

# REED CANAL ROAD SIDEWALK FEASIBILITY STUDY

Reed Canal Road, From State Road 5A (Nova Road) to  
State Road 5 (US 1)(S. Ridgewood Avenue)

FM 447019-1

City of South Daytona

FINAL Report, February 2020



Prepared For:  
River to Sea TPO



Prepared By:  
Traffic Engineering Data Solutions, Inc.

*Traffic Engineering Data Solutions, Inc.*

## TABLE OF CONTENTS

1 INTRODUCTION .....	1
2 PROJECT PURPOSE AND SCOPE .....	3
3 EXISTING CONDITIONS .....	5
4 SIDEWALK CONCEPT PLAN .....	15
5 FINANCIAL FEASIBILITY .....	20
6 CONCLUSION .....	23

## LIST OF FIGURES

FIGURE 1 PROJECT LOCATION MAP .....	2
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## LIST OF TABLES

TABLE 1 DRIVEWAY INFORMATION .....	8
TABLE 2 COST ESTIMATE .....	21

## LIST OF APPENDICES

APPENDIX A TYPICAL SECTIONS AND CONCEPT PLANS	
APPENDIX B RIGHT OF WAY DOCUMENTS AND LAND RECORDS	
APPENDIX C FEMA MAPS	
APPENDIX D SOILS MAP	
APPENDIX E ENVIRONMENTAL FEASIBILITY	
APPENDIX F CULTURAL RESOURCES FEASIBILITY STUDY	
APPENDIX G FDOT APPROVED INFLATION FACTORS	

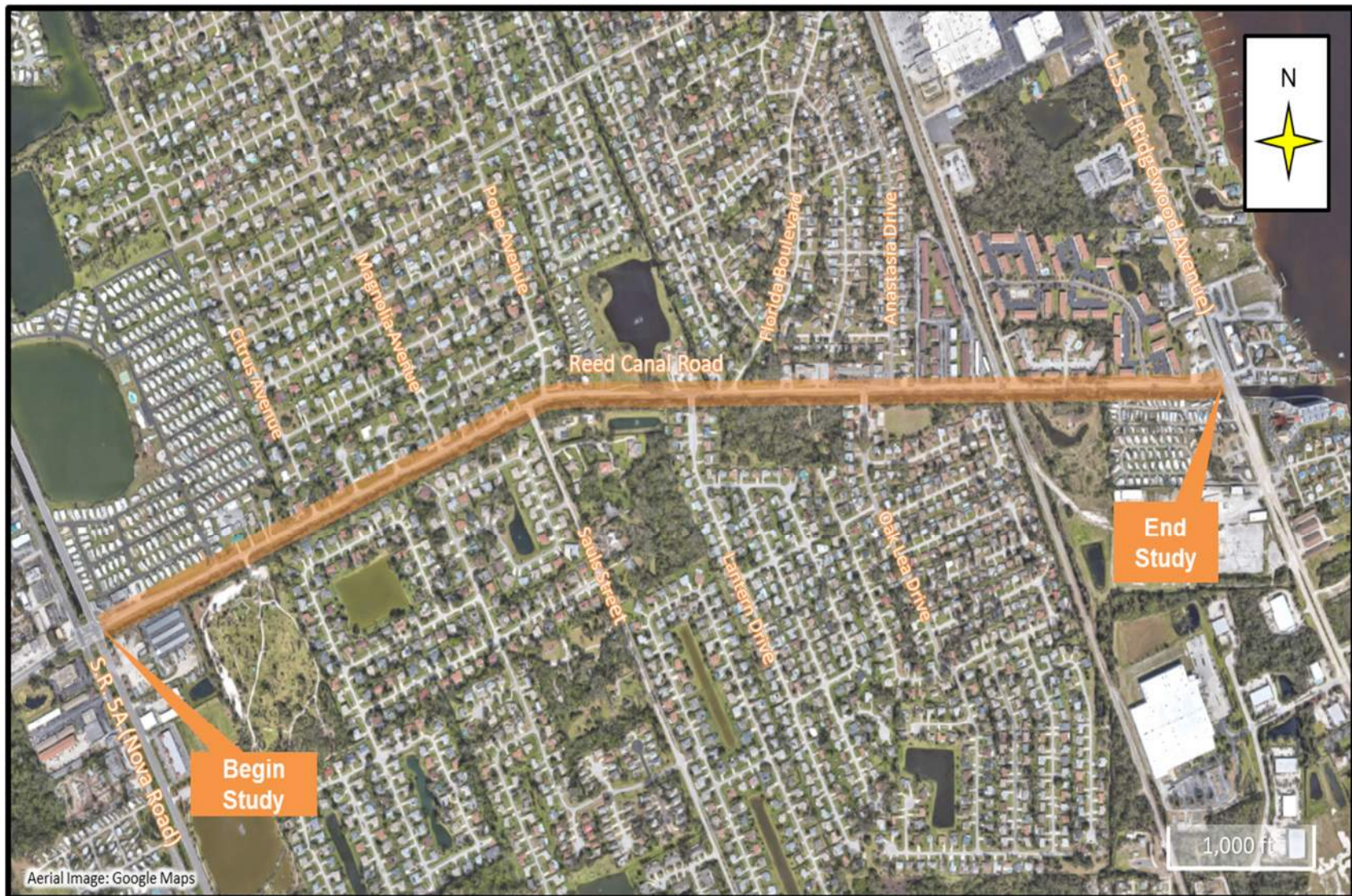
# 1

## INTRODUCTION

The City of South Daytona (the City) filed a 2019 Application for Project Prioritization with the River to Sea Transportation Planning Organization (R2CTPO) for this project. The purpose of this study is to evaluate the feasibility of replacing the existing sidewalk facilities on the north side of Reed Canal Road, from State Road 5A (Nova Road) to State Road 5 (US 1)(S. Ridgewood Avenue) to provide increased pedestrian safety. As shown in **Figure 1**, this study corridor is approximately 8,000 feet (1.5 miles) in length. Improvements requested in the City's application include removal of existing sidewalk facilities and construction a new 6-foot wide sidewalk with vertical barrier, such as curbing or safety bollards, along with enhanced pedestrian crossings at the intersections of the entrance to Reed Canal Park, Sauls Street, Lantern Drive, and Oak Lea Drive, with special emphasis crosswalk constructed of patterned pavement and command activated lighted signage.

There is existing sidewalk along the north side of Reed Canal Road that varies in width between four (4) to five (5) feet in most areas, and which is located very close to the existing 11-foot travel lane with little separation in most instances. Additionally, the existing sidewalk is in poor repair and does not meet current accessibility requirements in several locations. The south side of the roadway hosts existing guardrail that protects motorists from the steep side slopes of Reed Canal, with no sidewalk or other pedestrian facilities present. There are no paved shoulders or bicycle lanes along either side of the roadway. The enhanced sidewalk along Reed Canal Road will provide local residents with safer access to public transportation, commercial properties, and other community amenities within the area. The project purpose and scope for this study are further explained in Section 2.

**Figure 1**  
**Project Location Map**



## 2

### PROJECT PURPOSE AND SCOPE

An initial scoping meeting for this project was held on July 8, 2019 with members of the City, the Florida Department of Transportation (FDOT), and R2CTPO in attendance. As the maintenance authority for Reed Canal Road right of way, Volusia County (the County) was invited, but not able to attend the meeting.

As noted in the City's application, there are single-family residential neighborhoods, apartment complexes, condominiums and City owned parks and facilities located adjacent to the corridor, as well as several other commercial amenities in close proximity, such as a shopping mall, retail center, activity center, vocational school, post office, driver's license office, etc. In addition, there are bus stops along the corridor for patrons utilizing public transportation, and school children that traverse the corridor to access the nearby South Daytona Elementary School, as well as the Sugar Mill Elementary School in the City of Port Orange. The City's objective is to provide a safer access for pedestrians traveling along the Reed Canal Road corridor that regularly travel to these various destinations.

A base map was assembled with current aerial photography and GIS data available from the County, including private property owners, parcel limits, right of way, and LIDAR topography. Available historical records were also obtained for a desktop review of the physical features present within the project corridor, including as-built surveys, record plans, right of way maps, etc. These items were traced for incorporation of existing elements into the base map, including buildings, roadways, sidewalks, driveways, curbing, drainage facilities, signs, pavement markings, traffic control devices, lighting, and utilities. A field review was then conducted to further inventory the corridor and validate existing conditions. Physical features of the corridor were investigated to identify conditions that would have impact on the proposed sidewalk improvements for development of concept plans and a cost estimate. These include right-of-way constraints, unusual geometrics, visual obstructions, signing and pavement marking deficiencies, utility conflicts, etc. Color photographs were taken along the study corridor with emphasis on obtaining visual information which would be of value to the City, the County, R2CTPO, FDOT and/or the designer(s) that will complete plans preparation in any subsequent design phases of the project.

An ecological feasibility analysis was performed to identify potential impacts to wetlands and threatened and endangered species which would result from the proposed sidewalk improvements included in this study. A cultural resources desktop feasibility study was also conducted with a review of background maps and technical publications, as well as a search of relevant databases.

Upon compiling the base map information and conducting field reviews, an initial layout of proposed improvements was completed. Considerations were made for the requirements of the Americans with Disabilities Act (ADA) to eliminate the associated liabilities from the corridor. Considerations were also made for the design requirements related to "off-system" projects, or projects not located on the State Highway System (SHS), as specified within the 2019 FDOT Design Manual (FDM), the 2016 Manual of Uniform Minimum Standards for Design, Construction and Maintenance (Florida Greenbook), and other various publications. A

subsequent phone conference was held on November 1, 2019, with the City, the County, and R2CTPO in attendance, to discuss preliminary findings and alternative solutions. Per discussion at this meeting, Volusia County's Capital Improvement Program (CIP) contains no scheduled improvements along Reed Canal Road within the limits of the study corridor. Based on all the research completed and discussions that the project coordination meetings, Typical Sections and Concept Plans were prepared showing all existing elements and the recommended improvements, as included in **Appendix A**. Additionally, a cost estimate was prepared for the project, as included in Section 5 below.

Below is a brief summary of other on-going projects in various stages of planning and design, that may have some impact on design of the proposed sidewalk improvements, depending upon timing:

#### Sauls Street Bridge Replacement

Under FM 447018-1, a separate feasibility study is being simultaneously prepared for replacement of the existing bridge at the intersection of Sauls Street and Reed Canal Road, as also requested by the City. With overlap at this intersection, that study is being prepared to include similar enhancements to the existing crosswalk as proposed within this feasibility study, including patterned pavement crosswalk, signage, and pedestrian signalization. Timing of funding for design and construction for both projects will likely dictate in which one (1) these improvements are constructed. For further details, refer to the feasibility study prepared for this project.

#### SJR2C Loop PD&E

Under FPID 439865-1, FDOT is in the process of completing a Project Development and Environment (PD&E) study for the St. Johns River to Sea (SJR2C) Loop of the Shared-Use Nonmotorized (SUN) Trail Regional Trail System. Based on a phone conversation with the PD&E consultant, John Scarlatos, PE / Scalar Consulting Group, Inc., the City and County identified an alternative route for the future SJR2C Loop trail that runs along the south bank of Reed Canal between Sauls Street and Carmen Drive, with a new crosswalk across Reed Canal Road anticipated just east of the Florida East Coast (FEC) railroad right of way near station 75+00. The City and County entered into an agreement for maintenance responsibilities once the future bike path is constructed, a copy of which has been included in **Appendix B**. Timing of funding for design and construction of both projects has not yet been determined, but design of the proposed sidewalk improvements at Carmen Drive may need to be coordinated accordingly.

# 3

## EXISTING CONDITIONS

The following section provides a general description of the characteristics observed within the project study limits in regards to the physical conditions, environmental conditions, drainage, and utilities. Also included is an assessment of the existing right-of-way.

### General Description

The study corridor is approximately 8,000 feet (1.5 miles) in length, extending from State Road 5A (Nova Road) to State Road 5 (US 1)(S. Ridgewood Avenue) within the City of South Daytona. There are two (2) parks located along the south side of the corridor. With its entrance near station 20+50 (RT), Reed Canal Park is located just east of Nova Road. This park maintains a natural setting containing a lake, trails, restrooms, picnic facilities, playground area, and a multipurpose field. Situated on approximately 35 acres, this park is a regional attraction used by several residents that live in the surrounding areas. Ned Wagner Park is a smaller park accessed from Oak Lea Drive near station 65+00 (RT). This park hosts an outdoor basketball court, playground, and multipurpose field. In addition to these parks, the City maintains their Stormwater Control Facility site on the north side of Reed Canal Road adjacent to Stevens Canal, which contains a large stormwater pond with fountain that is surrounded by large grassed lawn areas. A few benches are provided near station 50+00 (LT) that offer patrons a resting place that overlooks the pond and fountain.

Reed Canal Road is an east-west, two-lane undivided, urban minor collector roadway maintained by Volusia County. Within the study corridor, the posted speed limit is 30 miles per hour and travel lanes are 11-foot wide. There is existing sidewalk along the north side of Reed Canal Road that varies in width between 4 to 5 feet in most areas, which is located very close to the existing 11-foot travel lane with little separation. Additionally, several portions of the existing sidewalk are in poor repair and do not meet current accessibility requirements. There is an exception where just west of Lantern Drive the existing sidewalk was recently reconstructed at 6 feet wide on City-owned property (station 47+80 to 52+40). The sidewalk in this area maintains substantial separation from the edge of pavement and is in good condition. The south side of the roadway hosts existing guardrail that protects motorists from the steep side slopes of Reed Canal. No sidewalk or other pedestrian facilities are present on the south side, and there are no paved shoulders or bicycle lanes along either side of the roadway, leaving bicyclists forced to share the road. There is an existing school crossing located at the Oak Lea Drive intersection, which is manned by a crossing guard during school arrival and departure times. The associated flashing beacons are hard wired into the existing overhead electric lines.

Near the middle of the study corridor, there is a curve from PC station 42+04.84 to PT station 44+70.67 that is superelevated ( $e = RC$ ), with advisory speed flashing beacon signs that are solar powered. In all other areas, the existing roadway is crowned. The travel lanes appear to have slightly less than 2.0% cross-slope in most areas. The south side of the roadway is urban, hosting an asphaltic curb & gutter with Type "F" profile that sits below the existing guardrail. The north side of the roadway is predominantly rural with no curb & gutter present,

though there is an exception near the curve where a non-typical curb & gutter has been installed on the high side of the curve from approximately station 41+62 to station 46+85. The existing sidewalk is not flush with the top of the curb in this area with the back of curb revealed.

The western portion of the study corridor is characterized by single-family residential subdivisions, though there are also individual homes directly adjacent to Reed Canal Road. The eastern portion of the corridor is characterized by commercial uses and apartments / condominiums. The residential and commercial developments along the study corridor are as follows:

- Lakeview Plaza
- A Place For Your Stuff Storage Warehouses
- Lakeview Estates Mobile Home Park
- Reed Canal Park
- Hammock Lake Estates subdivision
- City of South Daytona Stormwater Control Facility
- Lantern Park subdivision
- Kid City USA Child Care & Preschool
- Horizon Church
- Oaktree Healthcare
- Coventry Forest subdivision
- Circle S Short Stop Convenience Store
- The Whole Scoop Ice Cream Shoppe
- Marcell Gardens Apartments
- Marcell Mini Warehouses
- Riverwood Village Condominiums
- Bristol Bay Condominiums

On the western end, the single-family residential subdivisions access Reed Canal Road from a public sidestreet in typical convention, while the individual homes have driveways that directly access Reed Canal Road. On the eastern end, several of the commercial uses and apartments/condominiums have rather long, expansive driveways with very little channelization islands or striping, leaving pedestrians exposed to vehicular traffic. In many cases, these establishments also have patron parking spaces directly accessed from Reed Canal Road creating several points of conflict and hazards for pedestrians.



As noted above, there is a FEC railroad crossing located near station 74+55, just west of the Carmen Drive intersection. This crossing maintains a trestle bridge over Reed Canal with a single track. There are existing vehicular gates on the northeast and southeast corners that control eastbound and westbound vehicular traffic on Reed Canal Road, and there is a pedestrian gate on the northwest corner that controls westbound pedestrian traffic on the sidewalk along Reed Canal Road, which extends entirely across the existing sidewalk. No improvements within the railroad right-of-way are anticipated in this project.

Along the study corridor, there are three (3) existing traffic signals. The existing signal at the intersection of State Road 5A (Nova Road) is owned and maintained by Volusia County. The existing signals at the intersections of Carmen Drive and State Road 5 (US 1)(S. Ridgewood Avenue) are both owned by the City of South Daytona, though Volusia County provides maintenance for the City. Only the existing traffic signal at Carmen Drive is within the limits of proposed improvements, and the signals at both state roads will remain unchanged. At the Carmen Drive intersection, there is a pedestrian signal and detector attached to the traffic signal pole in the northwest corner, and the northeast corner contains a pedestrian signal on concrete pole that will need to be upgraded. Crosswalk striping across Carmen Drive is outdated and worn.

On the eastern end of the project, FDOT recently completed construction of improvements at the intersection of Reed Canal Road and State Road 5 (US 1)(S. Ridgewood Avenue) under FPID 240992-7-52-01. On the west leg of this intersection, this project added a westbound right-turn lane at Banana Cay Drive to serve the Bristol Bay Condominiums, with new 6-foot concrete sidewalk adjacent to the turn lane. This project also implemented a raised median island in Reed Canal Road.

### Right-of-Way

Within the limits of the study corridor, Reed Canal Road is maintained by Volusia County. As a result of early collaboration for this project with the County's Deputy Director of Road & Bridge (Ben Bartlett) and County Engineer (Tadd Kasbeer), the County's Survey Department prepared a DRAFT Maintenance map to determine existing right of way that could potentially be claimed by maintenance through a portion of corridor, extending approximately 300 feet east of Pope Avenue, near station 46+00. A CAD file of this mapping was provided for use in this study. Within the maintenance mapping exercise, the County also surveyed existing right of way limits in areas that were established by a few underlying plats. The DRAFT maintenance maps will need to be finalized, approved and recorded to formally establish existing right of way limits.

East of station 46+00, existing right of way was derived from County GIS information, which is denoted by "Apparent R/W" in the Concept Plans. Other documents of record were also researched for information related to existing right of way. The Riverwood Village Condominium documents (ORB 5766, page 2174) suggest there was a 20-foot wide City Services Easement dedicated along the north side of Reed Canal Road for the existing sidewalk, though the easement itself has not been located and will need to be confirmed during design. Copies of the County's DRAFT Maintenance Map, underlying plats, and other record documents of relevance have been included **Appendix B**.

### Driveways

There are thirty-one (31) driveways along the study corridor, two (2) of which are unpaved and therefore not in compliance with ADA requirements. **Table 1** below summarizes existing driveways within study corridor and the parcels they serve.

**Table 1**  
**Driveway Information**  
**Reed Canal Road from Nova Road to US 1**

Existing Driveway Material	Station	Parcel ID	Proposed Driveway Material	Property Location	ADA Compliant
Asphalt	12+90 (LT)	534416001180	Asphalt	Driveway to existing commercial site	NO
Asphalt Private Road	18+50 (LT)	534416001180	Asphalt	Private Road to existing Mobile Home Park	NO
Concrete	20+48 (LT)	534416001184	Concrete	Driveway to existing residence	NO
Concrete	21+45 (LT)	534416001184	Concrete	Driveway to existing commercial site	NO
Concrete	22+43 (LT)	534416001182	Concrete	Driveway to existing residence	NO
Concrete	22+80 (LT)	534416001181	Concrete	Driveway to existing residence	NO
Dirt	27+20 (LT)	534215000060	Concrete	Driveway to existing residence	NO
Concrete	37+18 (LT)	534214020500	Concrete	Driveway to existing residence	NO
Concrete	38+12 (LT)	534214020510	Concrete	Driveway to existing residence	NO
Circular Concrete	39+00 (LT) 39+60 (LT)	534214020520	Concrete	Driveway to existing residence	NO
Circular Concrete	40+15 (LT) 40+45 (LT)	534214020530	Concrete	Driveway to existing residence	NO
Circular Concrete	41+05 (LT) 41+40 (LT)	534214020540	Concrete	Driveway to existing residence	NO
Circular Dirt and Concrete	44+90 (LT) 45+17 (LT)	534416000781	Concrete	Driveway to existing residence	NO

Asphalt	46+20 (LT)	534416000785	Asphalt	Driveway to existing residence	NO
Asphalt	47+05 (LT)	534416000783	Asphalt	Driveway to existing Reed Canal Mobile Home Park	NO
Concrete	52+22 (LT)	533300000090	Concrete	Driveway to existing City Maintenance Facility	YES
Asphalt	55+10 (LT)	533309020010	Asphalt	Driveway to existing Apartment Building	NO
Asphalt	58+65 (LT)	532804050160	Asphalt	Driveway to existing residence	NO
Circular Asphalt	59+42 (LT) 60+10 (LT)	532804050140	Asphalt	Driveway to existing Kid City Child Care	NO
Asphalt	61+90 (LT)	532804050090	Asphalt	Driveway to existing Horizon Church	NO
Circular Asphalt	63+15 (LT) 65+60 (LT)	532804050030	Asphalt	Driveway to existing Oaktree Health Care	NO
Asphalt	65+60 through 66+58 (LT)	532804050010	Asphalt	Driveway to existing convenience store	YES
Concrete	67+60 through 68+05 (LT)	532804010510	Concrete	Driveway to existing commercial site	NO
Asphalt	68+75 (LT)	533310000017	Asphalt	Driveway to existing Marcel Gardens Apts.	NO
Asphalt	70+35 (LT)	533310000016	Asphalt	Driveway to existing Marcel Gardens Apts.	NO
Asphalt	70+70 (LT)	533310000011	Asphalt	Driveway to existing Marcel Gardens Apts.	NO
Asphalt	72+55 (LT)	533310000019	Asphalt	Driveway to existing Marcel Gardens Apts.	NO
Asphalt	73+20 (LT)	533310000018	Asphalt	Driveway to existing Marcel Mini Warehouses	NO
Asphalt	78+90 (LT)	533329000001	Asphalt	Driveway to existing Riverwood Village	YES
Asphalt	84+40 (LT)	533310000080	Asphalt	Driveway to existing Bristol Bay Condominiums	NO

### Utilities

The City provided Utility As-Built Maps depicting underground potable water, reclaimed water, sanitary sewer, and stormwater utilities within the study corridor. These maps were traced for inclusion in the base mapping, and an assessment of existing utilities was made during the field visit. Based on field review, there is evidence that gas mains are also present on the north side of the roadway. However, no information on the location of existing gas mains was available at time of preparation of this study.

Overhead power lines are located throughout the corridor, which were traced from aerial photographs. From Nova Road to Carmen Road, overhead utilities are predominantly located on the south side of the road behind the existing guard rail, though there are a few service drops or feeder lines crossing the roadway with poles on the north side to serve existing developments. East of Carmen Drive, existing overhead lines are located predominantly on the north side of the roadway. Throughout the study corridor, there are a few areas where existing guy wires span over top of the existing sidewalk. Additionally, there are several street lights attached to existing overhead utility poles, but there are no dedicated street light poles. In the western portion of the corridor, the street lights are predominantly located along the south side of Reed Canal Road, while in the eastern portions of the corridor, they are located predominantly on the north side.

During the field visit, there was evidence that FPL was implementing a hardening project in the eastern portion of the corridor, between Lantern Drive and Carmen Drive, with several existing wooden poles replaced with new concrete poles. FPL's efforts appeared to be largely completed.



Guy wire over existing sidewalk.  
Facing East



New FPL poles recently installed near Lantern Dr.  
Facing East

In the western portions of the corridor, there was also evidence that new underground electric facilities were being installed via directional bores, and the locations of underground vaults were noted.



Refer to the Concept Plans in **Appendix A** for a depiction of relevant existing utilities.

#### [Floodway / Floodplain](#)

According to FEMA FIRM Panel 12127C0369J and 12127C0367J, as last revised September 29, 2017, no portions of the study corridor lie within Special Flood Hazard Areas (SFHAs), though portions of the existing right of way from approximately Lantern Drive to Oak Lea Drive are noted to be within the 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile. Copies of the referenced FEMA maps are provided in **Appendix C**.

#### [Drainage and Permitting](#)

The eastbound travel lane of Reed Canal Road drains south to the existing curb & gutter underneath the guardrail, which is collected in a series of open flumes that convey the runoff directly to Reed Canal.



On the north side of the road, runoff from the westbound travel lane is presently directed to the adjacent private properties, with collection system components either in the public right of way or just into private property that capture the runoff, and direct it back southerly to Reed Canal via pipe systems. Below is a brief summary of existing collection system components that convey runoff from the north side to Reed Canal.

- Station 16+67 (LT) – A stormwater control structure with 36" RCP outfall pipe
- Station 24+20 (LT) – A stormwater pump station with an 8" force main
- Station 30+74 (LT) – A catch basin with a 24" RCP outfall pipe
- Station 35+56 (LT) – A catch basin with a 24" RCP outfall pipe
- Station 43+34 (LT) – A catch basin with a 36" RCP outfall pipe
- Station 45+67 (LT) – A storm vault with a 54" RCP outfall pipe
- Station 54+40 (LT) – A box culvert at Stevens Canal (exact size unknown)
- Station 56+40 (LT) – A manhole with 24" RCP outfall pipe
- Station 66+75 (LT) – A catch basin with 24" RCP outfall pipe
- Station 68+56 (LT) – A catch basin with 15" CMP outfall pipe
- Station 70+45 (LT) – A catch basin with 15" CMP outfall pipe
- Station 75+40 (LT) – A catch basin with 24" CMP outfall pipe
- Station 83+65 (LT) – A catch basin with 24" CMP outfall pipe



Existing profile grade on Reed Canal Road was analyzed utilizing LIDAR topography, which revealed that 0.3% longitudinal slope is not maintained over several portions of the roadway, and in some cases the roadway profile is nearly flat. However, on the November 1, 2019 phone conference, both the City and the County reiterated that no drainage issues or concerns have been reported or brought to their attention in the past. Several of the existing sidestreets on the north side of the roadway utilize drop curb to receive runoff from the westbound travel lane on Reed Canal Road, including Citrus Avenue, Bishop Court, Pike Court, Magnolia Avenue, and Pope Avenue. However, in all cases, the existing drop curbs are not compliant with ADA requirements and therefore need to be reconstructed.

Under provision in FAC 62-330.051, minor roadway safety projects included sidewalks less than 6' in width typically qualify for exemption from Environmental Resource Permit (ERP). Nonetheless, below is a summary of ERP records on file with the St. Johns River Water

Management District (SJRWMD) in the vicinity of the project, which were reviewed to see how they may relate to the proposed project.

- ERP No. 86167-1 - Issued January 2003 for the construction of the Reed Canal Stormwater Treatment System, located on the south side of Reed Canal Road just east of the railroad tracks across from Carmen Drive.
- ERP No. 86167-2 – Issued November 2003 to add another treatment area for the first pond which is located just south of the existing pond located in the same place. A non-compliance letter was issued for this permit in September 2009, but was certified with as-builts in October of that year.
- ERP No. 86167-3 – Issued October 2004 for expansion of the sediment collection basin with a flow through treatment system.
- ERP No. 86167-4 - Issued January 2019 to add an acre of shallow/planted area to enhance current treatment of nutrients within the pond area.
- ERP No. 23120-1 – Issued January 2018 for the South Daytona Drainage Improvement Phase 1, which proposed a one-acre shallow/planted area for the pond located across from Carmen Drive. This appears to be very similar to ERP No. 86167-4, but was filed and issued a year earlier.
- ERP No. 23120-2 – Issued September 1996 for the South Daytona Drainage Improvements Phase II. This permit implemented baffle boxes to assist with stage in the Nova Canal, as well as a pond and pumping system located on Aspen Drive.
- ERP No. 92356-1 – Issued April of 2004 for the Sauls Road Drainage Improvements, authorizing construction of a sidewalk over  $\pm 1,120$  feet of roadside ditch, with a piping system that flows to the Reed Canal.
- ERP No. 119952-1 – Issued November 2009 for the Reed and Stevens Canal Basin Improvements. This permit authorized the construction of the City stormwater management facility and pumping station located on the north side of Reed Canal Road near Lantern Drive. This project was a water-quality retrofit initiated by the City of South Daytona.
- ERP No. 146403-1 – Issued June 2006 for the Lantern Park Drainage Improvements. This permit authorized construction of another wet stormwater maintenance facility and pumping station on the south side of Reed Canal Road near station 50+00 which is used to divert stormwater coming from the adjacent existing residential subdivision to the pond for treatment and attenuation.

Nothing reviewed within the previously issued ERP's are expected to impacts the project's ability to obtain an exemption from ERP.

### Soils

A soils map was prepared through the Web Soil Survey (WSS) operated by USDA Natural Resources Conservation Services (NRCS), which is included in **Appendix D**. Proceeding from west to east, soils within the corridor traverse through classifications of Tuscawill-Urban Land Complex, Immokalee Sand, and Daytona Sand.

### Environmental

An ecological feasibility study for the project was completed by Environmental Services, Inc. (ESI). The purpose of the investigation was to preliminarily assess the work corridor for the presence of jurisdictional wetlands in accordance with the current methodologies of the U.S. Army Corps of Engineers (ACOE) and the SJRWMD. In addition, the study corridor was investigated for the potential presence and/or use of the area by any species protected by the Florida Fish and Wildlife Conservation Commission (FWC) and/or the U.S. Fish and Wildlife Service (FWS). The study was initiated with a review of topographic maps, soil survey information, and color infrared aerial photographs of the study area, along with relevant technical publications and field guides. Upon completion of the in-house review, ESI staff inspected the study area in October 2019. For further details, refer to the complete environmental feasibility study included in **Appendix E**.

### Cultural Resources

ESI also completed a cultural resource feasibility study for the proposed sidewalk project, which indicated that the eastern portion of the project corridor was previously subjected to an archaeological and historical investigation in 2017, which recorded the Reed Canal (8VO7970) as a historic group (linear), which was deemed ineligible for listing in the National Register of Historic Places (NRHP). For further details, refer to the complete cultural resources feasibility study included in **Appendix F**.

# 4

## SIDEWALK CONCEPT PLAN

As previously mentioned, the purpose of this study was to evaluate the feasibility of removing existing sidewalk facilities and replacing them with a new 6-foot wide sidewalk on the north side of Reed Canal Road with curb & gutter or other vertical barrier, in order to provide a safer access for pedestrians. In addition, the City desires enhanced pedestrian crossings at the intersections of the entrance to Reed Canal Park, Sauls Street, Lantern Drive, and Oak Lea Drive, with special emphasis pedestrian constructed of patterned pavement and command activated lighted signage. This section discusses the sidewalk concept plan and the supporting drainage and utilities improvements required to implement the proposed sidewalk in accordance with the 2019 FDM, the 2016 Florida Greenbook, and other various design requirements related to “off-system” projects.

### *Sidewalk, Driveways, and Signing, Pedestrian Signalization and Lighting*

The requirements for sidewalks include path width, cross slopes, longitudinal grades, clearance, and separation from roadway. In accordance with the City’s goals, 6-foot wide sidewalks have been considered at the back of proposed Type “F” curb & gutter, which is in accordance with FDM 222.2.1.1 and Florida Greenbook Ch. 8.B.1. To meet ADA requirements, the maximum cross slope on sidewalk is 2% and the maximum longitudinal grade is 5%. The standard vertical clearance is 7 feet minimum (FDM 222.2.1.2). Florida Greenbook Ch. 8.C.2.a.4 indicates sidewalks should have a 5-foot separation from the edge of paved shoulder on flush shoulder roadways. Additionally, Florida Greenbook Ch. 3.C.5.b recommends minimum gutter grades of 0.3% for flat terrain.

Throughout most portions of the project on the western end, where maintenance mapping was completed, the available right-of-way on the north side is constrained. Type “F” curb & gutter is proposed in these areas, but as requested by the County, adjacent sidewalk abutting the back of curb is proposed with a 6-inch reveal, to minimize grading impacts. As discussed during the November 1, 2019 phone conference, the existing roadway profile does not appear to maintain the minimum gutter grades of 0.3% in most areas, as recommended in Chapter 3.C.5 of the Florida Greenbook. Therefore, milling and resurfacing with overbuild is proposed to correct the profile and achieve 0.3% minimum profile grade. During final design, it may be determined that full reconstruction is more cost-effective in certain portions of the roadway, and it will be required where warranted by the installation of drainage improvements. Sufficient pavement cores should be obtained in areas of roadway resurfacing and/or reconstruction. In areas where profile grade will be corrected, it will also likely be necessary to remove and reconstruct existing Type F curb & gutter and guardrail on the south side of the road. As the maintenance authority for Reed Canal Road, the County indicated that given the constraints, they may accept gutter grades greater than or equal to 0.2%, as they have done on similar projects in the past. There are a few areas near existing drainage structures where significant drop offs will occur behind the proposed sidewalk in proposed conditions. In these areas, gravity wall with aluminum pipe guiderail is proposed to protect the pedestrians and avoid impact to the existing structures.

On the eastern end of the project, existing sidewalk will be removed and new 6-foot wide sidewalk will be constructed as close to the existing right of way as practical, without causing major impact to prominent physical features or existing utility systems. In these areas, shallow swales will be constructed between the proposed sidewalk and the existing roadway to capture runoff and ensure that runoff directed to the private properties is less in post-development conditions than it is in pre-development conditions.

Per the FDOT's Traffic Engineering Manual (TEM) supplemental beacons may be considered to provide additional emphasis of the marked crosswalk and the presence of pedestrians. Two (2) options that are currently available for use are standard flashing yellow warning beacons and Rectangular Rapid Flashing Beacons (RRFB). Use of RRFB's should be limited to roadways with four (4) or fewer through lanes and should be limited to locations with the most critical safety concerns, such as pedestrian and school crosswalks across uncontrolled approaches. Data has shown that drivers exhibit yielding behavior much further in advance of the crosswalk with RRFB's than with standard flashing yellow warning beacons. Additionally, RRFB's offer significant potential safety and cost benefits, because they achieve very high rates of compliance at very low relative costs in comparison to other more restrictive devices that provide comparable results. Therefore, it is recommended to install RRFB's at the four (4) proposed crosswalks (entrance to Reed Canal Park, Sauls Street, Lantern Drive, and Oak Lea Drive) where Reed Canal Road has uncontrolled approaches. In addition, four (4) luminaires should be provided at each proposed RRFB location, with two (2) luminaires per traffic flow direction; one (1) in front of the crosswalk, and one (1) immediately after the crosswalk. Due to the proximity of overhead electric lines, these luminaires should be installed by the power company on wooden poles, as there is not sufficient clearance to utilize the FDOT standard aluminum poles. Within City jurisdictional limits, Volusia County will defer to the City for placement and installation of street lighting. With regards to all new traffic control devices and street lighting installed in the project, Volusia County has indicated that they will not commit to assist in funding, and the City will be fully responsible for maintenance of all such items.

Refer to the Typical Sections and Concept plans in **Appendix A** for a depiction of the following improvements that are recommended in this project:

- Construct a 6-foot wide sidewalk along the north side of Reed Canal Road from station 14+86 (LT) to station 84+20 (LT) on the west side of Banana Cay Drive
- Sawcut & remove existing curb & gutter at the following approximate locations:
  - Station 41+62 (LT) to station 46+85 (LT)
  - Station 25+57 (RT) to station 36+80 (RT)
  - Station 40+50 (RT) to station 47+77 (RT)
- Construct new Type "F" curb & gutter at the existing edge of pavement at the following approximate locations:
  - Station 15+00 (LT) to station 47+20 (LT)
  - Station 25+57 (RT) to station 36+80 (RT)
  - Station 40+50 (RT) to station 47+77 (RT)
- Remove existing guardrail and reconstruct new guardrail at the following approximate locations:
  - Station 25+57 (RT) to station 36+80 (RT)
  - Station 40+50 (RT) to station 47+77 (RT)

- Mill & resurface Reed Canal Road travel lanes with overbuild (or reconstruct with full depth pavement) from station 14+86 to 47+77 (areas where Type “F” curb & gutter is being added on north side) to achieve a minimum of 0.3% longitudinal slope and a minimum of 2.0% cross-slope
- Construct gravity wall with aluminum pipe rail to maintain grade separation from existing drainage structures near station 24+20 (LT), station 30+80 (LT), and station 38+70 (LT)
- Construct ADA compliant pedestrian ramps with detectable warnings at all existing driveways and sidestreet crossings
- Remove and replace crosswalks, stop bars, stop signs and street signs at all connecting sidestreets to the north
- Remove and replace stop signs and stop bars at all commercial or apartment/condominium driveways on the north
- Install a traffic separator for parking lot channelization at station 68+82 (LT)
- Install landscape islands for parking lot channelization and pedestrian refuge at stations 66+10 (LT), 69+40 (LT), 70+22 (LT), and 70+90 (LT) by sawcutting the existing asphalt parking lots
- Mill & resurface sidestreets and private drives at the following locations to achieve walkway cross-slope in accordance with ADA requirements:
  - Station 18+50 - Lakeview Drive
  - Station 26+00 - Citrus Avenue
  - Station 29+20 - Bishop Court
  - Station 32+30 - Pike Court
  - Station 35+40 - Magnolia Avenue
  - Station 43+20 - Pope Avenue
  - Station 56+00 - Florida Boulevard
  - Station 67+00 - Anastasia Drive
  - Station 68+50 to 71+60 - Marcell Garden Apartments
- Adjust all meter and valve boxes to finished grade
- Remove and replace 11 mailboxes from station 20+00 to 47+50
- Provide new patterned pavement crosswalks at the following locations:
  - Station 20+85 - entrance to Reed Canal Park
  - Station 42+20 - Sauls Street
- Provide new RRFB pedestrian crossing signals with pedestrian detectors and signing and pavement markings (Scheme 2) at the uncontrolled approaches to the following intersections:
  - Station 20+85 - entrance to Reed Canal Park
  - Station 42+20 - Sauls Street
  - Station 53+42 - Lantern Drive
  - Station 65+25 - Oak Lea Drive
- Remove existing pedestrian signal from traffic signal pole on northwest corner of Carmen Drive (station 75+00) and install new pedestrian signal
- Remove existing pedestrian signal (on concrete pole) at the northeast corner of Carmen Drive (station 75+50) and provide new pedestrian signal (with breakaway style pole) to meet current requirements
- Coordinate with the power company to provide pedestrian crosswalk lighting at the five (5) following intersections:

- Station 20+85 - entrance to Reed Canal Park
- Station 42+20 - Sauls Street
- Station 53+42 - Lantern Drive
- Station 65+25 - Oak Lea Drive
- Station 75+50 - Carmen Drive

### Drainage and Permitting

In western portions of the project, the addition of curb and gutter on the north side warrants the addition of new curb inlets and pipes which connect them to the existing collection system components. Type 9 inlets have been depicted in the concept plans such that the structures can be set within the roadway areas to avoid impacts to existing utilities. Accordingly, runoff that is presently discharged directly to the private properties will be reduced, though it will ultimately still be discharged under Reed Canal Road and into the canal. On the south side of the roadway, runoff will continue to be directed to the existing open flumes that also convey runoff to the canal. In eastern portions of the project, reconstructing the existing sidewalk to drain toward shallow roadside swales will ensure that drainage conditions are not exacerbated.

The following drainage collection system improvements are recommended in this project:

- Construct new curb inlets (Type 9) at the following approximate locations:
  - Station 24+20 (LT) – connect to existing outfall pipe as shown
  - Station 25+50 (LT) – with additional pipe to make connection as shown
  - Station 29+60 (LT) – with additional pipe to make connection as shown
  - Station 30+75 (LT) – connect to existing outfall pipe as shown
  - Station 32+75 (LT) – with additional pipe to make connection as shown
  - Station 36+80 (LT) – with additional pipe to make connection as shown
- Construct a new manhole at station 35+60 (LT) with connection to existing outfall pipe as shown
- Adjust the existing catch basins to finish grade at the following approximate locations:
  - Station 62+20 (LT)
  - Station 68+60 (LT)
  - Station 70+55 (LT)
- Remove existing steel pipe bollard and rebar railing from near the Stevens canal box culvert (near station 54+50), modify the existing headwall to extend vertically, and construct new bike ped railing on top of the modified headwall

Under provision in FAC 62-330.051, minor roadway safety projects included sidewalks less than 6' in width typically qualify for exemption from ERP. An Application for Verification of Exemption should be submitted to SJRWMD during the design phase to confirm. Additionally, the work will require a Right of Way Use Permit from Volusia County.

### Right-of-Way

As noted above, the DRAFT maintenance maps previously prepared by the County for the western portions of the project will need to be finalized, approved and recorded to formally establish existing right of way limits. Within these same areas, right of entry agreements or permanent harmonizing easements will also likely be required to construct tie-in grading and

other harmonizing improvements on several of the adjacent properties. As the project sponsor, the City has indicated that they are committed to coordinating with the residents to secure right of entry in accordance with federal funding requirements. However, there will be additional costs associated with coordinating these agreements or easements, such as survey(s), appraisal(s), legal fee(s), etc. These costs are difficult to project until such time design has been completed and negotiations have occurred, but they have been preliminarily estimated at \$200,000, as reported within the cost estimate.

### Utilities

While there are numerous potable water mains, force mains, and other utilities located on the north side of Reed Canal Road within the limits of proposed work, significant impact to these systems is not anticipated since much of the improvements will either be constructed entirely in fill, or with only minimal depths of proposed excavation, as anticipated to be necessary for construction the proposed sidewalk and shallow swales. Based on limited field observations, several utility appurtenances will need to be adjusted to finished grade as a result of the proposed improvements, including meters and valve boxes, as they are located within, or in close proximity to, the proposed sidewalk alignment. Minor adjustments of utilities, such as riser relocations, may also be necessary. Reduced horizontal clearance may be required in few areas to eliminate the need for relocation of existing overhead utility poles.

### Environmental

Based on the environmental feasibility study performed by ESI, no direct evidence of any wetlands or surface waters was noted on the north side of the road within the right-of-way, and any work that should occur within the maintained right-of-way or just outside of the existing maintained right-of-way is not expected to impact any wetlands or surface waters. Additionally, the study noted that no detrimental impacts to any state or federally listed species are anticipated, though if required, impacts to mangroves within Reed Canal would require consultation and permitting with FDEP. For further details, refer to the complete environmental feasibility study included in **Appendix E**.

### Cultural Resources

The cultural resource feasibility study performed by ESI indicates that it is likely that above ground historic resources that have yet to be recorded are within the area of potential effect of the current project, and that it is likely that some level cultural resource assessment will be required during the permitting process. For further details, refer to the complete cultural resources feasibility study included in **Appendix F**.

# 5

## FINANCIAL FEASIBILITY

This section summarizes the preliminary cost estimate prepared for the design and construction of the proposed sidewalk improvements along Reed Canal Road from State Road 5A (Nova Road) to State Road 5 (US 1)(S. Ridgewood Avenue). As completed in the feasibility study, this estimate is intended facilitate the R2CTPO and the City of South Daytona with prioritizing the proposed sidewalk improvements. The overall improvement costs were estimated based on FDOT historical unit prices from the FDOT Basis of Estimates. To adjust for potential future increases in the project's cost estimates, an annual inflation factor was applied based on FDOT guidelines. FDOT provides annual inflation factors for roadway construction costs. A listing of the FDOT approved inflation factors through 2028 is available in **Appendix G**.

The total cost of the improvements, including engineering and CEI, is estimated at approximately \$2,502,930.23, as presented in **Table 2** on the following pages. Using FDOT inflation factors, the three-year breakdown for cost estimates is provided below:

- Year 1 (2021) cost estimate adjusted for inflation – \$2,568,006.47
- Year 2 (2022) cost estimate adjusted for inflation – \$2,637,342.64
- Year 3 (2023) cost estimate adjusted for inflation – \$2,711,188.23

**Table 2**  
**Cost Estimate**  
**Reed Canal Road from State Road 5 (Nova Road) to**  
**State Road 5A (US 1)(S. Ridgewood Avenue)**

ENGINEER'S OPINION OF PROBABLE COSTS REED CANAL SIDEWALK, FEASIBILITY STUDY CITY OF SOUTH DAYTONA					
PAY ITEM NO.	PAY ITEM DESCRIPTION	UNIT	QUANTITY	2019 UNIT PRICE	AMOUNT
101-1	MOBILIZATION	LS	1	\$141,995.00	\$141,995.00
102-1	MAINTENANCE OF TRAFFIC	LS	1	\$212,992.00	\$212,992.00
104-10-3	SEDIMENT BARRIER	LF	3686	\$1.89	\$6,965.60
104-18	INLET PROTECTION SYSTEM	EA	17	\$102.00	\$1,734.00
110-1-1	CLEARING AND GRUBBING	AC	2,229	\$17,217.00	\$38,376.69
110-4-10	REMOVAL OF EXISTING CONCRETE	SY	4357	\$21.00	\$91,497.00
110-7-1	MAILBOX, F&I SINGLE	EA	14	\$191.67	\$2,683.38
120-1	REGULAR EXCAVATION	CY	856	\$6.00	\$5,136.00
120-6	EMBANKMENT	CY	1089	\$12.00	\$13,068.00
160-4	TYPE B STABILIZATION	SY	2167	\$3.50	\$7,584.50
327-70-12	MILLING EXIST ASPHALT PAVT, 1 1/4" AVG DEPTH	SY	8737	\$3.00	\$26,211.00
334-1-13	SUPER PAVE ASPHALTIC CONCRETE, TRAFFIC C	TN	2393	\$130.00	\$311,090.00
337-7-82	APHALT CONCRETE FRICTION COURSE, TRAFFIC C, FC-9.5, PG 76-22	TN	528	\$150.00	\$79,200.00
339-1	MISCELLANEOUS ASPHALT PAVEMENT	TN	40	\$140.00	\$5,600.00
400-0-11	CONCRETE CLASS NS, GRAVITY WALL	CY	20	\$683.00	\$13,660.00
400-1-2	CONCRETE CLASS I, ENDWALLS	CY	20	\$1,460.12	\$29,202.40
415-1-1	REINFORCING STEEL-ROADWAY	LB	9255	\$1.03	\$9,532.65
425-4	INLETS, ADJUST	EA	1	\$2,020.00	\$2,020.00
425-5	MANHOLE, ADJUST	EA	2	\$799.00	\$1,598.00
425-6	VALVE BOXES, ADJUST	EA	11	\$420.00	\$4,620.00
425-1-203	INLETS, CURB, TYPE 9, J BOTTOM, <10'	EA	6	\$6,100.00	\$36,600.00
425-2-41	MANHOLES, P-7, <10'	EA	1	\$5,200.00	\$5,200.00
430-174-118	PIPE CULVERT, OPTIONAL MATERIAL, ROUND, 18" SD	LF	549	\$65.63	\$36,030.87
515-2-311	PED/BICYCLE RAILING, ALUM, 42" TYPE 1	LF	91	\$65.00	\$5,915.00
520-1-10	CONCRETE CURB & GUTTER, TYPE F	LF	5012	\$23.00	\$115,276.00
520-5-11	TRAF SEP CONC-TYPE I, 4' WIDE	LF	19	\$40.00	\$760.00
522-1	CONCRETE SIDEWALK, 4" THICK (WITH FIBER) (3000 PSI)	SY	4095	\$45.00	\$184,275.00
522-2	CONCRETE DRIVEWAY, 6" THICK	SY	1797	\$52.00	\$93,444.00
523-1	PATTERNED PAVEMENT, VEHICULAR AREAS	SY	72	\$100.00	\$7,200.00
527-2	DETECTABLE WARNINGS	SF	392	\$29.00	\$11,368.00
536-1-0	GUARDRAIL -ROADWAY, GENERAL/LOW SPEED TL-2	LF	1738	\$17.00	\$29,546.00

**Table 2 (cont.)  
Cost Estimate  
Reed Canal Road from State Road 5 (Nova Road) to  
State Road 5A (US 1)(S. Ridgewood Avenue)**

ENGINEER'S OPINION OF PROBABLE COSTS REED CANAL SIDEWALK, FEASIBILITY STUDY CITY OF SOUTH DAYTONA					
PAY ITEM NO.	PAY ITEM DESCRIPTION	UNIT	QUANTITY	2019 UNIT PRICE	AMOUNT
536-73	GUARDRAIL -REMOVAL	LF	1738	\$2.50	\$4,345.00
570-1-2	PERFORMANCE TURF, SOD	SY	10,788	\$2.50	\$26,970.00
635-2-11	PULL & SPLICE BOX, F&I, 13" x 24"	EA	1	\$750.00	\$750.00
630-2-11	COUNDUIT, F&I, OPEN TRENCH	LF	10	\$8.00	\$80.00
632-7-1	SIGNAL CABLE-NEW OR RECO, F&I	PI	1	\$300.00	\$300.00
646-1-12	ALUMINUM SIGNAL POLE, F&I PEDESTRIAN DETECTOR POST	EA	2	\$1,200.00	\$2,400.00
653-1-60	PEDESTRIAN SIGNAL, REMOVE PED SIGNAL- POLE/PEDESTAL TO REMAIN	AS	2	\$120.00	\$240.00
653-1-11	PEDESTRIAN SIGNAL, F&I LED COUNTDOWN, 1 WAY	AS	2	\$681.00	\$1,362.00
654-2-22	RECTANGULAR RAPID FLASHING BEACON, FURNISH & INSTALL- SOLAR POWERED, COMPLETE SIGN ASSEMBLY- BACK TO BACK	AS	8	\$7,800.00	\$62,400.00
665-1-12	PEDESTRIAN DETECTOR, F&I, ACCESSIBLE	EA	2	\$1,485.00	\$2,970.00
665-1-60	PEDESTRIAN DETECTOR, REMOVE	EA	2	\$52.00	\$104.00
700-1-11	SINGLE POST SIGN, F&I, GROUND MOUNT, UP TO 12SF	AS	43	\$356.00	\$15,308.00
700-1-60	SINGLE POST SIGN, REMOVE	AS	16	\$27.00	\$432.00
706-3	RETRO-REFLECTIVE PAVEMENT MARKERS	EA	329	\$4.00	\$1,316.40
711-14-123	THERMOPLASTIC, PREFORM, WHITE, SOLID, 12"	LF	923	\$11.00	\$10,153.00
711-14-125	THERMOPLASTIC, PREFORM, WHITE, SOLID, 24"	LF	328	\$17.50	\$5,740.00
711-16-201	THERMOPLASTIC, STD-OTH,YELLOW, SOLID, 6"	GM	1.247	\$4,153.00	\$5,178.79
-	LIGHT POLE BY POWER COMPANY	EA	19	\$5,500.00	\$104,500.00
CONSTRUCTION COSTS SUBTOTAL					\$1,774,930.28
RIGHT-OF-WAY ACQUISITION					\$200,000.00
-	SURVEYING & R/W MAPPING	LS	1	\$ 110,000.00	\$ 110,000.00
-	CULTURAL RESOURCES	LS	1	\$ 4,500.00	\$ 4,500.00
-	ENVIRONMENTAL (WETLANDS AND PROTECTED SPECIES ASSESSMENT)	LS	1	\$ 3,500.00	\$ 3,500.00
-	ENGINEERING	LS	1	\$ 190,000.00	\$ 190,000.00
-	STRUCTURAL	LS	1	\$ 15,000.00	\$ 15,000.00
-	SUE	LS	1	\$ 20,000.00	\$ 20,000.00
-	CEI	LS	1	\$ 185,000.00	\$ 185,000.00
SURVEY / DESIGN / CEI SUBTOTAL					\$528,000.00
TOTAL PROJECT COST					\$2,502,930.28
FDOT INFLATION-ADJUSTED ESTIMATE			INFLATION FACTOR	PDC MULTIPLIER	ADJUSTED COST
2021 ESTIMATED PROJECT COST			2.6%	1.026	\$2,568,006.47
2022 ESTIMATED PROJECT COST			2.7%	1.054	\$2,637,342.64
2023 ESTIMATED PROJECT COST			2.8%	1.083	\$2,711,188.23
* Costs for mitigation of impacts to wetlands or protected species are not included as they are not anticipated in this project.					
* Costs for mitigation of impacts to cultural resources are not included as none are anticipated in this project.					

# 6

## CONCLUSION

The purpose of this study was to evaluate the feasibility of replacing the existing sidewalk facilities on the north side of Reed Canal Road, from State Road 5A (Nova Road) to State Road 5 (US 1)(S. Ridgewood Avenue) in the City of South Daytona, in order to provide increased pedestrian safety. The following improvements are recommended for study corridor:

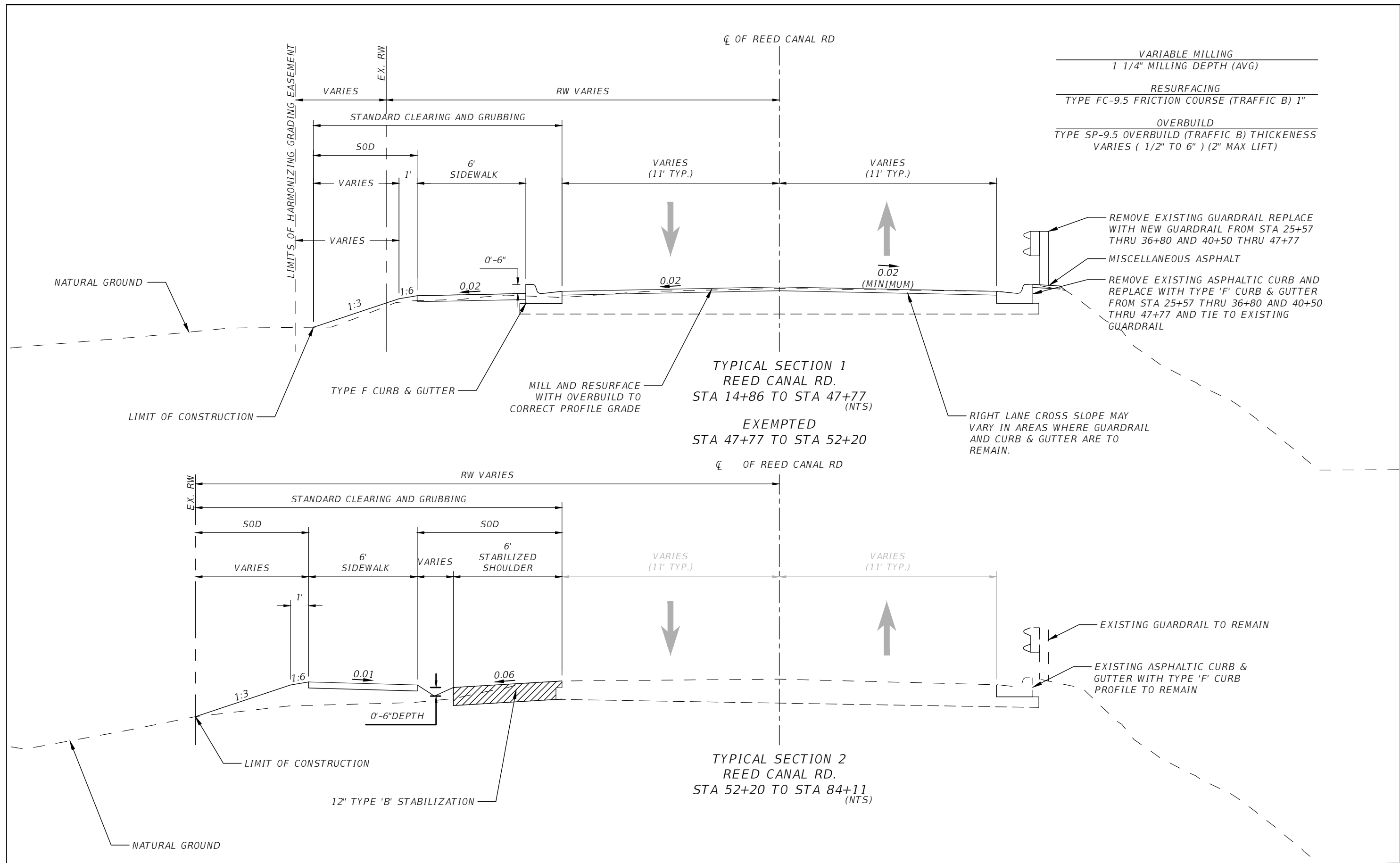
- Remove existing sidewalk and curbing, and regrade as necessary to construct a new 6-foot wide sidewalk behind new Type “F” curb & gutter along the north side of Reed Canal Road approximately from station 14+86 (LT) to station 47+80 (LT)
- Sawcut & remove existing curb & gutter at the following approximate locations:
  - Station 41+62 (LT) to station 46+85 (LT)
  - Station 25+57 (RT) to station 36+80 (RT)
  - Station 40+50 (RT) to station 47+77 (RT)
- Construct new Type “F” curb & gutter at the existing edge of pavement at the following approximate locations:
  - Station 15+00 (LT) to station 47+20 (LT)
  - Station 25+57 (RT) to station 36+80 (RT)
  - Station 40+50 (RT) to station 47+77 (RT)
- Remove existing guardrail and reconstruct new guardrail at the following approximate locations:
  - Station 25+57 (RT) to station 36+80 (RT)
  - Station 40+50 (RT) to station 47+77 (RT)
- Mill & resurface Reed Canal Road travel lanes with overbuild (or reconstruct with full depth pavement) from station 14+86 to 47+77 (areas where Type “F” curb & gutter is being added on north side) to achieve a minimum of 0.3% longitudinal slope and a minimum of 2.0% cross-slope
- Acquire all necessary right of entry agreements or permanent harmonizing easements to construct tie-in grading and other harmonizing improvements
- Remove existing sidewalk and regrade as necessary to construct a new roadside shoulder and shallow swale system in front of a new 6-foot wide sidewalk approximately from station 52+40 (LT) to station 84+10 (LT)
- Reconstruct all existing driveways and sidestreet crossings to provide ADA compliant pedestrian ramps and detectable warnings
- Remove and replace crosswalks, stop bars, stop signs and street signs at all connecting sidestreets to the north
- Construct gravity wall with aluminum pipe rail to maintain grade separation from existing drainage structures near station 24+20 (LT), station 30+80 (LT), and station 38+70 (LT)
- Construct new curb inlets (Type 9) at the following approximate locations:
  - Station 24+20 (LT) – connect to existing outfall pipe as shown
  - Station 25+50 (LT) – with additional pipe to make connection as shown
  - Station 29+60 (LT) – with additional pipe to make connection as shown
  - Station 30+75 (LT) – connect to existing outfall pipe as shown
  - Station 32+75 (LT) – with additional pipe to make connection as shown

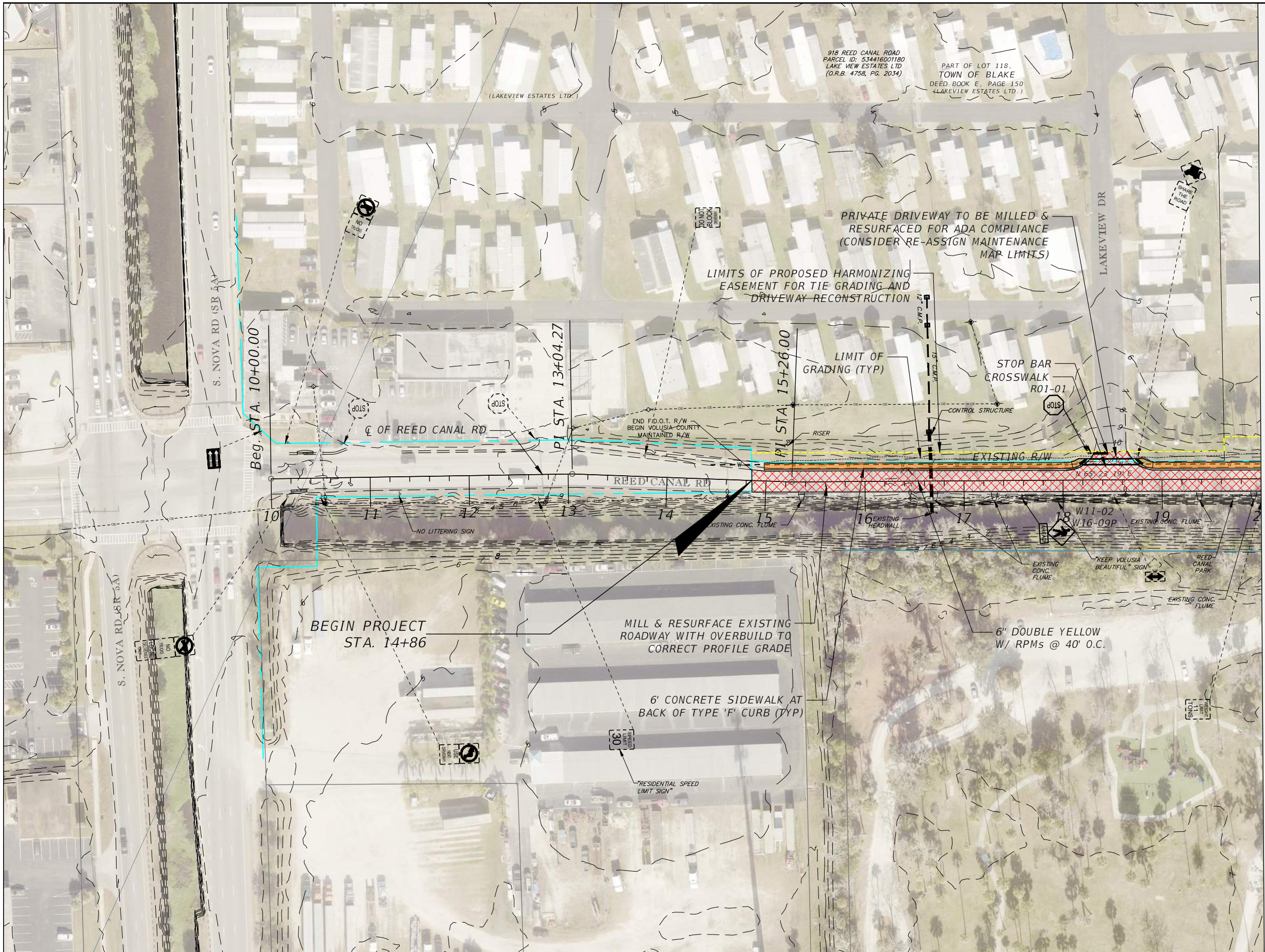
- Station 36+80 (LT) – with additional pipe to make connection as shown
- Construct a new manhole at station 35+60 (LT) with connection to existing outfall pipe as shown
- Adjust the existing catch basins to finish grade at the following approximate locations:
  - Station 62+20 (LT)
  - Station 68+60 (LT)
  - Station 70+55 (LT)
- Remove existing steel pipe bollard and rebar railing from near the Stevens canal box culvert (near station 54+50), modify the existing headwall to extend vertically, and construct new bike ped railing on top of the modified headwall
- Construct new traffic separator channelization islands or striping at commercial or apartment/ condominium driveways and remove and replace stop signs and stop bars as necessary
- Construct new patterned pavement crosswalks at the entrance to Reed Canal Park and Sauls Street
- Construct new RRFB pedestrian crossing signals with pedestrian detectors and signing and pavement markings (Scheme 2) at the uncontrolled approaches to at the entrance to Reed Canal Park, Sauls Street, Lantern Drive, and Oak Lea Drive
- Remove existing pedestrian sign from traffic signal pole on northwest corner of Carmen Drive (station 75+00) and install new pedestrian signal
- Remove existing pedestrian signal (on concrete pole) at the northeast corner of Carmen Drive (station 75+50) and provide new pedestrian signal (with breakaway style pole) to meet current requirements
- Coordinate with the power company to provide pedestrian crosswalk lighting at the entrance to Reed Canal Park, Sauls Street, Lantern Drive, Oak Lea Drive, Carmen Drive
- Adjust all drainage inlets, meters, valve boxes, and other utility appurtenances to finished grade as necessary to accommodate the proposed improvements
- Remove and replace mailboxes as necessary to accommodate the proposed improvements
- The engineering and construction costs associated with these improvements are estimated at approximately \$2,502,930.28 in 2020.

Based on analysis of the data, graphics, concept plans, and cost estimate provided within this report, it is concluded that this project is feasible.

**APPENDIX A**

**TYPICAL SECTIONS**  
**AND**  
**CONCEPT PLANS**





LEGEND	
	CONCRETE SIDEWALK
	CONCRETE DRIVEWAY
	MILLING & RESURFACING

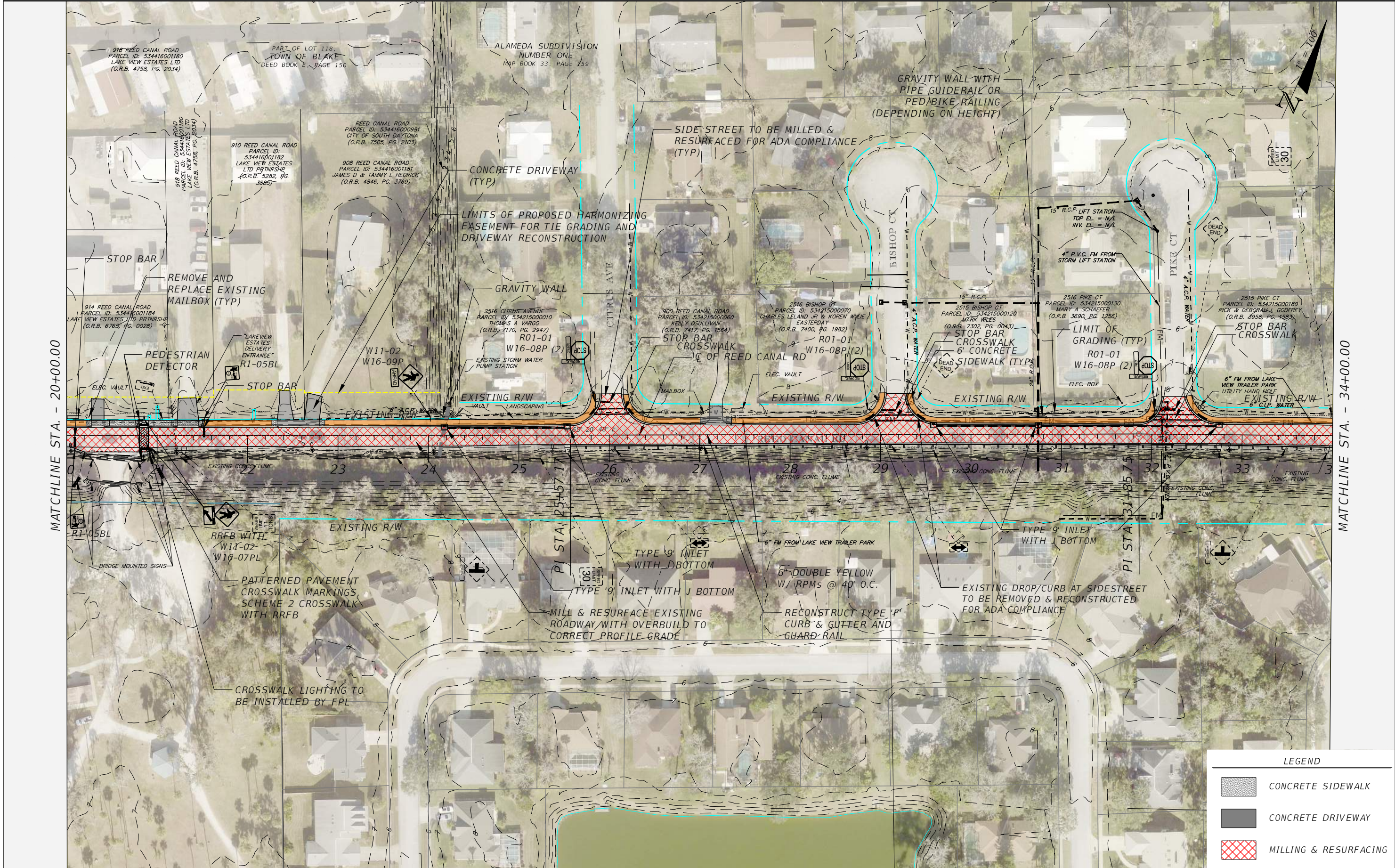
REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

TRAFFIC ENGINEERING DATA SOLUTIONS, INC.  
80 SPRING VISTA DRIVE  
DEBARY, FL 32713  
386-753-0558  
CERTIFICATION OF AUTHORIZATION #27392

	COUNTY	FINANCIAL PROJECT ID
	VOLUSIA	447019-1

CONCEPT PLAN

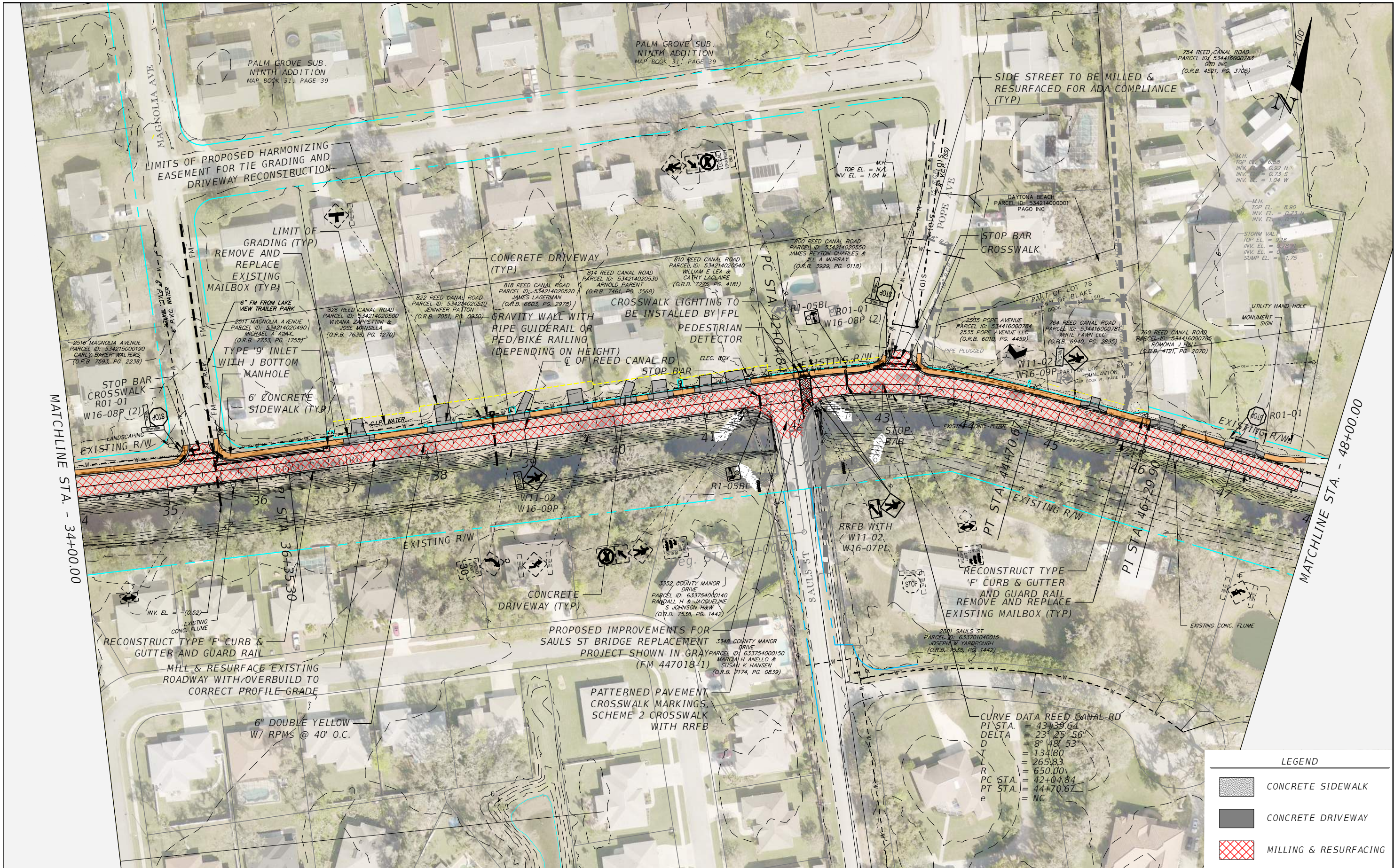
SHEET NO.
02



REVISIONS				TRAFFIC ENGINEERING DATA SOLUTIONS, INC. 80 SPRING VISTA DRIVE DEBARY, FL 32713 386-753-0558 CERTIFICATION OF AUTHORIZATION #27392			COUNTY VOLUSIA FINANCIAL PROJECT ID 447019-1		SHEET NO. 03	
DATE	DESCRIPTION	DATE	DESCRIPTION							

LEGEND	
	CONCRETE SIDEWALK
	CONCRETE DRIVEWAY
	MILLING & RESURFACING


CONCEPT PLAN



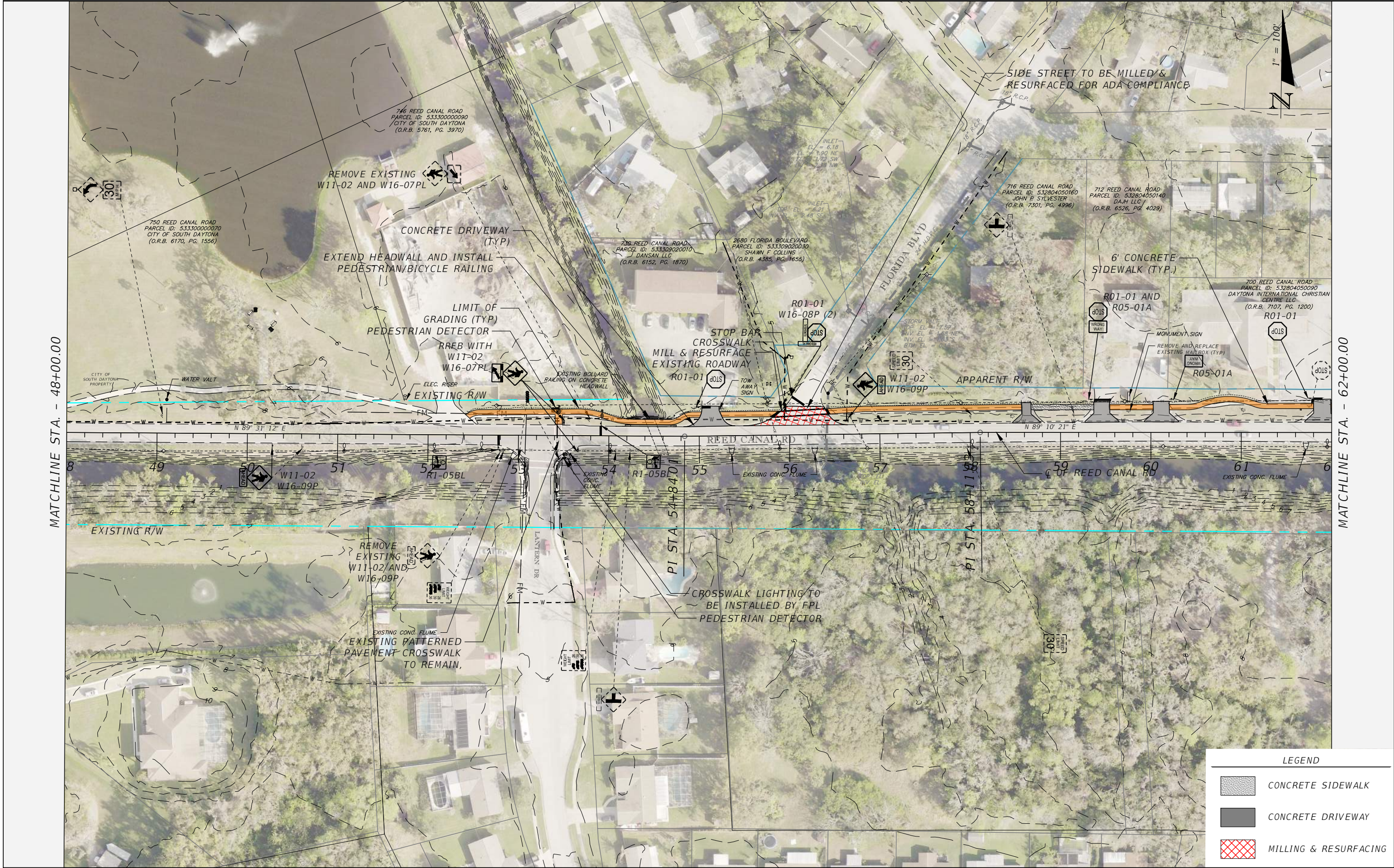
REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

TRAFFIC ENGINEERING DATA SOLUTIONS, INC.  
80 SPRING VISTA DRIVE  
DEBARY, FL 32713  
386-753-0558

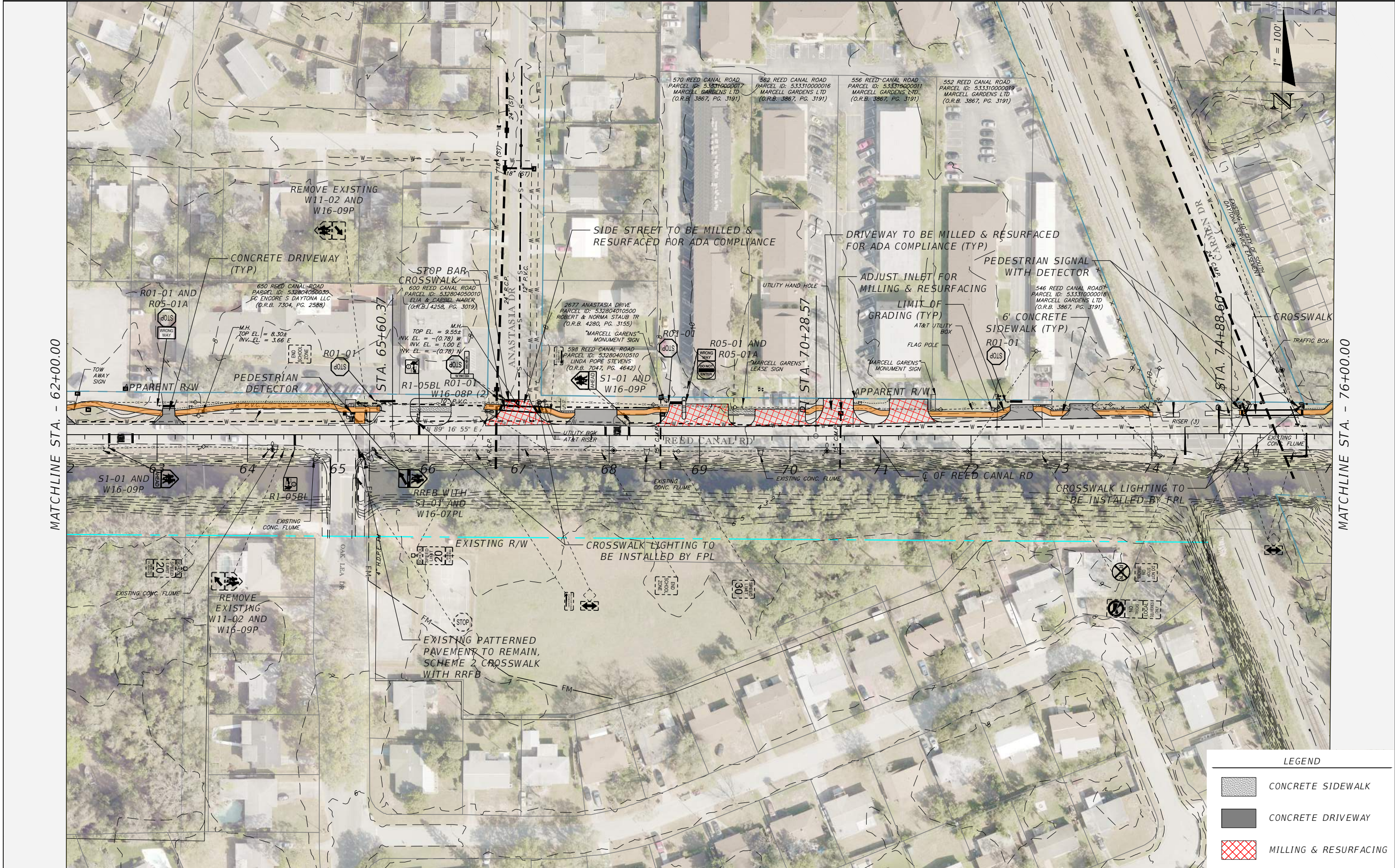
CERTIFICATION OF AUTHORIZATION #27392

	COUNTY	FINANCIAL PROJECT ID
	VOLUSIA	447019-1

CONCEPT PLAN		SHEET NO.
		04



REVISIONS				TRAFFIC ENGINEERING DATA SOLUTIONS, INC. 80 SPRING VISTA DRIVE DEBARY, FL 32713 386-753-0558  CERTIFICATION OF AUTHORIZATION #27392			COUNTY VOLUSIA  FINANCIAL PROJECT ID 447019-1		CONCEPT PLAN		SHEET NO.  05
DATE	DESCRIPTION	DATE	DESCRIPTION								



REVISIONS				TRAFFIC ENGINEERING DATA SOLUTIONS, INC. 80 SPRING VISTA DRIVE DEBARY, FL 32713 386-753-0558  CERTIFICATION OF AUTHORIZATION #27392			COUNTY VOLUSIA  FINANCIAL PROJECT ID 447019-1		SHEET NO.  06	
DATE	DESCRIPTION	DATE	DESCRIPTION							

CONCEPT PLAN



REVISIONS				TRAFFIC ENGINEERING DATA SOLUTIONS, INC. 80 SPRING VISTA DRIVE DEBARY, FL 32713 386-753-0558  CERTIFICATION OF AUTHORIZATION #27392			COUNTY VOLUSIA  FINANCIAL PROJECT ID 447019-1		SHEET NO.  07	
DATE	DESCRIPTION	DATE	DESCRIPTION							

CONCEPT PLAN

**APPENDIX B**

**RIGHT OF WAY DOCUMENTS  
AND  
LAND RECORDS**

**MAINTANANCE AGREEMENT BETWEEN COUNTY OF VOLUSIA AND CITY OF  
SOUTH DAYTONA FOR REED CANAL MAINTENANCE RESPONSIBILITIES  
AFTER CONSTRUCTION OF ADJACENT BIKE PATH**

THIS AGREEMENT (AGREEMENT) is made and entered into by and between the County of Volusia (County), a political subdivision of the State of Florida, and the City of South Daytona (City), a municipal corporation of the State of Florida, for maintenance responsibilities of Reed Canal after construction of an adjacent bike trail in the City. Each of the above individually may be referred to as Party, and collectively as Parties.

WHEREAS, there is a proposal between the Florida Department of Transportation (FDOT) and the City to construct a portion of bike path, part of the St. John's River To Sea Loop (Bike Path) along the south bank of the Reed Canal between Carmen Drive and Sauls Street within Right of Way that is owned and maintained by the County; and

WHEREAS, the County desires to support construction of the Bike Path as long as the City agrees to maintain and repair the proposed Bike Path; and

WHEREAS, the City shall be responsible for the maintenance and repair of the Bike Path located in the Reed Canal Right of Way between Carmen Drive and Sauls Street.

NOW, THEREFORE, for and in consideration of mutual covenants contained herein, the sufficiency of which are hereby acknowledged, the undersigned parties agree to the following:

1) The recitals set forth above are true and correct and are intended to form a material part of this Interlocal Agreement.

2) The County agrees that this Agreement pursuant to the conditions herein shall permit the Bike Path to be constructed within County owned Right-of-Way on the south bank of Reed Canal between Carmen Drive and Sauls Street. This Agreement shall function as a use permit or licensing agreement authorizing the City to place the Bike Path in the County Right of Way pursuant to the terms contained herein. Prior to Bike Path construction, the City shall provide the County with design and engineering plans for approval by the County Engineer at the 60%, 90%, and 100% design plan phases.

3) The County shall continue to maintain Reed Canal at the current levels of service which serve only to ensure the canal's primary function as a stormwater conveyance system is being properly met. The current level of maintenance does not include the removal of litter or debris for aesthetic purposes that cause no impact to the conveyance of stormwater through the canal.

4) At the conclusion of construction, the City shall own, operate, and be responsible for all maintenance and repairs of the Bike Path, to all applicable standards, including any FDOT maintenance agreement and approved construction plans. The Bike Path shall include all improvements and associated amenities constructed as part of the proposed Bike Path by, or on

behalf of, the City in the Reed Canal Right of Way. These improvements and amenities to include, but are not limited to, concrete paving, asphalt paving, striping, retaining walls, sheet piling, drainage systems, signage, handrail, guardrail, lighting, landscaping and any Bike Path crossings of local and county roads.

5) If, at any time while the terms of this agreement are in effect, it shall come to the attention of the County, that the City's responsibility as established herein or a part thereof is not being properly accomplished pursuant to the terms of this agreement, the County Manager, may, at his/her sole discretion, issue a written notice in care of the City Manager to place the City on notice thereof. Thereafter, the City shall have a period of (30) thirty calendar days within which to correct the cited deficiency or deficiencies. If said deficiency or deficiencies are not corrected within this time period the County may at its option, proceed as follows:

Maintain the declared deficiency with County or a Contractor's material, equipment and personnel. The actual cost for such work will be the responsibility of the City and the County will send an invoice for actual cost to the City.

6) The City shall also have the right, but not the obligation, to provide aesthetic maintenance and repairs, which only includes removal of litter and debris, to Reed Canal above and beyond the County's obligation herein. The City shall acquire written approval from County for any maintenance or repairs to Reed Canal beyond removing litter or debris from Reed Canal.

7) All notices required to be given by either party under this Interlocal Agreement shall be in writing, addressed to the other party as follows, and delivered by certified mail, return receipt requested, or in person:

(a) City of South Daytona  
ATTN: City Manager  
1672 S Ridgewood Ave.  
South Daytona, FL 32119

(b) County of Volusia  
ATTN: County Manager  
123 West Indiana Avenue  
DeLand, FL 32720

Either party may, by written notice to the other party as provided herein above, change the address for any subsequent notice.

8) **SOVEREIGN IMMUNITY.** The City acknowledges that its use of the Bike Path in the County's Right-of-Way shall be at the City's sole risk and expense. The City agrees to indemnify, hold harmless and defend the County, from and against, all liability and expense, including reasonable attorney's fees and costs, in conjunction with any and all claims whatsoever for personal injuries or property damage, including loss of use caused by the negligent or delibert acts or omissions of the City, his/her/their agents, officers or employees arising in any way out of

the construction, operation and maintenance of the Bike Path. Each party to this Agreement expressly retains all rights, benefits and immunities of sovereign immunity that they presently enjoy under the Constitution and Statutes of the State of Florida, and particularly with respect to Chapter 768, Florida Statutes. Notwithstanding anything set forth in this Agreement to the contrary, nothing in this Agreement shall be deemed as a waiver of immunity or limits of liability of either party beyond any statutory limited waiver of immunity or limits of liability which may have been adopted by the Florida Legislature or may be adopted by the Florida Legislature and any liability of either party for damages shall not exceed the statutory limits of liability, regardless of the number or nature of any claim which may arise including but not limited to a claim sounding in tort, equity or contract. The County shall in no way be liable to the City or any third party for any costs, expenses, losses, damages, or liabilities incurred by the City or any third party in its use of the County's Right-of-Way. Nothing in this Agreement shall inure to the benefit of any third party for the purpose of allowing any claim against any party, which would otherwise be barred under the Doctrine of Sovereign Immunity or by operation of law.

9) **THIRD PARTIES.** In no event shall any of the terms of this Agreement confer upon any third person, corporation, or entity other than the parties hereto any right or cause of action for damages claimed against any of the parties to this Agreement arising from the performance of the obligations and responsibilities of the parties herein or for any other reason.

10) **DISPUTE RESOLUTION.** Any disputes concerning non-performance or other aspects of this agreement by which either party initiates litigation to enforce its rights hereunder, shall be subject to the provisions of Chapter 164, Florida Statutes, the "Florida Governmental Cooperation Act".

11) **MISCELLANEOUS.** It is expressly agreed and understood between the CITY and the COUNTY that there are no other written or verbal agreements applicable herein between the PARTIES.

This Agreement shall become effective when it is last approved and executed by the COUNTY and the CITY.


Upon execution, either party may record this Agreement in the public records of Volusia County, Florida.

This Agreement shall be executed in triplicate (3), the aggregate of which shall constitute a single document, and electronic and/or facsimile signatures shall be deemed original signatures

12) **ENTIRE AGREEMENT.** This Agreement sets forth the entire Agreement between the Parties. Modifications to this Agreement may not be made unless such modifications are in writing and executed by both Parties.

**IN WITNESS WHEREOF**, the parties hereto executed this Interlocal Agreement, by and through their duly authorized representatives, on the respective dates below.

**ATTEST:**

  
\_\_\_\_\_  
GEORGE RECKTENWALD  
COUNTY MANAGER

**COUNTY OF VOLUSIA, FLORIDA**

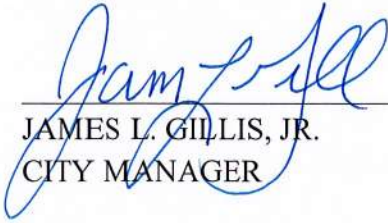
BY:   
\_\_\_\_\_  
ED KELLEY,  
COUNTY CHAIR

DATE: 12-10-2019



ATTEST:

CITY OF SOUTH DAYTONA, FLORIDA



---

JAMES L. GILLIS, JR.  
CITY MANAGER



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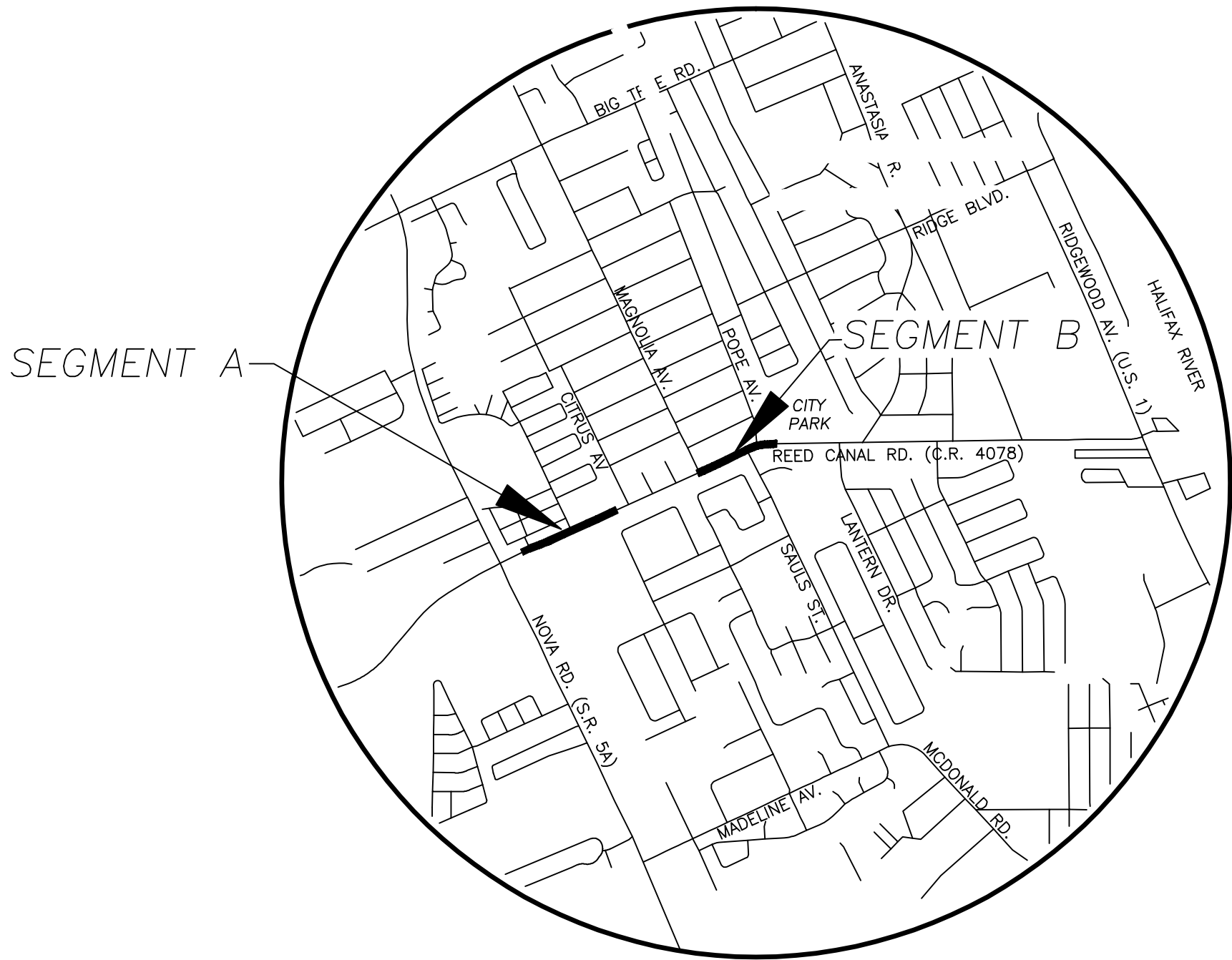
WILLIAM C. HALL  
MAYOR

INDEX:

- SHEET 1: COVER SHEET  
SHEET 2: "SEGMENT A" DETAIL  
SHEET 3: "SEGMENT B" DETAIL

SURVEYORS NOTES:

1. THE BEARINGS AND COORDINATES SHOWN HEREON ARE BASED ON THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE, 1983 NORTH AMERICAN DATUM, 2007 ADJUSTMENT, AS ESTABLISHED FROM MULTIPLE OBSERVATIONS USING THE LENGEMANN REAL TIME KINEMATIC REFERENCE STATIONS, ALSO KNOWN AS THE L-NET (TopNET GNSS Network).
- A. DERIVING A BEARING OF N 85°04'53" E ALONG THE NORTH RIGHT OF WAY LINE OF REED CANAL ROAD ACCORDING TO THE FLORIDA DEPARTMENT OF TRANSPORTATION RIGHT OF WAY MAP OF STATE ROAD NO. 5A (NOVA ROAD), SECTION NO. 79190-2510 SHEET 7 OF 17, FOR THE BEARING BASE OF SEGMENT A, AS MAPPED ON SHEET 2 OF 3, OF THIS SURVEY.
- B. DERIVING A BEARING OF N 85°45'44" E ALONG THE SOUTH LINE OF LOTS 49 TO 55, PALM GROVE SUBDIVISION NINTH ADDITION, RECORDED IN MAP BOOK 31, PAGE 39, OF THE PUBLIC RECORDS OF VOLUSIA COUNTY, FOR THE BEARING BASE OF SEGMENT B, AS MAPPED ON SHEET 3 OF 3, OF THIS SURVEY.
2. THE SPECIFIC PURPOSE OF THIS SURVEY IS TO:
- A. ESTABLISH THE SURVEY BASELINES AS DESCRIBED HEREON.
- B. ESTABLISH AND MAP THE MAINTAINED NORTHERLY RIGHT OF WAY OF REED CANAL ROAD ALONG SEGMENTS A AND B AS SHOWN HEREON.
3. ON MARCH 28, 2017, TADD KASBEER (ASSISTANT VOLUSIA COUNTY ENGINEER), BENJAMIN BARTLETT (ENGINEERING SECTION MANAGER VOLUSIA COUNTY ROAD AND BRIDGE DEPARTMENT) AND LES GILLIS (CITY OF SOUTH DAYTONA, PUBLIC WORKS DIRECTOR), MET IN THE FIELD TO DETERMINE THE LIMITS OF THE MAINTAINED RIGHT OF WAY.
4. THE VOLUSIA COUNTY MAINTAINED RIGHT OF WAY HAS BEEN DETERMINED BY BENJAMIN BARTLETT TO BE 1.00 FOOT NORTH OF THE EDGE OF SIDEWALK.
5. THE CITY OF SOUTH DAYTONA BEACH MAINTAINED UTILITY LIMITS ,SHOWN HEREON, HAVE BEEN DETERMINED BY LES GILLIS.
6. THE DISTANCES SHOWN HEREON ARE IN US SURVEY FEET AND ARE FIELD MEASURED OR CALCULATED FROM FIELD MEASUREMENTS UNLESS OTHERWISE NOTED.
7. PROPERTY LINES ARE SHOWN FOR INFORMATIONAL PURPOSES ONLY AND ARE NOT TO BE CONSIDERED SURVEY QUALITY.
8. UNDERGROUND UTILITIES AND FOUNDATIONS HAVE NOT BEEN LOCATED AS A PART OF THIS SURVEY.
9. ALL RECORDING INFORMATION SHOWN HEREON IS RECORDED IN THE PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA.
10. ONLY PERTINENT FIXED IMPROVEMENTS, SUCH AS EVIDENCE OF BOUNDARY INCLUDING BUT NOT LIMITED TO, FENCES, SIDEWALKS, AND UTILITY LINES, HAVE BEEN SHOWN IN RELATIONSHIP TO THE MAINTAINED RIGHT OF WAY.
11. THE FIELD DATE OF THIS SURVEY IS MAY 26, 2017.



# COUNTY ROAD No. 4078 REED CANAL ROAD

## "MAINTENANCE MAP"

### SEGMENT A

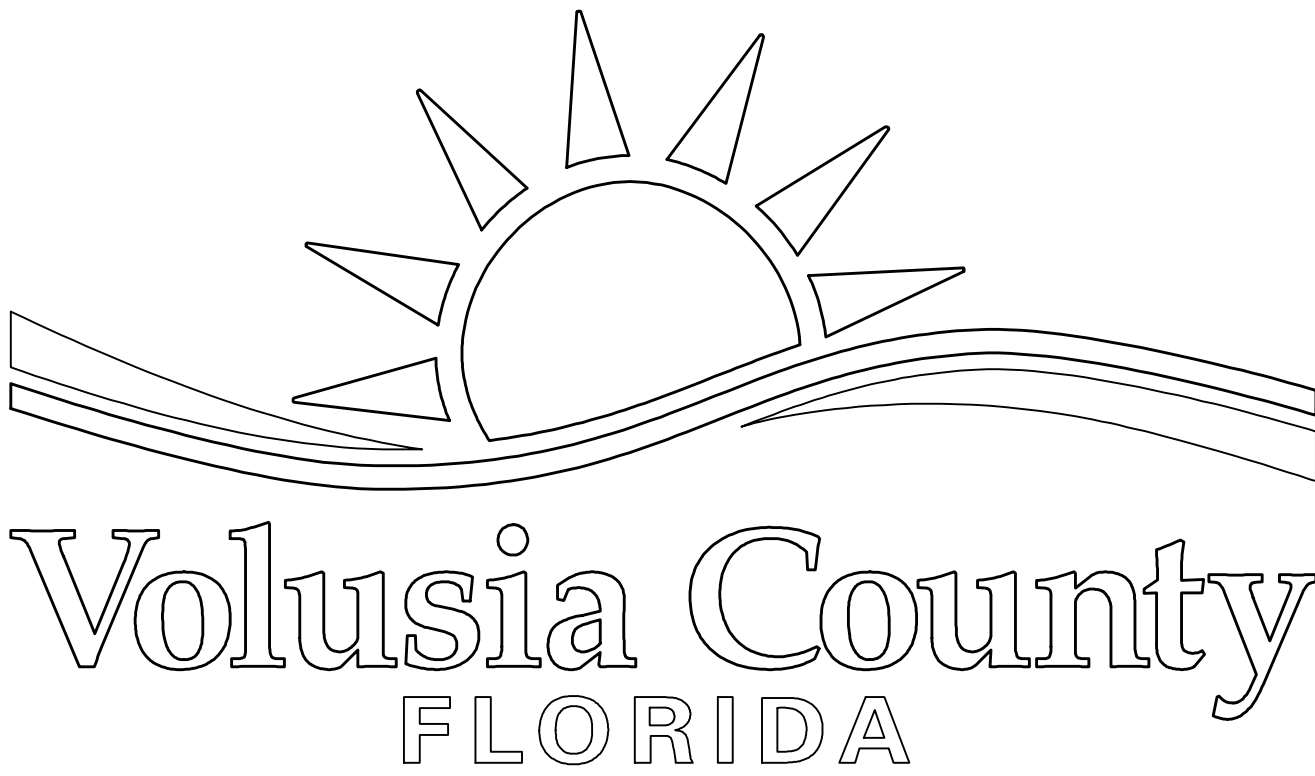
FROM NOVA ROAD TO JUST WEST OF CITRUS AVE.

### SEGMENT B

FROM MAGNOLIA AVE. TO JUST EAST OF SAULS RD.

IN SECTIONS 42 & 43 ALL

IN TOWNSHIP 15 SOUTH, RANGE 33 EAST



Segment A (Survey Baseline description):

Commence at a Copper Coated Rod with Cap stamped FDOT marking the Southerly corner of the Right of Way corner clip at the northeastern corner of Nova Road and Reed Canal Road as depicted on Sheet 7 of 17 of the Right of Way Map for State Road 5A (Nova Road) Section 79190-2510; thence run N 65°04'53" E (N 65°03'55" E, FDOT Map), along the north Right of Way line of said Reed Canal Road, a distance of 310.35 feet (310.28 feet, FDOT Map) to a Copper Coated Rod with Cap stamped FDOT; thence N 68°42' 55" E (N 68°45'30" E, FDOT Map) along said right of way a distance of 170.35 feet (170.44 feet FDOT map) to a Copper Coated Rod with Cap stamped FDOT; thence S 24°59'29" E (S 24°55'49" E, FDOT Map), a distance of 44.05 feet (44.00 feet, FDOT Map) to a Parker-Kalon Nail (P.K. Nail) with disk stamped FDOT and the Point of Beginning: thence departing said Right of Way line, N 65°49'28" E, a distance of 948.75 feet to the Point of Terminus.

Segment B (Survey Baseline description):

Beginning at the intersection of the westerly projection of the southerly line of Lots 49 through 55 inclusive and the centerline of Right of Way of Magnolia Avenue, a 60.00 foot-wide Right of Way, as depicted on the plat of Palm Grove Sub., Ninth Addition, as recorded in Map Book 31, Page 39; thence run N 65°45'44" E, along said westerly projection, the South line of said lots and the easterly projection thereof, a distance of 795.18 feet; thence departing said easterly projection, N 88°47'46"E, a distance of 388.38 feet to the Point of Terminus.

CERTIFICATE OF APPROVAL BY THE CITY OF SOUTH DAYTONA PUBLIC WORKS DIRECTOR

THIS IS TO CERTIFY, That UTILITIES ALONG REED CANAL ROAD have been constructed, maintained or repaired, continuously and uninterruptedly for more than 4 years by the City of South Daytona Public Works Department and that this Maintenance Map shall vest all right, title, easement and appurtenances in and to the road to the County of Volusia, in accordance with subsection (1) of Chapter 95.361 of the Florida Statutes of 2013.

BY: \_\_\_\_\_  
MR. LES GILLIS  
CITY OF SOUTH DAYTONA, PUBLIC WORKS DIRECTOR

CERTIFICATE OF APPROVAL BY JEFF W. BARNES  
REGISTERED LAND SURVEYOR FOR VOLUSIA COUNTY

THIS IS TO CERTIFY, That on \_\_\_\_\_a survey of the prescriptive roadway was performed under my direction and supervision and that this Maintenance Map is a correct representation of the existing roadway and is in compliance with Chapter 95.361 of the Florida Statutes of 2013.

BY: \_\_\_\_\_  
JEFF W. BARNES, P.S.M. # 5576  
REGISTERED LAND SURVEYOR

CERTIFICATE OF APPROVAL BY THE VOLUSIA COUNTY ROAD AND BRIDGE DIRECTOR

THIS IS TO CERTIFY, That REED CANAL ROAD was constructed, maintained or repaired, continuously and uninterruptedly for more than 4 years by Volusia County Road and Bridge Division and that this Maintenance Map shall vest all right, title, easement and appurtenances in and to the road to the County of Volusia, in accordance with subsection (1) of Chapter 95.361 of the Florida Statutes of 2013.

BY: \_\_\_\_\_  
JUDY GRIM  
VOLUSIA COUNTY ROAD AND BRIDGE DIRECTOR

CERTIFICATE OF APPROVAL BY THE COUNTY COUNCIL OF  
VOLUSIA COUNTY, FLORIDA

THIS IS TO CERTIFY, That on \_\_\_\_\_ the foregoing map was approved by the County Council of Volusia County, Florida.

Ed Kelley, Chair of the County Council of Volusia County \_\_\_\_\_ County Seal

Attest: \_\_\_\_\_  
James Dinneen, County Manager of Volusia County and Ex-officio Clerk

CERTIFICATE OF CLERK  
I HEREBY CERTIFY, That I have examined the foregoing map and find that it complies in form of Chapter 95.361 Florida Statutes, and was filed

for record on \_\_\_\_\_at\_\_\_\_\_

RECORDED IN RIGHT OF WAY BOOK \_\_\_\_\_ PAGE \_\_\_\_\_

\_\_\_\_\_  
Clerk of the Circuit Court  
in and for Volusia County, Florida

REED CANAL ROAD  
SEGMENTS A AND B  
NORTH R/W LIMITS BY MAINTENANCE

TYPE OF SURVEY  
SPECIFIC PURPOSE SURVEY

Proj. No: N/A  
Draw No: 2443  
Sh No: 1 of 3

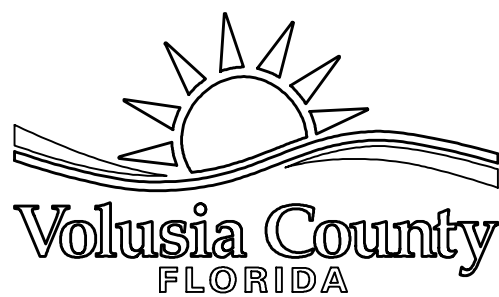
- △ = BENCHMARK  
△ = CENTRAL ANGLE  
○ = CONCRETE  
□ = CONCRETE MONUMENT  
° = DEGREES  
⊕ = ELECTRIC BOX  
⊕ = FIRE HYDRANT  
⊕ = GUY ANCHOR  
⊕ = GUY POLE  
⊕ = IRON PIPE
- ☆ = LIGHT POLE  
⬢ = POWER POLE  
⬢ = ROD & CAP  
⊕ = SANITARY MANHOLE  
⊕ = STORMWATER MANHOLE  
⊕ = TELEPHONE SERVICE BOX, CABLE TV BOX  
⊕ or SANITARY VALVE BOX  
⊕ = UTILITY POLE  
⊕ = WATER METER  
⊕ = WATER VALVE or RECLAIMED WATER VALVE

LEGEND & ABBREVIATIONS

A/C = AIR CONDITIONER  
ASPH = ASPHALT  
(C) = CALCULATED  
C/L = CENTERLINE  
C.B. = CHORD BEARING  
CH. = CHORD DISTANCE  
C.M. = CONCRETE MONUMENT  
CONC. = CONCRETE  
CONST. = CONSTRUCTION  
(D) = DEAD  
ELEV. = ELEVATIONS  
EXIST = EXISTING  
F.D.O.T. = FLORIDA DEPARTMENT OF TRANSPORTATION

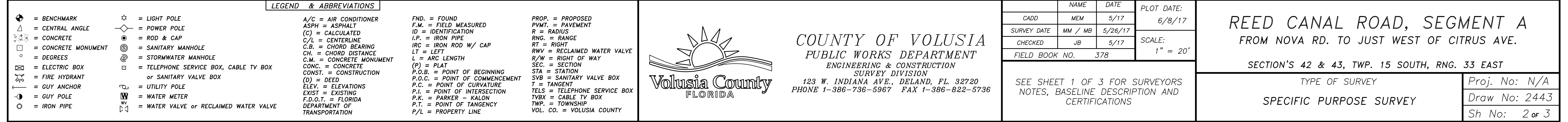
FND. = FOUND  
F.M. = FIELD MEASURED  
ID = IDENTIFICATION  
I.P. = IRON PIPE  
IRC = IRON ROD W/ CAP  
LT = LEFT  
L = ARC LENGTH  
(P) = PLAT  
P.O.B. = POINT OF BEGINNING  
P.O.C. = POINT OF COMMENCEMENT  
P.C. = POINT OF CURVATURE  
P.I. = POINT OF INTERSECTION  
P.K. = PARKER - KALON  
P.T. = POINT OF TANGENCY  
P/L = PROPERTY LINE

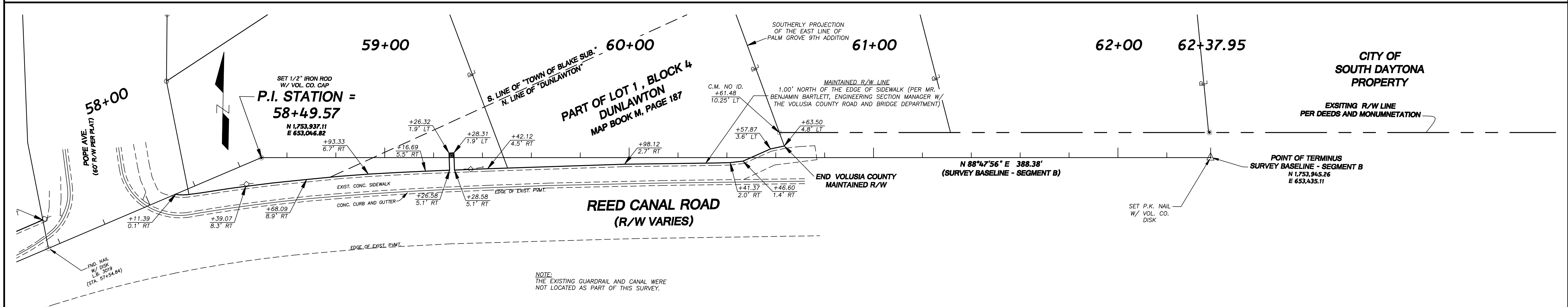
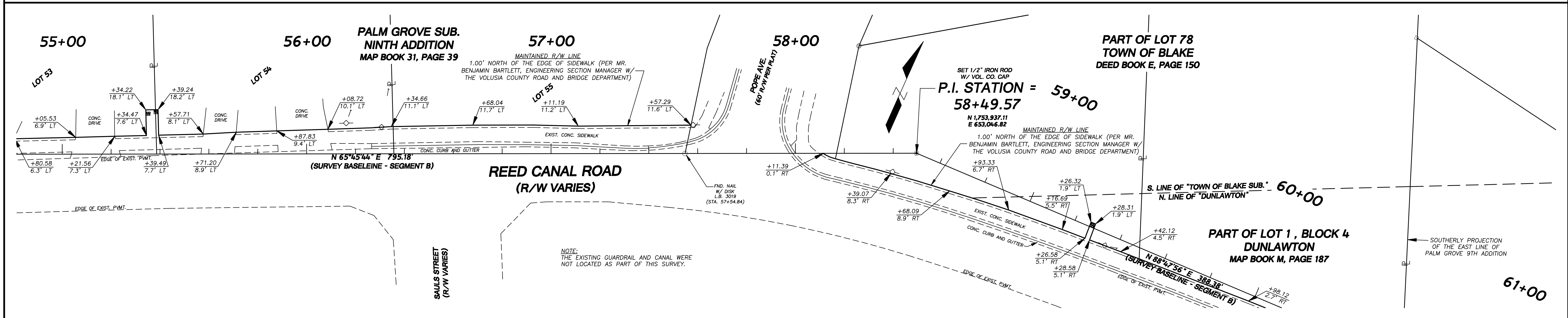
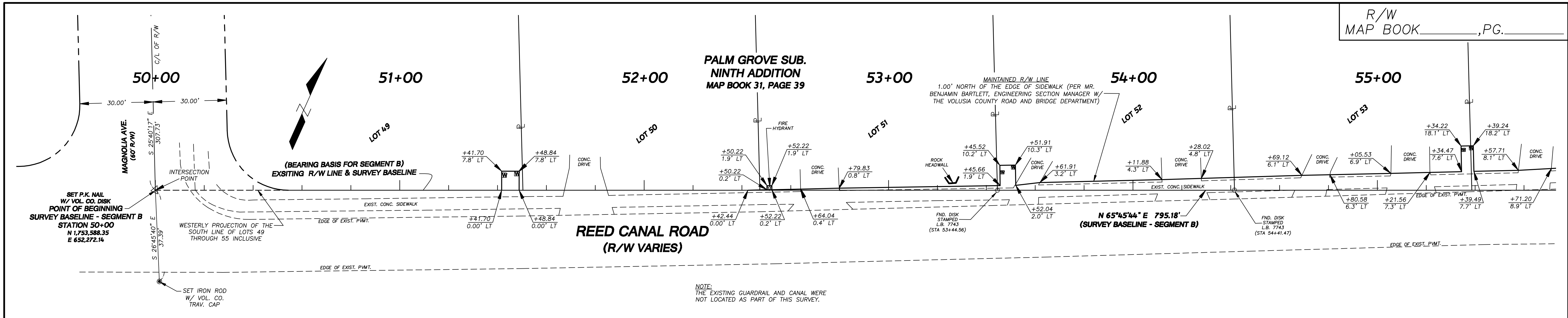
PROP. = PROPOSED  
P.V.M.T. = PAVEMENT  
R = RADIUS  
RNG. = RANGE  
RT = RIGHT  
RWY = RECLAIMED WATER VALVE  
R/W = RIGHT OF WAY  
SEC. = SECTION  
STA = STATION  
SVB = SANITARY VALVE BOX  
T = TANGENT  
TELS = TELEPHONE SERVICE BOX  
TVBX = CABLE TV BOX  
TWP. = TOWNSHIP  
VOL. CO. = VOLUSIA COUNTY



COUNTY OF VOLUSIA  
PUBLIC WORKS DEPARTMENT  
ENGINEERING & CONSTRUCTION  
SURVEY DIVISION  
123 W. INDIANA AVE., DELAND, FL. 32720  
PHONE 1-386-736-5967 FAX 1-386-822-5736

NAME	DATE	PLOT DATE:
CADD	MEM	5/17
SURVEY DATE	MM / MB	5/26/17
CHECKED	JB	5/17
FIELD BOOK NO.	378	SCALE: N/A
SURVEYORS CERTIFICATE: NOT VALID WITHOUT THE ORIGINAL SIGNATURE AND RAISED SEAL OF A FLORIDA LICENSED SURVEYOR AND MAPPER		
JEFF W. BARNES, P.S.M. #5576		





LEGEND & ABBREVIATIONS			
	= BENCHMARK		= LIGHT POLE
	= CENTRAL ANGLE		= POWER POLE
	= CONCRETE		= ROD & CAP
	= CONCRETE MONUMENT		= SANITARY MANHOLE
	= DEGREES		= STORMWATER MANHOLE
	= ELECTRIC BOX		= TELEPHONE SERVICE BOX, CABLE TV BOX or SANITARY VALVE BOX
	= FIRE HYDRANT		= UTILITY POLE
	= GUY POLE		= WATER METER
	= IRON PIPE		= WATER VALVE or RECLAIMED WATER VALVE
	= AIR CONDITIONER		= FOUND
	= ASPHALT		= FIELD MEASURED
	= CALCULATED		= IDENTIFICATION
	= CENTERLINE		= IRON PIPE
	= CHORD BEARING		= IRON ROD W/ CAP
	= CHORD DISTANCE		= LEFT
	= CONCRETE MONUMENT		= ARC LENGTH
	= CONCRETE		= PLAT
	= CONSTRUCTION		= POINT OF BEGINNING
	= DEED		= POINT OF COMMENCEMENT
	= ELEVATIONS		= POINT OF CURVATURE
	= FLORIDA DEPARTMENT OF TRANSPORTATION		= POINT OF INTERSECTION
			= PARKER - KALON
			= POINT OF TANGENCY
			= PROPERTY LINE
			= PROPOSED
			= PAVEMENT
			= RADIUS
			= RANGE
			= RIGHT
			= RECLAIMED WATER VALVE
			= RIGHT OF WAY
			= SECTION
			= STATION
			= SANITARY VALVE BOX
			= TANGENT
			= TELEPHONE SERVICE BOX
			= CABLE TV BOX
			= TOWNSHIP
			= VOLUSIA COUNTY

**COUNTY OF VOLUSIA**  
PUBLIC WORKS DEPARTMENT  
ENGINEERING & CONSTRUCTION  
SURVEY DIVISION  
123 W. INDIANA AVE., DELAND, FL. 32720  
PHONE 1-386-736-5967 FAX 1-386-822-5736

NAME	DATE	PLOT DATE:
CADD	MEM	5/17
SURVEY DATE	MM / MB	5/26/17
CHECKED	JB	5/17
FIELD BOOK NO.	378	SCALE:
		1" = 20'

SEE SHEET 1 OF 3 FOR SURVEYORS  
NOTES, BASELINE DESCRIPTION AND  
CERTIFICATIONS

**REED CANAL ROAD, SEGMENT B**  
FROM MAGNOLIA AVE. TO JUST EAST OF SAULS RD.

SECTIONS 42 & 43 , TWP. 15 SOUTH, RNG. 33 EAST

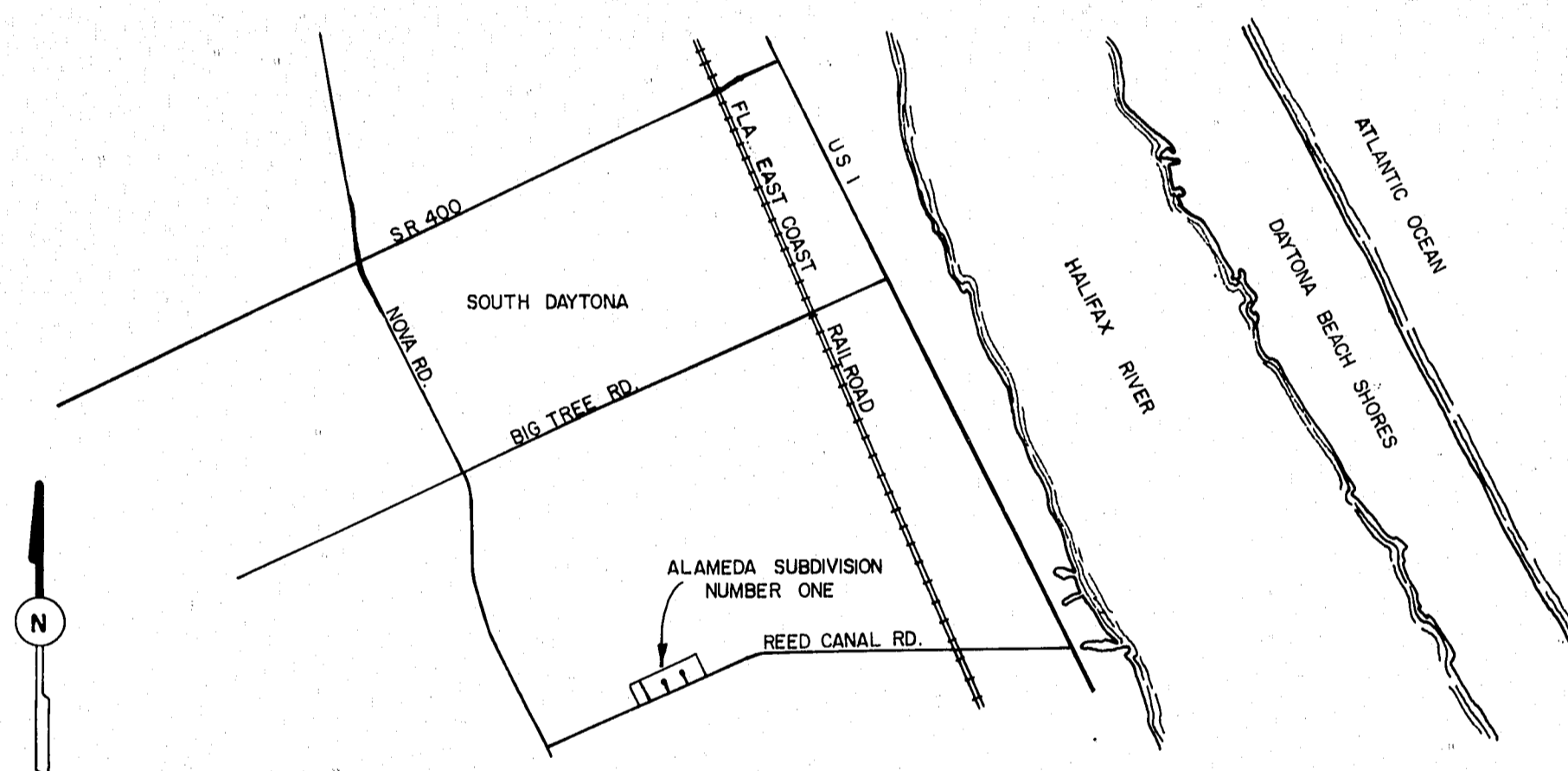
TYPE OF SURVEY	Proj. No: N/A
SPECIFIC PURPOSE SURVEY	Draw No: 2443
	Sh No: 3 of 3

# ALAMEDA SUBDIVISION NUMBER ONE

SOUTH DAYTONA, VOLUSIA COUNTY, FLORIDA

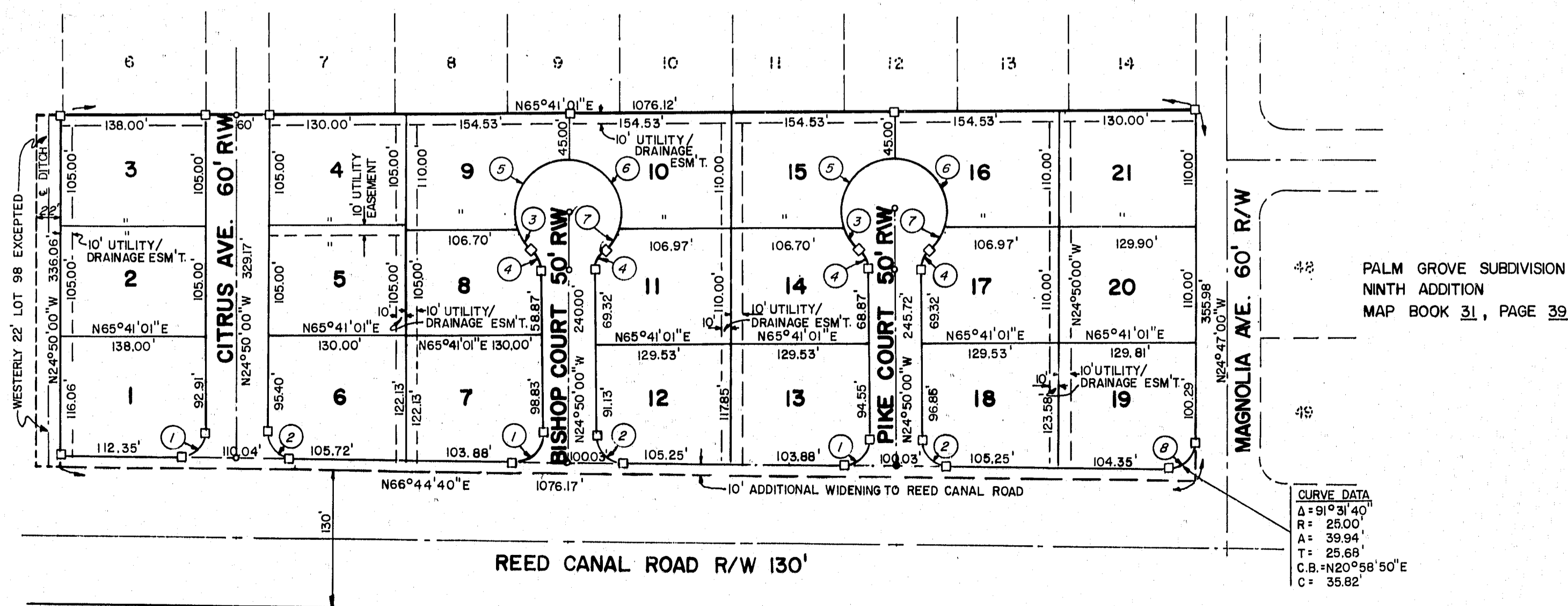
Being A Resubdivision Of Lot 98, Blake Subdivision, As Recorded In Deed Book "E", Page 150 And Map Book 1, Page 38 Of The Public Records Of Volusia County, Florida Excepting Therefrom The Westerly 22 Feet And Also Excepting That Portion Lying In Reed Canal Road, A 130 Foot Right-Of-Way As Now Established And Recognized. Parcel Containing 8.547 Acres.

Prepared By  
**PHILLIPS, WINE, & PHILLIPS, INC.**  
CONSULTING ENGINEERS & SURVEYORS  
595 North Nova Road Ormond Beach, Florida



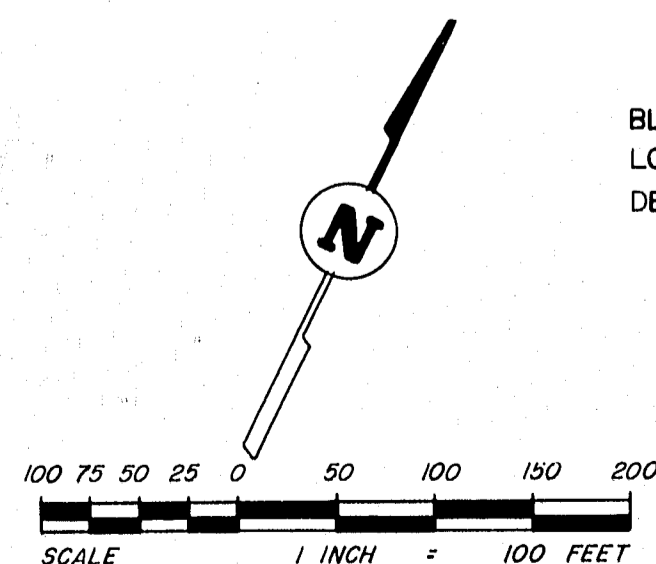
VICINITY MAP  
Not To Scale

PALM GROVE SUBDIVISION - NINTH ADDITION - MAP BOOK 31, PAGE 39



CURVE DATA				
CURVE NO.	DELTA	TANGENT	ARC	RADIUS
1	91°34'40"	25.70'	39.96'	25.00'
2	88°25'20"	24.32'	38.58'	25.00'
3	31°14'59"	13.98'	27.27'	50.00'
4	48°11'23"	11.18'	21.03'	25.00'
5	106°56'24"	67.50'	93.32'	50.00'
6	107°58'26"	68.75'	94.22'	50.00'
7	30°12'57"	13.50'	26.37'	50.00'
8	91°31'40"	25.68'	39.94'	25.00'

BLAKE SUBDIVISION  
LOT 118  
DEED BOOK E, PAGE 150



NOTE: 5' Drainage And Utility Easement Are Hereby Provided Along The Rear And Side Lot Lines Of All Lots (10' Overall With An Adjacent Lot) Unless Otherwise Specified.

- = Denotes P.R.M.
- = Denotes P.C.P.

PLAT BOOK 33  
AND PAGE 159

## DEDICATION

KNOW ALL MEN BY THESE PRESENTS, That the Corporation named below, being the owner in fee simple of the lands described in the foregoing caption to this plat, hereby dedicates said lands and plat for the uses and purposes therein expressed and dedicates the STREETS, THOROUGHFARES, AND EASEMENTS shown hereon to the perpetual use of the public, and  
IN WITNESS WHEREOF, has caused these presents to be signed and attested to by the officers named below and its corporate seal to be affixed hereto on OCTOBER 3, 1974.

ALAMEDA SERVICE CORP.  
By Charles J. Harris President  
Attest: Nicole M. Blankenship Secretary  
Signed and sealed in the presence of:  
Bobbie D. Horton  
Nicole M. Blankenship

STATE OF FLORIDA COUNTY OF VOLUSIA  
THIS IS TO CERTIFY, That on OCTOBER 3, 1974  
before me, an officer duly authorized to take acknowledgments in the State and County aforesaid, personally appeared CHARLES J. HARRIS and RAUL H. DARRY, JR. respectively Exec. Vice President and SECRETARY of the above named corporation incorporated under the laws of the State of FLORIDA, to me known to be the individuals and officers described in and who executed the foregoing Dedication and severally acknowledged the execution thereof to be their free act and deed as such officers thereunto duly authorized; that the official seal of said corporation is duly affixed thereto; and that the said Dedication is the act and deed of said corporation.

IN WITNESS WHEREOF, I have hereto set my hand and seal on the above date.

William A. Davis  
NOTARY PUBLIC  
My Commission Expires July 23, 1976

## CERTIFICATE OF SURVEYOR

KNOW ALL MEN BY THESE PRESENTS, That the undersigned, being a licensed and registered land surveyor, does hereby certify that on JUNE 6, 1974 he completed the survey of the lands as shown in the foregoing plat; that said plat is a correct representation of the lands therein described and platted; that permanent reference monuments have been placed as shown thereon as required by Chapter 177, Florida Statutes; and that said land is located in

Volusia County, Florida. Dated OCTOBER 3, 1974  
David E. Wine Registration No. 1418  
DAVID E. WINE

## CERTIFICATE OF APPROVAL BY PLANNING AND ZONING COMMISSION

THIS IS TO CERTIFY, That on AUGUST 21, 1974 the Zoning Commission of the below Municipality approved the foregoing plat.  
Robert James Felt Zoning Director

## CERTIFICATE OF APPROVAL BY MUNICIPALITY

THIS IS TO CERTIFY, That on SEPTEMBER 24, 1974 the foregoing plat was approved by the SOUTH DAYTONA CITY COUNCIL.

Attest: James M. Brown Mayor  
Reynold E. Hunt City Clerk

## CERTIFICATE OF CLERK

I HEREBY CERTIFY, That I have examined the foregoing plat and find that it complies in form with all the requirements of Chapter 177, Florida Statutes, and was filed for record on October 3, 1974 at 1:00 PM File No. 159

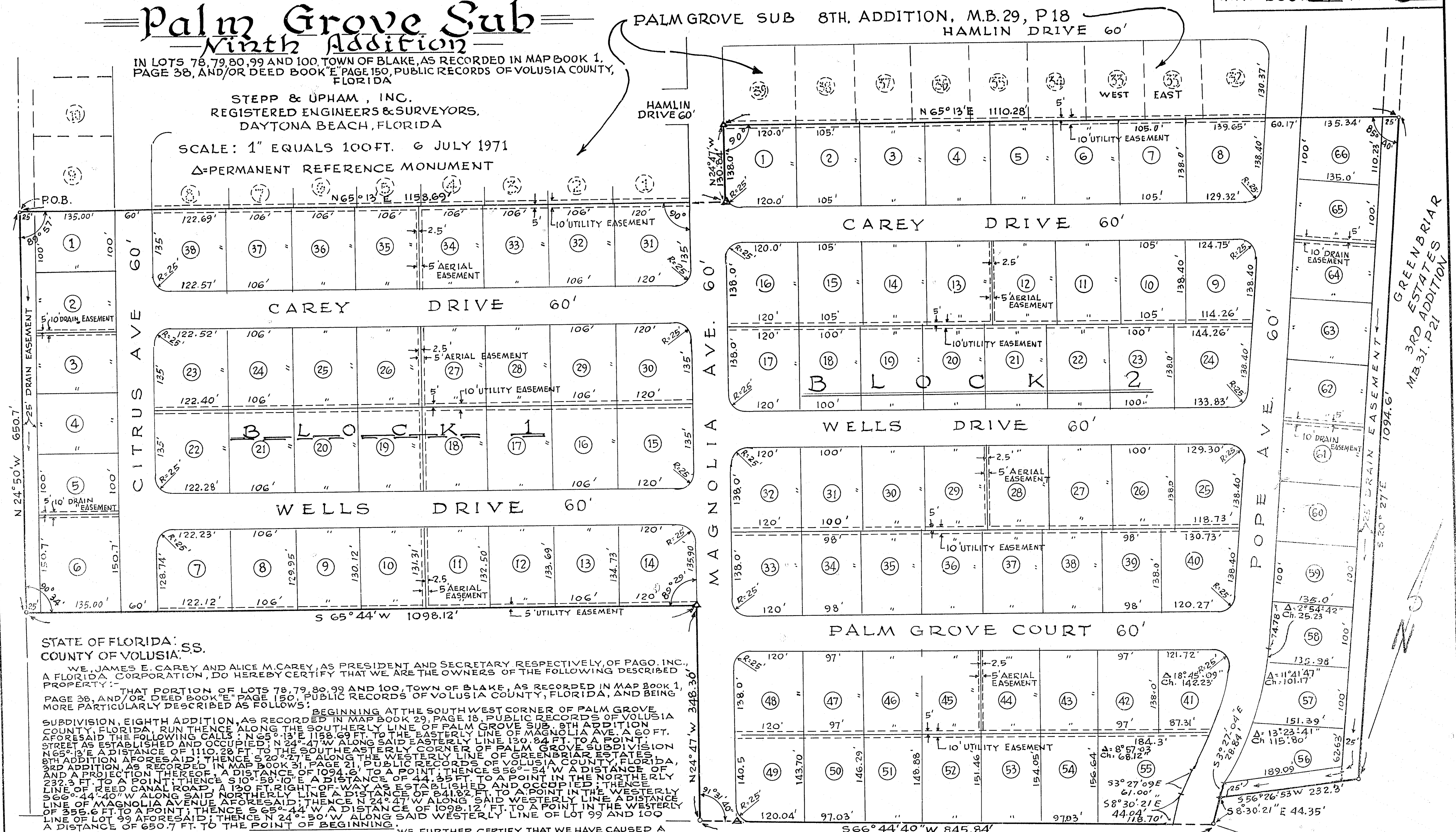
Clerk of the Circuit Court  
in and for Volusia County, Fla.

# Palm Grove Sub Ninth Addition

IN LOTS 78, 79, 80, 99 AND 100, TOWN OF BLAKE, AS RECORDED IN MAP BOOK 1, PAGE 38, AND/OR DEED BOOK "E" PAGE 150, PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA

STAPP & UPHAM, INC.  
REGISTERED ENGINEERS & SURVEYORS,  
DAYTONA BEACH, FLORIDA

SCALE: 1" EQUALS 100 FT. 6 JULY 1971  
Δ=PERMANENT REFERENCE MONUMENT



STATE OF FLORIDA: SS.  
COUNTY OF VOLUSIA: SS.

WE, JAMES E. CAREY AND ALICE M. CAREY, AS PRESIDENT AND SECRETARY RESPECTIVELY, OF PAGO, INC., A FLORIDA CORPORATION, DO HEREBY CERTIFY THAT WE ARE THE OWNERS OF THE FOLLOWING DESCRIBED PROPERTY:

THAT PORTION OF LOTS 78, 79, 80, 99 AND 100, TOWN OF BLAKE, AS RECORDED IN MAP BOOK 1, PAGE 38, AND/OR DEED BOOK "E" PAGE 150, PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA, AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS: BEGINNING AT THE SOUTHWEST CORNER OF PALM GROVE SUBDIVISION, EIGHTH ADDITION, AS RECORDED IN MAP BOOK 29, PAGE 18, PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA, RUN THENCE ALONG THE SOUTHERLY LINE OF PALM GROVE SUB, 8TH ADDITION, AFORESAID, THE FOLLOWING CALS: N 65° 13' E 1158.69' TO THE EASTERLY LINE OF MAGNOLIA AVE 60' FT. STREET AS ESTABLISHED AND OCCUPIED; N 24° 47' W 348.30' TO THE SOUTHEAST CORNER OF PALM GROVE SUBDIVISION, 8TH ADDITION AFORESAID; THENCE S 20° 27' E 1110.28' TO THE SOUTHEAST CORNER OF PALM GROVE SUBDIVISION, 8TH ADDITION, AS RECORDED IN MAP BOOK 31, PAGE 39, PUBLIC RECORDS OF VOLUSIA COUNTY, FLORIDA, AND A PROJECTION THEREOF A DISTANCE OF 1094.6' TO A POINT; THENCE S 55° 54' W A DISTANCE OF 232.3' TO A POINT; THENCE S 10° 58' E A DISTANCE OF 44.35' TO A POINT IN THE NORTHERLY LINE OF REED CANAL ROAD A 120' FT. RIGHT-OF-WAY AS ESTABLISHED AND OCCUPIED; THENCE S 66° 44' 40' W 845.84' TO THE NORTHERLY LINE OF MAGNOLIA AVENUE AFORESAID; THENCE N 24° 47' W 348.30' TO A POINT IN THE WESTERLY LINE OF LOT 99 AFORESAID; THENCE S 65° 44' W 1098.12' TO A POINT IN THE WESTERLY LINE OF LOT 99 AFORESAID; THENCE N 24° 50' W 650.7' TO THE POINT OF BEGINNING. A DISTANCE OF 650.7' FT. TO THE POINT OF BEGINNING.

WE FURTHER CERTIFY THAT WE HAVE CAUSED A SURVEY AND REPLAT TO BE MADE OF SAID LANDS AS SHOWN HEREON AND THAT THE SAME IS CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF AND WE DO HEREBY DEDICATE TO PUBLIC USE FOREVER ANY AND ALL STREETS, LANES OR OTHER THOROUGHFARES AND EASEMENTS LYING WITHIN SAID PROPERTY LINES, AND WE DO HEREBY FILE THIS PLAT FOR PUBLIC RECORD.

PAGO INC.

*Dear Deborah*  
*Wilbur C. Upson*  
*Paul J. Swadlow*  
*Jane V. Baker*

*James E. Carey*  
JAMES E. CAREY PRESIDENT  
*Alice M. Carey*  
ALICE M. CAREY SECRETARY

WITNESSES

STATE OF FLORIDA: S.S.  
COUNTY OF VOLUSIA: S.S.

I HEREBY CERTIFY THAT ON THIS DAY BEFORE ME, AN OFFICER DULY AUTHORIZED IN THE STATE AND COUNTY AFORESAID TO TAKE ACKNOWLEDGEMENTS, PERSONALLY APPEARED JAMES E. CAREY AND ALICE M. CAREY, TO ME KNOWN TO BE THE PERSONS DESCRIBED IN AND WHO EXECUTED THE FOREGOING INSTRUMENT AND ACKNOWLEDGED BEFORE ME THAT THEY EXECUTED THE SAME.

WITNESS MY HAND AND OFFICIAL SEAL IN THE STATE AND COUNTY LAST AFORESAID  
THIS 1st DAY OF July A.D., 1971  
MY COMMISSION EXPIRES \_\_\_\_\_  
*Byron E. Trent*  
NOTARY PUBLIC

APPROVED AND ACCEPTED BY THE CITY OF SOUTH DAYTONA, FLORIDA  
THIS 1st DAY OF July A.D., 1971

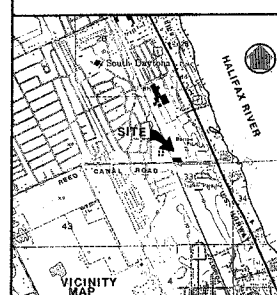
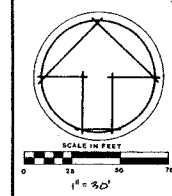
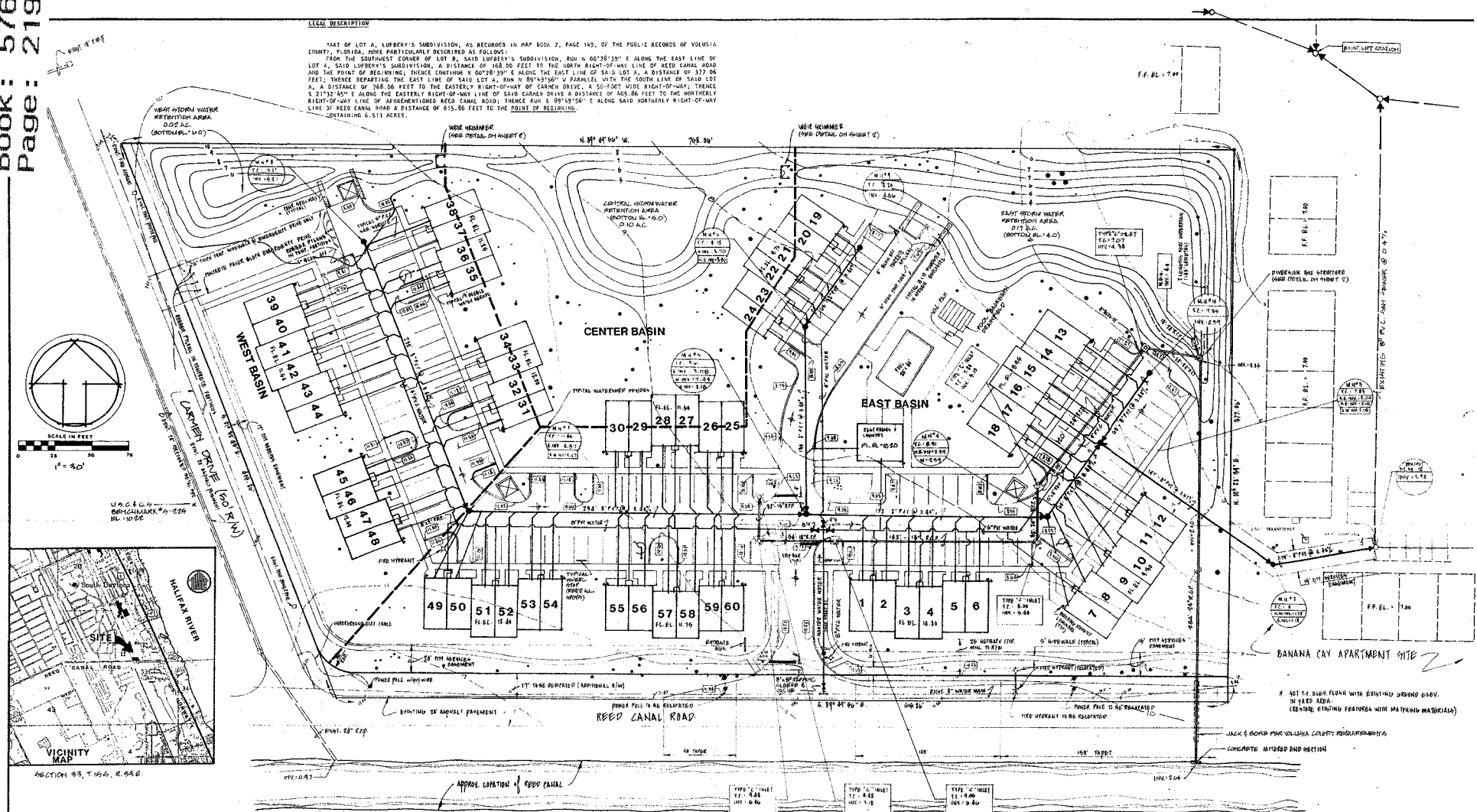
*Byron E. Trent*  
CLERK  
*David J. Brown*  
MAYOR

SURVEYORS CERTIFICATE  
I HEREBY CERTIFY THAT THE FOREGOING PLAT IS A CORRECT REPRESENTATION OF THE LAND SURVEYED AND THAT PERMANENT REFERENCE MONUMENTS HAVE BEEN PLACED AS REQUIRED BY THE SURVEY LAWS OF THE STATE OF FLORIDA

1971 JUL 22 REGISTERED SURVEYOR #669  
*J. H. Stepp*

CERTIFICATES OF APPROVAL:  
ZONING COMMISSION DATE July 21, 1971 CHAIRMAN *Donald McNeal*  
CITY ENGINEER *L. J. Dillard Jr.* DATE July 16, 1971  
CITY ATTORNEY *Robert Abraham* DATE July 22, 1971

Instrument# 2006-037034 # 26  
Book: 5766  
Page: 2199



**GENERAL NOTES**

EXISTING ZONING: R-2B  
SIZE OF SITE: 6.51 AC.  
NUMBER OF APARTMENTS: 121, INCLUDING 3 HANDICAPPED SPOTS  
NUMBER OF 10'x20' PARKING SLOTS: 217

**DEVELOPERS:**

BRIARCLIFF TOWNHOUSES PARTNERSHIP  
C. LARRY SIMS  
5 CIRCLE OAKS TRAIL  
ORLANDO BEACH, FL 32074  
904/673-5119

HANWELL C. BOALES  
318 RIVER BLUFF DRIVE  
ORLANDO BEACH, FL 32074  
904/672-0301

QUILFORD T. SIMS  
Rt. 1, Box 1154  
TAYLORS, FL 32778  
352/343-2072

SOIL TYPES ON SITE ARE DAYTONIA SANDS AND COCOA SANDS, WITH DEPTH TO WATER TABLE OF 3.5' - 5.0' AND 6.0' - 8.0', RESPECTIVELY.

**ENGINEER:** ZEV COHEN & ASSOCIATES, INC.  
55 SETON TRAIL  
ORLANDO BEACH, FL 32074  
904/677-2482

**SURVEYOR:** SLIGER & ASSOCIATES, INC.  
3911 SOUTH NOVA ROAD  
ORLANDO BEACH, FL 32019  
904/781-5385

**ARCHITECT:** KEITH MOORE  
1301 BEVILLE ROAD  
SOUTH DAYTONA, FL 32019  
904/788-4337

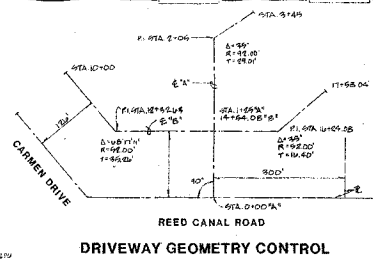
SANITARY SEWER SHALL BE 30" 35 PVC.  
WATER LINES TO BE 20" 26 PVC.  
CONTRACTOR TO VERIFY LOCATION OF EXISTING UTILITIES PRIOR TO START OF CONSTRUCTION.

SEE DRAWING JDS-166A BY SLIGER & ASSOCIATES, INC. AND KEY SHEET FOR TREE TYPES AND SIZES (TREES TO BE REMOVED NOT SHOWN ON THIS DRAWING).

BOUNDARY AND TOPOGRAPHY BY SLIGER & ASSOCIATES, INC.

TWO EXISTING SEPTIC TANKS ON SITE TO BE FILLED WITH DIRT (PER ORLANDO BEACH PERM 1210)

AREA TRIMITY CALCULATION BASED ON REGIONAL PROPERTY BOUNDARY LINES



**NOTES:**

- 1) PRE-ENGINEERING TO BE COMPLETED & INSTALLED BY CONTRACTOR.
- 2) STOP-ROAD TO BE 12" WHITE THERMOPLASTIC.
- 3) ALL CITY SIGNS TO BE 36" HIGHS 36" WIDE WHITE THERMOPLASTIC WITH A BOTTOM 12" HIGH TO BE 36" WIDE WHITE THERMOPLASTIC.
- 4) SIGHTING SIGN LOCATION APPROXIMATE TO CITY REQUIREMENTS.
- 5) MINIMUM 15' CLEAR BETWEEN WATER AND MAINLINE AT CAYMAN DRIVE, 30' LAND O.P. RESERVED FOR MAINLINE REPAIRS AT REPAIRING.

**INDEX OF SHEETS**

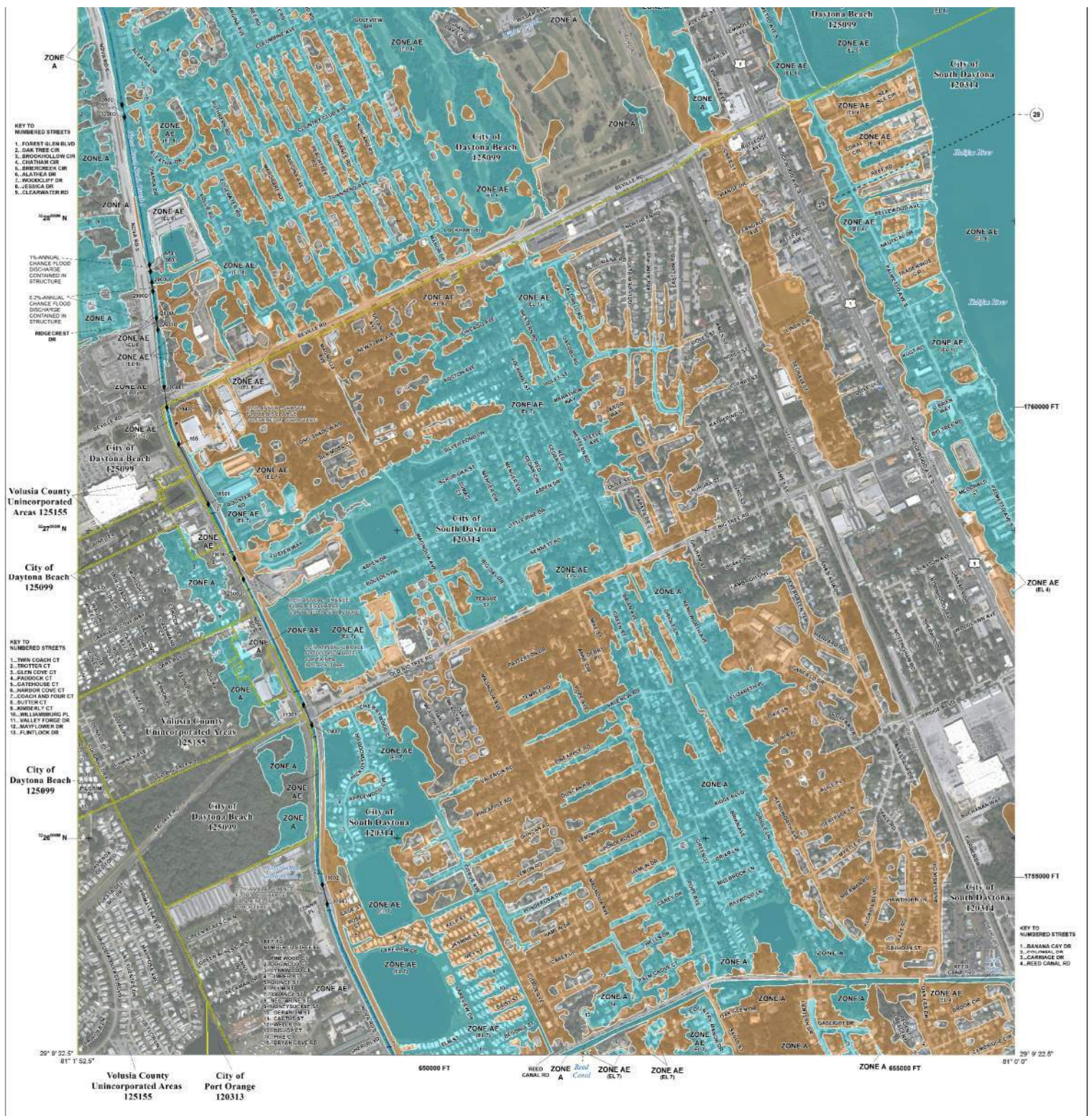
- 1 - SITE PLAN
- 2 - STORMWATER CALCULATIONS AND DETAILS
- 3 - WATER AND SANITARY SEWER DETAILS

REV	DATE	DESCRIPTION	BY
<b>BRIARCLIFF TOWNHOUSES</b> <b>SITE PLAN</b>			
CITY OF SOUTH DAYTONA VOLUSIA COUNTY, FLORIDA			
<b>ZEV COHEN &amp; associates, inc.</b> ENGINEERING • PLANNING • SURVEYING LANDSCAPING DESIGN 55 SETON TRAIL (904) 677-2482 ORLANDO BEACH, FLORIDA 32074			
DRAWING # B-201-1199-3		DESIGNER T.W.	1:15 FILE LOCATION
DATE 12-18-99		DRAWN/REVISION AR, JAC, JCH	
SCALE 1"=20'		SHEET 1 OF 3	

NOT FOR CONSTRUCTION  
Ex. A Page 2

**APPENDIX C**

**FEMA MAPS**



### FLOOD HAZARD INFORMATION

SEE HIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT  
**THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT**  
[HTTP://MSC.FEMA.GOV](http://MSC.FEMA.GOV)

**SPECIAL FLOOD HAZARD AREAS**

- Without Base Flood Elevation (BFE) Zone A, AE, AH, VE, AR
- Regulatory Floodway

**OTHER AREAS OF FLOOD HAZARD**

- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee See Notes Zone X
- NO SCREEN Areas of Minimal Flood Hazard Zone X
- Area of Undetermined Flood Hazard Zone D

**OTHER AREAS**

- Channel, Culvert, or Storm Sewer Accredited or Provisionally Accredited Levee, Dike, or Floodwall
- Non-accredited Levee, Dike, or Floodwall

**GENERAL STRUCTURES**

- Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)

### NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of the FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-Map11-877 or visit the FEMA Map Service Center website at <http://msc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

Communities annexing and/or adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM index. These may be ordered directly from the Map Service Center at the number listed above.

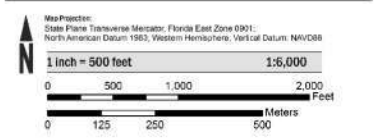
For community and countywide map data refer to the Flood Insurance Study report for this jurisdiction. To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-625-6925.

Base Map information shown on this FIRM was provided in digital format by Volusia County Growth and Resource Management, Volusia County GIS Department, Florida Department of Transportation, U.S. Fish and Wildlife Service, U.S. Geological Survey and FEMA.

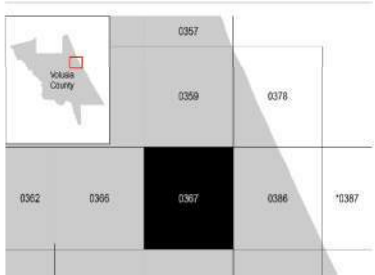
**Nodes:** Points used to define the topology of the hydrologic network

**1NED100**

### SCALE



### PANEL LOCATOR



**FEMA**  
 National Flood Insurance Program

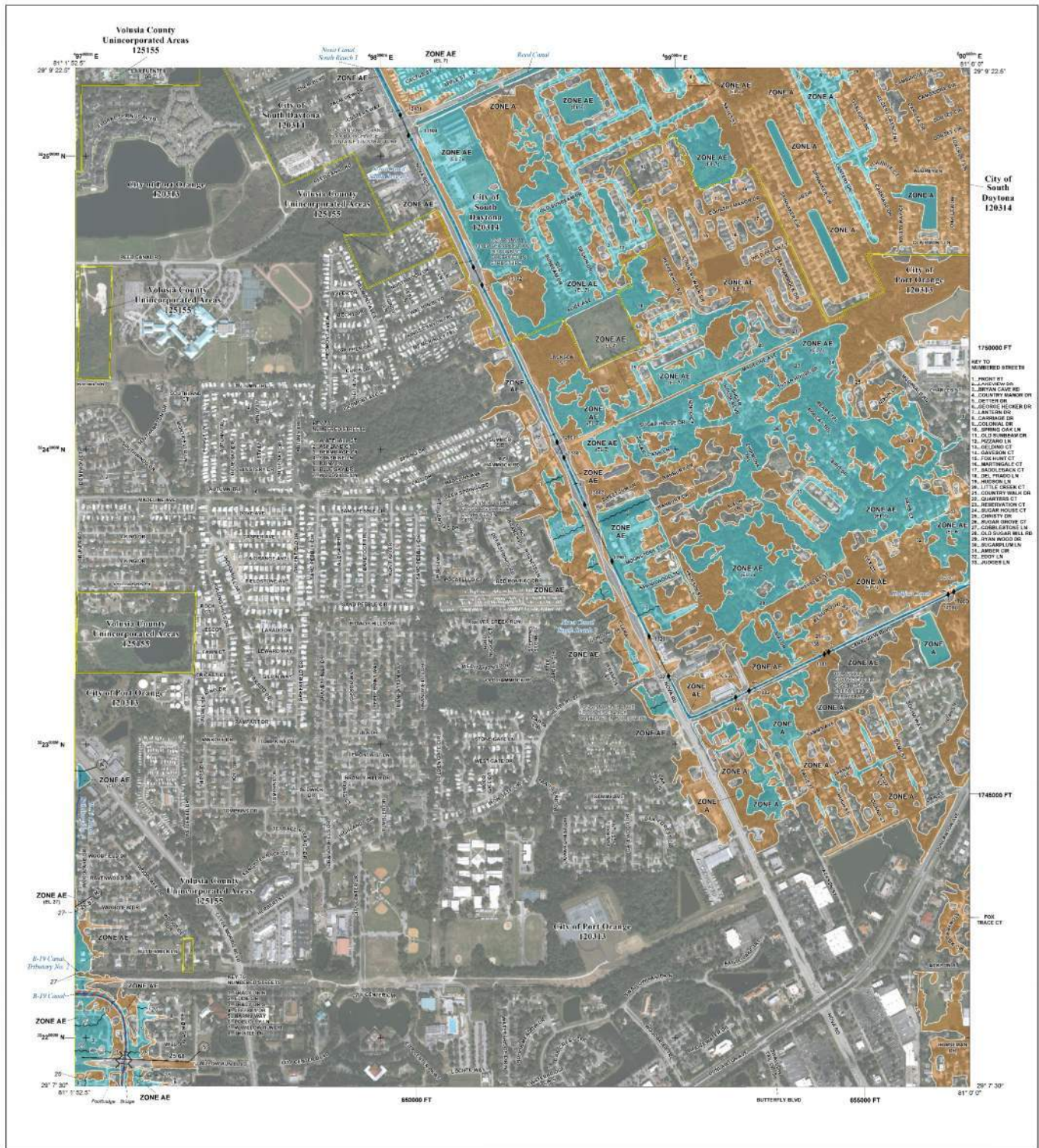
**NATIONAL FLOOD INSURANCE PROGRAM  
 FLOOD INSURANCE RATE MAP**

**VOLUSIA COUNTY, FLORIDA**  
 And Incorporated Areas

**PANEL 367 OF 930**

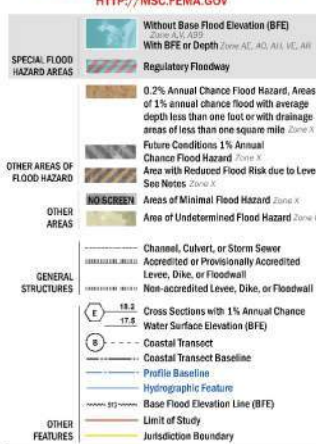
Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
DAYTONA BEACH, CITY OF	125099	0367	1
PORT ORANGE, CITY OF	120313	0367	1
SOUTH DAYTONA, CITY OF	120314	0367	1
VOLUSIA COUNTY, FLORIDA	125155	0367	1



# FLOOD HAZARD INFORMATION

SEE THIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT. THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT [HTTP://MSC.FEMA.GOV](http://msc.fema.gov)



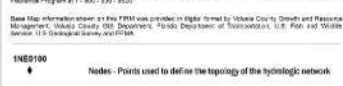
# NOTES TO USERS

For information and questions about this map, available products associated with the FIRM including historic versions of the FIRM, how to order products, or the National Flood Insurance Program in general, please call the FIRM Map Information Center at 1-877-FIRM-1 (1-877-376-2161) or visit the FIRM Map Information Center website at <http://msc.fema.gov>. Available products may include: Floodway Study, Letters of Map Change, a Flood Insurance Study Report, and/or digital editions of the map. Users of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the Flood Map Service Center website or by calling the FIRM Map Information Center.

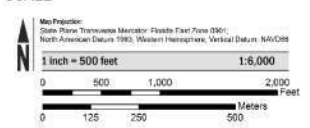
Communities receiving data on advanced FIRM panels must obtain a current copy of the advance panel as well as the current FIRM index. These may be ordered directly from the Map Service Center at the number listed above.

For community and countywide map data used in the Flood Insurance Study and for the purposes of determining flood insurance availability in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-338-9222.

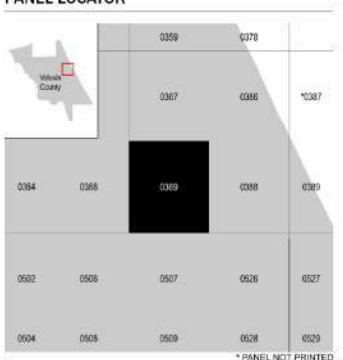
Base map information shown on this FIRM was provided in digital form by Volusia County Growth and Resource Management, Volusia County GIS Department, Florida Department of Transportation, U.S. Fish and Wildlife Service, U.S. Geological Survey, and FEMA.



# SCALE



# PANEL LOCATOR



**National Flood Insurance Program**

**NATIONAL FLOOD INSURANCE PROGRAM**

**FLOOD INSURANCE RATE MAP**

**VOLUSIA COUNTY, FLORIDA**

**PANEL 369 of 930**

**Panel Contains:**

COMMUNITY	NUMBER	PANEL	SUFFIX
PORT ORANGE, CITY OF	120313	0369	J
SOUTH DAYTONA, CITY OF	120314	0369	J
VOLUSIA, COUNTY	125155	0369	J

**VERSION NUMBER**

**2.3.3.2**

**MAP NUMBER**

**1212700369J**

**MAP REVISION**

**September 29, 2017**

**APPENDIX D**

**SOILS MAP**

Soil Map—Volusia County, Florida  
(REED CANAL ROAD SOIL CLASSIFICATIONS)



Soil Map—Volusia County, Florida  
(REED CANAL ROAD SOIL CLASSIFICATIONS)

## MAP LEGEND

### Area of Interest (AOI)

Area of Interest (AOI)

### Soils



Soil Map Unit Polygons



Soil Map Unit Lines



Soil Map Unit Points

### Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

### Water Features



Streams and Canals

### Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

### Background



Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Volusia County, Florida

Survey Area Data: Version 18, Sep 17, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 12, 2011—Dec 18, 2013

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
17	Daytona sand, 0 to 5 percent slopes	1.5	7.7%
29	Immokalee sand	3.3	17.2%
70	Tuscawilla-Urban land complex	14.5	75.1%
<b>Totals for Area of Interest</b>		<b>19.3</b>	<b>100.0%</b>

**APPENDIX E**

**ENVIRONMENTAL  
FEASIBILITY STUDY**

**(by Environmental Services, Inc.)**

**FEASIBILITY STUDY**

**REED CANAL ROAD SIDEWALK AND PEDESTRIAN CROSSING ENHANCEMENTS  
VOLUSIA COUNTY, FLORIDA**

**OCTOBER 2019**

**For**

**River to Sea TPO  
2570 West International Speedway Boulevard, Suite 100  
Daytona Beach, Florida 32114**

**HK197198**



**Environmental Services, Inc., A Terracon Company  
7220 Financial Way, Suite 100  
Jacksonville, Florida 32256**

## **I. INTRODUCTION**

Environmental Services, Inc., A Terracon Company (ESI) has completed an ecological feasibility study for the proposed sidewalk project along Reed Canal Road between South Nova Road and U.S. Highway 1 in Volusia County, Florida. The study corridor is described as approximately 1.52 miles long along the north Right-Of-Way (ROW) of Reed Canal Road. More specifically, the project is located in Sections 33,42, and 43, Township 15 South, and Range 33 East at the approximate central coordinates of 29.1585° north latitude, 81.0080° west longitude (Figure 1).

Per the information provided to ESI from Traffic Engineering Data Solutions, Inc. (TEDS), the proposed project will consist of the construction of a 6-foot wide sidewalk on the north side of Reed Canal Road beginning at Nova Road and ending at U.S. Highway 1. Additionally, the proposed project will create pedestrian crossings of stamped asphalt with command activated lighted crossing signage at Sauls Street, Oak Lea Drive, Lantern Park Drive, and the entrance to Reed Canal Park. Construction activities will include: sidewalk removal, curbing, sidewalk construction, and the installation of safety bollards.

The purpose of our investigation was to preliminarily assess the work corridor for the presence of jurisdictional wetlands in accordance with the current methodologies of the U.S. Army Corps of Engineers (ACOE) and the St. Johns River Water Management District (SJRWMD). In addition, ESI also investigated the study corridor for the potential presence and/or use of the area by any species protected by the Florida Fish and Wildlife Conservation Commission (FWC) and/or the U.S. Fish and Wildlife Service (FWS). The study was initiated with a review of topographic maps, soil survey information, and color infrared aerial photographs of the study area, along with relevant technical publications and field guides. An additional in-house review of previous state and local permitting information was also reviewed to help further characterize the area. Upon completion of the in-house review, ESI staff inspected the study area on 14 October 2019. The following report summarizes our interpretation of the status of the subject project area.

## **II. WILDLIFE STUDY**

ESI initiated a wildlife study of the Reed Canal Rd. corridor with a literature search of the listed species known to occur in this portion of Volusia County, Florida. The literature consulted included lists supplied by FWC, FWS, and the Florida Natural Areas Inventory (FNAI) along with technical publications and field guides. Based on this information, and knowledge of the specific habitat requirements for the individual listed species, the probability of each species occurrence on the site was considered.

Table 1 - Comprehensive List of Endangered and Threatened Species - Volusia, Florida (Source: FWC, FNAI, and USFWS)						
Common Name	Scientific Name	Federal Status*	State Status*	Habitat Typically Utilized By Species	Habitat Present?	Observed on site?
Okeechobee gourd	<i>Cucurbita okeechobeensis</i> ssp.	E	FE	Pond apple swamps and mucky soils along St. Johns River floodplain forests, and Lake Okeechobee shores	No	No
Rugel's Pawpaw	<i>Deeringothamnus rugelii</i>	E	FE	Open slash pine or longleaf pine flatwoods with wiregrass and sawpalmetto understory	No	No
Red-cockaded Woodpecker	<i>Picoides borealis</i>	E	FE	Open, mature pine woodlands	No	No
Everglade Snail Kite	<i>Rostrhamus sociabilis plumbeus</i>	E	FE	Large open freshwater marshes and lakes with shallow water	No	No
Piping Plover	<i>Charadrius melodus</i>	T	FT	Open sandy beaches and on tidal mudflats and sandflats	No	No
Wood Stork	<i>Mycteria americana</i>	T	FT	Freshwater and estuarine wetlands, freshwater marshes, tidal creeks	Yes	No
Florida Scrub-jay	<i>Aphelocoma coerulescens</i>	T	FT	Fire-dominated, low-growing oak scrub found on well-drained sandy soils	No	No
Tricolored Heron	<i>Egretta tricolor</i>	-	ST	Forested and open water wetlands, streams, lakes, and swamps	Yes	No
Little Blue Heron	<i>Egretta caerulea</i>	-	ST	Shallow freshwater lakes, marshes, swamps and streams	Yes	No
American Oystercatcher	<i>Haematopus palliatus</i>	-	ST	Large areas of beach, sandbar, mud flat, and shellfish beds	No	No
Black Skimmer	<i>Rynchops niger</i>	-	ST	Coastal waters, beaches, bays, estuaries, sandbars, tidal creeks and inland waters including large lakes and flooded agricultural fields	No	No
Florida Sandhill Crane	<i>Grus canadensis</i>	-	ST	Praries, freshwater marshes, and pasture lands	No	No
Redish Egret	<i>Egretta rufescens</i>	-	ST	Forested and open water wetlands, streams, lakes, and swamps	Yes	No
Least Tern	<i>Sternula antillarum</i>	-	ST	Coastal areas, beaches, lagoons, bays, and estuaries	No	No
Southeastern American Kestrel	<i>Falco sparverius paulus</i>	-	ST	Open pine, woodland edges, prairies and pastures	No	No
Roseate Spoonbill	<i>Platalea ajaja</i>	-	ST	Coastal marshes, mangrove-dominated inlets, freshwater sloughs and marshes	Marginal	No
Shortnose Sturgeon	<i>Acipenser brevirostrum</i>	E	FE	Salt, brackish, and freshwater habitats	Yes	No
Bluenose Shiner	<i>Pteronotropis welaka</i>	-	ST	Quiet backwaters and pools of blackwater streams and river and spring runs	No	No
Gopher Tortoise	<i>Gopherus polyphemus</i>	C	ST	Dry upland habitats; also disturbed habitats such as pastures, oldfields, and road shoulders	Marginal	No
Florida Pine Snake	<i>Pituophis melanoleucus migitus</i>	-	ST	Dry upland habitats such as sandhills and scrubby flatwoods; also oldfields and pastures	No	No
Eastern Indigo Snake	<i>Drymarchon corais couperi</i>	T	FT	Broad range including scrub, sandhill, wet praries, and mangrove swamps	No	No
Atlantic Salt Marsh Snake	<i>Nerodia clarkii taeniata</i>	T	FT	Saltmarsh tidal flats that contain grasses such as glasswort, Spartina, and Juncus	Marginal	No
American Alligator	<i>Alligator mississippiensis</i>	-	FT	Freshwater lakes, slow moving rivers, and brackish water habitats	Marginal	No
Green Sea Turtle	<i>Chelonia mydas</i>	T	FE	Estuarine and marine coastal and oceanic waters	No	No
Hawksbill Sea Turtle	<i>Eretmochelys imbricata</i>	E	FE	Marine coastal and oceanic waters	No	No
Kemps Ridley Sea Turtle	<i>Lepidochelys kempii</i>	E	FE	Marine coastal waters, usually with sand or mud bottoms	No	No
Leatherback Sea Turtle	<i>Dermochelys coriacea</i>	E	FE	Oceanic waters	No	No
Loggerhead Sea Turtle	<i>Caretta caretta</i>	T	FT	Marine coastal and oceanic waters	No	No
North Atlantic Right Whale	<i>Eubalaena glacialis</i>	E	FE	Atlantic Ocean	No	No
West Indian Manatee	<i>Trichechus manatus</i>	T	FT	Coastal waters, bays, rivers, and occasional lakes	Marginal	No

\*Defintions of above terms: T - Threatened, E - Endangered, FE - State Listed as Federally-designated Endangered, FT - State Listed as Federally-designated Threatened, ST - State Listed as Threatened, DL - Delisted, SSC - Species of Special Concern, C - Candidate

\*\*Table Sources: [FNAI] Florida Natural Areas Inventory. FNAI Tracking List. <http://fnaif.org/bioticssearch.cfm>.

[USFWS] United States Fish and Wildlife Service. Environmental Conservation Online System. [http://ecos.fws.gov/tess\\_public/reports/species-by-current-range-county?tips=12031](http://ecos.fws.gov/tess_public/reports/species-by-current-range-county?tips=12031).

[FWC] Florida Fish and Wildlife Conservation Commission. Florida's Imperiled Species Management Plan, Oct 12, 2015 Draft. <http://myfwc.com/media/3344480/draft-ismp-october-2015.pdf>

Due to the nature of the proposed project, use of the area by a wide variety of protected species is not likely. The work area is alongside an existing two-lane highway with commercial and residential uses on the northern edge, and an upland cut canal named the Reed Canal along the southern edge; and work will primarily occur within an existing mowed and maintained right-of-way.

Based on ESI's review, it is not anticipated that the project will have any detrimental impact on any state or federally listed species. Soils surrounding the majority of the study corridor do not appear to be sufficiently drained to support habitat for the gopher tortoise (*Gopherus polyphemus*). The eastern most portion of the corridor does appear to contain more suitable-well draining soils, though at no point during the site investigation were any signs of gopher tortoise, or gopher tortoise burrows observed. Should work be limited to within the existing maintained right-of-way, no adverse effect is likely for this species.

Marginal foraging habitat for wading birds such as the wood stork (*Mycteria americana*) occurs along the littoral fringes of the Reed Canal system that runs along the southern edge of the study corridor. Impacts to wood storks will be considered as part of the federal wetland permitting process (if necessary), but it is unlikely the proposed project will be determined to adversely affect the species. Additionally, the study corridor is not within the core foraging area (CFA) of any wood stork rookeries, and therefore would be unlikely to adversely affect the species. As for the remaining wading birds, if the Reed Canal system south of the road remains unchanged, the project would be unlikely to adversely affect any of the listed species, and no further action would be necessary.

Marginal habitat for the West Indian manatee (*Trichechus manatus*), American alligator (*Alligator mississippiensis*), Atlantic saltmarsh snake (*Nerodia clarkii taeniata*), and shortnose sturgeon (*Acipenser brevirostrum*), is also present due to the Reed Canal system that runs along the southern edge of the study corridor, and its connection to the Halifax River. The continuation of the proposed project would not have any affect on these species if the Reed Canal system remains unaltered.

The study corridor was also reviewed for the presence of bald eagle (*Haliaeetus leucocephalus*), and osprey (*Pandion haliaetus*), and the occurrence of any nests. At no point during the site investigation were either of these species, or their nests observed within the study corridor, or the adjacent properties. After review of the FWC Bald Eagle (*Haliaeetus leucocephalus*) nesting data resulted in one, inactive bald eagle nest within one mile of the study corridors boundaries. Nest ID VO049, located approximately one-half of a mile west of the intersection of S. Nova Road and Reed Canal Road. This nest was last known to be active in 2003 and was last surveyed in 2016. Due to the study corridor being located further than 660 feet from the eagle nest, there will be no further action required. The continuation of the proposed project would have no adverse effect on these species.

### **III. WETLANDS STUDY**

ESI has investigated the proposed project corridor for the presence of any state or federally jurisdictional wetlands or surface waters in accordance with the current methodologies of ACOE and SJRWMD. ESI initiated the investigation with a review of historic and infrared aerial photography, along with National Wetlands Inventory (NWI) data and soils maps. This review was supplemented with the historic permitting review. Based on this information, no direct evidence of any wetlands or surface waters were noted on the northern side of Reed Canal Road, though a riverine canal system lies just outside the maintained right-of-way of the southern side of Reed Canal Road. On 14 October 2018, ESI staff performed a site review of the corridor to further investigate for the presence of any jurisdictional wetlands or surface waters within the intended project area. Upon review it was concluded that none of the wetlands or surface waters within the study corridor are of high quality or unique communities.

Should all work occur within the maintained right-of-way on the north side of Reed Canal Road, ESI does not anticipate wetland impacts as long as the ditch crossings, located ~200-feet west of Citrus Avenue, and ~170-feet west of Florida Boulevard, are not expanded. However, if work occurs outside of the existing maintained right-of-way, or along the right-of-way on the south side of Reed Canal Road, then there is potential for wetland impacts. Should wetland impacts prove necessary for the continuation of this project, appropriate ACOE and SJRWMD permits would be required, and mitigation may be necessary depending on the size of the impacts and type of permit required. The project falls within SJRWMD Mitigation Basin 17 – Halifax River. Based on ESI permitting experience, joint mitigation credits in this basin sell for \$145,000.00 per credit. Avoidance of any wetland areas by constructing within the maintained right-of-way is the optimal alternative from a wetland permitting perspective.

### **IV. ADDITIONAL CONSIDERATIONS**

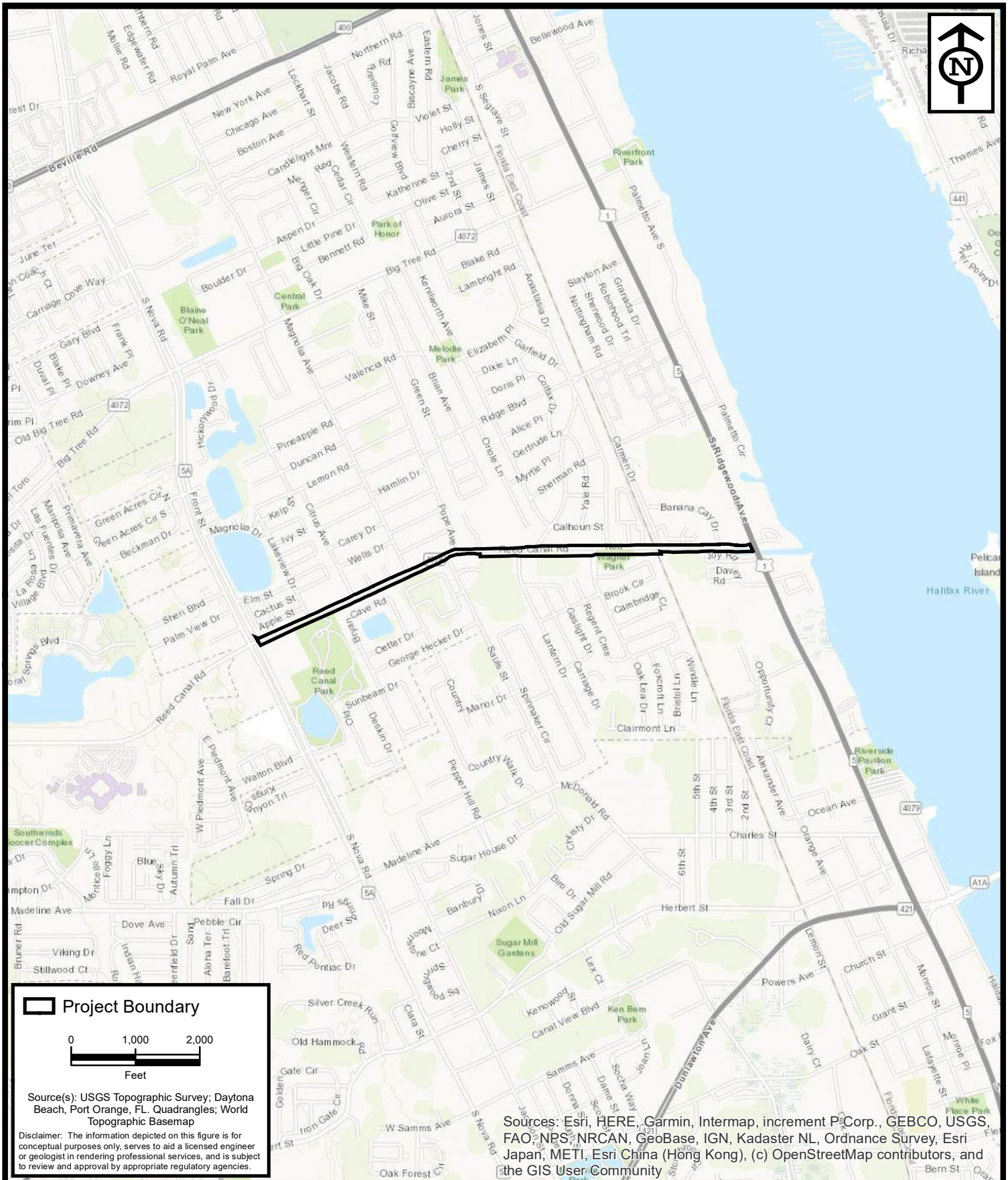
During ESI's site investigation of the study corridor, black mangroves (*Avicennia germinans*) were observed along the littoral fringe of Reed Canal. The presence of this species was sporadic beginning just west of the Lantern Drive Bridge and became more prominent closer to the Halifax River (Figure 3). Mangroves are protected under the FDEP 1996 Mangrove Trimming and Preservation ACT section 403.9321 and the unregulated removal, defoliation, or destruction of the species is prohibited. If the completion of the intended project would require the removal or alteration of these mangroves, correspondence and permitting with the FDEP would be required to move forward with the project activities.

### **V. SUMMARY**

ESI has performed an ecological feasibility assessment of proposed Reed Canal Road Sidewalk project. Based on in-house and field reviews, wetlands may need to be addressed if construction occurs outside of the maintained right-of-way of Reed Canal Road. Depending on the final site design, wetland impacts may be necessary and therefore require permits from SJRWMD and

ACOE. Depending on the size of potential wetland impacts and permit types, mitigation may be required. ESI also reviewed the project area for the potential presence and/or utilization by listed wildlife species. It is not anticipated this phase of the project will have any detrimental impacts on any state or federally listed species. Any impacts to mangroves within Reed Canal would require consultation and permitting with FDEP.

SF/smc/HK197198.reedcanalrfeasibilitystudy.doc  
N:projects103019f



Project Location

## Reed Canal Road Sidewalks Feasibility

Volusia County, Florida

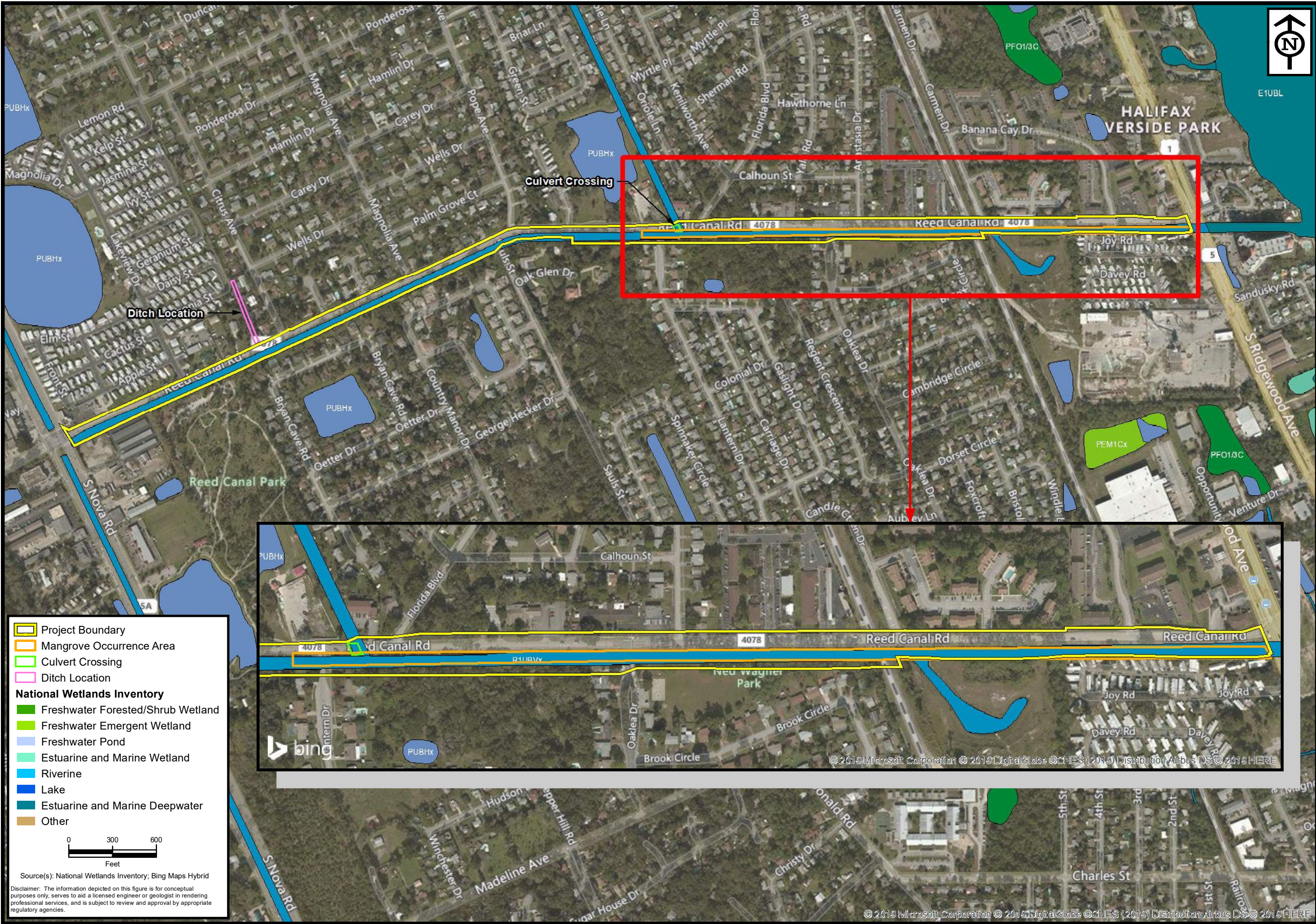
Project:	HK197198
Date:	Oct 2019
Drawn By:	AA
Checked By:	JRN
Approved By:	BAA
Figure:	1



**ENVIRONMENTAL  
SERVICES, INC.**

7220 Financial Way, Suite 100  
Jacksonville, Florida 32256  
(904) 470-2200  
(904) 470-2112 Fax

www.environmentalservicesinc.com



- Project Boundary
- Mangrove Occurrence Area
- Culvert Crossing
- Ditch Location
- National Wetlands Inventory**
  - Freshwater Forested/Shrub Wetland
  - Freshwater Emergent Wetland
  - Freshwater Pond
  - Estuarine and Marine Wetland
  - Riverine
  - Lake
  - Estuarine and Marine Deepwater
  - Other

Source(s): National Wetlands Inventory; Bing Maps Hybrid

Disclaimer: The information depicted on this figure is for conceptual purposes only, serves to aid a licensed engineer or geologist in rendering professional services, and is subject to review and approval by appropriate regulatory agencies.

Project:	HK197198
Date:	Oct. 2019
Drawn by:	AA
Checked by:	JRN
Approved by:	BAA
Figure:	2

Feasibility Location

# Reed Canal Road Sidewalks Feasibility

Volusia County, Florida

**ENVIRONMENTAL SERVICES, INC.**

7220 Financial Way, Suite 100  
Jacksonville, Florida 32256  
(904) 470-2200  
(904) 470-2112 Fax

[www.environmentalservicesinc.com](http://www.environmentalservicesinc.com)

**Figure 3A**  
**Black Mangrove Along Reed Canal**



**Figure 3.B**  
**Facing West, Black Mangrove Along Eastern Extent of Reed Canal**



**APPENDIX F**

**CULTURAL RESOURCES  
FEASIBILITY STUDY**

**(by Environmental Services, Inc.)**

**CULTURAL RESOURCES FEASIBILITY STUDY:**  
**REED CANAL ROAD SIDEWALK AND PEDESTRIAN CROSSING ENHANCEMENTS**  
**VOLUSIA COUNTY, FLORIDA**

**OCTOBER 2019**

**For**

**River to Sea TPO**  
**2570 West International Speedway Boulevard, Suite 100**  
**Daytona Beach, Florida 32114**

**Environmental Services, Inc., A Terracon Company**  
**7220 Financial Way, Suite 100**  
**Jacksonville, Florida 32256**

**ESI Project Number: HK197198**

Environmental Services, Inc., A Terracon Company (ESI) has completed a cultural resource desktop feasibility study for the proposed sidewalk project along Reed Canal Road between South Nova Road and U.S. Highway 1 in Volusia County, Florida. The study corridor is described as approximately 1.52 miles long along the north Right-Of-Way (ROW) of Reed Canal Road. More specifically, the project is located in Sections 33, 42, and 43, Township 15 South, and Range 33 East at the approximate central coordinates of 29.1585° north latitude, 81.0080° west longitude.

The proposed project will consist of the construction of a 6-foot wide sidewalk on the north side of Reed Canal Road beginning at Nova Road and ending at U.S. Highway 1. Additionally, the proposed project will create pedestrian crossings of stamped asphalt with command activated lighted crossing signage at Sauls Street, Oak Lea Drive, Lantern Park Drive, and the entrance to Reed Canal Park. Construction activities will include: sidewalk removal, curbing, sidewalk construction, and the installation of safety bollards.

The purpose of this desktop investigation was to preliminarily assess the work corridor for the presence of known cultural resources, areas that have been previously tested using current standards, and areas of moderate to high probability for containing these resources. The study was initiated with a review of topographic maps, historic aerials, and soil survey information of the study area, along with relevant technical publications and a search of the Florida Master Site File (FMSF) for previously recorded cultural resources such as archaeological sites, cemeteries, and historic structures (buildings, bridges, and canals).

As a result of the cultural resource desktop evaluation, it was determined that the eastern portion of the project corridor was previously subjected to an archaeological and historical investigation

in 2017. This investigation recorded the Reed Canal (8VO9790) as a historic resource group (linear), which was deemed ineligible for listing in the National Register of Historic Places (NRHP) by the recorders and the Florida Division of Historical Resources (aka SHPO). In addition to the Canal, the bridge at Reed Canal Road and US-1 has also been recorded, along with the FEC Railroad. The bridge is considered ineligible, but the railroad tracks have been determined to be eligible by SHPO.

Recommendations: It is likely above ground historic resources that have yet to be recorded are within the area of potential effect of the current project. It is also likely some level of cultural resource assessment will be required during the permitting process. If an archaeological survey is recommended by the various review agencies, it is the team's opinion that testing should be focused in the central to western portion of the corridor.

## **APPENDIX G**

# **FDOT APPROVED INFLATION FACTORS**



# FLORIDA DEPARTMENT OF TRANSPORTATION

## TRANSPORTATION COSTS REPORTS

### Inflation Factors

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This “*Transportation Costs*” report is issued by the Office of Policy Planning. It provides information on inflation factors and other indices that may be used to convert Present Day Costs (PDC) to future Year Of Expenditure costs (YOE) or vice versa. This report is updated regularly based on the FDOT Work Program Instructions.

Please note that the methodology for inflationary adjustments relating to specific transportation projects should be addressed with the district office where the project will be located. For general use or non-specific areas, the guidelines provided herein may be used for inflationary adjustments.

#### Construction Cost Inflation Factors

The table on the next page includes the inflation factors and Present Day Cost (PDC) multipliers that are applied to the Department’s Work Program for highway construction costs expressed in Fiscal Year 2019 dollars (FY 2019 runs from July 1, 2018 to June 30, 2019).

#### Other Transportation Cost Inflation Factors

Other indices may be used to adjust project costs for other transportation modes or non-construction components of costs. Examples are as follows:

The Consumer Price Index (CPI, also retail price index) is a weighted average of prices of a specified set of products and services purchased by wage earners in urban areas. As such, it provides one measure of inflation. The CPI is a fixed quantity price index and a reasonable cost-of-living index.

The Employment Cost Index (ECI) is based on the National Compensation Survey, administered by the Bureau of Labor Statistics (BLS). It measures quarterly changes in compensation costs, which include wages, salaries, and other employer costs for civilian workers (nonfarm private industry and state and local government).

The monthly series, Producer Price Index for Highway and Street Construction, is also available from BLS. It provides national-level estimates of past and recent highway construction inflation. The Producer Price Index (PPI) web site is <http://www.bls.gov/ppi/home.htm>.



# FLORIDA DEPARTMENT OF TRANSPORTATION

## TRANSPORTATION COSTS REPORTS

### Work Program Highway Construction Cost Inflation Factors

Fiscal Year	Inflation Factor	PDC Multiplier
2019	Base	1.000
2020	2.6%	1.026
2021	2.6%	1.053
2022	2.7%	1.081
2023	2.8%	1.111
2024	2.9%	1.144
2025	3.0%	1.178
2026	3.1%	1.214
2027	3.2%	1.253
2028	3.3%	1.295
2029	3.3%	1.337
2030	3.3%	1.381
2031	3.3%	1.427
2032	3.3%	1.474
2033	3.3%	1.523
2034	3.3%	1.573
2035	3.3%	1.625
2036	3.3%	1.679
2037	3.3%	1.734
2038	3.3%	1.791
2039	3.3%	1.850
Source: Offices of Work Program and Budget and Policy Planning (Fiscal Year 2019 is July 1, 2018 to June 30, 2019)		

### Advisory Inflation Factors For Previous Years

Another “*Transportation Costs*” report covers highway construction cost inflation for previous years. “*Advisory Inflation Factors For Previous Years (1987-2018)*” provides Present Day Cost (PDC) multipliers that enable project cost estimates from previous years to be updated to FY 2018. For the table and text providing this information, please go to

[https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/planning/policy/economic/retrocostinflation220259309.pdf?sfvrsn=ce29b2b6\\_2](https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/planning/policy/economic/retrocostinflation220259309.pdf?sfvrsn=ce29b2b6_2)