



**Marion County  
Board of County Commissioners**

Office of the County Engineer

412 SE 25th Ave.  
Ocala, FL 34471  
Phone: 352-671-8686  
Fax: 352-671-8687

August 21, 2025

KITTELSON & ASSOCIATES  
EMMANUEL MASINDOKI  
225 E. ROBINSON STREET, #355  
ORLANDO, FL 32801

**SUBJECT: TRAFFIC METHODOLOGY APPROVAL LETTER**  
**PROJECT NAME: FAWN LAKE PUD**  
**PROJECT #2025060057    APPLICATION: #32989    PARCEL #9027-0000-02**

Dear Emmanuel,

The Traffic Methodology dated August 12, 2025 for the above referenced project was approved by Marion County on August 21, 2025. Please submit the Traffic Study in accordance with this approved Methodology. The following comments are for your review. You need not reply to the comments, and if the comments have been previously completed, simply disregard.

Feel free to contact the Office of the County Engineer at (352) 671-8686 or [DevelopmentReview@marionfl.org](mailto:DevelopmentReview@marionfl.org) should you have questions.

Sincerely,

*Your Development Review Team*  
**Office of the County Engineer**

## MEMORANDUM

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Date:	August 12, 2025	Project #: 31547
To:	Development Review Marion County Board of County Commissioners 412 SE 25 <sup>th</sup> Avenue Ocala, FL 34471	
From:	Emmanuel Masindoki, P.E. 225 E Robinson Street, Suite 355 Orlando, FL 32801	
CC:	Kok Wan Mah, P.E.	
Project:	Fawn Lake Estates	
Subject:	Proposed Methodology for Fawn Lake Estates TIA	

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## INTRODUCTION AND PROJECT DESCRIPTION

This technical memorandum provides a recommended Transportation Impact Study (TIS) methodology for the proposed Fawn Lake Estates residential development. The approximately 107.8-acre site consists of parcel 9027-0000-02 and is located on the north side of Bahia Trace, approximately 1.25 miles northeast of CR 464/Maricamp Road, in Marion County, Florida. The project location and a one-mile radius from the proposed access locations is shown in **Figure 1**.

The development is planned to include up to 356 single-family residential units. Based upon the generated project trips, a Transportation Impact Study (TIS) will be conducted per the Marion County TRAFFIC IMPACT ANALYSIS GUIDELINES.

The development will be constructed in a single phase with an anticipated buildout year of 2028. Access to the development will be provided via four proposed access driveways, all of them will connect to Bahia Trace (future extension). These access points are depicted in the site plan included in **Attachments**.



Figure 1. Project Location and 1 mile radius

## TRIP GENERATION

The trip generation analysis was conducted using information published by the Institute of Transportation Engineers (ITE) *Trip Generation (11<sup>th</sup> Edition)*. **Table 1** summarizes the resulting trip generation analysis. The ITE trip generation information sheets are included in the **Attachments**.

**Table 1: Trip Generation**

Land Use Type	ITE Code	Intensity	Daily	AM Peak-Hour Trips Ends			PM Peak-Hour Trips Ends		
				In	Out	Total	In	Out	Total
Single Family Residential	210	356 DU	3,245	59	178	237	207	121	328
Net New External Trips Ends (Existing Development)			3,245	59	178	237	207	121	328

Source: *ITE Trip Generation, 11<sup>th</sup> Edition*; Fitted curves were used when *r-squared* > 0.75

The proposed development is projected to generate 3,245 new net external daily trips of which 237 trips occur during the AM peak hour and 328 trips occur during the PM peak hour. As per County guidelines, a traffic study is required for projects generating 100 or more peak hour trips.

## TRIP DISTRIBUTION AND ASSIGNMENT

The project trip distribution and assignment was estimated based on a select zone analysis using the Central Florida Regional Planning Model, Version 7, project driveway distribution, and local traffic patterns. The model included the Emerald Road extension, from SE 92 Loop Road to CR 464. The proposed distribution for the future year is included in **Figure 2** with the detailed model plots included in **Attachments**.



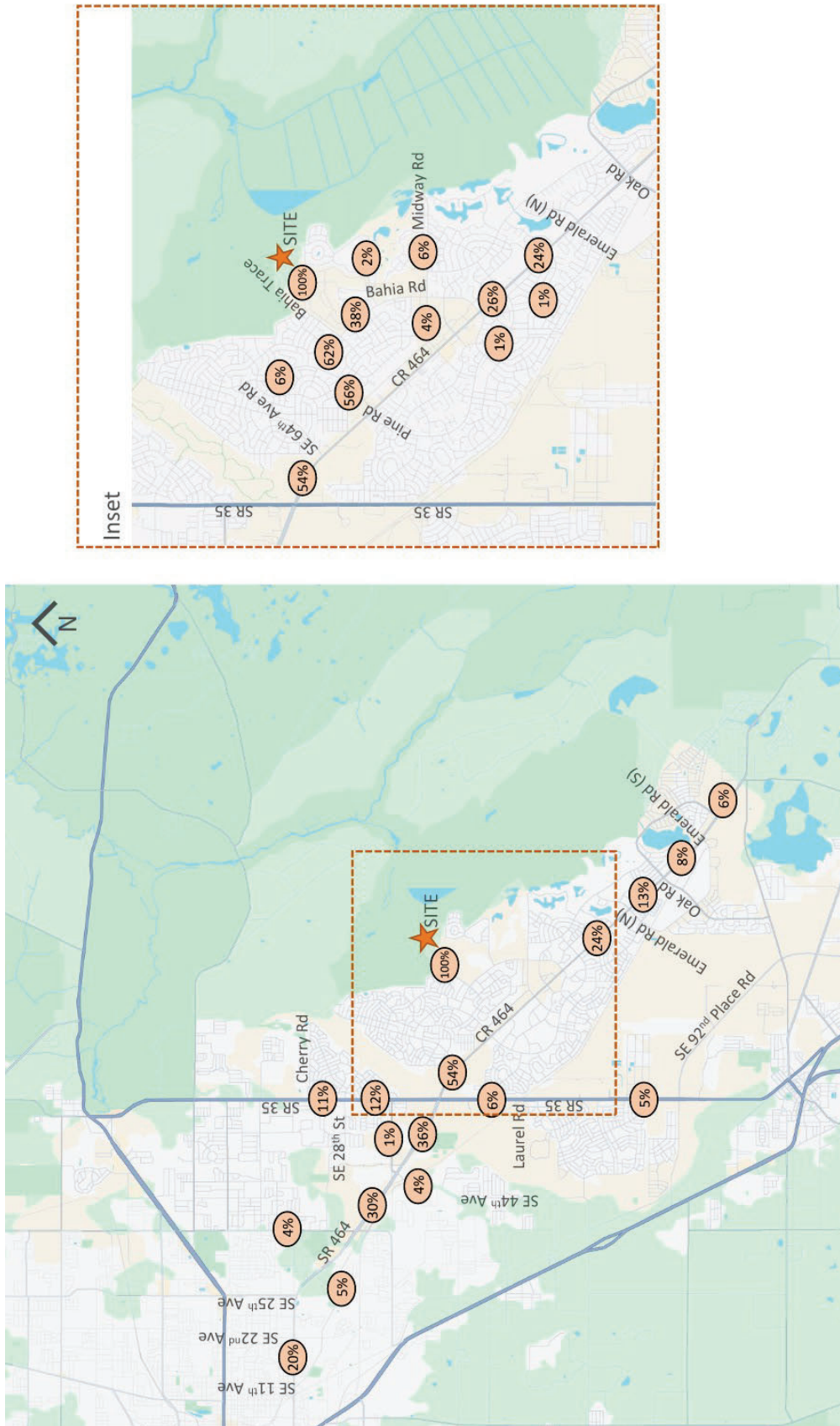


Figure 2. Trip Distribution and Assignment

### STUDY AREA DETERMINATION

Per MARION COUNTY TRAFFIC IMPACT ANALYSIS GUIDELINES, a study area for a Traffic Study level of analysis includes any public roadway where the net new project's traffic consumes at least three percent of the maximum service volume based on the adopted level of service. **Table 2** presents the project's significance review, which indicates that four of the reviewed segments are projected to have project trips that consume at least three percent of their maximum service volume. Roadway segment maximum service volumes and the existing traffic counts were obtained from the Ocala Marion Congestion Management Process (CMP), dated August 2023, included in the **Attachments**. Project trips were calculated using trips generated by the proposed development and trip distribution presented in previous sections.

Based on the expected trip generation, distribution, assignment, and significance review, it is recommended that the following roadway segments and intersections to be evaluated in the TIA. The roadway and intersections included in the study area are shown in **Figure 3**.

Roadway segments:

- SR 464
  - SE 22 Avenue to SE 25 Avenue
  - SE 25 Avenue to SE 44 Avenue
  - SE 44 Avenue to SR 35
- CR 464
  - SR 35 to Emerald Rd (N)
  - Emerald Rd (N) to Oak Road
  - Oak Road to Emerald Rd (S)
- Bahia Road
  - Pine Road to CR 464
- Pine Road
  - State Road to CR 464

Counts from the intersection turning movements will be used to develop existing baseline volumes. Intersections:

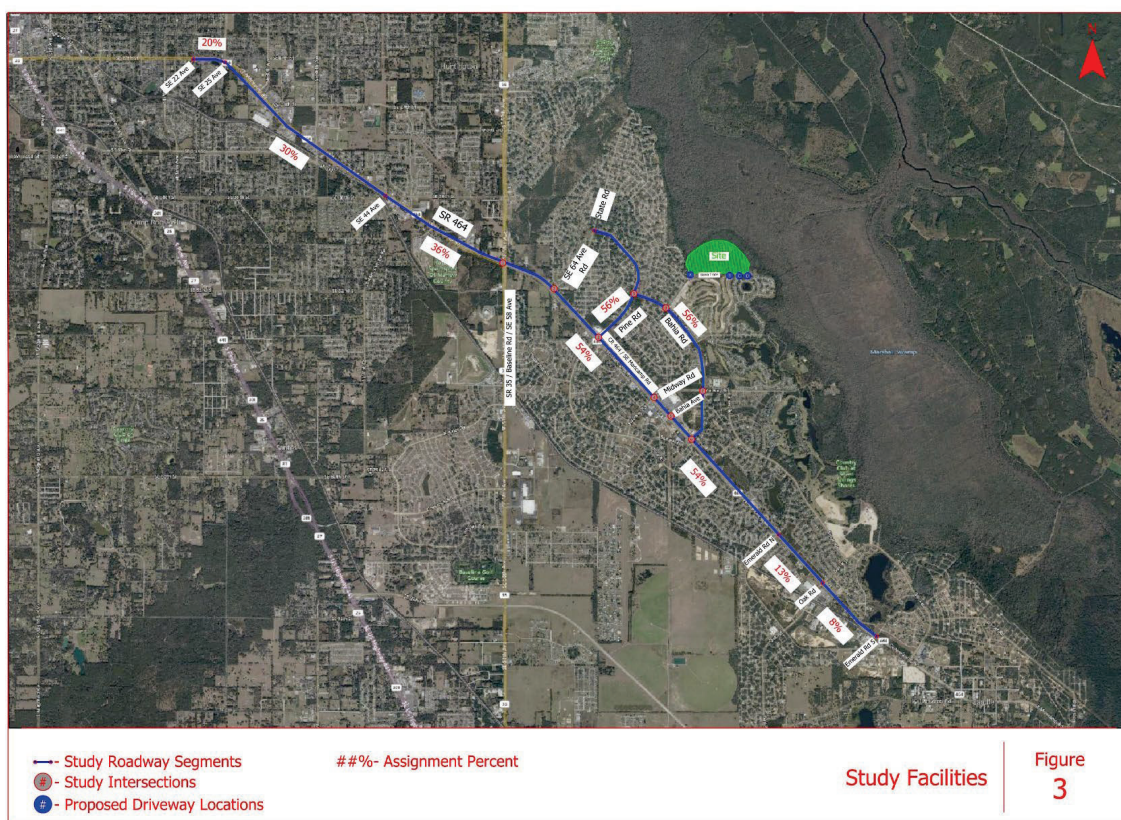
1. SR 35 & CR 464 (signalized)
2. CR 464 & SE 64 Avenue Road (unsignalized)
3. CR 464 & Pine Road (signalized)
4. CR 464 & Midway Road (signalized)
5. CR 464 & Bahia Avenue / Cedar Radial (signalized)
6. CR 464 & Bahia Road (signalized)
7. Bahia Road & Midway Road (unsignalized)
8. Bahia Road & Bahia Trace (unsignalized)
9. Pine Road & Bahia Road (unsignalized)

Table 2. Project Trip Significance

Segment ID	Road Name	Roadway Segment		Roadway Attributes <sup>1</sup>				PM Peak Project Trips <sup>2</sup>			Significant Test <sup>3</sup>	
		From	To	No. Lns	Functional Class.	LOS Std	PK - Dir Cap	Assign %	Dir Trips	Max % Impact	Sign?	In Study?
3930.1	SR 464	SE 11 AV	SE 22 AV	4	ARTERIAL	D	1,901	20%	41	2.11%	NO	NO
3950.0	SR 464	SE 22 AV	SE 25 AV	4	ARTERIAL	D	1,901	20%	41	2.16%	NO	YES
1660	SR 464	SE 25 AV	SE 44 AV	4	ARTERIAL	D	1,901	30%	62	3.26%	YES	YES
1690	SR 464	SE 44 AV	SR 35	4	ARTERIAL	D	1,901	36%	75	3.95%	YES	YES
1710	CR 464	SR 35	Emerald Road (N)	4	ARTERIAL	D <sup>6</sup>	1,850	54%	112	6.05%	YES	YES
1770	CR 464	Emerald Road (N)	Oak Road	4	ARTERIAL	D <sup>6</sup>	1,850	13%	27	1.46%	NO	YES
1780	CR 464	Oak Road	Emerald Road (S)	4	ARTERIAL	D <sup>6</sup>	1,850	8%	17	0.92%	NO	NO
5090.1	SR 35	SE 92 Place	Laurel Road	4	ARTERIAL	D	3,056	5%	10	0.33%	NO	NO
5100	SR 35	Laurel Road	SR 464	4	ARTERIAL	D	2,910	6%	12	0.41%	NO	NO
5110	SR 35	SR 464	SE 28 Street	4	ARTERIAL	D	2,910	12%	25	0.86%	NO	NO
5120	SR 35	SE 28 ST	CHERRY RD	4	ARTERIAL	D	1,901	11%	23	1.21%	NO	NO
--	Emerald Road Extension	SE 92 Loop	CR 464	2	LOCAL	D	1,110	9%	19	1.71%	NO	NO
--	Bahia Road	Pine Road	CR 464	2	LOCAL	D	1,110	62%	128	11.53%	YES	YES
--	Midway Road	CR 464	Bahia Road	2	LOCAL	D	1,110	4%	8	0.72%	NO	NO
--	Pine Road	State Road	CR 464	2	LOCAL	D	1,110	56%	116	10.45%	YES	YES

Notes:

1. Data obtained from the latest Ocala TPO Marion CMP Database
2. Directional trips calculated as the maximum of the PM Peak entry and exit trips
3. Percent impact was calculated as the PM peak directional project trips divided by the PM peak directional service volume
4. The minimum threshold for significance is at least 3% impact of the directional capacity
5. Capacity for local roads is calculated using FDOT QLOS Handbook for context classification C3R – Suburban Residential
6. County LOS thresholds changed from LOS E to LOS D, effective January 2026





## FUTURE VOLUMES BUILDOUT (2028)

Traffic counts will be collected at the study intersections, including heavy vehicle percentages. The seasonal factor will be applied to the existing peak hour traffic data. If the seasonal factor is less than 1.0, then the counts will not be seasonally adjusted.

Future background traffic volume will be calculated by using a weighted average annual growth of 1.17%, which was calculated based on the growth rate presented in the Ocala Marion Congestion Management Process (CMP), as shown in **Table 3**. Additionally, committed trips from planned developments will be included in the background calculation, if available.

**Table 3. Growth Rate Determination**

Segment ID	Road Name	Roadway Segment		Growth Rate Calculation	
		From	To	2023 AADT	Growth Rate
3950	SR 464	SE 22 Avenue	SE 25 Avenue	30,800	1.00%
1690	SR 464	SE 25 Avenue	SE 44 Avenue	34,800	1.00%
1690	SR 464	SE 44 Avenue	SR 35	33,200	1.25%
1710	CR 464	SR 35	Emerald Road (N)	34,300	1.00%
1770	CR 464	Emerald Road (N)	Oak Road	15,600	2.09%
Weighted Average Growth					1.17%

## FUTURE CONDITIONS OPERATIONAL ANALYSIS

The Traffic Impact Study will provide an analysis of weekday PM peak hour traffic operations at study intersections and AM and PM operations for project driveways within the study area for Future Background and Buildout conditions. HCM 7th Edition methodology included in Synchro 12 software will be used for intersection operational analyses.

The intersection operational analyses will include an assessment of overall intersection delay and level of service (LOS), as well as queues, delays, and LOS by movement, for the study intersections.

Roadway segments will be analyzed for Future No-Build and Future Buildout conditions using roadway capacities published in the Ocala Marion TPO CMP Database 2023. For segments where capacities are not provided in the CMP Database, then FDOT Generalized LOS Tables (2023) will be used. For roadways or intersections found to be operating deficiently due to the addition of project trips, recommendations will be provided to address the identified deficiencies.

## SITE ACCESS TURN LANE ANALYSIS

The need for turn lanes at the project entrances will be evaluated using the NCHRP 457 methodology, and in accordance with county requirements. The analysis will consider projected future advancing and turning volumes at each entrance. Turn lane lengths will be provided for projects that meet the applicable criteria.

# ATTACHMENTS

## Attachment D

225 East Robinson Street, Suite 355  
Orlando, FL 32801  
P 407.540.0555

# MEMORANDUM

August 12, 2025

Project #: 31547

To: Development Review  
Office of the County Engineer  
412 SE 25<sup>th</sup> Avenue  
Ocala, FL 34471

From: Emmanuel Masindoki, PE and Kok Wan Mah, PE

RE: Fawn Lake PUD Traffic Methodology Response to Comments

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This memorandum has been prepared to provide responses to the comments from Marion County on August 4, 2025. The revised TIA methodology memorandum is provided under separate cover.

## TRANSPORTATION

1. Marion County is considering modifying the Roadway Level of Service standards in the Comprehensive Plan. If approved, the changes will take effect in 2026. The changes include increasing the Level of Service on County roads within the urban area from LOS E to LOS D. Since this development is unlikely to be approved prior to the new changes taking effect, this study needs to also examine the impacts to the study area roadways and intersections at the new standard of LOS D.

***Response: Agreed. The segment analysis will be based on the standard LOS D, and Table 2 (Project Trip Significance) has been updated to reflect this.***

2. Include on evaluation of the project entrances for the need for turn lanes.

***Response: The evaluation of the need for turn lanes at project entrances will be included in the analysis.***





## Attachment D

# Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units  
On a: Weekday

Setting/Location: General Urban/Suburban

Number of Studies: 174

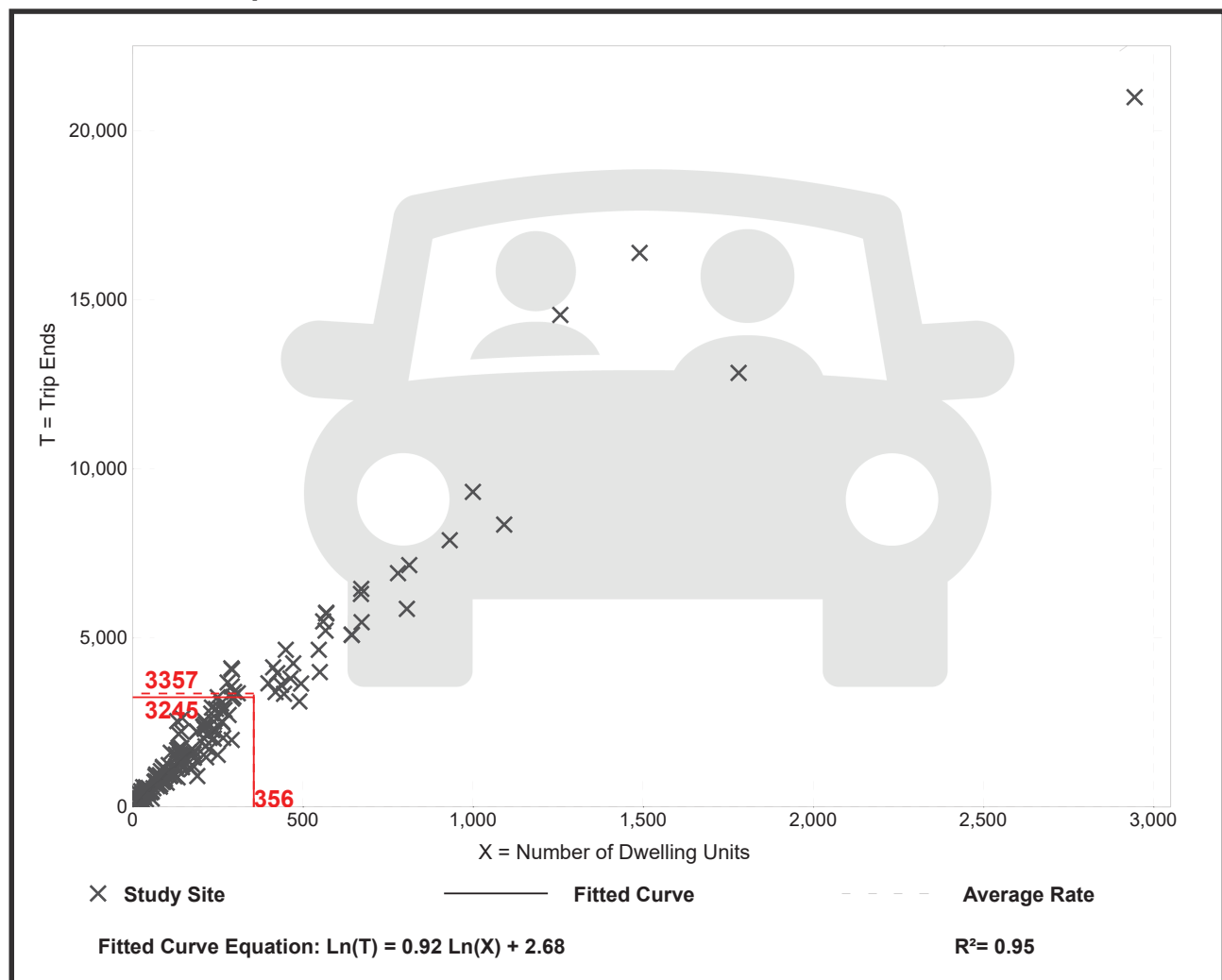
Avg. Num. of Dwelling Units: 246

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



## 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

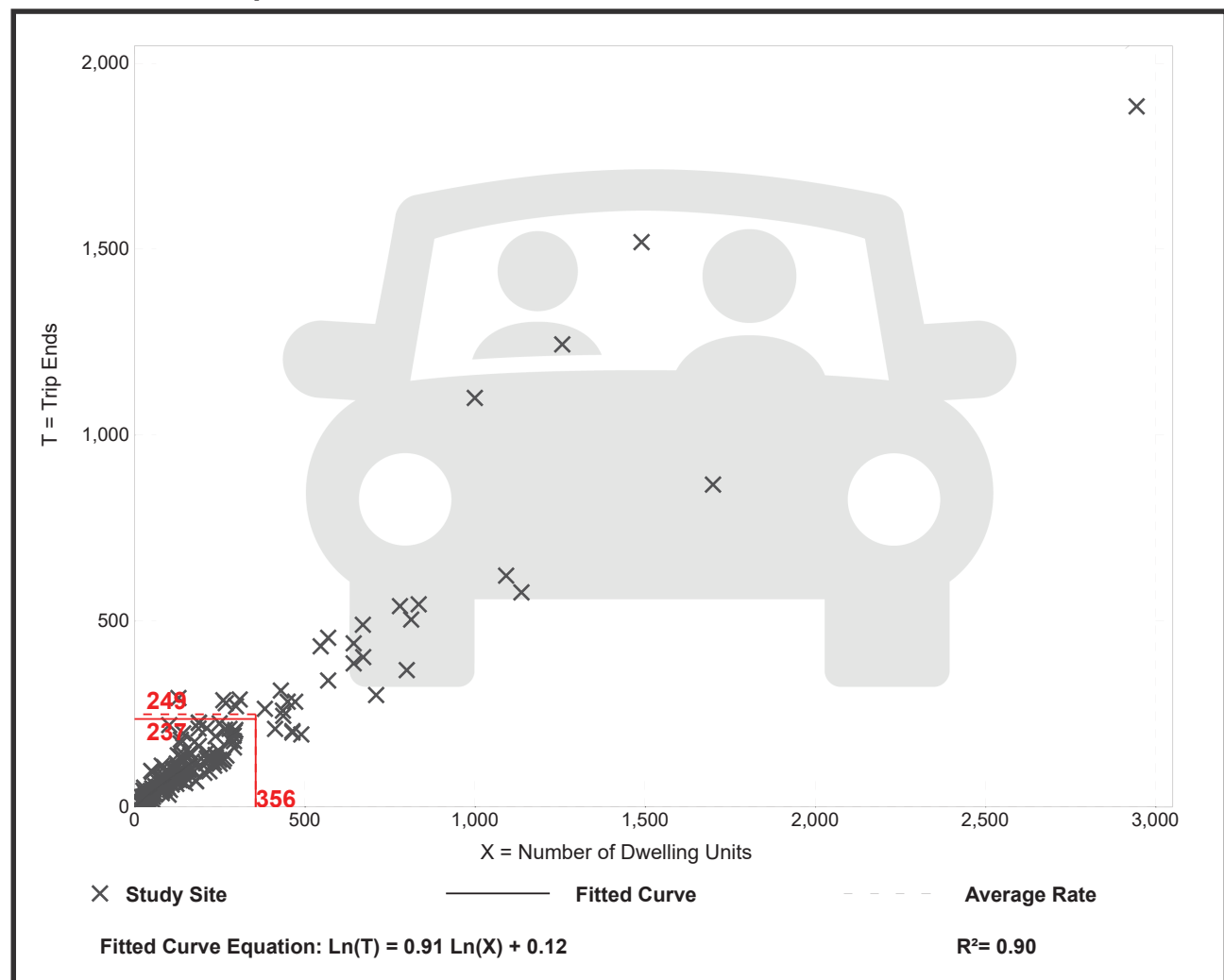
Avg. Num. of Dwelling Units: 226

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



## 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

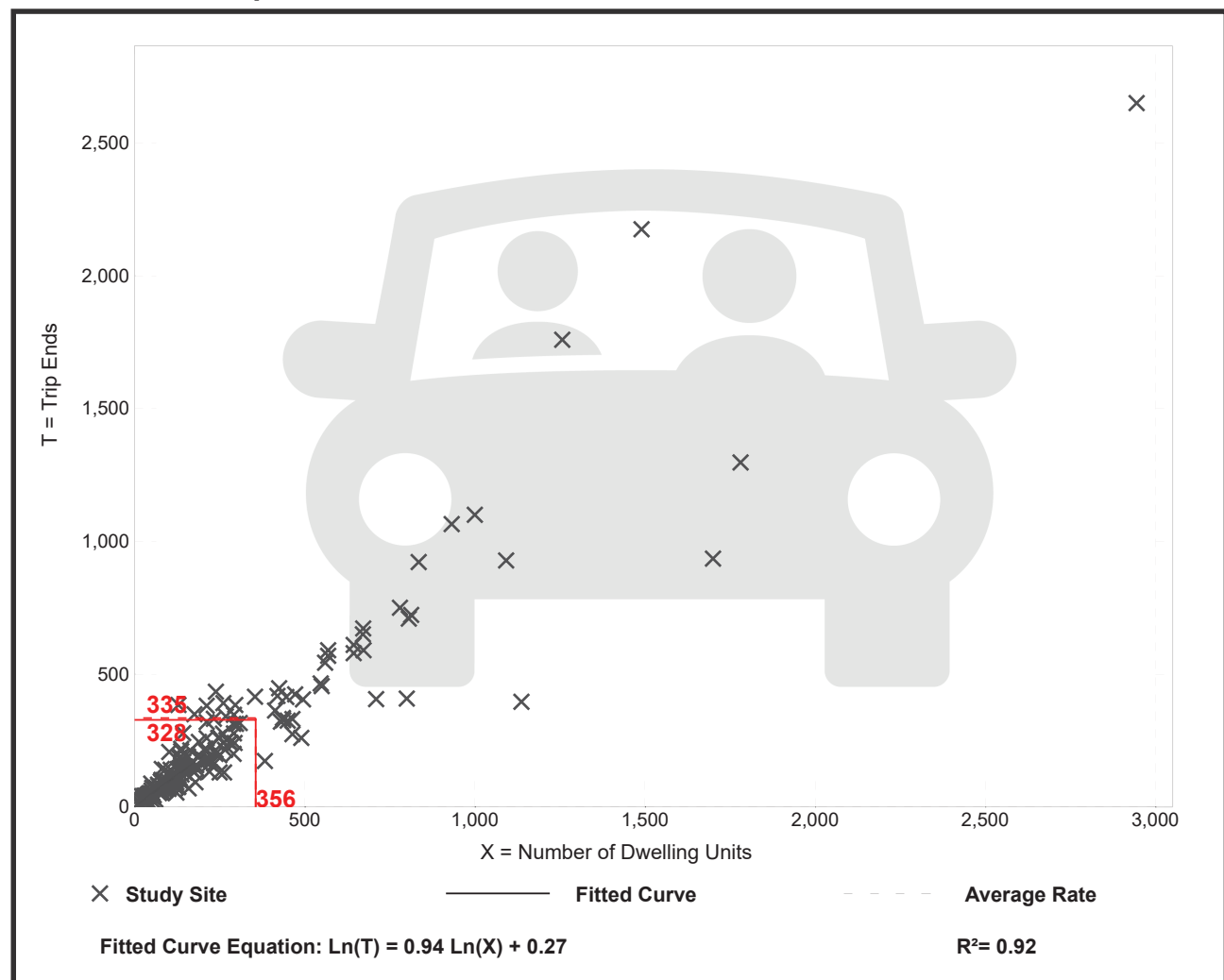
Avg. Num. of Dwelling Units: 248

Directional Distribution: 63% entering, 37% exiting

### Vehicle Trip Generation per Dwelling Unit

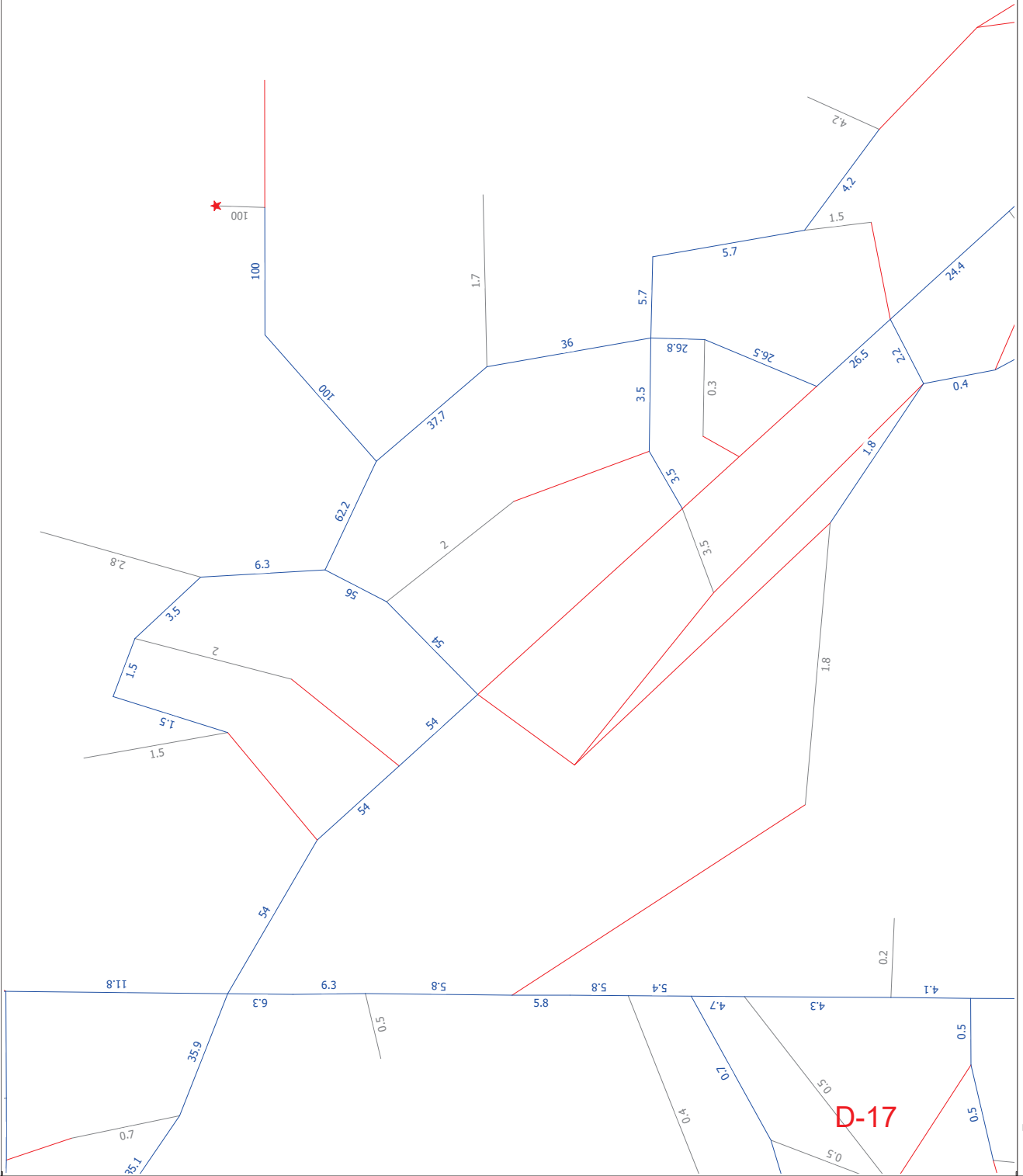
Average Rate	Range of Rates	Standard Deviation
0.94	0.35 - 2.98	0.31

### Data Plot and Equation

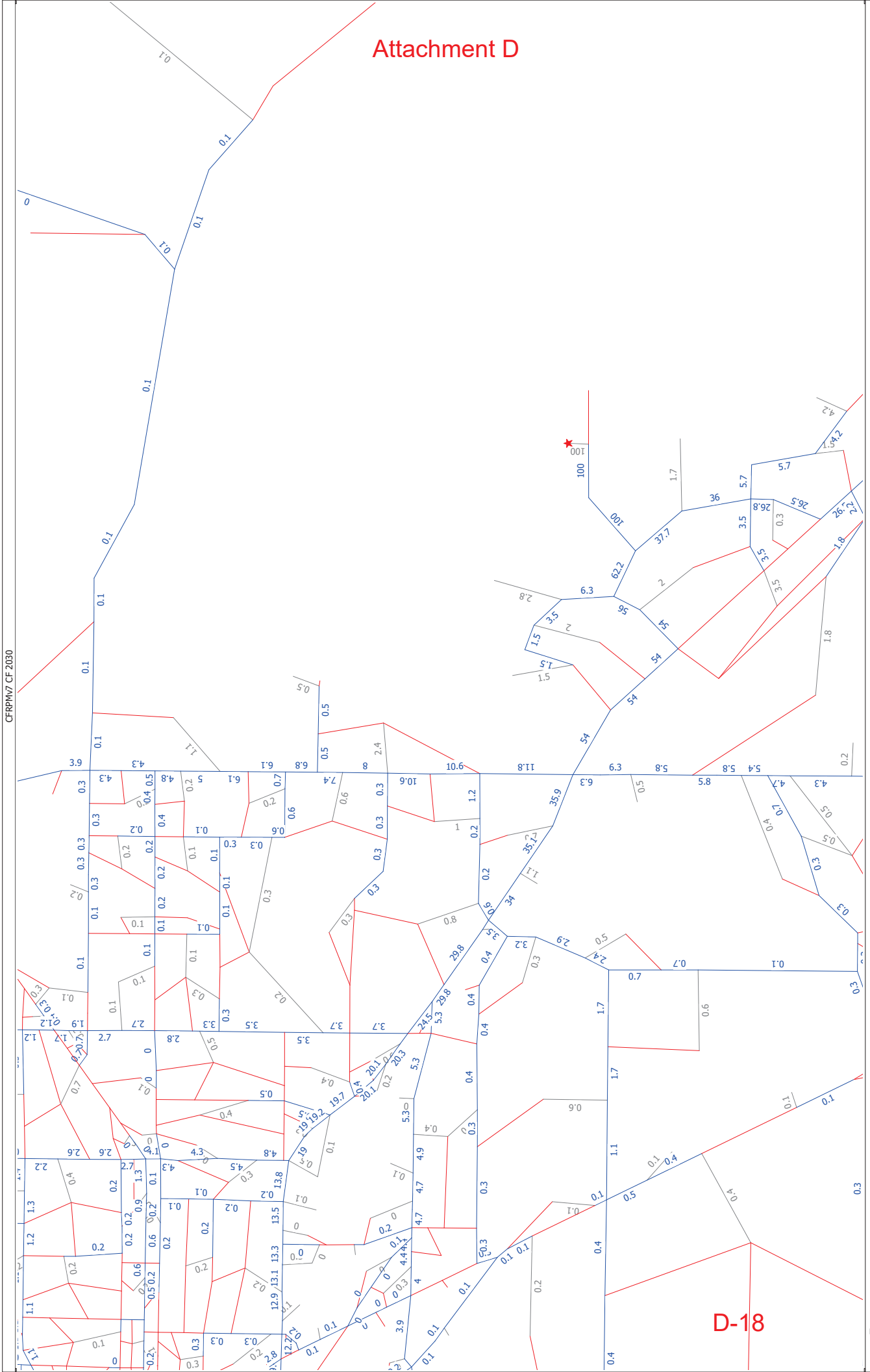




## Attachment D



CFRPMV7 CF 2030



D-18

Ocala Marion TPO CMP Database - August 2023

SEGMENT ID	ROAD NAME	FROM	TO	LANES (2023)	FUNCTIONAL CLASSIFICATION	FLOW	FOOT CLASS	DAILY SERVICE VOLUME (2023)	PEAK HOUR DIRECTIONAL SERVICE VOLUME (2023)	LANES (2029)	DAILY SERVICE VOLUME (2029)	PEAK HOUR GIRE PERFORMANCE VOLUME (2029)	URBAN / RURAL	DIVIDED / UNDIVIDED	MAINTAINING AGENCY	NHS	ADOPTED STANDARD	2023 ADOT	2023 DAILY VMSV	2023 DAILY LOS	GROWTH RATE	2028 ADOT	2028 DAILY VMSV	2028 DAILY LOS
1710	CR 464	SR 35	EMERALD RD (N)	4	ARTERIAL	INTERRUPTED	1	35,820	1,800	4	35,820	1,800	Urban	D	COUNTY	Other CMP Network Roadway	E	34,300	0.96	D	1.00%	36,100	1.01	F
1770	CR 464	EMERALD RD (N)	OAK RD	4	ARTERIAL	INTERRUPTED	1	35,820	1,800	4	35,820	1,800	Urban	D	COUNTY	Other CMP Network Roadway	E	15,600	0.44	C	7.09%	17,300	0.48	C
1780	CR 464	OAK RD	EMERALD RD (S)	4	ARTERIAL	INTERRUPTED	1	35,820	1,800	4	35,820	1,800	Urban	D	COUNTY	Other CMP Network Roadway	E	9,800	0.27	C	8.12%	14,500	0.40	C
5090.1	SR 35	SE 92ND PL	LAUREL RD	4	ARTERIAL	INTERRUPTED		58,485	3,056	4	58,485	3,056	Urban	D	STATE	Other CMP Network Roadway	D	27,600	0.47	B	4.27%	34,100	0.58	C
5100	SR 35	LAUREL RD	SR 464	4	ARTERIAL	INTERRUPTED		55,700	2,910	4	55,700	2,910	Urban	D	STATE	Other CMP Network Roadway	D	27,600	0.5	B	4.27%	34,100	0.61	C
5120	SR 35	SE 28 ST	CHEERY RD	4	ARTERIAL	INTERRUPTED		38,430	1,901	4	38,430	1,901	Urban	D	STATE	Other CMP Network Roadway	D	30,700	0.54	C	1.00%	21,800	0.57	C
1860	SR 464	SE 25 AV	SE 44 AV	4	ARTERIAL	INTERRUPTED		38,430	1,901	4	38,430	1,901	Urban	D	STATE	Other CMP Network Roadway	D	34,800	0.91	D	1.00%	26,800	0.96	D
1690	SR 464	SE 44 AV	SR 35	4	ARTERIAL	INTERRUPTED		38,430	1,901	4	38,430	1,901	Urban	D	STATE	Other CMP Network Roadway	D	33,200	0.86	D	1.25%	35,300	0.92	D
3930.1	SR 464	SE 11 AV	SE 22 AV	4	ARTERIAL	INTERRUPTED		39,165	1,943	4	39,165	1,943	Urban	D	STATE	Other CMP Network Roadway	D	30,800	0.79	C	1.00%	32,400	0.88	C
3950	SR 464	SE 22 AV	SE 25 AV	4	ARTERIAL	INTERRUPTED		38,430	1,901	4	38,430	1,901	Urban	D	STATE	Other CMP Network Roadway	D	30,800	0.8	C	1.00%	32,400	0.88	D

# C3C & C3R

## Motor Vehicle Arterial Generalized Service Volume Tables

### Peak Hour Directional

### Peak Hour Two-Way

### AADT



(C3C-Suburban Commercial)

	B	C	D	E
1 Lane	*	760	1,070	**
2 Lane	*	1,520	1,810	**
3 Lane	*	2,360	2,680	**
4 Lane	*	3,170	3,180	**

	B	C	D	E
2 Lane	*	1,380	1,950	**
4 Lane	*	2,760	3,290	**
6 Lane	*	4,290	4,870	**
8 Lane	*	5,760	5,780	**

	B	C	D	E
2 Lane	*	15,300	21,700	**
4 Lane	*	30,700	36,600	**
6 Lane	*	47,700	54,100	**
8 Lane	*	64,000	64,200	**



(C3R-Suburban Residential)

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

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

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

## Attachment D

### Adjustment Factors

The peak hour directional service volumes should be adjusted by multiplying by 1.2 for one-way facilities	Exclusive right turn lane(s): Multiply by 1.05
The AADT service volumes should be adjusted by multiplying 0.6 for one way facilities 2 Lane Divided Roadway with an Exclusive Left Turn Lane(s): Multiply by 1.05	Multilane Undivided Roadway with an Exclusive Left Turn Lane(s): Multiply by 0.95
2 lane Undivided Roadway with No Exclusive Left Turn Lane(s): Multiply by 0.80	Multilane Roadway with No Exclusive Left Turn Lane(s): Multiply by 0.75
	Non-State Signalized Roadway: Multiply by 0.90

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.