RANGE ROAD PROJECT

Project № 23119
November 2023

TRAFFIC IMPACT ANALYSIS
CITY OF COCOA
FLORIDA

Prepared by:

Traffic & Mobility Consultants
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(407) 531-5332

Prepared for:

Karali Associates LLC
2642 Fawnlake Trail
Orlando, Florida 32828

EXECUTIVE SUMMARY

Project Information

Name:	Range Road Project
Location:	North of SR 520 and east of Hooper Road
Description:	71 Single Family Detached Dwelling Units (DUs)

Findings

Trip Generation:	736 Daily Trips / 55 AM Peak Hour Trips / 72 PM Peak Hour Trips
Access Plan:	Two (2) full access driveways on Range Road
Roadway Capacity:	All roadway segments are projected to continue to operate adequately at project buildout.
Intersection Capacity:	All intersections are projected to operate adequately at project buildout.
Access Review:	Deceleration lanes are not warranted on Range Road at project access driveways.

PROFESSIONAL ENGINEERING CERTIFICATION

I hereby certify that I am a Professional Engineer properly registered in the State of Florida practicing with Traffic & Mobility Consultants LLC, a corporation authorized to operate as an engineering business, CA-30024, by the State of Florida Department of Professional Regulation, Board of Professional Engineers, and that I have prepared or approved the evaluations, findings, opinions, conclusions, or technical advice attached hereto for:

PROJECT: Range Road Project

LOCATION: City of Cocoa, Florida

CLIENT: Karali Associates LLC

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

THIS ITEM HAS BEEN DIGITALLY SIGNED AND SEALED BY

ON THE DATE ADJACENT TO THE SEAL

PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.

TRAFFIC & MOBILITY CONSULTANTS LLC
3101 MAGUIRE BOULEVARD, SUITE 265
ORLANDO, FLORIDA 32803
CERTIFICATE OF AUTHORIZATION CA-30024
AYMAN H. AS-SAIDI, P.E. NO 56849

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1.0 INTRODUCTION

This Tier 2 Traffic Impact Analysis (TIA) was conducted to assess the impact of the proposed Range Road Project development in the City of Cocoa, Brevard County, Florida. The project will include 71 Single Family Detached Dwelling Units (DUs). The site is located east of Range Road, approximately 1.33 miles north of SR 520, and east of Hooper Road, in the City of Cocoa, Florida. **Figure 1** depicts the site location and the surrounding transportation network. A preliminary development site plan is provided in **Appendix A**.

Access to the site is proposed via two (2) full access driveways on Range Road. The development is projected to be completed by the year 2026.

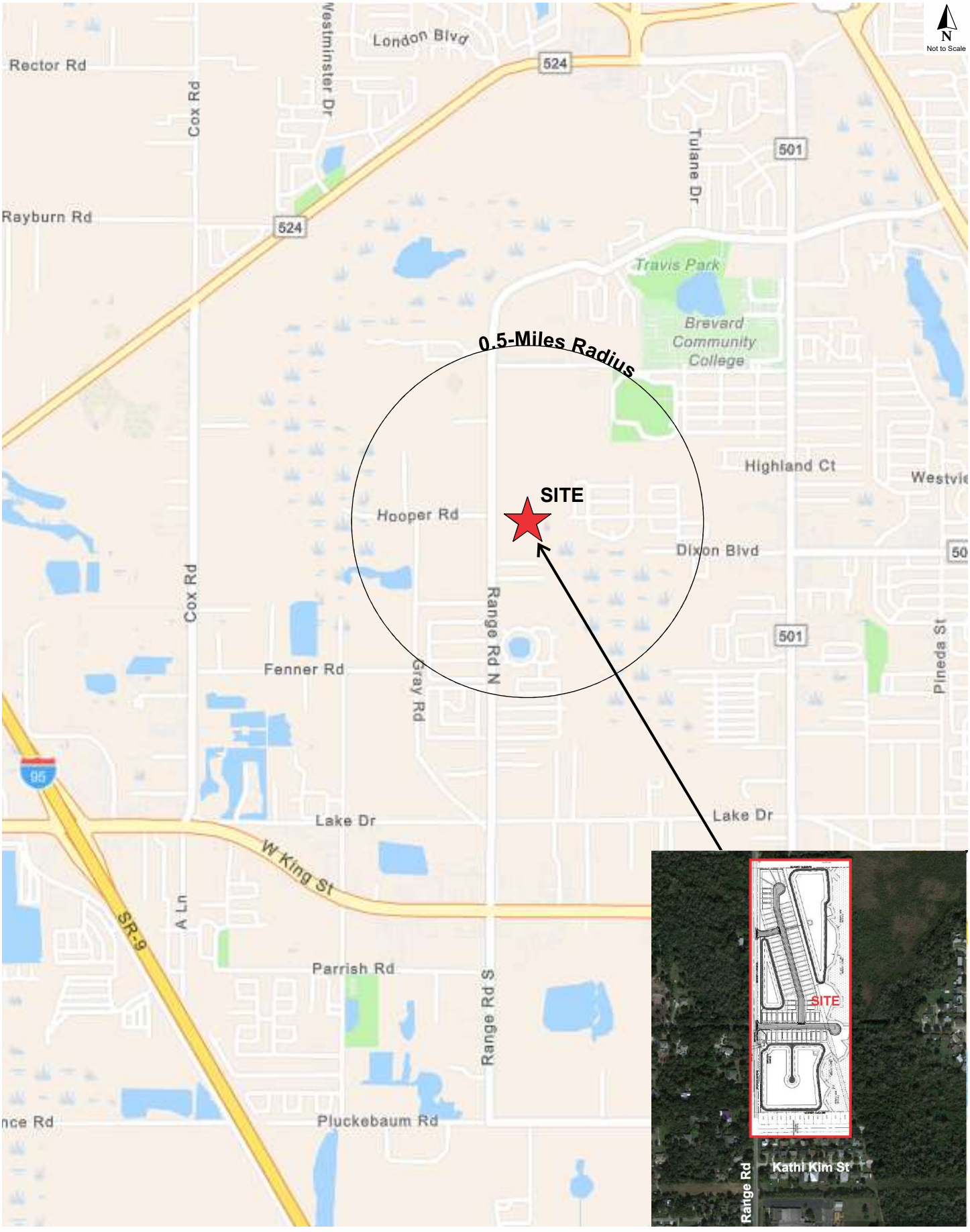
The analysis was prepared in accordance with the approved methodology submitted to the City of Cocoa and reviewed by the City's reviewer. A copy of the approved methodology is included in **Appendix B**.

Data used in the analysis consisted of site plan/development information provided by the project engineers, AM and PM peak hour intersection traffic counts obtained by Traffic & Mobility Consultants LLC (TMC), and roadway capacities obtained from the *Space Coast Transportation Planning Organization (SCTPO) Traffic Counts 2013-2022* and *Florida Department of Transportation (FDOT) 2023 Multimodal Quality/Level of Service (Q/LOS) Handbook.*

1.1 Study Area

The project study area was established based on the standard requirements of the *City of Cocoa TIA Guidelines*. In accordance with the *City of Cocoa TIA Guidelines*, the impacted roadways and intersections/signalized systems that must be studied in TIA shall include:

- The major roadway segment(s) to which the site has direct connections, or to which the site has the most direct access via local/non-major streets.
- All roadways of the project where the project's peak hour trips consume three percent (3%) or more of a roadway's two-way peak hour generalized service volume based on the adopted LOS and committed number of lanes.
- Major intersections and signalized systems that are part of the impacted threshold roadways.



TMC
Traffic & Mobility Consultants

Site Location Map
Range Road Project
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Figure
1

- The intersection(s) and signalized systems of the major roadways with the non-major roads that provide access for 50 or more peak-hour development trips to or from the site (two-way total) to the major road network.

The project study area roadway significance is provided in **Table 1** as determined in the approved methodology.

Table 1
Study Area Significance

Road Name	Median Type	Area Type	# LNS	LOS Std	Pk Hr 2-Way Capacity	Trip Distr	Project Trips	% of Cap
Range Rd								
Lake Dr to Hooper Road/Street A	Undivided	Urban	2	E	1,620	50%	36	2.2%
Hooper Road/Street A to Rosetine St	Undivided	Urban	2	E	1,620	40%	29	1.8%

2022 Space Coast Transportation Planning Organization Traffic Counts
Capacities are taken from 2023 FDOT Q/LOS Tables

Based on the information presented in **Table 1**, the study roadway segments are as follows:

- Range Road
  - Lake Drive to Hooper Road/ Street A
  - Hooper Road/ Street A to Rosetine Street

The study intersections are as follows*:*

- Range Road and Hooper Road/ Street A (Unsignalized)
- Range Road and Street C (Proposed)

2.0 EXISTING CONDITIONS ANALYSIS

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

2.1 Roadway Segment Capacity

Existing roadway conditions were analyzed by comparing the existing traffic volumes within the study area and the adopted level of service (LOS) standards for the roadway segments. Existing annual average daily traffic (AADT) volumes were obtained from the *2022 Space Coast Transportation Planning Organization (SCTPO) Database*. *2023 FDOT Florida Traffic Online (FTO) website* provides peak hour (K=0.09) factor to calculate the two-way peak hour traffic. Annual growth rates (AGRs) were calculated from the Range Road historical AADTs to obtain the buildout year two-way peak hour volumes on Range Road, which will be used to calculate the projected background traffic volume in this study. The service volumes and capacities were obtained from the *2022 Space Coast Transportation Planning Organization (SCTPO) Database* and *2023 FDOT Multimodal Quality/Level of Service Handbook.* Excerpts from the 2022 *Space Coast Transportation Planning Organization (SCTPO) Database, 2023 Florida Traffic Online (FTO) website*, and *2023 FDOT Multimodal Quality/Level of Service Handbook* are included in **Appendix C**. **Table 2** summarizes the roadway segment capacity analysis.

Table 2
Existing Roadway Segment Capacity Analysis

Road Name	Median Type	Area Type	# LNS	LOS Std	Pk Hr 2-Way Capacity	2022 Existing				
						AADT	K-Factor	Pk Hr 2-Way	LOS	V/C
Range Rd										
Lake Dr to Hooper Road/Street A	Undivided	Urban	2	D	1,620	5,970	0.09	537	C	0.33
Hooper Road/Street A to Rosetine St	Undivided	Urban	2	D	1,620	5,970	0.09	537	C	0.33

2022 Space Coast Transportation Planning Organization Traffic Counts
Capacities are taken from 2023 FDOT Q/LOS Tables
K-factor is taken from FTO Website

The analysis indicates that all study roadway segments currently operate adequately within their LOS standards.

2.2 Intersection Capacity

The intersection capacity analysis was performed for the AM and PM peak hour periods at the study intersections. The capacity analysis was performed using *Synchro* and the methods of the *Highway Capacity Manual (HCM)*. Turning movement counts were collected at the study intersections on November 14, 2023. Existing turning movement counts were collected during the off-peak season; therefore, a seasonal adjustment factor of 1.06 was applied. The AM and PM peak hour counts are presented in **Figure 2**. The turning movement counts and the *2022 Peak Season Factor Category Report* are included in **Appendix D**. The summary results of the intersection capacity analysis, summarized in **Table 3,** reveal that the intersection of Range Road and Hooper Road is currently operating at adequate LOS. Detailed *HCM* analysis worksheets are included in **Appendix E**.

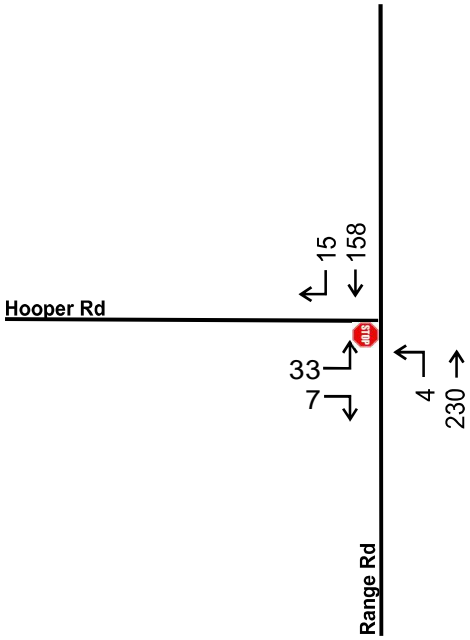
Table 3
Existing Intersection Capacity Analysis

Intersection	Traffic Control	Time Period	EB		WB		NB		SB	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Range Rd & Hooper Road/Street A	TWSC	AM	12.1	B	--	--	7.7	A	--	--
		PM	10.3	B	--	--	7.7	A	--	--

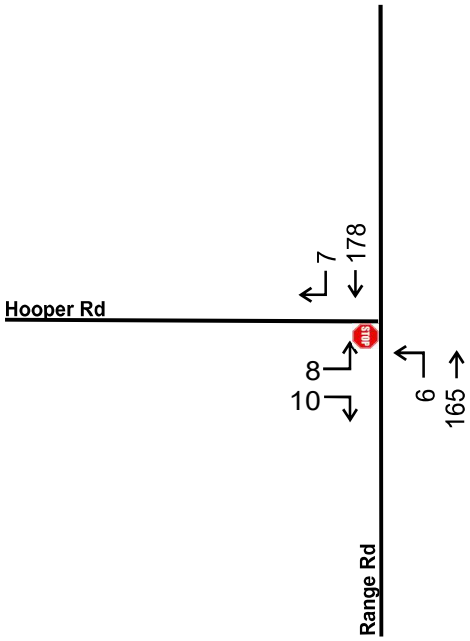
Delays expressed in sec/veh

N
Not to Scale

AM Peak



PM Peak



Existing Peak Hour Intersection Volumes
Range Road Project
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Figure
2

3.0 PROJECT TRAFFIC

3.1 Trip Generation

The traffic generation of the proposed development was calculated using the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 11th Edition*. The trip generation for the project is summarized in **Table 4** and the ITE sheets are provided in **Appendix F**.

Table 4
Trip Generation Calculations

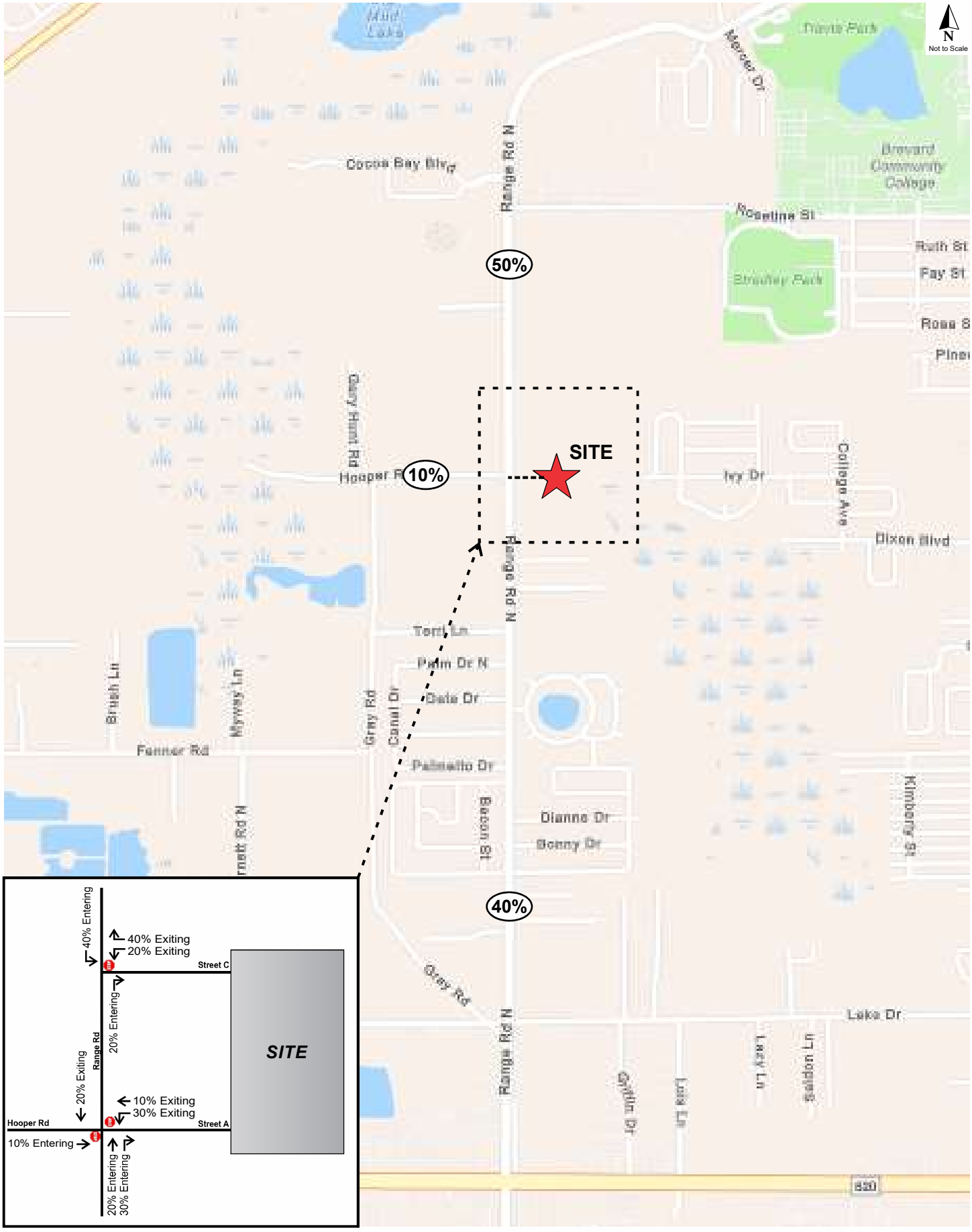
ITE			Daily		AM Peak Hour				PM Peak Hour			
Code	Land Use	Size	Rate	Trips	Rate	Total	Enter	Exit	Rate	Total	Enter	Exit
210	Single Family Residential	71 DU	10.37	736	0.77	55	14	41	1.01	72	45	27

Trip Generation analysis based on ITE Trip Generation Manual, 11th Edition.

The proposed development at project buildout is projected to generate 736 daily trips; of which 55 trips occur during the AM peak hour, and 72 trips occur during the PM peak hour.

3.2 Trip Distribution/Assignment

A trip distribution pattern was estimated using the existing roadway network traffic volumes from *2022 Space Coast Transportation Planning Organization (SCTPO) Database*. The location of the development with respect to the study area attractions and activity centers were also used to estimate the distribution to reflect prevailing travel patterns in the vicinity of the site and the surrounding transportation network. *2022 SCTPO Database* is provided in **Appendix C**, and the trip distribution is shown in **Figure 3.**



TMC Traffic & Mobility Consultants

Project Trip Distribution

Range Road Project
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Figure 3

4.0 PROJECTED CONDITIONS ANALYSIS

An analysis of projected conditions was conducted to determine the impact of the proposed development on the roadway segments' capacity, as well as the proposed access connections to the site. The project buildout year is 2026.

4.1 Planned and Programmed Improvements

The *FDOT Work Program (WP)*, *2040 SCTPO Long Range Transportation Plan Document,* and the *City of Cocoa Comprehensive Plan* have been reviewed. No planned or programmed improvements funded for construction were identified within the study area.

4.2 Background Traffic Projection

Projected traffic includes background traffic volumes, the project trips, and committed trips. Projected background traffic is based on traffic growth or vested trips, whichever was found to be higher. The *City of Cocoa Traffic Concurrency Management System* database was reviewed, and no committed/reserved trips were found relevant to the study area. Traffic growth at the project buildout was calculated using the historical data between 2018 and 2022 obtained from *FTO website.* A minimum of 2% annual growth rate was applied to roadway segments for which minimal or no growth was detected. The *FTO Historical AADT Report* for Range Road and annual growth rate calculations are included in **Appendix G**.

4.3 Roadway Segment Capacity

The project trips were assigned to study roadway segments based on the project's trip generation and trip distribution pattern. Projected roadway conditions were analyzed by comparing the projected traffic volumes on the study roadway segments to their capacities and service volumes, which were obtained from *2022 SCTPO Database* and *2023 FDOT Multimodal Quality/Level of Service Handbook*.

Table 5 summarizes the projected roadway segment capacity analysis under the projected conditions for the PM peak hour, which reveals that all roadway segments are projected to continue to operate adequately at the project buildout.

Table 5
Projected Roadway Segment Capacity Analysis

Road Name	# LNS	LOS Std	Pk Hr 2-Way Capacity	Growth Rate	Existing Pk Hr 2-Way	2026 Background Volume	2026 Background LOS	2026 Background V/C	Trip Distr	2026 Buildout Trips	2026 Buildout Volume	2026 Buildout LOS	2026 Buildout V/C
Range Rd													
Lake Dr to Access Rd	2	D	1,620	2%	537	580	C	0.36	50%	36	616	C	0.38
Access Rd to Rosetine St	2	D	1,620	2%	537	580	C	0.33	40%	29	609	C	0.38

2022 Space Coast Transportation Planning Organization Traffic Counts
Capacities are taken from 2023 FDOT Q/LOS Tables
K-factor is taken from FTO Website

4.4 Intersection Capacity

The projected volumes for the intersection capacity and operations analysis were calculated by assigning the project trips to the project driveways and adding those volumes to the background volumes at the study intersections. Projected background traffic was estimated using the annual growth rate discussed in the previous section. The projected AM and PM peak hour volumes are illustrated in **Figure 4**.

Results of the intersection capacity analysis, summarized in **Table 6**, reveal that all study intersections are projected to operate adequately at project buildout. Projected intersection volume calculation worksheets and detailed *HCM* analysis worksheets are included in **Appendix H**.

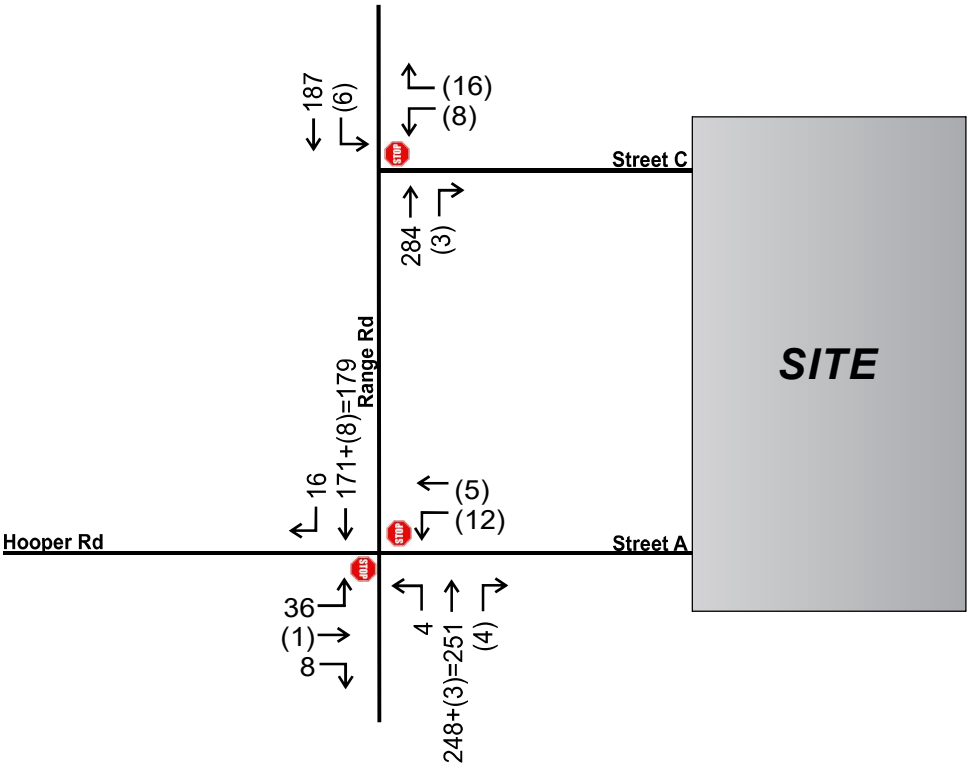
Table 6
Projected Intersection Capacity Analysis

Intersection	Traffic Control	Time Period	EB Delay	EB LOS	WB Delay	WB LOS	NB Delay	NB LOS	SB Delay	SB LOS
Range Rd & Hooper Road/Street A	TWSC	AM	13.8	B	13.9	B	7.7	A	--	--
		PM	11.4	B	12.8	B	7.7	A	--	--
Range Road & Street C	TWSC	AM	--	--	10.9	B	--	--	7.9	A
		PM	--	--	10.2	B	--	--	7.7	A

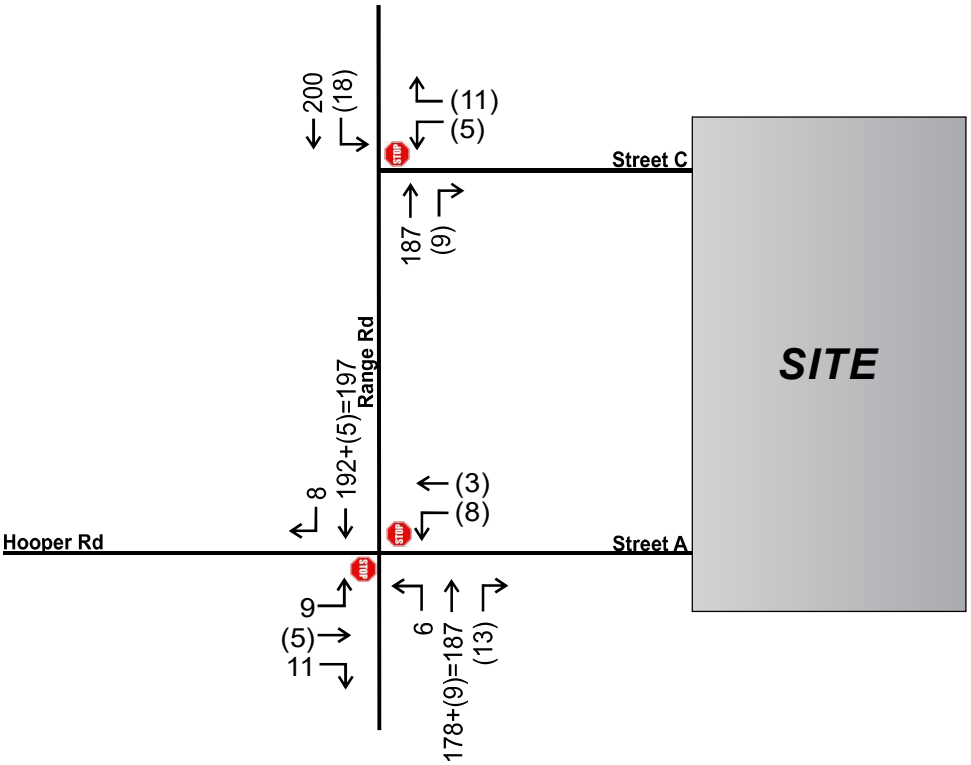
Delays expressed in sec/veh

N
Not to Scale

AM Peak



PM Peak



Legend:
Background + (Project) = Total

5.0 ACCESS REVIEW

The development will be accessed via two (2) full access driveways on Range Road; one (1) is at Hooper Road, and one (1) is north of Hooper Road. Range Road is a 2-lane undivided roadway with a posted speed of 35 MPH adjacent to the site. Hooper Road is a 2-lane undivided roadway with a posted speed of 25 mph adjacent to the site.

The access analysis was performed for buildout conditions of the development in order to determine the need for deceleration turn lanes at the project access driveways. The left and right turn deceleration turn warrants were conducted for the proposed project access driveway based on the *NCHRP Report 457* Methodology.

5.1 Turn Lane Review

Right Turn Deceleration Lane at Street A Project Driveway on Range Road

The results of the right turn warrant analysis show that a right turn deceleration lane is not warranted at Range Road. The right turn lane warrant analysis sheet is included in **Appendix I**.

Left Turn Deceleration Lane at Street C Project Driveway on Range Road

The results of the left turn warrant analysis show that a left turn deceleration lane is not warranted at Range Road. The left turn lane warrant analysis sheet is included in **Appendix I**.

6.0 STUDY CONCLUSIONS

This traffic analysis was conducted to assess the impact of the proposed development of Range Road Project in the City of Cocoa, Brevard County, Florida. The project will include 71 Single Family Detached Dwelling Units (DUs). Project is projected to be completed by year 2026. The analysis included a determination of project trip generation, a review of existing and projected roadway and intersection capacity, and access review.

The results of the traffic analysis are summarized as follows:

- The proposed development is projected to generate 736 daily trips; of which 55 trips occur during the AM peak hour, and 72 trips occur during the PM peak hour at project buildout.

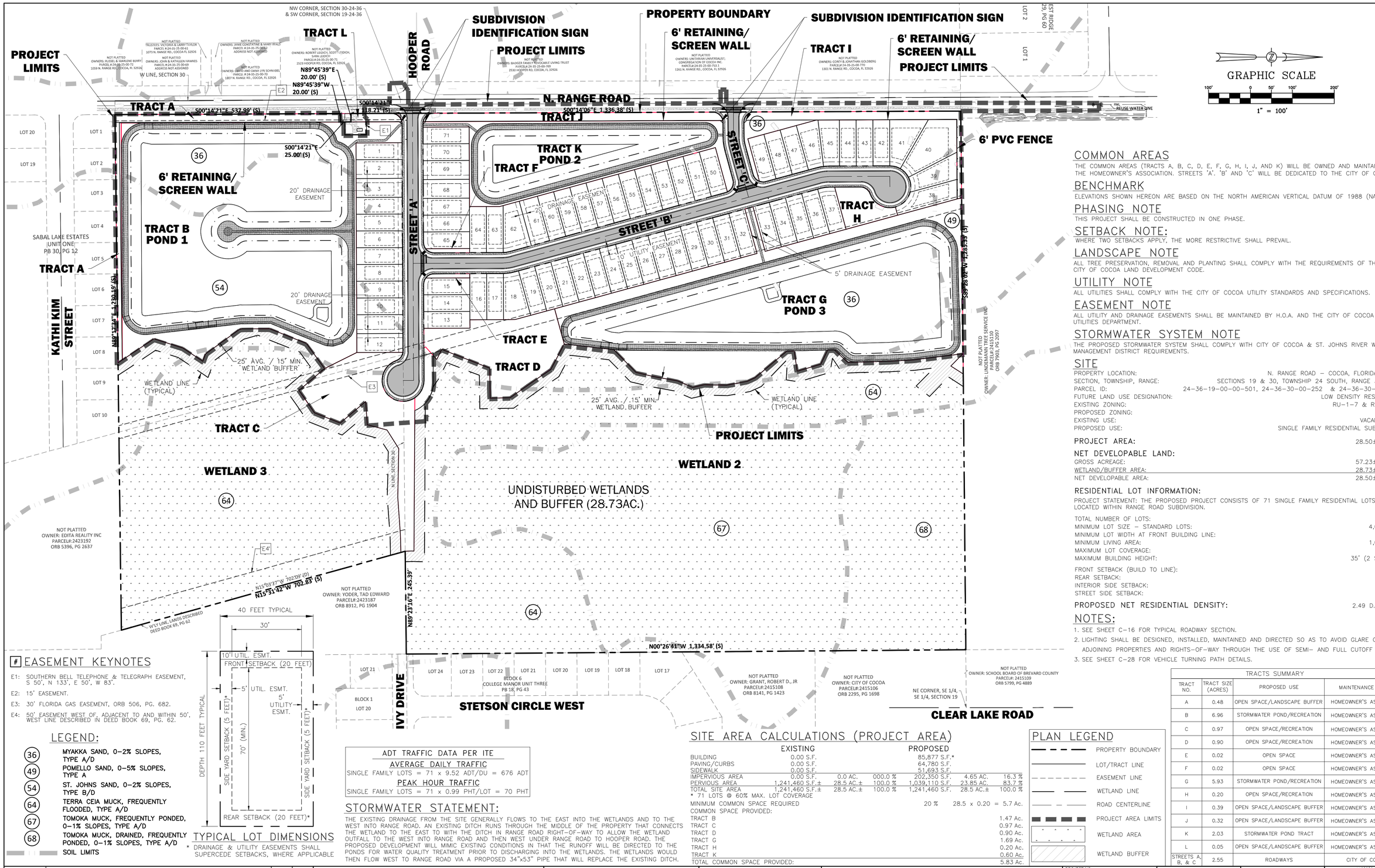
- All roadway segments are projected to continue to operate adequately at project buildout.

- All the study intersections and project access driveways are projected to operate adequately at project buildout.

- The results of right and left turn warrant analyses show that deceleration lanes are not warranted on Range Road at the project access driveways.

APPENDICES

Appendix A
Preliminary Development Plan



EASEMENT KEYNOTES

E1: SOUTHERN BELL TELEPHONE & TELEGRAPH EASEMENT, S 50', N 133', E 50', W 83'.

E2: 15' EASEMENT.

E3: 30' FLORIDA GAS EASEMENT, ORB 506, PG. 682.

E4: 50' EASEMENT WEST OF, ADJACENT TO AND WITHIN 50', WEST LINE DESCRIBED IN DEED BOOK 69, PG. 62.

LEGEND:

(36) MYAKKA SAND, 0–2% SLOPES, TYPE A/D

(49) POMELLO SAND, 0–5% SLOPES, TYPE A

(54) ST. JOHNS SAND, 0–2% SLOPES, TYPE B/D

(64) TERRA CEIA MUCK, FREQUENTLY FLOODED, TYPE A/D

(67) TOMOKA MUCK, FREQUENTLY PONDED, 0–1% SLOPES, TYPE A/D

(68) TOMOKA MUCK, DRAINED, FREQUENTLY PONDED, 0–1% SLOPES, TYPE A/D

SOIL LIMITS

TYPICAL LOT DIMENSIONS

* DRAINAGE & UTILITY EASEMENTS SHALL SUPERCEDE SETBACKS, WHERE APPLICABLE

ADT TRAFFIC DATA PER ITE	
AVERAGE DAILY TRAFFIC	
SINGLE FAMILY LOTS = 71 x 9.52 ADT/DU = 676 ADT	
PEAK HOUR TRAFFIC	
SINGLE FAMILY LOTS = 71 x 0.99 PHT/LOT = 70 PHT	

STORMWATER STATEMENT:

THE EXISTING DRAINAGE FROM THE SITE GENERALLY FLOWS TO THE EAST INTO THE WETLANDS AND TO THE WEST INTO RANGE ROAD, AN EXISTING DITCH RUNS THROUGH THE MIDDLE OF THE PROPERTY THAT CONNECTS THE WETLAND TO THE EAST TO WITH THE DITCH IN RANGE ROAD RIGHT-OF-WAY TO ALLOW THE WETLAND OUTFALL TO THE WEST INTO RANGE ROAD AND THEN WEST UNDER RANGE ROAD TO HOOPER ROAD. THE PROPOSED DEVELOPMENT WILL MIMIC EXISTING CONDITIONS IN THAT THE RUNOFF WILL BE DIRECTED TO THE PONDS FOR WATER QUALITY TREATMENT PRIOR TO DISCHARGING INTO THE WETLANDS. THE WETLANDS WOULD THEN FLOW WEST TO RANGE ROAD VIA A PROPOSED 34"x53" PIPE THAT WILL REPLACE THE EXISTING DITCH.

SITE AREA CALCULATIONS (PROJECT AREA)

	EXISTING			PROPOSED		
BUILDING	0.00 S.F.			85,877 S.F.*		
PAVING/CURBS	0.00 S.F.			64,780 S.F.		
SIDEWALK	0.00 S.F.			51,693 S.F.		
IMPERVIOUS AREA	0.00 S.F.	0.0 AC.	000.0 %	202,350 S.F.	4.65 AC.	16.3 %
PERVIOUS AREA	1,241,460 S.F.±	28.5 AC.±	100.0 %	1,039,110 S.F.	23.85 AC.	83.7 %
TOTAL SITE AREA	1,241,460 S.F.±	28.5 AC.±	100.0 %	1,241,460 S.F.	28.5 AC.±	100.0 %

* 71 LOTS @ 60% MAX. LOT COVERAGE

MINIMUM COMMON SPACE REQUIRED	20 %	28.5 x 0.20 =	5.7 Ac.
COMMON SPACE PROVIDED:			
TRACT B			1.47 Ac.
TRACT C			0.97 Ac.
TRACT D			0.90 Ac.
TRACT G			1.69 Ac.
TRACT H			0.20 Ac.
TRACT K			0.60 Ac.
TOTAL COMMON SPACE PROVIDED:			5.83 Ac.

PLAN LEGEND

PROPERTY BOUNDARY

LOT/TRACT LINE

EASEMENT LINE

WETLAND LINE

ROAD CENTERLINE

PROJECT AREA LIMITS

WETLAND AREA

WETLAND BUFFER

COMMON AREAS

THE COMMON AREAS (TRACTS A, B, C, D, E, F, G, H, I, J, AND K) WILL BE OWNED AND MAINTAINED BY THE HOMEOWNER'S ASSOCIATION. STREETS 'A'. 'B' AND 'C' WILL BE DEDICATED TO THE CITY OF COCOA.

BENCHMARK

ELEVATIONS SHOWN HEREON ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).

PHASING NOTE

THIS PROJECT SHALL BE CONSTRUCTED IN ONE PHASE.

SETBACK NOTE:

WHERE TWO SETBACKS APPLY, THE MORE RESTRICTIVE SHALL PREVAIL.

LANDSCAPE NOTE

ALL TREE PRESERVATION, REMOVAL AND PLANTING SHALL COMPLY WITH THE REQUIREMENTS OF THE CITY OF COCOA LAND DEVELOPMENT CODE.

UTILITY NOTE

ALL UTILITIES SHALL COMPLY WITH THE CITY OF COCOA UTILITY STANDARDS AND SPECIFICATIONS.

EASEMENT NOTE

ALL UTILITY AND DRAINAGE EASEMENTS SHALL BE MAINTAINED BY H.O.A. AND THE CITY OF COCOA UTILITIES DEPARTMENT.

STORMWATER SYSTEM NOTE

THE PROPOSED STORMWATER SYSTEM SHALL COMPLY WITH CITY OF COCOA & ST. JOHNS RIVER WATER MANAGEMENT DISTRICT REQUIREMENTS.

SITE

PROPERTY LOCATION:	N. RANGE ROAD – COCOA, FLORIDA 32922
SECTION, TOWNSHIP, RANGE:	SECTIONS 19 & 30, TOWNSHIP 24 SOUTH, RANGE 36 EAST
PARCEL ID:	24-36-19-00-00-501, 24-36-30-00-252 & 24-36-30-00-258
FUTURE LAND USE DESIGNATION:	LOW DENSITY RESIDENTIAL
EXISTING ZONING:	RU-1-7 & RU-2-15
PROPOSED ZONING:	PUD
EXISTING USE:	VACANT LAND
PROPOSED USE:	SINGLE FAMILY RESIDENTIAL SUBDIVISION
PROJECT AREA:	28.50± ACRES
NET DEVELOPABLE LAND:	
GROSS ACREAGE:	57.23± ACRES
WETLAND/BUFFER AREA:	28.73± ACRES
NET DEVELOPABLE AREA:	28.50± ACRES

RESIDENTIAL LOT INFORMATION:

PROJECT STATEMENT: THE PROPOSED PROJECT CONSISTS OF 71 SINGLE FAMILY RESIDENTIAL LOTS LOCATED WITHIN RANGE ROAD SUBDIVISION.

TOTAL NUMBER OF LOTS:	71 LOTS
MINIMUM LOT SIZE – STANDARD LOTS:	4,000 S.F.
MINIMUM LOT WIDTH AT FRONT BUILDING LINE:	40'
MINIMUM LIVING AREA:	1,000 S.F.
MAXIMUM LOT COVERAGE:	60%
MAXIMUM BUILDING HEIGHT:	35' (2 STORIES)
FRONT SETBACK (BUILD TO LINE):	20'
REAR SETBACK:	20'
INTERIOR SIDE SETBACK:	5'
STREET SIDE SETBACK:	15'
PROPOSED NET RESIDENTIAL DENSITY:	2.49 D.U./ACRE

NOTES:

1. SEE SHEET C-16 FOR TYPICAL ROADWAY SECTION.
2. LIGHTING SHALL BE DESIGNED, INSTALLED, MAINTAINED AND DIRECTED SO AS TO AVOID GLARE ON ADJOINING PROPERTIES AND RIGHTS-OF-WAY THROUGH THE USE OF SEMI- AND FULL CUTOFF SHIELDS.
3. SEE SHEET C-28 FOR VEHICLE TURNING PATH DETAILS.

TRACTS SUMMARY

TRACT NO.	TRACT SIZE (ACRES)	PROPOSED USE	MAINTENANCE ENTITY
A	0.48	OPEN SPACE/LANDSCAPE BUFFER	HOMEOWNER'S ASSOCIATION
B	6.96	STORMWATER POND/RECREATION	HOMEOWNER'S ASSOCIATION
C	0.97	OPEN SPACE/RECREATION	HOMEOWNER'S ASSOCIATION
D	0.90	OPEN SPACE/RECREATION	HOMEOWNER'S ASSOCIATION
E	0.02	OPEN SPACE	HOMEOWNER'S ASSOCIATION
F	0.02	OPEN SPACE	HOMEOWNER'S ASSOCIATION
G	5.93	STORMWATER POND/RECREATION	HOMEOWNER'S ASSOCIATION
H	0.20	OPEN SPACE/RECREATION	HOMEOWNER'S ASSOCIATION
I	0.39	OPEN SPACE/LANDSCAPE BUFFER	HOMEOWNER'S ASSOCIATION
J	0.32	OPEN SPACE/LANDSCAPE BUFFER	HOMEOWNER'S ASSOCIATION
K	2.03	STORMWATER POND TRACT	HOMEOWNER'S ASSOCIATION
L	0.05	OPEN SPACE/LANDSCAPE BUFFER	HOMEOWNER'S ASSOCIATION
STREETS A, B, & C	2.55	ROADWAYS	CITY OF COCOA

DATE	REVISIONS	BY	CHECKED
10/03/23	3 REVISED PER FLORIDA GAS TRANSMISSION	SMT	GRC
9/25/23	2 REVISED PER FLORIDA GAS TRANSMISSION	ST/JM	GRC
4/20/23	1 REVISED PER CITY AND SJRWMD COMMENTS	JM	GRC

RANGE ROAD PRELIMINARY PUD - LARGE SCALE SITE PLAN
CITY OF COCOA, FLORIDA

FEG FLORIDA ENGINEERING GROUP
Engineering the Future

5127 S. Orange Avenue, Suite 200
Orlando, FL 32809
Phone: 407-895-0324
Fax: 407-895-0325
www.feg-inc.us

OVERALL SITE PLAN

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY
CPN	CPN	GRC	GRC

PROJECT NO. 19-070
SCALE 1"=100'
DATE MAY 25, 2022
SHEET NO. C-11
SHEET 11 OF 36

FLORIDA ENGINEERING GROUP, INC.
CERTIFICATE NO. EB0006595
No 51335 STATE OF FLORIDA REGISTERED PROFESSIONAL ENGINEER
GREGORY B. CRAWFORD, P.E.
LICENSE NO. 51335

19-070 OverallSitePlan.dwg

Appendix B
Study Methodology

Batuhan Anlitan

From: Batuhan Anlitan
Sent: Wednesday, November 8, 2023 10:00 AM
To: Abigail Morgan
Cc: 23119 RANGE ROAD PROJECT; Ayman As-Saidi; Stephen Noto; Lucilene Ribeiro
Subject: TIA Methodology v1.1
Attachments: 11 OVERALL SITE PLAN.pdf; Figure 1.pdf; Table 1 - 2.pdf; Figure 2.pdf; 23119 Range Road Project Response to Methodology Comments 110823.pdf

Good Morning Abigail,

Please find below the updated Methodology Letter v1.1 for the Range Road Project, with the attached Response to Methodology Comments Letter.

Results of Methodology v1.1 as follows:

- The ±57.23-acre site is proposed to be a residential development consisting of 71 Single Family Detached Dwelling Units (DUs). (Please see attached Overall Site Plan)
- The site located east of Range Road, approximately 1.33 miles north of SR 520, and east of Hooper Road in the City of Cocoa, Brevard County, Florida. (Please see Figure 1)
- The proposed development at project buildout is projected to generate 736 new external daily trips; of which 55 external trips occur during the AM peak hour, and 72 external trips occur during the PM peak hour (Table 1: Trip Generation Calculations).
- The study significance test within the 0.5-mile radius of the project site summarizes that Range Road segment (from Lake Dr to Rosetine St), is projected to consume less than 5% of roadway's current Maximum Allowable Volume (Table 2: Study Area Significance Analysis)
- Adjusted trip distribution is shown in Figure 2; 10% of the projected traffic is assigned to Hooper Road, 50% assigned to North of Range Road, and 40% assigned to South of Range Road.

Please review this Methodology v1.1 and let us know your feedback as soon as possible.

Sincerely,

Batuhan Anlitan, MSCE
Transportation/Traffic Engineer

TMC
Traffic & Mobility Consultants

Traffic & Mobility Consultants LLC
3101 Maguire Boulevard, Suite 265
Orlando, Florida 32803
Office: (407) 531-5332 x204
Fax: (407) 531-5331
ba@trafficmobility.com

From: Abigail Morgan <amorgan@cocoafl.gov>
Sent: Thursday, October 12, 2023 8:37 AM

To: Batuhan Anlitan <ba@trafficmobility.com>
Cc: 23119 RANGE ROAD PROJECT <23119@trafficmobility.com>; Ayman As-Saidi <aha@trafficmobility.com>; Stephen Noto <snoto@rviplanning.com>; Lucilene Ribeiro <lribeiro@cocoafl.gov>
Subject: RE: Determination of TIA Requirements for Range Road Residential Development Project

Good morning Batuhan,

Please find the comments from our traffic reviewer. The build year and assignment of traffic on Hooper Road was brought up.

Thank you.
Abby

Abigail Morgan, P.E.
Interim Public Works Director/City Engineer
City of Cocoa

From: Batuhan Anlitan <ba@trafficmobility.com>
Sent: Wednesday, October 11, 2023 8:38 AM
To: Abigail Morgan <amorgan@cocoafl.gov>
Cc: 23119 RANGE ROAD PROJECT <23119@trafficmobility.com>; Ayman As-Saidi <aha@trafficmobility.com>
Subject: RE: Determination of TIA Requirements for Range Road Residential Development Project

Good Morning Abigail,

I hope this email finds you in good health. I am writing to follow up on the review of the methodology for Range Road Project Development. We would greatly appreciate any comments or questions you may have regarding this matter.

Thank you for your time and attention.

Best regards,

Batuhan Anlitan, MSCE
Transportation/Traffic Engineer

TMC
Traffic & Mobility Consultants

Traffic & Mobility Consultants LLC
3101 Maguire Boulevard, Suite 265
Orlando, Florida 32803
Office: (407) 531-5332 x204
Fax: (407) 531-5331
ba@trafficmobility.com

From: Abigail Morgan <amorgan@cocoafl.gov>
Sent: Tuesday, September 26, 2023 10:54 AM
To: Batuhan Anlitan <ba@trafficmobility.com>
Cc: Ayman As-Saidi <aha@trafficmobility.com
Subject: RE: Determination of TIA Requirements for Range Road Residential Development Project

Good morning Batuhan.

Please note that the City of Cocoa's procedures include a three tiered process. A Tier 1 study is for 0-25 peak hour trips, a Tier 2 study is for 26-100 Peak hour trips, and a Tier 3 study is for 100+ Peak hour trips. Based on the information provided, your project requires a Tier 2 TIA study.

Your methodology email is received and will be reviewed.

Thank you.
Abby

Abigail Morgan, P.E.
Interim Public Works Director/City Engineer
City of Cocoa

From: Batuhan Anlitan <ba@trafficmobility.com>
Sent: Monday, September 25, 2023 2:03 PM
To: Abigail Morgan <amorgan@cocoafl.gov>
Cc: Ayman As-Saidi <aha@trafficmobility.com>; 23050@trafficmobility.com
Subject: FW: Determination of TIA Requirements for Range Road Residential Development Project

Good Afternoon Abigail,

I am a Traffic Engineer from Traffic & Mobility Consultants LLC, and I am working on a residential development project in the City of Cocoa, Brevard County, Florida. The project is a residential development that consists of 71 single-family homes. According to the Institute of Transportation Engineers (ITE), the project is expected to generate less than 100 peak hour trips, and less than 1,000 daily trips.

I understand that the Brevard County TIA guidelines require a Traffic Impact Analysis (TIA) for any development that generates more than 100 peak hour trips, or more than 1,000 daily trips. However, TIA guidelines also divided TIA Analysis into two categories as Small Project (less than 100 peak hour trips), and Large Project (100 or more peak hour trips), and this raises some uncertainty about the applicability of the TIA requirement for our project.

Please consider this as a Methodology, as it consists of the following information regarding the initial analysis of the project, and please review and let us know if we need to perform the TIA Analysis.

Initial analysis results of the project as follows:

- The ±57.23-acre site is proposed to be a residential development consisting of 71 Single Family Detached Dwelling Units (DUs). (Please see attached Overall Site Plan)
- The site located east of Range Road, approximately 1.33 miles north of SR 520 in the City of Cocoa, Brevard County, Florida. (Please see Figure 1)
- The proposed development at project buildout is projected to generate 736 new external daily trips; of which 55 external trips occur during the AM peak hour, and 72 external trips occur during the PM peak hour.
- Since the only road segment within the 0.5-mile radius of the project site is Range Road (from Lake Dr to Resotine Dr), 100% of the project trip is assigned to Range Road and proposed development projected to consume less than 5% of roadway's current Maximum Acceptable Volume. (Please see attached Tables)

Based on the information provided above, we believe that the proposed development will have a negligible impact on the surrounding traffic network and will not require a full-scale TIA. However, we would like to request your confirmation on whether we need to perform a TIA Analysis and/or Methodology Report or not. Please review this methodology and let us know your feedback as soon as possible.

Thank you for your cooperation and attention. We look forward to hearing from you soon.

Sincerely,

Batuhan Anlitan, MSCE
Transportation/Traffic Engineer

Traffic & Mobility Consultants LLC
3101 Maguire Boulevard, Suite 265
Orlando, Florida 32803
Office: (407) 531-5332 x204
Fax: (407) 531-5331
ba@trafficmobility.com

PLEASE NOTE: Florida has a very broad public records law. Most written communications (including contents of emails and email addresses) to or from City of Cocoa officials and employees regarding public business are public records available to the public and media upon request. Your written and e-mail communications may be subject to public disclosure. If you do not want your written and email communications released in response to a public records request, do not send written or email communications to City of Cocoa officials and employees. Instead, contact this office by phone.

Appendix C

2022 SCTPO Database & 2023 Florida Traffic Online (FTO) *&* FDOT Q/LOS Generalized Table

SPACE COAST TRANSPORTATION PLANNING ORGANIZATION TRAFFIC COUNTS: 2013 - 2022

ID	ROAD	FROM	TO	2013 AADT	2014 AADT	2015 AADT	2016 AADT	2017 AADT	2018 AADT	2019 AADT	2020 AADT	2021 AADT	2022 AADT	Current MAV	Last Count Taken	Functional Classification
AREA: CENTRAL																
	MURRELL RD.	BARNES BLVD.	BARTON BLVD.										11,615			
60	MURRELL RD.	BARNES BLVD.	EYSTER BLVD.										18,630	41,790	01/13/22-01/14/22	Urban Minor Arterial
56	MURRELL RD.	EYSTER BLVD.	BARTON BLVD.										4,600	34,020	01/11/22-01/12/22	Urban Major Collector
592	PEACHTREE ST.	LAKE DR.	FISKE BLVD.	3,010	2,910	NC	NC	NC	3,380	4,330	NC	4,460	4,470	15,600	03/01/22-03/02/22	Urban Major Collector
	PINEHURST AVE./HOLIDAY SPRINGS RD.	WICKHAM RD.	HOLIDAY SPRINGS RD.	4,543	4,458	4,808	4,928	5,088	5,260	5,265	5,718	4,925	4,880			
17	PINEHURST AVE.	WICKHAM RD.	SPYGLASS HILL DR.	6,490	6,270	6,810	7,100	7,320	7,340	7,480	7,250	6,650	6,640	15,600	01/11/22-01/12/22	Urban Minor Collector
530	PINEHURST AVE.	SPYGLASS HILL DR.	FARGO DR.	5,140	5,040	5,340	5,350	5,430	5,810	5,550	6,170	5,130	5,010	15,600	01/11/22-01/12/22	Urban Minor Collector
16	PINEHURST AVE.	FARGO DR.	HOLIDAY SPRINGS RD.	3,000	2,950	3,190	3,340	3,380	3,590	3,750	4,460	3,650	3,740	15,600	01/11/22-01/12/22	Urban Minor Collector
94	HOLIDAY SPRINGS RD.	PINEHURST AVE.	VIERA BLVD.	3,540	3,570	3,890	3,920	4,220	4,300	4,280	4,990	4,270	4,130	15,600	01/11/22-01/12/22	Urban Minor Collector
568	PLUCKEBAUM RD.	CLEARLAKE RD.	FISKE BLVD. (SR 519)	5,970	6,240	7,030	6,490	6,560	7,570	7,270	6,820	6,530	5,900	15,600	01/31/22-02/01/22	Urban Major Collector
	RANGE RD.	SR 520	ROSETINE ST.	4,330	5,140	4,760	5,860	4,740	5,970	4,360	5,990	4,470	5,970			
531	RANGE RD.	SR 520	LAKE DR.	4,330	NC	4,760	NC	4,740	NC	4,360	NC	4,470	NC	15,600	01/19/21-01/20/21	Urban Major Collector
532	RANGE RD.	LAKE DR.	ROSETINE ST.	NC	5,140	NC	5,860	NC	5,970	NC	5,990	NC	5,970	15,600	01/19/22-01/20/22	Urban Major Collector
74	ROSETINE ST.	RANGE RD.	CLEARLAKE RD.	NC	2,730	NC	NC	NC	2,920	NC	3,140	2,760	2,920	15,600	01/19/22-01/20/22	Urban Minor Collector
18	SPYGLASS HILL RD.	MURRELL RD.	PINEHURST AVE.	3,880	3,780	3,960	4,240	4,720	4,640	4,780	4,410	3,940	4,220	15,600	01/11/22-01/12/22	Urban Minor Collector
	SR 520	ORANGE CO	I-95	15,090	15,167	17,220	16,670	16,637	16,567	17,160	17,767	17,273	16,097			
534	SR 520	ORANGE CO	SR 524	13,140	12,760	15,950	15,170	15,750	12,240	16,010	18,680	15,530	14,590	40,300	03/10/22-03/11/22	Rural Principal Arterial Other
1	SR 520	SR 524	FRIDAY RD.	14,050	13,990	15,720	14,880	14,320	16,610	14,650	14,700	15,100	12,460	41,790	02/03/22-02/04/22	Urban Principal Arterial-Other
84	SR 520	FRIDAY RD.	I-95	18,080	18,750	19,990	19,960	19,840	20,850	20,820	19,920	21,190	21,240	41,790	03/09/22-03/10/22	Urban Principal Arterial-Other
	SR 520	I-95	CLEARLAKE RD. (SR 501)	20,367	20,583	23,857	22,600	21,240	20,573	23,173	21,193	22,727	21,840			
2	SR 520	I-95	BURNETT RD.	20,200	21,440	24,190	22,190	21,780	21,740	21,650	24,200	23,230	21,640	41,790	02/03/22-02/04/22	Urban Principal Arterial-Other
3	SR 520	BURNETT RD.	RANGE RD.	19,980	19,680	24,180	22,970	21,040	20,040	21,280	19,840	22,550	21,530	41,790	02/03/22-02/04/22	Urban Principal Arterial-Other
14	SR 520	RANGE RD.	CLEARLAKE RD. (SR 501)	20,920	20,630	23,200	22,640	20,900	19,940	26,590	19,540	22,400	22,350	41,790	02/03/22-02/04/22	Urban Principal Arterial-Other
	SR 520	CLEARLAKE RD. (SR 501)	FISKE BLVD. (SR 519)	20,815	21,385	24,880	24,575	22,915	22,735	22,115	21,730	23,145	21,260			
4	SR 520	CLEARLAKE RD. (SR 501)	LAKE DR.	19,160	19,560	22,860	22,870	20,200	20,800	20,400	21,720	21,550	19,310	39,800	02/03/22-02/04/22	Urban Principal Arterial-Other
5	SR 520	LAKE DR.	FISKE BLVD. (SR 519)	22,470	23,210	26,900	26,280	25,630	24,670	23,830	21,740	24,740	23,210	39,800	02/03/22-02/04/22	Urban Principal Arterial-Other
	SR 520	FISKE BLVD. (SR 519)	US 1	23,775	25,160	28,120	28,250	26,600	25,495	25,275	23,310	26,600	24,575			
6	SR 520	FISKE BLVD. (SR 519)	BLAKE AVE.	23,820	25,090	28,270	28,430	26,540	25,550	25,280	NC	26,680	25,010	41,790	02/03/22-02/04/22	Urban Principal Arterial-Other
7	SR 520	BLAKE AVE.	US 1	23,730	25,230	27,970	28,070	26,660	25,440	25,270	23,310	26,520	24,140	41,790	02/03/22-02/04/22	Urban Principal Arterial-Other
	SR 520 (EB)	US 1	RIVEREDGE BLVD.	19,838	19,020	21,483	18,600	20,718	20,855	21,135	19,265	22,220	19,625			
8	SR 520 (EB)	US 1	FORREST AVE.	15,570	17,090	18,210	13,820	16,750	17,250	16,830	15,460	NC	16,470	19,440	03/09/22-03/10/22	Urban Principal Arterial-Other
9	SR 520 (EB)	FORREST AVE.	BREVARD AVE.	21,020	19,560	21,850	19,620	22,460	20,930	22,250	20,930	21,800	20,140	19,440	02/03/22-02/04/22	Urban Principal Arterial-Other
10	SR 520 (EB)	BREVARD AVE.	DELANNOY AVE.	20,900	19,450	22,930	22,010	21,670	22,280	22,500	19,990	NC	21,080	19,440	03/09/22-03/10/22	Urban Principal Arterial-Other
11	SR 520 (EB)	DELANNOY AVE.	RIVEREDGE BLVD.	21,860	19,980	22,940	18,950	21,990	22,960	22,960	20,680	22,640	20,810	19,440	02/03/22-02/04/22	Urban Principal Arterial-Other
	SR 520 (WB)	CAUSEWAY	US 1	20,770	20,643	21,703	20,098	21,220	20,920	21,915	19,093	17,797	21,705			
12	SR 520 (WB)	CAUSEWAY	DELANNOY AVE.	22,160	21,250	23,700	23,050	21,130	22,990	22,780	20,340	22,850	20,800	19,440	02/03/22-02/04/22	Urban Principal Arterial-Other
13	SR 520 (WB)	DELANNOY AVE.	BREVARD AVE.	23,970	23,100	23,460	21,900	24,290	22,980	24,250	21,420	NC	22,610	19,440	03/09/22-03/10/22	Urban Principal Arterial-Other
15	SR 520 (WB)	BREVARD AVE.	FORREST AVE.	21,220	21,560	22,400	18,690	21,810	20,660	21,610	19,840	22,080	NC	19,440	01/19/21-01/20/21	Urban Principal Arterial-Other
87	SR 520 (WB)	FORREST AVE.	US 1	15,730	16,660	17,250	16,750	17,650	17,050	19,020	14,770	NC	NC	19,440	01/29/20-01/30/20	Urban Principal Arterial-Other
66	SR 524	SR 520	I-95	4,670	4,530	5,690	5,300	5,890	7,200	6,870	6,600	8,460	6,280	24,200	03/10/22-03/11/22	Urban Minor Arterial
	SR 524	I-95	INDUSTRY RD.	11,220	10,880	12,765	12,605	11,710	13,860	12,540	11,775	13,965	13,625			
73	SR 524	I-95	COX RD.	9,780	9,670	11,440	11,170	10,460	12,690	11,700	11,020	13,300	12,870	18,590	02/02/22-02/03/22	Urban Minor Arterial
76	SR 524	COX RD.	INDUSTRY RD.	12,660	12,090	14,090	14,040	12,960	15,030	13,380	12,530	14,630	14,380	19,470	01/24/22-01/25/22	Urban Minor Arterial
	SR 528	ORANGE CO	I-95	27,835	28,320	34,205	31,740	33,780	40,640	37,805	43,810	33,090	27,865			
91	SR 528	ORANGE CO	SR 407	30,820	30,220	37,830	35,120	37,330	40,640	42,560	49,690	36,880	31,390	43,000	02/02/22-02/03/22	Rural Principal Arterial - Freeways & Expressways
90	SR 528	SR 407	I-95	24,850	26,420	30,580	28,360	30,230	NC	33,050	37,930	29,300	24,340	43,000	02/17/22-02/18/22	Rural Principal Arterial - Freeways & Expressways
	SR 528	I-95	US 1	25,860	25,315	30,165	27,775	28,340	31,000	32,730	37,960	28,765	27,060			
93	SR 528	I-95	INDUSTRY RD.	21,000	23,050	23,030	22,810	23,290	29,350	28,880	33,780	24,750	22,810	74,400	02/02/22-02/03/22	Urban Principal Arterial - Freeways & Expressways
92	SR 528	INDUSTRY RD.	US 1	30,720	27,580	37,300	32,740	33,390	32,650	36,580	42,140	32,780	31,310	74,400	01/27/22-01/28/22	Urban Principal Arterial - Freeways & Expressways
25	STADIUM PKWY.	WICKHAM RD.	JUDGE F JAMIESON WY.	6,550	6,890	7,810	8,480	9,150	10,460	11,240	10,620	10,380	11,180	17,700	01/11/22-01/12/22	Urban Minor Arterial
	STADIUM PKWY.	JUDGE F JAMIESON WY	I-95/FISKE BLVD.	16,515	16,965	17,707	18,173	19,337	20,273	20,780	18,447	15,570	14,613			
26	STADIUM PKWY.	JUDGE F JAMIESON WY	VIERA BLVD.	18,270	18,910	19,950	20,890	22,170	22,920	23,650	24,190	18,970	16,590	39,800	01/11/22-01/12/22	Urban Minor Arterial
535	STADIUM PKWY.	VIERA BLVD.	ROSEMOUNT DR.	14,760	15,020	15,980	16,120	17,160	17,870	18,460	15,370	13,700	13,780	39,800	01/11/22-01/12/22	Urban Minor Arterial
606	STADIUM PKWY.	ROSEMOUNT DR.	I-95/FISKE BLVD.			17,190	17,510	18,680	20,030	20,230	15,780	14,020	13,470	39,800	01/11/22-01/12/22	Urban Minor Arterial
607	TAVISTOCK DR.	JUDGE F JAMIESON WY.	VIERA BLVD.			3,300	3,680	3,720	3,780	3,620	3,310	2,990	3,070	15,600	01/11/22-01/12/22	Urban Local
608	TAVISTOCK DR.	VIERA BLVD.	STADIUM PKWY.			2,890	2,680	2,650	3,160	2,290	2,250	2,180	2,130	15,600	01/11/22-01/12/22	Urban Local
	US 1	PINEDA CSWY. (SR 404)	BARNES BLVD.	29,530	31,853	32,577	32,687	30,737	32,013	31,497	32,037	29,953	28,490			
89	US 1	PINEDA CSWY. (SR 404)	SUNTREE BLVD.	33,100	37,580	37,310	38,750	34,340	38,730	37,540	38,150	35,090	31,640	41,790	03/09/22-03/10/22	Urban Principal Arterial-Other
567	US 1	SUNTREE BLVD.	VIERA BLVD.	28,770	31,550	32,650	31,520	30,670	31,070	29,740	31,800	28,090	25,340	41,790	03/09/22-03/10/22	Urban Principal Arterial-Other
36	US 1	VIERA BLVD.	BARNES BLVD.	26,720	26,430	27,770	27,790	27,200	26,240	27,210	26,160	26,680	NC	41,790	01/12/21-01/13/21	Urban Principal Arterial-Other
70	US 1	BARNES BLVD.	EYSTER BLVD.	26,150	25,690	25,980	26,300	25,060	26,090	26,340	25,880	26,480	30,560	41,790	01/27/22-01/28/22	Urban Principal Arterial-Other
	US 1	EYSTER BLVD.	ROSA JONES DR.	34,977	35,303	36,267	35,167	34,170	37,277	35,953	35,180	36,280	35,815			
34	US 1	EYSTER BLVD.	BARTON BLVD.	33,220	32,820	34,440	33,650	32,520	31,160	34,410	32,080	33,300	NC	62,900	01/19/21-01/20/21	Urban Principal Arterial-Other
33	US 1	BARTON BLVD.	FLORIDA AVE.	38,070	40,180	40,480	39,840	36,860	42,630	38,100	38,490	39,550	37,430	62,900	01/27/22-01/28/22	Urban Principal Arterial-Other
88	US 1	FLORIDA AVE.	ROSA JONES DR.	33,640	32,910	33,880	32,010	33,130	38,040	35,350	34,970	35,990	34,200	62,900	01/27/22-01/28/22	Urban Principal Arterial-Other

**Note: 2016 AADT's Beaches area were counted twice in 2016 and the AADT listed is the average of the two counts.*
NC=Not Counted; UC=Under Construction

FLORIDA DEPARTMENT OF TRANSPORTATION
2022 ANNUAL AVERAGE DAILY TRAFFIC REPORT - REPORT TYPE: ALL

COUNTY: 70 BREVARD

SITE	SITE TYPE	DESCRIPTION	DIRECTION 1		DIRECTION 2		AADT TWO-WAY		"K" FCTR	"D" FCTR	"T" FCTR
7034		LAMPLIGHTER DRIVE, PACE DRIVE TO EMERSON DRIVE (	N	700	S	700	1400	C	9.0	53.9F	4.4A
7035		PEACHTREE STREET, CLEARLAKE ROAD/SR-501 TO FORRE	E	2800	W	3100	5900	C	9.0	53.9F	4.1A
7036		STACK BLVD., PALM BAY ROAD TO EBER ROAD (HPMS)	N	1900	S	1700	3600	C	9.0	53.9F	3.9A
7037		FRIDAY ROAD, SR-520 TO SR-524 (HPMS)	N	1000	S	950	1950	C	9.0	53.9F	5.5A
7038		HIBISCUS BLVD, 1250 FT E OF DAIRY RD (HPMS)	E	7700	W	8400	16100	C	9.0	53.9F	3.1A
7039		SINGLETON AVE/WESTWOOD DR., SR-406/GARDEN ST TO	E	4400	W	4100	8500	C	9.0	53.9F	4.2A
7040		SARNO ROAD, 0.70 MI E OF SR 518 (I-95 TO A1A) (H	E	7500	W	6800	14300	C	9.0	53.9F	4.1A
7041		MALABAR ROAD, 0.1 MI E OF ELDRON BLVD. (HPMS)	E	11000E	W	12000E	23000	S	9.0	53.9F	16.4P
7042		FISKE BLVD. 0.25 N OF SR-520 TO DIXON BLVD (HPMS	N	3300	S	3300	6600	C	9.0	53.9F	4.0P
7043		BANANA RIVER DR/PINETREE DR., 0.25 MI W OF SR-A1	E	1500E	W	1800E	3300	S	9.0	53.9F	13.1P
7044		GEORGE KING BLVD, 850 FT W OF N ATLANTIC BLVD (H	W	3900	E	2600	6500	C	9.0	53.9F	16.7A
7045		DIXON BLVD., 0.20 MI W OF CLEARLAKE RD/SR-501 TO	E	4700	W	4800	9500	C	9.0	53.9F	5.9A
7046		RANGE ROAD, 0.18 MI N OF SR-520 (HPMS)	N	2500	S	2200	4700	C	9.0	53.9F	8.0A
7047		HOLDER RD, 0.2 MI N OF PARRISH ROAD (HPMS)	N	1200E	S	1100E	2300	S	9.0	53.9F	1.8P
7048		PARRISH ROAD, 0.29 MI E OF I-95 (HPMS)	E	300E	W	400E	700	S	9.0	53.9F	1.7P
7049		PARK AVENUE, 0.86 MI S OF SOUTH STREET (HPMS)	N	4400E	S	3500E	7900	S	9.0	53.9F	4.2P

SITE TYPE : BLANK= PORTABLE; T= TELEMETERED
"K" FACTOR : DEPARTMENT ADOPTED STANDARD K FACTOR BEGINING WITH COUNT YEAR 2011
AADT FLAGS : C= COMPUTED; E= MANUAL EST; F= FIRST YEAR EST; S= SECOND YEAR EST; T= THIRD YEAR EST; R= FOURTH YEAR EST; V= FIFTH YEAR EST; 6= SIXTH YEAR EST; X= UNKNOWN
"D/T" FLAGS : A= ACTUAL; F= FACTOR CATG; D= DIST FUNCL; P= PRIOR YEAR; S= STATEWIDE DEFAULT; W= ONE-WAY ROAD; X= CROSS REF

C3R

Motor Vehicle Highway Generalized Service Volume Tables

(C3R-Suburban Residential)

Adjusted Capacity

Peak Hour Directional

	B	C	D	E
1 Lane	*	776	888	**
2 Lane	*	1,360	1,480	**
3 Lane	*	2,096	2,184	**

Peak Hour Two-Way

	B	C	D	E
2 Lane	*	1,408	1,616	**
4 Lane	*	2,472	2,688	**
6 Lane	*	3,808	3,968	**

AADT

	B	C	D	E
2 Lane	*	15,680	17,920	**
4 Lane	*	27,440	29,840	**
6 Lane	*	42,320	44,080	**

Round results to the nearest tens (i.e. 1,754 should be rounded to 1,750)

Base Capacity

Peak Hour Directional

	B	C	D	E
1 Lane	*	970	1,110	**
2 Lane	*	1,700	1,850	**
3 Lane	*	2,620	2,730	**

Peak Hour Two-Way

	B	C	D	E
2 Lane	*	1,760	2,020	**
4 Lane	*	3,090	3,360	**
6 Lane	*	4,760	4,960	**

AADT

	B	C	D	E
2 Lane	*	19,600	22,400	**
4 Lane	*	34,300	37,300	**
6 Lane	*	52,900	55,100	**

Source: 2023 FDOT MQ/LOS Handbook

Apply Adjustment Factors

One-way Facility: PHDS Multiply by 1.2 ; AADT: Multiply by 0.6	☐
2 Lane Divided Roadway **with** Exclusive Left Turn Adjustment: Multiply by 1.05	☐
2 Lane Undivided Roadway **with No** Exclusive Left Turn Lane(s): Multiply by 0.80	☑
Exclusive Right Turn Lane(s): Multiply by 1.05	☐
Multilane Undivided Roadway **with** Exclusive Left Turn: Multiply by 0.95	☐
Multilane Undivided Roadway **with No** Exclusive Left Turn Lane(s): Multiply by 0.75	☐
Non-State Signalized Roadway	☐

This table does not constitute a standard and should be used only for general planning applications. The table should not be used for corridor or intersection design, where more refined techniques exist.

*Cannot be achieved using table input value defaults.

**Not applicable for that level of service letter grade. For the automobile mode, volumes greater than level of service D become F because intersection capacities have been reached.

Source: 2023 FDOT MQ/LOS Handbook, Appendix B: Florida's Generalized Service Volume Tables

PHDS: Peak Hour Directional Service

2023 Multimodal Quality/ Level Of Service Handbook, January 2023

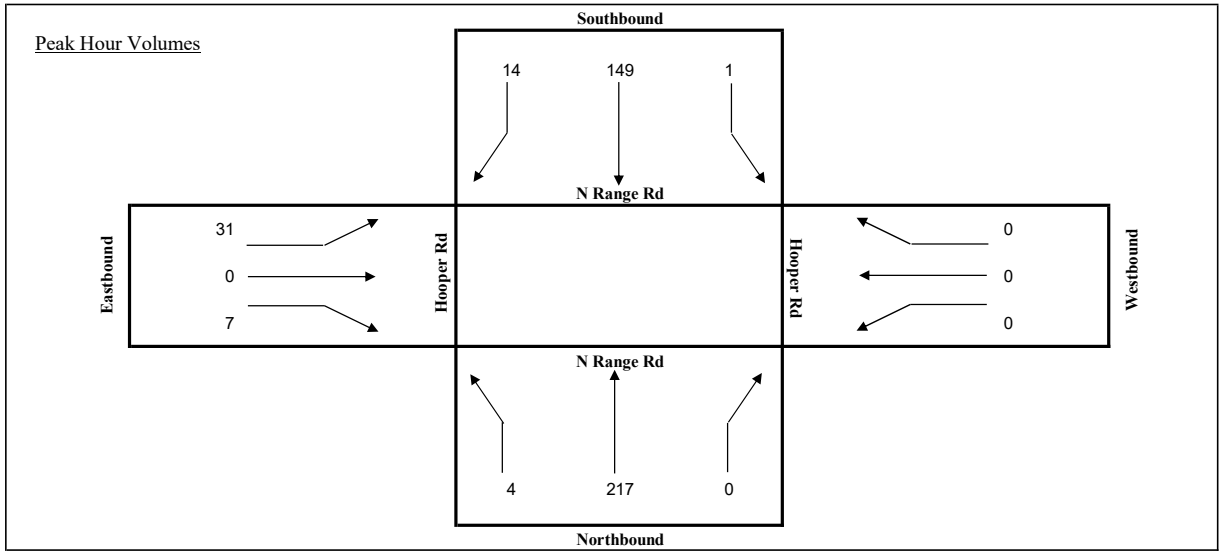
Appendix D
Turning Movement Counts & Seasonal Factor Data

TURNING MOVEMENT COUNT ANALYSIS

AUTOS & TRUCKS

Intersection (N/S): N Range Rd
Intersection (E/W): Hooper Rd
Date: 11/14/2023

			N Range Rd			N Range Rd			Hooper Rd			Hooper Rd			
			NB			SB			EB			WB			
	Start	End	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
	7:00 AM	7:15 AM	0	18	0	0	17	2	2	0	1	0	0	0	40
	7:15 AM	7:30 AM	1	35	0	0	24	4	9	0	2	0	0	0	75
	7:30 AM	7:45 AM	6	56	0	0	32	6	9	0	5	0	0	0	114
	7:45 AM	8:00 AM	2	58	0	0	26	4	5	0	1	0	0	0	96
	8:00 AM	8:15 AM	1	38	0	0	30	1	6	0	3	0	0	0	79
	8:15 AM	8:30 AM	1	55	0	1	41	4	11	0	1	0	0	0	114
	8:30 AM	8:45 AM	0	66	0	0	52	5	9	0	2	0	0	0	134
	8:45 AM	9:00 AM	0	28	0	0	37	4	3	0	0	0	0	0	72
Total for:	7:00 AM	8:00 AM	9	167	0	0	99	16	25	0	9	0	0	0	325
Total for:	8:00 AM	9:00 AM	2	187	0	1	160	14	29	0	6	0	0	0	399
Tota Peak Hour:	7:45 AM	8:45 AM	4	217	0	1	149	14	31	0	7	0	0	0	423
Overall PHF:	0.79														

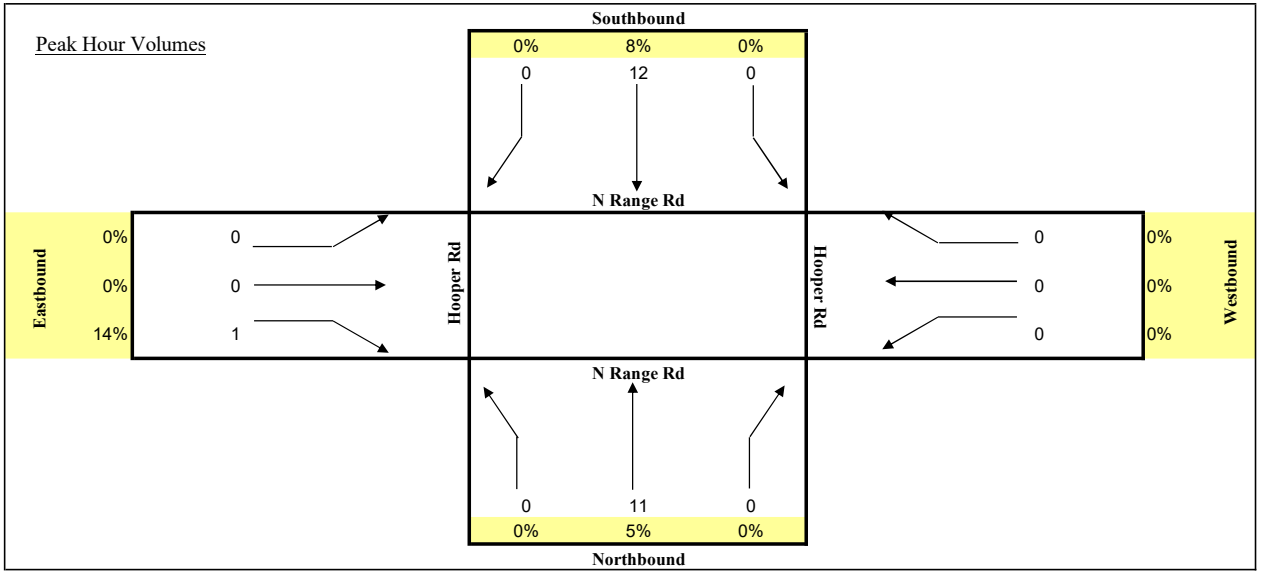


TURNING MOVEMENT COUNT ANALYSIS

TRUCKS

Intersection (N/S): N Range Rd
Intersection (E/W): Hooper Rd
Date: 11/14/2023

		N Range Rd			N Range Rd			Hooper Rd			Hooper Rd			
		NB			SB			EB			WB			
Start	End	R	T	L	R	T	L	R	T	L	R	T	L	TOTAL
7:00 AM	7:15 AM	0	2	0	0	0	0	0	0	0	0	0	0	2
7:15 AM	7:30 AM	0	3	0	0	2	0	0	0	0	0	0	0	5
7:30 AM	7:45 AM	0	4	0	0	0	0	0	0	1	0	0	0	5
7:45 AM	8:00 AM	0	4	0	0	1	0	0	0	1	0	0	0	6
8:00 AM	8:15 AM	0	2	0	0	0	0	0	0	0	0	0	0	2
8:15 AM	8:30 AM	0	2	0	0	8	0	0	0	0	0	0	0	10
8:30 AM	8:45 AM	0	3	0	0	3	0	0	0	0	0	0	0	6
8:45 AM	9:00 AM	0	3	0	0	3	0	0	0	0	0	0	0	6
Total for:	7:00 AM	8:00 AM	0	13	0	0	3	0	0	0	2	0	0	0	18
Total for:	8:00 AM	9:00 AM	0	10	0	0	14	0	0	0	0	0	0	0	24
Tota Peak Hour:	7:45 AM	8:45 AM	0	11	0	0	12	0	0	0	1	0	0	0	24
Overall PHF:	0.60														

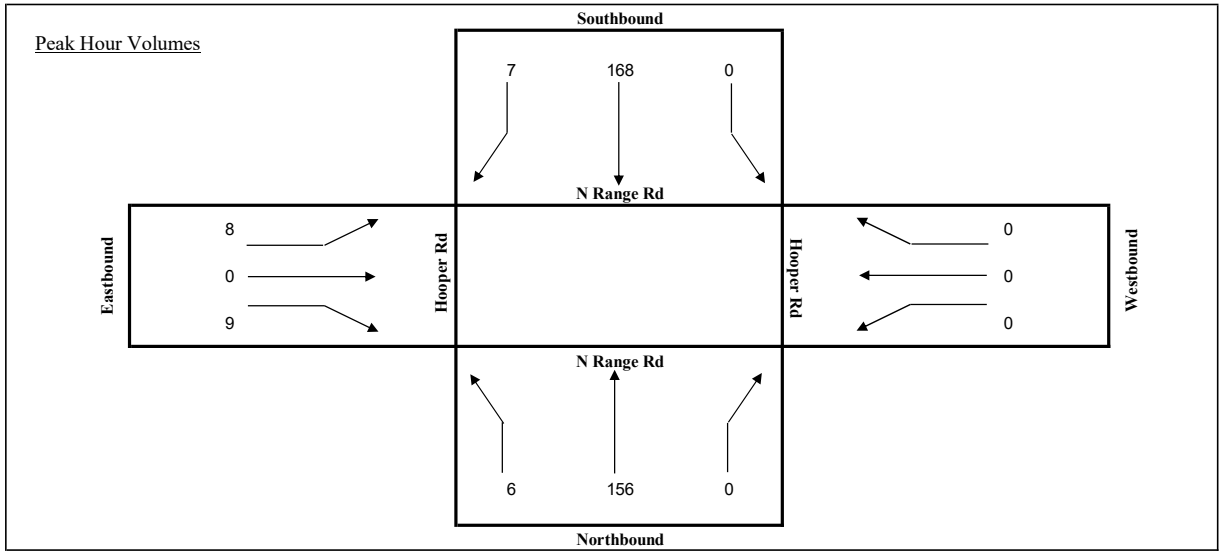


TURNING MOVEMENT COUNT ANALYSIS

AUTOS & TRUCKS

Intersection (N/S): N Range Rd
Intersection (E/W): Hooper Rd
Date: 11/14/2023

			N Range Rd			N Range Rd			Hooper Rd			Hooper Rd			
			NB			SB			EB			WB			
Start	End	L	T	R	L	T	R	L	T	R	L	T	R	TOTAL
4:00 PM	4:15 PM	3	48	0	0	44	3	3	0	4	0	0	0	105
4:15 PM	4:30 PM	1	33	0	0	41	2	2	0	3	0	0	0	82
4:30 PM	4:45 PM	2	39	0	0	42	1	0	0	0	0	0	0	84
4:45 PM	5:00 PM	0	36	0	0	41	1	3	0	2	0	0	0	83
5:00 PM	5:15 PM	1	35	0	0	32	5	6	0	1	0	0	0	80
5:15 PM	5:30 PM	1	37	0	0	39	4	4	0	0	0	0	0	85
5:30 PM	5:45 PM	2	43	0	0	33	5	5	0	0	0	0	0	88
5:45 PM	6:00 PM	3	49	0	0	28	5	6	0	0	0	0	0	91
Total for:	4:00 PM	5:00 PM	6	156	0	0	168	7	8	0	9	0	0	0	354
Total for:	5:00 PM	6:00 PM	7	164	0	0	132	19	21	0	1	0	0	0	344
Tota Peak Hour:	4:00 PM	5:00 PM	6	156	0	0	168	7	8	0	9	0	0	0	354
Overall PHF:	0.84														

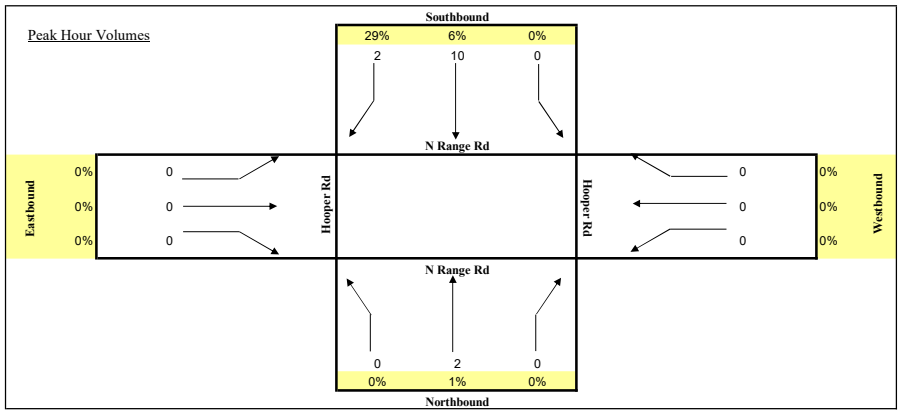


TURNING MOVEMENT COUNT ANALYSIS

TRUCKS

Intersection (N/S): N Range Rd
Intersection (E/W): Hooper Rd
Date: 11/14/2023

		N Range Rd			N Range Rd			Hooper Rd			Hooper Rd			
		NB			SB			EB			WB			
Start	End	R	T	L	R	T	L	R	T	L	R	T	L	TOTAL
4:00 PM	4:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
4:15 PM	4:30 PM	0	0	0	0	2	2	0	0	0	0	0	0	4
4:30 PM	4:45 PM	0	2	0	0	2	0	0	0	0	0	0	0	4
4:45 PM	5:00 PM	0	0	0	0	4	0	0	0	0	0	0	0	4
5:00 PM	5:15 PM	0	0	0	0	2	0	0	0	0	0	0	0	2
5:15 PM	5:30 PM	0	2	0	0	0	0	0	0	0	0	0	0	2
5:30 PM	5:45 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
5:45 PM	6:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
Total for:	4:00 PM	5:00 PM	0	3	0	0	8	2	0	0	0	0	0	0	13
Total for:	5:00 PM	6:00 PM	0	2	0	0	4	0	0	0	0	0	0	0	6
Tota Peak Hour:	4:15 PM	5:15 PM	0	2	0	0	10	2	0	0	0	0	0	0	14
Overall PHF:	0.88														



2022 PEAK SEASON FACTOR CATEGORY REPORT - REPORT TYPE: ALL
CATEGORY: 7000 BREVARD COUNTYWIDE

MOCF: 0.93

WEEK	DATES	SF	PSCF
1	01/01/2022 - 01/01/2022	1.03	1.11
2	01/02/2022 - 01/08/2022	1.02	1.10
3	01/09/2022 - 01/15/2022	1.01	1.09
4	01/16/2022 - 01/22/2022	0.99	1.06
5	01/23/2022 - 01/29/2022	0.98	1.05
* 6	01/30/2022 - 02/05/2022	0.96	1.03
* 7	02/06/2022 - 02/12/2022	0.94	1.01
* 8	02/13/2022 - 02/19/2022	0.92	0.99
* 9	02/20/2022 - 02/26/2022	0.92	0.99
*10	02/27/2022 - 03/05/2022	0.91	0.98
*11	03/06/2022 - 03/12/2022	0.91	0.98
*12	03/13/2022 - 03/19/2022	0.90	0.97
*13	03/20/2022 - 03/26/2022	0.91	0.98
*14	03/27/2022 - 04/02/2022	0.92	0.99
*15	04/03/2022 - 04/09/2022	0.93	1.00
*16	04/10/2022 - 04/16/2022	0.94	1.01
*17	04/17/2022 - 04/23/2022	0.95	1.02
*18	04/24/2022 - 04/30/2022	0.96	1.03
19	05/01/2022 - 05/07/2022	0.97	1.04
20	05/08/2022 - 05/14/2022	0.98	1.05
21	05/15/2022 - 05/21/2022	0.99	1.06
22	05/22/2022 - 05/28/2022	1.00	1.08
23	05/29/2022 - 06/04/2022	1.02	1.10
24	06/05/2022 - 06/11/2022	1.04	1.12
25	06/12/2022 - 06/18/2022	1.05	1.13
26	06/19/2022 - 06/25/2022	1.05	1.13
27	06/26/2022 - 07/02/2022	1.05	1.13
28	07/03/2022 - 07/09/2022	1.05	1.13
29	07/10/2022 - 07/16/2022	1.05	1.13
30	07/17/2022 - 07/23/2022	1.04	1.12
31	07/24/2022 - 07/30/2022	1.04	1.12
32	07/31/2022 - 08/06/2022	1.04	1.12
33	08/07/2022 - 08/13/2022	1.04	1.12
34	08/14/2022 - 08/20/2022	1.04	1.12
35	08/21/2022 - 08/27/2022	1.05	1.13
36	08/28/2022 - 09/03/2022	1.06	1.14
37	09/04/2022 - 09/10/2022	1.07	1.15
38	09/11/2022 - 09/17/2022	1.08	1.16
39	09/18/2022 - 09/24/2022	1.06	1.14
40	09/25/2022 - 10/01/2022	1.04	1.12
41	10/02/2022 - 10/08/2022	1.02	1.10
42	10/09/2022 - 10/15/2022	1.00	1.08
43	10/16/2022 - 10/22/2022	1.02	1.10
44	10/23/2022 - 10/29/2022	1.03	1.11
45	10/30/2022 - 11/05/2022	1.04	1.12
46	11/06/2022 - 11/12/2022	1.05	1.13
47	11/13/2022 - 11/19/2022	1.06	1.14
48	11/20/2022 - 11/26/2022	1.05	1.13
49	11/27/2022 - 12/03/2022	1.05	1.13
50	12/04/2022 - 12/10/2022	1.04	1.12
51	12/11/2022 - 12/17/2022	1.03	1.11
52	12/18/2022 - 12/24/2022	1.02	1.10
53	12/25/2022 - 12/31/2022	1.01	1.09

* PEAK SEASON

Appendix E
HCM Analysis Worksheets - Existing Conditions

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	33	7	4	230	158	15
Future Vol, veh/h	33	7	4	230	158	15
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	79	79	79	79	79	79
Heavy Vehicles, %	0	14	0	5	8	0
Mvmt Flow	42	9	5	291	200	19

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	511	210	219	0	-	0
Stage 1	210	-	-	-	-	-
Stage 2	301	-	-	-	-	-
Critical Hdwy	6.4	6.34	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.426	2.2	-	-	-
Pot Cap-1 Maneuver	526	801	1362	-	-	-
Stage 1	830	-	-	-	-	-
Stage 2	755	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	524	801	1362	-	-	-
Mov Cap-2 Maneuver	524	-	-	-	-	-
Stage 1	827	-	-	-	-	-
Stage 2	755	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.1	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1362	-	558	-	-
HCM Lane V/C Ratio	0.004	-	0.091	-	-
HCM Control Delay (s)	7.7	0	12.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	10	6	165	178	7
Future Vol, veh/h	8	10	6	165	178	7
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	84	84	84	84	84	84
Heavy Vehicles, %	0	0	0	1	6	29
Mvmt Flow	10	12	7	196	212	8

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	426	216	220	0	-	0
Stage 1	216	-	-	-	-	-
Stage 2	210	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	589	829	1361	-	-	-
Stage 1	825	-	-	-	-	-
Stage 2	830	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	585	829	1361	-	-	-
Mov Cap-2 Maneuver	585	-	-	-	-	-
Stage 1	820	-	-	-	-	-
Stage 2	830	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.3	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1361	-	699	-	-
HCM Lane V/C Ratio	0.005	-	0.031	-	-
HCM Control Delay (s)	7.7	0	10.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Appendix F
ITE Trip Generation Sheets

Single-Family Detached Housing
(210)

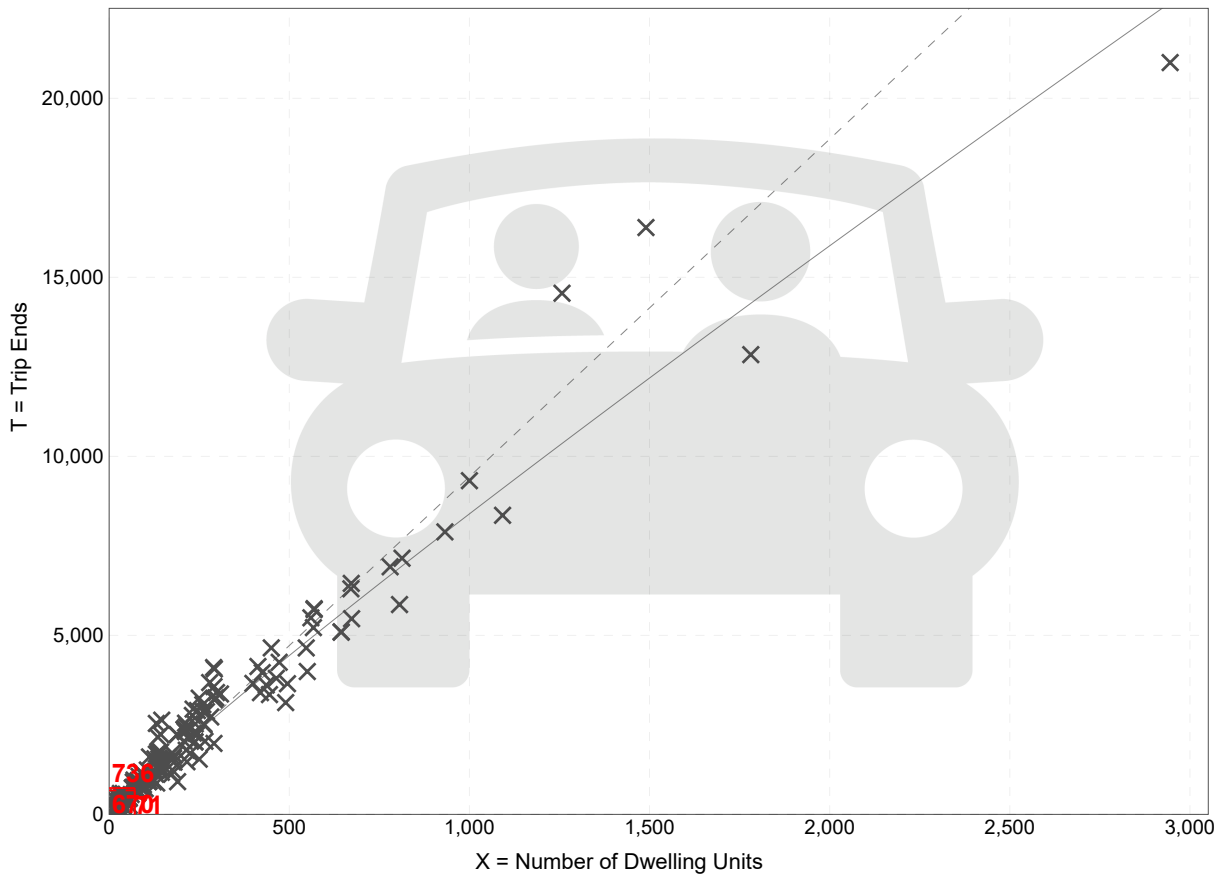
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 174
Avg. Num. of Dwelling Units: 246
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.43	4.45 - 22.61	2.13

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.92 Ln(X) + 2.68

R^2= 0.95

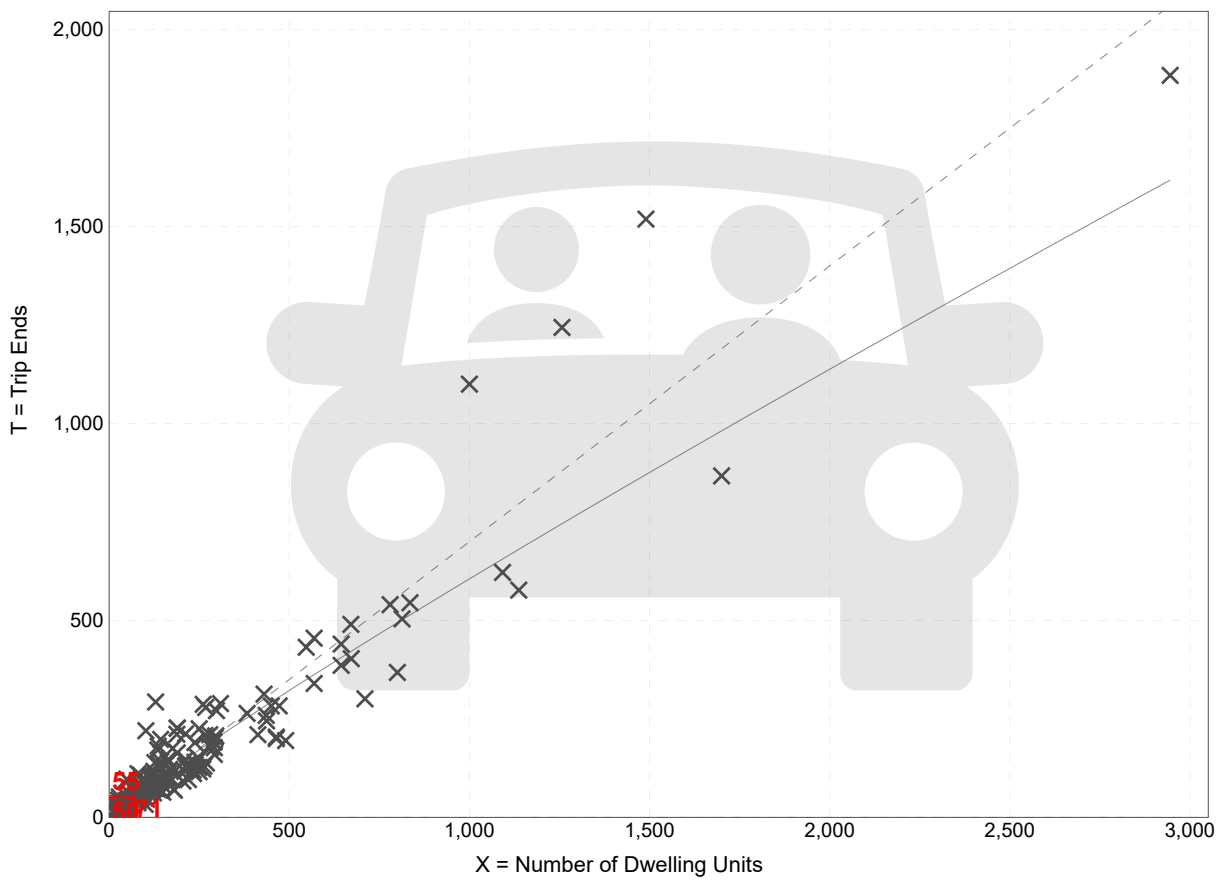
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 192
Avg. Num. of Dwelling Units: 226
Directional Distribution: 25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.70	0.27 - 2.27	0.24

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.91 Ln(X) + 0.12 **R^2= 0.90**

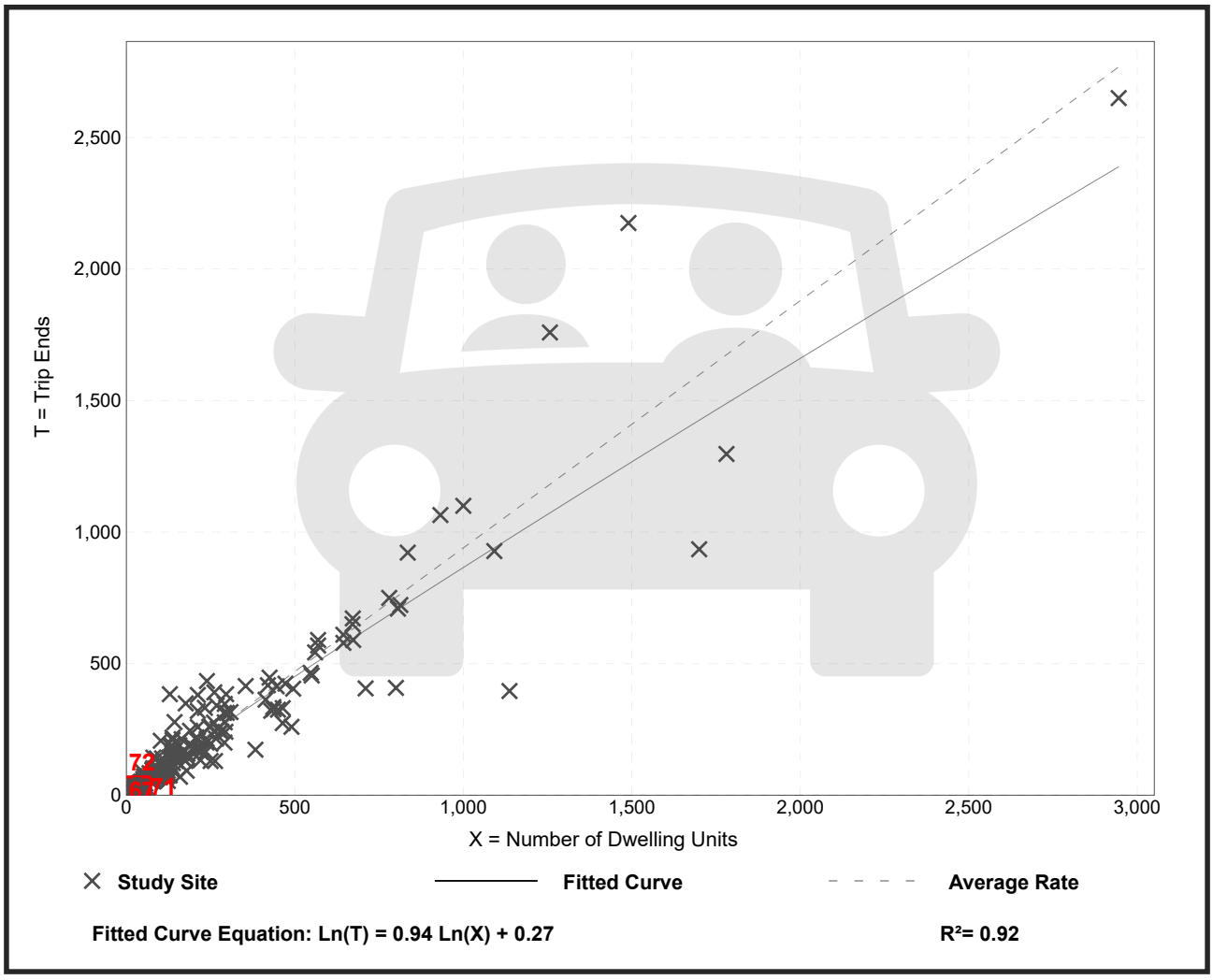
Single-Family Detached Housing
(210)

Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 208
Avg. Num. of Dwelling Units: 248
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.94	0.35 - 2.98	0.31

Data Plot and Equation



Appendix G
FTO Historical AADT & Growth Rate Calculations

FLORIDA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION STATISTICS OFFICE
2022 HISTORICAL AADT REPORT

COUNTY: 70 - BREVARD

SITE: 7046 - RANGE ROAD, 0.18 MI N OF SR-520 (HPMS)

YEAR	AADT	DIRECTION 1	DIRECTION 2	*K FACTOR	D FACTOR	T FACTOR
2022	4700 C	N 2500	S 2200	9.00	53.90	8.00
2021	4800 S	N 2400	S 2400	9.00	54.30	9.90
2020	4800 F	N 2400	S 2400	9.00	55.00	9.90
2019	5000 C	N 2500	S 2500	9.00	54.70	9.90
2018	4500 S	N 2200	S 2300	9.00	54.10	1.50
2017	4300 F	N 2100	S 2200	9.00	54.30	1.50
2016	4100 C	N 2000	S 2100	9.00	53.40	1.50
2015	4300 T			9.00	53.80	6.20
2014	4200 S	N 2200	S 2000	9.00	53.80	4.30
2013	4200 F	N 2200	S 2000	9.00	54.20	4.30
2012	4200 C	N 2200	S 2000	9.00	53.60	4.30
2011	4200 C	N 2100	S 2100	9.00	54.30	3.70
2010	4300 S	N 1900	S 2400	10.91	56.02	3.60
2009	4300 F	N 1900	S 2400	11.80	61.02	3.30
2008	4500 C	N 2000	S 2500	11.37	57.79	3.20

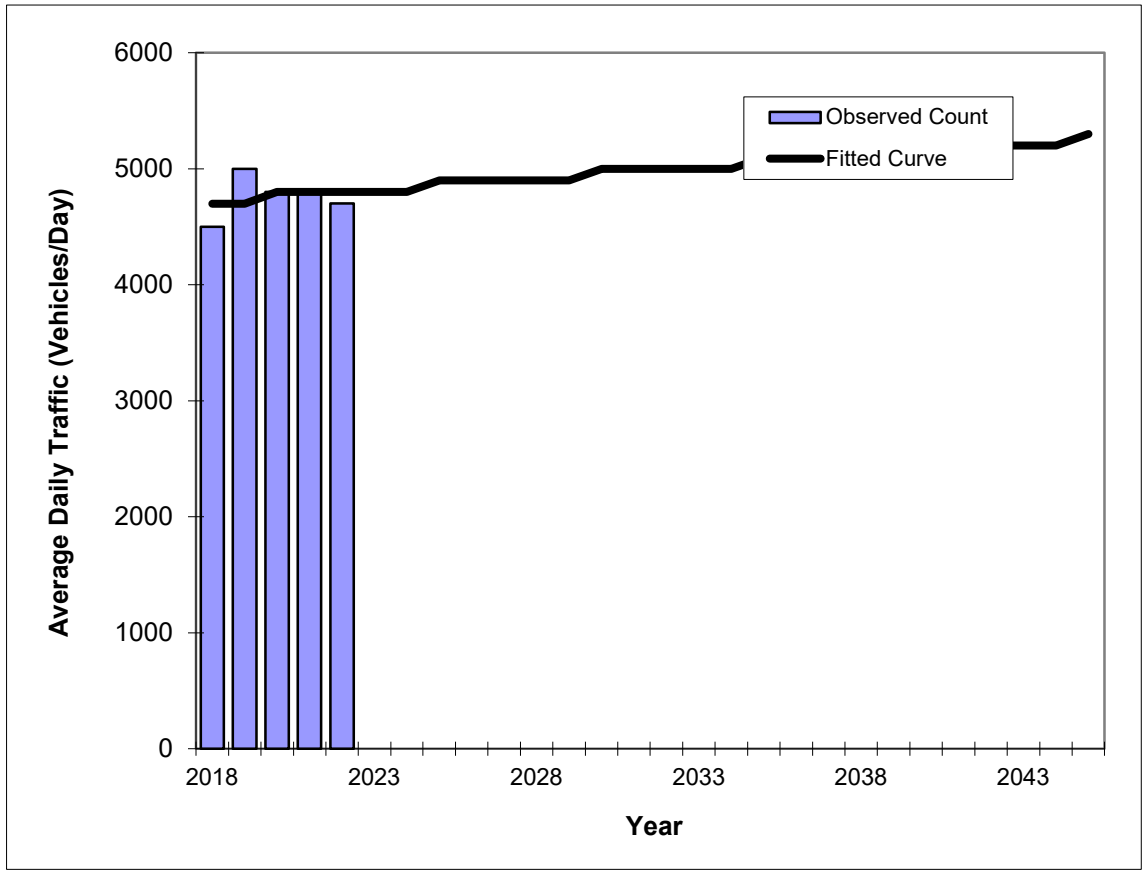
AADT FLAGS: C = COMPUTED; E = MANUAL ESTIMATE; F = FIRST YEAR ESTIMATE
S = SECOND YEAR ESTIMATE; T = THIRD YEAR ESTIMATE; R = FOURTH YEAR ESTIMATE
V = FIFTH YEAR ESTIMATE; 6 = SIXTH YEAR ESTIMATE; X = UNKNOWN
*K FACTOR: STARTING WITH YEAR 2011 IS STANDARDK, PRIOR YEARS ARE K30 VALUES

Traffic Trends - V2.0

RANGE RD --

PIN#	0
Location	1

County:	Brevard (70)
Station #:	7046
Highway:	RANGE RD



Year	Traffic (ADT/AADT) Count*	Trend**
2018	4500	4700
2019	5000	4700
2020	4800	4800
2021	4800	4800
2022	4700	4800
2026 Opening Year Trend		
2026	N/A	4900
2035 Mid-Year Trend		
2035	N/A	5100
2045 Design Year Trend		
2045	N/A	5300
TRANPLAN Forecasts/Trends		

**** Annual Trend Increase:**	20
Trend R-squared:	3.03%
Trend Annual Historic Growth Rate:	0.53%
Trend Growth Rate (2022 to Design Year):	0.45%
Printed:	17-Nov-23

Straight Line Growth Option

***Axle-Adjusted**

Appendix H

HCM Worksheets - Projected Conditions & Intersection Volume Projections

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	36	1	8	12	5	0	4	251	4	0	179	16
Future Vol, veh/h	36	1	8	12	5	0	4	251	4	0	179	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	92	79	92	92	92	79	79	92	92	79	79
Heavy Vehicles, %	0	2	14	2	2	2	0	5	2	2	8	0
Mvmt Flow	46	1	10	13	5	0	5	318	4	0	227	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	570	569	237	573	577	320	247	0	0	322	0	0
Stage 1	237	237	-	330	330	-	-	-	-	-	-	-
Stage 2	333	332	-	243	247	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.34	7.12	6.52	6.22	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.426	3.518	4.018	3.318	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	435	432	773	430	427	721	1331	-	-	1238	-	-
Stage 1	771	709	-	683	646	-	-	-	-	-	-	-
Stage 2	685	644	-	761	702	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	429	430	773	422	425	721	1331	-	-	1238	-	-
Mov Cap-2 Maneuver	429	430	-	422	425	-	-	-	-	-	-	-
Stage 1	767	709	-	680	643	-	-	-	-	-	-	-
Stage 2	676	641	-	750	702	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.8	13.9	0.1	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1331	-	-	466	423	1238	-	-
HCM Lane V/C Ratio	0.004	-	-	0.122	0.044	-	-	-
HCM Control Delay (s)	7.7	0	-	13.8	13.9	0	-	-
HCM Lane LOS	A	A	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.1	0	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	9	5	11	8	3	0	6	187	13	0	197	8
Future Vol, veh/h	9	5	11	8	3	0	6	187	13	0	197	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	92	84	92	92	92	84	84	92	92	84	84
Heavy Vehicles, %	0	2	0	2	2	2	0	1	2	2	6	29
Mvmt Flow	11	5	13	9	3	0	7	223	14	0	235	10

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	486	491	240	493	489	230	245	0	0	237	0	0
Stage 1	240	240	-	244	244	-	-	-	-	-	-	-
Stage 2	246	251	-	249	245	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.2	7.12	6.52	6.22	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.3	3.518	4.018	3.318	2.2	-	-	2.218	-	-
Pot Cap-1 Maneuver	495	478	804	486	480	809	1333	-	-	1330	-	-
Stage 1	768	707	-	760	704	-	-	-	-	-	-	-
Stage 2	762	699	-	755	703	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	490	475	804	472	477	809	1333	-	-	1330	-	-
Mov Cap-2 Maneuver	490	475	-	472	477	-	-	-	-	-	-	-
Stage 1	763	707	-	755	700	-	-	-	-	-	-	-
Stage 2	754	695	-	737	703	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.4	12.8	0.2	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1333	-	-	590	473	1330	-	-
HCM Lane V/C Ratio	0.005	-	-	0.05	0.025	-	-	-
HCM Control Delay (s)	7.7	0	-	11.4	12.8	0	-	-
HCM Lane LOS	A	A	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	8	16	284	3	6	187
Future Vol, veh/h	8	16	284	3	6	187
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	9	17	309	3	7	203

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	528	311	0	0	312	0
Stage 1	311	-	-	-	-	-
Stage 2	217	-	-	-	-	-
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	511	729	-	-	1248	-
Stage 1	743	-	-	-	-	-
Stage 2	819	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	508	729	-	-	1248	-
Mov Cap-2 Maneuver	508	-	-	-	-	-
Stage 1	743	-	-	-	-	-
Stage 2	814	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.9	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	637	1248	-
HCM Lane V/C Ratio	-	-	0.041	0.005	-
HCM Control Delay (s)	-	-	10.9	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	5	11	187	9	18	200
Future Vol, veh/h	5	11	187	9	18	200
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	5	12	203	10	20	217

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	465	208	0	0	213	0
Stage 1	208	-	-	-	-	-
Stage 2	257	-	-	-	-	-
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	556	832	-	-	1357	-
Stage 1	827	-	-	-	-	-
Stage 2	786	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	547	832	-	-	1357	-
Mov Cap-2 Maneuver	547	-	-	-	-	-
Stage 1	827	-	-	-	-	-
Stage 2	773	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	0.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	716	1357	-
HCM Lane V/C Ratio	-	-	0.024	0.014	-
HCM Control Delay (s)	-	-	10.2	7.7	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Project No. **23119 Range Road**

Intersection Volumes

Period	Tgen	Enter	Exit	SF	AGR	Legend
AM Peak		14	41	1.06	2.00%	Backg'd + (Project) = Total

Intersection= Range Road & Hooper Road/Street A **1**

Approach	Mvmt	Raw	SF	Adjusted	GR	Adj Bg'd	%Proj Ent	%Proj Ext	Project	Total	Formula
	L	31	1.06	33	2%	36			0	36	36
EB	T	0	1.06	0	2%	0	10%		1	1	(1)
	R	7	1.06	7	2%	8			0	8	8
	L	0	1.06	0	2%	0		30%	12	12	(12)
WB	T	0	1.06	0	2%	0		10%	5	5	(5)
	R	0	1.06	0	2%	0			0	0	
	L	4	1.06	4	2%	4			0	4	4
NB	T	217	1.06	230	2%	248	20%		3	251	248 + (3) = 251
	R	0	1.06	0	2%	0	30%		4	4	(4)
	L	0	1.06	0	2%	0			0	0	
SB	T	149	1.06	158	2%	171		20%	8	179	171 + (8) = 179
	R	14	1.06	15	2%	16			0	16	16

Intersection= Range Road & Street C **2**

Approach	Mvmt	Raw	SF	Adjusted	GR	Adj Bg'd	%Proj Ent	%Proj Ext	Project	Total	Formula
	L					0			0	0	
EB	T					0			0	0	
	R					0			0	0	
	L					0		20%	8	8	(8)
WB	T					0			0	0	
	R					0		40%	16	16	(16)
	L					0			0	0	
NB	T					284			0	284	284
	R					0	20%		3	3	(3)
	L					0	40%		6	6	(6)
SB	T					187			0	187	187
	R					0			0	0	

Project No. 23119 Range Road

Intersection Volumes

Period	Tgen	Enter	Exit	SF	AGR	Legend
PM Peak		45	27	1.06	2.00%	Backg'd + (Project) = Total

Intersection= Range Road & Hooper Road/Street A — 1

Approach	Mvmt	Raw	SF	Adjusted	GR	Adj Bg'd	%Proj Ent	%Proj Ext	Project	Total	Formula
	L	8	1.06	8	2%	9			0	9	9
EB	T	0	1.06	0	2%	0	10%		5	5	(5)
	R	9	1.06	10	2%	11			0	11	11
	L	0	1.06	0	2%	0		30%	8	8	(8)
WB	T	0	1.06	0	2%	0		10%	3	3	(3)
	R	0	1.06	0	2%	0			0	0	
	L	6	1.06	6	2%	6			0	6	6
NB	T	156	1.06	165	2%	178	20%		9	187	178 + (9) = 187
	R	0	1.06	0	2%	0	30%		13	13	(13)
	L	0	1.06	0	2%	0			0	0	
SB	T	168	1.06	178	2%	192		20%	5	197	192 + (5) = 197
	R	7	1.06	7	2%	8			0	8	8

Intersection= Range Road & Street C — 2

Approach	Mvmt	Raw	SF	Adjusted	GR	Adj Bg'd	%Proj Ent	%Proj Ext	Project	Total	Formula
	L					0			0	0	
EB	T					0			0	0	
	R					0			0	0	
	L					0		20%	5	5	(5)
WB	T					0			0	0	
	R					0		40%	11	11	(11)
	L					0			0	0	
NB	T					187			0	187	187
	R					0	20%		9	9	(9)
	L					0	40%		18	18	(18)
SB	T					200			0	200	200
	R					0			0	0	

Appendix I
NCHRP Report 457 - Turn Lane Warrants

23119 Range Road Project
Right Turn Lane Warrant for
Range Road at Hooper Road/Street A Access Driveway

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

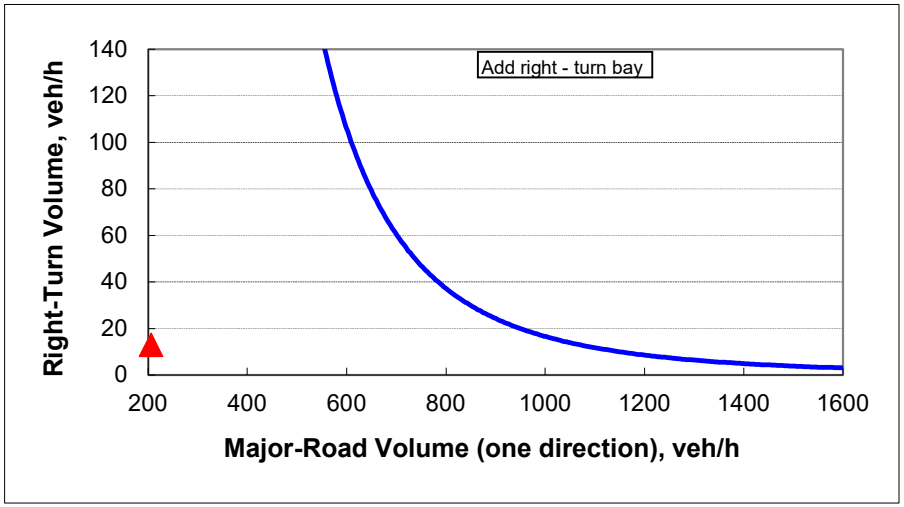
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	35
Major-road volume (one direction), veh/h:	206
Right-turn volume, veh/h:	13

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	5166
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



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

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

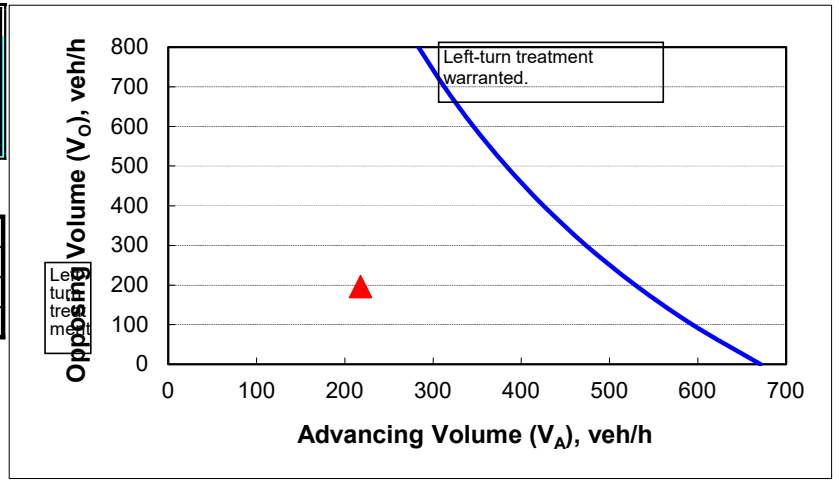
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	35
Percent of left-turns in advancing volume (V_A), %:	8%
Advancing volume (V_A), veh/h:	218
Opposing volume (V_O), veh/h:	196

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	532
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

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

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