

LAKE HILLS PD

Project № 23103
December 2023

**TRAFFIC IMPACT ANALYSIS
HOWEY-IN-THE-HILLS
FLORIDA**

Prepared by:



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EXECUTIVE SUMMARY

Project Information

Name: Lake Hills PD

Location: North of CR 48 and west of SR 19

Jurisdiction: Town of Howey-In-The-Hills, Lake County, Florida

Description: 475 Senior Adult Housing Single-Family (SF) Dwelling Units (DUs)
125 Senior Adult Housing Multifamily
92,300 Square-Foot shopping plaza
5,000 Square-Foot convenience store
5,000 Square-Foot fast food restaurant with drive through window

Findings

Trip Generation: 8,782 Daily Trips / 521 AM Peak Hour Trips / 697 PM Peak Hour Trips

Access Plan: One (1) full access driveway on CR 48, one (1) full access driveway on SR 19, one (1) directional access driveway on CR 48, two (2) right-in/right-out access driveways on SR 19

Planned Improvements: SR 19 from CR 48 to CR 561 will be widened to four (4) lanes by FDOT, including a roundabout at SR 19 and CR 48.

Roadway Capacity: SR 19 from CR 561 to Central Avenue and from CR 455 to US 27/SR 25 are projected to operate over their capacities due to background traffic.

Intersection Capacity: SR 19 and CR 455 is projected to operate with delay for the westbound left movement.
SR 19 and CR 48 is projected to operate above the adopted LOS at background and projected traffic conditions. The intersection is projected to operate at acceptable LOS with a roundabout.
SR 19 and Central Avenue is projected to experience delays on the eastbound approach at background and buildout conditions. The project does not assign trips to the minor approaches.
SR 19 and East Entrance Driveway is projected to operate above the LOS at buildout condition with two-way stop control sign.

Recommendations

Intersection
Improvements:

The developer will install traffic signal at SR 19 and East Entrance Driveway when warranted.

Turn Lanes:

Construct a 490-foot southbound right turn lane and a 490-foot northbound left turn lane at SR 19 and East Entrance Driveway.

Construct a 375-foot northbound right turn lane and a 375-foot southbound left turn lane at CR 48 and West Entrance Driveway.

Construct a 375-foot northbound right turn lane and a 375-foot southbound left turn lane at CR 48 and Commercial Entrance Driveway.

Construct a 490-foot southbound right turn lane at SR 19 and North Right-in/Right-out Driveway.

Construct a 490-foot southbound right turn lane at SR 19 and South Right-in/Right-out Driveway.

PROFESSIONAL ENGINEERING CERTIFICATION

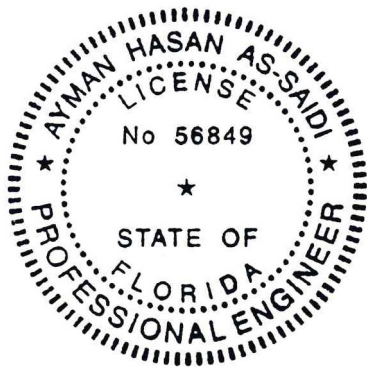
I hereby certify that I am a Professional Engineer properly registered in the State of Florida practicing with Traffic & Mobility Consultants LLC, a corporation authorized to operate as an engineering business, CA-30024, by the State of Florida Department of Professional Regulation, Board of Professional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

PROJECT: Lake Hills PD

LOCATION: Town of Howey-In-The-Hills, Florida

CLIENT: Reader and Partners LLC and WindCrest Development Group, Inc.

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

**AYMAN H AS-
SAIDI**

Digitally signed by AYMAN H AS-SAIDI

Date: 2023.12.22 14:44:31 -05'00'

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
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CERTIFICATE OF AUTHORIZATION CA-30024
AYMAN H. AS-SAIDI, P.E. NO 56849

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1.0 INTRODUCTION

This Traffic Impact Analysis (TIA) was conducted to assess the impact of the proposed Lake Hills PD development in the Town of Howey-In-The-Hills, Lake County, Florida. The project will include 475 Senior Adult Housing Single Family (SF) Detached Dwelling Units (DUs), 125 Senior Adult Housing SF Attached DUs, a 92,300 square foot shopping plaza, 5,000 square foot convenience store, and 5,000 square foot fast food restaurant with drive thru. The site is located north of CR 48 and west of SR 19 in the Town of Howey-In-The-Hills, Florida. **Figure 1** depicts the site location and the surrounding transportation network. A preliminary development site plan is provided in **Appendix A**.

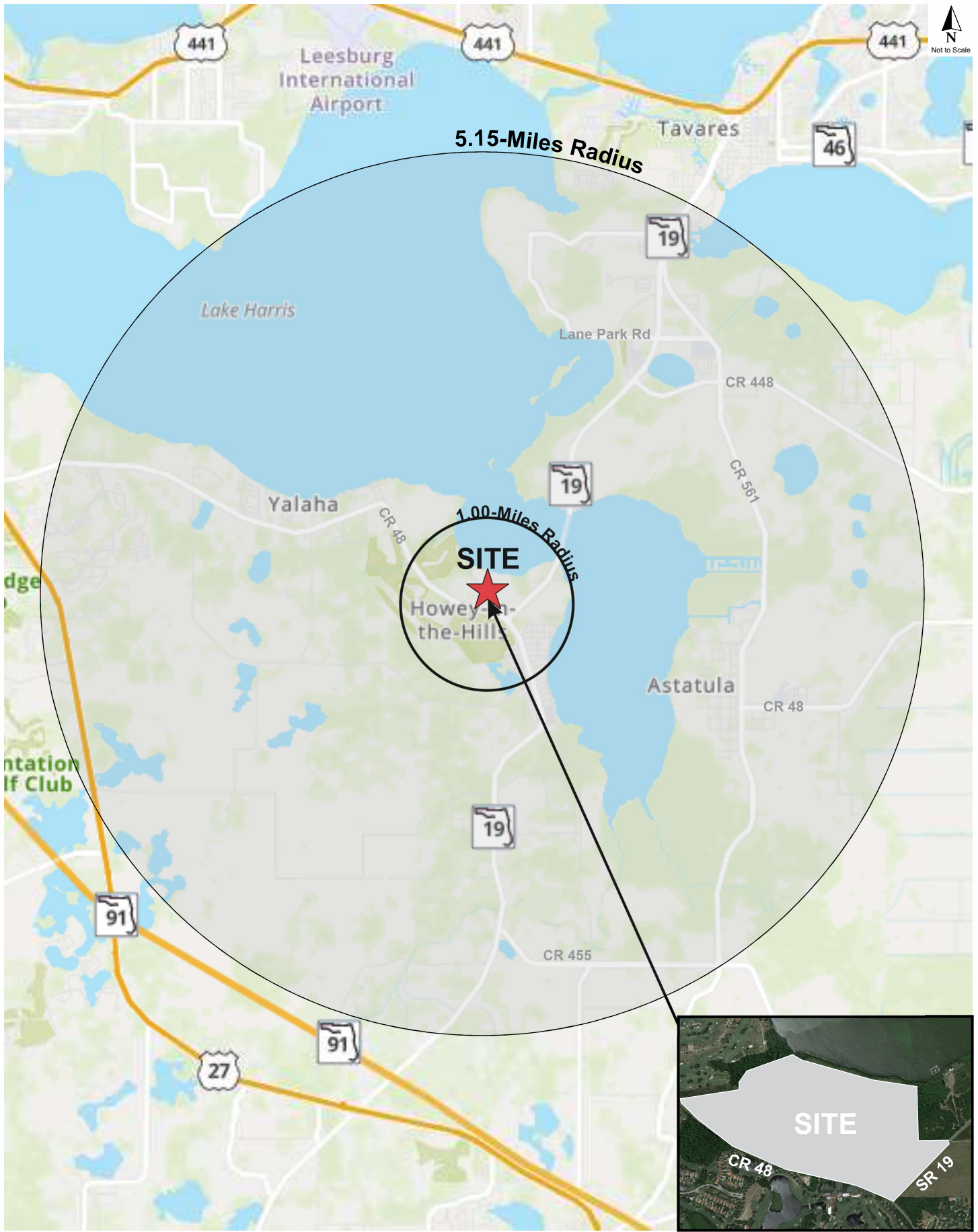
Access to the site is proposed via one (1) full access driveway on CR 48, serving the residential portion, one (1) full access driveway on SR 19, serving both residential and commercial parcels; one (1) directional driveway on CR 48, serving the commercial parcels; and two (2) right-in/right-out access driveways on SR 19, serving the commercial parcels. The development is projected to be completed by the year 2028.

The analysis was prepared in accordance with the methodology submitted to the Town of Howey-In-The-Hills and reviewed by the Town. A copy of the revised methodology (incorporating the Town's comments) is included with the response to comments letter 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 *2022 Lake County CMP Database*.

1.1 Study Area

The project study area was established based on the standard requirements of the Lake Sumter Metropolitan Planning Organization (LSMPO) methodology and the Town of Howey-In-The-Hills Land Development Code. In accordance with the requirements of Tier 2 TIA methodology, the impact area includes roadway segments and intersections within 5.15-mile radius, ($\frac{1}{2}$ the trip length for active adult residential land use), in addition to roadways where development is expected to consume 5% or more of their adopted Level of Service (LOS) capacities. The project study area determination is provided in **Table 1**, as determined in the approved methodology.



**Table 1
Study Area**

Seg ID	Road Name	From	To	# of Lns	LOS Std	Dir Cap	Trip Distr	Project Trips	Significance	Within 1 Mile	>5% Sig	Included in Study?	Included in Study?
590	CR 448	SR 19	CR 561	2	D	840	20%	71	8.45%	N	Y	TRUE	YES
600	CR 448	CR 561	LAKE INDUSTRIAL BOULEVARD	2	D	840	10%	36	4.29%	N	N	FALSE	NO
610	CR 448	LAKE INDUSTRIAL BOULEVARD	ORANGE COUNTY LINE	2	C	740	10%	36	4.86%	N	N	FALSE	NO
950	CR 455	SR 19	CR 561	2	C	740	5%	18	2.43%	N	N	FALSE	NO
1240	CR 48	US 27	LIME AVENUE	2	D	1,080	25%	89	8.24%	Y	Y	TRUE	YES
1250	CR 48	LIME AVENUE	SR 19	2	D	1,080	25%	89	8.24%	Y	Y	TRUE	YES
1400	CR 561	SR 19	CR 448	2	D	840	5%	18	2.14%	N	N	FALSE	NO
1410	CR 561	CR 448	CR 48	2	D	1,080	5%	18	1.67%	N	N	FALSE	NO
1420	CR 561	CR 48	SOUTH ASTATULA CITY LIMIT	2	D	620	5%	18	2.90%	N	N	FALSE	NO
1430	CR 561	SOUTH ASTATULA CITY LIMIT	CR 455	2	D	1,080	0%	0	0.00%	N	N	FALSE	NO
3030	SR 19	CR 561	LANE PARK ROAD	2	D	920	30%	107	11.63%	N	Y	TRUE	YES
3040	SR 19	LANE PARK ROAD	CR 48	2	D	920	50%	178	19.35%	N	Y	TRUE	YES
3050	SR 19	CR 48	CENTRAL AVENUE	2	D	700	25%	89	12.71%	N	Y	TRUE	YES
3060	SR 19	CENTRAL AVENUE	CR 455	2	D	1,200	25%	89	7.42%	N	Y	TRUE	YES
3070	SR 19	CR 455	US 27 / SR 25	2	C	450	20%	71	15.78%	N	Y	TRUE	YES

2022 Lake County Congestion Management Process (CMP)

Based on the information presented in the analysis, the study roadway segments are as follows:

- CR 448
 - SR 19 to CR 561
- CR 48
 - US 27 to Lime Avenue
 - Lime Avenue to SR 19
- SR 19
 - CR 561 to Lane Park Road
 - Lane Park Road to CR 48
 - CR 48 to Central Avenue
 - Central Avenue to CR 455
 - CR 455 to US 27/SR 25

The study intersections are as follows:

- SR 19 and CR 455 (Unsignalized)
- SR 19 and CR 48 (Signalized)
- SR 19 and CR 448 (Signalized)
- SR 19 and Central Avenue (Unsignalized)
- SR 19 and East Entrance Driveway (Proposed)
- CR 48 and West Entrance Driveway (Proposed)
- CR 48 and Commercial Entrance Driveway (Proposed)
- SR 19 and North RI/RO Driveway (Proposed)
- SR 19 and South RI/RO Driveway (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 peak hour directional traffic volumes were obtained from the *2022 Lake County CMP Database*, for County roads, and the *2023 Florida Traffic Online (FTO) website*, for SR 19.

Annual growth rates (AGRs) were calculated from the SR 19 historical Annual Average Daily Traffic (AADT), from the *2023 FTO website*, to calculate the projected background traffic volume in this study. The service volumes and capacities were obtained from the *2022 Lake County CMP Database*. Excerpts from the *2022 Lake County CMP Database*, *2023 FTO website*, *2023 FDOT Multimodal Quality/Level of Service Handbook*, and SR 19 AGRs calculations are included in **Appendix C. Table 2** summarizes the roadway segment capacity analysis.

**Table 2
Existing Roadway Segment Capacity Analysis**

Road Name	From	To	# of Lns	LOS Std	Pk Dir Cap	Existing Volume			
						Dir	Volume	LOS	V/C
CR 448	SR 19	CR 561	2	D	840	NB/EB	277	C	0.33
						SB/WB	224	C	0.27
CR 48	US 27	LIME AVENUE	2	D	1,080	NB/EB	420	B	0.39
						SB/WB	380	B	0.35
CR 48	LIME AVENUE	SR 19	2	D	1,080	NB/EB	429	B	0.40
						SB/WB	404	B	0.37
SR 19	CR 561	LANE PARK ROAD	2	D	920	NB/EB	775	C	0.84
						SB/WB	647	C	0.70
SR 19	LANE PARK ROAD	CR 48	2	D	920	NB/EB	775	C	0.84
						SB/WB	647	C	0.70
SR 19	CR 48	CENTRAL AVENUE	2	D	700	NB/EB	515	C	0.74
						SB/WB	439	C	0.63
SR 19	CENTRAL AVENUE	CR 455	2	D	1,200	NB/EB	515	B	0.43
						SB/WB	439	B	0.37
SR 19	CR 455	US 27 / SR 25	2	C	450	NB/EB	637	D	1.42
						SB/WB	532	D	1.18

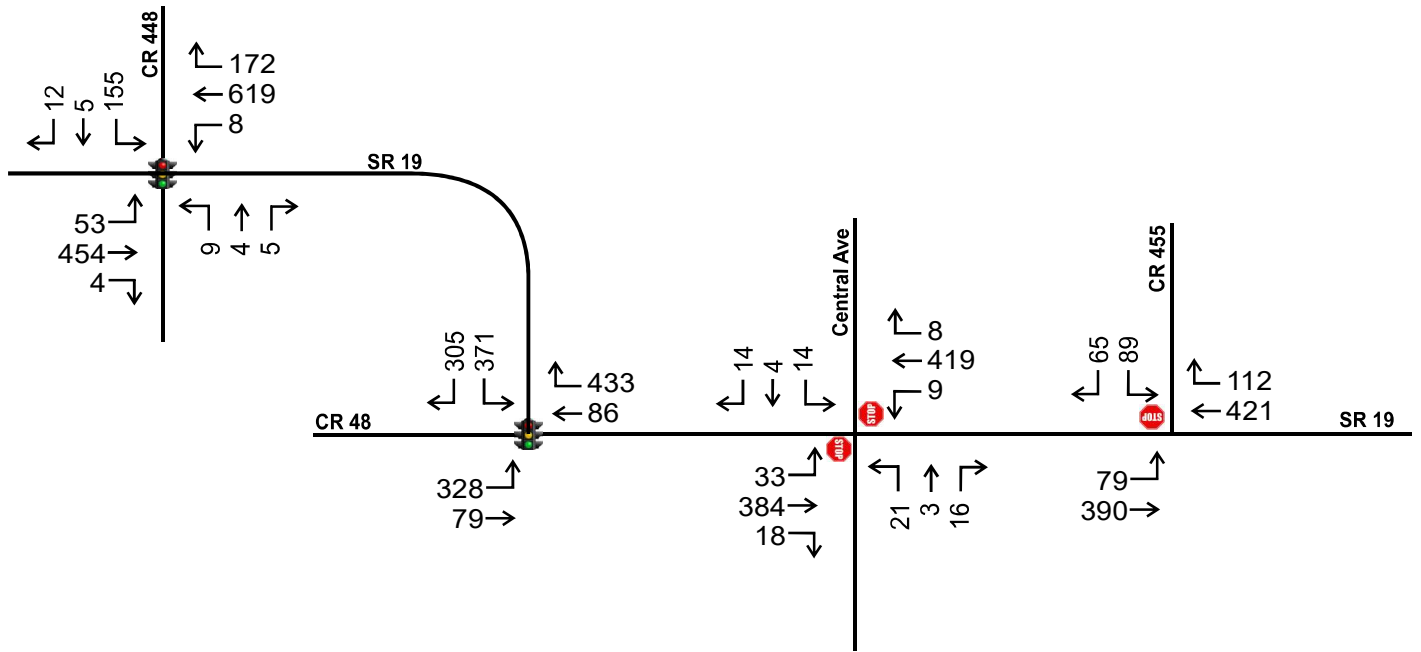
Source: 2022 Lake County Congestion Management Process (CMP)

The analysis indicates that all study roadway segments currently operate adequately within their capacities, except the segment of SR 19 from CR 455 to US 27/SR 25 which currently operates over capacity. This segment at SR 19 is currently classified as rural area, but this area is developing rapidly which could result in a potential change in context classification.

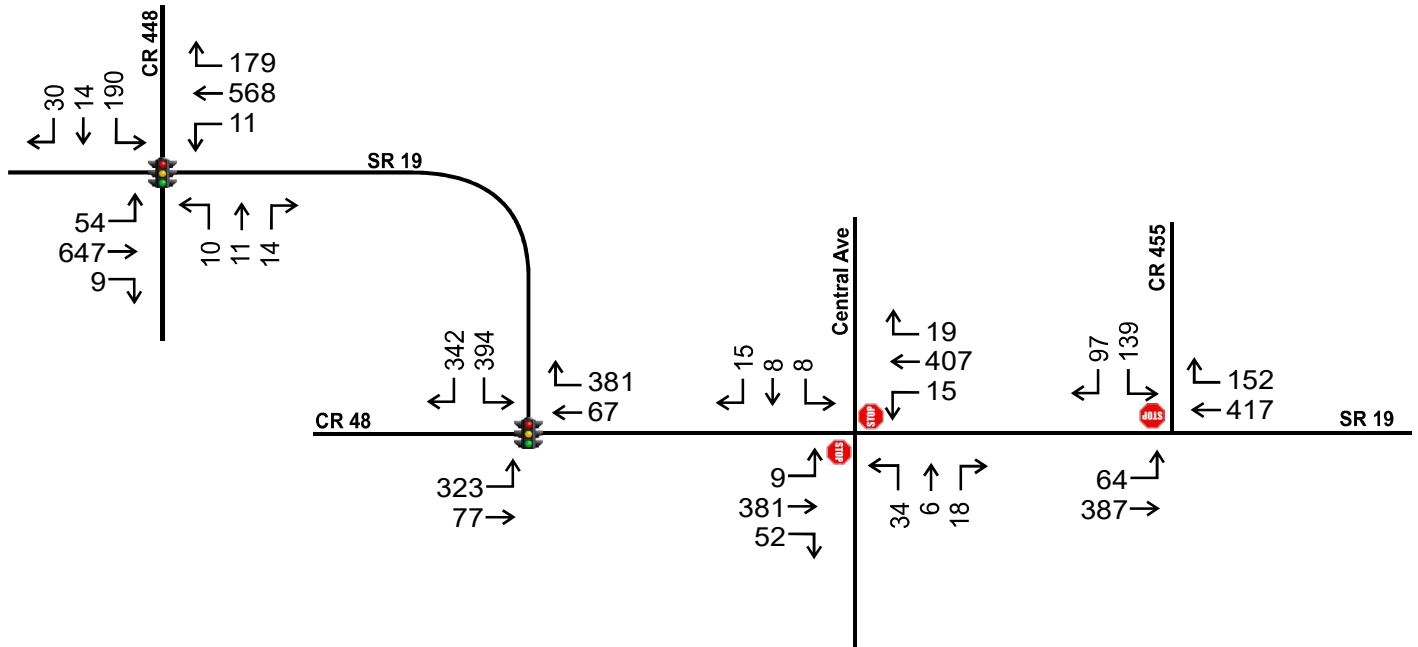
2.2 Intersection Capacity

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 October 11, 2023 and October 12, 2023. Existing turning movement counts were collected during the peak season; therefore, a seasonal adjustment factor was not applied. The AM and PM peak hour counts are presented in **Figure 2**. The turning movement counts, the 2022 *Peak Season Factor Category Report*, and signal timing record for signalized intersections are included in **Appendix D**.

AM Peak



PM Peak



The results of the intersection capacity analysis, summarized in **Table 3**, reveal that the intersection of SR 19 and CR 48 is experiencing delays on the westbound and southbound approaches. All the other study intersections are 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		Overall	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
SR 19 & CR 455	TWSC	AM	--	--	16.4	C	--	--	9.0	A	--	--
		PM	--	--	16.8	C	--	--	8.9	A	--	--
SR 19 & CR 48	Signal	AM	--	--	87.3	F	20.3	C	120.8	F	94.1	F
		PM	--	--	79.6	E	19.9	B	92.9	F	80.9	F
SR 19 & CR 448	Signal	AM	20.5	C	24.3	C	15.9	B	13.8	B	16.2	B
		PM	18.6	B	22.0	C	16.3	B	17.7	B	17.7	B
SR 19 & Central Ave	TWSC	AM	21.8	C	19.5	C	8.6	A	8.6	A	--	--
		PM	21.9	C	16.7	C	8.3	A	8.2	A	--	--

Average delay is in seconds

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 charts, and internal capture calculations are provided in **Appendix F**.

Table 4
Trip Generation Calculations

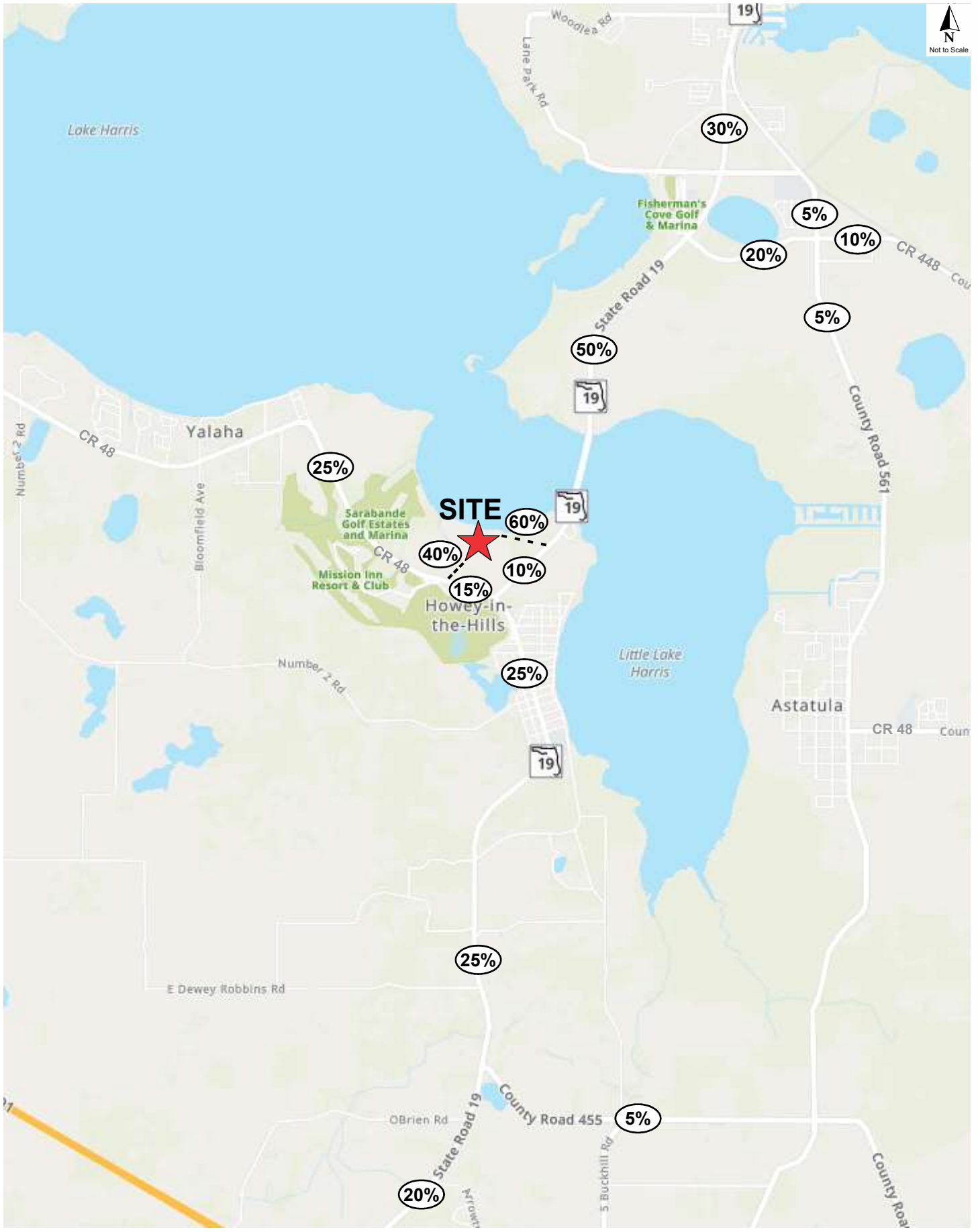
ITE Code	Land Use	Size	Daily		AM Peak Hour			PM Peak Hour					
			Rate	Trips	Rate	Total	Enter	Exit	Rate	Total	Enter	Exit	
251	Senior Housing Single Family	475 DU	4.31	2,047	0.27	127	42	85	0.31	150	91	59	
252	Senior Housing Multifamily	125 DU	3.24	405	0.20	25	9	16	0.25	31	18	13	
821	Shopping Plaza (40-150k)	92.300 KSF	94.49	8,721	3.53	326	202	124	9.03	833	400	433	
851	Convenience Store	5.000 KSF	762.28	3,811	62.54	313	156	157	49.11	246	125	121	
934	Fast Food Restaurant with Drive-Through Window	5.000 KSF	467.48	2,337	44.61	223	114	109	33.03	165	86	79	
Total Gross Trip Generation				17,322		1,014	523	491		1,425	720	705	
Internal Capture (Daily - 18.26%, AM -15.2%, PM -21.4%)				3,163		154	79	75		304	154	150	
External Trips				14,159		860	444	416		1,121	566	555	
Retail Pass-by (40%)				2,852		111	69	42		262	126	136	
Convenience Pass-by (51%)				1,589		135	68	67		98	50	48	
Fast-Food Pass-by (49%)				936		93	47	46		64	33	31	
Total Pass-by				5377		339	184	155		424	209	215	
Total Net New External Trip Generation				8,782		521	260	261		697	357	340	

Source: ITE Trip Generation Manual, 11th Edition
ITE equations were used as R² were greater than 0.75 and with more than 20 studies

The proposed development at project buildout is projected to generate 8,782 new external daily trips; of which 521 external trips occur during the AM peak hour, and 697 external trips occur during the PM peak hour.

3.2 Trip Distribution/Assignment

The trip distribution pattern was developed using the *Central Florida Regional Planning Model (CFRPM v7)*. The model distribution was manually adjusted based on local knowledge, professional engineering judgement, and the location of the development with respect to the study area attractions and activity centers to better reflect prevailing travel and traffic flow patterns in the study area. The raw model plots are provided in **Appendix G**, and the adjusted project trip distribution is shown in **Figure 3**.



Not to Scale

4.0 PLANNED AND PROGRAMMED IMPROVEMENTS

The *Lake-Sumter Metropolitan Planning Organization (LSMPO) 2023-2027 Transportation Improvement Program (TIP)*, as well as *LSMPO 2022 List of Priority Projects (LOPP)* were reviewed to identify any planned or programmed improvements to the transportation facilities in the study area. The improvements are listed in **Table 5**. SR 19 is being widened to 4-lanes from CR 48 to CR 561 and will include a roundabout at the intersection of SR 19 and CR 48. Construction is not planned to be completed within the next three (3) years for either improvement. However, the intersection of SR 19 and CR 48 was evaluated as both a signal and a roundabout in this study. Excerpts from the *LSMPO TIP*, *LSMPO LOPP*, and the preliminary engineering plans for the roundabout are provided in **Appendix H**.

Table 5
Planned and Programmed Improvements

FM #	Project Name	From	To	Proposed Phase	Proposed Phase FY	Description of Improvement
2383191	SR 19 *	CR 48	CR 561	PDE-PE-ENV	2023	Add Lanes & Reconstruct
238319-1	SR 19 **	Howey Bridge	CR 561	-	-	Road Widening

* LSMPO TIP Fiscal Year 2023-2027

** LSMPO 2022 LOPP Tier 2 project

5.0 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 2028.

5.1 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. Traffic growth at the project buildout was estimated based on annual growth rates available on *2022 Lake County CMP Database* for county roads. For state roads the growth rates were calculated using the historical data between 2017 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 committed trips for the following approved developments within the study area were included in the analysis:

- Whispering Hills – Buildout year 2023
- Talichet Phase 1 and Phase 2 – Buildout year 2023
- Garden Center commercial project (project information was obtained from the Town, but was determined to be insignificant with under 50 daily trips and therefore, trips were not included in this TIA)
- Drake Point (copy of site plan was obtained, trip generation was calculated, and trip assignment was assumed) – Buildout year 2025
- The Reserve at Howey-In-The-Hills (traffic study was obtained) – Buildout year 2028
- Watermark (Simpson) (traffic study was obtained) – Buildout year 2027

Excerpts from of these developments traffic studies are included in **Appendix I**.

5.2 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 Lake County CMP Database*. **Table 6** summarizes the projected roadway segment capacity analysis, which reveals the following:

- SR 19 from CR 561 to Central Avenue and from CR 455 to US 27/SR 25 are projected to operate over their capacities due to background traffic.
- All remaining roadway segments are projected to continue to operate adequately at project buildout.

**Table 6
Projected Roadway Segment Capacity Analysis**

Road Name	From	To	# of Lns	LOS Std	Dir Cap	Dir	Growth Rate	Existing Volume	Vested Trips	2028 Background		Trip Distr	2028 Buildout			
										Volume	LOS		Project Trips	Volume	LOS	V/C
CR 448	SR 19	CR 561	2	D	840	NB/EB SB/WB	2%	277	37	314	C	20%	68	382	C	0.46
								224	63	287	C	20%	71	358	C	0.43
CR 48	US 27	LIME AVENUE	2	D	1,080	NB/EB SB/WB	4%	420	219	639	C	25%	89	729	C	0.67
								380	285	665	C	25%	85	750	C	0.69
CR 48	LIME AVENUE	SR 19	2	D	1,080	NB/EB SB/WB	2%	429	219	648	C	25%	85	733	C	0.68
								404	285	689	C	25%	89	778	C	0.72
SR 19	CR 561	LANE PARK ROAD	2	D	920	NB/EB SB/WB	2%	775	155	930	F	30%	102	1,032	F	1.12
								647	292	939	F	30%	107	1,046	F	1.14
SR 19	LANE PARK ROAD	CR 48	2	D	920	NB/EB SB/WB	2%	775	155	930	F	50%	170	1,100	F	1.20
								647	292	939	F	50%	178	1,117	F	1.21
SR 19	CR 48	CENTRAL AVENUE	2	D	700	NB/EB SB/WB	2%	515	269	784	F	25%	89	873	F	1.25
								439	352	791	F	25%	85	876	F	1.25
SR 19	CENTRAL AVENUE	CR 455	2	D	1,200	NB/EB SB/WB	2%	515	434	949	D	25%	89	1,038	D	0.87
								439	257	696	C	25%	85	781	C	0.65
SR 19	CR 455	US 27 / SR 25	2	C	450	NB/EB SB/WB	2%	637	328	965	E	20%	71	1,036	E	2.30
								532	207	739	E	20%	68	807	E	1.79

Source: 2022 Lake County Congestion Management Process (CMP)

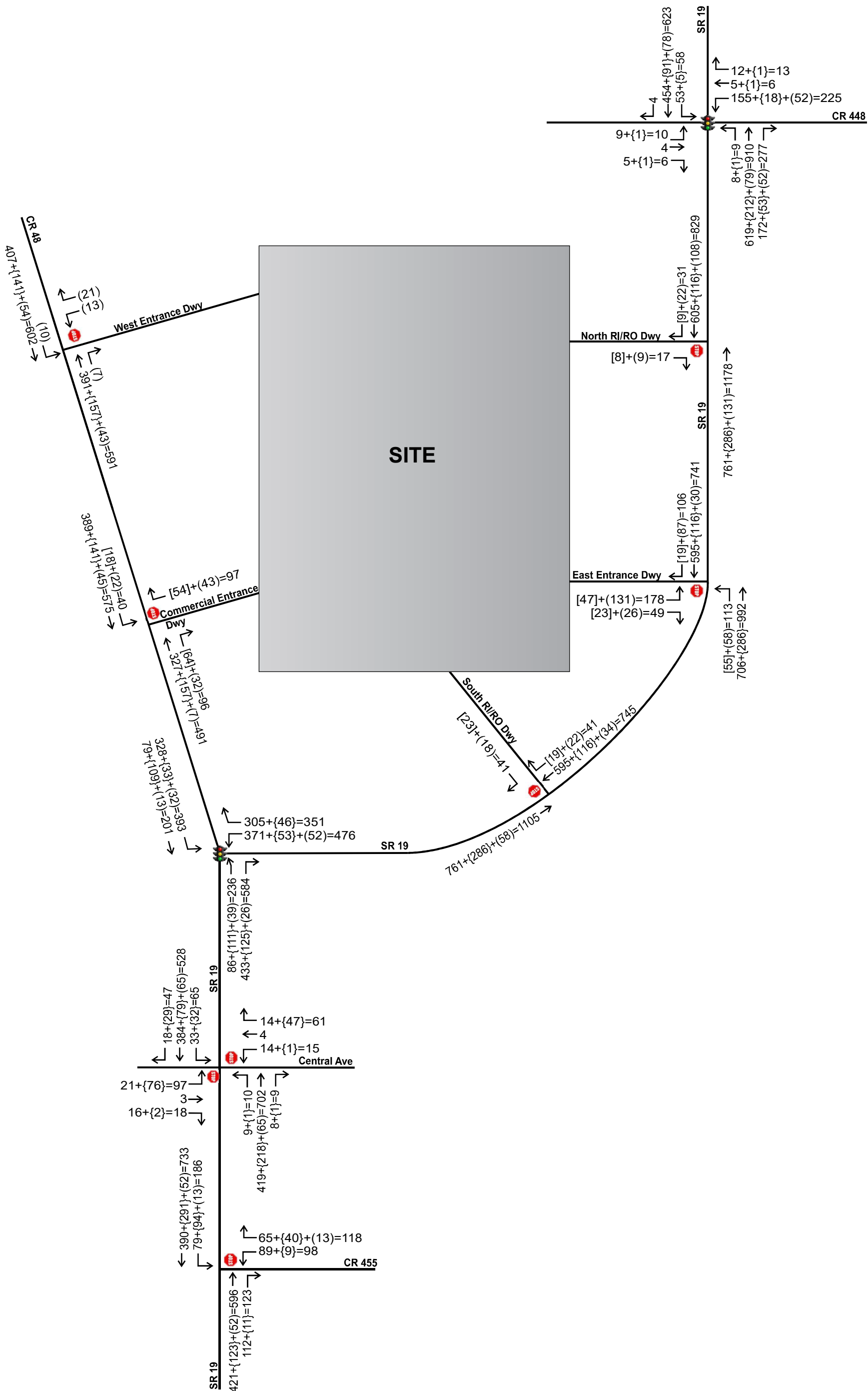
Background traffic volume is based on traffic growth or vested trips from committed developments, whichever was found to be higher.

It should be noted that SR 19 from CR 48 to CR 561 is programmed in the *TIP* to be widened to four (4) lanes, which will improve the LOS. The segment of SR 19 from CR 48 to Central would potentially require to be widened to four (4) lanes to achieve acceptable LOS conditions. If context classification of the segment SR 19 from CR 455 to US 27/SR 25 changes to urbanized area, the adopted LOS capacity would increase, which would result in an acceptable LOS.

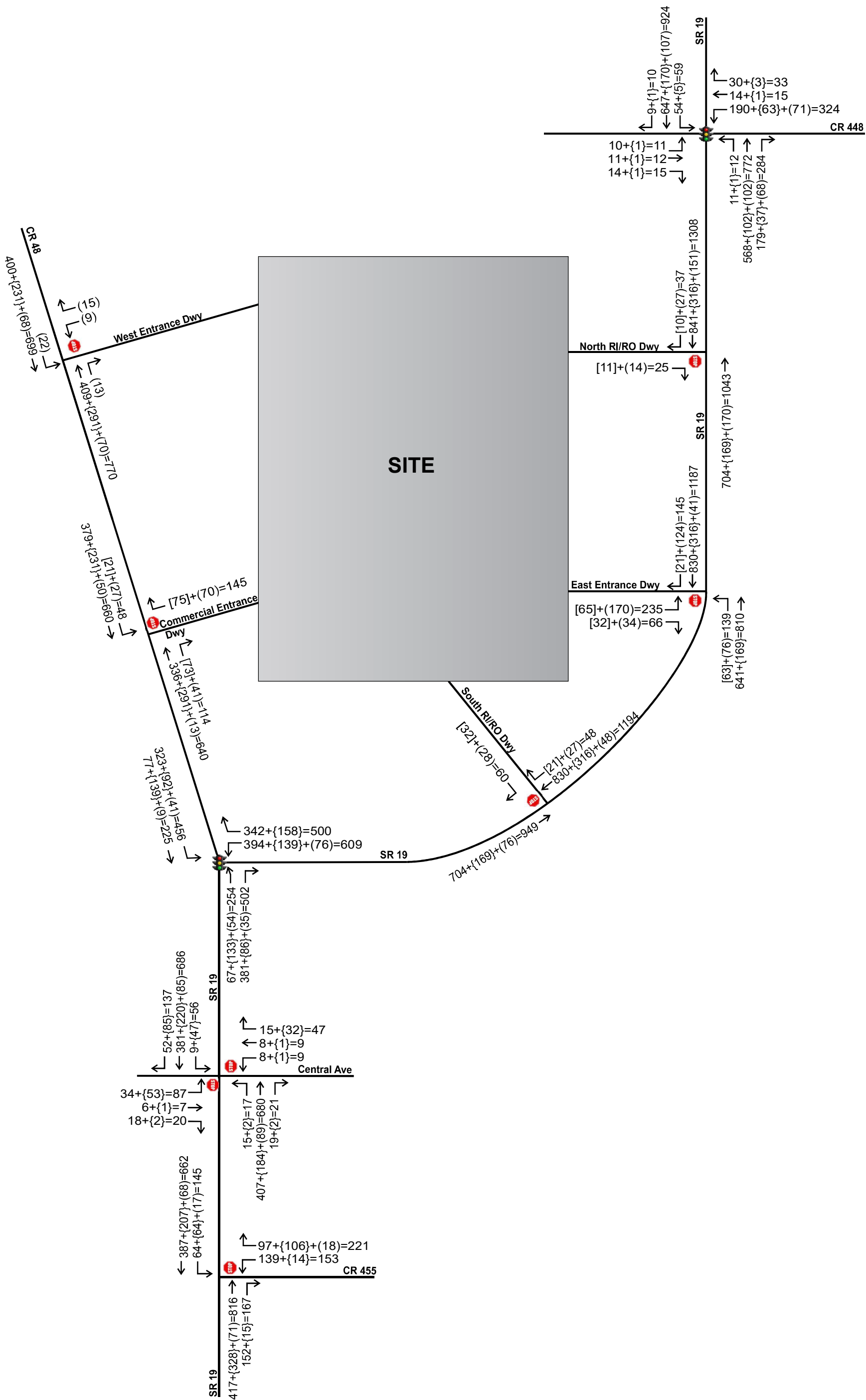
5.3 Intersection Capacity Analysis

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 section 5.1.

The projected AM and PM peak hour volumes are illustrated in **Figure 4** and **Figure 5**, respectively. The results of the analysis for background and buildout traffic conditions are summarized in **Table 7**. The intersection volume projection sheets are included in **Appendix J**, and *HCM* analysis worksheets are included in **Appendix K**.



Legend:
 Existing + {Vested} + [Pass-by] + (Project) = Total



Legend:
Existing + {Vested} + [Pass-by] + (Project) = Total

**Table 7
Buildout Intersection Capacity Analysis**

No	Intersection	Traffic Control	Time Period	Scenario	EB		WB		NB		SB		Overall	
					Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1	SR 19 & CR 455	TWSC	AM	Background	--	--	33.7	D	--	--	10.3	B	--	--
				Buildout	--	--	41.2	E	--	--	10.8	B	--	--
			PM	Background	--	--	42.5	E	--	--	11.1	B	--	--
				Buildout	--	--	61.1	F	--	--	11.8	B	--	--
2	SR 19 & CR 48	Signal	AM	Background	--	--	134.3	F	22.6	C	130.2	F	118.3	F
				Buildout	--	--	167.5	F	23.5	C	163.1	F	145.4	F
		Roundabout	AM	Background	--	--	8.6	A	13.9	B	11.2	B	11.2	B
				Buildout	--	--	186.1	F	22.3	C	155.9	F	155.6	F
		Signal	PM	Background	--	--	248.3	F	23.5	C	197.7	F	199.7	F
				Buildout	--	--	19.2	C	24.3	C	33.7	D	24.6	C
Roundabout	PM	Background	--	--	26.9	C	32.6	C	28.8	C	15.7	B	24.9	C
		Buildout	26.5	C	34.2	C	56.8	E	19.9	B	42.2	D		
3	SR 19 & CR 448	Signal	AM	Background	23.5	C	29.7	C	20.2	C	31.7	C	26.4	C
				Buildout	24.2	C	35.9	D	34.1	C	69.5	E	48.4	D
4	SR 19 & Central Ave	TWSC	AM	Background	>300	F	29.5	D	9.0	A	9.7	A	--	--
				Buildout	>300	F	39.3	E	9.3	A	10.1	B	--	--
			PM	Background	>300	F	30.3	D	9.4	A	9.1	A	--	--
				Buildout	>300	F	43.2	E	9.7	A	9.4	A	--	--
5	SR 19 & East Entrance Dwy	TWSC	AM	Buildout	250.7	F	--	--	10.8	B	--	--	--	--
			PM	Buildout	>300	F	--	--	16.3	C	--	--	--	--
6	SR 19 & West Entrance Dwy	TWSC	AM	Buildout	8.9	A	--	--	--	--	19.6	C	--	--
			PM	Buildout	9.7	A	--	--	--	--	26.8	D	--	--
7	SR 19 & Commercial Entrance Dwy	TWSC	AM	Buildout	--	--	13.2	B	--	--	9.0	A	--	--
			PM	Buildout	--	--	17.6	C	--	--	9.8	A	--	--
8	SR 19 & North RI/RO Dwy	TWSC	AM	Buildout	16.3	C	--	--	--	--	--	--	--	--
			PM	Buildout	30.7	D	--	--	--	--	--	--	--	--
9	SR 19 & South RI/RO Dwy	TWSC	AM	Buildout	15.7	C	--	--	--	--	--	--	--	--
			PM	Buildout	31.9	D	--	--	--	--	--	--	--	--

The analysis reveals the following:

- The intersection of SR 19 and CR 455 is projected to operate with delay for the westbound left movement. Project trips contribute no traffic to that movement.
- The signalized intersection of SR 19 and CR 48 is projected to operate overall above the adopted LOS at background and projected traffic conditions with delays on the westbound and southbound approaches; however, the intersection is projected to operate at acceptable LOS with a roundabout.
- The intersection of SR 19 and Central Avenue is operating with a flashing signal (beacon), and it is projected to experience delays on the eastbound approach at background and buildout conditions, due to heavy projected background traffic on SR 19. The project does not assign trips to the minor approaches.

- The intersection of SR 19 and East Entrance is projected to operate above the LOS standard at buildout condition with a two-way stop control sign. The developer will install a traffic signal at this entrance when warranted.

The remaining study intersections are projected to operate adequately at the project buildout.

6.0 ACCESS REVIEW

The development will be accessed via one (1) full access driveway on CR 48, serving the residential portion, one (1) full access driveway on SR 19, serving both residential and commercial parcels; one (1) directional driveway on CR 48, serving the commercial parcels; and two (2) right-in/right-out access driveways on SR 19, serving the commercial parcels. SR 19 is a 2-lane undivided roadway with a posted speed of 55 mph adjacent to the site. CR 48 is a 2-lane undivided roadway with a posted speed of 40 mph adjacent to the site.

6.1 Turn Lane Review

A review of the need for turn lanes at the project entrance intersections was conducted based on the Lake County *Land Development Code (LDC)* guidelines, which are provided in **Appendix L**. In accordance with the *LDC* guidelines, right and left turn lanes are warranted at the intersections on SR 19 and CR 48. The calculations are provided as follows:

SR 19 and East Entrance Driveway

Southbound Right Turn Lane Length = Taper Length + Storage Length

Taper Length at 60 mph (design speed) = 270 feet

Storage Length at 60 mph (design speed) = 220 feet

Southbound Right Turn Lane = 270 feet + 220 feet = 490 feet

Northbound Left Turn Lane Length = Taper Length + Storage Length

Taper Length at 60 mph (design speed) = 270 feet

Storage Length at 60 mph (design speed) = 220 feet

Northbound Left Turn Lane = 270 feet + 220 feet = 490 feet

CR 48 and West Entrance Driveway

Northbound Right Turn Lane Length = Taper Length + Storage Length

Taper Length at 45 mph (design speed) = 210 feet

Storage Length at 45 mph (design speed) = 165 feet

Northbound Right Turn Lane = 210 feet + 165 feet = 375 feet

Southbound Left Turn Lane Length = Taper Length + Storage Length

Taper Length at 45 mph (design speed) = 210 feet

Storage Length at 45 mph (design speed) = 165 feet

Southbound Left Turn Lane = 210 feet + 165 feet = 375 feet

CR 48 and Commercial Entrance Driveway

Northbound Right Turn Lane Length = Taper Length + Storage Length

Taper Length at 45 mph (design speed) = 210 feet

Storage Length at 45 mph (design speed) = 165 feet

Northbound Right Turn Lane = 210 feet + 165 feet = 375 feet

Southbound Left Turn Lane Length = Taper Length + Storage Length

Taper Length at 45 mph (design speed) = 210 feet

Storage Length at 45 mph (design speed) = 165 feet

Southbound Left Turn Lane = 210 feet + 165 feet = 375 feet

SR 19 and North Right-in/Right-out Driveway

Southbound Right Turn Lane Length = Taper Length + Storage Length

Taper Length at 60 mph (design speed) = 270 feet

Storage Length at 60 mph (design speed) = 220 feet

Southbound Right Turn Lane = 270 feet + 220 feet = 490 feet

SR 19 and South Right-in/Right-out Driveway

Southbound Right Turn Lane Length = Taper Length + Storage Length

Taper Length at 60 mph (design speed) = 270 feet

Storage Length at 60 mph (design speed) = 220 feet

Southbound Right Turn Lane = 270 feet + 220 feet = 490 feet

7.0 STUDY CONCLUSIONS

This traffic analysis was conducted to assess the impact of the proposed development of Lake Hills PD in the Town of Howey-In-The-Hills, Lake County, Florida. The project will include 475 Senior Adult Housing Single Family (SF) Detached Dwelling Units (DUs), 125 Senior Adult Housing SF Attached DUs, a 92,300 square foot shopping plaza, 5,000 square foot convenience store, and 5,000 square foot fast food restaurant with drive thru. Project is projected to be completed by year 2028. The analysis included a determination of project trip generation, a review of existing and projected roadway and intersection capacity, and an access review.

The results of the traffic analysis are summarized as follows:

- The proposed development is projected to generate 8,782 new external daily trips, of which 521 external trips occur during the AM peak hour, and 697 external trips occur during the PM peak hour at project buildout.
- The roadway segments of SR 19 from CR 561 to Central Avenue and from CR 455 to US 27/SR 25 are projected to operate over their capacities due to background traffic.
- SR 19 from CR 48 to CR 561 is programmed in the *TIP* to be widened to four (4) lanes, which is projected to improve the LOS.
- The segment of SR 19 from CR 48 to Central would potentially require widening to four (4) lanes to achieve acceptable LOS conditions.
- All remaining study roadway segments are projected to continue to operate adequately at project buildout.
- The intersection of SR 19 and CR 455 is projected to operate with delay for the westbound left movement. Project trips contribute no traffic to the movement.
- The signalized intersection of SR 19 and CR 48 is projected to operate overall above the adopted LOS at background and projected traffic conditions with delays on the westbound and southbound approaches; however, the intersection is projected to operate at acceptable LOS with a roundabout.

- The intersection of SR 19 and Central Avenue is projected to experience delays on the eastbound approach at background and buildout conditions due to heavy projected background traffic on SR 19. The project does not assign trips to the minor approaches.
- The intersection of SR 19 and East Entrance is projected to operate above the LOS standard at buildout condition with a two-way stop control sign. The developer will install a traffic signal at this entrance when warranted.
- Construct a 490-foot southbound right turn lane and a 490-foot northbound left turn lane at SR 19 and East Entrance Driveway.
- Construct a 375-foot northbound right turn lane and a 375-foot southbound left turn lane at CR 48 and West Entrance Driveway.
- Construct a 375-foot northbound right turn lane and a 375-foot southbound left turn lane at CR 48 and Commercial Entrance Driveway.
- Construct a 490-foot southbound right turn lane at SR 19 and North Right-in/Right-out Driveway.
- Construct a 490-foot southbound right turn lane at SR 19 and South Right-in/Right-out Driveway.

APPENDICES

Appendix A
Preliminary Development Plan

SITE DATA:

PARCEL ID:	23-20-25-0004-000-00200, 22-20-25-0004-000-01000, 15-20-25-0101-001-00000, 22-20-25-0001-000-01400, 23-20-25-0002-000-01100, 23-20-25-0002-000-00600, 23-20-25-0004-000-01000
JURISDICTION:	HOWEY-IN-THE-HILLS
ZONED:	PUD (LAKE HILLS 2011-008)
GROSS SITE AREA:	220.21 ACRES ±
TOTAL NUMBER OF LOTS:	571 LOTS
DENSITY:	2.59 DU/AC
OPEN SPACE REQUIRED:	55.33 AC (MIN. 25% OF GROSS AREA)
OPEN SPACE PROVIDED:	79.02 AC (36.0%)

LEGEND:

	WETLAND TO BE PRESERVED
	WETLAND IMPACT (2.74 AC)
	WETLAND BUFFER/OPEN SPACE
	OPEN SPACE/LANDSCAPE BUFFER
	TREE TO REMAIN
	TREE TO BE REMOVED

	50' COTTAGE HOME LOT - (40'X85' PAD) TYPICAL	321 UNITS
	60+ COTTAGE HOME LOT - (50'X85' PAD) TYPICAL	152 UNITS
	PAIRED HOME LOT - (30'X85' PAD - DUPLEX) TYPICAL	98 UNITS
TOTAL UNITS -		571 UNITS

	DEVELOPED AREA	220.21 AC	100%
	RESIDENTIAL LOTS	45.72 AC	20.8%
	ASPHALT AREA:	15.19 AC	6.9%
	RECREATION AREA:	6.36 AC	2.9%
	12' MULTI-USE PATH:	1.20 AC	0.5%
	WETLAND BUFFER:	8.24 AC	3.7%
	WETLAND:	31.83 AC	14.4%
	POND WET:	21.89 AC	9.9%
	POND DRY:	6.40 AC	2.9%
	PARK:	4.36 AC	2.0%
	OPEN SPACE:	79.02 AC	36.0%
TOTAL PERVIOUS:		89.78 AC	40.9%
TOTAL IMPERVIOUS:		108.54 AC	49.2%
TOTAL WET POND:		21.89 AC	9.9%

MADDEN
MOORHEAD & STOKES, LLC
CIVIL ENGINEERS
431 E. Horatio Avenue
Suite 250
Maitland, Florida 32751
(407) 629-8330

PRELIMINARY SUBDIVISION PLAN
FOR
LAKE HILLS
TOWN OF HOWEY-IN-THE-HILLS
LAKE COUNTY, FLORIDA

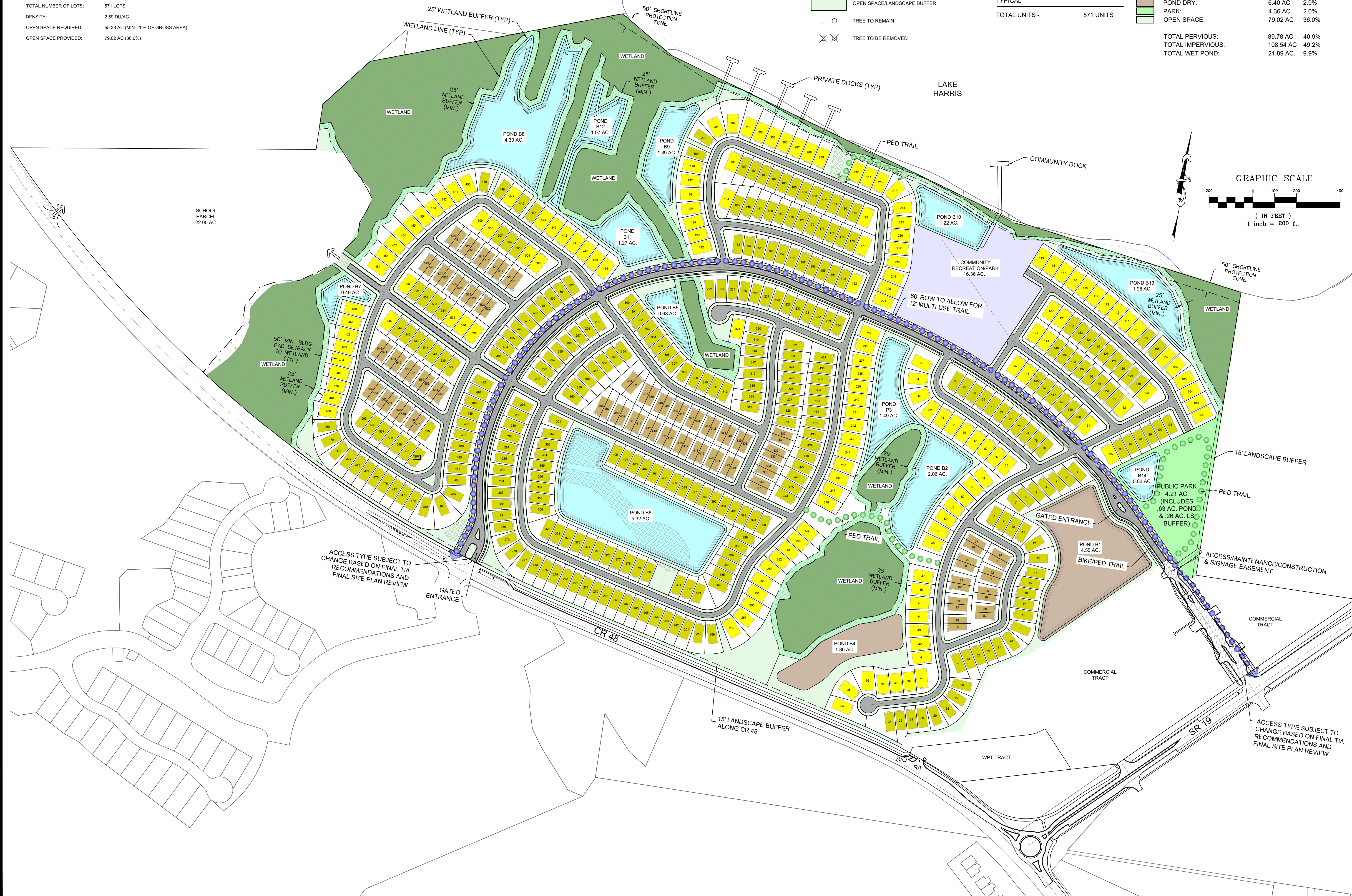
LAKE HILLS
READER COMMUNITIES
5850 TO LEE BOULEVARD, SUITE 200
ORLANDO, FL 32822
(407) 856-4899

ENGINEER IN CHARGE:
DAVID A. STOKES, P.E. #66527
DATE: December 22, 2023
CERTIFICATE OF AUTHORIZATION NO. EB-0007723

NO.	DATE	REVISIONS

JOB # 23019
DATE: 10/27/2023
SCALE: 1"=200'
DESIGNED BY: JV
DRAWN BY: JV
APPROVED BY: DAS

C1.00

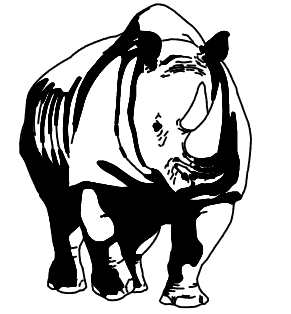
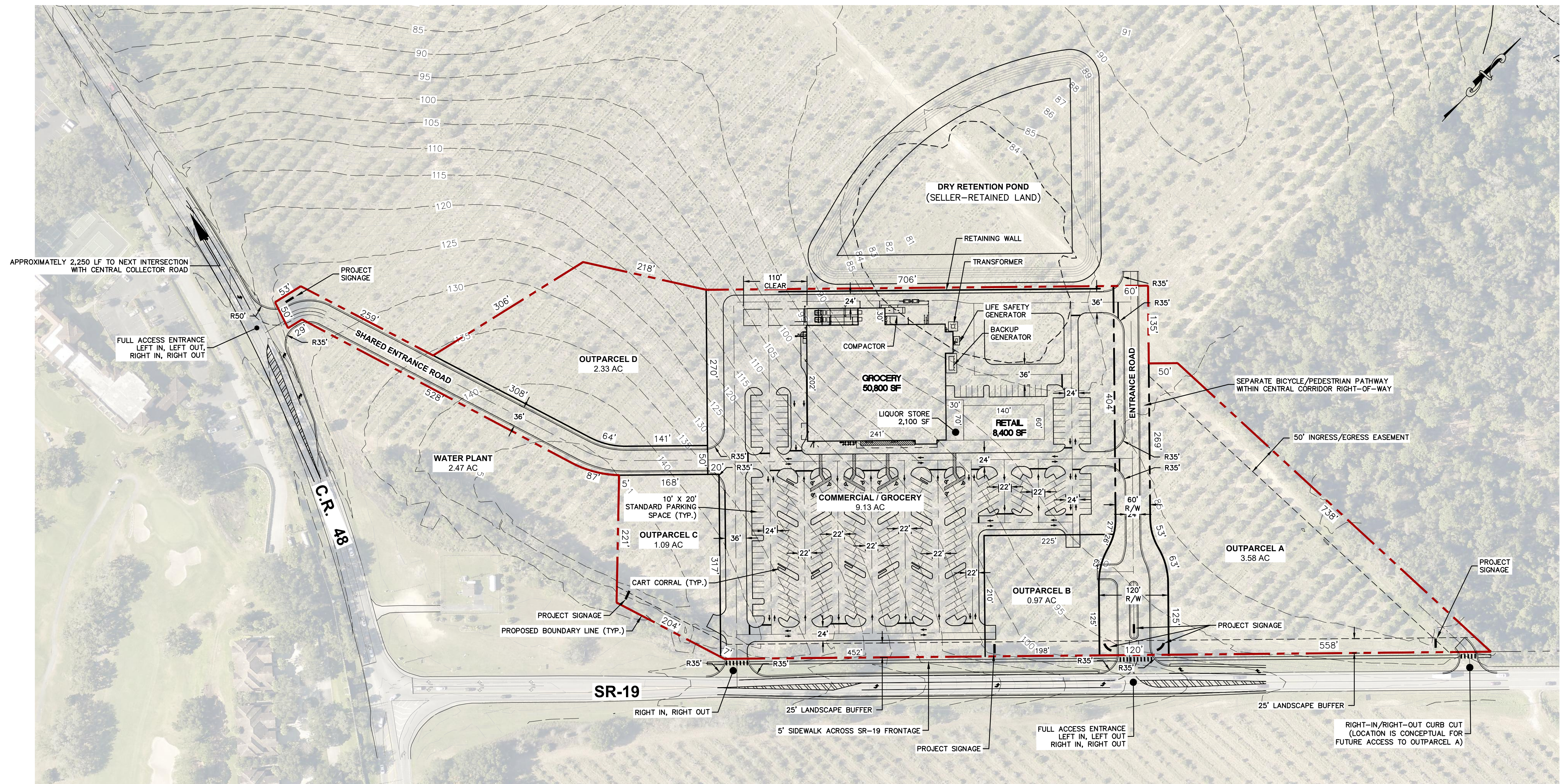
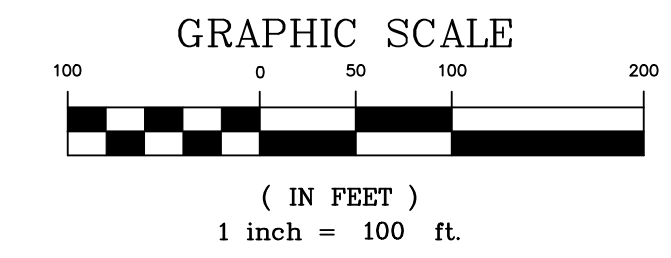
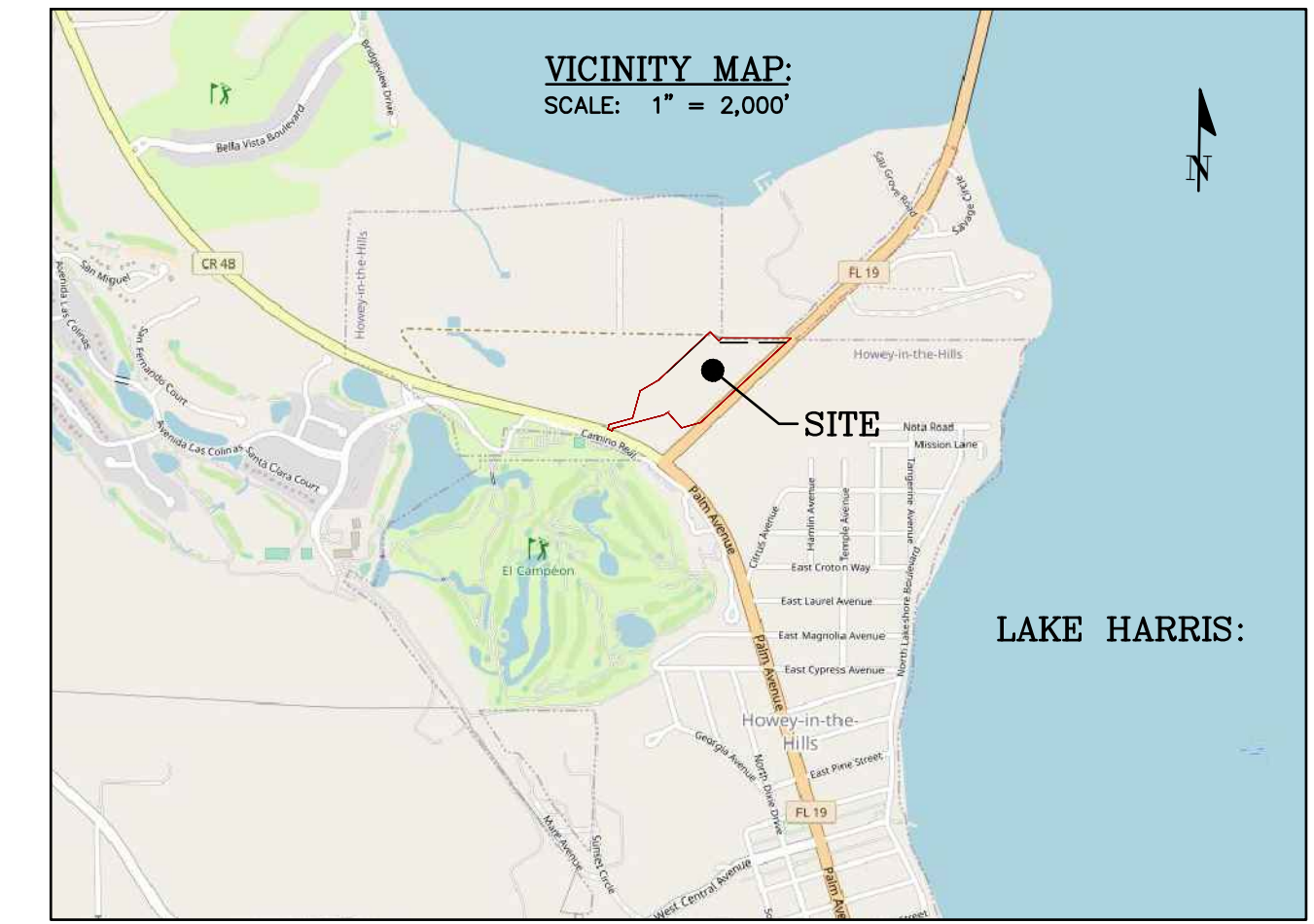


LAND USE TABLE:

SITE AREA	OWNERSHIP	MAINTENANCE	AREA (AC)	AREA (%)
GROCERY RETAIL	PRIVATE	PRIVATE	9.13	47.59%
OUTPARCEL A	PRIVATE	PRIVATE	3.58	18.63%
OUTPARCEL B	PRIVATE	PRIVATE	0.97	5.07%
OUTPARCEL C	PRIVATE	PRIVATE	1.09	5.69%
OUTPARCEL D	PRIVATE	PRIVATE	2.33	12.13%
SHARED ENTRANCE ROAD	PRIVATE	PRIVATE	0.96	4.99%
PUBLIC RIGHT-OF-WAY	PUBLIC	PUBLIC	1.13	5.90%
TOTAL			19.19	100.00%

SITE DATA:

PARCEL ID: 23-20-25-0002-000-01100
 JURISDICTION: HOWEY-IN-THE-HILLS
 ZONING: PUD
 GROSS SITE AREA: 19.19 ACRES ±
 TOTAL BUILDING S.F.: 61,300 SF
 FLOOR AREA RATIO:
 MAXIMUM: 0.23 (PER OVERALL PD)
 PROPOSED: TO BE DETERMINED WITH FINAL SITE PLAN
 MAX BUILDING HEIGHT: 35 FT (45 FT FOR PARAPETS, TOWERS, ETC.)
 PARKING:
 REQUIRED: 306 SPACES
 5 SPACES PER 1,000SF OF BUILDING AREA
 (61,300 SF / 1,000 SF) * 5 = 306 SPACES MIN.
 PROVIDED: 326 SPACES PROVIDED
 OPEN SPACE:
 REQUIRED: 40 ACRES ON OVERALL PD
 PROVIDED: 0 (ZERO) ACRES. THIS PROJECT IS NOT CONTRIBUTING TO THE OVERALL OPEN SPACE COMMITMENT AS DEFINED UNDER SECTION 5.D OF THE PUD.
 DEDICATIONS & RESERVATIONS: 1.13 AC TO BE DEDICATED AS PUBLIC RIGHT-OF-WAY

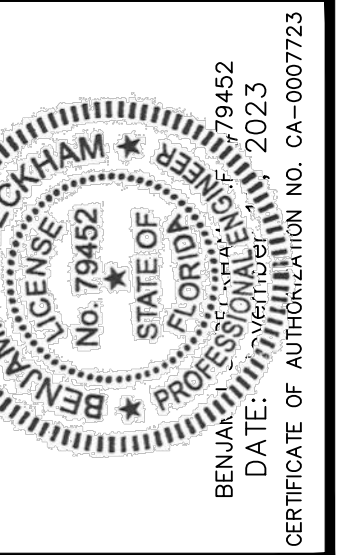


MADDEN
 MOORHEAD & STOKES, LLC
 CIVIL ENGINEERS

431 E. Horatio Avenue
 Suite 260
 Maitland, Florida 32751
 (407) 629-8330

PRELIMINARY SITE PLAN
 FOR
LAKE HILLS SHOPPING CENTER
 TOWN OF HOWEY-IN-THE-HILLS, FLORIDA

WINDCREST DEVELOPMENT GROUP, INC.
 605 E. ROBINSON ST., SUITE 340
 ORLANDO, FL 32801
 407-219-3540



NO.	DATE	REVISIONS
1	11/29/23	REVISED PER HOWEY DISC COMMENTS

JOB # 22041
 DATE: 09/29/23
 SCALE: 1" = 100'
 DESIGNED BY: JAS
 DRAWN BY: JAS
 APPROVED BY: BSB

C100

H:\Data\22041\Eng\Y\SP\22041_C101_PSP.dwg November 16, 2023 11:05 AM

Appendix B
Study Methodology



MEMORANDUM

December 15, 2023

Re: Lake Hills PD
Tier 2 Traffic Impact Analysis (TIA) Methodology v1.2
Town of Howey-In-The-Hills, Florida
Project № 23103

This methodology outlines the proposed Traffic Impact Analysis (TIA) for the above referenced project. The methodology is consistent with the requirements of the Town of Howey-In-The-Hills and the Lake-Sumter Metropolitan Planning Organization (LSMPO) for a Tier 2 TIA. This methodology has been revised in accordance with the comments provided by the Town of Howey-in-the-Hills. The comments and response to comments letter are included in the **Attachments**.

Project Description

The ±264-acre site is proposed to be residential and commercial development consisting of parcels: 23-20-25-0004-000-00200, 23-20-25-0004-000-01000, 23-20-25-0002-000-00600, and 22-20-25-0004-000-02600. The project will include 450 Senior Adult Housing Single Family (SF) Detached Dwelling Units (DUs), 150 Senior Adult Housing SF Attached DUs, and a total of 92,300 Square Feet shopping plaza, 5,000 Square Feet convenience store, and 5,000 Square Feet fast food restaurant with drive-thru. The development is projected to be completed by the year 2028. A preliminary site plan is included in the **Attachments**.

Project Location

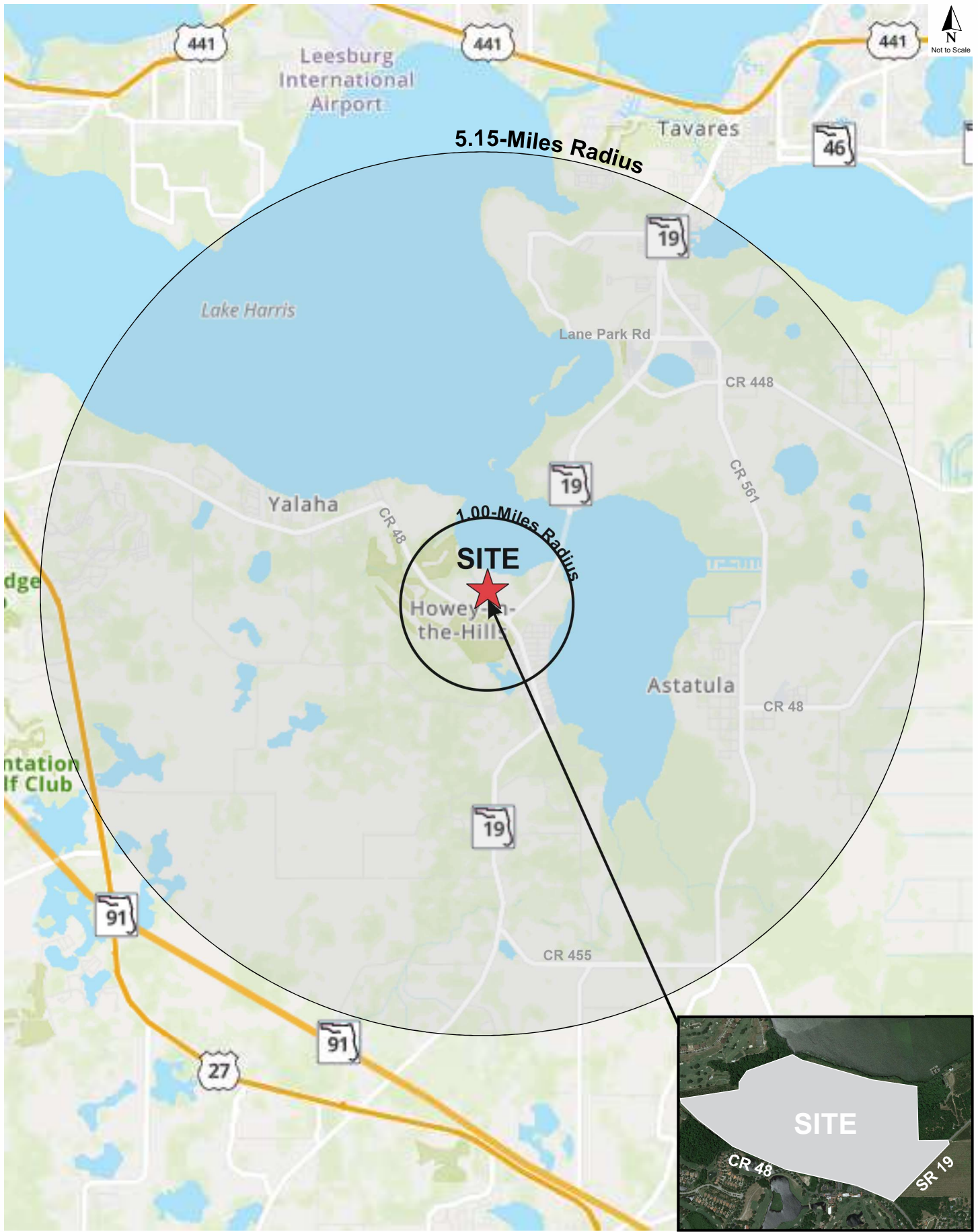
The site is located north of CR 48 and west of SR 19, in the Town of Howey-In-The-Hills, Florida, as shown in **Figure 1**.

Project Access

The project proposes two (2) full access driveways: one (1) on CR 48, serving the residential portion, and one (1) on SR 19, serving both residential and commercial parcels; one (1) directional driveway on CR 48, serving the commercial parcels; and two (2) right-in/right-out access driveways on SR 19, serving commercial parcels. The access configuration is depicted in the preliminary site plan included in the **Attachments**.

Trip Generation

A trip generation analysis was performed for the development using the trip generation information from the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 11th Edition*. The ITE information sheets are included in the **Attachments**. The trip generation of proposed development is summarized in **Table 1**.



Lake Hills PD

Traffic Impact Analysis Methodology v1.1

Project № 23103

September 15, 2023

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**Table 1
Trip Generation Calculations**

ITE Code	Land Use	Size	Daily		AM Peak Hour			PM Peak Hour				
			Rate	Trips	Rate	Total	Enter	Exit	Rate	Total	Enter	Exit
251	Senior Housing Single Family	475 DU	4.31	2,047	0.27	127	42	85	0.31	150	91	59
252	Senior Housing Multifamily	125 DU	3.24	405	0.20	25	9	16	0.25	31	18	13
821	Shopping Plaza (40-150k)	92.300 KSF	94.49	8,721	3.53	326	202	124	9.03	833	400	433
851	Convenience Store	5.000 KSF	762.28	3,811	62.54	313	156	157	49.11	246	125	121
934	Fast Food Restaurant with Drive-Through Window	5.000 KSF	467.48	2,337	44.61	223	114	109	33.03	165	86	79
Total Gross Trip Generation				17,322		1,014	523	491		1,425	720	705
<i>Internal Capture (Daily - 18.26%, AM -15.2%, PM -21.4%)</i>				3,163		154	79	75		304	154	150
External Trips				14,159		860	444	416		1,121	566	555
<i>Retail Pass-by (40%)</i>				2,852		111	69	42		262	126	136
<i>Convenience Pass-by (51%)</i>				1,589		135	68	67		98	50	48
<i>Fast-Food Pass-by (49%)</i>				936		93	47	46		64	33	31
Total Net New External Trip Generation				8,782		521	260	261		697	357	340

Source: ITE Trip Generation Manual, 11th Edition

ITE equations were used as R² were greater than 0.75 and with more than 20 studies

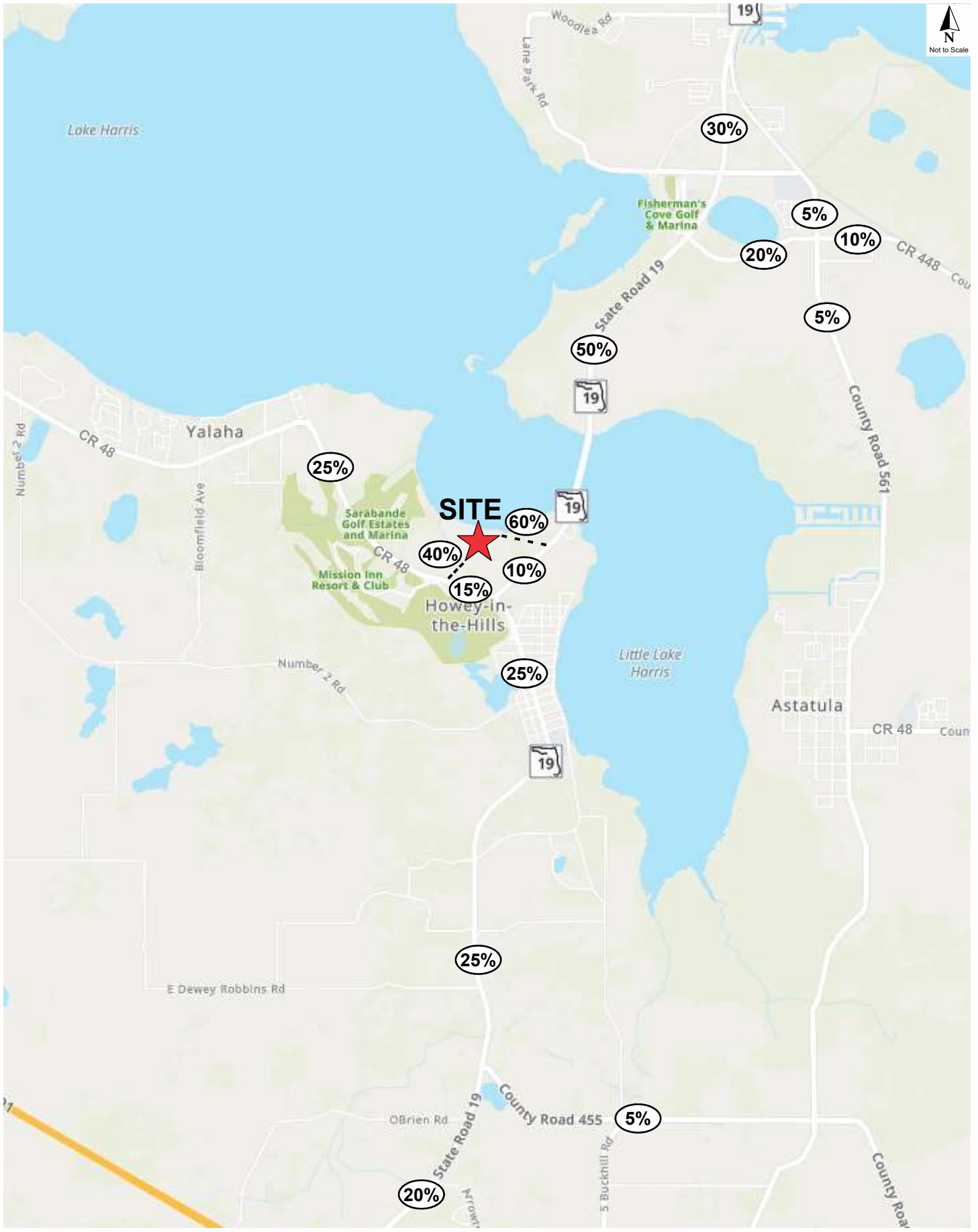
The proposed development at project buildout is projected to generate 8,760 new external daily trips; of which 521 external trips occur during the AM peak hour, and 697 external trips occur during the PM peak hour.

Trip Distribution

A trip distribution pattern was estimated using the *Central Florida Regional Planning Model, version 7 (CFRPM V7)*. The model distribution was adjusted based on local knowledge, professional engineering judgement, and the location of the development with respect to the study area attractions and activity centers to reflect prevailing travel patterns in the vicinity of the site and the surrounding transportation network. The raw model plots are provided in the **Attachments**, and the adjusted trip distribution is shown in **Figure 2**.

Study Area

In accordance with the LSMPO requirements for a Tier 2 TIA methodology and the Town of Howey-In-The-Hills *Land Development Code*, the study area will encompass roadway segments and intersections within a 1-mile radius at a minimum. The study will also include segments and intersections within a 5.15-mile radius, (½ the trip length for residential land use), where the project’s peak hour trips consume five percent (5%) or more of a roadway’s two-way peak hour generalized service volume, based on the adopted level of service (LOS), and committed number of lanes. The total trip length was obtained from the *Lake County Transportation Impact Fee Schedule Table 9-1* (dated 12/21/2001), included in the **Attachments**. The roadway segments identified by the significance test will be analyzed in the Tier 2 TIA. Excerpts from the *2022 Lake County Congestion Management Plan (CMP) Database* are included in the **Attachments**. The study area significance analysis is summarized in **Table 2**.



Not to Scale

Lake Hills PD

Traffic Impact Analysis Methodology v1.1

Project № 23103

September 15, 2023

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Table 2
Study Area Significance Analysis

Road Name	From	To	#		LOS		Project Trips			Within	Within	%	In
			LNS	T	Std	Cap	% Dist	NB/EB	SB/WB	5.15 miles?	1.0 miles?	Cap	Study?
CR 448	SR 19	CR 561	2	U	D	840	20%	68	71	YES	NO	8.5%	YES
CR 448	CR 561	Lake Industrial Blvd	2	U	D	840	10%	34	36	YES	NO	4.3%	NO
CR 455	SR 19	CR 561	2	R	C	740	5%	18	17	YES	NO	2.4%	NO
CR 48	US 27	Lime Ave	2	U	D	1,080	25%	89	85	YES	NO	8.2%	YES
CR 48	Lime Ave	SR 19	2	U	D	1,080	25%	85	89	YES	YES	8.2%	YES
CR 561	SR 19	CR 448	2	U	D	840	5%	18	17	YES	NO	2.1%	NO
CR 561	CR 448	CR 48	2	U	D	1,080	5%	17	18	YES	NO	1.7%	NO
CR 561	CR 48	S Astatula City Limits	2	U	D	620	5%	17	18	YES	NO	2.9%	NO
CR 561	S Astatula City Limits	CR 455	2	U	D	1,080	0%	0	0	YES	NO	0.0%	NO
SR 19	CR 561	Lane Park Rd	2	U	D	920	30%	102	107	YES	NO	11.6%	YES
SR 19	Lane Park Rd	CR 48	2	U	D	920	50%	178	171	YES	YES	19.3%	YES
SR 19	CR 48	Central Ave	2	U	D	700	25%	89	85	YES	YES	12.7%	YES
SR 19	Central Ave	CR 455	2	U	D	1,200	25%	89	85	YES	NO	7.4%	YES
SR 19	CR 455	US 27	2	R	C	450	20%	71	68	YES	NO	15.8%	YES

Source: 2022 Lake County CMP Database

Based on the study area analysis, the following roadway segments will be analyzed for the PM peak hour:

- CR 448
 - SR 19 to CR 561
 - CR 561 to Lake Industrial Boulevard
- CR 48
 - US 27 to Lime Avenue
 - Lime Avenue to SR 19
- SR 19
 - CR 561 to Lane Park Road
 - Lane Park Road to CR 48
 - CR 48 to Central Avenue
 - Central Avenue to CR 455
 - CR 455 to US 27/SR 25

The following intersections will be analyzed for the AM and PM peak hours:

- SR 19 and CR 455 (Unsignalized)
- SR 19 and CR 48 (Signalized)
- SR 19 and CR 448 (Signalized)
- SR 19 and Central Avenue (Unsignalized)
- SR 19 and East Entrance Driveway (Proposed)
- CR 48 and West Entrance Driveway (Proposed)
- CR 48 and Commercial Entrance Driveway (Proposed)
- SR 19 and North RI/RO Driveway (Proposed)
- SR 19 and South RI/RO Driveway (Proposed)

Lake Hills PD

Traffic Impact Analysis Methodology v1.1

Project № 23103

September 15, 2023

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Projected Traffic

Projected traffic includes background traffic volumes, the project trips, and committed trips. Projected background traffic for the buildout year (2028) will be calculated using the 5-year annual average growth rates provided in the *Lake County Counts 2021_Master Table (6-15-2021)* for county roads. For state roads, the growth rates will be calculated using the last 5-year (2018-2022) historical data obtained from the *Florida Traffic Online (FTO)* website. A 2%, minimum growth rate will be applied if the calculated growth rates are lower than 2%.

The committed trips for the following approved developments within the study area will be included in the analysis as vested trips:

- a. Whispering Hills (traffic study obtained)
- b. Talichet Phase 1 and Phase 2 (traffic study obtained)
- c. Garden Center commercial project (traffic generation obtained)
- d. Drake Point (copy of site plan obtained)
- e. The Reserve (153 townhomes and 628 single family residential units)
- f. Watermark- Simpson Parcel (269 single family residential units)

Planned and Programmed Improvements

The FDOT *Work Program*, the *LSMPO Transportation Improvement Program (TIP)*, the *Town of Howey-In-The-Hills* and the *Lake County Capital Improvement Programs (CIP)* were reviewed, if any roadway improvements are funded for construction within the study area. As shown in **Table 3**, construction is not planned to be completed within the next three (3) years for either improvement. Excerpts from the *LSMPO TIP* and *LSMPO LOPP* are provided in the **Attachments**. The project of SR 19 widening to 4-lane from CR 48 to CR 561 will include a roundabout at the intersection of SR 19 and CR 48. The future condition of the intersection will be evaluated for a roundabout, as well as a signal.

Table 3
Planned and Programmed Improvements

FM #	Project Name	From	To	Proposed Phase	Proposed Phase FY	Description of Improvement
2383191	SR 19 *	CR 48	CR 561	PDE-PE-ENV	2023	Add Lanes & Reconstruct
238319-1	SR 19 **	Howey Bridge	CR 561	-	-	Road Widening

* LSMPO TIP Fiscal Year 2023-2027

** LSMPO 2022 LOPP Tier 2 project

Lake Hills PD

Traffic Impact Analysis Methodology v1.1

Project № 23103

September 15, 2023

Page 7 of 7

Capacity Analysis

The traffic study will include existing and 2028 buildout conditions for the roadway segment and intersection capacity analyses. A capacity analysis of the study roadway segments will be conducted for the PM peak hour under existing and projected conditions. The capacity analysis will be based on service volumes, capacities, and existing volumes, as documented in *2022 Lake County CMP Database* and the *Generalized Table 7* from the *2023 FDOT Quality/Level of Service (Q/LOS) Handbook*, included in the **Attachments**.

The study intersections will be analyzed for the AM and PM peak conditions using the methods of the *Highway Capacity Manual (HCM), 6th Edition*. The analysis will be performed for the existing year and project buildout year (2028). The intersection turning movement counts will be seasonally adjusted, if needed, using the *2022 FDOT Peak Season Factor Category Report* obtained from the *Florida Traffic Online (FTO)* website.

The project access driveways on SR 19 and CR 48 will be analyzed for the AM and PM peak conditions, including the evaluation for the need of deceleration turn lanes at the project driveways in accordance with *National Cooperative Highway Research Program (NCHRP) Report 457*, and *Lake County Land Development Code (LDC)*.

In cases where a projected conditions analysis requires mitigation as a result of the proposed development, an analysis including the recommended mitigation will be conducted.

Alternative Mode Analysis

A review of transit, pedestrian and bicycle facilities will be conducted in accordance with the LSMPO requirements.

Report

A TIA report detailing the methods and findings of the study, including all associated graphics, tables, calculations, and supporting information will be prepared for submittal to the Town of Howey-In-The-Hills.

ATTACHMENTS

GRIFFEY ENGINEERING, INC.

October 24, 2023
Lake Hills PUD TIA Methodology
Engineering Review Comments
Page 1

1. Trip generation needs to be based on all of the land uses in the PUD (residential, commercial & institutional). Trips from the commercial portion need to be based on the most recent site plan (currently under review by the town). Provide realistic, reasonable estimates of the uses and building areas for the outparcels. Take the same approach for the institutional use.
2. Provide worksheets justifying the internal capture.
3. Since the character of trips for senior adult housing, commercial and institutional uses are very different, provide a separate distribution and trip assignment for each use to better estimate the true effects of the project.
4. There are planned improvements in this area. Refer to your traffic study for Mission Rise and incorporate that information into this one.
5. Projected traffic should include the Watermark project.
6. The commercial access on CR 48 should be limited to prohibit outbound left turns.
7. The future condition for the intersection of SR 19 & CR 48 should be evaluated for a roundabout as well as a signal.
8. The intersection of SR 19 and Central Avenue is currently not signalized, it is stop controlled on the side streets with a flashing beacon.



December 21, 2023

Mr. Don Griffey
Griffey Engineering Inc
36202 East Eldorado Lake Drive
Eustis, FL 32736
dag@griffeyengineering.com

Re: Lake Hills PD
Response to Methodology Comments
TMC Project № 23103
Town of Howey in the Hills, Florida

Dear Mr. Griffey,

Please find below our responses to the review comments prepared by Griffey Engineering Inc on behalf of The Town of Howey in the Hills dated December 11, 2023, regarding the above referenced Methodology dated October 24, 2023. The comments are listed in **bold** typeface and the TMC responses follow in *italic* typeface. Additionally, a revised Methodology is provided under cover reflecting the changes resulting from these comments.

- 1. Trip generation needs to be based on all of the land uses in the PUD (residential, commercial & institutional). Trips from the commercial portion need to be based on the most recent site plan (currently under review by the town). Provide realistic, reasonable estimates of the uses and building areas for the outparcels. Take the same approach for the institutional use.**

TMC Response: As per the meeting held with the Lake County School Board, there are no plans for improvements in the district's current 5-year plan regarding the site on CR 48 owned by the school board. Please find the most recent site plan as well as correspondence with the School Board in the Attachments of the revised Methodology (v1.2) attached.

- 2. Provide worksheets justifying the internal capture.**

TMC Response: Internal capture calculations are included in the revised Methodology (v1.2) attached.

- 3. Since the character of trips for senior adult housing, commercial and institutional uses are very different, provide a separate distribution and trip assignment for each use to better estimate the true effects of the project.**

TMC Response: The trip distribution pattern was initially developed using the Central Florida Regional Planning Model (CFRPM v7), which took into account the different land use mix of the project. The model distribution was manually adjusted based on local knowledge, professional engineering judgement, and the location of the development with respect to the study area attractions and activity centers to better reflect prevailing travel and traffic flow patterns in the study area.

- 4. There are planned improvements in this area. Refer to your traffic study for Mission Rise and incorporate that information into this one.**

TMC Response: The planned and programmed improvements are included in revised TIA Methodology (v1.2) attached.

- 5. Projected traffic should include the Watermark project.**

TMC Response: The vested trips from the Watermark project will be included in the traffic study as indicated in the revised Methodology (v1.2) attached.

- 6. The commercial access on CR 48 should be limited to prohibit outbound left turns.**

TMC Response: Noted. The commercial access on CR 48 will be limited to prohibit outbound left turns and will be analyzed accordingly in the traffic study as indicated in the revised Methodology (v1.2) attached.

- 7. The future condition for the intersection of SR 19 & CR 48 should be evaluated for a roundabout as well as a signal.**

TMC Response: Noted. The future condition for the intersection of SR 19 & CR 48 will be evaluated for a roundabout as well as a signal in the traffic study, as indicated in the revised Methodology (v1.2) attached.

- 8. The intersection of SR 19 and Central Avenue is currently not signalized, it is stop controlled on the side streets with a flashing beacon.**

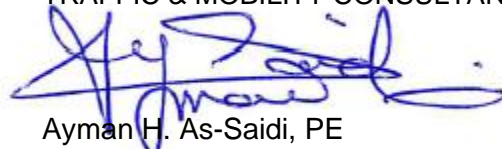
TMC Response: Noted. SR 19 at Central Avenue intersection is listed as an unsignalized intersection in the revised Methodology (v1.2) attached.

END OF COMMENTS

We trust these responses and the revised Methodology adequately address the review comments. We remain available to discuss this matter further or to answer any questions you may have.

Kind regards,

TRAFFIC & MOBILITY CONSULTANTS LLC



Ayman H. As-Saidi, PE
Director of Engineering

Batuhan Anlitan

From: Mark Watts <Mark.Watts@cobbcole.com>
Sent: Thursday, November 30, 2023 2:17 PM
To: Ayman As-Saidi; Dean Barberree; Tom Harowski; dag@griffeyengineering.com; Batuhan Anlitan; lavalleyh@lake.k12.fl.us
Cc: Regina Epple
Subject: Lake Hills PUD TIA

All,

As luck would have it, I was able to speak with Helen Lavalley after our call and have copied her here. With regard to the CR 48 site owned by the Lake County School Board, there are no plans for improvement in the district's current 5-year plan. Helen confirmed that any use of the property was likely in the 5–10-year horizon. There is no specific use planned, but the two most likely alternatives are administrative offices or an elementary school site. Their standard elementary site is designed to serve 940 students.

Helen,

Thanks for being available. Please jump in and correct me if I missed something. Thanks.



Mark Watts
Florida Bar No. 157521
Cobb Cole
231 North Woodland Boulevard
DeLand, FL 32720
(D) 386-736-7700 | (F) 386-785-1549
[Website](#) | [Bio](#)

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Appendix C

2022 Lake County CMP & 2023 Florida Traffic Online (FTO) & FDOT Q/LOS Generalized Table

FLORIDA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION STATISTICS OFFICE
2022 HISTORICAL AADT REPORT

COUNTY: 11 - LAKE

SITE: 0255 - ON SR-19, 0.021 MI. S OF CR-455 (RVL) CAB NW

YEAR	AADT		DIRECTION 1		DIRECTION 2	*K FACTOR	D FACTOR	T FACTOR	
2022	12300	C	N	6100	S	6200	9.50	54.50	11.80
2021	10500	S	N	5200	S	5300	9.50	53.80	19.50
2020	10500	F	N	5200	S	5300	9.50	54.10	9.00
2019	10900	C	N	5400	S	5500	9.50	54.30	14.20
2018	12000	F	N	5900	S	6100	9.50	54.20	23.20
2017	11800	C	N	5800	S	6000	9.50	54.20	16.50
2016	9200	C	N	4600	S	4600	9.00	53.90	19.70
2015	8800	C	N	4400	S	4400	9.00	54.60	13.90
2014	8000	C	N	4000	S	4000	9.00	54.50	15.80
2013	8400	C	N	4100	S	4300	9.00	54.70	16.70
2012	8000	C	N	4000	S	4000	9.00	55.10	14.80
2011	7600	C	N	3800	S	3800	9.00	54.20	15.10
2010	7700	C	N	3900	S	3800	9.86	54.75	13.50
2009	7700	C	N	3900	S	3800	9.96	54.94	9.90
2008	8100	C	N	4100	S	4000	10.42	55.39	16.40
2007	8800	C	N	4400	S	4400	10.24	59.56	18.60

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

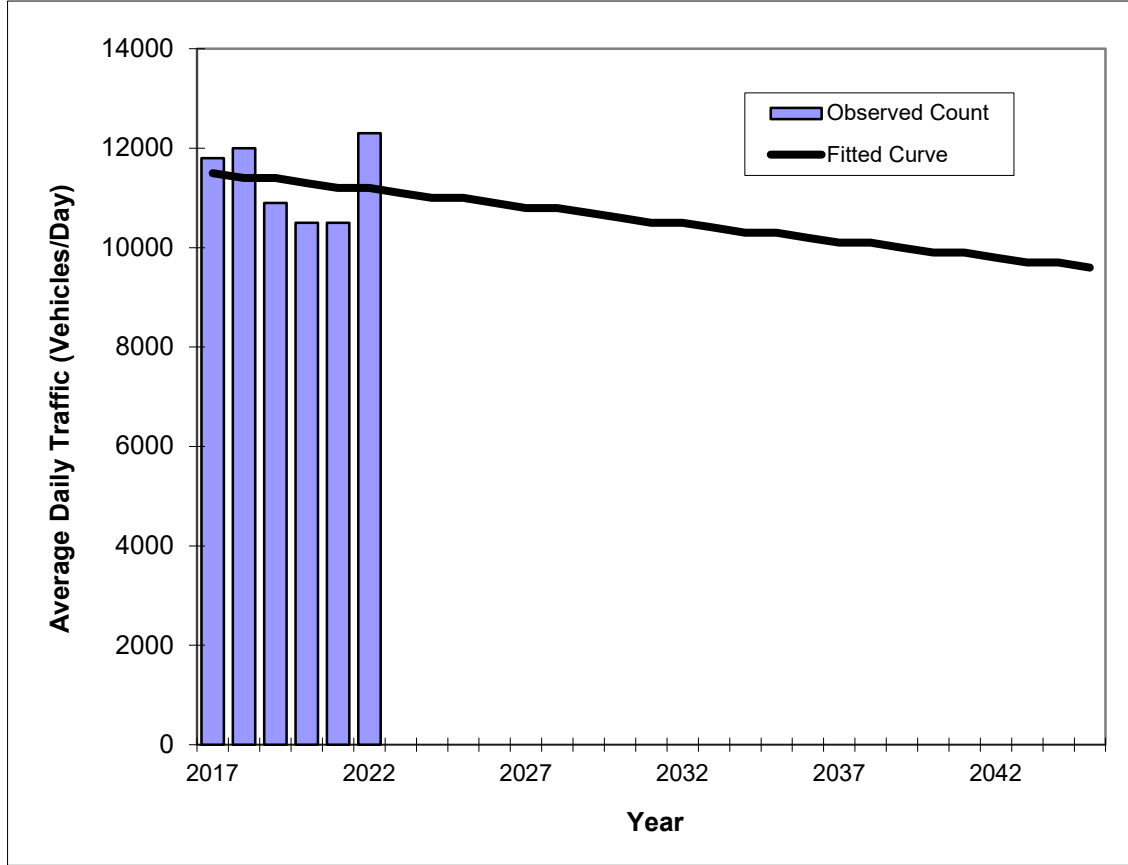
*K FACTOR: STARTING WITH YEAR 2011 IS STANDARDK, PRIOR YEARS ARE K30 VALUES

Traffic Trends - V2.0

SR 19 Central Ave to US 27 --

PIN#	0
Location	1

County:	Lake (11)
Station #:	110255
Highway:	SR 19 Central Ave to US 27



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2017	11800	11500
2018	12000	11400
2019	10900	11400
2020	10500	11300
2021	10500	11200
2022	12300	11200
2028 Opening Year Trend		
2028	N/A	10800
2035 Mid-Year Trend		
2035	N/A	10300
2045 Design Year Trend		
2045	N/A	9600
TRANPLAN Forecasts/Trends		

** Annual Trend Increase:	-69
Trend R-squared:	2.59%
Trend Annual Historic Growth Rate:	-0.52%
Trend Growth Rate (2022 to Design Year):	-0.62%
Printed:	19-Oct-23
Straight Line Growth Option	

*Axle-Adjusted

FLORIDA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION STATISTICS OFFICE
2022 HISTORICAL AADT REPORT

COUNTY: 11 - LAKE

SITE: 0494 - ON SR-19, 0.3 MI. N OF CR-48 (RCLP) CAB NW

YEAR	AADT		DIRECTION 1		DIRECTION 2	*K FACTOR	D FACTOR	T FACTOR	
2022	15800	F	N	7800	S	8000	9.00	54.50	16.10
2021	15400	C	N	7600	S	7800	9.00	53.80	16.10
2020	15500	F	N	7700	S	7800	9.00	54.10	7.20
2019	16000	C	N	7900	S	8100	9.00	54.30	7.20
2018	14900	F	N	7600	S	7300	9.00	54.20	11.50
2017	14500	C	N	7400	S	7100	9.00	54.20	11.50
2016	13900	C	N	7000	S	6900	9.00	53.90	11.20
2015	12900	C	N	6400	S	6500	9.00	54.60	11.00
2014	12200	C	N	6100	S	6100	9.00	54.50	15.10
2013	12900	C	N	6500	S	6400	9.00	54.70	24.50
2012	11800	C	N	5900	S	5900	9.00	55.10	11.10
2011	10400	C	N	4600	S	5800	9.00	54.20	10.10
2010	11000	C	N	4900	S	6100	9.86	54.75	7.60
2009	12400	C	N	6200	S	6200	9.96	54.94	12.60
2008	12300	C	N	6300	S	6000	10.42	55.39	12.60
2007	14000	C	N	7000	S	7000	10.24	59.56	11.20

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

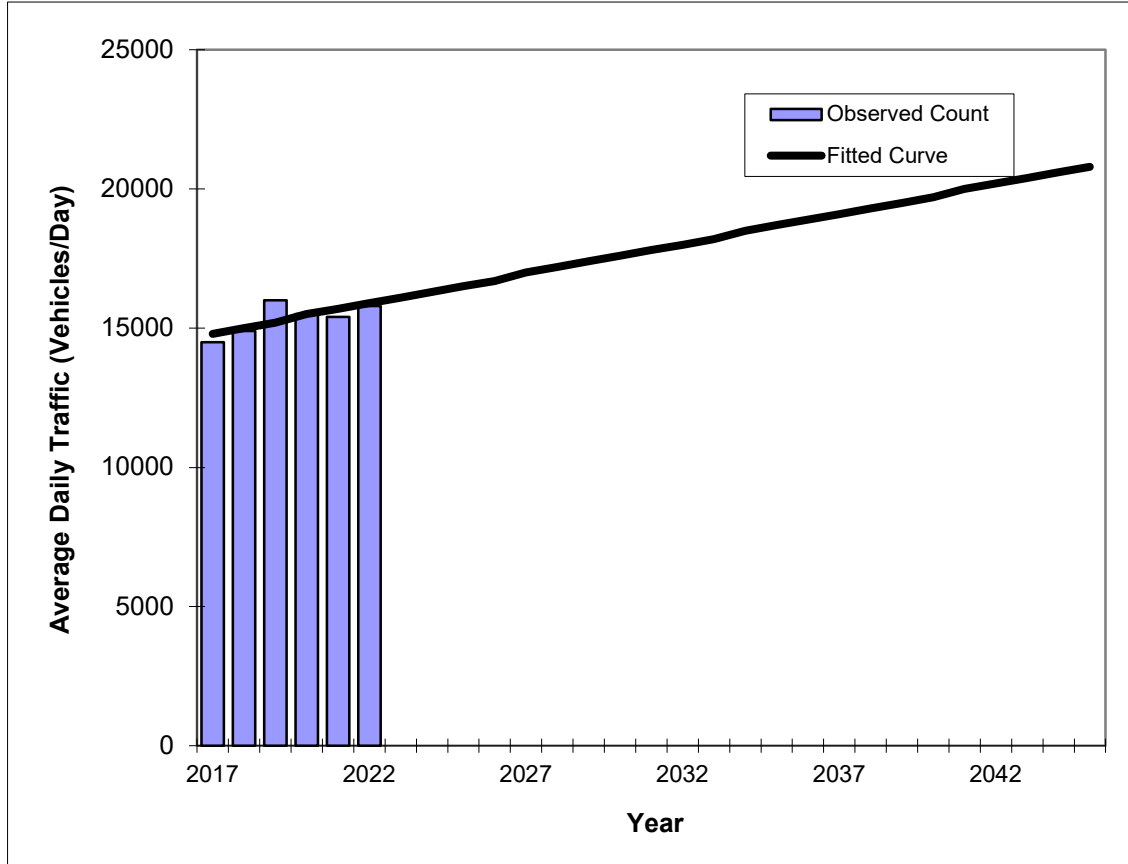
*K FACTOR: STARTING WITH YEAR 2011 IS STANDARDK, PRIOR YEARS ARE K30 VALUES

Traffic Trends - V2.0

SR 19 N of CR 48 --

PIN#	0
Location	1

County:	Lake (11)
Station #:	110494
Highway:	SR 19 N of CR 48



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2017	14500	14800
2018	14900	15000
2019	16000	15200
2020	15500	15500
2021	15400	15700
2022	15800	15900
2028 Opening Year Trend		
2028	N/A	17200
2035 Mid-Year Trend		
2035	N/A	18700
2045 Design Year Trend		
2045	N/A	20800
TRANPLAN Forecasts/Trends		

** Annual Trend Increase:	214
Trend R-squared:	51.02%
Trend Annual Historic Growth Rate:	1.49%
Trend Growth Rate (2022 to Design Year):	1.34%
Printed:	19-Oct-23
Straight Line Growth Option	

*Axle-Adjusted

FLORIDA DEPARTMENT OF TRANSPORTATION
 TRANSPORTATION STATISTICS OFFICE
 2022 HISTORICAL AADT REPORT

COUNTY: 11 - LAKE

SITE: 0495 - ON SR-19, 0.326 MI. S OF CR-48 (RVL)

YEAR	AADT		DIRECTION 1		DIRECTION 2	*K FACTOR	D FACTOR	T FACTOR	
2022	10600	C	N	5200	S	5400	9.00	54.50	11.80
2021	9000	S	N	4500	S	4500	9.00	53.80	19.50
2020	9000	F	N	4500	S	4500	9.00	54.10	9.00
2019	9200	C	N	4600	S	4600	9.00	54.30	14.20
2018	9100	C	N	4600	S	4500	9.00	54.20	23.20
2017	9200	C	N	4600	S	4600	9.00	54.20	16.50
2016	9100	C	N	4600	S	4500	9.00	53.90	19.70
2015	8700	C	N	4400	S	4300	9.00	54.60	13.90
2014	8200	C	N	4100	S	4100	9.00	54.50	15.80
2013	8700	C	N	4400	S	4300	9.00	54.70	16.70
2012	8200	C	N	4100	S	4100	9.00	55.10	14.80
2011	7900	C	N	4000	S	3900	9.00	54.20	15.10
2010	8200	C	N	4000	S	4200	9.86	54.75	13.50
2009	9000	C	N	4700	S	4300	9.96	54.94	9.90
2008	8200	C	N	4100	S	4100	10.42	55.39	16.40
2007	8800	C	N	4400	S	4400	10.24	59.56	18.60

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

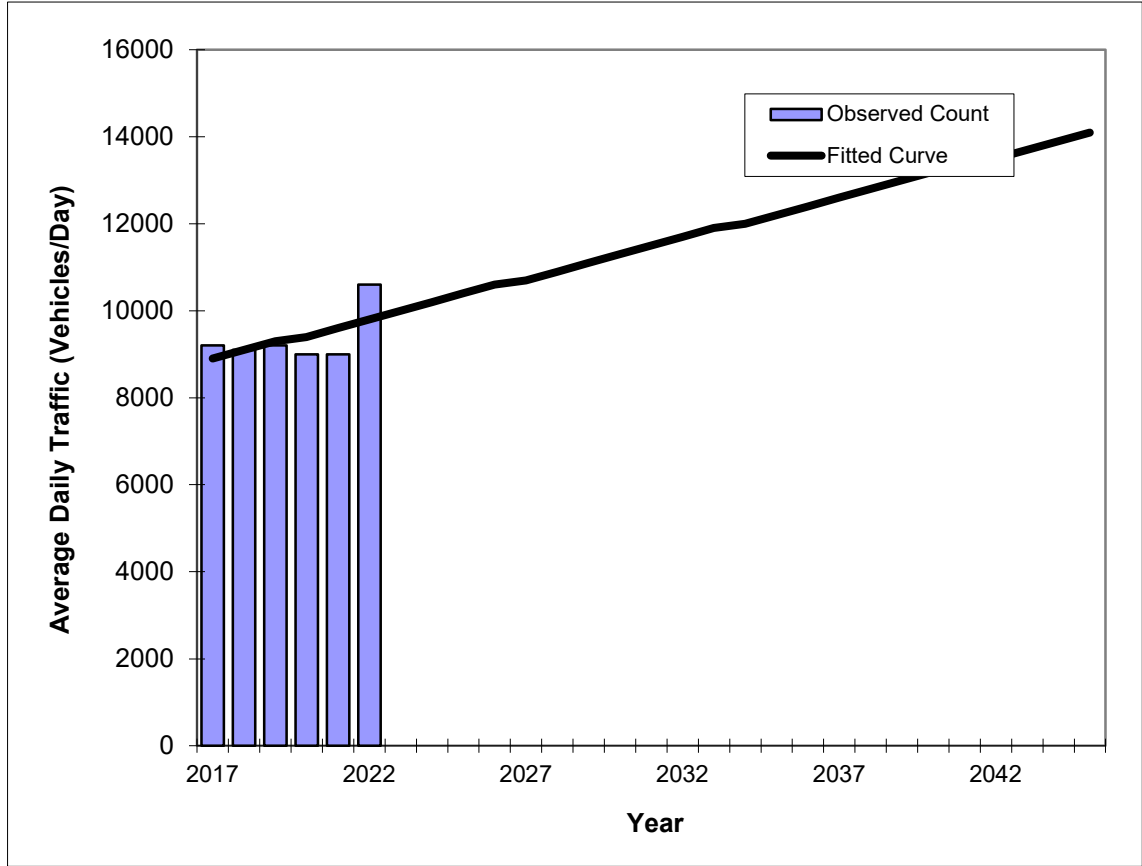
*K FACTOR: STARTING WITH YEAR 2011 IS STANDARDK, PRIOR YEARS ARE K30 VALUES

Traffic Trends - V2.0

SR 19 CR 48 to Central Ave --

PIN#	0
Location	1

County:	Lake (11)
Station #:	110495
Highway:	SR 19 CR 48 to Central Ave



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2017	9200	8900
2018	9100	9100
2019	9200	9300
2020	9000	9400
2021	9000	9600
2022	10600	9800
2028 Opening Year Trend		
2028	N/A	10900
2035 Mid-Year Trend		
2035	N/A	12200
2045 Design Year Trend		
2045	N/A	14100
TRANPLAN Forecasts/Trends		

** Annual Trend Increase:	186
Trend R-squared:	31.52%
Trend Annual Historic Growth Rate:	2.02%
Trend Growth Rate (2022 to Design Year):	1.91%
Printed:	19-Oct-23
Straight Line Growth Option	

*Axle-Adjusted

Appendix D
Turning Movement Counts & Seasonal Factor Data & Signal Timing

15 MINUTE TURNING MOVEMENT COUNTS

(Cars and Trucks)

DATE: October 11, 2023 (Wednesday)

CITY: Howie in the Hills

LATITUDE: 0

LOCATION: SR 19 & CR 455

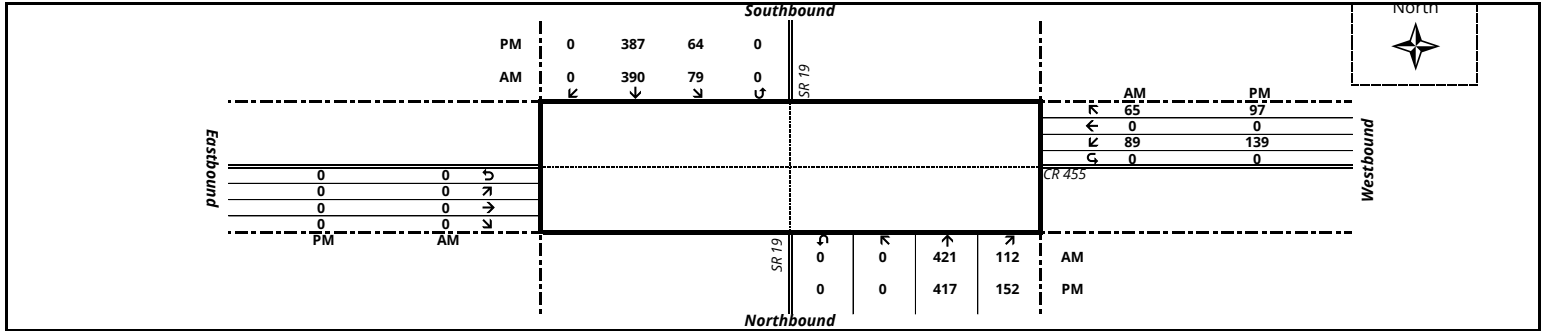
COUNTY: Lake County

LONGITUDE: 0

TIME BEGIN	SR 19					SR 19					N/S	EASTBOUND					WESTBOUND					E/W TOTAL	GRAND TOTAL
	NORTHBOUND					SOUTHBOUND						EASTBOUND					WESTBOUND						
	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL	TOTAL	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL	TOTAL	TOTAL
07:00 AM	0	92	26	0	118	26	90	0	0	116	234	0	0	0	0	0	21	0	8	0	29	29	263
07:15 AM	0	91	24	0	115	21	102	0	0	123	238	0	0	0	0	0	15	0	17	0	32	32	270
07:30 AM	0	119	31	0	150	17	110	0	0	127	277	0	0	0	0	0	26	0	11	0	37	37	314
07:45 AM	0	116	25	0	141	21	98	0	0	119	260	0	0	0	0	0	19	0	17	0	36	36	296
TOTAL	0	418	106	0	524	85	400	0	0	485	1,009	0	0	0	0	0	81	0	53	0	134	134	1,143
08:00 AM	0	95	32	0	127	20	80	0	0	100	227	0	0	0	0	0	29	0	20	0	49	49	276
08:15 AM	0	94	24	0	118	11	86	0	0	97	215	0	0	0	0	0	23	0	21	0	44	44	259
08:30 AM	0	83	19	0	102	9	69	0	0	78	180	0	0	0	0	0	23	0	15	0	38	38	218
08:45 AM	0	78	19	0	97	12	76	0	0	88	185	0	0	0	0	0	13	0	9	0	22	22	207
TOTAL	0	350	94	0	444	52	311	0	0	363	807	0	0	0	0	0	88	0	65	0	153	153	960
04:00 PM	0	95	28	0	123	14	96	0	0	110	233	0	0	0	0	0	27	0	20	0	47	47	280
04:15 PM	0	95	39	0	134	14	81	0	0	95	229	0	0	0	0	0	28	0	23	0	51	51	280
04:30 PM	0	106	44	0	150	25	92	0	0	117	267	0	0	0	0	0	38	0	27	0	65	65	332
04:45 PM	0	111	46	0	157	13	86	0	0	99	256	0	0	0	0	0	31	0	28	0	59	59	315
TOTAL	0	407	157	0	564	66	355	0	0	421	985	0	0	0	0	0	124	0	98	0	222	222	1,207
05:00 PM	0	99	35	0	134	16	95	0	0	111	245	0	0	0	0	0	33	0	23	0	56	56	301
05:15 PM	0	101	27	0	128	10	114	0	0	124	252	0	0	0	0	0	37	0	19	0	56	56	308
05:30 PM	0	65	35	0	100	8	92	0	0	100	200	0	0	0	0	0	22	0	18	0	40	40	240
05:45 PM	0	82	27	0	109	15	95	0	0	110	219	0	0	0	0	0	28	0	24	0	52	52	271
TOTAL	0	347	124	0	471	49	396	0	0	445	916	0	0	0	0	0	120	0	84	0	204	204	1,120

AM Peak																					Peak Hour Factor: 0.920		
07:15 AM to 08:15 AM	0	421	112	0	533	79	390	0	0	469	1,002	0	0	0	0	0	89	0	65	0	154	154	1,156

PM Peak																					Peak Hour Factor: 0.946		
04:30 PM to 05:30 PM	0	417	152	0	569	64	387	0	0	451	1,020	0	0	0	0	0	139	0	97	0	236	236	1,256



15 MINUTE TURNING MOVEMENT COUNTS

(Trucks Only)

DATE: October 11, 2023 (Wednesday)

CITY: Howie in the Hills LATITUDE: 0

LOCATION: SR 19 & CR 455

COUNTY: Lake County LONGITUDE: 0

TIME BEGIN	SR 19 NORTHBOUND					SR 19 SOUTHBOUND					N/S TOTAL	EASTBOUND					WESTBOUND					E/W TOTAL	GRAND TOTAL
	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL		L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL		
07:00 AM	0	7	4	0	11	0	4	0	0	4	15	0	0	0	0	0	1	0	0	0	1	1	16
07:15 AM	0	5	5	0	10	1	1	0	0	2	12	0	0	0	0	0	2	0	1	0	3	3	15
07:30 AM	0	3	5	0	8	1	5	0	0	6	14	0	0	0	0	0	4	0	0	0	4	4	18
07:45 AM	0	6	0	0	6	1	4	0	0	5	11	0	0	0	0	0	4	0	0	0	4	4	15
TOTAL	0	21	14	0	35	3	14	0	0	17	52	0	0	0	0	0	11	0	1	0	12	12	64
08:00 AM	0	7	3	0	10	0	7	0	0	7	17	0	0	0	0	0	5	0	2	0	7	7	24
08:15 AM	0	11	5	0	16	0	5	0	0	5	21	0	0	0	0	0	3	0	0	0	3	3	24
08:30 AM	0	12	3	0	15	1	9	0	0	10	25	0	0	0	0	0	4	0	0	0	4	4	29
08:45 AM	0	5	1	0	6	1	5	0	0	6	12	0	0	0	0	0	2	0	1	0	3	3	15
TOTAL	0	35	12	0	47	2	26	0	0	28	75	0	0	0	0	0	14	0	3	0	17	17	92
04:00 PM	0	2	0	0	2	0	5	0	0	5	7	0	0	0	0	0	3	0	0	0	3	3	10
04:15 PM	0	1	8	0	9	0	1	0	0	1	10	0	0	0	0	0	4	0	0	0	4	4	14
04:30 PM	0	2	4	0	6	0	5	0	0	5	11	0	0	0	0	0	2	0	1	0	3	3	14
04:45 PM	0	1	0	0	1	0	2	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	3
TOTAL	0	6	12	0	18	0	13	0	0	13	31	0	0	0	0	0	9	0	1	0	10	10	41
05:00 PM	0	1	1	0	2	0	2	0	0	2	4	0	0	0	0	0	5	0	0	0	5	5	9
05:15 PM	0	1	1	0	2	0	0	0	0	0	2	0	0	0	0	0	3	0	0	0	3	3	5
05:30 PM	0	1	1	0	2	0	1	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	3
05:45 PM	0	0	1	0	1	0	5	0	0	5	6	0	0	0	0	0	1	0	0	0	1	1	7
TOTAL	0	3	4	0	7	0	8	0	0	8	15	0	0	0	0	0	9	0	0	0	9	9	24
AM Peak																							
07:15 AM to 08:15 AM	0	21	13	0	34	3	17	0	0	20	54	0	0	0	0	0	15	0	3	0	18	18	72
PM Peak																							
04:30 PM to 05:30 PM	0	5	6	0	11	0	9	0	0	9	20	0	0	0	0	0	10	0	1	0	11	11	31

15 MINUTE TURNING MOVEMENT COUNTS

(Cars and Trucks)

DATE: October 11, 2023 (Wednesday)

CITY: Howie in the Hills

LATITUDE: 0

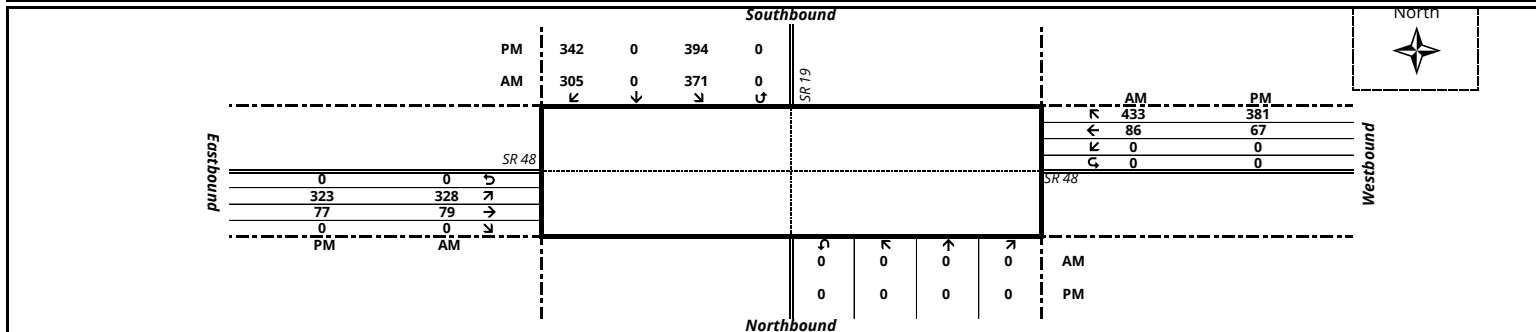
LOCATION: SR 19 & SR 48

COUNTY: Lake County

LONGITUDE: 0

TIME BEGIN	SR 19 NORTHBOUND					SR 19 SOUTHBOUND					N/S TOTAL	SR 48 EASTBOUND					SR 48 WESTBOUND					E/W TOTAL	GRAND TOTAL
	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL		L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL		
07:00 AM	0	0	0	0	0	60	0	69	0	129	129	65	24	0	0	89	0	10	97	0	107	196	325
07:15 AM	0	0	0	0	0	101	0	52	0	153	153	62	18	0	0	80	0	20	99	0	119	199	352
07:30 AM	0	0	0	0	0	101	0	77	0	178	178	79	27	0	0	106	0	23	125	0	148	254	432
07:45 AM	0	0	0	0	0	113	0	76	0	189	189	73	21	0	0	94	0	16	115	0	131	225	414
TOTAL	0	0	0	0	0	375	0	274	0	649	649	279	90	0	0	369	0	69	436	0	505	874	1,523
08:00 AM	0	0	0	0	0	86	0	79	0	165	165	89	16	0	0	105	0	19	101	0	120	225	390
08:15 AM	0	0	0	0	0	71	0	73	0	144	144	87	15	0	0	102	0	28	92	0	120	222	366
08:30 AM	0	0	0	0	0	59	0	69	0	128	128	83	13	0	0	96	0	13	105	0	118	214	342
08:45 AM	0	0	0	0	0	56	0	63	0	119	119	73	9	0	0	82	0	28	92	0	120	202	321
TOTAL	0	0	0	0	0	272	0	284	0	556	556	332	53	0	0	385	0	88	390	0	478	863	1,419
04:00 PM	0	0	0	0	0	85	0	99	0	184	184	57	8	0	0	65	0	21	93	0	114	179	363
04:15 PM	0	0	0	0	0	89	0	90	0	179	179	54	20	0	0	74	0	21	91	0	112	186	365
04:30 PM	0	0	0	0	0	83	0	87	0	170	170	80	20	0	0	100	0	19	98	0	117	217	387
04:45 PM	0	0	0	0	0	104	0	75	0	179	179	74	16	0	0	90	0	17	77	0	94	184	363
TOTAL	0	0	0	0	0	361	0	351	0	712	712	265	64	0	0	329	0	78	359	0	437	766	1,478
05:00 PM	0	0	0	0	0	107	0	78	0	185	185	77	19	0	0	96	0	17	112	0	129	225	410
05:15 PM	0	0	0	0	0	100	0	102	0	202	202	92	22	0	0	114	0	14	94	0	108	222	424
05:30 PM	0	0	0	0	0	90	0	76	0	166	166	84	17	0	0	101	0	15	94	0	109	210	376
05:45 PM	0	0	0	0	0	88	0	66	0	154	154	66	21	0	0	87	0	16	81	0	97	184	338
TOTAL	0	0	0	0	0	385	0	322	0	707	707	319	79	0	0	398	0	62	381	0	443	841	1,548

AM Peak	Peak Hour Factor: 0.927																						
07:30 AM to 08:30 AM	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL	E/W TOTAL	GRAND TOTAL	
AM Peak	0	0	0	0	0	371	0	305	0	676	676	328	79	0	0	407	0	86	433	0	519	926	1,602
PM Peak	Peak Hour Factor: 0.934																						
04:30 PM to 05:30 PM	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL	E/W TOTAL	GRAND TOTAL	
PM Peak	0	0	0	0	0	394	0	342	0	736	736	323	77	0	0	400	0	67	381	0	448	848	1,584



15 MINUTE TURNING MOVEMENT COUNTS

(Trucks Only)

DATE: October 11, 2023 (Wednesday)

CITY: Howie in the Hills

LATITUDE: 0

LOCATION: SR 19 & SR 48

COUNTY: Lake County

LONGITUDE: 0

TIME BEGIN	SR 19 NORTHBOUND					SR 19 SOUTHBOUND					N/S TOTAL	SR 48 EASTBOUND					SR 48 WESTBOUND					E/W TOTAL	GRAND TOTAL
	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL		L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL		
07:00 AM	0	0	0	0	0	6	0	10	0	16	16	13	2	0	0	15	0	1	4	0	5	20	36
07:15 AM	0	0	0	0	0	4	0	2	0	6	6	5	1	0	0	6	0	0	3	0	3	9	15
07:30 AM	0	0	0	0	0	2	0	11	0	13	13	10	1	0	0	11	0	1	3	0	4	15	28
07:45 AM	0	0	0	0	0	5	0	10	0	15	15	10	3	0	0	13	0	1	3	0	4	17	32
TOTAL	0	0	0	0	0	17	0	33	0	50	50	38	7	0	0	45	0	3	13	0	16	61	111
08:00 AM	0	0	0	0	0	7	0	8	0	15	15	13	2	0	0	15	0	2	5	0	7	22	37
08:15 AM	0	0	0	0	0	8	0	9	0	17	17	9	1	0	0	10	0	3	4	0	7	17	34
08:30 AM	0	0	0	0	0	2	0	14	0	16	16	9	0	0	0	9	0	2	5	0	7	16	32
08:45 AM	0	0	0	0	0	7	0	9	0	16	16	16	0	0	0	16	0	3	8	0	11	27	43
TOTAL	0	0	0	0	0	24	0	40	0	64	64	47	3	0	0	50	0	10	22	0	32	82	146
04:00 PM	0	0	0	0	0	1	0	5	0	6	6	2	0	0	0	2	0	0	5	0	5	7	13
04:15 PM	0	0	0	0	0	3	0	1	0	4	4	2	0	0	0	2	0	2	3	0	5	7	11
04:30 PM	0	0	0	0	0	3	0	10	0	13	13	4	1	0	0	5	0	0	2	0	2	7	20
04:45 PM	0	0	0	0	0	5	0	3	0	8	8	7	0	0	0	7	0	1	2	0	3	10	18
TOTAL	0	0	0	0	0	12	0	19	0	31	31	15	1	0	0	16	0	3	12	0	15	31	62
05:00 PM	0	0	0	0	0	2	0	0	0	2	2	3	0	0	0	3	0	0	8	0	8	11	13
05:15 PM	0	0	0	0	0	3	0	2	0	5	5	2	1	0	0	3	0	0	2	0	2	5	10
05:30 PM	0	0	0	0	0	2	0	1	0	3	3	3	0	0	0	3	0	0	3	0	3	6	9
05:45 PM	0	0	0	0	0	5	0	2	0	7	7	2	0	0	0	2	0	0	2	0	2	4	11
TOTAL	0	0	0	0	0	12	0	5	0	17	17	10	1	0	0	11	0	0	15	0	15	26	43

AM Peak	Peak Hour Factor: 0.927																						
07:30 AM to 08:30 AM	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL	E/W TOTAL	GRAND TOTAL	
AM Peak	0	0	0	0	0	22	0	38	0	60	60	42	7	0	0	49	0	7	15	0	22	71	131

PM Peak

04:30 PM to
05:30 PM

0	0	0	0	0	13	0	15	0	28	28	16	2	0	0	18	0	1	14	0	15	33	61
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15 MINUTE TURNING MOVEMENT COUNTS

(Cars and Trucks)

DATE: October 12, 2023 (Thursday)

CITY: Tavares

LATITUDE: 0

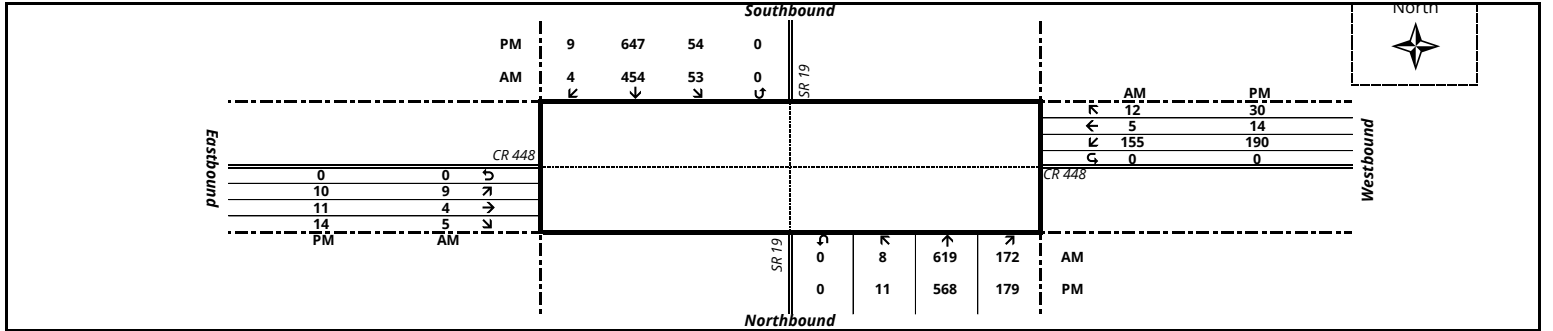
LOCATION: SR 19 & CR 448

COUNTY: Lake County

LONGITUDE: 0

TIME BEGIN	SR 19					SR 19					N/S TOTAL	CR 448					CR 448					E/W TOTAL	GRAND TOTAL
	NORTHBOUND					SOUTHBOUND						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		
07:00 AM	3	142	32	0	177	6	89	0	0	95	272	1	0	3	0	4	21	1	3	0	25	29	301
07:15 AM	2	124	31	0	157	17	127	0	0	144	301	2	1	1	0	4	39	3	2	0	44	48	349
07:30 AM	2	170	42	0	214	14	110	1	0	125	339	5	2	2	0	9	37	0	1	0	38	47	386
07:45 AM	3	166	55	0	224	15	114	1	0	130	354	1	0	1	0	2	42	1	3	0	46	48	402
TOTAL	10	602	160	0	772	52	440	2	0	494	1,266	9	3	7	0	19	139	5	9	0	153	172	1,438
08:00 AM	1	159	44	0	204	7	103	2	0	112	316	1	1	1	0	3	37	1	6	0	44	47	363
08:15 AM	5	116	49	0	170	7	75	0	0	82	252	1	1	0	0	2	45	5	3	0	53	55	307
08:30 AM	2	148	47	0	197	13	99	2	0	114	311	0	4	4	0	8	38	7	6	0	51	59	370
08:45 AM	2	141	45	0	188	2	78	4	0	84	272	5	5	2	0	12	41	3	6	0	50	62	334
TOTAL	10	564	185	0	759	29	355	8	0	392	1,151	7	11	7	0	25	161	16	21	0	198	223	1,374
04:00 PM	0	143	33	0	176	11	132	0	0	143	319	0	0	2	0	2	57	3	16	0	76	78	397
04:15 PM	1	150	41	0	192	13	164	1	0	178	370	1	4	3	0	8	31	1	6	0	38	46	416
04:30 PM	3	150	36	0	189	12	166	5	0	183	372	2	2	4	0	8	51	3	9	0	63	71	443
04:45 PM	2	147	36	0	185	16	164	0	0	180	365	2	4	5	0	11	33	3	5	0	41	52	417
TOTAL	6	590	146	0	742	52	626	6	0	684	1,426	5	10	14	0	29	172	10	36	0	218	247	1,673
05:00 PM	3	124	53	0	180	11	151	3	0	165	345	5	4	1	0	10	57	4	5	0	66	76	421
05:15 PM	3	147	54	0	204	15	166	1	0	182	386	1	1	4	0	6	49	4	11	0	64	70	456
05:30 PM	1	140	50	0	191	19	131	2	0	152	343	2	0	0	0	2	41	1	11	0	53	55	398
05:45 PM	0	103	40	0	143	20	154	1	0	175	318	2	0	2	0	4	55	0	4	0	59	63	381
TOTAL	7	514	197	0	718	65	602	7	0	674	1,392	10	5	7	0	22	202	9	31	0	242	264	1,656

AM Peak																	Peak Hour Factor: 0.933					
07:15 AM to 08:15 AM																						
8	619	172	0	799	53	454	4	0	511	1,310	9	4	5	0	18	155	5	12	0	172	190	1,500
PM Peak																	Peak Hour Factor: 0.952					
04:30 PM to 05:30 PM																						
11	568	179	0	758	54	647	9	0	710	1,468	10	11	14	0	35	190	14	30	0	234	269	1,737



15 MINUTE TURNING MOVEMENT COUNTS

(Trucks Only)

DATE: October 12, 2023 (Thursday)

CITY: Tavares LATITUDE: 0

LOCATION: SR 19 & CR 448

COUNTY: Lake County LONGITUDE: 0

TIME BEGIN	SR 19 NORTHBOUND					SR 19 SOUTHBOUND					N/S TOTAL	CR 448 EASTBOUND					CR 448 WESTBOUND					E/W TOTAL	GRAND TOTAL
	L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL		L	T	R	U-turn	TOTAL	L	T	R	U-turn	TOTAL		
07:00 AM	0	6	2	0	8	0	5	0	0	5	13	0	0	0	0	0	1	0	0	0	1	1	14
07:15 AM	0	6	4	0	10	0	6	0	0	6	16	0	0	0	0	0	2	0	0	0	2	2	18
07:30 AM	0	7	9	0	16	0	4	0	0	4	20	0	0	0	0	0	4	0	0	0	4	4	24
07:45 AM	0	4	7	0	11	0	5	0	0	5	16	0	0	0	0	0	10	0	1	0	11	11	27
TOTAL	0	23	22	0	45	0	20	0	0	20	65	0	0	0	0	0	17	0	1	0	18	18	83
08:00 AM	0	5	7	0	12	0	6	0	0	6	18	0	0	0	0	0	5	0	1	0	6	6	24
08:15 AM	0	12	12	0	24	0	9	0	0	9	33	0	0	0	0	0	14	0	0	0	14	14	47
08:30 AM	0	12	13	0	25	1	3	0	0	4	29	0	0	0	0	0	8	0	0	0	8	8	37
08:45 AM	0	10	5	0	15	0	4	0	0	4	19	0	0	0	0	0	9	0	0	0	9	9	28
TOTAL	0	39	37	0	76	1	22	0	0	23	99	0	0	0	0	0	36	0	1	0	37	37	136
04:00 PM	0	9	3	0	12	1	6	0	0	7	19	0	0	0	0	0	6	0	0	0	6	6	25
04:15 PM	0	2	2	0	4	0	8	0	0	8	12	0	0	0	0	0	3	0	0	0	3	3	15
04:30 PM	0	2	0	0	2	0	2	0	0	2	4	0	0	0	0	0	1	0	0	0	1	1	5
04:45 PM	0	2	2	0	4	0	4	0	0	4	8	0	0	0	0	0	0	0	0	0	0	0	8
TOTAL	0	15	7	0	22	1	20	0	0	21	43	0	0	0	0	0	10	0	0	0	10	10	53
05:00 PM	0	1	9	0	10	0	1	0	0	1	11	0	0	0	0	0	1	0	0	0	1	1	12
05:15 PM	0	2	1	0	3	0	2	0	0	2	5	0	0	0	0	0	0	0	0	0	0	0	5
05:30 PM	0	2	1	0	3	0	2	0	0	2	5	0	0	0	0	0	2	0	0	0	2	2	7
05:45 PM	0	2	0	0	2	1	8	0	0	9	11	0	0	0	0	0	1	0	0	0	1	1	12
TOTAL	0	7	11	0	18	1	13	0	0	14	32	0	0	0	0	0	4	0	0	0	4	4	36
AM Peak																							
07:15 AM to 08:15 AM	0	22	27	0	49	0	21	0	0	21	70	0	0	0	0	0	21	0	2	0	23	23	93
PM Peak																							
04:30 PM to 05:30 PM	0	7	12	0	19	0	9	0	0	9	28	0	0	0	0	0	2	0	0	0	2	2	30

15 MINUTE TURNING MOVEMENT COUNTS

(Cars and Trucks)

DATE: October 12, 2023 (Thursday)

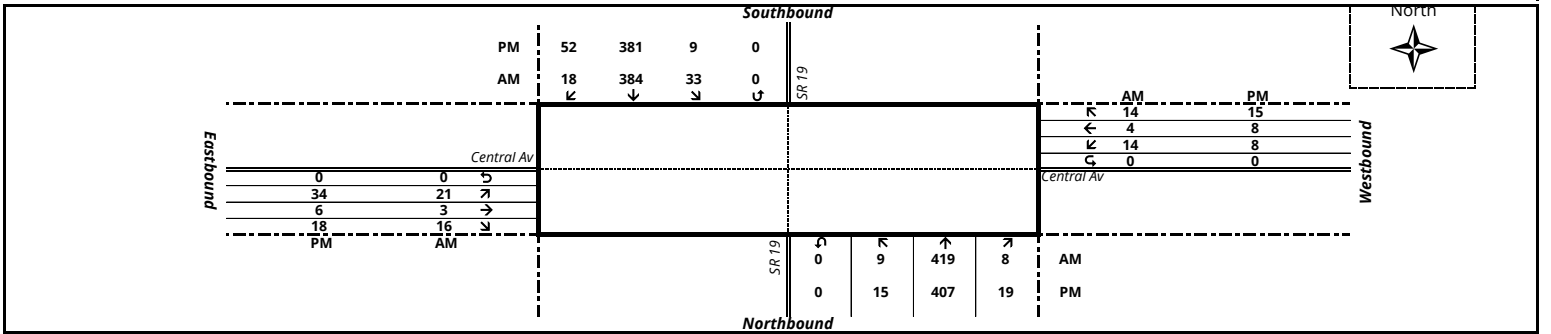
CITY: Howie in the Hills LATITUDE: 0

LOCATION: SR 19 & Central Av

COUNTY: Lake County LONGITUDE: 0

TIME BEGIN	SR 19					SR 19					N/S TOTAL	Central Av					Central Av					E/W TOTAL	GRAND TOTAL
	NORTHBOUND					SOUTHBOUND						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			
07:00 AM	4	79	2	0	85	0	75	2	0	77	162	7	4	6	0	17	1	1	1	0	3	20	182
07:15 AM	2	93	2	0	97	4	92	3	0	99	196	8	1	3	0	12	6	0	1	0	7	19	215
07:30 AM	2	113	3	0	118	14	108	6	0	128	246	4	1	4	0	9	4	1	5	0	10	19	265
07:45 AM	2	102	1	0	105	10	100	6	0	116	221	4	0	7	0	11	2	0	4	0	6	17	238
TOTAL	10	387	8	0	405	28	375	17	0	420	825	23	6	20	0	49	13	2	11	0	26	75	900
08:00 AM	3	111	2	0	116	5	84	3	0	92	208	5	1	2	0	8	2	3	4	0	9	17	225
08:15 AM	5	87	0	0	92	5	73	7	0	85	177	6	0	5	0	11	1	0	5	0	6	17	194
08:30 AM	3	81	1	0	85	6	70	4	0	80	165	5	0	5	0	10	0	0	5	0	5	15	180
08:45 AM	4	80	3	0	87	2	61	8	0	71	158	7	4	2	0	13	2	0	3	0	5	18	176
TOTAL	15	359	6	0	380	18	288	22	0	328	708	23	5	14	0	42	5	3	17	0	25	67	775
04:00 PM	3	104	3	0	110	2	99	14	0	115	225	9	3	9	0	21	1	3	8	0	12	33	258
04:15 PM	4	105	4	0	113	1	92	11	0	104	217	9	2	3	0	14	1	0	3	0	4	18	235
04:30 PM	4	99	7	0	110	5	89	11	0	105	215	5	0	4	0	9	3	4	2	0	9	18	233
04:45 PM	4	99	5	0	108	1	101	16	0	118	226	11	1	2	0	14	3	1	2	0	6	20	246
TOTAL	15	407	19	0	441	9	381	52	0	442	883	34	6	18	0	58	8	8	15	0	31	89	972
05:00 PM	6	106	2	0	114	1	92	9	0	102	216	14	1	2	0	17	2	1	3	0	6	23	239
05:15 PM	1	97	3	0	101	4	122	9	0	135	236	7	0	0	0	7	3	0	3	0	6	13	249
05:30 PM	1	70	2	0	73	4	105	8	0	117	190	4	2	2	0	8	2	1	2	0	5	13	203
05:45 PM	1	74	1	0	76	8	89	9	0	106	182	2	2	5	0	9	1	0	6	0	7	16	198
TOTAL	9	347	8	0	364	17	408	35	0	460	824	27	5	9	0	41	8	2	14	0	24	65	889

AM Peak 07:15 AM to 08:15 AM	9	419	8	0	436	33	384	18	0	435	871	21	3	16	0	40	14	4	14	0	32	72	943	Peak Hour Factor: 0.890
PM Peak 04:00 PM to 05:00 PM	15	407	19	0	441	9	381	52	0	442	883	34	6	18	0	58	8	8	15	0	31	89	972	Peak Hour Factor: 0.942



15 MINUTE TURNING MOVEMENT COUNTS

(Trucks Only)

DATE: October 12, 2023 (Thursday)

CITY: Howie in the Hills LATITUDE: 0

LOCATION: SR 19 & Central Av

COUNTY: Lake County LONGITUDE: 0

TIME BEGIN	SR 19					SR 19					N/S TOTAL	Central Av					Central Av					E/W TOTAL	GRAND TOTAL
	NORTHBOUND					SOUTHBOUND						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			
07:00 AM	4	6	0	0	10	0	1	1	0	2	12	0	0	1	0	1	0	0	0	0	0	1	13
07:15 AM	1	5	0	0	6	0	3	1	0	4	10	0	0	0	0	0	0	0	0	0	0	0	10
07:30 AM	0	1	0	0	1	0	7	0	0	7	8	0	0	1	0	1	0	0	0	0	0	1	9
07:45 AM	0	5	0	0	5	2	3	1	0	6	11	1	0	2	0	3	0	0	0	0	0	3	14
TOTAL	5	17	0	0	22	2	14	3	0	19	41	1	0	4	0	5	0	0	0	0	0	5	46
08:00 AM	1	5	0	0	6	2	6	0	0	8	14	2	0	1	0	3	0	0	0	0	0	3	17
08:15 AM	2	10	0	0	12	3	5	1	0	9	21	0	0	2	0	2	0	0	3	0	3	5	26
08:30 AM	1	5	0	0	6	1	4	1	0	6	12	0	0	2	0	2	0	0	4	0	4	6	18
08:45 AM	3	7	0	0	10	1	2	1	0	4	14	4	0	1	0	5	0	0	0	0	0	5	19
TOTAL	7	27	0	0	34	7	17	3	0	27	61	6	0	6	0	12	0	0	7	0	7	19	80
04:00 PM	0	6	0	0	6	0	5	0	0	5	11	1	0	1	0	2	0	0	0	0	0	2	13
04:15 PM	0	1	0	0	1	0	3	1	0	4	5	1	0	0	0	1	0	0	0	0	0	1	6
04:30 PM	0	2	0	0	2	0	4	0	0	4	6	0	0	0	0	0	0	0	0	0	0	0	6
04:45 PM	0	1	0	0	1	0	4	1	0	5	6	3	0	0	0	3	0	0	0	0	0	3	9
TOTAL	0	10	0	0	10	0	16	2	0	18	28	5	0	1	0	6	0	0	0	0	0	6	34
05:00 PM	0	3	0	0	3	0	1	2	0	3	6	1	0	0	0	1	0	0	0	0	0	1	7
05:15 PM	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
05:30 PM	0	0	0	0	0	0	2	1	0	3	3	0	0	0	0	0	0	0	0	0	0	0	3
05:45 PM	0	1	0	0	1	0	4	0	0	4	5	1	0	1	0	2	0	0	0	0	0	2	7
TOTAL	0	5	0	0	5	0	7	3	0	10	15	2	0	1	0	3	0	0	0	0	0	3	18

AM Peak 07:15 AM to 08:15 AM	2	16	0	0	18	4	19	2	0	25	43	3	0	4	0	7	0	0	0	0	0	7	50	Peak Hour Factor: 0.890
--	---	----	---	---	----	---	----	---	---	----	----	---	---	---	---	---	---	---	---	---	---	---	----	-------------------------

PM Peak

04:00 PM to
05:00 PM

0	10	0	0	10	0	16	2	0	18	28	5	0	1	0	6	0	0	0	0	0	6	34
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2022 PEAK SEASON FACTOR CATEGORY REPORT - REPORT TYPE: ALL
 CATEGORY: 1100 LAKE COUNTYWIDE

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

* PEAK SEASON

23-FEB-2023 09:11:22

830UPD

5_1100_PKSEASON.TXT

LAKE COUNTY - TRAFFIC SIGNAL OPERATIONS

CARTEGRAPH ID: LC-S-043

DATE: 05/15/2015

INTERSECTION NAME AND ID#: SR 19 & CR 48 076

PHASE	1	2	3	4	5	6	7	8
	EBL	WB		SB		EB		
INITIAL	8	15		8		15		
PASSAGE	3	3		3		3		
YELLOW	4.4	4.4		4.8		4.4		
RED CLEAR	2.1	2.0		2.5		2.0		
MAX 1	25	45		30		45		
MAX 2								
WALK								
DON'T WALK								
RECALL				SOFT				
DET. FUNC.	L	L		L		L		

SYSTEM TIMING

PATTERN	CYCLE	OFFSET	COORDINATED		BASE DAY 1		BASE DAY 2	
	Sec.	Sec.	Phase	Sequence	Mon.- Fri.	Sat.- Sun.		

SPLIT ALLOCATION - Sec.

PHASE	1	2	3	4	5	6	7	8

NOTES: Naztec 980

LAKE COUNTY - TRAFFIC SIGNAL OPERATIONS

CARTEGRAPH ID: LC-S-281		DATE: 8/21/2019						
INTERSECTION NAME AND ID#: SR 19 & CR 448 034								
PHASE	1	2	3	4	5	6	7	8
	NBL	SB		WB	SBL	NB		EB
INITIAL	5	15		8	5	15		8
PASSAGE	3	3		3	3	3		3
YELLOW	3.4	5.5		4.8	3.4	5.5		4.8
RED CLEAR	2.1	2.0		2.0	2.2	2.0		2.3
MAX 1	20	50		35	20	50		35
MAX 2								
WALK								
DON'T WALK								
RECALL		Min				Min		
DET. FUNC.		L				L		
PREEMPTION TIMING								
	COORD.+ PREEMPT.	DELAY (Sec.)	MIN. DURATION (Sec.)	MAX PRESENC E (Sec.)	MIN. GREEN (Sec.)	TRACK GREEN (Sec.)	MIN. DWELL (Sec.)	
	OFF		10	60	10		10	
SYSTEM TIMING								
PATTERN	CYCLE	OFFSET	COORDINATED		BASE DAY 1		BASE DAY 2	
	Sec.	Sec.	Phase	Sequence	Mon.- Fri.		Sat.- Sun.	
1 2 3	120	30	2	1	0:00	FREE	0:00	FREE
	90	9	2	1	6:00	C1O1S1	7:00	C4O4S4
	80	67	2	1	10:00	C2O2S2	19:00	FREE
					14:00	C3O3S3		
					16:00	C4O4S4		
					18:00	FREE		
SPLIT ALLOCATION - Sec.								
PHASE	1	2	3	4	5	6	7	8
1 2 3	18	69		33	18	69		33
	18	54		18	18	54		18
	18	43		19	18	43		19
NOTES: Naztec 980								

Appendix E
HCM Analysis Worksheets - Existing Conditions

HCM 6th TWSC
1: SR 19 & CR 455

Existing AM Peak Hour

Intersection						
Int Delay, s/veh	2.8					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↑	↗	↘	↑
Traffic Vol, veh/h	89	65	421	112	79	390
Future Vol, veh/h	89	65	421	112	79	390
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	0	-	440	450	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	17	5	5	12	4	4
Mvmt Flow	97	71	458	122	86	424

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1054	458	0	0	580	0
Stage 1	458	-	-	-	-	-
Stage 2	596	-	-	-	-	-
Critical Hdwy	6.57	6.25	-	-	4.14	-
Critical Hdwy Stg 1	5.57	-	-	-	-	-
Critical Hdwy Stg 2	5.57	-	-	-	-	-
Follow-up Hdwy	3.653	3.345	-	-	2.236	-
Pot Cap-1 Maneuver	234	597	-	-	984	-
Stage 1	607	-	-	-	-	-
Stage 2	522	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	214	597	-	-	984	-
Mov Cap-2 Maneuver	339	-	-	-	-	-
Stage 1	607	-	-	-	-	-
Stage 2	477	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.4	0	1.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	339	597	984
HCM Lane V/C Ratio	-	-	0.285	0.118	0.087
HCM Control Delay (s)	-	-	19.8	11.8	9
HCM Lane LOS	-	-	C	B	A
HCM 95th %tile Q(veh)	-	-	1.2	0.4	0.3

Intersection						
Int Delay, s/veh	3.6					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↑	↗	↘	↑
Traffic Vol, veh/h	139	97	417	152	64	387
Future Vol, veh/h	139	97	417	152	64	387
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	0	-	440	450	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	7	1	1	4	0	2
Mvmt Flow	146	102	439	160	67	407

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	980	439	0	0	599	0
Stage 1	439	-	-	-	-	-
Stage 2	541	-	-	-	-	-
Critical Hdwy	6.47	6.21	-	-	4.1	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.309	-	-	2.2	-
Pot Cap-1 Maneuver	271	620	-	-	988	-
Stage 1	639	-	-	-	-	-
Stage 2	574	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	253	620	-	-	988	-
Mov Cap-2 Maneuver	380	-	-	-	-	-
Stage 1	639	-	-	-	-	-
Stage 2	535	-	-	-	-	-













Approach	WB	NB	SB
HCM Control Delay, s	16.8	0	1.3
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	380	620	988
HCM Lane V/C Ratio	-	-	0.385	0.165	0.068
HCM Control Delay (s)	-	-	20.3	11.9	8.9
HCM Lane LOS	-	-	C	B	A
HCM 95th %tile Q(veh)	-	-	1.8	0.6	0.2

HCM 6th Signalized Intersection Summary

2: SR 19 & CR 48

Existing AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	371	305	86	433	328	79
Future Volume (veh/h)	371	305	86	433	328	79
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	1811	1722	1781	1856	1707	1767
Adj Flow Rate, veh/h	399	328	92	0	353	85
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	6	12	8	3	13	9
Cap, veh/h	392	331	688		301	1124
Arrive On Green	0.23	0.23	0.39	0.00	0.19	0.64
Sat Flow, veh/h	1725	1459	1781	1572	1626	1767
Grp Volume(v), veh/h	399	328	92	0	353	85
Grp Sat Flow(s),veh/h/ln	1725	1459	1781	1572	1626	1767
Q Serve(g_s), s	22.7	22.4	3.3	0.0	18.5	1.8
Cycle Q Clear(g_c), s	22.7	22.4	3.3	0.0	18.5	1.8
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	392	331	688		301	1124
V/C Ratio(X)	1.02	0.99	0.13		1.17	0.08
Avail Cap(c_a), veh/h	392	331	688		301	1124
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	38.7	38.5	19.9	0.0	40.7	7.0
Incr Delay (d2), s/veh	50.4	46.6	0.4	0.0	107.5	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	21.0	17.5	2.5	0.0	24.4	1.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	89.1	85.2	20.3	0.0	148.2	7.1
LnGrp LOS	F	F	C		F	A
Approach Vol, veh/h	727		92	A		438
Approach Delay, s/veh	87.3		20.3			120.8
Approach LOS	F		C			F
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	25.0	45.0		30.0		70.0
Change Period (Y+Rc), s	6.5	6.4		7.3		6.4
Max Green Setting (Gmax), s	18.5	38.6		22.7		38.6
Max Q Clear Time (g_c+I1), s	20.5	5.3		24.7		3.8
Green Ext Time (p_c), s	0.0	0.4		0.0		0.4
Intersection Summary						
HCM 6th Ctrl Delay			94.1			
HCM 6th LOS			F			













Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

2: SR 19 & CR 48

Existing PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	394	342	67	381	323	77
Future Volume (veh/h)	394	342	67	381	323	77
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	1856	1841	1885	1841	1826	1856
Adj Flow Rate, veh/h	424	192	72	0	347	83
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	4	1	4	5	3
Cap, veh/h	401	354	728		322	1180
Arrive On Green	0.23	0.23	0.39	0.00	0.19	0.64
Sat Flow, veh/h	1767	1560	1885	1560	1739	1856
Grp Volume(v), veh/h	424	192	72	0	347	83
Grp Sat Flow(s),veh/h/ln	1767	1560	1885	1560	1739	1856
Q Serve(g_s), s	22.7	10.8	2.4	0.0	18.5	1.7
Cycle Q Clear(g_c), s	22.7	10.8	2.4	0.0	18.5	1.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	401	354	728		322	1180
V/C Ratio(X)	1.06	0.54	0.10		1.08	0.07
Avail Cap(c_a), veh/h	401	354	728		322	1180
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	38.7	34.1	19.6	0.0	40.8	6.9
Incr Delay (d2), s/veh	60.8	1.7	0.3	0.0	72.7	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	23.3	7.4	1.9	0.0	20.9	1.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	99.4	35.8	19.9	0.0	113.5	7.1
LnGrp LOS	F	D	B		F	A
Approach Vol, veh/h	616		72	A		430
Approach Delay, s/veh	79.6		19.9			92.9
Approach LOS	E		B			F
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	25.0	45.0		30.0		70.0
Change Period (Y+Rc), s	6.5	6.4		7.3		6.4
Max Green Setting (Gmax), s	18.5	38.6		22.7		38.6
Max Q Clear Time (g_c+I1), s	20.5	4.4		24.7		3.7
Green Ext Time (p_c), s	0.0	0.3		0.0		0.4
Intersection Summary						
HCM 6th Ctrl Delay			80.9			
HCM 6th LOS			F			

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
 3: SR 19 & CR 448

Existing AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑	↗	↖	↗	
Traffic Volume (veh/h)	9	4	5	155	5	12	8	619	172	53	454	4
Future Volume (veh/h)	9	4	5	155	5	12	8	619	172	53	454	4
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	1900	1900	1900	1693	1900	1648	1900	1841	1663	1900	1826	1900
Adj Flow Rate, veh/h	10	4	4	167	5	9	9	666	185	57	488	2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	0	0	14	0	17	0	4	16	0	5	0
Cap, veh/h	351	145	145	331	101	182	21	798	611	94	864	4
Arrive On Green	0.17	0.17	0.17	0.17	0.17	0.17	0.01	0.43	0.43	0.05	0.48	0.48
Sat Flow, veh/h	1422	872	872	1274	608	1095	1810	1841	1409	1810	1817	7
Grp Volume(v), veh/h	10	0	8	167	0	14	9	666	185	57	0	490
Grp Sat Flow(s),veh/h/ln	1422	0	1743	1274	0	1703	1810	1841	1409	1810	0	1825
Q Serve(g_s), s	0.3	0.0	0.2	7.3	0.0	0.4	0.3	18.6	5.0	1.8	0.0	11.2
Cycle Q Clear(g_c), s	0.7	0.0	0.2	7.6	0.0	0.4	0.3	18.6	5.0	1.8	0.0	11.2
Prop In Lane	1.00		0.50	1.00		0.64	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	351	0	290	331	0	284	21	798	611	94	0	867
V/C Ratio(X)	0.03	0.00	0.03	0.50	0.00	0.05	0.43	0.83	0.30	0.61	0.00	0.57
Avail Cap(c_a), veh/h	798	0	839	738	0	828	452	1349	1033	449	0	1337
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(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.6	0.0	20.2	23.4	0.0	20.3	28.5	14.6	10.7	26.9	0.0	10.9
Incr Delay (d2), s/veh	0.0	0.0	0.0	1.2	0.0	0.1	13.1	2.4	0.3	6.2	0.0	0.6
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/lr	0.2	0.0	0.2	3.6	0.0	0.3	0.3	9.9	2.0	1.5	0.0	5.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.7	0.0	20.3	24.6	0.0	20.4	41.6	17.0	11.0	33.1	0.0	11.5
LnGrp LOS	C	A	C	C	A	C	D	B	B	C	A	B
Approach Vol, veh/h		18			181			860			547	
Approach Delay, s/veh		20.5			24.3			15.9			13.8	
Approach LOS		C			C			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.2	35.1		16.8	8.6	32.6		16.8				
Change Period (Y+Rc), s	5.5	7.5		* 7.1	* 5.6	7.5		* 7.1				
Max Green Setting (Gmax), s	41.5	42.5		* 28	* 14	42.5		* 28				
Max Q Clear Time (g_c+1), s	12.3	13.2		9.6	3.8	20.6		2.7				
Green Ext Time (p_c), s	0.0	2.7		0.5	0.1	4.5		0.0				

Intersection Summary

HCM 6th Ctrl Delay	16.2
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
 3: SR 19 & CR 448

Existing PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	11	14	190	14	30	11	568	179	54	647	9
Future Volume (veh/h)	10	11	14	190	14	30	11	568	179	54	647	9
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	1900	1900	1900	1885	1900	1900	1900	1885	1796	1900	1885	1900
Adj Flow Rate, veh/h	10	11	15	198	15	31	11	592	186	56	674	5
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	0	1	0	0	0	1	7	0	1	0
Cap, veh/h	366	141	192	383	107	221	25	735	593	94	803	6
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.01	0.39	0.39	0.05	0.43	0.43
Sat Flow, veh/h	1381	728	993	1396	553	1142	1810	1885	1522	1810	1869	14
Grp Volume(v), veh/h	10	0	26	198	0	46	11	592	186	56	0	679
Grp Sat Flow(s),veh/h/ln	1381	0	1721	1396	0	1694	1810	1885	1522	1810	0	1883
Q Serve(g_s), s	0.3	0.0	0.7	7.5	0.0	1.2	0.3	15.5	4.7	1.7	0.0	17.8
Cycle Q Clear(g_c), s	1.6	0.0	0.7	8.2	0.0	1.2	0.3	15.5	4.7	1.7	0.0	17.8
Prop In Lane	1.00		0.58	1.00		0.67	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	366	0	333	383	0	328	25	735	593	94	0	809
V/C Ratio(X)	0.03	0.00	0.08	0.52	0.00	0.14	0.43	0.81	0.31	0.59	0.00	0.84
Avail Cap(c_a), veh/h	794	0	867	823	0	862	473	1446	1167	470	0	1444
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(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.2	0.0	18.3	21.7	0.0	18.5	27.1	15.0	11.8	25.7	0.0	14.1
Incr Delay (d2), s/veh	0.0	0.0	0.1	1.1	0.0	0.2	11.2	2.1	0.3	5.8	0.0	2.4
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/lr	0.2	0.0	0.5	3.9	0.0	0.8	0.4	8.8	2.1	1.4	0.0	9.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.2	0.0	18.4	22.7	0.0	18.7	38.3	17.2	12.1	31.5	0.0	16.5
LnGrp LOS	B	A	B	C	A	B	D	B	B	C	A	B
Approach Vol, veh/h		36		244				789			735	
Approach Delay, s/veh		18.6		22.0				16.3			17.7	
Approach LOS		B		C				B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.3	31.3		17.8	8.5	29.1		17.8				
Change Period (Y+Rc), s	5.5	7.5		* 7.1	* 5.6	7.5		* 7.1				
Max Green Setting (Gmax), s	42.5	42.5		* 28	* 14	42.5		* 28				
Max Q Clear Time (g_c+1), s	12.3	19.8		10.2	3.7	17.5		3.6				
Green Ext Time (p_c), s	0.0	4.0		0.7	0.1	4.0		0.1				

Intersection Summary

HCM 6th Ctrl Delay	17.7
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
4: SR 19 & Central Ave

Existing AM Peak Hour

Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	21	3	16	14	4	14	9	419	8	33	384	18
Future Vol, veh/h	21	3	16	14	4	14	9	419	8	33	384	18
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	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	14	0	25	0	0	0	22	4	0	12	5	11
Mvmt Flow	24	3	18	16	4	16	10	471	9	37	431	20

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1021	1015	441	1022	1021	476	451	0	0	480	0	0
Stage 1	515	515	-	496	496	-	-	-	-	-	-	-
Stage 2	506	500	-	526	525	-	-	-	-	-	-	-
Critical Hdwy	7.24	6.5	6.45	7.1	6.5	6.2	4.32	-	-	4.22	-	-
Critical Hdwy Stg 1	6.24	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.24	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4	3.525	3.5	4	3.3	2.398	-	-	2.308	-	-
Pot Cap-1 Maneuver	204	240	571	216	238	593	1012	-	-	1032	-	-
Stage 1	521	538	-	559	549	-	-	-	-	-	-	-
Stage 2	527	546	-	539	533	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	186	226	571	197	224	593	1012	-	-	1032	-	-
Mov Cap-2 Maneuver	186	226	-	197	224	-	-	-	-	-	-	-
Stage 1	514	512	-	552	542	-	-	-	-	-	-	-
Stage 2	502	539	-	494	507	-	-	-	-	-	-	-

Approach	EB		WB		NB			SB		
HCM Control Delay, s	21.8		19.5		0.2			0.7		
HCM LOS	C		C							

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1012	-	-	259	284	1032	-	-
HCM Lane V/C Ratio	0.01	-	-	0.174	0.127	0.036	-	-
HCM Control Delay (s)	8.6	0	-	21.8	19.5	8.6	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0.4	0.1	-	-

HCM 6th TWSC
4: SR 19 & Central Ave

Existing PM Peak Hour

Intersection												
Int Delay, s/veh	2.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	34	6	18	8	8	15	15	407	19	9	381	52
Future Vol, veh/h	34	6	18	8	8	15	15	407	19	9	381	52
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	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	15	0	6	0	0	0	0	2	0	0	4	4
Mvmt Flow	36	6	19	9	9	16	16	433	20	10	405	55

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	941	938	433	940	955	443	460	0	0	453	0	0
Stage 1	453	453	-	475	475	-	-	-	-	-	-	-
Stage 2	488	485	-	465	480	-	-	-	-	-	-	-
Critical Hdwy	7.25	6.5	6.26	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.25	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.25	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.635	4	3.354	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	231	266	614	246	260	619	1112	-	-	1118	-	-
Stage 1	562	573	-	574	561	-	-	-	-	-	-	-
Stage 2	538	555	-	581	558	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	214	258	614	228	252	619	1112	-	-	1118	-	-
Mov Cap-2 Maneuver	214	258	-	228	252	-	-	-	-	-	-	-
Stage 1	551	566	-	563	550	-	-	-	-	-	-	-
Stage 2	506	544	-	550	551	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	21.9		16.7		0.3		0.2	
HCM LOS	C		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1112	-	-	274	340	1118	-	-
HCM Lane V/C Ratio	0.014	-	-	0.225	0.097	0.009	-	-
HCM Control Delay (s)	8.3	0	-	21.9	16.7	8.2	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.8	0.3	0	-	-

Appendix F
ITE Trip Generation Sheets & Internal Capture Calculations

Senior Adult Housing - Single-Family (251)

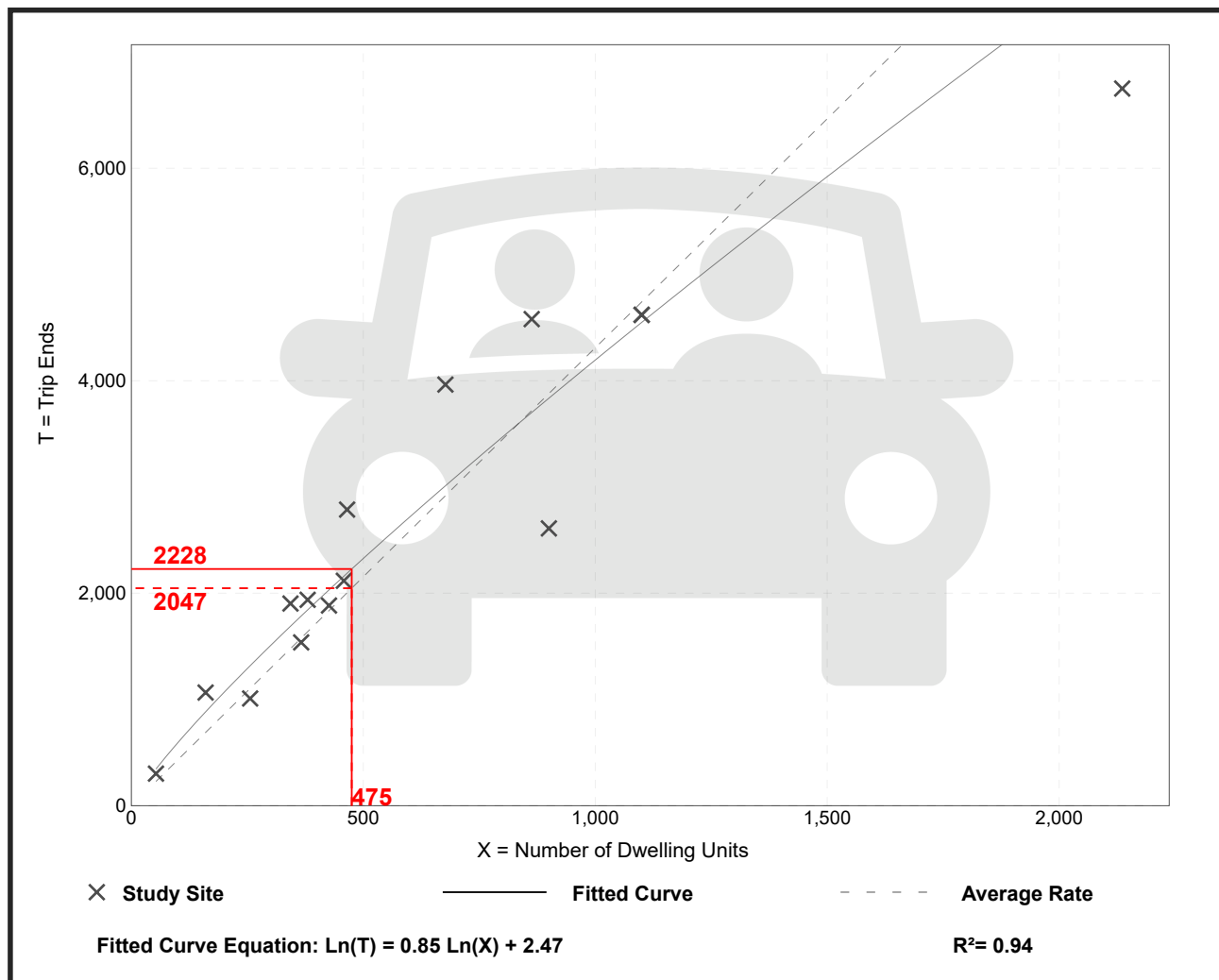
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 15
Avg. Num. of Dwelling Units: 646
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
4.31	2.90 - 6.66	1.07

Data Plot and Equation



Senior Adult Housing - Single-Family (251)

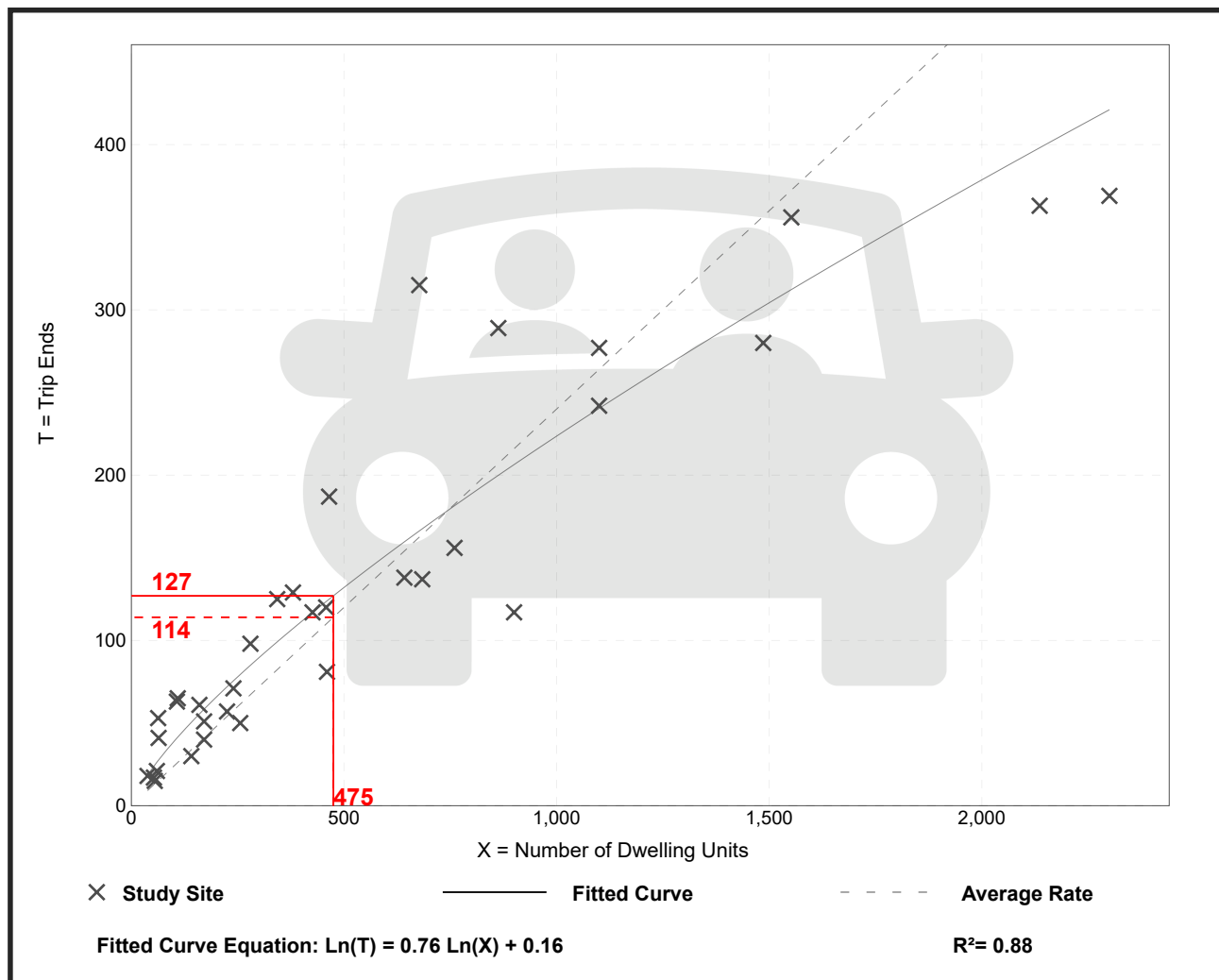
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban
 Number of Studies: 34
 Avg. Num. of Dwelling Units: 557
 Directional Distribution: 33% entering, 67% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.24	0.13 - 0.84	0.10

Data Plot and Equation



Senior Adult Housing - Single-Family (251)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

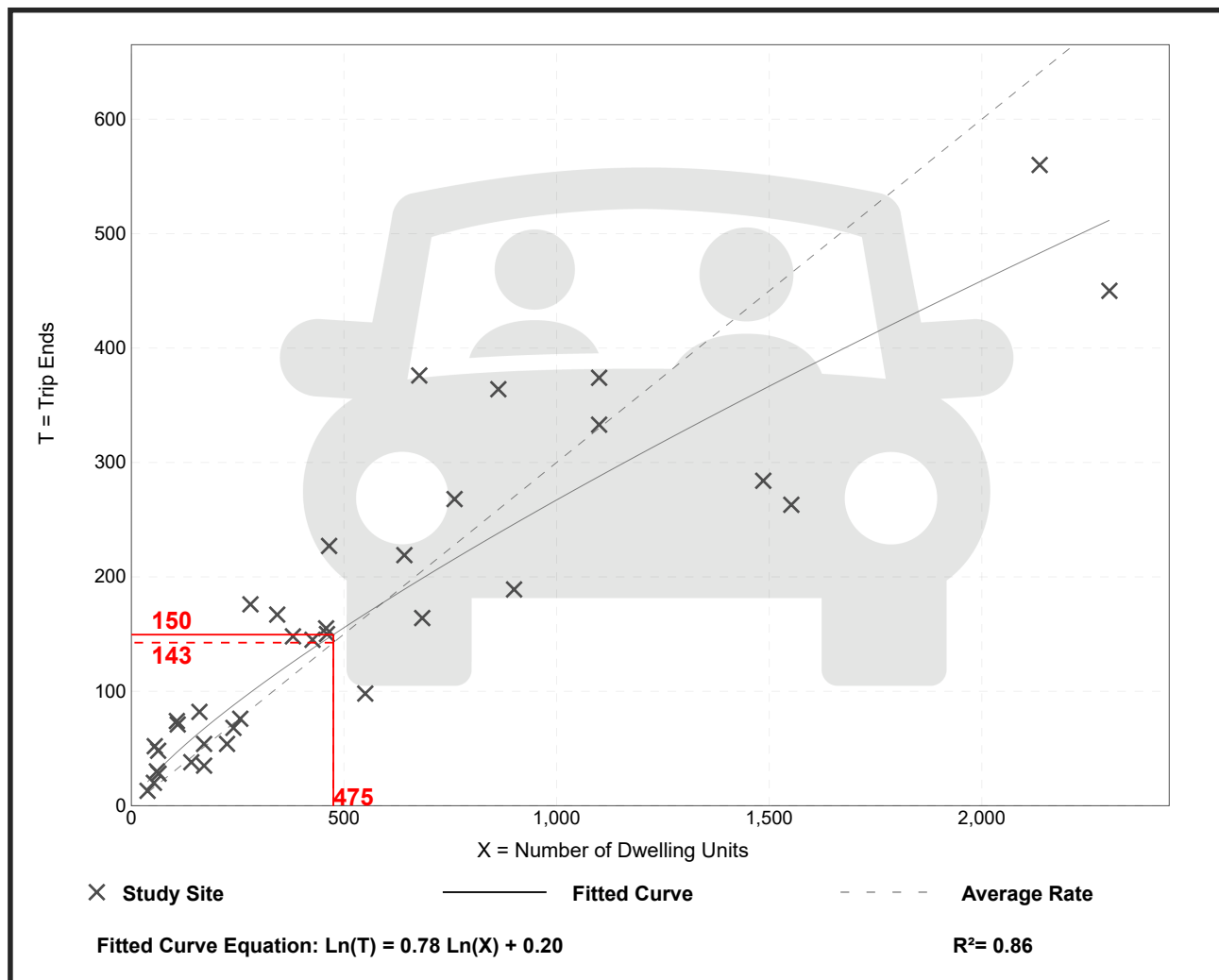
Setting/Location: General Urban/Suburban

Number of Studies: 35
 Avg. Num. of Dwelling Units: 556
 Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.30	0.17 - 0.95	0.12

Data Plot and Equation



Senior Adult Housing - Multifamily (252)

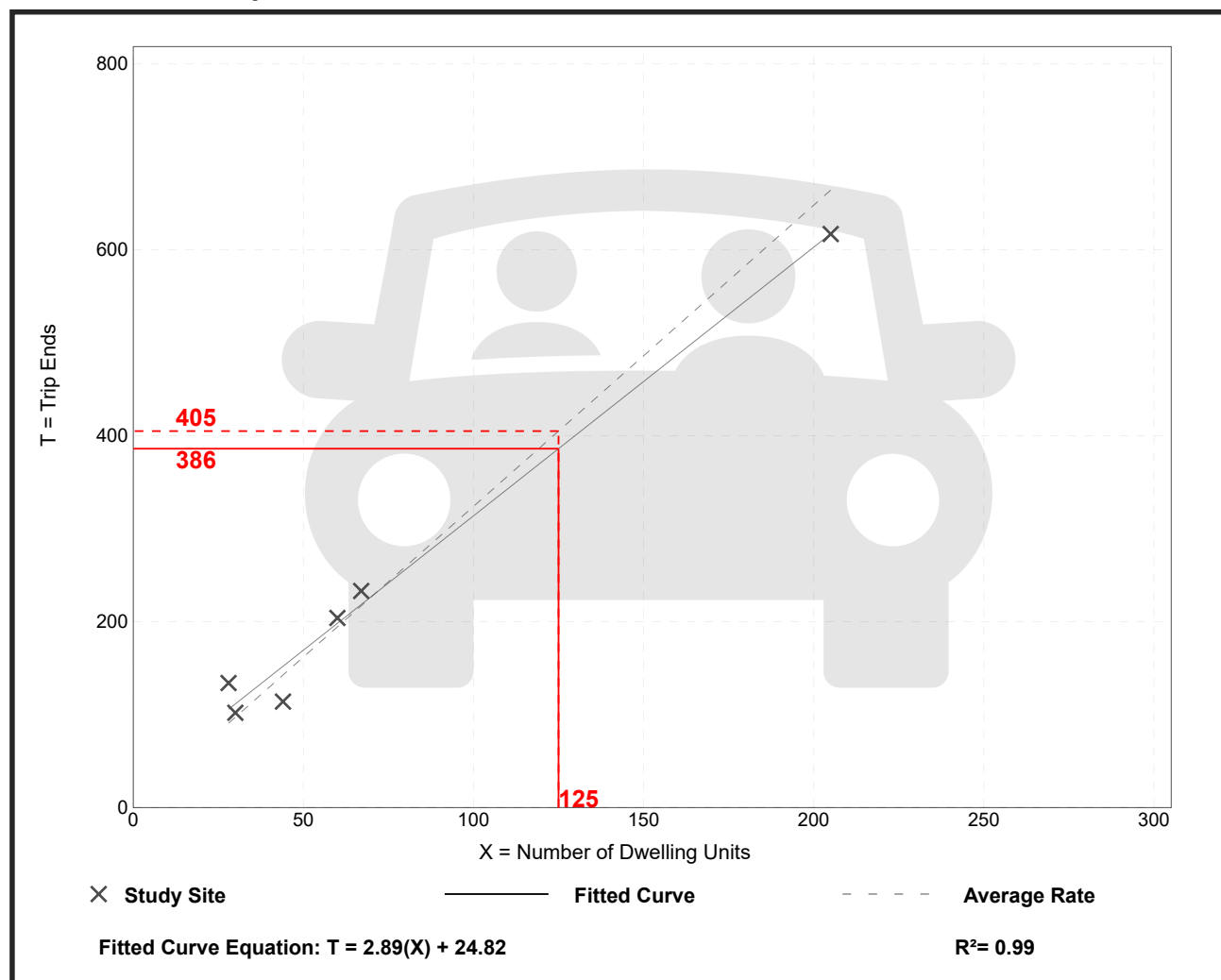
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 6
Avg. Num. of Dwelling Units: 72
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
3.24	2.59 - 4.79	0.53

Data Plot and Equation



Senior Adult Housing - Multifamily (252)

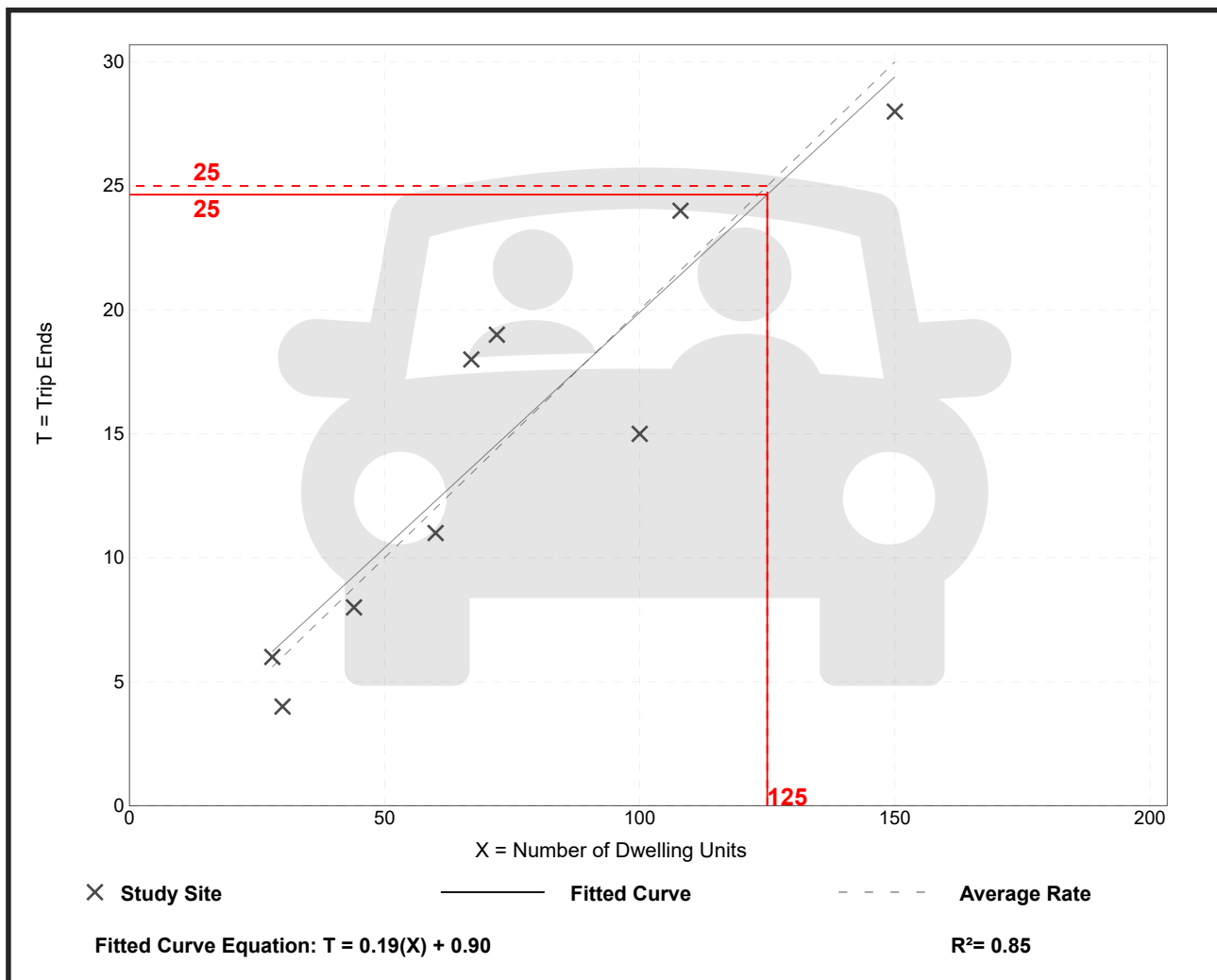
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban
 Number of Studies: 9
 Avg. Num. of Dwelling Units: 73
 Directional Distribution: 34% entering, 66% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.20	0.13 - 0.27	0.04

Data Plot and Equation



Senior Adult Housing - Multifamily (252)

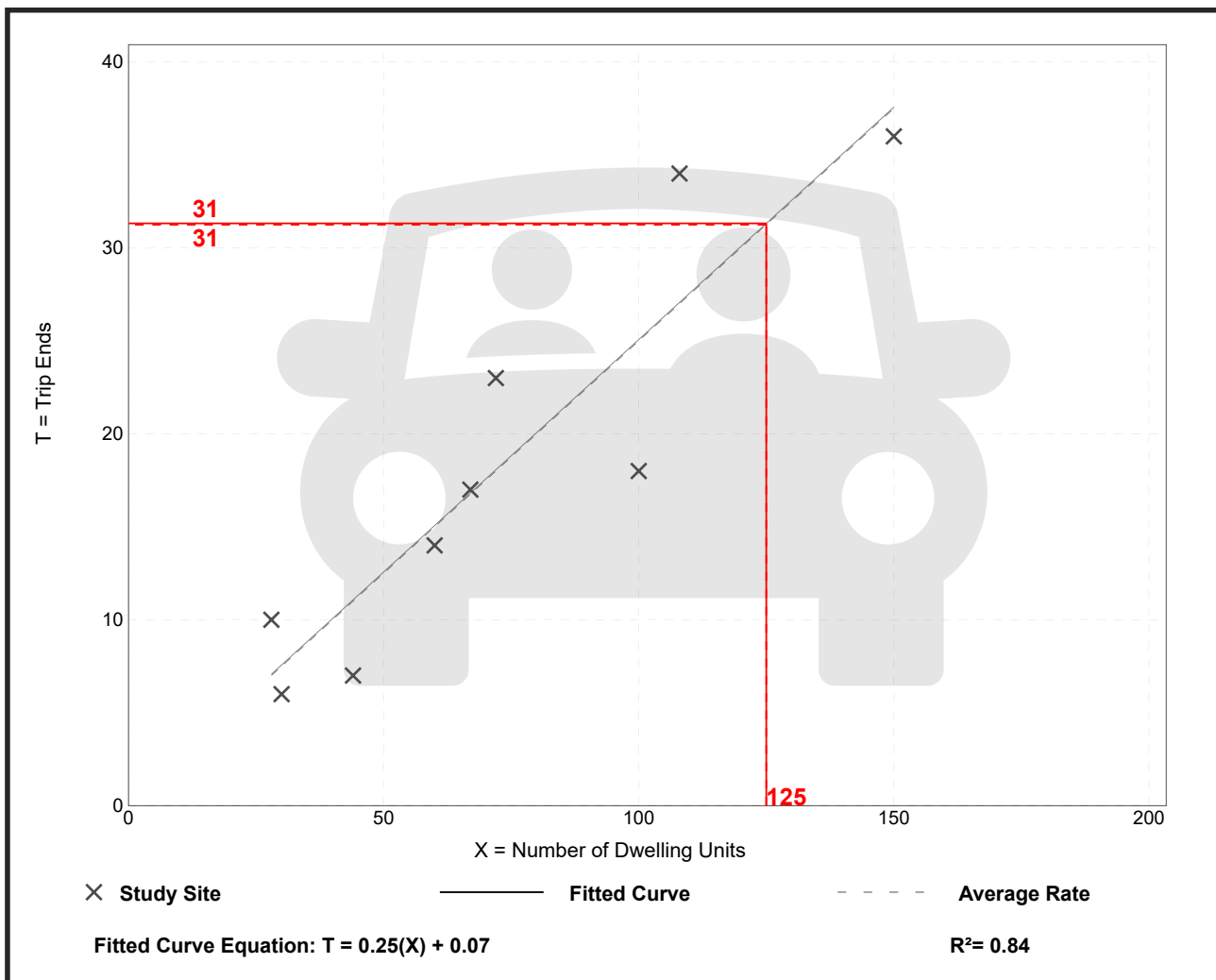
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban
 Number of Studies: 9
 Avg. Num. of Dwelling Units: 73
 Directional Distribution: 56% entering, 44% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.25	0.16 - 0.36	0.06

Data Plot and Equation



Shopping Plaza (40-150k) - Supermarket - Yes (821)

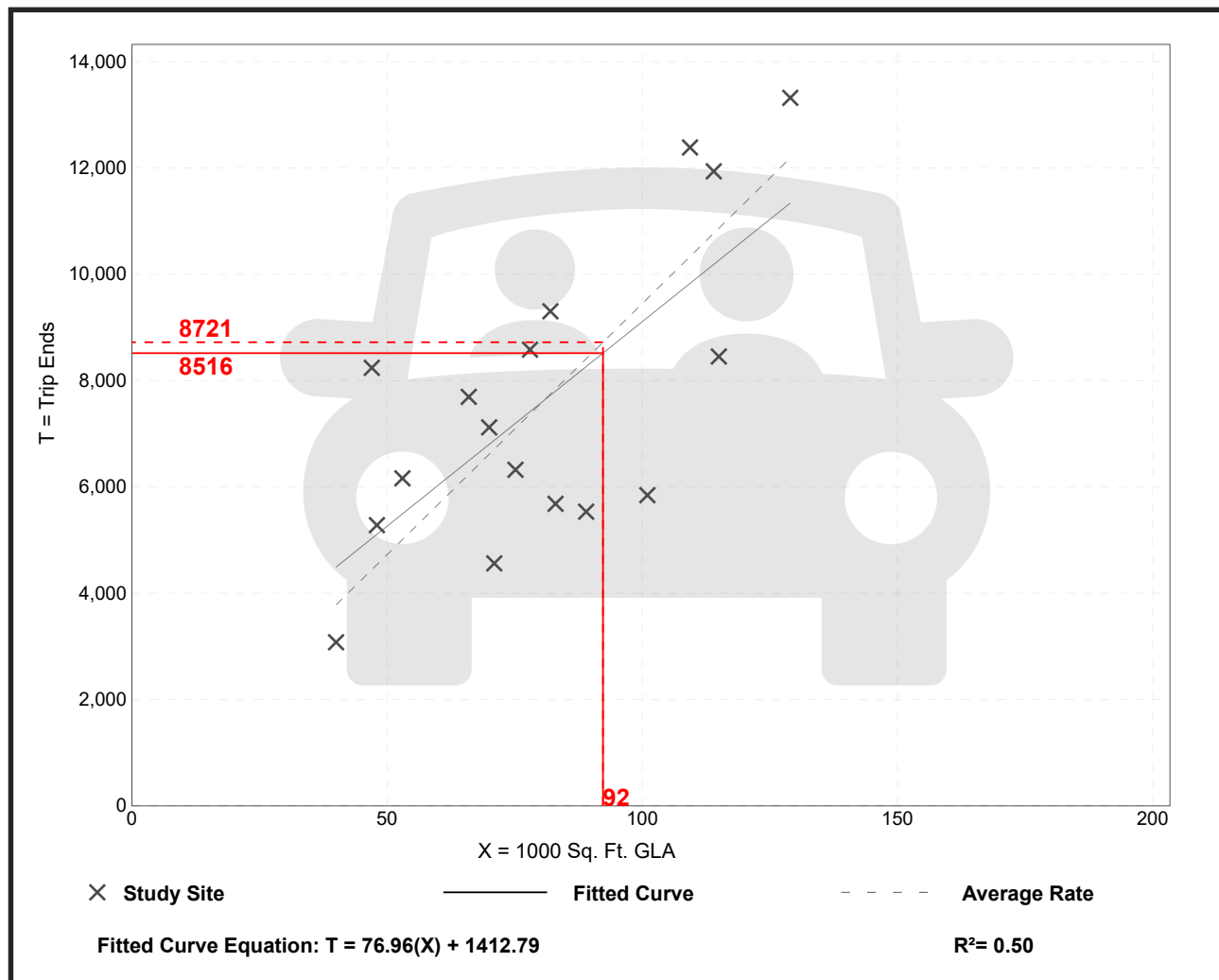
Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 17
Avg. 1000 Sq. Ft. GLA: 81
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
94.49	57.86 - 175.32	26.55

Data Plot and Equation



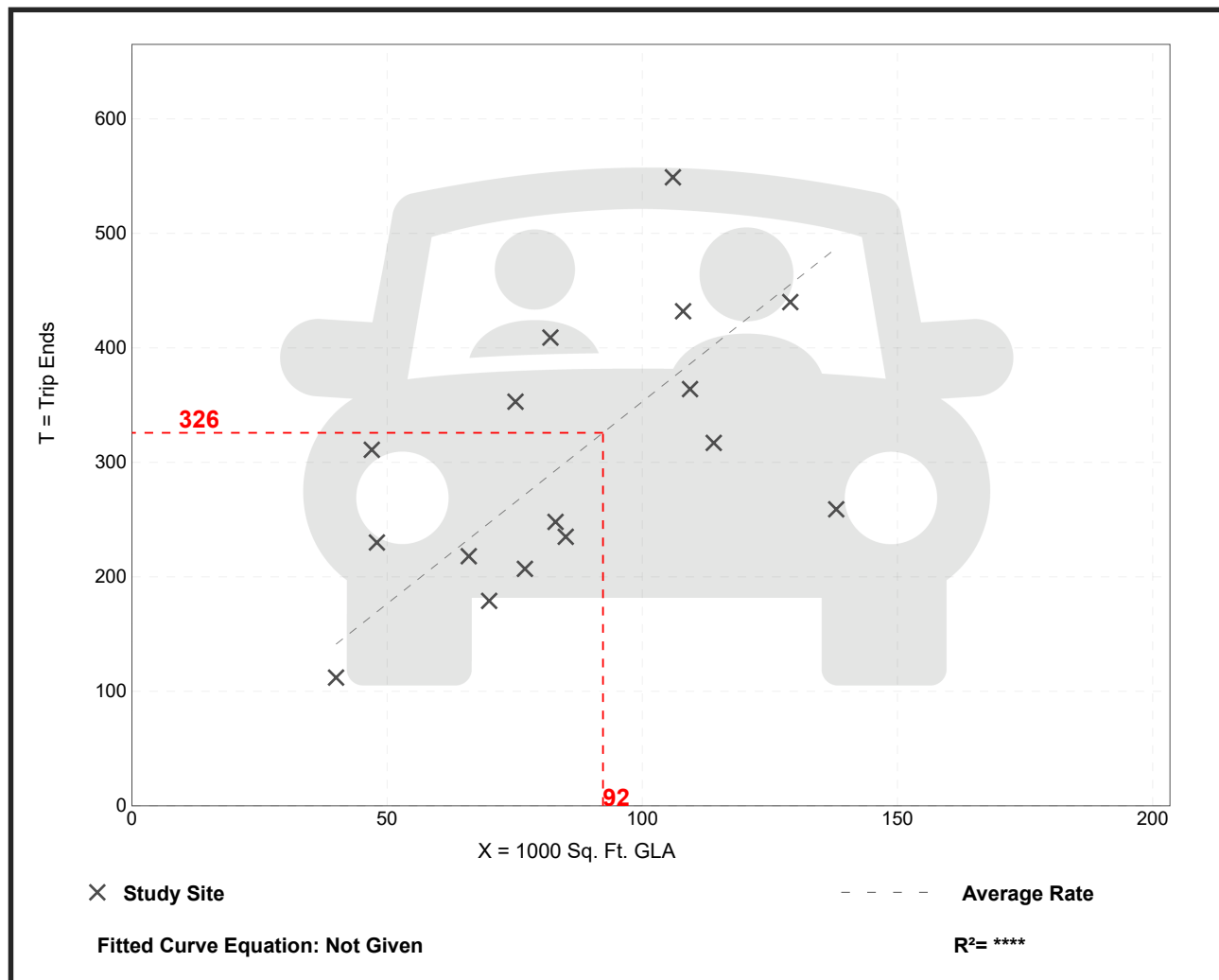
Shopping Plaza (40-150k) - Supermarket - Yes (821)

Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
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: 16
 Avg. 1000 Sq. Ft. GLA: 86
 Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
3.53	1.88 - 6.62	1.17

Data Plot and Equation



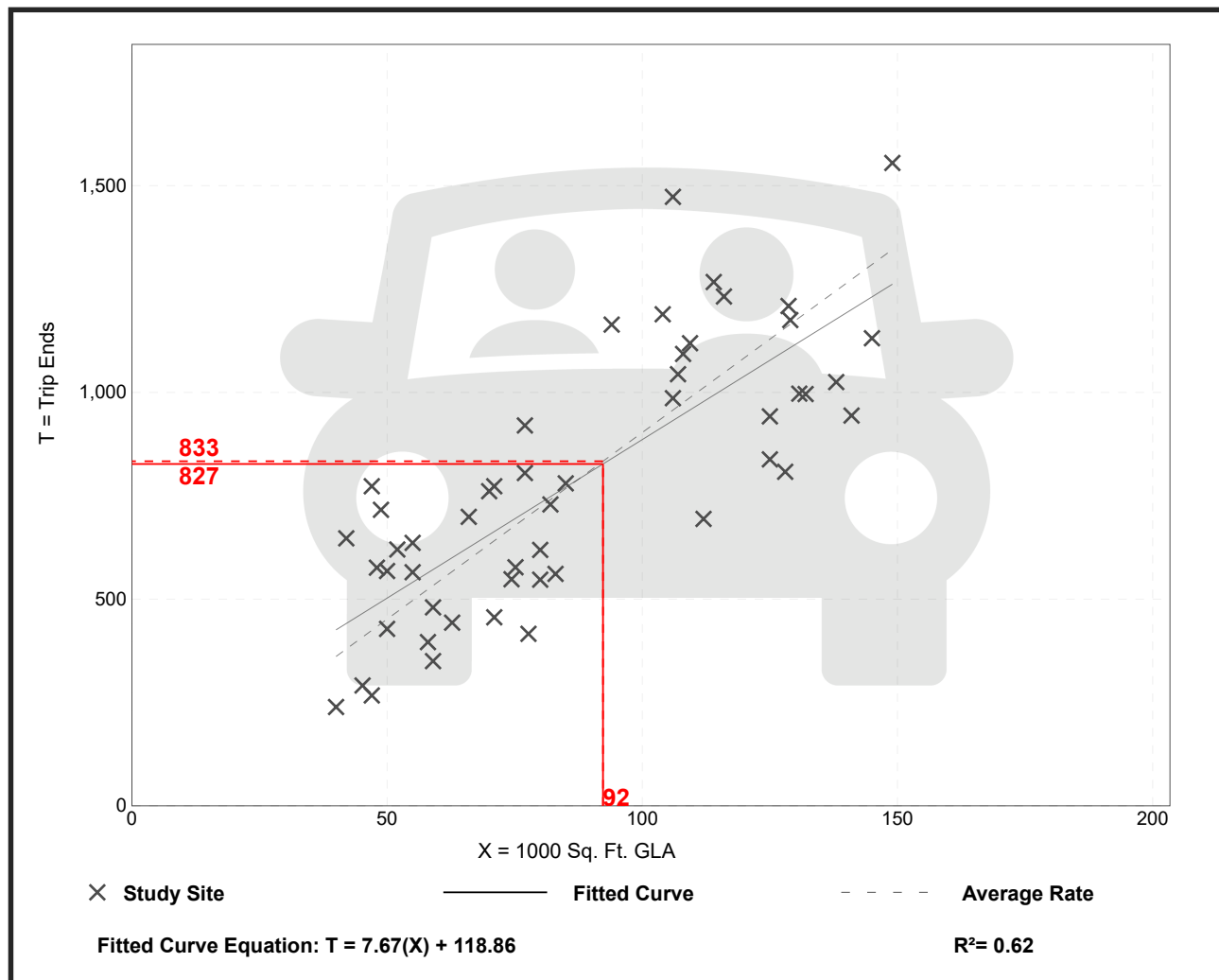
Shopping Plaza (40-150k) - Supermarket - Yes (821)

Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
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: 51
 Avg. 1000 Sq. Ft. GLA: 87
 Directional Distribution: 48% entering, 52% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
9.03	5.35 - 16.45	2.37

Data Plot and Equation



Convenience Store (851)

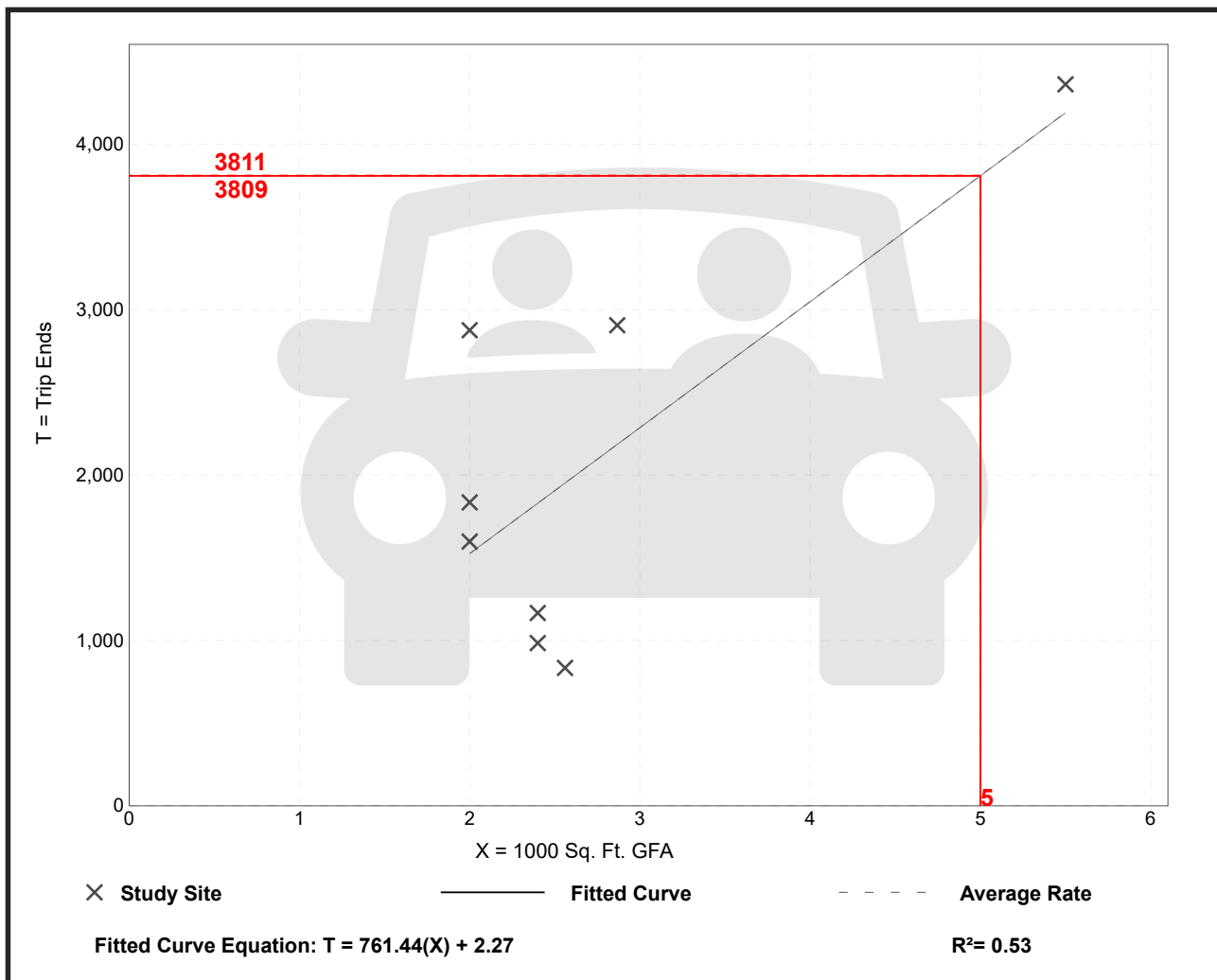
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 8
Avg. 1000 Sq. Ft. GFA: 3
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
762.28	325.78 - 1438.00	333.89

Data Plot and Equation



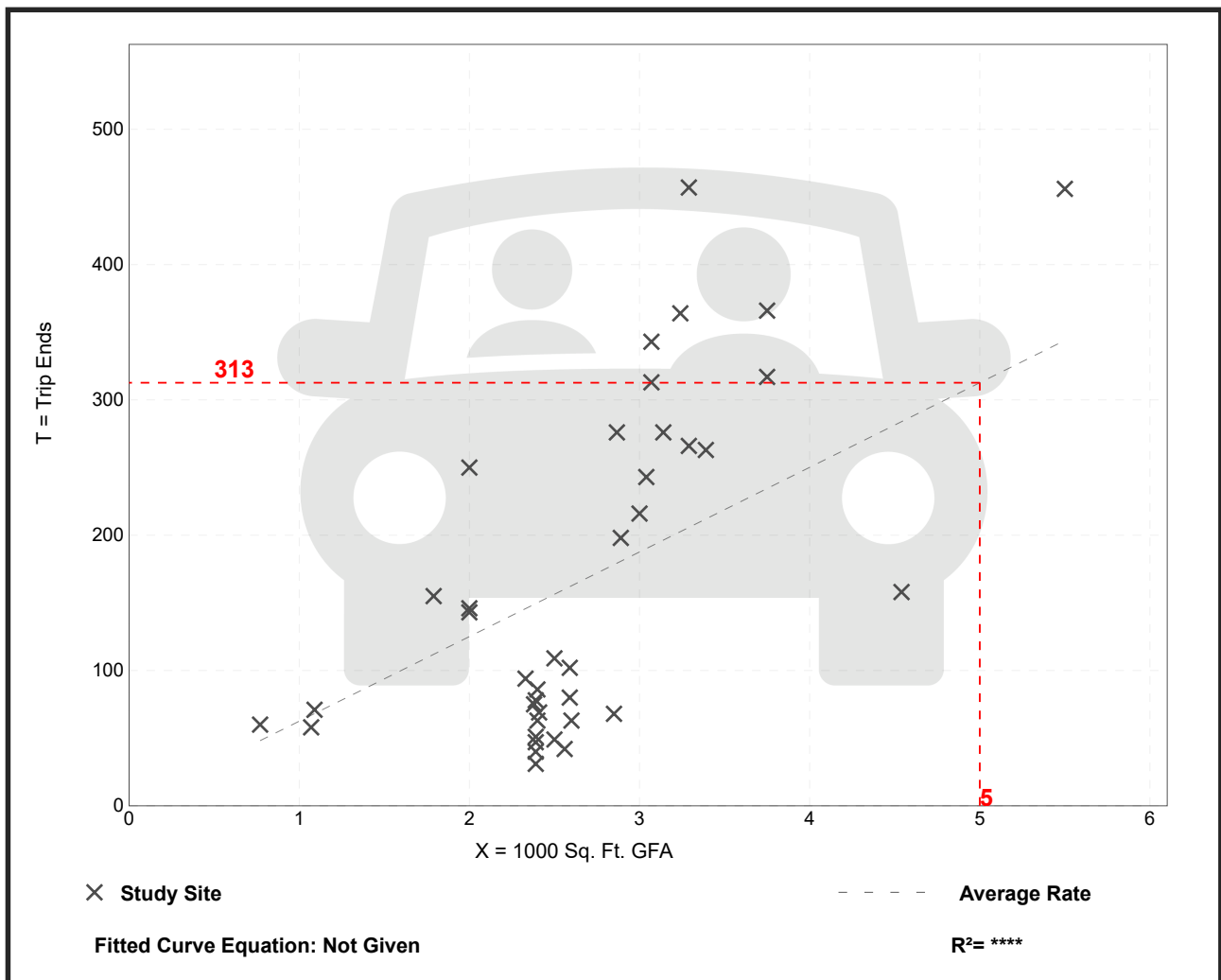
Convenience Store (851)

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: 39
 Avg. 1000 Sq. Ft. GFA: 3
 Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
62.54	12.97 - 138.91	35.04

Data Plot and Equation



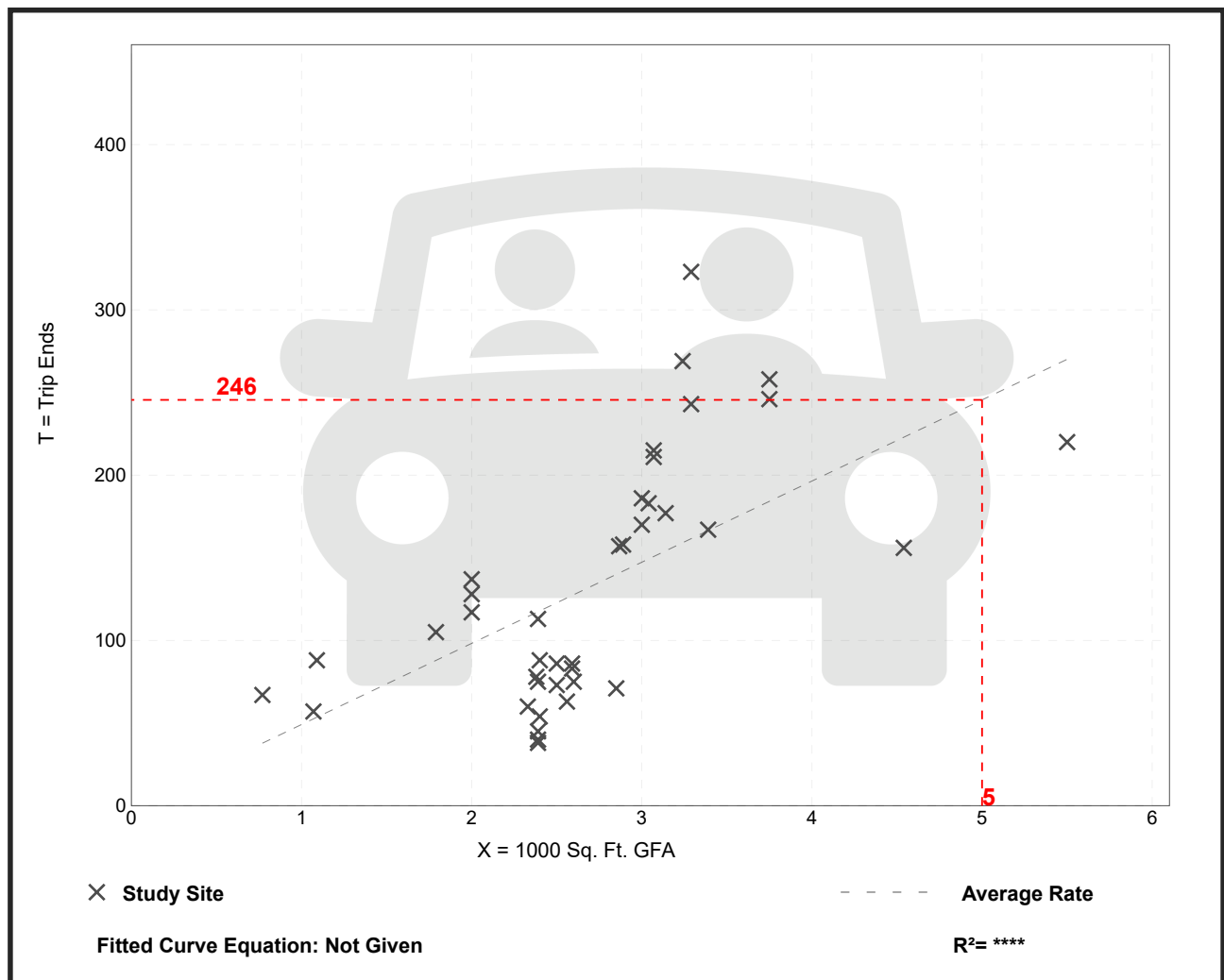
Convenience Store (851)

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: 39
 Avg. 1000 Sq. Ft. GFA: 3
 Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
49.11	15.90 - 98.18	20.84

Data Plot and Equation



Fast-Food Restaurant with Drive-Through Window (934)

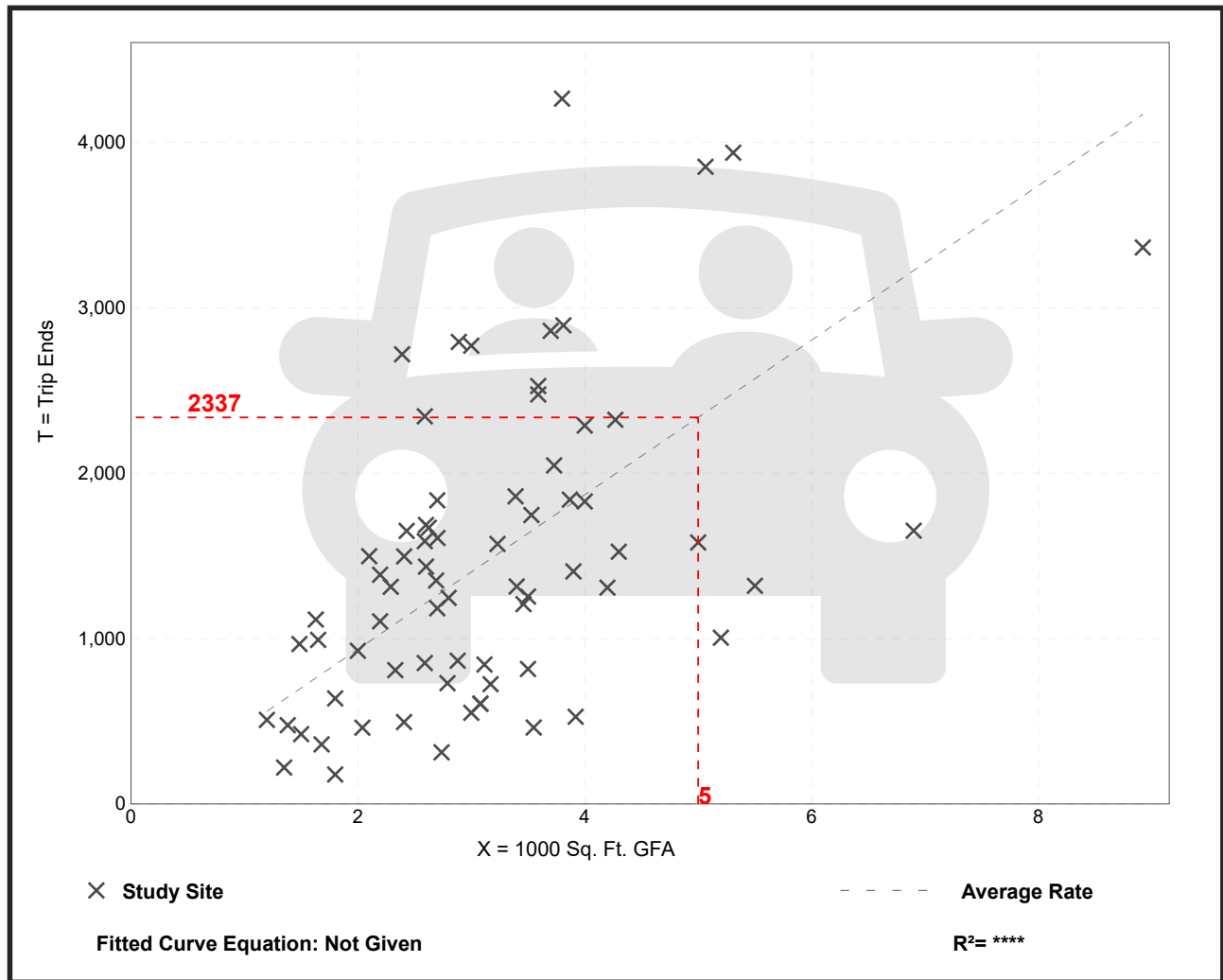
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 71
Avg. 1000 Sq. Ft. GFA: 3
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
467.48	98.89 - 1137.66	238.62

Data Plot and Equation



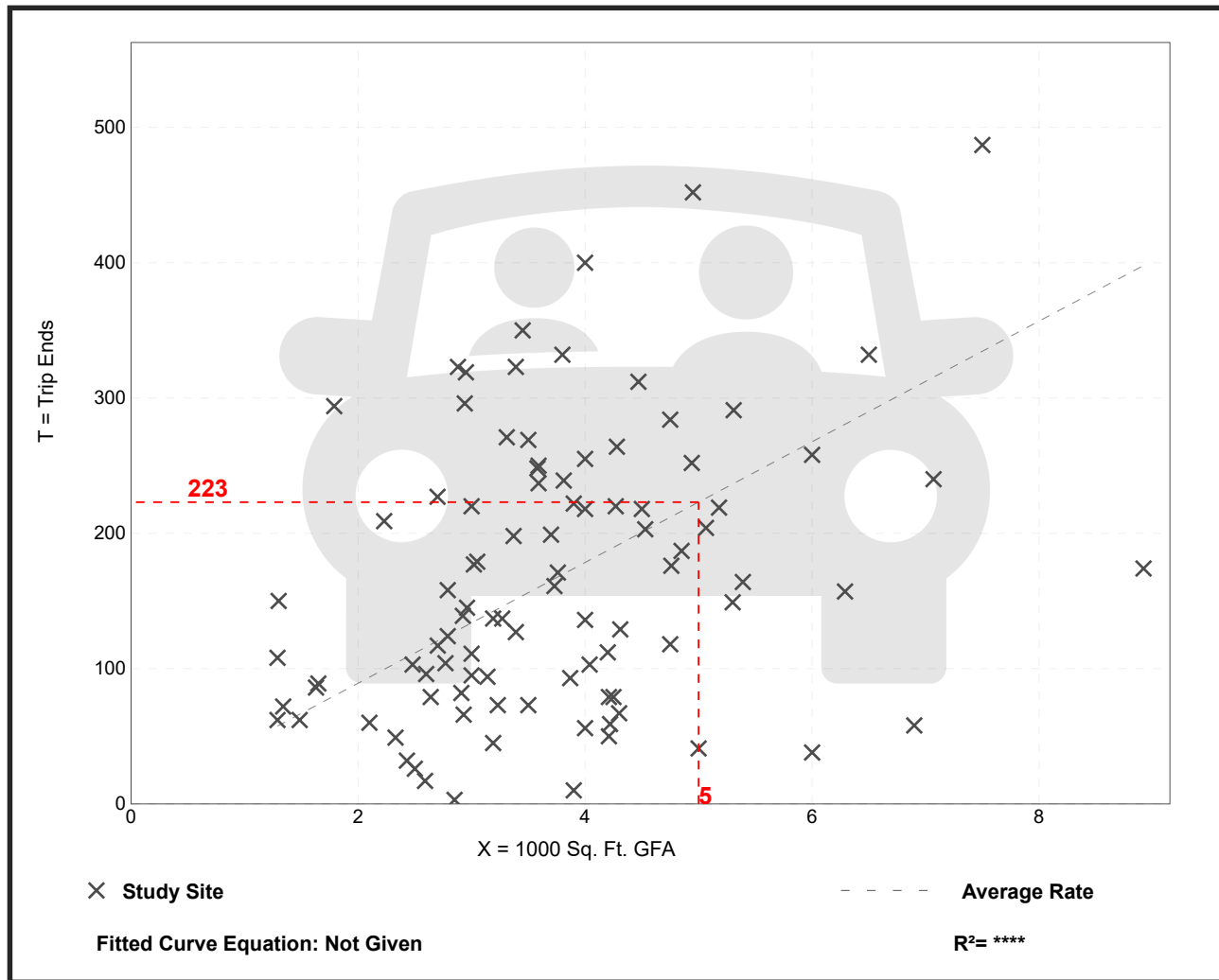
Fast-Food Restaurant with Drive-Through Window (934)

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: 96
 Avg. 1000 Sq. Ft. GFA: 4
 Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
44.61	1.05 - 164.25	27.14

Data Plot and Equation



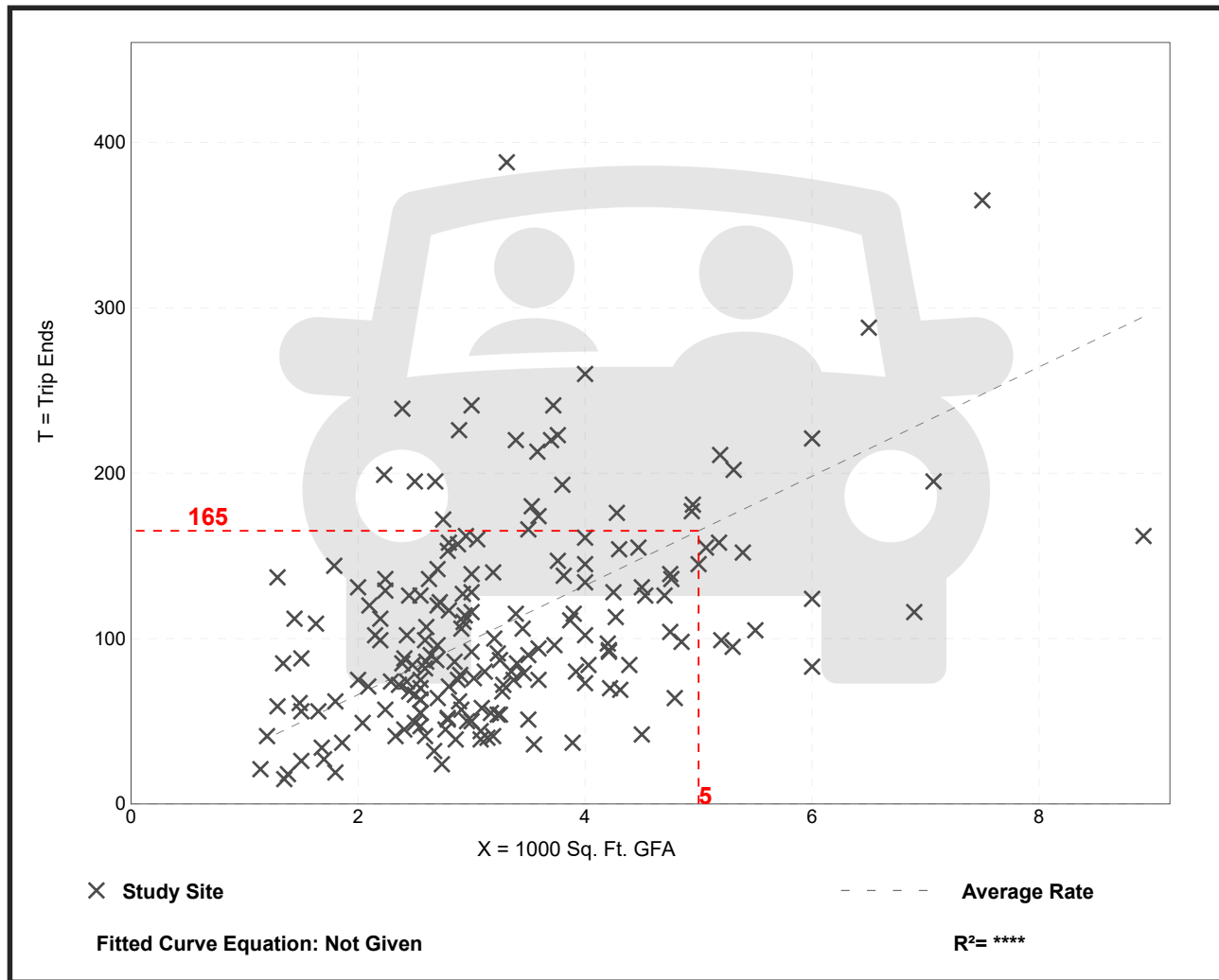
Fast-Food Restaurant with Drive-Through Window (934)

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: 190
 Avg. 1000 Sq. Ft. GFA: 3
 Directional Distribution: 52% entering, 48% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
33.03	8.77 - 117.22	17.59

Data Plot and Equation



**Table F.14 Pass-By and Non-Pass-By Trips Weekday, PM Peak Period
Land Use Code 851—Convenience Market (Open 24 Hours)**

SIZE (1,000 SQ. FT. GFA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIPS (%)			ADJ. STREET PEAK HOUR VOLUME	SOURCE
						PRIMARY	DIVERTED	TOTAL		
3	Overland Park, KS	Aug. 1987	68	4:30–5:30 p.m.	34	53	13	66	—	—
3	Overland Park, KS	July 1987	68	4:30–5:30 p.m.	28	50	22	72	—	—
~1.9	Billings, MT	1987	461	4:00–6:00 p.m.	62	13	25	38	—	ITE Montana Section Tech Comm
<50.0	Chicago suburbs, IL	1987	72	3:00–6:00 p.m.	28	—	—	72	—	Kenig, O'Hara, Humes, Flock
<50.0	Chicago suburbs, IL	1987	54	3:00–6:00 p.m.	78	—	—	22	—	Kenig, O'Hara, Humes, Flock
<50.0	Chicago suburbs, IL	1987	34	3:00–6:00 p.m.	69	—	—	31	—	Kenig, O'Hara, Humes, Flock
<50.0	Chicago suburbs, IL	1987	100	3:00–6:00 p.m.	63	—	—	37	—	Kenig, O'Hara, Humes, Flock
<50.0	Chicago suburbs, IL	1987	43	3:00–6:00 p.m.	43	—	—	57	—	Kenig, O'Hara, Humes, Flock
<50.0	Chicago suburbs, IL	1987	135	3:00–6:00 p.m.	39	—	—	61	—	Kenig, O'Hara, Humes, Flock
<50.0	Chicago suburbs, IL	1987	74	3:00–6:00 p.m.	53	—	—	47	—	Kenig, O'Hara, Humes, Flock
<50.0	Chicago suburbs, IL	1987	80	3:00–6:00 p.m.	64	—	—	36	—	Kenig, O'Hara, Humes, Flock

Average Pass-By Trip Percentage: 51

“—” means no data were provided

**Table F.15 Pass-By and Non-Pass-By Trips Weekday, AM Peak Period
Land Use Code 853—Convenience Market with Gasoline Pumps**

SIZE (1,000 SQ. FT. GFA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIPS (%)			ADJ. STREET PEAK HOUR VOLUME	SOURCE
						PRIMARY	DIVERTED	TOTAL		
2.8	Louisville area, KY	1993	—	7:00–9:00 a.m.	54	11	35	46	1,240	Barton-Aschman Assoc.
2.4	Louisville area, KY	1993	—	7:00–9:00 a.m.	48	17	35	52	1,210	Barton-Aschman Assoc.
4.2	Louisville area, KY	1993	47	7:00–9:00 a.m.	62	19	19	38	1,705	Barton-Aschman Assoc.
2.6	Crestwood, KY	1993	—	7:00–9:00 a.m.	72	15	13	28	940	Barton-Aschman Assoc.
3.7	Louisville area, KY	1993	49	7:00–9:00 a.m.	66	16	18	34	990	Barton-Aschman Assoc.
3.0	New Albany, IN	1993	62	7:00–9:00 a.m.	74	10	16	26	790	Barton-Aschman Assoc.
2.3	Louisville, KY	1993	58	7:00–9:00 a.m.	64	5	31	36	1,255	Barton-Aschman Assoc.
2.2	New Albany, IN	1993	79	7:00–9:00 a.m.	56	6	38	44	635	Barton-Aschman Assoc.
3.6	Louisville area, KY	1993	49	7:00–9:00 a.m.	67	4	29	33	1,985	Barton-Aschman Assoc.

Average Pass-By Trip Percentage: 63

“—” means no data were provided

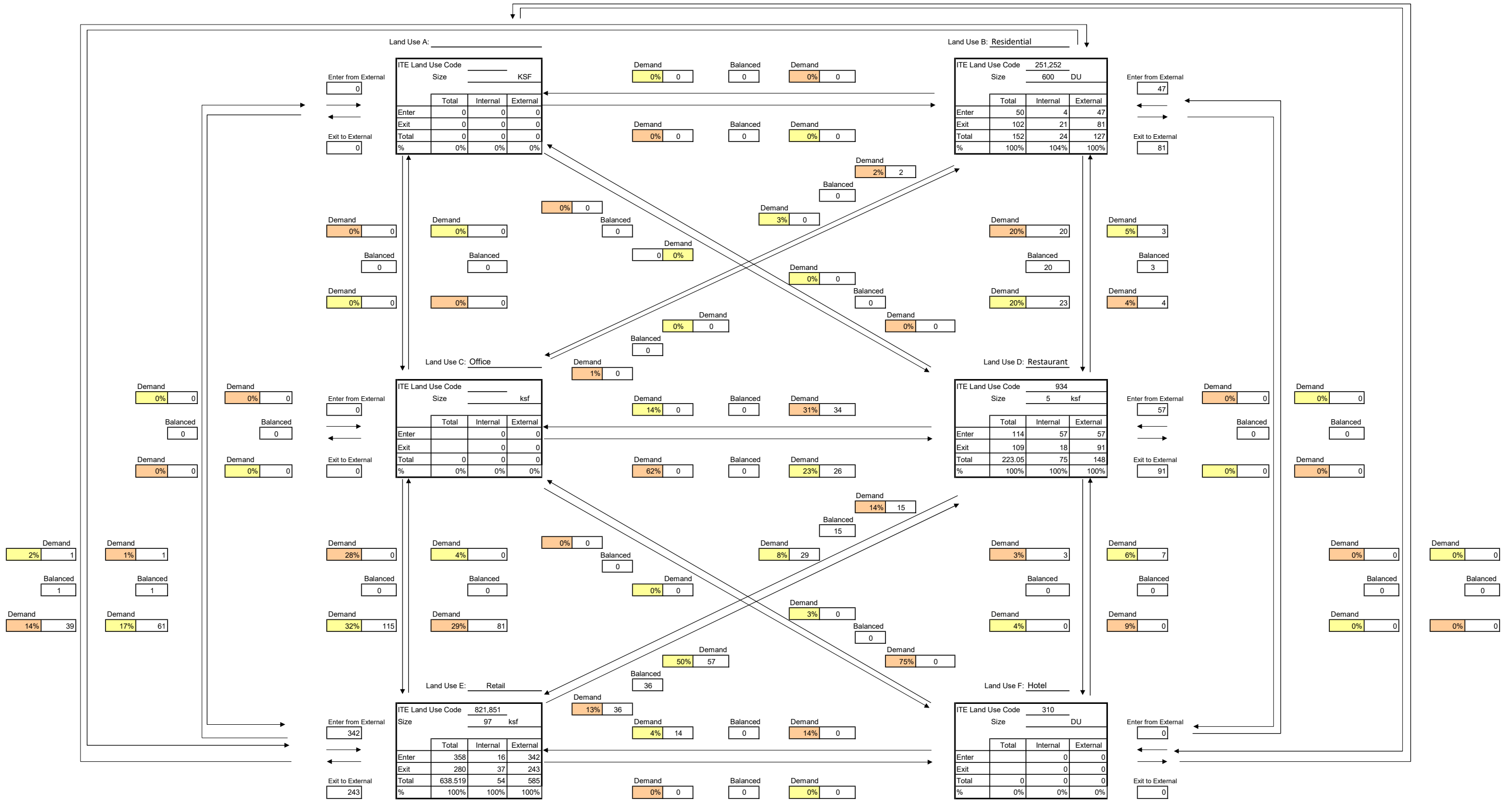
**Table F.31 Pass-By and Non-Pass-By Trips Weekday, AM Peak Period
Land Use Code 934—Fast-Food Restaurant with Drive-Through Window**

SEATS	SIZE (1,000 SQ. FT. GFA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIPS (%)			ADJ. STREET PEAK HOUR VOLUME	SOURCE
							PRIMARY	DIVERTED	TOTAL		
—	<5	Chicago suburbs, IL	1987	84	7:00–9:00 a.m.	44	—	—	56	—	Kenig, O'Hara, Humes, Flock
88	1.4	Louisville area, KY	1993	—	7:00–9:00 a.m.	62	22	16	38	1,407	Barton-Aschman Assoc.
100	3.6	Louisville, KY	1993	—	7:00–9:00 a.m.	32	47	21	68	437	Barton-Aschman Assoc.
87	4.2	New Albany, IN	1993	—	7:00–9:00 a.m.	46	23	31	54	1,049	Barton-Aschman Assoc.
150	3.0	Louisville area, KY	1993	—	7:00–9:00 a.m.	43	14	43	57	2,903	Barton-Aschman Assoc.
—	3.3	varies	1996	—	6:00–9:00 a.m.	68	—	—	32	—	Oracle Engineering

Average Pass-By Trip Percentage: 49

“—” means no data were provided

Multi-Use Development Internal Capture Summary



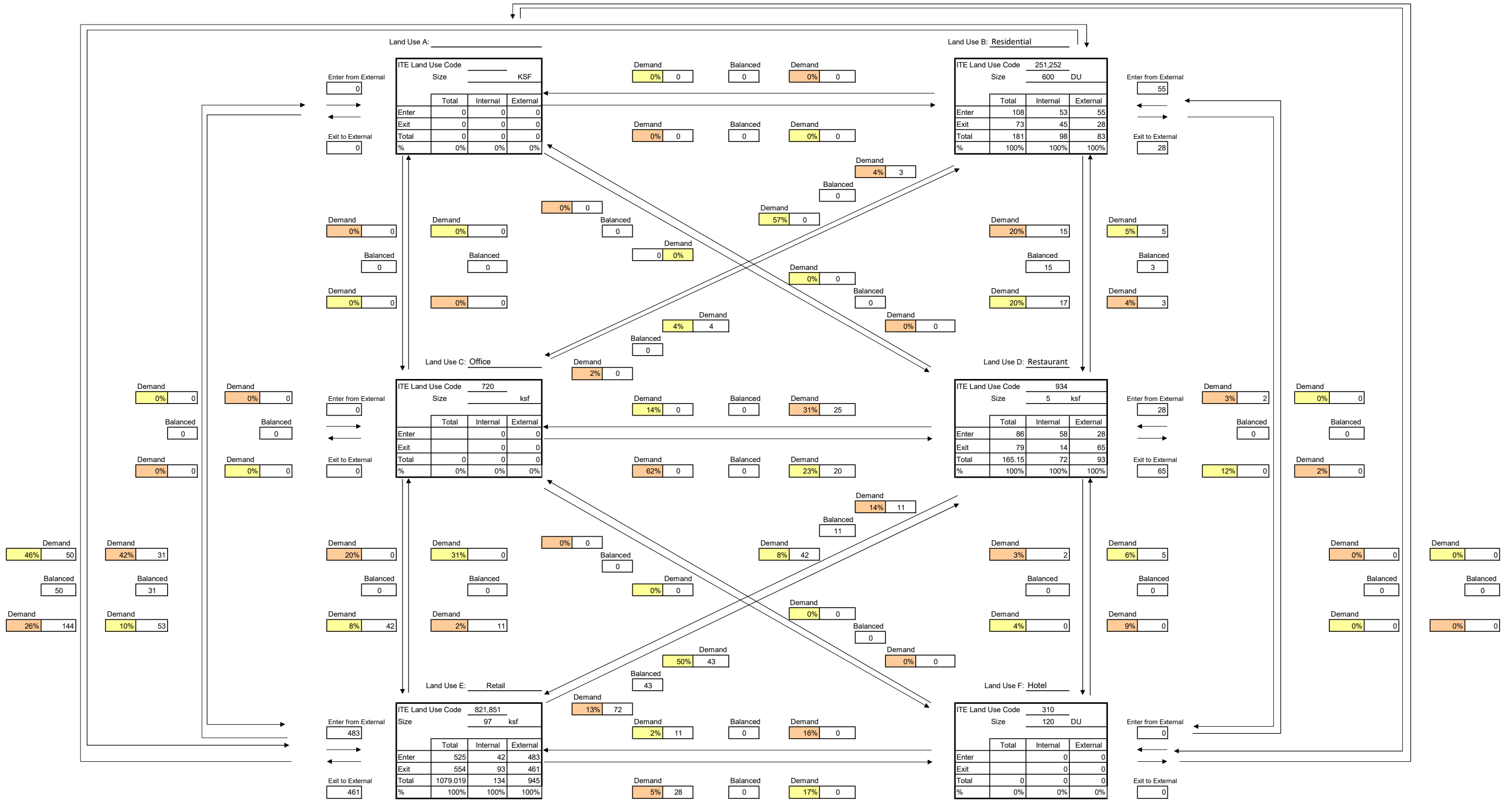
Net External Trips for Multi-Use Development

	Land Use A	Land Use B Residential	Land Use C Office	Land Use D Restaurant	Land Use E Retail	Land Use F Hotel	Total	Passer By	Net Trips
Enter	0	47	0	57	342	0	445	1	444
Exit	0	81	0	91	243	0	415	1	414
Sub-Total	0	127	0	148	585	0	860	2	858
Passer By Trips					2		2		
Total	0	127	0	148	583	0	858		858
Single-Use Trip Gen Estimate	0	152	0	223	639	0	1,014		

Internal Capture
154
15.2%

Source: Traffic Mobility Consultants, LLC, based on procedures from the ITE Trip Generation Handbook, 3rd Edition

Multi-Use Development Internal Capture Summary



Net External Trips for Multi-Use Development

	Land Use A	Land Use B	Land Use C	Land Use D	Land Use E	Land Use F	Total	Passer By	Net Trips
Enter	0	55	0	28	483	0	566	1	565
Exit	0	28	0	65	461	0	554	1	553
Sub-Total	0	83	0	93	945	0	1,121	2	1,119
Passer By Trips					2		2		
Total	0	83	0	93	943	0	1,119		1,119
Single-Use Trip Gen Estimate	0	181	0	165	1,079	0	1,425		

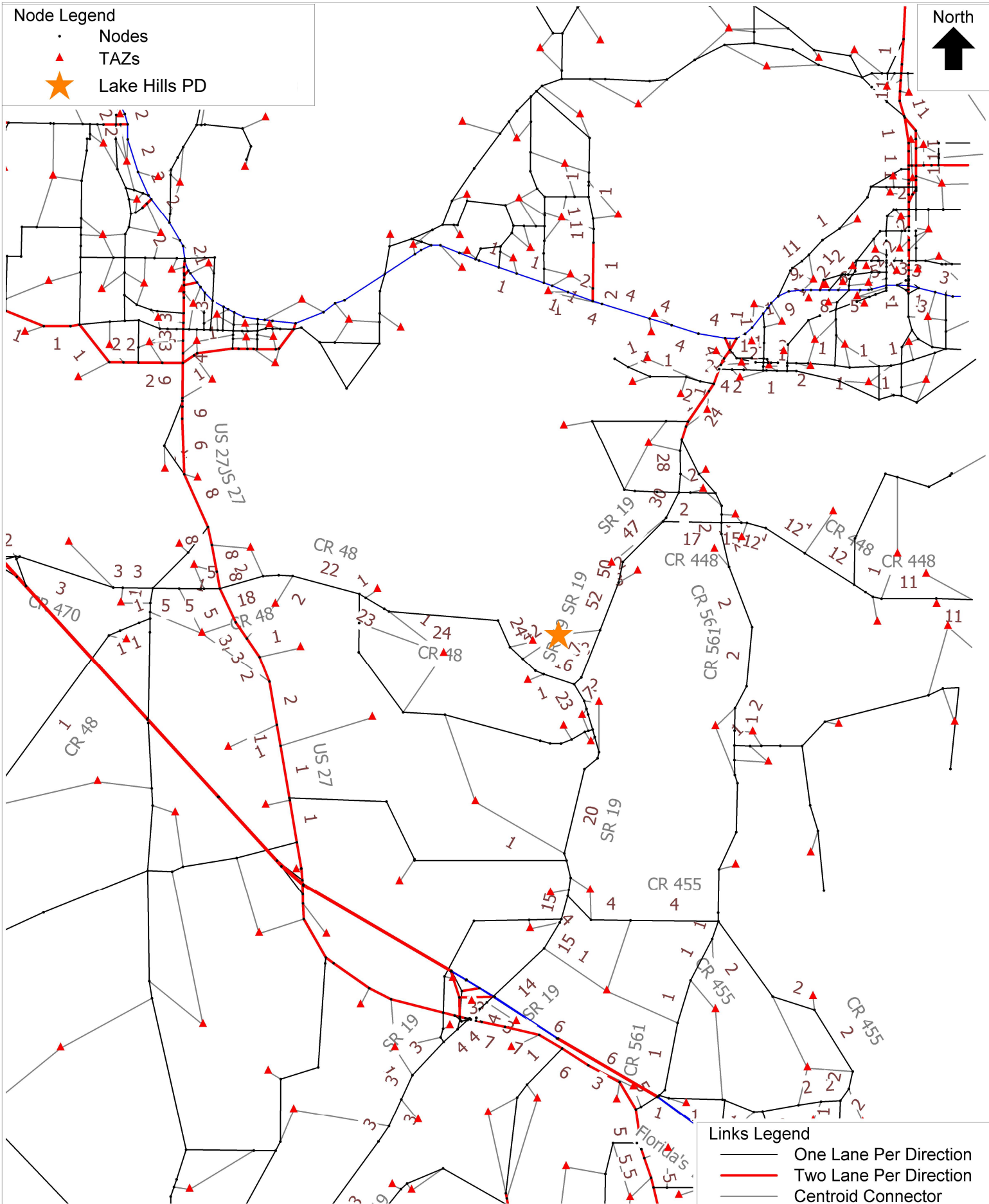
Internal Capture
304
21.4%

Source: Traffic Mobility Consultants, LLC, based on procedures from the ITE Trip Generation Handbook, 3rd Edition

Appendix G
CFRPM Model Output

Node Legend

- Nodes
- ▲ TAZs
- ★ Lake Hills PD



Links Legend

- One Lane Per Direction
- Two Lane Per Direction
- Centroid Connector

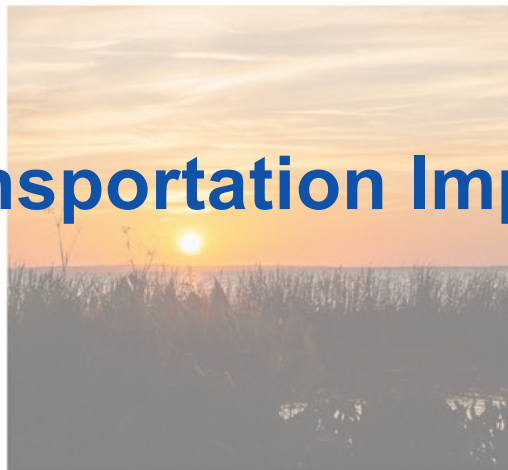
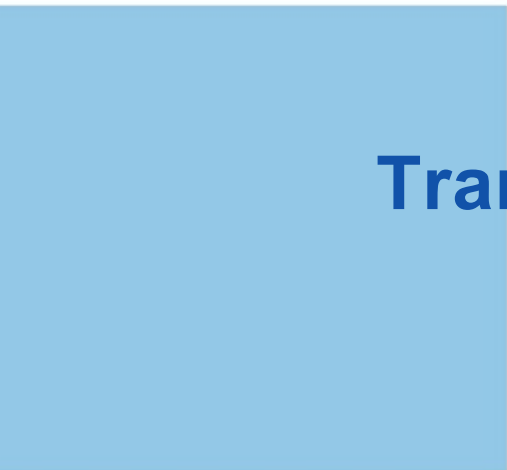
23103 Lake Hills PD Howey-In-The-Hills, FL - TAZ 7676
 CFRPM7 CF2025 Project Distribution

V2.0 C:\FSUTMS\D5\CFRPM7\Base\CF_2025\P21237\OUTPUT\HWYLOAD_SL_AllDay_A25.NET Wed 12 Jan 2022



(Licensed to)

Appendix H
Planned and Programmed Improvements



Transportation Improvement Program

FISCAL YEARS 2023-2027






APPROVED

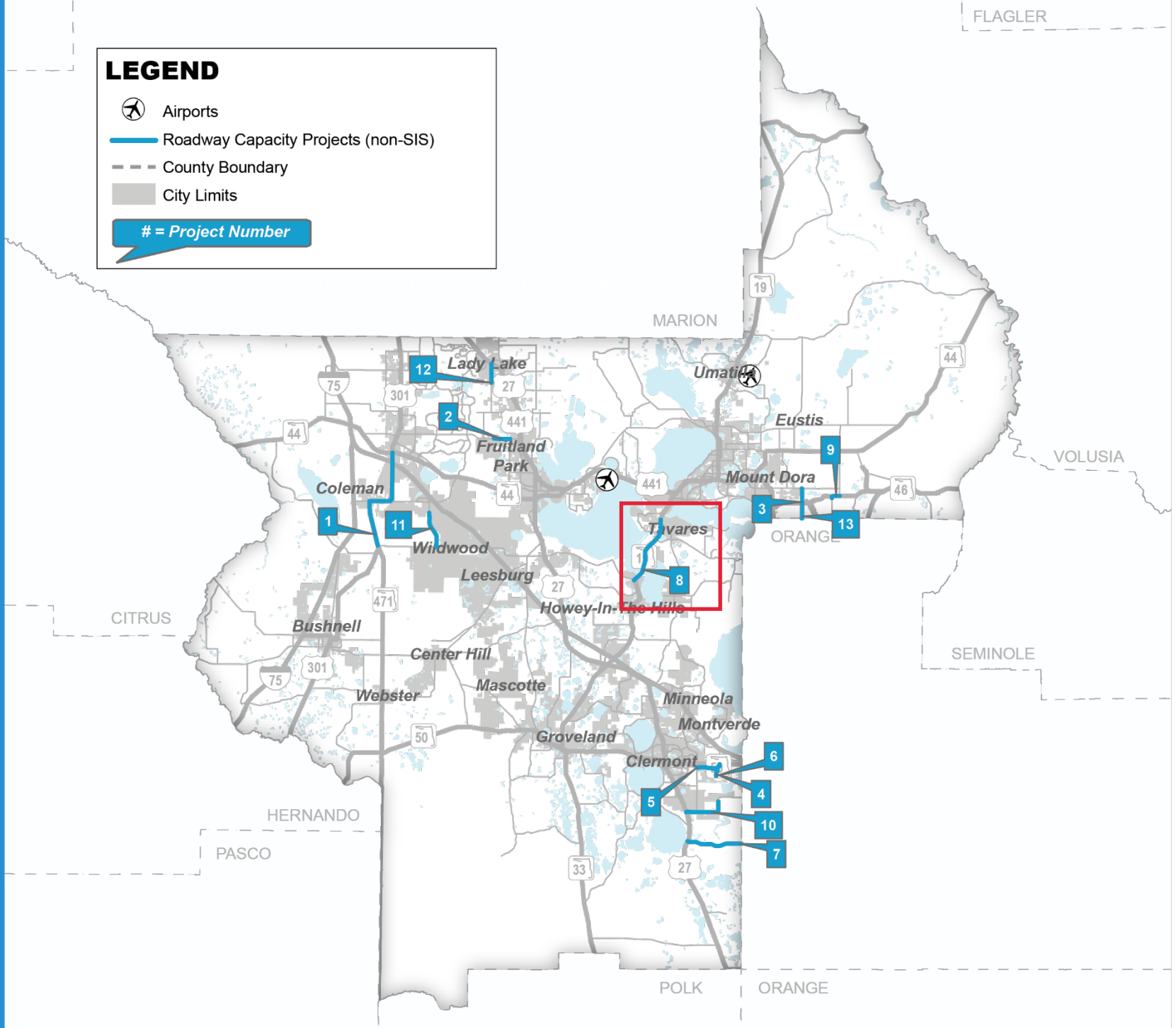
AMENDED

The preparation of this report was financed in part by the Federal Highway Administration, Federal Transit Administration, U.S. Department of Transportation, and local participating governments. The views and opinions of the report do not necessarily reflect the official views or policy of the U.S. Department of Transportation.

ROADWAY CAPACITY PROJECTS (NON-SIS)

LEGEND

-  Airports
-  Roadway Capacity Projects (non-SIS)
-  County Boundary
-  City Limits
-  # = Project Number



7

Project Description: WELLNESS WAY FROM US-27 TO THE LAKE/ORANGE COUNTY LINE FM# 4487331 Funding Source(s): Local and State
 Work Description: NEW ROAD CONSTRUCTION L RTP Page: PG. 4-12

Phase	<2023	2023	2024	2025	2026	2027	>2027	Amount Funded
PDE	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
PE	\$ -	\$ -	\$ 3,000,000	\$ -	\$ -	\$ -	\$ -	\$ 3,000,000
ENV	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
ROW	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
LAR	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
RRU	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
CST	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total	\$ -	\$ -	\$ 3,000,000	\$ -	\$ -	\$ -	\$ -	\$ 3,000,000
Responsible Agency: RESPONSIBLE AGENCY NOT AVAILABLE			County: LAKE			Total Project Cost: \$ 3,000,000		

8

Project Description: SR 19 FROM CR 48 TO CR 561 FM# 2383191 Funding Source(s): State and Federal
 Work Description: ADD LANES & RECONSTRUCT L RTP Page: PG. 4-12

Phase	<2023	2023	2024	2025	2026	2027	>2027	Amount Funded
PDE	\$ 1,161,015	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,161,015
PE	\$ 4,141,718	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,141,718
ENV	\$ 492,196	\$ 200,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 692,196
ROW	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
LAR	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
RRU	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
CST	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total	\$ 5,794,929	\$ 200,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5,994,929
Responsible Agency: FDOT			County: LAKE			Total Project Cost: \$ 5,994,929		



2022 List of Priority Projects

Lake~Sumter Metropolitan Planning Organization

Adopted June 22, 2022

Capacity Rank	Sponsor/ Location	FM #	Project Name	From	To	Description	Performance Measure(s)	Proposed Phase	Proposed Phase FY	Proposed Phase Cost	Programmed Phase(s)	Programmed Phase FY	CMP Congested Corridors 2021 Analysis (for informational purposes)
20	Lake County	-	Woodlea Road	SR 19	End	Road Widening	System Performance	Design Update/ ROW	2023/24	\$3,000,000			Operating at Acceptable Level of Service
21	FDOT/ Lake County	238319-1	SR 19	Howey Bridge	CR 561	Road Widening	System Performance	CST	2023/24	\$35,000,000			Extremely Congested (2021)
22	Lake County	-	Hancock Road	Hartwood Marsh Rd	Wellness Way	New Road	System Performance	CST	2025/26	\$20,000,000			New Roadway, Not on CMP Network
23	Lake County	-	SR 46A	SR 44	SR 46	Road Widening	System Performance	CST	2023/24	\$TBD	Design		Congested (2021)

Top 20 Project

The annual List of Priority Projects (LOPP) is a critical step in the process of planning, programming and implementing the highest priority transportation projects within the Lake~Sumter Metropolitan Planning Organization (LSMPO) planning area. The LOPP is the bridge between the Long-Range Transportation Plan and the annual selection of projects to program for funding in FDOT's Five-Year Work Program and LSMPO's Transportation Improvement Program (TIP).

- » Projects in the LOPP are the highest priority unfunded needs in the MPO area.
- » Each MPO is required to annually develop a LOPP and submit it to FDOT, along with the necessary project information.
- » The 2022 LOPP will be used by FDOT to determine projects that might be added to the FY 2023/24 – 2027/28 Tentative Five-Year Work Program. It will similarly guide LSMPO's development of the TIP for the same period.

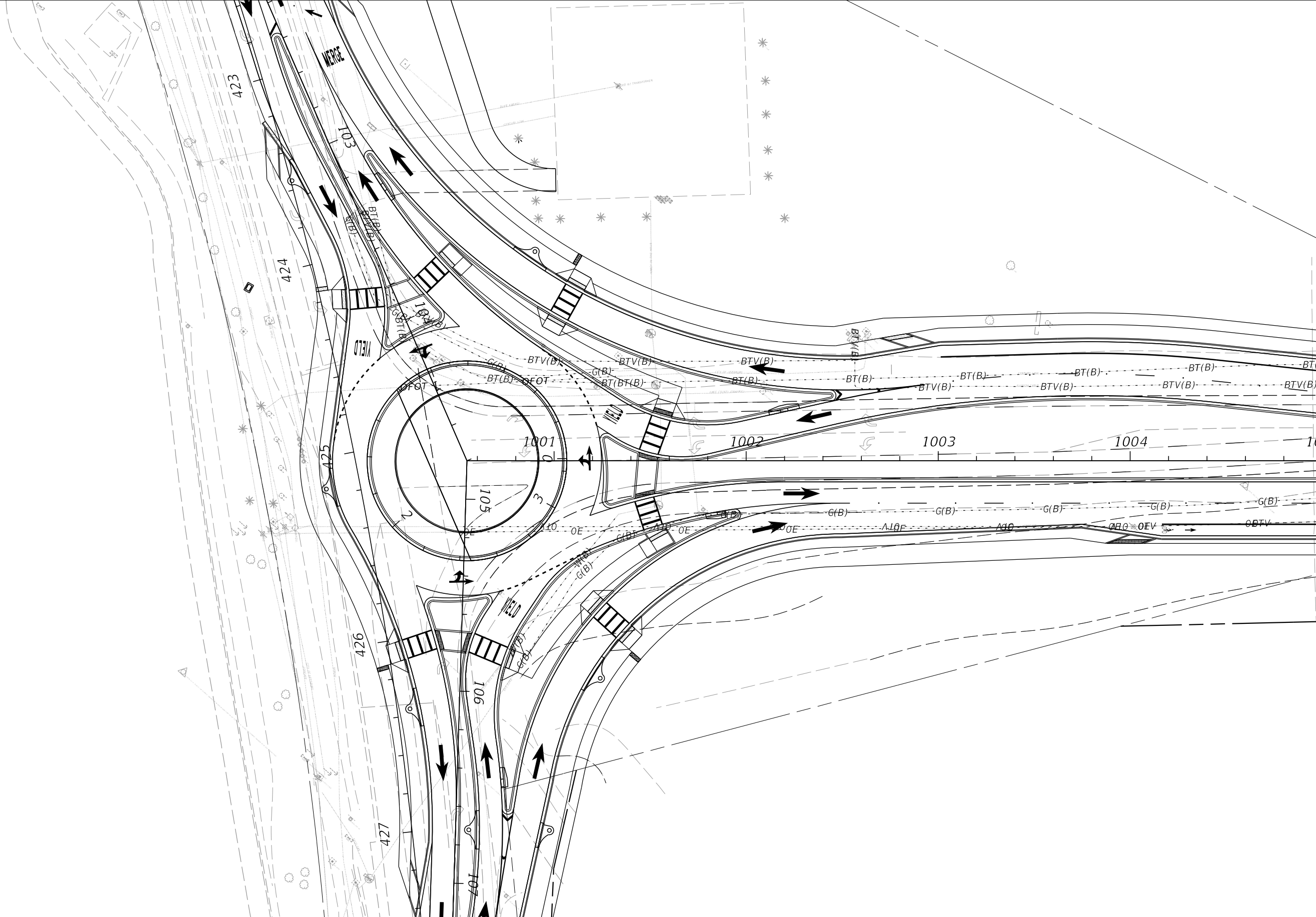
The LOPP Structure

The LSMPO LOPP is divided into two categories. Tier 1 consists of the Top 20 highest priority projects. Tier 2 includes other LSMPO priorities, categorized by phase, that have not yet advanced into Tier 1. Additionally, the LOPP includes special purpose lists for modal projects and, as needed, project lists for certain funding programs. The LOPP structure is:

- » **Tier 1**
 - Top 20 Priorities
- » **Tier 2**
 - Construction Project (CST) Priorities
 - Right-of-Way Acquisition (ROW) Priorities
 - Design Project Priorities
 - Project Development & Environment Study (PD&E) Priorities
 - Planning Study Priorities
- » **Special Purpose – Modal**
 - Trail Priorities – Combined list of all trail priorities in Tier 1 and Tier 2. Includes a separate ranking of trail projects as a group.
 - Transit Priorities
- » **Special Purpose – Funding Program Project Lists**
 - As warranted, lists of projects by certain funding programs will be included (see the Project Screening Form for more information)

MATCHLINE 1000+54.61 Ext. -254.61

MATCHLINE 1005+00.00



REVISIONS				NATHAN BALO, P.E. P.E. LICENSE NUMBER 70824 HORIZON ENGINEERING GROUP, INC. 2603 MAITLAND CENTER PARKWAY, SUITE B MAITLAND, FLORIDA 32751 CERTIFICATE OF AUTHORIZATION 00009544	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
				19	LAKE	238319-1-52-01	ROADWAY PLANS	

Appendix I
Surrounding Developments Committed Trips

PROPOSED DEVELOPMENT AND TRIP GENERATION

The proposed development is a 154-unit single family residential development in the City of Howey-in-the-Hills, Florida. A proposed site plan and its access configuration is shown in **Figure 3**. To determine the impact of this development on the area roadways, an analysis of its trip generation characteristics was made. This included the determination of the number of trips generated by the site and their distribution onto the surrounding roadways.

Trip Generation

The trip generation of the proposed development was calculated using rates obtained from the 10th Edition of the *Institute of Transportation Engineers (ITE) Trip Generation Manual*. This calculation is summarized in **Table 3**. The trip generation sheets are included in the study methodology.

Table 3
Trip Generation Summary

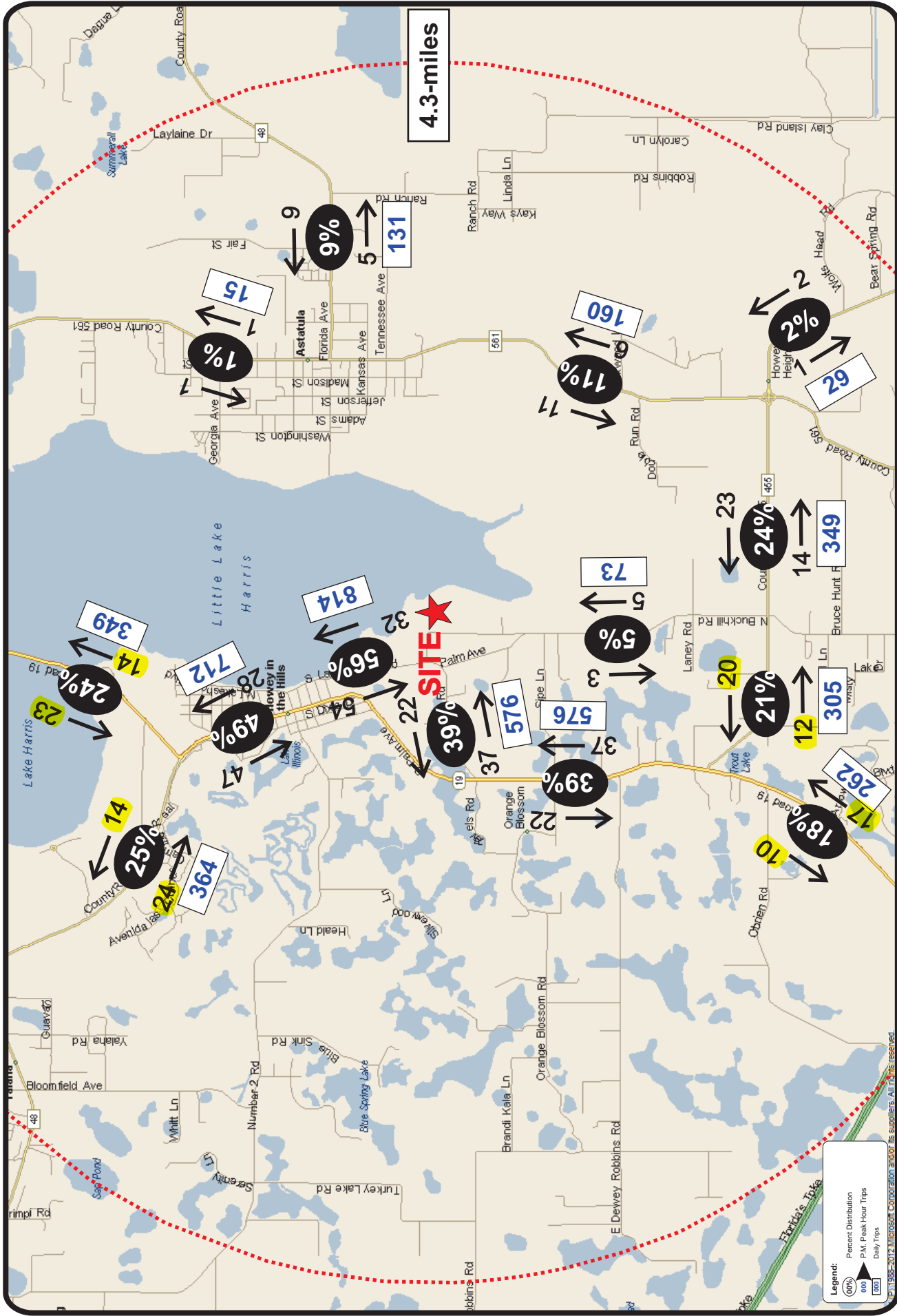
ITE Code	Land Use	Size	Daily Trips		P.M. Peak Hour Generation			
			Rate	Trips	Rate	Enter	Exit	Total
210	Single-Family Housing	154 Units	9.44	1,454	0.99	96	57	153
Total Trips				1,454	---	96	57	153

The proposed development is estimated to generate 1,454 daily trips and 153 P.M. peak hour trips, 96 entering and 57 exiting.

Trip Distribution/Trip Assignment

The distribution of the project trips within the study area was determined with the use of the Central Florida Regional Planning Model (CFRPM). Prior to use this model, a minor modification was made to add a traffic analysis zone (TAZ) representing the proposed development. Subsequently the model was run with a select zone analysis to determine a distribution pattern as shown in **Figure 4**. The model distribution plot is included in the study methodology. Utilizing this distribution pattern, the development's daily and P.M. peak hour trips were assigned to the area roadways also shown in Figure 4.

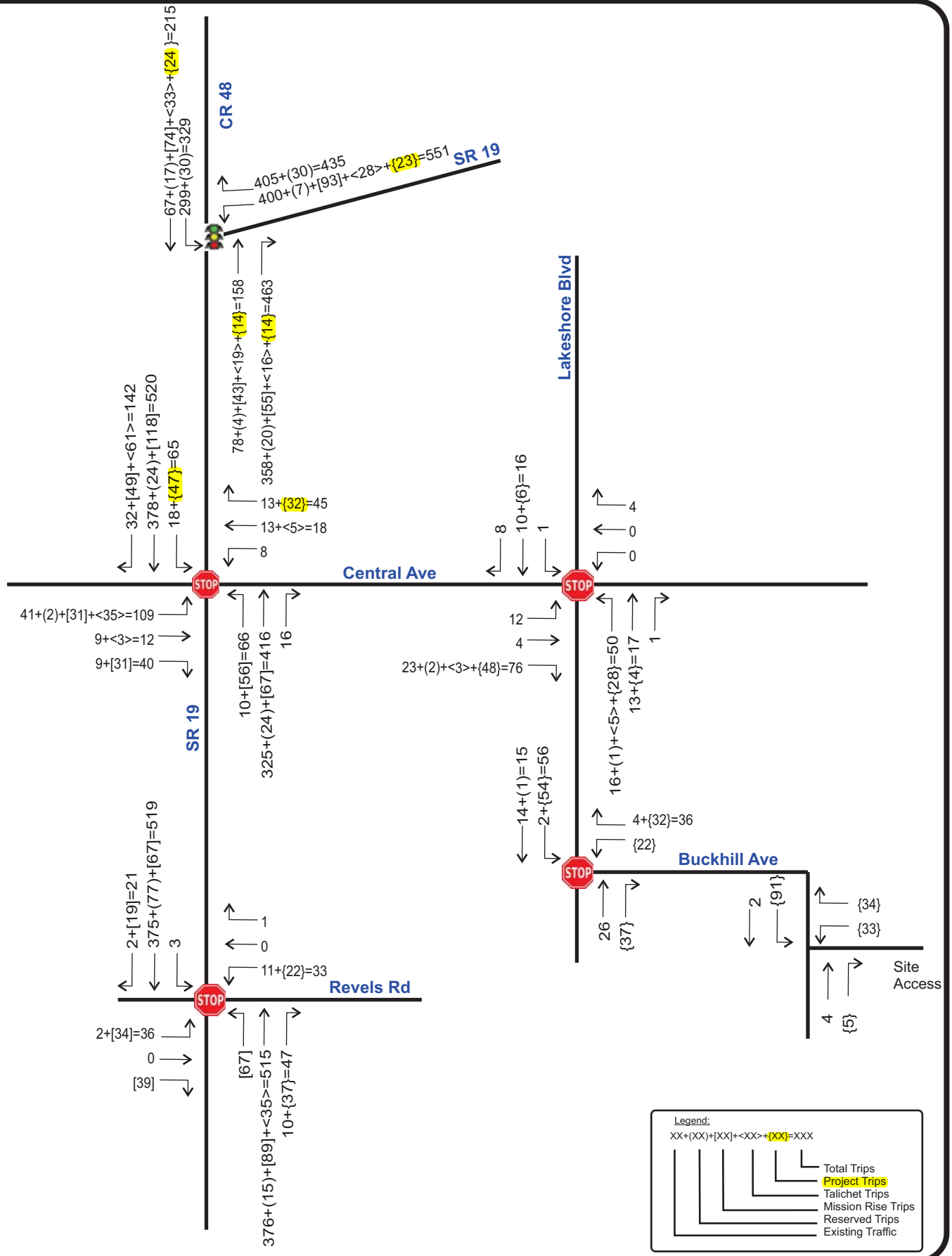




Trip Distribution/ Assignment

Whispering Hills
Project No 5199
Figure 4





PROPOSED DEVELOPMENT AND TRIP GENERATION

The proposed development comprises 165 single family units. To determine the impact of this development, an analysis of its trip generation characteristics was conducted. This included the determination of the trips to be generated as well as their distribution and assignment to the area roadways.

Trip Generation

Trip generation rates were obtained from the 10th Edition of the Institute of Transportation Engineers (ITE) *Trip Generation Manual*. **Table 3** provides a summary of the trip generation for the proposed development. As indicated, the proposed development is projected to generate 1,648 new daily trips, of which 165 trips will occur in the P.M. peak hour. **Appendix D** provides copies of the ITE trip generation graphs.

Table 3
Trip Generation Summary

ITE Code	Land Use	Size	Daily		AM Peak Hour				PM Peak Hour			
			Rate	Trips	Rate	Total	Enter	Exit	Rate	Total	Enter	Exit
210	Single Family	165 DUs	9.99	1,648	0.74	122	31	91	1.00	165	104	61

Notes:

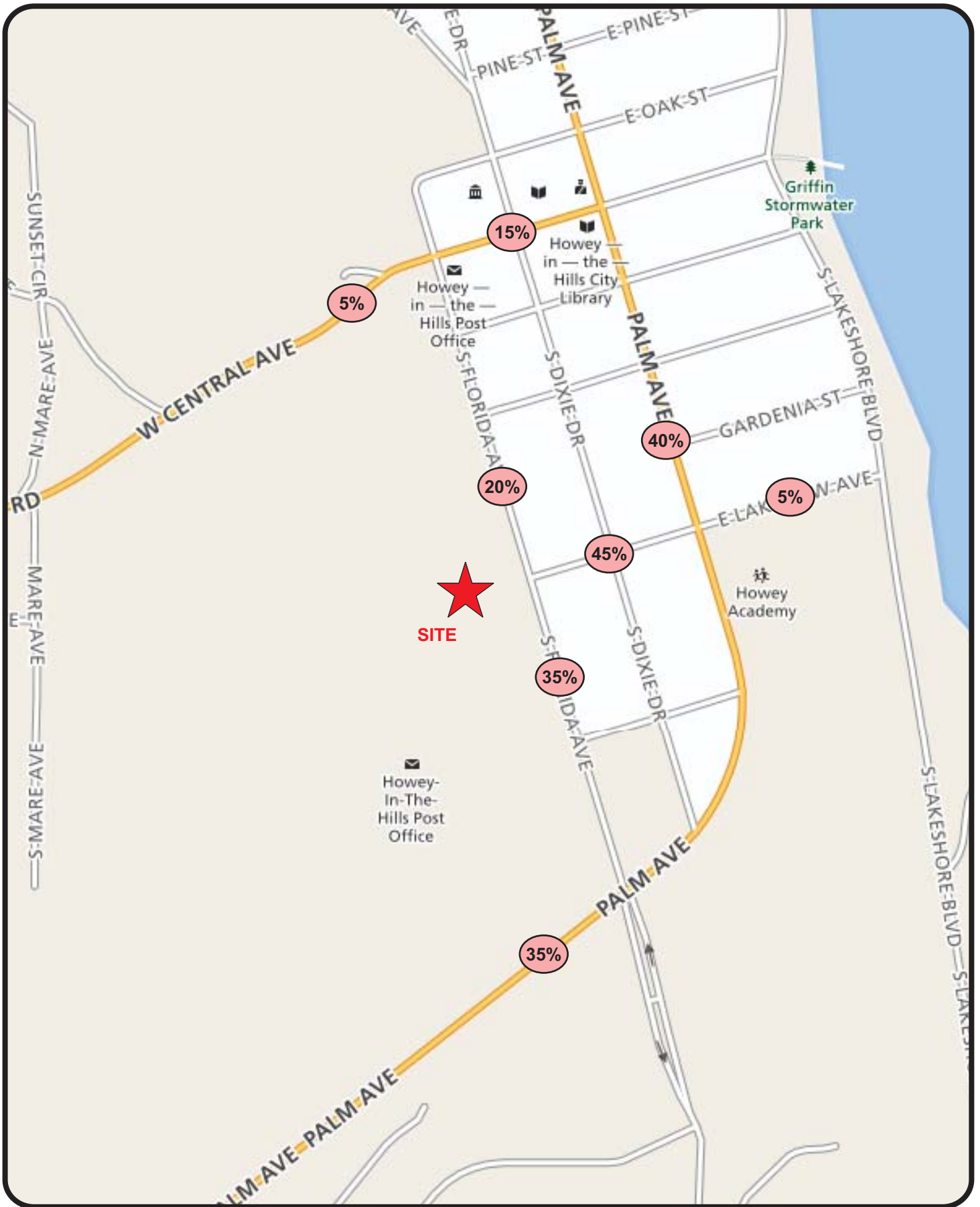
*Trip Generation analysis based on ITE Trip Generation Manual, 10th Edition
The ITE equations were used as the R-squared correlation coefficient was greater than 0.75*

As the P.M. peak hour volume is approximated 25% more that the A.M. peak hour volumes, in an effort to be conservative, the P.M. peak hour will be analyzed.

Trip Distribution / Trip Assignment

A trip distribution pattern was estimated using the currently adopted *Central Florida Regional Planning Model (CFRPM)*. A Select Zone Analysis (SZA) was conducted by modifying the 2020 interim year model network to include a Traffic Analysis Zone (TAZ) representing the proposed project and the model's socio-economic data updated to reflect the proposed project buildout. The resulting trip distribution model plot is provided in the **Appendix E**. Many of the local streets were not coded in the adopted model network; therefore, reasonable assumptions were made using engineering judgement to assign project traffic to these local streets. The distribution thus developed is illustrated in **Figure 3**. Utilizing this distribution, the development project trips will be assigned to the area roadways.

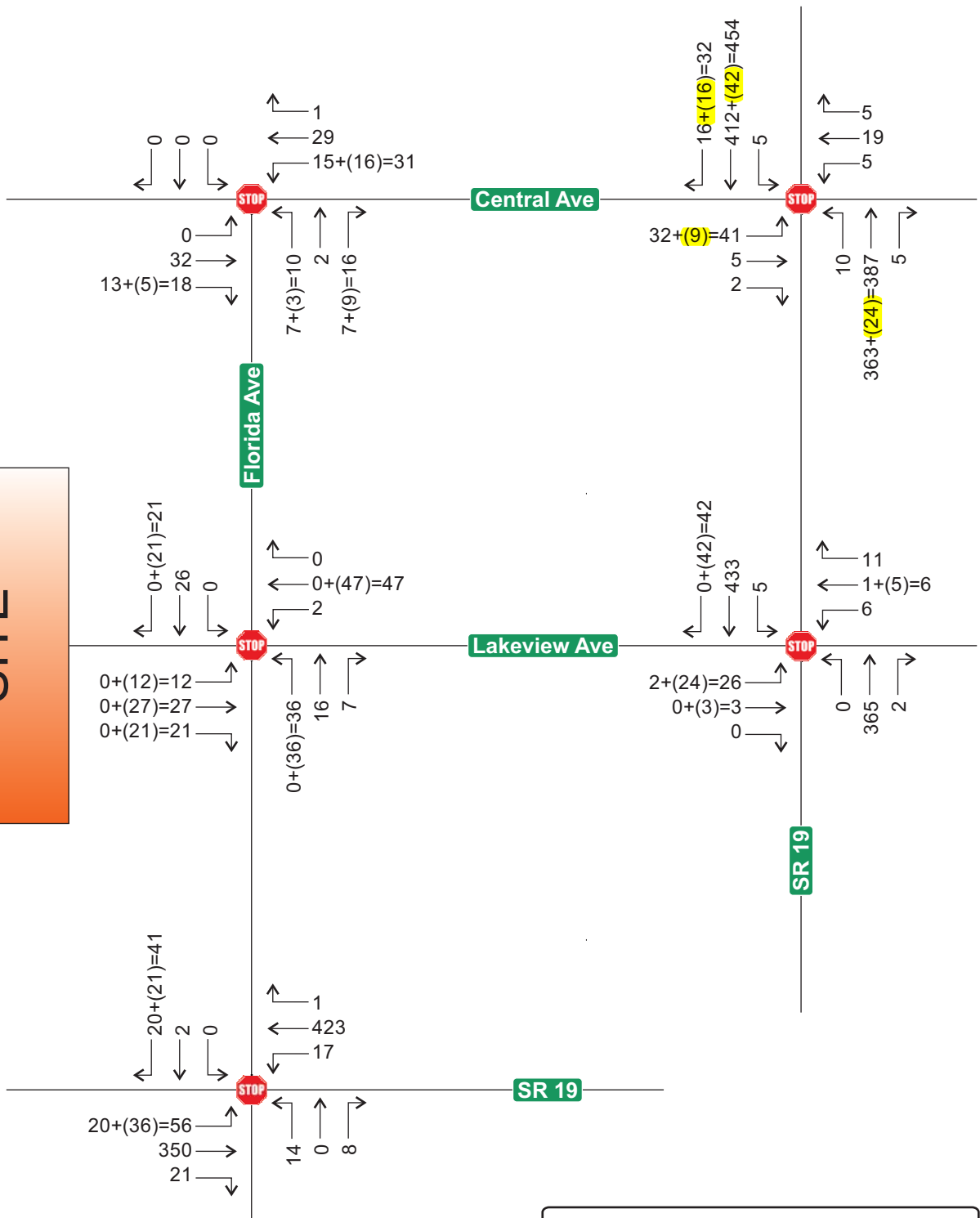




**Table 4
Projected Roadway Capacity Analysis**

Seg ID	Roadway	Segment	Lanes	LOS Stnd	PH Dir Capacity	Dir	Backg'd Vol	Trip Dist	Project Vol	% Sig.	Total Vol	Projected LOS
3030	SR 19	CR 561 to LAKE HARRIS NORTH END	2	D	1,190	NB/EB	1,121	28.0%	17	1.43%	1,138	D
						SB/WB	1,071		29	2.44%	1,100	D
3040	SR 19	LAKE HARRIS NORTH END to CR 48	2	C	850	NB/EB	451	28.0%	17	2.00%	468	C
						SB/WB	497		29	3.41%	526	C
3050	SR 19	CR 48 to CENTRAL AVENUE	2	C	710	NB/EB	328	65.0%	40	5.63%	368	C
						SB/WB	287		68	9.58%	355	C
3060	SR 19	CENTRAL AVENUE to CR 455	2	C	850	NB/EB	328	35.0%	36	4.24%	364	B
						SB/WB	287		21	2.47%	308	B
3070	SR 19	CR 455 to US 27 / SR 25	2	C	850	NB/EB	312	22.0%	23	2.71%	335	B
						SB/WB	354		13	1.53%	367	B
1250	C.R. 48	LIME AVENUE to SR 19	2	D	792	NB/EB	372	32.0%	33	4.17%	405	C
						SB/WB	318		20	2.53%	338	C





Legend:
 XX+(XX)=XXX
 Total Traffic
 Project Trips
 Background Traffic

*Schematic drawing. Not to scale.
 ** Any +/- 1 project trip discrepancy is due to rounding





To: Ron Roberts
From: Turgut Dervish, P.E.
Date: June 4, 2021
RE: Talichet Traffic Study Update
TPD # 5045

The Talichet project has already been constructed and platted with 93 single family units. You are now proposing to add 20 net additional lots to Talichet bringing the total to 113 units. The original traffic study was conducted for 132 single family units. Since the current Talichet project is less than 132 units, its impact on the area roadways would be less than the original plan. **Table 1** is a summary calculation of daily and A.M./P.M. peak hour trips for the three development scenarios for Talichet. As can be seen, the current proposed plan will generate less daily and A.M./P.M. peak hour trips than the development included in the original study.

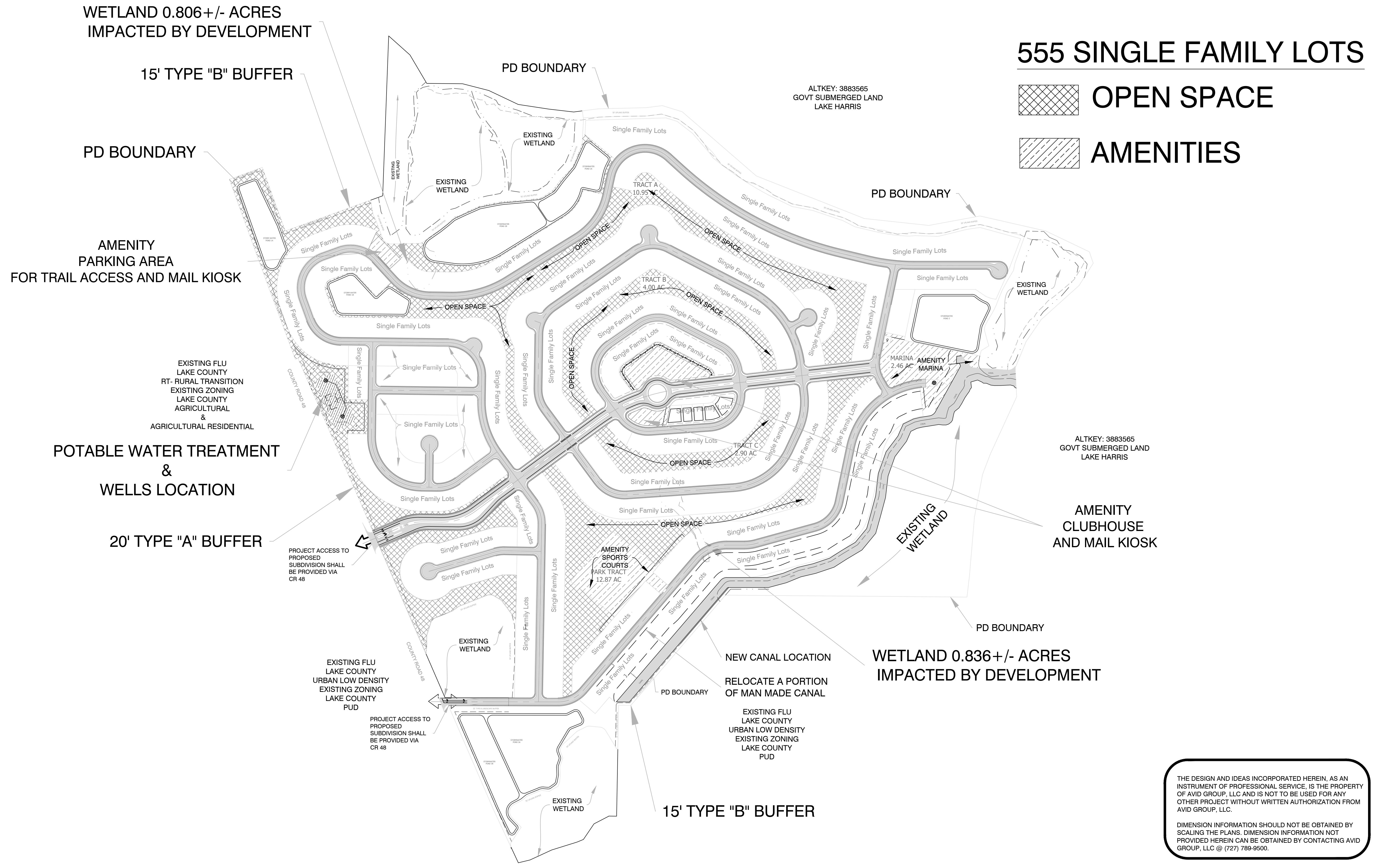
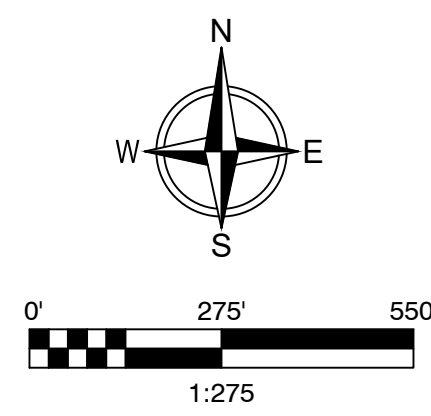
Table 1
Trip Generation Summary

ITE Code	Land Use	Size (DU)	Daily		A.M. Peak Hour				P.M. Peak Hour			
			Rate	Trips	Rate	Enter	Exit	Total	Rate	Enter	Exit	Total
Original Plan												
210	Single Family	132	10.17	1,342	0.75	25	74	99	1.00	83	49	132
Constructed Plan												
210	Single Family	93	10.46	972	0.76	18	52	70	1.02	60	35	95
Current Proposed Plan												
210	Single Family	113	10.30	1,164	0.75	21	64	85	1.01	72	42	114

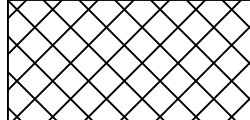
Please call if you have questions or need additional information.

DRAKE POINT SUBDIVISION LAND USE PLAN

LAKE COUNTY, FLORIDA
SECTION 15, TOWNSHIP 20 SOUTH, RANGE 25 EAST
SECTION 22, TOWNSHIP 20 SOUTH, RANGE 25 EAST



555 SINGLE FAMILY LOTS

 **OPEN SPACE**

 **AMENITIES**

11	NOT VALID WITHOUT ORIGINAL PROFESSIONAL SEAL AND SIGNATURE	DATE	04/22/2021
10		NO.	1
9		DATE	
8		NO.	1
7		DATE	
6		NO.	1
5		DATE	
4		NO.	1
3		DATE	
2		NO.	1
1		DATE	
		NO.	1
		DATE	

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 LAND PLANNING
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AVID GROUP
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 PALM HARBOR, FLORIDA 34883
 PHONE (727) 789-9500
 FAX (727) 789-9500
 WWW.AVIDGROUP.COM

GP REAL ESTATE
 CIVIL ENGINEERING
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AVID GROUP
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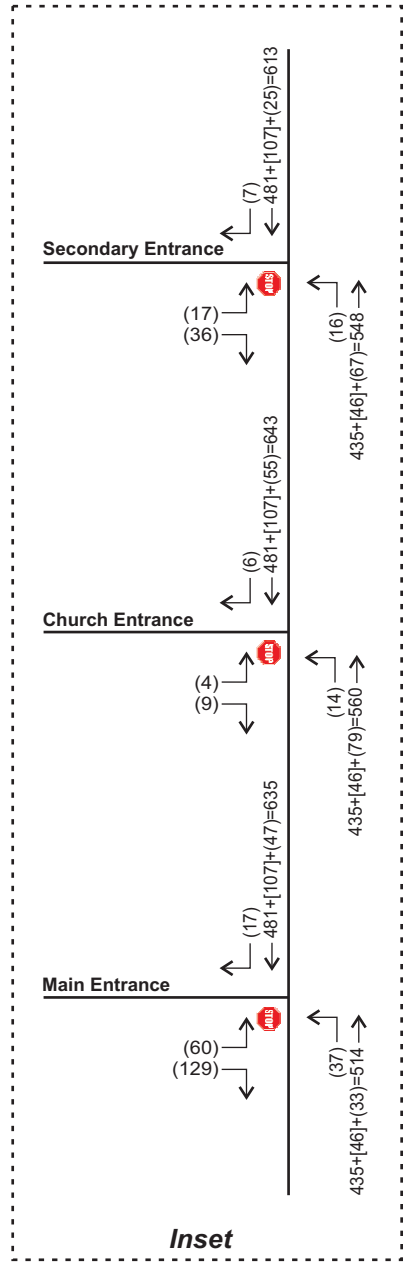
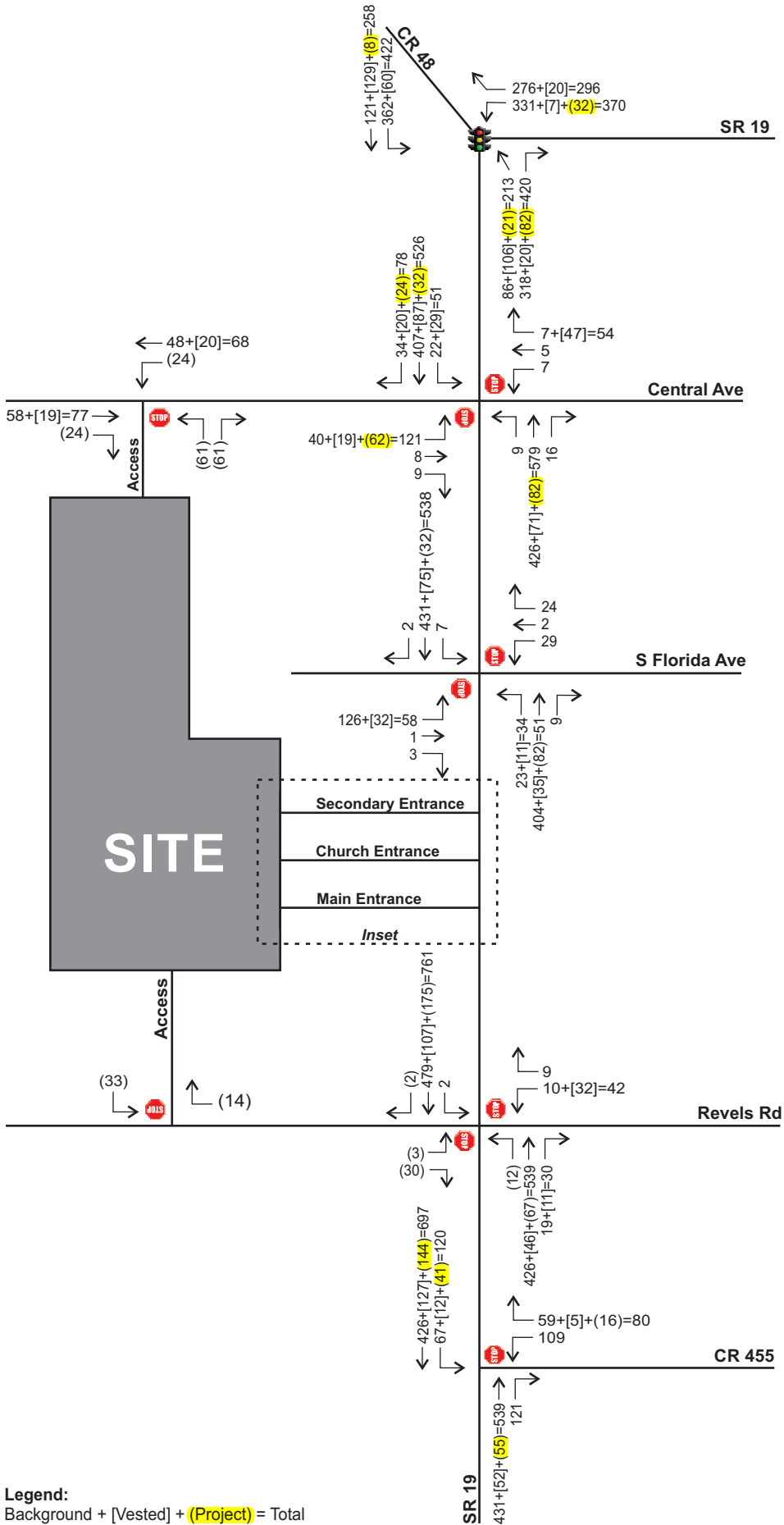
DRAKE POINT SUBDIVISION
 Lake County, Florida
LUP

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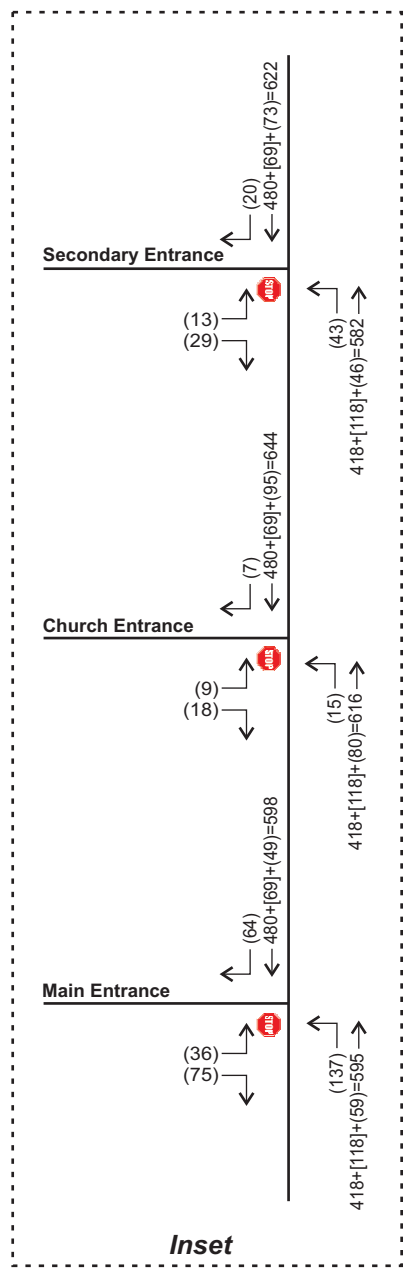
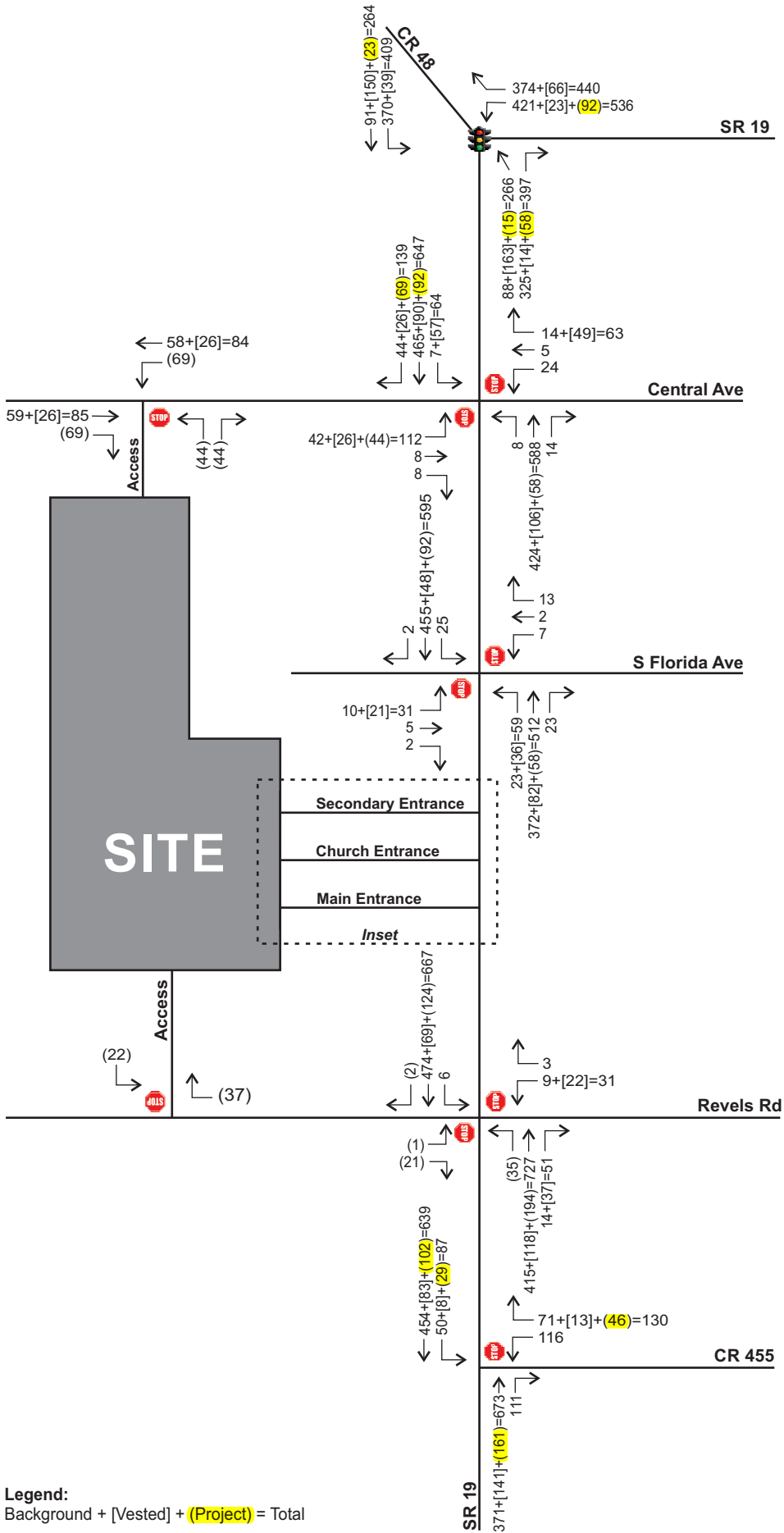
Legend:
 Background + [Vested] + (Project) = Total



Projected AM Peak Intersection Volumes
 The Reserve at Howey in the Hills
 21082



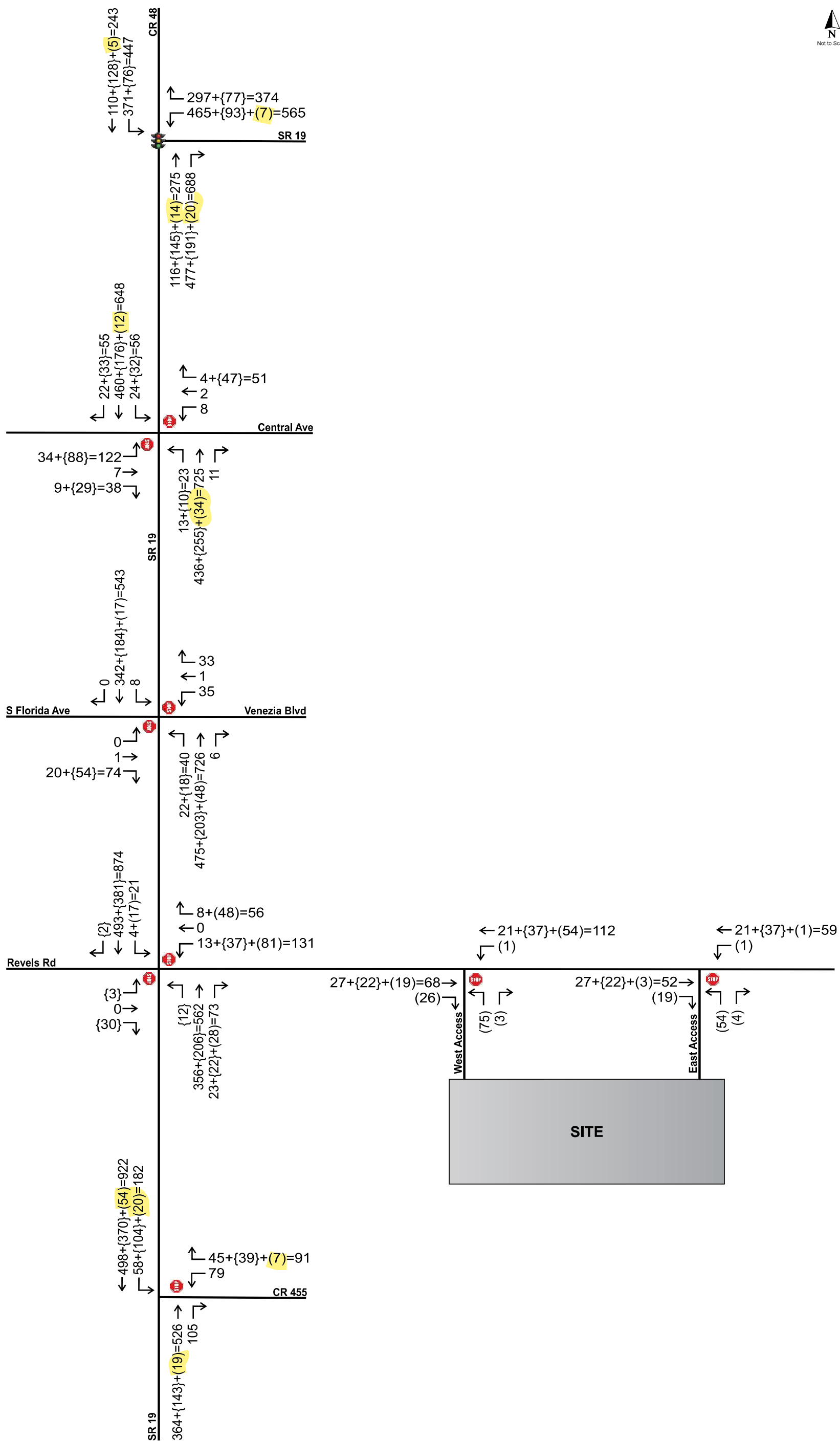
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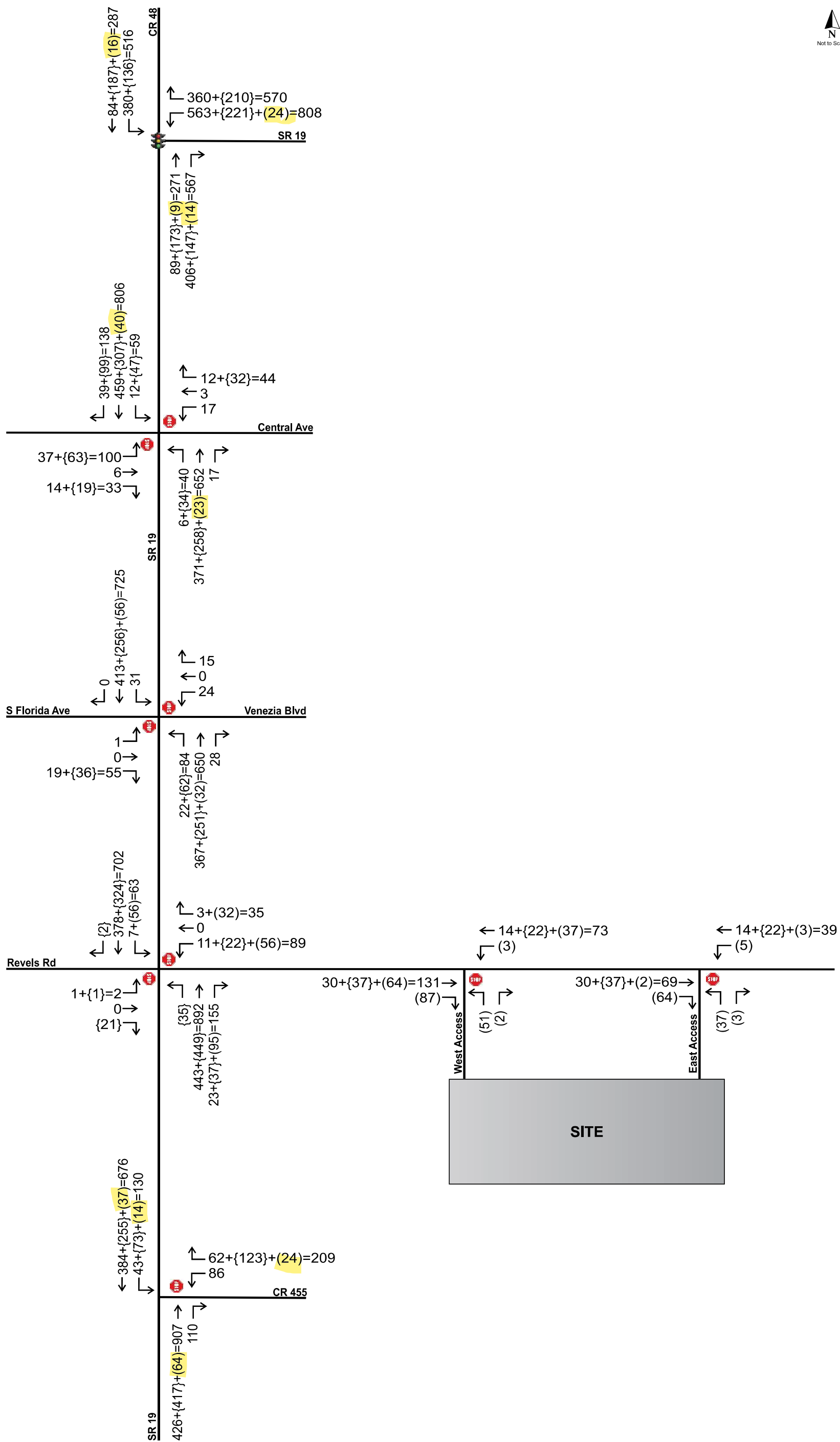
Legend:
 Background + [Vested] + (Project) = Total



Projected PM Peak Intersection Volumes
 The Reserve at Howey in the Hills
 21082



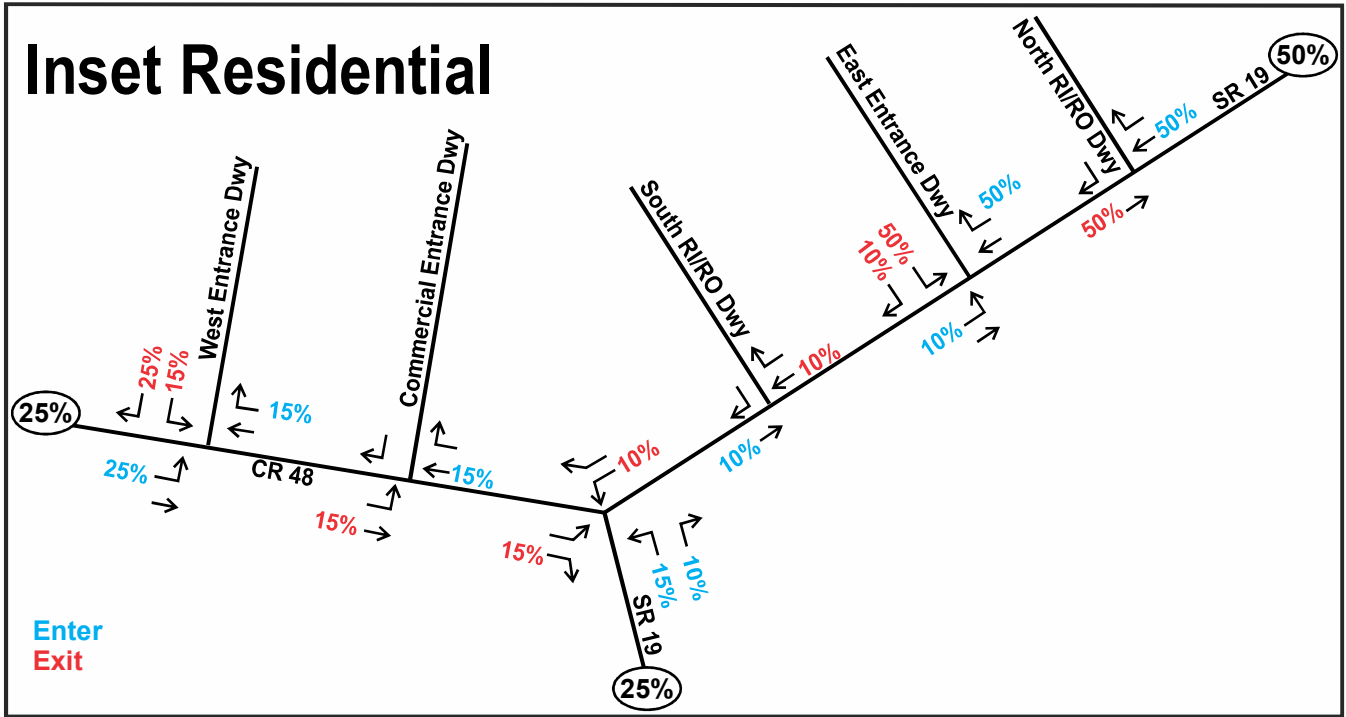
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Background + {Committed} + (Project) = Total



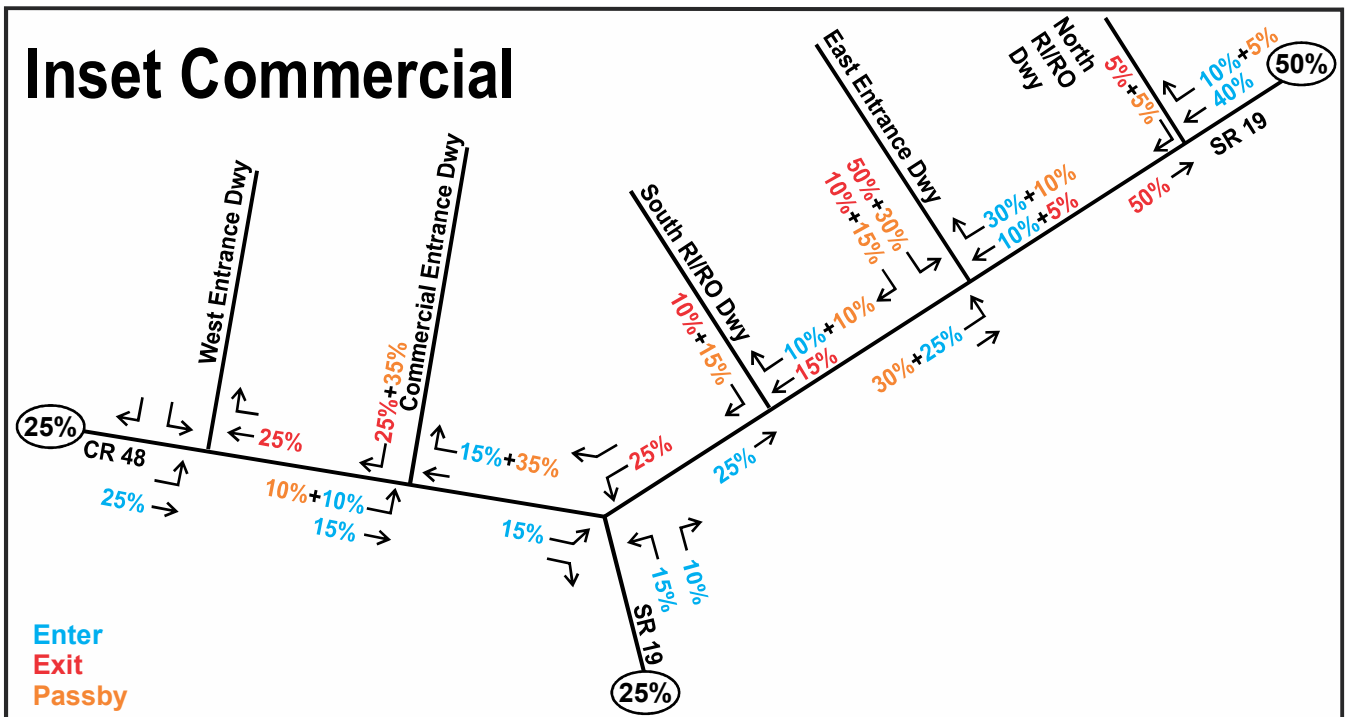
Legend:
Background + {Committed} + (Project) = Total

Appendix J
Intersection Volume Projections

Inset Residential



Inset Commercial



Appendix K
HCM Worksheets - Projected Conditions

Intersection						
Int Delay, s/veh	5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↕	↖	↗	↕
Traffic Vol, veh/h	98	105	544	123	173	681
Future Vol, veh/h	98	105	544	123	173	681
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	0	-	440	450	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	17	5	5	12	4	4
Mvmt Flow	107	114	591	134	188	740

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1707	591	0	0	725
Stage 1	591	-	-	-	-
Stage 2	1116	-	-	-	-
Critical Hdwy	6.57	6.25	-	-	4.14
Critical Hdwy Stg 1	5.57	-	-	-	-
Critical Hdwy Stg 2	5.57	-	-	-	-
Follow-up Hdwy	3.653	3.345	-	-	2.236
Pot Cap-1 Maneuver	~ 92	501	-	-	869
Stage 1	525	-	-	-	-
Stage 2	293	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	~ 72	501	-	-	869
Mov Cap-2 Maneuver	173	-	-	-	-
Stage 1	525	-	-	-	-
Stage 2	230	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	33.7	0	2.1
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	173	501	869
HCM Lane V/C Ratio	-	-	0.616	0.228	0.216
HCM Control Delay (s)	-	-	54.4	14.3	10.3
HCM Lane LOS	-	-	F	B	B
HCM 95th %tile Q(veh)	-	-	3.4	0.9	0.8

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	5.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↑	↗	↘	↑
Traffic Vol, veh/h	98	118	596	123	186	733
Future Vol, veh/h	98	118	596	123	186	733
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	0	-	440	450	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	17	5	5	12	4	4
Mvmt Flow	107	128	648	134	202	797

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1849	648	0	0	782	0
Stage 1	648	-	-	-	-	-
Stage 2	1201	-	-	-	-	-
Critical Hdwy	6.57	6.25	-	-	4.14	-
Critical Hdwy Stg 1	5.57	-	-	-	-	-
Critical Hdwy Stg 2	5.57	-	-	-	-	-
Follow-up Hdwy	3.653	3.345	-	-	2.236	-
Pot Cap-1 Maneuver	~ 75	465	-	-	827	-
Stage 1	493	-	-	-	-	-
Stage 2	266	-	-	-	-	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	~ 57	465	-	-	827	-
Mov Cap-2 Maneuver	151	-	-	-	-	-
Stage 1	493	-	-	-	-	-
Stage 2	201	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	41.2	0	2.2
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	151	465	827
HCM Lane V/C Ratio	-	-	0.705	0.276	0.244
HCM Control Delay (s)	-	-	71.9	15.7	10.8
HCM Lane LOS	-	-	F	C	B
HCM 95th %tile Q(veh)	-	-	4.1	1.1	1

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	8.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↑	↗	↘	↑
Traffic Vol, veh/h	153	203	745	167	128	594
Future Vol, veh/h	153	203	745	167	128	594
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	0	-	440	450	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	7	1	1	4	0	2
Mvmt Flow	161	214	784	176	135	625

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1679	784	0	0	960
Stage 1	784	-	-	-	-
Stage 2	895	-	-	-	-
Critical Hdwy	6.47	6.21	-	-	4.1
Critical Hdwy Stg 1	5.47	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-
Follow-up Hdwy	3.563	3.309	-	-	2.2
Pot Cap-1 Maneuver	~ 101	395	-	-	725
Stage 1	441	-	-	-	-
Stage 2	391	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	~ 82	395	-	-	725
Mov Cap-2 Maneuver	205	-	-	-	-
Stage 1	441	-	-	-	-
Stage 2	318	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	42.5	0	2
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	205	395	725
HCM Lane V/C Ratio	-	-	0.786	0.541	0.186
HCM Control Delay (s)	-	-	66.7	24.3	11.1
HCM Lane LOS	-	-	F	C	B
HCM 95th %tile Q(veh)	-	-	5.5	3.1	0.7

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	11.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘	↗	↑	↗	↘	↑
Traffic Vol, veh/h	153	221	816	167	145	662
Future Vol, veh/h	153	221	816	167	145	662
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	0	-	440	450	-
Veh in Median Storage, #	1	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	7	1	1	4	0	2
Mvmt Flow	161	233	859	176	153	697

Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1862	859	0	0	1035	0
Stage 1	859	-	-	-	-	-
Stage 2	1003	-	-	-	-	-
Critical Hdwy	6.47	6.21	-	-	4.1	-
Critical Hdwy Stg 1	5.47	-	-	-	-	-
Critical Hdwy Stg 2	5.47	-	-	-	-	-
Follow-up Hdwy	3.563	3.309	-	-	2.2	-
Pot Cap-1 Maneuver	~ 78	358	-	-	679	-
Stage 1	407	-	-	-	-	-
Stage 2	347	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 60	358	-	-	679	-
Mov Cap-2 Maneuver	174	-	-	-	-	-
Stage 1	407	-	-	-	-	-
Stage 2	269	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	61.1	0	2.1
HCM LOS	F		













Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	174	358	679
HCM Lane V/C Ratio	-	-	0.926	0.65	0.225
HCM Control Delay (s)	-	-	103.3	31.9	11.8
HCM Lane LOS	-	-	F	D	B
HCM 95th %tile Q(veh)	-	-	7	4.4	0.9

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th Signalized Intersection Summary

2: SR 19 & CR 48













Background AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	424	351	197	558	361	188
Future Volume (veh/h)	424	351	197	558	361	188
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	1811	1722	1781	1856	1707	1767
Adj Flow Rate, veh/h	456	377	212	0	388	202
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	6	12	8	3	13	9
Cap, veh/h	392	331	688		301	1124
Arrive On Green	0.23	0.23	0.39	0.00	0.19	0.64
Sat Flow, veh/h	1725	1459	1781	1572	1626	1767
Grp Volume(v), veh/h	456	377	212	0	388	202
Grp Sat Flow(s),veh/h/ln	1725	1459	1781	1572	1626	1767
Q Serve(g_s), s	22.7	22.7	8.3	0.0	18.5	4.7
Cycle Q Clear(g_c), s	22.7	22.7	8.3	0.0	18.5	4.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	392	331	688		301	1124
V/C Ratio(X)	1.16	1.14	0.31		1.29	0.18
Avail Cap(c_a), veh/h	392	331	688		301	1124
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	38.7	38.6	21.4	0.0	40.7	7.5
Incr Delay (d2), s/veh	98.5	92.2	1.2	0.0	153.1	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	29.4	24.4	6.2	0.0	30.5	2.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	137.2	130.9	22.6	0.0	193.9	7.8
LnGrp LOS	F	F	C		F	A
Approach Vol, veh/h	833		212	A		590
Approach Delay, s/veh	134.3		22.6			130.2
Approach LOS	F		C			F
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	25.0	45.0		30.0		70.0
Change Period (Y+Rc), s	6.5	6.4		7.3		6.4
Max Green Setting (Gmax), s	18.5	38.6		22.7		38.6
Max Q Clear Time (g_c+I1), s	20.5	10.3		24.7		6.7
Green Ext Time (p_c), s	0.0	1.1		0.0		1.0
Intersection Summary						
HCM 6th Ctrl Delay			118.3			
HCM 6th LOS			F			
Notes						
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.						

HCM 6th Signalized Intersection Summary

2: SR 19 & CR 48

Projected AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	476	351	236	584	393	201
Future Volume (veh/h)	476	351	236	584	393	201
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	1811	1722	1781	1856	1707	1767
Adj Flow Rate, veh/h	512	377	254	0	423	216
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	6	12	8	3	13	9
Cap, veh/h	392	331	688		301	1124
Arrive On Green	0.23	0.23	0.39	0.00	0.19	0.64
Sat Flow, veh/h	1725	1459	1781	1572	1626	1767
Grp Volume(v), veh/h	512	377	254	0	423	216
Grp Sat Flow(s),veh/h/ln	1725	1459	1781	1572	1626	1767
Q Serve(g_s), s	22.7	22.7	10.2	0.0	18.5	5.1
Cycle Q Clear(g_c), s	22.7	22.7	10.2	0.0	18.5	5.1
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	392	331	688		301	1124
V/C Ratio(X)	1.31	1.14	0.37		1.41	0.19
Avail Cap(c_a), veh/h	392	331	688		301	1124
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	38.7	38.6	22.0	0.0	40.7	7.5
Incr Delay (d2), s/veh	155.8	92.2	1.5	0.0	201.6	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	39.3	24.4	7.7	0.0	37.0	3.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	194.5	130.9	23.5	0.0	242.3	7.9
LnGrp LOS	F	F	C		F	A
Approach Vol, veh/h	889		254	A		639
Approach Delay, s/veh	167.5		23.5			163.1
Approach LOS	F		C			F
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	25.0	45.0		30.0		70.0
Change Period (Y+Rc), s	6.5	6.4		7.3		6.4
Max Green Setting (Gmax), s	18.5	38.6		22.7		38.6
Max Q Clear Time (g_c+I1), s	20.5	12.2		24.7		7.1
Green Ext Time (p_c), s	0.0	1.3		0.0		1.1
Intersection Summary						
HCM 6th Ctrl Delay			145.4			
HCM 6th LOS			F			

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Roundabout
2: SR 19 & CR 48













Projected Mitigation AM Peak Hour

Intersection							
Intersection Delay, s/veh 11.2							
Intersection LOS B							
Approach	WB		NB		SB		
Entry Lanes	2		2		2		
Conflicting Circle Lanes	1		1		1		
Adj Approach Flow, veh/h	889		882		639		
Demand Flow Rate, veh/h	965		921		713		
Vehicles Circulating, veh/h	274		478		543		
Vehicles Exiting, veh/h	1125		778		696		
Ped Vol Crossing Leg, #/h	0		0		0		
Ped Cap Adj	1.000		1.000		1.000		
Approach Delay, s/veh	8.6		13.9		11.2		
Approach LOS	A		B		B		
Lane	Left	Right	Left	Right	Left	Right	
Designated Moves	L	TR	LT	R	L	TR	
Assumed Moves	L	TR	LT	R	L	TR	
RT Channelized							
Lane Util	0.563	0.437	0.298	0.702	0.670	0.330	
Follow-Up Headway, s	2.535	2.535	2.535	2.535	2.535	2.535	
Critical Headway, s	4.544	4.544	4.544	4.544	4.544	4.544	
Entry Flow, veh/h	543	422	274	647	478	235	
Cap Entry Lane, veh/h	1107	1107	919	919	866	866	
Entry HV Adj Factor	0.943	0.893	0.926	0.971	0.885	0.917	
Flow Entry, veh/h	512	377	254	628	423	216	
Cap Entry, veh/h	1043	989	851	892	767	795	
V/C Ratio	0.491	0.381	0.298	0.704	0.552	0.271	
Control Delay, s/veh	9.2	7.8	7.5	16.5	13.1	7.6	
LOS	A	A	A	C	B	A	
95th %tile Queue, veh	3	2	1	6	3	1	

HCM 6th Signalized Intersection Summary

2: SR 19 & CR 48

Background PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	533	500	200	467	415	216
Future Volume (veh/h)	533	500	200	467	415	216
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	1856	1841	1885	1841	1826	1856
Adj Flow Rate, veh/h	573	362	215	0	446	232
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	4	1	4	5	3
Cap, veh/h	401	354	728		322	1180
Arrive On Green	0.23	0.23	0.39	0.00	0.19	0.64
Sat Flow, veh/h	1767	1560	1885	1560	1739	1856
Grp Volume(v), veh/h	573	362	215	0	446	232
Grp Sat Flow(s),veh/h/ln	1767	1560	1885	1560	1739	1856
Q Serve(g_s), s	22.7	22.7	7.9	0.0	18.5	5.2
Cycle Q Clear(g_c), s	22.7	22.7	7.9	0.0	18.5	5.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	401	354	728		322	1180
V/C Ratio(X)	1.43	1.02	0.30		1.39	0.20
Avail Cap(c_a), veh/h	401	354	728		322	1180
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	38.7	38.7	21.3	0.0	40.8	7.6
Incr Delay (d2), s/veh	206.7	53.6	1.0	0.0	192.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	49.3	19.7	6.3	0.0	38.0	3.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	245.4	92.3	22.3	0.0	232.8	7.9
LnGrp LOS	F	F	C		F	A
Approach Vol, veh/h	935		215	A		678
Approach Delay, s/veh	186.1		22.3			155.9
Approach LOS	F		C			F
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	25.0	45.0		30.0		70.0
Change Period (Y+Rc), s	6.5	6.4		7.3		6.4
Max Green Setting (Gmax), s	18.5	38.6		22.7		38.6
Max Q Clear Time (g_c+I1), s	20.5	9.9		24.7		7.2
Green Ext Time (p_c), s	0.0	1.1		0.0		1.2
Intersection Summary						
HCM 6th Ctrl Delay			155.6			
HCM 6th LOS			F			













Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

2: SR 19 & CR 48

Projected PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	609	500	254	502	456	225
Future Volume (veh/h)	609	500	254	502	456	225
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	1856	1841	1885	1841	1826	1856
Adj Flow Rate, veh/h	655	362	273	0	490	242
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	4	1	4	5	3
Cap, veh/h	401	354	728		322	1180
Arrive On Green	0.23	0.23	0.39	0.00	0.19	0.64
Sat Flow, veh/h	1767	1560	1885	1560	1739	1856
Grp Volume(v), veh/h	655	362	273	0	490	242
Grp Sat Flow(s),veh/h/ln	1767	1560	1885	1560	1739	1856
Q Serve(g_s), s	22.7	22.7	10.4	0.0	18.5	5.5
Cycle Q Clear(g_c), s	22.7	22.7	10.4	0.0	18.5	5.5
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	401	354	728		322	1180
V/C Ratio(X)	1.63	1.02	0.38		1.52	0.21
Avail Cap(c_a), veh/h	401	354	728		322	1180
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	38.7	38.7	22.0	0.0	40.8	7.6
Incr Delay (d2), s/veh	295.9	53.6	1.5	0.0	250.7	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	65.5	19.7	8.1	0.0	46.4	3.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	334.6	92.3	23.5	0.0	291.5	8.0
LnGrp LOS	F	F	C		F	A
Approach Vol, veh/h	1017		273	A		732
Approach Delay, s/veh	248.3		23.5			197.7
Approach LOS	F		C			F
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	25.0	45.0		30.0		70.0
Change Period (Y+Rc), s	6.5	6.4		7.3		6.4
Max Green Setting (Gmax), s	18.5	38.6		22.7		38.6
Max Q Clear Time (g_c+I1), s	20.5	12.4		24.7		7.5
Green Ext Time (p_c), s	0.0	1.4		0.0		1.3
Intersection Summary						
HCM 6th Ctrl Delay			199.7			
HCM 6th LOS			F			

Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 2010 Roundabout
2: SR 19 & CR 48

Projected with Mitigation PM Peak Hour

Intersection						
Intersection Delay, s/veh						
24.6						
Intersection LOS						
C						
Approach	WB		NB		SB	
Entry Lanes	2		2		2	
Conflicting Circle Lanes	1		1		1	
Adj Approach Flow, veh/h	1193		813		732	
Demand Flow Rate, veh/h	1235		838		763	
Vehicles Circulating, veh/h	276		514		675	
Vehicles Exiting, veh/h	1076		924		836	
Follow-Up Headway, s	3.186		3.186		3.186	
Ped Vol Crossing Leg, #/h	0		0		0	
Ped Cap Adj	1.000		1.000		1.000	
Approach Delay, s/veh	19.2		24.3		33.7	
Approach LOS	C		C		D	
Lane	Left	Right	Left	Right	Left	Right
Designated Moves	L	TR	LT	R	L	TR
Assumed Moves	L	TR	LT	R	L	TR
RT Channelized						
Lane Util	0.547	0.453	0.329	0.671	0.674	0.326
Critical Headway, s	5.193	5.193	5.193	5.193	5.193	5.193
Entry Flow, veh/h	675	560	276	562	514	249
Cap Entry Lane, veh/h	857	857	676	676	575	575
Entry HV Adj Factor	0.970	0.961	0.990	0.961	0.953	0.971
Flow Entry, veh/h	655	538	273	540	490	242
Cap Entry, veh/h	832	824	669	649	548	559
V/C Ratio	0.787	0.653	0.408	0.832	0.893	0.433
Control Delay, s/veh	22.2	15.5	11.1	31.1	43.7	13.4
LOS	C	C	B	D	E	B
95th %tile Queue, veh	8	5	2	9	10	2

HCM 6th Signalized Intersection Summary

3: SR 19 & CR 448

Background AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗	↖	↗	↖	↗
Traffic Volume (veh/h)	10	4	6	173	6	13	9	831	225	58	545	4
Future Volume (veh/h)	10	4	6	173	6	13	9	831	225	58	545	4
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	1900	1900	1900	1693	1900	1648	1900	1841	1663	1900	1826	1900
Adj Flow Rate, veh/h	11	4	5	186	6	10	10	894	242	62	586	2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	0	0	14	0	17	0	4	16	0	5	0
Cap, veh/h	332	136	170	312	113	189	23	951	728	86	1006	3
Arrive On Green	0.18	0.18	0.18	0.18	0.18	0.18	0.01	0.52	0.52	0.05	0.55	0.55
Sat Flow, veh/h	1419	768	960	1272	640	1067	1810	1841	1409	1810	1819	6
Grp Volume(v), veh/h	11	0	9	186	0	16	10	894	242	62	0	588
Grp Sat Flow(s),veh/h/ln	1419	0	1727	1272	0	1708	1810	1841	1409	1810	0	1825
Q Serve(g_s), s	0.5	0.0	0.3	11.1	0.0	0.6	0.4	35.6	7.8	2.6	0.0	16.6
Cycle Q Clear(g_c), s	1.1	0.0	0.3	11.4	0.0	0.6	0.4	35.6	7.8	2.6	0.0	16.6
Prop In Lane	1.00		0.56	1.00		0.63	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	332	0	306	312	0	302	23	951	728	86	0	1009
V/C Ratio(X)	0.03	0.00	0.03	0.60	0.00	0.05	0.44	0.94	0.33	0.72	0.00	0.58
Avail Cap(c_a), veh/h	589	0	617	546	0	617	336	1002	767	334	0	1009
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	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.1	0.0	26.6	31.3	0.0	26.7	38.3	17.7	11.0	36.7	0.0	11.5
Incr Delay (d2), s/veh	0.0	0.0	0.0	1.8	0.0	0.1	13.0	15.6	0.3	10.9	0.0	0.9
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	0.3	0.0	0.2	5.9	0.0	0.4	0.5	21.8	3.5	2.4	0.0	8.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.2	0.0	26.6	33.1	0.0	26.8	51.3	33.3	11.3	47.6	0.0	12.4
LnGrp LOS	C	A	C	C	A	C	D	C	B	D	A	B
Approach Vol, veh/h		20			202			1146			650	
Approach Delay, s/veh		26.9			32.6			28.8			15.7	
Approach LOS		C			C			C			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.5	50.7		20.9	9.3	47.8		20.9				
Change Period (Y+Rc), s	5.5	7.5		* 7.1	* 5.6	7.5		* 7.1				
Max Green Setting (Gmax), s	41.5	42.5		* 28	* 14	42.5		* 28				
Max Q Clear Time (g_c+1), s	12.4	18.6		13.4	4.6	37.6		3.1				
Green Ext Time (p_c), s	0.0	3.3		0.5	0.1	2.7		0.0				

Intersection Summary

HCM 6th Ctrl Delay	24.9
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

3: SR 19 & CR 448

Projected AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	4	6	225	6	13	9	910	277	58	623	4
Future Volume (veh/h)	10	4	6	225	6	13	9	910	277	58	623	4
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	1900	1900	1900	1693	1900	1648	1900	1841	1663	1900	1826	1900
Adj Flow Rate, veh/h	11	4	5	242	6	10	10	978	298	62	670	2
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	0	0	14	0	17	0	4	16	0	5	0
Cap, veh/h	385	168	210	358	140	234	22	918	703	82	970	3
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.01	0.50	0.50	0.05	0.53	0.53
Sat Flow, veh/h	1419	768	960	1272	640	1067	1810	1841	1409	1810	1819	5
Grp Volume(v), veh/h	11	0	9	242	0	16	10	978	298	62	0	672
Grp Sat Flow(s),veh/h/ln	1419	0	1727	1272	0	1708	1810	1841	1409	1810	0	1825
Q Serve(g_s), s	0.5	0.0	0.3	15.7	0.0	0.6	0.5	42.5	11.4	2.9	0.0	23.2
Cycle Q Clear(g_c), s	1.2	0.0	0.3	16.1	0.0	0.6	0.5	42.5	11.4	2.9	0.0	23.2
Prop In Lane	1.00		0.56	1.00		0.63	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	385	0	378	358	0	374	22	918	703	82	0	972
V/C Ratio(X)	0.03	0.00	0.02	0.68	0.00	0.04	0.45	1.06	0.42	0.76	0.00	0.69
Avail Cap(c_a), veh/h	539	0	566	501	0	565	308	918	703	306	0	972
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(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.7	0.0	26.1	32.4	0.0	26.2	41.8	21.3	13.6	40.2	0.0	14.7
Incr Delay (d2), s/veh	0.0	0.0	0.0	2.2	0.0	0.0	13.3	48.6	0.4	13.3	0.0	2.1
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/lr	0.3	0.0	0.3	8.3	0.0	0.4	0.5	37.0	5.5	2.7	0.0	12.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.7	0.0	26.2	34.7	0.0	26.3	55.1	69.9	14.0	53.5	0.0	16.8
LnGrp LOS	C	A	C	C	A	C	E	F	B	D	A	B
Approach Vol, veh/h		20			258			1286			734	
Approach Delay, s/veh		26.5			34.2			56.8			19.9	
Approach LOS		C			C			E			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.6	52.9		25.7	9.4	50.0		25.7				
Change Period (Y+Rc), s	5.5	7.5		* 7.1	* 5.6	7.5		* 7.1				
Max Green Setting (Gmax), s	41.5	42.5		* 28	* 14	42.5		* 28				
Max Q Clear Time (g_c+1), s	12.5	25.2		18.1	4.9	44.5		3.2				
Green Ext Time (p_c), s	0.0	3.6		0.6	0.1	0.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay	42.2
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

3: SR 19 & CR 448

Background PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	12	15	253	15	33	12	670	216	59	817	10
Future Volume (veh/h)	11	12	15	253	15	33	12	670	216	59	817	10
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	1900	1900	1900	1885	1900	1900	1900	1885	1796	1900	1885	1900
Adj Flow Rate, veh/h	11	12	16	264	16	34	12	698	225	61	851	6
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	0	1	0	0	0	1	7	0	1	0
Cap, veh/h	380	171	228	398	125	266	27	865	698	86	921	6
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.01	0.46	0.46	0.05	0.49	0.49
Sat Flow, veh/h	1376	738	984	1393	542	1151	1810	1885	1522	1810	1870	13
Grp Volume(v), veh/h	11	0	28	264	0	50	12	698	225	61	0	857
Grp Sat Flow(s),veh/h/ln	1376	0	1723	1393	0	1693	1810	1885	1522	1810	0	1883
Q Serve(g_s), s	0.5	0.0	1.0	14.0	0.0	1.8	0.5	24.5	7.2	2.6	0.0	32.6
Cycle Q Clear(g_c), s	2.3	0.0	1.0	15.0	0.0	1.8	0.5	24.5	7.2	2.6	0.0	32.6
Prop In Lane	1.00		0.57	1.00		0.68	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	380	0	398	398	0	391	27	865	698	86	0	927
V/C Ratio(X)	0.03	0.00	0.07	0.66	0.00	0.13	0.45	0.81	0.32	0.71	0.00	0.92
Avail Cap(c_a), veh/h	561	0	626	587	0	621	341	1043	842	339	0	1041
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(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.3	0.0	23.1	29.0	0.0	23.4	37.5	17.9	13.2	36.1	0.0	18.2
Incr Delay (d2), s/veh	0.0	0.0	0.1	1.9	0.0	0.1	11.5	4.0	0.3	10.4	0.0	12.5
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(95%),veh/lr	0.3	0.0	0.7	7.9	0.0	1.2	0.5	14.4	3.7	2.3	0.0	20.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.3	0.0	23.2	30.9	0.0	23.5	49.0	21.9	13.5	46.4	0.0	30.7
LnGrp LOS	C	A	C	C	A	C	D	C	B	D	A	C
Approach Vol, veh/h		39			314			935			918	
Approach Delay, s/veh		23.5			29.7			20.2			31.7	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.6	45.3		24.9	9.2	42.7		24.9				
Change Period (Y+Rc), s	5.5	7.5		* 7.1	* 5.6	7.5		* 7.1				
Max Green Setting (Gmax), s	41.5	42.5		* 28	* 14	42.5		* 28				
Max Q Clear Time (g_c+1), s	12.5	34.6		17.0	4.6	26.5		4.3				
Green Ext Time (p_c), s	0.0	3.3		0.8	0.1	4.4		0.1				

Intersection Summary

HCM 6th Ctrl Delay	26.4
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

3: SR 19 & CR 448

Projected PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	12	15	324	15	33	12	772	284	59	924	10
Future Volume (veh/h)	11	12	15	324	15	33	12	772	284	59	924	10
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	1900	1900	1900	1885	1900	1900	1900	1885	1796	1900	1885	1900
Adj Flow Rate, veh/h	11	12	16	338	16	34	12	804	296	61	962	6
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	0	1	0	0	0	1	7	0	1	0
Cap, veh/h	430	204	272	448	149	318	26	856	691	80	907	6
Arrive On Green	0.28	0.28	0.28	0.28	0.28	0.28	0.01	0.45	0.45	0.04	0.48	0.48
Sat Flow, veh/h	1376	738	984	1393	542	1151	1810	1885	1522	1810	1871	12
Grp Volume(v), veh/h	11	0	28	338	0	50	12	804	296	61	0	968
Grp Sat Flow(s),veh/h/ln	1376	0	1723	1393	0	1693	1810	1885	1522	1810	0	1883
Q Serve(g_s), s	0.5	0.0	1.1	21.1	0.0	2.0	0.6	36.3	11.8	3.0	0.0	43.3
Cycle Q Clear(g_c), s	2.5	0.0	1.1	22.1	0.0	2.0	0.6	36.3	11.8	3.0	0.0	43.3
Prop In Lane	1.00		0.57	1.00		0.68	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	430	0	475	448	0	467	26	856	691	80	0	913
V/C Ratio(X)	0.03	0.00	0.06	0.75	0.00	0.11	0.46	0.94	0.43	0.77	0.00	1.06
Avail Cap(c_a), veh/h	480	0	538	504	0	535	294	897	725	292	0	913
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(l)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.1	0.0	23.8	31.9	0.0	24.1	43.7	23.2	16.5	42.2	0.0	23.0
Incr Delay (d2), s/veh	0.0	0.0	0.1	5.7	0.0	0.1	12.1	16.9	0.4	14.1	0.0	47.3
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	0.3	0.0	0.8	11.7	0.0	1.4	0.6	24.2	6.5	2.8	0.0	37.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.1	0.0	23.8	37.6	0.0	24.2	55.8	40.1	17.0	56.3	0.0	70.3
LnGrp LOS	C	A	C	D	A	C	E	D	B	E	A	F
Approach Vol, veh/h		39			388			1112			1029	
Approach Delay, s/veh		24.2			35.9			34.1			69.5	
Approach LOS		C			D			C			E	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.8	50.8		31.7	9.5	48.0		31.7				
Change Period (Y+Rc), s	5.5	7.5		* 7.1	* 5.6	7.5		* 7.1				
Max Green Setting (Gmax), s	41.5	42.5		* 28	* 14	42.5		* 28				
Max Q Clear Time (g_c+1), s	12.6	45.3		24.1	5.0	38.3		4.5				
Green Ext Time (p_c), s	0.0	0.0		0.5	0.1	2.3		0.1				

Intersection Summary

HCM 6th Ctrl Delay	48.4
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
4: SR 19 & Central Ave

Background AM Peak Hour

Intersection												
Int Delay, s/veh	35.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	97	3	18	15	4	61	10	637	9	65	463	47
Future Vol, veh/h	97	3	18	15	4	61	10	637	9	65	463	47
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	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	14	0	25	0	0	0	22	4	0	12	5	11
Mvmt Flow	109	3	20	17	4	69	11	716	10	73	520	53

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1473	1441	547	1447	1462	721	573	0	0	726	0	0
Stage 1	693	693	-	743	743	-	-	-	-	-	-	-
Stage 2	780	748	-	704	719	-	-	-	-	-	-	-
Critical Hdwy	7.24	6.5	6.45	7.1	6.5	6.2	4.32	-	-	4.22	-	-
Critical Hdwy Stg 1	6.24	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.24	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4	3.525	3.5	4	3.3	2.398	-	-	2.308	-	-
Pot Cap-1 Maneuver	~ 98	134	495	110	130	431	908	-	-	833	-	-
Stage 1	415	448	-	410	425	-	-	-	-	-	-	-
Stage 2	371	423	-	431	436	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	~ 71	114	495	92	111	431	908	-	-	833	-	-
Mov Cap-2 Maneuver	~ 71	114	-	92	111	-	-	-	-	-	-	-
Stage 1	407	390	-	402	417	-	-	-	-	-	-	-
Stage 2	302	415	-	357	379	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	404.7	29.5	0.1	1.1
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	908	-	-	83	235	833	-	-
HCM Lane V/C Ratio	0.012	-	-	1.597	0.383	0.088	-	-
HCM Control Delay (s)	9	0	-	404.7	29.5	9.7	0	-
HCM Lane LOS	A	A	-	F	D	A	A	-
HCM 95th %tile Q(veh)	0	-	-	10.8	1.7	0.3	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th TWSC
4: SR 19 & Central Ave

Projected AM Peak Hour

Intersection												
Int Delay, s/veh	51.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	97	3	18	15	4	61	10	702	9	65	528	47
Future Vol, veh/h	97	3	18	15	4	61	10	702	9	65	528	47
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	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	14	0	25	0	0	0	22	4	0	12	5	11
Mvmt Flow	109	3	20	17	4	69	11	789	10	73	593	53

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1619	1587	620	1593	1608	794	646	0	0	799	0	0
Stage 1	766	766	-	816	816	-	-	-	-	-	-	-
Stage 2	853	821	-	777	792	-	-	-	-	-	-	-
Critical Hdwy	7.24	6.5	6.45	7.1	6.5	6.2	4.32	-	-	4.22	-	-
Critical Hdwy Stg 1	6.24	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.24	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4	3.525	3.5	4	3.3	2.398	-	-	2.308	-	-
Pot Cap-1 Maneuver	~ 78	109	449	87	106	391	851	-	-	781	-	-
Stage 1	378	415	-	374	393	-	-	-	-	-	-	-
Stage 2	337	391	-	393	404	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	~ 54	91	449	70	88	391	851	-	-	781	-	-
Mov Cap-2 Maneuver	~ 54	91	-	70	88	-	-	-	-	-	-	-
Stage 1	369	354	-	365	384	-	-	-	-	-	-	-
Stage 2	268	382	-	317	345	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	651.1		39.3		0.1		1	
HCM LOS	F		E					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	851	-	-	63	192	781	-	-
HCM Lane V/C Ratio	0.013	-	-	2.105	0.468	0.094	-	-
HCM Control Delay (s)	9.3	0	-	651.1	39.3	10.1	0	-
HCM Lane LOS	A	A	-	F	E	B	A	-
HCM 95th %tile Q(veh)	0	-	-	12.6	2.2	0.3	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th TWSC
4: SR 19 & Central Ave

Background PM Peak Hour

Intersection												
Int Delay, s/veh	29.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	87	7	20	9	9	47	17	591	21	56	601	137
Future Vol, veh/h	87	7	20	9	9	47	17	591	21	56	601	137
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	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	15	0	6	0	0	0	0	2	0	0	4	4
Mvmt Flow	93	7	21	10	10	50	18	629	22	60	639	146

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1538	1519	712	1522	1581	640	785	0	0	651	0	0
Stage 1	832	832	-	676	676	-	-	-	-	-	-	-
Stage 2	706	687	-	846	905	-	-	-	-	-	-	-
Critical Hdwy	7.25	6.5	6.26	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.25	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.25	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.635	4	3.354	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	~ 88	120	426	98	110	479	843	-	-	945	-	-
Stage 1	345	387	-	446	456	-	-	-	-	-	-	-
Stage 2	407	450	-	360	358	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	~ 65	102	426	78	94	479	843	-	-	945	-	-
Mov Cap-2 Maneuver	~ 65	102	-	78	94	-	-	-	-	-	-	-
Stage 1	333	342	-	431	440	-	-	-	-	-	-	-
Stage 2	344	435	-	296	316	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	394.8		30.3		0.3		0.6	
HCM LOS	F		D					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	843	-	-	78	210	945	-	-
HCM Lane V/C Ratio	0.021	-	-	1.555	0.329	0.063	-	-
HCM Control Delay (s)	9.4	0	-	\$ 394.8	30.3	9.1	0	-
HCM Lane LOS	A	A	-	F	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	10	1.4	0.2	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th TWSC
4: SR 19 & Central Ave

Projected PM Peak Hour

Intersection												
Int Delay, s/veh	47.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	87	7	20	9	9	47	17	680	21	56	686	137
Future Vol, veh/h	87	7	20	9	9	47	17	680	21	56	686	137
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	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	15	0	6	0	0	0	0	2	0	0	4	4
Mvmt Flow	93	7	21	10	10	50	18	723	22	60	730	146

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1723	1704	803	1707	1766	734	876	0	0	745	0	0
Stage 1	923	923	-	770	770	-	-	-	-	-	-	-
Stage 2	800	781	-	937	996	-	-	-	-	-	-	-
Critical Hdwy	7.25	6.5	6.26	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.25	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.25	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.635	4	3.354	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	~ 65	93	377	73	85	423	779	-	-	872	-	-
Stage 1	307	351	-	396	413	-	-	-	-	-	-	-
Stage 2	360	408	-	320	325	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	~ 45	77	377	55	70	423	779	-	-	872	-	-
Mov Cap-2 Maneuver	~ 45	77	-	55	70	-	-	-	-	-	-	-
Stage 1	295	303	-	380	396	-	-	-	-	-	-	-
Stage 2	297	392	-	254	280	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	713.7		43.2		0.2		0.6	
HCM LOS	F		E					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	779	-	-	55	161	872	-	-
HCM Lane V/C Ratio	0.023	-	-	2.205	0.429	0.068	-	-
HCM Control Delay (s)	9.7	0	-	713.7	43.2	9.4	0	-
HCM Lane LOS	A	A	-	F	E	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	12.1	1.9	0.2	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th TWSC
5: SR 19 & East Entrance Dwy

Projected AM Peak Hour

Intersection						
Int Delay, s/veh	26.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑	↑	Y
Traffic Vol, veh/h	178	49	113	992	741	106
Future Vol, veh/h	178	49	113	992	741	106
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	-	530	-	-	405
Veh in Median Storage, #	1	-	-	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	193	53	123	1078	805	115

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2129	805	920	0	-	0
Stage 1	805	-	-	-	-	-
Stage 2	1324	-	-	-	-	-
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	~ 55	382	742	-	-	-
Stage 1	440	-	-	-	-	-
Stage 2	249	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 46	382	742	-	-	-
Mov Cap-2 Maneuver	~ 156	-	-	-	-	-
Stage 1	367	-	-	-	-	-
Stage 2	249	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	250.7	1.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	742	-	179	-	-
HCM Lane V/C Ratio	0.166	-	1.378	-	-
HCM Control Delay (s)	10.8	-	250.7	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.6	-	14.7	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th TWSC
5: SR 19 & East Entrance Dwy

Projected PM Peak Hour

Intersection						
Int Delay, s/veh	99.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↑	↑	↔
Traffic Vol, veh/h	235	66	139	810	1187	145
Future Vol, veh/h	235	66	139	810	1187	145
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	-	530	-	-	405
Veh in Median Storage, #	1	-	-	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	255	72	151	880	1290	158

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2472	1290	1448	0	-	0
Stage 1	1290	-	-	-	-	-
Stage 2	1182	-	-	-	-	-
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	~ 33	200	468	-	-	-
Stage 1	258	-	-	-	-	-
Stage 2	291	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 22	200	468	-	-	-
Mov Cap-2 Maneuver	~ 109	-	-	-	-	-
Stage 1	~ 175	-	-	-	-	-
Stage 2	291	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	\$ 846.1	2.4	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	468	-	121	-	-
HCM Lane V/C Ratio	0.323	-	2.704	-	-
HCM Control Delay (s)	16.3	-	\$ 846.1	-	-
HCM Lane LOS	C	-	F	-	-
HCM 95th %tile Q(veh)	1.4	-	29.9	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th TWSC
6: CR 48 & West Entrance Dwy

Projected AM Peak Hour

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	602	591	7	13	21
Future Vol, veh/h	10	602	591	7	13	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	375	-	-	375	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	11	654	642	8	14	23

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	650	0	-	0	1318 642
Stage 1	-	-	-	-	642 -
Stage 2	-	-	-	-	676 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	936	-	-	-	173 474
Stage 1	-	-	-	-	524 -
Stage 2	-	-	-	-	505 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	936	-	-	-	171 474
Mov Cap-2 Maneuver	-	-	-	-	171 -
Stage 1	-	-	-	-	518 -
Stage 2	-	-	-	-	505 -

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	19.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	936	-	-	-	283
HCM Lane V/C Ratio	0.012	-	-	-	0.131
HCM Control Delay (s)	8.9	-	-	-	19.6
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.4

HCM 6th TWSC
6: CR 48 & West Entrance Dwy

Projected PM Peak Hour

Intersection						
Int Delay, s/veh	0.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↑	↗	↘	↘
Traffic Vol, veh/h	22	699	770	13	9	15
Future Vol, veh/h	22	699	770	13	9	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	375	-	-	375	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	24	760	837	14	10	16

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	851	0	-	0	1645 837
Stage 1	-	-	-	-	837 -
Stage 2	-	-	-	-	808 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	788	-	-	-	109 367
Stage 1	-	-	-	-	425 -
Stage 2	-	-	-	-	438 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	788	-	-	-	106 367
Mov Cap-2 Maneuver	-	-	-	-	106 -
Stage 1	-	-	-	-	412 -
Stage 2	-	-	-	-	438 -

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	26.8
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	788	-	-	-	191
HCM Lane V/C Ratio	0.03	-	-	-	0.137
HCM Control Delay (s)	9.7	-	-	-	26.8
HCM Lane LOS	A	-	-	-	D
HCM 95th %tile Q(veh)	0.1	-	-	-	0.5

HCM 6th TWSC
7: CR 48 & Commercial Entrance Dwy

Projected AM Peak Hour

Intersection						
Int Delay, s/veh	1.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↗	↗	↗	↗
Traffic Vol, veh/h	0	97	491	96	40	575
Future Vol, veh/h	0	97	491	96	40	575
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	-	375	375	-
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	105	534	104	43	625

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	534	0	0	638
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	4.12
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	2.218
Pot Cap-1 Maneuver	0	546	-	-	946
Stage 1	0	-	-	-	-
Stage 2	0	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	-	546	-	-	946
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.2	0	0.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	546	946
HCM Lane V/C Ratio	-	-	0.193	0.046
HCM Control Delay (s)	-	-	13.2	9
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.7	0.1

HCM 6th TWSC
 7: CR 48 & Commercial Entrance Dwy

Projected PM Peak Hour

Intersection						
Int Delay, s/veh	1.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↑	↖	↘	↑
Traffic Vol, veh/h	0	145	640	114	48	660
Future Vol, veh/h	0	145	640	114	48	660
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	-	375	375	-
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	158	696	124	52	717

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	-	696	0	0	820
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.22	-	-	4.12
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.318	-	-	2.218
Pot Cap-1 Maneuver	0	442	-	-	809
Stage 1	0	-	-	-	-
Stage 2	0	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	-	442	-	-	809
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	17.6	0	0.7
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	442	809
HCM Lane V/C Ratio	-	-	0.357	0.064
HCM Control Delay (s)	-	-	17.6	9.8
HCM Lane LOS	-	-	C	A
HCM 95th %tile Q(veh)	-	-	1.6	0.2

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↖	↖	↗
Traffic Vol, veh/h	0	17	0	1178	829	31
Future Vol, veh/h	0	17	0	1178	829	31
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	-	-	-	405
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	18	0	1280	901	34

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	-	901	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	337	0
Stage 1	0	-	0
Stage 2	0	-	0
Platoon blocked, %			-
Mov Cap-1 Maneuver	-	337	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.3	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	-	337	-
HCM Lane V/C Ratio	-	0.055	-
HCM Control Delay (s)	-	16.3	-
HCM Lane LOS	-	C	-
HCM 95th %tile Q(veh)	-	0.2	-

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↖	↖	↗
Traffic Vol, veh/h	0	25	0	1043	1308	37
Future Vol, veh/h	0	25	0	1043	1308	37
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	-	-	-	405
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	27	0	1134	1422	40

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	- 1422	- 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	0 167	0 -	- -
Stage 1	0 -	0 -	- -
Stage 2	0 -	0 -	- -
Platoon blocked, %		- -	- -
Mov Cap-1 Maneuver	- 167	- -	- -
Mov Cap-2 Maneuver	- -	- -	- -
Stage 1	- -	- -	- -
Stage 2	- -	- -	- -

Approach	EB	NB	SB
HCM Control Delay, s	30.7	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 167	- -	- -
HCM Lane V/C Ratio	- 0.163	- -	- -
HCM Control Delay (s)	- 30.7	- -	- -
HCM Lane LOS	- D	- -	- -
HCM 95th %tile Q(veh)	- 0.6	- -	- -

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑	↑	↗
Traffic Vol, veh/h	0	41	0	1105	745	41
Future Vol, veh/h	0	41	0	1105	745	41
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	-	-	-	405
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	45	0	1201	810	45

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	-	810	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	380	0
Stage 1	0	-	0
Stage 2	0	-	0
Platoon blocked, %			-
Mov Cap-1 Maneuver	-	380	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.7	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	-	380	-
HCM Lane V/C Ratio	-	0.117	-
HCM Control Delay (s)	-	15.7	-
HCM Lane LOS	-	C	-
HCM 95th %tile Q(veh)	-	0.4	-

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↖	↖	↗
Traffic Vol, veh/h	0	60	0	949	1194	48
Future Vol, veh/h	0	60	0	949	1194	48
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	-	-	-	405
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	65	0	1032	1298	52

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	- 1298	- 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	0 198	0 -	- -
Stage 1	0 -	0 -	- -
Stage 2	0 -	0 -	- -
Platoon blocked, %		- -	- -
Mov Cap-1 Maneuver	- 198	- -	- -
Mov Cap-2 Maneuver	- -	- -	- -
Stage 1	- -	- -	- -
Stage 2	- -	- -	- -

Approach	EB	NB	SB
HCM Control Delay, s	31.9	0	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBT EBLn1	SBT	SBR
Capacity (veh/h)	- 198	- -	- -
HCM Lane V/C Ratio	- 0.329	- -	- -
HCM Control Delay (s)	- 31.9	- -	- -
HCM Lane LOS	- D	- -	- -
HCM 95th %tile Q(veh)	- 1.4	- -	- -

Appendix L
Lake County Land Development Code Guidelines

2. Turn Lanes

Turn lanes consist of left-turn lanes and right-turn lanes (deceleration lanes). Turn lanes shall be installed on the road which is being accessed at the proposed entrance(s) to the development, as deemed necessary by the County Manager or Designee. The County Manager or Designee may also require turn lanes at adjacent or nearby intersections in lieu of, or in addition to, turn lanes at the development entrances.

Conditions which are to be considered in determining the need for turn lanes include the following:

- a) If the property accessing the road is projected to generate 500 or more vehicle trips per day, or 50 or more vehicle trips in any hour;
- b) If a traffic analysis indicates that turn lanes would be necessary to maintain capacity on fronting roads and/or on adjacent or nearby intersections.
- c) If entrances are proposed at locations where grade, topography, site distance, traffic, or other unusual conditions indicate that turn lanes would be needed for traffic safety. The need for turn lanes to accommodate right turn movements and left turn movements shall be based upon anticipated traffic distribution and projected turning movement volumes among other considerations, including traffic safety.

C. Traffic Analysis

1. Transportation Concurrency Management System

Transportation Concurrency Management System is administered by the Lake-Sumter Metropolitan Planning Organization (LSMPO). All information regarding traffic study could be found on LSPMO website www.lakesumtermpo.com/concurrency/index.aspx

D. Road Classification

1. Arterial Roads

An arterial road is a route providing service which is relatively continuous and of relatively high traffic volume, long average trip length, high operating speed and of high mobility importance.

Arterial roads are grouped into the following sub-categories:

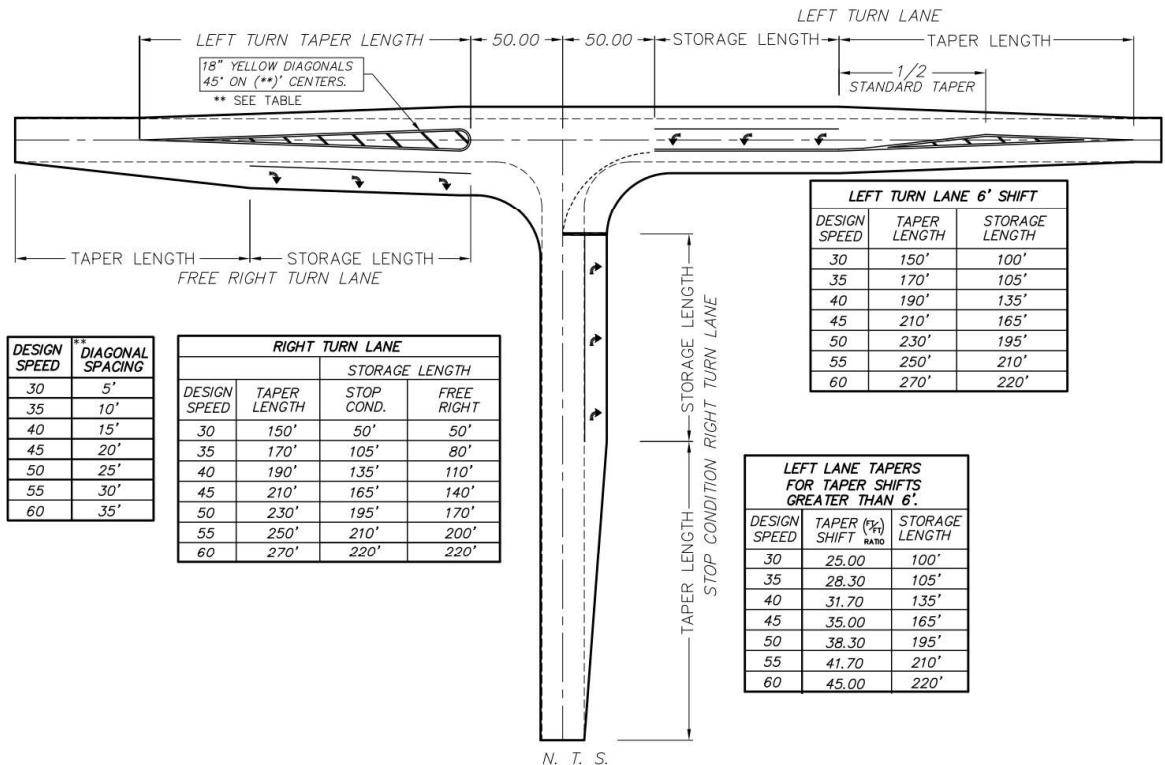
- a) Principal Arterial
- b) Minor Arterial

The classification of roads as arterials shall be based upon criteria established by the Florida Department of Transportation utilizing their most recent, adopted functional classification system.

2. Collector Roads

A collector road is a route providing services which is of relatively moderate traffic volume, moderate trip length and moderate operating speed. Collector roads collect and distribute the traffic between local roads and arterial roads and serves as a linkage between land access and mobility needs.

LAKE COUNTY STANDARD TURN LANES



DESIGN SPEED	** DIAGONAL SPACING
30	5'
35	10'
40	15'
45	20'
50	25'
55	30'
60	35'

RIGHT TURN LANE			
DESIGN SPEED	TAPER LENGTH	STORAGE LENGTH	
		STOP COND.	FREE RIGHT
30	150'	50'	50'
35	170'	105'	80'
40	190'	135'	110'
45	210'	165'	140'
50	230'	195'	170'
55	250'	210'	200'
60	270'	220'	220'

LEFT TURN LANE 6' SHIFT		
DESIGN SPEED	TAPER LENGTH	STORAGE LENGTH
30	150'	100'
35	170'	105'
40	190'	135'
45	210'	165'
50	230'	195'
55	250'	210'
60	270'	220'

LEFT LANE TAPERS FOR TAPER SHIFTS GREATER THAN 6'		
DESIGN SPEED	TAPER SHIFT (1/2) RATIO	STORAGE LENGTH
30	25.00	100'
35	28.30	105'
40	31.70	135'
45	35.00	165'
50	38.30	195'
55	41.70	210'
60	45.00	220'

Typical Details

0: _CAD STANDARDS\DWG\Turn LanesR1.dwg (02/06/2007)

THIS SHOULD BE USED AS A GUIDE LINE ONLY.
ALL DESIGNS SHALL BE SUBMITTED FOR REVIEW.