US 17 Green Cove Springs Corridor Study

US 17 (Orange Avenue) from SR 16 to Orion Road

UPWP Task No. 5.12

June 2022

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Jacksonville, Florida 32209
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PROFESSIONAL ENGINEER CERTIFICATE

I hereby certify that I am a registered professional engineer in the State of Florida practicing with Kimley-Horn and Associates, Inc., a Florida corporation authorized to operate as an engineering business, Certificate of Authorization 00000696, by the State of Florida Department of Professional Regulation, Board of Engineers, and that I have prepared or approved the evaluation, findings, opinions, conclusions or technical advice hereby reported for:

Project: US 17 Green Cove Springs Corridor Study

Location: US 17 (Orange Avenue) from SR 16 to Orion Road

County: Clay

Project Manager: Clark Letter

I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering as applied through professional judgment and experience.

Signature: Terrel Shaw Digitally signed by Terrel Shaw Date: 2022.10.31 16:42:06 -04'00'

Name: Terrel Shaw

P.E. No: 50096

Firm: Kimley-Horn and Associates, Inc.

Date: July 30, 2022

Executive Summary

The North Florida Transportation Planning Organization (TPO) conducted this corridor study to evaluate the approximately 2.4 miles of US 17 from SR 16 (Leonard C Taylor Parkway) to Orion Road. The study developed and evaluated alternatives which will help to improve the users' experience of US 17 within the city limits through traffic operations, hardscape and streetscape improvements. The project's purpose is to:

- Create a sense of community
- Enhance safety
- Improve traffic operations
- Meet future transportation demand

The preferred alternative consists of the following:

- Widen and reconstruct sidewalks to 6 feet
- Add landscaping adjacent to sidewalks to create shade
- Construct landscaping in the median between Leonard C Taylor Parkway and Oak Street
- Construct a median with landscaping between Oak Street and Governors Creek Bridge
- Implement access management strategies to improve safety
- Construct landscaping in the median between Governors Creek Bridge and Orion Street
- Add a traffic separator on the Governors Creek Bridge
- Replace strain poles with mast arms at all signals
- Implement traffic signal controllers and timing
- Mill and resurface pavement within the limits of the project
- Add entry features at city limits
- Make intersection improvements to enhance safety and improve operations
- Widen Center Street and Gum Street to provide golf cart crossings
- Add colored asphalt at all pedestrian crossings within intersection

The project is anticipated to cost $17 million. The project will realize traffic operations, safety and redevelopment improvements worth $136 million of potential benefits, resulting in an 8:1 benefit/cost ratio.

Recommended next steps include:

- Coordinate with FDOT and the North Florida TPO on the potential funding for the project including adding to a planned resurfacing project along US 17. Any right-of-way acquisition to implement the project will be performed by FDOT.
- Maintenance agreements will be needed for the decorative asphalt, pavers and landscaping.
- Establish a funding mechanism to ensure the City's maintenance responsibilities are sustainable.

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1.0 Project Summary

This section describes the project, the purpose and need, and related projects.

1.1 Project Description

The North Florida Transportation Planning Organization (TPO) is conducting this corridor study to evaluate the approximately 2.4 miles of US 17 from SR 16 (Leonard C Taylor Parkway) to Orion Road as shown in **Figure 1**. The study is intended to develop and evaluate alternatives which will help to improve the users' experience of US 17 within the City limits through hardscape and streetscape improvements. This document evaluates the existing conditions of the corridor, known environmental features in the surrounding area, and the demographics of the community to develop alternatives that will help to address identified needs throughout the corridor.

1.2 Purpose and Need

The project's purpose is to:

- Create a sense of community
- Enhance safety
- Improve traffic operations
- Meet future transportation demand

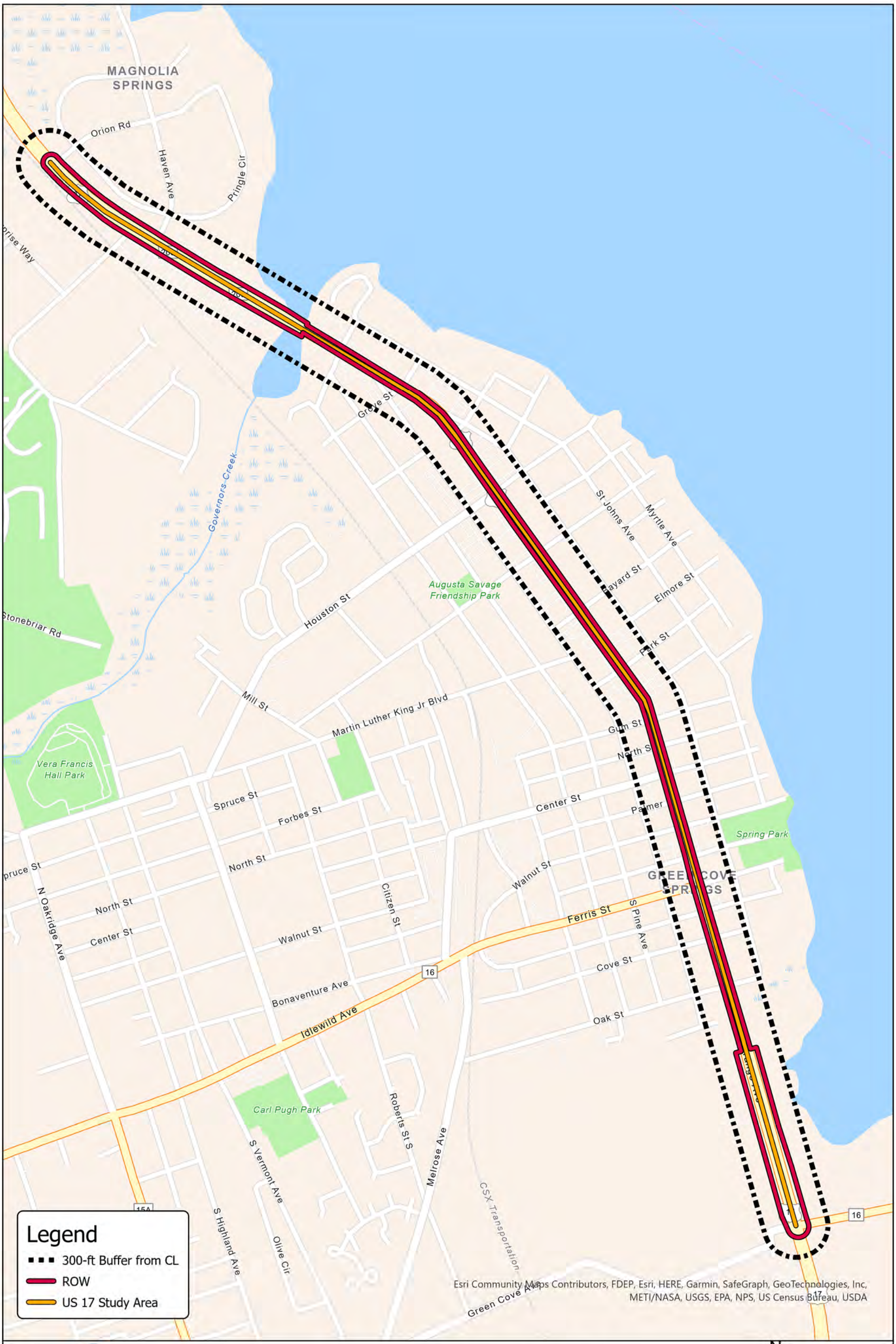

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Figure 1 - US 17 Corridor Study Project Location

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1.3 Consistency with Other Plans

Proposed improvements should be consistent with local and regional plans guiding future development of the land and roadway network in the study area. The following planning documents were reviewed to determine the current guidance:

Clay County Comprehensive Plan

- CON Policy 1.1.1: To reduce pollution generated from automobiles, the County shall continue to enforce the provisions of the tree protection and landscaping ordinance requiring landscaping and vegetative buffers between arterial roadways and new residential developments.
- CON Policy 1.1.1: Encourage efficient traffic flow by maintaining adequate levels of service on County roadways as required under the Transportation Element of this Plan.
- TRA Policy 1.9.2: Within the Urban Service Area, the County shall require new local streets and all collector roads serving residential areas and nonresidential land uses to include five-foot sidewalks within the dedicated right-of-way or an approved alternative pedestrian circulation system.
- TRA Policy 1.9.7: Designated bicycle lanes shall be built when constructing or reconstructing roads in Clay County and in accordance with FDOT standards. The outside lane of major arterial, minor arterial, and collector roadways, except for residential collector roadways, shall include a 4-foot-wide bicycle lane for urban roadways and a 5-foot-wide bicycle lane for rural roadways. Construction projects for existing roads shall be reviewed on a case-by case basis and only under extreme right-of-way width constraints will designated bicycle lanes be excluded from a project.
- TRA Policy 1.10.3: Where appropriate, the County shall encourage transit-oriented developments within the urban areas of the County, and shall accommodate transit use through designated stops, bus bays, etc.
- TRA Policy 1.12.4: The County shall pursue transit alternatives to address projected long-range level of service deficiencies by working collaboratively with the Jacksonville Transportation Authority (JTA) to improve connectivity and regional mobility between Clay Transit and JTA services, including regional express services and the First Coast Flyer Bus Rapid Transit Southwest Corridor.
- TRA Policy 1.12.5: The County, with assistance from the JTA, shall identify potential public transportation corridors and work with JTA and Clay Transit in developing a transit system that is more urban in nature to serve the rapidly developing and developed areas in the northern and middle portion of the County.
- TRA Policy 1.14.2: The County, in coordination with JTA and Clay Transit, will determine if there are locations where land to facilitate additional park-and-ride facilities should be acquired to serve commuters using JTA services or carpools.
- TRA Policy 3.3.1: The County shall protect historic sites and culturally or architecturally significant sites from diminishment or destruction due to transportation improvements. The level of protection shall be in a manner consistent with the objectives and policies contained in the

Historic Preservation Element of this Plan and the Historic Preservation Overlay District section of the Land Development Regulations.

- HIS Policy 1.5.1: The County shall enforce the historic preservation overlay zone that as a minimum shall include criteria for the protection of historic sites, structures and cemeteries, criteria and procedures for designating historically significant properties and enforcement procedures.
- EDE Policy 2.2.1: Support the implementation of regulations that focus on the development of diverse housing options, multi-modal transportation, employment centers with enhanced social amenities that support placemaking in the County.

City of Green Cove Springs Comprehensive Plan

- Policy 2.1.1: The City shall institute a program of protection and acquisition of right-of-way for the major roadway network, to ensure continuity of the system and the protection of existing and future roadway network from development or encroachments, while being cognizant of protecting private property rights. Right-of-way acquisitions needed for road improvements shall be kept to a minimum.
- Policy 2.1.5: The City shall continue to coordinate with the North Florida Transportation Planning Organization (TPO), FDOT and Clay County to implement a Complete Streets concept along US 17/Orange Avenue between SR 16 and Orion Road.
- Policy 2.1.10: The City shall consider the following speed management strategies when designing or approving new roadways or modifying existing roads in the City:
    - a. Enclosure: Framing the road with street trees, buildings, on-street parking.
    - b. Engagement: Connecting the driver with the surrounding environment using tools such as on-street parking, narrower lanes, architectural details, pedestrian activity
    - c. Deflection: Creating vertical or horizontal shifts incorporating round-abouts, splitter medians, raised intersections, raised and or mid-block crosswalks, or similar designs.
- Policy 2.2.2: Intersections shall be made pedestrian-friendly by limiting the pedestrian crossing width; use of adequate lighting; adequate timing for traffic signals; and the provision of facilities for persons with disabilities.
- Policy 2.3.1: The City shall rely on level of service (LOS) standards adopted in the Capital Improvements Element to ensure that acceptable traffic conditions are maintained.
- Policy 2.3.9: The City shall prioritize mobility projects that encourage people to walk, bicycle, use new mobility technology and ride public transit in lieu of adding capacity to roadways.
- Policy 2.4.4: The City shall coordinate with Clay County and the FDOT to incorporate pedestrian walkways and bicycle paths, or multi-use trails, in conjunction with road improvements, where such need is demonstrated.
- Policy 2.6.6: The City shall work with the North Florida TPO, Clay County, and other applicable agencies to expand public transportation to residents of Green Cove Springs.

City of Green Cove Springs Municipal Code

- The city council hereby designates each street as a street upon which golf carts may be operated within the meaning and pursuant to all requirements contained in F.S. § 316.212.
- The city is hereby authorized to seek approval from the state department of transportation (FDOT) and any other regulatory authority to allow the operation of golf carts at certain designated locations upon and across any federal or state highway.

1.4 Related Projects

We reviewed programed projects from the Clay County Capital Improvement Program (CIP) and Bonded Transportation Program (BTP), the TPO Transportation Improvement Plan (TIP), and FDOT 2022-2026 Work Program. Projects which are programmed within the limits of the study corridor are summarized below.

- FDOT 2022-2026 Work Program: An 8-foot multi-use trail will be constructed along Palmetto Avenue, parallel to US 17, through Green Cove Springs, and along Martin Luther King Jr. Boulevard. The trail is proposed to provide access to the Green Cove Springs Nature Preserve and to the Vera Francis Hall Park through a historically black neighborhood. The trail will also promote the connection of the Black Creek Trail north of Green Cove Springs. This project is currently funded through the FDOT Local Agency Program and will begin construction in 2022 (FPID 435677-1).
- FDOT 2022-2026 Work Program: A multi-use trail will be constructed north of Green Cove Springs from Ball Road to the Black Creek Trail. The project will extend the existing multi-use path across the Black Creek Bridge and has a letting date of 7/30/2025. No date of completion was available at the time of review (FPID 446154-1).
- FDOT 2022-2026 Work Program: An interchange will be built on US 17 as part of the construction of the new SR 23 First Coast Expressway in Clay County. The interchange will be built approximately 2.4 miles south of the study corridor but will likely be a significant traffic generator. Construction of the Expressway began on 4/4/2019 and is expected to be completed in 2025 (FPID 422938-5)
- FDOT 2023-2028 Work Program: US 17 is scheduled to undergo a resurfacing project for the approximately 4.3 mile segment of US 17 from Oak Street in the south to the Black Creek Bridge in the north. The project is currently in the engineering phase and has a scheduled letting date in FY 2025. Construction is scheduled to be completed in FY 2026 (FPID 208202-5).
- FDOT 2016-2021 Work Program: A recently completed project constructed a path approximately 10-feet wide across the Governors Creek bridge. Construction was completed on 2/23/2021 (FPID 441406-1)

1.5 Recently Completed Studies

A Safety and Operational Study which encompassed the entirety of US 17 in Clay County was completed in October of 2018 on the behalf of the TPO. Several "high-benefit" improvements were identified to improve traffic and safety-related conditions. Recommendations which fall within the limits of this report are summarized below:

- Extend the northbound left-turn lane at SR 16 (Ferris Street) to eliminate the frequent overspill of left-turning vehicles into the travel lane. This will require closing the Bay Street intersection and rerouting vehicles to alternate access points. Traffic demand at Bay Street was observed to be minimal.
- Improve the pedestrian crosswalks at the signalized intersections of Walnut Street, Center Street, and Gum Street to meet current standards. Removing each signal was considered due to low traffic volumes, but their removal was not ultimately recommended.
- Refurbish the pedestrian crosswalk at the intersection of Houston Street and restripe the eastbound approach to include a left-turn and shared left-thru-right lane to accommodate the high left-turning volumes observed at the intersection.
- Refurbish the pedestrian crosswalks and intersection pavement markings at the Harbor Road intersection to meet current standards and provide a second lane for the Harbor Road approach to improve the future operation of the intersection.

1.6 Special Events

The special events which occur within the study area include the following:

- Memorial Day River Fest – annually on Memorial Day
- Christmas on Walnut Street – first Saturday of each December
- Parade of Trees – each December
- Letters to Santa – December 1 to December 15
- Martin Luther King Jr. Day Ceremony – third Monday in January
- Soul Food and Music Festival – first Saturday of October
- Third Saturday Market in the Park – third Saturday of each month from September to June
- CalaVida – A weeklong celebration at the end of April
- Green Cove Springs Food Truck Friday – second Friday of each month from March to November
- Green Cove Springs Christmas Parade – first Saturday of each December

2.0 Existing Roadway Conditions

This section describes the existing roadway characteristics within the project limits based on a review of aerial photography, existing records, and site observations. The constraints, existing deficiencies, and opportunities along the corridor were considered in the recommended alternative.

2.1 Functional Classification

The Straight-Line Diagrams (SLDs) for the US 17 corridor were used to determine the functional classification of the study limits. The SLDs (Sections 71010000 and 71020000) showed that US 17, part of Florida's Strategic Intermodal System, has a functional classification of Urban Principal Arterial throughout the entirety of the corridor.

The FDOT Context Classification is C3C – Suburban Commercial from SR 16 (Leonard C Taylor Parkway) to just south of Oak Street and C4 – Urban General from just south of Oak Street to the Sheriff's Office driveway north of Governors Creek. The classification then reverts back to C3C – Suburban Commercial for the remainder of the corridor. The SLDs for this segment of US 17 are provided in **Appendix A**.

2.2 Typical Section

The existing typical section along US 17 (Orange Avenue) changes as you travel north through the corridor, but generally consists of four 11-foot to 12-foot travel lanes. South of Oak Street and north of the Governors Creek Bridge the typical section, Typical Section 1, generally consists of four 12-foot travel lanes, a raised grassy median of widths varying from 16-feet to 19-feet, and flush paved shoulders with adjacent grassy shoulders both of which are 4-feet wide as shown in **Figure 2**. Within the urban limits of Green Cove Springs the typical section, Typical Section 2, generally consists of four 11-foot to 12-foot travel lanes, a paved 13-foot median accommodating alternating left-turn lanes and a two-way-left-turn lane, and 2-foot curb and gutter shoulders as shown in **Figure 3**. The project traverses through the City of Green Cove Springs, with the Florida Department of Transportation responsible for roadway maintenance.

FIGURE 2: Existing Typical Section 1

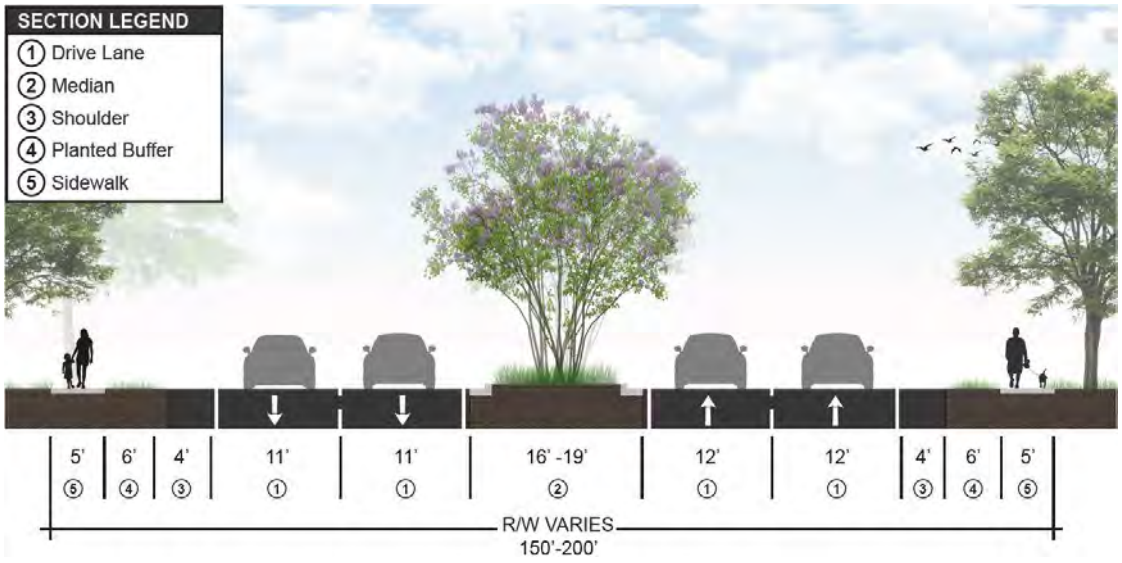
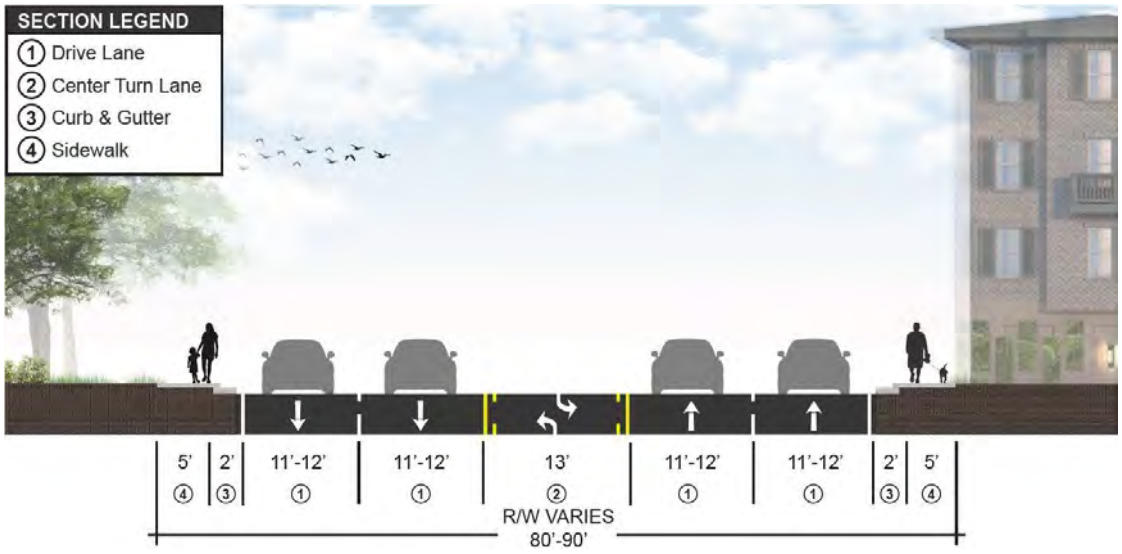


FIGURE 3: Existing Typical Section 2



2.3 Existing Right-of-Way

The 2019 Florida Parcels dataset published in the Florida Geographic Data Library (FGDL) was used to measure the right-of-way (ROW) width at various locations along the corridor as shown in **Table 1**. Generally, the ROW south of Oak Street and north of the Governors Creek Bridge is much wider and varies from 150-feet to 200-feet, while the ROW within the downtown core of Green Cove Springs varies from 78-feet to 89-feet.

TABLE 1: Existing Right-Of-Way Widths

From	To	Minimum (ft)	Typical (ft)	Maximum (ft)
SR 16 (Leonard C Taylor Parkway)	Oak Street	85	200	215
Oak Street	SR 16 (Ferris Street)	88	90	90
SR 16 (Ferris Street)	Center Street	81	82	88
Center Street	Gum Street	78	80	81
Gum Street	Houston Street	78	82	85
Houston Street	Governors Creek Bridge	77	80	136
Governors Creek Bridge	Orion Road	136	150	157

2.4 Adjacent Land Uses

Existing and future land uses were determined using datasets provided from the TPO Project Planning Tool and City of Green Cove Springs GIS and Open Data team. US 17 runs through the Green Cove Springs central business district. As shown in **Figure 4**, the corridor generally consists of commercial and institutional land uses. The Green Cove Springs Nature Preserve in the southern limit is designated as recreational. One parcel immediately south of the Governors Creek Bridge is currently zoned as a Planned Unit Development (PUD). Low density residential parcels are located behind the commercial land uses which abut US 17.

The future land uses are shown in **Figure 5.** The corridor will remain primarily commercial and institutional in its land uses directly about the US 17 corridor. It also shows that the parcel which is currently zoned as a PUD will have a high intensity commercial land use in the future.

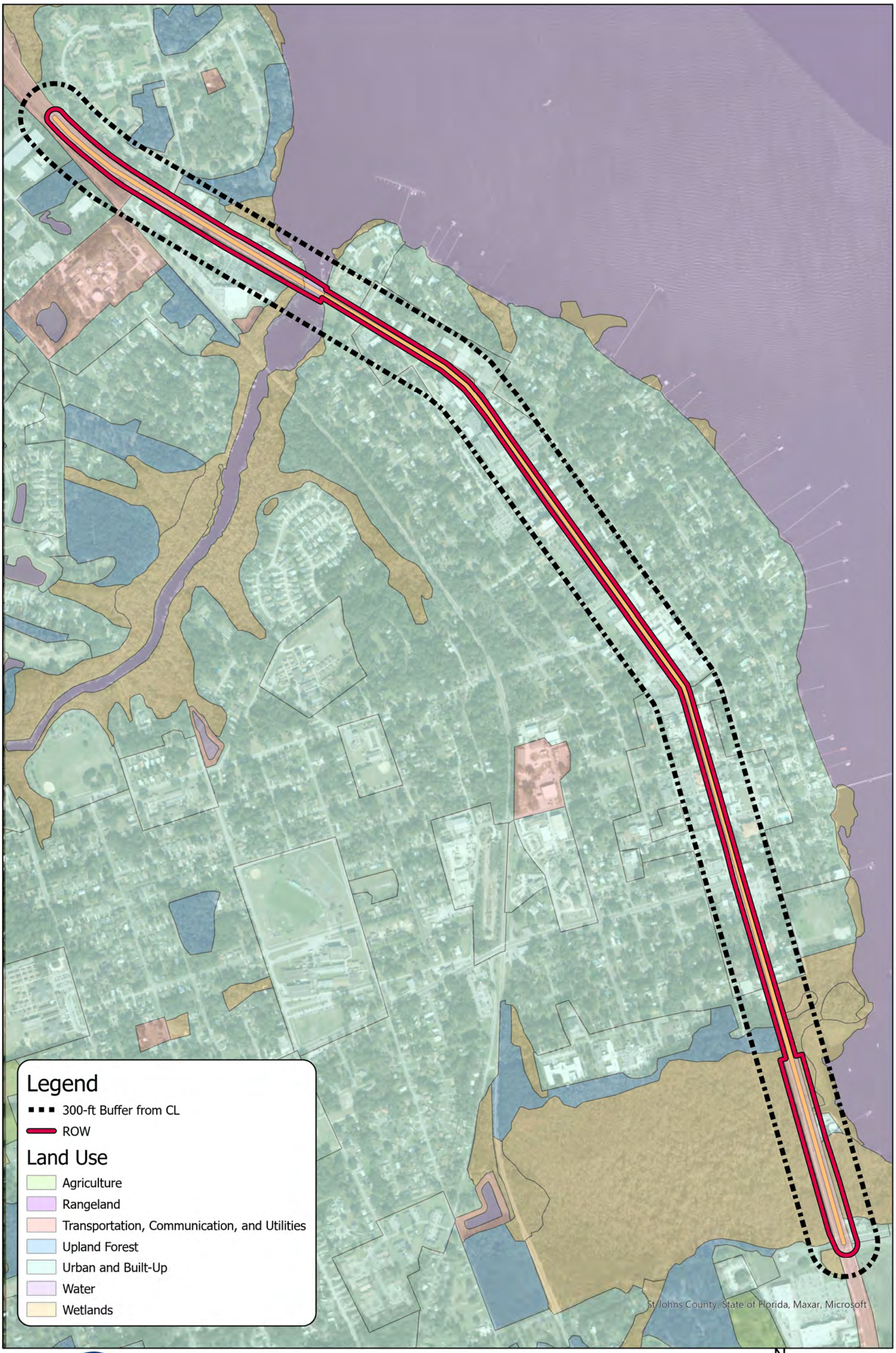


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Figure 4 - US 17 Corridor Study
Existing Land Use

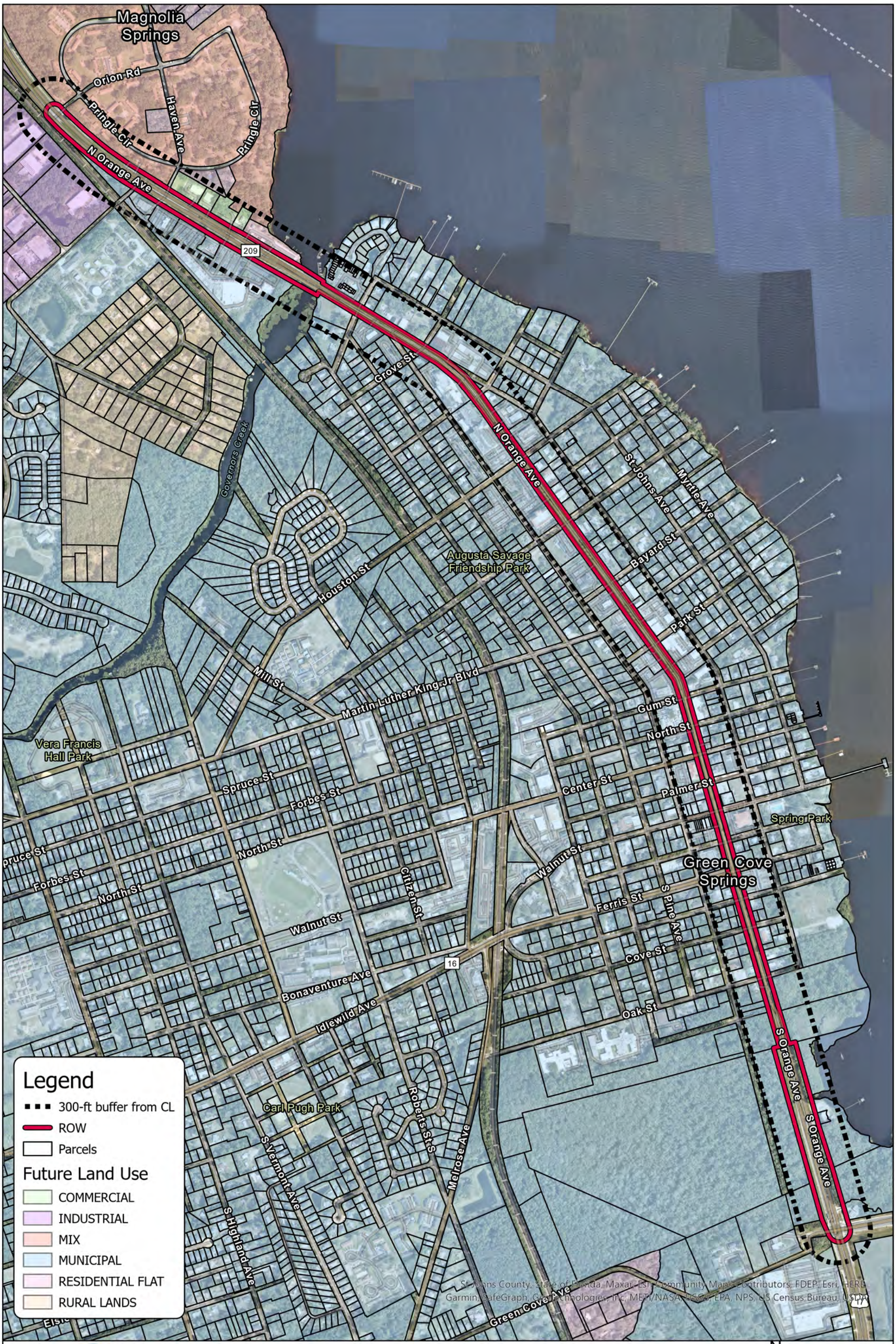

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Figure 5 - US 17 Corridor Study
Future Land Use

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2.5 Posted Speed Limit

The posted speed limit of US 17 varies throughout the study corridor. Traveling north from SR 16 (Leonard C Taylor Parkway) to Orion Road the posted speed decreases from 45 mph to 35 mph south of Oak Street. The speed limit then decreases to 30 mph south of SR 16 (Ferris Street). It remains 30 mph for the majority of the central business district before increasing to 35 mph south of Bayard Street. The speed limit again increases to 45 mph as you travel north across the Governors Creek Bridge and remains constant for the remainder of the study limits.

2.6 Roadway Geometrics

Roadway plans for the 2006 resurfacing of US 17 from Oak Street to the Governors Creek Bridge (FPID 208085-2-52-01 and 208085-3-52-01) were obtained from the FDOT Project Suite database to verify the existing roadway geometrics.

The study corridor of US 17 is generally straight and oriented in a northwesterly direction. Three horizontal curves, with points of curvature located at mileposts 0.316, 0.955, and 1.666 (Section # 71020000) can be found within the study limits.

The vertical alignment of US 17 appears to be relatively flat. According to the obtained resurfacing plans, the typical sections of US 17 maintain a cross slope of 2% superelevation; however, this will have to be confirmed with appropriate survey prior to beginning any design phase.

2.7 Multimodal Accommodations

Sidewalks are approximately 5 feet wide throughout the corridor on both sides of US 17 south of the Governors Creek Bridge. The recently constructed barrier wall protected walkway is also provided across the bridge. North of the bridge, the eastern sidewalk transitions into a 10-foot-wide mixed-use path which continues north approximately 2.4 miles to the intersection of Ball Road. The western sidewalk terminates at the intersection with Harbor Road. Bicycle lanes are provided south of Oak Street. There is a mixed-use path, Black Creek Trail, which runs parallel to US 17 and terminates north of the Black Creek Bridge, approximately 2.5 miles north of Orion Road.

Clay County Council on Aging provides the Clay Community Transportation (CCT) service, with the “Blue Line” and “Green Line” servicing stops along US 17 as far south as the SR 16 (Ferris Street) intersection. Stops serviced by these lines include the Challenge Enterprises facility and Clay County Courthouse (Blue Line), and the Clayton and Mildred Revels Senior Center (Green Line).

CSX Transportation owns and operates a railroad generally parallel to US 17. There are no rail crossings present within the project limits.

2.8 Intersections

There are 23 intersections within the study corridor, seven of which are controlled by a traffic signal. The remaining 16 intersections are unsignalized and allow turns onto US 17 through full-access median openings. **Table 2** below describes the existing intersections. The most common deficiencies seen throughout the corridor were non-ADA-compliant or insufficient detectable warning mats and pavement markings in poor condition.

Table 3 summarizes the features at each signalized intersection. The most common deficiencies seen at the signalized intersections were signal heads with no retroreflective backplates.

TABLE 2: Existing Intersection Features					
Intersection	**Traffic Control**	**Left-Turn Lanes**	**Right-Turn Lanes**	**Crosswalks**	**Notes**
SR 16 (Leonard C Taylor Parkway)	Signalized	NB, SB, WB	NB, WB	N, S, E, W	Channelized NB right-turn, span wire
Oak Street	Minor Stop	NB	None	None	"Stamped" concrete instead of ADA mats, missing sidewalk connection
Cove Street	Minor Stop	SB	None	E, W	"Stamped" concrete instead of ADA mats, faded markings
Bay Street	Minor Stop	NB, SB	None	W	"Stamped" concrete instead of ADA mats, faded markings
SR 16 (Ferris Street)	Signalized	NB, SB, EB	EB	N, S, E, W	Non-uniform detectable warnings, standard crosswalks, photo-enforced
Spring Street	Minor Stop	NB, SB	None	E, W	Directional median on west leg restricts EB to right-turn only
Walnut Street	Signalized	NB, SB	None	N, S, E, W	Non-uniform detectable warnings, standard crosswalks
Palmer Street	Minor Stop	NB, SB	None	E, W	"Stamped" concrete on NE corner
Center Street	Signalized	NB, SB	None	N, S, E, W	Non-uniform detectable warnings, pedestrian signal installed in curb ramp
North Street	Minor Stop	NB, SB	None	E, W	Non-uniform detectable warnings, faded markings
Gum Street	Signalized	NB, SB	None	N, S, E, W	"Stamped" concrete on NE corner
Park Street	Minor Stop	NB, SB	None	E, W	Faded markings
Bayard Street	Minor Stop	NB, SB	None	E, W	"Stamped" concrete instead of ADA mats, faded markings
Walburg Street	Minor Stop	NB, SB	None	E, W	None

TABLE 2: Existing Intersection Features					
Intersection	**Traffic Control**	**Left-Turn Lanes**	**Right-Turn Lanes**	**Crosswalks**	**Notes**
Houston Street	Signalized	NB, SB, EB	None	N, S, E, W	Non-uniform detectable warnings, standard crosswalks, photo-enforced
Lamont Street	Minor Stop	SB	None	E	"Stamped" concrete on SE corner
Magnolia Avenue	Minor Stop	None	None	E	One-way street
Grove Street	Minor Stop	NB, SB	None	E, W	Non-uniform detectable warnings
Palmetto Avenue	Minor Stop	None	None	W	"Stamped" concrete instead of ADA mats
Governor Street	Minor Stop	NB, SB	None	E, W	"Stamped" concrete instead of ADA mats, faded markings
Haven Avenue	Minor Stop	NB, SB	None	E	Mixed-use path crossing Haven Avenue
Harbor Road	Signalized	NB	SB	N, E	Photo-enforced
Orion Road	Minor Stop	SB	NB	E	Mixed-Use path crossing Orion Road

TABLE 3: Signalized Intersection Features

Intersection	Structure Type	Detection Type	Retroreflective Backplates	US 17 Left-Turn Type	Side Street Left-Turn Type
SR 16 (Leonard C Taylor Parkway)	Box Span Wire	Video	Yes	Protected	Protected-Permissive WB, Permissive EB
SR 16 (Ferris Street)	Diagonal Span Wire	Loops	No	Protected-Permissive	Protected
Walnut Street	Diagonal Span Wire	Loops	No	Permissive	Permissive
Center Street	Diagonal Span Wire	Loops	No	Permissive	Permissive
Gum Street	Diagonal Span Wire	Loops	No	Permissive	Permissive
Houston Street	Box Span Wire	Loops	No	Protected-Permissive	Permissive WB, Protected-Permissive EB
Harbor Road	Diagonal Span Wire	Loops	No	Protected-Permissive	Permissive

2.9 Known Environmental Features

The existing environmental features in the vicinity of the study corridor were reviewed using the datasets provided by the TPO Project Planning Tool. The analysis of environmental features utilized a 300-foot study area buffer. The following subsections provide detail on the physical, natural, and social environment.

2.9.1 Soils

In general, the soils present along the US 17 corridor are comprised of Fine Sands. **Table 4** below summarizes the respective soil characteristics for the soils found along the corridor, as provided by the United States Department of Agriculture (USDA) Natural Resource Conservation Service Custom Soil Resource Report for Clay County. The Custom Soil Resource Report is shown in **Appendix B**.

TABLE 4: Soil Data

Map Unit Symbol	Name	Slope	Drainage Class	Runoff Class
1	Albany Fine Sand	0-5%	Somewhat Poorly Drained	Negligible
3	Hurricane Fine Sand	0-5%	Somewhat Poorly Drained	Negligible
9	Leon Fine Sand	0-2%	Poorly Drained	*
10	Ortega Fine Sand	0-5%	Moderately Well Drained	Negligible
11	Allanton and Rutlege Mucky Fine Sand	0-2%	Very Poorly Drained	Negligible
14	Ortega-Urban Land Complex	0-5%	Moderately Well Drained	Negligible
20	Scranton Fine Sand	0-2%	Somewhat Poorly Drained	Negligible
25	Maurepas Muck	0-1%	Very Poorly Drained	Very High
65	Meadowbrook Sand	0-2%	Poorly Drained	Negligible
2t2v1	Cassia Fine Sand	0-2%	Somewhat Poorly Drained	Very Low

*Information not found in Custom Soil Resource Report

Source: Custom Soil Resource Report for Clay County, Florida

2.9.2 Wetlands and Surface Water

The US 17 corridor runs generally parallel to the St. Johns River. As such, surface water is present near much of the project limits. Surface waters are classified as Estuarine and Marine Deepwater, with short stretches of Riverine waters. Wetlands are present at the southern limit near the SR 16 (Leonard C Taylor Parkway) intersection and adjacent to the Governors Creek Bridge. Wetlands are classified as either Freshwater Forested/Shrub Wetland or Freshwater Emergent Wetland. The wetlands located in the corridor are shown in **Figure 6**.

2.9.3 Floodplains

Data provided in the Clay County GIS Library shows that the US 17 corridor largely lies outside of established floodplains. However, the Green Cove Springs Nature Preserve adjacent to the intersection at SR 16 (Leonard C Taylor Parkway) and the segment of US 17 which crosses Governors Creek lie within FEMA Flood Zones A and AE. These floodplains are considered to be Special Flood Hazard Areas and are subject to a 1% chance of water levels meeting or exceeding the Base Flood Elevation. An analysis of the 300-foot study area buffer showed that approximately 29 acres of land lie within the Zone AE and Zone A Floodplains. The floodplains located in the corridor are shown in **Figure 7**.

2.9.4 Contamination Sites

There are multiple potential contamination sites present along the study corridor. Contamination sites were classified as Storage Tank Contamination Monitoring (10 sites), Petroleum Contamination Monitoring Discharges (13 sites), Cleanup Sites (7 sites), or ERIC Waste Cleanup Sites (2 sites). Additionally, three parcels at the intersection of US 17 and Park Street are listed as a Brownfield site. The Florida Department of Environmental Protection Open Data site has the three parcels listed as a former car dealership awaiting cleanup. The known contamination sites located in the corridor are shown in **Figure 8**.

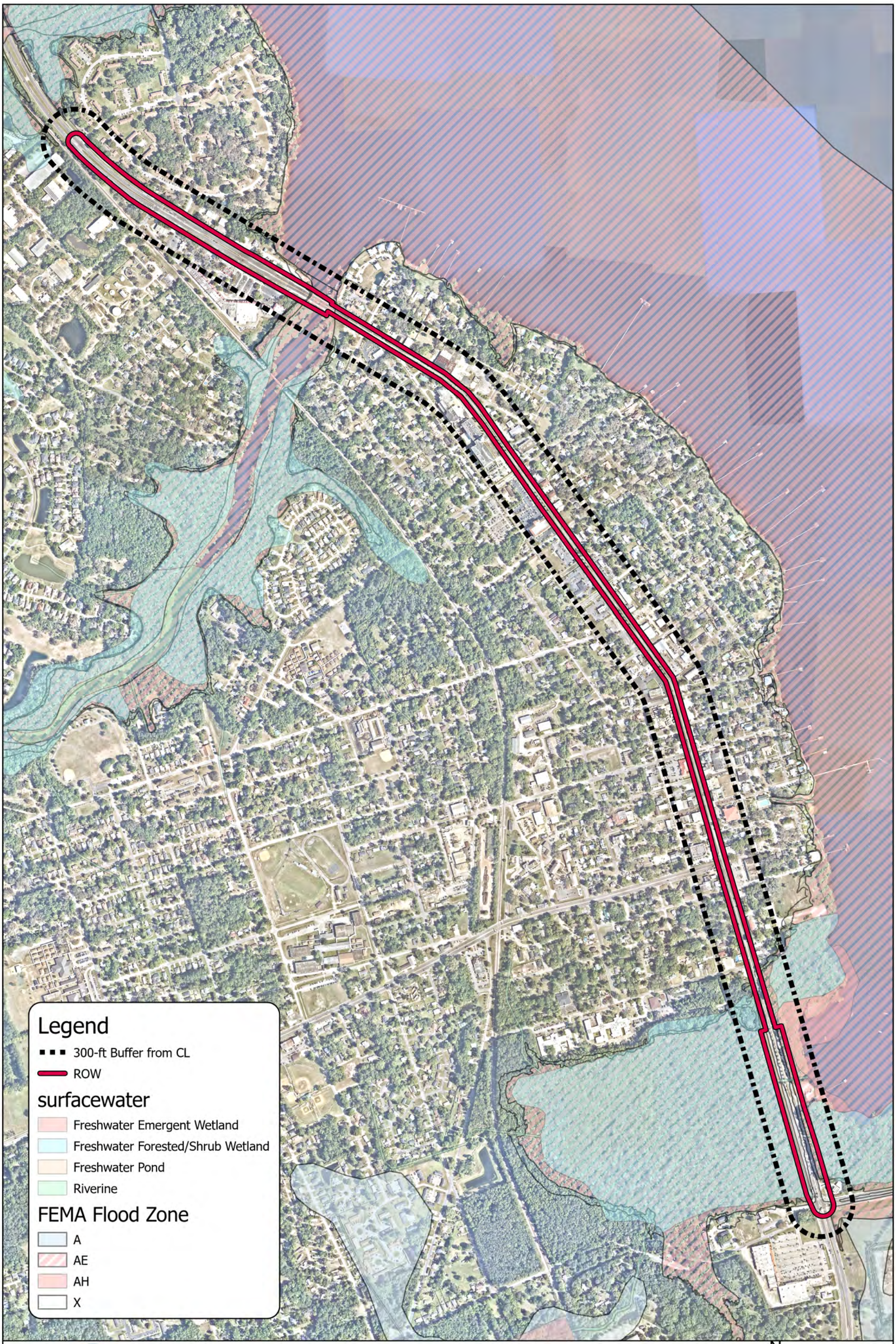

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Figure 6 - US 17 Corridor Study Wetlands and Floodplain

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Legend

- Cleanup Sites
- ERIC Waste Cleanup
- Petroleum Contamination Monitoring Discharges (PCTS)
- Solid Waste Facilities
- Storage Tank Contamination Monitoring (STCM)
- 300-ft Buffer from CL
- ROW
- FL SOLARIS Clear Conservation
- Brownfield Sites
- Florida Institutional Clip

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Figure 7 - US 17 Corridor Study
Potential Contamination Sites

July 2022

N

0 0.15 0.3 Miles

2.9.5 Archeological and Historic Resources

The *Historical Structure Locations* dataset published by the Bureau of Archeological Research in the FGDL was reviewed to determine the presence of historical resources within the 300-foot study area buffer on the US 17 corridor. There are 37 historic structures are present within the study area. Their locations are displayed in **Figure 9** and summarized below.

- 62% (23) of the structures were found to be private residences and 24% (9) were found to be commercial structures.
- 24% (9) are either eligible or likely eligible for the National Register of Historic Places.
- 40% (15) of the structures are potential or likely contributors to a National Register District.

2.9.6 Conservation Areas

The Green Cove Springs Nature Preserve is the only conservation area present in the study corridor. The Preserve is located on the parcels adjacent to the SR 16 (Leonard C Taylor Parkway) intersection and is owned by the City of Green Cove Springs.

2.9.7 Parks and Recreation

No state parks are present near the study corridor, however there are multiple county and city parks. Recreational facilities operated by Clay County include the Carl Pugh Park and the Governors Creek Boat Ramp. Recreational facilities operated by the City of Green Cove Springs include Spring Park and Green Cove Springs City Pool, City Pier, Augusta Savage Friendship Park, Vera Francis Hall Park, Thomas Hogans Memorial Gym, Augusta Savage Arts and Community Center Park, and Magnolia Park.

Legend

Archeological Sites

ELIGIBLE FOR NRHP

INELIGIBLE FOR NRHP

LIKELY NRHP ELIGIBLE

NOT EVALUATED BY RECORDER

300-ft Buffer from CL

ROW

NORTH FLORIDA TPO

Figure 8 - US 17 Corridor Study Archaeological Site

July 2022

N

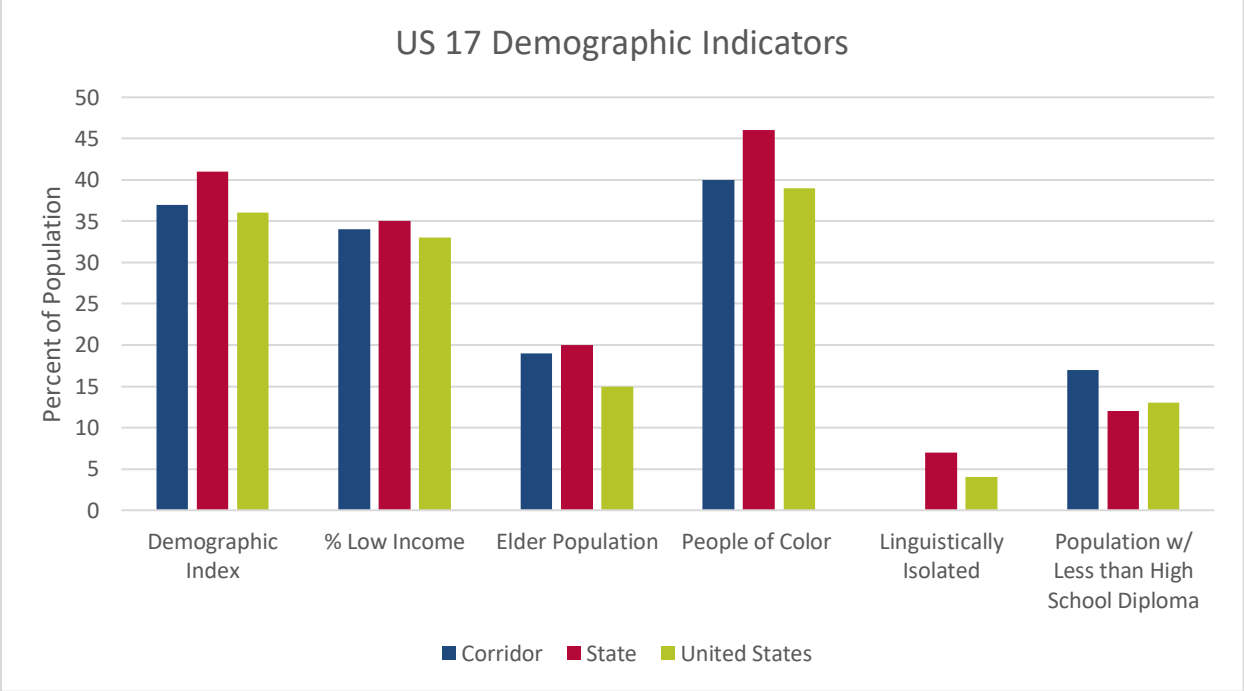
0 0.15 0.3 Miles

2.10 Demographics and Underserved Populations

Six demographic indicators were summarized using data provided by the United Stated Environmental Protection Agency (EPA) EJSCREEN tool. The EJSCREEN tool is an environmental justice mapping and screening tool developed by the EPA to combine nationally consistent environmental and demographic data. The tool is available at https://www.epa.gov/ejscreen. The EJSCREEN report prepared for this corridor is shown in **Appendix C**.

Figure 10 summarizes the percentage of the population living along the corridor. Five of the six available demographic indicators are below the statewide average. The percentage of citizens living along US 17 who hold less than a high school education is above the statewide average by 4%.

FIGURE 9: Summary of Demographic Indicators along US 17 corridor



Source: US EPA Environmental Justice Screening and Mapping Tool

3.0 Safety Analysis

Crash data for the US 17 corridor was obtained from the Signal 4 Analytics (S4A) database available at https://signal4analytics.com/. The most recent six-year period from January 1, 2015 to December 31, 2020 was analyzed. The crash trends occurring within the study corridor were analyzed. The corresponding individual crash reports were not reviewed to verify the accuracy of the coded data.

A total of 485 crashes were reported for the six-year period. The crashes included 116 injury crashes, resulting in 182 injuries, and two fatal crashes, resulting in two fatalities. There were 89 crashes reported in 2015, 87 crashes reported in 2016, 92 crashes in 2017, 84 crashes in 2018, 77 crashes in 2019, and 56 crashes in 2020. The most commonly occurring types of crashes within the US 17 corridor include rear-end crashes, left-turn crashes, and "other" crashes. The locations below were found to have experienced crash frequencies which exceeded five crashes per year and will be discussed in greater detail.

- US 17 (Orange Avenue) at SR 16 (Leonard C Taylor Parkway) - Signalized
- US 17 (Orange Avenue) at SR 16 (Ferris Street) - Signalized
- US 17 (Orange Avenue) at Oak Street - Unsignalized
- US 17 (Orange Avenue) at Houston Street - Signalized

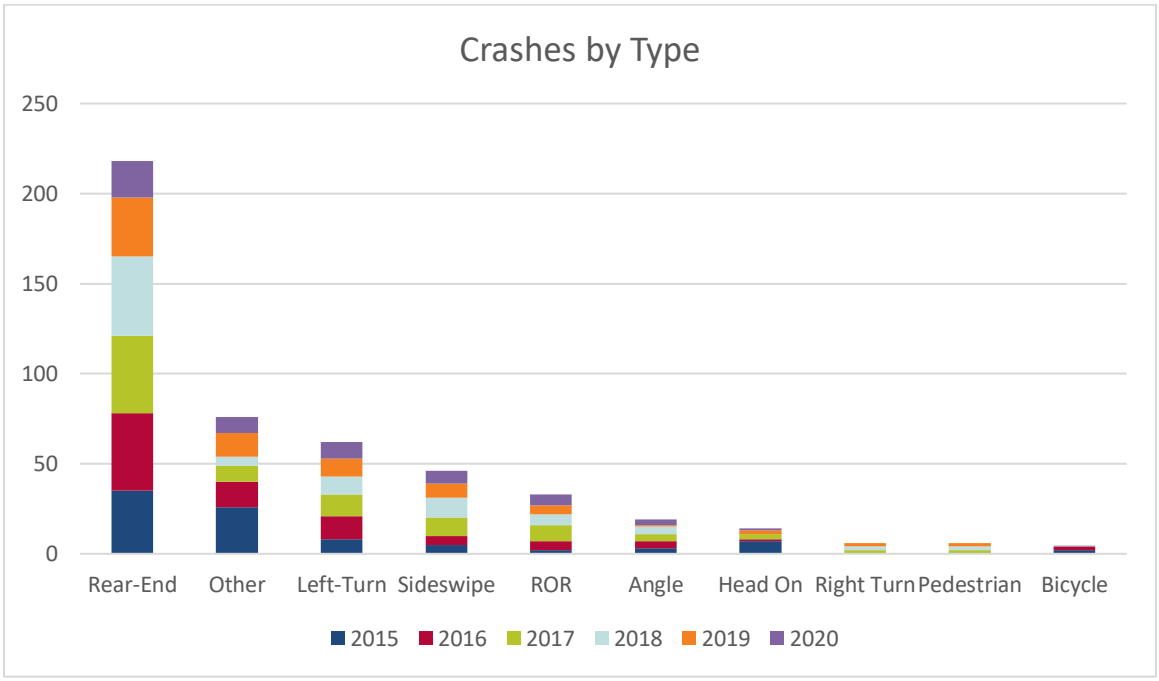
Table 5 summarizes the crashes observed at each signalized intersection. **Figures 11 through 14** depict the overall trends of characteristics surrounding crashes occurring within the US 17 corridor. A map which shows the location of crashes occurring throughout the corridor is presented in **Figure 15.** The corresponding crash data tables are included in **Appendix D.**

TABLE 5: Summary of Crashes by Signalized Intersection

Intersection	2015	2016	2017	2018	2019	2020	Total
US 17 @ SR 16 (Leonard C Taylor Parkway)	21	24	30	25	12	1	**113**
US 17 @ SR 16 (Ferris Street)	11	15	15	11	13	15	**80**
US 17 @ Walnut Street	2	1	3	4	1	0	**11**
US 17 @ Center Street	1	2	4	4	3	2	**16**
US 17 @ Gum Street	2	2	4	3	2	2	**15**
US 17 @ Houston Street	4	6	5	3	7	6	**31**
US 17 @ Harbor Road	1	3	2	1	1	0	**8**

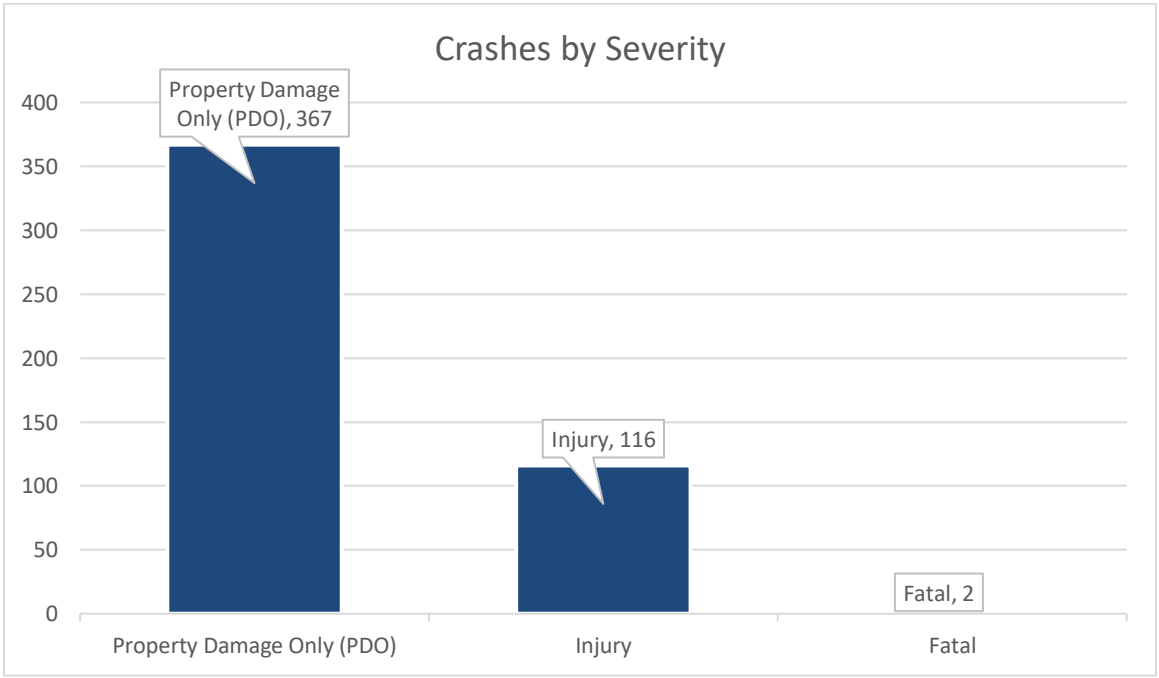
Source: Signal 4 Analytics

FIGURE 10: Summary of Observed Crashes by Type



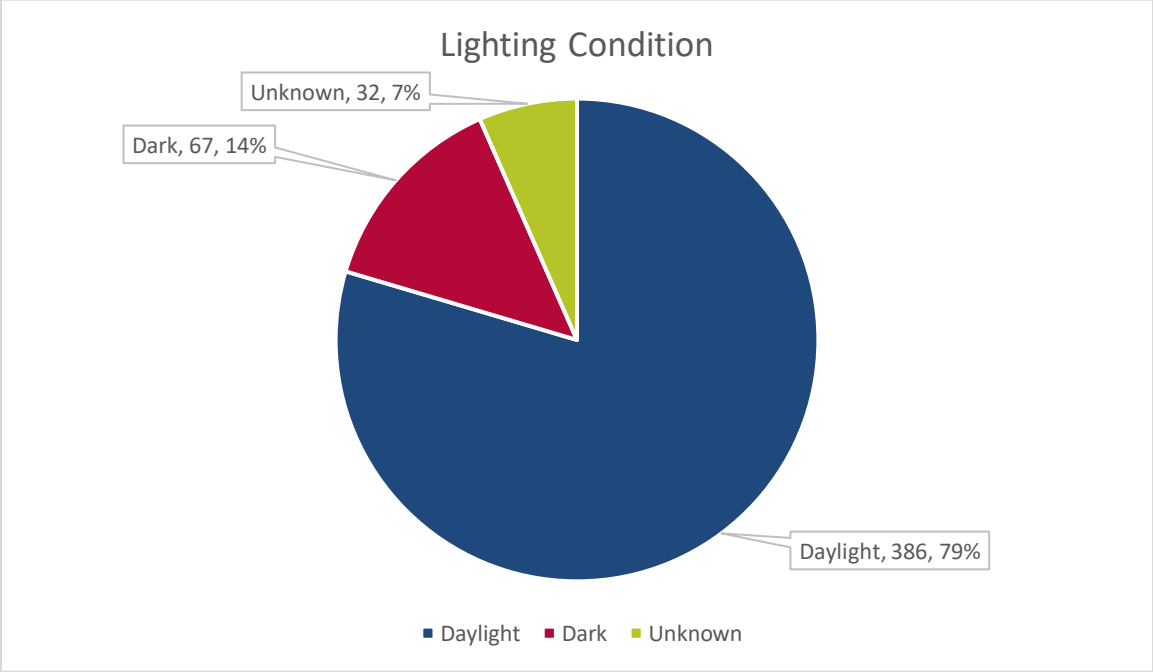
Source: Signal 4 Analytics

FIGURE 11: Summary of Observed Crashes by Severity



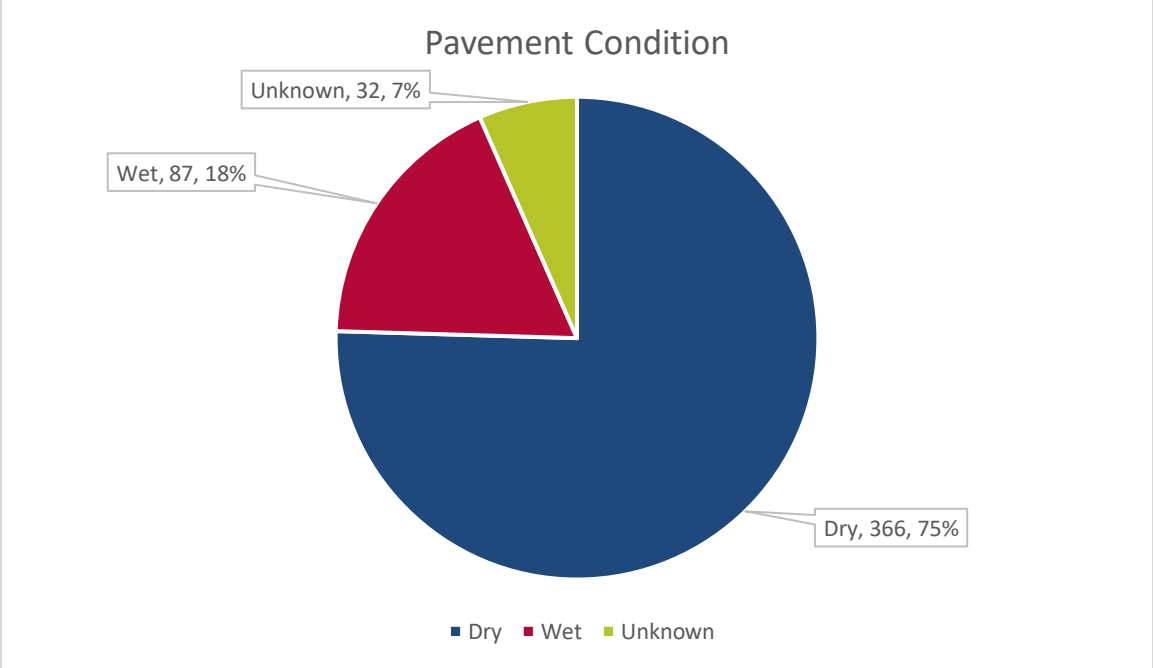
Source: Signal 4 Analytics

FIGURE 12: Summary of Observed Crashes by Light Condition



Source: Signal 4 Analytics

FIGURE 13: Summary of Observed Crashes by Pavement Condition



Source: Signal 4 Analytics

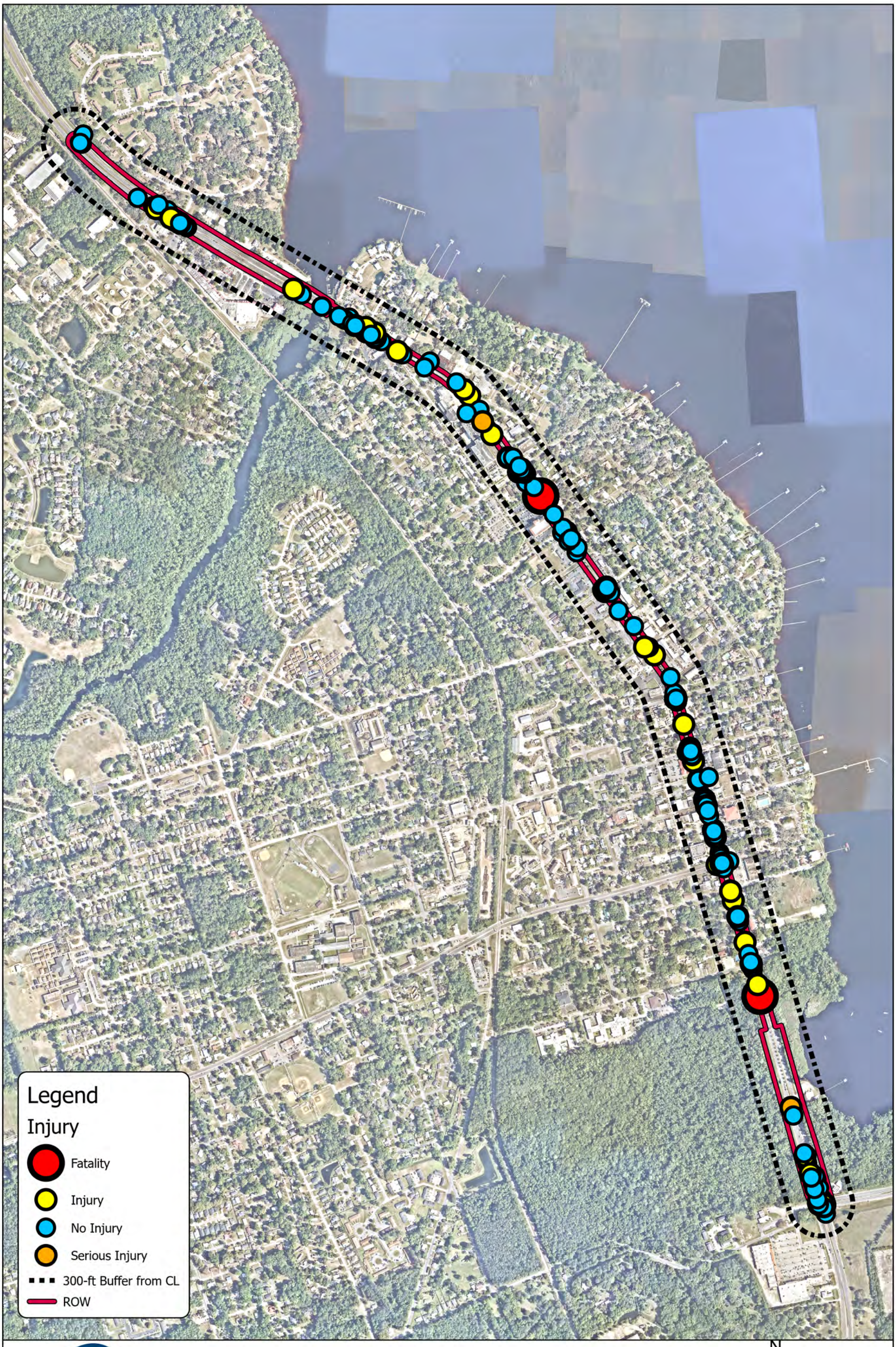


Figure 14 - US 17 Corridor Study
Crash Location

July 2022

The crash reports for the two fatal crashes from the Signal 4 Analytics database were analyzed to evaluate the contributing causes to the crashes.

- One fatal crash occurred October 25, 2016 when a passenger vehicle traveling northbound on US 17 swerved off road just south of Houston Street and struck a sign support for a red-light running camera. It is suspected that the driver suffered a medical emergency which contributed to the crash and the driver's death. The crash occurred on dry pavement under dark lighting conditions.
- The second fatal crash occurred February 15, 2019 when a motorcycle traveling southbound on US 17 collided with the rear of a southbound vehicle. The motorcycle was traveling faster than the posted speed, and the operator of the motorcycle had a blood-alcohol-level of 0.120. The crash occurred south of Oak Street on dry pavement and in dawn lighting conditions.

3.1 US 17 (Orange Avenue) at SR 16 (Leonard C Taylor Parkway)

The crashes that occurred within the influence area of the intersection of US 17 and SR 16 (Leonard C Taylor Parkway) were analyzed. The following observations were made:

- 44 crashes were reported to have occurred southbound, 19 eastbound, 25 westbound, and 19 northbound. Six occurred in an unknown direction.
- The predominant crash types at this intersection included 57 rear-end crashes, 25 left-turn crashes, and 7 sideswipe crashes. One bicycle crash occurred at the intersection.
- Of the 25 left-turn crashes, 11 were at-fault in the southbound direction and eight were at-fault in the eastbound direction. The eastbound approach to this intersection currently operates with permissive left-turn phasing while the mainline approaches operate with protected left-turn phasing. However, prior to the intersection being rebuilt in 2018, the southbound approach operated with protected-permissive left-turn phasing.
- Approximately 17% (19) of the crashes at this intersection occurred under dark lighting conditions and approximately 18% (20) occurred on wet pavement.
- 65 injuries resulted from crashes at this intersection.

3.2 US 17 (Orange Avenue) at SR 16 (Ferris Street)

The crash data reported to have occurred within the influence area of US 17 and SR 16 (Ferris Street) was analyzed to identify trends. The following observations were made:

- 28 crashes were reported to have occurred northbound, 23 occurred southbound, 14 occurred eastbound, 8 occurred westbound, and 7 occurred in an unknown direction.
- The predominant crash types occurring at this intersection included 29 rear-end crashes, 13 sideswipe crashes, and 11 left-turn crashes. One pedestrian and one bicycle crash also occurred at the intersection.

- Of the 11 left-turn crashes, seven occurred in the northbound direction and two occurred in the westbound direction. One crash occurred in each of the southbound and eastbound directions.
- Approximately 13% (10) of the crashes at this intersection occurred under dark lighting conditions and approximately 19% (15) occurred on wet pavement.
- 10 injuries resulted from crashes at this intersection.

3.3 US 17 (Orange Avenue) at Oak Street

Crash data within the influence area of US 17 and Oak Street was analyzed with the following findings:

- 25 crashes were reported to have occurred southbound, 5 northbound, and 2 westbound.
- The predominant crash types at this intersection included 21 rear-end crashes, 4 "other" crashes, 2 left-turn crashes, and 2 sideswipe crashes. One bicycle crash was also reported to have occurred at the intersection.
- Approximately 13% (4) of the crashes at this intersection occurred under dark lighting conditions and approximately 19% (6) occurred on wet pavement.
- 14 injuries resulted from crashes which occurred at this intersection.

3.4 US 17 (Orange Avenue) at Houston Street

Crash data within the influence area of US 17 and Houston Street was analyzed with the following findings:

- 23 crashes were reported to have occurred northbound, 5 southbound, 2 eastbound, and 1 westbound.
- The predominant crash types occurring at this intersection included 21 rear-end crashes, 5 sideswipe crashes, 2 ROR crashes, 2 head-on crashes, and 1 unknown crash.
- Approximately 13% (4) of the crashes at this intersection occurred under dark lighting conditions and approximately 23% (7) occurred on wet pavement.
- 12 injuries resulted from crashes which occurred at this intersection.

3.5 Economic Impact of Observed Crashes

As part of its method for analyzing the economic impacts of crashes along a given segment of roadway, the FDOT assigns comprehensive crash costs to the various crash severities. The costs are listed in FDOT Design Manual Chapter 122 – Design Exceptions and Design Variations, and are summarized in **Table 6**.

TABLE 6: FDOT KABCO Costs	
Crash Severity	**Comprehensive Crash Cost**
Fatal (K)	$10,560,000
Severe Injury (A)	$599,040
Moderate Injury (B)	$162,240
Minor Injury (C)	$100,800
Property Damage Only (O)	$7,600

Source: FDOT Design Manual

The average annual economic impact of crashes occurring in the US 17 study corridor was determined using the 6-year crash history from the S4A database and the Comprehensive Crash Costs published by FDOT in the FDOT Design Manual. The crash severity categories available in the S4A differ from the FDOT KABCO categories. The following assumptions were made:

- Crashes listed as "Fatal" in S4A equated to a "Fatal" KABCO severity
- Crashes listed as "Incapacitating" in S4A equated to a "Severe Injury" KABCO severity
- Crashes listed as "Non-Incapacitating" in S4A equated to a "Moderate Injury" KABCO severity
- Crashes listed as "Possible Injury" in S4A equated to a "Minor Injury" KABCO severity
- Crashes listed as "Property Damage Only" in S4A equated to a "Property Damage Only" KABCO severity

Table 7 summarizes the average annual costs of observed crashes along US 17.

TABLE 7: Average Annual Crash Costs within Study Area				
Crash Severity	**Comprehensive Crash Cost**	**Total Observed Crashes**	**Total Cost**	**Average Annual Cost**
Fatal (K)	$10,560,000	2	$21,120,000	$3,520,000
Severe Injury (A)	$599,040	7	$4,193,280	$698,880
Moderate Injury (B)	$162,240	36	$5,840,640	$973,440
Minor Injury (C)	$100,800	74	$7,459,200	$1,243,200
Property Damage Only (O)	$7,600	366	$2,781,600	$463,600
Total	-	**485**	**$41,394,720**	**$6,899,120**

4.0 Traffic Analysis

4.1 Existing Conditions

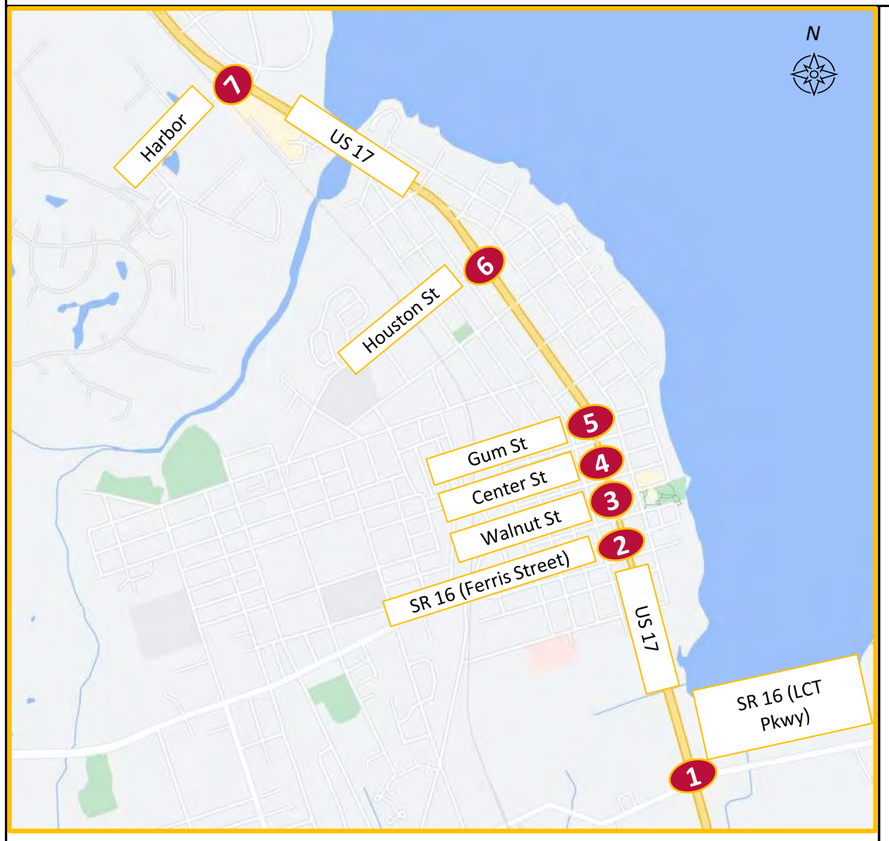
Traffic counts were conducted at the seven signalized intersections identified in **Table 3** November 2, 2021 for the periods from 6 a.m. – 10 a.m. and from 3 p.m. – 7 p.m. The AM peak hour for the study corridor was determined to occur from 6:30 – 7:30 a.m., and the PM peak hour was determined to occur from 4:30 – 5:30 p.m. The appropriate peak season correction factor (PSCF) of 1.07 for Clay County was then applied to convert each intersection's turning movement counts into existing peak season demand. **Appendix E** shows the collected turning movement counts, while volume development worksheets are provided in **Appendix F**.

An analysis of each signalized intersection's performance was conducted using the *Synchro 10* traffic analysis software. Existing signal timings were then obtained from the FDOT Traffic Operations office and input into the *Synchro* network to model base year conditions. Signal timings for the 2045 network were allowed to be optimized by *Synchro* to account for the likely signal retiming maintenance which will occur along the corridor. Turning movement counts for the 2045 future year were developed by applying the suggested growth rates summarized in **Table 12** to the observed 2021 peak season counts. **Table 8** summarizes the results at each intersection. The critical movement at each intersection is shown beside the corresponding V/C ratio by direction (for example the Eastbound Left-Turn movement is shown as (EBL)). The traffic data and *Synchro* reports are shown in **Appendix G**.

TABLE 8: Signalized Intersection Synchro Results						
Intersection	Weekday AM Peak Hour (Existing)			Weekday PM Peak Hour (Existing)		
	Weekday AM Peak Hour (2045 No Build)			Weekday PM Peak Hour (2045 No Build)		
	LOS	Delay (sec/veh)	Max V/C*	LOS	Delay (sec/veh)	Max V/C*
SR 16 (Leonard C Taylor Parkway)	C	29.8	0.88 (SBL)	D	42.4	0.98 (SBL)
	F	170.3	1.74 (SBL)	F	201.0	1.81 (WBR)
SR 16 (Ferris Street)	C	23.7	1.01 (EBR)	D	49.1	1.21 (NBL)
	D	49.1	1.19 (EBR)	F	118.8	1.93 (NBL)
Walnut Street	A	0.6	0.33 (SBT)	A	2.4	0.45 (NBT)
	A	0.8	0.47 (SBT)	A	2.7	0.66 (NBT)
Center Street	A	3.4	0.44 (EBL)	A	3.5	0.59 (EBL)
	A	3.5	0.61 (EBL)	A	4.8	0.72 (EBL)
Gum Street	A	2.2	0.37 (SBT)	A	1.4	0.44 (NBT)
	A	3.0	0.52 (SBT)	A	2.4	0.65 (NBT)
Houston Street	B	12.3	0.47 (EBL)	C	25.6	0.76 (NBT)
	B	16.7	0.78 (SBT)	E	68.6	1.37 (EBL)
Harbor Road	B	10.6	0.78 (EBL)	B	17.0	0.90 (EBL)
	B	19.1	0.90 (SBT)	D	48.9	1.10 (EBL)

* Volume/capacity ratio

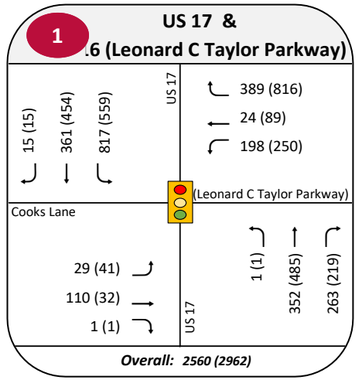
Existing Conditions AM & PM Peak Hour Vehicle Volumes

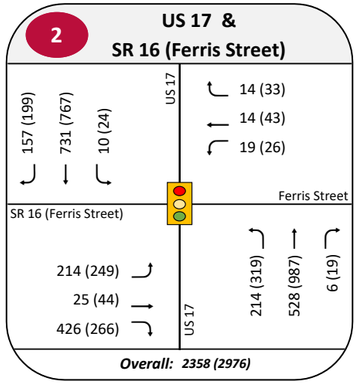


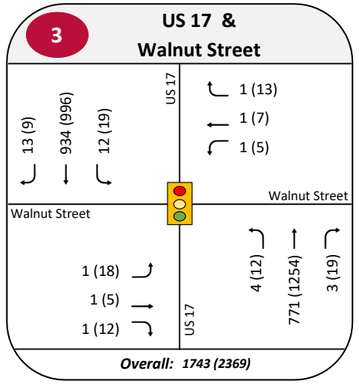
LEGEND

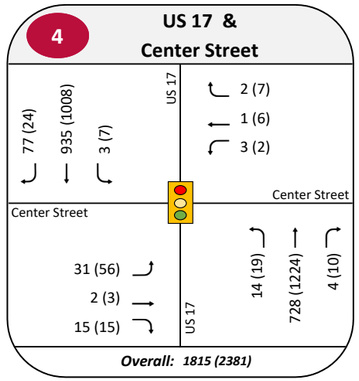
*Intersection ID*

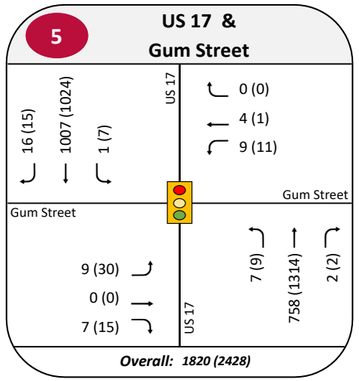
XX (XX) *AM (PM) Peak Hour Vehicle Volumes*

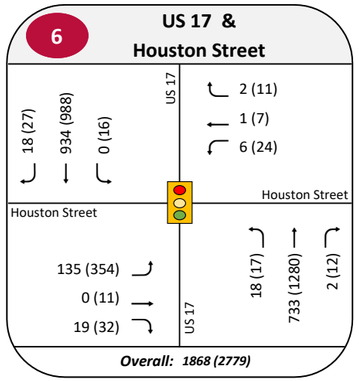












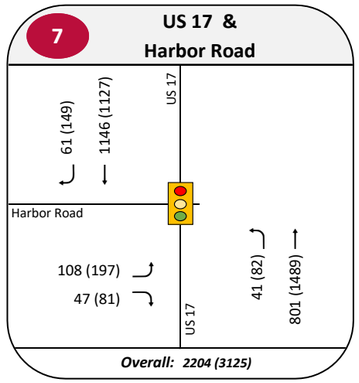


Figure 15 - US 17 Corridor Study (Existing Conditions)

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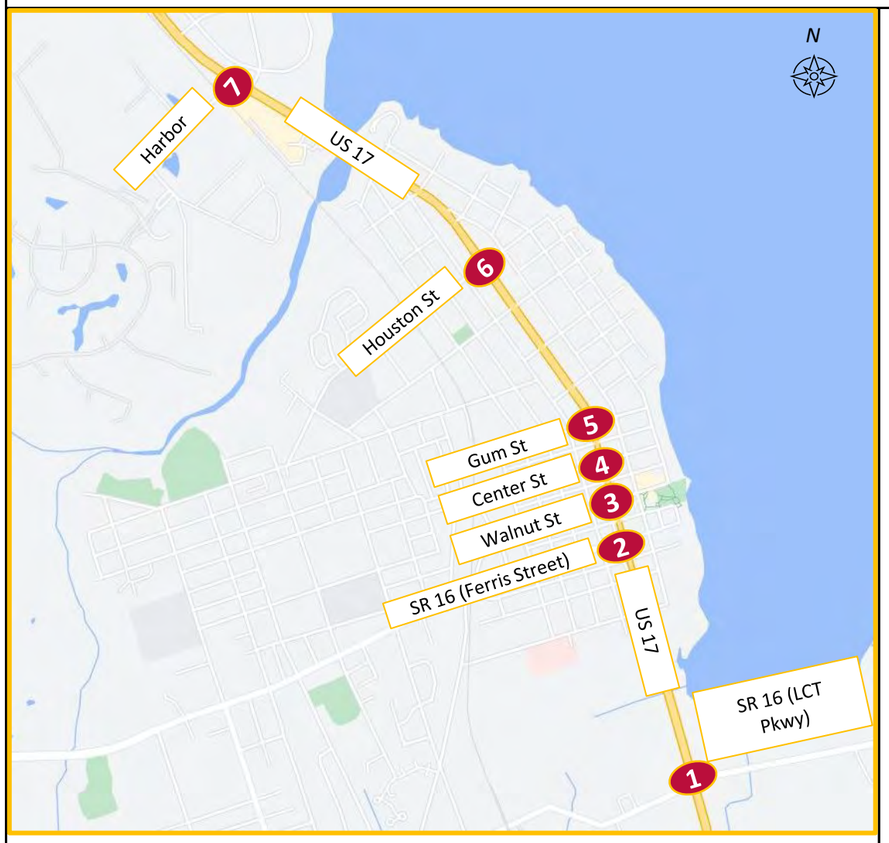
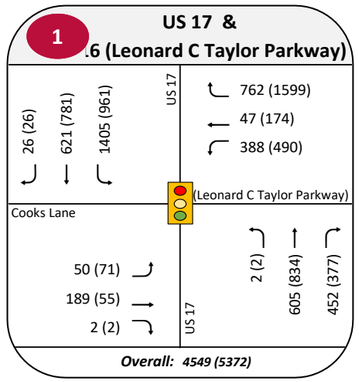
No Build AM & PM Peak Hour Vehicle Volumes

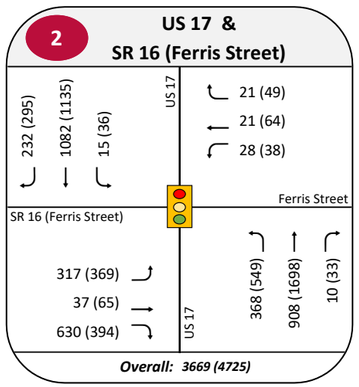


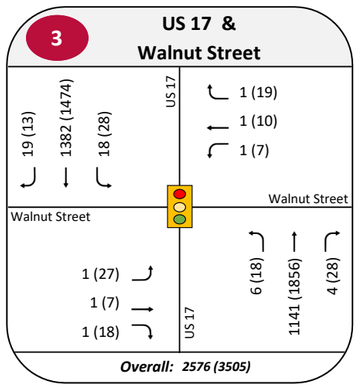
LEGEND

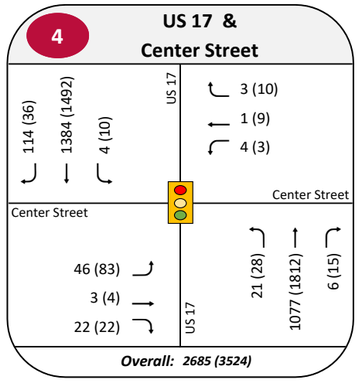
(#) *Intersection ID*

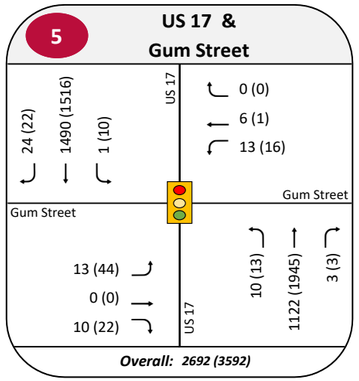
XX (XX) *AM (PM) Peak Hour Vehicle Volumes*

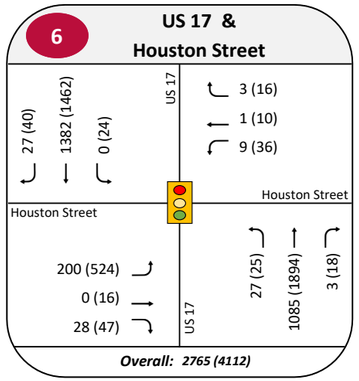












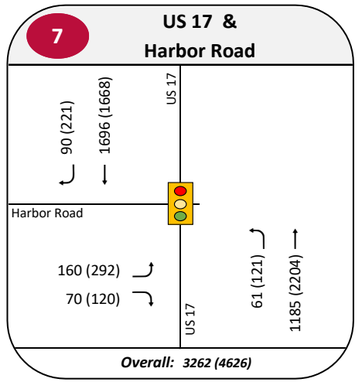


Figure 16 - US 17 Corridor Study (2045 No Build)

Kimley»Horn

4.2 Traffic Forecasting

Traffic forecasting was performed using the adopted NERPM-AB V2.1.1 model to project future travel demands for the US 17 corridor and for the intersecting SR 16 links. The 2045 Cost Feasible Plan model was used to estimate growth factors. The NERPM model was run under two scenarios, one with the First Coast Expressway (FCX) present, and one in which it was absent. This was done to analyze impact of the FCX travel demand along the study corridor.

4.3 NERPM Results

The outputs from the 2045 Cost Feasible model were converted to projected Annual Average Daily Traffic (AADT) using the guidance in the FDOT Project Forecasting Handbook. The outputs from the NERPM-AB model represent Peak Season Weekday Average Daily Traffic volumes, which were then converted to AADTs by applying the Clay County Model Output Conversion Factor (MOCF) of 0.95 as provided from the 2019 Peak Season Correction Factor (PSCF) report. The 2019 report was used to avoid atypical shifts in the Clay County peak season caused by COVID-19 remain-at-home orders.

The resulting AADT outputs were then compared to the counted AADTs at eight identified Florida Traffic Online count stations along US 17 and SR 16. The AADTs, counted in 2019, were used as the base for comparison to again avoid atypical traffic patterns caused by the COVID-19 pandemic. The results of the two modeled scenarios, with and without the FCE present, are presented in **Table 9** . **Appendix H** provides the PSCF Report for Clay County.

TABLE 9: 2045 NERPM Projections

Location	2019 AADT	2045 w/ FCX	Growth Rate	2045 w/o FCX	Growth Rate
US 17 south of SR 16 (Leonard C Taylor Parkway)	14,100	25,800	3.18%	25,600	3.13%
US 17 north of SR 16 (Leonard C Taylor Parkway)	21,500	50,100	5.12%	58,100	6.54%
SR 16 (Leonard C Taylor Parkway) east of US 17	17,800	25,400	1.64%	40,900	5.00%
US 17 south of SR 16 (Ferris Street)	20,000	44,500	4.70%	49,800	5.74%
SR 16 (Ferris Street) west of US 17	11,500	19,200	2.59%	23,100	3.86%
US 17 north of SR 16 (Ferris Street)	22,500	41,600	3.26%	39,900	2.98%
US 17 at Gum Street	24,000	41,600	2.81%	38,400	2.30%
US 17 at Governors Creek Bridge	29,500	61,100	4.11%	55,300	3.36%

In general, the NERPM-AB model outputs showed that the AADT along US 17 north of the SR 16 and along SR 16 will increase more when the FCX is considered than without. The FCX is anticipated to attract trips from north of Green Cove Springs to travel south to cross the St. Johns River to avoid congestion on US 17 to the north and along I-295.

4.4 Historical Traffic Demand

A supplemental analysis of the AADTs collected from the FDOT Florida Traffic Online database for 2010-2019 was conducted. The eight count stations identified above were used. **Table 10** summarizes the historical AADTs collected at each identified station, as well as their calculated Growth Rate. The AADT for the year of 2020 was excluded due to traffic impacts caused by COVID-19. **Appendix I** shows the Historical AADT Reports.

TABLE 10: Historical Traffic Demand

Location	Count Station	2010 AADT	2011 AADT	2012 AADT	2013 AADT	2014 AADT	2015 AADT	2016 AADT	2017 AADT	2018 AADT	2019 AADT	Growth Rate
US 17 south of SR 16 (Leonard C Taylor Parkway)	710196	11,600	11,400	11,400	11,200	11,100	11,600	12,900	13,800	14,500	14,100	2.39%
US 17 north of SR 16 (Leonard C Taylor Parkway)	710142	18,100	17,900	16,600	17,500	17,900	19,100	20,000	22,500	23,000	21,500	2.09%
SR 16 (Leonard C Taylor Parkway) east of US 17	710113	13,300	12,300	12,400	13,700	14,300	14,400	16,200	18,300	18,300	17,800	3.76%
US 17 south of SR 16 (Ferris Street)	715016	18,000	17,300	17,300	17,900	18,800	18,400	21,000	21,500	20,500	20,000	1.23%
SR 16 (Ferris Street) west of US 17	710151	10,200	10,300	10,500	10,400	11,000	10,100	10,600	11,500	12,100	11,500	1.42%
US 17 north of SR 16 (Ferris Street)	715015	20,000	19,700	19,700	19,300	19,100	19,500	21,500	22,000	23,000	22,500	1.39%
US 17 at Gum Street	715019	21,500	21,000	19,800	20,500	20,500	20,400	23,000	23,000	24,500	24,000	1.29%
US 17 at Governors Creek Bridge	710147	25,500	26,000	25,000	27,000	26,500	26,500	28,000	29,000	31,000	29,500	1.74%

Overall, the annual growth rates at the identified count stations averaged between 1.23% and 3.76%.

4.5 FDOT TRENDs Analysis

The 10 years of historical counts, which were collected from the eight FDOT count stations, were then input into the FDOT TRENDs tool. The tool was then used to conduct a linear regression analysis with the assumption that historic growth patterns will continue to the horizon year of 2045. **Table 11** summarizes the results of the TRENDs tool, and the TRENDs outputs are provided in **Appendix J.**

TABLE 11: TRENDs Analysis

Location	Referenced Count Station	TREND Growth Rate
US 17 south of SR 16 (Leonard C Taylor Parkway)	710196	2.69%
US 17 north of SR 16 (Leonard C Taylor Parkway)	710142	2.83%
SR 16 (Leonard C Taylor Parkway) east of US 17	710113	3.93%
US 17 south of SR 16 (Ferris Street)	715016	2.03%
SR 16 (Ferris Street) west of US 17	710151	1.53%
US 17 north of SR 16 (Ferris Street)	715015	1.73%
US 17 at Gum Street	715019	1.80%
US 17 at Governors Creek Bridge	710147	1.90%

4.6 Summary of Growth Rates

The results were compared and a reasonable growth rate along the study corridor was selected. **Table 12** summarizes the results of each method of calculation, as well as the growth rate suggested for future traffic projections. A growth rate of 3.0% was used for Cooks Lane to match the surrounding legs of US 17.

TABLE 12: Growth Rate Summary				
Location	**NERPM-AB Model**	**Historical Traffic Demand**	**TRENDs Analysis**	**Suggested Rate**
US 17 south of SR 16 (Leonard C Taylor Parkway)	3.13%	2.39%	2.69%	3.00%
US 17 north of SR 16 (Leonard C Taylor Parkway)	6.54%	2.09%	2.83%	3.00%
SR 16 (Leonard C Taylor Parkway) east of US 17	5.00%	3.76%	3.93%	4.00%
US 17 south of SR 16 (Ferris Street)	5.74%	1.23%	2.03%	3.00%
SR 16 (Ferris Street) west of US 17	3.86%	1.42%	1.53%	2.00%
US 17 north of SR 16 (Ferris Street)	2.98%	1.39%	1.73%	2.00%
US 17 at Gum Street	2.30%	1.29%	1.80%	2.00%
US 17 at Governors Creek Bridge	3.36%	1.74%	1.90%	2.00%

4.7 Corridor Level of Service

The 2020 FDOT Quality Level of Service tables provided in the Quality/Level of Service Handbook were referenced to complete a planning level analysis of the existing and projected AADT's along the US 17 corridor. Table 1, Generalized Annual Average Daily Volumes for Florida's Urbanized Areas, in The Handbook was used for the limits of the corridor. The volume threshold listed in the table represents the volume required to meet the FDOT's adopted criteria of LOS D. **Table 13** shows the results of the analysis.

TABLE 13: Corridor Level of Service					
Location	**LOS D Volume Threshold**	**2019 AADT**	**2019 LOS**	**2045 AADT**	**2045 LOS**
US 17 south of SR 16 (Leonard C Taylor Parkway)	39,800	14,100	C	25,100	C
US 17 north of SR 16 (Leonard C Taylor Parkway)	39,800	21,500	C	38,300	D
SR 16 (Leonard C Taylor Parkway) east of US 17	39,800	17,800	C	36,300	C
US 17 south of SR 16 (Ferris Street)	32,400	20,000	D	35,600	F
SR 16 (Ferris Street) west of US 17	32,400	11,500	C	17,500	D
US 17 north of SR 16 (Ferris Street)	32,400	22,500	D	34,200	F
US 17 at Gum Street	32,400	24,000	D	36,500	F
US 17 at Governors Creek Bridge	32,400	29,500	D	44,800	F

5.0 Needs

The analysis of existing conditions along the US 17 corridor identified the following needs and opportunities for improvement of the US 17 corridor as it relates to safety, traffic operations, and multimodal transportation.

5.1 Safety Needs

The intersection of US 17 and SR 16 (Leonard C Taylor Parkway) had the highest concentration of observed crashes. This intersection was recently rebuilt in 2018 and crash records from 2019 and 2020 showed a decreasing frequency in crash occurrences. The improvements implemented at the intersection are likely to continue to alleviate the observed trends.

Signal improvements are justified at the US 17 and SR 16 (Ferris Street) intersection based on the high crash frequency likely being sufficient to produce a benefit/cost ratio greater than 1.0.

5.2 Traffic Operations Needs

The *Synchro* analysis performed for existing traffic counts showed that the northbound left-turning movement at the SR 16 (Ferris Street) intersection is operating above capacity. This movement was also referenced as an area of concern in the US 17 Safety and Operational Study completed in 2018. The analysis completed with 2021 turning movement counts supports the 2018 recommendation to lengthen the northbound left-turning lane.

The eastbound right-turning movement at Harbor Road will operate above capacity and was referenced as an area of concern in the previously completed Safety and Operational Study that could be mitigated by adding a second turning lane.

5.3 Multimodal Transportation Needs

The most common deficiencies observed were non-uniform detectable warning mats and pedestrian crosswalk markings in poor condition at the existing intersections. At a minimum, the warning mats and pedestrian crosswalks should be refurbished to meet current standards. Additionally, the missing sidewalk connection at the corner of the Oak Street intersection should be constructed.

The City of Green Cove Springs, as stipulated in their Municipal Code, allows golf cart operation on all city streets. In general, the streets behind the US 17 corridor are developed with single-family residences which have the potential to act as generators of golf cart traffic, especially during special events. Due to the low observed side street volumes at the Walnut Street, Gum Street and Center Street, signalized intersections and low posted speeds on US 17 through downtown Green Cove Springs, golf cart crossings should be considered at these locations. Their proximity to the Green Cove Springs central business district and the Green Cove Springs Park and City Pool increases the demand for bicycles, pedestrians and golf carts. A full study in compliance with FDOT Traffic Engineering Manual Chapter 5 is needed to justify installing a golf cart crossing on a state road.

No shelters are present at the Clay Community Transportation shuttle stops. Providing shelter will encourage continued shuttle service use during unfavorable weather.

Mobility improvements should be implemented via context sensitive solutions which will encourage maximizing existing and future land uses.

6.0 Alternatives

Alternatives were developed to meet the project needs. The alternatives were subdivided into two functional classifications as follows:

- Suburban section from Leonard C Taylor to Oak Street and the Governors Creek Bridge to Orion Street
- Urban or downtown section from Oak Street to Governors Creek Bridge

Concept plans for each alternative are provided in **Appendix K**.

6.1 Typical Section – Suburban Section

One alternative was evaluated for the segments of US 17 with a context classification of C3C – Suburban Commercial. These segments are (1) from the southern terminus of the project at Leonard C. Taylor Parkway to the beginning of the urban curb and gutter section at Oak Street and (2) from the Governors Creek Bridge to Orion Street. The recommended improvements are:

- Reduce the posted speed to 45 mph
- Narrow the travel lanes from their current widths of 12 feet to a proposed width of 11 feet
- Use the additional travel lane width and shoulder to stripe a 7-foot bicycle lane
- Widen sidewalks to 6 feet
- Modify the median to remove the U-turn south of Oak Street
- Modify the median to reduce vehicle conflicts north of the Governors Creek bridge
- Landscape the medians
- Landscape along the sidewalks to create shade
- Construct gateway features at the entrance to the city at Leonard C Taylor Parkway for northbound travelers and Orion Street for southbound travelers

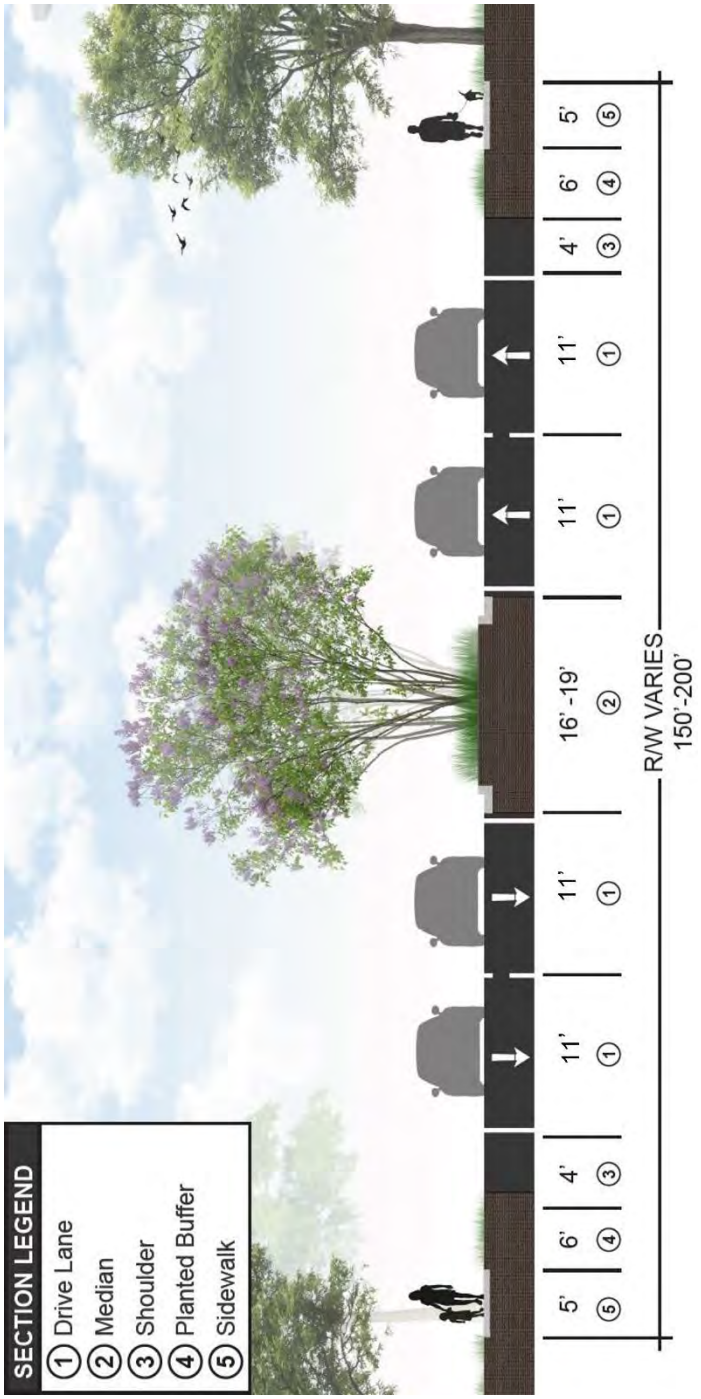
These proposed improvements are mutually exclusive and can be implemented with any of the alternatives proposed for the downtown section from Oak Street to Governors Creek Bridge or independent of the other segment.

When the First Coast Expressway opens in 2024, the southbound to eastbound left-turn at the Leonard C Taylor Parkway is expected to decline as more traffic travels south on US 17 to the First Coast Expressway.

As part of future developments planned south of Leonard C Taylor, Pearse Boulevard will be constructed to connect US 17 to SR 16 Ferris Street west of the city. This bypass may also allow traffic to avoid traveling through the downtown area, reducing traffic at this intersection.

Figure 18 shows the proposed typical section for Alternative 1.

FIGURE 17: Alternative 1 – Suburban Section



6.2 Typical Section Downtown

Three alternative typical section options were evaluated for the downtown segment of the corridor.

- Typical Section Option 1 includes leaving the existing curb and gutter in place, narrowing the travel lanes to 11 feet, constructing a 16-foot median. The 16-foot median will accommodate constructing left-turn lanes at signalized intersections. The sidewalks will be widened to 6 feet. This option is shown in **Figure 19.**
- Typical Section Option 2 includes reconstructing the curb and gutter by widening the sidewalks to 8 feet, narrowing the travel lanes to 10 feet and constructing a 13-foot median. The 13-foot median accommodates constructing left-turn lanes at signalized intersections. This option is shown in **Figure 20.**
- Typical Section Option 3 includes reconstructing the curb and gutter to widen the sidewalks and implement an undivided section with two 10-foot lanes in each direction. The sidewalks will be widened to as much as 18 feet with this alternative. This option is consistent with the proposed typical section in the City's Master Plan and is shown in **Figure 21**.

US 17 is a Strategic Intermodal System (SIS) facility. The SIS is Florida's high priority network of transportation facilities important to the state's economy and mobility. It connects each urban area in the state with key centers of intermodal and economic activity.

The minimum criteria are 11-foot travel lanes, 16-foot median and a 35-mph design speed. Option 1 is the only typical section that meets these criteria. Implementing Option 2 or Option 3 will require design variations from the FDOT's Strategic Intermodal System design criteria.

Typical Section Option 2 was eliminated from further consideration across the entire segment. This is due to Option 2 not meeting the minimum lane widths for SIS Facilities of 11-feet.

The preferred alternative consists of Typical Section Option 1 with a limited application of Typical Section Option 2 at the Walnut Street intersection. This intersection is the activity center or focal point of downtown. This option allows the city to widen the sidewalks, provide additional landscaping and demarcate this focus for travelers while still providing left-turn lanes. Implementing this option will require a design variation from Strategic Intermodal System design standards for lane width and median width.

Typical Section Option 3 was eliminated from further consideration because US 17 is a Strategic Intermodal System facility and the proposed section is more consistent with a local collector.

FIGURE 18: Downtown Typical Section Option 1

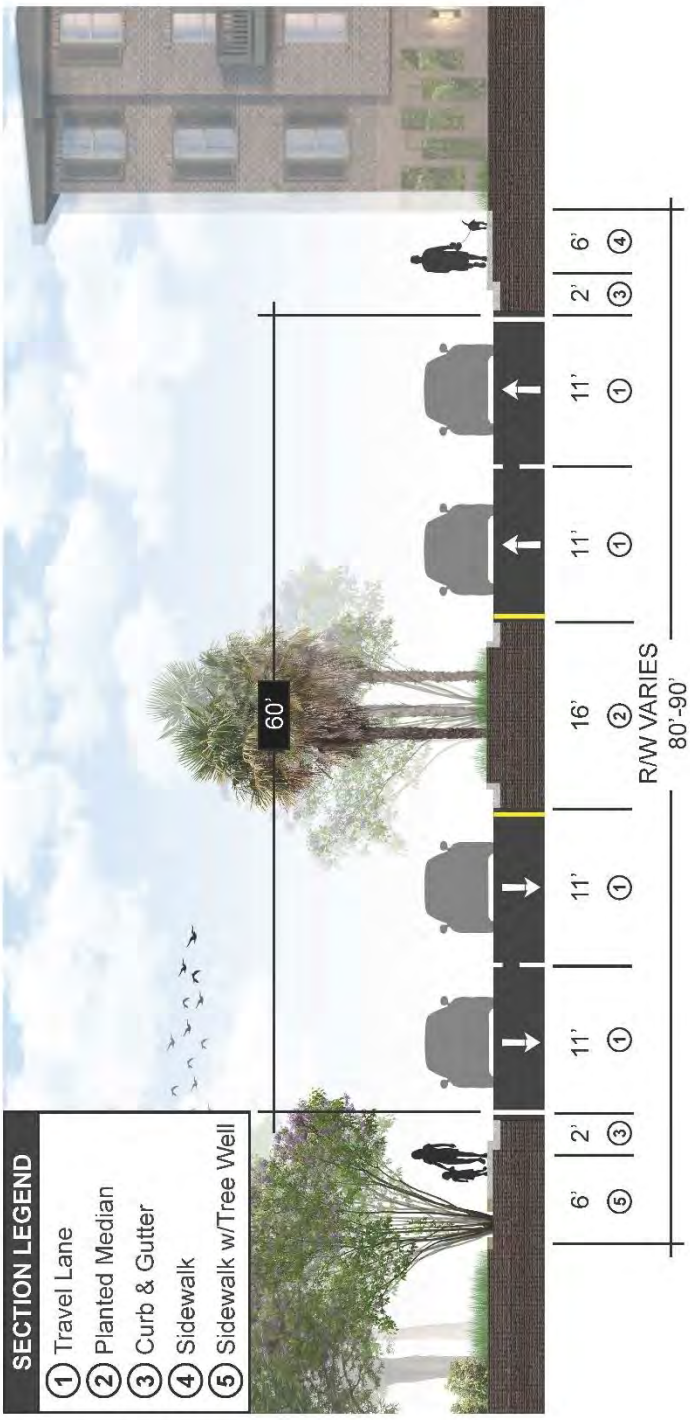


FIGURE 19: Downtown Typical Section Option 2

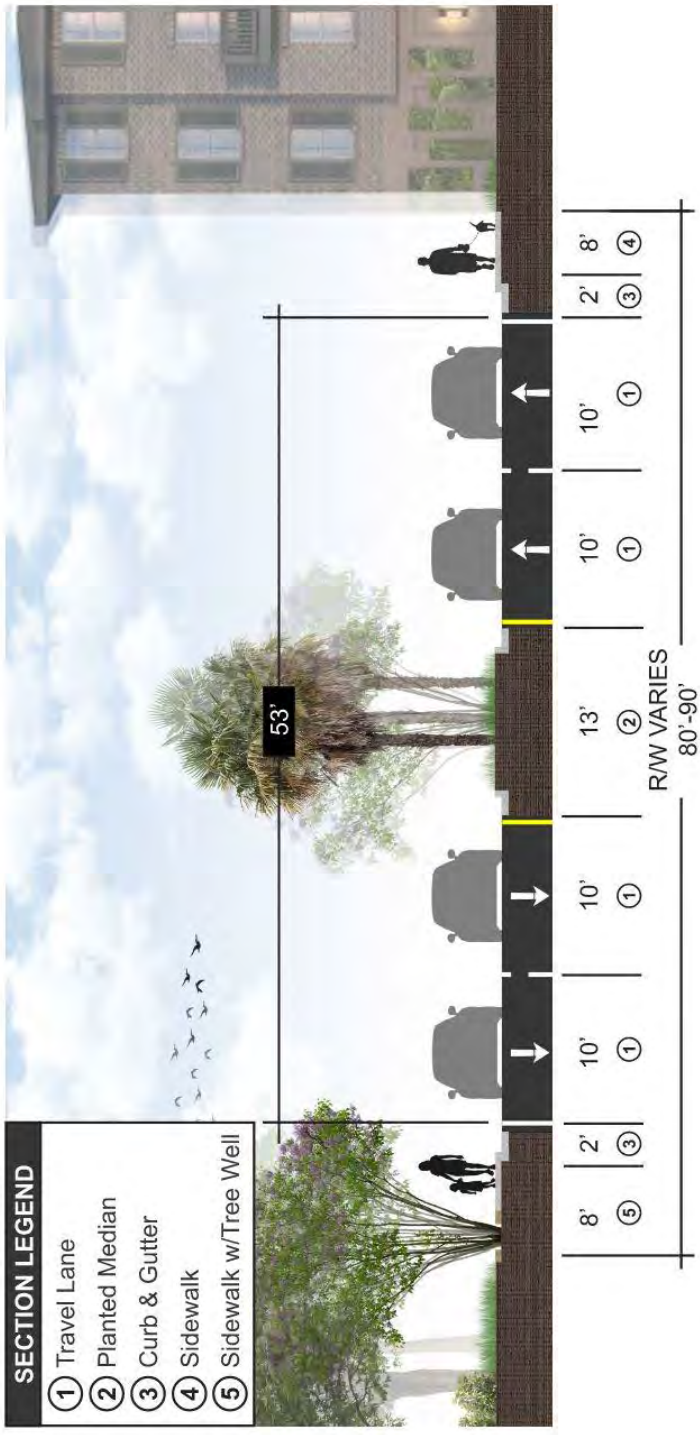
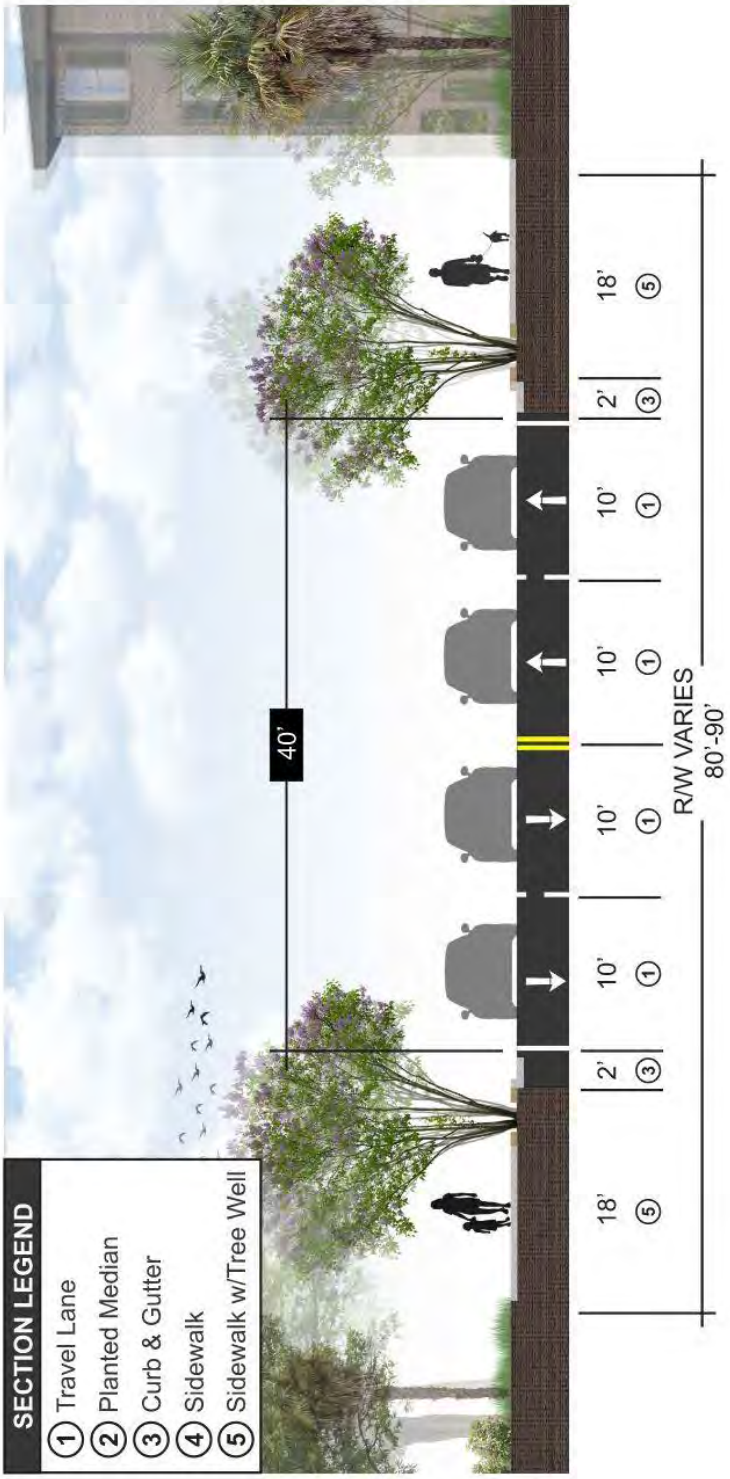


FIGURE 20: Downtown Typical Section Option 3



6.3 Alignment Alternatives Downtown

The alignment alternatives considered different approaches to intersection design and access management. All alternatives will:

- Maintain the posted speed limit as 35 mph.
- Improve access management to bring driveways to existing criteria along the corridor to remove conflicts and enhance safety.
- Reconstruct curb ramps to meet current Americans with Disabilities standards.
- Construct mast arms at each signalized intersection.
- Upgrade traffic signal controllers to meet current standards.
- Retime the traffic signal timing to meet the current needs.

Alternative 1 proposes the following:

- Close the median opening for the Elks Lodge north of Leonard C Taylor Parkway and provide a U-turn median to allow the Elks Lodge travelers to make an indirect left-turn. This alternative was proposed to avoid left-turning (to southbound US 17) vehicles from the Elks Lodge crossing the southbound to eastbound left-turn queue at the Leonard C Taylor Parkway intersection.
- Close the median opening at Bay Street to provide queue storage for the northbound to westbound left-turn movement at Ferris Street.
- Increase the radius of the eastbound to southbound right turn lane to accommodate turning movements of combination trucks. This concept was evaluated as part of a prior study performed by FDOT.
- Construct left-turn bays at the signalized intersections along the corridor.
- Golf cart signals at Walnut Street and Center Street were evaluated.
- Extend the median through the intersection at Governors Street that does not allow left turns from Governors Street.
- Construct a traffic separator on the Governors Creek Bridge.
- Modify the median to reduce the number of potential vehicle conflict points between the Governors Creek Bridge and Harbor Road

Alternative 2 differs from Alternative 1 as follows:

- The eastbound to southbound right-turn lane at Ferris Street is not improved.
- Walnut Street is realigned to widen the sidewalk that is needed to accommodate a signalized golf cart crossing within the intersection where the golf carts use a designated crossing space adjacent to the special emphasis pedestrian crossing areas.
- An alternative access management approach to the segment north of the Governors Creek bridge to Harbor Road that eliminates the left-turn out of the boat ramp and forces drivers to travel north and make a U-turn at the intersection.

Alternative 3 consists of the following:

- The median opening for the Elks Lodge was modified to provide a "set-up" lane where the left turn queue storage is extended as one lane beyond the median opening to accommodate both the design queue length and the ability for vehicles to turn left from the Elks Lodge.
- The full design left-turn lane for the northbound to westbound left turn from US 17 to Ferris Street is proposed which requires the median to close left turns at Cove Street and Bay Street.
- The eastbound to southbound right-turn lane at Ferris Street is widened to accommodate the combination truck design radius.
- At Walnut Street the lanes are narrowed to 10 feet and the median is reduced to 13 feet to allow the sidewalk to be widened. This will require reconstruction of the curb, gutter and drainage within the limits of construction (implement Typical Section Option 2 at the intersection only).
- Signalized golf cart crossings are proposed at Walnut Street.
- The median is extended through the Palmer Street intersection to eliminate left-turns.
- Signalized golf cart crossings are proposed at Center Street.
- The median is extended through North Street intersection to eliminate left-turns.
- Extend the median through the intersection at Governors Street that does not allow left turns from Governors Street as shown in Alternative 1.
- Construct a traffic separator on the Governors Creek Bridge.
- Modify the median to reduce the number of potential vehicle conflict points between the Governors Creek Bridge and Harbor Road as shown in Alternative 1.

Alternative 4 is similar to Alternative 3 except for the following:

- No signalized golf cart crossings are proposed. The side street approaches on Center Street and Gum Street will be widened to provide one left-turn lane and one through-right turn lane on each approach. This is required by FDOT to allow golf carts to use the travel lanes on the side streets to cross US 17. The crossings are by permit and an engineering and safety analysis must be submitted to FDOT to implement.

Other Alternatives Considered but Not Advanced

In addition to the alternatives shown on the concept layouts in **Appendix K,** the following were evaluated.

1. Continuous Flow Intersection at Leonard C Taylor Parkway

This alternative evaluated using a displaced southbound to eastbound left-turn lane and constructing a new signal along Leonard C Taylor Parkway. The left-turn movement will likely be reduced in the future with the construction of SR 23 First Coast Expressway interchange with US 17. When the interchange is opened, the current left-turn volumes are likely to travel southbound to the interchange and avoid the delay resulting from narrowing Leonard C Taylor to two lanes east of the intersection.

2. Jug-handle Intersection at SR 16 Ferris Street

This alternative included the following:

- Adding a new signal at US 17 Orange Avenue and Bay Street. A northbound left-left will be constructed at Bay Street.
- Restricting the northbound left turns will be allowed at SR 16 Ferris Street.
- Accommodating a northbound to westbound left-turn movement along Bay Street and Palmetto Avenue. From Palmetto Avenue the traffic will turn right and travel to SR 16 Ferris Street. Stop signs will be placed to make this movement a continuous flow through the Bay Street and Palmetto Avenue intersection.
- Adding a new signal at Palmetto Avenue and SR 16 Ferris Street to accommodate a left-turn.

This alternative was eliminated since the total delay resulting from adding the two new signals is greater than the existing configuration. This alternative will also route traffic through the residential area along Bay Street and Palmetto Avenue.

3. Roundabout on US 17 Orange Avenue south of Orion Street

This alternative considered constructing a roundabout as an entry feature to the city for travelers from the north. The alternative was eliminated based on a traffic analysis that showed that the roundabout will operate at a substandard LOS.

6.4 Preferred Alternative

A preferred alternative is recommended that consists of elements of the alternatives proposed above. The final recommendations were based on a review of the design concepts with FDOT and city staff. The following summarizes the preferred alternative. **Figure 22** below provides a layout of the preferred alternative.

Typical Section and Corridor-wide Improvements

- Widen and reconstruct sidewalks to 6 feet
- Add landscaping adjacent to sidewalks to create shade
- Construct landscaping in the median between Leonard C Taylor Parkway and Oak Street
- Construct a median with landscaping between Oak Street and Governors Creek Bridge
- Implement access management strategies to improve safety
- Construct landscaping in the median between Governors Creek Bridge and Orion Street
- Add a traffic separator on the Governors Creek Bridge
- Replace strain poles with mast arms at all signals
- Implement traffic signal controllers and timing
- Mill and resurface pavement within the limits of the project
- Add entry features at city limits
- Suburban Typical Section from Leonard C Taylor Parkway to Oak Street
- Downtown Typical Section Option 1 from Oak Street to Governors Creek Bridge
- Downtown Typical Section Option 2 at Walnut Street intersection
- Suburban Typical Section from Governors Creek Bridge to Orion Street
- Add colored asphalt at all pedestrian crossings within intersections

Intersection Improvements

- Leonard C Taylor Parkway
    - Extend left-turn lanes to accommodate design queues
    - Maintain the median opening for Elks Lodge drivers to make a left turn
    - Provide a “set-up” lane to extend the queue storage past the median opening
    - Construct mast arms
    - Construct entry feature for northbound entry to city
    - Begin mill and resurfacing
- Oak Street (Unsignalized)
    - Provide left turn lanes northbound and southbound
- Cove Street (Unsignalized)
    - Make right-out only because median extends through the intersection

Figure 21 - US-17 / South Orange Avenue
JUNE 2022

GREEN COVE SPRINGS, FLORIDA

Figure 21 - US-17 / South Orange Avenue - Section One
JUNE 2022

GREEN COVE SPRINGS, FLORIDA

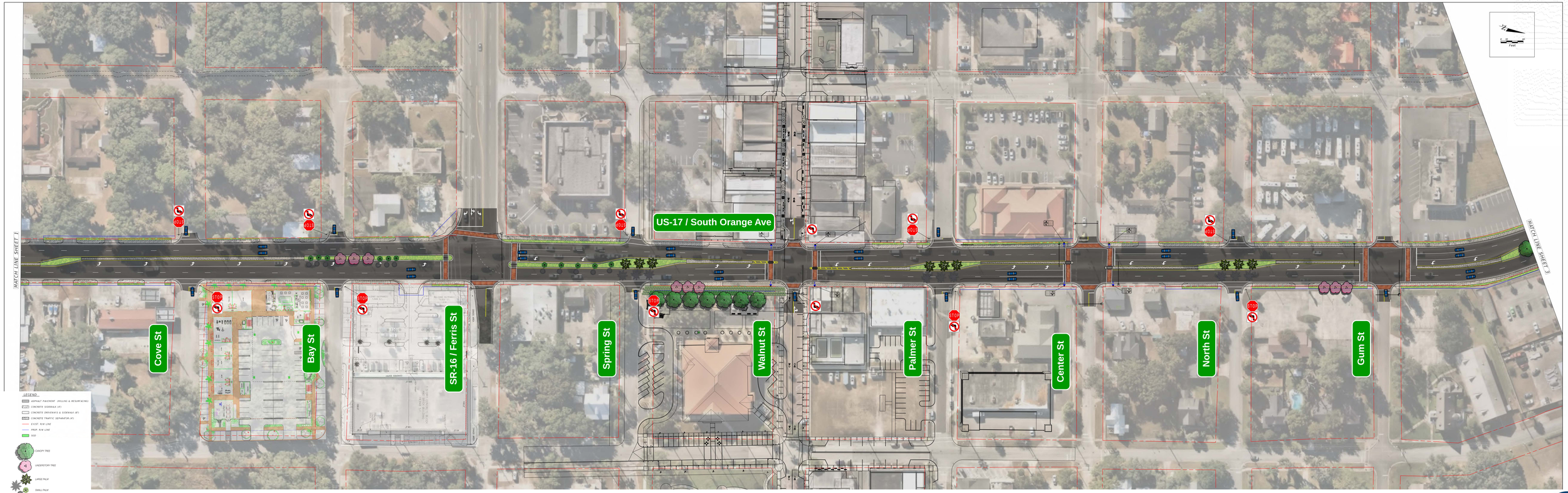


Figure 21 - US-17 / South Orange Avenue - Section Two
JUNE 2022

GREEN COVE SPRINGS, FLORIDA

GRAPHIC SCALE: 1"=40'

Figure 21 - US-17 / South Orange Avenue - Section Three
JUNE 2022

GREEN COVE SPRINGS, FLORIDA

GRAPHIC SCALE: 1"=40'

Figure 21 - US-17 / South Orange Avenue - Section Four
JUNE 2022

GREEN COVE SPRINGS, FLORIDA

GRAPHIC SCALE: 1"=40'

Figure 21 - US-17 / South Orange Avenue - Section Five
JUNE 2022

GREEN COVE SPRINGS, FLORIDA

GRAPHIC SCALE: 1"=40'

- Bay Street (Unsignalized)
  - Make right-out only because median extends through the intersection

- SR 16 Ferris Street
  - Improve eastbound to southbound right turn lane radius to accommodate combination trucks
  - Provide left turn lanes northbound and southbound
  - Construct mast arms
- Spring Street (Unsignalized)
  - Make right-out only because median extends through the intersection
- Walnut Street
  - Provide left turn lanes northbound and southbound
  - Construct mast arms
  - Narrow travel lanes to 10 feet
  - Widen sidewalk on US 17 Orange Avenue to provide additional landscaping and create focal location
  - Widen sidewalk on Walnut Street to provide bulb-outs
  - Reassign Walnut Street approaches to one lane that accommodates left-, through- and right-turn lanes
  - This alternative will require a design variation from FDOT for lane width and median width
- Palmer Street (Unsignalized)
  - Make right-out only because median extends through the intersection
- Center Street
  - Provide left turn lanes northbound and southbound
  - Construct mast arms
  - Widen Center Street on eastbound approach to construct left-turn lane
  - Sign golf cart crossing of US 17 Orange Avenue
- North Street (Unsignalized)
  - Make right-out only because median extends through the intersection
- Gum Street
  - Provide left turn lanes northbound and southbound
  - Construct mast arms
  - Widen Center Street on eastbound approach to construct left-turn lane
  - Sign golf cart crossing of US 17 Orange Avenue
- Bayard Street (Unsignalized)
  - Provide left turn lanes northbound and southbound
- Walburg Street (Unsignalized)
  - Provide left turn lanes northbound and southbound
- Grove Street (Unsignalized)
  - Provide left turn lanes northbound and southbound

- Governors Street
    - Provide left turn lanes northbound and southbound
    - Add a new traffic signal
    - Construct mast arms
    - Make McDonalds driveway right-turn in and out only
- Boat Ramp Entrance (Unsignalized)
    - Construct directional median opening with southbound left-turn lane
    - Construct directional median southbound lane
- Magnolia Layne Shopping Center (Unsignalized)
    - Construct northbound left-tun lane
    - Construct southbound right-turn lane at south entrance
    - Construct southbound right-turn lane at north entrance
- Haven Avenue (Unsignalized)
    - Construct northbound right-turn lane
    - Make right-turn and right-out only
- Harbor Road
    - Construct northbound and southbound left-turn lanes
    - Construct mast arms
    - Construct southbound right-turn lane
- Orion Road (Unsignalized)
    - End mill and resurfacing
    - Construct entry feature for northbound entry to city

Drainage Improvements and Permitting

No stormwater management facilities are currently provided. The existing roadway discharges directly to the St. Johns River or Governors Creek, a tributary of the St. Johns River depending on the location.

FDOT replaced two substantial storm drain systems located on US 17 Orange Avenue in the City of Green Cove Springs in 2005. The storm drains accept runoff from existing city storm drain systems. Both storm drains eventually discharge to the St. Johns River at Gum and Walberg Streets. An environmental resource permit was issued for US 17 Orange Avenue in 2004 that resurfaced and made drainage improvements along the corridor, ERP 93019-1.
https://permitting.sjrwmd.com/ep/#/prmtInfo?curId=&hdr=1&usrId=0&offclId=93019&seqNo=1

The preferred alternative requires reconstructing the existing drainage structures where the curb and gutter is being modified in the SR 16 Ferris Street and Walnut Street intersections. No new treatment facilities are anticipated to be required based on the following justification:

- The preferred alternative is a safety improvement.
- The proposed storm drain pipe will be equivalent to the existing pipes.

- The peak discharge resulting from the project will be reduced since the impervious area is reduced with median's construction.

An exemption application must be filed with the St. Johns River Water Management District.

Bridges and Structures

A median traffic separator is proposed on the Governors Creek Bridge. No structural evaluations were performed as part of the corridor study.

Aesthetics and Landscaping

Landscaping is proposed along the corridor within the proposed median along sidewalks. The final design shall follow FDOT's Plant and Turf Grass Selection Guide included in the FDOT Landscape Guide: https://www.fdot.gov/docs/defaultsource/designsupport/highwaybeautification/beauty/LandArch/Landscape-Guide.pdf

Typical plantings may include the following:

- Ground cover such as mondo grass
- Understory shrubs such as oleander
- Canopy trees such as water oaks
- Understory trees such as crepe myrtles
- Palm tree such as rural or cabbage palms
- Small palms such as windmill palms

Tree wells are shown on the concept layout at the back of the sidewalk. This location is shown in lieu of at the back of curb to maximize the number of trees that can be placed. Fewer trees can be constructed at the back of curbs to maintain stopping sight distance sight-lines in this urban environment.

Stamped and colored concrete is proposed at pedestrian crossing along US 17 and each side street to emphasize the pedestrian movements.

Decorative sidewalk pavers in the bulb outs and sidewalk widening can also be considered.

Lighting

Lighting at signalized intersections are proposed to meet current FDOT criteria to enhance safety.

6.5 Potential Impacts of the Project

Potential Right-of-Way Impacts

Project impacts were analyzed using GIS maps. The following summarizes the potential impacts:

A total of 48 parcels will be impacted as follows:

- Relocate one business
- Acquire right-of-way at 17 parcels
- Create temporary construction easements at 30 parcels

Potential Environmental Impacts

Multiple potential contamination sites are present along the study corridor. The work outside the right of way in parcel acquisitions and temporary construction easements also includes contamination risks.

No other environmental impacts are anticipated as part of the project.

Cost Estimates

A cost estimate was prepared for the project and is included in **Appendix M** and is summarized in **Table 14.**

TABLE 14: Corridor Level of Service

Element	Millions of 2022 Dollars
Construction	$10.2
Right of Way	$4.9
Support Costs	$2.1
Total	**$17.2**

6.6 Potential Benefits

The potential benefits of the project result from the following:

- Constructing the median and removing the continuous two-way left turn lane is shown to reduce traffic crashes by 23%. The benefits are estimated to be $31 million per year over the 20- year project life.
- Implementing context sensitive solutions will stimulate redevelopment within a community where there are vacant and underutilized parcels. There are 26 vacant parcels and 78 parcels that are underutilized (where the values of the buildings are less than 30% of the total assessed value of the property). Low-, medium- and high-range estimates of the project's economic benefits through each underutilized and vacant parcel to reach economic potential range from $76 to $90 million over the 20-year project life.
- Improved operations by adding the median and accommodating design queues, traffic signal retiming have the potential to improve travel time reliability and reduce delays.
- The project will realize traffic operations, safety and redevelopment improvements worth $136 million of potential benefits, resulting in an 8:1 benefit/cost ratio over the 20-year project life.

7.0 Public Engagement

A special meeting of the Green Cove Springs City Council was conducted June 7, 2022 at 5 p.m. The meeting began with a presentation summarizing the project. A question-and-answer session and public comment period followed. The following summarizes the major themes of the discussion:

- Restricting movements from the side streets was a concern by some attendees. Specific comments included:
  - Consider a traffic signal at Palmer Street or Spring Street with left turns instead of Walnut Street
  - Provide a protected left-turn at Haven Street or Orion Road
- Make the Walnut Street intersection more people friendly and less auto friendly.
- Relieve traffic on Ferris Street from the left turns and south to the Dollar Tree and Prelude Development.
- Consider a new alignment with Harbor Road and Haven Road to combine the intersections with a single signal.
- Provide golf carts crossings to enhance the accessibility to the community core at Walnut Street and the vicinity of city hall. Multiple events occur in this area each year.

8.0 Summary and Next Steps

The North Florida Transportation Planning Organization (TPO) conducted this corridor study to evaluate the approximately 2.4 miles of US 17 from SR 16 (Leonard C Taylor Parkway) to Orion Road. The study is intended to develop and evaluate alternatives which will help to improve the users' experience of US 17 within the city limits through traffic operations, hardscape and streetscape improvements. The project's purpose is to:

- Create a sense of community
- Enhance safety
- Improve traffic operations
- Meet future transportation demand

The preferred alternative consists of the following:

- Widen and reconstruct sidewalks to 6 feet
- Add landscaping adjacent to sidewalks to create shade
- Construct landscaping in the median between Leonard C Taylor Parkway and Oak Street
- Construct a median with landscaping between Oak Street and Governors Creek Bridge
- Implement access management strategies to improve safety
- Construct landscaping in the median between Governors Creek Bridge and Orion Street
- Add a traffic separator on the Governors Creek Bridge
- Replace strain poles with mast arms at all signals
- Implement traffic signal controllers and timing
- Mill and resurface pavement within the limits of the project
- Add entry features at city limits
- Make intersection improvements to enhance safety and improve operations
- Widen Center Street and Gum Street to provide golf cart crossings
- Add colored asphalt at all pedestrian crossings within intersection

The project is anticipated to cost $17 million.

The project will realize traffic operations, safety and redevelopment improvements resulting $136 million of potential benefits resulting in an 8:1 benefit/cost ratio.

Recommended next steps include:

- Coordinate with FDOT and the North Florida TPO on the potential funding for the project including adding to a planned resurfacing project along US 17. Any right-of-way acquisition to implement the project will be performed by FDOT.
- Develop maintenance agreements for the decorative asphalt, pavers and landscaping.
- Establish a funding mechanism to ensure the City's maintenance responsibilities are sustainable.