City of Deltona

FINAL Providence Boulevard

Shared Use Path Feasibility Study

RIVER TO SEA TPO
Transportation Planning Organization
VISION - PLAN - IMPLEMENT

INFRASTRUCTURE ENGINEERS, INC.

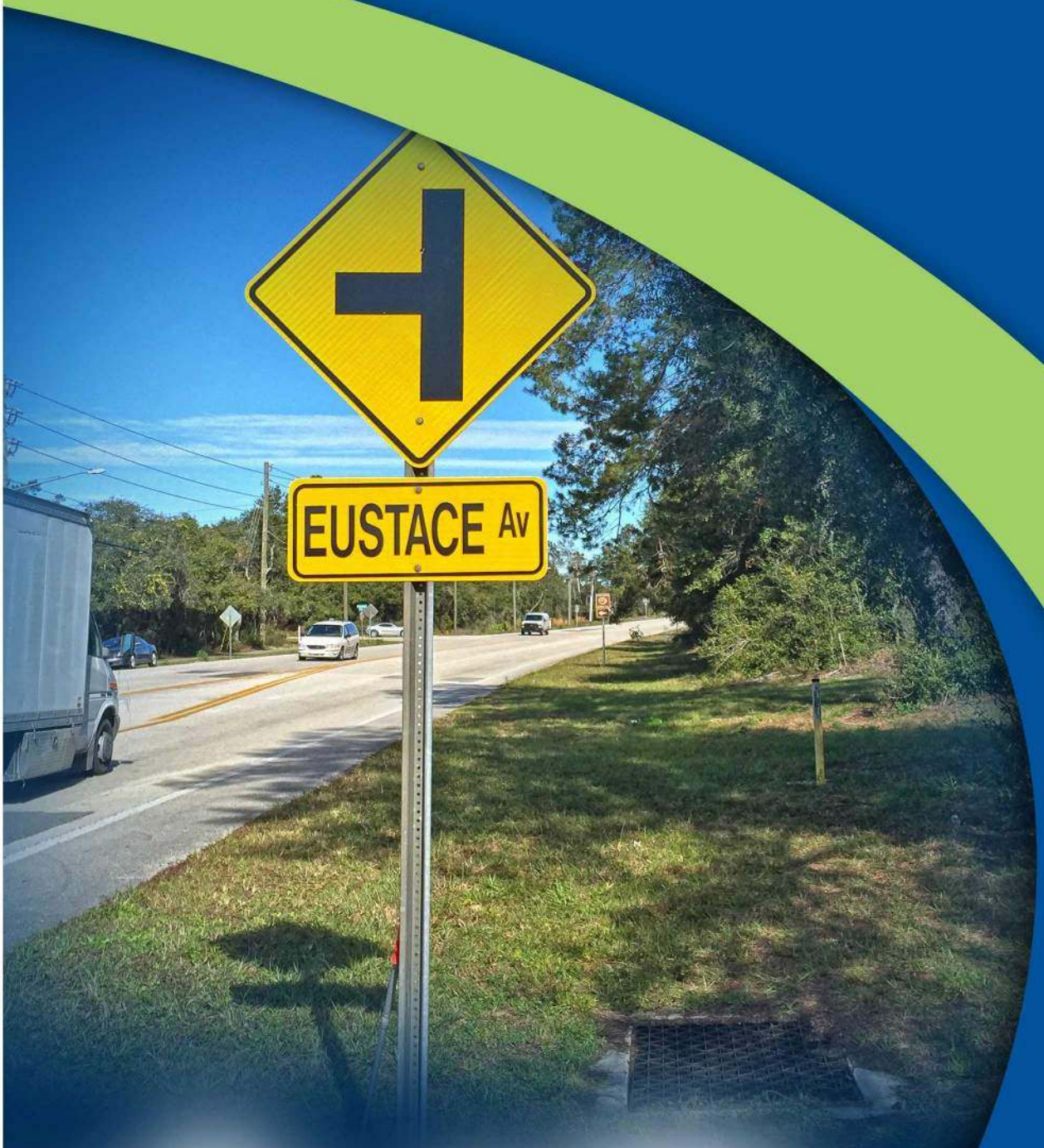
TABLE OF CONTENTS

LIST OF PHOTOGRAPHS

LIST OF TABLES

APPENDICES

Introduction



INFRASTRUCTURE ENGINEERS, INC.

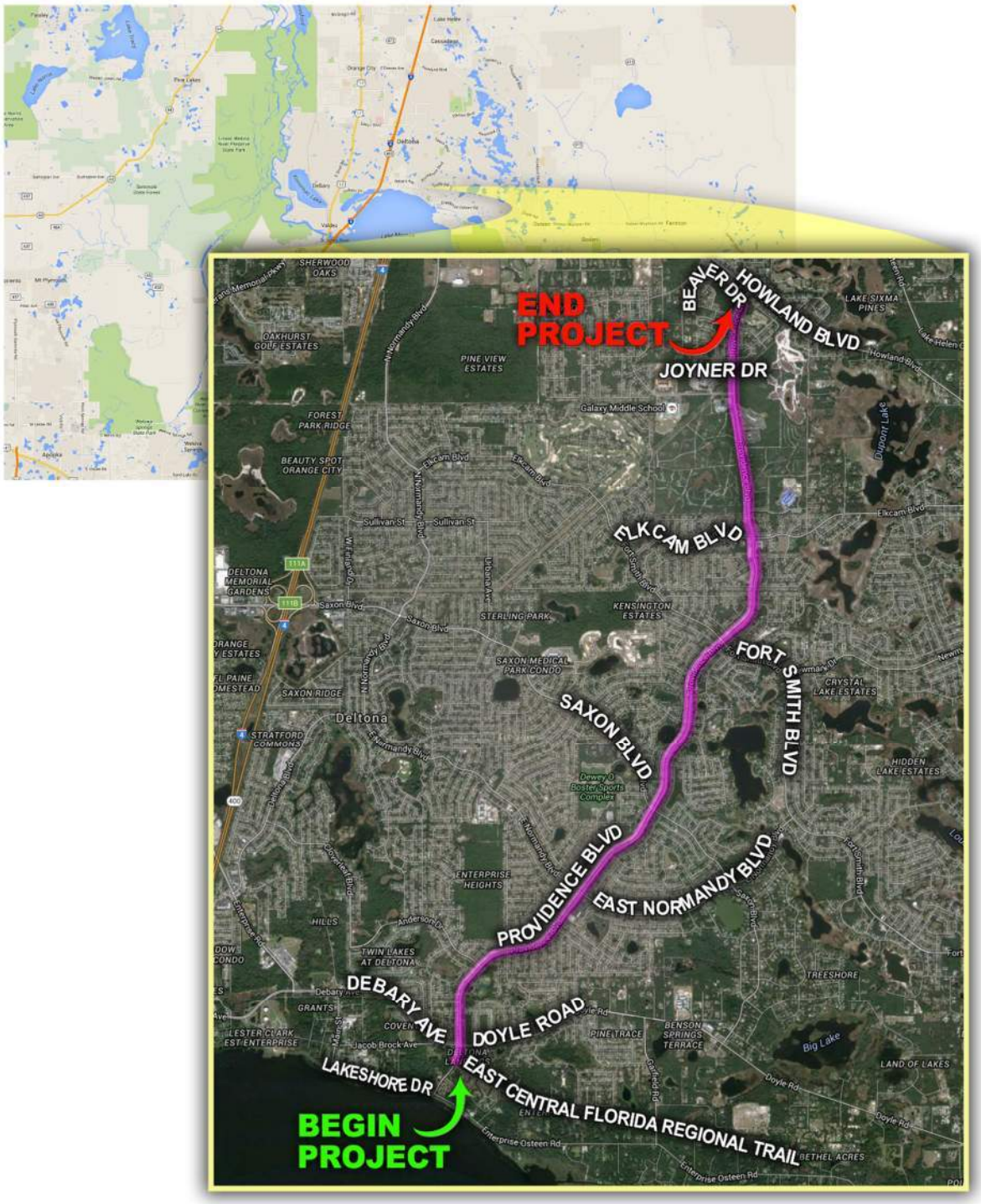
RIVER TO SEA TPO
Transportation Planning Organization
VISION - PLAN - IMPLEMENT

I. INTRODUCTION

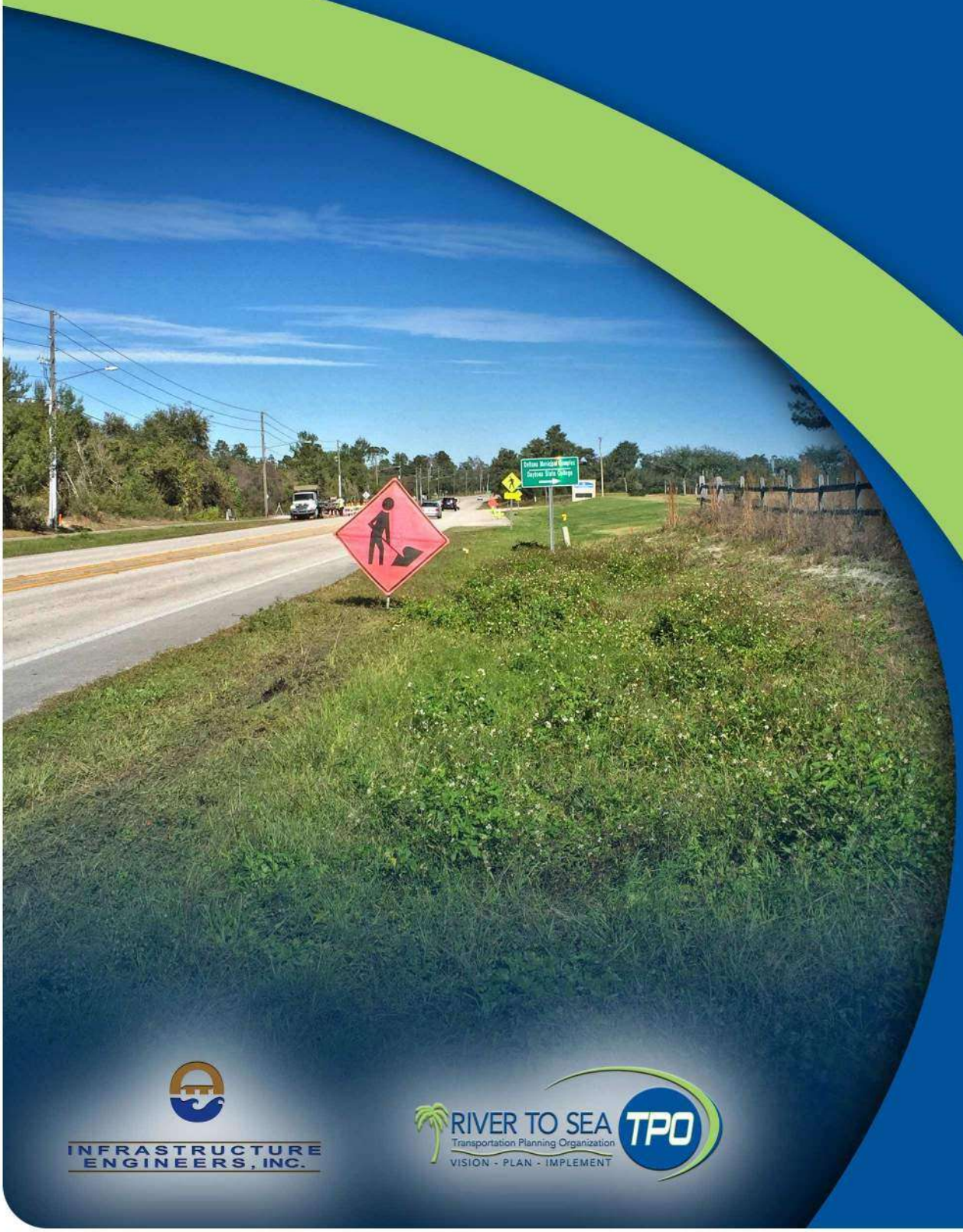
The City of Deltona has submitted an application to the River to Sea Transportation Planning Organization (R2CTPO) for the review of a feasibility study for a new 6.1-mile shared use path. The intent is to provide a 10-ft. - 12-ft. wide path where possible. Although not preferred, it may be necessary to further reduce the width to an 8-ft. sidewalk in order to minimize and/or avoid conflicts with utilities and drainage, as well as avoid right-of-way acquisition. The shared use path will follow along the east side of Providence Boulevard through Deltona from the East Central Florida Regional Trail to just south of Beaver Drive. This project will connect four major commercial nodes as well as connect over twenty-four public facilities. It will also provide connectivity to the East Central Florida Regional Trail and the Lakeshore Multi-use Path. See Exhibit 1, Project Location Map.

The impetus for this project is based on the need to meet the City's mobility standards in Deltona's Comprehensive Plan, which are to expand connections to commercial, institutional, and recreational nodes for bicycle and pedestrian use. The shared use path will comply with the pedestrian and bicycle standards set forth in Deltona's Land Development Code and the 2010 ADA Standards for Accessible Design.

Exhibit 1 - Project Location Map



Purpose and Objectives



INFRASTRUCTURE ENGINEERS, INC.

RIVER TO SEA TPO
Transportation Planning Organization
VISION - PLAN - IMPLEMENT

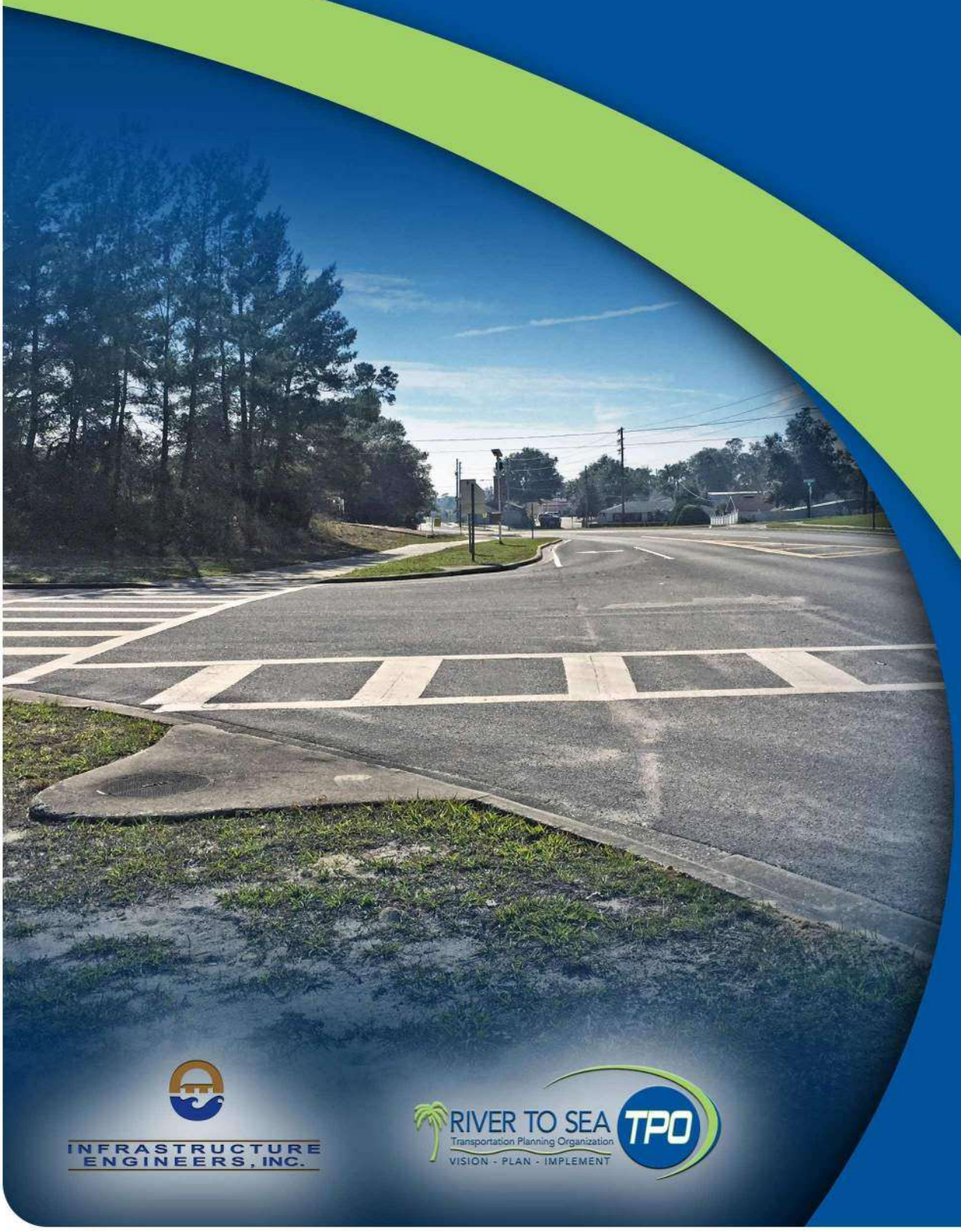
II. PURPOSE AND OBJECTIVE

The purpose of this project is to assess the feasibility of constructing a 10-ft - 12-ft. shared use path along Providence Boulevard from the East Central Regional Rail Trail to just south of Beaver Drive. The objective of the study is to determine the conceptual alignment of the shared use path along Providence Boulevard given the many constraints that exist within the potential shared use path alignments. Providing a continuous shared use path along Providence Boulevard will connect over twenty-four public facilities, as well as four commercial nodes for shopping and employment. More specifically, the shared use path will improve the safety for pedestrians and bicyclists using the library complex, Daytona State College, City Hall, a middle school and two elementary schools. This project will benefit not only those residents adjacent to the corridor, but also residents, businesses, and school students within the project area.

This study required coordination with several agency representatives and stakeholders that the study team would like to thank for their continuing interest in this project and their assistance:

Mr. Stephen Harris – River to Sea Transportation Planning Organization
Ms. Cheryl Atkins – City of Deltona
Mr. Scott McGrath – City of Deltona
Mr. Jerry Mayes – City of Deltona
Mr. Scott Martin, P.E. – Volusia County

Study Methodology



INFRASTRUCTURE ENGINEERS, INC.

RIVER TO SEA TPO
Transportation Planning Organization
VISION - PLAN - IMPLEMENT

III. STUDY METHODOLOGY

The following tasks were completed so that a detailed feasibility report can be provided:

1. A project coordination meeting was held with R2CTPO's project manager, Volusia County and the City of Deltona staff for the purpose of scoping the project and obtaining relevant project information.
2. Data collection consisted of reviewing the City's Comprehensive Plan, Land Development Code, and Bicycle and Pedestrian Master Plan. Additionally, aerial photography was obtained as well as right-of-way and parcel lines from Volusia County's Geographic Information System (GIS). The team also reviewed Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), Map Nos. 12127C0620J, 12127C0630J, 12127C0640J, and 12127C0735J, United States Soil Conservation Service Soil Survey maps, and the National Wetlands Inventory maps to gain a better understanding of the project. Additionally, the Lakeshore Drive Shared Use Feasibility Study was reviewed.
3. Three site visits were conducted in the project corridor to assess current constraints. Photographs and aerial maps were used to document the items that would impact constructability such as power and light pole locations, guy wires, other utility features, fencing, drainage features, landscaping, mailboxes, bus stops, large trees, etc. The aerial photography and information collected from our site visits is the foundation for the conceptual design. No survey was performed.
4. Typical sections were developed and concept plans were created from the information collected from the previous tasks. The design criteria used to develop the concept plans are as follows:
    a. 2016 Plans Preparation Manual, FDOT
    b. Manual on Uniform Traffic Control Devices, FHWA
    c. 2016-17 FDOT Design Standards
    d. 2013 Florida Green Book
    e. 2010 ADA Standards for Accessible Design
5. An Engineer's Opinion of Probable Costs (EOPC) to construct the conceptual design was prepared. The EOPC unit prices were obtained from the FDOT's historical statewide average costs.
6. Preparation of the final report will occur after receipt of comments from the City, R2CTPO, FDOT and Volusia County.

Existing Conditions

INFRASTRUCTURE ENGINEERS, INC.

RIVER TO SEA TPO
Transportation Planning Organization
VISION - PLAN - IMPLEMENT

IV. EXISTING CONDITIONS

Existing conditions were noted during our site visits. The site visits began at south of the East Central Regional Rail Trail and continued north for 6.1 miles to Beaver Drive. Photographs from the site visits are located in *Appendix A*.

The existing speed limit is predominantly 35 MPH, however, from the East Central Regional Rail Trail Drive to DeBary Avenue, the posted speed limit is 30 MPH. There are two school zones within the corridor. The speed limit within these zones is reduced to 20 MPH for a short time period before and after school lets out.

There is approximately 3.7 miles of existing sidewalk located on the east side of Providence Boulevard at the following locations:

- Lakeshore Drive to DeBary Avenue – 5-ft. wide
- Alexander Avenue to the entrance to Deltona Lakes Elementary School – varies 4-5-ft. wide
- Joyner Drive to Howland Boulevard – varies 4-5-ft. wide

The majority of the existing sidewalk along the east side of Providence Boulevard will be removed in order to make room for the proposed shared use path. See the Concept Plans for exact locations of removal. Please note, the majority of the sidewalk from the northerly Joyner Drive/Providence Boulevard intersection to Beaver Drive is in very poor condition. Much of it is severely cracked, due in large part to being exposed to vehicular traffic because it is located directly adjacent to the roadway paved shoulder.

Driveways and Side Streets

There are one hundred seventy-four residential driveways and twelve commercial driveways located on the east side of Providence Boulevard within the project limits. The residential driveways are all concrete and the majority of the commercial driveways are asphalt. There are sixty-two side street intersections within the project limits. Thirty-nine of these intersect the east side of the roadway. Of the sixty-two intersections, the following seven are signalized:

- DeBary Ave/Doyle Road
- East Normandy Boulevard
- Saxon Boulevard
- Tivoli Drive
- Fort Smith Boulevard
- Elkcam Boulevard
- Howland Boulevard

Of these seven intersections, only DeBary Avenue/Doyle Road and Saxon Boulevard are ADA compliant. The other intersections will require some improvements along the east side to bring them

into compliance with ADA standards. Only minor ADA improvements, such as detectable warning surfaces have been proposed on the west side of these intersections. Please see the list of all side street intersections below.

- Magnolia Woods Court
- Perimeter Drive
- DeBary Ave/Doyle Road
- Montego Street
- Maguire Street
- Garland Street
- Fisher Drive (south)
- Fisher Drive (north)
- Nardello Drive
- Anderson Drive
- Lino Court
- Chestnut Court
- Alexander Avenue
- Tacoma Avenue
- Fuller Avenue
- Galloway Avenue
- Murphy Avenue
- Tyler Avenue
- Marshall Street
- Voyager Street
- Sacramento Street
- East Normandy Boulevard
- La Casita Street
- Lambert Street
- Buttercup Terrace
- Bluebird Terrace
- Clayton Drive
- Section Line Trail
- Saxon Boulevard
- Wakefield Circle (south)
- Gold Terrace

- Wakefield Circle (north)
- Renton Street
- Clearfield Street
- North page Drive
- Foothill Terrace
- Lindsey Terrace
- Fergason Avenue
- Gainesville Drive
- Galiano Street
- Tivoli Drive
- Alley 494
- Alley 498
- Dunlap Drive
- Fort Smith Boulevard
- Merrick Drive
- Horseshoe Terrace
- North Akron Drive
- Monticello Street
- East Chapel Drive
- West Chapel Drive
- Elkcam Boulevard
- Alley 484
- Giles Street
- North Acadian Drive
- Eustace Avenue
- Joyner Drive (south)
- Joyner Drive (north)
- Auburndale Street
- Barrow Street
- Beaver Drive
- Howland Boulevard

Apparent Right-of-Way

Table 1 below lists the apparent right-of-way along the project corridor. No additional right-of-way is anticipated for the proposed sidewalk. The apparent right-of-way lines shown on the concept plans were obtained from the Volusia County Geographic Information System (GIS).

Table 1 – Apparent Right-of-Way

Lakeshore Drive to DeBary Avenue/Doyle Road	80-ft. – 100-ft.
DeBary Avenue/Doyle Road to Saxon Boulevard	80-ft. – 90-ft.
Saxon Boulevard to East Chapel Drive	100-ft. – 110-ft.
East Chapel Drive to Deltona Lakes Elementary Entrance	80-ft. – 210-ft.
Deltona Lakes Elementary Entrance to Eustace Avenue	100-ft. – 110-ft.
Eustace Avenue to Joyner Drive (southerly connection)	80-ft. – 100-ft.
Joyner Drive (southerly connection) to Beaver Drive	60-ft
Beaver Drive to Howland Boulevard	60-ft. – 70-ft.

Utilities

There are a number of utilities located within the corridor. They are as follows:

- Brighthouse Networks, LLC
- Deltona Water
- Duke Energy
- FPL Fibernet, LLC
- Florida Public Utilities
- AT&T Distribution
- Sunesys, LLC
- Centurylink
- Volusia County Water & Utility Service

Drainage and Environmental Permitting

During the field assessment, it was noted that, in general, roadway runoff drains outside onto the existing grassed shoulder and then into roadside swales. The roadside swales are often times very poorly defined. Storm and roadway runoff generally sheet flows overland to various low points, swales, and ditches and then makes its way to one of many outfall locations within the project corridor.

Based on the National Wetlands Inventory (NWI) data, there are no wetlands within the project corridor. A wetland assessment should be completed prior to surveying.

A Threatened and Endangered (T&E) Species Assessment will also need to be performed to determine if there are any impacts to T&E species habitats. During our site visits, we did not encounter any gopher tortoise burrows. A portion of the project crosses through the Lyonia Preserve, which is scrub jay habitat, however, the proposed sidewalk stays within the apparent right-of-way and does not encroach into the Lyonia Preserve. See Photos 33, 34, and 35.

Soils and Floodplains

The proposed Providence Boulevard shared use path route traverses 6.1 miles through the City. More than 32 soil types are encountered within the project limits. The vast majority of the soils are Apopka fine sand, Astatula fine sand, Paola fine sand, Orsino fine sand, Paola-Urban land complex and St. Lucie fine sand. All of these soils have depths of more than 80-in. to the water table and are well drained to excessively well drained. The locations and types are depicted on the soils maps found in *Appendix D*.

The majority of the project does not lie within a floodplain. The project corridor does travel through a couple of floodplain areas. They are classified as Zone A, no base flood elevations determined. However, these locations have been altered (filled) by the construction of Providence Boulevard and the surrounding residential homes. Addition of the sidewalk within these areas should not require floodplain compensation. The Flood Insurance Rate Maps can be found in *Appendix E.*

Shared Use Trail Concept Plan Feasibility Analysis

INFRASTRUCTURE ENGINEERS, INC.

RIVER TO SEA TPO
Transportation Planning Organization
VISION - PLAN - IMPLEMENT

Shared Use Trail Concept Plan Feasibility Analysis

V. SHARED USE PATH CONCEPT PLAN FEASIBILITY ANALYSIS

The concept for this project is to construct a 10-ft. - 12-ft. shared use path along the east side of Providence Boulevard. The limits of the project, as submitted in the XU Bicycle/Pedestrian Project application, are from Lakeshore Drive to Howland Boulevard. Based on discussions with the City of Deltona (City) and several site visits, it was determined that, due to limited right-of-way from Joyner Drive (southerly connection) to Howland Boulevard, the shared use path would end at Joyner Drive (southerly connection). Based on additional coordination with the City and the R2CTPO, the begin project limits are from the East Central Regional Rail Trail, rather than Lakeshore Drive. However, the actual project limits will extend to Beaver Drive. This will be discussed in more detail later in this section.

The horizontal separation from the vehicular traffic was determined using the following general criteria from the May 2013 Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways (Florida Greenbook). The horizontal separation criteria are as follows:

- Outside of the right-of-way in a separately dedicated corridor adjacent to the right-of-way
- At or near the right-of-way line (ideally, 3-ft. of width should be provided behind the sidewalk for above ground utilities)
- Outside of the minimum required clear zone (10-ft for a collector and a 35 MPH design speed)
- As far from the edge of the driving lane as practical

Additionally, shared use paths should have a 4-ft. minimum separation from above ground hazards.

The following text describes the feasibility analysis as a "walk-through" of the project corridor.

The feasibility analysis begins at the East Central Regional Rail Trail. There is an existing 8-ft sidewalk on the east side of Providence Boulevard. The construction of the Lakeshore Drive Multi-use Trail will provide the connection to this sidewalk and will also provide a connection along the east side of Providence Boulevard to the Thornby Park entrance. An 8-ft. wide sidewalk exists along the west side of Providence Boulevard from the Thornby Park entrance to DeBary Avenue/Doyle Road. The sidewalk terminus at the Thornby Park entrance can be seen in Photo 1D. It is proposed that an 8-ft. sidewalk be constructed on the west side of the road, south of the park entrance, terminating just north of Lakeshore Drive (See Photos 1B and 1C) to provide for future connectivity with the Lakeshore Drive Multi-use Trail.

Shifting back to the east side of Providence Boulevard, the existing 8-ft. sidewalk extends north to Perimeter Drive. From this point to DeBary Avenue there is an existing 5-ft. sidewalk. An 8-ft. sidewalk is proposed from Perimeter drive north to tie into the existing sidewalk at the DeBary Avenue intersection. A 10-ft. shared use path is not possible within these limits, as it eliminates the sodded strip that provides stormwater conveyance. In order to provide the proposed 8-ft. sidewalk, the back of

sidewalk will remain in the same location and the widening will take place to the west towards the existing edge of pavement. Although the additional 3-ft. of widening encroaches into the grass strip between the existing sidewalk and edge of pavement, the remaining sodded area is sufficient to accommodate the roadway and sidewalk runoff, due to the excessively drained soils at this location (See Photos 1E and Photos 2-5). There is a damaged signal pull box that will need to be replaced (See Photo 6). As the sidewalk approaches DeBary Avenue, it will transition from 8-ft. to match the existing sidewalk and curb cut ramps. This is necessary to avoid impacts to an existing FPL transmission line pole and to avoid shifting the curb cut ramps, which would require removing and restriping the crosswalks within the intersection (See Photo 7). There are a number of ways to remove existing striping, but they all have their limitations and costs. Hydroblasting removes the striping with minimal damage to the pavement, but does not thoroughly remove the striping. The existing striping can still be seen at night and during rain events often times causing confusion for pedestrians and motorists alike. If the striping is milled off, the loop lead-ins for the signals are damaged and have to be replaced. This increases the cost and complexity of the project, as this removal option requires a more detailed maintenance of traffic plan. Based on discussions with the City of Deltona, they prefer that milling and resurfacing be used to remove any existing striping.

As the project moves to the north side of DeBary Avenue, similar issues are encountered as it relates to the existing curb cut ramps, however, there is room to widen one of the curb cut ramps to accommodate a 10-ft. shared use path. The pedestrian signal pole will have to be relocated. Photo 8 shows this existing curb cut ramp and pedestrian signal pole. The proposed 8-ft. sidewalk is continued north to Montego Street. A 10-ft. shared use path is proposed starting at Montego Street and continuing until just north of Fisher Drive (northerly connection). The shared use path is generally offset 5-ft. from the edge of pavement. This placement was based on avoidance of numerous telephone and cable pedestals and power poles (See Photos 9-11). It is the intent of this concept design that all mailboxes impacted by the shared use path be relocated/replaced to the front (roadside) of the shared use path.

From just north of Fisher Drive (northerly connection) to Alexander Avenue (See Photos 12-24) the shared use path is reduced to an 8-ft. sidewalk. The width is reduced because there is now a paved shoulder adjacent to Providence Boulevard. In order to maintain the 5-ft. offset from the edge of pavement and minimize impacts to the adjacent properties, the width was reduced from 10-ft. to 8-ft. There are a number of drainage structures that are impacted by the proposed path (See Photos 15, 19, and 21). These structures not only pick up Providence Boulevard runoff, but also offsite runoff. Because the shared use path slopes away from the roadway, these inlets have been replaced with back of sidewalk inlets. Roadway runoff will sheet flow across the path. A headwall/gravity wall with handrail will be constructed at the back side of the path and the area behind will be graded to drain to these two back of sidewalk inlets.

Starting at the north side of Alexander Avenue and continuing to just north of Voyager Street the 8-ft. sidewalk is widened to a 12-ft. shared use path (See Photos 25-34). The proposed path matches the

existing back of sidewalk and is widened 12-ft. towards the existing edge of pavement. However, the slope of the shared use path is towards the back of sidewalk. This will allow for the creation of a shallow swale to convey runoff. A number of signs, mailboxes and bus stop benches are impacted and require relocation. There are also AT&T pull boxes and water valve covers that will need to be adjusted to grade.

Just north of Voyager Street to Saxon Boulevard the shared use path width is reduced to 10-ft. (See Photos 35-53). The proposed path continues to match the existing back of sidewalk and widen towards the Providence Boulevard existing edge of pavement. From Voyager Street to La Casita Street the trail slopes away from the roadway. From La Casita Street to Saxon Boulevard the shared use path slopes towards the existing roadway. As with the majority of the project, numerous mailboxes need to be relocated along with signs and several bus stop benches. There are also AT&T pull boxes and water valve covers that will need to be adjusted to grade. During our site visit, it was noted that there was recent ponding at approximately Station 129+80, which is a low point in the roadway. A ditch bottom inlet (DBI) is proposed on the east side of the road and is shown to connect with an existing DBI on the west side of the road to provide a positive outlet for runoff collecting at this location (See Photo 50).

The Saxon Boulevard intersection was recently improved to provide ADA compliant curb cut ramps, pedestrian signals, cross walks, etc. The sidewalk at the south side of the intersection is 5-ft. wide (See Photo 54). The 10-ft. shared use path width transitions to match the existing sidewalk in order to avoid impacting the recent improvements. In order to provide a 10-ft. shared use path connection, the recent sidewalk, crosswalk and pedestrian features would have to be re-constructed. Additionally, the concrete strain poles would need to be relocated adding considerable cost to the project. There is existing sidewalk on the northeast side of the Saxon Boulevard/Providence Boulevard intersection (See Photo 55).

Immediately north of the Saxon Boulevard intersection there are several constraints. There is an AT&T pull box, AT&T cabinets, water valve and bus stop sign, bench and trash adjacent to the front side of the existing sidewalk (See Photos 56-57). The existing strain pole and power pole are additional constraints. The apparent right-of-way line, as depicted in the concept plans at this location, is incorrect. As stated previously, the right-of-way lines are based on GIS level parcel data and often times does not properly rectify to the aerials. Our site visit confirmed that the right-of-way line is just a couple of feet behind the existing sidewalk. This prevents the sidewalk from being widened to the east and the existing utilities prevent the sidewalk from being widened to the west. As a result, an 8-ft. sidewalk is proposed between the existing edge of pavement and the existing utilities.

From this point to Galiano Street, the 8-ft. sidewalk is widened to a 10-ft. shared use path (See Photos 58-76). Within this section, the path is transitioned around existing light poles. At each of the light pole locations dual 6-in. pipes are proposed to provide conveyance of stormwater runoff. This method is utilized at several other locations along the corridor, both at side streets (See Photo 66) and recently

constructed bus stop pads. There are telephone pedestals located in between the light poles that will have to be relocated. Additionally, there are water meter boxes located in the existing sidewalk that will have to be adjusted to match the proposed sidewalk grade. At approximately Station 154+10 there is an existing DBI (See Photo 61). This DBI has pipes entering from the west and exiting to the east. At this location there is sufficient room to cover this DBI and add two additional DBI's to pick up the roadway and offsite runoff.

North of Galiano Street to Tivoli Drive the 10-ft. shared use path width is reduced to an 8-ft. sidewalk. There is an existing ditch and mitered end section (MES) adjacent to the road between Galiano Street and Tivoli Drive (See Photos 77-78) that requires a width reduction and the construction of a gravity wall and handrail.

The 8-ft. sidewalk continues from Tivoli Drive to Fort Smith Boulevard (Photos 79-87). The typical section for this section of Providence Boulevard has Type F curb and gutter and a 2.5-ft. – 3.0-ft. utility strip. To provide the 8-ft. sidewalk, the proposed sidewalk will be constructed to the back of curb. This results in impacts to a number of signs that will have to be relocated to the back of sidewalk. At some locations (See Photo 85) the trees will need to be trimmed to provide the required line of sight for the relocated signs. One item to note is that the driveway to Deltona Liquor has a steep grade and the sidewalk across this driveway does not meet ADA criteria. This driveway will have to be reconstructed to meet ADA criteria. Due to the steep driveway grade, a temporary construction easement may be required to tie back to existing. It should be noted that if this project is funded through the Local Agency Program (LAP) process, Right-of-Way Certification will be required.

Moving north past Fort Smith Boulevard to East Chapel Drive, the 8-ft. sidewalk widens to a 10-ft. shared use path (See Photos 88-97). As with previous sections, the proposed path matches the existing back of sidewalk and widens toward the Providence Boulevard edge of pavement. This allows for the widening of the path, while at the same time provides room to grade a roadside swale to collect and convey runoff from the path and the existing roadway.

As the path continues north of East Chapel Drive it widens to 12-ft. The 12-ft. path continues north, matching the existing back of sidewalk until the entrance to Deltona Lakes Elementary School (See Photos 98-108).

The 12-ft. shared use path continues from the Deltona Lakes Elementary School driveway to Joyner Drive (southerly connection) (See Photos 109-119). The path is located 4-ft. from the existing right-of-way. Within this section, there are several water valves and a water meter that need to be adjusted to grade. Additionally, there are a couple of DBI's that need to be adjusted.

Based on discussions with City Staff, the shared use path is to end at Joyner Drive (southerly connection). This is due to the fact that right-of-way acquisition is required in order to provide an 8-ft.

sidewalk. A 10-ft. – 12-ft. shared use path would require considerable right-of-way acquisition and was determined to be infeasible. Based on site visits, it was noted that the existing sidewalk, on both sides of the roadway from Joyner Drive (southerly connection) to Beaver Street, is in very poor condition (See Photos 120-125). More than likely, the poor condition is due to the fact that the sidewalk is located adjacent to the existing paved shoulder and is routinely exposed to vehicular traffic. Based on this assessment, it is recommended that the existing sidewalk be reconstructed with 6" thick concrete, 5-ft. in width on both sides of Providence Boulevard up to the point where the Type F curb and gutter begins, which is approximately at Beaver Drive.

From Beaver Drive to Howland Boulevard (See Photos 126-127) there is an existing 5-ft. sidewalk adjacent to the back of the Type F curb and gutter. The sidewalk is in good condition. Due to the limited right-of-way, it is recommended that this sidewalk be left as-is. Based on this, the end project is approximately Beaver Drive.

Due to the length of this project, it is anticipated that the project will be broken into phases. Below are possible phasing scenarios for the shared use path:

Phase 1 – Elkcam Boulevard to Joyner Drive (sidewalk to Beaver Drive)

Phase 2 – Fort Smith Boulevard to Elkcam Boulevard

Phase 3 – East Central Regional Rail Trail to East Normandy Boulevard

Phase 4 – East Normandy Boulevard to Saxon Boulevard

Phase 5 – Saxon Boulevard to Tivoli Drive

Phase 6 – Tivoli Drive to Fort Smith Boulevard

Based on the concept plan feasibility analysis, the Providence Shared Use Path appears to be feasible based on the following information:

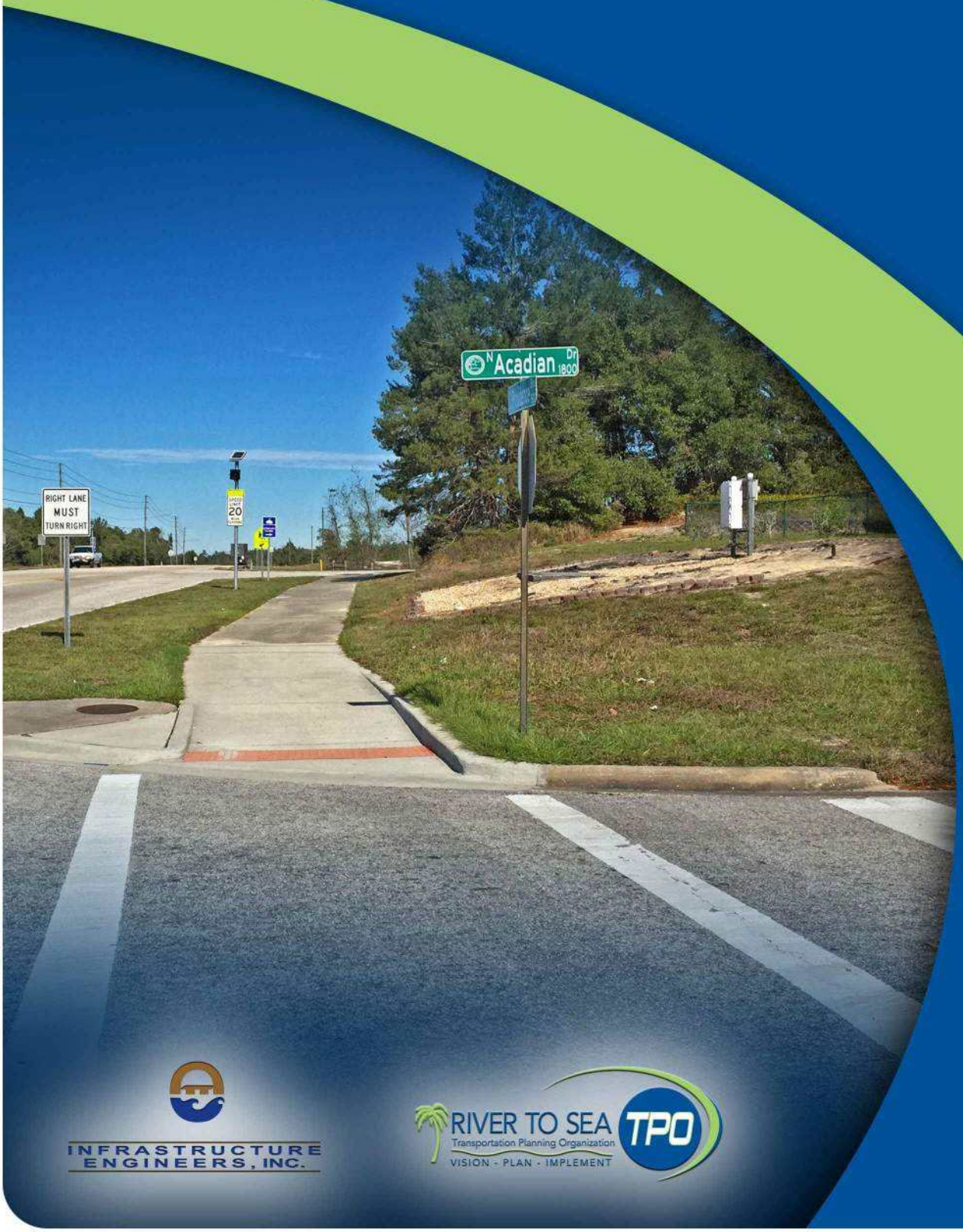
1. All residential driveways within the limits of the shared use path and sidewalk are to be reconstructed with like material. The majority of these driveways are concrete.

2. It is assumed that all utility relocations/adjustments will be at the expense of the utility since they are in the right-of-way by permit. However, a utility relocation contingency item was added to the estimate to account for possible unforeseen City utility relocations

3. Improvements at signalized intersections are on the east side of Providence Boulevard only. This includes the relocation of pedestrian signals but does not include milling and resurfacing and replacement of signal loops.

4. The rutting that is shown in many of the photos is from the USPS trucks. It is not from pedestrian use.
5. All mailboxes will either be relocated or replaced to the front side (road side) of the trail.
6. Clearing and Grubbing is assumed to be from edge of pavement to the apparent right-of-way line.
7. All existing striping is to be removed via milling and resurfacing.
8. A drainage contingency was added to the EOPC to account for unforeseen drainage improvements.

Financial Feasibility



INFRASTRUCTURE ENGINEERS, INC.

RIVER TO SEA TPO
Transportation Planning Organization
VISION - PLAN - IMPLEMENT

VI. FINANCIAL FEASIBILITY

Table 2 and Table 3 provide the Engineer's Opinion of Probable Costs (EOPC) for the construction of the proposed shared use path. Table 2 assumes the shared use path is constructed of 4-in. thick concrete and Table 3 assumes the shared use path will be constructed of asphalt.

The item numbers and units of measure are based on the Florida Department of Transportation (FDOT) Basis of Estimates Manual. The unit prices are derived from the FDOT Statewide Historical Average costs for each pay item. Pay items that have whole dollar values (i.e. - $1500.00) have been inflated due to the small quantity for that item. In addition, the cost of the asphalt was increased by 25% because of the required hand work to place the asphalt between the many concrete driveways. The cost estimate does not include utility relocation other than the adjustment of water meter and water valve covers, tree removal or permitting fees that may be associated with the final design phase.

To adjust for potential future increases in the project's cost estimate, an annual inflationary factor has been applied to the EOPC.

TABLE 2
PROVIDENCE BOULEVARD SHARED USE PATH
ENGINEER'S OPINION OF PROBABLE COSTS
(CONCRETE)

Pay Item	Description	Unit	Quantity	Unit Price	Estimate
101-1	MOBILIZATION	LS	10.00%	$245,088.92	$245,089
102-1	MAINTENANCE OF TRAFFIC	LS	5.00%	$122,544.46	$122,544
104-10-3	SEDIMENT BARRIER	LF	31213	$1.18	$36,832
110-1-1	CLEARING & GRUBBING	AC	17.27	$12,987.81	$224,351
110-7-1A	MAILBOX, RELOCATE	EA	100.00	$50.00	$5,000
110-7-1B	MAILBOX, FURNISH AND INSTALL	EA	50.00	$136.10	$6,805
120-1	REGULAR EXCAVATION	CY	11560	$4.60	$53,176
120-6	EMBANKMENT	CY	5780	$8.79	$50,806
285-709	OPTIONAL BASE GROUP 09	SY	60	$17.90	$1,074
327-70-1	MILLING EXISTING ASPHALT PAVEMENT (1" AVG. DEPTH)	SY	3695	$2.00	$7,390
334-1-13	SUPER PAVE ASPHALTIC CONC., TRAFFIC C	TN	10	$90.37	$904
337-7-42	ASPHALT CONCRETE FRICTION COURSE TRAFFIC C, FC-9.5	TN	204	$110.00	$22,440
400-0-11	CLASS NS CONCRETE	CY	184	$627.80	$115,515
400-1-2	CONC. CLASS I, ENDWALLS	CY	5	$1,305.45	$6,005
425-1-521	INLET DRAINAGE , TYPE C, <10'	EA	4	$2,735.07	$10,940
425-1-525	INLET DRAINAGE PARTIAL	EA	4	$2,508.33	$10,033
425-1-531	INLETS, DITCH BOTTOM, TYPE C MODIFIED- BACK OF SIDEWALK, <10'	EA	7	$2,865.69	$20,060
425-1-533	INLETS, DITCH BOTTOM TYPE C MODIFIED- BACK OF SIDEWALK, J BOT, <10'	EA	5	$4,578.75	$22,894
425-5-	ADJUST MANHOLE	EA	2	$1,000.00	$2,000
430-174-118	PIPE CULVERT OPTIONAL MATERIAL, ROUND (18")	LF	77.0	$100.00	$7,700
430-174-215	PIPE CULVERT OPTIONAL MATERIAL, ELLIPTICAL (15")	LF	273.0	$85.00	$23,205
430-963-2	PVC PIPE FOR BACK OF SIDEWALK DRAINAGE, NON STANDARD	LF	2113.0	$51.46	$108,735
430-984-623	MITERED END SECTION SD, ELLIPTICAL, 12"X18"	EA	19.0	$1,175.00	$22,325
515-1-2	PIPE HANDRAIL - GUIDERAIL, ALUMINUM	LF	900.0	$34.16	$30,744
520-1-10	CONCRETE CURB AND GUTTER TYPE F	LF	437	$17.30	$7,560
522-1	CONCRETE SIDEWALK AND DRIVEWAYS 4" THICK	SY	28018	$34.54	$967,742
522-2	CONCRETE SIDEWALK AND DRIVEWAYS 6" THICK	SY	10236	$42.90	$439,124
527-2	DETECTABLE WARNINGS	SF	2659	$30.46	$80,993
570-1-2	PERFORMANCE TURF (SOD)	SY	45551	$2.29	$104,312
630-2-11	CONDUIT, F& I, OPEN TRENCH	LF	20	$15.00	$300
635-2-11	PULL & SPLICE BOX, F&I, 13" x 24"	EA	2	$800.00	$1,600
641-2-11	PRESTRESSED CONCRETE POLE, F&I, TYPE P-II PEDESTAL	EA	2	$1,500.00	$3,000
700-1-11	SINGLE POST SIGN (FURNISH & INSTALL) (UP TO 12 SF)	EA	102	$317.13	$32,347
700-1-50	SINGLE SIGN POST (RELOCATE)	EA	46	$173.12	$7,964
711-11-123	THERMOPLASTIC, WHITE, SOLID, 12"	LF	3035	$2.18	$6,616
711-11-125	THERMOPLASTIC, WHITE, SOLID, 24"	LF	744	$4.11	$3,058
711-15-201	THERMOPLASTIC, YELLOW, SOLID, 6"	NM	0.750	$4,118.25	$3,089
1080-21-5	UTILITY FIXTURE - VALVE/METER BOX (ADJUST/MODIFY)	EA	17.000	$250.00	$4,250
			PROJECT SUB-TOTAL w/o MOT and Mobilization		$2,450,889
			PROJECT SUB-TOTAL w/ MOT and Mobilization		$2,818,523
N/A	DRAINAGE IMPROVEMENT CONTINGENCY	LS	5.0%		$122,544
N/A	UTILITY RELOCATION CONTINGENCY	LS	5.0%		$122,544
N/A	ENGINEERING DESIGN	LS	20.0%		$563,705
N/A	SURVEY (Includes R/W Survey)	LS	15.0%		$422,778
N/A	CEI	LS	10.0%		$281,852
				TOTAL COST	**$4,331,947**

FDOT INFLATION-ADJUSTED ESTIMATES	***FACTOR***	***ESTIMATE***
YEAR 1 INFLATION-ADJUSTED ESTIMATE (2017)	1.091	**$4,726,154**
YEAR 2 INFLATION-ADJUSTED ESTIMATE (2018)	1.122	**$4,860,444**
YEAR 3 INFLATION-ADJUSTED ESTIMATE (2019)	1.155	**$5,003,398**

TABLE 3
PROVIDENCE BOULEVARD SHARED USE PATH
ENGINEER'S OPINION OF PROBABLE COST
(ASPHALT)

Pay Item	Description	Unit	Quantity	Unit Price	Estimate
101-1	MOBILIZATION	LS	10.00%	$225,045.28	$225,045
102-1	MAINTENANCE OF TRAFFIC	LS	5.00%	$112,522.64	$112,523
104-10-3	SEDIMENT BARRIER	LF	31213	$1.18	$36,832
110-1-1	CLEARING & GRUBBING	AC	17.27	$12,987.81	$224,351
110-7-1A	MAILBOX, RELOCATE	EA	100.00	$50.00	$5,000
110-7-1B	MAILBOX, FURNISH AND INSTALL	EA	50.00	$136.10	$6,805
120-1	REGULAR EXCAVATION	CY	11560	$4.60	$53,176
120-6	EMBANKMENT	CY	5780	$8.79	$50,806
160-4	TYPE B STABILIZATION (12")	SY	39225	$3.12	$122,383
285-704	OPTIONAL BASE (BASE GROUP 4)	SY	29419	$10.94	$321,843
285-709	OPTIONAL BASE GROUP 09	SY	60	$17.90	$1,074
327-70-1	MILLING EXISTING ASPHALT PAVEMENT (1" AVG. DEPTH)	SY	3695	$2.00	$7,390
337-7-42	ASPHALT CONCRETE FRICTION COURSE TRAFFIC C, FC-9.5	TN	204	$110.00	$22,440
334-1-12	SUPERPAVE ASPHALTIC CONCRETE (TRAFFIC B) (2")	TN	3082.0	$112.00	$345,182
334-1-13	SUPER PAVE ASPHALTIC CONC., TRAFFIC C	TN	10	$90.37	$904
400-0-11	CLASS NS CONCRETE	CY	184	$627.80	$115,515
400-1-2	CONC. CLASS I, ENDWALLS	CY	5	$1,305.45	$6,005
425-1-521	INLET DRAINAGE , TYPE C, <10'	EA	4	$2,735.07	$10,940
425-1-525	INLET DRAINAGE PARTIAL	EA	4	$2,508.33	$10,033
425-1-531	INLETS, DITCH BOTTOM, TYPE C MODIFIED- BACK OF SIDEWALK, <10'	EA	7	$2,865.69	$20,060
425-1-533	INLETS, DITCH BOTTOM TYPE C MODIFIED- BACK OF SIDEWALK, J BOT, <10'	EA	5	$4,578.75	$22,894
425-5-	ADJUST MANHOLE	EA	2	$1,000.00	$2,000
430-174-118	PIPE CULVERT OPTIONAL MATERIAL, ROUND (18")	LF	77.0	$100.00	$7,700
430-174-215	PIPE CULVERT OPTIONAL MATERIAL, ELLIPTICAL (15")	LF	273.0	$85.00	$23,205
430-963-2	PVC PIPE FOR BACK OF SIDEWALK DRAINAGE, NON STANDARD	LF	2113.0	$51.46	$108,735
430-984-623	MITERED END SECTION SD, ELLIPTICAL, 12"X18"	EA	19.0	$11.75	$223
515-1-2	PIPE HANDRAIL - GUIDERAIL, ALUMINUM	LF	900.0	$34.16	$30,744
520-1-10	CONCRETE CURB AND GUTTER TYPE F	LF	437	$17.30	$7,560
522-2	CONCRETE SIDEWALK AND DRIVEWAYS 6" THICK	SY	10236	$42.90	$439,124
527-2	DETECTABLE WARNINGS	SF	2659	$30.46	$80,993
570-1-2	PERFORMANCE TURF (SOD)	SY	45551	$2.29	$104,312
630-2-11	CONDUIT, F& I, OPEN TRENCH	LF	20	$15.00	$300
635-2-11	PULL & SPLICE BOX, F&I, 13" x 24"	EA	2	$800.00	$1,600
641-2-11	PRESTRESSED CONCRETE POLE, F&I, TYPE P-II PEDESTAL	EA	2	$1,500.00	$3,000
700-1-11	SINGLE POST SIGN (FURNISH & INSTALL) (UP TO 12 SF)	EA	102	$317.13	$32,347
700-1-50	SINGLE SIGN POST (RELOCATE)	EA	46	$173.12	$7,964
711-11-123	THERMOPLASTIC, WHITE, SOLID, 12"	LF	3035	$2.18	$6,616
711-11-125	THERMOPLASTIC, WHITE, SOLID, 24"	LF	744	$4.11	$3,058
711-15-201	THERMOPLASTIC, YELLOW, SOLID, 6"	NM	0.750	$4,118.25	$3,089
1080-21-5	UTILITY FIXTURE - VALVE/METER BOX (ADJUST/MODIFY)	EA	17.000	$250.00	$4,250
			PROJECT SUB-TOTAL w/o MOT and Mobilization		$2,250,453
			PROJECT SUB-TOTAL w/ MOT and Mobilization		$2,588,021
N/A	DRAINAGE IMPROVEMENT CONTINGENCY	LS	5.0%		$112,523
N/A	UTILITY RELOCATION CONTINGENCY	LS	5.0%		$112,523
N/A	ENGINEERING DESIGN	LS	20.0%		$517,604
N/A	SURVEY (Includes R/W Survey)	LS	15.0%		$388,203
N/A	CEI	LS	10.0%		$258,802
				TOTAL COST	**$3,977,675**

FDOT INFLATION-ADJUSTED ESTIMATES	*FACTOR*	*ESTIMATE*
YEAR 1 INFLATION-ADJUSTED ESTIMATE (2017)	1.091	**$4,339,644**
YEAR 2 INFLATION-ADJUSTED ESTIMATE (2018)	1.122	**$4,462,952**
YEAR 3 INFLATION-ADJUSTED ESTIMATE (2019)	1.155	**$4,594,215**

Data Collection References

INFRASTRUCTURE ENGINEERS, INC.

RIVER TO SEA TPO
Transportation Planning Organization
VISION - PLAN - IMPLEMENT

VII. DATA COLLECTION REFERENCES

Data collection sources used in the report included the following:

- City of Deltona, Florida Submittal of XU Bicycle/Pedestrian Project application
- National Resources Conservation Service, Web Soil Survey, http://websoilsurvey.nrcs.usda.gov/app/
- River to Sea TPO, http://www.r2ctpo.org/
- Volusia County Property Appraiser's Land Mapping System
- Google Maps, https://maps.google.com/
- Volusia County Geographic Information Services (GIS)
- FEMA Map Service Center
- 2012 FDOT Volusia County Aerials, http://www.dot.state.fl.us/surveyingandmapping/
- Deltona Land Development Code, https://library.municode.com/index.aspx?clientId=13902
- May 2013 Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways (Florida Greenbook)
- 2010 ADA Standards for Accessible Design
- FDOT Plans Preparation Manual