Sarasota County

TECHNICAL MEMORANDUM

To: Teresa Goluch, Sarasota County Public Works

From: W. T. Bowman, P.E., Tindale Oliver

Subject: Venice Avenue and Pinebrook Road Intersection Improvement: Additional Analysis

Sarasota County, Florida

Date: July 10, 2019

This item has been electronically signed and sealed by W. T. Bowman, P.E. on 7/10/2019 using a digital signature.

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William T Bowman Digitally signed by William T Bowman Date: 2019.07.10 11:20:33 -04'00'

BACKGROUND

Tindale Oliver previously conducted a traffic operational analysis to improve the capacity and traffic operations at the intersections of Venice Avenue at Pinebrook Road and Pinebrook Road at Ridgewood Avenue, as requested by Sarasota County. This initial analysis reviewed the following future options:

- *Option 1* – Intersection improvements to include turn-lane modifications and addition of through lanes at Venice Avenue and Pinebrook Road
- *Option 2A* – Multi-lane roundabout (2-lane) at Venice Avenue and Pinebrook Road
- *Option 2B* – Multi-lane roundabout (2-lane and 3-lane hybrid) at Venice Avenue and Pinebrook Road
- *Option 3* – Median U-turn; prohibit selected left-turn movements at intersection, accomplished by performing a right-turn and a U-turn at Venice Avenue and Pinebrook Road
- *Optional roundabout* – at Ridgewood Avenue and Pinebrook Road (with any above option).

All of these alternatives had estimated construction costs higher than the County's available budget. Therefore, additional analysis was requested to explore design options that could be accommodated within the budget. The new analyzed scenarios included only turn-lane modifications to multiple approaches to the intersection of Pinebrook Road and Venice Avenue—in particular, dual left-turn lanes at multiple approaches.

This report focuses on operational evaluation of the new scenarios. For existing conditions and future volume development process, refer to the "Venice Ave at Pinebrook Rd, Intersection capacity analysis" report.

The following tasks were undertaken for this analysis:

- Developed Synchro files representing conceptual geometric conditions at study location.
- Conducted operational analysis for each feasible alternative for years 2020, 2030, and 2040.
- Prepared conceptual designs for preferred alternative.
- Prepared planning level cost estimates for preferred alternative.

OPERATIONAL ANALYSIS

The additional operational analysis evaluated the intersection at Venice Avenue and Pinebrook Road with the addition of turning lanes for the different approaches for projected 2020, 2030, and 2040 PM peak-period conditions. All options analyzed maintained a typical four-leg intersection configuration.

Analysis of the new alternatives included different intersection lane configurations that were evaluated through an iterative process. Some of these iterations showed failing v/c ratios, excessive delay, blocked through movements, and extremely long queues that reached upstream signalized intersections on Venice Avenue. Ultimately, the following options were selected for further analysis, as they showed the most acceptable operational parameters:

- *Option 4.1* – Dual left-turn lanes NB-SB approaches and single left-turn lanes EB-WB approaches; dedicated right-turn lanes in all approaches
- *Option 4.2* – Dual left-turn lanes all approaches and right-turn lanes as existing conditions
- *Option 4.3* – Dual left-turn lanes and dedicated right-turn lanes in all approaches

For each of these scenarios, an additional analysis was conducted to assess impacts of modeling channelized right-turn lanes (yield/merge condition) to each approach. The Synchro analysis of channelized right-turn lane conditions did not show any differences in terms of v/c ratio or delay compared to typical dedicated right-turn lanes layouts due to right turns in both conditions being permissive movements.

The following summarizes each analyzed alternative.

Option 4.1

This alternative evaluates the following intersection configuration, also shown in **Figure 1**:

- Dual left-turn lanes, NB and SB approaches
- Single left-turn lanes, EB and WB approaches
- Dedicated right-turn lanes, all approaches (non-channelized)

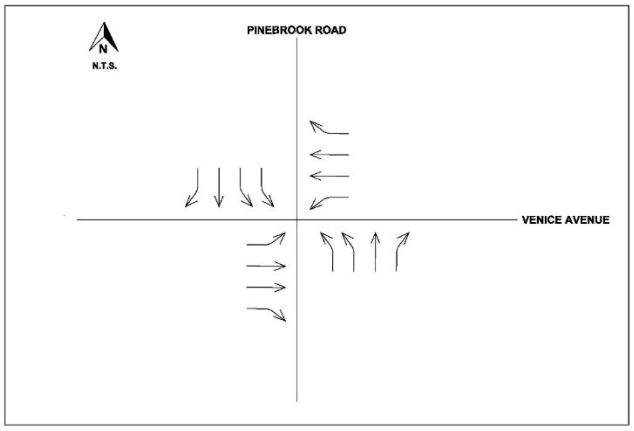


Figure 1: Option 4.1 lane configuration

The results of the 2020, 2030 and 2040 scenarios from Synchro are presented in **Table 1**.

Table 1: Option 4.1 Performance Summary

	Venice Avenue and Pinebrook Road											
2020	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
	V/C Ratio	0.37	0.73	0.20	0.76	0.43	0.07	0.74	0.67	0.07	0.68	0.73	0.10
	Delay	29.6	46.4	34.6	40.6	32.3	26.7	79.2	58.6	43.3	76.0	61.9	44.1
	LOS	C	D	C	D	C	C	E	E	D	E	E	D
	Approach Delay	42.8			33.5			63.4			62.6		
	Approach LOS	D			C			E			E		
	HCM 2000 Ctrl Delay	48.1											
	ICU	76.8%											
	HCM 2000 LOS	D											
	ICU LOS	D											
2030	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
	V/C Ratio	0.55	0.86	0.25	0.89	0.59	0.12	0.83	0.81	0.07	0.81	0.84	0.20
	Delay	30.3	53.7	35.5	78.6	37.3	28.4	87.5	70.1	45.6	85.6	73.2	47.9
	LOS	C	D	D	E	D	C	F	E	D	F	E	D
	Approach Delay	48.3			44.1			72.5			71.5		
	Approach LOS	D			D			E			E		
	HCM 2000 Ctrl Delay	55.6											
	ICU	84.3%											
	HCM 2000 LOS	E											
	ICU LOS	E											
2040	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
	V/C Ratio	0.80	0.98	0.28	0.96	0.79	0.20	0.94	0.91	0.07	0.99	0.92	0.30
	Delay	61.2	70.9	36.2	104.8	47.4	32.6	108.0	81.9	46.2	122.2	83.7	50.6
	LOS	E	E	D	F	D	C	F	F	D	F	F	D
	Approach Delay	64.6			55.4			86.1			88.1		
	Approach LOS	E			E			F			F		
	HCM 2000 Ctrl Delay	69.5											
	ICU	91.8%											
	HCM 2000 LOS	E											
	ICU LOS	F											

As shown in Table 1, the Option 4.1 scenario at Venice Avenue and Pinebrook Road showed that all movements are expected to operate with v/c ratios less than 1.0 and overall intersection LOS E. It should be noted, however, that some movements are expected to operate near capacity in the 2040 scenario, including mainline EB through. This indicates that the intersection will be close to reaching maximum capacity with estimated 2040 volumes.

Operational analysis for the 2030 scenario showed acceptable intersection performance with v/c ratios under 0.90. NB and SB left-turn movements are expected to perform at LOS F.

The intersection is expected to operate acceptably with 2020 estimated volumes.

The Option 4.1 *Highway Capacity Manual 2000* summary report from Synchro is provided in **Attachment A**.

Option 4.2

This alternative reviewed the following lane configurations, also shown in **Figure 2**:

- Dual left-turn lanes, all approaches
- Dedicated right-turn lanes, EB and SB approaches
- Shared through-right lanes, NB and WB approaches

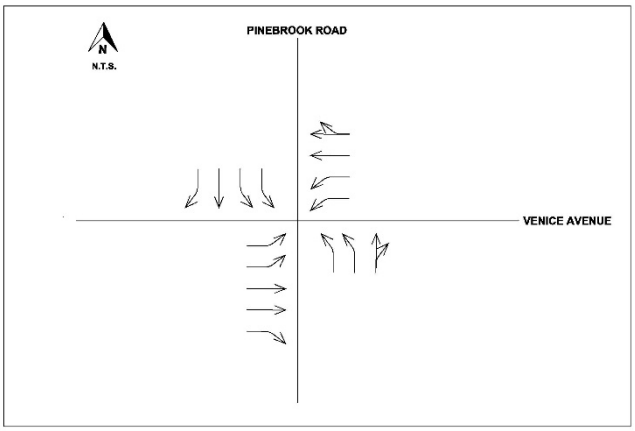


Figure 2: Option 4.2 Lane Configuration

A summary of the results for all modeled scenarios from Synchro is shown in **Table 2.**

Table 2: Option 4.2 Performance Summary

	Venice Avenue and Pinebrook Road									
2020	**Movement**	**EBL**	**EBT**	**EBR**	**WBL**	**WBTR**	**NBL**	**NBTR**	**SBL**	**SBT**	**SBR**
	V/C Ratio	0.59	0.74	0.20	0.74	0.57	0.69	0.82	0.68	0.66	0.16
	Delay	78.0	48.3	35.7	81.6	40.1	75.4	63.9	80.9	55.2	42.2
	LOS	E	D	D	F	D	E	E	F	E	D
	Approach Delay	48.9			49.3		68.0		60.4		
	Approach LOS	D			D		E		E		
	HCM 2000 Ctrl Delay	54.8									
	ICU	79.4%									
	HCM 2000 LOS	D									
	ICU LOS	D									
2030	**Movement**	**EBL**	**EBT**	**EBR**	**WBL**	**WBTR**	**NBL**	**NBTR**	**SBL**	**SBT**	**SBR**
	V/C Ratio	0.77	0.88	0.25	0.83	0.77	0.73	0.89	0.80	0.72	0.25
	Delay	90.1	56.9	36.8	89.3	47.2	76.9	71.9	89.7	58.7	44.2
	LOS	F	E	D	F	D	E	E	F	E	D
	Approach Delay	57.1			55.3		73.7		65.2		
	Approach LOS	E			E		E		E		
	HCM 2000 Ctrl Delay	60.9									
	ICU	85.7%									
	HCM 2000 LOS	E									
	ICU LOS	E									
2040	**Movement**	**EBL**	**EBT**	**EBR**	**WBL**	**WBTR**	**NBL**	**NBTR**	**SBL**	**SBT**	**SBR**
	V/C Ratio	0.80	0.98	0.28	0.93	0.98	0.82	0.98	0.99	0.80	0.32
	Delay	89.6	70.9	36.2	105.8	67.9	89.8	88.5	122.2	64.4	46.7
	LOS	F	E	D	F	E	F	F	F	E	D
	Approach Delay	67.8			74.5		89.0		78.6		
	Approach LOS	E			E		F		E		
	HCM 2000 Ctrl Delay	75.3									
	ICU	92.6%									
	HCM 2000 LOS	E									
	ICU LOS	F									

As shown in Table 2, Option 4.2 is expected to operate acceptably during the 2020 and 2030 scenarios. In the 2040 scenario, several movements will be very close to reaching maximum capacity, and the intersection is expected to have an overall LOS E. Intersection control delay slightly increases by 6.1 seconds compared to Option 4.1. EB left-turn delay significantly increases by 28.4 seconds, as it changed from protective-permissive to protected only. NB and SB left-turn through movement delays decrease by 18.2 and 19.3 seconds, respectively, due to reallocation of green time in this intersection lane configuration.

The Option 4.2 *Highway Capacity Manual 2000* summary report from Synchro is provided in **Attachment A**.

Option 4.3

This alternative reviewed the following lane configurations, also shown in **Figure 3**:

- Dual left-turn lanes, all approaches
- Dedicated right-turn lanes, all approaches (non-channelized)

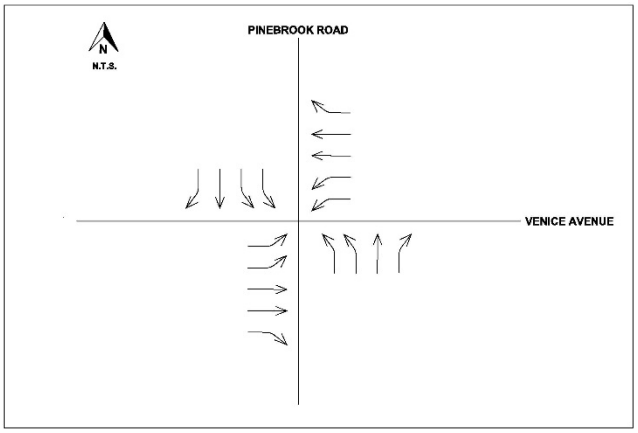


Figure 3: Option 4.3 Lane Configuration

A summary of the results for all modeled scenarios for Option 4.3 is shown in **Table 3.**

Table 3: Option 4.3 Performance Summary

	Venice Avenue and Pinebrook Road											
2020	**Movement**	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
	V/C Ratio	0.50	0.72	0.20	0.68	0.46	0.07	0.72	0.66	0.07	0.63	0.71	0.17
	Delay	73.1	45.5	34.0	75.9	36.3	29.8	76.7	57.5	42.7	77.0	59.6	44.3
	LOS	E	D	C	E	D	C	E	E	D	E	E	D
	Approach Delay	46.0			44.3			61.9			61.8		
	Approach LOS	D			D			E			E		
	HCM 2000 Ctrl Delay	51.6											
	ICU	74.6%											
	HCM 2000 LOS	D											
	ICU LOS	D											
2030	**Movement**	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
	V/C Ratio	0.62	0.85	0.24	0.75	0.63	0.12	0.75	0.74	0.07	0.75	0.77	0.26
	Delay	76.5	52.7	35.1	79.9	40.9	30.9	79.0	61.8	42.9	83.8	64.3	46.7
	LOS	E	D	D	E	D	C	E	E	D	F	E	D
	Approach Delay	52.3			47.2			65.0			66.5		
	Approach LOS	D			D			E			E		
	HCM 2000 Ctrl Delay	55.7											
	ICU	80.8%											
	HCM 2000 LOS	E											
	ICU LOS	D											
2040	**Movement**	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
	V/C Ratio	0.67	0.91	0.26	0.85	0.76	0.18	0.86	0.92	0.09	0.85	0.91	0.37
	Delay	75.9	54.2	32.1	89.7	43.3	30.1	91.0	82.7	46.1	92.1	79.7	49.5
	LOS	E	D	C	F	D	C	F	F	D	F	E	D
	Approach Delay	53.3			49.7			80.5			76.5		
	Approach LOS	D			D			F			E		
	HCM 2000 Ctrl Delay	60.8											
	ICU	87.1%											
	HCM 2000 LOS	E											
	ICU LOS	E											

Option 4.3 substantially increases capacity compared to the baseline condition and previously analyzed alternatives, with the addition of dual left-turn lanes and dedicated right-turn lanes in every approach. This option is expected to operate with acceptable v/c ratios in all three scenarios of 2020, 2030, and 2040. During 2040 traffic conditions, LOS E is expected for the overall operation of the intersection. However, some specific movements, primarily left turns, will perform at LOS F and an average delay of 88.9 seconds. Most saturated movements will be SB, NB, and EB throughs.

Extended analysis of this alternative was conducted using SimTraffic to determine a more comprehensive queueing forecast at the study intersection. Analysis of the busiest traffic conditions in the 2040 scenario showed SB queues extended past Ridgewood, which could generate excessive delay for traffic on the side street. EB and WB queues for through movements did not reach upstream intersections based on 95th percentile. NB, EB, and WB queues were able to clear in less than two cycles. All turning lanes are estimated to reach back-of-queues longer than designed storage based on 95th percentile queue, and average queues are estimated to extend within storage length. Most congested turning movement is EB left-turn, taking several cycles to clear during the peak period.

The Option 4.3 *Highway Capacity Manual 2000* summary report from Synchro and SimTraffic Queueing and Blocking report are provided in **Attachment A**.

IMPROVEMENT CONCEPTS AND COST ESTIMATE

Conceptual plans and a cost estimate were prepared for Option 4.3, the preferred alternative after review of the operational analysis. The cost estimate was prepared using FDOT's Historical Cost table. Right-of-way (ROW) estimated cost was calculated using available parcel cost information provided by the County.

A summary of the estimated cost of the project is presented in **Table 4**. Details of the construction cost estimate and ROW cost are included in **Attachment B**. Conceptual plans for improvements and ROW impact areas are included in **Attachment C**.

Table 4: Cost Estimate Summary

Alternative	Construction Cost	ROW Cost	Total
Option 4.3	$ 2,389,327.77	$ 92,075.10	$ 2,481,402.87

RECOMMENDATION

Based on the analysis, Option 4.3 is estimated to provide the best long-term operation within the County's budget. Additionally, although 2040 is expected to have operational challenges with all three options, Option 4.3 provides the best estimated intersection operation in 2040 and is estimated to provide acceptable operation through 2030.

It should be noted that though this analysis included right-turn lanes (not channelized) a design decision can be made to add channelization. The impacts on cost are estimated to be minor.

ATTACHMENTS

- A – HCM 2000 Synchro and SimTraffic Queueing and Blocking Reports
- B – Construction Cost Estimate and ROW Cost
- C – Conceptual Plan Sheets

Attachment A

HCM 2000 Synchro and SimTraffic Queueing and Blocking Reports

2020

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	872	203	161	595	90	231	315	88	185	326	127
Future Volume (vph)	117	872	203	161	595	90	231	315	88	185	326	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1736	3539	1599	1787	3574	1599	3467	1863	1583	3467	1845	1553
Flt Permitted	0.36	1.00	1.00	0.12	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	656	3539	1599	229	3574	1599	3467	1863	1583	3467	1845	1553
Peak-hour factor, PHF	0.97	0.91	0.88	0.73	0.90	0.78	0.93	0.92	0.77	0.84	0.90	0.87
Adj. Flow (vph)	121	958	231	221	661	115	248	342	114	220	362	146
RTOR Reduction (vph)	0	0	110	0	0	65	0	0	83	0	0	104
Lane Group Flow (vph)	121	958	121	221	661	50	248	342	31	220	362	42
Heavy Vehicles (%)	4%	2%	1%	1%	1%	1%	1%	2%	2%	1%	3%	4%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2			4			8
Actuated Green, G (s)	67.5	59.5	59.5	83.0	69.0	69.0	15.4	43.5	43.5	14.9	43.0	43.0
Effective Green, g (s)	67.5	59.5	59.5	83.0	69.0	69.0	15.4	43.5	43.5	14.9	43.0	43.0
Actuated g/C Ratio	0.42	0.37	0.37	0.52	0.43	0.43	0.10	0.27	0.27	0.09	0.27	0.27
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	331	1321	596	290	1547	692	334	508	431	324	497	418
v/s Ratio Prot	0.02	0.27		c0.08	0.18		c0.07	0.18		0.06	c0.20	
v/s Ratio Perm	0.14		0.08	c0.31		0.03			0.02			0.03
v/c Ratio	0.37	0.73	0.20	0.76	0.43	0.07	0.74	0.67	0.07	0.68	0.73	0.10
Uniform Delay, d1	28.6	42.9	33.9	28.7	31.5	26.5	70.1	51.6	43.0	69.9	52.9	43.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	3.5	0.8	11.9	0.9	0.2	9.2	7.0	0.3	6.1	9.0	0.5
Delay (s)	29.6	46.4	34.6	40.6	32.3	26.7	79.2	58.6	43.3	76.0	61.9	44.1
Level of Service	C	D	C	D	C	C	E	E	D	E	E	D
Approach Delay (s)		42.8			33.5			63.4			62.6	
Approach LOS		D			C			E			E	

Intersection Summary			
HCM 2000 Control Delay	48.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	159.4	Sum of lost time (s)	24.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		

Description: Phase 3 max recall per FN.

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	872	203	161	595	90	231	315	88	185	326	127
Future Volume (vph)	117	872	203	161	595	90	231	315	88	185	326	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		0.97	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3367	3539	1599	3467	3495		3467	1793		3467	1845	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3367	3539	1599	3467	3495		3467	1793		3467	1845	1553
Peak-hour factor, PHF	0.97	0.91	0.88	0.73	0.90	0.78	0.93	0.92	0.77	0.84	0.90	0.87
Adj. Flow (vph)	121	958	231	221	661	115	248	342	114	220	362	146
RTOR Reduction (vph)	0	0	113	0	9	0	0	8	0	0	0	72
Lane Group Flow (vph)	121	958	118	221	767	0	248	448	0	220	362	74
Heavy Vehicles (%)	4%	2%	1%	1%	1%	1%	1%	2%	2%	1%	3%	4%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6									8
Actuated Green, G (s)	9.8	58.1	58.1	13.7	62.0		16.5	49.0		15.0	47.5	47.5
Effective Green, g (s)	9.8	58.1	58.1	13.7	62.0		16.5	49.0		15.0	47.5	47.5
Actuated g/C Ratio	0.06	0.36	0.36	0.09	0.39		0.10	0.31		0.09	0.30	0.30
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Grp Cap (vph)	206	1286	581	297	1356		357	549		325	548	461
v/s Ratio Prot	0.04	c0.27		c0.06	c0.22		c0.07	c0.25		0.06	0.20	
v/s Ratio Perm			0.07									0.05
v/c Ratio	0.59	0.74	0.20	0.74	0.57		0.69	0.82		0.68	0.66	0.16
Uniform Delay, d1	73.0	44.4	34.9	71.3	38.3		69.2	51.2		70.1	49.1	41.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.0	4.0	0.8	10.3	1.7		6.2	12.7		10.8	6.1	0.7
Delay (s)	78.0	48.3	35.7	81.6	40.1		75.4	63.9		80.9	55.2	42.2
Level of Service	E	D	D	F	D		E	E		F	E	D
Approach Delay (s)		48.9			49.3			68.0			60.4	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	54.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	159.8	Sum of lost time (s)	24.0
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		

Description: Phase 3 max recall per FN.

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	872	203	161	595	90	231	315	88	185	326	127
Future Volume (vph)	117	872	203	161	595	90	231	315	88	185	326	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3367	3539	1599	3467	3574	1599	3467	1863	1583	3467	1845	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3367	3539	1599	3467	3574	1599	3467	1863	1583	3467	1845	1553
Peak-hour factor, PHF	0.97	0.91	0.88	0.73	0.90	0.78	0.93	0.92	0.77	0.84	0.90	0.87
Adj. Flow (vph)	121	958	231	221	661	115	248	342	114	220	362	146
RTOR Reduction (vph)	0	0	113	0	0	69	0	0	82	0	0	74
Lane Group Flow (vph)	121	958	118	221	661	46	248	342	32	220	362	72
Heavy Vehicles (%)	4%	2%	1%	1%	1%	1%	1%	2%	2%	1%	3%	4%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	11.5	60.0	60.0	14.9	63.4	63.4	15.9	44.0	44.0	16.0	44.1	44.1
Effective Green, g (s)	11.5	60.0	60.0	14.9	63.4	63.4	15.9	44.0	44.0	16.0	44.1	44.1
Actuated g/C Ratio	0.07	0.38	0.38	0.09	0.40	0.40	0.10	0.28	0.28	0.10	0.28	0.28
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	243	1336	603	325	1426	637	346	515	438	349	512	431
v/s Ratio Prot	0.04	c0.27		c0.06	c0.18		c0.07	0.18		0.06	c0.20	
v/s Ratio Perm			0.07			0.03			0.02			0.05
v/c Ratio	0.50	0.72	0.20	0.68	0.46	0.07	0.72	0.66	0.07	0.63	0.71	0.17
Uniform Delay, d1	70.9	42.2	33.2	69.7	35.2	29.5	69.3	50.9	42.4	68.6	51.6	43.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	3.3	0.7	6.2	1.1	0.2	7.4	6.6	0.3	8.4	8.0	0.8
Delay (s)	73.1	45.5	34.0	75.9	36.3	29.8	76.7	57.5	42.7	77.0	59.6	44.3
Level of Service	E	D	C	E	D	C	E	E	D	E	E	D
Approach Delay (s)		46.0			44.3			61.9			61.8	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	51.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	158.9	Sum of lost time (s)	24.0
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		

Description: Phase 3 max recall per FN.

c Critical Lane Group

2030

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	1031	219	183	801	128	248	351	88	219	353	161
Future Volume (vph)	156	1031	219	183	801	128	248	351	88	219	353	161
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1736	3539	1599	1787	3574	1599	3467	1863	1583	3467	1845	1553
Flt Permitted	0.22	1.00	1.00	0.06	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	399	3539	1599	116	3574	1599	3467	1863	1583	3467	1845	1553
Peak-hour factor, PHF	0.97	0.91	0.88	0.73	0.90	0.78	0.93	0.92	0.77	0.84	0.90	0.87
Adj. Flow (vph)	161	1133	249	251	890	164	267	382	114	261	392	185
RTOR Reduction (vph)	0	0	103	0	0	86	0	0	85	0	0	107
Lane Group Flow (vph)	161	1133	146	251	890	78	267	382	29	261	392	78
Heavy Vehicles (%)	4%	2%	1%	1%	1%	1%	1%	2%	2%	1%	3%	4%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2			4			8
Actuated Green, G (s)	72.3	59.1	59.1	86.0	66.8	66.8	14.8	40.1	40.1	14.8	40.1	40.1
Effective Green, g (s)	72.3	59.1	59.1	86.0	66.8	66.8	14.8	40.1	40.1	14.8	40.1	40.1
Actuated g/C Ratio	0.46	0.37	0.37	0.54	0.42	0.42	0.09	0.25	0.25	0.09	0.25	0.25
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	292	1316	594	282	1502	672	322	470	399	322	465	391
v/s Ratio Prot	0.05	0.32		c0.12	0.25		c0.08	0.21		0.08	c0.21	
v/s Ratio Perm	0.20		0.09	c0.37		0.05			0.02			0.05
v/c Ratio	0.55	0.86	0.25	0.89	0.59	0.12	0.83	0.81	0.07	0.81	0.84	0.20
Uniform Delay, d1	27.5	46.1	34.5	50.7	35.5	28.1	70.8	55.9	45.2	70.7	56.4	46.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.8	7.6	1.0	27.9	1.7	0.4	16.7	14.2	0.4	14.9	16.8	1.1
Delay (s)	30.3	53.7	35.5	78.6	37.3	28.4	87.5	70.1	45.6	85.6	73.2	47.9
Level of Service	C	D	D	E	D	C	F	E	D	F	E	D
Approach Delay (s)		48.3			44.1			72.5			71.5	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	55.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	158.9	Sum of lost time (s)	24.0
Intersection Capacity Utilization	84.3%	ICU Level of Service	E
Analysis Period (min)	15		

Description: Phase 3 max recall per FN.

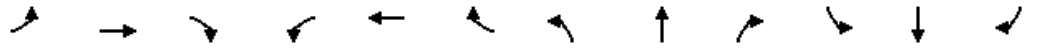
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	1031	219	183	801	128	248	351	88	219	353	161
Future Volume (vph)	156	1031	219	183	801	128	248	351	88	219	353	161
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		0.97	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3367	3539	1599	3467	3491		3467	1799		3467	1845	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3367	3539	1599	3467	3491		3467	1799		3467	1845	1553
Peak-hour factor, PHF	0.97	0.91	0.88	0.73	0.90	0.78	0.93	0.92	0.77	0.84	0.90	0.87
Adj. Flow (vph)	161	1133	249	251	890	164	267	382	114	261	392	185
RTOR Reduction (vph)	0	0	103	0	9	0	0	7	0	0	0	72
Lane Group Flow (vph)	161	1133	146	251	1045	0	267	489	0	261	392	113
Heavy Vehicles (%)	4%	2%	1%	1%	1%	1%	1%	2%	2%	1%	3%	4%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6									8
Actuated Green, G (s)	10.0	58.0	58.0	14.0	62.0		16.9	49.0		15.0	47.1	47.1
Effective Green, g (s)	10.0	58.0	58.0	14.0	62.0		16.9	49.0		15.0	47.1	47.1
Actuated g/C Ratio	0.06	0.36	0.36	0.09	0.39		0.11	0.31		0.09	0.29	0.29
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Grp Cap (vph)	210	1282	579	303	1352		366	550		325	543	457
v/s Ratio Prot	0.05	c0.32		c0.07	c0.30		c0.08	c0.27		0.08	0.21	
v/s Ratio Perm			0.09									0.07
v/c Ratio	0.77	0.88	0.25	0.83	0.77		0.73	0.89		0.80	0.72	0.25
Uniform Delay, d1	73.9	47.8	35.8	71.8	42.8		69.3	52.9		71.1	50.6	43.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	16.2	9.1	1.0	17.5	4.3		7.6	19.0		18.7	8.1	1.3
Delay (s)	90.1	56.9	36.8	89.3	47.2		76.9	71.9		89.7	58.7	44.2
Level of Service	F	E	D	F	D		E	E		F	E	D
Approach Delay (s)		57.1			55.3			73.7			65.2	
Approach LOS		E			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	60.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		

Description: Phase 3 max recall per FN.

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	1031	219	183	801	128	248	351	88	219	353	161
Future Volume (vph)	156	1031	219	183	801	128	248	351	88	219	353	161
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3367	3539	1599	3467	3574	1599	3467	1863	1583	3467	1845	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3367	3539	1599	3467	3574	1599	3467	1863	1583	3467	1845	1553
Peak-hour factor, PHF	0.97	0.91	0.88	0.73	0.90	0.78	0.93	0.92	0.77	0.84	0.90	0.87
Adj. Flow (vph)	161	1133	249	251	890	164	267	382	114	261	392	185
RTOR Reduction (vph)	0	0	103	0	0	89	0	0	82	0	0	74
Lane Group Flow (vph)	161	1133	146	251	890	75	267	382	32	261	392	111
Heavy Vehicles (%)	4%	2%	1%	1%	1%	1%	1%	2%	2%	1%	3%	4%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	12.3	60.0	60.0	15.4	63.1	63.1	16.3	44.1	44.1	16.0	43.8	43.8
Effective Green, g (s)	12.3	60.0	60.0	15.4	63.1	63.1	16.3	44.1	44.1	16.0	43.8	43.8
Actuated g/C Ratio	0.08	0.38	0.38	0.10	0.40	0.40	0.10	0.28	0.28	0.10	0.27	0.27
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	259	1331	601	334	1413	632	354	515	437	347	506	426
v/s Ratio Prot	0.05	c0.32		c0.07	c0.25		c0.08	0.21		0.08	c0.21	
v/s Ratio Perm			0.09			0.05			0.02			0.07
v/c Ratio	0.62	0.85	0.24	0.75	0.63	0.12	0.75	0.74	0.07	0.75	0.77	0.26
Uniform Delay, d1	71.3	45.7	34.2	70.2	38.8	30.6	69.7	52.5	42.6	69.8	53.3	45.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.2	7.0	1.0	9.7	2.1	0.4	9.4	9.3	0.3	14.0	11.0	1.5
Delay (s)	76.5	52.7	35.1	79.9	40.9	30.9	79.0	61.8	42.9	83.8	64.3	46.7
Level of Service	E	D	D	E	D	C	E	E	D	F	E	D
Approach Delay (s)		52.3			47.2			65.0			66.5	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM 2000 Control Delay	55.7	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	159.5	Sum of lost time (s)	24.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		

Description: Phase 3 max recall per FN.

c Critical Lane Group

2040

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	1189	234	205	1006	165	264	387	87	252	380	194
Future Volume (vph)	195	1189	234	205	1006	165	264	387	87	252	380	194
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1736	3539	1599	1787	3574	1599	3467	1863	1583	3467	1845	1553
Flt Permitted	0.10	1.00	1.00	0.10	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	178	3539	1599	183	3574	1599	3467	1863	1583	3467	1845	1553
Peak-hour factor, PHF	0.97	0.91	0.88	0.73	0.90	0.78	0.93	0.92	0.77	0.84	0.90	0.87
Adj. Flow (vph)	201	1307	266	281	1118	212	284	421	113	300	422	223
RTOR Reduction (vph)	0	0	96	0	0	87	0	0	85	0	0	107
Lane Group Flow (vph)	201	1307	170	281	1118	125	284	421	28	300	422	116
Heavy Vehicles (%)	4%	2%	1%	1%	1%	1%	1%	2%	2%	1%	3%	4%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2			4			8
Actuated Green, G (s)	60.0	60.0	60.0	63.1	63.1	63.1	14.0	40.0	40.0	14.0	40.0	40.0
Effective Green, g (s)	60.0	60.0	60.0	63.1	63.1	63.1	14.0	40.0	40.0	14.0	40.0	40.0
Actuated g/C Ratio	0.38	0.38	0.38	0.39	0.39	0.39	0.09	0.25	0.25	0.09	0.25	0.25
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	250	1327	599	292	1409	630	303	465	395	303	461	388
v/s Ratio Prot	0.09	c0.37		c0.13	0.31		0.08	0.23		c0.09	c0.23	
v/s Ratio Perm	0.21		0.11	c0.25		0.08			0.02			0.07
v/c Ratio	0.80	0.98	0.28	0.96	0.79	0.20	0.94	0.91	0.07	0.99	0.92	0.30
Uniform Delay, d1	43.5	49.6	35.0	62.4	42.7	31.8	72.6	58.2	45.8	72.9	58.4	48.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	17.7	21.4	1.2	42.4	4.7	0.7	35.5	23.8	0.4	49.3	25.4	2.0
Delay (s)	61.2	70.9	36.2	104.8	47.4	32.6	108.0	81.9	46.2	122.2	83.7	50.6
Level of Service	E	E	D	F	D	C	F	F	D	F	F	D
Approach Delay (s)		64.6			55.4			86.1			88.1	
Approach LOS		E			E			F			F	

Intersection Summary			
HCM 2000 Control Delay	69.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	91.8%	ICU Level of Service	F
Analysis Period (min)	15		

Description: Phase 3 max recall per FN.

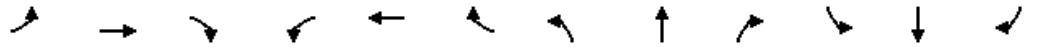
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	1189	234	205	1006	165	264	387	87	252	380	194
Future Volume (vph)	195	1189	234	205	1006	165	264	387	87	252	380	194
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95		0.97	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3367	3539	1599	3467	3489		3467	1804		3467	1845	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3367	3539	1599	3467	3489		3467	1804		3467	1845	1553
Peak-hour factor, PHF	0.97	0.91	0.88	0.73	0.90	0.78	0.93	0.92	0.77	0.84	0.90	0.87
Adj. Flow (vph)	201	1307	266	281	1118	212	284	421	113	300	422	223
RTOR Reduction (vph)	0	0	96	0	10	0	0	6	0	0	0	78
Lane Group Flow (vph)	201	1307	170	281	1320	0	284	528	0	300	422	145
Heavy Vehicles (%)	4%	2%	1%	1%	1%	1%	1%	2%	2%	1%	3%	4%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6									8
Actuated Green, G (s)	12.0	60.0	60.0	14.0	62.0		16.0	48.0		14.0	46.0	46.0
Effective Green, g (s)	12.0	60.0	60.0	14.0	62.0		16.0	48.0		14.0	46.0	46.0
Actuated g/C Ratio	0.08	0.38	0.38	0.09	0.39		0.10	0.30		0.09	0.29	0.29
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Grp Cap (vph)	252	1327	599	303	1351		346	541		303	530	446
v/s Ratio Prot	0.06	0.37		c0.08	c0.38		0.08	c0.29		c0.09	0.23	
v/s Ratio Perm			0.11									0.09
v/c Ratio	0.80	0.98	0.28	0.93	0.98		0.82	0.98		0.99	0.80	0.32
Uniform Delay, d1	72.8	49.6	35.0	72.5	48.3		70.6	55.4		72.9	52.7	44.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	16.8	21.4	1.2	33.3	19.6		19.2	33.1		49.3	11.8	1.9
Delay (s)	89.6	70.9	36.2	105.8	67.9		89.8	88.5		122.2	64.4	46.7
Level of Service	F	E	D	F	E		F	F		F	E	D
Approach Delay (s)		67.8			74.5			89.0			78.6	
Approach LOS		E			E			F			E	

Intersection Summary			
HCM 2000 Control Delay	75.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	92.6%	ICU Level of Service	F
Analysis Period (min)	15		

Description: Phase 3 max recall per FN.

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	1189	234	205	1006	165	264	387	87	252	380	194
Future Volume (vph)	195	1189	234	205	1006	165	264	387	87	252	380	194
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3367	3539	1599	3467	3574	1599	3467	1863	1583	3467	1845	1553
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3367	3539	1599	3467	3574	1599	3467	1863	1583	3467	1845	1553
Peak-hour factor, PHF	0.97	0.91	0.88	0.73	0.90	0.78	0.93	0.92	0.77	0.84	0.90	0.87
Adj. Flow (vph)	201	1307	266	281	1118	212	284	421	113	300	422	223
RTOR Reduction (vph)	0	0	94	0	0	90	0	0	77	0	0	79
Lane Group Flow (vph)	201	1307	172	281	1118	122	284	421	36	300	422	144
Heavy Vehicles (%)	4%	2%	1%	1%	1%	1%	1%	2%	2%	1%	3%	4%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Actuated Green, G (s)	14.0	64.0	64.0	15.0	65.0	65.0	15.0	38.6	38.6	16.0	39.6	39.6
Effective Green, g (s)	14.0	64.0	64.0	15.0	65.0	65.0	15.0	38.6	38.6	16.0	39.6	39.6
Actuated g/C Ratio	0.09	0.41	0.41	0.10	0.41	0.41	0.10	0.24	0.24	0.10	0.25	0.25
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	299	1437	649	329	1474	659	329	456	387	351	463	390
v/s Ratio Prot	0.06	c0.37		c0.08	0.31		0.08	0.23		c0.09	c0.23	
v/s Ratio Perm			0.11			0.08			0.02			0.09
v/c Ratio	0.67	0.91	0.26	0.85	0.76	0.18	0.86	0.92	0.09	0.85	0.91	0.37
Uniform Delay, d1	69.6	44.1	31.1	70.2	39.6	29.4	70.3	58.1	46.0	69.7	57.3	48.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.4	10.1	1.0	19.5	3.7	0.6	20.8	24.6	0.1	22.5	22.4	0.8
Delay (s)	75.9	54.2	32.1	89.7	43.3	30.1	91.0	82.7	46.1	92.1	79.7	49.5
Level of Service	E	D	C	F	D	C	F	F	D	F	E	D
Approach Delay (s)		53.3			49.7			80.5			76.5	
Approach LOS		D			D			F			E	

Intersection Summary			
HCM 2000 Control Delay	60.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	157.6	Sum of lost time (s)	24.0
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		

Description: Phase 3 max recall per FN.

c Critical Lane Group

SimTraffic Queueing and Blocking Reports
Option 4.3

Intersection: 1104: Pinebrook Rd & Venice Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	L
Maximum Queue (ft)	270	245	509	528	290	176	211	354	368	246	222	389
Average Queue (ft)	145	46	323	330	174	101	115	180	198	45	119	152
95th Queue (ft)	262	179	469	487	367	167	190	311	331	152	209	271
Link Distance (ft)			1197	1197				1238	1238			
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500	500			250	260	260			260	340	340
Storage Blk Time (%)			0	20	0		0	1	3	0	0	0
Queuing Penalty (veh)			1	45	0		0	3	3	0	0	1

Intersection: 1104: Pinebrook Rd & Venice Ave

Movement	NB	NB	SB	SB	SB	SB	B5
Directions Served	T	R	L	L	T	R	T
Maximum Queue (ft)	464	315	185	246	335	190	114
Average Queue (ft)	247	76	105	174	295	109	68
95th Queue (ft)	389	218	176	294	380	237	139
Link Distance (ft)	1910				247		30
Upstream Blk Time (%)			0	0	30		24
Queuing Penalty (veh)			0	0	218		178
Storage Bay Dist (ft)		290	280	280		140	
Storage Blk Time (%)	6	0	0	0	46	1	
Queuing Penalty (veh)	21	0	0	2	168	4	

Intersection: 1104: Pinebrook Rd & Venice Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	L
Maximum Queue (ft)	377	547	687	692	290	230	304	490	502	285	205	388
Average Queue (ft)	243	183	421	435	203	122	177	279	286	107	118	173
95th Queue (ft)	386	466	628	649	387	197	307	434	436	294	186	335
Link Distance (ft)			1197	1197				1242	1242			
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500	500			250	260	260			260	340	340
Storage Blk Time (%)	0		5	30	0	0	0	10	12	0		0
Queuing Penalty (veh)	0		8	75	0	0	2	24	19	0		0

Intersection: 1104: Pinebrook Rd & Venice Ave

Movement	NB	NB	SB	SB	SB	SB	B5
Directions Served	T	R	L	L	T	R	T
Maximum Queue (ft)	619	315	216	246	340	190	123
Average Queue (ft)	324	116	122	194	308	133	89
95th Queue (ft)	614	308	197	302	369	251	147
Link Distance (ft)	2039				247		30
Upstream Blk Time (%)			0	1	39		35
Queuing Penalty (veh)			0	0	325		294
Storage Bay Dist (ft)		290	280	280		140	
Storage Blk Time (%)	14	0	0	1	51	1	
Queuing Penalty (veh)	53	0	0	6	229	5	

Intersection: 1104: Pinebrook Rd & Venice Ave

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	L	T	T	R	L	L	T	T	R	L	L
Maximum Queue (ft)	505	550	1074	1061	290	279	305	746	744	285	271	390
Average Queue (ft)	403	426	659	664	212	186	244	407	407	182	151	260
95th Queue (ft)	598	718	1011	1025	395	291	364	664	662	380	251	464
Link Distance (ft)			1195	1195				1243	1243			
Upstream Blk Time (%)			1	1								
Queuing Penalty (veh)			4	5								
Storage Bay Dist (ft)	500	500			250	260	260			260	340	340
Storage Blk Time (%)	23	25	16	38	0	2	8	22	24	0		
Queuing Penalty (veh)	150	163	32	100	0	11	43	62	51	0		

Intersection: 1104: Pinebrook Rd & Venice Ave

Movement	NB	NB	SB	SB	SB	SB	B5
Directions Served	T	R	L	L	T	R	T
Maximum Queue (ft)	1226	315	233	246	345	190	127
Average Queue (ft)	558	148	145	218	318	144	98
95th Queue (ft)	1163	364	226	301	340	254	137
Link Distance (ft)	3234				247		29
Upstream Blk Time (%)			0	1	46		43
Queuing Penalty (veh)			0	0	429		402
Storage Bay Dist (ft)		290	280	280		140	
Storage Blk Time (%)	33	0	0	1	55	2	
Queuing Penalty (veh)	129	1	0	7	288	16	

Attachment B
Construction Cost Estimate and ROW Cost

Construction Cost Estimate

ENGINEER'S ESTIMATE
FLORIDA DEPARTMENT OF TRANSPORTATION DISTRICT 1

FINANCIAL PROJECT ID # :	
PROJECT DESCRIPTION:	Add dual left turns to the intersection of Venice Ave and Pinebrook Rd.
PAY ITEM SPEC YEAR:	2019
SUBMITTAL TYPE:	Preliminary Design Estimate
COUNTY:	Sarasota
DATE:	April 8, 2019
ENGINEERING CONSULTANT FIRM:	Tindale Oliver
CONTACT NAME:	Mauricio Micolta, P.E.
PHONE NUMBER:	(813) 224-8862
FILE VERSION:	EE_04/19
PAGE NUMBER:	1 of 1

COMPONENT GROUPS

200 - ROADWAY (OPTION 1)		$1,149,150.19
300 - SIGNING & PAVEMENT MARKINGS		$80,404.14
400 - LIGHTING		$51,436.80
500 - SIGNALIZATION		$311,894.05
COMPONENT SUB-TOTAL		$1,592,885.18
(102-1) MOT (Maintenance of Traffic)	10%	$159,288.52
SUB-TOTAL		$1,752,173.70
(101-1) MOB (Mobilization)	10%	$159,288.52
SUB-TOTAL		$1,911,462.21
Drainage & Embankment	10%	$191,146.22
SUB-TOTAL		$2,102,608.44
Contingency	15%	$286,719.33
SUB-TOTAL		$2,389,327.77
PROJECT GRAND TOTAL		**$2,389,327.77**

NOTES: Costs based on FDOT Historical Cost table (March 1, 2018 thur February 28, 2018)

ENGINEER'S ESTIMATE

FLORIDA DEPARTMENT OF TRANSPORTATION DISTRICT 1

FINANCIAL PROJECT ID:	
FILE VERSION:	EE_04/19
PAGE NUMBER:	

200-Roadway

PAY ITEM #	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
0104 18	INLET PROTECTION SYSTEM	EA	3.00	$ 115.80	$ 347.40
0107 1	LITTER REMOVAL	AC	10.68	$ 12.51	$ 133.54
0107 2	MOWING	AC	2.13	$ 19.55	$ 41.72
0110 1 1	CLEARING & GRUBBING	AC	3.07	$ 11,821.78	$ 36,292.86
0110 86	DELIVERY OF SALVAGEABLE MATERIAL TO FDOT	LS	1.00	$ 2,683.83	$ 2,683.83
0110 4 10	REMOVAL OF EXISTING CONCRETE PAVEMENT	SY	2243.39	$ 13.88	$ 31,138.24
0160 4	TYPE B STABILIZATION	SY	9907.40	$ 3.51	$ 34,774.97
0285709	OPTIONAL BASE, BASE GROUP 09	SY	9907.40	$ 16.16	$ 160,103.58
0327 70 5	MILLING EXIST ASPH PAVT, 2" AVG DEPTH	SY	25462.80	$ 2.49	$ 63,402.37
0334 1 13	SUPERPAVE ASPHALTIC CONC, TRAFFIC C	TN	544.95	$ 93.04	$ 50,702.15
0337 7 83	ASPHALT CONCRETE FRICTION COURSE,TRAFFIC C, FC-12.5,	TN	817.39	$ 111.54	$ 91,171.68
0425 5	MANHOLE, ADJUST	EA	4.00	$ 1,070.81	$ 4,283.24
0425 6	VALVE BOXES, ADJUST	EA	14.00	$ 751.52	$ 10,521.28
0520 1 10	CONCRETE CURB & GUTTER, TYPE F	LF	24367.90	$ 19.96	$ 486,383.28
0520 5 41	TRAFFIC SEPARATOR CONCRETE- TYPE IV, 4' WIDE	LF	1397.30	$ 39.67	$ 55,430.89
0520 70	CONCRETE TRAFFIC SEPARATOR, SPECIAL- VARIABLE WIDTH	SY	337.30	$ 54.28	$ 18,308.64
0522 2	SIDEWALK CONCRETE, 6" THICK	SY	1395.50	$ 55.59	$ 77,575.85
0527 2	DETECTABLE WARNINGS	SF	66.00	$ 26.85	$ 1,772.10
0570 1 2	PERFORMANCE TURF, SOD	SY	8219.30	$ 2.93	$ 24,082.55
200-Roadway		**COMPONENT TOTAL**			**$ 1,149,150.19**

ENGINEER'S ESTIMATE

FLORIDA DEPARTMENT OF TRANSPORTATION DISTRICT 1

FINANCIAL PROJECT ID:	
FILE VERSION:	EE_04/19
PAGE NUMBER:	

300-Signing & Pavement Markings

PAY ITEM #	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
0700 5 21	INTERNALLY ILLUMINATED SIGN, FURNISH & INSTALL OVERHEAD MOUNT, UP TO 12 SF	EA	4.00	$3,022.60	$12,090.40
0706 3	RETRO-REFLECTIVE PAVEMENT MARKERS	EA	328.00	$3.58	$1,174.24
0710 11101	PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, SOLID, 6"	GM	2.78	$1,020.95	$2,839.67
0710 11124	PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, SOLID, 18"	LF	41.2	$0.98	$40.38
0710 11125	PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, SOLID, 24"	LF	337	$1.50	$505.50
0710 11131	PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, SKIP, 6",	GM	1.06	$427.19	$451.20
0710 11141	PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, DOTTED / 6" (2/4)	GM	0.481	$584.04	$280.92
0710 11141	PAINTED PAVEMENT MARKINGS, STANDARD, WHITE, DOTTED / 6" (2/4)	GM	0.015	$584.04	$8.76
0710 11201	PAINTED PAVEMENT MARKINGS, STANDARD, YELLOW, SOLID, 6"	GM	1.27	$974.96	$1,234.30
0710 11224	PAINTED PAVEMENT MARKINGS, STANDARD, YELLOW, SOLID, 18"	LF	28	$1.04	$29.12
0710 11290	PAINTED PAVEMENT MARKINGS, STANDARD, YELLOW, ISLAND	SF	111.4	$2.93	$326.40
0711 11124	THERMOPLASTIC, STANDARD, WHITE, SOLID, 18"	LF	42.1	$3.33	$140.19
0711 11125	THERMOPLASTIC, STANDARD, WHITE, SOLID, 24"	LF	337	$4.91	$1,654.67
0711 11141	THERMOPLASTIC, STANDARD, WHITE, DOTTED / 6" (2/4)	GM	0.481	$2,130.09	$1,024.57
0711 11141B	THERMOPLASTIC, STANDARD, WHITE, DOTTED / 6" (6/10)	GM	0.015	$2,130.09	$31.95
0711 11224	THERMOPLASTIC, STANDARD, YELLOW, SOLID, 18"	LF	28	$3.21	$89.88
0711 14123	THERMOPLASTIC, PREFORMED, WHITE, SOLID, 12"	LF	854.3	$8.77	$7,492.21
0711 14125	THERMOPLASTIC, PREFORMED, WHITE, SOLID, 24"	LF	711.8	$16.03	$11,410.15
0711 14160	THERMOPLASTIC, PREFORMED, WHITE, MESSAGE	EA	26	$226.77	$5,896.02
0711 14170	THERMOPLASTIC, PREFORMED, WHITE, ARROWS	EA	83	$129.30	$10,731.90
0711 16101	THERMOPLASTIC, STANDARD, OTHER, WHITE, SOLID, 6"	GM	2.78	$4,172.05	$11,604.14
0711 16131	THERMOPLASTIC, STANDARD, OTHER, WHITE, SKIP, 6" (10/30)	GM	1.06	$5,754.90	$6,078.33
0711 16201	THERMOPLASTIC, STANDARD, OTHER, YELLOW, SOLID, 6"	GM	1.27	$4,162.11	$5,269.23
300-Signing & Pavement Markings		**COMPONENT TOTAL**			**$80,404.14**

ENGINEER'S ESTIMATE

FLORIDA DEPARTMENT OF TRANSPORTATION DISTRICT 7

FINANCIAL PROJECT ID:	
FILE VERSION:	EE_04/19
PAGE NUMBER:	

400-Lighting

PAY ITEM #	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
0630 2 11	CONDUIT, FURNISH & INSTALL, OPEN TRENCH	LF	400	$7.41	$2,964.00
0630 2 12	CONDUIT, FURNISH & INSTALL, DIRECTIONAL BORE	LF	400	$20.30	$8,120.00
0635 2 11	PULL & JUNCTION BOXES, F&I, PULL BOX	EA	6	$652.70	$3,916.20
0715 1 12	LIGHTING CONDUCTORS, F&I, INSULATED, NO.8 - 6	AC	5000	$1.37	$6,850.00
0715 1 60	LIGHTING CONDUCTORS, REMOVE & DISPOSE, CONTRACTOR	LF	5000	$0.35	$1,750.00
0715 4400	LIGHT POLE COMPLETE, RELOCATE	EA	4	$6,455.65	$25,822.60
0715500 1	POLE CABLE DISTRIBUTION SYSTEM, CONVENTIONAL	EA	4	$503.50	$2,014.00
400-Lighting		**COMPONENT TOTAL**			**$51,436.80**

ENGINEER'S ESTIMATE

FLORIDA DEPARTMENT OF TRANSPORTATION DISTRICT 7

FINANCIAL PROJECT ID:	
FILE VERSION:	EE_04/19
PAGE NUMBER:	

500-Signalization

PAY ITEM #	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
0630 2 11	CONDUIT, FURNISH & INSTALL, OPEN TRENCH	LF	160	$6.77	$1,083.20
0630 2 12	CONDUIT, FURNISH & INSTALL, DIRECTIONAL BORE	LF	1515	$18.60	$28,179.00
0632 7 1	CABLE, SIGNAL, FURNISH & INSTALL	PI	1	$5,220.00	$5,220.00
0635 2 11	PULL & JUNCTION BOXES, F&I, PULL BOX	EA	10	$678.20	$6,782.00
0639 1 111	SIGNALS, ELECTRICAL POWER SERVICE, OVERHEAD,	AS	1	$6,920.00	$6,920.00
0639 2 1	SIGNALS, ELECTRICAL SERVICE WIRE	LF	500	$6.54	$3,270.00
0639 3 11	SIGNALS, ELECTRICAL SERVICE DISCONNECT, F&I,	EA	1	$1,031.38	$1,031.38
0641 2 12	PRESTRESSED CONCRETE POLE, F&I, TYPE P-II SERVICE POLE	EA	1	$1,398.49	$1,398.49
0646 1 11	ALUMINUM SIGNALS POLE, PEDESTAL	EA	8	$1,299.14	$10,393.12
0649 21 15	MAST ARM,F&I, WIND SPEED-150,SINGLE ARM,W/0 LUMINAIRE-70	EA	3	$45,537.60	$136,612.80
0649 21 21	MAST ARM,F&I, WIND SPEED-150,SINGLE ARM,W/0 LUMINAIRE-78	EA	1	$49,877.53	$49,877.53
0650 1 14	TRAFFIC SIGNAL, F&I, 3 SECTION, 1 WAY, STANDARD	AS	12	$911.27	$10,935.24
0653111	SIGNAL PEDESTRIAN, 12 INCH, INCANDESCENT, 1 WAY	AS	8	$640.65	$5,125.20
0660 1105	LOOP DETECTOR, INDUCTIVE, F&I, TYPE 5, 2CHANNEL, SOLID	EA	1	$270.00	$270.00
0660 2101	LOOP ASSEMBLY- F&I, TYPE A	AS	6	$842.35	$5,054.10
0660 2106	LOOP ASSEMBLY, F&I, TYPE F	AS	8	$867.00	$6,936.00
0665111	PEDESTRIAN DETECTOR- ACCESSIBLE, F&I, POLE OR CONTROLLER	EA	8	$225.63	$1,805.04
0670 5112	TRAFFIC CONTROLLER ASSEMBLY, F&I, NEMA, 2 PREEMPTION	AS	1	$31,000.95	$31,000.95
500-Signalization		**COMPONENT TOTAL**			**$311,894.05**

ROW Cost

Summary of Right-of-ay Cost per parcel

Option 4.3, Intersection Improvement			
	Parcel ID	Price $/Sq. ft.	ROW Cost
0410010031 - 6.50	410010031	$ 6.50	$ 3,538.86
0410010040 - 7.00	410010040	$ 7.00	$ 14,549.50
0412040002 - 20.00	412040002	$ 20.00	$ 27,889.20
*	412050013	$ -	$ -
0412050005 – 34.00	412050005	$ 34.00	$ 46,097.54
Total ROW Cost			**$ 92,075.10**

**Parcel not provided*

Option 4.3, Intersection Improvement at Venice Avenue and Pinebrook Road								
Reference Conceptual Plan Sheet	R/W Impact (SF)	Parcel ID	Price/Sq. ft.	R/W Cost	Location	Type	Road	Comment
Sheet 1				$ -		Commercial	Venice	No anticipated impacts
				$ -		Residential	Venice	No anticipated impacts
Sheet 1 Subtotal	0.00			$ -		Commercial		
	0.00			$ -		Residential		
Sheet 2				$ -		Commercial	Venice	No anticipated impacts
				$ -		Residential	Venice	No anticipated impacts
Sheet 2 Subtotal	0.00			$ -		Commercial		
	0.00			$ -		Residential		
Sheet 3	544.44	410010031	6.50	3,538.86	SW Quadrant	Residential	Pinebrook & Venice	
	2,078.50	410010040	7.00	14,549.50	NW Quadrant	Commercial	Pinebrook & Venice	Includes ROW impact in Sheet 7
	1,394.46	412040002	$ 20.00	27,889.20	NE Quadrant	Commercial	Pinebrook & Venice	Includes ROW impact in Sheet 7
					SE Quadrant	Commercial	Pinebrook & Venice	No anticipated impacts
Sheet 3 Subtotal	3,472.96			$42,438.70		Commercial		
	544.44			$ 3,538.86		Residential		
Sheet 4	-			$ -		Commercial	Venice	No anticipated impacts
	-			$ -		Residential	Venice	No anticipated impacts
Sheet 4 Subtotal	0.00			$ -		Commercial		
	0.00			$ -		Residential		
Sheet 5				$ -		Commercial	Pinebrook	No anticipated impacts
				$ -		Residential	Pinebrook	No anticipated impacts
Sheet 5 Subtotal	0.00			$ -		Commercial		
	0.00			$ -		Residential		
Sheet 6	1,355.81	412050005	$ 34.00	$46,097.54	NE Quadrant	Commercial	Pinebrook & Venice Commons	
		412050013		$ -	SE Quadrant	Commercial	Pinebrook & Venice Commons	Price not available
Sheet 6 Subtotal	1,355.81			$46,097.54		Commercial		
	0.00			$ -		Residential		
Sheet 7		410010040	$ 7.00	$ -	W	Commercial	Pinebrook south of Ridegewood	Included in Sheet 3 ROW impact
		412040002	$ 20.00	$ -	E	Commercial	Pinebrook south of Ridegewood	Included in Sheet 3 ROW impact
Sheet 7 Subtotal	0.00			$ -		Commercial		
	0.00			$ -		Residential		
Total	**5,373.21**			**92,075.10**				

Attachment C
Conceptual Plan Sheets

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

TINDALE OLIVER
1000 NORTH ASHLEY DRIVE, SUITE 400
TAMPA, FLORIDA 33602
813-224-8862
MAURICIO MICOLTA, P.E., 73046

SARASOTA COUNTY

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
NA	SARASOTA	NA

INTERSECTION IMPROVEMENTS
SHEET 1 OF 7

SHEET NO.
C - 2
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REVISIONS			
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NA	SARASOTA	NA

INTERSECTION IMPROVEMENTS (WITH RIGHT OF WAY IMPACTS) SHEET 1 OF 7

SHEET NO.
C - 3
1

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INTERSECTION IMPROVEMENTS
SHEET 2 OF 7

SHEET NO. C - 4 2

REVISIONS			
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SARASOTA COUNTY

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
NA	SARASOTA	NA

INTERSECTION IMPROVEMENTS (WITH RIGHT OF WAY IMPACTS) SHEET 2 OF 7

SHEET NO. C-5 2

MATCHLINE SEE SHEET 7

RIGHT OF WAY
4' MEDIAN
RIGHT OF WAY
5' BIKE LANE
ONLY
11'
11'
11'
11'
11'
11'
PINEBROOK ROAD
EXISTING SIDEWALK TO REMAIN
RIGHT OF WAY
PROPOSED 6' SIDEWALK
MERGE
PROPOSED 6' SIDEWALK
EXISTING SIDEWALK TO REMAIN
RIGHT OF WAY
5' BIKE LANE WITH 2' BUFFER (TYP)
VENICE AVENUE
4' MEDIAN (TYPE IV)
12'
12'
12'
12'
11'
12'
12'
12'
12'
12'
12'
12'
5' BIKE LANE WITH 2' BUFFER (TYP)
4' MEDIAN (TYPE IV)
℄ CONSTRUCTION
5' BIKE LANE WITH 2' BUFFER (TYP)
PROPOSED 5' SIDEWALK
83.64°
96.36°
96.36°
83.64°
RIGHT OF WAY
EXISTING SIDEWALK TO REMAIN
℄ CONSTRUCTION (VENICE AVE)
STATION 137+97.20
℄ CONSTRUCTION (PINEBROOK RD)
STATION 24+00.14
EXISTING SIDEWALK TO REMAIN
RIGHT OF WAY
PROPOSED 6' SIDEWALK
11'
11'
11'
11'
11'
11'
5' BIKE LANE
5' BIKE LANE
4' MEDIAN
PINEBROOK ROAD
RIGHT OF WAY
RIGHT OF WAY
0 10 40
Feet
N

MATCHLINE SEE SHEET 2

MATCHLINE SEE SHEET 4

MATCHLINE SEE SHEET 6

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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SARASOTA COUNTY

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
NA	SARASOTA	NA

INTERSECTION IMPROVEMENTS
SHEET 3 OF 7

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C - 6
3

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MATCHLINE SEE SHEET 7

RIGHT OF WAY
4' MEDIAN
RIGHT OF WAY
ONLY
11'
11'
11'
11'
11'
11'
PINEBROOK ROAD
1355.81 SF PARCEL IMPACT
EXISTING SIDEWALK TO REMAIN
PROPOSED 6' SIDEWALK
MERGE
PROPOSED 6' SIDEWALK
EXISTING SIDEWALK TO REMAIN
RIGHT OF WAY
RIGHT OF WAY
5' BIKE LANE WITH 2' BUFFER (TYP)
VENICE AVENUE
12'
12'
12'
12'
12'
12'
12'
12'
5' BIKE LANE WITH 2' BUFFER (TYP)
4' MEDIAN (TYPE IV)
11'
12'
83.64°
96.36°
96.36°
83.64°
12'
12'
11'
℄ CONSTRUCTION
4' MEDIAN (TYPE IV)
5' BIKE LANE WITH 2' BUFFER (TYP)
12'
12'
PROPOSED 5' SIDEWALK
RIGHT OF WAY
EXISTING SIDEWALK TO REMAIN
℄ CONSTRUCTION (VENICE AVE) STATION 137+97.20
℄ CONSTRUCTION (PINEBROOK RD) STATION 24+00.14
554.44 SF PARCEL IMPACT
PROPOSED 6' SIDEWALK
EXISTING SIDEWALK TO REMAIN
RIGHT OF WAY
11'
11'
11'
11'
11'
11'
5' BIKE LANE
5' BIKE LANE
4' MEDIAN
PINEBROOK ROAD
RIGHT OF WAY
RIGHT OF WAY
NOTES:
R/W IMPACTS
0 10 40
Feet
N

MATCHLINE SEE SHEET 2

MATCHLINE SEE SHEET 4

MATCHLINE SEE SHEET 6

REVISIONS			
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NA	SARASOTA	NA

INTERSECTION IMPROVEMENTS (WITH RIGHT OF WAY IMPACTS) SHEET 3 OF 7

SHEET NO.
C - 7
3

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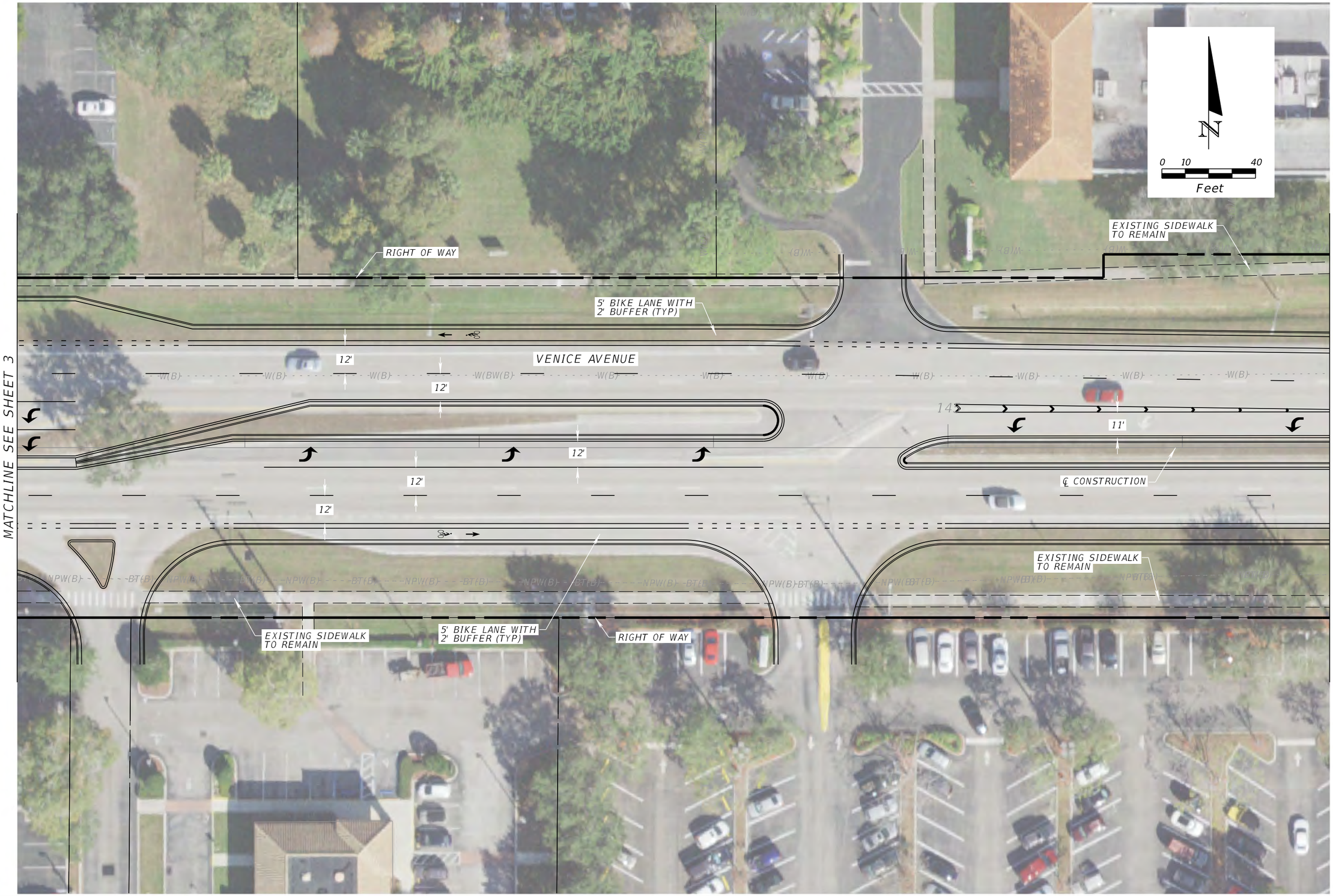

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NA	SARASOTA	NA

INTERSECTION IMPROVEMENTS
SHEET 4 OF 7

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4

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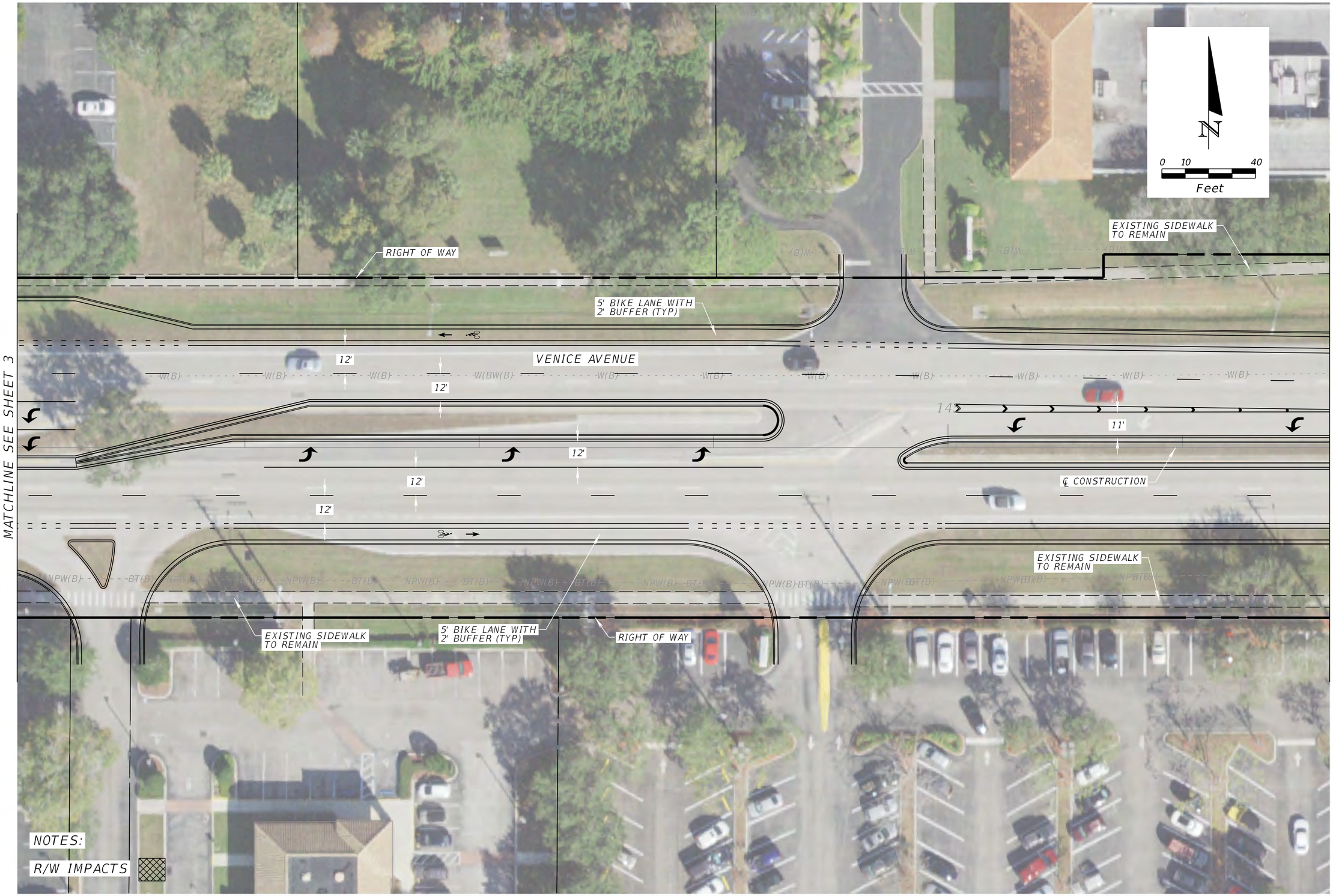

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INTERSECTION IMPROVEMENTS (WITH RIGHT OF WAY IMPACTS) SHEET 4 OF 7

SHEET NO.
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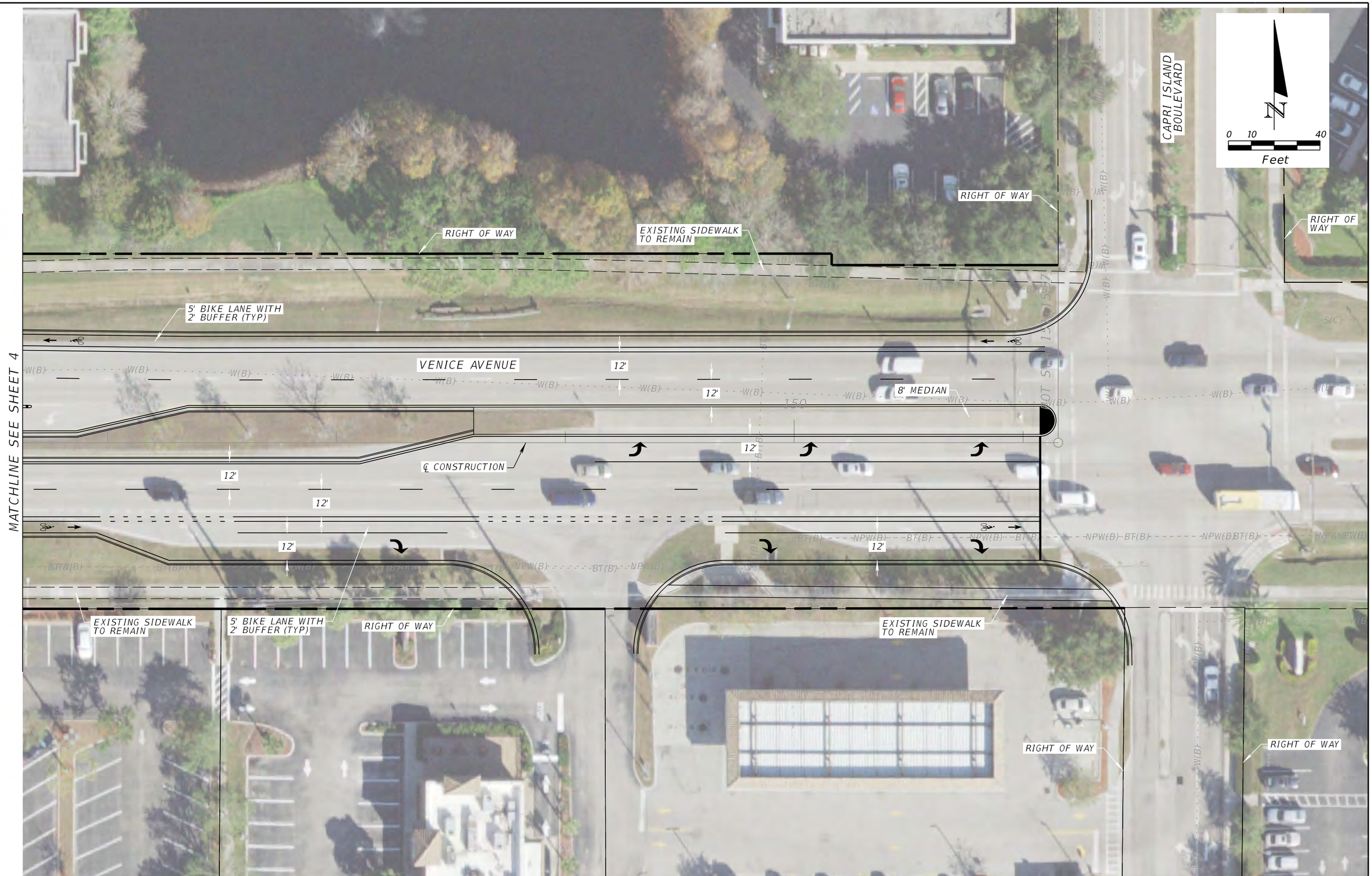

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SARASOTA COUNTY

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NA	SARASOTA	NA

INTERSECTION IMPROVEMENTS
SHEET 5 OF 7

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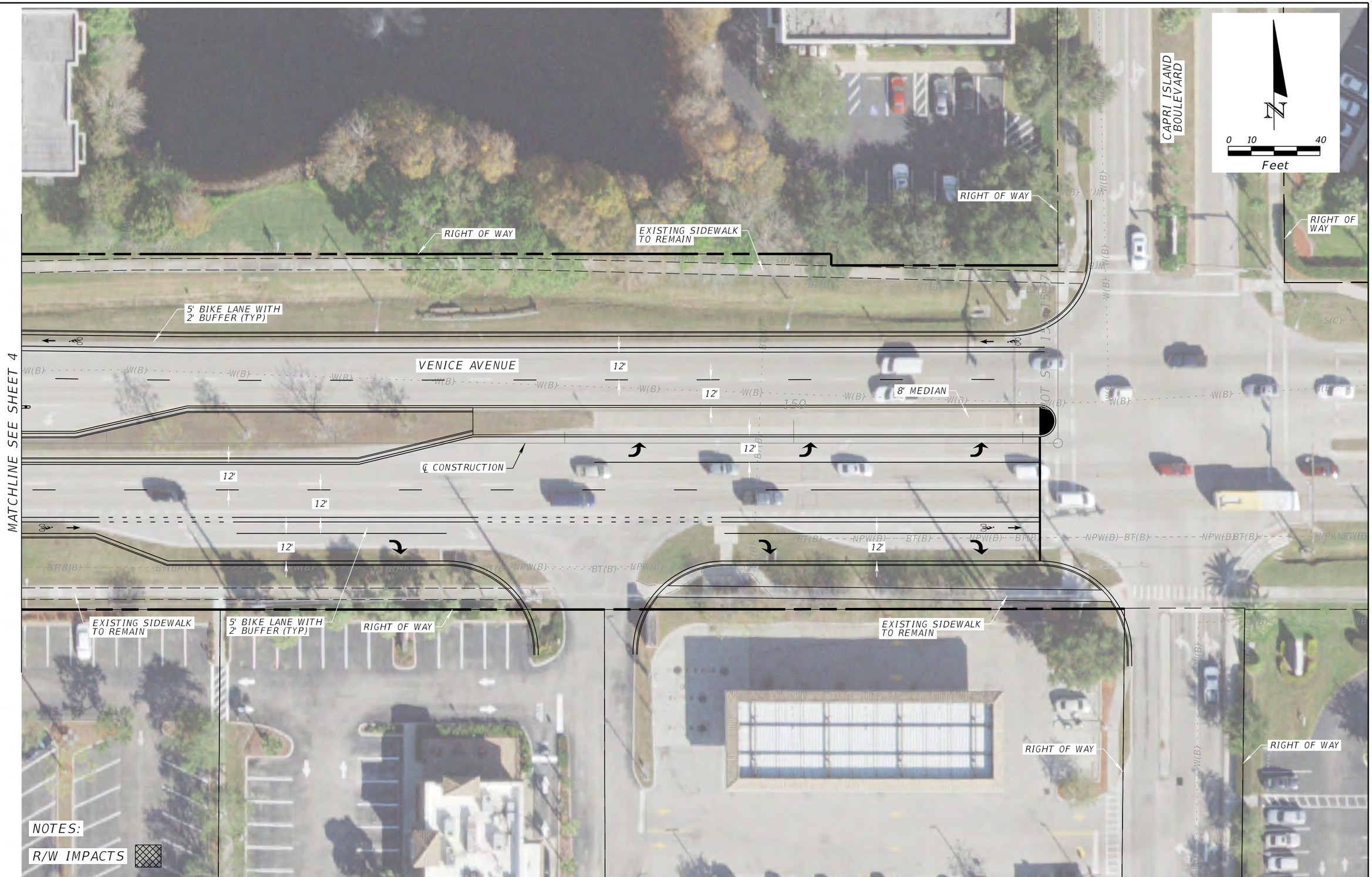

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SARASOTA COUNTY

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INTERSECTION IMPROVEMENTS (WITH RIGHT OF WAY IMPACTS) SHEET 5 OF 7

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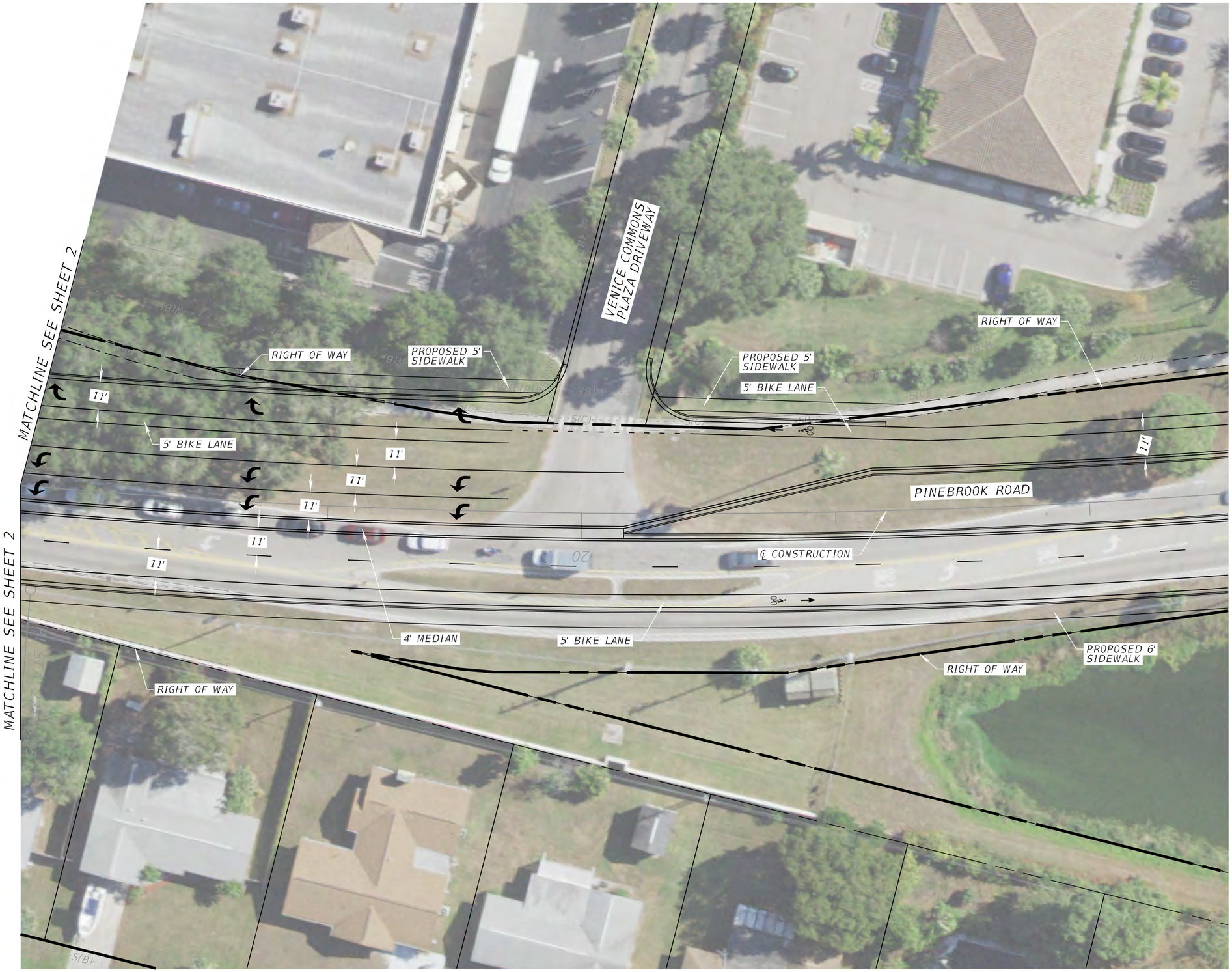

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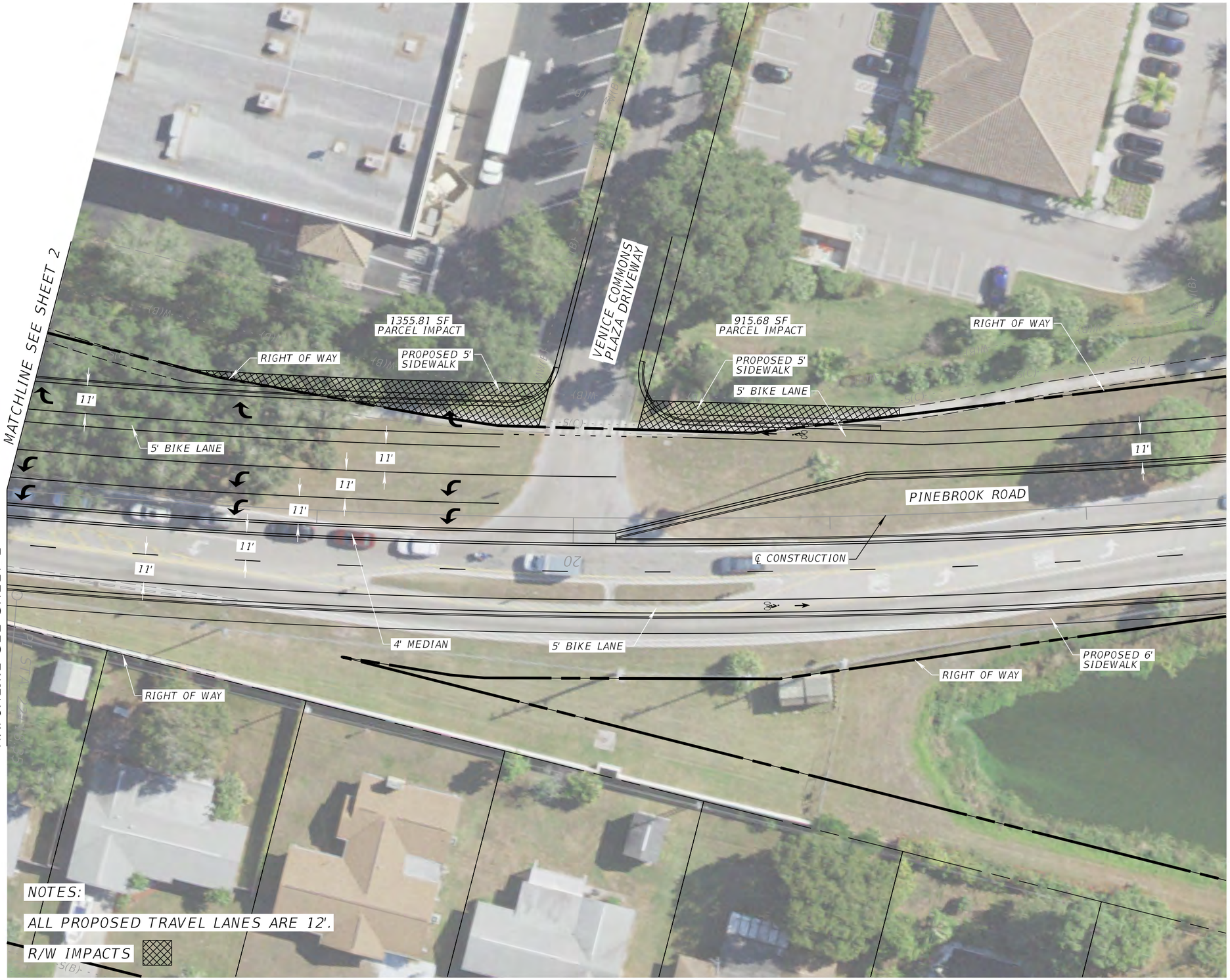
INTERSECTION IMPROVEMENTS
SHEET 6 OF 7

SHEET NO. C - 12 6



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INTERSECTION IMPROVEMENTS (WITH RIGHT OF WAY IMPACTS) SHEET 6 OF 7

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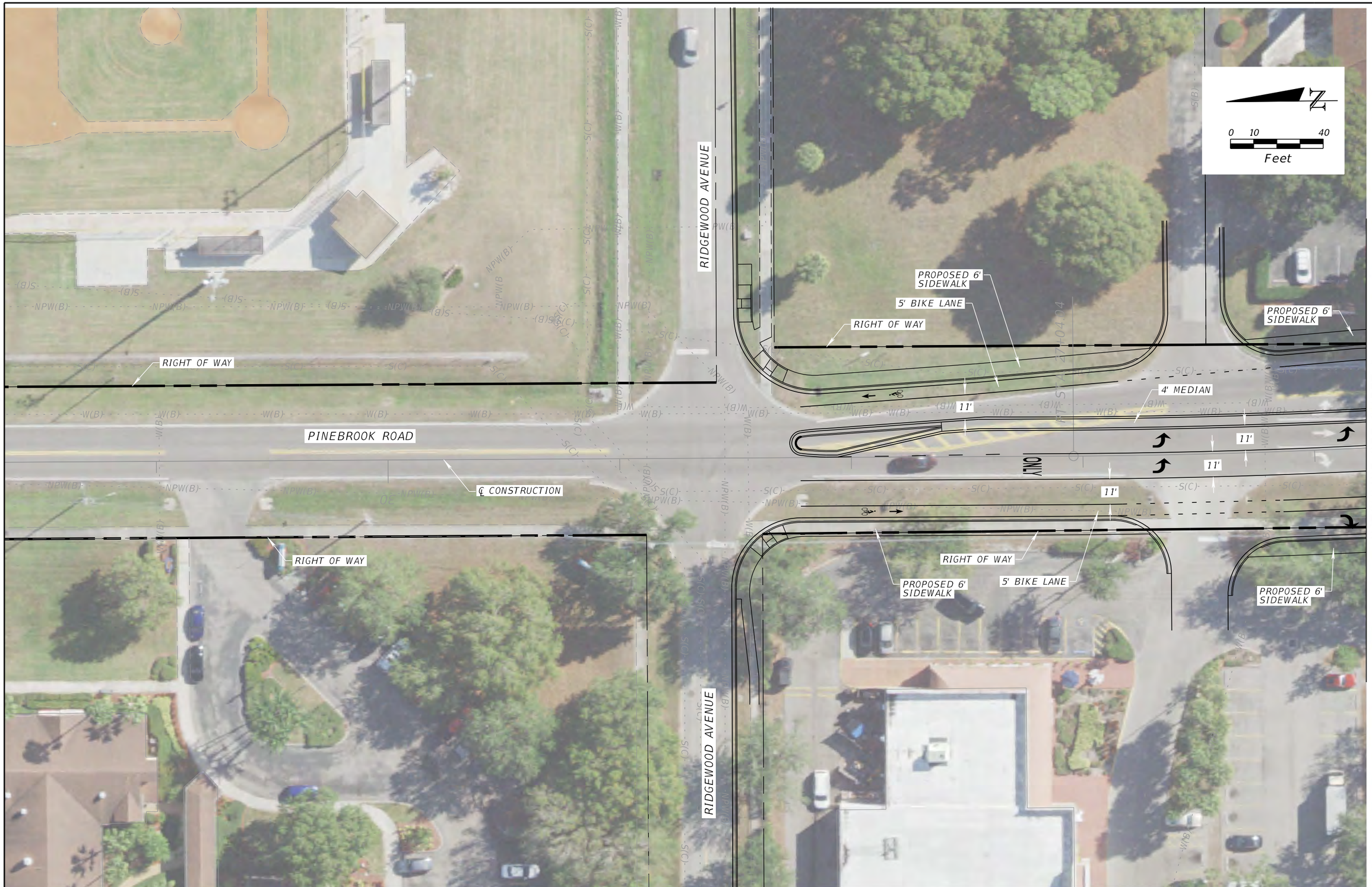

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SARASOTA COUNTY

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
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INTERSECTION IMPROVEMENTS
SHEET 7 OF 7

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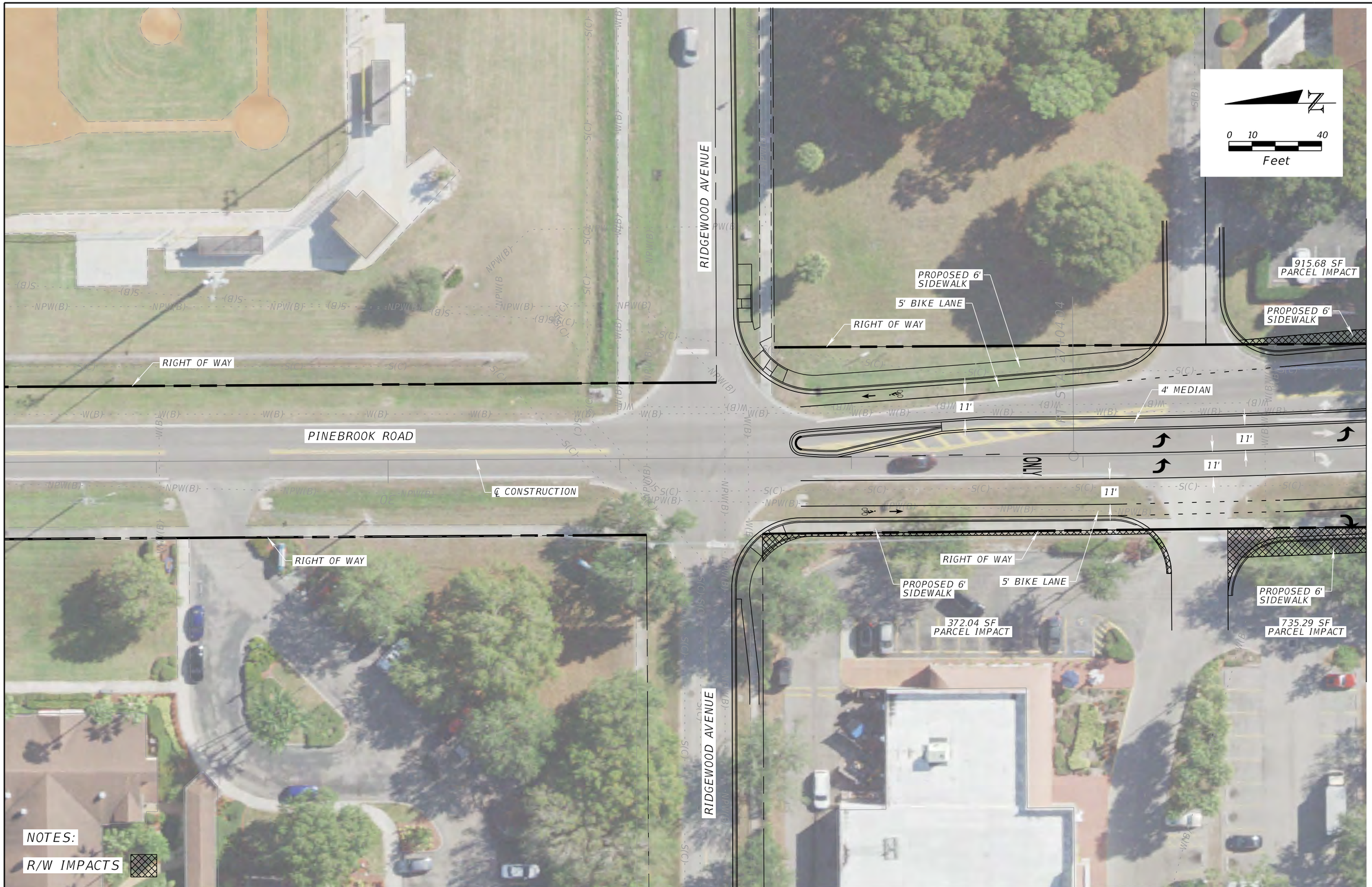

REVISIONS			
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NA	SARASOTA	NA

INTERSECTION IMPROVEMENTS (WITH RIGHT OF WAY IMPACTS) SHEET 7 OF 7

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7

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