North Florida TPO
Transportation Planning Organization
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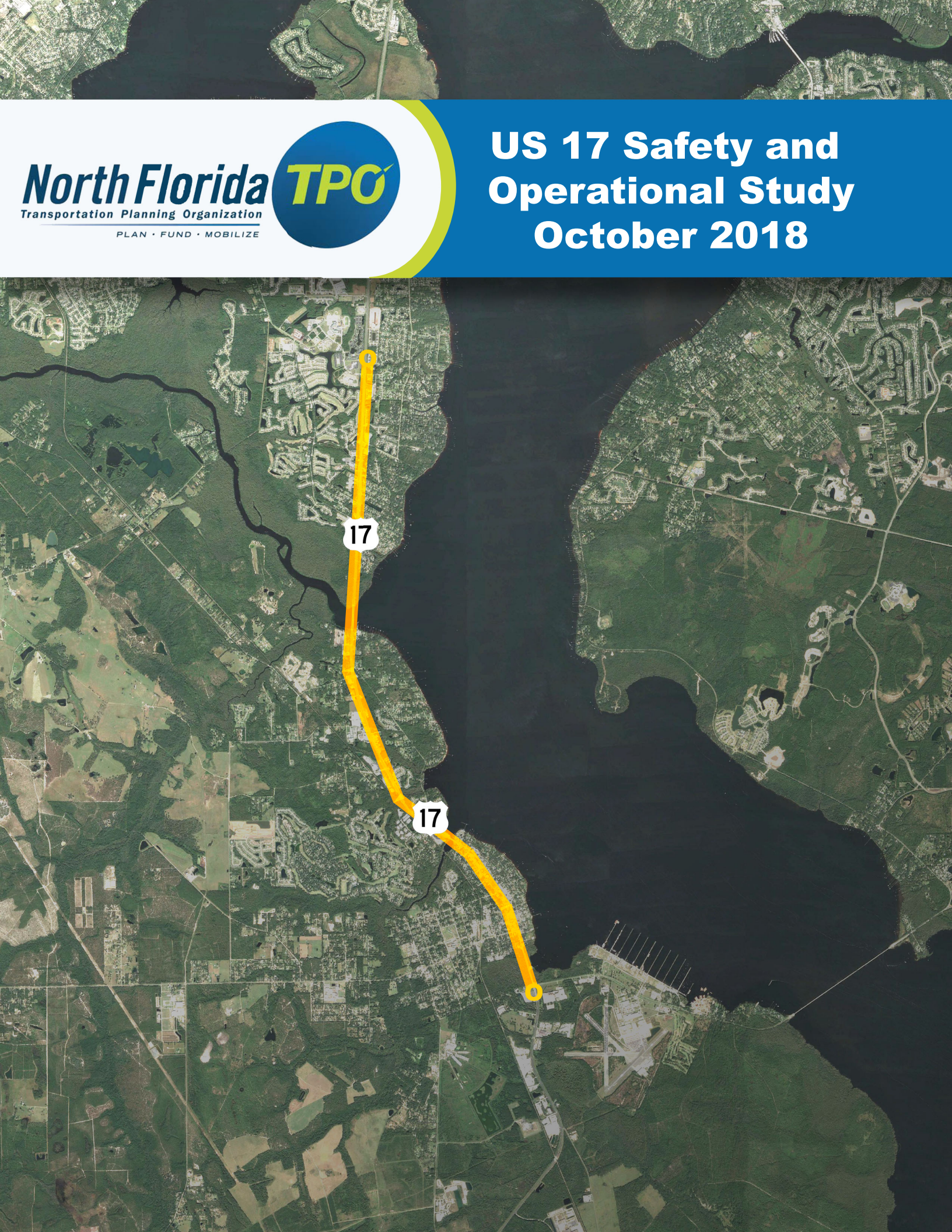
US 17 Safety and Operational Study
October 2018



US 17 CLAY COUNTY TRAFFIC STUDY

Prepared for:

North Florida TPO
Transportation Planning Organization
PLAN • FUND • MOBILIZE

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EXECUTIVE SUMMARY

Clay County has experienced continuous, sustained growth for the past several years. The County's population was 140,814 in 2000, 190,865 in 2010, and 203,967 in 2015. With this ongoing increase, traffic conditions will continue to deteriorate. One area impacted by this growth is the US 17 corridor and adjacent roadways from Green Cove Springs north to Fleming Island.

To address traffic and safety-related impacts in this area, the North Florida TPO tasked England-Thims & Miller, Inc. (ETM) with determining potential/reasonable improvements. The study area for this US 17 project is bordered by SR 16/Leonard C. Taylor Parkway to the south and Radar Road to the north (approximately 8.2 miles). This study identifies operational and safety improvements including access-management and intersection-configuration modifications. Specific focus areas include crash histories, needs of pedestrians/cyclists, existing vehicle queues, etc. Existing conditions (2018) and projected conditions (2035) were used to identify roadway segments and intersections where travel times, delays, and congestion are expected to significantly increase.

Potential traffic-flow improvements were identified and analyzed. Planned local-roadway projects and any proposed enhancements to US 17 were considered and recommendations were developed. To address the anticipated traffic impacts generated by this area's continued growth, a proactive plan is suggested.

Numerous options to improve traffic flow within the study area (from south to north) were considered and/or identified, as follows:

1. The signalized intersection of US 17 at SR 16/Leonard C. Taylor Parkway/Cooks Lane – Several improvements were identified. However, FDOT has a project (FN 436118-1-52-01) that will address capacity as well as safety issues at this intersection. This project is currently under construction and is expected to operate at Level-of-Service (LOS) "A" when the project is complete. Traffic projections indicate this intersection should experience LOS "C" operations during the 2035 AM and PM peak periods.

2. The signalized intersection of US 17 and SR 16/Ferris Street – The northbound through traffic often backs up and blocks the short (96' including taper) northbound left-turn lane. Motorists queue through the southbound left-turn lane for Bay Street. The northbound left-turn lane for SR 16/Ferris Street should be extended which will require closing the existing access to/from Bay Street. Motorists on US 17 wishing to access Bay Street, and motorists on Bay Street wishing to turn left onto US 17, will need to use nearby access points. Specifically, Ferris Street and Cove Street parallel Bay Street (north and south, respectively); Magnolia Avenue and Palmetto Avenue parallel US 17 (east and west, respectively). It should be noted that during field reviews very little traffic was observed on Bay Street.

   Additionally, the pedestrian crosswalks and stop bars are badly faded and should be refurbished. FDOT recently studied this location and their May 2017 report includes these recommendations. This intersection currently operates at LOS "C" in the AM peak and LOS "D" for the PM peak. Traffic projections indicate this intersection should experience LOS "C" operations during the 2035 AM peak hour and LOS "D" operations during the 2035 PM peak hour. Although the southbound thru movement is expected to experience LOS "E" results by 2035, constructing a dedicated right-turn bay for the southbound-to-westbound movement will improve the southbound approach to LOS "D".

3. The signalized intersection of US 17 and Walnut Street – Because the existing traffic volumes are minimal to/from Walnut Street, removing the traffic signal was considered. This could be accomplished by revising the access management (i.e., constructing a directional median opening at this location). However, because visibility is limited, especially from the west leg of Walnut Street, removing the signal is not recommended at this time. The pedestrian crosswalks should be refurbished to satisfy current requirements. This intersection currently operates at LOS "A" during the AM and PM peak periods. Traffic projections indicate this intersection should continue to operate at LOS "A" during the 2035 AM and PM peak periods.
4. The signalized intersection of US 17 and Center Street – The possibility of removing the traffic signal was considered but is not recommended at this time. However, the pedestrian crosswalks should be refurbished to satisfy current requirements. This intersection currently operates at LOS "A" during the AM and PM peak periods. Traffic projections indicate this intersection should continue to operate at LOS "A" during the 2035 AM and PM peak periods.
5. The signalized intersection of US 17 and Gum Street – Because the existing traffic volumes are minimal to/from Gum Street, removing the traffic signal was considered. This could be accomplished by changing the access management (i.e., constructing a directional median opening at this location). However, because visibility is limited, especially traveling from Gum Street, removing the signal is not recommended at this time. The pedestrian crosswalks should be refurbished to satisfy current requirements. This intersection currently operates at LOS "A" during the AM and PM peak periods. Traffic projections indicate this intersection should continue to operate at LOS "A" during the 2035 AM and PM peak periods.
6. The signalized intersection of US 17 and Houston Street – Significant eastbound-to-northbound left-turn volumes (especially during the PM peak period) exist at this location. These left turns also represent the majority of Houston Street's west-leg approach volumes throughout the day. Consideration should be given to providing dual-left turns from the west leg by re-striping the existing thru/right lane to a shared left/thru/right lane. An additional left-turn signal head will be required and the intersection's signal operation will need to be split-phased (for the side-street approaches). In addition, the pedestrian crosswalks should be refurbished to satisfy current requirements and the stop bars on Houston Street should be re-striped. This intersection currently operates at LOS "B" during the AM peak period and LOS "C" during the PM peak period. Traffic projections indicate this intersection should operate at LOS "C" during the 2035 AM peak period and LOS "D" in the 2035 PM peak period.
7. The unsignalized intersection of US 17 at Governor Street – This location was analyzed to determine if a traffic signal should be installed. However, traffic volumes fall well short of the minimum thresholds needed to satisfy a signal warrant. In addition, only one crash report included a collision that could be corrected by installing a traffic signal. For these reasons, no improvements are recommended at this time.
8. The signalized intersection of US 17 and Harbor Road – The southbound-to-westbound right-turn movement is marked as a free-flow slip lane. However, there is no "Yield" sign for this movement. Also, the west leg has a marked pedestrian crosswalk that also crosses the slip lane but has no pedestrian warning signs. A "Yield" sign and pedestrian warning signs should be installed at this location for this right-turn movement. In addition, the pedestrian crosswalks should be refurbished to satisfy current requirements and the intersection's pavement markings should be refurbished. This intersection currently operates at LOS "B" during the AM peak period and LOS "C" during the PM peak period. Traffic projections indicate this intersection will operate at LOS "C" during the 2035 AM peak period and at LOS "E" during the PM peak

period. However, the Harbor Road approach will operate at LOS F during the PM peak period. If a second lane is constructed to service the Harbor Road traffic, as a shared left/right lane, the intersection's operation in 2035 will improve to LOS "C". An additional left-turn signal head will be required and the intersection's signal operation will need to be split-phased for the side-street approaches.

9. The signalized intersection of US 17 and CR 315 – This intersection currently operates at LOS "B" during the AM and PM peak periods. However, traffic projections indicate this intersection will fail during the 2035 AM peak period and will operate at LOS "D" in the 2035 PM peak period. During the AM peak period, both the eastbound-to-northbound left turns and the southbound thrus are expected to experience unacceptable delays. However, if a second CR 315 left-turn lane is added, the intersection operation is expected to improve to LOS "D". An additional left-turn signal head will be required and the intersection's signal operation will need to be split-phased for the side-street approaches. In addition, the intersection's pavement markings should be refurbished.
10. The signalized intersection of US 17 and CR 209/Russell Road – This intersection currently operates at LOS "C" during both the AM and PM peak periods. However, traffic projections indicate this intersection will fail during the 2035 AM and PM peak periods. Adding a dedicated eastbound right-turn lane, converting the existing eastbound right/thru lane to a shared left/thru lane and restriping the northbound gore area to provide a second left-turn lane will allow the intersection to operate at LOS "D" during the 2035 peak periods. This will require two lanes westbound and additional signal heads. The intersection's signal operation will also need to be split-phased for the side-street approaches. At least 400' of traffic-separator median should also be constructed on Russell Road between eastbound and westbound traffic.
11. The unsignalized intersection of US 17 and Town Center Boulevard/Margarets Walk Road – This location was analyzed to determine if a traffic signal should be installed. However, traffic volumes fall well short of the minimum thresholds to satisfy a signal warrant. In addition, within a 3-year period, only two crash reports included a collision that could be corrected by installing a traffic signal. For these reasons, no improvements are recommended at this time. It should be noted that during the 2035 PM peak hour, the southbound thru volumes increase to the point that the northbound left turns are not provided sufficient gaps. In turn, this impacts the left turns from both side streets. This indicates a traffic signal may be warranted prior to the 2035 design year.
12. The signalized intersection of US 17 and Fleming Plantation Boulevard/Hibernia Road – This intersection currently operates at LOS "C" during both the AM and PM peak periods. Traffic projections indicate this intersection will operate at LOS "D" during the 2035 AM and PM peak periods.
13. The signalized intersection of US 17 and Village Square Parkway/Water Oak Lane – This intersection currently operates at LOS "C" during the AM peak period and at LOS "D" during the PM peak period. However, traffic projections indicate this intersection will fail during the 2035 AM and PM peak periods. Adding a second eastbound left-turn lane by restriping the thru lane to a shared left/thru lane is recommended. Adding a dedicated westbound right-turn lane is also recommended. An additional left-turn signal head will be required and the intersection's signal operation will need to be split-phased for the side-street approaches. If implemented, the 2035 peak periods will improve to LOS "D".

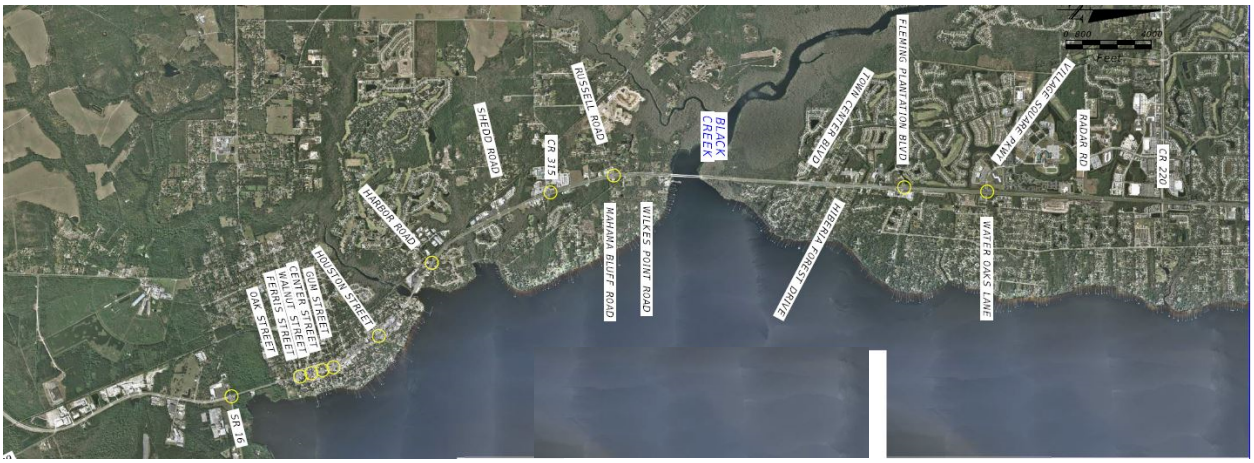
14. The unsignalized intersection of US 17 at Radar Road/Pine Forest Drive – This location was analyzed to determine if a traffic signal should be installed. Traffic volumes fall well short of any of the minimum thresholds to satisfy a signal warrant. Within a 3-year period, four crash reports included a collision that could be corrected by installing a traffic signal. For these reasons, no improvements are recommended at this time.
15. Several potential improvements to the sidewalk network in this area seem reasonable, including constructing new sidewalks to eliminate existing gaps and ensuring all sidewalk ramps are ADA-compliant.
16. The only designated bike lanes that exist within the study area are located on both sides of US 17 south of CR 220. Bike lanes exist on both shoulders from CR 220 south to just north of Fleming Plantation Boulevard/Hibernia Road and then from CR 209/ Russell Road south to CR 315. Consideration should be given to continuing the bike lanes on US 17 when future roadway improvements are implemented.
17. A separated multi-use trail is located on the west side of and parallel to US 17 that is part of Black Creek Trail between CR 220 and Margarets Walk Road/Town Center Boulevard. Another trail segment exists on the west side of and parallel to US 17 between Ball Road and CR 209/Russell Road. At Russell Road, this trail crosses US 17 and continues south to just north of the Governors Creek Bridge at the public boat ramp. Consideration should be given to connecting the trail network between Margarets Walk Road/Town Center Boulevard and Ball Road across Black Creek, a distance of approximately one mile.
18. As a general note, it is recommended that when signal-reconstruction projects occur throughout this corridor, back-plates should be provided with all new signal heads, and four-section, flashing-yellow-arrow signal heads should replace any existing five-section cluster signal heads to service protected/permitted left turns.
19. Consideration should be given to provide ITS communication capabilities for traffic signals south of Fleming Plantation Boulevard/Hibernia Road. This improvement will benefit Clay County by allowing remote monitoring and maintaining signal coordination.
20. A final recommendation is to provide advanced intersection warning signs at several intersections, including SR 16/Leonard C. Taylor Parkway/Cooks Lane, Harbor Road, CR 315, CR 209/Russell Road, Fleming Plantation Boulevard/Hibernia Road, Village Square Parkway/Water Oak Lane, and Copper Stone Drive. Additional side streets may also benefit from this upgrade but Clay County and FDOT should consider these on a case-by-case basis.

To summarize, no "major" reconstruction efforts are required at this time. However, several high-benefit improvements should be considered to improve traffic and safety-related conditions in this area. Many improvements will be required to ensure acceptable LOS results are achieved and maintained in the future.

I. INTRODUCTION

Clay County has experienced significant population growth over the past 15-plus years. The County's unique location and natural resources indicate this growth trend will continue. Traffic congestion will remain a challenge for the region's roadways including the US 17 corridor and adjacent/nearby roadways in the Green Cove Springs/Fleming Island area.

In response to Clay County's concerns, the North Florida TPO asked England-Thims & Miller, Inc. (ETM) to identify potential/reasonable traffic- and safety-related improvements. For this traffic study, the project limits are bordered by SR 16/Leonard C. Taylor Parkway/Cooks Lane to the south and Radar Road/Pine Forest Drive to the north. The study's purpose is to identify operational and safety improvements. Specific focus areas include crash histories, needs of pedestrians/cyclists, existing vehicle queues, etc. Additionally, the possibility of providing new traffic signals was considered at three locations within the US 17 corridor: at Radar Road/Pine Forest Drive, at Margarets Walk Drive/Town Center Boulevard and at Governor Street.



Project Limits

Existing conditions (2018) and projected conditions (2035) were used to identify roadway segments and intersections where travel times, delays and congestion are expected to significantly increase.

Potential traffic-flow improvements were identified and analyzed. Planned local-roadway and any US 17 improvements were considered. To address the anticipated traffic impacts generated by this area's continued growth, a proactive plan is recommended.

A. Background

ETM analyzed potential traffic improvements to the roadway network within the study area and identified specific capacity and safety enhancements that should maintain acceptable level-of-service (LOS) results for future (2035) traffic volumes.

B. Study Objective

ETM analyzed existing traffic conditions, considered alternative improvements to the roads and intersections within the study area, and provided specific recommendations for various analyses. The purpose of this study is to provide a record of the existing traffic conditions, projected/future conditions, and how potential improvements to the roadway network will impact travel within the study area.

II. DATA COLLECTION

A. Aerial Photography – Aerial Photography was used as a basis for plotting various data needed to complete engineering analyses, roadway alternatives and design studies, and the preliminary plans of conceptual design.

B. Base Maps – A MicroStation CADD database that includes existing roadway characteristics was manipulated and formatted to ensure compatibility with aerial photography used for location/corridor maps and alternative plans.

C. Traffic Data – New 8-hour turning-movement counts were collected in March 2018 at the following locations and include pedestrian counts that are included in **Appendix L**:

- US 17 at Cooks Lane/SR 16/Leonard C. Taylor Parkway – existing traffic signal
- US 17 at Ferris Street/SR 16 – existing traffic signal
- US 17 at Walnut Street – existing traffic signal
- US 17 at Center Street – existing traffic signal
- US 17 at Gum Street – existing traffic signal
- US 17 at Houston Street – existing traffic signal
- US 17 at Governor Street
- US 17 at Harbor Road – existing traffic signal
- US 17 at CR 315 – existing traffic signal
- US 17 at CR 209/Russell Road – existing traffic signal
- US 17 at Margarets Walk Road/Town Center Boulevard
- US 17 at Fleming Plantation Boulevard/Hibernia Road – existing traffic signal
- US 17 at Village Square Parkway/Water Oak Lane – existing traffic signal
- US 17 at Radar Road/Pine Forest Drive

III. DESCRIPTION OF EXISTING ROADWAYS

A. US 17 between Radar Road/Pine Forest Drive and just south of Margarets Walk Road/Town Center Boulevard is a six-lane divided suburban principal arterial roadway. Left- and right-turn bays are present at the various side streets and some driveways. This roadway segment is Access Class 3 and has a posted speed limit of 55 mph.

B. US 17 between just south of Margarets Walk Road/Town Center Boulevard and just north of the Governors Creek Bridge is a four-lane divided rural principal arterial roadway. Left- and right-turn bays are present at the various side streets and some driveways. This roadway segment is also Access Class 3 and has posted speed limits of 55 mph between Margarets Walk Road/Town Center Boulevard and Onion Road, 45 mph between Onion Road and 1,000' north of Governors Creek, and 35 mph just north of Governors Creek.

C. US 17 between the Governors Creek Bridge and Lamont Street is predominantly a five-lane urban principal arterial roadway with a center two-way left-turn lane and curb and gutter. This roadway segment is Access Class 6 and has a posted speed limit of 35 mph.

D. US 17 between Lamont Street and Gum Street is a four-lane urban principal arterial roadway with a raised landscaped median and dedicated left-turn bays at each intersection. This roadway segment is also Access Class 6 and has a posted speed limit of 35 mph. The speed limit decreases to 30 mph approximately 350' north of Park Street.

E. US 17 between Gum Street and Oak Street is a five-lane urban principal arterial roadway with dedicated left-turn bays at each intersection. This roadway segment is also Access Class 6 and has a posted speed limit of 35 mph between Oak Street and Cove Street and 30 mph between Bay Street and Gum Street.

F. US 17 between Oak Street and SR 16/Leonard C. Taylor Parkway/Cooks Lane is a four-lane urban principal arterial roadway with a raised landscaped median and dedicated left-turn bays at both intersections. This roadway segment is also Access Class 3 and has a posted speed limit of 45 mph. The speed limit decreases to 35 mph approximately 500' south of Oak Street.

Each segment of US 17 is also classified as an Emerging Strategic Intermodal Systems (SIS) roadway.

IV. ANALYSIS OF EXISTING TRAFFIC CONDITIONS

A. Roadway Safety

Crash data was collected from *Signal Four Analytics* within the study area for a three-year period from January 2015 to December 2017. A total of 580 crashes were reported within the study area, as follows:

- 276 Rear-end
- 90 Other
- 77 Left-Turn
- 58 Sideswipe
- 26 Off-Road
- 25 Angle
- 13 Head-On
- 12 Bicycle/Pedestrian
- 3 Right-Turn

Additional crash-statistic information:

- There were 167 crashes in 2015, 221 crashes in 2016, and 192 crashes in 2017.
- Eight crashes (0.2 percent) resulted in 10 fatalities and 150 crashes (36 percent) resulted in 244 injuries.
- There were 87 wet-pavement crashes (21 percent) and 116 nighttime crashes (27 percent).
- The total property damage amount for all crashes was $2,445,000.

The eight fatal crashes reported in the three-year crash history are detailed below:

Sunday, April 12, 2015 at 2:05 a.m.: A southbound motorcyclist traveling at least 75 mph on US 17, 0.3 miles north of Village Square Parkway/Water Oaks Lane, struck a vehicle ejecting the driver from the motorcycle. The ejected driver was then struck by another vehicle traveling southbound. The driver of the motorcycle was under the influence of alcohol. The collision occurred on dry pavement at night (Crash Report No. 84876064).

Tuesday, May 19, 2015 at 12:00 p.m.: A southbound vehicle ran a red light and struck an eastbound vehicle attempting to turn left onto northbound US 17 at the Village Square Parkway/Water Oaks Lane intersection. The drug test results were positive for the southbound driver. The collision occurred on dry pavement during daylight conditions (Crash Report No. 84883076).

Friday, May 22, 2015 at 12:18 p.m.: An eastbound vehicle on Floyd Street crossing over the southbound lanes of US 17 was struck by a southbound vehicle on US 17. The drug test results were positive for the driver of the southbound vehicle. The collision occurred on dry pavement during daylight conditions (Crash Report No. 84893275).

Monday, February 1, 2016 at 3:10 a.m.: A southbound vehicle on US 17 veered off the roadway at the intersection of Village Square Parkway/Water Oaks Lane and struck a utility pole. The resulting investigation implied it was possible the driver may have operated his vehicle in such a manner to take his own life. The drug test results were positive for the driver. The collision occurred on dry pavement under dark (but lighted) conditions (Crash Report No. 84888187).

Monday, September 26, 2016 at 12:55 p.m.: A southbound vehicle ran a red light and struck an eastbound vehicle attempting to turn left onto northbound US 17 at the Village Square Parkway/Water Oaks Lane intersection. The drug test results were positive for the southbound driver. The collision occurred on dry pavement during daylight conditions (Crash Report No. 85382915).

Tuesday, October 25, 2016 at 5:49 a.m.: A northbound vehicle on US 17 veered off the roadway 300' south of Houston Street and struck a sign. It is believed that the driver experienced a severe medical incident prior to the crash. The collision occurred on dry pavement under dark (but lighted) conditions (Crash Report No. 84244696).

Wednesday, January 25, 2017 at 6:45 p.m.: A southbound vehicle on US 17 just north of Copper Stone Drive veered across the left lane and over the concrete median onto the northbound lanes into the path of oncoming traffic. No impairment was identified for the driver of the vehicle. The collision occurred on dry pavement under dusk conditions (Crash Report No. 85455282).

Friday, August 4, 2017 at 10:10 p.m.: A southbound vehicle struck a motorcyclist in front of him traveling at a slower rate. The driver of the southbound vehicle was under the influence of alcohol. The collision occurred on dry pavement under dark conditions (Crash Report No. 85552833).

Detailed crash summaries and collision diagrams can be found in **Appendix E** and **Appendix F**, respectively.

B. Golf Carts

The City of Green Cove Springs passed a Golf Cart Ordinance in July 2011 (O-01-2011). The ordinance establishes rules and regulation on the operation of golf carts on all streets within the city boundaries of the City of Green Cove Springs.

C. Sidewalks

The City of Green Cove Springs has developed Alternate Setback Requirements in their Land Development Code to promote safe pedestrian movements (Sec. 102-551). These requirements are encouraged along the SR 16 and US 17 corridors. Improvements to the

sidewalk network within the study area will improve pedestrian access. These options include connecting existing segments to each other, maintaining existing segments, and adding crosswalks at key intersections. Below is a list of the missing sidewalk links:

East side of US 17:

- From CR 209/Russell Road north to Margarets Walk Road/Town Center Boulevard, a distance of approximately 1.63 miles which includes approximately 1,500' across the Black Creek Bridge
- Two small gaps between Eagle Crest Drive and Village Square Parkway/Water Oak Lane, a distance of approximately 715'
- From Water Oak Lane north to Copper Stone Drive, a distance of approximately 2,500'

West Side of US 17:

- From Harbor Road north to CR 209/Russell Road, a distance of approximately 1.83 miles
- From Ball Road north to Margarets Walk Road/Town Center Boulevard, a distance of approximately 1.27 miles which includes approximately 1,500' across the Black Creek Bridge

Black Creek Trail (west side) starts from the north side of Black Creek bridge and continues north to Holly Point Road. Bike lanes exist on both shoulders from CR 220 south to just north of Fleming Plantation Boulevard/Hibernia Road and then between CR 209/Russell Road and CR 315. An exhibit showing the missing sidewalk gaps can be found in **Appendix M**.

D. Traffic Operational Analysis (Existing Year Results)

An operational analysis of existing conditions was conducted using Synchro/SimTraffic analysis software. Synchro software was used to model the roadway network and provide a detailed analysis of the signalized and non-signalized intersection operations. The software considers the effects of signal spacing and signal coordination, including actuated and semi-actuated signal operations, and incorporates traffic volumes, signal timing and vehicle detection. The model output includes intersection approach delays, volume-to-capacity ratios, estimated queue lengths, and level-of-service (LOS) results. SimTraffic uses the Synchro model to simulate system-wide traffic operations and produces a visual model of the operating roadway network. This software was used to form a complete and detailed analysis of the system operations.

Intersection turning-movement counts were collected to accurately reflect the traffic flow at the intersections within the study area. The existing roadway network (with 2018 traffic volumes) was analyzed and the LOS results for the various intersections were determined. The analyses at the signalized intersections were based on existing traffic signal timing obtained from Clay County and the Florida Department of Transportation.

The analyses of existing conditions did not reveal any intersection failures. However, there were many individual movements that experienced unacceptable delays. For example, at the US 17/Village Square Parkway/Water Oak Lane signal during the 2018 PM peak hour, the intersection experiences LOS "D" results. However, the eastbound-to-northbound left-turn movement routinely experiences cycle failures and an average vehicle delay of 121 seconds. Please refer to **Appendix G** for the supporting traffic-analysis results.

V. ANALYSIS OF PROJECTED TRAFFIC DEMAND (2035 DESIGN YEAR)

A. Background

This section provides the methodology used for evaluating the transportation impacts of the vehicular traffic entering and exiting the roadway network with the study area. The recommended improvements are based on the 2035/design-year traffic volumes.

B. Travel Demand Forecasting

1. Planned and Programmed Transportation Projects

The only roadways within the study area currently programmed to be improved are at/near the US 17/SR 16 (Cooks Lane) intersection. FDOT's project (FN 436118-1-52-01) will address capacity and safety issues at this intersection. This project is currently under construction.

2. Planned Development

Although properties within the study area are mostly developed, there are still several undeveloped out-parcels located along US 17 within the study area. Although planned development outside the study area was not considered, future traffic growth was included to address this issue.

3. Future Projections

Based on historical traffic trends in this area, growth rates for each intersection were calculated using the 2020 and 2035 data sets for the Activity Based Northeast Regional Planning Model version 1.3 (NERPM-AB). The growth rates were compared to the those calculated using volumes from the District 2 Level of Service Report. A minimum growth rate of one percent annually was used to estimate future volumes at each intersection within the study area.

4. Trip Distribution

The projected trips within the study area were distributed on the roadway network during the 2035 design year. The 2035 trip distribution and assignments reflect/mirror the existing (2018) turning-movement counts.

C. No Build Condition/Need for Improvements

With the continuing/anticipated growth in the region, the associated traffic volumes (including motorized and non-motorized users) will continue to increase within the study area over the next several years. For this reason, congestion and safety concerns should be addressed for all roadway segments and intersections. Although no signalized intersection currently experiences failing LOS result, unacceptable delays exist for some individual movements.

D. Traffic Operational Analysis (Design Year Results)

As with the existing conditions, an operational analysis of future (2035) conditions was also conducted using Synchro/SimTraffic analysis software. A minimum growth rate of one percent annually was used to estimate future volumes within the study area.

The future roadway network, with projected traffic volumes, was analyzed and the LOS results for the various system components were determined. The analyses at the signalized intersections were based on optimized traffic signal timing.

The analyses of future (2035) conditions did not reveal any intersection failures (with recommended improvements in place). Again, please refer to **Appendix H** for the supporting traffic-analysis results.

VI. RECOMMENDATIONS

Numerous options to improve traffic flow within the study area, from south to north, were considered and/or identified, as follows:

1. The signalized intersection of US 17 at SR 16/Leonard C. Taylor Parkway/Cooks Lane – Several improvements were identified. However, FDOT has a project (FN 436118-1-52-01) that will address capacity as well as safety issues at this intersection. This project is currently under construction and is expected to operate at Level-of-Service (LOS) "A" when the project is complete. Traffic projections indicate this intersection should experience LOS "C" operations during the 2035 AM and PM peak periods.
2. The signalized intersection of US 17 and SR 16/Ferris Street – The northbound through traffic often backs up and blocks the very short northbound left-turn lane. Motorists queue through the southbound left-turn lane for Bay Street. The northbound left-turn lane for SR 16/Ferris Street should be extended which will require closing the existing access to/from Bay Street. Motorists on US 17 wishing to access Bay Street, and motorists on Bay Street wishing to turn left onto US 17, should use nearby access points. Specifically, Ferris Street and Cove Street parallel Bay Street north and south, respectively; Magnolia Avenue and Palmetto Avenue parallel US 17 east and west, respectively. It should be noted that during field reviews very little traffic was observed on Bay Street.

   Additionally, the pedestrian crosswalks and stop bars are badly faded and should be refurbished. FDOT recently studied this location and their May 2017 report includes these recommendations. This intersection currently operates at LOS "C" in the AM peak and LOS "D" for the PM peak. Traffic projections indicate this intersection should experience LOS "C" operations during the 2035 AM peak hour and LOS "D" operations during the 2035 PM peak hour. Although the southbound thru movement is expected to experience LOS "E" results by 2035, constructing a dedicated right-turn bay for the southbound-to-westbound movement will improve the southbound approach to LOS "D".
3. The signalized intersection of US 17 and Walnut Street – Because the existing traffic volumes are minimal to/from Walnut Street, the possibility of removing the traffic signal was considered. This could be accomplished by revising the access management (i.e., constructing a directional median opening at this location). However, because visibility is limited, especially from the west leg of Walnut Street, removing the signal is not currently recommended. The pedestrian crosswalks should be refurbished to satisfy current requirements. This intersection currently operates at LOS "A" during the AM and PM peak periods. Traffic projections indicate this intersection should continue to operate at LOS "A" during the 2035 AM and PM peak periods.
4. The signalized intersection of US 17 and Center Street – The possibility of removing the traffic signal was considered but is not currently recommended. However, the pedestrian crosswalks should be refurbished to satisfy current requirements. This intersection currently operates at LOS "A" during the AM and PM peak periods. Traffic projections indicate this intersection should continue to operate at LOS "A" during the 2035 AM and PM peak periods.

5. The signalized intersection of US 17 and Gum Street – Because the existing traffic volumes are minimal to/from Gum Street, the possibility of removing the traffic signal was considered. This could be accomplished by changing the access management (i.e., constructing a directional median opening at this location). However, because visibility is limited, especially traveling from Gum Street, removing the signal is not currently recommended. The pedestrian crosswalks should be refurbished to satisfy current requirements. This intersection currently operates at LOS "A" during the AM and PM peak periods. Traffic projections indicate this intersection should continue to operate at LOS "A" during the 2035 AM and PM peak periods.

6. The signalized intersection of US 17 and Houston Street – There are significant eastbound-to-northbound left-turn volumes especially during the PM peak period. These left turns also represent the majority of Houston Street's west-leg approach volumes throughout the day. Consideration should be given to providing dual-left turns from the west leg by re-striping the existing thru/right lane to a shared left/thru/right lane. An additional left-turn signal head will be required and the intersection's signal operation will need to be split-phased for the side-street approaches. In addition, the pedestrian crosswalks should be refurbished to satisfy current requirements and the stop bars on Houston Street should be re-striped. This intersection currently operates at LOS "B" during the AM peak hour and LOS "C" during the PM peak hour. Traffic projections indicate this intersection should operate at LOS "C" during the 2035 AM peak hour and LOS "D" in the 2035 PM peak hour.

7. The unsignalized intersection of US 17 at Governor Street – This location was analyzed to determine if a traffic signal should be installed. However, traffic volumes fall well short of the minimum thresholds to satisfy a signal warrant. In addition, only one crash report included a collision that could be corrected by installing a traffic signal. For these reasons, no improvements are recommended at this time.

8. The signalized intersection of US 17 and Harbor Road – The southbound-to-westbound right-turn movement is marked as a free-flow slip lane. However, there is no "Yield" sign for this movement. Also, the west leg has a marked pedestrian crosswalk that also crosses the slip lane but has no pedestrian warning signs. A "Yield" sign along with pedestrian warning signs should be installed at this location for this right-turn movement. In addition, the pedestrian crosswalks should be refurbished to satisfy current requirements and the intersection's pavement markings should be refurbished.

   This intersection currently operates at LOS "B" during the AM peak period and LOS "C" during the PM peak period. Traffic projections indicate this intersection will operate at LOS "C" during the 2035 AM peak period and at LOS "E" during the PM peak period. However, the Harbor Road approach will operate at LOS F during the PM peak period. If a second lane is constructed to service the Harbor Road traffic, as a shared left/right lane, the intersection's operation in 2035 will improve to LOS "C". An additional left-turn signal head will be required and the intersection's signal operation will need to be split-phased for the side-street approaches.

9. The signalized intersection of US 17 and CR 315 – This intersection currently operates at LOS "B" during the AM and PM peak periods. However, traffic projections indicate this intersection will fail during the 2035 AM peak period and will operate at LOS "D" in the 2035 PM peak period. During the AM peak period, both the eastbound-to-northbound left

turns and the southbound thrus are expected to experience unacceptable delays. However, if a second CR 315 left-turn lane is added, the intersection operation is expected to improve to LOS "D". An additional left-turn signal head will be required and the intersection's signal operation will need to be split-phased for the side-street approaches. In addition, the intersection's pavement markings should be refurbished.

10. The signalized intersection of US 17 and CR 209/Russell Road – This intersection currently operates at LOS "C" during both the AM and PM peak periods. However, traffic projections indicate this intersection will fail during the 2035 AM and PM peak periods. Adding a dedicated eastbound right-turn lane, converting the existing eastbound right/thru lane to a shared left/thru lane and restriping the northbound gore area to provide a second left-turn lane will allow the intersection to operate at LOS "D" during the 2035 peak periods. This will require two lanes westbound and additional signal heads. The intersection's signal operation will also need to be split-phased for the side-street approaches. At least 400' of traffic-separator median should also be constructed on Russell Road between eastbound and westbound traffic.

    It should be noted that there are numerous utilities located on the north side of CR 209 west of US 17. This may require extensive utility relocation. Additionally, drainage improvements will be needed when the northbound left-turn lane is reconstructed to ensure ponding issues are addressed.

11. The unsignalized intersection of US 17 and Town Center Boulevard/Margarets Walk Road – This location was analyzed to determine if a traffic signal should be installed. However, traffic volumes fall well short of the minimum thresholds to satisfy a signal warrant. In addition, only two crash reports (within a 3-year period) included a collision that could be corrected by installing a traffic signal. For these reasons, no improvements are currently recommended. It should be noted that during the 2035 PM peak hour, the southbound thru volumes increase to the point that the northbound left turns are not provided sufficient gaps. In turn, this impacts the left turns from both side streets. This indicates a traffic signal may be warranted prior to the 2035 design year.

12. The signalized intersection of US 17 and Fleming Plantation Boulevard/Hibernia Road – This intersection currently operates at LOS "C" during both the AM and PM peak periods. Traffic projections indicate this intersection will operate at LOS "D" during the 2035 AM and PM peak periods.

13. The signalized intersection of US 17 and Village Square Parkway/Water Oak Lane – This intersection currently operates at LOS "C" during the AM peak period and at LOS "D" during the PM peak period. However, traffic projections indicate this intersection will fail during the 2035 AM and PM peak periods. Adding a second eastbound left-turn lane by restriping the thru lane to a shared left/thru lane is recommended. Adding a dedicated westbound right-turn lane is also recommended. An additional left-turn signal head will be required and the intersection's signal operation will need to be split-phased (for the side-street approaches). If implemented, the 2035 peak periods will improve to LOS "D".

14. The unsignalized intersection of US 17 at Radar Road/Pine Forest Drive – This location was analyzed to determine if a traffic signal should be installed. Traffic volumes fall well short of the minimum thresholds to satisfy a signal warrant. Four crash reports (within a 3-year period) included a collision that could be corrected by installing a traffic signal. For these reasons, no improvements are currently recommended.

15. Several potential improvements to the sidewalk network in this area seem reasonable, including constructing new sidewalks to eliminate existing gaps and ensuring all sidewalk ramps are ADA-compliant.

16. The only designated bike lanes that exist within the study area are located on both sides of US 17 south of CR 220. Bike lanes exist on both shoulders from CR 220 south to just north of Fleming Plantation Boulevard/Hibernia Road and then from CR 209/ Russell Road south to CR 315. Consideration should be given to continuing the bike lanes on US 17 when future roadway improvements are implemented.

17. A separated multi-use trail is located on the west side of, and parallel to, US 17 that is part of Black Creek Trail between CR 220 and Margarets Walk Road/Town Center Boulevard. Another trail segment exists on the west side of, and parallel to, US 17 between Ball Road and CR 209/Russell Road. At Russell Road, this trail crosses US 17 and continues south to just north of the Governors Creek Bridge at the public boat ramp. Consideration should be given to connecting the trail network between Margarets Walk Road/Town Center Boulevard and Ball Road, which includes the segment across Black Creek, a distance of approximately one mile. Connecting the trail over Governors Creek Bridge will promote community connectivity. Currently, golf carts travel in the US 17 lanes with other vehicles to cross the Governors Creek Bridge.

18. As a general note, it is recommended that when signal-reconstruction projects occur throughout this corridor, back-plates should be provided with all new signal heads, and four-section, flashing-yellow-arrow signal heads should replace any existing five-section cluster signal heads to service protected/permitted left turns.

19. ITS communication capabilities should be provided for traffic signals south of Fleming Plantation Boulevard/Hibernia Road. This improvement will benefit Clay County and FDOT by allowing remote monitoring and maintaining signal coordination.

20. A final recommendation is to provide advanced intersection warning signs at several intersections, including SR 16/Leonard C. Taylor Parkway/Cooks Lane, Harbor Road, CR 315, CR 209/Russell Road, Fleming Plantation Boulevard/Hibernia Road, Village Square Parkway/Water Oak Lane, and Copper Stone Drive. Additional side streets may also benefit from this upgrade but should be considered on a case-by-case basis by Clay County and FDOT.

To summarize, no "major" reconstruction efforts are required at this time. However, several high-benefit improvements should be considered to improve traffic and safety-related conditions in this area. Many of these improvements will be required to ensure acceptable LOS results are achieved and maintained in the future.