CERTIFICATION

AGENCY: Florida Department of Transportation District One
801 North Broadway Avenue
Bartow, Florida 33831-1249

I hereby certify that I am a registered professional engineer in the State of Florida and that I have supervised the preparation of, and approved the analysis, findings, opinions, conclusions and technical advice hereby reported for:

REPORT: SR 72/Lorraine Road Intersection Control Evaluation (ICE) - Stage 1

PROJECT: SR 72 Project Development and Environment (PD&E) Study

LOCATION: SR 72 from East of I-75 to Lorraine Road
Sarasota County, Florida

ROADWAY ID: 17070000

MILEPOST No: 7.967

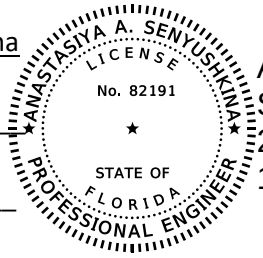
FPID No.: 444634-1-22-01

I acknowledge that the procedures and references used to develop the information contained in this memorandum are standard to the professional practice of transportation engineering as applied through professional judgement and experience.

Engineer in Responsible Charge: Anastasiya A. Senyushkina

Professional Registration No.: 82191

Date: 2/5/2024



Anastasiya A Senyushkina
2024.02.05 12:31:36-05'00'

AIM Engineering & Surveying, Inc.

MEMORANDUM

Tampa Office
201 E. Kennedy Boulevard, Suite 1800
Tampa, Florida 33602
813-627-4144
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Date:	February 5, 2024
To:	Steven Andrews, P.E. – FDOT District One DEMO Project Manager
From:	Greg Root/Anastasiya Senyushkina, P.E.
Subject:	SR 72 at Lorraine Road Intersection (Sarasota County) –- Stage 1+ Intersection Control Evaluation

INTRODUCTION/PROJECT BACKGROUND

This memorandum documents the Intersection Control Evaluation (ICE) conducted for the Lorraine Road intersection. This analysis was conducted in support of the SR 72 Project Development & Environment (PD&E) Study from east of I-75 to Lorraine Road in Sarasota County. The length of the study corridor is approximately 2.7 miles. This PD&E study is evaluating the costs and impacts of widening (i.e., four-laning) SR 72 from Hummingbird Avenue to Lorraine Road. This PD&E study is also looking to reduce the posted speeds/target speeds within the corridor. The overall PD&E study goals are to determine the location and conceptual design of the improvement(s) that satisfy the purpose and need for the project, while also minimizing the impacts to the natural and social environment and satisfying the requirements of the National Environmental Policy Act (NEPA). This memorandum documents the Stage 1 CAP-X and SPICE analyses, as well as the detailed traffic operations analyses conducted using the SIDRA software.

EXISTING ROADWAY/INTERSECTION CHARACTERISTICS

This intersection is a four-legged intersection. Lorraine Road is the north and south legs of this intersection. The land in the northwest and northeast quadrants of the intersection is currently undeveloped. A large residential development (i.e., Skye Ranch) is currently being constructed on the east side of Lorraine Road south of SR 72. An aerial image depicting the Lorraine Road intersection is provided in **Figure 1**, which is included in **Appendix A.** Until recently, this intersection was operating under two-way stop control. A one-lane roundabout has been constructed at this location and is now open to traffic. The posted speed limit on SR 72 in the vicinity of this intersection is 55 miles per hour (mph). The posted speed limits on Lorraine Road are 55 mph (north leg) and 45 mph (south leg). SR 72 is a two-lane undivided roadway with 12-foot travel lanes and five-foot designated bicycle lanes both west and east of Lorraine Road. There are no sidewalks on either SR 72 or Lorraine Road. The context classification of this roadway is C3R (Suburban Residential). East of Lorraine Road, SR 72 has a context classification C2 (Rural) and a 55 mph speed limit.

Crash data from Signal Four Analytics was provided by District One for the years 2017 through 2021. The crash data is included in **Appendix B**. The intersection has experienced 17 crashes over this five-

year period, resulting in seven injuries and no fatalities. The most prevalent crash types are rear-end crashes (eight) and left-turn/angle crashes (five). Two crashes involved animals. There were no crashes involving bicyclists or pedestrians. The May 2022 traffic count data obtained in support of the PD&E study indicates that Traffic Signal Warrants No. 1, 2 and 3 of the Manual on Uniform Traffic Control Devices are satisfied. The existing traffic count data and the signal warrant summary sheets are also provided in **Appendix B**.

INTERSECTION CONTROL EVALUATION

The proposed typical section includes four 11-foot travel lanes (two in each direction), a 22-foot median and 12-foot shared use paths on both sides of SR 72. The FDOT-approved design speed/target speed for the proposed SR 72 typical section in this area is 45 mph. This speed is 10 mph lower than the existing posted speed limit. The following alternative intersection control strategies were initially analyzed for this intersection:

- Conventional Traffic Signal
- Signalized Restricted Crossing U-Turn (RCUT)
- Signalized Thru-Cut
- Median U-Turn (MUT)
- Partial MUT
- Bowtie
- Two-lane x two-lane roundabout

The opening year (2030) and design year (2050) Average Annual Daily Traffic (AADT) volumes documented in the SR 72 Project Traffic Analysis Report are provided in **Appendix C** along with the 2050 a.m. and p.m. peak hour volumes documented in this same report. The magnitude of the 2050 AADT volumes on Lorraine Road would require that this roadway be widened to four lanes to provide acceptable levels of service. The results of the CAP-X and SPICE analyses are summarized in **Table 1**. The CAP-X and SPICE analysis summary sheets for this intersection are provided in **Appendix D**.

Table 1: Stage 1 ICE Analysis Summary - Lorraine Road Intersection

	2050 V/C Ratios		Life-Cycle Crashes		SSI Scores	
Intersection Type	AM Peak Hour	PM Peak Hour	Total	Fatal & Injury	Opening Year	Design Year
Conventional Signalized Intersection	0.64	0.60	105	35	96	88
Signalized RCUT (EW)	0.82	0.77	131	35	95	86
Signalized Thru-Cut (EW)	0.61	0.60	n/a	n/a	95	86
Median U-Turn (EW)	0.80	0.74	66	27	95	85
Partial Median U-Turn (NS)	0.78	0.70	n/a	n/a	n/a	n/a
Bowtie (EW)	0.84	0.74	n/a	n/a	96	89
Roundabout (2EW x 2NS)	**1.01**	0.95	254	35	99	96

Lowest number of crashes of all alternatives analyzed

n/a = No Safety Performance Function (SPF) available

The signalized RCUT, signalized thru-cut, MUT, and PMUT alternatives would not provide positive speed control. Consequently, these signalized alternatives were eliminated from any further consideration. The two-lane by two-lane roundabout alternative is compatible with the single lane roundabout that was constructed at this intersection earlier this year. It is also projected to have the highest opening year and design year SSI scores.

Design year (2050) peak hour SIDRA analyses were subsequently conducted for the roundabout to determine the optimal geometry and the results are summarized in **Table 2.** With two exceptions, all of the intersection approaches are projected to operate with v/c ratios less than or equal to 1.00 during both peak hours. The westbound approach in the a.m. peak hour and the northbound approach in the p.m. peak hour are projected to be slightly overcapacity in the design year with v/c ratios equal to 1.01. Based on the magnitude of these v/c ratios, these two intersection approaches are expected to reach capacity between 2049 and 2050. The overall average peak hour intersection delays are representative of Level of Service E operations. The design year SIDRA analysis summary sheets are provided in **Appendix E**.

Table 2: Design Year (2050) Peak Hour Operational Analysis Summary - Lorraine Road Roundabout

AM Peak Hour

Intersection Approach	V/C Ratio [1]	Avg. Delay	LOS
Northbound	0.87	40.7	E
Southbound	0.91	49.3	E
Westbound	**1.01**	70.4	F
Eastbound	0.74	24.4	C
Overall	**1.01**	46.7	E

PM Peak Hour

Intersection Approach	V/C Ratio [1]	Avg. Delay	LOS
Northbound	**1.01**	67.4	F
Southbound	0.38	11.6	B
Westbound	0.83	39.0	E
Eastbound	0.58	17.5	C
Overall	**1.01**	35.9	E

[1] *Highest volume-to-capacity ratio of any approach movements*

An initial geometric improvement concept was developed for this two-lane roundabout and is provided in **Appendix F**. The proposed roundabout geometry includes a southbound right-turn bypass lane and an eastbound right-turn bypass lane. Some additional right-of-way is required for the two-lane roundabout but this would not result in any residential or business relocations.

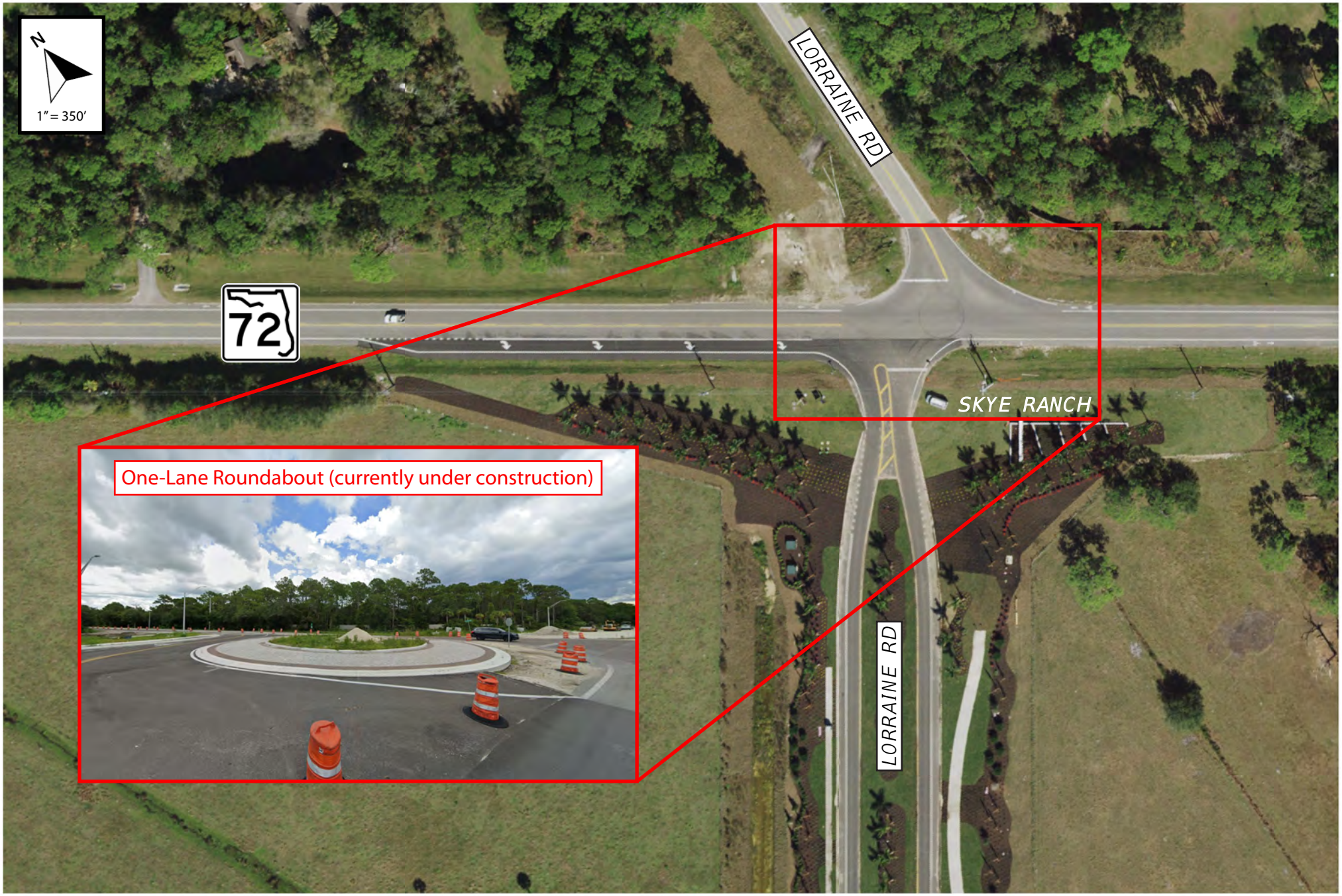
RECOMMENDED INTERSECTION CONTROL STRATEGY

The implementation of a two-lane roundabout is expected to provide positive speed control in this area and help to facilitate the 45 mph design speed/target speed associated with the proposed SR 72 typical section west of Lorraine Road. Reduced vehicle speeds will provide additional safety benefits for the older driving population that travels within the study corridor. The roundabout is also projected to have the highest SSI scores and is expected to result in acceptable design year peak hour vehicle delays. The implementation of a two-lane roundabout maximizes the value of the current transportation investment that has been made at this intersection with the construction of the one-lane roundabout. Consequently, the PD&E study recommends a two-lane roundabout for the Lorraine Road intersection. A Benefit/Cost analysis, required for federally funded projects, will be conducted for this intersection using updated information during the final design phase of the project.

Appendix A

Existing Intersection Aerial

Figure 1: Existing SR 72 / Lorraine Road Intersection



Appendix B

Historic Crash Data

CRASH_YEAR	ON_STREET_ROAD	FEET_FROM	DIRECTION	FROM_INTERSECTION_OF	LIGHT_CONDITION	WEATHER_CONDITION	ROAD_SURFACE	TYPE_OF_IMPACT	FIRST_HARMFUL_EVENT	S4_CRASH_TYPE	S4_CRASH_TYPE_SIM	S4_CRASH_SEVERITY	S4_INJURY_COUNT	S4_BICYCLIST_COUNT	S4_PEDESTRIAN_COUNT
2020	CLARK RD	0		LORRAINE RD	Daylight	Cloudy	Dry	Other	Motor Vehicle in Transport	Backed Into	Other	No Injury	0	0	0
2021	CLARK RD	24	West	BEE RIDGE RD EXT	Daylight	Clear	Dry	Front to Rear	Motor Vehicle in Transport	Rear End	Rear End	No Injury	0	0	0
2021	CLARK RD	52	West	LORRAINE RD	Daylight	Cloudy	Wet	Front to Rear	Motor Vehicle in Transport	Rear End	Rear End	No Injury	0	0	0
2021	LORRAINE RD	198	North	CLARK RD	Dark - Not Lighted	Clear	Dry		Animal	Animal	Animal	No Injury	0	0	0
2017	BEE RIDGE RD EXT	0		CLARK RD	Daylight	Clear	Dry	Front to Rear	Motor Vehicle in Transport	Rear End	Rear End	No Injury	0	0	0
2018	CLARK RD	0		BEE RIDGE RD EXT	Daylight	Clear	Dry	Front to Rear	Motor Vehicle in Transport	Rear End	Rear End	Injury	1	0	0
2019	LORRAINE RD	0		SR 72 (CLARK RD)	Daylight	Clear	Dry	Front to Rear	Motor Vehicle in Transport	Rear End	Rear End	No Injury	0	0	0
2021	SR-72 (CLARK ROAD	0		LORRAINE ROAD	Daylight	Clear	Dry	Angle	Motor Vehicle in Transport	Right Angle/ Front to Side	Angle	Serious Injury	1	0	0
2021	SR 72	0		LORRAINE RD	Daylight	Clear	Dry	Front to Rear	Motor Vehicle in Transport	Rear End	Rear End	No Injury	0	0	0
2021	LORRAINE RD	0		SR 72	Daylight	Clear	Dry	Front to Rear	Motor Vehicle in Transport	Rear End	Rear End	No Injury	0	0	0
2021	SR 72 (CLARK RD)	0		LORRAINE RD	Daylight	Clear	Dry	Angle	Motor Vehicle in Transport	Left Entering	Left Turn	Injury	2	0	0
2019	CLARK RD	188	West	BEE RIDGE RD EXT	Daylight	Clear	Dry	Front to Rear	Motor Vehicle in Transport	Rear End	Rear End	No Injury	0	0	0
2019	LORRAINE RD	0		CLARK RD	Daylight	Clear	Dry	Front to Front	Motor Vehicle in Transport	Left Leaving	Left Turn	No Injury	0	0	0
2019	CLARK RD	205	West	LORRAINE RD	Daylight	Clear	Wet		Ditch	Off Road	Off Road	No Injury	0	0	0
2019	CLARK RD	241	West	BEE RIDGE RD EXT	Daylight	Clear	Dry		Other Non-Fixed Object	Single Vehicle/ Hit Animal	Other	No Injury	0	0	0
2020	CLARK RD	0		LORRAINE RD	Dark - Not Lighted	Rain	Wet	Angle	Motor Vehicle in Transport	Right Angle/ Fron to Side	Angle	Injury	1	0	0
2020	CLARK RD	0		BEE RIDGE RD EXT	Daylight	Clear	Dry	Angle	Motor Vehicle in Transport	Right Angle/ Front to Side	Angle	Injury	2	0	0
													7		

Appendix C

Opening Year and Design Year Traffic Volumes

FIGURE 3-4: OPENING YEAR (2030) AADT VOLUMES - BUILD ALTERNATIVE

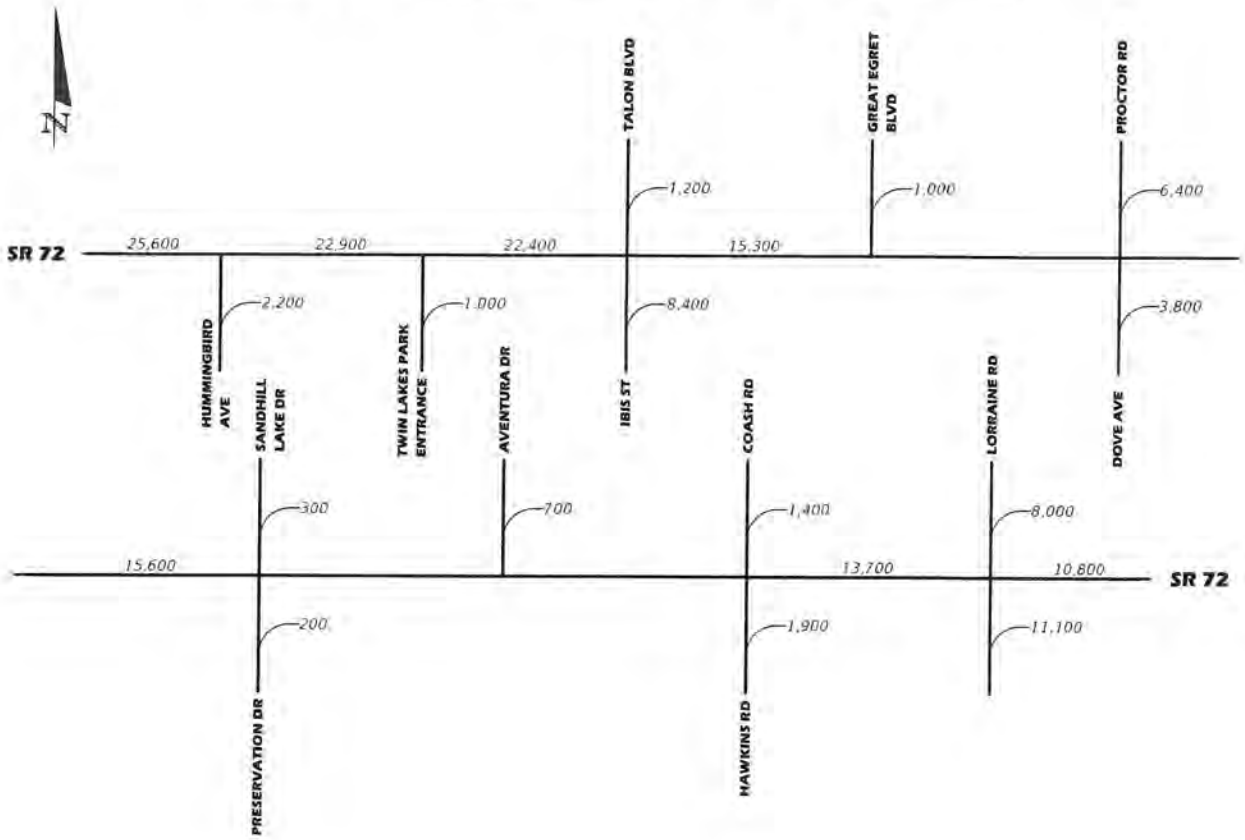


FIGURE 3-2: DESIGN YEAR (2050) AADT VOLUMES - BUILD ALTERNATIVE

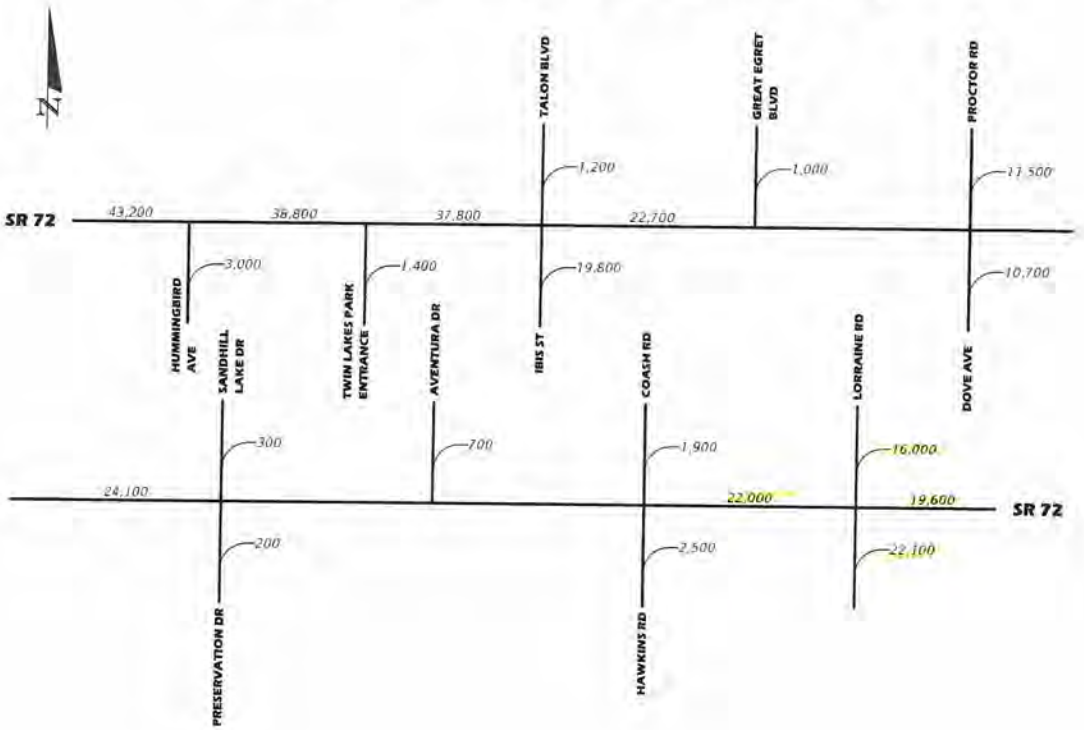


FIGURE 3-7: DESIGN YEAR (2050) AM PEAK HOUR VOLUMES - BUILD ALTERNATIVE

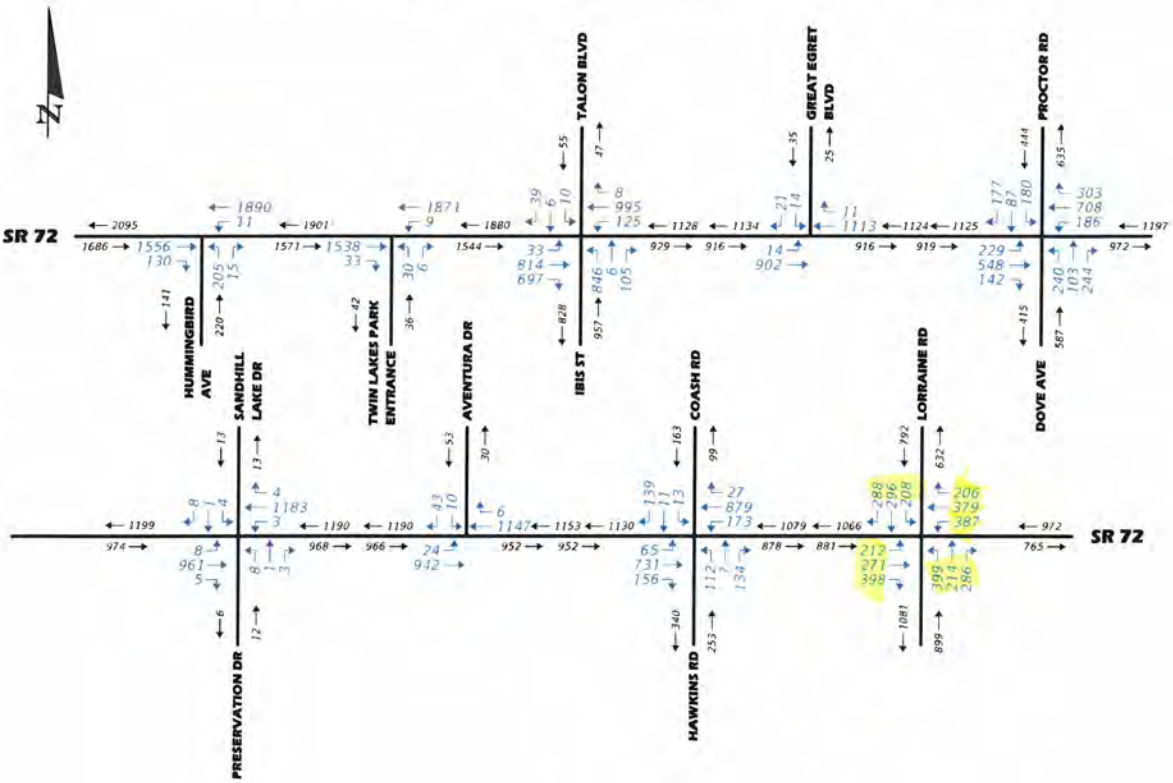
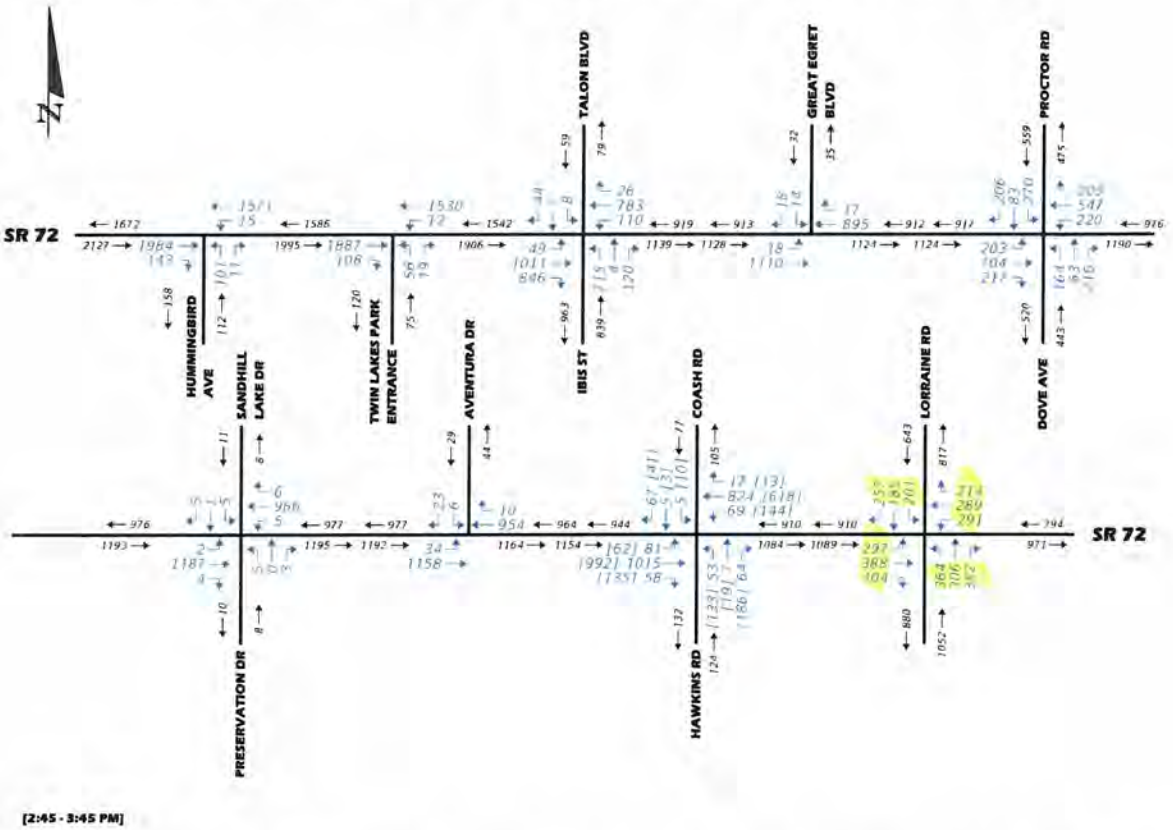


FIGURE 3-8: DESIGN YEAR (2050) PM PEAK HOUR VOLUMES - BUILD ALTERNATIVE



Design year weekend (i.e., Saturday) peak hour volumes were also estimated for the Twin Lakes Park entrance/exit and the Talon Boulevard/Ibis Street intersection for the Build Alternative. The methodology used to estimate the 2050 weekend peak hour volumes for these two intersections consisted of the following steps:

- Step 1 – The 2022 weekday total peak hour entering volumes were calculated for both peak hours.
- Step 2 – The 2050 weekday total peak hour entering volumes were calculated for both peak hours.
- Step 3 – The overall growth in total peak hour weekday entering volumes was calculated for both peak hours and the average of these two values was calculated.
- Step 4 – The 2022 weekend peak hour intersection approach volumes were multiplied by the average overall growth in total peak hour weekday entering volumes calculated in Step 3. This yielded estimates of the 2050 weekend peak hour intersection approach volumes.
- Step 5 – The 2050 weekend peak hour intersection turning movement volumes were estimated by multiplying the 2050 weekend peak hour intersection approach volumes by the existing weekend peak hour turning movement percentages.

LORRAINE ROAD INTERSECTION

DESIGN YEAR (2050) PEAK HOUR APPROACH TRUCK PERCENTAGES

AM PEAK HOUR								
EB LT		EB TH		EB RT		EB APPROACH		
Vol.	Truck %	Vol.	Truck %	Vol.	Truck %	Vol.	Truck Vol.	Truck %
212	0.06	271	0.11	398	0.12	881	90	10.2%
WB LT		WB TH		WB RT		WB APPROACH		
Vol.	Truck %	Vol.	Truck %	Vol.	Truck %	Vol.	Truck Vol.	Truck %
387	0.02	379	0.10	206	0.10	972	66	6.8%
NB LT		NB TH		NB RT		NB APPROACH		
Vol.	Truck %	Vol.	Truck %	Vol.	Truck %	Vol.	Truck Vol.	Truck %
399	0.09	214	0.02	286	0.12	899	75	8.3%
SB LT		SB TH		SB RT		SB APPROACH		
Vol.	Truck %	Vol.	Truck %	Vol.	Truck %	Vol.	Truck Vol.	Truck %
208	0.18	296	0.09	288	0.06	792	81	10.3%
PM PEAK HOUR								
EB LT		EB TH		EB RT		EB APPROACH		
Vol.	Truck %	Vol.	Truck %	Vol.	Truck %	Vol.	Truck Vol.	Truck %
297	0.06	388	0.11	404	0.12	1089	109	10.0%
WB LT		WB TH		WB RT		WB APPROACH		
Vol.	Truck %	Vol.	Truck %	Vol.	Truck %	Vol.	Truck Vol.	Truck %
291	0.02	289	0.05	214	0.06	794	33	4.2%
NB LT		NB TH		NB RT		NB APPROACH		
Vol.	Truck %	Vol.	Truck %	Vol.	Truck %	Vol.	Truck Vol.	Truck %
364	0.02	306	0.02	382	0.02	1052	21	2.0%
SB LT		SB TH		SB RT		SB APPROACH		
Vol.	Truck %	Vol.	Truck %	Vol.	Truck %	Vol.	Truck Vol.	Truck %
201	0.02	185	0.04	257	0.04	643	22	3.4%

Lorraine Road Intersection - AM Peak Hour Volumes

Mvmt	Year				
	2050	2030	2045	2047	2048
EB LT	212	175	203	206	208
EB TH	271	209	256	262	265
EB RT	398	197	348	368	378
WB LT	387	112	318	346	360
WB TH	379	328	366	371	374
WB RT	206	100	180	190	195
NB LT	399	183	345	367	377
NB TH	214	75	179	193	200
NB RT	286	85	236	256	266
SB LT	208	91	179	190	196
SB TH	296	100	247	267	276
SB RT	288	209	268	276	280

Appendix D

CAP-X and SPICE Analysis Summary Sheets

Capacity Analysis for Planning of Junctions

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Project Name:	SR 72 PD&E Study from East of I-75 to Lorraine Road
Project Number:	FPID No. 444634-1-22-01
Location:	SR 72 at Lorraine Road
Date:	Design Year (2050) AM Peak Hour
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	212	271	398	10.20%	0.00%
Westbound	0	387	379	206	6.80%	0.00%
Southbound	0	208	296	288	10.30%	0.00%
Northbound	0	399	214	286	8.30%	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

Detailed Report - Page 2 of 4

Number of Lanes for Non-roundabout Intersections

TYPE OF INTERSECTION	Sheet	Northbound				Southbound				Eastbound				Westbound			
		U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Traffic Signal	FULL		1	2	1		1	2	1		1	2	1		2	2	1
Signalized Restricted Crossing U-Turn	E-W				2				2	2	1	2	1	2	2	2	1
Median U-Turn	E-W			2	2			2	2	2		2	1	2		2	1
Signalized ThruCut	E-W		1		2		1		2		1	2	1		2	2	1

Number of Lanes for Interchanges

TYPE OF INTERCHANGE	Sheet	Northbound				Southbound				Eastbound				Westbound			
		U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R

Capacity Analysis for Planning of Junctions

Detailed Report - Page 3 of 4

Results for Non-roundabout Intersections

TYPE OF INTERSECTION	Sheet	Zone 1 (North)		Zone 2 (South)		Zone 3 (East)		Zone 4 (West)		Zone 5 (Center)		Overall v/c Ratio	Ped Accommodations	Bicycle Accommodations
		CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C			
Traffic Signal	FULL									1090	0.64	0.64	4.46	4.49
Signalized Restricted Crossing U-Turn	E-W	1414	0.79	1473	0.82	934	*0.52*	833	*0.46*			0.82	2.61	4.14
Median U-Turn	E-W					935	*0.52*	887	*0.49*	1439	0.80	0.80	2.73	4.49
Signalized ThruCut	E-W									1062	0.61	0.61	3.37	4.58

Capacity Analysis for Planning of Junctions

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Results for Roundabouts

TYPE OF ROUNDABOUT	Zone 1 (North)			Zone 3 (East)			Zone 2 (South)			Zone 4 (West)			Overall v/c Ratio	Ped Accommodations	Bicycle Accommodations
	Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3			
2 X 2	1.01	0.99		0.87	*0.87*		*0.72*	0.73		0.87	0.87		1.01	4.49	4.50

Results for Interchanges

TYPE OF INTERCHANGE	Sheet	Zone 1 (Rt Mrg)		Zone 2 (Lt Mrg)		Zone 3 (Ctr. 1)		Zone 4 (Ctr. 2)		Zone 5 (Lt Mrg)		Zone 6 (Rt Mrg)		Overall v/c Ratio	Ped Accommodations	Bicycle Accommodations
		CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C			

Capacity Analysis for Planning of Junctions

Detailed Report - Page 1 of 4

Project Name:	SR 72 PD&E Study from East of I-75 to Lorraine Road
Project Number:	FPID No. 444634-1-22-01
Location:	SR 72 at Lorraine Road
Date:	Design Year (2050) AM Peak Hour
Number of Intersection Legs:	4
Major Street Direction:	North-South

Traffic Volume Demand

	Volume (Veh/hr)				Percent (%)	
	U-Turn	Left	Thru	Right	Heavy Vehicles	Volume Growth
Eastbound	0	212	271	398	10.20%	0.00%
Westbound	0	387	379	206	6.80%	0.00%
Southbound	0	208	296	288	10.30%	0.00%
Northbound	0	399	214	286	8.30%	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

Detailed Report - Page 2 of 4

Number of Lanes for Non-roundabout Intersections

TYPE OF INTERSECTION	Sheet	Northbound				Southbound				Eastbound				Westbound			
		U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Traffic Signal	FULL		1	2	1		1	2	1		1	2	1		2	2	1
Partial Median U-Turn	N-S	1		2	1	1		2	1		1	2	1		2	2	1
Bowtie	N-S			2	2			2	2			2	1			2	1

Number of Lanes for Interchanges

TYPE OF INTERCHANGE	Sheet	Northbound				Southbound				Eastbound				Westbound			
		U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R

Capacity Analysis for Planning of Junctions

Detailed Report - Page 3 of 4

Results for Non-roundabout Intersections

TYPE OF INTERSECTION	Sheet	Zone 1 (North)		Zone 2 (South)		Zone 3 (East)		Zone 4 (West)		Zone 5 (Center)		Overall v/c Ratio	Ped Accommodations	Bicycle Accommodations
		CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C			
Traffic Signal	FULL									1090	0.64	0.64	4.46	4.49
Partial Median U-Turn	N-S	977	*0.54*	773	*0.43*					1370	0.78	0.78	2.68	4.49
Bowtie	N-S	808	*0.57*	1150	0.81	616	0.84	589	*0.72*	1438	0.80	0.84	4.29	4.49

Capacity Analysis for Planning of Junctions

Detailed Report - Page 4 of 4

Results for Roundabouts

TYPE OF ROUNDABOUT	Zone 1 (North)			Zone 3 (East)			Zone 2 (South)			Zone 4 (West)			Overall v/c Ratio	Ped Accommodations	Bicycle Accommodations
	Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3			

Results for Interchanges

TYPE OF INTERCHANGE	Sheet	Zone 1 (Rt Mrg)		Zone 2 (Lt Mrg)		Zone 3 (Ctr. 1)		Zone 4 (Ctr. 2)		Zone 5 (Lt Mrg)		Zone 6 (Rt Mrg)		Overall v/c Ratio	Ped Accommodations	Bicycle Accommodations
		CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C			

Capacity Analysis for Planning of Junctions

Detailed Report - Page 1 of 4

Project Name:	SR 72 PD&E Study from East of I-75 to Lorraine Road
Project Number:	FPID No. 444634-1-22-01
Location:	SR 72 at Lorraine Road
Date:	Design Year (2050) PM Peak Hour
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	297	388	404	10.00%	0.00%
Westbound	0	291	289	214	4.20%	0.00%
Southbound	0	201	185	257	3.40%	0.00%
Northbound	0	364	306	382	2.00%	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**
Critical Lane Volume Threshold — 3-phase signal	**Suggested = 1750**	**1750**
Critical Lane Volume Threshold — 4-phase signal	**Suggested = 1700**	**1700**

Capacity Analysis for Planning of Junctions

Detailed Report - Page 2 of 4

Number of Lanes for Non-roundabout Intersections

TYPE OF INTERSECTION	Sheet	Northbound				Southbound				Eastbound				Westbound			
		U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Traffic Signal	FULL		1	2	1		1	2	1		1	2	1		2	2	1
Signalized Restricted Crossing U-Turn	E-W				2				2	2	1	2	1	2	2	2	1
Median U-Turn	E-W			2	2			2	2	2		2	1	2		2	1
Signalized ThruCut	E-W		1		2		1		2		1	2	1		2	2	1

Number of Lanes for Interchanges

TYPE OF INTERCHANGE	Sheet	Northbound				Southbound				Eastbound				Westbound			
		U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R

Capacity Analysis for Planning of Junctions

Detailed Report - Page 3 of 4

Results for Non-roundabout Intersections

TYPE OF INTERSECTION	Sheet	Zone 1 (North)		Zone 2 (South)		Zone 3 (East)		Zone 4 (West)		Zone 5 (Center)		Overall v/c Ratio	Ped Accommodations	Bicycle Accommodations
		CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C			
Traffic Signal	FULL									1024	0.60	0.60	4.46	4.49
Signalized Restricted Crossing U-Turn	E-W	1138	*0.63*	1378	0.77	840	*0.47*	848	*0.47*			0.77	2.61	4.14
Median U-Turn	E-W					850	*0.47*	918	*0.51*	1326	0.74	0.74	2.73	4.49
Signalized ThruCut	E-W									1050	0.60	0.60	3.37	4.58

Capacity Analysis for Planning of Junctions

Detailed Report - Page 4 of 4

Results for Roundabouts

TYPE OF ROUNDABOUT	Zone 1 (North)			Zone 3 (East)			Zone 2 (South)			Zone 4 (West)			Overall v/c Ratio	Ped Accommodations	Bicycle Accommodations
	Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3			
2 X 2	*0.60*	*0.60*		0.77	0.77		0.95	0.95		0.84	0.85		0.95	4.49	4.50

Results for Interchanges

TYPE OF INTERCHANGE	Sheet	Zone 1 (Rt Mrg)		Zone 2 (Lt Mrg)		Zone 3 (Ctr. 1)		Zone 4 (Ctr. 2)		Zone 5 (Lt Mrg)		Zone 6 (Rt Mrg)		Overall v/c Ratio	Ped Accommodations	Bicycle Accommodations
		CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C			

Capacity Analysis for Planning of Junctions

Project Name:	SR 72 PD&E Study from East of I-75 to Lorraine Road
Project Number:	FPID No. 444634-1-22-01
Location:	SR 72 at Lorraine Road
Date:	Design Year (2050) PM Peak Hour
Number of Intersection Legs:	4
Major Street Direction:	North-South

Traffic Volume Demand

	Volume (Veh/hr)				Percent (%)	
	U-Turn	Left	Thru	Right	Heavy Vehicles	Volume Growth
Eastbound	0	297	388	404	10.00%	0.00%
Westbound	0	291	289	214	4.20%	0.00%
Southbound	0	201	185	257	3.40%	0.00%
Northbound	0	364	306	382	2.00%	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

Number of Lanes for Non-roundabout Intersections

TYPE OF INTERSECTION	Sheet	Northbound				Southbound				Eastbound				Westbound			
		U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Traffic Signal	FULL		1	2	1		1	2	1		1	2	1		2	2	1
Partial Median U-Turn	N-S	1		2	1	1		2	1		1	2	1		2	2	1
Bowtie	N-S			2	2			2	2			2	1			2	1

Number of Lanes for Interchanges

TYPE OF INTERCHANGE	Sheet	Northbound				Southbound				Eastbound				Westbound			
		U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R

Capacity Analysis for Planning of Junctions

Results for Non-roundabout Intersections

TYPE OF INTERSECTION	Sheet	Zone 1 (North)		Zone 2 (South)		Zone 3 (East)		Zone 4 (West)		Zone 5 (Center)		Overall v/c Ratio	Ped Accommodations	Bicycle Accommodations
		CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C			
Traffic Signal	FULL									1024	0.60	0.60	4.46	4.49
Partial Median U-Turn	N-S	796	*0.44*	797	*0.44*					1226	0.70	0.70	2.68	4.49
Bowtie	N-S	1035	*0.73*	905	*0.64*	454	*0.64*	658	*0.71*	1327	0.74	0.74	4.29	4.49

Capacity Analysis for Planning of Junctions

Results for Roundabouts

TYPE OF ROUNDABOUT	Zone 1 (North)			Zone 3 (East)			Zone 2 (South)			Zone 4 (West)			Overall v/c Ratio	Ped Accommodations	Bicycle Accommodations
	Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3	Lane 1	Lane 2	Lane 3			

Results for Interchanges

TYPE OF INTERCHANGE	Sheet	Zone 1 (Rt Mrg)		Zone 2 (Lt Mrg)		Zone 3 (Ctr. 1)		Zone 4 (Ctr. 2)		Zone 5 (Lt Mrg)		Zone 6 (Rt Mrg)		Overall v/c Ratio	Ped Accommodations	Bicycle Accommodations
		CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C			

Florida Department of Transportation
Safety Performance for Intersection Control Evaluation Tool

Results

Summary of crash prediction results for each alternative

Project Information

Project Name:	SR 72 PD&E Study from East of I-75 to Lorraine Road	**Intersection Type**	At-Grade Intersection
Intersection:	Lorraine Road	**Opening Year**	2030
Agency:	FDOT District One	**Design Year**	2050
Project Reference:	FPID No.: 444634-1-22-01	**Facility Type**	On Urban and Suburban Arterial
City:	Sarasota County	**Number of Legs**	4-leg
State:	Florida	**1-Way/2-Way**	2-way Intersecting 2-way
Date:	1/30/2024	**# of Major Street Lanes (both directions)**	5 or fewer
Analyst:	AIM Engineering & Surveying, Inc.	**Major Street Approach Speed**	Less than 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? (Open Year)	AADT Within SPF Prediction Range? (Design Year)	Source of Prediction	SSI Score: Opening Year	SSI Score: Design Year	SSI Score: Rank
Traffic Signal	Total	3.33	6.74	104.92	4	Yes	Yes	Calibrated SPF	96	88	3
	Fatal & Injury	1.11	2.30	35.43							
2-lane Roundabout	Total	8.09	16.20	253.90	2	Yes	Yes	Uncalibrated SPF	99	96	1
	Fatal & Injury	1.07	2.30	35.07							
Median U-Turn (MUT)	Total	2.10	4.25	66.10	1	N/A	N/A	CMF	95	85	6
	Fatal & Injury	0.84	1.75	26.93							
Signalized RCUT	Total	3.72	9.00	130.99	3	Yes	No	Uncalibrated SPF	95	86	4
	Fatal & Injury	0.95	2.50	35.29							
Signalized Thru-Cut	Total	No SPF	No SPF	No SPF	--	N/A	N/A	N/A	95	86	5
	Fatal & Injury	No SPF	No SPF	No SPF							
Bowtie	Total	No SPF	No SPF	No SPF	--	N/A	N/A	N/A	96	89	2
	Fatal & Injury	No SPF	No SPF	No SPF							
			--	--							
			--	--							

Legend	
	AADT >= 75%
	AADT >= 50%
	AADT >= 25%
	AADT >= 10%
	AADT > 0%

Appendix E

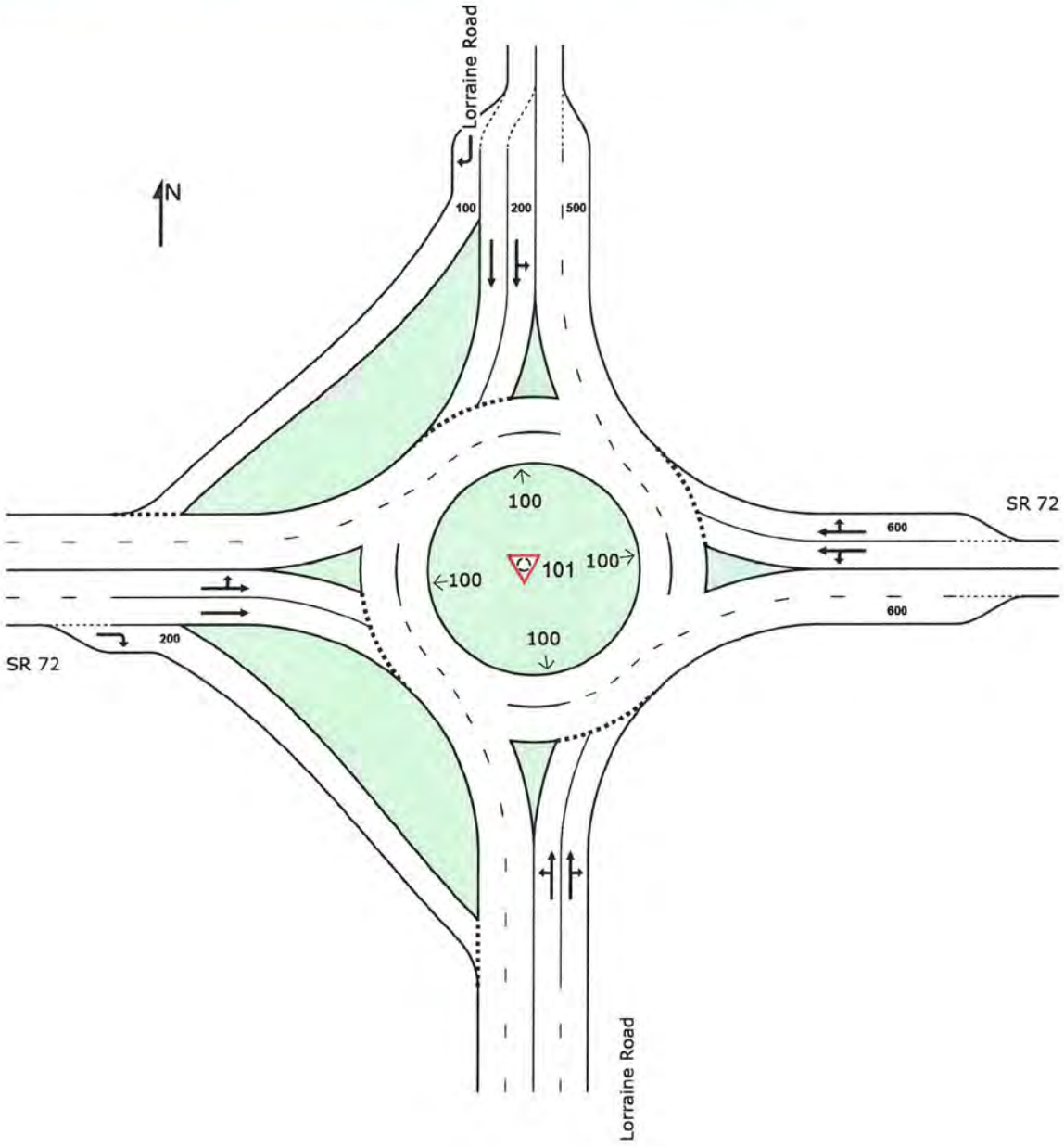
Design Year SIDRA Analysis Summary Sheets

SITE LAYOUT

Site: 101 [Lorraine Road (Site Folder: General)]

Design Year (2050) Build Alternative 1B (SB & EB RT Bypass Lanes) - AM Peak Hour
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [Lorraine Road (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Design Year (2050) Build Alternative 1B (SB & EB RT Bypass Lanes) - AM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Lorraine Road															
3	L2	All MCs	429	9.0	429	9.0	0.869	37.8	LOS E	9.6	255.2	0.95	1.39	2.50	21.7
8	T1	All MCs	230	2.0	230	2.0	0.869	39.1	LOS E	9.6	255.2	0.94	1.36	2.42	22.4
18	R2	All MCs	308	12.0	308	12.0	0.857	46.1	LOS E	8.7	232.2	0.94	1.35	2.37	22.3
Approach			967	8.3	967	8.3	0.869	40.7	LOS E	9.6	255.2	0.94	1.37	2.44	22.0
East: SR 72															
1	L2	All MCs	416	2.0	416	2.0	1.012	65.0	LOS F	19.3	497.8	1.00	2.01	4.29	17.3
6	T1	All MCs	408	10.0	408	10.0	1.012	71.6	LOS F	19.3	497.8	1.00	1.98	4.21	16.9
16	R2	All MCs	222	10.0	222	10.0	1.012	78.5	LOS F	15.9	428.8	1.00	1.97	4.15	16.6
Approach			1045	6.8	1045	6.8	1.012	70.4	LOS F	19.3	497.8	1.00	1.99	4.23	17.0
North: Lorraine Road															
7	L2	All MCs	224	18.0	224	18.0	0.909	75.9	LOS F	5.0	141.3	0.96	1.43	2.60	15.9
4	T1	All MCs	318	9.0	318	9.0	0.909	62.5	LOS F	6.2	166.0	0.96	1.43	2.64	18.2
14	R2	All MCs	310	6.0	310	6.0	0.547	16.4	LOS C	2.8	73.3	0.75	0.86	1.18	28.6
Approach			852	10.3	852	10.3	0.909	49.3	LOS E	6.2	166.0	0.88	1.22	2.10	20.0
West: SR 72															
5	L2	All MCs	228	6.0	228	6.0	0.575	19.0	LOS C	2.7	72.2	0.77	0.91	1.24	26.2
2	T1	All MCs	291	11.0	291	11.0	0.575	27.7	LOS D	2.7	72.2	0.78	0.93	1.26	26.8
12	R2	All MCs	428	12.0	428	12.0	0.738	24.9	LOS C	5.5	150.2	0.85	1.06	1.71	25.6
Approach			947	10.2	947	10.2	0.738	24.4	LOS C	5.5	150.2	0.81	0.98	1.46	26.1
All Vehicles			3811	8.8	3811	8.8	1.012	46.7	LOS E	19.3	497.8	0.91	1.41	2.61	20.7

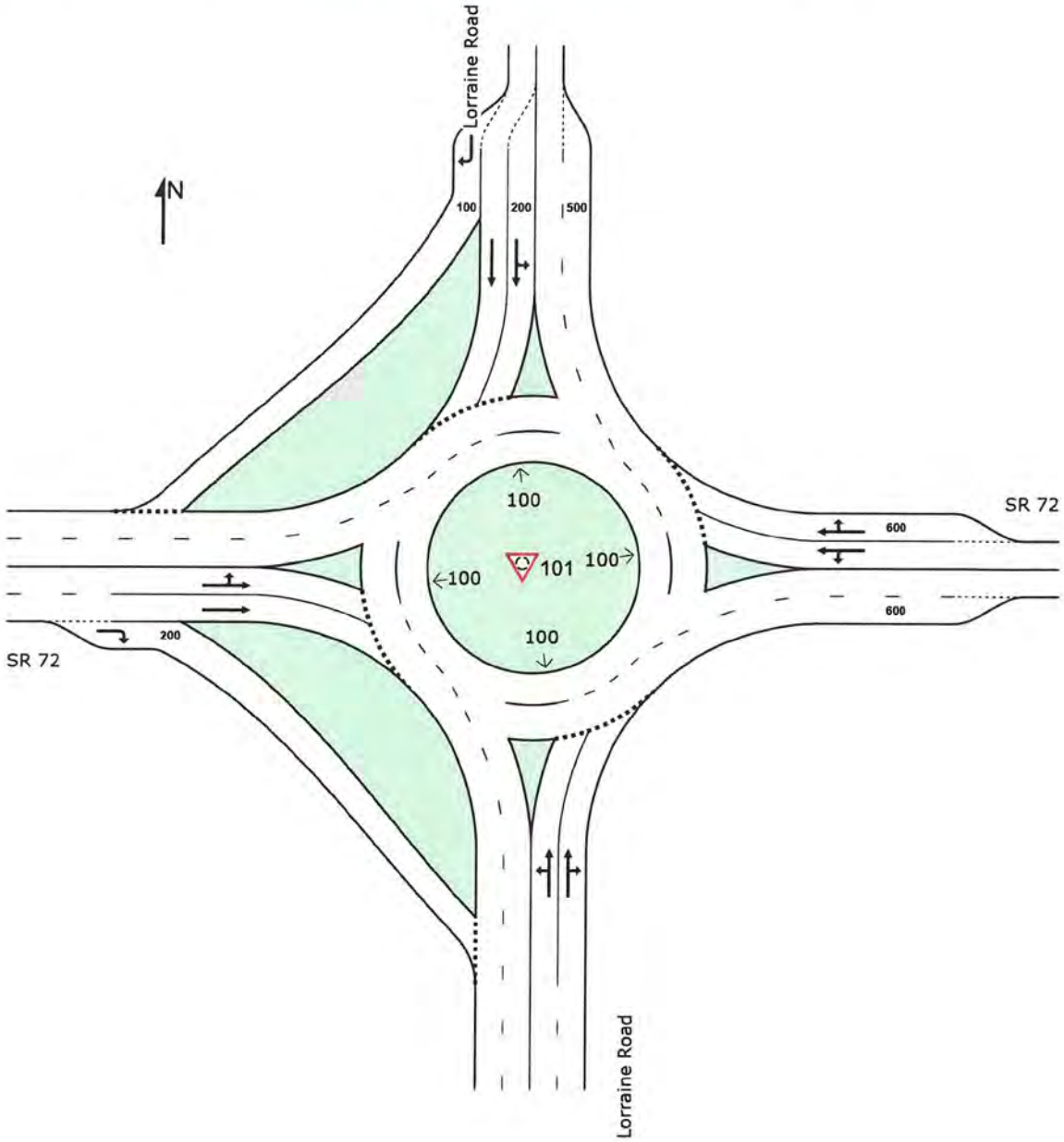
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SITE LAYOUT

Site: 101 [Lorraine Road (Site Folder: General)]

Design Year (2050) Build Alternative 1B (SB & EB RT Bypass Lanes) - PM Peak Hour
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings



MOVEMENT SUMMARY

Site: 101 [Lorraine Road (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

Design Year (2050) Build Alternative 1B (SB & EB RT Bypass Lanes) - PM Peak Hour
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] ft	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed mph
South: Lorraine Road															
3	L2	All MCs	379	2.0	379	2.0	1.006	64.1	LOS F	18.9	481.1	1.00	1.96	4.20	17.6
8	T1	All MCs	319	2.0	319	2.0	1.006	65.9	LOS F	18.9	481.1	1.00	1.91	4.06	17.8
18	R2	All MCs	398	2.0	398	2.0	0.991	71.7	LOS F	16.3	413.9	0.99	1.83	3.82	17.8
Approach			1096	2.0	1096	2.0	1.006	67.4	LOS F	18.9	481.1	1.00	1.90	4.02	17.7
East: SR 72															
1	L2	All MCs	303	2.0	303	2.0	0.834	37.7	LOS E	6.9	177.1	0.91	1.25	2.09	21.7
6	T1	All MCs	301	5.0	301	5.0	0.834	37.6	LOS E	6.9	177.1	0.90	1.25	2.10	22.5
16	R2	All MCs	223	6.0	223	6.0	0.834	42.5	LOS E	6.6	173.6	0.90	1.25	2.10	22.7
Approach			827	4.2	827	4.2	0.834	39.0	LOS E	6.9	177.1	0.90	1.25	2.09	22.3
North: Lorraine Road															
7	L2	All MCs	209	2.0	209	2.0	0.382	12.0	LOS B	1.6	40.4	0.69	0.74	0.88	28.3
4	T1	All MCs	193	4.0	193	4.0	0.382	13.7	LOS B	1.6	40.4	0.71	0.77	0.91	30.0
14	R2	All MCs	268	4.0	268	4.0	0.372	9.7	LOS A	1.6	42.1	0.64	0.61	0.76	31.3
Approach			670	3.4	670	3.4	0.382	11.6	LOS B	1.6	42.1	0.68	0.70	0.84	29.9
West: SR 72															
5	L2	All MCs	309	6.0	309	6.0	0.579	16.1	LOS C	3.6	94.7	0.76	0.85	1.24	27.0
2	T1	All MCs	404	11.0	404	11.0	0.579	23.2	LOS C	3.6	94.7	0.75	0.84	1.24	28.8
12	R2	All MCs	421	12.0	421	12.0	0.555	13.1	LOS B	3.7	100.9	0.69	0.70	1.07	29.7
Approach			1134	10.0	1134	10.0	0.579	17.5	LOS C	3.7	100.9	0.73	0.79	1.18	28.6
All Vehicles			3727	5.2	3727	5.2	1.006	35.9	LOS E	18.9	481.1	0.84	1.20	2.16	23.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
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Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
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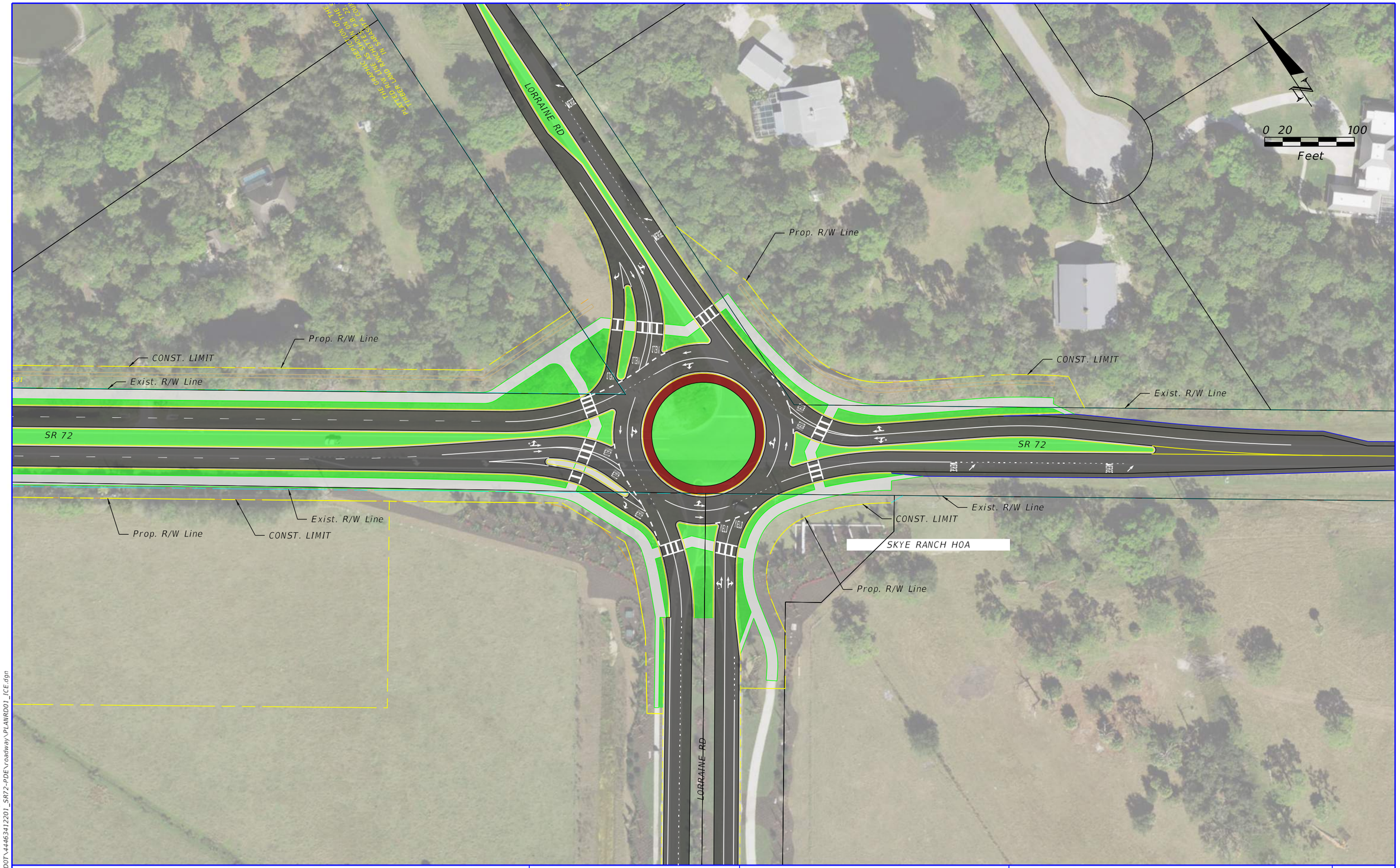
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Appendix F

Preliminary Roundabout Concept and Performance Checks



REVISIONS						
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					ROAD NO. / COUNTY / FINANCIAL PROJECT ID		
					72 / SARASOTA / 444634-1		4

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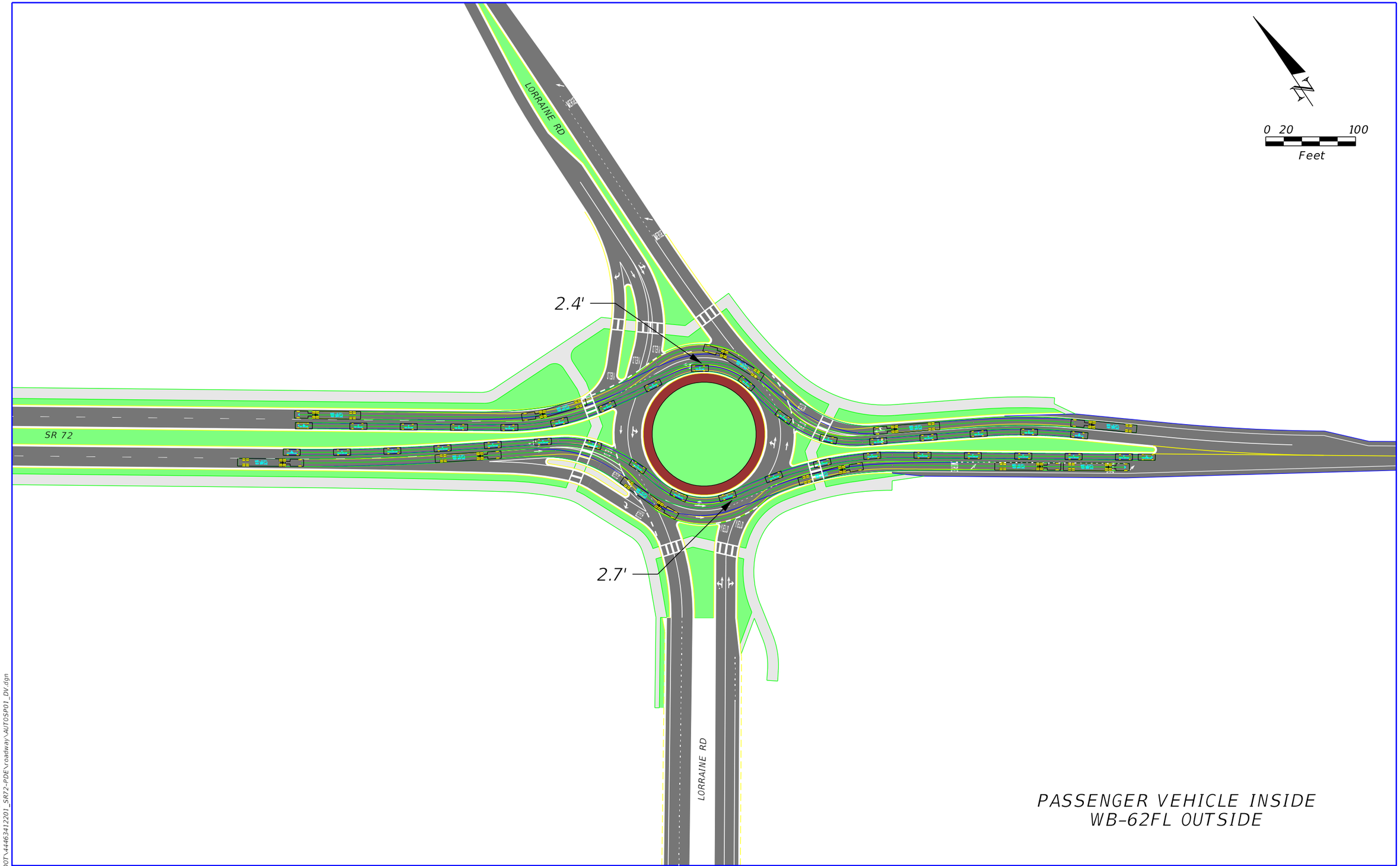

PASSENGER VEHICLE INSIDE
WB-62FL OUTSIDE

REVISIONS				DRAFT SEPTEMBER 7, 2023	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			CONTROL VEHICLE EXHIBIT LORRAINE ROAD INTERSECTION	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
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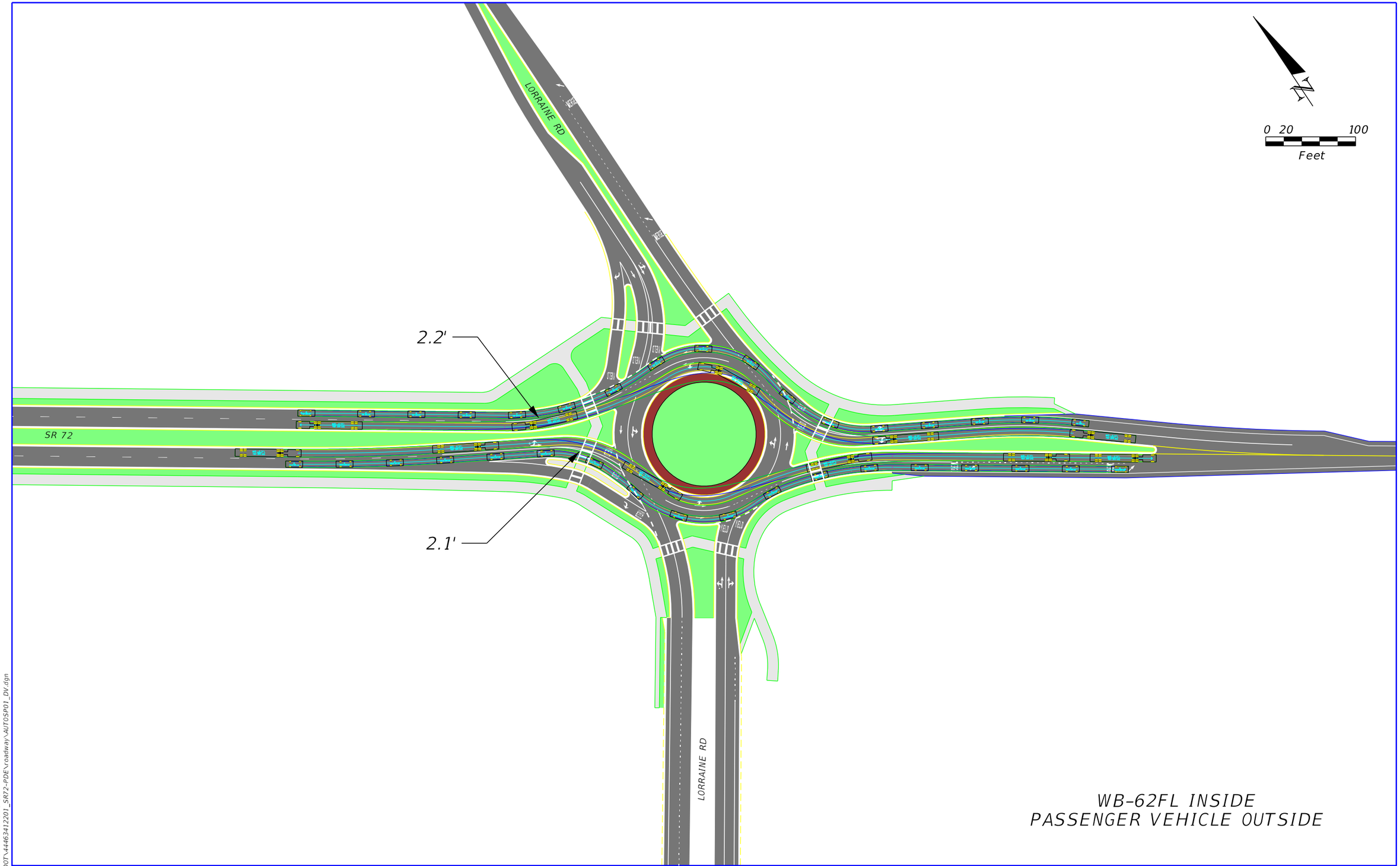

WB-62FL INSIDE
PASSENGER VEHICLE OUTSIDE

REVISIONS				DRAFT SEPTEMBER 7, 2023	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			CONTROL VEHICLE EXHIBIT LORRAINE ROAD INTERSECTION	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
					.	SARASOTA	444634-1		.

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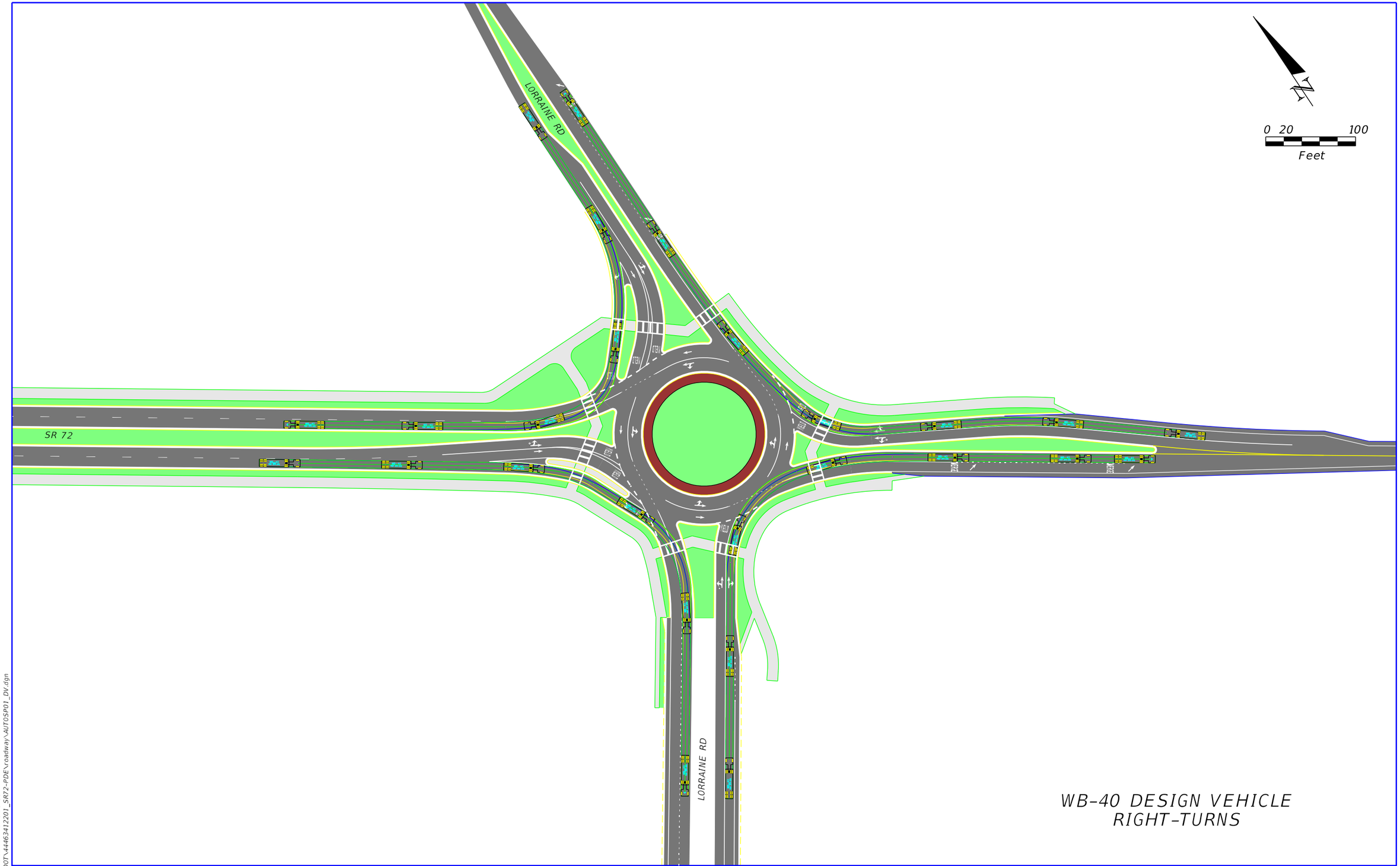

WB-40 DESIGN VEHICLE
RIGHT-TURNS

REVISIONS				DRAFT SEPTEMBER 7, 2023	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			CONTROL VEHICLE EXHIBIT LORRAINE ROAD INTERSECTION	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
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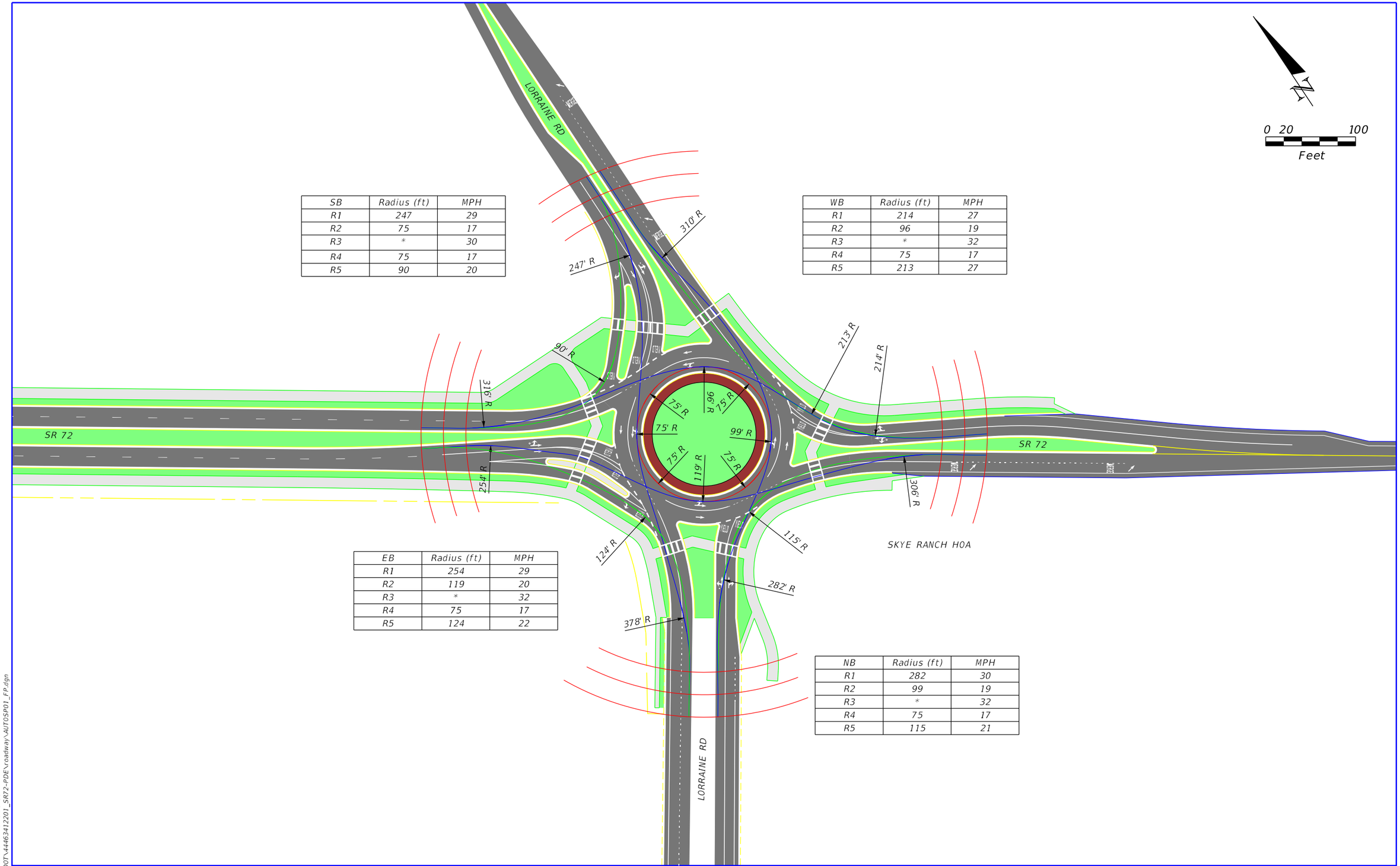

SB	Radius (ft)	MPH
R1	247	29
R2	75	17
R3	*	30
R4	75	17
R5	90	20

WB	Radius (ft)	MPH
R1	214	27
R2	96	19
R3	*	32
R4	75	17
R5	213	27

EB	Radius (ft)	MPH
R1	254	29
R2	119	20
R3	*	32
R4	75	17
R5	124	22

NB	Radius (ft)	MPH
R1	282	30
R2	99	19
R3	*	32
R4	75	17
R5	115	21

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

DRAFT
SEPTEMBER 7, 2023

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
72	SARASOTA	444634-1

FASTEST PATH EXHIBIT
LORRAINE ROAD INTERSECTION

SHEET NO. 4A

9/11/2023 10:47:18 AM Eric.Benson
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