



Synergy at Normandy Mixed-Use

City of Deltona, Florida

TRAFFIC IMPACT STUDY

Prepared for:

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EXECUTIVE SUMMARY

This traffic analysis is being conducted to assess the impact of the proposed 320 apartments, 234.6 KSF of light warehouse and a Gas Station with 14 Fuel positions. The proposed development is located east of Normandy Boulevard in City of Deltona, Florida. The analysis included a determination of project trip generation, a review of existing and projected roadway and intersection capacity and a review of access operations.

The results of the traffic analysis are summarized as follows:

- The proposed development will generate a total of 3,514 daily trips of which 355 and 280 will occur during the AM and PM peak hour, respectively.
- Access to the site will be provided via two right-in/right-out and one full access driveway onto Normandy Boulevard. In addition, access will be provided via the proposed new roadway, Amelia Avenue/Rhode Island Avenue.
- The analysis indicates that the study roadway segments generally currently operate adequately within their adopted Level of Service (LOS). There are some segments that are projected to fail with or without construction of the proposed project due to committed trips and background traffic growth.
- An analysis of the study intersections indicates that the study intersections currently operate adequately within their adopted Level of Service standard and are projected to continue to do so upon buildout of the proposed development.
- In summary, an exclusive 235 foot (includes a 50-foot taper) southbound left turn lane is warranted on Normandy Boulevard at Amelia Avenue/Rhode Island Avenue and at the Main Project Access. The turn lane design will be developed and coordinated by the site civil engineers.
- Per City staff, exclusive right turn lanes shall be provided at the driveways, since Normandy Blvd in the study area is a 45 mph roadway.

PROFESSIONAL ENGINEERING CERTIFICATION

I hereby certify that I am a Professional Engineer properly registered in the State of Florida practicing with Premier Traffic Group a dba of Karma Consultancy, LLC. and that I have supervised the preparation and approve the evaluation, findings, opinions, conclusions, and technical advice hereby reported for:

PROJECT: Synergy at Normandy Mixed-Use

LOCATION: City of Deltona, Florida

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

NAME: Vasu T. Persaud, PE

P.E. #: Florida P.E. No. 72790

DATE: July 16, 2024

SIGNATURE:

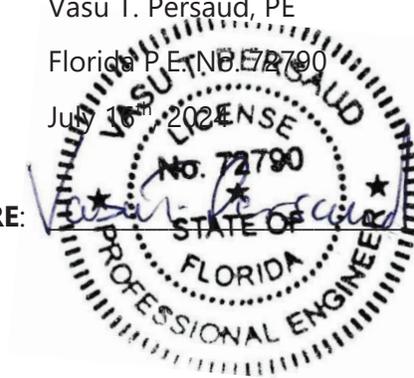


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1.0 INTRODUCTION

The proposed project comprises 320 apartments, 234.6 KSF of light warehouse and a Gas Station with 14 Fuel positions. The proposed development is located east of Normandy Boulevard in City of Deltona, Florida. **Figure 1** depicts the site location and the surrounding transportation network. Access to the site will be provided via two right-in/right-out and one full access driveway onto Normandy Boulevard. In addition, access will be provided via the proposed new roadway, Amelia Avenue/Rhode Island Avenue. A preliminary concept plan is included in **Appendix A**.

1.1 Data and Methodology

Data used in the analysis consisted of site plan/development information provided by the Project Engineers, PM peak hour intersection traffic counts obtained by PTG and roadway segment traffic volumes obtained from Volusia County and the Florida Department of Transportation (FDOT). The analysis was conducted in accordance with the Traffic Impact Analysis (TIA) *Methodology Memorandum* prepared for the project. A copy of the methodology coordination is provided in **Appendix B**.

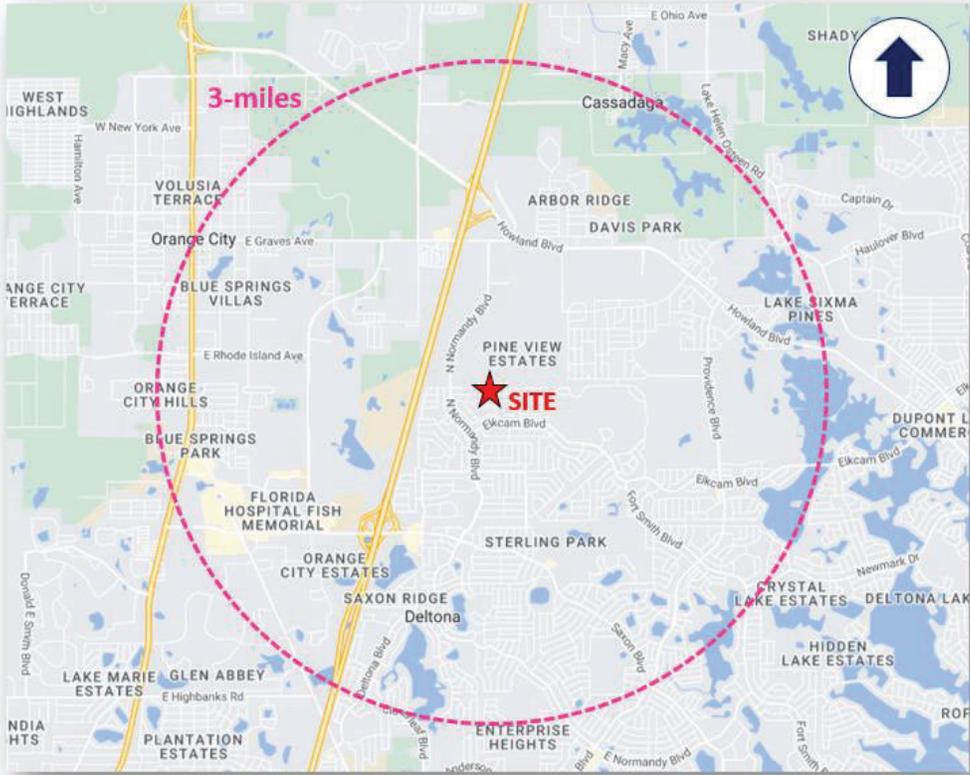


Figure 1: Project Location Map

1.2 Study Area

The study facilities to be considered in the analysis are:

Study Intersections

- Normandy Boulevard and Saxon Boulevard
- Normandy Boulevard and Elkcam Boulevard
- Normandy Boulevard and Graves Avenue
- Graves Avenue and Howland Boulevard
- Normandy Boulevard and Amelia Avenue/Rhode Island Avenue (Full- Full)
- Normandy Boulevard and Project Access 1 (North – Right-in/Right-out)
- Normandy Boulevard and Project Access 2 (Main - Full)
- Normandy Boulevard and Project Access 3 (South – Right-in/Right-out)

Study Segments

- Graves Avenue
 - Veteran's Memorial Parkway to Kentucky Avenue
 - Kentucky Avenue to Normandy Boulevard
 - Normandy Boulevard to Howland Boulevard

- Saxon Boulevard
 - Veterans Memorial Parkway to FDOT Park & Ride
 - FDOT Park & Ride to I-4
 - I-4 to Finland Drive
 - Finland Drive to Normandy Boulevard

- Howland Boulevard
 - I-4/SR 472 to Wolf Pack Run
 - Wolf Pack Run to Catalina Boulevard

- Normandy Boulevard
 - Graves Avenue to Rhode Island
 - Rhode Island to Elkcam Boulevard
 - Elkcam Boulevard to Saxon Boulevard
 - Saxon Boulevard to Deltona Boulevard

- US 17/92
 - DeBary Plantation Blvd to Saxon Boulevard
 - Saxon Boulevard to Enterprise Road
 - Enterprise Road to Rhode Island Avenue
 - Rhode Island Avenue to Graves Avenue
 - Graves Avenue to New York Avenue

1.3 Planned and Programmed Improvements

Based on discussions and review of data documented by FDOT, Volusia County and the Volusia Metropolitan Planning Organization, there are no pertinent roadway capacity improvements that were planned and programmed within three (3) years of the project buildout.

It is known that the City is currently adding turn lanes on Normandy Boulevard in front of the site. Therefore, any turn lane designs will be developed and coordinated by the site civil engineers.

2.0 EXISTING TRAFFIC CONDITIONS

Existing conditions in the vicinity of the site were analyzed to establish a baseline for the traffic conditions prevailing in the vicinity of the proposed development. The analysis included a review of the existing roadway segment capacities and an analysis of the intersection operations at the study intersections.

2.1 Roadway Segment Analysis

Table 1 summarizes the existing roadway segment capacity analysis for study segment within a four (4) mile radius of the proposed development. The existing roadway segment conditions were analyzed by comparing the existing traffic volumes observed on the study roadway segments to the service volumes at the adopted Level of Service (LOS) standard for the roadway segments. The LOS data was obtained from the latest Volusia County traffic data and committed trips spreadsheets.

Table 1: Existing Roadway Segment Capacity Analysis

No.	Roadway	Segment	Lanes	LOS Stnd	PH Dir Capacity	PM PK Hr Ext Vol	Ext LOS Met?
99	Graves Ave	VMP to Kentucky Ave	2	E	1,620	1,640	No
100	Graves Ave	Kentucky to Normandy	2	E	1,620	1,420	Yes
101	Graves Ave	Normandy Blvd to Howland Blvd	4	E	2,740	1,590	Yes
102	Saxon Blvd	VMP to FDOT Park n Ride	6	E	5,140	3,360	Yes
103	Saxon Blvd	Park n Ride to I-4	6	E	5,140	2,710	Yes
104	Saxon Blvd	I-4 to Finland Dr	5	E	4,280	3,580	Yes
105	Saxon Blvd	Finland Dr to Normandy Blvd	4	E	3,410	3,170	Yes
121	Howland Blvd	I-4 to Wolf Pack Run	4	E	3,410	2,530	Yes
122	Howland Blvd	Wolf Pack Run to Catalina Blvd	4	E	3,410	2,310	Yes
189	Normandy Blvd	Graves Ave to Rhode Island	2	E	1,150	787	Yes
190	Normandy Blvd	Rhode Island to Elkcam Blvd	4	E	2,630	636	Yes
191	Normandy Blvd	Elkcam Blvd to Saxon Blvd	4	E	2,630	599	Yes
192	Normandy Blvd	Saxon Blvd to Deltona Blvd	2	E	2,630	936	Yes
53	US 17/92	DeBary Plantation Blvd to Saxon Blvd.	4	E	3,580	1,622	Yes
54	US 17/92	Saxon Blvd. to Enterprise Rd.	4	E	3,580	1,223	Yes
55	US 17/92	Enterprise Rd. to Rhode Island Ave.	4	E	3,580	1,649	Yes
56	US 17/92	Rhode Island Ave. to Graves Ave.	4	E	3,580	1,649	Yes
57	US 17/92	Graves Ave. to New York Ave.	4	E	3,580	1,782	Yes

Note: (1) Volusia Vested Trips 2022 table used for segments No. 99 to 192; (2) VolusiaAADTs2021 table used for segments 53 to 57; (3) PM Peak Hour Existing Volume for US 17/92 was obtained by applying the K and D factors to the AADT values found in the VolusiaAADTs2021 spreadsheet

The analysis indicates that the study roadway segments currently operate adequately within their adopted Level of Service (LOS) standard except Graves Avenue from Veteran’s Memorial Parkway to Kentucky Avenue.

2.2 Intersection Capacity Analysis

Table 2 summarizes the results of the existing intersection capacity analysis. The existing intersection capacity analysis was conducted for the PM peak hour using the *Synchro* software and the methods of the *Highway Capacity Manual (HCM)*. The turning movement count data and the existing PM peak hour Turning Movement Volumes are included in **Appendix C**. It should be noted that the raw turning movement counts were adjusted to peak season volumes using a seasonal adjustment factor (1.02) obtained from the *FDOT Traffic Online* website.

Table 2: Existing Intersection Capacity Analysis

Intersection	Control	Time	EB		WB		NB		SB		Overall	
		Period	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Normandy Blvd & Saxon Blvd	Signal	AM	23.0	C	38.0	D	39.5	D	62.4	E	39.4	D
		PM	40.0	D	32.5	C	54.5	D	56.2	E	42.0	D
Normandy Blvd & Elkam Blvd	Signal	AM	--	--	9.4	A	10.0	A	5.4	A	8.6	A
		PM	--	--	14.5	B	10.2	B	4.4	A	8.5	A
Normandy Blvd & Graves Ave	Signal	AM	20.4	C	17.7	B	9.9	A	--	--	16.0	B
		PM	19.4	B	16.5	B	14.7	B	--	--	17.8	B
Graves Ave & Howland Blvd	Signal	AM	25.0	C	33.8	C	55.9	E	54.0	D	36.3	D
		PM	33.5	C	21.7	C	16.6	B	31.2	C	21.0	C

The analysis indicates that the study intersections operate adequately during the PM peak hour period. The detailed *Synchro* worksheets are included in **Appendix D**.

3.0 TRIP GENERATION

To determine the impact of this development, an analysis of its trip generation characteristics was conducted. This included a determination of the trips to be generated as well as their distribution and assignment to the surrounding roadways. The estimated project buildout is 2026.

3.1 Trip Generation

Table 3 summarizes the trip generation analysis conducted using information published by the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual, 11th Edition* and the *Trip Generation Handbook, 3rd Edition*. The calculation indicated that the proposed development would generate a total of 3,514 daily trips of which 355 and 280 new net trips will occur during the AM and PM peak hour, respectively. The ITE Trip Generation graphs are included as part of the *Methodology Memorandum* in **Appendix B**.

Table 3: Trip Generation

ITE Code	Land Use	Size	Daily		AM Peak Hour			PM Peak Hour				
			Rate	Trips	Rate	Enter	Exit	Total	Rate	Enter	Exit	Total
110	General Light Industrial	234.6 KSF	4.87	1,143	0.74	153	21	174	0.65	21	131	152
221	Multi-Family (Mid-Rise)	320 DUs	4.62	1,478	0.4	29	99	128	0.39	76	49	125
945	Gas Station with Convenience Market (GFA 2-4ksf)	14 FPs	265.1	3,712	16.06	113	112	225	18.42	129	129	258
Subtotal			--	6,333	--	295	232	527	--	226	309	535
<i>Internal Capture (1% AM, 18% PM)</i>			--	63	--	3	2	5	--	41	55	96
<i>Gas Station with Convenience Market Pass-by (75%)</i>			--	2,756	--	84	83	167	--	79	80	159
New Net Trips			--	3,514	--	208	147	355	--	106	174	280

Note: ITE Trip generation equation used as the R-squared value is greater than 0.7

3.2 Trip Distribution/Assignment

The *Central Florida Regional Planning Model (CFRPM)* was used to determine a trip distribution pattern for this project. A model plot showing the trip distribution pattern is provided as part of the *Methodology Memorandum* in **Appendix B**. The trip distribution pattern was assessed for reasonableness using knowledge of the traffic patterns in the area, review of existing traffic counts and engineering judgement.

Figure 2 provides the finalized trip distribution developed for this project. Using this trip distribution pattern, project trips will be assigned to the surrounding study roadway network.

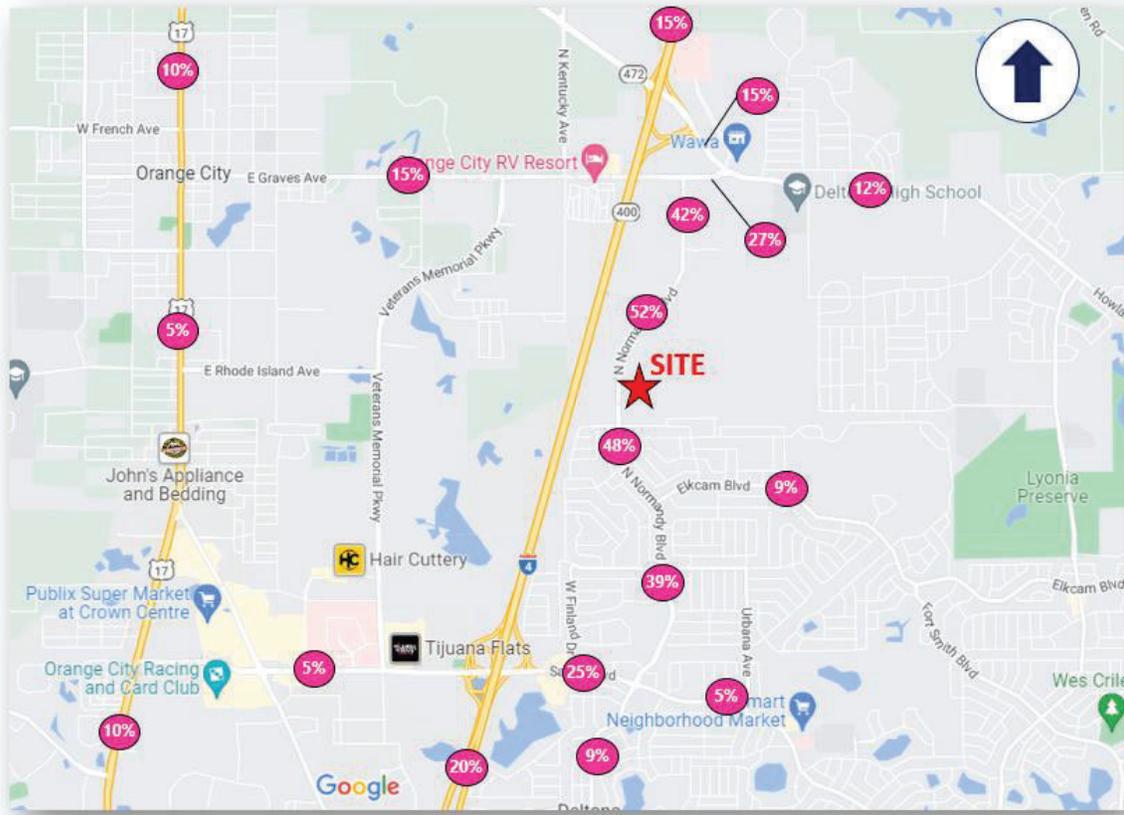


Figure 2: Trip Distribution Map

4.0 PROJECTED TRAFFIC CONDITIONS

An analysis of projected conditions was conducted to determine the proposed development's impact on the roadway segment capacities and to evaluate the operations of the study intersections. The project buildout year for the analysis is 2026.

4.1 Background Traffic Projection

Projected traffic volumes consist of background traffic combined with site generated traffic. Typically, background traffic volumes are determined by expanding existing peak hour traffic volumes to the buildout year using an annual growth rate. A historical trend analysis was conducted based on the Annual Average Daily Traffic (AADT) data obtained from the *FDOT Traffic Online* website in the vicinity of the project (see **Appendix E**). Based on this historical trend analysis, an annual growth rate of 1.96% was calculated. This growth rate was applied to the existing traffic volumes as appropriate in order to determine the projected background volumes in the project buildout year.

4.2 Roadway Segment Analysis

Table 4 and **Table 5** summarize the results of the background and projected study roadway segment capacity analysis, respectively. The Background and Projected roadway segment conditions were analyzed by comparing the projected traffic volumes on the study segments to their respective service volumes at the adopted Level of Service (LOS) standard. The total projected traffic volume is composed of background traffic and project trips. Projected background traffic was estimated using the annual growth rate discussed in the previous section.

The analysis indicates that the study roadway segments generally currently operate adequately within their adopted Level of Service (LOS). There are some segments that are projected to fail with or without the construction of the proposed project due to committed trips and background traffic growth.

Table 4: Background Roadway Segment Capacity Analysis

No.	Roadway	Segment	Lanes	LOS Stnd	PH Dir Capacity	Backg'd Vol	Backg'd Comm	Backg'd Tot Vol	Backd'd LOS Met?
99	Graves Ave	VMP to Kentucky Ave	2	E	1,620	1771	470	2,241	No
100	Graves Ave	Kentucky to Normandy	2	E	1,620	1534	925	2,459	No
101	Graves Ave	Normandy Blvd to Howland Blvd	4	E	2,740	1717	991	2,708	Yes
102	Saxon Blvd	VMP to FDOT Park n Ride	6	E	5,140	3629	316	3,945	Yes
103	Saxon Blvd	Park n Ride to I-4	6	E	5,140	2927	313	3,240	Yes
104	Saxon Blvd	I-4 to Finland Dr	5	E	4,280	3866	262	4,128	Yes
105	Saxon Blvd	Finland Dr to Normandy Blvd	4	E	3,410	3424	262	3,686	No
121	Howland Blvd	I-4 to Wolf Pack Run	4	E	3,410	2732	868	3,600	No
122	Howland Blvd	Wolf Pack Run to Catalina Blvd	4	E	3,410	2495	783	3,278	Yes
189	Normandy Blvd	Graves Ave to Rhode Island	2	E	1,150	850	764	1,614	No
190	Normandy Blvd	Rhode Island to Elkcam Blvd	4	E	2,630	687	507	1,194	Yes
191	Normandy Blvd	Elkcam Blvd to Saxon Blvd	4	E	2,630	647	338	985	Yes
192	Normandy Blvd	Saxon Blvd to Deltona Blvd	2	E	2,630	1011	61	1,072	Yes
53	US 17/92	DeBary Plantation Blvd to Saxon Blvd.	4	E	3,580	1752	0	1,752	Yes
54	US 17/92	Saxon Blvd. to Enterprise Rd.	4	E	3,580	1321	0	1,321	Yes
55	US 17/92	Enterprise Rd. to Rhode Island Ave.	4	E	3,580	1781	0	1,781	Yes
56	US 17/92	Rhode Island Ave. to Graves Ave.	4	E	3,580	1781	0	1,781	Yes
57	US 17/92	Graves Ave. to New York Ave.	4	E	3,580	1925	0	1,925	Yes

Table 5: Projected Roadway Segment Capacity Analysis

No.	Roadway	Segment	Lanes	LOS Stnd	PH Dir Capacity	Backg'd Tot Vol	Trip Dist	Project Vol	Total Vol	Projected LOS Met?
99	Graves Ave	VMP to Kentucky Ave	2	E	1,620	2,241	15%	26	2267	No
100	Graves Ave	Kentucky to Normandy	2	E	1,620	2,459	15%	16	2475	No
101	Graves Ave	Normandy Blvd to Howland Blvd	4	E	2,740	2,708	27%	47	2755	No
102	Saxon Blvd	VMP to FDOT Park n Ride	6	E	5,140	3,945	5%	5	3950	Yes
103	Saxon Blvd	Park n Ride to I-4	6	E	5,140	3,240	5%	9	3249	Yes
104	Saxon Blvd	I-4 to Finland Dr	5	E	4,280	4,128	25%	27	4155	Yes
105	Saxon Blvd	Finland Dr to Normandy Blvd	4	E	3,410	3,686	25%	44	3730	No
121	Howland Blvd	I-4 to Wolf Pack Run	4	E	3,410	3,600	15%	16	3616	No
122	Howland Blvd	Wolf Pack Run to Catalina Blvd	4	E	3,410	3,278	12%	21	3299	Yes
189	Normandy Blvd	Graves Ave to Rhode Island	2	E	1,150	1,614	52%	55	1669	No
190	Normandy Blvd	Rhode Island to Elkcam Blvd	4	E	2,630	1,194	48%	84	1278	Yes
191	Normandy Blvd	Elkcam Blvd to Saxon Blvd	4	E	2,630	985	39%	41	1026	Yes
192	Normandy Blvd	Saxon Blvd to Deltona Blvd	2	E	2,630	1,072	9%	16	1088	Yes
53	US 17/92	DeBary Plantation Blvd to Saxon Blvd.	4	E	3,580	1,752	10%	17	1769	Yes
54	US 17/92	Saxon Blvd. to Enterprise Rd.	4	E	3,580	1,321	5%	5	1326	Yes
55	US 17/92	Enterprise Rd. to Rhode Island Ave.	4	E	3,580	1,781	5%	9	1790	Yes
56	US 17/92	Rhode Island Ave. to Graves Ave.	4	E	3,580	1,781	15%	16	1797	Yes
57	US 17/92	Graves Ave. to New York Ave.	4	E	3,580	1,925	10%	17	1942	Yes

Note: Total Vol = 2022 Existing Vol x [1+(2%x 4 years)] + Project Vol

4.3 Intersection Capacity Analysis

Table 6 summarizes the results of the projected intersection capacity analysis. The projected intersection capacity and operational analysis was conducted using the *Synchro* software and the methods of the *Highway Capacity Manual (HCM)* and was performed for the PM peak hours. The projected volumes for the intersection capacity and operations analysis were calculated as previously discussed. Projected background traffic was estimated using the annual growth rate as previously discussed. The projected peak hour volumes are also provided **Appendix D**.

The analysis indicates that the study intersections are projected to continue to operate adequately during both the AM and PM peak hour periods. The *Synchro* analysis worksheets are included in **Appendix F**.

Table 6: Projected Intersection Capacity Analysis

Intersection	Control	Time	EBL		WBL		NBL		SBL		Overall	
		Period	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Normandy Blvd & Saxon Blvd	Signal	AM	36.1	D	53.9	D	59.1	E	78.4	E	55.3	E
		PM	38.5	D	80.5	F	85.7	F	56.3	E	54.3	D
Normandy Blvd & Elkam Blvd	Signal	AM	--	--	10.8	B	10.8	B	5.7	A	9.4	A
		PM	--	--	15.5	B	11.3	B	4.8	A	9.1	A
Normandy Blvd & Graves Ave	Signal	AM	19.7	B	18.0	B	10.6	B	--	--	16.0	B
		PM	20.3	C	16.9	B	16.3	B	--	--	18.5	B
Graves Ave & Howland Blvd	Signal	AM	27.0	C	41.8	D	69.7	E	56.0	E	44.1	D
		PM	34.9	C	22.1	C	18.0	B	33.8	C	22.3	C
Normandy Blvd & Amelia Ave	Stop	AM	--	--	17.5	C	0.0	A	1.9	A	--	--
		PM	--	--	23.0	C	0.0	A	0.6	A	--	--
Normandy Blvd & Project Access	Stop	AM	--	--	11.2	B	0.0	A	0.0	A	--	--
		PM	--	--	10.1	B	0.0	A	0.0	A	--	--
Normandy Blvd & Project Access	Stop	AM	--	--	18.9	C	0.0	A	2.1	A	--	--
		PM	--	--	25.5	D	0.0	A	0.6	A	--	--
Normandy Blvd & Project Access	Stop	AM	--	--	11.9	B	0.0	A	0.0	A	--	--
		PM	--	--	10.4	B	0.0	A	0.0	A	--	--

Note: Planning level signal timings utilize for projected conditions

4.4 Access Turn Lane Analysis

Left Turn Lane

The need for exclusive southbound left turn lanes on Normandy Boulevard at Amelia Avenue/Rhode Island Avenue and at the Main Project Access was assessed using guidance from the *National Cooperative Highway Research Program (NCHRP) Report 457- Evaluating Intersection Improvements: An Engineering Study Guide*. The review indicated that the project volumes and posted speed limit at this location do meet the warrant thresholds and

consequently, an exclusive southbound left turn lane is warranted at both Locations. The NCHRP 457 worksheet is provided in **Appendix G**.

The minimum required turn lane dimensions is as follows:

Total Turn Lane Length = Vehicular Deceleration Distance + Queue Storage
Deceleration @ 45 mph = 185' (incl. 50-foot taper), per FDOT Design Standards
Queue = 95th percentile queue from Synchro = 1.6 vehicle, use 2 vehicles minimum = 50'
Total Turn Lane Length = 185 + 50 = 235 feet

In summary, an exclusive 235-foot (includes a 50-foot taper) southbound left turn lane is warranted on Normandy Boulevard at Amelia Avenue/Rhode Island Avenue and at the Main Project Access. The turn lane design will be developed and coordinated by the site civil engineers.

Right Turn Lane

Per City staff, exclusive right turn lanes shall be provided at the driveways, since Normandy Blvd in the study area is a 45 mph roadway. Specifically, the following applies

- According to Volusia County LDC Section 72-619 for turn lane requirements, it states that "A right-turn lane of 12 feet in width, conforming to Table VI shall be provided at each driveway when the speed limit equals or exceeds 35 miles per hour or if the development will generate 100 or more right-turn movements during the peak hour."
- According to Section 96-37 (Access to thoroughfare corridors) from City of Deltona ordinances - A right-turn lane with a minimum of 150 feet of storage and 100 feet of transition shall be required 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.

4.5 Intersection Queuing Analysis

A PM peak hour queue analysis was conducted of the study intersection to determine the adequacy of the exiting left turn lane lengths to accommodate the projected volumes. This analysis is summarized in **Table 7**. As shown, the study intersection storage lane lengths accommodate the projected traffic except for the Normandy Boulevard and Saxon Boulevard intersection, which currently had queue storage deficiencies.

Note: The right turn lanes were not analyzed because of the right turn on red allowance which would inherently reduce queuing at these intersections

Table 7: Intersection Queue Analysis

Approach Movement	Data	Normandy Blvd & Saxon Blvd	Normandy Blvd & Elkam Blvd	Normandy Blvd & Graves Ave	Graves Ave & Howland Blvd
EBL	Queue (ft)	915	N/A	N/A	60
	Speed Limit (mph)	30	N/A	35	35
	Decel Distance (ft)	145	N/A	145	145
	Total Required (ft)	1060	N/A	145	205
	Ext Lane Length (ft)	545	N/A	485	545
	Sufficient (Y/N)	N	N/A	Y	Y
WBL	Queue (ft)	47.5	80	175	169
	Speed Limit (mph)	30	35	35	35
	Decel Distance (ft)	145	145	145	145
	Total Required (ft)	192.5	225	320	314
	Ext Lane Length (ft)	180	619	562	367
	Sufficient (Y/N)	N	Y	Y	Y
NBL	Queue (ft)	237.5	N/A	155	94
	Speed Limit (mph)	30	35	35	35
	Decel Distance (ft)	145	145	145	145
	Total Required (ft)	382.5	145	300	239
	Ext Lane Length (ft)	280	N/A	577	732
	Sufficient (Y/N)	N	Y	Y	Y
SBL	Queue (ft)	140	32.5	N/A	81
	Speed Limit (mph)	30	35	N/A	35
	Decel Distance (ft)	145	145	N/A	145
	Total Required (ft)	285	177.5	N/A	226
	Ext Lane Length (ft)	1000	1000	N/A	N/A
	Sufficient (Y/N)	Y	Y	N/A	Y

4.6 Proportionate Fair Share

The roadway segments that are failing in the projected conditions fail during the background conditions. Therefore, as per F.S. 160.3180 3. (B) the roadways are deficient without the project under review and therefore are removed from the proportionate-share calculation.

5.0 MULTIMODAL ASSESSMENT

An assessment was done of the immediate project site and proposed project site plans as it relates to multimodal transportation options.

Existing multimodal provisions in the area primarily includes sidewalks with stripped crosswalks on internally in the adjacent subdivisions. The proposed project would further facilitate multimodal connectivity by providing on-site/site related sidewalks connectivity. In general, the site plan is consistent with the City guidelines that will encourage the following:

- Safe, adequately lit and well-maintained pathways (on-site)
- Share Road Bicycle connectivity
- Identifiable crosswalks
- Removal of natural and/or built barriers that discourage walking
- Compliance with American's with Disabilities Act requirements
- Buffering between vehicular areas and sidewalks
- Linkage to existing or future walkway and/or bikeway network and transit route

Further information on multimodal provisions is documented by the site civil engineer on the site plans.

6.0 STUDY CONCLUSIONS

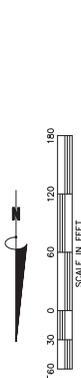
This traffic analysis is being conducted to assess the impact of the proposed 320 apartments, 234.6 KSF of light warehouse and a Gas Station with 14 Fuel positions. The proposed development is located east of Normandy Boulevard in City of Deltona, Florida. The analysis included a determination of project trip generation, a review of existing and projected roadway and intersection capacity and a review of access operations.

The results of the traffic analysis are summarized as follows:

- The proposed development will generate a total of 3,514 daily trips of which 355 and 280 will occur during the AM and PM peak hour, respectively.
- Access to the site will be provided via two right-in/right-out and one full-access driveway onto Normandy Boulevard. In addition, access will be provided via the proposed new roadway, Amelia Avenue/Rhode Island Avenue.
- The analysis indicates that the study roadway segments generally currently operate adequately within their adopted Level of Service (LOS). There are some segments that are projected to fail with or without the construction of the proposed project due to committed trips and background traffic growth.
- An analysis of the study intersections indicates that the study intersections currently operate adequately within their adopted Level of Service standard and are projected to continue to do so upon buildout of the proposed development.
- In summary, an exclusive 235 foot (includes a 50-foot taper) southbound left turn lane is warranted on Normandy Boulevard at Amelia Avenue/Rhode Island Avenue and at the Main Project Access. The turn lane design will be developed and coordinated by the site civil engineers.
- Per City staff, exclusive right turn lanes shall be provided at the driveways, since Normandy Boulevard within the study area is a 45 mph roadway.

APPENDIX

Appendix A: Preliminary Concept Plan



SYNERGY AT NORMANDY

A Multi-Use Development

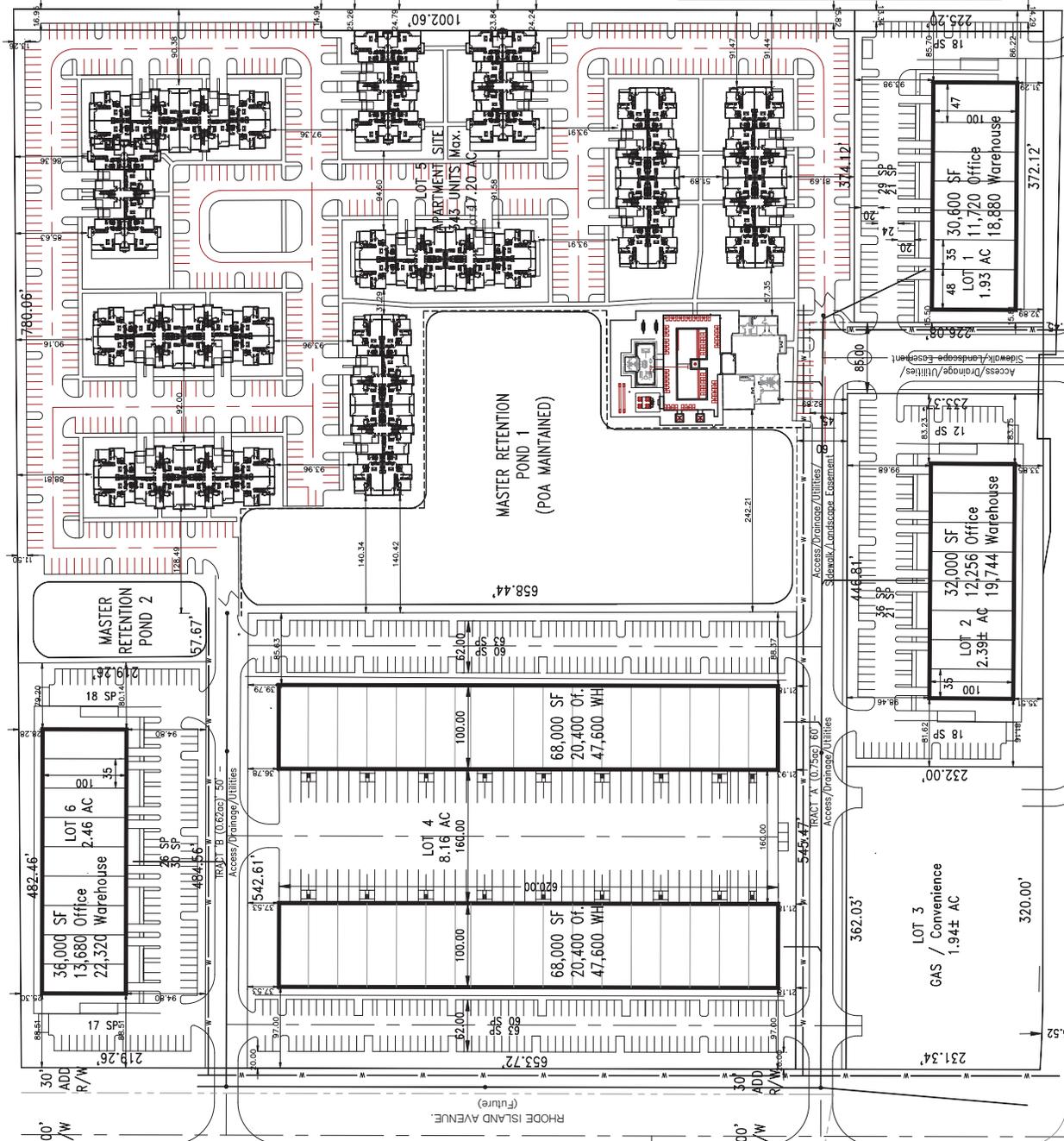
DEVELOPER:
Telesis Services LLC
 Attn: Scott Banta
 scott@telesisservices.com
 1111 N. Ronald Reagan Blvd, Suite 101
 Longwood, FL 32750

OWNER:
Warranty Parts Solutions, LLC
 14327 Whitridge Drive
 Winter Garden, FL 34957

CIVIL ENGINEER:
CFE Central Florida
Engineering Consultants, LLC
 1111 N. Ronald Reagan Blvd, STE 101
 Longwood, FL 32750
 407-599-7010
 ATTN: Russell Maynard
 rmaynard@cfecollc.com

LOT / BUILDING TABLE

Lot #	Industrial Building	Office	Warehouse	Max. Distance (ft)
Lot 1	1,53	30,000	11,720	18,880
Lot 2	2,39	53,000	12,256	19,744
Lot 3	1,54			
Lot 4	8,16	68,000	20,400	47,600
Lot 5	17,20			
Lot 6	2,46	30,000	13,680	23,280
Totals	3,27	234,000	70,640	156,844
Total Land Area				
Developed Total (incl. Storm S. Run)	18,45	234,000	70,640	156,844
Rock Island and Normandy R/W Deduction				
Total Land Area	36,46			



NORMANDY BLVD.

Appendix B: Methodology Coordination

MEMORANDUM

**RE: Synergy at Normandy Mixed-Use
City of Deltona, Florida**
Traffic Impact Analysis Comments Responses
07/16/2024
Job # 22120

The following responds to comments received on the Traffic Impact Analysis (TIA) for the above referenced project.

1. Existing Roadway Segment Capacity Analysis (Table 1):

- a. Roadway segment numbers 190 and 191 (Normandy Blvd from Rhode Island to Saxon Blvd) – Number of lanes should be 4 instead of 2.
- b. It was stated that the PM Peak Hour External Volume for US 17/92 segments are calculated by multiplying the AADTs with K & D factors. Using the AADTs from AADT spreadsheet, K and D factors from Florida Traffic Online website, following are the PM peak hour volumes calculated:
 - I. 1,622 instead of 1,565 on segment number 53,
 - II. 1,223 instead of 1,180 on segment number 54,
 - III. 1,649 instead of 1,590 on segment number 55,
 - IV. 1,649 instead of 1,590 on segment number 56,
 - V. 1,782 instead of 1,719 on segment number 57.

For example, the AADT along segment number 53 is 30,500 veh/day with K&D factors of 9.0 and 59.1% respectively. $AADT \times K \times D = 30,500 \times 0.09 \times 0.591 = 1,622$. Please modify the table with accurate values.

Response: As requested, the TIA was updated per these comments.

2. Trip Generation (Table 3):

- a. It is observed that a total industrial land use size of 234,600 SF was included (75,456 SF of office space and 156,144 SF of warehouse) in the latest site plan, which is higher than the 230,600 SF used in the trip generation table. In the approved methodology and the TIA (September 2023), Lot 6 had 32,000 SF which included 12,256 SF of office space and 19,744 SF of warehouse usage while updated TIA (June 2024) has 36,000 SF which included 13,680 SF of office space and 22,320 SF of warehouse usage. Please update the trip generation table to include the additional 4,000 SF.

- b. Multi-Family (Mid-Rise) - Based on ITE Trip Generation 11th Edition, the AM peak hour trips for 320 dwelling units using the equation calculates to be 129 (Total), 30 (Enter) and 99 (Exit). Please modify the trip generation values.**

Note: The values of 138 (Total), 32 (Enter) and 106 (Exit) shown in the table is for 340 dwelling units.

- c. The values shown in the pass-by trips during the AM peak hour are incorrect. For example, reducing the internal capture of 1% (AM peak hour) from the total trips of 225 equals to approximately 223 and 75% pass-by trips will be 167 trips instead of 138 shown. It seems like the internal capture of 18% is inadvertently used instead of 1% to reduce the internal capture trips, please modify the calculations and update the table.**

Response: As requested, the TIA was updated per these comments.

- 3. Projected Traffic Conditions (Section 4): The body of the report states the build-out year as 2025 while the TIA methodology submission checklist states it as 2026. Please confirm which is the accurate build-out year.**

Response: The build-out year was updated to 2026.

- 4. Background Roadway Segment Capacity Analysis (Table 4):**

- a. Check comments on Table 1 and update this table accordingly.**
- b. The background volumes seems to be incorrect. The AADTs used as a baseline to forecast to build-out year (2025) is from year 2021 and not 2023. Hence, the background volume should be equal to PM peak hour volume from 2021 AADT spreadsheet $\times (1 + 4 \times 1.96\%)$. Please update the background volume column.**
- c. Please confirm with the County the attached July 2022 is the latest vested trip data available.**

Response: As requested, the TIA was updated per these comments. The Vested Trip data July 2022 is the latest.

- 5. Projected Roadway Segment Capacity Analysis (Table 5):**

- a. Check comments on Tables 1 and 4 and update this table accordingly.**
- b. Trip distribution – Based on the review of trip distribution map (Figure 2), the distribution percentages should be as follows:**

- I. **Roadway Number 100 - Project trip percentage should be 15% instead of 52%,**
- II. **Roadway Number 101 - Project trip percentage should be 27% instead of 42%,**
- III. **Roadway Number 103 - Project trip percentage should be 5% instead of 55%,**
- IV. **Roadway Number 105 - Project trip percentage should be 25% instead of 39%,**
- V. **Roadway Number 121 - Project trip percentage should be 15% instead of 27%,**
- VI. **Roadway Number 189 - Project trip percentage should be 52% instead of 25%,**
- VII. **Roadway Number 190 - Project trip percentage should be 48% instead of 39%,**
- VIII. **Roadway Number 191 - Project trip percentage should be 39% instead of 52%,**
- IX. **Roadway Number 192 - Project trip percentage should be 9% instead of 52%,**
- X. **Roadway Number 53 - Project trip percentage should be 10% instead of 5%.**
- XI. **1,782 instead of 1,719 on segment number 57.**

Please update Table 5 based on above modifications.

Response: As requested, the TIA was updated per these comments.

6. Intersection Capacity Analysis (Section 4.3): A queuing analysis has to be performed to confirm the sufficiency of the turn lane storages volumes at the study intersections to accommodate the background and project traffic.

Response: A queuing analysis was added to the report.

7. General: A multimodal analysis reviewing bicycle, pedestrian and transit facilities within the project influence area need to be included as part of the TIA.

Response: As requested, a multimodal discussion was added to the TIA.

END

MEMORANDUM

**RE: Synergy at Normandy Mixed-Use
City of Deltona, Florida**
Traffic Impact Analysis Comments Responses
06/12/2024
Job # 22120

The following responds to comments received on the Traffic Impact Analysis (TIA) for the above referenced project.

City of Deltona Comments

1. Preliminary Site Plan (Figure 2):

- a. **Please include the calculation for number of parking spaces required versus the actual parking spaces provided using the rates from the Volusia County/City of Deltona parking guidelines for residential uses, to make sure adequate spaces are provided for documentation purposes.**
- b. **Based on the review of site plan, it is seen that there will be 312 residential units. Please confirm if the number of residential dwelling units will be 320 or 312.**

Response: The parking calculation will be provided by the site civil engineer as it is not part of the Traffic Impact Study. There are 320 residential units.

2. Existing Roadway Segment Capacity Analysis (Table 1):

- a. **The number of lanes seems to be incorrect for a lot of roadway segments. For example:**
 - i. **Graves Avenue from Kentucky to Normandy is a two-lane roadway based on google street view and Volusia County volume spreadsheet.**
 - ii. **Saxon Boulevard from VMP to FDOT Park & Ride is a six-lane roadway based on google street view and Volusia County volume spreadsheet.**
 - iii. **Normandy Boulevard from Graves Avenue to Rhode Island is a two-lane roadway based on google street view and Volusia County volume spreadsheet.**
 - iv. **The above are just a few examples, please verify all the segments and update the table.**
- b. **Please verify the PM PK Hr Ext Volumes on Saxon Blvd, the values seem different in the 2021 Volume Spreadsheet**
- c. **For the segments on US 17/92:**

- i. **Based on 2021 Volusia County AADT spreadsheet, the peak 2-way capacity is seen as 3,580 vehicle/hour while the table shows a value of 2,000 vehicle/hour. Please explain or reconcile as needed.**
- ii. **Also, please explain where the peak hour volumes were obtained from. No values were seen in the 2021 Volusia County AADT spreadsheet.**

Response: The table was updated and notes added as requested

3. Trip Generation (Table 3):

- a. **General Light Industrial (LUC 110) - It is seen from the preliminary site plan that there will be 77 KSF of office space (33%) and 153.6 KSF of warehouse (67%). Please confirm the office space is related to warehousing and will not be using for other uses. Based on description of land use 110, Light Industrial is defined as "The facility has an emphasis on activities other than manufacturing and typically has minimal office space". If the office space will be used for different purpose, the general light industrial and office uses must be calculated as different land uses.**
- b. **Multi-Family (Mid-Rise) - Based on ITE Trip Generation 11th Edition, the AM peak hour trips calculate to be 129 (Total), 30 (Enter) and 99 (Exit). Please modify as necessary.**
- c. **Internal capture - The 18% internal capture is for PM peak hour and the internal trip capture estimation was not performed for AM peak hour or attached with the methodology. Please calculate the internal capture for AM peak hour. Based on initial analysis, it is observed the internal capture will be less than 1% for the AM peak hour. Please update the trip generation calculations.**

Response: (a) Per the developer, the office space is intended to be incidental to the warehouse space; (b) Per the note at the bottom of Table 3, the ITE trip generation equations were used to derive trip rates; (c) The AM peak hour internal capture was updated as requested.

4. Projected Roadway Segment Capacity Analysis (Table 4):

- a. **Were the vested trips added to the background volume? If yes, please include a column showing the vested trips on each corridor.**
- b. **In addition, please verify the number of lanes are correct.**

Response: (a) Vested trips were used originally in the analysis but a column was not shown in the PDF. A column has now been added to Table 4; (b) The number of lanes was updated per comment #2.

- 5. Turn Lane Analysis (Section 4.4): This section reviewed the requirements for left-turn lanes but did not evaluate for the right-turn lane requirements.**
- a. According to Volusia County LDC Section 72-619 for turn lane requirements, it states that "A right-turn lane of 12 feet in width, conforming to Table VI shall be provided at each driveway when the speed limit equals or exceeds 35 miles per hour or if the development will generate 100 or more right-turn movements during the peak hour."
 - b. According to Section 96-37 (Access to thoroughfare corridors) from City of Deltona ordinances - A right-turn lane with a minimum of 150 feet of storage and 100 feet of transition shall be required 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.

Exclusive right turn lanes shall be provided at the driveways, since Normandy Blvd in the study area is a 45 mph roadway.

Response: The turn lane section was updated accordingly.

- 6. Study Conclusions: Please calculate the Proportionate Fair Share for the proposed mixed-use development.**

Response: A proportionate fair share section was added to the report

- 7. Housekeeping comment: In Section 2.2, it is stated that a seasonal adjustment factor of 1.16 was used, shouldn't it be 1.02**

Response: The seasonal factor used was 1.02, the text was updated to be consistent.

Volusia County Comments

- 1. Please make sure to utilize the County's 2022 AADT spreadsheet.**

Response: The County 2022 AADT Spreadsheet was utilized. References are provided in the TIA.

- 2. Please state any planned or programmed improvements that will be assumed for future conditions.**

Response: Planned and programmed improvements are discussed in Section 1.3 of the TIA.

3. Please provide additional justification to ensure the proposed buildout year of 2025 aligns with realistic development timelines in the TIA study.

Response: This comment will be addressed by the Developer thru discussion with City and County staff.

4. Confirm if there are any planned phases for the development and full development buildout year.

Response: This comment will be addressed by the Developer thru discussion with City and County staff.

5. Please include the following statement (if applicable) Given the staged nature of the development and recognizing the potential evolution of traffic patterns over time, the developer is required to conduct a comprehensive reevaluation of the access control type in conjunction with each stage of development. This process is essential to ensure that access control measures align with the changing transportation needs and conditions associated with the different phases of the project. The developer must collaborate closely with the CTE to assess and adjust the access control type based on the specific requirements and challenges presented by each stage. This reevaluation should consider factors such as the increasing population density, changing land use patterns, and corresponding shifts in traffic volumes. For each stage, the developer is expected to submit a revised access control proposal that reflects the current and anticipated traffic conditions. This proposal should outline any necessary modifications to the initially proposed access control type, taking into account factors such as peak traffic periods, pedestrian movements, and the integration of alternative transportation modes. The CTE will review each stage's access control proposal, ensuring that it complies with established standards and guidelines. The goal is to adapt the access control type to the evolving demands of the development, promoting an efficient and safe transportation network throughout the different phases. This staged approach to access control evaluation aims to create a flexible and responsive framework that accommodates the dynamic nature of the development. It is imperative that the developer remains proactive in reassessing and refining access control measures to uphold the highest standards of transportation planning and engineering throughout the entire staged development process.

Response: This comment will be addressed by the Developer thru discussion with City and County staff.

6. Please Use the updated attached PFS spreadsheet dated 2024.

Response: A Proportionate Fair Share Section has been added to the report.

7. Refer to the attached traffic growth policy for compliance.

Response: This section is noted.

8. Refer to the TIA guideline section 9 (Passer -By Capture) for compliance on, The total passer-by capture shall not exceed 14 percent (14%) of the total background traffic on the adjacent roadway, unless approved by the CTE.

Response: Typically the pass-by trip vs. adjacent street traffic rate cap is not utilized for gas stations since gas stations are acknowledged to have very high pass-by rates. This can be discussed more with the CTE.

9. Refer to TIA guideline section 7 (though an analysis of safety and access management issues may still need to be completed) and provide documentation that support this requirement. A crash diagram as noted below georeferenced to the specific study location(s) highlighting crash trends based on 5yrs period. The proposed design is to consider this input.

Response: This comment is noted and the site civil engineer will coordinate with staff.

10. TIA shall address the following contents:

Response: The TIA was updated to address the contents as requested.

END

METHODOLOGY MEMORANDUM

**RE: Synergy at Normandy Mixed-Use
City of Deltona, FL**
Traffic Impact Analysis Methodology
08/9/2023
Job # 22120

The following is a methodology outline for the Traffic Impact Analysis (TIA) for the above referenced project. In general, the TIA will conform to the methodology requirements and guidelines documented by City of Deltona, Volusia County and the Florida Department of Transportation (FDOT).

Project Description

The traffic analysis will be conducted to assess the impact of the proposed 320 apartments, 230.6 KSF of light warehouse and a Gas Station with 14 Fuel positions. The proposed development is located east of Normandy Boulevard in City of Deltona, Florida. **Figure 1** depicts the site location and the surrounding transportation network.

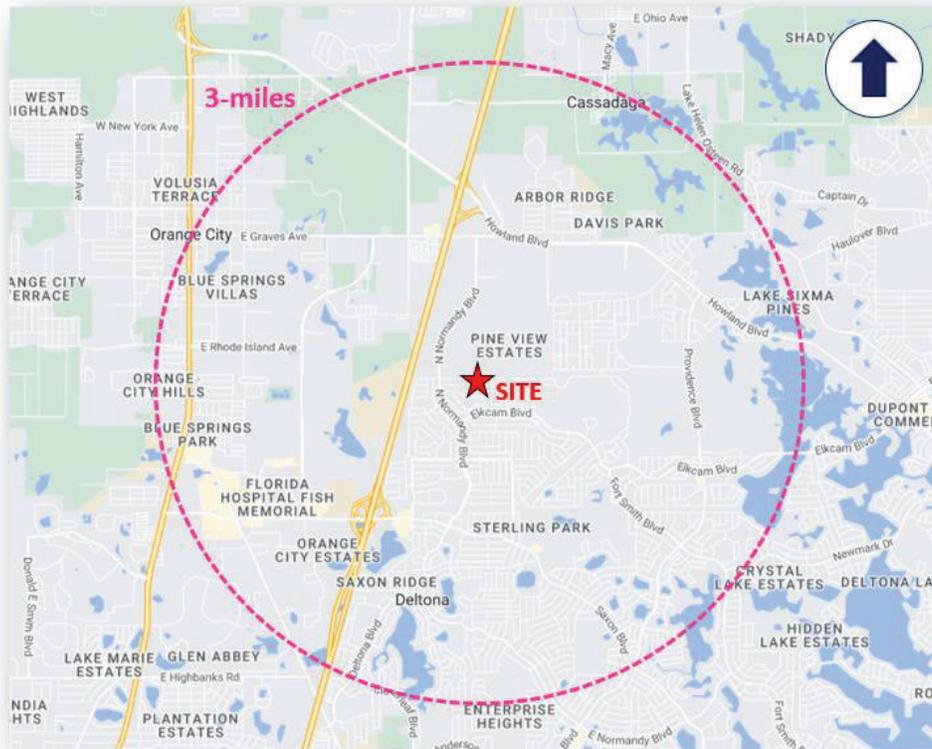


Figure 1: Project Location Map

Site Access

Access to the site will be provided via two right-in/right-out and one full access driveways onto Normandy Boulevard. **Attachment A** provides the preliminary concept plan.

Trip Generation

Table 1 summarizes the trip generation analysis conducted using information published by the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual, 11th Edition* and the *Trip Generation Handbook, 3rd Edition*. The calculation revealed that the proposed development will generate a total of 2,894 daily trips of which 300 and 278 will occur during the AM and PM peak hour, respectively. The ITE Trip Generation information is included for reference in **Attachment B**.

Table 1: Trip Generation

ITE Code	Land Use	Size	Daily		AM Peak Hour				PM Peak Hour			
			Rate	Trips	Rate	Enter	Exit	Total	Rate	Enter	Exit	Total
110	General Light Industrial	230.6 KSF	4.87	1,123	0.74	150	21	171	0.65	21	129	150
221	Multi-Family (Mid-Rise)	320 DUs	4.62	1,478	0.43	32	106	138	0.39	76	49	125
945	Gas Station with Convenience Market (GFA 2-4ksf)	14 FPs	265.1	3,712	16.06	113	112	225	18.42	129	129	258
Subtotal			--	6,313	--	295	239	534	--	226	307	533
Internal Capture (18%)			--	1,136	--	53	43	96	--	41	55	96
Gas Station with Convenience Market Pass-by (75%)			--	2,283	--	69	69	138	--	79	80	159
New Net Trips			--	2,894	--	173	127	300	--	106	172	278

Trip Distribution

A preliminary distribution of the project trips onto the study area roadways was determined using the Florida Standard Urban Area Transportation Study (FSUTMS) model developed for the adjacent approved Portland Industrial Park (see **Attachment C** for model plots). This preliminary trip distribution was adjusted using knowledge of the study area, development type, prevailing traffic flow patterns and existing traffic counts.

Figure 2 provides the derived trip distribution developed for this project. Using this trip distribution pattern, project trips were assigned to the surrounding study roadway network.

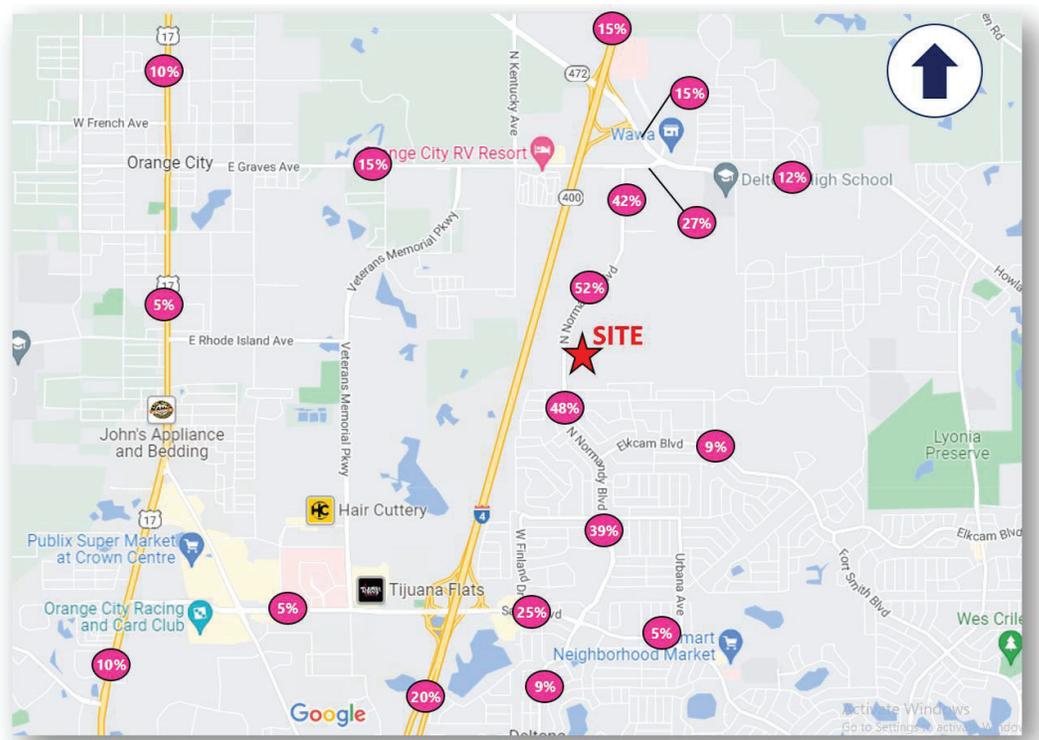


Figure 2: Trip Distribution Map

Study Area

The study facilities to be considered in the analysis are:

Study Intersections

- Normandy Boulevard and Saxon Boulevard
- Normandy Boulevard and Elkcarn Boulevard
- Normandy Boulevard and Graves Avenue
- Graves Avenue and Howland Boulevard
- Normandy Boulevard and Amelia Avenue/Rhode Island Avenue (Full)
- Normandy Boulevard and Project Access 1 (North – Right-in/Right-out)
- Normandy Boulevard and Project Access 2 (Middle - Full)
- Normandy Boulevard and Project Access 3 (South – Right-in/Right-out)

Study Segments

- Graves Avenue
 - Veteran's Memorial Parkway to Kentucky Avenue
 - Kentucky Avenue to Normandy Boulevard
 - Normandy Boulevard to Howland Boulevard

- Saxon Boulevard
 - Veterans Memorial Parkway to FDOT Park & Ride
 - FDOT Park & Ride to I-4
 - I-4 to Finland Drive
 - Finland Drive to Normandy Boulevard

- Howland Boulevard
 - I-4/SR 472 to Wolf Pack Run
 - Wolf Pack Run to Catalina Boulevard

- Normandy Boulevard
 - Graves Avenue to Rhode Island
 - Rhode Island to Elkcam Boulevard
 - Elkcam Boulevard to Saxon Boulevard
 - Saxon Boulevard to Deltona Boulevard

- US 17/92
 - DeBary Plantation Blvd to Saxon Boulevard
 - Saxon Boulevard to Enterprise Road
 - Enterprise Road to Rhode Island Avenue
 - Rhode Island Avenue to Graves Avenue
 - Graves Avenue to New York Avenue

The significance analysis is provided in Table The critical and near critical segments near the site are provided in **Attachment D**.

Growth Rate

A historical trend analysis was conducted based on the Annual Average Daily Traffic (AADT) data obtained from the *FDOT Traffic Online* website in the vicinity of the project (see **Attachment E**). Based on this historical trend analysis, an average annual growth rate of 1.96% was calculated. Therefore, a minimum annual growth rate of 2% will be utilized in the study.

Table 2: Roadway Segment Significance Analysis

No.	Roadway	Segment	Lanes	LOS Stnd	PH Dir Capacity	Trip Dist	Project Vol	% of Capacity	Signif at 3%
99	Graves Ave	VMP to Kentucky Ave	4	E	1,620	15%	26	1.60%	No
100	Graves Ave	Kentucky to Normandy	4	E	1,620	52%	55	3.40%	Yes
101	Graves Ave	Normandy Blvd to Howland Blvd	4	E	2,740	42%	72	2.63%	No
102	Saxon Blvd	VMP to FDOT Park n Ride	4	E	5,140	5%	5	0.10%	No
103	Saxon Blvd	Park n Ride to I-4	4	E	5,140	55%	95	1.85%	No
104	Saxon Blvd	I-4 to Finland Dr	4	E	4,280	25%	27	0.63%	No
105	Saxon Blvd	Finland Dr to Normandy Blvd	4	E	3,410	39%	67	1.96%	No
121	Howland Blvd	I-4 to Wolf Pack Run	4	E	3,410	27%	29	0.85%	No
122	Howland Blvd	Wolf Pack Run to Catalina Blvd	4	E	3,410	12%	21	0.62%	No
189	Normandy Blvd	Graves Ave to Rhode Island	4	E	1,150	25%	27	2.35%	No
190	Normandy Blvd	Rhode Island to Elkcam Blvd	4	E	2,630	39%	67	2.55%	No
191	Normandy Blvd	Elkcam Blvd to Saxon Blvd	4	E	2,630	52%	55	2.09%	No
192	Normandy Blvd	Saxon Blvd to Deltona Blvd	4	E	2,630	52%	89	3.38%	Yes
53	US 17/92	DeBary Plantation Blvd to Saxon Blvd.	4	E	2,000	5%	9	0.45%	No
54	US 17/92	Saxon Blvd. to Enterprise Rd.	4	E	2,000	5%	5	0.25%	No
55	US 17/92	Enterprise Rd. to Rhode Island Ave.	4	E	2,000	5%	9	0.45%	No
56	US 17/92	Rhode Island Ave. to Graves Ave.	4	E	2,000	15%	16	0.80%	No
57	US 17/92	Graves Ave. to New York Ave.	4	E	2,000	10%	17	0.85%	No

Note: (1) Volusia Vested Trips 2022 table used for segments No. 99 to 192; (2) VolusiaAADTs2021 table used for segments 53 to 57

Projected Conditions Analysis

The projected conditions analysis will be conducted within the following framework:

- **Counts:** Roadway and intersection counts will be obtained during the AM and PM peak period, as applicable. These counts will be adjusted using a peak season correction factor as necessary.
- **Growth Factors:** Growth factors, derived from historical traffic volume data, will be applied to existing traffic counts to develop future background traffic volumes.
- **Traffic Volumes:** Project traffic volumes will be added to the future background traffic volumes to obtain total future traffic volumes.
- **Analysis Periods:** Analyses will be performed for existing conditions, future background conditions and future background plus project trips (i.e. total traffic/buildout) conditions.
- **Roadway Analysis:** Roadways segments will be evaluated using the applicable Volusia County and FDOT service volume capacities, as applicable.
- **Intersection Analysis:** Intersection capacity analysis will be performed using the latest operational analysis procedures documented in the *Highway Capacity Manual* as applied using the Synchro software during the AM and PM peak period.

- *Turn Lane Analysis:* Turn Lane analysis (based on queues) will be performed for all the site access driveways and will be done in accordance with Volusia County Land Development Code.
- *Buildout Year:* The buildout year of the project is 2025.
- *Mitigation and Concurrency:* Concurrency strategies/transportation improvement to mitigate transportation deficiencies, if any, will be identified in the traffic study.

Multimodal Assessment

An assessment of multimodal options will be documented for: Transit, Bicycle and Pedestrian.

Traffic Impact Study Report

The traffic report prepared will summarize the study procedures, data, analysis, and recommendations.

Volusia County TIA Methodology Checklist

As required by the County this checklist was prepared and is provided in **Attachment F**.

END

Attachment A
Preliminary Concept Plan

Attachment B
Trip Generation Information

Land Use: 110

General Light Industrial

Description

A light industrial facility is a free-standing facility devoted to a single use. The facility has an emphasis on activities other than manufacturing and typically has minimal office space. Typical light industrial activities include printing, material testing, and assembly of data processing equipment. Industrial park (Land Use 130) and manufacturing (Land Use 140) are related uses.

Additional Data

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

The sites were surveyed in the 1980s, the 2000s, and the 2010s in Colorado, Connecticut, Indiana, New Jersey, New York, Oregon, Pennsylvania, and Texas.

Source Numbers

106, 157, 174, 177, 179, 184, 191, 251, 253, 286, 300, 611, 874, 875, 912

General Light Industrial (110)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 37

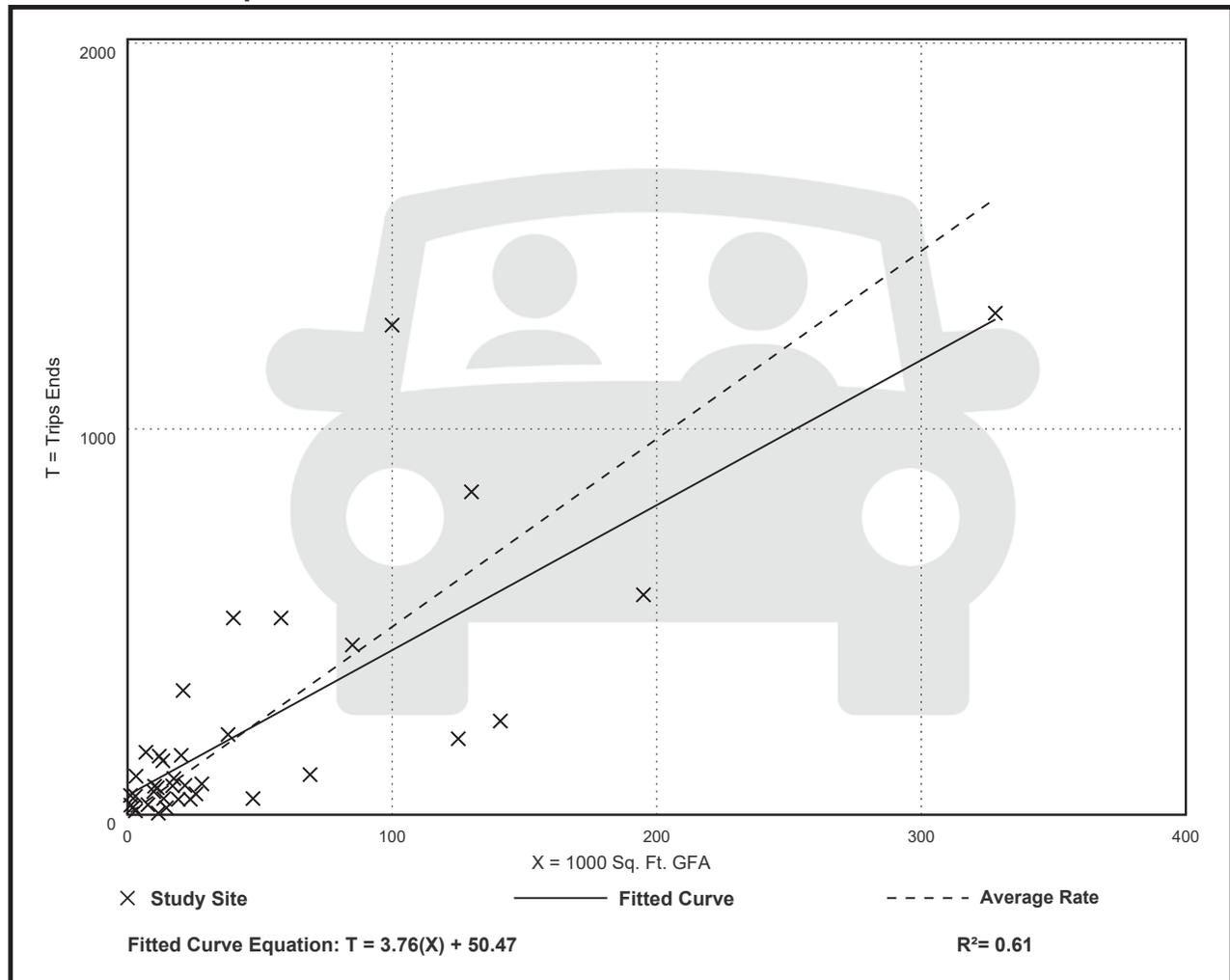
Avg. 1000 Sq. Ft. GFA: 45

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
4.87	0.34 - 43.86	4.08

Data Plot and Equation



General Light Industrial (110)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 41

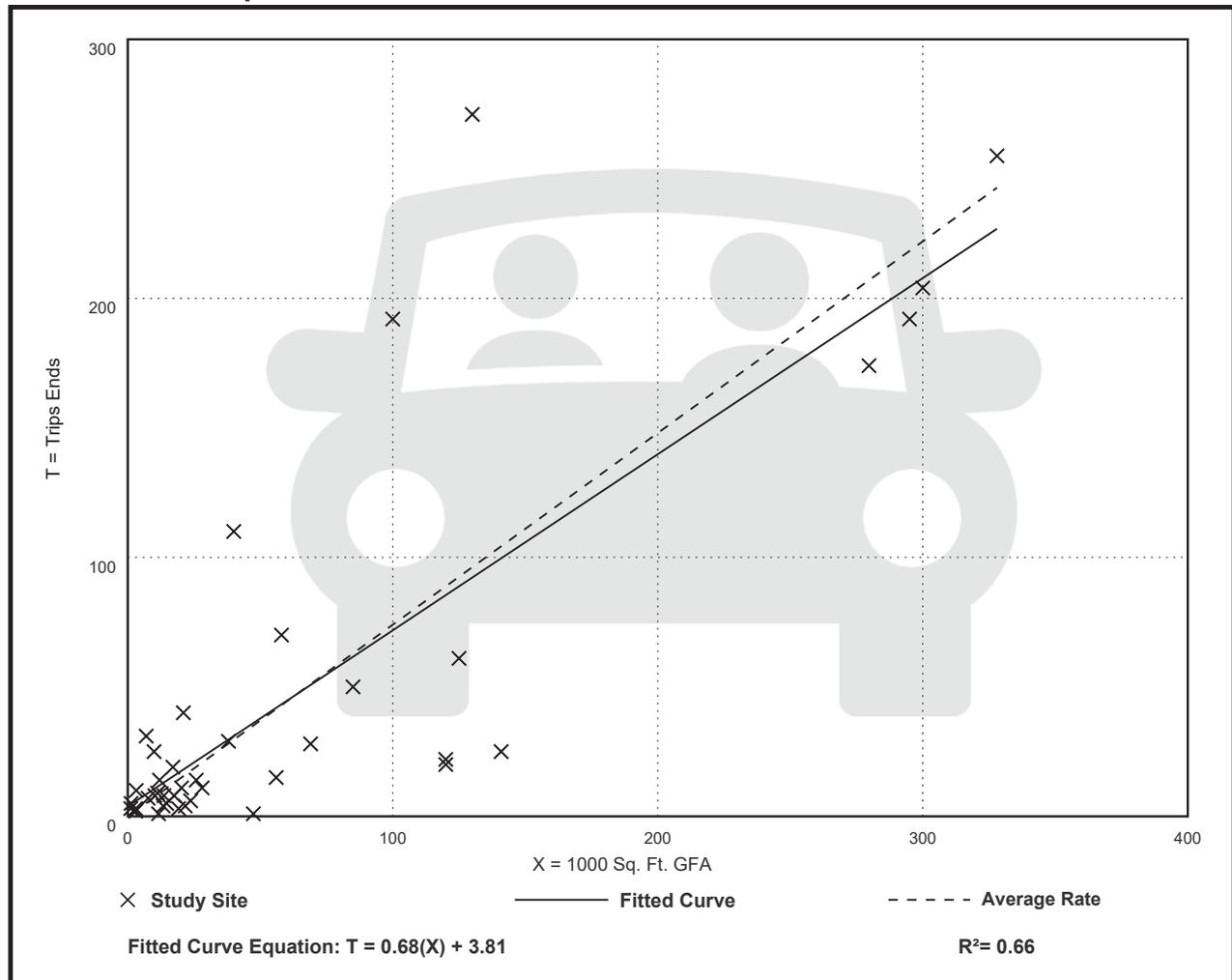
Avg. 1000 Sq. Ft. GFA: 65

Directional Distribution: 88% entering, 12% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.74	0.02 - 4.46	0.61

Data Plot and Equation



General Light Industrial (110)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 40

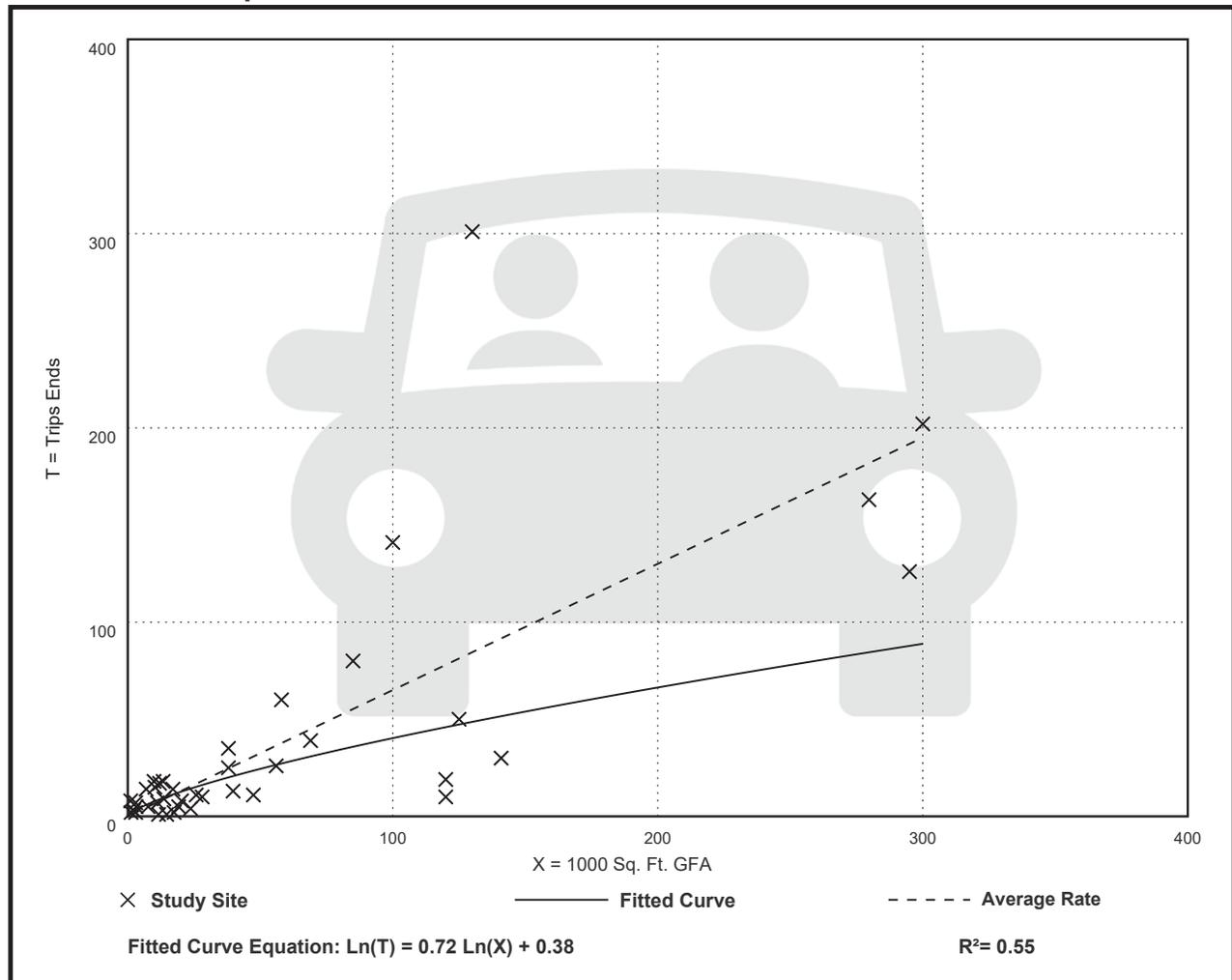
Avg. 1000 Sq. Ft. GFA: 58

Directional Distribution: 14% entering, 86% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.65	0.07 - 7.02	0.56

Data Plot and Equation



Land Use: 221

Multifamily Housing (Mid-Rise)

Description

Mid-rise multifamily housing includes apartments and condominiums located in a building that has between four and 10 floors of living space. Access to individual dwelling units is through an outside building entrance, a lobby, elevator, and a set of hallways.

Multifamily housing (low-rise) (Land Use 220), multifamily housing (high-rise) (Land Use 222), off-campus student apartment (mid-rise) (Land Use 226), and mid-rise residential with ground-floor commercial (Land Use 231) are related land uses.

Land Use Subcategory

Data are presented for two subcategories for this land use: (1) not close to rail transit and (2) close to rail transit. A site is considered close to rail transit if the walking distance between the residential site entrance and the closest rail transit station entrance is ½ mile or less.

Additional Data

For the six sites for which both the number of residents and the number of occupied dwelling units were available, there were an average of 2.5 residents per occupied dwelling unit.

For the five sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 96 percent of the total dwelling units were occupied.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

It is expected that the number of bedrooms and number of residents are likely correlated to the trips generated by a residential site. To assist in future analysis, trip generation studies of all multifamily housing should attempt to obtain information on occupancy rate and on the mix of residential unit sizes (i.e., number of units by number of bedrooms at the site complex).

The sites were surveyed in the 1990s, the 2000s, the 2010s, and the 2020s in Alberta (CAN), California, District of Columbia, Florida, Georgia, Illinois, Maryland, Massachusetts, Minnesota, Montana, New Jersey, New York, Ontario (CAN), Oregon, Utah, and Virginia.

Source Numbers

168, 188, 204, 305, 306, 321, 818, 857, 862, 866, 901, 904, 910, 949, 951, 959, 963, 964, 966, 967, 969, 970, 1004, 1014, 1022, 1023, 1025, 1031, 1032, 1035, 1047, 1056, 1057, 1058, 1071, 1076

Multifamily Housing (Mid-Rise) Not Close to Rail Transit (221)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 11

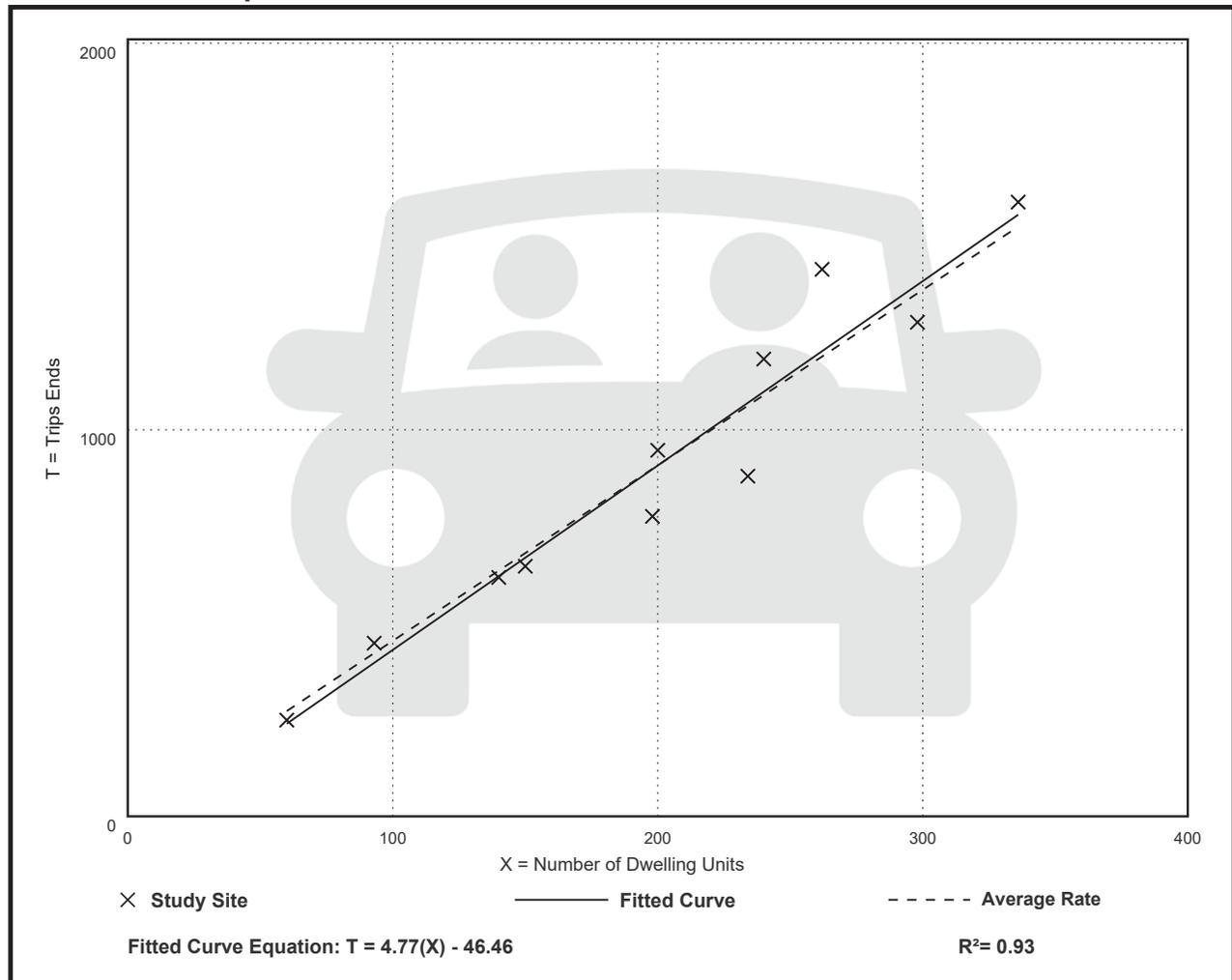
Avg. Num. of Dwelling Units: 201

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
4.54	3.76 - 5.40	0.51

Data Plot and Equation



Multifamily Housing (Mid-Rise) Not Close to Rail Transit (221)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 30

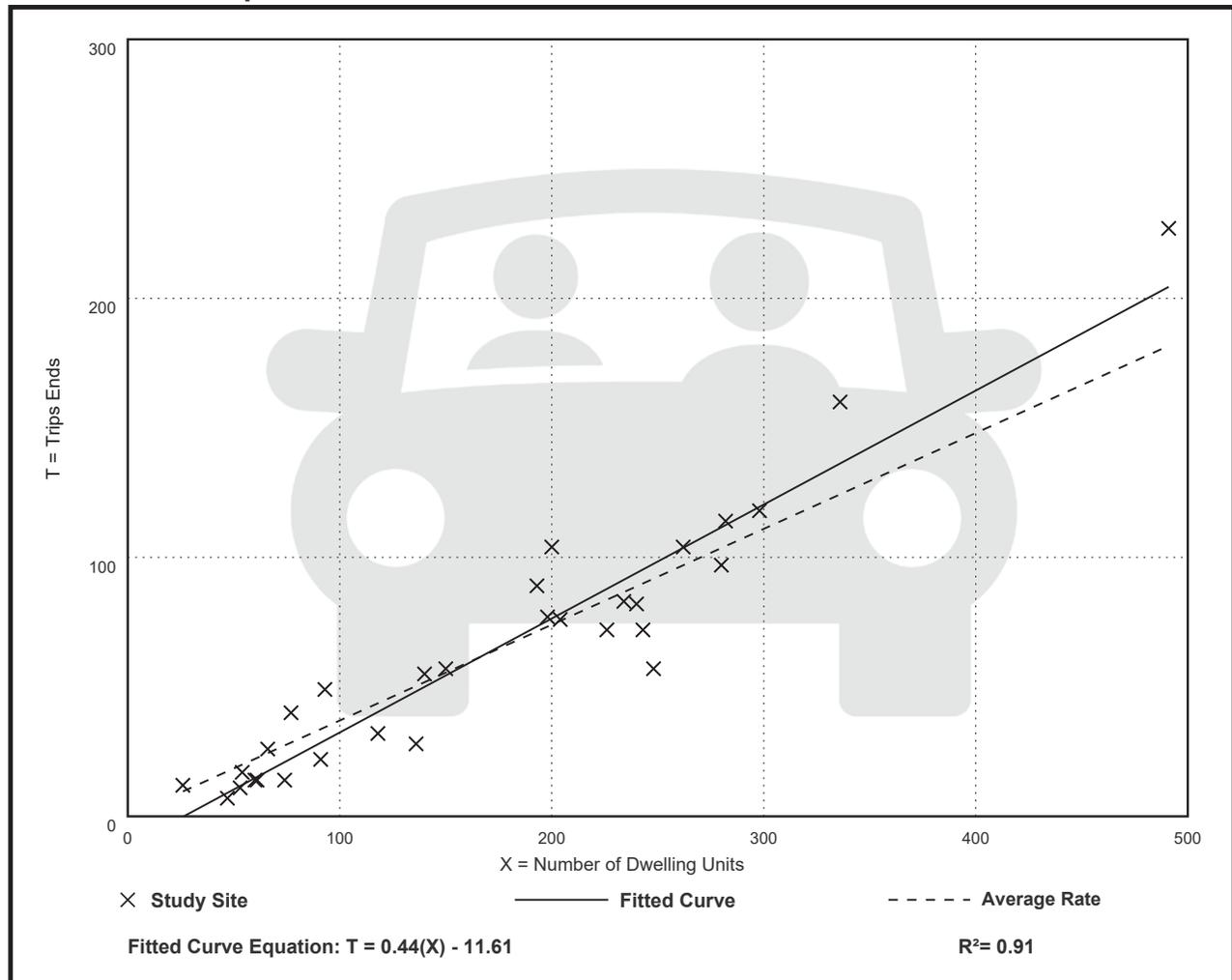
Avg. Num. of Dwelling Units: 173

Directional Distribution: 23% entering, 77% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.37	0.15 - 0.53	0.09

Data Plot and Equation



Multifamily Housing (Mid-Rise) Not Close to Rail Transit (221)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 31

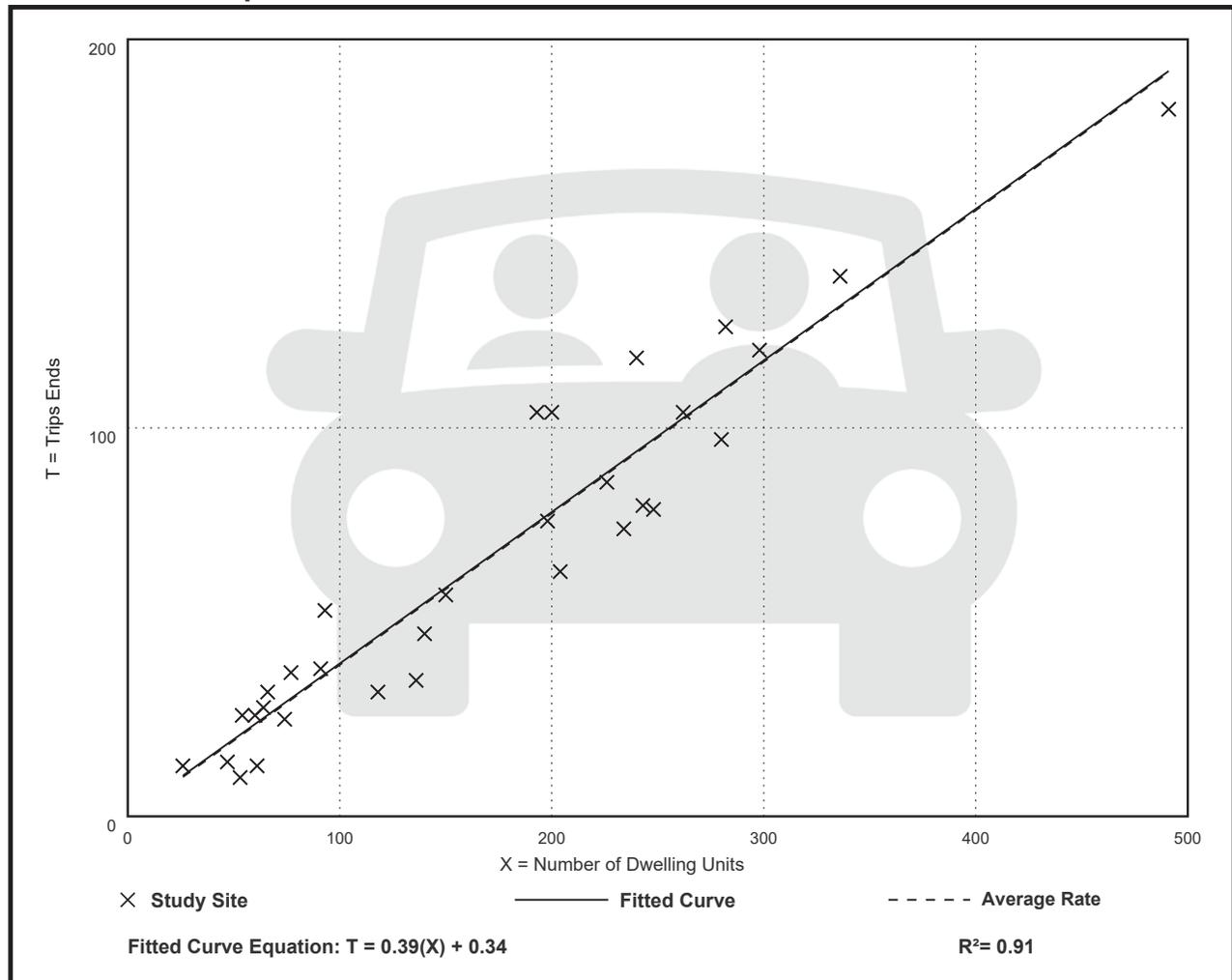
Avg. Num. of Dwelling Units: 169

Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.39	0.19 - 0.57	0.08

Data Plot and Equation



Land Use: 945

Convenience Store/Gas Station

Description

A convenience store/gas station is a facility with a co-located convenience store and gas station. The convenience store sells grocery and other everyday items that a person may need or want as a matter of convenience. The gas station sells automotive fuels such as gasoline and diesel.

A convenience store/gas station is typically located along a major thoroughfare to optimize motorist convenience. Extended hours of operation (with many open 24 hours, 7 days a week) are common at these facilities.

The convenience store product mix typically includes pre-packaged grocery items, beverages, dairy products, snack foods, confectionary, tobacco products, over-the-counter drugs, and toiletries. A convenience store may sell alcohol, often limited to beer and wine. Coffee and pre-made sandwiches are also commonly sold at a convenience store. Made-to-order food orders are sometimes offered. Some stores offer limited seating.

The sites in this land use include both self-pump and attendant-pumped fueling positions and both pre-pay and post-pay operations.

Convenience store (Land Use 851), gasoline/service station (Land Use 944), and truck stop (Land Use 950) are related uses.

Land Use Subcategory

Multiple subcategories were added to this land use to allow for multi-variable evaluation of sites with single-variable data plots. All study sites are assigned to one of three subcategories, based on the number of vehicle fueling positions (VFP) at the site: between 2 and 8 VFP, between 9 and 15 VFP, and between 16 and 24 VFP. For each VFP range subcategory, data plots are presented with GFA as the independent variable for all time periods and trip types for which data are available. The use of both GFA and VFP (as the independent variable and land use subcategory, respectively) provides a significant improvement in the reliability of a trip generation estimate when compared to the single-variable data plots in prior editions of *Trip Generation Manual*.

Further, the study sites were also assigned to one of three other subcategories, based on the gross floor area (GFA) of the convenience store at the site: between 2,000 and 4,000 square feet, between 4,000 and 5,500 square feet, and between 5,500 and 10,000 square feet. For each GFA subcategory range, data plots are presented with VFP as the independent variable for all time periods and trip types for which data are available. The use of both VFP and GFA (as the independent variable and land use subcategory, respectively) provides a significant improvement in the reliability of a trip generation estimate when compared to the single-variable data plots in prior editions of *Trip Generation Manual*.

When analyzing the convenience store/gas station land use with each combination of GFA and VFP values as described above, the two sets of data plots will produce two estimates of site-generated trips. Both values can be considered when determining a site trip generation estimate.

Data plots are also provided for three additional independent variables: AM peak hour traffic on adjacent street, PM peak hour traffic on adjacent street, and employees. These independent variables are intended to be analyzed as single independent variables and do not have sub-categories associated with them. Within the data plots and within the ITETripGen web app, these plots are found under the land use subcategory “none.”

Additional Data

ITE recognizes there are existing convenience store/gas station sites throughout North America that are larger than the sites presented in the data plots. However, the ITE database does not include any site with more than 24 VFP or any site with gross floor area greater than 10,000 square feet. Submission of trip generation data for larger sites is encouraged.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alberta (CAN), Arkansas, California, Connecticut, Delaware, Florida, Indiana, Iowa, Kentucky, Maryland, Massachusetts, Minnesota, Nevada, New Hampshire, New Jersey, Pennsylvania, Rhode Island, South Dakota, Texas, Utah, Vermont, Washington, and Wisconsin.

Source Numbers

221, 245, 274, 288, 300, 340, 350, 351, 352, 355, 359, 385, 440, 617, 718, 810, 813, 844, 850, 853, 864, 865, 867, 869, 882, 883, 888, 904, 926, 927, 936, 938, 954, 960, 962, 977, 1004, 1024, 1025, 1027, 1052

Convenience Store/Gas Station - GFA (2-4k) (945)

Vehicle Trip Ends vs: Vehicle Fueling Positions
On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 48

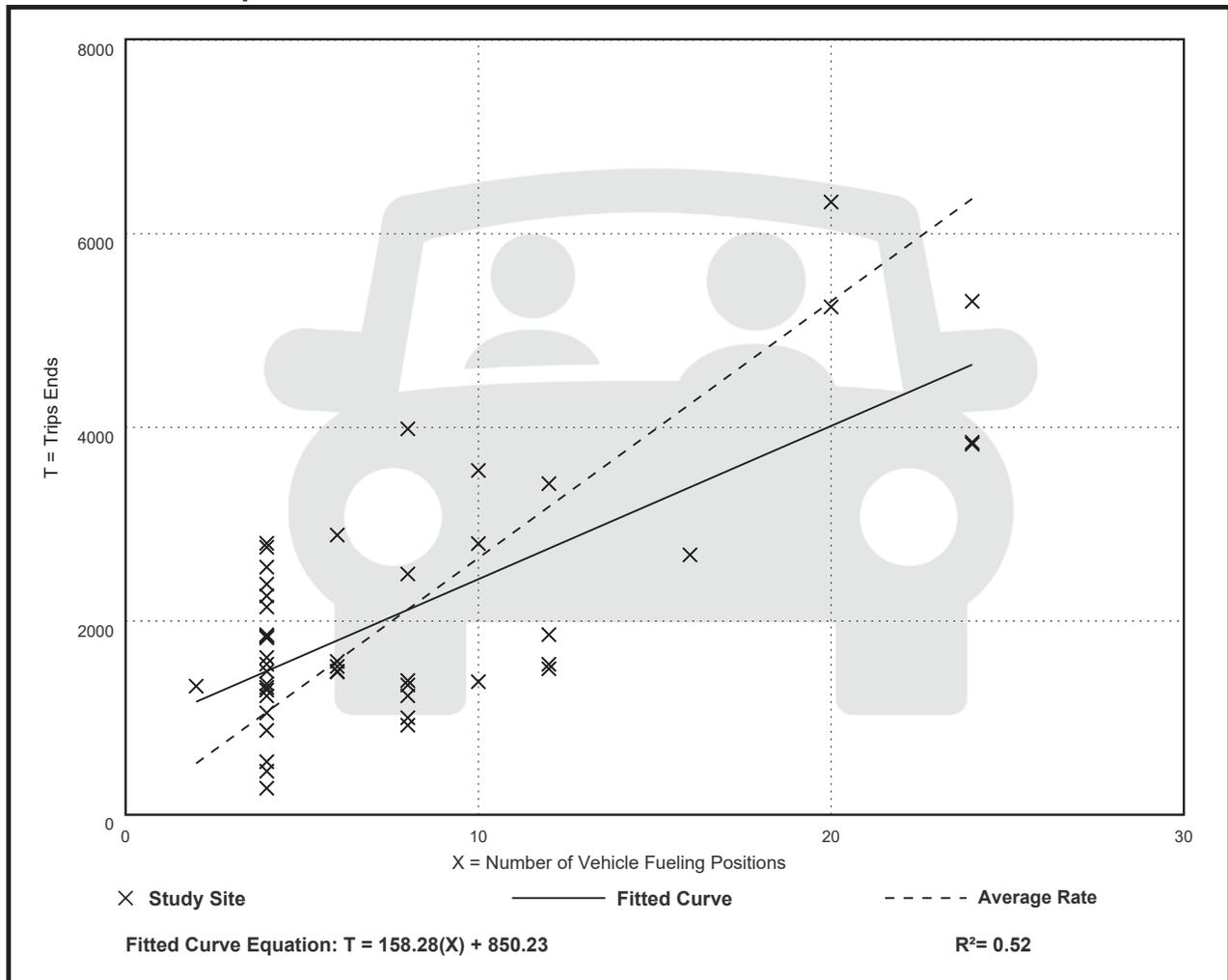
Avg. Num. of Vehicle Fueling Positions: 8

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
265.12	68.50 - 701.00	142.37

Data Plot and Equation



Convenience Store/Gas Station - GFA (2-4k) (945)

Vehicle Trip Ends vs: Vehicle Fueling Positions

On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 76

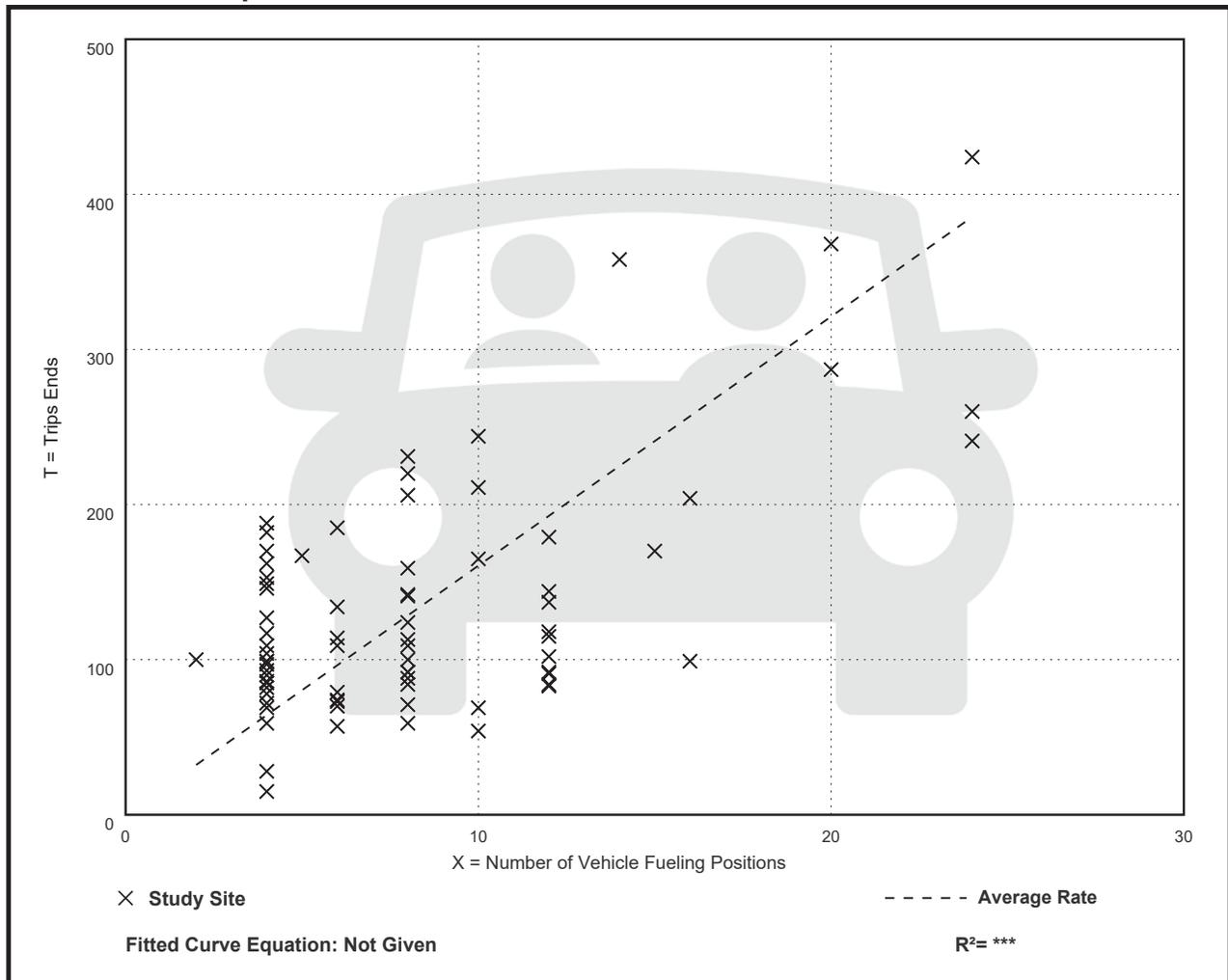
Avg. Num. of Vehicle Fueling Positions: 8

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
16.06	3.75 - 50.00	8.79

Data Plot and Equation



Convenience Store/Gas Station - GFA (2-4k) (945)

Vehicle Trip Ends vs: Vehicle Fueling Positions

On a: Weekday,

Peak Hour of Adjacent Street Traffic,

One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 93

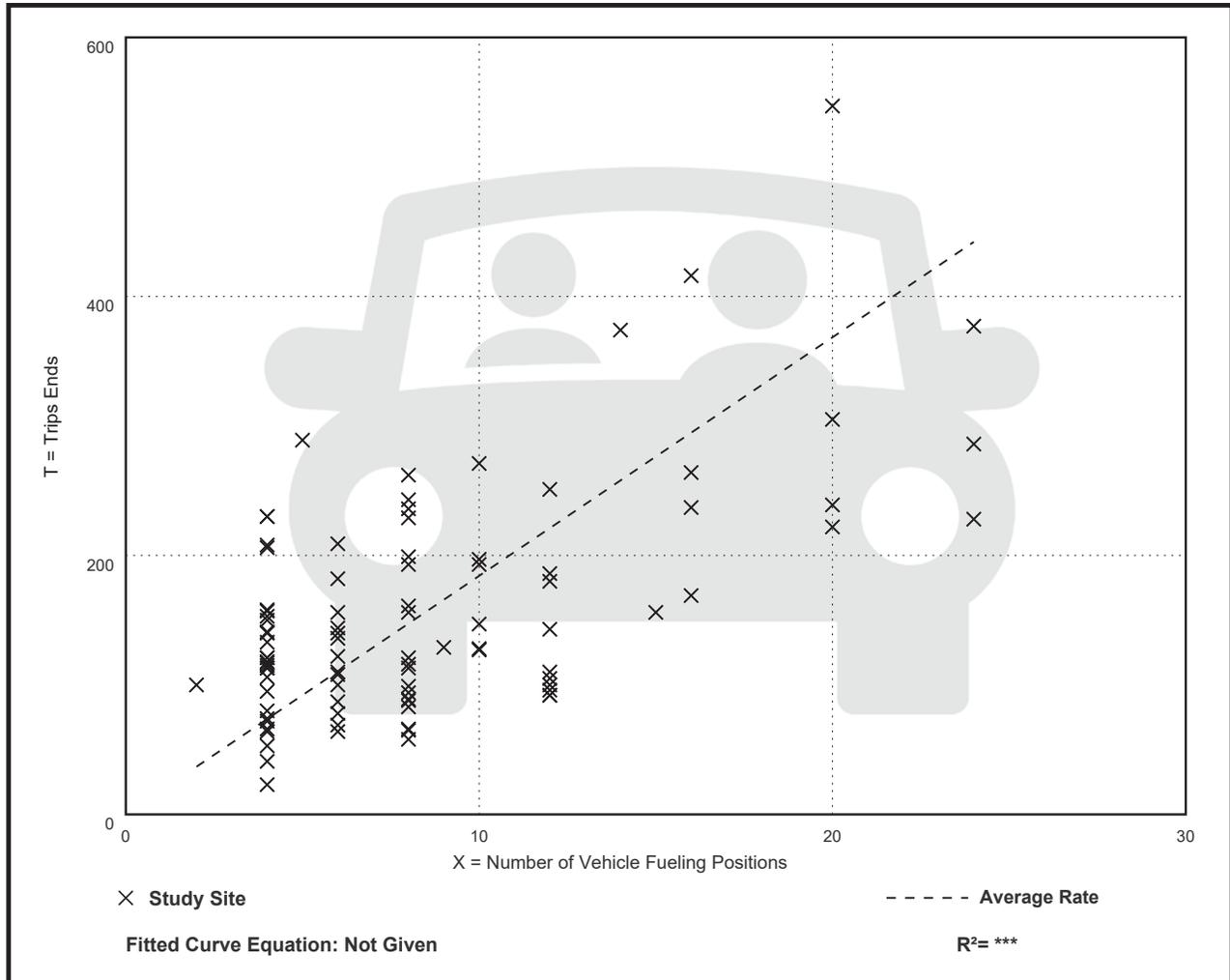
Avg. Num. of Vehicle Fueling Positions: 8

Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Vehicle Fueling Position

Average Rate	Range of Rates	Standard Deviation
18.42	5.75 - 57.80	10.16

Data Plot and Equation



Vehicle Pass-By Rates by Land Use

Source: ITE Trip Generation Manual, 11th Edition

Land Use Code	945									
Land Use	Convenience Store/Gas Station									
Setting	General Urban/Suburban									
Time Period	Weekday PM Peak Period									
# Data Sites	12 Sites with between 2 and 8 VFP					28 Sites with between 9 and 20 VFP				
Average Pass-By Rate	56% for Sites with between 2 and 8 VFP					75% for Sites with between 9 and 20 VFP				
Pass-By Characteristics for Individual Sites										
GFA (000)	VFP	State or Province	Survey Year	# Interviews	Pass-By Trip (%)	Non-Pass-By Trips			Adj Street Peak Hour Volume	Source
						Primary (%)	Diverted (%)	Total (%)		
2.1	8	Maryland	1992	31	52	13	35	48	1785	25
2.1	6	Maryland	1992	30	53	20	27	47	1060	25
2.2	< 8	Indiana	1993	115	48	16	36	52	820	2
2.3	< 8	Kentucky	1993	67	57	16	27	43	1954	2
2.3	6	Maryland	1992	55	40	11	49	60	2760	25
2.4	< 8	Kentucky	1993	—	58	13	29	42	2655	2
2.6	< 8	Kentucky	1993	68	67	15	18	33	950	2
2.8	< 8	Kentucky	1993	—	62	11	27	38	2875	2
3	< 8	Indiana	1993	80	65	15	20	35	1165	2
3.6	< 8	Kentucky	1993	60	56	17	27	44	2505	2
3.7	< 8	Kentucky	1993	70	61	16	23	39	2175	2
4.2	< 8	Kentucky	1993	61	58	26	16	42	2300	2
4.694	12	Maryland	2000	—	78	—	—	22	3549	30
4.694	12	Maryland	2000	—	67	—	—	33	2272	30
4.694	12	Maryland	2000	—	66	—	—	34	3514	30
4.848	12	Virginia	2000	—	71	—	—	29	2350	30
5.06	12	Pennsylvania	2000	—	91	—	—	9	4181	30
5.242	12	Virginia	2000	—	70	—	—	30	2445	30
5.242	12	Virginia	2000	—	56	—	—	44	950	30
5.488	12	Delaware	2000	—	73	—	—	27	—	30
5.5	12	Pennsylvania	2000	—	84	—	—	16	4025	30
4.694	16	Maryland	2000	—	89	—	—	11	2755	30
4.694	16	Delaware	2000	—	73	—	—	27	1858	30
4.694	16	Delaware	2000	—	59	—	—	41	1344	30
4.694	16	Delaware	2000	—	72	—	—	28	3434	30
4.694	16	New Jersey	2000	—	81	—	—	19	1734	30
4.694	20	Delaware	2000	—	76	—	—	24	1616	30
4.848	16	Virginia	2000	—	67	—	—	33	2,954	30
4.848	16	Virginia	2000	—	78	—	—	22	3086	30
4.848	16	Virginia	2000	—	83	—	—	17	4143	30
4.848	16	Virginia	2000	—	73	—	—	27	2534	30
4.993	16	Pennsylvania	2000	—	72	—	—	28	2917	30
5.094	16	New Jersey	2000	—	86	—	—	14	1730	30
5.5	16	Pennsylvania	2000	—	90	—	—	10	2616	30
5.543	16	Pennsylvania	2000	—	87	—	—	13	2363	30
5.565	16	Pennsylvania	2000	—	81	—	—	19	2770	30
5.565	16	Pennsylvania	2000	—	76	—	—	24	3362	30
5.565	16	New Jersey	2000	—	61	—	—	39	1713	30
5.565	16	New Jersey	2000	—	86	—	—	14	1721	30
5.565	16	New Jersey	2000	---	81	---	---	19	2227	30

NCHRP 684 Internal Trip Capture Estimation Tool

Project Name:	Normandy Mixed-Use	Organization:	PTG
Project Location:	City of Deltona	Performed By:	PTG
Scenario Description:	Full Buildout	Date:	3/31/2023
Analysis Year:	n/a	Checked By:	PTG
Analysis Period:	PM Street Peak Hour	Date:	3/31/2023

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips ³		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	945	14	FPs	258	129	129
Restaurant				0		
Cinema/Entertainment				0		
Residential	221	320	DUs	125	76	49
Hotel				0		
All Other Land Uses ²	110	231	KSF	150	21	129
				533	226	307

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses ²						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	34	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	13	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	533	226	307
Internal Capture Percentage	18%	21%	15%
External Vehicle-Trips ⁵	439	179	260
External Transit-Trips ⁶	0	0	0
External Non-Motorized Trips ⁶	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	10%	26%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	45%	27%
Hotel	N/A	N/A

¹Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

³Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

⁴Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made

⁵Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

⁶Person-Trips

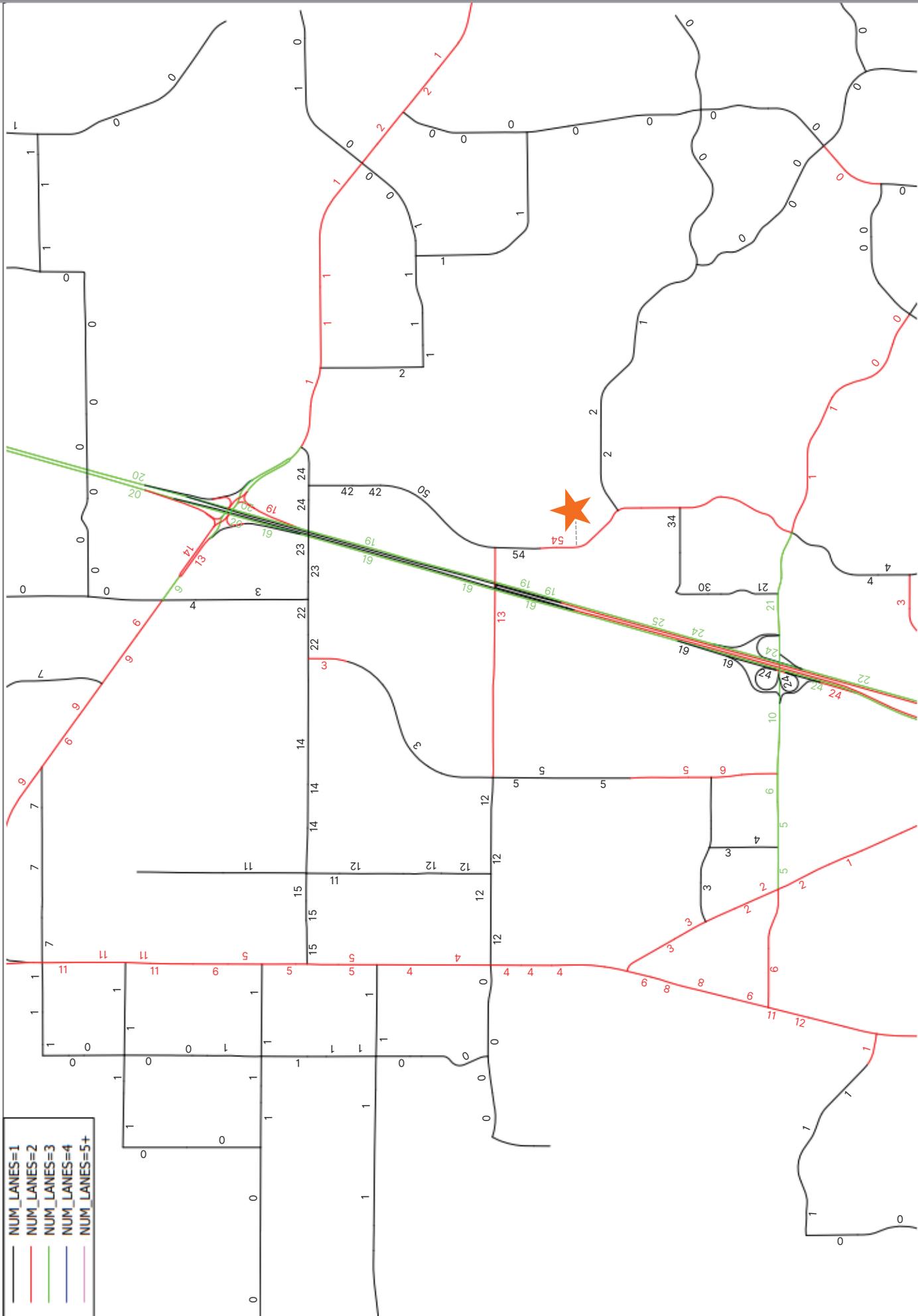
*Indicates computation that has been rounded to the nearest whole number.

Attachment C
Model Plots

Year 2025 - CFRPM 7

Trip Distribution

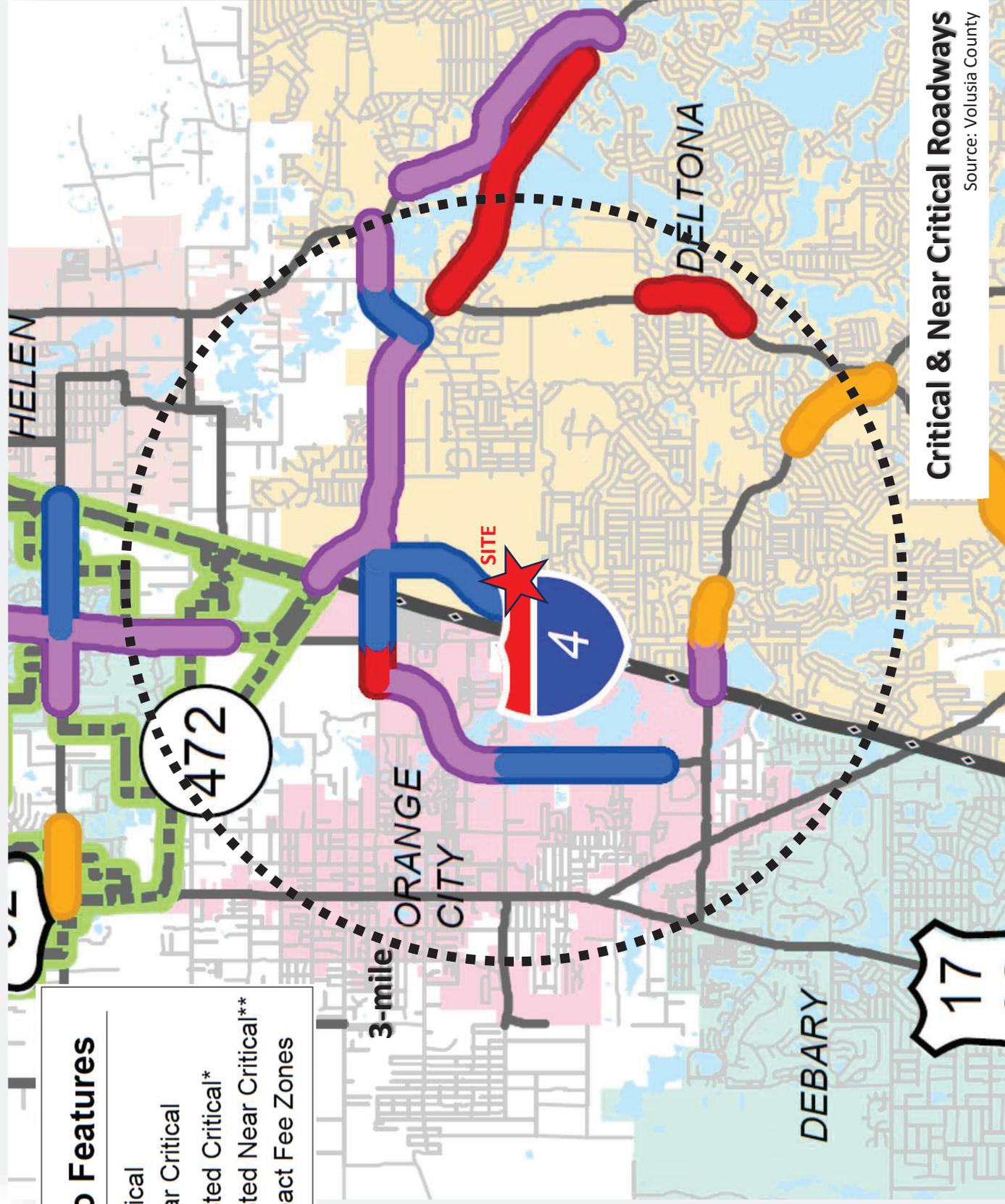
- NUM_LANES=1
- NUM_LANES=2
- NUM_LANES=3
- NUM_LANES=4
- NUM_LANES=5+



Attachment D
Critical and Not Critical Segments

Key To Features

- Critical
- Near Critical
- Vested Critical*
- Vested Near Critical**
- Impact Fee Zones



Critical & Near Critical Roadways

Source: Volusia County

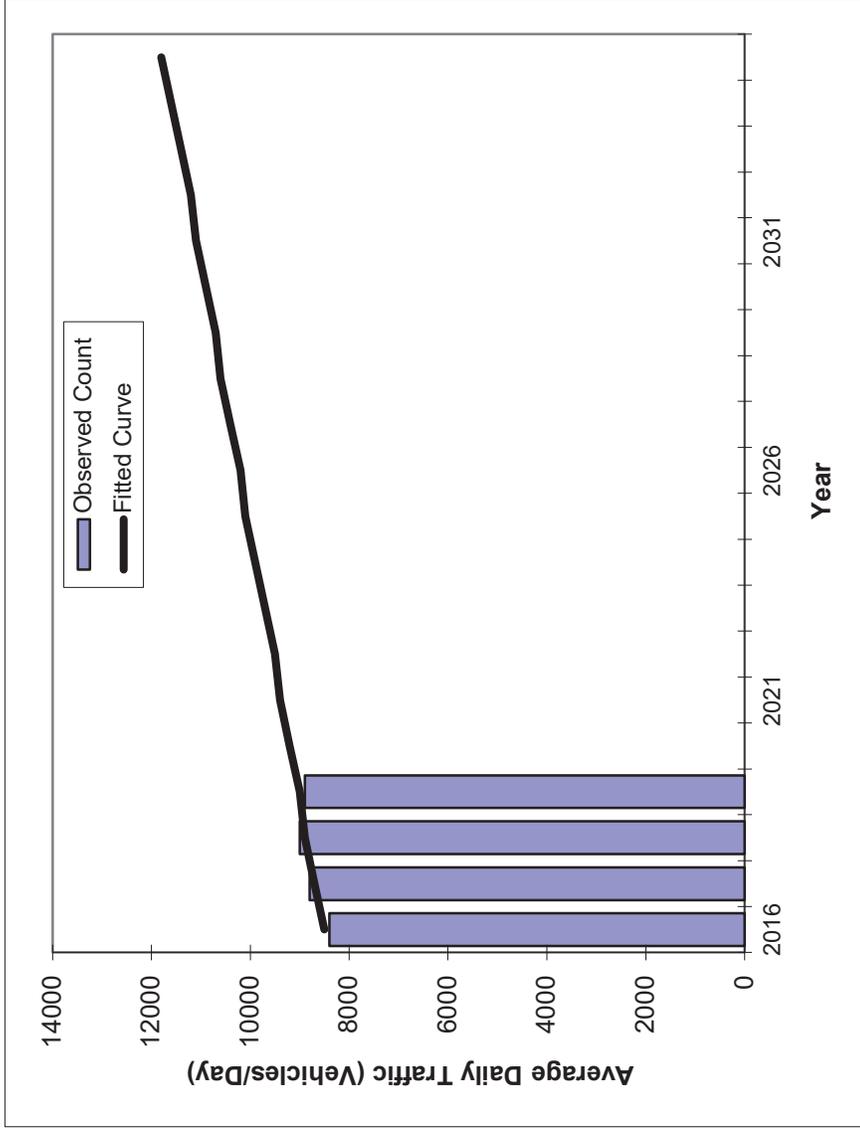
Attachment E
Growth Rate

Traffic Trends - V3.0

NORMANDY BLVD -- N OF ELKCAM BLVD

FIN# 0
Location 1

County: Orange (75)
Station #: 750592
Highway: NORMANDY BLVD



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	8400	8500
2017	8800	8700
2018	9000	8900
2019	8900	9000
2023 Opening Year Trend		
2023	N/A	9700
2024 Mid-Year Trend		
2024	N/A	9900
2026 Design Year Trend		
2026	N/A	10200
TRANPLAN Forecasts/Trends		

**** Annual Trend Increase:** 170
Trend R-squared: 69.64%
Trend Annual Historic Growth Rate: 1.96%
Trend Growth Rate (2019 to Design Year): 1.90%
Printed: 04-Apr-23

Straight Line Growth Option

*Axle-Adjusted

Attachment F
TIA Methodology Checklist

TIA METHODOLOGY SUBMISSION CHECKLIST

Project Name: Normandy Mixed-Use

Location: City of Deltona

	DESCRIPTION	INFORMATION INCLUDED		
		YES	NO	Remarks ¹
TRANSPORTATION IMPACT ANALYSIS METHODOLOGY	Type of TIA Methodology: <input type="checkbox"/> COMP PLAN <input checked="" type="checkbox"/> REZONING <input checked="" type="checkbox"/> SITE PLAN	Y		
	LAND USES being analyzed (# of units, sq. feet, etc.)	Y		320 Apartments; 230.6 ksf warehouse; 14 FP GasStation
	BUILD-OUT SCHEDULE proposed (state year(s))	Y		2026
	Conceptual Site Plan or Proposed Access description	Y		Attachment A
	SITE LOCATION MAP relative to surrounding roadway network	Y		Figure 1
	Analysis Period(s): <input type="checkbox"/> AM <input type="checkbox"/> Mid-Day <input checked="" type="checkbox"/> PM <input type="checkbox"/> Weekend	Y		
	Traffic Volume Counts (Day & Time)		N	To be provided as part of study
	Vested Trip Information (verify with nearby local government(s))		N	To be provided as part of study
	Proposed Project trip generation (check all that apply): <input checked="" type="checkbox"/> Daily <input checked="" type="checkbox"/> 2-Way Peak Hour <input checked="" type="checkbox"/> Internal Capture <input checked="" type="checkbox"/> Pass By Capture (<14% Adjacent Road)	Y		
	Proposed project trip distribution and assignment (include map) <input checked="" type="checkbox"/> CFRPM <input checked="" type="checkbox"/> by Engineering Judgment	Y		Figure 2 and Attachment C
	ROADWAY SIGNIFICANCE TEST TABLE - (includes all 3-mile radius roadway segments, Number of Lanes, Adopted LOS Capacity (cite source), Project Distribution percentages, Project Trips, Project Trips/adopted capacity ratio, 3% significance test check) ALONG WITH all Critical & Near-Critical map road segments within the appropriate radius (5-mile radius for all uses except Parks/Recreational uses (1.5 mile radius) & Convenience Stores (1-mile radius)	Y		Table 2
	ANALYSIS MAP – 3-mile study area boundary including all Critical & Near-Critical map road segments and intersections within the appropriate radius	Y		Figure 1 and Attachment D.
	Proposed roadway segment to be analyzed (list)	Y		
	Proposed intersections to be analyzed (list)	Y		
	Proposed Critical & Near-Critical segments to be analyzed (list)			
	Background Traffic/Build-Out Traffic: <input type="checkbox"/> CFRPM <input checked="" type="checkbox"/> Historical Growth Rate (state & justify proposed minimum	Y		FDOT data used from 2016 to 2021
	Segment Analysis <input type="checkbox"/> Signalized Corridor Analysis Required if Part of Signal System		N	Not applicable
	Intersection Analysis <input type="checkbox"/> HCS <input checked="" type="checkbox"/> Synchro <input type="checkbox"/> Other	Y		
	List Programmed Improvements within first three years: <input checked="" type="checkbox"/> FDOT Work Program <input checked="" type="checkbox"/> County CIP <input checked="" type="checkbox"/> City CIP	Y		None identified
	Proposed Alternative Modes Study (commit to studying project's alternative mode needs associated with transit connection, pedestrian & bicycle facilities, school student access needs, etc.) <input type="checkbox"/> Study to Include TPO's Transit Development Guidelines	Y		A section of the TIA will discuss opportunities for multi-modal mode connectivity
Transportation Improvements (commit to identifying roadway & intersection improvements in TIA if deficiencies are identified)	Y			
Concurrency mitigation strategy (commit to including this in TIA)	Y			

1 – Remarks: Justify "NO"

Submitted By: Vasu T. Persaud, AICP, PE

Date: 08/09/2023

Appendix C: Volusia County CMS

Address	County	Yes	1.55	45	N/S	21,460	21,500	21,570	21,630	21,690	21,750	21,810	21,870	21,930	21,990	22,050	22,110	22,170	22,230	22,290	22,350	22,410	22,470	22,530	22,590	22,650	22,710	22,770	22,830	22,890	22,950	23,010	23,070	23,130	23,190	23,250	23,310	23,370	23,430	23,490	23,550	23,610	23,670	23,730	23,790	23,850	23,910	23,970	24,030	24,090	24,150	24,210	24,270	24,330	24,390	24,450	24,510	24,570	24,630	24,690	24,750	24,810	24,870	24,930	24,990	25,050	25,110	25,170	25,230	25,290	25,350	25,410	25,470	25,530	25,590	25,650	25,710	25,770	25,830	25,890	25,950	26,010	26,070	26,130	26,190	26,250	26,310	26,370	26,430	26,490	26,550	26,610	26,670	26,730	26,790	26,850	26,910	26,970	27,030	27,090	27,150	27,210	27,270	27,330	27,390	27,450	27,510	27,570	27,630	27,690	27,750	27,810	27,870	27,930	27,990	28,050	28,110	28,170	28,230	28,290	28,350	28,410	28,470	28,530	28,590	28,650	28,710	28,770	28,830	28,890	28,950	29,010	29,070	29,130	29,190	29,250	29,310	29,370	29,430	29,490	29,550	29,610	29,670	29,730	29,790	29,850	29,910	29,970	30,030	30,090	30,150	30,210	30,270	30,330	30,390	30,450	30,510	30,570	30,630	30,690	30,750	30,810	30,870	30,930	30,990	31,050	31,110	31,170	31,230	31,290	31,350	31,410	31,470	31,530	31,590	31,650	31,710	31,770	31,830	31,890	31,950	32,010	32,070	32,130	32,190	32,250	32,310	32,370	32,430	32,490	32,550	32,610	32,670	32,730	32,790	32,850	32,910	32,970	33,030	33,090	33,150	33,210	33,270	33,330	33,390	33,450	33,510	33,570	33,630	33,690	33,750	33,810	33,870	33,930	33,990	34,050	34,110	34,170	34,230	34,290	34,350	34,410	34,470	34,530	34,590	34,650	34,710	34,770	34,830	34,890	34,950	35,010	35,070	35,130	35,190	35,250	35,310	35,370	35,430	35,490	35,550	35,610	35,670	35,730	35,790	35,850	35,910	35,970	36,030	36,090	36,150	36,210	36,270	36,330	36,390	36,450	36,510	36,570	36,630	36,690	36,750	36,810	36,870	36,930	36,990	37,050	37,110	37,170	37,230	37,290	37,350	37,410	37,470	37,530	37,590	37,650	37,710	37,770	37,830	37,890	37,950	38,010	38,070	38,130	38,190	38,250	38,310	38,370	38,430	38,490	38,550	38,610	38,670	38,730	38,790	38,850	38,910	38,970	39,030	39,090	39,150	39,210	39,270	39,330	39,390	39,450	39,510	39,570	39,630	39,690	39,750	39,810	39,870	39,930	39,990	40,050	40,110	40,170	40,230	40,290	40,350	40,410	40,470	40,530	40,590	40,650	40,710	40,770	40,830	40,890	40,950	41,010	41,070	41,130	41,190	41,250	41,310	41,370	41,430	41,490	41,550	41,610	41,670	41,730	41,790	41,850	41,910	41,970	42,030	42,090	42,150	42,210	42,270	42,330	42,390	42,450	42,510	42,570	42,630	42,690	42,750	42,810	42,870	42,930	42,990	43,050	43,110	43,170	43,230	43,290	43,350	43,410	43,470	43,530	43,590	43,650	43,710	43,770	43,830	43,890	43,950	44,010	44,070	44,130	44,190	44,250	44,310	44,370	44,430	44,490	44,550	44,610	44,670	44,730	44,790	44,850	44,910	44,970	45,030	45,090	45,150	45,210	45,270	45,330	45,390	45,450	45,510	45,570	45,630	45,690	45,750	45,810	45,870	45,930	45,990	46,050	46,110	46,170	46,230	46,290	46,350	46,410	46,470	46,530	46,590	46,650	46,710	46,770	46,830	46,890	46,950	47,010	47,070	47,130	47,190	47,250	47,310	47,370	47,430	47,490	47,550	47,610	47,670	47,730	47,790	47,850	47,910	47,970	48,030	48,090	48,150	48,210	48,270	48,330	48,390	48,450	48,510	48,570	48,630	48,690	48,750	48,810	48,870	48,930	48,990	49,050	49,110	49,170	49,230	49,290	49,350	49,410	49,470	49,530	49,590	49,650	49,710	49,770	49,830	49,890	49,950	50,010	50,070	50,130	50,190	50,250	50,310	50,370	50,430	50,490	50,550	50,610	50,670	50,730	50,790	50,850	50,910	50,970	51,030	51,090	51,150	51,210	51,270	51,330	51,390	51,450	51,510	51,570	51,630	51,690	51,750	51,810	51,870	51,930	51,990	52,050	52,110	52,170	52,230	52,290	52,350	52,410	52,470	52,530	52,590	52,650	52,710	52,770	52,830	52,890	52,950	53,010	53,070	53,130	53,190	53,250	53,310	53,370	53,430	53,490	53,550	53,610	53,670	53,730	53,790	53,850	53,910	53,970	54,030	54,090	54,150	54,210	54,270	54,330	54,390	54,450	54,510	54,570	54,630	54,690	54,750	54,810	54,870	54,930	54,990	55,050	55,110	55,170	55,230	55,290	55,350	55,410	55,470	55,530	55,590	55,650	55,710	55,770	55,830	55,890	55,950	56,010	56,070	56,130	56,190	56,250	56,310	56,370	56,430	56,490	56,550	56,610	56,670	56,730	56,790	56,850	56,910	56,970	57,030	57,090	57,150	57,210	57,270	57,330	57,390	57,450	57,510	57,570	57,630	57,690	57,750	57,810	57,870	57,930	57,990	58,050	58,110	58,170	58,230	58,290	58,350	58,410	58,470	58,530	58,590	58,650	58,710	58,770	58,830	58,890	58,950	59,010	59,070	59,130	59,190	59,250	59,310	59,370	59,430	59,490	59,550	59,610	59,670	59,730	59,790	59,850	59,910	59,970	60,030	60,090	60,150	60,210	60,270	60,330	60,390	60,450	60,510	60,570	60,630	60,690	60,750	60,810	60,870	60,930	60,990	61,050	61,110	61,170	61,230	61,290	61,350	61,410	61,470	61,530	61,590	61,650	61,710	61,770	61,830	61,890	61,950	62,010	62,070	62,130	62,190	62,250	62,310	62,370	62,430	62,490	62,550	62,610	62,670	62,730	62,790	62,850	62,910	62,970	63,030	63,090	63,150	63,210	63,270	63,330	63,390	63,450	63,510	63,570	63,630	63,690	63,750	63,810	63,870	63,930	63,990	64,050	64,110	64,170	64,230	64,290	64,350	64,410	64,470	64,530	64,590	64,650	64,710	64,770	64,830	64,890	64,950	65,010	65,070	65,130	65,190	65,250	65,310	65,370	65,430	65,490	65,550	65,610	65,670	65,730	65,790	65,850	65,910	65,970	66,030	66,090	66,150	66,210	66,270	66,330	66,390	66,450	66,510	66,570	66,630	66,690	66,750	66,810	66,870	66,930	66,990	67,050	67,110	67,170	67,230	67,290	67,350	67,410	67,470	67,530	67,590	67,650	67,710	67,770	67,830	67,890	67,950	68,010	68,070	68,130	68,190	68,250	68,310	68,370	68,430	68,490	68,550	68,610	68,670	68,730	68,790	68,850	68,910	68,970	69,030	69,090	69,150	69,210	69,270	69,330	69,390	69,450	69,510	69,570	69,630	69,690	69,750	69,810	69,870	69,930	69,990	70,050	70,110	70,170	70,230	70,290	70,350	70,410	70,470	70,530	70,590	70,650	70,710	70,770	70,830	70,890	70,950	71,010	71,070	71,130	71,190	71,250	71,310	71,370	71,430	71,490	71,550	71,610	71,670	71,730	71,790	71,850	71,910	71,970	72,030	72,090	72,150	72,210	72,270	72,330	72,390	72,450	72,510	72,570	72,630	72,690	72,750	72,810	72,870	72,930	72,990	73,050	73,110	73,170	73,230	73,290	73,350	73,410	73,470	73,530	73,590	73,650	73,710	73,770	73,830	73,890	73,950	74,010	74,070	74,130	74,190	74,250	74,310	74,370	74,430	74,490	74,550	74,610	74,670	74,730	74,790	74,850	74,910	74,970	75,030	75,090	75,150	75,210	75,270	75,330	75,390	75,450	75,510	75,570	75,630	75,690	75,750	75,810	75,870	75,930	75,990	76,050	76,110	76,170	76,230	76,290	76,350	76,410	76,470	76,530	76,590	76,650	76,710	76,770	76,830	76,890	76,950	77,010	77,070	77,130	77,190	77,250	77,310	77,370	77,430	77,490	77,550	77,610	77,670	77,730	77,790	77,850	77,910	77,970	78,030	78,090	78,150	78,210	78,270	78,330	78,390	78,450	78,510	78,570	78,630	78,690	78,750	78,810	78,870	78,930	78,990	79,050	79,110	79,170	79,230	79,290	79,350	79,410	79,470	79,530	79,590	79,650	79,710	79,770	79,830	79,890	79,950	80,010	80,070	80,130	80,190	80,250	80,310	80,370	80,430	80,490	80,550	80,610	80,670	80,730	80,790	80,850	80,910	80,970	81,030	81,090	81,150	81,210	81,270	81,330	81,390	81,450	81,510	81,570	81,630	81,690	81,750	81,810	81,870	81,930	81,990	82,050	82,110	82,170	82,230	82,290	82,350	82,410	82,470	82,530	82,590	82,650	82,710	82,770	82,830	82,890</
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All State Rds =

County

Facility Type =

State Rds =

Total

VC Arterial

VC Collector

Local-Future Rds

Facility Type - Urban/Transitioning

FWS

= Freeways - Interchange Spacing Group 1 (spacing >= 2 miles apart)

FW

= Freeways - Transitioning & Rural

UFR

= Uninterrupted flow highways

SSA/C1

= State Signalized Arterial Class 1

SSA/C2

= State Signalized Arterial Class 2

NSR/C1

= Non-State Signalized Road Class 1

NSR/C2

= Non-State Signalized Road Class 2

Facility Type - Rural Developed

FW

= Freeways - Transitioning & Rural

UFR

= Uninterrupted flow highways

IFH

= Interrupted Flow Highway

Facility Type - Rural Undeveloped

FW

= Freeways - Transitioning & Rural

IFH

= Interrupted Flow Highway

ISF

= Isolated Signalized Intersection

One-Way/Two-Way

OW

= One-way Directional Volumes

2W

= Two-way Directional Volumes

Number of Lanes

2L, 4L, 5L, etc.

Divided/Undivided

D

= Divided

U

= Undivided

Left Turn Bays

LC

= Left Turn Bay

NC

= No Left Turn Bays

Always refer to the VADT spreadsheet for count and capacity info, and the spreadsheet...

Public notice

Approved by the Board and the Board of Directors...

Public notice

Always refer to the VADT spreadsheet for count and capacity info, and the spreadsheet...

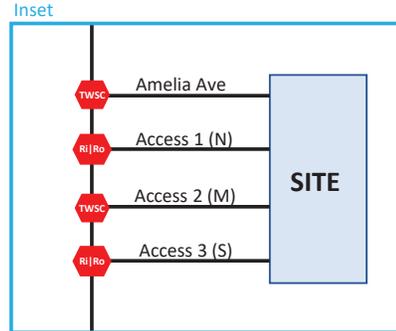
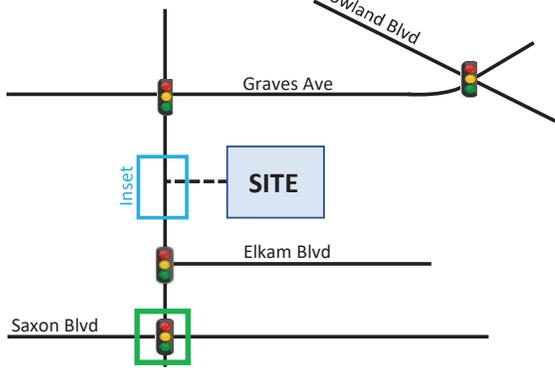
Table with multiple columns including: Agency, Program, Budget, FY, and various financial metrics. The table is color-coded with red, yellow, and blue highlights.

Appendix D: Traffic Volumes

INTERSECTION TRAFFIC VOLUMES

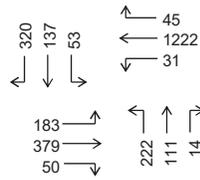
 - Subject Intersection

Intx 1: Normandy Blvd & Saxon Blvd
AM Peak Hour



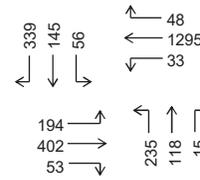
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



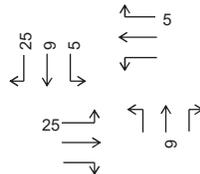
*SF applied = 1.02

2026 VOLUMES

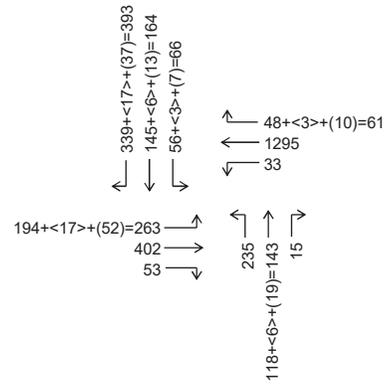


*Growth rate applied = 1.06

TRIP DISTRIBUTION %



PROJECTED VOLUMES

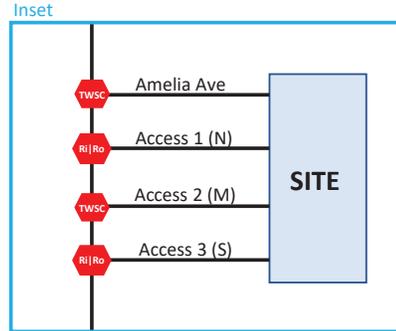
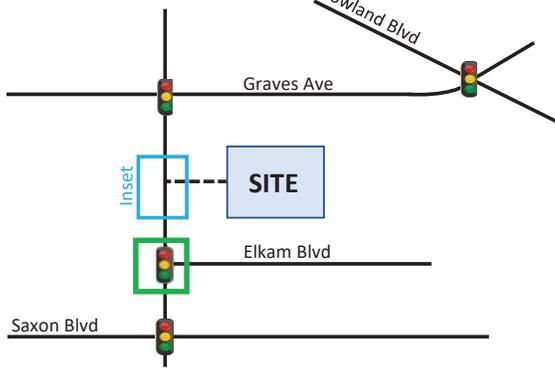


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

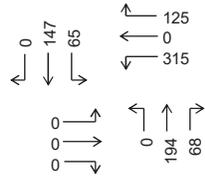
 - Subject Intersection

Intx 2: Normandy Blvd & Elkcam Blvd
AM Peak Hour



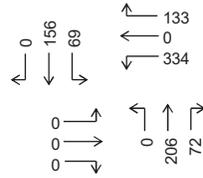
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



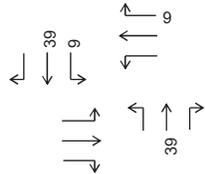
*SF applied = 1.02

2026 VOLUMES

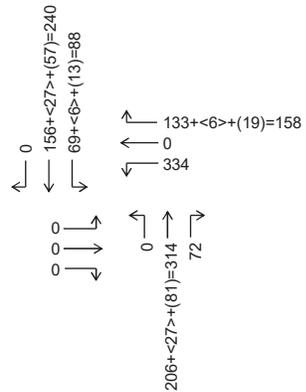


*Growth rate applied = 1.06

TRIP DISTRIBUTION %



PROJECTED VOLUMES

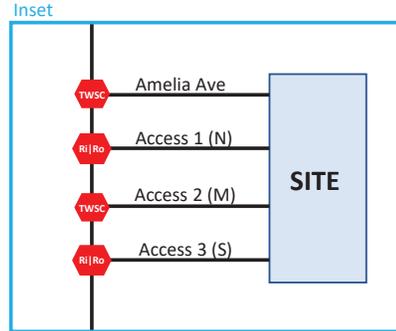
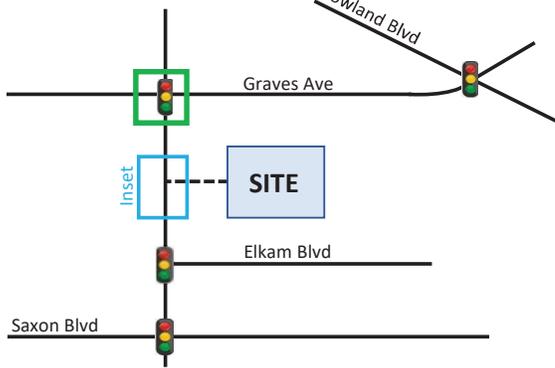


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

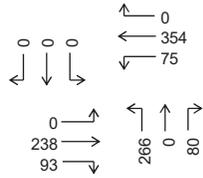
 - Subject Intersection

Intx 3: Normandy Blvd & Graves Ave
AM Peak Hour



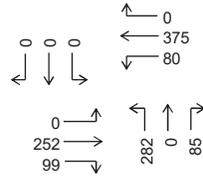
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



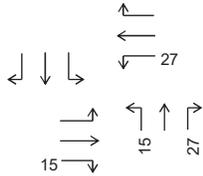
*SF applied = 1.02

2026 VOLUMES

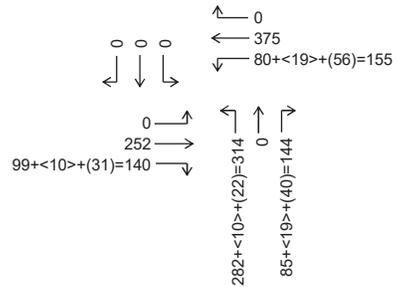


*Growth rate applied = 1.06

TRIP DISTRIBUTION %



PROJECTED VOLUMES

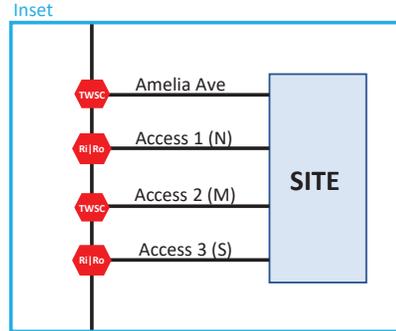
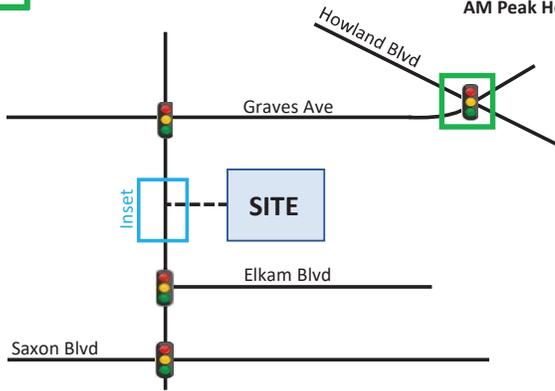


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

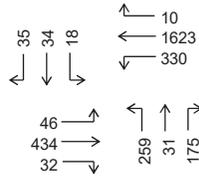
 - Subject Intersection

Intx 4: Graves Ave & Howland Blvd
AM Peak Hour



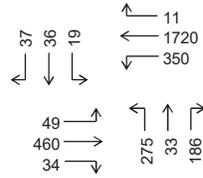
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



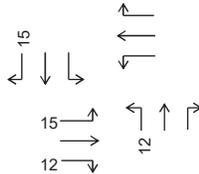
*SF applied = 1.02

2026 VOLUMES

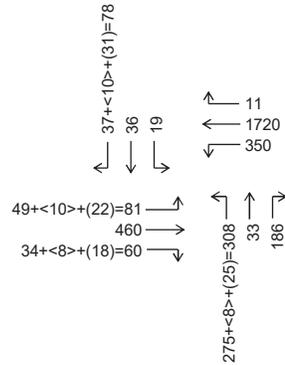


*Growth rate applied = 1.06

TRIP DISTRIBUTION %



PROJECTED VOLUMES

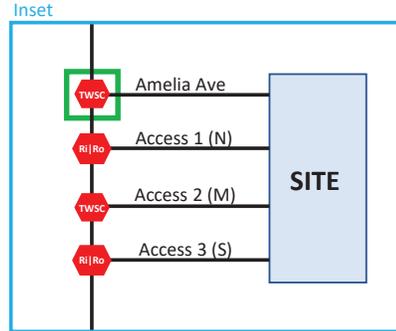
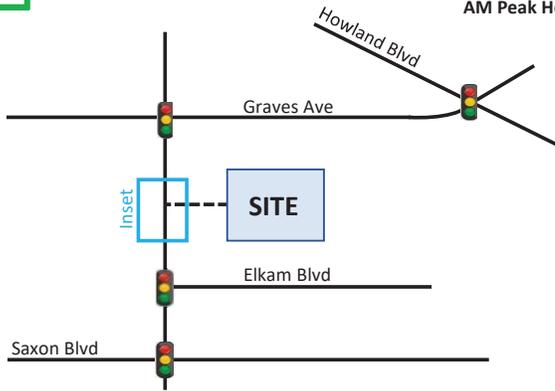


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

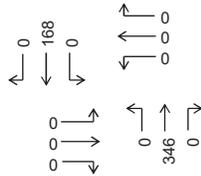
 - Subject Intersection

Intx 5: Normandy Blvd & Amelia Ave
AM Peak Hour



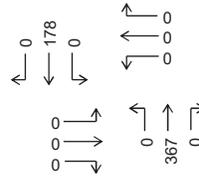
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



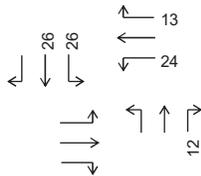
*SF applied = 1.02

2026 VOLUMES

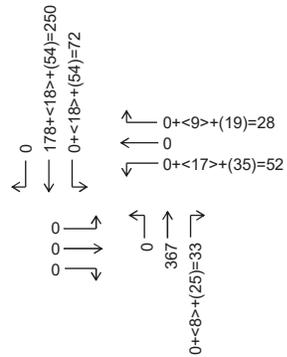


*Growth rate applied = 1.06

TRIP DISTRIBUTION %



PROJECTED VOLUMES

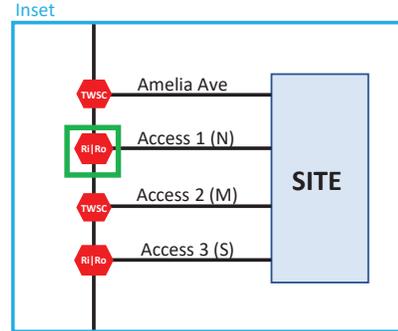
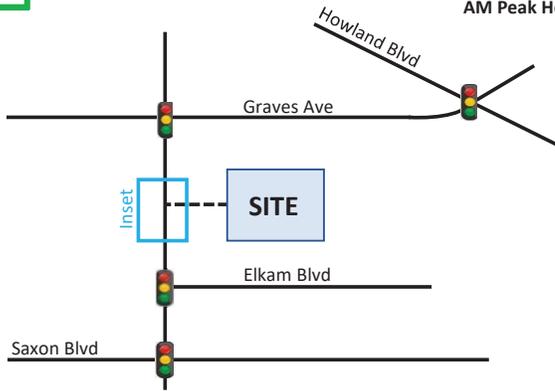


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

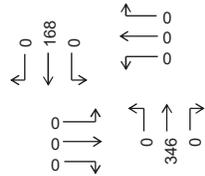
 - Subject Intersection

Intx 6: Normandy Blvd & Access 1 (N)
AM Peak Hour



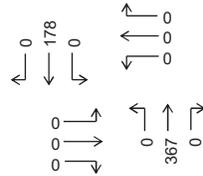
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



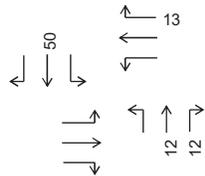
*SF applied = 1.02

2026 VOLUMES

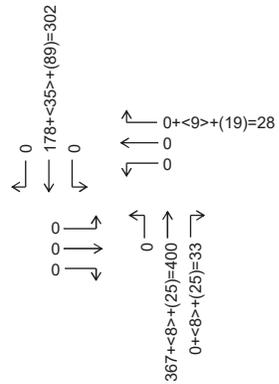


*Growth rate applied = 1.06

TRIP DISTRIBUTION %



PROJECTED VOLUMES

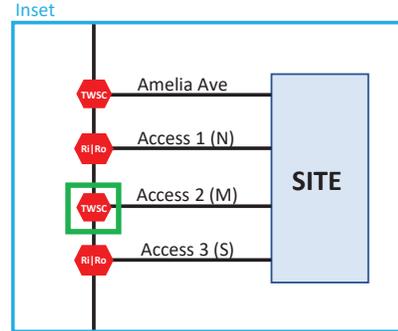
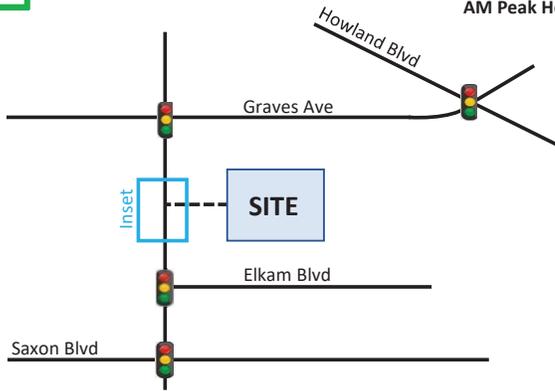


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

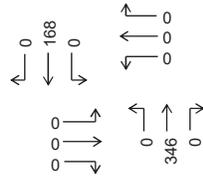
 - Subject Intersection

Intx 7: Normandy Blvd & Access 2 (M)
AM Peak Hour



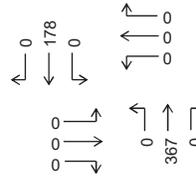
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



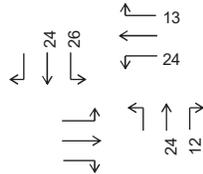
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2026 VOLUMES

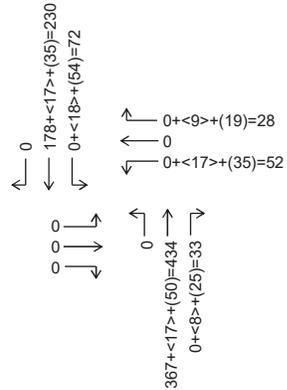


*Growth rate applied = 1.06

TRIP DISTRIBUTION %



PROJECTED VOLUMES

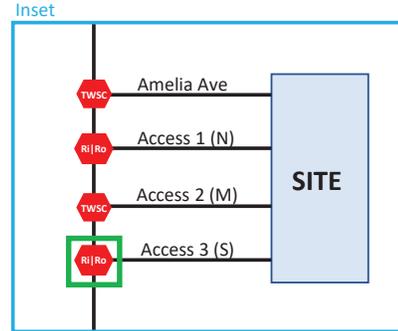
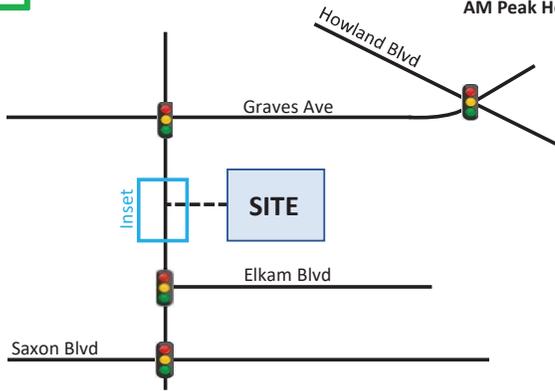


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

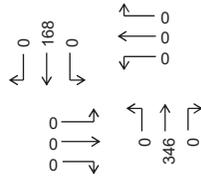
 - Subject Intersection

Intx 8: Normandy Blvd & Access 3 (S)
AM Peak Hour



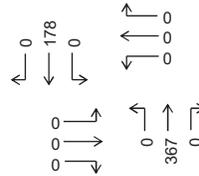
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



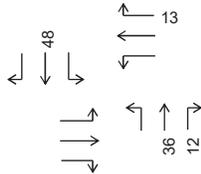
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2026 VOLUMES

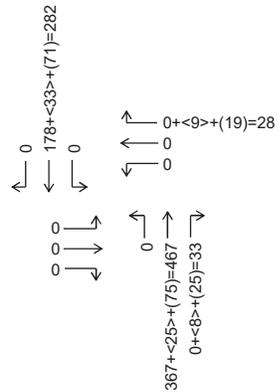


*Growth rate applied = 1.06

TRIP DISTRIBUTION %



PROJECTED VOLUMES

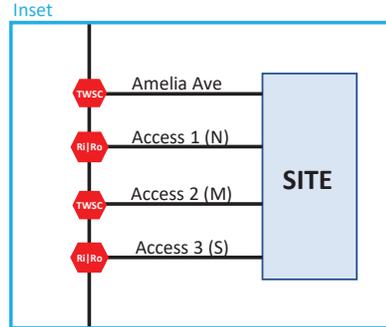
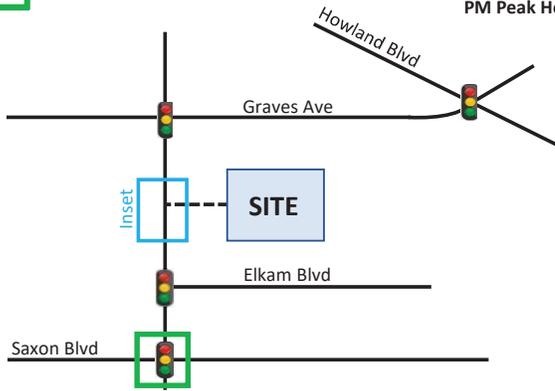


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

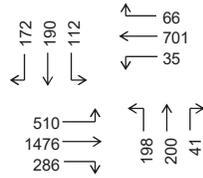
 - Subject Intersection

Intx 1: Normandy Blvd & Saxon Blvd
PM Peak Hour



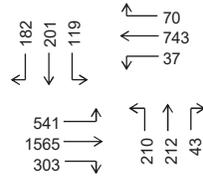
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



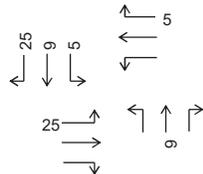
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2026 VOLUMES

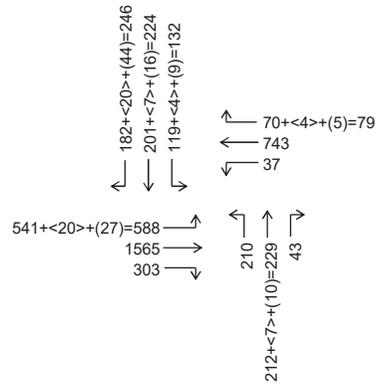


*Growth rate applied = 1.06

TRIP DISTRIBUTION %



PROJECTED VOLUMES

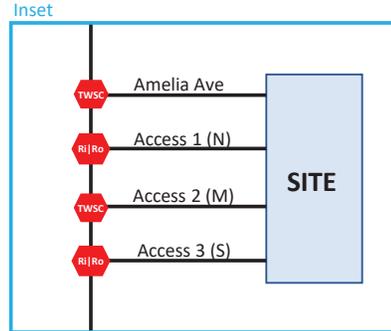
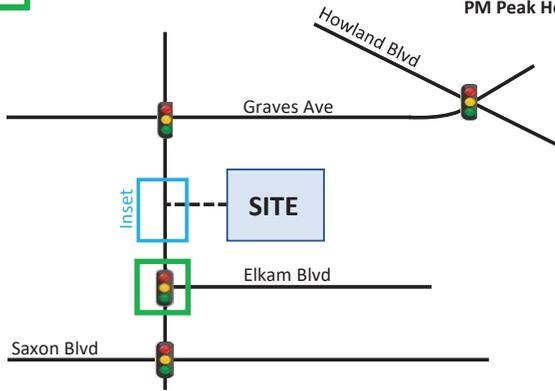


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

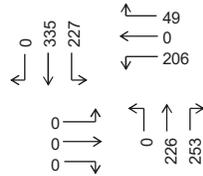
 - Subject Intersection

Intx 2: Normandy Blvd & Elkcam Blvd
PM Peak Hour



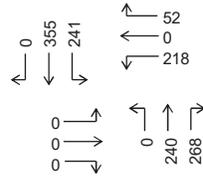
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



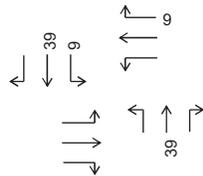
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2026 VOLUMES

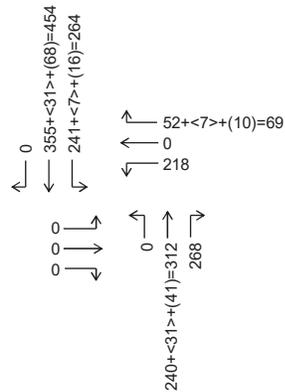


*Growth rate applied = 1.06

TRIP DISTRIBUTION %



PROJECTED VOLUMES

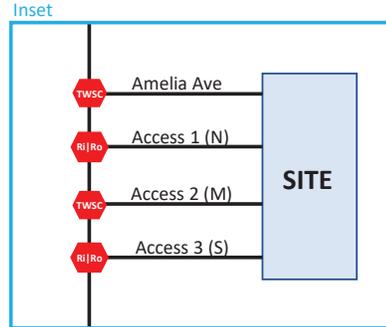
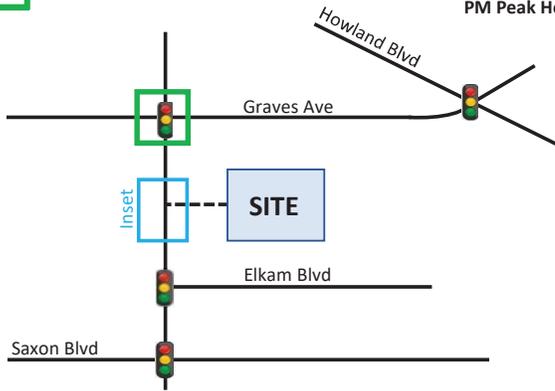


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

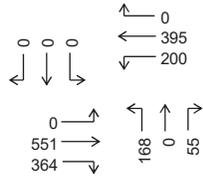
 - Subject Intersection

Intx 3: Normandy Blvd & Graves Ave
PM Peak Hour



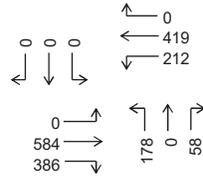
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



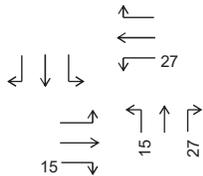
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2026 VOLUMES

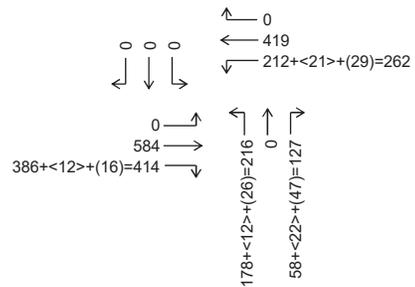


*Growth rate applied = 1.06

TRIP DISTRIBUTION %



PROJECTED VOLUMES

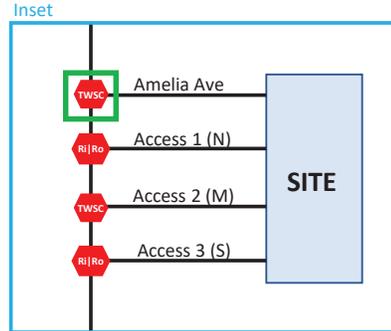
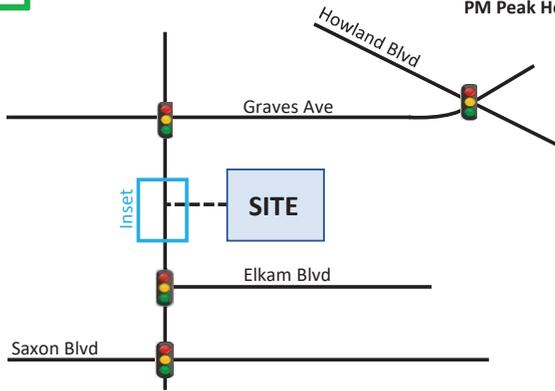


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

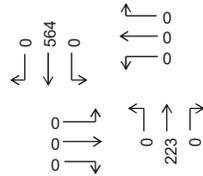
 - Subject Intersection

Intx 5: Normandy Blvd & Amelia Ave
PM Peak Hour



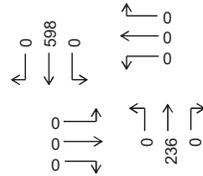
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



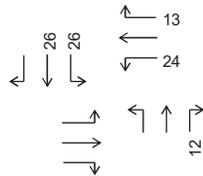
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2026 VOLUMES

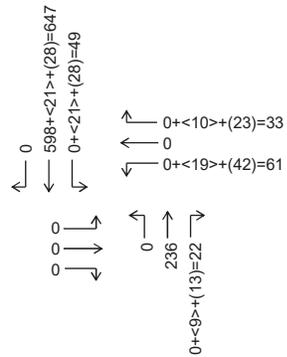


*Growth rate applied = 1.06

TRIP DISTRIBUTION %



PROJECTED VOLUMES

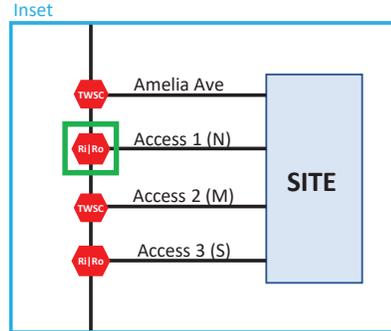
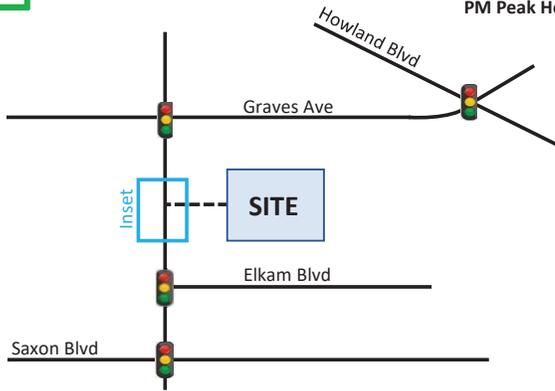


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

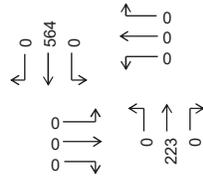
 - Subject Intersection

Intx 6: Normandy Blvd & Access 1 (N)
PM Peak Hour



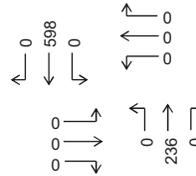
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



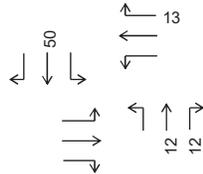
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2026 VOLUMES

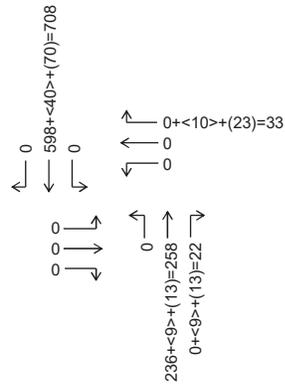


*Growth rate applied = 1.06

TRIP DISTRIBUTION %



PROJECTED VOLUMES

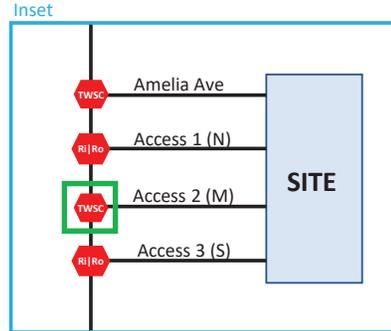
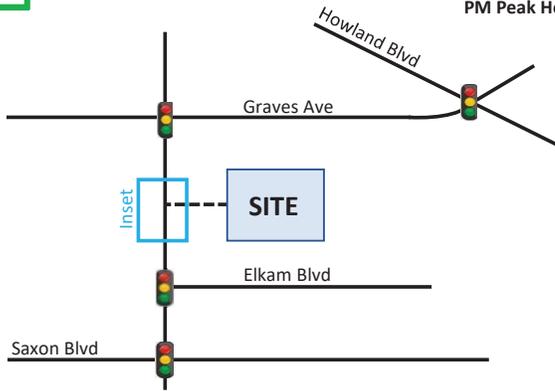


Note: +/- errors due to rounding

INTERSECTION TRAFFIC VOLUMES

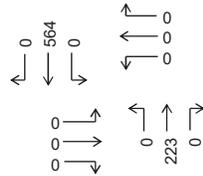
 - Subject Intersection

Intx 7: Normandy Blvd & Access 2 (M)
PM Peak Hour



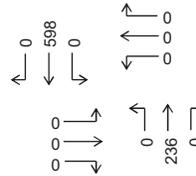
*Background + <Pass-By Vol> + (Project Vol) = Total Volume

2023 VOLUMES



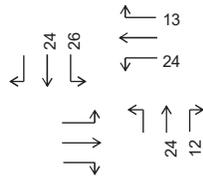
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2026 VOLUMES

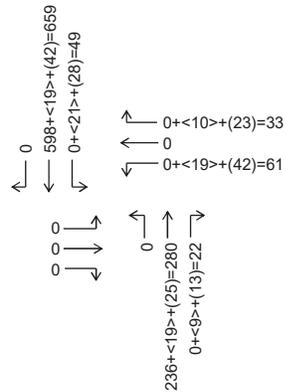


*Growth rate applied = 1.06

TRIP DISTRIBUTION %



PROJECTED VOLUMES



Note: +/- errors due to rounding

15 MINUTE TURNING MOVEMENT COUNTS

(Cars and Trucks)

DATE: June 1, 2023 (Thursday)

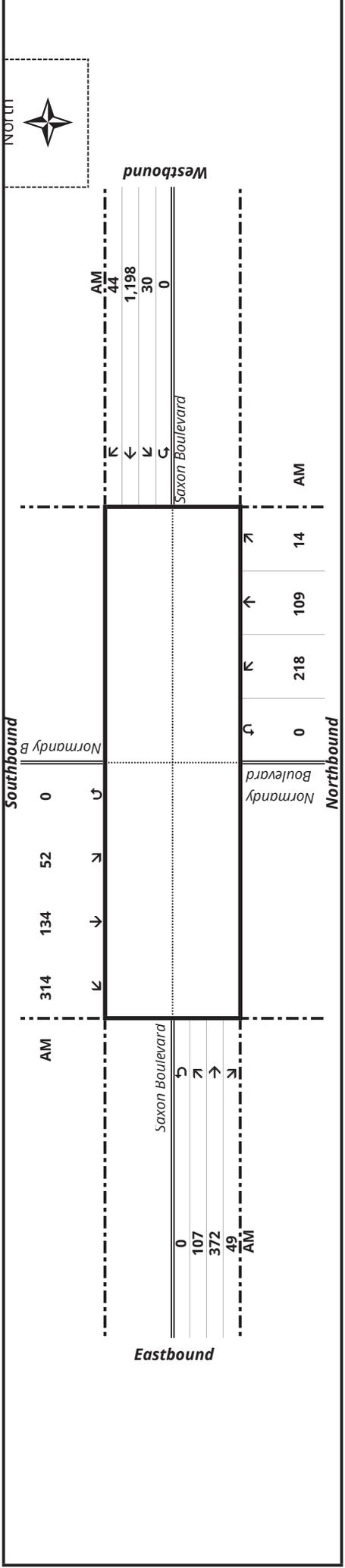
LOCATION: Normandy Boulevard and Saxon Boulevard

CITY: Deltona
COUNTY: Volusia

LATITUDE: 0
LONGITUDE: 0

TIME BEGIN	NORTHBOUND				SOUTHBOUND				N/S TOTAL			EASTBOUND				WESTBOUND				E/W TOTAL	GRAND TOTAL		
	L	T	R	U-turn	L	T	R	U-turn	L	T	U-turn	L	T	R	U-turn	L	T	R	U-turn				
07:00 AM	52	23	2	0	77	3	22	79	0	104	181	27	76	9	0	112	8	273	8	0	289	401	582
07:15 AM	70	27	4	0	101	11	36	90	0	137	238	33	69	10	0	112	6	278	2	0	286	398	636
07:30 AM	58	25	3	0	86	18	34	87	0	139	225	25	92	16	0	133	8	387	18	0	413	546	771
07:45 AM	45	31	5	0	81	11	34	74	0	119	200	19	108	11	0	138	11	267	10	0	288	426	626
TOTAL	225	106	14	0	345	43	126	330	0	499	844	104	345	46	0	495	33	1,205	38	0	1,276	1,771	2,615
08:00 AM	45	26	2	0	73	12	30	63	0	105	178	30	103	12	0	145	5	266	14	0	285	430	608
08:15 AM	49	27	3	0	79	9	28	67	0	104	183	39	84	22	0	145	11	269	4	0	284	429	612
08:30 AM	55	31	3	0	89	10	35	67	0	112	201	36	96	26	0	158	5	240	14	0	259	417	618
08:45 AM	43	27	6	0	76	9	35	45	0	89	165	33	112	19	0	164	9	243	14	0	266	430	595
TOTAL	192	111	14	0	317	40	128	242	0	410	727	138	395	79	0	612	30	1,018	46	0	1,094	1,706	2,433

AM Peak	Peak Hour Factor: 0.856																						
07:15 AM to 08:15 AM	218	109	14	0	341	52	134	314	0	500	841	107	372	49	0	528	30	1,198	44	0	1,272	1,800	2,641



15 MINUTE TURNING MOVEMENT COUNTS

(Cars and Trucks)

DATE: June 1, 2023 (Thursday)

LOCATION: Normandy Boulevard and Elkcam Boulevard

CITY: Deltona

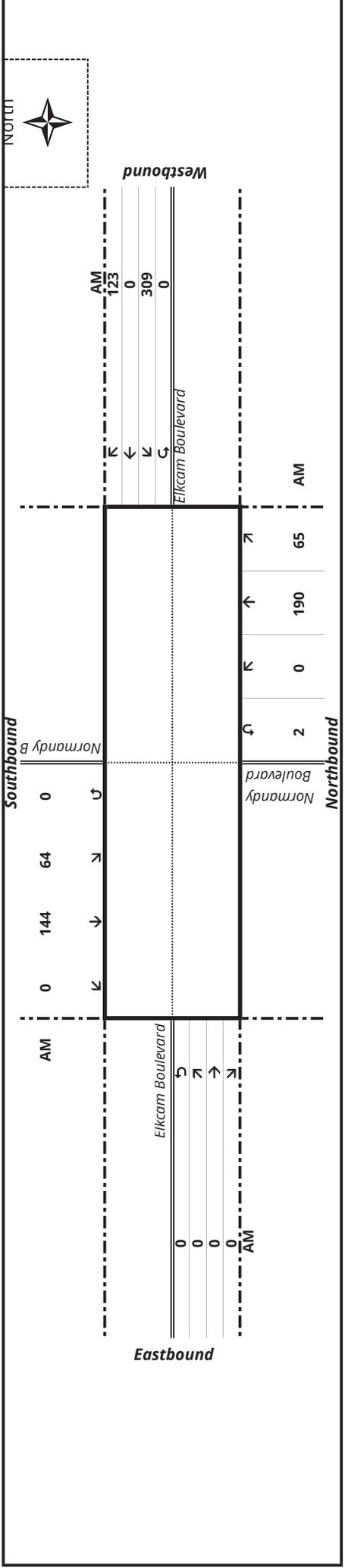
LATITUDE: 0

COUNTY: Volusia

LONGITUDE: 0

TIME BEGIN	NORTHBOUND				SOUTHBOUND				N/S TOTAL	EASTBOUND				WESTBOUND				E/W TOTAL	GRAND TOTAL	
	L	T	R	U-turn	L	T	R	U-turn		L	T	R	U-turn	L	T	R	U-turn			
07:00 AM	0	49	9	0	58	12	22	0	34	92	0	0	0	0	0	67	0	18	85	177
07:15 AM	0	44	16	0	60	18	41	0	59	119	0	0	0	0	0	74	0	37	111	230
07:30 AM	0	68	14	0	82	14	26	0	40	122	0	0	0	0	0	89	0	39	128	250
07:45 AM	0	44	17	1	62	19	51	0	70	132	0	0	0	0	0	74	0	23	97	229
TOTAL	0	205	56	1	262	63	140	0	203	465	0	0	0	0	0	304	0	117	421	886
08:00 AM	0	34	18	1	53	13	26	0	39	92	0	0	0	0	0	72	0	24	96	188
08:15 AM	0	39	12	0	51	10	35	0	45	96	0	0	0	0	0	78	0	18	96	192
08:30 AM	0	45	15	0	60	11	27	0	38	98	0	0	0	0	0	77	0	12	89	187
08:45 AM	0	50	24	0	74	12	47	0	59	133	0	0	0	0	0	76	0	11	87	220
TOTAL	0	168	69	1	238	46	135	0	181	419	0	0	0	0	0	303	0	65	368	787

AM Peak																Peak Hour Factor: 0.897						
07:15 AM to 08:15 AM	0	190	65	2	257	64	144	0	0	208	465	0	0	0	0	309	0	123	0	432	432	897



15 MINUTE TURNING MOVEMENT COUNTS

(Cars and Trucks)

DATE: June 1, 2023 (Thursday)

LOCATION: Normandy Boulevard and Graves Avenue

CITY: Deltona
COUNTY: Volusia

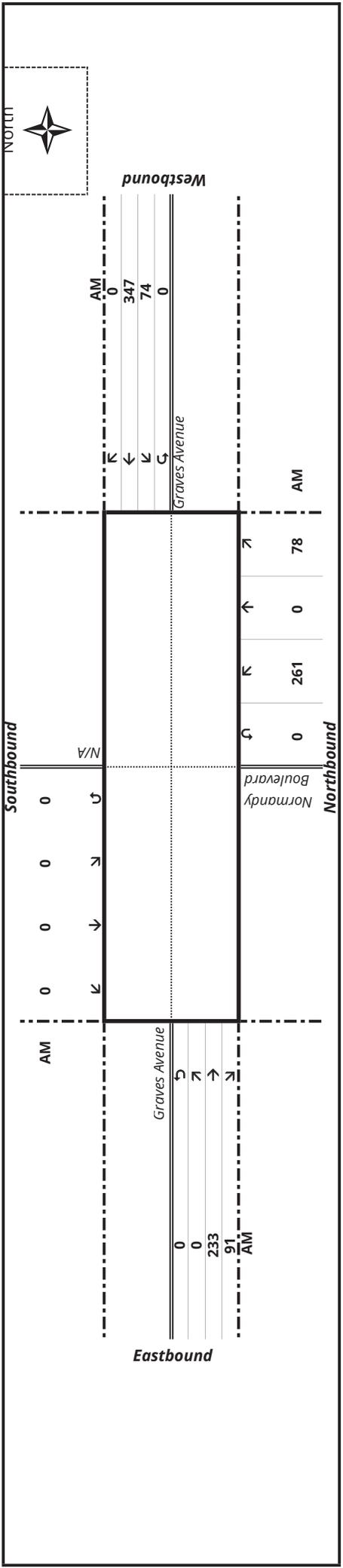
LATITUDE: 0
LONGITUDE: 0

Normandy Boulevard N/A Graves Avenue

TIME BEGIN	NORTHBOUND			SOUTHBOUND			N/S TOTAL	EASTBOUND			WESTBOUND			E/W TOTAL	GRAND TOTAL			
	L	T	R	L	T	R		L	T	R	L	T	R					
07:00 AM	58	0	18	0	0	0	76	0	56	13	0	69	11	68	0	79	148	224
07:15 AM	69	0	26	0	0	0	95	0	66	25	0	91	17	75	0	92	183	278
07:30 AM	71	0	30	0	0	0	101	0	55	14	0	69	15	92	0	107	176	277
07:45 AM	77	0	18	0	0	0	95	0	54	29	0	83	24	96	0	120	203	298
TOTAL	275	0	92	0	0	0	367	0	231	81	0	312	67	331	0	398	710	1,077
08:00 AM	44	0	4	0	0	0	48	0	58	23	0	81	18	84	0	102	183	231
08:15 AM	53	0	10	0	0	0	63	0	43	9	0	52	22	103	0	125	177	240
08:30 AM	54	0	11	0	0	0	65	0	72	25	0	97	19	77	0	96	193	258
08:45 AM	60	0	14	0	0	0	74	0	56	21	0	77	27	89	0	116	193	267
TOTAL	211	0	39	0	0	0	250	0	229	78	0	307	86	353	0	439	746	996

Peak Hour Factor: 0.909

AM Peak 07:15 AM to 08:15 AM	261	0	78	0	339	0	0	0	0	0	233	91	0	324	74	347	0	0	421	745	1,084
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15 MINUTE TURNING MOVEMENT COUNTS

(Cars and Trucks)

DATE: June 1, 2023 (Thursday)

LOCATION: Normandy Boulevard and Saxon Boulevard

CITY: Deltona

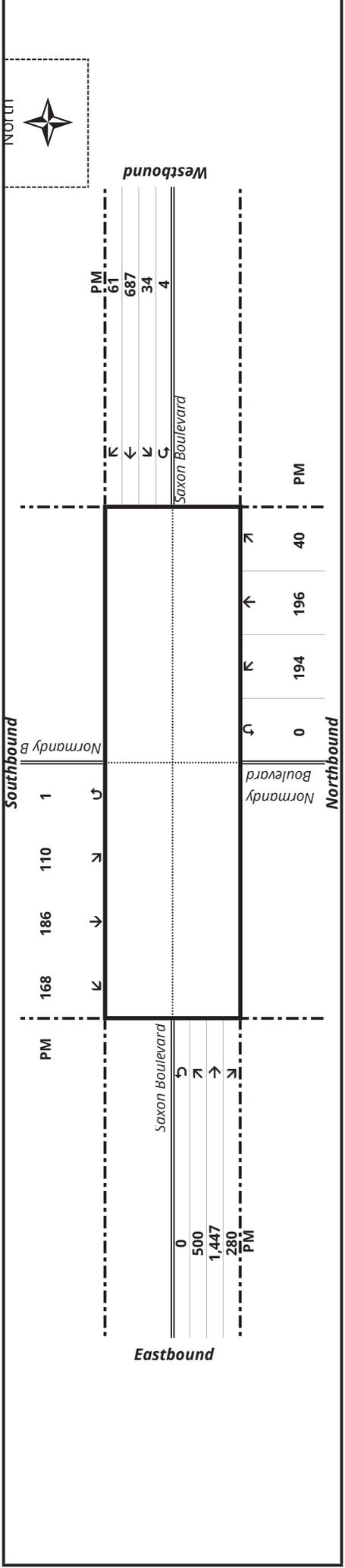
LATITUDE: 0

COUNTY: Volusia

LONGITUDE: 0

TIME BEGIN	NORTHBOUND				SOUTHBOUND				N/S TOTAL		EASTBOUND				WESTBOUND				E/W TOTAL	GRAND TOTAL		
	L	T	R	U-turn	L	T	R	U-turn	L	T	R	U-turn	L	T	R	U-turn	L	T			R	U-turn
04:00 PM	38	32	9	0	79	16	24	0	68	147	91	274	58	0	423	4	187	17	0	208	631	778
04:15 PM	49	42	6	0	97	18	37	0	91	188	111	300	57	0	468	9	192	9	0	210	678	866
04:30 PM	45	31	9	0	85	19	40	0	113	198	130	310	52	0	492	8	171	18	0	197	689	887
04:45 PM	59	34	9	0	102	23	50	0	98	200	102	345	62	0	509	5	184	13	0	202	711	911
TOTAL	191	139	33	0	363	76	155	0	370	733	434	1,229	229	0	1,892	26	734	57	0	817	2,709	3,442
05:00 PM	50	51	12	0	113	24	44	0	109	222	124	375	76	0	575	10	196	11	0	217	792	1,014
05:15 PM	45	54	9	0	108	25	53	0	135	243	122	355	76	0	553	9	185	11	0	205	758	1,001
05:30 PM	52	39	11	0	102	34	44	0	112	214	119	377	69	0	565	6	156	23	1	186	751	965
05:45 PM	47	52	8	0	107	27	45	0	109	216	135	340	59	0	534	9	150	16	3	178	712	928
TOTAL	194	196	40	0	430	110	186	0	465	895	500	1,447	280	0	2,227	34	687	61	4	786	3,013	3,908

PM Peak	Peak Hour Factor: 0.964																					
05:00 PM to 06:00 PM	194	196	40	0	430	110	186	1	465	895	500	1,447	280	0	2,227	34	687	61	4	786	3,013	3,908

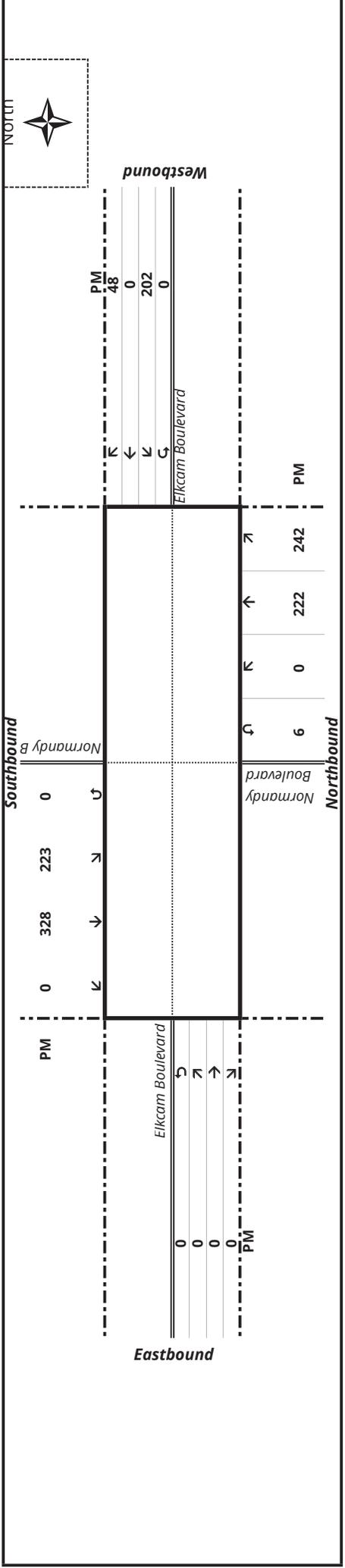


15 MINUTE TURNING MOVEMENT COUNTS
(Cars and Trucks)

DATE: June 1, 2023 (Thursday) CITY: Deltona LATITUDE: 0
 LOCATION: Normandy Boulevard and Elkcam Boulevard COUNTY: Volusia LONGITUDE: 0

TIME BEGIN	NORTHBOUND			SOUTHBOUND			N/S TOTAL			EASTBOUND			WESTBOUND			E/W TOTAL	GRAND TOTAL		
	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R				
04:00 PM	0	56	57	0	67	0	1	102	215	0	0	0	0	28	10	0	38	38	253
04:15 PM	0	44	60	0	56	0	0	98	202	0	0	0	0	45	3	0	48	48	250
04:30 PM	0	50	50	0	67	0	0	110	210	0	0	0	0	48	6	0	54	54	264
04:45 PM	0	44	46	0	71	0	0	114	204	0	0	0	0	39	16	0	55	55	259
TOTAL	0	194	213	0	261	0	1	424	831	0	0	0	0	160	35	0	195	195	1,026
05:00 PM	0	51	57	0	44	0	0	94	202	0	0	0	0	54	17	0	71	71	273
05:15 PM	0	44	64	0	91	0	0	151	260	0	0	0	0	61	11	0	72	72	332
05:30 PM	0	66	66	0	98	0	0	163	298	0	0	0	0	38	6	0	44	44	342
05:45 PM	0	61	55	0	95	0	0	143	261	0	0	0	0	49	14	0	63	63	324
TOTAL	0	222	242	0	328	0	0	551	1,021	0	0	0	0	202	48	0	250	250	1,271

PM Peak	Peak Hour Factor: 0.929																					
05:00 PM to 06:00 PM	0	222	242	6	470	223	328	0	0	551	1,021	0	0	0	0	202	0	48	0	250	250	1,271

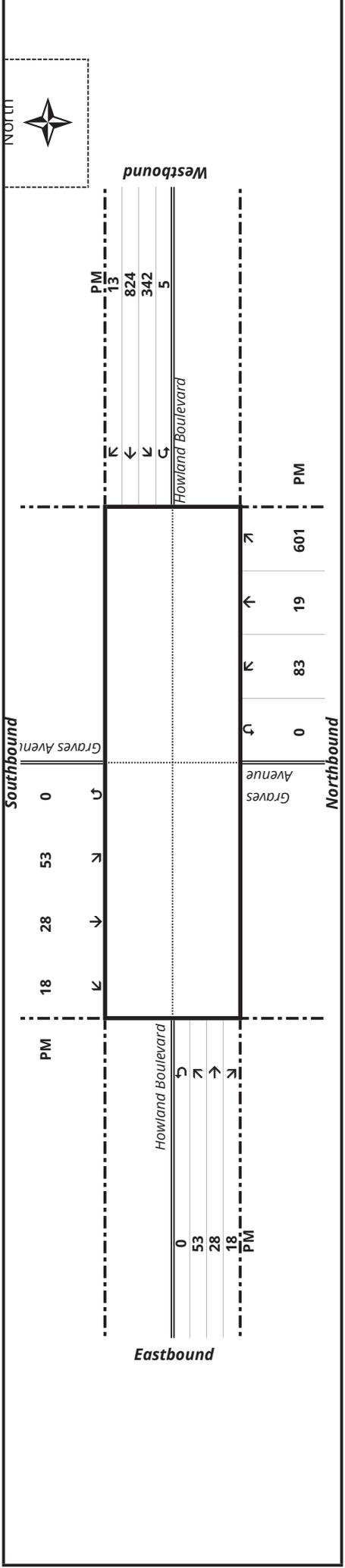


15 MINUTE TURNING MOVEMENT COUNTS
(Cars and Trucks)

DATE: June 1, 2023 (Thursday) CITY: Deltona LATITUDE: 0
 LOCATION: Graves Avenue and Howland Boulevard COUNTY: Volusia LONGITUDE: 0

TIME BEGIN	Graves Avenue					Graves Avenue					Howland Boulevard					Howland Boulevard					E/W TOTAL	GRAND TOTAL					
	NORTHBOUND		SOUTHBOUND			NORTHBOUND		SOUTHBOUND			EASTBOUND		WESTBOUND			EASTBOUND		WESTBOUND									
	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL							
04:00 PM	31	6	139	0	176	4	3	1	0	8	4	3	1	0	8	98	182	5	0	285	81	173	4	0	258	293	477
04:15 PM	22	8	135	0	165	13	12	3	0	28	13	12	3	0	28	81	173	4	0	258	75	176	1	2	254	286	479
04:30 PM	28	4	129	0	161	10	4	5	0	19	10	4	5	0	19	75	176	1	2	254	91	154	0	0	245	273	453
04:45 PM	17	2	139	0	158	9	3	5	0	17	9	3	5	0	17	91	154	0	0	245	345	685	10	2	1,042	262	437
TOTAL	98	20	542	0	660	36	22	14	0	72	36	22	14	0	72	345	685	10	2	1,042	310	720	12	2	1,114	1,114	1,846
05:00 PM	19	8	166	0	193	17	4	2	0	23	17	4	2	0	23	85	198	4	0	287	79	198	3	2	282	310	526
05:15 PM	20	2	144	0	166	10	9	11	0	30	10	9	11	0	30	79	198	3	2	282	88	232	3	3	326	312	508
05:30 PM	19	4	153	0	176	12	5	4	0	21	12	5	4	0	21	88	232	3	3	326	90	196	3	0	289	347	544
05:45 PM	25	5	138	0	168	14	10	1	0	25	14	10	1	0	25	90	196	3	0	289	342	824	13	5	1,184	314	507
TOTAL	83	19	601	0	703	53	28	18	0	99	53	28	18	0	99	342	824	13	5	1,184	342	824	13	5	1,283	1,283	2,085

PM Peak													Peak Hour Factor: 0.958																						
05:00 PM to 06:00 PM													83	19	601	0	703	53	28	18	0	99	802	53	28	18	0	99	342	824	13	5	1,184	1,283	2,085



2022 PEAK SEASON FACTOR CATEGORY REPORT - REPORT TYPE: ALL
 CATEGORY: 7900 VOLUSIA COUNTYWIDE

MOCF: 0.94
 PSCF

WEEK	DATES	SF	PSCF
1	01/01/2022 - 01/01/2022	1.02	1.09
2	01/02/2022 - 01/08/2022	1.03	1.10
3	01/09/2022 - 01/15/2022	1.04	1.11
4	01/16/2022 - 01/22/2022	1.02	1.09
5	01/23/2022 - 01/29/2022	1.01	1.07
6	01/30/2022 - 02/05/2022	0.99	1.05
* 7	02/06/2022 - 02/12/2022	0.97	1.03
* 8	02/13/2022 - 02/19/2022	0.95	1.01
* 9	02/20/2022 - 02/26/2022	0.94	1.00
*10	02/27/2022 - 03/05/2022	0.93	0.99
*11	03/06/2022 - 03/12/2022	0.92	0.98
*12	03/13/2022 - 03/19/2022	0.91	0.97
*13	03/20/2022 - 03/26/2022	0.92	0.98
*14	03/27/2022 - 04/02/2022	0.93	0.99
*15	04/03/2022 - 04/09/2022	0.94	1.00
*16	04/10/2022 - 04/16/2022	0.96	1.02
*17	04/17/2022 - 04/23/2022	0.96	1.02
*18	04/24/2022 - 04/30/2022	0.97	1.03
*19	05/01/2022 - 05/07/2022	0.98	1.04
20	05/08/2022 - 05/14/2022	0.98	1.04
21	05/15/2022 - 05/21/2022	0.99	1.05
22	05/22/2022 - 05/28/2022	1.00	1.06
23	05/29/2022 - 06/04/2022	1.02	1.09
24	06/05/2022 - 06/11/2022	1.03	1.10
25	06/12/2022 - 06/18/2022	1.04	1.11
26	06/19/2022 - 06/25/2022	1.05	1.12
27	06/26/2022 - 07/02/2022	1.06	1.13
28	07/03/2022 - 07/09/2022	1.06	1.13
29	07/10/2022 - 07/16/2022	1.07	1.14
30	07/17/2022 - 07/23/2022	1.06	1.13
31	07/24/2022 - 07/30/2022	1.05	1.12
32	07/31/2022 - 08/06/2022	1.04	1.11
33	08/07/2022 - 08/13/2022	1.03	1.10
34	08/14/2022 - 08/20/2022	1.02	1.09
35	08/21/2022 - 08/27/2022	1.04	1.11
36	08/28/2022 - 09/03/2022	1.05	1.12
37	09/04/2022 - 09/10/2022	1.06	1.13
38	09/11/2022 - 09/17/2022	1.07	1.14
39	09/18/2022 - 09/24/2022	1.05	1.12
40	09/25/2022 - 10/01/2022	1.02	1.09
41	10/02/2022 - 10/08/2022	0.99	1.05
42	10/09/2022 - 10/15/2022	0.97	1.03
43	10/16/2022 - 10/22/2022	0.98	1.04
44	10/23/2022 - 10/29/2022	0.99	1.05
45	10/30/2022 - 11/05/2022	1.01	1.07
46	11/06/2022 - 11/12/2022	1.02	1.09
47	11/13/2022 - 11/19/2022	1.04	1.11
48	11/20/2022 - 11/26/2022	1.03	1.10
49	11/27/2022 - 12/03/2022	1.03	1.10
50	12/04/2022 - 12/10/2022	1.02	1.09
51	12/11/2022 - 12/17/2022	1.02	1.09
52	12/18/2022 - 12/24/2022	1.03	1.10
53	12/25/2022 - 12/31/2022	1.04	1.11

* PEAK SEASON

23-FEB-2023 09:11:23

830UPD

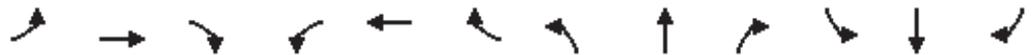
5_7900_PKSEASON.TXT

Appendix E: Existing Intersection Analysis Output

HCM 6th Signalized Intersection Summary

1: Normandy Blvd & Saxon Blvd

09/12/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	183	379	50	31	1222	45	222	111	14	53	137	320
Future Volume (veh/h)	183	379	50	31	1222	45	222	111	14	53	137	320
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	199	412	54	34	1328	49	241	121	15	58	149	348
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	237	1709	962	510	1540	57	362	389	48	347	301	381
Arrive On Green	0.08	0.48	0.48	0.04	0.44	0.44	0.13	0.24	0.24	0.05	0.16	0.16
Sat Flow, veh/h	1781	3554	1585	1781	3495	129	1781	1632	202	1781	1870	1585
Grp Volume(v), veh/h	199	412	54	34	674	703	241	0	136	58	149	348
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1847	1781	0	1834	1781	1870	1585
Q Serve(g_s), s	7.4	8.5	1.7	1.3	42.5	42.6	13.5	0.0	7.6	3.3	9.0	20.0
Cycle Q Clear(g_c), s	7.4	8.5	1.7	1.3	42.5	42.6	13.5	0.0	7.6	3.3	9.0	20.0
Prop In Lane	1.00		1.00	1.00		0.07	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	237	1709	962	510	783	814	362	0	437	347	301	381
V/C Ratio(X)	0.84	0.24	0.06	0.07	0.86	0.86	0.67	0.00	0.31	0.17	0.49	0.91
Avail Cap(c_a), veh/h	441	2347	1246	541	930	967	381	0	443	360	301	381
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.9	18.9	9.9	17.2	31.3	31.4	35.5	0.0	38.9	40.1	47.5	45.9
Incr Delay (d2), s/veh	7.7	0.1	0.0	0.1	7.3	7.2	4.1	0.0	0.4	0.2	1.3	26.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	3.5	0.6	0.5	19.4	20.2	6.3	0.0	3.5	1.5	4.3	13.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.6	19.0	10.0	17.3	38.6	38.5	39.6	0.0	39.3	40.3	48.7	71.9
LnGrp LOS	C	B	A	B	D	D	D	A	D	D	D	E
Approach Vol, veh/h		665			1411			377			555	
Approach Delay, s/veh		23.0			38.0			39.5			62.4	
Approach LOS		C			D			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.1	35.6	10.8	65.7	21.6	26.0	15.8	60.7				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	30.0	7.0	82.0	17.0	20.0	24.0	65.0				
Max Q Clear Time (g_c+I1), s	5.3	9.6	3.3	10.5	15.5	22.0	9.4	44.6				
Green Ext Time (p_c), s	0.0	0.6	0.0	3.3	0.1	0.0	0.5	10.1				

Intersection Summary

HCM 6th Ctrl Delay	39.4
HCM 6th LOS	D

HCM 6th Signalized Intersection Summary

2: Normandy Blvd & Elkcam Blvd

09/12/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	315	125	194	68	65	147
Future Volume (veh/h)	315	125	194	68	65	147
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	342	136	211	74	71	160
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	518	461	551	188	524	1487
Arrive On Green	0.29	0.29	0.21	0.21	0.06	0.42
Sat Flow, veh/h	1781	1585	2695	886	1781	3647
Grp Volume(v), veh/h	342	136	142	143	71	160
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1711	1781	1777
Q Serve(g_s), s	4.6	1.8	1.9	2.0	0.7	0.8
Cycle Q Clear(g_c), s	4.6	1.8	1.9	2.0	0.7	0.8
Prop In Lane	1.00	1.00		0.52	1.00	
Lane Grp Cap(c), veh/h	518	461	376	362	524	1487
V/C Ratio(X)	0.66	0.30	0.38	0.39	0.14	0.11
Avail Cap(c_a), veh/h	2917	2596	3427	3300	3008	12546
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.6	7.6	9.3	9.3	6.4	4.9
Incr Delay (d2), s/veh	1.5	0.4	0.6	0.7	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	0.4	0.5	0.6	0.2	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	10.0	7.9	9.9	10.0	6.6	4.9
LnGrp LOS	B	A	A	B	A	A
Approach Vol, veh/h	478		285			231
Approach Delay, s/veh	9.4		10.0			5.4
Approach LOS	A		A			A
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	5.7	9.8			15.5	12.0
Change Period (Y+Rc), s	4.0	4.0			4.0	4.0
Max Green Setting (Gmax), s	40.0	53.0			97.0	45.0
Max Q Clear Time (g_c+I1), s	2.7	4.0			2.8	6.6
Green Ext Time (p_c), s	0.2	1.8			1.1	1.6
Intersection Summary						
HCM 6th Ctrl Delay			8.6			
HCM 6th LOS			A			

HCM 6th Signalized Intersection Summary

3: Normandy Blvd & Graves Ave

09/12/2023

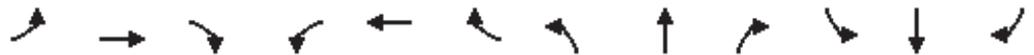


Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↵	↑↑	↵	↵↵
Traffic Volume (veh/h)	238	93	75	354	266	80
Future Volume (veh/h)	238	93	75	354	266	80
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	259	101	82	385	289	87
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	535	1026	340	1147	884	1614
Arrive On Green	0.15	0.15	0.08	0.32	0.50	0.50
Sat Flow, veh/h	3647	1585	1781	3647	1781	2790
Grp Volume(v), veh/h	259	101	82	385	289	87
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1781	1395
Q Serve(g_s), s	4.4	1.6	2.4	5.5	6.5	0.9
Cycle Q Clear(g_c), s	4.4	1.6	2.4	5.5	6.5	0.9
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	535	1026	340	1147	884	1614
V/C Ratio(X)	0.48	0.10	0.24	0.34	0.33	0.05
Avail Cap(c_a), veh/h	2192	1765	944	4010	884	1614
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.9	4.4	19.3	17.1	10.1	6.1
Incr Delay (d2), s/veh	0.7	0.0	0.4	0.2	1.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	1.4	1.0	2.1	2.4	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	26.5	4.5	19.6	17.3	11.0	6.2
LnGrp LOS	C	A	B	B	B	A
Approach Vol, veh/h	360			467	376	
Approach Delay, s/veh	20.4			17.7	9.9	
Approach LOS	C			B	A	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	11.5	16.0			27.5	39.0
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0
Max Green Setting (Gmax), s	28.0	41.0			75.0	33.0
Max Q Clear Time (g_c+I1), s	4.4	6.4			7.5	8.5
Green Ext Time (p_c), s	0.2	2.1			2.9	1.2
Intersection Summary						
HCM 6th Ctrl Delay			16.0			
HCM 6th LOS			B			

HCM Signalized Intersection Capacity Analysis

4: Graves Rd & Howland Blvd

09/12/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↕	↖	↖↗	↕	↖	↖	↖↗	↖	↖	↕	↖
Traffic Volume (vph)	46	434	32	330	1623	10	259	31	175	18	34	35
Future Volume (vph)	46	434	32	330	1623	10	259	31	175	18	34	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1681	1703	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1681	1703	1583	1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	50	472	35	359	1764	11	282	34	190	20	37	38
RTOR Reduction (vph)	0	0	15	0	0	4	0	0	137	0	0	33
Lane Group Flow (vph)	50	472	20	359	1764	7	158	158	53	20	37	5
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	5	2	8	1	6	4	8	8	1	4	4	5
Permitted Phases			2			6			8			4
Actuated Green, G (s)	5.9	59.5	75.8	19.9	73.5	83.9	16.3	16.3	36.2	10.4	10.4	16.3
Effective Green, g (s)	5.9	59.5	75.8	19.9	73.5	83.9	16.3	16.3	36.2	10.4	10.4	16.3
Actuated g/C Ratio	0.05	0.46	0.58	0.15	0.56	0.64	0.13	0.13	0.28	0.08	0.08	0.13
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	155	1618	922	525	1999	1093	210	213	513	141	148	198
v/s Ratio Prot	0.01	0.13	0.00	c0.10	c0.50	0.00	c0.09	0.09	0.02	0.01	c0.02	0.00
v/s Ratio Perm			0.01			0.00			0.02			0.00
v/c Ratio	0.32	0.29	0.02	0.68	0.88	0.01	0.75	0.74	0.10	0.14	0.25	0.02
Uniform Delay, d1	60.2	22.1	11.5	52.1	24.6	8.2	55.0	54.9	34.9	55.7	56.2	49.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.1	0.0	3.7	5.0	0.0	14.1	13.0	0.1	0.5	0.9	0.0
Delay (s)	61.4	22.2	11.5	55.8	29.5	8.2	69.1	67.9	35.0	56.2	57.1	50.0
Level of Service	E	C	B	E	C	A	E	E	C	E	E	D
Approach Delay (s)		25.0			33.8			55.9			54.0	
Approach LOS		C			C			E			D	

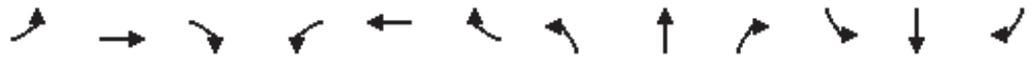
Intersection Summary		
HCM 2000 Control Delay	36.3	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.81	D
Actuated Cycle Length (s)	130.1	Sum of lost time (s)
Intersection Capacity Utilization	80.4%	24.0
Analysis Period (min)	15	ICU Level of Service
		D

c Critical Lane Group

HCM 6th Signalized Intersection Summary

1: Normandy Blvd & Saxon Blvd

09/12/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	510	1476	286	35	701	66	198	200	41	112	190	172
Future Volume (veh/h)	510	1476	286	35	701	66	198	200	41	112	190	172
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	554	1604	311	38	762	72	215	217	45	122	207	187
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	514	1892	1030	160	1281	121	283	290	60	212	240	492
Arrive On Green	0.18	0.53	0.53	0.04	0.39	0.39	0.12	0.19	0.19	0.05	0.13	0.13
Sat Flow, veh/h	1781	3554	1585	1781	3281	310	1781	1503	312	1781	1870	1585
Grp Volume(v), veh/h	554	1604	311	38	412	422	215	0	262	122	207	187
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1815	1781	0	1814	1781	1870	1585
Q Serve(g_s), s	24.0	50.8	11.3	1.6	24.3	24.3	13.4	0.0	18.0	7.0	14.3	12.2
Cycle Q Clear(g_c), s	24.0	50.8	11.3	1.6	24.3	24.3	13.4	0.0	18.0	7.0	14.3	12.2
Prop In Lane	1.00		1.00	1.00		0.17	1.00		0.17	1.00		1.00
Lane Grp Cap(c), veh/h	514	1892	1030	160	693	708	283	0	350	212	240	492
V/C Ratio(X)	1.08	0.85	0.30	0.24	0.59	0.60	0.76	0.00	0.75	0.57	0.86	0.38
Avail Cap(c_a), veh/h	514	2209	1171	184	875	894	304	0	413	212	284	529
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.8	26.3	10.1	26.5	31.9	31.9	42.2	0.0	50.2	48.9	56.3	35.6
Incr Delay (d2), s/veh	62.2	2.9	0.2	0.8	0.8	0.8	9.9	0.0	6.2	3.7	20.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.7	21.6	3.9	0.7	10.6	10.8	6.7	0.0	8.8	0.7	8.1	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	88.0	29.2	10.2	27.3	32.8	32.7	52.1	0.0	56.5	52.6	76.5	36.0
LnGrp LOS	F	C	B	C	C	C	D	A	E	D	E	D
Approach Vol, veh/h		2469			872			477			516	
Approach Delay, s/veh		40.0			32.5			54.5			56.2	
Approach LOS		D			C			D			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	31.4	11.3	76.2	21.5	23.0	30.0	57.5				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	30.0	7.0	82.0	17.0	20.0	24.0	65.0				
Max Q Clear Time (g_c+I1), s	9.0	20.0	3.6	52.8	15.4	16.3	26.0	26.3				
Green Ext Time (p_c), s	0.0	1.0	0.0	17.5	0.1	0.7	0.0	6.3				

Intersection Summary

HCM 6th Ctrl Delay	42.0
HCM 6th LOS	D

HCM 6th Signalized Intersection Summary

2: Normandy Blvd & Elkcam Blvd

09/12/2023



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	206	49	226	253	227	335
Future Volume (veh/h)	206	49	226	253	227	335
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	224	53	246	275	247	364
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	332	296	559	499	619	2049
Arrive On Green	0.19	0.19	0.31	0.31	0.14	0.58
Sat Flow, veh/h	1781	1585	1870	1585	1781	3647
Grp Volume(v), veh/h	224	53	246	275	247	364
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1585	1781	1777
Q Serve(g_s), s	3.9	0.9	3.7	4.9	2.6	1.6
Cycle Q Clear(g_c), s	3.9	0.9	3.7	4.9	2.6	1.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	332	296	559	499	619	2049
V/C Ratio(X)	0.67	0.18	0.44	0.55	0.40	0.18
Avail Cap(c_a), veh/h	2375	2113	2790	2489	2475	10212
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.8	11.6	9.2	9.6	5.5	3.4
Incr Delay (d2), s/veh	2.4	0.3	0.5	1.0	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.3	1.1	1.3	0.5	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.2	11.8	9.7	10.5	6.0	3.4
LnGrp LOS	B	B	A	B	A	A
Approach Vol, veh/h	277		521			611
Approach Delay, s/veh	14.5		10.2			4.4
Approach LOS	B		B			A
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	8.8	14.6			23.5	10.3
Change Period (Y+Rc), s	4.0	4.0			4.0	4.0
Max Green Setting (Gmax), s	40.0	53.0			97.0	45.0
Max Q Clear Time (g_c+I1), s	4.6	6.9			3.6	5.9
Green Ext Time (p_c), s	0.7	3.8			2.7	0.9
Intersection Summary						
HCM 6th Ctrl Delay			8.5			
HCM 6th LOS			A			

HCM 6th Signalized Intersection Summary

3: Normandy Blvd & Graves Ave

09/12/2023



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↵	↑↑	↵	↗↗
Traffic Volume (veh/h)	551	364	200	395	168	55
Future Volume (veh/h)	551	364	200	395	168	55
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	599	396	217	429	183	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	895	1048	352	1570	729	1464
Arrive On Green	0.25	0.25	0.12	0.44	0.41	0.41
Sat Flow, veh/h	3647	1585	1781	3647	1781	2790
Grp Volume(v), veh/h	599	396	217	429	183	60
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1781	1395
Q Serve(g_s), s	12.2	9.1	6.8	6.2	5.5	0.8
Cycle Q Clear(g_c), s	12.2	9.1	6.8	6.2	5.5	0.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	895	1048	352	1570	729	1464
V/C Ratio(X)	0.67	0.38	0.62	0.27	0.25	0.04
Avail Cap(c_a), veh/h	1808	1455	765	3307	729	1464
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.1	6.2	19.0	14.3	15.7	9.3
Incr Delay (d2), s/veh	0.9	0.2	1.8	0.1	0.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	7.4	2.8	2.4	2.3	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	28.0	6.4	20.8	14.4	16.5	9.4
LnGrp LOS	C	A	C	B	B	A
Approach Vol, veh/h	995			646	243	
Approach Delay, s/veh	19.4			16.5	14.7	
Approach LOS	B			B	B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	15.3	26.3			41.6	39.0
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0
Max Green Setting (Gmax), s	28.0	41.0			75.0	33.0
Max Q Clear Time (g_c+I1), s	8.8	14.2			8.2	7.5
Green Ext Time (p_c), s	0.6	6.1			3.2	0.7

Intersection Summary

HCM 6th Ctrl Delay	17.8
HCM 6th LOS	B

HCM Signalized Intersection Capacity Analysis

4: Graves Rd & Howland Blvd

09/12/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↕	↖	↖↗	↕	↖	↖	↖	↖	↖	↖	↖
Traffic Volume (vph)	54	29	18	349	840	18	85	19	613	54	29	18
Future Volume (vph)	54	29	18	349	840	18	85	19	613	54	29	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1681	1715	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1681	1715	1583	1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	59	32	20	379	913	20	92	21	666	59	32	20
RTOR Reduction (vph)	0	0	15	0	0	10	0	0	349	0	0	16
Lane Group Flow (vph)	59	32	5	379	913	10	56	57	317	59	32	4
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	5	2	8	1	6	4	8	8	1	4	4	5
Permitted Phases			2			6			8			4
Actuated Green, G (s)	5.6	8.2	18.8	28.3	30.9	41.5	10.6	10.6	38.9	10.6	10.6	16.2
Effective Green, g (s)	5.6	8.2	18.8	28.3	30.9	41.5	10.6	10.6	38.9	10.6	10.6	16.2
Actuated g/C Ratio	0.07	0.10	0.23	0.35	0.38	0.51	0.13	0.13	0.48	0.13	0.13	0.20
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	235	355	364	1189	1338	920	218	222	869	229	241	313
v/s Ratio Prot	0.02	0.01	0.00	0.11	c0.26	0.00	0.03	0.03	c0.13	c0.03	0.02	0.00
v/s Ratio Perm			0.00			0.00			0.07			0.00
v/c Ratio	0.25	0.09	0.01	0.32	0.68	0.01	0.26	0.26	0.36	0.26	0.13	0.01
Uniform Delay, d1	36.1	33.4	24.3	19.6	21.3	9.9	32.0	32.0	13.6	32.0	31.5	26.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.1	0.0	0.2	1.5	0.0	0.6	0.6	0.3	0.6	0.3	0.0
Delay (s)	36.6	33.5	24.3	19.8	22.7	10.0	32.6	32.6	13.8	32.6	31.7	26.3
Level of Service	D	C	C	B	C	A	C	C	B	C	C	C
Approach Delay (s)		33.5			21.7			16.6			31.2	
Approach LOS		C			C			B			C	

Intersection Summary		
HCM 2000 Control Delay	21.0	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.57	
Actuated Cycle Length (s)	81.7	Sum of lost time (s) 24.0
Intersection Capacity Utilization	69.6%	ICU Level of Service C
Analysis Period (min)	15	

c Critical Lane Group

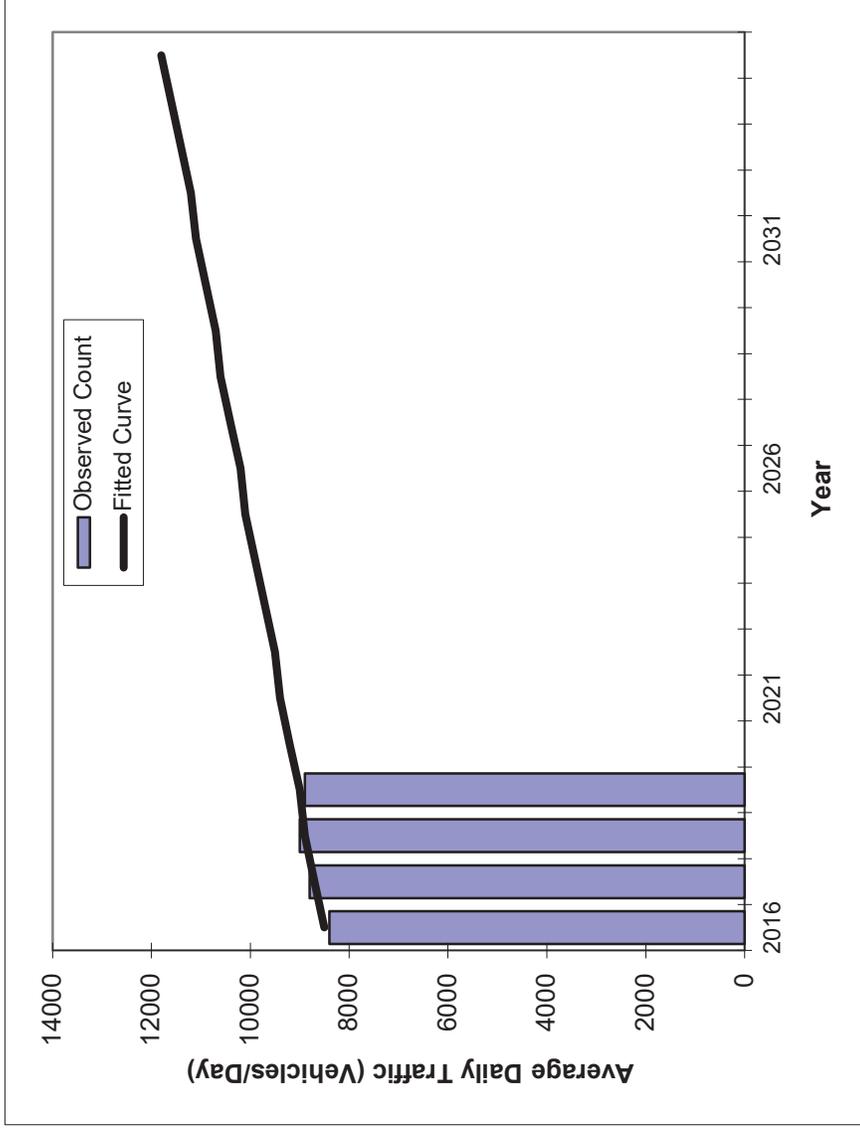
Appendix F: Historical Trends Analysis

Traffic Trends - V3.0

NORMANDY BLVD -- N OF ELKCAM BLVD

FIN# 0
Location 1

County: Orange (75)
Station #: 750592
Highway: NORMANDY BLVD



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2016	8400	8500
2017	8800	8700
2018	9000	8900
2019	8900	9000
2023 Opening Year Trend		
2023	N/A	9700
2024 Mid-Year Trend		
2024	N/A	9900
2026 Design Year Trend		
2026	N/A	10200
TRANPLAN Forecasts/Trends		

**** Annual Trend Increase:** 170
Trend R-squared: 69.64%
Trend Annual Historic Growth Rate: 1.96%
Trend Growth Rate (2019 to Design Year): 1.90%
Printed: 04-Apr-23

Straight Line Growth Option

*Axle-Adjusted

FLORIDA DEPARTMENT OF TRANSPORTATION
 TRANSPORTATION STATISTICS OFFICE
 2021 HISTORICAL AADT REPORT

COUNTY: 79 - VOLUSIA

SITE: 7060 - NORMANDY BLVD, 0.3 MI N OF ELKCAM BLVD, (HPMS)

YEAR	AADT	DIRECTION 1	DIRECTION 2	*K FACTOR	D FACTOR	T FACTOR
2021	8700 S	N 4400	S 4300	9.00	58.20	1.70
2020	8700 F	N 4400	S 4300	9.00	58.70	1.70
2019	8900 C	N 4500	S 4400	9.00	59.00	1.70
2018	9000 S	N 4500	S 4500	9.00	60.00	1.80
2017	8800 F	N 4400	S 4400	9.00	60.90	1.80
2016	8400 C	N 4200	S 4200	9.00	61.40	1.80
2015	5750 E			9.00	60.20	3.60
2014	5700 S	N 2800	S 2900	9.00	59.20	3.00
2013	5700 F	N 2800	S 2900	9.00	61.00	3.00
2012	5700 C	N 2800	S 2900	9.00	61.90	3.00
2010	6800 C	N 2900	S 3900	10.39	62.46	3.10
2009	5400 C	N 2600	S 2800	10.54	62.19	3.70

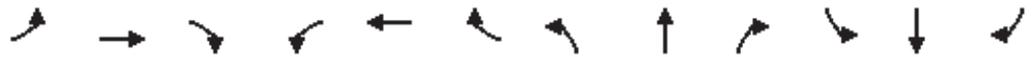
AADT FLAGS: C = COMPUTED; E = MANUAL ESTIMATE; F = FIRST YEAR ESTIMATE
 S = SECOND YEAR ESTIMATE; T = THIRD YEAR ESTIMATE; R = FOURTH YEAR ESTIMATE
 V = FIFTH YEAR ESTIMATE; 6 = SIXTH YEAR ESTIMATE; X = UNKNOWN
 *K FACTOR: STARTING WITH YEAR 2011 IS STANDARDK, PRIOR YEARS ARE K30 VALUES

Appendix G: Projected Intersection Analysis Output

HCM 6th Signalized Intersection Summary

1: Normandy Blvd & Saxon Blvd

07/09/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	263	402	53	33	1295	61	235	143	15	66	164	393
Future Volume (veh/h)	263	402	53	33	1295	61	235	143	15	66	164	393
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	286	437	58	36	1408	66	255	155	16	72	178	427
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	311	1909	1039	512	1515	71	301	354	37	292	261	437
Arrive On Green	0.14	0.54	0.54	0.04	0.44	0.44	0.12	0.21	0.21	0.05	0.14	0.14
Sat Flow, veh/h	1781	3554	1585	1781	3456	162	1781	1667	172	1781	1870	1585
Grp Volume(v), veh/h	286	437	58	36	722	752	255	0	171	72	178	427
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1841	1781	0	1839	1781	1870	1585
Q Serve(g_s), s	17.1	9.3	1.9	1.6	55.1	55.5	17.0	0.0	11.6	4.9	13.0	20.0
Cycle Q Clear(g_c), s	17.1	9.3	1.9	1.6	55.1	55.5	17.0	0.0	11.6	4.9	13.0	20.0
Prop In Lane	1.00		1.00	1.00		0.09	1.00		0.09	1.00		1.00
Lane Grp Cap(c), veh/h	311	1909	1039	512	779	807	301	0	390	292	261	437
V/C Ratio(X)	0.92	0.23	0.06	0.07	0.93	0.93	0.85	0.00	0.44	0.25	0.68	0.98
Avail Cap(c_a), veh/h	367	2033	1095	533	806	835	301	0	390	297	261	437
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.5	17.5	8.8	20.1	38.1	38.2	45.8	0.0	49.0	49.5	58.6	51.5
Incr Delay (d2), s/veh	25.5	0.1	0.0	0.1	16.5	16.6	19.4	0.0	0.8	0.4	7.1	37.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.4	3.9	0.7	0.7	27.3	28.5	9.4	0.0	5.5	2.2	6.7	19.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.0	17.6	8.8	20.2	54.6	54.8	65.2	0.0	49.8	50.0	65.7	88.5
LnGrp LOS	E	B	A	C	D	D	E	A	D	D	E	F
Approach Vol, veh/h		781			1510			426			677	
Approach Delay, s/veh		36.1			53.9			59.1			78.4	
Approach LOS		D			D			E			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.6	36.4	11.3	83.0	23.0	26.0	25.5	68.8				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	30.0	7.0	82.0	17.0	20.0	24.0	65.0				
Max Q Clear Time (g_c+I1), s	6.9	13.6	3.6	11.3	19.0	22.0	19.1	57.5				
Green Ext Time (p_c), s	0.0	0.8	0.0	3.5	0.0	0.0	0.4	5.3				
Intersection Summary												
HCM 6th Ctrl Delay			55.3									
HCM 6th LOS			E									

HCM 6th Signalized Intersection Summary

2: Normandy Blvd & Elkcam Blvd

07/09/2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	334	158	314	72	88	240
Future Volume (veh/h)	334	158	314	72	88	240
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	363	172	341	78	96	261
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	528	470	728	165	502	1603
Arrive On Green	0.30	0.30	0.25	0.25	0.07	0.45
Sat Flow, veh/h	1781	1585	2973	650	1781	3647
Grp Volume(v), veh/h	363	172	209	210	96	261
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1753	1781	1777
Q Serve(g_s), s	5.7	2.7	3.2	3.2	1.1	1.4
Cycle Q Clear(g_c), s	5.7	2.7	3.2	3.2	1.1	1.4
Prop In Lane	1.00	1.00		0.37	1.00	
Lane Grp Cap(c), veh/h	528	470	449	443	502	1603
V/C Ratio(X)	0.69	0.37	0.46	0.47	0.19	0.16
Avail Cap(c_a), veh/h	2529	2250	2971	2931	2621	10874
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.9	8.8	10.0	10.1	6.8	5.2
Incr Delay (d2), s/veh	1.6	0.5	0.7	0.8	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.7	1.0	1.0	0.3	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.5	9.3	10.8	10.8	6.9	5.2
LnGrp LOS	B	A	B	B	A	A
Approach Vol, veh/h	535		419			357
Approach Delay, s/veh	10.8		10.8			5.7
Approach LOS	B		B			A
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	6.3	12.0			18.3	13.4
Change Period (Y+Rc), s	4.0	4.0			4.0	4.0
Max Green Setting (Gmax), s	40.0	53.0			97.0	45.0
Max Q Clear Time (g_c+I1), s	3.1	5.2			3.4	7.7
Green Ext Time (p_c), s	0.3	2.8			1.9	1.8
Intersection Summary						
HCM 6th Ctrl Delay			9.4			
HCM 6th LOS			A			

HCM 6th Signalized Intersection Summary

3: Normandy Blvd & Graves Ave

07/09/2024

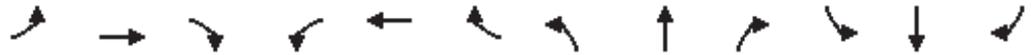


Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↵	↑↑	↵	↵↵
Traffic Volume (veh/h)	252	140	155	375	314	144
Future Volume (veh/h)	252	140	155	375	314	144
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	274	152	168	408	341	157
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	521	999	366	1210	862	1645
Arrive On Green	0.15	0.15	0.11	0.34	0.48	0.48
Sat Flow, veh/h	3647	1585	1781	3647	1781	2790
Grp Volume(v), veh/h	274	152	168	408	341	157
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1781	1395
Q Serve(g_s), s	4.9	2.7	5.1	5.8	8.3	1.7
Cycle Q Clear(g_c), s	4.9	2.7	5.1	5.8	8.3	1.7
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	521	999	366	1210	862	1645
V/C Ratio(X)	0.53	0.15	0.46	0.34	0.40	0.10
Avail Cap(c_a), veh/h	2136	1719	909	3907	862	1645
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.9	5.2	19.8	16.8	11.2	6.1
Incr Delay (d2), s/veh	0.8	0.1	0.9	0.2	1.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	2.3	2.1	2.2	3.2	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	27.7	5.2	20.7	16.9	12.6	6.2
LnGrp LOS	C	A	C	B	B	A
Approach Vol, veh/h	426			576	498	
Approach Delay, s/veh	19.7			18.0	10.6	
Approach LOS	B			B	B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	13.2	16.0			29.2	39.0
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0
Max Green Setting (Gmax), s	28.0	41.0			75.0	33.0
Max Q Clear Time (g_c+I1), s	7.1	6.9			7.8	10.3
Green Ext Time (p_c), s	0.4	2.4			3.1	1.7
Intersection Summary						
HCM 6th Ctrl Delay			16.0			
HCM 6th LOS			B			

HCM Signalized Intersection Capacity Analysis

4: Graves Rd & Howland Blvd

07/09/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	460	60	350	1720	11	308	33	186	19	36	78
Future Volume (vph)	81	460	60	350	1720	11	308	33	186	19	36	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1681	1701	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1681	1701	1583	1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	88	500	65	380	1870	12	335	36	202	21	39	85
RTOR Reduction (vph)	0	0	26	0	0	4	0	0	145	0	0	73
Lane Group Flow (vph)	88	500	39	380	1870	8	184	187	57	21	39	12
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	5	2	8	1	6	4	8	8	1	4	4	5
Permitted Phases			2			6			8			4
Actuated Green, G (s)	9.0	65.7	83.4	21.3	78.0	88.3	17.7	17.7	39.0	10.3	10.3	19.3
Effective Green, g (s)	9.0	65.7	83.4	21.3	78.0	88.3	17.7	17.7	39.0	10.3	10.3	19.3
Actuated g/C Ratio	0.06	0.47	0.60	0.15	0.56	0.64	0.13	0.13	0.28	0.07	0.07	0.14
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	222	1672	949	526	1985	1073	214	216	512	131	138	219
v/s Ratio Prot	0.03	0.14	0.01	c0.11	c0.53	0.00	0.11	c0.11	0.02	0.01	c0.02	0.00
v/s Ratio Perm			0.02			0.00			0.02			0.00
v/c Ratio	0.40	0.30	0.04	0.72	0.94	0.01	0.86	0.87	0.11	0.16	0.28	0.05
Uniform Delay, d1	62.4	22.5	11.4	56.0	28.4	9.3	59.4	59.5	37.1	60.3	60.9	51.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.1	0.0	4.9	9.7	0.0	27.3	28.4	0.1	0.6	1.1	0.1
Delay (s)	63.6	22.6	11.4	60.9	38.1	9.3	86.8	87.9	37.2	60.9	62.0	52.0
Level of Service	E	C	B	E	D	A	F	F	D	E	E	D
Approach Delay (s)		27.0			41.8			69.7			56.0	
Approach LOS		C			D			E			E	

Intersection Summary		
HCM 2000 Control Delay	44.1	HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio	0.88	
Actuated Cycle Length (s)	139.0	Sum of lost time (s) 24.0
Intersection Capacity Utilization	84.4%	ICU Level of Service E
Analysis Period (min)	15	

c Critical Lane Group

HCM 6th TWSC
5: Ameila Ave & Normandy Blvd

07/09/2024

Intersection						
Int Delay, s/veh	2.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	52	28	367	33	72	250
Future Vol, veh/h	52	28	367	33	72	250
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	57	30	399	36	78	272

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	845	417	0	0	435
Stage 1	417	-	-	-	-
Stage 2	428	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	333	636	-	-	1125
Stage 1	665	-	-	-	-
Stage 2	657	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	306	636	-	-	1125
Mov Cap-2 Maneuver	306	-	-	-	-
Stage 1	665	-	-	-	-
Stage 2	603	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17.5	0	1.9
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	374	1125
HCM Lane V/C Ratio	-	-	0.233	0.07
HCM Control Delay (s)	-	-	17.5	8.4
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	0.9	0.2

HCM 6th TWSC
6: Normany Blvd & Access (N)

07/09/2024

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↘			↑
Traffic Vol, veh/h	0	28	400	33	0	302
Future Vol, veh/h	0	28	400	33	0	302
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	30	435	36	0	328

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	453	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	607	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	607	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	607
HCM Lane V/C Ratio	-	-	0.05
HCM Control Delay (s)	-	-	11.2
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.2

HCM 6th TWSC
7: Normany Blvd & Access (Main)

07/09/2024

Intersection						
Int Delay, s/veh	2.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	52	28	434	33	72	230
Future Vol, veh/h	52	28	434	33	72	230
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	57	30	472	36	78	250

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	896	490	0	0	508
Stage 1	490	-	-	-	-
Stage 2	406	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	311	578	-	-	1057
Stage 1	616	-	-	-	-
Stage 2	673	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	284	578	-	-	1057
Mov Cap-2 Maneuver	284	-	-	-	-
Stage 1	616	-	-	-	-
Stage 2	615	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	18.9	0	2.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	346	1057
HCM Lane V/C Ratio	-	-	0.251	0.074
HCM Control Delay (s)	-	-	18.9	8.7
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	1	0.2

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↘			↑
Traffic Vol, veh/h	0	28	467	33	0	282
Future Vol, veh/h	0	28	467	33	0	282
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	30	508	36	0	307

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	526	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	552	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	552	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	552
HCM Lane V/C Ratio	-	-	0.055
HCM Control Delay (s)	-	-	11.9
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.2

HCM 6th Signalized Intersection Summary

1: Normandy Blvd & Saxon Blvd

07/09/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	588	1565	303	37	743	79	210	229	43	132	224	246
Future Volume (veh/h)	588	1565	303	37	743	79	210	229	43	132	224	246
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	639	1701	329	40	808	86	228	249	47	143	243	267
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	652	1972	1022	149	847	90	231	293	55	174	281	765
Arrive On Green	0.33	0.56	0.56	0.04	0.26	0.26	0.09	0.19	0.19	0.05	0.15	0.15
Sat Flow, veh/h	1781	3554	1585	1781	3240	345	1781	1530	289	1781	1870	1585
Grp Volume(v), veh/h	639	1701	329	40	443	451	228	0	296	143	243	267
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1808	1781	0	1818	1781	1870	1585
Q Serve(g_s), s	46.4	59.0	13.4	2.3	35.4	35.4	13.0	0.0	22.7	7.0	18.3	15.1
Cycle Q Clear(g_c), s	46.4	59.0	13.4	2.3	35.4	35.4	13.0	0.0	22.7	7.0	18.3	15.1
Prop In Lane	1.00		1.00	1.00		0.19	1.00		0.16	1.00		1.00
Lane Grp Cap(c), veh/h	652	1972	1022	149	465	473	231	0	349	174	281	765
V/C Ratio(X)	0.98	0.86	0.32	0.27	0.95	0.95	0.99	0.00	0.85	0.82	0.87	0.35
Avail Cap(c_a), veh/h	652	1972	1022	179	467	476	231	0	415	174	350	823
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.2	27.4	11.5	37.4	52.5	52.5	50.9	0.0	56.4	56.4	60.0	23.3
Incr Delay (d2), s/veh	30.3	4.2	0.2	0.9	30.0	29.7	55.6	0.0	13.4	26.4	16.8	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	28.0	25.6	4.8	1.1	19.6	20.0	5.6	0.0	11.7	3.1	10.0	5.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.4	31.6	11.7	38.3	82.5	82.2	106.5	0.0	69.7	82.8	76.8	23.5
LnGrp LOS	E	C	B	D	F	F	F	A	E	F	E	C
Approach Vol, veh/h		2669			934			524				653
Approach Delay, s/veh		38.5			80.5			85.7				56.3
Approach LOS		D			F			F				E
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	33.7	11.6	86.2	19.0	27.7	54.0	43.8				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	33.0	8.0	78.0	13.0	27.0	48.0	38.0				
Max Q Clear Time (g_c+I1), s	9.0	24.7	4.3	61.0	15.0	20.3	48.4	37.4				
Green Ext Time (p_c), s	0.0	1.1	0.0	12.6	0.0	1.4	0.0	0.3				

Intersection Summary

HCM 6th Ctrl Delay	54.3
HCM 6th LOS	D

HCM 6th Signalized Intersection Summary

2: Normandy Blvd & Elkcam Blvd

07/09/2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↷	↶↷		↶	↶↷
Traffic Volume (veh/h)	218	69	312	268	264	454
Future Volume (veh/h)	218	69	312	268	264	454
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	237	75	339	291	287	493
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	347	308	607	512	609	2111
Arrive On Green	0.19	0.19	0.33	0.33	0.16	0.59
Sat Flow, veh/h	1781	1585	1922	1541	1781	3647
Grp Volume(v), veh/h	237	75	329	301	287	493
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1593	1781	1777
Q Serve(g_s), s	4.7	1.5	5.7	5.9	3.3	2.5
Cycle Q Clear(g_c), s	4.7	1.5	5.7	5.9	3.3	2.5
Prop In Lane	1.00	1.00		0.97	1.00	
Lane Grp Cap(c), veh/h	347	308	590	529	609	2111
V/C Ratio(X)	0.68	0.24	0.56	0.57	0.47	0.23
Avail Cap(c_a), veh/h	2119	1885	2489	2231	2214	9110
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.2	12.9	10.4	10.4	6.0	3.6
Incr Delay (d2), s/veh	2.4	0.4	0.8	1.0	0.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.5	1.8	1.7	0.7	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.5	13.3	11.2	11.4	6.6	3.7
LnGrp LOS	B	B	B	B	A	A
Approach Vol, veh/h	312		630			780
Approach Delay, s/veh	15.8		11.3			4.8
Approach LOS	B		B			A
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.9	16.6			26.5	11.4
Change Period (Y+Rc), s	4.0	4.0			4.0	4.0
Max Green Setting (Gmax), s	40.0	53.0			97.0	45.0
Max Q Clear Time (g_c+I1), s	5.3	7.9			4.5	6.7
Green Ext Time (p_c), s	0.9	4.7			3.8	1.0
Intersection Summary						
HCM 6th Ctrl Delay			9.1			
HCM 6th LOS			A			

HCM 6th Signalized Intersection Summary

3: Normandy Blvd & Graves Ave

07/09/2024

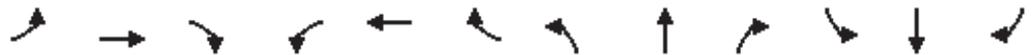


Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↵	↑↑	↵	↵↵
Traffic Volume (veh/h)	584	414	262	419	216	127
Future Volume (veh/h)	584	414	262	419	216	127
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	635	450	285	455	235	138
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	930	1027	389	1682	688	1472
Arrive On Green	0.26	0.26	0.14	0.47	0.39	0.39
Sat Flow, veh/h	3647	1585	1781	3647	1781	2790
Grp Volume(v), veh/h	635	450	285	455	235	138
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1781	1395
Q Serve(g_s), s	13.7	11.9	9.3	6.6	8.0	2.1
Cycle Q Clear(g_c), s	13.7	11.9	9.3	6.6	8.0	2.1
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	930	1027	389	1682	688	1472
V/C Ratio(X)	0.68	0.44	0.73	0.27	0.34	0.09
Avail Cap(c_a), veh/h	1706	1373	721	3120	688	1472
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.4	7.4	19.4	13.6	18.5	10.0
Incr Delay (d2), s/veh	0.9	0.3	2.7	0.1	1.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	9.3	3.9	2.5	3.4	0.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	29.3	7.7	22.1	13.7	19.9	10.1
LnGrp LOS	C	A	C	B	B	B
Approach Vol, veh/h	1085			740	373	
Approach Delay, s/veh	20.3			16.9	16.3	
Approach LOS	C			B	B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	18.1	28.3			46.4	39.0
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0
Max Green Setting (Gmax), s	28.0	41.0			75.0	33.0
Max Q Clear Time (g_c+I1), s	11.3	15.7			8.6	10.0
Green Ext Time (p_c), s	0.8	6.6			3.5	1.2
Intersection Summary						
HCM 6th Ctrl Delay			18.5			
HCM 6th LOS			B			

HCM Signalized Intersection Capacity Analysis

4: Graves Rd & Howland Blvd

07/09/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↕	↖	↖↗	↕	↖	↖	↖	↖	↖	↖	↖
Traffic Volume (vph)	95	31	50	370	890	19	112	20	650	57	31	47
Future Volume (vph)	95	31	50	370	890	19	112	20	650	57	31	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1681	1710	1583	1770	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1681	1710	1583	1770	1863	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	34	54	402	967	21	122	22	707	62	34	51
RTOR Reduction (vph)	0	0	42	0	0	10	0	0	335	0	0	40
Lane Group Flow (vph)	103	34	12	402	967	11	72	72	372	62	34	11
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Split	NA	pm+ov	Split	NA	pm+ov
Protected Phases	5	2	8	1	6	4	8	8	1	4	4	5
Permitted Phases			2			6			8			4
Actuated Green, G (s)	8.4	9.7	20.6	34.8	36.1	46.6	10.9	10.9	45.7	10.5	10.5	18.9
Effective Green, g (s)	8.4	9.7	20.6	34.8	36.1	46.6	10.9	10.9	45.7	10.5	10.5	18.9
Actuated g/C Ratio	0.09	0.11	0.23	0.39	0.40	0.52	0.12	0.12	0.51	0.12	0.12	0.21
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	320	381	362	1328	1421	926	203	207	910	206	217	332
v/s Ratio Prot	0.03	0.01	0.00	0.12	c0.27	0.00	0.04	0.04	c0.16	c0.04	0.02	0.00
v/s Ratio Perm			0.00			0.01			0.08			0.00
v/c Ratio	0.32	0.09	0.03	0.30	0.68	0.01	0.35	0.35	0.41	0.30	0.16	0.03
Uniform Delay, d1	38.1	36.1	26.9	19.1	22.2	10.5	36.3	36.2	13.7	36.3	35.7	28.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.1	0.0	0.1	1.4	0.0	1.1	1.0	0.3	0.8	0.3	0.0
Delay (s)	38.7	36.2	27.0	19.3	23.5	10.5	37.3	37.3	14.0	37.2	36.1	28.3
Level of Service	D	D	C	B	C	B	D	D	B	D	D	C
Approach Delay (s)		34.9			22.1			18.0			33.8	
Approach LOS		C			C			B			C	

Intersection Summary		
HCM 2000 Control Delay	22.3	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.60	
Actuated Cycle Length (s)	89.9	Sum of lost time (s) 24.0
Intersection Capacity Utilization	71.9%	ICU Level of Service C
Analysis Period (min)	15	

c Critical Lane Group

HCM 6th TWSC
5: Ameila Ave & Normandy Blvd

07/09/2024

Intersection						
Int Delay, s/veh	2.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	TT		TT			TT
Traffic Vol, veh/h	61	33	236	22	49	647
Future Vol, veh/h	61	33	236	22	49	647
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	66	36	257	24	53	703

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1078	269	0	0	281
Stage 1	269	-	-	-	-
Stage 2	809	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	242	770	-	-	1282
Stage 1	776	-	-	-	-
Stage 2	438	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	226	770	-	-	1282
Mov Cap-2 Maneuver	226	-	-	-	-
Stage 1	776	-	-	-	-
Stage 2	408	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	23	0	0.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	301	1282
HCM Lane V/C Ratio	-	-	0.339	0.042
HCM Control Delay (s)	-	-	23	7.9
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	1.5	0.1

HCM 6th TWSC
6: Normany Blvd & Access (N)

07/09/2024

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↖			↗
Traffic Vol, veh/h	0	33	258	22	0	708
Future Vol, veh/h	0	33	258	22	0	708
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	36	280	24	0	770

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	292	0	0	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-
Pot Cap-1 Maneuver	0	747	-	-	0
Stage 1	0	-	-	-	0
Stage 2	0	-	-	-	0
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	-	747	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.1	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	747
HCM Lane V/C Ratio	-	-	0.048
HCM Control Delay (s)	-	-	10.1
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.2

HCM 6th TWSC
7: Normany Blvd & Access (Main)

07/09/2024

Intersection						
Int Delay, s/veh	2.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	61	33	280	22	49	659
Future Vol, veh/h	61	33	280	22	49	659
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	66	36	304	24	53	716

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1138	316	0	0	328
Stage 1	316	-	-	-	-
Stage 2	822	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12
Critical Hdwy Stg 1	5.42	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218
Pot Cap-1 Maneuver	223	724	-	-	1232
Stage 1	739	-	-	-	-
Stage 2	432	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	207	724	-	-	1232
Mov Cap-2 Maneuver	207	-	-	-	-
Stage 1	739	-	-	-	-
Stage 2	401	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	25.5	0	0.6
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	276	1232
HCM Lane V/C Ratio	-	-	0.37	0.043
HCM Control Delay (s)	-	-	25.5	8.1
HCM Lane LOS	-	-	D	A
HCM 95th %tile Q(veh)	-	-	1.6	0.1

HCM 6th TWSC
8: Access(S) & Normany Blvd

07/09/2024

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↘			↑
Traffic Vol, veh/h	0	33	302	22	0	720
Future Vol, veh/h	0	33	302	22	0	720
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	36	328	24	0	783

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	-	340	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	-	-
Pot Cap-1 Maneuver	0	702	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-	-	-
Mov Cap-1 Maneuver	-	702	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	-	702
HCM Lane V/C Ratio	-	-	0.051
HCM Control Delay (s)	-	-	10.4
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.2

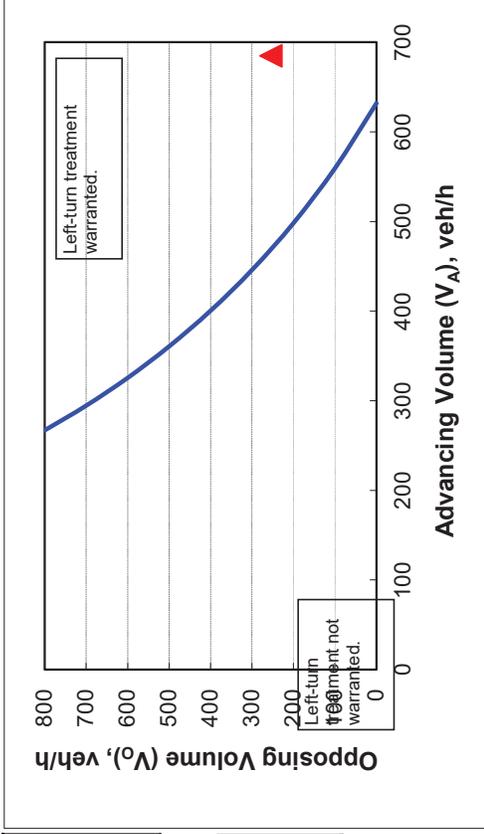
Appendix H: Turn Lane Analysis

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

2-lane roadway (English)

INPUT	
Variable	Value
85 th percentile speed, mph:	45
Percent of left-turns in advancing volume (V_A), %:	7%
Advancing volume (V_A), veh/h:	685
Opposing volume (V_O), veh/h:	254

OUTPUT	
Variable	Value
Limiting advancing volume (V_A), veh/h:	469
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



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

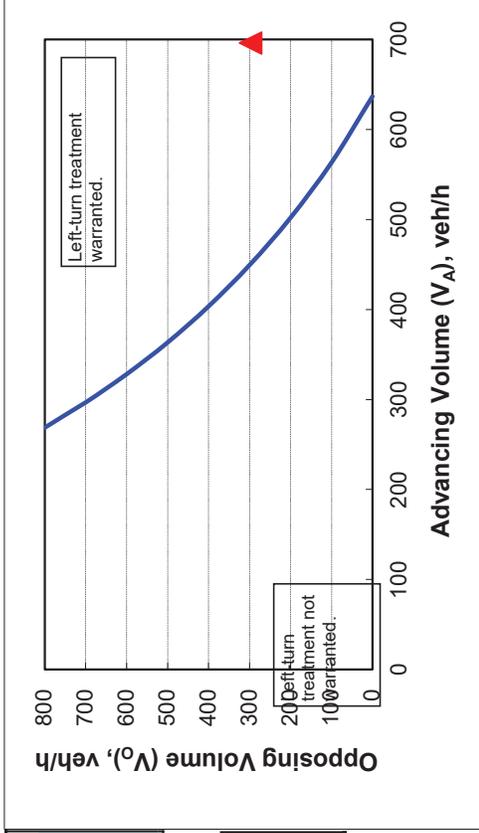
Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

2-lane roadway (English)

INPUT	
Variable	Value
85 th percentile speed, mph:	45
Percent of left-turns in advancing volume (V_A), %:	7%
Advancing volume (V_A), veh/h:	696
Opposing volume (V_O), veh/h:	298

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	450
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

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

Appendix I: Intersection Queue Analysis

HCM 6th Signalized Intersection Summary

1: Normandy Blvd & Saxon Blvd

07/10/2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	588	1565	303	37	743	79	210	229	43	132	224	246
Future Volume (veh/h)	588	1565	303	37	743	79	210	229	43	132	224	246
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	639	1701	329	40	808	86	228	249	47	143	243	267
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	652	1972	1022	149	847	90	231	293	55	174	281	765
Arrive On Green	0.33	0.56	0.56	0.04	0.26	0.26	0.09	0.19	0.19	0.05	0.15	0.15
Sat Flow, veh/h	1781	3554	1585	1781	3240	345	1781	1530	289	1781	1870	1585
Grp Volume(v), veh/h	639	1701	329	40	443	451	228	0	296	143	243	267
Grp Sat Flow(s),veh/h/ln	1781	1777	1585	1781	1777	1808	1781	0	1818	1781	1870	1585
Q Serve(g_s), s	46.4	59.0	13.4	2.3	35.4	35.4	13.0	0.0	22.7	7.0	18.3	15.1
Cycle Q Clear(g_c), s	46.4	59.0	13.4	2.3	35.4	35.4	13.0	0.0	22.7	7.0	18.3	15.1
Prop In Lane	1.00		1.00	1.00		0.19	1.00		0.16	1.00		1.00
Lane Grp Cap(c), veh/h	652	1972	1022	149	465	473	231	0	349	174	281	765
V/C Ratio(X)	0.98	0.86	0.32	0.27	0.95	0.95	0.99	0.00	0.85	0.82	0.87	0.35
Avail Cap(c_a), veh/h	652	1972	1022	179	467	476	231	0	415	174	350	823
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.2	27.4	11.5	37.4	52.5	52.5	50.9	0.0	56.4	56.4	60.0	23.3
Incr Delay (d2), s/veh	30.3	4.2	0.2	0.9	30.0	29.7	55.6	0.0	13.4	26.4	16.8	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	36.6	33.8	8.3	1.9	26.9	27.3	9.5	0.0	17.4	5.6	15.2	9.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.4	31.6	11.7	38.3	82.5	82.2	106.5	0.0	69.7	82.8	76.8	23.5
LnGrp LOS	E	C	B	D	F	F	F	A	E	F	E	C
Approach Vol, veh/h		2669			934			524				653
Approach Delay, s/veh		38.5			80.5			85.7				56.3
Approach LOS		D			F			F				E
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.0	33.7	11.6	86.2	19.0	27.7	54.0	43.8				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0				
Max Green Setting (Gmax), s	7.0	33.0	8.0	78.0	13.0	27.0	48.0	38.0				
Max Q Clear Time (g_c+I1), s	9.0	24.7	4.3	61.0	15.0	20.3	48.4	37.4				
Green Ext Time (p_c), s	0.0	1.1	0.0	12.6	0.0	1.4	0.0	0.3				

Intersection Summary

HCM 6th Ctrl Delay	54.3
HCM 6th LOS	D

HCM 6th Signalized Intersection Summary

2: Normandy Blvd & Elkcam Blvd

07/10/2024



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	218	69	312	268	264	454
Future Volume (veh/h)	218	69	312	268	264	454
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	237	75	339	291	287	493
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	347	308	607	512	609	2111
Arrive On Green	0.19	0.19	0.33	0.33	0.16	0.59
Sat Flow, veh/h	1781	1585	1922	1541	1781	3647
Grp Volume(v), veh/h	237	75	329	301	287	493
Grp Sat Flow(s),veh/h/ln	1781	1585	1777	1593	1781	1777
Q Serve(g_s), s	4.7	1.5	5.7	5.9	3.3	2.5
Cycle Q Clear(g_c), s	4.7	1.5	5.7	5.9	3.3	2.5
Prop In Lane	1.00	1.00		0.97	1.00	
Lane Grp Cap(c), veh/h	347	308	590	529	609	2111
V/C Ratio(X)	0.68	0.24	0.56	0.57	0.47	0.23
Avail Cap(c_a), veh/h	2119	1885	2489	2231	2214	9110
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.2	12.9	10.4	10.4	6.0	3.6
Incr Delay (d2), s/veh	2.4	0.4	0.8	1.0	0.6	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	3.2	0.8	3.2	3.0	1.3	0.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.5	13.3	11.2	11.4	6.6	3.7
LnGrp LOS	B	B	B	B	A	A
Approach Vol, veh/h	312		630			780
Approach Delay, s/veh	15.8		11.3			4.8
Approach LOS	B		B			A
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.9	16.6			26.5	11.4
Change Period (Y+Rc), s	4.0	4.0			4.0	4.0
Max Green Setting (Gmax), s	40.0	53.0			97.0	45.0
Max Q Clear Time (g_c+I1), s	5.3	7.9			4.5	6.7
Green Ext Time (p_c), s	0.9	4.7			3.8	1.0
Intersection Summary						
HCM 6th Ctrl Delay			9.1			
HCM 6th LOS			A			

HCM 6th Signalized Intersection Summary

3: Normandy Blvd & Graves Ave

07/10/2024



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↵	↑↑	↵	↵↵
Traffic Volume (veh/h)	584	414	262	419	216	127
Future Volume (veh/h)	584	414	262	419	216	127
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	635	450	285	455	235	138
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	930	1027	389	1682	688	1472
Arrive On Green	0.26	0.26	0.14	0.47	0.39	0.39
Sat Flow, veh/h	3647	1585	1781	3647	1781	2790
Grp Volume(v), veh/h	635	450	285	455	235	138
Grp Sat Flow(s),veh/h/ln	1777	1585	1781	1777	1781	1395
Q Serve(g_s), s	13.7	11.9	9.3	6.6	8.0	2.1
Cycle Q Clear(g_c), s	13.7	11.9	9.3	6.6	8.0	2.1
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	930	1027	389	1682	688	1472
V/C Ratio(X)	0.68	0.44	0.73	0.27	0.34	0.09
Avail Cap(c_a), veh/h	1706	1373	721	3120	688	1472
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.4	7.4	19.4	13.6	18.5	10.0
Incr Delay (d2), s/veh	0.9	0.3	2.7	0.1	1.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	9.7	14.3	7.0	4.6	6.2	1.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	29.3	7.7	22.1	13.7	19.9	10.1
LnGrp LOS	C	A	C	B	B	B
Approach Vol, veh/h	1085			740	373	
Approach Delay, s/veh	20.3			16.9	16.3	
Approach LOS	C			B	B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	18.1	28.3			46.4	39.0
Change Period (Y+Rc), s	6.0	6.0			6.0	6.0
Max Green Setting (Gmax), s	28.0	41.0			75.0	33.0
Max Q Clear Time (g_c+I1), s	11.3	15.7			8.6	10.0
Green Ext Time (p_c), s	0.8	6.6			3.5	1.2

Intersection Summary

HCM 6th Ctrl Delay	18.5
HCM 6th LOS	B

Queues

4: Graves Rd & Howland Blvd

07/10/2024



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	103	34	54	402	967	21	72	72	707	62	34	51
v/c Ratio	0.31	0.05	0.12	0.29	0.74	0.02	0.34	0.33	0.58	0.29	0.15	0.12
Control Delay	41.5	27.8	0.5	22.9	27.1	0.1	42.6	42.4	4.1	42.0	39.8	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.5	27.8	0.5	22.9	27.1	0.1	42.6	42.4	4.1	42.0	39.8	0.6
Queue Length 50th (ft)	26	8	0	52	224	0	36	36	3	30	16	0
Queue Length 95th (ft)	60	21	1	169	335	0	94	94	94	81	52	0
Internal Link Dist (ft)		555			745			579			524	
Turn Bay Length (ft)	340		340	545		750	285			155		
Base Capacity (vph)	484	940	586	2828	3205	1057	356	362	1539	375	394	497
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.04	0.09	0.14	0.30	0.02	0.20	0.20	0.46	0.17	0.09	0.10

Intersection Summary