



AGENDA
CITY OF LAKE WORTH BEACH
CITY COMMISSION WORK SESSION - PARKING/FEDERAL HWY
CITY HALL COMMISSION CHAMBER
MONDAY, MAY 09, 2022 - 5:00 PM

ROLL CALL:

PLEDGE OF ALLEGIANCE: led by Commissioner Kimberly Stokes

UPDATES / FUTURE ACTION / DIRECTION

- A. [Federal Highway Update](#)
- B. [Discussion of downtown parking study](#)

ADJOURNMENT:

The City Commission has adopted Rules of Decorum for Citizen Participation (See Resolution No. 25-2021). The Rules of Decorum are posted within the City Hall Chambers, City Hall Conference Room, posted online at: <https://lakeworthbeachfl.gov/government/virtual-meetings/>, and available through the City Clerk's office. Compliance with the Rules of Decorum is expected and appreciated.

If a person decides to appeal any decision made by the board, agency or commission with respect to any matter considered at such meeting or hearing, he or she will need a record of the proceedings, and that, for such purpose, he or she may need to ensure that a verbatim record of the proceedings is made, which record includes the testimony and evidence upon which the appeal is to be based. (F.S. 286.0105)

EXECUTIVE BRIEF WORK SESSION

AGENDA DATE: May 9, 2022

DEPARTMENT: Public Works

TITLE:

Federal Highway Update

SUMMARY:

There have been many conversations about Federal Highway at the Commission, staff, and resident levels for the past few years. With state projects upcoming, now is the time to address these concerns.

BACKGROUND AND JUSTIFICATION:

Last year at the September 21, 2021 Commission meeting, Public Works brought forth an agenda item for the joint funding of a Federal Highway traffic study with the Palm Beach County Transportation Planning Agency (TPA). The background for this study involved two upcoming Florida Department of Transportation (FDOT) Resurfacing Restoration & Rehabilitation (RRR) projects:

- 10th Ave South to 6th Ave North in 2024
- 6th Ave North to Arlington Rd in 2025

In previous City meetings, traffic concerns and possible calming measures have been discussed. One of these measures was the utilization of mini-roundabouts, which necessitated a particular traffic study scope. On September 9th last year, FDOT informed the City of certain aspects this study, to be performed by an FDOT pre-qualified consultant, should contain with a deadline falling at the end of December, 2021 for submittal (the study is included in the backup). This corridor level feasibility study included an ICE (Intersection Control Evaluation) component and examined intersections within the project limits. While ultimately FDOT didn't find the use of mini-roundabouts appropriate for within the corridor (the letter is included in backup), some positives did arise.

In addition to the mini-roundabout discussion, from the beginning Public Works has been adamant in requesting additional traffic calming measures on Federal Highway including:

- Addressing the inconsistent speed limit between the City's northern and southern borders
- Creation of a vertical deflection by raising the existing signalized pedestrian crosswalk adjacent to Sacred Heart School between 4th Ave North and 5th Ave North (would be one of the first on a State road)
- Creation of a vertical deflection by the addition of a raised pedestrian crosswalk east of South Grade Elementary in the vicinity of 7th Ave South to 8th Ave South OR 8th Ave South to 9th Ave South (per FDOT, creating a raised intersection at 7th Ave South is a possibility – also would be one of the first on a State road)

- Use of Rectangular Rapid-Flashing Beacons (RRFB), which the City has recently received approval to utilize from the Federal Highway Administration (letter included in backup material)

The four options mentioned above are currently in discussion on this state project.

DIRECTION:

The 7th Ave South raised intersection traffic calming measure listed within the body of this executive brief would require a resolution of endorsement from the governing body. Should this be a direction in which the City wishes to move, Public Works would add this resolution to the next Commission meeting agenda for approval.

ATTACHMENT(S):

Federal Highway Mini-Roundabouts Report
FDOT Letter
FHA Letter
PBSO Approval
PBC Fire Approval

*Mini-Roundabout Feasibility Analysis & Intersection Control
Evaluation (ICE)
for Submittal to the
Florida Department of Transportation*

SR-5 Mini-Roundabouts Analysis Lake Worth Beach, Florida

Prepared for:
City of Lake Worth Beach; and
Palm Beach Transportation Planning Agency

Prepared by:
Kimley-Horn and Associates, Inc.

Kimley»»Horn

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December 2021
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EXECUTIVE SUMMARY

The City of Lake Worth Beach and the Palm Beach Transportation Planning Agency (TPA) are evaluating speed management strategies to proceed with for the SR-5/Federal Highway corridor in advance of the Florida Department of Transportation (FDOT) starting their upcoming SR-5 resurfacing project. The SR-5 resurfacing project (FM# 446173-1) from 10th Ave S to 6th Ave N is currently in design and is scheduled for construction in fiscal year (FY) 2024.

Currently, SR-5/Federal Highway is a two (2)-lane roadway between 10th Ave S and 6th Ave N with dedicated left-turn lanes at most of the intersections north of Lake Ave. The existing posted speed limit varies between 35 miles per hour (mph) and 25 mph. This report summarizes the results of the mini-roundabouts feasibility analysis and the Intersection Control Evaluation (ICE) results for the five (5) intersections where it was determined that a mini-roundabout could be constructed within the existing right-of-way (ROW). The intent of using mini-roundabouts at the intersections identified within the project limits is to provide speed management along the corridor.

A 2031 design year was utilized for the project and existing traffic was grown utilizing a 2.20 percent (2.20%) historical growth rate. The growth rate was determined based upon historical growth trends at nearby FDOT traffic count stations.

The peak period AM and PM peak hour ICE analyses show that mini-roundabouts are anticipated to provide sufficient capacity and safety at each of the five (5) study intersections along the SR-5 corridor.

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INTRODUCTION

Kimley-Horn and Associates, Inc. was retained by the City of Lake Worth Beach and the Palm Beach TPA to evaluate the feasibility of constructing mini-roundabouts along SR-5/Federal Highway from 10th Ave S to 6th Ave N and conduct an Intersection Control Evaluation (ICE) study for the feasible locations. The study corridor is shown in Figure 1. The study corridor is programmed by FDOT to be resurfaced in FY 2024 (FM# 446173-1). The intent of this analysis is to assess the feasibility of constructing mini-roundabouts along SR-5 which could be utilized as a form of intersection control to assist with speed management between 10th Ave S and 6th Ave N.

Currently SR-5/Federal Highway is a two (2)-lane roadway between 10th Ave S and 6th Ave N, with dedicated left-turn lanes at most intersections north of Lake Ave. The existing posted speed limit is 35 miles per hour (mph) south of 2nd Ave N and 25 mph north of 2nd Ave N.

The purpose of this report is to summarize the feasibility and ICE analyses conducted for the proposed mini-roundabouts along SR-5/Federal Highway from 10th Ave S to 6th Ave N. This report summarizes the feasibility analysis, data collection, existing traffic, future growth, intersection control evaluation (ICE), and safety performance analyses (SPICE).



Figure 1: Project Location Map

FEASIBILITY ANALYSIS

A feasibility analysis was conducted to determine if a mini-roundabout could be constructed at each of the 17 study intersections along SR-5/Federal Highway. The 17 study intersections are as follows:

1. 10th Ave S
2. 9th Ave S
3. 8th Ave S
4. 7th Ave S
5. 6th Ave S
6. 5th Ave S
7. 4th Ave S
8. 3rd Ave S
9. 2nd Ave S
10. 1st Ave S
11. Lake Ave
12. Lucerne Ave
13. 2nd Ave N
14. 3rd Ave N
15. 4th Ave N
16. 5th Ave N
17. 6th Ave N

Right-of-way (ROW) along SR-5/Federal Highway was obtained from the FDOT Right-of-Way (ROW) Mapping website. It was determined that the ROW varied between 40 feet and 50 feet.

The U.S. Department of Transportation (DOT) Federal Highway Administration (FHWA) publication *Roundabouts: An Information Guide* was utilized for the sizing and design requirements of a mini-roundabout. Per Exhibit B-1 the typical inscribed circle diameter of a mini-roundabout should be between 45 and 80 feet. Due to the limited ROW available the smallest 45-foot inscribed diameter was utilized in the feasibility analysis where a 40 feet ROW was provided and a 50-foot inscribed diameter where a 50 feet ROW was available.

Conceptual development plans were developed for each of the 17 study intersections, overlaying a typical mini-roundabout on an aerial which included a ROW layer. The mini-roundabout overlay was then reviewed to determine if the mini-roundabout could be constructed within the existing ROW or if ROW acquisition would be required. The evaluation also considered if the existing sidewalk would need to be relocated to accommodate the mini-roundabout and the impacts to the ROW based on the relocated sidewalk. As ROW acquisition is not included within the scope of the SR-5/Federal Highway resurfacing project (FM# 446173-1), the mini-roundabout was

determined to be “Not Feasible” if ROW was impacted and “Feasible” if ROW was not impacted. Table 1 below summarizes the feasibility results for each of the study intersections. Conceptual development plans for the mini-roundabouts are included in Appendix A.

Table 1: Mini-Roundabout Feasibility Analysis Results				
Intersection(s)	Existing Control	Inscribed Diameter	ROW Impacted?	Feasible?
10th Ave S	TWSC	45 feet	Yes	No
9th Ave S	TWSC	45 feet	Yes	No
8th Ave S	TWSC	45 feet	Yes	No
7th Ave S	TWSC	45 feet	Yes	No
6th Ave S	Signal	45 feet	Yes	No
5th Ave S	TWSC	45 feet	Yes	No
4th Ave S	TWSC	45 feet	Yes	No
3rd Ave S	TWSC	45 feet	Yes	No
2nd Ave S	TWSC	45 feet	Yes	No
1st Ave S	TWSC	45 feet	Yes	No
Lake Ave	Signal	150 feet ⁽¹⁾	Yes	No
Lucerne Ave	Signal	150 feet ⁽¹⁾	Yes	No
2nd Ave N	Signal	50 feet	No	Yes
3rd Ave N	TWSC	50 feet	No	Yes
4th Ave N	TWSC	50 feet	No	Yes
5th Ave N	TWSC	50 feet	No	Yes
6th Ave N	TWSC	45 feet	No	Yes

Note (1): Both Lake Ave and Lucerne Ave are a one-way pair with each roadway having two-lanes requiring a multi-lane roundabout with a 150-foot inscribed diameter.

As shown in Table 1 it was determined that a mini-roundabout was feasible at five (5) intersections. It should be noted that although both Lake Ave and Lucerne Ave are two (2) lane one-way roadways and were determined to be “not feasible” due to the impacts of a multi-lane roundabout, a mini-roundabout was still analyzed for both intersections. However, as mini-roundabouts are single lane only, it would require both Lake Ave and Lucerne Ave to merge down to one (1) lane in advance of the mini-roundabout which would impact operations at adjacent intersections. Therefore, mini-roundabouts were determined to be not feasible at the Lake Ave and Lucerne Ave intersections. Based on the above results, ICE analyses were conducted at the five (5) locations where mini-roundabouts were determined to be feasible.

EXISTING TRAFFIC

A.M. peak period (7:00 A.M. to 9:00 A.M.) and P.M. peak period (4:00 P.M. to 6:00 P.M.) turning movement counts were collected in 15-minute intervals on Tuesday, November 16th, 2021, and included pedestrians and bicyclists at the following five (5) intersections:

- SR-5/Federal Highway and 2nd Avenue North
- SR-5/Federal Highway and 3rd Avenue North
- SR-5/Federal Highway and 4th Avenue North
- SR-5/Federal Highway and 5th Avenue North
- SR-5/Federal Highway and 6th Avenue North

The turning movement count data is included in Appendix B. Figure 2 presents the existing turning movement volumes at the study intersections during the weekday A.M. and P.M. peak hours. Figure 3 summarizes existing lane configurations for the study intersections.

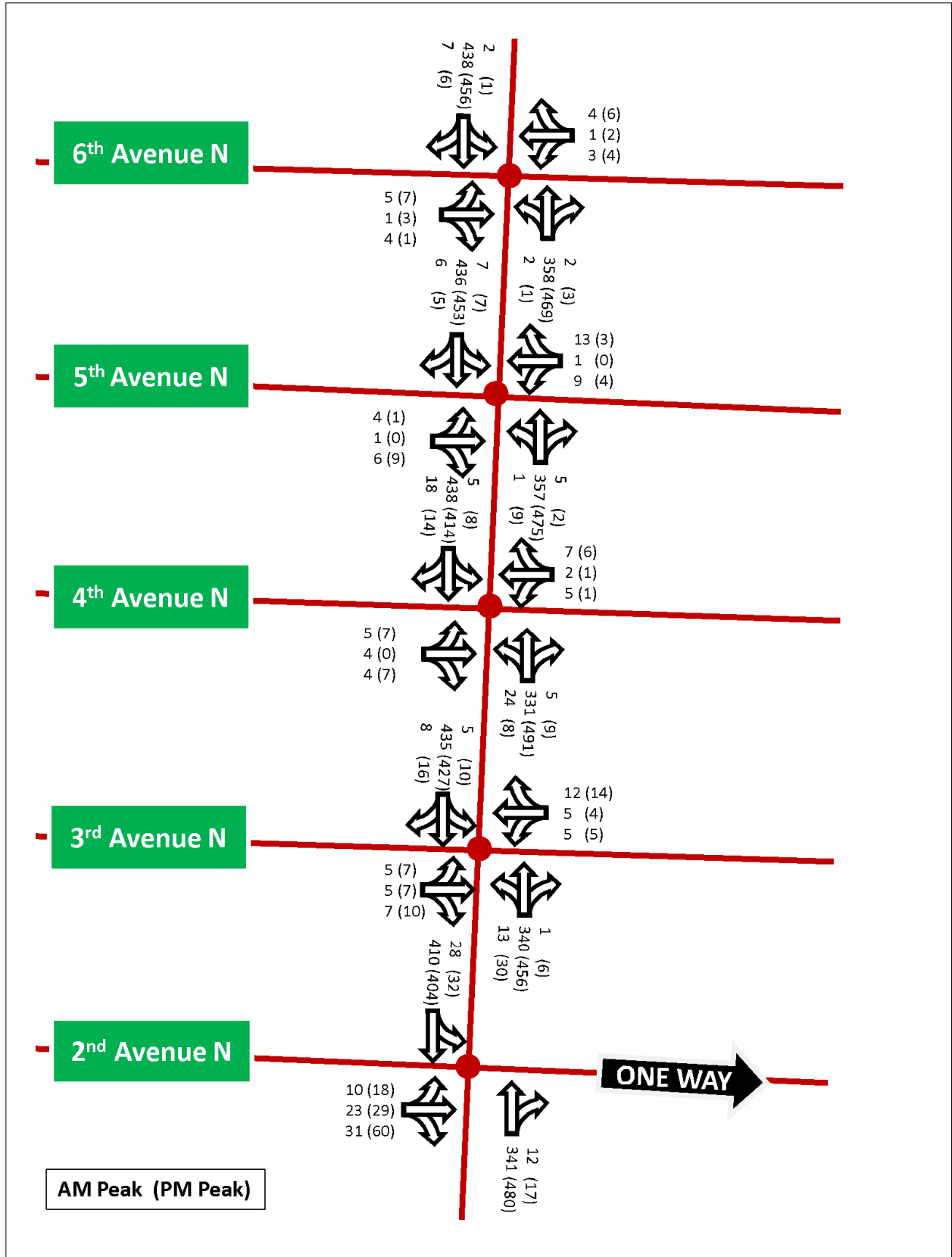


Figure 2: Existing Peak Hour Traffic

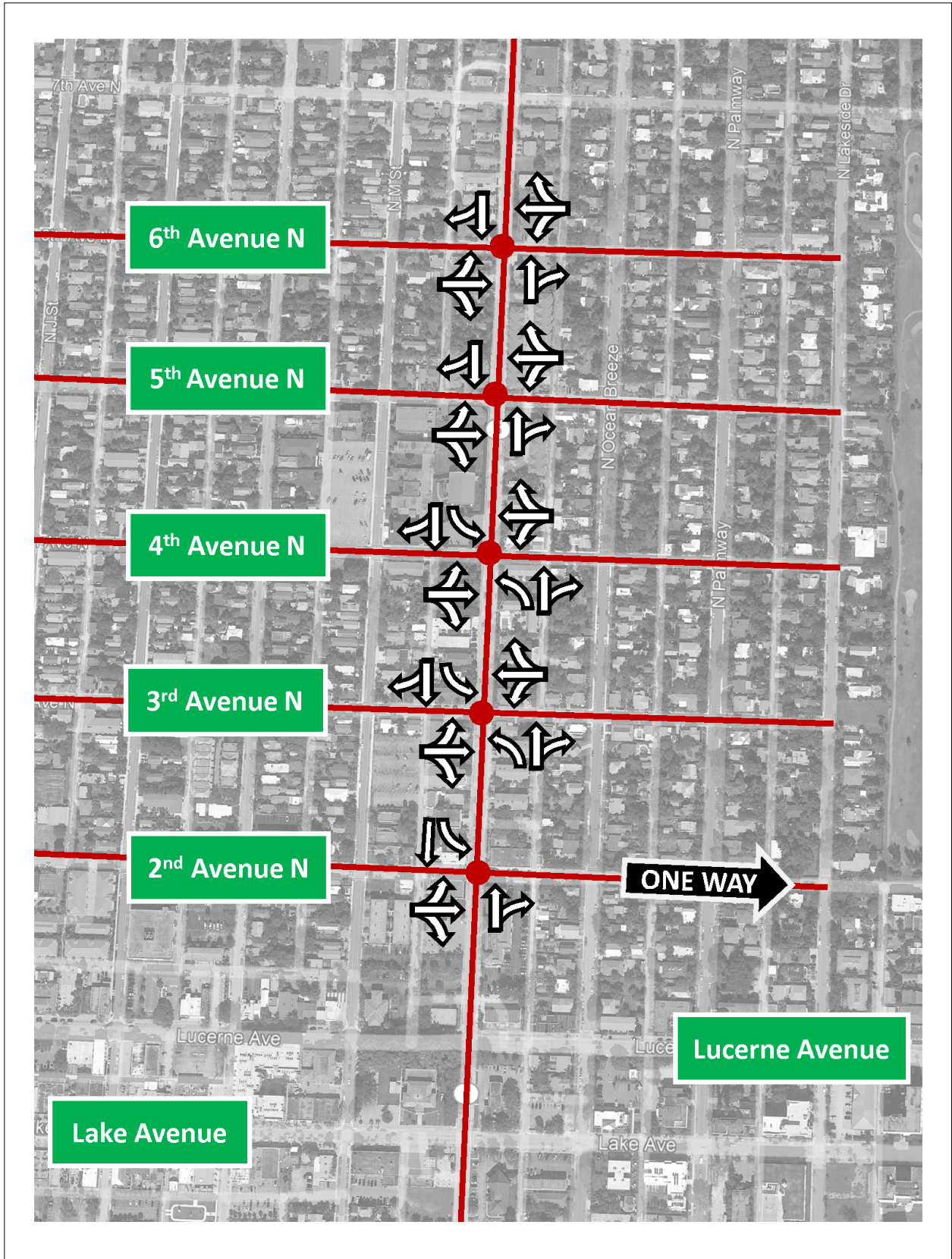


Figure 3: Existing Lane Configuration

FUTURE TRAFFIC

Future traffic conditions are defined as expected traffic conditions on the roadway network during the analysis years due to anticipated future traffic growth. Per Section 2.4.2 Design Year of the *Manual on Intersection Control Evaluation*, the design year for a resurfacing project is 10 years from existing; therefore, the future traffic was developed for a 2031 design year. Future traffic volumes used in the analysis are the sum of the existing traffic and an additional amount of traffic generated by growth in the study area.

Growth Rate Calculations

Future traffic growth on the transportation network was determined based upon (a) historical growth trends at nearby FDOT traffic count stations, and (b) traffic volume comparisons from the year 2015 and 2045 FSUTMS – Southeast Regional Planning Model (SERPM) Version 8.512.

The following nearby FDOT count stations were referenced for this analysis:

- FDOT Count Station #930221 located on SR-5/Olive Ave/Federal Highway, south of Lake and Lucerne Ave (County Link: 4824)
- FDOT Count Station #935056 located on SR-5/Federal Highway, north of SR-802/Lucerne Ave, westbound (County Link: 4802)

A summary of the 10-year historical growth rates based on FDOT count stations is presented in Table 2. The linear growth trend yielded a growth rate of 2.13 percent (2.13%) over the most recent ten (10) year period, and a 2.41 percent (2.41%) on the segment of SR-5/Federal Highway north of Lake Ave and Lucerne Ave which is the segment containing the five (5) intersections determined to be feasible. The exponential growth trend yielded an average growth rate of 1.97 percent (1.97%) over the most recent ten (10) year period, and a 2.20 percent (2.20%) on the segment of SR-5/Federal Highway north of Lake Ave and Lucerne Ave which is the segment containing the five (5) intersections determined to be feasible. It should be noted that the ten (10) year period analyzed was from 2010 to 2019 and did not include 2020 AADTs as 2020 traffic was impacted by the COVID-19 pandemic.

Station No.	Description	Linear (10-yr)	Exponential (10-yr)
0221	SR-5/Olive Ave/Federal Highway, south of Lake and Lucerne Ave	1.85%	1.73%
5056	SR-5/Federal Highway, north of SR-802/Lucerne Ave, westbound	2.41%	2.20%
Average		2.13%	1.97%

Based on the forecasted volumes obtained from the 2015 and 2045 FSUTMS SERPM, an average annual growth rate of 1.02 percent (1.02%) along the study corridor was calculated as shown in Table 2.

Roadway Segment	Limits	2015 Model Volumes	2045 Model Volumes	Calculated Annual Growth Rate
SR-5/Federal Highway	south of Lake & Lucerne Ave	5,548	7,317	1.06%
		4,772	7,360	1.81%
	between Lake & Lucerne Ave	6,201	8,298	1.13%
	north of Lake & Lucerne Ave	7,391	9,208	0.82%
		6,695	8,272	0.79%
		6,731	8,279	0.77%
Average				1.02%

As the historical growth rate calculations using FDOT count station information yielded the highest growth rate, it was utilized to provide a conservative analysis. Additionally, as the 2.20 percent (2.20%) exponential growth rate for the segment north of Lake Ave & Lucerne Ave yielded the highest 2031 volumes when applied to the existing 2021 counts, the 2.20 percent (2.20%) exponential growth rate was utilized in the analysis. The worksheets used to analyze the historical growth trends along with the FSUTMS travel demand model outputs are included in Appendix C.

INTERSECTION CONTROL EVALUATION (ICE) ANALYSIS

A Stage 1 ICE analysis was conducted for the five (5) study locations. Stage 1 consists of two (2) parts: (1) FHWA’s Capacity Analysis for Planning of Junctions (CAP-X); and (2) FHWA’s Safety Performance of Intersection Control Evaluations (SPICE). CAP-X is an operational analysis and SPICE is a safety analysis. The following sections summarize the results of the CAP-X and SPICE analyses.

CAP-X

Table 4 summarizes the results of the CAP-X analyses for each of the five (5) study intersections. As can be seen from the results, the mini-roundabout (50 ICD) provides adequate capacity (i.e. $v/c < 0.70$) for all study intersections during both the A.M. and P.M. peak hours. It should be noted that the two-way stop control and traffic signal configurations provide “Poor” Pedestrian and Bicycle Accommodations per the CAP-X analysis while the mini-roundabout (50 ICD) and all-way stop control configurations provide “Fair” Pedestrian and Bicycle Accommodations and provide the best Multimodal Scores of the four study configurations. Detailed CAP-X results are provided in Appendix D.

Table 4: CAP-X Results										
Type of Intersection	V/C									
	2nd Ave N		3rd Ave N		4th Ave N		5th Ave N		6th Ave N	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Two-Way Stop Control	0.30	0.62	0.31	0.34	0.32	0.35	0.32	0.34	0.32	0.33
All-Way Stop Control	0.72	0.88	0.71	0.85	0.72	0.82	0.72	0.81	0.88	1.01
Traffic Signal	0.35	0.46	0.36	0.38	0.37	0.39	0.36	0.36	0.34	0.36
Mini-Roundabout (50 ICD)	0.55	0.69	0.58	0.63	0.60	0.64	0.57	0.61	0.57	0.60

SPICE

Tables 5 and 6 summarize the results of the SPICE Crash Prediction and SSI Scores, respectively, for each of the five (5) study intersections. As shown in Table 5 the mini-roundabout was ranked 1st for five (5) of the six (6) intersections. As shown in Table 6 the mini-roundabout was ranked

1st for one (1) intersection and 3rd for the other five (5) intersections. Detailed SPICE results are provided in Appendix E.

Table 5: SPICE Crash Prediction Results					
Control Strategy	Crash Prediction Rank				
	2nd Ave N	3rd Ave N	4th Ave N	5th Ave N	6th Ave N
Traffic Signal	2	4	4	4	4
Minor Road Stop	3	3	3	3	3
All-Way Stop	4	2	2	2	1
1-lane (Mini) Roundabout	1	1	1	1	2

Table 6: SPICE SSI Results					
Control Strategy	SSI Rank				
	2nd Ave N	3rd Ave N	4th Ave N	5th Ave N	6th Ave N
Traffic Signal	3	1	2	2	2
Minor Road Stop	4	4	4	4	4
All-Way Stop	2	2	1	1	1
1-lane (Mini) Roundabout	1	3	3	3	3

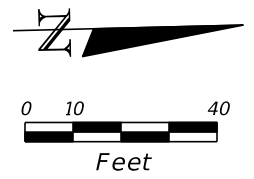
CONCLUSION

The City of Lake Worth Beach and the Palm Beach TPA are evaluating speed management strategies to proceed with for the SR-5/Federal Highway corridor in advance of the FDOT starting their upcoming SR-5 resurfacing project. The SR-5 resurfacing project (FM# 446173-1) from 10th Ave S to 6th Ave N is currently in design and is scheduled for construction in FY 2024.

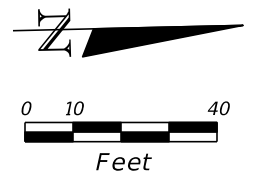
The peak period AM and PM peak hour Stage 1 ICE analyses (CAP-X and SPICE) show that mini-roundabouts are anticipated to provide sufficient capacity and safety at each of the study intersections along the SR-5 corridor. Additionally, the CAP-X results show the mini-roundabout configuration has the highest multi-modal score of the four (4) analyzed traffic control strategies and the SPICE results show the mini-roundabout was ranked highest for crash prediction.

Appendix A

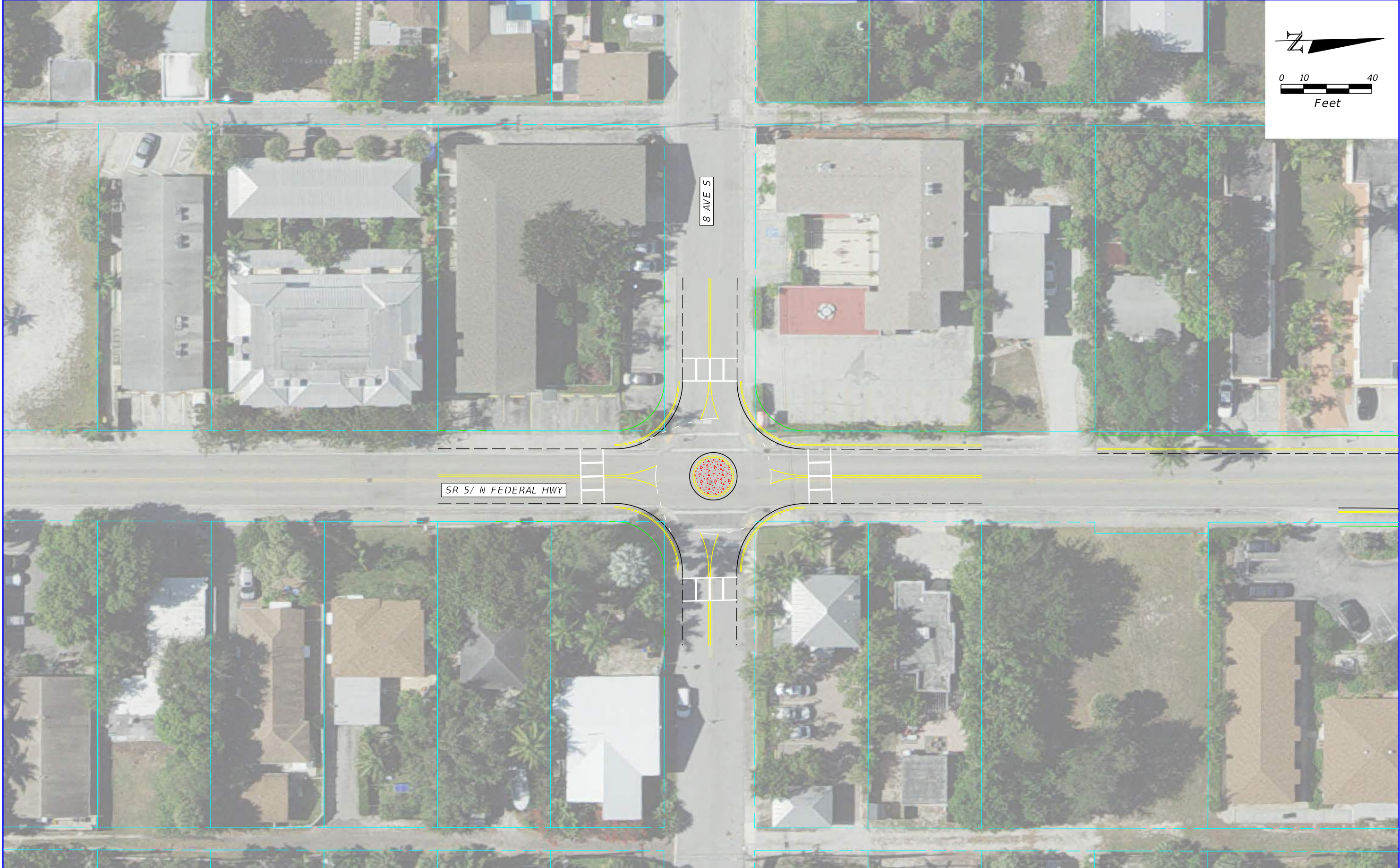
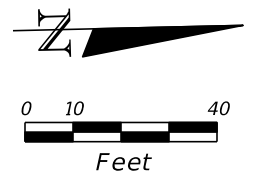
Conceptual Development Plans



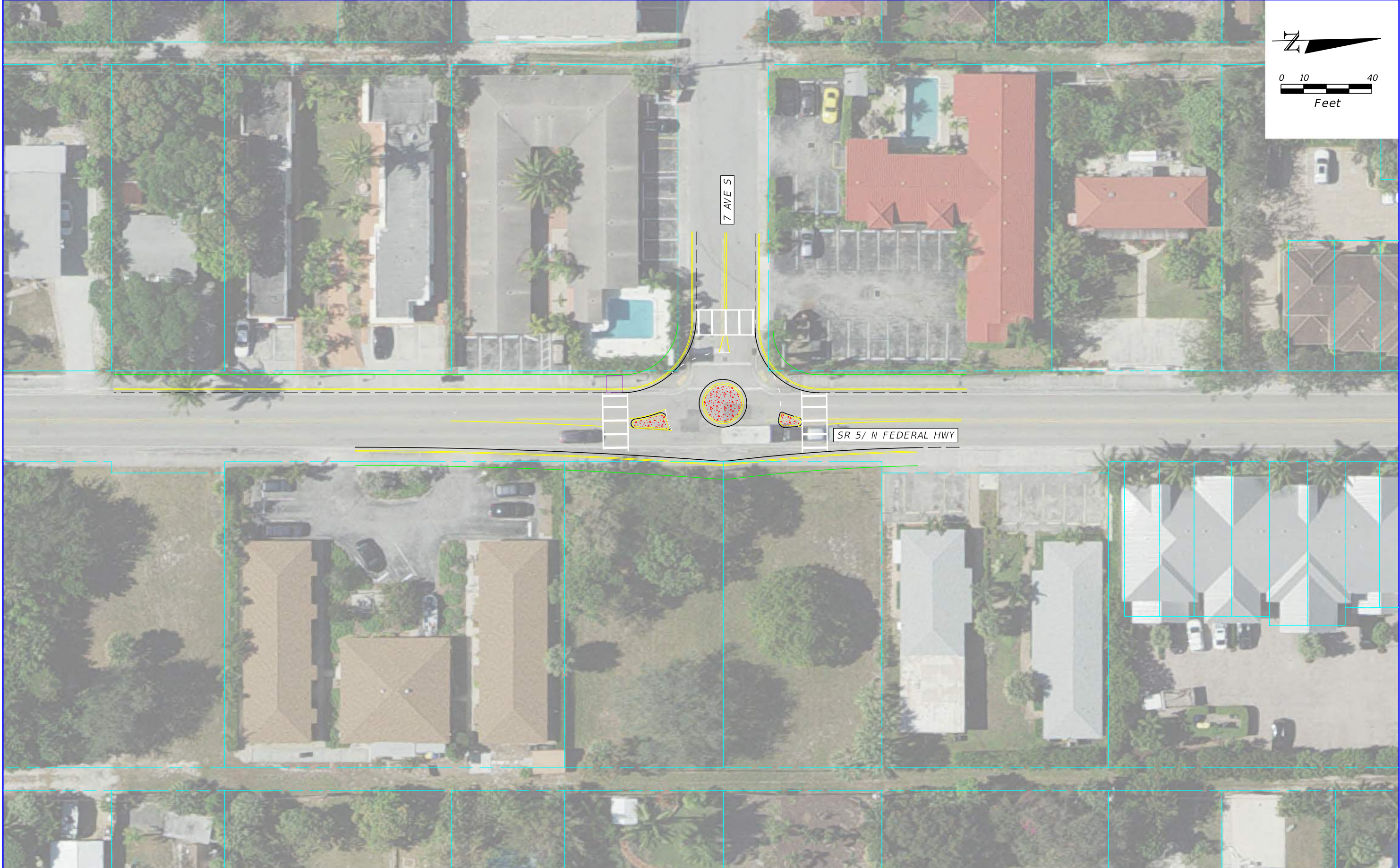
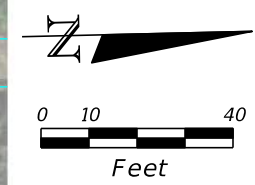
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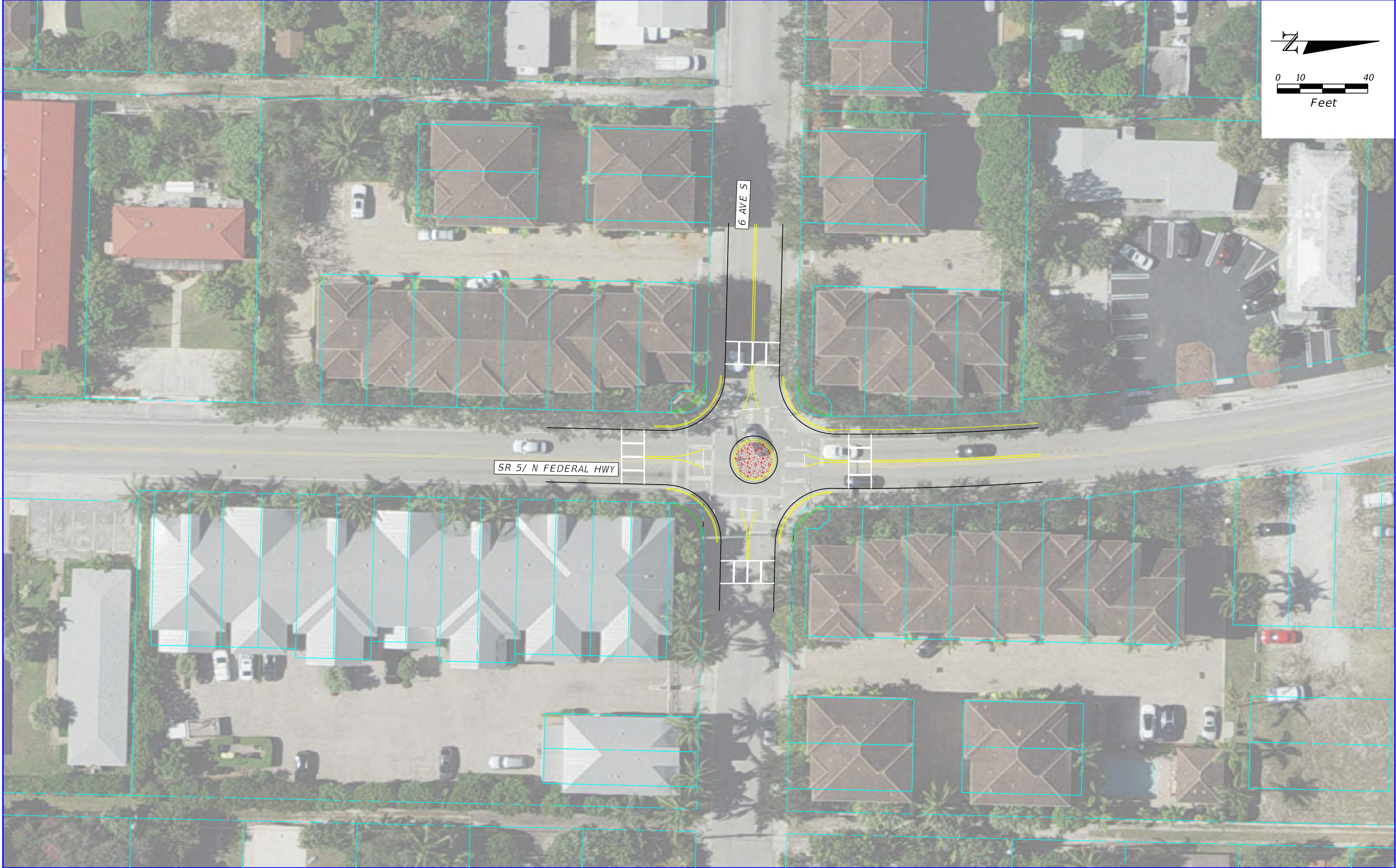
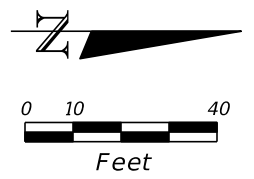
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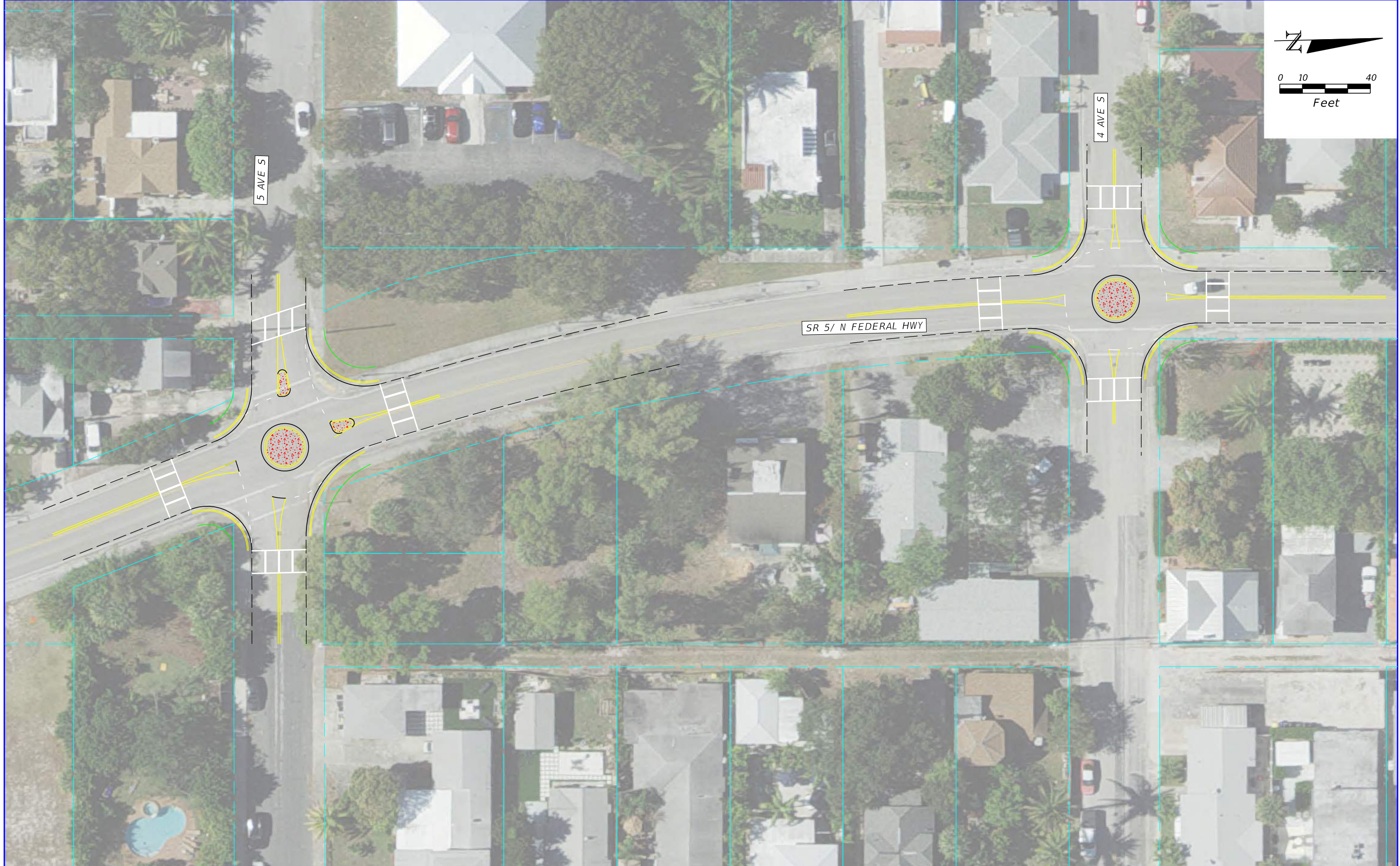
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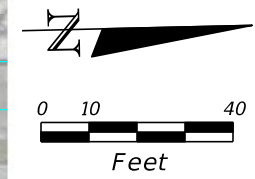
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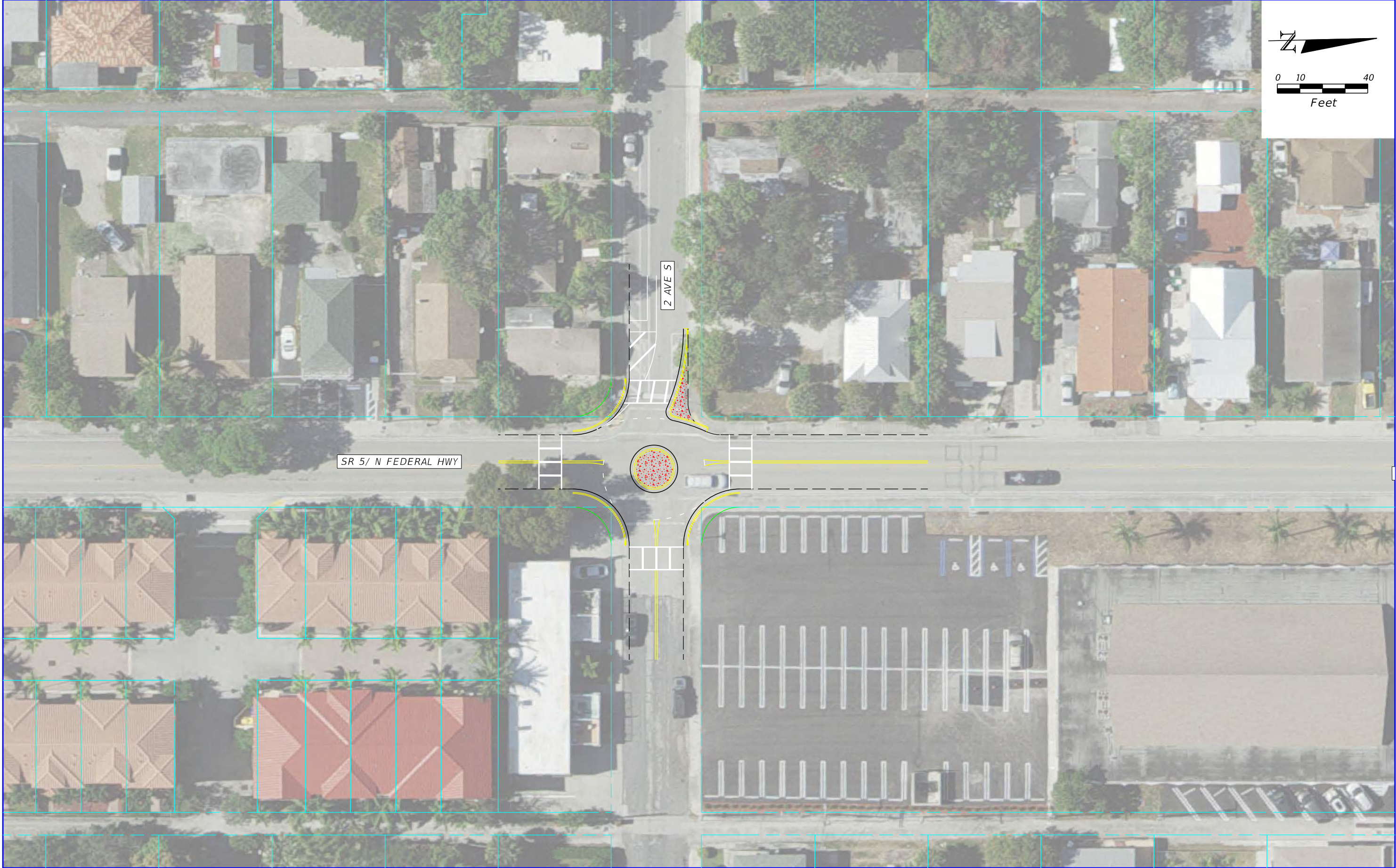
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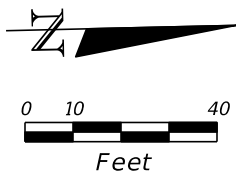
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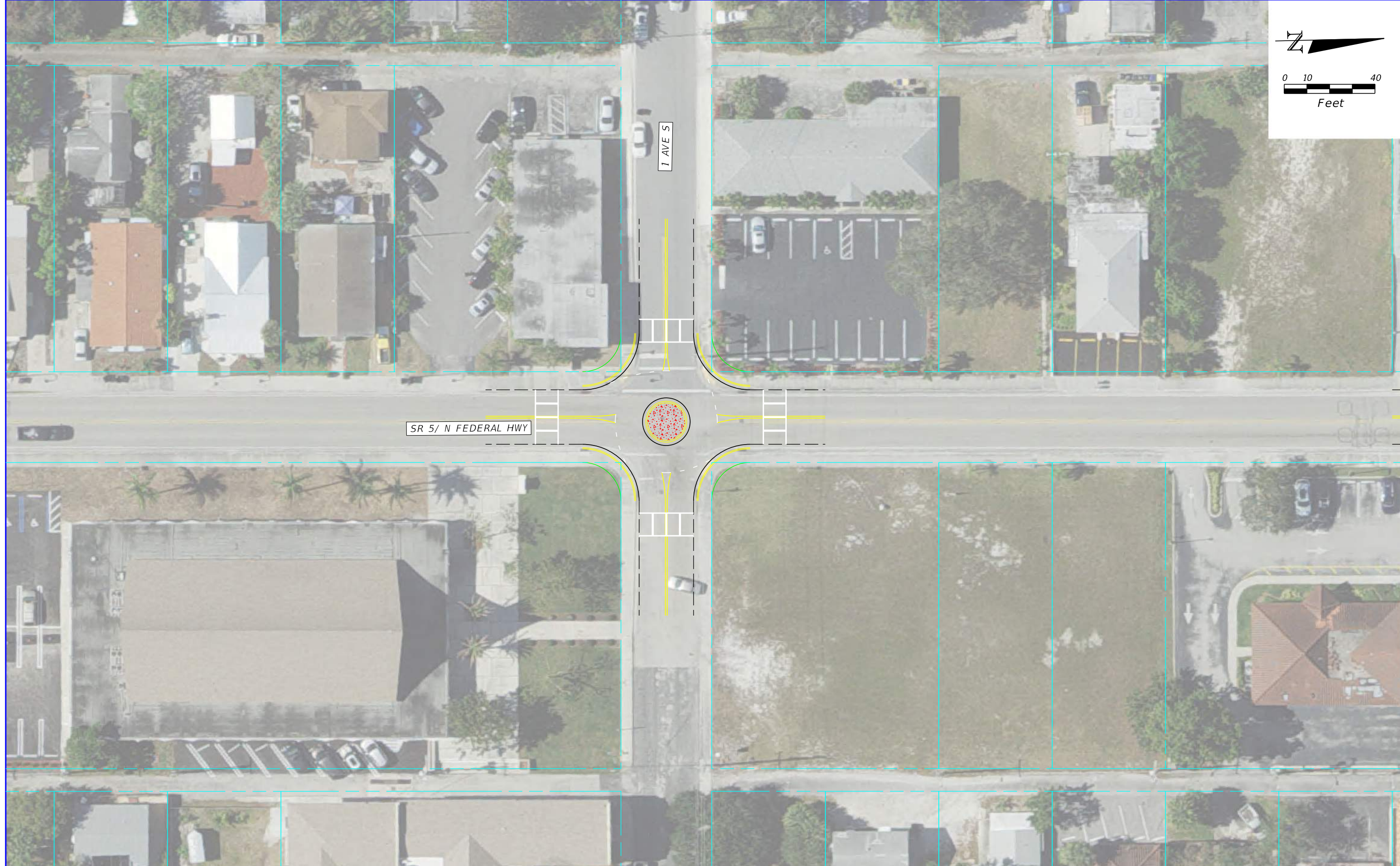
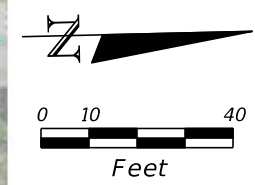
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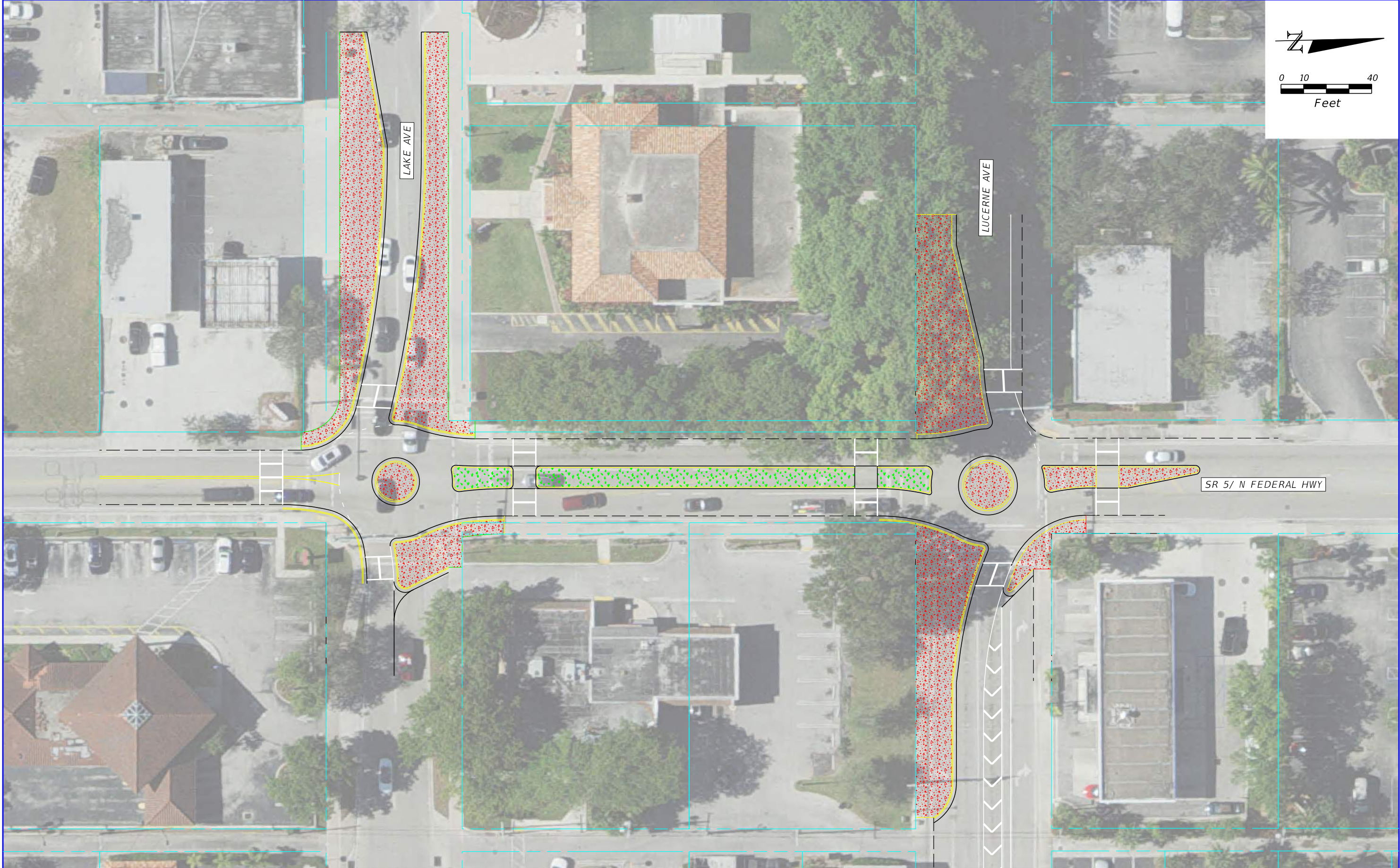
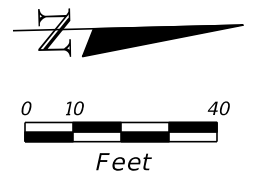
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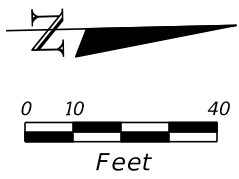
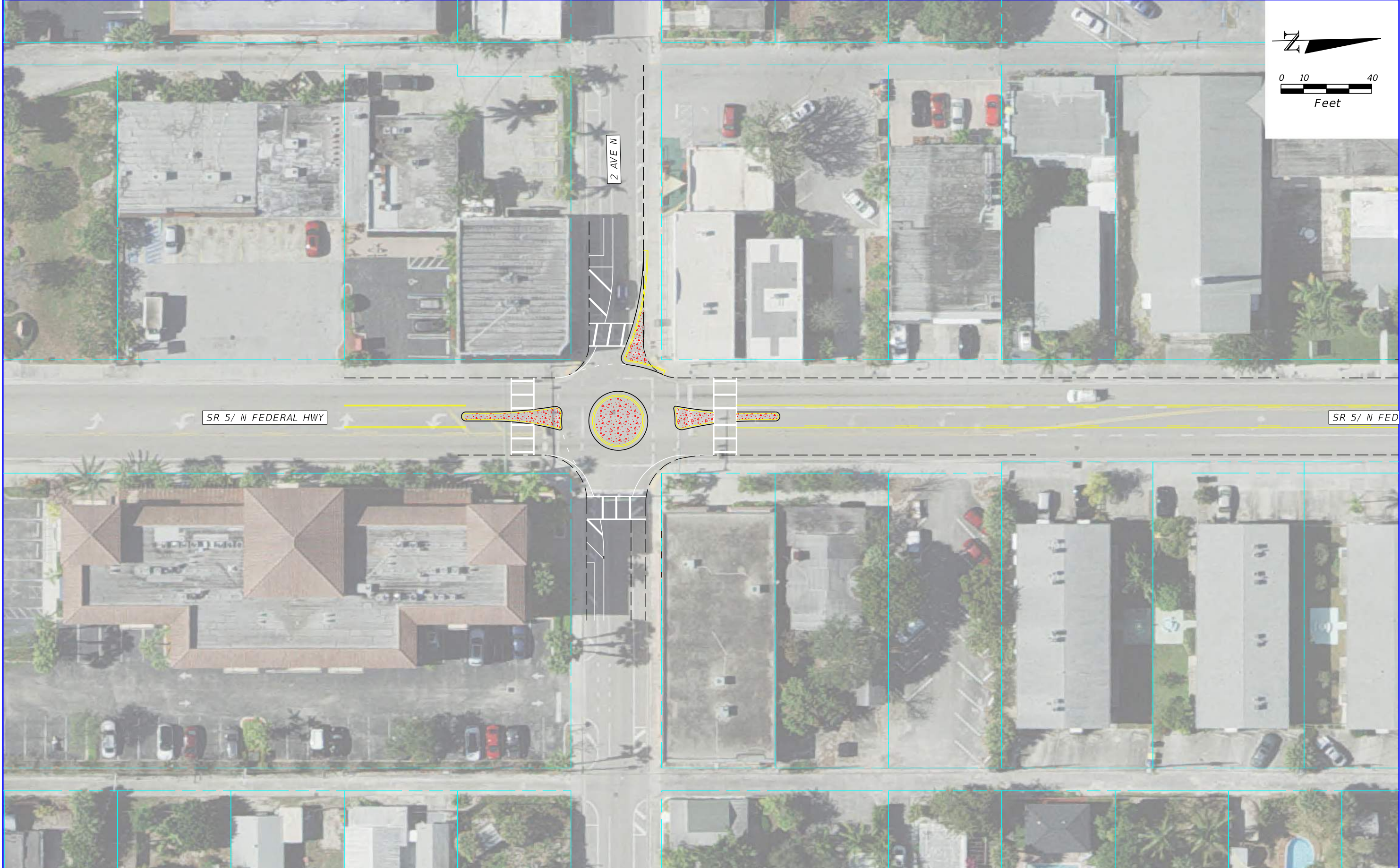
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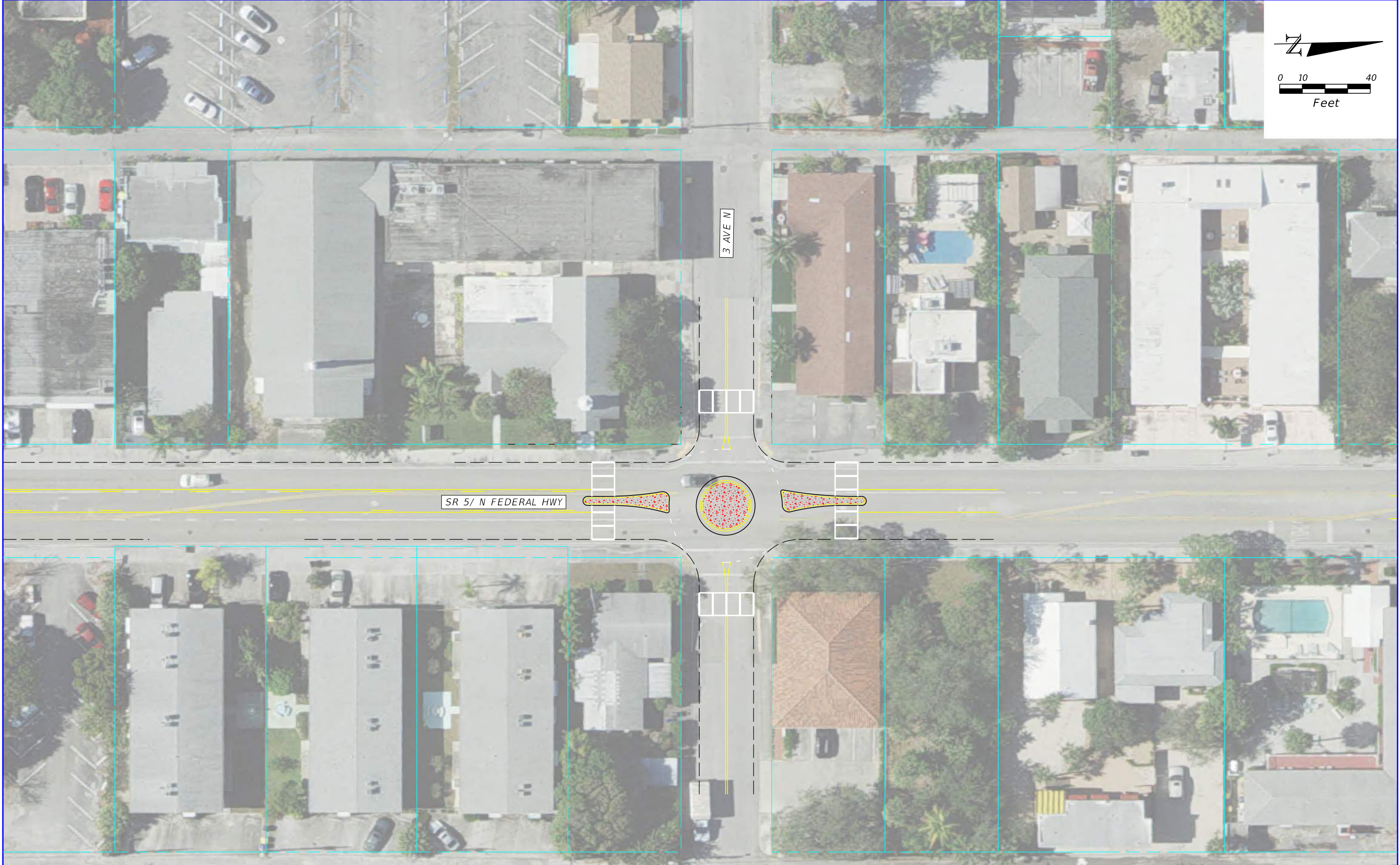
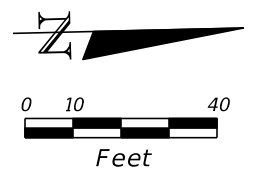


SR 5/ N FEDERAL HWY

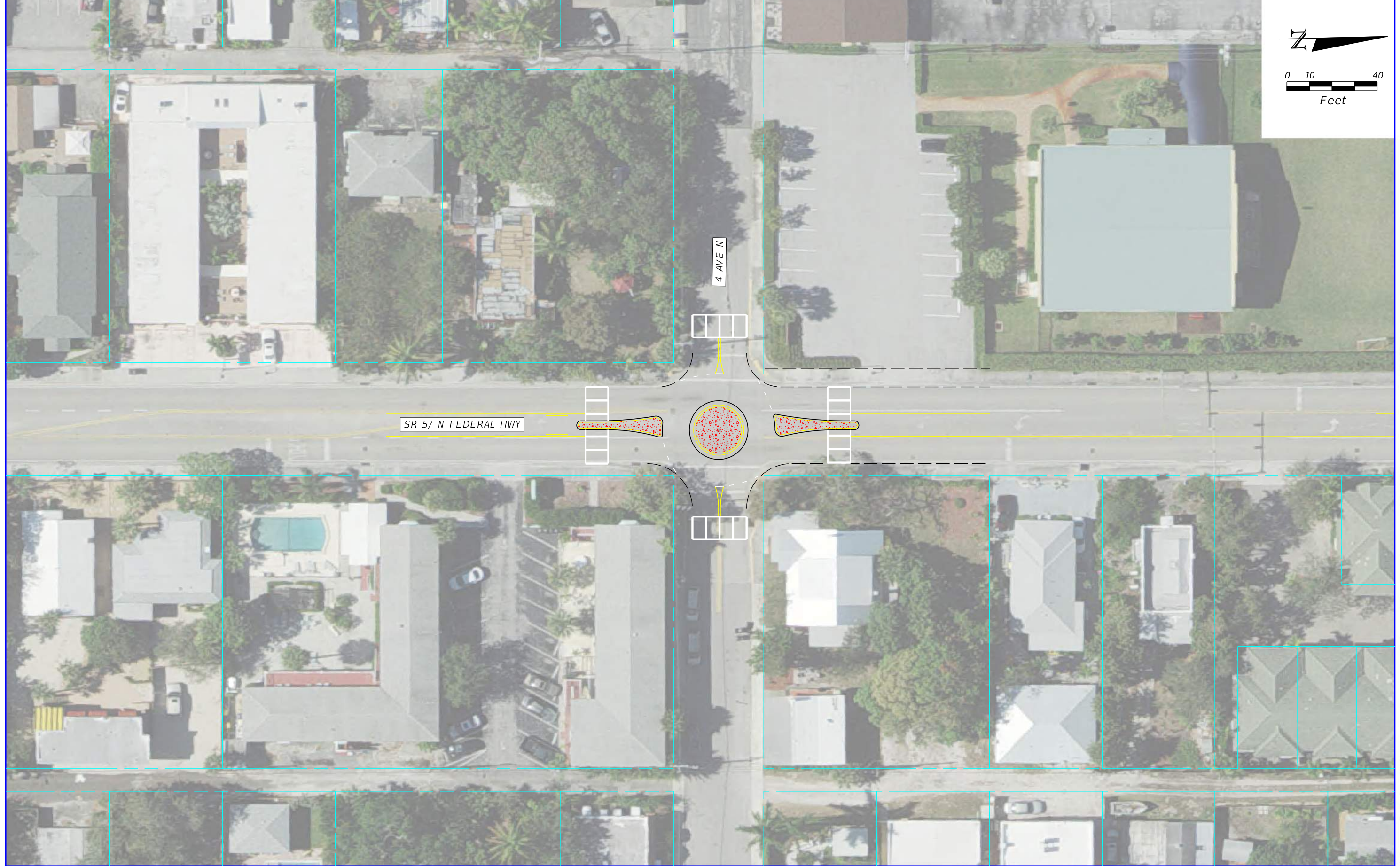
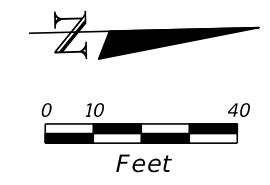
2 AVE N

SR 5/ N FED

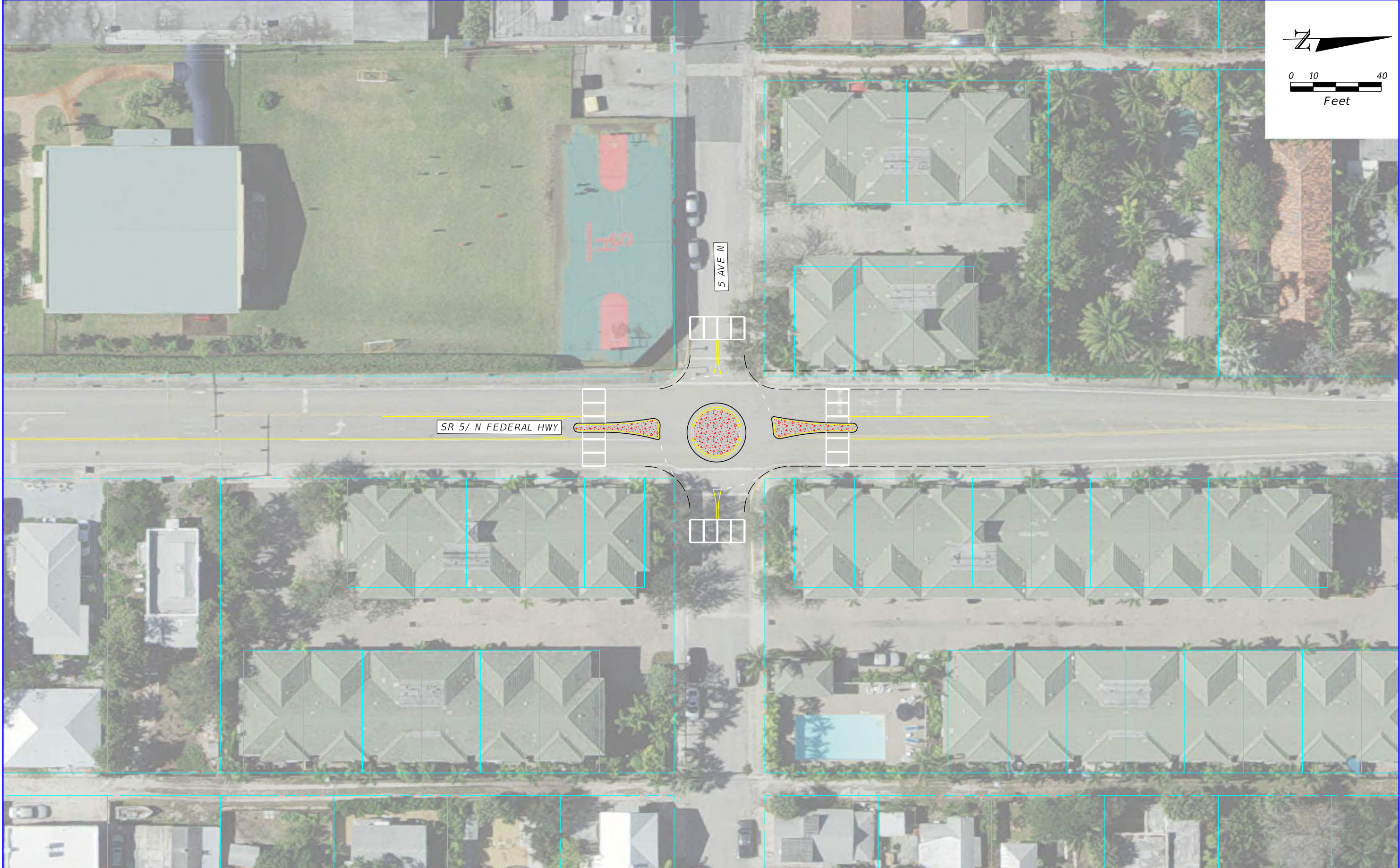
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DATE	DESCRIPTION	DATE	DESCRIPTION	ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
				5	PALM BEACH			11



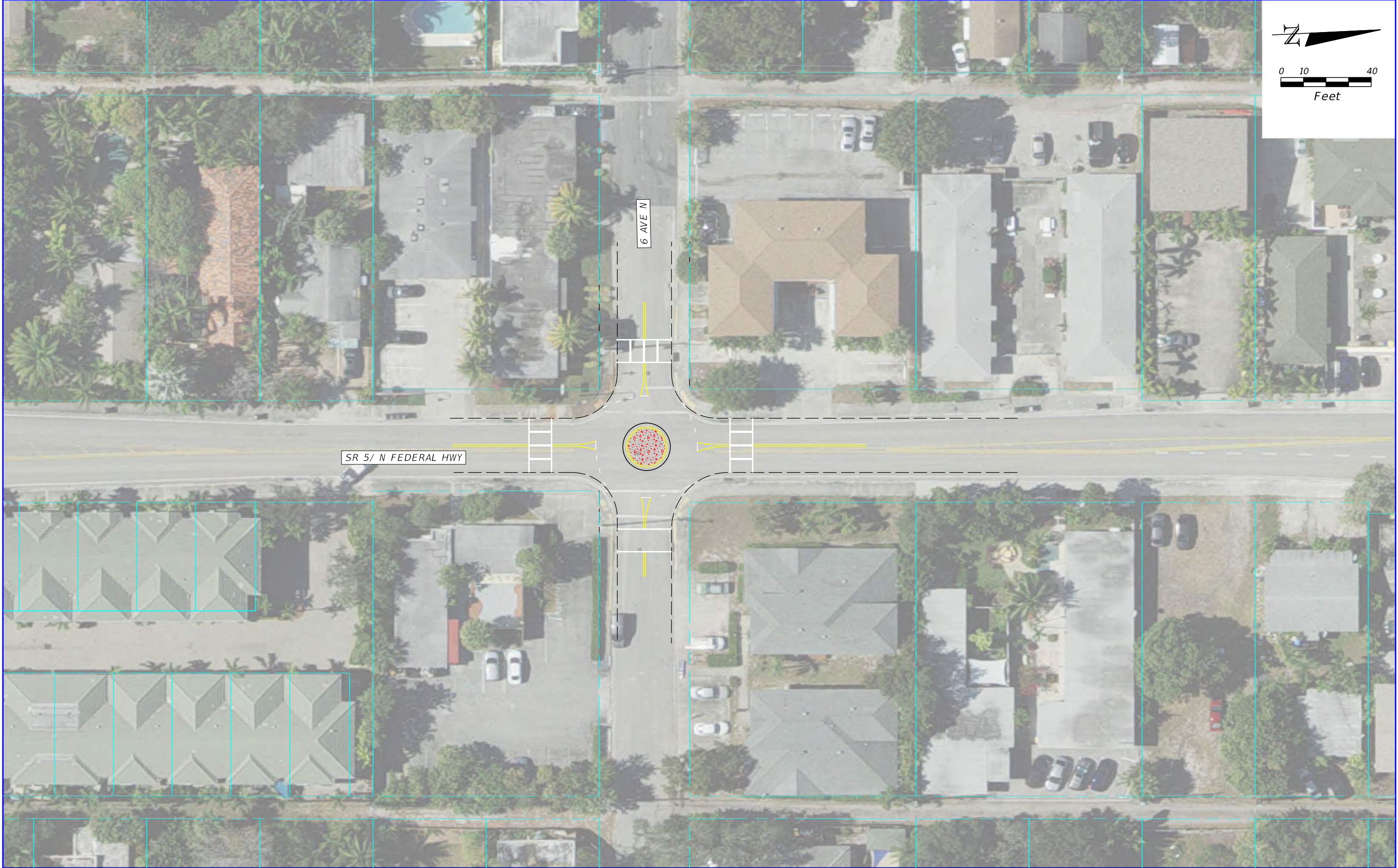
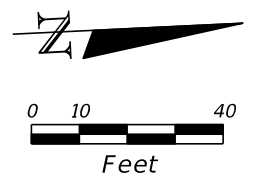
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DATE	DESCRIPTION	DATE	DESCRIPTION	ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
				5	PALM BEACH			12



REVISIONS				CITY OF LAKE WORTH BEACH			4 AVE N/ SR 5/N FEDERAL HWY ROUNDBABOUT FEASIBILITY	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
				5	PALM BEACH			13



REVISIONS				CITY OF LAKE WORTH BEACH			5 AVE N/ SR 5/N FEDERAL HWY ROUNDAABOUT FEASIBILITY	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
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REVISIONS				CITY OF LAKE WORTH BEACH			6 AVE N/ SR 5/N FEDERAL HWY ROUNABOUT FEASIBILITY	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION	ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
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Appendix B

Traffic Data

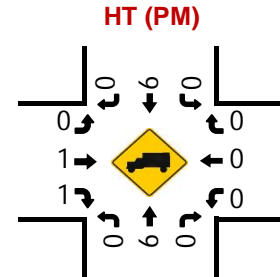
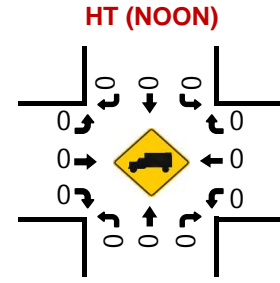
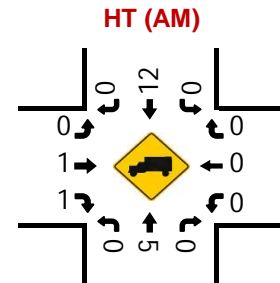
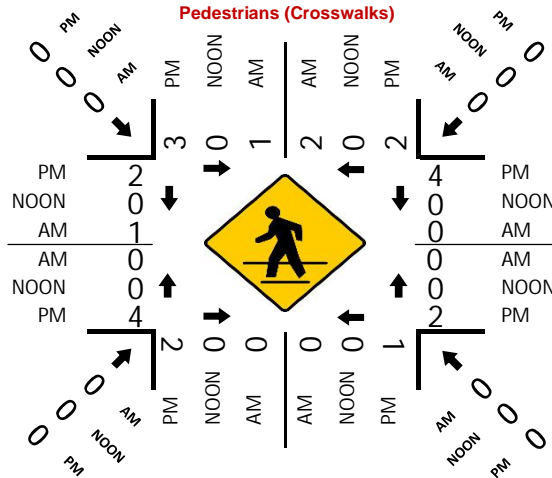
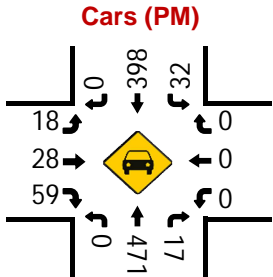
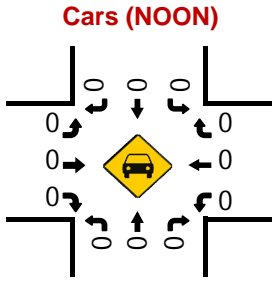
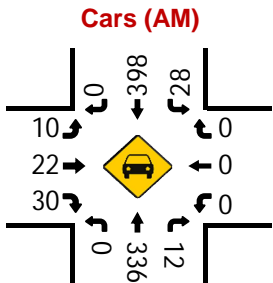
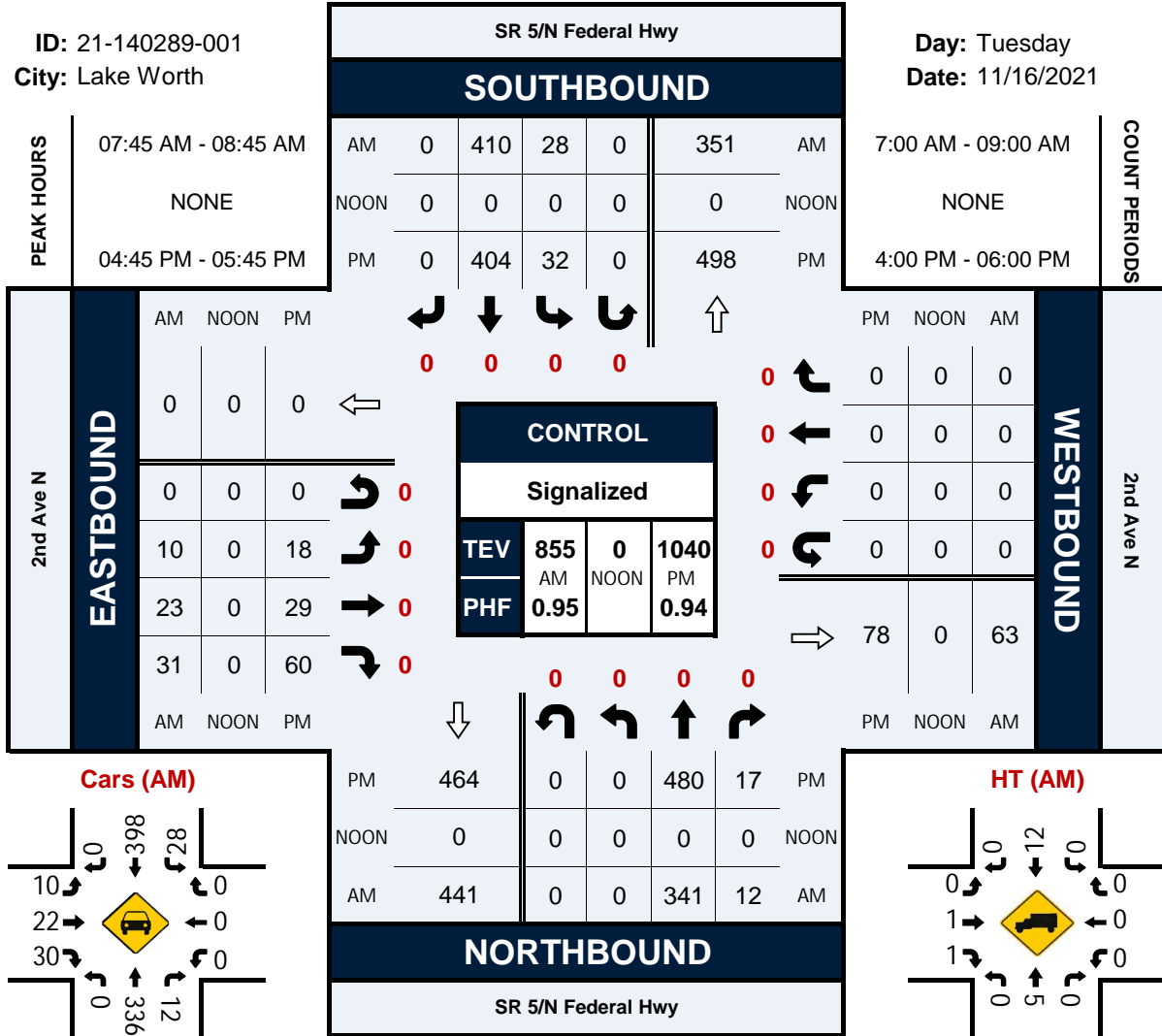
Turning Movement Counts

SR 5/N Federal Hwy & 2nd Ave N

Peak Hour Turning Movement Count

ID: 21-140289-001
City: Lake Worth

Day: Tuesday
Date: 11/16/2021

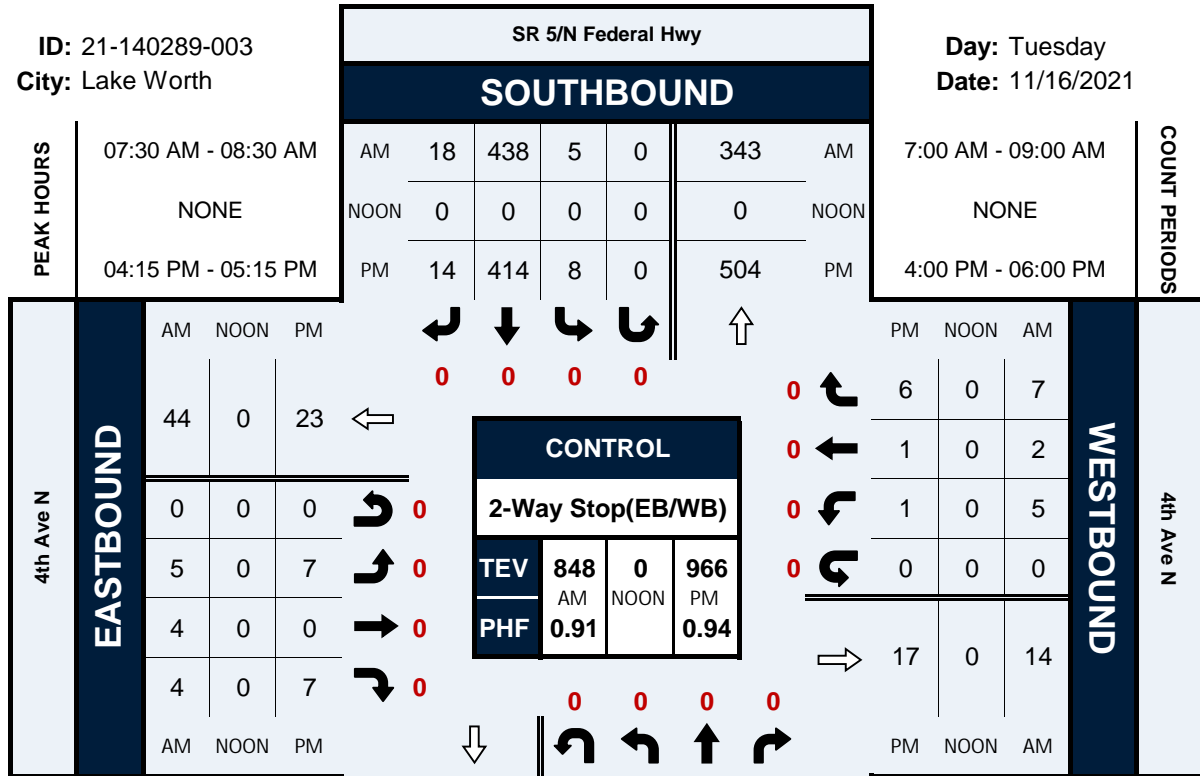


SR 5/N Federal Hwy & 4th Ave N

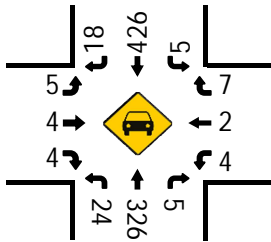
Peak Hour Turning Movement Count

ID: 21-140289-003
City: Lake Worth

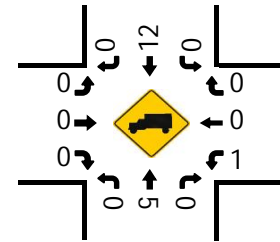
Day: Tuesday
Date: 11/16/2021



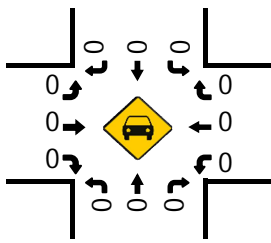
Cars (AM)



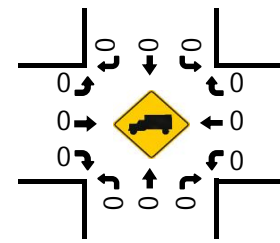
HT (AM)



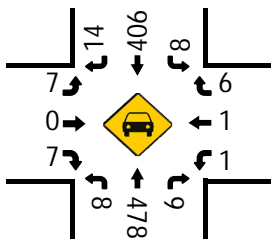
Cars (NOON)



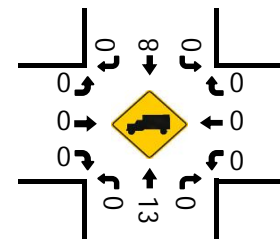
HT (NOON)



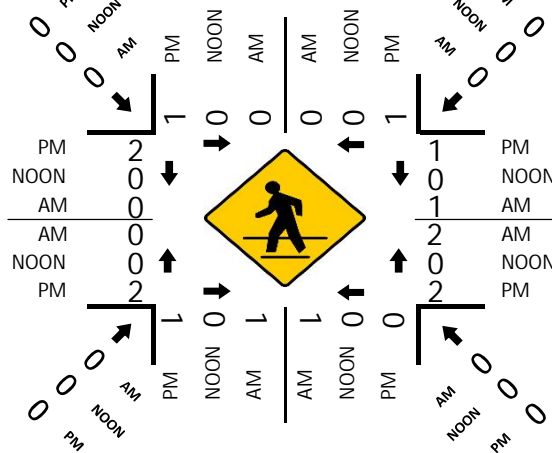
Cars (PM)



HT (PM)



Pedestrians (Crosswalks)

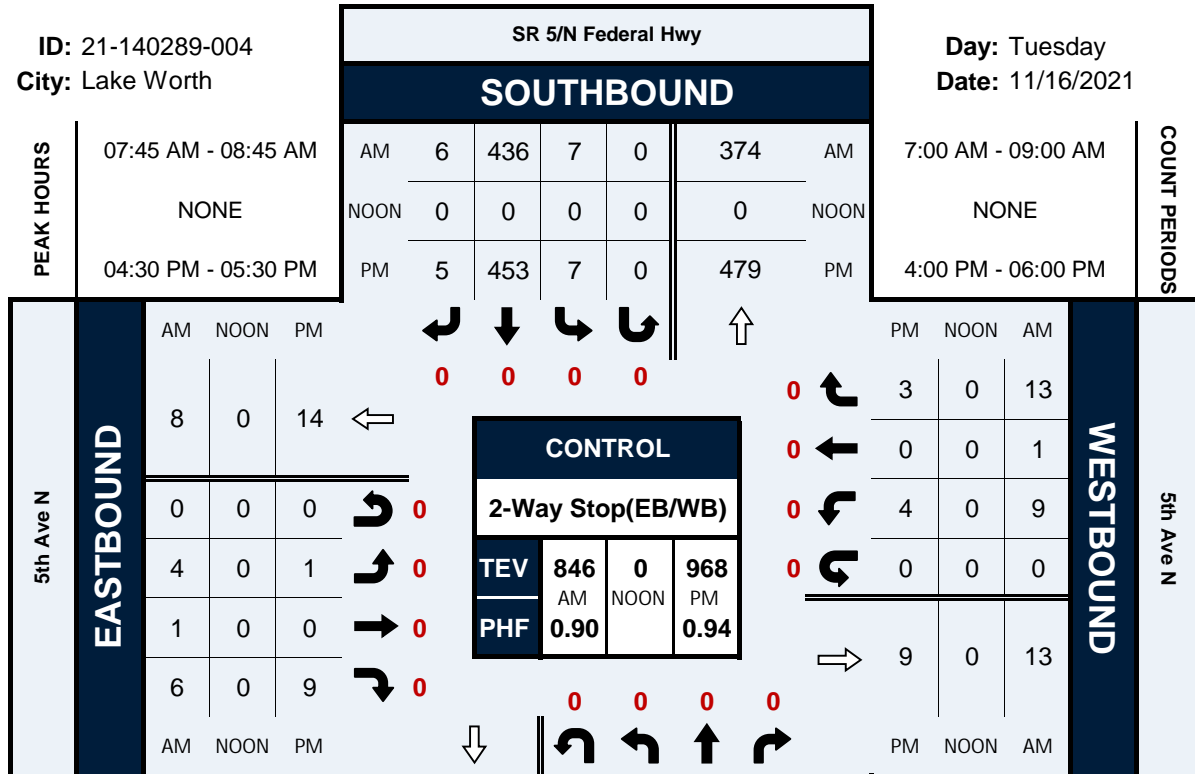


SR 5/N Federal Hwy & 5th Ave N

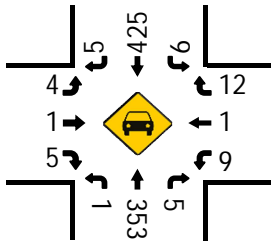
Peak Hour Turning Movement Count

ID: 21-140289-004
City: Lake Worth

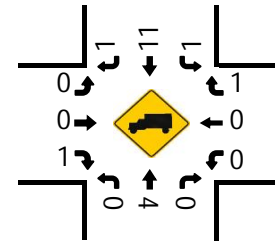
Day: Tuesday
Date: 11/16/2021



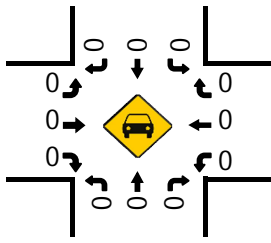
Cars (AM)



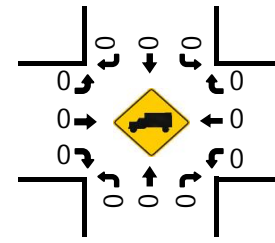
HT (AM)



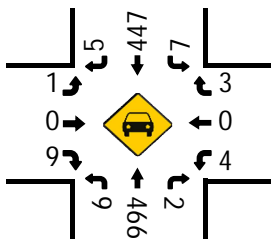
Cars (NOON)



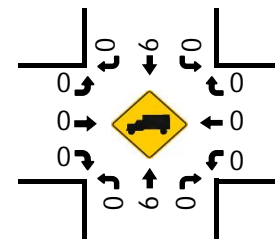
HT (NOON)



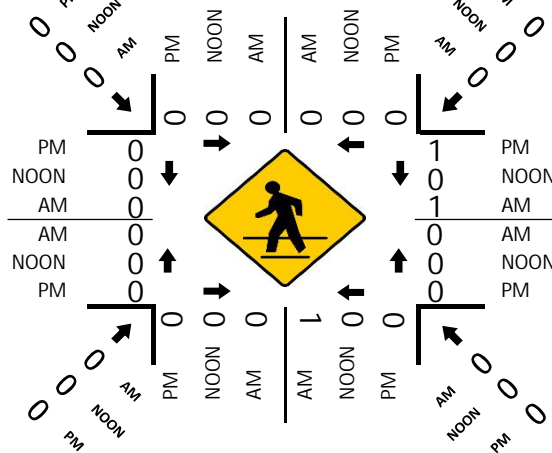
Cars (PM)



HT (PM)



Pedestrians (Crosswalks)

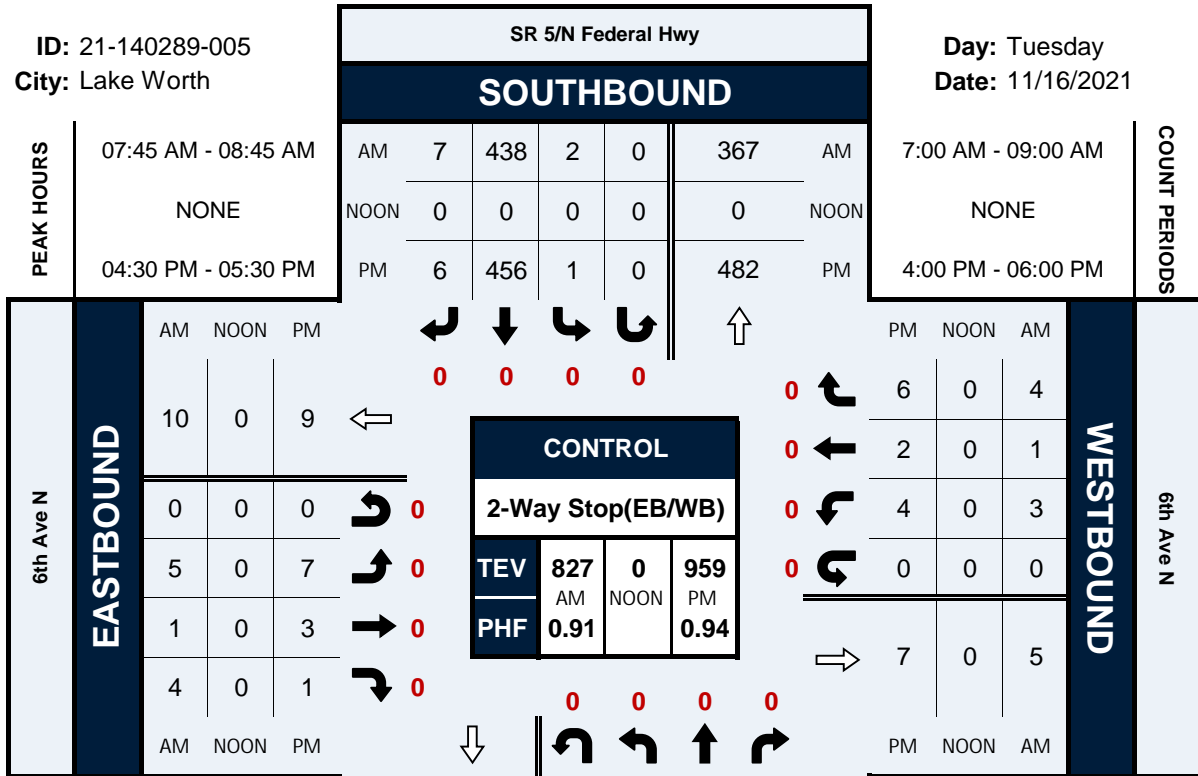


SR 5/N Federal Hwy & 6th Ave N

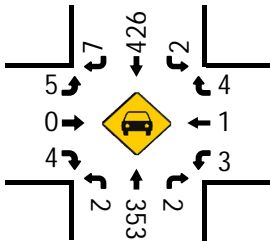
Peak Hour Turning Movement Count

ID: 21-140289-005
City: Lake Worth

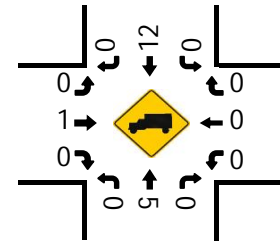
Day: Tuesday
Date: 11/16/2021



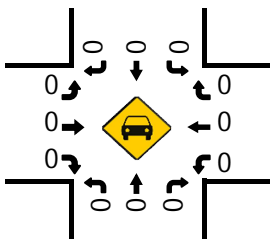
Cars (AM)



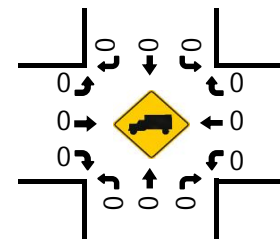
HT (AM)



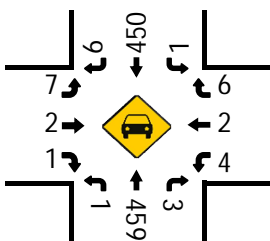
Cars (NOON)



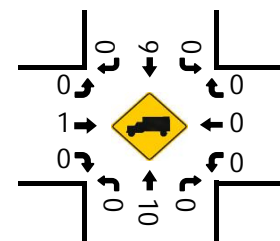
HT (NOON)



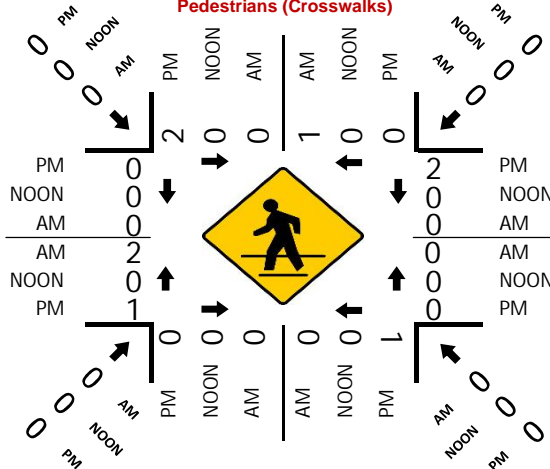
Cars (PM)



HT (PM)



Pedestrians (Crosswalks)



Appendix C

Growth Rate Calculations

FDOT Historic Growth Trends

FDOT Growth Rate Summary

Station Number	Location	Historic Growth- Linear				Historic Growth- Exponential			
		5-year	R-squared	10-year	R-squared	5-year	R-squared	10-year	R-squared
0221	SR 5/Olive Ave - S of Lake & Lucerne Ave	2.38%	38.17%	1.85%	43.24%	2.30%	38.83%	1.73%	43.00%
5056	SR 5/Federal Highway - N of SR 802/Lucerne Ave	-0.75%	1.70%	2.41%	37.55%	-0.76%	1.27%	2.20%	41.08%
Total		0.82%	19.94%	2.13%	40.40%	0.77%	20.05%	1.97%	42.04%

FLORIDA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION STATISTICS OFFICE
2020 HISTORICAL AADT REPORT

COUNTY: 93 - PALM BEACH

SITE: 5056 - SR 5/FEDERAL HWY - N OF SR 802/LUCERNE AVE,WB (COUNTY LINK: 4802)

YEAR	AADT		DIRECTION 1		DIRECTION 2	*K FACTOR	D FACTOR	T FACTOR	
2020	9600	F	N	4900	S	4700	9.00	57.60	2.40
2019	10000	C	N	5100	S	4900	9.00	58.80	2.40
2018	9300	C	N	5000	S	4300	9.00	55.50	2.40
2017	9200	C	N	4700	S	4500	9.00	55.40	2.50
2016	11500	C	N	5600	S	5900	9.00	55.30	2.50
2015	9300	C	N	4900	S	4400	9.00	55.60	2.50
2014	8300	C	N	4300	S	4000	9.00	55.40	2.80
2013	9100	C	N	4800	S	4300	9.00	58.50	2.80
2012	8700	C	N	4400	S	4300	9.00	59.30	0.10
2011	8000	C	N	4100	S	3900	9.00	58.80	6.30
2010	8500	C	N	4200	S	4300	10.86	60.20	11.10
2009	9800	C	N	5000	S	4800	11.11	60.16	11.10
2008	9700	C	N	5100	S	4600	10.95	57.63	11.10
2007	10700	C	N	5600	S	5100	10.80	57.68	2.50
2006	12000	C	N	6200	S	5800	10.77	57.38	5.80
2005	10600	C	N	5300	S	5300	10.80	56.50	5.80

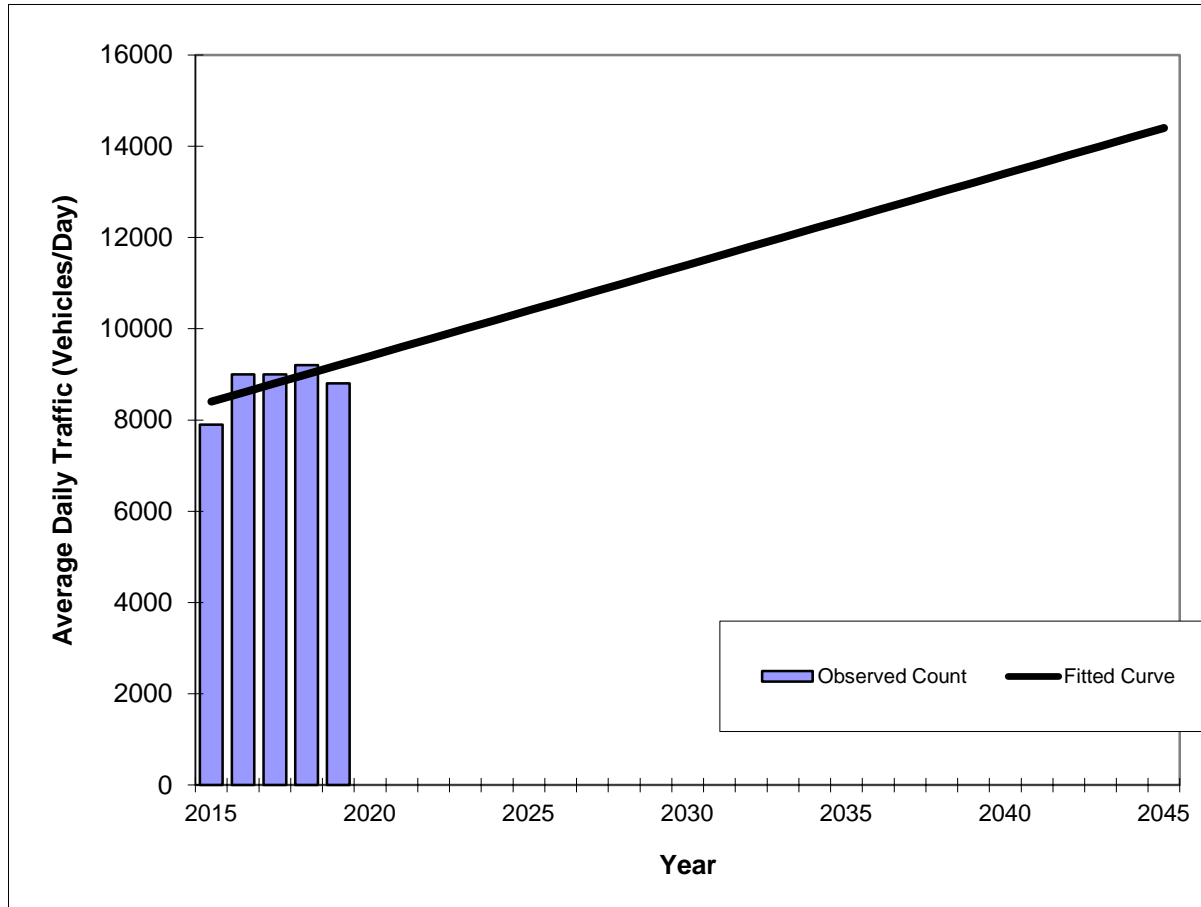
AADT FLAGS: C = COMPUTED; E = MANUAL ESTIMATE; F = FIRST YEAR ESTIMATE
S = SECOND YEAR ESTIMATE; T = THIRD YEAR ESTIMATE; R = FOURTH YEAR ESTIMATE
V = FIFTH YEAR ESTIMATE; 6 = SIXTH YEAR ESTIMATE; X = UNKNOWN

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

Traffic Trends - V03.a

FEDERAL HWY -- South of Lake & Lucerne Ave

County:	Palm Beach (93)
Station #:	930221
Highway:	FEDERAL HWY



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2015	7900	8400
2016	9000	8600
2017	9000	8800
2018	9200	9000
2019	8800	9200

Trend R-squared:	38.17%
Trend Annual Historic Growth Rate:	2.38%
Printed:	30-Nov-21

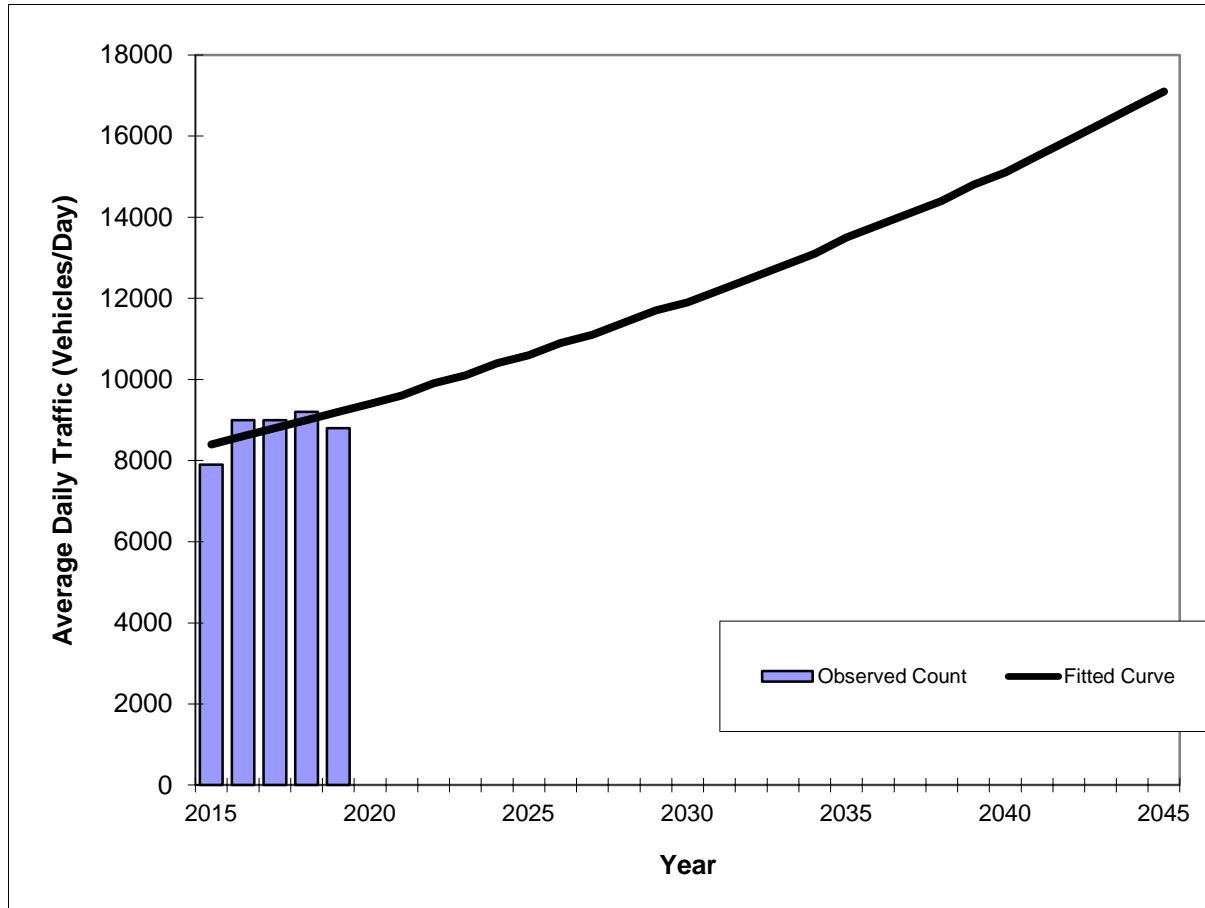
Straight Line Growth Option

*Axle-Adjusted

Traffic Trends - V03.a

FEDERAL HWY -- South of Lake & Lucerne Ave

County:	Palm Beach (93)
Station #:	930221
Highway:	FEDERAL HWY



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2015	7900	8400
2016	9000	8600
2017	9000	8800
2018	9200	9000
2019	8800	9200

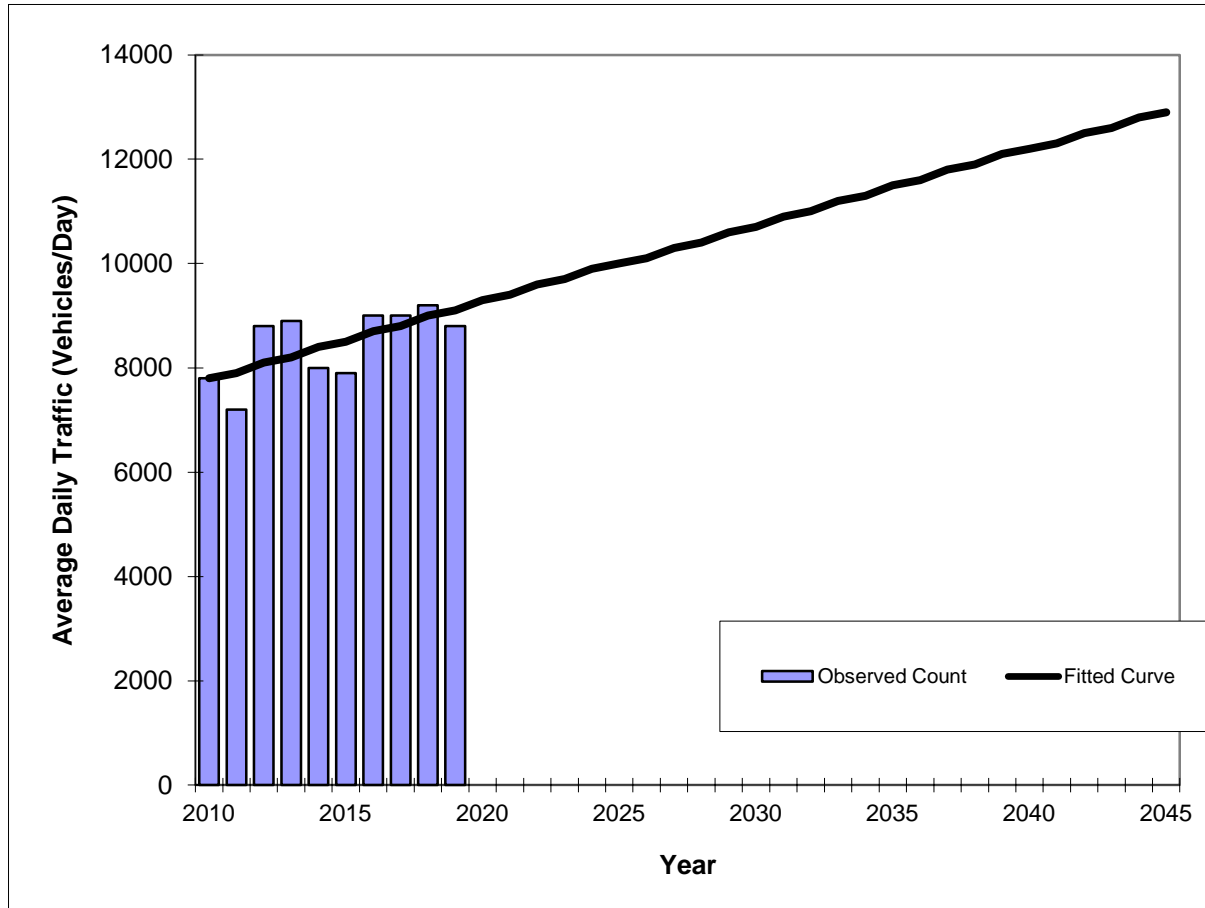
Trend R-squared:	38.83%
Compounded Annual Historic Growth Rate:	2.30%
Printed:	30-Nov-21
Exponential Growth Option	

*Axle-Adjusted

Traffic Trends - V03.a

FEDERAL HWY -- South of Lake & Lucerne Ave

County:	Palm Beach (93)
Station #:	930221
Highway:	FEDERAL HWY



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2010	7800	7800
2011	7200	7900
2012	8800	8100
2013	8900	8200
2014	8000	8400
2015	7900	8500
2016	9000	8700
2017	9000	8800
2018	9200	9000
2019	8800	9100

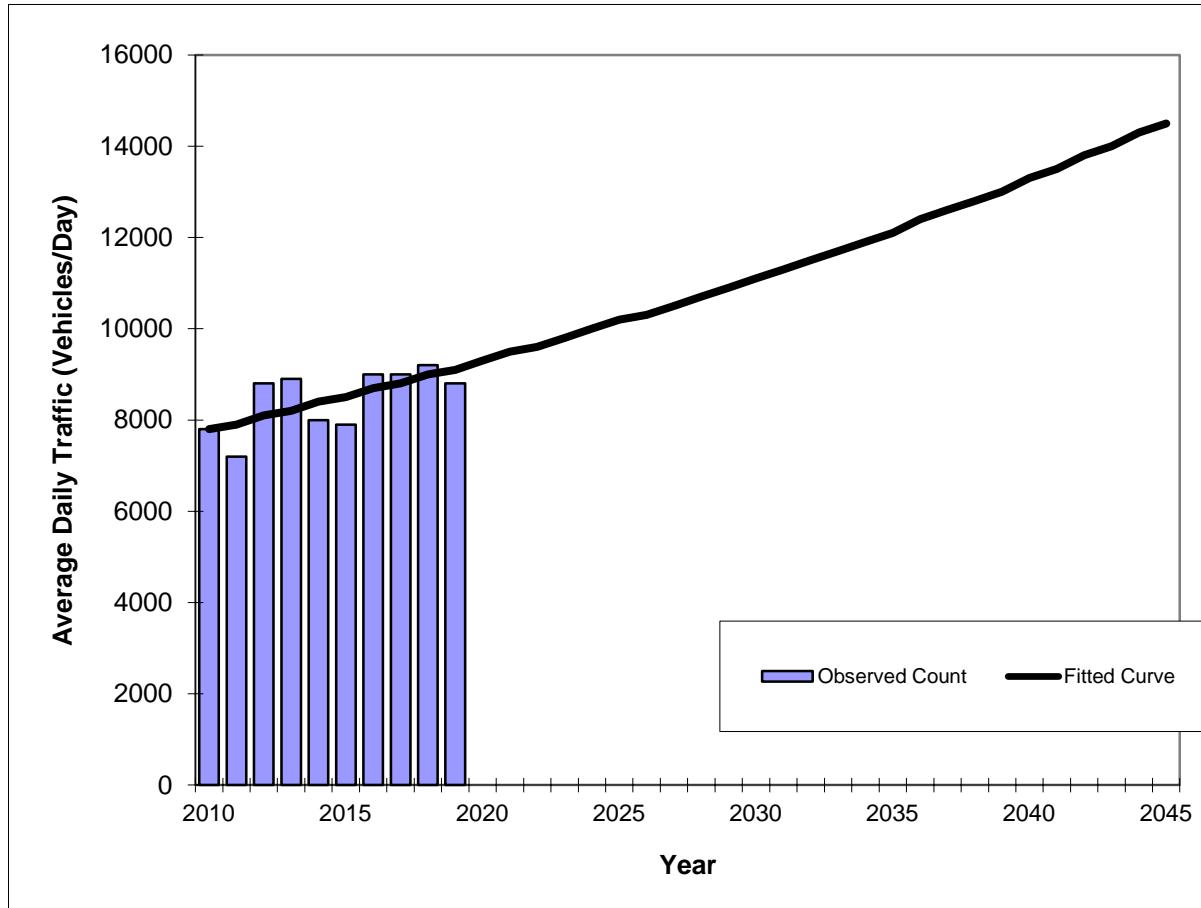
Trend R-squared:	43.24%
Trend Annual Historic Growth Rate:	1.85%
Printed:	30-Nov-21
Straight Line Growth Option	

*Axle-Adjusted

Traffic Trends - V03.a

FEDERAL HWY -- South of Lake & Lucerne Ave

County:	Palm Beach (93)
Station #:	930221
Highway:	FEDERAL HWY



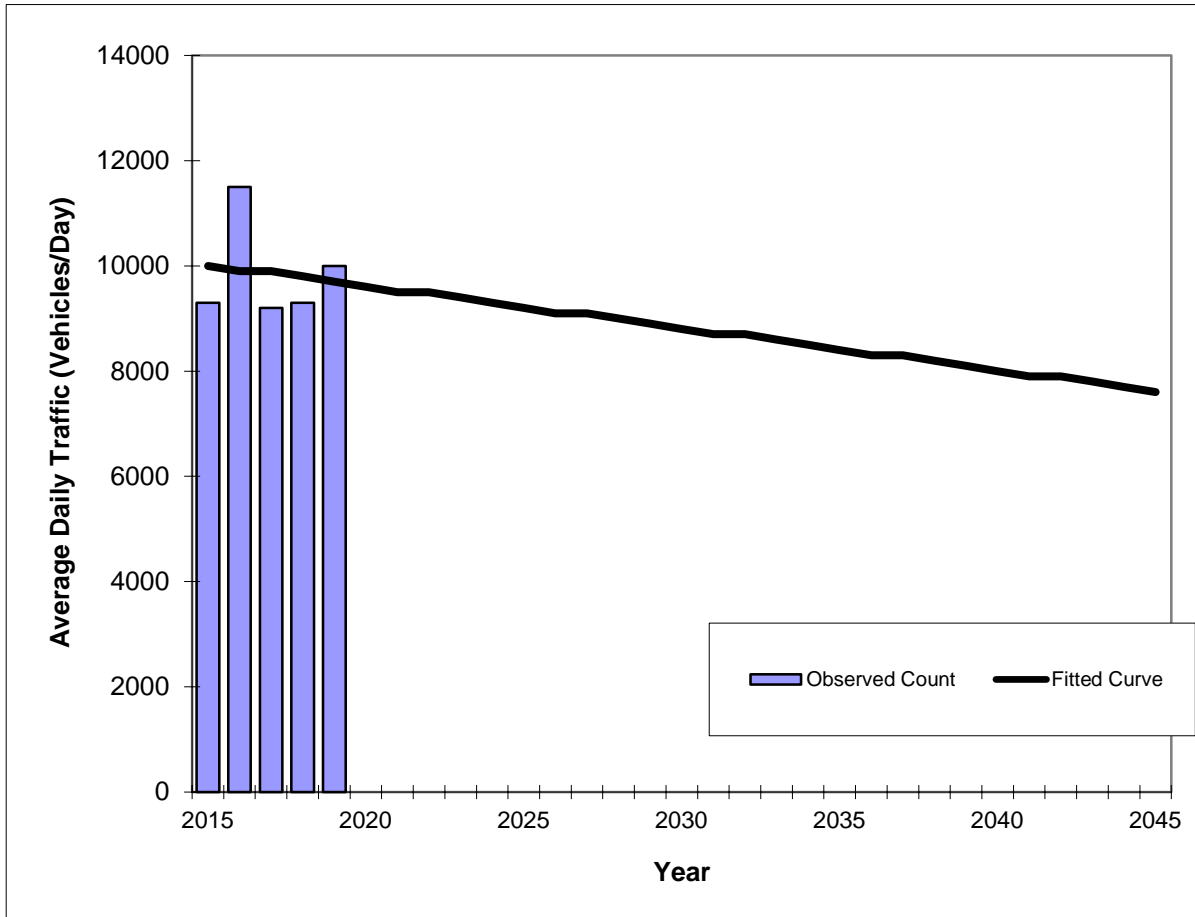
Year	Traffic (ADT/AADT)	
	Count*	Trend**
2010	7800	7800
2011	7200	7900
2012	8800	8100
2013	8900	8200
2014	8000	8400
2015	7900	8500
2016	9000	8700
2017	9000	8800
2018	9200	9000
2019	8800	9100

Trend R-squared:	43.00%
Compounded Annual Historic Growth Rate:	1.73%
Printed:	30-Nov-21
Exponential Growth Option	

*Axle-Adjusted

Traffic Trends - V03.a
FEDERAL HWY -- south of Lake and Lucerne Ave

County:	Palm Beach (93)
Station #:	5056
Highway:	FEDERAL HWY



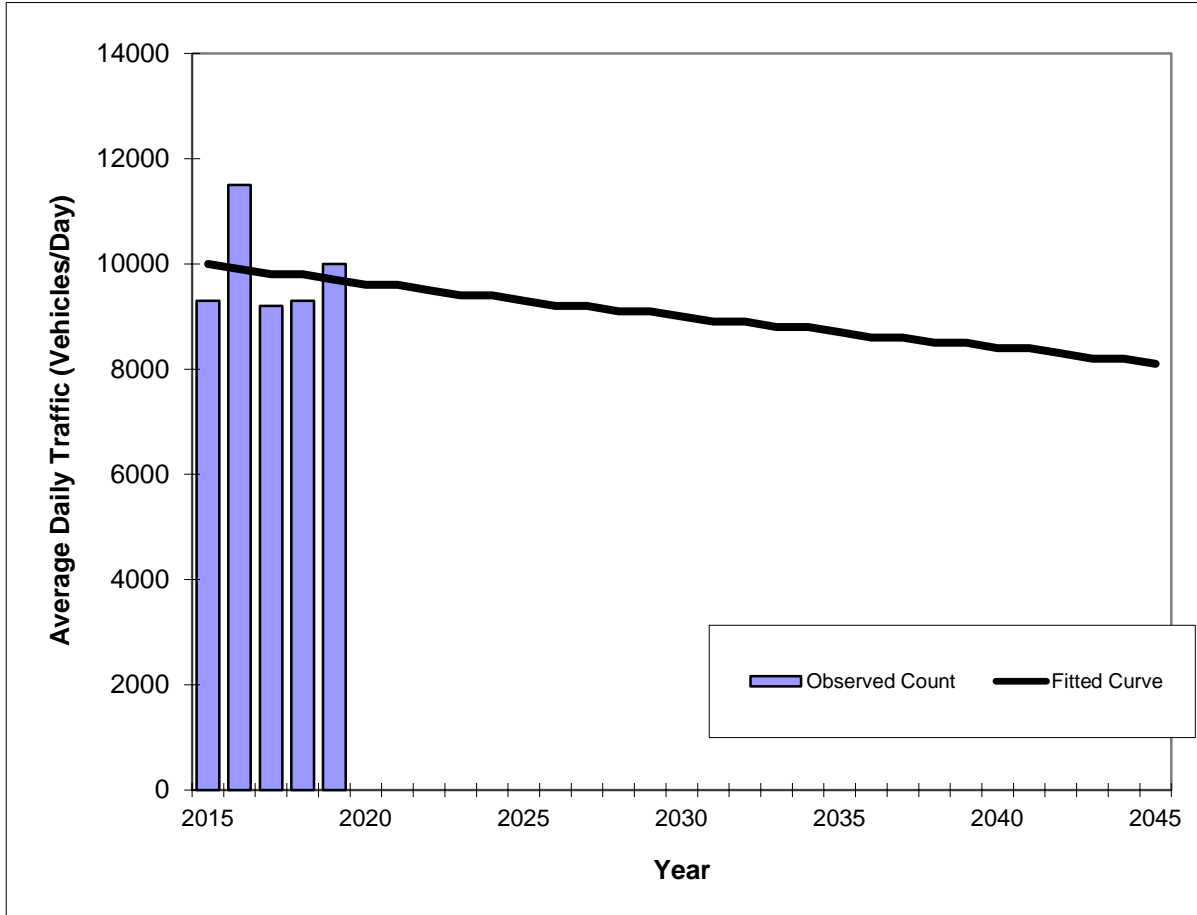
Year	Traffic (ADT/AADT)	
	Count*	Trend**
2015	9300	10000
2016	11500	9900
2017	9200	9900
2018	9300	9800
2019	10000	9700

Trend R-squared: 1.70%
Trend Annual Historic Growth Rate: -0.75%
Printed: 30-Nov-21
Straight Line Growth Option

*Axle-Adjusted

Traffic Trends - V03.a
FEDERAL HWY -- south of Lake and Lucerne Ave

County:	Palm Beach (93)
Station #:	5056
Highway:	FEDERAL HWY



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2015	9300	10000
2016	11500	9900
2017	9200	9800
2018	9300	9800
2019	10000	9700

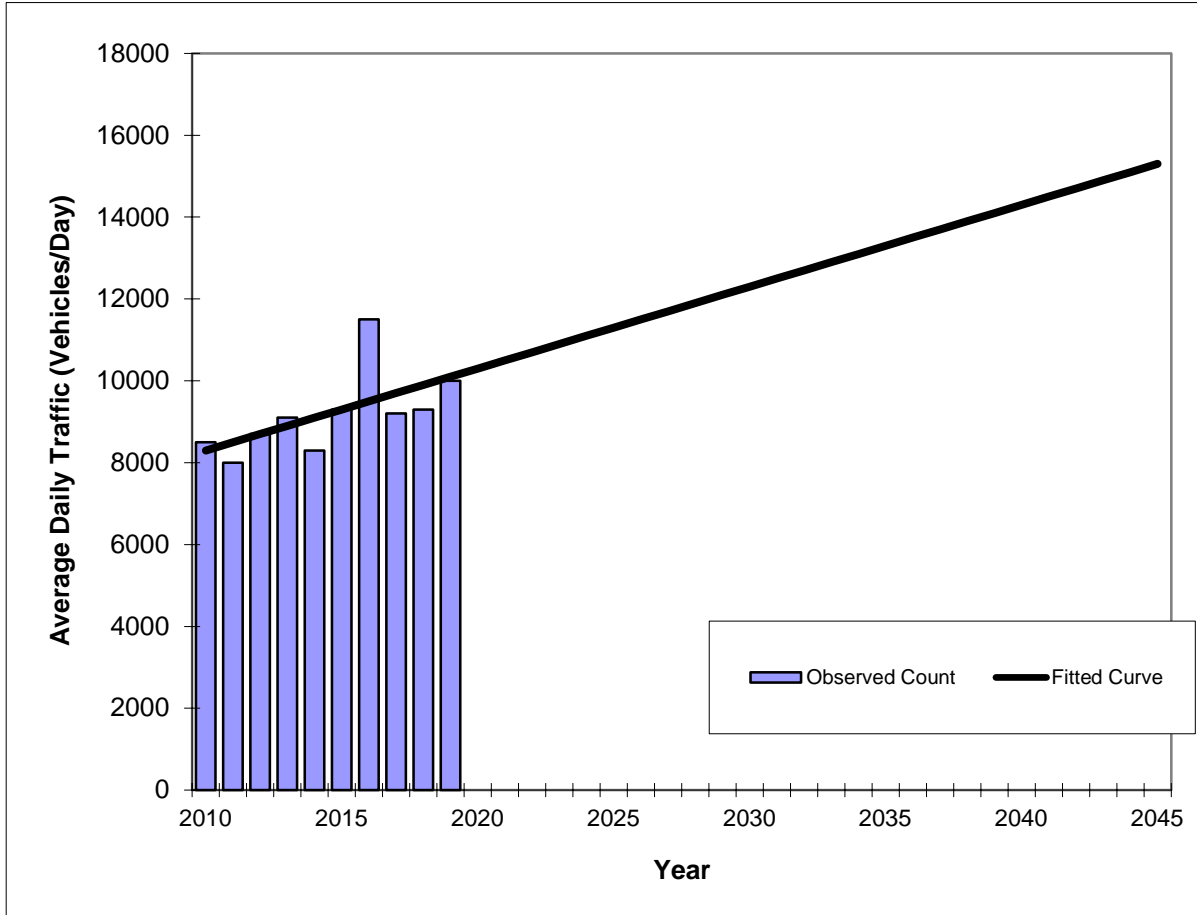
Trend R-squared: 1.27%
 Compounded Annual Historic Growth Rate: -0.76%
 Printed: 1-Dec-21
Exponential Growth Option

*Axle-Adjusted

Traffic Trends - V03.a

FEDERAL HWY -- south of Lake and Lucerne Ave

County:	Palm Beach (93)
Station #:	5056
Highway:	FEDERAL HWY



Year	Traffic (ADT/AADT)	
	Count*	Trend**
2010	8500	8300
2011	8000	8500
2012	8700	8700
2013	9100	8900
2014	8300	9100
2015	9300	9300
2016	11500	9500
2017	9200	9700
2018	9300	9900
2019	10000	10100

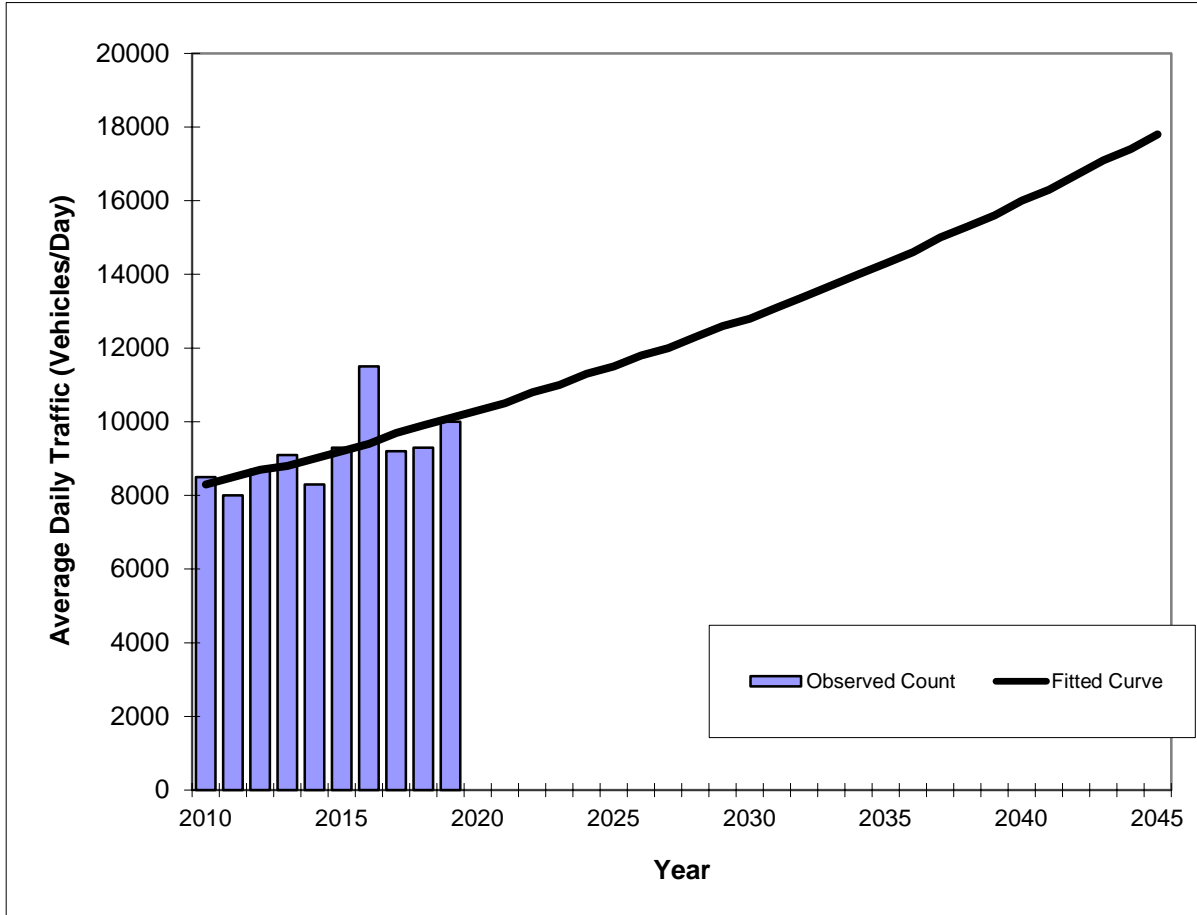
Trend R-squared:	37.55%
Trend Annual Historic Growth Rate:	2.41%
Printed:	30-Nov-21

Straight Line Growth Option

*Axle-Adjusted

Traffic Trends - V03.a
FEDERAL HWY -- south of Lake and Lucerne Ave

County:	Palm Beach (93)
Station #:	5056
Highway:	FEDERAL HWY



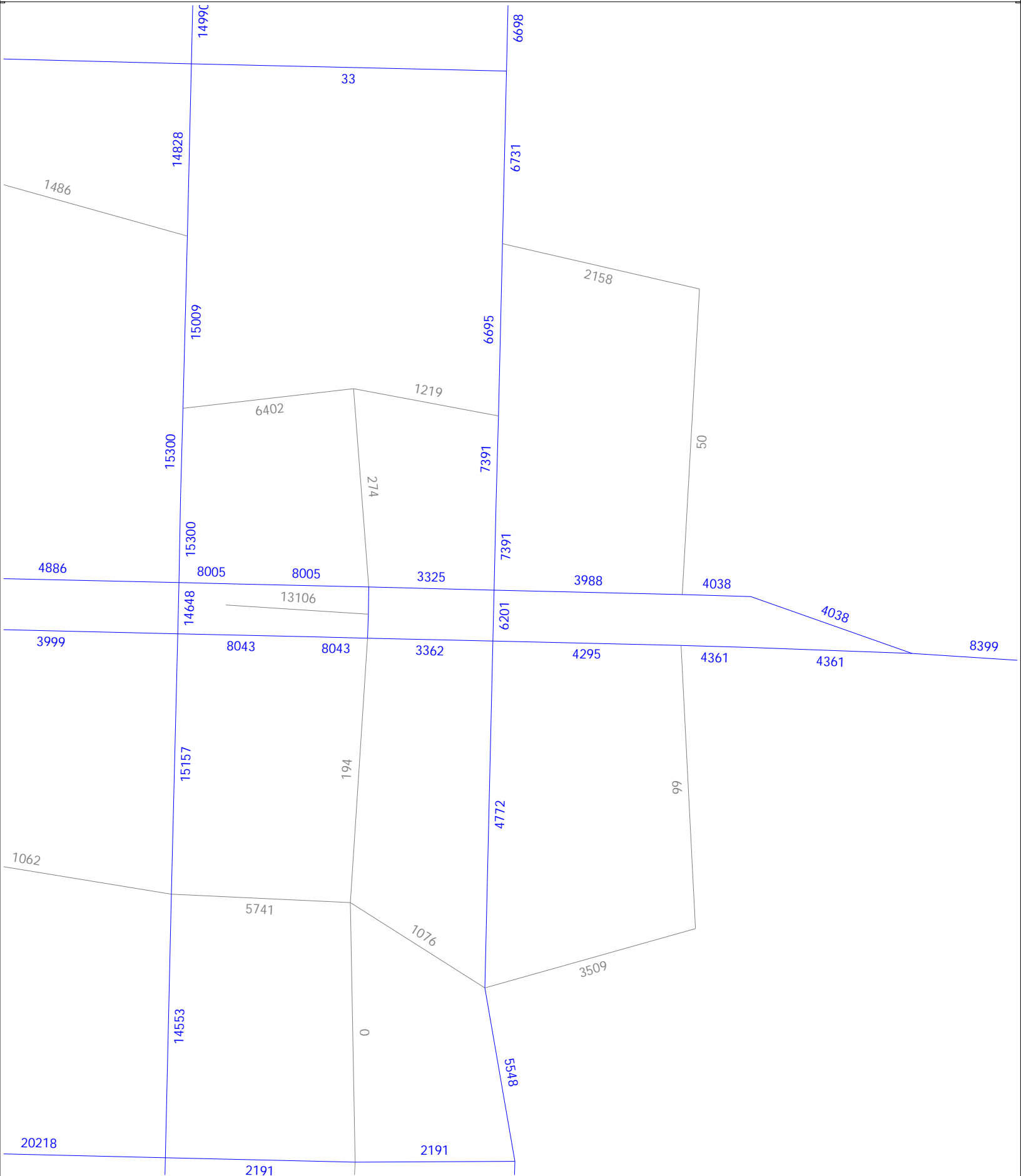
Year	Traffic (ADT/AADT)	
	Count*	Trend**
2010	8500	8300
2011	8000	8500
2012	8700	8700
2013	9100	8800
2014	8300	9000
2015	9300	9200
2016	11500	9400
2017	9200	9700
2018	9300	9900
2019	10000	10100

Trend R-squared: 41.08%
 Compounded Annual Historic Growth Rate: 2.20%
 Printed: 30-Nov-21
Exponential Growth Option

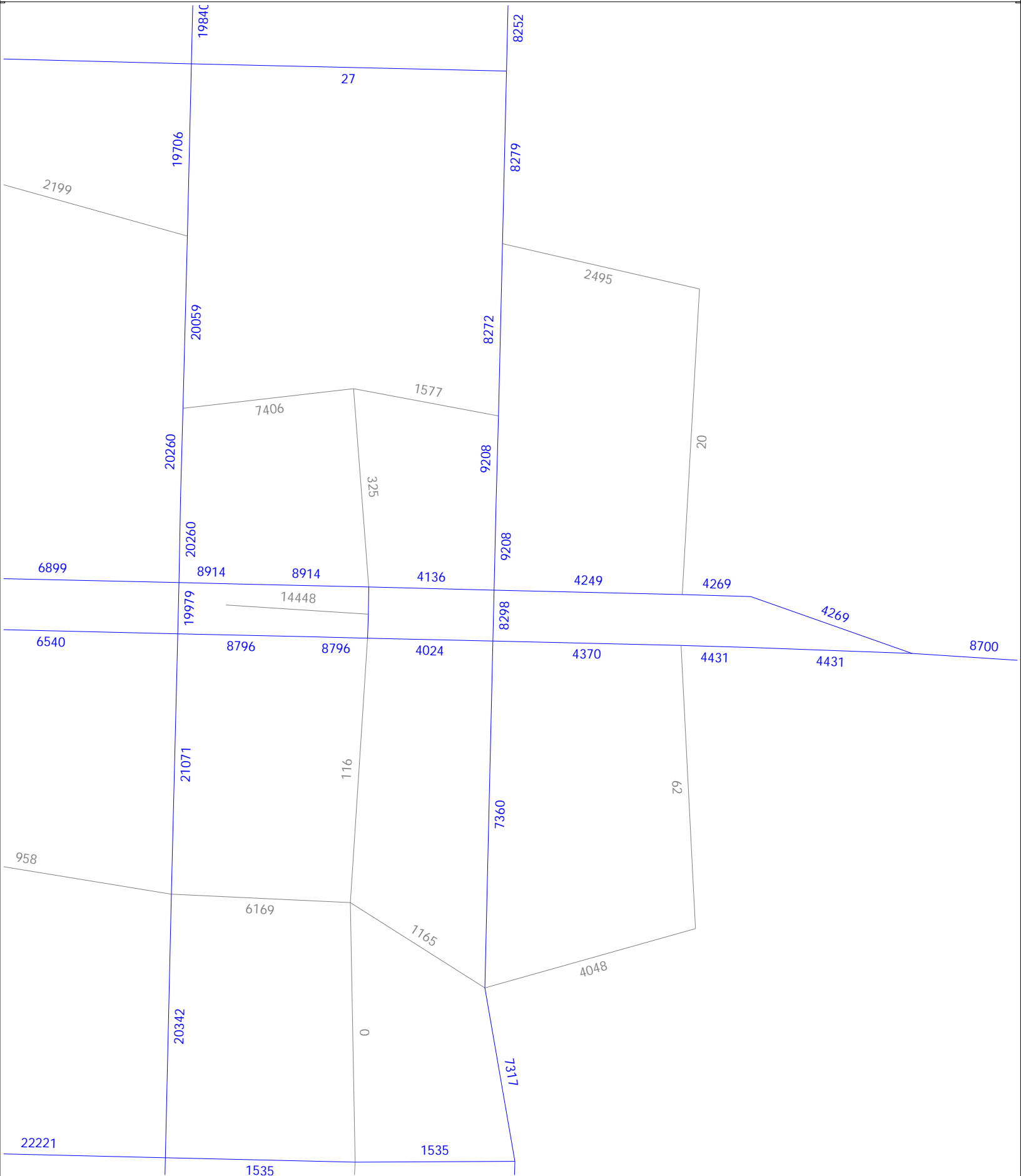
*Axle-Adjusted

SERPM 8.512 Analysis

SR 5 / Federal Highway
SERPM 8.512
B2015
Lake Worth Mini Roundabouts



SR 5 / Federal Highway
SERPM 8.512
2045
Lake Worth Mini Roundabouts







Appendix D

CAP-X Worksheets

Capacity Analysis for Planning of Junctions

Summary Report - Page 1 of 2

Project Name:	SR-5 & 2nd Ave N - AM
Project Number:	Work Order 11
Location:	Lake Worth Beach, FL
Date:	November 22, 2021
Number of Intersection Legs:	3
Which leg is the minor street?:	W

Traffic Volume Demand						
	Volume (Veh/hr)				Percent (%)	
	U-Turn 	Left 	Thru 	Right 	Heavy Vehicles	Volume Growth
Eastbound	0	10	23	31	3.10%	24.31%
Westbound	0	0	0	0	0.00%	24.31%
Southbound	0	28	410	0	2.70%	24.31%
Northbound	0	0	341	12	1.40%	24.31%
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		C4-General Urban Residential				
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 1 of 4

Project Name:	SR-5 & 2nd Ave N - AM
Project Number:	Work Order 11
Location:	Lake Worth Beach, FL
Date:	November 22, 2021
Number of Intersection Legs:	3
Major Street Direction:	North-South

Traffic Volume Demand						
	Volume (Veh/hr)				Percent (%)	
	U-Turn 	Left 	Thru 	Right 	Heavy Vehicles	Volume Growth
Eastbound	0	10	23	31	3.10%	24.31%
Westbound	0	0	0	0	0.00%	24.31%
Southbound	0	28	410	0	2.70%	24.31%
Northbound	0	0	341	12	1.40%	24.31%
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			C4-General Urban Residential			
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

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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	/	0	1	0	/	1	1	0	/	0	1	0	/	0	0	0
Two-Way Stop Control	N-S	/	0	1	0	/	1	1	0	/	0	1	0	/	0	0	0
All-Way Stop Control	FULL	/	0	1	0	/	1	1	0	/	0	1	0	/	0	0	0

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





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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	Pedestrian Accommodations	Bicycle Accommodations	Transit Accommodations
		CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C				
Traffic Signal	FULL	/	/	/	/	/	/	/	/	605	0.35	0.35	Poor	Poor	Fair
Two-Way Stop Control	N-S	/	/	/	/	/	/	/	/	--	0.30	0.30	Poor	Poor	Fair
All-Way Stop Control	FULL	/	/	/	/	/	/	/	/	1086	0.72	0.72	Fair	Fair	Fair

Capacity Analysis for Planning of Junctions

Summary Report - Page 1 of 2

Project Name:	SR-5 & 2nd Ave N - PM
Project Number:	Work Order 11
Location:	Lake Worth Beach, FL
Date:	November 22, 2021
Number of Intersection Legs:	3
Which leg is the minor street?:	W

Traffic Volume Demand						
	Volume (Veh/hr)				Percent (%)	
	U-Turn 	Left 	Thru 	Right 	Heavy Vehicles	Volume Growth
Eastbound	0	18	29	60	1.90%	24.31%
Westbound	0	0	0	0	0.00%	24.31%
Southbound	0	32	404	0	1.40%	24.31%
Northbound	0	0	480	17	1.80%	24.31%
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		C4-General Urban Residential				
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 1 of 4

Project Name:	SR-5 & 2nd Ave N - PM
Project Number:	Work Order 11
Location:	Lake Worth Beach, FL
Date:	November 22, 2021
Number of Intersection Legs:	3
Major Street Direction:	North-South

Traffic Volume Demand						
	Volume (Veh/hr)				Percent (%)	
	U-Turn 	Left 	Thru 	Right 	Heavy Vehicles	Volume Growth
Eastbound	0	18	29	60	1.90%	24.31%
Westbound	0	0	0	0	0.00%	24.31%
Southbound	0	32	404	0	1.40%	24.31%
Northbound	0	0	480	17	1.80%	24.31%
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			C4-General Urban Residential			
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	/	0	1	0	/	1	1	0	/	0	1	0	/	0	0	0
Two-Way Stop Control	N-S	/	0	1	0	/	1	1	0	/	0	1	0	/	0	0	0
All-Way Stop Control	FULL	/	0	1	0	/	1	1	0	/	0	1	0	/	0	0	0

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





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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	Pedestrian Accommodations	Bicycle Accommodations	Transit Accommodations
		CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C				
Traffic Signal	FULL	/	/	/	/	/	/	/	/	809	0.46	0.46	Poor	Poor	Fair
Two-Way Stop Control	N-S	/	/	/	/	/	/	/	/	--	0.62	0.62	Poor	Poor	Fair
All-Way Stop Control	FULL	/	/	/	/	/	/	/	/	1314	0.88	0.88	Fair	Fair	Fair

Capacity Analysis for Planning of Junctions

Summary Report - Page 1 of 2

Project Name:	SR-5 & 3rd Ave N - AM
Project Number:	Work Order 11
Location:	Lake Worth Beach, FL
Date:	November 22, 2021
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	5	5	7	0.00%	24.31%
Westbound	0	5	5	12	0.00%	24.31%
Southbound	0	5	435	8	2.90%	24.31%
Northbound	0	13	340	1	1.50%	24.31%
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		C4-General Urban Residential				
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 1 of 4

Project Name:	SR-5 & 3rd Ave N - AM
Project Number:	Work Order 11
Location:	Lake Worth Beach, FL
Date:	November 22, 2021
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	5	5	7	0.00%	24.31%
Westbound	0	5	5	12	0.00%	24.31%
Southbound	0	5	435	8	2.90%	24.31%
Northbound	0	13	340	1	1.50%	24.31%
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			C4-General Urban Residential			
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

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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	1	0	/	1	1	0	/	0	1	0	/	0	1	0
Two-Way Stop Control	N-S	/	1	1	0	/	1	1	0	/	0	1	0	/	0	1	0
All-Way Stop Control	FULL	/	1	1	0	/	1	1	0	/	0	1	0	/	0	1	0

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





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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	Pedestrian Accommodations	Bicycle Accommodations	Transit Accommodations
		CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C				
Traffic Signal	FULL	/	/	/	/	/	/	/	/	611	0.36	0.36	Poor	Poor	Fair
Two-Way Stop Control	N-S	/	/	/	/	/	/	/	/	--	0.31	0.31	Poor	Poor	Fair
All-Way Stop Control	FULL	/	/	/	/	/	/	/	/	1066	0.71	0.71	Fair	Fair	Fair

Capacity Analysis for Planning of Junctions

Summary Report - Page 1 of 2

Project Name:	SR-5 & 3rd Ave N - PM
Project Number:	Work Order 11
Location:	Lake Worth Beach, FL
Date:	November 22, 2021
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	7	7	10	0.00%	24.31%
Westbound	0	5	4	14	0.00%	24.31%
Southbound	0	10	427	16	1.40%	24.31%
Northbound	0	30	456	6	5.10%	24.31%
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		C4-General Urban Residential				
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

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Project Name:	SR-5 & 3rd Ave N - PM
Project Number:	Work Order 11
Location:	Lake Worth Beach, FL
Date:	November 22, 2021
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	7	7	10	0.00%	24.31%
Westbound	0	5	4	14	0.00%	24.31%
Southbound	0	10	427	16	1.40%	24.31%
Northbound	0	30	456	6	5.10%	24.31%
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			C4-General Urban Residential			
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

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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	1	0	/	1	1	0	/	0	1	0	/	0	1	0
Two-Way Stop Control	N-S	/	1	1	0	/	1	1	0	/	0	1	0	/	0	1	0
All-Way Stop Control	FULL	/	1	1	0	/	1	1	0	/	0	1	0	/	0	1	0

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





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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	Pedestrian Accommodations	Bicycle Accommodations	Transit Accommodations
		CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C				
Traffic Signal	FULL	/	/	/	/	/	/	/	/	648	0.38	0.38	Poor	Poor	Fair
Two-Way Stop Control	N-S	/	/	/	/	/	/	/	/	--	0.34	0.34	Poor	Poor	Fair
All-Way Stop Control	FULL	/	/	/	/	/	/	/	/	1272	0.85	0.85	Fair	Fair	Fair

Capacity Analysis for Planning of Junctions

Summary Report - Page 1 of 2

Project Name:	SR-5 & 4th Ave N - AM
Project Number:	Work Order 11
Location:	Lake Worth Beach, FL
Date:	November 22, 2021
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	5	4	4	0.00%	24.31%
Westbound	0	5	2	7	7.10%	24.31%
Southbound	0	5	438	18	2.60%	24.31%
Northbound	0	24	331	5	1.40%	24.31%
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		C4-General Urban Residential				
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

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Project Name:	SR-5 & 4th Ave N - AM
Project Number:	Work Order 11
Location:	Lake Worth Beach, FL
Date:	November 22, 2021
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	5	4	4	0.00%	24.31%
Westbound	0	5	2	7	7.10%	24.31%
Southbound	0	5	438	18	2.60%	24.31%
Northbound	0	24	331	5	1.40%	24.31%
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		C4-General Urban Residential				
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

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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	1	0	/	1	1	0	/	0	1	0	/	0	1	0
Two-Way Stop Control	N-S	/	1	1	0	/	1	1	0	/	0	1	0	/	0	1	0
All-Way Stop Control	FULL	/	1	1	0	/	1	1	0	/	0	1	0	/	0	1	0

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





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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	Pedestrian Accommodations	Bicycle Accommodations	Transit Accommodations
		CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C				
Traffic Signal	FULL	/	/	/	/	/	/	/	/	634	0.37	0.37	Poor	Poor	Fair
Two-Way Stop Control	N-S	/	/	/	/	/	/	/	/	--	0.32	0.32	Poor	Poor	Fair
All-Way Stop Control	FULL	/	/	/	/	/	/	/	/	1076	0.72	0.72	Fair	Fair	Fair

Capacity Analysis for Planning of Junctions

Summary Report - Page 1 of 2

Project Name:	SR-5 & 4th Ave N - PM
Project Number:	Work Order 11
Location:	Lake Worth Beach, FL
Date:	November 22, 2021
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	7	0	7	0.00%	24.31%
Westbound	0	1	1	6	0.00%	24.31%
Southbound	0	8	414	14	1.80%	24.31%
Northbound	0	8	491	9	2.60%	24.31%
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		C4-General Urban Residential				
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

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Project Name:	SR-5 & 4th Ave N - PM
Project Number:	Work Order 11
Location:	Lake Worth Beach, FL
Date:	November 22, 2021
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	7	0	7	0.00%	24.31%
Westbound	0	1	1	6	0.00%	24.31%
Southbound	0	8	414	14	1.80%	24.31%
Northbound	0	8	491	9	2.60%	24.31%
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			C4-General Urban Residential			
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

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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	1	0	/	1	1	0	/	0	1	0	/	0	1	0
Two-Way Stop Control	N-S	/	1	1	0	/	1	1	0	/	0	1	0	/	0	1	0
All-Way Stop Control	FULL	/	1	1	0	/	1	1	0	/	0	1	0	/	0	1	0

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





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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	Pedestrian Accommodations	Bicycle Accommodations	Transit Accommodations
		CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C				
Traffic Signal	FULL	/	/	/	/	/	/	/	/	666	0.39	0.39	Poor	Poor	Fair
Two-Way Stop Control	N-S	/	/	/	/	/	/	/	/	--	0.35	0.35	Poor	Poor	Fair
All-Way Stop Control	FULL	/	/	/	/	/	/	/	/	1226	0.82	0.82	Fair	Fair	Fair

Capacity Analysis for Planning of Junctions

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Project Name:	SR-5 & 5th Ave N - AM
Project Number:	Work Order 11
Location:	Lake Worth Beach, FL
Date:	November 22, 2021
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	4	1	6	9.10%	24.31%
Westbound	0	9	1	13	4.30%	24.31%
Southbound	0	7	436	6	2.90%	24.31%
Northbound	0	1	357	5	1.10%	24.31%
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		C4-General Urban Residential				
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

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Project Name:	SR-5 & 5th Ave N - AM
Project Number:	Work Order 11
Location:	Lake Worth Beach, FL
Date:	November 22, 2021
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	4	1	6	9.10%	24.31%
Westbound	0	9	1	13	4.30%	24.31%
Southbound	0	7	436	6	2.90%	24.31%
Northbound	0	1	357	5	1.10%	24.31%
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			C4-General Urban Residential			
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

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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	1	0	/	0	1	0	/	0	1	0	/	0	1	0
Two-Way Stop Control	N-S	/	1	1	0	/	0	1	0	/	0	1	0	/	0	1	0
All-Way Stop Control	FULL	/	1	1	0	/	0	1	0	/	0	1	0	/	0	1	0

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





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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	Pedestrian Accommodations	Bicycle Accommodations	Transit Accommodations
		CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C				
Traffic Signal	FULL	/	/	/	/	/	/	/	/	606	0.36	0.36	Poor	Poor	Fair
Two-Way Stop Control	N-S	/	/	/	/	/	/	/	/	--	0.32	0.32	Poor	Poor	Fair
All-Way Stop Control	FULL	/	/	/	/	/	/	/	/	1075	0.72	0.72	Fair	Fair	Fair

Capacity Analysis for Planning of Junctions

Summary Report - Page 1 of 2





Project Name:	SR-5 & 5th Ave N - PM
Project Number:	Work Order 11
Location:	Lake Worth Beach, FL
Date:	November 22, 2021
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	1	0	9	0.00%	24.31%
Westbound	0	4	0	3	0.00%	24.31%
Southbound	0	7	453	5	1.30%	24.31%
Northbound	0	9	475	2	1.90%	24.31%
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		C4-General Urban Residential				
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 1 of 4

Project Name:	SR-5 & 5th Ave N - PM
Project Number:	Work Order 11
Location:	Lake Worth Beach, FL
Date:	November 22, 2021
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	1	0	9	0.00%	24.31%
Westbound	0	4	0	3	0.00%	24.31%
Southbound	0	7	453	5	1.30%	24.31%
Northbound	0	9	475	2	1.90%	24.31%
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			C4-General Urban Residential			
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 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	Pedestrian Accommodations	Bicycle Accommodations	Transit Accommodations
		CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C				
Traffic Signal	<u>FULL</u>	/	/	/	/	/	/	/	/	617	<u>0.36</u>	0.36	Poor	Poor	Fair
Two-Way Stop Control	<u>N-S</u>	/	/	/	/	/	/	/	/	--	<u>0.34</u>	0.34	Poor	Poor	Fair
All-Way Stop Control	<u>FULL</u>	/	/	/	/	/	/	/	/	1222	<u>0.81</u>	0.81	Fair	Fair	Fair

Capacity Analysis for Planning of Junctions

Summary Report - Page 1 of 2





Project Name:	SR-5 & 6th Ave N - AM
Project Number:	Work Order 11
Location:	Lake Worth Beach, FL
Date:	November 22, 2021
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	5	1	4	10.00%	24.31%
Westbound	0	3	1	4	0.00%	24.31%
Southbound	0	2	438	7	2.70%	24.31%
Northbound	0	2	358	2	1.40%	24.31%
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		C4-General Urban Residential				
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 1 of 4

Project Name:	SR-5 & 6th Ave N - AM
Project Number:	Work Order 11
Location:	Lake Worth Beach, FL
Date:	November 22, 2021
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	5	1	4	10.00%	24.31%
Westbound	0	3	1	4	0.00%	24.31%
Southbound	0	2	438	7	2.70%	24.31%
Northbound	0	2	358	2	1.40%	24.31%
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			C4-General Urban Residential			
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	/	0	1	0	/	0	1	0	/	0	1	0	/	0	1	0
Two-Way Stop Control	N-S	/	0	1	0	/	0	1	0	/	0	1	0	/	0	1	0
All-Way Stop Control	FULL	/	0	1	0	/	0	1	0	/	0	1	0	/	0	1	0

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	Pedestrian Accommodations	Bicycle Accommodations	Transit Accommodations
		CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C				
Traffic Signal	FULL	/	/	/	/	/	/	/	/	584	0.34	0.34	Poor	Poor	Fair
Two-Way Stop Control	N-S	/	/	/	/	/	/	/	/	--	0.32	0.32	Poor	Poor	Fair
All-Way Stop Control	FULL	/	/	/	/	/	/	/	/	1051	0.88	0.88	Fair	Fair	Fair

Capacity Analysis for Planning of Junctions

Summary Report - Page 1 of 2





Project Name:	SR-5 & 6th Ave N - PM
Project Number:	Work Order 11
Location:	Lake Worth Beach, FL
Date:	November 22, 2021
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	7	3	1	0.00%	24.31%
Westbound	0	4	2	6	10.00%	24.31%
Southbound	0	1	456	6	2.70%	24.31%
Northbound	0	1	469	3	1.40%	24.31%
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		C4-General Urban Residential				
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 1 of 4

Project Name:	SR-5 & 6th Ave N - PM
Project Number:	Work Order 11
Location:	Lake Worth Beach, FL
Date:	November 22, 2021
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	7	3	1	0.00%	24.31%
Westbound	0	4	2	6	10.00%	24.31%
Southbound	0	1	456	6	2.70%	24.31%
Northbound	0	1	469	3	1.40%	24.31%
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			C4-General Urban Residential			
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	/	0	1	0	/	0	1	0	/	0	1	0	/	0	1	0
Two-Way Stop Control	N-S	/	0	1	0	/	0	1	0	/	0	1	0	/	0	1	0
All-Way Stop Control	FULL	/	0	1	0	/	0	1	0	/	0	1	0	/	0	1	0

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	Pedestrian Accommodations	Bicycle Accommodations	Transit Accommodations
		CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C	CLV	V/C				
Traffic Signal	FULL	/	/	/	/	/	/	/	/	612	0.36	0.36	Poor	Poor	Fair
Two-Way Stop Control	N-S	/	/	/	/	/	/	/	/	--	0.33	0.33	Poor	Poor	Fair
All-Way Stop Control	FULL	/	/	/	/	/	/	/	/	1217	1.01	1.01	Fair	Fair	Fair

Appendix E

SPICE-X Worksheets

Federal Highway Administration (FHWA)
 Safety Performance for Intersection Control Evaluation Tool

Results
 Summary of crash prediction results for each alternative

Project Information

Project Name:	SR 5 Roundabouts	Intersection Type	At-Grade Intersections
Intersection:	2nd Ave N	Opening Year	2021
Agency:	Lake Worth	Design Year	2031
Project Reference:		Facility Type	On Urban and Suburban Arterial
City:	Lake Worth	Number of Legs	4-leg
State:	Florida	1-Way/2-Way	1-way Intersecting 2-way
Date:	11/29/2021	# of Major Street Lanes (both directions)	5 or fewer
Analyst:	Ian M. Bairden, P.E.	Major Street Approach Speed	Less than 55 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	Rank
Traffic Signal	Total	1.35	1.59	16.17	2	Yes	Uncalibrated SPF	95	93	3
	Fatal & Injury	0.31	0.35	3.60						
Minor Road Stop	Total	1.87	2.60	24.51	3	Yes	Calibrated SPF w/ EB	91	88	4
	Fatal & Injury	0.35	0.46	4.47						
All Way Stop	Total	1.19	1.55	15.05	4	N/A	N/A	97	96	2
	Fatal & Injury	0.40	0.55	5.22						
1-lane Roundabout	Total	1.51	1.83	18.42	1	Yes	Uncalibrated SPF	97	96	1
	Fatal & Injury	0.27	0.34	3.32						
Other 1*	Total	No SPF	No SPF	No SPF	--	N/A	CMF	--	--	--
	Fatal & Injury	No SPF	No SPF	No SPF						
Other 2*	Total	No SPF	No SPF	No SPF	--	N/A	CMF	--	--	--
	Fatal & Injury	No SPF	No SPF	No SPF						

Federal Highway Administration (FHWA)
 Safety Performance for Intersection Control Evaluation Tool

Results
 Summary of crash prediction results for each alternative

Project Information

Project Name:	SR 5 Roundabouts	Intersection Type	At-Grade Intersections
Intersection:	3rd Ave N	Opening Year	2021
Agency:	Lake Worth	Design Year	2031
Project Reference:		Facility Type	On Urban and Suburban Arterial
City:	Lake Worth	Number of Legs	4-leg
State:	Florida	1-Way/2-Way	2-way Intersecting 2-way
Date:	11/29/2021	# of Major Street Lanes (both directions)	5 or fewer
Analyst:	Ian M. Bairden, P.E.	Major Street Approach Speed	Less than 55 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	Rank
Traffic Signal	Total	2.77	3.82	36.18	4	Yes	Calibrated SPF	97	96	1
	Fatal & Injury	0.91	1.28	12.01						
Minor Road Stop	Total	1.41	1.82	17.78	3	Yes	Calibrated SPF w/ EB	95	93	4
	Fatal & Injury	0.58	0.77	7.39						
All Way Stop	Total	1.03	1.35	13.08	2	N/A	N/A	97	96	2
	Fatal & Injury	0.35	0.48	4.58						
1-lane Roundabout	Total	1.47	1.79	17.94	1	Yes	Uncalibrated SPF	97	96	3
	Fatal & Injury	0.26	0.33	3.21						
Other 1*	Total	No SPF	No SPF	No SPF	--	N/A	CMF	--	--	--
	Fatal & Injury	No SPF	No SPF	No SPF						
Other 2*	Total	No SPF	No SPF	No SPF	--	N/A	CMF	--	--	--
	Fatal & Injury	No SPF	No SPF	No SPF						

Federal Highway Administration (FHWA)
 Safety Performance for Intersection Control Evaluation Tool

Results
 Summary of crash prediction results for each alternative

Project Information

Project Name:	SR 5 Roundabouts	Intersection Type	At-Grade Intersections
Intersection:	4th Ave N	Opening Year	2021
Agency:	Lake Worth	Design Year	2031
Project Reference:		Facility Type	On Urban and Suburban Arterial
City:	Lake Worth	Number of Legs	4-leg
State:	Florida	1-Way/2-Way	2-way Intersecting 2-way
Date:	11/29/2021	# of Major Street Lanes (both directions)	5 or fewer
Analyst:	Ian M. Bairden, P.E.	Major Street Approach Speed	Less than 55 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	Rank
Traffic Signal	Total	2.59	3.52	33.53	4	Yes	Calibrated SPF	97	97	2
	Fatal & Injury	0.85	1.18	11.17						
Minor Road Stop	Total	0.97	1.22	12.03	3	Yes	Calibrated SPF w/ EB	95	94	4
	Fatal & Injury	0.41	0.53	5.19						
All Way Stop	Total	0.93	1.19	11.68	2	N/A	N/A	97	97	1
	Fatal & Injury	0.32	0.43	4.12						
1-lane Roundabout	Total	1.45	1.76	17.67	1	Yes	Uncalibrated SPF	97	96	3
	Fatal & Injury	0.25	0.32	3.15						
Other 1*	Total	No SPF	No SPF	No SPF	--	N/A	CMF	--	--	--
	Fatal & Injury	No SPF	No SPF	No SPF						
Other 2*	Total	No SPF	No SPF	No SPF	--	N/A	CMF	--	--	--
	Fatal & Injury	No SPF	No SPF	No SPF						

Federal Highway Administration (FHWA)
 Safety Performance for Intersection Control Evaluation Tool

Results
 Summary of crash prediction results for each alternative

Project Information

Project Name:	SR 5 Roundabouts	Intersection Type	At-Grade Intersections
Intersection:	5th Ave N	Opening Year	2021
Agency:	Lake Worth	Design Year	2031
Project Reference:		Facility Type	On Urban and Suburban Arterial
City:	Lake Worth	Number of Legs	4-leg
State:	Florida	1-Way/2-Way	2-way Intersecting 2-way
Date:	11/29/2021	# of Major Street Lanes (both directions)	5 or fewer
Analyst:	Ian M. Rairden, P.E.	Major Street Approach Speed	Less than 55 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	Rank
Traffic Signal	Total	2.61	3.61	34.18	4	Yes	Calibrated SPF	97	97	2
	Fatal & Injury	0.86	1.21	11.41						
Minor Road Stop	Total	1.36	1.74	17.04	3	Yes	Calibrated SPF w/ EB	95	94	4
	Fatal & Injury	0.54	0.71	6.84						
All Way Stop	Total	0.81	1.06	10.28	2	N/A	N/A	97	97	1
	Fatal & Injury	0.28	0.38	3.66						
1-lane Roundabout	Total	1.43	1.74	17.46	1	Yes	Uncalibrated SPF	97	96	3
	Fatal & Injury	0.25	0.32	3.11						
Other 1*	Total	No SPF	No SPF	No SPF	--	N/A	CMF	--	--	--
	Fatal & Injury	No SPF	No SPF	No SPF						
Other 2*	Total	No SPF	No SPF	No SPF	--	N/A	CMF	--	--	--
	Fatal & Injury	No SPF	No SPF	No SPF						

Federal Highway Administration (FHWA)
 Safety Performance for Intersection Control Evaluation Tool

Results
 Summary of crash prediction results for each alternative

Project Information

Project Name:	SR 5 Roundabouts	Intersection Type	At-Grade Intersections
Intersection:	6th Ave N	Opening Year	2021
Agency:	Lake Worth	Design Year	2031
Project Reference:		Facility Type	On Urban and Suburban Arterial
City:	Lake Worth	Number of Legs	4-leg
State:	Florida	1-Way/2-Way	2-way Intersecting 2-way
Date:	11/29/2021	# of Major Street Lanes (both directions)	5 or fewer
Analyst:	Ian M. Bairden, P.E.	Major Street Approach Speed	Less than 55 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	Rank
Traffic Signal	Total	2.47	3.24	31.39	4	Yes	Calibrated SPF	97	97	2
	Fatal & Injury	0.82	1.10	10.55						
Minor Road Stop	Total	1.71	2.07	20.77	3	Yes	Calibrated SPF w/ EB	95	94	4
	Fatal & Injury	0.70	0.87	8.62						
All Way Stop	Total	0.64	0.77	7.76	1	N/A	N/A	97	97	1
	Fatal & Injury	0.23	0.29	2.82						
1-lane Roundabout	Total	1.41	1.71	17.18	2	No	Uncalibrated SPF	97	96	3
	Fatal & Injury	0.24	0.31	3.05						
Other 1*	Total	No SPF	No SPF	No SPF	--	N/A	CMF	--	--	--
	Fatal & Injury	No SPF	No SPF	No SPF						
Other 2*	Total	No SPF	No SPF	No SPF	--	N/A	CMF	--	--	--
	Fatal & Injury	No SPF	No SPF	No SPF						

Jamie Brown

From: Wetherell, Leslie <Leslie.Wetherell@dot.state.fl.us>
Sent: Monday, March 07, 2022 3:28 PM
To: Jamie Brown
Subject: SR-5/446173-1

Jamie,

RE: 446173-1/SR-5 from south of 10th Ave South to 6th Ave North

Thank you for taking the time to discuss the mini-roundabouts along the SR5 project referenced above. As you know, I am the Design Project Manager for the above referenced project.

As discussed, the Department has determined that mini-roundabouts are not the best fit to address speed management along the corridor.

We would like to share with you some other already approved ideas and partner with you on some potential ideas (that need to be further evaluated) that we feel are a better fit to address speed management:

- The speed limit along this corridor within the project limits (south of 10th Ave South to 6th Ave North) will be changed to be 25mph upon the completion of the Resurfacing, Restoration, and Rehabilitation (RRR) job
- A new Rectangular Rapid Flashing Beacon (RRFB) crossing on the north side of SR-5/8th Ave South intersection will be installed with the RRR
- A new RRFB crossing on the north side of SR-5/3rd Ave North intersection will be installed with the RRR
- The existing pedestrian signal on SR-5 between 4th Ave North and 5th Ave North will be evaluated to see if it can be a raised crosswalk
 - Regardless if the crosswalk can be raised or if it needs to stay at grade, the faded markings will be updated as a part of the RRR
- We would like to evaluate a raised intersection at 7th Ave South
 - The Department can do the design/evaluation
 - We need the City's help in leading a public meeting/getting the public support necessary for the improvement
 - We need a resolution from the City Commission endorsing the raised intersection

We believe the combination of the speed management techniques listed above provide a great benefit to the community and the traveling public, and would like to work with you further on them.

Please kindly respond with your concurrence. I am happy to talk more if needed. Thank you in advance.

L. Wetherell, PE
Design Project Manager
FDOT, District 4 Design Office
3400 W Commercial Blvd
Ft Lauderdale, FL 33309
(954) 777-4438
leslie.wetherell@dot.state.fl.us



U.S. Department
of Transportation
**Federal Highway
Administration**

1200 New Jersey Avenue, SE
Washington, D.C. 20590

February 15, 2022

In Reply Refer to:
HOTO-1

Mr. Jamie Brown
Director, Public Works Department
City of Lake Worth Beach
1749 3rd Avenue South
Lake Worth Beach, Florida 33460

Dear Mr. Brown:

Thank you for your letter requesting approval to use Pedestrian-Actuated Rectangular Rapid-Flashing Beacons (RRFBs) at uncontrolled marked crosswalk locations on a city-wide basis on city-maintained roadways throughout the City of Lake Worth Beach. Your request is made under the provisions of Section 1A.10 of the 2009 edition of the *Manual on Uniform Traffic Control Devices for Streets and Highways* and the Federal Highway Administration's Interim Approval memorandum (IA-21) dated March 20, 2018 for the optional use of RRFBs.

Your request is approved. This approval is granted for all locations where the City of Lake Worth Beach installs RRFBs under the technical conditions contained in IA-21. Per Paragraphs 20 and 21 of Section 1A.10, please inform the Florida DOT of the locations of such use and please check for any State laws and/or directives covering the application of the MUTCD provisions that might exist in the State of Florida. Also, please note that the installation of RRFBs on state routes in the City of Lake Worth Beach will require the approval of the Florida DOT.

For recordkeeping purposes, we have assigned your request the following number and title: "IA-21.127 - Rectangular Rapid-Flashing Beacons at Crosswalks - Lake Worth Beach, Florida". Please refer to this number and title in any future correspondence.

Thank you for your interest in improving pedestrian safety.

Sincerely yours,

**MARK RICHARD
KEHRLI**

Digitally signed by
MARK RICHARD KEHRLI
Date: 2022.02.15
12:59:36 -05'00'

Mark R. Kehrli
Director, Office of Transportation
Operations

Jamie Brown

From: Baer, Todd <BaerT@pbsso.org>
Sent: Monday, July 26, 2021 2:49 PM
To: Jamie Brown
Subject: FW: 446173-1 follow-up

Caution: This is an external email. Do not click links or open attachments from unknown or unverified sources.

Good Afternoon,

I fully support these measures.

Regards,

Captain Todd Baer
Palm Beach County Sheriff's Office
Commander - District 14 - City of Lake Worth Beach
Office: (561) 202-9601
baert@pbsso.org



From: Jamie Brown <jbrown@lakeworthbeachfl.gov>
Sent: Friday, July 23, 2021 9:48 AM
To: Baer, Todd <BaerT@pbsso.org>; Geraldine Jaramillo <GJaramil@pbcgov.org>
Subject: FW: 446173-1 follow-up

****This email was sent from an external (non-PBSO) source.****

Captain Baer / Chief Jaramillo,

Good morning. FDOT has two upcoming roadway projects on Federal Highway here in Lake Worth Beach:

- 2024 – Resurfacing, Restoration, & Rehabilitation (RRR) from 10th Ave South to 6th Ave North
- 2025 – Resurfacing, Restoration, & Rehabilitation (RRR) from 6th Ave North to Arlington Road

There have already been multiple conversations at the Commission level regarding the traffic / speeding issues in the corridor, the latest being this past Tuesday night's meeting. In these preliminary design stages, with the support of the Palm Beach Transportation Planning Agency, I've been in conversation with FDOT to implement some form of traffic calming in the south project. More specifically, the raising of the current signalized mid-block pedestrian crossing between 4th and 5th Avenue North by Sacred Heart (so faded you can barely see it today) and adding an additional mid-block crossing due east of South Grade Elementary either between 7th and 8th Avenue South or 8th and 9th Avenue South.

The end goal is to provide a safer experience for pedestrians to traverse from one side of US-1 to the other, especially in these particular areas near the schools. I wanted to reach out to make sure PBSO and County Fire wouldn't have an issue with these safety measures should FDOT approve them. Please let me know your thoughts, as FDOT wouldn't want to design something within their right-of-way you wouldn't support.

Thanks and have a great day,

Jamie Brown, CFM, LEED AP BD+C, ENV SP
Director | Public Works Department



City of Lake Worth Beach – Public Works Dept.

1749 3rd Avenue South

Lake Worth Beach, FL 33460

P: 561-586-1720

C: 561-719-4280

JBrown@LakeWorthBeachFL.gov

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From: Wetherell, Leslie <Leslie.Wetherell@dot.state.fl.us>
Sent: Thursday, July 22, 2021 5:13 PM
To: Jamie Brown <jbrown@lakeworthbeachfl.gov>
Cc: 'Jagan Katkuri' <jagan@constructiveengineeringinc.com>
Subject: 446173-1 follow-up

Caution: This is an external email. Do not click links or open attachments from unknown or unverified sources.

Hi Jamie,

Thanks for taking the time to speak with me last week and this week.

Per our conversation, we are investigating the following traffic calming features requested by the City:

- Raised crosswalk at the current mid block crossing between 4th Ave N and 5th Ave N (near Sacred Heart)
- New mid block crosswalk somewhere in the vicinity of [7th Ave S to 8th Ave S] or [8th Ave S to 9th Ave S] and raised crosswalk—if possible

We also discussed that the City has requested decorative lighting (at locations where lighting is being done) and patterned pavement crosswalks at Lake and Lucerne.

The Department kindly needs a commitment, in writing, from the City that they are willing to enter into a LFA (Locally funded agreement) for these items. We need this commitment to start the design of these elements. This commitment can be in an email (with your email signature) to make it easier.

I will send you the traffic speed study under separate cover.

Thanks, and I look forward to hearing back from you.

L. Wetherell
Design
(954) 777-4438

Jamie Brown

From: Geraldine Jaramillo <GJaramil@pbcgov.org>
Sent: Monday, July 26, 2021 3:44 PM
To: Jamie Brown; Baer, Todd
Subject: RE: 446173-1 follow-up

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Good afternoon Jamie, I have no issues with this project and its goals. Thank you, and be safe

From: Jamie Brown <jbrown@lakeworthbeachfl.gov>
Sent: Friday, July 23, 2021 9:48 AM
To: Baer, Todd <BaerT@pbso.org>; Geraldine Jaramillo <GJaramil@pbcgov.org>
Subject: FW: 446173-1 follow-up

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Captain Baer / Chief Jaramillo,

Good morning. FDOT has two upcoming roadway projects on Federal Highway here in Lake Worth Beach:

- 2024 – Resurfacing, Restoration, & Rehabilitation (RRR) from 10th Ave South to 6th Ave North
- 2025 – Resurfacing, Restoration, & Rehabilitation (RRR) from 6th Ave North to Arlington Road

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Downtown Parking Study

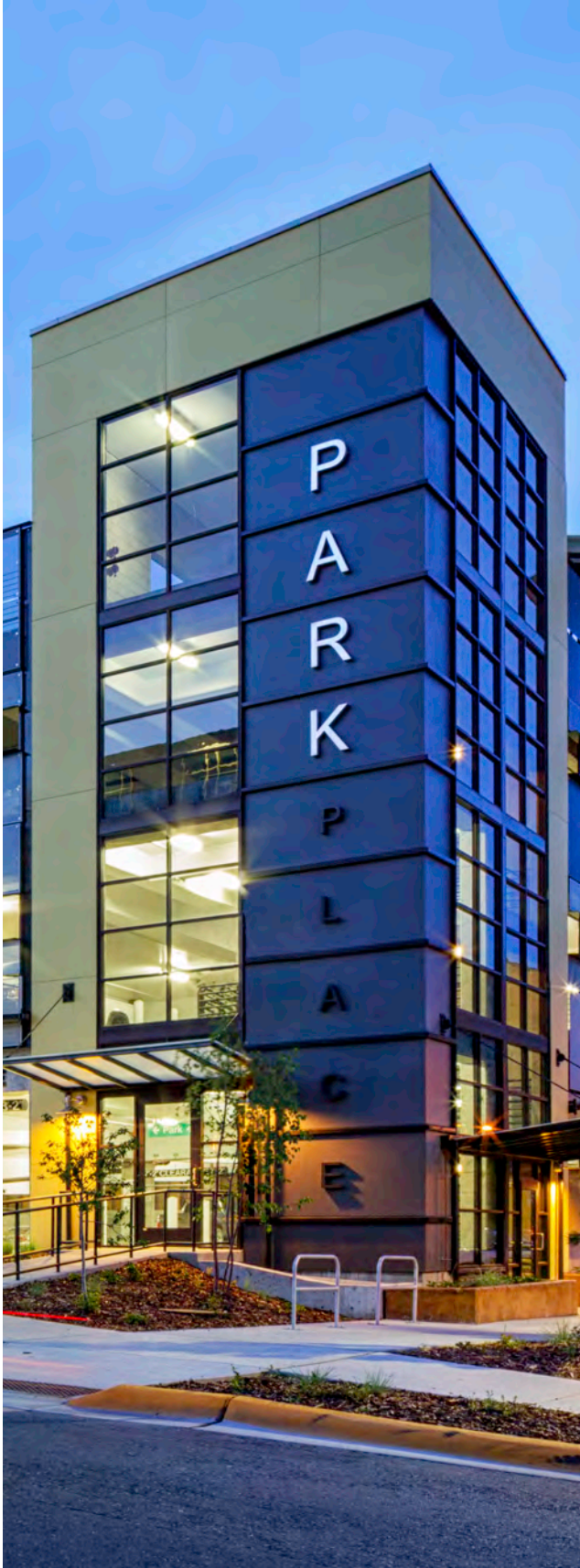
City of Lake Worth



Final Report
October 11, 2018



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SECTION I – EXECUTIVE SUMMARY

Parking is a key component of vibrant and viable downtowns. An efficient and effective parking program provides the opportunity for residents and visitors to enjoy living, working and recreating. Lake Worth has an active downtown core along Lake and Lucerne Avenues, and growing development opportunities within and just outside of the downtown area. Adequate parking supply is a necessary component to support the continued evolution of downtown Lake Worth.

The core of downtown Lake Worth has seen significant changes over the last several years. Along with the success of the area, there has been an increase in parking demand that has placed pressure on the public parking assets. To promote continued growth and vitality of the downtown core, Lake Worth needs to increase parking capacity to ensure current and future parking demand is met.

Lake Worth currently has free public parking throughout the downtown area, except for a single 24 space privately owned parking lot. During the parking utilization surveys, the downtown core exceeded 100% occupancy of public parking spaces. Vehicles were double parked, blocked drive lanes, and parked near fire hydrants. Overflow parking was accommodated in the neighborhoods north of 2nd Avenue North and south of 1st Avenue South. While there is no user fee for downtown parking, free parking is useless if every spot is taken and patrons cannot reasonably reach their destination and find an available parking space. Lake Worth has reached a point where downtown parking can no longer be managed laissez-faire.

Based on data gathered and information provided by the City, it is estimated the downtown core needs an additional 150 public parking spaces to accommodate the current parking demand. Additional parking spaces (beyond the 150 spaces noted above) would be required if vacant space in existing buildings were occupied or if development opportunities arose. Developers may be hesitant to invest in downtown without assurances there is sufficient parking.

This study includes a review of local ordinances and policies to assist the City with understanding parking needs and how to best manage a municipal parking program in an evolving downtown. A comparable cities analysis was conducted to understand how other cities similar to Lake Worth organize and administer parking. Lake Worth indeed has unique qualities and characteristics, but also shares similar parking and transportation challenges with other cities.

In order to provide the necessary parking infrastructure, a comprehensive Parking and Transportation Program administered through a Parking and Transportation Office is recommended. Until now, Lake Worth has been able to accommodate parking needs with on-street parking spaces and adding surface parking lots when land opportunities arose. This is no longer the case, and the City must take a leadership role in providing increased parking capacity, implementing growth-oriented parking policy, and daily administration of a high-quality parking program.

Paid parking in downtown districts is proven effective policy, and a key function for an overall administrative plan to manage downtown parking and transportation. A paid parking program will create the necessary revenue stream for capital improvements including building additional parking facilities. It will also allow the City to provide a professionally managed program whereby the parking supply is maximized.

Leveraging the existing organizational structure of the beach parking program will help the downtown program get started efficiently, while maintaining the separation of parking revenue between downtown and the beach. **Appendix “A”** includes a set of specific recommendations to implement a paid parking program in the downtown core. The management recommendations are scalable and can be expanded to areas around the downtown core as growth and redevelopment occur.

Since the inception of this parking study, the CRA has purchased land on the northeast corner of L Street and 1st Avenue South. This land will allow for the expansion of an existing City parking lot, and will increase parking capacity by approximately 40 spaces. This parcel has also been evaluated for adequacy to support a future parking structure and could accommodate approximately 284 to 325 parking spaces depending on the amount of ground level retail space. The potential construction cost is approximately \$8 million. The street layout of downtown provides the opportunity for similar sized parking facilities in other locations north and south of the Lake Avenue and Lucerne Avenue corridor.

While not immediately necessary, the Artisanal, Mixed Use – East (MUE) and Downtown East districts will need effective parking management as they grow. The parking system should be able to expand and adapt to those areas when necessary. One of the keys of effective parking management is anticipating future needs and planning to meet those needs instead of reacting to parking shortages.

Financial responsibility is an important factor for a successful parking and transportation program. Section VII contains a financial projection of a downtown parking system that includes assumptions regarding operating hours, rates, staffing, operational costs, and residential and employee parking programs. Using conservative estimates of both revenues and expenses, a parking system consisting of on-street meters and off-street parking lots could potentially have positive annual net revenues of \$300,000 before creating any new parking spaces. A parking system with a small parking structure may have to be subsidized to cover debt service. The potential revenue shortfall could be approximately **(\$165,000)** in year one (not including any retail rental income), with positive net revenue in year six. If retail space rental income is assumed, the shortfall is reduced to **(\$60,000)** in year one, with positive net revenue in year three.

If the parking system were to generate a positive cash flow, the money should be reinvested into downtown, and not allocated to the general fund. Primarily it should be used to maintain and improve the parking system. Surplus funds could also be allocated for downtown streetscapes, alternate transportation initiatives, pedestrian enhancement or other downtown programs.

In order to support the vibrant and growing downtown core, the City needs to increase parking capacity. A professionally managed paid parking program will provide a revenue stream to help fund the creation of more parking. A paid parking program will also bring order to the current parking situation, promote growth and development opportunities, plan for future parking and transportation needs, and provide the necessary infrastructure for a growing and changing city.

SECTION II – PURPOSE OF STUDY AND PROJECT APPROACH

Introduction/Overview

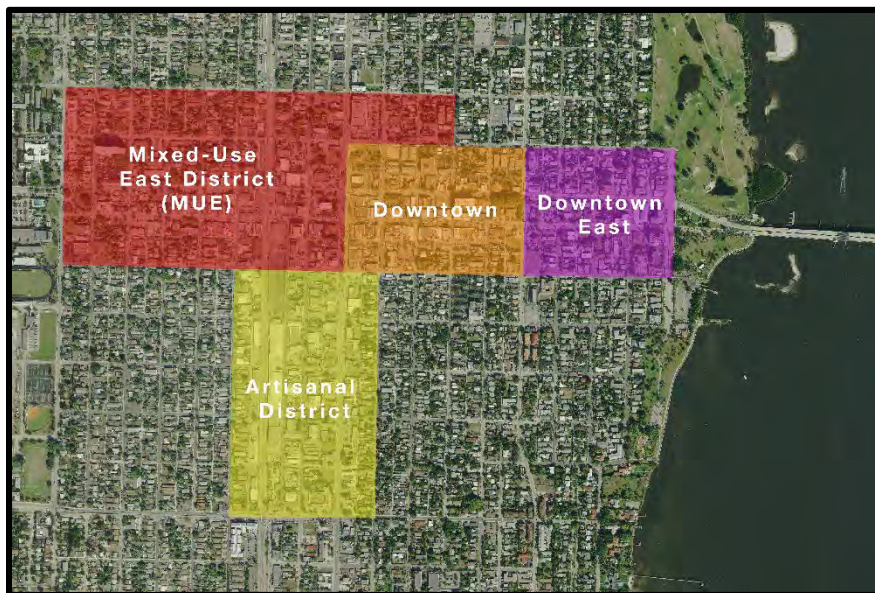
The City of Lake Worth has seen growth and development over the past several years, especially in the downtown corridor along Lake Ave. and Lucerne Ave. The activity associated with growth increased the demand for parking to the point where patrons are having trouble finding parking spaces. Parking shortages are most acute in the evenings, with Thursday, Friday and Saturday being the busiest.

The City selected WGI to conduct an assessment of the City's downtown parking conditions and provide options to address demand and improve customer service and access to necessary parking. The intention of this assessment was to analyze current downtown parking supply and demand, existing policies, practices and programs and provide the City with an integrated, proactive and strategic management solution that maximizes program efficiencies while providing high levels of customer service. A focus of the report is to consider whether paid parking would help in managing the parking needs of downtown.

Recognizing that an efficient and well managed parking system is vital to the economic success of downtown, the City's ultimate goal with this downtown parking analysis was to develop an efficient, cost-effective and customer-focused parking management plan that will leverage the City's parking assets to support the continued growth and development of downtown and the surrounding areas.

Project Approach and Methodologies

The study area included 81 blocks stretching from A Street east to Golfview Road, and 2nd Avenue north and 1st Avenue South. Additionally, the Artisanal District south from 1st Avenue to 6th Avenue between the train tracks and Dixie Highway was reviewed. In order to study such a large area, the study team needed to create smaller sub areas. Upon initial data gathering, it became apparent that the downtown currently has fairly defined sub areas due to economic activity and physical barriers such as Dixie Highway and Federal Highway. The following map shows the overall study area and focused sub areas.

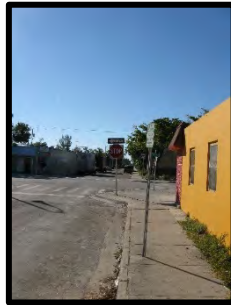
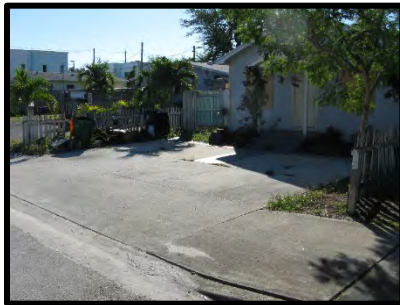


Data collection efforts for existing conditions included three days of vehicle car counts. In addition to performing field observations and statistical analyses of existing conditions, the information gathering also relied on outreach and direct communication with key staff and the City Commission.

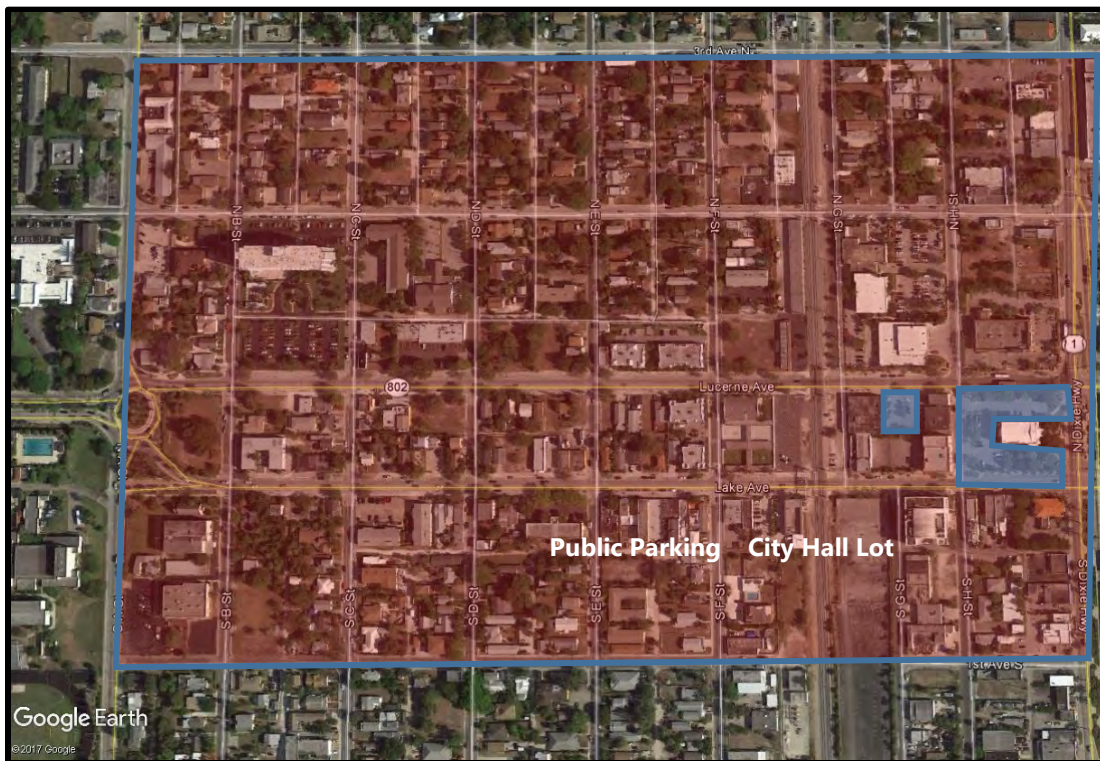
SECTION III – EXISTING PARKING CONDITIONS

Mixed Use East (MUE) District

The MUE District has a variety of land uses including; residential, commercial, government and cultural. Parking is accommodated in private off-street parking lots on the various properties, although there is on-street parking in most areas. Currently, the area does not have significant parking demand, even though there is limited public parking. There are City-owned parking lots on Lucerne Ave and at City Hall.



There are several CRA owned properties that could increase parking demand if they were developed. The CRA has identified projects that will impact parking if and when they are completed. Due to the lot sizes and code restrictions it may be difficult to include on-site parking for any new development. The City/CRA should identify property in the area to create additionally public parking capacity (initially parking lots, with an opportunity for future parking structures) and create shared parking opportunities within the MUE District.



Downtown East

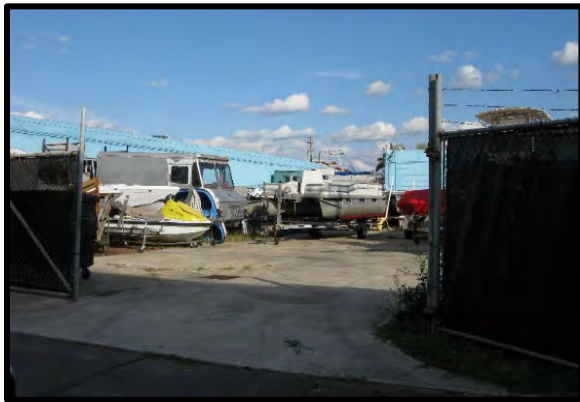
The area east of Federal Highway functions more like a commercial strip than a traditional downtown. Most commercial land uses (banks, dentist office, gas station, convenience store) have on-site parking for staff and patrons. There is obviously some parking pressure, as towing signs are prevalent. Other than on-street spaces, there are no public (city owned) parking spaces. North of Lucerne Ave is primarily a residential area with on-street parking. With the private off-street parking there is not currently a parking demand issue in the area.



Artisanal District

The area just south of Lake Ave. and west of Dixie Highway has a long history of commercial use. From 1st Avenue to 6th Avenue South between Dixie Highway and the railroad tracks there is a mix of semi-industrial commercial uses that include: cabinet making, a brewery, a large flooring warehouse, retail, and law offices. The most predominant use in the area is auto maintenance and repair. The parking demand in the Artisanal District is largely commercial activity related to the storage of vehicles needing repair and the vehicles of the auto shop staff.

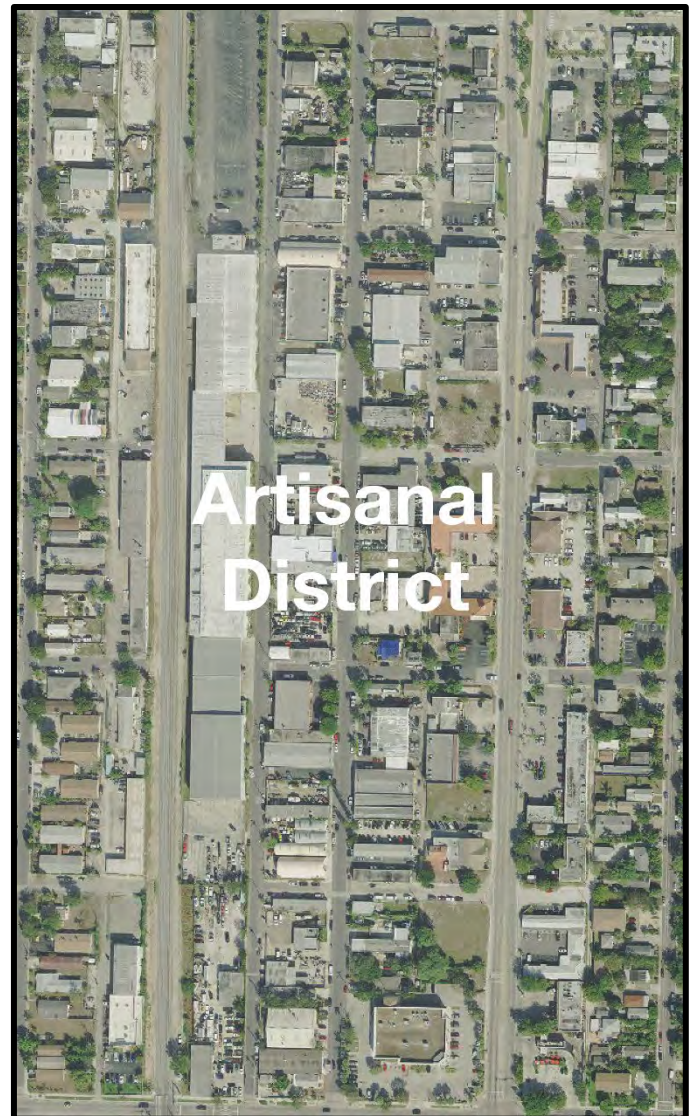
The railroad track creates a firm barrier to vehicle and pedestrian traffic to the west. Dixie Highway provides a direct north / south vehicular traffic link to the area, but remains a pedestrian barrier, especially near Lake Avenue where the highway is a divided boulevard. The area has the potential for a pedestrian connection to downtown from H Street near City Hall.



There is a need for parking management and regulation in the Artisanal District. However, this need is more related to the auto repair activity than traditional downtown type activity. Auto repair services are generally a poor fit for downtown / urban / entertainment districts that are seeking density and mass to create vibrant activity centers.

Regulating parking (or other aspects) of the Artisanal District will likely include a change of land uses in the area, such as Matthews Brewery. However, changes will bring significant parking demand. The Artisanal District has no off-street parking capacity to meet expanded demand. This could lead to demolishing old buildings and open blocks dedicated to surface parking.

The City should carefully monitor development activity in this area and discourage the creation of private parking lots serving only single businesses. The City/CRA should identify parcels for public shared use parking areas. The land could be initially for public parking lots, and eventually for small parking structures as demand increases and the area needs additional parking.

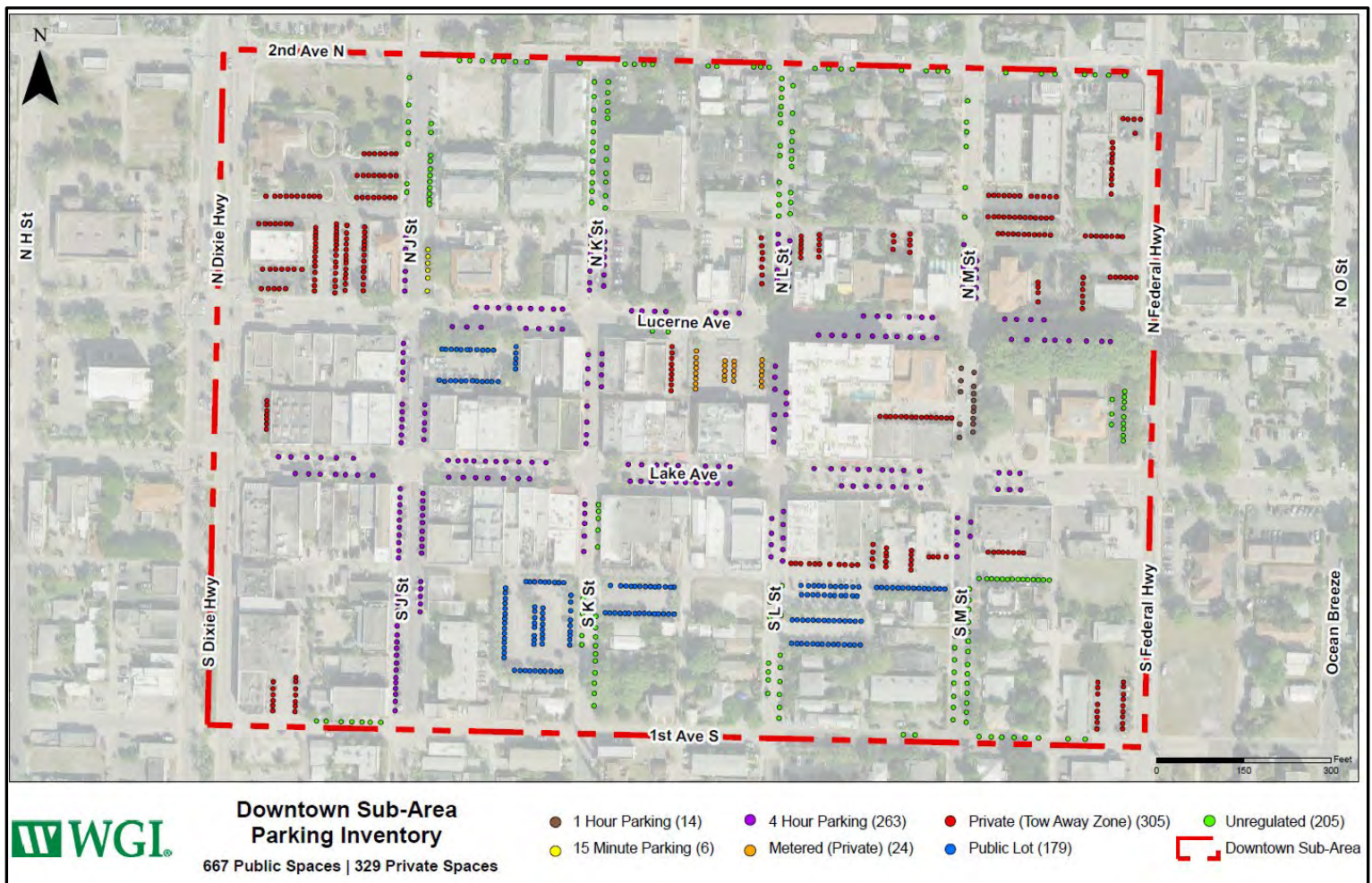


Downtown Core

The MUE, Downtown East and Artisanal Districts have the potential to be vibrant destination areas with urban density. The downtown core area has already achieved this status. Considering the downtown core is the only area that has significant density, it was the prime focus of the data gathering, analysis, and recommendations for the study. While the other districts need to be monitored and equipped with effective policy, the downtown core needs immediate solutions for the current parking situation.

The downtown core is bound on the north by 2nd Avenue North, Federal Highway to the east, 1st Avenue South to the south, and to the west by Dixie Highway. The activity in the area is driven by entertainment, dining and shopping along Lake Avenue and Lucerne Avenue, with a higher level of density along Lake Avenue. Vehicle and pedestrian traffic is contained within the downtown core with little parking or pedestrian activity east of Federal Highway or west of Dixie Highway. When needed, overflow parking generally extends into the neighborhoods north and south of downtown.

Parking inventory within the downtown core consists of 996 parking spaces, of which 667 are public spaces, and 329 private spaces. Most of the private spaces are signed No Parking – Tow Away Zone, although there is obviously some unauthorized use. Private No Parking signs are prevalent in the downtown core. The following map shows the parking space locations by type.



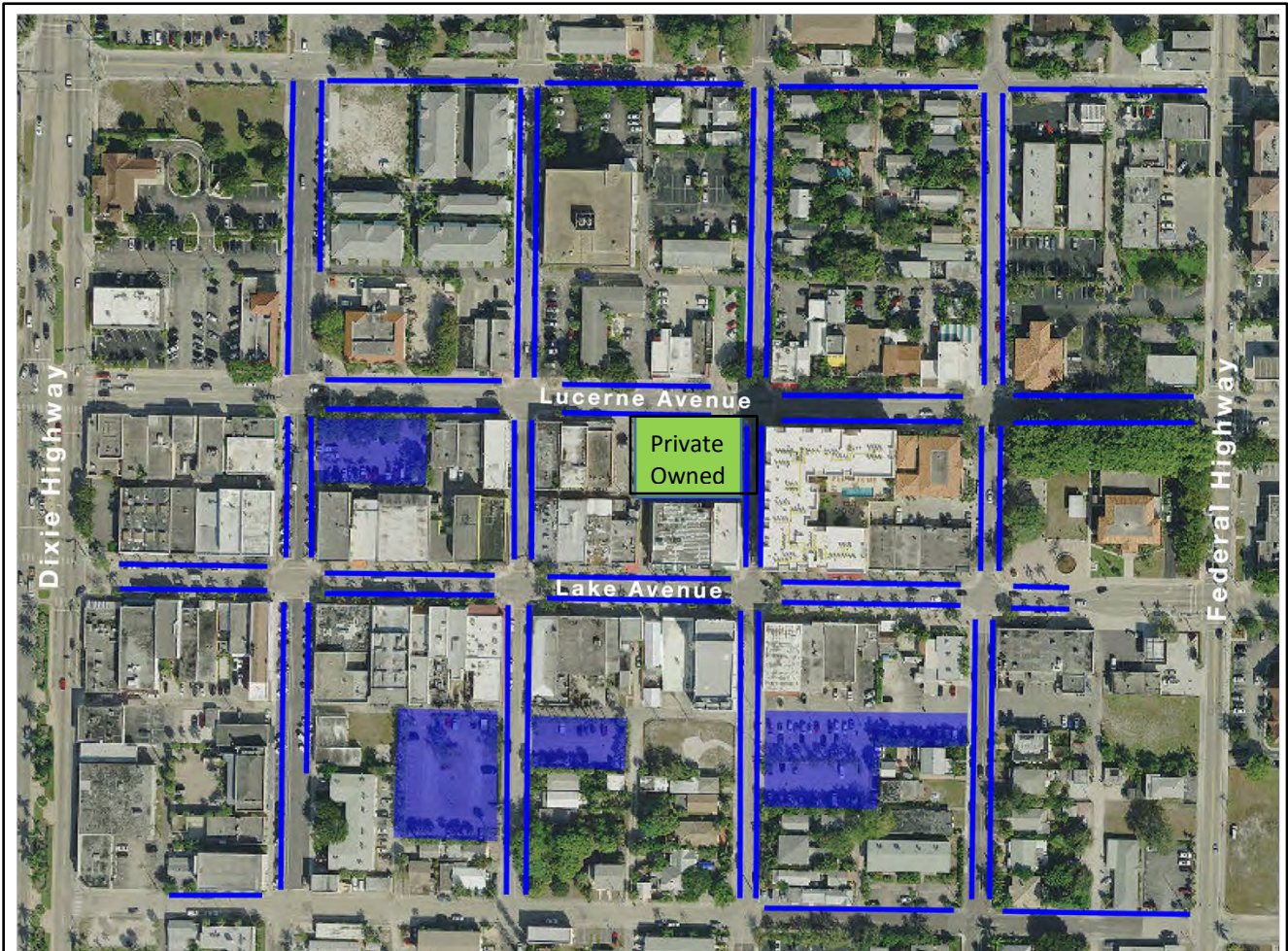
Downtown Land Committed to Parking

Downtown land use is currently highly committed to surface parking lots. There is one parking structure that is private for residential use on the southeast corner of Lucerne Ave. and L Street. All other parking is located in surface parking lots, highlighted in yellow below. Every block has land committed to surface parking. The storefronts along Lake Ave. are largely intact, creating a retail core area.



Public Parking Area

The map below shows the parking areas open for public parking. There is one privately owned public parking lot that charges a flat fee of \$5 per parking session. All other public parking is free to the patron.



Summary of Parking Occupancy

The City and private land owners have created nearly 1,000 parking spaces within the downtown core. There are additional on-street spaces and off-street parking lots in the surrounding blocks. Vehicle occupancy counts were conducted to determine adequacy of the parking supply to meet demand. Data collection was conducted during the weeks of January 15 and 22, 2018, with specific parking counts on Saturday, January 20 and Thursday January 25.

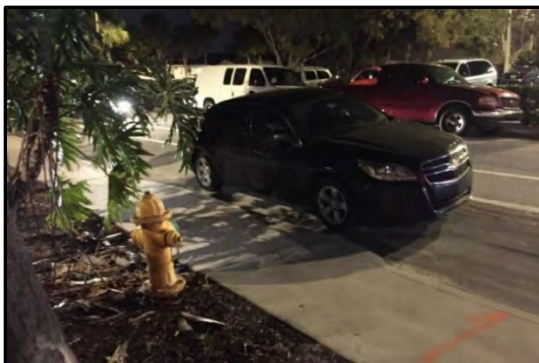
The occupancy counts indicated heavy demand for parking on weekend evenings. During these times, the number of vehicles exceeded the number of marked parking spaces in the downtown core. Observations verified the parking demand on Friday January 19th were similar to the 20th. The parking occupancy counts are shown below.

DOWNTOWN AREA	Date	Weekday	Period	On-Street Parking			Off-Street Public Parking		
				Inventory	Occupancy	Occupancy %	Inventory	Occupancy	Occupancy %
	1/20/2018	Saturday	4PM - 6PM	462	429	92.86%	205	195	95.12%
	1/20/2018	Saturday	6PM - 8PM	462	461	99.78%	205	209	101.95%
	1/25/2018	Thursday	10AM-12PM	462	333	72.08%	205	101	49.27%
	1/25/2018	Thursday	12PM-2PM	462	292	63.20%	205	111	54.15%

The evening parking demand is acute enough that patron vehicles are spilling over into the residential neighborhoods south of 1st Ave. South and north of 2nd Ave. North. When parking occupancy levels exceed 90%, patrons become frustrated trying to find the final few spaces. With parking occupancy in Lake Worth exceeding 100% on certain evenings, patron behavior has undoubtedly become modified, with an unknown number of patrons potentially choosing not to visit downtown during high demand times.

It was noted that parking demand is high enough on weekend evenings that patrons willingly pay the \$5 parking fee at the private parking lot on the corner of Lake Ave. and L St. It was also noted that vehicle counts in that lot exceeded the number of marked spaces during all weekend evening observations. The willingness to pay \$5 for an evening of parking, when the rest of the area has free parking, indicates a paid parking market already exists.

Many of the private parking lots were chained-off or posted with Tow-Away signs. We did observe high parking demand but some of these lots or portions thereof remained empty. Although, during the peak weekend nights several cars were observed double parking in some of the private lots. High demand periods are creating unsafe conditions when vehicles park illegally.



Review of Parking Management

There is currently little structured management of downtown parking. Various tasks such as parking enforcement, signage, housekeeping, maintenance and policy development are performed by City departments (or the Palm Beach Sheriff) as necessary. There is no organizational structure overseeing daily parking or planning for future parking needs.

Parking Enforcement

Downtown parking enforcement is very light. The enforcement that does exist is provided upon complaint and when time allows. Parking management best practices suggests time limited parking is cumbersome to enforce and inefficient. Enforcement staff must establish the presence of a specific vehicle in a specific location, and return after the time limit has expired to verify the vehicle is in the same location. For the small number of vehicles parking downtown for more than four hours, this is a considerable amount of work for few citations. Enforcement resources likely have more pressing needs than enforcing overtime limits downtown. However, ADA, fire hydrant, and no parking zones should be regularly monitored.

Parking Related Signage and Wayfinding

Parking wayfinding signs are located around downtown utilizing the universal “P” and parking designation. They are not branded specifically to Lake Worth, but do provide direction to the public parking areas.

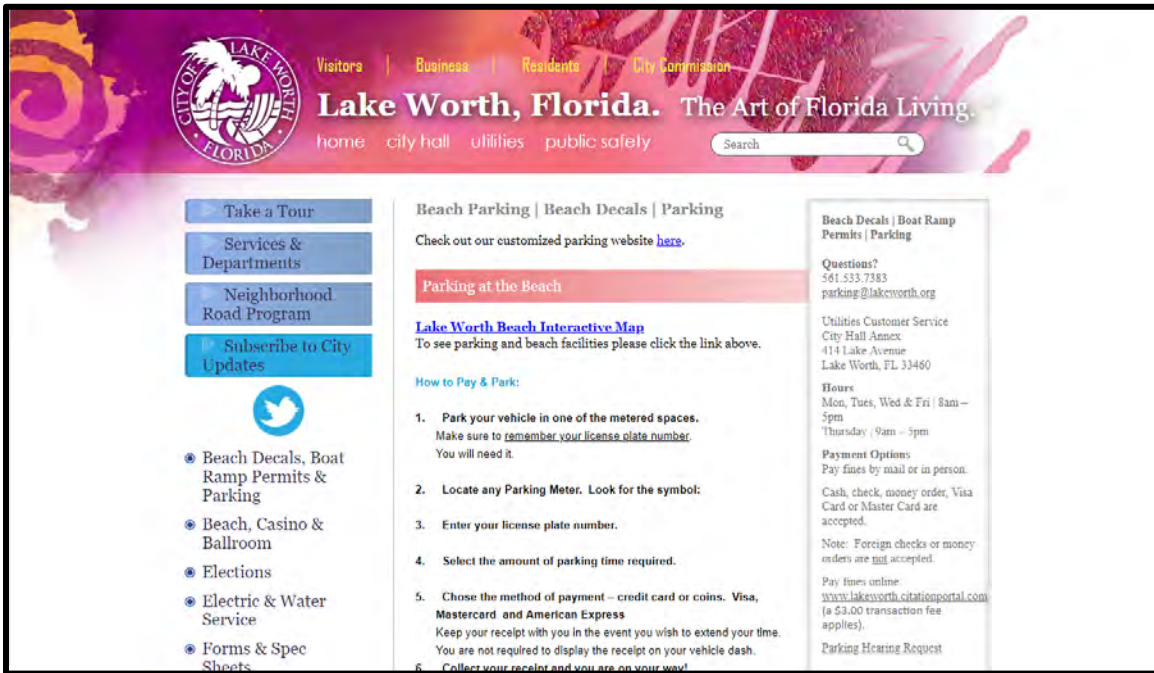
The on-street regulatory signs provide the time limits, no parking areas and other information needed for patrons to understand parking policies.

The individual parking lots have “Public Parking” signs that are branded with the Lake Worth logo and provide parkers with the assurance of being in a proper parking area.



Parking Webpage

The parking webpage is mostly dedicated to Lake Worth Beach parking. There is a brief mention of downtown parking citations, but no details regarding parking locations, enforcement, time limits, etc.



SECTION IV – FUTURE PARKING DEMAND

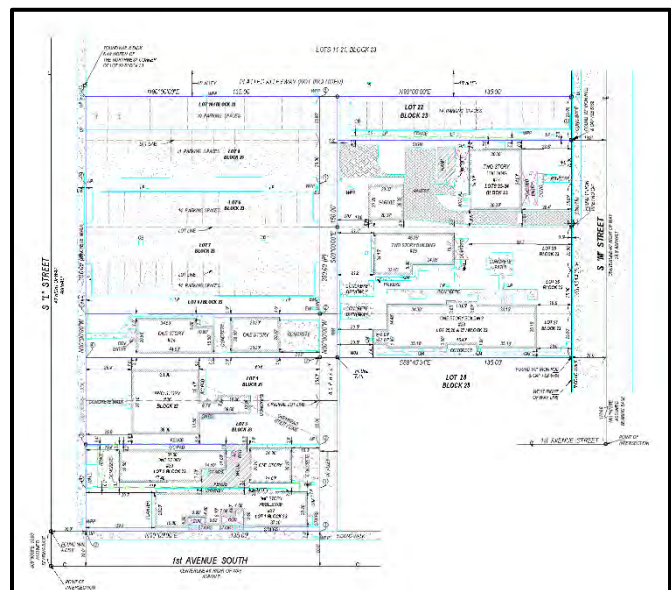
Downtown Core

As noted previously, parking occupancy in the downtown core is over 100% at peak times. Occupancy levels this high create frustration for patrons of the parking system. To operate optimally and allow parkers to find open parking when coming to the downtown, parking occupancy levels should ideally not exceed 85% - 90%. To achieve this goal, 100 additional parking spaces would need to be created or opened up in downtown. This does not include the number of vehicles spilling over into the neighborhoods north and south of downtown. Data suggests there is a need for at least 50 more spaces to accommodate those parkers. ***In total, it is estimated the downtown is deficient by approximately 150 parking spaces to accommodate current parking demand.***

City staff estimates approximately 30% of the usable building space in the downtown core is currently vacant. Conservatively, if the ***vacant buildings were utilized at 90%, this could add an additional need for over 100 parking spaces.*** This does not include development of a current parking lot into occupied space, or conversion of low intensity usage (residential or office) into high intensity usage (restaurant or bar).

Since the inception of this parking study, the CRA has purchased land on the northeast corner of L Street and 1st Avenue South. This land will allow for the expansion of an existing City parking lot, and will increase the parking supply by approximately 40 spaces. The CRA also has signed contracts for other assembled land in the area which could be temporarily used to increase the parking supply. The configuration of the lots could support a parking structure with various layouts, footprints, and pedestrian and vehicle access points.

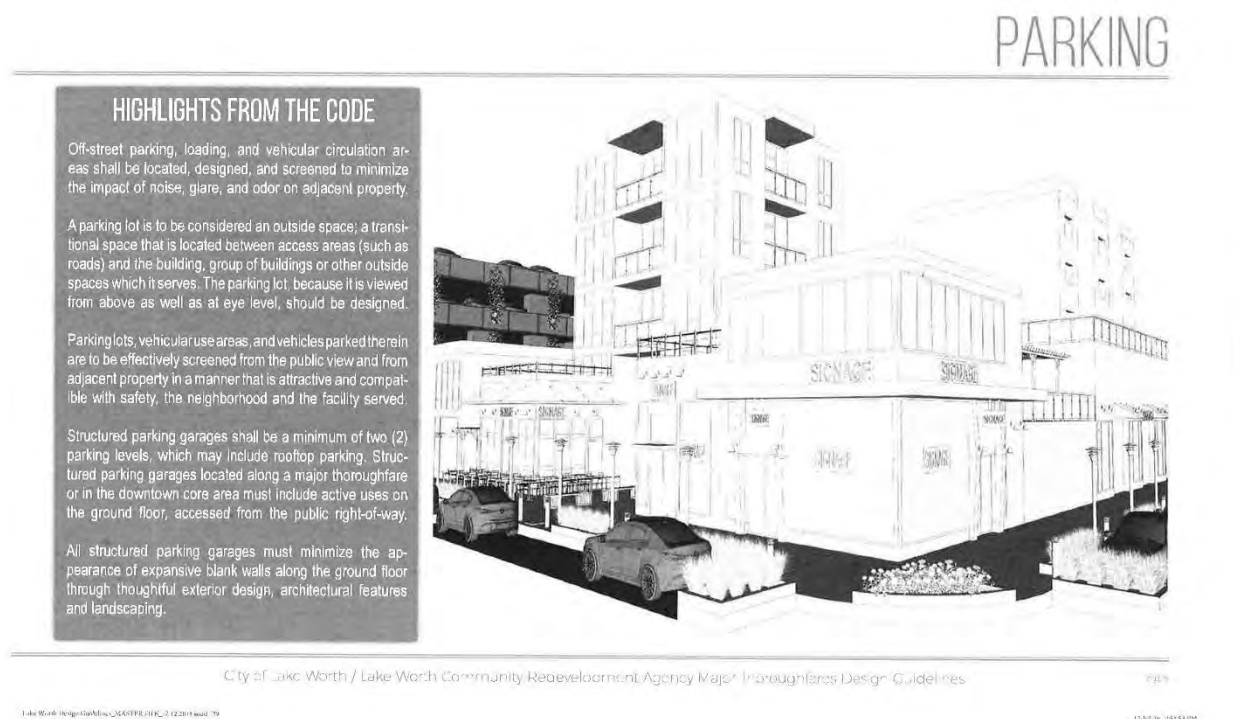
While walking and biking are encouraged, Lake Worth has little public transit or alternative transportation options, making Lake Worth reliant on automobile traffic and a need for parking. It is possible that the 100% occupancy levels being experienced are dampening economic growth as developers consider the impact the lack of parking could have on customer willingness to visit their locations.



City Hall and Surrounding Blocks

While there are not specific plans, the City may have the opportunity to return City Hall to the previous use as an auditorium and relocate City services to another location. An auditorium can be a significant parking demand generator during events. The auditorium would have an estimated 150-200 seats, creating a **parking demand of 75-110 vehicles at peak use**. The City Hall parking lot has 74 spaces and would provide a fair amount of parking on-site for most uses. The additional spaces could be absorbed on the city streets west of Dixie Highway.

If there were other competing developments in the area, parking supply would become an issue. Development in this area should be closely monitored during the site approval process to provide adequate on-site parking. Opportunities for mixed use development with parking spaces integrated into the building envelopes should be strongly encouraged. The City has developed parking guidelines that should be included in all developments in the area. Any development with a parking demand of more than 30 would require an off-street parking facility. This could be a parking lot or parking structure depending on the number of spaces and location desired.



MUE, Artisanal and Downtown East Districts

These districts do not currently have parking demand concerns. The Artisanal District has vehicle storage issues related to the numerous auto repair locations, but that is more a function of city code and enforcement. However, as *Mathews Brewery* demonstrates, a single high intensity land use in any of these districts could cause almost immediate parking supply concerns. When *Mathews* is busy, two 15-20 space parking lots are utilized and the surrounding streets become full. In order to create those two parking lots, it appears from old aerial photos that two buildings were demolished.

Demolishing existing buildings to create a few parking spaces is of concern for these three districts. If a block of land is cleared for each *Mathews* style development, the area becomes more parking than occupied building space.

It is important for City's development code and site plan review process to limit the amount of privately owned parking lots in each of the districts. The City should seek to limit parking requirements and provide opportunities for public parking. The City should develop strategically placed parking lots in each district that can potentially be developed into parking structures as the need increases. A privately-owned parking structure (or Public / Private Partnership) for a specific development could provide valuable parking while maximizing land use. The goal is to avoid districts littered with small private parking lots breaking up the streetscape and causing vehicle congestion.

SECTION V – COMPARABLE CITIES ANALYSIS

Introduction/Overview

This comparable city analysis is intended to supply the City of Lake Worth with public parking information from other Florida coastal communities. The information, once assembled and reviewed, can help Lake Worth compare itself against other similar Florida cities in terms of overall parking operations and policies, parking rates, and the use of technology. In the early stages of the analysis, City staff provided a list of potential cities to research including Ft. Pierce and Stewart, FL. However, neither of these cities charge for parking so they were eliminated.

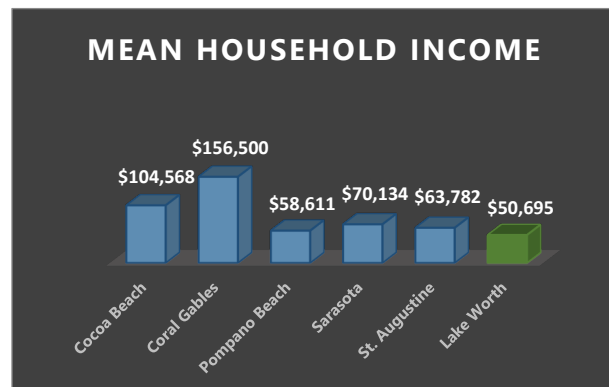
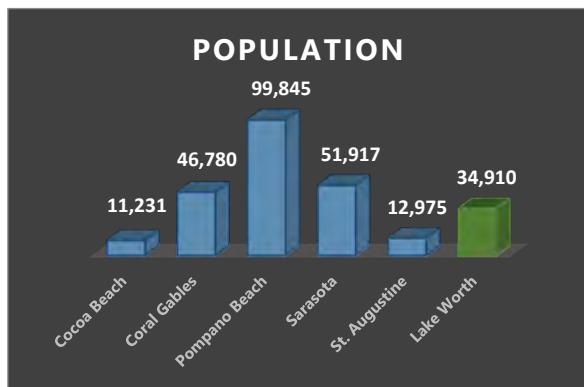
City staff agreed to include the following four (4) cities: Cocoa Beach; Coral Gables; Sarasota; and St. Augustine. Unfortunately, despite considerable effort to connect directly with city representatives to obtain detailed information for each of the city's parking operations, only Sarasota and Cocoa Beach were responsive. As a result, information on additional Florida cities was assembled. The information included basic information on parking rates, hours of operation, and technologies in use. The following report summarizes the comparable cities information obtained and brief narratives of each respective municipal parking operation.

General City Comparisons and Commuter Mode Splits

Population and Mean Household Income

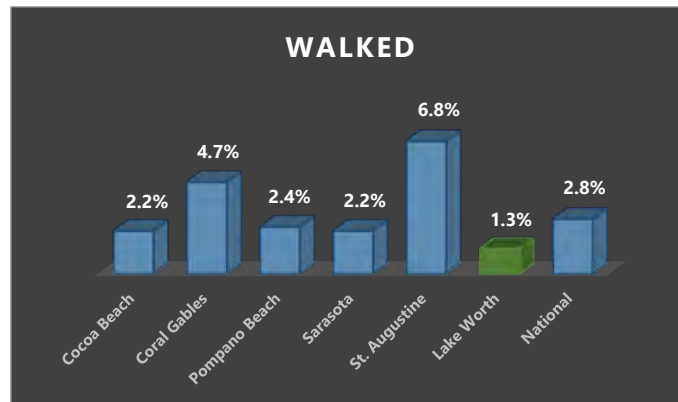
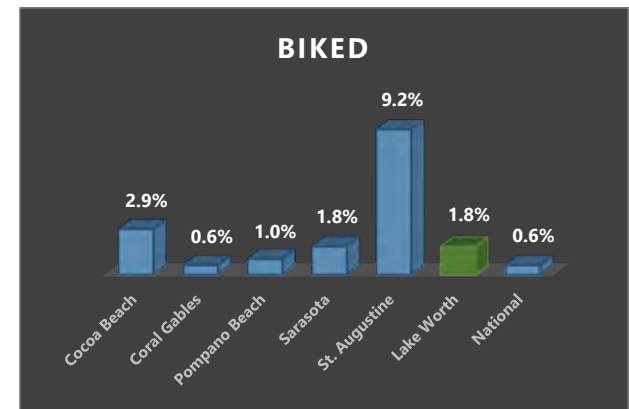
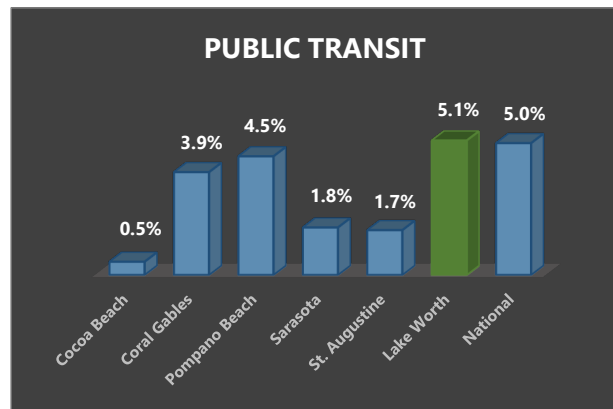
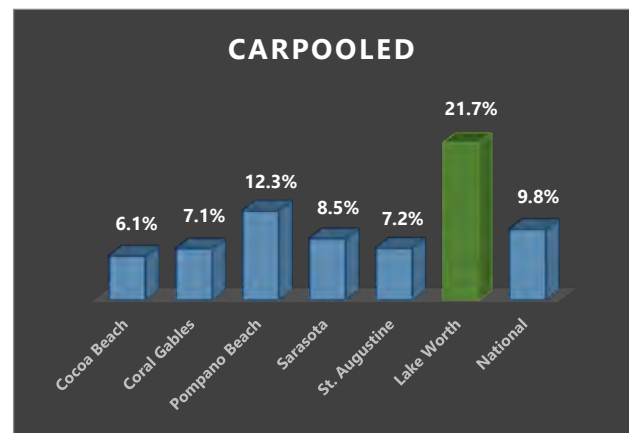
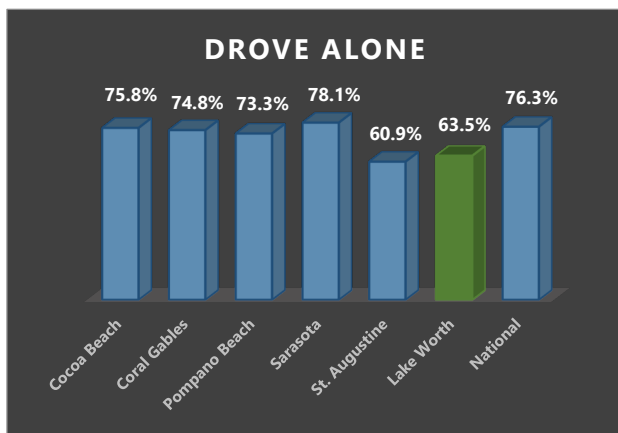
As the bar chart below illustrates, Lake Worth's population (34,910) is in the middle range of the cities analyzed. Lake Worth ranks the lowest at \$50,695 for Mean Household Income. This compares to a national Mean Household Income of \$77,866. Lake Worth's general population should be considered when formulating future parking rate and fee policies.

Source: 2016 American Community Survey, US Census Bureau



Travel to Work Mode Splits

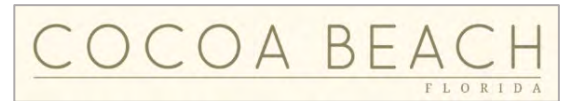
US Census Bureau travel to work information was used to identify travel mode patterns for each city. The results were charted to compare Lake Worth against the other cities and national averages. This census information is based specifically on travel to work commutes, however, the information is a strong indicator of general travel characteristics for each city. As the charts below graphically illustrate, Lake Worth compares positively against its comparable cities and the national averages in terms of drive alone rate, use of public transit, and carpooling. Bike travel in Lake Worth is higher than the national average, but not as robust as Cocoa Beach or St. Augustine. The statistic most interesting (and not able to explain), is Lake Worth has the lowest walk to work mode split than any of the other Florida cities analyzed and the national average.



Narratives on Comparable Cities and Other Municipal Parking Operations in Florida

Cocoa Beach – Population 11,231

On-street parking in downtown Cocoa Beach is limited to 90 minutes of free parking and the City has one public parking lot. The lot is for City Hall parking only on weekdays from 9:00am to 5:00pm, with free parking after 5:00pm on weekdays. The City charges for parking on weekends and the holiday rate is \$2.50 per hour/\$10 all day. Cocoa Beach recently approved the design and construction of its first parking garage on the site of the City Hall lot. Once the parking structure is completed, the City plans to charge \$2.50 per hour with a \$10 daily maximum rate. The City offers pay-by-mobile app parking through Passport Parking (also the vendor recently selected by Lake Worth to replace Park Mobile).



Coral Gables – Population 46,780

Of the cities researched, Coral Gables has the largest municipal parking operation including four parking structures and 18 surface lots. Parking is managed by a formal Parking Department with a full-time Parking Administrator. On-street parking is enforced 7 days a week from 9:00am to Midnight. The prime on-street parking rate is \$2.50 per hour. Municipal lots and garages operate 24/7 with a cost range from \$1.50 to \$3.00 per hour based on location. Transient parking rates in the municipal garages are \$1.00 per 40 minutes and increase to \$2.00 per 40 minutes after four hours. Monthly permit parking ranges from \$96.30 to \$107 per month.



Coral Gables offers a free shuttle service downtown that operates Monday through Friday from 6:30am to 8:00pm. The shuttle runs until 10:00pm on First Friday Gallery Nights, and in 2017 service was extended to include major holidays. Funding for the trolley service is provided by the City, with assistance from the Miami-Dade County Half Penny Transportation Surcharge, the Florida Department of Transportation, and the Metropolitan Planning Organization. Service runs every 12 to 15 minutes on average. The trolley service has been very successful since its inception in 2003 and it currently serves approximately 5,000 riders per day.

NOTE: The information we were able to obtain on Coral Gables was limited to online research.

Pompano Beach – Population 99,845

The City manages five public parking lots and paid on-street parking. Pricing is seasonal, with lower rates charged April 15th to November 14th during the off season, and higher rates charged November 15th to April 14th.



To help support the construction of future parking garages, the City established a Parking Enterprise Fund in the fall of 2013. Soon after, the City issued an RFP for parking management services to a commercial parking operator. The new parking management contract shifted parking enforcement from the Broward County Sheriff's Department to the private operator. The enforcement program was also upgraded from a manual paper-based ticketing system to a computerized system. Of all the Florida cities we researched, Pompano Beach is the only city that contracts out for the management of its municipal parking system – to include parking enforcement.

In the Fall of 2018 the City will issue General Obligation Bonds for multiple projects including design of a new public parking garage in the *Downtown Pompano Transit Oriented Corridor (DPTOC)*. Funding for design is scheduled for 2021 and construction in 2024.

NOTE: The information we were able to obtain on Pompano Beach was limited to online research.

Sarasota – Population 51,917

The City of Sarasota has a long and interesting history with paid parking. The City originally installed 160 on-street meters in January 1942, only to remove them in March of that same year due to merchant complaints. In December of 1946, the City re-instituted paid parking on-street with the installation of 250 metered spaces. The on-street paid parking system grew to 600 meters until 1967 when the City again cancelled the meter program.



In 2010 the City completed a new Master Plan that identified a shortage of public parking and recommended paid parking be re-instituted to generate revenue that could be used to develop additional parking capacity. Based on this recommendation, the City created a Parking Division and hired a professional Parking Manager in conjunction with the re-institution of paid parking in the spring of 2011. The 2011 paid parking program was abandoned in March of 2012. According to the current Parking Division Manager, the 2011 program failed primarily because the public did not accept the meter technology that was selected. He also believes the City did not properly communicate the reinstatement of paid parking to the downtown community in advance of the equipment installation.

More recently, the City developed and published a “Citywide Strategy for Parking Management” plan in 2016 that recognized the value of on-street parking. The plan recommended the City reinstitute paid parking as part of a broader parking and transportation strategy. Based on this latest plan, the first area to be monetized is the St. Armand’s District, where the City is currently constructing its fourth parking structure that is slated for completion by December 2018. To help pay for debt service on the new garage, the city will monetize 950 on-street spaces with metered parking and plans to dedicate 75% of meter revenue to servicing the debt. The City also passed a special assessment on commercial properties within the District that is expected to generate \$260,000 annually that will also be dedicated to debt service.

After field testing a variety of parking meters from four different manufacturers, multi-space pay stations were selected that will be configured as a pay-by-plate system, combined with License Plate Recognition (LPR) parking enforcement technology. The new street meters will be installed in December 2018 once construction of the new parking structure is complete. While parking will remain mostly free in the downtown area in the near-term (except for two existing garages that charge a \$5.00 flat rate during special events), the expectation is to re-meter the downtown area as part of the longer term strategic plan.

Other interesting features of the Sarasota parking program include:

- A deeply discounted employee permit parking program that charges \$20 per month to park in a parking garage (compared to the regular overnight permit rate of \$100 per month). To quote the Sarasota Parking Manager “We’re not trying to make money from them, we are just trying to get employees off the street”.
- The City is just over one year into an initial two-year contract with the “Gotcha Company” to operate the “i-Ride”, a micro transit service. The on-demand service connects the beach to downtown on a defined route. The program is partially funded through paid display advertising on the vehicles and is subsidized with transportation funds. Thus far the program is popular with riders, but the advertising revenue is underperforming.

St. Augustine – Population 12,975

St. Augustine is one of the oldest cities in America and is a very popular tourist destination. The City is very multi-modal with privately operated trolleys, foot powered “Pedi cabs”, bike rentals, moped and scooter rentals and free shuttles that the City offers on weekends and for special events. It is also a very walkable downtown, which is verified in the mode split analysis above. The paid parking program in St. Augustine includes single-space meters on-street, pay-and-display kiosks in parking lots, and an attended parking structure that is branded as “The Historic Downtown Parking Facility”.



The parking structure design features facades that are historically sympathetic to its surroundings and houses the City’s Visitor Information Center in the ground level. The garage charges a flat rate of \$15 per day for visitors and tourists. A unique feature of the St. Augustine parking program is the “ParkNow” pre-loaded chip card that is only available to City residents. The pre-paid chip card offers deep discounts for City residents. For example, the hourly meter rate for ParkNow cards is \$.50 per hour (regular rate \$2.50), and the ParkNow cost for structured parking is \$3.00 (regular rate \$15.00). The ParkNow card can be used at all meters, pay stations and at the Historic Parking Facility.

Deerfield Beach – Population 78,642

Deerfield Beach recently upgraded their parking technology to pay-by-plate multi-space kiosks, with LPR parking enforcement parking is \$2.00 per hour Monday through Friday, and \$3.00 per hour from 4:00pm Friday through Midnight Sunday and is enforced daily from 6:00am until 7:00pm downtown.



Delray Beach – Population 65,044

Delray Beach has historically charged for beach parking and just started to charge for parking downtown in June 2018. The downtown hourly rate is \$2.00 with a 3-hour limit. Downtown paid parking is Sunday – Thursday Noon to 9:00pm; Friday and Saturday Noon to 2:00am. The City has two public parking garages that offer free parking until 4:00pm daily, with a \$5.00 flat rate charged after 4:00pm. The City uses LUKE multi-space pay stations configured as pay-by-plate and enforces using LPR technology.



Lauderdale by the Sea – Population 6,375

Lauderdale by the Sea has 600 on-street metered parking spaces and several surface parking lots. Paid parking is enforced 24/7 both at the beach and downtown. Parking downtown ranges from \$.50 per hour to \$1.75 per hour, depending on location. Monthly parking permits for surface lots range from \$80 to \$95 per month. The City offers discounted employee permit parking at \$24 per month.



Summary and Conclusions

Our analysis of other Florida communities confirms that Lake Worth is unique. As the table below demonstrates, Lake Worth is one of the more ethnically diverse communities, it is the youngest community, and it has the lowest median income of the communities surveyed.

City	Median Age	White	Hispanic	African American	Other
Lake Worth	36	36.6%	38.9%	21.4%	3.1%
Cocoa Beach	57	93.3%	3.5%	1.3%	2.1%
Coral Gables	41	36.6%	56.5%	3.2%	3.7%
Pompano Beach	42	45.6%	19.4%	31.4%	3.8%
Sarasota	47	64.1%	18.2%	14.6%	3.1%
St. Augustine	43	81.4%	6.9%	8.5%	3.2%

As different as each community is in terms of geographic location and demographics, there are similarities and trends related to how each community manages its paid parking program. A summary of common practices and trends include:

- Cities that have historically only charged for beach parking are migrating to paid parking downtown.
- Many offer in-season and off-season parking rates.
- Most have structured parking, are in the process of constructing structured parking, or have plans to build structured parking in the future.
- Most offer pay-by-mobile technology.
- Many have paid parking 24/7, particularly beach parking.
- Many charge higher rates for weekend parking than weekdays.
- The cities that recently invested in new payment technology have migrated to multi-space pay stations and license plate-based payment, with LPR for parking enforcement.

SECTION VI – PARKING EXPANSION SITE OPTIONS

The CRA recently purchased land on South L St. and 1st Avenue South with the specific intent of creating temporary parking by combining an existing City parking lot with the new parcels. In the near-term, the City anticipates a temporary parking lot with the potential for a parking structure in the future. Parking layouts for the temporary parking lot and two parking structure options were developed.

Temporary Parking Lot

The north half of the parking lot currently exists with 51 parking spaces. A consolidated temporary parking lot could include an estimated 91 parking spaces, a gain of 40 spaces.

Parking Structure Options

A parking structure on this site, especially a mixed-use parking structure with retail space, has to consider the height limitations in this area of downtown. The top of the structure has to be below 43 feet above grade. With a floor to floor height of 11'4" for parking levels and at least 13 feet for occupied space, the maximum height is four levels. Coupled with a small footprint, the number of parking spaces that can be created is limited.

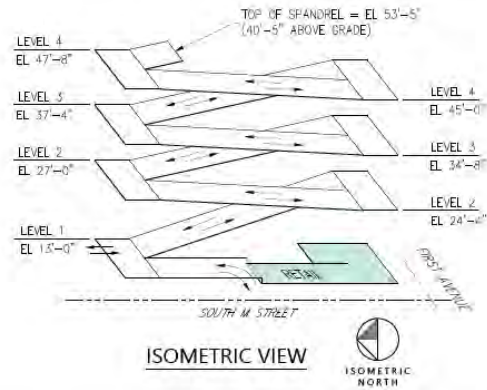
Option 1 shows a limited (7,000 sq. ft.) amount of retail area and 284 parking spaces. The retail space may be a prime location for the Parking System Office. Option 1A eliminates the retail area for additional parking and has 325 parking spaces. There are 51 surface parking lot spaces currently on the site. Option 1 would gain 233 spaces and Option 1A would gain 274 spaces. The blocks south of Lake Avenue from Dixie Highway to Federal Highway are uniform and similar to the blocks north of Lucerne Avenue. The sample parking structures could be located on most of the blocks north of Lucerne Avenue or South of Lake Avenue if similar land parcels could be assembled.



First & L Parking Lot

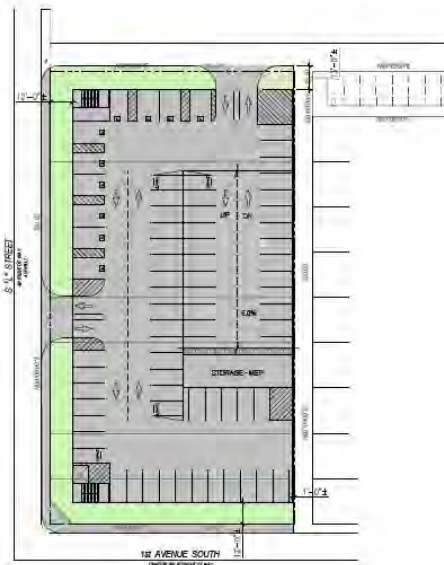


SITE & LEVEL 1 PLAN



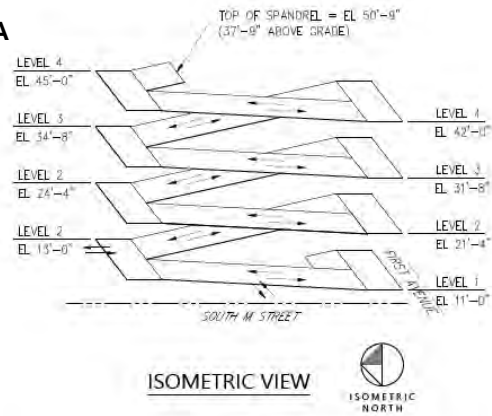
SPACE TABULATION						
LEVEL	STANDARD	ADA VAN	ADA	COMPACT	TOTAL	AREA
4	66	0	0	6	72	22,900
3	82	0	0	8	90	27,800
2	82	0	0	8	90	27,800
1	21	2	8	1	32	17,400
TOTALS	251	2	8	23	284	95,900

STANDARD SPACE SIZE - 9'-0" X 19'-0"			
COMPACT SPACE SIZE - 8'-0" X 16'-0"			
ADA VAN & ADA SPACE SIZE - 12'-0" X 19'-0" W/ 5'-0" ACCESS AISLE			
PARKING EFFICIENCY = 337.68 SF/SPACE			
SURFACE SPACES LOST	51	NET GAIN FOR SITE	233
RETAIL SPACE = 6,900 SF			



SITE & LEVEL 1 PLAN

Option 1A



SPACE TABULATION						
LEVEL	STANDARD	ADA VAN	ADA	COMPACT	TOTAL	AREA
4	66	0	0	6	72	22,900
3	82	0	0	8	90	27,800
2	82	0	0	8	90	27,800
1	59	2	8	4	73	25,800
TOTALS	289	2	8	26	325	104,300

STANDARD SPACE SIZE - 9'-0" X 18'-0"			
COMPACT SPACE SIZE - 8'-0" X 16'-0"			
ADA VAN & ADA SPACE SIZE - 12'-0" X 18'-0" W/ 5'-0" ACCESS AISLE			
PARKING EFFICIENCY = 320.92 SF/SPACE			
SURFACE SPACES LOST	51	NET GAIN FOR SITE	274
RETAIL SPACE = 0 SF			

Both structures would cost approximately \$57 / sq. ft. to construct, plus soft costs of testing, design and contingency. The retail space would cost \$100 to \$150 / sq. ft. depending on the level of finish. The parking structures would likely have a total cost of \$7.5 to \$8 million. Anticipated debt service for a 30-year term at 4% would be approximately \$460,000 per year.

SECTION VII – FINANCIAL PRO FORMA

The financial pro forma for the recommended downtown parking operation includes assumptions regarding hours of operation, rates, occupancy and enforcement. Our base model for projecting revenue is a tiered rate structure for a 7-day per week operation. Generally, the daytime or weekday rates are lower than weekday nights and weekends. Hours of operation are proposed as 9 AM – Midnight.

On Street Hourly Meter Rates		
Sun - Thurs	\$1.00	9 AM - 4 PM
	\$1.25	4 PM - Midnight
Friday	\$1.00	9 AM - 4 PM
	\$1.50	4 PM - Midnight
Saturday	\$1.25	9 AM - 4 PM
	\$1.50	4 PM - Midnight

Three pro forma estimates were developed for the downtown parking program. Assumptions included:

- When a city initially implements a paid parking program it can sometimes take a while to become fully functional and consistent. With that in mind, we took a very conservative approach for the revenue and expense projections.
- Operating expenses were based on current operating expenses from the Beach Parking Program and modified for potential downtown operations.
- The projections are based on year one occupancy estimates. There are not adjustments for increased economic activity and growth over the course of 10 years.
- A rental / building space cost assumption of \$25,000 annually is included. The final location of parking offices and the potential costs are unknown.
- Personnel cost projections were developed from current Beach Program wages and benefits information.
- Revenue projections are based on observed occupancy levels, seasonal adjustments, stated rate assumptions and potential hours of operation.
- The off-street revenue projection includes the creation of a surface parking lot where the CRA recently purchased property.
- The same rate structure was used for all city-owned parking, including the on and off-street inventory as described in the report. We did not project any daily revenue from the spaces outside of the study area that are recommended as “Permit or Hourly Pay” parking as we felt it would be minimal.
- Parking structure operating expenses include annual maintenance line item of \$29,000 for future concrete, sealants and other repairs.

PRO FORMA SCENARIO #1

The first scenario is based upon the city moving forward with the recommendation to create a parking division and installing paid parking. Scenario 1 does not include a parking structure, but would manage the parking supply through paid parking. ***Under this scenario Annual Net Revenue is estimated at \$310,000.***

PRO FORMA SCENARIO #2

The second scenario assumes the city will move forward with the recommended paid parking program and build a parking structure. The proposed structure will provide a net gain of 233 parking spaces.

Downtown parking gross revenues are estimated at \$1.2 million; parking structure operating expense estimates are \$131,000; and parking structure debt service is \$460,000.

The parking system annual net revenue for scenario #2 (without retail rental income) is a loss of (\$165,000) in year one. The pro forma shows the parking system breaking even in year six, with regular positive net revenue in year nine. Depending upon the City's financing requirements, the debt service coverage ratio (DSCR) may require an additional funding contribution. Typically DSCR is 1.25% (*could be higher based on lender requirements*).

PRO FORMA SCENARIO #3

The third scenario assumes the city will move forward with the recommended paid parking program and build a parking structure. The proposed structure will provide a net gain of 233 parking spaces and have 7,000 square feet of leasable occupied space. The difference between Scenario #2 and #3 is the inclusion of \$105,000 per year in rent for the occupied space.

Downtown gross revenues are estimated at \$1.2 million; parking structure operating expense estimates are \$131,000; and parking structure debt service is \$460,000.

The annual net revenue for Scenario #3 (with retail income) is a loss of (\$60,000) in year one. By year three there is a positive net revenue of \$67,000. Depending upon the City's financing requirements, the debt service coverage ratio (DSCR) may require an additional funding contribution. Typically DSCR is 1.25% (*could be higher based on lender requirements*).

Appendix B

City of Lake Worth

Downtown Parking System Financial Proforma Projection

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Annual Inflation - Expenses		2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
Rate Increase - Hourly			20%	20%	10%	10%	15%	15%	20%	20%
Rate Increase - Monthly			20%	20%	20%	20%	20%	20%	20%	20%
Potential Annual Parking Revenue										
On-Street Revenue	\$478,029	\$478,029	\$573,634	\$573,634	\$573,634	\$630,998	\$630,998	\$630,998	\$725,648	\$725,648
Off-Street Revenue	\$228,959	\$228,959	\$274,751	\$274,751	\$274,751	\$302,226	\$302,226	\$302,226	\$347,560	\$347,560
Citation Revenue	\$298,384	\$298,384	\$301,368	\$301,368	\$304,381	\$304,381	\$304,381	\$304,381	\$307,425	\$307,425
Permits - Employee & RPP	\$21,250	\$21,250	\$25,500	\$25,500	\$25,500	\$30,600	\$30,600	\$30,600	\$36,720	\$36,720
Scenario #1 Total Rev w/o Structure	\$1,026,622	\$1,026,622	\$1,175,253	\$1,175,253	\$1,178,267	\$1,268,206	\$1,268,206	\$1,268,206	\$1,417,353	\$1,417,353
Parking Structure Revenue	\$111,739	\$111,739	\$134,087	\$134,087	\$134,087	\$147,496	\$147,496	\$147,496	\$169,620	\$169,620
Retail Rental Income [\$15 s.f. x 7,000s.f.]	\$105,000	\$105,000	\$105,000	\$105,000	\$105,000	\$105,000	\$105,000	\$105,000	\$105,000	\$105,000
Potential Annual Operating / Debt Svc Exp										
Parking System Operating Expenses	\$715,628	\$733,519	\$751,857	\$770,654	\$789,920	\$809,668	\$829,910	\$850,657	\$871,924	\$893,722
Sub-Total Operating Exp	\$715,628	\$733,519	\$751,857	\$770,654	\$789,920	\$809,668	\$829,910	\$850,657	\$871,924	\$893,722
Parking Structure Oper & Maint Expenses	\$130,640	\$133,906	\$137,254	\$140,685	\$144,202	\$147,807	\$151,502	\$155,290	\$159,172	\$163,151
Parking Structure Debt Service	\$457,605	\$457,605	\$457,605	\$457,605	\$457,605	\$457,605	\$457,605	\$457,605	\$457,605	\$457,605
Sub-Total Structure Operating Exp	\$588,245	\$591,511	\$594,859	\$598,290	\$601,807	\$605,412	\$609,107	\$612,895	\$616,777	\$620,756
SUMMARY NET REVENUE										
Scenario #1 Total Net Revenue (w/o Structure)	\$310,993	\$293,103	\$423,396	\$404,600	\$388,347	\$458,538	\$438,296	\$417,548	\$545,429	\$523,631
Scenario #2 Total Net Revenue (w/ Structure - No Retail)	-\$165,512	-\$186,669	-\$37,375	-\$59,603	-\$79,373	\$621	-\$23,315	-\$47,851	\$98,272	\$72,495
Scenario #3 Total Net Revenue (w/ Structure & Rental Income)	-\$60,512	-\$81,669	\$67,625	\$45,397	\$25,627	\$105,621	\$81,685	\$57,149	\$203,272	\$177,495

Parking Program Start-Up Costs

Not included in the annual pro formas are the potential start-up costs of the new parking plan. Capital costs are estimated at \$500,000 - \$620,000.

Total estimated capital costs to install the pay stations, new signs, RPP program, and license plate recognition (LPR) for compliance is:

<i>Pay Stations, Installation, & Sign Package)</i>	<i>\$430,000 - \$537,000</i>
<i>LPR System</i>	<i>\$ 45,000 - \$ 50,000</i>
<i>Vehicle (1)</i>	<i>\$ 20,000 - \$ 25,000</i>
<i>RPP Area Sign Package & Installation</i>	<i><u>\$ 7,000 - \$ 9,000</u></i>

Total Capital Costs* **\$502,000 - \$621,000**

**Capital costs do not include a meter shop with work stations, tools, equipment, supplies, etc.*

Estimating Potential Revenues and Expenses

WGI cannot guarantee that the revenue and expense projections contained in the analysis will be realized, as actual performance will be determined by many factors including the final commercial/retail mix of development, price and demand fluctuations in the market, development timetables and occupancies, managerial decisions made by the City, developers and other political decisions made by local, state and federal government officials.

The results and conclusions presented in this report may be dependent on force majeure events beyond anyone's control regarding the local, national or international economy. These assumptions and resultant conclusions may be invalid in the event of war, terrorism, economic recession, rationing, or other events that may cause a significant change in economic conditions. This also assumes there will be no significant changes in the availability of public transportation, transit or roadways during the period of pro forma.

All information, estimates and opinions obtained from parties not employed by WGI are assumed to be accurate. WGI assumes no liability resulting from information presented by the City, their representative, or other third-party sources. This assessment does not include an audit of any historical financial information provided by the City or any other party to determine its accuracy.

WGI assumes no responsibility for any events or circumstances that take place or change subsequent to the date of this submittal.

All opinions, recommendations and conclusions included herein are rendered by the staff as employees of WGI, not as individuals.

WGI has provided this study to help determine the feasibility of the project, not to provide advice concerning the structure, timing, terms, or similar matters concerning a financial product or offering.

APPENDIX “A” DOWNTOWN PARKING AND TRANSPORTATION PROGRAM

Purpose

The core of Downtown Lake Worth has seen significant changes and growth over the last several years. Along with the success of the area, there has been a significant increase in parking demand that has placed a considerable amount of parking pressure on capacity. **To promote continued growth, investment opportunities, and vitality of the downtown core, Lake Worth needs to increase parking capacity to ensure current and future demand is met.** Lake Worth has grown into a busy city with a vibrant downtown that requires effective parking management.

A paid parking program will create a revenue stream for capital improvements including building additional parking. Secondly, it will allow the City to professionally manage the program with well-trained knowledgeable staff, and use of efficient technology. The following recommendations form an outline of a paid parking program for Lake Worth. There are numerous details that need to be identified and resolved. Implementation of a paid parking program would likely take six months to a year from project inception to a fully functioning system. After implementation, details such as hours, rates, enforcement policy, technology applications and operational issues will need to regular attention and modification when necessary.

Recommendation #1: Parking Administration

The following recommendations create the framework for the downtown parking system. The details may change during the implementation phase, but the recommendations are intended to assist the City with a framework for a successful system.

Lake Worth already has a successful parking program at Lake Worth Beach. It is recommended the parking operation continue under the Leisure Services Department for an initial period of one-year and then revisit the operation after the downtown parking system is in operation.

The downtown system can be an extension of the beach program, even though the goals and policies may be different. Some of the critical infrastructure such as money handling, enforcement, technology and parking planning are already present.

During the initial year it is important for the City Manager's Office, CRA, City Economic Development staff, and others responsible for growth and development to have input on policy, organizational structure and parking and transportation initiatives. These groups should continue to have an ongoing role in parking planning and policy after start up. The Parking Administrator should also regularly (quarterly or semi-annually) provide updates to the City Commission regarding current parking operations, capital needs, strategic planning and financial status.

Proposed Staffing Plan

Current / Proposed Management and Operational Structure

The current beach parking operation is supervised by the Parking Enforcement Manager with a total of 6.19 FTEs. A more detailed review of work functions will need to be reviewed to determine how much of the new downtown parking program can be absorbed by the existing staff.

As the Lake Worth parking program expands to downtown, coupled with the existing or growing beach operation, there is a need to create a **Parking Administrator** position. This position will have a dual role to oversee the daily operations and analyze financial reports, prepare budgets, ensure parking programs and policies are in line with parking demand, negotiate vendor contracts / agreements, address capital projects, and plan for the future. The Parking Administrator is the face of parking for the City. The

Administrator will have community communication responsibility and be the go to person for staff as parking questions arise affecting other departments.

Preliminary Staffing Plan

1. *Ambassador / Enforcement (7 days / week)*
3.0 FTE (Possibly use the current beach enforcement staff for fill-ins and/or supervision).
2. *Meter Operations & Facilities Maintenance Staff (On & Off-Street)*
1.5 FTE (Pay Station Operations, maintenance, repair, and collections)
3. *Supervisory Staff*
2.0 FTE (On & Off-Street Operations & Compliance)
4. *Parking Administrator & Administrative Staff*
2.0 FTE (Parking Administrator; Customer Service / Permit Program / Administrative Staff)



Recommendation #2: Pay Stations / Mobile App

On & Off-Street Parking Operations

On-Street Metered Parking

Install multi-space parking meters / pay stations on the following streets between Dixie Highway / Federal Highway.

Lake Avenue	9 Units	(4 – North; 5 – South)
Lucerne Avenue	5 Units	(3 – North; 2 – South)

Pay Stations for North / South streets only extend to mid-block within core.

J Street	6 Units	(4 – West; 2 – East)
K Street	3 Units	(3 – West)
L Street	3 Units	(2 – West; 1 – East)
M Street	3 Units	(3 – West; 1 – East)

Multi-Space Pay Station



The recommended installation plan indicates the number of units per block. Parkers will not be required to use a pay station to begin a parking session. For customer convenience, a mobile payment option should be heavily promoted. The pay stations will utilize vehicle license plates as the credential. When patrons pay, they will enter their vehicle license plate number. This allows the patron to pay for parking at any pay station or use the mobile app. The enforcement staff will electronically check license plates on the street to verify payments.

The recommendation includes units on both sides of Lake Avenue with the exception of one block. Conversely, units are only proposed on both sides of Lucerne Avenue for one block. Factors such as traffic, number of spaces, and visibility were considered.

The ratio of pay stations to spaces is lower in an on-street application due to space configuration and accessibility. The ratio for surface lots or off-street is much higher. This is a new paid parking program and it is important to keep customer convenience, accessibility, and safety as goals for success.

Off-Street Metered Parking

Install a total of 10 multi-space parking meters / pay stations in the four (4) public parking lots.

On-Street **Non-Metered** Paid / Permit Parking – Areas north of 2nd Ave. North and South of 1st Ave. South for one block.

There are a total of **241 non-metered paid parking spaces** recommended on the following streets between 2nd to 3rd Avenue North; and between 1st to 2nd Avenue South:

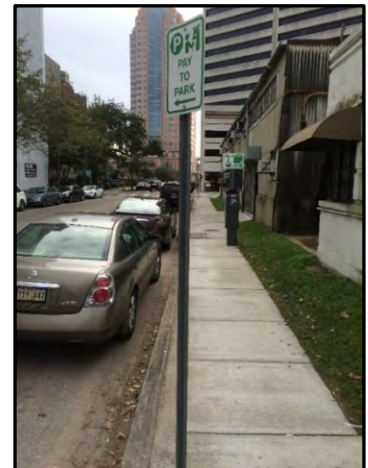
J Street	33 spaces
K Street	39 spaces
L Street	35 spaces
M Street	37 spaces
1 st Avenue South	45 spaces
2 nd Avenue North	52 spaces

The non-metered paid parking area will allow vehicles with valid Employee or Resident permits to park without daily payment. Those without a permit will have to pay via pay station or mobile app and are subject to ticketing.

Parking Signage

Each pay station should have one sign post with 2 signs (back-to-back) located at or near the pay station. The signs are installed perpendicular to the roadway for better visibility.

Typically, regulatory signs are installed at the beginning and end of each block with arrows indicating paid parking. The majority of the blocks in the study area are small enough that a mid-block sign with a double arrow will not be required.



Pay at Nearest Pay Station or Mobile App

The pay station implementation plan for the North / South streets recommends pay stations on one side of the block that serves both sides of the street.

When applicable, signs can be installed to indicate “Pay at Any Pay Station.” The streets are narrow enough that the pay stations will be visible and easily accessible.

Potential Hours of Operation

A survey of business hours and demand should be revisited prior to establishing hours of enforcement. With the mix of land uses in this area, operating hours from 9am – midnight are appropriate. Parking staff should monitor parking demand to determine if reduced hours during certain seasons, on Sunday through Wednesday evenings or on some mornings may be necessary.

Potential Hourly Rates

On Street Hourly Meter Rates		
Sun - Thu	\$1.00	9 AM - 4 PM
	\$1.25	4 PM - Midnight
Friday	\$1.00	9 AM - 4 PM
	\$1.50	4 PM - Midnight
Saturday	\$1.25	9 AM - 4 PM
	\$1.50	4 PM - Midnight

Recommendation #3: Parking Branding, Signage and Wayfinding

Effective wayfinding programs create a sense of welcoming for both regular and occasional patrons of downtown. Likewise, poor programs can convey that downtown is not “open for business” or an attractive place to go.

Downtown Lake Worth does not have a problem with visitors not knowing that businesses are open. However, it can be difficult for infrequent visitors to locate the public parking locations and understand policies. The new parking program should incorporate the new branding and wayfinding elements shown below. This will improve patron ability to find open parking and understand parking policy. New branding will also create excitement for the new parking program and show immediate improvements related to downtown parking.



Parking Lot on South L Street

The CRA has a newly created sign plan to address the wayfinding concerns as it will incorporate not only the branding but the regulatory information. Use of the public parking “P” symbol and consistent application throughout downtown and the rest of the city will build the brand and give people confidence they are parking in the right location.



Recommendation #4: On-Street Parking Compliance / Technology

Parking compliance is needed to ensure the management tools are working as planned. Parking Ambassadors / Enforcement Officers will be responsible for parking enforcement and compliance. Law enforcement will continue to be responsible for moving violations and vehicle safety issues, but will not have daily parking responsibilities. When monitoring compliance, the parking staff will not necessarily be heavy-handed but fair and consistent. Consistent enforcement reduces the number of citations (and conflicts), while increasing customer satisfaction and compliance with policy.

One of the goals of the parking management program is to educate the drivers about the different payment options and offer suggestions for alternative parking and transportation. The ambassadors should also be well versed with answers to commonly asked questions, be able to provide directions to various landmarks and businesses, and provide assistance when needed.

The current fine structure is \$30 for unpaid parking and various other parking violations. If the fine is not disputed or goes unpaid after 15 days, the amount doubles. With lower hourly rates and a customer friendly approach, we recommend lower fines for expired downtown meters. Citation fees of \$15 would provide the necessary deterrence without being overly punitive.

License Plate Recognition (LPR) System

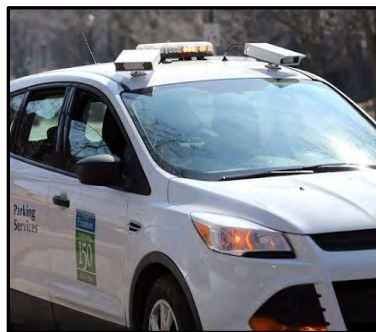
The purchase of one (1) LPR equipped vehicle will provide a high level of efficiency for parking enforcement. The LPR system can be integrated with the City's parking citation management platform, pay stations, and all city-issued permit programs. This equipment is near real-time which is helpful for booting and scofflaw programs.

Equipment Technology

The recommendation includes solar powered multi-space pay stations, consistent with the beach operation. The **Pay-by-Plate** platform combined with License Plate Recognition (LPR) for enforcement is recommended.



LPR cameras



LPR technology equipped to vehicle

Parking Ticket Management System

The City is in the process of changing parking citation management systems. The proposed pay stations and LPR must have the ability to be integrated with the ticket processing systems for efficiency when enforcing.

Delinquent Collections

There are several options available to manage delinquent collections. An effective parking program can quickly become ineffective if there is no follow-up on citation issuance as the word on the street spreads. The City must remain consistent with its efforts to collect outstanding debt. Some of the options include:

Registration Holds

The City currently participates in the Florida DMV vehicle registration hold program for violators with three or more unpaid parking tickets or one unpaid Handicap violation. It is recommended that the downtown parking program be integrated into the existing Florida DMV platform. Frequency recommended is no less than weekly.

Vehicle Immobilization (Booting)

The citation processing system must be properly integrated to provide real-time information for applying and removing boots based on the registered owners' actions. Booting programs require the city's administrative staff to be available to answer questions or provide assistance with boot releases.

Secondary Collections

The City currently contracts with a collections vendor for outstanding accounts over 90 days. Again, the citation management processing system must be completely integrated with the collections vendor based on established criteria and timelines.

The image shows a Florida Vehicle Registration form for plate DEE414. The VIN is 123456789, which is highlighted with a red box. The registration expires on Midnight Sun 7/13/2014. The form includes fields for Year/Make, Body, Color, Title, and various fees. It also contains important information regarding the registration process and renewal.

FLORIDA VEHICLE REGISTRATION		LEGACY ID: 82	TR
PLATE	DEE414	DECAL	123456789 Expires Midnight Sun 7/13/2014
YR/MK		BODY	CV
VIN	123456789	COLOR	BL
Plate Type		NET WT	3785
DL FEES		TRANSFER	X
Date Issued	12/13/2013	Plate Issued	12/13/2013
First Name Last Name		City, State, Zip	

IMPORTANT INFORMATION

- The Florida license plate must remain with the registrant upon sale of vehicle.
- The registration must be delivered to a Tax Collector or Tag Agent for transfer to a replacement vehicle.
- Your registration must be updated to your new address within 20 days of moving.
- Registration renewals are the responsibility of the registrant and shall occur during the 30-day period prior to the expiration date shown on this registration. Renewal notices are provided as a courtesy and are not required for renewal purposes.
- I understand that my driver license and registrations will be suspended immediately if the insurer denies the insurance information submitted for this registration.

RGS - SUNSHINE STATE PLATE ISSUED X

FL Vehicle Registration

days.

Recommendation #5 – Permit Parking Programs (Employee & Residential)

Employee Permit Parking

Many local restaurants and shops have limited or no on-site parking. Unfortunately, many times this has resulted in employees parking on-street. As paid parking is implemented, the downtown business owners and employees who regularly use the premium on-street parking will need to find appropriate parking out of the commercial corridor.

An employee permit program is designed to provide a supply of available parking at reasonable monthly rates further away from the closer on-street premium parking. This parking is not reserved and not guaranteed.

The proposed plan is to provide a program for **J, K, L & M Streets** between 1st Avenue South and 2nd Avenue South; and 2nd Avenue North to 3rd Avenue North for current downtown employees. To provide additional parking supply, the City should approach the First Baptist Church about using the church parking lots on Thursday, Friday and Saturday nights for employee parking only.

The spaces will be not be reserved and will open to any vehicle with a valid permit or one that pays the hourly rate, as space is available.

Employee Permit Parking Rates	
On-Street (non-metered paid parking)	\$10 / month
Garage (future)	\$25 / month

Resident Permit Program



Residential Permit Programs (RPP) are created to protect and prioritize resident access from outside parking impacts such as schools, hospitals, business centers, transit centers, and performing arts centers.

A common occurrence when a new paid parking program is implemented is to push parkers out a block or two to search for free and available parking. The neighborhoods adjacent to the core of downtown will feel the impacts of the new paid program.

We recommend creating a RPP for the residences located one block to the north and one block to the south of the core of downtown. This area includes 241 parking spaces. Residents will be able to purchase low cost permits to park on the identified streets.

Resident Permit Program	
3 Permits Per Residence	
Permit #1	\$25/Yr
Permit #2	\$25/Yr
Permit #3 (Transferable - Visitor)	\$45/Yr

The recommendation also allows vehicles without permits to park as long as the parking fee is paid. There will not be pay stations installed on these streets but the pay stations closer to downtown can be used, as well as the mobile payment app.

The area will be enforced and vehicles without a permit or hourly payment may be subject to ticketing.

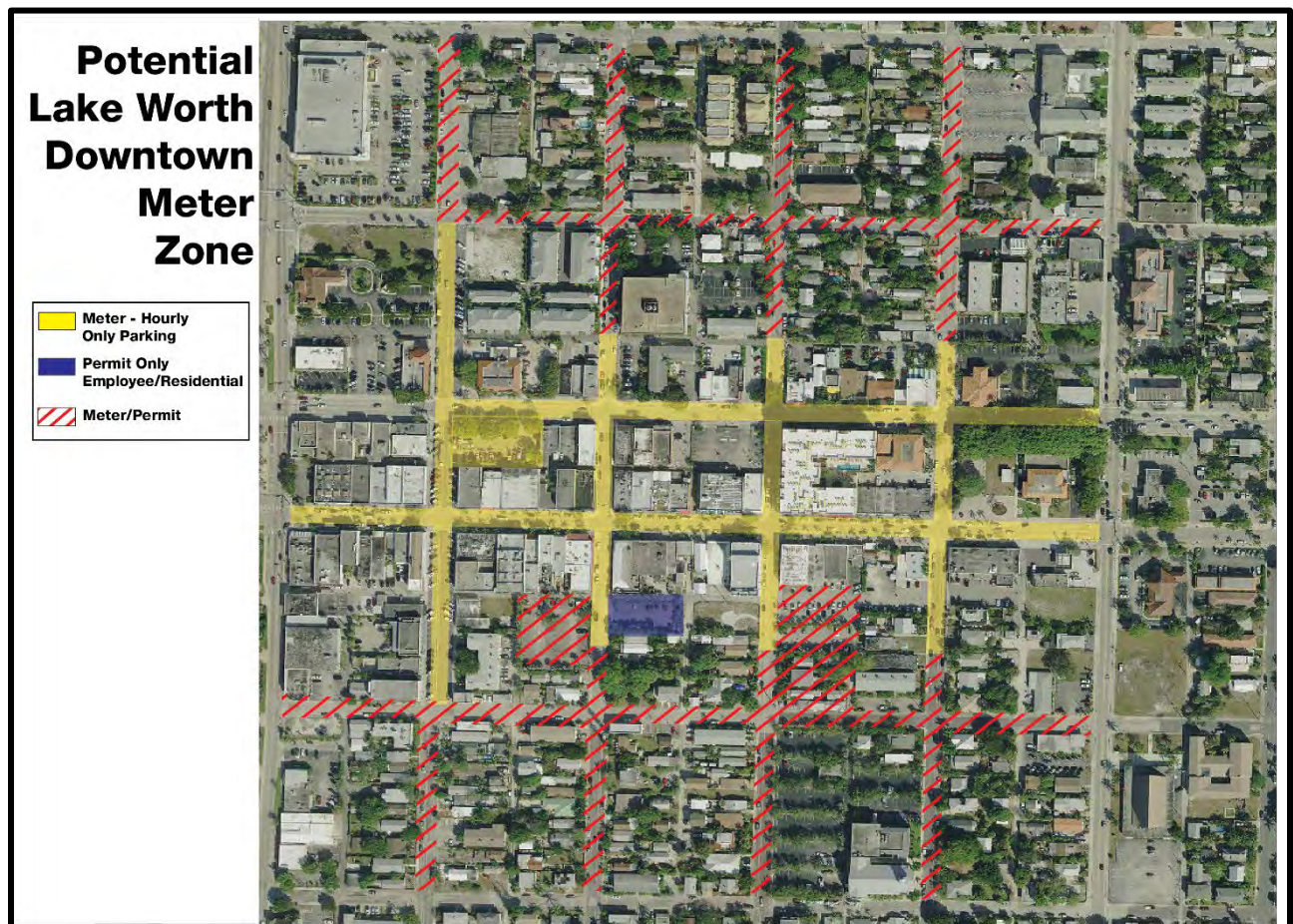
- 1st Avenue South between Dixie Hwy / Federal Hwy
- 2nd Avenue North between Dixie Hwy / Federal Hwy
- J, K, L, and M Streets between 1st Avenue South to 2nd Avenue South; and 2nd Avenue North to 3rd Avenue North

There are several policies and procedures that must be developed and vetted prior to launching this program (i.e., proof of residency, limit number of vehicles per residence, rate structure, guest/visitor parking, electronic virtual permitting, replacement permits, refunds, etc.).

Due to limited capacity, the suggested number of annual permits issued is a maximum of one per licensed driver per household with a maximum of three (3).

The following graphic shows the potential location for various parking user groups. The yellow (Hourly Meter) locations are for short-term parking intended for visitors. The red hatched areas (Permit and Hourly Meter) can be used by permit holders, or can be paid for hourly through the meters or by mobile payment. The blue lot would be for permit holders only. The off-street parking lots could have all day parking or daily permits at rates lower than the hourly total for employees or visitors that don't want or need a monthly permit.

These parking allocations would need to be evaluated over time to balance the parking supply with demand. For example: if the metered spaces were always below 80% occupancy, then some of those spaces could be opened up for permit parking. The parking management team is responsible for regular occupancy counts to measure parking demand and make adjustments as needed to best meet changing parking dynamics.



Recommendation #6 – Curbside Regulations

Curbside parking is a very valuable asset to the City. Managing the use of the curbside parking is essential for a viable parking program. Prior to installing paid parking the current use of the spaces for loading zones, passenger pick-up / drop-off, and valet parking needs to be reviewed.

American Disabilities Act (ADA) Parking Spaces

Florida Statutes (FS Chapter 553.5041(4)b) requires 1 ADA accessible space for every 150 metered curbside spaces. The spaces should be located at the end of the block unless there is sufficient space in the adjacent ROW to accommodate an access aisle at some other section of the block.

Loading Zones

Over time it is a common practice to install Loading Zones based on the adjacent land use. However, as the make-up of the businesses change, the needs vary. It is recommended that a limited number of loading zones be determined, and a policy developed as to where the spaces will be located, time limit set, payment required Y/N, and hours of enforcement.

Many communities have found that allowing paid parking during times when the loading zones are not in use increases capacity.

Examples of Loading Zone restrictions:



Valet Parking

Code of Ordinances Chapter 19, Article VIII, Section 19-130 thru 19-135 provides a very thorough definition of the valet parking program including an application / fee process.

Currently the valet operators are using the on-street spaces as a ramping and storage of vehicles, which is a violation of the ordinance. It was our understanding the valet program was not being consistently managed or monitored. The Parking Administrator would oversee the valet parking program as defined by City ordinance. Ongoing management would help facilitate parking turnover and maximize parking supply.



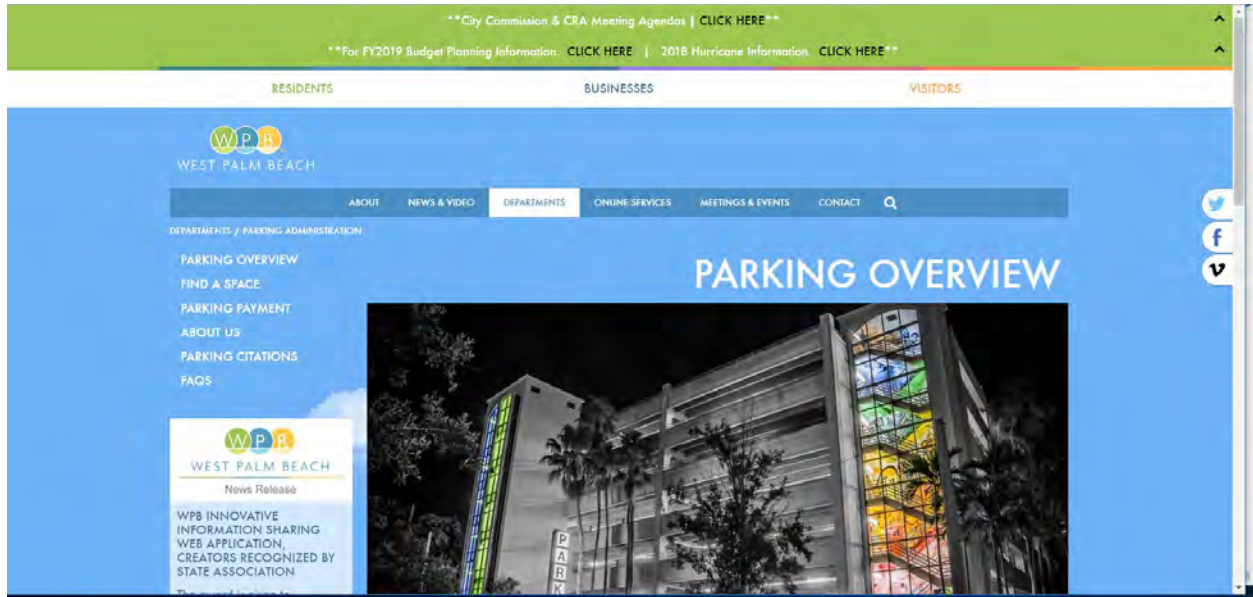
Transportation Network Companies (TNC – Uber, Lyft, etc.)

Similar to valet parking there is a need to address the public's use of TNCs for transportation. While reviewing policies for loading zones and valet programs, the need for designated TNC pick-up and drop-off locations should be considered. Consideration should be given to excluding Lake and Lucerne in order to help with traffic congestion on the main roads. A designated zone is not necessary on every block.

Recommendation #7 – Website Updates

The City's parking website should be updated to include pertinent information for downtown parking. The update should include; maps, rates, payment methods, meter information, permit application process and other helpful information. Citizens and visitors should be able to register for and purchase permits, pay for citations, and conduct most basic parking business without having to physically come to a centralized parking office.

The landing page of the West Palm Beach Parking Department is below.

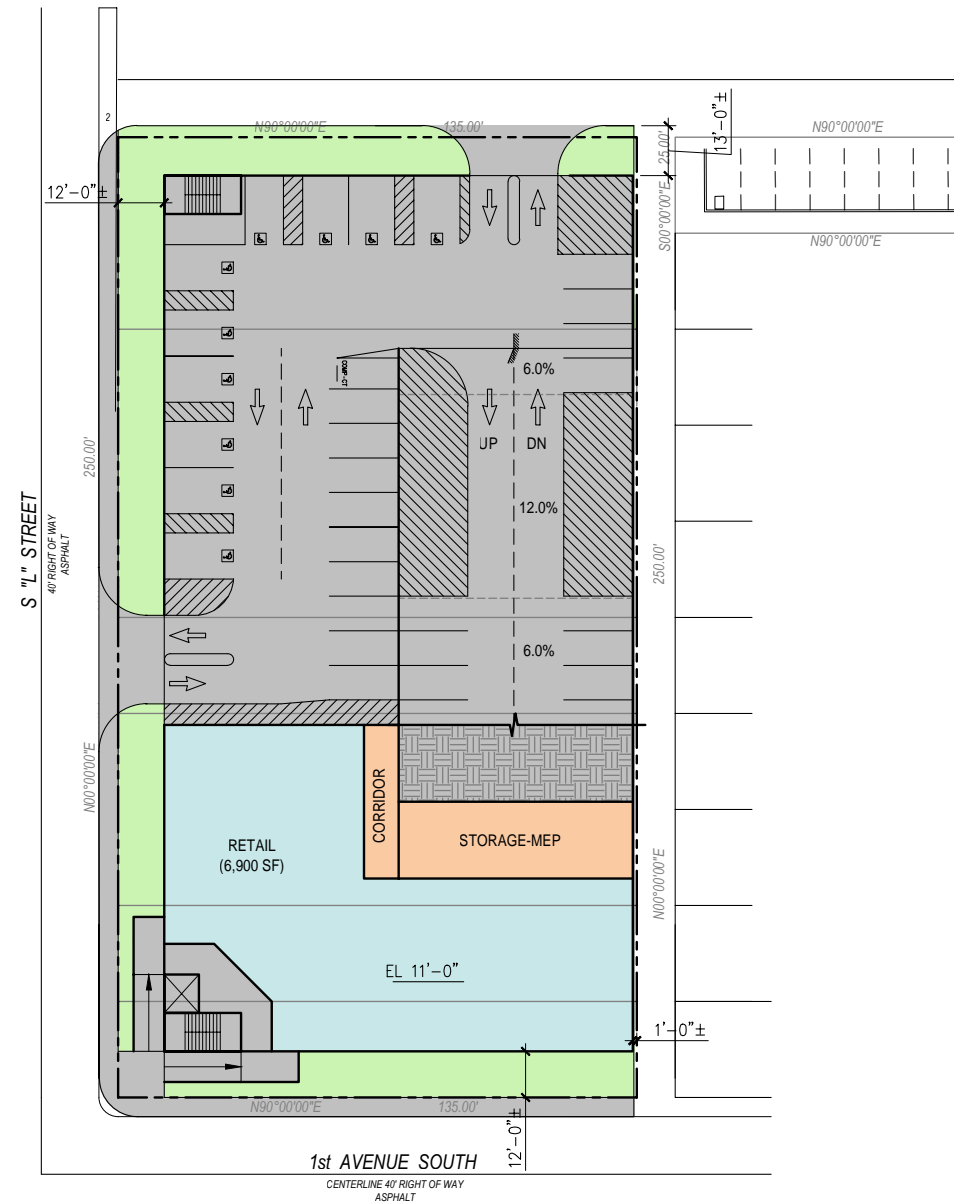


**APPENDIX “B”
PARKING PRO FORMA**

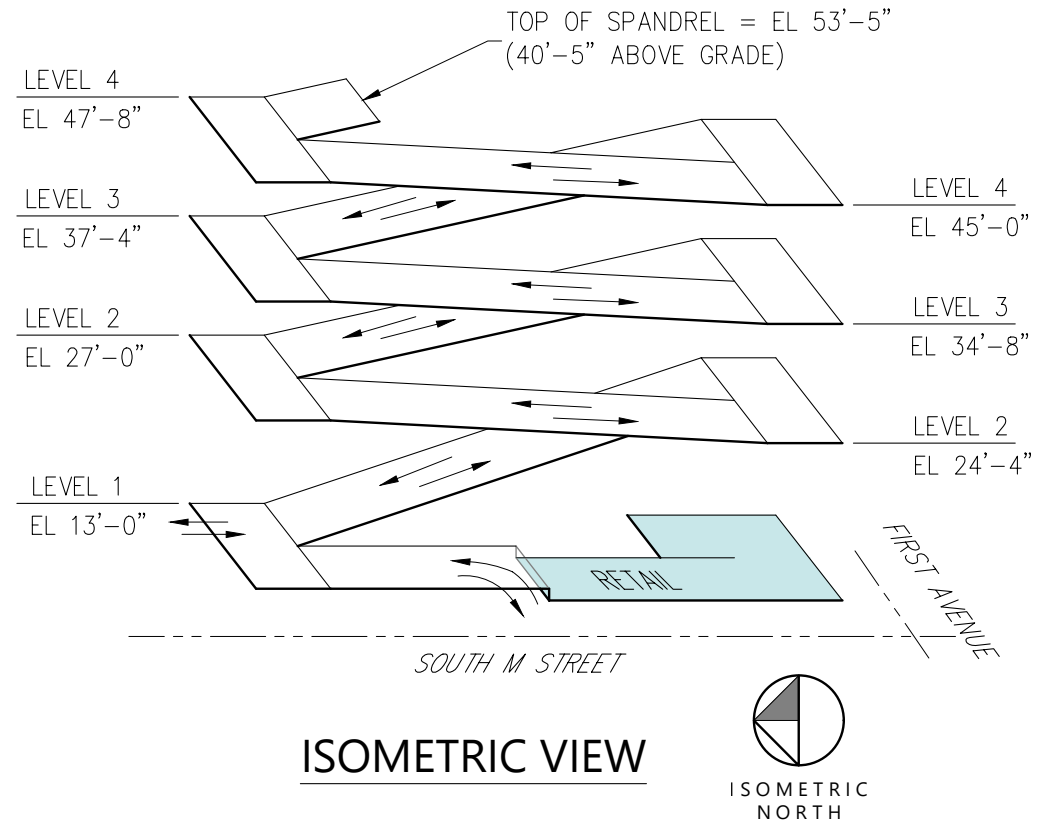
Appendix B

City of Lake Worth										
Downtown Parking System Financial Proforma Projection										
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Annual Inflation - Expenses		2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
Rate Increase - Hourly			20%			10%		15%		
Rate Increase - Monthly			20%			20%		20%		
Potential Annual Parking Revenue										
On-Street Revenue	\$478,029	\$478,029	\$573,634	\$573,634	\$573,634	\$630,998	\$630,998	\$630,998	\$725,648	\$725,648
Off-Street Revenue	\$228,959	\$228,959	\$274,751	\$274,751	\$274,751	\$302,226	\$302,226	\$302,226	\$347,560	\$347,560
Citation Revenue	\$298,384	\$298,384	\$301,368	\$301,368	\$304,381	\$304,381	\$304,381	\$304,381	\$307,425	\$307,425
Permits - Employee & RPP	\$21,250	\$21,250	\$25,500	\$25,500	\$25,500	\$30,600	\$30,600	\$30,600	\$36,720	\$36,720
Scenario #1 Total Rev w/o Structure	\$1,026,622	\$1,026,622	\$1,175,253	\$1,175,253	\$1,178,267	\$1,268,206	\$1,268,206	\$1,268,206	\$1,417,353	\$1,417,353
Parking Structure Revenue	\$111,739	\$111,739	\$134,087	\$134,087	\$134,087	\$147,496	\$147,496	\$147,496	\$169,620	\$169,620
Retail Rental Income [\$15 s.f. x 7,000s.f.]	\$105,000	\$105,000	\$105,000	\$105,000	\$105,000	\$105,000	\$105,000	\$105,000	\$105,000	\$105,000
Potential Annual Operating / Debt Svc Exp										
Parking System Operating Expenses	\$715,628	\$733,519	\$751,857	\$770,654	\$789,920	\$809,668	\$829,910	\$850,657	\$871,924	\$893,722
Sub-Total Operating Exp	\$715,628	\$733,519	\$751,857	\$770,654	\$789,920	\$809,668	\$829,910	\$850,657	\$871,924	\$893,722
Parking Structure Oper & Maint Expenses	\$130,640	\$133,906	\$137,254	\$140,685	\$144,202	\$147,807	\$151,502	\$155,290	\$159,172	\$163,151
Parking Structure Debt Service	\$457,605	\$457,605	\$457,605	\$457,605	\$457,605	\$457,605	\$457,605	\$457,605	\$457,605	\$457,605
Sub-Total Structure Operating Exp	\$588,245	\$591,511	\$594,859	\$598,290	\$601,807	\$605,412	\$609,107	\$612,895	\$616,777	\$620,756
SUMMARY NET REVENUE										
Scenario #1 Total Net Revenue (w/o Structure)	\$310,993	\$293,103	\$423,396	\$404,600	\$388,347	\$458,538	\$438,296	\$417,548	\$545,429	\$523,631
Scenario #2 Total Net Revenue (w/ Structure - No Retail)	-\$165,512	-\$186,669	-\$37,375	-\$59,603	-\$79,373	\$621	-\$23,315	-\$47,851	\$98,272	\$72,495
Scenario #3 Total Net Revenue (w/ Structure & Rental Income)	-\$60,512	-\$81,669	\$67,625	\$45,397	\$25,627	\$105,621	\$81,685	\$57,149	\$203,272	\$177,495

**APPENDIX “C”
PARKING EXPANSION OPTIONS**



SITE & LEVEL 1 PLAN



ISOMETRIC VIEW



SPACE TABULATION						
LEVEL	STANDARD	ADA VAN	ADA	COMPACT	TOTAL	AREA
4	66	0	0	6	72	22,900
3	82	0	0	8	90	27,800
2	82	0	0	8	90	27,800
1	21	2	8	1	32	17,400
TOTALS	251	2	8	23	284	95,900

STANDARD SPACE SIZE - 9'-0" X 19'-0"				
COMPACT SPACE SIZE - 8'-0" X 16'-0"				
ADA VAN & ADA SPACE SIZE - 12'-0" X 19'-0" W/ 5'-0" ACCESS AISLE				
PARKING EFFICIENCY = 337.68 SF/SPACE				
SURFACE SPACES LOST	51		NET GAIN FOR SITE	233
RETAIL SPACE = 6,900 SF				

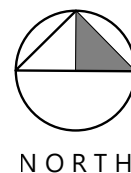
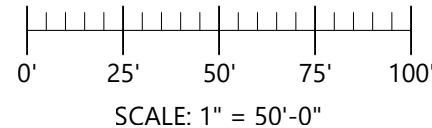
September 19, 2018

Site F - Concept 1

Sheet 1 of 2



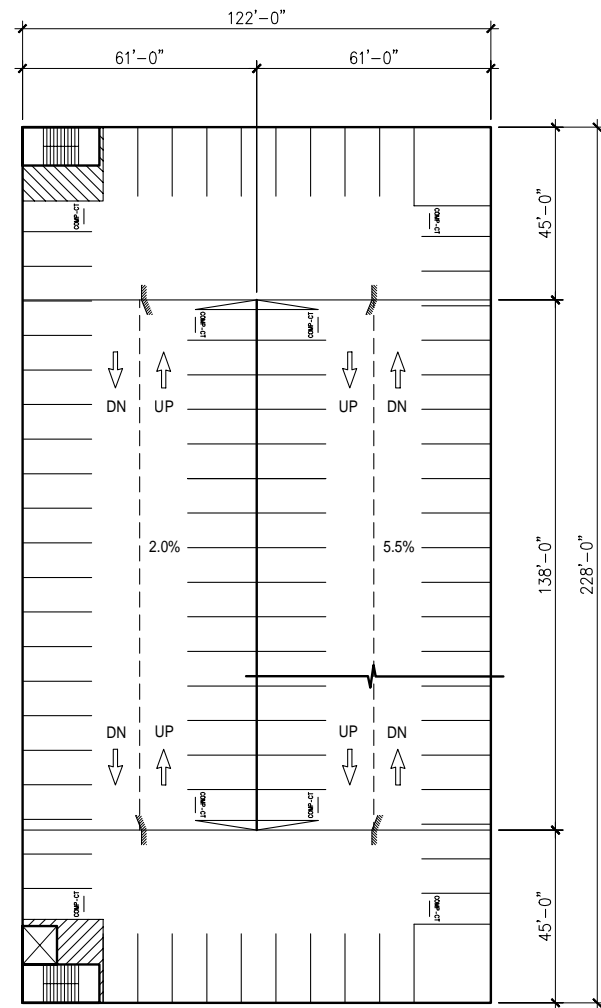
2035 Vista Parkway
West Palm Beach, Florida
P 561.687.2220



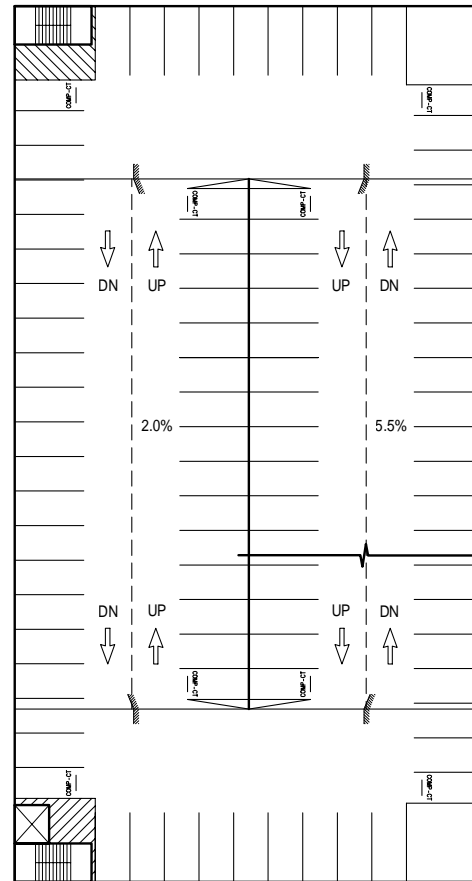
Downtown Lake Worth

Parking Expansion Options
Lake Worth, Florida

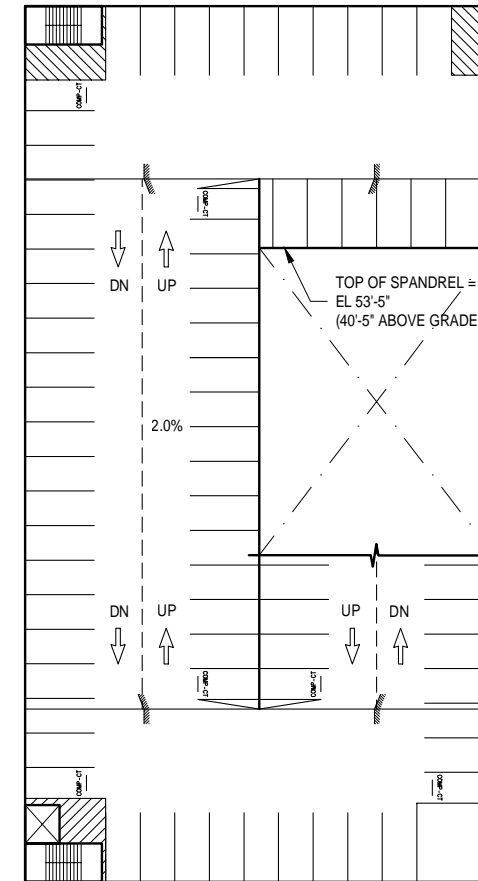
Project No. 25183119.00



LEVEL 2 PLAN



LEVEL 3 PLAN

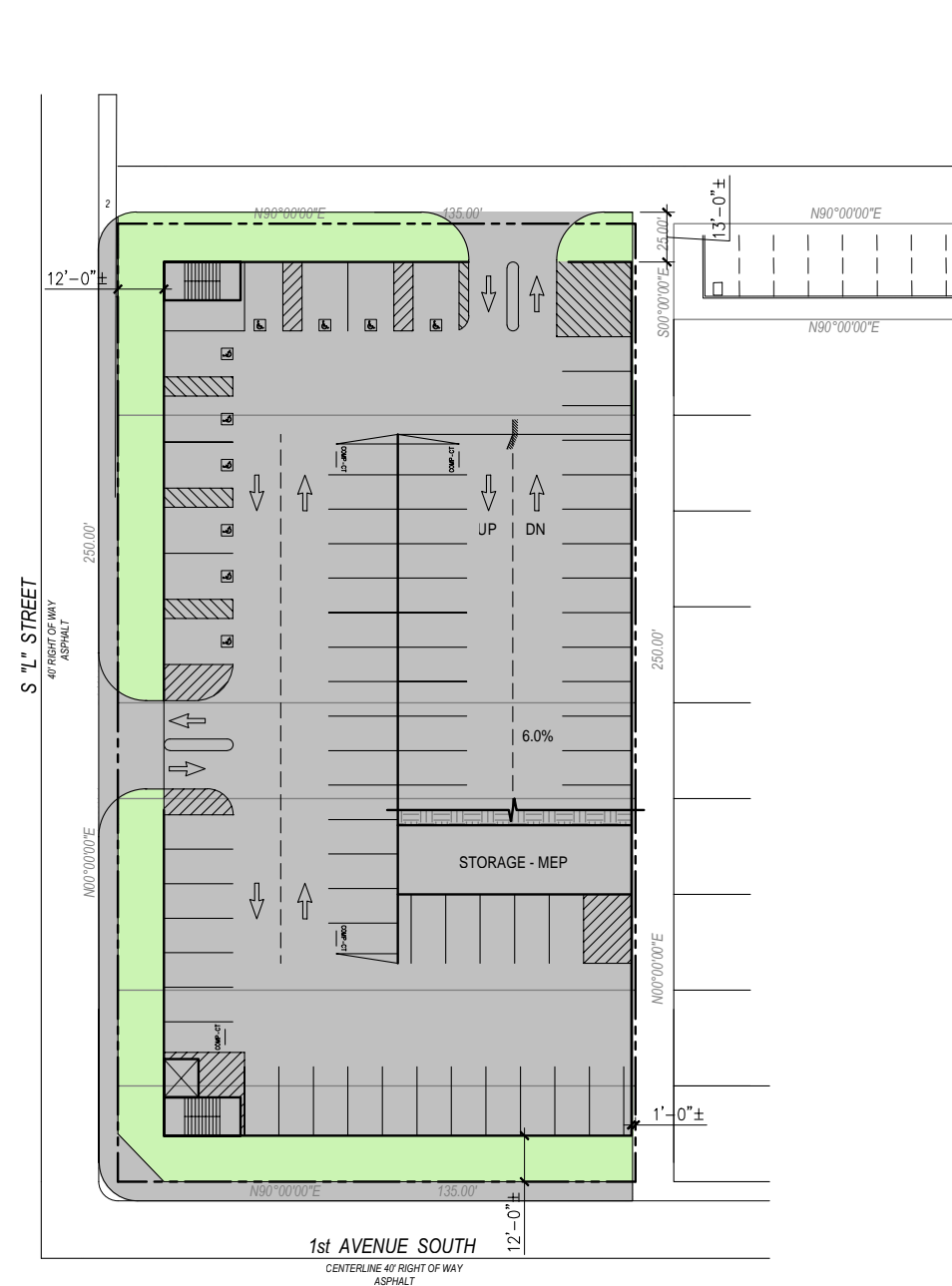


LEVEL 4 PLAN

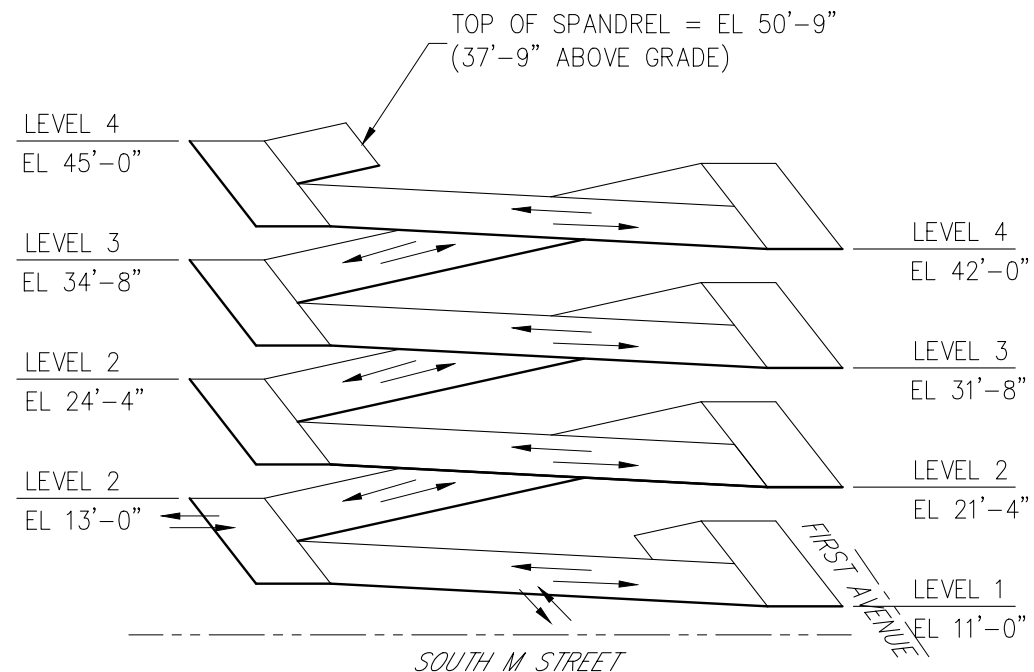
September 19, 2018

Site F - Concept 1

Sheet 2 of 2



SITE & LEVEL 1 PLAN



ISOMETRIC VIEW



SPACE TABULATION						
LEVEL	STANDARD	ADA VAN	ADA	COMPACT	TOTAL	AREA
4	66	0	0	6	72	22,900
3	82	0	0	8	90	27,800
2	82	0	0	8	90	27,800
1	59	2	8	4	73	25,800
TOTALS	289	2	8	26	325	104,300

STANDARD SPACE SIZE - 9'-0" X 18'-0"				
COMPACT SPACE SIZE - 8'-0" X 16'-0"				
ADA VAN & ADA SPACE SIZE - 12'-0" X 18'-0" W/ 5'-0" ACCESS AISLE				
PARKING EFFICIENCY = 320.92 SF/SPACE				
SURFACE SPACES LOST	51		NET GAIN FOR SITE	274
RETAIL SPACE = 0 SF				

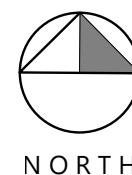
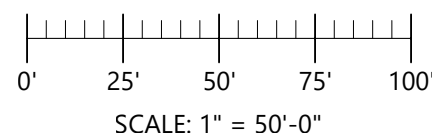
September 19, 2018

Site F - Concept 1A

Sheet 1 of 2



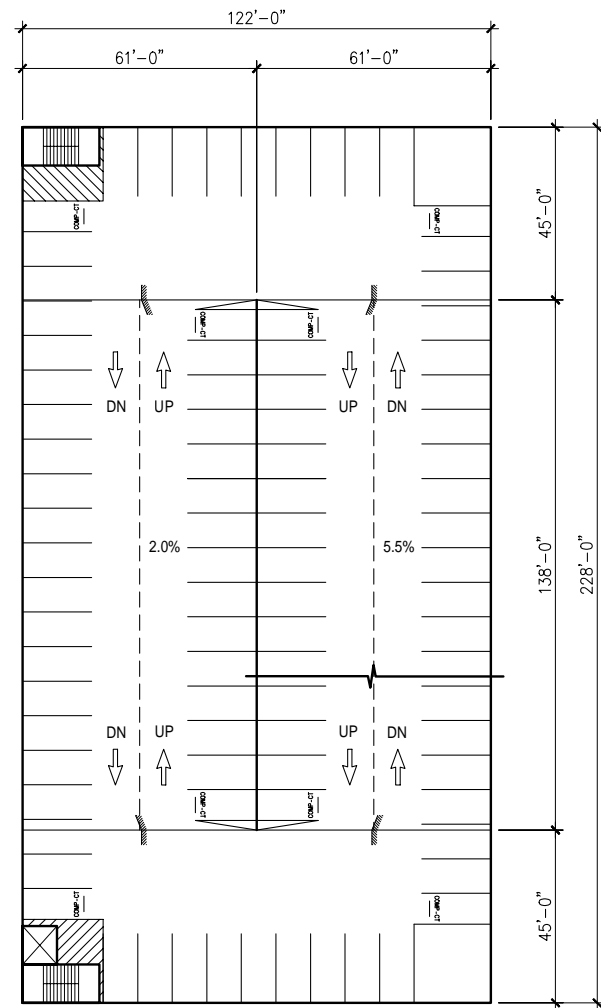
2035 Vista Parkway
West Palm Beach, Florida
P 561.687.2220



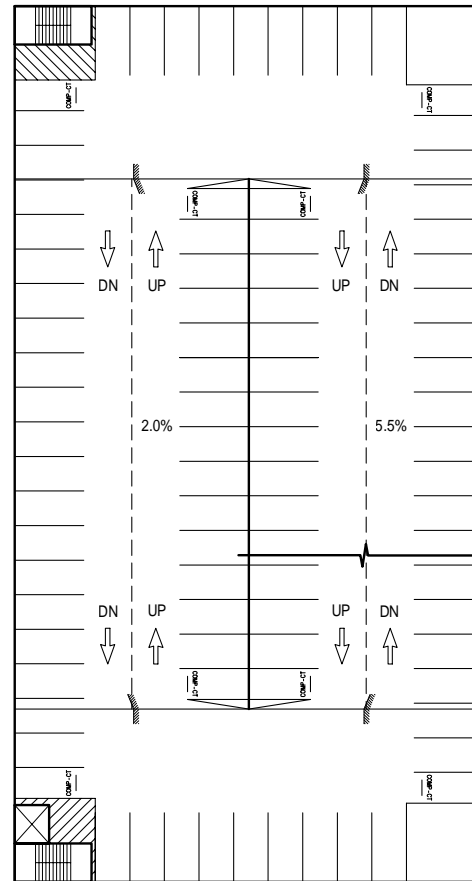
Downtown Lake Worth

Parking Expansion Options
Lake Worth, Florida

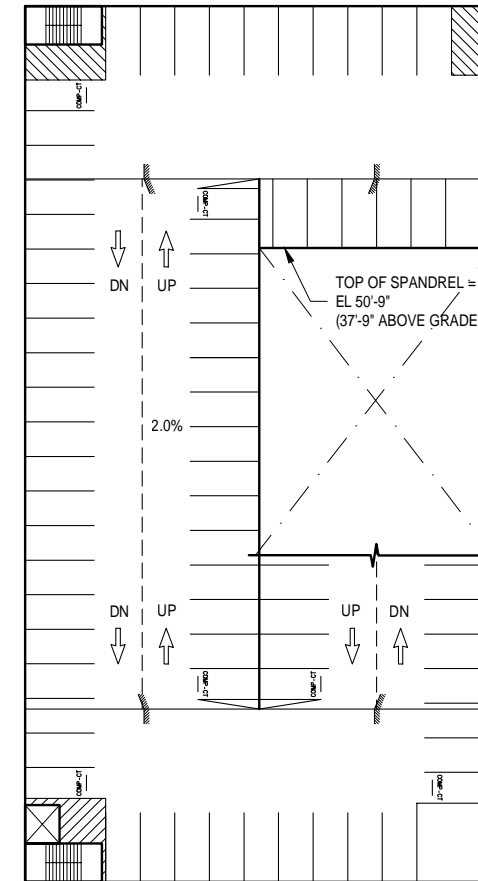
Project No. 25183119.00



LEVEL 2 PLAN



LEVEL 3 PLAN

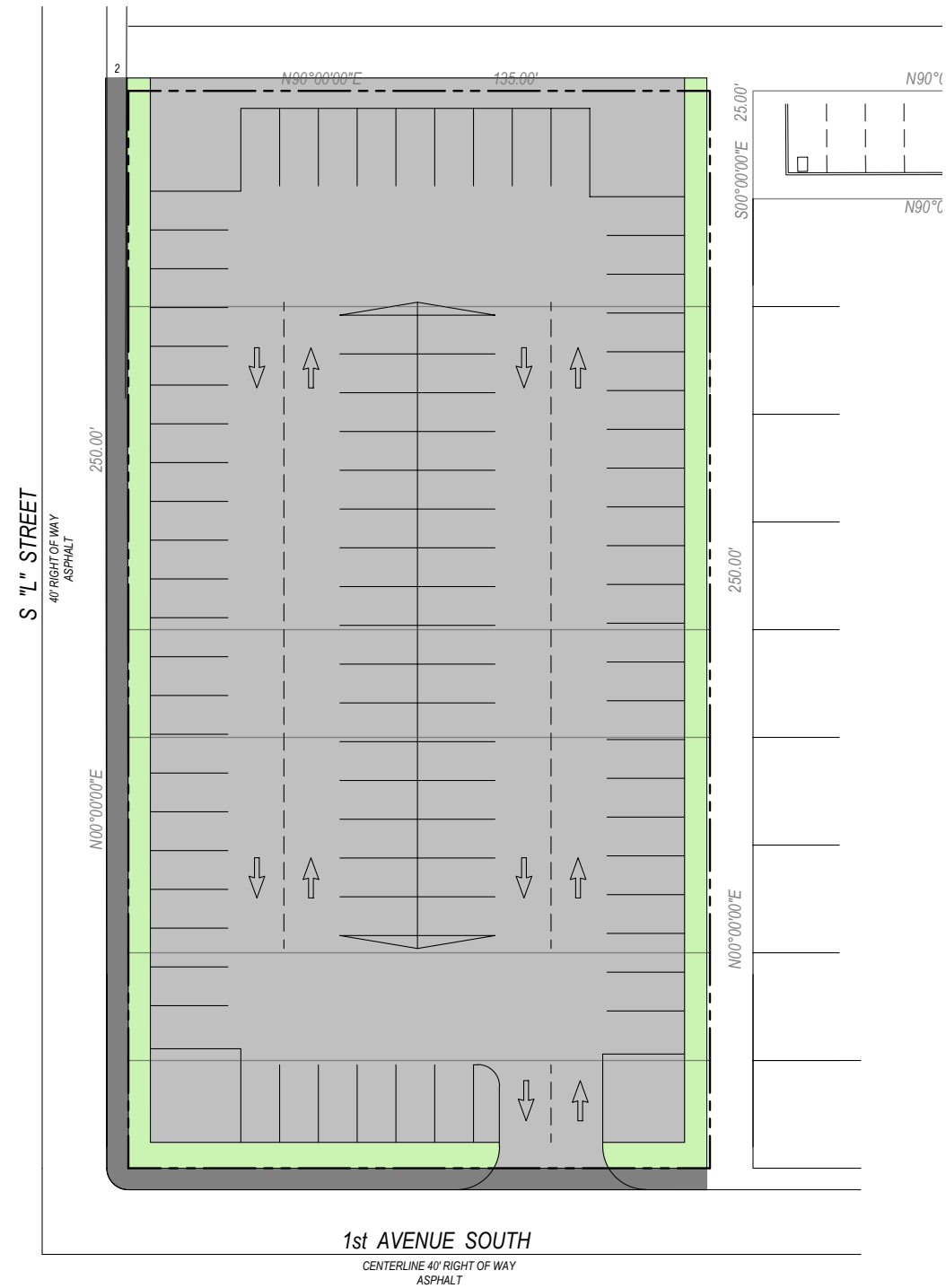


LEVEL 4 PLAN

September 19, 2018

Site F - Concept 1A

Sheet 2 of 2



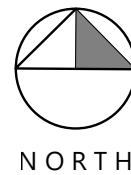
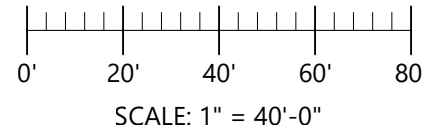
Surface Lot = 91 Spaces (9'-0" X 18'-0")

September 1, 2018

First & L Parking Lot



2035 Vista Parkway
West Palm Beach, Florida
P 561.687.2220



Downtown Lake Worth

Parking Expansion Options
Lake Worth, Florida

Project No. 25183119.00