Roberts Road Improvement Study

ST. JOHNS COUNTY FLORIDA

FINAL REPORT

ST. JOHNS COUNTY PUBLIC WORKS DEPARTMENT
ENGINEERING DIVISION

FEBRUARY - 2013

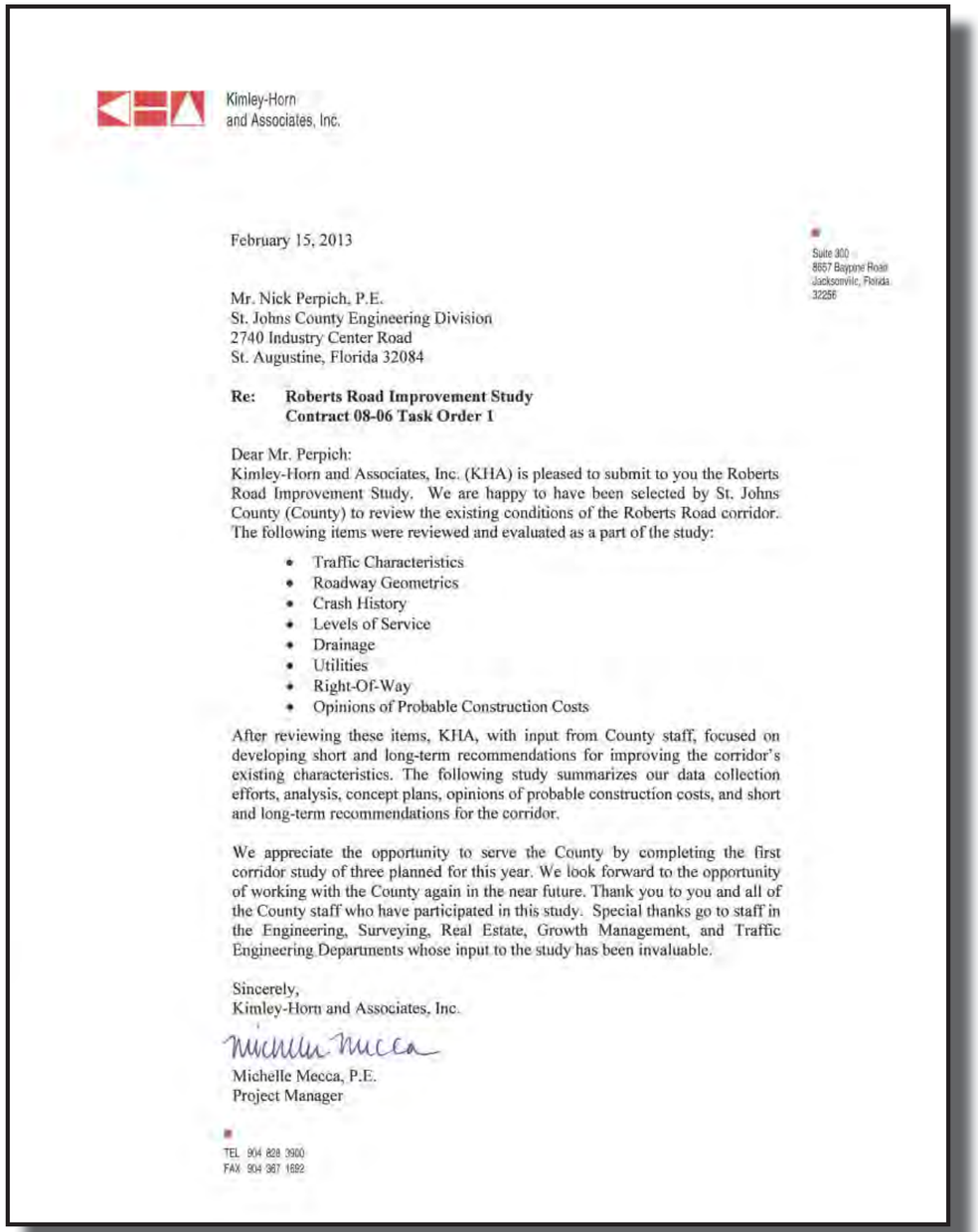
Kimley-Horn and Associates, Inc.

Contract 08-06 Task Order 1

51330076.08

Table of Contents:

Introduction	2
Study Methodology	2
Data Collection	2
Existing Conditions	2
Observations	3
Safety Analysis	4
Traffic Analysis	9
Geometry	11
Drainage	11
Existing Conditions / Crash Summary	12-45
Concept Development	46
Concept Plans	48-115
Concept Plans - Potential Pond Sites	116-119
Opinion of Probable Project Cost	120
Right-of-Way Summary	121
Benefit-Cost Analysis	121
Recommendations	121
Short-Term and Long-Term Recommendations	121
Public Involvement	122



Kimley-Horn
and Associates, Inc.

February 15, 2013

Suite 300
8667 Baymeadows Road
Jacksonville, Florida
32256

Mr. Nick Perpich, P.E.
St. Johns County Engineering Division
2740 Industry Center Road
St. Augustine, Florida 32084

Re: Roberts Road Improvement Study
Contract 08-06 Task Order 1

Dear Mr. Perpich:
Kimley-Horn and Associates, Inc. (KHA) is pleased to submit to you the Roberts Road Improvement Study. We are happy to have been selected by St. Johns County (County) to review the existing conditions of the Roberts Road corridor. The following items were reviewed and evaluated as a part of the study:

- Traffic Characteristics
- Roadway Geometrics
- Crash History
- Levels of Service
- Drainage
- Utilities
- Right-Of-Way
- Opinions of Probable Construction Costs

After reviewing these items, KHA, with input from County staff, focused on developing short and long-term recommendations for improving the corridor's existing characteristics. The following study summarizes our data collection efforts, analysis, concept plans, opinions of probable construction costs, and short and long-term recommendations for the corridor.

We appreciate the opportunity to serve the County by completing the first corridor study of three planned for this year. We look forward to the opportunity of working with the County again in the near future. Thank you to you and all of the County staff who have participated in this study. Special thanks go to staff in the Engineering, Surveying, Real Estate, Growth Management, and Traffic Engineering Departments whose input to the study has been invaluable.

Sincerely,
Kimley-Horn and Associates, Inc.

Michelle Mecca

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Project Manager

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Safety & Traffic Analysis

INTRODUCTION

St. Johns County retained Kimley-Horn and Associates, Inc. to perform an Improvement Study of Roberts Road in northwest St. Johns County, Florida. The study limits include a collector segment of Roberts Road from Longleaf Pine Parkway to SR 13. The collector segment includes the analysis of two signalized intersections at each end of the study segment and twelve unsignalized intersections.

The purpose of this study is to evaluate safety, operational and geometric deficiencies, and recommend improvements for the study intersections and the collector as a whole. The primary goal of these improvements is to increase the safety while also improving the operational and geometric characteristics of the corridor. This assessment is based on peak hour turning movement counts, three years of crash data, observations made during field reviews, field data collection, and drainage data. Recommendations will be made for short-term and long-term improvements with estimated construction costs.

STUDY METHODOLOGY

The procedure for the study was based upon the following tasks:

- **Data Collection** – Turning movement counts were performed at the two signalized intersections and eight of the twelve unsignalized intersections within the corridor. The remaining four unsignalized intersections that were not counted are those that already have existing turn lanes and were determined to be minor generators. The counts captured the morning and evening peak periods. The Cunningham Creek Elementary School intersection was also counted during the afternoon peak to coincide with the school's dismissal. Existing signal timing plans were obtained from St. Johns County Traffic Engineering.
- **Field Inventory** – A field review was conducted to determine the existing conditions of the intersections and roadway alignment. A Smart Level was used to obtain approximate grades along the roadway and measurements were made to document existing drainage features, etc. Photographs were taken to document the existing conditions.
- **Qualitative Assessment** – A professional engineer visited the intersections and environs to observe the operations during peak traffic demand periods and to assess existing geometric features and traffic characteristics. Morning and evening weekday peak hour observations were conducted along with the afternoon peak at the school driveway.
- **Crash Analysis** – Crash reports were reviewed and collision diagrams and crash tables were prepared based upon the most recent three complete years of crash data obtained from St. John's County.
- **Future Planned Roadway Improvements** – Research was conducted to determine if any future roadway improvements are planned or programmed for the study area. It was also researched to determine if there were any existing approved single family lots that were not yet constructed along the study segment.
- **Capacity Analysis** – Capacity analyses were prepared for the existing conditions at the signalized and unsignalized intersections during the morning, afternoon, and evening peak periods.
- **Evaluation of Alternatives** – Alternatives for improvements were developed and analyzed utilizing the information gathered in the previous tasks.
- **Recommendation of Improvements** – Recommendations for safety and operational improvements were developed. The improvements focused upon crash reduction, safety, traffic operations, and roadway geometrics.
- **Documentation** – The results are documented in this report.

DATA COLLECTION

Four-hour turning movement counts were performed on Tuesday, May 8th and Thursday, May 10th, 2012 at the two signalized intersections and eight unsignalized intersections within the study area including Greenfield Drive, Cunningham Creek Elementary School, Tiger Creek Parkway, Greenridge Circle East/Ivy Lake Drive, Mallard Landing Boulevard, Highland Forest Drive, Mallard Lake Avenue/Beluthahatchee Road, and Duck Blind Drive. The turning movement counts were conducted from 8:00 AM to 10:00 AM and 5:15 PM to 7:15 PM. The morning peak hour was determined to be 8:00 AM to 9:00 AM and the evening peak hour was determined to be 5:15 PM to 6:15 PM.

In addition to the traffic counts collected by the Consultant, St. Johns County provided the following data for use in the study:

a. Crash data for prior three years

b. Roberts Road segment traffic counts

c. Inventory of County maintained equipment within the study area

d. Current and Future Land Use data and maps for corridor

e. Approved development plans and agreements for property along the study corridor

f. Proposed transportation improvements within the study area

g. Documentation of any reported problem areas within the study area

h. Roadway and Utility As-builts

i. St. Johns County Drainage Basin Study

j. Floodplain and hydrological data obtained from the County's Northwest Regional Stormwater Model

k. Survey data consisting of cross-sections taken at intervals of 1,000 feet along the corridor

l. County's GIS Topographic data

The Consultant also conducted a field inventory within the study area on Thursday, August 2, 2012, and Friday, August 3, 2012. The field inventory data collected is further described in the Existing Conditions section below.

EXISTING CONDITIONS

A field inventory was performed for the study corridor on Thursday, August 2nd and Friday, August 3rd, 2012. Roberts Road is classified by St. Johns County as a two-lane urban collector oriented in the northwest-southeast direction with a posted speed limit of 35 mph (please refer to St. Johns County Transporation

Analysis Spreadsheet, dated July 1, 2012). For the purposes of this study, it will be referred to as a north-south oriented roadway. Roberts Road connects many northwest St. Johns County residential areas with SR 13 as a local traffic route leading to I-295 approximately 6.5 miles to the north. Longleaf Pine Parkway and SR 13 are the southern and northern limits of Roberts Road, respectively, and are both signalized intersections. The study also includes twelve unsignalized intersections between Longleaf Pine Parkway and SR 13: Bedstone Drive, Greenfield Drive, Cunningham Creek Elementary School, Tiger Creek Parkway, Southcreek Drive/Village Green Avenue, Greenridge Circle East/ Ivy Lake Drive, Lige Branch Lane, Greenridge Circle West, Mallard Landing Boulevard, Highland Forest Drive, Mallard Lake Avenue/Beluthahatchee Road, and Duck Blind Drive.

The area surrounding the study corridor is predominantly developed with residential subdivisions. There is an elementary school (Cunningham Creek Elementary School) within the study limits and a high school (Bartram Trail High School) outside of the study limits to the south on Longleaf Pine Parkway. There is a continuous five-foot sidewalk along both sides of the road from Longleaf Pine Parkway to approximately 500 feet north of the intersection, along the west side of the road along the frontage of the Mill Creek Landing subdivision near Bedstone Drive, and along the east side of the road from approximately 500 feet south of Greenfield Drive to SR 13.

Observations

A professional engineer observed the operation of the study intersections during the AM, afternoon, and PM peak hours on Tuesday, May 9; Friday, June 1; and Tuesday, June 5, 2012. The following observations were noted:

AM Peak Hour Observations

- School buses were observed throughout the corridor. Once Cunningham Creek Elementary School bus drop-off was completed, the school buses continued along the corridor picking up students for Bartram Trail High School.
- Two crossing guards arrive at the intersection of Roberts Road and Tiger Creek Parkway at 8 AM to direct pedestrian traffic across Tiger Creek Parkway. A Public Service Assistant (PSA) Officer arrives at the Roberts Road school entrance driveway at 8 AM.
- The southbound left-turn lane into the school driveway filled the queue several times prior to school starting. At 8:10 AM the queue extended back through Tiger Creek Parkway and then cleared.
- There was one last peak of parent drop offs at 8:26 AM just before school started.
- Two school buses were observed pulling off Roberts Road north of Tiger Creek Parkway on the east side of the road. This observation was after drop off at Cunningham Creek Elementary School and before beginning their Bartram Trail High School pick-ups.
- The crossing guards and PSA Officer left at 8:30 AM.
- Bartram Trail High School students were observed waiting for the bus at many of the subdivision intersections with Roberts Road after 8:30 AM.
- The northbound right from Roberts Road onto SR 13 was heavy during the AM peak hour. Many cars were observed making a right turn on red.
- The southbound right turn from Roberts Road onto Longleaf Pine Parkway was the primary movement during the AM peak hour at this intersection.

Afternoon Peak Hour Observations

- No operational deficiencies were observed along the corridor in the afternoon peak hour except in the area of the Cunningham Creek Elementary School entrance.
- Two crossing guards arrive at the intersection of Roberts Road and Tiger Creek Parkway at approximately 2:30 PM to direct pedestrian traffic across Tiger Creek Parkway. A PSA Officer arrives at the Roberts Road school entrance driveway at approximately 2:30 PM.
- Parents began queing in their vehicles for pick up at Cunningham Creek Elementary School as early as thirty minutes prior to classes letting out.
- Upon classes letting out the school buses were loaded first and allowed to exit the elementary school driveway prior to students being loaded in automobiles.
- Heavy pedestrian and bicycle traffic was observed using the Tiger Creek Parkway intersection crosswalk.
- No student pick-up was allowed by vehicle from Tiger Creek Parkway.
- Upon dismissal of students (at approximately 2:50 PM) the southbound left turn into the school driveway exceeded the existing turn lane's storage distance. The queue of waiting vehicles extended north of Tiger Creek Parkway, thereby blocking the Tiger Creek Parkway intersection causing excessive delay for vehicles turning left to travel southbound on Roberts Road.
- At approximately 3:15 PM the queue of southbound left turn vehicles at the school's driveway were back within the turn lane's existing storage distance.
- Upon dismissal of students the northbound right turn into the school driveway exceeded the existing turn lane's storage distance. Once the turn lane length was exceeded, drivers pulled off onto the grassed shoulder to wait to enter the school driveway.
- The crossing guards and PSA officer left at approximately 3:20 PM.

PM Peak Hour Observations

- No operational deficiencies were observed along the corridor in the PM peak hour.

Safety Analysis

Traffic crash reports were obtained for a three-year period from January 1, 2007 to December 31, 2009 for Roberts Road from the intersection of Longleaf Pine Parkway to the intersection of SR 13. The crash data was obtained from St. Johns County and included long and short form reports. Crashes that occurred on adjacent cross streets or outside of the study limits were excluded from the crash analysis. For every crash included in the analysis, the corresponding crash report narrative was reviewed to gain a better understanding of the crash and to ensure the details of the crash were coded correctly.

A total of 53 crashes, including 10 injury crashes, were reported for the three-year study period. There were 17 crashes reported on long forms and the remaining 36 crashes were reported on short forms. The number of crashes per year increased in 2008; there were 15 crashes reported in 2007, 22 crashes in 2008, and 16 crashes in 2009. The proportion of the number of crashes occurring under wet roadway conditions exceeds 30 percent. The typical threshold for concern regarding wet pavement conditions is 25 percent. Collision diagrams for the study area are presented in Sheets 12 through 45. Table 1 illustrates the number of crashes by year for all crashes, injury crashes, dark crashes, and wet crashes.

Table 1
Summary of Crashes by Year

Year	Total Number of Crashes	Number of Injury Crashes	Number of Dark Crashes	Number of Wet Crashes
2007	15	4	4	3
2008	22	2	1	7
2009	16	4	4	6
3-Year Total	**53**	**10**	**9**	**16**
Annual Average	*17.7*	*3.3*	*3.0*	*5.3*
Percent of Total	*-*	*18.9%*	*17.0%*	*30.2%*

The corresponding detailed crash data for the collision diagram is presented in Table 2.

Table 2
Three-Year Detailed Crash Data Corresponding to Collision Diagrams

No	Crash	Form	MP	Date	Year	Day	Time	Hour	Type	Cause	D1 Age	D2 Age	Light	Road	Weather	Injury
1	90530231	Long	1.000	9/7/2007	2007	Friday	Unk.	Unk.	Run off the Road	Other	33	N/A	Day	Dry	Clear	0
2	80109198	Long	2.339	9/5/2007	2007	Wednesday	15:30	15	Rear-end	Careless driving	17	17	Day	Dry	Clear	0
3	06247617	Short	2.492	12/20/2007	2007	Thursday	8:02	8	Rear-end	Careless driving	44	29	Day	Dry	Clear	0
4	10341369	Short	1.963	10/4/2007	2007	Thursday	4:43	4	Run off the Road	Careless driving	20	N/A	Dark	Wet	Rain	0
5	80169626	Long	2.229	12/22/2007	2007	Saturday	22:59	22	Run off the Road	Under the Influence	30	N/A	Dark	Dry	Clear	1
6	05043438	Short	2.255	2/27/2007	2007	Tuesday	15:20	15	Rear-end	Careless driving	17	16	Day	Dry	Clear	0
7	09069211	Short	2.236	1/17/2007	2007	Wednesday	22:07	22	Run off the Road	Overturned	16	N/A	Dark	Wet	Rain	0
8	80109448	Long	1.385	11/25/2007	2007	Sunday	16:50	16	Run off the Road	No improper driving	46	N/A	Day	Dry	Cloudy	1
9	06246610	Short	1.260	11/6/2007	2007	Tuesday	7:23	7	Angle	Failed to yield ROW	17	44	Day	Dry	Clear	0
10	05054194	Short	1.639	2/1/2007	2007	Thursday	1:48	1	Run off the Road	Failed to maintain equipment	18	N/A	Dark	Wet	Rain	0
11	09070525	Short	2.150	4/27/2007	2007	Friday	17:36	17	Rear-end	Followed too closely	39	37	Day	Dry	Clear	0
12	10341280	Short	2.050	9/14/2007	2007	Friday	8:05	8	Run off the Road	Careless driving	17	N/A	Day	Dry	Clear	0
13	09071917	Short	1.620	4/9/2007	2007	Monday	14:00	14	Run off the Road	Careless driving	17	N/A	Day	Dry	Clear	0
14	76987367	Long	2.620	5/23/2007	2007	Wednesday	12:25	12	Left-Turn	Failed to yield ROW	18	55	Day	Dry	Clear	2
15	76993269	Long	2.620	10/14/2007	2007	Sunday	13:00	13	Left-Turn	Failed to yield ROW	39	46	Day	Dry	Clear	2
16	80173585	Long	1.000	4/30/2008	2008	Wednesday	15:42	15	Rear-end	Careless driving	17	63	Day	Dry	Clear	1
17	80171326	Long	2.255	1/16/2008	2008	Wednesday	8:50	8	Run off the Road	Driver distraction	17	N/A	Day	Wet	Rain	0
18	06264752	Short	2.255	5/13/2008	2008	Tuesday	19:35	19	Rear-end	Failed to maintain equipment	50	N/A	Day	Dry	Clear	0
19	06247650	Short	1.260	4/18/2008	2008	Friday	14:18	14	Rear-end	Careless driving	16	16	Day	Dry	Clear	0
20	06266684	Short	1.260	10/13/2008	2008	Monday	16:05	16	Rear-end	Careless driving	17	56	Day	Dry	Cloudy	0
21	06266103	Short	1.019	6/23/2008	2008	Monday	4:15	4	Run off the Road	Under the Influence	21	N/A	Dark	Dry	Cloudy	0
22	06266107	Short	2.620	9/5/2008	2008	Friday	14:50	14	Angle	Other	52	44	Day	Wet	Rain	0
23	06180277	Short	0.000	9/22/2008	2008	Monday	9:03	9	Rear-end	Careless driving	17	17	Day	Wet	Cloudy	0
24	06247062	Short	2.620	9/18/2008	2008	Thursday	6:50	6	Rear-end	Careless driving	16	29	Day	Dry	Cloudy	0
25	06267750	Short	0.473	9/17/2008	2008	Wednesday	17:06	17	Run off the Road	Careless driving	66	N/A	Day	Dry	Cloudy	0
26	06247157	Short	0.000	11/12/2008	2008	Wednesday	15:00	15	Run off the Road	Careless driving	17	N/A	Day	Wet	Rain	0
27	06246618	Short	2.620	1/4/2008	2008	Friday	17:49	17	Right-Turn	Improper turn	17	24	Dusk	Dry	Clear	0
28	09067524	Short	0.910	2/7/2008	2008	Thursday	12:27	12	Rear-End	Careless driving	16	58	Day	Dry	Cloudy	0
29	76992921	Long	2.620	10/1/2008	2008	Wednesday	17:05	17	Left-Turn	Failed to yield ROW	17	59	Day	Dry	Clear	0
30	76996764	Long	2.555	2/21/2008	2008	Thursday	15:10	15	Rear-End	Careless driving	20	36	Day	Wet	Rain	0
31	7665261	Short	2.620	7/12/2008	2008	Saturday	16:20	16	Angle	Careless driving	16	47	Day	Wet	Rain	0
32	06246754	Short	2.620	6/3/2008	2008	Tuesday	17:02	17	Left-Turn	Failed to yield ROW	16	17	Day	Wet	Rain	0
33	09068558	Short	2.620	8/27/2008	2008	Wednesday	8:59	8	Left-Turn	Failed to yield ROW	19	31	Day	Dry	Clear	0
34	06250054	Short	1.000	4/18/2008	2008	Friday	12:35	12	Rear-End	Followed too closely	17	18	Day	Dry	Clear	0
35	80110003	Long	0.950	4/27/2008	2008	Sunday	10:11	10	Run off the Road	Under the Influence	50	N/A	Day	Dry	Clear	0
36	77250096	Long	2.492	11/25/2008	2008	Tuesday	16:00	16	Hit Bicycle	Failed to yield ROW	78	46	Day	Dry	Clear	1
37	06250725	Short	0.811	8/17/2008	2008	Sunday	10:16	10	Hit Deer	No improper driving	48	N/A	Day	Dry	Cloudy	0
38	06270605	Short	2.612	9/12/2009	2009	Saturday	19:16	19	Run off the road	Careless driving	16	N/A	Dark	Wet	Rain	0
39	07673321	Short	2.620	10/9/2009	2009	Friday	19:20	19	Left-Turn	Failed to yield ROW	45	44	Dark	Wet	Cloudy	0
40	07660581	Short	0.492	2/13/2009	2009	Friday	12:50	12	Rear-End	Careless driving	18	17	Day	Dry	Clear	0
41	06268453	Short	1.620	5/1/2009	2009	Friday	15:59	15	Rear-End	Careless driving	46	16	Day	Dry	Cloudy	0
42	06271153	Short	2.093	12/7/2009	2009	Monday	16:02	16	Rear-End	Careless driving	17	19	Day	Wet	Rain	0
43	80265355	Long	2.093	2/2/2009	2009	Monday	9:00	9	Rear-End	Careless driving	18	17	Day	Wet	Cloudy	0
44	06267560	Short	1.317	9/27/2009	2009	Sunday	14:23	14	Run off the Road	Careless driving	18	N/A	Day	Dry	Clear	1
45	80265657	Long	0.260	7/31/2009	2009	Friday	13:01	13	Sideswipe	Other	19	Ukn.	Day	Dry	Clear	0
46	06269879	Short	1.288	4/30/2009	2009	Thursday	16:00	16	Rear-End	Careless driving	17	17	Day	Dry	Clear	0
47	80265262	Long	1.260	4/11/2009	2009	Saturday	8:13	8	Hit Bicycle	Failed to yield ROW	31	39	Day	Dry	Cloudy	1
48	76999198	Long	2.256	4/12/2009	2009	Sunday	2:25	2	Run off the Road	Careless driving	44	N/A	Dark	Dry	Clear	1
49	80265543	Long	2.255	8/4/2009	2009	Tuesday	17:23	17	Head-on	Driving wrong side	54	37	Day	Dry	Cloudy	2
50	06268931	Short	2.001	1/12/2009	2009	Monday	16:07	16	Rear-End	Careless driving	16	18	Day	Wet	Rain	0
51	06250254	Short	2.492	4/1/2009	2009	Wednesday	15:30	15	Rear-End	Careless driving	17	17	Day	Wet	Rain	0
52	06180857	Short	2.492	12/24/2009	2009	Thursday	2:50	2	Left-Turn	Careless driving	25	63	Dark	Dry	Fog	0
53	06270004	Short	1.480	6/21/2009	2009	Sunday	11:18	11	Run off the Road	Careless driving	58	N/A	Day	Dry	Clear	0

Several parameters were used to analyze the crash data to determine trends in the circumstances involved in the crashes. The three most common crash types were reported as rear-end crashes (38 percent), run off the road crashes (32 percent), and left-turn crashes (13 percent). The run off the road crashes included harmful events of vehicles running into ditches or striking fixed objects such as culverts, trees, and utility poles. Over 52 percent of the crashes were attributed to careless driving and additional contributing causes included failure to yield the right-of-way and alcohol or drug use. Significant peaks in crash frequency were observed between the hours of 8:00 AM to 9:00 AM and 3:00 PM to 6:00 PM. Approximately 9 percent and 38 percent of the crashes occurred during these morning and afternoon peak periods, respectively. In addition, drivers aged 16 to 18 years old were at-fault for nearly 55 percent of the crashes. Table 3 illustrates the breakdown of crashes by crash type.

Table 3
Summary of Crashes by Crash Type

Type	2007	2008	2009	Total
Rear-end	4	9	7	20
Run off the road	8	5	4	17
Left-turn	2	3	2	7
Angle	1	2	0	3
Hit bicycle	0	1	1	2
Right-turn	0	1	0	1
Hit deer	0	1	0	1
Sideswipe	0	0	1	1
Head-on	0	0	1	1

Figures 1 through 3 graphically illustrate the number of crashes by location, time of day, and age of the at-fault driver, respectively.

Figure 1

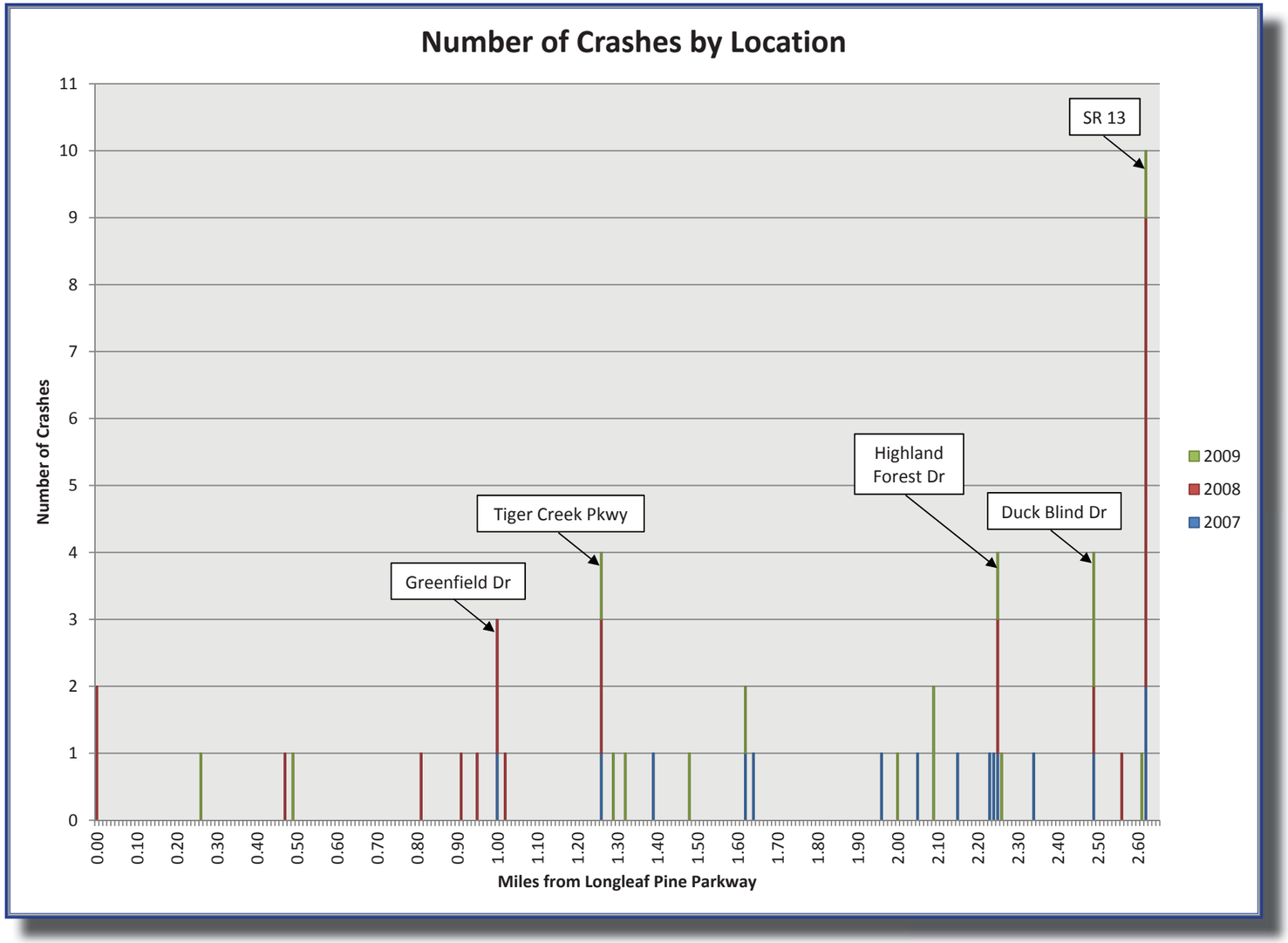


Figure 2

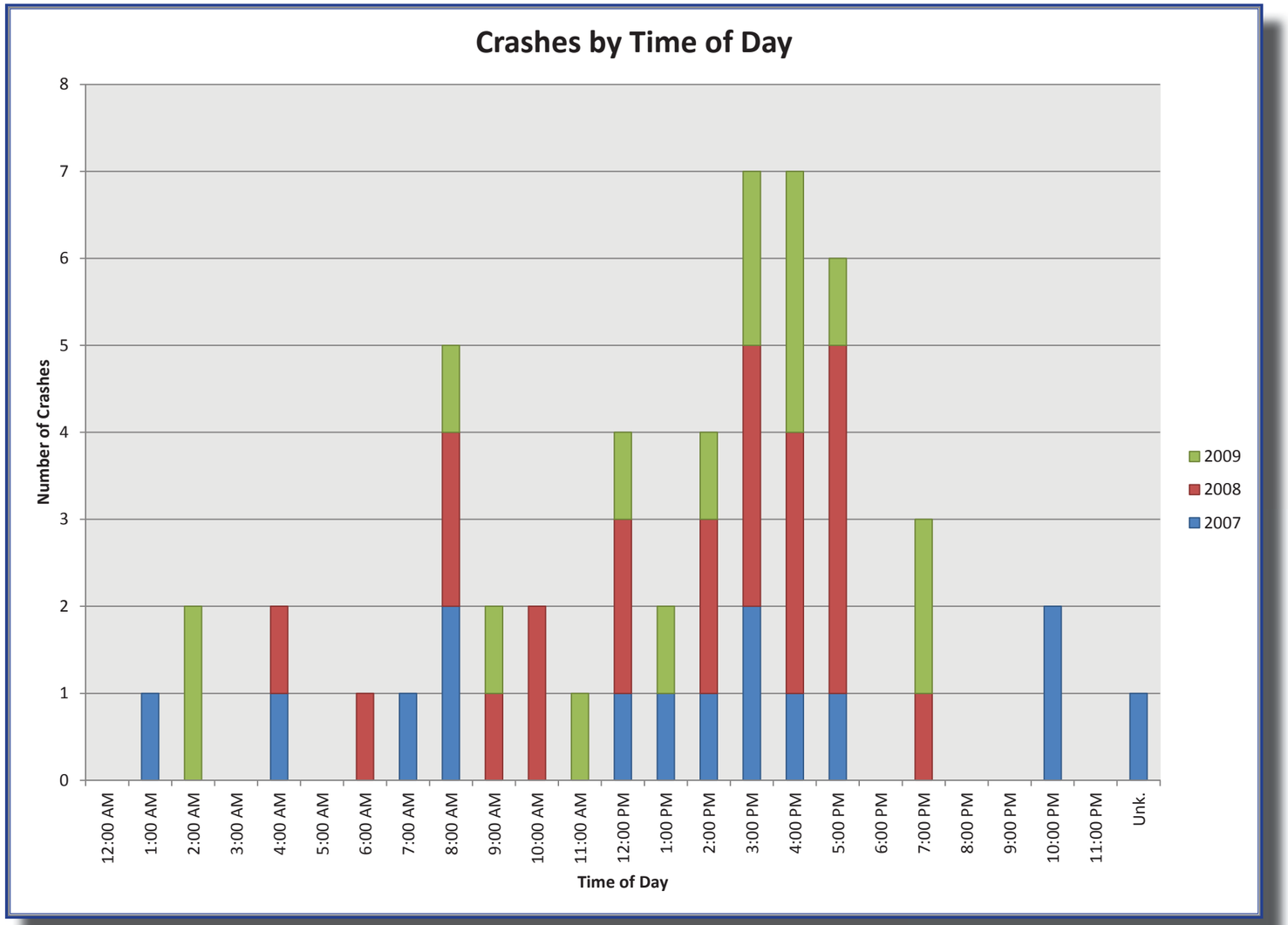
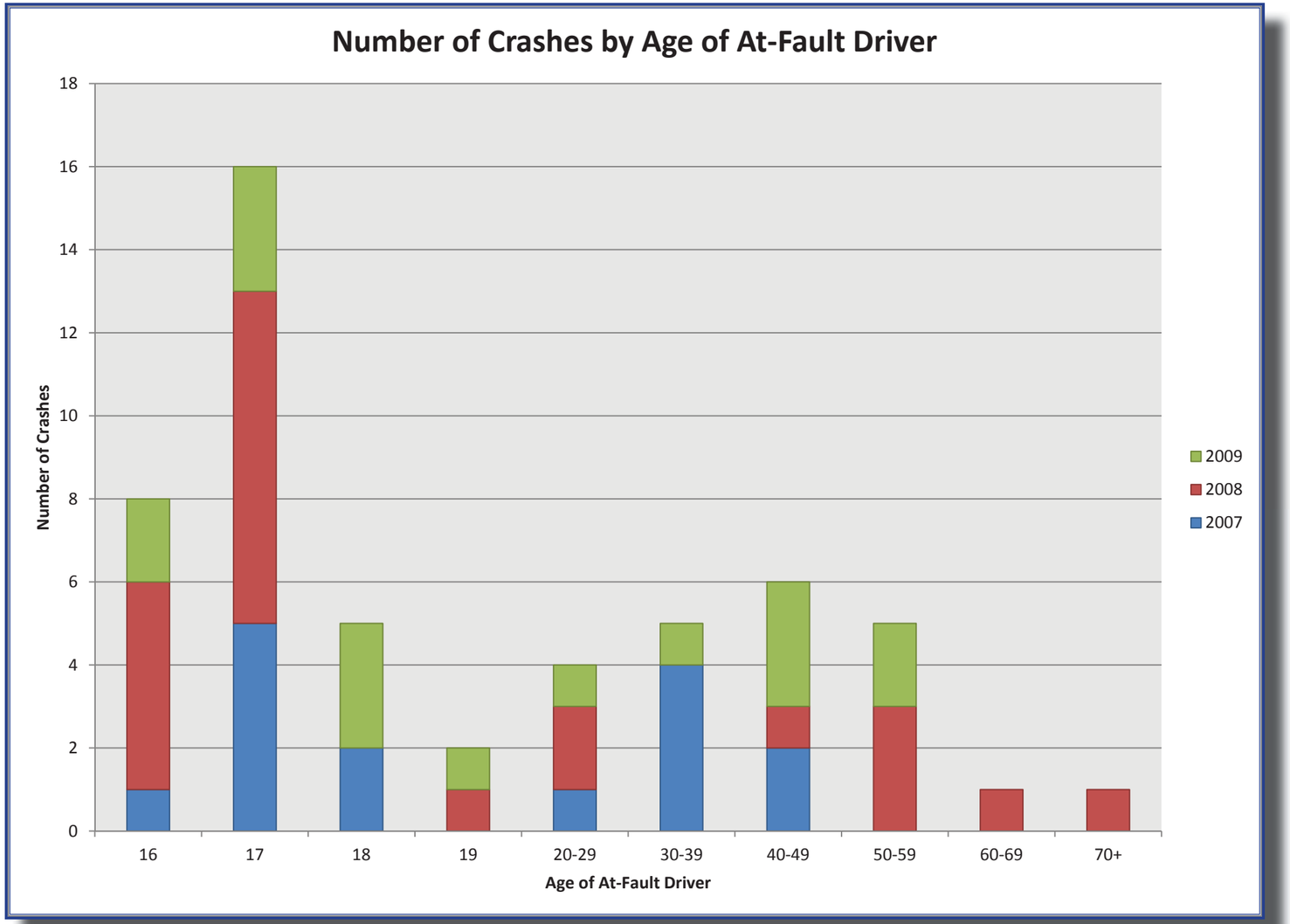
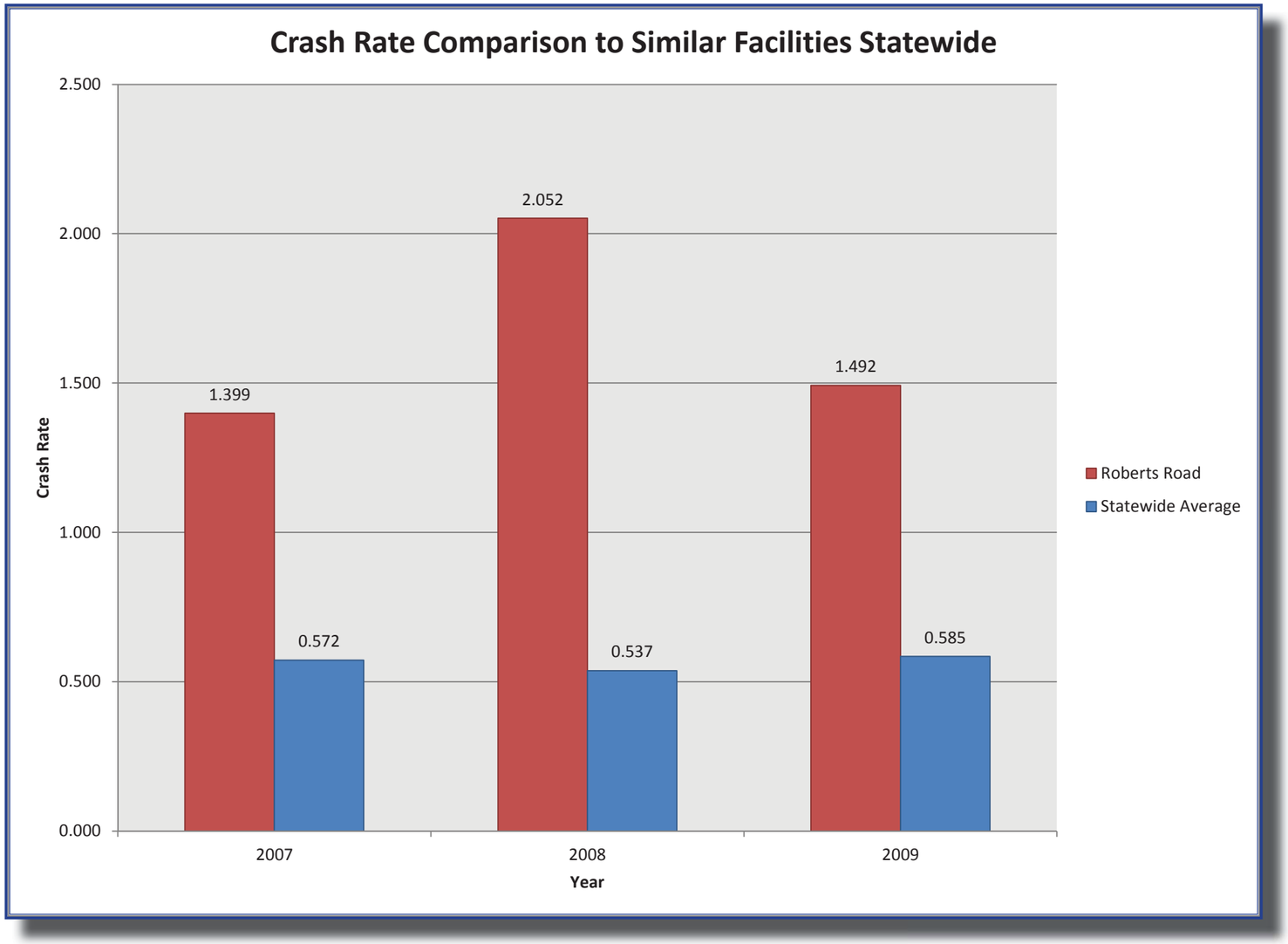

Crashes by Time of Day
Number of Crashes
0
1
2
3
4
5
6
7
8
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Unk.
Time of Day
2009
2008
2007

Figure 3


Number of Crashes by Age of At-Fault Driver
Number of Crashes
0
2
4
6
8
10
12
14
16
18
16
17
18
19
20-29
30-39
40-49
50-59
60-69
70+
Age of At-Fault Driver
2009
2008
2007

A statistical comparison was performed of the crash frequency on Roberts Road versus the crash frequency on similar FDOT roadways throughout the state. The typical cross section of Roberts Road matches the FDOT crash rate category R-2UN which is a rural, 2-lane, undivided roadway. The actual crash rate on Roberts Road was calculated separately for each year of the analysis based on the number of crashes per year, the annual average daily traffic, and the length of the segment. The statewide average crash rate for the R-2UN crash rate category was obtained from the FDOT CRASH system for each year of the analysis. The confidence level, which is a measure of the statistical significance of the comparison, was also calculated when the actual crash rate was greater than the statewide average crash rate. A confidence level above 95 percent for a rural section is considered significant. Statistical significance indicates that the higher than average number of crashes occurring on the study roadway cannot be solely attributed to normal, random fluctuations in crashes. The analysis revealed that Roberts Road has experienced a high crash rate above the 95 percent confidence level each year from 2007 to 2009. A graphic depiction of the actual Roberts Road crash rates and the statewide average crash rates is presented in Figure 4.

Figure 4



Traffic Analysis

Intersection capacity analyses were conducted for the existing 2012 traffic conditions during the AM and PM peak hours. The operating conditions were analyzed using Trafficware's Synchro 8.0 Software, which applies methodologies outlined in the Highway Capacity Manual, 2000 Edition. The intersection capacity analyses included the two signalized intersections and eight unsignalized intersections at which turning movement counts were performed. In addition, turn lane calculations were performed based on the St. Johns County Land Development Code (LDC) requirements to determine whether the existing turn lanes are sufficient to accommodate the existing traffic volumes. The threshold for a left-turn lane to be required is a volume greater than 500 daily vehicles generated and the threshold for a right-turn lane to be required is a volume greater than 250 daily vehicles generated. An estimate was made to determine the daily vehicles at each side street assuming that the highest peak hour volume obtained from the turning movement counts is equivalent to 9 percent of the total daily traffic. Where no turning movement counts were performed, the traffic volumes were instead estimated based on the *ITE Trip Generation Handbook (8th Edition)* equations for the number of single-family dwelling units accessed by the side street.

The results of the analyses for the existing traffic conditions during the AM and PM peak hours are summarized in Tables 4 and 5 for the signalized intersections and Tables 6 and 7 for the unsignalized intersections.

Table 4

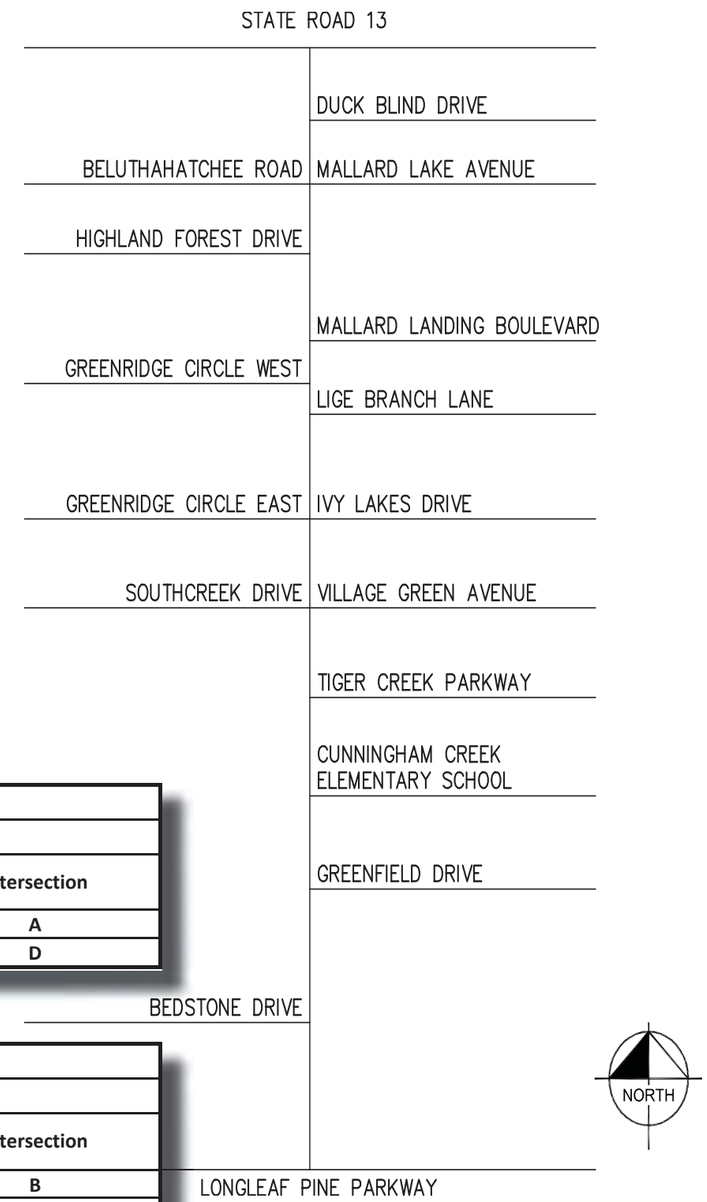
Signalized Intersection Levels of Service for Roberts Rd - AM Peak Hour

Intersecting Road	Movement												Intersection
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Longleaf Pine Pkwy	A	A	-	-	B	-	-	-	-	C	-	A	**A**
SR 13	B	C	-	C	B	-	-	D	F	-	D	-	**D**

Table 5

Signalized Intersection Levels of Service for Roberts Rd - PM Peak Hour

Intersecting Road	Movement												Intersection
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Longleaf Pine Pkwy	A	A	-	-	B	-	-	-	-	C	-	A	**B**
SR 13	C	C	-	C	B	-	-	D	D	-	D	-	**C**



CARDINAL DIRECTION DIAGRAM

Table 6

Unsignalized Intersection Levels of Service for Roberts Rd - AM Peak Hour

Intersecting Road	Stop-Controlled Approach LOS	
	EB	WB
Greenfield Dr	N/A	B
CCE School Driveway	N/A	F
Tiger Creek Pwky	N/A	D
Greenridge Cir E/Ivy Lakes Dr	C	E
Mallard Landing Blvd	N/A	C
Highland Forest Dr	C	N/A
Beluthahatchee Rd/Mallard Lake Ave	C	C
Duck Blind Dr.	N/A	C

Note: CCE is Cunningham Creek Elementary

Table 7

Unsignalized Intersection Levels of Service for Roberts Rd - PM Peak Hour

Intersecting Road	Stop-Controlled Approach LOS	
	EB	WB
Greenfield Dr	N/A	B
CCE School Driveway	N/A	C
Tiger Creek Pwky	N/A	C
Greenridge Cir E/Ivy Lakes Dr	C	C
Mallard Landing Blvd	N/A	B
Highland Forest Dr	C	N/A
Beluthahatchee Rd/Mallard Lake Ave	D	B
Duck Blind Dr.	N/A	C

The results of the turn lane calculations are summarized in Tables 8 and 9 for the left-turn and right-turn lanes, respectively. Detailed observations on the results at each intersection are presented in the subsequent pages.

Table 8
Left-Turn Lane Requirements for Roberts Rd

Intersecting Road	AM Left Turns	PM Left Turns	Daily Total Trips**	LT Lane Existing?	LT Lane Required?***	Existing Length	Required Length
SEB @ Longleaf Pine Pkwy	81	133	Existing	Yes	Existing	285	205
NB @ Bedstone Dr*	10	23	Existing	Yes	Existing	315	180
SB @ Greenfield Dr	17	15	570	No	Yes	0	180
SB @ CCE School Driveway	209	73	Existing	Yes	Existing	230	305
SB @ Tiger Creek Pwky	20	117	Existing	Yes	Existing	155	255
NB @ Southcreek Dr*	7	15	Existing	Yes	Existing	150	180
SB @ Village Green Ave*	10	47	Existing	Yes	Existing	185	205
NB @ Greenridge Cir E	14	28	Existing	Yes	Existing	200	180
SB @ Ivy Lakes Dr	16	52	Existing	Yes	Existing	175	205
SB @ Lige Branch Ln*	8	38	Existing	Yes	Existing	235	205
NB @ Greenridge Cir W*	10	22	Existing	Yes	Existing	115	180
SB @ Mallard Landing Blvd	3	26	590	No	Yes	0	180
NB @ Highland Forest Dr	4	1	450	No	No	0	0
NB @ Beluthahatchee Rd	1	0	80	No	No	0	0
SB @ Mallard Lake Ave	2	8	250	No	No	0	0
SB @ Duck Blind Dr	1	19	460	No	No	0	0
NWB @ SR 13	3	0	Existing	Yes	Existing	Shared	Shared

*Estimated using ITE 8th Edition Trip Generation

**Estimated assuming highest peak hour = 9% of daily traffic, rounded to next multiple of 10

***Left-turn lane required when daily total trips exceed 500 vehicles

Table 9
Right-Turn Lane Requirements for Roberts Rd

Intersecting Road	AM Right Turns	PM Right Turns	Daily Total Trips**	RT Lane Existing?	RT Lane Required?**	Existing Length	Required Length
SEB @ Longleaf Pine Pkwy	319	152	Existing	Yes	Existing	Free flow	Free flow
SB @ Bedstone Dr*	7	33	Existing	Yes	Existing	200	155
NB @ Greenfield Dr	3	7	570	No	Yes	0	155
NB @ CCE School Driveway	110	39	Existing	Yes	Existing	175	155
NB @ Tiger Creek Pwky	42	71	Existing	Yes	Existing	150	155
NB @ Village Green Ave*	14	27	Existing	Yes	Existing	180	155
SB @ Southcreek Dr*	5	21	Existing	Yes	Existing	165	155
NB @ Ivy Lakes Dr	25	24	Existing	Yes	Existing	145	155
SB @ Greenridge Cir E	8	24	Existing	Yes	Existing	150	155
NB @ Lige Branch Ln*	11	27	Existing	Yes	Existing	165	155
SB @ Greenridge Cir W*	7	32	850	No	Yes	0	155
NB @ Mallard Landing Blvd	5	8	590	No	Yes	0	155
SB @ Highland Forest Dr	9	21	Existing	Yes	Existing	150	155
NB @ Mallard Lake Ave	3	3	250	No	Yes	0	155
SB @ Beluthahatchee Rd	1	4	80	No	No	0	0
NB @ Duck Blind Dr	5	3	460	No	Yes	0	155
NWB @ SR 13	511	419	Existing	Yes	Existing	215	455

*Estimated using ITE 8th Edition Trip Generation

**Estimated assuming highest peak hour = 9% of daily traffic, rounded to next multiple of 10

***Right-turn lane required when daily total trips exceed 250 vehicles

Geometry

The existing roadway geometry consists of a 2-lane rural roadway, varying in width from 22 feet to 24 feet, unpaved shoulders, swales, with sidewalk and turn lanes along some sections of the road.

The cross slope varies throughout the corridor with most of the roadway having a crowned section. For most of the horizontal curves, the superevelation rate does not meet the appropriate rate base on the existing curve radii. In several cases, there is no superelevation through the curve. The existing pavement is in poor condition with extensive pavement wear, except for the newer reconstructed sections at Greenfield Drive and Bedstone Drive.

The shoulder width is inconsistent and in some areas the shoulder has started to erode. This erosion could lead to an undermining of the roadway. The shoulder width varies throughout the corridor.

The swale depths and width vary throughout the project: several feet deep on the south end to shallow on the north end. The combination of very narrow shoulder widths with deep swales presents a potential safety concern for vehicles.

The sidewalk varies from 5 feet to 6 feet throughout the corridor. There is no consistency in the location and layout of the sidewalk. The sidewalk has been marked in several areas for repair due to potential tripping hazards.

There are left-turn and right-turn lanes throughout the project. The turn lanes vary in width and length.

Drainage

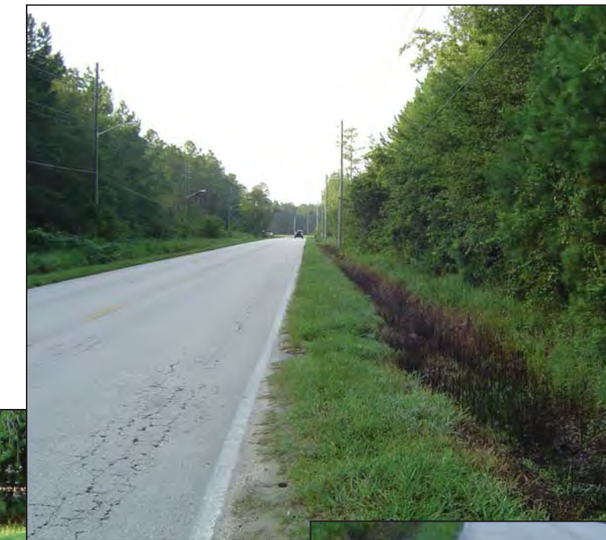
The existing drainage system is comprised of side drains, cross drains, swales and easements for conveyance, and a few stormwater ponds.

The side drains under existing driveways vary in size from 15 inches to 18 inches consisting of corrugated metal pipe and reinforced concrete pipe. Some of the side drains have mitered end sections.

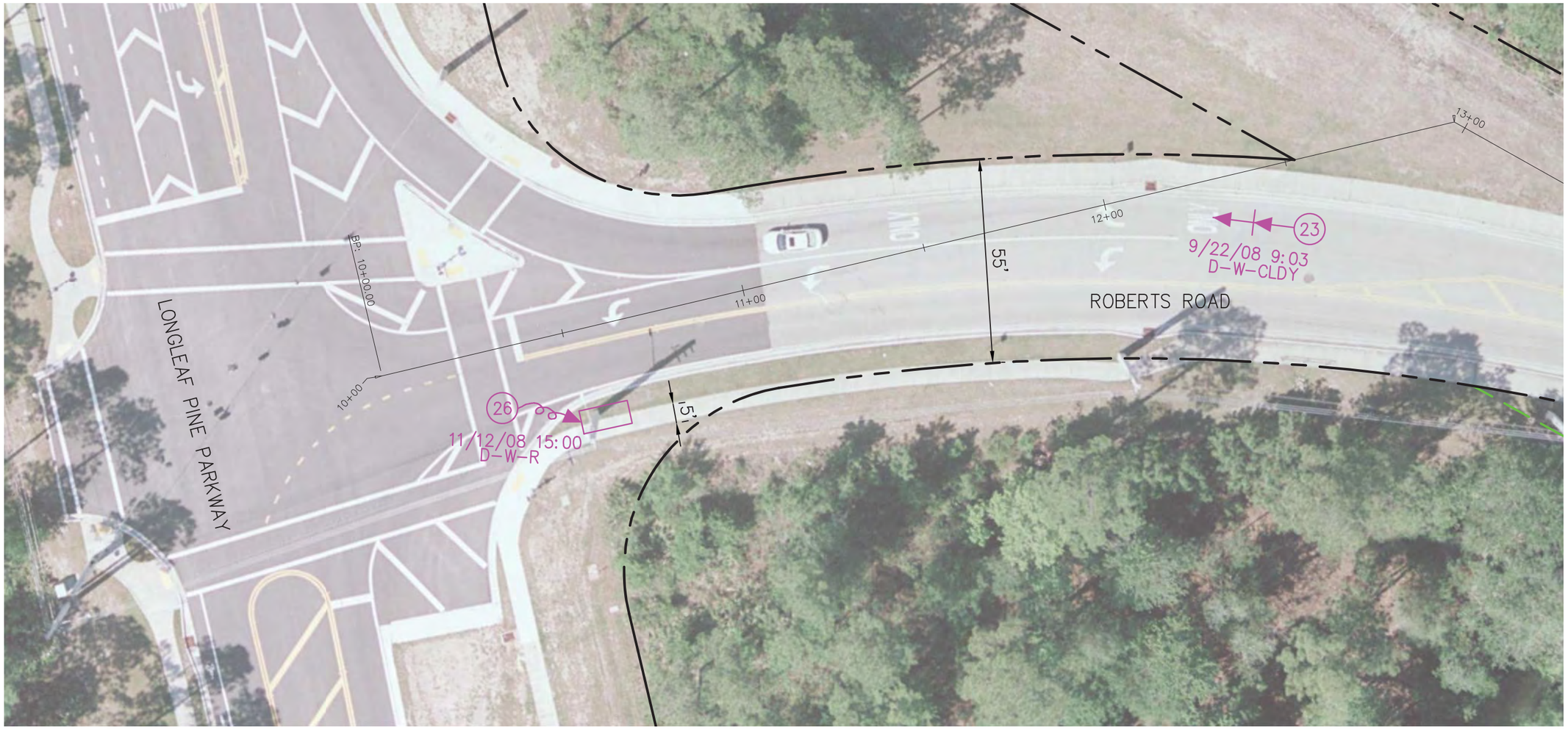
There are three 28 inch x 45 inch cross drains just south of Greenfield Drive and a 24 inch cross drain at approximately Station 116 +00.

The main conveyance system of the corridor is swales. The swale depths and widths vary throughout the project: several feet deep on the south end to shallow on the north end. The swales convey the water to existing easements. At different points along the project, the easements convey the water to the east to existing ponds and to the west to Mill Creek. The easements are heavily over grown and need to be maintained. The lack of maintenance in the easements is not allowing the water from the swales to convey the water through the system causing water to back up in the swales.

The existing conditions and collision diagrams are graphically depicted on Sheets 12 through 45. These sheets utilize an aerial background that was flown for the study in May 2012. A legend is also provided at the bottom of each sheet to describe the graphical coding utilized for the crash data.



EXISTING CONDITIONS / CRASH SUMMARY



CONCEPT PLANS – SHEET 49

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES
X-X-X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

ROAD SURFACE
D=DRY
W=WET
I=ICY
S=SLIPPERY

WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

EXISTING CONDITIONS / CRASH SUMMARY

CONCEPT PLANS – SHEET 51

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES
X–X–X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

ROAD SURFACE
D=DRY
W=WET
I=ICY
S=SLIPPERY

WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Existing Conditions / Crash Summary

CONCEPT PLANS – SHEET 53

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES

X-X-X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

ROAD SURFACE
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I=ICY
S=SLIPPERY

WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Existing Conditions / Crash Summary

CONCEPT PLANS – SHEET 55

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES

X-X-X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

ROAD SURFACE
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I=ICY
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WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Existing Conditions / Crash Summary

CONCEPT PLANS – SHEET 57

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES

X-X-X

LIGHTING
D=DAYLIGHT
DK=DARK
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ROAD SURFACE
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I=ICY
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WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Existing Conditions / Crash Summary

CONCEPT PLANS – SHEET 59

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES
X-X-X

LIGHTING
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S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Existing Conditions / Crash Summary

CONCEPT PLANS – SHEET 61

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES

X-X-X

LIGHTING
D=DAYLIGHT
DK=DARK
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ROAD SURFACE
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WEATHER
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CL=CLEAR
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S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

EXISTING CONDITIONS / CRASH SUMMARY

CONCEPT PLANS – SHEET 63

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES
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CLDY=CLOUDY
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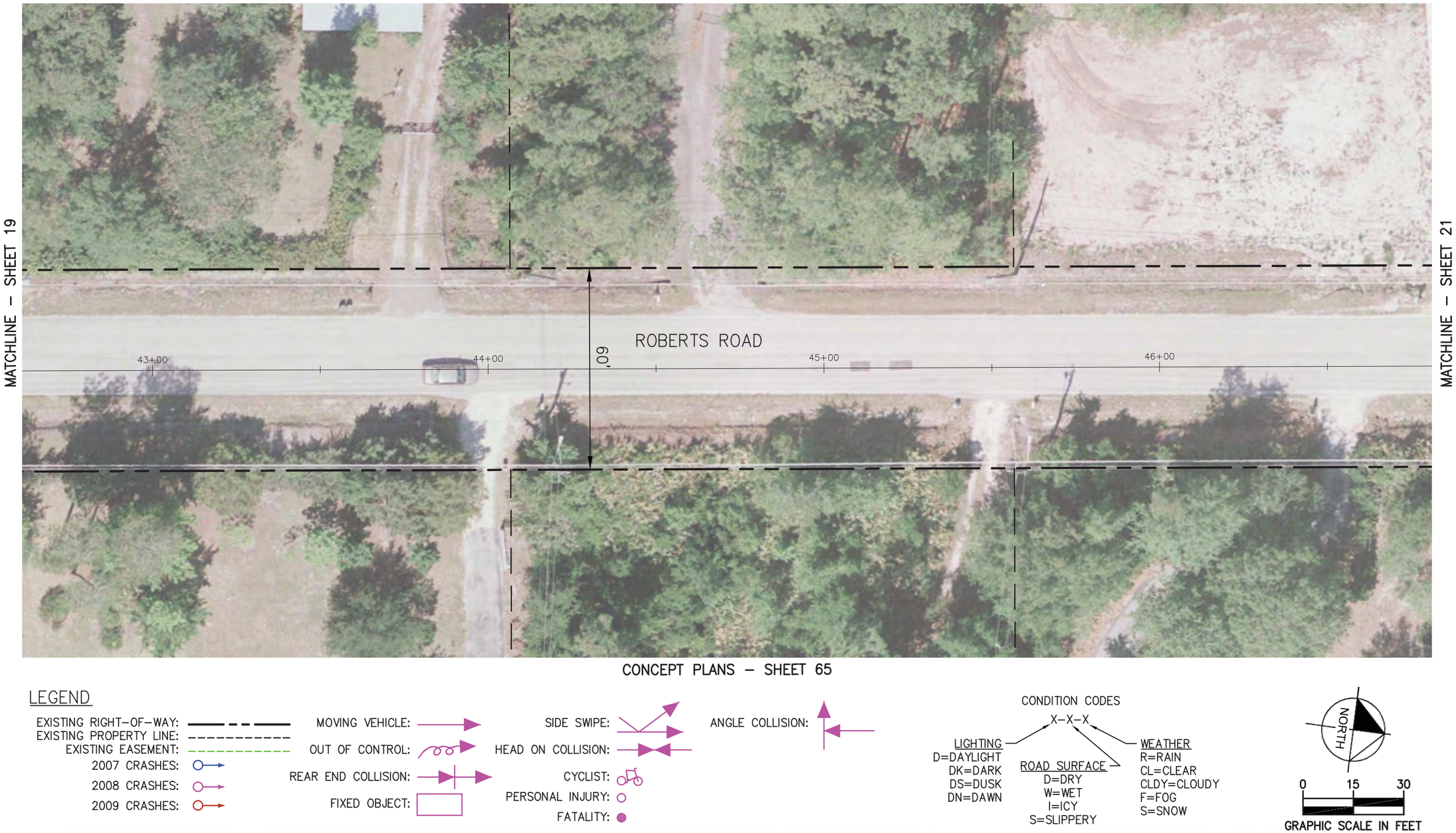
S=SNOW

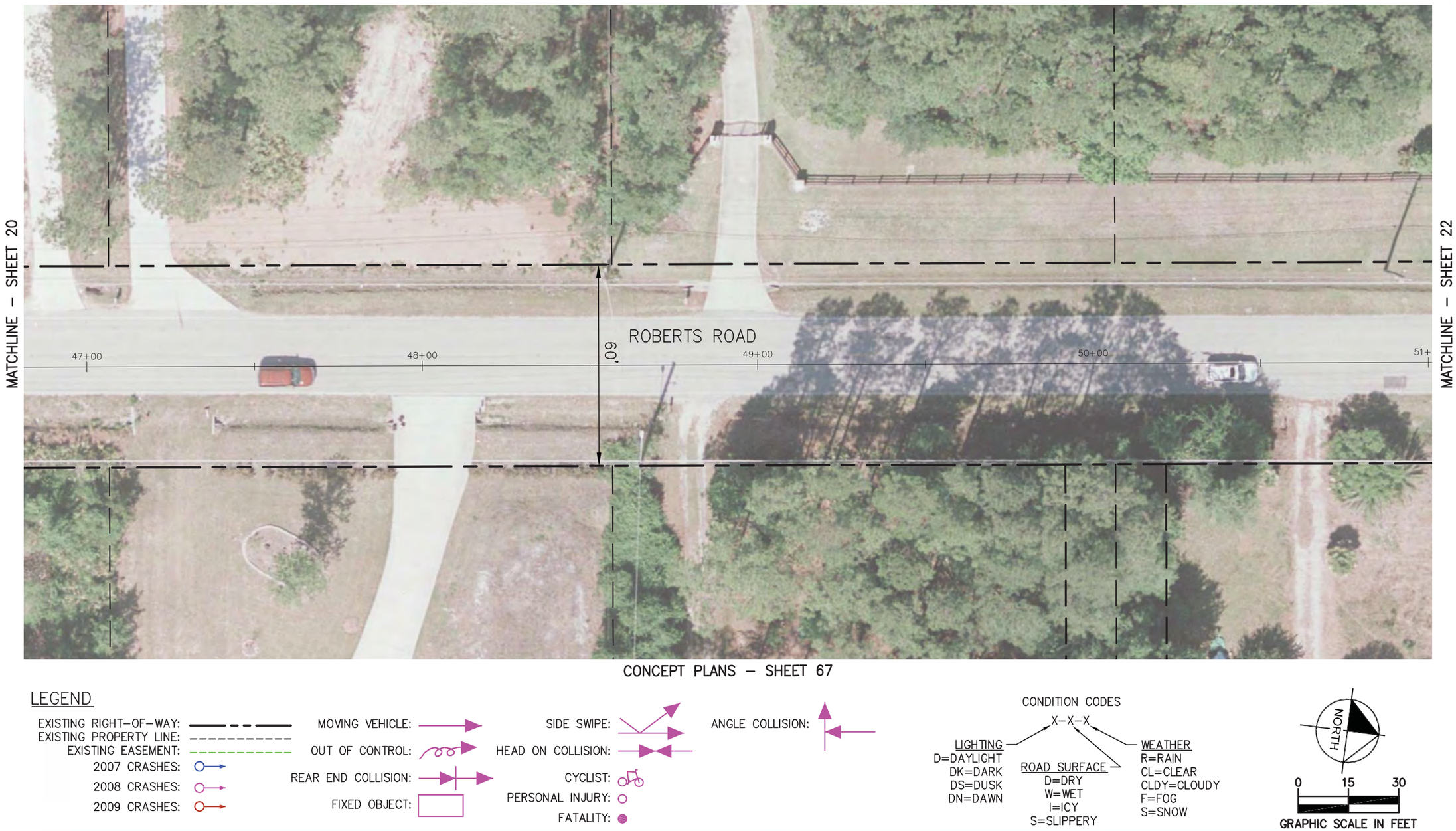
NORTH

0 15 30
GRAPHIC SCALE IN FEET

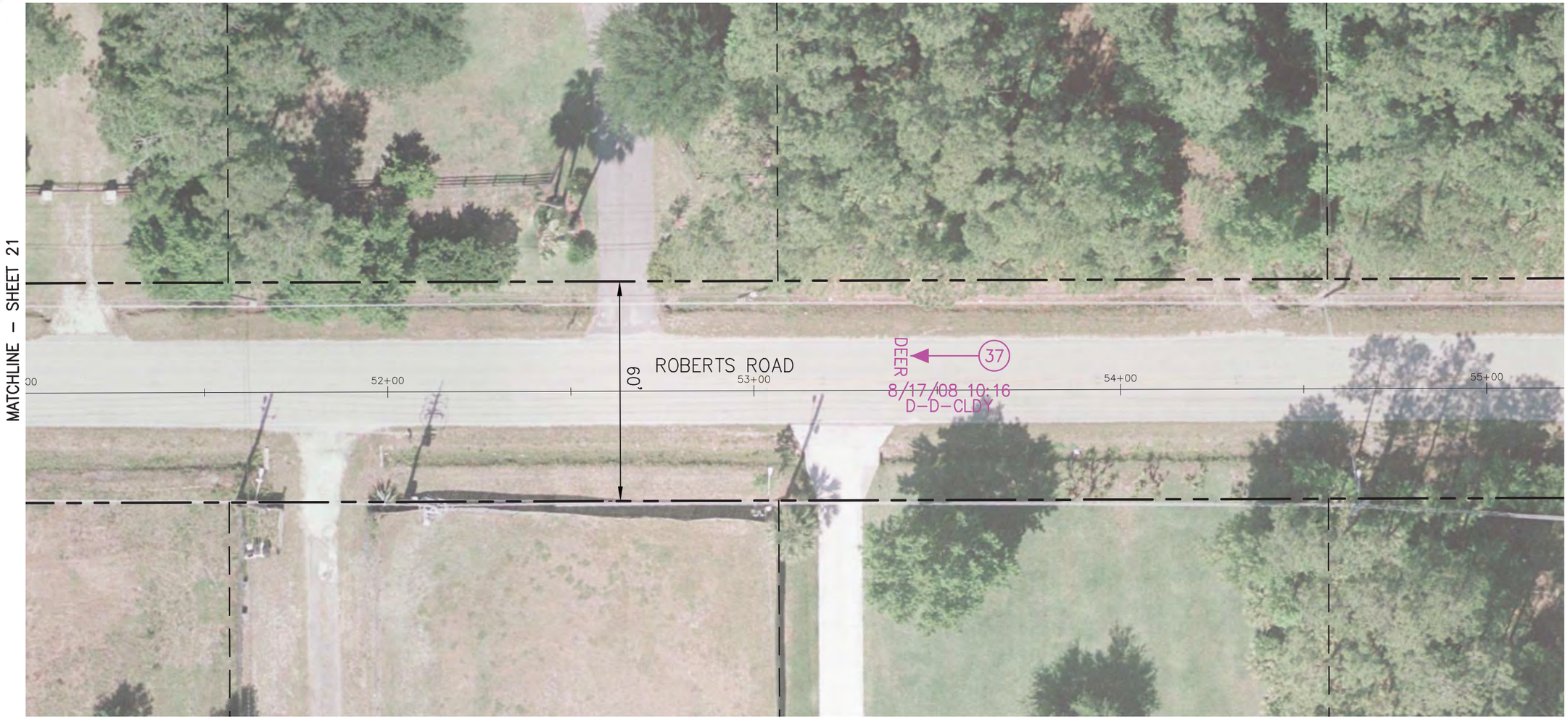
Existing Conditions / Crash Summary



Existing Conditions / Crash Summary



Existing Conditions / Crash Summary



CONCEPT PLANS – SHEET 69

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES

X-X-X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

ROAD SURFACE
D=DRY
W=WET
I=ICY
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WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

EXISTING CONDITIONS / CRASH SUMMARY

CONCEPT PLANS – SHEET 71

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES

X-X-X

LIGHTING
D=DAYLIGHT
DK=DARK
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DN=DAWN

ROAD SURFACE
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WEATHER
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CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Existing Conditions / Crash Summary

CONCEPT PLANS – SHEET 73

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES

X-X-X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

ROAD SURFACE
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I=ICY
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WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Kimley-Horn and Associates, Inc.

EXISTING CONDITIONS / CRASH SUMMARY

CONCEPT PLANS – SHEET 75

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES
X-X-X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

ROAD SURFACE
D=DRY
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I=ICY
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WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Existing Conditions / Crash Summary

CONCEPT PLANS – SHEET 77

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES

X–X–X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

ROAD SURFACE
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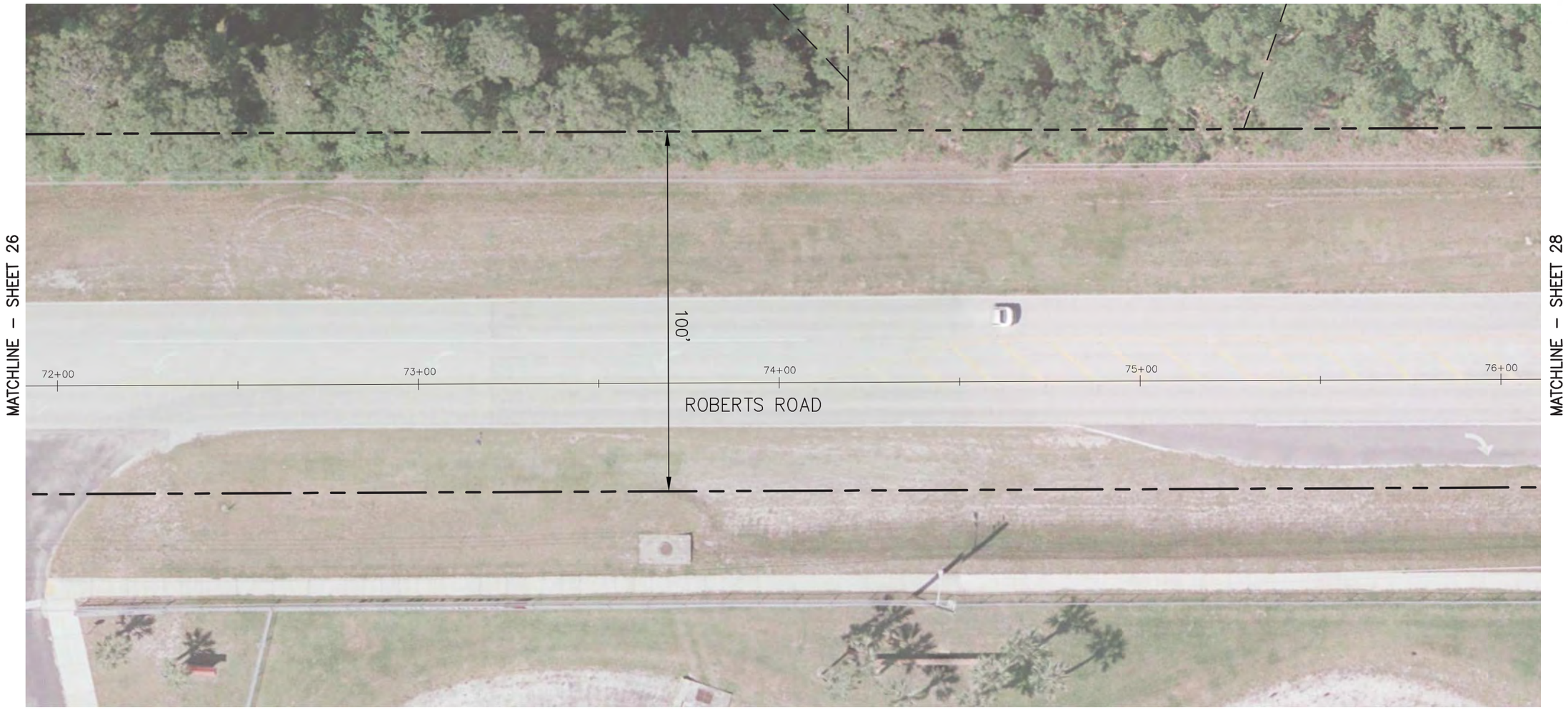
I=ICY
S=SLIPPERY

WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

EXISTING CONDITIONS / CRASH SUMMARY



CONCEPT PLANS – SHEET 79

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES
X-X-X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

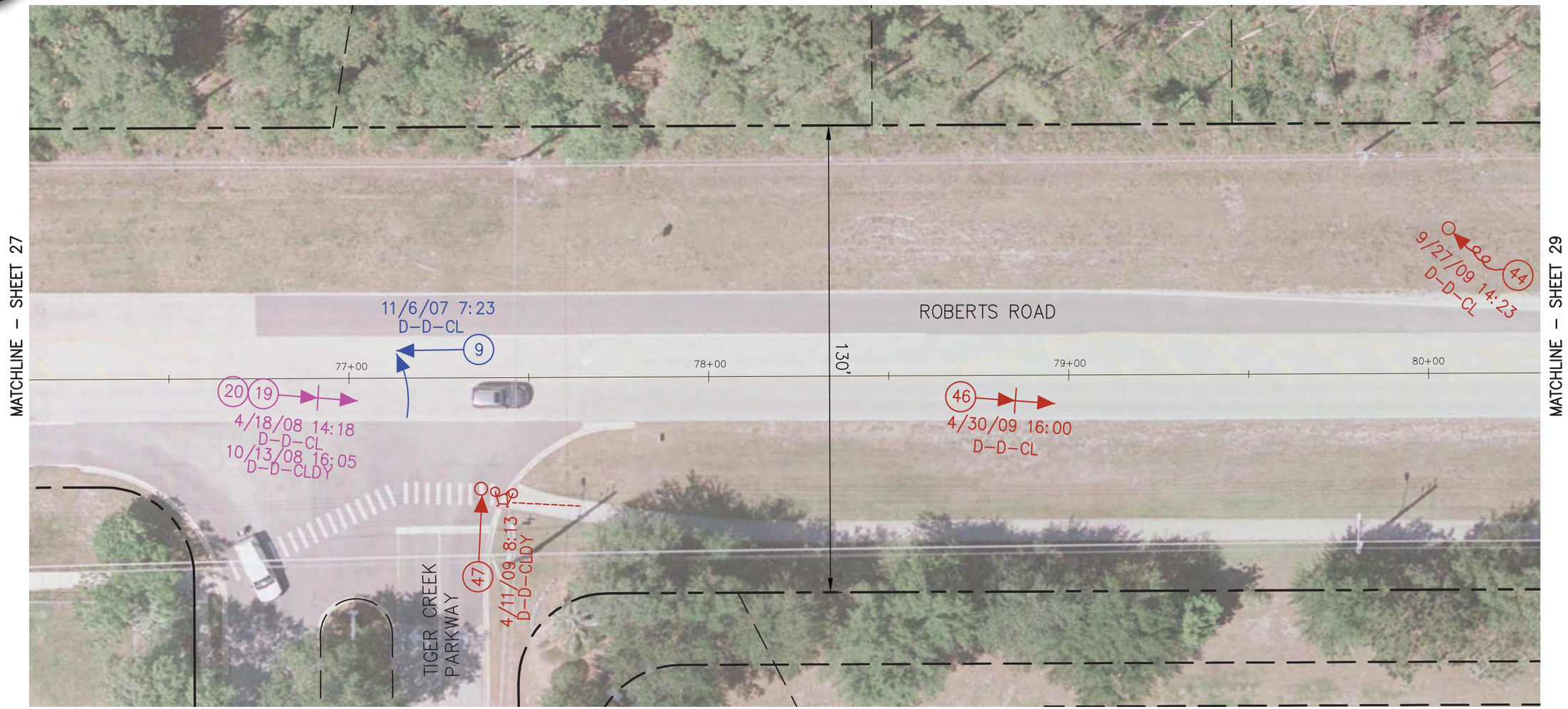
ROAD SURFACE
D=DRY
W=WET
I=ICY
S=SLIPPERY

WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Existing Conditions / Crash Summary



LEGEND

EXISTING RIGHT–OF–WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES

X–X–X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

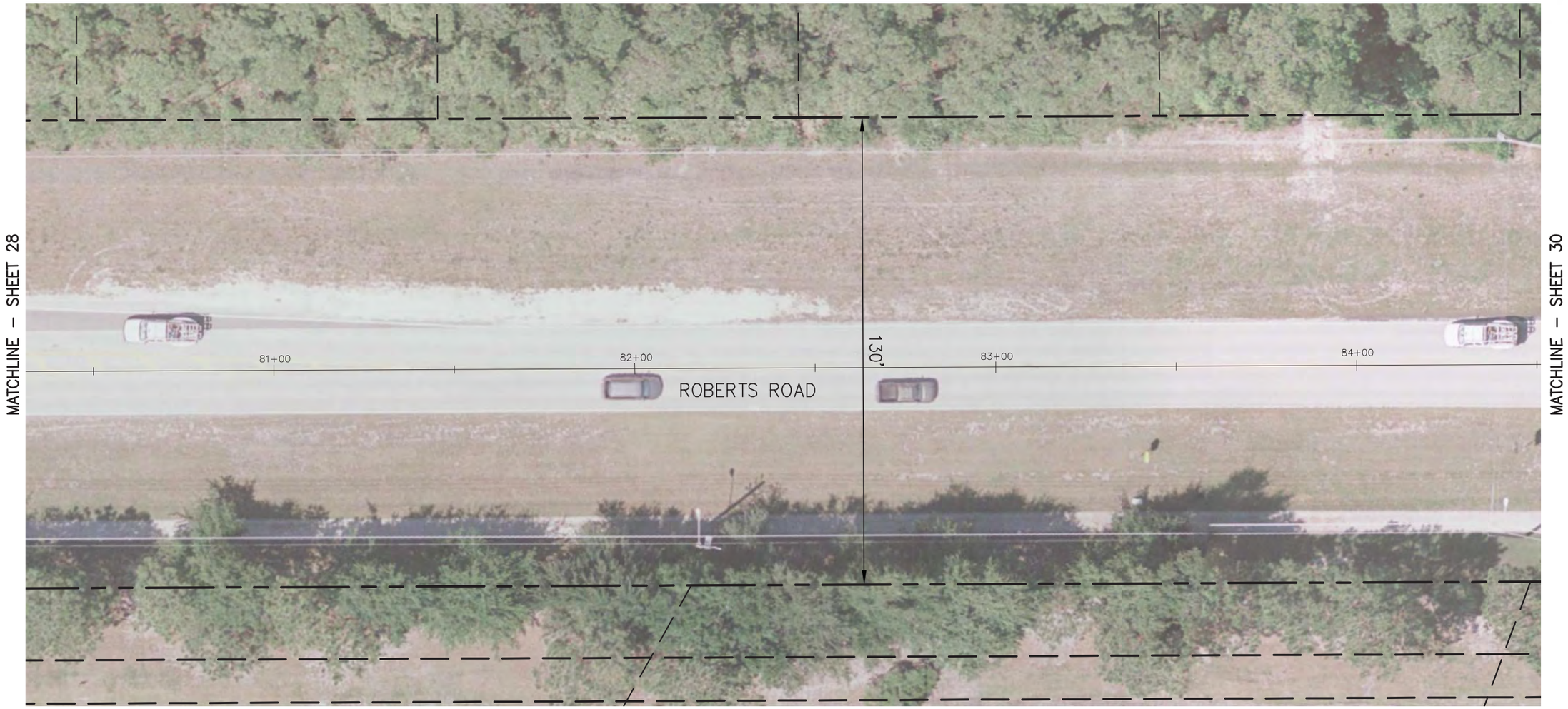
ROAD SURFACE
D=DRY
W=WET
I=ICY
S=SLIPPERY

WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

EXISTING CONDITIONS / CRASH SUMMARY



CONCEPT PLANS – SHEET 83

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES

X-X-X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

ROAD SURFACE
D=DRY
W=WET
I=ICY
S=SLIPPERY

WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Existing Conditions / Crash Summary

CONCEPT PLANS – SHEET 85

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES
X-X-X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

ROAD SURFACE
D=DRY
W=WET
I=ICY
S=SLIPPERY

WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Kimley-Horn and Associates, Inc.

EXISTING CONDITIONS / CRASH SUMMARY

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES

X–X–X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

ROAD SURFACE
D=DRY
W=WET
I=ICY
S=SLIPPERY

WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

EXISTING CONDITIONS / CRASH SUMMARY

CONCEPT PLANS – SHEET 89

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES
X-X-X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

ROAD SURFACE
D=DRY
W=WET
I=ICY
S=SLIPPERY

WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Existing Conditions / Crash Summary

CONCEPT PLANS – SHEET 91

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES

X-X-X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

ROAD SURFACE
D=DRY
W=WET
I=ICY
S=SLIPPERY

WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Existing Conditions / Crash Summary

CONCEPT PLANS – SHEET 93

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES

X-X-X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

ROAD SURFACE
D=DRY
W=WET
I=ICY
S=SLIPPERY

WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Kimley-Horn and Associates, Inc.

Existing Conditions / Crash Summary

CONCEPT PLANS – SHEET 95

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES

X–X–X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

ROAD SURFACE
D=DRY
W=WET
I=ICY
S=SLIPPERY

WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

EXISTING CONDITIONS / CRASH SUMMARY

CONCEPT PLANS – SHEET 97

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES

X-X-X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

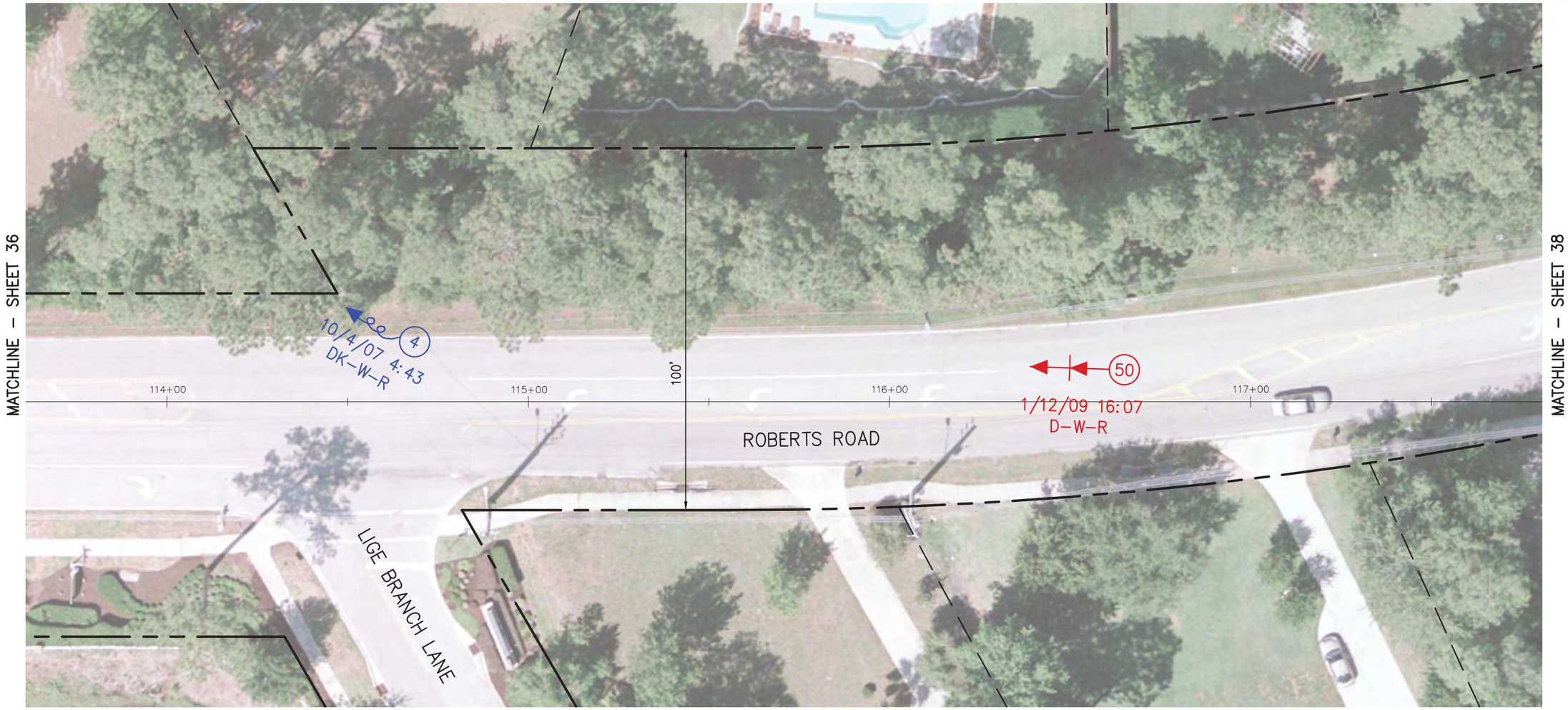
ROAD SURFACE
D=DRY
W=WET
I=ICY
S=SLIPPERY

WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

EXISTING CONDITIONS / CRASH SUMMARY



CONCEPT PLANS – SHEET 99

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES

X–X–X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

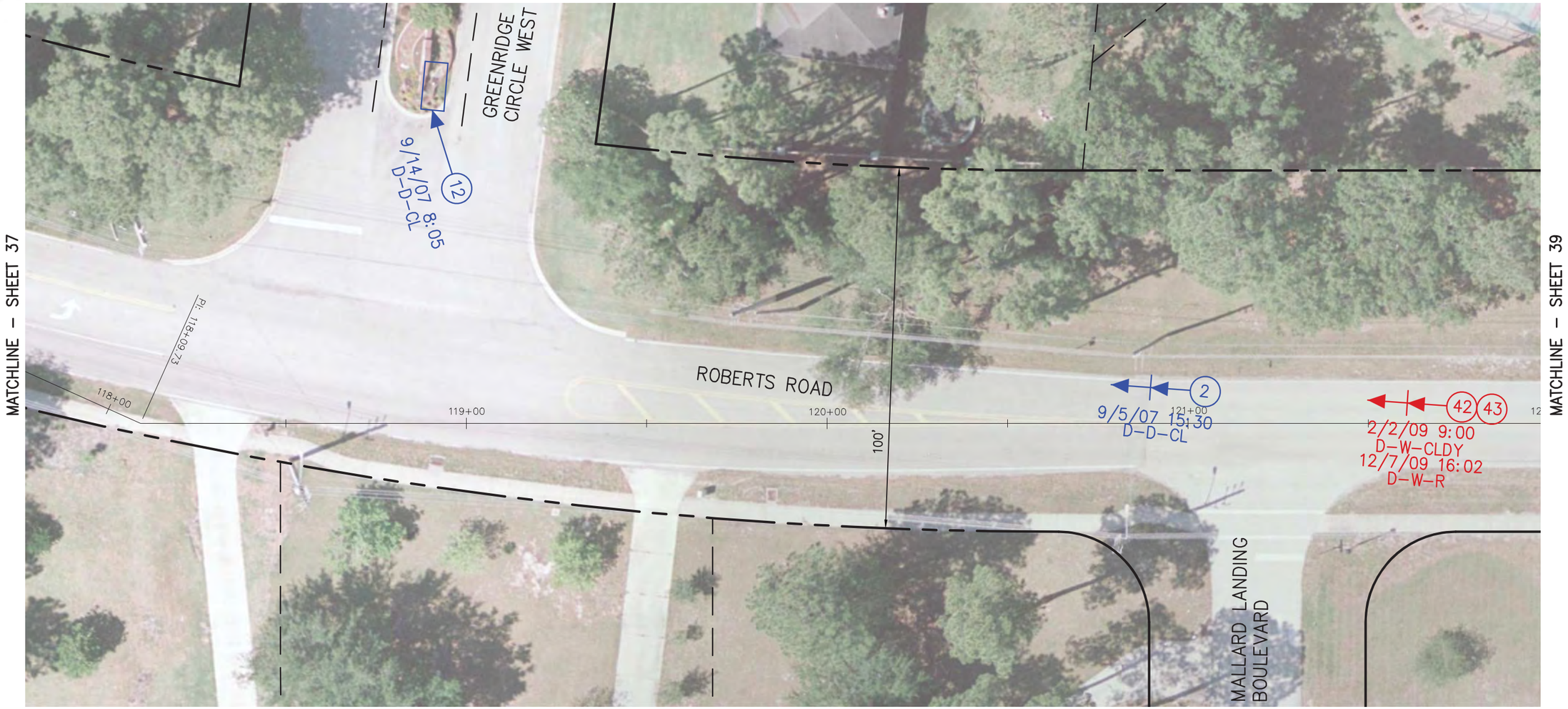
ROAD SURFACE
D=DRY
W=WET
I=ICY
S=SLIPPERY

WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

EXISTING CONDITIONS / CRASH SUMMARY



CONCEPT PLANS – SHEET 101

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES

X-X-X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

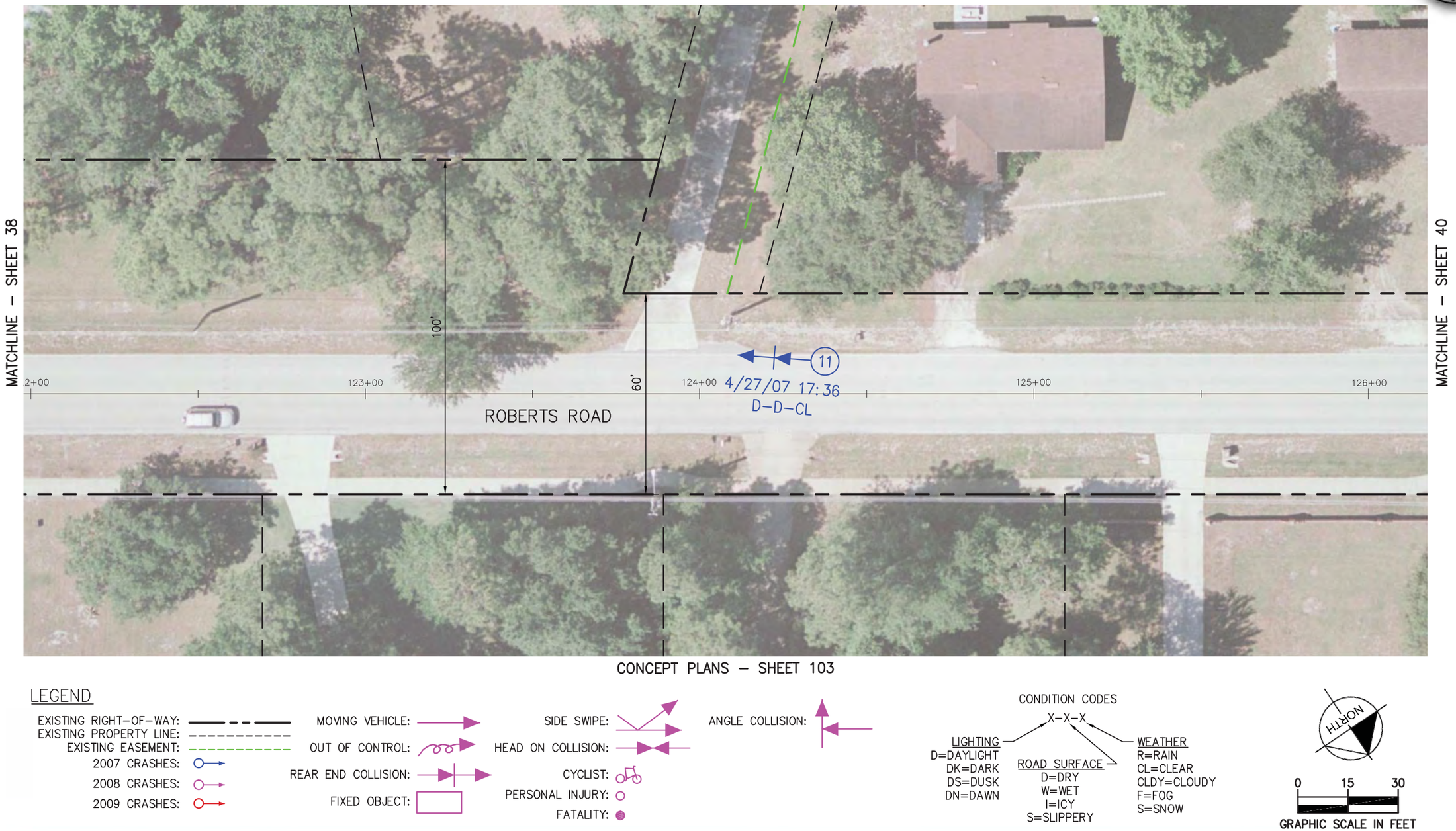
ROAD SURFACE
D=DRY
W=WET
I=ICY
S=SLIPPERY

WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

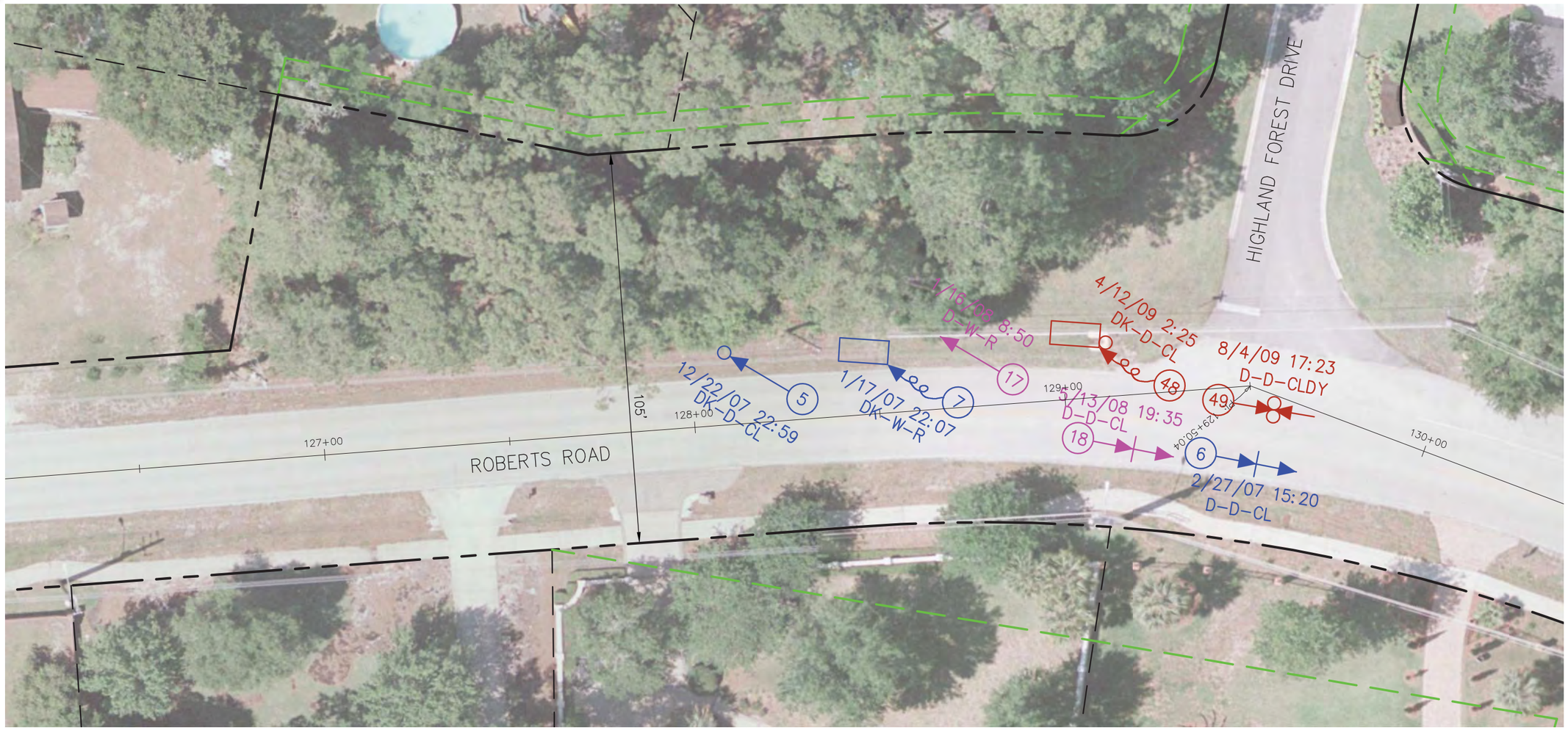
0 15 30
GRAPHIC SCALE IN FEET

Existing Conditions / Crash Summary



EXISTING CONDITIONS / CRASH SUMMARY

MATCHLINE – SHEET 39



MATCHLINE – SHEET 41

CONCEPT PLANS – SHEET 105

LEGEND

EXISTING RIGHT–OF–WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES

X–X–X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

ROAD SURFACE
D=DRY
W=WET
I=ICY
S=SLIPPERY

WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Kimley-Horn and Associates, Inc.

Existing Conditions / Crash Summary

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES

X-X-X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

ROAD SURFACE
D=DRY
W=WET
I=ICY
S=SLIPPERY

WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

EXISTING CONDITIONS / CRASH SUMMARY

CONCEPT PLANS – SHEET 109

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES

X-X-X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

ROAD SURFACE
D=DRY
W=WET
I=ICY
S=SLIPPERY

WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Existing Conditions / Crash Summary

CONCEPT PLANS – SHEET 111

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES

X-X-X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

ROAD SURFACE
D=DRY
W=WET
I=ICY
S=SLIPPERY

WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

EXISTING CONDITIONS / CRASH SUMMARY

CONCEPT PLANS – SHEET 113

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES

X-X-X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

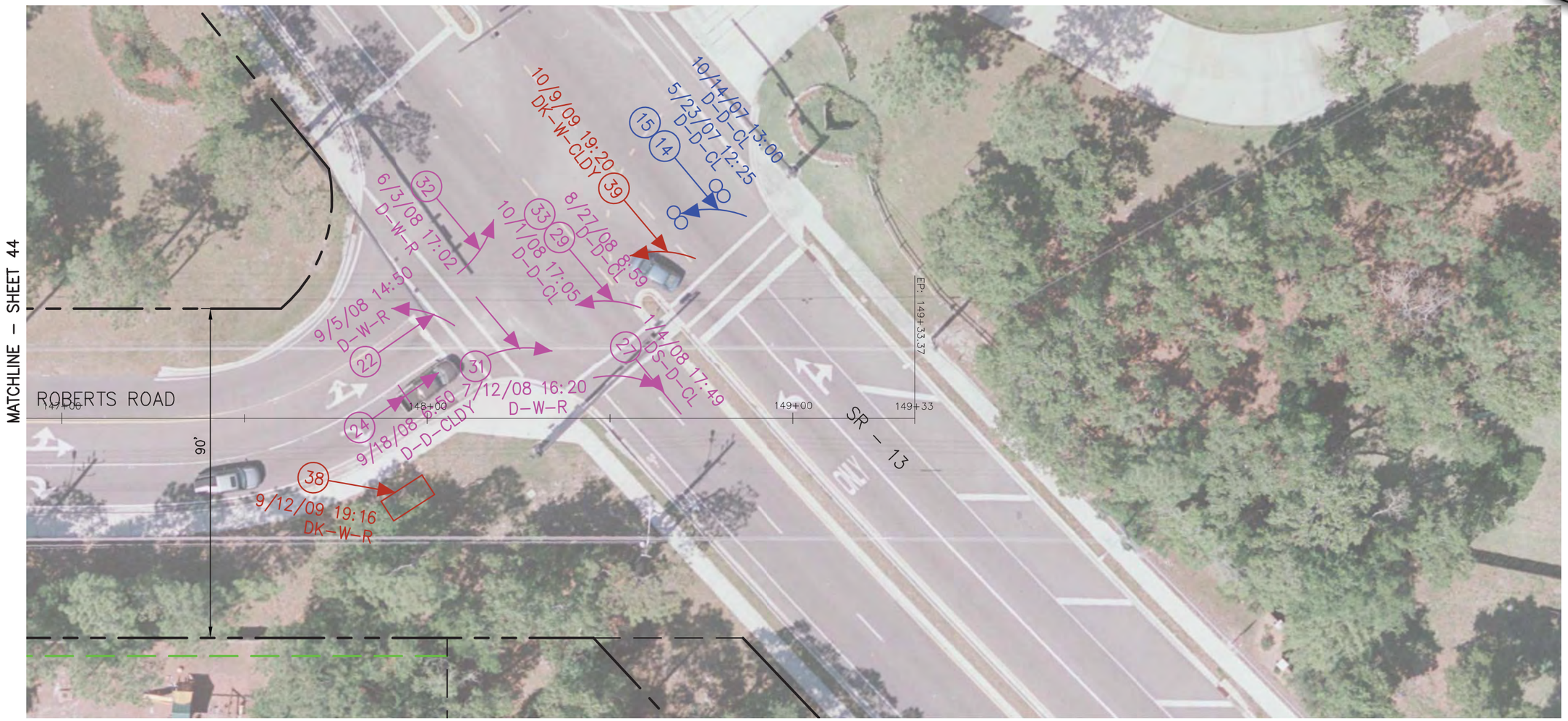
ROAD SURFACE
D=DRY
W=WET
I=ICY
S=SLIPPERY

WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

EXISTING CONDITIONS / CRASH SUMMARY



CONCEPT PLANS – SHEET 115

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
2007 CRASHES:
2008 CRASHES:
2009 CRASHES:

MOVING VEHICLE:
OUT OF CONTROL:
REAR END COLLISION:
FIXED OBJECT:

SIDE SWIPE:
HEAD ON COLLISION:
CYCLIST:
PERSONAL INJURY:
FATALITY:

ANGLE COLLISION:

CONDITION CODES

X-X-X

LIGHTING
D=DAYLIGHT
DK=DARK
DS=DUSK
DN=DAWN

ROAD SURFACE
D=DRY
W=WET
I=ICY
S=SLIPPERY

WEATHER
R=RAIN
CL=CLEAR
CLDY=CLOUDY
F=FOG
S=SNOW

NORTH

0 15 30
GRAPHIC SCALE IN FEET

CONCEPT DEVELOPMENT

The concept plans were developed around several goals stated by the County. The main goal was to limit the amount of right-of-way acquisitions, while also incorporating the safety recommendations and addressing any drainage concerns that could be determined with the limited drainage review.

The St. Johns County Public Works Department Engineering Division design details for minor (curb and gutter) and major (swaled section) collector road typical sections are shown on sheet 47. Both typical sections call for 12 foot travel lanes. During the conceptual design development stage it was discussed with County staff that in sections where the existing right-of-way was limited if the travel lanes could be reduced to 11 feet wide, it would eliminate the need for right-of-way acquisition from numerous parcels along the corridor. In order to make the concept plan more viable it was decided that in areas where the existing right-of-way was limited the travel lanes would be reduced from the County standards of 12 feet to 11 feet wide. When this project enters the design phase, if the 11 foot travel lane width option is pursued, a variance will be required for the deviation from the adopted County design standards. The urban and rural adopted County Standard Typical Sections are shown on sheet 47.

County staff stated that they were not limited to the location of the existing centerline of the roadway and the centerline could be adjusted to best utilize the existing right-of-way and to limit right-of-way acquisition. The safety recommendations that were evaluated would need to be incorporated and then the proposed typical section applied.

The right-of-way varies from 50 feet to 130 feet throughout the corridor, with much of the corridor having a 60 foot right-of-way width. Based on the wide variation of the right-of-way widths, it was determined that two different typical sections would be needed for the corridor. The main difference between the two typical sections is that one would have shoulders with swales and the other curb and gutter. This would allow an effective use of the existing right-of-way.

The safety evaluation determined that several left-turn and right-turn lanes were needed within the corridor. These needed turn lanes were considered and incorporated into the concept plans included in this report.

Based on the limited existing right-of-way and the recommendations of left -turn and right-turn lanes throughout the corridor, it was determined that a three-lane roadway typical section would be the chosen alternative. The three-lane section would allow the necessary left-turn lane storage and transitions lengths and a refuge for existing home owners turning in and out of their driveways. During final design consideration should be given as to whether medians and/or traffic separators should be incorporated into the three-lane roadway design typical section.

Where right-of-way is limited, a curb and gutter typical section was applied. This would allow the sidewalk to be placed at the back of curb to reduce the typical section width and allow for tie-in to the existing elevation at the right-of-way. In areas where the right-of-way has a larger width, a typical section with shoulders was applied. This will allow more use of the right-of-way for drainage conveyance and allow the sidewalk to remain outside of the clear zone.

The drainage is proposed to be conveyed to ponds located in different locations throughout the corridor. Four potential locations for ponds were identified. In the southeast quadrant of the intersection of Longleaf Pine Parkway (CR 244) and Roberts Road, a pond could be constructed. This location would utilize existing County right-of-way that is not being used since the realignment of Roberts Road and Longleaf Pine Parkway intersection. This location would also allow the existing outfall location to be used within the existing right-of-way.

The next pond location was located at Station 63+00, across from Greenfield Drive. This location has a few options. Option A would be to model and evaluate the current stormwater management facility that is located west of Roberts Road to see how much additional storage could be obtained. This recommendation matches the results from the "Drainage Pond Evaluation Memo on Roberts Road Curve Realignment for St. Johns County", completed by CH2M Hill on September 29, 2010. Option B would be to construct a new pond adjacent to Roberts Road and an outfall to the existing stormwater management facility.

The third and fourth potential pond locations are located at Station 110+00. At this location on the east side of Roberts Road is a large wetland area. The wetland area is blocked from flowing to the west by Roberts Road. Bypass pipes are shown to allow the wetland to overflow to the west. The pipes will be located to the south of pond location #3. Pond location #3 is a 1-acre lot between two existing houses. Pond location #4 is on the east side of Roberts Road. There is an existing pond that could be converted into a joint use pond and expanded.

All of the existing drainage easements need to be cleaned and maintained to allow for proper conveyance.

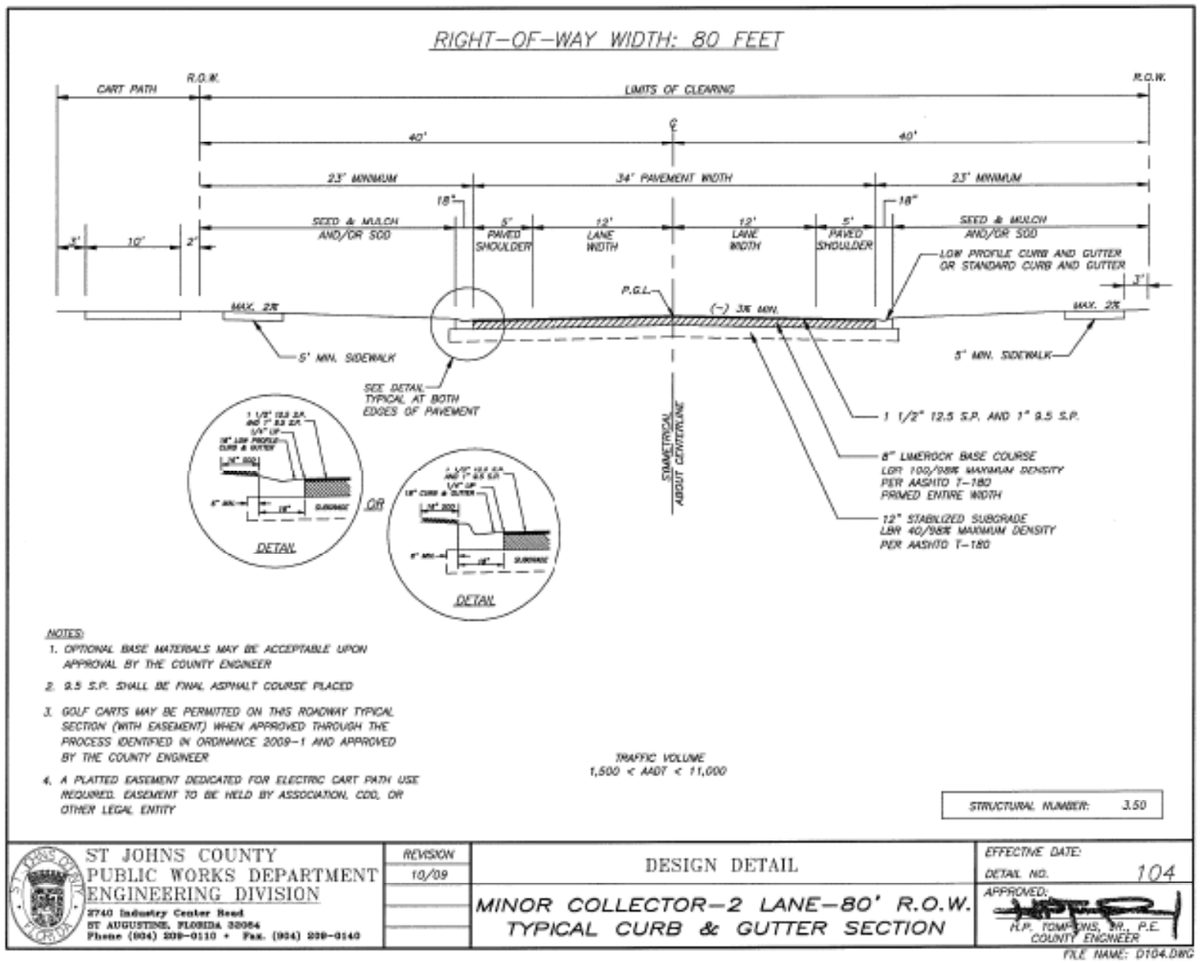
Throughout the corridor there are above ground utility poles that will need to be relocated due to their proximity to the edge of pavement and violation of clear zone distances. Some utility poles will have to be relocated due to the new alignment of the roadway.

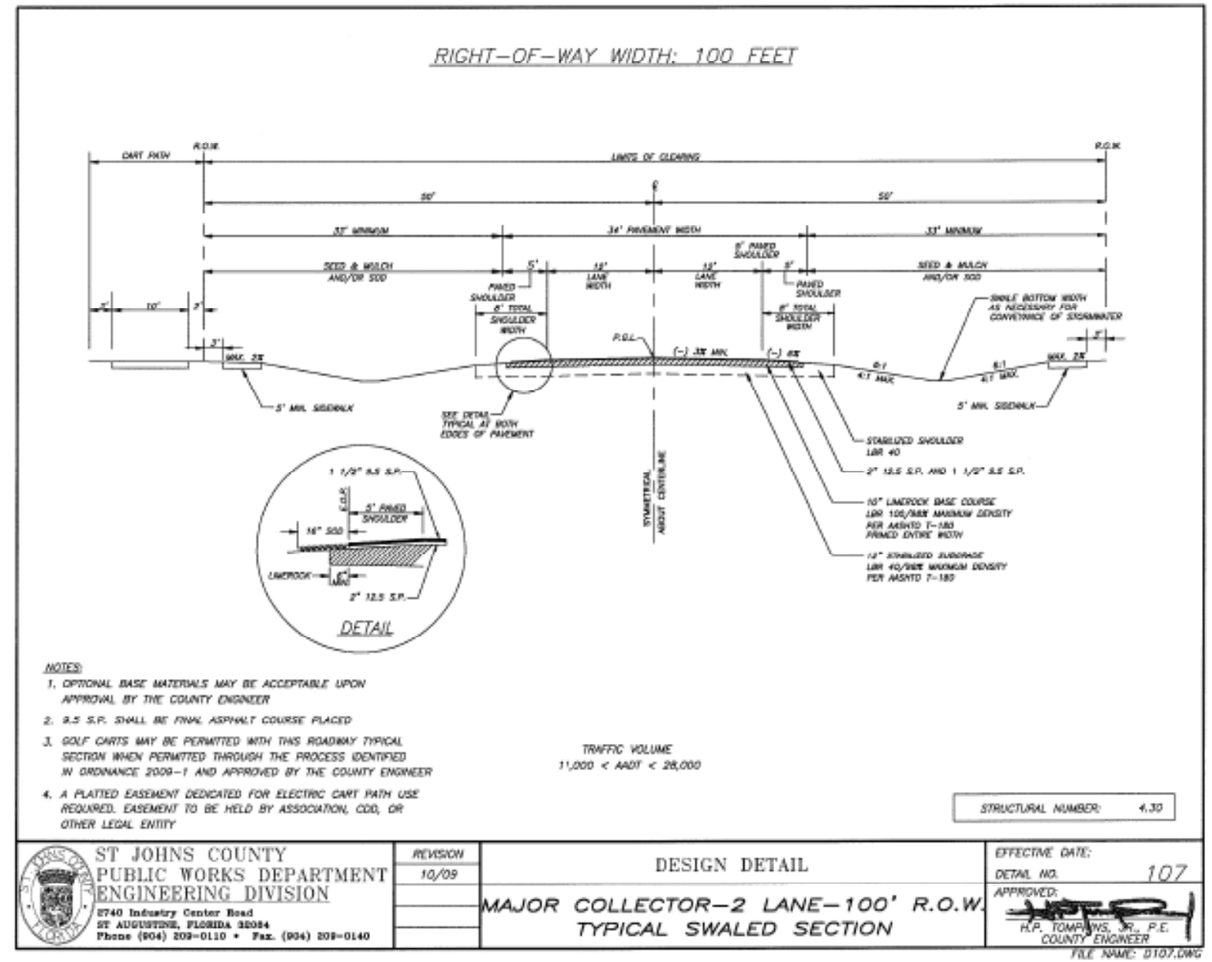
It is assumed that the typical cross slope for Roberts Road will be 3 percent based on the County's adopted collector typical section. In addition, a superelevation rate of 3 percent was used where a crowned section was not achievable based on the minimum curve radius per FDOT's design standards. Curve data has been provided on the concept plans included in this report.

The proposed concept plans are graphically depicted on Sheets 48 through 119.

The project was broken into three phasees for future implementation. Phase one would begin at STA. 111+00 and end at STA. 147+15. Phase two would continue from STA. 111+00 and end at STA. 58+00. Phase three would include STA. 58+00 to STA. 10+00. The intent would be for phase one to be implemented first, then phase two and the last phase would be phase three.

Concept Plans





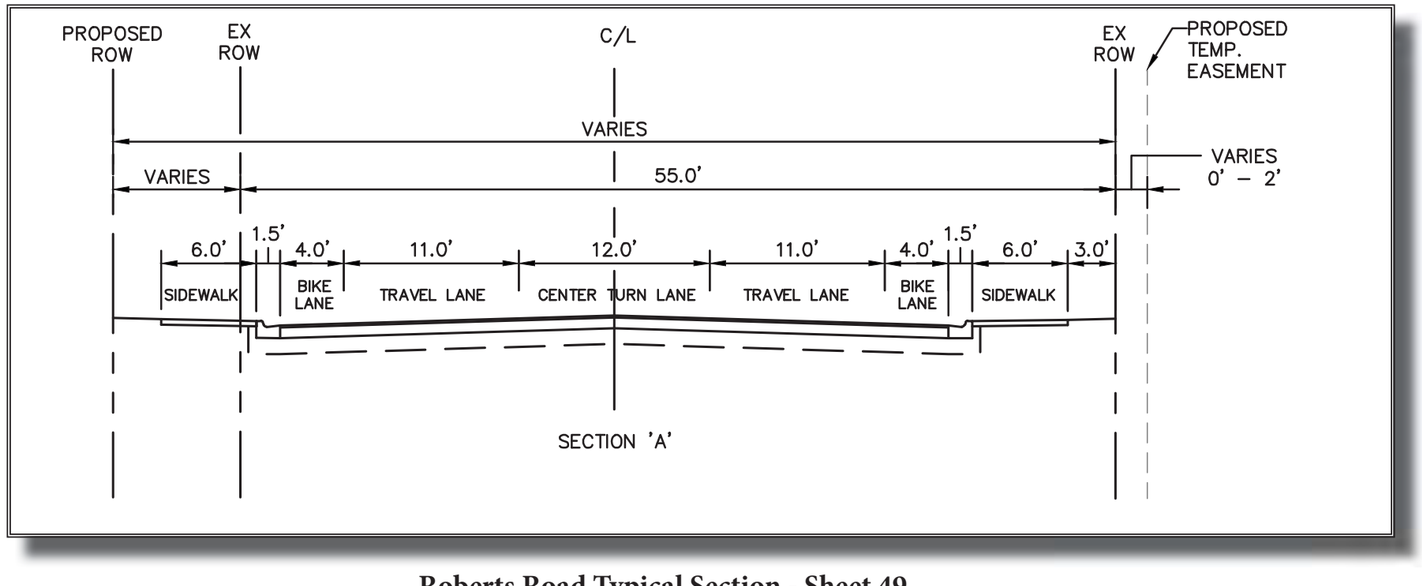
Longleaf Pine Parkway

Longleaf Pine Parkway is a major collector oriented in the north-south direction in the vicinity of the Roberts Road intersection. It is a two-lane roadway to the north and a four-lane divided roadway to the south of the intersection with a posted speed limit of 35 mph. The movements at the T-intersection are controlled by a traffic signal of diagonal box span wire design. The southeastbound approach is the southern limit of Roberts Road. Exclusive left-turn lanes are present in the southeastbound and northbound directions. The northbound left-turn movement operates with protected-permissive left-turn phasing and the southeastbound left-turn movement is permissive. The southeastbound right-turn lane operates as free-flow.

As summarized in Tables 4 and 5, the intersection currently operates at LOS A during the AM Peak Hour and LOS B during the PM Peak Hour, with all movements operating at LOS C or better. As summarized in Tables 8 and 9, the existing turn lane lengths on Roberts Road are sufficient to accommodate the existing traffic queues.

Needs:

- None



Roberts Road Typical Section - Sheet 49

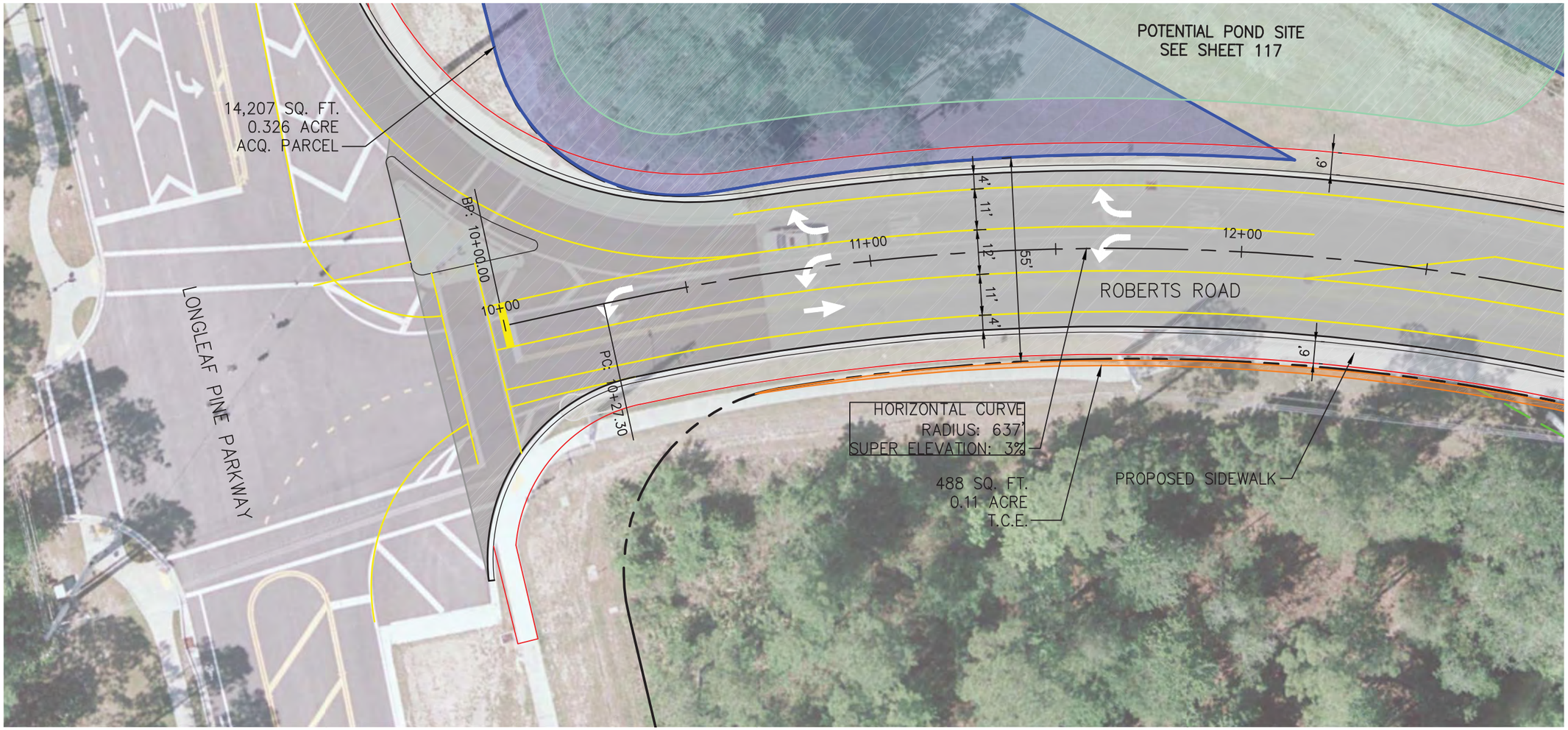
Pavement Design

Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

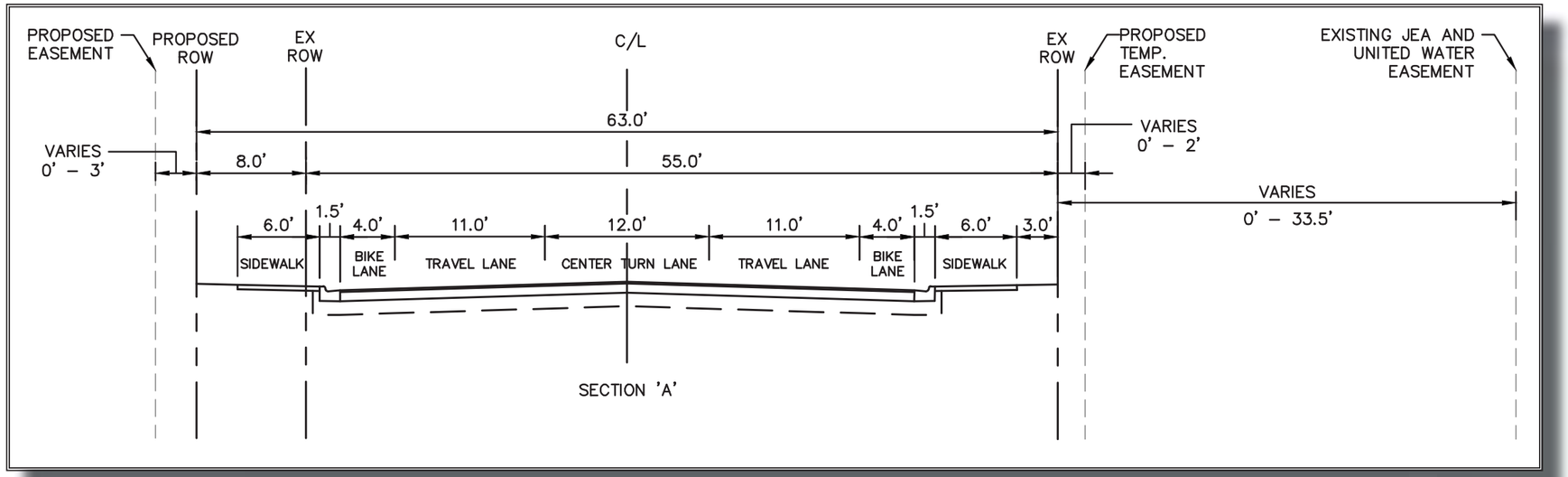
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Concept Plans



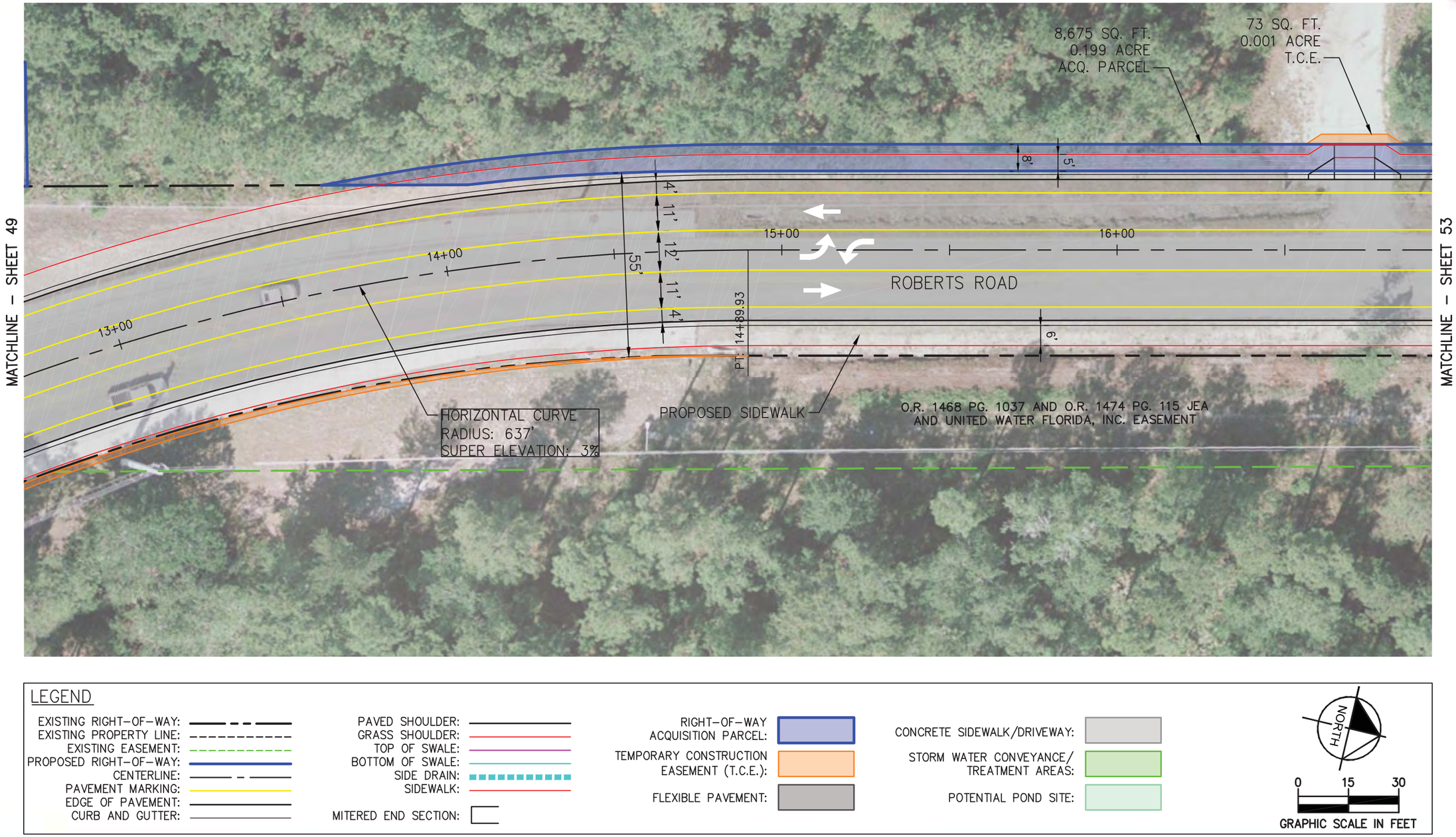
Roberts Road Typical Section - Sheet 51

Pavement Design
Friction Couse - 9.5 (1.5")

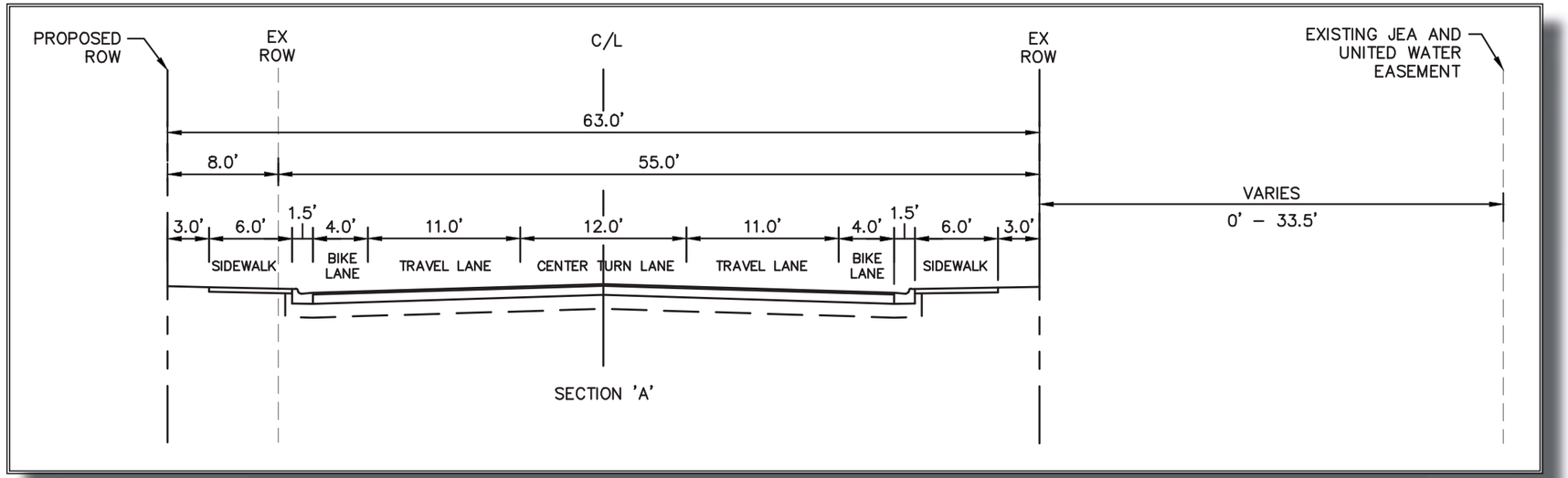
Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180


MATCHLINE – SHEET 49
MATCHLINE – SHEET 53
8,675 SQ. FT.
0.199 ACRE
ACQ. PARCEL
73 SQ. FT.
0.001 ACRE
T.C.E.
8'
5'
4'
11'
12'
11'
4'
55'
13+00
14+00
15+00
16+00
ROBERTS ROAD
PT: 14+89.93
6'
HORIZONTAL CURVE
RADIUS: 637'
SUPER ELEVATION: 3%
PROPOSED SIDEWALK
O.R. 1468 PG. 1037 AND O.R. 1474 PG. 115 JEA
AND UNITED WATER FLORIDA, INC. EASEMENT
LEGEND
EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:
PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:
CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:
NORTH
0
15
30
GRAPHIC SCALE IN FEET

Concept Plans



Roberts Road Typical Section - Sheet 53

Pavement Design

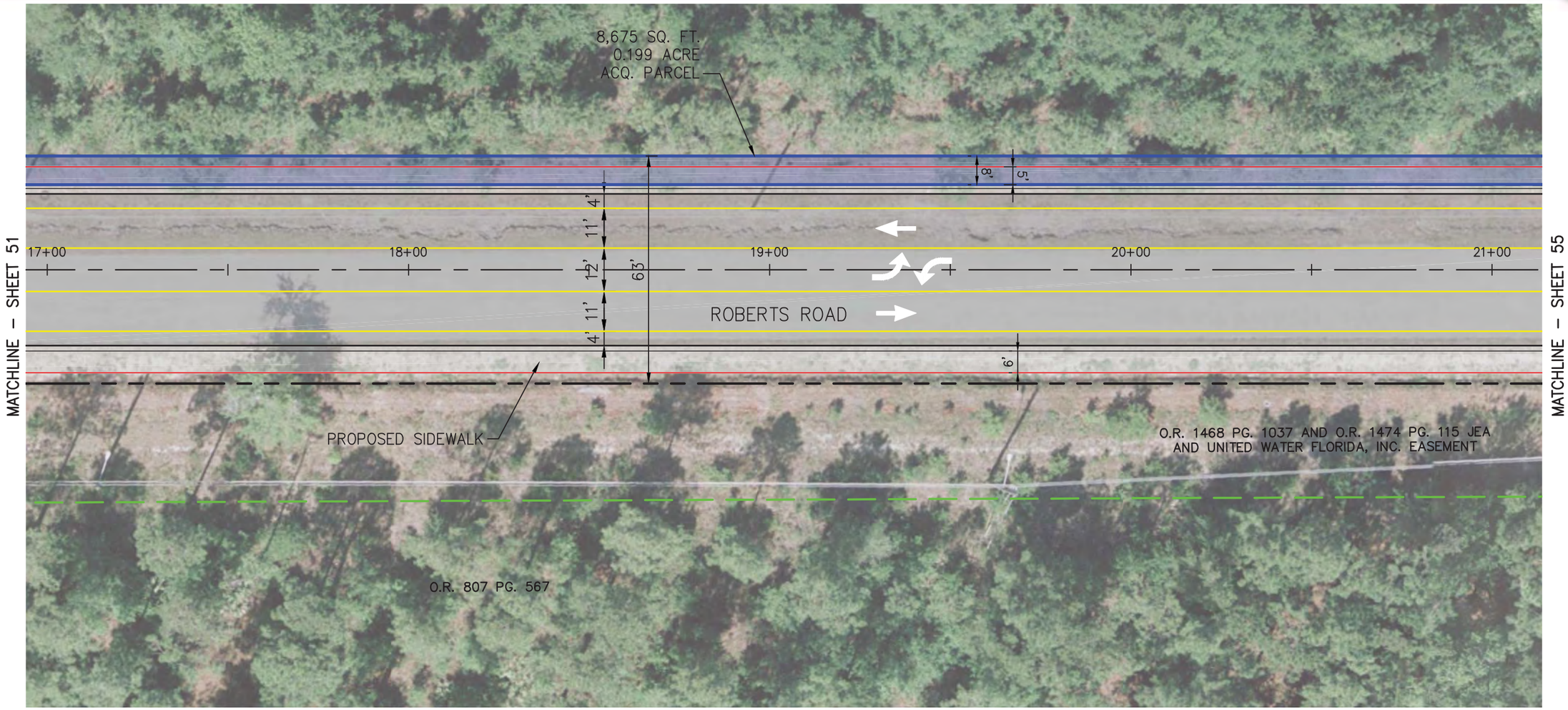
Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180

CONCEPT PLANS



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

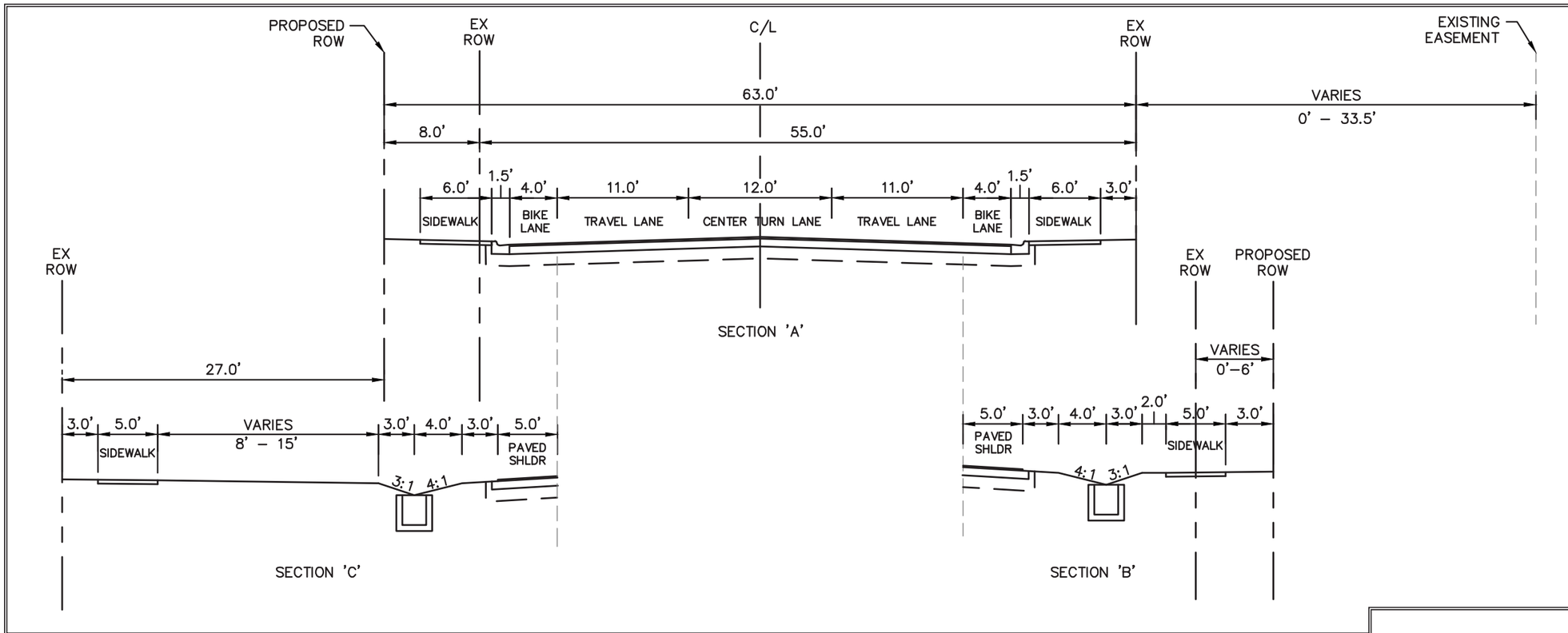
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Concept Plans



Roberts Road Typical Section

Section 'A' - Begins at STA: 21+15
Section 'B' - Begins at STA: 24+25
Section 'C' - Begins at STA: 24+75

Pavement Design

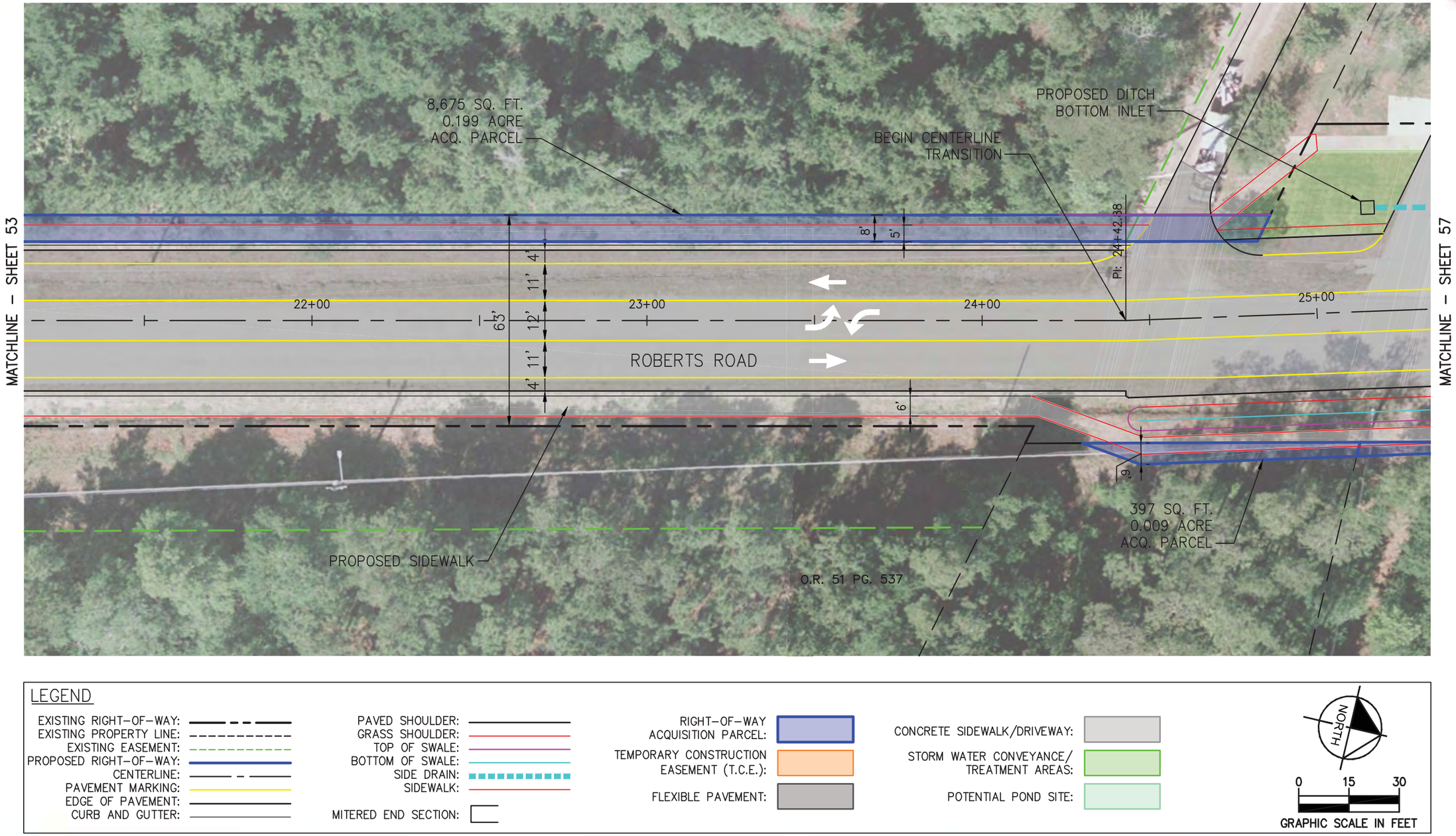
Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

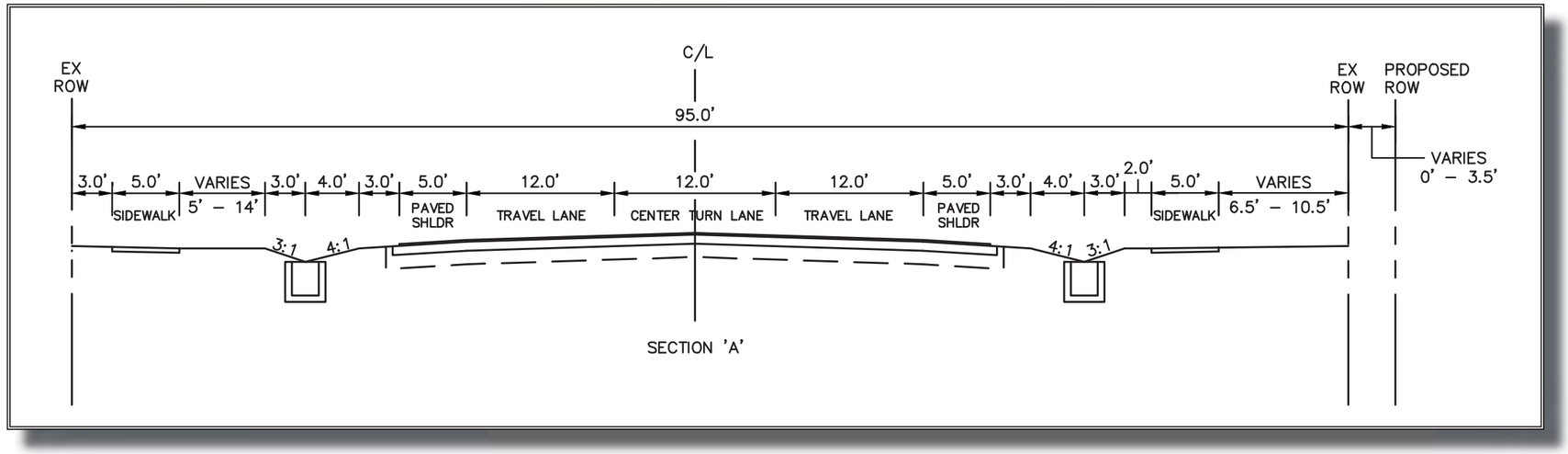
10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180

CONCEPT PLANS



Concept Plans



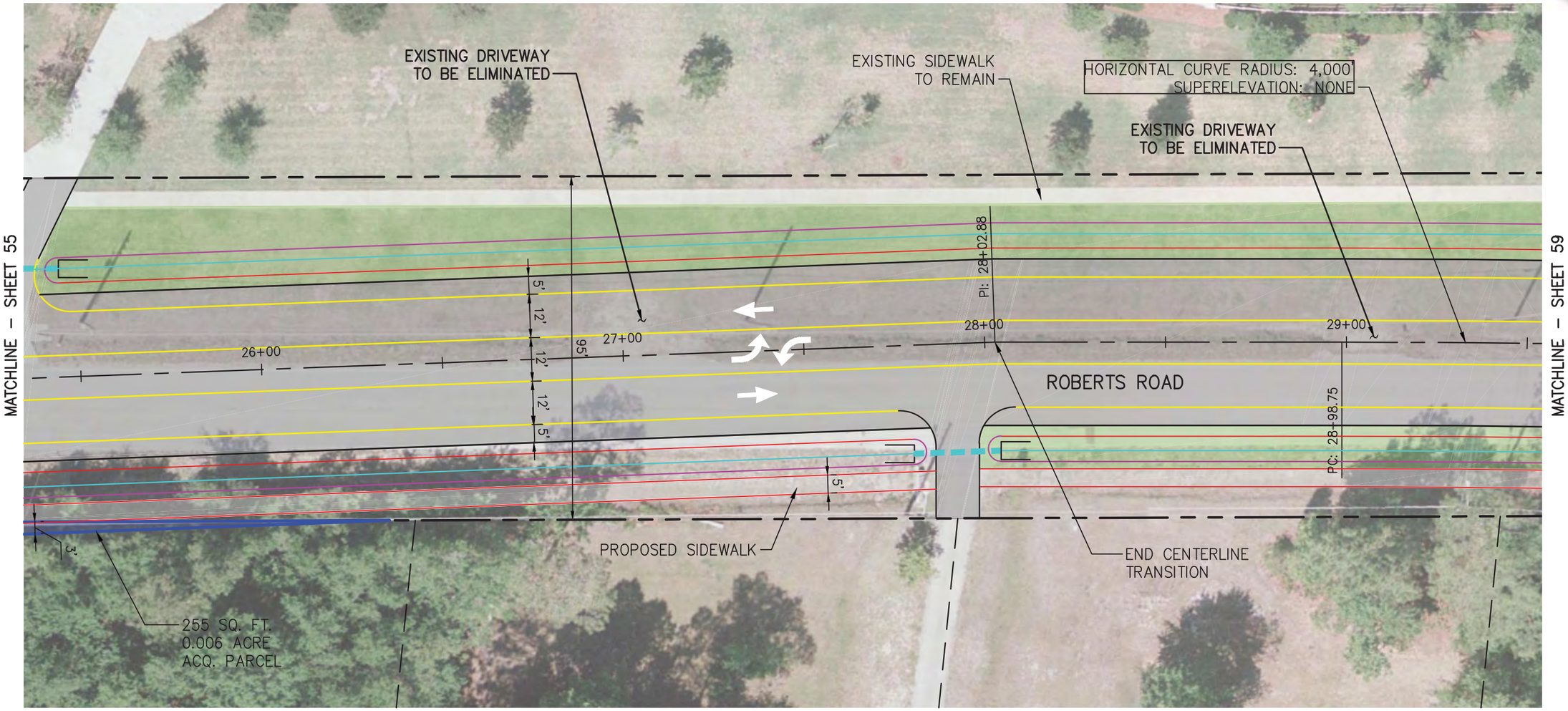
Roberts Road Typical Section - Sheet 57

Pavement Design
Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

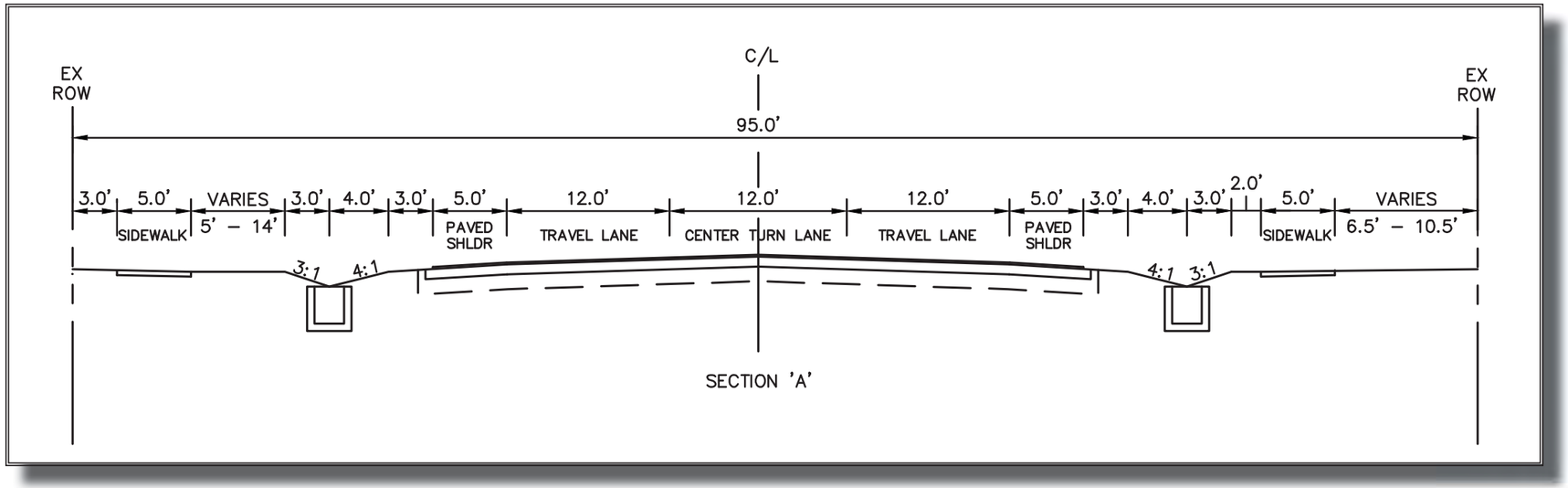
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Concept Plans



Roberts Road Typical Section - Sheet 59

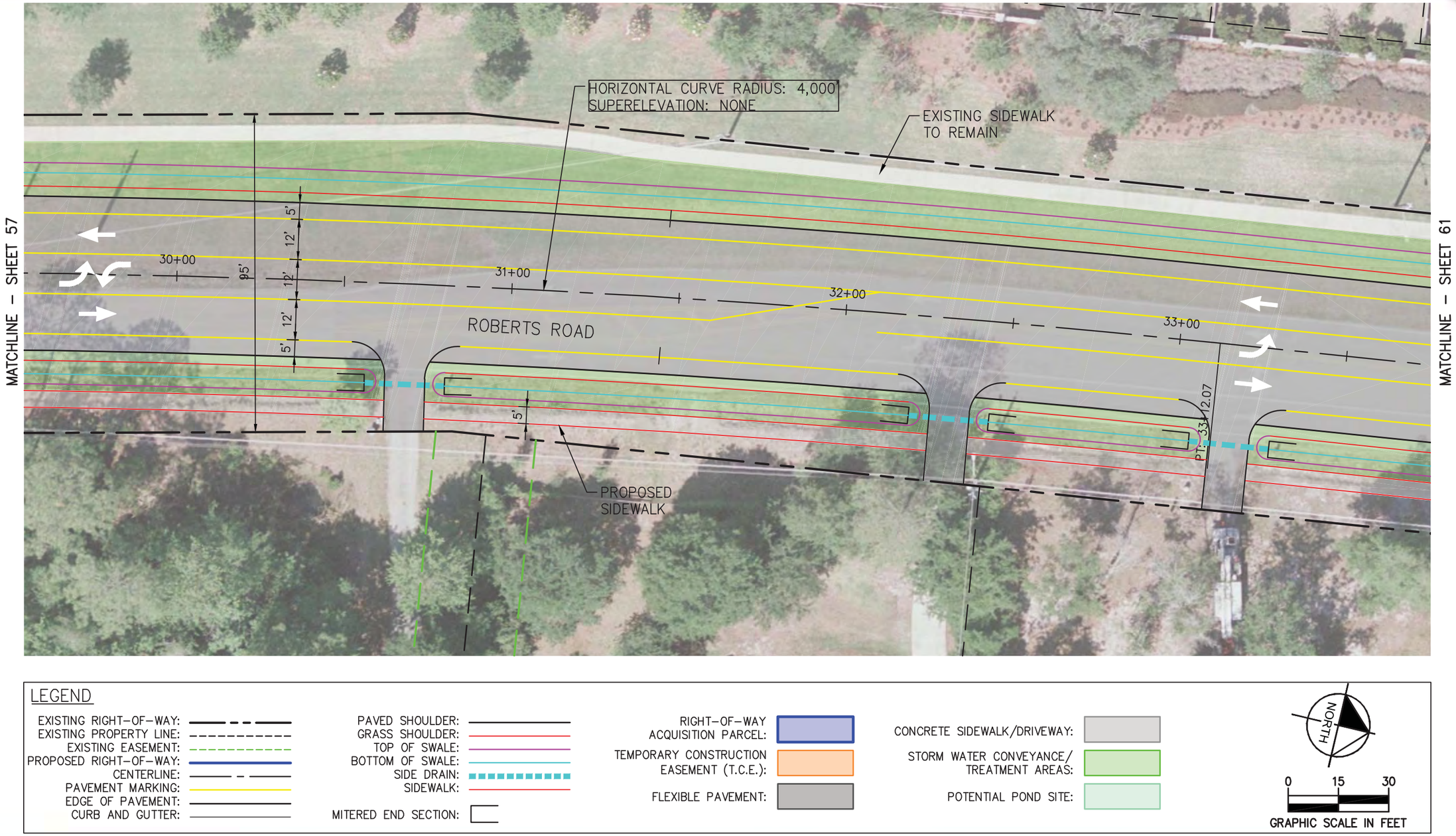
Pavement Design

Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180


HORIZONTAL CURVE RADIUS: 4,000'
SUPERELEVATION: NONE
EXISTING SIDEWALK TO REMAIN
MATCHLINE – SHEET 57
MATCHLINE – SHEET 61
30+00
31+00
32+00
33+00
95'
5'
12'
12'
12'
5'
5'
ROBERTS ROAD
PROPOSED SIDEWALK
PT: 33+12.07
LEGEND
EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:
PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:
CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:
NORTH
0
15
30
GRAPHIC SCALE IN FEET

Concept Plans

Bedstone Drive

The intersection of Bedstone Drive at Roberts Road is a two-way, stop-controlled T-intersection with Bedstone Drive being the west leg to the intersection controlled by a stop sign and Roberts Road operating as free-flow. This intersection was not counted and no operational analysis was performed. An exclusive left-turn lane is present in the northbound direction and an exclusive right-turn lane is present in the southbound direction. As summarized in Tables 8 and 9, the existing turn lane lengths are sufficient to accommodate the existing traffic queues.

Needs:

- None

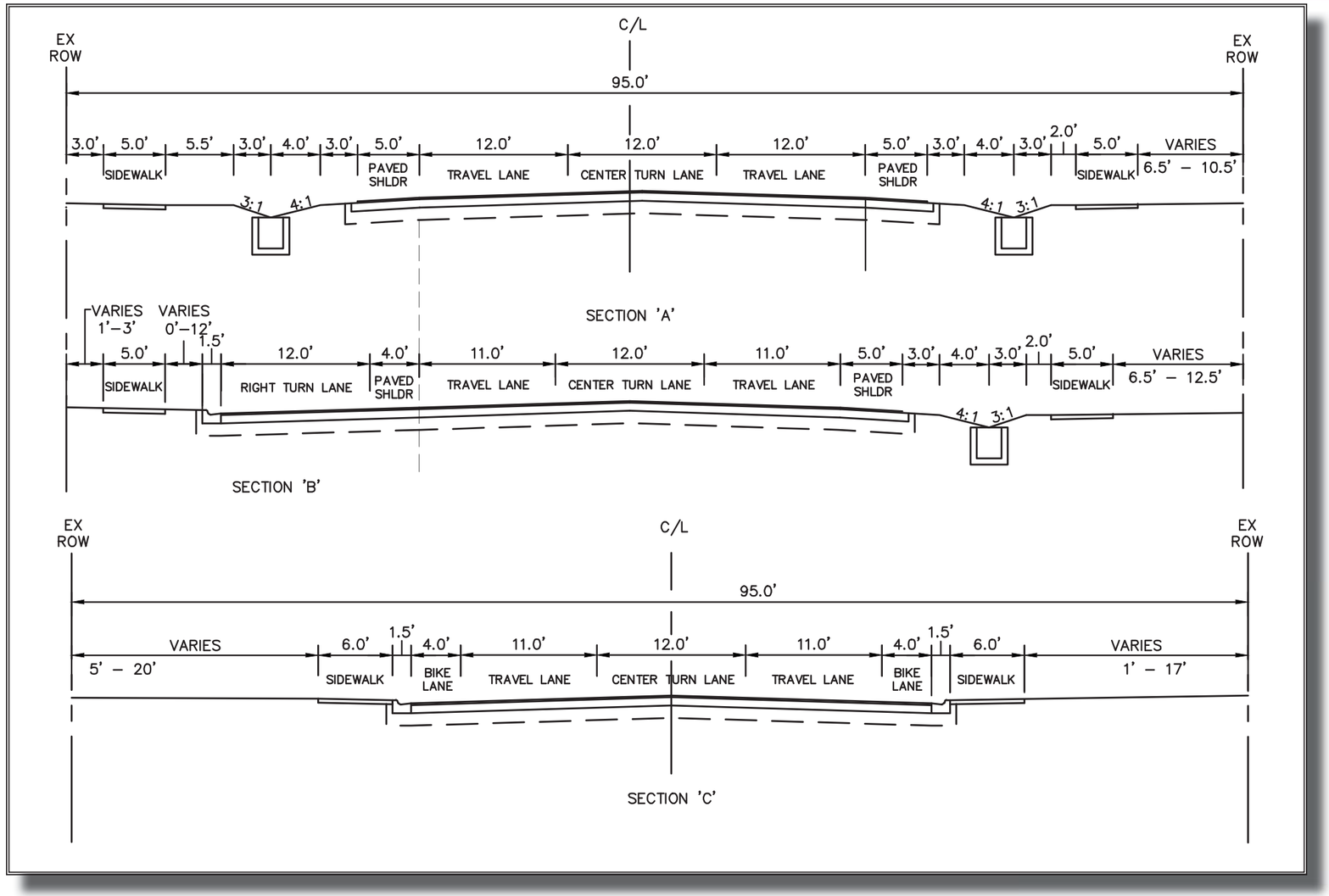
Pavement Design

Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180

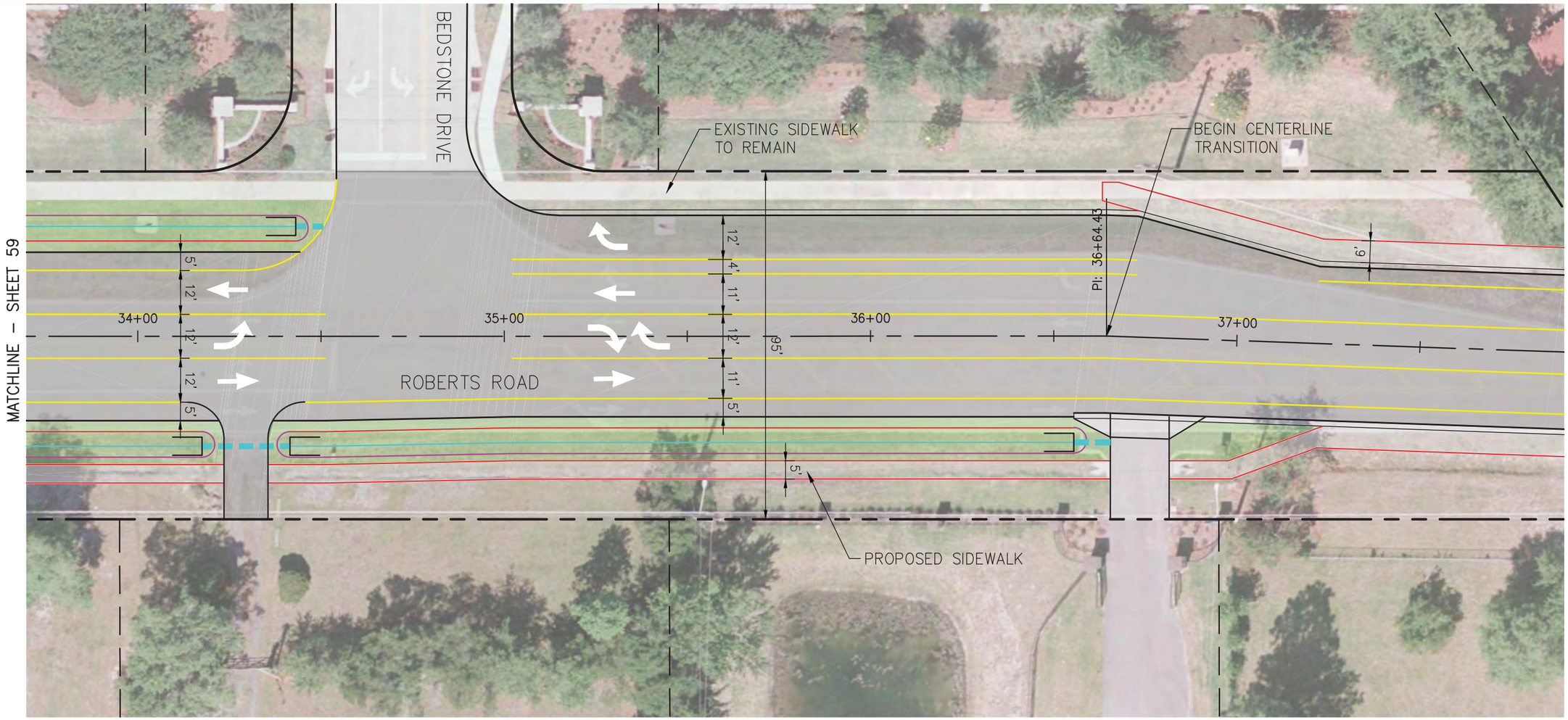


Roberts Road Typical Section

Section 'A' - Begins at STA: 33+50
Section 'B' - Begins at STA: 35+00
Section 'C' - Begins at STA: 37+25

Kimley-Horn and Associates, Inc.

CONCEPT PLANS



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

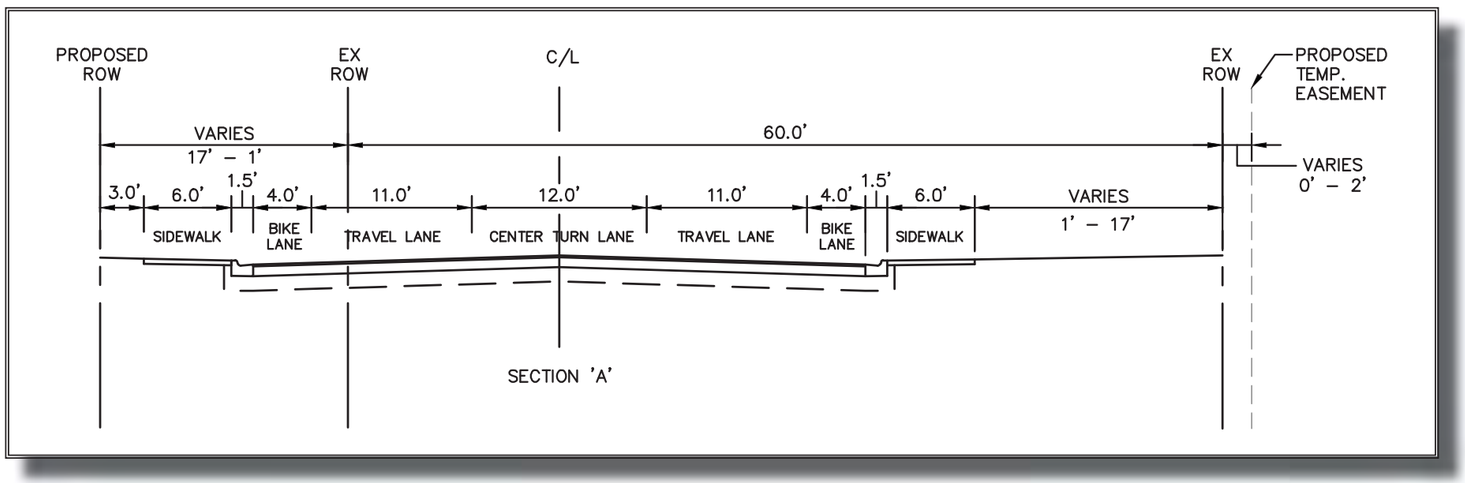
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Concept Plans



Roberts Road Typical Section - Sheet 63

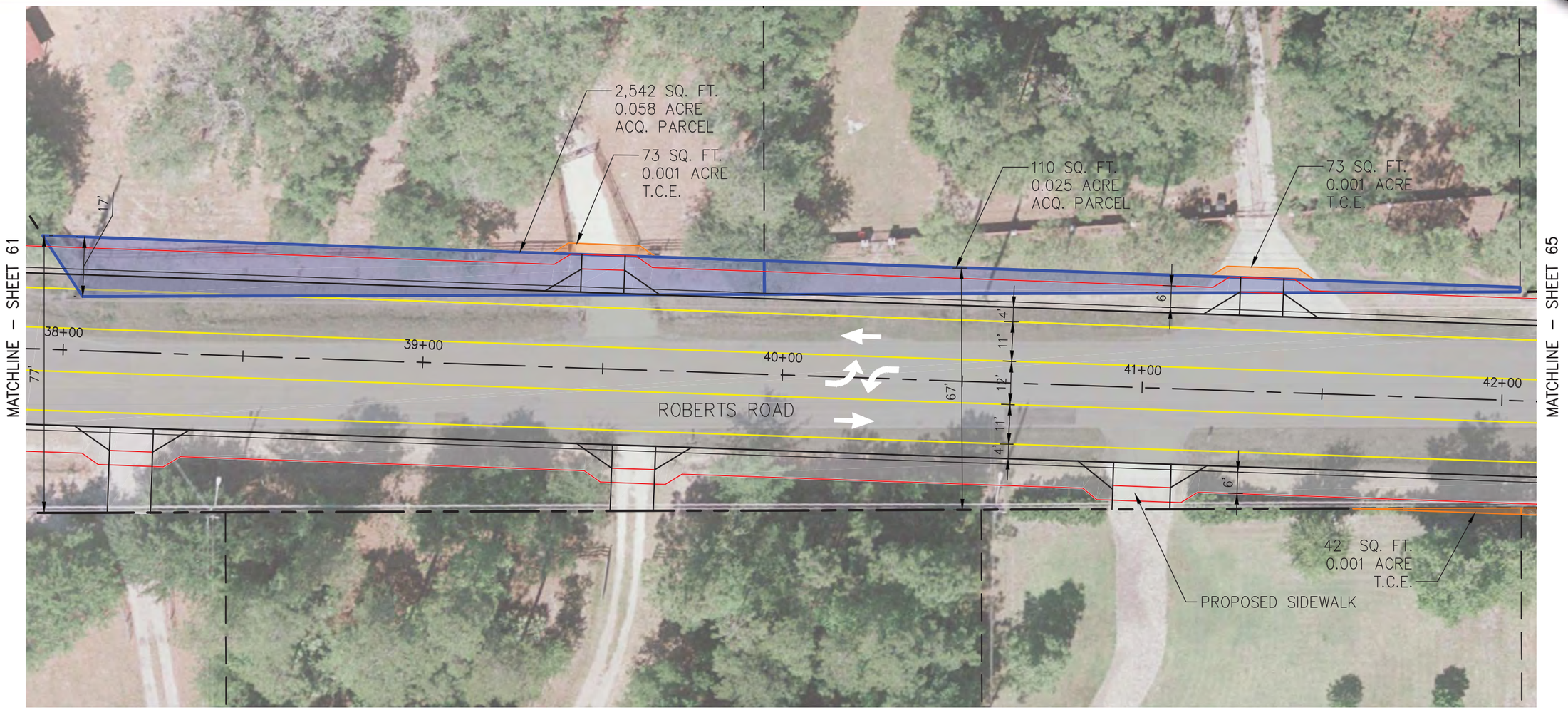
Pavement Design

Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

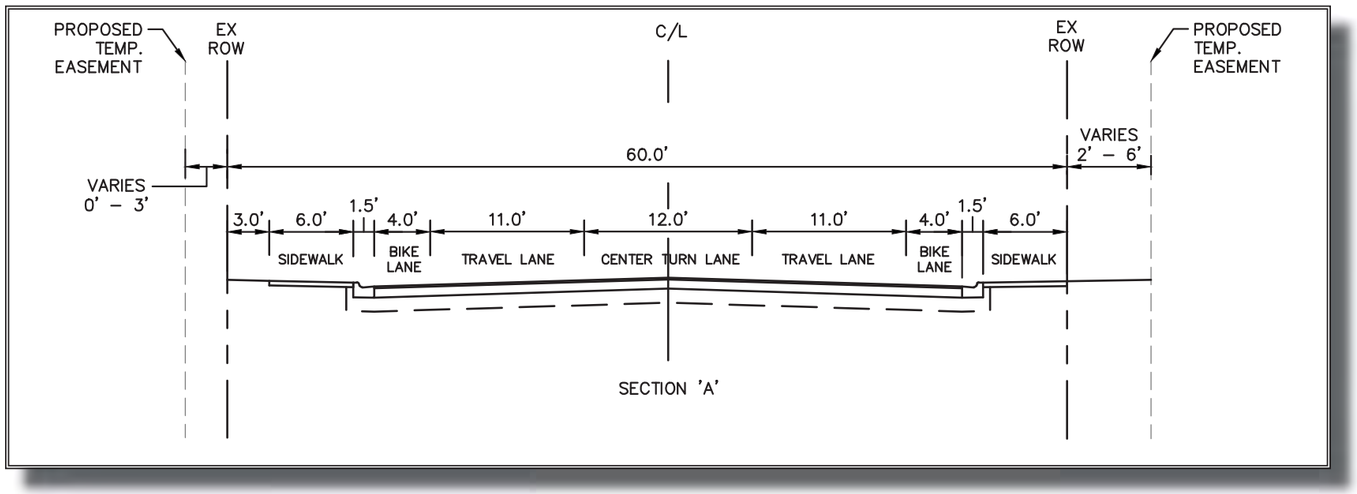
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Concept Plans



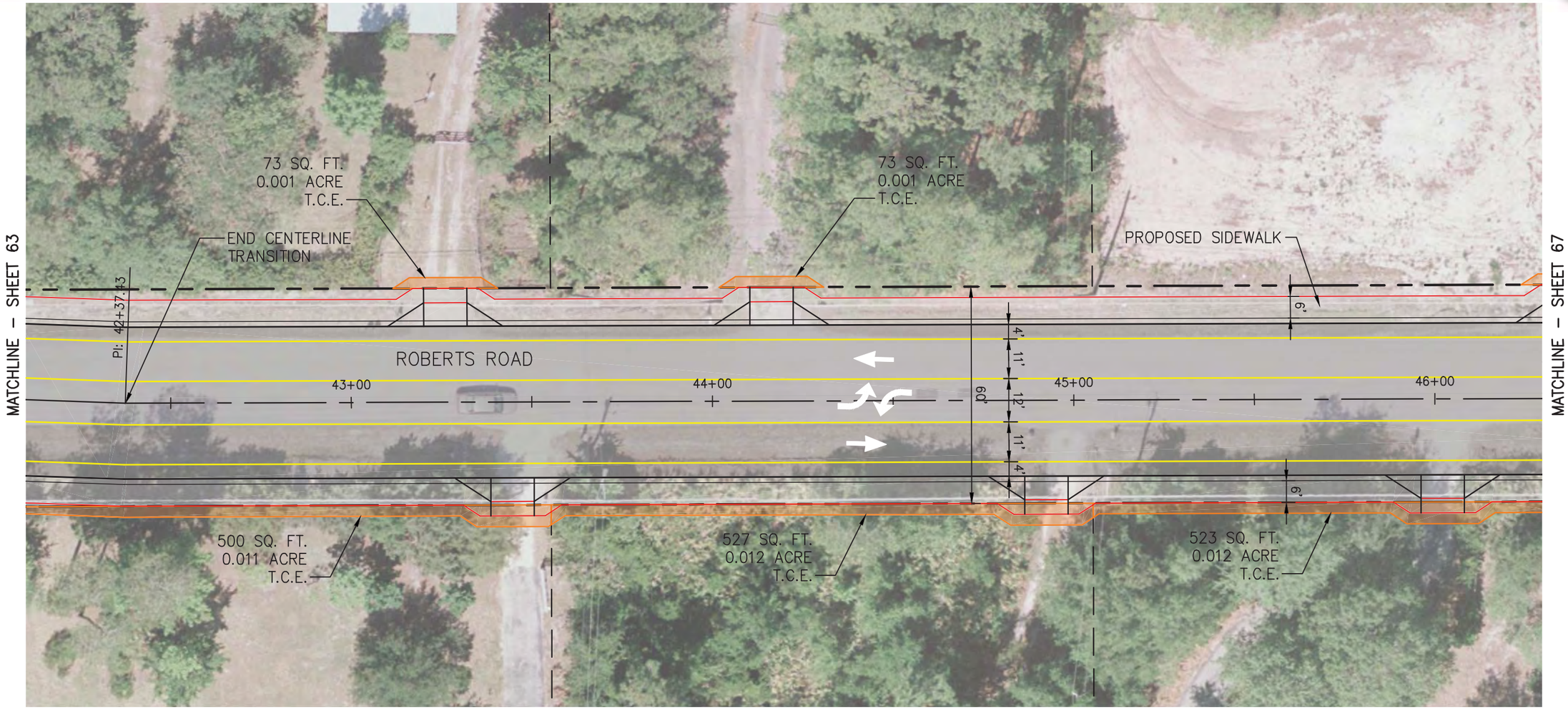
Roberts Road Typical Section - Sheet 65

Pavement Design
Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

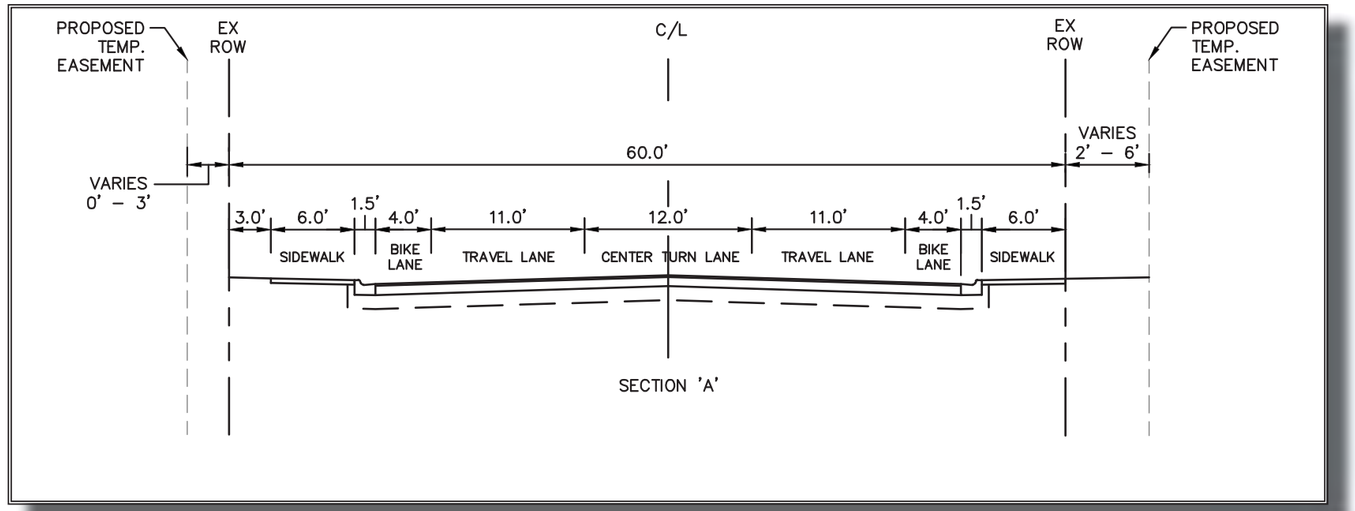
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Concept Plans



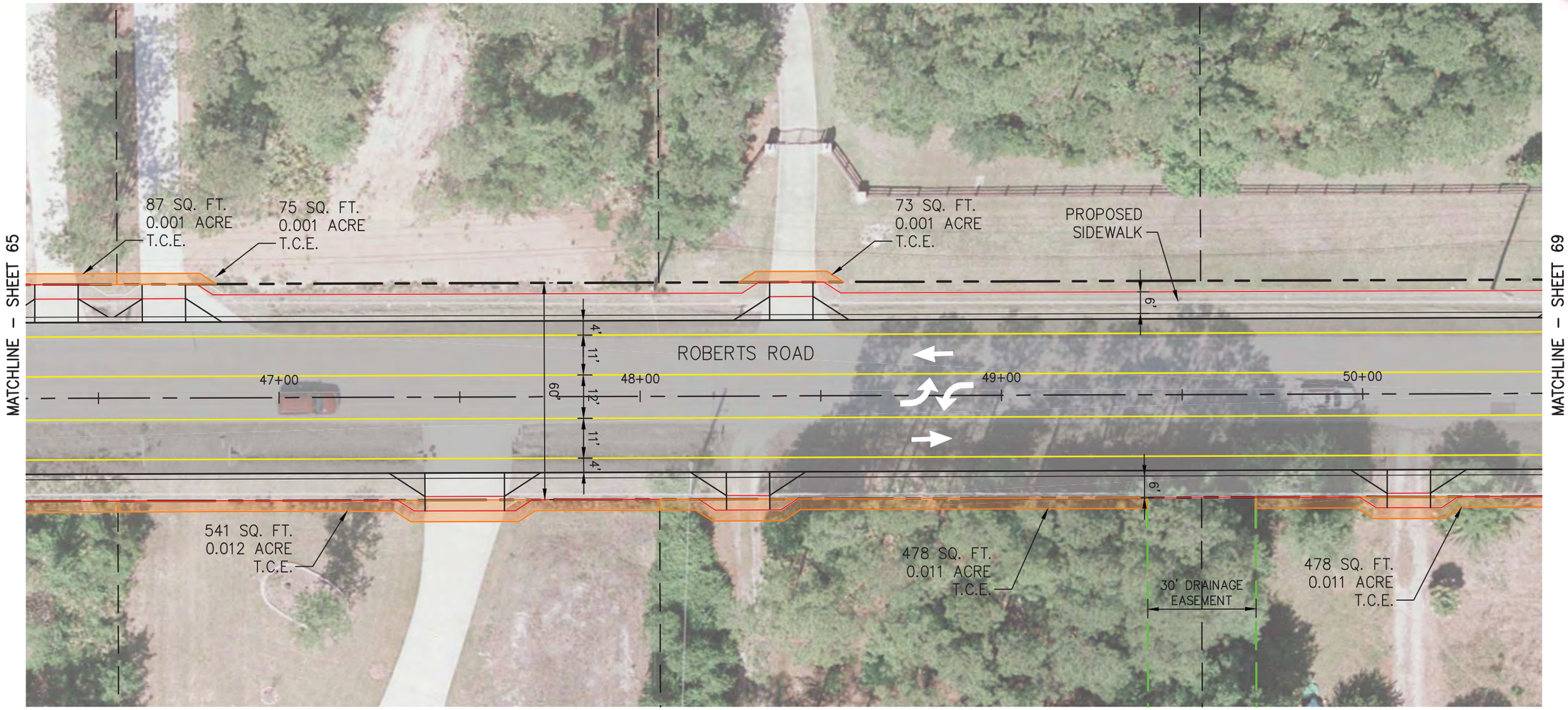
Roberts Road Typical Section - Sheet 67

Pavement Design
Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

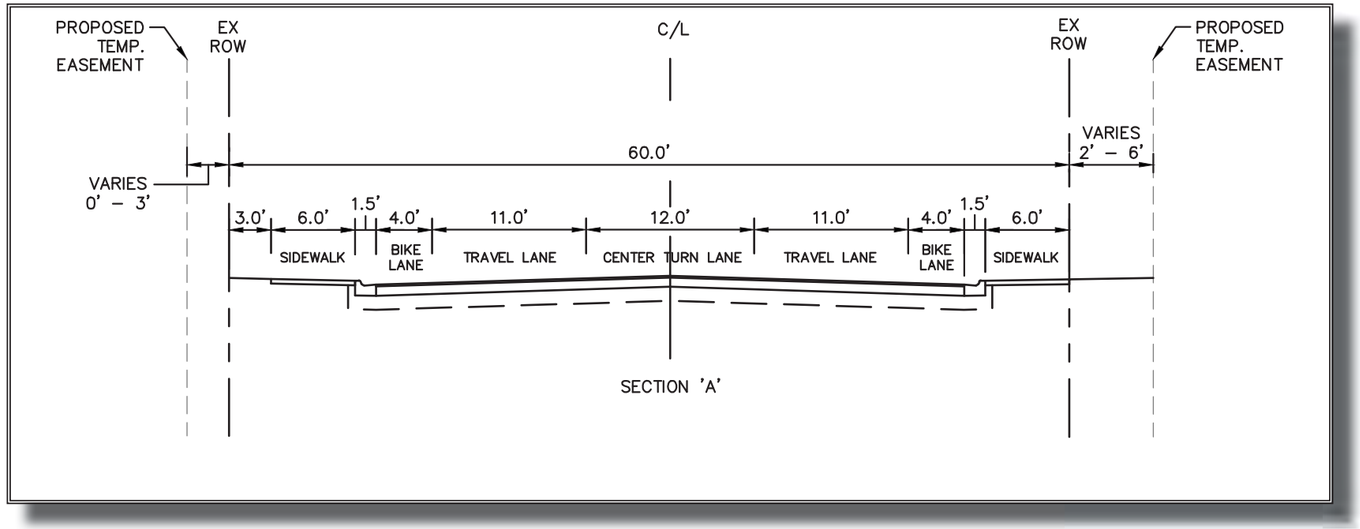
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Concept Plans



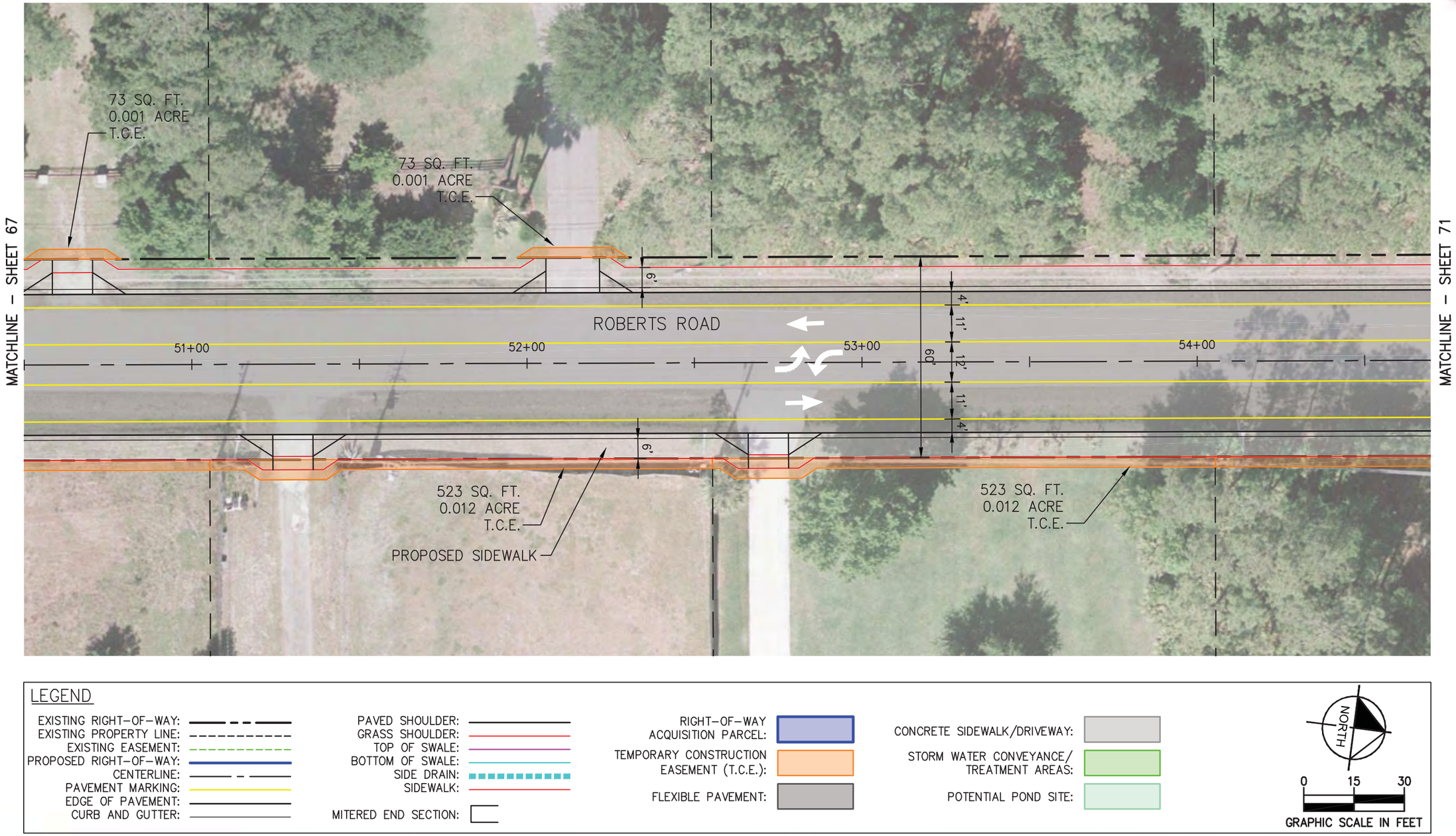
Roberts Road Typical Section - Sheet 69

Pavement Design
Friction Couse - 9.5 (1.5")

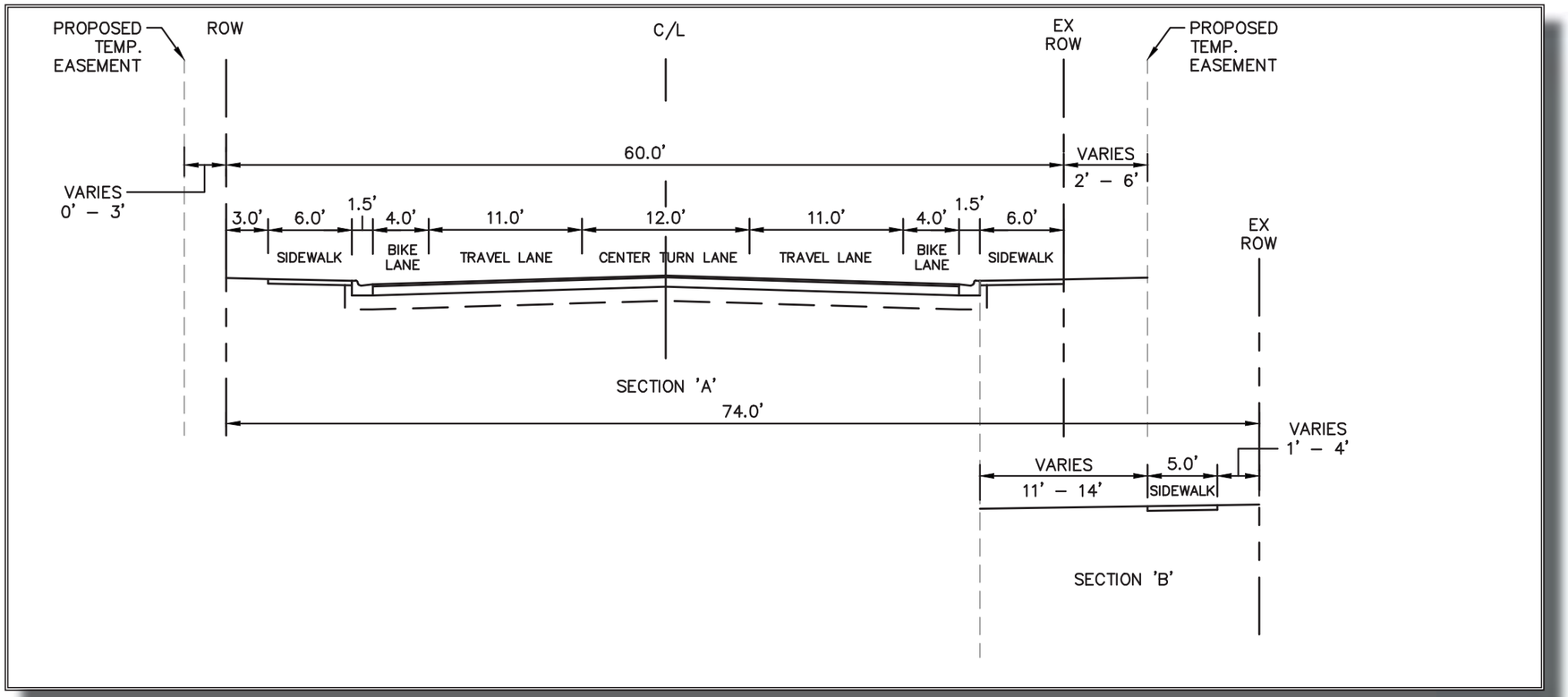
Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180


73 SQ. FT.
0.001 ACRE
T.C.E.
73 SQ. FT.
0.001 ACRE
T.C.E.
MATCHLINE – SHEET 67
MATCHLINE – SHEET 71
6'
4'
11'
12'
60'
12'
11'
4'
6'
ROBERTS ROAD
51+00
52+00
53+00
54+00
523 SQ. FT.
0.012 ACRE
T.C.E.
PROPOSED SIDEWALK
523 SQ. FT.
0.012 ACRE
T.C.E.
LEGEND
EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:
PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:
CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:
NORTH
0
15
30
GRAPHIC SCALE IN FEET

Concept Plans



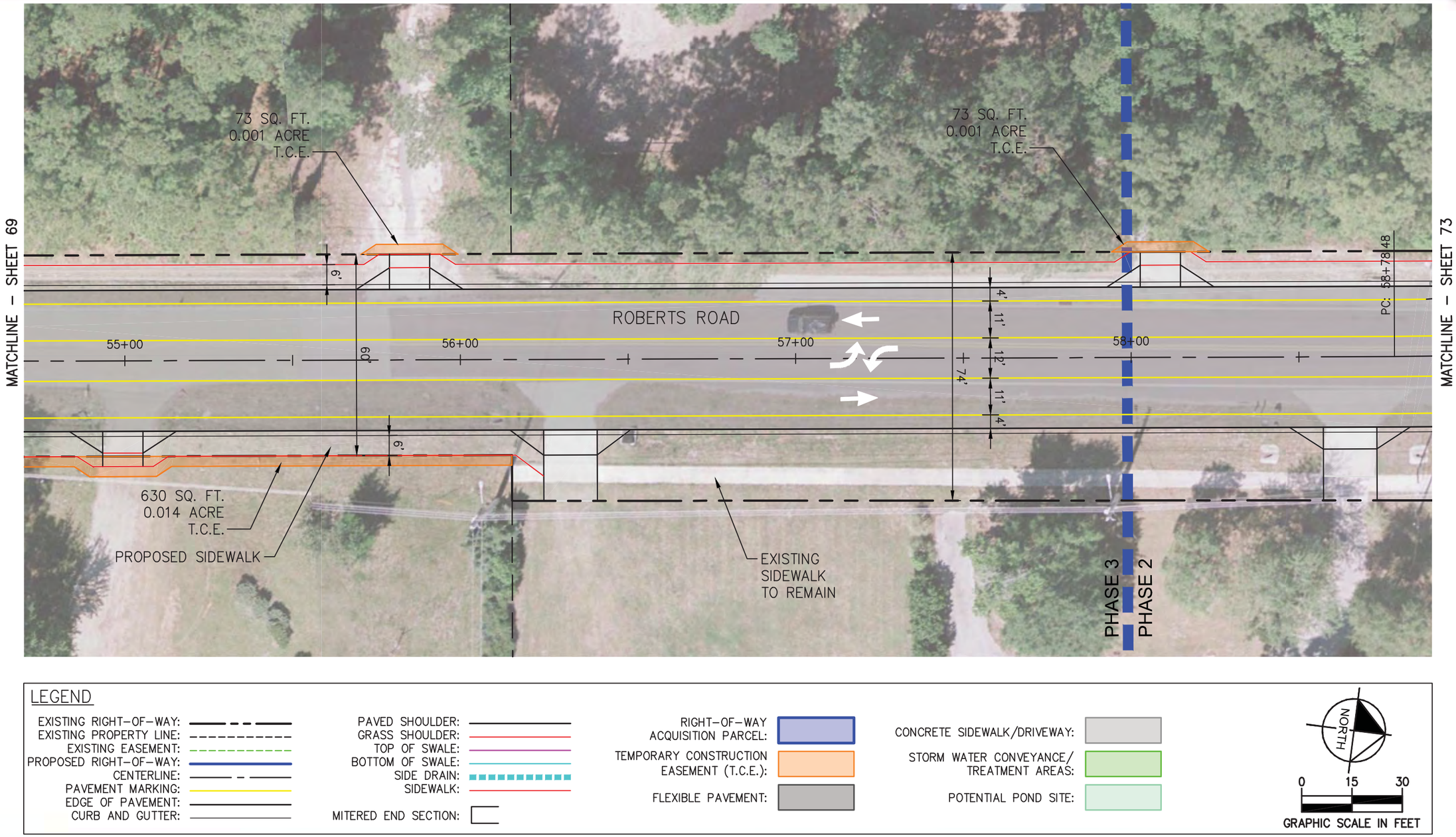
Roberts Road Typical Section
Section 'A' - Begins at STA: 54+45
Section 'B' - Begins at STA: 56+10

Pavement Design
Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180

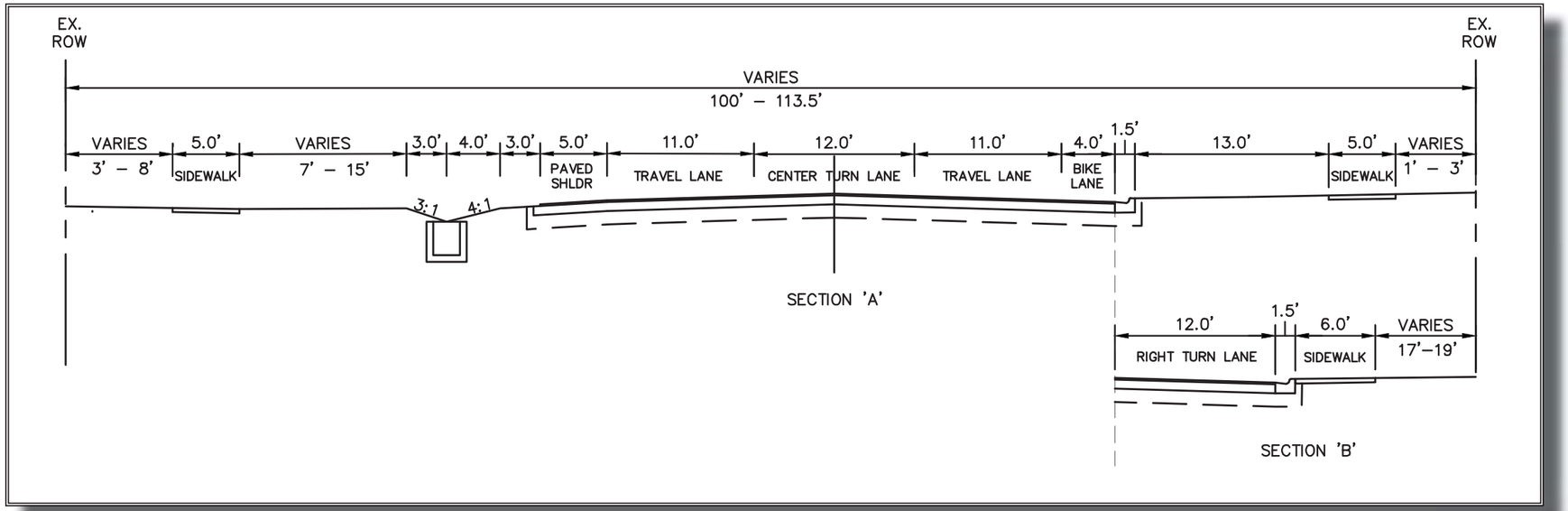

MATCHLINE – SHEET 69
MATCHLINE – SHEET 73
73 SQ. FT.
0.001 ACRE
T.C.E.
73 SQ. FT.
0.001 ACRE
T.C.E.
630 SQ. FT.
0.014 ACRE
T.C.E.
PROPOSED SIDEWALK
EXISTING
SIDEWALK
TO REMAIN
ROBERTS ROAD
55+00
56+00
57+00
58+00
PC: 58+78.48
6'
60'
6'
4'
11'
12'
11'
4'
74'
PHASE 3
PHASE 2
LEGEND
EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:
PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:
CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:
NORTH
0
15
30
GRAPHIC SCALE IN FEET

Greenfield Drive

The intersection of Greenfield Drive at Roberts Road is a two-way, stop-controlled T-intersection with Greenfield Drive being the east leg to the intersection controlled by a stop sign and Roberts Road operating as free-flow. As summarized in Tables 6 and 7, the Greenfield Drive stop-controlled approach currently operates at LOS B during the AM and PM Peak Hours. As summarized in Tables 8 and 9, the intersection has no existing turn lanes yet is required to have a northbound right-turn lane and southbound left-turn lane. Since the proposed northbound right-turn lane will operate as uncontrolled, a storage length is not required and the total required length is therefore 155 feet to accommodate deceleration and taper. The proposed southbound left-turn lane is anticipated to require 25 feet of storage and 155 feet of deceleration and taper distance for a total turn lane length of 180 feet.

Needs:

- New 155-foot northbound right-turn lane
- New 180-foot southbound left-turn lane



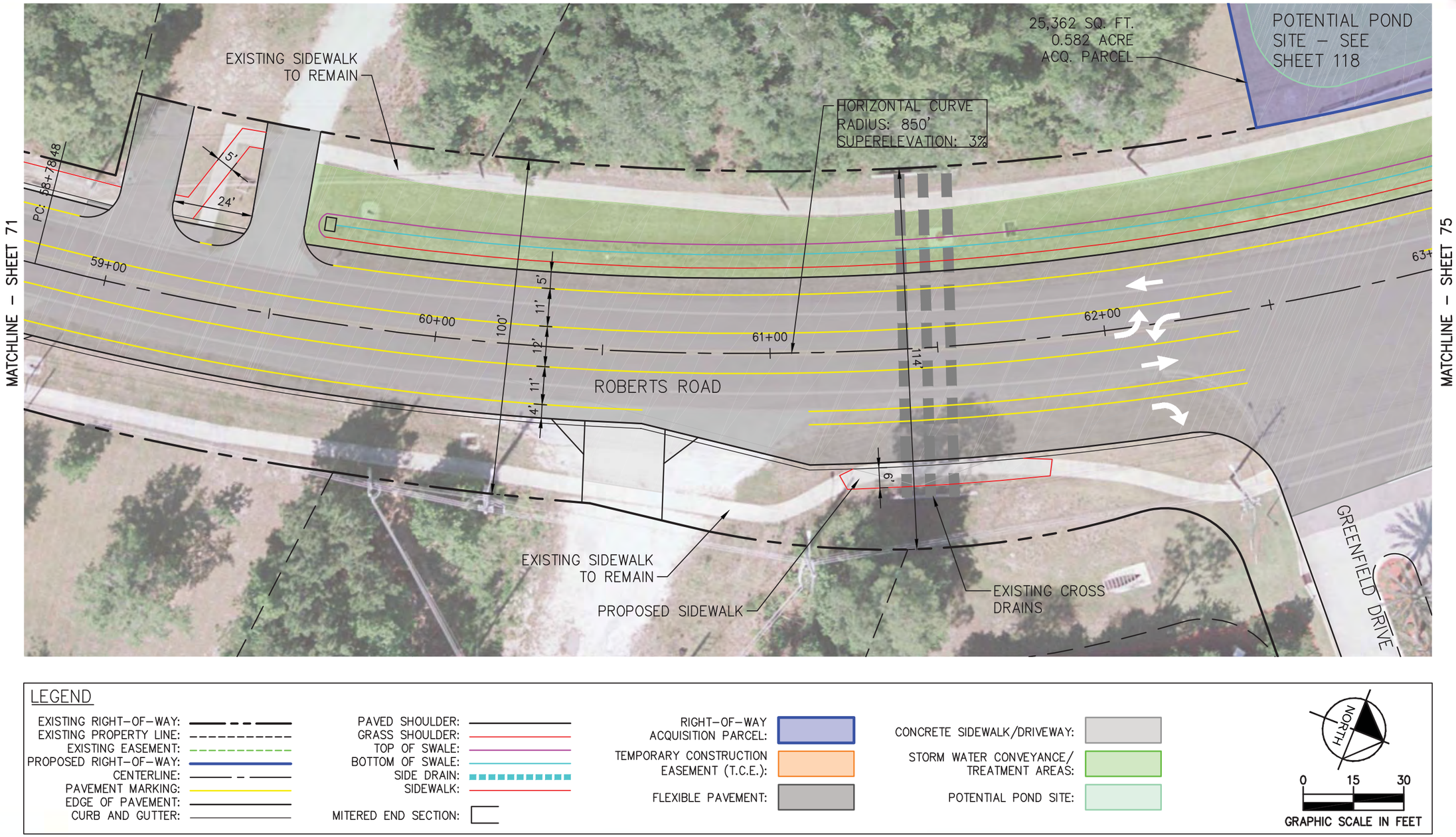
Roberts Road Typical Section
Section 'A' - Begins at STA: 58+50
Section 'B' - Begins at STA: 60+75

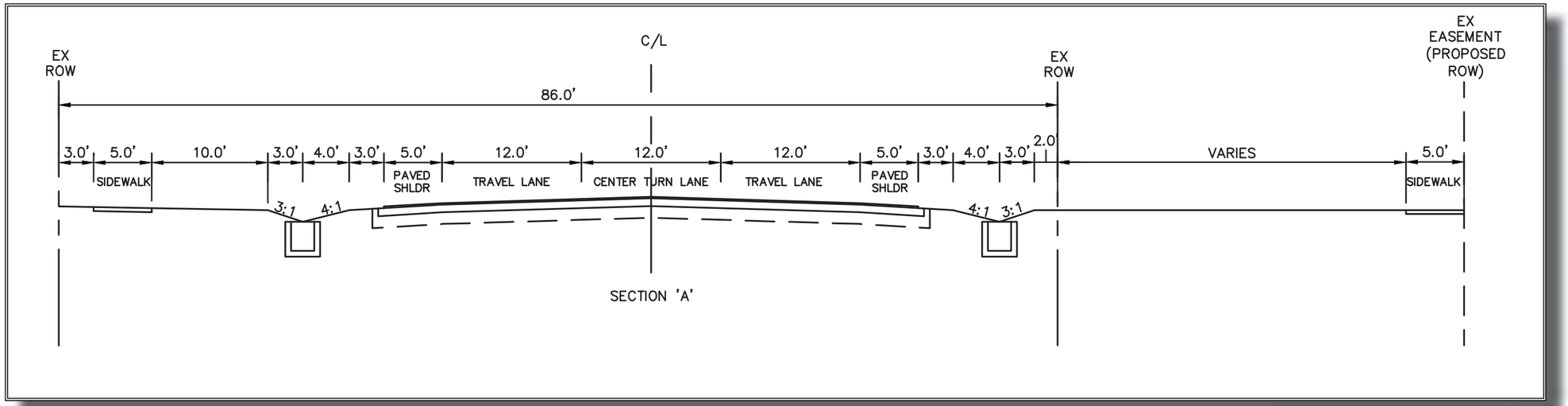
Pavement Design
Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180


MATCHLINE – SHEET 71
MATCHLINE – SHEET 75
EXISTING SIDEWALK TO REMAIN
25,362 SQ. FT.
0.582 ACRE
ACQ. PARCEL
POTENTIAL POND SITE – SEE SHEET 118
HORIZONTAL CURVE
RADIUS: 850'
SUPERELEVATION: 3%
PC: 58+78.48
5'
24'
59+00
60+00
61+00
62+00
63+
100'
5'
11'
12'
11'
4'
114'
6'
ROBERTS ROAD
EXISTING SIDEWALK TO REMAIN
PROPOSED SIDEWALK
EXISTING CROSS DRAINS
GREENFIELD DRIVE
LEGEND
EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:
PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:
CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:
NORTH
0
15
30
GRAPHIC SCALE IN FEET



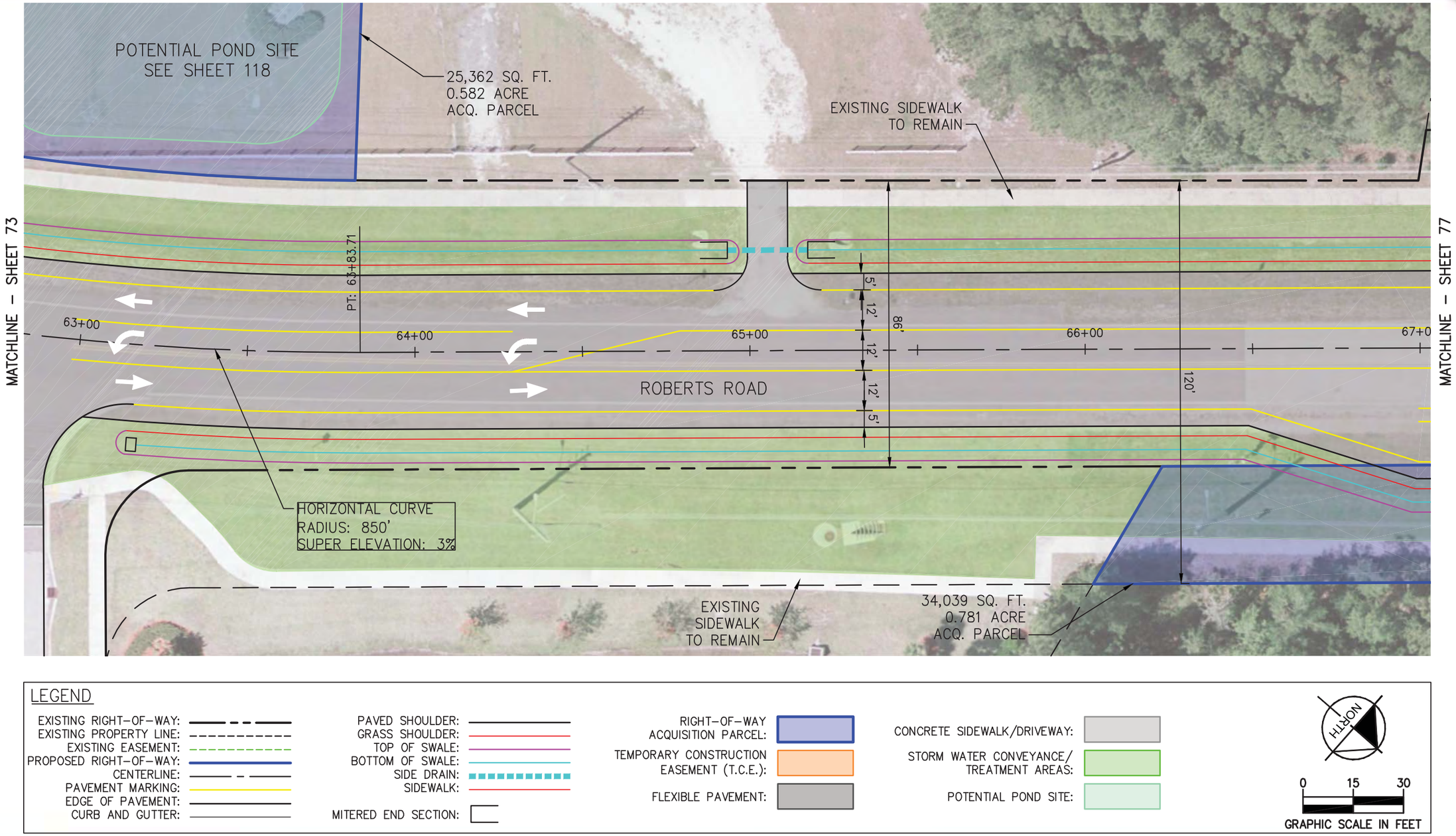
Roberts Road Typical Section - Sheet 75

Pavement Design
Friction Couse - 9.5 (1.5")

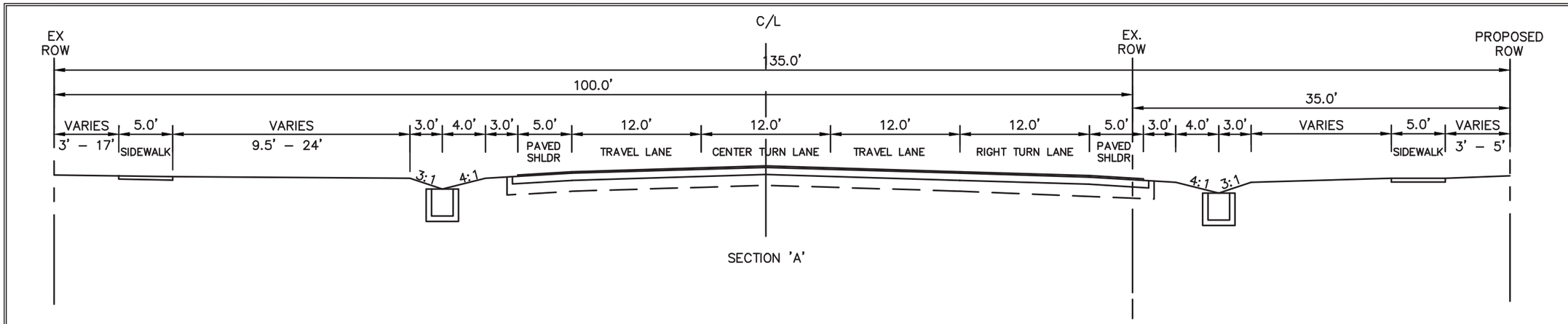
Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180


POTENTIAL POND SITE
SEE SHEET 118
25,362 SQ. FT.
0.582 ACRE
ACQ. PARCEL
EXISTING SIDEWALK
TO REMAIN
MATCHLINE – SHEET 73
MATCHLINE – SHEET 77
PT: 63+83.71
63+00
64+00
65+00
66+00
67+0
5'
12'
12'
12'
5'
86'
120'
ROBERTS ROAD
HORIZONTAL CURVE
RADIUS: 850'
SUPER ELEVATION: 3%
EXISTING
SIDEWALK
TO REMAIN
34,039 SQ. FT.
0.781 ACRE
ACQ. PARCEL
LEGEND
EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:
PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:
CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:
NORTH
0 15 30
GRAPHIC SCALE IN FEET

Concept Plans



Roberts Road Typical Section - Sheet 77

Cunningham Creek Elementary School Entrance

The intersection of Cunningham Creek Elementary School at Roberts Road is a two-way, stop-controlled T-intersection with the school driveway being the east leg to the intersection controlled by a stop sign and Roberts Road operating as free-flow. As summarized in Tables 6 and 7, the Cunningham Creek Elementary School stop-controlled approach currently operates at LOS F during the AM Peak Hour and LOS C during the PM Peak Hour. An exclusive left-turn lane is present in the southbound direction and an exclusive right-turn lane is present in the northbound direction. As summarized in Tables 8 and 9, the existing northbound right-turn lane length is sufficient to accommodate the existing traffic queues during peak hours but during the time of drop-off and pick-up as it was observed that additional turn lane lengths are needed. The southbound left-turn lane is anticipated to require 150 feet of storage and 155 feet of deceleration and taper distance for a total turn lane length of 305 feet. The existing turn lane is approximately 230 feet long and requires an additional 75 feet to accommodate the full storage, deceleration, and taper length. 250 feet has been provided to accomodate the higher storage volumes which occur at the time of pick-up.

Needs:

- Additional 75 feet of storage for southbound left-turn lane
- Additional 250 feet of storage for northbound right-turn lane

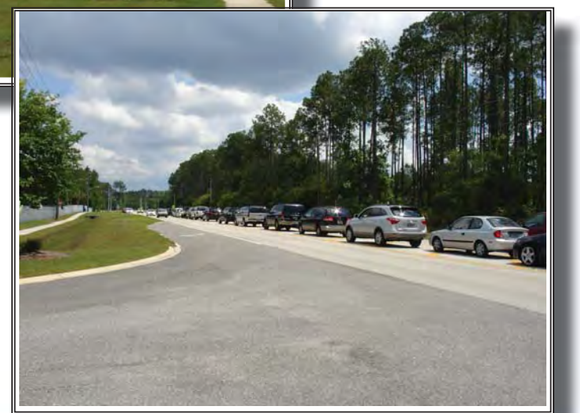
Pavement Design

Friction Couse - 9.5 (1.5")

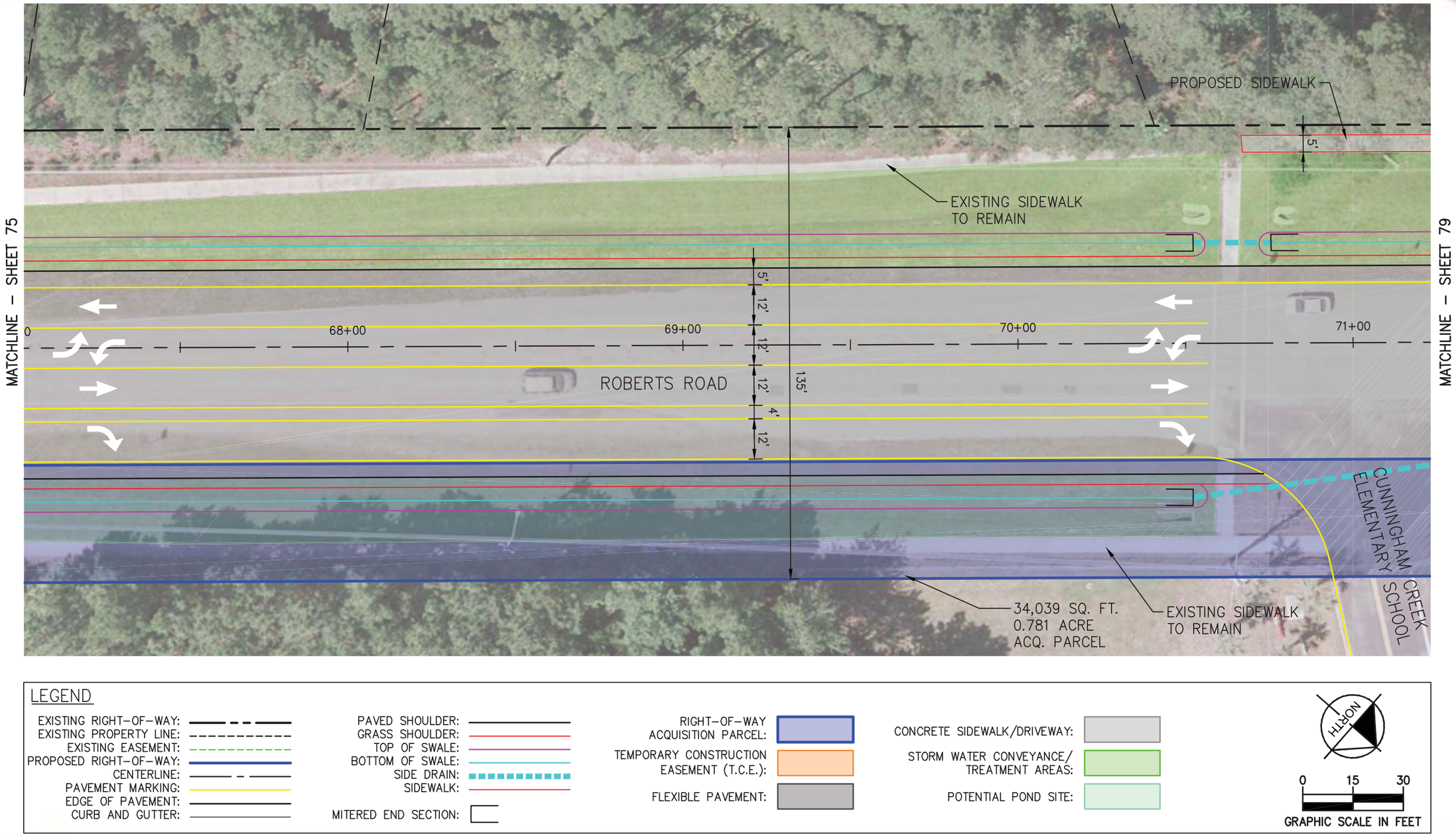
Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

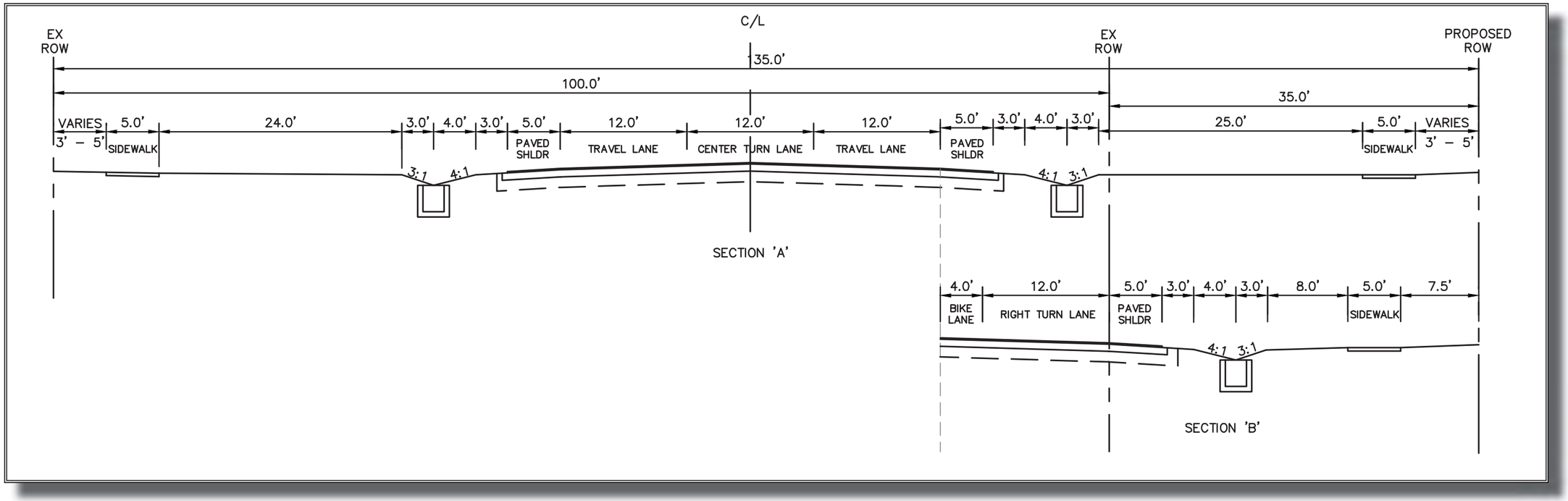
12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180



CONCEPT PLANS



Concept Plans



Roberts Road Typical Section

Section 'A' - Begin at STA: 71+20

Section 'B' - Begins at STA: 74+00

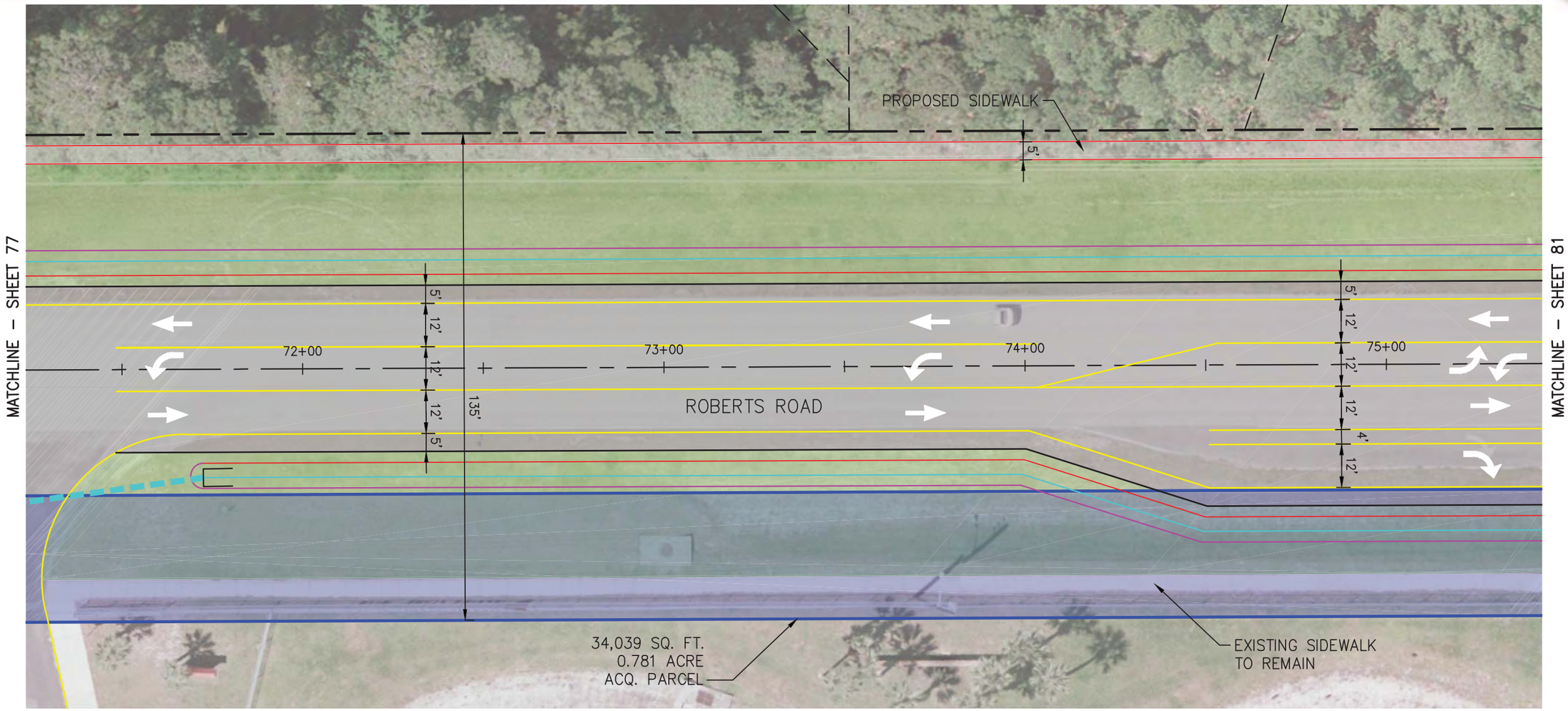
Pavement Design

Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

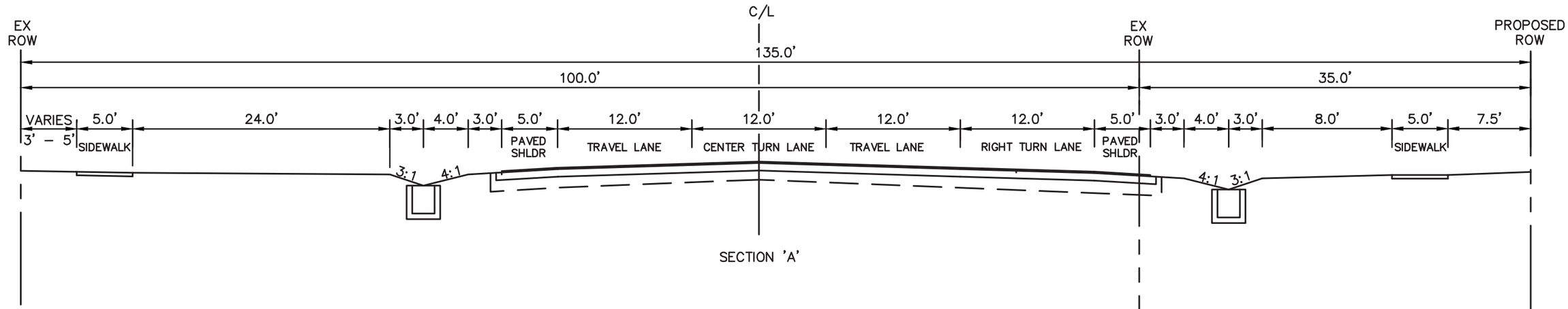
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

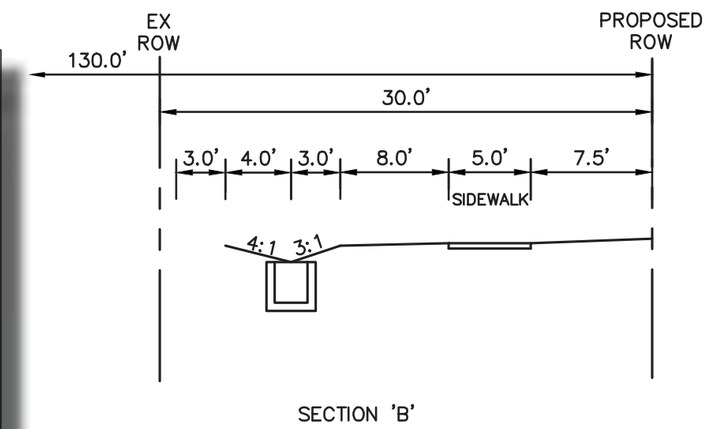
0 15 30
GRAPHIC SCALE IN FEET

Concept Plans



Roberts Road Typical Section

Section 'A' - Begin at STA: 75+45
Section 'B' - Begins at STA: 77+00



Pavement Design

Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

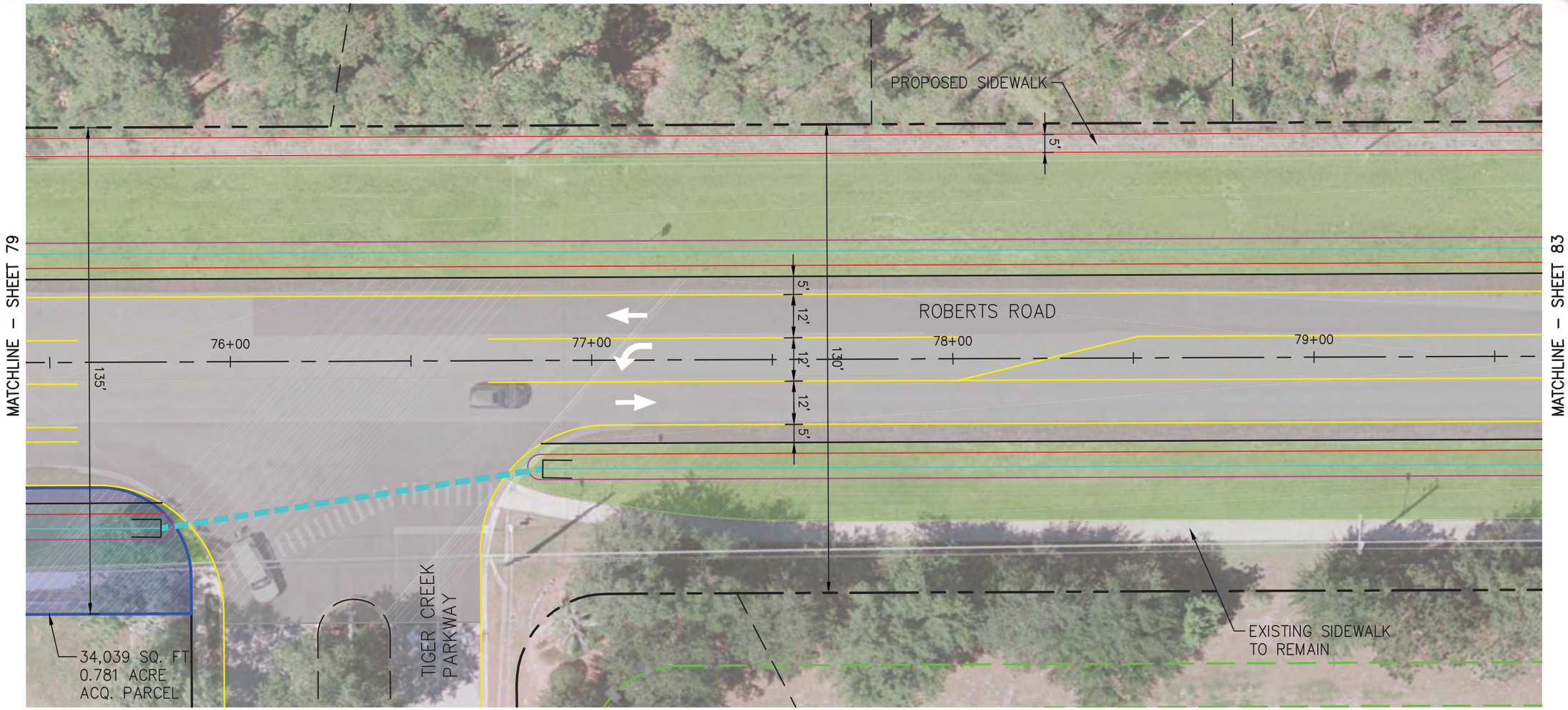
12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180

Tiger Creek Parkway

The intersection of Tiger Creek Parkway at Roberts Road is a two-way, stop-controlled T-intersection with Tiger Creek Parkway being the east leg to the intersection controlled by a stop sign and Roberts Road operating as free-flow. As summarized in Tables 6 and 7, the Tiger Creek Parkway stop-controlled approach currently operates at LOS D during the AM Peak Hour and LOS C during the PM Peak Hour. An exclusive left-turn lane is present in the southbound direction and an exclusive right-turn lane is present in the northbound direction. As summarized in Tables 8 and 9, the northbound right-turn lane operates as uncontrolled and no storage length is required. The total required length is therefore 155 feet to accommodate deceleration and taper. The existing right-turn lane is approximately 150 feet long and requires an additional 5 feet to accommodate the full deceleration and taper length. The southbound left-turn lane is anticipated to require 100 feet of storage and 155 feet of deceleration and taper distance for a total turn lane length of 255 feet. The existing left-turn lane is approximately 155 feet long and requires an additional 100 feet to accommodate the full storage, deceleration, and taper length.

Needs:

- Additional 5 feet of deceleration for northbound right-turn lane
- Additional 100 feet of storage for southbound left-turn lane



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

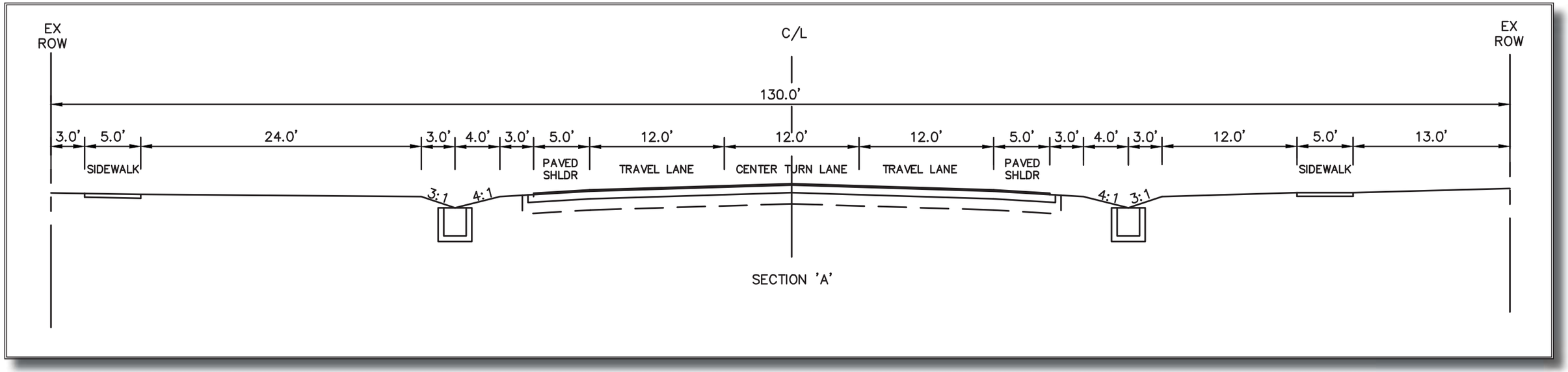
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Concept Plans



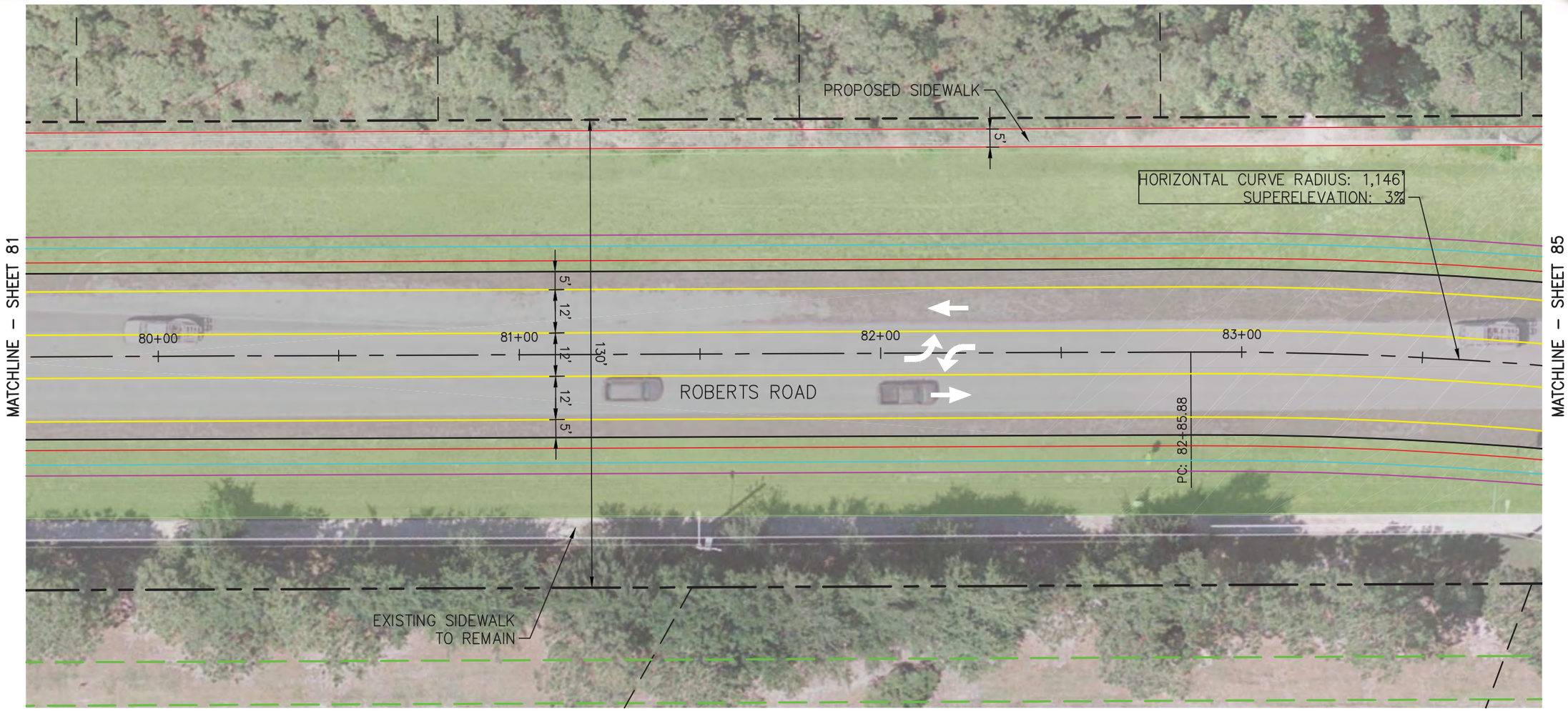
Roberts Road Typical Section - Sheet 83

Pavement Design
Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

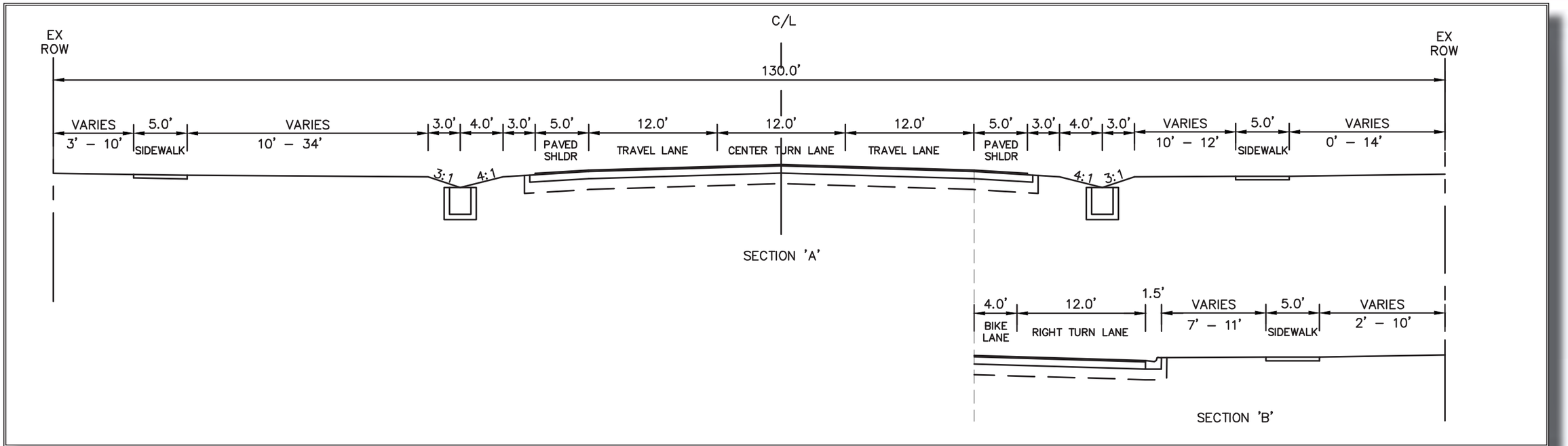
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Concept Plans



Roberts Road Typical Section

Section 'A' - Begins at STA: 83+50
Section 'B' - Begins at STA: 85+50

Southcreek Dr./Village Green Ave.

The intersection of Southcreek Drive/Village Green Avenue at Roberts Road is a two-way, stop-controlled intersection with Village Green Avenue being the east leg to the intersection controlled by a stop sign, Southcreek Drive being the west leg to the intersection controlled by a stop sign, and Roberts Road operating as free-flow. This intersection was not counted and no operational analysis was performed. Exclusive left-turn and right-turn lanes are present in the northbound and southbound directions. As summarized in Tables 8 and 9, the existing northbound and southbound right-turn lane lengths are sufficient to accommodate the existing traffic queues. The northbound left-turn lane is anticipated to require 25 feet of storage and 155 feet of deceleration and taper distance for a total turn lane length of 180 feet. The existing northbound left-turn lane is approximately 150 feet long and requires an additional 30 feet to accommodate the full storage, deceleration, and taper length. The southbound left-turn lane is anticipated to require 50 feet of storage and 155 feet of deceleration and taper distance for a total turn lane length of 205 feet. The existing southbound left-turn lane is approximately 185 feet long and requires an additional 20 feet to accommodate the full storage, deceleration, and taper length.

Needs:

- Additional 30 feet of storage for northbound left-turn lane
- Additional 20 feet of storage for southbound left-turn lane

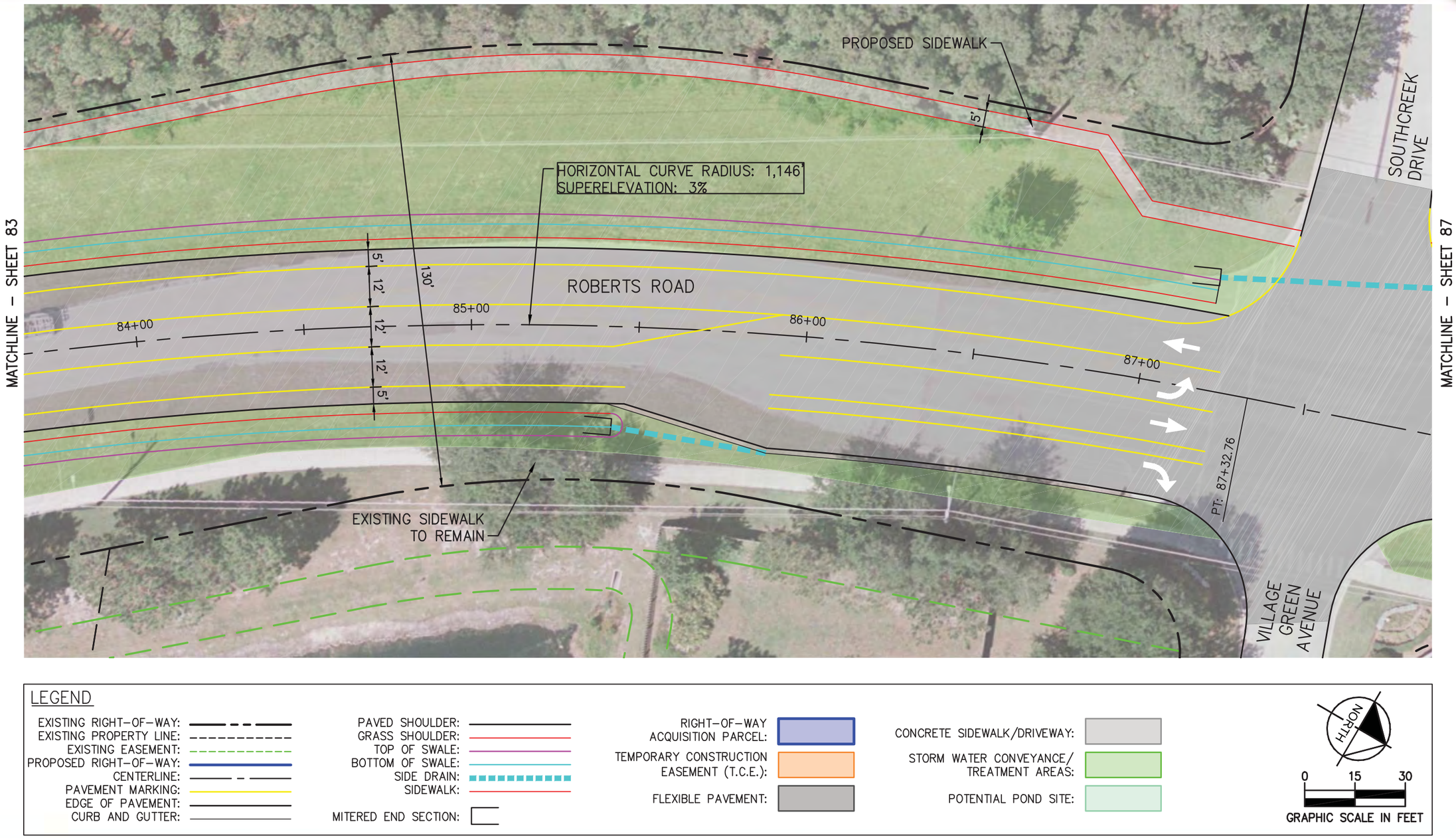
Pavement Design

Friction Couse - 9.5 (1.5")

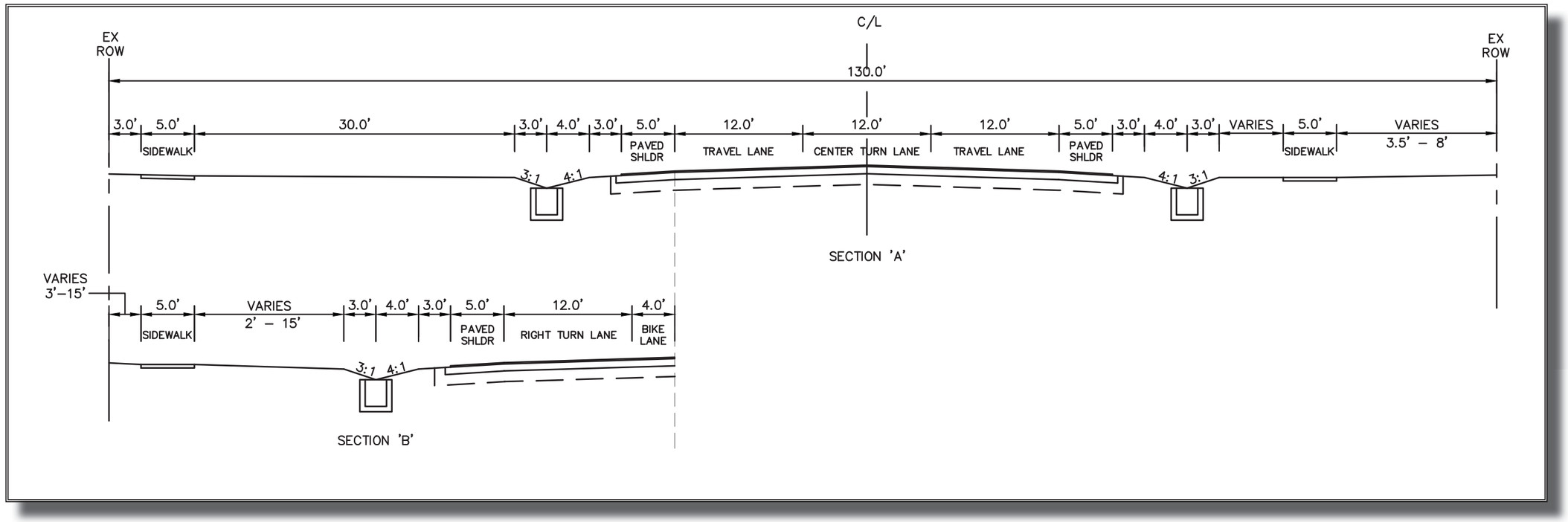
Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180


PROPOSED SIDEWALK
5'
HORIZONTAL CURVE RADIUS: 1,146'
SUPERELEVATION: 3%
SOUTHCREEK DRIVE
MATCHLINE – SHEET 83
MATCHLINE – SHEET 87
5'
12'
12'
12'
5'
130'
ROBERTS ROAD
84+00
85+00
86+00
87+00
PT: 87+32.76
EXISTING SIDEWALK TO REMAIN
VILLAGE GREEN AVENUE
LEGEND
EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:
PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:
CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:
NORTH
0
15
30
GRAPHIC SCALE IN FEET

Concept Plans



Roberts Road Typical Section

Section 'A' - Begins at STA: 89+75

Section 'B' - From STA: 88+00 To STA: 89+75

Pavement Design

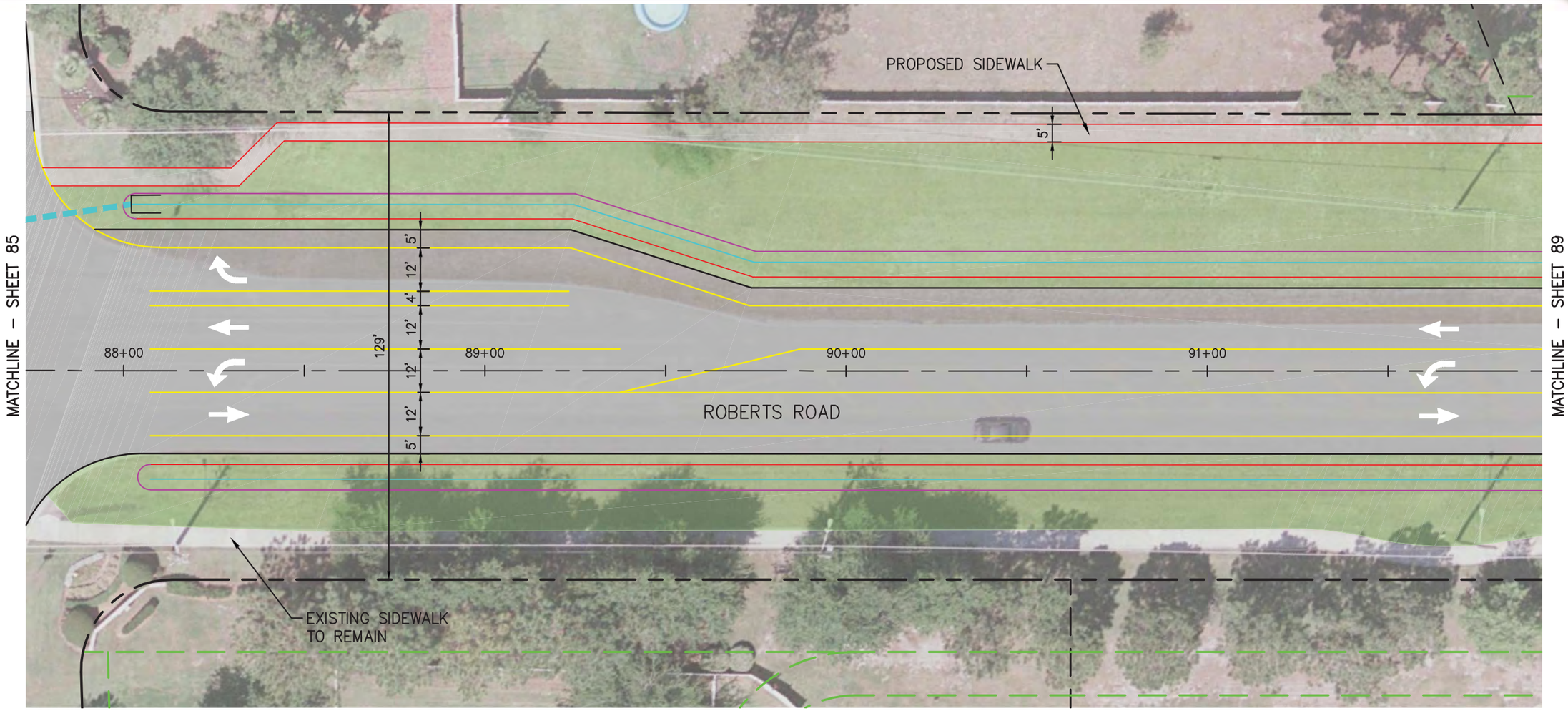
Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180

CONCEPT PLANS



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

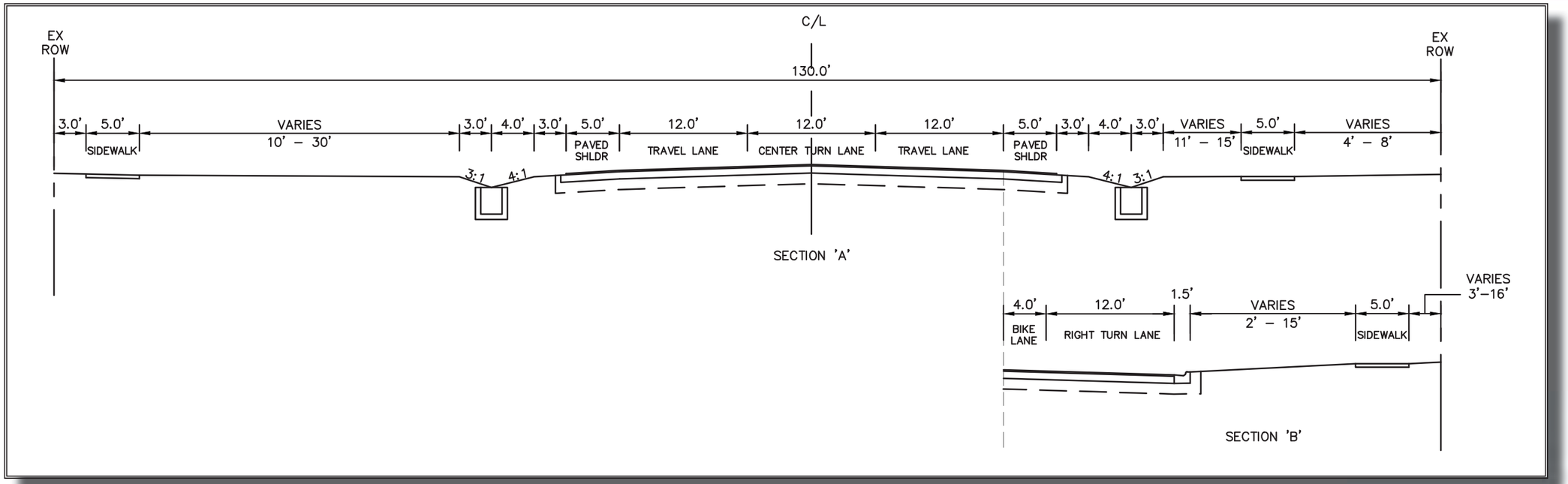
CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 15 30

GRAPHIC SCALE IN FEET

Concept Plans



Roberts Road Typical Section

Section 'A' - Remainder Sheet 89

Section 'B' - From STA: 93+00 To STA: 94+75

Pavement Design

Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

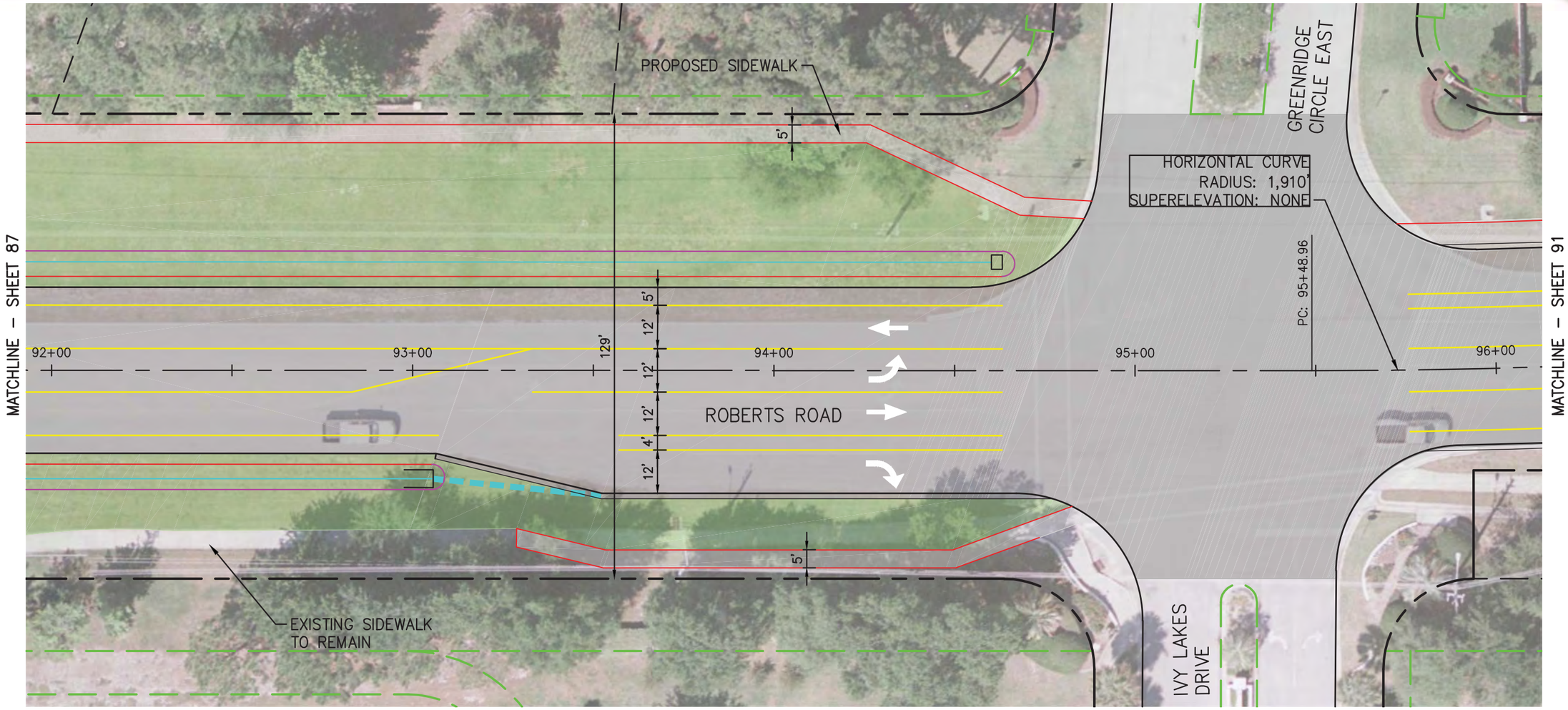
12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180

Greenridge Cir. E/Ivy Lakes Dr.

The intersection of Greenridge Circle East/Ivy Lakes Drive at Roberts Road is a two-way, stop-controlled intersection with Greenridge Circle East being the west leg to the intersection controlled by a stop sign, Ivy Lakes Drive being the east leg to the intersection controlled by a stop sign, and Roberts Road operating as free-flow. As summarized in Tables 6 and 7, the Greenridge Circle East stop-controlled approach currently operates at LOS C during the AM and PM Peak Hours and the Ivy Lakes Drive stop-controlled approach operates at LOS E during the AM Peak Hour and LOS C during the PM Peak Hour. Exclusive left-turn and right-turn lanes are present in the northbound and southbound directions. As summarized in Tables 8 and 9, the existing northbound left-turn lane length is sufficient to accommodate the existing traffic queues. The southbound left-turn lane is anticipated to require 50 feet of storage and 155 feet of deceleration and taper distance for a total turn lane length of 205 feet. The existing southbound left-turn lane is approximately 175 feet long and requires an additional 30 feet to accommodate the full storage, deceleration, and taper length. The northbound and southbound right-turn lanes operate as uncontrolled and no storage length is required. The total required length is therefore 155 feet to accommodate deceleration and taper. The existing northbound right-turn lane is approximately 150 feet long and requires an additional 5 feet to accommodate the full deceleration and taper length. The existing southbound right-turn lane is approximately 145 feet long and requires an additional 10 feet to accommodate the full deceleration and taper length.

Needs:

- Additional 30 feet of storage for southbound left-turn lane
- Additional 5 feet of deceleration for northbound right-turn lane
- Additional 10 feet of deceleration for southbound right-turn lane



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

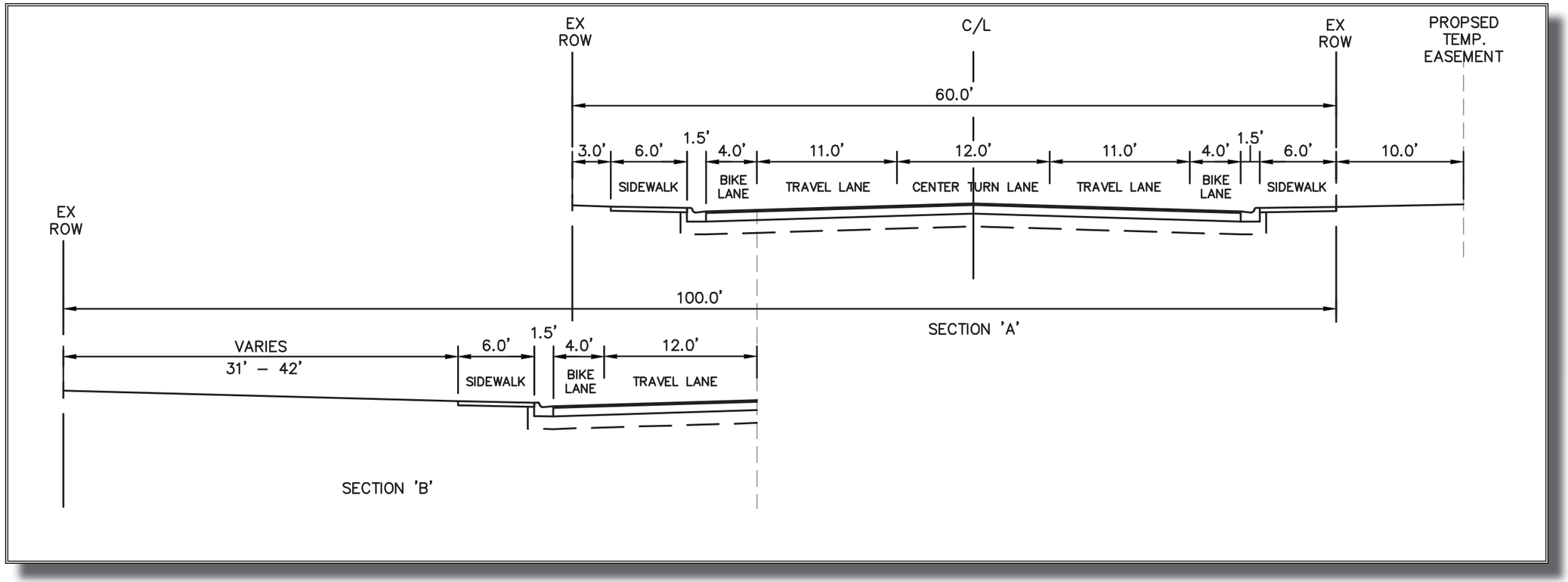
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Concept Plans



Roberts Road Typical Section

Section 'A' - Begins at STA: 97+00

Section 'B' - From STA: 96+00 To STA: 97+00

Pavement Design

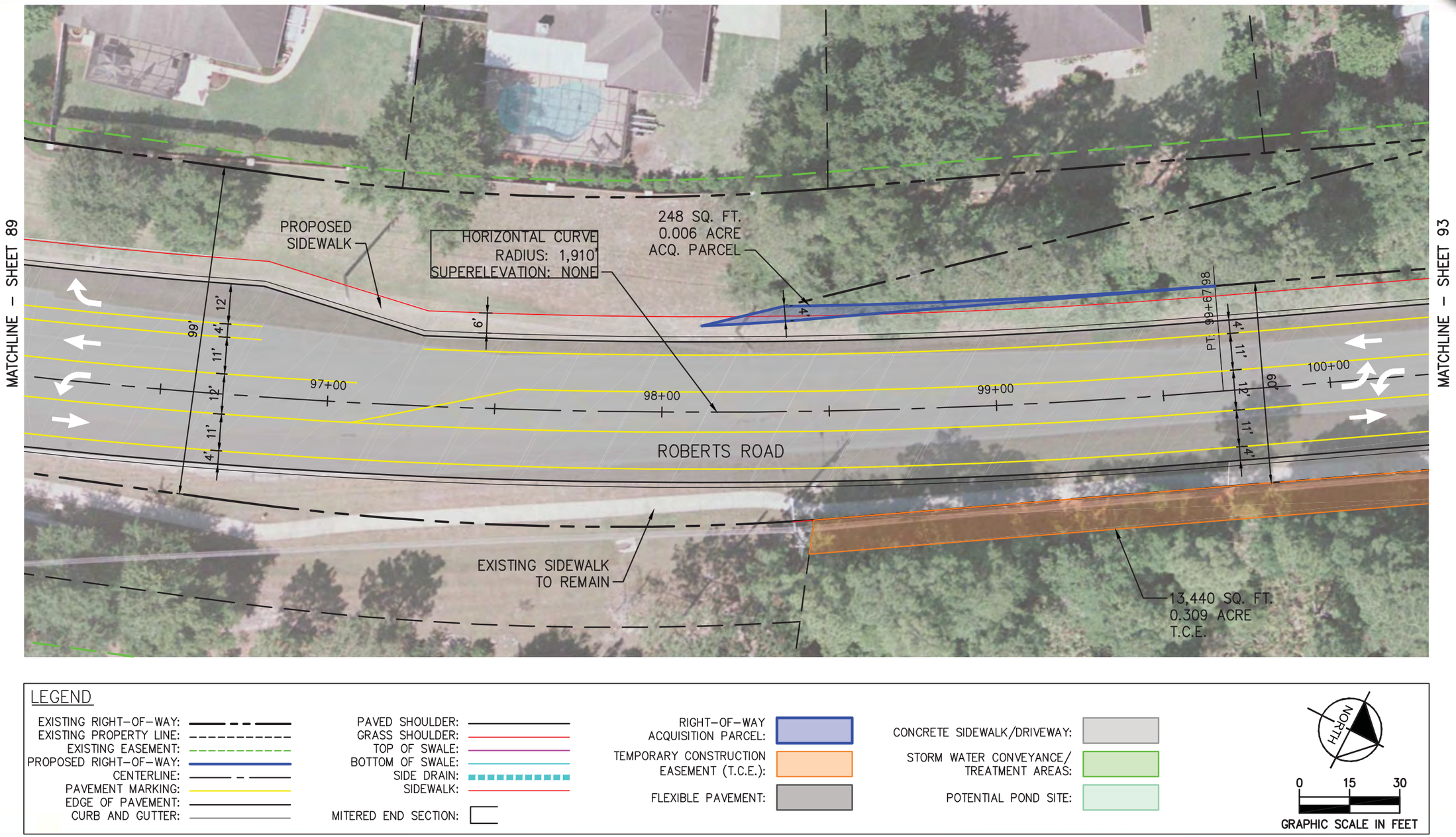
Friction Couse - 9.5 (1.5")

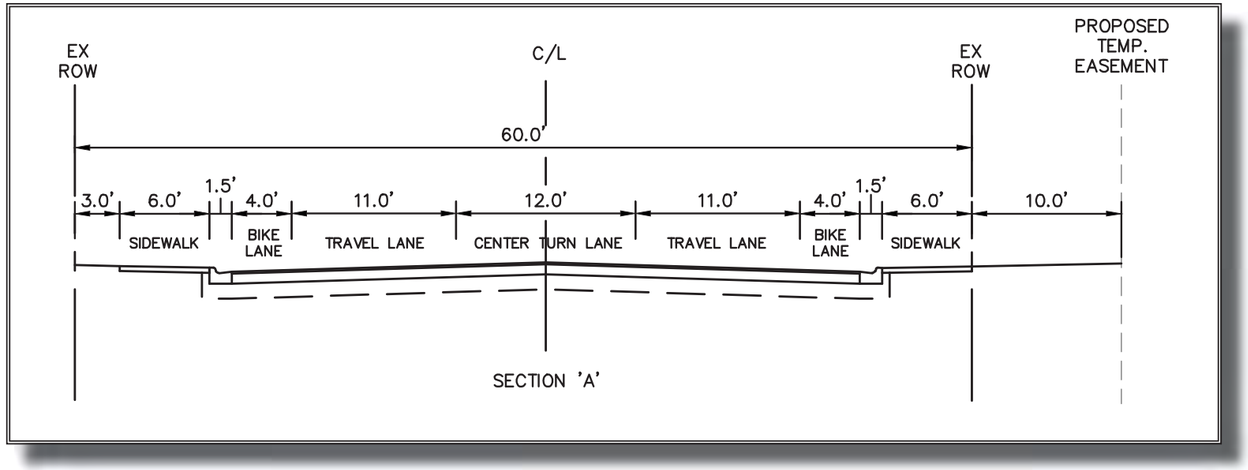
Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180

Concept Plans





Roberts Road Typical Section - Sheet 93

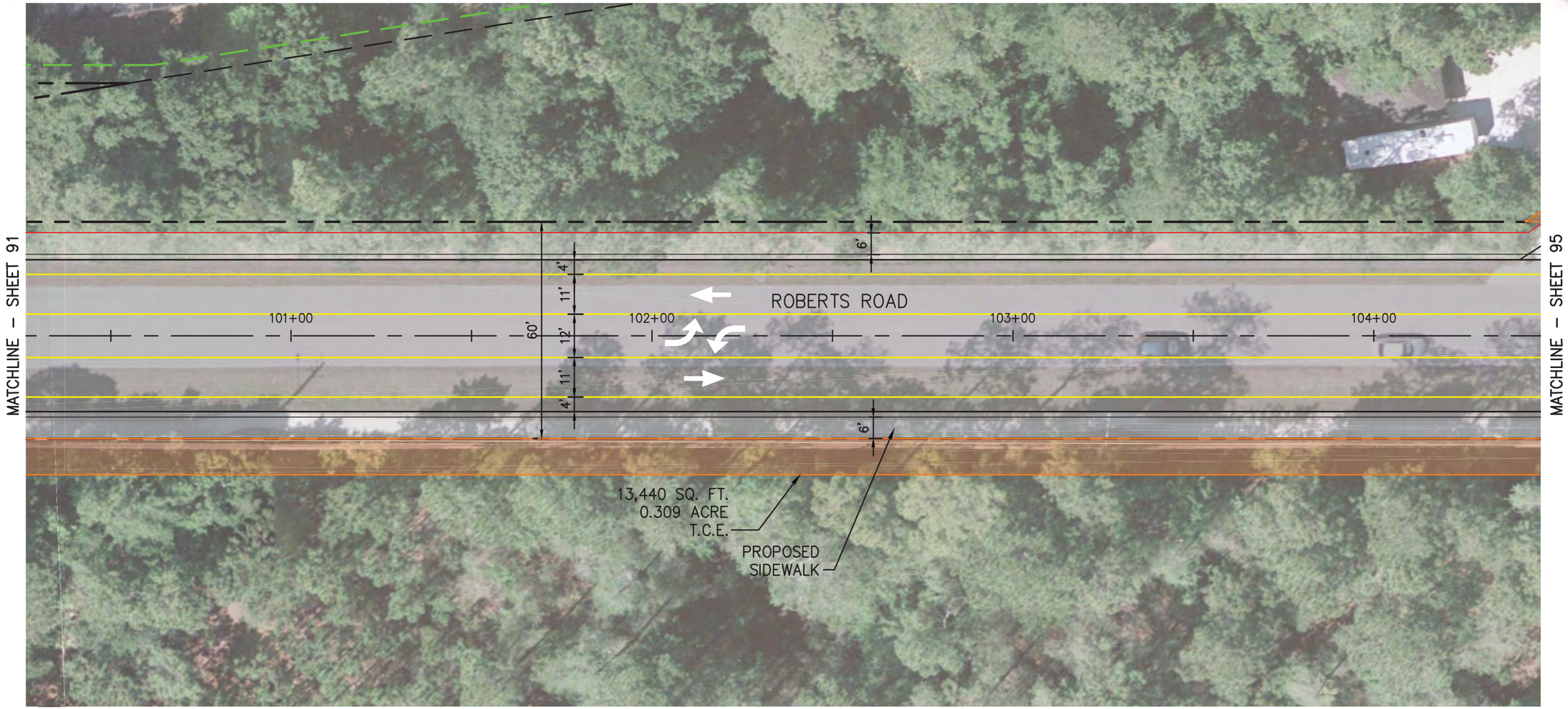
Pavement Design

Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

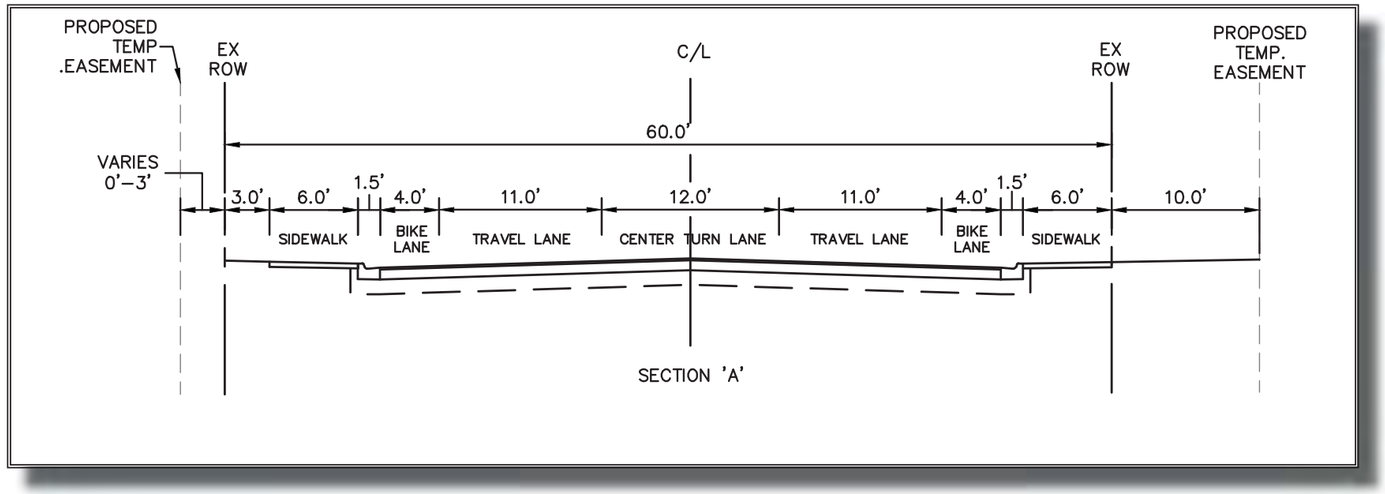
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Concept Plans



Roberts Road Typical Section - Sheet 95

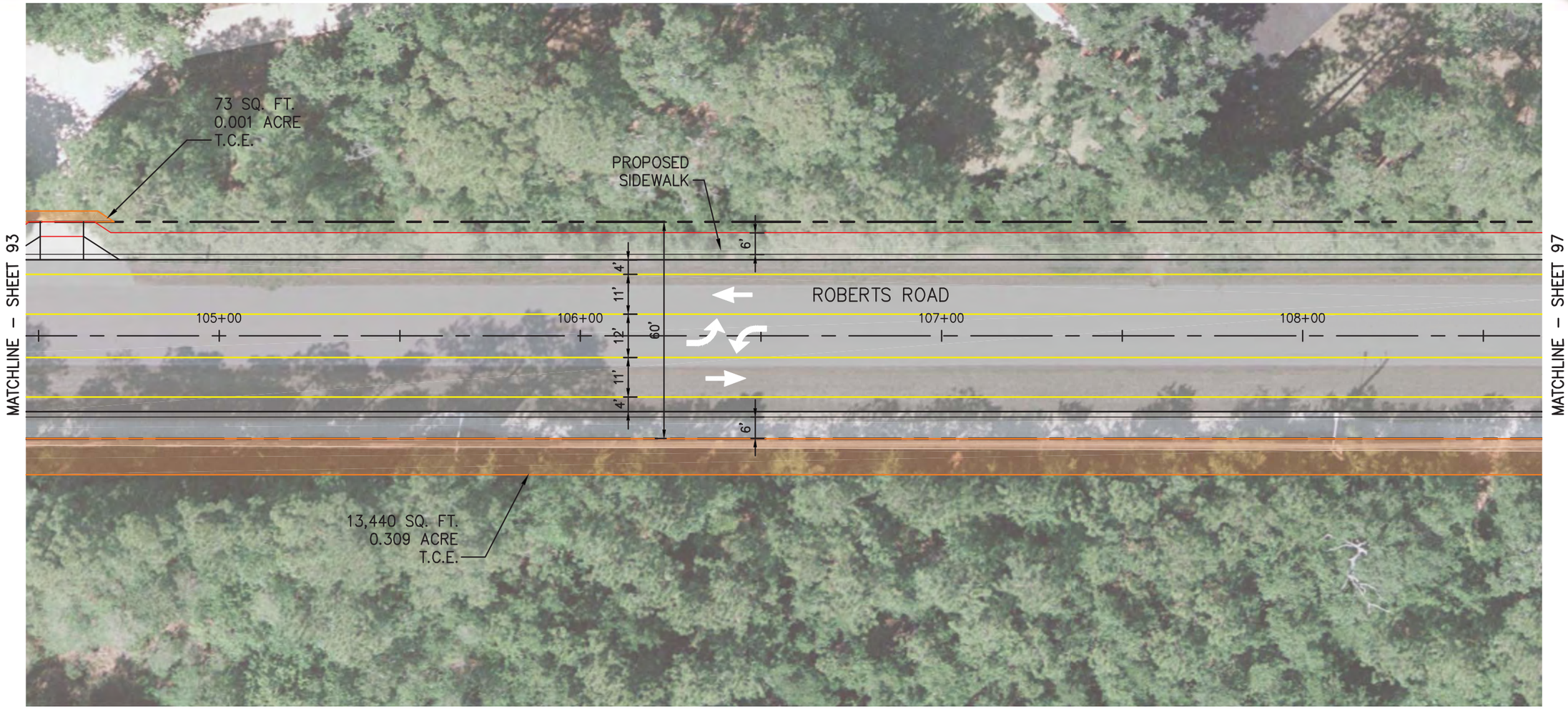
Pavement Design

Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

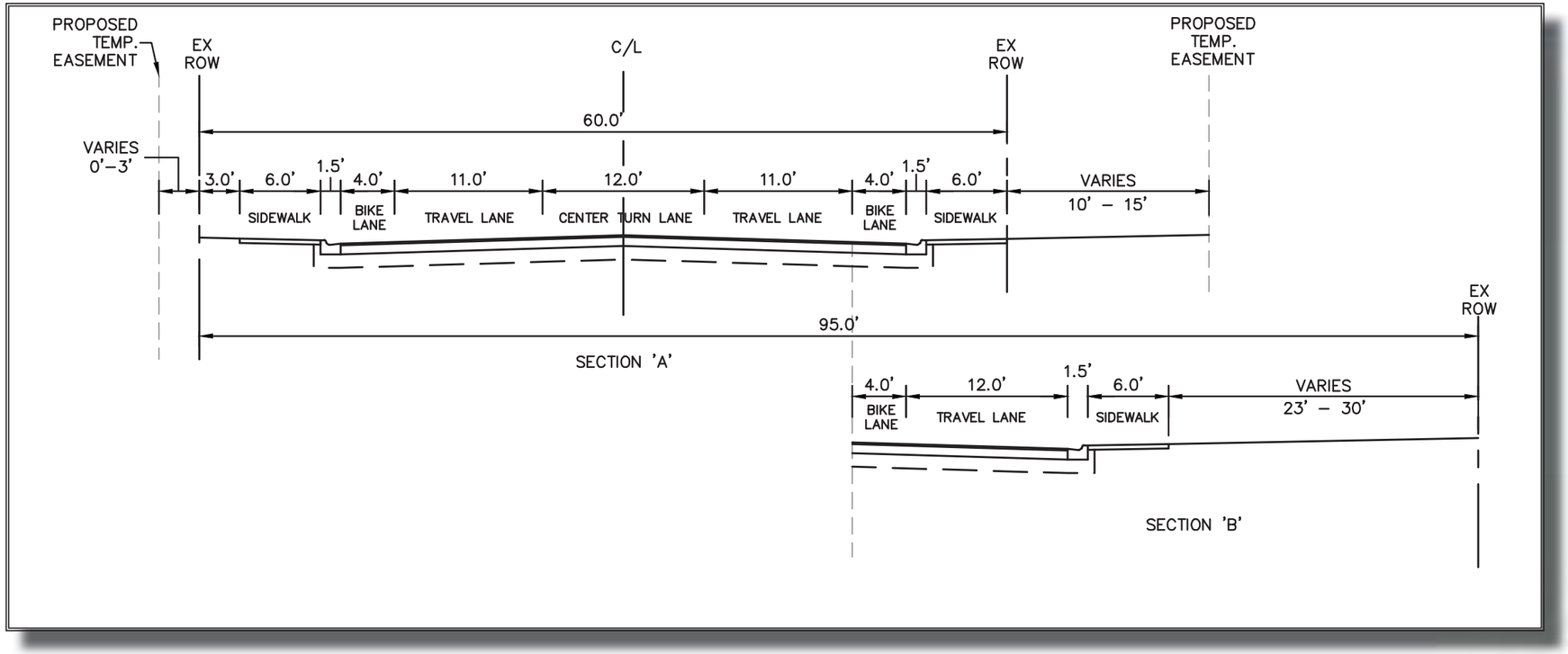
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Concept Plans



Roberts Road Typical Section

Section 'A' - Begins at STA: 108+50
Section 'B' - Begins at STA: 111+75

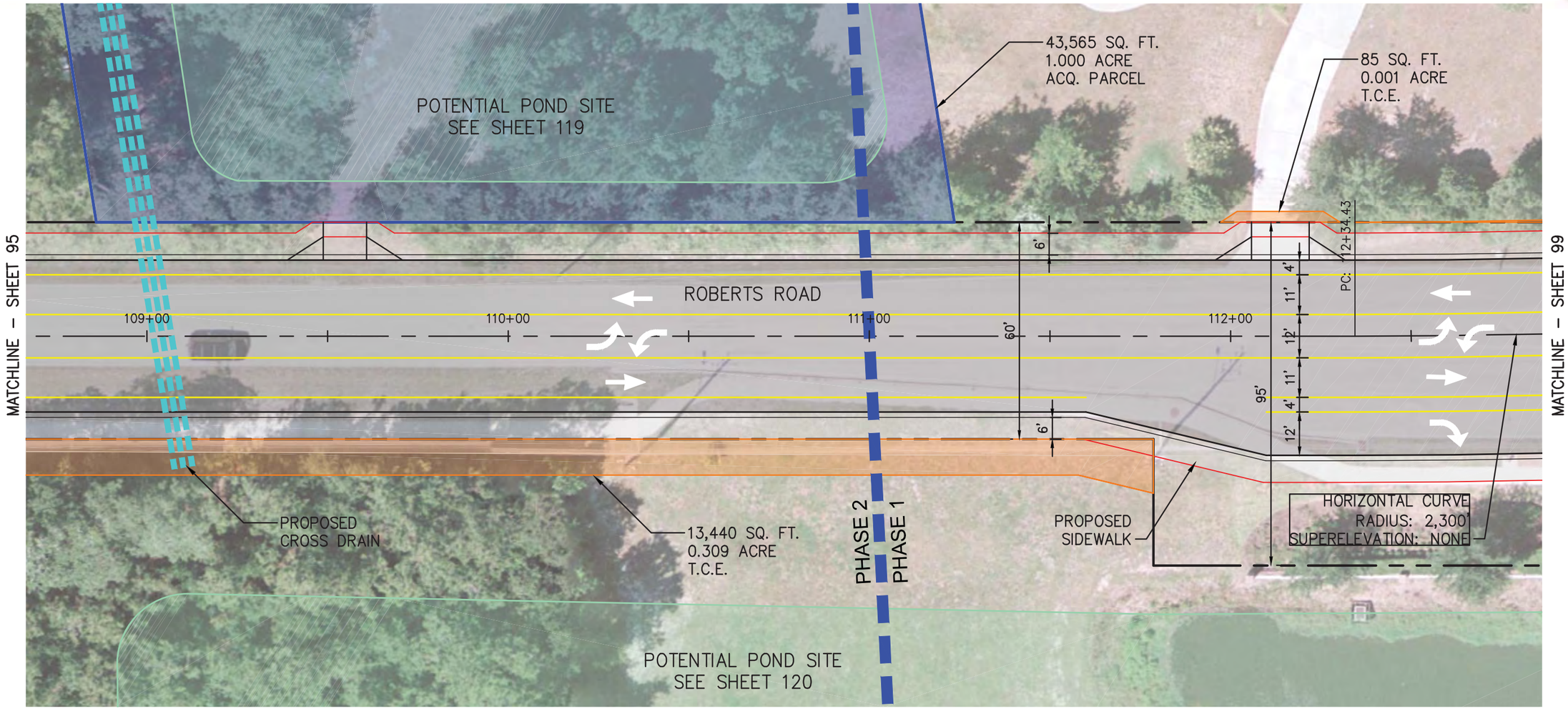
Pavement Design

Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 15 30
GRAPHIC SCALE IN FEET

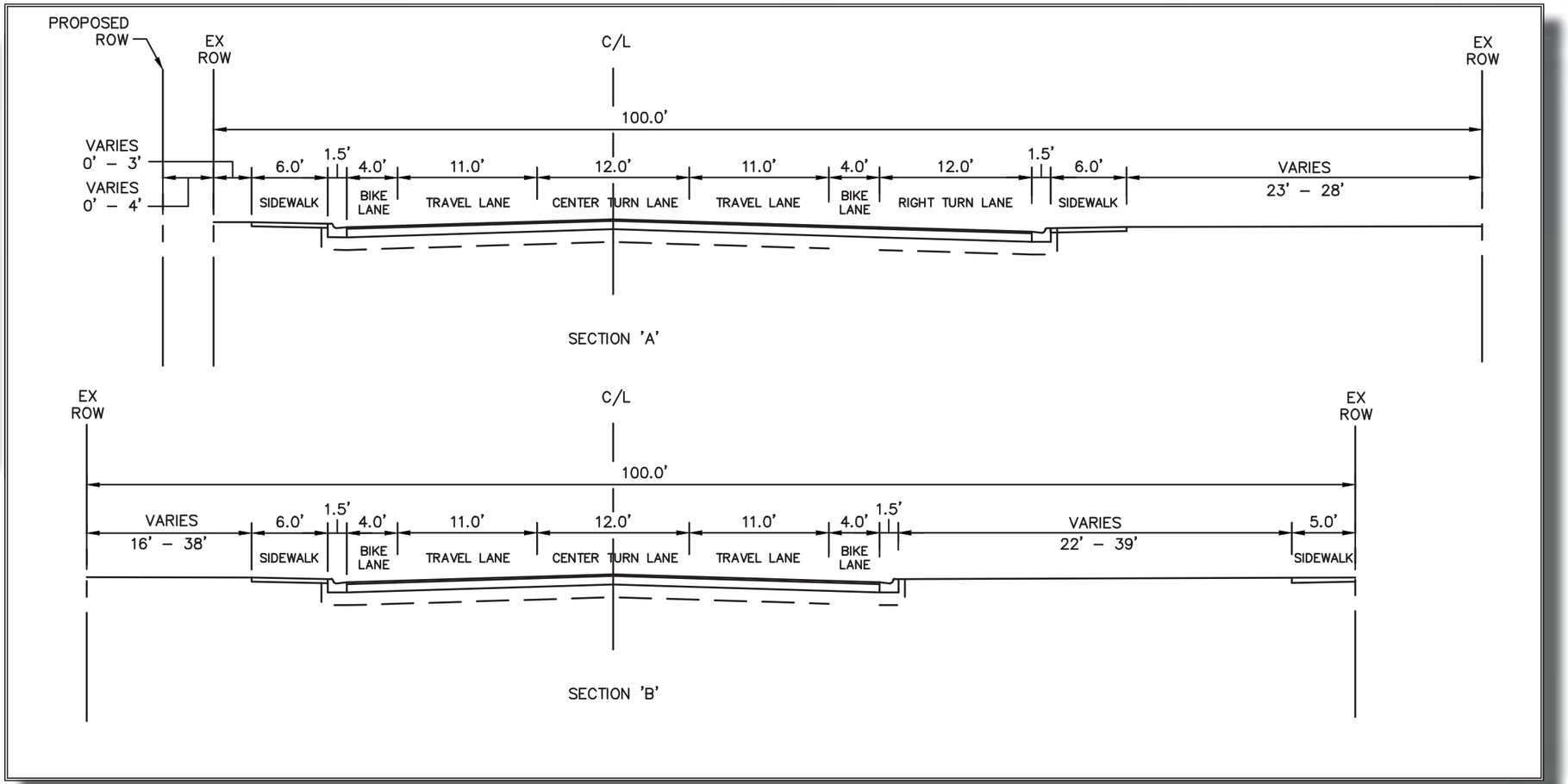
Concept Plans

Lige Branch Lane

The intersection of Lige Branch Lane at Roberts Road is a two-way, stop-controlled T-intersection with Lige Branch Lane being the east leg to the intersection controlled by a stop sign and Roberts Road operating as free-flow. This intersection was not counted and no operational analysis was performed. An exclusive left-turn lane is present in the southbound direction and an exclusive right-turn lane is present in the northbound direction. As summarized in Tables 8 and 9, the existing turn lane lengths are sufficient to accommodate the existing traffic queues.

Needs:

- None



Roberts Road Typical Section

Section 'A' - Begins at STA: 112+90

Section 'B' - Begins at STA: 114+00

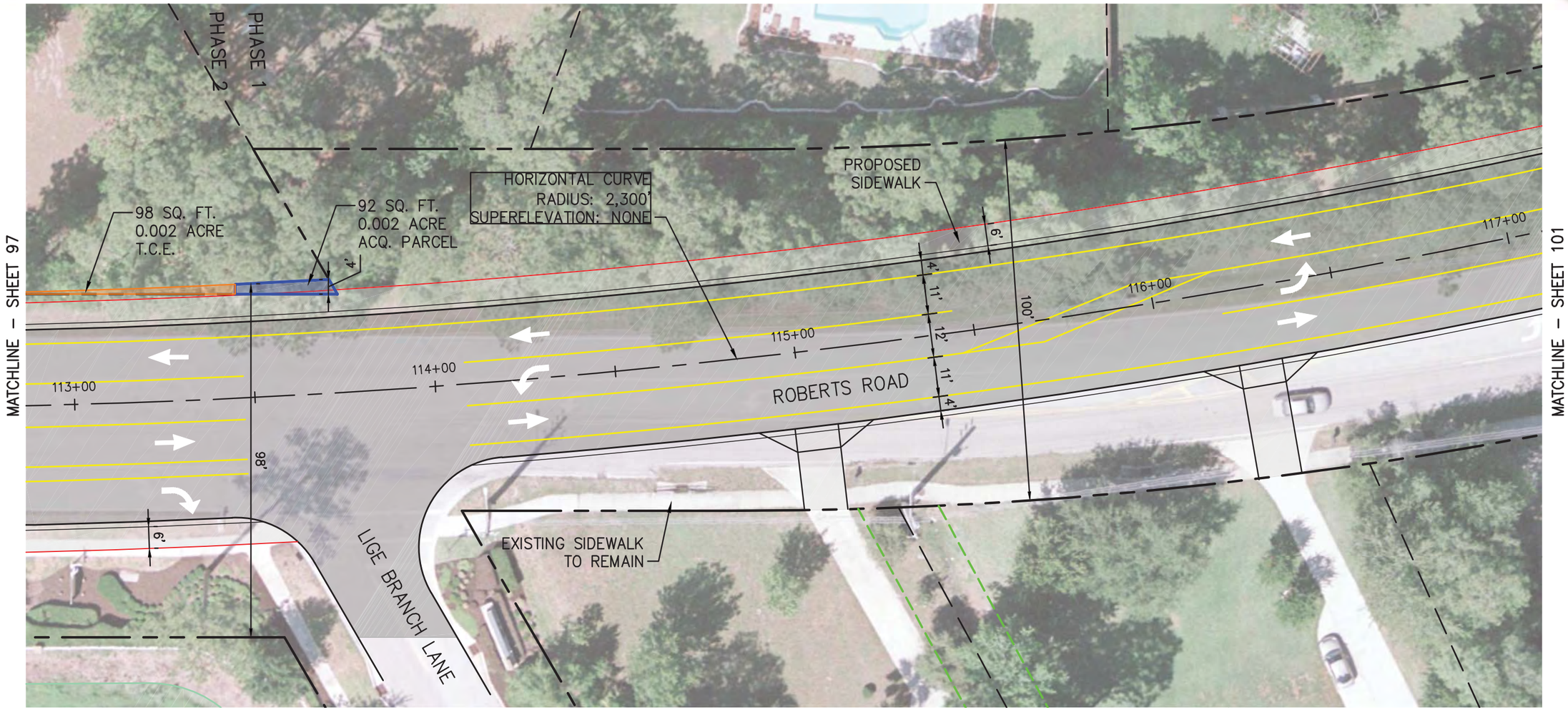
Pavement Design

Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 15 30
GRAPHIC SCALE IN FEET

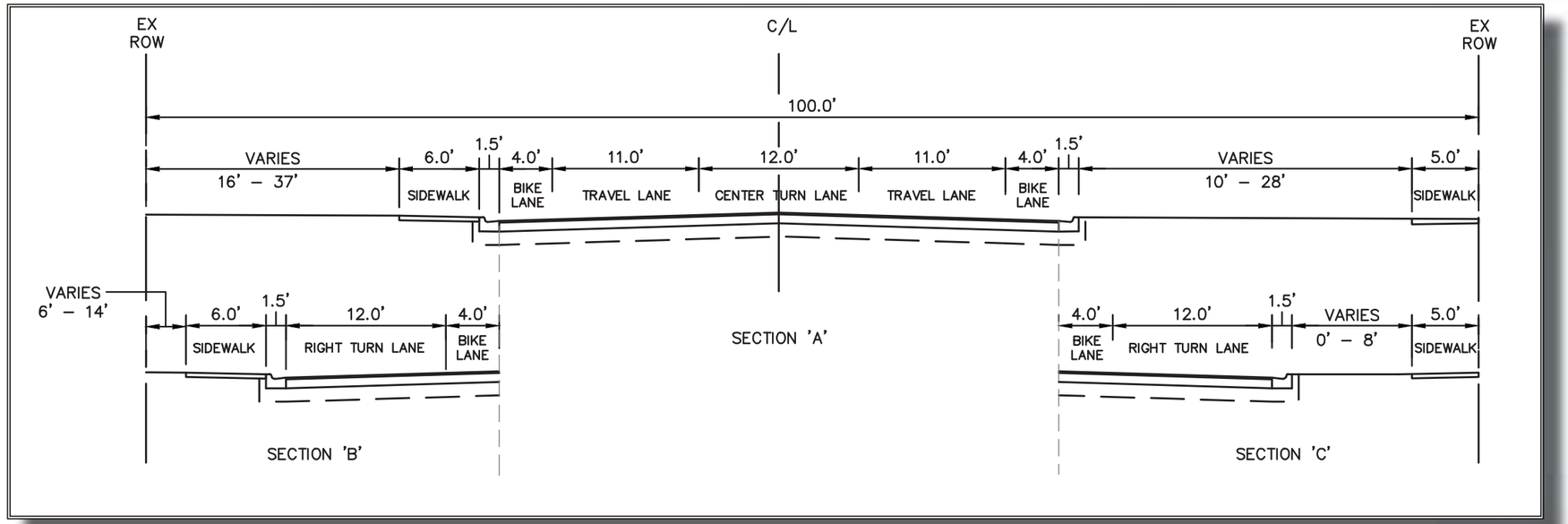
Concept Plans

Greenridge Circle West

The intersection of Greenridge Circle West at Roberts Road is a two-way, stop-controlled T-intersection with Greenridge Circle West being the west leg to the intersection controlled by a stop sign and Roberts Road operating as free-flow. This intersection was not counted and no operational analysis was performed. An exclusive left-turn lane is present in the northbound direction. As summarized in Tables 8 and 9, the intersection is also required to have a southbound right-turn lane. The existing northbound left-turn lane is anticipated to require 25 feet of storage and 155 feet of deceleration and taper distance for a total turn lane length of 180 feet. The existing northbound left-turn lane is approximately 115 feet long and requires an additional 65 feet to accommodate the full storage, deceleration, and taper length. Since the proposed southbound right-turn lane will operate as uncontrolled, a storage length is not required and the total required length is therefore 155 feet to accommodate deceleration and taper.

Needs:

- New 155-foot southbound right-turn lane
- Additional 65 feet of storage for northbound left-turn lane



Roberts Road Typical Section

Section 'A' - Begins at STA: 115+75 and Continues from STA: 120+00

Section 'B' - From STA: 118+50 To 120+00

Section 'C' - From STA: 118+50 To 120+00

Mallard Landing Boulevard

The intersection of Mallard Landing Boulevard at Roberts Road is a two-way, stop-controlled T-intersection with Mallard Landing Boulevard being the east leg to the intersection controlled by a stop sign and Roberts Road operating as free-flow. As summarized in Tables 6 and 7, the Mallard Landing Boulevard stop-controlled approach currently operates at LOS C during the AM Peak Hour and LOS B during the PM Peak Hour. As summarized in Tables 8 and 9, the intersection has no existing turn lanes yet is required to have a northbound right-turn lane and southbound left-turn lane. Since the proposed northbound right-turn lane will operate as uncontrolled, a storage length is not required and the total required length is therefore 155 feet to accommodate deceleration and taper. The proposed southbound left-turn lane is anticipated to require 25 feet of storage and 155 feet of deceleration and taper distance for a total turn lane length of 180 feet.

Needs:

- New 155-foot northbound right-turn lane
- New 180-foot southbound left-turn lane

Pavement Design

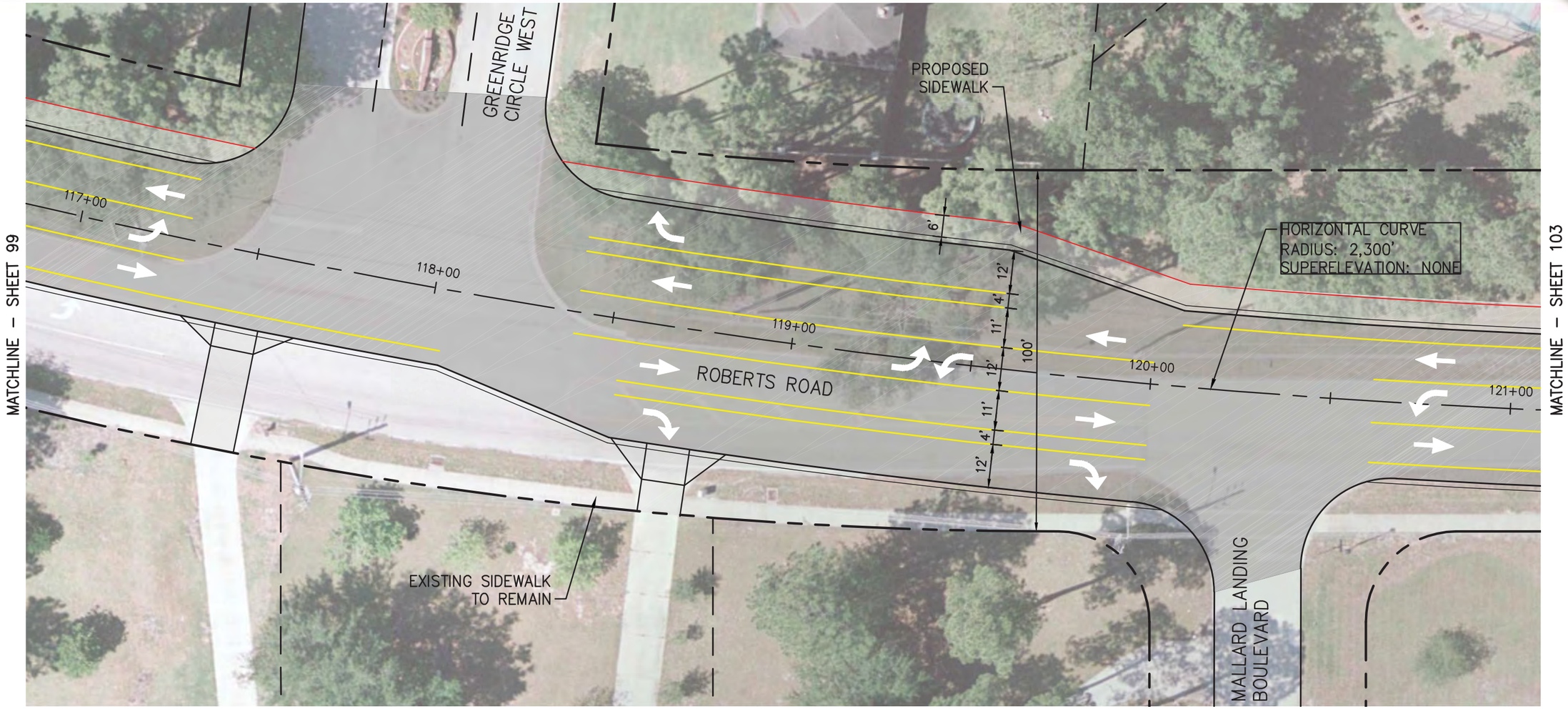
Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180

CONCEPT PLANS



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

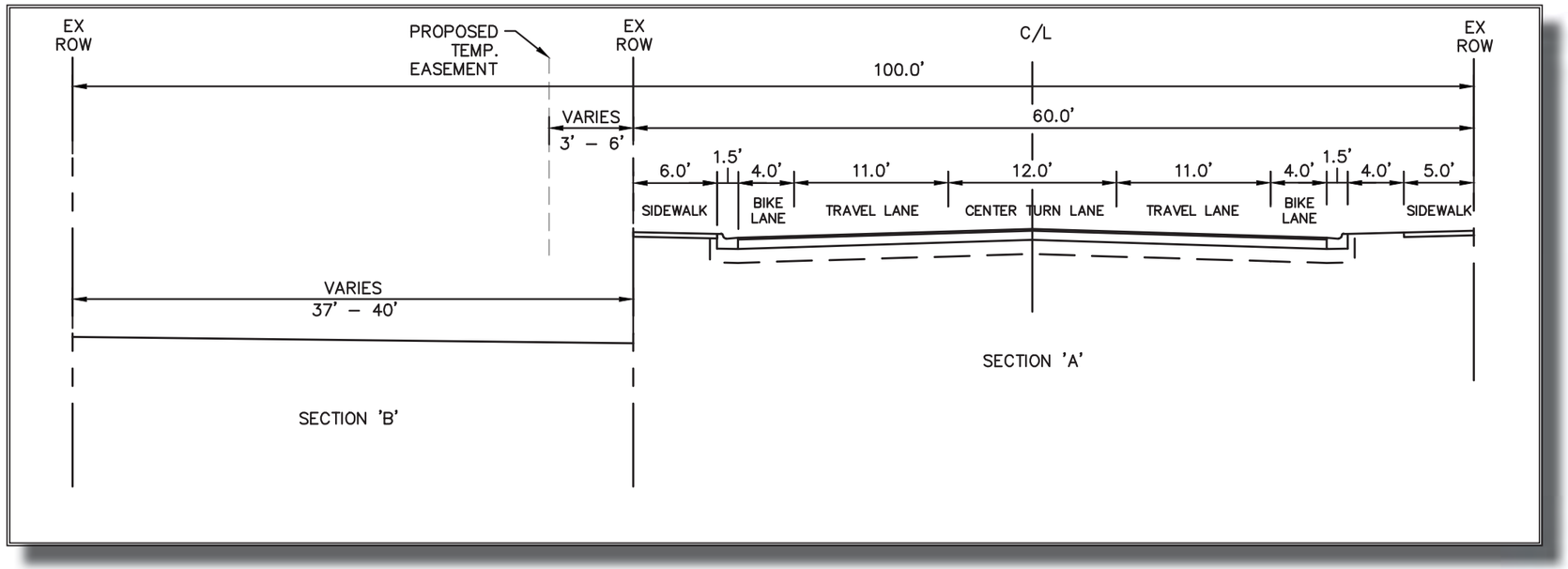
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Concept Plans



Roberts Road Typical Section

Section 'A' - Begins at STA: 122+85

Section 'B' - From STA: 121+00 To STA: 123+00

Pavement Design

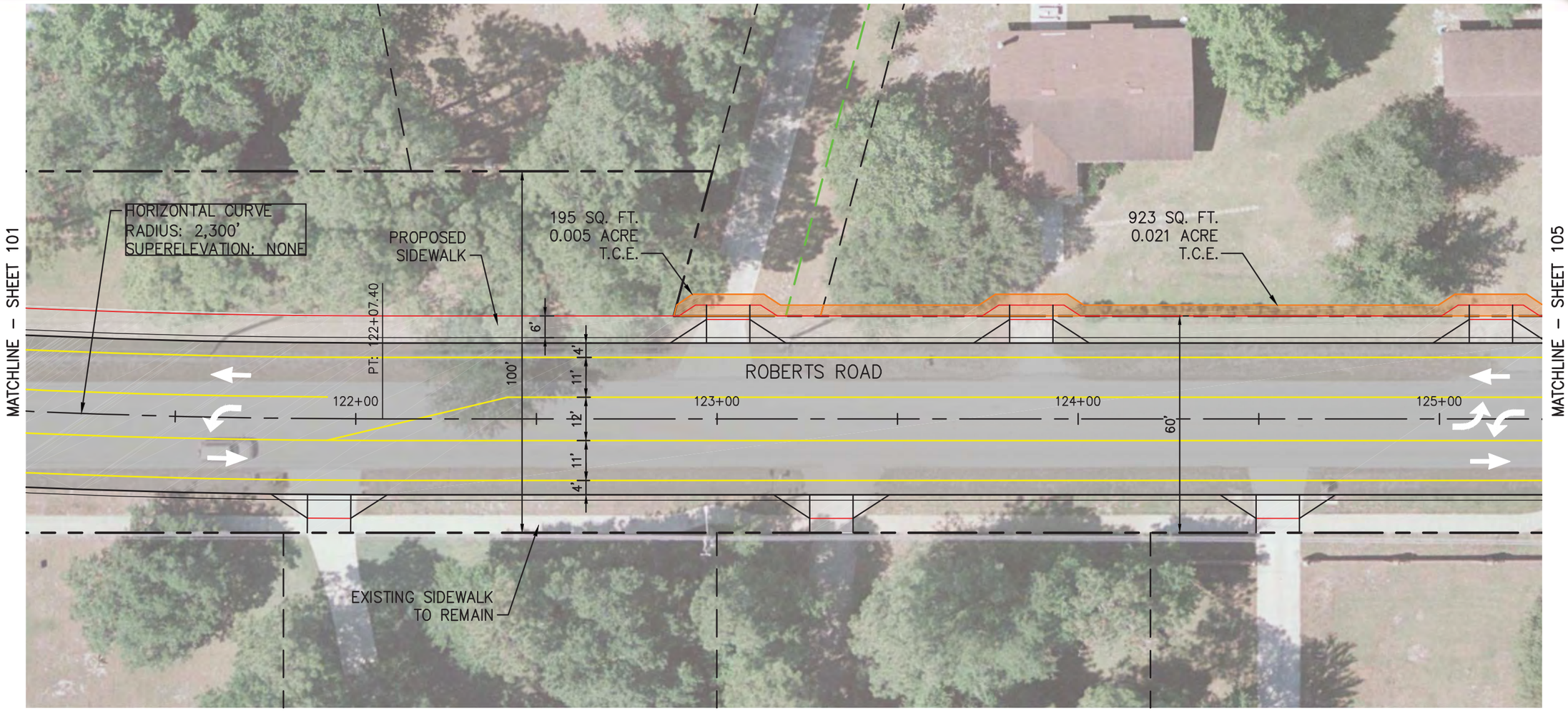
Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180

CONCEPT PLANS



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

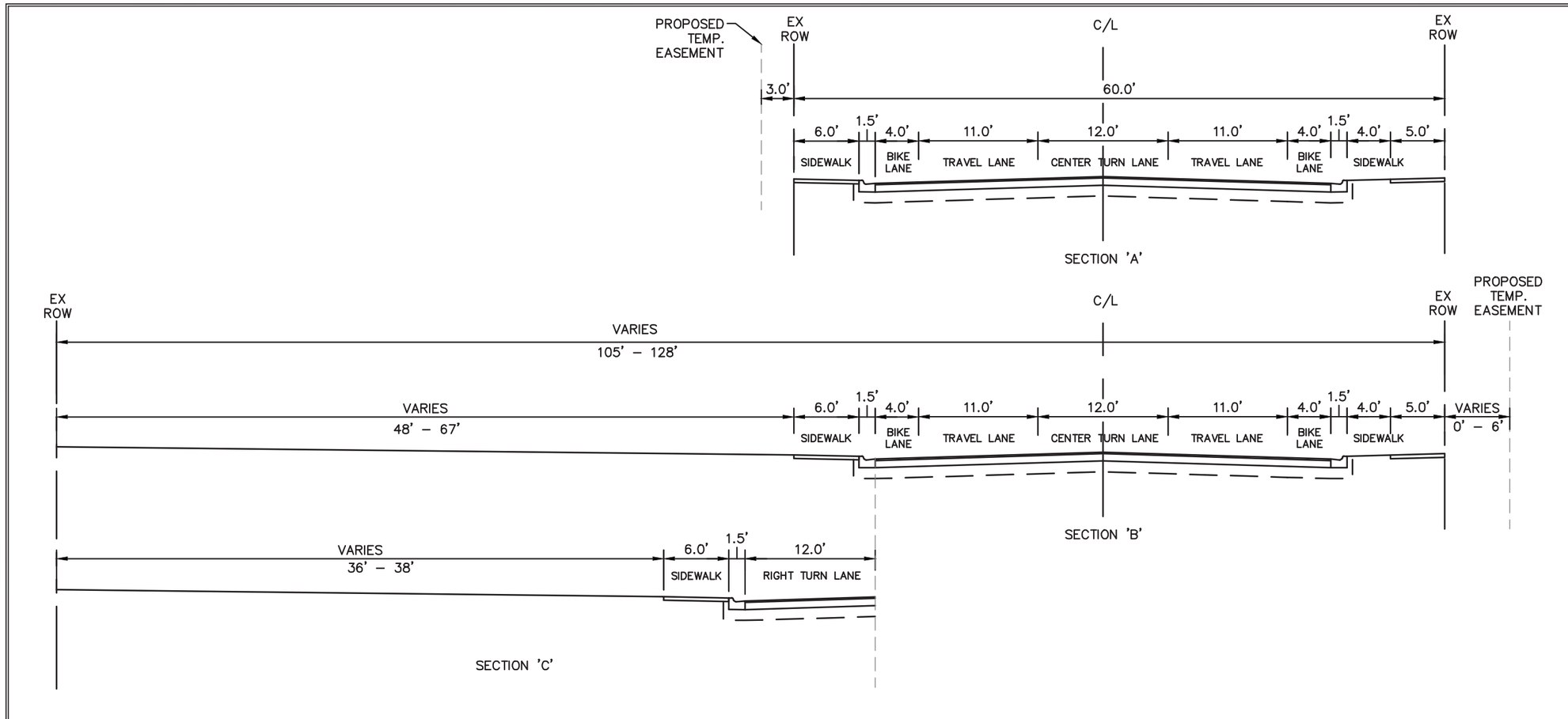
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Concept Plans



Pavement Design

Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180

Roberts Road Typical Section

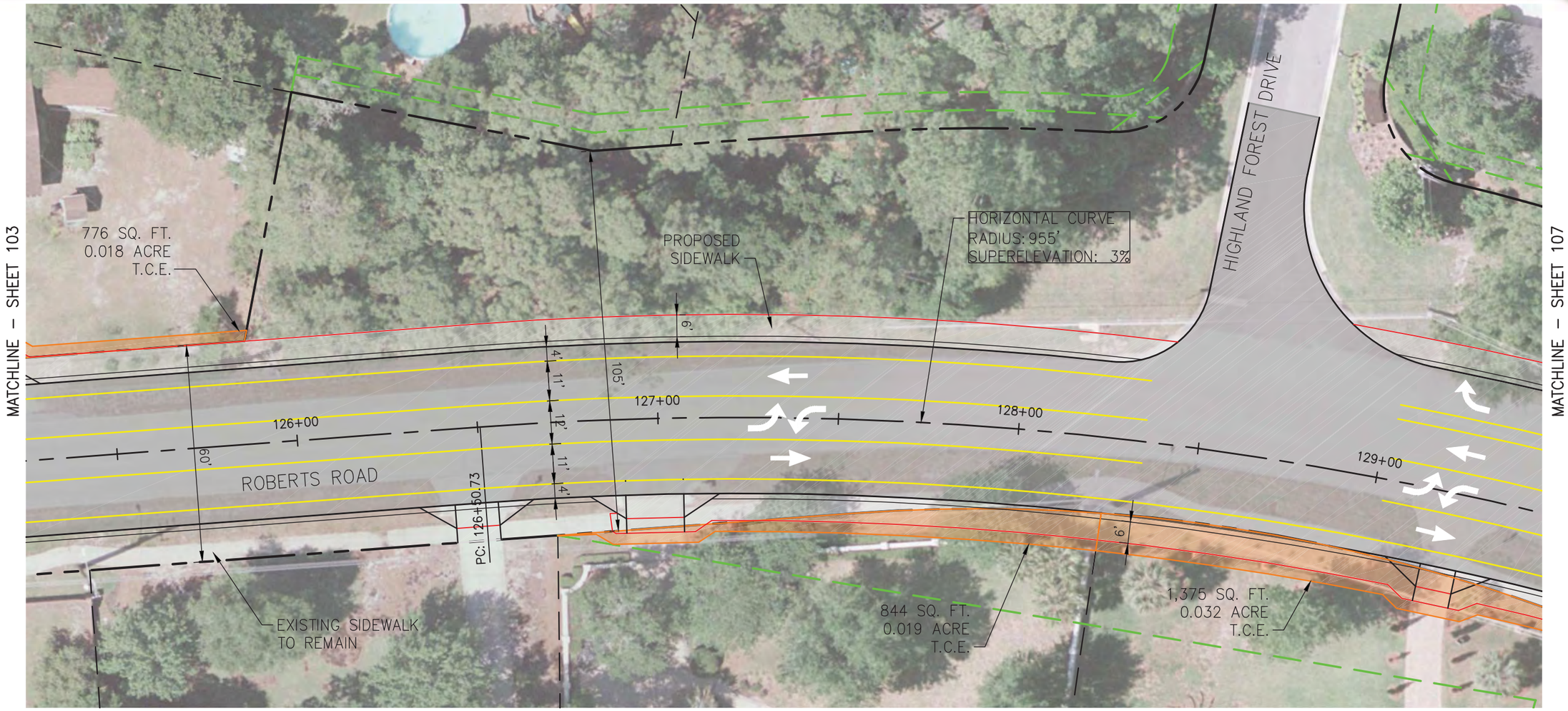
Section 'A' - From STA: 122+50 To STA: 126+00
Section 'B' - From STA: 126+00 To STA: 129+00
Section 'C' - Begins at STA: 129+00

Highland Forest Drive

The intersection of Highland Forest Drive at Roberts Road is a two-way, stop-controlled T-intersection with Highland Forest Drive being the west leg to the intersection controlled by a stop sign and Roberts Road operating as free-flow. As summarized in Tables 6 and 7, the Highland Forest Drive stop-controlled approach currently operates at LOS C during the AM and PM Peak Hours. An exclusive right-turn lane is present in the southbound direction. As summarized in Tables 8 and 9, the intersection is not required to have any additional turn lanes. The southbound right-turn lane operates as uncontrolled and no storage length is required. The total required length is therefore 155 feet to accommodate deceleration and taper. The existing southbound right-turn lane is approximately 150 feet long and requires an additional 5 feet to accommodate the full deceleration and taper length.

Needs:

- Additional 5 feet of deceleration for southbound right-turn lane



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

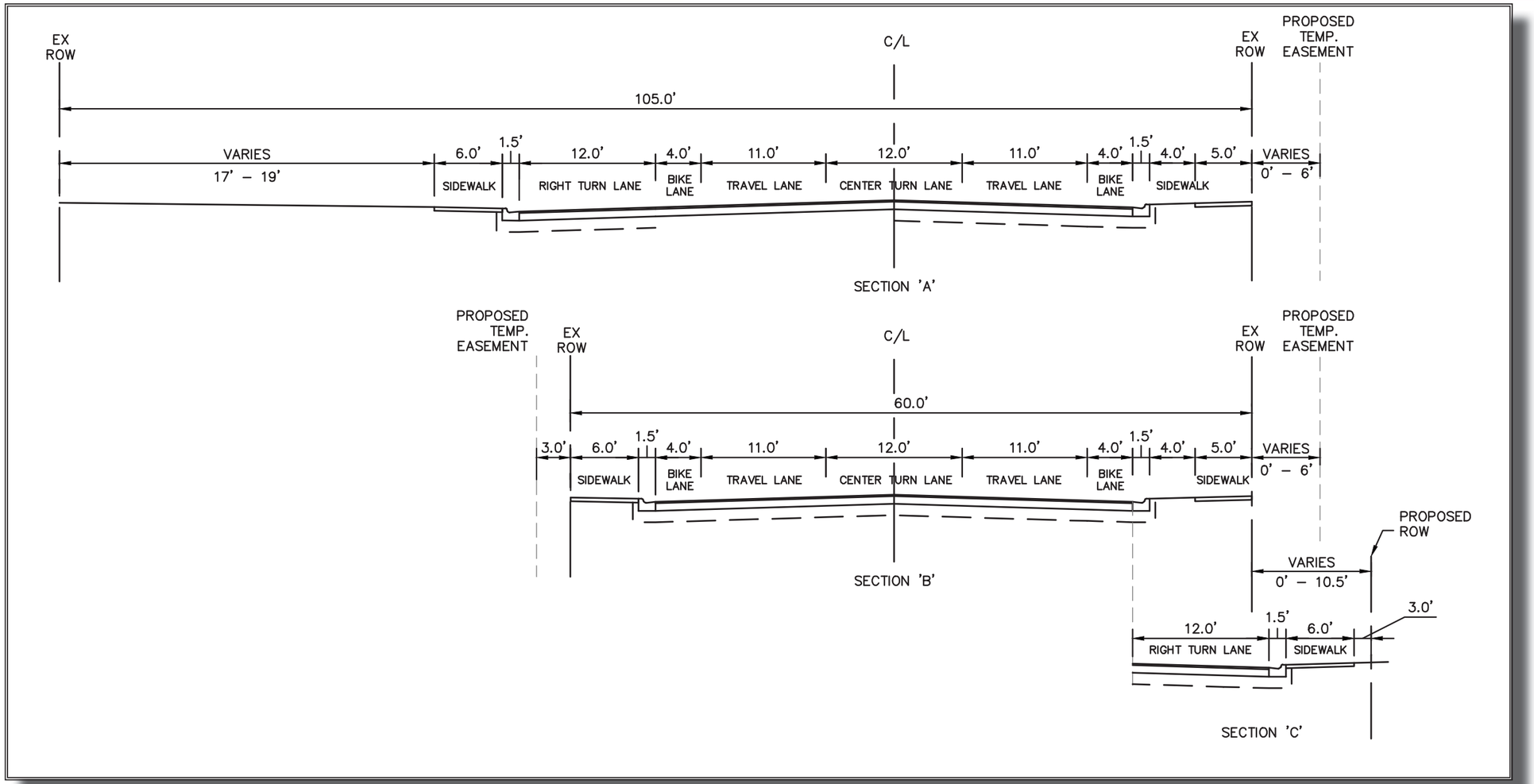
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Concept Plans



Pavement Design

Friction Couse - 9.5 (1.5")

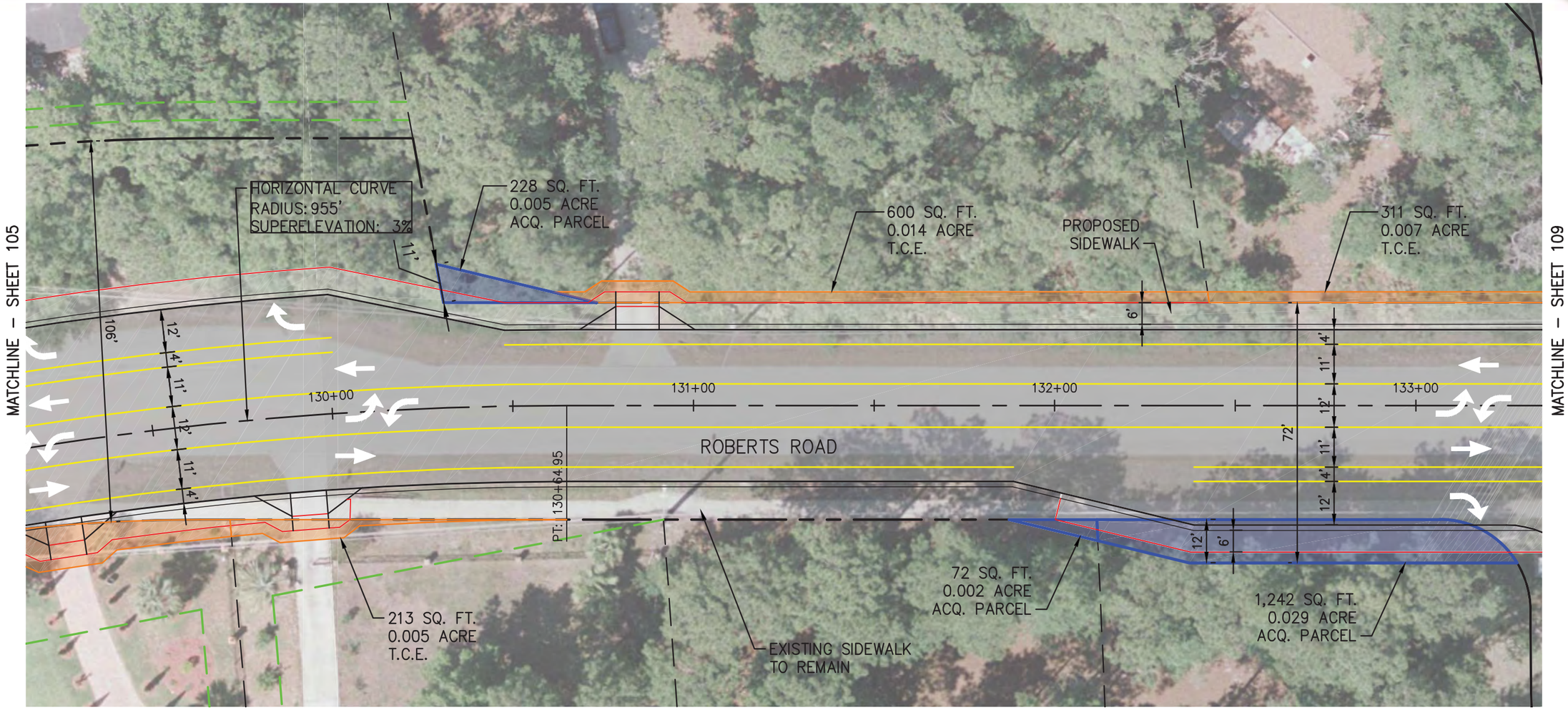
Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180

Roberts Road Typical Section

Section 'A' - Begins at STA: 129+20
Section 'B' - Begins at STA: 130+75
Section 'C' - Begins at STA: 131+75



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

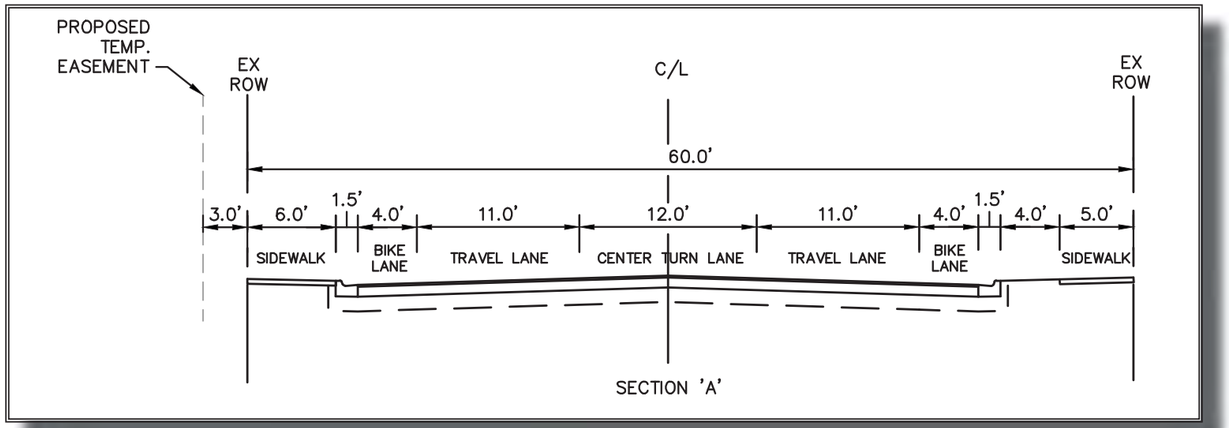
0 15 30
GRAPHIC SCALE IN FEET

Mallard Lake Ave. / Beluthahatchee Road

The intersection of Mallard Lake Avenue/Beluthahatchee Road at Roberts Road is a two-way, stop-controlled intersection with Mallard Lake Avenue being the east leg to the intersection controlled by a stop sign, Beluthahatchee Road being the west leg to the intersection controlled by a stop sign, and Roberts Road operating as free-flow. As summarized in Tables 6 and 7, the Mallard Lake Avenue stop-controlled approach currently operates at LOS C during the AM Peak Hour and LOS B during the PM Peak Hour and the Beluthahatchee Road stop-controlled approach operates at LOS C during the AM Peak Hour and LOS D during the PM Peak Hour. As summarized in Tables 8 and 9, the intersection has no existing turn lanes yet is required to have a northbound right-turn lane. Since the proposed northbound right-turn lane will operate as uncontrolled, a storage length is not required and the total required length is therefore 155 feet to accommodate deceleration and taper.

Needs:

- New 155-foot northbound right-turn lane



Roberts Road Typical Section - Sheet 109

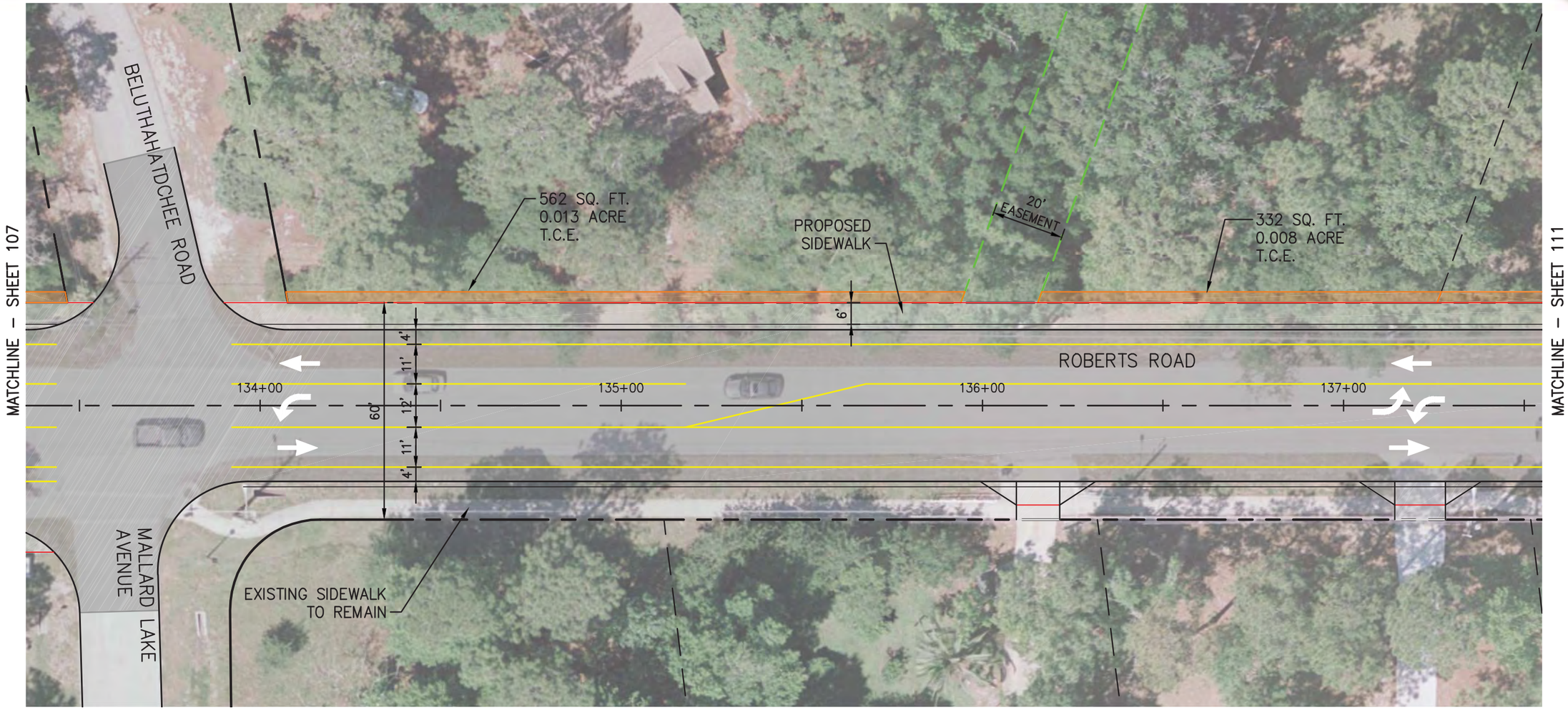
Pavement Design
Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180

CONCEPT PLANS



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 15 30
GRAPHIC SCALE IN FEET

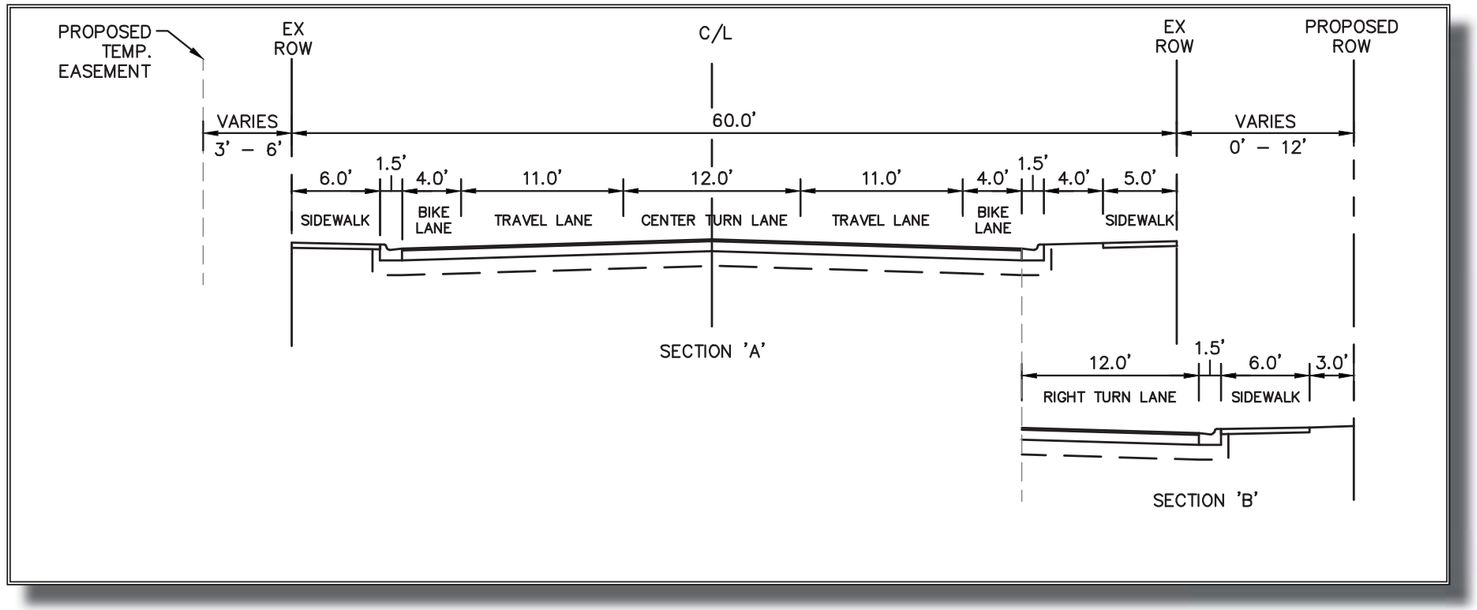
Concept Plans

Duck Blind Drive

The intersection of Duck Blind Drive at Roberts Road is a two-way, stop-controlled T-intersection with Duck Blind Drive being the east leg to the intersection controlled by a stop sign and Roberts Road operating as free-flow. As summarized in Tables 6 and 7, the Duck Blind Drive stop-controlled approach currently operates at LOS C during the AM and PM Peak Hours. As summarized in Tables 8 and 9, the intersection has no existing turn lanes yet is required to have a northbound right-turn lane. Since the proposed northbound right-turn lane will operate as uncontrolled, a storage length is not required and the total required length is therefore 155 feet to accommodate deceleration and taper.

Needs:

- New 155-foot northbound right-turn lane



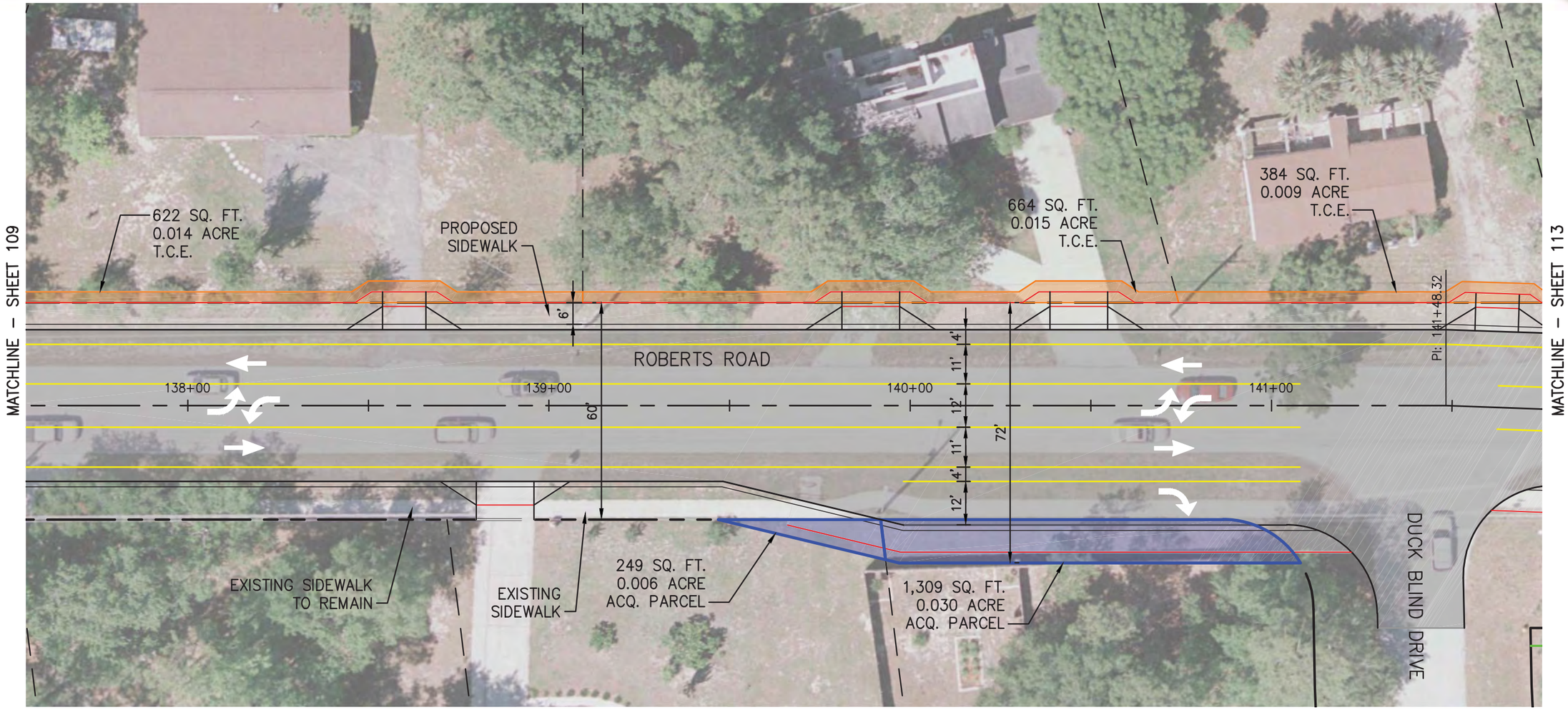
Roberts Road Typical Section
Section 'A' - Begins at STA: 137+50
Section 'B' - From STA: 139+50 To STA: 141+25

Pavement Design
Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

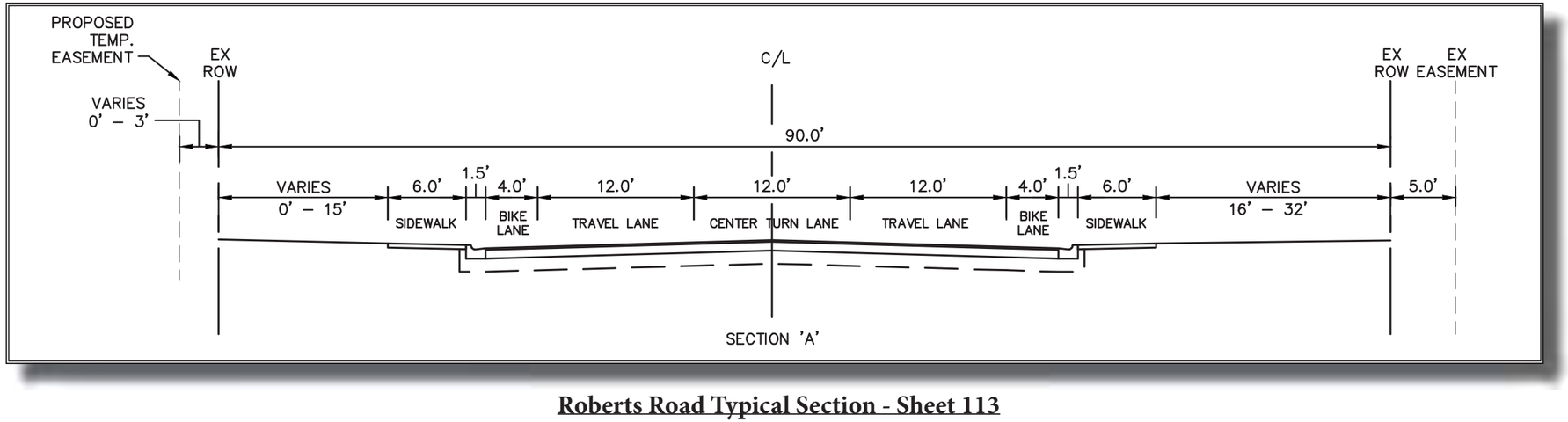
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 15 30
GRAPHIC SCALE IN FEET

CONCEPT PLANS



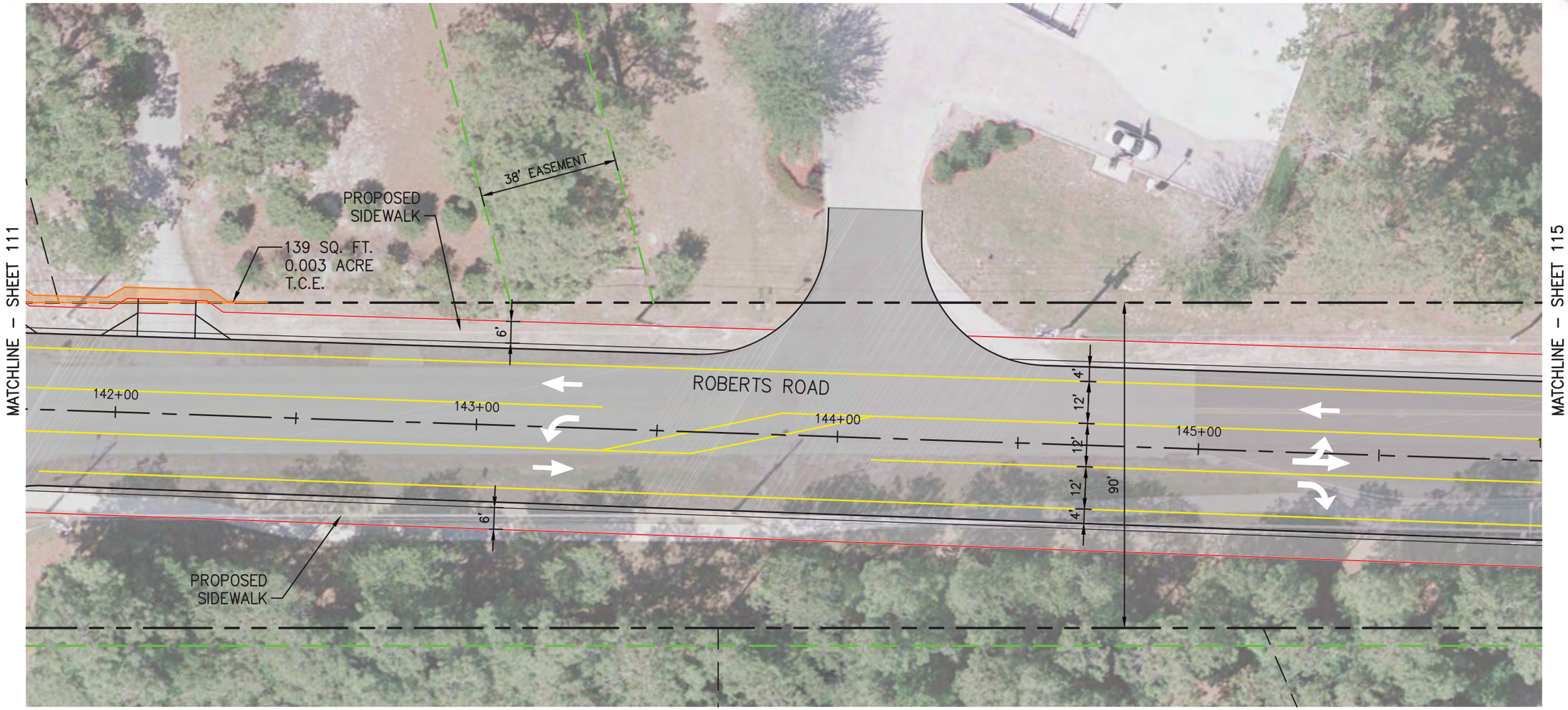
Roberts Road Typical Section - Sheet 113

Pavement Design
Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 15 30
GRAPHIC SCALE IN FEET

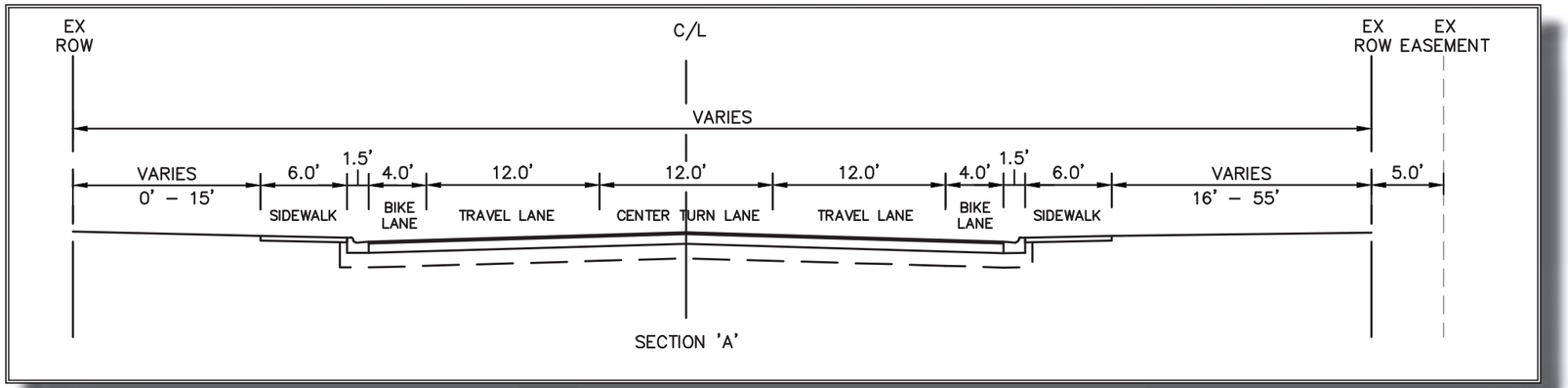
SR 13

SR 13 is a four-lane urban minor arterial oriented in the north-south direction with a posted speed limit of 45 mph in the vicinity of the Roberts Road intersection. The movements at the intersection are controlled by a traffic signal of mast arm design. The northwestbound approach is the northern limit of Roberts Road and the southeastbound approach is the driveway to Switzerland Animal Hospital. Exclusive left-turn lanes are present in the northbound and southbound directions and operate with protected-permissive left-turn phasing. The southeastbound and northwestbound left-turn movements are permissive. The northwestbound approach consists of a shared left-turn/ through lane and an exclusive right-turn lane.

As summarized in Tables 4 and 5, the intersection currently operates at LOS D during the AM Peak Hour and LOS C during the PM Peak Hour. All movements operate at LOS D or better with the exception of the northwestbound right-turn movement, which operates at LOS F during the AM Peak Hour. As summarized in Tables 8 and 9, the existing northwestbound right-turn lane is anticipated to require 300 feet of storage and 155 feet of deceleration and taper distance for a total turn lane length of 455 feet. The existing northwestbound right-turn lane is approximately 215 feet long and requires an additional 240 feet to accommodate the full storage, deceleration, and taper length.

Needs:

- Additional 240 feet of storage for northwestbound right-turn lane



Roberts Road Typical Section - Sheet 115

Pavement Design
Friction Couse - 9.5 (1.5")

Type SP - 12.5 Structural Course (2")

10" Limerock Base Course
LBR 100/98% Maximum Density
Per AASHTO T-180
Primed Entire Width

12" Stabilized Subgrade
LBR 100/98% Maximum Density
Per AASHTO T-180

LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

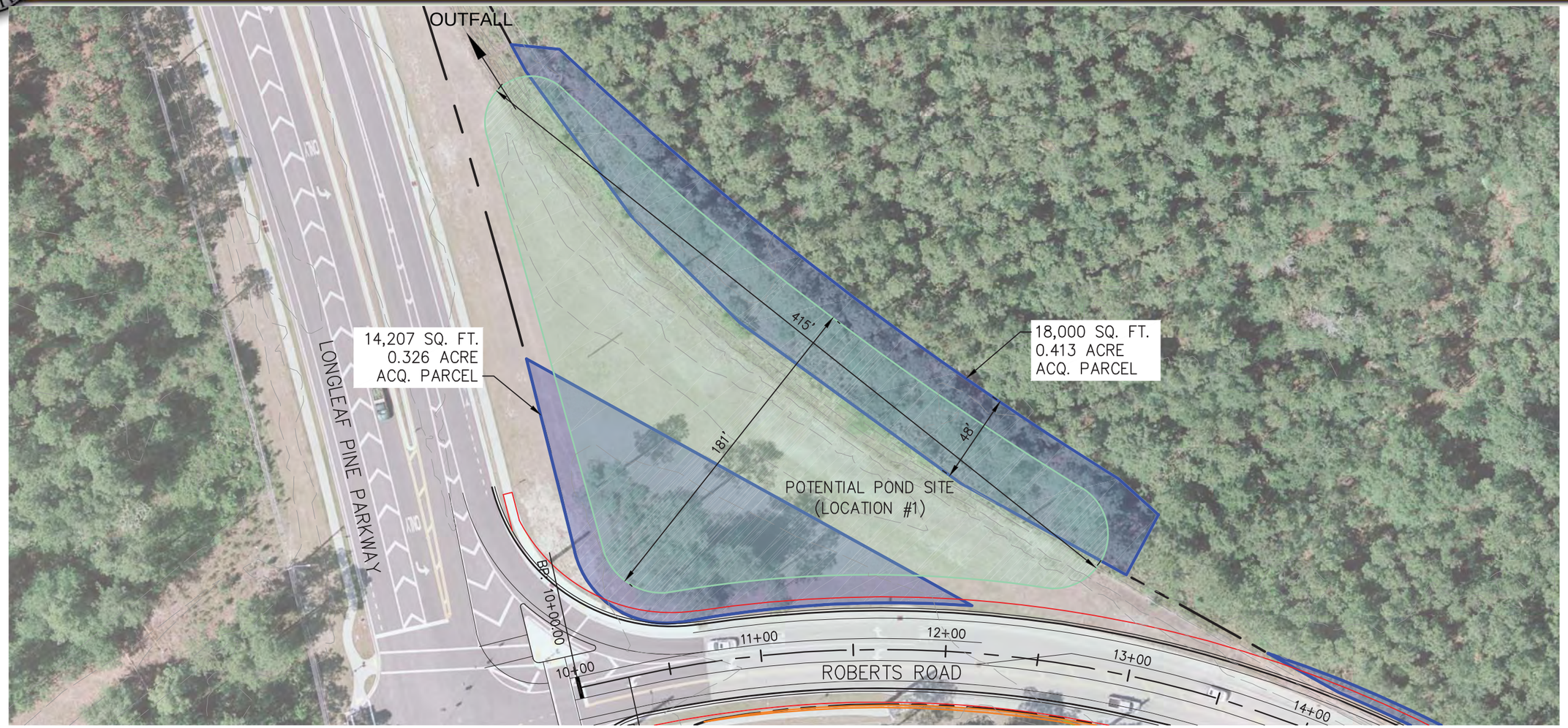
RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 15 30
GRAPHIC SCALE IN FEET

Concept Plans - Potential Pond Sites



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 30 60
GRAPHIC SCALE IN FEET

Kimley-Horn and Associates, Inc.

Concept Plans - Potential Pond Sites

LEGEND

EXISTING RIGHT–OF–WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT–OF–WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

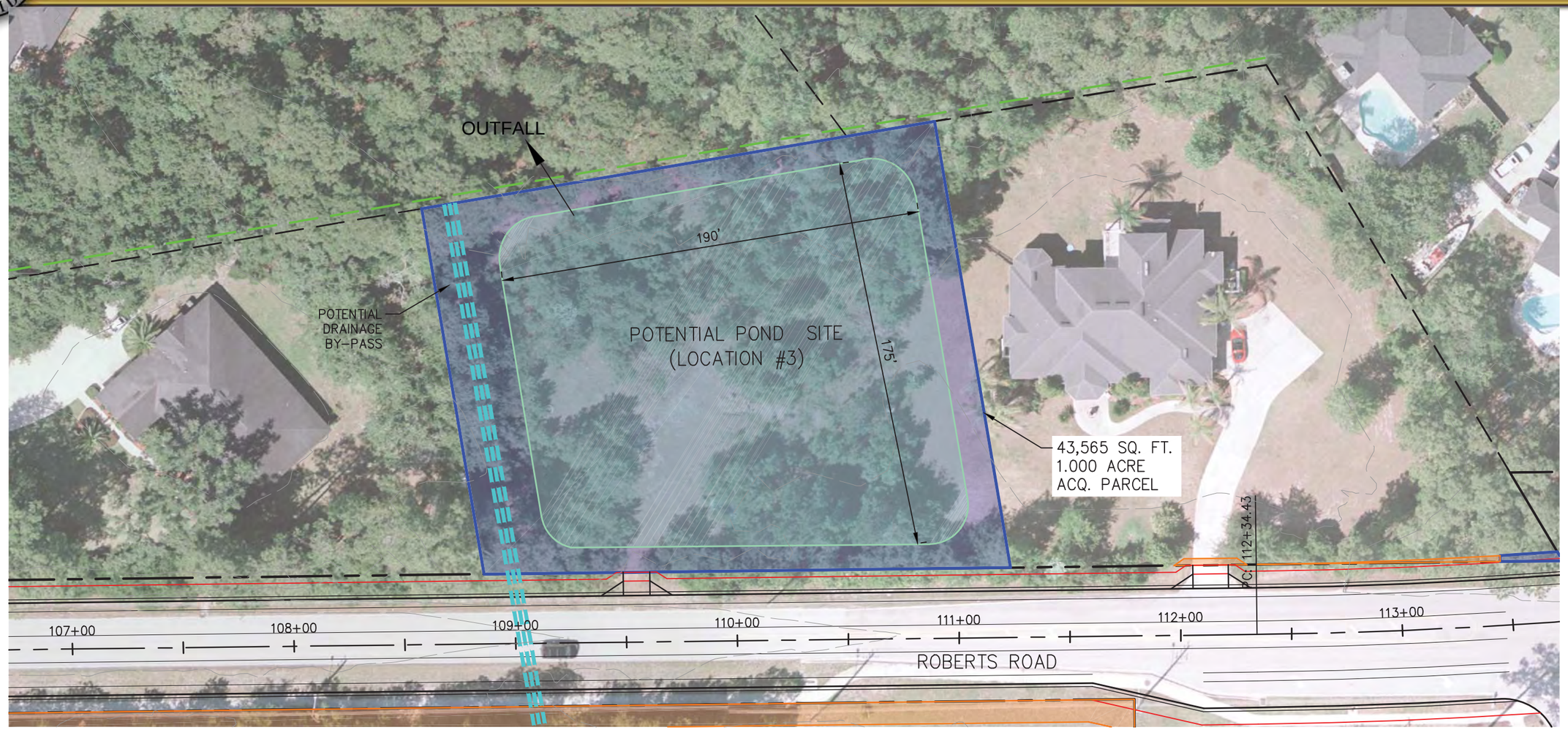
RIGHT–OF–WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 50 100
GRAPHIC SCALE IN FEET

Concept Plans - Potential Pond Sites



LEGEND

EXISTING RIGHT-OF-WAY:
EXISTING PROPERTY LINE:
EXISTING EASEMENT:
PROPOSED RIGHT-OF-WAY:
CENTERLINE:
PAVEMENT MARKING:
EDGE OF PAVEMENT:
CURB AND GUTTER:

PAVED SHOULDER:
GRASS SHOULDER:
TOP OF SWALE:
BOTTOM OF SWALE:
SIDE DRAIN:
SIDEWALK:
MITERED END SECTION:

RIGHT-OF-WAY ACQUISITION PARCEL:
TEMPORARY CONSTRUCTION EASEMENT (T.C.E.):
FLEXIBLE PAVEMENT:

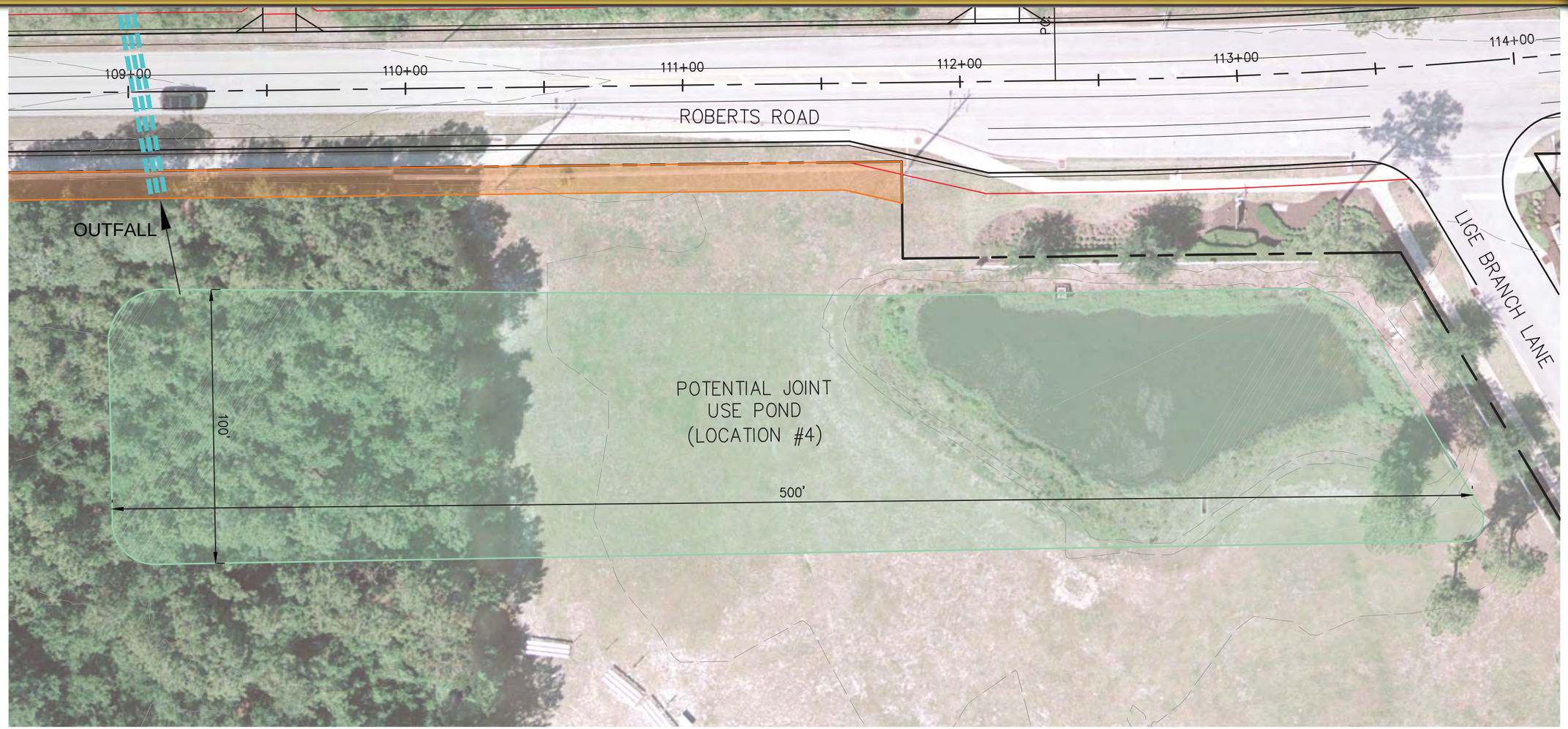
CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 25 50
GRAPHIC SCALE IN FEET

Kimley-Horn and Associates, Inc.

Concept Plans - Potential Pond Sites



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CONCRETE SIDEWALK/DRIVEWAY:
STORM WATER CONVEYANCE/ TREATMENT AREAS:
POTENTIAL POND SITE:

NORTH

0 20 40
GRAPHIC SCALE IN FEET

OPINION OF PROBABLE PROJECT COST

An Opinion of Probable Project Cost (OPPC) was prepared for each phase of the Roberts Road improvements depicted in the concept plans. The OPPCs were developed utilizing the per-mile construction costs contained in the FDOT's Long Range Estimate (LRE) database, dated January 2012. Two different LRE cost models were utilized. The first model being the New Construction Undivided 3-lane Rural Road with 5' Paved Shoulders and Center Turn Lane. The second model being the New Construction 3-lane Undivided Urban Arterial with Center Turn Lane and 4' Bike Lanes. Both cost models were modified to remove any pay items related to contingencies or lighting. The OPPCs contain an overall contingency that replaces the line item contingencies contained in the LRE models. No lighting modifications are proposed in the concept plans.

The OPPCs were calculated based on the same three phases described earlier in this report and are summarized below in Tables 10, 11 and 12.

Table 10

CONCEPT ESTIMATE OF PROBABLE PROJECT COST
Roberts Road Phase One - Widening to 3-Lanes
Stations 111+00 to 147+15
January 2013

Description	Unit	Quantity	Unit Cost	Amount
Robert Road Rural Section(1)	MILE	0.00	$ 2,803,217.01	$ -
Robert Road Urban Section(2)	MILE	0.69	$ 4,291,273.04	$ 2,939,522.03
Total Construction				**$ 2,939,522.03**
Surveying, Engineering and CEI (30%)				**$ 881,856.61**
Contingency (25%)				**$ 734,880.51**
TOTAL PROJECT "SAY"				**$ 4,557,000.00**

Notes:

(1) Unit Cost from FDOT Long Range Estimate (LRE), dated January 2012, for New construction undivided 3 lane rural road with 5' paved shoulders, center turn lane. The contingency has been removed from the unit cost.

(2) Unit Cost from FDOT Long Range Estimate (LRE), dated January 2012, for New construction 3 lane undivided urban arterial with center turn lane and 4' bike lanes. Lighting items and contingency has been removed from the unit cost.

No right-of-way acquisition price is included.

The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

Table 11

CONCEPT ESTIMATE OF PROBABLE PROJECT COST
Roberts Road Phase Two - Widening to 3-Lanes
Stations 58+00 to 111+00
January 2013

Description	Unit	Quantity	Unit Cost	Amount
Robert Road Rural Section(1)	MILE	0.65	$ 2,803,217.01	$ 1,822,091.06
Robert Road Urban Section(2)	MILE	0.35	$ 4,291,273.04	$ 1,519,110.66
Total Construction				**$ 3,341,201.71**
Surveying, Engineering and CEI (30%)				**$ 1,002,360.51**
Contingency (25%)				**$ 835,300.43**
TOTAL PROJECT "SAY"				**$ 5,179,000.00**

Notes:

(1) Unit Cost from FDOT Long Range Estimate (LRE), dated January 2012, for New construction undivided 3 lane rural road with 5' paved shoulders, center turn lane. The contingency has been removed from the unit cost.

(2) Unit Cost from FDOT Long Range Estimate (LRE), dated January 2012, for New construction 3 lane undivided urban arterial with center turn lane and 4' bike lanes. Lighting items and contingency has been removed from the unit cost.

No right-of-way acquisition price is included.

The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

Table 12

CONCEPT ESTIMATE OF PROBABLE PROJECT COST
Roberts Road Phase Three - Widening to 3-Lanes
Stations 10+00 to 58+00
January 2013

Description	Unit	Quantity	Unit Cost	Amount
Robert Road Rural Section(1)	MILE	0.23	$ 2,803,217.01	$ 647,543.13
Robert Road Urban Section(2)	MILE	0.68	$ 4,291,273.04	$ 2,909,483.12
Total Construction				**$ 3,557,026.25**
Surveying, Engineering and CEI (30%)				**$ 1,067,107.88**
Contingency (25%)				**$ 889,256.56**
TOTAL PROJECT "SAY"				**$ 5,514,000.00**

Notes:

(1) Unit Cost from FDOT Long Range Estimate (LRE), dated January 2012, for New construction undivided 3 lane rural road with 5' paved shoulders, center turn lane. The contingency has been removed from the unit cost.

(2) Unit Cost from FDOT Long Range Estimate (LRE), dated January 2012, for New construction 3 lane undivided urban arterial with center turn lane and 4' bike lanes. Lighting items and contingency has been removed from the unit cost.

No right-of-way acquisition price is included.

The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

RIGHT OF WAY SUMMARY

Minimization of right-of-way acquisition was an overriding goal of the study. There are areas along the corridor where, due to existing right-of-way constraints, future right-of-way acquisition is unavoidable if a three-lane typical section is to be constructed. The concept plans depict the right-of-way acquisition and temporary construction easement (TCE) areas anticipated as needed for construction as defined by the horizontal geometry of the proposed improvements. Refinement to these areas will likely be required as vertical geometry is considered during the final design process. Table 13 below summarizes the overall right-of-way and TCE acquisition areas depicted on the concept plans.

Table 13
Estimated Acquisition Areas

Type	Area (Square Feet)	Area (Acres)	Number of Parcels
Right-of-way	50,546	1.160	13
Pond Sites	101,059	2.320	4
Construction Easements	27,109	0.622	39

BENEFIT-COST ANALYSIS

A safety benefit-cost analysis was performed to evaluate the feasibility of the proposed improvements versus the anticipated reduction in crash frequency for phase one which includes Lige Branch Lane to SR 13. For the benefit component, crash modification factors from the AASHTO Highway Safety Manual 2010 and the FHWA Crash Modification Factor Clearinghouse website were reviewed along with crash reduction factors based on the rates provided in the technical report "Update of Florida Crash Reduction Factors and Countermeasures to Improve the Development of District Safety Improvement Projects" produced by the Lehman Center for Transportation Research in April 2005. These factors were evaluated with engineering judgment to obtain a logical and conservative expected change in crash frequency following implementation of the proposed roadway improvements. The following percentages were used to calculate the total number of correctable crashes claimed:

- 50% reduction in lane departure crashes for correction of the superelevation on the curve at Highland Forest Drive
- 50% reduction in lane departure crashes for the addition of shoulders/bicycle lanes
- 25% reduction in rear-end crashes at intersections where left or right-turn lanes are proposed

The total number of correctable crashes was divided out over the three-year study period to obtain an annual expected benefit. The FDOT 2010 average cost per crash for a rural, two-lane, undivided roadway was used to calculate the annual dollar amount of the crash reduction benefit.

For the cost component, the FDOT Long Range Estimate system was used to obtain an approximate construction cost for the proposed roadway improvements, including mobilization and maintenance of traffic. An additional 30 percent was added to this estimate to account for survey, engineering, and CEI services and another 25 percent was added on top of this for a contingency. These dollar amounts were annualized over the 20-year expected service life of the improvements to obtain an annual expected cost.

The resulting benefit-cost ratio yields 1.84 for the proposed improvements from Lige Branch Lane to SR 13 (phase one). It is estimated that construction of the improvements will correct two crashes per year, including short form and long form crashes.

RECOMMENDATIONS

The study revealed that Roberts Road has experienced an abnormally high crash rate above the 95 percent confidence level each year from 2007 to 2009 in comparison to similar FDOT roadways throughout the state. Over 52 percent of the crashes were attributed to careless driving and additional contributing causes included failure to yield the right-of-way and alcohol or drug use. Significant peaks in crash frequency were observed between the hours of 8:00 am to 9:00 am and 3:00 pm to 6:00 pm. Approximately 9 percent and 38 percent of the crashes occurred during these morning and afternoon peak periods, respectively. In addition, drivers aged 16 to 18 years old were at-fault for nearly 55 percent of the crashes.

Based on the capacity analysis, Long Leaf Pine Parkway and SR 13 operate at LOS D or better in the peak hours analyzed. All of the unsignalized intersections operate at an acceptable LOS during the peak hours with the exception of the Cunningham Creek Elementary School driveway and Greenridge Circle/Ivy Lakes Drive in the morning peak hour. The Cunningham Creek Elementary School driveway is controlled by a St. Johns County Public Service Assistant (PSA) Officer during both the morning and afternoon peak hours. It is not unusual for unsignalized intersections to operate with long side street delay during the peak hours. Turn lane lengths were analyzed for all the signalized and unsignalized driveways and various intersections require the addition of a turn lane or the lengthening of an existing turn lane.

Short-Term and Long-Term Recommendations

Short-term and long-term recommendations have been developed based on the study. Short-term recommendations are improvments that can be implemented within the next five years as funds become available. The long-term recommendation is intended as more of a vision for the corridor and will take more time to implement based on the overall cost. The short-term recommendations are summarized below.

- Maintenance of existing ditches and easements. Based on our observations after heavy rain events and the over grown nature of these areas, we recommend the County clear these areas of overgrown trees and growth that are hindering the drainage and flow of water.
- Finish the network of sidewalks near stations 15+00 and 56+00. In addition to completing the missing sidewalk sections we also recommend the existing trip hazards on the existing sidewalks be corrected.
- Lengthen existing turn lanes at the Cunningham Creek Elementary School driveway. During the afternoon peak, traffic queues up and out of the existing turn lane and blocks through traffic on Roberts Road and turning traffic on Tiger Creek Parkway. This is a safety hazard during the afternoon peak hour.
- Consider installation of a neighborhood drop off and pick up area at Cunningham Creek Elementary School. This could be constructed along Tiger Creek Parkway to alleviate a large portion of the traffic that exits Tiger Creek Parkway and then enters the school for drop off and pick up. It appears that the right-of-way along Tiger Creek Parkway is sufficient for this improvement. This improvement will need to be discussed with the St. Johns County School Board and HOA for the development.
- Due to the poor condition of some of the edges of pavement and shoul-

der areas, it is recommended the County request buses no longer pull off the road to stage between school drop off at Cunningham Creek Elementary School and pick up for Bartram Trail High School.

- Resurface Roberts Road. Due to the percentage of wet crashes it is recommended to consider resurfacing Roberts Road in the future. This will help lower the amount of wet weather crashes.

- Reconstruct the curve near station 129+00 to provide proper superelevation. This location has had four run off the road crashes in the past three years that could be attributed to the existing superelevation of the curve.

- Evaluate the purchase of the potential pond sites identified in the concept plans.

The overall concepts developed, as depicted in the concept plans, summarize the proposed long-term improvements for Roberts Road. The long-term vision for the corridor proposes widening Roberts Road to three lanes with bike lanes and a combination of curb and gutter or shoulder with grassed swale sections.

PUBLIC INVOLVMENT

A community meeting was held on Thursday, January 31, 2013 at the Bartram Trail Branch Public Library. At the meeting, the project objectives, existing conditions/crash summaries, concept plans, and OPPCs were available for public review and comment. Over fifty members of the public attended the meeting and provided input. Ten comment cards were completed and submitted to the project team. The comment cards have been included under separate cover in the study Appendix.