Stage 1 Intersection Control Evaluation
Fort Hamer Road at US 301

Fort Hamer Road PD&E Study

From Upper Manatee River Road to US 301

CIP #: 6054767 & 6054768

ETDM#: 14536

DRAFT

October 25, 2024

Manatee County FLORIDA

STAGE 1 INTERSECTION CONTROL EVALUATION

FORT HAMER ROAD AT US 301

Florida Department of Transportation

District One

Fort Hamer Road PD&E Study

Limits of Project: From Upper Manatee River Road to US 301

Manatee County, Florida

CIP #: 6054767 & 6054768

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Date: October 25, 2024

DRAFT

Authorized Signature

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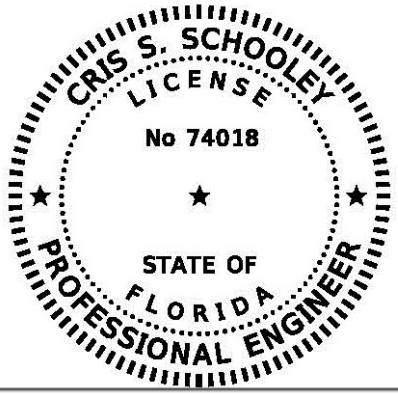

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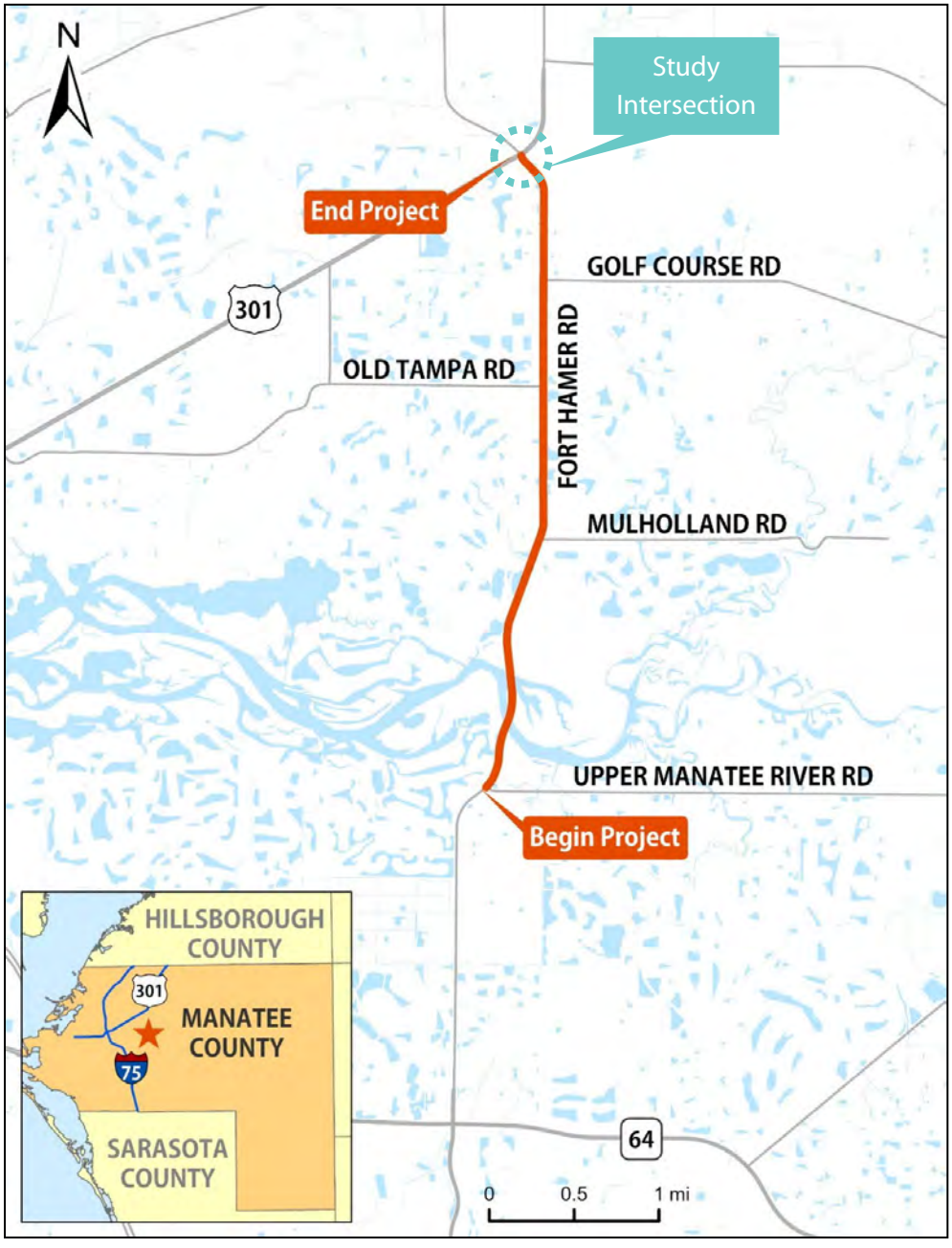
1.0 Introduction

Manatee County is conducting a Project Development & Environment (PD&E) Study to evaluate a 3.8-mile segment of Fort Hamer Road from Upper Manatee River Road to US 301 in Manatee County, Florida (**Figure 1**). The purpose of this project is to add capacity, improve traffic operations, accommodate area-wide growth, meet future transportation demand, enhance safety conditions, and accommodate bicycle and pedestrian activity. The preferred alternative includes widening to 4 lanes throughout the corridor, with a raised median and enhanced multimodal accommodations. This Stage 1 Intersection Control Evaluation (ICE) memorandum has been prepared for the Fort Hamer Road intersection at US 301 because it is on the state system and thus requires Florida Department of Transportation (FDOT) approval.

Figure 1: Project Location



2.0 Existing Conditions

The existing intersection (**Figure 2**) operates under signal control. US 301 is a 4-lane principal arterial with a speed limit of 50 miles per hour (mph) and a C3R (Suburban Residential) context classification. Fort Hamer Road is currently a 2-lane minor arterial with a speed limit of 45 mph. There are marked bicycle lanes and intermittent sidewalks, mainly along the west side of Fort Hamer Road and both sides of US 301. There are existing crosswalks on all approaches. Lighting is present along the south side of US 301 and along Fort Hamer Road south of US 301.

Figure 2: Existing Signalized Intersection

Crash data for the study intersection was obtained from Signal Four Analytics for a five-year period from January 1, 2018, to December 31, 2022. The crash data is included in **Attachment A**. There were 20 crashes, resulting in 3 with injuries (1 incapacitating injury) and no fatalities. The most prevalent crash types were front-to-rear crashes (10 crashes) and angle crashes (4 crashes). There were no crashes involving pedestrians or bicyclists. Five crashes occurred at nighttime and no crashes were reported to be the result of impaired driving.

3.0 ICE Results

Fort Hamer Road will utilize a 40-mph design and posted speed (5 mph lower than existing conditions). This evaluation includes a 4-lane US 301, as the future widening to 6 lanes is currently an unfunded need.

The design year (2050) Average Annual Daily Traffic (AADT) and peak hour volumes documented in the PTAR are provided in **Attachment B**. The CAP-X and SPICE analysis results for the study intersection are provided in **Attachment C** and **Attachment D**, respectively. The results of the CAP-X and SPICE analyses are summarized in **Table 1,** with the top scores highlighted in green. The signalized control is the base condition, and was in the top two of most categories.

Table 1: CAP-X and SPICE Results

Control Strategy	CAP-X Outputs				SPICE Outputs	
	V/C Ratio		Pedestrian Accommodation Score	Bicycle Accommodation Score	Crash Prediction Rank	SSI Rank
	AM Peak Hour	PM Peak Hour				
Signalized Control	0.76	0.99	4.56	4.21	4	2
2-Lane Roundabout	1.83	2.67	4.39	4.33	5	1
Median U-Turn	1.37	1.51	2.86	4.21	1	5
Signalized RCUT	1.11	1.16	2.64	3.83	3	3
Displaced Left-Turn	0.65	0.61	2.92	2.87	2	6
Signalized Thru-Cut	0.96	1.21	4.67	4.21	-	4

4.0 Recommended Intersection Control Strategy

The strategy proposed to be advanced for the study intersection is a signalized control, which aligns best with the project purpose to improve traffic operations, enhance safety conditions, and accommodate bicycle and pedestrian activity. The proposed lane configuration is shown in **Figure 3**.

Synchro outputs from the PTAR for 2030 opening year and 2050 design year are provided in **Appendix E** and summarized in **Tables 2 and 3.** The intersection is anticipated to be congested during the AM and PM peak periods in 2050; however, it will still operate at LOS E.

The proposed signalized intersection concept plan for Fort Hamer Road at US 301 is shown in **Attachment F**

Figure 3: Build Alternative Lane Configuration

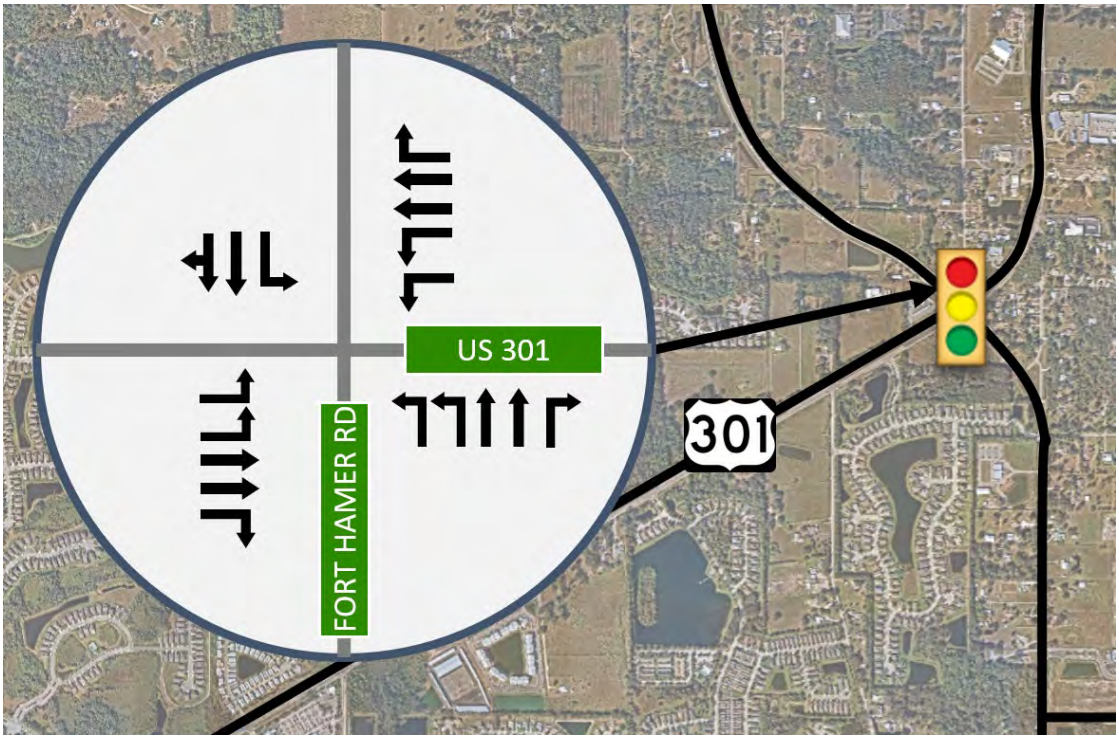


Table 2: 2030 Build Intersection Operational Analysis Summary

Fort Hamer Road Intersection at	Control Type	AM Peak Hour			PM Peak Hour		
		LOS	Delay (sec)	Max V/C Movement	LOS	Delay (sec)	Max V/C Movement
US 301	Signalized	D	39.6	0.86	D	45.0	0.96

Table 3: 2050 Build Intersection Operational Analysis Summary

Fort Hamer Road Intersection at	Control Type	AM Peak Hour			PM Peak Hour		
		LOS	Delay (sec)	Max V/C Movement	LOS	Delay (sec)	Max V/C Movement
US 301	Signalized	E	59.6	0.98	E	65.5	0.98

Attachment A

Crash Data

Crash Number	CRASH_YEAR	Crash Date	On Street	Feet From	Direction	From Intersection	Light Condition	Road Surface	Manner of Collision	Collision Type	Crash Type	Crash Severity1	Crash Severity2	Injury	Severe Injuries	Fatalities	Bicycle	Pedestrian
87552262	2018	18-JAN-2018 09:35 AM	US 301 N	236	West	121ST AVE E	Daylight	Dry	Front to Rear	Motor Vehicle in Transport	Rear End	No Injury	No Injury	0	0	0	0	0
87261896	2018	30-JUL-2018 06:04 PM	US 301 (SR 43)	0		121ST AVENUE EAST	Daylight	Wet	Angle	Motor Vehicle in Transport	Right Angle	No Injury	No Injury	0	0	0	0	0
87887380	2018	01-NOV-2018 01:30 PM	FT HAMER RD	0		US 301N	Daylight	Dry	Front to Rear	Motor Vehicle in Transport	Rear End	No Injury	No Injury	0	0	0	0	0
87887395	2018	07-NOV-2018 07:00 PM	US HIGHWAY 301 N	289	West	60TH ST E	Dark - Lighted	Dry	Front to Rear	Motor Vehicle in Transport	Rear End	No Injury	No Injury	0	0	0	0	0
88031503	2018	13-NOV-2018 11:45 AM	US 301 (STATE ROAD 43)	177	West	FT HAMER ROAD	Daylight	Dry	Other	Overturn/Rollover	Rollover	Injury	Possible Injury	1	0	0	0	0
88271384	2019	17-DEC-2019 06:48 AM	US-301 (SR 43)	0		121ST AVE E	Dark - Lighted	Dry	Front to Front	Motor Vehicle in Transport	Left Entering	Injury	Non-Incapacitating Injury	4	0	0	0	0
89791061	2021	01-FEB-2021 12:40 PM	US HIGHWAY 301 N	107	East	121ST AVE E	Daylight	Dry	Front to Rear	Motor Vehicle in Transport	Rear End	No Injury	No Injury	0	0	0	0	0
88481254	2021	28-MAR-2021 09:34 PM	US-301	15	East	121ST AVENUE EAST	Dark - Not Lighted	Dry	Front to Front	Motor Vehicle in Transport	Left Entering	No Injury	No Injury	0	0	0	0	0
88534022	2021	06-AUG-2021 11:05 AM	US 301 (STATE ROAD 43)	110	East	FT HAMER ROAD	Daylight	Dry	Front to Rear	Motor Vehicle in Transport	Rear End	No Injury	No Injury	0	0	0	0	0
88555487	2021	18-SEP-2021 09:10 AM	US 301 (STATE ROAD 43)	292	West	FT HAMER ROAD	Daylight	Wet	Front to Rear	Motor Vehicle in Transport	Rear End	No Injury	No Injury	0	0	0	0	0
88549666	2021	25-SEP-2021 02:52 PM	FORT HAMMER RD	179	West	US-301	Daylight	Dry	Front to Rear	Motor Vehicle in Transport	Rear End	No Injury	No Injury	0	0	0	0	0
88571639	2021	18-OCT-2021 08:29 AM	FORT HAMER RD	174	West	US 301 (SR 43)	Daylight	Dry	Front to Rear	Motor Vehicle in Transport	Rear End	No Injury	No Injury	0	0	0	0	0
88586769	2021	27-OCT-2021 07:10 AM	US 301 (SR 43)	15	North	121ST AVE E	Dawn	Dry	Angle	Motor Vehicle in Transport	Left Entering	No Injury	No Injury	0	0	0	0	0
89577681	2021	29-NOV-2021 11:38 AM	US 301 (SR 43)	49	North	121ST AVE E	Daylight	Dry	Other	Traffic Signal Support	Off Road	No Injury	No Injury	0	0	0	0	0
24910158	2022	20-MAR-2022 12:50 PM	DRIVEWAY ACCESS- 12060 US 301 N	208	West	US 301 (STATE ROAD 43)	Daylight	Dry	Angle	Motor Vehicle in Transport	Unknown	No Injury	No Injury	0	0	0	0	0
24946981	2022	26-APR-2022 02:55 PM	FT HAMER ROAD	0		US 301 (STATE ROAD 43)	Daylight	Dry	Sideswipe, Same Direction	Motor Vehicle in Transport	Same Direction Sideswipe	No Injury	No Injury	0	0	0	0	0
24944491	2022	26-APR-2022 09:10 PM	US 301 (STATE ROAD 43)	177	West	FORT HAMER ROAD	Dark - Lighted	Dry	Front to Rear	Motor Vehicle in Transport	Rear End	Serious Injury	Incapacitating Injury	1	1	0	0	0
24462352	2022	06-JUL-2022 10:00 PM	US HIGHWAY 301 N	0		121ST AVE E	Dark - Lighted	Wet	Angle	Motor Vehicle in Transport	Left Entering	No Injury	No Injury	0	0	0	0	0
24462240	2022	08-JUN-2022 04:37 PM	FORT HAMER RD	0			Daylight	Dry	Front to Rear	Motor Vehicle in Transport	Rear End	No Injury	No Injury	0	0	0	0	0
25035644	2022	22-OCT-2022 09:38 AM	US-301 (SR-43)	0		FT HAMER RD	Daylight	Dry	Sideswipe, Same Direction	Motor Vehicle in Transport	Same Direction Sideswipe	No Injury	No Injury	0	0	0	0	0

Attachment B

Traffic Volumes

(Excerpts from Project Traffic Analysis Report)

3.0 Existing Traffic Conditions

Existing traffic conditions were evaluated for five (5) study intersections along the Fort Hamer Road corridor using traffic data collected, including traffic counts and crash information. These locations included the following intersections.

- Rive Isle Run
- Mulholland Road
- Old Tampa Road
- Golf Course Road
- US 301

Under existing conditions, Fort Hamer Road has two lanes along most of the corridor and is classified as a minor arterial. There are marked bicycle lanes and intermittent sidewalks, mainly along the west side of the road. The posted speed limit is 45 mph, and the context classification is C3R-Suburban Residential. The existing roadway right-of-way varies from 84 feet to more than 120 feet.

3.1 Traffic Count Data

The *Project Traffic Forecasting Memorandum,* dated May 31, 2024, is included as **Appendix B** and was prepared and reviewed by County and FDOT staff for concurrence on traffic volumes to be used in this analysis. As described in detail in the memorandum, traffic counts were collected at or near the study intersections in various forms, including turning movement counts (TMCs), 48-hour bi-directional volume counts and 72-hour vehicle classification/speed counts along the study corridor and along several cross streets. The existing volumes documented in the Project Traffic Forecasting Memorandum are used throughout Section 3 of this analysis.

3.2 Existing Year AADT Volumes

To develop daily volumes for roadway segments, the Fort Hamer Road project corridor was broken up into 5 segments (between intersections). I-75 was analyzed because this project would serve as a relief to I-75 capacity issues. Annual Average Daily Traffic (AADT) volumes for existing year (2023) were calculated and are shown in **Table 1**.

Table 1: Existing Year AADT

Segment		Existing Year (2023)
		AADT
Fort Hamer Rd	Upper Manatee River Rd to Rive Isle Run	19,000
	Rive Isle Run to Mulholland Rd	19,900
	Mulholland Rd to Old Tampa Rd	20,400
	Old Tampa Rd to Golf Course Rd	12,700
	Golf Course Rd to US 301	13,600
I-75	SR 64 to US 301	131,000

3.3 Existing Year Peak Hour Volumes

Turning movement volumes for existing year (2023) were developed and are documented in the *Project Traffic Forecasting Memorandum,* (**Appendix B**). The existing turning movement traffic volumes are shown on **Figure 2**.

Figure 2: Existing Intersection Traffic Volumes (2023)

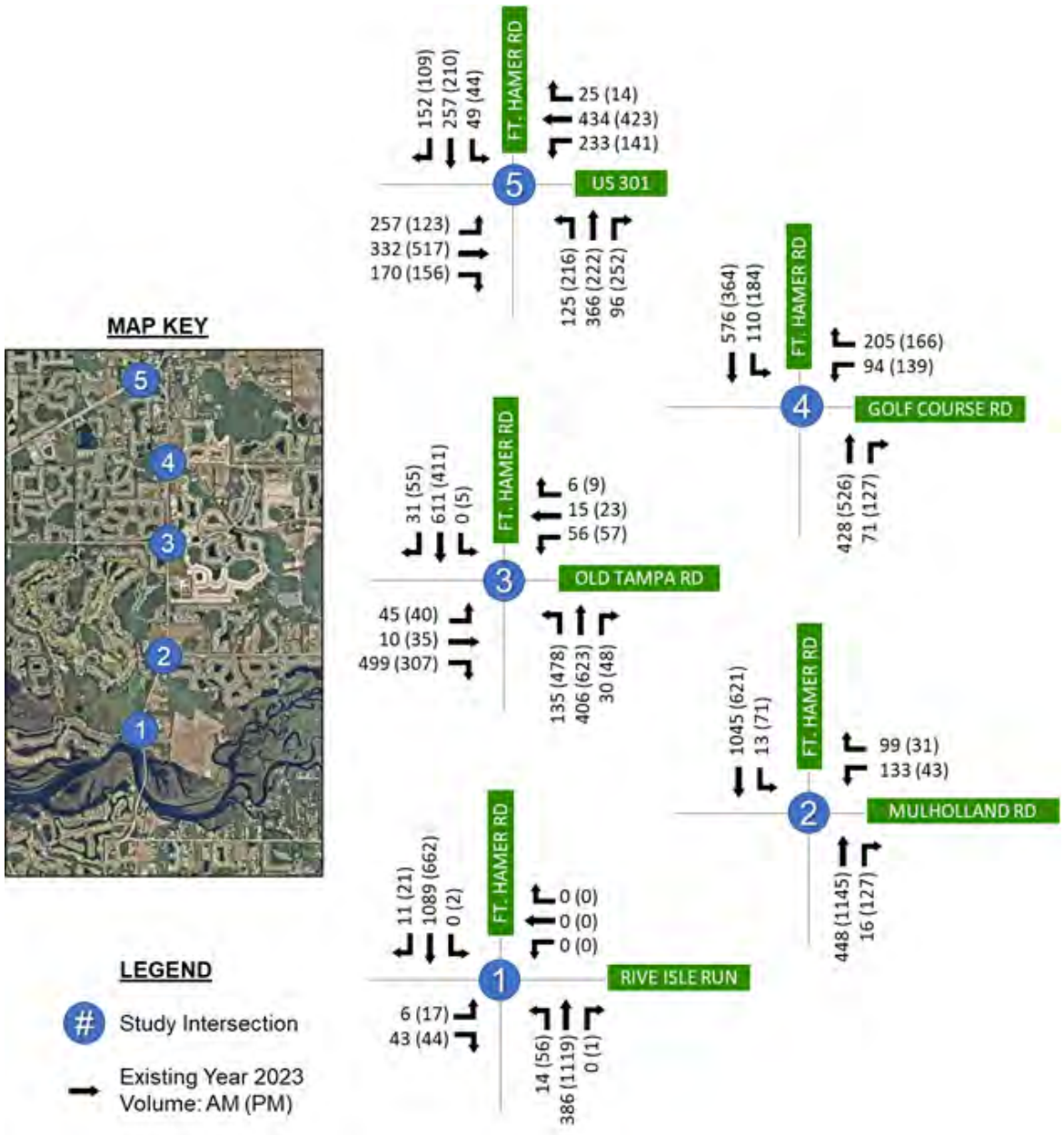


Table 7: Existing Intersection Level of Service (PM Peak Hour)

Fort Hamer Rd at	Existing Year 2023			
	Overall Delay[1] (Sec/Veh)	Overall LOS[1]	Max V/C Ratio	Max V/C Movement
Rive Isle Run	150.5	F	0.44	EBL
Mulholland Rd	18.9	B	0.91	NBT
Old Tampa Rd	29.5	C	0.82	NBL
Golf Course Rd	14.3	B	0.63	WBL
US 301	37.7	D	0.82	WBL

[1] For unsignalized locations, the delay is associated with the worst-case minor-street approach/movement.

4.0 Future Traffic Volume Conditions

The future traffic volumes for 2030 and 2050 were developed in the *Project Traffic Forecasting Memorandum*, dated May 31, 2024, under separate cover (**Appendix B**).

4.1 Future Year AADT Volumes

The future year AADTs for No-Build and Build Alternatives are shown in **Table 8**. Fort Hamer Road in the Build Alternative is forecasted to serve an additional 15,400 trips and reduce I-75 trips by 4,700. The LOS for each segment was determined using guidance from FDOT's 2023 Quality/Level of Service (Q/LOS) Handbook. FDOT's generalized service volumes for roadways with a C3R (suburban residential) context classification were used along with the application of a 0.9 adjustment factor as Fort Hamer Road is a non-state signalized roadway. The corresponding segment LOS for the No-Build will be a LOS F in three of the five segments in 2030, and in all five segments by 2050 (**Table 9**). The Build Alternative will be a LOS C in all segments in 2030, while LOS F is forecasted at the two end segments in 2050 (**Table 10**). The more detailed intersection operational analysis will determine if the roadway is truly over capacity or LOS deficient.

Table 8: Future Traffic Volumes

Segment		No-Build AADT		Build AADT	
		2030	2050	2030	2050
Fort Hamer Road	Upper Manatee River Road to Rive Isle Run	21,000	27,600	24,600	43,000
	Rive Isle Run to Mulholland Road	21,500	27,300	22,600	32,000
	Mulholland Road to Old Tampa Road	22,400	28,000	24,200	33,000
	Old Tampa Road to Golf Course Road	15,200	22,300	17,500	31,000
	Golf Course Road to US 301	17,200	27,400	19,700	37,000
I-75	SR 64 to US 301	146,500	190,700	145,000	186,000

Figure 6: 2030 Build Alternative Intersection Traffic Volumes

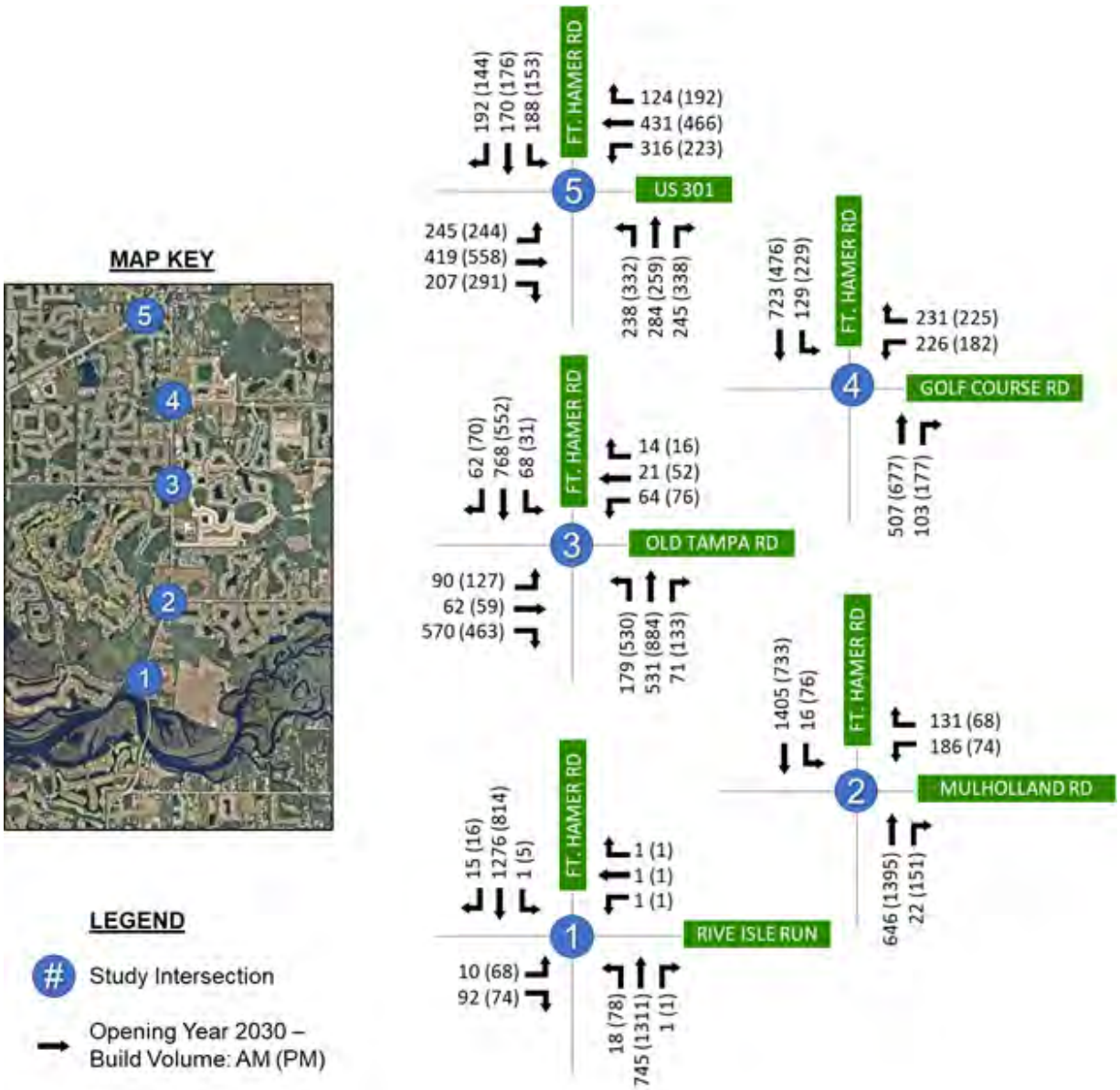
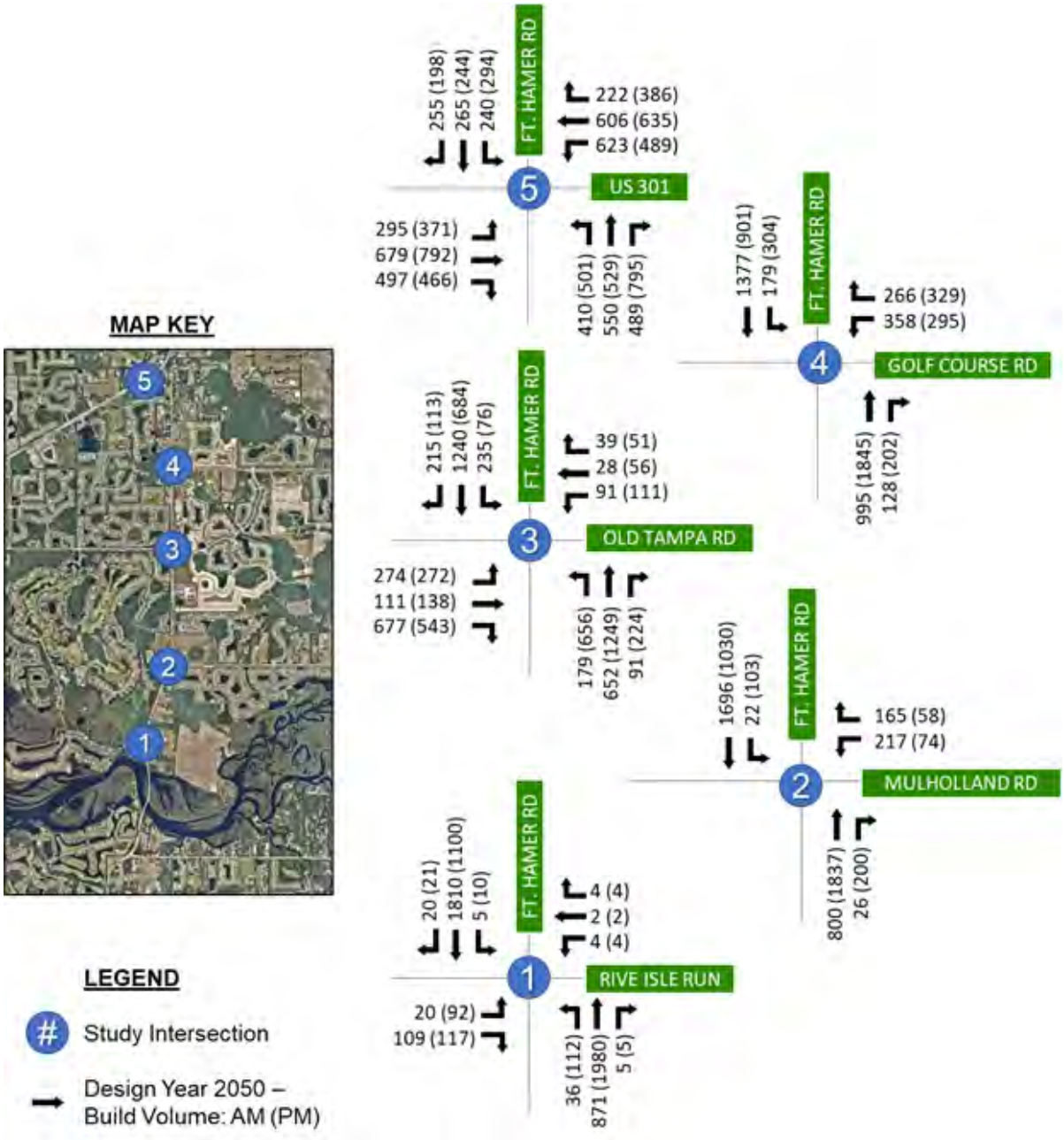


Figure 7: 2050 Build Alternative Intersection Traffic Volumes



Attachment C

CAP-X Results

AM Peak Hour

Capacity Analysis for Planning of Junctions

Summary Report - Page 1 of 2

Project Name	Fort Hamer Road PD&E Study
Project Number	0
Location	Manatee County
Date	September 10, 2024
Number of Intersection Legs	4
Major Street Direction	East-West

Traffic Volume Demand

	Volume (Veh/hr)				Percent (%)	
	U-Turn	Left	Thru	Right	Heavy Vehicles	Volume Growth
Eastbound	0	295	679	497	4.40%	0.00%
Westbound	0	623	606	222	4.60%	0.00%
Southbound	0	240	265	255	2.50%	0.00%
Northbound	0	410	550	489	2.70%	0.00%
Adjustment Factor	0.80	0.95		0.85		
Suggested	**0.80**	**0.95**		**0.85**		

Truck to PCE Factor		**Suggested = 2.00**	2.00
FDOT Context Zone	**C3R-Suburban Residential**		
E-W / Crossing East-West Legs	**Low**	**Low**	**Low**
N-S / Crossing North-South Legs	**Low**	**Low**	**Low**
Critical Lane Volume Threshold	2-phase signal	**Suggested = 1800**	**1800**
	3-phase signal	**Suggested = 1750**	**1750**
	4-phase signal	**Suggested = 1700**	**1700**

Capacity Analysis for Planning of Junctions

Summary Report - Page 2 of 2

TYPE OF INTERSECTION	Overall v/c Ratio	V/C Ranking	Pedestrian Accommodation Score	Bicycle Accommodation Score
Displaced Left Turn	**0.65**	**1**	**2.91**	**2.87**
Traffic Signal	**0.76**	**2**	**4.56**	**4.21**
Signalized ThruCut E-W	**0.96**	**3**	**4.67**	**4.21**
Signalized Restricted Crossing U-Turn E-W	**1.11**	**4**	**2.64**	**3.83**
Median U-Turn E-W	**1.37**	**5**	**2.86**	**4.21**
2 X 2	**1.83**	**6**	**4.39**	**4.33**
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Capacity Analysis for Planning of Junctions

Summary Report - Page 1 of 2

Project Name	Fort Hamer Road PD&E Study
Project Number	0
Location	Manatee County
Date	September 10, 2024
Number of Intersection Legs	4
Major Street Direction	East-West

Traffic Volume Demand

	Volume (Veh/hr)				Percent (%)	
	U-Turn	Left	Thru	Right	Heavy Vehicles	Volume Growth
Eastbound	0	371	792	466	2.40%	0.00%
Westbound	0	489	635	386	4.30%	0.00%
Southbound	0	294	244	198	1.20%	0.00%
Northbound	0	501	529	795	1.50%	0.00%
Adjustment Factor	0.80	0.95		0.85		
Suggested	**0.80**	**0.95**		**0.85**		

Truck to PCE Factor		**Suggested = 2.00**	2.00
FDOT Context Zone	**C3R-Suburban Residential**		
E-W / Crossing East-West Legs	**Low**	**Low**	**Low**
N-S / Crossing North-South Legs	**Low**	**Low**	**Low**
Critical Lane Volume Threshold	2-phase signal	**Suggested = 1800**	**1800**
	3-phase signal	**Suggested = 1750**	**1750**
	4-phase signal	**Suggested = 1700**	**1700**

Capacity Analysis for Planning of Junctions

Summary Report - Page 2 of 2

TYPE OF INTERSECTION	Overall v/c Ratio	V/C Ranking	Pedestrian Accommodation Score	Bicycle Accommodation Score
Displaced Left Turn	**0.61**	**1**	**2.92**	**2.87**
Traffic Signal	**0.99**	**2**	**4.56**	**4.21**
Signalized Restricted Crossing U-Turn E-W	**1.16**	**3**	**2.64**	**3.83**
Signalized ThruCut E-W	**1.21**	**4**	**4.67**	**4.21**
Median U-Turn E-W	**1.51**	**5**	**2.86**	**4.21**
2 X 2	**2.67**	**6**	**4.39**	**4.33**
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Attachment D

SPICE Results

Florida Department of Transportation
Safety Performance for Intersection Control Evaluation Tool

Results

Summary of crash prediction results for each alternative

Project Information

Project Name:	Fort Hamer Road PD&E Study	**Intersection Type**	At-Grade Intersection
Intersection:	Fort Hamer Road & US 301	**Opening Year**	2030
Agency:	Manatee County	**Design Year**	2050
Project Reference:	CIP #: 6054767 & 6054768	**Facility Type**	On Urban and Suburban Arterial
City:	Manatee County	**Number of Legs**	4-leg
State:	Florida	**1-Way/2-Way**	2-way Intersecting 2-way
Date:	9/10/2024	**# of Major Street Lanes (both directions)**	5 or fewer
Analyst:	Kimley Horn	**Major Street Approach Speed**	50+ mph

Crash Prediction Summary

Control Strategy	Crash Type	Opening Year	Design Year	Total Project Life Cycle	Crash Prediction Rank	AADT Within SPF Prediction Range?		Source of Prediction	SSI Score		
						(Open Year)	(Design Year)		Opening Year	Design Year	Rank
Traffic Signal	Total	9.29	19.01	294.90	4	Yes	No	Uncalibrated SPF	83	54	2
	Fatal & Injury	3.08	5.96	94.61							
2-lane Roundabout	Total	17.19	34.47	539.60	5	No	No	Uncalibrated SPF	97	92	1
	Fatal & Injury	3.23	6.94	105.80							
Displaced Left Turn (DLT)	Total	8.18	16.73	259.51	2	N/A	N/A	CMF	70	31	6
	Fatal & Injury	2.71	5.24	83.25							
Median U-Turn (MUT)	Total	5.85	11.98	185.79	1	N/A	N/A	CMF	78	43	5
	Fatal & Injury	2.34	4.53	71.90							
Signalized RCUT	Total	8.84	21.79	315.01	3	No	No	Uncalibrated SPF	80	48	3
	Fatal & Injury	2.32	6.16	86.62							
Signalized Thru-Cut	Total	No SPF	No SPF	No SPF	--	N/A	N/A	N/A	80	48	4
	Fatal & Injury	No SPF	No SPF	No SPF							

Attachment E

Synchro Outputs

2030 AM Build Scenario

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	245	419	207	316	431	124	238	284	245	188	170
Future Volume (vph)	245	419	207	316	431	124	238	284	245	188	170
Lane Group Flow (vph)	275	471	233	355	484	139	267	319	275	211	407
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4	5	3	8	1	5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	5	3	8	1	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	15.0	5.0	5.0	15.0	5.0	5.0	10.0	5.0	5.0	10.0
Minimum Split (s)	12.9	25.9	13.3	12.9	25.9	13.3	13.3	26.3	12.9	13.3	26.3
Total Split (s)	28.9	34.0	29.0	42.0	47.1	30.4	29.0	33.6	42.0	30.4	35.0
Total Split (%)	20.6%	24.3%	20.7%	30.0%	33.6%	21.7%	20.7%	24.0%	30.0%	21.7%	25.0%
Yellow Time (s)	5.1	5.1	4.8	5.1	5.1	4.8	4.8	4.8	5.1	4.8	4.8
All-Red Time (s)	2.8	2.8	3.5	2.8	2.8	3.5	3.5	3.5	2.8	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.9	7.9	8.3	7.9	7.9	8.3	8.3	8.3	7.9	8.3	8.3
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	Max
v/c Ratio	0.63	0.73	0.32	0.68	0.66	0.19	0.62	0.39	0.36	0.75	0.40
Control Delay (s/veh)	55.1	52.6	4.7	53.5	47.3	6.9	55.2	41.4	14.8	63.9	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	55.1	52.6	4.7	53.5	47.3	6.9	55.2	41.4	14.8	63.9	21.5
Queue Length 50th (ft)	98	167	2	126	167	15	95	102	79	149	66
Queue Length 95th (ft)	151	237	51	184	233	52	148	163	157	#258	127
Internal Link Dist (ft)		641			873			598			636
Turn Bay Length (ft)	565		220	750		430	500		425	450	
Base Capacity (vph)	643	842	796	1035	1252	773	640	824	979	341	1019
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.56	0.29	0.34	0.39	0.18	0.42	0.39	0.28	0.62	0.40

Intersection Summary

Cycle Length: 140
Actuated Cycle Length: 114.4
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Fort Hamer Road & US 301

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	245	419	207	316	431	124	238	284	245	188	170	192
Future Volume (veh/h)	245	419	207	316	431	124	238	284	245	188	170	192
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
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	1841	1841	1841	1826	1826	1826	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	275	471	233	355	484	139	267	319	275	211	191	216
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	4	4	4	5	5	5	3	3	3	3	3	3
Cap, veh/h	358	637	425	450	731	525	351	909	589	246	528	448
Arrive On Green	0.10	0.17	0.17	0.13	0.20	0.20	0.10	0.24	0.24	0.14	0.28	0.28
Sat Flow, veh/h	3506	3681	1560	3478	3652	1547	3534	3711	1572	1767	1856	1572
Grp Volume(v), veh/h	275	471	233	355	484	139	267	319	275	211	191	216
Grp Sat Flow(s),veh/h/ln	1753	1841	1560	1739	1826	1547	1767	1856	1572	1767	1856	1572
Q Serve(g_s), s	7.9	12.5	13.2	10.2	12.6	6.7	7.6	7.3	13.7	12.1	8.5	11.8
Cycle Q Clear(g_c), s	7.9	12.5	13.2	10.2	12.6	6.7	7.6	7.3	13.7	12.1	8.5	11.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	358	637	425	450	731	525	351	909	589	246	528	448
V/C Ratio(X)	0.77	0.74	0.55	0.79	0.66	0.26	0.76	0.35	0.47	0.86	0.36	0.48
Avail Cap(c_a), veh/h	713	930	549	1148	1386	802	708	909	589	378	528	448
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.2	40.5	32.2	43.6	38.1	24.8	45.3	32.2	24.5	43.5	29.5	30.6
Incr Delay (d2), s/veh	3.5	1.8	1.1	3.1	1.0	0.3	3.4	1.1	2.7	11.6	1.9	3.7
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	6.2	9.4	8.4	7.8	9.3	4.2	6.1	5.9	8.9	9.8	7.0	8.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	48.7	42.3	33.3	46.7	39.1	25.0	48.8	33.3	27.2	55.1	31.4	34.3
LnGrp LOS	D	D	C	D	D	C	D	C	C	E	C	C
Approach Vol, veh/h		979			978			861			618	
Approach Delay, s/veh		41.9			39.9			36.1			40.5	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.7	33.6	21.3	25.8	18.5	37.7	18.5	28.6
Change Period (Y+Rc), s	8.3	8.3	* 7.9	* 7.9	8.3	8.3	* 7.9	* 7.9
Max Green Setting (Gmax), s	22.1	25.3	* 34	* 26	20.7	26.7	* 21	* 39
Max Q Clear Time (g_c+I1), s	14.1	15.7	12.2	15.2	9.6	13.8	9.9	14.6
Green Ext Time (p_c), s	0.3	2.0	1.1	2.7	0.6	1.8	0.7	3.3

Intersection Summary	
HCM 7th Control Delay, s/veh	39.6
HCM 7th LOS	D

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

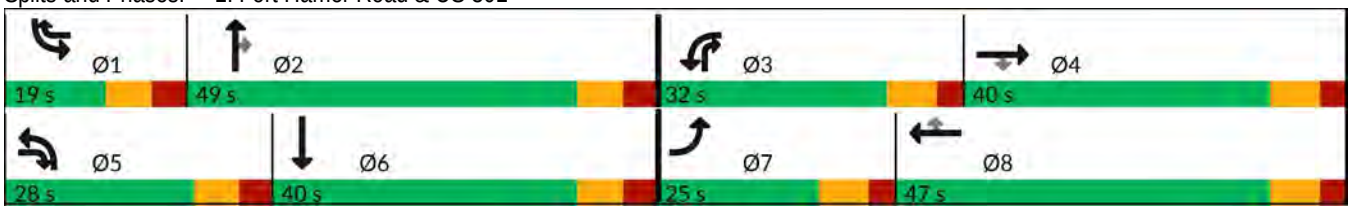
2030 PM Build Scenario

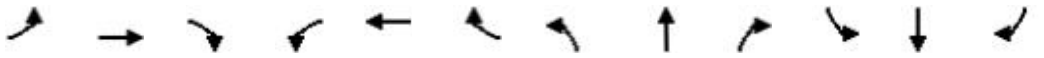
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	244	558	291	223	466	192	332	259	338	153	176
Future Volume (vph)	244	558	291	223	466	192	332	259	338	153	176
Lane Group Flow (vph)	249	569	297	228	476	196	339	264	345	156	327
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4	5	3	8	1	5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	5	3	8	1	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	15.0	5.0	5.0	15.0	5.0	5.0	10.0	5.0	5.0	10.0
Minimum Split (s)	12.9	25.9	13.3	12.9	25.9	13.3	13.3	26.3	12.9	13.3	26.3
Total Split (s)	25.0	40.0	28.0	32.0	47.0	19.0	28.0	49.0	32.0	19.0	40.0
Total Split (%)	17.9%	28.6%	20.0%	22.9%	33.6%	13.6%	20.0%	35.0%	22.9%	13.6%	28.6%
Yellow Time (s)	5.1	5.1	4.8	5.1	5.1	4.8	4.8	4.8	5.1	4.8	4.8
All-Red Time (s)	2.8	2.8	3.5	2.8	2.8	3.5	3.5	3.5	2.8	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.9	7.9	8.3	7.9	7.9	8.3	8.3	8.3	7.9	8.3	8.3
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	Max
v/c Ratio	0.63	0.77	0.37	0.59	0.66	0.29	0.71	0.21	0.40	0.99	0.29
Control Delay (s/veh)	59.9	54.0	3.8	58.7	49.8	4.8	59.9	30.9	14.3	126.3	21.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	59.9	54.0	3.8	58.7	49.8	4.8	59.9	30.9	14.3	126.3	21.8
Queue Length 50th (ft)	94	212	0	87	174	0	128	74	109	125	57
Queue Length 95th (ft)	147	286	53	134	234	50	192	122	200	#298	110
Internal Link Dist (ft)		641			873			598			636
Turn Bay Length (ft)	565		220	750		430	500		425	450	
Base Capacity (vph)	498	985	844	689	1177	671	574	1249	994	157	1109
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.58	0.35	0.33	0.40	0.29	0.59	0.21	0.35	0.99	0.29

Intersection Summary

Cycle Length: 140
Actuated Cycle Length: 121.9
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Fort Hamer Road & US 301





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	244	558	291	223	466	192	332	259	338	153	176	144
Future Volume (veh/h)	244	558	291	223	466	192	332	259	338	153	176	144
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1841	1841	1841	1870	1870	1870	1885	1885	1885
Adj Flow Rate, veh/h	249	569	297	228	476	196	339	264	345	156	180	147
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	4	4	4	2	2	2	1	1	1
Cap, veh/h	318	760	505	300	735	453	412	1292	683	163	635	487
Arrive On Green	0.09	0.20	0.20	0.09	0.20	0.20	0.12	0.35	0.35	0.09	0.32	0.32
Sat Flow, veh/h	3563	3741	1585	3506	3681	1560	3563	3741	1585	1795	1979	1518
Grp Volume(v), veh/h	249	569	297	228	476	196	339	264	345	156	171	156
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1753	1841	1560	1781	1870	1585	1795	1885	1612
Q Serve(g_s), s	8.1	16.8	18.5	7.5	14.0	12.0	11.0	5.9	18.7	10.2	8.0	8.6
Cycle Q Clear(g_c), s	8.1	16.8	18.5	7.5	14.0	12.0	11.0	5.9	18.7	10.2	8.0	8.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.94
Lane Grp Cap(c), veh/h	318	760	505	300	735	453	412	1292	683	163	605	517
V/C Ratio(X)	0.78	0.75	0.59	0.76	0.65	0.43	0.82	0.20	0.51	0.96	0.28	0.30
Avail Cap(c_a), veh/h	517	1019	615	717	1222	659	596	1292	683	163	605	517
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.6	44.1	33.6	52.7	43.3	33.9	50.9	27.2	24.4	53.3	29.9	30.1
Incr Delay (d2), s/veh	4.3	2.1	1.1	4.0	1.0	0.7	6.2	0.4	2.7	57.6	1.2	1.5
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/ln	6.6	12.3	11.2	6.0	10.3	7.9	8.8	4.7	11.4	11.4	6.7	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	56.8	46.2	34.7	56.6	44.3	34.6	57.1	27.5	27.0	110.9	31.1	31.6
LnGrp LOS	E	D	C	E	D	C	E	C	C	F	C	C
Approach Vol, veh/h		1115			900			948			483	
Approach Delay, s/veh		45.5			45.3			37.9			57.0	
Approach LOS		D			D			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.0	49.0	18.0	31.9	21.9	46.1	18.4	31.4
Change Period (Y+Rc), s	8.3	8.3	* 7.9	* 7.9	8.3	8.3	* 7.9	* 7.9
Max Green Setting (Gmax), s	10.7	40.7	* 24	* 32	19.7	31.7	* 17	* 39
Max Q Clear Time (g_c+I1), s	12.2	20.7	9.5	20.5	13.0	10.6	10.1	16.0
Green Ext Time (p_c), s	0.0	2.6	0.6	3.4	0.7	1.7	0.4	3.4

Intersection Summary	
HCM 7th Control Delay, s/veh	45.0
HCM 7th LOS	D

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

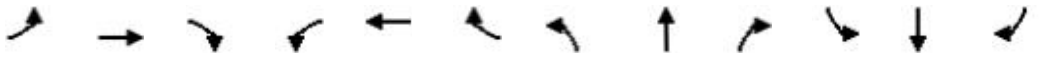
2050 AM Build Scenario

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	295	679	497	623	606	222	410	550	489	240	265
Future Volume (vph)	295	679	497	623	606	222	410	550	489	240	265
Lane Group Flow (vph)	311	715	523	656	638	234	432	579	515	253	547
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4	5	3	8	1	5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	5	3	8	1	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	15.0	5.0	5.0	15.0	5.0	5.0	10.0	5.0	5.0	10.0
Minimum Split (s)	12.9	25.9	13.3	12.9	25.9	13.3	13.3	26.3	12.9	13.3	26.3
Total Split (s)	26.0	34.0	33.0	33.0	41.0	28.0	33.0	35.0	33.0	28.0	30.0
Total Split (%)	20.0%	26.2%	25.4%	25.4%	31.5%	21.5%	25.4%	26.9%	25.4%	21.5%	23.1%
Yellow Time (s)	5.1	5.1	4.8	5.1	5.1	4.8	4.8	4.8	5.1	4.8	4.8
All-Red Time (s)	2.8	2.8	3.5	2.8	2.8	3.5	3.5	3.5	2.8	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.9	7.9	8.3	7.9	7.9	8.3	8.3	8.3	7.9	8.3	8.3
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	Max
v/c Ratio	0.72	0.98	0.72	0.99	0.65	0.29	0.75	0.76	0.66	0.95	0.70
Control Delay (s/veh)	64.8	79.3	29.8	84.7	46.2	11.7	59.8	56.3	25.4	99.5	40.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	64.8	79.3	29.8	84.7	46.2	11.7	59.8	56.3	25.4	99.5	40.0
Queue Length 50th (ft)	127	302	287	278	241	58	174	232	260	214	154
Queue Length 95th (ft)	175	#424	412	#401	309	116	225	296	389	#384	222
Internal Link Dist (ft)		641			873			598			636
Turn Bay Length (ft)	565		220	750		430	500		425	450	
Base Capacity (vph)	483	733	762	663	976	799	665	757	784	265	785
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.98	0.69	0.99	0.65	0.29	0.65	0.76	0.66	0.95	0.70

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 130
Natural Cycle: 110
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Fort Hamer Road & US 301



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	295	679	497	623	606	222	410	550	489	240	265	255
Future Volume (veh/h)	295	679	497	623	606	222	410	550	489	240	265	255
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
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	1841	1841	1841	1826	1826	1826	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	311	715	365	656	638	160	432	579	383	253	279	189
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	4	4	4	5	5	5	3	3	3	3	3	3
Cap, veh/h	371	739	535	672	1051	680	502	762	627	268	450	295
Arrive On Green	0.11	0.20	0.20	0.19	0.29	0.29	0.14	0.21	0.21	0.15	0.21	0.21
Sat Flow, veh/h	3506	3681	1560	3478	3652	1547	3534	3711	1572	1767	2092	1372
Grp Volume(v), veh/h	311	715	365	656	638	160	432	579	383	253	246	222
Grp Sat Flow(s),veh/h/ln	1753	1841	1560	1739	1826	1547	1767	1856	1572	1767	1856	1609
Q Serve(g_s), s	11.3	25.0	26.1	24.4	19.6	8.4	15.5	19.1	25.2	18.4	15.6	16.3
Cycle Q Clear(g_c), s	11.3	25.0	26.1	24.4	19.6	8.4	15.5	19.1	25.2	18.4	15.6	16.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.85
Lane Grp Cap(c), veh/h	371	739	535	672	1051	680	502	762	627	268	399	346
V/C Ratio(X)	0.84	0.97	0.68	0.98	0.61	0.24	0.86	0.76	0.61	0.94	0.62	0.64
Avail Cap(c_a), veh/h	488	739	535	672	1051	680	672	762	627	268	399	346
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.0	51.5	36.7	52.2	39.9	22.8	54.5	48.6	31.1	54.6	46.2	46.5
Incr Delay (d2), s/veh	9.5	25.2	3.6	28.9	1.0	0.2	8.6	7.0	4.4	40.1	7.0	8.8
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	9.2	19.8	15.2	18.8	13.4	0.1	11.8	14.4	15.0	16.4	12.4	11.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	66.5	76.7	40.2	81.1	40.9	23.0	63.1	55.6	35.5	94.8	53.2	55.3
LnGrp LOS	E	E	D	F	D	C	E	E	D	F	D	E
Approach Vol, veh/h		1391			1454			1394			721	
Approach Delay, s/veh		64.9			57.1			52.4			68.4	
Approach LOS		E			E			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	28.0	35.0	33.0	34.0	26.8	36.2	21.7	45.3
Change Period (Y+Rc), s	8.3	8.3	* 7.9	* 7.9	8.3	8.3	* 7.9	* 7.9
Max Green Setting (Gmax), s	19.7	26.7	* 25	* 26	24.7	21.7	* 18	* 33
Max Q Clear Time (g_c+I1), s	20.4	27.2	26.4	28.1	17.5	18.3	13.3	21.6
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.9	0.8	0.5	3.4

Intersection Summary	
HCM 7th Control Delay, s/veh	59.6
HCM 7th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

2050 PM Build Scenario

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	371	792	466	489	635	386	501	529	795	294	244
Future Volume (vph)	371	792	466	489	635	386	501	529	795	294	244
Lane Group Flow (vph)	379	808	476	499	648	394	511	540	811	300	451
Turn Type	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4	5	3	8	1	5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	5	3	8	1	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	15.0	5.0	5.0	15.0	5.0	5.0	10.0	5.0	5.0	10.0
Minimum Split (s)	12.9	25.9	13.3	12.9	25.9	13.3	13.3	26.3	12.9	13.3	26.3
Total Split (s)	27.9	40.1	37.6	28.9	41.1	33.0	37.6	43.0	28.9	33.0	38.4
Total Split (%)	19.2%	27.7%	25.9%	19.9%	28.3%	22.8%	25.9%	29.7%	19.9%	22.8%	26.5%
Yellow Time (s)	5.1	5.1	4.8	5.1	5.1	4.8	4.8	4.8	5.1	4.8	4.8
All-Red Time (s)	2.8	2.8	3.5	2.8	2.8	3.5	3.5	3.5	2.8	3.5	3.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.9	7.9	8.3	7.9	7.9	8.3	8.3	8.3	7.9	8.3	8.3
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Max	None	None	Max
v/c Ratio	0.82	0.98	0.60	0.99	0.75	0.51	0.80	0.61	1.08	0.99	0.50
Control Delay (s/veh)	76.3	81.8	23.1	99.9	58.0	23.0	67.1	52.4	89.2	107.6	36.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	76.3	81.8	23.1	99.9	58.0	23.0	67.1	52.4	89.2	107.6	36.9
Queue Length 50th (ft)	175	383	232	239	289	196	232	229	~796	286	133
Queue Length 95th (ft)	232	#512	338	#355	359	296	289	289	#1052	#482	192
Internal Link Dist (ft)		641			873			598			636
Turn Bay Length (ft)	565		220	750		430	500		425	450	
Base Capacity (vph)	488	827	830	502	863	769	715	891	754	304	905
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.98	0.57	0.99	0.75	0.51	0.71	0.61	1.08	0.99	0.50

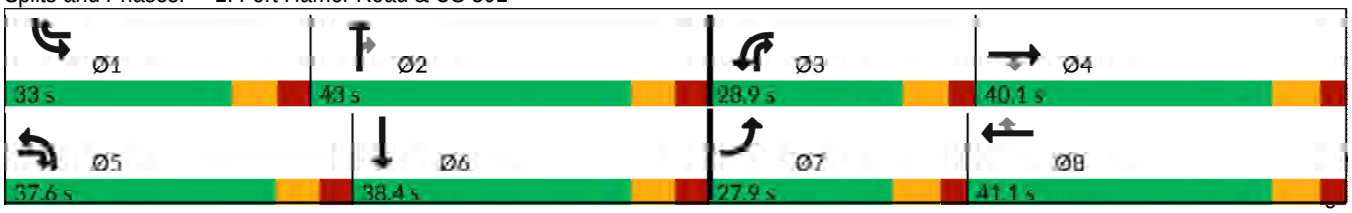
Intersection Summary

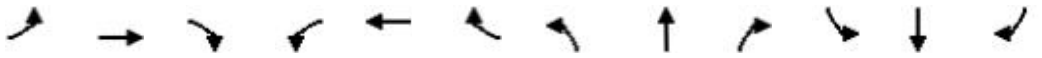
Cycle Length: 145
Actuated Cycle Length: 145
Natural Cycle: 110
Control Type: Actuated-Uncoordinated

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Fort Hamer Road & US 301





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	371	792	466	489	635	386	501	529	795	294	244	198
Future Volume (veh/h)	371	792	466	489	635	386	501	529	795	294	244	198
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width 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
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1841	1841	1841	1870	1870	1870	1885	1885	1885
Adj Flow Rate, veh/h	379	808	323	499	648	266	511	540	505	300	249	125
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	4	4	4	2	2	2	1	1	1
Cap, veh/h	431	831	608	508	905	649	576	895	609	306	594	288
Arrive On Green	0.12	0.22	0.22	0.14	0.25	0.25	0.16	0.24	0.24	0.17	0.25	0.25
Sat Flow, veh/h	3563	3741	1585	3506	3681	1560	3563	3741	1585	1795	2397	1164
Grp Volume(v), veh/h	379	808	323	499	648	266	511	540	505	300	194	180
Grp Sat Flow(s),veh/h/ln	1781	1870	1585	1753	1841	1560	1781	1870	1585	1795	1885	1676
Q Serve(g_s), s	15.2	31.1	22.9	20.6	23.4	17.4	20.4	18.6	34.7	24.1	12.5	13.1
Cycle Q Clear(g_c), s	15.2	31.1	22.9	20.6	23.4	17.4	20.4	18.6	34.7	24.1	12.5	13.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.69
Lane Grp Cap(c), veh/h	431	831	608	508	905	649	576	895	609	306	467	415
V/C Ratio(X)	0.88	0.97	0.53	0.98	0.72	0.41	0.89	0.60	0.83	0.98	0.42	0.43
Avail Cap(c_a), veh/h	491	831	608	508	905	649	720	895	609	306	467	415
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.7	56.0	34.6	61.8	50.0	29.8	59.5	49.0	40.4	59.9	45.7	45.9
Incr Delay (d2), s/veh	15.2	24.6	0.9	35.4	2.7	0.4	11.0	3.0	12.4	46.1	2.7	3.3
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	12.1	23.8	13.5	16.9	16.2	10.6	15.0	13.8	24.6	20.9	10.2	9.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	77.8	80.6	35.4	97.2	52.8	30.2	70.4	52.0	52.7	106.0	48.4	49.2
LnGrp LOS	E	F	D	F	D	C	E	D	D	F	D	D
Approach Vol, veh/h		1510			1413			1556			674	
Approach Delay, s/veh		70.2			64.2			58.3			74.3	
Approach LOS		E			E			E			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	33.0	43.0	28.9	40.1	31.8	44.2	25.5	43.5
Change Period (Y+Rc), s	8.3	8.3	* 7.9	* 7.9	8.3	8.3	* 7.9	* 7.9
Max Green Setting (Gmax), s	24.7	34.7	* 21	* 32	29.3	30.1	* 20	* 33
Max Q Clear Time (g_c+I1), s	26.1	36.7	22.6	33.1	22.4	15.1	17.2	25.4
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	1.1	1.7	0.4	3.0

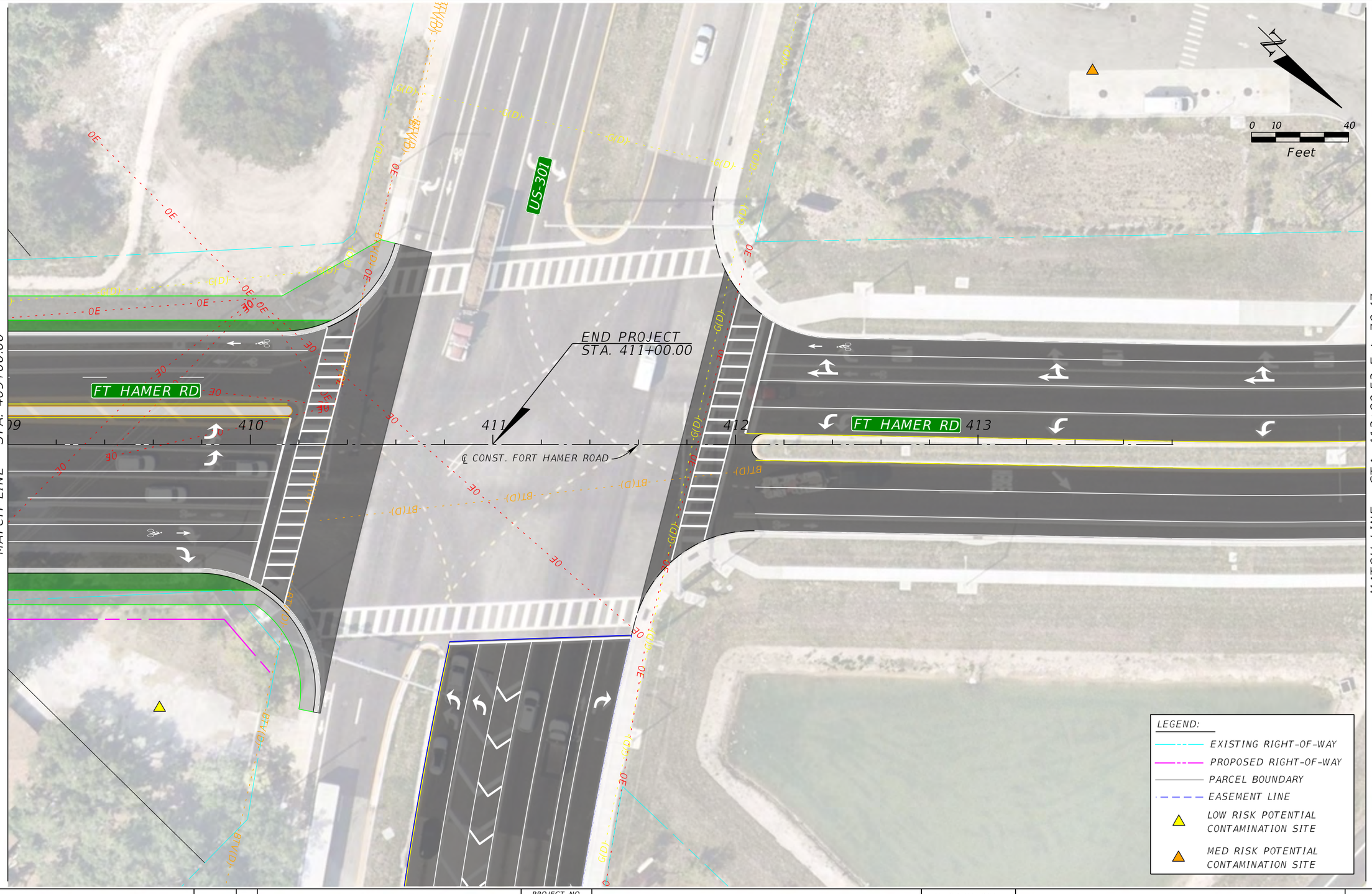
Intersection Summary	
HCM 7th Control Delay, s/veh	65.5
HCM 7th LOS	E

Notes

* HCM 7th computational engine requires equal clearance times for the phases crossing the barrier.

Attachment F

Proposed Concept Plan



No.	REVISIONS	DATE	BY

Kimley»Horn

KIMLEY-HORN AND ASSOCIATES, INC.
201 NORTH FRANKLIN STREET, SUITE 1400, TAMPA, FL 33602
PHONE: (813) 620-1460
WWW.KIMLEY-HORN.COM

PROJECT NO. 6118060
DATE AUGUST 2024
SCALE AS SHOWN
DESIGNED BY
DRAWN BY
CHECKED BY

Manatee County FLORIDA

MANATEE COUNTY — FT. HAMER ROAD — FL

LICENSED PROFESSIONAL
SHARI K. BARNWELL, P.E.
FL LICENSE NUMBER 71357
DATE:

CONCEPT PLAN (39)

SHEET NUMBER

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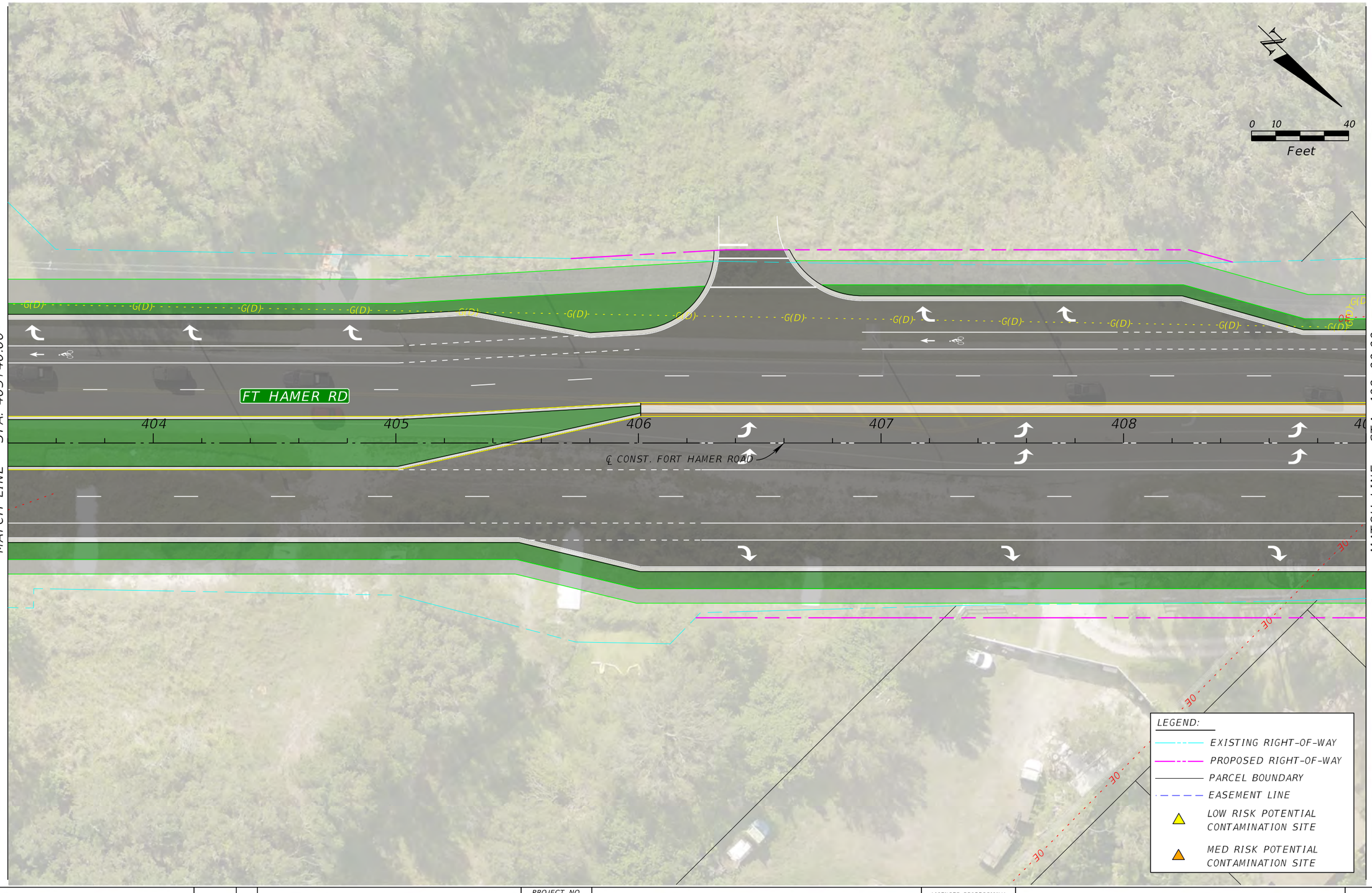

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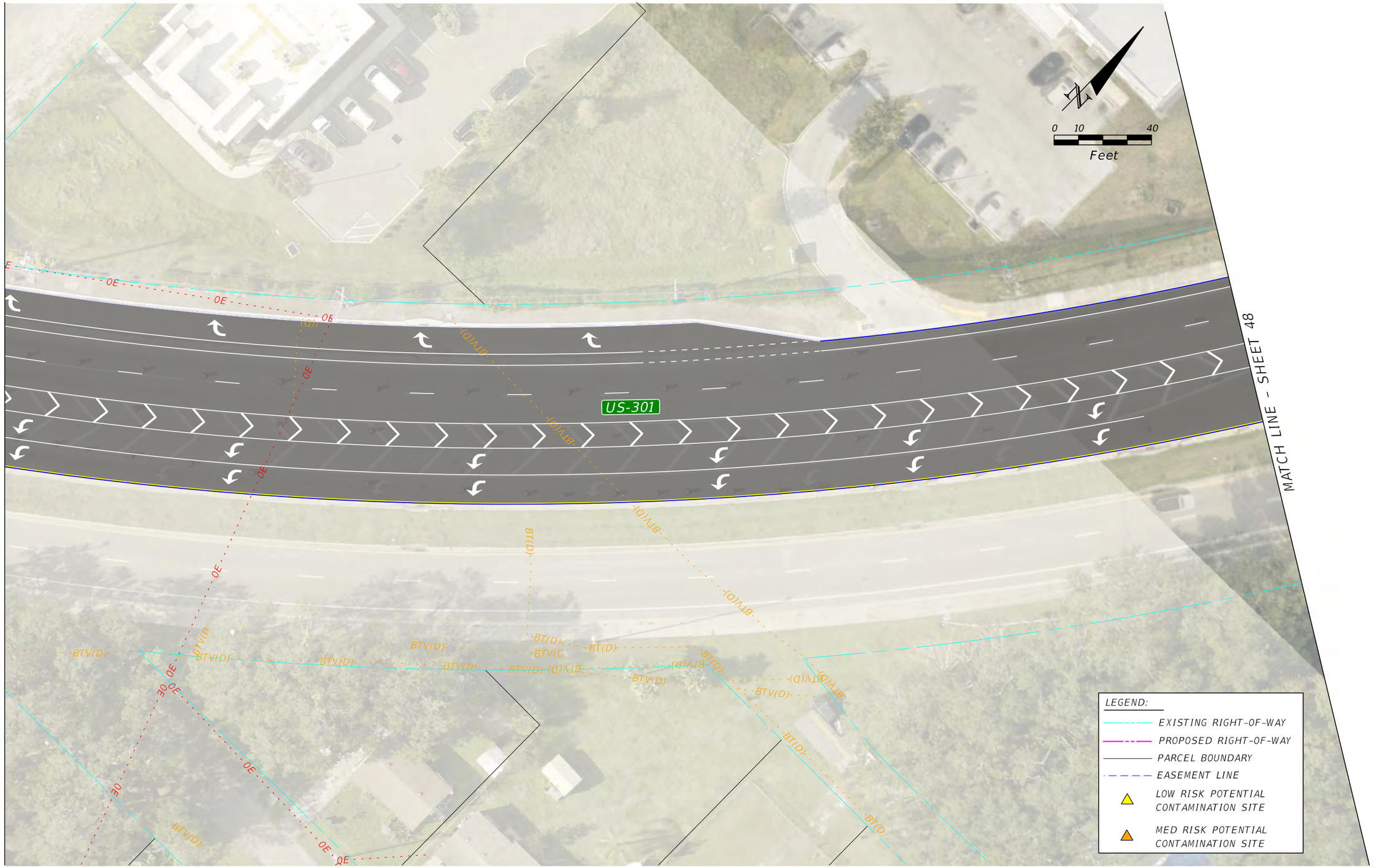
CONCEPT PLAN (38)

SHEET NUMBER 41



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FL LICENSE NUMBER 71357
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CONCEPT PLAN (47)

SHEET NUMBER 50

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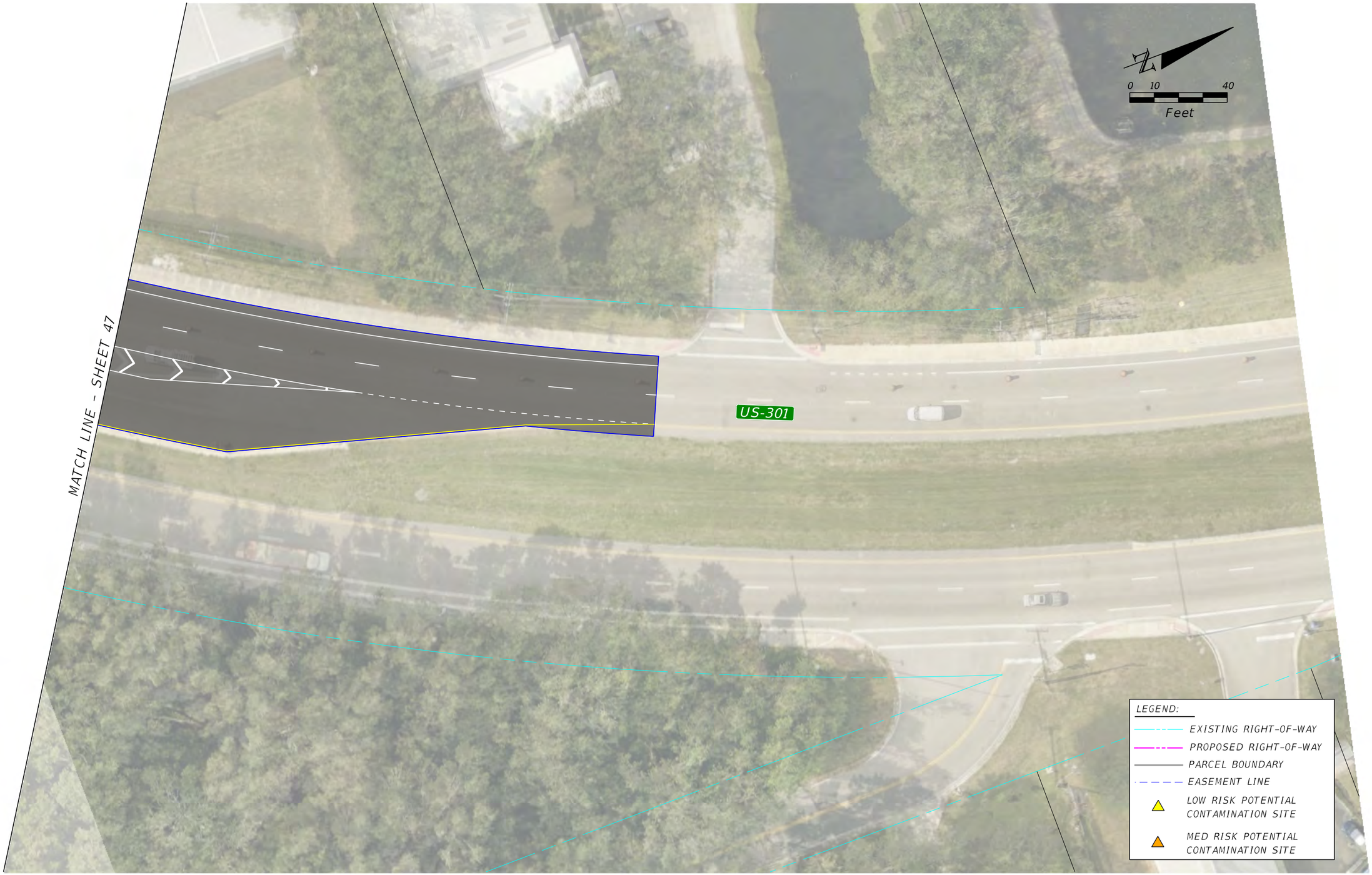

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FL LICENSE NUMBER 71357
DATE:

CONCEPT PLAN (48)

SHEET NUMBER 51

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Stage 1 Intersection Control Evaluation
Fort Hamer Road at US 301

Cris Schooley, P.E.
Kimley-Horn and Associates, Inc.
200 N Orange Ave, Suite 600
Orlando, FL 32801

Manatee County
FLORIDA