Part A – Technical Memorandum

Sinclair Road Extension
From Tradition Boulevard
to Bella Citta Boulevard
Osceola County, Florida

Prepared for:

OSCEOLA COUNTY

NOVEMBER 2023

Prepared by:

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1.0 PROJECT SUMMARY

1.1 PROJECT DESCRIPTION

This project involves extending Sinclair Road approximately 1.5-miles, from Tradition Boulevard to Bella Citta Boulevard in Osceola County. The proposed project includes constructing a 4-lane, divided roadway with a median, with bicycle and pedestrian facilities. Stormwater management facilities will be evaluated. **Exhibit 1-1** illustrates the project location and **Exhibit 1-2** illustrates the project limits.

Exhibit 1-1: Project Location

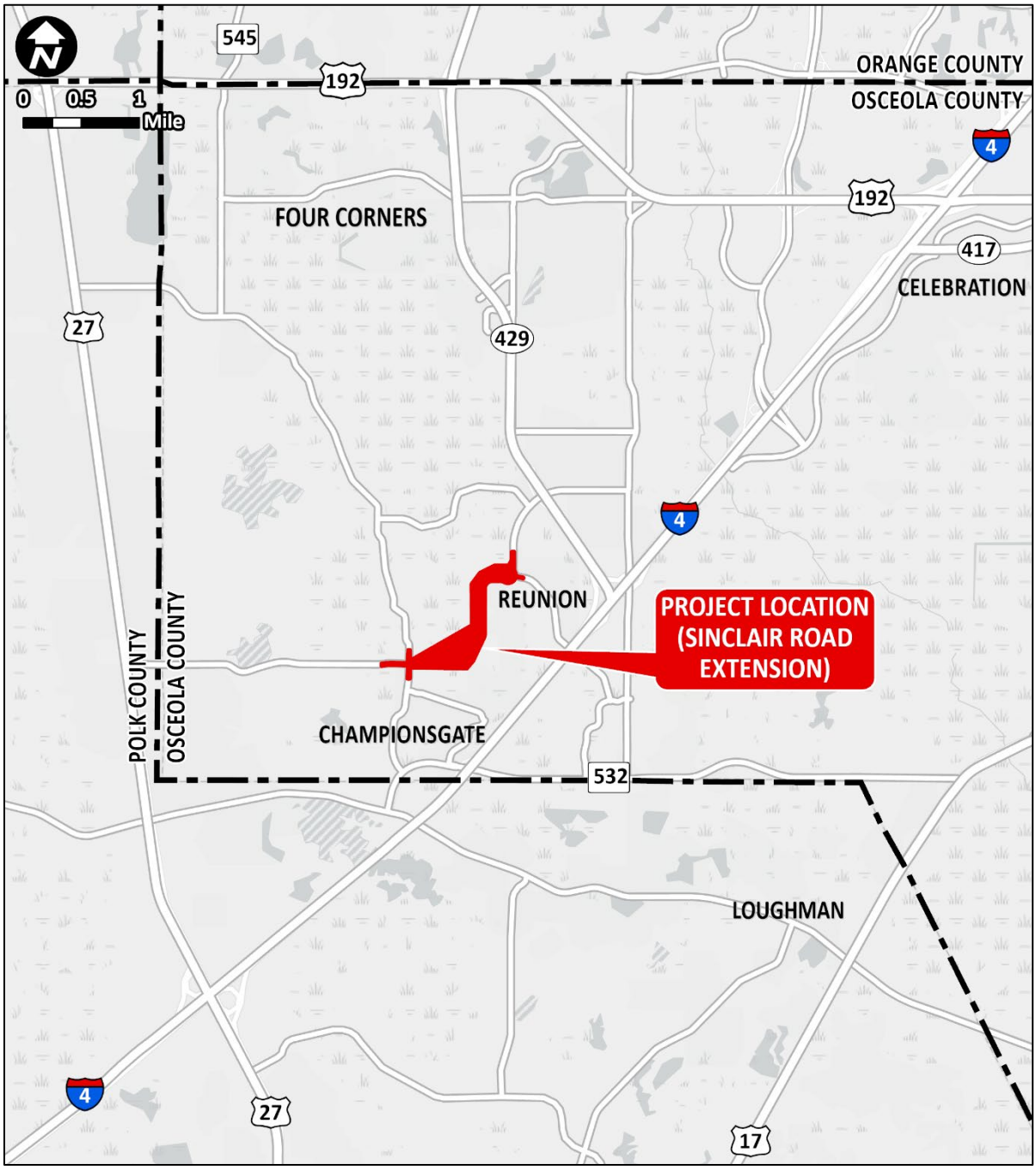
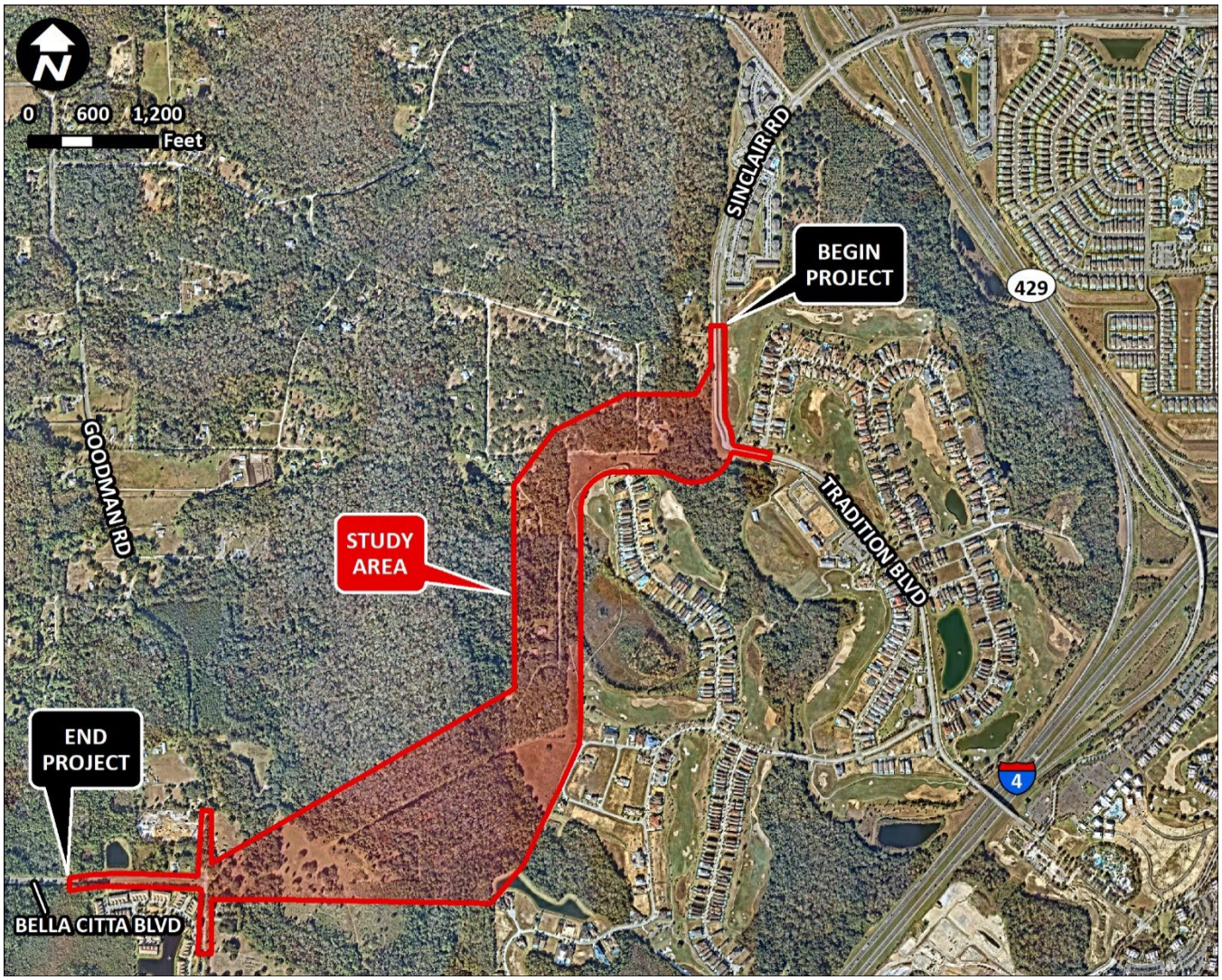


Exhibit 1-2: Project Limits



1.2 PURPOSE AND NEED

The purpose of the Sinclair Road Extension is to provide system linkage and improve mobility. The need for the project is based on system linkage and mobility.

System Linkage

System linkage is defined as linking two or more existing transportation facilities, types of modal facilities, geographic areas, or regional traffic generators. Currently, there is no roadway connection between SR 429 and US 27 (both Strategic Intermodal System facilities, as defined by the Florida Department of Transportation) except for Interstate 4 (I-4) and US 192. As a result, there is an increase in demand on the congested portion of I-4 between State Road SR 429 and CR 532 (which provides access to US 27 via Ronald Reagan Parkway) and on US 192.

Mobility
Mobility is the movement of people and goods and the ability to meet transportation demands. Sinclair Road Extension will provide a needed connection between residential developments near SR 429 and commercial developments along US 27. Sinclair Road Extension will also serve travel demands between US 27 and SR 429, thereby providing some relief to a severely congested portion of I-4.

1.3 COMMITMENTS

The following commitments are recommended to avoid and minimize impacts to natural protected resources, where practicable:

1. The Standard Protection Measures for the Eastern Indigo Snake will be implemented during project construction.
2. Avoidance and minimization of wetland and listed species impacts will continue to be evaluated during the final design, permitting, and construction phases of this project and all possible and practicable measures to avoid or minimize these impacts during design, construction, and operation will be incorporated.
3. Pre-construction surveys will be completed for listed species as required.
4. Best management practices to control erosion and sedimentation in accordance with FDOT's *Standard Specifications for Road and Bridge Construction* will be implemented.

1.4 ALTERNATIVES ANALYSIS SUMMARY

The Alternatives Analysis is described in Section 5.0. Alternatives included a No-Build Alternative, a Transportation System Management and Operations (TSM&O) Alternative, and Build Alternatives. The build alternatives include provisions for bicycles, pedestrians, and automobiles. No bus stops are provided on Sinclair Road and there are no plans to add bus stops. The alternatives analysis focused on the No-Build and Build Alternatives as the TSM&O Alternative strategies are included within the Build Alternatives.

1.4.1 BLUE ALTERNATIVE

The typical section for the Blue Alternative is a 4-lane divided urban roadway with a 35 MPH design speed with two 11-foot-wide travel lanes and a 4-foot-wide bicycle lane in each direction, separated by a 22-foot raised grass median with Type A curb and gutter. A 5-foot sidewalk is provided along both sides. This typical section would require 130 feet of right-of-way.

The typical section for the bridge across Davenport Creek is a 4-lane divided urban roadway with a 35 MPH design speed with two 11-foot-wide travel lanes and an 8-foot-4-inch-wide shoulder/bicycle lane in each direction, separated by a 22-foot raised median. A 5-foot sidewalk is provided along both sides, separated from the shoulder/bicycle lane by a barrier. This typical section would require 116 feet inches of right-of-way.

The proposed horizontal alignment for the Blue Alternative generally follows the alignment identified in the Reunion Resort and Club Development of Regional Impact (DRI), traveling along the northern and western property lines of the DRI. Variations from the DRI alignment include applying the 35 MPH design speed to the curve at the northern end and running the alignment along the south side of the Florida Gas and Transmission (FGT) gas pipeline. The Blue Alignment is illustrated on **Exhibit 1-3**.

During outreach to the Happy Trails Property Owners Association (HTPOA), residents requested three variations of the northern portion of the Blue Alternative, all with the intention of eliminating impacts to HTPOA parcels in the vicinity of Sinclair Road and Tradition Boulevard. These variations included:

- A modified T intersection at Sinclair Road and Tradition Boulevard where the through movement would be east-west instead of north-south (as with the Blue Alternative).
- Implementing a roundabout at Sinclair Road and Tradition Boulevard
- Shifting the alignment of existing Sinclair Road east, into the existing golf course, to shift the curve away from the HTPOA parcels.

Based on the evaluation of variations to the Blue Alternative (i.e., the northern portion of the Blue Alternative near the intersection at Tradition Boulevard) described in Section 5.5.1.3, the Blue Alternative variation was identified as the preferred alternative for the Blue Alternative to be evaluated against the Yellow Alternative. The advantages of the Blue Alternative variation more than offset the disadvantage, as described below.

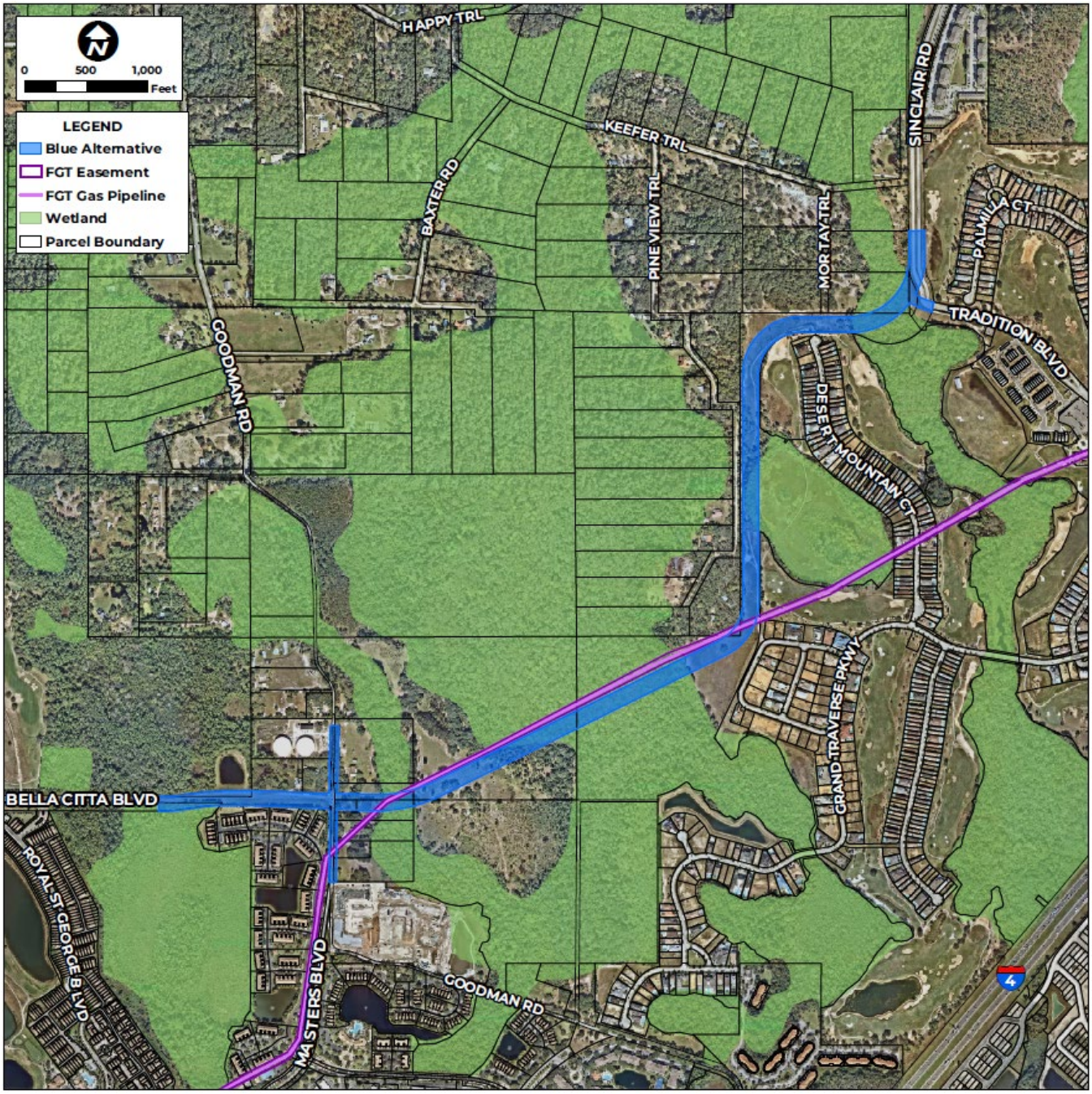
Advantages of the Blue Alternative variation include:

- The Blue Alternative, along with the Purple Alignment, provides the best traffic operations
- It impacts the fewest total parcels
- It impacts the fewest parcels with existing development
- It has the least environmental impacts
- It requires no relocations
- It does not impact parks or recreation areas
- It has a lower anticipated construction cost
- And it has lower anticipated right-of-way costs than the Purple Alignment

There is a disadvantage to the Blue Alternative variation:

- It impacts two residential parcels

Exhibit 1-3: Blue Alternative



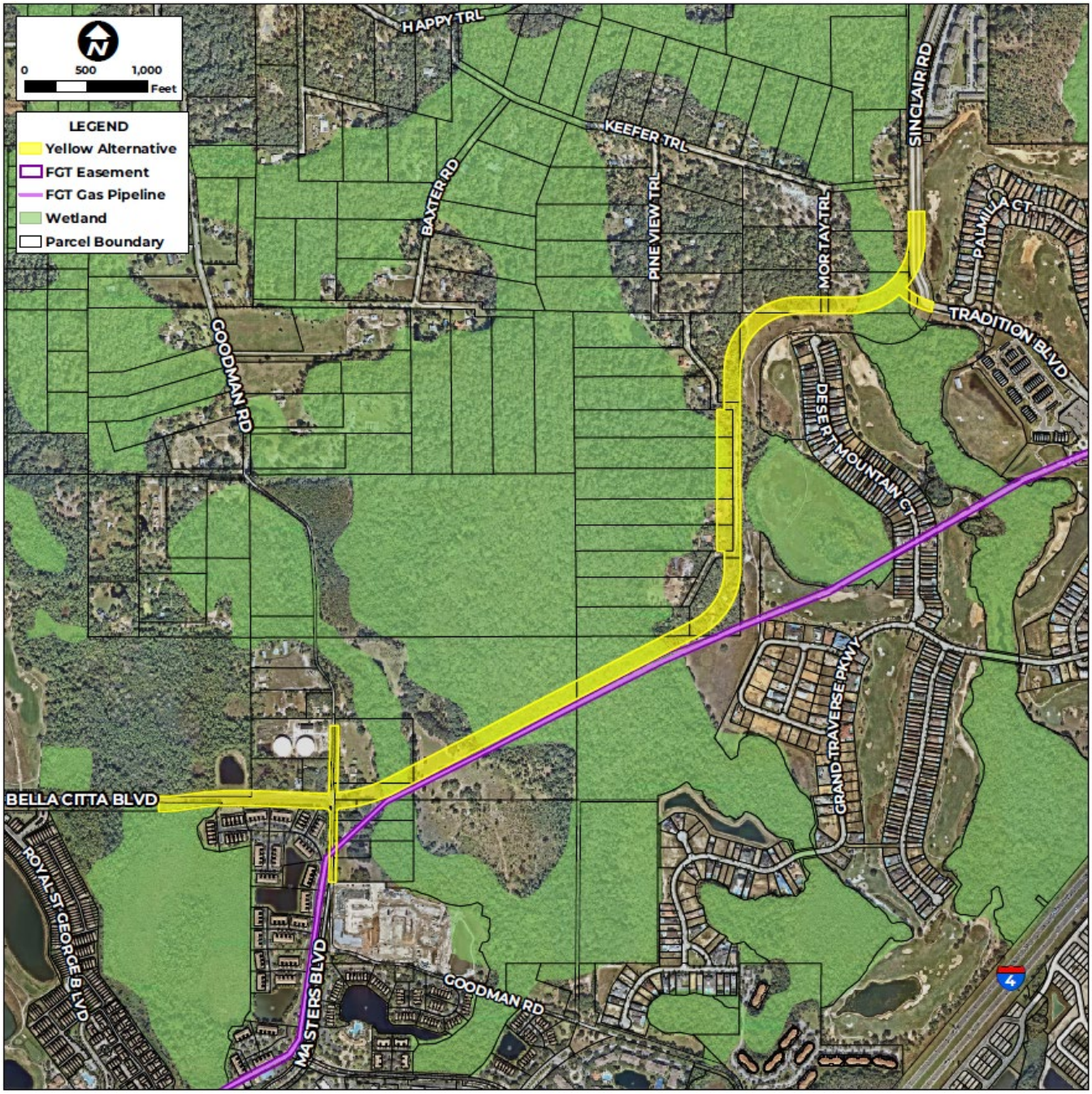
1.4.2 YELLOW ALTERNATIVE

The Yellow Alternative utilizes the same typical sections as described for the Blue Alternative in Section 1.4.1.

The proposed horizontal alignment for the Yellow Alternative is very similar to the Blue Alternative; however, it travels on the north side of the northern Reunion boundary and west of the western Reunion

boundary. It then travels on the north side of the FGT gas pipeline. The Yellow Alignment is illustrated on **Exhibit 1-4**.

Exhibit 1-4: Yellow Alternative



During outreach to the Reunion West Development Partners (RWDP), they requested a variation of the Yellow Alternative which continues west to Goodman Road and then turns south to reach Bella Citta Boulevard.

Based on the evaluation of the variation to the Yellow Alternative (i.e., the Pink Alternative) described in Section 5.5.2.3, the Yellow Alternative was identified as the preferred alternative to be evaluated against the Blue Alternative. The advantages of the Yellow Alternative variation more than offset the disadvantages, as described below.

Advantages of the Yellow Alternative include:

- It impacts the fewest parcels, both residential and non-residential
- It requires fewer residential relocations
- It has the least environmental impacts
- It has positive Community Cohesion impacts
- It has a lower anticipated construction cost
- And it has lower anticipated right-of-way costs

Disadvantages of the Yellow Alternative include:

- It impacts a conservation area
- It requires the relocation of Pine View Trail

1.4.3 ALTERNATIVES EVALUATION

A matrix which compares the Yellow and Blue Alternatives to the purpose and needs identified in Section 2.0 is presented in **Table 1-1**. Both build alternatives meet all of the needs. The No-Build Alternative does not meet the needs.

Table 1-1: Purpose and Need Matrix of Alternatives

Need	No-Build	Blue Alternative	Yellow Alternative
System Linkage	No	Yes	Yes
Mobility	No	Yes	Yes

A matrix which compares the alternatives using relevant physical, natural, social, and cultural environment considerations is presented in **Table 1-2**. A description of each of the considerations included in the matrix is provided in the sections following the matrix.

Note that the evaluation matrix does not include the effects of ponds which will be identified for the Preferred Alternative. It is anticipated that the ponds for both alternatives would have similar impacts, so this matrix provides a good comparison between the two build alternatives.

Table 1-2: Evaluation Matrix of Alternatives

Study Considerations	Alternatives		
	No-Build	Blue	Yellow
Median Width (feet)	N/A	22	22
Design Speed (MPH)	N/A	35	35
Bicycle Lane Width (feet)	0	4/8 [1]	4/8 [1]
Sidewalk Width (feet)	0	5	5
Roadway Right-of-Way Needed (acres)	0.0	24.3	25.8
Residential Parcels (Existing + Future = Total)	0	7 + 3 = 10	10 + 7 = 17
Non-Residential Parcels (Existing + Future = Total)	0	3 + 3 = 6	5 + 3 = 8
Potential Relocations of Existing Development (Residential + Non-Residential = Total)	0	2 + 0 = 2	4 + 0 = 4
Potential Relocations of Planned Development (Residential + Non-Residential = Total)	0	0 + 0 = 0	0 + 0 = 0
Conservation Parcels	0	1	1
Osceola County Parcels	0	4	4
Potential Contamination Parcels (Low + Medium + High Risk = Total)	0	2 + 3 + 0 = 5	2 + 2 + 0 = 4
Gas Pipeline Crossings	0	2	0
Potential Historic Resources	N/A	0	0
Known Archaeological Resources [2]	N/A	1	1
Wildlife & Habitat Impacts	None	Moderate	Moderate
Bald Eagle Nest Impacts	None	None	None
Conservation in Reunion (acres)	0.0	4.0	2.8
Wetland Impacts (acres)	None	8.9	8.8
Surface Water Impacts (acres)	None	0.0	0.0
Floodplains Impacts - Zone A (acres)	None	3.2	1.5
Floodplains Impacts - Zone AE (acres)	None	4.8	6.7
Parks & Recreation Area Impacts	None	None	None
Community Facility Impacts	None	None	Moderate
Construction Cost (excluding ponds & muck removal)	$0	$28,800,000	$29,100,000
Right-of-Way Cost (excluding ponds)	$0	$16,400,000	$20,400,000
Utility Adjustments	$0	$4,100,000	$0
Mitigation Costs	$0	$1,000,000	$1,100,000
Total Project Costs	$0	$50,300,000	$50,600,000

Notes:

1 - 4-foot bicycle lane except for at the bridge, where it is 8-foot

2 - Excluding SHPO-evaluated ineligible resources

The typical sections (lane widths, median, sidewalks, bicycle lanes, etc.) and design criteria (including the design speed) for both the Blue and Yellow Alternatives are the same.

The Blue Alternative would require less right-of-way (24.3 acres) than the Yellow Alternative (25.8 acres).

The Blue Alternative would impact less residential parcels (10) than the Yellow Alternative (17).

The Blue Alternative would impact less non-residential parcels (6) than the Yellow Alternative (8).

The Blue Alternative may require two residential relocations while the Yellow Alternative may require four.

Neither alternative would require relocation of planned developments.

Both alternatives would impact one conservation parcel.

Both alternatives would impact four parcels owned by Osceola County.

The Yellow Alternative would impact fewer potential contamination parcels (4) than the Blue Alternative (5).

The Yellow Alternative would not cross the FGT gas pipeline while the Blue would cross it twice.

Neither alternative will impact potential historic resources.

Both alternatives would impact one known archaeological resource (excluding State Historic Preservation Officer (SHPO)-evaluated resources).

Both alternatives have a moderate impact on wildlife and habitat.

Neither alternative impacts bald eagle nests.

The Yellow Alternative impacts less conservation land (2.8 acres) than the Blue Alternative (4.0 acres).

The Yellow Alternative would impact slightly less wetlands (8.8 acres) than the Blue Alternative (8.9 acres).

Neither alternative would impact surface waters.

The Yellow Alternative would impact less Zone A Floodplains (1.5 acres) than the Blue Alternative (3.2 acres).

The Blue Alternative would impact less Zone AE Floodplains (4.8 acres) than the Yellow Alternative (6.7 acres).

Neither alternative impacts parks or recreation areas.

The Blue Alternative has no impacts to Community Facilities. The Yellow Alternative has a moderate impact to Community Facilities as it requires the relocation of a portion of Pine View Trail.

The Blue Alternative would have a lower construction cost ($28.8 million) than the Yellow Alternative ($29.1 million).

Excluding ponds, the Blue Alternative would have a lower right-of-way cost ($16.4 million) than the Yellow Alternative ($20.4 million).

The Yellow Alternative is not expected to require utility adjustments. The Blue Alternative is projected to require approximately $4.1 million for utility adjustments associated with crossing the FGT gas pipeline twice. This cost may be reduced due to the need for FGT to upgrade their pipeline due to planned development in the area.

The Blue Alternative would have a lower mitigation cost ($1.0 million) than the Yellow Alternative ($1.1 million).

In total, the Blue Alternative is projected to have a lower cost ($50.3 million) than the Yellow Alternative ($50.6 million).

1.5 PUBLIC INPUT

The Blue and Yellow Alternative (along with the potential variations to the Blue Alternative), were presented at a Public Alternatives Meeting on August 9, 2022. The meeting was attended by 117 people and 92 comments were submitted. These comments include ones received via email from people who did not attend the meeting but reviewed the information on the project website. A summary of the meeting comments is provided in **Table 1-3**. Comments received were considered in the identification of the Preferred Alternative.

Table 1-3: Public Comments on Alternatives

# of Comments	On Alternatives
18	Prefers Blue Alternative
26	Prefers Blue Alternative with reduced impacts to Happy Trails
2	Prefers Yellow Alternative
9	Supports project, no preference of alternative
12	Prefers No-Build Alternative
8	Prefers original alignment in Reunion
7	Suggested a different alignment
4	Suggested improving other roads
2	Prefers Roundabout at Goodman Road
# of Comments	**On Other Topics**
12	Concerned about social impacts
10	Concerned about wildlife
6	Concerned about traffic noise
4	Concerned about speed and safety
2	Concerned about traffic
2	Concerned about drop in property values
2	Some Happy Trails parcels will not meet 5-acre requirement
1	Concerned about light pollution
1	Concerned about environmental impacts
1	Suggested providing wider sidewalks
14	Requested additional information

1.6 SELECTION OF THE PREFERRED ALTERNATIVE

Based on the evaluation of the Blue and Yellow Alternative, and in consideration of public input, the Blue Alternative was identified as the preferred alternative, along with the consideration of design strategies to reduce impacts to residential parcels. The advantages of the Blue Alternative more than offset the disadvantages, as described below.

Advantages of the Blue Alternative include:

- It requires the lower amount of right-of-way
- It impacts the fewest parcels, both residential and non-residential
- It requires fewer potential residential relocations
- It does not impact any community facilities
- It has less total floodplain impacts
- It has a lower projected cost (which may be reduced further)
- It is the preferred alternative based on public input received
- It more closely aligns with the previous concept for the Reunion alignment

Disadvantages of the Blue Alternative include:

- It impacts more potentially contaminated parcels (one parcel more)
- It impacts more conservation area (1.2 acres more)
- It impacts more wetlands (0.1 acre more)

1.7 LIST OF TECHNICAL DOCUMENTS

Additional technical documents prepared as part of the study include:

- Public Involvement Plan, October 2021, Kimley-Horn and Associates, Inc.
- Project Traffic Analysis Report, December 2022, Kimley-Horn and Associates, Inc.
- Contamination Screening Evaluation Report, June 2023, Terracon Consultants, Inc.
- Lighting Justification Memorandum, November 2023, Kimley-Horn and Associates, Inc.
- Comments and Coordination Report, July 2023, Kimley-Horn and Associates, Inc.
- Cultural Resource Assessment Survey (Draft), July 2023, SEARCH, Inc.

2.0 PROJECT PURPOSE AND NEED

The purpose of the Sinclair Road Extension is to provide system linkage and improve mobility. The need for the project is based on system linkage and mobility.

2.1 SYSTEM LINKAGE

System linkage is defined as linking two or more existing transportation facilities, types of modal facilities, geographic areas, or regional traffic generators. Currently, there is no roadway connection between SR 429 and US 27 (both Strategic Intermodal System facilities, as defined by the Florida Department of Transportation) except for Interstate 4 (I-4) and US 192. As a result, there is an increase in demand on the congested portion of I-4 between SR 429 and CR 532 (which provides access to US 27 via Ronald Reagan Parkway) and on US 192.

2.2 MOBILITY

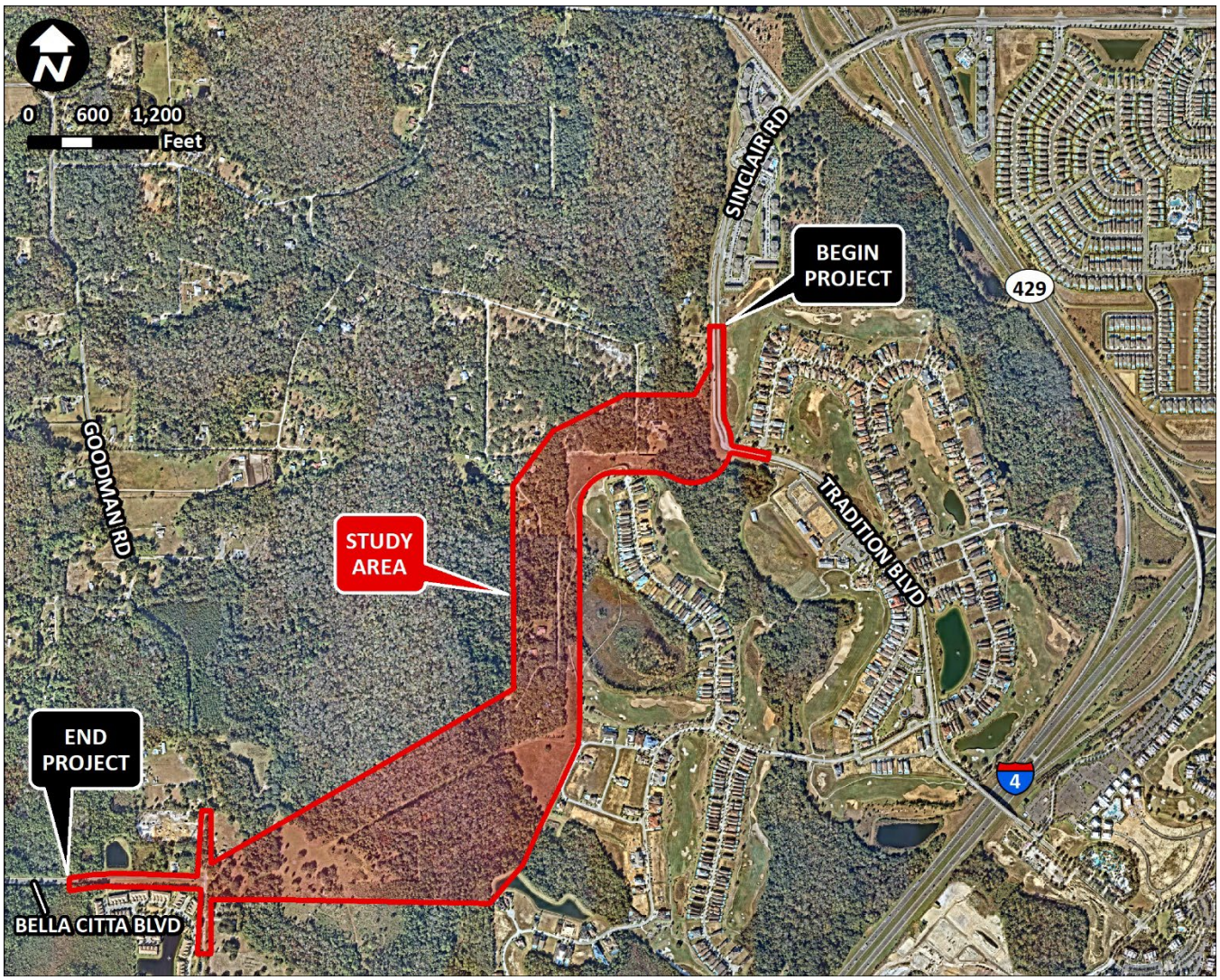
Mobility is the movement of people and goods and the ability to meet transportation demands. Sinclair Road Extension will provide a needed connection between residential developments near SR 429 and commercial developments along US 27. Sinclair Road Extension will also serve travel demands between US 27 and SR 429, thereby providing some relief to a severely congested portion of I-4.

3.0 EXISTING CONDITIONS

3.1 EXISTING ROAD NETWORK

Exhibit 3-1 illustrates the project study area. Sinclair Road Extension is planned to extend from Tradition Boulevard to Bella Citta Boulevard in Osceola County. Sinclair Road, north of Tradition Boulevard, has a 4-lane divided typical section with sidewalks on the east side. Bella Citta Boulevard, west of Goodman Road, has a 2-lane typical section, with sidewalks on the north side.

Exhibit 3-1: Project Study Area



3.1.1 FUNCTIONAL CLASSIFICATION

The portion of Sinclair Road east of SR 429 is classified as an Urban Major Collector. From SR 429 to Tradition Boulevard, Sinclair Road is classified as an Urban Local roadway. Bella Citta Boulevard is classified as an Urban Major Collector. If Sinclair Road Extension is constructed, it is expected that it will be classified as an Urban Major Collector, from SR 429 to Bella Citta Boulevard.

3.1.2 CONTEXT AND COUNTY ROADWAY CLASSIFICATION

Within the project limits, Sinclair Road Extension will have the characteristics of Context Classification C3R: Suburban Residential, which is distinguished by mostly residential uses within large blocks and a disconnected or sparse roadway network.

Osceola County has identified Sinclair Road Extension as a planned Avenue within their roadway classification system.

3.1.3 ACCESS CLASSIFICATION

Osceola County has not established the access management classification for Sinclair Road Extension. East of the study area, Sinclair Road has the characteristics of Access Classification 7. Within the study area, Bella Citta Boulevard has the characteristics of Access Classification 6. West of the study area, Bella Citta Boulevard has the characteristics of Access Classification 4.

3.2 EXISTING ROADWAY CHARACTERISTICS

3.2.1 TYPICAL SECTIONS

East of the study area, Sinclair Road has a 4-lane divided typical section with 12-foot lanes, 18-foot median, curb and gutter, a 4-foot sidewalk on the east side, and 130 feet of right-of-way.

West of the study area, Bella Citta Boulevard has a 2-lane typical section with curb and gutter. A 12-foot westbound lane and an 11-foot eastbound lane are provided. A 4-foot bicycle lane is provided in the westbound direction with a 5-foot sidewalk on the north side. This typical section is located within the northern half of the existing 120 feet of right-of-way. It appears the existing roadway was constructed to accommodate a future widening to a 4-lane divided roadway by constructing two eastbound lanes and converting the existing 2-lane roadway to two westbound lanes.

At the intersection of Bella Citta Boulevard, the study area includes Goodman Road approximately 600 feet to the north and to the south. Goodman Road is a 2-lane roadway. North of Bella Citta Boulevard, lanes are 10-feet wide with no bicycle lanes or sidewalks provided. North of the intersection, the existing roadway corridor drains into Reedy Creek with ill-defined roadside conveyances. South of Bella Citta Boulevard, lanes are 12-feet wide with no bicycle lanes, but a 5-foot sidewalk is provided on the west side of the road. South of the intersection, the road is in crown and the stormwater is collected by curb and gutter that drains into two sag inlets located at the intersection.

Just east of Sinclair Road, Tradition Boulevard has two 12-foot lanes with a 12-foot paved median. A 10-foot multi-use path is provided on the south side of Tradition Boulevard.

3.2.2 RIGHT-OF-WAY

There is currently no right-of-way for Sinclair Road Extension. As noted above, east of the study area, Sinclair Road has 130 feet of right-of-way, and west of the study area, Bella Citta Boulevard has 120 feet of right-of-way.

Tradition Boulevard is a private street on a parcel (owned by Reunion West Community Development District (CDD)) that is approximately 60-feet wide. Goodman Road has approximately 25-feet of right-of-way. South of Bella Citta Boulevard and on the west side of Goodman Road, an additional parcel (owned by Championsgate CDD) that is approximately 10-feet wide is used to accommodate Goodman Road.

3.2.3 DESIGN AND POSTED SPEED

East of the study area, the posted speed for Sinclair Road is 35 miles per hour (MPH). West of the study area, the posted speed limit for Bella Citta Boulevard is 40 MPH.

3.2.4 HORIZONTAL AND VERTICAL ALIGNMENT

There are no existing horizontal and vertical alignments for Sinclair Road Extension.

3.2.5 PEDESTRIAN ACCOMMODATIONS

East of the study area, Sinclair Road has a 4-foot sidewalk on the east side of the roadway. West of the study area, Bella Citta Boulevard has a 5-foot sidewalk on the north side of the roadway. There is a 10-foot-wide multi-use trail along the south side of Tradition Boulevard. There is a 5-foot-wide sidewalk on the west side of Goodman Road, south of Bella Citta Boulevard.

3.2.6 BICYCLE FACILITIES

East of the study area, Sinclair Road has no bicycle facilities. West of the study area, Bella Citta Boulevard has a 4-foot bicycle lane in the westbound direction. There is a 10-foot-wide multi-use trail along the south side of Tradition Boulevard.

3.2.7 TRANSIT FACILITIES

Currently, there are no transit stops (or routes) located within study area. Based on the latest Osceola County Comprehensive Plan 2040 Transit System Map (TRN 4), transit-related improvements are not planned on within the study area.

3.2.8 INTERSECTION LAYOUT AND TRAFFIC CONTROL

Intersection layout and traffic control within the project limits are identified in **Table 3-1**.

Table 3-1: Intersection Layout and Traffic Control

Intersection	Type	Control	Turn Lanes	Crosswalks
Sinclair Road and Tradition Boulevard	L	Free-Flow	Not Applicable	Westbound Approach
Bella Citta Boulevard and Goodman Road	T	Stop[1]	None	Eastbound Approach

[1] Intersection has a one-way stop control at the eastbound approach of Bella Citta Boulevard

3.2.9 TRAFFIC VOLUMES AND OPERATIONAL CONDITIONS

Existing traffic volumes and operating conditions were identified from Osceola County's 2021 Roadway Network Capacity Report, supplemented with traffic counts conducted for this study. **Table 3-2** summarizes the 2021 Annual Average Daily Traffic (AADT) for roadways within the vicinity of the project.

Table 3-2: 2021 Annual Average Daily Traffic

Station ID	Count Location	From	To	Year	AADT
184	Bella Citta Boulevard	Westside Boulevard	Goodman Road	2021	10,264
N/A	Sinclair Road	Tradition Boulevard	SR 429	2021	3,528
106	Sinclair Road	SR 429	S. Old Lake Wilson Road	2021	11,643
N/A	Tradition Boulevard	Sinclair Road	East of Sinclair Road	2021	3,528
N/A	Goodman Road	Bella Citta Boulevard	North of Bella Citta Boulevard	2021	4,378
N/A	Goodman Road	Bella Citta Boulevard	South of Bella Citta Boulevard	2021	10,969
121	Masters Boulevard	Champions Gate Boulevard	Links Boulevard	2021	11,888
122	Champions Gate Boulevard	Masters Boulevard	I-4	2021	31,730
105	S. Old Lake Wilson Road	Westgate Boulevard	Sinclair Road	2021	19,828
103	S. Old Lake Wilson Road	Sinclair Road	CR 532	2021	17,699

Existing intersection geometry and turning movement data were obtained in 2021 for the intersections of Sinclair Road at Tradition Boulevard and Bella Citta Boulevard at Goodman Road. **Exhibit 3-2** provides the existing intersection geometry and **Exhibit 3-3** provides the existing peak hour turning movement volumes. The AM peak hour movements are shown first, followed by the PM peak hour movements shown in parentheses.

Exhibit 3-2: Existing Intersection Geometry

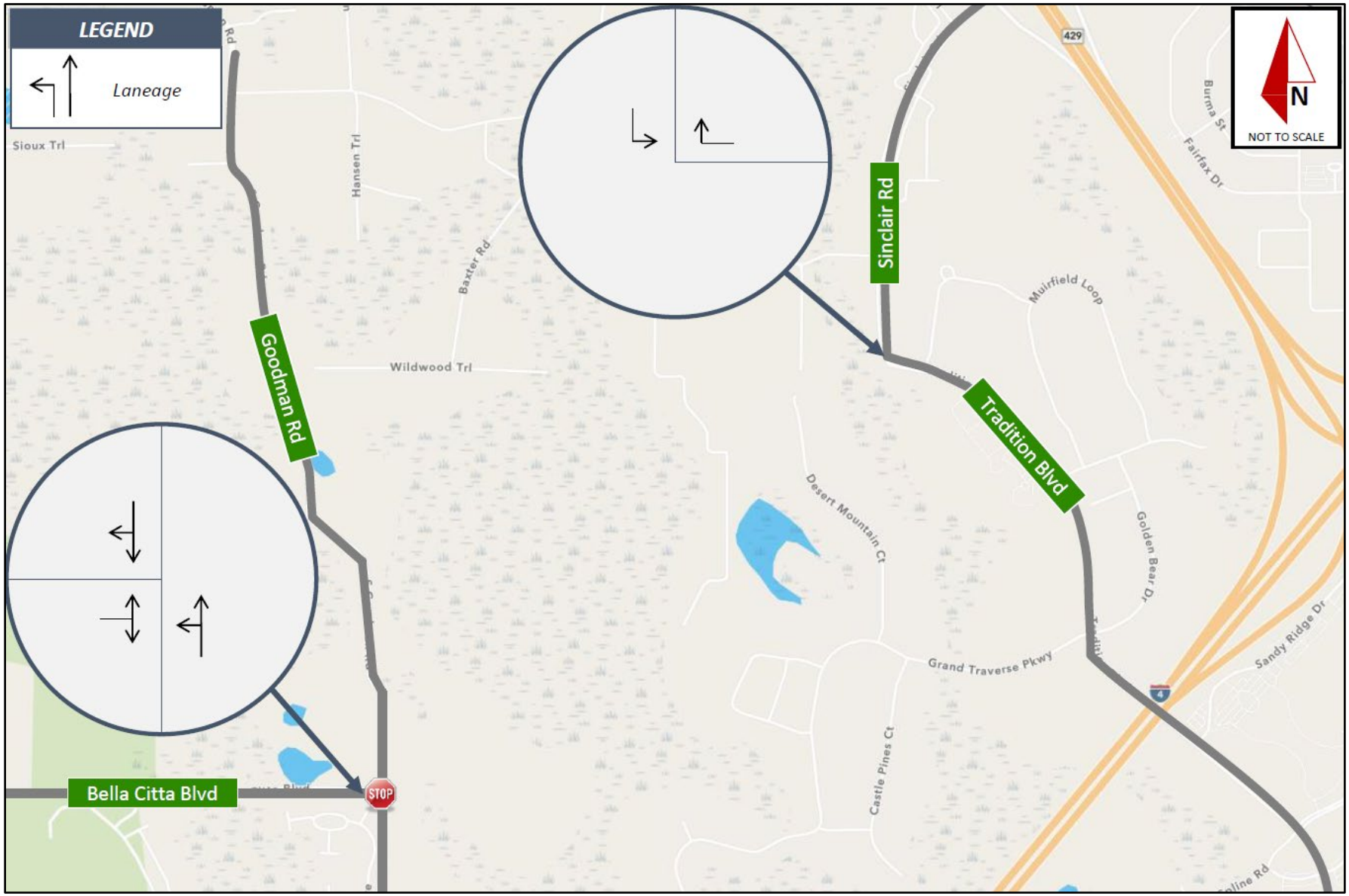
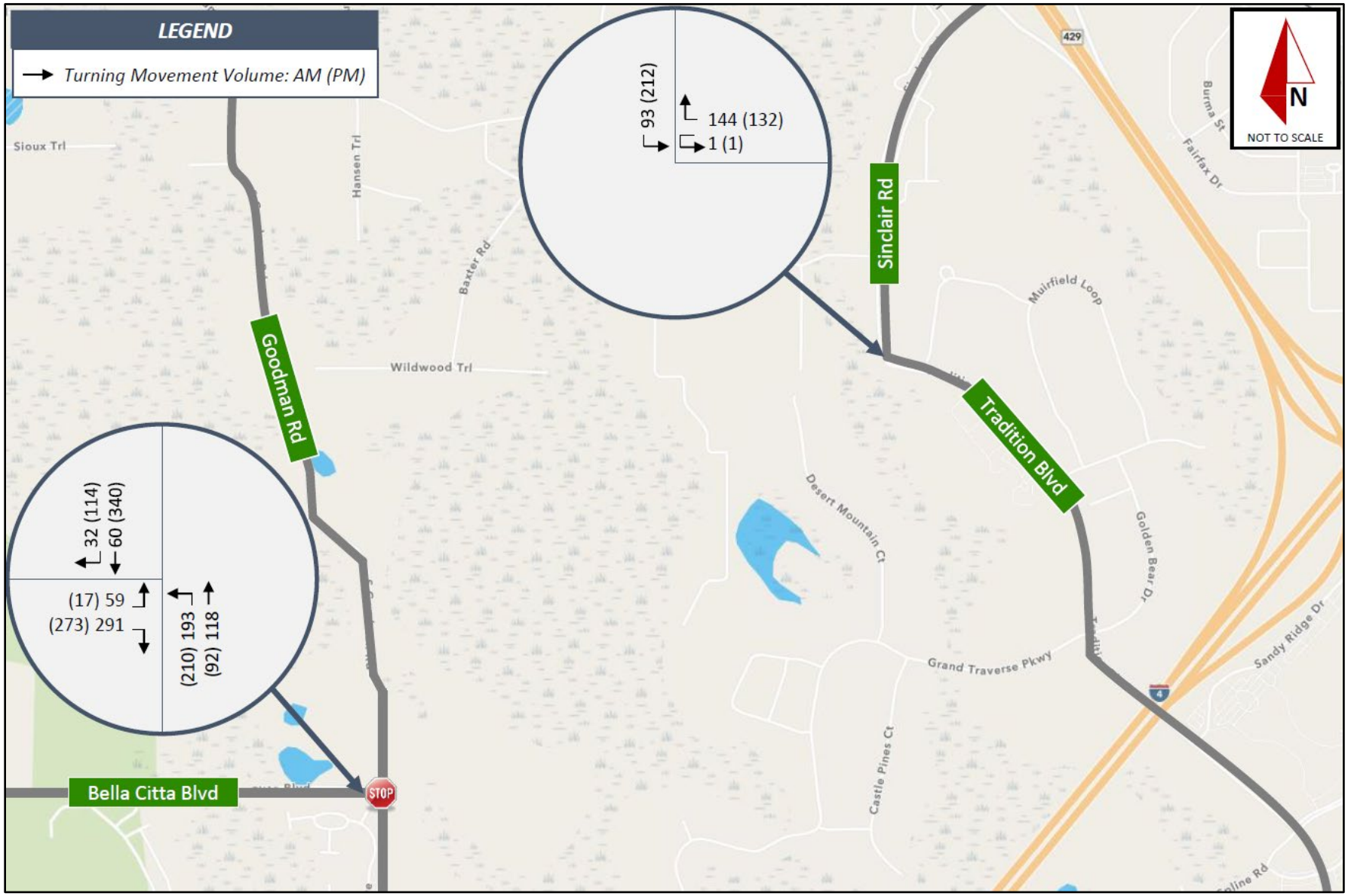


Exhibit 3-3: Existing AM and PM Peak Hour Turning Movement Volumes



Level of service (LOS) and volume-to-capacity (V/C) ratios were obtained from Osceola County's 2021 Roadway Network Capacity Report and the same methodology was applied to determine LOS and V/C ratios for segment volumes counted for this project. The estimated 2021 peak hour/peak direction volumes, LOS, and V/C ratios for study roadways are provided in **Table 3-3**.

Table 3-3: 2021 Roadway Segment LOS

Segment	# of Lanes by Direction	Year	Peak Hour Directional Volume	V/C Ratio	LOS
Bella Citta Boulevard, from Westside Boulevard to Goodman Road	1	2021	410	0.72	C
Sinclair Road, from Tradition Boulevard to SR 429	2	2021	212	0.14	C
Sinclair Road, from SR 429 to S. Old Lake Wilson Road	2	2021	494	0.31	C
Tradition Boulevard, East of Sinclair Road	1	2021	212	0.40	C
Goodman Road, North of Bella Citta Boulevard	1	2021	340	0.65	D
Goodman Road, South of Bella Citta Boulevard	1	2021	340	0.65	D
Masters Boulevard, from Champions Gate Boulevard to Links Boulevard	1	2021	636	0.77	C
Champions Gate Boulevard, from Masters Boulevard to I-4	2	2021	940	0.70	D
S. Old Lake Wilson Road, from Westgate Boulevard to Sinclair Road	2	2021	928	0.53	B
S. Old Lake Wilson Road, from Sinclair Road to CR 532	1	2021	1,053	1.33	F

The 2021 existing turning movement counts were utilized in performing the intersection LOS operations analysis using Highway Capacity Software (HCS) for unsignalized intersections. **Table 3-4** and **Table 3-5** provide a summary of the intersection delay and LOS for the existing peak hour conditions (both AM and PM peak hours).

As shown in the tables, both unsignalized intersections operate acceptably during the AM and PM peak hours.

Table 3-4: 2021 AM Peak Hour Intersection LOS

Intersection	Delay (sec)/ LOS	Eastbound			Westbound			Northbound			Southbound			Overall
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Sinclair Road @ Tradition Boulevard	Delay	--	--	--	--	--	0.0	--	--	--	0.0	--	--	0.0
	LOS	--	--	--	--	--	A	--	--	--	A	--	--	--
Bella Citta Boulevard @ Goodman Road	Delay	16.7	--	16.7	--	--	--	7.9	0.0	--	--	0.0	0.0	9.8
	LOS	C	--	C	--	--	--	A	A	--	--	A	A	--

Table 3-5: 2021 PM Peak Hour Intersection LOS

Intersection	Delay (sec)/ LOS	Eastbound			Westbound			Northbound			Southbound			Overall
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Sinclair Road @ Tradition Boulevard	Delay	--	--	--	--	--	0.0	--	--	--	0.0	--	--	0.0
	LOS	--	--	--	--	--	A	--	--	--	A	--	--	--
Bella Citta Boulevard @ Goodman Road	Delay	20.3	--	20.3	--	--	--	9.3	0.0	--	--	0.0	0.0	7.5
	LOS	C	--	C	--	--	--	A	A	--	--	A	A	--

3.2.10 RAILROAD CROSSINGS

There are no railroad crossings located within the study area.

3.2.11 CRASH DATA AND SAFETY ANALYSIS

Historical crash data were obtained at the study intersections for a five-year period from January 1, 2016, to December 31, 2020. The crash data was obtained from the University of Florida's Signal Four Analytics online crash database, which compiles statewide crash data from the Florida Highway Patrol (FHP) and local law enforcement agencies. The data was analyzed to identify specific crash patterns and locations that may indicate a potential safety problem within the study area. The proposed roadway extension was also reviewed to identify any potential safety implications to the corridor. The study area includes the intersections of Sinclair Road and Tradition Boulevard, and Goodman Road and Bella Citta Boulevard.

3.2.11.1 EXISTING CRASH DATA STATISTICS

A total of nine crashes were reported for the five-year period, of which only one involved an injury. Five crashes occurred at night, and four occurred during the day, all under clear and dry weather conditions. All of the crashes that occurred at the intersection of Sinclair Road and Tradition Boulevard involved one vehicle impacting roadway infrastructure (e.g., utility pole, guardrail, traffic sign, etc.). Crashes located at the intersection of Goodman Road and Bella Citta Boulevard involved two vehicles. **Table 3-6** summarizes the total number of crashes that occurred within the study area.

Table 3-6: Summary of Crashes

Year	Total Number of Crashes		Number of Injury Crashes		Number of Dark Crashes		Number of Off-Road Crashes	
	#1	#2	#1	#2	#1	#2	#1	#2
2016	0	1	0	0	0	0	0	1
2017	0	1	0	0	0	1	0	0
2018	2	0	1	0	2	0	2	0
2019	0	1	0	0	0	0	0	0
2020	2	2	0	0	2	0	2	0
Total	**4**	**5**	**1**	**0**	**4**	**1**	**4**	**1**
Average per year	0.8	1	0.2	0	0.8	0.2	0.8	0.2
Percent			*25%*	*0%*	*100%*	*20%*	*100%*	*20%*

Note:
#1 Sinclair Road & Tradition Boulevard intersection
#2 Bella Citta Boulevard & Goodman Road intersection

3.2.11.2 EXISTING CRASH DATA BY CRASH TYPE

The crash data was organized to determine any significant trend in the circumstances involved in the crashes. The crash data was organized by crash type throughout the five-year study period. As shown in **Table 3-7**, approximately 55.6% of crashes were off-road (run-off-the-road) crashes.

Table 3-7: Summary of Crashes by Type

Crash Type	2016		2017		2018		2019		2020		Total		Percent	
	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2	#1	#2
Left Turn	0	0	0	1	0	0	0	0	0	1	**0**	**2**	*0%*	*40%*
Off-Road	0	1	0	0	2	0	0	0	2	0	**4**	**1**	*100%*	*20%*
Rear End	0	0	0	0	0	0	0	1	0	0	**0**	**1**	*0%*	*20%*
Sideswipe	0	0	0	0	0	0	0	0	0	1	**0**	**1**	*0%*	*20%*

Note:
#1 Sinclair Road & Tradition Boulevard intersection
#2 Bella Citta Boulevard & Goodman Road intersection

3.2.11.3 EXISTING CRASH DATA BY INTERSECTION

Four crashes were reported at the intersection of Sinclair Road and Tradition Boulevard within the five-year period. All crashes reported at this intersection were off-road crashes. The off-road crashes occurred by vehicles approaching the curve where Sinclair Road meets Tradition Boulevard and losing control. These types of crashes were shown to occur early in the day (between 3:00 AM and 8:00 AM) and late at night after 10:00 PM. These crashes occurred during clear weather and dry surface conditions. Potential contributing factors to the occurrence of crashes at this intersection are listed below:

- Intersection lighting may not be adequate,
- Retroreflective signage may not be adequate,
- Lack of appropriate warning signage, and steep slope

Five crashes were reported at the intersection of Goodman Road and Bella Citta Boulevard within the five-year period. Two left turn crashes were reported to be caused by vehicles performing a left turn movement from Goodman Road onto Bella Citta Boulevard and colliding with a vehicle on the conflicting movement. One of the crashes involved a minor street movement, and the other crash involved a major street movement. Potential contributing factors to the occurrence of crashes at this intersection are listed below:

- Unprotected movements for all approaches,
- Gaps along the major approach may be difficult to find or judge during peak times, and
- Narrow north leg at Goodman Road with minimal clearance

The other three crashes were off-road, sideswipe, and rear-end. All of these crashes occurred during clear and dry conditions, except for the sideswipe which occurred during cloudy weather.

3.2.11.4 EXISTING CRASH DATA BY SEGMENTS

Crashes along the Sinclair Road Extension were predicted based on the Highway Safety Manual (HSM) methodology, as shown in the subsequent section.

3.2.11.5 OVERVIEW OF FATAL CRASHES

No fatal crashes were reported within the study area intersections.

3.2.11.6 CRASH FREQUENCY AND CRASH RATE DEVELOPMENT

The crash rates and crash frequencies (crashes per year) at the study area intersections were developed based on the five-year crash data. The crash rates are expressed in the number of crashes per million vehicles entered (million entering vehicles [MEV]), based on the following equations:

$$MEV = \frac{Total\ Entering\ Volume\ \times 365 \times Number\ of\ Years}{1{,}000{,}000}$$

$$Crash\ Rate = \frac{Number\ of\ Crashes\ per\ n\ Years}{MEV}$$

The total entering volumes (TEV) were developed by averaging the total entering volume for the three-day period that data was collected and adjusting it by the seasonal factor as provided by FDOT's FTO database. As shown in **Table 3-8**, the intersection of Goodman Road and Bella Citta Boulevard has a slightly higher crash frequency and a lower crash rate than the intersection of Sinclair Road and Tradition Boulevard. Statewide average crash rates were obtained from FDOT's Crash Analysis Reporting (CAR) System database. As shown in **Table 3-8**, the intersection of Goodman Road and Bella Citta Boulevard has a slightly lower crash rate than the statewide average for a similar area and facility type; however, the crash rate for the intersection of Sinclair Road and Tradition Boulevard is significantly higher than the statewide average. See Section 5.3 regarding potential contributing factors.

Table 3-8: Crash Frequency and Crash Rate Summary

Intersection		TEV	Number of Crashes	Crash Frequency (Crashes per Year)	Crash Rate	Statewide Average Crash Rate
1	Sinclair Road and Tradition Boulevard	3,528	4	0.8	0.62	0.29
2	Goodman Road and Bella Citta Boulevard	12,187	5	1.0	0.22	0.29

3.2.12 PAVEMENT CONDITIONS

Within the study area, the following roads are generally in good condition:

- Sinclair Road
- Tradition Boulevard (with some patching)
- Bella Citta Boulevard (with some shoving on the approach to Goodman Road)
- Goodman Road, south of Bella Citta Boulevard
- Goodman Road, north of Bella Citta Boulevard

3.2.13 STRUCTURES

There are no existing structures located within the study area.

3.2.14 LIGHTING

Decorative lighting is currently provided on:

- Sinclair Road
- Traditions Boulevard
- Goodman Road, south of Bella Citta Boulevard

No lighting is provided on Bella Citta Boulevard or on Goodman Road, north of Bella Citta Boulevard.

3.2.15 SIGNS

Traffic signs within the study area are consistent with typical signage on similar facilities. Regulatory and warning signs are located throughout the study area, including some signage associated with pedestrian crosswalks. Unique signage includes the chevron signs for the sharp curve at the intersection of Sinclair Road and Tradition Boulevard. Any improvements or modifications to Sinclair Road will include design of signing and pavement markings based on the updated conditions.

3.3 GEOTECHNICAL DATA

3.3.1 GEOLOGY/HYDROLOGY

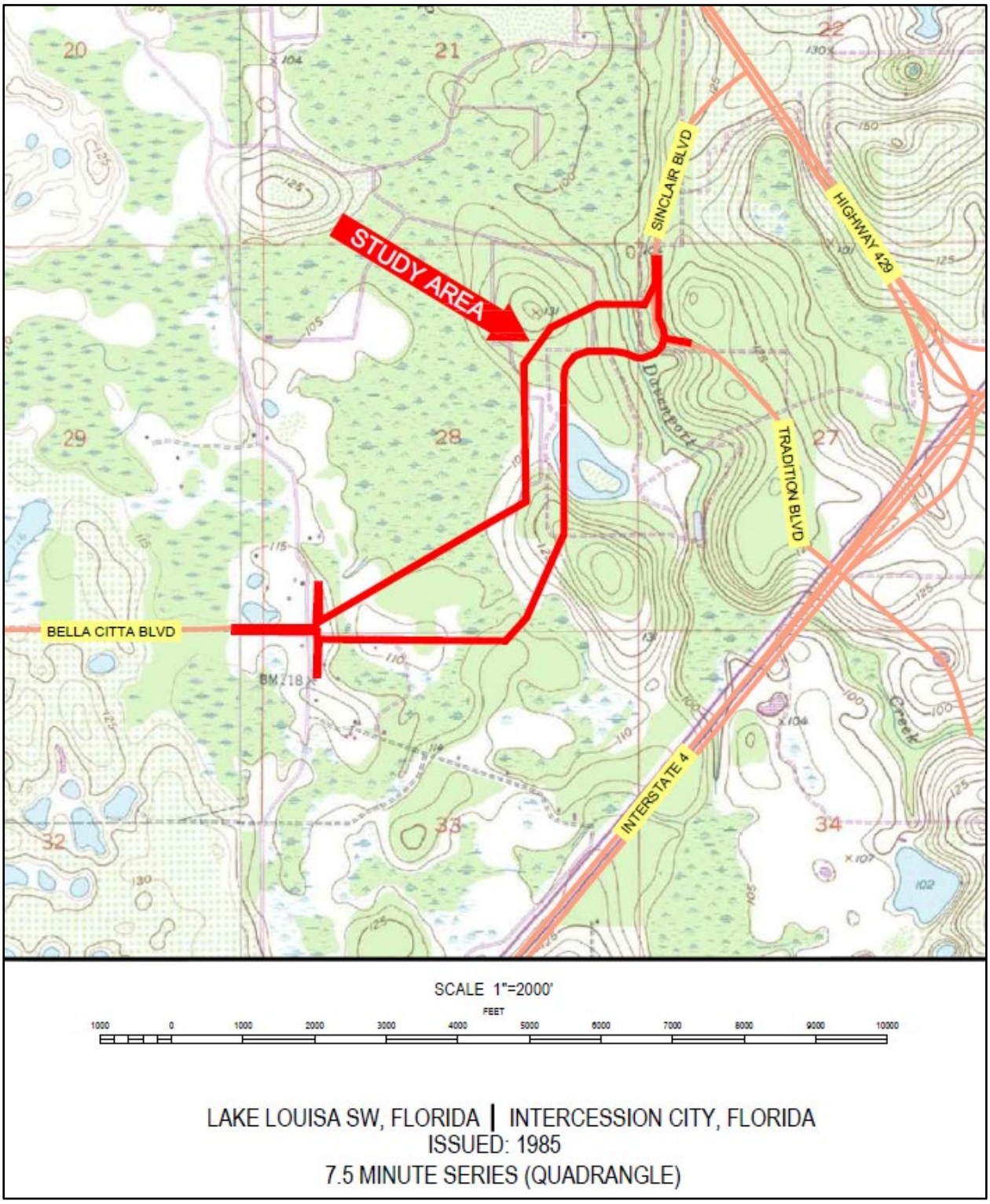
The United States Geological Survey (USGS), Water Resources Investigation Report 92-4076, Geohydrology of Osceola County Florida (1993), indicates the underlying geology within the Florida Aquifer consists of carbonate rocks of Paleocene to Eocene age. The overlying surficial aquifer system is

of Pleistocene and Holocene age with a thickness ranging from approximately 30 to 270 feet thick. Surface water exposures were visible along portions of the study area.

3.3.2 USGS QUADRANGLE MAP

The Intercession City and Lake Louisa SW, Florida USGS topographic quadrangle map (1985) (**Exhibit 3-4**) illustrates that the project area is located at an elevation ranging from approximately +100 to +130 feet National Geodetic Vertical Datum (NGVD) west of I-4. Topography in the west and central portion of the study area is relatively flat, with predominantly wetland areas identified as Davenport Creek Swamp. The northeast portion of the study area is located on a ridge, sloping to the east and south.

Exhibit 3-4: Topographic Vicinity Map



3.3.3 USDA SOIL SURVEY

The Soil Survey of Osceola County Area, Florida as prepared by the United States Department of Agriculture (USDA), Soil Conservation Service (SCS; later renamed the Natural Resource Conservation Service - NRCS), was reviewed for the soil types along the subject alignment. Soils mapped in the vicinity of the project are listed in **Table 3-9** and illustrated on **Exhibit 3-5**.

Table 3-9: Soil Types

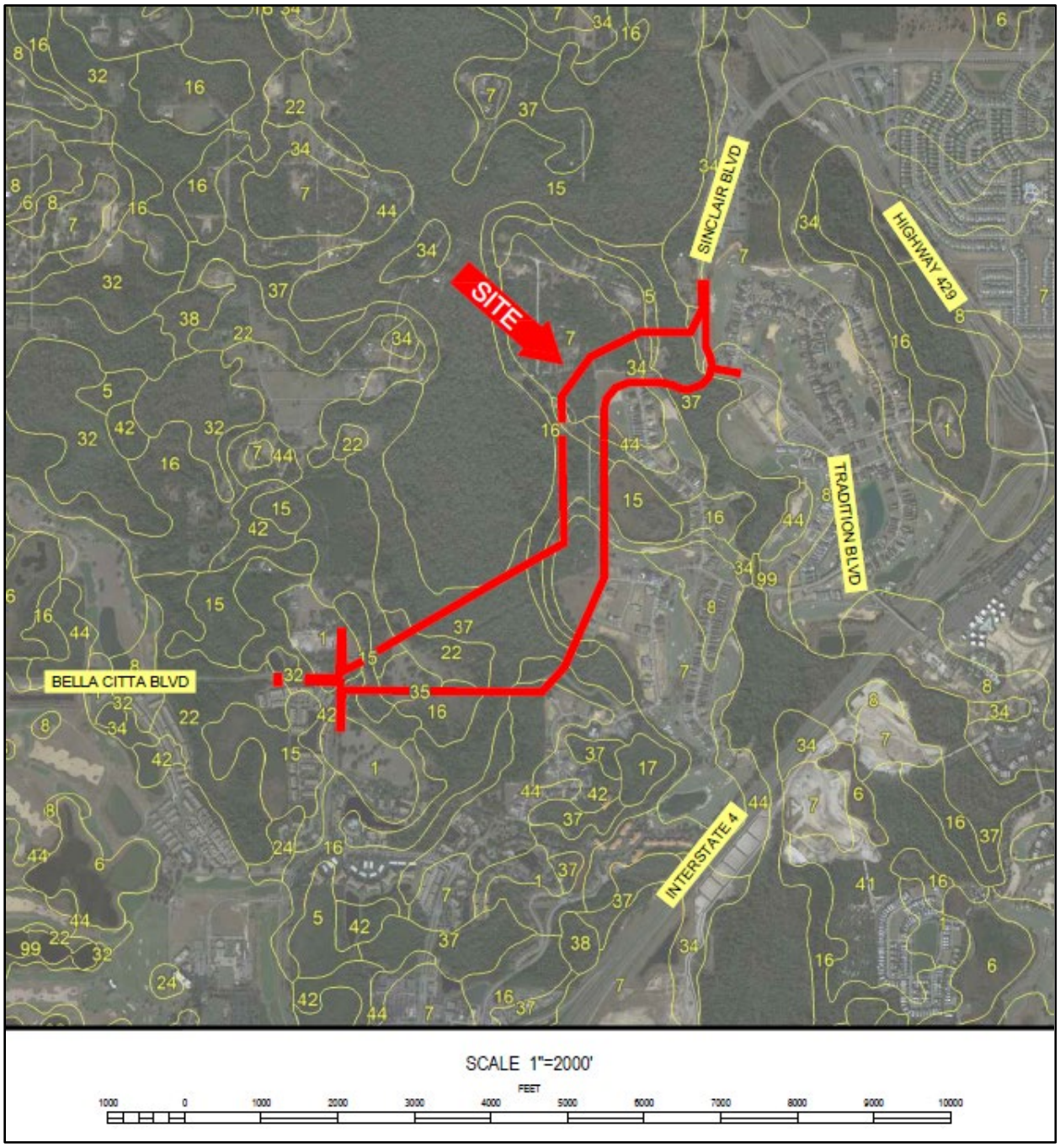
USDA Map Symbol	USDA Soil Name	Depth of Seasonal High Groundwater Table in its Natural Condition
1	Adamsville sand, 0 to 2 percent slopes	20 to 40 inches
5	Basinger fine sand, 0 to 2 percent slopes	Within 10 inches
7	Candler sand, 0 to 5 percent slopes	> 72 inches
8	Candler sand, 5 to 12 percent slopes	>72 inches
15	Hontoon muck, frequently ponded, 0 to 1 percent slopes	<10 inches
16	Immokalee fine sand, 0 to 2 percent slopes	Within 10 inches
22	Myakka fine sand, 0 to 2 percent slopes	Within 10 inches
32	Placid fine sand, frequently flooded, 0 to 1 percent slopes	Ponded
34	Pomello fine sand, 0 to 5 percent slopes	24 to 42 inches
35	Pomona fine sand, 0 to 2 percent slopes	0 to 12 inches
37	Pompano fine sand, frequently ponded, 0 to 1 percent slopes	Ponded
42	Smyrna fine sand, 0 to 2 percent slopes	<10 inches
44	Tavares fine sand, 0 to 5 percent slopes	42 to 72 inches

It should be noted that the Soil Survey is not intended as a substitute for site-specific geotechnical exploration; rather it is a useful tool in planning a project scope in that it provides information on soil types likely to be encountered. Boundaries between adjacent soil types on the Soil Survey map are approximate.

3.3.4 POTENTIOMETRIC SURFACE

Based on a review of the “Potentiometric Surface of the Upper Floridan Aquifer in the South Florida Water Management District and Vicinity, Florida” published by the USGS, the potentiometric surface in the vicinity of the project alignment is near elevation +100 feet, NGVD’29.

Exhibit 3-5: Soil Survey



SOIL LEGEND

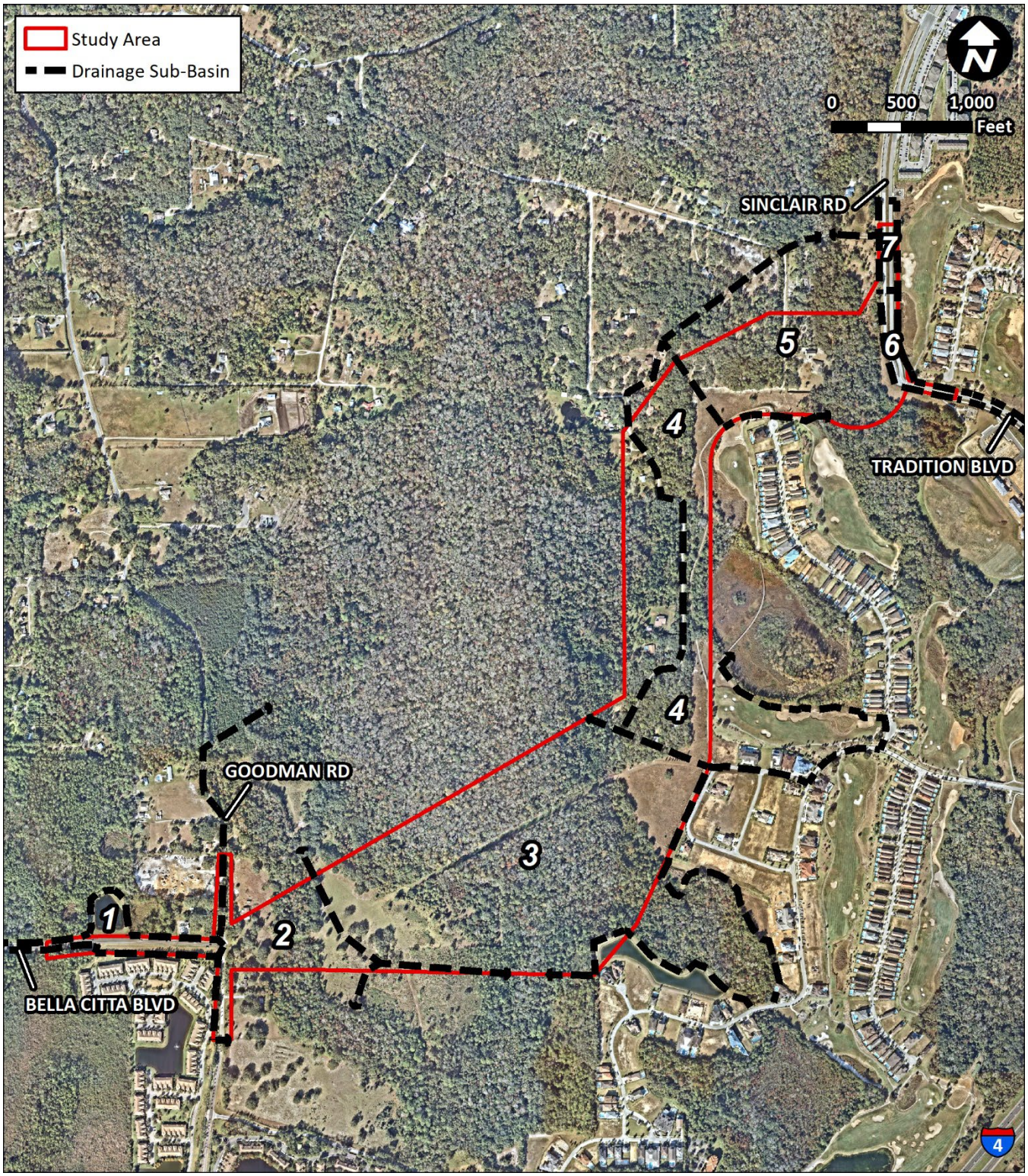
1	ADAMSVILLE SAND, 0 TO 2 PERCENT SLOPES	32	PLACID FINE SAND, FREQUENTLY PONDED, 0 TO 1 PERCENT SLOPES
5	BASINGER FINE SAND, 0 TO 2 PERCENT SLOPES	34	POMELLO FINE SAND, 0 TO 5 PERCENT SLOPES
7	CANDLER SAND, 0 TO 5 PERCENT SLOPES	35	POMONA FINE SAND, 0 TO 2 PERCENT SLOPES
8	CANDLER SAND, 5 TO 12 PERCENT SLOPES	37	POMPANO FINE SAND, FREQUENTLY PONDED, 0 TO 1 PERCENT SLOPES
15	HONTOON MUCK, FREQUENTLY PONDED, 0 TO 1 PERCENT SLOPES	42	SMYRNA FINE SAND, 0 TO 2 PERCENT SLOPES
16	IMMOKALEE FINE SAND, 0 TO 2 PERCENT SLOPES	44	TAVARES FINE SAND, 0 TO 5 PERCENT SLOPES
22	MYAKKA FINE SAND, 0 TO 2 PERCENT SLOPES		

N

3.4 DRAINAGE

The study area is located within geographic Sections 27, 28, 29, 32, and 33 of Township 25 South, Range 27 East in Osceola County. The study area is also located within the South Florida Water Management District (SFWMD) in the Kissimmee Watershed. The project alternatives will span over the Davenport Creek (Water Body ID (WBID) 3170K1), which is not impaired for nutrients. The general flow of the creek is from west to east and ultimately outfalls into Reedy Creek. The existing basin topography is shown on the USGS Vicinity/Quadrangle Map (**Exhibit 3-4**). Existing ground elevations range from +100 to +130 feet NGVD'29. The study area contains standing water in some areas for more than half a year and in other areas the water table is between 10 or less inches to 40 inches to the water table. The overall drainage basin is in the Reedy Creek Drainage Basin. There are seven drainage sub-basins within the study area. These basins were determined using LiDAR data obtained from Osceola County and are illustrated on **Exhibit 3-6**. Unavoidable wetland impacts and surface water impacts are anticipated during the construction of the new bridge over Davenport Creek and will be addressed during the design/permitting phase of the project.

Exhibit 3-6: Drainage Basins



Bella Citta Boulevard, formerly known as Tri-County Road, is a previously permitted project Permit No. 49-01744-P, Application No. 051222-24 dated February 15, 2007. The project consisted of the construction and operation of a surface water management system to serve 44.47 acres of roadway development. Operation of the surface water management system is the responsibility of Osceola County excluding previously permitted ponds P1 and P2 (see **Exhibit 3-7** for pond locations) owned and operated by Stoneybrook South Development (Permit No. 49-01682-P, Application No. 051222-25). The two ponds (P1 and P2) discharge into the existing surrounding wetlands. 8.97 acres of wetlands were impacted within the Stoneybrook South project area along with an additional 2.85 acres of secondary impacts that extended outside of the Stoneybrook South project's limits which resulted in the purchase of 7.98 offsite credits (FF) for mitigation from Reedy Creek Mitigation Bank. The roadway corridor is super elevated to the west where the surface water is collected by a system of curb inlets and corresponding culverts to collect and convey project runoff to the four ponds for the required water quality treatment and attenuation prior to discharging to existing wetlands. A portion of the roadway drains to the two, previously permitted Stoneybrook South Construction Plan, dry retention ponds P1 and P2 designed to treat and attenuate the road basins. The remainder of the roadway is treated and attenuated in the two wet detention ponds, T1 and T2, per the Permit No. 49-01744-P, Application No. 051222-24 dated February 15, 2007. Ponds T1 and T2 discharge into existing wetlands. Floodplain compensation storage is provided in pond T2 of 9.33 acre-feet. No adverse water quality impacts are anticipated from the Tri-County permitted project. Each pond holds the equivalent of a 100-year storm event within the pond banks.

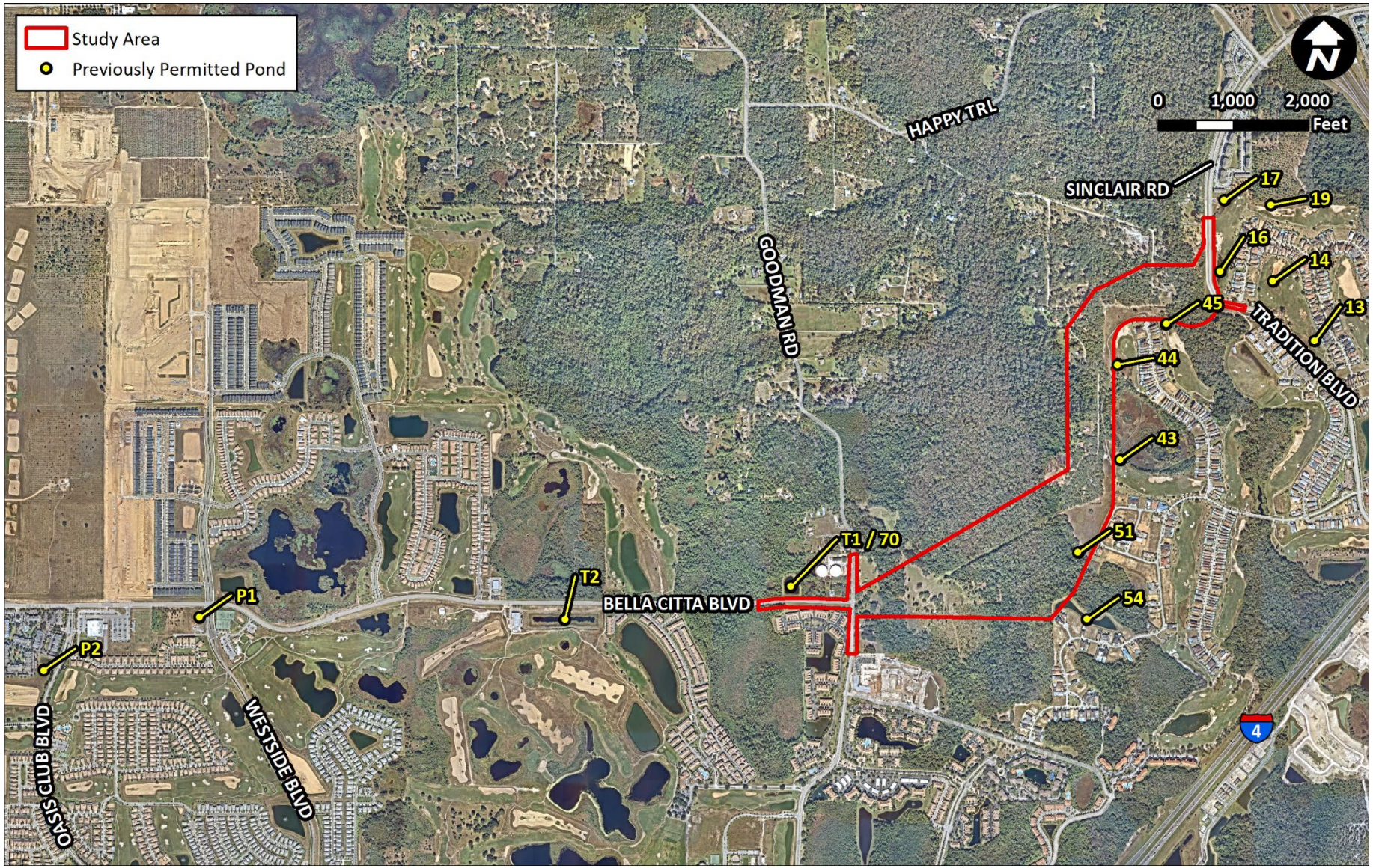
Champions Gate Golf Course Permit No. 49-00884-P-20, Application No. 000201-16 dated April 13, 2000, was permitted for the modification of Application No. 000201-16 dated February 1, 2000, to excavate and replant 14.04 acres of existing wetlands to clear the exotic and nuisance species. The wetlands were classified as freshwater marshes (Florida Land Use Cover and Forms Classification System (FLUCFCS) 641). This project is located west of S Goodman Road.

North of the intersection at Bella Citta Boulevard along the west side of S Goodman Road, located within Parcel No. 28-25-27-0000-0100-0000, is a permitted Western Service Area Reuse Storage and Pump Station (Permit No. is 49-01856-P, Application No. is 071019-26). The environmental permit was to authorize construction and operation of a surface water management system to serve a 5.0-acre government project. The site consists of grading, inlets, and culverts that direct runoff to a dry retention pond. The dry retention pond discharges to the north to the compensating storage area in the design storm and to the southwest to the existing wetlands for the water quality treatment volume. The project resulted in approximately 0.32-acre feet of encroachment into the 100-year floodplain. Compensating storage is provided in a regraded portion of the site that is directly connected to the floodplain with approximately 0.34-acre feet of storage between elevation 112.0' and 113.5' NGVD, the 100-year flood elevation.

As previously mentioned in Section 3.2.1, at the intersection of Bella Citta Boulevard, the study area includes Goodman Road approximately 600 feet to the north and to the south. North of the intersection, the existing roadway corridor drains into Reedy Creek with ill-defined roadside conveyances. South of the intersection, the road is in crown and the stormwater is collected by curb and gutter that drains into two sag inlets located at the intersection. No existing environmental permits were identified for this section of the roadway.

Reunion Resort Phase 3 Sinclair Road Extension is a previously permitted project (Permit No. 49-01107-P, Application No. 050719-8, dated May 10,2006). The modification of an Environmental Resource Individual Permit was to authorize the modification of an existing surface water management system to serve the 123.12-acre Reunion Resort Phase 3 Sinclair Road Extension. No existing permits were located within the project area. Adjacent permitted surface water facilities were analyzed to determine if the required water quality treatment and attenuation would be provided. The application permitted the construction of existing pond 70, a dry detention pond, modifications to previously permitted dry retention ponds 43, 44, and 45 with no change to existing control structures, dry detention pond 51, and wet detention pond 54 (see **Exhibit 3-7** for pond locations). The modification of ponds 43 and 54 increased the water quality storage. Lastly, it identified as-built changes to five existing ponds: 13, 14 (dry retention), 16, 17 (dry detention), and pond 19. The existing master surface water management system, water quality treatment and attenuation are provided for a maximum impervious coverage of 70% prior to discharging to the existing wetlands within the Davenport Creek System. The previously mentioned permit is 58% impervious coverage and was consistent with the intent of the master plan. No adverse impacts were noted under water quality. The total wetland impact is 4.13 acres. Mitigation for the proposed impacts is provided by the previously approved offsite preservation areas located within the project area of the Reunion DRI Conceptual Permit 49-01107-P.

Exhibit 3-7: Previously Permitted Ponds



3.5 SOCIAL AND ECONOMIC

3.5.1 SOCIAL

3.5.1.1 COMMUNITY COHESION

Community cohesion is the degree to which residents have a sense of belonging to their community. This may also include the degree to which neighbors interact and cooperate with one another, the level of attachment felt between residents and institutions in the community, and/or a sense of common belonging, cultural similarity or "togetherness" experienced by the population. Therefore, construction of roadways through existing communities has the potential to reduce the level of community cohesion by restricting access and creating divisions between already connected neighborhoods. Increased connections between communities and regions can have a positive effect on community cohesion particularly in areas that are heavily congested or divided by man-made or natural barriers such as wetland/stream systems.

The proposed project involves an extension of Sinclair Road from its existing terminus at Tradition Boulevard west/southwest to Bella Citta Boulevard. Consideration will be given to alternative alignments that minimize effects to existing and planned neighborhoods and businesses. Residents are currently required to use I-4 and SR 429 to commute in and out of Reunion and ChampionsGate communities. The roadway extension will allow residents a new route to get from US 27 to SR 429 with avoidance of I-4. The project is being planned and evaluated to increase vehicular capacity and improve roadway mobility within areas of Osceola County undergoing rapid growth. It is anticipated that the project would enhance the movement of individuals, as well as goods and services, to community or neighborhood activity centers.

3.5.1.2 DEMOGRAPHICS

This project has been developed in accordance with the *Civil Rights Act of 1964*, as amended by the *Civil Rights Act of 1968*. Additionally, the project has been developed in accordance with *Executive Order 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (February 11, 1994)*. This project has been developed without regard to race, color, national origin, age, sex, religion, disability or family status.

An analysis of minority and low-income populations (Environmental Justice (EJ) or potential EJ populations) was conducted through a review of census data and field reconnaissance. For the purposes of the following discussions, the study area refers to the proposed project right-of-way bounded by the Reunion community to the east and Davenport Creek Swamp to the west with a crossing to the connection with Bella Citta Boulevard. The area for reviewing demographics included those census tracts/blocks that overlap the study area and field review of those populations living immediately adjacent to the project improvements (see **Exhibit 3-8**). Most of the study area consists of residential and natural uplands and wetlands. Per 2020 Census data (**Table 3-10**), the residential population in the study area is approximately 930 people.

Table 3-10: Demographic Data from the 2018 American Community Survey (Census Bureau)

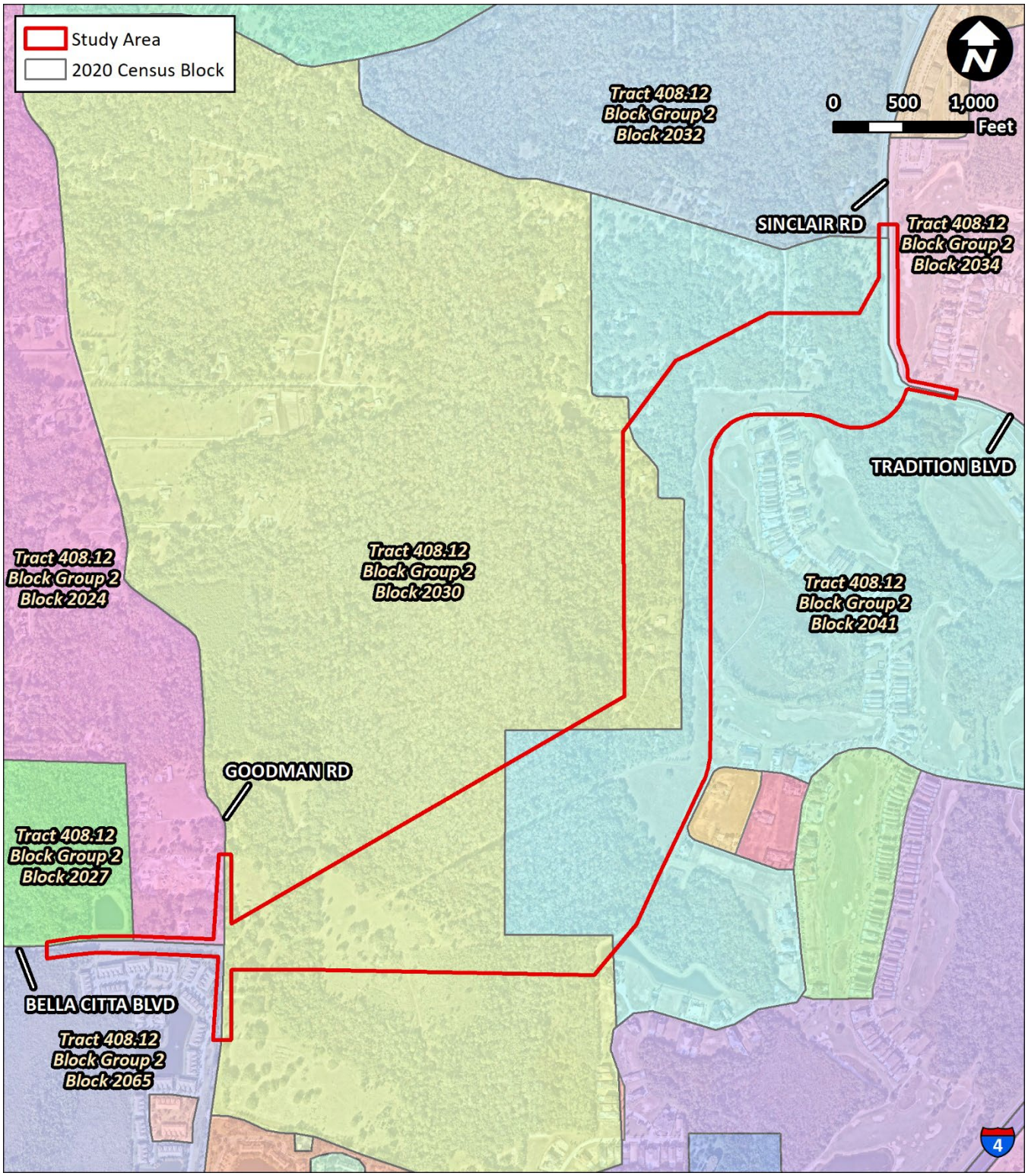
Geography	Census Block	2020 Population	Percent White	Percent Hispanic [1]	Percent Black	Percent Other [2]
Study Area	**N/A**	930	65.4	21.8	5.8	7.0
Census Tract 408.12; Block Group 2	N/A	5,021	47.1	34.1	7.9	10.9
Census Tract 408.12; Block Group 2	Block 2024	217	65.5	24.4	8.8	2.3
Census Tract 408.12; Block Group 2	Block 2027	0	0	0	0	0
Census Tract 408.12; Block Group 2	Block 2030	103	89.3	10.7	0	0
Census Tract 408.12; Block Group 2	Block 2032	74	67.6	27.0	0	5.4
Census Tract 408.12; Block Group 2	Block 2034	84	66.7	14.3	0	19.0
Census Tract 408.12; Block Group 2	Block 2041	49	69.4	16.3	6.1	8.2
Census Tract 408.12; Block Group 2	Block 2065	403	58.6	24.6	7.9	8.9

Source: U.S. Census Bureau, 2020 Census Redistricting Data (Public Law 94-171)
[1]Hispanic includes persons of any race with Hispanic or Latino family heritage.
[2]Other includes American Indian/Alaskan Native, Asian, Native Hawaiian, other single race, and two or more races.

For the discussion of household income, the study area is fully within the 2010 Census Tract 408.02 Block Group 1. The *Household Income Characteristics* summarized from the 2018 American Community Survey (ACS) five-year estimates indicate that the median household income of the study area vicinity is approximately $56,269 with approximately 18.9% of families having incomes below the federal poverty level.

In addition to ethnicity and household income, the ACS five-year estimates were reviewed to evaluate the percentage of households with one or more persons 65 years or older and the percentage of persons with limited English proficiency. Based on the estimates, the percentage of households with one or more persons 65 years or older in the study area vicinity is approximately 44.1%. Limited English proficiency is defined as people aged five years or older that do not speak English “very well” or “well”. The percentage of persons with limited English proficiency is approximately 3.6%.

Exhibit 3-8: 2020 Census Data



3.5.1.3 COMMUNITY FACILITIES

There are no community facilities located within or near the study area.

3.5.2 ECONOMIC

Sinclair Road Extension is a planned new roadway as defined on the 2040 Roadway Network Map from Osceola County's 2040 Comprehensive Plan. The construction of this roadway will support the economy by improving access for residents from the Reunion and SR 429 area to shopping and businesses to the west, along US 27.

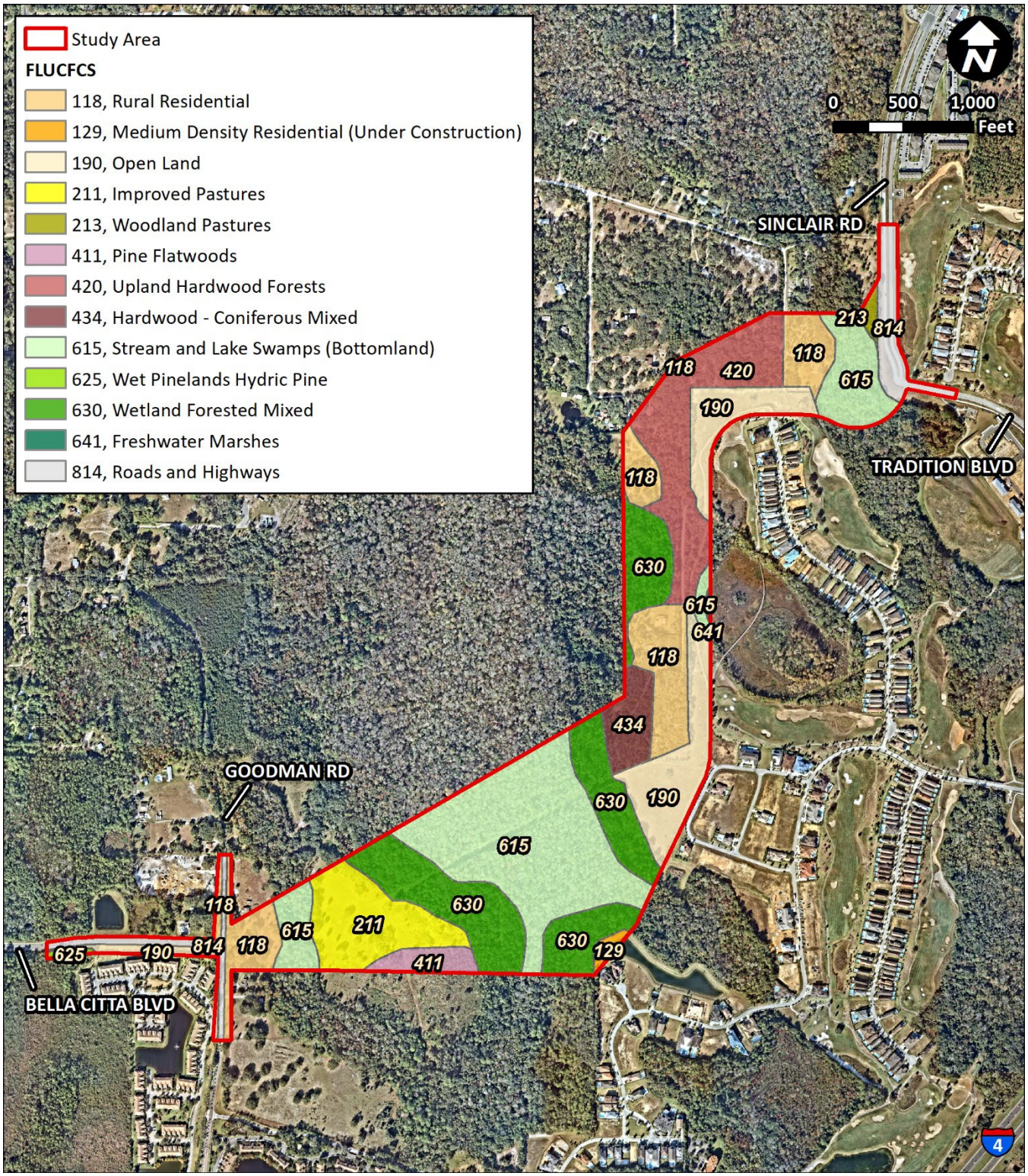
3.5.3 LAND USE CHANGES

Geographic Information Systems (GIS) data was obtained from the SFWMD to assist in identifying land cover and natural communities. Additionally, field reconnaissance was conducted on November 2, 2021. Land covers were classified according to the FLUCFCS system. The general land cover within the study area consists of residential development, wetlands, agriculture (pastures), native uplands (pine flatwoods, upland hardwood forest, and hardwood-conifer mixed), and roads. **Table 3-11** provides the FLUCFCS data and acreage within the study area. The FLUCFCS map is displayed on **Exhibit 3-9**.

Table 3-11: FLUCFCS Data

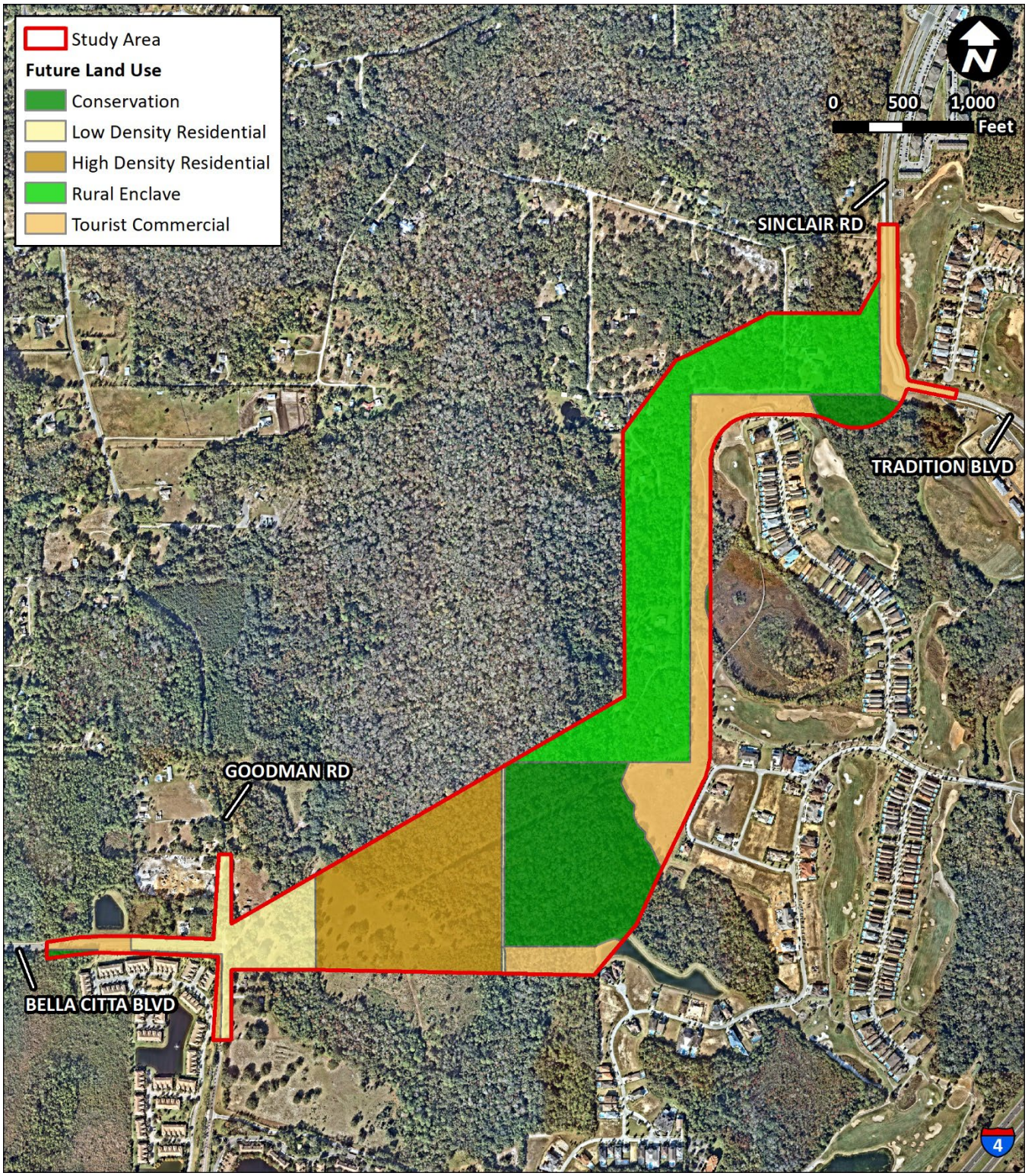
FLUCFCS Code	FLUCFCS Type	Acres	% of Study Area
118	Rural Residential	19.4	12.5
129	Medium Density Residential – Under Construction	0.8	0.5
190	Open Land	18.8	12.1
211	Improved Pastures	11.7	7.6
213	Woodland Pastures	0.7	0.5
411	Pine Flatwoods	2.8	1.8
420	Upland Hardwood Forest	16.9	10.9
434	Hardwood-Conifer Mixed	4.6	3.0
615	Stream and Lake Swamps (Bottomland)	41.6	26.9
625	Wet Pinelands Hydric Pine	0.4	0.3
630	Wetland Forested Mixed	29.3	18.9
641	Freshwater Marshes	0.2	0.1
814	Roads and Highways	7.6	4.9
TOTAL		**154.8**	**100.0**

Exhibit 3-9: FLUCFCS



Future land use maps of the study area were reviewed to determine if the proposed project will promote changes to land use within the study area in Osceola County (**Exhibit 3-10**). Osceola County future land use within the study area includes Conservation, Low Density Residential, High Density Residential, Rural Enclave, and Tourist Commercial. This project will require acquisition of right-of-way; therefore, the existing land use will change.

Exhibit 3-10: Future Land Use



3.5.4 MOBILITY

This roadway extension will provide improved mobility throughout the local community and to commuters by providing an alternative to using I-4 and allowing a connection from US 27 to SR 429. The extension allows for easier access to local goods and services.

3.5.5 AESTHETIC EFFECTS

The topography of the study area is relatively flat consisting primarily of single- and multi-family residential areas. Views within the area are restricted by vegetation and/or other structures. The proposed roadway extension will change the viewshed of the localized area; however, the localized area is also planned for development and, therefore, the roadway will be consistent with the proposed changes.

Landscaping will likely be included in the construction of the Sinclair Road Extension and would provide a vegetative buffer between residential communities and the roadway.

3.5.6 RELOCATION POTENTIAL

Alternatives are being considered that would potentially involve residential relocations. Additional right-of-way may be needed to accommodate stormwater management facilities.

If right-of-way is needed, Osceola County will carry out a Right of Way and Relocation Assistance Program in accordance with s. 421.55 Florida Statutes (FS) (Relocation of displaced persons) to minimize the unavoidable effects of right-of-way acquisition and displacement of people.

3.6 CULTURAL

3.6.1 HISTORIC SITES/DISTRICTS AND ARCHAEOLOGICAL SITES

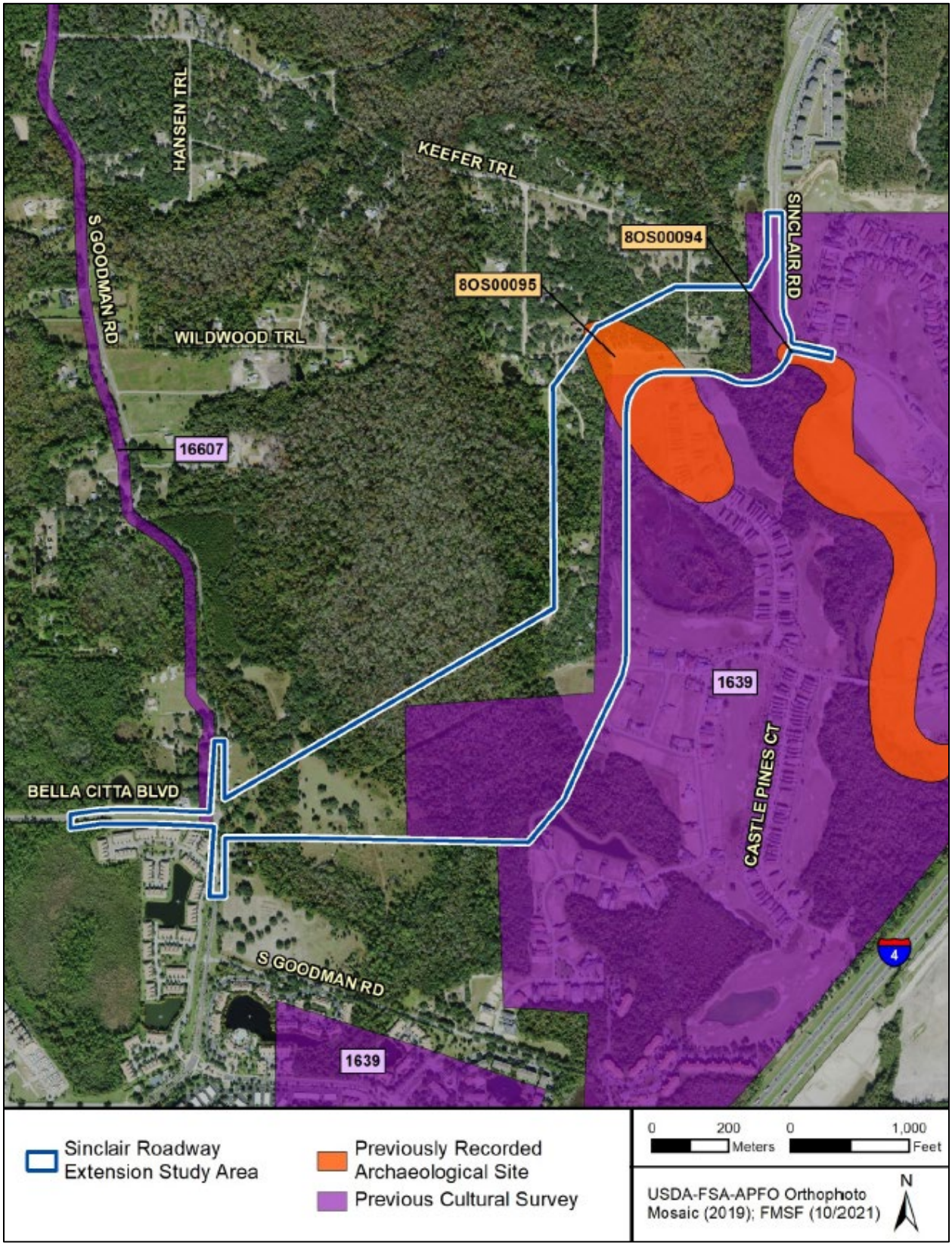
The Florida Master Site File (FMSF) database (updated October 2021) indicates that three previous cultural resource surveys intersect the study area **(Table 3-12; Exhibit 3-11**).

Table 3-12: Previously Conducted Cultural Resource Surveys

Survey No.	Title	Year	SHPO Evaluation
1639	*An Archaeological Survey of the Proposed Osceola Pointe DRI*	1988	Rollins College
3360*	*A Cultural Resource Assessment Survey of the Heidrich Community DRI Project Area, Osceola County, Florida*	1992	Janus Research/ Piper Archaeology
16607	*Cultural Resources Reconnaissance Survey Goodman Road Corridor, Osceola County, Florida*	2009	SouthArc, Inc.

*This survey is not included on **Exhibit 3-10** due to incorrect boundary plotting in the FMSF GIS database.

Exhibit 3-11: Previously Conducted Cultural Resource Surveys and Recorded Archaeological Sites



FMSF Survey No. 1639 was conducted in 1988 by Rollins College. The study included an archaeological survey of 291 hectares (694 acres) in northwestern Osceola County associated with Davenport Creek and Davenport Creek Swamp. This survey intersects the eastern edge of the study area for 830 meters (2,723.1 feet) alongside Pine View Trail, beginning 462.6 meters (1,517.7 feet) east of South Goodman Road and continuing east for 304 meters (997.4 feet). Archaeological survey methods included a pedestrian survey, shovel testing, and test excavation. Approximately 200 shovel test pits were targeted during the survey. These test pits were excavated at 30-meter (98.4-feet) intervals in targeted areas to 120 centimeters below surface (cmbs) (47.2 inches) when possible. While the survey report included a map of general test pit locations, their exact locations were not recorded. Based on the map, it appears that roughly 15 test pits were dug within the current study area. These test pits were located along Sinclair Road, immediately south of Mor Tay Trail, and roughly 750 meters (2,460.6 feet) east of South Goodman Road. Six newly recorded resources were identified during the survey. Two of these resources are archaeological sites that are within the current study area (8OS00094 and 8OS00095).

FMSF Survey No. 3360 was conducted in 1992 by Janus Research and Piper Archaeology. The survey measured 388 hectares (960 acres) in Osceola County. Archaeological survey methods included pedestrian survey, shovel testing, test unit excavation, and surface collection. Twelve newly recorded sites were identified during the survey, none of which are in the current study area. Of the three previously recorded sites that were identified during the survey, one is within the current study area (8OS00094). Although the exact locations of individual shovel tests and test units are unknown based on available documentation, the report indicates 60 shovel tests and three 1.0-x-2.0-meter (3.3-x-6.6-foot) test units were excavated at 8OS00094, which intersects the current study area.

FMSF Survey No. 16607 is a pedestrian survey conducted in 2009 by SouthArc, Inc. that included 5.6 kilometers (3.5 miles) of South Goodman Road in Osceola County. This survey intersects the western area of the study area near Bella Citta Boulevard and South Goodman Road. Archaeological survey methods included a controlled surface collection along the project corridor. SouthArc, Inc. identified one lithic scatter during the survey. Architectural survey methods included a windshield survey, where four historic structures and one historic tram were identified. However, none of these resources are within the current study area.

The FMSF review further indicates that two archaeological sites (8OS00094 and 8OS00095) are located within or intersecting the study area (**Table 3-13**; **Exhibit 3-11**).

Table 3-13: Previously Recorded Archaeological Sites

FMSF No.	Name	Time Period	Surveyor Recommendation	SHPO Evaluation
8OS00094	Osceola Pointe 2	Archaic, Middle Archaic, St. Johns	Ineligible	Ineligible
8OS00095	Osceola Pointe 3	Archaic	Not evaluated	Not evaluated

Osceola Pointe 2 (8OS00094) is located between Pine View Trail and Mor Tay Trail in the northeastern portion of the study area. This site includes a dense lithic artifact scatter that was originally identified during the 1988 survey conducted by Rollins College (FMSF Survey No. 1639) and was not evaluated by

the State Historic Preservation Officer (SHPO) at the time. However, this site was revisited by Janus Research and Piper Archaeology in 1992 (FMSF Survey No. 3360). It was recommended ineligible for National Register of Historic Places (NRHP) listing after Phase II testing was conducted in high-probability areas. Although Janus Research/Piper Archaeology (1992) identified lithics attributed to stone tool manufacture and modification associated with Site 8OS00094, they determined that additional insight from future excavations was unlikely. In 2014, SEARCH conducted additional survey in the southern terminus of the site associated with an existing pond along I-4; however, no additional cultural material was found during this survey. The SHPO evaluated the Osceola Pointe 2 site as ineligible for listing in the NRHP on June 23, 2014.

Osceola Pointe 3 (8OS00095) is a lithic scatter that has not been evaluated for listing in the NRHP by the SHPO. A relatively small portion of this site is located within the northeastern section of the study area along Sinclair Road. The site boundary is estimated, and its delineation status is unknown based on the available documentation.

In addition to the FMSF, the Osceola County Property Appraiser's database was reviewed to identify parcels containing unrecorded structures of historic age (i.e., structures constructed earlier than 1977). This search did not identify any historic structures within the study area.

The potential for prehistoric sites to be identified within the study area was assessed based on an examination of environmental variables (soil drainage, access to streams and wetlands and marine resources, relative elevation), as well as the results of previously conducted surveys. Due to soil drainage variation throughout the study area and the archaeological findings from previously conducted cultural resource surveys (FMSF Survey Nos. 1639 and 3360), which included subsurface testing within portions of the current study area, the probability for unrecorded prehistoric sites within the study area is considered to be moderate.

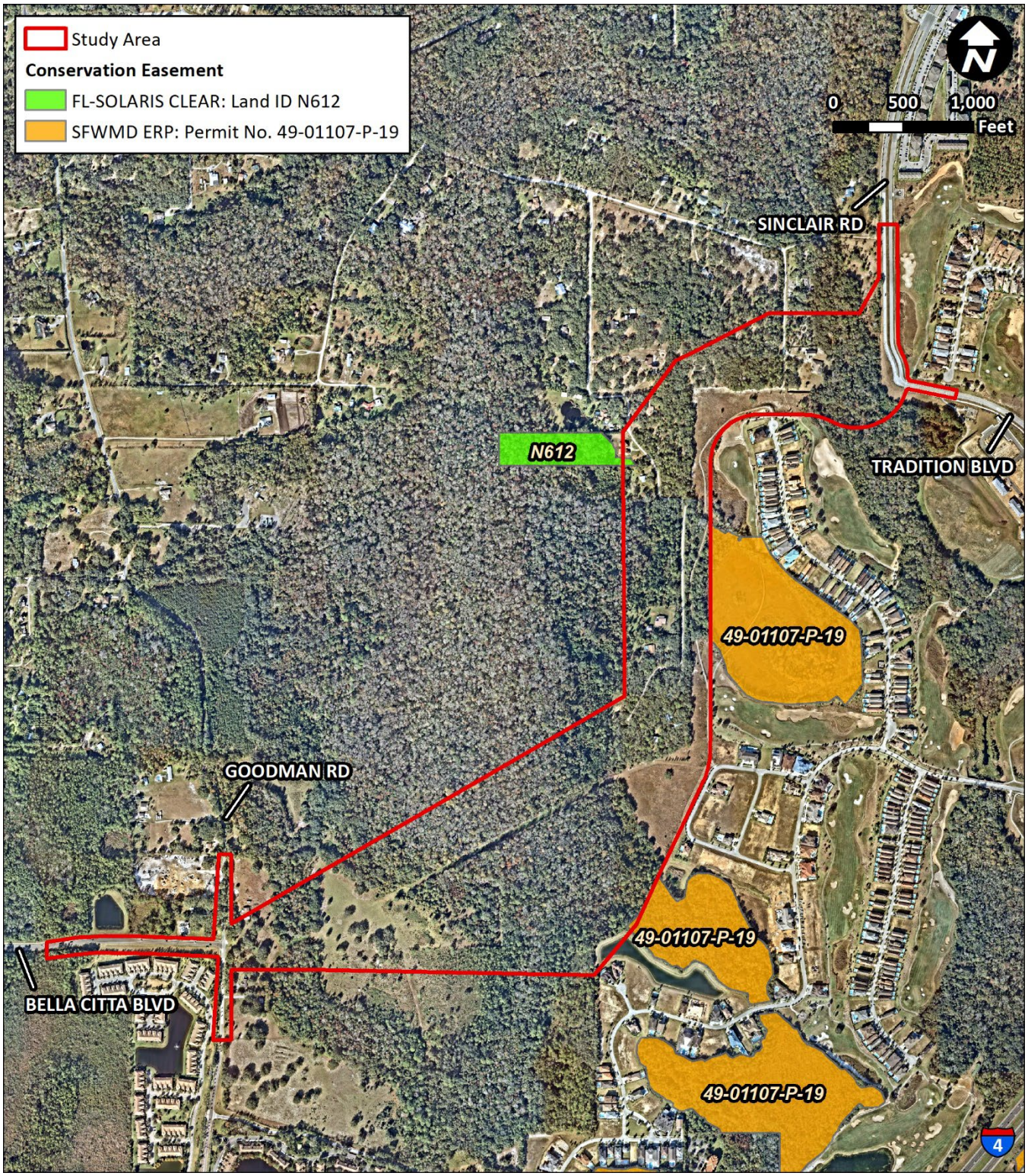
The highest probability for pre-contact sites is in elevated, well drained landforms near freshwater or marine resources. Areas of moderate probability have less well drained soils or are situated at a greater distance from freshwater or marine resources. Low-probability areas generally include those portions of the study area that contain very poorly drained soils or significant levels of subsurface disturbance (e.g., buried utility lines or drainage features). Based on this assessment, the eastern and northeastern portions of the study area have the highest probability for prehistoric sites due to the excessively and moderately drained soils, as well as the presence of Sites 8OS00094 and 8OS00095 in the vicinity. Additionally, there is a small swamp adjacent to Pine View Trail in the northeastern portion of the study area. Therefore, this area has a moderate probability for intact and previously unrecorded archaeological sites. The southwestern and south-central portions of the study area have a low probability for intact archaeological sites due to the poorly drained soils and associated wooded marshland.

Based on the results of previously conducted cultural resource surveys, the absence of previously recorded and unrecorded historic-aged buildings in the study area, and the historic map review of the study area, the study area has a low probability for historic resources.

3.6.2 RECREATIONAL AREAS AND PROTECTED LANDS

The study area does not contain any recreational areas or protected lands. Two conservation easements are located immediately adjacent to the study area. A FL-SOLARIS Conservation Lands, Easements and Recreation (CLEAR) conservation easement (Land ID N612) is associated with a private residential home located west of Pine Way Trail. An additional SFWMD Environmental Resource Permit (ERP) conservation easement (Permit No. 49-01107-P-19), Reunion Resort Phase 2, is associated with the Reunion Resort located southeast of the study area. Both of these conservation easements are still active and are shown on **Exhibit 3-12**.

Exhibit 3-12: Conservation Easements



3.7 NATURAL

3.7.1 WETLANDS AND OTHER SURFACE WATERS

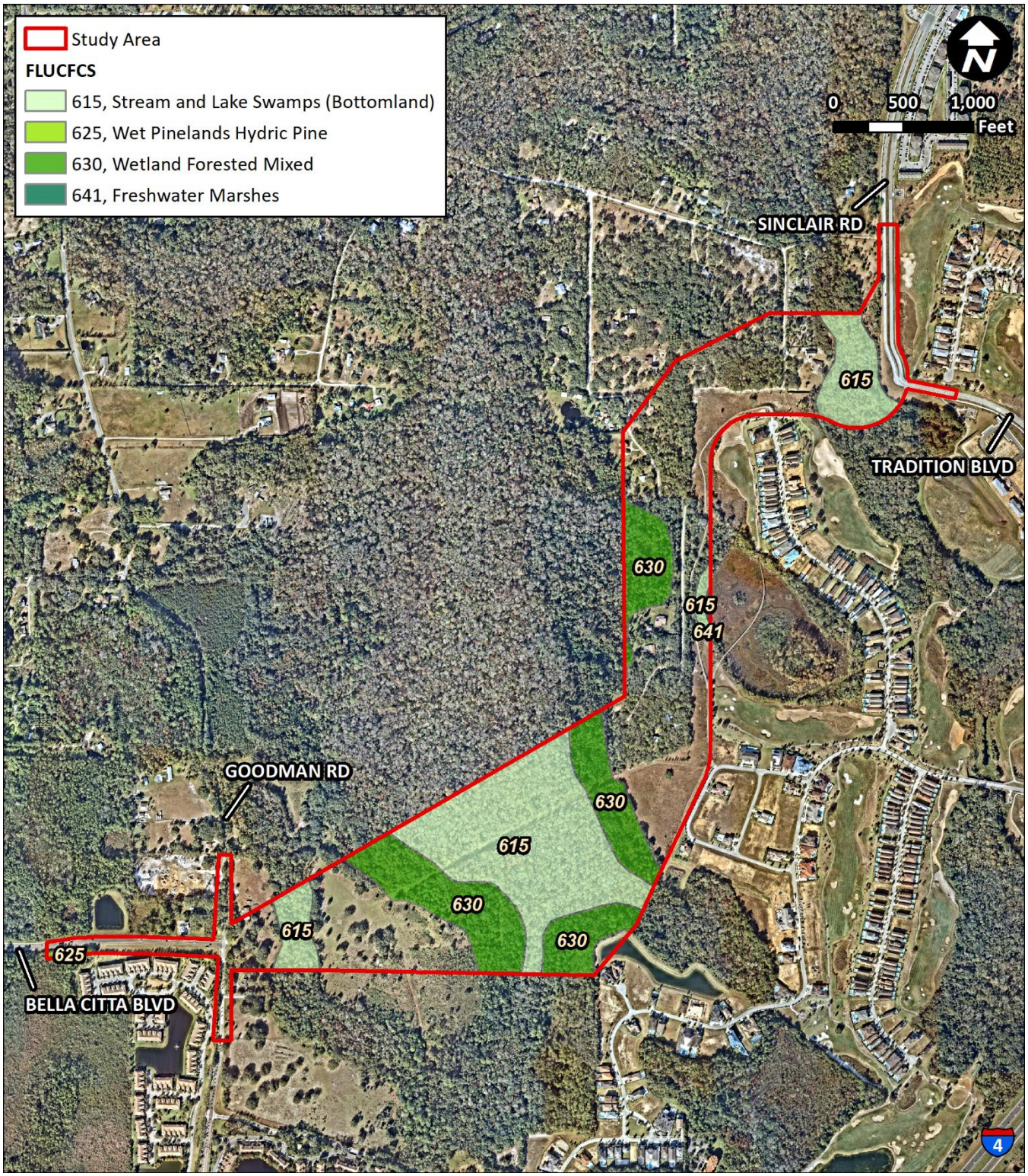
Activities in, on, or over Waters of the United States (WOTUS), including wetlands, are regulated at the state and federal level. Executive Order 11990, Protection of Wetlands, 1977 (the Order), was issued to "minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands". To meet these objectives, the Order requires federal agencies, in planning their actions, to consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided. In Florida, the U.S. Environmental Protection Agency (EPA) had previously delegated the jurisdictional authority over activities in WOTUS under the Clean Water Act (CWA) of 1972, as amended, to the U.S. Army Corps of Engineers (USACE). On January 23, 2020, the EPA Administration and Assistant Secretary of the Army for Public Works signed a final rule defining the scope of waters federally regulated under the CWA. The Navigable Waters Protection Rule is the second step of a two-step process intended to review and revise the definition of WOTUS. It is intended to increase the predictability and consistency of the CWA programs by clarifying the scope of WOTUS federally regulated under the CWA. The final rule was posted on April 21, 2020 and became effective June 22, 2020. On December 17, 2020, the State of Florida applied for and received approval to formally transfer permitting authority under the CWA Section 404 from the USACE to the State of Florida Department of Environmental Protection (FDEP) for any project proposing dredge or fill activities within State assumed waters (all jurisdictional wetlands located more than 300 feet from the edge of a navigable freshwater body or a tidal waterbody). Florida's Section 404 program became effective on December 22, 2020, upon publication of EPA's approval in the Federal Register.

In addition, FS 373.016 states that waters in the state are among its basic resources. If activities in, on, or over wetlands or surface waters cannot be avoided by an activity, it is subject to the conditions set forth in Florida Administrative Code (FAC) 62-330. The FDEP and SFWMD, as well as other local governments, have jurisdictional authority over wetlands and surface waters within the study area.

An assessment of wetlands and surface waters was conducted within the study area utilizing the 2016 SFWMD FLUCFCS and the National Wetland Inventory (NWI) GIS datasets. Additionally, field reconnaissance was conducted on November 2, 2021.

The study area contains four wetland systems, three of which are forested and extend offsite. The fourth wetland is a freshwater marsh and appears to have been improved during the construction of the adjacent Reunion West Golf Course. Due to the hydrologic connections of the onsite wetlands, all four wetlands will likely fall under the jurisdiction of the SFWMD and FDEP. **Exhibit 3-13** depicts the wetland land use types within the study area.

Exhibit 3-13: Wetlands



3.7.2 WATER RESOURCES

There are no aquatic preserves or Outstanding Florida Waters (OFWs) located within the study area. A review of EPA Sole Source Aquifer Protection Program maps of sole source aquifers in the southeastern United States indicated that the study area is located within the Biscayne Sole Source Aquifer and Recharge Zone. The project will meet all applicable SFWMD criteria related to water quality. The project is currently a non-federal action receiving no federal monies; therefore, concurrence from the EPA is not required according to the Safe Drinking Water Act. Best Management Practices (BMPs) to control erosion, sediment release, and storm water runoff to minimize adverse impacts on surface water resources will be implemented during design, permitting and construction.

A stormwater management system will be designed and will include wet detention stormwater management facilities. The design of the stormwater facilities will comply with the standards set forth by SFWMD and Osceola County. The western half of the study area is within the WBID 3170K – Davenport Creek which is not an Outstanding Florida Water; however, it is an impaired water for fecal coliform and bacteria. Thus, to minimize water quality impacts, the stormwater management system design will include a site-specific pollutant loading analysis and an additional 50% water quality treatment volume.

The surface water management system will be designed to maintain and support existing hydrologic flow patterns and regimes and avoid gradient drawdowns of the wetlands through a design that incorporates appropriate control elevations.

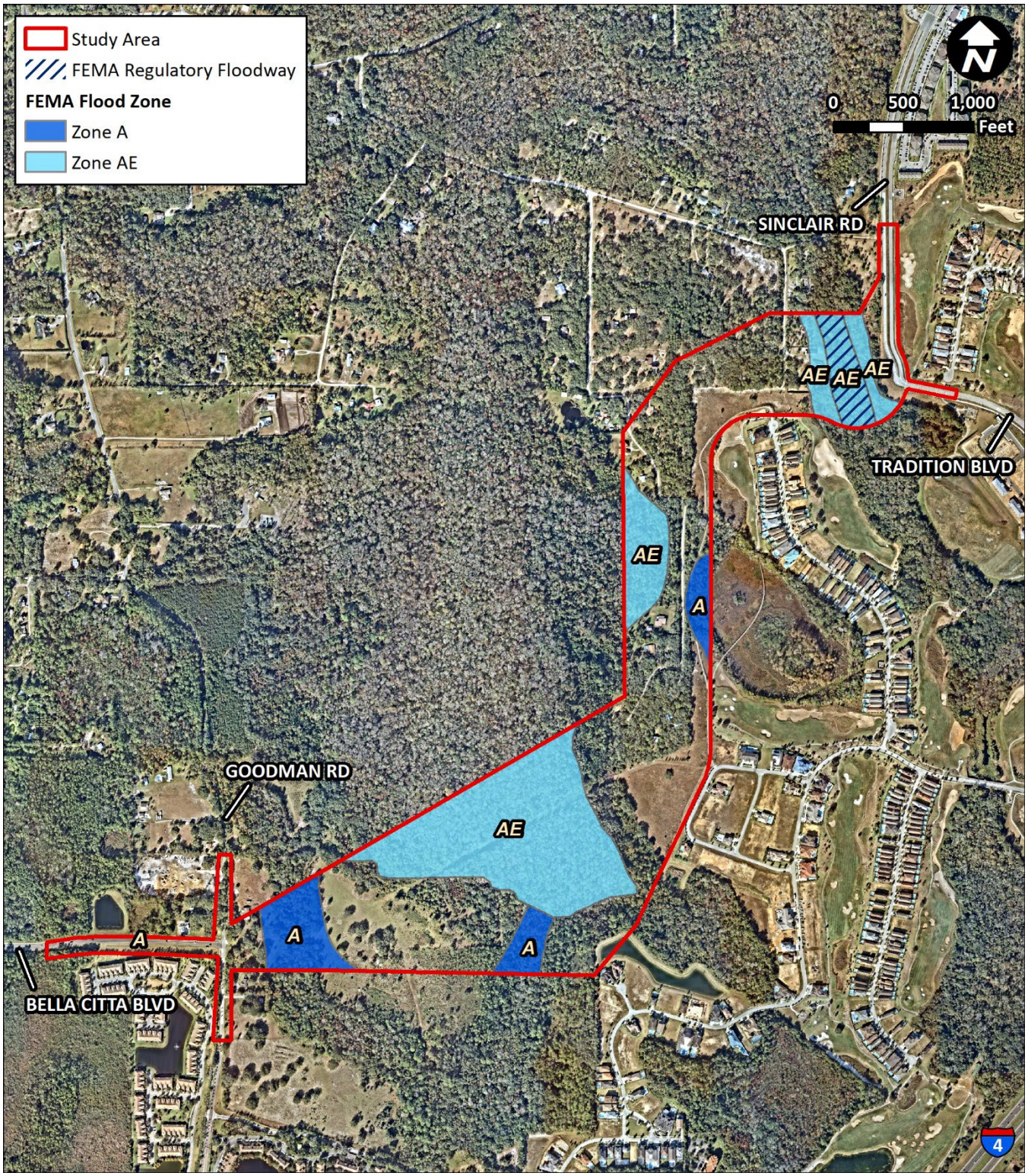
3.7.3 WILD AND SCENIC RIVERS

There are no wild or scenic rivers located within the study area, thus the proposed project would have no involvement with these resources.

3.7.4 FLOODPLAINS

Approximately 56.7 acres of the ±154.7-acre study area (36.7%) is classified as being within the Federal Emergency Management Agency (FEMA) Flood Zone A or Zone AE, within the 100-year floodplain. Approximately 45.3 acres of these floodplains are Zone AE, where an established Base Flood Elevation (BFE) of 106 feet (NAVD 88) has been determined. Zone A floodplains do not have established BFEs. The floodplains are illustrated on **Exhibit 3-14**. Davenport Creek is a FEMA Regulatory Floodway and is located at the east end of the study area, west of Sinclair Road and Tradition Boulevard.

Exhibit 3-14: Floodplains



3.7.5 COASTAL BARRIER RESOURCES

The proposed project would have no involvement with coastal barrier resources.

3.7.6 PROTECTED SPECIES AND HABITAT

The U.S. Fish and Wildlife Service (USFWS) and Florida Fish and Wildlife Conservation Commission (FWC) have authority under the U.S. Endangered Species Act of 1973 (ESA) and the State of Florida's Endangered and Threatened Species Act (FS 379.2291) to provide comments and recommendations concerning protected species. Section 7 of the ESA requires Federal agencies to ensure that activities do not have a detrimental effect on the continued existence of listed species or their habitats. For some species, USFWS has designated consultation areas or critical habitat. If proposed actions have the potential to affect state or federally listed species or critical habitats, coordination with USFWS and/or FWC will be required. The following information and datasets were reviewed to determine the likelihood of state and federally listed species occurring within the study area:

- Endangered & Threatened Wildlife and Plants, 50 Code of Federal Regulations (CFR) 17.11 and 17.12
- "Federal Listed Species in Osceola County, Florida" USFWS (2021)
- FDEP MapDirect GIS (https://ca.dep.state.fl.us/mapdirect/)
- Florida Black Bear Management Units https://myfwc.com/wildlifehabitats/wildlife/bear/bmu/
- "Florida's Endangered and Threatened Species," FWC (2018)
- Florida Natural Areas Inventory (FNAI) database of listed species known to occur in and Osceola County (2021)
- FNAI Biodiversity Matrix (http://www.fnai.org/biointro.cfm)
- FWC listed species occurrence data (2017)
- FWC Gopher Tortoise Permitting Guidelines (April 2008, Revised July 2020)
- "Notes on Florida's Endangered and Threatened Plants," FDACS (2010), and 5B-40 FAC
- SFWMD Land Use Data (2016)
- SFWMD Permitting Portal (2021)
- True color aerial photography (Environmental Science Research Institute's (ESRI) Online Database)
- USDA NRCS Soils GIS Data for Osceola County
- USFWS Information for Planning and Consultation (IPaC) data (https://ecos.fws.gov/ipac/)
- USFWS NWI data (2013)
- USFWS Wood Stork Key for South Florida (revised 2010)
- USFWS Wood Stork Florida Nesting Colonies and Core Foraging Areas (CFA) Active 2008-2019 (2021)
- USFWS Consultation Areas and Critical Habitat Maps GIS Data (2021)
- USGS Topographic (ESRI Online Database)

A database review of potential species occurring within the study area and immediate vicinity was conducted. Results of the database review is summarized below.

Based on FNAI data, four listed plant species have been documented near the study area. These species include Small's jointweed (*Polygonella myriophylla*), Florida bonamia (*Bonamia grandiflora*), scrub buckwheat (*Eriogonum longifolium* var. *gnaphalifolium*), and Britton's beargrass (*Nolina brittoniana*). No listed wildlife species have been documented by FNAI near the study area.

There are no known wading bird rookeries within the study area or within one mile of the study area. Based on the Audubon Florida EagleWatch Public Nest App, two nests are located within one mile of the study area. Nest IDs OS231 and OS151 are located approximately 0.16-mile south and 0.9-mile northwest of the study area, respectively. The study area is outside of the FWC-recommended 660-foot bald eagle nest protection buffer. No other federally or state listed species were documented near the study area.

Areas identified by FWC as strategic habitat conservation areas (SHCA) are located within the study area. SHCAs are undeveloped natural areas identified by FWC as areas that could provide potential habitat to native plant and wildlife species and, therefore, may be considered for acquisition as conservation lands. However, these areas have no regulatory implications and have not been and may never be acquired for conservation.

The study area lies within the USFWS consultation area for the Audubon's crested caracara (*Polyborus plancus audubonii*), Everglade snail kite (*Rostrhamus sociabilis plumbeus*), Florida scrub-jay (*Aphelocoma coerulescens*), sand skink (*Plestiodon reynoldsi*), blue-tailed mole skink (*Plestiodon egregius lividus*), red-cockaded woodpecker (*Picoides borealis*), and Lake Wales Ridge plants. Based on a review of the USFWS Critical Habitat Mapper, there is no USFWS designated critical habitat within the study area. A USFWS IPaC Trust Resource list was reviewed for the study area. As described below, species which have the potential to occur near the study area are given a Low, Moderate, or High ranking. The IPaC list includes historical data for species which can result in some species findings that do not reflect current on-site conditions. These species are not included in further discussion.

Based on field reconnaissance and database reviews, a listing of the state and federally listed species with the potential to occur within the immediate vicinity of the study area has been compiled. **Table 3-14** lists species that may occur and their likelihood of occurrence. Species which do not have suitable habitat within the study area and are not within a USFWS consultation area have been removed from the list and are not included in further discussion. Likelihood of occurrence is based on actual observation of the species, signs of the species (burrows, tracks, scat, etc.), observance of suitable habitat, or documented occurrences of the species within various databases. A Low ranking indicates that preferred habitat for that species was found within the study area, but the species has not been documented within one mile of the study area. A Moderate ranking indicates that suitable habitat exists, and the species has been documented within one mile of the study area or the study area is within the species' critical habitat. A High ranking indicates that suitable habitat exists, and the species was observed during field reconnaissance. A None ranking indicates that no suitable habitat exists; however, the study area is within the species' USFWS consultation area.

Table 3-14: Potential Listed Species and Likelihood of Occurrence

Common Name	Scientific Name	Federal Status	State Status [1]	Likelihood of Occurrence
Mammals				
Florida panther	*Puma concolor coryi*	E	FE	Moderate
Florida black bear	*Ursus americanus floridanus*	NL*	NL*	Moderate
Birds				
Audubon's crested caracara	*Polyborus plancus audubonii*	T	FT	Low
Everglade snail kite	*Rostrhamus sociabilis*	E	FE	None
Florida grasshopper sparrow	*Ammodramus savannarum floridanus*	E	FE	None
Florida scrub-jay	*Aphelocoma coerulescens*	T	FT	Low
Red-cockaded woodpecker	*Picoides borealis*	E	FE	None
Wood stork	*Mycteria americana*	T	FT	Low
Florida burrowing owl	*Athene cunicularia floridana*	NL	ST	Low
Florida sandhill crane	*Grus canadensis pratensis*	NL	ST	Low
Little blue heron	*Egretta caerulea*	NL	ST	Low
Southeastern American kestrel	*Falco sparverius paulus*	NL	ST	Low
Tricolored heron	*Egretta tricolor*	NL	ST	Low
Bald eagle	*Haliaeetus leucocephalus*	NL**	NL**	Moderate
Reptiles				
American alligator	*Alligator mississippiensis*	T (S/A)	T (S/A)	Low
Blue-tailed mole skink	*Plestiodon egregius lividus*	T	FT	Low
Eastern indigo snake	*Drymarchon couperi*	T	FT	Low
Florida sand skink	*Plestiodon reynoldsi*	T	FT	Low
Florida pine snake	*Pituophis melanoleucus mugitus*	NL	ST	Low
Gopher tortoise	*Gopherus polyphemus*	C	ST	High
Plants				
Britton's beargrass	*Nolina brittoniana*	E	FE	Moderate
Florida bonamia	*Bonamia grandiflora*	T	FT	Moderate
Scrub buckwheat	*Eriogonum longifolium var. gnaphalifolium*	T	FT	Moderate
Small's jointweed/Sandlace	*Polygonella myriophylla*	E	FE	Moderate

[1] Based on *Florida's Endangered and Threatened Species* updated June 2021 available on http://myfwc.com/wildlifehabitats/imperiled/ and the *5B-40.0055 FAC Regulated Plant Index*.

- Federal Status: E = Endangered; T = Threatened; T(S/A) = Threatened due to Similarity of Appearance; C = Candidate Species; NL = Not Listed
- State Status: FE = Federally Endangered; FT = Federally Threatened; FT(S/A) = Federally Threatened due to Similarity of Appearance. ST= State Threatened; SE = State Endangered; SSC = Species of Special Concern. Note: Coordination is not required with FWC for federally listed species.
- Bold = observed during field reconnaissance

* The Florida Black Bear is still protected under Florida Black Bear Conservation Rule 68A-4.009 (FAC) and the FWC Florida Black Bear Management Plan.

** The bald eagle is still protected under the Bald and Golden Eagle Protection Act, Migratory Bird Treaty Act and FWC Management Plan regulations.

3.7.6.1 LISTED FAUNA SPECIES

3.7.6.1.1 Federal Listed Fauna

Mammals

Florida Panther (Puma concolor coryi)

The Florida panther is listed as endangered by USFWS and FWC. Panthers are uniform tawny brown cats, approximately 5-7 feet in length, and can weigh between 60 to 160 pounds. Panthers utilize a range of different habitat types to some degree but rely upon forested areas that provide dense understory vegetation for rest sites, den sites, and stalking cover. Panthers are solitary in nature, except for females with kittens, and tend to be most active between dusk and dawn.

The study area is not within the USFWS consultation area for the Florida panther; however, several species occurrences have been documented within one mile of the study area in the form of telemetry and roadkill. Potential habitat for the Florida panther is present within the study area. Coordination with USFWS may be required to address impacts to Florida panthers or their habitat. This project **may affect, but is not likely to adversely affect,** the Florida panther.

Birds

Audubon's crested caracara

Audubon's crested caracara (caracara) is listed as threatened by USFWS and FWC. Caracaras are large, boldly patterned raptors, with a crest and unusually long legs. Caracaras are year-round residents in Florida. The species has been reported from the Kissimmee, Caloosahatchee and Upper St. Johns River basins, and the Kissimmee prairie. The crested caracara is strongly associated with open habitats, preferring large expanses of pastures, grasslands, or prairies with numerous shallow ponds and sloughs and single or small clumps of cabbage palms, live oaks, and cypress. The caracara is an opportunistic feeder with a broad diet consisting of carrion and live prey, including invertebrates associated with carrion and dung in pastures. They forage in a wide variety of habitats including pastures, along roads, wetlands and agricultural lands including citrus groves.

The study area is within the USFWS consultation area for the caracara. Although there is suitable habitat for the caracara within the study area, no caracaras were observed during field reconnaissance and the species has not been documented within one mile of the study area. To determine caracara use within the study area, a survey using the USFWS Crested Caracara Draft Survey Protocol should be performed during the caracara nesting season (January – April). This project **may affect, but is not likely to adversely affect,** the Audubon's crested caracara.

Everglades snail kite

The Everglades snail kite is listed as endangered by USFWS and FWC. This species is a mid-sized raptor that can reach a length of 14.2 to 15.4 inches. Males are slate gray with red eyes and orange legs, which turn more reddish during breeding season. Females are brown with red eyes and yellow to orange legs, with varying amounts of white streaking on the face, neck, and chest. Snail kites have a highly specific diet, which is made up almost exclusively of apple snails (*Pomacea paludosa*). Snail kites typically prefer large, open, freshwater marshes and shallow lakes (less than 4 feet deep) with a low-density of emergent vegetation and typically nest in low trees or shrubs over water (commonly willow, wax myrtle, pond apple, or buttonbush, but also in non-woody vegetation like cattail or sawgrass).

The study area is located within the USFWS consultation area for the snail kite; however, there is no suitable foraging or nesting habitat within the study area. Although there is freshwater marsh within the study area, it does not contain the characteristic low vegetation and consistent water level required by the snail kite for nesting. Additionally, no apple snails, apple snail eggs, or snail kites were observed during field reconnaissance and the species has not been documented within one mile of the study area. Thus, the project will have ***no effect*** on the Everglade snail kite.

Florida grasshopper sparrow

The Florida grasshopper sparrow is listed as endangered by USFWS and FWC. This small bird species has a pale median stripe on top of its flattened head, and a light brown breast. The diet of the grasshopper sparrow primarily consists of grasshoppers and seeds. Florida grasshopper sparrows inhabit dry open prairies that contain bunch grasses, low shrubs, and saw palmetto. They are endemic to Florida and can be found in south-central Florida in the counties of Polk, Osceola, Highlands, and Okeechobee; however, this species is currently believed to be found almost exclusively in the Kissimmee Prairie.

The study area is located within the USFWS consultation area for the Florida grasshopper sparrow; however, there is no suitable foraging or nesting habitat within the study area. Additionally, no grasshopper sparrows were observed during field reconnaissance and the species has not been documented within one mile of the study area. Thus, this project will have ***no effect*** on the Florida grasshopper sparrow.

Florida scrub-jay

The Florida scrub-jay (scrub-jay) is listed as threatened by USFWS and FWC. Scrub-jays are similar in size and shape to their relative, the blue jay, but they differ strikingly in color pattern and exhibit subtle markings as opposed to the blue jay. They have a pale blue head, nape, wings and tail and are pale gray on the back and belly. The Florida scrub-jay is a non-migratory species and is relatively sedentary and rarely sustains a flight of more than a kilometer. This species prefers low growing oak scrub habitats, including sand pine and scrubby flatwoods. Optimal habitat includes scrub oak with most of the oaks and other shrubs limited to ~3-12 feet in height, interspersed with numerous small patches of bare sand. Fire is a frequent natural event in scrub habitats and serves to maintain the habitat. Fire suppression and development of the habitat has made this species vulnerable to extinction.

There is marginal scrub habitat within the pine flatwoods of the study area; however, no scrub jays were observed during field reconnaissance and the species has not been documented within one mile of the study area. Surveys would be required to determine presence or absence of the scrub-jay. Coordination with USFWS may be required to address impacts to scrub-jay habitat, if scrub-jays are observed. This project ***may affect, but is not likely to adversely affect,*** the Florida scrub-jay.

Red-cockaded woodpecker

The red-cockaded woodpecker (RCW) is listed as endangered by USFWS and FWC. The RCW is a black and white bird that can reach lengths of 9 inches and a weight of 1.8 ounces. RCWs have a large white patch located on their cheek, a black head and neck, a white belly, and a barred black and white back. The red-cockade, which is only found on the male, consists of a small red streak above the cheek and is rarely visible. RCWs inhabit open, mature pine woodlands that have a diversity of grass and shrub species. Preferred habitat includes longleaf pine flatwoods in north and central Florida and mixed longleaf pine and slash pine in south-central Florida. The RCW creates cavities within the longleaf pine tree and relies on the tree's production of resin to protect them from predators. Development of longleaf pine habitat

as well as fire exclusion in this fire-dependent ecosystem has led to a large decrease in populations of RCWs.
The study area is located within the USFWS consultation area for the RCW; however, habitat for the RCW does not occur within the study area. Additionally, no RCWs were observed during field reconnaissance and the species has not been documented within one mile of the study area. Thus, the project will have ***no effect*** on the red-cockaded woodpecker.

Wood stork
The wood stork is listed as threatened by USFWS and FWC. The wood stork is a large, long legged wading bird that reaches a length of 35 to 45 inches with a wingspan of 60 to 65 inches. The primary and tail feathers are black. The head and upper neck of adult wood storks have no feathers but have gray rough scaly skin. Wood storks also have a black bill and black legs with pink toes. Wood storks are typically found in marshes, cypress swamps, and mangrove swamps, but their presence in artificial ponds, seasonally flooded roadside or agricultural ditches, and managed impoundments has become common. Wood stork breeding areas extend from South Florida through Georgia and along the coastal areas of South Carolina. Large, colonial nesting areas are typically established in swamps or islands surrounded by broad, open water areas. The same colony site may be used over many years, provided the site remains undisturbed and sufficient foraging habitat is available. Wood storks are known to nest with other wading bird species, including white ibis, tricolored herons, snowy egrets, and great blue herons. Foraging habitat consists of nearly any calm, shallow water area (between 4 and 10 inches) or wetland depression that concentrates fish and is not overgrown with dense, aquatic vegetation. Some examples of foraging habitat include freshwater marshes, stocked ponds, shallow ditches, narrow tidal creeks, shallow tidal pools, and depressional areas of cypress heads and swamp sloughs.

No wood storks were observed during field reconnaissance and the species has not been documented within one mile of the study area; however, there is suitable foraging habitat within the wetlands in the study area and the study area is within the core foraging area of the Gatorland nesting colony. If impacts to suitable foraging habitat exceed 0.50-acre, mitigation may be required. In accordance with the *USFWS Wood Stork Effect Determination Key* (May 18, 2010), and with the implementation of mitigation, it has been determined that the project ***may affect, but is not likely to adversely affect,*** the wood stork (see **Appendix A** for key path steps to this determination).

Reptiles

American alligator
The American alligator is listed as threatened by USFWS and FWC due to similarity of appearance to other imperiled crocodilians. The alligator is a large aquatic reptile that has a broad, rounded snout with no lower teeth visible when their jaws are closed. The species is found statewide in wetland habitats, including freshwater marshes, swamps, lakes, and rivers and is most active from spring to fall, with nesting in late spring and hatchlings emerging in the summer. Females require grassy marsh to build their mounded nest out of soil, vegetation, debris, and deposits.

Suitable wetland habitats are available within the study area; however, no alligators were observed during field reconnaissance and the species has not been documented within one mile of the study area. This project ***may affect, but is not likely to adversely affect,*** the American alligator.

Eastern indigo snake

The eastern indigo snake is listed as threatened by USFWS and FWC. This species is a very large, stout-bodied, shiny black snake and is widespread but uncommon in Florida. In south Florida, preferred habitat for the eastern indigo snake includes a diverse assemblage including pine flatwoods, scrubby flatwoods, floodplain edges, sand ridges, dry glades, tropical hammocks, edges of freshwater marshes, muckland fields, coastal dunes, and xeric sandhill communities (*Eastern Indigo Snake Programmatic Effect Determination Key (South Florida) – Revised July 2017*). Eastern indigo snakes are often found in strong association with gopher tortoises, though this is more prevalent where temperatures drop to below 50 degrees regularly in the winter but are also known to use the burrows of armadillos, cotton rats, and land crabs (in coastal areas). These snakes require large tracts of land for survival and are typically restricted to xeric habitats on pine-oak sandhills. Indigo snakes forage in hydric habitats, often along wetland ecotones.

Suitable habitats, such as xeric oak and hydric habitats, were documented within the study area; however, no indigo snakes were observed during field reconnaissance and the species has not been documented within one mile of the study area. Impacts will likely not exceed 25 acres, therefore according to the *Eastern Indigo Snake Programmatic Effect Determination Key (South Florida) – Revised July 2017*, with utilization of the *Standard Protection Measures for the Eastern Indigo Snake* during construction, this project ***may affect, but is not likely to adversely affect,*** the eastern indigo snake (see **Appendix A** for key path steps to this determination).

Florida sand skink and blue-tailed mole skink

The sand skink and blue-tailed mole skink are listed as threatened by USFWS and FWC. The sand skink is a small, slender, grey to light brown lizard with shiny scales that can reach a length of five inches and the bluetail mole skink is a small lizard with a brownish body with a blue tail that can reach five inches in length. The bluetail mole skinks tail may become pink or orange when an individual gets older or when the tail is regenerated. Skinks typically inhabit scrub, sandhill, and xeric hammock habitats located along the central ridge of Florida, from Putnam to Highlands County. Skinks are found at elevations above 82 feet and utilize twenty-eight (28) distinct soil types of which the following occur within the study area: Basinger fine sand, Candler sand, Immokalee fine sand, Placid fine sand, Pomello fine sand, Pompano fine sand, Smyrna fine sand, and Tavares fine sand.

The study area is located within the USFWS consultation area for both skink species and contains suitable soils; however, no skinks or signs of skinks were observed during field reconnaissance and the species has not been documented within one mile of the study area. USFWS may require cover board surveys, which typically are conducted during the design and permitting phase of a project. If occupied skink habitat will be impacted, mitigation at a 2:1 ratio will be required and would entail purchasing species mitigation credits at an approved conservation bank. From the results of the pedestrian survey and the identification of suitable habitat, it is anticipated that the project ***may affect, but is not likely to adversely affect,*** skinks.

3.7.6.1.2 State Listed Fauna

Birds

Florida sandhill crane

The Florida sandhill crane is listed as threatened by the FWC. This species a tall grey bird with a red forehead, and long neck and legs. The Florida sandhill crane is non-migratory and inhabits open grasslands, freshwater marshes, swampy edges of lakes and ponds, riverbanks, prairies, pasture lands and

occasionally pine savanna throughout the state. Florida sandhill cranes typically start nesting on the margins of marshes and wet grasslands in late December and continue into June. The nests are built by both adults and generally consist of sticks, reeds, grasses and mosses. Sandhill cranes are omnivorous and have been known to feed on seeds, grains, berries, insects, earthworms, mice, small birds, snakes, lizards, frogs, and crayfish.

There is limited nesting habitat within the study area; however, no nests were observed. Additionally, no sandhill cranes were observed during field reconnaissance and the species has not been documented within one mile of the study area. An updated review for potential nests for this species should be conducted during the design and permitting phase to determine if any nests exist within the proposed limits of construction or within 400-feet from the limits of construction. If a nest exists within the construction limits, further coordination with FWC will be required. Based on this information, it has been determined that ***no adverse effect is anticipated*** for the Florida sandhill crane.

Little blue heron

The little blue heron is listed as threatened by the FWC. This species is a small, slate-blue, wading bird. Little blue herons inhabit fresh, salt, and brackish water environments in Florida including swamps, estuaries, ponds, lakes, and rivers. This species diet primarily consists of fish, insects, shrimp, and amphibians and they forage in shallow marine, brackish, or freshwater areas, including tidal ponds, sloughs, marshes, and human-created impoundments. It nests in colonies with other wading birds in woody trees and shrubs on islands, thickets near water, or emergent vegetation over water.

There is limited nesting habitat within the study area; however, no nests were observed. Additionally, no little blue herons were observed during field reconnaissance and the species has not been documented within one mile of the study area. Additional coordination with FWC regarding the little blue heron is recommended during the design and permitting phase to determine what survey and/or mitigation requirements may be applicable to the project, if any. Based on this information, it has been determined that ***no adverse effect is anticipated*** for the little blue heron.

Southeastern American kestrel

The southeastern American kestrel (kestrel) is listed as threatened by the FWC. The kestrel is the smallest falcon in United States. The male kestrel has blue-gray wings, while the female is larger and has more uniformly rufous back and wings. Both sexes have a mustached black-and white facial pattern with strong perpendicular lines extending below the eye and ear, and a black band at the base of the rufous tail. The alarm call is highly distinguishable and given frequently in flight.

The kestrel's range is limited by a combination of nest and perch site availability, food supply and suitable foraging habitat. Kestrels require all these elements in close proximity. Kestrels are secondary cavity nesters using abandoned woodpecker cavities and typically nest in open pine habitats, woodland edges, prairies, and pastures throughout much of Florida. Nest sites are in tall dead trees or utility poles generally with an unobstructed view of surroundings. Sandhill habitats seem to be preferred, but kestrels have been observed in flatwoods settings. Open patches of grass or bare ground are necessary for kestrels to effectively utilize flatwoods settings, since thick palmettos may prevent detection of prey.

Habitat for the southeastern American kestrel is located throughout the study area. Cavity trees were not observed during field reconnaissance and no kestrels were observed. Additionally, there are no documented occurrences of the species within one mile of the study area. A review of potential habitat

for foraging and nesting is recommended in the design and permitting phase as this is a highly mobile species. If potential habitat is present, surveys should be completed during the appropriate months (April through August). Mitigation may be required to replace any nest sites impacted by construction. Based on this information, it has been determined that ***no adverse effect is anticipated*** for the southeastern American kestrel.

Tricolored heron

The tricolored heron is listed as threatened by the FWC. This species has a dark slate-blue colored head and upper body, a purple chest, and white underparts. Tricolored herons inhabit fresh and saltwater marshes, estuaries, mangrove swamps, lagoons, and river deltas. This species diet primarily consists of fish, insects, shrimp, and amphibians and they forage in shallow marine, brackish, or freshwater areas, including tidal ponds, sloughs, marshes, and human-created impoundments. It nests in colonies trees or shrubs on salt marsh islands or standing water.

There is limited nesting habitat within the study area; however, no nests were observed. Additionally, no tricolored herons were observed during field reconnaissance and the species has not been documented within one mile of the study area. Additional coordination with FWC regarding the tricolored heron is recommended during the design and permitting phase to determine what survey and/or mitigation requirements may be applicable to the project, if any. Based on this information, it has been determined that ***no adverse effect is anticipated*** for the tricolored heron.

Reptiles

Gopher tortoise

The gopher tortoise is listed as threatened by FWC. Gopher tortoises range throughout the southeastern United States and occur in suitable upland habitats in parts of all Florida counties. The gopher tortoise excavates extensive underground burrows and spends much of its life in these burrows. Gopher tortoise habitat typically includes well drained, sandy soils, abundant groundcover, relatively open canopy, and sparse shrub cover.

These habitat characteristics occur in a variety of Florida's native upland communities, including scrub communities, coastal strand, and pine flatwoods. Development pressures on many of the upland communities in Florida have been increasing, resulting in suboptimal habitat such as fence rows, old fields, range lands, and canal banks providing for a higher potential for gopher tortoises occupancy.

Habitat for this species was observed within the study area and one gopher tortoise burrow was observed during field reconnaissance (see **Exhibit 3-15**); therefore, an updated survey is recommended prior to construction. If gopher tortoise burrows are observed and cannot be avoided, a FWC gopher tortoise relocation permit will be required. A gopher tortoise relocation permit allows the permittee to relocate gopher tortoises found onsite to a protected approved recipient site by an authorized agent per the *FWC Gopher Tortoise Permitting* Guidelines (April 2008, revised July 2020). Since gopher tortoise burrows located within 25 feet of the project will be relocated as stipulated in the FWC permitting guidelines for this species, it has been determined that ***no adverse effect is anticipated*** for the gopher tortoise.

Florida pine snake

The Florida pine snake is listed as threatened by FWC. This species is a large, stocky, tan or rusty colored snake with an indistinct pattern of large blotches on a lighter background. This snake is found throughout

the state, excluding the Florida Keys, the Everglades, extreme southwest Florida, and immediately north of Lake Okeechobee. It is found most often in open, pine-turkey oak woodlands and abandoned fields, along with scrub, sandhills, and longleaf pine forest, as it requires dry sandy soils for burrowing. Florida pine snakes spend most of their time underground in pocket gopher or gopher tortoise burrows.

Habitat for this species was observed within the study area; however, no pine snakes were observed during field reconnaissance and the species has not been documented within one mile of the study area. Based on this information, it has been determined that ***no adverse effect is anticipated*** for the Florida pine snake.

3.7.6.2 LISTED PLANT SPECIES

The Florida Department of Agriculture and Consumer Service's *Notes on Florida's Threatened and Endangered Plants*, and Richard Wunderlin's *Guide to Vascular Plants of Florida*, were consulted to assess habitat requirements for listed species. Based on the available habitats, state and federally listed plant species have the potential to occur within the study area; however, limited suitable habitat is present and no listed plants were observed during the field review. As previously mentioned, four plant species have been documented near the study area. These species include Small's jointweed, Florida bonamia, scrub buckwheat, and Britton's beargrass. Therefore, this project ***may affect, but is not likely to adversely affect,*** these plant species. A determination of ***no effect*** has been made for the remaining state and federally listed plant species.

3.7.6.3 NON-LISTED SPECIES

<u>Florida Black Bear</u>

The Florida black bear was removed from the FWC list of state-threatened species in August 2012; however, the Florida black bear remains protected under other rules and regulations, primarily through the Florida Black Bear Conservation Rule 68A-4.009 (FAC) and the FWC Florida Black Bear Management Plan. Based on these regulations, pursuing, hunting, molesting, capturing, killing, or attempting those actions, whether or not such actions result in possession of the bear is unlawful. In addition, Rule 68A-4.009, FAC, generally prohibits anyone from possessing, injuring, shooting, wounding, trapping, collecting, or selling bears or their parts or attempting to engage in such actions without prior authorization from FWC. Black Bear Management Units (BMU) have also been established based on the seven geographically distinct bear subpopulations in Florida. The study area is located within the South Central BMU. Specifically, according to FWC, black bears occasionally occur in the study area.

Black bears are adaptable and inhabit a variety of forested habitats including seasonally inundated pine flatwoods, tropical hammocks, hardwood swamps and xeric sand pine-scrub oak communities. Based on a review of GIS databases, there are no reported bear telemetry, nuisance reports, or road kills within the study area. Habitat for this species was observed within the study area and the species has been documented within one mile of the study area; however, no black bears were observed during field reconnaissance. Consistent with the June 2012 FWC Black Bear Management Plan, garbage and food debris will need to be properly removed during construction to eliminate possible sources of food that could encourage and attract bears. Nuisance bears will be reported to the FWC at the Wildlife Alert Hotline at 1-888-404-3922. This project will have no adverse impacts on this species

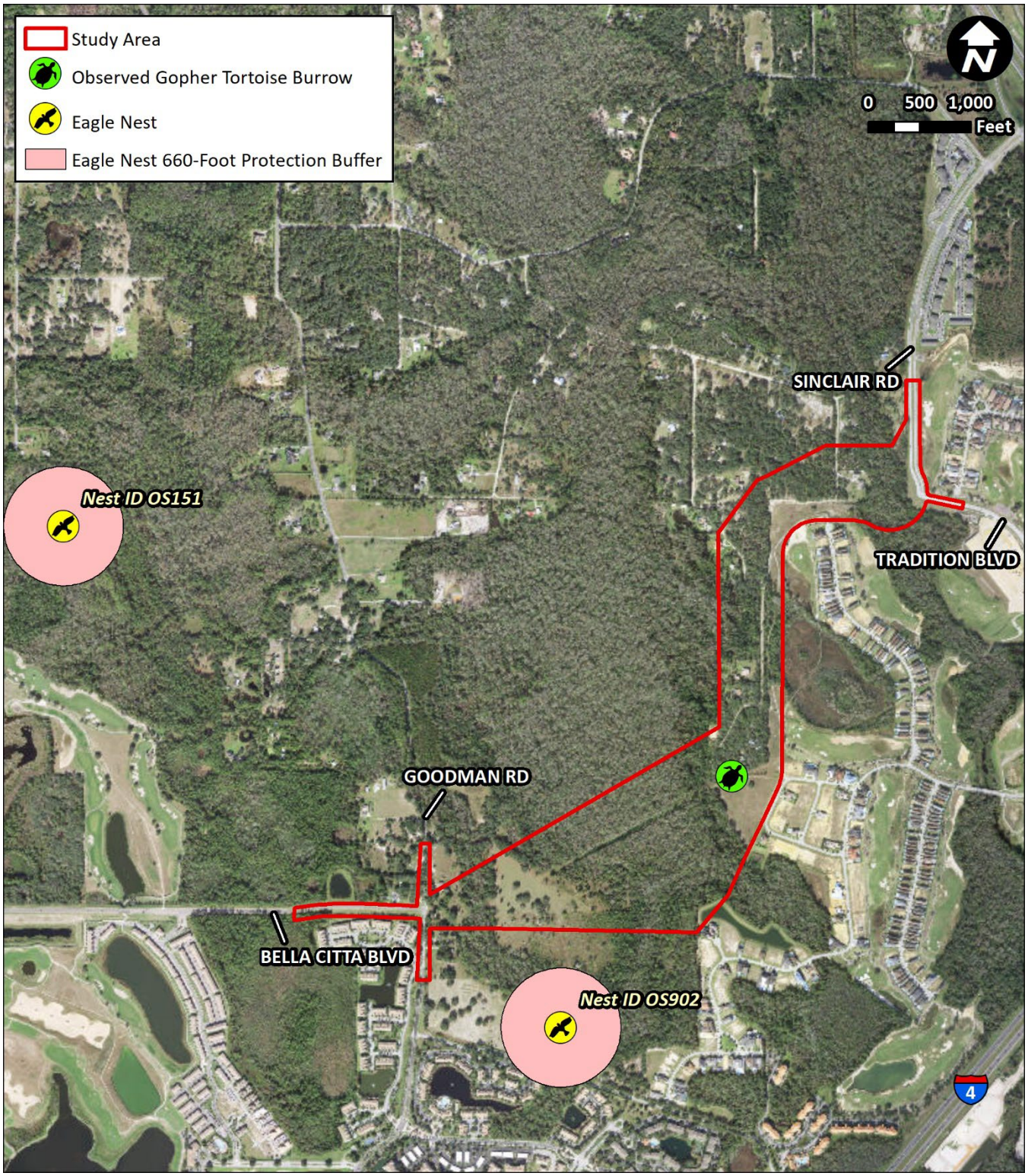
<u>Bald Eagle</u>

As of 2008, the bald eagle is no longer listed by the USFWS or FWC. Bald eagles are still protected under the Bald and Golden Eagle Protection Act, Migratory Bird Treaty Act, and FWC's bald eagle rule (FAC 68A-

16.002). Eagles usually nest in tall trees (mostly live pines) in proximity to bays, rivers, lakes, or other bodies of water that provide concentrated prey availability and clear views of the surrounding area. Habitat for this species was observed within the study area; however, no bald eagles were observed during field reconnaissance. Based on the Audubon Florida EagleWatch Public Nest App, two nests are located within one mile of the study area. Nest IDs OS231 and OS151 are located approximately 0.16 mile south and 0.9 mile northwest of the study area, respectively (see **Exhibit 3-15**). The study area is outside of the FWC-recommended 660-foot bald eagle nest protection buffer. This project will have no adverse impacts on this species.

During the design and permitting phase, a review of the potential bald eagle nesting habitat is recommended to confirm no new nests have been built. If impacts to an active bald eagle nest are anticipated a permit may be required.

Exhibit 3-15: Protected Species



3.8 PHYSICAL

3.8.1 AIR QUALITY

This project is not expected to create adverse impacts on air quality because the project area is in attainment for all National Ambient Air Quality Standards (NAAQS) and because the project is expected to improve the LOS on connecting roadways and reduce delay and congestion on all facilities within the study area. Construction activities may cause short-term air quality impacts in the form of dust from earthwork and unpaved roads. These impacts will be minimized by adherence to applicable state regulations and to the latest edition of *Florida Department of Transportation (FDOT) Standard Plans*. For these reasons, no substantial impacts to air quality are anticipated as a result of the proposed project.

3.8.2 CONTAMINATION

Four sites have been identified that are considered to pose a potential "Low" environmental risk rating and all areas of historical citrus groves were identified as "Low to Medium" per FDOT Contamination Screening Evaluation Report criteria based on review of current and historical topographical and aerial maps, historical directories, and associated FDEP online databases information as follows:

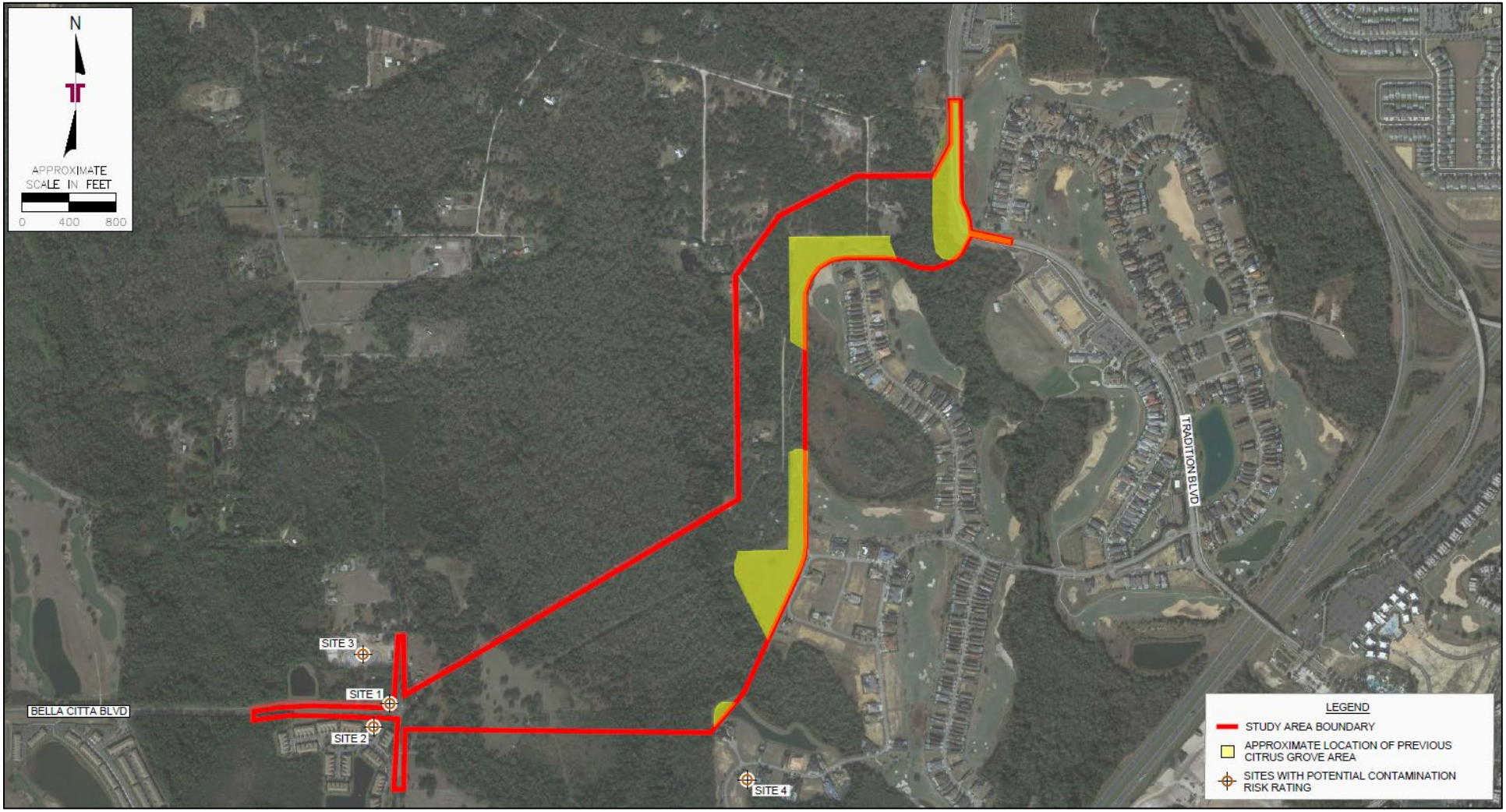
1. Edward R. Rutledge Site: This facility formerly utilized two aboveground storage tanks (ASTs), consisting of one 500-gallon leaded gasoline AST and one 250-gallon diesel AST. The installation dates are unknown; however, the tank registration documents indicate that the tanks were removed in 1988. FDEP notes indicate that the tanks are non-regulated due to their size. No discharge or regulatory compliance issues have been reported. This site is regarded as a Low-Risk site.
2. Former Fertilizer Storage Area/Champions Gate Golf Course: The facility was formerly utilized by Champions Gate Golf Course as a fertilizer storage area. Soil and groundwater assessment activities were conducted as part of environmental due diligence prior to site acquisition for a residential development. Ammonia was identified in the soil and groundwater and a discharge was reported to FDEP in 2003. Subsequent site assessment activities and soil source removal was completed. The facility was granted a Site Rehabilitation Completion Order (SRCO) in August 2008. The site is currently developed with a multi-family residential development. This site is regarded as a Low-Risk site.
3. TWA Western Reuse Storage & Pumping Facility: The facility is registered with a 4,200-gallon AST belly tank for an emergency generator installed at the facility in June 2021. No discharge or regulatory compliance issues have been reported. This site is regarded as a Low-Risk site.
4. Residence at 1245 Grand Traverse Parkway: The residence at 1245 Grand Traverse Parkway is identified by EDR as having an ethylene dibromide (EDB) contamination concern. EDB is an agricultural pesticide used to control nematodes in citrus groves. The Florida Department of Agriculture and Consumer Services (FDACS) conducted widespread applications of EDB between 1962 to 1980. In 1983, the FDEP began testing groundwater in potable wells throughout Florida due to the discovery of EDB in wells in other states. FDEP implements the Delineated Areas Program under Chapter 62-524, FAC to protect public health and groundwater resources by regulating potable water well construction and testing standards for areas of known groundwater contamination. The EDB delineated areas are potable wells, agricultural or residential, with confirmed impacts were shown on the website with a 1,000-foot buffer zone in an attempt to

project future migration of contaminants. However, based on review of the FDEP Map Direct website, no EDB-delineated areas exist within 1,000 feet of the study area. This site is regarded a Low-Risk site.

5. Historical Citrus Grove Areas: Areas of citrus grove cultivation within the study area are illustrated on **Exhibit 3-16**. Historical aerials indicate the presence of citrus groves from at least 1957 to 2007. Historic citrus groves present a potential environmental risk due to the possible use of herbicides and pesticides. Although pesticide and herbicide application are generally applied in accordance with manufacturer recommendation, many products contain arsenic which tend to accumulate in certain soil conditions and potentially creating a potential risk by binding with the soils, or potentially infiltrating into the groundwater. Soil chemistry is complex in relation to arsenic accumulation in the soil or if arsenic has a potential to release or leach to the groundwater from potential past long-term use of pesticides, herbicides and related heavy metal components contained in agricultural products. Storage sheds which may have housed chemicals were not observed on aerial images in the historical grove areas. The citrus groves are no longer present as observed during site reconnaissance on April 13, 2023. Additionally, a residential development was constructed on the east side of the study area in the footprint of the historical citrus grove area. This involved the clearing and filling of affected areas beginning in 2005. Based on the clearing and redevelopment of this area, the historical citrus grove activity is considered a Low-Risk site.

The potential contamination sites are displayed on **Exhibit 3-16**.

Exhibit 3-16: Potential Contamination Sites



3.8.3 UTILITIES

Through coordination with Sunshine 811, twelve utility providers were identified as having utilities within the study area. **Table 3-15** provides a list of the utility providers and a general description of existing facilities.

Based on information from existing right-of-way maps and property appraiser information, several utilities are located within easements along the study area. Utility providers that have facilities identified in easements include Florida Gas Transmission (FGT) and common utility easements for service to structures. Since relocation of facilities located in easements would likely be eligible for reimbursement, all measures will be taken to avoid impacting facilities identified in lands of compensable interest. Utility coordination should be performed during the final design phase of the project to clearly identify all utility easements and potential reimbursable relocations on the project.

Table 3-15: Existing Utilities in the Study Area

Utility Agency/Owner	Description of Facilities
CenturyLink	• Primarily buried Fiber at Bella Citta Boulevard and Sinclair Road with aerial phone attached to Duke's pole
Charter Communications	• Aerial CATV on Duke's pole line with buried services throughout the project
Comcast Communications	• Aerial CATV on Duke's pole line with buried services throughout the project
Duke Energy - Distribution	• Overhead distribution electric along the north side of Bella Citta Boulevard • Buried electric line along the east side of Bella Citta Boulevard
FGT	• 18" high pressure pipeline in a 50-foot easement from south of Bella Citta Boulevard and continues northeast and crosses Tradition Boulevard south of Sinclair Road
Florida Public Utilities	• Distribution gas along the south side of Bella Citta Boulevard
OUC - Lighting	• Decorative lighting along both sides of Sinclair Road
Summit Broadband	• Primarily buried Fiber at Bella Citta Boulevard and Sinclair Road with aerial phone attached to Duke's pole
TECO Peoples Gas	• Distribution gas along the east side of Sinclair Road
TOHO Water Authority	• Water, reclaimed, and force main located on the north side of Bella Citta Boulevard • 24" DIP water main along the east side of Sinclair Road • 10" PVC force main and 12" PVC reclaimed water on west side of Sinclair Road
Uniti Fiber	• Primarily buried Fiber at Bella Citta Boulevard and Sinclair Road with aerial phone attached to Duke's pole
Zayo Group	• Primarily buried Fiber at Bella Citta Boulevard and Sinclair Road with aerial phone attached to Duke's pole

3.8.4 RAILROADS

There are no railroads located within the study area.

3.8.5 CONSTRUCTION

Construction activities for the proposed improvements will have temporary air, noise, water quality, traffic flow, and visual impacts for those residents and travelers within the immediate vicinity of the project. The air quality impact will be temporary and will primarily be in the form of emissions from diesel powered construction equipment and dust from embankment and haul road areas. Air pollution associated with the creation of airborne particles will be effectively controlled using watering or the application of calcium chloride in accordance with FDOT's *Standard Specifications for Road and Bridge Construction.*

The contractor will adhere to the current version of FDOT's *Standard Specifications for Road and Bridge Construction* to minimize or eliminate potential construction noise and vibration impacts.

Water quality impacts resulting from erosion and sedimentation will be controlled in accordance with FDOT's *Standard Specifications for Road and Bridge Construction*. To prevent point source discharge BMPs will be used during construction and a stormwater pollution prevention plan will be developed and implemented prior to development.

Maintenance of Traffic (MOT) and Sequence of Construction will be planned and scheduled to minimize traffic delays throughout the project. Signs will be used as appropriate to provide notice of lane closures and other pertinent information to the traveling public.

3.8.6 BICYCLES AND PEDESTRIANS

East of the study area, Sinclair Road has a 4-foot sidewalk on the east side of the roadway. West of the study area, Bella Citta Boulevard has a 5-foot sidewalk on the north side of the roadway. There is a 10-foot-wide multi-use trail along the south side of Tradition Boulevard. There is a 5-foot sidewalk on the west side of Goodman Road, south of Bella Citta Boulevard.

East of the study area, Sinclair Road has no bicycle facilities. West of the study area, Bella Citta Boulevard has a 4-foot bicycle lane in the westbound direction. There is a 10-foot-wide multi-use trail along the south side of Tradition Boulevard.

3.8.7 NAVIGATION

There are no navigable waterways affected by the proposed project and thus, the project will have no involvement with navigation.

4.0 PROJECT DESIGN CONTROLS AND CRITERIA

4.1 ROADWAY CONTEXT CLASSIFICATION

The roadway context classification for Sinclair Road Extension was established by Osceola County as C3R-Suburban Residential from Goodman Road to S. Old Lake Wilson Road.

4.2 ROADWAY DESIGN STANDARDS

Design and construction criteria for the proposed improvement, at a minimum, shall meet all County standards for the design of such roadways and *A Policy on Geometric Design of Highways and Streets*, 6th edition, AASHTO, 2011. The recommended standard practices as set forth in the FDOT Design Manual, the FDOT Standard Plans, and the FDOT Florida Greenbook, were considered.

The design criteria described in **Table 4-1** was used in the development of alternatives.

Table 4-1: Minimum Design Criteria Matrix

Design Element	Urban Section 35 MPH Design Speed	Source
General		
Context Classification	C3R	County
County Roadway Classification System	Planned Avenue	County
Access Classification	6 (2-lane) 5 (4-lane)	County Table 201.4.2 [1]
Posted Speed	35 MPH	County
Design Speed	35 MPH	County
Design Year	2045	County
Roadway Cross Section		
Lane Width	10 ft (minimum)	Table 3-20 [2]
Bike Lane Width	4 ft	Ch. 9, B.1 [2]
Shared Use Path Width	10 ft	Ch. 9, C.1 [2]
Minimum Lateral Offset	4 ft from face of curb	Table 4-2 [2]
Median Width	22 ft	Table 3-23 [2]
	15.5 ft – constrained right-of-way	Table 3-23 [2]
Sidewalk Width	5 ft	Ch. 8, B.1 [2]
Cross Slope	0.02	Ch. 3, C.7.b.2 [2]
Curb and Gutter (Edge)	Type F	Ch. 3, C.7.g [2]
Curb and Gutter (Median)	Type E	Ch. 3, C.7.g [2]
Horizontal Alignment		
Minimum Length of Curve	525 ft	Table 3-8 [2]
Maximum Curvature Radius @ e=NC	1,146 ft	Table 3-11 [2]
Vertical Alignment		
Maximum Grade	9%	Table 3-16 [2]
Minimum Distance Between VPI's	250 ft	210.10.1.1 [1]
Minimum Grade	0.30%	Ch. 5, C.5.b [2]
Vertical Curve K Values	K = 29 (Crest)	Table 3-18 [2]
	K = 49 (Sag)	Table 3-18 [2]
Minimum Length of Vertical Curves	105 ft (Crest)	Table 3-18 [2]
	105 ft (Sag)	Table 3-18 [2]

Note:

[1] FDOT Design Manual, 2023, Florida Department of Transportation

[2] Florida Greenbook, 2018, Florida Department of Transportation

4.3 DRAINAGE DESIGN STANDARDS

The design of the stormwater facilities will comply with the standards set forth by SFWMD and Osceola County. An ERP will need to be acquired from SFWMD during the design of this project.

4.3.1 WATER QUALITY CRITERIA

Standard treatment measures per Section 4.2.1 of the 2016 SFWMD ERP Applicant's Handbook Volume II, wet detention volume shall be provided for the first inch of runoff from the developed project, or the total runoff of 2.5 inches times the percentage of imperviousness, whichever is greater. Proposed offsite ponds are assumed to be wet detention due to the apparent high SHWL throughout the corridor.

In coordination with SFWMD, it has been determined that if the project does not directly discharge to an OFW or an impaired waterbody, only standard treatment measures are required, and no nutrient loading calculations are required. This determination includes projects located within the Lake Okeechobee BMAP.

Since this is a preliminary analysis for pond sizing capacity, recovery calculations for orifice sizing, and permanent pool calculations are not included in the pond sizing considerations.

4.3.2 WATER QUANTITY CRITERIA

Per Section 5.2.2 of the 2023 FDOT Drainage Manual, the design must comply with state, water management district, and – when delegated by the state – local government stormwater management programs.

Per Section 3.2 of the 2016 SFWMD ERP Applicant's Handbook Volume II, off-site discharge rate is limited to rates not causing adverse impacts to existing off-site properties, and: (a) Historic discharge rates; or (b) Rates determined in previous Agency permit actions; or (c) Rates specified in District criteria. The project area does not discharge to any locations with rates specified in District criteria.

Per Section 3.3 of the 2016 SFWMD ERP Applicant's Handbook Volume II, unless otherwise specified by previous Agency permits or criteria, a storm event of three-day duration and 25-year return frequency shall be used in computing off-site discharge rates. Applicants are advised that local drainage districts or local governments may require more stringent design storm criteria. For this project, the local government criteria of Osceola County will govern, and the design storm event will be the 10-year/72-hour storm event.

4.3.3 FLOODPLAIN COMPENSATION CRITERIA

The SFWMD will require cup-for-cup floodplain compensation between the 100-year elevation and estimated average wet season water table, and this volume can be provided within the proposed stormwater ponds.

For this project, floodplain impacts were identified at five locations along the corridor for which compensation will be required up to the 100-year floodplain elevation.

4.3.4 POND GEOMETRY CRITERIA

Wet and dry detention ponds were sized for Sinclair Road based on available seasonal high water elevation information and research of existing permits. Dimensions include 0.5-acre minimum surface area at the control elevation and the pond bottom shall be a minimum of 12 feet below the control elevation. Side slopes shall not be steeper than 1:4 to 3 feet below the control elevation and no steeper than 1:2 to the pond bottom, with a 10-foot-wide minimum berm. One foot of freeboard above the Design High Water (DHW) to the inside berm shall be maintained. Side slopes and berms shall be sodded.

5.0 ALTERNATIVES ANALYSIS

5.1 PREVIOUS PLANNING STUDIES

The roadway currently referred to as Sinclair Road Extension has been planned for since the early 1990's. The development currently called Reunion Resort and Club (formerly known as Magnolia Creek) is a Development of Regional Impact (DRI) and went through multiple rounds of regional review and approvals. The DRI included a planned road extending from what is now Sinclair Road, southwest to Goodman Road (see E**xhibit 5-1**). Construction plans were developed in the early 2000's; however, after reviewing the plans they were determined to not meet current design standards. Modifications to this alignment resulted in the Blue Alternative, to be described later in this section.

In 2011, Osceola County conducted an extensive analysis to update the Transportation Element of their Comprehensive Plan. This process identified Sinclair Road Extension, from Tradition Boulevard to Goodman Road at Bella Citta Boulevard, as a planned roadway.

Metroplan Orlando has included Sinclair Road Extension in their Cost Feasible Plan as part of their 2045 Metropolitan Transportation Plan.

5.2 NO-BUILD ALTERNATIVE

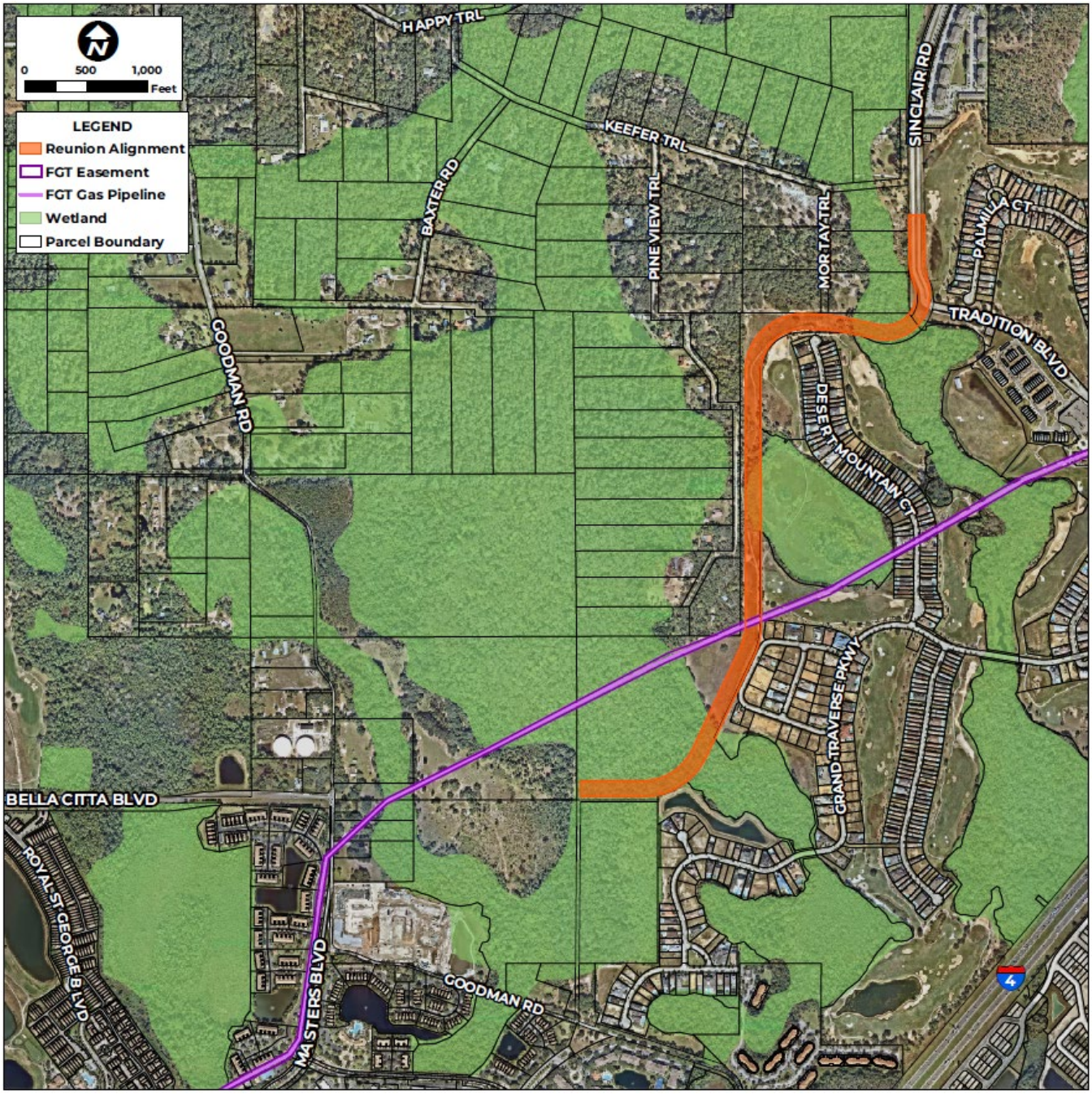
The No-Build Alternative is an option where the proposed project activity (i.e., extending Sinclair Road) would not take place. The No-Build Alternative provides the baseline for establishing environmental impacts of the build alternatives.

5.3 TRANSPORTATION SYSTEM MANAGEMENT AND OPERATIONS ALTERNATIVE

A Transportation System Management and Operations (TSM&O) Alternative generally provides short-term improvements that extend the service life of the facility. TSM&O Alternatives include activities and strategies designed to optimize the performance and utilization of the existing infrastructure through implementation of systems, services, and projects that preserve transportation system capacity and improve security, safety, and reliability. Example TSM&O strategies include upgrades or additions to the existing facility, such as arterial traffic management systems, traffic incident management, work zone traffic management, road weather management, traveler information services, congestion pricing, parking management, traffic control, commercial vehicle operations, transit priority signals systems, and freight management.

The No-Build Alternative already includes providing the maximum number of lanes (through and turn lanes) within the surrounding roadway network; therefore, the existing intersections have already been optimized and the analysis of No-Build conditions is representative of a TSM&O Alternative. The extension of Sinclair Road would be required to provide the needed capacity and transportation demand identified in the purpose and need for the project. Therefore, no standalone TSM&O Alternative was considered; however, TSM&O strategies will be incorporated into the build alternatives.

Exhibit 5-1: Original Reunion Alignment

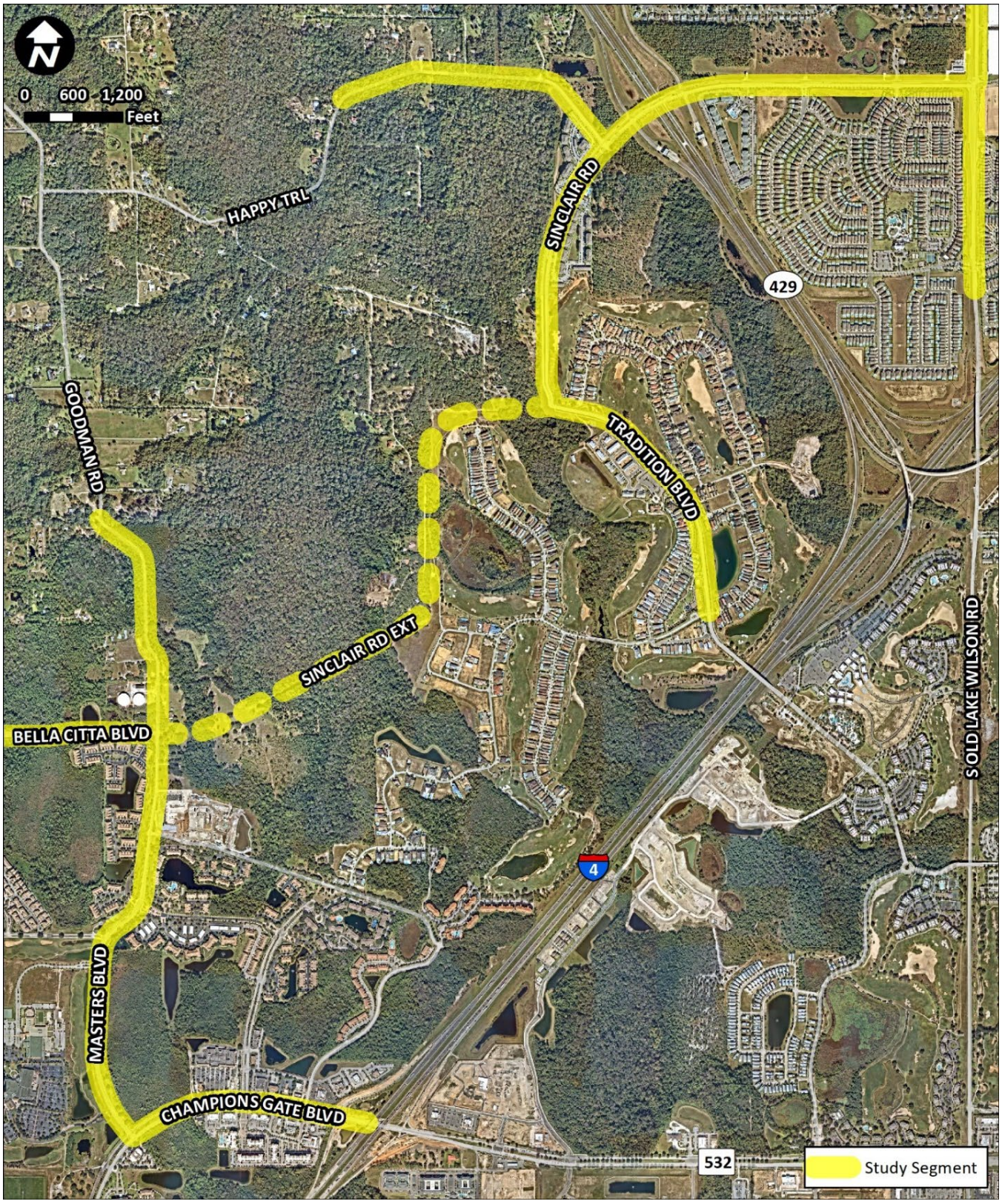


5.4 FUTURE CONDITIONS

A Project Traffic Analysis Report (PTAR), dated December 2022, was prepared to provide design traffic volumes and traffic in support of this study. The PTAR considered existing traffic volumes and patterns, as well as historic trends and future developments. Future traffic demands on Sinclair Road Extension were projected and evaluated for the no-build and build alternatives. A summary of the PTAR findings are provided below with additional details provided in the PTAR.

A roadway level of service (LOS) analysis was performed for the roadway segments within the study area identified on **Exhibit 5-2**.

Exhibit 5-2: Study Roadway Segments



Future Peak Hour Peak Direction (PHPD) volumes were developed by forecasting existing peak hour volumes. Roadway segment characteristics and LOS capacities were obtained from Osceola County's 2020 Roadway Network Capacity Report and FDOT's Generalized Service Volume Tables to identify the projected LOS and volume to capacity (V/C) ratios for each segment.

Under No-Build conditions, Sinclair Road Extension would not be constructed. **Table 5-1** presents the projected 2025 and 2045 No-Build PHPD volumes, V/C, and LOS on select roadways in the vicinity of the project.

Table 5-1: Future (2025 and 2045) No-Build Roadway Segment Performance Summary

Roadway Segment	Lanes	Target LOS Standard	LOS Capacity	Opening Year 2025			Lanes	Target LOS Standard	LOS Capacity	Design Year 2045		
				PHPD	V/C	LOS				PHPD	V/C	LOS
Happy Trail												
west of Sinclair Road	2	E	570	73	0.13	C	2	E	570	680	1.19	F
Tradition Boulevard												
east of Sinclair Road	2	E	570	255	0.45	C	2	E	570	634	1.11	F
Sinclair Road												
east of Goodman Road	-	-	-	-	-	-	-	-	-	-	-	-
north of Tradition Boulevard	4	E	1,680	255	0.15	C	4	E	1,680	634	0.38	D
east of SR 429	4	E	1,680	553	0.33	C	4	E	1,680	976	0.58	D
Bella Citta Boulevard												
west of S Goodman Road	2	E	570	417	0.73	D	4	E	1,280	454	0.35	C
S Goodman Road												
north of Bella Citta Boulevard	2	D	790	339	0.43	C	2	D	790	441	0.56	C
south of Bella Citta Boulevard	2	D	790	670	0.85	C	2	D	790	870	1.10	F
Masters Boulevard												
north of Champions Gate Boulevard	2	D	830	678	0.82	C	2	D	830	936	1.13	F
Champions Gate Boulevard												
east of Masters Boulevard	4	D	1,530	962	0.63	C	4	D	1,530	1,081	0.71	C
S Old Lake Wilson Road												
north of Sinclair Road	4	D	1,760	1,050	0.60	C	4	D	1,760	1,946	1.11	F
south of Sinclair Road	2	D	790	1,204	1.52	F	4	D	1,760	2,356	1.34	F

Over capacity conditions are projected on Happy Trail, Tradition Boulevard, Goodman Road (south of Bella Citta Boulevard), Masters Boulevard and S. Old Lake Wilson Road.

Table 5-2 presents the projected 2025 and 2045 Build PHPD volumes, V/C, and LOS on select roadways in the vicinity of the project.

Table 5-2: Future (2025 and 2045) Build Roadway Segment Performance Summary

Roadway Segment	Target LOS Standard	LOS Capacity	Opening Year 2025			Lanes	Target LOS Standard	LOS Capacity	Design Year 2045		
			PHPD	V/C	LOS				PHPD	V/C	LOS
Happy Trail											
west of Sinclair Road	E	570	72	0.13	C	2	E	570	621	1.09	F
Tradition Boulevard											
east of Sinclair Road	E	570	261	0.46	C	2	E	570	724	1.27	F
Sinclair Road											
east of Goodman Road	-	-	-	-	-	4	E	1,680	942	0.56	D
north of Tradition Boulevard	E	1,680	290	0.17	C	4	E	1,680	1,358	0.81	D
east of SR 429	E	1,680	555	0.33	D	4	E	1,680	997	0.59	D
Bella Citta Boulevard											
west of S Goodman Road	E	570	456	0.80	D	4	E	1,280	772	0.60	D
S Goodman Road											
north of Bella Citta Boulevard	D	790	329	0.42	C	2	D	790	368	0.47	C
south of Bella Citta Boulevard	D	790	666	0.84	C	2	D	790	841	1.06	F
Masters Boulevard											
north of Champions Gate Boulevard	D	830	654	0.79	C	2	D	830	749	0.90	C
Champions Gate Boulevard											
east of Masters Boulevard	D	1,530	955	0.62	C	4	D	1,530	1,037	0.68	C
S Old Lake Wilson Road											
north of Sinclair Road	D	1,760	1,050	0.60	C	4	D	1,760	1,946	1.11	F
south of Sinclair Road	D	790	1,204	1.52	F	4	D	1,760	2,356	1.34	F

With the addition of Sinclair Road Extension, operating conditions improve on Happy Trail, Goodman Road (south of Bella Citta Boulevard), Masters Boulevard, Champions Gate Boulevard, and S. Old Lake Wilson Road (south of Sinclair Road). Traffic volumes on Tradition Boulevard increase, raising the V/C ratio.

While **Table 5-2** shows the projected V/C and LOS for each analysis year, the LOS calculations are based on FDOT generalized service volumes and the intersection analysis presented in the following section are a more accurate representation of anticipated operating conditions.

5.4.1 INTERSECTION DESIGN HOUR VOLUMES

Future Design Hourly Volume (DHV) for Opening Year 2025 and Design Year 2045 were developed as described in the PTAR.

Exhibits 5-3 and 5-4 show the Opening Year 2025 and Design Year 2045 intersection volumes.

Exhibit 5-3: Opening Year (2025) Intersection Turning Movement Volumes

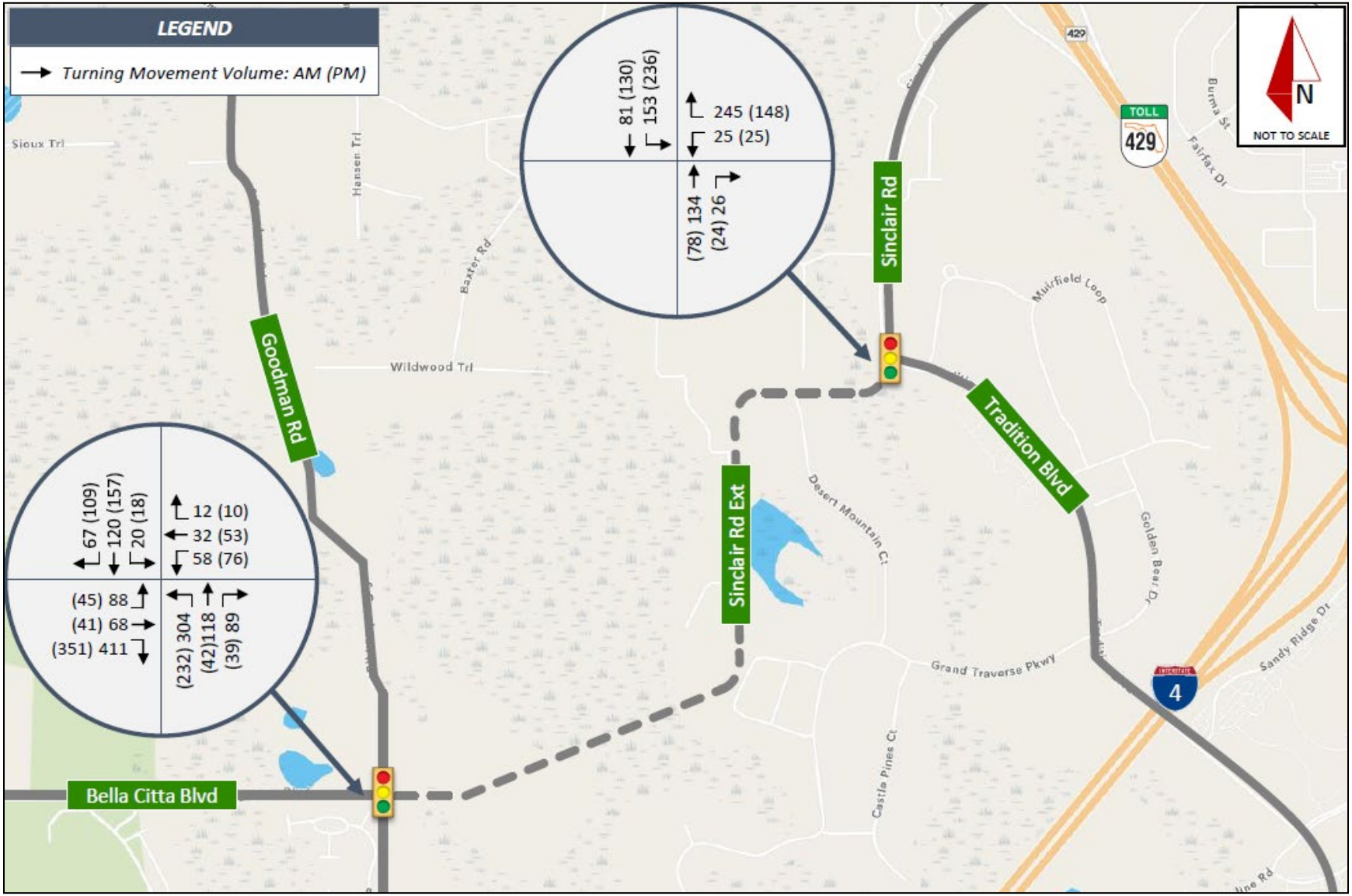
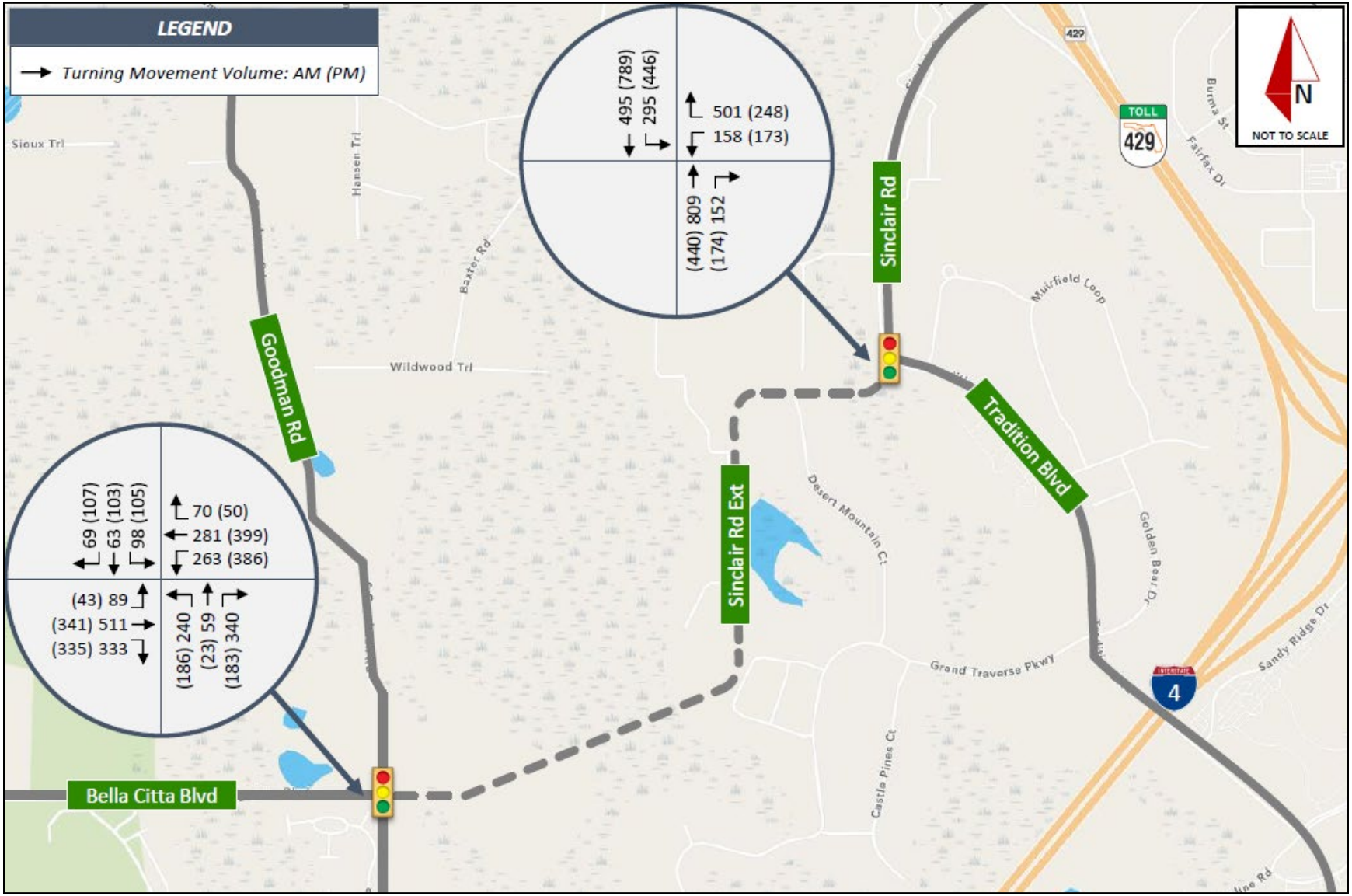


Exhibit 5-4: Design Year (2045) Intersection Turning Movement Volumes



5.4.2 FUTURE ARTERIAL PERFORMANCE MEASURES – BUILD

An arterial performance analysis was performed for the extension of Sinclair Road under the Build conditions for the Opening Year 2025 and Design Year 2045 conditions. The arterial analysis was performed using Synchro (v11) software. Arterial performance measures, such as speed and LOS, are shown in **Table 5-3**. As shown below, the Sinclair Road Extension is anticipated to operate better than the targeted LOS E.

Table 5-3: Arterial Performance Measures Summary

Year / Time Period	Build			
	Speed (mph)		LOS	
	NB/EB	WB/SB	NB/EB	WB/SB
AM Peak Hour				
2025	29	28	B	B
2045	26	27	B	B
PM Peak Hour				
2025	29	27	B	B
2045	27	26	B	B

5.4.3 INTERSECTION LEVEL OF SERVICE ANALYSIS – BUILD

Intersection operational analyses were conducted for AM and PM peak hour conditions for both analysis years, 2025 and 2045. The study intersections were evaluated with multiple control types (unsignalized and signalized) and lane configurations to determine the appropriate intersection configuration needed during the horizon year (2045). The signalized intersection control was selected to evaluate both intersections. The same intersection control was assumed for the Opening Year 2025.

As shown in **Tables 5-4** through **5-7**, all study intersection movements are shown to operate with acceptable LOS (LOS E or better) and V/C ratio less than one (1.0) during the peak hours with the following lane configuration:

Sinclair Road (N/S) and Tradition Boulevard (E/W)

- Northbound: 1 through lane and 1 shared through/right-turn lane
- Southbound: 1 left-turn lane and 2 through lanes
- Westbound: 1 left-turn lane and 1 right-turn lane

Sinclair Road/Bella Citta Boulevard and S Goodman Road

- Northbound: 1 left-turn lane and 1 shared through/right-turn lane
- Southbound: 1 left-turn lane and 1 shared through/right-turn lane
- Westbound: 1 left-turn lane, 1 through lane, and 1 shared through/right-turn lane
- Eastbound: 1 left-turn lane, 1 through lane, and 1 shared through/right-turn lane

Table 5-4: Opening Year (2025) Intersection Performance – AM Peak Hour

Intersection	MOE	Eastbound			Westbound			Northbound			Southbound			Overall
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Sinclair Road @ Tradition Boulevard (Signalized)	Delay	--	--	--	25.8	--	36.8	--	9.7	9.8	6.8	4.8	--	19.0
	LOS	--	--	--	C	--	D	--	A	A	A	A	--	B
	V/C	--	--	--	0.08	--	0.85	--	0.10	0.10	0.21	0.04	--	--
	Queue (veh)	--	--	--	1	--	9	--	1	1	2	0	--	--
Bella Citta Boulevard @ Goodman Road (Signalized)	Delay	14.7	17.5	32.2	18.6	16.7	16.7	62.5	0.0	25.6	27.1	0.0	37.3	35.6
	LOS	B	B	C	B	B	B	E	A	C	C	A	A	D
	V/C	0.16	0.13	0.87	0.28	0.04	0.04	0.96	0.00	0.53	0.08	0.00	0.79	--
	Queue (veh)	2	2	15	1	1	1	15	0	7	1	0	8	--

Table 5-5: Opening Year (2025) Intersection Performance – PM Peak Hour

Intersection	MOE	Eastbound			Westbound			Northbound			Southbound			Overall
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Sinclair Road @ Tradition Boulevard (Signalized)	Delay	--	--	--	33.6	--	39.9	--	8.6	8.6	5.6	3.8	--	14.7
	LOS	--	--	--	C	--	D	--	A	A	A	A	--	B
	V/C	--	--	--	0.10	--	0.66	--	0.05	0.06	0.27	0.06	--	--
	Queue (veh)	--	--	--	1	--	7	--	1	1	3	1	--	--
Bella Citta Boulevard @ Goodman Road (Signalized)	Delay	16.9	19.1	28.4	18.8	17.8	17.8	23.1	0.0	18.4	22.3	0.0	32.2	25.5
	LOS	B	B	C	B	B	B	C	A	B	C	A	C	C
	V/C	0.09	0.09	0.83	0.30	0.06	0.06	0.67	0.00	0.16	0.05	0.00	0.80	--
	Queue (veh)	1	1	11	2	1	1	6	0	2	1	0	9	--

Table 5-6: Design Year (2045) Intersection Performance – AM Peak Hour

Intersection	MOE	Eastbound			Westbound			Northbound			Southbound			Overall
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Sinclair Road @ Tradition Boulevard (Signalized)	Delay	--	--	--	22.6	--	59.5	--	58.4	58.6	62.6	13.8	--	47.7
	LOS	--	--	--	C	--	E	--	E	E	E	B	--	D
	V/C	--	--	--	0.27	--	0.96	--	0.94	0.94	0.95	0.30	--	--
	Queue (veh)	--	--	--	5	--	24	--	23	23	12	6	--	--
Bella Citta Boulevard @ Goodman Road (Signalized)	Delay	28.5	73.1	74.7	71.8	26.3	26.4	38.5	0.0	76.7	60.0	0.0	39.0	59.6
	LOS	C	E	E	E	C	C	D	A	E	E	A	D	E
	V/C	0.24	0.96	0.93	0.93	0.29	0.30	0.65	0.00	0.97	0.78	0.00	0.34	--
	Queue (veh)	4	29	27	20	8	8	6	0	28	7	0	8	--

Table 5-7: Design Year (2045) Intersection Performance – PM Peak Hour

Intersection	MOE	Eastbound			Westbound			Northbound			Southbound			Overall
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Sinclair Road @ Tradition Boulevard (Signalized)	Delay	--	--	--	36.6	--	61.5	--	18.7	18.8	14.0	6.7	--	19.7
	LOS	--	--	--	D	--	E	--	B	B	B	A	--	B
	V/C	--	--	--	0.54	--	0.89	--	0.41	0.42	0.78	0.36	--	--
	Queue (veh)	--	--	--	10	--	10	--	8	8	6	6	--	--
Bella Citta Boulevard @ Goodman Road (Signalized)	Delay	21.1	31.0	33.0	44.5	17.0	17.0	31.5	0.0	35.7	29.6	0.0	42.2	32.1
	LOS	C	C	C	D	B	B	C	A	D	C	A	D	C
	V/C	0.12	0.73	0.80	0.93	0.32	0.32	0.64	0.0	0.68	0.39	0.0	0.81	--
	Queue (veh)	1	12	12	14	6	6	7	0	8	4	0	9	--

Both intersections should operate with permissive/protected left turning movements. Additionally, the 95th-percentile queues at the left-turning movements at the study intersections were obtained from the Synchro outputs to determine the recommended queue storage lengths. Recommended turn lane queue lengths are shown in **Table 5-8**.

Table 5-8: Recommended Turn Lane Queue Lengths

Intersection	Turn Lane Queue Length (feet)			
	EBL	WBL	NBL	SBL
Sinclair Rd & Tradition Bvld	-	250	-	300
Sinclair Rd/Bella Citta Blvd & Goodman Rd	100	500	175	175

5.5 BUILD ALTERNATIVES

Two build alternatives (Blue and Yellow) were initially developed for Sinclair Road Extension, with the primary difference being the horizontal alignment. As part of the Stakeholder outreach, three alternatives to the Blue Alternative and one alternative to the Yellow Alternative were proposed and evaluated.

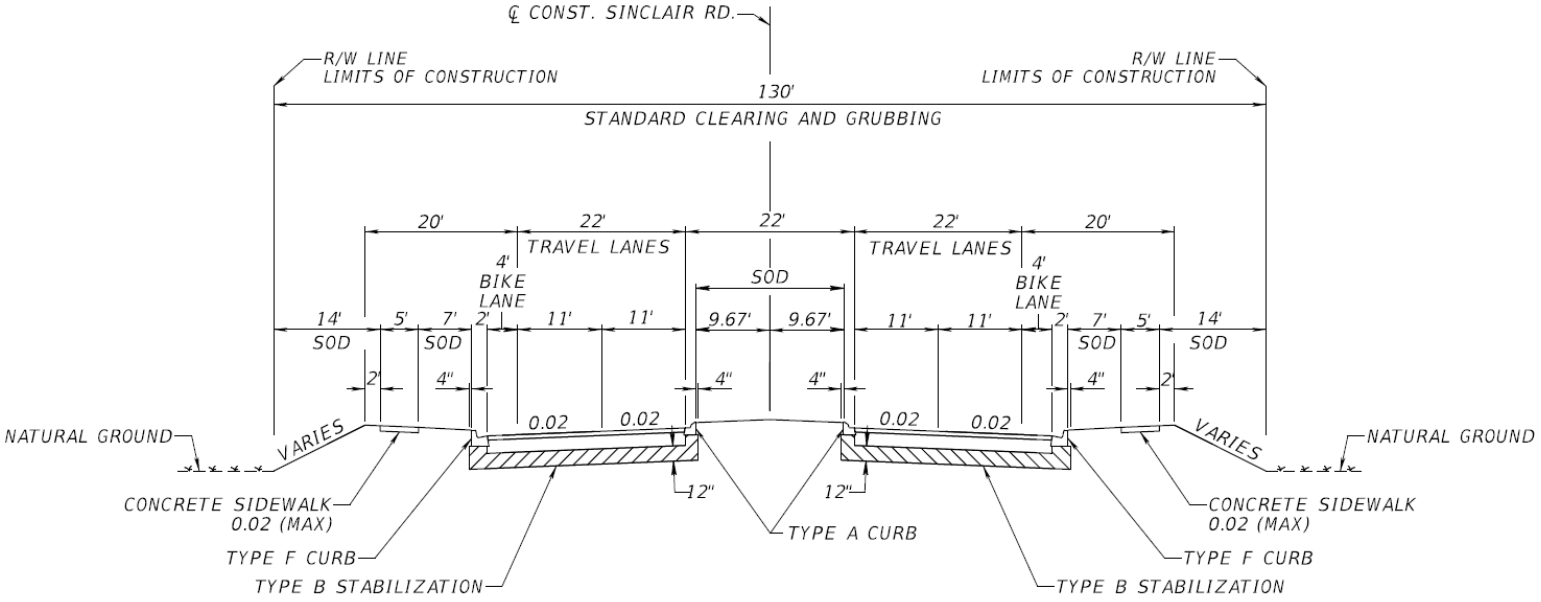
5.5.1 BLUE ALTERNATIVE

5.5.1.1 TYPICAL SECTION

All alternatives utilize Typical Section Number 1 for all segments except at the bridge over Davenport Creek, which utilizes Typical Section Number 2.

Typical Section Number 1 is shown on **Exhibit 5-5**. It is a 4-lane divided urban roadway with a 35 MPH design speed with two 11-foot-wide travel lanes and a 4-foot-wide bicycle lane in each direction, separated by a 22-foot raised grass median with Type A curb and gutter. A 5-foot sidewalk is provided along both sides. This typical section would require 130 feet of right-of-way.

Exhibit 5-5: Typical Section Number 1

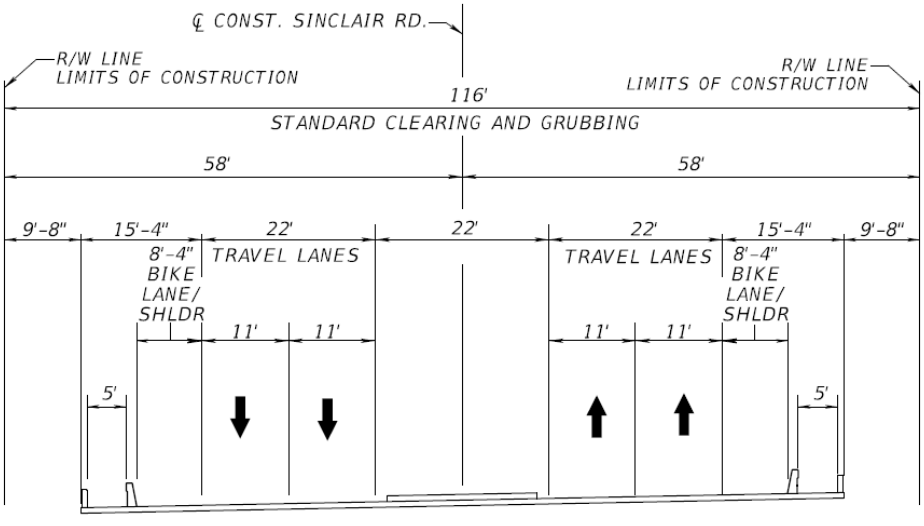


TYPICAL SECTION
SINCLAIR ROAD

DESIGN SPEED = 35 MPH

Typical Section Number 2 is shown on **Exhibit 5-6**. It applies to the bridge across Davenport Creek and is a 4-lane divided urban roadway with a 35 MPH design speed with two 11-foot-wide travel lanes and an 8-foot-4-inch-wide shoulder/bicycle lane in each direction, separated by a 22-foot raised median. A 5-foot sidewalk is provided along both sides, separated from the shoulder/bicycle lane by a barrier. This typical section would require 116 feet of right-of-way.

Exhibit 5-6: Typical Section Number 2



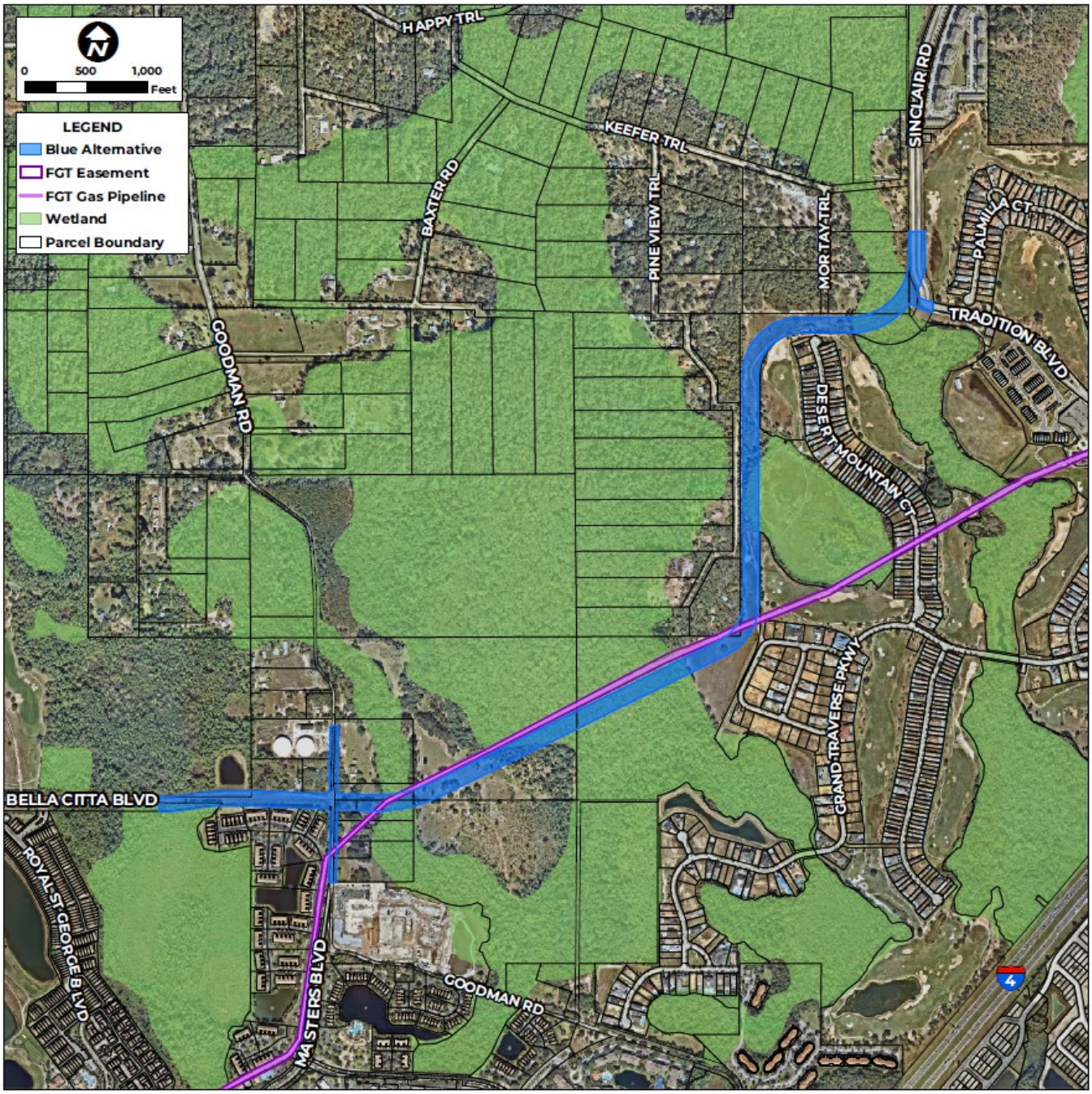
BRIDGE TYPICAL SECTION
SINCLAIR ROAD

DESIGN SPEED = 35 MPH

5.5.1.2 Horizontal Alignment

The proposed horizontal alignment for the Blue Alternative generally follows the alignment identified in the Reunion Resort and Club DRI, traveling along the northern and western property lines of the DRI. Variations from the DRI alignment include applying the 35 MPH design speed to the curve at the northern end and running the alignment along the south side of the FGT gas pipeline. The Blue Alignment is illustrated on **Exhibit 5-7**.

Exhibit 5-7: Blue Alternative

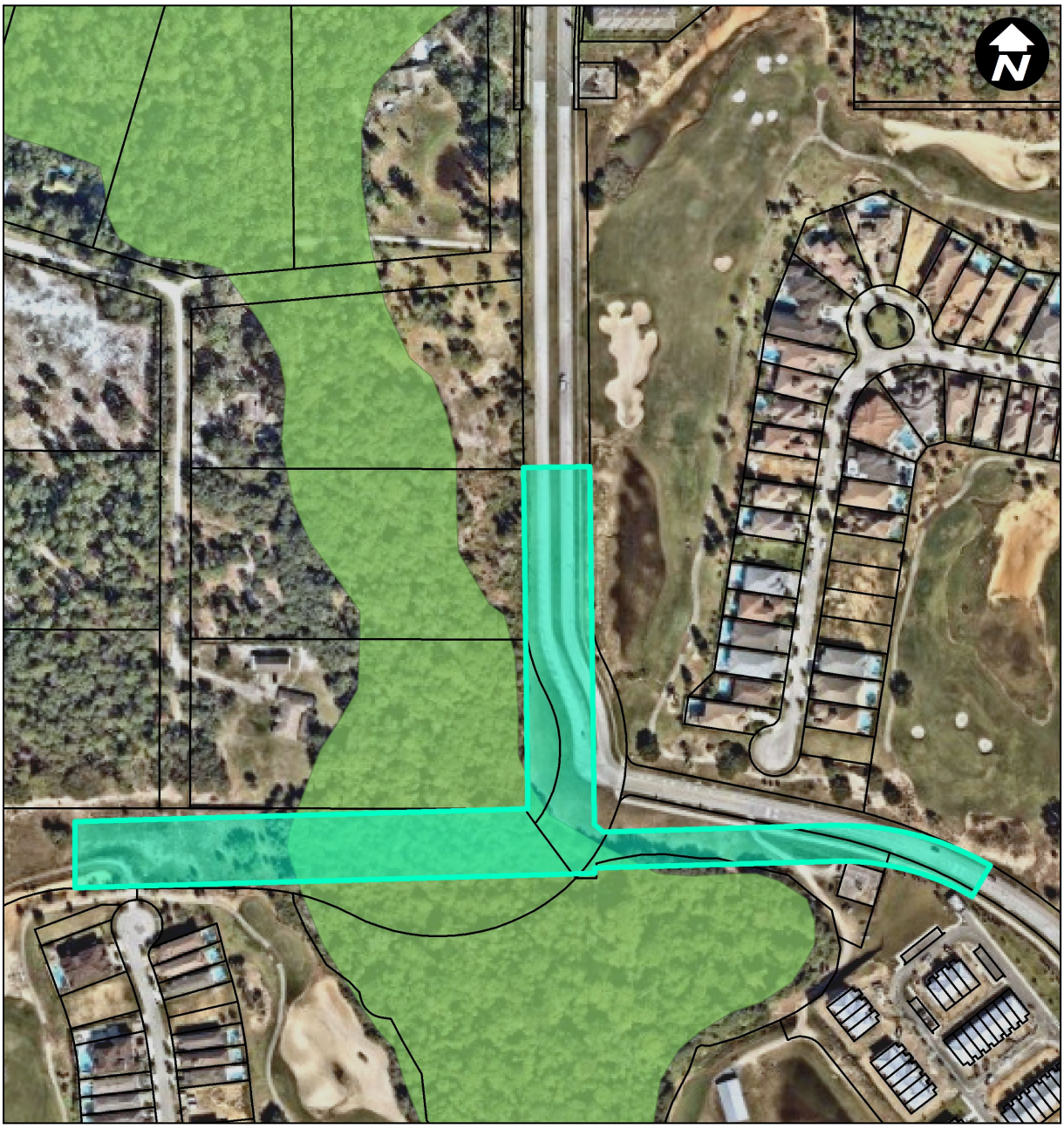


5.5.1.3 VARIATIONS TO BLUE ALTERNATIVE

During outreach to the Happy Trails Property Owners Association (HTPOA), residents requested three variations of the northern portion of the Blue Alternative, all with the intention of eliminating impacts to HTPOA parcels in the vicinity of Sinclair Road and Tradition Boulevard.

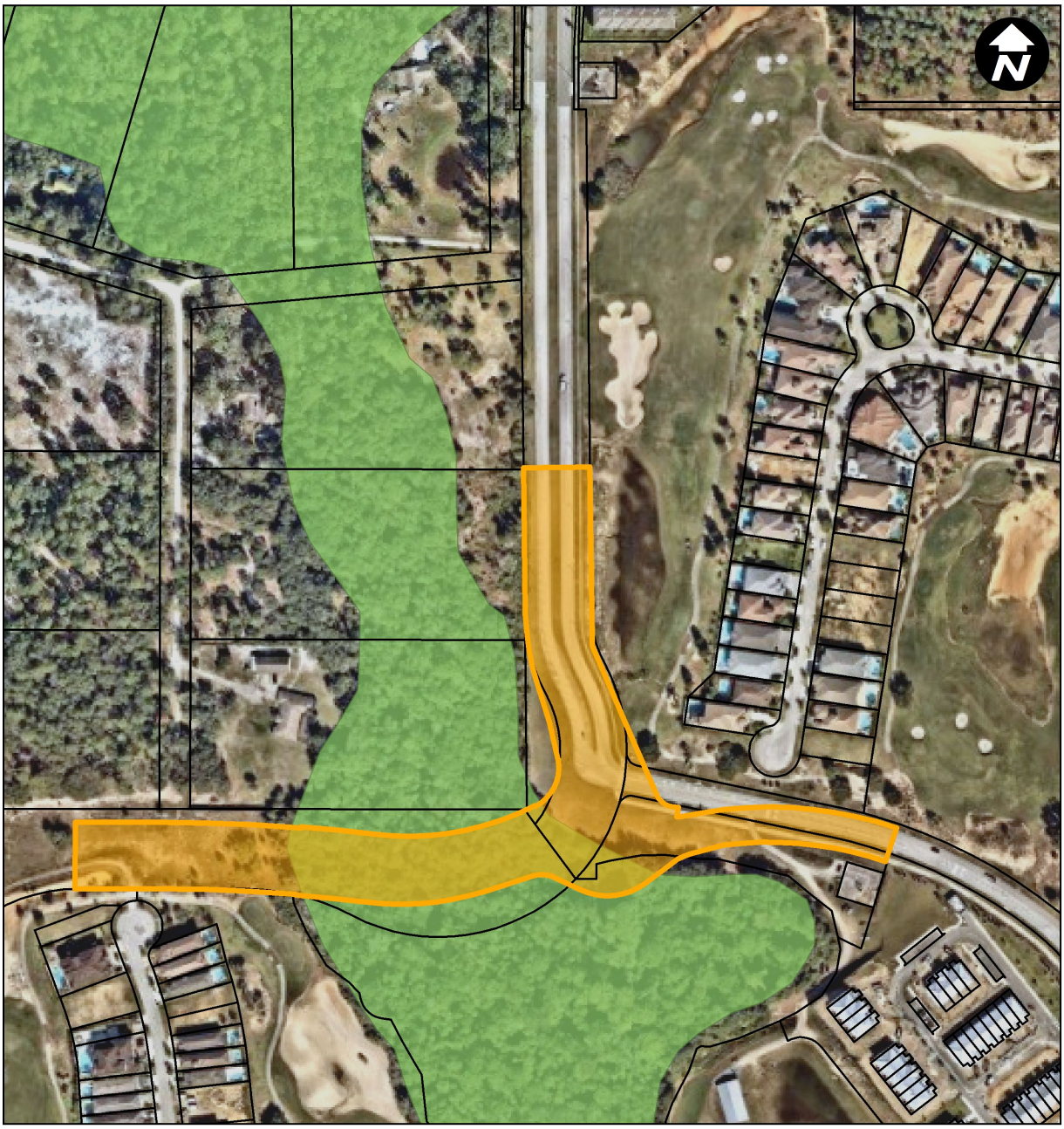
The first variation involved implementing a modified T intersection at Sinclair Road and Tradition Boulevard where the through movement would be east-west instead of north-south (as with the Blue Alternative). **Exhibit 5-8** illustrates the Modified T Intersection.

Exhibit 5-8: Modified T Intersection



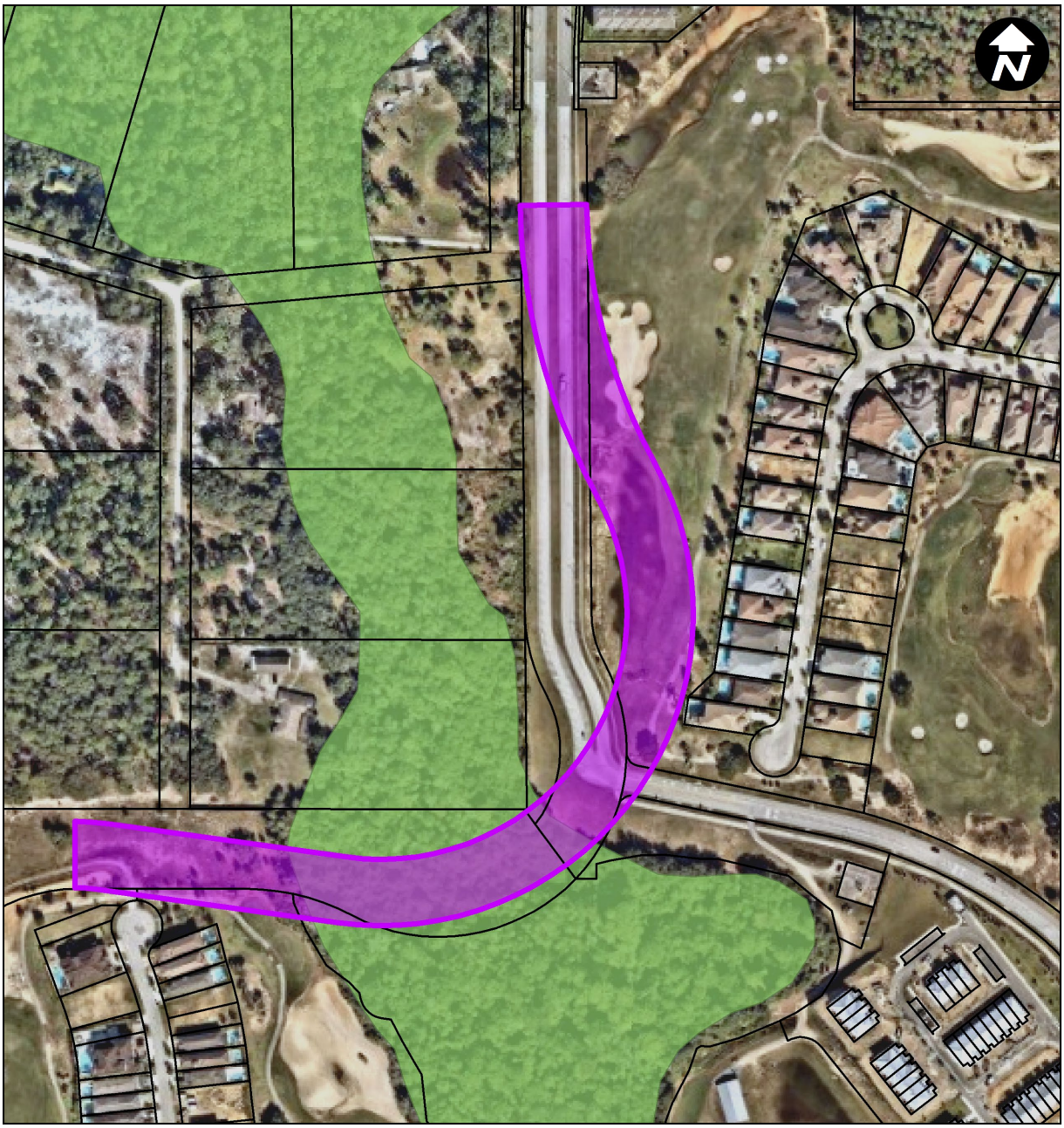
The second variation involved implementing a roundabout at Sinclair Road and Tradition Boulevard. **Exhibit 5-9** illustrates the Roundabout.

Exhibit 5-9: Roundabout



The third variation involved shifting the alignment of existing Sinclair Road east, into the existing golf course, to shift the curve away from the HTPOA parcels. **Exhibit 5-10** illustrates the resulting Purple Alignment.

Exhibit 5-10: Modified Alignment (Purple)



5.5.1.3.1 Screening and Evaluation of Blue Alternative Variations

A matrix which compares the northern portion of the Blue Alternative (near the intersection at Tradition Boulevard) with variations proposed by the HTPOA is presented in **Table 5-9**.

Table 5-9: Variations to Blue Alternative Screening Matrix

Study Considerations	Variations			
	Blue	Modified "T" [1]	Roundabout [2]	Purple
Percent Through Traffic	55	15	N/A	55
Percent Turning Traffic	45	85	N/A	45
FHWA Intersection Control Rank [3]	2	N/A	3	2
Volume-to-Capacity Ratio (AM/PM) [4]	0.63 / 0.57	0.85 / 0.72	0.75 / 0.98	0.63 / 0.57
Residential Parcels (Existing + Future = Total)	1 + 1 = 2	0 + 0 = 0	0 + 0 = 0	0 + 0 = 0
Non-Residential Parcels (Existing + Future = Total)	0 + 2 = 2	2 + 2 = 4	3 + 2 = 5	4 + 2 = 6
Potential Relocations of Existing Development (Residential + Non-Residential = Total)	0 + 0 = 0	0 + 0 = 0	0 + 1 = 1	0 + 2 = 2
Potential Relocations of Planned Development (Residential + Non-Residential = Total)	0 + 0 = 0	0 + 0 = 0	0 + 0 = 0	0 + 0 = 0
Conservation in Reunion (acres)	0.9	1.7	1.8	1.6
Wetland Impacts - Including Bridge (acres)	1.6	1.8	1.9	1.7
Davenport Creek Wetlands Filled (acres)	0.3	0.4	0.5	0.0
Surface Water Impacts (acres)	0.0	0.0	0.0	0.0
Floodplains Impacts - Zone A (acres)	0.0	0.0	0.0	0.0
Floodplains Impacts - Zone AE (acres)	1.6	2.0	2.1	1.7
Community Cohension Impacts	Positive	Positive	Positive	Positive
Parks & Recreation Area Impacts	None	None	Golf Course	Golf Course
Community Facility Impacts	None	None	None	None
Project Segment Length (feet)	1,700	2,530	2,580	2,290
Bridge (square feet)	37,900	44,000	52,800	58,600
Mechanically Stabilized Earth (MSE) Area (square	32,800	63,600	48,400	5,000
Roadway Right-of-Way Needed (acres)	3.2	3.1	4.2	5.1
Right-of-Way Cost Increase over Blue Alternative	$0	Not Estimated	Not Estimated	$14,603,000 [5]

Notes:

1 - The Modified "T" intersection variation is oriented with the through movement as east-west (Tradition Boulevard to Sinclair Road south). The Blue Alternative variation has a "T" intersection with the through movement as north-south (Sinclair Road).

2 - With 2-lanes on Sinclair Road Extension and 1-lane on Tradition Boulevard

3 - The CAP-X ranked a continuous green signalized "T" intersection (the Blue Alternative variation) number 1. It is not preferred due to poor pedestrian and bicycle operations.

4 - Based on the CAP-X analysis

5 - Cost assumes that impacted golf holes can be replaced as well as the design by Jack Nicklaus. If they cannot be replaced, the cost will be higher.

The Blue and Purple Alternatives have the higher through movements at the intersection with Tradition Boulevard while the Modified T intersection has the higher volume of traffic turning at this intersection (which is less efficient). This comparison is not applicable for a roundabout as all traffic travels through the roundabout.

The intersection of Sinclair Road and Tradition Boulevard was evaluated using the Federal Highway Administration (FHWA) CAP-X program which screens various intersection designs and ranks them. This analysis ranked a signalized T intersection (oriented similar to the Blue and Purple Alternatives) as higher than a roundabout. The program ranked a continuous green signalized T intersection (oriented similar to the Blue and Purple Alternatives) the highest; however, this design is not preferred due to poor pedestrian and bicycle operations. The Modified T intersection was not ranked as the traffic volumes do not support this orientation.

The Blue and Purple Alternatives provide a lower V/C ratio (better operation) than the Modified T or Roundabout variations.

The Blue Alternative would impact two residential parcels while the other alternatives would not impact any residential parcels.

Non-residential parcels which would be impacted are two for the Blue Alternative, four for the Modified T, five for the Roundabout, and six for the Purple variation.

No relocations are expected for the Blue or Modified T Alternatives. One non-residential relocation is expected for the Roundabout (a golf course tee box) and two non-residential relocations are expected for the Purple variation (two golf course holes).

None of the alternatives will require any relocation of planned development.

The Blue Alternative would have the lowest impacts to conservation land (0.9 acre) and the Roundabout would have the highest impacts to conservation land (1.8 acres).

The Blue Alternative would have the lowest impacts to wetlands (1.6 acres) and the Roundabout would have the highest impacts to wetlands (1.9 acres).

The Purple Alternative does not require any wetlands to be filled at Davenport Creek. Wetlands would need to be filled at Davenport Creek (to accommodate the bridge over Davenport Creek) for the Blue Alternative (0.3 acre), the Modified T (0.4 acre), and the Roundabout (0.5 acre).

None of the alternatives would impact surface waters.

None of the alternatives would impact Zone A Floodplains.

The Blue Alternative would have the lowest impacts to Zone AE Floodplains (1.6 acres) and the Roundabout would have the highest impacts to Zone AE Floodplains (2.1 acres).

All alternatives would have a positive impact on community cohesion by providing improved connectivity.

The Blue and Modified T intersection would not have any impacts to parks and recreation areas while the Roundabout and Purple variation would impact a golf course.

None of the alternatives would impact community facilities.

The Blue Alternative would require the shortest length (1,700 feet), implying a lower construction cost. The Modified T and Roundabout are the longest (2,530 and 2,580 feet, respectively).

The Blue Alternative would require less bridge (37,900 square feet), implying a lower construction cost. The Purple Alternative would require the most bridge (58,600 square feet).

The Purple Alternative would require less Mechanically Stabilized Earth (MSE) wall (5,000 square feet), implying a lower construction cost. The Modified T would require the most MSE wall (63,600 square feet).

The Blue Alternative and Modified T would require the least right-of-way (3.2 and 3.1 acres, respectively).

An estimate of the right-of-way cost increase over the Blue Alternative was only developed for the Purple Alternative as it impacts the golf course designed by Jack Nicklaus. Assuming the course can be redesigned to mitigate the loss of area, the right-of-way for this alternative would be approximately $14.6 million. If the course cannot be redesigned, this cost would be higher.

5.5.1.3.2 Blue Alternative Variations Screening Results

Based on the evaluation of variations to the Blue Alternative (i.e., the northern portion of the Blue Alternative near the intersection at Tradition Boulevard), the Blue Alternative variation was identified as the preferred alternative for the Blue Alternative to be evaluated against the Yellow Alternative. The advantages of the Blue Alternative variation more than offset the disadvantage, as described below.

Advantages of the Blue Alternative variation include:

- The Blue Alternative, along with the Purple Alignment, provides the best traffic operations
- It impacts the fewest total parcels
- It impacts the fewest parcels with existing development
- It has the least environmental impacts
- It requires no relocations
- It does not impact parks or recreation areas
- It has a lower anticipated construction cost
- And it has lower anticipated right-of-way costs than the Purple Alignment

There is a disadvantage to the Blue Alternative variation:

- It impacts two residential parcels

5.5.2 YELLOW ALTERNATIVE

5.5.2.1 TYPICAL SECTION

The Yellow Alternative utilizes the same typical sections as described for the Blue Alternative in Section 5.5.1.1.

5.5.2.2 HORIZONTAL ALIGNMENT

The proposed horizontal alignment for the Yellow Alternative is very similar to the Blue Alternative; however, it travels on the north side of the northern Reunion boundary and west of the western Reunion boundary. It then travels on the north side of the FGT gas pipeline. The Yellow Alignment is illustrated on **Exhibit 5-11**.

5.5.2.3 VARIATION TO YELLOW ALTERNATIVE (MODIFIED ALIGNMENT (PINK))

During outreach to the Reunion West Development Partners (RWDP), they requested a variation of the Yellow Alternative which continues west to Goodman Road and then turns south to reach Bella Citta Boulevard. After applying the 35 MPH design speed to this alignment, the resulting alignment is illustrated on **Exhibit 5-12**.

Exhibit 5-11: Yellow Alternative

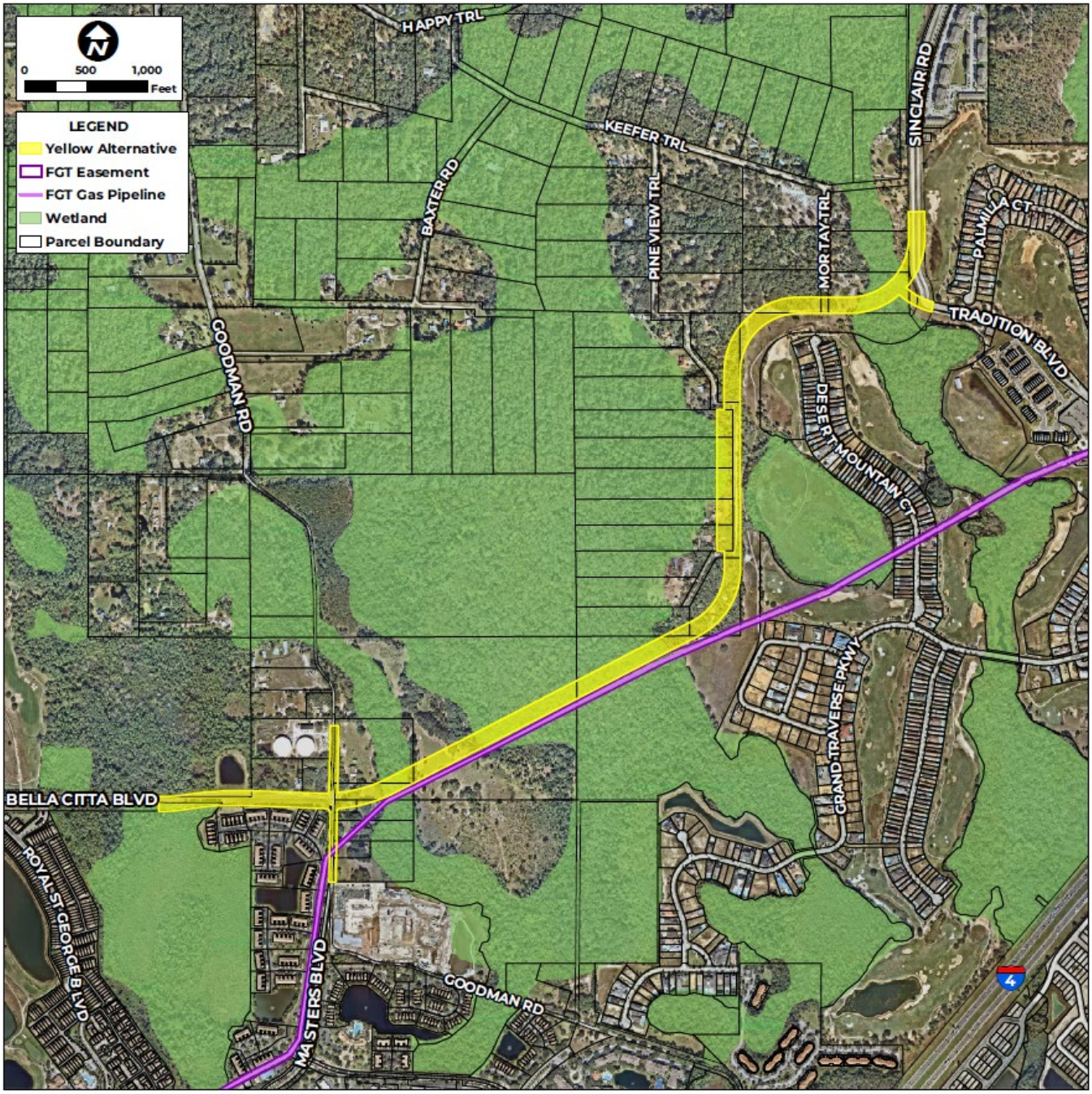
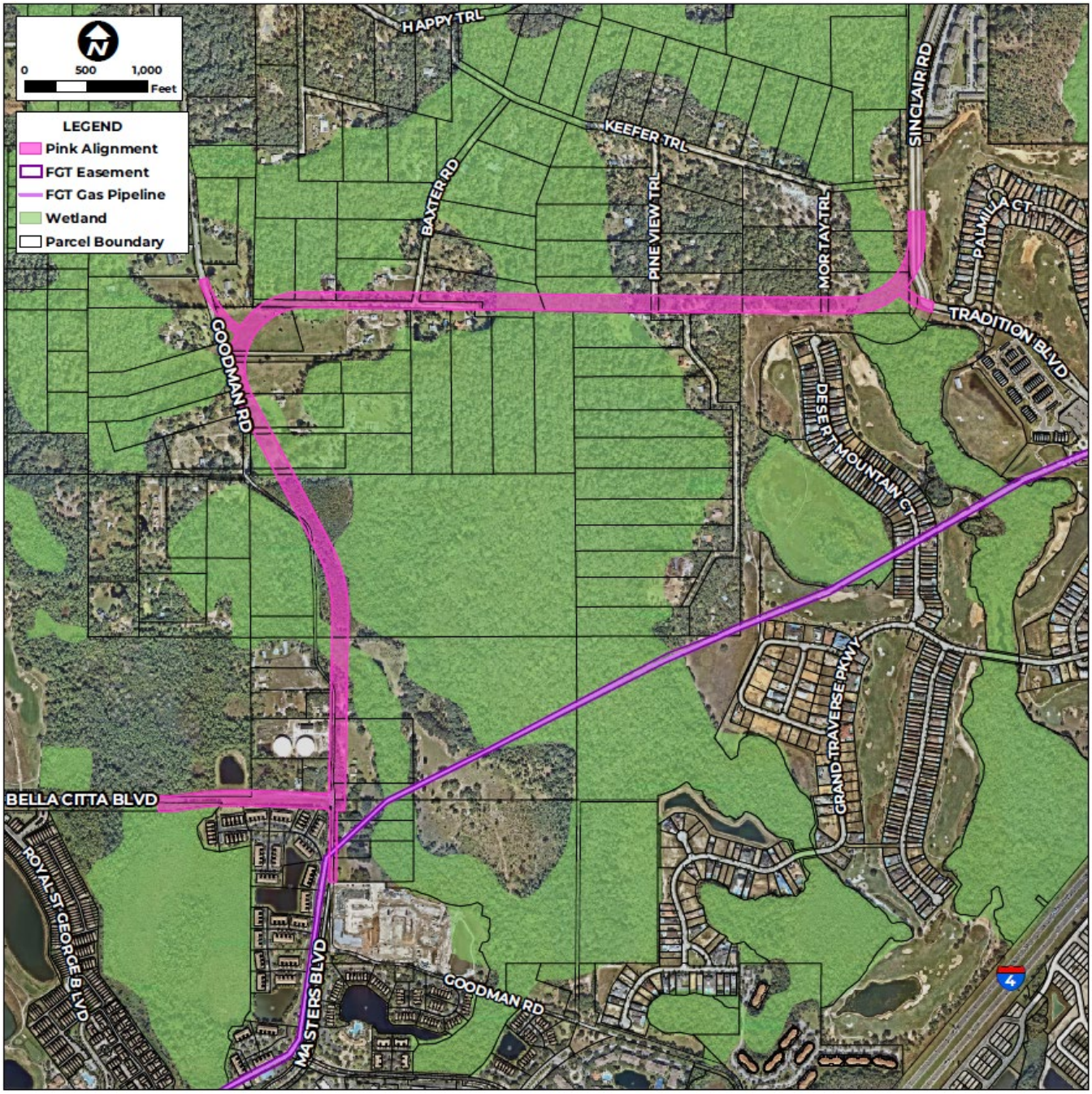


Exhibit 5-12: Modified Alignment (Pink)



5.5.2.3.1 Screening and Evaluation of Yellow Alternative Variation

A matrix which compares the Yellow Alternative with Pink Alternative proposed by the RWDP is presented in **Table 5-10**.

Table 5-10: Variation to Yellow Alternative Screening Matrix

Study Considerations	Variations	
	Yellow	**Pink**
Median Width (feet)	22	22
Design Speed (MPH)	35	35
Bicycle Lane Width (feet)	4/8 [1]	4/8 [1]
Sidewalk Width (feet)	5	5
Residential Parcels (Existing + Future = Total)	10 + 7 = 17	18 + 10 = 28
Non-Residential Parcels (Existing + Future = Total)	5 + 3 = 8	7 + 2 = 9
Potential Existing Relocations (Residential + Non-Residential = Total)	4 + 0 = 4	4 + 1 = 5
Potential Relocations of Planned Development (Residential + Non-Residential = Total)	0 + 0 = 0	0 + 0 = 0
Conservation Parcels	1	0
Conservation in Reunion (acres)	2.8	0.0
Osceola County Parcels	4	4
Gas Pipeline Crossings	0	0
Wetland Impacts (acres)	8.8	9.2
Surface Water Impacts (acres)	0.0	0.0
Floodplains - Zone A (acres)	1.5	0.0
Floodplains - Zone AE (acres)	6.7	10.5
Community Cohesion Impacts	Positive	Negative
Parks, Recreation Areas	None	None
Community Facilities	Moderate	None
Project Length (miles)	1.48	1.91
Davenport Creek Bridge Length (feet)	385	385
Roadway Right-of-Way Needed (acres)	25.8	29.8

Note:
1 – 4-foot bike lane except for bridge, which is 8-foot-4-inches

The typical sections (lane widths, median, sidewalks, bicycle lanes, etc.) and design criteria (including the design speed) for both the Yellow and Pink Alternatives are the same.

The Pink Alternative would impact more residential parcels (28) than the Yellow Alternative (17).

The Pink Alternative would impact more non-residential parcels (9) than the Yellow Alternative (8).

The Pink Alternative would potentially require more residential relocations (5) than the Yellow Alternative (4).

The Yellow Alternative would impact a conservation parcel (2.8 acres) while the Pink Alternative would not impact any conservation parcels.

Both alternatives would impact four parcels owned by Osceola County.

Neither alternative would cross the FGT gas pipeline.

The Pink Alternative would impact more wetlands (9.2 acres) than the Yellow Alternative (8.8 acres).

Neither alternative would impact surface waters.

The Yellow Alternative would impact more Zone A Floodplains (1.5 acres) than the Pink Alternative (0.0 acres).

The Pink Alternative would impact more Zone AE Floodplains (10.5 acres) than the Yellow Alternative (6.7 acres).

The Yellow Alternative would have a positive effect on Community Cohesion by providing connectivity. The Pink Alternative would have a negative effect on Community Cohesion because it divides the Happy Trails community.

Neither alternative impacts parks or recreation areas.

The Yellow Alternative has a moderate impact to Community Facilities as it requires the relocation of a portion of Pine View Trail. The Pink Alternative has no impacts to Community Facilities.

The Yellow Alternative would have the shorter length (1.48 miles), implying a lower construction cost, as compared to the Pink Alterative (1.91 miles).

The bridge length over Davenport Creek is the same, implying the same bridge construction costs.

The Pink Alternative would require more right-of-way (29.8 acres) than the Yellow Alternative (25.8 acres) implying a higher cost for right-of-way.

5.5.2.3.2 Yellow Alternative Variation Screening Results

Based on the evaluation of the variation to the Yellow Alternative (i.e., the Pink Alternative), the Yellow Alternative was identified as the preferred alternative to be evaluated against the Blue Alternative. The advantages of the Yellow Alternative variation more than offset the disadvantages, as described below.

Advantages of the Yellow Alternative include:

- It impacts the fewest parcels, both residential and non-residential
- It requires fewer residential relocations
- It has the least environmental impacts
- It has positive Community Cohesion impacts
- It has a lower anticipated construction cost
- And it has lower anticipated right-of-way costs

Disadvantages of the Yellow Alternative include:

- It impacts a conservation area
- It requires the relocation of Pine View Trail

5.6 COMPARATIVE ALTERNATIVES EVALUATION

The evaluation of alternatives and potential variations to the alternatives was conducted in multiple steps. First, a screening analysis of the Blue Alternative variations was conducted, as described in Section 5.5.1.3. Next a screening analysis of the Yellow Alternative variation was conducted, as described in Section 5.5.2.3. Finally, an evaluation of the alternatives resulting from the screening analyses was conducted.

5.6.1 ALTERNATIVES EVALUATION

A matrix which compares the Yellow and Blue Alternatives to the purpose and needs identified in Section 2.0 is presented in **Table 5-11**. Both build alternatives meet all of the needs. The No-Build Alternative does not meet the needs.

Table 5-11: Purpose and Need Matrix of Alternatives

Need	No-Build	Blue Alternative	Yellow Alternative
System Linkage	No	Yes	Yes
Mobility	No	Yes	Yes

A matrix which compares the alternatives using relevant physical, natural, social, and cultural environment considerations is presented in **Table 5-12**. A description of each of the considerations included in the matrix is provided in the sections following the matrix.

Note that the evaluation matrix does not include the effects of ponds which will be identified for the preferred alternative. It is anticipated that the ponds for both alternatives would have similar impacts, so this matrix provides a good comparison between the two build alternatives.

Table 5-12: Evaluation Matrix of Alternatives

Study Considerations	Alternatives		
	No-Build	Blue	Yellow
Median Width (feet)	N/A	22	22
Design Speed (MPH)	N/A	35	35
Bicycle Lane Width (feet)	0	4/8 [1]	4/8 [1]
Sidewalk Width (feet)	0	5	5
Roadway Right-of-Way Needed (acres)	0.0	24.3	25.8
Residential Parcels (Existing + Future = Total)	0	7 + 3 = 10	10 + 7 = 17
Non-Residential Parcels (Existing + Future = Total)	0	3 + 3 = 6	5 + 3 = 8
Potential Relocations of Existing Development (Residential + Non-Residential = Total)	0	2 + 0 = 2	4 + 0 = 4
Potential Relocations of Planned Development (Residential + Non-Residential = Total)	0	0 + 0 = 0	0 + 0 = 0
Conservation Parcels	0	1	1
Osceola County Parcels	0	4	4
Potential Contamination Parcels (Low + Medium + High Risk = Total)	0	2 + 3 + 0 = 5	2 + 2 + 0 = 4
Gas Pipeline Crossings	0	2	0
Potential Historic Resources	N/A	0	0
Known Archaeological Resources [2]	N/A	1	1
Wildlife & Habitat Impacts	None	Moderate	Moderate
Bald Eagle Nest Impacts	None	None	None
Conservation in Reunion (acres)	0.0	4.0	2.8
Wetland Impacts (acres)	None	8.9	8.8
Surface Water Impacts (acres)	None	0.0	0.0
Floodplains Impacts - Zone A (acres)	None	3.2	1.5
Floodplains Impacts - Zone AE (acres)	None	4.8	6.7
Parks & Recreation Area Impacts	None	None	None
Community Facility Impacts	None	None	Moderate
Construction Cost (excluding ponds & muck removal)	$0	$28,800,000	$29,100,000
Right-of-Way Cost (excluding ponds)	$0	$16,400,000	$20,400,000
Utility Adjustments	$0	$4,100,000	$0
Mitigation Costs	$0	$1,000,000	$1,100,000
Total Project Costs	$0	$50,300,000	$50,600,000

Notes:

1 - 4-foot bicycle lane except for at the bridge, where it is 8-foot

2 - Excluding SHPO-evaluated ineligible resources

The typical sections (lane widths, median, sidewalks, bicycle lanes, etc.) and design criteria (including the design speed) for both the Blue and Yellow Alternatives are the same.

The Blue Alternative would require less right-of-way (24.3 acres) than the Yellow Alternative (25.8 acres).

The Blue Alternative would impact less residential parcels (10) than the Yellow Alternative (17).

The Blue Alternative would impact less non-residential parcels (6) than the Yellow Alternative (8).

The Blue Alternative may require two residential relocations while the Yellow Alternative may require four.

Neither alternative would require relocation of planned developments.

Both alternatives would impact one conservation parcel.

Both alternatives would impact four parcels owned by Osceola County.

The Yellow Alternative would impact fewer potentially contaminated parcels (4) than the Blue Alternative (5).

The Yellow Alternative would not cross the FGT gas pipeline while the Blue would cross it twice.

Neither alternative will impact potential historic resources.

Both alternatives would impact one known archaeological resource (excluding State Historic Preservation Officer (SHPO)-evaluated resources).

Both alternatives have a moderate impact on wildlife and habitat.

Neither alternative impacts bald eagle nests.

The Yellow Alternative impacts less conservation land (2.8 acres) than the Blue Alternative (4.0 acres).

The Yellow Alternative would impact slightly less wetlands (8.8 acres) than the Blue Alternative (8.9 acres).

Neither alternative would impact surface waters.

The Yellow Alternative would impact less Zone A Floodplains (1.5 acres) than the Blue Alternative (3.2 acres).

The Blue Alternative would impact less Zone AE Floodplains (4.8 acres) than the Yellow Alternative (6.7 acres).

Neither alternative impacts parks or recreation areas.

The Blue Alternative has no impacts to Community Facilities. The Yellow Alternative has a moderate impact to Community Facilities as it requires the relocation of a portion of Pine View Trail.

The Blue Alternative would have a lower construction cost ($28.8 million) than the Yellow Alternative ($29.1 million).

Excluding ponds, the Blue Alternative would have a lower right-of-way cost ($16.4 million) than the Yellow Alternative ($20.4 million).

The Yellow Alternative is not expected to require utility adjustments. The Blue Alternative is projected to require approximately $4.1 million for utility adjustments associated with crossing the FGT gas pipeline twice. This cost may be reduced due to the need for FGT to upgrade their pipeline due to planned development in the area.

The Blue Alternative would have a lower mitigation cost ($1.0 million) than the Yellow Alternative ($1.1 million).

In total, the Blue Alternative is projected to have a lower cost ($50.3 million) than the Yellow Alternative ($50.6 million).

5.7 PUBLIC INPUT

The Blue and Yellow Alternative (along with the potential variations to the Blue Alternative), were presented at a Public Alternatives Meeting on August 9, 2022. The meeting was attended by 117 people and 92 comments were submitted. These comments include ones received via email from people who did not attend the meeting but reviewed the information on the project website. A summary of the comments received is provided in **Table 5-13** and a summary of the meeting is provided in Section 6.2.4. Comments received were considered in the identification of the preferred alternative.

Table 5-13: Public Comments on Alternatives

# of Comments	On Alternatives
18	Prefers Blue Alternative
26	Prefers Blue Alternative with reduced impacts to Happy Trails
2	Prefers Yellow Alternative
9	Supports project, no preference of alternative
12	Prefers No-Build Alternative
8	Prefers original alignment in Reunion
7	Suggested a different alignment
4	Suggested improving other roads
2	Prefers Roundabout at Goodman Road
# of Comments	**On Other Topics**
12	Concerned about social impacts
10	Concerned about wildlife
6	Concerned about traffic noise
4	Concerned about speed and safety
2	Concerned about traffic
2	Concerned about drop in property values
2	Some Happy Trails parcels will not meet 5-acre requirement
1	Concerned about light pollution
1	Concerned about environmental impacts
1	Suggested providing wider sidewalks
14	Requested additional information

5.8 SELECTION OF THE PREFERRED ALTERNATIVE

Based on the evaluation of the Blue and Yellow Alternative, and in consideration of public input, the Blue Alternative was identified as the preferred alternative, along with the consideration of design strategies to reduce impacts to residential parcels. The advantages of the Blue Alternative more than offset the disadvantages, as described below.

Advantages of the Blue Alternative include:

- It requires the lower amount of right-of-way
- It impacts the fewest parcels, both residential and non-residential
- It requires fewer potential residential relocations
- It does not impact any community facilities
- It has less total floodplain impacts
- It has a lower projected cost (which may be reduced further)
- It is the preferred alternative based on public input received
- It more closely aligns with the previous concept for the Reunion alignment

Disadvantages of the Blue Alternative include:

- It impacts more potentially contaminated parcels (one parcel more)
- It impacts more conservation area (1.2 acres more)
- It impacts more wetlands (0.1 acre more)

6.0 PROJECT COORDINATION AND PUBLIC INVOLVEMENT

6.1 AGENCY COORDINATION

The study team met with Florida's Turnpike Enterprise on October 10, 2021 to discuss the Sinclair Road Extension and to coordinate with their Project Development and Environment (PD&E) studies for Poinciana Parkway Extension and the widening of SR 429, both of which include the SR 429 interchange with Sinclair Road. The Sinclair Road Extension study team and the Turnpike agreed to share information about their respective studies as they progress.

6.2 PUBLIC INVOLVEMENT

A separate Comments and Coordination Report, dated July 2023, has been prepared which provides information about the public involvement efforts and results.

Public involvement efforts included:

- Newsletters
- Project website
- Coordination meetings with and presentations to various stakeholders
- Public Alternatives Meeting
- Comments
- Presentation to the Osceola County Board of County Commissioners

6.2.1 NEWSLETTERS

Early in the study process, in November 2021, a newsletter (in both English and Spanish) was mailed to each property owner and occupant (if different from property owner) located within and adjacent to the study area, and was also emailed to officials, agencies, other key stakeholders, and interested parties who had previously submitted comments regarding the project. This newsletter informed the public of the study, identified the study area, presented the study schedule, and identified the project website where information about the study will be posted, and identified contacts for additional information and/or to provide comments. The newsletter distribution also included a list of frequently asked questions (FAQs) outlining multiple topics including the purpose of the project, schedule, and funding.

In July 2022, prior to the Public Alternatives Meeting, a second newsletter (in both English and Spanish) was mailed to each property owner and occupant (if different from property owner) located within and adjacent to the study area, and was also emailed to officials, agencies, other key stakeholders, and interested parties who had previously submitted comments regarding the project. This newsletter invited people to the Public Alternatives Meeting, providing the date, time, and location of the meeting. A graphic with the alternatives being evaluated was included, along with the project website where information about the study will be posted, and contacts for additional information and/or to provide comments were identified. The newsletter distribution also included an invitation letter to the Public Alternatives Meeting, which further detailed information about the meeting.

6.2.2 PROJECT WEBSITE

A study web page (www.Osceola.org/go/SinclairRoad) was established on the County's website and was maintained throughout the study's duration as a means of updating the general public on a frequent basis.

The web page initially introduced the study, identified the goals of the project, provided a map of the project, identified the study schedule, provided contact information, and encouraged the public to submit comments. Materials presented at the Public Alternatives Meeting were added prior to the meeting. The Preferred Alternative was posted after evaluating the alternatives, considering input from the Public Alternatives Meeting. Then the decision by the Osceola County Board of County Commissioners approving the Preferred Alternative and an explanation of next steps were posted. Draft and final versions of report documentation have been posted as they become available.

6.2.3 COORDINATION WITH STAKEHOLDERS

The study team coordinated with various stakeholders during the study, including:

- Reunion West Community Development District (CDD)
- Happy Trails Property Owners Association (POA)
- Elevation/Dewan Property development representatives
- ChampionsGate
- Florida Gas Transmission (FGT)
- Bella Trae Homeowners Association (HOA)
- Proposed Charter School
- Kingwood development company
- Reunion West Development Partners
- Cramp Property representatives
- Reunion West CDD District Engineer

Summaries of meetings are provided below. More detailed meeting summaries are provided in the separate Comments and Coordination Report, dated July 2023.

Reunion West CDD, October 14, 2021 – The study team met with the Reunion West CDD board members during one of their regularly scheduled board meetings. A presentation was provided that identified the project history, purpose and need, study objective, study process, study area, potential alignments to spur discussion, study schedule and study contacts. Board members offered their preferences for the potential alignments. Potential shared use ponds (with Reunion) were noted as a possibility.

Happy Trails POA, October 21, 2021 – The study team met with a group of Happy Trails POA members invited by the POA president. A presentation was provided that identified the project history, purpose and need, study objective, study process, study area, potential alignments to spur discussion, study schedule and study contacts. POA members offered their preferences for the potential alignments. Options for reducing impacts to POA parcels were discussed.

Elevation/Dewan Property representatives, October 26, 2021 – The study team met with the representatives from the Elevation development company and the owners of the Dewan property. A presentation was provided that identified the project history, purpose and need, study objective, study process, study area, potential alignments to spur discussion, study schedule and study contacts. Various coordination topics were discussed as well as the schedules for Sinclair Road Extension and the planned development.

ChampionsGate, November 4, 2021 – The study team met with the representatives from ChampionsGate. A presentation was provided that identified the project history, purpose and need, study objective, study process, study area, potential alignments to spur discussion, study schedule and study contacts. Various coordination topics were discussed.

FGT, November 12, 2021 – The study team met with the representatives from FGT to discuss the project, their facilities and easements and potential issues/requirements relating to Sinclair Road Extension. FGT identified special considerations for crossing their facility and the separation needed.
Happy Trails POA, November 20, 2021 – The study team met with the Happy Trails POA members during one of their regularly scheduled meetings. A presentation was provided that identified the project history, purpose and need, study objective, study process, study area, potential alignments to spur discussion, study schedule and study contacts. POA members offered their preferences for the potential alignments. Options for modifying the alignment near the intersection of Sinclair Road Extension and Tradition Boulevard were suggested for consideration. The study team agreed to consider them.

Bella Trae HOA, December 6, 2021 email – In response to a request for additional information from the Bella Trae HOA, the study team provided a copy of the study presentation that identified the project history, purpose and need, study objective, study process, study area, potential alignments, study schedule and study contacts.

Proposed Charter School, December 6, 2021 email – In response to a request for additional information from the proposed charter school in the northeast quadrant of the future intersection of Sinclair Road Extension and Goodman Road, the study team provided a copy of the study presentation that identified the project history, purpose and need, study objective, study process, study area, potential alignments, study schedule and study contacts.

Kingwood, December 7, 2021 – The study team met with the representatives from Kingwood. A presentation was provided that identified the project history, purpose and need, study objective, study process, study area, potential alignments to spur discussion, study schedule and study contacts. The Kingwood representative offered his preference for the potential alignments and suggested the County consider another alignment that travels west from Traditions Boulevard to utilize existing roadways where possible. Kingwood noted that they are in the process of proposing additional development within Reunion in the vicinity of the alignment through Reunion.

Reunion West Development Partners (RWDP), January 31, 2022 – The study team met with the representatives from RWDP. RWDP's involvement in the study was discussed, along with the traffic methodology being used in the study. A presentation was provided that identified the project schedule, potential alignments to spur discussion, as well as variations of the intersection of Sinclair Road Extension and Tradition Boulevard being considered. RWDP representative requested the County consider another alignment that travels west from Traditions Boulevard to utilize existing roadways where possible. The study team agreed to consider this alignment.

Happy Trails POA, February 5, 2022 – The study team met with the Happy Trails POA members during one of their regularly scheduled meetings. A presentation was provided that identified the study schedule, study area, a summary of the previous meeting with the POA (including requests to evaluate various options) and the initial results of the study team considering their options. POA members provided their

thoughts on the various options. Some expressed that the alignment impacting the Reunion golf course did not represent their thoughts and additional detail on their request was provided.

Cramp Property Owner, April 4, 2022 – The study team met with the owner of the Cramp property to provide information on how alternatives impact Mr. Cramp's property. Both the Blue and Yellow Alternatives impact Mr. Cramp's property. It was noted that Mr. Cramp did not want to be relocated and has a desire that the impacts to his property be minimized.

Reunion West CDD Engineer, June 1, 2022 – The study team met with the District Engineer for the Reunion West CDD to initiate coordination regarding the potential for Osceola County to jointly use existing ponds serving Reunion for drainage needs for Sinclair Road Extension. It was noted that the original Reunion drainage plan anticipated the joint use of several ponds for the roadway. Further coordination will be needed with Kingwood, who currently owns the property for the potential joint use ponds.

Elevation/Dewan Property representatives, June 29, 2022 – The study team met with the representatives from the Elevation development company and the owners of the Dewan property. A presentation was provided that identified the existing conditions, typical sections, and alternative alignments, including an assessment of the 2005 Reunion alignment and safety issues with it. A draft evaluation matrix was presented which compared the impacts of the Blue and Yellow Alternatives. It was noted that this and additional information were to be presented at a Public Meeting tentatively scheduled for August 9, 2022. Opportunities for joint use ponds were discussed and Elevation supported the concept, with more specific details to be worked out after the preferred alternative is identified.

Kingwood, July 12, 2022 – The study team met with the representatives from Kingwood. A presentation was provided that identified the existing conditions, typical sections, and alternative alignments, including an assessment of the 2005 Reunion alignment and safety issues with it. A draft evaluation matrix was presented which compared the impacts of the Blue and Yellow Alternatives. Variations to the northern portion of the Blue Alternative and its intersection with Tradition Boulevard were reviewed. It was noted that this and additional information will be presented at a Public Meeting tentatively scheduled for August 9, 2022. Opportunities for joint use ponds were discussed and Kingwood supported the concept, with more specific details to be worked out after the preferred alternative is identified.

Kingwood, November 9, 2022 – The study team met with the representatives from Kingwood to discuss engineering information provided by Fred Zohouri, Principal, Reunion Resort & Golf Club, dated September 21, 2022. The engineering information that was provided included a proposed alternative alignment (the "Kingwood Alternative"). Kimley-Horn stated that the Kingwood Alternative did not appear to meet current design standards (per the Florida Design Manual) related to several curves. Kimley-Horn also stated that the Kingwood Alternative did not appear to be constructable as it did not provide needed slope easements and that the engineering information provided did not appear to have considered a hydraulic analysis of Davenport Creek to determine minimum bridge height or a structural analysis to determine elevation of the road, which influences the slope easement needed in this area. Kingwood representatives disagreed with Kimley-Horn's review of the Kingwood Alternative and stated that they planned to hire a firm that meets the County's requirements for conducting a PD&E study to further review the Sinclair Road Extension alternatives. It was noted that the preferred alternative from the Sinclair Road Extension study was to be presented to the Osceola County Board of County Commissioners on December 19, 2022 (the presentation to the Osceola County Board of County Commissioners was later rescheduled to February 20, 2023).

6.2.4 PUBLIC ALTERNATIVES MEETING

A Public Alternatives Meeting was held in Champions Hall at the ChampionsGate Golf Club on August 9, 2022. Newspaper advertisements were published in the Osceola News Gazette on July 21, 2022, and on July 28, 2022. A news release was distributed to major media outlets on August 4, 2022. Meeting information was also posted on the County's social media accounts on August 4, 2022. Public meeting invitation letters were sent on July 13, 2022, by email to five elected officials and their aides, as well as to 40 local, regional, state, and federal agency contacts. An additional 824 meeting invitation letters were mailed to property owners and tenants within the study area on July 15, 2022. Public meeting invitation letters were also sent on July 15, 2022, by email to 63 stakeholders and to 16 other interested parties who previously submitted comments on the project. Meeting information was posted on the County's meetings calendar and on the project website on July 15, 2022. All meeting materials that were shown at the Public Alternatives Meeting were posted on the project website on August 8, 2022.

A total of 117 people signed in at the Public Alternatives Meeting. A total of 92 written and emailed comments were received as of August 22, 2022, the end of the public meeting comment period. **Table 6-1** summarizes the comments received. The sum of comments is more than 92 as some people commented on multiple topics.

Table 6-1: Public Comments on Project Alternatives

# of Comments	On Alternatives
18	Prefers Blue Alternative
26	Prefers Blue Alternative with reduced impacts to Happy Trails
2	Prefers Yellow Alternative
9	Supports project, no preference of alternative
12	Prefers No-Build Alternative
8	Prefers original alignment in Reunion
7	Suggested a different alignment
4	Suggested improving other roads
2	Prefers Roundabout at Goodman Road
# of Comments	**On Other Topics**
12	Concerned about social impacts
10	Concerned about wildlife
6	Concerned about traffic noise
4	Concerned about speed and safety
2	Concerned about traffic
2	Concerned about drop in property values
2	Some Happy Trails parcels will not meet 5-acre requirement
1	Concerned about light pollution
1	Concerned about environmental impacts
1	Suggested providing wider sidewalks
14	Requested additional information

6.2.5 OSCEOLA COUNTY BOARD OF COUNTY COMMISSIONERS MEETING

For the February 20, 2023, Osceola County Board of County Commissioners meeting, a presentation with script was provided as part of the agenda package. This allowed the commissioners to review the findings and recommendations of the Sinclair Road Extension Part A Study prior to the meeting. The presentation included study methodology, purpose and need, results of the August 9, 2022 Public Alternatives Meeting including comments from the public, the Preferred Build Alternative and the impacts of the Preferred Build Alternative. Based on the advantages and disadvantages of the No-Build and Preferred Build Alternative, it was recommended that the Preferred Build Alternative, as identified in the Sinclair Road Extension Part A Study be constructed. No questions or comments were provided by the Board and the Board unanimously passed a resolution approving the Preferred Build Alternative of the Sinclair Road Extension Part A Study, allowing the Sinclair Road Extension project to move forward through the final design, right-of-way, and construction process.

7.0 DESIGN FEATURES OF THE PREFERRED ALTERNATIVE

After considering the alternatives analysis described in Section 5 and the project coordination and public involvement described in Section 6, the Preferred Alternative was identified as the Blue Alternative, along with the consideration of design strategies to reduce impacts to residential parcels.

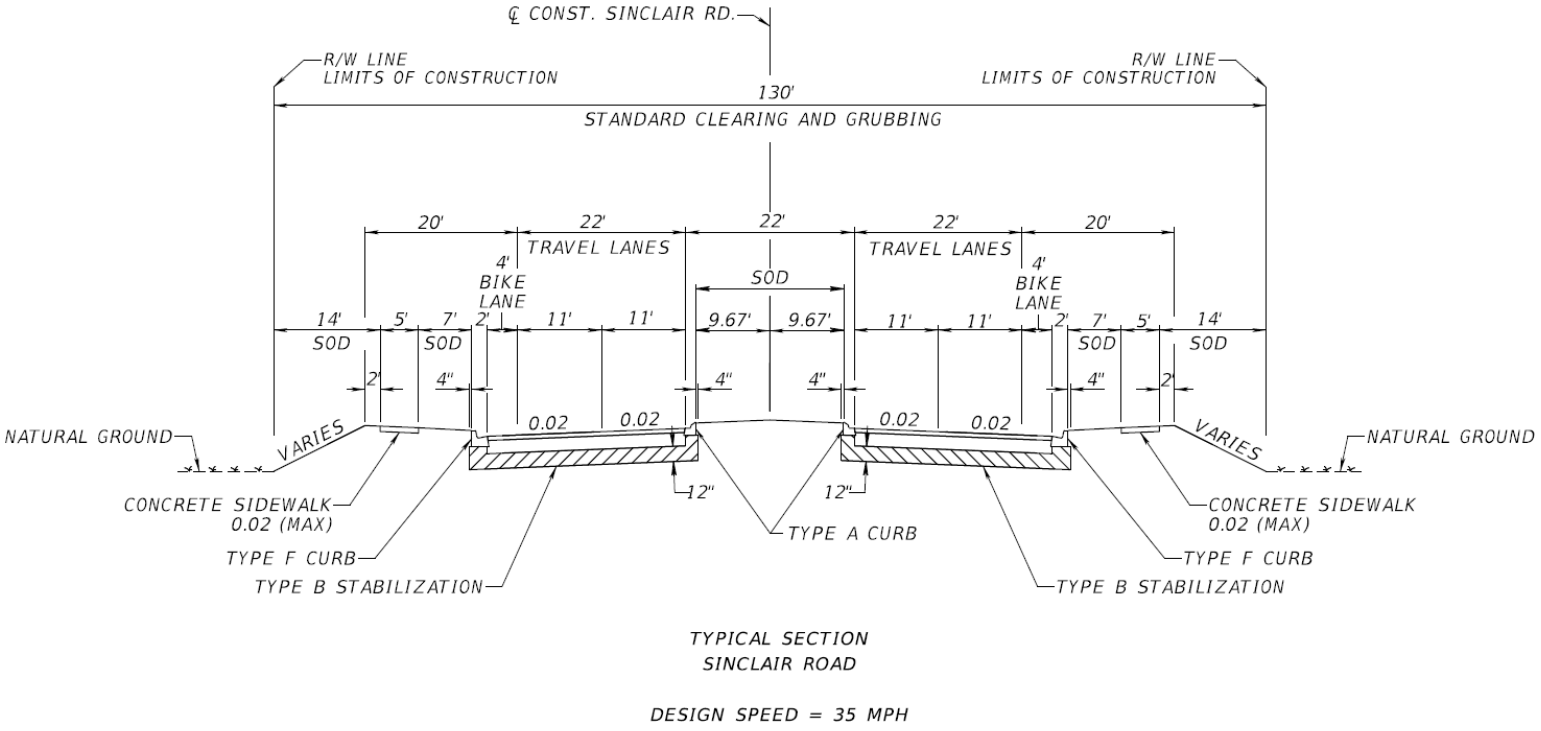
Concept plans for the Preferred Alternative are provided in **Appendix B**.

7.1 TYPICAL SECTION

The Preferred Alternative utilizes Typical Section Number 1 for all segments except at the bridge over Davenport Creek, which utilizes Typical Section Number 2.

Typical Section Number 1 is shown on **Exhibit 7-1**. It is a 4-lane divided urban roadway with a 35 MPH design speed with two 11-foot-wide travel lanes and a 4-foot-wide bicycle lane in each direction, separated by a 22-foot raised grass median with Type A curb and gutter. A 5-foot sidewalk is provided along both sides. This typical section would require 130 feet of right-of-way.

Exhibit 7-1: Typical Section Number 1

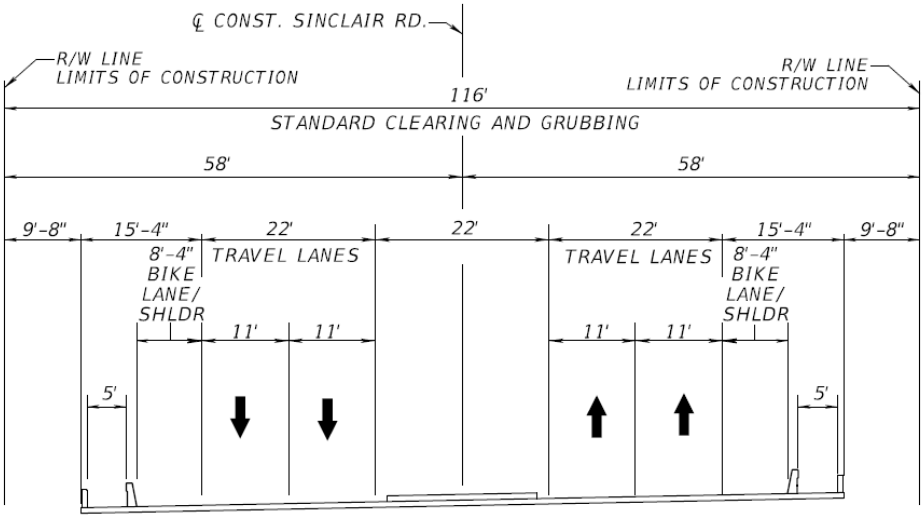


TYPICAL SECTION
SINCLAIR ROAD

DESIGN SPEED = 35 MPH

Typical Section Number 2 is shown on **Exhibit 7-2**. It applies to the bridge across Davenport Creek and is a 4-lane divided urban roadway with a 35 MPH design speed with two 11-foot-wide travel lanes and an 8-foot-4-inch-wide shoulder/bicycle lane in each direction, separated by a 22-foot raised median. A 5-foot sidewalk is provided along both sides, separated from the shoulder/bicycle lane by a barrier. This typical section would require 116 feet of right-of-way.

Exhibit 7-2: Typical Section Number 2



BRIDGE TYPICAL SECTION
SINCLAIR ROAD

DESIGN SPEED = 35 MPH

7.2 BRIDGES AND STRUCTURES

The bridge spanning Davenport Creek is a 4-lane divided urban roadway with a 35 MPH design speed with two 11-foot-wide travel lanes and an 8-foot-4-inch-wide shoulder/bicycle lane in each direction, separated by a 22-foot raised median. A 5-foot sidewalk is provided along both sides, separated from the shoulder/bicycle lane by a barrier. This typical section would require 116 feet of right-of-way. The proposed total bridge length is approximately 407 feet measured along the center of the bridge. The bridge is located on a curved alignment with a minimum radius of 500 feet. Based on bridge length and horizontal curvature, a multi-span curved steel bridge will be utilized for the crossing.

7.3 RIGHT-OF-WAY AND RELOCATIONS

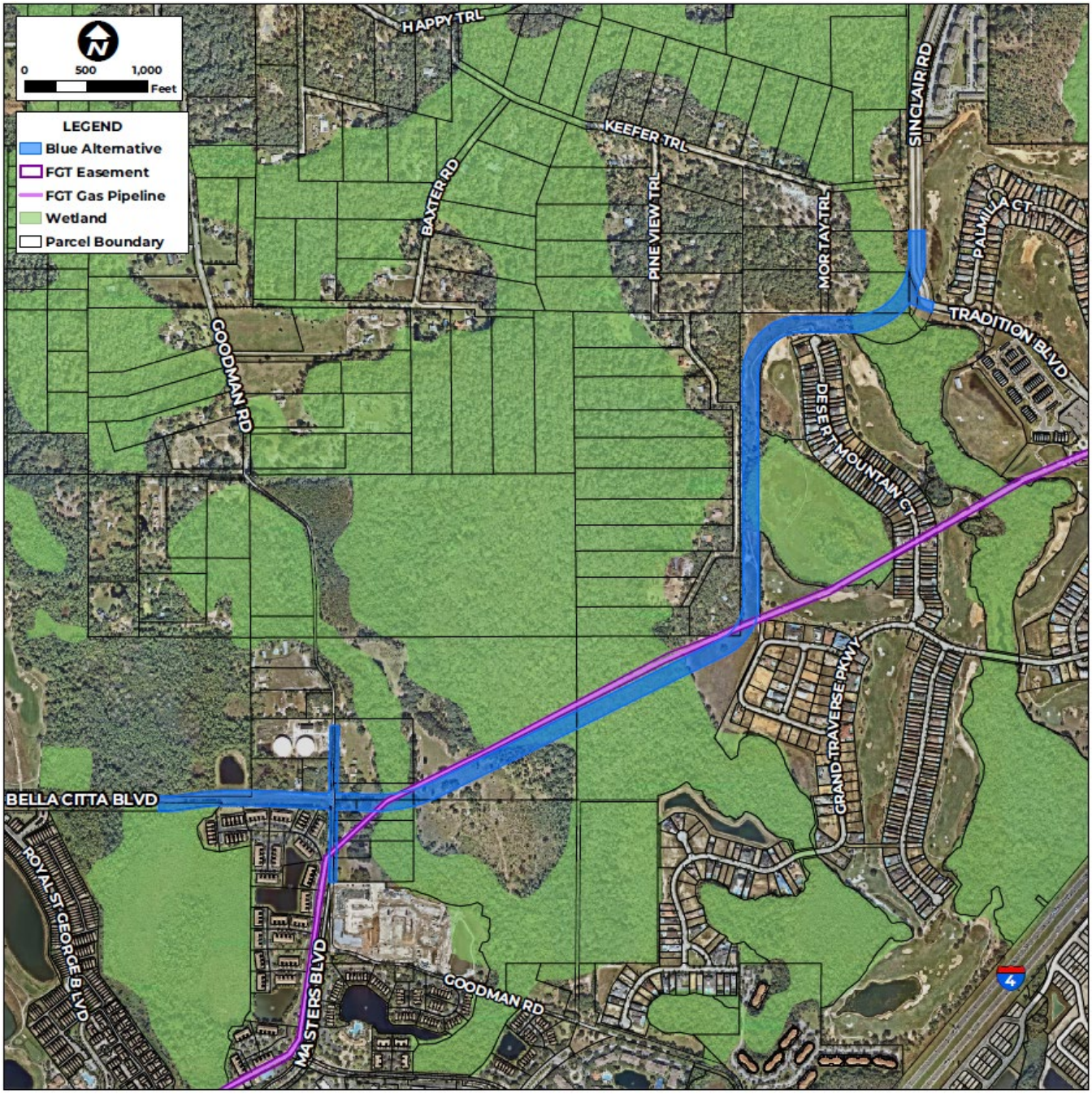
The Preferred Alternative (including ponds) requires right-of-way from 19 parcels: five business parcels, seven residential parcels, and seven unimproved parcels. Of the seven existing residences, two may potentially require relocation. Of the existing non-residential buildings, none are expected to require relocation.

7.4 HORIZONTAL ALIGNMENT

The proposed horizontal and vertical alignments for the Preferred Alternative generally follow the corresponding alignments of the existing roadway as described in Section 3.2.4.

The proposed horizontal alignment for the Preferred Alternative travels along the northern and western property lines of the Reunion Development with some encroachment into Happy Trails parcels. During design, strategies to reduce impacts to residential parcels should be considered. The Preferred Alternative crosses and travels along the south side of the FGT gas pipeline before crossing the FGT gas pipeline again to connect to Goodman Road at Bella Citta Boulevard. The Preferred Alternative is illustrated on **Exhibit 7-3**.

Exhibit 7-3: Preferred (Blue) Alternative



7.5 BICYCLE AND PEDESTRIAN ACCOMMODATIONS

The Preferred Alternative includes 4-foot bicycle lanes and 5-foot sidewalks in each direction.

7.6 MULTI-MODAL ACCOMMODATIONS

No fixed route bus service is currently provided on Sinclair Road and no bus service is planned in the future.

7.7 ACCESS MANAGEMENT

Osceola County utilizes the same Access Management Classification system as the Florida Department of Transportation (FDOT). Osceola County has established an access management classification of 5 for Sinclair Road Extension. Access Management Classification 5 includes the following:

- Restrictive median
- Full median opening spacing of 1,320-feet at 45 mph or less posted speed
- Directional median opening spacing of 660-feet
- Signal spacing of 1,320-feet at 45 mph or less posted speed
- Connection spacing of 245-feet at 45 mph or less posted speed

The Preferred Alternative includes full median openings at the following locations:

- Tradition Boulevard
- Elevation Address Drive (location to be determined, consistent with spacing requirements)
- Goodman Road

Directional median openings allow for right-in, right-out and left-in turn movements accessing the side street, and U-turns; however, left turns out from the side street are not permitted. Directional median openings will be determined during design.

All other connections would be restricted to right-in/right-out movements.

All access management will be refined during the final design phase.

7.8 INTERSECTION CONCEPTS

Intersection concepts are illustrated in the concept plans for the Preferred Alternative which are provided in **Appendix B**.

7.9 INTELLIGENT TRANSPORTATION SYSTEM AND TSM&O STRATEGIES AND TECHNOLOGIES

Intelligent transportation system and TSM&O strategies and technologies will be evaluated and identified as part of the design of Sinclair Road Extension.

7.10 UTILITIES

There are twelve utility providers from the Sunshine 811 design ticket and initial utility coordination efforts. All of the utility providers and operators were contacted on May 5, 2022 and were provided aerial maps of the project for review. Based on the aerial maps, utility providers were asked to assist in locating and identifying their existing and planned facilities within the study area. Through mark-ups and/or verbal descriptions, most utility providers or operators provided information on the location and type of existing facilities and information on the planned facilities anticipated in the future. At the time of utility contact efforts, none of the utility providers indicated any future planned facilities or upgrades to existing facilities within the study area. A list of the utility providers and a general description of their facilities is provided in **Table 7-1**.

Table 7-1: Summary of Utility Providers and Facilities

Utility Agency/Owner	Description of Facilities
CenturyLink/Lumen	• Buried fiber on the north side of Bella Citta Boulevard and east and west side of S. Goodman Road • Aerial facilities on the south side of Pine View Trail until the road turns and aerial facilities are on the west side of Pine View Trail until the road turns again and the aerial facilities are on the north side of Pine View Trail
Charter Communications	• Buried TV on the north side of Bella Citta Boulevard and east and west side of S. Goodman Road which transfers to aerial TV on the east side of S. Goodman Road • Aerial TV on the west side of Pine View Trail which transfers to buried TV on the west side until the road turns and it is on the south side of Pine View Trail
Comcast Communications	• No facilities are within the project limits
Duke Energy - Distribution	• Overhead electric 12.47/7.2 kV on the north side of Bella Citta Boulevard • Overhead electric lines crossing properties near the Bella Citta Boulevard and S. Goodman Road intersection in Duke Energy Easements • Underground electric 3 Phase 12.7/7.2 kV lines along the east side of S. Goodman Road in right-of-way • Overhead electric 12.47/7.2 kV on the south side of S. Goodman Road • Overhead electric 12.47/7.2 kV on the west side of Pine View Trail until the road turns and it is on the north side running parallel to the road in right-of-way, all overhead crossings through properties are on easements • Underground electric 3 Phase 12.47/7.2 kV around the roundabout at Desert Mountain Court • Underground electric 3 Phase 12.47/7.2 kV on the south side of Sinclair Road with switchgear at the intersection of Tradition Boulevard and Sinclair Road in an easement
FGT - Davenport	• 18” high pressure pipeline in a 50-foot easement approximately 0.45 mile south of Bella Citta Boulevard, turns north along the west side of S. Goodman Road until approximately 0.12 mile south of the intersection of Bella Citta Boulevard and S. Goodman Road where it continues northeast and crosses Tradition Boulevard approximately 0.35 mile south of Sinclair Road
Florida Public Utilities	• 4” plastic PSIG0 gas main on the west side of S. Goodman Road
OUC - Lighting	• Decorative lighting along both sides of Sinclair Road and Tradition Boulevard
Summit Broadband	• Underground 48 CT FOC in 3-1.25” HDPE conduit on the north side of Bella Citta Boulevard • Underground 72 CT FOC in 3-1.25” HDPE conduit on the west side of S. Goodman Road
TECO Peoples Gas - Orlando	• 4” PE Gas main on the north side of Tradition Boulevard and east side of Sinclair Road

Table 7-1: Summary of Utility Providers and Facilities *(continued)*

Utility Agency/Owner	Description of Facilities
TOHO Water Authority - Zone 1	• 24" DIP water main, 24" DIP reclaimed main, and 20" DIP force main on the north side of Bella Citta Boulevard • 24" unknown material reclaimed main on the south side of Bella Citta Boulevard • At the existing pond along Bella Citta Boulevard, the 24" DIP reclaimed main and 24" DIP water main cross the road and continue on the south side of Bella Citta Boulevard. The 24" unknown material reclaimed main turns north along the pond, and the water main also has a branch along the pond. The 20" DIP FM remains on the north side of Bella Citta Boulevard • 6" PVC force main which turns into a 24" force main and 20" DIP water main on the west side of S. Goodman Road. 24" reclaimed on the east side of S. Goodman Road • 8" PVC water main and 8" gravity sewer on Romani Avenue • 2" water main, 8" gravity sewer, and 2" reclaimed main in the roundabout at Desert Mountain Court • 10" PVC force main on the south side of Tradition Boulevard and west side of Sinclair Road • 12" PVC reclaimed main on the south side of Tradition Boulevard and east side of Sinclair Road • 24" DIP water main on the north side of Tradition Boulevard and east side of Sinclair Road
Uniti Fiber	• Three 1.25" ducts with 0.75" fiber cable on the north side of Bella Citta Boulevard at the intersection with S. Goodman Road
Zayo Group (Formerly Lightwave)	• Three 1.25" HDPE ducts with 44 CT FOC on the north side of Bella Citta Boulevard • Three 1.25" HDPE ducts with 44 CT FOC on the west side of S. Goodman Road

Most of the anticipated utility impacts identified occur within the Bella Citta Boulevard, S. Goodman Road, Tradition Boulevard, and existing Sinclair Road right-of-way. The majority of the utility impacts are to the existing facilities along the north side of Bella Citta Boulevard and the west side of S. Goodman Road. The utility impacts evaluation was based on information provided by the utility providers and will need to be reviewed more in detail during the design phase of the project to accurately identify utility impacts. **Table 7-2** summarizes the utility relocations on the project.

Table 7-2: Utility Impacts

Utility Agency/Owner	Description [1, 2]
CenturyLink/Lumen	• Buried fiber on the north side of Bella Citta Boulevard and east and west side of S. Goodman Road
Charter Communications	• Buried TV on the north side of Bella Citta Boulevard and east and west side of S. Goodman Road which transfers to aerial TV on the east side of S. Goodman Road
Comcast Communications	• No facilities
Duke Energy - Distribution	• Overhead electric 12.47/7.2 kV on the north side of Bella Citta Boulevard • Overhead electric lines crossing properties near the Bella Citta Boulevard and S. Goodman Road intersection in Duke Energy Easements • Underground electric 3 Phase 12.7/7.2 kV lines along the east side of S. Goodman Road in right-of-way • Overhead electric 12.47/7.2 kV on the south side of S. Goodman Road • Underground electric 3 Phase 12.47/7.2 kV on the south side of Sinclair Road with switchgear at the intersection of Tradition Boulevard and Sinclair Road in an easement
FGT - Davenport	• 18” high pressure pipeline within a 50-foot easement will be crossed twice northeast of the intersection of Bella Citta Boulevard and S. Goodman Road
Florida Public Utilities	• 4” plastic PSIG0 gas main on the west side of S. Goodman Road
OUC - Lighting	• Decorative lighting along both sides of Sinclair Road and Tradition Boulevard
Summit Broadband	• Underground 48 CT FOC in 3-1.25” HDPE conduit on the north side of Bella Citta Boulevard • Underground 72 CT FOC in 3-1.25” HDPE conduit on the west side of S. Goodman Road
TECO Peoples Gas - Orlando	• 4” PE Gas main on the north side of Tradition Boulevard and east side of Sinclair Road
TOHO Water Authority - Zone 1	• 24” DIP water main, 24” DIP reclaimed main, and 20” DIP force main on the north side of Bella Citta Boulevard • 24” unknown material reclaimed main on the south side of Bella Citta Boulevard • At the existing pond along Bella Citta Boulevard, the 24” DIP reclaimed main and 24” DIP water main cross the road and continue on the south side of Bella Citta Boulevard. The 24” unknown material reclaimed main turns north along the pond, and the water main also has a branch along the pond. The 20” DIP FM remains on the north side of Bella Citta Boulevard • 6” PVC force main which turns into a 24” force main and 20” DIP water main on the west side of S. Goodman Road. 24” reclaimed on the east side of S. Goodman Road • 10” PVC force main on the south side of Tradition Boulevard and west side of Sinclair Road

Table 7-2: Utility Impacts *(continued)*

Company	Description [1, 2]
TOHO Water Authority - Zone 1 *(continued)*	• 12" PVC reclaimed main on the south side of Tradition Boulevard and east side of Sinclair Road • 24" DIP water main on the north side of Tradition Boulevard and east side of Sinclair Road
Uniti Fiber	• Three 1.25" ducts with 0.75" fiber cable on the north side of Bella Citta Boulevard at the intersection with S. Goodman Road
Zayo Group (Formerly Lightwave, LLC)	• Three 1.25" HDPE ducts with 44 CT FOC on the north side of Bella Citta Boulevard • Three 1.25" HDPE ducts with 44 CT FOC on the west side of S. Goodman Road

1) The information contained in this table is based on the best available information and should be considered preliminary until verified through design survey during the design phase of the project.
2) FGT utility relocations were the only relocations identified as reimbursable at the time of this report.

7.11 DRAINAGE AND STORMWATER MANAGEMENT FACILITIES AND FLOODPLAIN ANALYSIS

Stormwater runoff from the proposed roadway will be collected by curb inlets and conveyed to corresponding ponds through closed system storm sewers. The proposed ponds have been sized to achieve the required water quality treatment and storage volume per SFWMD criteria as defined in the Applicant's Handbook Volume II.

7.11.1 PROPOSED PONDS

There are seven proposed ponds for the Preferred Alternative. Four ponds are existing water management facilities that will require modification (Permit No. 49-01107). The other three are new ponds sized to accommodate runoff from corresponding basins. The ponds were sized under the assumption that offsite runoff will bypass the pond site toward its historical path. For contingency purposes, the ponds were upsized by a minimum of 25% to account for factors that may change the pond design. The ponds were sized to accommodate four 11-foot-wide travel lanes (two in each direction), 4-foot-wide bike lanes, 5-foot-wide sidewalks on both sides of the road, and a 22-foot sodded median. See Section 7.1 for the typical section.

The areas draining to the ponds were determined through basin delineation using 2016 Osceola County LiDAR data and permit research. The location of the outfalls for each basin remains unchanged between existing and buildout conditions.

A summary of the proposed drainage basins and ponds is included in **Table 7-3**.

The proposed drainage basins and ponds are shown on **Exhibit 7-4** and **Exhibit 7-5**, respectively. More detailed drainage maps are included in **Appendix C**.

Table 7-3: Summary of Proposed Drainage Basins and Ponds

Basin/ Pond	From Station	To Station	Total Length (feet)	Open/Closed Basin	Waterbody ID (WBID)	Impairment	Outfall Location
1*	0+00	13+00	1300	Open	3170K	Bacteria	Davenport Creek
2	13+00	21+60	860	Open	3170K	Bacteria	CD-03
3	21+60	50+30	2870	Open	3170K	Bacteria	CD-01
4*	50+30	61+70	1140	Open	3170K	Bacteria	CD-02
5A*	61+70	74+00	1230	Open	3170K	Bacteria	CD-02
5B	74+00	84+40	1040	Open	3170K	Bacteria	Davenport Creek
6*	84+40	91+60	720	Open	3170K	Bacteria	Davenport Creek

* Existing Pond

Exhibit 7-4: Proposed Drainage Basins

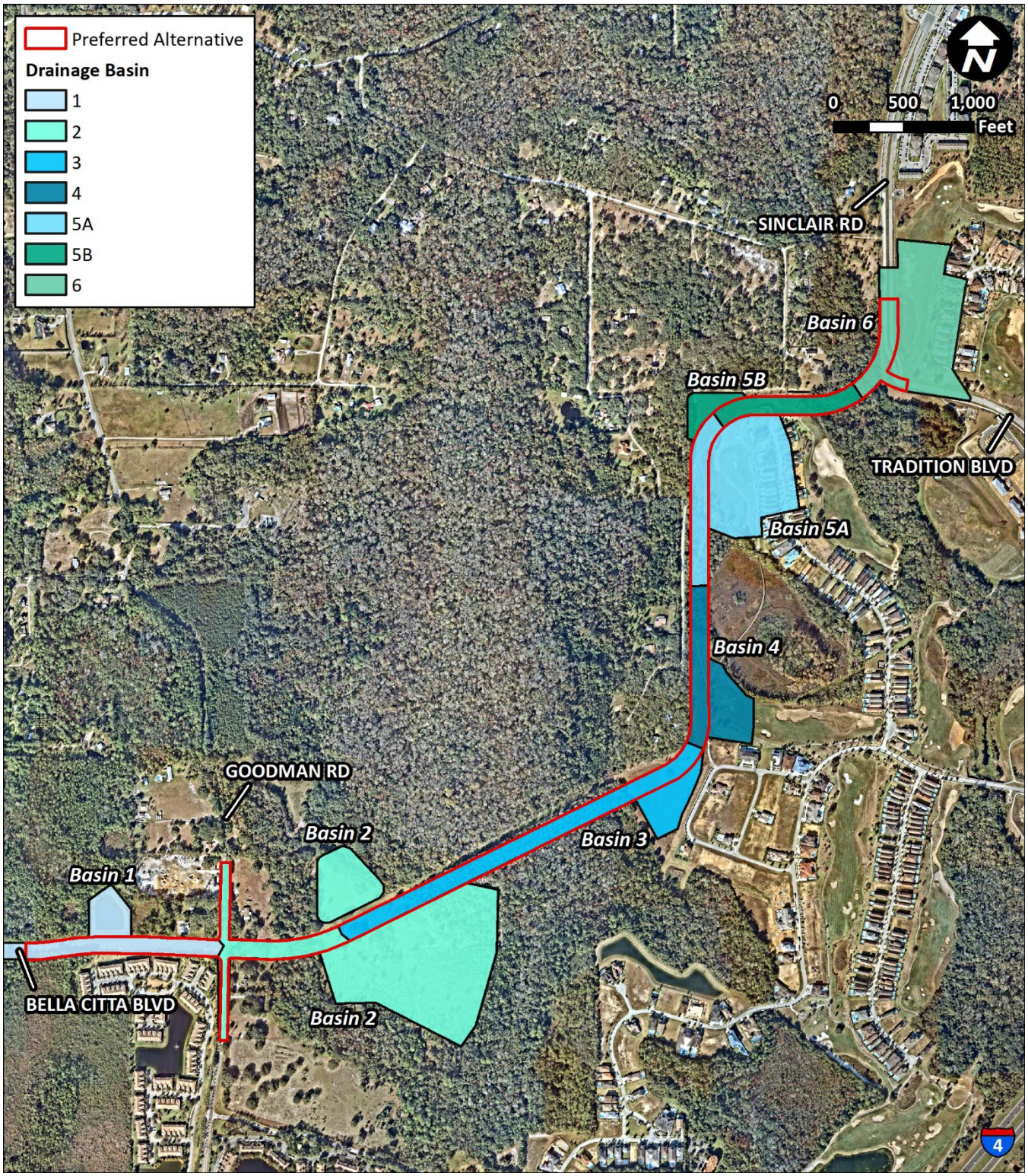
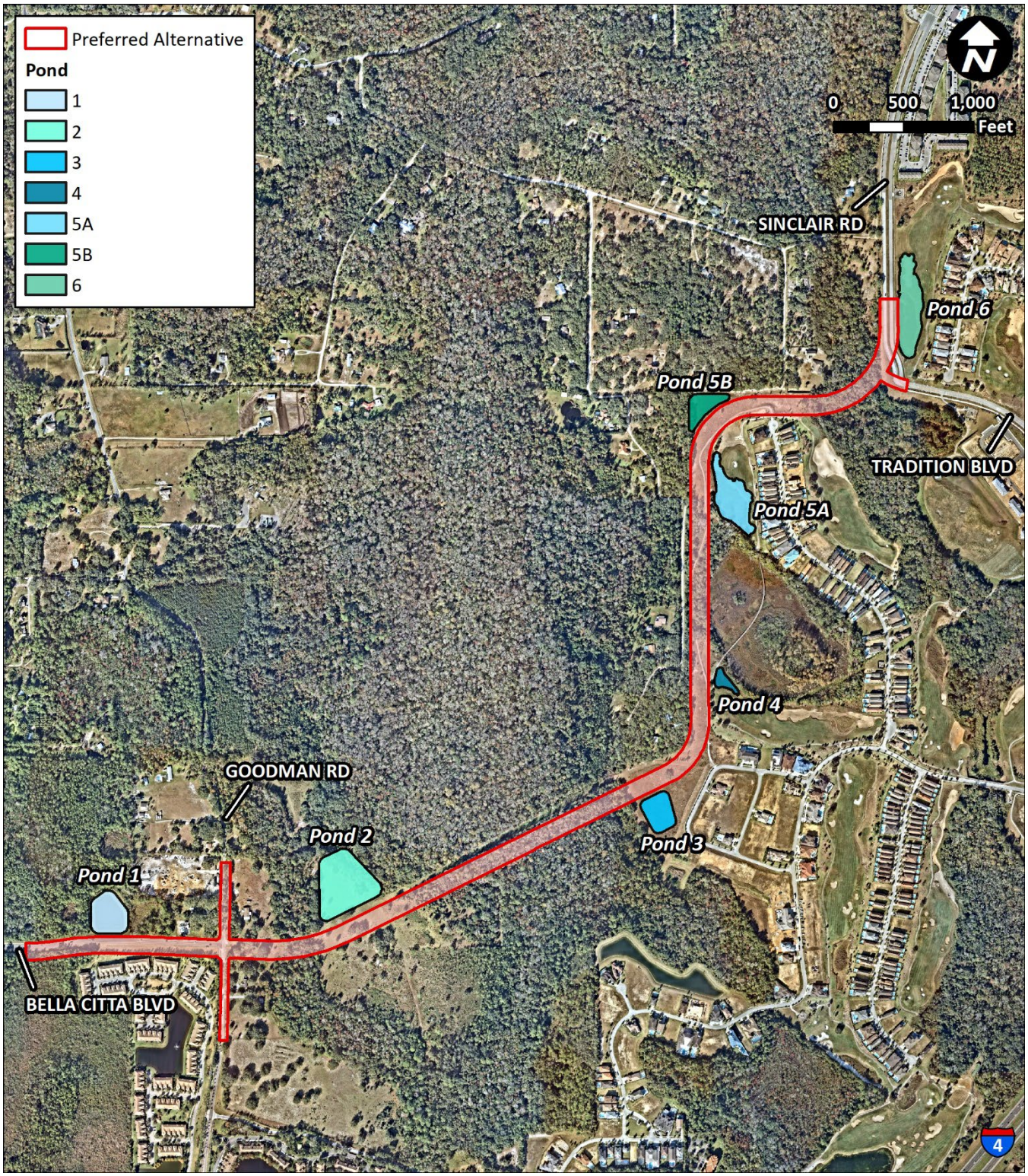


Exhibit 7-5: Proposed Ponds



7.11.1.1 BASIN 1

Basin 1 is composed of the Bella Citta Boulevard corridor and spans east to Station 13+00 at the intersection of S. Goodman Road. Basin 1 is considered an open basin because the surrounding area drains into Davenport Creek and is conveyed towards Lake Okeechobee through the Kissimmee River. Basin 1 includes areas of Bella Citta Boulevard which have been permitted (Permit No. 49-01744-P). Sections of Basin 1 are within FEMA's 100-year floodplain Zone A with no established BFE. Basin 1 will require approximately 1.13 acres of floodplain compensation. Floodplain impacts will be mitigated through a mass haul analysis or a "cup-for-cup" analysis during the design phase to ensure no adverse effects are created. Basin 1 will have no impacts to existing wetlands. Basin 1 is located within WBID 3170K which is not impaired for nitrogen or phosphorus; however, due to the ultimate outfall being Lake Okeechobee, nutrient loading analysis will need to be completed during the design phase.

Pond 1

The selected alternative for Basin 1 consists of modifying an existing pond located on Bella Citta Boulevard at Station 5+00 (Permit No. 49-01744-P). This existing pond is permitted as a wet detention pond and will continue to operate as a wet detention stormwater facility when modified to meet treatment and attenuation volume criteria for the proposed conditions of this project. Based on criteria set forth in the SFWMD Applicant's Handbook Volume II, Pond 1 requires a minimum treatment volume of 0.75-acre-feet, and a storage volume of 2.31-acre-feet. The control elevation of Pond 1 will remain at 108 feet (NAVD), the weir elevation will remain at 113.5 feet (NAVD), and the berm elevation will remain at 115.0 feet (NAVD). The proposed modification to the pond is to increase surface areas above the control elevation, which can be achieved by modifying the bank slopes from 1:4 to 1:6. Based on expected pond modifications, pond calculations yield a treatment volume capacity of 1.32-acre-feet, and a storage capacity of 2.54-acre-feet up to the design high water elevation. These physical modifications will not require additional right-of-way. Pond calculations are included in **Appendix D**.

7.11.1.2 BASIN 2

Basin 2 begins at the intersection of Bella Citta Boulevard and S. Goodman Road from Station 13+00 to Station 21+60. Basin 2 is considered an open basin because the surrounding area drains into Davenport Creek and is conveyed towards Lake Okeechobee through the Kissimmee River. Basin 2 is composed of the Preferred Alternative typical section and Elevation property. Elevation is a proposed private residential development on the south side of Basin 2, which upon completion, will discharge into Pond 2. Offsite runoff is intended to bypass and continue to flow through historical paths using cross drains. Basin 2 will impact 1.42 acres of floodplain since part of Basin 2 is within FEMA's 100-year floodplain Zone A without BFE established. Floodplain impacts will be mitigated through a mass haul analysis or a "cup-for-cup" analysis during the design phase to ensure no adverse effects are created. Additionally, the proposed corridor will impact approximately 0.66 acre of existing wetlands, which will need to be mitigated. The stormwater management system for Basin 2 (Pond 2) is proposed to be constructed outside the wetland limits. Offsite runoff is intended to bypass Basin 2 by implementing a (4) - 48" cross drain (CD-03) at Station 18+00. Basin 2 is located within WBID 3170K which is not impaired for phosphorus or nitrogen; however, due to the ultimate outfall being Lake Okeechobee, nutrient loading analysis will need to be completed during the design phase.

Pond 2

Pond 2 is located on the north side of the proposed corridor at approximately Station 23+00 on Parcel 28-25-27-0000-0060-0000 owned by Dewan Properties, LLC. The location of Pond 2 was chosen to minimize

clearing and grubbing of existing trees and to avoid floodplain and wetland impacts. The future development of Elevation, a residential complex on the south side of the Preferred Alternative, was also accounted for to preliminarily size Pond 2, as it is intended to be a joint-use pond between Sinclair Road Extension and Elevation. According to the soil survey, the proposed site for Pond 2 is primarily composed of Hontoon muck and Pomona fine sand with an approximate depth of 0 to 12 inches to the seasonal high-water table in its natural conditions. Pond 2 was sized to meet criteria set forth in the SFWMD Applicant's Handbook Volume II. The minimum treatment and attenuation volume required for Pond 2 is 8.81 acre-feet, of which 4.5 acre-feet are needed for treatment. Pond calculations yield a total storage capacity of 9.66 acre-feet up to the design high water elevation, and a treatment volume capacity of 4.68 acre-feet. The control elevation is set at 108 feet (NAVD), the weir elevation is 18 inches above that at 109.50 feet (NAVD), and the top of berm is set at 112 feet (NAVD). Pond calculations are included in **Appendix D**.

7.11.1.3 BASIN 3

Basin 3 spans from Station 21+60 to Station 50+30. Basin 3 is considered an open basin because the surrounding area drains into Davenport Creek and conveys towards Lake Okeechobee through the Kissimmee River. Basin 3 is composed of the Preferred Alternative typical section where all offsite runoff will bypass Basin 3 and continue to flow through historical paths by implementing a (3) – 48" cross drain (CD-01) at Station 35+00. Basin 3 will not have wetland impacts; however, Basin 3 will impact 3.26 acres of FEMA's 100-year floodplain Zone AE with an established BFE of 106 feet (NAVD). Floodplain impacts will be mitigated through a mass haul analysis or a "cup-for-cup" analysis during the design phase to ensure no adverse effects are created. Basin 3 is located within WBID 3170K which is not impaired for phosphorus or nitrogen; however, due to the ultimate outfall being Lake Okeechobee, nutrient loading analysis will need to be completed during the design phase.

Pond 3

Pond 3 is located on the South side of Sinclair Road between Stations 45+00 and 46+50. The pond sits on Parcel 34-25-27-4012-0003-0010 owned by Orlando Reunion Development, LLC. Pond 3 will have no impacts to wetlands or floodplains. According to soil survey, this area of land is primarily composed of Candler sand with a seasonal high-water depth of more than 72 inches. Based on 2016 Osceola County LiDAR (contours), Pond 3 is at an elevation of 111 feet (NAVD.) Pond 3 will be a dry detention pond with a control elevation of 108 feet (NAVD), weir elevation of 109.50 feet (NAVD), and a berm elevation of 112 feet (NAVD). Pond 3 was sized to meet criteria set forth in the SFWMD Applicant's Handbook Volume II. The minimum treatment volume required is 0.95 acre-feet, with a minimum storage capacity of 1.96 acre-feet for attenuation. Pond calculations yield a treatment volume capacity of 1.38 acre-feet and storage capacity of 2.93 acre-feet up to the design high water elevation. Pond calculations are included in **Appendix D**.

7.11.1.4 BASIN 4

Basin 4 spans from Station 50+30 to Station 61+70 of the Preferred Alternative. Basin 4 is considered an open basin because the surrounding area drains into Davenport Creek and conveys towards Lake Okeechobee through the Kissimmee River. Basin 4 is composed of the Preferred Alternative typical section and open space from the adjacent Reunion golf course. Part of Basin 4 is located within FEMA's 100-year floodplain with no determined BFE. Floodplain compensation will be required for 1.08 acres. Floodplain impacts will be mitigated through a mass haul analysis or a "cup-for-cup" analysis during the design phase to ensure no adverse effects are created. Basin 4 will impact approximately 0.74 acre of existing wetlands, for which compensation will also be required. Offsite runoff is intended to bypass Basin 4 by implementing cross drains to allow flow to continue its historic path. A (1) – 36" cross drain (CD-02) is proposed at Station

61+00. Basin 4 is located within WBID 3170K which is not impaired for phosphorus or nitrogen; however, due to the ultimate outfall being Lake Okeechobee, nutrient loading analysis will need to be completed during the design phase.

Pond 4

Pond 4 is located on the east side of the Preferred Alternative at approximately 55+00. Pond 4 is an existing pond originally permitted for the future construction of Sinclair Road Extension (Permit No. 49-01107-P). Based on permit research, Pond 4 was permitted with a control elevation of 108 feet (NAVD), weir elevation of 110 feet (NAVD), and berm elevation of 111 feet (NAVD). This configuration yields 0.96 acre-feet of treatment volume and 1.45 acre-feet of storage volume up to the permitted design high water elevation, which meets criteria for proposed conditions as set forth by the SFWMD Applicant's Handbook Volume II. No major modifications are proposed for Pond 4. Pond 4 also has an existing control structure that outfalls into adjacent wetlands. This control structure is composed of a Type "E" inlet with a weir and grate, and an 18-inch pipe at an invert of 107.1-feet (NAVD). Pond calculations are included in **Appendix D**.

7.11.1.5 BASIN 5A

Basin 5A spans from Station 61+70 to Station 74+00. Basin 5A is considered an open basin because the surrounding area drains into Davenport Creek and conveys towards Lake Okeechobee through the Kissimmee River. This basin is composed of the Preferred Alternative typical section, adjacent open space from the Reunion golf course, and residential space from an upstream subdivision on the east side of the Preferred Alternative. 0.6 acre of the alignment resides within FEMA's 100-year floodplain Zone A with no BFE established, for which floodplain compensation will be required. Floodplain impacts will be mitigated through a mass haul analysis or a "cup-for-cup" analysis during the design phase to ensure no adverse effects are created. The proposed corridor will impact approximately 0.19 acre of wetlands, for which compensation will be required. Offsite runoff is intended to bypass Basin 5A and continue its historic path through existing wetlands, proposed cross drains, and into Davenport Creek. Basin 5A is located within WBID 3170K which is not impaired for phosphorus or nitrogen; however, due to the ultimate outfall being Lake Okeechobee, nutrient loading analysis will need to be completed during the design phase.

Pond 5A

Pond 5A is located within the Reunion golf course on the east side of the Preferred Alternative at approximately Station 68+00. Pond 5A is an existing pond originally permitted for the future construction of Sinclair Road Extension (Permit No. 49-01107-P). Based on permit research, Pond 5A was permitted with a control elevation of 106 feet (NAVD), weir elevation of 110 feet (NAVD), and berm elevation of 114 feet (NAVD). The existing pond is equipped with a Type "E" inlet control structure and an 18-inch pipe out falling into adjacent wetlands. Pond 5A was sized to meet criteria set forth in the SFWMD Applicant's Handbook Volume II. Pond 5A requires minimum treatment and storage volumes of 1.20 acre-feet and 4.33 acre-feet, respectively, to meet design criteria. Pond calculations yield a treatment volume capacity of 1.26 acre-feet and storage volume of 5.18 acre-feet up to the design high water elevation. Modifications to the existing pond will require lowering the weir elevation to have a maximum of 18 inches between the control elevation and weir elevation. Control and berm elevations are to remain unmodified. Pond calculations are included in **Appendix D**.

7.11.1.6 BASIN 5B

Basin 5B spans from Station 74+00 to Station 84+40. Basin 5B is considered an open basin because the surrounding area drains into Davenport Creek and conveys towards Lake Okeechobee through the Kissimmee River. This basin is composed of the Preferred Alternative typical section. Part of Basin 5B is within FEMA's 100-year floodplain with an established BFE of 104 feet (NAVD). The part of the basin within the floodplain is intended to include a bridge culvert over Davenport Creek. A HEC-RAS model has been developed to ensure no adverse effects are created in the existing creek and to ensure bypass flow continues its historic path. Basin 5 will have no impact on wetlands. Basin 5B is located within WBID 3170K which is not impaired for phosphorus or nitrogen; however, due to the ultimate outfall being Lake Okeechobee, nutrient loading analysis will need to be completed during the design phase.

Pond 5B

Pond 5 is located on the west side of the Preferred Alternative at approximately Station 74+00. The pond sits in Parcel 34-25-27-4012-0003-0010 owned by Orlando Reunion Development, LLC. The site of Pond 5B will not impact floodplain or wetlands. According to soil survey, this site is primarily composed of Pomello fine sand with an estimated depth to the seasonal high-water table of 24 to 42 inches in its natural conditions. Based on 2016 Osceola County LiDAR, Pond 5B sits at an elevation of 113 feet (NAVD.) Pond 5B will be a wet-detention pond with a control elevation of 112 feet (NAVD), weir elevation of 113 feet (NAVD), and a berm elevation of 115 feet (NAVD). Pond 5B was sized to meet criteria set forth in the SFWMD Applicant's Handbook Volume II. The minimum treatment volume required is 0.38 acre-feet, with a minimum storage capacity of 1.13 acre-feet. Pond calculations yield a treatment volume capacity of 0.69 acre-feet and storage capacity of 1.46 acre-feet up to the design high water elevation estimated at 114 feet (NAVD). Pond calculations are included in **Appendix D**.

7.11.1.7 BASIN 6

Basin 6 spans from Station 84+40 to Station 91+60 of the Preferred Alternative. Basin 6 is considered an open basin because the surrounding area drains into Davenport Creek and conveys towards Lake Okeechobee through the Kissimmee River. Basin 6 is composed of proposed and existing segments of Sinclair Road, areas from Tradition Boulevard, open space from the adjacent Reunion golf course, and areas from the Reunion West Village subdivision. Basin 6 is within FEMA's 100-year floodplain with an established BFE of 104 feet (NAVD). This part of the basin is intended to include a bridge culvert over Davenport Creek. A HEC-RAS model has been developed to ensure no adverse effects are created in the existing creek, and to ensure bypass flow continues its historic path. Basin 6 will have no impact to wetlands. Basin 6 is located within WBID 3170K which is not impaired for phosphorus or nitrogen; however, due to the ultimate outfall being Lake Okeechobee, nutrient loading analysis will need to be completed during the design phase.

Pond 6

Pond 6 is an existing, permitted pond located in the Reunion golf course on the east side of Sinclair Road at approximately Station 90+00. Pond 6 was originally permitted for the future construction of Sinclair Road Extension (Permit No. 49-01107-P). The recommended modifications are intended to meet minimum design criteria set forth by the SFWMD Applicant's Handbook Volume II. The minimum treatment and storage volume required for Pond 6 are 1.54 acre-feet and 1.73 acre-feet, respectively. Pond calculations yield a treatment volume of 1.74 acre-feet, and storage of 3.78 acre-feet up to the design high water elevation, which is assumed to be one foot below the berm elevation. Pond 6 will remain at a control elevation of 105 feet (NAVD), a weir elevation 18 inches above the control elevation

at 106.5 feet (NAVD), and a berm elevation congruent to the permitted pond at 109 feet (NAVD). The existing pond is also equipped with a Type "E" inlet control structure that outfalls into Davenport Creek. This control structure is composed of a weir, grate, and an 18-inch outfall pipe with an upstream invert of 105 feet (NAVD). This control structure is to remain in place and undergo modifications to the weir elevation as described above. Pond calculations are included in **Appendix D**.

7.11.2 CROSS DRAINS

There are three proposed cross drains within the Preferred Alternative limits. All three cross drains are intended to aid the allowance of bypass runoff to continue flowing through historic flow paths. These were sized using HY-8 software with sufficient hydraulic capacity for a 50-year, 24-hour storm event as set forth in the Osceola County standards for Boulevard/Multimodal cross drains. For cross drains CD-01 and CD-02, discharge rates from Permit No. 49-01107-P ICRP model were used to determine minimum, design, and maximum discharge rates to size cross drains. For CD-03, excerpts from Permit No. 49-00884-P were used to determine discharge flows by using tailwater stage conditions for Node TW-4 through the wetland conveyance channel. **Appendix E** includes HY-8 calculations as well as a capacity analysis of the existing wetland channel for CD-03 using tailwater stages. A summary of the proposed cross drains is included in **Table 7-4**.

Table 7-4: Summary of Proposed Cross Drains

Cross Drain	Station	Proposed Size
CD-01	35+00.00	(3) – 48" Pipes
CD-02	61+00.00	(1) – 36" Pipe
CD-03	18+00.00	(4) – 48" Pipes

7.11.3 SPAN BRIDGE

Davenport Creek was modeled using HEC-RAS software (version 5.0.7) to determine the minimum length for a proposed bridge to prevent flow disturbances of Davenport Creek. The minimum bridge length is 150 feet; however, to account for the existing FEMA floodway width, the recommended length is 407 feet measured in the middle of the curved alignment. The recommended high and low chord elevations are 112 feet and 105 feet, respectively. Two abutments were modeled on either side of the bridge. Moreover, two sets of piers are proposed for the multi-span bridge, for which no rise certifications will be required. Based on modeling of proposed conditions, the water surface elevation at the bridge for the design storm (50-year storm) is 102.37 feet. Whereas the surface water elevation for the base flood (100-year storm), and the greatest flood (500-year storm), are 103.30 feet and 103.75 feet, respectively. FEMA Flood Insurance Rate Maps (FIRMs) indicate a BFE of 104 feet (NAVD88) in this area; thus, no adverse effects are created. HEC-RAS analysis reports for proposed and existing conditions are included in **Appendix F**.

7.12 TRANSPORTATION MANAGEMENT PLAN

Because this is a new facility, construction for the extension of Sinclair Road can be accomplished in one phase.

7.13 SPECIAL FEATURES

Special features for this project include a wildlife crossing (tunnel) to be provided. The location of the tunnel will be determined during design.

7.14 DESIGN VARIATIONS AND DESIGN EXCEPTIONS

No design variations or design exceptions are anticipated for this project.

7.15 COST ESTIMATES

Table 7-5 summarizes the costs projected for the Preferred Alternative, including construction costs, engineering, construction engineering and inspection (CEI), right-of-way costs, utility adjustments, and mitigation costs. In total, the projected cost for the project is approximately $52.2 million.

Table 7-5: Preferred Alternative Cost

Cost Element	Amount
Construction Cost	$ 24,000,000
Engineering/CEI (20%)	$ 4,800,000
Subtotal	*$ 28,800,000*
Right-of-Way Costs	$ 18,300,000
Utility Adjustment Costs	$4,100,000
Mitigation Costs	$ 1,000,000
Projected Total Cost	**$ 52,200,000**

8.0 SUMMARY OF ENVIRONMENTAL IMPACTS OF THE PREFERRED ALTERNATIVE

	Issues / Resources	Substantial Impacts? *			
		Yes	No	Enhance	NoInv
8.1	**Social and Economic**				
	1. Social	☐	☐	☒	☐
	2. Economic	☐	☐	☒	☐
	3. Land Use Changes	☐	☒	☐	☐
	4. Mobility	☐	☐	☒	☐
	5. Aesthetic Effects	☐	☒	☐	☐
	6. Relocation Potential	☐	☒	☐	☐
8.2	**Cultural**				
	1. Historic Sites/Districts	☐	☒	☐	☐
	2. Archaeological Sites	☐	☒	☐	☐
	3. Recreational Areas & Protected Lands	☐	☒	☐	☐
8.3	**Natural**				
	1. Wetlands & Other Surface Waters	☐	☒	☐	☐
	2. Aquatic Preserves & Outstanding FL Waters	☐	☐	☐	☒
	3. Water Resources	☐	☒	☐	☐
	4. Wild & Scenic Rivers	☐	☐	☐	☒
	5. Floodplains	☐	☒	☐	☐
	6. Coastal Barrier Resources	☐	☐	☐	☒
	7. Protected Species & Habitat	☐	☒	☐	☐
8.4	**Physical**				
	1. Air Quality	☐	☒	☐	☐
	2. Contamination	☐	☒	☐	☐
	3. Utilities & Railroads	☒	☐	☐	☐
	4. Construction	☐	☒	☐	☐
	5. Bicycles & Pedestrians	☐	☐	☒	☐
	6. Navigation	☐	☐	☐	☒

* Substantial Impacts? : Yes = Substantial Impact; No = No Substantial Impact;
Enhance = Enhancement; NoInv = Issue absent, no involvement.

8.5 Anticipated Permits

☐ Section 404 Dredge and Fill Permit - USACE
☐ Nationwide Permit – USACE
☐ Bridge Permit – USCG
☒ Environmental Resource Permit (SFWMD)
☒ Section 404 State Program – FDEP
☒ NPDES Permit
☒ FWC Gopher Tortoise Relocation Permit

8.1 SOCIAL AND ECONOMIC

The proposed project is anticipated to support growth in the area by connecting communities, improving traffic operations in the area, and enhancing pedestrian and bicycle facilities.

8.1.1 SOCIAL

Osceola County is one of the fastest growing counties in Florida. To accommodate this growth, traffic operations on existing roadways needs to be addressed. This project is being designed and evaluated to increase vehicular capacity and improve mobility between the rapidly growing communities of Reunion and ChampionsGate. The Preferred Alternative would enhance the movement of residents and individuals to community or neighborhood activity centers and therefore would enhance community connectivity. The Preferred Alternative would also provide a safer environment for bicyclists and pedestrians.

8.1.2 ECONOMIC

I-4 is currently used by residents to commute in and out of their communities and for the transport of local goods and services. The Preferred Alternative would provide a system linkage between Reunion and ChampionsGate communities. The proposed roadway would allow residents a new route from US 27 to SR 429 while avoiding I-4, thereby enhancing the movement of commuters to work as well as individuals to local shops and restaurants. This project proposes to support the projected growth of Osceola County and subsequent economic growth by improving the existing transportation infrastructure.

The Preferred Alternative will not result in any business relocations; therefore, the local economy/tax base will not be negatively affected by this project. It is expected that the Preferred Alternative would enhance the economy of the local community.

8.1.3 LAND USE CHANGES

Osceola County future land use (FLU) maps were reviewed to determine if the Preferred Alternative will promote changes to land use within the proposed project area. The current planned FLU from the Osceola County 2040 Comprehensive Plan includes low-density residential, high-density residential, rural enclave, tourism, and conservation. The Preferred Alternative would promote residential growth as planned and provide access for tourists; however, the rural enclave may be impacted. Construction of the Preferred Alternative would require acquisition of additional right-of-way; therefore, changing the current land use. The proposed stormwater ponds will be constructed outside of the existing right-of-way; however, the pond sites are undeveloped parcels and will remain undeveloped with the addition of the pond sites.

8.1.4 MOBILITY

To accommodate the rapid growth of this area, traffic operations on existing roadways needs to be addressed. The Preferred Alternative would improve the overall traffic operations of existing highway networks, improve mobility, and enhance safety. This roadway extension would allow a connection from US 27 to SR 429 without the use of I-4. The extension would enhance mobility for the commuter, visitor, and residents. The inclusion of bicycle lanes and sidewalks/shared use paths would also provide additional pedestrian mobility.

8.1.5 AESTHETIC EFFECTS

The existing topography of the proposed project area is relatively flat consisting of open pasture and woodlands with the surrounding area consisting of single- and multi-family residential areas as well as single-story commercial buildings. Existing views within the proposed project area are restricted by

vegetation and/or other structures. The Preferred Alternative would change the viewshed of the localized areas with newly constructed roadway and bridges; however, the localized area is also planned for development and would be consistent with the proposed changes.

Landscaping will likely be included in the construction of the Sinclair Road Extension and would provide a vegetative buffer between residential communities and the roadway.

8.1.6 RELOCATION POTENTIAL

No business relocations will be required, and there are two potential residential relocations that may be required; however, both the Preferred Alternative and proposed pond sites require acquisition of right-of-way.

8.2 CULTURAL

8.2.1 HISTORIC SITES/DISTRICTS AND ARCHAEOLOGICAL SITES

A Cultural Resource Assessment Survey (CRAS) was conducted by SEARCH in July 2023. The purpose of the survey was to locate, identify, and bound any archaeological resources, historic buildings or structures, and potential historic districts within the project's area of potential effects (APE) and assess their potential for listing in the NRHP.

The CRAS was conducted in accordance with the requirements set forth in Chapter 267, Florida Statutes (F.S.) and Rule Chapter 1A-46, FAC, as well as the Florida Division of Historical Resources' (FDHR) recommendations for such projects as stipulated in the FDHR's Cultural Resource Management Standards & Operations Manual, Module Three: Guidelines for Use by Historic Preservation Professionals. Additionally, all work was performed in accordance with Part 2, Chapter 8 of FDOT's PD&E Manual (revised July 2020). The principal investigator for the CRAS meets the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716-42). The CRAS complies with Public Law 113-287 (Title 54 U.S.C.), which incorporates the provisions of the National Historic Preservation Act (NHPA) of 1966, as amended, and the Archeological and Historic Preservation Act of 1974, as amended. The CRAS also complies with the regulations for implementing NHPA Section 106 found in 36 CFR Part 800 (Protection of Historic Properties).

The APE defines the area within which physical, visual, and audible effects that project improvements and subsequent maintenance may have on historic properties. The archaeological APE was defined to include the proposed right-of-way of the project's roadway corridor and seven pond footprints. The architectural history APE includes the archaeological APE and was extended to the back or side property lines of parcels adjacent to the proposed right-of-way or a distance of no more than 100 meters (330 feet) from the corridor right-of-way line and 30 meters (100 feet) from the pond footprints. The "APE" refers to the combined archaeological APE and architectural history APE. The archaeological and historical/architectural fieldwork was conducted between April 3, 2023, and April 14, 2023.

The archaeological survey included the excavation of 97 shovel tests within the APE corridor and adjacent pond footprints, six of which were positive for cultural material and associated with previously recorded sites 8OS00094 and 8OS00095. Additional planned shovel tests were not excavated due to the presence of gopher tortoise burrows, inundated and wet conditions within depressed areas, in addition to the presence of marked buried utilities within the archaeological APE at an active golf course, adjacent to

newly constructed residential areas, and at the intersection of Bella Citta Boulevard with South Goodman Road and the intersection of Sinclair Road with Tradition Boulevard.

Three of the positive shovel tests are associated with previously recorded archaeological site 8OS00094 and three are associated with previously recorded site 8OS00095. The boundaries of each site were expanded to include the positive shovel test locations. In total, five non-diagnostic lithic flakes were recovered from each site. Due to the low density of cultural materials, the nondiagnostic artifact assemblage, and noted disturbance, it is SEARCH's opinion that the portions of 8OS00094 or 8OS00095 within the archaeological APE do not have the potential to provide additional information regarding the precontact Native American history or postcontact history of the region. The SHPO has previously recommended site 8OS00094 not eligible for the NRHP and SEARCH recommends no change to its NRHP eligibility status. Site 8OS00095 has not been evaluated by the SHPO but was recommended ineligible for the NRHP by the surveyor (Rollins College 1988). Based on the results of the current survey, SEARCH supports this recommendation. No further archaeological work is recommended in support of the proposed project.

The architectural survey resulted in the identification and evaluation of one newly recorded historic building (8OS03331). Resource 8OS03331 lacks the architectural distinction and significant historical associations necessary to be considered for listing in the NRHP and is recommended not eligible. No existing or potential historic districts were identified.

No further architectural history survey is recommended. No NRHP-listed or eligible cultural resources were identified within the project APE. SEARCH recommended that this project would result in No Adverse Effect to historic properties. No further cultural resources work is recommended. Physical and digital copies of the CRAS draft documentation were submitted to SHPO in August 2023, to seek concurrence from the FDHR with this finding. The FDHR confirmed receipt of the CRAS draft documentation on October 14, 2023; however, they are unable to provide comments on the documentation unless a state or federal agency becomes involved in the funding or permitting of the project. The FDHR is holding the CRAS draft documentation as a due diligence submittal and will review once permitting information is provided to them, which will occur during the permitting phase of this project.

8.2.2 RECREATIONAL AREAS AND PROTECTED LANDS

No recreational areas or protected lands are contained within the Preferred Alternative. Two conservation easements are located adjacent to the Preferred Alternative limits. A FL-SOLARIS Conservation Lands, Easements and Recreation (CLEAR) conservation easement (Land ID N612) is associated with a private residential home located west of Pine Way Trail, approximately 390 feet from the proposed Preferred Alternative. An additional SFWMD ERP conservation easement (Permit No. 49-01107-P-19), Reunion Resort Phase 2, is associated with the Reunion Resort located approximately one mile southeast of the Preferred Alternative. Both of these conservation easements are still active, though neither are projected to be impacted by the Preferred Alternative.

8.3 NATURAL

8.3.1 WETLANDS AND SURFACE WATER IMPACTS

The jurisdictional limits of the wetlands were estimated in accordance with the State unified wetland delineation methodologies as adopted by the FDEP and the water management districts per Chapter 62-340, FAC and described in *The Florida Wetlands Delineation Manual* and the USACE 1987 Wetland

Delineation Manual and regional supplement. The extent and types of wetlands in the project study area were documented in accordance with Executive Order EO 11990, Protection of Wetlands, and Part 2, Chapter 9 of the PD&E Manual.

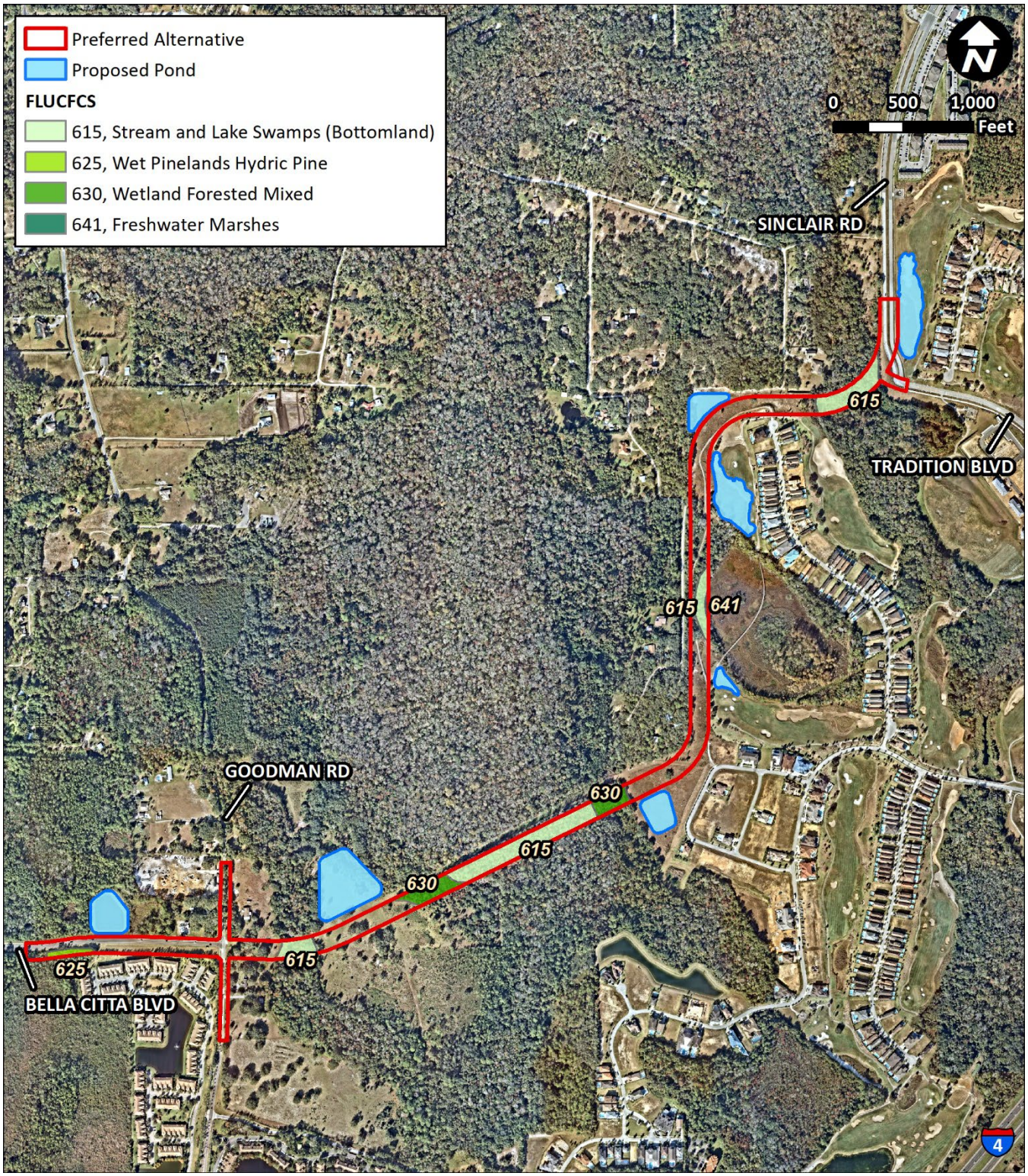
Osceola County has considered all actions to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the SFWMD's responsibilities. Nonetheless, Osceola County has determined that there is no practicable alternative to construction impacts occurring in wetlands (design standards required tie down slopes at a ratio that were not able to be reduced). Any unavoidable impacts to wetlands will be mitigated to achieve no net loss of wetland function within the respective basin. Impacts to wetlands are unavoidable for the Preferred Alternative due to their location within the project area immediately adjacent to the existing road. However, potential wetland impacts have been minimized to the extent possible by incorporating a stormwater management system which would be constructed to meet state water quality criteria, thereby minimizing water quality impacts from stormwater discharges from roadway surfaces.
For the purposes of this document, wetlands are defined as per 62.340 FAC and Section 373.019 (27), F.S. Surface waters are defined as open water bodies. No surface waters were identified during site reconnaissance. Three forested wetland FLUCFCS types were identified within the Preferred Alternative limits. These systems include a stream and lake swamps (bottomland) system (FLUCFCS 615), a hydric pine flatwood system (FLUCFCS 625), and a mixed wetland forests system (FLUCFCS 630). The Preferred Alternative limits bisect these forested wetland types. The Preferred Alternative also has a small portion of a freshwater marsh (FLUCFCS 641) near the eastern limits. The forested wetland types appear to be relatively undisturbed with the exception of a cleared utility easement. The utility easement runs adjacent to the Preferred Alternative. Due to the hydrologic connections of the forested wetlands, it is anticipated they will be jurisdictional to the SFWMD and FDEP.

The Preferred Alternative proposes impacts to the forested wetland systems and the freshwater marsh system. The current proposed pond sites will not directly impact wetlands. Indirect impacts will be assessed using the Uniform Mitigation Assessment Methodology (UMAM) at the time of permitting to determine loss within a buffer extending out from the direct impacts associated with these systems. Direct wetland impacts are shown on **Exhibit 8-1** and impact acreages are shown below in **Table 8-1**.

Table 8-1: Preferred Alternative Direct Wetland Impacts

Alternative	FLUCFCS Code: Description	Impact Acreage
Preferred Alternative	615: Stream and Lake Swamps (Bottomland)	5.02
	625: Hydric Pine Flatwoods	0.43
	630: Wetland Forested Mixed	1.89
	641: Freshwater Marsh	0.09
TOTAL		**7.43**

Exhibit 8-1: Direct Wetland Impacts



8.3.2 UNIFORM MITIGATION ASSESSMENT METHODOLOGY

The UMAM per Chapter 62-345, FAC, is a state and federally approved method used to assess wetlands in the State of Florida. UMAM was developed by the FDEP and the water management districts to determine the amount of mitigation required to offset adverse impacts to wetlands. The methodology was designed to assess functions provided by wetlands, the amount those functions are reduced by a proposed impact, and the amount of mitigation necessary to offset the proposed functional losses. This method is also used to determine the degree of affect in ecological value that will result from the proposed activity.

The UMAM assessment includes a Qualitative Characterization (Part 1) as well as a Quantitative Assessment and Scoring (Part 2). The Qualitative Assessment is a basic descriptor of the site being evaluated. The variables described include the following:

- Significant nearby features
- Water classifications
- Assessment area size
- Hydrology and relationship to contiguous off-site wetlands
- Uniqueness of the assessment area
- Functions of the assessment area
- Wildlife utilization

The Quantitative Assessment provides a score of the assessment area in both the current condition and "with impact" condition. The assessment scoring evaluates the following parameters:

- Location and landscape support
- Water environment
- Vegetative community

For this analysis, representative UMAM scores were developed for each wetland type affected by the proposed project.

To calculate functional loss, the difference between the existing condition (current) scores and the proposed condition (with) scores for each habitat type (see **Table 8-2**) was multiplied by the acreage of proposed impact to determine the lost value of functions resulting from construction of the proposed project (see **Table 8-3**). The completed UMAM data sheets for each wetland habitat type are provided in **Appendix G**. Functional loss was calculated by habitat type for the Preferred Alternative. Construction of the Preferred Alternative results in a loss of 5.63 forested functional units and 0.05 herbaceous functional units.

These UMAM calculations are estimates and are based on existing conditions. The UMAM scores and values presented in **Table 8-2** are subject to agency review and may change during the state and federal permitting process.

Table 8-2: Representative UMAM[1] Scores for Direct Impacts to Wetlands

FLUCFCS Code	FLUCFCS Description	Location and Landscape Support		Water Environment		Community Structure		Score (Sum ÷ 30)		Delta
		Current	With	Current	With	Current	With	Current	With	
615	Stream and Lake Swamps (Bottomland)	8	0	8	0	8	0	0.80	0	-0.80
625	Hydric Pine Flatwoods	6	0	7	0	7	0	0.67	0	-0.67
630	Wetland Forested Mixed	7	0	7	0	7	0	0.70	0	-0.70
641	Freshwater Marsh	5	0	6	0	6	0	0.57	0	-0.57

[1] UMAM scores have not been approved by permitting agencies and are subject to change during the permitting process.

Table 8-3: Estimated UMAM[1] Functional Loss from Direct Wetland Impacts for Preferred Alternative

FLUCFCS Code	Direct Impacts (Acres)	UMAM Composite Score	Potential Functional Loss	Sum of Potential Functional Loss by Habitat Type
615	5.02	0.80	4.02	Forested: -5.63 Herbaceous: -0.05
625	0.43	0.67	0.29	
630	1.89	0.70	1.32	
641	0.09	0.57	0.05	

[1] UMAM scores have not been approved by permitting agencies and are subject to change during the permitting process.

8.3.3 MITIGATION

Avoidance and minimization of wetland impacts will continue to be evaluated during the design, permitting, and construction of this project and all possible and practicable measures to avoid or minimize these impacts will be incorporated. Appropriate mitigation options will be provided for unavoidable impacts. Mitigation is expected to consist of purchase of mitigation credits. The project occurs within the Reedy Creek Cumulative Impact Basin and several mitigation banks have service areas that include the project study area. The following mitigation banks will be considered for wetland mitigation: Hatchineha Ranch Mitigation Bank, Bullfrog Bay Mitigation Bank, and Shingle Creek Mitigation Bank. These banks currently have both forested and herbaceous, state and federal credits available.

All UMAM scores, UMAM calculations, preliminary wetland lines and determinations discussed are subject to revision and approval by regulatory agencies during the permitting process. The exact type of mitigation used to offset wetland impacts from the proposed Sinclair Road extension will be coordinated with the FDEP and the SFWMD during the permitting phase(s) of this project.

As required by Executive Order 11990 and U.S. Department of Transportation (USDOT) Order 5660.1A, the proposed project will have no significant short-term or long-term adverse impacts to wetlands, there is no practical alternative which may be constructed without direct impact to wetlands. Wetland impacts which will result from the construction of this project will be mitigated pursuant to Section 373.4137, F.S. to satisfy all mitigation requirements of Part IV. Chapter 373, F.S. and 33 U.S.C. s. 1344.

8.3.4 AQUATIC PRESERVES AND OUTSTANDING FLORIDA WATERS

There are no Aquatic Preserves or Outstanding Florida Waters within the project area, thus the proposed project would have no involvement with these resources.

8.3.5 WATER RESOURCES

There are no aquatic preserves or Outstanding Florida Waters (OFWs) within the Preferred Alternative limits. A review of EPA Sole Source Aquifer Protection Program maps of sole source aquifers in the southeastern United States indicated that the Preferred Alternative is located within the Biscayne Sole Source Aquifer and Recharge Zone. The project will meet all applicable SFWMD criteria related to water quality. The project is currently a non-federal action receiving no federal monies; therefore, concurrence from the EPA is not required according to the Safe Drinking Water Act. BMPs to control erosion, sediment release, and storm water runoff to minimize adverse impacts on surface water resources will be implemented during design, permitting and construction.

A stormwater management system will be designed and will include stormwater management facilities. The design of the stormwater facilities will comply with the standards set forth by SFWMD and Osceola County. The western half of the Preferred Alternative is within the WBID 3170K – Davenport Creek which is an impaired water for fecal coliform and bacteria. Therefore, the stormwater management system design will include a site-specific pollutant loading analysis and an additional 50% water quality treatment volume.

Water quality impacts resulting from erosion and sedimentation during construction activities will be controlled in accordance with FDEP's National Pollutant Discharge Elimination System (NPDES) Permit including the preparation of a stormwater pollution prevention plan; the latest edition of FDOT's *Standard Specification for Road and Bridge Construction;* and through the use of BMPs including temporary erosion features (e.g., turbidity barriers) during construction.

Biscayne Aquifer

The Preferred Alternative limits are within the boundaries of the Biscayne Sole Source Aquifer Streamflow and Recharge Source Zone which includes portions of Osceola County extending south towards the Everglades. The proposed roadway will have a curb and gutter stormwater collection system. Stormwater captured by the proposed inlets will be conveyed, by closed storm sewer pipes, to one or more potential pond sites. Captured stormwater will receive treatment and attenuation by the wet detention pond before discharging to the adjacent stormwater outfall. The proposed stormwater facilities would meet all SFWMD criteria; therefore, water quality impacts to downstream receiving waters are not anticipated to occur. The project is currently a non-federal action receiving no federal monies; therefore, concurrence from the USEPA is not required according to the Safe Drinking Water Act.

8.3.6 WILD AND SCENIC RIVERS

There are no wild or scenic rivers within the project area, thus the proposed project would have no involvement with these resources.

8.3.7 FLOODPLAINS

Of the ±29.3-acre project areas, approximately 8.0 acres of the Preferred Alternative limits (27%) are classified as being within the FEMA Flood Zone A or Zone AE, within the 100-year floodway. Zone AE is defined as the 1% annual chance flood where an established BFE has been determined; Zone A is defined as the 1% annual chance flood with no BFE determined. Of these floodplains, approximately 4.8 acres (16.4%) are classified as Zone AE. There is a FEMA Regulatory Floodway within the crossing of Davenport Creek. Impacts to flood zones by are shown in **Table 8-4**.

Table 8-4: Flood Zone Impacts by Alternative

Alternative	Flood Zone Area (Acres)*	
	Zone AE	Zone A
Mainline	4.8	3.2
Pond 1	0.0	1.0
Pond 2	0.4	0.1
Pond 4	0.0	0.3

*There are areas where, based on the mapping, the road itself is mapped in the A zone. But depending on the actual surveyed elevation, the road and adjacent shoulders may have been built above the flood elevation. For purposes of this review, the acreage is shown based on the mapped FEMA-FIRM floodplain.

8.3.8 COASTAL BARRIER RESOURCES

The proposed project would have no involvement with coastal barrier resources.

8.3.9 PROTECTED SPECIES AND HABITAT

Habitat mapping, general wildlife surveys, and gopher tortoise surveys were conducted on November 2, 2021. Observations of flora and fauna or indicators of wildlife within the corridor such as tracks, burrows, scat, calls (avian), and evidence of foraging activities were noted, in addition to actual observations of plants and animals.

Fourteen federally listed species and six state-listed species were evaluated to determine if the proposed project will affect these species. The effect determinations listed in **Table 8-5** were made based on field surveys, literature, and database reviews. Effect determinations for the wood stork and eastern indigo snake were determined using the respective species determination keys (see **Appendix A** for key path steps to determination).

Table 8-5: Species Effect Determinations

Common Name	Effect Determination
Federally Listed Species	
Audubon's crested caracara	May affect, not likely to adversely affect
Everglade snail kite	No effect
Florida grasshopper sparrow	No effect
Florida scrub-jay	May affect, not likely to adversely affect
Red-cockaded woodpecker	No effect
Wood stork	May affect, not likely to adversely affect
American alligator	May affect, not likely to adversely affect
Blue-tailed mole skink	May affect, not likely to adversely affect
Eastern indigo snake	May affect, not likely to adversely affect
Sand skink	May affect, not likely to adversely affect
Britton's beargrass	May affect, not likely to adversely affect
Florida bonamia	No effect
Scrub buckwheat	No effect
Small's jointweed/Sandlace	No effect
State Listed Species	
Florida sandhill crane	No adverse effect is anticipated
Little blue heron	No adverse effect is anticipated
Southeastern American kestrel	No adverse effect is anticipated
Tricolored heron	No adverse effect is anticipated
Florida pine snake	No adverse effect is anticipated
Gopher tortoise	No adverse effect is anticipated

A summary of the proposed impacts to upland habitats within the Preferred Alternative limits and proposed pond sites are presented in **Table 8-6**. Due to golf course maintenance, habitat within golf course property is excluded from impacts.

Table 8-6: Habitat Impacts (Acres)

Alternative	FLUCFCS Code: Description	Acreage of Impact
Preferred Alternative	190: Open Land	9.9
	211: Improved Pastures	2.2
	420: Upland Hardwood Forest	1.6
	434: Hardwood-Conifer Mixed	0.2
TOTAL		**13.9**
Pond 1	N/A	0.0
Pond 2	211: Improved Pastures	3.6
Pond 3	190: Open Land	1.2
Pond 4	N/A	0.0
Pond 5A	N/A	0.0
Pond 5B	190: Open Land	0.9
Pond 6	N/A	0.0
TOTAL		**5.7**

8.4 PHYSICAL

8.4.1 AIR QUALITY

The project is located in an air quality attainment area, Osceola County, so an air quality screening consistent with the National Ambient Air Quality Standards was not required. Temporary air quality impacts due to construction activities are possible due to emissions from construction equipment and dust from excavation and hauling activities. Air pollution associated with the creation of airborne particles will be effectively controlled using watering or the application of calcium chloride in accordance with FDOT's *Standard Specifications for Road and Bridge Construction* as directed.

8.4.2 CONTAMINATION

The Contamination Screening Evaluation Report, dated June 2023, prepared for this project identified and evaluated known or potential contamination sites, identified recommendations concerning these sites, and described possible impacts to the proposed project.

As summarized in **Table 8-7**, a total of three sites potentially impacted by the Preferred Alternative were assigned contamination risk potential ratings of Low-Risk. There were no Medium-Risk or High-Risk sites identified for the Preferred Alternative. The Low-Risk rating indicates that contamination impacts to the project are unlikely for those sites. No additional contamination work is recommended in addressing the Low-Risk sites.

Table 8-7: Potential Contamination Risk

Site Name	Site Location	Risk Potential
Edward R Rutledge	1200 S Goodman Road - Within the project right-of-way	Low
TWA Western Reuse Storage	1180 S Goodman Road - Directly west of the project right-of-way	Low
Historical Citrus Grove Area	Within the project right-of-way	Low

8.4.3 UTILITIES AND RAILROADS

A total of twelve utility providers were identified through coordination with Sunshine 811 as having utilities within the project area.

Most of the anticipated utility impacts identified occur within the Bella Citta Boulevard, S. Goodman Road, Tradition Boulevard, and existing Sinclair Road right-of-way. The majority of the utility impacts are to the existing facilities along the north side of Bella Citta Boulevard and the west side of S. Goodman Road. More detailed utility coordination should be performed during the design phase of the project to accurately identify utility impacts

There are no railroads located within the project area.

8.4.4 CONSTRUCTION

Construction activities for the proposed improvements may have temporary air, noise, water quality, traffic flow, and visual impacts for those residents and travelers within the immediate vicinity of the project. The air quality impact will be temporary and will primarily be in the form of emissions from diesel powered construction equipment and dust from embankment and haul road areas. Air pollution associated with the creation of airborne particles will be effectively controlled using watering or the application of calcium chloride in accordance with FDOT's *Standard Specifications for Road and Bridge Construction.*

The contractor will adhere to the most current version of FDOT's *Standard Specifications for Road and Bridge Construction* to minimize or eliminate potential construction noise and vibration impacts.

Water quality impacts resulting from erosion and sedimentation will be controlled in accordance with FDOT's *Standard Specifications for Road and Bridge Construction*. To prevent point source discharge BMPs will be used during construction and a stormwater pollution prevention plan will be developed and implemented prior to development.

MOT and Sequence of Construction will be planned and scheduled to minimize traffic delays throughout the project. Signs will be used as appropriate to provide notice of lane closures and other pertinent information to the traveling public.

8.4.5 BICYCLES AND PEDESTRIANS

The project area does not include any existing pedestrian trails or paths. One dirt path is located within the Preferred Alternative limits; however, it appears to be in use for golf course maintenance and does

not require relocation. The Preferred Alternative includes the construction of a 5-foot-wide sidewalk on both sides of the road. The Preferred Alternative also includes the construction of a 4-foot-wide bicycle lane in each direction for all segments except for at the bridge over Davenport Creek, which will include the construction of an 8-foot-4-inch-wide shoulder/bicycle lane in each direction. These facilities are anticipated to improve the access and mobility for multi-modal users and have a net positive impact to the users. Temporary impacts during construction are possible but access will be maintained when practical and feasible.

8.4.6 NAVIGATION

There are no navigable waterways affected by the proposed project and thus, the project will have no involvement with navigation.

8.5 ANTICIPATED PERMITS

Both the USACE and SFWMD regulate impacts to wetlands within the project area. Other agencies, including the USFWS, NMFS, EPA, and the FWC, review and comment on wetland permit applications. The FWC also issues permit for gopher tortoise relocation activities and incidental takes for state protected avian species and the USFWS is the lead agency for eagle nest take permitting or coordination. In addition, the FDEP regulates stormwater discharges from construction sites. The complexity of the permitting process will depend on the degree of the impact to jurisdictional areas. **Table 8-8** lists the anticipated permits that will be required for this project.

Table 8-8: Anticipated Required Permits

Permit	Issuing Agency
Environmental Resource Permit (ERP)	SFWMD
Section 404 State Assumption	FDEP
National Pollutant Discharge Elimination System (NPDES)	FDEP
Gopher Tortoise Relocation Permit, if needed	FWC

SFWMD Environmental Resource Permit

SFWMD requires an ERP when construction of any project results in the creation of a new or modification of an existing surface water management system or results in impacts to waters of the state. As with USACE permits, the complexity associated with the ERP permitting process will depend on the size of the project and/or the extent of wetland impacts. Under current state rules, the SFWMD will likely require an individual permit for this project.

FDEP State 404 Program

In 2018, FDEP was given the authority to begin the rulemaking process to assume the federal dredge and fill permitting program under section 404 of the Clean Water Act within state-assumed waters. This process was completed in July 2020 and created the State 404 Program within Chapter 62-330 and 62-331, FAC to facilitate this assumption. This State 404 Program is responsible for overseeing permitting for any project proposing dredge or fill activities within state-assumed waters. The State 404 Program is a separate program from the existing ERP program, and projects within the state-assumed waters require both an ERP and a State 404 Program authorization. The wetlands associated with this project would fall under the state-assumed waters definition and therefore would require a permit through this program.

NPDES

40 CFR Part 122 prohibits point source discharges of stormwater to waters of the U.S. without a NPDES permit. Under the State of Florida's delegated authority to administer the NPDES program, construction sites that will result in greater than one acre of disturbance must file for and obtain either coverage under an appropriate generic permit contained in Chapter 62-621, FAC, or an individual permit issued pursuant to Chapter 62-620, FAC. A major component of the NPDES permit is the development of a stormwater pollution prevention plan. The plan identifies potential sources of pollution that may reasonably be expected to affect the quality of stormwater discharges from the site and discusses good engineering practices (i.e., BMPs) that will be used to reduce the pollutants.

FWC Gopher Tortoise Relocation Permit

At the time of the site reviews, one potentially occupied gopher tortoise burrow was observed adjacent to the Preferred Alternative limits. Coordination with FWC to secure permits needed to relocate the tortoises and associated commensal species should occur prior to construction. FWC requires the excavation and relocation of any gopher tortoise burrows and individuals within the project limits prior to construction. Permits to excavate and relocate tortoises are issued through FWC and would be completed as either a 10 or Fewer Burrows permit or a Conservation permit.

APPENDIX A

Species Determination Keys and Protection Measures

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

May 18, 2010

Donnie Kinard
Chief, Regulatory Division
Jacksonville District Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Service Federal Activity Code: 41420-2007-FA-1494
Service Consultation Code: 41420-2007-I-0964
Subject: South Florida Programmatic Concurrence
Species: Wood Stork

Dear Mr. Kinard:

This letter addresses minor errors identified in our January 25, 2010, wood stork key and as such, supplants the previous key. The key criteria and wood stork biomass foraging assessment methodology have not been affected by these minor revisions.

The Fish and Wildlife Service's (Service) South Florida Ecological Services Office (SFESO) and the U.S. Army Corps of Engineers Jacksonville District (Corps) have been working together to streamline the consultation process for federally listed species associated with the Corps' wetland permitting program. The Service provided letters to the Corps dated March 23, 2007, and October 18, 2007, in response to a request for a multi-county programmatic concurrence with a criteria-based determination of "may affect, not likely to adversely affect" (NLAA) for the threatened eastern indigo snake (*Drymarchon corais couperi*) and the endangered wood stork (*Mycteria americana*) for projects involving freshwater wetland impacts within specified Florida counties. In our letters, we provided effect determination keys for these two federally listed species, with specific criteria for the Service to concur with a determination of NLAA.

The Service has revisited these keys recently and believes new information provides cause to revise these keys. Specifically, the new information relates to foraging efficiencies and prey base assessments for the wood stork and permitting requirements for the eastern indigo snake. This letter addresses the wood stork key and is submitted in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C. 1531 *et seq.*). The eastern indigo snake key will be provided in a separate letter.

Wood stork

Habitat

The wood stork is primarily associated with freshwater and estuarine habitats that are used for nesting, roosting, and foraging. Wood storks typically construct their nests in medium to tall

trees that occur in stands located either in swamps or on islands surrounded by relatively broad expanses of open water (Ogden 1991, 1996; Rodgers et al. 1996). Successful colonies are those that have limited human disturbance and low exposure to land-based predators. Nesting colonies protected from land-based predators are characterized as those surrounded by large expanses of open water or where the nest trees are inundated at the onset of nesting and remain inundated throughout most of the breeding cycle. These colonies have water depths between 0.9 and 1.5 meters (3 and 5 feet) during the breeding season.

Successful nesting generally involves combinations of average or above-average rainfall during the summer rainy season and an absence of unusually rainy or cold weather during the winter-spring breeding season (Kahl 1964; Rodgers et al. 1987). This pattern produces widespread and prolonged flooding of summer marshes, which maximize production of freshwater fishes, followed by steady drying that concentrate fish during the season when storks nest (Kahl 1964). Successful nesting colonies are those that have a large number of foraging sites. To maintain a wide range of foraging sites, a variety of wetland types should be present, with both short and long hydroperiods. The Service (1999) describes a short hydroperiod as a 1 to 5-month wet/dry cycle, and a long hydroperiod as greater than 5 months. During the wet season, wood storks generally feed in the shallow water of the short-hydroperiod wetlands and in coastal habitats during low tide. During the dry season, foraging shifts to longer hydroperiod interior wetlands as they progressively dry-down (though usually retaining some surface water throughout the dry season).

Wood storks occur in a wide variety of wetland habitats. Typical foraging sites for the wood stork include freshwater marshes and stock ponds, shallow, seasonally flooded roadside and agricultural ditches, narrow tidal creeks and shallow tidal pools, managed impoundments, and depressions in cypress heads and swamp sloughs. Because of their specialized feeding behavior, wood storks forage most effectively in shallow-water areas with highly concentrated prey. Through tactolocation, or grope feeding, wood storks in south Florida feed almost exclusively on fish between 2 and 25 centimeters [cm] (1 and 10 inches) in length (Ogden et al. 1976). Good foraging conditions are characterized by water that is relatively calm, uncluttered by dense thickets of aquatic vegetation, and having a water depth between 5 and 38 cm (5 and 15 inches) deep, although wood storks may forage in other wetlands. Ideally, preferred foraging wetlands would include a mosaic of emergent and shallow open-water areas. The emergent component provides nursery habitat for small fish, frogs, and other aquatic prey and the shallow, open-water areas provide sites for concentration of the prey during seasonal dry-down of the wetland.

Conservation Measures

The Service routinely concurs with the Corps' "may affect, not likely to adversely affect" determination for individual project effects to the wood stork when project effects are insignificant due to scope or location, or if assurances are given that wetland impacts have been avoided, minimized, and adequately compensated such that there is no net loss in foraging potential. We utilize our *Habitat Management Guidelines for the Wood Stork in the Southeast Region* (Service 1990) (Enclosure 1) (HMG) in project evaluation. The HMG is currently under review and once final will replace the enclosed HMG. There is no designated critical habitat for the wood stork.

The SFESO recognizes a 29.9 kilometer [km] (18.6-mile) core foraging area (CFA) around all known wood stork colonies in south Florida. Enclosure 2 (to be updated as necessary) provides locations of colonies and their CFAs in south Florida that have been documented as active within the last 10 years. The Service believes loss of suitable wetlands within these CFAs may reduce foraging opportunities for the wood stork. To minimize adverse effects to the wood stork, we recommend compensation be provided for impacts to foraging habitat. The compensation should consider wetland type, location, function, and value (hydrology, vegetation, prey utilization) to ensure that wetland functions lost due to the project are adequately offset. Wetlands offered as compensation should be of the same hydroperiod and located within the CFAs of the affected wood stork colonies. The Service may accept, under special circumstances, wetland compensation located outside the CFAs of the affected wood stork nesting colonies. On occasion, wetland credits purchased from a "Service Approved" mitigation bank located outside the CFAs could be acceptable to the Service, depending on location of impacted wetlands relative to the permitted service area of the bank, and whether or not the bank has wetlands having the same hydroperiod as the impacted wetland.

In an effort to reduce correspondence in effect determinations and responses, the Service is providing the Wood Stork Effect Determination Key below. If the use of this key results in a Corps determination of "no effect" for a particular project, the Service supports this determination. If the use of this Key results in a determination of NLAA, the Service concurs with this determination[1]. This Key is subject to revisitation as the Corps and Service deem necessary.

The Key is as follows:

A. Project within 0.76 km (0.47 mile)[2] of an active colony site[3] ..... "*may affect*[4]"

Project impacts Suitable Foraging Habitat (SFH)[5] at a location greater than 0.76 km (0.47 mile) from a colony site..... ....."*go to* B"

[1] With an outcome of "no effect" or "NLAA" as outlined in this key, and the project has less than 20.2 hectares (50 acres) of wetland impacts, the requirements of section 7 of the Act are fulfilled for the wood stork and no further action is required. For projects with greater than 20.2 hectares (50 acres) of wetland impacts, written concurrence of NLAA from the Service is necessary.

[2] Within the secondary zone (the average distance from the border of a colony to the limits of the secondary zone is 0.76 km (2,500 feet, or 0.47 mi).

[3] An active colony is defined as a colony that is currently being used for nesting by wood storks or has historically over the last 10 years been used for nesting by wood storks.

[4] Consultation may be concluded informally or formally depending on project impacts.

[5] Suitable foraging habitat (SFH) includes wetlands that typically have shallow-open water areas that are relatively calm and have a permanent or seasonal water depth between 5 to 38 cm (2 to 15 inches) deep. Other shallow non-wetland water bodies are also SFH. SFH supports and concentrates, or is capable of supporting and concentrating small fish, frogs, and other aquatic prey. Examples of SFH include, but are not limited to freshwater marshes, small ponds, shallow, seasonally flooded roadside or agricultural ditches, seasonally flooded pastures, narrow tidal creeks or shallow tidal pools, managed impoundments, and depressions in cypress heads and swamp sloughs.

Project does not affect SFH……..…..*"no effect[1]".*

B. Project impact to SFH is less than 0.20 hectare (one-half acre)[6]……..……*NLAA[1]"*

Project impact to SFH is greater in scope than 0.20 hectare (one-half acre)....……*go to* C

C. Project impacts to SFH not within the CFA (29.9 km, 18.6 miles) of a colony site ……..…….…….…..……*go to* D

Project impacts to SFH within the CFA of a colony site …….…..…...…….*go to* E

D. Project impacts to SFH have been avoided and minimized to the extent practicable; compensation (Service approved mitigation bank or as provided in accordance with Mitigation Rule 33 CFR Part 332) for unavoidable impacts is proposed in accordance with the CWA section 404(b)(1) guidelines; and habitat compensation replaces the foraging value matching the hydroperiod[7] of the wetlands affected and provides foraging value similar to, or higher than, that of impacted wetlands. See Enclosure 3 for a detailed discussion of the hydroperiod foraging values, an example, and further guidance[8]…….. *NLAA[1]"*

Project not as above.……... *"may affect[4]"*

E. Project provides SFH compensation in accordance with the CWA section 404(b)(1) guidelines and is not contrary to the HMG; habitat compensation is within the appropriate CFA or within the service area of a Service-approved mitigation bank; and habitat compensation replaces foraging value, consisting of wetland enhancement or restoration matching the hydroperiod[7] of the wetlands affected, and provides foraging value similar

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[6] On an individual basis, SFH impacts to wetlands less than 0.20 hectare (one-half acre) generally will not have a measurable effect on wood storks, although we request that the Corps require mitigation for these losses when appropriate. Wood storks are a wide ranging species, and individually, habitat change from impacts to SFH less than one-half acre are not likely to adversely affect wood storks. However, collectively they may have an effect and therefore regular monitoring and reporting of these effects are important.

[7] Several researchers (Flemming et al. 1994; Ceilley and Bortone 2000) believe that the short hydroperiod wetlands provide a more important pre-nesting foraging food source and a greater early nestling survivor value for wood storks than the foraging base (grams of fish per square meter) than long hydroperiod wetlands provide. Although the short hydroperiod wetlands may provide less fish, these prey bases historically were more extensive and met the foraging needs of the pre-nesting storks and the early-age nestlings. Nest productivity may suffer as a result of the loss of short hydroperiod wetlands. We believe that most wetland fill and excavation impacts permitted in south Florida are in short hydroperiod wetlands. Therefore, we believe that it is especially important that impacts to these short hydroperiod wetlands within CFAs are avoided, minimized, and compensated for by enhancement/restoration of short hydroperiod wetlands.

[8] For this Key, the Service requires an analysis of foraging prey base losses and enhancements from the proposed action as shown in the examples in Enclosure 3 for projects with greater than 2.02 hectares (5 acres) of wetland impacts. For projects with less than 2.02 hectares (5 acres) of wetland impacts, an individual foraging prey base analysis is not necessary although type for type wetland compensation is still a requirement of the Key.

to, or higher than, that of impacted wetlands. See Enclosure 3 for a detailed discussion of the hydroperiod foraging values, an example, and further guidance[8]……..... *"NLAA[1]"*

Project does not satisfy these elements ……..……..…..…..... *"may affect[4]"*

This Key does not apply to Comprehensive Everglades Restoration Plan projects, as they will require project-specific consultations with the Service.

Monitoring and Reporting Effects

For the Service to monitor cumulative effects, it is important for the Corps to monitor the number of permits and provide information to the Service regarding the number of permits issued where the effect determination was: "may affect, not likely to adversely affect." We request that the Corps send us an annual summary consisting of: project dates, Corps identification numbers, project acreages, project wetland acreages, and project locations in latitude and longitude in decimal degrees.

Thank you for your cooperation and effort in protecting federally listed species. If you have any questions, please contact Allen Webb at extension 246.

Sincerely yours,

Paul Souza
Field Supervisor
South Florida Ecological Services Office

Enclosures

cc: w/enclosures (electronic only)
Corps, Jacksonville, Florida (Stu Santos)
EPA, West Palm Beach, Florida (Richard Harvey)
FWC, Vero Beach, Florida (Joe Walsh)
Service, Jacksonville, Florida (Billy Brooks)

LITERATURE CITED

Ceilley, D.W. and S.A. Bortone. 2000. A survey of freshwater fishes in the hydric flatwoods of flint pen strand, Lee County, Florida. Proceedings of the 27th Annual Conference on Ecosystems Restoration and Creation, 70-91. Hillsborough Community College; Hillsborough County, Florida.

Flemming, D.M., W.F. Wolff, and D.L. DeAngelis. 1994. Importance of landscape heterogeneity to wood storks. Florida Everglades Management 18: 743-757.

Kahl, M.P., Jr. 1964. Food ecology of the wood stork (*Mycteria americana*) in Florida. Ecological Monographs 34:97-117.

Ogden, J.C. 1991. Nesting by wood storks in natural, altered, and artificial wetlands in central and northern Florida. Colonial Waterbirds 14:39-45.

Ogden, J.C., J.A. Kushlan, and J.T. Tilmant. 1976. Prey selectivity by the wood stork. Condor 78(3):324-330.

Ogden, J.C. 1996. Wood Stork *in* J.A. Rodgers, H. Kale II, and H.T. Smith, eds. Rare and endangered biota of Florida. University Press of Florida; Gainesville, Florida.

Rodgers, J.A. Jr., A.S. Wenner, and S.T. Schwikert. 1987. Population dynamics of wood storks in northern and central Florida, USA. Colonial Waterbirds 10:151-156.

Rodgers, J.A., Jr., S.T. Schwikert, and A. Shapiro-Wenner. 1996. Nesting habitat of wood storks in north and central Florida, USA. Colonial Waterbirds 19:1-21.

U.S. Fish and Wildlife Service. 1990. Habitat management guidelines for the wood stork in the southeast region. Prepared by John C. Ogden for the Southeast Region U.S. Fish and Wildlife Service; Atlanta, Georgia.

U.S. Fish and Wildlife Service. 1999. South Florida multi-species recovery plan. Fish and Wildlife Service; Atlanta, Georgia. Available from: http://verobeach.fws.gov/Programs/Recovery/vbms5.html.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

August 1, 2017

Donnie Kinard
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Subject: Consultation Key for the Eastern Indigo Snake – Revised

Dear Mr. Kinard:

This letter revises and replaces the January 25, 2010, and August 13, 2013, letters to the U.S. Army Corps of Engineers (Corps) regarding the use of the eastern indigo snake programmatic effect determination key (Key) for projects occurring within the South Florida Ecological Service's Office (SFESO) jurisdiction. This revision supersedes all prior versions of the Key in the SFESO area. The purpose of this revision is to clarify portions of the previous keys based on questions we have been asked, specifically related to habitat and refugia used by eastern indigo snakes (*Drymarchon corais couperi*), in the southern portion of their range and within the jurisdiction of the SFESO. This Key is provided pursuant to the Service's authorities under the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C.1531 *et seq.*). This Key revision has been assigned Service Consultation Code: 41420-2009-I-0467-R001.

The purpose of this Key is to assist the Corps (or other Federal action agency) in making appropriate effects determinations for the eastern indigo snake under section 7 of the Act, and streamline informal consultation with the SFESO for the eastern indigo snake when the proposed action can be walked through the Key. The Key is a tool available to the Corps (or other Federal action agency) for the purposes of expediting section 7 consultations. There is no requirement to use the Key. There will be cases when the use of the Key is not appropriate. These include, but are not limited to: where project specific information is outside of the scope of the Key or instances where there is new biological information about the species. In these cases, we recommend the Corps (or other Federal action agency) initiates traditional consultation pursuant to section 7 of the Act, and identify that consultation is being requested outside of the Key.

This Key uses project size and home ranges of eastern indigo snakes as the basis for making determinations of "may affect, but is not likely to adversely affect" (NLAA) and "may affect. and is likely to adversely affect" (may affect). Suitable habitat for the eastern indigo snake consists of a mosaic of habitats types, most of which occur throughout South Florida. Information on home ranges for individuals is not available in specific habitats in South Florida. Therefore, the SFESO uses the information from a 26-year study conducted by Layne and Steiner (1996) at Archbold Biological Station, Lake Placid, Florida, as the best available

information. Layne and Steiner (1996) determined the average home range size for a female eastern indigo snake was 46 acres and 184 acres for a male.

Projects that would remove/destroy less than 25 acres of eastern indigo snake habitat are expected to result in the loss of a portion of an eastern indigo snakes home range that would not impair the ability of the individual to feed, breed, and shelter. Therefore, the Service finds that take would not be reasonably certain to occur due to habitat loss. However, these projects have the potential to injure or kill an eastern indigo snake if the individual is crushed by equipment during site preparation or other project aspects. The Service's *Standard Protection Measures for the Eastern Indigo Snake* (Service 2013 or most current version) and the excavation of underground refugia (where a snake could be buried, trapped and/or injured), when implemented, are designed to avoid these forms of take. Consequently, projects less than 25 acres that include the Service's *Standard Protection Measures for the Eastern Indigo Snake* (Service 2013 or most current version) and a commitment to excavate underground refugia as part of the proposed action would be expected to avoid take and thus, may affect, but are not likely to adversely affect the species.

If a proposed project would impact less than 25 acres of vegetated eastern indigo snake habitat (not urban/ human-altered) completely surrounded by urban development, and an eastern indigo snake has been observed on site, the Key should not be used. The Service recommends formal consultation for this situation because of the expected increased value of the vegetated habitat within the individual's home range.

Projects that would remove 25 acres or more of eastern indigo snake habitat could remove more than half of a female eastern indigo snakes home range. This loss of habitat within a home range would be expected to significantly impair the ability of that individual to feed, breed, and shelter. Therefore, the Service finds take through habitat loss would be reasonably certain to occur and formal consultation is appropriate. Furthermore, these projects have the potential to injure or kill an eastern indigo snake if the individual is crushed by equipment during site preparation or other project aspects. The Service's *Standard Protection Measures* for the *Eastern Indigo Snake* (Service 2013 or most current version) and the excavation of underground refugia (where a snake could be buried, trapped and/or injured), when implemented, are designed to avoid these forms of take.

Eastern indigo snakes use a variety of habitat and are difficult to detect. Therefore, site specific information on the land use, observations of eastern indigo snakes within the vicinity, as well as other factors, as appropriate, will all be considered by the Service when making a final recommendation on the appropriate effects determination and whether it is appropriate to conclude consultation with the Corps (or other Federal action agency) formally or informally for projects that will impact 25 acres or more of habitat. Accordingly, when the use of the Key results in a determination of "may affect," the Corps (or other Federal action agency) is advised that consultation may be concluded informally or formally, depending on the project specific effects to eastern indigo snakes. Technical assistance from the Service can assist you in making a determination prior to submitting a request for consultation. In circumstances where the Corps (or other Federal action agency) desires to proceed with a consultation request prior to receiving

additional technical assistance from the Service, we recommend the agency documents the biological rationale for their determination and proceed with a request accordingly.

If the use of the Key results in a determination of "no effect," no further consultation is necessary with the SFESO. If the use of the Key results in a determination of "NLAA," the SFESO concurs with this determination based on the rationale provide above, and no further consultation is necessary for the effects of the proposed action on the eastern indigo snake. For "no effect" or "NLAA" determinations, the Service recommends that the Corps (or other Federal action agency) documents the pathway used to reach your no effect or NLAA determination in the project record and proceed with other species analysis as warranted.

Eastern Indigo Snake Programmatic Effect Determination Key
Revised July 2017
South Florida Ecological Service Office

Scope of the Key

This Key should be used only in the review of permit applications for effects determinations for the eastern indigo snake (*Drymarchon corais couperi*) within the South Florida Ecological Service's Office (SFESO) area (Broward, Charlotte, Collier, De Soto, Glades, Hardee, Hendry, Highlands, Lee, Indian River, Martin, Miami-Dade, Monroe, Okeechobee, Osceola, Palm Beach, Polk, Sarasota, and St. Lucie Counties). There is no designated critical habitat for the eastern indigo snake.

This Key is subject to revision as the Corps (or other Federal action agency) and Service deem necessary and in particular whenever there is new information on eastern indigo snake biology and effects of proposed projects.

The Key is a tool available to the Corps (or other Federal action agency) for the purposes of expediting section 7 consultations. There is no requirement to use the Key. There will be cases when the use of the Key is not appropriate. These include, but are not limited to: where project specific information is outside of the scope of the Key or instances where there is new biological information about the species. In these cases, we recommend the Corps (or other Federal action agency) initiates traditional consultation pursuant to section 7 of the Act, and identify that consultation is being requested outside of the Key.

Habitat

Habitat use varies seasonally between upland and wetland areas, especially in the more northern parts of the species' range. In southern parts of their range eastern indigo snakes are habitat generalists which use most available habitat types. Movements between habitat types in northern areas of their range may relate to the need for thermal refugia (protection from cold and/or heat).

In northern areas of their range eastern indigo snakes prefer an interspersion of tortoise-inhabited sandhills and wetlands (Landers and Speake 1980). In these northern regions eastern indigo

snakes most often use forested areas rich with gopher tortoise burrows, hollowed root channels, hollow logs, or the burrows of rodents, armadillos, or land crabs as thermal refugia during cooler seasons (Lawler 1977; Moler 1985a; Layne and Steiner 1996). The eastern indigo snake in the northern region is typically classified as a longleaf pine savanna specialist because here, in the northern four-fifths of its range, the eastern indigo snake is typically only found in vicinity of xeric longleaf pine–turkey oak sandhills inhabited by the gopher tortoise (Means 2006).

In the milder climates of central and southern Florida, comprising the remaining one fifth of its range, thermal refugia such as those provided by gopher tortoise burrows may not be as critical to survival of indigo snakes. Consequently, eastern indigo snakes in these regions use a more diverse assemblage of habitats such as pine flatwoods, scrubby flatwoods, floodplain edges, sand ridges, dry glades, tropical hammocks, edges of freshwater marshes, muckland fields, coastal dunes, and xeric sandhill communities; with highest population concentrations of eastern indigo snakes occurring in the sandhill and pineland regions of northern and central Florida (Service 1999). Eastern indigo snakes have also been found on agricultural lands with close proximity to wetlands (Zeigler 2006).

In south Florida, agricultural sites (*e.g.*, sugar cane fields and citrus groves) are occupied by eastern indigo snakes. The use of sugarcane fields by eastern indigo snakes was first documented by Layne and Steiner in 1996. In these areas there is typically an abundance of wetland and upland ecotones (due to the presence of many ditches and canals), which support a diverse prey base for foraging. In fact, some speculate agricultural areas may actually have a higher density of eastern indigo snakes than natural communities due to the increased availability of prey. Gopher tortoise burrows are absent at these locations but there is an abundance of both natural and artificial refugia. Enge and Endries (2009) reporting on the status of the eastern indigo snake included sugarcane fields and citrus groves in a Global Information Systems (GIS)-base map of potential eastern indigo snake habitat. Numerous sightings of eastern indigo snakes within sugarcane fields have been reported within south Florida (Florida Fish and Wildlife Conservation Commission Indigo Snake Database [Enge 2017]). A recent study associated with the Comprehensive Everglades Restoration Plan (CERP) (A-1 FEB Project formerly A-1 Reservoir; Service code: 41420-2006-F-0477) documented eastern indigo snakes within sugarcane fields. The snakes used artificial habitats such as piles of limerock, construction debris, and pump stations. Recent studies also associated with the CERP at the C-44 Project (Service code: 41420-2009-FA-0314), and C-43 Project (Service code: 41420-2007-F-0589) documented eastern indigo snakes within citrus groves. The snakes used artificial habitats such as boards, sheets of tin, construction debris, pipes, drain pipes in abandoned buildings and septic tanks.

In extreme south Florida (*i.e.*, the Everglades and Florida Keys), eastern indigo snakes also utilize tropical hardwood hammocks, pine rocklands, freshwater marshes, abandoned agricultural land, coastal prairie, mangrove swamps, and human-altered habitats. Though eastern indigo snakes have been found in all available habitats of south Florida it is thought they prefer hammocks and pine forests since most observations occur there and use of these areas is disproportionate compared to the relatively small total area of these habitats (Steiner *et al.* 1983).

Even though thermal stress may not be a limiting factor throughout the year in south Florida, eastern indigo snakes still seek and use underground refugia. On the sandy central ridge of central Florida, eastern indigo snakes use gopher tortoise burrows more (62 percent) than other underground refugia (Layne and Steiner 1996). Other underground refugia used include armadillo (*Dasypus novemcinctus*) burrows near citrus groves, cotton rat (*Sigmodon hispidus*) burrows, and land crab (*Cardisoma guanhumi*) burrows in coastal areas (Layne and Steiner 1996; Wilson and Porras 1983). Natural ground holes, hollows at the base of trees or shrubs, ground litter, trash piles, and crevices of rock-lined ditch walls are also used (Layne and Steiner 1996). These refugia are used most frequently where tortoise burrows are not available, principally in low-lying areas off the central and coastal ridges.

Minimization Measures

The Service developed protection measures for the eastern indigo snake "Standard Protection Measures for the Eastern Indigo Snake" (Service 2013) located at: https://www.fws.gov/verobeach/ReptilesPDFs/20130812_EIS%20Standard%20Protection%20Measures_final.pdf. These protections measures (or the most updated version) are considered a minimization measure for projects proposed within eastern indigo snake habitat.

Determinations

If the use of this Key results in a determination of "**no effect**," no further consultation is necessary with the SFESO.

If the use of this Key results in a determination of "**NLAA**," the SFESO concurs with this determination and no further consultation is necessary for the effects of the proposed action on the eastern indigo snake.

For no effect or NLAA determinations, the Corps (or other Federal action agency) should make a note in the project file indicating the pathway used to reach your no effect or NLAA determination.

If a proposed project would impact less than 25 acres of vegetated eastern indigo snake habitat (not urban/ human-altered) completely surrounded by urban development, and an eastern indigo snake has been observed on site, the subsequent Key should not be used. The Service recommends formal consultation for this situation because of the expected increased value of the vegetated habitat within the individual's home range.

If the use of this Key results in a determination of "**may affect**," consultation may be concluded informally or formally depending on project effects to eastern indigo snakes. Technical assistance from the Service can assist you in making a determination prior to submitting a request for consultation. In circumstances where the Corps desires to proceed with a consultation request prior to receiving additional technical assistance from the Service, we recommend the Corps document the biological rationale for their determination and proceed with a request accordingly.

A. Project is not located in open water or salt marsh.....go to B

Project is located solely in open water or salt marsh.....**no effect**

B. Permit will be conditioned for use of the Service's most current guidance for Standard Protection Measures For The Eastern Indigo Snake (currently 2013) during site preparation and project construction.....go to C

Permit will not be conditioned as above for the eastern indigo snake, or it is not known whether an applicant intends to use these measures and consultation with the Service is requested.....**may affect**

C. The project will impact less than 25 acres of eastern indigo snake habitat (*e.g.*, sandhill, scrub, pine flatwoods, pine rocklands, scrubby flatwoods, high pine, dry prairie, coastal prairie, mangrove swamps, tropical hardwood hammocks, hydric hammocks, edges of freshwater marshes, agricultural fields [including sugar cane fields and active, inactive, or abandoned citrus groves], and coastal dunes).....go to D

The project will impact 25 acres or more of eastern indigo snake habitat (*e.g.*, sandhill, scrub, pine flatwoods, pine rocklands, scrubby flatwoods, high pine, dry prairie, coastal prairie, mangrove swamps, tropical hardwood hammocks, hydric hammocks, edges of freshwater marshes, agricultural fields [including sugar cane fields and active, inactive, or abandoned citrus groves], and coastal dunes).....**may affect**

D. The project has no known holes, cavities, active or inactive gopher tortoise burrows, or other underground refugia where a snake could be buried, trapped and/or injured during project activities.....**NLAA**

The project has known holes, cavities, active or inactive gopher tortoise burrows, or other underground refugia where a snake could be buried, trapped and /or injured.....go to E

E. Any permit will be conditioned such that all gopher tortoise burrows, active or inactive, will be excavated prior to site manipulation in the vicinity of the burrow[1]. If an eastern indigo snake is encountered, the snake must be allowed to vacate the area prior to additional site manipulation in the vicinity. Any permit will also be conditioned such that holes, cavities, and snake refugia other than gopher tortoise burrows will be inspected each morning before planned site manipulation of a particular area, and, if occupied by an eastern indigo snake, no work will commence until the snake has vacated the vicinity of proposed work.....**NLAA**[2]

Permit will not be conditioned as outlined above.....**may affect**

End Key

---

[1] If excavating potentially occupied burrows, active or inactive, individuals must first obtain state authorization via a Florida Fish and Wildlife Conservation Commission Authorized Gopher Tortoise Agent permit. The excavation method selected should also minimize the potential for injury of an indigo snake. Applicants should follow the excavation guidance provided within the most current Gopher Tortoise Permitting Guidelines found at http://myfwc.com/gophertortoise.

[2] Please note, if the proposed project will impact less than 25 acres of vegetated eastern indigo snake habitat (not urban/ human-altered) completely surrounded by urban development, and an eastern indigo snake has been observed on site, NLAA is not the appropriate conclusion. The Service recommends formal consultation for this situation because of the expected increased value of the vegetated habitat within the individual's home range

Working with the Fish and Wildlife Foundation of Florida, the Service has established a fund to support conservation and recovery for the eastern indigo snake. Any project that has the potential to affect the eastern indigo snake and/or its habitat is encouraged to make a voluntary contribution to this fund. If you would like additional information about how to make a contribution and how these monies are used to support eastern indigo snake recovery please contact Ashleigh Blackford, Connie Cassler, or José Rivera at 772-562-3559.

This revised Key is effective immediately upon receipt by the Corps. Should circumstances change or new information become available regarding the eastern indigo snake and/or implementation of the Key, the determinations herein may be reconsidered and this Key further revised or amended.

Thank you for your continued cooperation in the effort to conserve fish and wildlife resources. If you have any questions or comments regarding this Key, please contact the SFESO at 772-562-3909.

Sincerely,

Roxanna Hinzman
Field Supervisor
South Florida Ecological Services

Cc:
Corps, Jacksonville, Florida (Dale Beter, Muriel Blaisdell, Ingrid Gilbert, Angela Ryan, Irene Sadowski, Victoria White, Alisa Zarbo)
Service, Athens, Georgia (Michelle Elmore)
Service, Jacksonville, Florida (Annie Dziergowski)
Service, Panama City, Florida (Sean Blomquist)

LITERATURE CITED

Enge K. M. 2017. Personal communication. Email from Kevin Enge, Florida Fish and Wildlife Conservation Commission, Gainesville, Florida to Steve Mortellaro, U.S. Fish and Wildlife Service, Vero Beach, Florida, July 5, 2017. Locations of Eastern Indigo Snake (*Drymarchon couperi*).

Enge K. M. and M. J. Endries. 2009. Status of the Eastern Indigo Snake (*Drymarchon couperi*) in Florida. Southeast Partners in Amphibian and Reptile Conservation Meeting.

Landers, J. L. and D.W. Speake. 1980. Management Needs of Sandhill Reptiles in Southern Georgia. Proceedings Annual Conference of Southeastern Association of Fish and Wildlife Agencies. 34: 515-529.

Layne, J.N., and T.M. Steiner. 1996. Eastern indigo snake (Drymarchon corais couperi): summary of research conducted on Archbold Biological Station. Report prepared under Order 43910-6-0134 to the U.S. Fish and Wildlife Service; Jackson, Mississippi.

Lawler, H.E. 1977. The status of *Drymarchon corais couperi* (Holbrook), the eastern indigo snake, in the southeastern U.S.A. *Herpetological Review* 8(3):76-79.

Means, D. B. 2006. Vertebrate faunal diversity of longleaf pine ecosystems. In *The Longleaf Pine Ecosystem* pp. 157-213. Springer New York.

Molar, P.E. 1985a. Distribution of the eastern indigo snake, *Drymarchon corais couperi*, in Florida. *Herpetological Review* 16(2):37-38.

Moler, P.E. 1985b. Home range and seasonal activity of the eastern indigo snake, Drymarchon corais couperi, in northern Florida. Final performance report, Study E-1-06, III-A-5. Florida Game and Fresh Water Fish Commission; Tallahassee, Florida.

Steiner, T.M., O.L. Bass, Jr., and J.A. Kushlan. 1983. Status of the eastern indigo snake in Southern Florida National Parks and vicinity. South Florida Research Center Report SFRC-83-01, Everglades National Park; Homestead, Florida.

U.S. Fish and Wildlife Service (Service). 1999. South Florida multi-species recovery plan. 23 pp.

U.S. Fish and Wildlife Service (Service). 2013. Standard Protection Measures for the Eastern Indigo Snake. August 12, 2013. U.S. Fish and Wildlife Service, South Florida Ecological Services Office; Vero Beach, Florida.

Wilson, L.D. and L. Porras. 1983. The ecological impact of man on the south Florida herpetofauna. *University of Kansas Museum of Natural History Special Publication* 9:1–89.

Zeigler, M. 2006. Personal communication. Citrus grove operations manager. Meeting with the U.S. Fish and Wildlife Service on August 1, 2006. Agricultural Resource Management; Vero Beach, Florida.

APPENDIX B

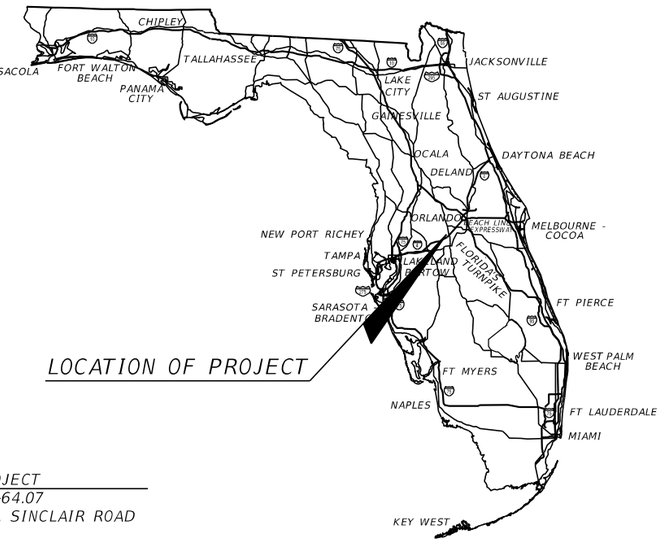
Concept Plans for the Preferred Alternative

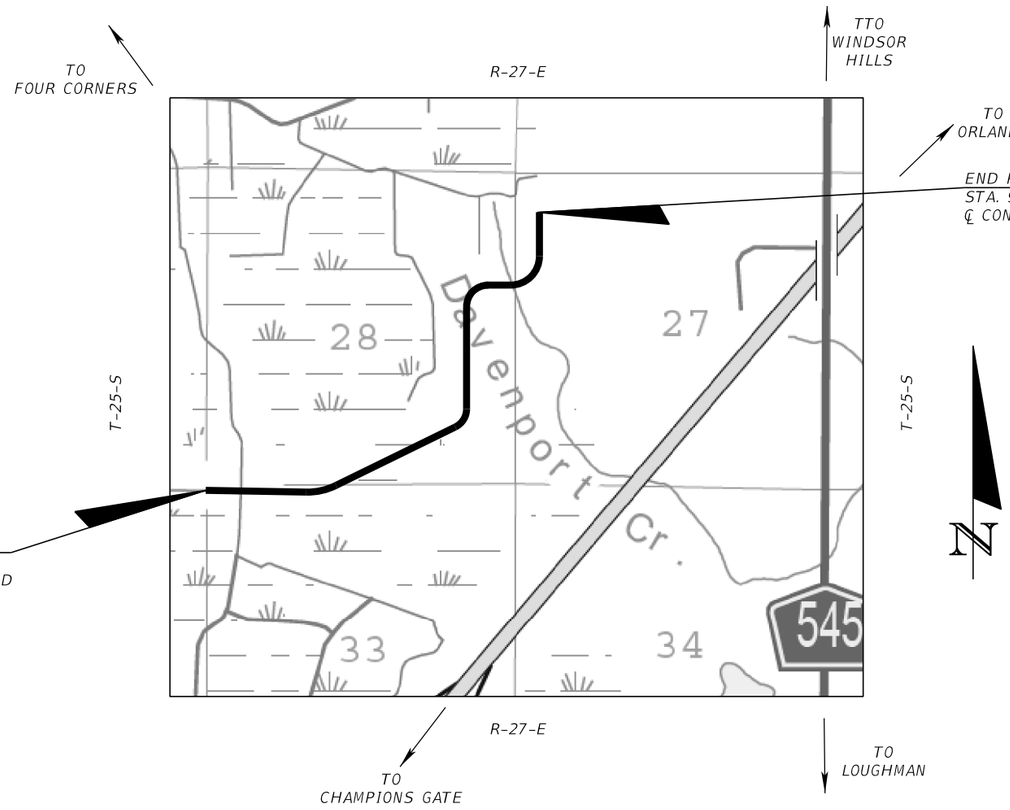
OSCEOLA COUNTY, FLORIDA

TRANSPORTATION AND TRANSIT

CONCEPT PLANS

SINCLAIR ROAD EXTENSION





INDEX OF CONCEPT PLANS

GOVERNING STANDARD PLANS:

Florida Department of Transportation, FY 2023-24 Standard Plans for Road and Bridge Construction and applicable Interim Revisions (IRs).

Standard Plans for Road Construction and associated IRs are available at the following website: http://www.fdot.gov/design/standardplans

GOVERNING STANDARD SPECIFICATIONS:

Florida Department of Transportation, Standard Specifications for Road and Bridge Construction FY 2023-24 at the following website: http://www.fdot.gov/programmanagement/Implemented/SpecBooks

FISCAL YEAR	SHEET NO.
23	1

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( )	C1 : NATURAL	( )	C3C : SUBURBAN COMM.
( )	C2 : RURAL	( )	C4 : URBAN GENERAL
( )	C2T : RURAL TOWN	( )	C5 : URBAN CENTER
(X)	C3R : SUBURBAN RES.	( )	C6 : URBAN CORE
( )	N/A : L.A. FACILITY		

FUNCTIONAL CLASSIFICATION

( )	INTERSTATE	(X)	MAJOR COLLECTOR
( )	FREEWAY/EXPWY.	( )	MINOR COLLECTOR
( )	PRINCIPAL ARTERIAL	( )	LOCAL
( )	MINOR ARTERIAL		

HIGHWAY SYSTEM

( )	NATIONAL HIGHWAY SYSTEM
( )	STRATEGIC INTERMODAL SYSTEM
( )	STATE HIGHWAY SYSTEM
(X)	OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

( )	1 - FREEWAY
( )	2 - RESTRICTIVE w/Service Roads
( )	3 - RESTRICTIVE w/660 ft. Connection Spacing
( )	4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
(X)	5 - RESTRICTIVE w/440 ft. Connection Spacing
( )	6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( )	7 - BOTH MEDIAN TYPES

CRITERIA

(X)	NEW CONSTRUCTION / RECONSTRUCTION
( )	RESURFACING (LA FACILITIES)
( )	RRR (ARTERIALS & COLLECTORS)

POTENTIAL EXCEPTIONS AND VARIATIONS RELATED TO TYPICAL SECTION:

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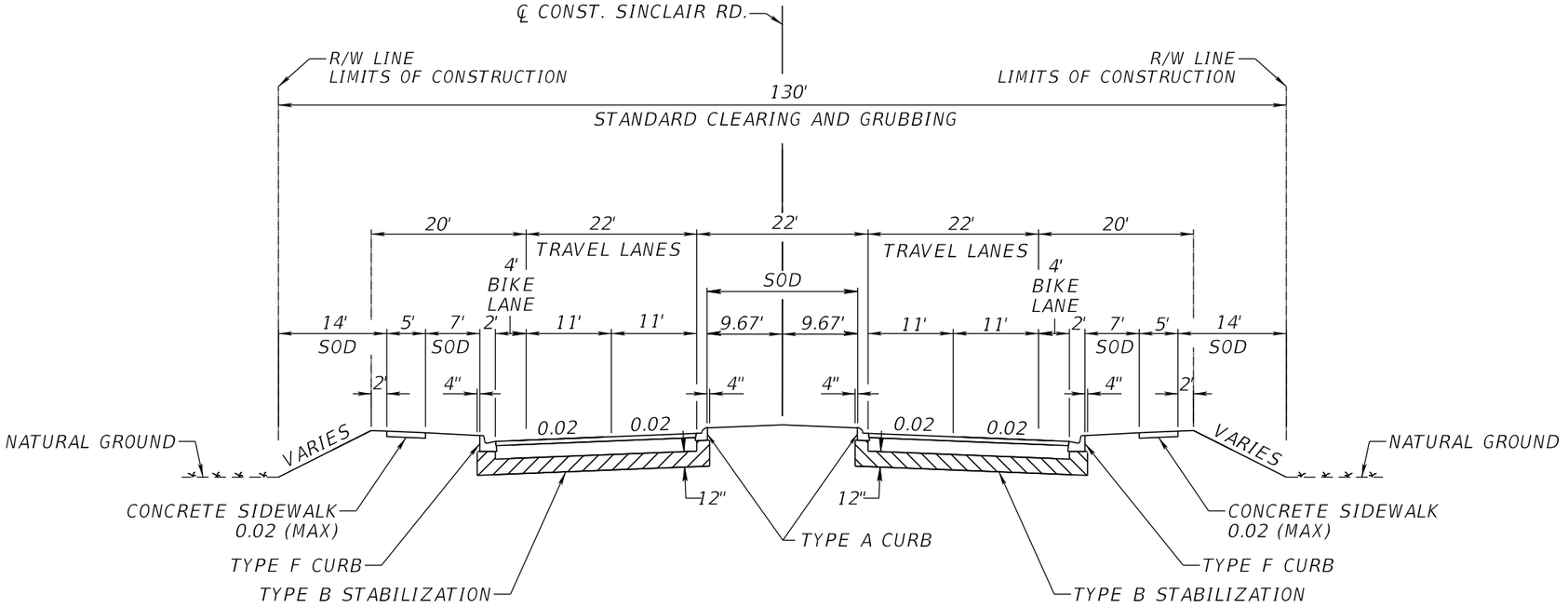

TYPICAL SECTION
SINCLAIR ROAD

DESIGN SPEED = 35 MPH

Proposed right-of-way lines are based on a conservative estimation approach at this time and may be adjusted during the design phase.

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( ) C1 : NATURAL
( ) C2 : RURAL
( ) C2T : RURAL TOWN
(X) C3R : SUBURBAN RES.
( ) C3C : SUBURBAN COMM.
( ) C4 : URBAN GENERAL
( ) C5 : URBAN CENTER
( ) C6 : URBAN CORE
( ) N/A : L.A. FACILITY

FUNCTIONAL CLASSIFICATION

( ) INTERSTATE
( ) FREEWAY/EXPWY.
( ) PRINCIPAL ARTERIAL
( ) MINOR ARTERIAL
(X) MAJOR COLLECTOR
( ) MINOR COLLECTOR
( ) LOCAL

HIGHWAY SYSTEM

( ) NATIONAL HIGHWAY SYSTEM
( ) STRATEGIC INTERMODAL SYSTEM
( ) STATE HIGHWAY SYSTEM
(X) OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

( ) 1 - FREEWAY
( ) 2 - RESTRICTIVE w/Service Roads
( ) 3 - RESTRICTIVE w/660 ft. Connection Spacing
( ) 4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
(X) 5 - RESTRICTIVE w/440 ft. Connection Spacing
( ) 6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( ) 7 - BOTH MEDIAN TYPES

CRITERIA

(X) NEW CONSTRUCTION / RECONSTRUCTION
( ) RESURFACING (LA FACILITIES)
( ) RRR (ARTERIALS & COLLECTORS)

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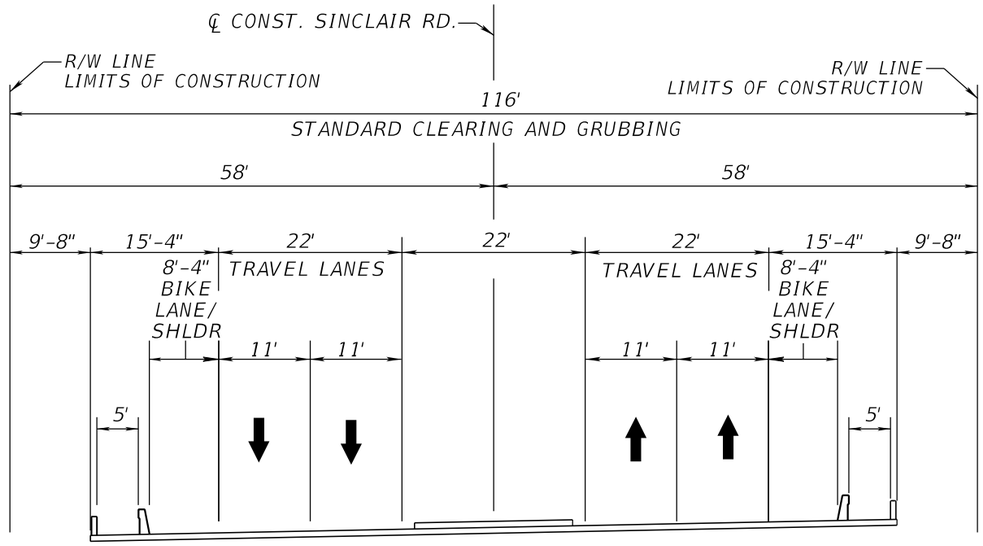

BRIDGE TYPICAL SECTION
SINCLAIR ROAD

DESIGN SPEED = 35 MPH

Proposed right-of-way lines are based on a conservative estimation approach at this time and may be adjusted during the design phase.

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( )	C1 : NATURAL	( )	C3C : SUBURBAN COMM.
( )	C2 : RURAL	( )	C4 : URBAN GENERAL
( )	C2T : RURAL TOWN	( )	C5 : URBAN CENTER
(X)	C3R : SUBURBAN RES.	( )	C6 : URBAN CORE
( )	N/A : L.A. FACILITY		

FUNCTIONAL CLASSIFICATION

( )	INTERSTATE	( )	MAJOR COLLECTOR
( )	FREEWAY/EXPWY.	(X)	MINOR COLLECTOR
( )	PRINCIPAL ARTERIAL	( )	LOCAL
( )	MINOR ARTERIAL		

HIGHWAY SYSTEM

( )	NATIONAL HIGHWAY SYSTEM
( )	STRATEGIC INTERMODAL SYSTEM
( )	STATE HIGHWAY SYSTEM
(X)	OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

( )	1 - FREEWAY
( )	2 - RESTRICTIVE w/Service Roads
( )	3 - RESTRICTIVE w/660 ft. Connection Spacing
( )	4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( )	5 - RESTRICTIVE w/440 ft. Connection Spacing
(X)	6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( )	7 - BOTH MEDIAN TYPES

CRITERIA

(X)	NEW CONSTRUCTION / RECONSTRUCTION
( )	RESURFACING (LA FACILITIES)
( )	RRR (ARTERIALS & COLLECTORS)

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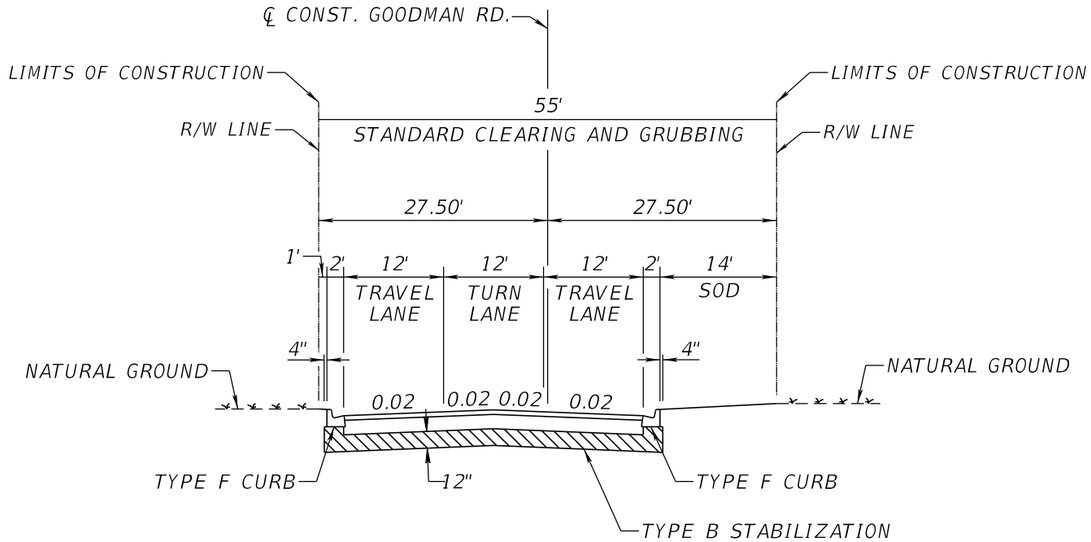

TYPICAL SECTION
GOODMAN ROAD
SOUTH OF SINCLAIR ROAD

DESIGN SPEED = 35 MPH

Proposed right-of-way lines are based on a conservative estimation approach at this time and may be adjusted during the design phase.

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( )	C1 : NATURAL	( )	C3C : SUBURBAN COMM.
( )	C2 : RURAL	( )	C4 : URBAN GENERAL
( )	C2T : RURAL TOWN	( )	C5 : URBAN CENTER
(X)	C3R : SUBURBAN RES.	( )	C6 : URBAN CORE
( )	N/A : L.A. FACILITY		

FUNCTIONAL CLASSIFICATION

( )	INTERSTATE	( )	MAJOR COLLECTOR
( )	FREEWAY/EXPWY.	(X)	MINOR COLLECTOR
( )	PRINCIPAL ARTERIAL	( )	LOCAL
( )	MINOR ARTERIAL		

HIGHWAY SYSTEM

( )	NATIONAL HIGHWAY SYSTEM
( )	STRATEGIC INTERMODAL SYSTEM
( )	STATE HIGHWAY SYSTEM
(X)	OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

( )	1 - FREEWAY
( )	2 - RESTRICTIVE w/Service Roads
( )	3 - RESTRICTIVE w/660 ft. Connection Spacing
( )	4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( )	5 - RESTRICTIVE w/440 ft. Connection Spacing
(X)	6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( )	7 - BOTH MEDIAN TYPES

CRITERIA

(X)	NEW CONSTRUCTION / RECONSTRUCTION
( )	RESURFACING (LA FACILITIES)
( )	RRR (ARTERIALS & COLLECTORS)

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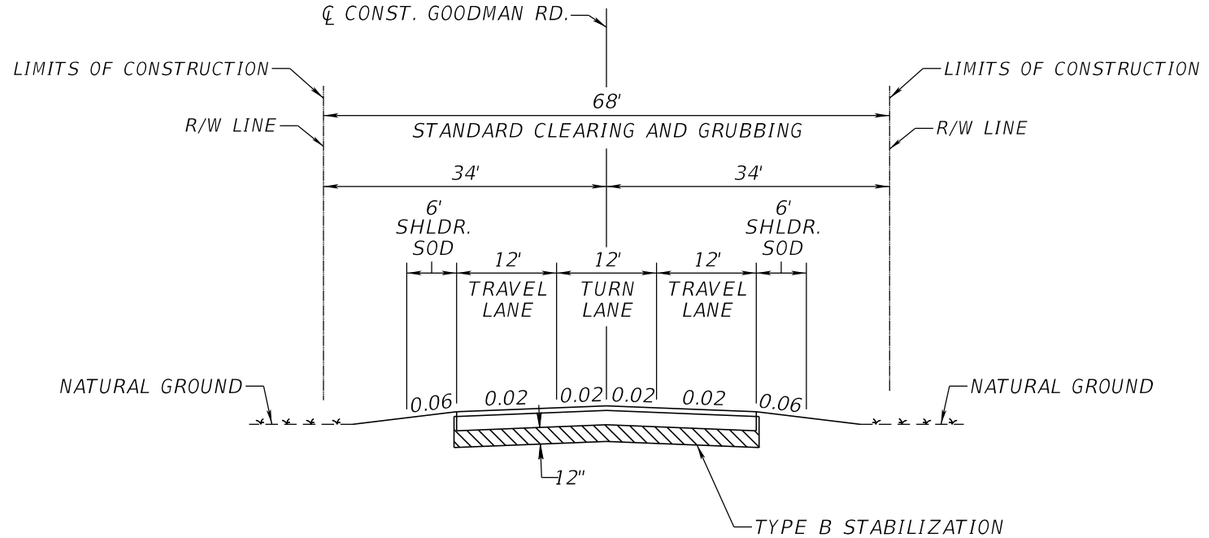

TYPICAL SECTION
GOODMAN ROAD
NORTH OF SINCLAIR ROAD

DESIGN SPEED = 35 MPH

Proposed right-of-way lines are based on a conservative estimation approach at this time and may be adjusted during the design phase.

PROJECT CONTROLS

CONTEXT CLASSIFICATION

( )	C1 : NATURAL	( )	C3C : SUBURBAN COMM.
( )	C2 : RURAL	( )	C4 : URBAN GENERAL
( )	C2T : RURAL TOWN	( )	C5 : URBAN CENTER
(X)	C3R : SUBURBAN RES.	( )	C6 : URBAN CORE
( )	N/A : L.A. FACILITY		

FUNCTIONAL CLASSIFICATION

( )	INTERSTATE	( )	MAJOR COLLECTOR
( )	FREEWAY/EXPWY.	(X)	MINOR COLLECTOR
( )	PRINCIPAL ARTERIAL	( )	LOCAL
( )	MINOR ARTERIAL		

HIGHWAY SYSTEM

( )	NATIONAL HIGHWAY SYSTEM
( )	STRATEGIC INTERMODAL SYSTEM
( )	STATE HIGHWAY SYSTEM
(X)	OFF-STATE HIGHWAY SYSTEM

ACCESS CLASSIFICATION

( )	1 - FREEWAY
( )	2 - RESTRICTIVE w/Service Roads
( )	3 - RESTRICTIVE w/660 ft. Connection Spacing
( )	4 - NON-RESTRICTIVE w/2640 ft. Signal Spacing
( )	5 - RESTRICTIVE w/440 ft. Connection Spacing
(X)	6 - NON-RESTRICTIVE w/1320 ft. Signal Spacing
( )	7 - BOTH MEDIAN TYPES

CRITERIA

(X)	NEW CONSTRUCTION / RECONSTRUCTION
( )	RESURFACING (LA FACILITIES)
( )	RRR (ARTERIALS & COLLECTORS)

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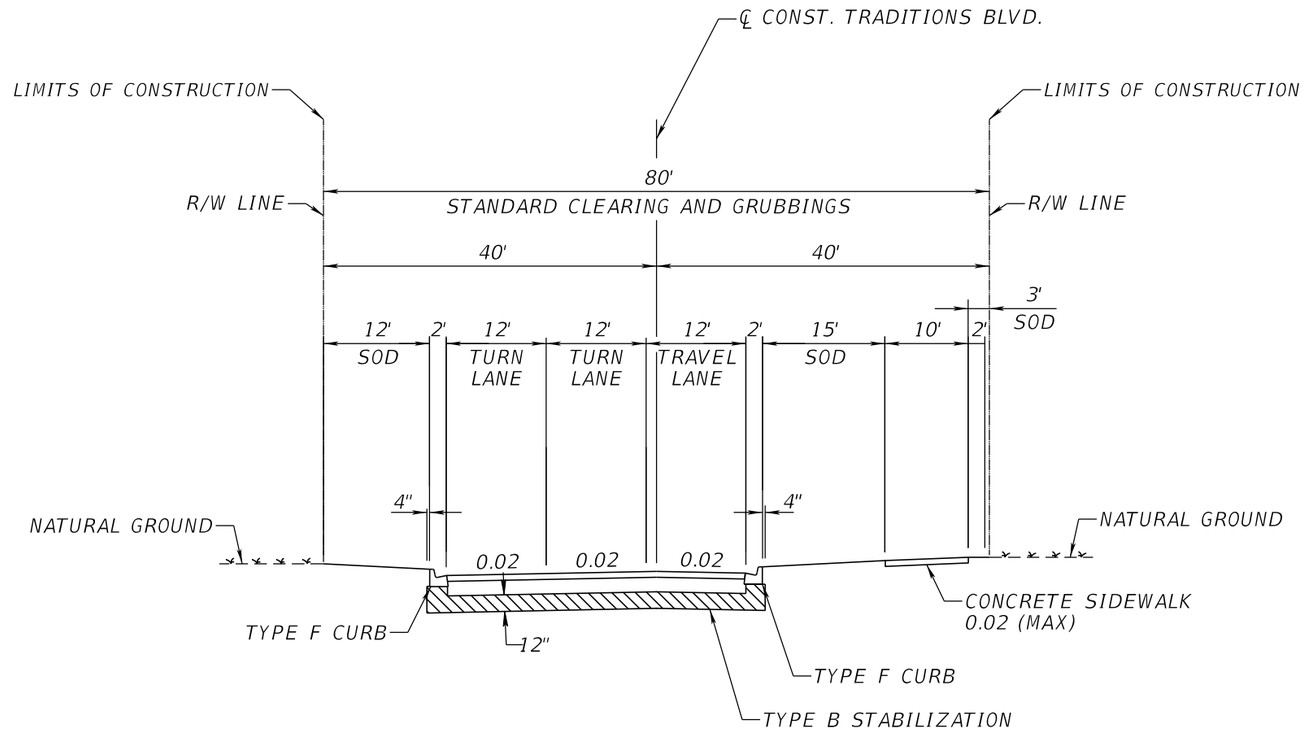


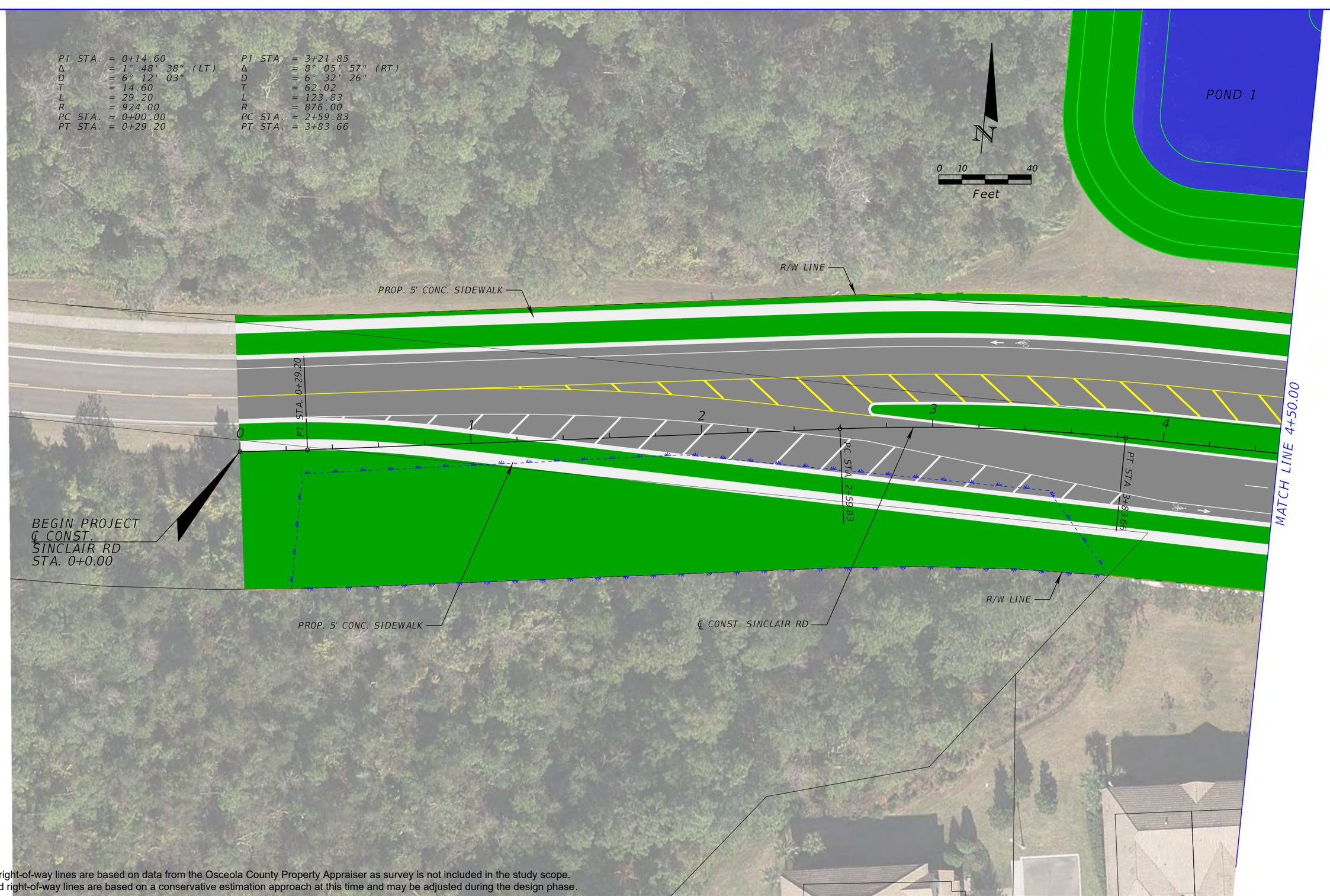
TYPICAL SECTION
TRADITION BLVD

DESIGN SPEED = 35 MPH

Proposed right-of-way lines are based on a conservative estimation approach at this time and may be adjusted during the design phase.

PI STA. = 0+14.60
Δ = 1° 48' 38" (LT)
D = 6° 12' 03"
T = 14.60
L = 29.20
R = 924.00
PC STA. = 0+00.00
PT STA. = 0+29.20

PI STA. = 3+21.85
Δ = 8° 05' 57" (RT)
D = 6° 32' 26"
T = 62.02
L = 123.83
R = 876.00
PC STA. = 2+59.83
PT STA. = 3+83.66



Existing right-of-way lines are based on data from the Osceola County Property Appraiser as survey is not included in the study scope.
Proposed right-of-way lines are based on a conservative estimation approach at this time and may be adjusted during the design phase.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

Kimley»Horn
Registry 696
Hao T. Chau, P.E.
P.E. License No. 61640
189 South Orange Avenue, Suite 1000
Orlando, Florida 32801

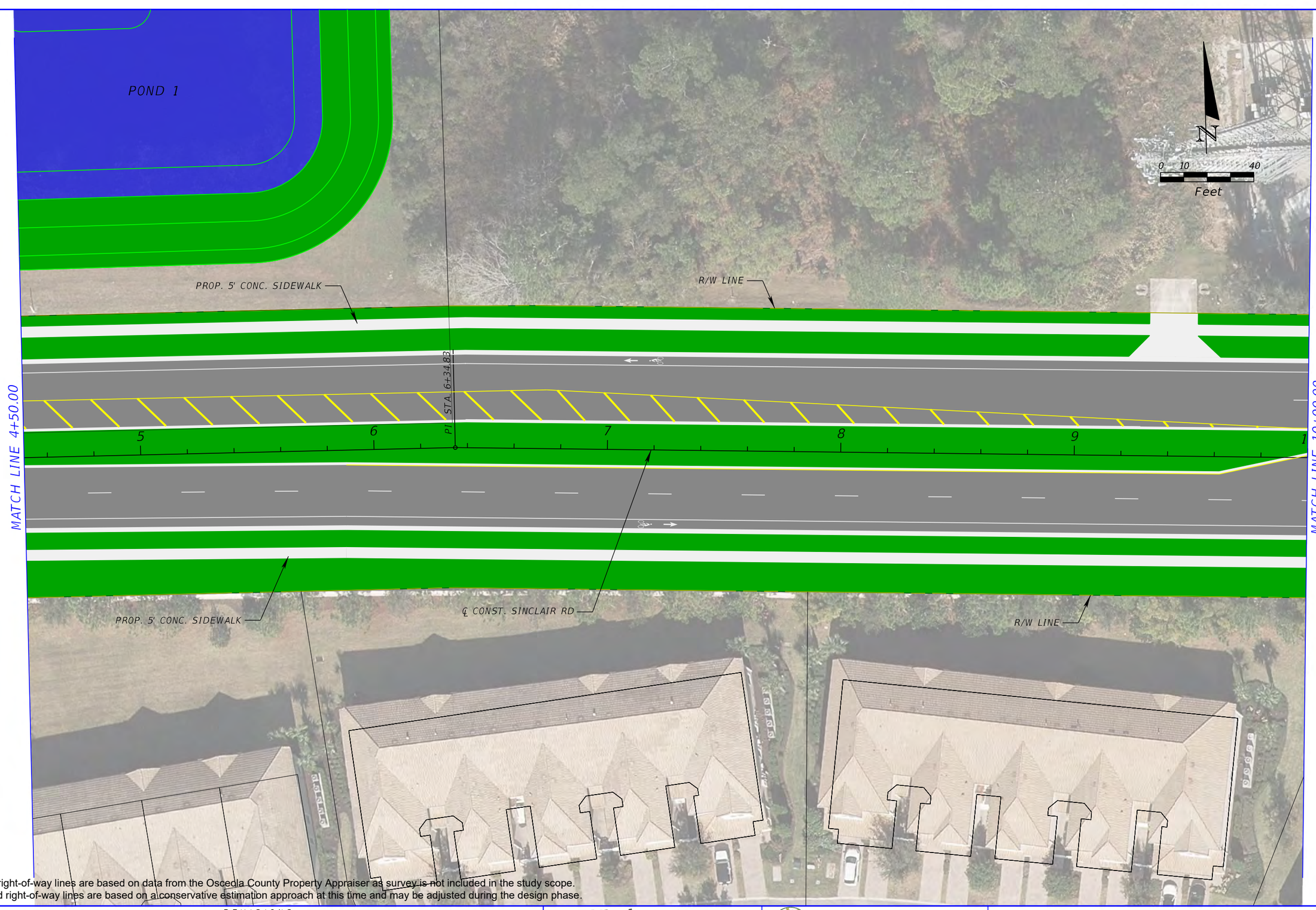
OSCEOLA COUNTY TRANSPORTATION AND TRANSIT
1 Courthouse Square, Suite 3100
Kissimmee, Florida 34741-5488
Phone: (407) 742-0662 Fax (407) 742-0600

SINCLAIR ROAD CONCEPT PLANS (01)

SHEET NO. 7

THE OFFICIAL RECORD OF THIS SHEET IS THE ELECTRONIC FILE DIGITALLY SIGNED AND SEALED UNDER RULE 61G15-23.004, F.A.C.

Spencer.Edwards 6/15/2023 12:29:13 PM K:\ORL_TPTO\049563001_Sinclair Ext\200_Engineering\Roadway\Preferred Alternative\Plan Sheets\PLANRD01.dgn



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REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

Kimley»Horn
Registry 696
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P.E. License No. 61640
189 South Orange Avenue, Suite 1000
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OSCEOLA COUNTY TRANSPORTATION AND TRANSIT
1 Courthouse Square, Suite 3100
Kissimmee, Florida 34741-5488
Phone: (407) 742-0662 Fax (407) 742-0600

SINCLAIR ROAD CONCEPT PLANS (02)

SHEET NO. 8

MATCH LINE 108+00.00

MATCH LINE 10+00.00

MATCH LINE 15+50.00

MATCH LINE 104+40.00

S. GOODMAN RD.

℄ CONST. S. GOODMAN RD.

℄ CONST. SINCLAIR RD

R/W LINE

PROP. 5' CONC. SIDEWALK

MERGE

0 10 40
Feet

Existing right-of-way lines are based on data from the Osceola County Property Appraiser as survey is not included in the study scope.
Proposed right-of-way lines are based on a conservative estimation approach at this time and may be adjusted during the design phase.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

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TRANSPORTATION
AND TRANSIT
1 Courthouse Square, Suite 3100
Kissimmee, Florida 34741-5488
Phone: (407) 742-0662 Fax (407) 742-0600

SINCLAIR ROAD CONCEPT PLANS (03)

SHEET NO. 9

Spencer.Edwards 6/15/2023 12:30:06 PM K:\ORL_TPTO\049563001_Sinclair Ext\200_Engineering\Roadway\Preferred Alternative\Plan Sheets\PLANRD03.dgn

PI STA. = 18+91.02
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D = 4° 59' 59"
T = 290.69
L = 569.38
R = 1,146.00
PC STA. = 16+00.33
PT STA. = 21+69.71
e = 0.02 (NC)

N

0 10 40
Feet

POND 2

PROP. 5' CONC. SIDEWALK

R/W LINE

MATCH LINE 15+50.00

℄ STA. 16+00.33

16

17

18

19

20

MATCH LINE 21+00.00

PROP. 5' CONC. SIDEWALK

R/W LINE

℄ CONST. SINCLAIR RD

Existing right-of-way lines are based on data from the Osceola County Property Appraiser as survey is not included in the study scope.
Proposed right-of-way lines are based on a conservative estimation approach at this time and may be adjusted during the design phase.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

Kimley»Horn
Registry 696
Hao T. Chau, P.E.
P.E. License No. 61640
189 South Orange Avenue, Suite 1000
Orlando, Florida 32801

OSCEOLA COUNTY
TRANSPORTATION
AND TRANSIT
1 Courthouse Square, Suite 3100
Kissimmee, Florida 34741-5488
Phone: (407) 742-0662 Fax (407) 742-0600

SINCLAIR ROAD CONCEPT PLANS (04)

SHEET NO. 10

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POND 2

PROP. 5' CONC. SIDEWALK

R/W LINE

PT STA. 21+69.71

MATCH LINE 21+00.00

MATCH LINE 26+50.00

1 22 23 24 25 26

0 10 40

Feet

PROP. 5' CONC. SIDEWALK

℄ CONST. SINCLAIR RD

R/W LINE

Existing right-of-way lines are based on data from the Osceola County Property Appraiser as survey is not included in the study scope.
Proposed right-of-way lines are based on a conservative estimation approach at this time and may be adjusted during the design phase.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

Kimley»Horn
Registry 696
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189 South Orange Avenue, Suite 1000
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AND TRANSIT
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SINCLAIR ROAD CONCEPT PLANS (05)

SHEET NO. 11

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Existing right-of-way lines are based on data from the Osceola County Property Appraiser as survey is not included in the study scope.
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REVISIONS					
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Kimley»Horn
Registry 696
Hao T. Chau, P.E.
P.E. License No. 61640
189 South Orange Avenue, Suite 1000
Orlando, Florida 32801

OSCEOLA COUNTY TRANSPORTATION AND TRANSIT
1 Courthouse Square, Suite 3100
Kissimmee, Florida 34741-5488
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SINCLAIR ROAD CONCEPT PLANS (06)

SHEET NO. 12

Spencer.Edwards 6/15/2023 12:31:27 PM K:\ORL_TPTO\049563001_Sinclair Ext\200_Engineering\Roadway\Preferred Alternative\Plan Sheets\PLANRD06.dgn

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SINCLAIR ROAD CONCEPT PLANS (07)

SHEET NO. 13

Spencer.Edwards 6/15/2023 12:31:51 PM K:\ORL_TPTO\049563001_Sinclair Ext\200_Engineering\Roadway\Preferred Alternative\Plan Sheets\PLANRD07.dgn

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SINCLAIR ROAD CONCEPT PLANS (08)

SHEET NO. 14

Spencer.Edwards 6/15/2023 12:32:13 PM K:\ORL_TPTO\049563001_Sinclair Ext\200_Engineering\Roadway\Preferred Alternative\Plan Sheets\PLANRD08.dgn

PI STA. = 50+01.59
Δ = 63° 50' 11" (LT)
D = 14° 00' 31"
T = 254.76
L = 455.69
R = 409.00
PC STA. = 47+46.83
PT STA. = 52+02.52
e = 0.045

N

0 10 40
Feet

R/W LINE

PROP. 5' CONC. SIDEWALK

MATCH LINE 43+00.00

43 44 45 46 47 48

PC STA. 47+46.83

MATCH LINE 48+50.00

PROP. 5' CONC. SIDEWALK

℄ CONST. SINCLAIR RD

R/W LINE

POND 3

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SINCLAIR ROAD CONCEPT PLANS (09)

SHEET NO. 15

Spencer.Edwards 6/5/2023 12:32:38 PM K:\ORL_TPTO\049563001_Sinclair Ext\200_Engineering\Roadway\Preferred Alternative\Plan Sheets\PLANRD09.dgn

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D = 14° 00' 31"
T = 254.76
L = 455.69
R = 409.00
PC STA. = 47+46.83
PT STA. = 52+02.52
e = 0.045

0 10 40
Feet

MATCH LINE 48+50.00

MATCH LINE 54+00.00

PROP. 5' CONC. SIDEWALK

R/W LINE

PC STA. 47+46.83

PT STA. 52+02.52

49

50

51

52

53

54

PROP. 5' CONC. SIDEWALK

℄ CONST. SINCLAIR RD

R/W LINE

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SINCLAIR ROAD CONCEPT PLANS (10)

SHEET NO. 16

Spencer.Edwards 6/15/2023 12:32:59 PM K:\ORL_TPTO\049563001_Sinclair Ext\200_Engineering\Roadway\Preferred Alternative\Plan Sheets\PLANRD010.dgn

Existing right-of-way lines are based on data from the Osceola County Property Appraiser as survey is not included in the study scope.
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SINCLAIR ROAD CONCEPT PLANS (11)

SHEET NO. 17

Spencer.Edwards 6/15/2023 12:33:20 PM K:\ORL_TPTO\049563001_Sinclair Ext\200_Engineering\Roadway\Preferred Alternative\Plan Sheets\PLANRD011.dgn

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SINCLAIR ROAD CONCEPT PLANS (12)

SHEET NO. 18

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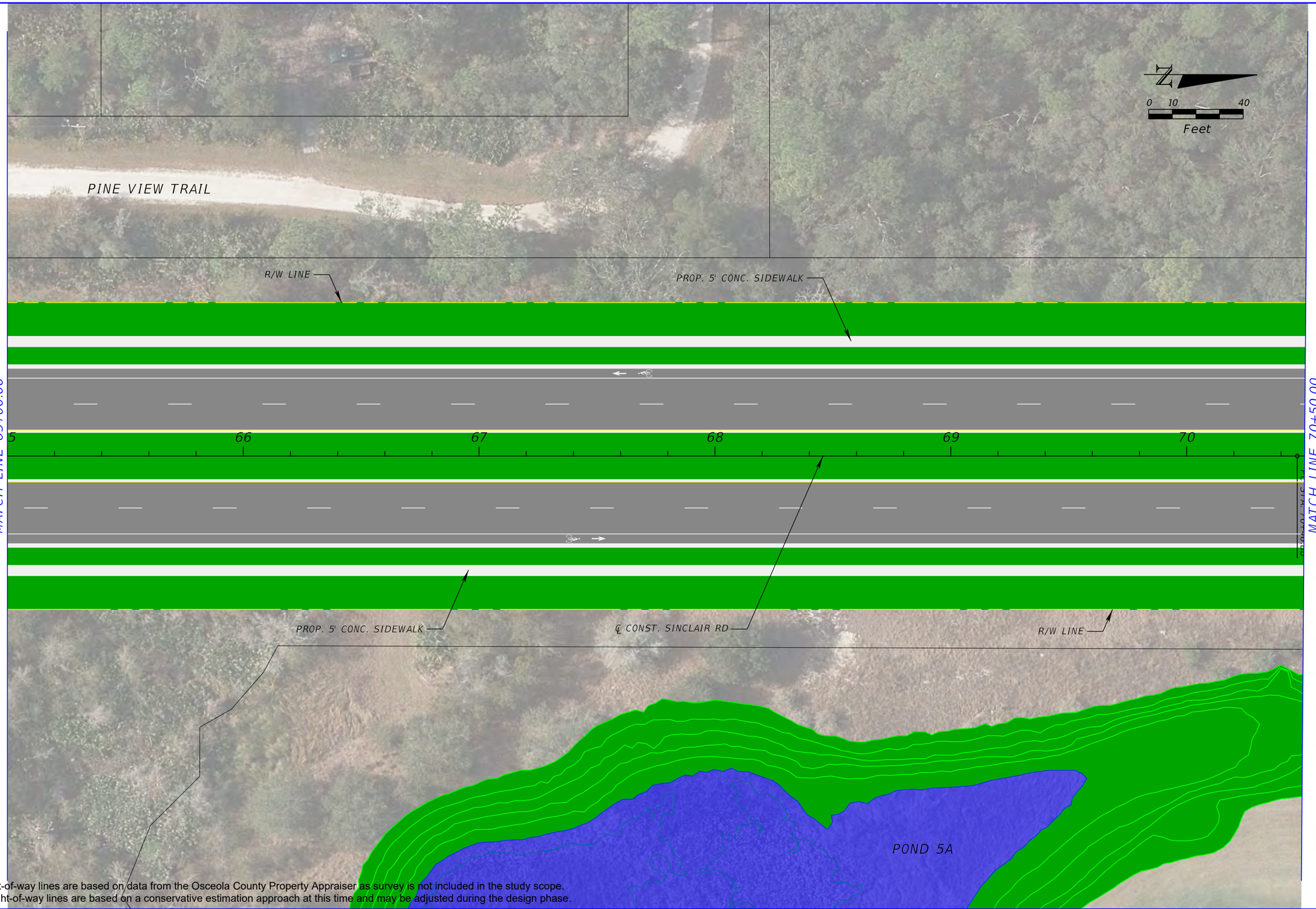

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SINCLAIR ROAD CONCEPT PLANS (13)

SHEET NO. 19

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PI STA. = 74+56.95
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D = 14° 00' 31"
T = 410.07
L = 643.52
R = 409.00
PC STA. = 70+46.88
PT STA. = 76+90.40
e = 0.045

POND 5B

PROP. 5' CONC. SIDEWALK

R/W LINE

0 10 40
Feet

73

74

72

75

71

MATCH LINE 70+50.00

MATCH LINE 76+00.00

℄ CONST. SINCLAIR RD

R/W LINE

PROP. 5' CONC. SIDEWALK

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SINCLAIR ROAD CONCEPT PLANS (14)

SHEET NO.
20

Spencer.Edwards 6/15/2023 12:34:14 PM K:\ORL_TPTO\049563001_Sinclair Ext\200_Engineering\Roadway\Preferred Alternative\Plan Sheets\PLANRD014.dgn

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D = 10° 29' 37"
T = 553.16
L = 864.76
R = 546.00
PC STA. = 80+85.75
PT STA. = 89+50.52
e = 0.045

N

0 10 40
Feet

PROP. 5' CONC. SIDEWALK

R/W LINE

MATCH LINE 76+00.00

MATCH LINE 81+50.00

PT STA. 76+90.40

PC STA. 80+85.75

76 77 78 79 80 81

R/W LINE

℄ CONST. SINCLAIR RD

PROP. 5' CONC. SIDEWALK

DESERT MOUNTAIN CT.

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SINCLAIR ROAD CONCEPT PLANS (15)

SHEET NO.
21

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PI STA. = 86+38.91
Δ = 90° 44' 46" (LT)
D = 10° 29' 37"
T = 553.16
L = 864.76
R = 546.00
PC STA. = 80+85.75
PT STA. = 89+50.52
e = 0.02 (RC)

0 10 40
Feet

DAVENPORT CREEK

PROP. 5' CONC. SIDEWALK
R/W LINE
BEGIN BRIDGE
STA. 81+87.63
MATCH LINE 81+50.00
82
83
84
85
86
℄ CONST. TRADITION BLVD.
END BRIDGE
STA. 86+03.63
R/W LINE
PROP. 5' CONC. SIDEWALK
MATCH LINE 87+00.00
200
PC STA. 200+64.98
TRADITION BLVD.
201
MATCH LINE 201+20.00
R/W LINE
PROP. 5' CONC. SIDEWALK
℄ CONST. SINCLAIR RD
DAVENPORT CREEK
R/W LINE
PROP. 5' CONC. SIDEWALK
R/W LINE

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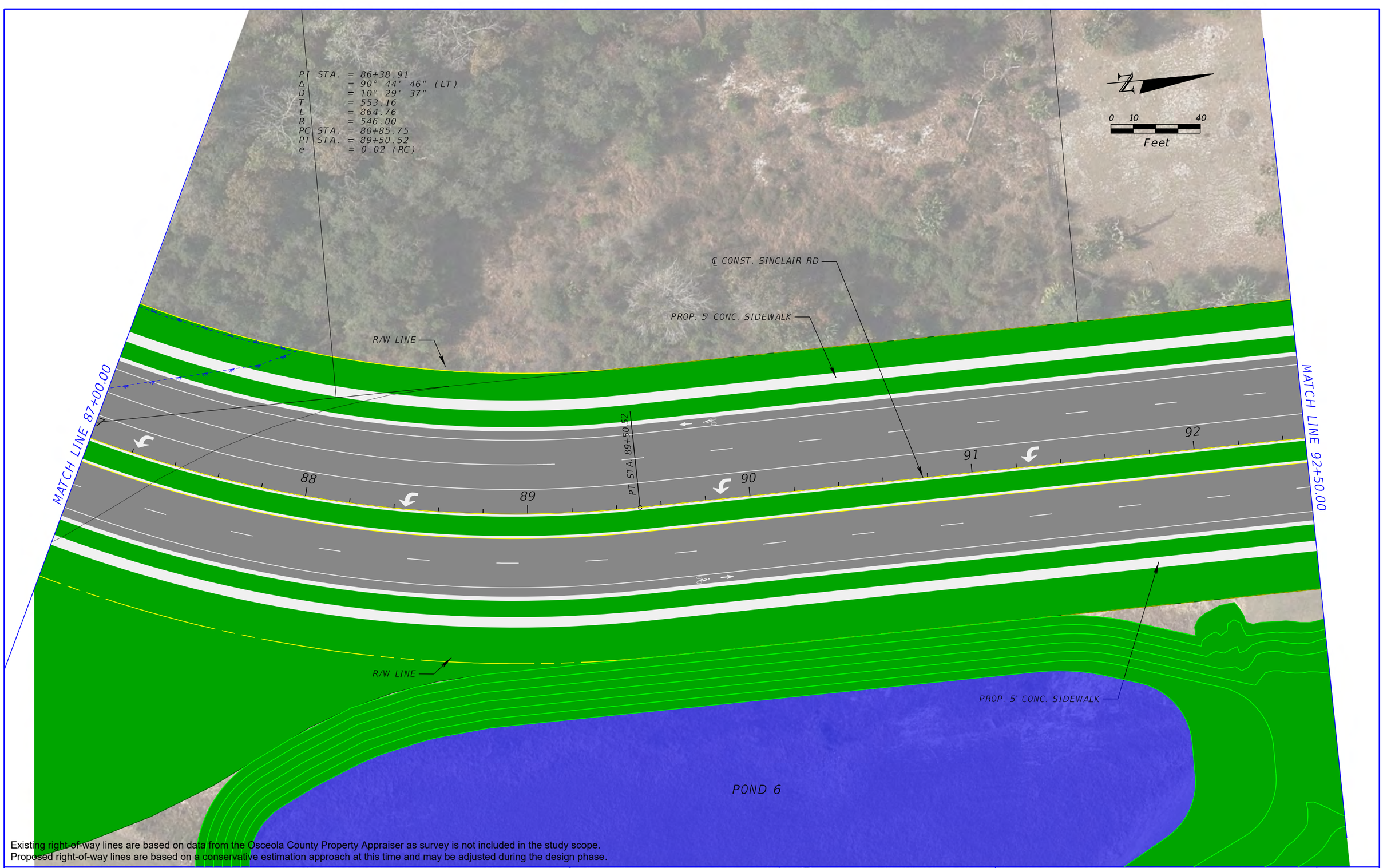
SINCLAIR ROAD CONCEPT PLANS (16)

SHEET NO. 22

brian.mayer 8/17/2023 10:44:18 PM K:\ORL_TPTO\049563001_Sinclair Ext\200_Engineering\Roadway\Preferred Alternative\Plan Sheets\PLANRD016.dgn



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SINCLAIR ROAD CONCEPT PLANS (17)

SHEET NO. 23

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SINCLAIR ROAD CONCEPT PLANS (18)

SHEET NO. 24

MATCH LINE 104+40.00

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SINCLAIR ROAD CONCEPT PLANS (19)

SHEET NO.
25

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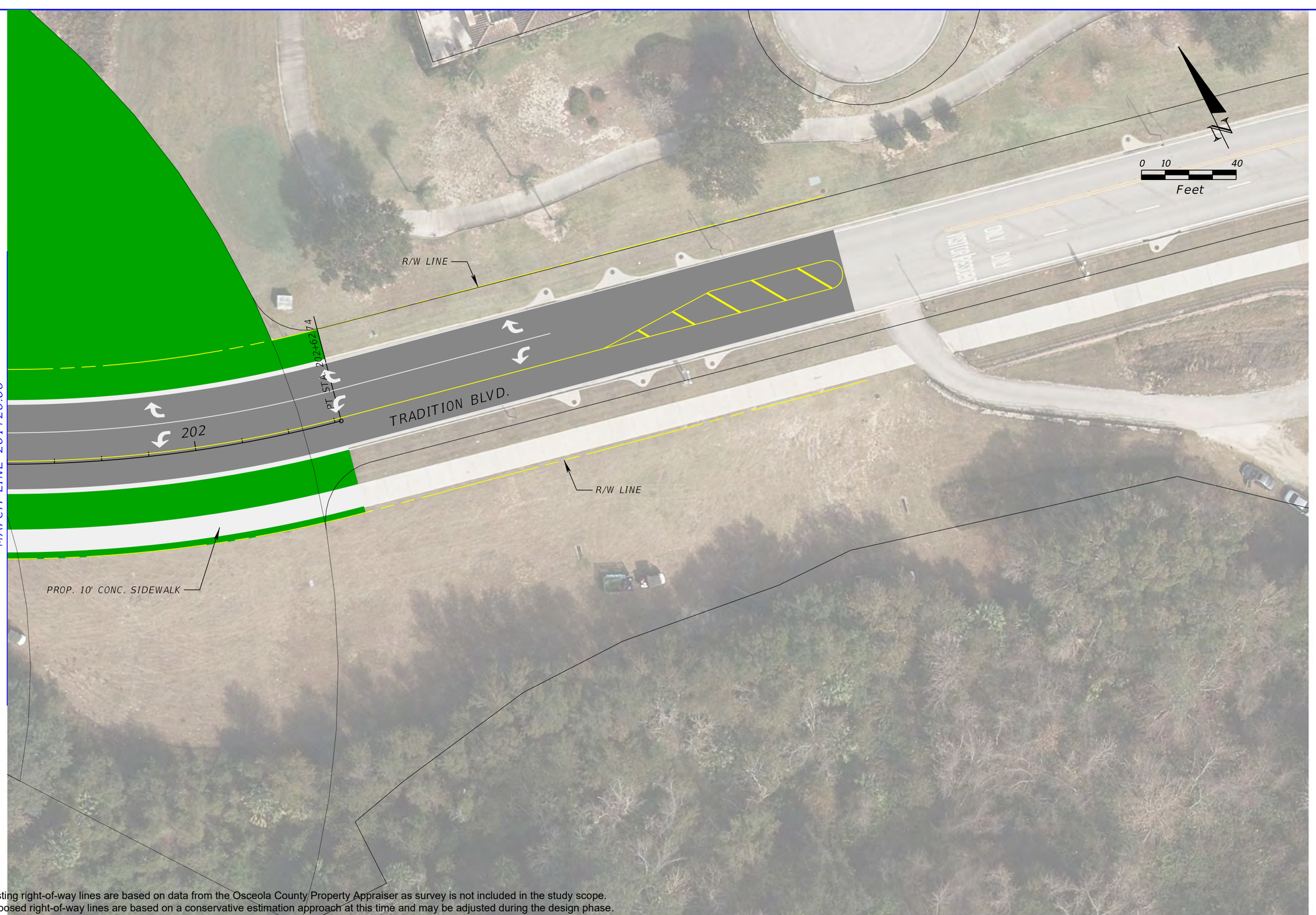
SINCLAIR ROAD CONCEPT PLANS (20)

SHEET NO. 26



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SINCLAIR ROAD CONCEPT PLANS (21)

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APPENDIX C

Drainage Maps

POND 1
EXIST. PERMIT #49-01744-P
TV=1.32 AC-FT
STORAGE=2.54 AC-FT

BEGIN PROJECT
STA. 00+00

POND 1

UTILITY EASEMENT

S GOODMAN RD

BELLA CITTA BLVD

BASIN 1

BASIN 2

SINCLAIR ROAD

EXIST 18"
GAS LINE

N

0 50 200
Feet

LEGEND
BASIN 1
BASIN 2
POND CONTOURS
OFFSITE FLOW ARROWS
ONSITE FLOW ARROWS
WETLAND
PROPERTY LINE

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armando.orozco

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REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

OSCEOLA COUNTY
PUBLIC WORKS DEPARTMENT

ROAD NO.	PROJECT NO.

DRAINAGE MAP 01

SHEET NO.

28-25-27-0000-0060-0000
DEWAN PROPERTIES LLC

POND 2
TV= 5.49 AC-FT
STORAGE=11.33 AC-FT

112
110
108

UTILITY EASEMENT

EXIST 18" GAS LINE

34-25-27-4012-0003-0010
ORLANDO REUNION DEVELOPMENT LLC

0 50 200
Feet

BASIN 2

SINCLAIR ROAD

BASIN 3

PROP. CROSS DRAIN
3-48" PIPES (CD-03)

28-25-27-0000-0060-0000
DEWAN PROPERTIES LLC

FUTURE DEVELOPMENT BY OTHERS

33-25-27-0000-0050-0000
DEWAN PROPERTIES LLC

PROP. CROSS DRAIN
3-48" PIPES (CD-01)

112
110
108

POND 3
TV= 1.38 AC-FT
SV=2.93 AC-FT

116

34-25-27-4012-0003-0010
ORLANDO REUNION DEVELOPMENT LLC

LEGEND
BASIN 2
BASIN 3
POND CONTOURS
OFFSITE FLOW ARROWS
ONSITE FLOW ARROWS
WETLAND
PROPERTY LINE

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REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

OSCEOLA COUNTY
PUBLIC WORKS DEPARTMENT

ROAD NO.	PROJECT NO.

DRAINAGE MAP 02

SHEET NO.

POND 4
EXIST. PERMIT #49-01107-P
TV=0.96 AC-FT
STORAGE=1.45 AC-FT

POND 5A
EXIST. PERMIT #49-01107-P
TV=1.29 AC-FT
STORAGE=6.40 AC-FT

POND 5B
TV=0.69 AC-FT
STORAGE=1.46 AC-FT

21-25-27-3302-0001-097G
(ER RELOCATION)

21-25-27-3302-0001-097L
(ER RELOCATION)

BASIN 3

PINE VIEW TRAIL

SINCLAIR ROAD

BASIN 4

BASIN 5A

POND 5B

UTILITY EASEMENT

POND 4

CROSS DRAIN
(1)-36" PIPE
(CD-02)

POND 5A

DESERT MOUNTAIN CT

BASIN 5B

MOR-TAY TRAIL

21-25-27-3302-0001-0780
(ER RELOCATION)

EXIST 18"
GAS LINE

DAVENPORT
CREEK

N

0 50 200
Feet

LEGEND
- BASIN 3
- BASIN 4
- BASIN 5A
- BASIN 5B
- POND CONTOURS
- OFFSITE FLOW ARROWS
- ONSITE FLOW ARROWS
- WETLAND
- PROPERTY LINE

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5/5/2023 10:30:12 AM armando.orozco

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REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

OSCEOLA COUNTY
PUBLIC WORKS DEPARTMENT

ROAD NO.	PROJECT NO.

DRAINAGE MAP 03

SHEET NO.

POND 6 (EXIST. PERMIT # 49-01107-P)
TV=1.74 AC-FT
STORAGE=3.78 AC-FT

BASIN 5B

BASIN 6

DAVENPORT CREEK

DAVENPORT CREEK

JURISDICTIONAL LINE Z=30.0-1070.80

KELLER TRAIL

0 50 200
Feet

END PROJECT
STA. 93+65

SINCLAIR RD

POND 6

EXIST. BASIN

PALMITTA CT

TRADITION BLVD

UTILITY EASEMENT

EXIST 18" GAS LINE

LEGEND
- BASIN 5B
- BASIN 6
- POND CONTOURS
- OFFSITE FLOW ARROWS
- ONSITE FLOW ARROWS
- WETLAND
- PROPERTY LINE

REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

OSCEOLA COUNTY
PUBLIC WORKS DEPARTMENT

ROAD NO.	PROJECT NO.

DRAINAGE MAP 04

SHEET NO.

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APPENDIX D

Pond Calculations

PROJECT NAME:	Sinclair	Kimley Horn & Associates
BASIN DESIGNATION:	Basin 1	
BASIN ANALYSIS (PRE/POST)	Pre	

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL GROUP	CN	AREA (ac)	PRODUCT
Onsite Flow Areas				
Open space - (Good)	D	80	4.53	362.40
Impervious - (Road)	D	98	3.10	303.80
Water - (Pond)	D	100	1.07	107.00
		TOTALS	8.70	773.20

COMPOSITE CN =	88.9

ESTIMATE OF RUNOFF VOLUME - 25YR/24HR

NOAA 10 yr - 72 hr = 7.75 in

1) DETERMINE SOIL STORAGE #VALUE!

S= (1000/CN) - 10

S =	**1.25 in**

2) DETERMINE RUNOFF - R

R= $(P-0.2*S)^2$ / (P+0.8*S)

R =	**6.43 in**

Where P=Preci 7.8 inches for 25yr/24hr storm event

3) DETERMINE RUNOFF VOLUME- V(R)

V(R)= R/12*AREA =

V(R) =	**4.66 ac-ft**

PROJECT NAME:	Sinclair	Kimley Horn & Associates
BASIN DESIGNATION:	Basin 1	
BASIN ANALYSIS (PRE/POST)	Post	

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL GROUP	CN	AREA (ac)	PRODUCT
Onsite Flow Areas				
Open space - (Good)	D	80	4.48	358.51
Prop. Impervious - (Curb+Sidewalk)	D	98	0.56	54.55
Prop. Impervious - (Road)	D	98	1.67	163.66
Exist. Impervious	D	98	1.27	124.66
Water - Pond	D	100	1.07	107.00
		TOTALS	9.05	808.38

COMPOSITE CN =	89.3

ESTIMATE OF RUNOFF VOLUME - 25YR/24HR

NOAA 10 yr - 72 hr = 7.75 in

1) DETERMINE SOIL STORAGE - S

S= (1000/CN) - 10

S =	**1.20 in**

2) DETERMINE RUNOFF - R

R= $(P-0.2*S)^2$ / (P+0.8*S)

R =	**6.48 in**

Where P=Preci 7.8 inches for 25yr/24hr storm event

ADDITIONAL STORAGE VOLUME NEEDED FOR POND

DIFFERENCE IN VOLUME

ΔV(R) =	**0.22 ac-ft**
Treatment=	**0.75 ac-ft**
ΔV(R) + Treatment=	**0.97 ac-ft**
Total + 25% contigency=	**1.22 ac-ft**

PROJECT NAME:	Sinclair	Kimley-Horn & Associates
BASIN DESIGNATION:	Existing Pond 1 (Permitted Pond)	

Water Quality Calculations

Total Onsite Basin Area =	8.70	ac
Onsite Paved Area=	3.10	ac
Trail Paved Area=	D	ac
Paved Area to be Treated=	D	ac
Pond @ SHW=	1.05	ac

Required Treatment Volume: **Wet-Online**

The Greater of: 14.33

1.0 " Runoff Over Project Area =		1"/12 x	8.70 ac =	**0.73**
2.5 " Runoff Over DCIA (Imp. Area)=		2.5"/12 x	3.10 ac =	**0.65**

Total Volume Required = **0.73 Ac-Ft**

TREATMENT PROVIDED = 1.09 Ac-Ft

STAGE STORAGE CALCULATIONS

	ELEV.	AREA (AC)	AVG AREA (AC)	DELTA (FT)	DELTA STORAGE (AC-FT)	SUM STORAGE (AC-FT)
			1.35	0.00	0.00	
Berm	115.00	1.35				2.92
			1.28	0.65	0.83	
DHW	114.35	1.20				2.08
			1.17	0.85	0.99	
Weir	113.50	1.13				1.09
			1.09	1.00	1.09	
Control	112.50	1.05				-

PROJECT NAME:	Sinclair	Kimley-Horn & Associates
BASIN DESIGNATION:	Proposed Pond 1	

Water Quality Calculations

Total Onsite Basin Area =	9.05 ac
Onsite Paved Area=	3.50 ac
Trail Paved Area=	0.00 ac
Paved Area to be Treated=	3.50 ac
Pond @ SHW=	1.26 ac

Required Treatment Volume: **Wet-Online**

The Greater of:

1.0 " Runoff Over Project Area =	1"/12 x	9.05 ac =	**0.75**
2.5 " Runoff Over DCIA (Imp. Area)=	2.5"/12 x	3.50 ac =	**0.73**

Total Volume Required = **0.75 Ac-Ft**

TREATMENT PROVIDED = 1.32 Ac-Ft

STAGE STORAGE CALCULATIONS

	ELEV.	AREA (AC)	AVG AREA (AC)	DELTA (FT)	DELTA STORAGE (AC-FT)	SUM STORAGE (AC-FT)
			1.57	0.00	0.00	
Berm	115.00	1.57				3.53
			1.53	0.65	0.99	
DHW	114.35	1.48				2.54
			1.43	0.85	1.22	
Weir	113.50	1.38				1.32
			1.32	1.00	1.32	
Control	112.50	1.26				-

PROJECT NAME:	Sinclair	Kimley Horn & Associates
BASIN DESIGNATION:	Basin 2	
BASIN ANALYSIS (PRE/POST)	Pre	

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL GROUP	CN	AREA (ac)	PRODUCT
Onsite Flow Areas				
Woods - (Fair)	D	84	31.65	2659.00
Impervious - (Road)	D	98	0.10	9.80
	D			
		TOTALS	31.75	2668.80

COMPOSITE CN =	84.0

ESTIMATE OF RUNOFF VOLUME - 25YR/24HR

NOAA 10 yr - 72 hr = 7.75 in

1) DETERMINE SOIL STORAGE #VALUE!

S= (1000/CN) - 10

S =	**1.90 in**

2) DETERMINE RUNOFF - R

$R= (P-0.2*S)^2 / (P+0.8*S)$

R =	**5.86 in**

Where P=Preci 7.8 inches for 25yr/24hr storm event

3) DETERMINE RUNOFF VOLUME- V(R)

V(R)= R/12*AREA =

V(R) =	**15.50 ac-ft**

PROJECT NAME:	Sinclair	Kimley Horn & Associates
BASIN DESIGNATION:	Basin 2	
BASIN ANALYSIS (PRE/POST)	Post	

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL GROUP	CN	AREA (ac)	PRODUCT
Onsite Flow Areas				
Open space - (Good)	D	80	10.16	812.73
Impervious - (Curb+Sidewalk)	D	98	0.35	34.10
Impervious - (Road)	D	98	1.04	102.21
Vehicular Impervious - Elevation Development	D	98	20.20	1979.60
		TOTALS	31.75	2928.64

COMPOSITE CN =	92.2

ESTIMATE OF RUNOFF VOLUME - 25YR/24HR

NOAA 10 yr - 72 hr = 7.75 in

1) DETERMINE SOIL STORAGE - S

S= (1000/CN) - 10

S =	**0.85 in**

2) DETERMINE RUNOFF - R

$R= (P-0.2*S)^2 / (P+0.8*S)$

R =	**6.82 in**

Where P=Preci 7.8 inches for 25yr/24hr storm event

3) DETERMINE RUNOFF VOLUME- V(R)

ADDITIONAL STORAGE VOLUME NEEDED FOR POND

DIFFERENCE IN VOLUME

ΔV(R) =	**2.55 ac-ft**
Treatment=	**4.50 ac-ft**
ΔV(R) + Treatment=	**7.05 ac-ft**
Total + 25% contigency=	**8.81 ac-ft**

PROJECT NAME:	Sinclair	Kimley-Horn & Associates
BASIN DESIGNATION:	Proposed Pond 2	

Water Quality Calculations

Total Onsite Basin Area =	31.75 ac
Onsite Paved Area=	21.59 ac
Trail Paved Area=	0.00 ac
Paved Area to be Treated=	21.59 ac
Pond @ SHW=	3.02 ac

Required Treatment Volume: **Wet-Online**

The Greater of:

1.0 " Runoff Over Project Area =	1"/12 x 31.75 ac =	**2.65**
2.5 " Runoff Over DCIA (Imp. Area)=	2.5"/12 x 21.59 ac =	**4.50**

Total Volume Required = **4.50 Ac-Ft**

TREATMENT PROVIDED = 4.68 Ac-Ft

STAGE STORAGE CALCULATIONS

	ELEV.	AREA (AC)	AVG AREA (AC)	DELTA (FT)	DELTA STORAGE (AC-FT)	SUM STORAGE (AC-FT)
			3.56	0.00	0.00	
Berm	112.00	3.56				13.15
			3.49	1.00	3.49	
DHW	111.00	3.42				9.66
			3.32	1.50	4.98	
Weir	109.50	3.22				4.68
			3.12	1.50	4.68	
Control	108.00	3.02				-

PROJECT NAME:	Sinclair	Kimley Horn & Associates
BASIN DESIGNATION:	Basin 3	
BASIN ANALYSIS (PRE/POST)	Pre	

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL GROUP	CN	AREA (ac)	PRODUCT
Onsite Flow Areas				
Woods - (Fair)	D	84	11.36	954.24
	D			
	D			
		TOTALS	11.36	954.24

COMPOSITE CN =	84.0

14.33

ESTIMATE OF RUNOFF VOLUME - 25YR/24HR

NOAA 10 yr - 72 hr = 7.75 in

1) DETERMINE SOIL STORAGE - S

S= (1000/CN) #VALUE! — **S = 1.90 in**

2) DETERMINE RUNOFF - R

R= $(P-0.2*S)^2$ / (P+0.8*S) — **R = 5.86 in**

Where P=Preci 7.8 inches for 25yr/24hr storm event

3) DETERMINE RUNOFF VOLUME- V(R)

V(R)= R/12*AREA = — **V(R) = 5.54 ac-ft**

PROJECT NAME:	Sinclair	Kimley Horn & Associates
BASIN DESIGNATION:	Basin 3	
BASIN ANALYSIS (PRE/POST)	Post	

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL GROUP	CN	AREA (ac)	PRODUCT
Onsite Flow Areas				
Open space - (Good)	D	80	5.48	438.32
Impervious - (Curb+Sidewalk)	D	98	1.13	110.27
Impervious - (Road)	D	98	3.38	331.24
Water - Pond	D	100	1.38	137.57
		TOTALS	11.36	1017.41

COMPOSITE CN =	89.6

ESTIMATE OF RUNOFF VOLUME - 25YR/24HR

NOAA 10 yr - 72 hr = 7.75 in

1) DETERMINE SOIL STORAGE - S

S= (1000/CN) - 10

S =	**1.16 in**

2) DETERMINE RUNOFF - R

$R= (P-0.2*S)^2 / (P+0.8*S)$

R =	**6.51 in**

Where P=Preci 7.8 inches for 25yr/24hr storm event

3) DETERMINE RUNOFF VOLUME- V(R)

ADDITIONAL STORAGE VOLUME NEEDED FOR POND

DIFFERENCE IN VOLUME

ΔV(R) =	**0.62 ac-ft**
Treatment=	**0.95 ac-ft**
ΔV(R) + Treatment=	**1.57 ac-ft**
Total + 25% contigency=	**1.96 ac-ft**

PROJECT NAME:	Sinclair	Kimley-Horn & Associates
BASIN DESIGNATION:	Proposed Pond 3	

Water Quality Calculations

Total Onsite Basin Area =	11.36	ac
Onsite Paved Area=	4.51	ac
Trail Paved Area=	0.00	ac
Paved Area to be Treatec	4.51	ac
Pond @ SHW=	0.87	ac

Required Treatment Volume: **Wet-Online**

The Greater of:

1.0 " Runoff Over Project Area =	1"/12 x	11.36 ac =	**0.95**
2.5 " Runoff Over DCIA (Imp. Area)=	2.5"/12 x	4.51 ac =	**0.94**

Total Volume Required = **0.95 Ac-Ft**

TREATMENT PROVIDED =	**1.38 Ac-Ft**

STAGE STORAGE CALCULATIONS

	ELEV.	AREA (AC)	AVG AREA (AC)	DELTA (FT)	DELTA STORAGE (AC-FT)	SUM STORAGE (AC-FT)
			1.16	0.00	0.00	
Berm	112.00	1.16				4.06
			1.13	1.00	1.13	
DHW	111.00	1.09				2.93
			1.03	1.50	1.55	
Weir	109.50	0.98				1.38
			0.92	1.50	1.38	
Control	108.00	0.87				-

PROJECT NAME:	Sinclair	Kimley Horn & Associates
BASIN DESIGNATION:	Basin 4	
BASIN ANALYSIS (PRE/POST)	Pre	

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL GROUP	CN	AREA (ac)	PRODUCT
Onsite Flow Areas				
Open space - (Good)	D	80	6.97	557.78
Impervious - (Trail)	D	89	0.14	12.26
Water - Pond	D	100	0.28	28.00
		TOTALS	7.39	598.04

COMPOSITE CN =	80.9

ESTIMATE OF RUNOFF VOLUME - 25YR/24HR

NOAA 10 yr - 72 hr = 7.75 in

1) DETERMINE SOIL STORAGE #VALUE!

S= (1000/CN) - 10

S =	**2.36 in**

2) DETERMINE RUNOFF - R

R= $(P-0.2*S)^2$ / (P+0.8*S)

R =	**5.50 in**

Where P=Preci 7.8 inches for 25yr/24hr storm event

3) DETERMINE RUNOFF VOLUME- V(R)

V(R)= R/12*AREA =

V(R) =	**3.38 ac-ft**

PROJECT NAME:	Sinclair	Kimley Horn & Associates
BASIN DESIGNATION:	Basin 4	
BASIN ANALYSIS (PRE/POST)	Post	

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL GROUP	CN	AREA (ac)	PRODUCT
Onsite Flow Areas				
Open space - (Good)	D	80	5.19	415.29
Impervious - (Curb+Sidewalk)	D	98	0.42	41.11
Impervious - (Trail)	D	89	0.14	12.46
Impervious - (Road)	D	98	1.26	123.42
Water - Pond	D	100	0.38	38.00
		TOTALS	7.39	630.28

COMPOSITE CN =	85.3

ESTIMATE OF RUNOFF VOLUME - 25YR/24HR

NOAA 10 yr - 72 hr = 7.75 in

1) DETERMINE SOIL STORAGE - S

S= (1000/CN) - 10

S =	**1.72 in**

2) DETERMINE RUNOFF - R

R= $(P-0.2*S)^2$ / (P+0.8*S)

R =	**6.01 in**

Where P=Preci 7.8 inches for 25yr/24hr storm event

ADDITIONAL STORAGE VOLUME NEEDED FOR POND

DIFFERENCE IN VOLUME

ΔV(R) =	**0.32 ac-ft**
Treatment=	**0.62 ac-ft**
ΔV(R) + Treatment=	**0.94 ac-ft**
Total + 25% contigency=	**1.17 ac-ft**

PROJECT NAME:	Sinclair	Kimley-Horn & Associates
BASIN DESIGNATION:	Proposed Pond 4	

Water Quality Calculations

Total Onsite Basin Area =	7.39	ac	
Onsite Paved Area=	1.82	ac	
Trail Paved Area=	0.14	ac	
Paved Area to be Treatec	1.68	ac	(excludes trail)
Pond @ SHW=	0.57	ac	

Required Treatment Volume:

The Greater of: 14.33

1.0 " Runoff Over Project Area =	1"/12 x	7.39 ac =	**0.62**
2.5 " Runoff Over DCIA (Imp. Area)=	2.5"/12 x	1.68 ac =	**0.35**

Total Volume Required = **0.62 Ac-Ft**

TREATMENT PROVIDED =	**0.96 Ac-Ft**

STAGE STORAGE CALCULATIONS

	ELEV.	AREA (AC)	AVG AREA (AC)	DELTA (FT)	DELTA STORAGE (AC-FT)	SUM STORAGE (AC-FT)
			0.83	0.00	0.00	
Berm	111.00	0.83				2.10
			0.79	0.83	0.66	
DHW	110.17	0.75				1.45
			0.73	0.67	0.49	
Weir	109.50	0.70				0.96
			0.64	1.50	0.96	
Control	108.00	0.57				-

PROJECT NAME:	Sinclair	Kimley Horn & Associates
BASIN DESIGNATION:	Basin 5	
BASIN ANALYSIS (PRE/POST)	Pre	

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL GROUP	CN	AREA (ac)	PRODUCT
Onsite Flow Areas				
Open space - (Good)	D	80	14.69	1175.20
Water - Pond	D	100	1.02	102.00
Impervious - (Trail)	D	89	0.13	11.57
		TOTALS	15.84	1288.77

COMPOSITE CN =	81.4

ESTIMATE OF RUNOFF VOLUME - 25YR/24HR

NOAA 10 yr - 72 hr = 7.75 in

1) DETERMINE SOIL STORAGE - S

S= (1000/CN) - 10

S =	**2.29 in**

2) DETERMINE RUNOFF - R

R= $(P-0.2*S)^2$ / (P+0.8*S)

R =	**5.55 in**

Where P=Preci 7.8 inches for 25yr/24hr storm event

3) DETERMINE RUNOFF VOLUME- V(R)

V(R)= R/12*AREA =

V(R) =	**7.33 ac-ft**

PROJECT NAME:	Sinclair	Kimley Horn & Associates
BASIN DESIGNATION:	Basin 5	
BASIN ANALYSIS (PRE/POST)	Post	

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL GROUP	CN	AREA (ac)	PRODUCT
Onsite Flow Areas				
Open space - (Good)	D	80	8.30	663.89
Impervious - (Curb+Sidewalk)	D	98	0.64	62.85
Impervious - (Road)	D	98	1.93	189.14
Water - Pond	D	100	3.43	343.00
Impervious - (Trail)	D	89	0.13	11.57
				1270.45
		TOTALS	**14.43**	1270.5

COMPOSITE CN = **88**

#VALUE!

ESTIMATE OF RUNOFF VOLUME - 25YR/24HR

NOAA 10 yr - 72 hr = 7.75 in — **S =** **1.36 in**

1) DETERMINE SOIL STORAGE - S

S= (1000/CN) - 10

R = **6.32 in**

2) DETERMINE RUNOFF - R

$R= (P-0.2*S)^2 / (P+0.8*S)$

Wh 7.8 inches for 25yr/24hr storm event

ADDITIONAL STORAGE VOLUME NEEDED FOR POND

DIFFERENCE IN VOLUME

ΔV(R) =	**0.27 ac-ft**
Treatment=	**0.54 ac-ft**
ΔV(R) + Treatment=	**0.81 ac-ft**
Total + 25% contigency=	**1.02 ac-ft**

PROJECT NAME:	Sinclair	Kimley-Horn & Associates
BASIN DESIGNATION:	Existing Pond 5A (Permitted Pond)	

Water Quality Calculations

Total Onsite Basin Area =	15.84	ac
Onsite Paved Area=	0.13	ac
Trail Paved Area=	0.13	ac
Paved Area to be Treatec	0.13	ac
Pond @ SHW=	0.76	ac

Required Treatment Volume:

The Greater of: 14.33

1.0 " Runoff Over Project Area =	1"/12 x	15.84 ac =	**1.32**
2.5 " Runoff Over DCIA (Imp. Area)=	2.5"/12 x	0.13 ac =	**0.03**

Total Volume Required = **1.32 Ac-Ft**

TREATMENT PROVIDED = 3.84 Ac-Ft

STAGE STORAGE CALCULATIONS

	ELEV.	AREA (AC)	AVG AREA (AC)	DELTA (FT)	DELTA STORAGE (AC-FT)	SUM STORAGE (AC-FT)
			1.91	0.00	0.00	
Berm	114.00	1.91				9.97
			1.55	3.82	5.92	
DHW	110.18	1.18				4.05
			1.17	0.18	0.21	
Weir	110.00	1.16				3.84
			0.96	4.00	3.84	
Bottom of pond	106.00	0.76				-

PROJECT NAME:	Sinclair	Kimley-Horn & Associates
BASIN DESIGNATION:	Proposed Pond 5A	

Water Quality Calculations

Total Onsite Basin Area =	14.43	ac	
Onsite Paved Area=	2.70	ac	
Trail Paved Area=	0.13	ac	
Paved Area to be Treated=	2.57	ac	(excludes trail)
Pond @ SHW=	0.76	ac	

Required Treatment Volume: **Dry Retention**

The Greater of:

1.0 " Runoff Over Project Area =	1"/12 x	14.43 ac =	**1.20**
2.5 " Runoff Over DCIA (Imp. Area)=	2.5"/12 x	2.57 ac =	**0.54**

Total Volume Required = **1.20 Ac-Ft**

TREATMENT PROVIDED = 1.26 Ac-Ft

STAGE STORAGE CALCULATIONS

	ELEV.	AREA (AC)	AVG AREA (AC)	DELTA (FT)	DELTA STORAGE (AC-FT)	SUM STORAGE (AC-FT)
			1.91	0.00	0.00	
Berm	114.00	1.91				10.04
			1.62	3.00	4.86	
DHW	111.00	1.33				5.18
			1.12	3.50	3.92	
Weir	107.50	0.91				1.26
			0.84	1.50	1.26	
Bottom of pond	106.00	0.76				-

PROJECT NAME:	Sinclair	Kimley Horn & Associates
BASIN DESIGNATION:	Basin 5B	
BASIN ANALYSIS (PRE/POST)	Pre	

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL GROUP	CN	AREA (ac)	PRODUCT
Onsite Flow Areas				
Open space - (Good)	D	80	4.55	364.00
	D			
	D			
		TOTALS	4.55	364.00
		COMPOSITE CN =		80.0

ESTIMATE OF RUNOFF VOLUME - 25YR/24HR

NOAA 10 yr - 72 hr = 7.75 in

1) DETERMINE SOIL STORAGE - S

S= (1000/CN) #VALUE! — **S = 2.50 in**

2) DETERMINE RUNOFF - R

R= $(P-0.2*S)^2 / (P+0.8*S)$ — **R = 5.39 in**

Where P=Preci 7.8 inches for 25yr/24hr storm event

3) DETERMINE RUNOFF VOLUME- V(R)

V(R)= R/12*AREA = — **V(R) = 2.04 ac-ft**

PROJECT NAME:	Sinclair	Kimley Horn & Associates
BASIN DESIGNATION:	Basin 5	
BASIN ANALYSIS (PRE/POST)	Post	

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL GROUP	CN	AREA (ac)	PRODUCT
Onsite Flow Areas				
Open space - (Good)	D	80	1.69	135.55
Impervious - (Curb+Sidewalk)	D	98	0.41	39.75
Impervious - (Road)	D	98	1.22	119.56
Water - Pond	D	100	1.23	123.00
			4.55	417.86
		TOTALS	**4.55**	417.9

COMPOSITE CN = **91.8**

ESTIMATE OF RUNOFF VOLUME - 25YR/24HR

10 yr - 72 hr = 7.75 in — **S =** **0.89 in**

1) DETERMINE SOIL STORAGE - S

S= (1000/CN) - 10

R = **6.77 in**

2) DETERMINE RUNOFF - R

$R= (P-0.2*S)^2 / (P+0.8*S)$

Where P=Preci 7.8 inches for 25yr/24hr storm event

V(R) = **2.57 ac-ft**

ADDITIONAL STORAGE VOLUME NEEDED FOR POND

DIFFERENCE IN VOLUME

ΔV(R) =	**0.52 ac-ft**
Treatment=	**0.38 ac-ft**
ΔV(R) + Treatment=	**0.90 ac-ft**
Total + 25% contigency=	**1.13 ac-ft**

PROJECT NAME:	Sinclair	Kimley-Horn & Associates
BASIN DESIGNATION:	Proposed Pond 5B	

Water Quality Calculations

Total Onsite Basin Area =	4.55	ac
Onsite Paved Area=	1.63	ac
Trail Paved Area=	0.00	ac
Paved Area to be Treatec	1.63	ac
Pond @ SHW=	0.67	ac

Required Treatment Volume: **Dry Detention**

The Greater of:

1.0 " Runoff Over Project Area =	1"/12 x	4.55 ac =	**0.38**
2.5 " Runoff Over DCIA (Imp. Area)=	2.5"/12 x	1.63 ac =	**0.34**

Total Volume Required = **0.38 Ac-Ft**

TREATMENT PROVIDED = 0.69 Ac-Ft

STAGE STORAGE CALCULATIONS

	ELEV.	AREA (AC)	AVG AREA (AC)	DELTA (FT)	DELTA STORAGE (AC-FT)	SUM STORAGE (AC-FT)
			1.08	0.00	0.00	
Berm	115.00	0.93				2.34
			0.88	1.00	0.88	
DHW	114.00	0.83				1.46
			0.77	1.00	0.77	
Weir	113.00	0.72				0.69
			0.69	1.00	0.69	
Control	112.00	0.67				-

PROJECT NAME:	Sinclair	Kimley Horn & Associates
BASIN DESIGNATION:	Basin 6	
BASIN ANALYSIS (PRE/POST)	Pre	

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL GROUP	CN	AREA (ac)	PRODUCT
Onsite Flow Areas				
Open Space - (Good)	D	80	6.55	524.30
Impervious - (Road + Sidewalk)	D	98	6.69	655.62
Impervious - (Trail)	D	89	0.30	26.70
Water - Pond	D	100	0.79	78.63
		TOTALS	14.33	1285.25

COMPOSITE CN =	89.7

ESTIMATE OF RUNOFF VOLUME - 25YR/24HR

NOAA 10 yr - 72 hr = 7.75 in

1) DETERMINE SOIL STORAGE - S

S= (1000/CN) - 10

S =	**1.15 in**

2) DETERMINE RUNOFF - R

R= $(P-0.2*S)^2$ / (P+0.8*S)

R =	**6.52 in**

Where P=Preci 7.8 inches for 25yr/24hr storm event

3) DETERMINE RUNOFF VOLUME- V(R)

V(R)= R/12*AREA =

V(R) =	**7.79 ac-ft**

PROJECT NAME:	Sinclair	Kimley Horn & Associates
BASIN DESIGNATION:	Basin 6	
BASIN ANALYSIS (PRE/POST)	Post	

BASIN RUNOFF CURVE NUMBER WORKSHEET

LAND-USE DESCRIPTION	SOIL GROUP	CN	AREA (ac)	PRODUCT
Onsite Flow Areas				
Open space - (Good)	D	80	5.38	430.70
Impervious - (Trail)	D	89	0.30	26.70
Impervious - (Curb+Sidewalk)	D	98	0.24	23.52
Impervious - (Road)	D	98	7.41	725.81
Water - Pond	D	100	1.00	100.00
		TOTALS	14.33	1306.73

COMPOSITE CN =	91.2

ESTIMATE OF RUNOFF VOLUME - 25YR/24HR

NOAA 10 yr - 72 hr = 7.75 in

1) DETERMINE SOIL STORAGE - S

S= (1000/CN) - 10

S =	**0.96 in**

2) DETERMINE RUNOFF - R

R= $(P-0.2*S)^2 / (P+0.8*S)$

R =	**6.70 in**

Where P=Preci 7.8 inches for 25yr/24hr storm event

ADDITIONAL STORAGE VOLUME NEEDED FOR POND

DIFFERENCE IN VOLUME

ΔV(R) =	**0.21 ac-ft**
Treatment=	**1.19 ac-ft**
ΔV(R) + Treatment=	**1.40 ac-ft**
Total + 25% contigency=	**1.75 ac-ft**

PROJECT NAME:	Sinclair	Kimley-Horn & Associates
BASIN DESIGNATION:	Existing Pond 6 (Permitted Pond)	

Water Quality Calculations

Total Onsite Basin Area =	14.33	ac	
Onsite Paved Area=	6.99	ac	
Trail Paved Area=	0.30	ac	
Paved Area to be Treatec	6.69	ac	(excludes trail)
Pond @ SHW=	0.30	ac	

Required Treatment Volume: **Dry Detention**

The Greater of:

1.0 " Runoff Over Project Area =	1"/12 x	14.33 ac =	**1.19**
2.5 " Runoff Over DCIA (Imp. Area)=	2.5"/12 x	6.69 ac =	**1.39**

Total Volume Required = **1.39 Ac-Ft**

TREATMENT PROVIDED = 1.47 Ac-Ft

STAGE STORAGE CALCULATIONS

	ELEV.	AREA (AC)	AVG AREA (AC)	DELTA (FT)	DELTA STORAGE (AC-FT)	SUM STORAGE (AC-FT)
			0.95	0.00	0.00	
Berm	112.00	0.95				4.09
			0.76	3.32	2.52	
DHW	108.68	0.57				1.57
			0.56	0.18	0.10	
Weir	108.50	0.55				1.47
			0.42	3.50	1.47	
Control	105.00	0.30				-

PROJECT NAME:	Sinclair	Kimley-Horn & Associates
BASIN DESIGNATION:	Proposed Pond 6	

Water Quality Calculations

Total Onsite Basin Area =	14.33	ac
Onsite Paved Area=	7.95	ac
Trail Paved Area=	0.30	ac
Paved Area to be Treatec	7.65	ac
Pond @ SHW=	0.97	ac

Required Treatment Volume:

The Greater of: 14.33

1.0 " Runoff Over Project Area =	1"/12 x	14.33 ac =	**1.19**
2.5 " Runoff Over DCIA (Imp. Area)=	2.5"/12 x	7.65 ac =	**1.59**

Total Volume Required = **1.59 Ac-Ft**

TREATMENT PROVIDED = 1.74 Ac-Ft

STAGE STORAGE CALCULATIONS

	ELEV.	AREA (AC)	AVG AREA (AC)	DELTA (FT)	DELTA STORAGE (AC-FT)	SUM STORAGE (AC-FT)
			1.38	0.00	0.00	
Berm	109.00	1.46				5.19
			1.41	1.00	1.41	
DHW	108.00	1.36				3.78
			1.36	1.50	2.04	
Weir	106.50	1.35				1.74
			1.16	1.50	1.74	
Control	105.00	0.97				-

APPENDIX E

HY-8 Calculations

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 80.70 cfs

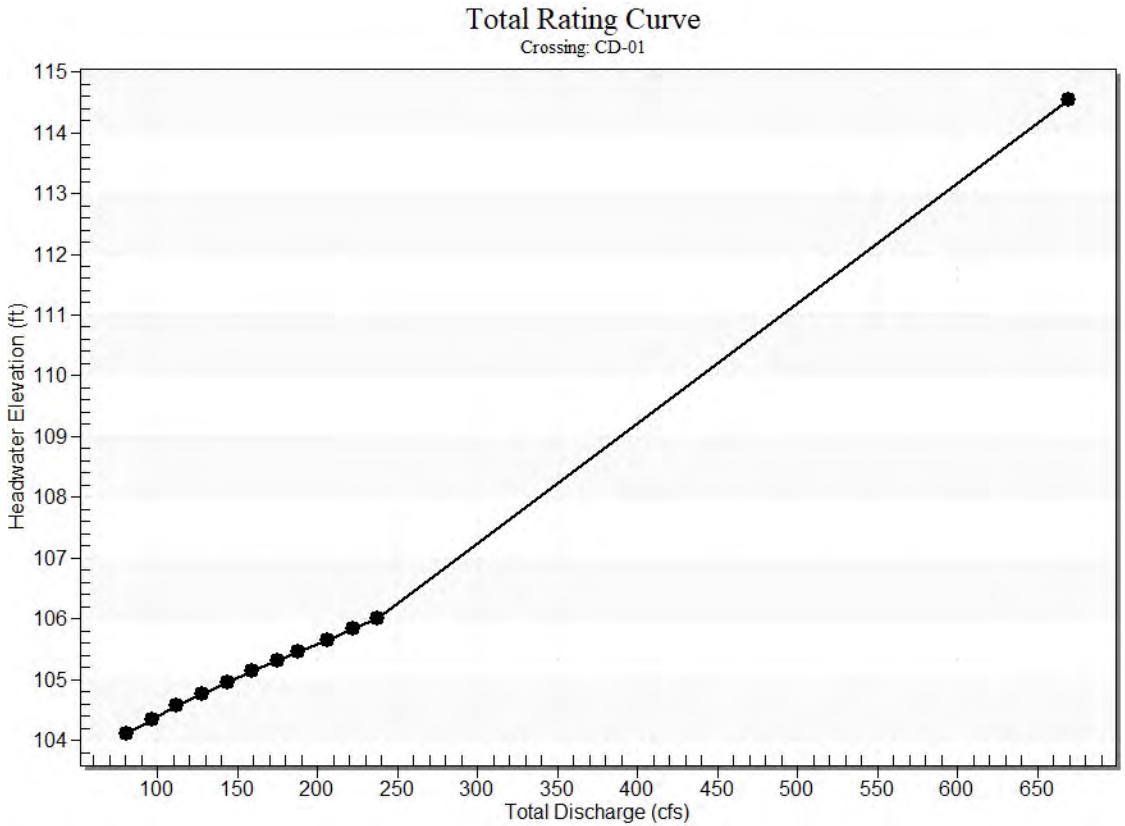
Design Flow: 188.06 cfs

Maximum Flow: 237.50 cfs

Table 1 - Summary of Culvert Flows at Crossing: CD-01

Headwater Elevation (ft)	Total Discharge (cfs)	CD-01 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
104.11	80.70	80.70	0.00	1
104.35	96.38	96.38	0.00	1
104.57	112.06	112.06	0.00	1
104.77	127.74	127.74	0.00	1
104.96	143.42	143.42	0.00	1
105.14	159.10	159.10	0.00	1
105.31	174.78	174.78	0.00	1
105.46	188.06	188.06	0.00	1
105.66	206.14	206.14	0.00	1
105.83	221.82	221.82	0.00	1
106.00	237.50	237.50	0.00	1
114.50	658.01	658.01	0.00	Overtopping

Rating Curve Plot for Crossing: CD-01



Culvert Data: CD-01

Table 1 - Culvert Summary Table: CD-01

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
80.70 cfs	80.70 cfs	104.11	2.11	1.554	1-JS1t	1.20	1.53	2.43	1.43	3.37	0.00
96.38 cfs	96.38 cfs	104.35	2.35	1.607	1-JS1t	1.32	1.68	2.43	1.43	4.02	0.00
112.06 cfs	112.06 cfs	104.57	2.57	1.669	1-JS1t	1.43	1.82	2.43	1.43	4.68	0.00
127.74 cfs	127.74 cfs	104.77	2.77	1.741	1-S2n	1.53	1.95	1.57	1.43	9.32	0.00
143.42 cfs	143.42 cfs	104.96	2.96	1.822	1-S2n	1.63	2.07	1.67	1.43	9.61	0.00
159.10 cfs	159.10 cfs	105.14	3.14	1.912	1-S2n	1.73	2.19	1.78	1.43	9.82	0.00
174.78 cfs	174.78 cfs	105.31	3.31	2.012	1-S2n	1.82	2.30	1.88	1.43	10.05	0.00
188.06 cfs	188.06 cfs	105.46	3.46	2.103	1-S2n	1.90	2.39	1.96	1.43	10.24	0.00
206.14 cfs	206.14 cfs	105.66	3.66	2.314	1-S2n	2.01	2.50	2.07	1.43	10.49	0.00
221.82 cfs	221.82 cfs	105.83	3.83	2.538	1-S2n	2.10	2.60	2.16	1.43	10.69	0.00
237.50 cfs	237.50 cfs	106.00	4.00	2.769	5-S2n	2.18	2.69	2.25	1.43	10.88	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

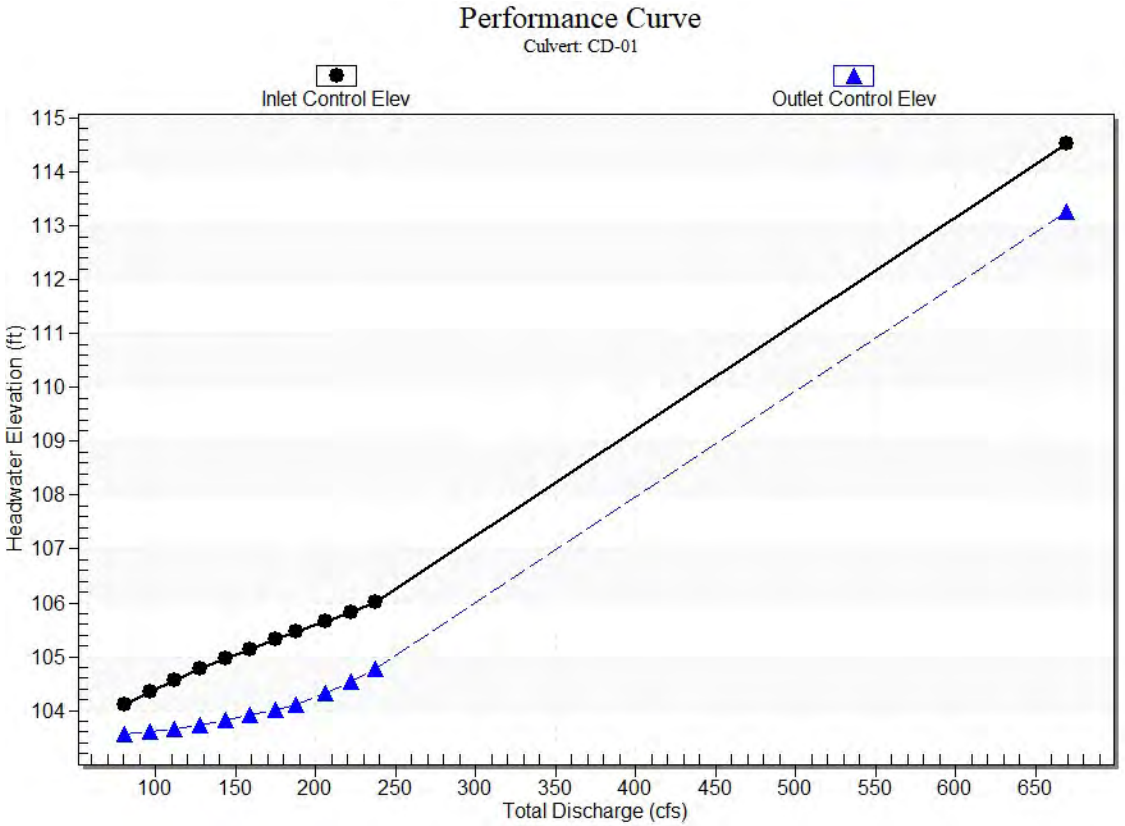
Inlet Elevation (invert): 102.00 ft,

Outlet Elevation (invert): 101.00 ft

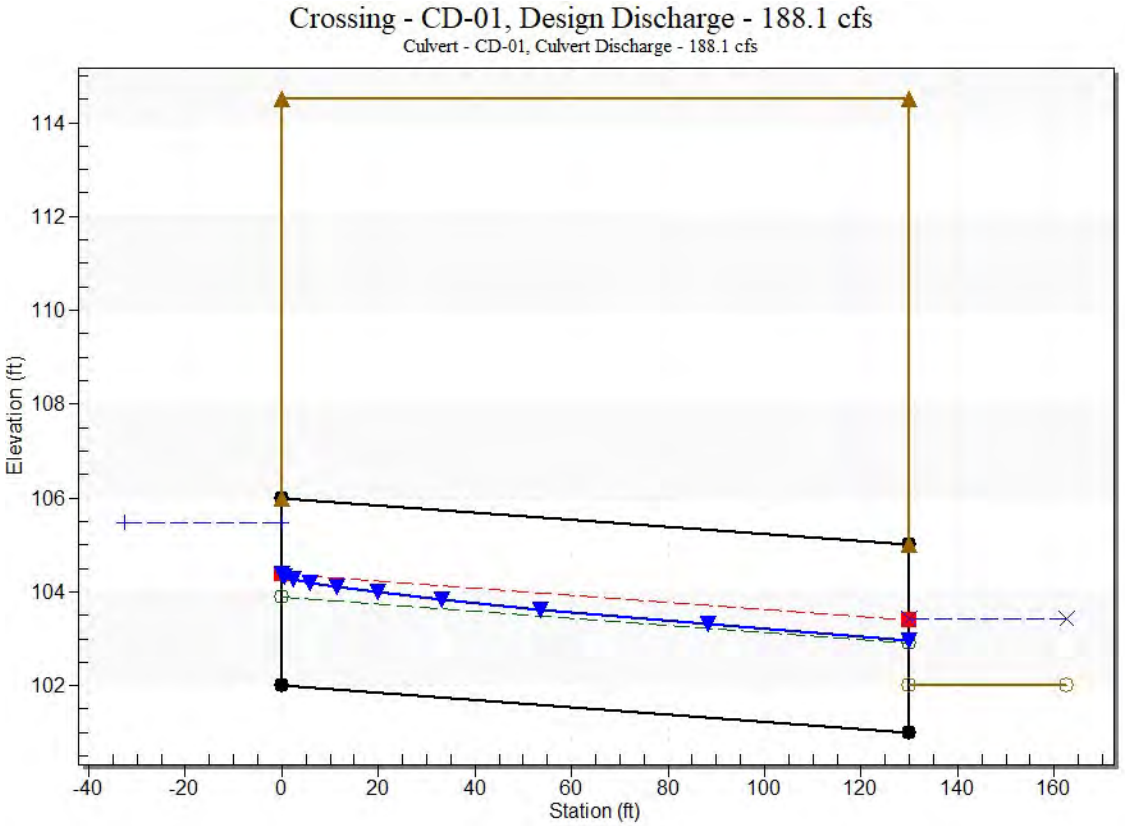
Culvert Length: 130.00 ft,

Culvert Slope: 0.0077

Culvert Performance Curve Plot: CD-01



Water Surface Profile Plot for Culvert: CD-01



Site Data - CD-01

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 102.00 ft

Outlet Station: 130.00 ft

Outlet Elevation: 101.00 ft

Number of Barrels: 3

Culvert Data Summary - CD-01

Barrel Shape: Circular

Barrel Diameter: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Grooved End Projecting (Ke=0.2)

Inlet Depression: None

Tailwater Data for Crossing: CD-01

Table 2 - Downstream Channel Rating Curve (Crossing: CD-01)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
80.70	103.43	1.43
96.38	103.43	1.43
112.06	103.43	1.43
127.74	103.43	1.43
143.42	103.43	1.43
159.10	103.43	1.43

174.78	103.43	1.43
188.06	103.43	1.43
206.14	103.43	1.43
221.82	103.43	1.43
237.50	103.43	1.43

Tailwater Channel Data - CD-01

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 103.43 ft

Roadway Data for Crossing: CD-01

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 500.00 ft

Crest Elevation: 114.50 ft

Roadway Surface: Paved

Roadway Top Width: 130.00 ft

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 12.97 cfs

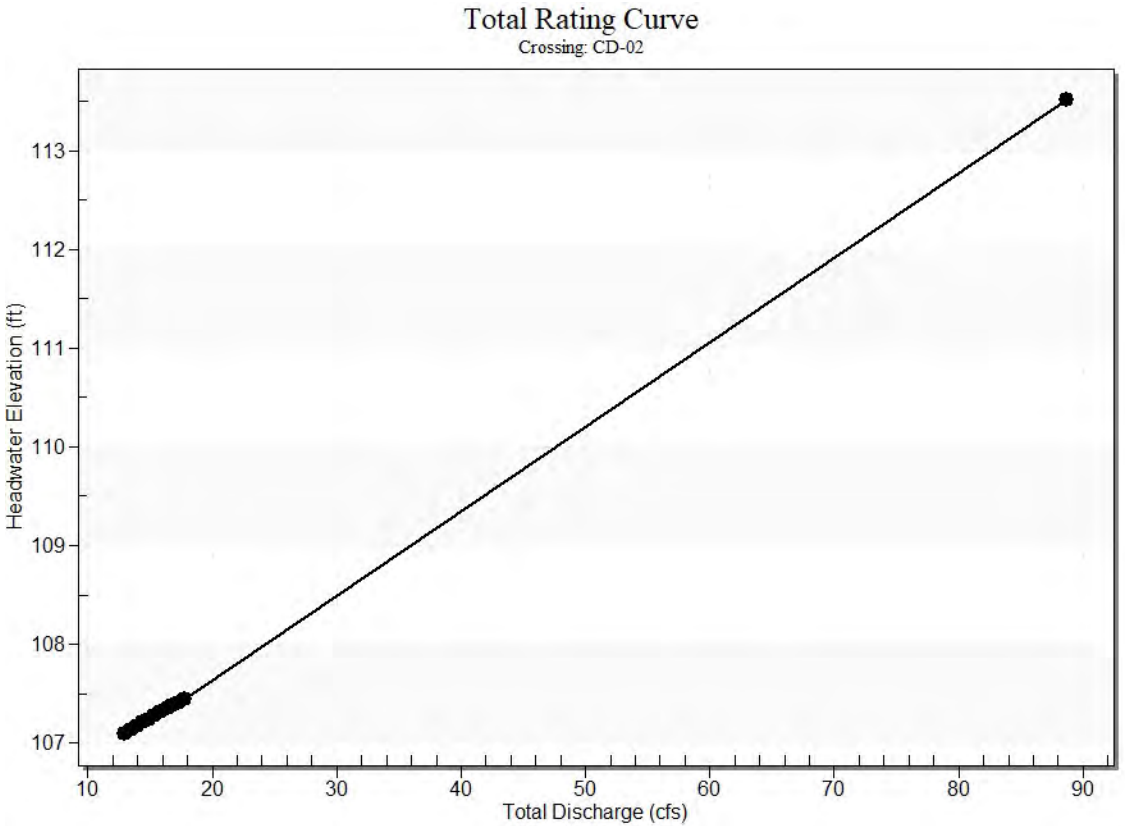
Design Flow: 16.48 cfs

Maximum Flow: 17.73 cfs

Table 3 - Summary of Culvert Flows at Crossing: CD-02

Headwater Elevation (ft)	Total Discharge (cfs)	CD-02 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
107.10	12.97	12.97	0.00	1
107.13	13.45	13.45	0.00	1
107.17	13.92	13.92	0.00	1
107.21	14.40	14.40	0.00	1
107.24	14.87	14.87	0.00	1
107.28	15.35	15.35	0.00	1
107.31	15.83	15.83	0.00	1
107.36	16.48	16.48	0.00	1
107.38	16.78	16.78	0.00	1
107.41	17.25	17.25	0.00	1
107.44	17.73	17.73	0.00	1
113.50	86.91	86.91	0.00	Overtopping

Rating Curve Plot for Crossing: CD-02



Culvert Data: CD-02

Table 2 - Culvert Summary Table: CD-02

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
12.97 cfs	12.97 cfs	107.10	1.60	0.490	1-S2n	0.94	1.14	0.94	1.27	6.80	0.00
13.45 cfs	13.45 cfs	107.13	1.63	0.499	1-S2n	0.96	1.17	0.96	1.27	6.87	0.00
13.92 cfs	13.92 cfs	107.17	1.67	0.508	1-S2n	0.98	1.19	0.98	1.27	6.93	0.00
14.40 cfs	14.40 cfs	107.21	1.71	0.518	1-S2n	1.00	1.21	1.00	1.27	7.00	0.00
14.87 cfs	14.87 cfs	107.24	1.74	0.528	1-S2n	1.02	1.23	1.02	1.27	7.06	0.00
15.35 cfs	15.35 cfs	107.28	1.78	0.538	1-S2n	1.03	1.25	1.03	1.27	7.12	0.00
15.83 cfs	15.83 cfs	107.31	1.81	0.549	1-S2n	1.05	1.27	1.05	1.27	7.19	0.00
16.48 cfs	16.48 cfs	107.36	1.86	0.591	1-S2n	1.07	1.30	1.07	1.27	7.26	0.00
16.78 cfs	16.78 cfs	107.38	1.88	0.610	1-S2n	1.08	1.31	1.08	1.27	7.30	0.00
17.25 cfs	17.25 cfs	107.41	1.91	0.641	1-S2n	1.10	1.33	1.11	1.27	7.29	0.00
17.73 cfs	17.73 cfs	107.44	1.94	0.672	1-S2n	1.11	1.35	1.12	1.27	7.34	0.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

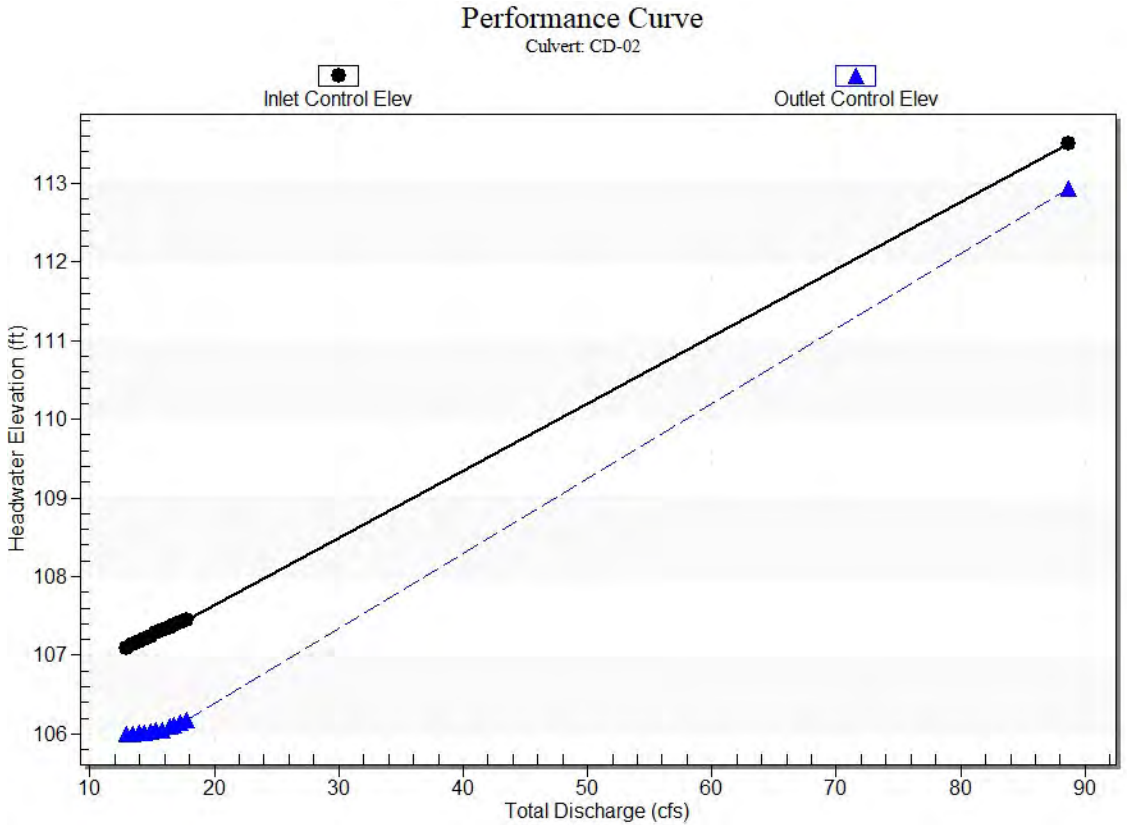
Inlet Elevation (invert): 105.50 ft,

Outlet Elevation (invert): 104.60 ft

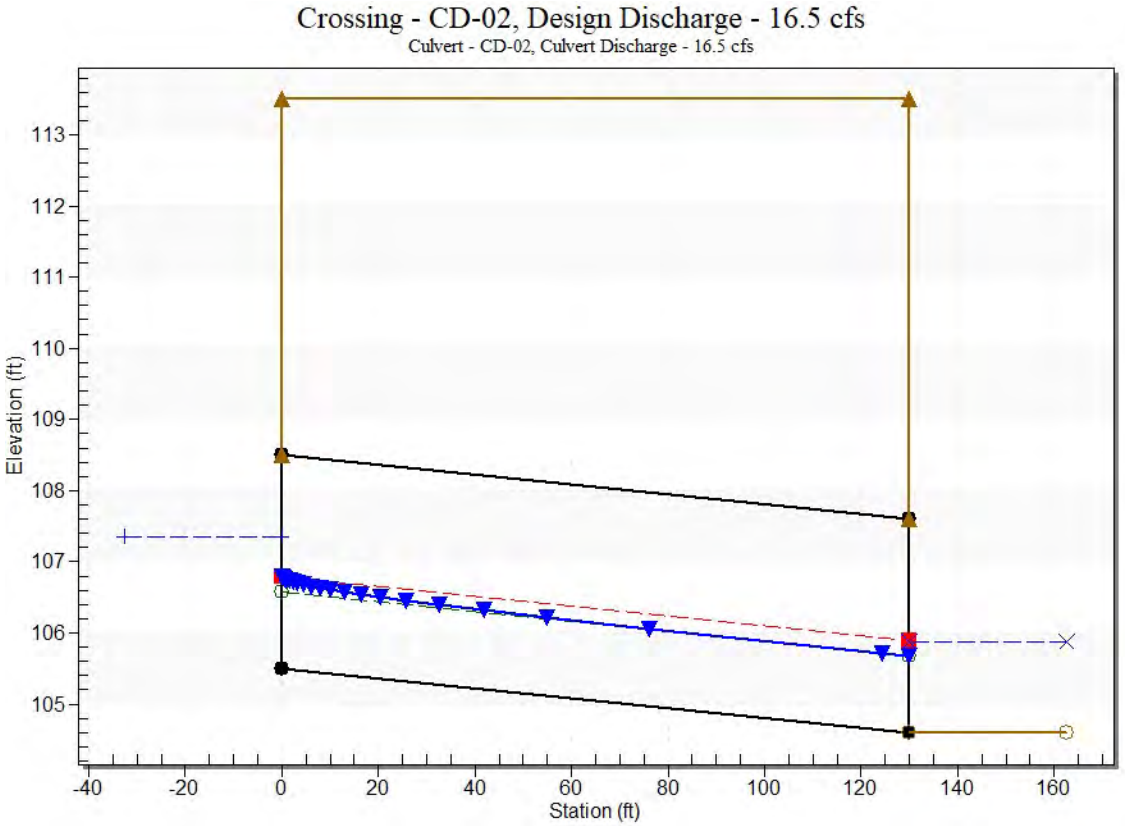
Culvert Length: 130.00 ft,

Culvert Slope: 0.0069

Culvert Performance Curve Plot: CD-02



Water Surface Profile Plot for Culvert: CD-02



Site Data - CD-02

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 105.50 ft

Outlet Station: 130.00 ft

Outlet Elevation: 104.60 ft

Number of Barrels: 1

Culvert Data Summary - CD-02

Barrel Shape: Circular

Barrel Diameter: 3.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: CD-02

Table 4 - Downstream Channel Rating Curve (Crossing: CD-02)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)
12.97	105.87	1.27
13.45	105.87	1.27
13.92	105.87	1.27
14.40	105.87	1.27
14.87	105.87	1.27
15.35	105.87	1.27

15.83	105.87	1.27
16.48	105.87	1.27
16.78	105.87	1.27
17.25	105.87	1.27
17.73	105.87	1.27

Tailwater Channel Data - CD-02

Tailwater Channel Option: Enter Constant Tailwater Elevation

Constant Tailwater Elevation: 105.87 ft

Roadway Data for Crossing: CD-02

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 500.00 ft

Crest Elevation: 113.50 ft

Roadway Surface: Paved

Roadway Top Width: 130.00 ft

Crossing Discharge Data

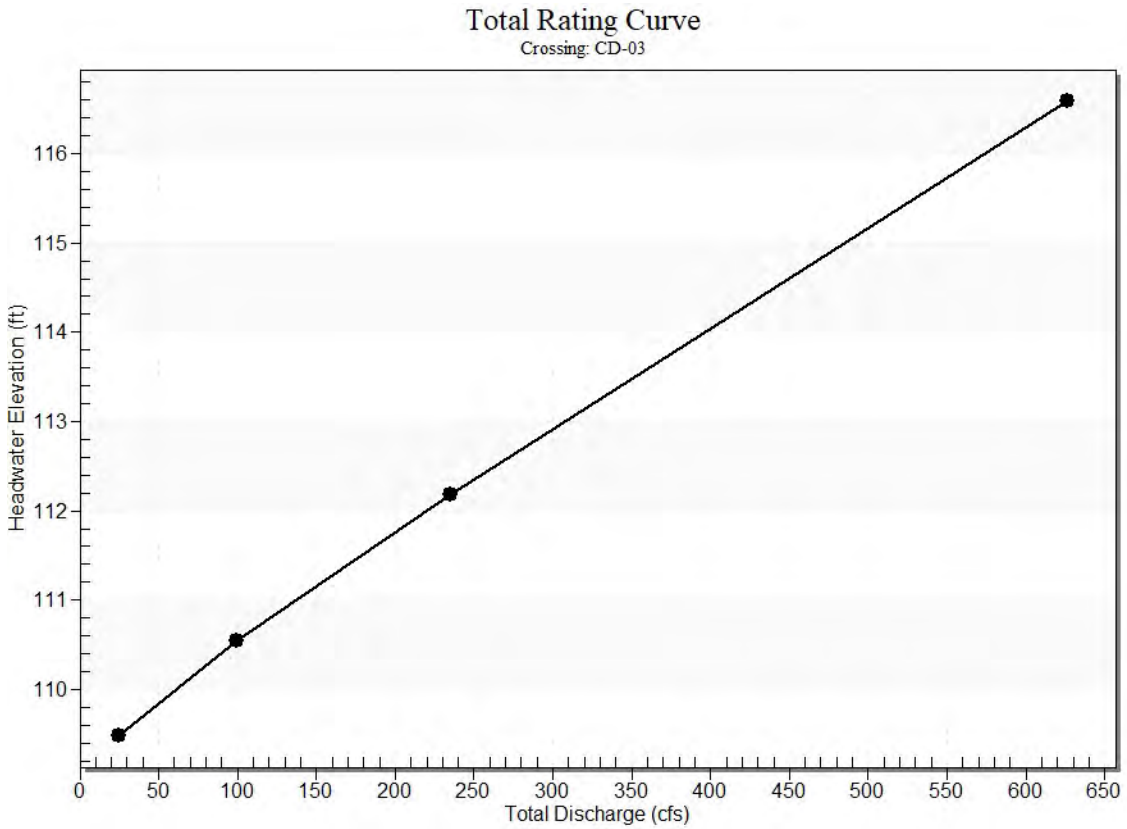
Discharge Selection Method: User Defined

Table 5 - Summary of Culvert Flows at Crossing: CD-03

Headwater Elevation (ft)	Discharge Names	Total Discharge (cfs)	CD-03 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
109.48	@109'	25.00	25.00	0.00	1
110.54	@110'	99.30	99.30	0.00	1
112.18	@111'	235.00	235.00	0.00	1

116.50	Overtopping	584.04	584.04	0.00	Overtopping

Rating Curve Plot for Crossing: CD-03



Culvert Data: CD-03

Table 3 - Culvert Summary Table: CD-03

Discharge Names	Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
@109'	25.00 cfs	25.00 cfs	109.48	0.98	0.508	1-JS1t	0.69	0.72	1.00	1.00	2.54	4.00
@110'	99.30 cfs	99.30 cfs	110.54	2.04	1.624	1-JS1t	1.38	1.47	2.00	2.00	3.95	4.00
@111'	235.00 cfs	235.00 cfs	112.18	3.49	3.676	1-S1t	2.25	2.31	3.00	3.00	5.81	4.00

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

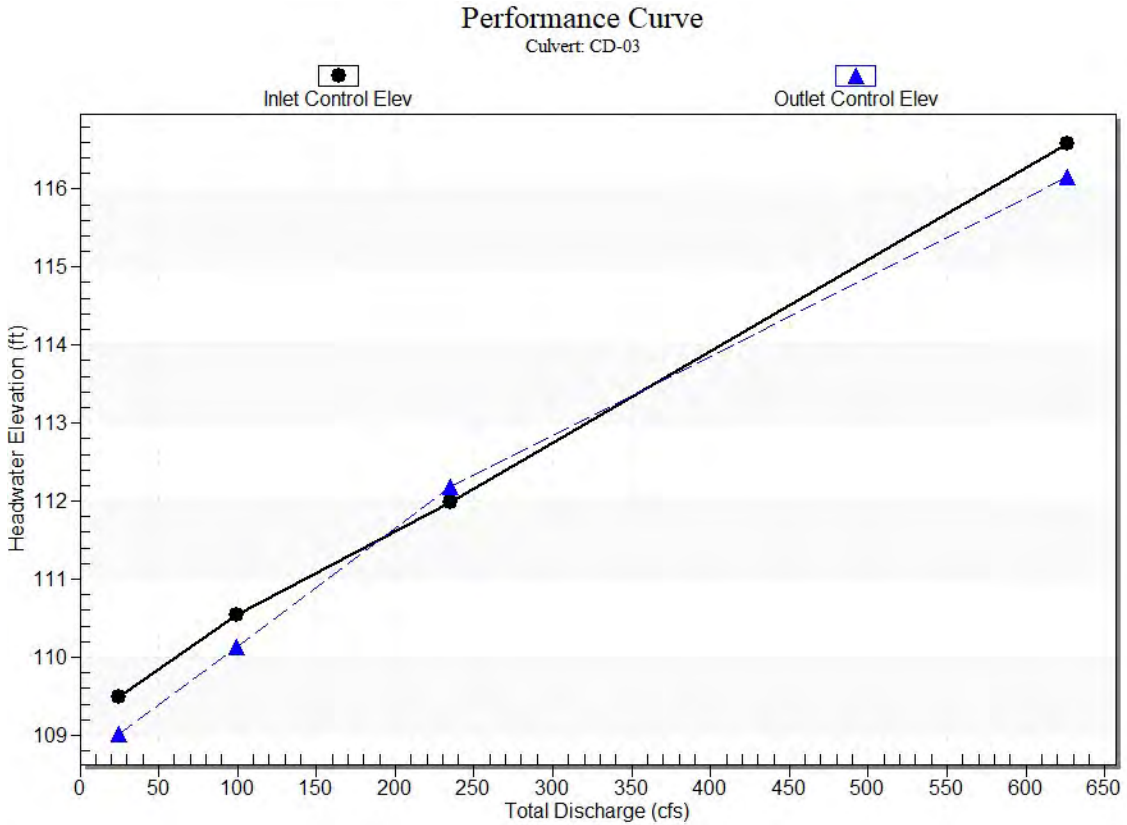
Inlet Elevation (invert): 108.50 ft,

Outlet Elevation (invert): 108.00 ft

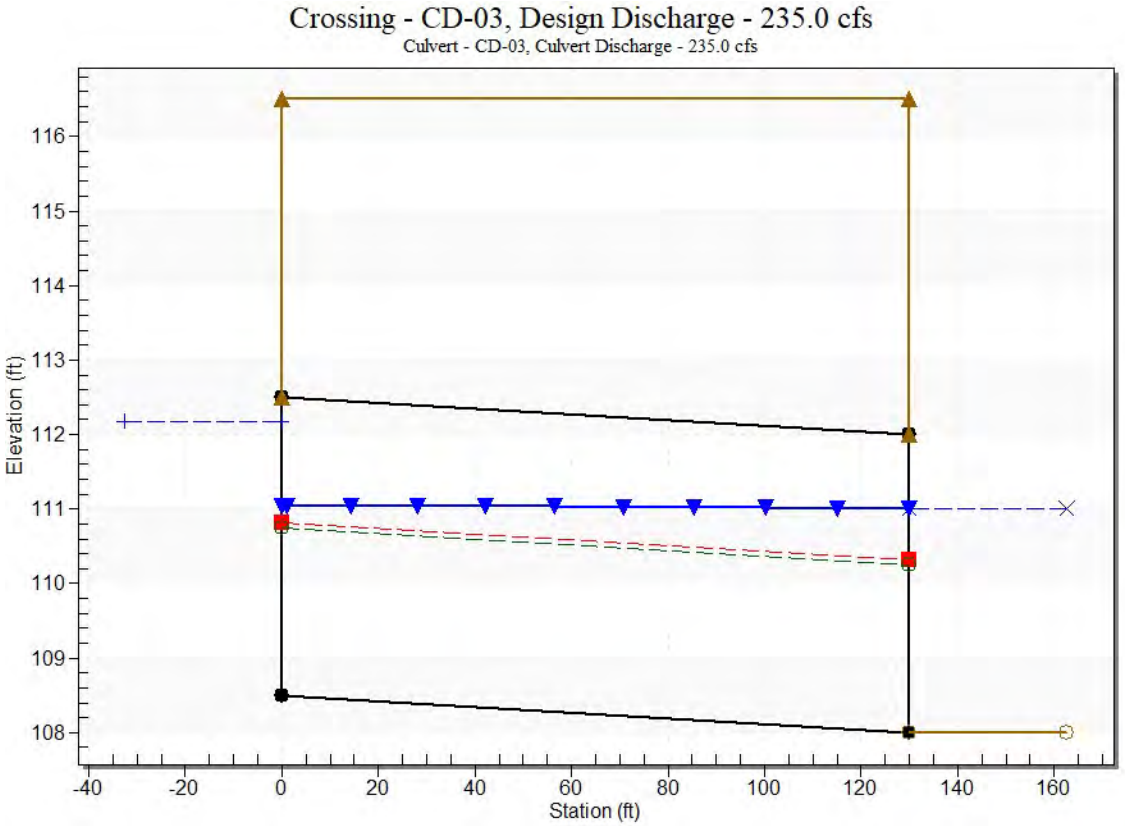
Culvert Length: 130.00 ft,

Culvert Slope: 0.0038

Culvert Performance Curve Plot: CD-03



Water Surface Profile Plot for Culvert: CD-03



Site Data - CD-03

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 108.50 ft

Outlet Station: 130.00 ft

Outlet Elevation: 108.00 ft

Number of Barrels: 4

Culvert Data Summary - CD-03

Barrel Shape: Circular

Barrel Diameter: 4.00 ft

Barrel Material: Concrete

Embedment: 0.00 in

Barrel Manning's n: 0.0120

Culvert Type: Straight

Inlet Configuration: Square Edge with Headwall (Ke=0.5)

Inlet Depression: None

Tailwater Data for Crossing: CD-03

Table 6 - Downstream Channel Rating Curve (Crossing: CD-03)

Flow (cfs)	Water Surface Elev (ft)	Depth (ft)	Velocity (ft/s)
25.00	109.00	109.00	4.00
99.28	110.00	110.00	4.00
235.00	111.00	111.00	4.00

Tailwater Channel Data - CD-03

Tailwater Channel Option: Enter Rating Curve

Channel Invert Elevation: Enter Rating Curve

Roadway Data for Crossing: CD-03

Roadway Profile Shape: Constant Roadway Elevation

Crest Length: 500.00 ft

Crest Elevation: 116.50 ft

Roadway Surface: Paved

Roadway Top Width: 130.00 ft

APPENDIX F

HEC-RAS Reports

EXISTING CONDITIONS

HEC-RAS Plan: Plan p01 River: DavenportCreek Reach: DavenportCreek

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
DavenportCreek	1173.72	10% Annual	1417.00	96.00	98.99		99.15	0.001073	3.27	433.28	198.37	0.39
DavenportCreek	1173.72	2% Annual	2368.00	96.00	99.76		100.01	0.001214	3.97	597.01	224.39	0.43
DavenportCreek	1173.72	1% Annual	2798.00	96.00	100.07		100.34	0.001234	4.20	666.48	232.98	0.44
DavenportCreek	1173.72	0.2% Annual	3813.00	96.00	100.74		101.07	0.001234	4.61	827.88	251.83	0.45
DavenportCreek	828.05	10% Annual	1417.00	95.99	98.16		98.53	0.003371	4.88	290.30	172.13	0.66
DavenportCreek	828.05	2% Annual	2368.00	95.99	98.60		99.24	0.004470	6.43	368.51	178.72	0.79
DavenportCreek	828.05	1% Annual	2798.00	95.99	98.76		99.53	0.004969	7.06	396.47	180.82	0.84
DavenportCreek	828.05	0.2% Annual	3813.00	95.99	99.08	99.01	100.16	0.006488	8.37	455.75	196.70	0.97
DavenportCreek	616.04	10% Annual	1417.00	95.29	97.76		97.93	0.001990	3.30	429.48	309.07	0.49
DavenportCreek	616.04	2% Annual	2368.00	95.29	98.22		98.49	0.002193	4.11	576.85	321.67	0.54
DavenportCreek	616.04	1% Annual	2798.00	95.29	98.41		98.71	0.002243	4.39	636.67	326.00	0.55
DavenportCreek	616.04	0.2% Annual	3813.00	95.29	98.79		99.18	0.002341	5.00	764.59	346.85	0.58
DavenportCreek	520.04	10% Annual	1417.00	95.69	97.62		97.75	0.001507	2.84	498.21	363.85	0.43
DavenportCreek	520.04	2% Annual	2368.00	95.69	98.09		98.28	0.001656	3.53	671.77	381.53	0.47
DavenportCreek	520.04	1% Annual	2798.00	95.69	98.28		98.50	0.001708	3.76	744.25	392.82	0.48
DavenportCreek	520.04	0.2% Annual	3813.00	95.69	98.67		98.95	0.001782	4.22	904.29	414.84	0.50
DavenportCreek	381.10	10% Annual	1417.00	95.79	97.36		97.51	0.002028	3.06	463.60	379.63	0.49
DavenportCreek	381.10	2% Annual	2368.00	95.79	97.81		98.03	0.002005	3.72	637.32	386.10	0.51
DavenportCreek	381.10	1% Annual	2798.00	95.79	97.99		98.24	0.002021	3.96	707.39	392.39	0.52
DavenportCreek	381.10	0.2% Annual	3813.00	95.79	98.38		98.68	0.002050	4.42	862.25	408.99	0.54
DavenportCreek	238.95	10% Annual	1417.00	95.00	97.09		97.22	0.001874	2.98	475.51	381.22	0.47
DavenportCreek	238.95	2% Annual	2368.00	95.00	97.54		97.75	0.001892	3.63	651.76	390.83	0.50
DavenportCreek	238.95	1% Annual	2798.00	95.00	97.72		97.96	0.001904	3.88	721.93	394.71	0.51
DavenportCreek	238.95	0.2% Annual	3813.00	95.00	98.10		98.40	0.001922	4.37	872.98	401.78	0.52
DavenportCreek	0.00	10% Annual	1417.00	95.00	96.95	96.15	97.00	0.000501	1.86	913.06	719.40	0.26
DavenportCreek	0.00	2% Annual	2368.00	95.00	97.45	96.42	97.51	0.000500	2.21	1273.83	735.70	0.27
DavenportCreek	0.00	1% Annual	2798.00	95.00	97.64	96.52	97.71	0.000500	2.34	1416.29	738.51	0.27
DavenportCreek	0.00	0.2% Annual	3813.00	95.00	98.05	96.72	98.14	0.000500	2.61	1721.79	744.30	0.28

HEC-RAS HEC-RAS 5.0.7 March 2019
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
X     X  XXXXXX    XXXX       X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Sinclair-PreferredAlt
Project File : Sinclair-PreferredA.prj
Run Date and Time: 5/3/2023 11:41:31 AM

Project in English units

PLAN DATA

Plan Title: Plan 02
Plan File : k:\ORL_TPTO\049563001_Sinclair Ext\200_Engineering\Drainage\HEC-RAS\HECRAS\Proposed\Prefferred ALT\Sinclair-PreferredA.p02

Geometry Title: Preferred Alt
Geometry File : k:\ORL_TPTO\049563001_Sinclair Ext\200_Engineering\Drainage\HEC-RAS\HECRAS\Proposed\Prefferred ALT\Sinclair-PreferredA.g03

Flow Title : Flow-PreferredAlt
Flow File : k:\ORL_TPTO\049563001_Sinclair Ext\200_Engineering\Drainage\HEC-RAS\HECRAS\Proposed\Prefferred ALT\Sinclair-PreferredA.f01

Plan Summary Information:

Number of:	Cross Sections	= 9	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 1	Lateral Structures	=	0

Computational Information
    Water surface calculation tolerance = 0.01
    Critical depth calculation tolerance = 0.01
    Maximum number of iterations   = 20
    Maximum difference tolerance   = 0.3
    Flow tolerance factor   = 0.001

Computation Options
    Critical depth computed only where necessary
    Conveyance Calculation Method: At breaks in n values only
    Friction Slope Method: Average Conveyance
    Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Flow-PreferredAlt
Flow File : k:\ORL_TPTO\049563001_Sinclair Ext\200_Engineering\Drainage\HEC-RAS\HECRAS\Proposed\Prefferred ALT\Sinclair-PreferredA.f01

Flow Data (cfs)

River	Reach	RS	10% Annual	2% Annual	1% Annual	0.2% Annual
DavenportCreek	DavenportCreek	2810	1417	2368	2798	3813
DavenportCreek	DavenportCreek	2282	1417	2368	2798	3813

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
DavenportCreek	DavenportCreek	10% Annual	Normal S = 0.002 Known WS = 100.75	
DavenportCreek	DavenportCreek	2% Annual	Normal S = 0.002 Known WS = 102.25	
DavenportCreek	DavenportCreek	1% Annual	Normal S = 0.002 Known WS = 102.75	
DavenportCreek	DavenportCreek	0.2% Annual	Normal S = 0.002 Known WS = 103.75	

Changes in WS and EG

River	Reach	RS	Profile	Type	Value
DavenportCreek	DavenportCreek	1078	1% Annual	Known WS	103.2
DavenportCreek	DavenportCreek	485	1% Annual	Known WS	103
DavenportCreek	DavenportCreek	247	1% Annual	Known WS	103

GEOMETRY DATA

Geometry Title: Preferred Alt
Geometry File : k:\ORL_TPTO\049563001_Sinclair Ext\200_Engineering\Drainage\HEC-RAS\HECRAS\Proposed\Prefferred ALT\Sinclair-PreferredA.g03

CROSS SECTION

RIVER: DavenportCreek
REACH: DavenportCreek RS: 2810

INPUT
Description:
Station Elevation Data num= 145

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	111.23	1.23	111	4.64	110.3	6.3	110	8.93	109.29
9.8	109	14.47	108.44	16.82	108	22.18	107.52	30.45	107
44.04	106.58	61.79	106	70.39	105.76	81.52	105.48	98.22	105.03
100.85	105	107.65	104.63	113.9	104.36	127.27	104.33	139.59	104.08
141.54	104.01	143.81	104	148.02	103.88	156.01	103.72	161.67	103.63
166.99	103.51	178.82	103.17	181.43	103.14	184.75	103.03	187.73	103.02
189.43	103.02	192.31	103.01	195	103	197.65	102.93	199.5	102.93
206.52	102.6	212.75	102	226.76	101.41	232.28	101.23	234.76	101.18
239.13	101	249.42	100.54	256.89	100	262.83	99.02	262.98	99
265.19	98.49	267.31	98	267.35	97.98	271.05	97	276.04	96.08
276.45	96	277.82	96	280.79	96.03	281.77	96.02	283.41	96.02
284.06	96.01	284.88	96	290.16	96	293.63	96.22	298.25	96.64
300.85	96.82	302.09	96.83	302.88	96.82	311.62	96	311.91	96.01
312.75	96	314.05	96.01	314.32	96.03	316.84	96.22	325.53	96.55
327.76	96.44	329.68	96.64	332.86	96.07	333.52	96	346.58	96
347.86	96.01	348.71	96.18	350.74	96.6	353	96.9	356.07	96.98
358.21	96.97	362.82	96.98	364.23	96.92	370.15	96.68	375.29	96.8
377.25	96.84	379.03	96.82	381.63	96.93	383.49	96.99	385.98	96.98
389.33	96.97	391.38	96.98	396.79	96.97	398.98	96.97	406.32	96.98
412.43	96.99	414.72	96.99	424.46	97	444.63	97	445.84	97.07
447.41	97.37	449.42	97.72	451.14	97.82	452.21	98	455.64	98.3

```
  461.53      99  463.76   99.26  467.94   99.27  475.33   99.46  488.47     100
  492.31  100.54  502.85     101  506.57  101.03  510.58  101.32  520.59  101.77
  524.83     102  532.01     102  532.49  102.03  532.86  102.15   536.9  102.33
  544.19  102.37  555.42  102.69  562.47     103  580.64   103.7  588.77  103.98
  590.77     104  606.02  104.52   610.6  104.76  614.19  104.98  620.97     105
  626.68  105.21  632.18  105.37  643.38  105.93     649  105.93  650.99  105.92
  652.86  105.93  663.73   105.8  664.47  105.76  671.26  105.68  675.32  105.69
  682.44  105.74   687.9  105.98  688.15     106   688.3     106  696.29  106.41

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03   199.5    .025  643.38     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         199.5  643.38           310.92  345.67  416.54             .1       .3

CROSS SECTION


RIVER: DavenportCreek
REACH: DavenportCreek     RS: 2464

INPUT
Description:
Station Elevation Data    num=     104
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   107.9    1.45  107.49    3.09     107     4.6  106.72   11.14     106
   19.94  105.29   22.52     105   25.14  104.96   26.09  104.94   26.53  104.95
   35.22  104.48   42.56   104.1   44.47     104   45.56  103.95   47.75  103.86
   61.01   103.4   65.48  103.29   72.22     103    73.5  102.94   74.77  102.92
   74.88  102.91      75  102.92   77.27     103   78.67  102.91   81.68  102.66
   89.34     102   90.64  101.96    96.4  101.55  102.88     101  104.81   100.8
  111.64     100  114.17   99.57  118.38      99  122.17   98.28  125.63      98
   135.4   97.32  138.98   97.31  148.73   97.23  150.89      97  155.88   96.62
  164.12      96  178.07      96  186.18   96.67  189.23   96.87  190.71   96.96
  194.06   96.93  194.32   96.94  198.27      97  214.68   96.19  215.01   96.18
  218.54      96  280.64      96   281.1      96  285.12   95.99  287.35      96
  288.14   96.34  290.05      97  294.14   97.87  294.87      98  296.72    98.3
  302.48      99  307.43   98.99  311.37   98.99  313.39      99  313.76      99
  323.04   99.92  323.74     100   328.9  100.83  332.77  100.89   338.3  100.85
  339.73  100.96  346.55     101  350.48  101.33  361.33  101.82  362.64  101.85
  363.47  101.99  366.29     102  371.98  102.41  379.32  102.87  380.27  102.92
  385.48  102.92  390.95  102.96   392.9     103  393.85  102.99  397.86  102.99
   399.2  102.98  399.51  102.98  401.66  102.97  404.48  102.96  410.62  102.99
  411.98     103  412.44     103  413.68  103.09  432.58     104  437.17  104.21
   442.7  104.56  446.68  104.83  452.19     105  460.26     105  467.19  105.01
  492.98  105.04  524.37     105  545.23     105  574.01  105.73

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
```

```
       0     .03   74.88    .025  380.27     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         74.88  380.27           238.92  182.01  148.31             .1       .3

CROSS SECTION


RIVER: DavenportCreek
REACH: DavenportCreek     RS: 2282

INPUT
Description:
Station Elevation Data    num=     155
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  108.42    1.94  108.04    2.12     108     5.5  107.32    7.31  107.01
    7.33     107    7.34     107   11.54  106.08   11.92     106   12.32  105.91
   16.69     105   22.52  104.41   25.49     104   26.82  103.94   27.58  103.94
   28.91  103.97   33.12  103.34   34.04  103.17   34.34  103.11    35.4     103
   39.29  102.78   54.95     102   56.69  101.99    61.7     102   63.29  102.01
   63.83     102   65.01  101.92   71.91  101.64    75.8  101.52   82.34  101.22
   84.88  101.07   89.61     101   100.8  100.37  109.15     100   113.1   99.96
  123.04   99.61  134.15   99.16  137.09   99.03  144.26   99.01  147.03      99
  147.46      99  149.35   98.91  166.17      98  167.12   97.74  171.87   97.53
  178.69      97  185.64   96.54  194.34   96.24  195.91   96.19  197.03   96.17
  199.22      96  201.37   95.83  208.78   95.92  223.14   95.98   223.6   95.98
  225.76   95.99  227.12   95.99  229.07      96   230.6   96.16   232.5   96.06
  238.04   96.08  241.55      96   246.7   95.99  248.15   95.98  250.53   95.98
  253.26   95.97  253.86   95.97  255.73      96  283.05      96  287.47   96.01
  300.92   96.01  305.19      96  306.01      96  307.03   96.01  309.44   96.01
  316.83   96.03  317.74   96.04  323.01   96.02  325.36   96.02  328.48   96.01
  330.14   96.03  332.45      96  338.19      96  339.36   96.01  339.96   96.01
  340.58      96  354.92      96  362.57   96.93  363.25      97  363.57      97
  364.11   96.98  365.23   96.94  368.49   96.73  371.62   96.42  372.56   96.28
  373.85   96.35   383.1   96.23  386.68   96.13  388.01      96  396.46      96
  398.95   96.05  402.14   96.26  408.36   96.61  411.76   96.69   421.9      97
  423.46   97.07  423.92   97.07  426.35    97.3  432.63    97.8  437.46   97.87
  438.19   97.91  441.17      98  442.39   98.16  443.14   98.16  444.02   98.18
  445.12   98.19  454.63   98.58   458.7   98.54  461.02   98.38  463.22   98.51
  474.24   98.92  475.21   98.94  476.22      99   489.3   99.93  490.09     100
  498.71   100.5  504.52     101   510.6  101.26  522.82  101.69  529.91  101.99
  530.55     102  532.96   102.2  550.45     103  551.33  103.01  553.25     103
  558.85  103.46  564.67  103.87  565.12     104  565.54     104  570.82  104.04
  572.51  104.03  576.72  104.08   577.9     104  582.39  103.96  587.66  103.88
  597.42  103.87  601.03     104  609.98  104.32  616.85  104.45  621.75  104.51
  629.87  104.74  634.06     105  638.59  105.25  638.65  105.25   645.7  105.49

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03    61.7    .025  576.72     .03
```

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

	61.7	576.72	156.66	156	156.09	.1	.3

BRIDGE

RIVER: DavenportCreek
REACH: DavenportCreek RS: 2150

INPUT
Description:
Distance from Upstream XS = 30
Deck/Roadway Width = 96
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 4

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	112		61.7	112	105	576	112	105
650	112							

Upstream Bridge Cross Section Data
Station Elevation Data num= 155

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	108.42	1.94	108.04	2.12	108	5.5	107.32	7.31	107.01
7.33	107	7.34	107	11.54	106.08	11.92	106	12.32	105.91
16.69	105	22.52	104.41	25.49	104	26.82	103.94	27.58	103.94
28.91	103.97	33.12	103.34	34.04	103.17	34.34	103.11	35.4	103
39.29	102.78	54.95	102	56.69	101.99	61.7	102	63.29	102.01
63.83	102	65.01	101.92	71.91	101.64	75.8	101.52	82.34	101.22
84.88	101.07	89.61	101	100.8	100.37	109.15	100	113.1	99.96
123.04	99.61	134.15	99.16	137.09	99.03	144.26	99.01	147.03	99
147.46	99	149.35	98.91	166.17	98	167.12	97.74	171.87	97.53
178.69	97	185.64	96.54	194.34	96.24	195.91	96.19	197.03	96.17
199.22	96	201.37	95.83	208.78	95.92	223.14	95.98	223.6	95.98
225.76	95.99	227.12	95.99	229.07	96	230.6	96.16	232.5	96.06
238.04	96.08	241.55	96	246.7	95.99	248.15	95.98	250.53	95.98
253.26	95.97	253.86	95.97	255.73	96	283.05	96	287.47	96.01
300.92	96.01	305.19	96	306.01	96	307.03	96.01	309.44	96.01
316.83	96.03	317.74	96.04	323.01	96.02	325.36	96.02	328.48	96.01
330.14	96.03	332.45	96	338.19	96	339.36	96.01	339.96	96.01
340.58	96	354.92	96	362.57	96.93	363.25	97	363.57	97
364.11	96.98	365.23	96.94	368.49	96.73	371.62	96.42	372.56	96.28
373.85	96.35	383.1	96.23	386.68	96.13	388.01	96	396.46	96
398.95	96.05	402.14	96.26	408.36	96.61	411.76	96.69	421.9	97
423.46	97.07	423.92	97.07	426.35	97.3	432.63	97.8	437.46	97.87
438.19	97.91	441.17	98	442.39	98.16	443.14	98.16	444.02	98.18
445.12	98.19	454.63	98.58	458.7	98.54	461.02	98.38	463.22	98.51
474.24	98.92	475.21	98.94	476.22	99	489.3	99.93	490.09	100
498.71	100.5	504.52	101	510.6	101.26	522.82	101.69	529.91	101.99

530.55	102	532.96	102.2	550.45	103	551.33	103.01	553.25	103
558.85	103.46	564.67	103.87	565.12	104	565.54	104	570.82	104.04
572.51	104.03	576.72	104.08	577.9	104	582.39	103.96	587.66	103.88
597.42	103.87	601.03	104	609.98	104.32	616.85	104.45	621.75	104.51
629.87	104.74	634.06	105	638.59	105.25	638.65	105.25	645.7	105.49

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	61.7	.025	576.72	.03

Bank Sta: Left	Right	Coeff Contr.	Expan.
61.7	576.72	.1	.3

Downstream Deck/Roadway Coordinates

num= 4

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	112		61.7	112	105	576	112	105
650	112							

Downstream Bridge Cross Section Data

Station Elevation Data num= 165

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	108.66	5.91	108	7.65	107.76	8.54	107.63	12.99	107
15.71	106.6	19.71	106	22.11	105.65	26.51	105	30.32	104.57
34.44	104	35.89	103.83	41.24	103	41.35	102.99	48.13	102
50.73	101.7	56.14	101	62.71	100.81	66.85	100.68	85.52	100.01
86.43	100	87.62	99.99	91.13	99.97	95.53	100	103.94	100
105.26	99.91	113.68	99.13	114.67	99.06	114.93	99.07	115.25	99.08
116.24	99.02	118.79	99.03	119.81	99.04	120.68	99.06	121.31	99.04
122.74	99	130.11	98.35	133.33	98	140.59	97.09	141.78	97.02
143.34	97.04	146.33	97.06	147.57	97.06	148.3	97.1	149.12	97.06
149.94	97.05	152.86	97.08	156.03	97	157.8	96.92	161.87	96.63
168.57	96.53	170.45	96.44	171.82	96.38	175.61	96.22	177.75	96.22
182.12	96.21	185.5	96.1	192.13	96.09	194.41	96.11	202.7	96.04
203.61	96.1	204.3	96.02	209.07	96.05	213.18	96.03	216.34	96.02
217.8	96.01	220.77	96	225.54	96	229.94	96.01	237.36	96.01
246.66	96	247.01	96	247.43	96.03	251.49	96.4	252.36	96.48
255.68	96.4	260.86	97	267.45	97	268.62	96.97	268.79	96.97
270.91	96.74	276.21	96.15	277.26	96.01	278.39	96	351.33	96
356.75	95.81	365.89	95.79	371.47	95.85	376.5	95.9	377.49	95.95
380.14	95.97	387.96	95.89	388.6	95.87	394.38	95.82	400.65	95.82
405.06	95.98	410.35	95.96	411.79	95.96	412.32	95.95	413.47	95.96
413.88	95.95	414.91	95.96	416.5	96	421.69	96	423.14	95.98
429.16	95.91	431.96	95.94	435	95.98	436.78	95.99	436.94	95.99
437.33	96	476.52	96	478.06	95.99	480.36	96	484.54	96
486.19	95.99	486.62	95.99	489.05	95.98	491.66	95.97	493.3	95.97
495.43	95.96	496.98	95.96	504.13	96	512.3	96.72	515.81	97
521.65	97.93	522.29	98	522.45	98	526.78	97.99	527.27	97.97
527.89	97.98	528.53	98	531.14	98	531.3	98.01	532.86	98.07
534.5	98.15	550.05	98.98	550.73	99	559.15	99.92	559.46	100

```
  560.01  100.06  563.59  100.72  565.15     101  565.74  101.06  576.03  101.78
  577.97  101.83   578.6  101.95  580.94  101.98  581.78  101.99  582.27     102
  594.72   102.8  597.85     103  599.97  103.54  602.16     104   607.5  104.56
  611.85     105  612.88  105.27  615.48     106  616.93  106.33  617.69     107
  620.46   107.7  623.73     108  629.39   108.9  632.24  108.73  637.15   108.7

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03  103.94    .025  581.78     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
        103.94  581.78             .1       .3

Upstream Embankment side slope              =       2 horiz. to 1.0 vertical
Downstream Embankment side slope            =       2 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =       0
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Abutments =  2

Abutment Data
Upstream     num=       3
     Sta    Elev     Sta    Elev     Sta    Elev
       0     105     250     105     250      96
Downstream     num=       3
     Sta    Elev     Sta    Elev     Sta    Elev
       0     105     250     105     250      96

Abutment Data
Upstream     num=       3
     Sta    Elev     Sta    Elev     Sta    Elev
     400      96     400     105     650     105
Downstream     num=       3
     Sta    Elev     Sta    Elev     Sta    Elev
     400      96     400     105     650     105

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
       Add Friction component to Momentum
```

Do not add Weight component to Momentum
Class B flow critical depth computations use critical depth
inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

CROSS SECTION

RIVER: DavenportCreek
REACH: DavenportCreek RS: 2018

INPUT
Description:
Station Elevation Data num= 165

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	108.66	5.91	108	7.65	107.76	8.54	107.63	12.99	107
15.71	106.6	19.71	106	22.11	105.65	26.51	105	30.32	104.57
34.44	104	35.89	103.83	41.24	103	41.35	102.99	48.13	102
50.73	101.7	56.14	101	62.71	100.81	66.85	100.68	85.52	100.01
86.43	100	87.62	99.99	91.13	99.97	95.53	100	103.94	100
105.26	99.91	113.68	99.13	114.67	99.06	114.93	99.07	115.25	99.08
116.24	99.02	118.79	99.03	119.81	99.04	120.68	99.06	121.31	99.04
122.74	99	130.11	98.35	133.33	98	140.59	97.09	141.78	97.02
143.34	97.04	146.33	97.06	147.57	97.06	148.3	97.1	149.12	97.06
149.94	97.05	152.86	97.08	156.03	97	157.8	96.92	161.87	96.63
168.57	96.53	170.45	96.44	171.82	96.38	175.61	96.22	177.75	96.22
182.12	96.21	185.5	96.1	192.13	96.09	194.41	96.11	202.7	96.04
203.61	96.1	204.3	96.02	209.07	96.05	213.18	96.03	216.34	96.02
217.8	96.01	220.77	96	225.54	96	229.94	96.01	237.36	96.01
246.66	96	247.01	96	247.43	96.03	251.49	96.4	252.36	96.48
255.68	96.4	260.86	97	267.45	97	268.62	96.97	268.79	96.97
270.91	96.74	276.21	96.15	277.26	96.01	278.39	96	351.33	96
356.75	95.81	365.89	95.79	371.47	95.85	376.5	95.9	377.49	95.95
380.14	95.97	387.96	95.89	388.6	95.87	394.38	95.82	400.65	95.82
405.06	95.98	410.35	95.96	411.79	95.96	412.32	95.95	413.47	95.96
413.88	95.95	414.91	95.96	416.5	96	421.69	96	423.14	95.98
429.16	95.91	431.96	95.94	435	95.98	436.78	95.99	436.94	95.99
437.33	96	476.52	96	478.06	95.99	480.36	96	484.54	96
486.19	95.99	486.62	95.99	489.05	95.98	491.66	95.97	493.3	95.97
495.43	95.96	496.98	95.96	504.13	96	512.3	96.72	515.81	97
521.65	97.93	522.29	98	522.45	98	526.78	97.99	527.27	97.97
527.89	97.98	528.53	98	531.14	98	531.3	98.01	532.86	98.07
534.5	98.15	550.05	98.98	550.73	99	559.15	99.92	559.46	100
560.01	100.06	563.59	100.72	565.15	101	565.74	101.06	576.03	101.78
577.97	101.83	578.6	101.95	580.94	101.98	581.78	101.99	582.27	102
594.72	102.8	597.85	103	599.97	103.54	602.16	104	607.5	104.56
611.85	105	612.88	105.27	615.48	106	616.93	106.33	617.69	107
620.46	107.7	623.73	108	629.39	108.9	632.24	108.73	637.15	108.7

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	103.94	.025	581.78	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
103.94	581.78	169.61	142.15	87.18	.1	.3

CROSS SECTION

RIVER: DavenportCreek
REACH: DavenportCreek RS: 1875

INPUT
Description:
Station Elevation Data num= 162

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	106.29	1.87	106	3.52	105.7	7.18	105	10.37	104.45
12.96	104	16.73	103.5	20.87	103	27.42	102.67	39.42	102
45.18	101.86	49.75	101.73	62.03	101.4	74.42	101.19	75.17	101.16
75.46	101.15	77.41	101.01	79.71	101	81.1	101	86.1	100.67
100.46	100	107.36	100	108.29	99.9	114.09	99.66	123.1	99.26
127.07	99.29	129.09	99.34	132.51	99.53	137.08	99.12	138.05	99.07
138.46	99.05	138.9	99	140.03	98.98	141.18	98.95	141.78	98.96
143	99	148.83	98.68	151.54	98.52	161.06	98.23	162.05	98.18
162.7	98.15	164.4	98.11	165.96	98	167.35	97.74	175.98	97
179.23	97	182.86	97.03	184.94	97.04	189.36	97.01	189.78	97.03
190.14	97.01	190.31	97	195.25	97	200.92	96.99	205.32	97
208.52	96.99	209.21	96.99	210.89	97	214.69	96.99	234.45	96.99
235.92	97	237.09	97	239.47	96.81	242.22	96.76	245.1	96.71
258.54	96	279.75	96	281.35	95.86	287.62	95.6	290.85	95.66
292.7	95.71	293.91	95.71	299.83	95.65	302.59	95.53	305.81	95.52
305.82	95.52	314.4	96	330.9	96	332.5	95.98	332.59	95.98
339.17	95.73	348.86	95.54	355.69	95.51	357.59	95.52	362.68	95.28
366.57	95.04	371.19	95.05	375.56	95.16	390.4	95.29	394.52	95.32
398.77	95.27	402.38	95.35	406.03	95.26	410.89	95.21	415.17	95.02
416.93	95.08	428.55	95.42	438.73	95.61	440.83	95.56	445.47	95.15
450.98	95	467.1	95	467.33	95.02	467.38	95.02	469.55	95.03
471.4	95.02	475.62	95.13	487.63	96	490.42	95.99	493.53	95.99
496.58	96	497.48	96	500.82	95.68	504.96	95.5	507.27	95.64
511.41	95.11	511.71	95.1	511.99	95.1	513.8	95.02	517.42	95.02
520.81	95	524.21	95	532.02	95.59	533.68	96	534.58	95.98
535.73	95.96	537.89	95.86	538.12	95.91	541.99	96	545.12	96.25
555.37	97	561.47	97.65	565.37	98	568.58	98.35	575.25	99
580.01	99.61	584.24	100	591.29	100.76	594.11	101	607.12	101.72
610.51	101.89	612.47	101.99	613.38	101.99	614.24	102	616.52	102.04
619.98	102.24	628.65	103	629.67	103.01	631.37	103.02	632.01	103.01
634.67	103	635.99	103	636.41	103.03	648.58	103.5	660.08	104
663.29	104.83	663.91	105	664.75	105.19	669.05	106	672.67	106.26
683.36	107	691.79	107						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	74.42	.025	683.36	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
74.42	683.36	164.28	238.95	379.42	.1	.3

CROSS SECTION

RIVER: DavenportCreek
REACH: DavenportCreek RS: 1636

INPUT
Description:
Station Elevation Data num= 140

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	99.6	3.77	99.26	6.99	99	8.88	98.7	13.28	98
19.18	97.03	19.39	97	27.26	96.06	27.86	96	68.8	96
78.64	96.2	81.41	96	145.18	96	146.28	96.07	154.62	96.47
163.09	96.05	163.51	96.07	164.12	96.08	166.52	96	176.1	96
176.21	96.05	180.62	96.36	181.67	96.43	184.74	96.23	188.13	96
195.88	96	200.34	96.02	203.25	96.04	208.1	96.04	211.68	96.03
215.11	96.01	216.37	96.01	219.17	96.02	221.22	96.04	222.58	96.03
226.61	96.02	228.39	96.01	230.53	96	358.31	96	367.05	95.99
382.09	95.97	398.05	95.97	414.47	95.57	426.22	95.43	450.63	95.01
450.97	95	452.25	95.01	453.93	95	455.1	95.04	458.49	95.09
461.7	95.1	466.99	95.09	469.24	95	475.21	95	476.83	95.01
478.78	95	487.66	95	488.13	95.02	488.24	95.02	488.72	95
491.35	95.01	492.87	95.02	493.1	95.02	494.29	95.01	501.38	95
527.57	95	531.39	95.01	534.19	95	542.48	95	544.16	95.01
551.23	95.03	563.75	95.03	568.17	95.04	570.99	95.04	575.79	95.05
577.36	95.05	577.75	95.06	578.39	95.05	582.73	95.03	587.22	95.03
587.88	95.02	592.08	95.01	593.99	95	617.54	95	619.37	95.01
623.32	95.02	624.71	95.02	631.1	95.01	632.55	95	634.08	95
638.89	95.01	639.83	95.01	643.44	95	649.42	95	650.14	95.01
651.33	95.02	653.22	95.04	653.59	95.04	654.49	95.07	660.14	95.24
665.19	95.3	675.68	95.5	682.99	95.67	686.79	95.74	693.42	95.8
695.18	96	701.65	96	707	96.01	713.74	96.01	715.37	96
717.41	96	721.97	96.13	729.77	96.51	738.42	96.9	739.87	97
744.4	96.96	744.94	96.96	747.85	96.98	749.4	97	751.54	97.35
757.06	98	759.99	98.75	762.27	99	764.75	99.02	765.16	99.04
771.02	99.22	780.54	100	783.68	100.39	791.37	101	795.69	101.23
805.32	102	810.34	102.36	820.52	103	827.58	103.48	829.18	103.55
831.35	103.65	836.78	103.97	838.33	104	849.92	104.58	859.22	104.95

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	398.05	.025	739.87	.03

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
398.05	739.87		570.1	570.1	570.1	.1	.3

CROSS SECTION

RIVER: DavenportCreek
REACH: DavenportCreek RS: 1078

INPUT
Description:
Station Elevation Data num= 352

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	109.34	3.81	109	4.25	108.97	4.58	108.94	10.54	108.48
15.65	108.06	15.95	108.03	16.36	108	28.94	107.52	30.78	107.45
39.32	107.14	42.45	107.02	44.25	107.03	44.28	107.03	47.23	107.03
47.53	107.03	48.63	107.03	48.94	107.03	48.99	107.03	50.54	107.03
51.12	107.03	52.35	107.03	54.11	107.03	57.61	107.01	57.96	107.01
58.2	107.01	58.39	107.01	58.91	107.01	63.67	107.02	65.54	107.02
66.12	107.03	68.13	107.03	68.93	107.03	70.65	107.04	74.27	107.03
79.6	107.04	82.34	107.05	82.97	107.05	83.63	107.04	88.28	107.08
96.04	107.17	97.46	107	102.99	107	106.69	107	113.21	107.84
114.66	108	116.09	108.76	116.59	109	116.7	109.04	119.8	110
125.51	110.54	129.08	110.84	133.09	110.95	133.49	110.97	133.67	110.98
134.36	111	137.23	110.99	137.51	111	138.01	111	140.14	111
140.3	111	140.7	111	143.54	111.06	143.85	111.08	144.31	111.12
145.98	111.28	150.51	111.65	153.99	112	157.02	112.04	158.76	112.07
161.94	112.11	164.7	112.09	170.4	112.001	170.44	112	173.35	111.36
175.27	111	178.33	110.45	180.81	110	182.03	109.65	185.02	109
186.14	108.74	188.7	108	190.4	107.57	192.51	107	193.61	106.71
195.11	106.37	196.07	106.14	196.53	106	197.34	105.78	200	105
200.55	104.77	201.75	104.19	202.34	104	202.89	103.86	205.94	103
209.1	102.13	209.59	102	210.78	101.79	215.07	101	218.12	100.26
219.07	100	219.84	99.89	221.15	99.79	229.16	99.04	230.91	99
232.23	98.98	246.06	98.04	246.54	98.01	246.64	98	246.66	98
246.73	97.99	246.81	97.98	250.71	97.88	258.3	97	258.48	96.98
258.7	96.95	267.04	96	269.38	95.43	270.9	95	271.39	95
274.36	95	275.2	95	278.73	95	284.03	95	286.26	95
288.5	94.91	293.8	94.91	298.01	94.78	303.05	94.99	303.17	94.99
306.59	94.82	316.65	94.3	317.63	94.31	318.92	94.35	319.68	94.16
322.9	94	326.94	94	326.99	94	327.34	94	328.81	94
330.56	94	330.64	94	334.55	94	335.36	94	336	94.14
337.24	94.33	340.02	94.6	341.87	94.86	346.78	94.88	350.75	94.93
352.7	94.96	353.97	94.98	355.78	95	357.03	95	360.92	94.71
365.95	94.27	368.69	94.07	369.77	94.02	369.85	94	370.22	94.01
373.77	94.01	375.71	94.02	375.76	94.02	376.81	94.01	377.56	94.01
379.55	94.01	379.64	94.01	379.71	94.01	388.03	94.52	395.02	95
396.61	95.49	400.26	96	400.35	96.01	405.68	97	405.94	97.02
406.19	97.04	409.61	97.31	417.46	97.92	418.12	97.97	418.49	98
427.42	98.58	429.89	98.75	434.34	99	435.28	99.01	436.04	99.02

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  436.96   99.03  438.17   99.03  438.43   99.05   441.9   99.29  445.46    99.4
  447.57   99.51  449.73   99.59  451.34   99.63  452.63   99.62  454.15   99.72
  456.39   99.91  456.69   99.91  458.51     100  459.58  100.01  460.22  100.02
  461.57  100.03  465.47  100.17  466.04  100.21   467.1  100.31  470.26  100.45
  472.34  100.58  474.84  100.68  476.08  100.71  477.16  100.72  480.57  100.76
  481.46  100.81  483.68  100.76  488.42   100.9  489.63  100.95  491.89     101
  495.03  101.22   498.5   101.4  501.36  101.47  508.54  101.99  508.57     102
  508.59     102  508.62     102  508.63     102  514.81     102   515.3     102
  516.08     102  516.72     102  517.13     102   518.3     102  518.92  101.99
  519.59  101.99  521.24     102  521.56     102  521.73     102  535.41  102.77
  539.39     103  540.48     103  544.16     103  546.33     103  553.08     103
  553.21     103  553.25     103  553.33     103   555.3     103  557.55     103
  558.52     103  560.08     103  561.53     103     564     103  565.13     103
  566.26     103   566.8  103.01   575.6  103.46  580.29   103.7  586.79     104
  589.87  104.32  596.23     105  598.95  105.92  599.29     106  599.68  106.21
  601.42     107  603.78  107.86  604.23     108  606.74  108.01  608.34  108.02
  608.35  108.02  608.43  108.02  608.54  108.02  610.31  108.01  611.45     108
  623.79  107.42  633.23  107.01  633.46     107  645.51  106.34  651.29  106.01
  651.35     106  651.41     106  659.44  105.51  666.39     105  667.36     105
  672.51  104.98  672.95  104.98  676.24  104.99  677.46  104.98  679.16  104.98
  680.06  104.98  682.04  104.98   682.9  104.98   688.6  104.95  689.02  104.95
  689.24  104.95  689.94  104.95   693.9  104.96  696.04  104.96  697.61  104.97
  700.36  104.98  700.93  104.99   702.2  104.94   702.4  104.94  709.25  104.98
  709.32  104.98  709.41  104.97  712.71  104.92  715.98  104.94  716.17  104.93
  716.88  104.98  719.07  104.99  719.24     105  719.63     105  724.86  105.04
  725.25  105.04  729.94  105.01  730.89     105   730.9     105  730.94     105
  735.35  104.55  742.05     104  742.15  103.99  742.24  103.99  748.08  103.67
  749.42  103.64  751.43  103.47  753.06   103.5  754.57   103.5  756.25  103.55
   757.6  103.59  760.33  103.56  764.14  103.45  765.74  103.53  767.48   103.5
  769.05   103.5   771.7  103.61  776.29  103.87  777.88     104  779.26  104.15
  786.57     105  792.93  105.87   793.9     106   796.5  106.45  798.71  106.89
  799.25     107  799.88  107.12  804.51  107.95  804.77  107.99  804.81     108
  804.84  108.01  809.33     109  811.89  109.53  813.55     110  816.21  110.09
   818.2  110.15  827.83  110.51

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03  170.44    .025  603.78     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
        170.44  603.78              620     620     620             .1       .3

CROSS SECTION


RIVER: DavenportCreek
REACH: DavenportCreek     RS: 485

INPUT
Description:
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Station Elevation Data num= 296

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	108	2.889	108	3.503	108	5.266	108	6.735	108
9.601	108	9.623	108	12.977	108	13.291	108	13.793	108
15.531	108	17.582	108	18.404	108	19.112	108	19.685	108
20.033	108	21.009	108	22.936	108	24.248	108	26.359	108
28.435	108.01	31.129	108	31.867	108	32.597	108	33.619	108
34.015	108.01	34.139	108.01	35.318	108	41.044	107.34	44.632	107
45.922	106.75	49.757	106	51.193	105.7	54.328	105	56.841	104.45
58.71	104.04	58.858	104	61.911	103.19	62.606	103	66.217	102.02
66.282	102	66.724	101.9	70.441	101	72.201	100.42	73.377	100
74.03	99.87	78.303	99	79.89	98.65	82.038	98.27	83.501	98
92.788	97.43	99.025	97.01	99.569	97	105.586	97	106.48	97
108.632	97	112.544	97	112.722	97	113.504	97	114.41	97
116.907	97	120.825	97	128.165	97	129.83	97	132.123	97
132.65	97	132.657	97	136.332	96.36	139.28	96.05	140.933	96.03
141.443	96	141.805	95.97	146.761	95.18	147.439	95.11	148.019	95
149.779	94.62	152.717	94	155.106	94	156.076	94	164.286	94
168.981	94	175.259	94	175.63	94	176.012	94	177.194	94
177.365	94	177.496	94	177.856	94	180.465	94	180.566	94
180.728	94	181.075	94	189.85	94	190.552	94	191.1	94
191.48	94	195.133	94	196.239	94	197.71	94	199.82	94
204.003	94	204.074	94	205.436	94	205.75	94	206.155	94
207.394	94	209.017	94	210.236	94	216.646	94	219.914	94
227.881	94	230.451	94	230.948	94	232.225	94	233.854	94
234.564	94	234.621	94	234.677	94	235.628	94	237.749	94
239.978	94	245.547	94	248.969	94	250.755	94	260.636	94
263.725	94	263.784	94	263.912	94	264.182	94	270.864	94
274.677	94	277.99	94	279.732	94	281.582	94	284.48	94
285.579	94.04	286.092	94.05	286.932	94.06	292.022	94.73	293.691	95
294.145	95.02	298.656	95.47	300.952	95.67	301.972	95.79	302.64	95.84
306.888	95.95	307.276	95.97	308.871	96	312.795	96.2	316.061	96.41
318.18	96.5	320.804	96.6	324.864	96.78	328.845	97	329.606	97.01
330.643	97.02	332.099	97.03	338.857	97.69	341.267	98	342.711	98.02
343.038	98.03	344.531	98.03	346.131	98.05	347.433	98.07	347.538	98.07
349.85	98.05	353.925	98.54	355.69	99	359.495	99	362.567	99
362.572	99	362.581	99	365.206	98.11	366.067	98	367.783	98
368.677	98	369.835	98.14	370.188	98.28	371.067	98.41	373.186	99
375.603	99.99	375.658	100	378.915	100.66	379.69	100.79	382.839	100.85
383.341	100.82	386.399	100.68	387.445	100.74	390.677	100.93	390.881	100.95
391.417	101	394.479	101.33	395.841	101.48	397.318	101.68	399.442	102
405.008	102.43	410.354	102.11	415.975	102.18	417.051	102.2	417.842	102.2
423.299	102.12	430.363	102	431.467	101.88	432.049	101.84	435.164	101.58
437.791	101.39	439.281	101.29	440.379	101.23	444.27	101.02	444.328	101.01
444.618	101	454.207	100.47	458.411	100.41	459.729	100.38	461.132	100.38
463.212	100.41	465.211	100.4	466.587	100.39	467.797	100.41	469.034	100.41
473.031	100.51	475.184	100.58	477.46	100.61	479.066	100.69	482.025	100.76
485.827	100.87	489.919	101	490.943	101.03	491.158	101.04	496.09	101.24
498.682	101.35	503.22	101.58	511.293	102	511.55	102	516.115	102.23
519.219	102.34	530.878	102.73	534.151	102.81	536.938	102.88	537.464	102.88

```
  537.99  102.87 540.835   102.9 542.407  102.98 543.361  102.99 543.854     103
 544.315  103.01 549.838  103.19 554.444  103.29 559.162  103.29 564.333  103.23
 565.885   103.2 568.764  103.22 571.427  103.23 574.161   103.2 576.978  103.23
 579.672  103.23 582.809  103.26 583.831  103.25 588.384  103.36 591.944  103.42
 593.471  103.41 594.934   103.4 600.424   103.6  606.96  103.94  609.01  103.95
 609.862  103.95 610.599  103.96 612.341  103.95 613.213  103.95 621.885  103.96
 626.208  103.96 626.398  103.96 626.842  103.95 629.184  103.92  642.63  103.74
  644.79  103.76 647.474  103.76 650.212  103.78 650.956  103.76 653.527  103.77
 656.401  103.79 659.101  103.82  659.71  103.82 666.144  103.83 673.109  103.97
 674.284  103.97 675.303  103.98 677.416  103.99 678.329     104 678.622     104
 678.934     104 679.867  104.05 680.326  104.08 682.722  104.23 694.414  104.98
 695.118     105

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .03  132.65    .025  355.69     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        132.65  355.69              263     263     263             .1       .3

CROSS SECTION


RIVER: DavenportCreek
REACH: DavenportCreek     RS: 247

INPUT
Description:
Station Elevation Data    num=     297
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  109.34    .816  109.32   3.216  109.27   6.599  109.18    9.31  109.09
  10.361  109.01  14.082     109  16.212  108.69  20.253     108  23.511  107.48
  26.626     107  31.267  106.19  32.683     106  33.535   105.9  35.223  105.59
   38.93     105  40.615  104.76  44.351  104.08  44.751     104  46.601   103.7
  50.846     103  51.403  102.93  51.739   102.9   52.71  102.79  58.698     102
  60.197  101.79  62.917  101.46  65.876  101.13  67.201     101  69.625  100.59
  74.154     100  75.978   99.82  77.513   99.73  82.592   99.33  85.335   99.12
  85.818   99.09   86.16   99.07  87.746      99  89.466   98.99  91.209      99
  93.247   99.04  95.344   99.06   95.98   99.07  96.166   99.07  99.154      99
   100.6   98.93 101.748   98.87 105.853   98.64 108.045   98.51  113.19   98.23
 114.684   98.13 116.761      98 123.599    97.5 128.389   97.27 132.917   97.02
  134.01   97.01 134.705      97 137.996   96.51  140.23   96.27 141.197    96.2
 141.942   96.19 145.851   96.13 148.146   96.03 150.015      96 150.762      96
 151.125      96 151.695      96 153.019   95.99 153.068   95.99 157.349   95.81
 160.569   95.69 164.297   95.57  166.94   95.49 168.776   95.49 172.249   95.41
 174.865   95.37 179.802    95.4 186.812   95.52 191.711   95.49 198.179   95.37
  200.61   95.29 202.917   95.16 205.038   95.01 205.264      95 205.921   94.85
 212.716   94.18 213.844   94.06 214.096   94.04 214.239   94.07 217.707   94.25
 218.534   94.18 219.245   94.17  222.08   94.15 222.849      94 225.147   93.61
 227.042   93.48  228.05   93.46 230.455   93.56  235.74      94 235.824      94
```

236.708	94	238.872	94	238.892	94	241.617	94	242	94		
242.029	94	242.039	94	245.835	94	248.62	94	249.678	93.89		
250.384	93.82	253.056	93.79	259.714	93.17	261.567	93.17	262.233	93.23		
264.358	93.54	266.234	93.53	267.178	94	268.294	94	271.428	94		
271.795	94	272.211	94	273.589	94	275.228	94	276.695	94		
277.023	94	277.34	94	278.893	93.92	286.078	93.12	287.266	93.01		
287.361	93.01	287.392	93.01	287.44	93.01	287.723	93.04	293.409	93.54		
297.148	93.93	297.698	93.93	299.012	93.96	300.161	93.95	302.147	93.99		
302.607	94	303.208	94	303.348	94	303.592	94.01	306.784	94.03		
309.535	94.06	312.389	94.09	313.726	94.08	316.4	94.06	318.558	94.04		
321.451	94	322.812	94	324.523	94	326.083	94	326.803	94		
328.677	94	328.961	94	330.233	94	330.588	94	332.164	94		
334	94	336.605	94	337.172	94	338.798	94	343.12	94		
346.069	94	350.163	94	351.185	94	354.613	94	355.415	94		
357.152	94	361.489	94	362.004	94	365.507	94	366.217	94		
366.257	94	366.684	94.01	368.46	94.17	370.074	94.24	372.05	95		
373.54	95.66	374.65	96	377.197	96.62	378.295	97	379.718	97.33		
382.095	98	382.388	98.07	384.515	98.39	386.265	98.34	388.559	98.43		
390.26	98.37	392.103	98.49	396.423	99	397.787	99.13	398.908	99.05		
401.24	99.08	401.245	99.08	401.54	99.077	402.347	99.07	403.516	99.08		
404.673	99.07	406.563	99.06	409.235	99.02	410.996	99	413.541	98.24		
413.986	98	414.229	97.87	415.433	97	417.1	96.51	418.585	96		
419.017	96	419.518	96	424.156	96	444.935	96	451.681	96		
456.406	96	458.839	96	461.535	96	463.027	96	464.948	96		
466.64	96	473.6	96.28	485.193	96.81	488.882	97	489.198	97		
492.538	97.52	495.756	97.99	496.017	98	502.697	98.55	508.159	99		
508.506	99	510.117	99.03	517.671	99.17	522.644	99.25	534.151	99.18		
539.156	99.07	550.941	99	551.022	99	551.422	99	552.051	99		
552.645	99	554.03	99	555.631	99	556.302	99	556.768	99		
557.293	99	558.127	99	558.315	99	558.447	99	558.815	99		
564.827	99	565.673	99	570.137	99	572.084	99	574.072	99		
575.545	99	575.939	99	576.603	99	577.145	99	577.613	99		
585.914	99.01	587.974	99.01	590.871	99.01	595.345	99	596.401	99		
598.886	99.07	601.061	99.08	610.013	99.51	610.133	99.51	611.991	99.56		
614.544	99.61	616.352	99.74	617.446	99.77	619.633	99.88	620.651	99.94		
621.938	99.91	623.12	99.9	628.586	99.34	631.079	99.12	631.61	99.04		
632.115	99.04	633.303	99	634.074	99	636.258	99.64	636.651	99.73		
636.901	99.77	638.993	100	639.596	100	643.244	99.3	644.583	99.32		
647.733	99.7	649.36	100	650.228	100.03	651.545	100.09	651.692	100.09		
659.259	100.9	659.994	101								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	14.082	.025	401.24	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
14.082	401.24	667	667	.1	.3

SUMMARY OF MANNING'S N VALUES

River:DavenportCreek

Reach	River Sta.	n1	n2	n3
DavenportCreek	2810	.03	.025	.03
DavenportCreek	2464	.03	.025	.03
DavenportCreek	2282	.03	.025	.03
DavenportCreek	2150	Bridge		
DavenportCreek	2018	.03	.025	.03
DavenportCreek	1875	.03	.025	.03
DavenportCreek	1636	.03	.025	.03
DavenportCreek	1078	.03	.025	.03
DavenportCreek	485	.03	.025	.03
DavenportCreek	247	.03	.025	.03

SUMMARY OF REACH LENGTHS

River: DavenportCreek

Reach	River Sta.	Left	Channel	Right
DavenportCreek	2810	310.92	345.67	416.54
DavenportCreek	2464	238.92	182.01	148.31
DavenportCreek	2282	156.66	156	156.09
DavenportCreek	2150	Bridge		
DavenportCreek	2018	169.61	142.15	87.18
DavenportCreek	1875	164.28	238.95	379.42
DavenportCreek	1636	570.1	570.1	570.1
DavenportCreek	1078	620	620	620
DavenportCreek	485	263	263	263
DavenportCreek	247	667	667	667

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: DavenportCreek

Reach	River Sta.	Contr.	Expan.
DavenportCreek	2810	.1	.3
DavenportCreek	2464	.1	.3
DavenportCreek	2282	.1	.3
DavenportCreek	2150	Bridge	

DavenportCreek	2018	.1	.3
DavenportCreek	1875	.1	.3
DavenportCreek	1636	.1	.3
DavenportCreek	1078	.1	.3
DavenportCreek	485	.1	.3
DavenportCreek	247	.1	.3

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
DavenportCreek	2810	2% Annual	2368.00	96.00	102.41	102.46	0.000149	1.80	1318.54	337.12	0.16	
DavenportCreek	2464	2% Annual	2368.00	95.99	102.35	102.41	0.000154	1.94	1222.12	285.85	0.17	
DavenportCreek	2282	2% Annual	2368.00	95.83	102.36	97.59	102.38	0.000047	1.11	2137.56	488.84	0.09
DavenportCreek	2150			Bridge								
DavenportCreek	2018	2% Annual	2368.00	95.79	102.31	102.32	0.000023	0.88	2746.77	541.15	0.07	
DavenportCreek	1875	2% Annual	2368.00	95.00	102.31	102.32	0.000020	0.81	2930.22	586.94	0.06	
DavenportCreek	1636	2% Annual	2368.00	95.00	102.31	102.32	0.000006	0.54	5042.28	809.69	0.04	
DavenportCreek	1078	2% Annual	2368.00	94.00	102.27	102.30	0.000086	1.56	1518.74	317.87	0.13	
DavenportCreek	485	2% Annual	2368.00	94.00	102.25	102.27	0.000033	1.28	2124.13	445.75	0.08	
DavenportCreek	247	2% Annual	2368.00	93.01	102.25	95.81	102.26	0.000016	0.83	3248.78	603.19	0.06

APPENDIX G

UMAM Data Sheets

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Sinclair Road Extension	TBD	615

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
615 Stream and Lake Swamps (bottomland)	N/A	Impact (Direct)	5.02 ac

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Reedy Creek (3170)	Class I	N/A

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Wetland 1 is a forested wetland contiguously connected to Davenport Creek Swamp, ultimately outflowing to Reedy Creek.

Assessment area description

This system contained a hardwood dominant canopy including species such as sweetgum (*Liquidambar styraciflua*), black gum (*Nyssa sylvatica*), laurel oak (*Quercus laurifolia*), water oak (*Quercus nigra*), red maple (*Acer rubrum*), and bald cypress (*Taxodium distichum*). The understory was marginal and consisted primarily of cabbage palm. Groundcover species consisted of St. John's Wort (*Hypericum* sp.), dollarweed (*Hydrocotyle* sp.), royal fern *(Osmunda regalis*), and broomsedge (*Andropogon* sp.).

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Reunion Resort & Golf Club, ChampionsGate Golf Club	Not Unique

Functions	Mitigation for previous permit/other historic use
Foraging and nesting habitat for wading birds food chain support.	N/A

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Amphibians, reptiles, small mammals and wading birds	Wood stork - T; State listed wading birds

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

None

Additional relevant factors:

None

Assessment conducted by:	Assessment date(s):
Christine Prince	Feb-22

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Sinclair Road	TBD	615
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact (Direct)	Christine Prince	Feb-22

Scoring Guidance
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed

Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 8 with: 0	Stream and Lake Swamps (bottomland) consisting of Davenport Creek and floways of the Davenport Creek Swamp. One of these systems has been bisected by a utility easement. The Reunion development is adjacent and east of the evaluated properties. Generally, the systems have marginally been impacted by development.	
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 8 with: 0	Flow and flow levels within FLUCFCS 615 appear appropriate for the systems. Seasonal high indicators appear healthy. Impact from roadway runoff, development, culverts, and agriculture appear minimal.	
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 8 with: 0	These systems have a mix of red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), water hickory (*Carya aquatica*), sweetbay magnolia (Magnolia virginiana), water oak (*Quercus nigra*), cinnamon fern (*Osmundastrum cinnamomeum*), pop ash (*Fraxinus caroliniana*). Obvious signs of recruitment, good mixture of adult and subadult trees. *Ludwigia spp. was* observed at the edges of these wetlands.	

Score = sum of above scores/30 (if uplands, divide by 20)		
current or w/o pres: 0.800	with: 0	

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = 4.016

Delta = [with-current]
-0.800

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Sinclair Road	TBD	625

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
625 Hydric Pine Flatwoods	N/A	Impact (Direct)	0.43 ac

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Reedy Creek (3170)	Class I	N/A

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Hydric pine flatwood consists of a forested wetland bordering Bella Citta Blvd and adjacent to the BellaTrea apartments.

Assessment area description

The assessment area is a hydric pine flatwood in the western portion of the preferred alignment. The wetland continues offsite and connects to additional forested wetlands.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Reunion Resort & Golf Club, ChampionsGate Golf Club	Not Unique

Functions	Mitigation for previous permit/other historic use
Foraging and nesting habitat for wading birds food chain support.	N/A

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Amphibians, reptiles, small mammals and wading birds	Wood stork - T; State listed wading birds

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

None

Additional relevant factors:

None

Assessment conducted by:	Assessment date(s):
Christine Prince	Feb-22

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Sinclair Road	TBD	625
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact (Direct)	Christine Prince	Feb-22

Scoring Guidance
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed

Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 6 with: 0	Hydric pine south and adjacent to Bella Citta Blvd. The ChampionsGate Golf Club borders this wetland system. Generally, the system has been impacted somewhat significantly by development.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 7 with: 0	Flow and flow levels within FLUCFCS 625 appear appropriate for the systems. Seasonal high indicators appear healthy. Impact from roadway runoff, development, culverts, and agriculture appear minimal.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 7 with: 0	This system has a canopy of slash pine (*Pinus elliottii*) and red maple (*Acer rubrum*) with an understory of saw palmetto (*Serenoa repens*), sword fern (*Nephrolepis exaltata*), Peruvian primrose willow (*Ludwigia peruviana*), and broomsedge (*Andropogon* spp.). Moderate introduction of invasive exotics from nearby development.

Score = sum of above scores/30 (if uplands, divide by 20)	
current or w/o pres: 0.667	with: 0

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = 0.287

Delta = [with-current]
-0.667

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Sinclair Road	TBD	630

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
630 Wetland Forested Mixed	N/A	Impact (Direct)	1.89 ac

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Reedy Creek (3170)	Class I	N/A

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Wetland forested mixed consists of coniferous/hardwood wetlands which buffer the bottomlands from the uplands.

Assessment area description

The assessment areas are mixed forested wetlands in the central portion of the preferred alignment. The wetlands continue offsite south and north.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Reunion Resort & Golf Club, ChampionsGate Golf Club	Not Unique

Functions	Mitigation for previous permit/other historic use
Foraging and nesting habitat for wading birds food chain support.	N/A

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Amphibians, reptiles, small mammals and wading birds	Wood stork - T; State listed wading birds

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

None

Additional relevant factors:

None

Assessment conducted by:	Assessment date(s):
Christine Prince	Feb-22

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Sinclair Road	TBD	630
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact (Direct)	Christine Prince	Feb-22

Scoring Guidance
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed

Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 7	with: 0
Mixed forested wetland connected to the Davenport Creek swamp and ultimately outflowing into Reedy Creek. These systems are bisected by a utility easement. The Reunion development is adjacent and east of the evaluated property. Generally, the systems have marginally been impacted by development.		
.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 7	with: 0
Flow and flow levels within FLUCFCS 630 appear appropriate for the systems. Seasonal high indicators appear healthy. Impact from roadway runoff, development, culverts, and agriculture appear minimal. Connected downstream to Davenport Creek Swamp.		
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	w/o pres or current: 7	with: 0
These systems have a mix of slash pine, red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), sweetbay magnolia (*Magnolia virginiana*), water oak (*Quercus nigra*), cinnamon fern (*Osmundastrum cinnamomeum*), pop ash (*Fraxinus caroliniana*). Obvious signs of recruitment, good mixture of adult and subadult trees.		

Score = sum of above scores/30 (if uplands, divide by 20)		
current or w/o pres: 0.700	with: 0	

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = 1.323

Delta = [with-current]
-0.700

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Sinclair Road	TBD	641

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
641 Freshwater Marshes	N/A	Impact (Direct)	0.09 ac

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Reedy Creek (3170)	Class I	N/A

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Isolated freshwater marsh which has been modified via the adjacent golf course.

Assessment area description

The assessment area is freshwater marsh in the eastern portion of the preferred alignment. The wetland is isolated and adjacent to golf course.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
Reunion Resort & Golf Club, ChampionsGate Golf Club	Not Unique

Functions	Mitigation for previous permit/other historic use
Foraging and nesting habitat for wading birds food chain support.	N/A

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Amphibians, reptiles, small mammals and wading birds	Wood stork - T; State listed wading birds

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

None

Additional relevant factors:

None

Assessment conducted by:	Assessment date(s):
Christine Prince	Feb-22

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Sinclair Road	TBD	641
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact (Direct)	Christine Prince	Feb-22

Scoring Guidance
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed

Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 5	with: 0	This freshwater marsh is surrounded to the north east and south by golf course. A dirt road is adjacent to the west. This system has been heavily imapcted by adjacent development.
.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 6	with: 0	Flow and flow levels within FLUCFCS 630 appear somewhat appropriate for the system. Seasonal high indicators appear healthy. The system has been historically impacted during development of the golf course.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	w/o pres or current: 6	with: 0	This system is a mix of pickerelweed, soft rush, and additional suitable species; however, there is some introduction of invasive exotics. Community zonation appears healthy.

Score = sum of above scores/30 (if uplands, divide by 20)		
current or w/o pres: 0.567	with: 0	

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = 0.051

Delta = [with-current]
-0.567

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =