--				*15.1*		
Approach LOS	--	--				*C*		

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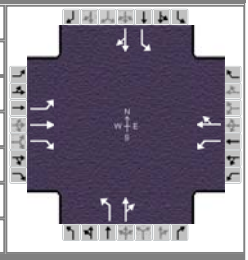
HCS 2010 Signalized Intersection Input Data

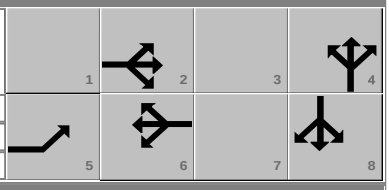
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.88
Intersection	Saxon and Tivoli	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Saxon Blvd & Tivoli Dr.xus				
Project Description	W9501.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	176	240	56	11	575	8	93	64	15	33	83	606

Signal Information			
Cycle, s	86.7	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	8.2	30.0	30.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.5	0.0	0.0	0.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	176	240	56	11	575	8	93	64	15	33	83	606
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	2	2	2	2	2		2	2		2	2	
Ped / Bike / RTOR, /h	0	0	25	0	0	3	0	0	6	0	0	113
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	3	3	3	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	
Turn Bay Length, ft	315	0	205	120	0		270	0		80	0	
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	40	40	40	35	35	35	30	30	30	35	35	35

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	15.0	30.0		30.0		30.0		30.0
Yellow Change Interval (*Y*), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	2.0	2.0	1.0	2.0	1.0	2.5	1.0	2.5
Minimum Green (G_{min}), s	5	11	5	11	5	5	5	5
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	2.0	4.0	2.0	3.0	2.0	3.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	16.0	0.0	16.0	0.0	20.0	0.0	20.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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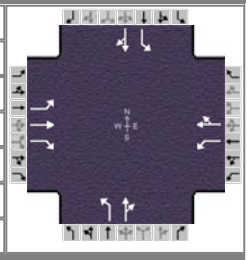
HCS 2010 Signalized Intersection Results Summary

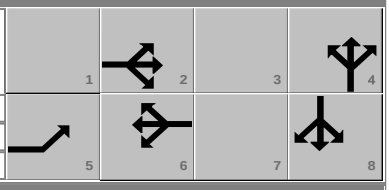
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.88
Intersection	Saxon and Tivoli	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Saxon Blvd & Tivoli Dr.xus				
Project Description	W9501.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	176	240	56	11	575	8	93	64	15	33	83	606

Signal Information			
Cycle, s	86.7	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	8.2	30.0	30.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.5	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		4		8
Case Number	1.0	3.0		6.3		6.0		6.0
Phase Duration, s	14.2	50.2		36.0		36.5		36.5
Change Period, ($Y+R_c$), s	6.0	6.0		6.0		6.5		6.5
Max Allow Headway (*MAH*), s	4.1	5.0		5.0		4.5		4.5
Queue Clearance Time (g_s), s	7.9	9.3		32.0		32.0		32.0
Green Extension Time (g_e), s	0.3	6.2		0.0		0.0		0.0
Phase Call Probability	0.99	1.00		1.00		1.00		1.00
Max Out Probability	0.12	0.15		1.00		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	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	200	273	35	13	659		106	83		38	655	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1774	1863	1579	1102	1860		775	1822		1310	1614	
Queue Service Time (g_s), s	5.9	7.3	1.0	0.7	30.0		0.0	2.7		1.8	30.0	
Cycle Queue Clearance Time (g_c), s	5.9	7.3	1.0	0.7	30.0		30.0	2.7		4.5	30.0	
Green Ratio (*g/C*)	0.46	0.51	0.51	0.35	0.35		0.35	0.35		0.35	0.35	
Capacity (*c*), veh/h	251	950	805	464	644		83	631		495	559	
Volume-to-Capacity Ratio (*X*)	0.798	0.287	0.044	0.027	1.024		1.272	0.132		0.076	1.172	
Available Capacity (c_a), veh/h	390	950	805	464	644		83	631		495	559	
Back of Queue (*Q*), veh/ln (50th percentile)	2.6	2.8	0.3	0.2	19.9		6.1	1.1		0.5	25.6	
Queue Storage Ratio (*RQ*) (50th percentile)	0.21	0.00	0.04	0.03	0.00		0.57	0.00		0.17	0.00	
Uniform Delay (d_1), s/veh	20.0	12.2	10.7	18.8	28.3		43.3	19.4		20.9	28.3	
Incremental Delay (d_2), s/veh	6.3	0.2	0.0	0.0	41.7		188.5	0.1		0.1	95.2	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	26.2	12.4	10.7	18.8	70.1		231.8	19.5		21.0	123.5	
Level of Service (LOS)	C	B	B	B	F		F	B		C	F	
Approach Delay, s/veh / LOS	17.7	B		69.1	E		138.4	F		118.0	F	
Intersection Delay, s/veh / LOS	79.2						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.4	B	2.3	B	2.5	B
Bicycle LOS Score / LOS	1.3	A	1.6	A	0.8	A	1.6	A

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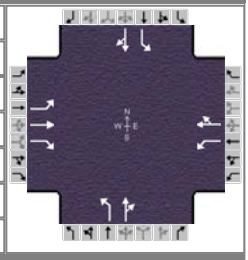
HCS 2010 Signalized Intersection Intermediate Values

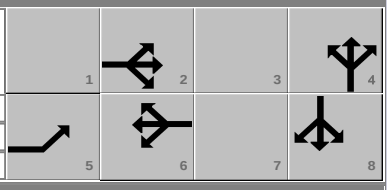
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.88
Intersection	Saxon and Tivoli	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Saxon Blvd & Tivoli Dr.xus				
Project Description	W9501.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	176	240	56	11	575	8	93	64	15	33	83	606

Signal Information			
Cycle, s	86.7	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	8.2	30.0	30.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.5	0.0	0.0	0.0



	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.980	0.980	0.980	0.980	0.980	1.000	0.980	0.980	1.000	0.980	0.980	1.000
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000			0.000			0.000			0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.998			0.978			0.867	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h	1774	1863			1844			1598			233	
Platoon Ratio (R_p)	1.00	1.00			1.00			1.00			1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)	0.12	0.15	0.15	0.15	0.50		0.50	0.11		0.11	0.50	

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	6.0	6.0		6.0		6.5		6.5
Green Ratio (*g/C*)	0.46	0.51		0.35		0.35		0.35
Permitted Saturation Flow Rate (s_p), veh/h/ln	772	0		1102		775		1310
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	32.0	0.0		30.0		30.0		30.0
Permitted Service Time (g_u), s	0.0	0.0		30.0		0.0		27.3
Permitted Queue Service Time (g_{ps}), s	0.0			0.7		0.0		1.8
Time to First Blockage (g_f), s	0.0	0.0		0.0		0.0		0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln		0						
Protected Right Effective Green Time (g_R), s		0.0						

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.01	1.557	0.16	1.557	0.00	1.710	0.04
Pedestrian F_s / F_{delay}	0.000	0.094	0.000	0.117	0.000	0.117	0.000	0.117
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	1019.49	10.42	692.11	18.54	692.11	18.54	692.11	18.54
Bicycle F_w / F_v	-3.64	0.84	-3.64	1.11	-3.64	0.31	-3.64	1.14

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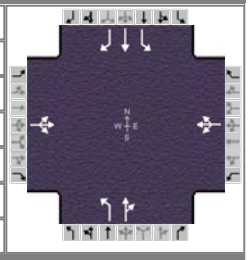
HCS 2010 Signalized Intersection Input Data

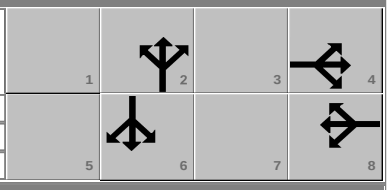
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/18/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.95
Intersection	Providence & Tivoli	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Providence Blvd & Tivoli Dr.xus				
Project Description	W9401.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	201	18	48	9	32	9	71	236	14	26	305	503

Signal Information			
Cycle, s	56.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	22.1	11.1	3.8	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.5	2.5	0.0	0.0	0.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	201	18	48	9	32	9	71	236	14	26	305	503
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %		2			2		2	2		2	2	2
Ped / Bike / RTOR, /h	0	0	10	0	0	3	0	0	1	0	0	36
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	3	3	3	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft		12.0			12.0		12.0	12.0		12.0	12.0	12.0
Turn Bay Length, ft		0			0		65	0		330	0	0
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	30	30	30	30	30	30	35	35	35	35	35	35

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s		35.0		35.0		35.0		35.0
Yellow Change Interval (*Y*), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	1.0	2.5	1.0	2.5	1.0	2.0	1.0	2.0
Minimum Green (G_{min}), s	5	7	5	7	5	7	5	7
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0
Recall Mode	Min	Off	Min	Off	Off	Min	Off	Min
Dual Entry	No	No	No	No	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	20.0	0.0	20.0	0.0	16.0	0.0	16.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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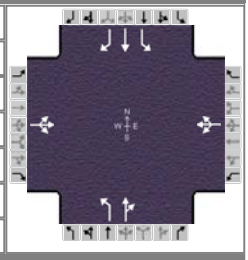
HCS 2010 Signalized Intersection Results Summary

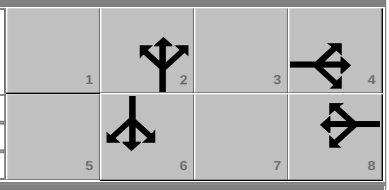
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/18/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.95
Intersection	Providence & Tivoli	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Providence Blvd & Tivoli Dr.xus				
Project Description	W9401.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	201	18	48	9	32	9	71	236	14	26	305	503

Signal Information			
Cycle, s	56.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	22.1	11.1	3.8	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.5	2.5	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		12.0		12.0		6.0		5.0
Phase Duration, s		17.6		10.3		28.1		28.1
Change Period, ($Y+R_c$), s		6.5		6.5		6.0		6.0
Max Allow Headway (*MAH*), s		4.2		4.1		4.2		4.2
Queue Clearance Time (g_s), s		10.2		3.5		12.1		17.3
Green Extension Time (g_e), s		1.0		0.1		5.1		4.7
Phase Call Probability		0.99		0.54		1.00		1.00
Max Out Probability		0.00		0.00		0.06		0.14

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		271			49		75	262		27	321	492
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1748			1804		1054	1845		1113	1863	1579
Queue Service Time (g_s), s		8.2			1.5		3.1	5.6		1.0	7.1	15.3
Cycle Queue Clearance Time (g_c), s		8.2			1.5		10.1	5.6		6.5	7.1	15.3
Green Ratio (*g/C*)		0.20			0.07		0.40	0.40		0.40	0.40	0.40
Capacity (*c*), veh/h		347			122		414	730		459	737	624
Volume-to-Capacity Ratio (*X*)		0.780			0.406		0.181	0.359		0.060	0.436	0.788
Available Capacity (c_a), veh/h		1091			1126		655	1152		713	1162	985
Back of Queue (*Q*), veh/ln (50th percentile)		3.4			0.7		0.7	2.0		0.2	2.5	4.9
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00		0.27	0.00		0.02	0.00	0.00
Uniform Delay (d_1), s/veh		21.3			25.1		16.0	11.9		14.2	12.4	14.9
Incremental Delay (d_2), s/veh		3.8			2.2		0.2	0.3		0.1	0.4	2.3
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh		25.2			27.2		16.3	12.2		14.3	12.8	17.1
Level of Service (LOS)		C			C		B	B		B	B	B
Approach Delay, s/veh / LOS	25.2	C		27.2	C		13.1	B		15.4	B	
Intersection Delay, s/veh / LOS	17.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.5	B	2.1	B	2.1	B
Bicycle LOS Score / LOS	0.9	A	0.6	A	1.0	A	1.9	A

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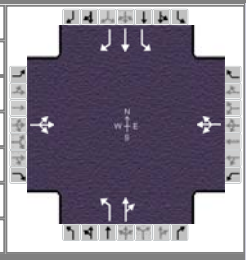
HCS 2010 Signalized Intersection Intermediate Values

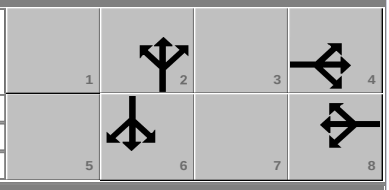
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/18/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.95
Intersection	Providence & Tivoli	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Providence Blvd & Tivoli Dr.xus				
Project Description	W9401.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	201	18	48	9	32	9	71	236	14	26	305	503

Signal Information			
Cycle, s	56.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	22.1	11.1	3.8	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.5	2.5	0.0	0.0	0.0



	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	1.000	0.980	1.000	1.000	0.980	1.000	0.980	0.980	1.000	0.980	0.980	0.980
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})		0.938			0.968			0.000			0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.000			0.991			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h		122			1228			1749			1863	
Platoon Ratio (R_p)		1.00			1.00			1.00			1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)		0.11			0.11		0.11	0.11		0.11	0.11	0.11

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)		5.0		6.5		6.0		6.0
Green Ratio (*g/C*)		0.20		0.07		0.40		0.40
Permitted Saturation Flow Rate (s_p), veh/h/ln		0		0		1054		1113
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s		0.0		0.0		22.2		22.2
Permitted Service Time (g_u), s		0.0		0.0		15.2		16.7
Permitted Queue Service Time (g_{ps}), s						3.1		1.0
Time to First Blockage (g_f), s		0.0		0.0		0.0		0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln								0
Protected Right Effective Green Time (g_R), s								0.0

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.00	1.710	0.05	1.389	0.00	1.389	0.01
Pedestrian F_s / F_{delay}	0.000	0.128	0.000	0.144	0.000	0.093	0.000	0.093
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	134.80	24.35	-267.89	36.00	790.38	10.24	790.38	10.24
Bicycle F_w / F_v	-3.64	0.45	-3.64	0.08	-3.64	0.56	-3.64	1.39

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	GR	Intersection	Sterling Silver and Alabaster
Agency/Co.	CPH	Jurisdiction	Volusia County
Date Performed	9/20/2013	Analysis Year	Future Total
Analysis Time Period	AM Peak		

Project Description	W9401.1-Retail Deltona
East/West Street: Alabaster Way	North/South Street: Sterling Silver Boulevard
Intersection Orientation: North-South	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	123	28	135	0	48	0
Peak-Hour Factor, PHF	0.64	0.64	0.64	0.64	0.64	0.64
Hourly Flow Rate, HFR (veh/h)	192	43	210	0	75	0
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0	0	113	116	0	1
Peak-Hour Factor, PHF	0.64	0.64	0.64	0.64	0.64	0.64
Hourly Flow Rate, HFR (veh/h)	0	0	176	181	0	1
Percent Heavy Vehicles	2	0	0	2	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	1	1	0
Configuration		LTR		L		TR

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR	L		TR		LTR	
v (veh/h)	192	0	181		1		176	
C (m) (veh/h)	1524	1312	260		904		992	
v/c	0.13	0.00	0.70		0.00		0.18	
95% queue length	0.43	0.00	4.67		0.00		0.64	
Control Delay (s/veh)	7.7	7.7	45.4		9.0		9.4	
LOS	A	A	E		A		A	
Approach Delay (s/veh)	--	--	45.2			9.4		
Approach LOS	--	--	E			A		

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*GR*
Agency/Co.	*CPH*
Date Performed	*9/23/2013*
Analysis Time Period	*AM Peak*

Site Information

Intersection	*Sterling Silver and Driveway 4*
Jurisdiction	*Volusia County*
Analysis Year	*Future Total*

Project Description *W9401.1-Retail, Deltona*

East/West Street: *Saxon Blvd.* | North/South Street: *Driveway 4*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*14*	*15*			*40*	*0*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*1.00*	*1.00*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*14*	*15*	*0*	*0*	*42*	*0*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)			*8*			
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*8*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*2*	*2*	*2*	*0*	*2*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*1*	*0*	*0*	*0*
Configuration			*R*			

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*							*R*
v (veh/h)	*14*							*8*
C (m) (veh/h)	*1567*							*1029*
v/c	*0.01*							*0.01*
95% queue length	*0.03*							*0.02*
Control Delay (s/veh)	*7.3*							*8.5*
LOS	*A*							*A*
Approach Delay (s/veh)	--	--				*8.5*		
Approach LOS	--	--				*A*		

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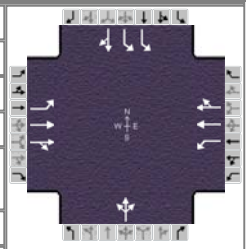
HCS 2010 Signalized Intersection Input Data

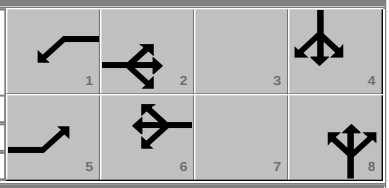
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	11/1/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.86
Intersection	Saxon & Sterling Silver	Analysis Year	Future Total Improved	Analysis Period	1> 7:00
File Name	Saxon Blvd & Sterling Silver Blvd Improved.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	171	509	4	6	1344	111	8	0	10	148	1	132

Signal Information			
Cycle, s	114.1	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	1.4	0.2	62.8	13.9	3.4	0.0
Yellow	4.5	4.5	4.5	4.0	4.0	0.0
Red	2.0	2.0	2.0	2.3	2.6	0.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	171	509	4	6	1344	111	8	0	10	148	1	132
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	2	2		2	2			2		2	2	
Ped / Bike / RTOR, /h	0	0	0	0	0	0	0	0	0	0	0	0
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	3	3	3	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0		12.0	12.0			12.0		12.0	12.0	
Turn Bay Length, ft	290	0		295	0			0		157	0	
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	40	40	40	40	40	40	30	30	30	30	30	30

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	25.0	60.0	10.0	75.0		10.0		25.0
Yellow Change Interval (*Y*), s	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	2.0	2.0	2.0	2.0	1.0	2.6	1.0	2.3
Minimum Green (G_{min}), s	7	20	7	20	5	7	5	7
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	2.0	4.0	2.0	3.0	2.0	3.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Clearance Time (*PC*), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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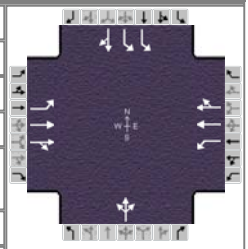
HCS 2010 Signalized Intersection Results Summary

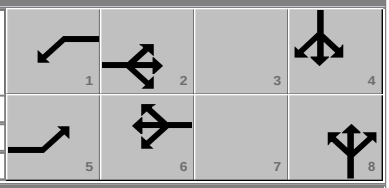
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	11/1/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.86
Intersection	Saxon & Sterling Silver	Analysis Year	Future Total Improved	Analysis Period	1> 7:00
File Name	Saxon Blvd & Sterling Silver Blvd Improved.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	171	509	4	6	1344	111	8	0	10	148	1	132

Signal Information			
Cycle, s	114.1	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	1.4	0.2	62.8	13.9	3.4	0.0
Yellow	4.5	4.5	4.5	4.0	4.0	0.0
Red	2.0	2.0	2.0	2.3	2.6	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	4.0	1.1	4.0		12.0		10.0
Phase Duration, s	14.6	76.0	7.9	69.3		10.0		20.2
Change Period, ($Y+R_c$), s	6.5	6.5	6.5	6.5		6.6		6.3
Max Allow Headway (*MAH*), s	4.1	5.0	3.1	5.0		4.3		4.3
Queue Clearance Time (g_s), s	7.5	10.5	2.2	46.5		3.4		12.9
Green Extension Time (g_e), s	0.6	26.5	0.0	16.3		0.0		1.0
Phase Call Probability	1.00	1.00	0.20	1.00		0.49		1.00
Max Out Probability	0.00	0.42	0.00	0.63		0.03		0.02

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	199	299	298	7	851	841		21		172	155	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1774	1863	1858	1774	1863	1813		1660		1723	1580	
Queue Service Time (g_s), s	5.5	8.5	8.5	0.2	43.3	44.5		1.4		5.3	10.9	
Cycle Queue Clearance Time (g_c), s	5.5	8.5	8.5	0.2	43.3	44.5		1.4		5.3	10.9	
Green Ratio (*g/C*)	0.64	0.61	0.61	0.56	0.55	0.55		0.03		0.12	0.12	
Capacity (*c*), veh/h	235	1134	1131	509	1025	997		50		421	193	
Volume-to-Capacity Ratio (*X*)	0.845	0.263	0.263	0.014	0.831	0.843		0.423		0.408	0.800	
Available Capacity (c_a), veh/h	497	1134	1131	642	1223	1190		145		754	346	
Back of Queue (*Q*), veh/ln (95th percentile)	6.2	5.9	5.9	0.1	25.6	25.7		1.2		4.1	8.2	
Queue Storage Ratio (*RQ*) (95th percentile)	0.54	0.00	0.00	0.01	0.00	0.00		0.00		0.67	0.00	
Uniform Delay (d_1), s/veh	25.6	10.4	10.4	11.0	21.3	21.6		54.5		46.3	48.8	
Incremental Delay (d_2), s/veh	8.1	0.2	0.2	0.0	4.7	5.4		5.6		0.6	7.4	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Control Delay (*d*), s/veh	33.6	10.6	10.6	11.1	26.0	26.9		60.1		47.0	56.2	
Level of Service (LOS)	C	B	B	B	C	C		E		D	E	
Approach Delay, s/veh / LOS	16.3	B		26.4	C		60.1	E		51.4	D	
Intersection Delay, s/veh / LOS	26.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.4	B	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.1	A	1.9	A	0.5	A	1.0	A

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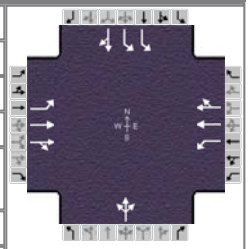
HCS 2010 Signalized Intersection Intermediate Values

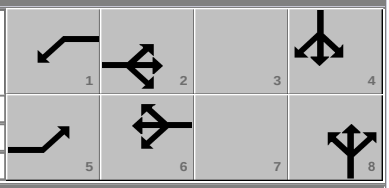
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	11/1/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	AM Peak	PHF	0.86
Intersection	Saxon & Sterling Silver	Analysis Year	Future Total Improved	Analysis Period	1> 7:00
File Name	Saxon Blvd & Sterling Silver Blvd Improved.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	171	509	4	6	1344	111	8	0	10	148	1	132

Signal Information			
Cycle, s	114.1	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	1.4	0.2	62.8	13.9	3.4	0.0
Yellow	4.5	4.5	4.5	4.0	4.0	0.0
Red	2.0	2.0	2.0	2.3	2.6	0.0



	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.980	0.980	1.000	0.980	0.980	1.000	1.000	0.980	1.000	0.980	0.980	1.000
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.971	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000			0.891			0.000	
Right-Turn Adjustment Factor (f_{RT})		0.997			0.973			0.000			0.848	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h	1774	3691		1774	3399			0			12	
Platoon Ratio (R_p)	1.00	1.00		1.00	1.00			1.00			1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)	0.11	0.15	0.15	0.04	0.29	0.30		0.11		0.11	0.11	

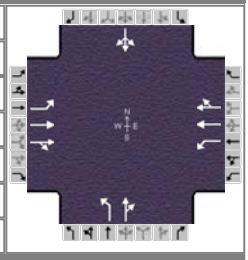
Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	6.5	6.5	6.5	6.5		6.3		5.0
Green Ratio (*g/C*)	0.64	0.61	0.56	0.55		0.03		0.12
Permitted Saturation Flow Rate (s_p), veh/h/ln	290	0	818	0		0		1774
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	64.9	0.0	62.9	0.0		0.0		0.0
Permitted Service Time (g_u), s	18.2	0.0	59.2	0.0		0.0		0.0
Permitted Queue Service Time (g_{ps}), s	18.2		0.0					
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0		0.0		0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln								
Protected Right Effective Green Time (g_R), s								

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.389	0.00	1.710	0.00	2.107	0.00	2.107	0.00
Pedestrian F_s / F_{delay}	0.000	0.087	0.000	0.098	0.000	0.167	0.000	0.160
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	1217.67	8.73	1100.50	11.54		64.92	64.90	53.43
Bicycle F_w / F_v	-3.64	0.66	-3.64	1.40	-3.64	0.03	-3.64	0.54

EXISTING CONDITIONS
(PM PEAK HOUR)

HCS 2010 Signalized Intersection Input Data

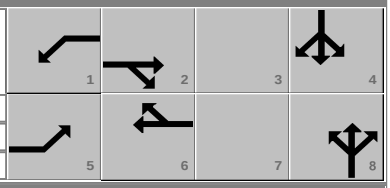
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.93
Intersection	Saxon & Finland	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Saxon Blvd & Finland Dr.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	190	1999	62	79	1036	19	113	53	133	19	26	110

Signal Information			
Cycle, s	130.0	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	7.9	0.1	72.5	23.5	0.0	0.0
Yellow	4.5	4.5	4.5	4.0	0.0	0.0
Red	2.0	2.0	2.0	2.5	0.0	0.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	190	1999	62	79	1036	19	113	53	133	19	26	110
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	2	2		2	2		2	2			2	
Ped / Bike / RTOR, /h	0	0	3	0	0	0	0	0	24	0	0	72
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	3	4	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	0.52	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0		12.0	12.0		12.0	12.0			12.0	
Turn Bay Length, ft	350	0		105	0		350	0			0	
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	40	40	40	40	40	40	30	30	30	30	30	30

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	21.0	75.0	25.0	79.0		30.0		30.0
Yellow Change Interval (*Y*), s	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	2.0	2.0	2.0	2.0	1.0	2.5	1.0	2.5
Minimum Green (G_{min}), s	5	11	5	11	5	6	5	6
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	3.0	4.0	2.0	4.0	2.0	4.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	22.0	0.0	22.0	0.0	24.0	0.0	24.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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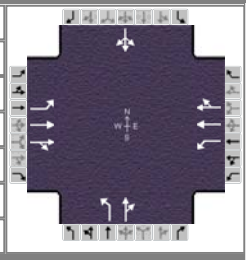
HCS 2010 Signalized Intersection Results Summary

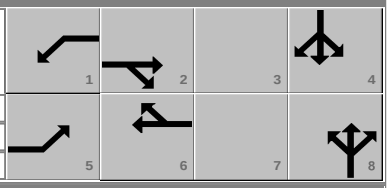
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.93
Intersection	Saxon & Finland	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Saxon Blvd & Finland Dr.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	190	1999	62	79	1036	19	113	53	133	19	26	110

Signal Information			
Cycle, s	130.0	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	7.9	0.1	72.5	23.5	0.0	0.0
Yellow	4.5	4.5	4.5	4.0	0.0	0.0
Red	2.0	2.0	2.0	2.5	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	4.0	2.0	4.0		6.0		8.0
Phase Duration, s	21.0	85.6	14.4	79.0		30.0		30.0
Change Period, ($Y+R_c$), s	6.5	6.5	6.5	6.5		6.5		6.5
Max Allow Headway (*MAH*), s	4.1	0.0	4.1	0.0		5.3		5.3
Queue Clearance Time (g_s), s	16.5		8.1			25.5		14.8
Green Extension Time (g_e), s	0.0	0.0	0.1	0.0		0.0		1.4
Phase Call Probability	1.00		0.95			1.00		1.00
Max Out Probability	1.00		0.00			1.00		0.35

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	204	1106	1106	85	569	565	122	174			89	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1774	1863	1844	1774	1863	1851	1327	1662			1194	
Queue Service Time (g_s), s	14.5	70.0	73.9	6.1	17.2	17.5	10.6	12.5			0.4	
Cycle Queue Clearance Time (g_c), s	14.5	70.0	73.9	6.1	17.2	17.5	23.5	12.5			12.8	
Green Ratio (*g/C*)	0.11	0.61	0.61	0.06	0.56	0.56	0.18	0.18			0.18	
Capacity (*c*), veh/h	198	1134	1122	108	1039	1032	164	300			250	
Volume-to-Capacity Ratio (*X*)	1.032	0.976	0.986	0.789	0.548	0.548	0.741	0.580			0.357	
Available Capacity (c_a), veh/h	198	1134	1122	252	1039	1032	164	300			250	
Back of Queue (*Q*), veh/ln (50th percentile)	10.4	19.4	22.3	2.9	5.4	5.5	4.8	5.5			2.6	
Queue Storage Ratio (*RQ*) (50th percentile)	0.75	0.00	0.00	0.71	0.00	0.00	0.35	0.00			0.00	
Uniform Delay (d_1), s/veh	57.7	11.4	12.5	60.2	9.6	9.9	60.3	48.7			46.2	
Incremental Delay (d_2), s/veh	72.6	21.6	23.7	6.6	1.1	1.1	17.6	3.4			1.2	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Control Delay (*d*), s/veh	130.3	33.0	36.2	66.8	10.7	11.0	77.8	52.1			47.4	
Level of Service (LOS)	F	C	D	E	B	B	E	D			D	
Approach Delay, s/veh / LOS	42.7	D		14.7	B		62.7	E		47.4	D	
Intersection Delay, s/veh / LOS	35.8						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.2	B	2.9	C	2.9	C
Bicycle LOS Score / LOS	2.5	B	1.5	A	1.0	A	0.6	A

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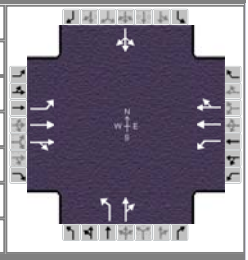
HCS 2010 Signalized Intersection Intermediate Values

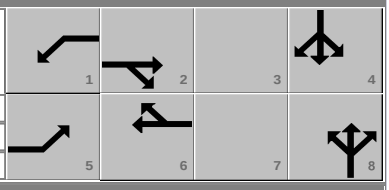
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.93
Intersection	Saxon & Finland	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Saxon Blvd & Finland Dr.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	190	1999	62	79	1036	19	113	53	133	19	26	110

Signal Information			
Cycle, s	130.0	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	7.9	0.1	72.5	23.5	0.0	0.0
Yellow	4.5	4.5	4.5	4.0	0.0	0.0
Red	2.0	2.0	2.0	2.5	0.0	0.0



	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.980	0.980	1.000	0.980	0.980	1.000	0.980	0.980	1.000	1.000	0.980	1.000
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000			0.000			0.641	
Right-Turn Adjustment Factor (f_{RT})		0.990			0.994			0.892			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h	1774	3601		1774	3647			544			483	
Platoon Ratio (R_p)	1.00	1.33		1.00	1.33			1.00			1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)	0.50	0.50	0.50	0.11	0.50	0.50	0.32	0.21			0.15	

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	6.5	6.5	6.5	6.5		6.5		6.5
Green Ratio (*g/C*)	0.11	0.61	0.06	0.56		0.18		0.18
Permitted Saturation Flow Rate (s_p), veh/h/ln	0	0	0	0		1327		1230
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								0
Permitted Effective Green Time (g_p), s	0.0	0.0	0.0	0.0		23.5		23.5
Permitted Service Time (g_u), s	0.0	0.0	0.0	0.0		10.6		11.0
Permitted Queue Service Time (g_{ps}), s						10.6		0.4
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0		0.0		6.4
Queue Service Time Before Blockage (g_{fs}), s								2.4
Protected Right Saturation Flow (s_R), veh/h/ln								
Protected Right Effective Green Time (g_R), s								

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.03	1.389	0.10	2.107	0.00	2.107	0.00
Pedestrian F_s / F_{delay}	0.000	0.092	0.000	0.102	0.000	0.151	0.000	0.151
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	1217.08	9.96	1115.33	12.72	361.53	43.62	361.53	43.62
Bicycle F_w / F_v	-3.64	1.99	-3.64	1.01	-3.64	0.49	-3.64	0.15

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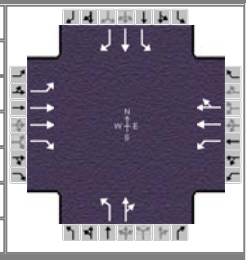
HCS 2010 Signalized Intersection Input Data

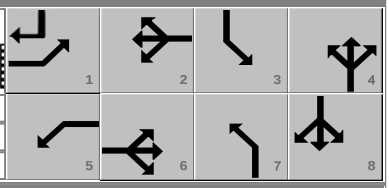
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.95
Intersection	Saxon and Normandy	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Saxon Blvd & Normandy Blvd.xus				
Project Description	W9401.1 Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	416	1376	292	36	659	51	221	183	35	95	187	241

Signal Information			
Cycle, s	130.0	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	3.7	11.4	46.7	8.1	0.9	15.7
Yellow	4.5	4.5	4.5	4.0	4.0	4.0
Red	3.0	3.0	3.0	3.0	3.0	3.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	416	1376	292	36	659	51	221	183	35	95	187	241
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	2	2	2	2	2		2	2		2	2	0
Ped / Bike / RTOR, /h	0	0	80	0	0	6	0	0	2	0	0	64
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	4	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	0.09	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	12.0
Turn Bay Length, ft	540	0	265	200	0		290	0		295	0	380
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	40	40	40	40	40	40	35	35	35	35	35	35

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	42.0	64.0	20.0	42.0	23.0	30.0	16.0	23.0
Yellow Change Interval (*Y*), s	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Green (G_{min}), s	5	11	5	11	5	6	5	6
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	18.0	0.0	29.0	0.0	23.0	0.0	23.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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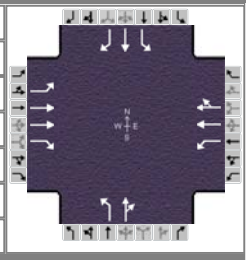
HCS 2010 Signalized Intersection Results Summary

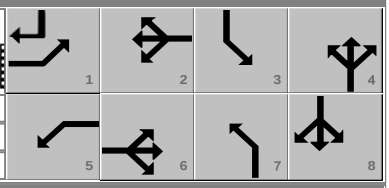
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.95
Intersection	Saxon and Normandy	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Saxon Blvd & Normandy Blvd.xus				
Project Description	W9401.1 Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	416	1376	292	36	659	51	221	183	35	95	187	241

Signal Information			
Cycle, s	130.0	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	3.7	11.4	46.7	8.1	0.9	15.7
Yellow	4.5	4.5	4.5	4.0	4.0	4.0
Red	3.0	3.0	3.0	3.0	3.0	3.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	1	6	5	2	7	4	3	8
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	3.0
Phase Duration, s	30.1	73.1	11.2	54.2	23.0	30.6	15.1	22.7
Change Period, ($Y+R_c$), s	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0
Max Allow Headway (*MAH*), s	4.1	0.0	4.1	0.0	4.1	5.2	4.1	5.2
Queue Clearance Time (g_s), s	21.2		3.7		16.5	17.3	8.3	15.5
Green Extension Time (g_e), s	1.4	0.0	0.0	0.0	0.0	1.9	0.0	0.2
Phase Call Probability	1.00		0.75		1.00	1.00	0.97	1.00
Max Out Probability	0.02		0.00		1.00	0.72	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	1	6	16	5	2	12	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	438	1448	223	38	375	367	233	227		100	197	186
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1774	1773	1579	1774	1863	1820	1774	1813		1774	1863	1610
Queue Service Time (g_s), s	19.2	38.2	10.6	1.7	21.0	21.0	14.5	15.3		6.3	13.5	12.0
Cycle Queue Clearance Time (g_c), s	19.2	38.2	10.6	1.7	21.0	21.0	14.5	15.3		6.3	13.5	12.0
Green Ratio (*g/C*)	0.55	0.50	0.50	0.39	0.36	0.36	0.26	0.18		0.18	0.12	0.29
Capacity (*c*), veh/h	505	1789	796	178	669	654	294	329		222	225	475
Volume-to-Capacity Ratio (*X*)	0.867	0.810	0.280	0.213	0.560	0.561	0.792	0.692		0.450	0.875	0.393
Available Capacity (c_a), veh/h	672	1789	796	302	669	654	294	333		234	229	478
Back of Queue (*Q*), veh/ln (50th percentile)	7.6	11.8	3.8	0.7	9.9	9.7	7.4	7.5		2.9	8.2	4.8
Queue Storage Ratio (*RQ*) (50th percentile)	0.36	0.00	0.36	0.09	0.00	0.00	0.65	0.00		0.25	0.00	0.32
Uniform Delay (d_1), s/veh	22.6	16.8	18.6	26.6	33.4	33.4	42.2	49.8		46.3	56.2	36.6
Incremental Delay (d_2), s/veh	0.9	0.4	0.1	0.6	3.4	3.5	13.7	6.6		1.4	29.5	0.8
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	23.5	17.2	18.7	27.2	36.8	36.9	55.9	56.4		47.7	85.7	37.3
Level of Service (LOS)	C	B	B	C	D	D	E	E		D	F	D
Approach Delay, s/veh / LOS	18.7	B		36.4	D		56.1	E		59.2	E	
Intersection Delay, s/veh / LOS	31.9						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.5	B	2.9	C	3.1	C
Bicycle LOS Score / LOS	2.2	B	1.1	A	1.2	A	1.3	A

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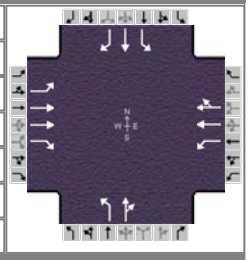
HCS 2010 Signalized Intersection Intermediate Values

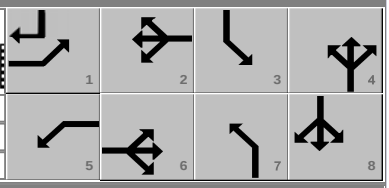
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.95
Intersection	Saxon and Normandy	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Saxon Blvd & Normandy Blvd.xus				
Project Description	W9401.1 Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	416	1376	292	36	659	51	221	183	35	95	187	241

Signal Information			
Cycle, s	130.0	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	3.7	11.4	46.7	8.1	0.9	15.7
Yellow	4.5	4.5	4.5	4.0	4.0	4.0
Red	3.0	3.0	3.0	3.0	3.0	3.0



Saturation Flow / Delay	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.980	0.980	0.980	0.980	0.980	1.000	0.980	0.980	1.000	0.980	0.980	1.000
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.977			0.973			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h	1774	3547		1774	3451		1774	1536		1774	1863	
Platoon Ratio (R_p)	1.00	1.33		1.33	1.00		1.00	1.00		1.00	1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)	0.23	0.50	0.50	0.11	0.50	0.50	0.34	0.28		0.11	0.40	0.15

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0
Green Ratio (*g/C*)	0.55	0.50	0.39	0.36	0.26	0.18	0.18	0.12
Permitted Saturation Flow Rate (s_p), veh/h/ln	715	0	366	0	1181	0	1149	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	48.7	0.0	46.7	0.0	17.7	0.0	15.7	0.0
Permitted Service Time (g_u), s	25.7	0.0	25.4	0.0	2.2	0.0	6.3	0.0
Permitted Queue Service Time (g_{ps}), s	25.7		2.4		2.2		0.9	
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln		0						1610
Protected Right Effective Green Time (g_R), s		0.0						22.6

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.00	1.710	0.09	2.107	0.01	2.224	0.11
Pedestrian F_s / F_{delay}	0.000	0.111	0.000	0.132	0.000	0.151	0.000	0.157
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	1008.82	15.96	718.12	26.70	362.58	43.57	241.52	50.25
Bicycle F_w / F_v	-3.64	1.74	-3.64	0.64	-3.64	0.76	-3.64	0.80

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	GR	Intersection	Saxon and Sterling Silver
Agency/Co.	CPH	Jurisdiction	Volusia County
Date Performed	9/20/2013	Analysis Year	Existing
Analysis Time Period	PM Peak		

Project Description *W9401.1-Retail Deltona*

East/West Street: *Saxon Boulevard*	North/South Street: *Sterling Silver Boulevard*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	33	1224	9	7	663	11
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate, HFR (veh/h)	34	1288	9	7	697	11
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	1	2	0	1	2	0
Configuration	L	T	TR	L	T	TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	8	0	10	11	0	20
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate, HFR (veh/h)	8	0	10	11	0	21
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	1	1	0
Configuration		LTR		L		TR

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L		LTR		L		TR
v (veh/h)	34	7		18		11		21
C (m) (veh/h)	887	530		104		89		688
v/c	0.04	0.01		0.17		0.12		0.03
95% queue length	0.12	0.04		0.59		0.41		0.09
Control Delay (s/veh)	9.2	11.9		46.7		51.1		10.4
LOS	A	B		E		F		B
Approach Delay (s/veh)	--	--	46.7			24.4		
Approach LOS	--	--	E			C		

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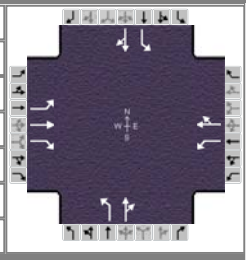
HCS 2010 Signalized Intersection Input Data

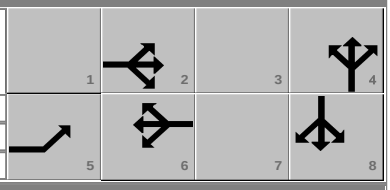
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.95
Intersection	Saxon and Tivoli	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Saxon Blvd & Tivoli Dr.xus				
Project Description	W9501.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	502	557	67	8	250	10	47	99	21	31	92	245

Signal Information			
Cycle, s	60.4	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	15.0	12.0	14.9	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.5	0.0	0.0	0.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	502	557	67	8	250	10	47	99	21	31	92	245
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	2	2	2	2	2		2	2		2	2	
Ped / Bike / RTOR, /h	0	0	24	0	0	0	0	0	7	0	0	99
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	3	3	3	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	
Turn Bay Length, ft	315	0	205	120	0		270	0		80	0	
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	40	40	40	35	35	35	30	30	30	35	35	35

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	15.0	30.0		30.0		30.0		30.0
Yellow Change Interval (*Y*), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	2.0	2.0	1.0	2.0	1.0	2.5	1.0	2.5
Minimum Green (G_{min}), s	5	11	5	11	5	5	5	5
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	2.0	4.0	2.0	4.0	2.0	4.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	16.0	0.0	16.0	0.0	20.0	0.0	20.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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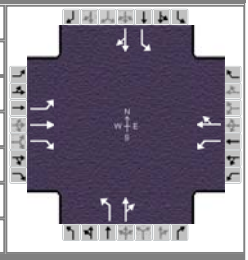
HCS 2010 Signalized Intersection Results Summary

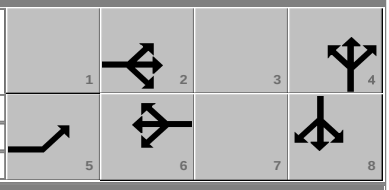
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.95
Intersection	Saxon and Tivoli	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Saxon Blvd & Tivoli Dr.xus				
Project Description	W9501.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	502	557	67	8	250	10	47	99	21	31	92	245

Signal Information			
Cycle, s	60.4	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	15.0	12.0	14.9	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.5	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		4		8
Case Number	1.0	3.0		6.3		6.0		6.0
Phase Duration, s	21.0	39.0		18.0		21.4		21.4
Change Period, ($Y+R_c$), s	6.0	6.0		6.0		6.5		6.5
Max Allow Headway (*MAH*), s	4.1	5.0		5.0		5.3		5.3
Queue Clearance Time (g_s), s	15.3	14.6		10.4		12.4		10.0
Green Extension Time (g_e), s	0.0	4.9		1.6		2.5		2.6
Phase Call Probability	1.00	1.00		1.00		1.00		1.00
Max Out Probability	1.00	0.24		0.14		0.03		0.02

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	528	586	45	8	274		49	119		33	251	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1774	1863	1579	826	1850		1125	1822		1268	1678	
Queue Service Time (g_s), s	13.3	12.6	0.8	0.5	8.4		2.5	3.2		1.3	8.0	
Cycle Queue Clearance Time (g_c), s	13.3	12.6	0.8	0.5	8.4		10.4	3.2		4.5	8.0	
Green Ratio (*g/C*)	0.48	0.55	0.55	0.20	0.20		0.25	0.25		0.25	0.25	
Capacity (*c*), veh/h	625	1017	862	283	368		249	450		366	415	
Volume-to-Capacity Ratio (*X*)	0.846	0.576	0.053	0.030	0.744		0.199	0.264		0.089	0.604	
Available Capacity (c_a), veh/h	625	1017	862	529	918		529	904		682	832	
Back of Queue (*Q*), veh/ln (50th percentile)	5.8	4.0	0.2	0.1	3.8		0.7	1.3		0.4	3.0	
Queue Storage Ratio (*RQ*) (50th percentile)	0.47	0.00	0.03	0.02	0.00		0.06	0.00		0.12	0.00	
Uniform Delay (d_1), s/veh	13.0	9.1	6.4	19.6	22.8		24.8	18.3		20.1	20.1	
Incremental Delay (d_2), s/veh	10.4	1.0	0.0	0.1	4.2		0.6	0.4		0.1	2.0	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	23.5	10.1	6.4	19.7	27.0		25.3	18.8		20.3	22.2	
Level of Service (LOS)	C	B	A	B	C		C	B		C	C	
Approach Delay, s/veh / LOS	16.0	B		26.8	C		20.7	C		21.9	C	
Intersection Delay, s/veh / LOS	18.9						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	2.4	B	2.3	B	2.5	B
Bicycle LOS Score / LOS	2.4	B	1.0	A	0.8	A	1.0	A

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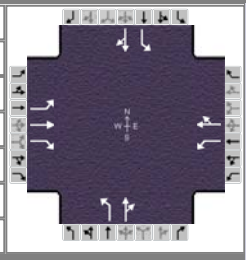
HCS 2010 Signalized Intersection Intermediate Values

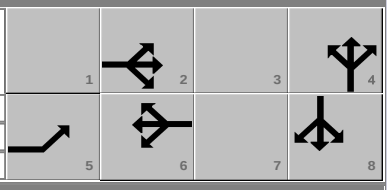
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.95
Intersection	Saxon and Tivoli	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Saxon Blvd & Tivoli Dr.xus				
Project Description	W9501.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	502	557	67	8	250	10	47	99	21	31	92	245

Signal Information			
Cycle, s	60.4	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	15.0	12.0	14.9	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.5	0.0	0.0	0.0



	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.980	0.980	0.980	0.980	0.980	1.000	0.980	0.980	1.000	0.980	0.980	1.000
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000			0.000			0.000			0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.993			0.978			0.901	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h	1774	1863			1779			1596			648	
Platoon Ratio (R_p)	1.00	1.00			1.00			1.00			1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)	0.38	0.21	0.15	0.15	0.15		0.15	0.15		0.15	0.15	

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	6.0	6.0		6.0		6.5		6.5
Green Ratio (*g/C*)	0.48	0.55		0.20		0.25		0.25
Permitted Saturation Flow Rate (s_p), veh/h/ln	1101	0		826		1125		1268
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	14.0	0.0		12.0		14.9		14.9
Permitted Service Time (g_u), s	3.6	0.0		12.0		7.0		11.8
Permitted Queue Service Time (g_{ps}), s	3.6			0.5		2.5		1.3
Time to First Blockage (g_f), s	0.0	0.0		0.0		0.0		0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln		0						
Protected Right Effective Green Time (g_R), s		0.0						

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.01	1.557	0.14	1.557	0.00	1.710	0.03
Pedestrian F_s / F_{delay}	0.000	0.073	0.000	0.119	0.000	0.114	0.000	0.114
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	1092.49	6.22	397.59	19.40	493.85	17.14	493.85	17.14
Bicycle F_w / F_v	-3.64	1.91	-3.64	0.47	-3.64	0.28	-3.64	0.47

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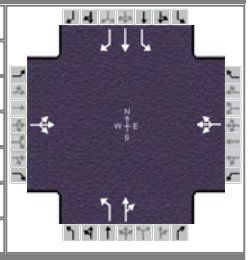
HCS 2010 Signalized Intersection Input Data

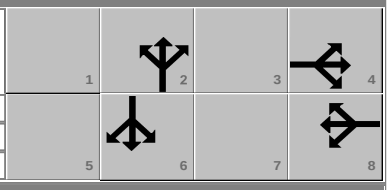
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/18/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.94
Intersection	Providence & Tivoli	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Providence Blvd & Tivoli Dr.xus				
Project Description	W9401.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	499	19	32	10	11	20	37	377	9	8	392	283

Signal Information			
Cycle, s	66.7	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	20.1	24.3	3.4	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.5	2.5	0.0	0.0	0.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	499	19	32	10	11	20	37	377	9	8	392	283
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %		2			2		2	2		2	2	2
Ped / Bike / RTOR, /h	0	0	1	0	0	8	0	0	0	0	0	148
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	3	3	3	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft		12.0			12.0		12.0	12.0		12.0	12.0	12.0
Turn Bay Length, ft		0			0		65	0		330	0	0
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	30	30	30	30	30	30	35	35	35	35	35	35

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s		35.0		35.0		35.0		35.0
Yellow Change Interval (*Y*), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	1.0	2.5	1.0	2.5	1.0	2.0	1.0	2.0
Minimum Green (G_{min}), s	5	7	5	7	5	7	5	7
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Off	Off	Off	Off	Off	Min	Off	Min
Dual Entry	No	No	No	No	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	20.0	0.0	20.0	0.0	16.0	0.0	16.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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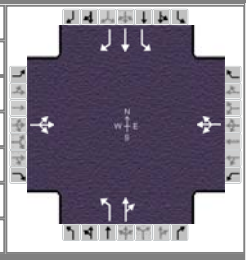
HCS 2010 Signalized Intersection Results Summary

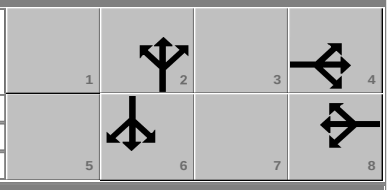
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/18/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.94
Intersection	Providence & Tivoli	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Providence Blvd & Tivoli Dr.xus				
Project Description	W9401.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	499	19	32	10	11	20	37	377	9	8	392	283

Signal Information			
Cycle, s	66.7	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	20.1	24.3	3.4	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.5	2.5	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		12.0		12.0		6.0		5.0
Phase Duration, s		30.8		9.9		26.1		26.1
Change Period, ($Y+R_c$), s		6.5		6.5		6.0		6.0
Max Allow Headway (*MAH*), s		3.2		3.2		3.1		3.1
Queue Clearance Time (g_s), s		23.0		3.3		18.0		15.8
Green Extension Time (g_e), s		1.1		0.0		2.0		2.0
Phase Call Probability		1.00		0.48		1.00		1.00
Max Out Probability		0.01		0.00		0.01		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	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		584			35		39	411		9	417	144
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1765			1724		965	1855		971	1863	1579
Queue Service Time (g_s), s		21.0			1.3		2.6	13.3		0.5	13.5	4.7
Cycle Queue Clearance Time (g_c), s		21.0			1.3		16.0	13.3		13.8	13.5	4.7
Green Ratio (*g/C*)		0.36			0.05		0.30	0.30		0.30	0.30	0.30
Capacity (*c*), veh/h		643			87		204	558		208	561	475
Volume-to-Capacity Ratio (*X*)		0.909			0.403		0.193	0.736		0.041	0.744	0.302
Available Capacity (c_a), veh/h		924			902		419	971		424	975	826
Back of Queue (*Q*), veh/ln (50th percentile)		9.2			0.6		0.6	5.3		0.1	5.4	1.6
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00		0.22	0.00		0.01	0.00	0.00
Uniform Delay (d_1), s/veh		20.2			30.8		28.2	21.0		27.1	21.0	18.0
Incremental Delay (d_2), s/veh		7.6			1.1		0.2	0.7		0.0	0.7	0.1
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh		27.8			31.9		28.4	21.7		27.2	21.8	18.1
Level of Service (LOS)		C			C		C	C		C	C	B
Approach Delay, s/veh / LOS	27.8	C		31.9	C		22.3	C		20.9	C	
Intersection Delay, s/veh / LOS	24.0						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.7	B	2.1	B	2.1	B
Bicycle LOS Score / LOS	1.5	A	0.5	A	1.2	A	1.4	A

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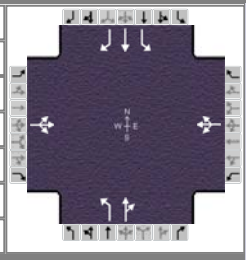
HCS 2010 Signalized Intersection Intermediate Values

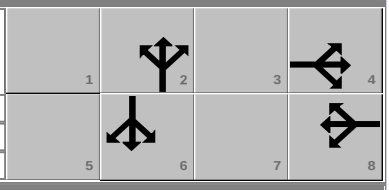
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/18/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.94
Intersection	Providence & Tivoli	Analysis Year	Existing	Analysis Period	1> 7:00
File Name	Providence Blvd & Tivoli Dr.xus				
Project Description	W9401.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	499	19	32	10	11	20	37	377	9	8	392	283

Signal Information			
Cycle, s	66.7	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	20.1	24.3	3.4	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.5	2.5	0.0	0.0	0.0



	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	1.000	0.980	1.000	1.000	0.980	1.000	0.980	0.980	1.000	0.980	0.980	0.980
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})		0.947			0.925			0.000			0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.000			0.996			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h		61			575			1812			1863	
Platoon Ratio (R_p)		1.00			1.00			1.00			1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)		0.16			0.04		0.04	0.04		0.04	0.04	0.04

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)		5.0		6.5		6.0		6.0
Green Ratio (*g/C*)		0.36		0.05		0.30		0.30
Permitted Saturation Flow Rate (s_p), veh/h/ln		0		0		965		971
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s		0.0		0.0		20.1		20.1
Permitted Service Time (g_u), s		0.0		0.0		6.7		6.9
Permitted Queue Service Time (g_{ps}), s						2.6		0.5
Time to First Blockage (g_f), s		0.0		0.0		0.0		0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln								0
Protected Right Effective Green Time (g_R), s								0.0

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.00	1.710	0.21	1.389	0.01	1.389	0.00
Pedestrian F_s / F_{delay}	0.000	0.136	0.000	0.149	0.000	0.112	0.000	0.112
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	101.00	30.06	-224.93	41.27	601.61	16.30	601.61	16.30
Bicycle F_w / F_v	-3.64	0.96	-3.64	0.06	-3.64	0.74	-3.64	0.94

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*GR*	Intersection	*Sterling Silver and Alabaster*
Agency/Co.	*CPH*	Jurisdiction	*Volusia County*
Date Performed	*9/20/2013*	Analysis Year	*Existing*
Analysis Time Period	*PM Peak*		

Project Description *W9401.1-Retail Deltona*

East/West Street: *Alabaster Way* | North/South Street: *Sterling Silver Boulevard*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*36*	*7*	*0*	*23*	
Peak-Hour Factor, PHF	*0.80*	*0.80*	*0.80*	*0.80*	*0.80*	*0.80*
Hourly Flow Rate, HFR (veh/h)	*0*	*44*	*8*	*0*	*28*	*0*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*		*0*	*8*		*0*
Peak-Hour Factor, PHF	*0.80*	*0.80*	*0.80*	*0.80*	*0.80*	*0.80*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*9*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*0*	*2*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration		*LR*		*L*		*R*

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*	*L*		*R*		*LR*	
v (veh/h)		*0*	*9*		*0*		*0*	
C (m) (veh/h)		*1554*	*914*		*1027*			
v/c		*0.00*	*0.01*		*0.00*			
95% queue length		*0.00*	*0.03*		*0.00*			
Control Delay (s/veh)		*7.3*	*9.0*		*8.5*			
LOS		*A*	*A*		*A*			
Approach Delay (s/veh)	--	--	*9.0*					
Approach LOS	--	--	*A*					

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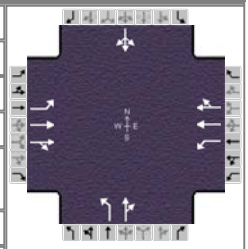
FUTURE BACKGROUND CONDITIONS
(PM PEAK HOUR)

HCS 2010 Signalized Intersection Input Data

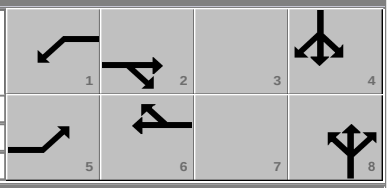
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.93
Intersection	Saxon & Finland	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Saxon Blvd & Finland Dr.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	205	2153	67	85	1116	20	122	57	143	20	28	118

Signal Information			
Cycle, s	130.0	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	8.4	6.1	72.5	23.5	0.0	0.0
Yellow	4.5	0.0	4.5	4.0	0.0	0.0
Red	2.0	0.0	2.0	2.5	0.0	0.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	205	2153	67	85	1116	20	122	57	143	20	28	118
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	2	2		2	2		2	2			2	
Ped / Bike / RTOR, /h	0	0	3	0	0	0	0	0	26	0	0	77
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	3	4	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	0.52	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0		12.0	12.0		12.0	12.0			12.0	
Turn Bay Length, ft	350	0		105	0		350	0			0	
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	40	40	40	40	40	40	30	30	30	30	30	30

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	21.0	75.0	25.0	79.0		30.0		30.0
Yellow Change Interval (*Y*), s	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	2.0	2.0	2.0	2.0	1.0	2.5	1.0	2.5
Minimum Green (G_{min}), s	5	11	5	11	5	6	5	6
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	3.0	4.0	2.0	4.0	2.0	4.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	22.0	0.0	22.0	0.0	24.0	0.0	24.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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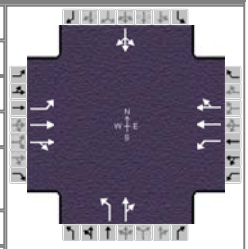
HCS 2010 Signalized Intersection Results Summary

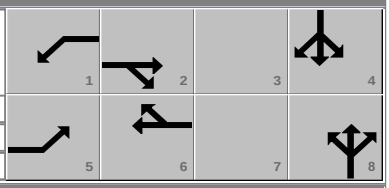
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.93
Intersection	Saxon & Finland	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Saxon Blvd & Finland Dr.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	205	2153	67	85	1116	20	122	57	143	20	28	118

Signal Information			
Cycle, s	130.0	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	8.4	6.1	72.5	23.5	0.0	0.0
Yellow	4.5	0.0	4.5	4.0	0.0	0.0
Red	2.0	0.0	2.0	2.5	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	4.0	2.0	4.0		6.0		8.0
Phase Duration, s	21.0	85.1	14.9	79.0		30.0		30.0
Change Period, ($Y+R_c$), s	6.5	6.5	6.5	6.5		6.5		6.5
Max Allow Headway (*MAH*), s	4.1	0.0	4.1	0.0		5.3		5.3
Queue Clearance Time (g_s), s	16.5		8.6			25.5		16.0
Green Extension Time (g_e), s	0.0	0.0	0.1	0.0		0.0		1.4
Phase Call Probability	1.00		0.96			1.00		1.00
Max Out Probability	1.00		0.00			1.00		0.52

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	220	1192	1192	91	613	609	131	187			96	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1774	1863	1844	1774	1863	1851	1320	1662			1134	
Queue Service Time (g_s), s	14.5	78.6	78.6	6.6	19.5	19.9	9.5	13.5			0.5	
Cycle Queue Clearance Time (g_c), s	14.5	78.6	78.6	6.6	19.5	19.9	23.5	13.5			14.0	
Green Ratio (*g/C*)	0.11	0.60	0.60	0.06	0.56	0.56	0.18	0.18			0.18	
Capacity (*c*), veh/h	198	1126	1114	115	1039	1032	152	300			239	
Volume-to-Capacity Ratio (*X*)	1.114	1.059	1.070	0.795	0.590	0.590	0.863	0.623			0.401	
Available Capacity (c_a), veh/h	198	1126	1114	252	1039	1032	152	300			239	
Back of Queue (*Q*), veh/ln (50th percentile)	11.8	28.6	31.3	3.1	5.9	6.1	5.9	6.0			2.8	
Queue Storage Ratio (*RQ*) (50th percentile)	0.85	0.00	0.00	0.76	0.00	0.00	0.43	0.00			0.00	
Uniform Delay (d_1), s/veh	57.7	12.6	13.4	59.9	9.9	10.2	61.5	49.2			46.4	
Incremental Delay (d_2), s/veh	97.8	43.8	47.7	6.4	1.3	1.3	37.5	4.6			1.5	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Control Delay (*d*), s/veh	155.6	56.4	61.0	66.3	11.2	11.5	99.0	53.8			47.9	
Level of Service (LOS)	F	F	F	E	B	B	F	D			D	
Approach Delay, s/veh / LOS	66.9	E		15.1	B		72.4	E		47.9	D	
Intersection Delay, s/veh / LOS	51.2						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.2	B	2.9	C	2.9	C
Bicycle LOS Score / LOS	2.6	B	1.6	A	1.0	A	0.6	A

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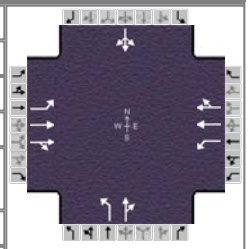
HCS 2010 Signalized Intersection Intermediate Values

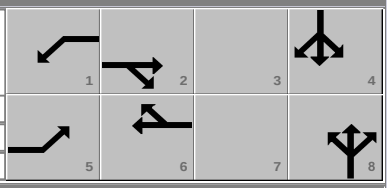
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.93
Intersection	Saxon & Finland	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Saxon Blvd & Finland Dr.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	205	2153	67	85	1116	20	122	57	143	20	28	118

Signal Information			
Cycle, s	130.0	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	8.4	6.1	72.5	23.5	0.0	0.0
Yellow	4.5	0.0	4.5	4.0	0.0	0.0
Red	2.0	0.0	2.0	2.5	0.0	0.0



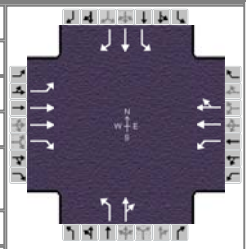
	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.980	0.980	1.000	0.980	0.980	1.000	0.980	0.980	1.000	1.000	0.980	1.000
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000			0.000			0.609	
Right-Turn Adjustment Factor (f_{RT})		0.990			0.994			0.892			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h	1774	3600		1774	3649			544			485	
Platoon Ratio (R_p)	1.00	1.33		1.00	1.33			1.00			1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)	0.50	0.50	0.50	0.11	0.50	0.50	0.41	0.24			0.15	

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	6.5	6.5	6.5	6.5		6.5		6.5
Green Ratio (*g/C*)	0.11	0.60	0.06	0.56		0.18		0.18
Permitted Saturation Flow Rate (s_p), veh/h/ln	0	0	0	0		1320		1215
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								0
Permitted Effective Green Time (g_p), s	0.0	0.0	0.0	0.0		23.5		23.5
Permitted Service Time (g_u), s	0.0	0.0	0.0	0.0		9.5		10.0
Permitted Queue Service Time (g_{ps}), s						9.5		0.5
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0		0.0		6.6
Queue Service Time Before Blockage (g_{fs}), s								2.6
Protected Right Saturation Flow (s_R), veh/h/ln								
Protected Right Effective Green Time (g_R), s								

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.04	1.389	0.11	2.107	0.00	2.107	0.00
Pedestrian F_s / F_{delay}	0.000	0.093	0.000	0.102	0.000	0.151	0.000	0.151
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	1208.84	10.17	1115.36	12.72	361.54	43.62	361.54	43.62
Bicycle F_w / F_v	-3.64	2.15	-3.64	1.08	-3.64	0.53	-3.64	0.16

HCS 2010 Signalized Intersection Input Data

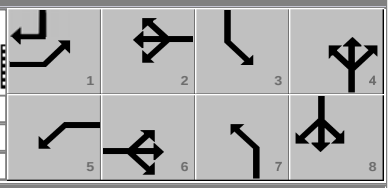
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.95
Intersection	Saxon and Normandy	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Saxon Blvd & Normandy Blvd.xus				
Project Description	W9401.1 Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	448	1482	314	39	710	55	238	197	38	102	201	260

Signal Information			
Cycle, s	130.0	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	3.9	14.2	43.4	8.6	0.4	16.0
Yellow	4.5	4.5	4.5	4.0	4.0	4.0
Red	3.0	3.0	3.0	3.0	3.0	3.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	448	1482	314	39	710	55	238	197	38	102	201	260
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	2	2	2	2	2		2	2		2	2	0
Ped / Bike / RTOR, /h	0	0	89	0	0	6	0	0	2	0	0	69
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	4	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	0.09	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	12.0
Turn Bay Length, ft	540	0	265	200	0		290	0		295	0	380
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	40	40	40	40	40	40	35	35	35	35	35	35

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	42.0	64.0	20.0	42.0	23.0	30.0	16.0	23.0
Yellow Change Interval (*Y*), s	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Green (G_{min}), s	5	11	5	11	5	6	5	6
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	18.0	0.0	29.0	0.0	23.0	0.0	23.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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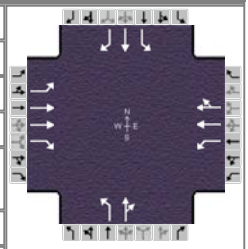
HCS 2010 Signalized Intersection Results Summary

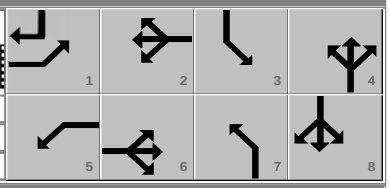
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.95
Intersection	Saxon and Normandy	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Saxon Blvd & Normandy Blvd.xus				
Project Description	W9401.1 Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	448	1482	314	39	710	55	238	197	38	102	201	260

Signal Information			
Cycle, s	130.0	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	3.9	14.2	43.4	8.6	0.4	16.0
Yellow	4.5	4.5	4.5	4.0	4.0	4.0
Red	3.0	3.0	3.0	3.0	3.0	3.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	1	6	5	2	7	4	3	8
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	3.0
Phase Duration, s	33.1	72.6	11.4	50.9	23.0	30.4	15.6	23.0
Change Period, ($Y+R_c$), s	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0
Max Allow Headway (*MAH*), s	4.1	0.0	4.1	0.0	4.1	5.2	4.1	5.2
Queue Clearance Time (g_s), s	24.2		4.0		17.8	18.7	8.8	16.6
Green Extension Time (g_e), s	1.3	0.0	0.0	0.0	0.0	1.6	0.0	0.0
Phase Call Probability	1.00		0.77		1.00	1.00	0.98	1.00
Max Out Probability	0.08		0.00		1.00	1.00	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	1	6	16	5	2	12	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	472	1560	237	41	404	395	251	245		107	212	201
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1774	1773	1579	1774	1863	1820	1774	1812		1774	1863	1610
Queue Service Time (g_s), s	22.2	45.9	11.4	2.0	24.0	24.0	15.8	16.7		6.8	14.6	12.6
Cycle Queue Clearance Time (g_c), s	22.2	45.9	11.4	2.0	24.0	24.0	15.8	16.7		6.8	14.6	12.6
Green Ratio (*g/C*)	0.55	0.50	0.50	0.36	0.33	0.33	0.26	0.18		0.19	0.12	0.32
Capacity (*c*), veh/h	506	1777	791	152	622	607	286	326		214	229	515
Volume-to-Capacity Ratio (*X*)	0.933	0.878	0.299	0.271	0.650	0.650	0.875	0.752		0.502	0.923	0.390
Available Capacity (c_a), veh/h	627	1777	791	270	622	607	286	326		219	229	515
Back of Queue (*Q*), veh/ln (50th percentile)	9.2	14.4	4.1	0.9	11.6	11.4	8.8	8.4		3.1	9.3	5.0
Queue Storage Ratio (*RQ*) (50th percentile)	0.43	0.00	0.39	0.11	0.00	0.00	0.77	0.00		0.27	0.00	0.33
Uniform Delay (d_1), s/veh	25.6	18.4	19.0	29.7	36.8	36.8	42.5	50.6		46.0	56.4	34.3
Incremental Delay (d_2), s/veh	2.5	0.6	0.1	0.9	5.2	5.3	24.7	10.1		1.8	39.3	0.7
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	28.1	19.0	19.1	30.6	42.0	42.2	67.2	60.7		47.8	95.7	35.0
Level of Service (LOS)	C	B	B	C	D	D	E	E		D	F	D
Approach Delay, s/veh / LOS	20.9	C		41.5	D		63.9	E		62.4	E	
Intersection Delay, s/veh / LOS	35.5						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.5	B	2.9	C	3.1	C
Bicycle LOS Score / LOS	2.4	B	1.2	A	1.3	A	1.3	A

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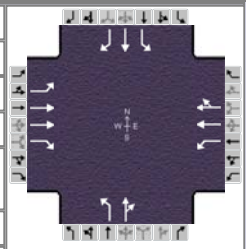
HCS 2010 Signalized Intersection Intermediate Values

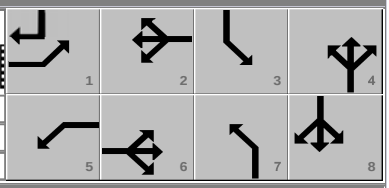
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.95
Intersection	Saxon and Normandy	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Saxon Blvd & Normandy Blvd.xus				
Project Description	W9401.1 Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	448	1482	314	39	710	55	238	197	38	102	201	260

Signal Information			
Cycle, s	130.0	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	3.9	14.2	43.4	8.6	0.4	16.0
Yellow	4.5	4.5	4.5	4.0	4.0	4.0
Red	3.0	3.0	3.0	3.0	3.0	3.0



Saturation Flow / Delay	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.980	0.980	0.980	0.980	0.980	1.000	0.980	0.980	1.000	0.980	0.980	1.000
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.977			0.973			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h	1774	3547		1774	3448		1774	1532		1774	1863	
Platoon Ratio (R_p)	1.00	1.33		1.33	1.00		1.00	1.00		1.00	1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)	0.31	0.50	0.50	0.11	0.50	0.50	0.40	0.33		0.11	0.45	0.15

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0
Green Ratio (*g/C*)	0.55	0.50	0.36	0.33	0.26	0.18	0.19	0.12
Permitted Saturation Flow Rate (s_p), veh/h/ln	678	0	329	0	1165	0	1130	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	45.4	0.0	43.4	0.0	18.0	0.0	16.0	0.0
Permitted Service Time (g_u), s	19.3	0.0	17.2	0.0	1.4	0.0	4.7	0.0
Permitted Queue Service Time (g_{ps}), s	19.3		3.7		1.4		1.2	
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln		0						1610
Protected Right Effective Green Time (g_R), s		0.0						25.6

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.00	1.710	0.10	2.107	0.01	2.224	0.13
Pedestrian F_s / F_{delay}	0.000	0.112	0.000	0.135	0.000	0.151	0.000	0.157
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	1002.08	16.18	667.88	28.84	359.81	43.72	246.15	49.98
Bicycle F_w / F_v	-3.64	1.87	-3.64	0.69	-3.64	0.82	-3.64	0.86

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*GR*	Intersection	*Saxon and Sterling Silver*
Agency/Co.	*CPH*	Jurisdiction	*Volusia County*
Date Performed	*9/20/2013*	Analysis Year	*Future Background*
Analysis Time Period	*PM Peak*		

Project Description *W9401.1-Retail Deltona*

East/West Street: *Saxon Boulevard*	North/South Street: *Sterling Silver Boulevard*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*36*	*1318*	*10*	*8*	*714*	*12*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*37*	*1387*	*10*	*8*	*751*	*12*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*1*	*2*	*0*
Configuration	*L*	*T*	*TR*	*L*	*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*9*	*0*	*11*	*12*	*0*	*22*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*9*	*0*	*11*	*12*	*0*	*23*
Percent Heavy Vehicles	*2*	*2*	*2*	*2*	*2*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*1*	*1*	*0*
Configuration		*LTR*		*L*		*TR*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*	*L*		*LTR*		*L*		*TR*
v (veh/h)	*37*	*8*		*20*		*12*		*23*
C (m) (veh/h)	*845*	*485*		*82*		*74*		*664*
v/c	*0.04*	*0.02*		*0.24*		*0.16*		*0.03*
95% queue length	*0.14*	*0.05*		*0.87*		*0.54*		*0.11*
Control Delay (s/veh)	*9.5*	*12.5*		*62.5*		*62.8*		*10.6*
LOS	*A*	*B*		*F*		*F*		*B*
Approach Delay (s/veh)	--	--	*62.5*			*28.5*		
Approach LOS	--	--	*F*			*D*		

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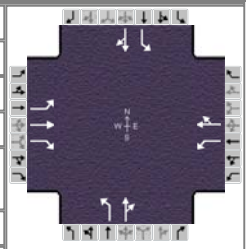
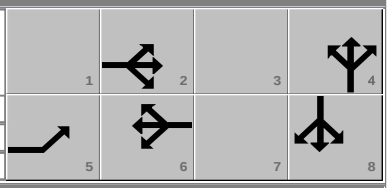
HCS 2010 Signalized Intersection Input Data

General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.95
Intersection	Saxon and Tivoli	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Saxon Blvd & Tivoli Dr.xus				
Project Description	W9501.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	541	600	72	9	269	11	51	107	23	33	99	264

Signal Information					EB			WB			NB			SB		
Cycle, s	63.5	Reference Phase	2													
Offset, s	0	Reference Point	End	Green	15.0	13.2		16.7	0.0	0.0	0.0					
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	4.0	4.0		4.0	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0		2.5	0.0	0.0	0.0					



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	541	600	72	9	269	11	51	107	23	33	99	264
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	2	2	2	2	2		2	2		2	2	
Ped / Bike / RTOR, /h	0	0	26	0	0	0	0	0	7	0	0	101
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	3	3	3	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	
Turn Bay Length, ft	315	0	205	120	0		270	0		80	0	
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	40	40	40	35	35	35	30	30	30	35	35	35

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	15.0	30.0		30.0		30.0		30.0
Yellow Change Interval (*Y*), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	2.0	2.0	1.0	2.0	1.0	2.5	1.0	2.5
Minimum Green (G_{min}), s	5	11	5	11	5	5	5	5
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	2.0	4.0	2.0	4.0	2.0	4.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	16.0	0.0	16.0	0.0	20.0	0.0	20.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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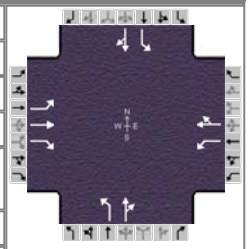
HCS 2010 Signalized Intersection Results Summary

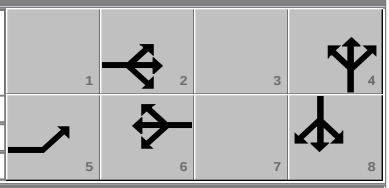
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.95
Intersection	Saxon and Tivoli	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Saxon Blvd & Tivoli Dr.xus				
Project Description	W9501.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	541	600	72	9	269	11	51	107	23	33	99	264

Signal Information			
Cycle, s	63.5	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	15.0	13.2	16.7	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.5	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		4		8
Case Number	1.0	3.0		6.3		6.0		6.0
Phase Duration, s	21.0	40.2		19.2		23.2		23.2
Change Period, ($Y+R_c$), s	6.0	6.0		6.0		6.5		6.5
Max Allow Headway (*MAH*), s	4.1	5.0		5.0		5.3		5.3
Queue Clearance Time (g_s), s	17.0	17.0		11.5		14.1		11.2
Green Extension Time (g_e), s	0.0	4.9		1.7		2.6		2.8
Phase Call Probability	1.00	1.00		1.00		1.00		1.00
Max Out Probability	1.00	0.38		0.19		0.06		0.03

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	569	632	48	9	295		54	129		35	276	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1774	1863	1579	792	1850		1099	1820		1256	1675	
Queue Service Time (g_s), s	15.0	15.0	0.9	0.6	9.5		2.9	3.6		1.4	9.2	
Cycle Queue Clearance Time (g_c), s	15.0	15.0	0.9	0.6	9.5		12.1	3.6		5.0	9.2	
Green Ratio (*g/C*)	0.48	0.54	0.54	0.21	0.21		0.26	0.26		0.26	0.26	
Capacity (*c*), veh/h	596	1005	851	278	386		244	480		374	442	
Volume-to-Capacity Ratio (*X*)	0.956	0.629	0.057	0.034	0.764		0.220	0.270		0.093	0.624	
Available Capacity (c_a), veh/h	596	1005	851	488	874		473	860		636	792	
Back of Queue (*Q*), veh/ln (50th percentile)	9.3	5.0	0.2	0.1	4.3		0.8	1.5		0.4	3.5	
Queue Storage Ratio (*RQ*) (50th percentile)	0.75	0.00	0.03	0.02	0.00		0.07	0.00		0.13	0.00	
Uniform Delay (d_1), s/veh	14.8	10.2	6.9	20.1	23.7		25.9	18.5		20.5	20.6	
Incremental Delay (d_2), s/veh	26.3	1.5	0.0	0.1	4.5		0.6	0.4		0.2	2.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	41.1	11.7	7.0	20.2	28.1		26.6	18.9		20.7	22.7	
Level of Service (LOS)	D	B	A	C	C		C	B		C	C	
Approach Delay, s/veh / LOS	24.9	C		27.9	C		21.2	C		22.4	C	
Intersection Delay, s/veh / LOS	24.6						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	2.4	B	2.3	B	2.5	B
Bicycle LOS Score / LOS	2.5	B	1.0	A	0.8	A	1.0	A

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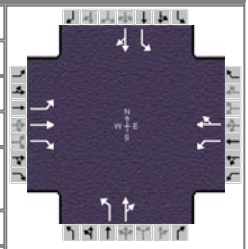
HCS 2010 Signalized Intersection Intermediate Values

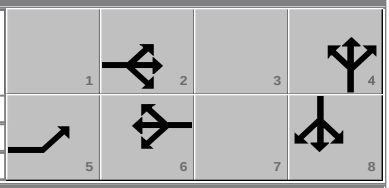
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.95
Intersection	Saxon and Tivoli	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Saxon Blvd & Tivoli Dr.xus				
Project Description	W9501.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	541	600	72	9	269	11	51	107	23	33	99	264

Signal Information			
Cycle, s	63.5	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	15.0	13.2	16.7	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.5	0.0	0.0	0.0



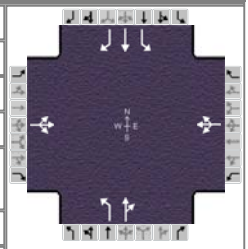
	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.980	0.980	0.980	0.980	0.980	1.000	0.980	0.980	1.000	0.980	0.980	1.000
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000			0.000			0.000			0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.993			0.977			0.899	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h	1774	1863			1777			1583			633	
Platoon Ratio (R_p)	1.00	1.00			1.00			1.00			1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)	0.47	0.24	0.15	0.15	0.15		0.15	0.15		0.15	0.15	

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	6.0	6.0		6.0		6.5		6.5
Green Ratio (*g/C*)	0.48	0.54		0.21		0.26		0.26
Permitted Saturation Flow Rate (s_p), veh/h/ln	1080	0		792		1099		1256
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	15.2	0.0		13.2		16.7		16.7
Permitted Service Time (g_u), s	3.7	0.0		13.2		7.5		13.2
Permitted Queue Service Time (g_{ps}), s	3.7			0.6		2.9		1.4
Time to First Blockage (g_f), s	0.0	0.0		0.0		0.0		0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln		0						
Protected Right Effective Green Time (g_R), s		0.0						

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.01	1.557	0.14	1.557	0.00	1.710	0.04
Pedestrian F_s / F_{delay}	0.000	0.076	0.000	0.120	0.000	0.114	0.000	0.114
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	1078.88	6.73	417.12	19.88	527.18	17.21	527.18	17.21
Bicycle F_w / F_v	-3.64	2.06	-3.64	0.50	-3.64	0.30	-3.64	0.51

HCS 2010 Signalized Intersection Input Data

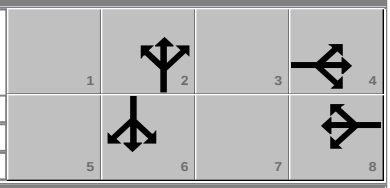
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/18/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.94
Intersection	Providence & Tivoli	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Providence Blvd & Tivoli Dr.xus				
Project Description	W9401.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	537	20	34	11	12	22	40	406	10	9	422	305

Signal Information			
Cycle, s	75.7	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	23.9	29.0	3.9	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.5	2.5	0.0	0.0	0.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	537	20	34	11	12	22	40	406	10	9	422	305
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %		2			2		2	2		2	2	2
Ped / Bike / RTOR, /h	0	0	1	0	0	9	0	0	0	0	0	159
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	3	3	3	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft		12.0			12.0		12.0	12.0		12.0	12.0	12.0
Turn Bay Length, ft		0			0		65	0		330	0	0
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	30	30	30	30	30	30	35	35	35	35	35	35

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s		35.0		35.0		35.0		35.0
Yellow Change Interval (*Y*), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	1.0	2.5	1.0	2.5	1.0	2.0	1.0	2.0
Minimum Green (G_{min}), s	5	7	5	7	5	7	5	7
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Off	Off	Off	Off	Off	Min	Off	Min
Dual Entry	No	No	No	No	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	20.0	0.0	20.0	0.0	16.0	0.0	16.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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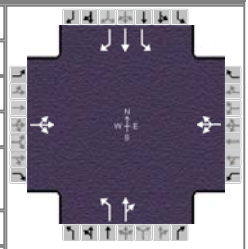
HCS 2010 Signalized Intersection Results Summary

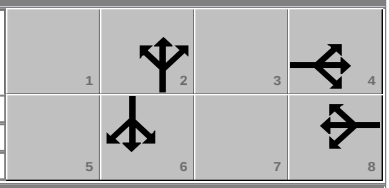
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/18/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.94
Intersection	Providence & Tivoli	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Providence Blvd & Tivoli Dr.xus				
Project Description	W9401.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	537	20	34	11	12	22	40	406	10	9	422	305

Signal Information			
Cycle, s	75.7	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	23.9	29.0	3.9	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.5	2.5	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		12.0		12.0		6.0		5.0
Phase Duration, s		35.5		10.4		29.9		29.9
Change Period, ($Y+R_c$), s		6.5		6.5		6.0		6.0
Max Allow Headway (*MAH*), s		3.2		3.2		3.1		3.1
Queue Clearance Time (g_s), s		27.9		3.6		21.7		19.0
Green Extension Time (g_e), s		1.0		0.1		2.1		2.2
Phase Call Probability		1.00		0.55		1.00		1.00
Max Out Probability		0.16		0.00		0.05		0.02

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		628			38		43	443		10	449	155
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1765			1724		938	1855		943	1863	1579
Queue Service Time (g_s), s		25.9			1.6		3.3	16.3		0.7	16.5	5.7
Cycle Queue Clearance Time (g_c), s		25.9			1.6		19.7	16.3		17.0	16.5	5.7
Green Ratio (*g/C*)		0.38			0.05		0.32	0.32		0.32	0.32	0.32
Capacity (*c*), veh/h		675			89		187	585		190	588	498
Volume-to-Capacity Ratio (*X*)		0.929			0.432		0.227	0.756		0.050	0.764	0.312
Available Capacity (c_a), veh/h		814			795		324	855		328	859	728
Back of Queue (*Q*), veh/ln (50th percentile)		12.5			0.7		0.7	6.7		0.2	6.9	2.0
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00		0.28	0.00		0.01	0.00	0.00
Uniform Delay (d_1), s/veh		22.4			34.9		32.3	23.4		31.0	23.4	19.7
Incremental Delay (d_2), s/veh		14.1			1.2		0.2	1.1		0.0	1.2	0.1
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh		36.5			36.2		32.5	24.4		31.0	24.6	19.9
Level of Service (LOS)		D			D		C	C		C	C	B
Approach Delay, s/veh / LOS	36.5	D		36.2	D		25.1	C		23.5	C	
Intersection Delay, s/veh / LOS	28.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.7	B	2.1	B	2.1	B
Bicycle LOS Score / LOS	1.5	A	0.6	A	1.3	A	1.5	A

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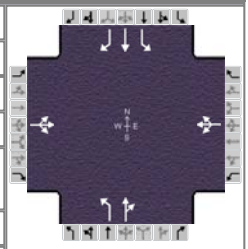
HCS 2010 Signalized Intersection Intermediate Values

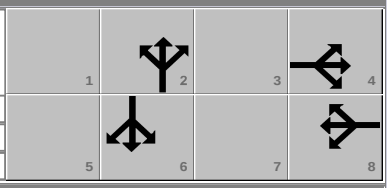
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/18/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.94
Intersection	Providence & Tivoli	Analysis Year	Future Background	Analysis Period	1> 7:00
File Name	Providence Blvd & Tivoli Dr.xus				
Project Description	W9401.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	537	20	34	11	12	22	40	406	10	9	422	305

Signal Information			
Cycle, s	75.7	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	23.9	29.0	3.9	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.5	2.5	0.0	0.0	0.0



Saturation Flow / Delay	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	1.000	0.980	1.000	1.000	0.980	1.000	0.980	0.980	1.000	0.980	0.980	0.980
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})		0.947			0.926			0.000			0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.000			0.996			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h		60			575			1810			1863	
Platoon Ratio (R_p)		1.00			1.00			1.00			1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)		0.29			0.04		0.04	0.06		0.04	0.06	0.04

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)		5.0		6.5		6.0		6.0
Green Ratio (*g/C*)		0.38		0.05		0.32		0.32
Permitted Saturation Flow Rate (s_p), veh/h/ln		0		0		938		943
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s		0.0		0.0		23.9		23.9
Permitted Service Time (g_u), s		0.0		0.0		7.5		7.7
Permitted Queue Service Time (g_{ps}), s						3.3		0.7
Time to First Blockage (g_f), s		0.0		0.0		0.0		0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln								0
Protected Right Effective Green Time (g_R), s								0.0

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.00	1.710	0.23	1.389	0.01	1.389	0.00
Pedestrian F_s / F_{delay}	0.000	0.141	0.000	0.153	0.000	0.115	0.000	0.115
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	102.76	34.07		45.73	630.60	17.75	630.60	17.75
Bicycle F_w / F_v	-3.64	1.04	-3.64	0.06	-3.64	0.80	-3.64	1.01

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*GR*
Agency/Co.	*CPH*
Date Performed	*9/20/2013*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Sterling Silver and Alabaster*
Jurisdiction	*Volusia County*
Analysis Year	*Future Background*

Project Description *W9401.1-Retail Deltona*

East/West Street: *Alabaster Way* | North/South Street: *Sterling Silver Boulevard*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*39*	*8*	*0*	*25*	
Peak-Hour Factor, PHF	*0.80*	*0.80*	*0.80*	*0.80*	*0.80*	*0.80*
Hourly Flow Rate, HFR (veh/h)	*0*	*48*	*9*	*0*	*31*	*0*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*		*0*	*9*		*0*
Peak-Hour Factor, PHF	*0.80*	*0.80*	*0.80*	*0.80*	*0.80*	*0.80*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*11*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*0*	*2*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration		*LR*		*L*		*R*

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*	*L*		*R*		*LR*	
v (veh/h)		*0*	*11*		*0*		*0*	
C (m) (veh/h)		*1547*	*904*		*1021*			
v/c		*0.00*	*0.01*		*0.00*			
95% queue length		*0.00*	*0.04*		*0.00*			
Control Delay (s/veh)		*7.3*	*9.0*		*8.5*			
LOS		*A*	*A*		*A*			
Approach Delay (s/veh)	--	--	*9.0*					
Approach LOS	--	--	*A*					

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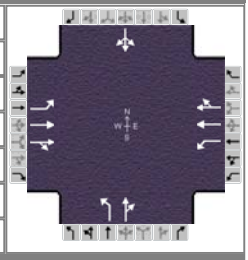
FUTURE TOTAL CONDITIONS
(PM PEAK HOUR)

HCS 2010 Signalized Intersection Input Data

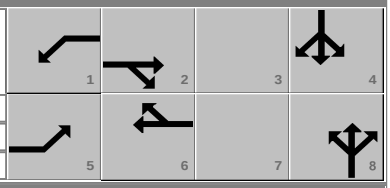
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.93
Intersection	Saxon & Finland	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Saxon Blvd & Finland Dr.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	205	2268	67	93	1227	23	122	57	151	23	28	118

Signal Information			
Cycle, s	130.0	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	9.1	5.4	72.5	23.5	0.0	0.0
Yellow	4.5	0.0	4.5	4.0	0.0	0.0
Red	2.0	0.0	2.0	2.5	0.0	0.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	205	2268	67	93	1227	23	122	57	151	23	28	118
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	2	2		2	2		2	2			2	
Ped / Bike / RTOR, /h	0	0	3	0	0	0	0	0	26	0	0	41
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	3	4	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	0.52	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0		12.0	12.0		12.0	12.0			12.0	
Turn Bay Length, ft	350	0		105	0		350	0			0	
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	40	40	40	40	40	40	30	30	30	30	30	30

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	21.0	75.0	25.0	79.0		30.0		30.0
Yellow Change Interval (*Y*), s	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	2.0	2.0	2.0	2.0	1.0	2.5	1.0	2.5
Minimum Green (G_{min}), s	5	11	5	11	5	6	5	6
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	3.0	4.0	2.0	4.0	2.0	4.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	22.0	0.0	22.0	0.0	24.0	0.0	24.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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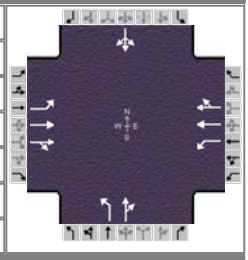
HCS 2010 Signalized Intersection Results Summary

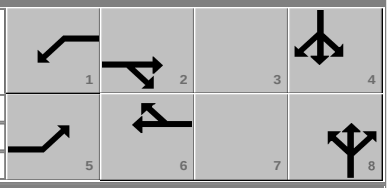
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.93
Intersection	Saxon & Finland	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Saxon Blvd & Finland Dr.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	205	2268	67	93	1227	23	122	57	151	23	28	118

Signal Information			
Cycle, s	130.0	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	9.1	5.4	72.5	23.5	0.0	0.0
Yellow	4.5	0.0	4.5	4.0	0.0	0.0
Red	2.0	0.0	2.0	2.5	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	2.0	4.0	2.0	4.0		6.0		8.0
Phase Duration, s	21.0	84.4	15.6	79.0		30.0		30.0
Change Period, ($Y+R_c$), s	6.5	6.5	6.5	6.5		6.5		6.5
Max Allow Headway (*MAH*), s	4.1	0.0	4.1	0.0		5.4		5.4
Queue Clearance Time (g_s), s	16.5		9.2			25.5		18.2
Green Extension Time (g_e), s	0.0	0.0	0.2	0.0		0.0		1.3
Phase Call Probability	1.00		0.97			1.00		1.00
Max Out Probability	1.00		0.01			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	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	220	1254	1254	100	674	670	131	196			138	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1774	1863	1845	1774	1863	1850	1275	1658			1194	
Queue Service Time (g_s), s	14.5	77.9	77.9	7.2	23.3	23.8	7.3	14.3			2.0	
Cycle Queue Clearance Time (g_c), s	14.5	77.9	77.9	7.2	23.3	23.8	23.5	14.3			16.2	
Green Ratio (*g/C*)	0.11	0.60	0.60	0.07	0.56	0.56	0.18	0.18			0.18	
Capacity (*c*), veh/h	198	1116	1105	125	1039	1032	127	300			249	
Volume-to-Capacity Ratio (*X*)	1.114	1.124	1.135	0.803	0.649	0.649	1.036	0.653			0.554	
Available Capacity (c_a), veh/h	198	1116	1105	252	1039	1032	127	300			249	
Back of Queue (*Q*), veh/ln (50th percentile)	11.8	36.6	39.2	3.4	6.7	7.0	7.4	6.4			4.5	
Queue Storage Ratio (*RQ*) (50th percentile)	0.85	0.00	0.00	0.83	0.00	0.00	0.53	0.00			0.00	
Uniform Delay (d_1), s/veh	57.8	13.1	13.8	59.6	10.4	10.7	63.0	49.5			48.4	
Incremental Delay (d_2), s/veh	97.9	67.7	72.1	6.2	1.6	1.7	89.9	5.7			3.4	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	
Control Delay (*d*), s/veh	155.6	80.7	85.9	65.7	12.0	12.4	152.8	55.1			51.8	
Level of Service (LOS)	F	F	F	E	B	B	F	E			D	
Approach Delay, s/veh / LOS	89.2	F		15.9	B		94.3	F		51.8	D	
Intersection Delay, s/veh / LOS	65.6						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.1	B	2.9	C	2.9	C
Bicycle LOS Score / LOS	2.7	B	1.7	A	1.0	A	0.7	A

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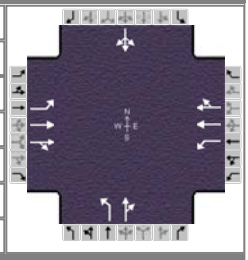
HCS 2010 Signalized Intersection Intermediate Values

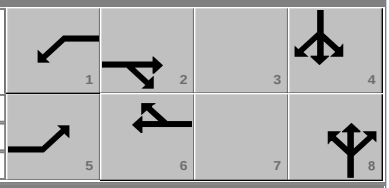
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.93
Intersection	Saxon & Finland	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Saxon Blvd & Finland Dr.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	205	2268	67	93	1227	23	122	57	151	23	28	118

Signal Information			
Cycle, s	130.0	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	9.1	5.4	72.5	23.5	0.0	0.0
Yellow	4.5	0.0	4.5	4.0	0.0	0.0
Red	2.0	0.0	2.0	2.5	0.0	0.0



	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.980	0.980	1.000	0.980	0.980	1.000	0.980	0.980	1.000	1.000	0.980	1.000
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000			0.000			0.641	
Right-Turn Adjustment Factor (f_{RT})		0.990			0.993			0.890			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h	1774	3606		1774	3645			519			336	
Platoon Ratio (R_p)	1.00	1.33		1.00	1.33			1.00			1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)	0.50	0.50	0.50	0.11	0.50	0.50	0.50	0.26			0.19	

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	6.5	6.5	6.5	6.5		6.5		6.5
Green Ratio (*g/C*)	0.11	0.60	0.07	0.56		0.18		0.18
Permitted Saturation Flow Rate (s_p), veh/h/ln	0	0	0	0		1275		1206
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								0
Permitted Effective Green Time (g_p), s	0.0	0.0	0.0	0.0		23.5		23.5
Permitted Service Time (g_u), s	0.0	0.0	0.0	0.0		7.3		9.2
Permitted Queue Service Time (g_{ps}), s						7.3		2.0
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0		0.0		8.2
Queue Service Time Before Blockage (g_{fs}), s								8.2
Protected Right Saturation Flow (s_R), veh/h/ln								
Protected Right Effective Green Time (g_R), s								

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.04	1.389	0.06	2.107	0.00	2.107	0.00
Pedestrian F_s / F_{delay}	0.000	0.094	0.000	0.102	0.000	0.151	0.000	0.151
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	1198.09	10.45	1115.38	12.72	361.54	43.62	361.54	43.62
Bicycle F_w / F_v	-3.64	2.25	-3.64	1.19	-3.64	0.54	-3.64	0.23

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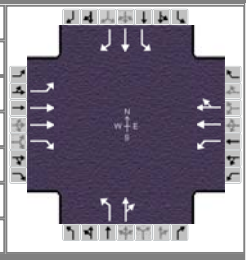
HCS 2010 Signalized Intersection Input Data

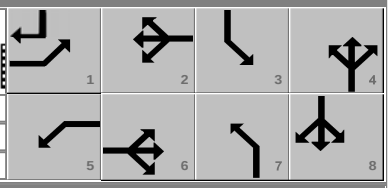
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.95
Intersection	Saxon and Normandy	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Saxon Blvd & Normandy Blvd.xus				
Project Description	W9401.1 Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	448	1607	314	44	831	65	238	197	43	112	201	260

Signal Information			
Cycle, s	130.0	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	4.1	18.4	39.1	9.0	0.0	16.0
Yellow	4.5	4.5	4.5	4.0	4.0	4.0
Red	3.0	3.0	3.0	3.0	3.0	3.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	448	1607	314	44	831	65	238	197	43	112	201	260
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	2	2	2	2	2		2	2		2	2	0
Ped / Bike / RTOR, /h	0	0	89	0	0	7	0	0	3	0	0	69
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	4	3	4	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	0.09	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	12.0
Turn Bay Length, ft	540	0	265	200	0		290	0		295	0	380
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	40	40	40	40	40	40	35	35	35	35	35	35

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	42.0	64.0	20.0	42.0	23.0	30.0	16.0	23.0
Yellow Change Interval (*Y*), s	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Green (G_{min}), s	5	11	5	11	5	6	5	6
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	18.0	0.0	29.0	0.0	23.0	0.0	23.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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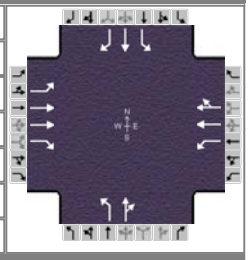
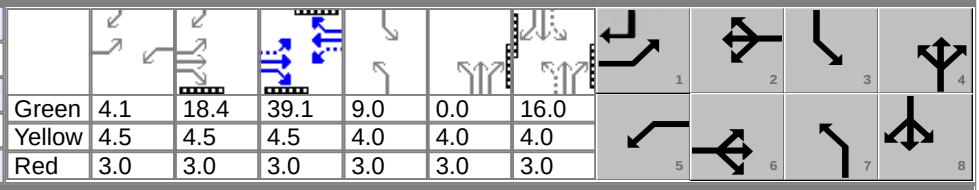
HCS 2010 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.95
Intersection	Saxon and Normandy	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Saxon Blvd & Normandy Blvd.xus				
Project Description	W9401.1 Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	448	1607	314	44	831	65	238	197	43	112	201	260

Signal Information			
Cycle, s	130.0	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	4.1	18.4	39.1	9.0	0.0	16.0
Yellow	4.5	4.5	4.5	4.0	4.0	4.0
Red	3.0	3.0	3.0	3.0	3.0	3.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	1	6	5	2	7	4	3	8
Case Number	1.1	3.0	1.1	4.0	1.1	4.0	1.1	3.0
Phase Duration, s	37.4	72.4	11.6	46.6	23.0	30.0	16.0	23.0
Change Period, ($Y+R_c$), s	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0
Max Allow Headway (*MAH*), s	4.1	0.0	4.1	0.0	4.1	5.2	4.1	5.2
Queue Clearance Time (g_s), s	29.0		4.3		17.8	19.1	9.5	16.6
Green Extension Time (g_e), s	0.9	0.0	0.0	0.0	0.0	1.4	0.0	0.0
Phase Call Probability	1.00		0.81		1.00	1.00	0.99	1.00
Max Out Probability	0.56		0.01		1.00	1.00	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	1	6	16	5	2	12	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	472	1692	237	46	473	462	251	249		118	212	201
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1774	1773	1579	1774	1863	1820	1774	1808		1774	1863	1610
Queue Service Time (g_s), s	27.0	56.9	11.5	2.3	31.0	31.0	15.8	17.1		7.5	14.6	12.0
Cycle Queue Clearance Time (g_c), s	27.0	56.9	11.5	2.3	31.0	31.0	15.8	17.1		7.5	14.6	12.0
Green Ratio (*g/C*)	0.55	0.50	0.50	0.33	0.30	0.30	0.26	0.18		0.19	0.12	0.35
Capacity (*c*), veh/h	501	1772	789	124	560	547	286	320		212	229	569
Volume-to-Capacity Ratio (*X*)	0.942	0.955	0.300	0.373	0.845	0.845	0.875	0.780		0.557	0.923	0.354
Available Capacity (c_a), veh/h	563	1772	789	239	560	547	286	320		212	229	569
Back of Queue (*Q*), veh/ln (50th percentile)	15.0	18.1	4.1	1.0	16.2	15.9	8.8	8.8		3.5	9.3	4.7
Queue Storage Ratio (*RQ*) (50th percentile)	0.70	0.00	0.40	0.13	0.00	0.00	0.77	0.00		0.30	0.00	0.31
Uniform Delay (d_1), s/veh	34.4	20.4	19.2	34.4	42.6	42.6	42.5	51.1		46.1	56.4	31.1
Incremental Delay (d_2), s/veh	3.4	1.8	0.1	1.8	14.5	14.8	24.7	12.3		3.2	39.3	0.5
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh	37.8	22.1	19.2	36.2	57.1	57.4	67.2	63.4		49.3	95.7	31.6
Level of Service (LOS)	D	C	B	D	E	E	E	E		D	F	C
Approach Delay, s/veh / LOS	24.9	C		56.3	E		65.3	E		61.1	E	
Intersection Delay, s/veh / LOS	40.8						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.5	B	2.9	C	3.1	C
Bicycle LOS Score / LOS	2.5	B	1.3	A	1.3	A	1.4	A

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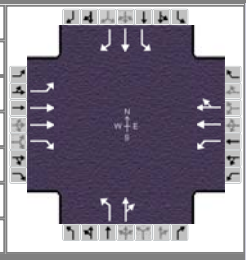
HCS 2010 Signalized Intersection Intermediate Values

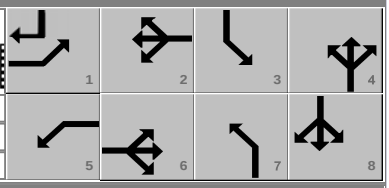
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.95
Intersection	Saxon and Normandy	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Saxon Blvd & Normandy Blvd.xus				
Project Description	W9401.1 Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	448	1607	314	44	831	65	238	197	43	112	201	260

Signal Information			
Cycle, s	130.0	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	4.1	18.4	39.1	9.0	0.0	16.0
Yellow	4.5	4.5	4.5	4.0	4.0	4.0
Red	3.0	3.0	3.0	3.0	3.0	3.0



	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.980	0.980	0.980	0.980	0.980	1.000	0.980	0.980	1.000	0.980	0.980	1.000
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	0.952	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000		0.952	0.000		0.952	0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.977			0.971			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h	1774	3547		1774	3445		1774	1503		1774	1863	
Platoon Ratio (R_p)	1.00	1.33		1.33	1.00		1.00	1.00		1.00	1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)	0.37	0.50	0.50	0.11	0.50	0.50	0.40	0.35		0.15	0.45	0.15

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	7.5	7.5	7.5	7.5	7.0	7.0	7.0	7.0
Green Ratio (*g/C*)	0.55	0.50	0.33	0.30	0.26	0.18	0.19	0.12
Permitted Saturation Flow Rate (s_p), veh/h/ln	596	0	290	0	1165	0	1126	0
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	41.1	0.0	39.1	0.0	18.0	0.0	16.0	0.0
Permitted Service Time (g_u), s	8.1	0.0	6.0	0.0	1.4	0.0	3.9	0.0
Permitted Queue Service Time (g_{ps}), s	8.1		6.0		1.4		1.4	
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln		0						1610
Protected Right Effective Green Time (g_R), s		0.0						29.9

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.00	1.710	0.10	2.107	0.01	2.224	0.13
Pedestrian F_s / F_{delay}	0.000	0.112	0.000	0.139	0.000	0.152	0.000	0.157
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	999.06	16.28	601.26	31.79	353.85	44.03	246.15	49.98
Bicycle F_w / F_v	-3.64	1.98	-3.64	0.81	-3.64	0.83	-3.64	0.88

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*GR*	Intersection	*Saxon & Driveway 2*
Agency/Co.	*CPH*	Jurisdiction	*Volusia County*
Date Performed	*9/23/2013*	Analysis Year	*Future Total*
Analysis Time Period	*PM Peak*		

Project Description *W9401.1-Retail, Deltona*

East/West Street: *Saxon Blvd.*	North/South Street: *Driveway 2*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*1504*			*824*	*46*
Peak-Hour Factor, PHF	*1.00*	*0.95*	*1.00*	*1.00*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*1583*	*0*	*0*	*867*	*48*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*			*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)						*57*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*60*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*2*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
v (veh/h)								*60*
C (m) (veh/h)								*601*
v/c								*0.10*
95% queue length								*0.33*
Control Delay (s/veh)								*11.7*
LOS								*B*
Approach Delay (s/veh)	--	--				*11.7*		
Approach LOS	--	--				*B*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	GR	Intersection	Saxon and Sterling Silver
Agency/Co.	CPH	Jurisdiction	Volusia County
Date Performed	9/20/2013	Analysis Year	Future Total
Analysis Time Period	PM Peak		

Project Description *W9401.1-Retail Deltona*

East/West Street: *Saxon Boulevard*	North/South Street: *Sterling Silver Boulevard*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	326	1169	10	8	739	106
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate, HFR (veh/h)	343	1230	10	8	777	111
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	1	2	0	1	2	0
Configuration	L	T	TR	L	T	TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	9	0	11	282	0	123
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate, HFR (veh/h)	9	0	11	296	0	129
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	1	1	0
Configuration		LTR		L		TR

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L	L		LTR		L		TR
v (veh/h)	343	8		20		296		129
C (m) (veh/h)	758	557		22		17		612
v/c	0.45	0.01		0.91		17.41		0.21
95% queue length	2.37	0.04		2.62		37.81		0.79
Control Delay (s/veh)	13.6	11.6		407.7		7820		12.4
LOS	B	B		F		F		B
Approach Delay (s/veh)	--	--	407.7			5450		
Approach LOS	--	--	F			F		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*GR*	Intersection	*Saxon and Driveway 1*
Agency/Co.	*CPH*	Jurisdiction	*Volusia County*
Date Performed	*9/23/2013*	Analysis Year	*Future Total*
Analysis Time Period	*PM Peak*		

Project Description *W9401.1-Retail, Deltona*

East/West Street: *Saxon Blvd.*	North/South Street: *Driveway 1*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*1462*			*794*	*64*
Peak-Hour Factor, PHF	*1.00*	*0.95*	*1.00*	*1.00*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*1538*	*0*	*0*	*835*	*67*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*			*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)						*58*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*61*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*2*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
v (veh/h)								*61*
C (m) (veh/h)								*607*
v/c								*0.10*
95% queue length								*0.33*
Control Delay (s/veh)								*11.6*
LOS								*B*
Approach Delay (s/veh)	--	--				*11.6*		
Approach LOS	--	--				*B*		

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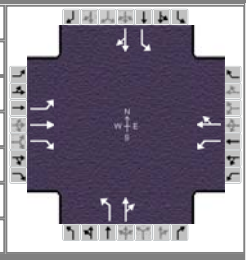
HCS 2010 Signalized Intersection Input Data

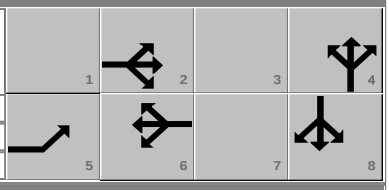
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.95
Intersection	Saxon and Tivoli	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Saxon Blvd & Tivoli Dr.xus				
Project Description	W9501.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	595	660	80	9	330	11	59	107	23	33	99	361

Signal Information			
Cycle, s	71.5	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	15.0	17.0	20.9	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.5	0.0	0.0	0.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	595	660	80	9	330	11	59	107	23	33	99	361
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	2	2	2	2	2		2	2		2	2	
Ped / Bike / RTOR, /h	0	0	29	0	0	0	0	0	7	0	0	150
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	3	3	3	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	
Turn Bay Length, ft	315	0	205	120	0		270	0		80	0	
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	40	40	40	35	35	35	30	30	30	35	35	35

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	15.0	30.0		30.0		30.0		30.0
Yellow Change Interval (*Y*), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	2.0	2.0	1.0	2.0	1.0	2.5	1.0	2.5
Minimum Green (G_{min}), s	5	11	5	11	5	5	5	5
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	2.0	4.0	2.0	4.0	2.0	4.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	16.0	0.0	16.0	0.0	20.0	0.0	20.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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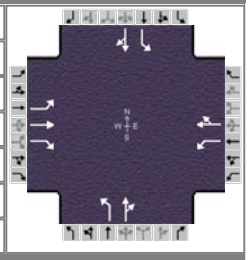
HCS 2010 Signalized Intersection Results Summary

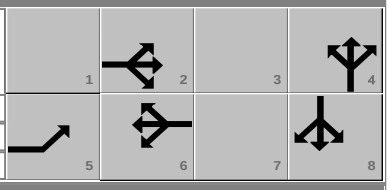
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.95
Intersection	Saxon and Tivoli	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Saxon Blvd & Tivoli Dr.xus				
Project Description	W9501.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	595	660	80	9	330	11	59	107	23	33	99	361

Signal Information			
Cycle, s	71.5	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	15.0	17.0	20.9	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.5	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2		6		4		8
Case Number	1.0	3.0		6.3		6.0		6.0
Phase Duration, s	21.0	44.0		23.0		27.4		27.4
Change Period, ($Y+R_c$), s	6.0	6.0		6.0		6.5		6.5
Max Allow Headway (*MAH*), s	4.1	5.0		5.0		5.3		5.3
Queue Clearance Time (g_s), s	17.0	21.9		15.1		18.3		14.4
Green Extension Time (g_e), s	0.0	4.2		1.9		2.6		3.0
Phase Call Probability	1.00	1.00		1.00		1.00		1.00
Max Out Probability	1.00	0.74		0.37		0.23		0.10

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	7	4	14	3	8	18
Adjusted Flow Rate (*v*), veh/h	626	695	54	9	359		62	129		35	326	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1774	1863	1579	747	1852		1049	1820		1256	1659	
Queue Service Time (g_s), s	15.0	19.9	1.2	0.7	13.1		4.0	3.9		1.5	12.4	
Cycle Queue Clearance Time (g_c), s	15.0	19.9	1.2	0.7	13.1		16.3	3.9		5.4	12.4	
Green Ratio (*g/C*)	0.48	0.53	0.53	0.24	0.24		0.29	0.29		0.29	0.29	
Capacity (*c*), veh/h	529	991	840	278	441		227	534		401	487	
Volume-to-Capacity Ratio (*X*)	1.184	0.701	0.064	0.034	0.814		0.274	0.243		0.087	0.671	
Available Capacity (c_a), veh/h	529	991	840	414	778		360	764		560	697	
Back of Queue (*Q*), veh/ln (50th percentile)	20.1	7.3	0.3	0.1	6.0		1.0	1.6		0.4	4.8	
Queue Storage Ratio (*RQ*) (50th percentile)	1.62	0.00	0.04	0.03	0.00		0.10	0.00		0.14	0.00	
Uniform Delay (d_1), s/veh	16.9	12.5	8.1	21.0	25.7		29.4	19.2		21.3	22.2	
Incremental Delay (d_2), s/veh	100.9	2.5	0.0	0.1	5.2		0.9	0.3		0.1	2.3	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Control Delay (*d*), s/veh	117.7	14.9	8.2	21.1	30.9		30.3	19.5		21.4	24.5	
Level of Service (LOS)	F	B	A	C	C		C	B		C	C	
Approach Delay, s/veh / LOS	61.5	E		30.7	C		23.0	C		24.2	C	
Intersection Delay, s/veh / LOS	47.5						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	2.5	B	2.3	B	2.5	B
Bicycle LOS Score / LOS	2.8	C	1.1	A	0.8	A	1.1	A

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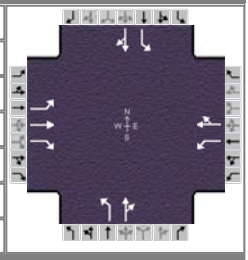
HCS 2010 Signalized Intersection Intermediate Values

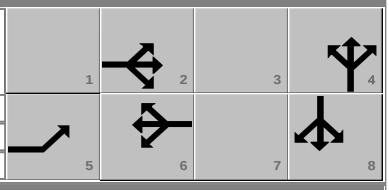
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/17/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.95
Intersection	Saxon and Tivoli	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Saxon Blvd & Tivoli Dr.xus				
Project Description	W9501.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	595	660	80	9	330	11	59	107	23	33	99	361

Signal Information			
Cycle, s	71.5	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	15.0	17.0	20.9	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.0	2.5	0.0	0.0	0.0



	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.980	0.980	0.980	0.980	0.980	1.000	0.980	0.980	1.000	0.980	0.980	1.000
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000			0.000			0.000			0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.994			0.977			0.891	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h	1774	1863			1792			1583			530	
Platoon Ratio (R_p)	1.00	1.00			1.00			1.00			1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)	0.50	0.29	0.15	0.15	0.15		0.15	0.15		0.15	0.15	

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	6.0	6.0		6.0		6.5		6.5
Green Ratio (*g/C*)	0.48	0.53		0.24		0.29		0.29
Permitted Saturation Flow Rate (s_p), veh/h/ln	1018	0		747		1049		1256
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	19.0	0.0		17.0		21.0		21.0
Permitted Service Time (g_u), s	3.9	0.0		17.0		8.6		17.1
Permitted Queue Service Time (g_{ps}), s	3.9			0.7		4.0		1.5
Time to First Blockage (g_f), s	0.0	0.0		0.0		0.0		0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln		0						
Protected Right Effective Green Time (g_R), s		0.0						

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.01	1.557	0.21	1.557	0.00	1.710	0.04
Pedestrian F_s / F_{delay}	0.000	0.083	0.000	0.122	0.000	0.116	0.000	0.116
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	1063.73	7.83	475.96	20.75	586.37	17.85	586.37	17.85
Bicycle F_w / F_v	-3.64	2.27	-3.64	0.61	-3.64	0.32	-3.64	0.60

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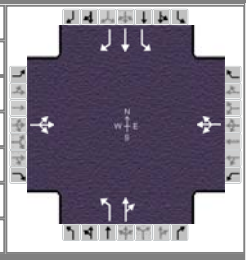
HCS 2010 Signalized Intersection Input Data

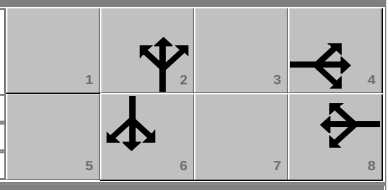
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/18/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.94
Intersection	Providence & Tivoli	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Providence Blvd & Tivoli Dr.xus				
Project Description	W9401.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	586	23	37	11	15	22	43	406	10	9	422	356

Signal Information			
Cycle, s	83.4	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	26.1	33.9	4.3	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.5	2.5	0.0	0.0	0.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	586	23	37	11	15	22	43	406	10	9	422	356
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %		2			2		2	2		2	2	2
Ped / Bike / RTOR, /h	0	0	1	0	0	9	0	0	0	0	0	186
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	3	3	3	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft		12.0			12.0		12.0	12.0		12.0	12.0	12.0
Turn Bay Length, ft		0			0		65	0		330	0	0
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	30	30	30	30	30	30	35	35	35	35	35	35

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s		35.0		35.0		35.0		35.0
Yellow Change Interval (*Y*), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	1.0	2.5	1.0	2.5	1.0	2.0	1.0	2.0
Minimum Green (G_{min}), s	5	7	5	7	5	7	5	7
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Off	Off	Off	Off	Off	Min	Off	Min
Dual Entry	No	No	No	No	No	Yes	No	Yes
Walk (*Walk*), s	0.0	7.0	0.0	7.0	0.0	7.0	0.0	7.0
Pedestrian Clearance Time (*PC*), s	0.0	20.0	0.0	20.0	0.0	16.0	0.0	16.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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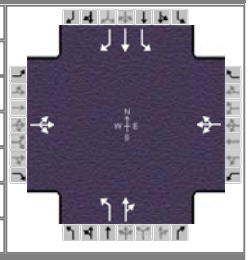
HCS 2010 Signalized Intersection Results Summary

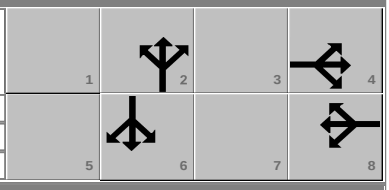
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/18/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.94
Intersection	Providence & Tivoli	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Providence Blvd & Tivoli Dr.xus				
Project Description	W9401.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	586	23	37	11	15	22	43	406	10	9	422	356

Signal Information			
Cycle, s	83.4	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	26.1	33.9	4.3	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.5	2.5	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		12.0		12.0		6.0		5.0
Phase Duration, s		40.4		10.8		32.1		32.1
Change Period, ($Y+R_c$), s		6.5		6.5		6.0		6.0
Max Allow Headway (*MAH*), s		3.2		3.2		3.1		3.1
Queue Clearance Time (g_s), s		33.5		3.9		24.0		20.7
Green Extension Time (g_e), s		0.4		0.1		2.0		2.2
Phase Call Probability		1.00		0.62		1.00		1.00
Max Out Probability		1.00		0.00		0.10		0.04

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		686			41		46	443		10	449	181
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1765			1734		938	1855		943	1863	1579
Queue Service Time (g_s), s		31.5			1.9		3.9	18.0		0.8	18.2	7.4
Cycle Queue Clearance Time (g_c), s		31.5			1.9		22.0	18.0		18.7	18.2	7.4
Green Ratio (*g/C*)		0.41			0.05		0.31	0.31		0.31	0.31	0.31
Capacity (*c*), veh/h		718			90		176	581		179	584	495
Volume-to-Capacity Ratio (*X*)		0.956			0.460		0.260	0.761		0.053	0.769	0.365
Available Capacity (c_a), veh/h		740			727		275	778		279	781	662
Back of Queue (*Q*), veh/ln (50th percentile)		16.6			0.8		0.9	7.8		0.2	7.9	2.6
Queue Storage Ratio (*RQ*) (50th percentile)		0.00			0.00		0.34	0.00		0.01	0.00	0.00
Uniform Delay (d_1), s/veh		24.0			38.4		35.9	25.8		34.2	25.9	22.2
Incremental Delay (d_2), s/veh		22.2			1.4		0.3	2.0		0.0	2.2	0.2
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0		0.0	0.0	0.0
Control Delay (*d*), s/veh		46.2			39.8		36.2	27.8		34.3	28.1	22.4
Level of Service (LOS)		D			D		D	C		C	C	C
Approach Delay, s/veh / LOS	46.2	D		39.8	D		28.6	C		26.6	C	
Intersection Delay, s/veh / LOS	34.7						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.7	B	2.1	B	2.1	B
Bicycle LOS Score / LOS	1.6	A	0.6	A	1.3	A	1.5	A

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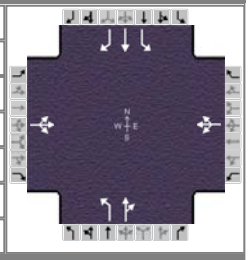
HCS 2010 Signalized Intersection Intermediate Values

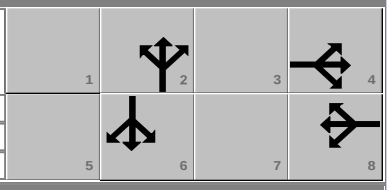
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	9/18/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.94
Intersection	Providence & Tivoli	Analysis Year	Future Total	Analysis Period	1> 7:00
File Name	Providence Blvd & Tivoli Dr.xus				
Project Description	W9401.1-Retail, Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	586	23	37	11	15	22	43	406	10	9	422	356

Signal Information			
Cycle, s	83.4	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	26.1	33.9	4.3	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	2.0	2.5	2.5	0.0	0.0	0.0



	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	1.000	0.980	1.000	1.000	0.980	1.000	0.980	0.980	1.000	0.980	0.980	0.980
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})		0.947			0.931			0.000			0.000	
Right-Turn Adjustment Factor (f_{RT})		0.000			0.000			0.996			0.000	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h		63			667			1810			1863	
Platoon Ratio (R_p)		1.00			1.00			1.00			1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)		0.43			0.04		0.04	0.10		0.04	0.11	0.04

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)		5.0		6.5		6.0		6.0
Green Ratio (*g/C*)		0.41		0.05		0.31		0.31
Permitted Saturation Flow Rate (s_p), veh/h/ln		0		0		938		943
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s		0.0		0.0		26.2		26.2
Permitted Service Time (g_u), s		0.0		0.0		8.0		8.2
Permitted Queue Service Time (g_{ps}), s						3.9		0.8
Time to First Blockage (g_f), s		0.0		0.0		0.0		0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln								0
Protected Right Effective Green Time (g_R), s								0.0

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.557	0.00	1.710	0.26	1.389	0.01	1.389	0.00
Pedestrian F_s / F_{delay}	0.000	0.145	0.000	0.156	0.000	0.119	0.000	0.119
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	103.92	37.46		49.51	626.81	19.65	626.81	19.65
Bicycle F_w / F_v	-3.64	1.13	-3.64	0.07	-3.64	0.81	-3.64	1.05

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TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*GR*
Agency/Co.	*CPH*
Date Performed	*9/20/2013*
Analysis Time Period	*PM Peak*

Site Information

Intersection	*Sterling Silver and Alabaster*
Jurisdiction	*Volusia County*
Analysis Year	*Future Total*

Project Description *W9401.1-Retail Deltona*

East/West Street: *Alabaster Way* | North/South Street: *Sterling Silver Boulevard*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*136*	*53*	*242*	*0*	*39*	*0*
Peak-Hour Factor, PHF	*0.80*	*0.80*	*0.80*	*0.80*	*0.80*	*0.80*
Hourly Flow Rate, HFR (veh/h)	*169*	*66*	*302*	*0*	*48*	*0*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*122*	*244*	*0*	*0*
Peak-Hour Factor, PHF	*0.80*	*0.80*	*0.80*	*0.80*	*0.80*	*0.80*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*152*	*304*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*0*	*2*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*1*	*1*	*0*
Configuration		*LTR*		*L*		*TR*

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*	*L*		*TR*		*LTR*	
v (veh/h)	*169*	*0*	*304*		*0*		*152*	
C (m) (veh/h)	*1559*	*1191*	*279*				*1027*	
v/c	*0.11*	*0.00*	*1.09*				*0.15*	
95% queue length	*0.36*	*0.00*	*12.35*				*0.52*	
Control Delay (s/veh)	*7.6*	*8.0*	*120.1*				*9.1*	
LOS	*A*	*A*	*F*				*A*	
Approach Delay (s/veh)	--	--				*9.1*		
Approach LOS	--	--				*A*		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*GR*	Intersection	*Sterling Silver & Driveway 4*
Agency/Co.	*CPH*	Jurisdiction	*Volusia County*
Date Performed	*9/23/2013*	Analysis Year	*Future Total*
Analysis Time Period	*PM Peak*		

Project Description *W9401.1-Retail, Deltona*

East/West Street: *Saxon Blvd.* | North/South Street: *Driveway 4*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*14*	*39*			*25*	*0*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*1.00*	*1.00*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*14*	*41*	*0*	*0*	*26*	*0*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)			*14*			
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*14*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*2*	*2*	*2*	*0*	*2*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*1*	*0*	*0*	*0*
Configuration			*R*			

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*							*R*
v (veh/h)	*14*							*14*
C (m) (veh/h)	*1588*							*1050*
v/c	*0.01*							*0.01*
95% queue length	*0.03*							*0.04*
Control Delay (s/veh)	*7.3*							*8.5*
LOS	*A*							*A*
Approach Delay (s/veh)	--	--				*8.5*		
Approach LOS	--	--				*A*		

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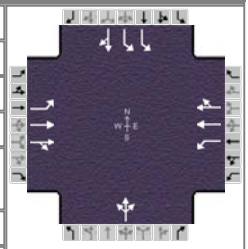
HCS 2010 Signalized Intersection Input Data

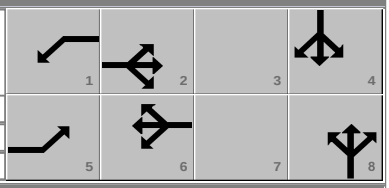
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	11/1/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.95
Intersection	Saxon & Sterling Silver	Analysis Year	Future Total Improved	Analysis Period	1> 7:00
File Name	Saxon Blvd & Sterling Silver Blvd Improved.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	326	1169	10	8	739	106	9	0	11	282	0	123

Signal Information			
Cycle, s	94.2	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	1.4	4.3	41.7	11.4	3.0	0.0
Yellow	4.5	4.5	4.5	4.0	4.0	0.0
Red	2.0	2.0	2.0	2.3	2.6	0.0



Traffic Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	326	1169	10	8	739	106	9	0	11	282	0	123
Initial Queue (Q_b), veh/h	0	0	0	0	0	0	0	0	0	0	0	0
Base Saturation Flow Rate (s_o), veh/h	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Parking (N_m), man/h		None			None			None			None	
Heavy Vehicles (P_{HV}), %	2	2		2	2			2		2	2	
Ped / Bike / RTOR, /h	0	0	0	0	0	0	0	0	0	0	0	0
Buses (N_b), buses/h	0	0	0	0	0	0	0	0	0	0	0	0
Arrival Type (*AT*)	3	3	3	3	3	3	3	3	3	3	3	3
Upstream Filtering (*I*)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Width (*W*), ft	12.0	12.0		12.0	12.0			12.0		12.0	12.0	
Turn Bay Length, ft	290	0		295	0			0		157	0	
Grade (*Pg*), %	0	0	0	0	0	0	0	0	0	0	0	0
Speed Limit, mi/h	40	40	40	40	40	40	30	30	30	30	30	30

Phase Information	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Maximum Green (G_{max}) or Phase Split, s	25.0	60.0	10.0	75.0		10.0		25.0
Yellow Change Interval (*Y*), s	4.5	4.5	4.5	4.5	4.0	4.0	4.0	4.0
Red Clearance Interval (R_c), s	2.0	2.0	2.0	2.0	1.0	2.6	1.0	2.3
Minimum Green (G_{min}), s	7	20	7	20	5	7	5	7
Start-Up Lost Time (*lt*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Extension of Effective Green (*e*), s	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Passage (*PT*), s	3.0	4.0	2.0	4.0	2.0	3.0	2.0	3.0
Recall Mode	Off	Min	Off	Min	Off	Off	Off	Off
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Walk (*Walk*), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pedestrian Clearance Time (*PC*), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Multimodal Information	EB			WB			NB			SB		
85th % Speed / Rest in Walk / Corner Radius	0	No	25	0	No	25	0	No	25	0	No	25
Walkway / Crosswalk Width / Length, ft	9.0	12	0	9.0	12	0	9.0	12	0	9.0	12	0
Street Width / Island / Curb	0	0	No	0	0	No	0	0	No	0	0	No
Width Outside / Bike Lane / Shoulder, ft	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0	12	5.0	2.0
Pedestrian Signal / Occupied Parking	No	0.50		No	0.50		No	0.50		No	0.50	

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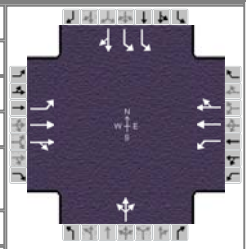
HCS 2010 Signalized Intersection Results Summary

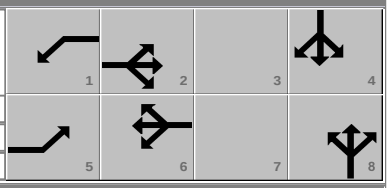
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	11/1/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.95
Intersection	Saxon & Sterling Silver	Analysis Year	Future Total Improved	Analysis Period	1> 7:00
File Name	Saxon Blvd & Sterling Silver Blvd Improved.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	326	1169	10	8	739	106	9	0	11	282	0	123

Signal Information			
Cycle, s	94.2	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	1.4	4.3	41.7	11.4	3.0	0.0
Yellow	4.5	4.5	4.5	4.0	4.0	0.0
Red	2.0	2.0	2.0	2.3	2.6	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6		8		4
Case Number	1.1	4.0	1.1	4.0		12.0		10.0
Phase Duration, s	18.7	59.0	7.9	48.2		9.6		17.7
Change Period, ($Y+R_c$), s	6.5	6.5	6.5	6.5		6.6		6.3
Max Allow Headway (*MAH*), s	4.1	5.0	3.1	5.0		4.3		4.3
Queue Clearance Time (g_s), s	11.2	22.9	2.2	19.0		3.2		9.8
Green Extension Time (g_e), s	1.0	19.2	0.0	22.7		0.0		1.6
Phase Call Probability	1.00	1.00	0.20	1.00		0.42		1.00
Max Out Probability	0.01	0.41	0.00	0.25		0.02		0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	343	621	620	8	455	435		21		297	129	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1774	1863	1857	1774	1863	1780		1661		1723	1579	
Queue Service Time (g_s), s	9.2	20.9	20.9	0.2	17.0	17.0		1.2		7.8	7.4	
Cycle Queue Clearance Time (g_c), s	9.2	20.9	20.9	0.2	17.0	17.0		1.2		7.8	7.4	
Green Ratio (*g/C*)	0.59	0.56	0.56	0.46	0.44	0.44		0.03		0.12	0.12	
Capacity (*c*), veh/h	470	1039	1036	243	825	788		52		417	191	
Volume-to-Capacity Ratio (*X*)	0.730	0.598	0.598	0.035	0.551	0.552		0.402		0.711	0.677	
Available Capacity (c_a), veh/h	711	1186	1182	405	1483	1417		176		914	419	
Back of Queue (*Q*), veh/ln (95th percentile)	6.1	12.5	12.5	0.2	11.3	10.9		1.0		6.1	5.5	
Queue Storage Ratio (*RQ*) (95th percentile)	0.53	0.00	0.00	0.01	0.00	0.00		0.00		0.99	0.00	
Uniform Delay (d_1), s/veh	13.9	13.8	13.8	14.7	19.4	19.4		44.8		39.8	39.6	
Incremental Delay (d_2), s/veh	2.2	0.9	0.9	0.0	0.8	0.9		4.9		2.3	4.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Control Delay (*d*), s/veh	16.1	14.7	14.7	14.7	20.2	20.2		49.6		42.1	43.8	
Level of Service (LOS)	B	B	B	B	C	C		D		D	D	
Approach Delay, s/veh / LOS	15.0	B		20.2	C		49.6	D		42.6	D	
Intersection Delay, s/veh / LOS	20.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.1	B	2.4	B	2.9	C	2.9	C
Bicycle LOS Score / LOS	1.8	A	1.2	A	0.5	A	1.2	A

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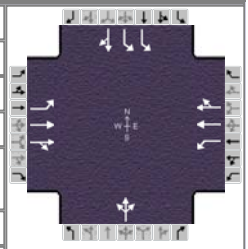
HCS 2010 Signalized Intersection Intermediate Values

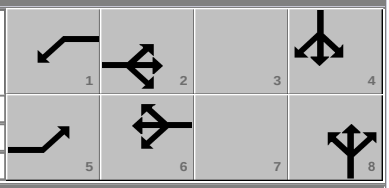
General Information				Intersection Information	
Agency	CPH			Duration, h	0.25
Analyst	GR	Analysis Date	11/1/2013	Area Type	Other
Jurisdiction	Volusia County	Time Period	PM Peak	PHF	0.95
Intersection	Saxon & Sterling Silver	Analysis Year	Future Total Improved	Analysis Period	1> 7:00
File Name	Saxon Blvd & Sterling Silver Blvd Improved.xus				
Project Description	W9401.1-Retail Deltona				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	326	1169	10	8	739	106	9	0	11	282	0	123

Signal Information			
Cycle, s	94.2	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	1.4	4.3	41.7	11.4	3.0	0.0
Yellow	4.5	4.5	4.5	4.0	4.0	0.0
Red	2.0	2.0	2.0	2.3	2.6	0.0



	EB			WB			NB			SB		
Saturation Flow / Delay	L	T	R	L	T	R	L	T	R	L	T	R
Lane Width Adjustment Factor (f_w)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicle Adjustment Factor (f_{HV})	0.980	0.980	1.000	0.980	0.980	1.000	1.000	0.980	1.000	0.980	0.980	1.000
Approach Grade Adjustment Factor (f_g)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Parking Activity Adjustment Factor (f_p)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Bus Blockage Adjustment Factor (f_{bb})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Area Type Adjustment Factor (f_a)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Lane Utilization Adjustment Factor (f_{LU})	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.971	1.000	1.000
Left-Turn Adjustment Factor (f_{LT})	0.952	0.000		0.952	0.000			0.892			0.000	
Right-Turn Adjustment Factor (f_{RT})		0.997			0.956			0.000			0.847	
Left-Turn Pedestrian Adjustment Factor (f_{Lpb})	1.000			1.000			1.000			1.000		
Right-Turn Ped-Bike Adjustment Factor (f_{Rpb})			1.000			1.000			1.000			1.000
Movement Saturation Flow Rate (*s*), veh/h	1774	3688		1774	3198			0			0	
Platoon Ratio (R_p)	1.00	1.00		1.00	1.00			0.00			1.00	
Proportion of Vehicles Arriving on Green (*P*)												
Incremental Delay Factor (*k*)	0.11	0.17	0.17	0.04	0.15	0.15		0.11		0.11	0.11	

Signal Timing / Movement Groups	EBL	EBT/R	WBL	WBT/R	NBL	NBT/R	SBL	SBT/R
Lost Time (t_L)	6.5	6.5	6.5	6.5		6.3		5.0
Green Ratio (*g/C*)	0.59	0.56	0.46	0.44		0.03		0.12
Permitted Saturation Flow Rate (s_p), veh/h/ln	623	0	447	0		0		1774
Shared Saturation Flow Rate (s_{sh}), veh/h/ln								
Permitted Effective Green Time (g_p), s	43.7	0.0	41.7	0.0		0.0		0.0
Permitted Service Time (g_u), s	24.8	0.0	29.7	0.0		0.0		0.0
Permitted Queue Service Time (g_{ps}), s	23.3		0.2					
Time to First Blockage (g_f), s	0.0	0.0	0.0	0.0		0.0		0.0
Queue Service Time Before Blockage (g_{fs}), s								
Protected Right Saturation Flow (s_R), veh/h/ln								
Protected Right Effective Green Time (g_R), s								

Multimodal	EB		WB		NB		SB	
Pedestrian F_w / F_v	1.389	0.00	1.710	0.00	2.107	0.00	2.107	0.00
Pedestrian F_s / F_{delay}	0.000	0.089	0.000	0.108	0.000	0.161	0.000	0.152
Pedestrian M_{corner} / M_{cw}								
Bicycle c_b / d_b	1115.33	9.21	885.31	14.63		55.00	69.44	43.88
Bicycle F_w / F_v	-3.64	1.31	-3.64	0.74	-3.64	0.03	-3.64	0.70

APPENDIX F

TURN LANE DATA REFERENCES

AM Peak Left-Turn Warrant Analysis

Left-Turn Lane Warrant Requirements adjacent to the development		Intersection					
		Sterling Silver Blvd and Alabaster Way NBLT		Sterling Silver Blvd and Alabaster Way SBLT		Sterling Silver Blvd and Driveway 4 NBLT	
		Actual	Warrant Met?	Actual	Warrant Met?	Actual	Warrant Met?
AM Peak Hour Inbound Left-Turn Volume	>= 25 veh	123*	**Yes**	0	No	14	No
Average Daily Trip Ends of the driveway	>= 1,000 veh	2003	**Yes**	0	No	413	No

* - Exceeds 75 veh in the peak hour - may be required to provide additional storage

AM Peak Right-Turn Warrant Analysis

Right-Turn Lane Warrant Requirements adjacent to the development		Intersection									
		Saxon Blvd and Driveway 1 WBRT		Saxon Blvd and Driveway 2 WBRT		Sterling Silver Blvd and Alabaster Way (Driveway 3) NBRT		Sterling Silver Blvd and Alabaster Way (Driveway 3) SBRT		Sterling Silver Blvd and Driveway 4 SBRT	
		Actual	Warrant Met?	Actual	Warrant Met?	Actual	Warrant Met?	Actual	Warrant Met?	Actual	Warrant Met?
Speed Limit	>= 35 mph	40 mph	**Yes**	40 mph	**Yes**	25 mph	No	25 mph	No	25 mph	No
AM Peak Hour Right-Turn Volume	>= 100 veh	46	No	73	No	135**	**Yes**	0	No	0	No

** - Exceeds 150 veh in the peak hour-may be required to provide additional storage

PM Peak Left-Turn Warrant Analysis

Left-Turn Lane Warrant Requirements adjacent to the development		Intersection					
		Sterling Silver Blvd and Alabaster Way NBLT		Sterling Silver Blvd and Alabaster Way SBLT		Sterling Silver Blvd and Driveway 4 NBLT	
		Actual	Warrant Met?	Actual	Warrant Met?	Actual	Warrant Met?
PM Peak Hour Inbound Left-Turn Volume	>= 25 veh	136*	**Yes**	0	No	14	No
Average Daily Trip Ends of the driveway	>= 1,000 veh	2003	**Yes**	0	No	413	No

* - Exceeds 75 veh in the peak hour - may be required to provide additional storage

PM Peak Right-Turn Warrant Analysis

Right-Turn Lane Warrant Requirements adjacent to the development		Intersection									
		Saxon Blvd and Driveway 1 WBRT		Saxon Blvd and Driveway 2 WBRT		Sterling Silver Blvd and Alabaster Way (Driveway 3) NBRT		Sterling Silver Blvd and Alabaster Way (Driveway 3) SBRT		Sterling Silver Blvd and Driveway 4 SBRT	
		Actual	Warrant Met?	Actual	Warrant Met?	Actual	Warrant Met?	Actual	Warrant Met?	Actual	Warrant Met?
Speed Limit	>= 35 mph	40 mph	**Yes**	40 mph	**Yes**	25 mph	No	25 mph	No	25 mph	No
PM Peak Hour Right-Turn Volume	>= 100 veh	64	No	46	No	242**	**Yes**	0	No	0	No

** - Exceeds 150 veh in the peak hour-may be required to provide additional storage

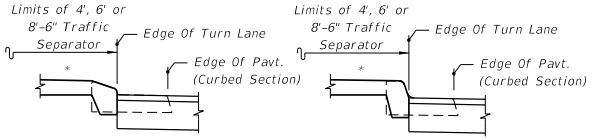
TURN LANES • CURBED AND UNCURBED MEDIANS								
			URBAN CONDITIONS			RURAL CONDITIONS		
Design Speed (mph)	Entry Speed (mph)	Clearance Distance L_1	Brake To Stop Distance L_2	Total Decel. Distance L	Clearance Distance L_3	Brake To Stop Distance L_2	Total Decel. Distance L	Clearance Distance L_3
35	25	70'	75'	145'	110'	——	——	——
40	30	80'	75'	155'	120'	——	——	——
45	35	85'	100'	185'	135'	——	——	——
50	40/44	105'	135'	240'	160'	185'	290'	160'
55	48	125'	——	——	——	225'	350'	195'
60	52	145'	——	——	——	260'	405'	230'
65	55	170'	——	——	——	290'	460'	270'

DESIGN NOTES

1. Basis for turn lane configurations:
   - Informed Driver.
   - Stop condition (With Or Without Stop Control).
   - Wet Pavement.
   - Reaction preceding entry point.
   - Minimum braking distance for urban conditions.
   - 75' min. for L_2.
   - Comfortable deceleration rates for rural conditions (AASHTO 2001 threshold rate of 11.2 ft./s²).

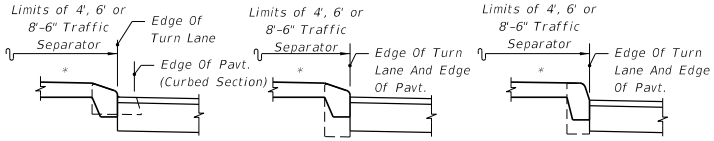
GENERAL NOTES

1. The plan views shown are for turn lane taper shapes and dimensional purposes only, they do not prescribe the use of curb, curb and gutter, shoulders nor separators specifically to either rural or urban conditions.
2. Total deceleration distances must not be reduced except where lesser values are imposed by unrelocatable control points.
3. Right turn lane tapers and distances identical to left turn lanes under stop control conditions. Right turn lane tapers and/or distances are site specific under free flow or yield conditions.
4. These left turn configurations apply to continuous left turn lanes only where specifically called for in the plans.
5. For pavement markings see Index No. 17346.



TYPE E — TYPE F

CURB AND GUTTER



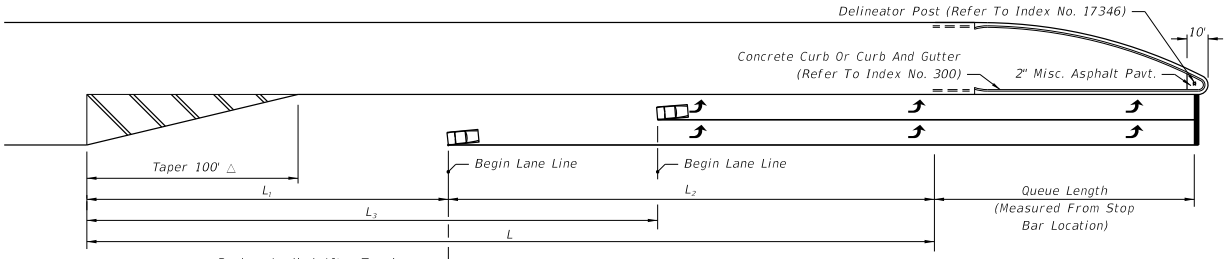
TYPE A — TYPE B — TYPE D

CURB

For Curb And Curb & Gutter Types, See Index No. 300

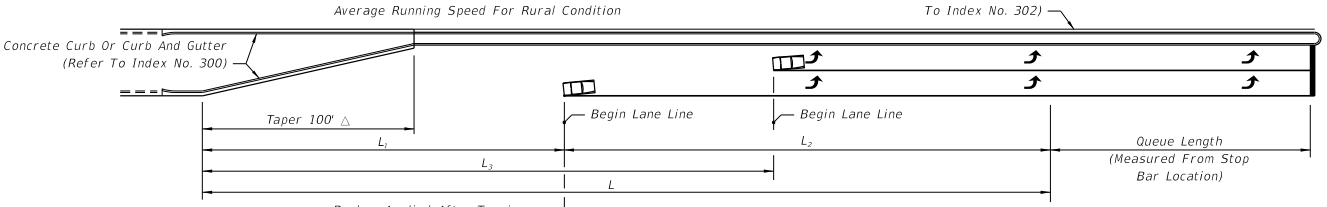
* Option I Separators Shown (Refer To Index No. 302)

MEDIAN CURB AND TRAFFIC SEPARATOR JUNCTURE DETAILS



Brakes Applied After Turning Vehicle Clears Through Lane;
Entry Speed:
10 mph Below Design Speed For Urban Condition
Average Running Speed For Rural Condition

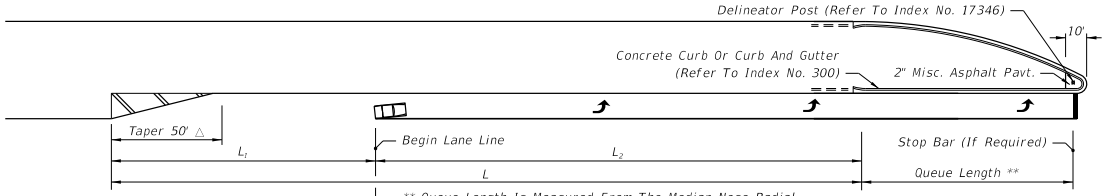
FLUSH AND/OR CURBED SEPARATION



Brakes Applied After Turning Vehicle Clears Through Lane;
Entry Speed:
10 mph Below Design Speed For Urban Condition
Average Running Speed For Rural Condition

RAISED SEPARATION

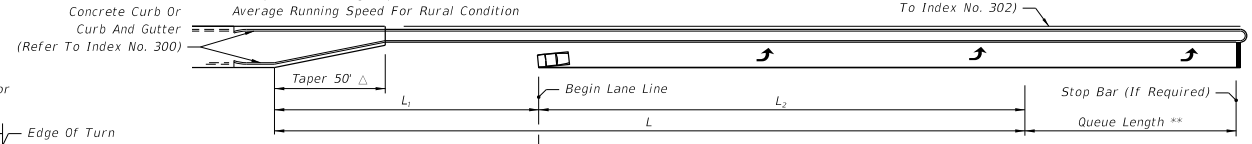
DOUBLE LEFT TURNS



** Queue Length Is Measured From The Median Nose Radial Point Or, When A Stop Bar Is Required, From The Stop Bar.

Brakes Applied After Turning Vehicle Clears Through Lane;
Entry Speed:
10 mph Below Design Speed For Urban Condition
Average Running Speed For Rural Condition

FLUSH AND/OR CURBED SEPARATION



Brakes Applied After Turning Vehicle Clears Through Lane;
Entry Speed:
10 mph Below Design Speed For Urban Condition
Average Running Speed For Rural Condition

RAISED SEPARATION

SINGLE LEFT TURNS

△ The length of taper may be increased to L_1 for single left turns and L_3 for double left turns when:
a. Left turn queue vehicles are adequately provided for within the design queue length.
b. Through vehicle queues will not block access to left turn lane.
c. Approved by District Design Engineer.

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	TURN LANES	INDEX NO.	SHEET NO.
07/01/05						301	1

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Turn lanes requirements.

a. *Turn lane requirements immediately adjacent to the development.*

1. A left-turn lane of 12 feet in width, conforming to Table VI, shall be provided at each driveway when the average daily trip ends of the driveway is 1,000 vehicles or more and/or the average peak hour inbound left-turn volume is 25 vehicles or more. Increased queue lengths (waiting vehicle storage) may be required by the CTE to provide for additional storage, based upon a peak hour entering volume greater than 75 vehicles in the peak hour. No queue length is required if the peak hour entering volume is 75 vehicles in the peak hour or less.
2. 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. Increased storage and transition queue lengths (waiting vehicle storage) may be required by the CTE to provide for additional storage, based upon a peak hour entering volume greater than 150 vehicles in the peak hour. No queue length is required if the peak hour entering volume is 150 vehicles in the peak hour or less.

b. *Additional improvements immediately adjacent to the development.* At intersections, with a thoroughfare which abut the development, the following improvements shall be provided:

1. A right-turn lane of 12 feet in width, conforming to subsection (e)(5) and Table VI, shall be provided if the development will generate 100 or more right turns during the peak hour.
2. A left-turn lane of 12 feet in width conforming to subsection (e)(5) and Table VI, shall be provided if the street's speed limit is 35 miles per hour or greater and if the development will generate 25 or more left turns during the peak hour.

c. *Through lane pavement transition tapers.* A through lane pavement transition taper shall be provided on all streets and roadways where the through lane is offset to provide for right turn lanes, left turn lanes, lane width changes and an increase or reduction in the number of through lanes. The through lane pavement transition taper length shall be based upon FDOT Standard Index #526 and 17346, and calculated using the following formulas:

For design speeds less than or equal to 40 m.p.h. use:

$$L = \frac{WS^2}{60}$$

For design speeds greater than or equal to 45 m.p.h. use:

L	=	WS
L	=	the pavement transition taper length in feet.
W	=	the width

		of the through lane lateral transition in feet (offset).
S	=	the design speed (must be at least five m.p.h. greater than the posted speed limit.)

TABLE VI. TURN LANE DIMENSIONAL REQUIREMENTS

Speed Limit (mph)	Urban Section Deceleration Length (feet)*	Rural Section Deceleration Length (feet)*
30	145	145
35	155	155
40	185	185
45	240	320
50	N/A**	385
55	N/A**	455

* ;sz=8.5q;Includes minimum 50 feet bay taper in accordance with FDOT Standard Index #301 and 526.

** ;sz=8.5q;Curbing is not permitted for these speed limits, use rural section.

d. *Modifications.* Required storage and transition lengths may be modified where conditions warrant and such modifications are acceptable to the DRC.

APPENDIX G

REFERENCES

Volusia County Road Program

5 Year Road Program

IMPACT FEE ZONE 1 - Northeast Volusia

Project	Section	Fund	Scope	PRIOR YEAR ENG	PRIOR YEAR R/W	PRIOR YEAR CON	FY 12/13 ENG	FY 12/13 R/W	FY 12/13 CON	FY 13/14 R/W	FY 13/14 CON	FY 14/15 ENG	FY 14/15 R/W	FY 14/15 CON	FY 15/16 ENG	FY 15/16 R/W	FY 15/16 CON	FY 16/17 ENG	FY 16/17 R/W	FY 16/17 CON
LPGA Blvd Widening	Jimmy Ann Dr to E. of Derbyshire Rd	LOGT	4 LN		750			1750	0											
"	"	BOND	"						1549											
"	"	TRIP	"						239											
"	"	CIGP	"						213											
Orange Av - Reconst/Resurface	Nova Rd to Beach St	LOGT	Resurfacing						650											
" Drainage Repairs	Nova Rd to Ridgewood Av	ONE	Repairs						350											
" Utility Repairs	Nova Rd to Ridgewood Av	CITY	Repairs						200											
Tymber Creek Rd Widening	SR 40 to Peruvian Ln	BOND	4 LN		400	0		550	5000											
"	"	LOGT	"			0			1133											
"	"	CITY	Utilities						277											
Veterans Memorial Bridge (Orange Av) over Halifax River		LAP	Replace Bridge				3100	679						47950						
Williamson Blvd Extension	Airport Rd to Pioneer Trail	LOGT	4 LN				738				9062									
Debt Service for Bonds		IMPACT				600			600		600			600			600			600
Debt Service for Bonds		LOGT				1455			1455		1455			1455			1455			1455
Loan Repayment for S. Williamson Blvd Extension	Pioneer Tr to Airport Rd	LOGT	4 LN	0			738		0		1100			1100			1100			1100

BOND - Bond Funding CBIR - Community Budget Issue Request (State Funding) CIGP - County Incentive Grant Program (State Grant) CITY - Cost sharing with City DEV - Developer Funding FED GRANT - Federal Grant
IMPACT - Road Impact Fee Funding LAP - Local Agency Program (Federal Grant) LOGT - Local Option Gas Tax Funding ONE - One Cent Gas Tax Funding TRIP - Transportation Regional Incentive Program (State Grant)

IMPACT FEE ZONE 2 - Southeast Volusia

Project	Section	Fund	Scope	PRIOR YEAR ENG	PRIOR YEAR R/W	PRIOR YEAR CON	FY 12/13 ENG	FY 12/13 R/W	FY 12/13 CON	FY 13/14 R/W	FY 13/14 CON	FY 14/15 ENG	FY 14/15 R/W	FY 14/15 CON	FY 15/16 ENG	FY 15/16 R/W	FY 15/16 CON	FY 16/17 ENG	FY 16/17 R/W	FY 16/17 CON
Pioneer Trail at Turnbull Bay Rd Intersection		LAP	Intersection		300				185											
"	"	LOGT	"		47	0			1400											
Tenth St Widening	Myrtle Av to US 1	BOND	4 LN	80	150	0			4475											
"	"	CBIR	"			0			2800											
Turnbull Bay Rd Bridge Replacement over Turnbull Creek		LOGT	Replace Bridge	50																
"	"	LAP	"	576				511			3016									
Debt Service for Bonds		IMPACT				538			250		250			100			100			90
Debt Service for Bonds		LOGT							288		288			438			438			448

BOND - Bond Funding CBIR - Community Budget Issue Request (State Funding) CIGP - County Incentive Grant Program (State Grant) CITY - Cost sharing with City DEV - Developer Funding FED GRANT - Federal Grant
IMPACT - Road Impact Fee Funding LAP - Local Agency Program (Federal Grant) LOGT - Local Option Gas Tax Funding ONE - One Cent Gas Tax Funding TRIP - Transportation Regional Incentive Program (State Grant)

Volusia County Road Program

5 Year Road Program

IMPACT FEE ZONE 3 - Southwest Volusia

Project	Section	Fund	Scope	PRIOR YEAR ENG	PRIOR YEAR R/W	PRIOR YEAR CON	FY 12/13 ENG	FY 12/13 R/W	FY 13/14 CON	FY 13/14 R/W	FY 13/14 CON	FY 14/15 ENG	FY 14/15 R/W	FY 14/15 CON	FY 15/16 ENG	FY 15/16 R/W	FY 15/16 CON	FY 16/17 ENG	FY 16/17 R/W	FY 16/17 CON
Howland Blvd Widening	Courtland Blvd to N of SR415	BOND	4 LN	50			100		4870											
"	"	TRIP	"						5130											
"	3 Laning of Ft Smith east & west of Howland	CITY	"						540											
Saxon Blvd Medians/6 Lanes	Enterprise Rd to I-4	BOND	6 LN/Median						2750											
"	"	CIGP	"						1427											
"	"	TRIP	"						16											
Debt Service for Bonds		IMPACT				300			300		300			300			300			300
Debt Service for Bonds		LOGT				1608			1608		1608			1608			1608			1608

BOND - Bond Funding CBIR - Community Budget Issue Request (State Funding) CIGP - County Incentive Grant Program (State Grant) CITY - Cost sharing with City DEV - Developer Funding FED GRANT - Federal Grant
IMPACT - Road Impact Fee Funding LAP - Local Agency Program (Federal Grant) LOGT - Local Option Gas Tax Funding ONE - One Cent Gas Tax Funding TRIP - Transportation Regional Incentive Program (State Grant)

IMPACT FEE ZONE 4 - Northwest Volusia

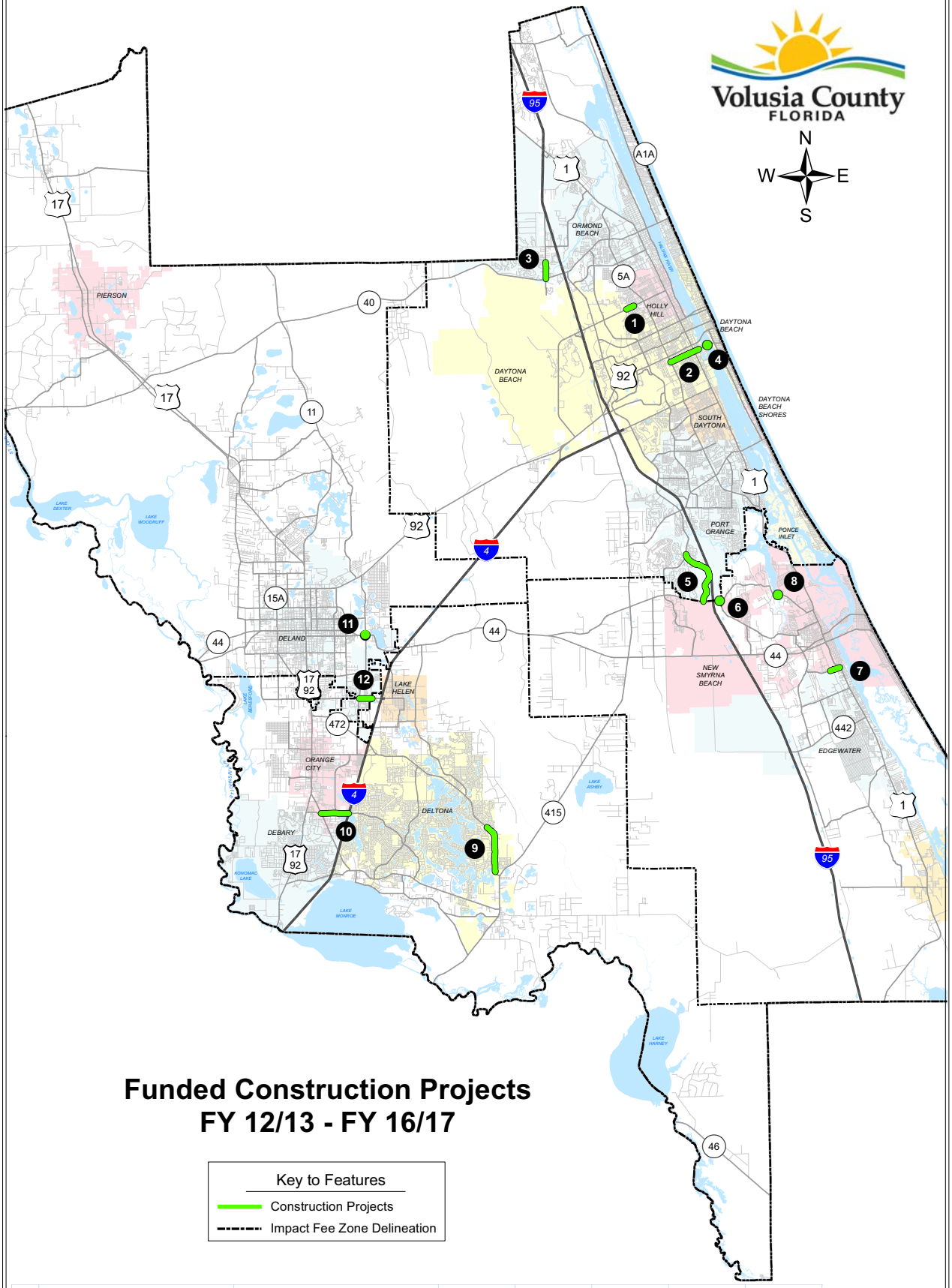
Project	Section	Fund	Scope	PRIOR YEAR ENG	PRIOR YEAR R/W	PRIOR YEAR CON	FY 12/13 ENG	FY 12/13 R/W	FY 13/14 CON	FY 13/14 R/W	FY 13/14 CON	FY 14/15 ENG	FY 14/15 R/W	FY 14/15 CON	FY 15/16 ENG	FY 15/16 R/W	FY 15/16 CON	FY 16/17 ENG	FY 16/17 R/W	FY 16/17 CON
Kepler Rd at SR44	Kepler N 1000'/SR44 E to Lk Winnemissett	IMPACT	Intersection				500	2000			2979									
"	"	CIGP									821									
Orange Camp Rd Widening	MLK Blvd to W of I-4 incl frontage rd stubout	IMPACT	4 LN						0		440									
"	"	BOND	"	100			185	774	0		4060									
Debt Service for Bonds		IMPACT				392			392		392			392			392			392

BOND - Bond Funding CBIR - Community Budget Issue Request (State Funding) CIGP - County Incentive Grant Program (State Grant) CITY - Cost sharing with City DEV - Developer Funding FED GRANT - Federal Grant
IMPACT - Road Impact Fee Funding LAP - Local Agency Program (Federal Grant) LOGT - Local Option Gas Tax Funding ONE - One Cent Gas Tax Funding TRIP - Transportation Regional Incentive Program (State Grant)

MISCELLANEOUS

Project	Fund	Scope	PRIOR YEAR ENG	PRIOR YEAR R/W	PRIOR YEAR CON	FY 12/13 ENG	FY 12/13 R/W	FY 13/14 CON	FY 13/14 R/W	FY 13/14 CON	FY 14/15 ENG	FY 14/15 R/W	FY 14/15 CON	FY 15/16 ENG	FY 15/16 R/W	FY 15/16 CON	FY 16/17 ENG	FY 16/17 R/W	FY 16/17 CON
Advanced Engineering & Permitting	LOGT		500			500					500			500			500		
"	IMPACT ZONE 1																		
"	IMPACT ZONE 2																		
"	IMPACT ZONE 3																		
"	IMPACT ZONE 4																		
Advanced Right-of-Way Acquistion	LOGT			500			500		500			500			500			500	
"	IMPACT ZONE 1																		
"	IMPACT ZONE 2																		
"	IMPACT ZONE 3																		
"	IMPACT ZONE 4																		
Major Bridge Repairs	LOGT		68		685	125		325		200	50		200	50		200	50		200
Countywide Sidewalks (to be determined)	ONE				250			250		250			250			250			250
Resurfacing (annual contract)	ONE				4294			1850		1900			1950			2000			2050
"	LOGT				850			200		850			850			850			850
Railroad Crossings	LOGT				100			100		100			100			100			100
Safety Projects, county wide (to be determined)	LOGT				1000			1000		1000			1000			1000			1000

BOND - Bond Funding CBIR - Community Budget Issue Request (State Funding) CIGP - County Incentive Grant Program (State Grant) CITY - Cost sharing with City DEV - Developer Funding FED GRANT - Federal Grant
IMPACT - Road Impact Fee Funding LAP - Local Agency Program (Federal Grant) LOGT - Local Option Gas Tax Funding ONE - One Cent Gas Tax Funding TRIP - Transportation Regional Incentive Program (State Grant)



Funded Construction Projects
FY 12/13 - FY 16/17

Key to Features

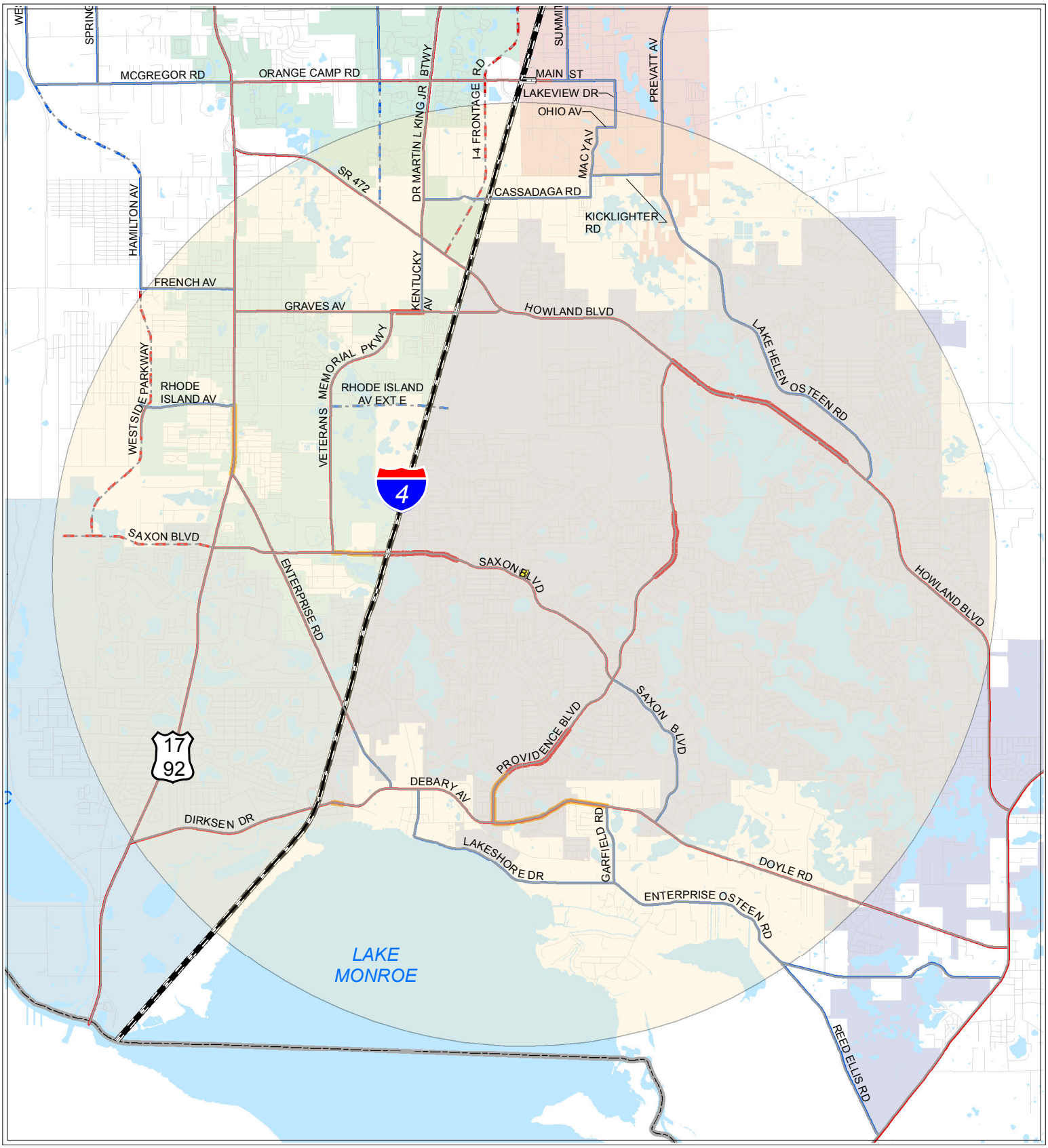
Construction Projects

Impact Fee Zone Delineation

	Road Name	Limits	FY 12/13	FY 13/14	FY 14/15	FY 15/16	FY 16/17
1	LPGA Blvd Widening	Jimmy Ann Dr to E of Derbyshire Rd	$ 2,001,000				
2	Orange Av Reconstruction	Nova Rd to Beach St	$ 1,000,000				
3	Tymber Creek Rd Widening	SR 40 to Peruvian Ln	$ 6,133,000				
4	Veterans Mem Bridge Replacement over Halifax River				$47,950,000		
5	Williamson Blvd Extension	Airport Rd to Pioneer Trl		$ 9,062,000			
6	Pioneer Trl at Turnbull Bay Rd	Intersection	$ 1,585,000				
7	Tenth St Widening	Myrtle Av to US 1	$ 7,275,000				
8	Turnbull Bay Bridge Replacement over Turnbull Creek			$ 3,016,000			
9	Howland Blvd Widening	Courtland Blvd to N of SR 415	$10,000,000				
10	Saxon Blvd Medians	Enterprise Rd to I-4	$ 4,193,000				
11	Kepler Rd at SR 44	Intersection		$ 3,800,000			
12	Orange Camp Rd Widening	MLK Blvd to W of I-4, incl. frontage road stubout		$ 4,500,000			

G:\Ongoing\ConstEng\RoadProgram\yr2012\ProjFile\ConstructionOverall.mxd

Date: 10/8/12



Legend

- buffer
- 8130-78-00-0010
- Hydrology
- LOS2011_NearCritical
- LOS2011_Critical

Impact Area - 5 mile radius

8130-78-00-0010

N
W E
S

COUNTY OF VOLUSIA

Road Program

CAPITAL IMPROVEMENT EXPENDITURE

Project Title	Prior Years	FY 2012-13 Year 1	FY 2013-14 Year 2	FY 2014-15 Year 3	FY 2015-16 Year 4	FY 2016-17 Year 5	Total Amount
Advanced Permits & Engineering	0	500,000	500,000	500,000	500,000	500,000	2,500,000
Advanced R/W Acquisition	0	500,000	500,000	500,000	500,000	500,000	2,500,000
Bridge Repair Program	0	450,000	250,000	250,000	250,000	250,000	1,450,000
Countywide Safety Projects	0	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	5,000,000
Howland Bl-Courtland-Sr415	1,644,038	10,640,000	0	0	0	0	12,284,038
Kepler-Sr44	322	2,500,000	3,800,000	0	0	0	6,300,322
LPGA Bl-Jimmy Ann-Nova 5 Lane	5,103,675	3,893,000	0	0	0	0	8,996,675
Orange Camp Rd - MLK to I-4 incl frontage Rd stubout	65,111	959,000	4,500,000	0	0	0	5,524,111
Pioneer Trail/Turnbull Bay Rd	344,764	1,585,000	0	0	0	0	1,929,764
Plymouth Av-15A-Us1792 4 Ln	0	0	950,000	1,500,000	0	0	2,450,000
Saxon Blvd 6 LN Median	150,414	4,193,726	0	0	0	0	4,344,140
Signal Upgrade	500,000	250,000	250,000	250,000	250,000	250,000	1,750,000
Tenth St Phase 2 - Myrtle Ave to US 1	2,327,792	7,275,000	0	0	0	0	9,602,792
Tymber Ck Rd-Sr40-Airport Rd	5,049,030	7,210,000	0	0	0	0	12,259,030
Williamson Blvd Ext	0	738,000	1,100,000	1,100,000	1,100,000	1,100,000	5,138,000
TOTAL EXPEDITURES	**15,185,146**	**41,693,726**	**12,850,000**	**5,100,000**	**3,600,000**	**3,600,000**	**82,028,872**

REVENUE SOURCE

Budget Object Name	Prior Years	FY 2012-13 Year 1	FY 2013-14 Year 2	FY 2014-15 Year 3	FY 2015-16 Year 4	FY 2016-17 Year 5	Total Amount
Bond Funded Road Program	35,360,140	0	0	0	0	0	35,360,140
City of Deltona	0	540,000	0	0	0	0	540,000
City of Ormond Beach	0	277,000	0	0	0	0	277,000
Federal Funds	61,057	185,000	0	0	0	0	246,057
Gas Tax-Local Option	5,889,557	6,289,000	3,600,000	3,600,000	3,600,000	3,600,000	26,578,557
Road Impact Fees Z4/NW	11,392	2,500,000	4,369,000	1,500,000	0	0	8,380,392
State Funds	0	9,825,726	821,000	0	0	0	10,646,726
TOTAL REVENUES	**41,322,146**	**19,616,726**	**8,790,000**	**5,100,000**	**3,600,000**	**3,600,000**	**82,028,872**

COUNTY OF VOLUSIA

Saxon Blvd 6 LN Median

Project No.: 5585
CIP Category: Road Program
Sub Category/Class: Roads / New Construction - 6 Lane
Project Request Code: 3347108632

CIP Class: A - Concurrency
Impact Fee Zone/Quad: 3
Location: Orange City
Account Number: 334-710-8632

Description/Justification for Capital and Operating

Saxon Boulevard from Enterprise Road to I-4, 6 laning and median. This project includes $1,427,000 in County Incentive Grant Program (CIGP) Funds and $16,000 in Transportation Regional Incentive Program (TRIP) Funds from a FDOT grant. A Local Match of 50% is also included. The project length is 1.3 miles.

Relationship To Other Projects/Plans:

Consistent with the Volusia County Five Year Road Program.

CAPITAL IMPROVEMENT EXPENDITURE:

Budget Object Name	Prior Years	FY 2012-13	FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	Total Years 1-5	Total Amount
Construction Projects	150,414	4,193,726	0	0	0	0	4,193,726	4,344,140
Total Expenses	**150,414**	**4,193,726**	**0**	**0**	**0**	**0**	**4,193,726**	**4,344,140**

REVENUE SOURCE:

Budget Object Name	Prior Years	FY 2012-13	FY 2013-14	FY 2014-15	FY 2015-16	FY 2016-17	Total Years 1-5	Total Amount
Bond Funded Road Program	2,900,414	0	0	0	0	0	0	2,900,414
State Funds	0	1,443,726	0	0	0	0	1,443,726	1,443,726
Total Revenues	**2,900,414**	**1,443,726**	**0**	**0**	**0**	**0**	**1,443,726**	**4,344,140**

APPENDIX H

TRAFFIC SIGNAL WARRANT ANALYSIS

LOCATION: Saxon Blvd west of Sterling Silver Blvd
SPECIFIC LOCATION: 200 ft from Sterling Silver Blvd
CITY/STATE: Deltona, FL

QC JOB #: 11213813
DIRECTION: EB
DATE: Sep 11 2013 - Sep 11 2013

Start Time	Mon	Tue	Wed 11-Sep-13	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			95			95			95	
1:00 AM			52			52			52	
2:00 AM			34			34			34	
3:00 AM			21			21			21	
4:00 AM			26			26			26	
5:00 AM			55			55			55	
6:00 AM			146			146			146	
7:00 AM			488			488			488	
8:00 AM			379			379			379	
9:00 AM			377			377			377	
10:00 AM			483			483			483	
11:00 AM			**500**			**500**			**500**	
12:00 PM			671			671			671	
1:00 PM			644			644			644	
2:00 PM			683			683			683	
3:00 PM			819			819			819	
4:00 PM			955			955			955	
5:00 PM			**1142**			**1142**			**1142**	
6:00 PM			860			860			860	
7:00 PM			704			704			704	
8:00 PM			611			611			611	
9:00 PM			470			470			470	
10:00 PM			253			253			253	
11:00 PM			176			176			176	
Day Total			10644			10644			10644	
% Weekday Average			100.0%							
% Week Average			100.0%			100.0%				
AM Peak Volume			11:00 AM 500			11:00 AM 500			11:00 AM 500	
PM Peak Volume			5:00 PM 1142			5:00 PM 1142			5:00 PM 1142	

Comments:

LOCATION: Saxon Blvd west of Sterling Silver Blvd
SPECIFIC LOCATION: 200 ft from Sterling Silver Blvd
CITY/STATE: Deltona, FL

QC JOB #: 11213813
DIRECTION: WB
DATE: Sep 11 2013 - Sep 11 2013

Start Time	Mon	Tue	Wed 11-Sep-13	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			42			42			42	
1:00 AM			27			27			27	
2:00 AM			21			21			21	
3:00 AM			38			38			38	
4:00 AM			107			107			107	
5:00 AM			331			331			331	
6:00 AM			751			751			751	
7:00 AM			**1093**			**1093**			**1093**	
8:00 AM			846			846			846	
9:00 AM			659			659			659	
10:00 AM			569			569			569	
11:00 AM			596			596			596	
12:00 PM			562			562			562	
1:00 PM			**679**			**679**			**679**	
2:00 PM			578			578			578	
3:00 PM			643			643			643	
4:00 PM			589			589			589	
5:00 PM			617			617			617	
6:00 PM			532			532			532	
7:00 PM			441			441			441	
8:00 PM			377			377			377	
9:00 PM			217			217			217	
10:00 PM			114			114			114	
11:00 PM			66			66			66	
Day Total			10495			10495			10495	
% Weekday Average			100.0%							
% Week Average			100.0%			100.0%				
AM Peak Volume			7:00 AM 1093			7:00 AM 1093			7:00 AM 1093	
PM Peak Volume			1:00 PM 679			1:00 PM 679			1:00 PM 679	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

LOCATION: Sterling Silver Blvd north of Saxon Blvd
SPECIFIC LOCATION: 200 ft from Saxon Blvd
CITY/STATE: Deltona, FL

QC JOB #: 11213814
DIRECTION: SB
DATE: Sep 11 2013 - Sep 11 2013

Start Time	Mon	Tue	Wed 11-Sep-13	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			3			3			3	
1:00 AM			0			0			0	
2:00 AM			0			0			0	
3:00 AM			2			2			2	
4:00 AM			2			2			2	
5:00 AM			10			10			10	
6:00 AM			16			16			16	
7:00 AM			**36**			**36**			**36**	
8:00 AM			27			27			27	
9:00 AM			28			28			28	
10:00 AM			21			21			21	
11:00 AM			30			30			30	
12:00 PM			21			21			21	
1:00 PM			23			23			23	
2:00 PM			25			25			25	
3:00 PM			**32**			**32**			**32**	
4:00 PM			25			25			25	
5:00 PM			30			30			30	
6:00 PM			22			22			22	
7:00 PM			23			23			23	
8:00 PM			14			14			14	
9:00 PM			7			7			7	
10:00 PM			7			7			7	
11:00 PM			0			0			0	
Day Total			404			404			404	
% Weekday Average			100.0%							
% Week Average			100.0%			100.0%				
AM Peak Volume			7:00 AM 36			7:00 AM 36			7:00 AM 36	
PM Peak Volume			3:00 PM 32			3:00 PM 32			3:00 PM 32	

Comments:

Quality Counts
TRANSPORTATION DATA COLLECTION

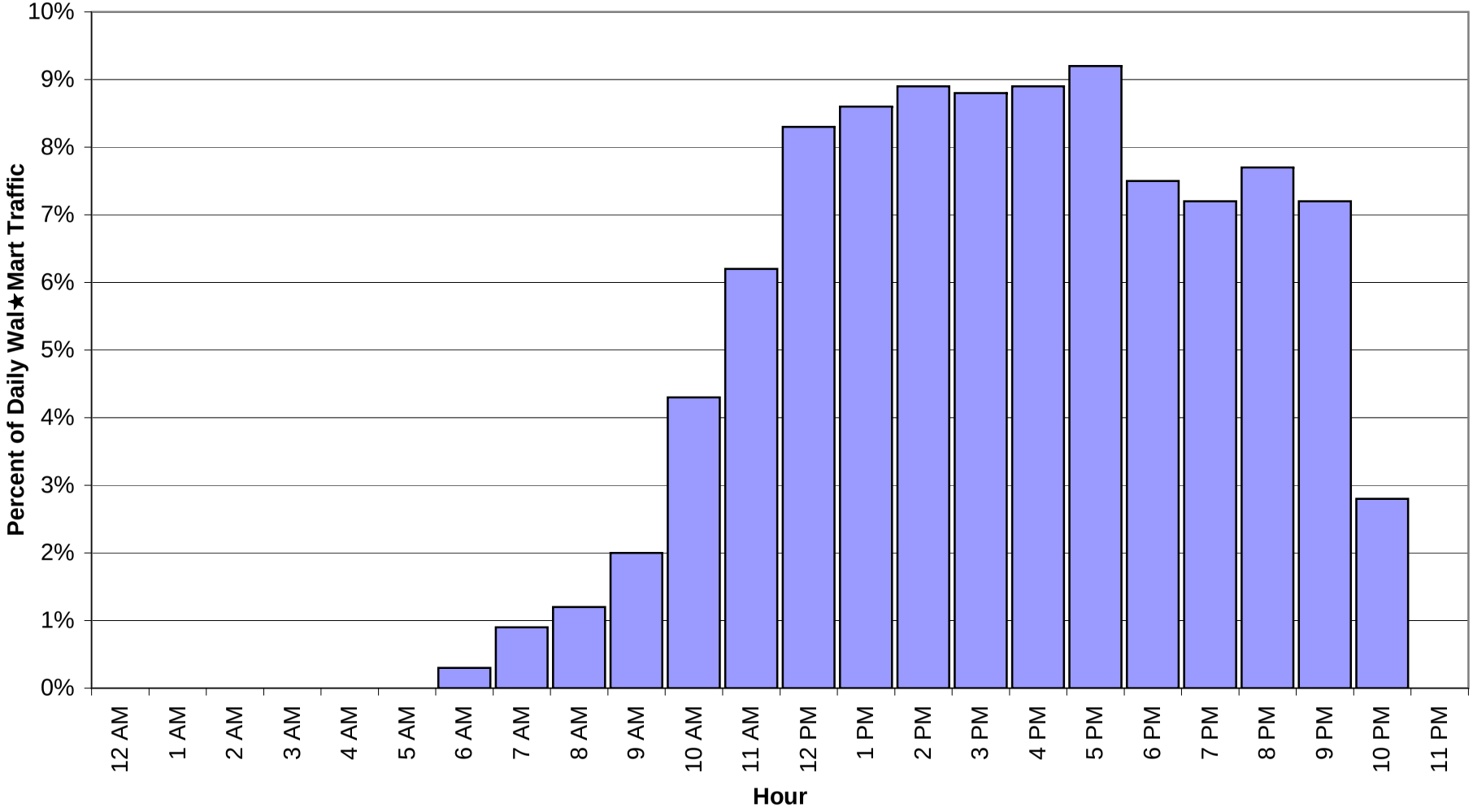
Hourly Variation in Shopping Center Traffic

(Based upon ITE Trip Generation, 9th Edition)

Time Interval			Percent of 24-Hour Entering Traffic	Percent of 24-Hour Exiting Traffic
12:00 AM	to	1:00 AM	0.00%	0.00%
1:00 AM	to	2:00 AM	0.00%	0.00%
2:00 AM	to	3:00 AM	0.00%	0.00%
3:00 AM	to	4:00 AM	0.00%	0.00%
4:00 AM	to	5:00 AM	0.00%	0.00%
5:00 AM	to	6:00 AM	0.00%	0.00%
6:00 AM	to	7:00 AM	0.80%	0.30%
7:00 AM	to	8:00 AM	2.00%	0.90%
8:00 AM	to	9:00 AM	3.10%	1.20%
9:00 AM	to	10:00 AM	5.50%	2.00%
10:00 AM	to	11:00 AM	7.00%	4.30%
11:00 AM	to	12:00 PM	8.40%	6.20%
12:00 PM	to	1:00 PM	9.40%	8.30%
1:00 PM	to	2:00 PM	8.20%	8.60%
2:00 PM	to	3:00 PM	7.70%	8.90%
3:00 PM	to	4:00 PM	7.80%	8.80%
4:00 PM	to	5:00 PM	8.00%	8.90%
5:00 PM	to	6:00 PM	8.40%	9.20%
6:00 PM	to	7:00 PM	8.00%	7.50%
7:00 PM	to	8:00 PM	7.90%	7.20%
8:00 PM	to	9:00 PM	4.30%	7.70%
9:00 PM	to	10:00 PM	1.80%	7.20%
10:00 PM	to	11:00 PM	1.70%	2.80%
11:00 PM	to	12:00 AM	0.00%	0.00%
			100.00%	**100.00%**

Hourly Variation in Shopping Center Traffic

(Based upon ITE Trip Generation, 9th Edition)



Shopping Center
Hourly Trip Generation Determination

Daily Trip Generation:	15,676	<-- Start Here
Daily Outbound Left-Turning Traffic at Sterling Silver Blvd.	47%	
Daily SB Right-Turning Traffic	18%/26%	

Time Interval			Percent of Daily Volume	Total Trips
12:00 AM	to	1:00 AM	0.00%	0
1:00 AM	to	2:00 AM	0.00%	0
2:00 AM	to	3:00 AM	0.00%	0
3:00 AM	to	4:00 AM	0.00%	0
4:00 AM	to	5:00 AM	0.00%	0
5:00 AM	to	6:00 AM	0.00%	0
6:00 AM	to	7:00 AM	0.30%	11
7:00 AM	to	8:00 AM	0.90%	33
8:00 AM	to	9:00 AM	1.20%	44
9:00 AM	to	10:00 AM	2.00%	74
10:00 AM	to	11:00 AM	4.30%	158
11:00 AM	to	12:00 PM	6.20%	228
12:00 PM	to	1:00 PM	8.30%	306
1:00 PM	to	2:00 PM	8.60%	317
2:00 PM	to	3:00 PM	8.90%	328
3:00 PM	to	4:00 PM	8.80%	324
4:00 PM	to	5:00 PM	8.90%	328
5:00 PM	to	6:00 PM	9.20%	339
6:00 PM	to	7:00 PM	7.50%	276
7:00 PM	to	8:00 PM	7.20%	265
8:00 PM	to	9:00 PM	7.70%	284
9:00 PM	to	10:00 PM	7.20%	265
10:00 PM	to	11:00 PM	2.80%	103
11:00 PM	to	12:00 AM	0.00%	0
	Totals:		**100.00%**	**3,684**

24-HOUR TUBE DATA

PSCF 1.10

RAW DATA					PSCF DATA					SORTING				
TIME	EB	WB	TOTAL	SB	TIME	EB	WB	TOTAL	SB	TIME	EB	WB	TOTAL	SB
12	95	42	137	3	12	105	46	151	3	17	1,256	679	1,935	33
1	52	27	79	0	1	57	30	87	0	7	537	1,202	1,739	40
2	34	21	55	0	2	37	23	61	0	16	1,051	648	1,698	28
3	21	38	59	2	3	23	42	65	2	15	901	707	1,608	35
4	26	107	133	2	4	29	118	146	2	18	946	585	1,531	24
5	55	331	386	10	5	61	364	425	11	13	708	747	1,455	25
6	146	751	897	16	6	161	826	987	18	14	751	636	1,387	28
7	488	1,093	1,581	36	7	537	1,202	1,739	40	12	738	618	1,356	23
8	379	846	1,225	27	8	417	931	1,348	30	8	417	931	1,348	30
9	377	659	1,036	28	9	415	725	1,140	31	19	774	485	1,260	25
10	483	569	1,052	21	10	531	626	1,157	23	11	550	656	1,206	33
11	500	596	1,096	30	11	550	656	1,206	33	10	531	626	1,157	23
12	671	562	1,233	21	12	738	618	1,356	23	9	415	725	1,140	31
13	644	679	1,323	23	13	708	747	1,455	25	20	672	415	1,087	15
14	683	578	1,261	25	14	751	636	1,387	28	6	161	826	987	18
15	819	643	1,462	32	15	901	707	1,608	35	21	517	239	756	8
16	955	589	1,544	25	16	1,051	648	1,698	28	5	61	364	425	11
17	1,142	617	1,759	30	17	1,256	679	1,935	33	22	278	125	404	8
18	860	532	1,392	22	18	946	585	1,531	24	23	194	73	266	0
19	704	441	1,145	23	19	774	485	1,260	25	12	105	46	151	3
20	611	377	988	14	20	672	415	1,087	15	4	29	118	146	2
21	470	217	687	7	21	517	239	756	8	1	57	30	87	0
22	253	114	367	7	22	278	125	404	8	3	23	42	65	2
23	176	66	242	0	23	194	73	266	0	2	37	23	61	0
TOTAL	**10,644**	**10,495**	**21,139**	**404**	**TOTAL**	**11,708**	**11,545**	**23,253**	**444**	**TOTAL**	**11,708**	**11,545**	**23,253**	**444**

PEAK 8-HOURS					PEAK 4-HOURS				
TIME	EB	WB	TOTAL	SB	TIME	EB	WB	TOTAL	SB
7	537	1,202	1,739	40	7	537	1,202	1,739	40
12	738	618	1,356	23	15	901	707	1,608	35
13	708	747	1,455	25	16	1,051	648	1,698	28
14	751	636	1,387	28	17	1,256	679	1,935	33
15	901	707	1,608	35					
16	1,051	648	1,698	28					
17	1,256	679	1,935	33					
18	946	585	1,531	24					

PROJECT TRIPS

TIME	SB
7	33
12	306
13	317
14	328
15	324
16	328
17	339
18	276

TRAFFIC SIGNAL WARRANT SUMMARY

City: **Deltona** Engineer: **CPH, Inc.**
County: **Volusia** Date: **September 20, 2013**

Major Street: **Saxon Boulevard** Lanes: **2** Critical Approach Speed: **40**
Minor Street: **Sterling Silver Blvd.** Lanes: **1**

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.
Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied.

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	7:00 AM - 8:00 AM	12:00 PM - 1:00 PM	1:00 PM - 2:00 PM	2:00 PM - 3:00 PM	3:00 PM - 4:00 PM	4:00 PM - 5:00 PM	5:00 PM - 6:00 PM	6:00 PM - 7:00 PM
Both Approaches on Major Street	500 (400)	350	600 (480)	420	1,739	1,356	1,455	1,387	1,608	1,698	1,935	1,531
Highest Approach on Minor Street	150 (120)	105	200 (160)	140	28	258	268	277	274	277	286	234

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☐ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☐ Yes ☒ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
Approach Lanes	1		2 or more									
Volume Level	100%	70%	100%	70%	7:00 AM - 8:00 AM	12:00 PM - 1:00 PM	1:00 PM - 2:00 PM	2:00 PM - 3:00 PM	3:00 PM - 4:00 PM	4:00 PM - 5:00 PM	5:00 PM - 6:00 PM	6:00 PM - 7:00 PM
Both Approaches on Major Street	750 (600)	525	900 (720)	630	1,739	1,356	1,455	1,387	1,608	1,698	1,935	1,531
Highest Approach on Minor Street	75 (60)	53	100 (80)	70	28	258	268	277	274	277	286	234

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: **Deltona** Engineer: **CPH, Inc.**
County: **Volusia** Date: **September 20, 2013**

Major Street: **Saxon Boulevard** Lanes: **2** Critical Approach Speed: **40**
Minor Street: **Sterling Silver Blvd.** Lanes: **1**

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

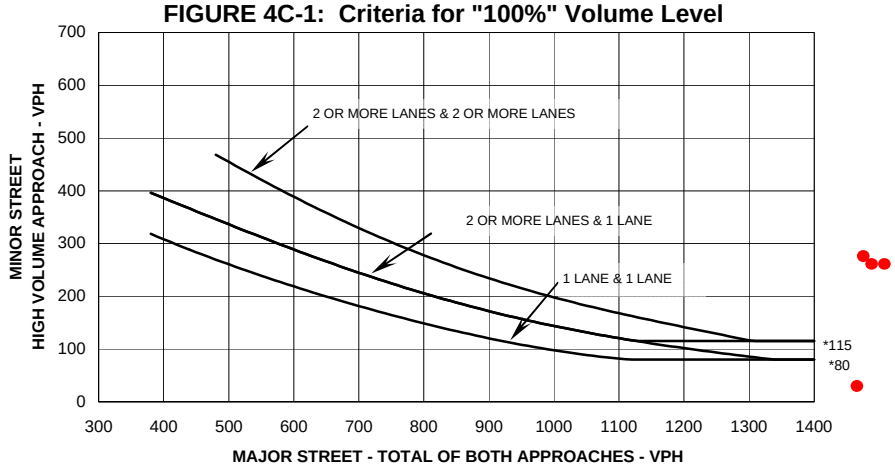
If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☒ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Plot four volume combinations on the applicable figure below.

Four Highest Hours	Volumes	
	Major Street	Minor Street
7:00 AM - 8:00 AM	1,739	28
3:00 PM - 4:00 PM	1,608	274
4:00 PM - 5:00 PM	1,698	277
5:00 PM - 6:00 PM	1,935	286

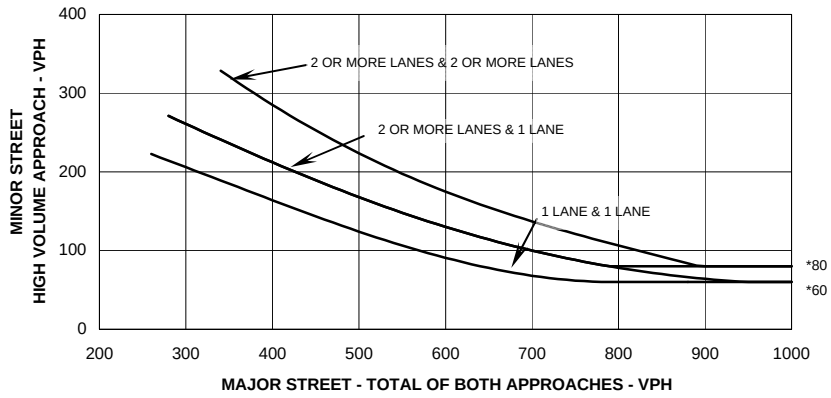
FIGURE 4C-1: Criteria for "100%" Volume Level



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

FIGURE 4C-2: Criteria for "70%" Volume Level

(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



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

Source: Revised from NCHRP Report 457

TRAFFIC SIGNAL WARRANT SUMMARY

City: **Deltona** Engineer: **CPH, Inc.**
County: **Volusia** Date: **September 20, 2013**

Major Street: **Saxon Boulevard** Lanes: **2** Critical Approach Speed: **40**
Minor Street: **Sterling Silver Blvd.** Lanes: **1**

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 3 - PEAK HOUR

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

If all three criteria are fullfilled or the plotted point lies above the appropriate line, then the warrant is satisfed.

Unusual condition justifying use of warrant:

_____

_____

Record hour when criteria are fulfilled and the corresponding delay or volume in boxes provided.

Peak Hour		

Criteria

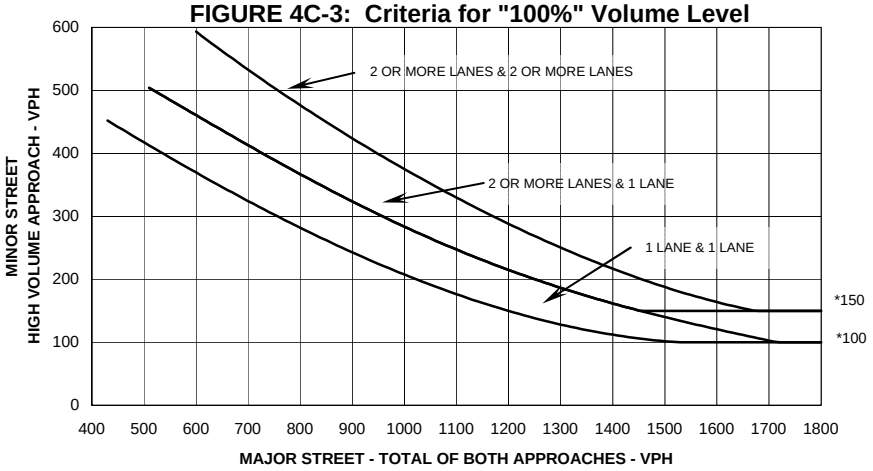
1. Delay on Minor Approach *(vehicle-hours)		
Approach Lanes	1	2
Delay Criteria*	4.0	5.0
Delay*		
Fulfilled?: ☐ Yes ☐ No		

2. Volume on Minor Approach *(vehicles per hour)		
Approach Lanes	1	2
Volume Criteria*	100	150
Volume*		
Fulfilled?: ☐ Yes ☐ No		

3. Total Entering Volume *(vehicles per hour)		
No. of Approaches	3	4
Volume Criteria*	650	800
Volume*		
Fulfilled?: ☐ Yes ☐ No		

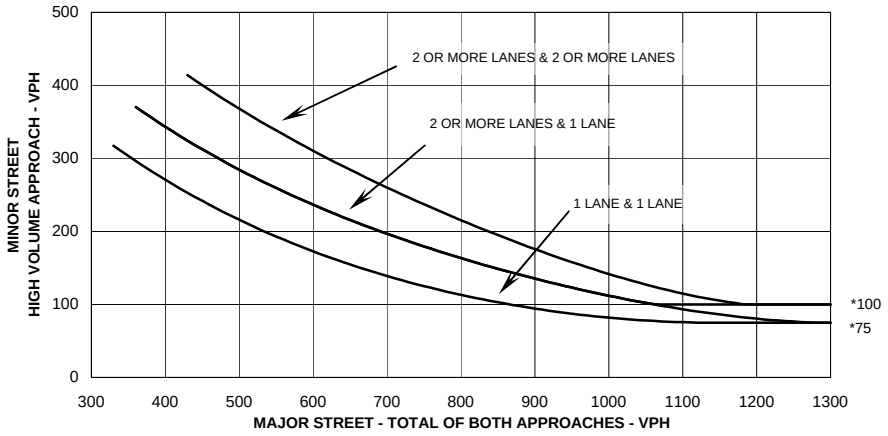
Plot volume combination on the applicable figure below.

FIGURE 4C-3: Criteria for "100%" Volume Level



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

FIGURE 4C-4: Criteria for "70%" Volume Level
(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



** Note: 100 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 75 vph applies as the lower threshold volume threshold for a minor street approach with one lane.*

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WARRANT 4 - PEDESTRIAN VOLUME

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if condition 1 or 2 is fulfilled and condition 3 is fulfilled.

Criteria	Hour	Pedestrian Volume	Pedestrian Gaps	Fulfilled? Yes	Fulfilled? No
1. Pedestrian volume crossing the major street is 100 ped/hr or more for each of any four hours and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
2. Pedestrian volume crossing the major street is 190 ped/hr or more for any one hour and there are less than 60 gaps per hour in the major street traffic stream of adequate length.					
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest si 3 is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 5 - SCHOOL CROSSING

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Record hours where criteria are fulfilled and the corresponding volume or gap frequency in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Criteria				Fulfilled? Yes	Fulfilled? No
1. There are a minimum of 20 students crossing the major street during the highest crossing hour.	Students:	Hour:			
2. There are fewer adequate gaps in the major street traffic stream during the period when the children are using the crossing than the number of minutes in the same period.		Minutes:	Gaps:		
3. The nearest traffic signal along the major street is located more than 90 m (300 ft) away, or the nearest signal is within 90 m (300 ft) but the proposed traffic signal will not restrict the progressive movement of traffic.					

WARRANT 6 - COORDINATED SIGNAL SYSTEM

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Indicate if the criteria are fulfilled in the boxes provided. The warrant is satisfied if either criterion is fulfilled. This warrant should not be applied when the resulting signal spacing would be less than 300 m (1,000 ft).

Criteria	Fulfilled? Yes	Fulfilled? No
1. On a one-way street or a street that has traffic predominately in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.		
2. On a two-way street, adjacent signals do not provide the necessary degree of platooning, and the proposed and adjacent signals will collectively provide a progressive operation.		

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WARRANT 7 - CRASH EXPERIENCE

Applicable: ☐ Yes ☒ No
Satisfied: ☐ Yes ☒ No

Record hours where criteria are fulfilled, the corresponding volume, and other information in the boxes provided. The warrant is satisfied if all three of the criteria are fulfilled.

Criteria		Hour	Volume	Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. One of the warrants to the right is met.	Warrant 1, Condition A (80% satisfied)						
	Warrant 1, Condition B (80% satisfied)						
	Warrant 4, Pedestrian Volume at 80% of volume requirements: 80 ped/hr for four (4) hours or 152 ped/hr for one (1) hour						
2. Adequate trial of other remedial measure has failed to reduce crash frequency.		Measure tried:					
3. Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12-mo. period.		Number of crashes per 12 months:					

WARRANT 8 - ROADWAY NETWORK

Applicable: ☐ Yes ☐ No
Satisfied: ☐ Yes ☒ No

Record hours where criteria are fulfilled, and the corresponding volume or other information in the boxes provided. The warrant is satisfied if at least one of the criteria is fulfilled and if all intersecting routes have one or more of the characteristics listed.

Criteria							Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Both of the criteria to the right are met.	a. Total entering volume of at least 1,000 veh/hr during a typical weekday peak hour.			Entering Volume: 1,672						
	b. Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		Warrant:	1	2	3				
			Satisfied?:							
2. Total entering volume at least 1,000 veh/hr for each of any 5 hrs of a non-normal business day (Sat. or Sun.)							← Hour			
							← Volume			

Characteristics of Major Routes		Met? Yes	Met? No	Fulfilled? Yes	Fulfilled? No
1. Part of the street or highway system that serves as the principal roadway network for through traffic flow.	Major Street:				
	Minor Street:				
2. Rural or suburban highway outside of, entering, or traversing a city.	Major Street:				
	Minor Street:				
3. Appears as a major route on an official plan.	Major Street:				
	Minor Street:				

CONCLUSIONS

Warrants Satisfied: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Remarks: _____

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