THOMPSON CREEK TRAIL
BICYCLE/PEDESTRIAN FEASIBILITY STUDY

CITY OF ORMOND BEACH, FL

JUNE 2017

Prepared For:

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

Prepared By:

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1.0 EXECUTIVE SUMMARY

The River to Sea Transportation Planning Organization (R2CTPO) recognizes the importance of developing a cohesive transportation network that provides safe, efficient, and accessible pedestrian and bicycle facilities. One way to accomplish this goal is to expand the integrated bicycle and pedestrian transportation system by completing engineering feasibility studies for prioritized projects.

The City of Ormond Beach submitted a 2016 Application for Project Prioritization for a Bicycle/Pedestrian Project for Thompson Creek Trail. Specifically, a shared use path which would pass through downtown Ormond Beach and would provide a connection between Central Park and Sanchez Park.

The purpose of this project is to conduct a limited corridor study that assesses the feasibility of providing a shared use path along Thompson Creek. The project study corridor is approximately 1.25 miles in length, and runs mostly parallel to Thompson Creek through the City of Ormond Beach in Volusia County. The corridor limits are from Division Avenue to Wilmette Avenue.

Field visits were conducted on July 21, 2016, September 21, 2016, and October 25, 2016, to review the existing conditions along the corridor in consideration of a potential shared use path. As part of the field visits, the locations of existing utilities, drainage features, power poles, large trees, and other existing features were identified.

Study recommendations for a conceptual alignment were made based on design criteria for pedestrian facilities. Additional recommendations from the Florida Department of Transportation for the crossing of Granada Boulevard are incorporated. The crossing modifications require an Access Management Public Hearing since they change access conditions.

This report contains the recommended conceptual alignment for the study corridor, as well as a planning level opinion of the anticipated costs associated with the recommended improvements. Key items on this corridor include coordination with Florida Power and Light (FPL), and permitting through St. Johns River Water Management District (SJRWMD) and Volusia County. These items are discussed further in the following sections.

2.0 INTRODUCTION

The River to Sea Transportation Planning Organization (R2CTPO) recognizes the importance of developing a cohesive transportation network that provides safe, efficient, and accessible pedestrian and bicycle facilities. One way to accomplish this goal is to expand the integrated bicycle and pedestrian transportation system by completing engineering feasibility studies for prioritized projects. The General Design Principles uses in the analysis are described in ***Appendix A.***

2.1 PURPOSE AND OBJECTIVES

The purpose of this project is to conduct a limited corridor study that assesses the feasibility of providing a shared use path along Thompson Creek. The project study corridor is approximately 1.25 miles in length, and generally runs parallel to Thompson Creek through the City of Ormond Beach in Volusia County. The corridor limits are from Division Avenue to Wilmette Avenue. The project study corridor is shown in ***Figure 1.***

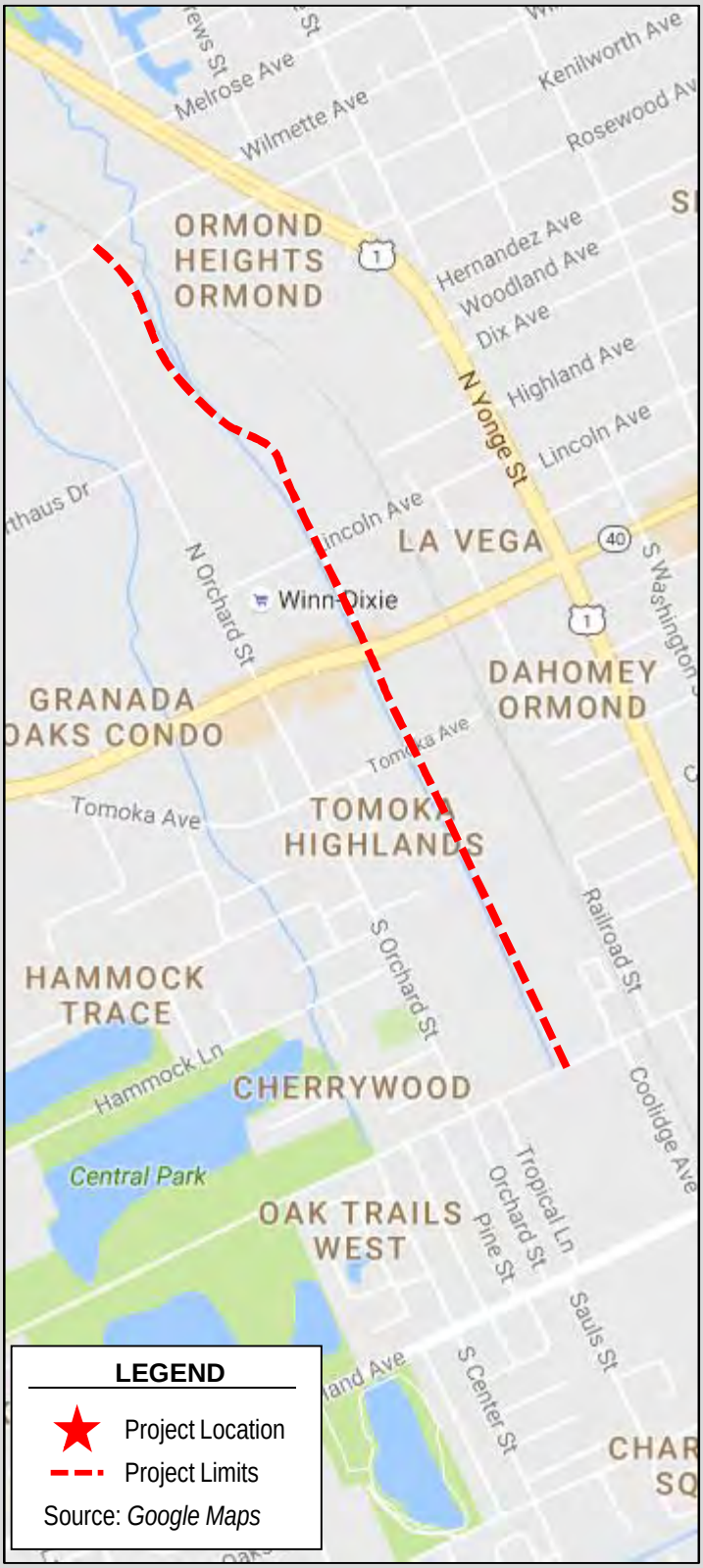
The development surrounding the study corridor varies between residential, commercial, and industrial development. The project is located in the vicinity of two parks, Sanchez Park and Central Park, and goes straight through the Downtown area. Some of the key surrounding features of the study corridor are shown in ***Figure 2.***

The study identifies the location and type of trail that fits within the existing right-of-way. Key components of the study include project coordination meetings, data collection, project site visits, conceptual planning, and development of an engineer's opinion of probable cost.

2.2 PROJECT HISTORY

The City of Ormond Beach submitted a 2016 Application for Project Prioritization for a Bicycle/Pedestrian Project for Thompson Creek Trail.

Thompson Creek Trail was included in the 2005 Volusia County MPO Bicycle/Pedestrian Plan, the City's adopted 2010 Multimodal Strategy Plan, and the adopted 2016 Bike/Ped Plan. Roadways which surround the study corridor, such as SR 40 (Granada Blvd), Division Avenue, Orchard street, Wilmette Avenue, and Lincoln Avenue, each have sidewalks on at least one side of the roadway. The path will accommodate pedestrians and bicyclists by providing an off-road connection to SR 40 (Granada Blvd), and the downtown area, from nearby residential neighborhoods.



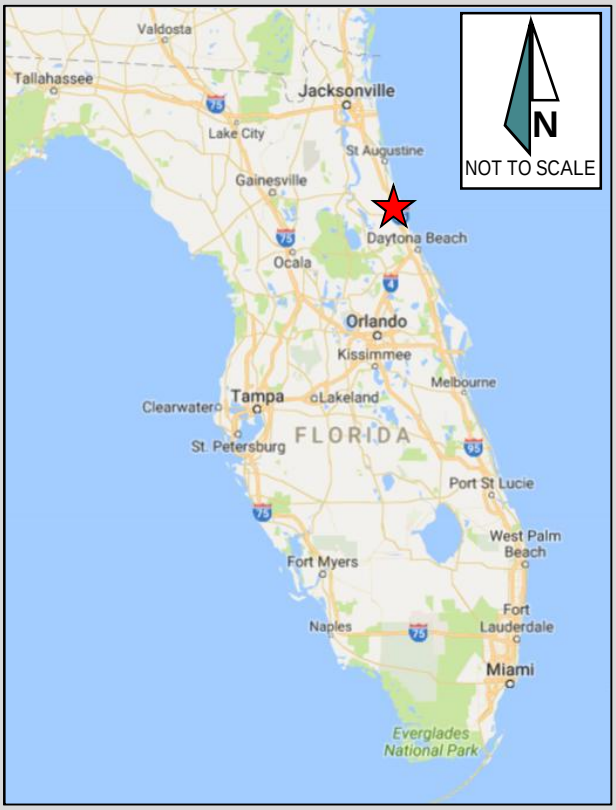


FIGURE 1 – LOCATION MAP

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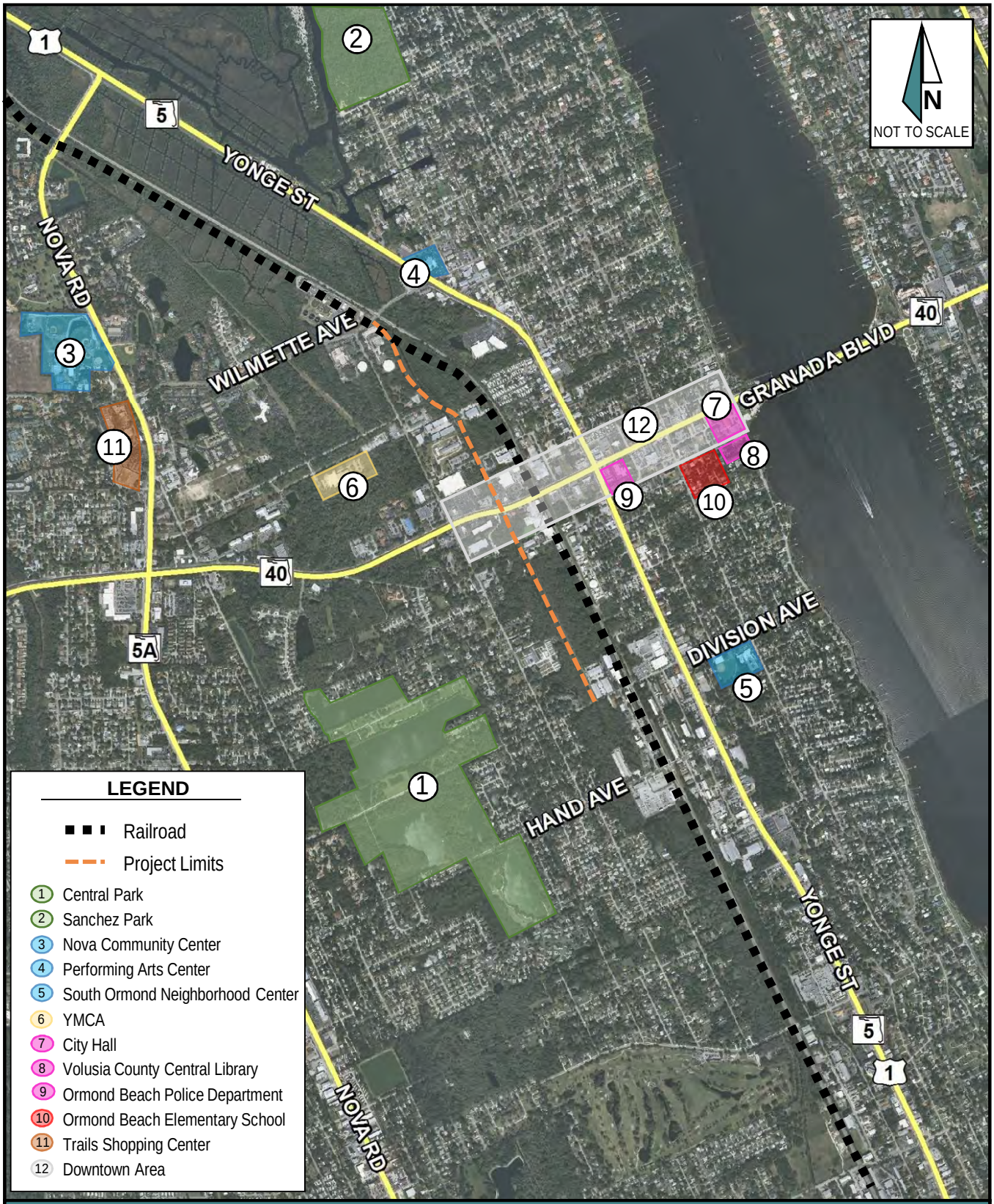

FIGURE 2 – SURROUNDING FEATURES

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3.0 EXISTING CONDITIONS

Field visits were conducted on July 21, 2016, September 21, 2016, and October 25, 2016, to review the existing conditions throughout the study area in consideration of a potential trail/boardwalk. As part of the field visit, the locations of existing utilities, drainage features, power poles, trees, wetlands, and other existing features were identified. These existing features are explained below, and are also noted in the project corridor concept plans included in ***Appendix B.***

General observations of the project study area include the following:

- Dense vegetation exists throughout much of the study corridor.
- Wetlands justify the use of a boardwalk in the northern section of the study corridor.
- Majority of surrounding development consists of commercial/industrial type land-uses.

Right of Way

Ample right-of-way is available throughout the project extents. Parcel boundaries along the corridor were obtained from Volusia County GIS data, in addition to the survey and right-of-way information provided by the City for Thompson Creek Road. Parcel data shows city owned property with approximately 100 feet of available right-of-way from the southern Division Avenue point to just north of Lincoln Avenue. The remaining area to the northern project extent at Wilmette Avenue is owned by the City and is the location for the City of Ormond Beach Department of Public Works.

Florida Power and Light (FPL) has a 26 foot wide utility easement that is either within or adjacent to the City owned 100 feet of right-of-way. FPL has overhead transmission power lines within the easement. The majority of the study corridor, has dense vegetation. The right-of-way information is provided in ***Appendix C.***

Environmental

The following information is based upon a desktop review of various Geographic Information System (GIS) data layers from the U.S. Fish and Wildlife Service (USFWS), Florida Fish and Wildlife Conservation Commission (FWC), and USFWS National Wetlands Inventory (NWI) Maps.

The project corridor is located within the US Fish and Wildlife Service (USFWS) Consultation Area for the Florida scrub-jay (Aphelocoma coerulescens) and the West Indian manatee (Trichechus manatus). Habitat for the Florida scrub-jay does not appear to be present within the project corridor; therefore, impacts to this species are unlikely. Habitat for the manatee exists within Thompson Creek throughout the project corridor. If impacts to the Thompson Creek are proposed consultation with USFWS may be required.

An active bald eagle (Haliaeetus leucocephalus) nest was also documented approximately 2000 feet west of the project corridor in 2012. Based on this distance no impacts to the eagle nest are anticipated from this project and consultation with USFWS should not be required.

According to a review of the National Wetlands Inventory, the northern and southern portion of the project corridor are comprised of forested freshwater wetlands, while a small portion of the northern extent of the project corridor appears to contain tidal wetlands associated with Thompson Creek. If wetland impacts are proposed an Environmental Resource Permit (ERP) from the St. Johns River Water Management District (SJRWMD) as well as a Standard Permit from the US Army Corps of Engineers (USACE) will be required. A map showing the environmental features of the surrounding area is provided in ***Appendix D***.

Drainage

Thompson Creek meanders the entire length of the study corridor, varying in width and depth throughout. The creek has a trapezoidal shape with a large berm on the eastern side of the water body which serves to separate the creek and the proposed trail. The creek is well developed along Thompson Creek Road but is fairly undeveloped along the remainder of the corridor. There is dense vegetation on both sides of the creek for the majority of the corridor.

Utility Coordination

The overhead transmission lines generally run parallel to the corridor. Approximately 800 feet north of Lincoln Avenue, the transmission lines make a 90^0 turn to the west and travel across Thompson Creek to a power sub-station on Sterhaus Drive. The proposed trail alignment purposefully avoids overlap with the FPL easement for the portions of the corridor where they are parallel. For the portion where the corridors cross (where the power line runs east/west, approximately 770' north of Lincoln Avenue), FPL does not have an easement so a Right-of-Way Consent Agreement is not needed.

3.1 DIVISION AVENUE TO GRANADA BOULEVARD

According to the shapefiles obtained from Volusia County GIS data, there is a City owned piece of property approximately 100 feet in width between Division Avenue and Granada Boulevard. Within this property, there is a 26 foot wide easement which is owned by FPL. Within FPL's easement, the area is cleared of trees and shrubs, while the remaining 74 feet of usable space outside of the easement is thick vegetation and wetlands.

The southern extent at Division Avenue consists of a combination of residential and commercial/industrial land uses. Division Avenue is a two-lane facility with curb and gutter and a speed limit of 25 miles per hour. There is an 8' wide sidewalk on the northern side of the roadway. The northern extent at Tomoka Avenue is surrounded by primarily commercial and industrial land uses to the east and residential to the west, serving neighborhoods and varying non-residential land use types. Tomoka Avenue is a two-lane facility without curb or sidewalk, and has a speed limit of 25 miles per hour. The trail alignment area remains mostly undeveloped to Granada Boulevard.

Within this segment, Thompson Creek is located on the western portion of the available right-of-way. A berm borders the creek on the east side which is in turn bordered by a swath of vegetation. Beyond the vegetation is the overhead utility easement (26 feet in width) which has been cleared, as shown in ***Image 1***. There are three drainage pipe culverts which currently cross below the proposed trail between Division Avenue and Tomoka Avenue which will need to be replaced.

Boardwalk is proposed in this section since the area is considered a wetland. More details on the conceptual alignment are provided in **Section 5.**

IMAGE 1 – TYPICAL SECTION BETWEEN DIVISION AVENUE AND TOMOKA AVENUE – THE PROPOSED TRAIL WILL BE ALIGNED THROUGH HEAVILY WOODED AREA

3.2 GRANADA BOULEVARD TO LINCOLN AVENUE

There is a shift in land use at this point in the study area, as it enters into the downtown area. Granada Boulevard is a major four-lane east/west thoroughfare in the City of Ormond Beach. Land uses along Granada Boulevard range from commercial and industrial to residential, providing access to downtown area and the beaches. The speed limit along the portion of Granada Boulevard is 35 miles per hour.

Thompson Creek Road is a two-lane roadway adjacent to the creek. There are currently no speed limit signs along this roadway, though it is clear that it is a low speed road. In the southbound direction, there is on-street parking for a portion of the roadway and a bus lane for the remainder. There are sidewalks on the west side of the roadway and a Votran bus stop which serves Routes 3A, 3B and 6. Bus stop amenities such as benches, trashcans, and a bus shelter exist along this portion. The roadway primarily serves as an access to commercial land uses. As shown in ***Image 2***, the western side of Thompson Creek Road has a large slope between the sidewalk and the creek. The existing light fixtures can also be seen in the image.

There are no traffic control features for pedestrians crossing Granada Boulevard at the median opening aligned with Thompson Creek Road, but there are crosswalks at the intersection of Granada Boulevard and Orchard Street to the west, and at Perrott Drive to the east.

The alignment for this section is proposed to be a boardwalk that is partially over the creek, located west of the existing bus stop shelter. More details on the conceptual alignment are provided in **Section 5.**

IMAGE 2 – EXISTING TYPICAL SECTION ALONG THOMPSON CREEK ROAD. PROPOSED TRAIL ALIGNMENT IS A BOARDWALK OVER THE CREEK

3.3 LINCOLN AVENUE TO WILMETTE AVENUE

Throughout this segment, the land use shifts from the downtown area to undeveloped land with dense vegetation. Lincoln Avenue is a two-lane roadway that connects to Orchard Street in the west and US 1 (Yonge Street) in the east. The speed limit along Lincoln Avenue is 25 miles per hour, with businesses fronting the roadway. Sidewalks are provided on the southern side of Lincoln Avenue.

Wilmette Avenue runs east/west connecting Nova Road to Beach Street. The speed limit is 25 miles per hour with a mix of office and industrial land uses directly surrounding the project extent, but with residential land uses to the east and west. There are sidewalks on the north side of the road within the corridor limits.

FPL overhead utilities continue through this segment to just north of the Ormond Business Park at which point they cross through the city right-of-way to Orchard Street. From there, the overhead lines continue up Orchard Street until the intersection with Wilmette Avenue.

This segment contains a large amount of standing water and is mostly within wetland areas.

As shown in ***Image 3***, the southern extent, prior to the Ormond Business Park, has a cleared area along the east side of Thompson Creek. In the segment from the Ormond Business Park to the northern project extent at Wilmette Avenue, the remaining area consists of almost all wetlands.

IMAGE 3 – VIEW LOOKING NORTH, THE PROPOSED ALIGNMENT IS IN THE OPEN AREA, THOUGH SOME TREES WILL NEED TO BE REMOVED

4.0 CONCEPTUAL DESIGN RECOMMENDATIONS

In order to construct a 12-foot-wide shared use path along Thompson Creek, a lateral offset of 4 feet on each side should be included, for a total of 20 feet. For the portions where the path is adjacent to the creek, a 5-foot-wide clear space is needed between the edge of the path and the creek, for a total of 21 feet wide. Alternatively, a railing may be provided if the edge of the path is within 2' of the creek edge/dropoff.

Most of the of the path is in wetlands and will require a boardwalk rather than an asphalt path. While the boardwalk is more expensive to build than a typical shared use path, it avoids impacting the wetlands and avoids costs associated with the additional buildup of a base. The boardwalk is recommended to be 12' wide. A map showing the general configuration of the trail is provided in ***Figure 3***.

The project corridor concept plans illustrate the recommended conceptual modifications to the corridor, and are included in **Appendix B**.

FIGURE 3 – GENERAL CONFIGURATION OF TRAIL

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4.1 DIVISION AVENUE TO GRANADA BOULEVARD

The southern terminus of the trail at Division Avenue is shown in ***Image 4***. This existing configuration along this portion of the corridor typically consists of relatively undisturbed woods with various types and sizes of trees. The City-owned property in this area is adjacent to FPL's transmission line easement. For this portion, a 12' wide boardwalk is recommended to be located approximately three to five feet inside of the eastern edge of the tree line. This section is shown in ***Image 5***. By staying within the tree line, there is a physical separation from the power lines and separation from the easement. There is also shade and aesthetics provided by trees on both sides of the path. The western limit of the pathway is somewhat constrained by a berm adjacent to the creek. East of the berm, the ground slopes down away from the berm and towards the tree line. The slope of the berm and of the ground adjacent to the berm varies. The alignment can meander around larger trees whenever possible. The northernmost portion of this section is not in wetlands so it is recommended to be an asphalt path.

IMAGE 4 –SOUTHERN TERMINUS OF TRAIL AT DIVISION AVENUE, LOOKING EAST. TRAIL ALIGNMENT IS EAST OF EXISTING HANDRAIL

IMAGE 5 – TRAIL ALIGNMENT BETWEEN DIVISION AVENUE AND GRANADA BOULEVARD

Recognizing that the large trees are not in consistent locations and there are constraints on the available space, it is recommended that the path meander by curving east and west by three to four feet to preserve as many large shade trees as possible, giving preference to native trees. Note that the horizontal curves must have a minimum radius of 74'.

4.2 GRANADA BOULEVARD TO LINCOLN AVENUE

The typical section of Thompson Creek Road (between Granada Boulevard and Lincoln Avenue) includes a sidewalk, on-street parking, and shelter amenities on the west side of the road.

A Votran bus stop is in the north portion of this section, and busses dwell there when not in service. The bus lane (and on-street parking) is shown in ***Image 6***. The typical section is narrow enough that there is not enough room to maintain the on-street parking and shelters and add a separate asphalt shared-use path. To have a shared use path along this section, it would be necessary to construct a boardwalk or to remove the on-street parking or remove the shelters and no longer allow the Votran bus to dwell in this area. Since these uses are valuable to the area, it is recommended that this section consist of a boardwalk, aligned over the creek. An image of the creek is provided in ***Image 7***.

IMAGE 6 – TYPICAL SECTION ALONG THOMPSON CREEK ROAD, LOOKING SOUTH

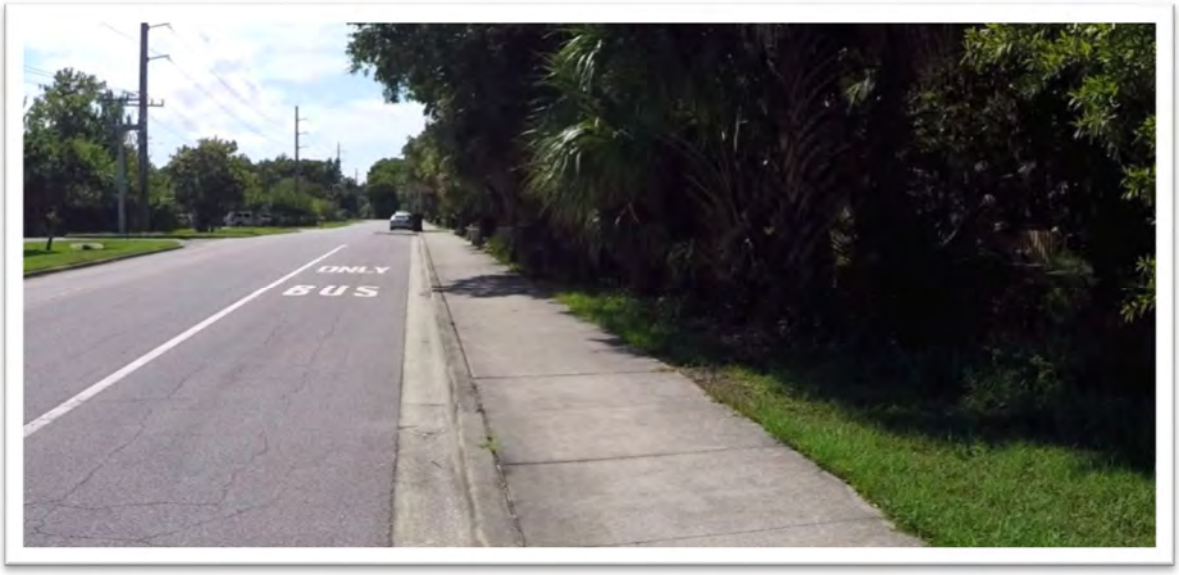
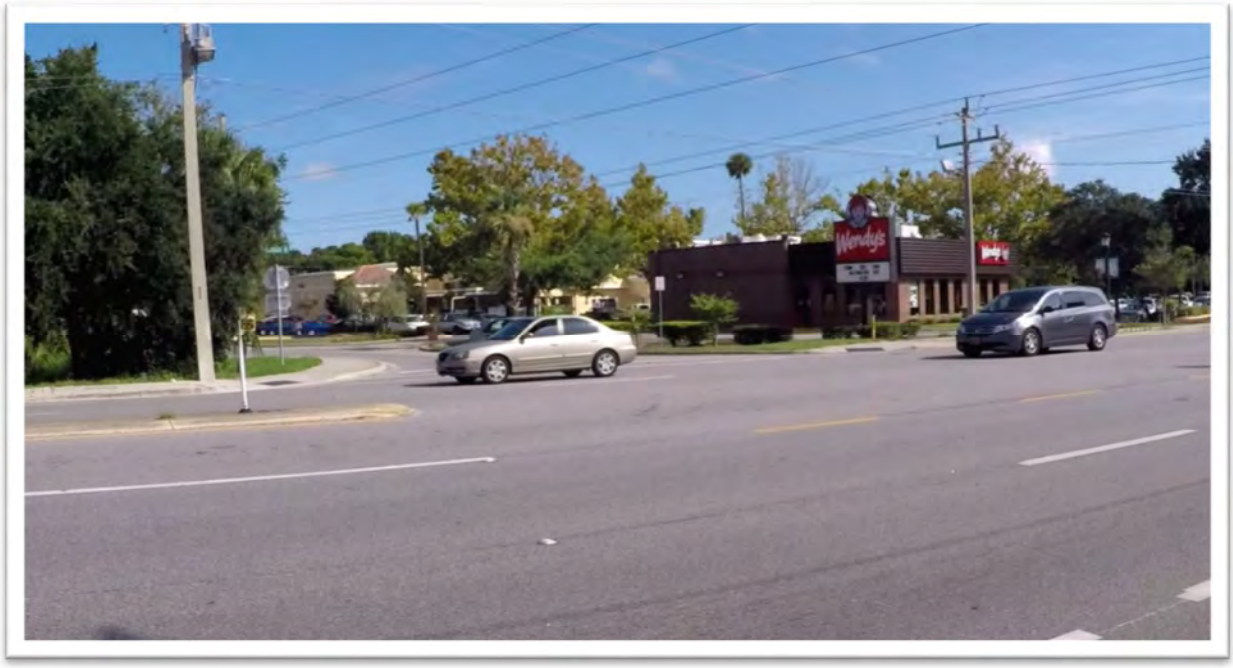


IMAGE 7 – THOMPSON CREEK, LOOKING SOUTH. PROPOSED BOARDWALK IS ABOVE THE CREEK

4.3 CROSSING GRANADA BOULEVARD

Since the typical section on each side of Granada Boulevard (along Thompson Creek Road) will include a continuous shared-use path, a crosswalk at this location is not subject to the crossing volume criteria that is typically needed to provide a marked crosswalk. To consider a crosswalk, a pedestrian refuge is needed since the crossing distance is over 60' (it is approximately 72'). The intersection is currently a full median opening without any turn restrictions. The existing median must be modified to be wide enough to provide a pedestrian refuge by restricting movements at the intersection. A picture of this location is shown in ***Image 8***.

IMAGE 8 – NARROW TRAFFIC SEPARATOR AT THE INTERSECTION OF GRANADA BOULEVARD AND THOMPSON CREEK ROAD



To make the median wide enough to serve as a pedestrian refuge, it is recommended to relocate the westbound left turn lane and driveway for the Oil Change development, and restrict the southbound movement to right-turn only as shown in ***Figure 4***. An Access Management Public Hearing is needed prior to making this access change.

An alternative to the median modifications and at-grade crosswalk is a pedestrian overpass. A pedestrian overpass would be beneficial since it would not require median modifications. The drawbacks of a pedestrian overpass are the high costs and likely need to acquire right-of-way to have enough space for the ramps.

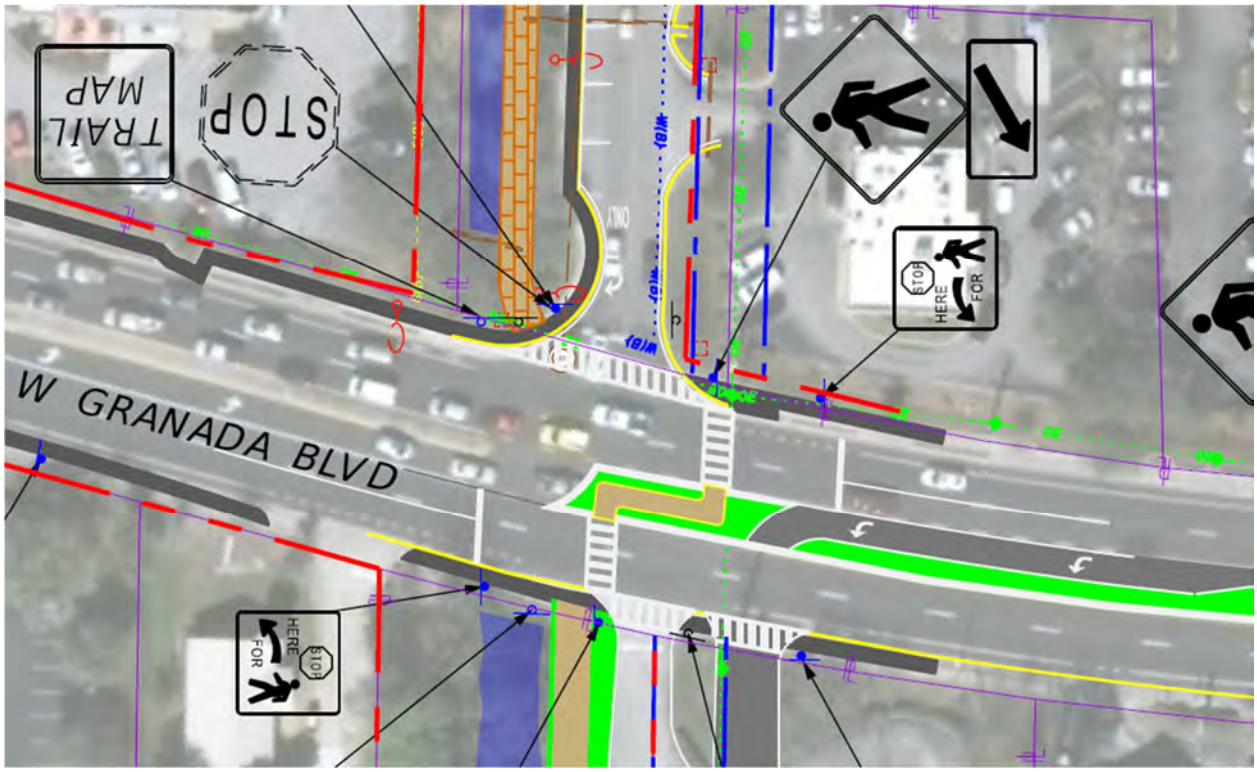


Figure 4 – Recommendations for Crossing Granada Boulevard

4.4 LINCOLN AVENUE TO WILMETTE AVENUE

A marked crosswalk is recommended at the intersection of Lincoln Avenue and Thompson Creek Road. The trail is recommended to be a 12-foot-wide shared use asphalt path near Thompson Creek, for the portion of the corridor just north of Lincoln Avenue. This area is shown in ***Image 9*** and ***Image 10***. Approximately three to four feet of the adjacent trees will need to be removed to provide the full 12-foot-wide trail and the necessary clear space from the creek and the adjacent trees.

IMAGE 9 – THOMPSON CREEK NORTH OF LINCOLN AVENUE

IMAGE 10 – THOMPSON CREEK NORTH OF LINCOLN AVENUE

The path crosses a driveway approximately 740’ north of Lincoln Avenue. Earthwork will be needed to maintain minimum vertical slopes near the driveway since the road is several feet higher than the adjacent ground, as seen in ***Image 11***.

IMAGE 11 – ELEVATION DIFFERENCE AT THE DRIVEWAY CROSSING (LOOKING NORTH)

North of the driveway, the path will be more separated from the creek to maintain an appropriate cross slope. The entire path will need to be cleared and grubbed as it will travel through a wooded area for approximately 770 feet. This portion is generally level and dry, as shown in ***Image 12***.

IMAGE 12 – RECOMMENDED ALIGNMENT NORTH OF STERHAUS DRIVE

North of the wooded area, the trail enters wetlands and is therefore recommended to continue north as a boardwalk for the remainder of the trail. ***Image 13*** shows a portion of the wetland that the boardwalk will travel over.

IMAGE 13 – WETLAND AREA WHERE A BOARDWALK IS RECOMMENDED

As the trail approaches Wilmette Avenue, it is recommended to curve to the west to increase the separation from the adjacent railroad right-of-way. Wilmette Avenue has a posted speed limit of 25 miles per hour and existing eight-foot-wide sidewalks along the north side of the road, as shown in ***Image 14***. At this location, a crosswalk is proposed to cross Wilmette Avenue and meet the existing sidewalks. Wayfinding signage and maps are recommended at this location.

IMAGE 14 – NORTHERN TERMINUS OF TRAIL AT WILMETTE AVENUE

5.0 FINANCIAL FEASIBILITY

Table 1 provides a planning level Opinion of Probable Cost to construct the proposed corridor, based on the conceptual alignment. The item numbers and units of measure are based on the FDOT 2016 Basis of Estimates Manual. Inflation factors provided by FDOT were used to adjust the total project cost on an annual basis for 2017, 2018, and 2019. The inflation factors are also shown in the table.

Explanations of the key items included in the cost estimate are included below. Additional detail is included in ***Table 1***.

- Mobilization – Consists of work and operations necessary to begin work on a project. Includes moving in equipment and personnel, establishing temporary offices, safety equipment and sanitary facilities. May include surveying, bond and insurance expenses.
- Maintenance of Traffic – Includes all items required to safely maintain traffic throughout a transportation work zone with minimal inconvenience to the public and fit into one of the following categories:
    1. cannot reasonably be quantified;
    2. cannot be addressed under current pay items;
    3. are incidental to the operation necessary to safely maintain traffic throughout a work zone
- Clearing and Grubbing – This Item is included to account for the clearing that is necessary to build the proposed trail.
- Earthwork/Embankment – The bid price for this item shall include, but not be limited to, the requirements of Section 120 Excavation and Embankment of the Standard Specifications.
- Sidewalk Concrete (4”/6” Thick) –These items are included to account for the cost of placing sidewalk and replacing driveways along the proposed route.
- Detectable Warning Surface – This item is included as an ADA compliant feature included within all sidewalk ramps. This item accounts for retrofitting existing sidewalk ramps with detectable warning surfaces.
- Performance Turf, Sod – This item is included to sod all areas disturbed by construction of the proposed sidewalk.
- Single Post Sign, F&I, Relocate, Remove – These items are included for the pedestrian crosswalk signage, and various additional signs throughout the project.
- Stabilization, Optional Base, and Superpave – These items are included to account for the cost of the proposed trail, and to cover the replacement of driveways.
- Thermoplastic - These items are included to mark the special emphasis crosswalks, as detailed in the FDOT Design Standards, Index 17346.

Table 1 – Engineer's Opinion of Probable Cost

Pay Item Number	Description	Estimated Quantity	Unit of Measure	Unit Price	Total Cost
101-1	Mobilization	1	LS	5%	$ 92,860
102-1	Maintenance of Traffic	1	LS	2%	$ 37,150
104-10-3	Sediment Barrier	6,600	LF	$ 2.00	$ 13,200
107-1	Litter Removal	4	AC	$ 25.00	$ 95
107-2	Mowing	4	AC	$ 50.00	$ 190
110-1-1	Clearing and Grubbing	4	AC	$ 20,000.00	$ 75,800
120-1	Regular Excavation	198	CY	$ 14.00	$ 2,774
120-6	Embankment	50	CY	$ 20.00	$ 991
160-4	Type B Stabilization, 12" (Min LBR 40)	3,621	SY	$ 7.50	$ 27,158
285-701	Optional Base, Base Group 1 (4")	2,828	SY	$ 60.00	$ 169,686
334-1-11	Superpave Asphalt, Traffic A	212	TN	$ 135.00	$ 28,620
430-174-218	Pipe Culvert, Optional Material, Elliptical, 18" SD	160	LF	$ 75.00	$ 12,000
430-982-125	Mitered End Section, Optional Round, 18" CD	8	EA	$ 1,400.00	$ 11,200
515-1-2	Pipe Handrail - Guardrail, Aluminum	120	LF	$ 55.00	$ 6,600
519-78	Bollards	16	EA	$ 375.00	$ 6,000
522-1	Concrete Sidewalk (4" Thick)	11	SY	$ 40.00	$ 440
522-2	Concrete Sidewalk (6" Thick)	120	SY	$ 55.00	$ 6,600
527-2	Detectable Warnings	160	SF	$ 28.00	$ 4,480
570-1-2	Performance Turf, Sod	1,750	SY	$ 2.50	$ 4,375
Boardwalk	Boardwalk with Composite Decking	4,817	LF	$ 300.00	$ 1,445,100
700-1-11	Single Post Sign, F&I, up to 12 SF	35	AS	$ 304.00	$ 10,640
711-15-101	Thermoplastic, Sdt, White, Solid, 6"	0.12	GM	$ 4,300.00	$ 516
711-11-123	Thermoplastic, Std, White, Solid, 12"	514	LF	$ 3.00	$ 1,542
711-11-125	Thermoplastic, Std, White, Solid, 24"	650	LF	$ 6.00	$ 3,900
711-11-160	Thermoplastic, Std, White, Message or Symbol	2	EA	$ 175.00	$ 350
				CONSTRUCTION COSTS SUBTOTAL	**$ 2,000,609**
-	Design (Including Bid Package)	1	LS	30%	$ 600,180
-	Wetland Permitting	1	LS		$ 30,000
-	CEI	1	LS	12%	$ 240,080
				DESIGN/CEI SUBTOTAL	**$ 870,260**
				TOTAL PROJECT COST	**$ 2,870,869**

FDOT Inflation-Adjusted Estimate	Inflation Factor	Adj. Cost
2017 Estimated Project Cost	1	$ 2,870,900
2018 Estimated Project Cost	1.027	$ 2,948,400
2019 Estimated Project Cost	1.056	$ 3,031,600

NOTES:

1) THIS OPC IS BASED ON CONCEPTUAL DESIGN.

2) THIS OPC IS BASED ON HISTORICAL COST INFORMATION MADE AVAILABLE BY THE FDOT. UNIT PRICES OF SOME QUANITIES MAY HAVE BEEN INFLATED TO ACCOUNT FOR THE SMALL NATURE OF THE PROJECT. ACTUAL CONSTRUCTION COSTS WILL VARY.

3) THIS OPC DOES NOT INCLUDE THE COSTS ASSOCIATED WITH OBTAINING PERMITS.

4) THE ESTIMATE FOR DESIGN FEE INCLUDES 18% FOR ENGINEERING DESIGN AND 12% FOR SURVEY AND GEOTECH. THE LIMITS OF SURVEY ARE ANTICIPATED TO BE FROM THE EDGE OF PAVEMENT TO THE RIGHT OF WAY LINE FOR THE LENGTH OF THE PROJECT.

5) THE ENGINEER HAS NO CONTROL OVER THE COST OF LABOR, MATERIALS, EQUIPMENT, OR OVER THE CONTRACTOR'S METHODS OF DETERMINING PRICES OR OVER COMPETITIVE BIDDING OR MARKET CONDITIONS. OPINIONS OF PROBABLE COSTS PROVIDED HEREIN ARE BASED ON THE INFORMATION KNOWN TO ENGINEER AT THIS TIME AND REPRESENT ONLY THE ENGINEER'S JUDGMENT AS A DESIGN PROFESSIONAL FAMILIAR WITH THE CONSTRUCTION INDUSTRY. THE ENGINEER CANNOT AND DOES NOT GUARANTEE THAT PROPOSALS, BIDS, OR ACTUAL CONSTRUCTION COSTS WILL NOT VARY FROM ITS OPINIONS OF PROBABLE COSTS.

3) THIS OPC DOES NOT INCLUDE THE COSTS FOR ANY RIGHT-OF-WAY OR EASEMENT ACQUISITIONS, AS THEY ARE NOT ANTICIPATED TO BE REQUIRED.

6.0 CONCLUSION AND SUMMARY OF RECOMMENDATIONS

The purpose of this project is to conduct a limited assessment of the feasibility of providing a shared use path adjacent to Thompson Creek. The conceptual alignment for the proposed shared use path is included in ***Appendix B***. Constructing the shared use path along the specified limits appears to be feasible.

6.1 PERMITTING & ENVIRONMENTAL

A desktop evaluation of the potential environmental impacts was conducted along the corridor. Further coordination with FWC is recommended to identify and address potential impacts associated with wetlands and with Manatee habitat.

The water management district for this area is the St. Johns River Water Management District. According to SJRWMD policies, the addition of sidewalk/pedestrian paths does not require an application to SJRWMD. Therefore, it is not anticipated that any drainage permitting will be required on this project. This project is anticipated to fall under exemption criteria, which is typically a 30-day to 60-day process. A pre-application meeting should be set up with SJRWMD when the project moves into design. Permitting needs can be reassessed once additional right of way information is available.

7.0 DATA COLLECTION REFERENCES

Data collection consisted of referencing readily available information including:

- Manual on Uniform Traffic Control Devices (2009)
- FDOT 2016 Basis of Estimates Handbook
- FDOT Plans Preparation Manual (PPM)
- Volusia County, http://www.volusia.org/
- River to Sea TPO, http://r2ctpo.org
- Florida Department of Transportation (FDOT), http://www.dot.state.fl.us/
- Florida Pedestrian Planning and Design Handbook, FDOT, 1999
- Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways, May 2013, (Florida Greenbook")
- American Association of State Highway and Transportation Officials (AASHTO) Guide for the Planning, Design, and Operation of Pedestrian Facilities, 2004
- ADA Standards for Accessible Design, Code of Federal Regulations, 28 CFR Part 36,
- FDOT Design Standards

APPENDIX A

General Design Principles

APPENDIX A – GENERAL DESIGN PRINCIPLES

Study recommendations are based on design criteria for pedestrian facilities contained in the FDOT Pedestrian Facilities Planning and Design Handbook, the FDOT Plans Preparation Manual (PPM), the Manual on Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways, The Traffic Engineering Manual, The Florida Greenbook, and the FDOT Design Standards.

Sidewalks

According to the Florida Pedestrian Planning and Design Handbook, sidewalks are defined as "paved area (typically concrete) which normally runs parallel to vehicular traffic and is separated from the road surface by at least a curb and gutter." A sidewalk is designed for preferential or exclusive use by pedestrians. The number one goal in designing sidewalks shall be the elimination of vehicle-pedestrian conflicts. Though it is not possible to eliminate all vehicle-pedestrian conflicts within the typical roadway corridor, steps should be taken to minimize the effects of all vehicle-pedestrian conflicts through proper design. Some important design requirements to consider involve the proper horizontal separation/barriers from the traveled way and accessibility/safety.

The effective minimum width of a sidewalk within a residential area is five feet. A minimum width of six feet of horizontal clear zone is recommended for urban facilities where no curb and gutter is present. If six feet is not available, a barrier is recommended between the pedestrian way and the vehicular travel way. The barrier may consist of curb and gutter, landscaping or a permanent structure, such as guard railing.

One of the most important design considerations for persons with disabilities is curb cuts. Therefore, new and retrofitted streets with sidewalks should have curb cuts installed at all delineated crossings. 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.

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, when included in pedestrian facility planning, produce "ADA-compliant" facilities.

Crosswalk markings provide guidance for pedestrians who are crossing roadways from defined sidewalks. Crosswalks delineate paths and also serve to alert vehicles of a pedestrian crossing

point. Crosswalks should be as wide as the sidewalk facility, not including ramp flares, and be aligned to reduce the crossing distance whenever possible.

Horizontal Separation

To properly account for horizontal separation between the roadway and sidewalk, the design must, at a minimum, meet Florida Greenbook requirements. The Florida Greenbook states that sidewalks shall be separated from the travel lane of a rural (non-curbed) roadway based on the following criteria listed in order of desirability:

- Outside of the highway right-of-way in a separately dedicated corridor
- At or near the right-of-way line
- Outside of the designed roadside clear zone.
- Outside of the minimum required roadside clear zone
- As far from the edge of the driving lane as possible.

When adequate horizontal separation cannot be achieved, longitudinal barriers should be considered. Longitudinal barriers can be either guardrails or other rigid barriers which are designed to deflect errant vehicles away from the pedestrian facility.

Accessibility/Safety

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. In general, proper design of pedestrian crossings shall consider the following:

- Crossings should be placed at locations with ample sight distances
- At crossings, the roadway should be free from changes in alignment or cross section
- The entire length of the crosswalk shall be visible to drivers at a sufficient distance to allow a stopping maneuver
- STOP bars shall be provided adjacent to all signalized crosswalks to inform drivers of the proper location to stop. The STOP bar should be well separated from the crosswalk, but should not be closer than four feet.
- All crosswalks shall be easily identified and clearly delineated, in accordance with Manual on Uniform Traffic Control Devices (MUTCD) (Rule 14-15.010)
- Additionally, signs and markings should be utilized whenever possible to provide the pedestrian clear direction. The signs and markings should conform to the standards set forth in the MUTCD.

Shared Use Paths

The Florida Greenbook defines shared uses paths as “paved facilities physically separated from motorized vehicular traffic by an open space or barrier”. These facilities may be within the

highway right of way or an independent right of way. Typical users may include pedestrians, bicyclists, skaters, and others.

According to the Florida Greenbook, the minimum recommended width for a two-way path is 10 feet. Under constraints, it may be acceptable to reduce the trail to eight feet if bicycle and pedestrian traffic is anticipated to be low. A horizontal buffer of two feet of mostly flat land should be provided adjacent to the shared use path, with three or more feet preferred if available. Additional clearance should be provided to adjacent ditches or steep slopes (five feet minimum) and fixed objects such as poles and fences (three feet minimum). The Plans Preparation Manual recommends a lateral offset of four feet on either side of the shared use path to provide sufficient clearance to obstacles.

A five-foot separation is recommended between the shared use path and the adjacent roadway. If five feet is not available, a physical barrier is recommended at a minimum of 42 inches high. Consideration should be given to the clear zone of the roadway and providing sufficient sight distance for motorists when considering the use of a barrier.

Crosswalks at Unsignalized Locations

The FDOT Traffic Engineering Manual (TEM), Section 3.8, describes considerations for crosswalks at mid-block locations and at uncontrolled approach locations (such as crossing the main street at an unsignalized side street).

Prior to approval of the installation of a marked crosswalk, an engineering study must document the following information (summarized from the TEM):

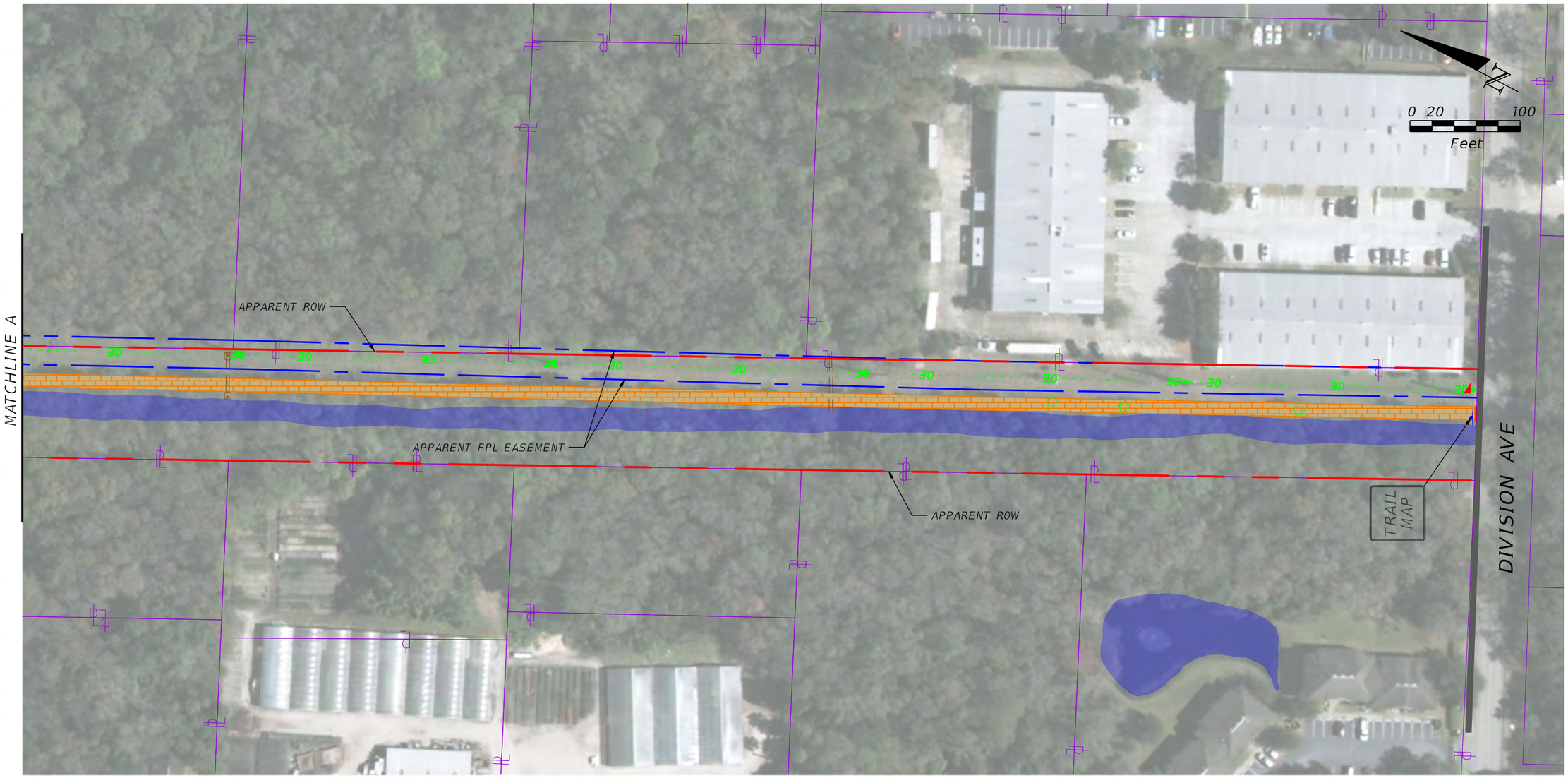
- Field data to demonstrate the need based on volume criteria and the availability of alternative crossing locations.
    - Well defined generators and attractors with patterns and flow
    - Data collection for three separate days within a seven-day period (non-holiday without a special event):
        - 20 or more pedestrians in an hour (four consecutive 15-minute intervals), or
        - 18 or more pedestrians during each of any two hours, or
        - 15 or more pedestrians during each of any three hours.
- Links between pedestrian generators and attractors
- Safety considerations, such as stopping sight distance, illumination levels, and proximity to intersection conflict areas.
    - Consistent with Section 2.7 of the FDOT Plans Preparation Manual, Vol. 1.
    - Crosswalk illumination must be provided.
    - A refuge island or raised median should be considered if the roadway has more than 12,000 ADT or if the crossing distance exceeds 60’ feet.
    - Bus stop location should be considered.
- Concepts of the proposed location must be shown with signing and markings.
- Crash history and nature of pedestrian-vehicle conflicts.
- Transit stop activity data.
- For Multi-use Trail Crossings:

    - The volume criteria are not applicable if the trail is located on each side of the roadway.
    - If the trail is on one side of the roadway, 50% of the volume threshold must be met
- Minimum Location Criteria:
    - The roadway must have at least 2,000 Average Daily Traffic
    - There must be a minimum of 300' to the nearest alternative crossing
    - Spacing between adjacent intersections must be less than 660'.
    - The proposed location must be outside the influence area of adjacent signalized intersections.

Additional information is provided on the TEM regarding design features and criteria for the use of hybrid beacons, supplemental beacons, in-roadway lighting, as well as signing and marking. The usage and type of these features to include are based on context, demand, and features of the roadway.

APPENDIX B

Study Area Concept Plans



LEGEND

POWER POLE	PROPOSED SIGN	COMM/ELEC BOX	DRAINAGE PIPE	BOARDWALK
HEADWALL	FIRE HYDRANT	LIGHT POLE	W(B) WATER LINE	12' ASPHALT SHARED USE PATH
MANHOLE/INLET	PULL BOX	WATER VALVE	OE OVERHEAD UTILITY	GRASS BUFFER STRIP (2' TYP.)
EXISTING SIGN	DRAINAGE INLET	APPARENT ROW	TRUNCATED DOMES	EXISTING SIDEWALK

PROJECT CORRIDOR DESIGN PLANS

THOMPSON CREEK TRAIL
BICYCLE/PEDESTRIAN FEASIBILITY STUDY
CITY OF ORMOND BEACH, FLORIDA

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

Kimley»Horn
3660 Maguire Boulevard, Suite 200
Orlando, Florida 32803

SECTION 1
DIVISION AVE TO MATCHLINE A

SHEET NO.
1

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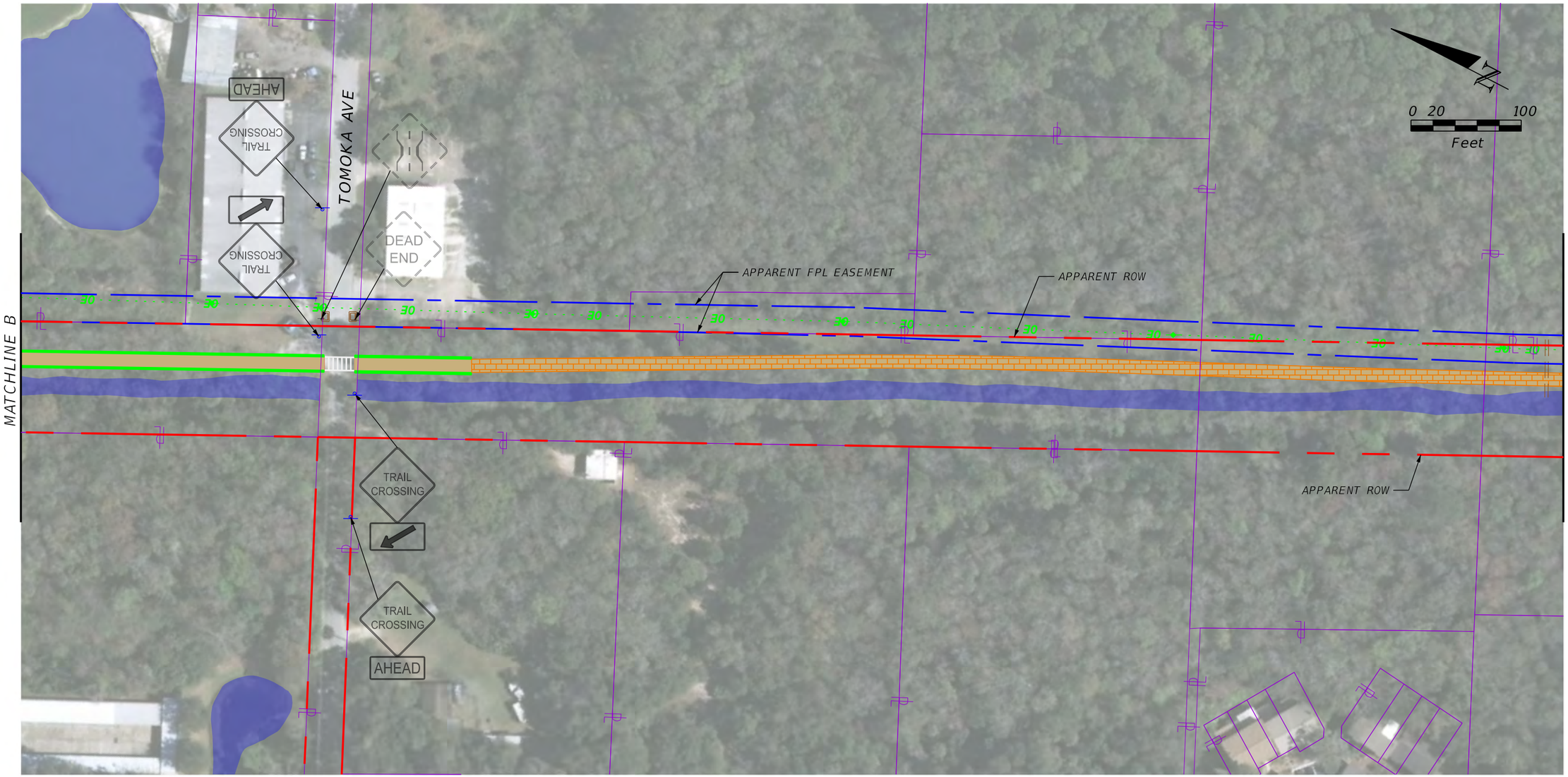

LEGEND

POWER POLE	PROPOSED SIGN	COMM/ELEC BOX	DRAINAGE PIPE	BOARDWALK
HEADWALL	FIRE HYDRANT	LIGHT POLE	W(B) - - - WATER LINE	12' ASPHALT SHARED USE PATH
MANHOLE/INLET	PULL BOX	WATER VALVE	OE - - - OVERHEAD UTILITY	GRASS BUFFER STRIP (2' TYP.)
EXISTING SIGN	DRAINAGE INLET	APPARENT ROW	TRUNCATED DOMES	EXISTING SIDEWALK

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SECTION 2
MATCHLINE A TO MATCHLINE B

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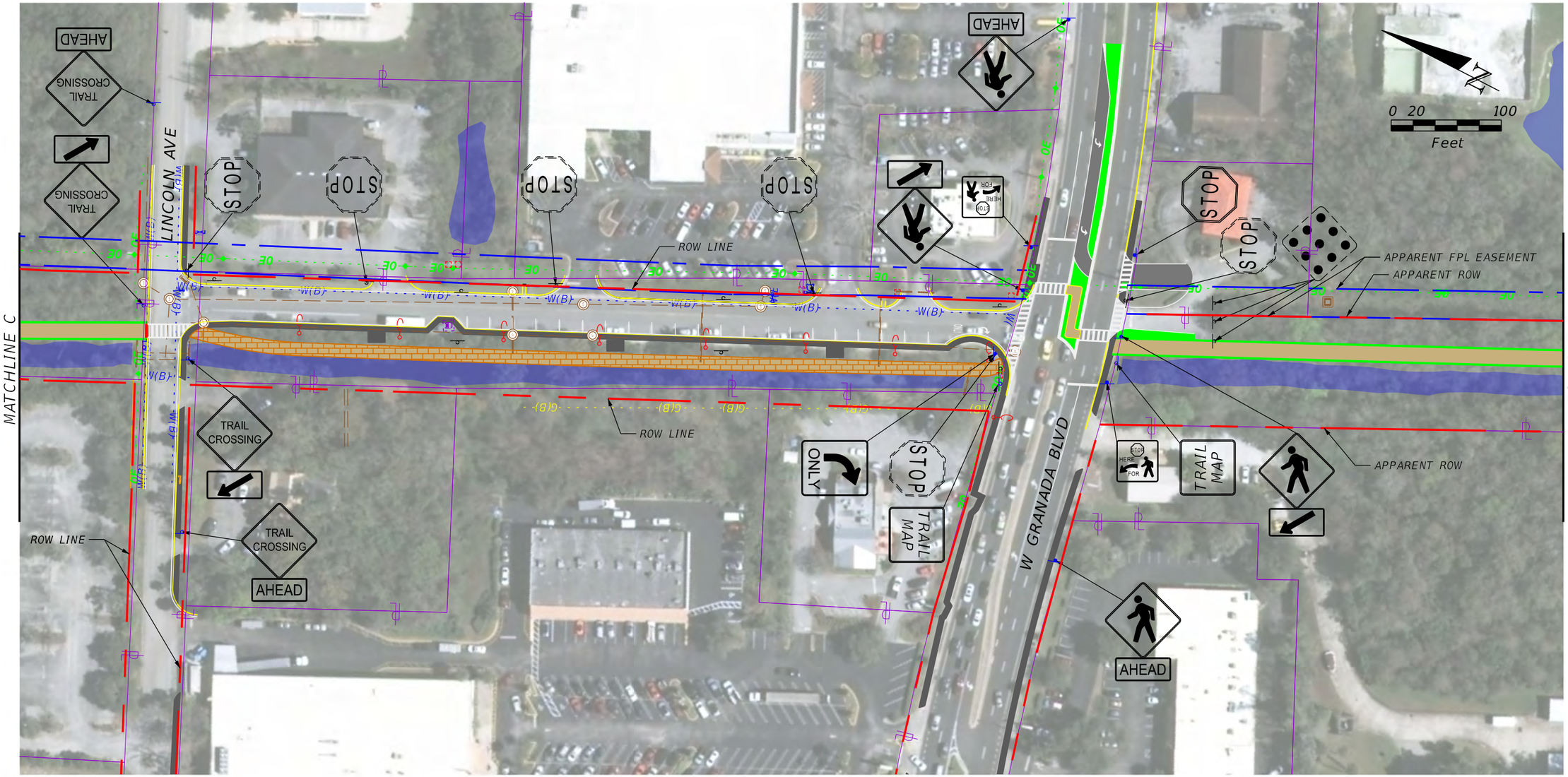

NOTE: SURVEY SHOWN IS APPROXIMATE

LEGEND

POWER POLE	PROPOSED SIGN	COMM/ELEC BOX	DRAINAGE PIPE	BOARDWALK
HEADWALL	FIRE HYDRANT	LIGHT POLE	W(B) WATER LINE	12' ASPHALT SHARED USE PATH
MANHOLE/INLET	PULL BOX	WATER VALVE	OE OVERHEAD UTILITY	GRASS BUFFER STRIP (2' TYP.)
EXISTING SIGN	DRAINAGE INLET	APPARENT ROW	TRUNCATED DOMES	EXISTING SIDEWALK

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SECTION 3
MATCHLINE B TO MATCHLINE C

SHEET NO. 3

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MATCHLINE D

MATCHLINE C

0 20 100
Feet

APPARENT FPL EASEMENT

APPARENT FPL EASEMENT

ROW LINE

APPARENT ROW

ROW LINE

APPARENT ROW

LEGEND

POWER POLE	PROPOSED SIGN	COMM/ELEC BOX	DRAINAGE PIPE		BOARDWALK
HEADWALL	FIRE HYDRANT	LIGHT POLE	W(B) WATER LINE		12' ASPHALT SHARED USE PATH
MANHOLE/INLET	PULL BOX	WATER VALVE	OE OVERHEAD UTILITY		GRASS BUFFER STRIP (2' TYP.)
EXISTING SIGN	DRAINAGE INLET	APPARENT ROW	TRUNCATED DOMES		EXISTING SIDEWALK

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SECTION 4
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SHEET NO.
4

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LEGEND

POWER POLE	PROPOSED SIGN	COMM/ELEC BOX	DRAINAGE PIPE	BOARDWALK
HEADWALL	FIRE HYDRANT	LIGHT POLE	W(B) - - -	WATER LINE	12' ASPHALT SHARED USE PATH
MANHOLE/INLET	PULL BOX	WATER VALVE	OE - - -	OVERHEAD UTILITY	GRASS BUFFER STRIP (2' TYP.)
EXISTING SIGN	DRAINAGE INLET	APPARENT ROW	TRUNCATED DOMES	EXISTING SIDEWALK

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SECTION 5
MATCHLINE D TO WILMETTE AVE

SHEET NO. 5

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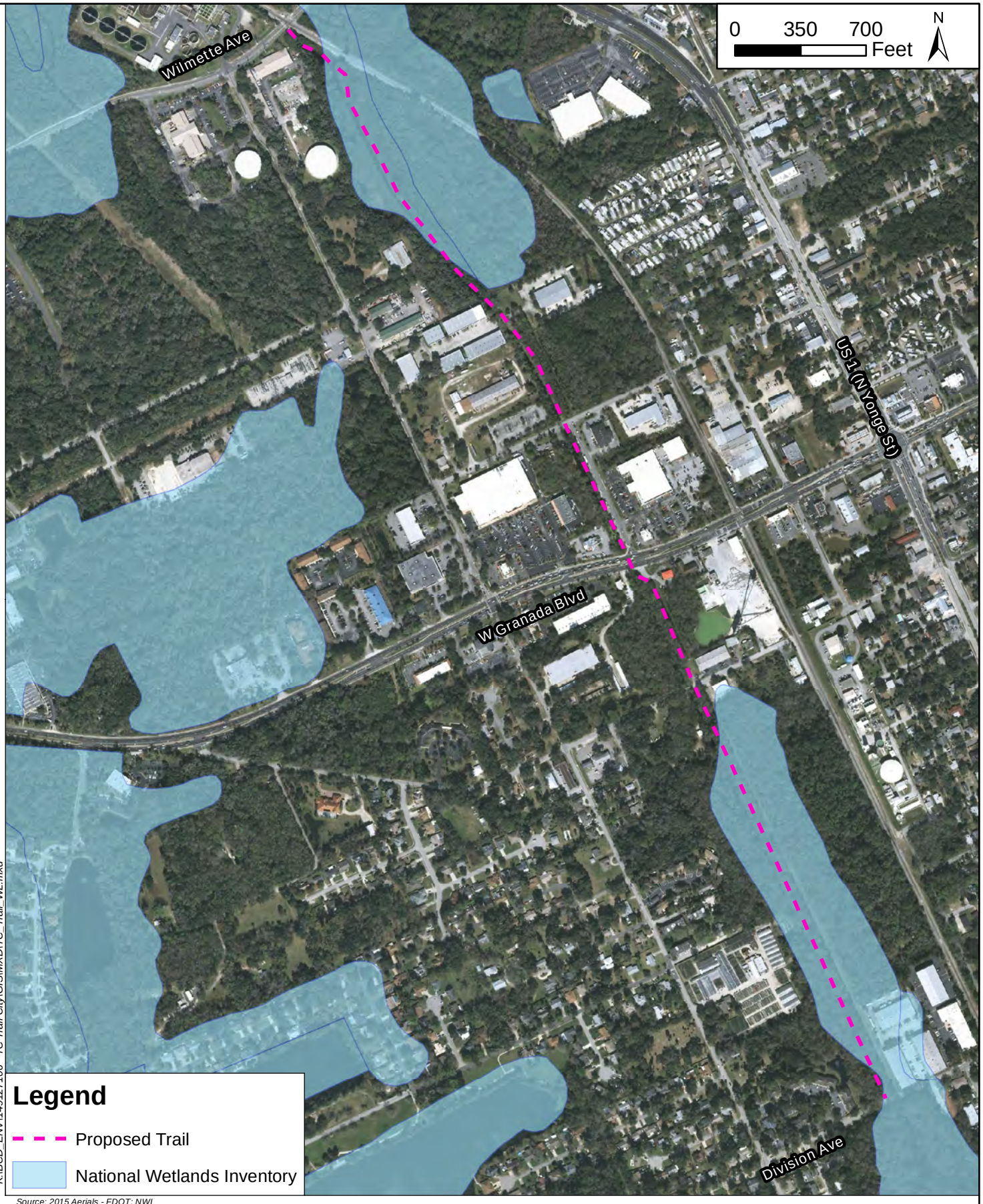
APPENDIX C

Right of Way Information


GRAND
AVE
EXT.
100' R/W
80'-31252
75'-31252
75'-31252
85'-31252
85'-31252
80'-31252
80'-31252
80'-31252
80'-31292
80'/90'-31262 DEF.
85'/95'-31262 DEF.
FP&L EASEMENT
LINCOLN
AVE
SELDEN AVE
STERTHAUS DR.
ORMOND SUB
(C-38908)
TO HOLLYHILL
E-27896
BIC-HAND INC. E#34
J.B. STERHAUS EST E#32
W.L. STERHAUS E#33
DUGGAN E#31
L.W. GRABKE E#30
BENNETT E#29
ROMINE E#28
131 I 4
131 I 8
131 I 12
131 I 14
6
6½
7
7½
8
8½
9
9½
530'
536'
536'
400'
320'
460'
505'
471
670'±
290'±
230'
250'
250'
200'
200'
260'
259
300
216
94'
65'
26'
33'
44'

APPENDIX D

Environmental Map



K:\BCD_ENV\149127106 - TC Trail City\GIS\MXD\TC_Trail_WL.mxd

Source: 2015 Aerials - FDOT; NWI

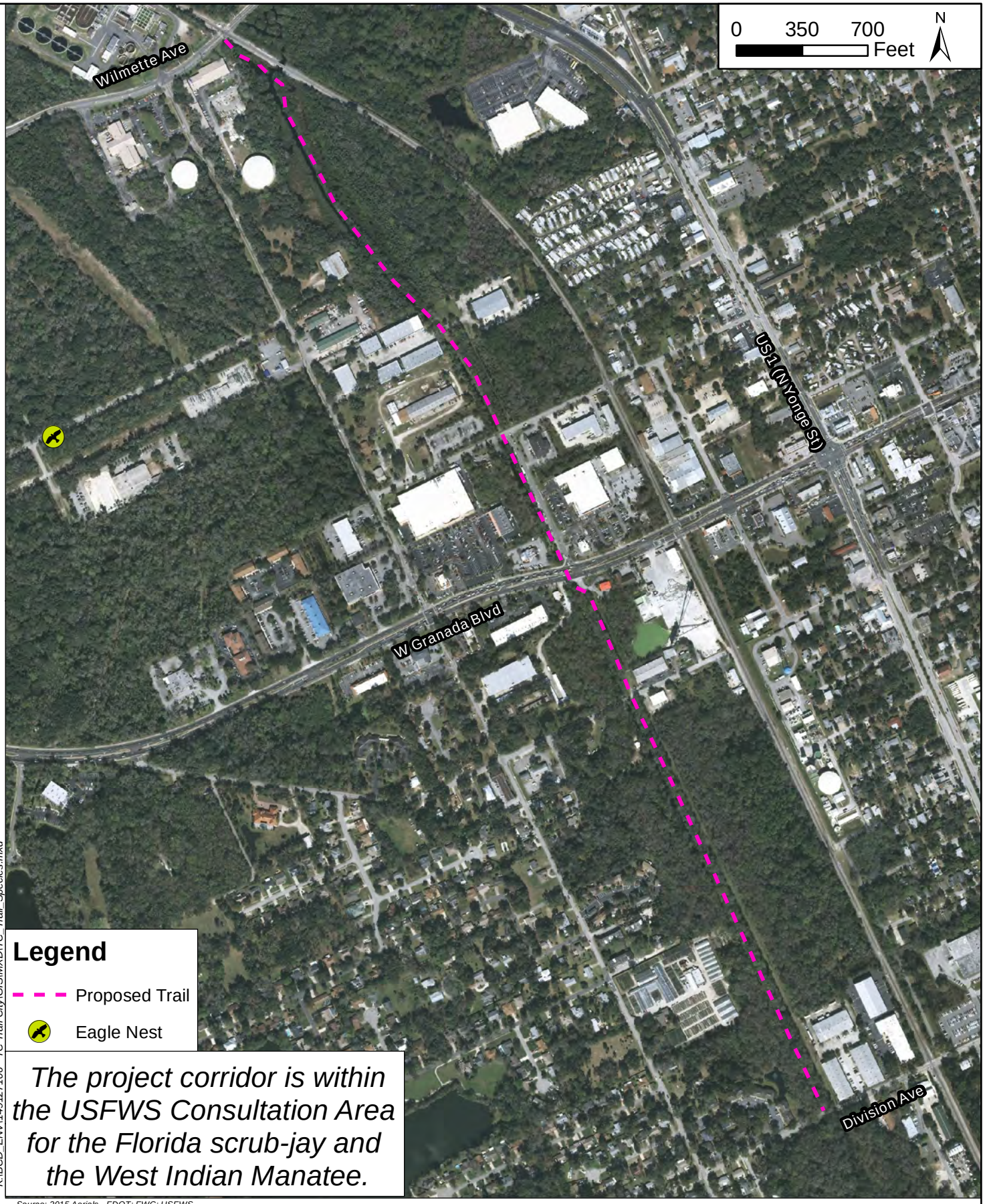
Kimley»Horn

1690 S Congress Ave #100, Delray Beach, FL 33445
Phone (561) 330-2345 Fax (561) 863-8175
www.kimley-horn.com

National Wetlands Inventory Map

Thompson Creek Trail
Volusia County, Florida

1 inch = 700 feet	PROJECT NUMBER: 149127106	SEPTEMBER 2016	FIGURE 1



K:\BCD_ENV\149127106 - TC Trail City\GIS\MXD\TC_Trail_Species.mxd

Source: 2015 Aerials - FDOT; FWC; USFWS

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Listed Species Map

Thompson Creek Trail
Volusia County, Florida

1 inch = 700 feet	PROJECT NUMBER: 149127106	SEPTEMBER 2016	FIGURE 2