

# Bicycle/Pedestrian Feasibility Study

City of Port Orange  
Halifax Drive Riverwalk Shared Use Path



## FINAL REPORT

Prepared By:

RS&H, Inc.

Prepared For:

River to Sea TPO



June 9, 2015

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## **INTRODUCTION**

This study is provided at the request of the River to Sea Transportation Planning Organization (R2CTPO, formerly VTPO, and formerly the Volusia Metropolitan Planning Organization). The City of Port Orange plans to close Halifax Drive to vehicular traffic and repurpose it into a non-motorized shared use path. This path will be located within the existing Halifax Drive right-of-way, or in city-owned land adjacent to the Halifax River.

## **EXECUTIVE SUMMARY**

Construction of a 12-foot shared use path in this corridor is feasible. No right-of way will need to be purchased in order to accommodate the path. Few utilities are anticipated to require adjustment, and a short run of the fiber optic located near the existing pond may need to be relocated due to the construction of the proposed gravity wall. No wetland impacts are expected, and minimal impacts to threatened and endangered species are anticipated. Some modifications will need to be made to the pond at the southern end of the project, near Dunlawton Avenue.

## **PROJECT PURPOSE AND SCOPE**

The purpose of this study is to determine the feasibility of providing a 12-foot wide shared use path along Halifax Drive from Dunlawton Avenue to Ocean Avenue. The path will provide users access to the Halifax riverfront and the future Riverwalk Park. A parking lot serving the path will be constructed in conjunction with the Riverwalk Park. The path may connect to the East Coast Greenway Trail and will connect to the City of Port Orange sidewalk network, and it may include historical or educational signage.

In the existing condition, there are no sidewalks or trails for walking or biking along the river. Those who walk or ride a bike must share the roadway with motor vehicles. Providing a non-motorized shared use path along Halifax Drive will improve safety for local residents walking or biking in the community.

A cost estimate has been prepared as part of this study, for the R2CTPO's budgeting and planning purposes. A field review was conducted during the study for the purposes of data collection, concept development, corridor evaluation and cost estimation.

The graphics within this report include notes, diagrams and callouts identifying the apparent right-of-way, existing utilities, location of proposed shared use path, and street names. Considerations include conformance to the requirements of the Americans with Disabilities Act (ADA), and appropriate signage and pavement markings along the facility at roadway and/or driveway crossings.

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

Tim Burman – City of Port Orange

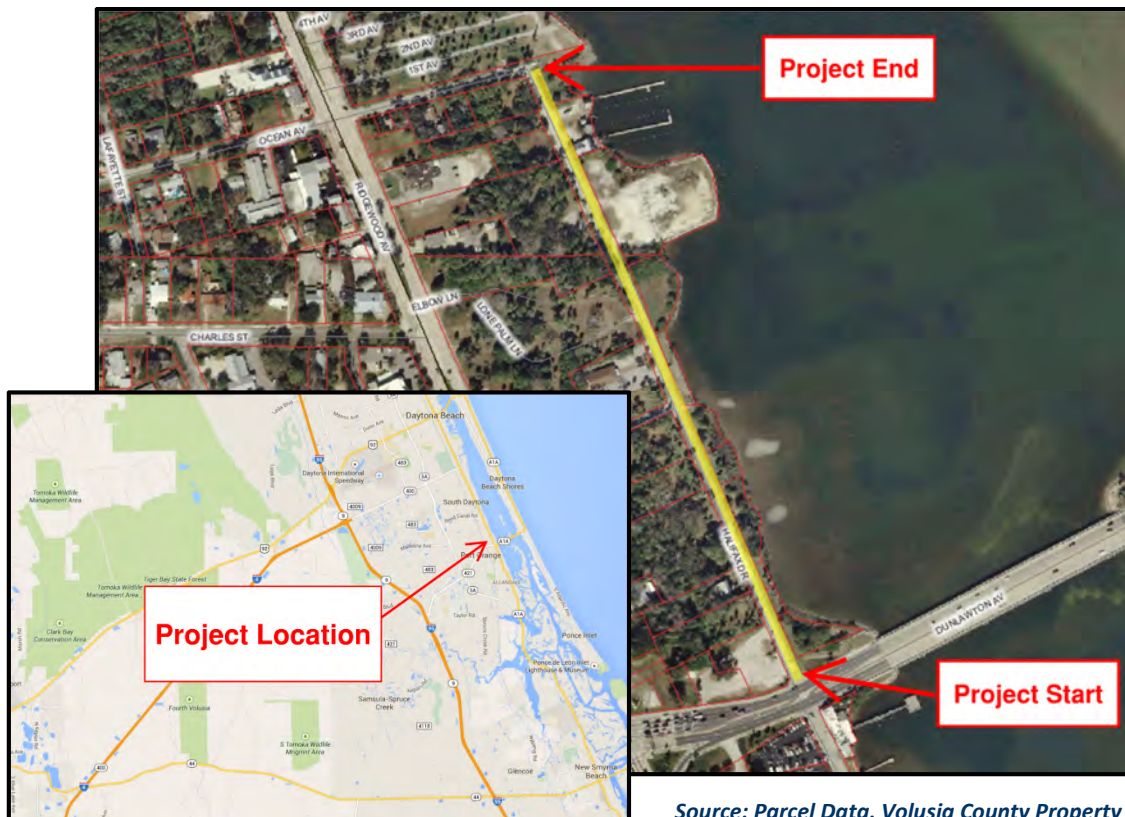
Penelope Cruz –Port Orange Town Center CRA

Margaret Momburger – City of Port Orange

Stephan Harris – R2CTPO

Amir Asgarinik – FDOT

**Figure 1 – Project Location Map**



Source: Parcel Data, Volusia County Property Appraiser

Source: Google Maps

## PHYSICAL INVENTORY AND ASSESSMENT OF RIGHT-OF-WAY

### GENERAL DESCRIPTION

The project corridor is located within the City of Port Orange, Florida. The proposed trail is approximately 1,850 linear feet (0.35 miles) in length, located along existing Halifax Drive from Dunlawton Avenue to Ocean Avenue. There are no existing sidewalks within the corridor.

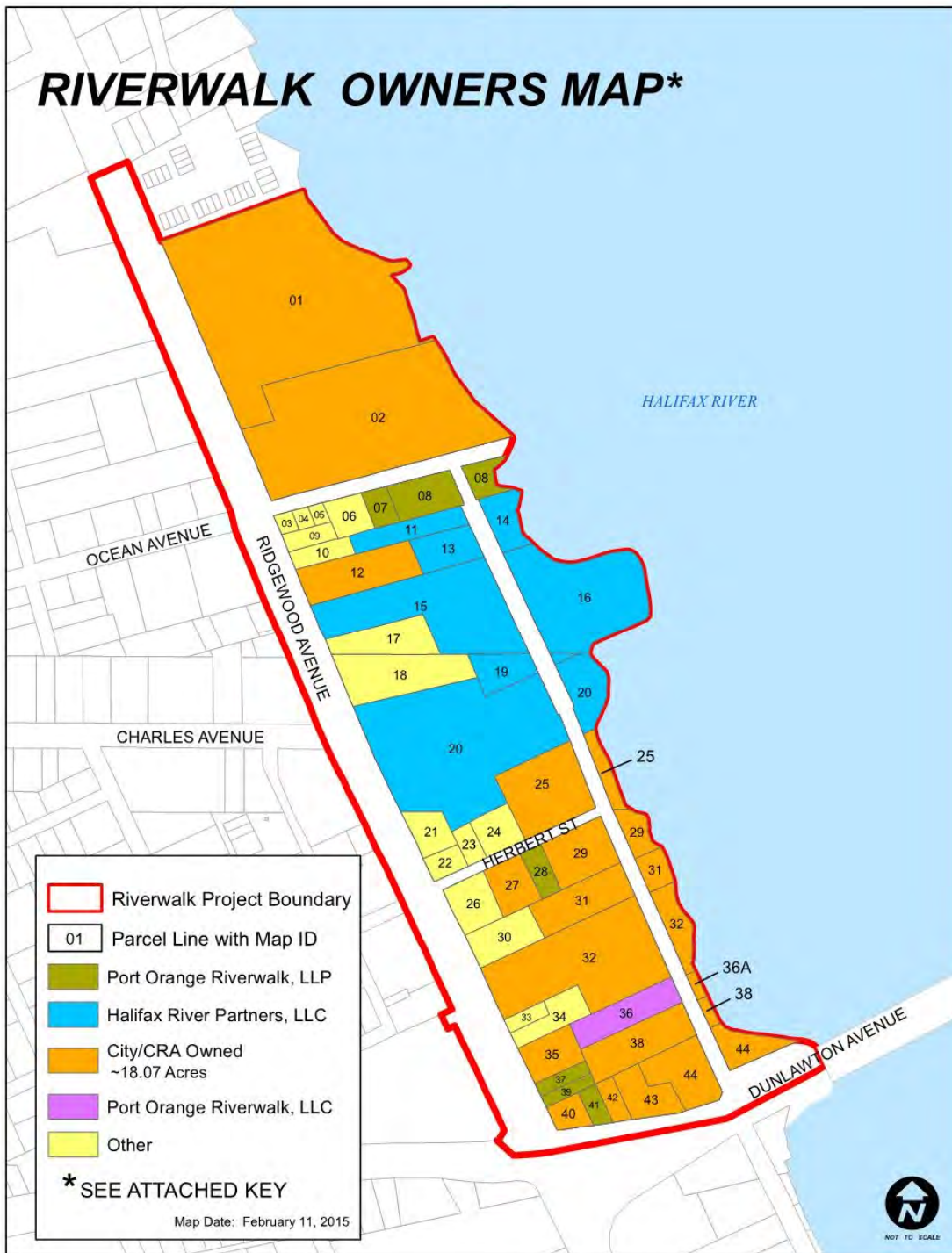
The City of Port Orange and the Port Orange Town Center CRA own the parcels adjacent to Halifax Drive at the southern end of the project corridor. The northern end of the corridor will be adjacent to the future Riverwalk development. Ocean Avenue will be closed to regular vehicular traffic with removable bollards. Vehicular access to Parcel 630311020031 (the parcel colored pink in Figure 3) is required to be maintained.

The parking lot serving the shared use path will be either at the northwest corner of the intersection of Halifax Drive and Dunlawton Avenue or at the Riverwalk Park (north of the project corridor). The crosswalk across Halifax Drive at Dunlawton Avenue is in poor condition and will require milling and resurfacing and restriping (Figure 2).

**Figure 2 – Condition of Existing Crosswalk**



**Figure 3 – Property Ownership along Halifax Drive**





Vehicular and pedestrian access to the Adult Center Annex (Figure 4) will need to be provided from Herbert Street. Herbert Street will be closed to regular vehicular traffic from the Adult Center Annex to the intersection with Halifax Drive using removable bollards.

**Figure 4 – Adult Center Annex**



A field review was conducted by RS&H staff on January 21, 2015. During this review, existing land uses were noted, roadway crossings were assessed, underground and overhead utilities were inventoried, stormwater drainage features were identified, distance and offset measurements of various elements were conducted, and numerous photographs were taken.

The field review started from the southern end of the project where Halifax Drive intersects Dunlawton Avenue. There is an existing pond at the northeast corner of the intersection (Figure 5). Gravity wall and handrail will be needed at the back of the path in order to minimize impacts to the existing pond. Refer to the Drainage and Permitting section of this report.

**Figure 5 – Pond near the intersection of Halifax Drive and Dunlawton Avenue**



## **RIGHT-OF-WAY**

Halifax Drive is a city street located in the City of Port Orange, Florida for which the City has maintenance responsibilities. Parcel lines obtained through the Volusia County Geographic



Information Services (GIS), were used to assess the apparent right-of-way width. Table 1 summarizes the apparent right-of-way information derived from the GIS parcel lines; the apparent right-of-way width is also reflected on the plan sheets in Appendix A.

**Table 1 - Existing Apparent Right-of-Way**

Street	Location	Approximate Linear Distance	Apparent R/W Width
Halifax Drive	Dunlawton Avenue to 250 ft. north of Herbert Street	1150 ft. (0.22 mi.)	40 ft.
Halifax Drive	250 ft. north of Herbert Street to Ocean Avenue	700 ft. (0.13 mi.)	50 ft.
	<b>TOTAL DISTANCE</b>	<b>1,850 ft. (0.35 mi.)</b>	

*Source: Volusia County Geographical Information Services Parcel Lines*

## UTILITIES

A utilities assessment was made during the field visit. Overhead power lines are located along the corridor on the west side of the entire project corridor, generally 10 feet back from the edge of pavement. There is also a pole that houses an osprey nest. There do not appear to be any utilities connected to the pole.

There are four fire hydrants located along either side of the corridor; three along the west side and one on the east side near Dunlawton Avenue. The hydrants on the west side will not impact the proposed improvements. The hydrant near Dunlawton Avenue will need to be relocated in order to accommodate the path.

There are six water valves and a force main valve on either side of the project corridor. The tops may require adjusting in order to be flush with the shared use path.

There are six sanitary sewer manholes along the center of Halifax Drive and two telephone manholes on the east side of the project corridor near Dunlawton

**Figure 6 – Fiber optic pull box near Dunlawton Avenue**



Avenue. The tops may require adjusting in order to be flush with the shared use path. Manhole tops shall be either fully outside the shared use path pavement, or fully within the pavement.

On the east side of the project corridor there are two fiber optic cable pull boxes. They will require relocation in order to accommodate the path. The City of Port Orange will be installing fiber optic along Halifax Drive in 2016 to serve the Riverwalk Park. Plans are currently under design and it is anticipated that when the 12-foot path is designed the plans will be completed for the fiber optic or it will be installed.

## ENVIRONMENTAL

A cursory inspection of the referenced site was conducted on January 21, 2015. The purpose of the inspection was to determine the approximate extent of any wetlands and identify other environmental issues that could impact the development of the property

The project area was historically maritime forest which graded to forested wetlands of predominantly mangrove at the edge of the Halifax River estuary. Currently the upland forest along the river has been cleared for the road construction and other development. Remnant trees, mainly live oak, cabbage palm, southern red cedar and slash pine, are located along the edge of the roadway as well as maintained areas of ruderal grasses and forbs.

The shoreline is stabilized with a vertical concrete bulkhead. In general, the bulkhead is in poor condition and has partially collapsed in some areas. The shared use path can be constructed without impacting the bulkhead. Waterward of the bulkhead the majority of the shoreline is characterized by forest of predominantly black mangrove with some red mangrove. Other sections are colonized by shrubs such as sea oxeye daisy and marsh elder with a groundcover of smooth cordgrass. The upland/wetland interface has been invaded by the undesirable exotic species Brazilian pepper in several areas.



No submerged aquatic vegetation was observed near the bulkhead.

Jurisdictional wetlands discovered at the project site are located along the waterward side of the bulkhead and in several small areas where the bulkhead has been breached. It does not appear that any wetland areas will be directly impacted by the project.

The study site is not located within any area designated as critical habitat by the U. S. Fish and Wildlife Service (USFWS), but is located within a USFWS-designated Consultation Area for the West Indian manatee. However, since no wetlands will be impacted by the proposed project, no impact to the species is anticipated. No endangered or threatened plant species listed by both USFWS and the Florida Department of Agriculture & Consumer Services (FDACS) are known to occur at the project site or were observed during the site inspection.

A search of the Florida Fish and Wildlife Conservation Commission's (FWC) Eagle Nest Locator web site revealed that no nests are located within 1500 feet of the project site. The nearest documented nest (VO075) is located southwest of the project site. No Bald Eagles or their nests were observed during the site inspection. The project as proposed is not anticipated to impact the species.

A search of the FWC's Wading Bird Colony Locator web site revealed that no nests are located in the vicinity of the project site. According to the USFWS website, the project site is not located within the Core Foraging Area of any Wood Stork rookeries. No Wood Stork or wading bird rookeries were observed during the site inspection.

A Florida Natural Inventory Biodiversity Matrix Query was conducted for this project, and is include in Appendix F. No documented listed species were recorded at the project site. Listed species likely to occur at the site include the West Indian manatee, Atlantic salt marsh snake, wood stork and state-listed wading birds. All of these species utilize aquatic and wetland habitats. Since wetlands are not to be impacted by this project, no impacts to these species are anticipated.

It appears that an occupied osprey nesting platform is located near the southern project boundary. A permit from the Florida Fish and Wildlife Conservation will be required to relocate the nest. The nest is located in a highly urbanized area, so the proposed construction is not anticipated to adversely affect the species. The relocation of the nest will need to occur in the

late summer to early fall time frame which is generally outside the normal nesting season for the osprey, which will be dictated by the permit.

Minimal impacts to listed species are anticipated. No nesting activity by listed species was discovered or is anticipated to occur at the project site. Searches of FWC's computer databases revealed no wading bird or Wood Stork rookeries or Bald Eagle nests in the immediate vicinity of the project site.

### **DRAINAGE**

Rainfall runoff generally sheet flows from west to east within the project area. The runoff either percolates into the sandy soil or sheet flows into the Halifax River.

As a best management practice, a shallow grass swale should be constructed on the east side of the shared use path to provide minimal treatment before runoff sheet flows into the river.

During the field assessment of the project corridor, the following existing drainage system features were noted:

- A dry retention stormwater pond in the northeast corner of the Dunlawton Avenue and Halifax Drive intersection that receives runoff from Dunlawton Avenue.
- Ditch bottom inlets on the east side of Halifax Drive at Herbert Street that are part of the Riverwalk Condominium & Yacht Club drainage system.
- A dry retention stormwater pond on the west side of Halifax Drive across

from the Riverwalk Marina & Riverboat that receives runoff from the Riverwalk Marina.

**Figure 8 – Osprey platform, fire hydrant and water valve near Dunlawton Avenue**



**Figure 9 – Pond and underdrain inspection boxes near the intersection of Halifax Drive and Dunlawton Avenue**



All of the existing drainage systems discharge to the Halifax River.

A review of FEMA's Flood Insurance Rate Maps for Volusia County showed that the study area is located entirely within Zone AE; the FIRM maps for the study area are included in Appendix C with the project limits noted in red. As shown on the maps, the entire project corridor is within a Special Flood Hazard Area (Zone AE); as such, floodplain storage compensation should be evaluated during the design phase.

## **PERMITTING**

St. Johns River Water Management District (SJRWMD) has issued the following two environmental resource permits for other projects that are adjacent to this project's limits: 1) Permit No. 22758-1 was issued to FDOT in 1987 for construction of the Dunlawton Avenue causeway and bridges at the southern end of this project, and; 2) Permit No. 105234-1 was issued to Halifax River Partners, LLC in 2006 for construction of the Riverwalk Condominium & Yacht Club in the northwestern portion of this project.

Riverwalk Marina, LLC applied to SJRWMD in 2012 under Permit No. 130722-1 for construction of the Riverwalk Marina & Riverboat in the northeastern portion of this project. SJRWMD transferred the permit application to FDEP. FDEP issued the permit in 2012 and the project is currently under construction.

As long as the permitted operation of the dry retention stormwater pond in the northeast corner of the Dunlawton Avenue and Halifax Drive intersection is not adversely impacted, this project will be exempt from obtaining an environmental resource permit from SJRWMD under Florida Administrative Code, Rule Chapter 62-330.051(10), construction of multi-use recreational paths. If the permitted operation of this pond is altered by construction of this project, then SJRWMD Permit No. 22758-1 will need to be modified.

The SJRWMD and U. S. Army Corps of Engineers (USACE) will regulate construction that impacts wetlands at the project site. Any unavoidable wetland impacts will more than likely require compensatory mitigation. No wetland impacts are expected to result from the proposed

project. Erosion control measures need to be employed during construction to prevent adverse impacts to the adjacent wetlands.

## **SOILS INFORMATION**

The proposed sidewalk route traverses through Canaveral Sand, which is a somewhat-poorly drained sandy soil. A soil survey map is included in Appendix D. This map was prepared through the Web Soil Survey (WSS) operated by the USDA Natural Resources Conservation Service (NRCS).

## **SHARED USE PATH CONCEPT PLAN**

The following sections describe the elements that make up the concept for this project. All proposed elements are depicted graphically in the Concept Plans (Appendix A) or the Typical Section (Appendix B).

### **Shared Use Path Plan**

- Construct a new 12-foot wide concrete or asphalt shared use path along Halifax Drive from Dunlawton Avenue to Ocean Avenue. The southernmost portion should be concrete as shown in the Concept Plan in Appendix A. The path will tie in to the existing sidewalk along the north side of Dunlawton Avenue and will be constructed east of the existing Halifax Drive roadway to the property at 3900 Halifax Drive. Gravity wall and handrail will be needed at the back of the path in order to minimize impacts to the existing pond.
- Sawcut and remove existing pavement north of the driveway serving 3900 Halifax Drive. North of the sawcut, the path will generally be constructed within the existing roadway.
- Construct a new vehicular access drive and sidewalk to the existing Adult Center Annex at the corner of Halifax Drive and Herbert St. Construct new circulation pavement within the existing parking lot. Mill and resurface and re-stripe the parking lot and add new circulation arrows.
- Install walklights along the shared use path at 100-foot intervals. The lights should match what is being installed as part of the Riverwalk Park Phase 1B project. During design, the



Engineer of Record shall coordinate with the City of Port Orange for the lighting specifications.

- Our recommended concept will require relocation of the osprey pole in order to maintain 5 feet of clearance from Halifax Drive. During our field investigation, we measured 11 feet of clearance between the existing edge of pavement and the pole. During design, the EOR may investigate the option of locating the shared use path adjacent to the road, with a reduced width, for this isolated location in order to avoid impacting the pole.

#### **Shared Use Path Typical Section**

- From Dunlawton Avenue to 3900 Halifax Drive: Construct a new 12-foot wide concrete or asphalt shared use path east of Halifax Drive. Construct a minimum 4-foot wide clear shoulder on the outside and maintain a minimum of 5 feet of clearance between the new shared use path and the existing asphalt roadway.
- From 3900 Halifax Drive to Ocean Avenue: Construct a new 12-foot wide concrete or asphalt shared use path within the existing limits of Halifax Drive. Construct a minimum 4-foot wide clear shoulder on both sides.

The alignment shown in this concept report and described above is considered to be the minimum allowable design, requiring no additional right-of-way and the least disturbance of existing drainage systems. The concept alignment and typical section that have been developed, and described above, are shown in Appendix A and Appendix B respectively.

## **FINANCIAL FEASIBILITY**

Tables 2 and 3 provide a preliminary cost estimate for the design and construction of the proposed shared use path. This cost estimate is to be considered an opinion of probable cost based solely on the results of this feasibility study. The item numbers and units of measure are based on the Florida Department of Transportation (FDOT) Basis of Estimates Manual. The unit prices are based on historical average costs for each pay item as provided by FDOT. Some unit prices may have been inflated due to the small nature of the project. The cost estimate does not include tree removal or permitting fees that may be associated with the final design phase. Based on the field review, no additional right-of-way will need to be purchased to accommodate

the proposed conceptual design. Two cost estimates were prepared; one for an asphalt section and one for a concrete section. The cost estimate for the construction of the proposed shared use path is \$395,538 for asphalt and \$521,254 for concrete.

To adjust for potential future increases in the project's cost estimate, an annual inflationary factor may be applied. The Florida Department of Transportation provides annual inflation factors for roadway construction costs which may be used as a guideline for this shared use path project. The cost estimate provided herein has been adjusted by the FDOT inflationary factors noted in Tables 2 and 3 to determine inflation-adjusted cost estimates for the Halifax Drive Riverwalk Shared Use Path project for the next three years. A listing of the FDOT approved inflation factors through 2035 is available in Appendix E. The inflation-adjusted cost estimates for 2016, 2017, and 2018 are \$406,218, \$416,502, and \$426,786, respectively for the asphalt section. The inflation-adjusted cost estimates for 2016, 2017, and 2018 are \$535,328, \$548,880, and \$562,433, respectively for the concrete section.

**Table 2- Quantities and Cost Estimate – Asphalt Option**

ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST - ASPHALT OPTION					
PAY ITEM NO.	ITEM DESCRIPTION	UNIT	BASE QTY	BASE UNIT COST	TOTAL COST
101-1	MOBILIZATION	LS	1	10%	\$ 24,940
102-1	MAINTENANCE OF TRAFFIC	LS	1	10%	\$ 15,786
104-10-3	SEDIMENT BARRIER	LF	4000	\$ 1.50	\$ 6,000
110-1-1	CLEARING AND GRUBBING	AC	2.50	\$ 8,000.00	\$ 20,000
120-1	REGULAR EXCAVATION	CY	300	\$ 10.00	\$ 3,000
160-4	STABILIZATION (TYPE B)	SY	3650	\$ 3.00	\$ 10,950
160-4*	STABILIZATION (TYPE B)	SY	350	\$ 3.00	\$ 1,050
285-704	OPTIONAL BASE GROUP 04	SY	2875	\$ 10.00	\$ 28,750
285-704*	OPTIONAL BASE GROUP 04	SY	290	\$ 10.00	\$ 2,900
327-70-1	MILLING (1")	SY	80	\$ 2.00	\$ 160
327-70-1*	MILLING (1")	SY	1660	\$ 2.00	\$ 3,320
334-1-12	SUPERPAVE TRAFFIC B	TN	305	\$ 90.00	\$ 27,450
334-1-12*	SUPERPAVE TRAFFIC B	TN	120	\$ 90.00	\$ 10,800
400-0-11	GRAVITY WALL	CY	30	\$ 500.00	\$ 15,000
425-5	ADJUST MANHOLE	EA	6	\$ 500.00	\$ 3,000
515-1-2	HANDRAIL, ALUMINUM	LF	70	\$ 30.00	\$ 2,100
519-78	BOLLARD	EA	6	\$ 1,000.00	\$ 6,000
522-1*	CONCRETE SIDEWALK, 4" THICK	SY	45	\$ 35.00	\$ 1,575
522-2	CONCRETE SIDEWALK, 6" THICK	SY	90	\$ 61.00	\$ 5,490
570-1-2	PERFORMANCE TURF, SOD	SY	3500	\$ 2.00	\$ 7,000
635-2-40	RELOCATE FIBER OPTIC PULL BOX	EA	2	\$ 350.00	\$ 700
700-1-11	SINGLE POST SIGN (FURNISH AND INSTALL)	EA	7	\$ 250.00	\$ 1,750
700-1-50	SINGLE POST SIGN (RELOCATE)	EA	7	\$ 100.00	\$ 700
700-1-60	SINGLE POST SIGN (REMOVE)	EA	6	\$ 10.00	\$ 60
700-2-50	MULTI POST SIGN (RELOCATE)	EA	1	\$ 100.00	\$ 100
710-11-111*	PAINTED PAVEMENT MARKINGS, STD, WHITE, 6"	LF	700	\$ 0.50	\$ 350
710-11-123	PAINTED PAVEMENT MARKINGS, STD, WHITE, 12"	LF	120	\$ 1.00	\$ 120
710-11-125	PAINTED PAVEMENT MARKINGS, STD, WHITE, 24"	LF	65	\$ 2.00	\$ 130
710-11-160*	PAINTED PAVEMENT MARKINGS, STD, WHITE, MESSAGE	EA	6	\$ 40.00	\$ 240
710-11-170*	PAINTED PAVEMENT MARKINGS, STD, WHITE, ARROW	EA	7	\$ 25.00	\$ 175
710-11-421*	PAINTED PAVEMENT MARKINGS, STD, BLUE, 6"	LF	260	\$ 0.50	\$ 130
715-1	LIGHTING CONDUCTOR	LF	2000	\$ 2.00	\$ 4,000
1080-15	ADJUST & MODIFY UTILITY FIXTURES (WATER VALVES)	EA	2	\$ 350.00	\$ 700
1644-8800	FIRE HYDRANT RELOCATE	EA	1	\$ 1,200.00	\$ 1,200
N/A	WALKLIGHT (FURNISH & INSTALL)	EA	21	\$ 4,000.00	\$ 84,000
N/A	HISTORICAL SIGNAGE	EA	1	\$ 500.00	\$ 500
N/A	RELOCATE OSPREY POLE	EA	1	\$ 4,000.00	\$ 4,000
				<b>SUBTOTAL</b>	<b>\$ 294,126</b>
N/A	CEI	LS	1	10%	\$ 29,413
N/A	ENGINEERING AND DESIGN	LS	1	\$ 65,000.00	\$ 65,000
N/A	SURVEY	LS	1	\$ 7,000.00	\$ 7,000
				<b>TOTAL</b>	<b>\$ 395,538</b>
	FDOT Inflation-Adjusted Estimate	Factor	PDC Multiplier	Estimate	
	Year 1 Inflation-adjusted Estimate (2016)	2.7%	1.027	\$ 406,218	
	Year 2 Inflation-adjusted Estimate (2017)	2.5%	1.053	\$ 416,502	
	Year 3 Inflation-adjusted Estimate (2018)	2.5%	1.079	\$ 426,786	

\* - For Adult Center Annex

**Table 3- Quantities and Cost Estimate – Concrete Option**

ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST - CONCRETE OPTION					
PAY ITEM NO.	ITEM DESCRIPTION	UNIT	BASE QTY	BASE UNIT COST	TOTAL COST
101-1	MOBILIZATION	LS	1	10%	\$ 34,461
102-1	MAINTENANCE OF TRAFFIC	LS	1	10%	\$ 25,342
104-10-3	SEDIMENT BARRIER	LF	4000	\$ 1.50	\$ 6,000
110-1-1	CLEARING AND GRUBBING	AC	2.50	\$ 8,000.00	\$ 20,000
120-1	REGULAR EXCAVATION	CY	300	\$ 10.00	\$ 3,000
160-4*	STABILIZATION (TYPE B)	SY	350	\$ 3.00	\$ 1,050
285-704*	OPTIONAL BASE GROUP 04	SY	290	\$ 10.00	\$ 2,900
327-70-1	MILLING (1")	SY	80	\$ 2.00	\$ 160
327-70-1*	MILLING (1")	SY	1660	\$ 2.00	\$ 3,320
334-1-12	SUPERPAVE TRAFFIC B	TN	5	\$ 90.00	\$ 450
334-1-12*	SUPERPAVE TRAFFIC B	TN	120	\$ 90.00	\$ 10,800
400-0-11	GRAVITY WALL	CY	30	\$ 500.00	\$ 15,000
425-5	ADJUST MANHOLE	EA	6	\$ 500.00	\$ 3,000
515-1-2	HANDRAIL, ALUMINUM	LF	70	\$ 30.00	\$ 2,100
519-78	BOLLARD	EA	6	\$ 1,000.00	\$ 6,000
522-1*	CONCRETE SIDEWALK, 4" THICK	SY	45	\$ 35.00	\$ 1,575
522-2	CONCRETE SIDEWALK, 6" THICK	SY	2750	\$ 61.00	\$ 167,750
570-1-2	PERFORMANCE TURF, SOD	SY	3500	\$ 2.00	\$ 7,000
635-2-40	RELOCATE FIBER OPTIC PULL BOX	EA	2	\$ 350.00	\$ 700
700-1-11	SINGLE POST SIGN (FURNISH AND INSTALL)	EA	7	\$ 250.00	\$ 1,750
700-1-50	SINGLE POST SIGN (RELOCATE)	EA	7	\$ 100.00	\$ 700
700-1-60	SINGLE POST SIGN (REMOVE)	EA	6	\$ 10.00	\$ 60
700-2-50	MULTI POST SIGN (RELOCATE)	EA	1	\$ 100.00	\$ 100
710-11-111*	PAINTED PAVEMENT MARKINGS, STD, WHITE, 6"	LF	700	\$ 0.50	\$ 350
710-11-123	PAINTED PAVEMENT MARKINGS, STD, WHITE, 12"	LF	120	\$ 1.00	\$ 120
710-11-125	PAINTED PAVEMENT MARKINGS, STD, WHITE, 24"	LF	65	\$ 2.00	\$ 130
710-11-160*	PAINTED PAVEMENT MARKINGS, STD, WHITE, MESSAGE	EA	6	\$ 40.00	\$ 240
710-11-170*	PAINTED PAVEMENT MARKINGS, STD, WHITE, ARROW	EA	7	\$ 25.00	\$ 175
710-11-421*	PAINTED PAVEMENT MARKINGS, STD, BLUE, 6"	LF	260	\$ 0.50	\$ 130
715-1	LIGHTING CONDUCTOR	LF	2000	\$ 2.00	\$ 4,000
1080-15	ADJUST & MODIFY UTILITY FIXTURES (WATER VALVES)	EA	1	\$ 350.00	\$ 350
1644-8800	FIRE HYDRANT RELOCATE	EA	1	\$ 1,200.00	\$ 1,200
N/A	WALKLIGHT (FURNISH & INSTALL)	EA	21	\$ 4,000.00	\$ 84,000
N/A	HISTORICAL SIGNAGE	EA	1	\$ 500.00	\$ 500
N/A	RELOCATE OSPREY POLE	EA	1	\$ 4,000.00	\$ 4,000
				<b>SUBTOTAL</b>	<b>\$ 408,413</b>
N/A	CEI	LS	1	10%	\$ 40,841
N/A	ENGINEERING AND DESIGN	LS	1	\$ 65,000.00	\$ 65,000
N/A	SURVEY	LS	1	\$ 7,000.00	\$ 7,000
				<b>TOTAL</b>	<b>\$ 521,254</b>
	FDOT Inflation-Adjusted Estimate	Factor	PDC Multiplier	Estimate	
	Year 1 Inflation-adjusted Estimate (2016)	2.7%	1.027	\$ 535,328	
	Year 2 Inflation-adjusted Estimate (2017)	2.5%	1.053	\$ 548,880	
	Year 3 Inflation-adjusted Estimate (2018)	2.5%	1.079	\$ 562,433	

\* - For Adult Center Annex

## CONCLUSION

The purpose of this study was to evaluate the feasibility of constructing a 12-foot wide shared use path along the waterfront at Halifax Drive from Dunlawton Avenue to Ocean Avenue. No right-of way will need to be purchased in order to accommodate the path. Minimal impacts to existing utilities are anticipated. No wetland impacts are expected, and minimal impacts to threatened and endangered species are anticipated. A gravity wall with handrail will need to be constructed next to the existing pond at the southern end of the project, near Dunlawton Avenue, in order to avoid impacts to the pond. As a result of this study, it has been determined that constructing this shared use path is feasible.

## DATA COLLECTION REFERENCES

Data collection sources used in the report included the following:

- City of Port Orange <http://www.port-orange.org/>
- National Resources Conservation Service, Web Soil Survey, <http://websoilsurvey.nrcs.usda.gov/app/>
- River to Sea Transportation Planning Organization, <http://www.r2ctpo.org/>
- Volusia County Property Appraiser's Land Mapping System
- Volusia County Geographic Information Services (GIS)
- Volusia County Flood Map Viewer, [http://maps1.vcgov.org/FloodMaps/FIRM\\_PDFs/Map\\_Index.pdf](http://maps1.vcgov.org/FloodMaps/FIRM_PDFs/Map_Index.pdf)
- FEMA Map Service Center
- FDOT 2015 Basis of Estimates Manual
- 2012 FDOT Volusia County Aerials, <http://www.dot.state.fl.us/surveyingandmapping/>
- 2010 ADA Standards for Accessible Design
- Google Maps, <https://maps.google.com/>

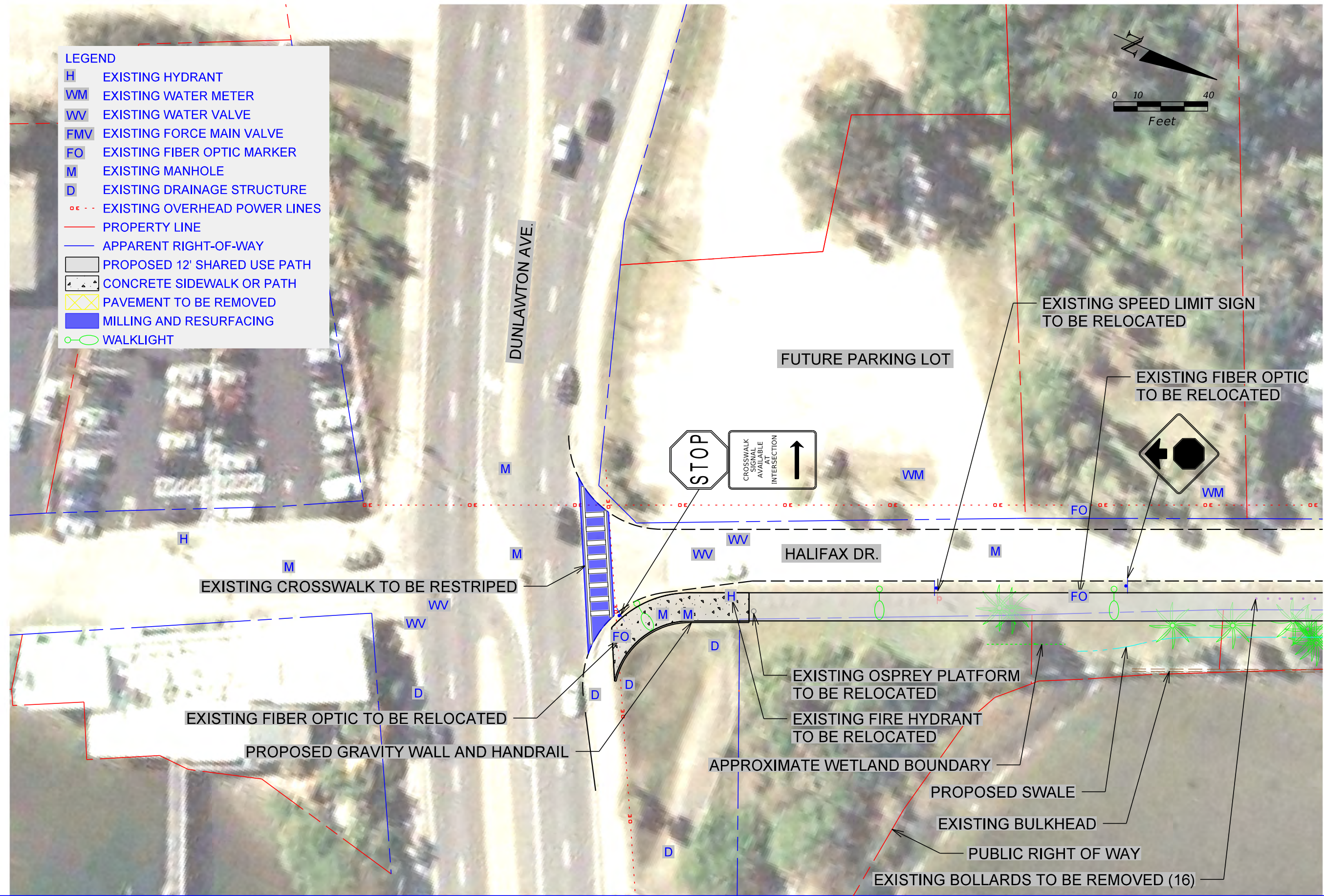
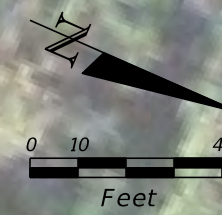
# APPENDIX A


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## *Concept Plan*



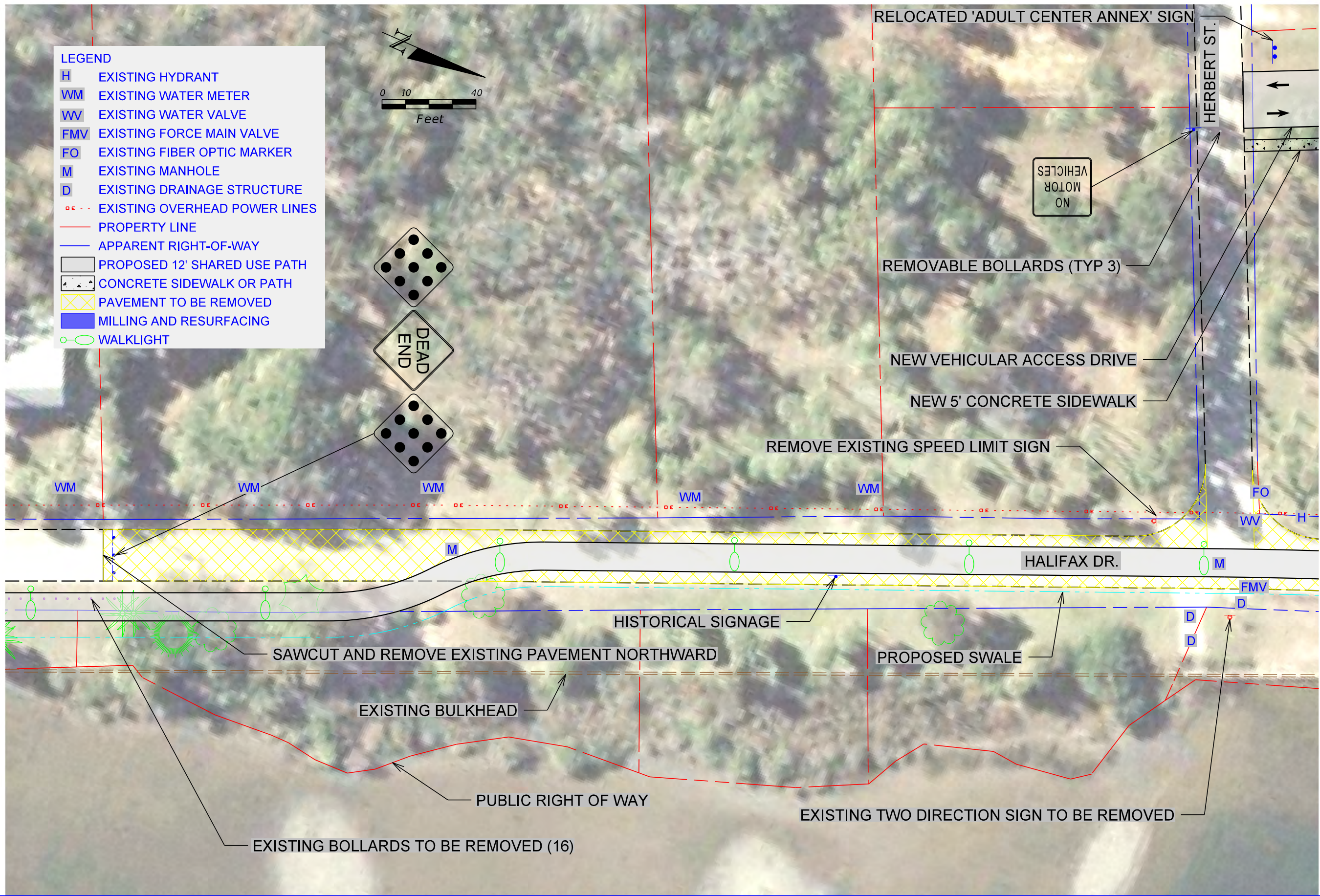
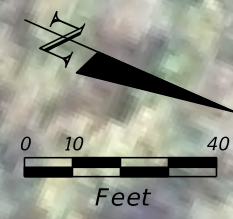
- LEGEND
- H EXISTING HYDRANT
  - WM EXISTING WATER METER
  - WV EXISTING WATER VALVE
  - FMV EXISTING FORCE MAIN VALVE
  - FO EXISTING FIBER OPTIC MARKER
  - M EXISTING MANHOLE
  - D EXISTING DRAINAGE STRUCTURE
  - EXISTING OVERHEAD POWER LINES
  - PROPERTY LINE
  - APPARENT RIGHT-OF-WAY
  - PROPOSED 12' SHARED USE PATH
  - CONCRETE SIDEWALK OR PATH
  - PAVEMENT TO BE REMOVED
  - MILLING AND RESURFACING
  - WALKLIGHT




REVISIONS				<div> 301 E Pine St, Suite 300 Orlando, Florida 32801 407-893-5800 FL Cert. No. EB0005620</div>	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			RIVERWALK SHARED USE PATH CONCEPT PLAN	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		EX-1
						VOLUSIA			

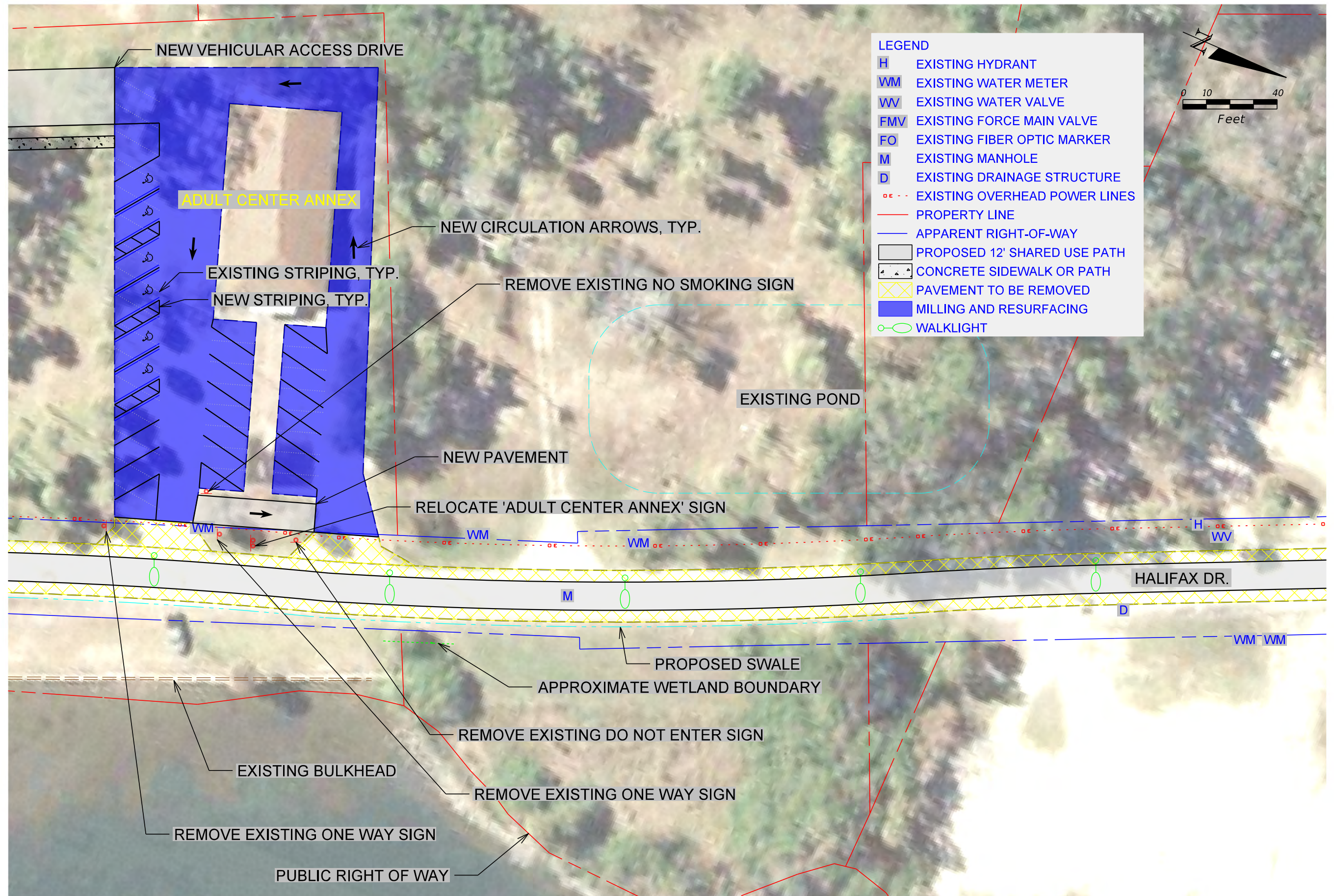



- LEGEND
- H EXISTING HYDRANT
  - WM EXISTING WATER METER
  - WV EXISTING WATER VALVE
  - FMV EXISTING FORCE MAIN VALVE
  - FO EXISTING FIBER OPTIC MARKER
  - M EXISTING MANHOLE
  - D EXISTING DRAINAGE STRUCTURE
  - EXISTING OVERHEAD POWER LINES
  - PROPERTY LINE
  - APPARENT RIGHT-OF-WAY
  - PROPOSED 12' SHARED USE PATH
  - CONCRETE SIDEWALK OR PATH
  - PAVEMENT TO BE REMOVED
  - MILLING AND RESURFACING
  - WALKLIGHT



REVISIONS				<div><p>301 E Pine St, Suite 300 Orlando, Florida 32801 407-893-5800 FL Cert. No. EB0005620</p></div>	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			RIVERWALK SHARED USE PATH CONCEPT PLAN	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		EX-2
						VOLUSIA			



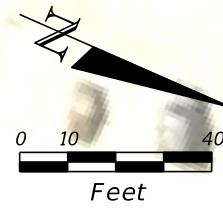


REVISIONS				<div> 301 E Pine St, Suite 300 Orlando, Florida 32801 407-893-5800 FL Cert. No. EB0005620</div>	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			RIVERWALK SHARED USE PATH CONCEPT PLAN	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		EX-3
						VOLUSIA			



# LEGEND

- H EXISTING HYDRANT
- WM EXISTING WATER METER
- WV EXISTING WATER VALVE
- FMV EXISTING FORCE MAIN VALVE
- FO EXISTING FIBER OPTIC MARKER
- M EXISTING MANHOLE
- D EXISTING DRAINAGE STRUCTURE
- EXISTING OVERHEAD POWER LINES
- PROPERTY LINE
- APPARENT RIGHT-OF-WAY
- PROPOSED 12' SHARED USE PATH
- CONCRETE SIDEWALK OR PATH
- PAVEMENT TO BE REMOVED
- MILLING AND RESURFACING
- WALKLIGHT



NO  
MOTOR  
VEHICLES

REMOVABLE BOLLARDS (TYP 3)

OCEAN AVE.

TIE SHARED USE PATH IN TO RIVERWALK PARK

REMOVE EXISTING SPEED LIMIT SIGN

REMOVABLE BOLLARDS (TYP 3)

HALIFAX DR.

EXISTING OBJECT MARKER  
EXISTING ONE DIRECTION SIGN  
EXISTING OBJECT MARKER  
EXISTING LEFT CHEVRON  
TO REMAIN

EXISTING RIGHT CHEVRON TO REMAIN  
EXISTING MULTIPOST SIGN TO REMAIN

EXISTING LIFT STATION TO RE

REVISIONS				<div><div>RS&amp;H</div><div>301 E Pine St, Suite 300 Orlando, Florida 32801 407-893-5800 FL Cert. No. EB0005620</div></div>	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			RIVERWALK SHARED USE PATH CONCEPT PLAN	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		EX-4
						VOLUSIA			




# APPENDIX B

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## *Typical Section*



OPTIONAL BASE GROUP 4 WITH  
TYPE SP STRUCTURAL COURSE (TRAFFIC B) (2")

<b>REVISIONS</b>				 301 E Pine St, Suite 300 Orlando, Florida 32801 407-893-5800 FL Cert. No. EB0005620	<b>STATE OF FLORIDA</b> <b>DEPARTMENT OF TRANSPORTATION</b>			<i>RIVERWALK SHARED USE PATH</i>  <i>TYPICAL SECTION</i>	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		B-1
						VOLUSIA			



# APPENDIX C

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## *FEMA FIRM Maps*



NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

**Coastal Base Flood Elevations** shown on this map apply only landward of 0.0' North American Vertical Datum of 1988. Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 'Flood Protection Measures' of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Florida State Plane East zone (FIPS zone 0901). The **horizontal datum** was the North American Datum of 1983 (NAD 83). GRS1980 Spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at <http://www.ngs.noaa.gov/> or contact the National Geodetic Survey at the following address:

NGS Information Services  
NOAA, NINGS12  
National Geodetic Survey  
SSMC-3, #6202  
1315 East-West Highway  
Silver Spring, Maryland, 20910-3282  
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at <http://www.ngs.noaa.gov/>.

**Base Map** information shown on this FIRM was provided in digital format by the Volusia County, Florida GIS Department at a scale of 1:12,000 or larger from photography dated 2006 or later.

Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations** and **floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unreviewed streams may differ from what is shown on previous maps.

**Corporate limits** shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at <http://mssc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.



LEGEND

**SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD**

The 1% annual chance flood (100-year flood), also known as the "base flood," is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

**ZONE A**  
No Base Flood Elevations determined.

**ZONE AE**  
Base Flood Elevations determined.

**ZONE AH**  
Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

**ZONE AO**  
Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

**ZONE AR**  
Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

**ZONE A99**  
Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

**ZONE V**  
Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

**ZONE VE**  
Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

**FLOODWAY AREAS IN ZONE AE**

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

**OTHER FLOOD AREAS**

**ZONE X**  
Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

**OTHER AREAS**

**ZONE X**  
Areas determined to be outside the 0.2% annual chance floodplain.

**ZONE D**  
Areas in which flood hazards are undetermined, but possible.

**COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS**

**OTHERWISE PROTECTED AREAS (OPAs)**

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

**Floodplain Boundary**

**Floodway Boundary**

**Zone D Boundary**

**CBRS and OPA boundary**

**Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.**

**Limit of Moderate Wave Action**

**Base Flood Elevation line and value; elevation in feet\***

**Base Flood Elevation value where uniform within zone; elevation in feet\***

**\*Referenced to the North American Vertical Datum of 1988**

**Cross section line**

**Transect line**

**Culvert**

**Bridge**

**Footbridge**

**Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere**

**1000-meter Universal Transverse Mercator grid ticks, zone 17**

**5000-foot grid values: Florida State Plane coordinate system, East zone (FIPS Zone 0901), Lambert Conformal Conic**

**Bench mark (see explanation in Notes to Users section of this FIRM panel)**

**River Mile**

**MAP REPOSITORIES**

Refer to Map Repositories list on Map Index

**EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP**

**APRIL 15, 2002**

**EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL**

February 19, 2014 - to update corporate limits, to reflect updated topographic information, to add and change Base Flood Elevations, to add floodways, to add and change Special Flood Hazard Areas, to incorporate previously issued Letters of Map Revision, and to change zone designations.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

**MAP SCALE 1" = 500'**

**250 0 500 1000 FEET**

**150 0 150 300 METERS**

**NATIONAL FLOOD INSURANCE PROGRAM**

**PANEL 0388H**

**FIRM**

**FLOOD INSURANCE RATE MAP**

**VOLUSIA COUNTY, FLORIDA AND INCORPORATED AREAS**

**PANEL 388 OF 930**  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

**CONTAINS:**

COMMUNITY	NUMBER	PANEL	SUFFIX
DAYTONA BEACH SHORES	125100	0388	H
CITY OF PORT ORANGE	120313	0388	H
CITY OF SOUTH DAYTONA	120314	0388	H
VOLUSIA COUNTY	125155	0388	H

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

**MAP NUMBER 12127C0388H**

**MAP REVISED FEBRUARY 19, 2014**

**Federal Emergency Management Agency**



# APPENDIX D

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## *Soil Survey Map*



Soil Map—Volusia County, Florida  
(Halifax Dr)



## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

### Water Features



Streams and Canals

### Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

### Background



Aerial Photography

## MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Volusia County, Florida  
Survey Area Data: Version 12, Sep 18, 2014

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

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

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

## Map Unit Legend

Volusia County, Florida (FL127)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
12	Canaveral sand, 0 to 5 percent slopes	6.4	96.0%
99	Water	0.3	4.0%
<b>Totals for Area of Interest</b>		<b>6.6</b>	<b>100.0%</b>



# APPENDIX E

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## *FDOT 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>.



# APPENDIX F

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## *Biodiversity Matrix Query Results*



FLORIDA  
Natural Areas  
INVENTORY

1018 Thomasville Road  
Suite 200-C  
Tallahassee, FL 32303  
850-224-8207  
850-681-9364 fax  
www.fnai.org

## Florida Natural Areas Inventory

### Biodiversity Matrix Query Results

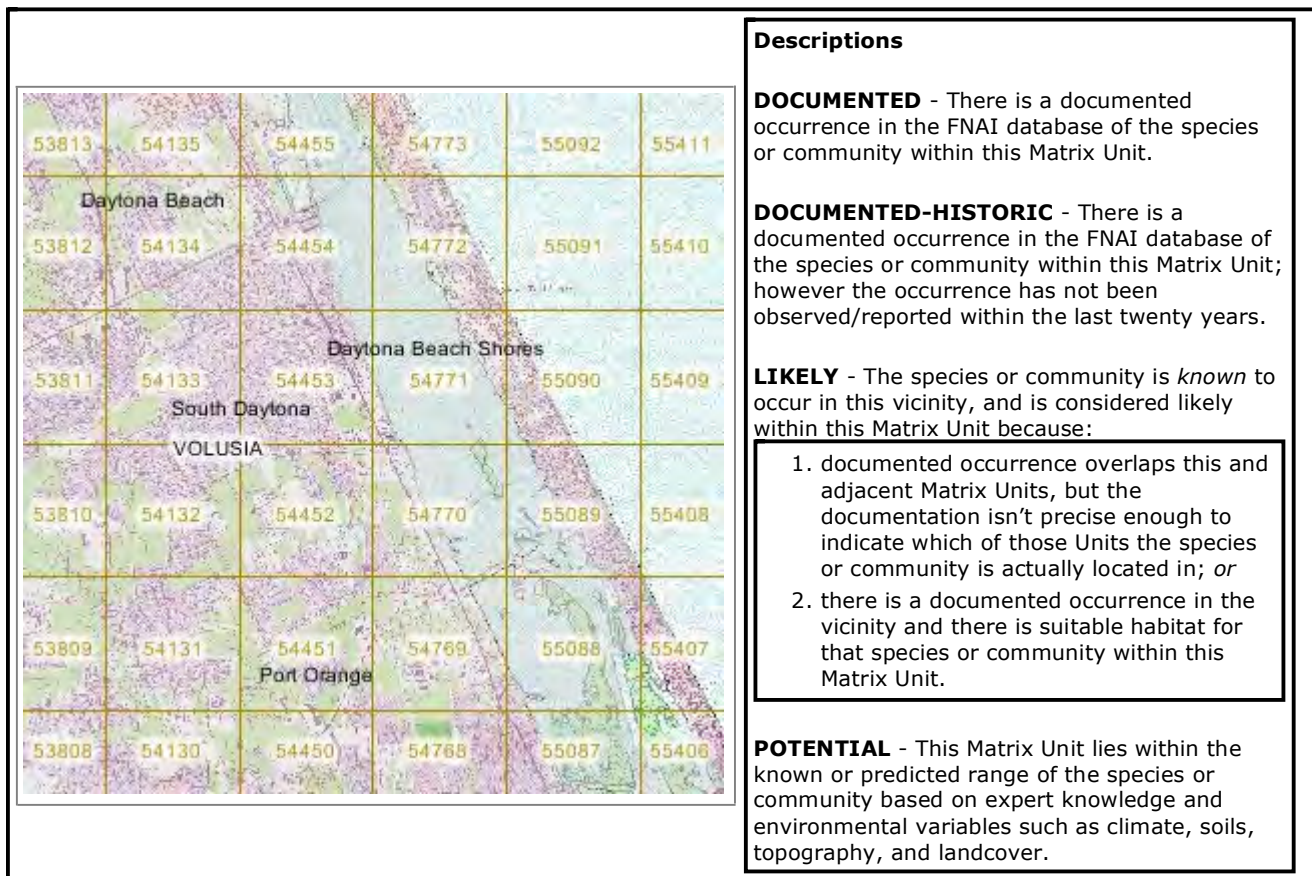
#### UNOFFICIAL REPORT

Created 1/30/2015

(Contact the FNAI Data Services Coordinator at 850.224.8207 for information on an official Standard Data Report)

NOTE: The Biodiversity Matrix includes only rare species and natural communities tracked by FNAI.

#### Report for 8 Matrix Units: 54451 , 54452 , 54453 , 54454 , 54769 , 54770 , 54771 , 54772



#### Matrix Unit ID: 54451

0 **Documented** Elements Found

0 **Documented-Historic** Elements Found

1 **Likely** Element Found

Scientific and Common Names	Global Rank	State Rank	Federal Status	State Listing
	G4	S2	LE	FE

[Mycteria americana](#)  
Wood Stork

**Matrix Unit ID: 54452**0 **Documented** Elements Found0 **Documented-Historic** Elements Found2 **Likely** Elements Found

Scientific and Common Names	Global Rank	State Rank	Federal Status	State Listing
<i>Mesic flatwoods</i>	G4	S4	N	N
<a href="#">Mycteria americana</a> Wood Stork	G4	S2	LE	FE

**Matrix Unit ID: 54453**0 **Documented** Elements Found0 **Documented-Historic** Elements Found1 **Likely** Element Found

Scientific and Common Names	Global Rank	State Rank	Federal Status	State Listing
<a href="#">Mycteria americana</a> Wood Stork	G4	S2	LE	FE

**Matrix Unit ID: 54454**0 **Documented** Elements Found0 **Documented-Historic** Elements Found2 **Likely** Elements Found

Scientific and Common Names	Global Rank	State Rank	Federal Status	State Listing
<a href="#">Mycteria americana</a> Wood Stork	G4	S2	LE	FE
<a href="#">Trichechus manatus</a> Manatee	G2	S2	LE	FE

**Matrix Unit ID: 54769**0 **Documented** Elements Found0 **Documented-Historic** Elements Found5 **Likely** Elements Found

Scientific and Common Names	Global Rank	State Rank	Federal Status	State Listing
<a href="#">Haematopus palliatus</a> American Oystercatcher	G5	S2	N	SSC
<a href="#">Mycteria americana</a> Wood Stork	G4	S2	LE	FE
	G4T1Q	S1	LT	FT

<a href="#"><i>Nerodia clarkii taeniata</i></a> Atlantic Salt Marsh Snake				
<a href="#"><i>Thalasseus maximus</i></a> Royal Tern	G5	S3	N	N
<a href="#"><i>Trichechus manatus</i></a> Manatee	G2	S2	LE	FE

**Matrix Unit ID: 54770**0 **Documented** Elements Found1 **Documented-Historic** Element Found

Scientific and Common Names	Global Rank	State Rank	Federal Status	State Listing
<i>Acrostichum aureum</i> Golden Leather Fern	G5	S3	N	LT

5 **Likely** Elements Found

Scientific and Common Names	Global Rank	State Rank	Federal Status	State Listing
<a href="#"><i>Haematopus palliatus</i></a> American Oystercatcher	G5	S2	N	SSC
<a href="#"><i>Mycteria americana</i></a> Wood Stork	G4	S2	LE	FE
<a href="#"><i>Nerodia clarkii taeniata</i></a> Atlantic Salt Marsh Snake	G4T1Q	S1	LT	FT
<a href="#"><i>Thalasseus maximus</i></a> Royal Tern	G5	S3	N	N
<a href="#"><i>Trichechus manatus</i></a> Manatee	G2	S2	LE	FE

**Matrix Unit ID: 54771**0 **Documented** Elements Found0 **Documented-Historic** Elements Found5 **Likely** Elements Found

Scientific and Common Names	Global Rank	State Rank	Federal Status	State Listing
<a href="#"><i>Caretta caretta</i></a> Loggerhead	G3	S3	LE, LT	FT
<a href="#"><i>Chelonia mydas</i></a> Green Turtle	G3	S2	LE	FE
<a href="#"><i>Lepidochelys kempii</i></a> Kemp's Ridley	G1	S1	LE	FE
<a href="#"><i>Nerodia clarkii taeniata</i></a> Atlantic Salt Marsh Snake	G4T1Q	S1	LT	FT
<a href="#"><i>Trichechus manatus</i></a> Manatee	G2	S2	LE	FE

**Matrix Unit ID: 54772**0 **Documented** Elements Found0 **Documented-Historic** Elements Found



4 **Likely** Elements Found

Scientific and Common Names	Global Rank	State Rank	Federal Status	State Listing
<a href="#"><i>Caretta caretta</i></a> Loggerhead	G3	S3	LE, LT	FT
<a href="#"><i>Chelonia mydas</i></a> Green Turtle	G3	S2	LE	FE
<a href="#"><i>Lepidochelys kempii</i></a> Kemp's Ridley	G1	S1	LE	FE
<a href="#"><i>Trichechus manatus</i></a> Manatee	G2	S2	LE	FE

**Matrix Unit IDs: 54451 , 54452 , 54453 , 54454 , 54769 , 54770 , 54771 , 54772**26 **Potential** Elements Common to Any of the 8 Matrix Units

Scientific and Common Names	Global Rank	State Rank	Federal Status	State Listing
<i>Acipenser oxyrinchus oxyrinchus</i> Atlantic Sturgeon	G3T3	S1	PS:LE,LT	SSC
<i>Ardea alba</i> Great Egret	G5	S4	N	N
<a href="#"><i>Calopogon multiflorus</i></a> Many-flowered Grass-pink	G2G3	S2S3	N	LE
<a href="#"><i>Centrosema arenicola</i></a> Sand Butterfly Pea	G2Q	S2	N	LE
<a href="#"><i>Charadrius melodus</i></a> Piping Plover	G3	S2	LT	FT
<i>Conradina grandiflora</i> Large-flowered Rosemary	G3	S3	N	LT
<a href="#"><i>Deeringothamnus rugelii</i></a> Rugel's Pawpaw	G1	S1	LE	LE
<a href="#"><i>Dermochelys coriacea</i></a> Leatherback	G2	S2	LE	FE
<a href="#"><i>Drymarchon couperi</i></a> Eastern Indigo Snake	G3	S3	LT	FT
<a href="#"><i>Eretmochelys imbricata</i></a> Hawksbill	G3	S1	LE	FE
<a href="#"><i>Eudocimus albus</i></a> White Ibis	G5	S4	N	SSC
<a href="#"><i>Glandularia maritima</i></a> Coastal Vervain	G3	S3	N	LE
<a href="#"><i>Gopherus polyphemus</i></a> Gopher Tortoise	G3	S3	C	ST
<a href="#"><i>Heterodon simus</i></a> Southern Hognose Snake	G2	S2	N	N
<i>Lechea cernua</i> Nodding Pinweed	G3	S3	N	LT
<a href="#"><i>Lupinus aridorum</i></a> Scrub Lupine	G1	S1	LE	LE
<i>Matelea floridana</i> Florida Spiny-pod	G2	S2	N	LE
<a href="#"><i>Nemastylis floridana</i></a> Celestial Lily	G2	S2	N	LE
<a href="#"><i>Neofiber alleni</i></a> Round-tailed Muskrat	G3	S3	N	N
<a href="#"><i>Nerodia clarkii taeniata</i></a> Atlantic Salt Marsh Snake	G4T1Q	S1	LT	FT
	G3	S3	N	LT

<i>Nolina atopocarpa</i> Florida Beargrass				
<a href="#"><i>Pelecanus occidentalis</i></a> Brown Pelican	G4	S3	N	SSC
<a href="#"><i>Pituophis melanoleucus mugitus</i></a> Florida Pine Snake	G4T3	S3	N	SSC
<i>Setophaga discolor paludicola</i> Florida Prairie Warbler	G5T3	S3	N	N
<a href="#"><i>Trichechus manatus</i></a> Manatee	G2	S2	LE	FE
<a href="#"><i>Ursus americanus floridanus</i></a> Florida Black Bear	G5T2	S2	N	ST*

**Disclaimer**

The data maintained by the Florida Natural Areas Inventory represent the single most comprehensive source of information available on the locations of rare species and other significant ecological resources statewide. However, the data are not always based on comprehensive or site-specific field surveys. Therefore, this information should not be regarded as a final statement on the biological resources of the site being considered, nor should it be substituted for on-site surveys. FNAI shall not be held liable for the accuracy and completeness of these data, or opinions or conclusions drawn from these data. FNAI is not inviting reliance on these data. Inventory data are designed for the purposes of conservation planning and scientific research and are not intended for use as the primary criteria for regulatory decisions.

**Unofficial Report**

These results are considered unofficial. FNAI offers a [Standard Data Request](#) option for those needing certifiable data.