

# Bicycle/Pedestrian Feasibility Studies

## US 17/SR 15 (Town of Pierson)



LTG Job No.: 3903.06

**Prepared For:**



**Prepared By:**



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Ormond Beach, Florida

FINAL  
JANUARY 2016

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## 1. EXECUTIVE SUMMARY

The River to Sea Transportation Planning Organization (R2CTPO) provides support to its member communities by conducting bicycle and pedestrian feasibility studies for projects with applications for funding through the priority project selection process. The Town of Pierson has submitted an application for a shared use path/sidewalk along US 17 (SR 15) from Washington Avenue to Palmetto Avenue. This project (R2CTPO SCHL-2015-056) is currently located on the Federal-aid system.

The purpose of this study is to assess the feasibility of a 12 ft. wide shared use path and an 8 ft. wide sidewalk along the east side of US 17. The corridor under review totals approximately 1.10 miles (approximately 5,800 ft.) in length and connects to an existing sidewalk in the northeast quadrant at the intersection with Washington Avenue in the southern boundary. In the northern boundary, the corridor does not connect to an existing sidewalk; however, a new elementary school is anticipated to be open for the 2018-2019 school year in the northern boundary. This sidewalk project was submitted to the R2CTPO by the Town of Pierson in 2015 in an application for funding through the priority project selection process.

A site visit was conducted on Thursday, November 12, 2015 which included Town of Pierson, Volusia County School Board (VCSB), Florida Department of Transportation (FDOT), and LTG staff. The site visit consisted of driving and walking walkable segments in the corridor to evaluate potential constraints within the apparent right-of-way. To aid in identifying the apparent right-of-way, the following items were reviewed prior to the site visit: FDOT right-of-way maps, Volusia County property appraiser's website, Volusia County Geographical Information Systems (GIS) files, and aerial maps. Based on the information contained in these documents, previous studies, and field review, the following bullet points summarize the results of this sidewalk feasibility study.

- US 17 is a principal rural arterial and is emerging on the Strategic Intermodal System (SIS).
- The majority of the right-of-way appears to be 150 ft. wide throughout the corridor with US 17 centered therein.
- FDOT will maintain an 8 ft. sidewalk. Accordingly, the conceptual design was based on an 8 ft. wide sidewalk section. However, it is anticipated that a 12 ft. wide path along a similar alignment would be attainable as well due to the undeveloped nature of the corridor.
- The proposed sidewalk connects to an existing sidewalk in the northeast quadrant at the signalized intersection of Washington Avenue in the southern boundary. Crosswalk pavement markings and detectable warnings are present and in good condition and will not need to be replaced or modified.
- In the northeast quadrant at the intersection of US 17 and Washington Avenue, the proposed path runs parallel and adjacent to the apparent right-of-way at an auto repair/service shop and then traverses east to avoid an open drainage feature. At the



auto repair/service shop, it is recommended to remove the existing pavement that will be on the west side of the proposed sidewalk and replace with sod to provide an unpaved buffer from the edge of the travel lane to the sidewalk. A reconstructed driveway is proposed in order to maintain access but also to create a single access point to the business on US 17.

- The proposed sidewalk travels north and utilizes a meandering alignment intended to deter the use of motorized vehicles on the sidewalk.
- At the Pierson Municipal Airport's paved driveway at Station 15+88, special emphasis pavement markings with detectable warnings are proposed.
- A 48 in. pipe culvert with two mitered end sections is proposed at the existing outfall located at Station 26+66.
- A 42 in. pipe culvert with two mitered end sections is proposed at the existing outfall located at Station 46+28.
- A detectable warning pad is proposed on the northbound approach at Palmetto Avenue.
- An Environmental Resource Permit (ERP) application fee of \$1,190 for the St. Johns River Water Management District (SJRWMD) is anticipated as a result of the impact to surface water at the two outfall locations.
- Two cost estimates were derived for the possible alternatives (2016 estimate):
  - 8 ft. concrete sidewalk: \$614,983
  - 12 ft. concrete shared use path: \$831,719

The results of this shared use path/sidewalk feasibility study for the east side of US 17 (SR 15) from Washington Avenue to Palmetto Avenue show that an 8 ft. wide concrete sidewalk, 6 inches in depth, is preferred over the 12 ft. wide shared use path option due to FDOT maintenance considerations and cost. The no lighting option is also preferred due to maintenance considerations and cost. The construction cost of the 8 ft. wide section is expected to fall within typical values for similar projects at a total cost estimate of approximately \$615,000. And the construction cost of the 12 ft. wide section is expected to fall within typical values for similar projects at a total cost estimate of approximately \$832,000.

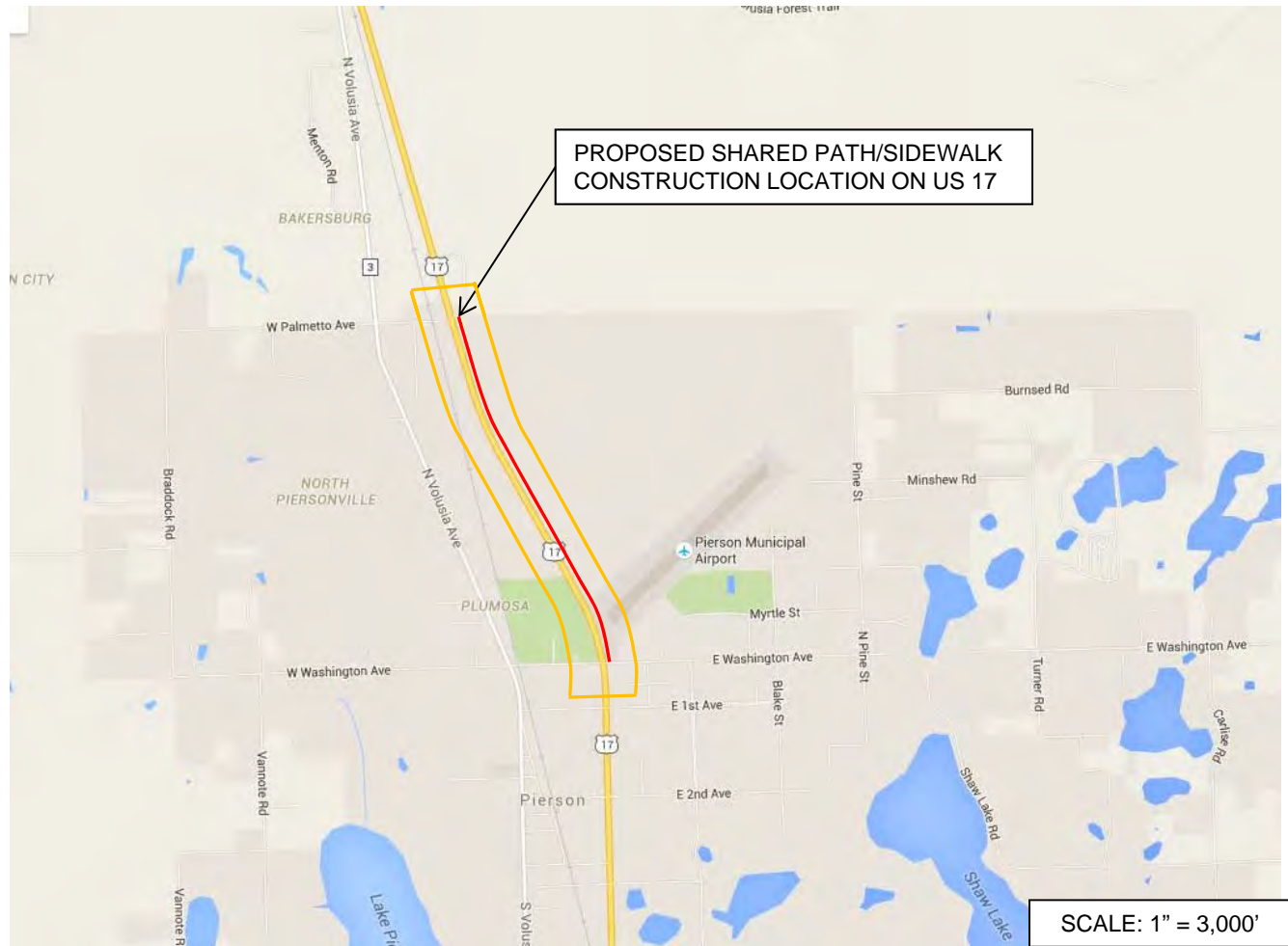
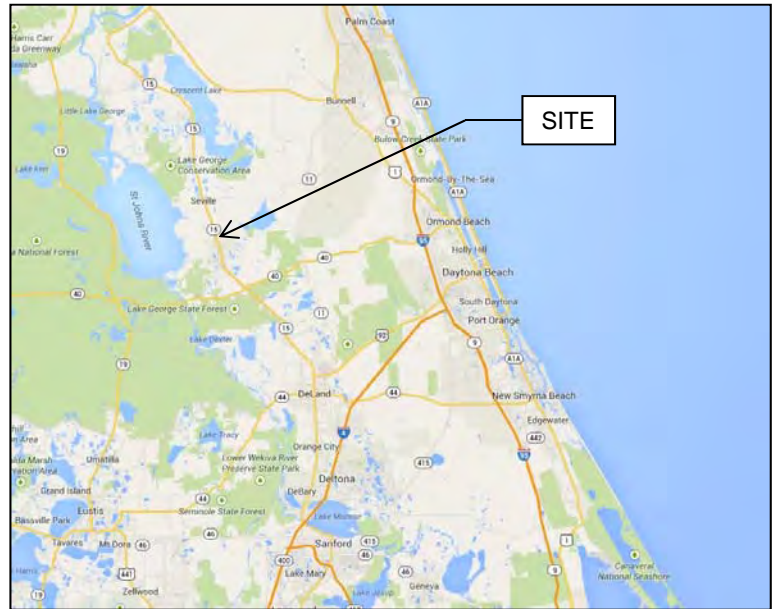
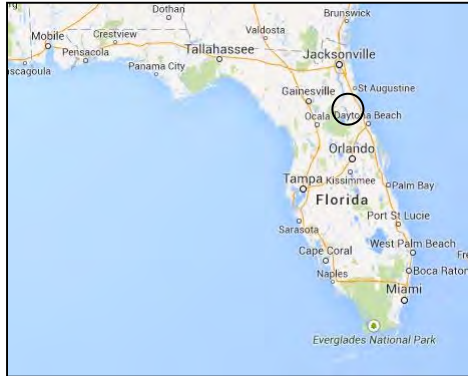
## 2. INTRODUCTION

Lassiter Transportation Group (LTG) has been retained by the River to Sea Transportation Planning Organization (R2CTPO) to prepare a sidewalk feasibility study along US 17 in the Town of Pierson. The Town of Pierson submitted an application to the R2CTPO requesting a feasibility study in March of 2015. This proposed project is located on the Federal-aid system as a result of its emerging SIS status. The Town's request is for construction of a 12 ft. shared use path or an 8 ft. sidewalk on the east side of US 17 (approximately 1.10 miles in length). The study corridor is located within the center of Pierson and within close proximity to community assets. Community assets within 1-mile of the project include the following:

- Pierson Elementary School
- Taylor Middle-High School
- Pierson Town Hall
- Pierson Municipal Airport
- Washington Avenue Park
- Lake Pierson Municipal Park
- Nixon Park
- Pierson Community Center

Additionally, FDOT is in the process of finalizing construction of sidewalks on both sides of US 17 from Hagstrom Road to Washington Avenue. The proposed shared path/ sidewalk would provide connectivity to this newly constructed facility. It is also anticipated that the VCSB will plan for a new elementary school in their FY 2015-2016 5 Year Capital Improvement Program. The location of this planned elementary school is on the northernmost property of the project corridor just south of Palmetto Avenue. The school is anticipated to open as early as the 2018-2019 school year. Accordingly, the proposed shared path/sidewalk under review would also provide connectivity to this new school for students.

This report summarizes LTG's investigation into the financial feasibility of constructing the project, as requested by the Town of Pierson. Figure 1 shows the location of the project in relation to the surrounding network.



NTS

## LOCATION MAP

Project No.: 3903.06

Figure: 1



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The following table outlines the supporting policies in the Town's comprehensive plan

**Policy II-1.11:** Reduce Hazardous Walking Conditions. Consistent with Public School Facility Element Policy X-1.3.4, the Town of Pierson shall reduce hazardous walking conditions consistent with Florida's safe ways to school program. In conjunction with the School Board, the Town of Pierson shall implement the following strategies:

1. New developments adjacent to schools shall be required to provide a right-of-way and direct safe access path for pedestrian travel to existing and planned schools and shall connect to the neighborhood's pedestrian network.
2. New development and redevelopment within two miles of a school shall be required to provide sidewalks within or adjacent to the property for the corridor that directly serves the school or qualifies as an acceptable designated walk or bicycle route to the school.
3. In order to ensure continuous pedestrian access to public schools, the Town of Pierson shall consider infill sidewalk and bicycle projects connecting networks serving schools as part of the annual capital budget process. Priority shall be given to hazardous walking conditions pursuant to Section 1006.23, Florida Statutes.
4. The Town of Pierson shall coordinate with the Metropolitan Planning Organization to maximize the funding from the Florida Department of Transportation and other sources that may be devoted to improving pedestrian networks serving schools.  
– *Town of Pierson Comprehensive Plan, 2012*

**Objective III.1.2:** The needs of pedestrians and bicyclists shall be accommodated in all road construction and reconstruction projects whenever possible and appropriate. – *Town of Pierson Comprehensive Plan, 2012*

**Policy III-1.2.1:** The Town shall continue to enforce the Land Development Code's design standards to insure that the needs of pedestrians and bicyclists are met. – *Town of Pierson Comprehensive Plan, 2012*

**Policy III-1.2.4:** The Town shall continue to expand its bike/sidewalk system whenever it can be accomplished in a fiscally sound manner. – *Town of Pierson Comprehensive Plan, 2012*

### 3. PURPOSE AND OBJECTIVES

The purpose of this project is to conduct a limited corridor study that will assess the feasibility for construction of a 12 ft. wide shared path or an 8 ft. wide concrete sidewalk along a segment of US 17 in the Town of Pierson. The study segment is approximately 1.10 miles, or 5,800 ft., in length from Washington Avenue to Palmetto Avenue. The proposed path will be on the east side of US 17. This proposed sidewalk segment connects to an existing sidewalk in the northeast quadrant at the intersection of Washington Avenue. The northern boundary of the study corridor, owned by the VCSB, at Palmetto Avenue does not connect to an existing sidewalk. This VCSB property is programmed to be the site of a new elementary school as early as the 2018-2019 school year. In order to prevent work redundancy and unnecessary costs, coordinated planning with the VCSB regarding the new school design, new infrastructure, and the proposed shared use path/sidewalk design is required. This coordination should be for the entire project corridor. With this, the proposed shared path/sidewalk will improve pedestrian safety throughout the corridor and will also enhance connectivity in the community.

This study evaluates existing conditions and proposes recommendations for construction of the desired shared path/sidewalk. Recommended conceptual alignments for segments are presented in this report. A cost estimate for the recommended alignment is included in this report with sufficient detail supporting the estimate provided in Section 8. The cost estimate is provided to assist the R2CTPO and the Town of Pierson in the budgeting and planning of this project. For the purposes of data collection, concept development, corridor evaluation, and cost estimation, field visits were conducted by LTG staff.

#### **4. STUDY METHODOLOGY**

The following tasks were completed per the project scope to provide an informed feasibility report in accordance with R2CTPO policies, procedures, and rules. In addition, the tasks will meet the procedures currently used by FDOT District 5 to evaluate transportation (SU funded) bicycle and pedestrian corridor projects.

1. A project scope meeting was held with R2CTPO, Town of Pierson, VCSB, Volusia County, FDOT, and LTG staff on Thursday, October 1, 2015. The purpose of the meeting was to discuss the scope of the project and to obtain any relevant project information from the stakeholders.
2. Data collection for the project consisted of obtaining copies of planning, land use, and engineering information, including the following:
  - a. FDOT right-of-way maps (show 150' right-of-way).
  - b. Volusia County Property Appraiser's parcel maps were downloaded to delineate the area right-of-way boundaries in order to check for consistency with FDOT's records. The County's MapIT online map tool shows a differing right-of-way width of approximately 100 ft. throughout the length of the US 17 study corridor. This could significantly affect feasibility. However, physical features such as driveway aprons and fence locations, as well as a VCSB survey, agree with the FDOT right-of-way maps. It should be noted the Volusia County right-of-way manager is in agreeance with the 150 ft. right-of-way and further discussions with FDOT personnel confirm the right-of-way to be 150 ft. Accordingly, the right-of-way shown on Figures 3A – 3I is based on the FDOT right-of-way maps.
  - c. County of Volusia LiDAR
  - d. USGS Soil Maps and data were downloaded and show several different soil types within the study area.
  - e. Data also consisted of referencing readily available information from a variety of sources including: the R2CTPO, Town of Pierson, VCSB, and FDOT.
3. A site visit was conducted on Thursday, November 11, 2015. The site visit was conducted by LTG staff and stakeholders to gain familiarity with the corridor and to also discuss how to address site specific challenges that can affect feasibility. The site visit also included Town of Pierson, VCSB, and FDOT representatives. During the site visit,

photographs, measurements, and field notes were collected to document the potential obstructions and obstacles that might impede the project's constructability.

4. A concept plan and a typical section for the corridor was developed based on the results of the three previous tasks and applicable design criteria. The concept plan and typical sections are based on design criteria for pedestrian facilities contained in the FDOT Design Standards, Plans Preparation Manual, Manual on Uniform Minimum Standards for Design, Construction, and Maintenance (the Florida Greenbook), and Town of Pierson standards.
5. An Engineer's Opinion of Probable Costs (EOPC) for construction was prepared based on the conceptual design to construct the sidewalk within the existing right of way limits. The EOPC was prepared based on FDOT historical cost data.

## 5. EXISTING CONDITIONS

The US 17 project corridor is located within incorporated Pierson. Since it is a federal highway and a state road (SR 15), the roadway is under FDOT maintenance. The corridor is approximately 1.10 miles, or 5,800 ft., in length and extends northbound from Washington Avenue to Palmetto Avenue. The roadway provides connectivity between the Town of Pierson and Seville, an unincorporated community approximately 5 miles to the north. With this, the corridor also provides connectivity to Pierson Municipal Airport, Taylor High School, a sports complex, an auto repair/service shop, and other sidewalks at Washington Avenue. It should be noted that the VCSB owns property on the northern boundary of the corridor and is actively planning for construction and completion of a new elementary school by the 2018-2019 school year. The project corridor will also provide connectivity to this planned project. Property ownership immediately south of VCSB property is privately owned and spans multiple parcels for approximately 3,580 ft. This private property is marked by a barbed wire fence with wooden posts running along the apparent right-of-way line (see Image 1). At the southern termination of this stretch of privately owned land is the Pierson Municipal Airport property owned by the town of Pierson spanning approximately 1,160 ft. and terminates at the auto repair/service shop.



**Image 1: Barbed Wire Fencing on Property Line**

The study corridor traverses through a primarily rural and undeveloped area. The southern boundary provides little development with the signalized intersection at Washington Avenue,



Pierson Municipal Airport, and the auto repair/service shop. Right-of-way is 150ft. with the roadway approximately centered within.

The roadway is classified by FDOT as a rural arterial principal. Accordingly, roadway cross sections are rural and feature a 5 ft. paved shoulder on both sides. The roadway is a two-lane undivided facility with asphalt pavement measuring 34 ft. in width. Roadway grades throughout the corridor are primarily flat and do not include vertical curvature. Mild horizontal curves are located in the southern corridor boundary and approximately 3,500 ft. north of Washington Avenue. At the southern boundary, the auto repair/service shop features a deteriorating fully paved concrete lot that is flush with the roadway. This lot appears to function as an overflow for customer vehicles or used car inventory (see Image 2). A portion of vehicles are within the apparent right-of-way.



**Image 2: SB View of Auto Repair/Service Shop Pavement**

A speed limit of 50 mph is posted on US 17 approximately 620 ft. north of Washington Avenue. Approximately 1,960 ft. north, a 60 mph sign is posted and continues for the remaining length of the corridor. The capital improvement plans for the Town of Pierson, Volusia County, and FDOT were reviewed; and no future projects were identified within the general area of the project. However, the completion of a sidewalk construction project is ongoing from Hagstrom Road to Washington Avenue.

Open drainage features are primarily present throughout the corridor. These open drainage features consist of ditches which run parallel to the roadway (see Image 3). The ditches are offset approximately 10 to 20 ft. from edge of pavement to edge of ditch. Accompanying the ditches at paved and unpaved driveways are side drain pipes with concrete mitered end sections on either side. There are three unpaved driveways with metal gates that provide access to private property and one paved driveway apron adjacent to the airport. There are also mitered end sections at both the southern and northern boundaries



**Image 3: NB View of Existing Ditch**

of the study corridor. Two outfalls assisting water conveyance are present within the corridor: a 5 ft. by 2 ft. box culvert approximately 1,670 ft. north of Washington Avenue and a 4 ft. by 2 ft. box culvert approximately 2,220 ft. south of Palmetto Avenue.

For the majority of the corridor (excluding the southern boundary and segment adjacent to the airport), significant underbrush and a heavy tree line are present on the east side of the ditches and span east to the barbed wire fence. At times, there appears to be a slight clearing between the underbrush/tree line and the fencing, most likely resulting from sporadic use as a vehicular frontage path for property owners or any maintenance personnel (see Image 4).

As a result of the undeveloped nature of the corridor, utility poles are not present on either side of the roadway. There are, however, underground telecommunication cable markings running parallel and directly adjacent to the ditches (see Image 5). A telecommunication junction box is also present on the northern boundary in the southeast quadrant at the intersection of Palmetto Avenue.

The U.S. Department of Agriculture's (USDA) Web Soil Survey and Volusia County Kiosk Map show that soil within the study corridor is primarily Myakka-Myakka, wet, fine sands, 0 to 2 percent slopes. The soil is described as fine sand that is poorly drained. Appendix B provides a map of the existing soil and a detailed description of soil properties.



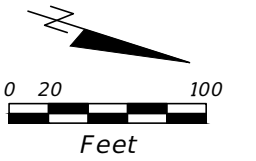
**Image 4: SB View of Clearing**



**Image 5: Telecommunication Cable Marker**

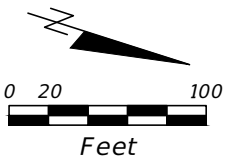
Along with the previous description of existing conditions, detailed graphics and photographs are included on Figures 2A – 2E.





REVISIONS				<div><b>Lassiter Transportation Group, Inc.</b> <i>Engineering and Planning</i> MARK NEIMAN P.E. No. 44077 1450 W. GRANADA BOULEVARD SUITE 2 ORMOND BEACH, FLORIDA 32174 PH: 386.257.2571 FAX: 386.257.6996 COE NO. 9227</div>	RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION			FIGURE 2A EXISTING CONDITION PHOTOGRAPHS	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD	COUNTY	PROJECT ID		10
					US 17	VOLUSIA	SCHL-2015-056		





MATCH LINE A-A



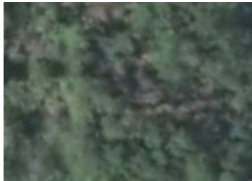
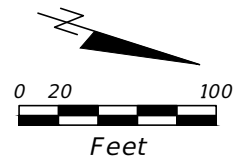
MATCH LINE B-B



REVISIONS				 <b>Lassiter Transportation Group, Inc.</b> <i>Engineering and Planning</i> MARK NEIMAN P.E. No. 44077 1450 W. GRANADA BOULEVARD SUITE 2 ORMOND BEACH, FLORIDA 32174 PH: 386.257.2571 FAX: 386.257.6996 COE NO. 9227	RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION			FIGURE 2B EXISTING CONDITION PHOTOGRAPHS	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD	COUNTY	PROJECT ID		11
					US 17	VOLUSIA	SCHL-2015-056		



MATCH LINE B-B

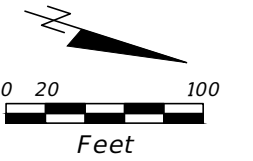


MATCH LINE C-C



REVISIONS				<div><b>Lassiter Transportation Group, Inc.</b> <i>Engineering and Planning</i> MARK NEIMAN P.E. No. 44077 1450 W. GRANADA BOULEVARD SUITE 2 ORMOND BEACH, FLORIDA 32174 PH: 386.257.2571 FAX: 386.257.6996 COE NO. 9227</div>	RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION			FIGURE 2C EXISTING CONDITION PHOTOGRAPHS	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD	COUNTY	PROJECT ID		12
					US 17	VOLUSIA	SCHL-2015-056		





MATCH LINE C-C



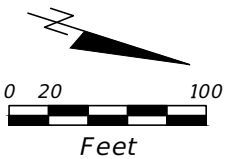
MATCH LINE D-D



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DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD	COUNTY	PROJECT ID		13
					US 17	VOLUSIA	SCHL-2015-056		



MATCH LINE D-D



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DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD	COUNTY	PROJECT ID		14
					US 17	VOLUSIA	SCHL-2015-056		



## 6. DESIGN CRITERIA

The concept plan and typical section included within this report were developed based on design criteria set forth and adopted by FDOT and the Town of Pierson. The following publications were used to prepare the concept design, typical section, and cost estimates:

- Plans Preparation Manual (FDOT)
- Design Standards (FDOT)
- Florida Greenbook (FDOT)
- Manual on Uniform Traffic Control Devices (MUTCD)
- Volusia County Land Development Code
- Town Of Pierson Land Development Code (Pierson)
- Standard Specifications for Road and Bridge Construction (FDOT)
- Basis of Estimates (FDOT)

The following specific criteria should be used in development of the final construction plans:

### Horizontal Separation

The Plans Preparation Manual (PPM) recommends that new sidewalks be placed as far from the roadway as practical in the following sequence of desirability:

1. As near the right of way line as possible
2. Outside of the clear zone
3. Five feet from the shoulder point on flush shoulders
4. At the shoulder point

The Florida Greenbook, which governs design of the non-state roadway system, recommends that pedestrian pathways be placed as far from the roadway as possible, in the following sequence of desirability:

1. Outside of the right of way in a separately dedicated corridor adjacent to the right of way
2. At or near the right of way
3. Outside of the minimum required clear zone
4. As far from the edge of the driving lane as practical

The PPM and Florida Greenbook criteria were selected as appropriate for design of the shared use path/sidewalk. Considering that the corridor is undeveloped with posted speed limits of 50 and 60 mph, it is recommended that the proposed alignment be placed east of the existing ditches and as close as possible to the right-of-way limits. If the path is to be shared use, bicycle use will require a recommended horizontal clearance of 3 ft. from fences or other lateral obstructions. This criteria would primarily apply to the back of the proposed path. Although 3 ft. is the recommended horizontal distance, a larger distance should be considered due to the presence of the barbed wire fencing and anticipated high student usage. Horizontal clearance on the front of the proposed path would be limited to a minimum of 5 ft. from the back of the edge of any ditch or slopes. The location of proposed alignment includes techniques to discourage potential motorized vehicle use on the path. This primarily includes a meandering

alignment, a general pattern of reverse curves that would be bothersome to drivers attempting to navigate the path in motorized vehicles.

The PPM and Florida Greenbook recommend that sidewalks be transitioned toward the roadway at intersections to establish a more functional crossing location that also meets driver expectations for stop line location. The concept plan has been developed so that the proposed sidewalk intersects existing streets, driveways, and sidewalks at approximate right angles in order to cross parallel to US 17. These intersections include the sidewalk in the northeast quadrant of Washington Avenue, a paved driveway apron at Pierson Municipal Airport, and the northbound approach at Palmetto Avenue.

#### Accessibility, Slopes, and Grades

Curb ramps, maximum slopes, minimum widths, clear zones, and design treatments for the visually impaired, such as truncated domes, are design features that result in part from the Americans with Disabilities Act (ADA). These design features must be accounted for when designing new pedestrian facilities and retrofitting existing facilities. The following list of design criteria should be taken into account when preparing the final construction plans for the project.

1. The Florida Greenbook states that curb ramps meeting the requirements of ADA Accessibility Guidelines and the Florida Accessibility Code for Building Construction shall be constructed at crosswalks at all intersections where curbs and sidewalks are constructed in order to give persons with disabilities safe access.
2. In general, proper design of pedestrian crossings shall consider the following:
  - a. Crossings should be placed at locations with ample sight distances.
  - b. At crossings, the roadway should be free from changes in alignment or cross section.
  - c. The entire length of the crosswalk shall be visible to drivers at a sufficient distance to allow a stopping maneuver.
  - d. STOP lines shall be provided adjacent to all signalized crosswalks to inform drivers of the proper location to stop. The STOP line should be separated from the crosswalk and should not be closer than 4 ft.
  - e. All crosswalks shall be easily identified and clearly delineated, in accordance with MUTCD (Rule 14-15.010).
3. The single most important design consideration for persons with disabilities are curb ramps. Therefore, new and retrofitted streets with sidewalks should have curb ramps installed at all delineated crossings, and it is desirable to provide separate ramps for each crosswalk at intersections with perpendicular approaches. Two curb cuts at each corner with a curb separating each ramp provides a greater amount of information to visually impaired pedestrians in street crossing designs. However, a single uniform diagonal ramp including both crossings is also acceptable, when installed with truncated dome warning strips along the edge of the curb line.
4. Crossings shall also meet the same grade and cross slope requirements as sidewalks where the longitudinal grade should not exceed 5% and the maximum cross slope shall be no more than 2%.

5. Marked crosswalks shall be provided at all side streets where a pedestrian facility meets the roadway.
6. Marked crosswalks on an uncontrolled leg of an intersection or midblock shall be supplemented with other treatments (including beacons, curb extensions, raised medians, raised traffic islands, or enhanced overhead lighting) when any of the following conditions exist: 1.) Where posted speeds are greater than 40 miles per hour (MPH), 2.) Inadequate stopping sight distance exists, such as on hills or curves, 3.) Block length is shorter than 600 feet and high pedestrian volumes exist, and 4.) Multiple conflict points that demand driver attention away from the crosswalk.

## **7. CONCEPT PLAN DEVELOPMENT**

According to the Town of Pierson's project funding application for this project, the concept is a 12 ft. maximum wide shared use path or an 8 ft. wide sidewalk along the east side of US 17 (SR 15) from Washington Avenue in the south to Palmetto Avenue in the north. It has been determined that an 8 ft. wide sidewalk will be the most feasible in terms of maintenance as a result of FDOT's agreeability to maintain a sidewalk no greater than 8 ft. wide. If the 12 ft. wide shared use path were constructed, it would not be maintained by FDOT and would need to be maintained by the combination of the Town of Pierson and the VCSB. With this in mind and through discussion at the site visit on November 12, 2015, it was determined the conceptual design would include the 8 ft. wide sidewalk option.

The complete concept plan is included as Figures 3, 3A – 3I. The typical cross section developed for the concept plan is included on Figure 3J.

On the corridor's southern boundary at Washington Avenue, the proposed sidewalk intersects an existing sidewalk in the northeast quadrant. The alignment continues parallel to US 17 and offset 12 to 13 ft. from the edge of pavement for approximately 105 ft. until it diverges east for approximately 30 ft. to avoid the first ditch system. The proposed alignment then returns to its northbound direction. Aluminum pipe hand rail per FDOT Standard Design Index No. 870 is recommended for this transition around the ditch. See Figure 3A.

Removal of the deteriorating pavement at the auto repair/service shop and replacement with sod is recommended between the front of sidewalk and edge of pavement. A reconstructed concrete driveway is also proposed in order to maintain the existing access to the shop from US 17. See Figure 3A.

Starting adjacent to the Pierson Municipal Airport, the sidewalk alignment begins to take on a meandering pattern. A meandering alignment is recommended in order to deter any motorized vehicle use of the sidewalk as a frontage road. There are no specific FDOT design standards for meandering sidewalks due to the site specific nature of each sidewalk. However, due to the nature of the adjacent roadway and lateral constraints, the meandering path consists of alternating horizontal curves at 500 ft. radii spaced at 150 ft. on center.



At the concrete driveway located at Station 15+88 providing access to Pierson Municipal Airport, a special emphasis crosswalk is proposed with detectable warnings on both approaches.

At the first concrete box culvert and its respective outfall (Station 26+66), a 48 in. concrete pipe with mitered end sections on both sides is recommended. This is to ensure that water conveyance will not be disturbed by the presence of the sidewalk. It also effectively bridges the sidewalk over a ditch/swale created for the outfall. At the second concrete box culvert and its respective outfall (Station 46+28), a 42 in. concrete pipe with mitered end sections on both sides is also recommended. A minimum of 24 ft. of Aluminum pipe hand rail per FDOT Standard Design Index No. 870 is recommended for the front and back side of the proposed sidewalk at both culverts. See Figures 3C and 3F, respectively.

A single detectable warning pad is proposed for the south side of Palmetto Avenue on the northern boundary of the corridor.

As a result of the underbrush and heavy tree line, significant clearing and grubbing will be required from east of the ditch to the eastern right-of-way edge. This clearing and grubbing is not only needed for construction of the proposed sidewalk, but it will also allow for the path to be safely exposed to the view of roadway users, thus deterring any criminal activity.



**Image 6: Shoebox Light Fixture**

Due to the undeveloped nature of the corridor, pedestrian light fixtures were investigated for feasibility. Multiple light fixtures were researched with varying wattage, height and luminaire type. Through this research, it was determined that a shoebox luminaire (Type I or Type II) at 40 watts mounted 12 to 14 ft. above the sidewalk provided the optimal lighting effect (see Image 6). Calculations indicate that the light fixtures would be spaced 67 ft. on center for a total of 87. These calculations are provided in Appendix C. Electrical service can be connected via a standard FDOT connection at a transformer mounted on a utility pole at Station 12+26. A cost estimate has been included for this lighting option in Appendix C. It should be noted that the lighting component of the sidewalk would not be maintained by FDOT. Costs associated with maintenance and operation of the lighting system would be the responsibility of the Town of Pierson. Due to the extra installation and maintenance cost, the lighting system is not the preferred option for the Town of Pierson.

It should be noted that the VCSB does not have a site plan for the anticipated elementary school. Accordingly, the final location and alignment of the proposed sidewalk should be coordinated by both the VCSB and the Town of Pierson during the design phase of both facilities.

## **8. ENGINEER'S OPINION OF PROBABLE COST (EOPC)**

Table 1 provides a preliminary cost estimate for the design and construction of the preferred 8 ft. sidewalk option on US 17. This cost estimate is to be considered an opinion of probable cost based solely on the results of this feasibility study. The pay item number and unit of measure are based on the Florida Department of Transportation (FDOT) Basis of Estimates (BOE) Manual. The unit prices are based on historical average costs for each pay item as provided by FDOT. Some unit prices may have been adjusted due to the small nature of the project or the lack of sufficient historical cost data. No right-of-way acquisition fees are anticipated with the final design phase. However, an Environmental Resource Permit (ERP) application fee of \$1,190 for the St. Johns River Water Management District (SJRWMD) is anticipated as a result of the impact to surface water at the two outfall locations. The cost estimate for the design and construction of the proposed 8 ft. is \$614,983.

Table 2 provides a preliminary cost estimate for the 12 ft. shared use path. The cost estimate for the design and the construction of the 12 ft. shared use path is \$831,719.

To adjust for potential future increases in the project's cost estimate, an annual inflationary factor was applied. The FDOT provides annual inflation factors for roadway construction costs which may be used as a guideline for this sidewalk project. The 2016 cost estimate provided herein may be adjusted by the FDOT inflationary factors (included in Appendix D) for the next three years (2017, 2018, and 2019) as follows:

- 8 ft. sidewalk: \$630,357.45, \$647,576.97, and \$665,411.47
- 12 ft. shared use path: \$852,512.24, \$875,800.38, \$899,920.24





REVISIONS				<div><b>Lassiter Transportation Group, Inc.</b> <b>Engineering and Planning</b> MARK NEIMAN P.E. No. 44077 1450 W. GRANADA BOULEVARD SUITE 2 ORMOND BEACH, FLORIDA 32174 PH: 386.257.2571 FAX: 386.257.6996 COA NO. 9227</div>	RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION			FIGURE 3 US 17/SR 15 CONCEPT PLAN SHEETS	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD	COUNTY	PROJECT ID		
					US 17	VOLUSIA	SCHL-2015-056		20



LEGEND

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APPARENT R/W

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EXISTING EDGE OF PAVEMENT

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PROPOSED FRONT OF SIDEWALK

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PROPOSED BACK OF SIDEWALK

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EXISTING FRONT OF SIDEWALK

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EXISTING BACK OF SIDEWALK

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PROPOSED 2' DETECTABLE WARNING

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EXISTING UTILITY POLE

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EXISTING DRAINAGE STRUCTURE

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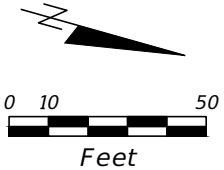
CONCRETE STRAIN POLE

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PEDESTRIAN SIGNAL

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CONTROLLER CABINET



NOTE: US 17 R/W SHOWN IS BASED ON FDOT R/W MAPS

REVISIONS				<div><div></div><div><b>Lassiter Transportation Group, Inc.</b> <b>Engineering and Planning</b> MARK NEIMAN P.E. No. 44077 1450 W. GRANADA BOULEVARD SUITE 2 ORMOND BEACH, FLORIDA 32174 PH: 386.257.2571 FAX: 386.257.6996 COA NO. 9227</div></div>	RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION			FIGURE 3A US 17 / SR 15 CONCEPT PLAN	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD	COUNTY	PROJECT ID		
					US 17	VOLUSIA	SCHL-2015-056	21	



LEGEND

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APPARENT R/W

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EXISTING EDGE OF PAVEMENT

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PROPOSED FRONT OF SIDEWALK

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EXISTING BACK OF SIDEWALK

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PROPOSED 2' DETECTABLE WARNING

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REVISIONS				<div><b>Lassiter Transportation Group, Inc.</b> <b>Engineering and Planning</b> MARK NEIMAN P.E. No. 44077 1450 W. GRANADA BOULEVARD SUITE 2 ORMOND BEACH, FLORIDA 32174 PH: 386.257.2571 FAX: 386.257.6996 COA NO. 9227</div>	RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION			FIGURE 3B US 17 / SR 15 CONCEPT PLAN	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD	COUNTY	PROJECT ID		22
					US 17	VOLUSIA	SCHL-2015-056		



LEGEND

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APPARENT R/W

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EXISTING EDGE OF PAVEMENT

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PROPOSED FRONT OF SIDEWALK

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PROPOSED BACK OF SIDEWALK

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EXISTING BACK OF SIDEWALK

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PROPOSED 2' DETECTABLE WARNING

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EXISTING DRAINAGE STRUCTURE

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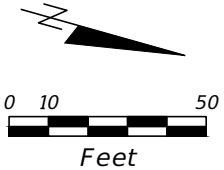
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APPARENT R/W

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EXISTING EDGE OF PAVEMENT

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PROPOSED FRONT OF SIDEWALK

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EXISTING DRAINAGE STRUCTURE

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**LEGEND**

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APPARENT R/W

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EXISTING EDGE OF PAVEMENT

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PROPOSED 2' DETECTABLE WARNING

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EXISTING UTILITY POLE

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EXISTING DRAINAGE STRUCTURE

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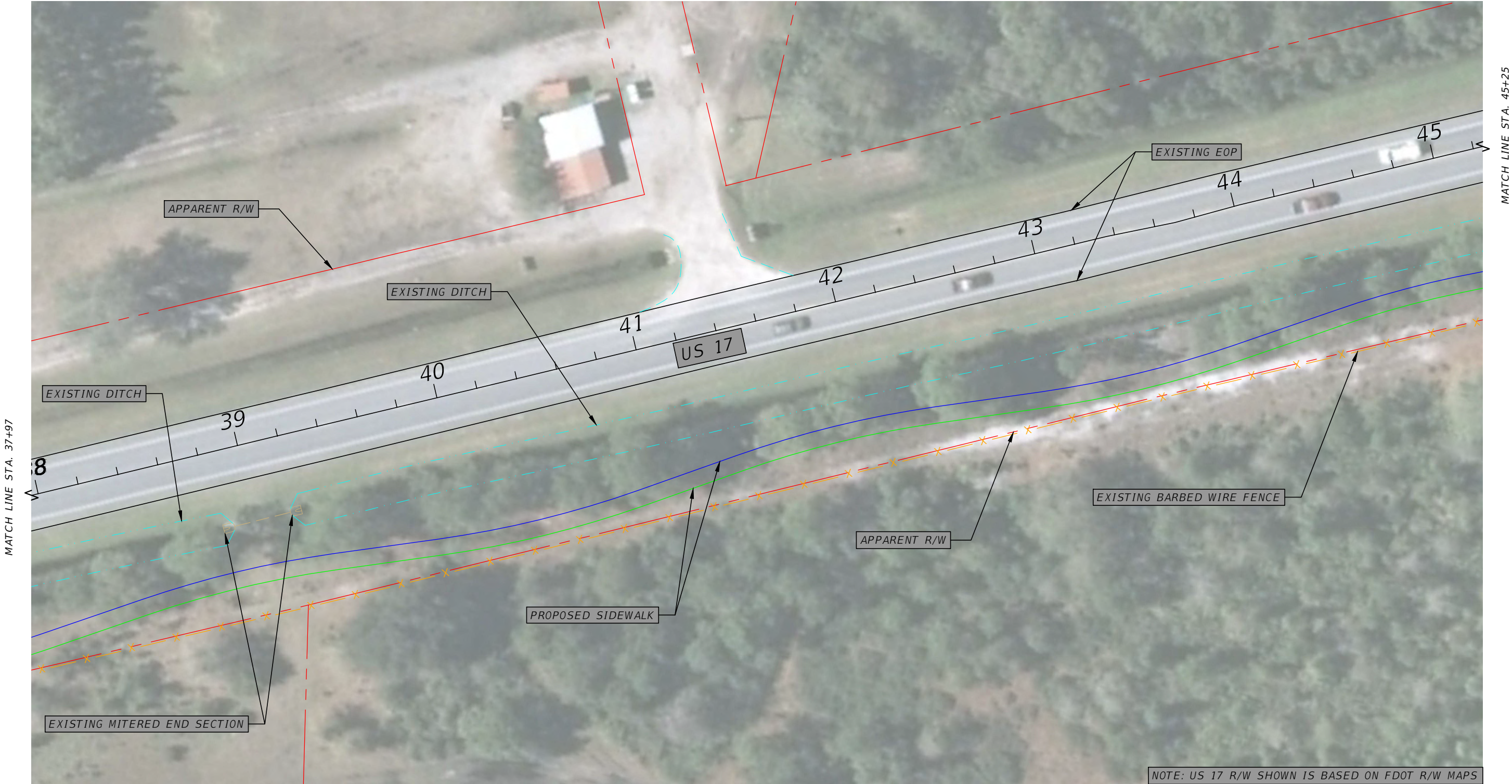
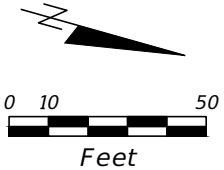
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PEDESTRIAN SIGNAL

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REVISIONS				<div><div><div><b>Lassiter Transportation Group, Inc.</b></div><div>Engineering and Planning</div><div>MARK NEIMAN P.E. No. 44077 1450 W. GRANADA BOULEVARD SUITE 2 ORMOND BEACH, FLORIDA 32174 PH: 386.257.2571 FAX: 386.257.6996 COA NO. 9227</div></div></div>	RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION			FIGURE 3E US 17 / SR 15 CONCEPT PLAN	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD	COUNTY	PROJECT ID		
					US 17	VOLUSIA	SCHL-2015-056	25	



LEGEND

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APPARENT R/W

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EXISTING EDGE OF PAVEMENT

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PROPOSED FRONT OF SIDEWALK

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PROPOSED BACK OF SIDEWALK

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EXISTING FRONT OF SIDEWALK

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EXISTING BACK OF SIDEWALK

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PROPOSED 2' DETECTABLE WARNING

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EXISTING UTILITY POLE

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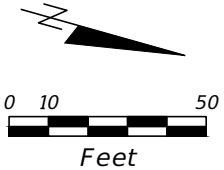
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NOTE: US 17 R/W SHOWN IS BASED ON FDOT R/W MAPS

REVISIONS				<div><div><div><div></div></div><div><b>Lassiter Transportation Group, Inc.</b></div><div><b>Engineering and Planning</b></div><div>MARK NEIMAN P.E. No. 44077 1450 W. GRANADA BOULEVARD SUITE 2 ORMOND BEACH, FLORIDA 32174 PH: 386.257.2571 FAX: 386.257.6996 COA NO. 9227</div></div></div>	RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION			FIGURE 3F US 17 / SR 15 CONCEPT PLAN	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD	COUNTY	PROJECT ID		26
					US 17	VOLUSIA	SCHL-2015-056		



LEGEND

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APPARENT R/W

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EXISTING EDGE OF PAVEMENT

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PROPOSED FRONT OF SIDEWALK

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PROPOSED BACK OF SIDEWALK

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EXISTING BACK OF SIDEWALK

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PROPOSED 2' DETECTABLE WARNING

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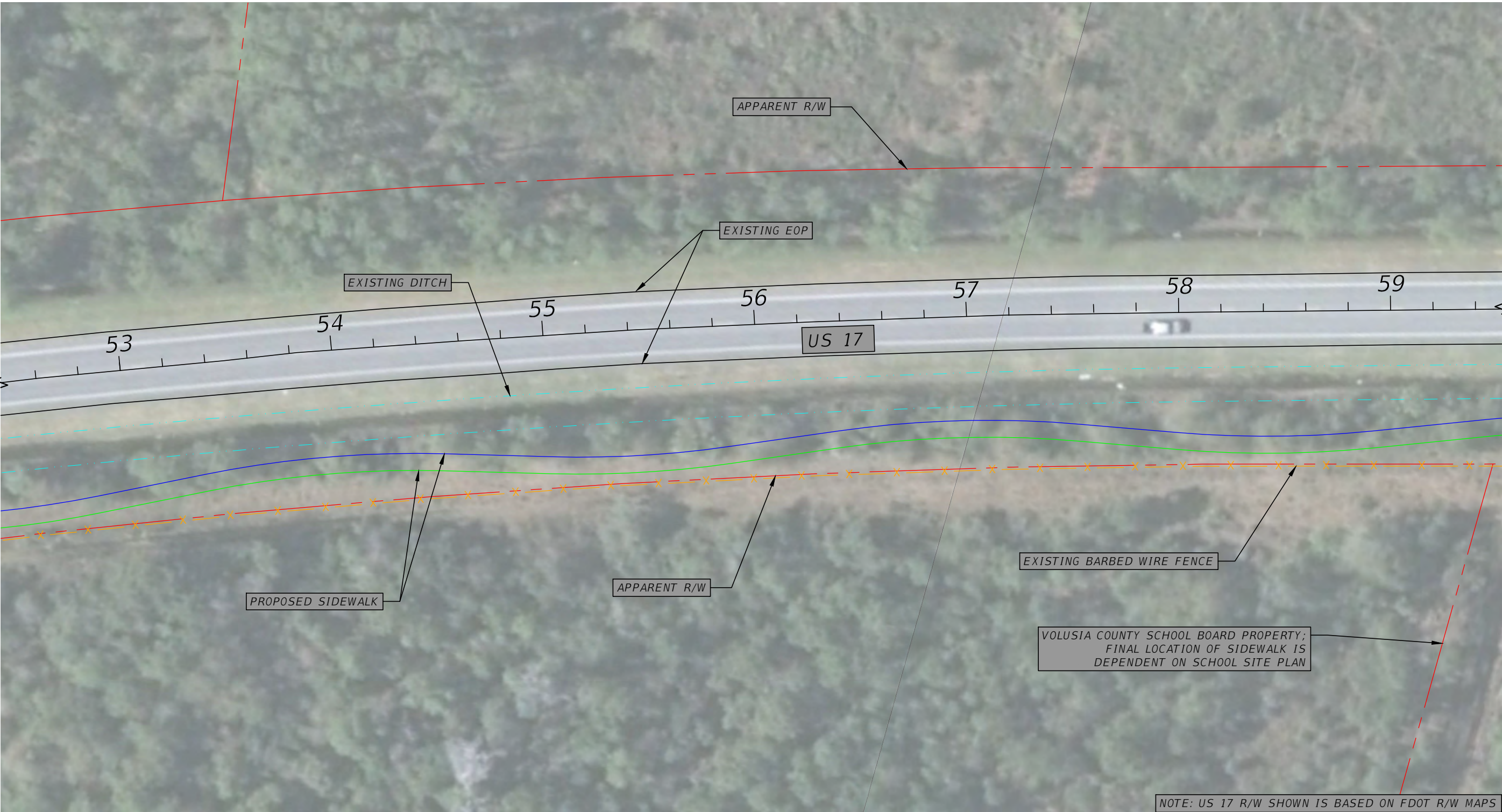
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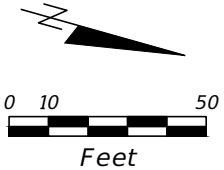
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EXISTING EDGE OF PAVEMENT

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PROPOSED 2' DETECTABLE WARNING

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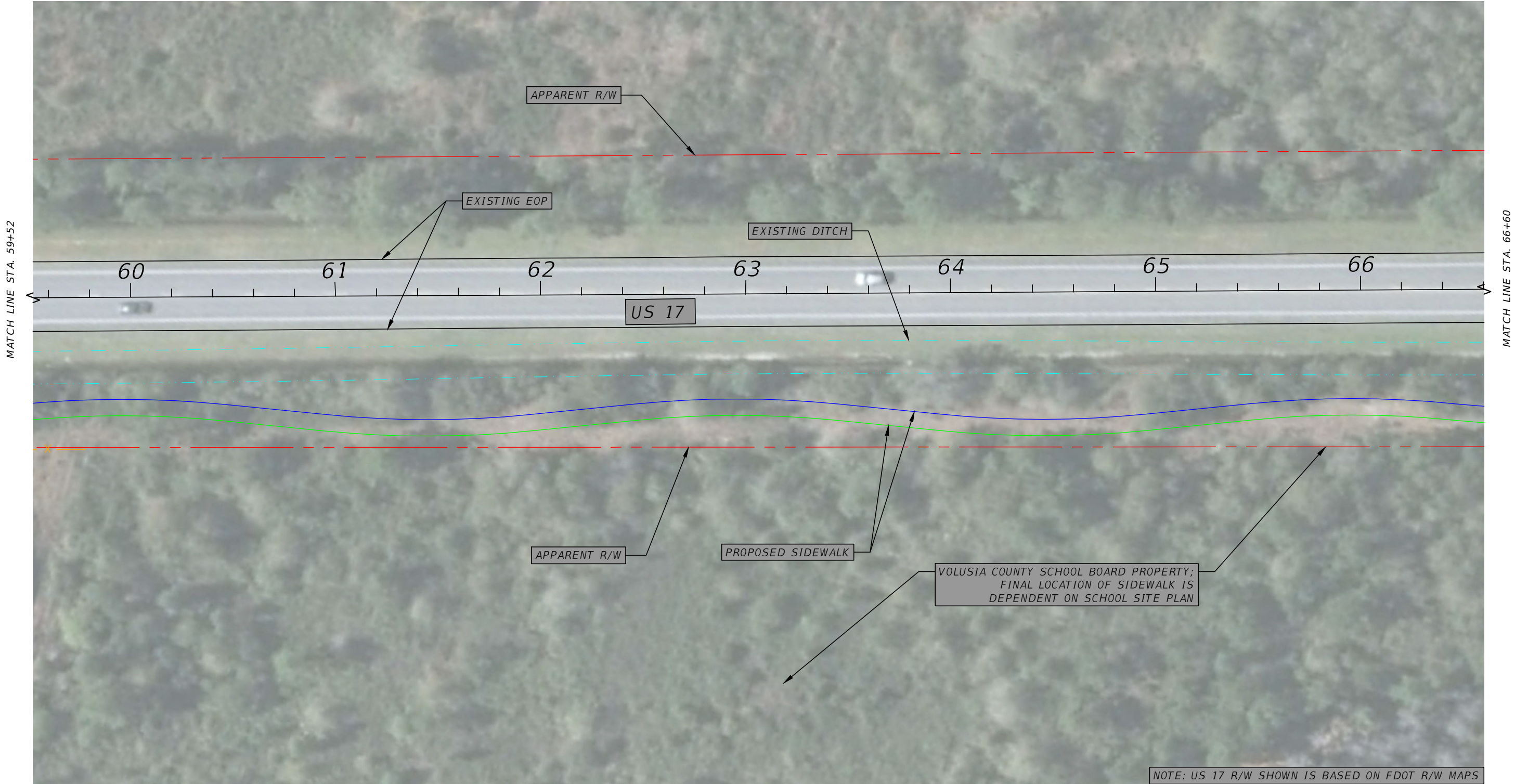
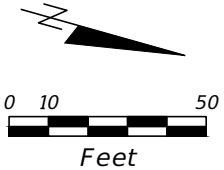
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DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD	COUNTY	PROJECT ID		28
					US 17	VOLUSIA	SCHL-2015-056		



LEGEND

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APPARENT R/W

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EXISTING EDGE OF PAVEMENT

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PROPOSED FRONT OF SIDEWALK

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PROPOSED BACK OF SIDEWALK

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EXISTING FRONT OF SIDEWALK

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EXISTING BACK OF SIDEWALK

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PROPOSED 2' DETECTABLE WARNING

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EXISTING UTILITY POLE

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EXISTING DRAINAGE STRUCTURE

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CONCRETE STRAIN POLE

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PEDESTRIAN SIGNAL

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CONTROLLER CABINET

NOTE: US 17 R/W SHOWN IS BASED ON FDOT R/W MAPS

REVISIONS				<div><div></div><div><b>Lassiter Transportation Group, Inc.</b></div><div><b>Engineering and Planning</b></div><div>MARK NEIMAN</div><div>P.E. No. 44077</div><div>1450 W. GRANADA BOULEVARD, SUITE 2</div><div>ORMOND BEACH, FLORIDA 32174</div><div>PH: 386.257.2571 FAX: 386.257.6996</div><div>COA NO. 9227</div></div> <th colspan="3">RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION</th> <th rowspan="2">FIGURE 3I US 17 / SR 15 CONCEPT PLAN</th> <th>SHEET NO.</th>	RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION			FIGURE 3I US 17 / SR 15 CONCEPT PLAN	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD	COUNTY	PROJECT ID		
					US 17	VOLUSIA	SCHL-2015-056	29	



FIGURE 3J US 17/SR 15  
TYPICAL SECTION

**Table 1**  
**Engineer's Opinion of Probable Cost**  
**US 17: 8 Ft. Shared Use Path**

PAY ITEM NUMBER	PAY ITEM DESCRIPTION	TOTAL QTY	UNIT MEASURE	UNIT PRICE	TOTAL PRICE
101-1	MOBILIZATION	1	LS	\$42,922.58	\$42,922.58
102-1	MAINTENANCE OF TRAFFIC	1	LS	\$39,020.53	\$39,020.53
104-10-3	SEDIMENT BARRIER	6,401	LF	\$1.09	\$6,977.09
110-1-1	CLEARING AND GRUBBING	4	AC	\$11,027.11	\$44,108.44
110-4	REMOVAL OF EXISTING CONCRETE PAVEMENT	892	SY	\$21.41	\$19,097.72
120-1	REGULAR EXCAVATION	1,078	CY	\$14.84	\$15,997.52
120-6	EMBANKMENT	30	CY	\$11.04	\$331.20
430-175-142	PIPE CULV, OPT MATL, ROUND, 42" S/CD	25	LF	\$131.03	\$3,275.75
430-175-148	PIPE CULV, OPT MATL, ROUND, 48" S/CD	25	LF	\$158.36	\$3,959.00
430-982-140	MITERED END SECT, OPTIONAL RD, 42" CD	2	EA	\$3,043.06	\$6,086.12
430-982-141	MITERED END SECT, OPTIONAL RD, 48" CD	2	EA	\$4,279.18	\$8,558.36
515-1-2	PIPE HANDRAIL - GUIDERAIL, ALUMINUM	177	LF	\$36.12	\$6,393.24
522-2	CONCRETE SIDEWALK AND DRIVEWAYS 6" THICK	5,756	SY	\$45.33	\$260,919.48
527-2	DETECTABLE WARNINGS	48	SF	\$34.90	\$1,675.20
570-1-2	PERFORMANCE TURF, SOD	5,690	SY	\$2.19	\$12,461.10
711-11-123	THERMOPLASTIC, STANDARD, WHITE, SOLID, 12"	64	LF	\$2.09	\$133.76
711-11-125	THERMOPLASTIC, STANDARD, WHITE, SOLID, 24"	56	LF	\$4.13	\$231.28
<b>Construction Subtotal:</b>					<b>\$472,148.36</b>
N/A	PRELIMINARY ENGINEERING	1	LS	20%	\$94,429.67
N/A	CEI	1	LS	10%	\$47,214.84
N/A	ENVIRONMENTAL RESOURCE PERMIT	1	LS	\$1,190	\$1,190.00
<b>Grand Total:</b>					<b>\$614,982.87</b>
<b>FDOT Inflation Adjusted Estimate</b>		<b>Inflation Factor</b>	<b>PDC Multiplier</b>	<b>Adjusted Cost Estimate</b>	
Year 1 Inflation-Adjusted Estimate (2017)		2.50%	1.025	<b>\$630,357.45</b>	
Year 2 Inflation-Adjusted Estimate (2018)		2.70%	1.053	<b>\$647,576.97</b>	
Year 3 Inflation-Adjusted Estimate (2019)		2.80%	1.082	<b>\$665,411.47</b>	

Notes:

- 1.) Unit costs obtained from FDOT 12-month and 6-month statewide and area averages.
- 2.) Inflation factors obtained from R2CTPO and FDOT.
- 3.) CEI – Construction, Engineering, and Inspection

**Table 2**  
**Engineer's Opinion of Probable Cost**  
**US 17: 12 Ft. Shared Use Path**

PAY ITEM NUMBER	PAY ITEM DESCRIPTION	TOTAL QTY	UNIT MEASURE	UNIT PRICE	TOTAL PRICE
101-1	MOBILIZATION	1	LS	\$58,078.97	\$58,078.97
102-1	MAINTENANCE OF TRAFFIC	1	LS	\$52,799.06	\$52,799.06
104-10-3	SEDIMENT BARRIER	6,401	LF	\$1.09	\$6,977.09
110-1-1	CLEARING AND GRUBBING	4	AC	\$11,027.11	\$44,108.44
110-4	REMOVAL OF EXISTING CONCRETE PAVEMENT	892	SY	\$21.41	\$19,097.72
120-1	REGULAR EXCAVATION	1,616	CY	\$14.84	\$23,981.44
120-6	EMBANKMENT	30	CY	\$11.04	\$331.20
430-175-142	PIPE CULV, OPT MATL, ROUND, 42" S/CD	25	LF	\$131.03	\$3,275.75
430-175-148	PIPE CULV, OPT MATL, ROUND, 48" S/CD	25	LF	\$158.36	\$3,959.00
430-982-140	MITERED END SECT, OPTIONAL RD, 42" CD	2	EA	\$3,043.06	\$6,086.12
430-982-141	MITERED END SECT, OPTIONAL RD, 48" CD	2	EA	\$4,279.18	\$8,558.36
515-1-2	PIPE HANDRAIL - GUIDERAIL, ALUMINUM	177	LF	\$36.12	\$6,393.24
522-2	CONCRETE SIDEWALK AND DRIVEWAYS 6" THICK	8,601	SY	\$45.33	\$389,883.33
527-2	DETECTABLE WARNINGS	72	SF	\$34.90	\$2,512.80
570-1-2	PERFORMANCE TURF, SOD	5,690	SY	\$2.19	\$12,461.10
711-11-123	THERMOPLASTIC, STANDARD, WHITE, SOLID, 12"	64	LF	\$2.09	\$133.76
711-11-125	THERMOPLASTIC, STANDARD, WHITE, SOLID, 24"	56	LF	\$4.13	\$231.28
<b>Construction Subtotal:</b>					<b>\$638,868.66</b>
N/A	PRELIMINARY ENGINEERING	1	LS	20%	\$127,773.73
N/A	CEI	1	LS	10%	\$63,886.87
N/A	ENVIRONMENTAL RESOURCE PERMIT	1	LS	\$1,190	\$1,190.00
<b>Grand Total:</b>					<b>\$831,719.26</b>
<b>FDOT Inflation Adjusted Estimate</b>		<b>Inflation Factor</b>	<b>PDC Multiplier</b>	<b>Adjusted Cost Estimate</b>	
Year 1 Inflation-Adjusted Estimate (2017)		2.50%	1.025	<b>\$852,512.24</b>	
Year 2 Inflation-Adjusted Estimate (2018)		2.70%	1.053	<b>\$875,800.38</b>	
Year 3 Inflation-Adjusted Estimate (2019)		2.80%	1.082	<b>\$899,920.24</b>	

Notes:

- 1.) Unit costs obtained from FDOT 12-month and 6-month statewide and area averages.
- 2.) Inflation factors obtained from R2CTPO and FDOT.
- 3.) CEI – Construction, Engineering, and Inspection

## **9. CONCLUSION**

The purpose of this study was to evaluate the feasibility of construction of an 8 ft. sidewalk and a 12 ft. shared use path on the east side of US 17 (SR 15), from Washington Avenue to Palmetto Avenue. The proposed path will enhance current connectivity within the immediate area and will eventually connect to a new elementary school anticipated to be open for the 2018-2019 school. Coordinated planning with the VCSB regarding the new school design, new infrastructure, and the proposed shared use path/sidewalk design is required to prevent work redundancy and unnecessary costs. The total length of the project is approximately 1.10 miles, or 5,800 ft. The 8 ft. sidewalk option is the most feasible due to FDOT's willingness to maintain it and also due to cost. Lighting options were investigated for feasibility and it was concluded to be infeasible for the Town of Pierson due to cost and maintenance requirements. The estimated cost for design, construction, and inspection of the 8 ft. sidewalk and 12 ft. shared use path option is \$614,983 and \$831,719 in present day value, respectively. No right-of-way acquisition cost is anticipated. A SJRWMD Environmental Resource Permit (ERP) application fee of \$1,190 is anticipated as a result of the sidewalk's surface water impacts at the two outfalls.

## **10. DATA COLLECTION REFERENCES**

- FDOT Right-of-Way Maps
- Volusia County GIS
- Volusia County Property Appraiser
- River to Sea TPO
- FDOT Design Standards (2016)
- FDOT Plans Preparation Manual (2015)
- FDOT Basis of Estimates (2015)
- FDOT Florida Greenbook (2013 DRAFT)
- FDOT Long Range Estimates
- Google Earth
- Manual on Uniform Traffic Control Devices (2009)
- Town of Pierson Comprehensive Plan
- Town of Pierson Land Development Code
- United States Geological Survey
- American Association of State Highway and Transportation Officials Greenbook



# **APPENDICES**

# **APPENDIX A**

## **FDOT Right-of-Way Maps**

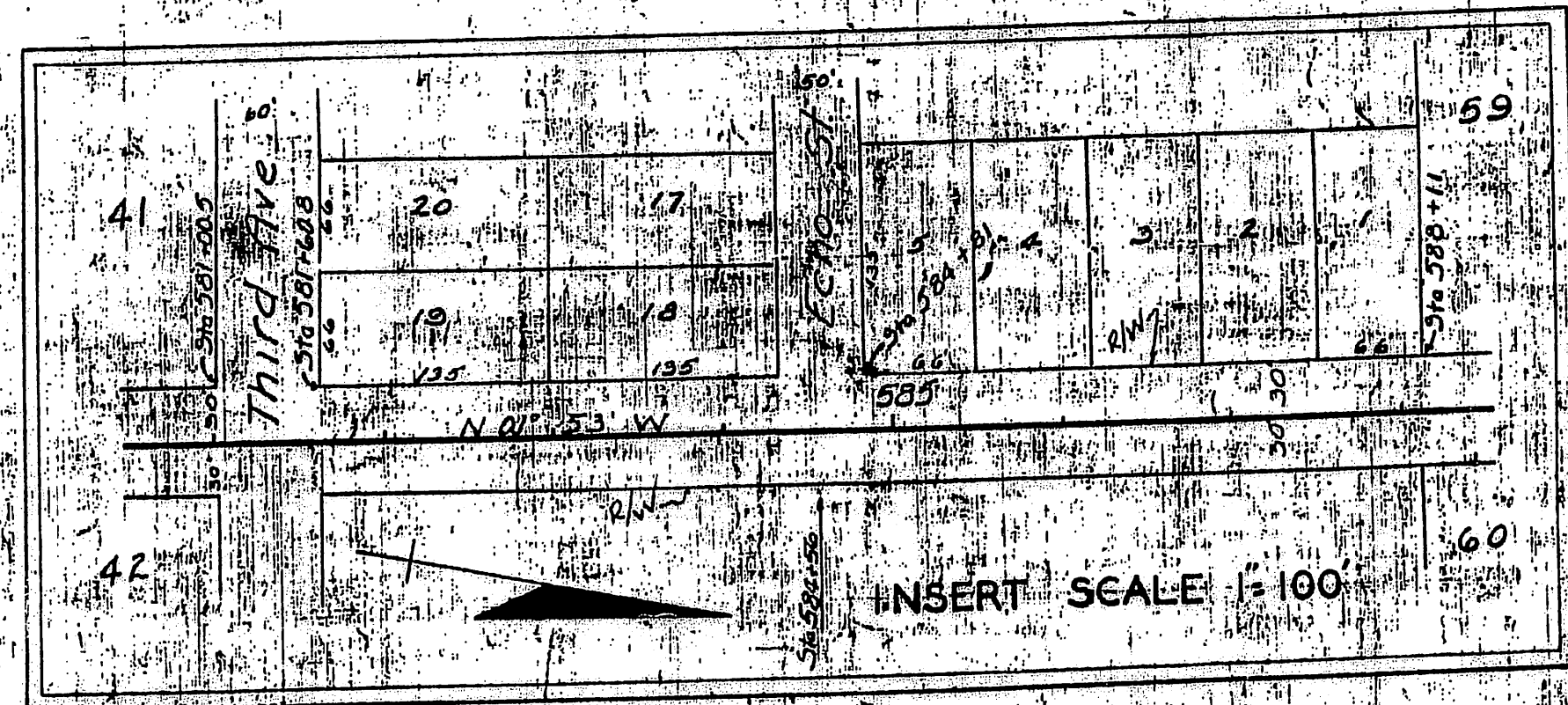


Second Edition  
FLANCO ESTATES  
Sec 2 Twp 15 S Rge 28 E  
Map Book 10 Page 189  
Volusia County, Florida

First Division  
FLANCO ESTATES  
Sec 1 Twp 15 S Rge 28 E  
Map Book 7 Page 63  
Volusia County, Florida

WIDTH OF R/W

LEFT	RIGHT
Sta. to Sta.	Width
498+25	502+50.58
502+50.58	508+93.08
508+93.08	519+28.51
519+28.51	523+19
523+19	523+32
523+32	536+26
536+26	537+70
537+70	556+87.7
556+87.7	560+44
560+44	578+75
578+75	610+00
610+00	613+03.72
613+03.72	618+75



INSERT SCALE 1:100

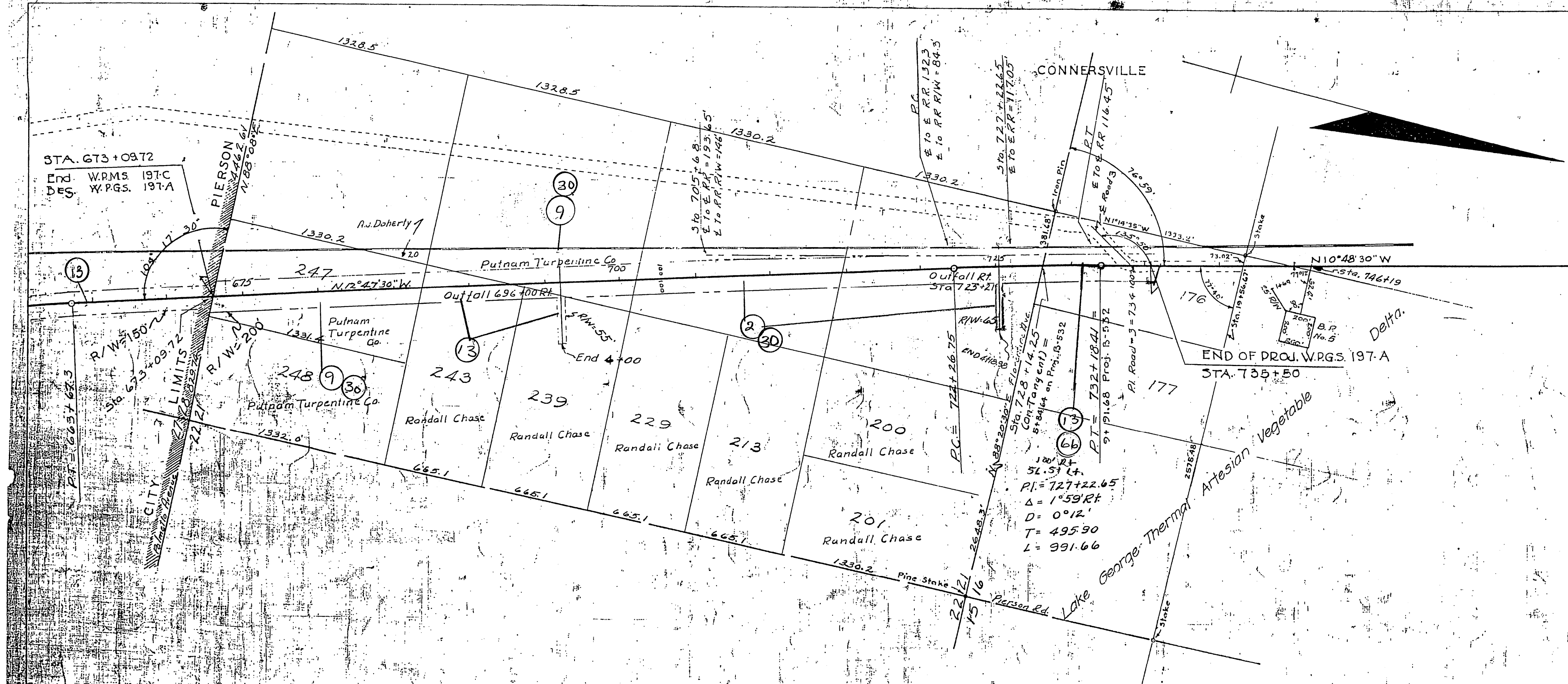
APPROVED  
STATE HIGHWAY ENGR.

STATE OF FLORIDA  
STATE ROAD DEPARTMENT  
**RIGHT OF WAY MAP**  
PROJECT WPG-197-A  
FORMERLY 532  
**VOLUSIA COUNTY**

SCALE 1"=500'

SHEET 4 OF 5





Width of R/W							
LEFT			RIGHT				
Sta.	to	Sta.	Width	Sta.	to	Sta.	Width
610+00		673+09.72	75	610+00		673+09.72	75
673+09.72		718+00	100				
718+00		722+26.75	100	84.3			
722+26.75		735+50	84.3	65	673+09.72	735+50	100

TABULATION OF DEEDS IN FILE									
SRD NO.	GRANTOR	INSTRUMENT	DATE OF EXEC.	RECORDED BOOK	PAGE	CLERKS NO.	REMARKS		
1	Bond Lumber Co.	Agreement	7-16-36	265	206	3411	O.D.S. B.P.		
2	Volusia Investment Co. Inc.	Q.C. Deed	7-16-36	264	490	3463	R/W		
3	Bd. of Public Instruction	"	1-9-36	266	62	3409	"		
4	C. M. Greiner, widower	"	7-22-36	265	210	3431	"		
5	Bd. of Public Instruction	"	12-5-35	260	526	5062	"		
6	Dawson Brown et ux	"	1-22-36	264	86	569	"		
7	Armour Fertilizer Works	P. Rel. Judg.	3-22-28	3	428	1015	J.S. Russell		
8	Anno M. Randall et vir	Q.C. Deed	3-9-36	263	320	1102	R/W		
9	Pulnam Turpentine Co.	"	3-31-36	263	446	1998	"		
10	Wm. R. Underhill et ux	"	12-23-35	264	274	1408	"		
12	Dawson Brown et ux	"	7-30-36	265	232	3336	"		
13	Realty Trust Co.	"	5-26-36	266	10	2752	"		
14	Rosa Lee Haynes	P. Rel. Mtg.	6-7-35	43	573	3687	W.H. McBride		
15	W. H. McBride et ux	Q.C. Deed	7-27-36	265	256	3685	R/W		
16	"	"	7-29-36	264	542	3686	"		
17	J. Foster Taylor et ux	"	8-1-36	265	262	3704	"		
18	J. S. Russell et ux	"	8-6-36	265	261	3703	"		
19	Margaret R. Zimmerschied, Inc.	"	8-20-36	264	568	3981	"		
20	F. N. Burt et ux	"	8-7-36	265	188	3936	"		
21	Fred V. Somerford et ux	"	8-19-36	266	166	3982	"		
22	C. M. Greiner	P. Esmt.	9-3-36	261	5	4028	D. Ditches		
23	W. O. Richardson	Q.C. Deed	9-2-36	265	309	4139	R/W		
24	Minnie B. & Byrd Minshew	"	9-2-36	264	190	4140	"		
25	J. B. Bradshaw et ux	"	9-2-36	265	193	4142	"		
26	A. M. McLelland et ux	"	8-23-36	266	192	4141	"		
27	Mary A. Morrison, widow	"	9-11-36	267	79	4443	"		
28	Ettie Hunter et vir	"	9-23-36	266	382	4444	"		
29	Bruce Byrd et ux	"	9-7-36	267	118	4641	"		
30	Condemnation	Final Judg.	10-13-36	18	25	3558	L. T. Ditch et al		
31	Sarah E. Richardson	Q.C. Deed	9-9-36	267	61	4493	R/W		
32	C. L. Stone et ux	"	9-16-36	265	362	4494	"		
33	Volusia County	"	9-12-36	267	87	4675	"		
34	O. L. Durrance et ux	"	9-29-36	266	394	5287	"		
35	J. G. Cade et al	P. Esmt.	10-20-36	266	372	5241	Stone Hill		
36	Emil Swanson et ux	Q.C. Deed	10-30-36	266	372	5241	"		
37	J. E. Dees	"	12-20-35	267	174	5371	"		
38	Arabella Pierson, Execut.	P. Esmt.	10-19-36	265	474	5372	Stone Hill		
39	H. W. Hansen et ux	"	10-20-36	267	175	5370	"		
40	W. R. Cowart et ux	Q.C. Deed	9-22-36	265	405	4928	R/W		
41	Theodore Strawn Corp.	"	9-14-36	265	404	4927	"		
42	Candace R. Strawn, widow	"	9-14-36	266	310	4930	"		
43	J. H. Dees et ux	"	5-25-36	265	45	5093	"		
44	Mary S. Howarth, widow	"	12-4-36	270	6	6123	"		
45	J. S. Russell et ux	"	12-17-36	269	31	6124	"		
46	B. C. Courson et ux	"	8-6-36	269	82	6125	"		
47	O. L. Durrance et ux	"	12-4-36	266	40	6126	"		
48	W. F. Purdom	"	12-2-36	160	155	5004	"		
49	Resolution (County)	"	12-22-36	Acceptance of Dedication			"		
50	Atlantic National Bank, Jax.	"	12-13-36	270	13	6163	R/W		
51	Mrs. Candace R. Strawn, widow	P. Esmt.	1-26-37	267	442	521	D.D.		
52	J. S. Russell et ux	Agreement	2-15-37				B.P.		
53	Frances L. Rush et al	Q.C. Deed	11-12-36	266	394	6322	R/W		
54	S. E. Lemmon et ux	"	10-2-36	270	287	923	O.F.D.		
55	W. J. Coleman et ux	P. Esmt.	2-17-37	269	1034	1085	"		
56	W. R. Underhill et ux et al	"	2-25-37	269	304	6323	R/W		
57	W. J. Coleman et ux	Q.C. Deed	12-14-36	267	304	6323	"		
58	Federal Land Bank of Columbia	Easement	12-15-36	269	360	1153	"		
59	Volusia County (Reconveyed)	Q.C. Deed	3-19-37	269	352	7114	"		
60	Nina H. Parramore et vir	"	3-4-37	269	349	7694	"		
61	L. H. Barber et ux & Eliza J. Barber, widow	"	11-13-36	266	427	5610	"		
62	F. N. Burt et ux	"	4-17-37	270	287	2354	"		
63	Pulnam Turpentine Co.	Easement	6-10-37	271	229	3884	B.R.		
64	Sarah E. Watson et vir	P. Esmt.	6-16-37	270	493	3970	O.F.D.		
65	Volusia County	Q.C. Deed	12-23-37	272	123	53	R/W		
66	"	Judgment	2-16-37	271	560	6812	B.P.		
67	J. S. Russell et ux	Q.C. Deed					"		

Sheet #5 revised Dec. 7-1937 see sketch in letter file Proj. 532  
Sheet No. 5 Revised January 11/1937  
Revised 6-20-36  
J-27-41 1905

APPROVED  
STATE HIGHWAY ENG.

STATE OF FLORIDA  
STATE-ROAD DEPARTMENT

RIGHT OF WAY MAP

W.P.M. 5 197-C  
PROJECT W.P.G.S. 197-A  
FORMERLY 532

ROAD(3)  
15 E 40

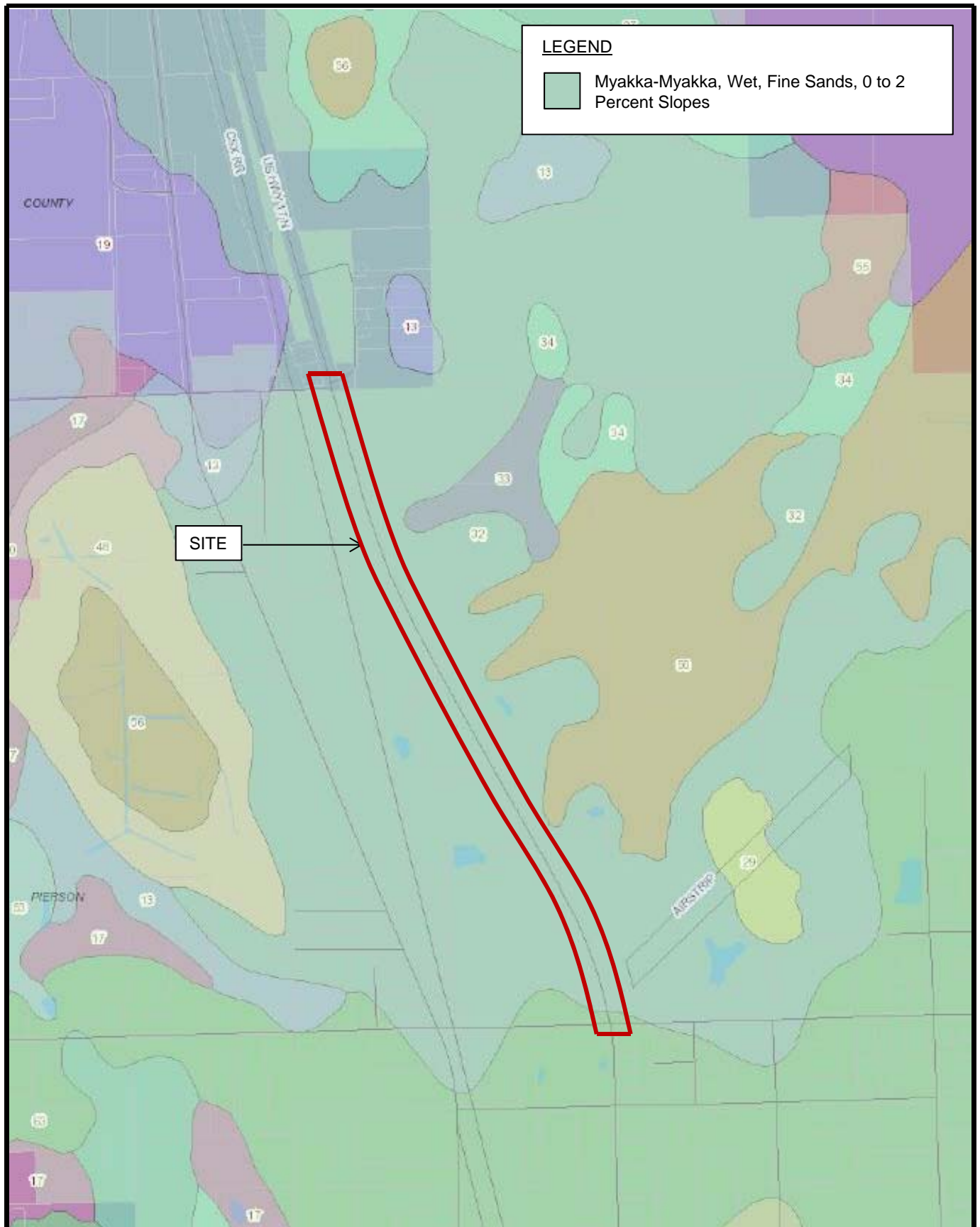
VOLUSIA COUNTY

SCALE 1"=500'

# **APPENDIX B**

## Soil Maps and Data





NTS

## SOILS MAP

Project No.: 3903.06

Figure: B-1



1450 W. Granada Blvd Suite 2 - Ormond Beach, Florida 32174  
Telephone: 386.257.2571 Fax: 386.257.6996 EB# 0009227

## Volusia County, Florida

### 32—Myakka-Myakka, wet, fine sands, 0 to 2 percent slopes

#### Map Unit Setting

*National map unit symbol:* 2tw7

*Elevation:* 10 to 130 feet

*Mean annual precipitation:* 50 to 60 inches

*Mean annual air temperature:* 70 to 73 degrees F

*Frost-free period:* 310 to 365 days

*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Myakka and similar soils:* 75 percent

*Myakka, wet, and similar soils:* 15 percent

*Minor components:* 10 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Myakka

##### Setting

*Landform:* Flatwoods on marine terraces

*Landform position (three-dimensional):* Tread, tal

*Down-slope shape:* Convex

*Across-slope shape:* Linear

*Parent material:* Sandy marine deposits

##### Typical profile

*A - 0 to 6 inches:* fine sand

*E - 6 to 20 inches:* fine sand

*Bh - 20 to 36 inches:* fine sand

*C - 36 to 80 inches:* fine sand

##### Properties and qualities

*Slope:* 0 to 2 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Poorly drained

*Runoff class:* High

*Capacity of the most limiting layer to transmit water (Ksat):*

Moderately high to high (0.57 to 5.95 in/hr)

*Depth to water table:* About 6 to 18 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

*Sodium adsorption ratio, maximum in profile:* 4.0

*Available water storage in profile:* Low (about 3.9 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 4w

*Hydrologic Soil Group:* A/D

*Other vegetative classification:* South Florida Flatwoods  
(R155XY003FL), Sandy soils on flats of mesic or hydric lowlands  
(G155XB141FL)

## **Description of Myakka, Wet**

### **Setting**

*Landform:* Flatwoods on marine terraces

*Landform position (three-dimensional):* Tread, talf

*Down-slope shape:* Convex

*Across-slope shape:* Linear

*Parent material:* Sandy marine deposits

### **Typical profile**

*A - 0 to 6 inches:* fine sand

*E - 6 to 20 inches:* fine sand

*Bh - 20 to 36 inches:* fine sand

*C - 36 to 80 inches:* fine sand

### **Properties and qualities**

*Slope:* 0 to 2 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Poorly drained

*Runoff class:* High

*Capacity of the most limiting layer to transmit water (Ksat):*

Moderately high to high (0.57 to 5.95 in/hr)

*Depth to water table:* About 0 to 6 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

*Sodium adsorption ratio, maximum in profile:* 4.0

*Available water storage in profile:* Low (about 3.9 inches)

### **Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 4w

*Hydrologic Soil Group:* A/D

*Other vegetative classification:* South Florida Flatwoods  
(R155XY003FL), Sandy soils on flats of mesic or hydric lowlands  
(G155XB141FL)

## **Minor Components**

### **Basinger**

*Percent of map unit:* 5 percent

*Landform:* Drainageways on marine terraces

*Landform position (three-dimensional):* Dip

*Down-slope shape:* Convex, linear

*Across-slope shape:* Linear, concave

*Other vegetative classification:* Sandy soils on flats of mesic or hydric lowlands (G155XB141FL)



**Eaugallie, non-hydric**

*Percent of map unit:* 4 percent

*Landform:* Flatwoods on marine terraces

*Landform position (three-dimensional):* Talf

*Down-slope shape:* Convex

*Across-slope shape:* Linear

*Other vegetative classification:* South Florida Flatwoods  
(R155XY003FL), Sandy soils on flats of mesic or hydric lowlands  
(G155XB141FL)

**Placid, depressional**

*Percent of map unit:* 1 percent

*Landform:* Depressions on marine terraces

*Landform position (three-dimensional):* Dip

*Down-slope shape:* Concave, convex

*Across-slope shape:* Concave, linear

*Other vegetative classification:* Sandy soils on stream terraces, flood  
plains, or in depressions (G155XB145FL)

## Data Source Information

Soil Survey Area: Volusia County, Florida

Survey Area Data: Version 14, Nov 19, 2015

# **APPENDIX C**

Pedestrian Lighting Engineer's Opinion  
of Probable Cost and Data

**Table 1-C  
Engineer's Opinion of Probable Cost  
US 27: 8 Ft. Sidewalk with Lighting**

PAY ITEM NUMBER	PAY ITEM DESCRIPTION	TOTAL QTY	UNIT MEASURE	UNIT PRICE	TOTAL PRICE
<b>TOTAL MOBILIZATION AND MAINTENANCE OF TRAFFIC</b>					
101-1	MOBILIZATION	1	LS	\$96,611.72	\$96,611.72
102-1	MAINTENANCE OF TRAFFIC	1	LS	\$87,828.83	\$87,828.83
<b>Total Mobilization and Maintenance of Traffic Subtotal:</b>					<b>\$184,440.55</b>
<b>SIDEWALK</b>					
101-1	MOBILIZATION	1	LS	\$42,922.58	\$42,922.58
102-1	MAINTENANCE OF TRAFFIC	1	LS	\$39,020.53	\$39,020.53
<b>Sidewalk Mobilization and Maintenance of Traffic:</b>					<b>\$81,943.10</b>
104-10-3	SEDIMENT BARRIER	6,401	LF	\$1.09	\$6,977.09
110-1-1	CLEARING AND GRUBBING	4	AC	\$11,027.11	\$44,108.44
110-4	REMOVAL OF EXISTING CONCRETE PAVEMENT	892	SY	\$21.41	\$19,097.72
120-1	REGULAR EXCAVATION	1,078	CY	\$14.84	\$15,997.52
120-6	EMBANKMENT	30	CY	\$11.04	\$331.20
430-175-142	PIPE CULV, OPT MATL, ROUND, 42" S/CD	25	LF	\$131.03	\$3,275.75
430-175-148	PIPE CULV, OPT MATL, ROUND, 48" S/CD	25	LF	\$158.36	\$3,959.00
430-982-140	MITERED END SECT, OPTIONAL RD, 42" CD	2	EA	\$3,043.06	\$6,086.12
430-982-141	MITERED END SECT, OPTIONAL RD, 48" CD	2	EA	\$4,279.18	\$8,558.36
515-1-2	PIPE HANDRAIL - GUIDERAIL, ALUMINUM	177	LF	\$36.12	\$6,393.24
522-2	CONCRETE SIDEWALK AND DRIVEWAYS 6" THICK	5,756	SY	\$45.33	\$260,919.48
527-2	DETECTABLE WARNINGS	48	SF	\$34.90	\$1,675.20
570-1-2	PERFORMANCE TURF, SOD	5,690	SY	\$2.19	\$12,461.10
711-11-123	THERMOPLASTIC, STANDARD, WHITE, SOLID, 12"	64	LF	\$2.09	\$133.76
711-11-125	THERMOPLASTICE, STANDARD, WHILE, SOLID, 24"	56	LF	\$4.13	\$231.28
<b>Sidewalk Subtotal:</b>					<b>\$390,205.26</b>
<b>Sidewalk with Mobilization and Maintenance of Traffic:</b>					<b>\$472,148.36</b>
<b>LIGHTING SYSTEM</b>					
101-1	MOBILIZATION	1	LS	\$53,689.14	\$53,689.14
102-1	MAINTENANCE OF TRAFFIC	1	LS	\$48,808.31	\$48,808.31
<b>Lighting Mobilization and Maintenance of Traffic</b>					<b>\$102,497.44</b>
630-2-11	CONDUIT, F&I, OPEN TRENCH	5,819	LF	\$3.90	\$22,694.10
630-2-12	CONDUIT, F&I, DIRECTIONAL BORE	32	LF	\$13.97	\$447.04
635-2-11	PULL & SPLICE BOX, F&I, 13" X 24"	87	EA	\$559.91	\$48,712.17
715-1-13	LIGHTING CONDUCTORS, F&I, INSUL, NO 4-2	5,851	LF	\$2.12	\$12,404.12
715-4-029	LIGHT POLE COMP, F&I, WS130, CUSTOM HEIGHT	87	EA	\$4,500.00	\$391,500.00
715-7-11	LOAD CENTER, F&I, SECONDARY VOLTAGE	1	EA	\$12,325.64	\$12,325.64
<b>Lighting Subtotal:</b>					<b>\$488,083.07</b>
<b>Lighting with Mobilization and Maintenance of Traffic:</b>					<b>\$590,580.51</b>
<b>Total Construction Subtotal:</b>					<b>\$1,062,728.88</b>
N/A	PRELIMINARY ENGINEERING	1	LS	20%	\$212,545.78
N/A	CEI	1	LS	10%	\$106,272.89
N/A	ENVIRONMENTAL RESOURCE PERMIT	1	LS	\$1,190	\$1,190.00
<b>Grand Total:</b>					<b>\$1,382,737.54</b>
<b>FDOT Inflation Adjusted Estimate</b>		<b>Inflation Factor</b>	<b>PDC Multiplier</b>	<b>Adjusted Cost Estimate</b>	
Year 1 Inflation-Adjusted Estimate (2016)		2.70%	1.027	<b>\$1,420,071.46</b>	
Year 2 Inflation-Adjusted Estimate (2017)		2.50%	1.053	<b>\$1,456,022.63</b>	
Year 3 Inflation-Adjusted Estimate (2018)		2.50%	1.079	<b>\$1,491,973.81</b>	

Notes:

- 1.) Unit costs obtained from FDOT 12-month and 6-month statewide and area averages.
- 2.) Inflation factors obtained from R2CTPO and FDOT.
- 3.) CEI – Construction, Engineering, and Inspection



**Table 2-D**  
**Engineer's Opinion of Probable Cost**  
**US 27: 12 Ft. Sidewalk with Lighting**

PAY ITEM NUMBER	PAY ITEM DESCRIPTION	TOTAL QTY	UNIT MEASURE	UNIT PRICE	TOTAL PRICE
<b>TOTAL MOBILIZATION AND MAINTENANCE OF TRAFFIC</b>					
101-1	MOBILIZATION	1	LS	\$111,768.11	\$111,768.11
102-1	MAINTENANCE OF TRAFFIC	1	LS	\$101,607.37	\$101,607.37
<b>Total Mobilization and Maintenance of Traffic Subtotal:</b>					<b>\$213,375.48</b>
<b>SIDEWALK</b>					
101-1	MOBILIZATION	1	LS	\$58,078.97	\$58,078.97
102-1	MAINTENANCE OF TRAFFIC	1	LS	\$52,799.06	\$52,799.06
<b>Sidewalk Mobilization and Maintenance of Traffic:</b>					<b>\$110,878.03</b>
104-10-3	SEDIMENT BARRIER	6,401	LF	\$1.09	\$6,977.09
110-1-1	CLEARING AND GRUBBING	4	AC	\$11,027.11	\$44,108.44
110-4	REMOVAL OF EXISTING CONCRETE PAVEMENT	892	SY	\$21.41	\$19,097.72
120-1	REGULAR EXCAVATION	1,616	CY	\$14.84	\$23,981.44
120-6	EMBANKMENT	30	CY	\$11.04	\$331.20
430-175-142	PIPE CULV, OPT MATL, ROUND, 42" S/CD	25	LF	\$131.03	\$3,275.75
430-175-148	PIPE CULV, OPT MATL, ROUND, 48" S/CD	25	LF	\$158.36	\$3,959.00
430-982-140	MITERED END SECT, OPTIONAL RD, 42" CD	2	EA	\$3,043.06	\$6,086.12
430-982-141	MITERED END SECT, OPTIONAL RD, 48" CD	2	EA	\$4,279.18	\$8,558.36
515-1-2	PIPE HANDRAIL - GUIDERAIL, ALUMINUM	177	LF	\$36.12	\$6,393.24
522-2	CONCRETE SIDEWALK AND DRIVEWAYS 6" THICK	8,601	SY	\$45.33	\$389,883.33
527-2	DETECTABLE WARNINGS	72	SF	\$34.90	\$2,512.80
570-1-2	PERFORMANCE TURF, SOD	5,690	SY	\$2.19	\$12,461.10
711-11-123	THERMOPLASTIC, STANDARD, WHITE, SOLID, 12"	64	LF	\$2.09	\$133.76
711-11-125	THERMOPLASTICE, STANDARD, WHILE, SOLID, 24"	56	LF	\$4.13	\$231.28
<b>Sidewalk Subtotal:</b>					<b>\$527,990.63</b>
<b>Sidewalk with Mobilization and Maintenance of Traffic:</b>					<b>\$638,868.66</b>
<b>LIGHTING SYSTEM</b>					
101-1	MOBILIZATION	1	LS	\$53,689.14	\$53,689.14
102-1	MAINTENANCE OF TRAFFIC	1	LS	\$48,808.31	\$48,808.31
<b>Lighting Mobilization and Maintenance of Traffic</b>					<b>\$102,497.44</b>
630-2-11	CONDUIT, F&I, OPEN TRENCH	5,819	LF	\$3.90	\$22,694.10
630-2-12	CONDUIT, F&I, DIRECTIONAL BORE	32	LF	\$13.97	\$447.04
635-2-11	PULL & SPLICE BOX, F&I, 13" X 24"	87	EA	\$559.91	\$48,712.17
715-1-13	LIGHTING CONDUCTORS, F&I, INSUL, NO 4-2	5,851	LF	\$2.12	\$12,404.12
715-4-029	LIGHT POLE COMP, F&I, WS130, CUSTOM HEIGHT	87	EA	\$4,500.00	\$391,500.00
715-7-11	LOAD CENTER, F&I, SECONDARY VOLTAGE	1	EA	\$12,325.64	\$12,325.64
<b>Lighting Subtotal:</b>					<b>\$488,083.07</b>
<b>Lighting with Mobilization and Maintenance of Traffic:</b>					<b>\$590,580.51</b>
<b>Total Construction Subtotal:</b>					<b>\$1,229,449.18</b>
N/A	PRELIMINARY ENGINEERING	1	LS	20%	\$245,889.84
N/A	CEI	1	LS	10%	\$122,944.92
N/A	ENVIRONMENTAL RESOURCE PERMIT	1	LS	\$1,190	\$1,190.00
<b>Grand Total:</b>					<b>\$1,599,473.93</b>
<b>FDOT Inflation Adjusted Estimate</b>		<b>Inflation Factor</b>	<b>PDC Multiplier</b>	<b>Adjusted Cost Estimate</b>	
Year 1 Inflation-Adjusted Estimate (2016)		2.70%	1.027	<b>\$1,642,659.73</b>	
Year 2 Inflation-Adjusted Estimate (2017)		2.50%	1.053	<b>\$1,684,246.05</b>	
Year 3 Inflation-Adjusted Estimate (2018)		2.50%	1.079	<b>\$1,725,832.37</b>	

Notes:

- 1.) Unit costs obtained from FDOT 12-month and 6-month statewide and area averages.
- 2.) Inflation factors obtained from R2CTPO and FDOT.
- 3.) CEI – Construction, Engineering, and Inspection



## Roadway Optimizer - Layout 1

### General:

Campana HPS @ 20'

Roadway Standard: IES RP-8-14

R-Table: R3 (Slightly Specular), Q0=0.07 Actual Q0 Value: 0.07

### Roadway Layout:

Layout Type: One Row, Near Side; 1RNS

Roadway Width: 8 ft

Lanes In Direction Of Travel: 1

Driver's Side Of Roadway: Right

### Luminaire Information:

#### CAMPANA-SN21P1-FT1GC-RT2-150H

Description: SN21P1-FT1GC-RT2-150HPS-ED17

File Name: CAMPANA-SN21P1-FT1GC-RT2-150HPS-ED17.ies

Lumens Per Lamp: 16000

Number Of Lamps: 1

Total Lamp Lumens: 16000

Luminaire Lumens: 12267

Luminaire Watts: 150

Efficiency (%): 77

Total Light Loss Factor: 1.000

Luminaire Arrangement: SINGLE

Arm Length: 1.084 ft

Offset: 0 ft



### Luminaire Location Summary:

Coordinates in ft

Spacing - Row 1: 105

<u>Label</u>	<u>X-Coord</u>	<u>Y-Coord</u>	<u>Z-Coord</u>	<u>Orient</u>	<u>Tilt</u>	<u>Spin</u>
CAMPANA-SN21P1-FT1G...	-315	-2	20	90	0	0
CAMPANA-SN21P1-FT1G...	-210	-2	20	90	0	0
CAMPANA-SN21P1-FT1G...	-105	-2	20	90	0	0
CAMPANA-SN21P1-FT1G...	0	-2	20	90	0	0
CAMPANA-SN21P1-FT1G...	105	-2	20	90	0	0
CAMPANA-SN21P1-FT1G...	210	-2	20	90	0	0
CAMPANA-SN21P1-FT1G...	315	-2	20	90	0	0

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## Roadway Optimizer - Layout 1 - Cont.

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### Luminaire Location Summary:

Coordinates in ft

CAMPANA-SN21P1-FT1G...	420	-2	20	90	0	0
------------------------	-----	----	----	----	---	---

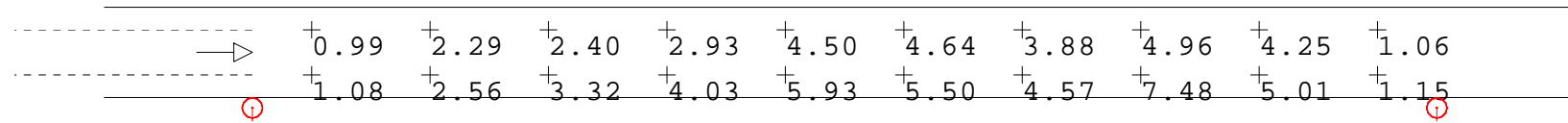
Total Number of locations: 8



---

## Roadway Optimizer - Layout 1

### RoadOpt\_2\_Luminance



### Luminance (Cd/SqM)

Average = 3.63

Maximum = 7.48

Minimum = 0.99

Avg/Min Ratio = 3.67

Max/Min Ratio = 7.56

Max/Avg Ratio = 2.06

---

## Roadway Optimizer - Layout 1

RoadOpt\_2\_Illum

---

→	+2.70	+6.45	+4.13	+2.11	+2.14	+2.14	+2.11	+4.13	+6.45	+2.70
	+2.74	+6.55	+4.72	+1.82	+1.83	+1.83	+1.82	+4.72	+6.55	+2.74

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### Illuminance (Fc)

Average = 3.52

Maximum = 6.55

Minimum = 1.82

Avg/Min Ratio = 1.93

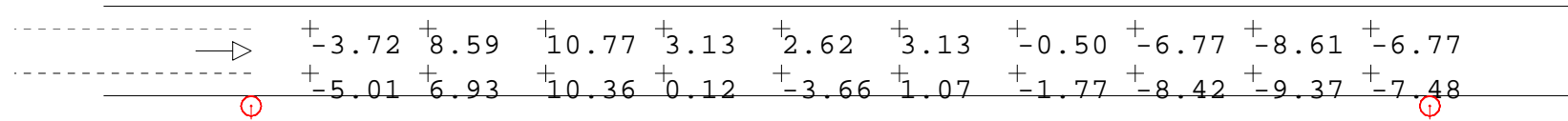
Max/Min Ratio = 3.6

Max/Avg Ratio = 1.86

---

## Roadway Optimizer - Layout 1

RoadOpt\_2\_Vis\_Level



Visibility Level

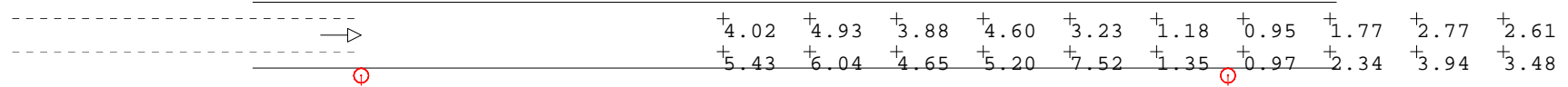
STV = 4.250664



---

## Roadway Optimizer - Layout 1

RoadOpt\_2\_Vis\_Level\_Bkgd\_Lum



### Background Luminance (Cd/SqM)

Average = 3.54

Maximum = 7.52

Minimum = 0.95

Avg/Min Ratio = 3.73

Max/Min Ratio = 7.92

Max/Avg Ratio = 2.12

---

## Roadway Optimizer - Layout 1

RoadOpt\_2\_Vis\_Level\_Target\_Lum

→	1.29	8.92	9.26	5.62	5.37	4.34	2.27	0.98	0.34	0.16
	1.31	9.06	10.62	4.70	4.37	3.97	2.22	0.98	0.35	0.16

### Target Luminance (Cd/SqM)

Average = 3.81

Maximum = 10.62

Minimum = 0.16

Avg/Min Ratio = 23.81

Max/Min Ratio = 66.38

Max/Avg Ratio = 2.79

---

## Roadway Optimizer - Layout 1

RoadOpt\_2\_Veil\_Lum

→	+	0.54	+	1.00	+	0.94	+	0.57	+	0.28	+	0.04	+	0.02	+	0.03	+	0.09	+	0.20
	+	0.60	+	1.08	+	0.87	+	0.62	+	0.68	+	0.04	+	0.02	+	0.03	+	0.11	+	0.24

### Veiling Luminance (Cd/SqM)

Average = 0.4

Maximum = 1.08

Minimum = 0.02

Avg/Min Ratio = 20

Max/Min Ratio = 54

Max/Avg Ratio = 2.7

MaxLv Ratio = 0.30

Threshold Increment (TI) = 25.03





## Roadway Optimizer - Layout 2

### General:

Universal 60W

Roadway Standard: IES RP-8-14

R-Table: R3 (Slightly Specular), Q0=0.07      Actual Q0 Value: 0.07

### Roadway Layout:

Layout Type: One Row, Near Side; 1RNS

Roadway Width: 8 ft

Lanes In Direction Of Travel: 1

Driver's Side Of Roadway: Right

### Luminaire Information:

#### UNIVERSAL-SU21S3-GAL-2-60W-4K

Description: SU21S3-GAL-2-60W-4K

File Name: UNIVERSAL-SU21S3-GAL-2-60W-4K.ies

Lumens Per Lamp: N.A.

Number Of Lamps: 1

Total Lamp Lumens: N.A.

Luminaire Lumens: 6680

Luminaire Watts: 64

Efficiency (%): N.A.

Total Light Loss Factor: 1.000

Luminaire Arrangement: SINGLE

Arm Length: 0 ft

Offset: 0 ft

### Luminaire Location Summary:

Coordinates in ft

Spacing - Row 1: 62

<u>Label</u>	<u>X-Coord</u>	<u>Y-Coord</u>	<u>Z-Coord</u>	<u>Orient</u>	<u>Tilt</u>	<u>Spin</u>
UNIVERSAL-SU21S3-GA...	-310	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	-248	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	-186	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	-124	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	-62	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	0	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	62	-2	12	90	0	0

---

## Roadway Optimizer - Layout 2 - Cont.

---

### Luminaire Location Summary:

Coordinates in ft

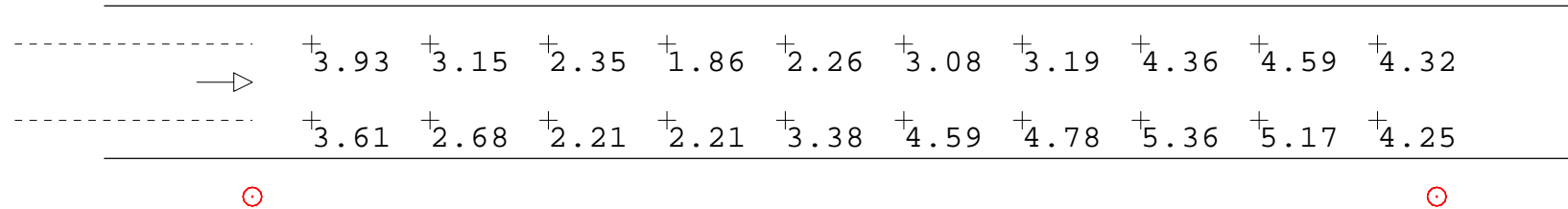
UNIVERSAL-SU21S3-GA...	124	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	186	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	248	-2	12	90	0	0

Total Number of locations: 10

---

## Roadway Optimizer - Layout 2

RoadOpt\_2\_Luminance



### Luminance (Cd/SqM)

Average = 3.57

Maximum = 5.36

Minimum = 1.86

Avg/Min Ratio = 1.92

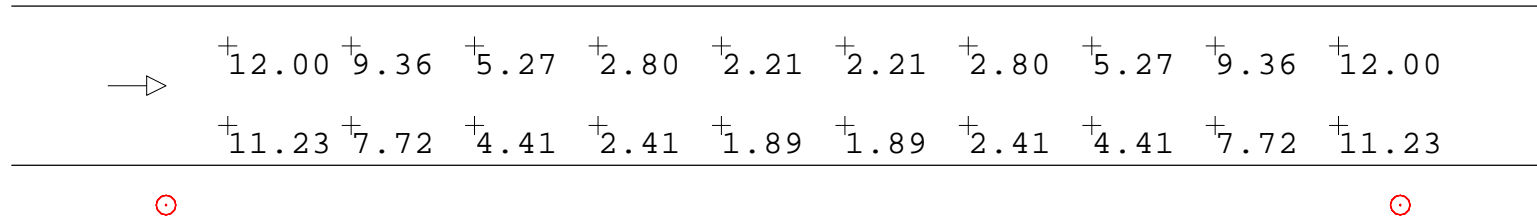
Max/Min Ratio = 2.88

Max/Avg Ratio = 1.5

---

## Roadway Optimizer - Layout 2

RoadOpt\_2\_Illum



### Illuminance (Fc)

Average = 5.93

Maximum = 12.00

Minimum = 1.89

Avg/Min Ratio = 3.14

Max/Min Ratio = 6.35

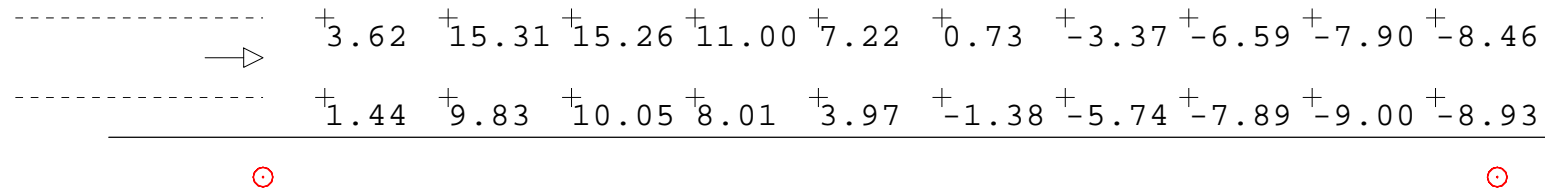
Max/Avg Ratio = 2.02



---

## Roadway Optimizer - Layout 2

RoadOpt\_2\_Vis\_Level



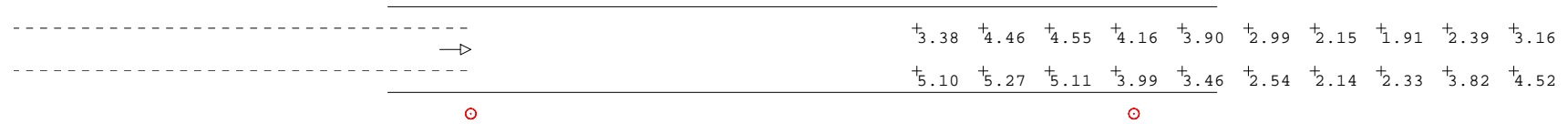
Visibility Level

STV = 5.620732

---

## Roadway Optimizer - Layout 2

RoadOpt\_2\_Vis\_Level\_Bkgd\_Lum



### Background Luminance (Cd/SqM)

Average = 3.57

Maximum = 5.27

Minimum = 1.91

Avg/Min Ratio = 1.87

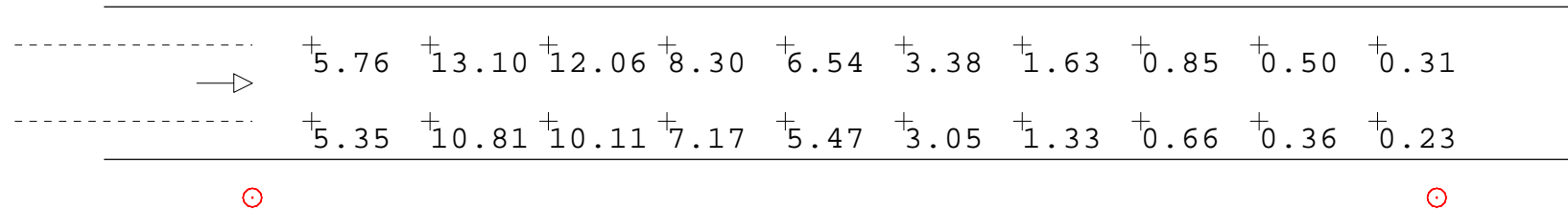
Max/Min Ratio = 2.76

Max/Avg Ratio = 1.48

---

## Roadway Optimizer - Layout 2

RoadOpt\_2\_Vis\_Level\_Target\_Lum



### Target Luminance (Cd/SqM)

Average = 4.85

Maximum = 13.10

Minimum = 0.23

Avg/Min Ratio = 21.09

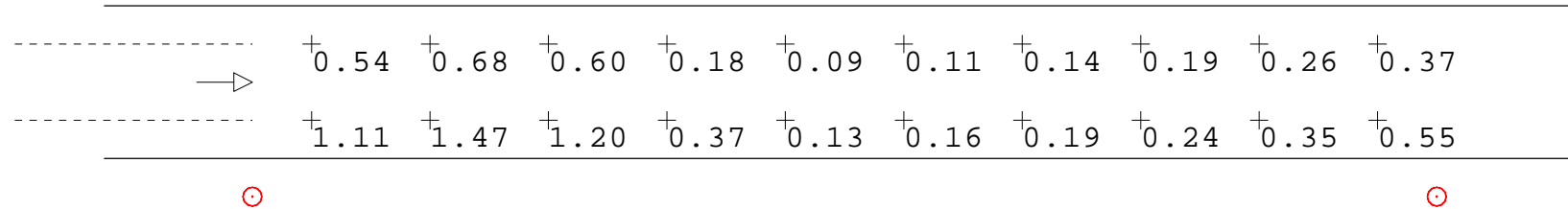
Max/Min Ratio = 56.96

Max/Avg Ratio = 2.7

---

## Roadway Optimizer - Layout 2

RoadOpt\_2\_Veil\_Lum



### Veiling Luminance (Cd/SqM)

Average = 0.45

Maximum = 1.47

Minimum = 0.09

Avg/Min Ratio = 5

Max/Min Ratio = 16.33

Max/Avg Ratio = 3.27

MaxLv Ratio = 0.41

Threshold Increment (TI) = 34.52





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## Roadway Optimizer - Layout 3

### General:

Universal 100W

Roadway Standard: IES RP-8-14

R-Table: R3 (Slightly Specular), Q0=0.07    Actual Q0 Value: 0.07

---

### Roadway Layout:

Layout Type: One Row, Near Side; 1RNS

Roadway Width: 8 ft

Lanes In Direction Of Travel: 1

Driver's Side Of Roadway: Right

---

### Luminaire Information:

#### UNIVERSAL-SU21S3-GAL-2-100W-4

Description: SU21S3-GAL-2-100W-4K

File Name: UNIVERSAL-SU21S3-GAL-2-100W-4K.ies

Lumens Per Lamp: N.A.

Number Of Lamps: 1

Total Lamp Lumens: N.A.

Luminaire Lumens: 11304

Luminaire Watts: 85

Efficiency (%): N.A.

Total Light Loss Factor: 1.000

Luminaire Arrangement: SINGLE

Arm Length: 0 ft

Offset: 0 ft

---

### Luminaire Location Summary:

Coordinates in ft

Spacing - Row 1: 77

<u>Label</u>	<u>X-Coord</u>	<u>Y-Coord</u>	<u>Z-Coord</u>	<u>Orient</u>	<u>Tilt</u>	<u>Spin</u>
UNIVERSAL-SU21S3-GA...	308	-2	14	90	0	0
UNIVERSAL-SU21S3-GA...	231	-2	14	90	0	0
UNIVERSAL-SU21S3-GA...	154	-2	14	90	0	0
UNIVERSAL-SU21S3-GA...	77	-2	14	90	0	0
UNIVERSAL-SU21S3-GA...	0	-2	14	90	0	0
UNIVERSAL-SU21S3-GA...	-77	-2	14	90	0	0
UNIVERSAL-SU21S3-GA...	-154	-2	14	90	0	0

---

## Roadway Optimizer - Layout 3 - Cont.

---

### Luminaire Location Summary:

Coordinates in ft

UNIVERSAL-SU21S3-GA...	-231	-2	14	90	0	0
UNIVERSAL-SU21S3-GA...	-308	-2	14	90	0	0

Total Number of locations: 9

## Roadway Optimizer - Layout 3

## RoadOpt\_2\_Luminance

	4.93	3.77	2.71	2.08	2.44	3.67	4.34	5.93	6.41	5.58
	4.17	2.96	2.34	2.22	3.30	5.46	5.71	6.45	6.15	5.03

## Luminance (Cd/SqM)

Average = 4.28

Maximum = 6.45

Minimum = 2.08

Avg/Min Ratio = 2.06

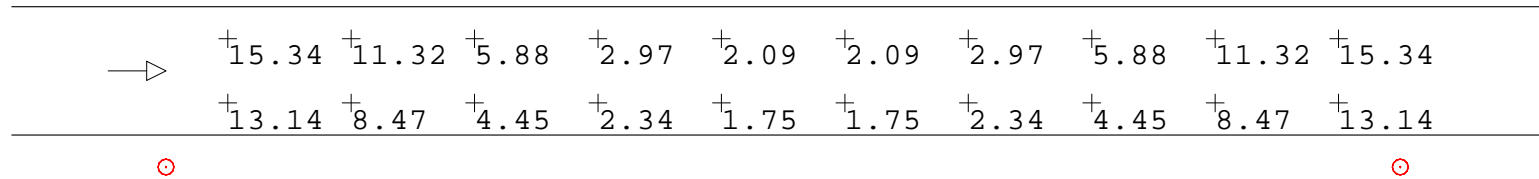
$$\text{Max/Min Ratio} = 3.1$$

Max/Avg Ratio = 1.51

---

## Roadway Optimizer - Layout 3

RoadOpt\_2\_Illum



### Illuminance (Fc)

Average = 6.78

Maximum = 15.34

Minimum = 1.75

Avg/Min Ratio = 3.87

Max/Min Ratio = 8.77

Max/Avg Ratio = 2.26



## Roadway Optimizer - Layout 3

RoadOpt\_2\_Vis\_Level

→	+5.37	+20.02	+14.26	+7.73	+4.43	+2.64	+6.38	+8.22	+8.85	+8.90
	+2.56	+12.09	+8.50	+4.68	+2.34	+4.69	+7.38	+8.68	+9.03	+9.16

### Visibility Level

$$\text{STV} = 6.348614$$

---

## Roadway Optimizer - Layout 3

RoadOpt\_2\_Vis\_Level\_Bkgd\_Lum

----->	3.69	4.34	5.94	6.41	5.57	4.92	3.75	2.69	2.09	2.45
----->	5.48	5.71	6.45	6.14	5.01	4.16	2.95	2.33	2.23	3.32

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### Background Luminance (Cd/SqM)

Average = 4.28

Maximum = 6.45

Minimum = 2.09

Avg/Min Ratio = 2.05

Max/Min Ratio = 3.09

Max/Avg Ratio = 1.51

---

## Roadway Optimizer - Layout 3

RoadOpt\_2\_Vis\_Level\_Target\_Lum

-----		+	7.69	+	16.72	+	14.26	+	9.50	+	6.72	+	3.17	+	1.43	+	0.76	+	0.43	+	0.27
-----	→																				
-----		+	6.58	+	12.52	+	10.80	+	7.50	+	5.67	+	2.62	+	1.13	+	0.57	+	0.32	+	0.21

### Target Luminance (Cd/SqM)

Average = 5.44

Maximum = 16.72

Minimum = 0.21


Avg/Min Ratio = 25.9

Max/Min Ratio = 79.62

Max/Avg Ratio = 3.07

## Roadway Optimizer - Layout 3

RoadOpt\_2\_Veil\_Lum

	$+0.43$	$+0.71$	$+1.14$	$+1.03$	$+0.56$	$+0.11$	$+0.13$	$+0.16$	$+0.21$	$+0.30$
	$+0.50$	$+0.91$	$+1.70$	$+1.42$	$+0.75$	$+0.14$	$+0.16$	$+0.19$	$+0.24$	$+0.32$

Veiling Luminance (Cd/SqM)

Average = 0.56

Maximum = 1.70

Minimum = 0.11

Avg/Min Ratio = 5.09

Max/Min Ratio = 15.45

Max/Avg Ratio = 3.04

MaxLv Ratio = 0.40

Threshold Increment (TI) = 34.53



## Roadway Optimizer - Layout 4

### General:

Universal 40W

Roadway Standard: IES RP-8-14

R-Table: R3 (Slightly Specular), Q0=0.07 Actual Q0 Value: 0.07

### Roadway Layout:

Layout Type: One Row, Near Side; 1RNS

Roadway Width: 8 ft

Lanes In Direction Of Travel: 1

Driver's Side Of Roadway: Right

### Luminaire Information:

#### UNIVERSAL-SU21S3-GAL-2-40W-4K

Description: SU21S3-GAL-2-40W-4K

File Name: UNIVERSAL-SU21S3-GAL-2-40W-4K.ies

Lumens Per Lamp: N.A.

Number Of Lamps: 1

Total Lamp Lumens: N.A.

Luminaire Lumens: 4419

Luminaire Watts: 43

Efficiency (%): N.A.

Total Light Loss Factor: 1.000

Luminaire Arrangement: SINGLE

Arm Length: 0 ft

Offset: 0 ft

### Luminaire Location Summary:

Coordinates in ft

Spacing - Row 1: 67

<u>Label</u>	<u>X-Coord</u>	<u>Y-Coord</u>	<u>Z-Coord</u>	<u>Orient</u>	<u>Tilt</u>	<u>Spin</u>
UNIVERSAL-SU21S3-GA...	-335	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	-268	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	-201	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	-134	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	-67	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	0	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	67	-2	12	90	0	0



---

## Roadway Optimizer - Layout 4 - Cont.

---

### Luminaire Location Summary:

Coordinates in ft

UNIVERSAL-SU21S3-GA...	134	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	201	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	268	-2	12	90	0	0

Total Number of locations: 10

## Roadway Optimizer - Layout 4

## RoadOpt\_2\_Luminance

-----	2.56	1.97	1.35	1.02	1.12	1.60	2.05	2.72	3.05	2.84
→										
-----	2.32	1.65	1.26	1.12	1.61	2.67	2.91	3.52	3.40	2.79

## Luminance (Cd/SqM)

Average = 2.18

Maximum = 3.52

Minimum = 1.02

Avg/Min Ratio = 2.14

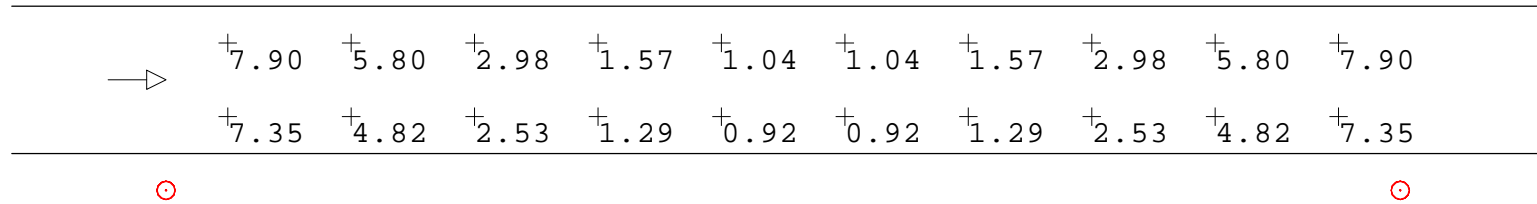
$$\text{Max/Min Ratio} = 3.45$$

Max/Avg Ratio = 1.61

---

## Roadway Optimizer - Layout 4

RoadOpt\_2\_Illum



### Illuminance (Fc)

Average = 3.62

Maximum = 7.90

Minimum = 0.92

Avg/Min Ratio = 3.93

Max/Min Ratio = 8.59

Max/Avg Ratio = 2.18



---

## Roadway Optimizer - Layout 4

RoadOpt\_2\_Vis\_Level

---

-----	+	4.44	+	16.98	+	13.24	+	8.65	+	4.49	+	-1.10	+	-4.26	+	-5.57	+	-6.40	+	-7.08
→▷																				
-----	+	2.69	+	11.17	+	9.86	+	5.89	+	2.91	+	-3.08	+	-5.44	+	-6.15	+	-6.45	+	-7.22

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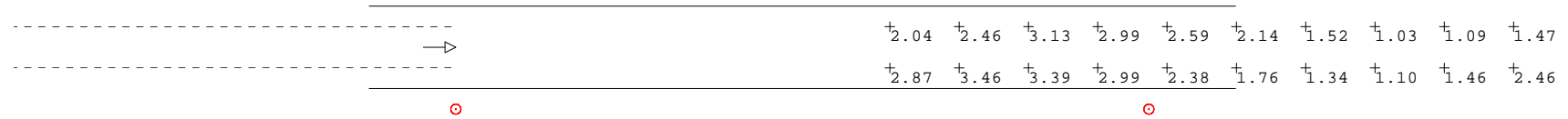
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Visibility Level

STV = 5.453751

## Roadway Optimizer - Layout 4

RoadOpt\_2\_Vis\_Level\_Bkgd\_Lum



## Background Luminance (Cd/SqM)

Average = 2.18

Maximum = 3.46

Minimum = 1.03

Avg/Min Ratio = 2.12

$$\text{Max/Min Ratio} = 3.36$$

Max/Avg Ratio = 1.59

---

## Roadway Optimizer - Layout 4

RoadOpt\_2\_Vis\_Level\_Target\_Lum

---

-----	+	4.05	+	8.76	+	7.39	+	5.16	+	3.43	+	1.60	+	0.73	+	0.40	+	0.24	+	0.15
→▷																				
-----	+	3.76	+	7.29	+	6.28	+	4.26	+	3.07	+	1.36	+	0.59	+	0.30	+	0.17	+	0.11

---

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### Target Luminance (Cd/SqM)

Average = 2.96

Maximum = 8.76

Minimum = 0.11

Avg/Min Ratio = 26.91

Max/Min Ratio = 79.64

Max/Avg Ratio = 2.96



---

## Roadway Optimizer - Layout 4

RoadOpt\_2\_Veil\_Lum

---

-----	+0.07	+0.06	+0.07	+0.08	+0.11	+0.16	+0.23	+0.36	+0.46	+0.33
→										
-----	+0.12	+0.08	+0.10	+0.12	+0.15	+0.21	+0.35	+0.74	+0.94	+0.72

---

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### Veiling Luminance (Cd/SqM)

Average = 0.27

Maximum = 0.94

Minimum = 0.06

Avg/Min Ratio = 4.5

Max/Min Ratio = 15.67

Max/Avg Ratio = 3.48

MaxLv Ratio = 0.43

Threshold Increment (TI) = 32.75



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## Roadway Optimizer - Layout 5

### General:

Universal 80W

Roadway Standard: IES RP-8-14

R-Table: R3 (Slightly Specular), Q0=0.07    Actual Q0 Value: 0.07

---

### Roadway Layout:

Layout Type: One Row, Near Side; 1RNS

Roadway Width: 8 ft

Lanes In Direction Of Travel: 1

Driver's Side Of Roadway: Right

---

### Luminaire Information:

#### UNIVERSAL-SU21S3-GAL-2-80W-4K

Description: SU21S3-GAL-2-80W-4K

File Name: UNIVERSAL-SU21S3-GAL-2-80W-4K.ies

Lumens Per Lamp: N.A.

Number Of Lamps: 1

Total Lamp Lumens: N.A.

Luminaire Lumens: 9043

Luminaire Watts: 85

Efficiency (%): N.A.

Total Light Loss Factor: 1.000

Luminaire Arrangement: SINGLE

Arm Length: 0 ft

Offset: 0 ft

---

### Luminaire Location Summary:

Coordinates in ft

Spacing - Row 1: 67

<u>Label</u>	<u>X-Coord</u>	<u>Y-Coord</u>	<u>Z-Coord</u>	<u>Orient</u>	<u>Tilt</u>	<u>Spin</u>
UNIVERSAL-SU21S3-GA...	268	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	201	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	134	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	67	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	0	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	-67	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	-134	-2	12	90	0	0

---

## Roadway Optimizer - Layout 5 - Cont.

---

### Luminaire Location Summary:

Coordinates in ft

UNIVERSAL-SU21S3-GA...	-201	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	-268	-2	12	90	0	0
UNIVERSAL-SU21S3-GA...	-335	-2	12	90	0	0

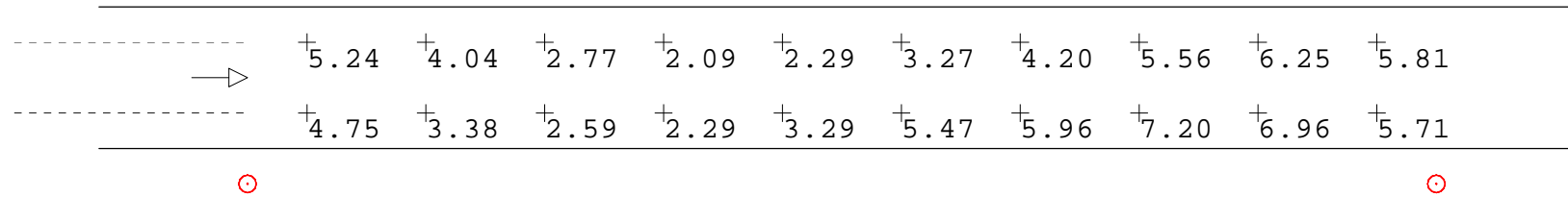
Total Number of locations: 10



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## Roadway Optimizer - Layout 5

### RoadOpt\_2\_Luminance



### Luminance (Cd/SqM)

Average = 4.46

Maximum = 7.20

Minimum = 2.09

Avg/Min Ratio = 2.13

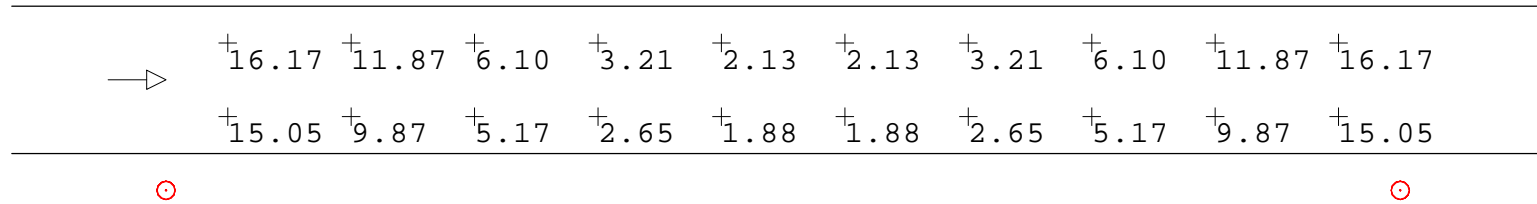
Max/Min Ratio = 3.44

Max/Avg Ratio = 1.61

---

## Roadway Optimizer - Layout 5

RoadOpt\_2\_Illum



### Illuminance (Fc)

Average = 7.41

Maximum = 16.17

Minimum = 1.88

Avg/Min Ratio = 3.94

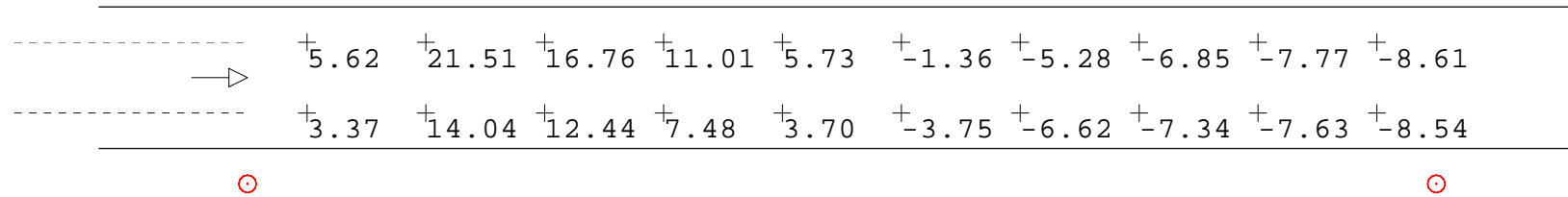
Max/Min Ratio = 8.6

Max/Avg Ratio = 2.18

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## Roadway Optimizer - Layout 5

RoadOpt\_2\_Vis\_Level



Visibility Level

STV = 6.491703



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## Roadway Optimizer - Layout 5

RoadOpt\_2\_Vis\_Level\_Bkgd\_Lum

-----	-----	4.17	5.04	6.41	6.12	5.29	4.37	3.10	2.10	2.22	3.01
-----	→	5.88	7.07	6.94	6.11	4.87	3.61	2.73	2.24	2.98	5.04

### Background Luminance (Cd/SqM)

Average = 4.47

Maximum = 7.07

Minimum = 2.10

Avg/Min Ratio = 2.13

Max/Min Ratio = 3.37

Max/Avg Ratio = 1.58

---

## Roadway Optimizer - Layout 5

RoadOpt\_2\_Vis\_Level\_Target\_Lum

---

-----	+	8.29	+	17.93	+	15.13	+	10.56	+	7.02	+	3.27	+	1.50	+	0.83	+	0.48	+	0.30
→▷																				
-----	+	7.69	+	14.91	+	12.86	+	8.71	+	6.29	+	2.78	+	1.20	+	0.62	+	0.35	+	0.22

---

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### Target Luminance (Cd/SqM)

Average = 6.05

Maximum = 17.93

Minimum = 0.22

Avg/Min Ratio = 27.5

Max/Min Ratio = 81.5

Max/Avg Ratio = 2.96

---

## Roadway Optimizer - Layout 5

RoadOpt\_2\_Veil\_Lum

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-----	+0.13	+0.11	+0.14	+0.17	+0.23	+0.33	+0.48	+0.73	+0.94	+0.68
→										
-----	+0.24	+0.16	+0.20	+0.24	+0.30	+0.44	+0.72	+1.51	+1.92	+1.48

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### Veiling Luminance (Cd/SqM)

Average = 0.56

Maximum = 1.92

Minimum = 0.11

Avg/Min Ratio = 5.09

Max/Min Ratio = 17.45

Max/Avg Ratio = 3.43

MaxLv Ratio = 0.43

Threshold Increment (TI) = 37.74



## Roadway Optimizer - Layout Comparison

	Layout 1	Layout 2	Layout 3	Layout 4	Layout 5
Description	Campana HPS @ 20'	Universal 60W	Universal 100W	Universal 40W	Universal 80W
Roadway Standard	IES RP-8-14	IES RP-8-14	IES RP-8-14	IES RP-8-14	IES RP-8-14
R-Table	R3	R3	R3	R3	R3
Actual Q0 Value	0.07	0.07	0.07	0.07	0.07
Layout Type	1RNS	1RNS	1RNS	1RNS	1RNS
Road Width	8	8	8	8	8
Median Width	N.A.	N.A.	N.A.	N.A.	N.A.
Number Lanes	1	1	1	1	1
Number Lanes Opposite	0	0	0	0	0
Drivers Side	Right	Right	Right	Right	Right
Calc Area	Bottom	Bottom	Bottom	Bottom	Bottom
Label - Row 1	CAMPANA-SN21P1	UNIVERSAL-SU21	UNIVERSAL-SU21	UNIVERSAL-SU21	UNIVERSAL-SU21
	-FT1GC-RT2-150H	S3-GAL-2-60W-4K	S3-GAL-2-100W-4	S3-GAL-2-40W-4K	S3-GAL-2-80W-4K
MH - Row 1	20	12	14	12	12
Setback - Row 1	2	2	2	2	2
+Orient - Row 1	0	0	0	0	0
Tilt - Row 1	0	0	0	0	0
Spin - Row 1	0	0	0	0	0
Spacing - Row 1	105	62	77	67	67
<b>1_Luminance (Cd/SqM)</b>					
Average	3.63	3.57	4.28	2.18	4.46
Maximum	7.48	5.36	6.45	3.52	7.20
Minimum	0.99	1.86	2.08	1.02	2.09
Avg/Min Ratio	3.67	1.92	2.06	2.14	2.13
Max/Min Ratio	7.56	2.88	3.10	3.45	3.44
Max/Avg Ratio	2.06	1.5	1.51	1.61	1.61
<b>1_Illum (Fc)</b>					
Average	3.52	5.93	6.78	3.62	7.41
Maximum	6.55	12.00	15.34	7.90	16.17
Minimum	1.82	1.89	1.75	0.92	1.88
Avg/Min Ratio	1.93	3.14	3.87	3.93	3.94
Max/Min Ratio	3.60	6.35	8.77	8.59	8.60

## Roadway Optimizer - Layout Comparison - Cont.

	Layout 1	Layout 2	Layout 3	Layout 4	Layout 5
Max/Avg Ratio	1.86	2.02	2.26	2.18	2.18
<b>1_Vis_Level</b>					
STV	4.25	5.62	6.35	5.45	6.49
<b>1_Vis_Level_Bkgd_Lum (Cd/SqM)</b>					
Average	3.54	3.57	4.28	2.18	4.47
Maximum	7.52	5.27	6.45	3.46	7.07
Minimum	0.95	1.91	2.09	1.03	2.10
Avg/Min Ratio	3.73	1.87	2.05	2.12	2.13
Max/Min Ratio	7.92	2.76	3.09	3.36	3.37
Max/Avg Ratio	2.12	1.48	1.51	1.59	1.58
<b>1_Vis_Level_Target_Lum (Cd/SqM)</b>					
Average	3.81	4.85	5.44	2.96	6.05
Maximum	10.62	13.10	16.72	8.76	17.93
Minimum	0.16	0.23	0.21	0.11	0.22
Avg/Min Ratio	23.81	21.09	25.90	26.91	27.50
Max/Min Ratio	66.38	56.96	79.62	79.64	81.50
Max/Avg Ratio	2.79	2.7	3.07	2.96	2.96
<b>1_Veil_Lum (Cd/SqM)</b>					
Average	0.4	0.45	0.56	0.27	0.56
Maximum	1.08	1.47	1.70	0.94	1.92
Minimum	0.02	0.09	0.11	0.06	0.11
Avg/Min Ratio	20.00	5.00	5.09	4.50	5.09
Max/Min Ratio	54.00	16.33	15.45	15.67	17.45
Max/Avg Ratio	2.7	3.27	3.04	3.48	3.43
MaxLV Ratio	0.3	0.41	0.4	0.43	0.43
Threshold Incr. (TI)	25.03	34.52	34.53	32.75	37.74

# **APPENDIX D**

## **FDOT Cost Inflation Factors**





## Inflation Factors

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This “*Transportation Costs*” report is one of a series of reports 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 Year Of Expenditure costs (YOE) or vice versa.

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 2015 dollars.

### 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. Restated, it is a price index which tracks the prices of a specified set of consumer products and services, providing a 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. 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 Other Non-residential Construction, is available from the Bureau of Labor Statistics (BLS). This index is not exclusively a highway construction index, but it is the best available national estimate of changes in highway costs from month to month.



# FLORIDA DEPARTMENT OF TRANSPORTATION

## TRANSPORTATION COSTS REPORTS

### Work Program Highway Construction Cost Inflation Factors

Fiscal Year	Inflation Factor	PDC Multiplier
2015	Base	1.000
2016	2.7%	1.027
2017	2.5%	1.053
2018	2.5%	1.079
2019	2.5%	1.106
2020	2.5%	1.134
2021	2.6%	1.163
2022	2.7%	1.194
2023	2.8%	1.228
2024	2.9%	1.264
2025	3.0%	1.301
2026	3.1%	1.342
2027	3.2%	1.385
2028	3.3%	1.430
2029	3.3%	1.478
2030	3.3%	1.526
2031	3.3%	1.577
2032	3.3%	1.629
2033	3.3%	1.683
2034	3.3%	1.738
2035	3.3%	1.795
Source: Office of Work Program and Budget, (Fiscal Year 2015 is July 1, 2014 to June 30, 2015)		

### Advisory Inflation Factors For Previous Years

Another “*Transportation Costs*” report is available covering highway construction cost inflation for previous years. “*Advisory Inflation Factors For Previous Years (1987-2013)*” provides Present Day Cost (PDC) multipliers that enable project cost estimates from previous years to be updated to FY 2013. This report is updated about once a year. For the table and text providing this information, please go to <http://www.dot.state.fl.us/planning/policy/costs/RetroCostInflation.pdf>.