## **DRAFT**

# **District Three Safety Office**



SR 363/S. Adams Street

From SR 61/Paul Russell Road to SR 373/Orange Avenue Leon County

Safety Study: Arterial

(Pedestrian)

Prepared by:

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Completion Date: July 2016

# SR 363/S. Adams Street

# Pedestrian Arterial Safety Study

Roadway ID Number: 55100000 Mile Post: 0.430 – 0.942 Leon County

Task Work Order No. 24
District-wide Safety Study and Minor Design
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### **Executive Summary**

This safety study has been conducted on behalf of FDOT District Three Safety Office as requested by the Capital Region Transportation Planning Agency (CRTPA) to address pedestrian safety along the SR 363/S. Adams Street corridor from SR 61/Paul Russell Road to SR 373/Orange Avenue. SR 363/S. The two signalized intersections in the corridor at SR 61/Paul Russell Road and at SR 373/Orange Avenue were also studied for both pedestrian and vehicle safety. A project location map is included as Figure 1 on page 3. The study includes a summary of observed pedestrian activities (data collection), analysis of recent crash history, a qualitative assessment, a condition diagram, collision diagrams and improvement recommendations/alternatives.

The pedestrian count data was collected for one day during three time periods; AM, midday and PM. The PM period had the highest number of crossings. Approximately 55 percent of the pedestrian crossings occurred between The Adams Place Condominiums on the west side of SR 363/S. Adams Street and the entrance to the College Club Townhomes (bus stop) located on the east side. Appendix B includes the count data.

Pedestrian and bicycle crash data were reviewed for the five-year period from 2011 to 2015. There were five pedestrian crashes and no bicycle crashes reported during the study period. All five of the crashes resulted in injuries and all the pedestrians were female. One of the crashes occurred during night-time conditions. The crashes typically resulted from motorists failing to yield to a pedestrian crossing the main street or side street. The driver was noted as at-fault in four of the five crashes. There were a total of 110 (vehicle and pedestrian) crashes within the corridor during the study period. The majority of the crashes were rear-end, angle and sideswipe. Nighttime conditions (dusk, dawn, dark-lighted, dark-not lighted) were noted in 32 percent of the crashes and wet roadway was a factor in 19 percent. Appendix C includes the collision diagrams and crash data.

The field reviews verified the safety concerns associated with pedestrians trying to cross the 40 and 45 MPH, five-lane roadway with an average daily traffic (ADT) volume of 22,000 vehicles (ADT) and no provision of a pedestrian refuge. The following recommendations were developed to improve the pedestrian and vehicle safety of the corridor:

#### Alternative 1

Due to the SR 363/S. Adams Street typical section, the vehicle speeds, the pedestrian volumes and the traffic volumes, a pedestrian signal is recommended at the College Club Townhomes bus stop. The signal should be coordinated with the adjacent signals at Paul Russell Road and Orange Avenue. Lighting levels will need to be improved at the new pedestrian signal and should also be upgraded at the adjacent signalized intersections. Due to the three vehicle crashes that were related to the existing bus stop location, it is recommended that the bus stop be relocated from the near-side to the far-side of the College Club Townhomes driveway. Alternative 1 should be considered for implementation as a short-term project due to the observed safety concerns of the pedestrians crossing in the vicinity of the bus stop.

#### Alternative 2

Although the proposed pedestrian signal in Alternative 1 will provide a safer means for the pedestrians to cross SR 363/S. Adams Street at the bus stop, the land uses and daily activity of vulnerable users within the entire corridor indicate a more pedestrian-friendly environment is needed. A raised median to replace the existing two-way-left-turn-lane (TWLTL) is recommended to reduce both pedestrian conflicts and vehicle conflicts. The 12-foot lane widths are recommended to be reduced to 10 and 11 feet to reduce vehicle speeds from 40 and 45 MPH to 35 MPH.



#### Alternative 3

Although not the primary focus of this study, the SR 363/S. Adams Street at Orange Avenue signalized intersection would experience a significant reduction in vehicle crashes with the upgrade of the signal to current standards including replacing the diagonal span wire with mast arms, yellow retroreflective back plates, one signal head per through lane, 5-section signals replaced with 4-section flashing yellow arrow signals and illuminated street name signs to name a few. Although the Paul Russell Road signal heads are on mast arms, the intersection is in need of similar standard upgrades to improve the signal head visibility.

Appendix D includes the drawings of the three Alternatives. The benefit cost ratios for each of the alternatives is expected to be 2.0 or higher and are included in Appendix E.





Figure 1 - Project Location



### **Background**

This pedestrian safety study has been conducted on behalf of FDOT District Three Safety Office for the SR 363/S. Adams Street corridor from SR 61/Paul Russell Road to SR 373/Orange Avenue in Tallahassee. The study was initiated based on concerns from the Capital Region Transportation Planning Agency (CRTPA). A Project Location Map, Figure 1, is included on page 3.

SR 363/S. Adams Street is classified as a five-lane urban major collector with two 12-foot lanes northbound and southbound and a 12-foot two-way center turn lane. Marked 4-foot bike lanes are present from SR 61/Paul Russell Road to north of Bass Street where they terminate. The FDOT Straight Line Diagram of the study corridor is included in Appendix A.



**BIKE LANE NORTHBOUND** 



**BIKE LANE SOUTHBOUND** 

Sidewalks and curb and gutter are present on both sides of the roadway. The signalized intersections are located at SR 61/Paul Russell Road at the south end of the corridor and at SR 373/Orange Avenue at the north end. Pedestrian crosswalks and signals are provided on the north and east legs at the SR 61/Paul Russell Road signalized T-intersection and across all legs at the SR 373/Orange Avenue signal.

Lighting is provided on both sides of the roadway from SR 61/Paul Russell Road to Bass Street and on the east side north of Bass Street. Lighting is provided on the southwest and northeast corners at the SR 61/Paul Russell Road signal and on the southwest corner at the SR 373/Orange Avenue signal.

The FDOT Traffic Online site identified a count station south of SR 373/Orange Avenue on SR 363/S. Adams Street as having 22,000 average daily traffic (ADT) in 2014. The posted speed limit is 45 MPH between SR 61/Paul Russel Road and the library and 40 MPH between the library and SR 373/Orange Avenue. The FDOT access management classification is Class 6.

The nearby land uses include residential, retail, educational and government. The Florida A&M University is located one mile north and west of the corridor. A post office, library, thrift store and fast-food restaurants are located at the north end of the corridor.

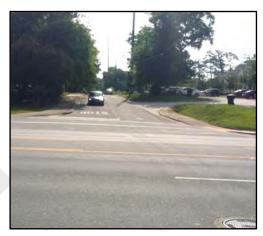
The South Monroe Commons shopping center is located at the northeast corner of the SR 61/Paul Russell Road intersection at the south end of the corridor. The residential complexes in the corridor are Adams Place Condominiums, a 180 unit apartment complex and the 136 unit College Club Townhomes. Both of these residential complexes are fenced. A convenience store/gas station is located across from the College Club Townhomes. The two bus stops in the corridor are located on the east side of SR 363/S. Adams Street on the (1) south side of the College Club Townhomes driveway (2848 S. Adams Street) and on the (2)



south side of the driveway to the South Monroe Commons shopping center. The buses are operated by the City of Tallahassee StarMetro.



LOOKING SOUTH AT POST OFFICE DRIVEWAYS



**LOOKING EAST AT BASS STREET** 





COLLEGE CLUB TOWNHOMES DRIVEWAY AND BUS STOP LOOKING EAST FROM GAS STATION DRIVEWAY



### Study Methodology

The study includes a summary review of observed pedestrian activities (data collection), development of condition and collision diagrams, analysis of recent crash history, qualitative assessment of the corridor, and improvement recommendations that support the focus of this study.

#### Data Collection - Pedestrian Counts

Pedestrian counts were conducted for eight hours on SR 363/S. Adams Street on Tuesday, December 1, 2015 from 7:00 AM to 10:00 AM, 11:00 AM to 1:00 PM and 3:00 PM to 6:00 PM. The counts were collected for the section of SR 363/S. Adams Street from SR 61/Paul Russell Road to SR 373/Orange Avenue including the crosswalk on the north leg at SR 61/Paul Russell Road and the south leg at SR 373/Orange Avenue. The weather was clear and cool. The Leon County schools and local universities (Florida State University and Florida A&M University) were in session at the time. Bicyclists were not included in the scope of this study. The majority of the bicyclists were observed riding along the roadway through the corridor.

Pedestrians were counted as either a child, an adult, or a senior. There were only four seniors and one child counted during the 8-hour count period. The majority of the pedestrians were young adults since the apartments cater to many of the college students.

Over 50 percent of the crossings occurred between the bus stop at the driveway to College Club Townhomes and the pedestrian access gate located north of the Adams Place Condominiums and 200 feet south of the bus stop. During the count, pedestrians were observed waiting/standing in the two way left turn lane (TWLTL) for a gap in traffic and also walking north/south in the TWLTL looking for a gap. Crossings from the west side near Adams Place Condominiums were primarily to the bus stop located across the street at College Club Townhomes.

The detailed counts of the SR 363/S. Adams Street crossings were consolidated into four zones as shown in Figure 2 and the data is summarized in Table 1 below:

#### **Table 1 – Pedestrian Count Summary**

| Zone 1 - F<br>Service R |        | Crossings | between SR | 61/Paul Rus | sell Rd. and | South Mon | roe Comm | ons    |
|-------------------------|--------|-----------|------------|-------------|--------------|-----------|----------|--------|
| Hour                    | 7-8 AM | 8-9 AM    | 9-10 AM    | 11-12 AM    | 12-1 PM      | 3-4 PM    | 4-5 PM   | 5-6 PM |
| Count                   | 1      | 0         | 0          | 2           | 0            | 0         | 2        | 1      |

| Zone 2 -<br>Pedestria |        | Crossings | between So | outh Monroe | Commons S | ervice Rd. | and Adams | s Place |
|-----------------------|--------|-----------|------------|-------------|-----------|------------|-----------|---------|
| Hour                  | 7-8 AM | 8-9 AM    | 9-10 AM    | 11-12 AM    | 12-1 PM   | 3-4 PM     | 4-5 PM    | 5-6 PM  |
| Count                 | 1      | 0         | 1          | 6           | 4         | 5          | 12        | 6       |

| Zone 3 - F<br>Driveways |        | Crossings | between Ad | ams Place Pe | edestrian Ga | te and Libr | ary/Post O | ffice  |
|-------------------------|--------|-----------|------------|--------------|--------------|-------------|------------|--------|
| Hour                    | 7-8 AM | 8-9 AM    | 9-10 AM    | 11-12 AM     | 12-1 PM      | 3-4 PM      | 4-5 PM     | 5-6 PM |
| Count                   | 11     | 15        | 41         | 24           | 25           | 23          | 30         | 24     |

| Zone 4 - F | Pedestrian C | rossings b | etween Lib | rary/Post Off | ice Drivewa | ys and SR | 373/Orang | ge Ave. |
|------------|--------------|------------|------------|---------------|-------------|-----------|-----------|---------|
| Hour       | 7-8 AM       | 8-9 AM     | 9-10 AM    | 11-12 AM      | 12-1 PM     | 3-4 PM    | 4-5 PM    | 5-6 PM  |
| Count      | 0            | 2          | 4          | 13            | 4           | 10        | 4         | 2       |





Figure 2 – Pedestrian Count Sections



The data indicated there were no crossings at the crosswalk on SR 363/S. Adams Street at SR 61/Paul Russell Road and 18 crossings occurred at the SR 373/Orange Avenue south leg crosswalk during the eight hours counted. The detailed pedestrian counts are included in Appendix B.

Zone 1 crossings, near the bus stop at the South Monroe Commons shopping center, were low throughout the 8-hour count period with zero and two pedestrians crossing per hour. Zone 2, the section south of the pedestrian gate at Adams Place Condominiums, had crossing volumes ranging from zero and 12 per hour with the 12 crossings occurring between 4:00 and 5:00 PM. The highest crossings occurred in the vicinity of Zone 3, the College Club Townhomes bus stop. The hourly volumes were between 11 and 41 with the highest occurring between 9:00 and 10:00 AM with 66 percent crossing from west to east. Between 4:00 and 5:00 PM the directional split near the bus stop reversed with 63 percent crossing from east to west. Zone 4, located from the library and post office driveways to SR 373/Orange Avenue, had crossing volumes between zero and 13 per hour with the highest occurring between 11:00 AM and noon.

Besides the pedestrian counts collected across SR 363/S. Adams Street, an origin/destination count of the pedestrians walking north/south on the sidewalk along SR 363/S. Adams Street were also recorded. The detailed count data is included in Appendix B. The pedestrians walking along SR 363/S. Adams Street were counted during the same 8-hour count period and were divided into 12 zones (see Appendix B for a map of the zones) to determine the origin and destination of each person counted. The north-south hourly totals of pedestrians that either started or ended their trip in each zone is included in Table 2. Zone 7, between Bass Street and the bus stop/convenience store, had the highest number of pedestrians. Approximately 80 percent of all northbound and 70 percent of all southbound pedestrian trips were internal to the study limits; i.e. both the origin and destination of the trip occurred between SR 61/Paul Russell Road and SR 373/Orange Avenue.

Table 2 - North-South Pedestrian Counts by Zone Origin/Destination

| HOUR | 7-8 AM | 8-9 AM | 9-10 AM | 11-12 AM | 12-1 PM | 3-4 PM | 4-5 PM | 5-6 PM |
|------|--------|--------|---------|----------|---------|--------|--------|--------|
| ZONE |        |        |         |          |         |        |        |        |
| 1    | 4      | 0      | 4       | 3        | 3       | 3      | 5      | 4      |
| 2    | 0      | 1      | 2       | 1        | 1       | 6      | 6      | 2      |
| 3    | 4      | 4      | 8       | 15       | 8       | 15     | 18     | 11     |
| 4    | 1      | 0      | 1       | 0        | 2       | 5      | 2      | 3      |
| 5    | 2      | 7      | 5       | 6        | 9       | 0      | 4      | 2      |
| 6    | 6      | 4      | 9       | 2        | 3       | 3      | 7      | 14     |
| 7    | 19     | 23     | 44      | 31       | 30      | 22     | 27     | 30     |
| 8    | 3      | 1      | 5       | 6        | 7       | 6      | 7      | 1      |
| 9    | 2      | 6      | 0       | 11       | 8       | 5      | 4      | 4      |
| 10   | 1      | 1      | 2       | 6        | 9       | 7      | 2      | 4      |
| 11   | 3      | 3      | 5       | 4        | 10      | 10     | 5      | 18     |
| 12   | 5      | 4      | 5       | 10       | 12      | 16     | 11     | 13     |

#### **Bus Service**

The Tallahassee StarMetro bus service runs every half hour Monday through Friday along the corridor. The route runs northbound only entering the corridor from SR 61/Paul Russell Road or from Crawfordville and then heads east on SR 373/Orange Avenue. The two bus stops are located at the South Monroe Commons shopping center and at the College Club Townhomes. On Saturdays the bus stops every 50 minutes and Sundays every 40 minutes. The FAMU bus service runs along this corridor but there are no stops. StarMetro was contacted and they currently do not have any plans for additional stops within the corridor. Any future stops will most likely be located near the post office, the library and the Adams Place Condominiums (west side). StarMetro stated that they prefer nearside stops for their buses.





**BUS STOP AT SOUTH MONROE COMMONS** 



**BUS STOP AT COLLEGE CLUB TOWNHOMES** 



#### **Crash Data Review**

#### Pedestrian Crashes

Pedestrian and bicycle crash data was obtained for the five-year period from 2011 through 2015 for the corridor. There were five pedestrian crashes and no bicycle crashes during the study period. Two crashes occurred in the two-way-left-turn lane, two occurred as a pedestrian crossed a driveway, and one occurred at the SR 363/S. Adams Street and SR 373/Orange Street signalized intersection in the crosswalk. Collision diagrams with pedestrian count data are included in Appendix C. Table 3, next page, includes a summary table of the details of each pedestrian crash. Four of the five crashes occurred during daylight hours and all five resulted in injury to the pedestrian. All five of the crashes occurred on dry pavement conditions and involved a pedestrian who was a female. The driver was cited as at-fault in four of the five crashes.

Three of the crashes occurred near the bus stop located at 2833 S. Adams Street which is at the College Club Townhomes driveway. Two crashes occurred as the pedestrian tried to cross SR 363/S. Adams Street and one occurred when the pedestrian was crossing the driveway to the Townhomes. There was also one crash at the Post Office driveway located at 2800 S. Adams Street. This crash involved a southbound pedestrian and an eastbound motorist. The one crash at the signal occurred when a northbound right-turn motorist failed to yield to a pedestrian traveling from east to west in the signalized crosswalk across the south leg. The pedestrians ranged in age from 19 to 50 and three of the five drivers involved in the crashes were between 20 and 22 years old. The crashes occurred during the AM, mid-day and evening hours.

#### Vehicle Crashes

Vehicle crash data was also investigated for the corridor. There were 110 crashes within the corridor including the two signalized intersections. Thirty-two (32) percent of the crashes occurred during dark/dawn/dusk conditions and 19 percent occurred on wet pavement. Vehicle crash diagrams are included in Appendix C.

The SR 363/S. Adams Street and SR 373/Orange Avenue signalized intersection had a high incidence of crashes with 72 during the five-year time period between 2011 and 2015. There was a significantly high occurrence of left-turn crashes with a total of 22. Of the 22, seven were northbound, seven westbound, four southbound and four eastbound. All of the left-turn movements are protected/permitted control with 5-section signal heads on the signal span wire. Rear-end crashes accounted for 49 percent of the crashes with 35 at the intersection; 29 entering the intersection and six exiting the intersection. There were 14 rear-end crashes northbound, nine eastbound, four westbound and two southbound. There were three crashes where a left-turn motorist drove left of center and struck a motorist waiting at the stop bar on the cross street. There were three angle crashes and 12 sideswipe crashes; eight on the approaches and four exiting the intersection. The SR 373/Orange Avenue intersection was recently resurfaced as part of the SR 373/Orange Avenue RRR project from Gunn Street to east of SR 363/S. Adams Street. Pedestrian signals were replaced on three of the four corners with this project. There were three angle crashes at the post office driveway.



Table 3 - Pedestrian Crash Summary Table

| Location:<br>Study Peri<br>Number o | iod:<br>if Years:          | Tallahassee<br>2011 to 2015<br>5 | 15<br>15 |      | 5, 5 1 | State Route:<br>County:<br>Location: |                         | SR 363/Av<br>Leon<br>Paul Russ | SR 363/Adams Street<br>Leon<br>Paul Russell Road to ( | SR 363/Adams Street<br>Leon<br>Paul Russell Road to Orange Avenue | Avenue |                               |                  |                |                |  |                    |                                    |  |
|-------------------------------------|----------------------------|----------------------------------|----------|------|--------|--------------------------------------|-------------------------|--------------------------------|---|---|--------|-------------------------------|------------------|----------------|----------------|--|--------------------|------------------------------------|--|
| NO.                                 | DATE                       | DAY                              | TIME     | TYPE | FATAL  | INJURY                               | PROP INJURY DAMAGE ONLY | DAY/ v                         | WET/<br>DRY IN  | UNDER GENDER INFLUENCE PED/BIKE                                   |        | AGE OF AGE OF PED/BIKE DRIVER | AGE OF<br>DRIVER | AT-<br>FAULT S | AT<br>SIGNAL D | AT- AT AT CENTER FAULT SIGNAL DRIVEWAY TURN LANE | CENTER<br>URN LANE | CENTER CONTRIBUTING JRN LANE CAUSE | COMMENTS   |
| 1                                   | 8/2/2011                   | Tuesday                          | 6:29 PM  | ped  |        | ×                                    |                         | Day                            | Dny   |   | Female | 45                            | 39               | Driver         | ×              |  |                    | FTYROW                             | ADAMS/ORANGE - Pedestrian crossing south leg of Adams St. from east to west with WALK signal was struck by a NB right-turn on red motorist who failed to yield the right-of-way.   |
| 2                                   | 1/8/2012                   | Sunday                           | 2:43 PM  | Ped  |        | ×                                    |                         | Day                            | Dry   |   | Female | 19                            | 20               | Ped            |                |  | ×                  | In roadway<br>improperly           | 1848 S. ADAMS ST Pedestrian crossing Adams St. near bus stop in center turn lane was struck by a motorist exiting the Sunoco driveway located at 2848 5 Adams St. Pedestrian was cited for improperty in roadway.                            |
| es                                  | 4/18/2013 Thursday 6:01 AM | Thursday                         | 6:01 AM  | Ped  |        | ×                                    | _                       | Night                          | Dry   |   | Female | 34                            | 02               | Driver         |                | ×  |                    | FTYROW                             | 1800 S. ADAMS ST Pedestrian on cell phone walking south across driveway located on west side of Adams St. was struck by an EB left-turn motorist who failed to yield the right-of-way. The crash report notes it was in a dark-lighted area. |
| 4                                   | 2/28/2014                  | Friday                           | 9:18 AM  | Ped  |        | ×                                    |                         | Day                            | Dry   |   | Female | 20                            | 20               | Driver         |                | ×  |                    | FTYROW                             | 2833. ADAMS ST Pedestrian crossing driveway located on east side of Adams St. (apartment complex) was struck by a WB right-turn motorist who failed to yield the right-of-way.   |
| 5                                   | 6/6/2014                   | Friday                           | 5:16 PM  | Ped  |        | ×                                    |                         | Day                            | Dry   |   | Female | 21                            | 22               | Driver         |                |  | ×                  | FTYROW                             | 2848 5 ADAMS ST Pedestrian crossing Adams St. was struck by an EB left-turn motorist exiting the Sunoco parking lot located on the west side of Adams St.  |



At the signalized intersection of SR 363/S. Adams Street and SR 61/Paul Russell Road there were 17 crashes; six southbound left-turn, four westbound rear end, two northbound rear end, two southbound rear end, two angle crashes and one run-off-the-road crash.

Besides the pedestrian crashes in the vicinity of the College Club Townhomes/gas station, there were five angle crashes, a U-turn crash, three rear end, a sideswipe, a run-off-the-road crash and a backing crash. Two angle crashes occurred while a bus was stopped at the bus stop, blocking the view of the westbound left-turns from the College Club Townhomes driveway. A sideswipe crash with a bus also occurred as a northbound motorist turned right around a bus that was assumed to be stopped at the bus stop.

The crashes in the vicinity of Bass Street/Adams Place Condominiums included five angle crashes, a left-turn crash, two rear end crashes, a run-off-the-road crash and a sideswipe crash.



### **Qualitative Assessment**

The corridor was reviewed during the count period by HSA and by Cardno in April on a weekday and on a weekend. Although pedestrian safety is the primary scope of this study, an assessment of the vehicle operations and safety was included.

The following observations were noted:

- There was steady use of the bus stop/bus shelter located in front of the College Club Townhomes.
   The pedestrian activity in the corridor was predominantly within the 200 foot section between this bus stop and the pedestrian walkway at the Adams Place Condominiums.
- Motorists traveling northbound in the outside lane behind a bus at times swerved into the inside lane to avoid delays with the bus stops. As a result of this maneuver, a near-miss sideswipe crash was observed.
- Two pedestrian warning signs (W11-2) with the supplemental plaque AHEAD are located in the corridor; one is located north of SR 61/Paul Russell Road and one south of SR 373/Orange Avenue.
- The two apartment complexes located in the corridor are fenced. The College Club Townhomes has a gated access from the driveway located on SR 363/S. Adams Street. The gate located on Bass Street is locked and signed for emergency vehicles only. The Adams Place Condominiums entrance on SR 363/S. Adams Street is not gated and has a pedestrian access located approximately 300 feet north of the main access. See photos below.









**WALKWAY/GATE AT ADAMS PLACE** 

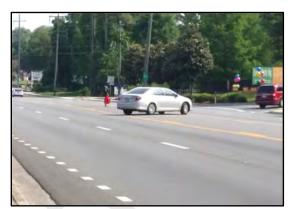
- The College Club Townhomes driveway curves north and is on a decline. See photo right.
- Pedestrians were observed traveling to and from the convenience store across from the College Club Townhomes and bus stop.
- Numerous pedestrians were seen climbing over the fence at College Club Townhomes to access the complex instead of using the driveways.
- During the afternoon peak hour the gas station traffic was busy with motorists using both driveways and some waiting in the TWLTL before crossing to the Townhomes driveway.

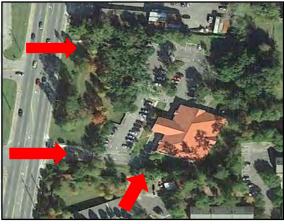


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- At the College Club Townhomes bus stop, pedestrians were observed waiting in the TWLTL for a gap in traffic before crossing the remainder of the roadway. Oftentimes they walked north or south in the TWLTL before crossing SR 363/S. Adams Street to the sidewalk. See photo to right.
- The Library is also fenced with pedestrian access located (1) at a sidewalk directly south of the thrift shop, (2) at the main driveway, and (3) from the College Club Townhomes via a pedestrian-only driveway between the two properties. The aerial to the lower right shows the access points.
- The thrift store parking lot was often used as a "cut through" by northbound vehicle traffic to SR 373/Orange Avenue.
- Pedestrians walking along SR 363/S. Adams Street often crossed when they saw a gap in traffic, not necessarily at their desired destination.
- Motorists entering the corridor from the south appeared to be driving at speeds too high in consideration of the pedestrian activity in the corridor.
- The night-time review noted that the lighting appeared deficient at the signalized intersections but the corridor lighting looked adequate. A lighting study has not been conducted for this study.





- There was minimal pedestrian activity noticed during the night-time review.
- A few times during the peak hour the northbound queue from SR 373/Orange Avenue backed up south to near the gas station.
- The South Monroe Commons shopping center located at the northeast corner of SR 61/Paul Russell Road and SR 373/S. Adams Street includes a Winn Dixie grocery store, a CVS pharmacy and a KFC fast food restaurant among other commercial services. The west side of the corridor from SR 61/Paul Russell Road to Bass Street is heavily wooded with trails that lead to a lake and open area. The open area is accessible via an unpaved driveway located across from the South Monroe Commons service road.

The corridor review determined that the signalized intersections are lacking standard features that have been added to FDOT's design criteria. The standards are updated based on research studies that have proven to reduce crashes at signalized intersections. The following includes upgrades that could reduce and prevent all crash types including angle, left-turn, sideswipe, rear end and pedestrian.

- Diagonal signal span The diagonal signal span at the SR 363/S. Adams Street and SR 373/Orange Avenue intersection does not meet current standards for a box span design. Visibility of the five-section signal heads are restricted during the permissive green phase. This can contribute to left-turn crashes since motorists cannot see when the signal is changing from green to yellow to red.
- Lane shift At the SR 363/S. Adams Street and SR 373/Orange Avenue intersection the eastbound lanes shift approximately five feet south through the intersection but there are no 2'-4' skip guideline



- pavement markings through the intersection. The eastbound inside through lane aligns with the westbound left-turn lane and a median is not provided.
- Missing advance street name signs NEXT SIGNAL signs provide advance notice of an upcoming signal and give motorists enough time to properly change lanes to enter the appropriate lane.
- Lack of one signal head per through lane One signal head per through lane provides improved signal head visibility thereby reducing sudden stops and motorists running a red signal.
- Five-section traffic signals Although 4-section flashing yellow arrow (FYA) signals have been in
  use throughout the country for some time, FDOT and local agencies have recently started using
  them. The FYA benefits include less confusion for motorists when turning left on the flashing yellow
  arrow than the permissive green ball. Additionally, the FYA provides a yield for motorists when
  turning concurrent with a pedestrian crossing. The 4-section FYA can also provide more flexibility
  than a protected only 3-section left-turn signal particularly during off-peak or low volume conditions.
- Missing internally illuminated street name signs As with advance street name signs, illuminated street name signs increase the distance at which a motorist can see the street name. These signs provide a benefit for both daytime and night-time driving.
- Missing back plates at SR 363/S. Adams Street and SR 373/Orange Avenue intersection Retroreflective yellow back plates on all signals can improve the signal head visibility during both day and night conditions.
- Lacking R10-15 Yield to Pedestrian signs With the potential for pedestrian crashes at signalized intersections involving turning vehicles, greater emphasis is needed to notify motorists of their presence. TURNING VEHICLES YIELD TO PEDESTRIANS (R10-15) signs installed at all locations where there is a potential conflict can aid in reducing these conflicts.
- Missing high emphasis crosswalks Although in the past high emphasis crosswalks were typically only used at mid-block crosswalks and school crossings, high emphasis crosswalks are now in the FDOT design standards for signalized intersections. Studies have shown these crosswalks have a greater visibility to drivers than the transverse crosswalk markings.
- Separate poles for pedestrian pushbuttons The MUTCD includes ADA standards to separate
  pedestrian pushbuttons on each corner by 10 feet to aid the visually impaired to differentiate
  between the two signalized crosswalks. The separate poles also aid sighted pedestrians and
  reduce unnecessary pedestrian actuations which can increase vehicle delays.
- Location of pedestrian pushbuttons The pedestrian pushbuttons and respective signs are located on the wrong side of the pole at both signalized intersections. The buttons/signs should be mounted on the pole in parallel with the crosswalk for which it is designated.
- Pedestrian signal head location The pedestrian signals on the southwest corner at SR 363/S.
  Adams Street and SR 373/Orange Avenue intersection are located more than 10 feet from the
  crosswalks for the south and west legs. Due to this offset, the pedestrian signal head for the west
  leg crossing is not visible to pedestrians when crossing from north to south when mid-way in the
  crosswalk
- Photos of the signalized intersections are shown on the following page.



LOOKING SOUTH AT S. ADAMS ST. AND ORANGE AVE.



LOOKING NORTH AT S. ADAMS ST. AND ORANGE AVE.



LOOKING NORTH AT S. ADAMS ST. AND PAUL RUSSELL RD.



LOOKING WEST AT PAUL RUSSELL RD. AND S. ADAMS ST.



LOOKING SOUTH AT S. ADAMS ST. AND PAUL RUSSELL RD.



#### Mid-Block Crosswalk Assessment

The 8-hours of SR 363/S. Adams Street crossing volumes were reviewed in consideration of the mid-block crossing minimum pedestrian volume criteria outlined in the Traffic Engineering Manual (TEM) Section 3.8. (February 2016). The volume criteria is:

- 20 or more pedestrians during a single hour (any four consecutive 15-minute periods) of an average day, or
- 18 or more pedestrians during each of any two hours of an average day, or
- 15 or more pedestrians during each of any three hours of an average day.

Based on the TEM minimum volumes for a pedestrian mid-block crossing, only the section of SR 363/S. Adams Street between the Adams Place Condominiums Pedestrian Walkway and the Library (Zone 3), which includes the bus stop at College Club Townhomes, meets the minimum volume criteria. Seven of the eight hours counted had 15 or more pedestrian crossings per hour. Additionally, pedestrians typically crossed by waiting in the median since they were unable to find a sufficient gap in two-way traffic to cross all lanes. Since the median is a paved two-way-left-turn lane, the pedestrians are exposed to the potential for a motorist striking from turning into a driveway/cross street, exiting a driveway/cross street or using the TWLTL as a passing lane.



## **Alternatives Analysis**

#### Road Diet

A Road Diet (five-lane section to a three-lane section) for this segment of SR 363/S. Adams Street was considered to accommodate the pedestrians within the corridor. This option was eliminated due to the mainline peak hour directional volume of 1,200 vehicles per hour (vph). This exceeds the 750 vph threshold recommended by FHWA.

#### Pedestrian Hybrid Beacon (HAWK Signal)

Installation of a pedestrian high intensity activated crosswalk hybrid beacon, often referred to as a HAWK signal, was considered for the College Club Townhomes bus stop. This location was selected since it accommodates pedestrians crossing the street to/from the bus stop and those pedestrians crossing the street to/from College Club Townhomes to access the convenience store. It also reduces the need for pedestrians traveling south from the bus stop to cross the gas station driveways.

Although motorist compliance is typically better with a HAWK signal than a rectangular rapid flashing beacon (RRFB), the HAWK alternative was eliminated since the posted speed (40-45 MPH) and the motorists' speeds on SR 363/S. Adams Street were deemed too high for this pedestrian treatment.

The following includes additional pedestrian and vehicle safety alternatives considered for the corridor.

#### Alternative 1 - Pedestrian Signal

Alternative 1 considers the option of installing a pedestrian traffic signal instead of the pedestrian hybrid signal at the bus stop location. FDOT Traffic Engineering Manual (TEM) Section 3.8.7, Selection Guidance for Pedestrian Treatments, was revised in 2016 to include the following:

For locations that meet the criteria for identified need under Section 3.8.5, but do not have sufficient pedestrian volume to meet MUTCD signal warrants, decisions about which additional treatment elements to include (if any) should be made with sound engineering judgment. In urban corridors featuring a coordinated signal system, a location that meets the pedestrian hybrid beacon criteria may be upgraded to a pedestrian traffic signal. In such cases consideration should be given to cycle length, signal spacing and available gaps to reduce pedestrian delay and promote signal compliance.

A two-phase pedestrian signal installed in the vicinity of the College Club Townhomes bus stop would provide a controlled crossing for the pedestrians with a stop control for the SR 363/S. Adams Street traffic. The signals at SR 61/Paul Russell Road and SR 373/Orange Avenue are approximately 2,800 feet apart and a signal at this location would provide a signal spacing in the coordinated system of approximately 1,400 feet to SR 61/Paul Russell Road and 1,200 feet to SR 373/Orange Avenue. Although the driveways to College Club Townhomes and the gas station may not meet the 100-foot setback from the crosswalk as outlined in the MUTCD, the location of the crossing should be determined by the proximity to the significant generators which in this case is the bus stop. Three options, A, B and C, for the location of the pedestrian crossing are included in Appendix D. Due to the three vehicle crashes that were associated with a bus stopped at the existing near-side bus stop, relocation of the bus stop to the far side is also recommended.

The pedestrian crossing locations include (A) the south side of the gas station driveway, (B) in-between the two gas station driveways or (C) on the north side of the driveways. Since the gas station and College Club Townhomes driveways are not proposed to be signalized due to the on-site characteristics which restrict adequate vehicle queueing, the potential for side street conflicts with pedestrians needs to be considered along with the frequency of pedestrians crossing the driveways. The south side crosswalk (A), would provide the least potential for vehicle conflicts with pedestrians.



The lighting at the signalized crosswalk will need to be upgraded to meet the latest standards in the Plans Preparation Manual. It is recommended that the signalized intersections also be reviewed for the lighting levels and upgraded as needed. Improved lighting can also provide a reduction in vehicle crashes.

A pedestrian refuge island located near the post office driveway is also recommended. This would assist those pedestrians that are currently crossing south of SR 373/Orange Avenue near the library, thrift store and post office. Vehicle gaps are created by the Orange Avenue signal.

Alternative 1 should include the addition of the R10-15, TURNING VEHICLES YIELD TO PEDESTRIAN, signs at the signalized intersections and replacement of the transvers crosswalks at the signalized intersections with high emphasis crosswalks. Both of these are designed to increase driver awareness/visibility of pedestrians. Additionally, the pedestrian signal heads on the southwest corner of Adams Street/Orange Avenue should be relocated to within 10 feet of the crosswalks.

Appendix D includes the Alternative 1 concept plan which depicts the pedestrian signal, the median refuge location and intersection improvements.

#### Alternative 2 - Raised Median

Alternative 2 investigated replacing the two-way-left-turn lane with a raised median to provide pedestrian refuge throughout the corridor. This would also provide more controlled access at the cross streets/driveways resulting in a reduction in vehicle crashes. To provide a more pedestrian friendly environment, the travel lane widths should be reduced along with the posted speed limit from the existing 40 MPH and 45 MPH to 35 MPH.

Although vehicle turning movement counts were not collected along the corridor, a preliminary concept design was developed to reflect the proposed median opening locations. The existing 60-foot typical section, four 12-foot lanes and a 12-foot TWLTL, would be modified to 10-foot inside through lanes, 11-foot outside lanes, 10-foot turn lanes and a variable width median. The 4-foot bike lane could not be widened to the standard 7-foot within the existing 68-foot pavement typical section.

The concept includes providing directional median openings at the following locations, from south to north, and the approximate spacing between the signals and directional median openings:

- Kendall Drive southbound left-turn (400 feet, 670 feet)
- Bass Street/Adams Place Condominiums northbound (1,010 feet, 525 feet) and southbound leftturns (660 feet, 600 feet)
- College Club Townhomes/Gas Station northbound (520 feet, 610 feet) and southbound left-turns (590 feet, 1080 feet)
- Post Office center driveway northbound left-turn (610 feet, 560 feet)

The directional opening locations were selected based on the existing land uses to provide direct left-turn access as the first priority. The locations can be modified/consolidated if needed to more closely meet the FDOT access management spacing requirements. The pedestrian signal as described in Alternative 1 would be provided near the existing College Club Townhomes bus stop. Appendix D includes the Alternative 2 raised median concept.

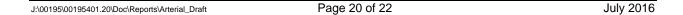
# Alternative 3 - New Mast Arm Signal at SR 373/Orange Avenue and Signal Upgrades at SR 61/Paul Russell Road

Alternative 3 includes upgrades to the signal at SR 61/Paul Russell Road, safety items along the corridor and replacing the signal at SR 373/Orange Avenue to a mast arm or box span design to improve visibility of the traffic signals. The new signal would also provide standard safety upgrades that have proven to provide a reduction in crashes. The following lists these improvements for Alternative 3:



- Add NEXT SIGNAL signs for the approach to SR 61/Paul Russell Road and SR 373/Orange Avenue.
- Improvements at SR 61/Paul Russell Road intersection:
  - Install internally illuminated street name signs.
  - Provide one signal head per through lane.
  - Replace the 5-section left-turn signal with 4-section flashing yellow arrow (FYA) signal.
  - Relocate pedestrian pushbuttons and signs to the correct side of the pole/pedestal.
- Improvements at SR 373/Orange Avenue intersection:
  - Replace the diagonal signal span with mast arm or box signal span.
  - Install internally illuminated street name signs.
  - Provide one signal head per through lane.
  - Add yellow retro-reflective back plates.
  - Replace the 5-section left-turn signals with 4-section flashing yellow arrow (FYA) signals.
  - Provide separate pedestrian pushbutton poles where right-of-way is available.

Appendix D includes the Alternative 3 concept drawing.





## **Benefit Cost Analysis and Net Present Value**

A Benefit Cost (B/C) ratio and Net Present Value (NPV) calculation were performed for the three alternatives outlined. The B/C Ratio and NPV are useful analysis tools when evaluating possible funding sources such as the Highway Safety Improvement Program (HSIP). Table 4 provides a summary of the B/C values for the three Alternatives. Details of the B/C and NPV calculations are provided in Appendix E including the cost estimates.

Table 4 - Benefit/Cost Analysis Summary

| Alternative   | Description                          | Project Cost | B/C Ratio |
|---------------|--------------------------------------|--------------|-----------|
| Alternative 1 | Install Pedestrian Signal            | \$228,000    | 1.9       |
| Alternative i | Add Street Lighting at Signals       | \$101,000    | 6.44      |
| Alternative 2 | Convert TWLTL to Raised Median       | ¢4.072.000   | 2.64      |
| Alternative 2 | Reduce Lane Widths and Speed Limit   | \$1,073,000  | 2.64      |
|               | Replace Diagonal Span at Orange Ave. |              |           |
| Altamatica 2  | and Upgrade to Standards             | £400,000     | 40.74     |
| Alternative 3 | Replace 5-section signals with FYA   | \$488,000    | 10.71     |
|               | Provide 1 Signal Head Per Lane       |              |           |

The B/C for the lighting improvements in Alternative 1 was calculated separately from the B/C for the pedestrian signal since lighting can reduce both pedestrian and vehicle crashes and the pedestrian signal benefits pedestrian crashes only. As shown in Table 4 the pedestrian signal is expected to provide a B/C of 1.9 and the lighting a B/C of 6.44. A weighted average of the two improvements would provide a B/C greater than 2.0.

Alternative 2, installation of the raised median with a speed reduction provides a B/C of 2.64. Alternative 3, signal replacement at SR 373/Orange Avenue and upgrades at SR 61/Paul Russell Road, are expected to have the highest B/C of 10.71.



#### Recommendations

The pedestrian safety concerns raised by the CRPTA for the SR 363/S. Adams Street corridor are validated in that (1) three of the five pedestrian crashes occurred near the bus stop located at the College Club Townhomes, (2) the field review indicated safety concerns with pedestrians standing/walking in the middle of the roadway with no refuge or barrier and (3) the pedestrian count data collected meets the minimum pedestrian volume criteria for a marked crosswalk near the College Club Townhomes bus stop.

#### Alternative 1

Due to the SR 363/S. Adams Street typical section, the vehicle speeds, the pedestrian volumes and the traffic volumes, a pedestrian signal is recommended at the College Club Townhomes bus stop. The signal should be coordinated with the adjacent signals at Paul Russell Road and Orange Avenue. Lighting levels will need to be improved at the new pedestrian signal and should also be upgraded at the adjacent signalized intersections. Due to the three vehicle crashes that were related to the existing bus stop location, it is recommended that the bus stop be relocated from the near-side to the far-side of the College Club Townhomes driveway. Alternative 1 should be considered for implementation as a short-term project due to the observed safety concerns of the pedestrians crossing in the vicinity of the bus stop.

#### Alternative 2

Although the proposed pedestrian signal in Alternative 1 will provide a safer means for the pedestrians to cross SR 363/S. Adams Street at the bus stop, the land uses and daily activity of vulnerable users within the entire corridor indicate a more pedestrian-friendly environment is needed. A raised median to replace the existing two-way-left-turn-lane (TWLTL) is recommended to reduce both pedestrian conflicts and vehicle conflicts. The 12-foot lane widths are recommended to be reduced to 10 and 11 feet to reduce vehicle speeds from 40 and 45 MPH to 35 MPH.

#### Alternative 3

Although not the primary focus of this study, the SR 363/S. Adams Street at Orange Avenue signalized intersection would experience a significant reduction in vehicle crashes with the upgrade of the signal to current standards including replacing the diagonal span wire with mast arms, yellow retroreflective back plates, one signal head per through lane, 5-section signals replaced with 4-section flashing yellow arrow signals and illuminated street name signs to name a few. Although the Paul Russell Road signal heads are on mast arms, the intersection is in need of similar standard upgrades to improve the signal head visibility.

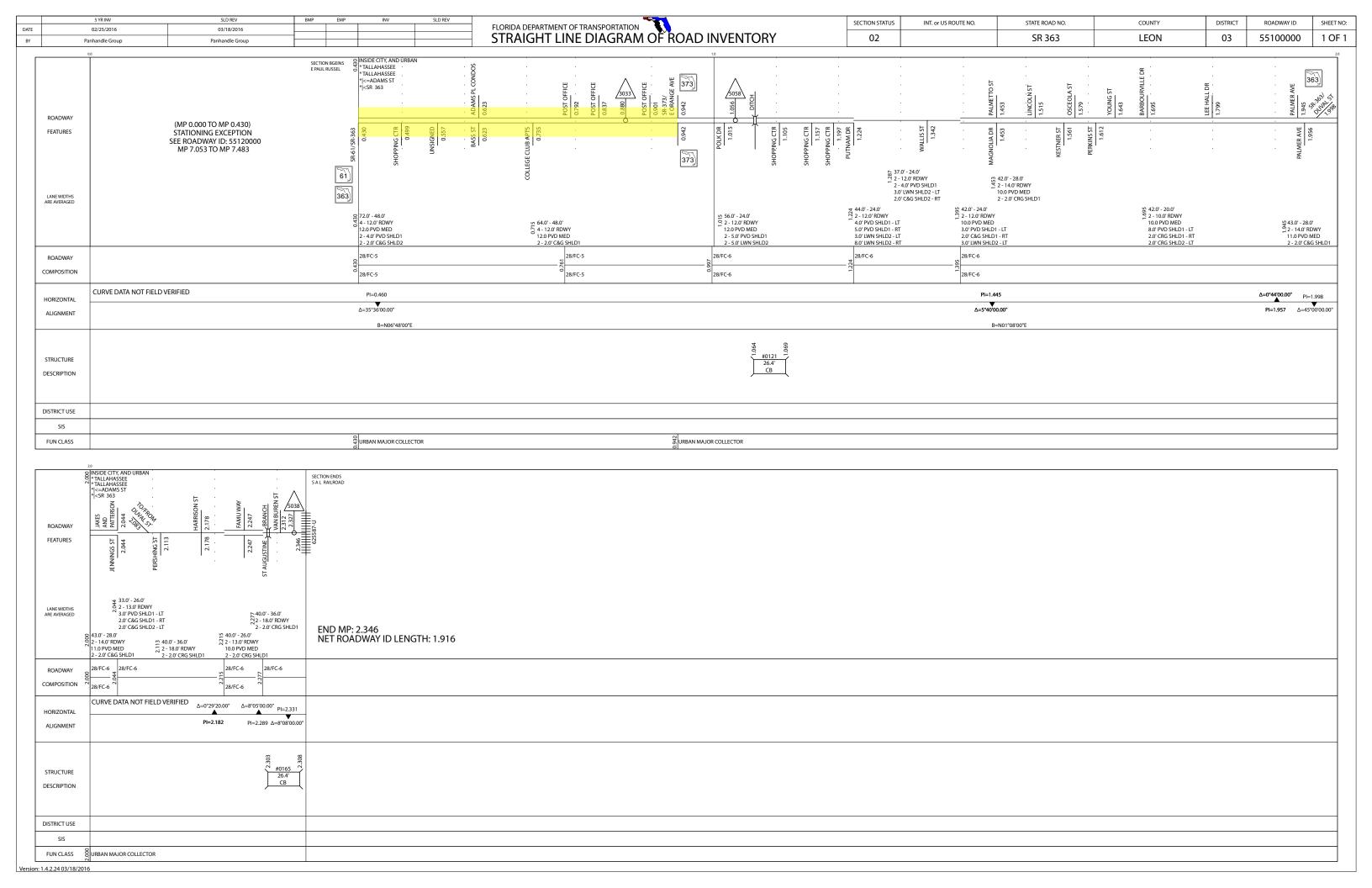
Appendix D includes the drawings of the three alternatives. The benefit cost ratios for each of the alternatives is expected to be 2.0 or higher and are included in Appendix E.



# **Appendices**



# Appendix A Straight Line Diagram





# Appendix B Pedestrian Count Data

Table 2
North / South Pedestrian Activity

|               |        |   | Ea | st Si | de o | f Roa | adwa | ay |   |   |    |    |    |       |
|---------------|--------|---|----|-------|------|-------|------|----|---|---|----|----|----|-------|
| Zon           | e      | 1 | 2  | 3     | 4    | 5     | 6    | 7  | 8 | 9 | 10 | 11 | 12 | Total |
|               | NB BEG | 3 | 0  | 5     | 0    | 8     | 0    | 27 | 0 | 1 | 1  | 6  | 0  | 51    |
| A.M Total     | NB END | 0 | 0  | 0     | 1    | 0     | 2    | 31 | 3 | 3 | 0  | 4  | 7  | 51    |
| 07:00 - 10:00 | SB BEG | 0 | 0  | 2     | 1    | 2     | 0    | 3  | 5 | 0 | 0  | 0  | 3  | 16    |
|               | SB END | 1 | 1  | 7     | 0    | 2     | 0    | 4  | 0 | 0 | 0  | 1  | 0  | 16    |

|               |        |   | We | st Si | de c | of Ro | adw | ay |   |   |    |    |    |       |
|---------------|--------|---|----|-------|------|-------|-----|----|---|---|----|----|----|-------|
| Zone          | e      | 1 | 2  | 3     | 4    | 5     | 6   | 7  | 8 | 9 | 10 | 11 | 12 | Total |
|               | NB BEG | 1 | 1  | 1     | 0    | 1     | 9   | 3  | 1 | 1 | 0  | 0  | 0  | 18    |
| A.M Total     | NB END | 0 | 0  | 0     | 0    | 1     | 1   | 7  | 0 | 3 | 3  | 0  | 3  | 18    |
| 07:00 - 10:00 | SB BEG | 0 | 0  | 0     | 0    | 0     | 2   | 10 | 0 | 0 | 0  | 0  | 1  | 13    |
|               | SB END | 3 | 1  | 1     | 0    | 0     | 5   | 3  | 0 | 0 | 0  | 0  | 0  | 13    |

|               |        |   | Ea | st Si | de o | f Roa | adwa | ay |   |   |    |    |    |       |
|---------------|--------|---|----|-------|------|-------|------|----|---|---|----|----|----|-------|
| Zon           | е      | 1 | 2  | 3     | 4    | 5     | 6    | 7  | 8 | 9 | 10 | 11 | 12 | Total |
|               | NB BEG | 2 | 1  | 8     | 0    | 4     | 0    | 16 | 1 | 2 | 1  | 0  | 1  | 36    |
| Mid-Day       | NB END | 0 | 0  | 2     | 1    | 1     | 0    | 12 | 6 | 4 | 0  | 0  | 10 | 36    |
| 11:00 - 13:00 | SB BEG | 0 | 0  | 2     | 0    | 1     | 0    | 4  | 2 | 1 | 2  | 8  | 6  | 26    |
|               | SB END | 2 | 0  | 4     | 0    | 3     | 1    | 2  | 0 | 3 | 5  | 6  | 0  | 26    |

|               | West Side of Roadway |   |   |   |   |   |   |   |   |   |    |    |    |       |  |
|---------------|----------------------|---|---|---|---|---|---|---|---|---|----|----|----|-------|--|
| Zone          | Zone                 |   | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | Total |  |
|               | NB BEG               | 1 | 0 | 2 | 1 | 0 | 2 | 7 | 1 | 2 | 0  | 0  | 0  | 16    |  |
| Mid-Day       | NB END               | 0 | 0 | 1 | 0 | 3 | 0 | 8 | 2 | 2 | 0  | 0  | 0  | 16    |  |
| 11:00 - 13:00 | SB BEG               | 0 | 0 | 0 | 0 | 2 | 0 | 7 | 1 | 2 | 2  | 0  | 4  | 18    |  |
|               | SB END               | 1 | 1 | 4 | 0 | 1 | 2 | 4 | 0 | 3 | 1  | 0  | 1  | 18    |  |

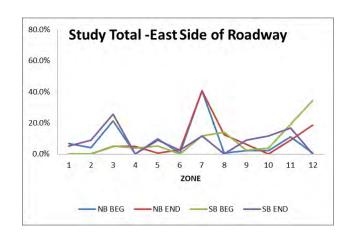
|               | East Side of Roadway |   |   |    |   |   |   |    |   |    |    |    |       |    |  |
|---------------|----------------------|---|---|----|---|---|---|----|---|----|----|----|-------|----|--|
| Zon           | 1                    | 2 | 3 | 4  | 5 | 6 | 7 | 8  | 9 | 10 | 11 | 12 | Total |    |  |
|               | NB BEG               | 5 | 5 | 18 | 0 | 2 | 1 | 16 | 0 | 0  | 1  | 10 | 0     | 58 |  |
| P.M. Total    | NB END               | 0 | 0 | 5  | 5 | 0 | 2 | 16 | 9 | 2  | 0  | 9  | 10    | 58 |  |
| 11:00 - 13:00 | SB BEG               | 0 | 0 | 0  | 2 | 1 | 0 | 2  | 4 | 1  | 1  | 7  | 18    | 36 |  |
|               | SB END               | 1 | 6 | 9  | 0 | 2 | 1 | 3  | 0 | 4  | 4  | 6  | 0     | 36 |  |

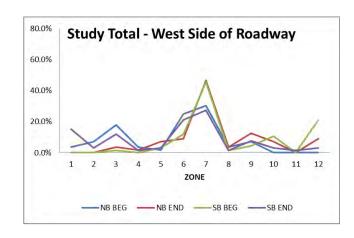
| West Side of Roadway |        |   |   |   |   |   |   |    |   |   |    |    |    |       |
|----------------------|--------|---|---|---|---|---|---|----|---|---|----|----|----|-------|
| Zone                 |        | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 | 11 | 12 | Total |
|                      | NB BEG | 0 | 3 | 7 | 1 | 0 | 3 | 7  | 0 | 1 | 0  | 0  | 0  | 22    |
| P.M. Total           | NB END | 0 | 0 | 1 | 1 | 0 | 4 | 11 | 0 | 2 | 1  | 0  | 2  | 22    |
| 11:00 - 13:00        | SB BEG | 0 | 0 | 1 | 0 | 0 | 6 | 13 | 0 | 1 | 5  | 0  | 9  | 35    |
|                      | SB END | 6 | 0 | 3 | 1 | 1 | 7 | 11 | 1 | 2 | 1  | 1  | 1  | 35    |

|             | East Side of Roadway |    |   |    |   |    |   |    |    |    |    |    |       |     |  |
|-------------|----------------------|----|---|----|---|----|---|----|----|----|----|----|-------|-----|--|
| Zon         | 1                    | 2  | 3 | 4  | 5 | 6  | 7 | 8  | 9  | 10 | 11 | 12 | Total |     |  |
|             | NB BEG               | 10 | 6 | 31 | 0 | 14 | 1 | 59 | 1  | 3  | 3  | 16 | 1     | 145 |  |
| Study Total | NB END               | 0  | 0 | 7  | 7 | 1  | 4 | 59 | 18 | 9  | 0  | 13 | 27    | 145 |  |
|             | SB BEG               | 0  | 0 | 4  | 3 | 4  | 0 | 9  | 11 | 2  | 3  | 15 | 27    | 78  |  |
|             | SB END               | 4  | 7 | 20 | 0 | 7  | 2 | 9  | 0  | 7  | 9  | 13 | 0     | 78  |  |

|             | West Side of Roadway |    |   |    |   |   |    |    |   |    |    |    |       |    |  |
|-------------|----------------------|----|---|----|---|---|----|----|---|----|----|----|-------|----|--|
| Zon         | 1                    | 2  | 3 | 4  | 5 | 6 | 7  | 8  | 9 | 10 | 11 | 12 | Total |    |  |
|             | NB BEG               | 2  | 4 | 10 | 2 | 1 | 14 | 17 | 2 | 4  | 0  | 0  | 0     | 56 |  |
| Study Total | NB END               | 0  | 0 | 2  | 1 | 4 | 5  | 26 | 2 | 7  | 4  | 0  | 5     | 56 |  |
|             | SB BEG               | 0  | 0 | 1  | 0 | 2 | 8  | 30 | 1 | 3  | 7  | 0  | 14    | 66 |  |
|             | SB END               | 10 | 2 | 8  | 1 | 2 | 14 | 18 | 1 | 5  | 2  | 1  | 2     | 66 |  |

Chart 1





A total of 345 pedestrian trips were recorded during the three study periods, with the p.m. period from 3:00 p.m. to 6:00 p.m. having the highest number of pedestrians (151). The rate of pedestrian activity during the mid-day study period from 11:00 a.m. to 1:00 p.m. was similar to the p.m. period with approximately 45 pedestrian trips recorded per hour. Of the 345 pedestrian trips, 201 were in the northbound direction with the greatest number (145) occurring on the east side of the roadway.



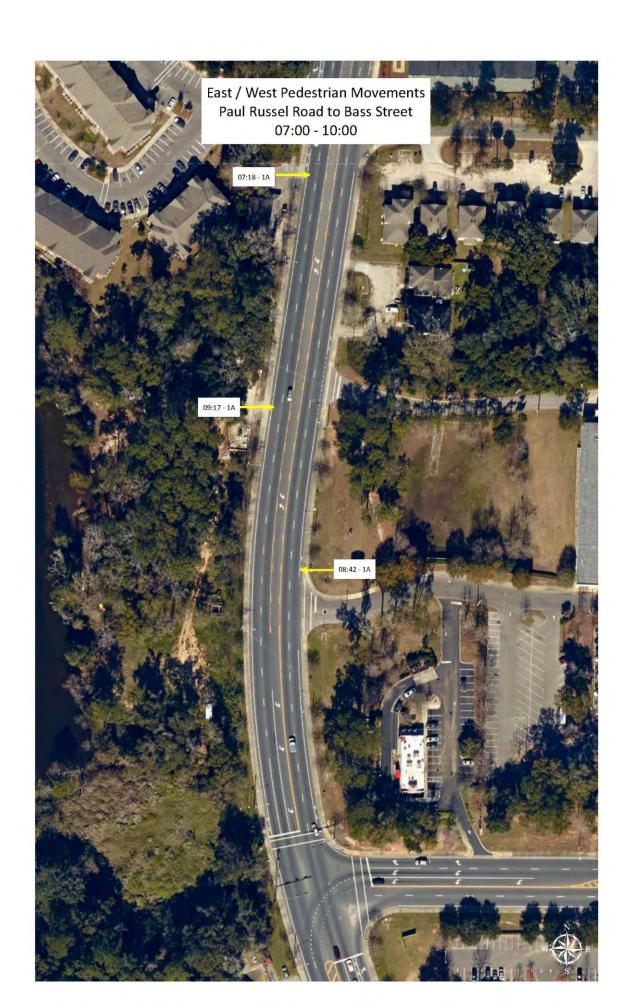


# PEDESTRIAN DATA

# East / West Pedestrian Crossings 7:00 – 10:00

(7:00 am to 10:00 am)





## East / West Pedestrian Crossings 11:00 – 13:00

(11:00 am to 1:00 pm)





### East / West Pedestrian Crossings 15:00 to 18:00 (3:00 pm to 6:00 pm)





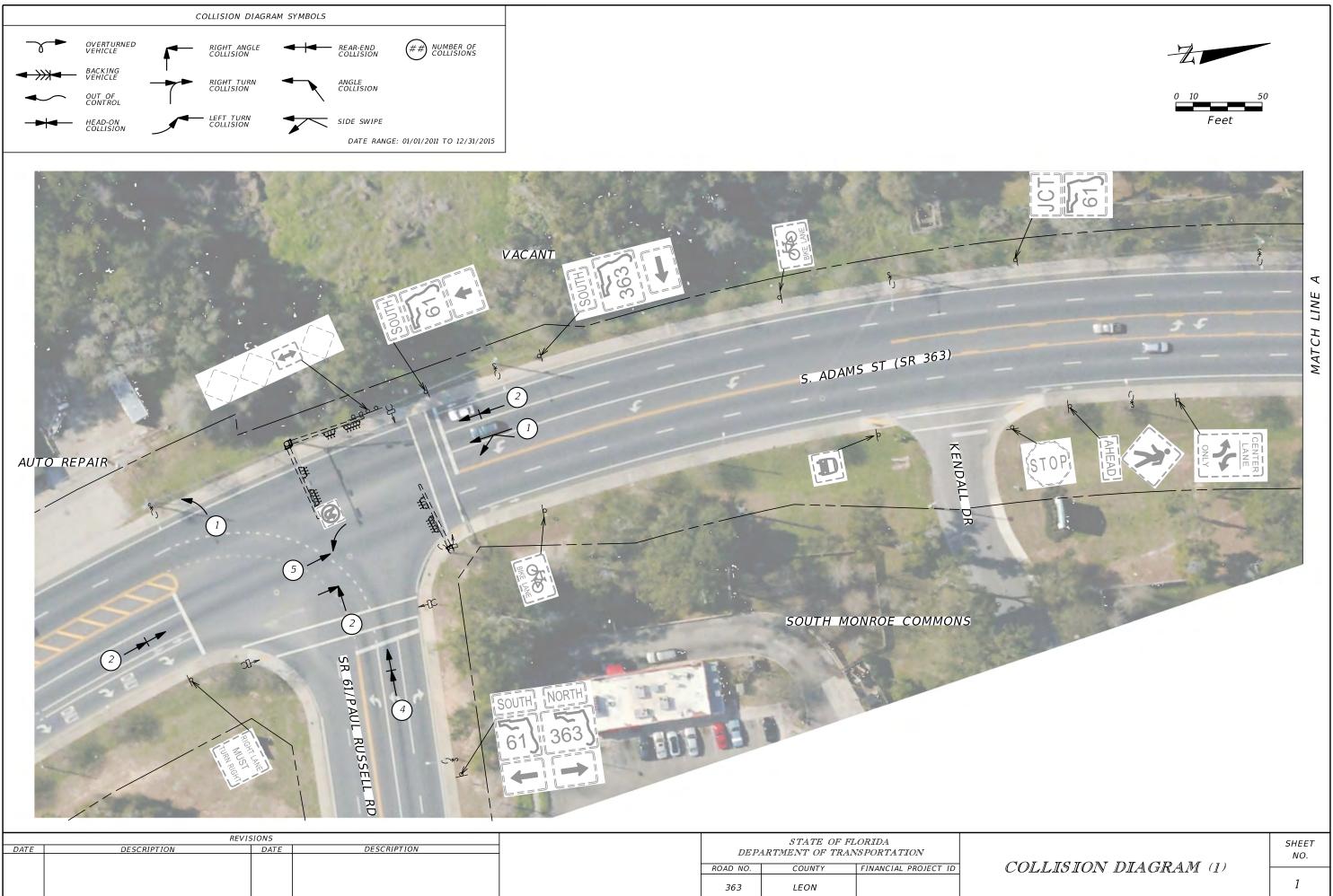
# Hourly North / South Pedestrian Trips By Zone

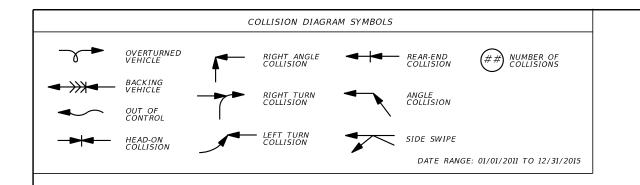
|                    |                            |   |         |       |       |       |           |     |                      | Hou | ırly f | lort   | h /    | South    | edestrian Tabl       | es by Zone       |   |     |       |       |       |          |         |   |   |    |    |        |         |
|--------------------|----------------------------|---|---------|-------|-------|-------|-----------|-----|----------------------|-----|--------|--------|--------|----------|----------------------|------------------|---|-----|-------|-------|-------|----------|---------|---|---|----|----|--------|---------|
|                    |                            |   |         |       |       |       |           |     |                      |     |        |        |        |          |                      |                  |   |     |       |       |       |          |         |   |   |    |    |        |         |
|                    | 1                          |   |         |       |       |       | adwa      | •   |                      |     |        |        |        |          |                      |                  |   |     |       | ide c |       |          |         |   |   |    |    |        | 1       |
| Zone               |                            | 1 | 2       | 3     | 4     | 5     | 6         | 7   | 8                    | 9   | 10     | 11     | _      | Total    | Zo                   |                  | 1 | 2   | 3     | 4     | 5     | 6        | 7       | 8 | 9 | 10 | 11 | 12     | Total   |
|                    | NB BEG                     | 2 | 0       | 0     | 0     | 1     | 0         | 5   | 0                    | 0   | 1      | 2      | 0      | 12<br>12 |                      | NB BEG           | 0 | 0   | 0     | 0     | 0     | 4        | 4       | 0 | 0 | 0  | 0  | 0      | 6       |
| A.M<br>07:00-08:00 | NB END<br>SB BEG           | 0 | 0       | 1     | 0     | 0     | 0         | 6   | 2                    | 0   | 0      | 0      | 1      | 5        | A.M<br>07:00-08:00   | NB END<br>SB BEG | 0 | 0   | 0     | 0     | 0     | 0        | 2       | 0 | 0 | 0  | 0  | 0      | 6<br>2  |
| 07.00-08.00        | SB END                     | 0 | 0       | 3     | 0     | 1     | 0         | 1   | 0                    | 0   | 0      | 0      | 0      | 5        | 07.00-08.00          | SB END           | 1 | 0   | 0     | 0     | 0     | 1        | 0       | 0 | 0 | 0  | 0  | 0      | 2       |
|                    | JULIAD                     | U | U       | ,     | U     | 1     | U         |     | U                    | U   | U      | U      | U      |          |                      | JULIAD           | 1 | U   | U     | 0     | U     | 1        | U       | U | U | U  | U  | U      |         |
|                    |                            |   | Ea      | st Si | de o  | f Roa | adwa      | y   |                      |     |        |        |        |          |                      |                  |   | W   | est S | ide d | f Ro  | adw      | ay      |   |   |    |    |        |         |
| Zone               | е                          | 1 | 2       | 3     | 4     | 5     | 6         | 7   | 8                    | 9   | 10     | 11     | 12     | Total    | Zo                   | ne               | 1 | 2   | 3     | 4     | 5     | 6        | 7       | 8 | 9 | 10 | 11 | 12     | Tota    |
|                    | NB BEG                     | 0 | 0       | 1     | 0     | 5     | 0         | 8   | 0                    | 0   | 0      | 2      | 0      | 16       |                      | NB BEG           | 0 | 0   | 1     | 0     | 0     | 2        | 1       | 1 | 1 | 0  | 0  | 0      | 6       |
| A.M                | NB END                     | 0 | 0       | 0     | 0     | 0     | 0         | 10  | 0                    | 3   | 0      | 1      | 2      | 16       | A.M                  | NB END           | 0 | 0   | 0     | 0     | 1     | 0        | 0       | 0 | 2 | 1  | 0  | 2      | 6       |
| 08:00-09:00        | SB BEG                     | 0 | 0       | 0     | 0     | 1     | 0         | 2   | 0                    | 0   | 0      | 0      | 0      | 3        | 08:00-09:00          | SB BEG           | 0 | 0   | 0     | 0     | 0     | 0        | 2       | 0 | 0 | 0  | 0  | 0      | 2       |
|                    | SB END                     | 0 | 1       | 2     | 0     | 0     | 0         | 0   | 0                    | 0   | 0      | 0      | 0      | 3        |                      | SB END           | 0 | 0   | 0     | 0     | 0     | 2        | 0       | 0 | 0 | 0  | 0  | 0      | 2       |
|                    |                            |   |         |       |       |       |           |     |                      |     |        |        |        |          | West Side of Roadway |                  |   |     |       |       |       |          |         |   |   |    |    |        |         |
| Zone               | •                          | 1 | Ea<br>2 | st Si | de o  | f Roa | adwa<br>6 | 7   | 8                    | 9   | 10     | 11     | 12     | Total    | Zo                   | 20               | 1 | 2   | est S | de d  | of Ro | adw<br>6 | ay<br>7 | 8 | 9 | 10 | 11 | 12     | Total   |
| 20116              | NB BEG                     | 1 | 0       | 4     | 0     | 2     | 0         | 14  | 0                    | 0   | 0      | 2      | 0      | 23       | 20                   | NB BEG           | 0 | 1   | 0     | 0     | 1     | 3        | 1       | 0 | 0 | 0  | 0  | 0      | 6       |
| A.M                | NB END                     | 0 | 0       | 0     | 1     | 0     | 2         | 15  | 2                    | 0   | 0      | 2      | 1      | 23       | A.M                  | NB END           | 0 | 0   | 0     | 0     | 0     | 0        | 3       | 0 | 0 | 2  | 0  | 1      | 6       |
| 09:00-10:00        | SB BEG                     | 0 | 0       | 1     | 0     | 1     | 0         | 1   | 3                    | 0   | 0      | 0      | 2      | 8        | 09:00-10:00          |                  | 0 | 0   | 0     | 0     | 0     | 2        | 6       | 0 | 0 | 0  | 0  | 1      | 9       |
| 05.00 _0.00        | SB END                     | 1 | 0       | 2     | 0     | 1     | 0         | 3   | 0                    | 0   | 0      | 1      | 0      | 8        | 03.00 _0.00          | SB END           | 2 | 1   | 1     | 0     | 0     | 2        | 3       | 0 | 0 | 0  | 0  | 0      | 9       |
|                    |                            |   |         |       |       |       |           |     |                      |     |        |        |        |          |                      |                  |   |     |       |       |       |          |         |   |   |    |    |        |         |
|                    | East Side of Roadway       |   |         |       |       |       |           |     | West Side of Roadway |     |        |        |        |          |                      |                  |   |     |       |       |       |          |         |   |   |    |    |        |         |
| Zone               |                            | 1 | 2       | 3     | 4     | 5     | 6         | 7   | 8                    | 9   | 10     | 11     | 12     | Total    | Zo                   |                  | 1 | 2   | 3     | 4     | 5     | 6        | 7       | 8 | 9 | 10 | 11 | 12     | Total   |
|                    | NB BEG                     | 1 | 1       | 3     | 0     | 0     | 0         | 8   | 0                    | 1   | 0      | 0      | 0      | 14       |                      | NB BEG           | 0 | 0   | 2     | 0     | 0     | 1        | 5       | 0 | 1 | 0  | 0  | 0      | 9       |
| Mid-Day            | NB END                     | 0 | 0       | 2     | 0     | 0     | 0         | 3   | 3                    | 2   | 0      | 0      | 4      | 14       | Mid-Day              | NB END           | 0 | 0   | 0     | 0     | 2     | 0        | 5       | 1 | 1 | 0  | 0  | 0      | 9       |
| 11:00 - 12:00      | SB BEG                     | 0 | 0       | 2     | 0     | 1     | 0         | 1   | 1                    | 1   | 0      | 3      | 3      | 12       | 11:00 - 12:00        |                  | 0 | 0   | 0     | 0     | 2     | 0        | 3       | 1 | 1 | 2  | 0  | 3      | 12      |
|                    | SB END                     | 1 | 0       | 2     | 0     | 1     | 0         | 2   | 0                    | 2   | 3      | 1      | 0      | 12       |                      | SB END           | 1 | 0   | 4     | 0     | 0     | 1        | 3       | 0 | 2 | 1  | 0  | 0      | 12      |
|                    |                            |   | Fa      | st Si | de o  | f Roa | adwa      | av. |                      |     |        |        |        |          |                      |                  |   | W   | est S | ide o | of Ro | adw      | av      |   |   |    |    |        |         |
| Zone               | e                          | 1 | 2       | 3     | 4     | 5     | 6         | 7   | 8                    | 9   | 10     | 11     | 12     | Total    | Zo                   | ne               | 1 | 2   | 3     | 4     | 5     | 6        | 7       | 8 | 9 | 10 | 11 | 12     | Total   |
|                    | NB BEG                     | 1 | 0       | 5     | 0     | 4     | 0         | 8   | 1                    | 1   | 1      | 0      | 1      | 22       |                      | NB BEG           | 1 | 0   | 0     | 1     | 0     | 1        | 2       | 1 | 1 | 0  | 0  | 0      | 7       |
| Mid-Day            | NB END                     | 0 | 0       | 0     | 1     | 1     | 0         | 9   | 3                    | 2   | 0      | 0      | 6      | 22       | Mid-Day              | NB END           | 0 | 0   | 1     | 0     | 1     | 0        | 3       | 1 | 1 | 0  | 0  | 0      | 7       |
| 12:00 - 13:00      | SB BEG                     | 0 | 0       | 0     | 0     | 0     | 0         | 3   | 1                    | 0   | 2      | 5      | 3      | 14       | 12:00 - 13:00        | SB BEG           | 0 | 0   | 0     | 0     | 0     | 0        | 4       | 0 | 1 | 0  | 0  | 1      | 6       |
|                    | SB END                     | 1 | 0       | 2     | 0     | 2     | 1         | 0   | 0                    | 1   | 2      | 5      | 0      | 14       |                      | SB END           | 0 | 1   | 0     | 0     | 1     | 1        | 1       | 0 | 1 | 0  | 0  | 1      | 6       |
|                    |                            |   |         |       |       |       |           |     |                      |     |        |        |        |          |                      |                  |   |     |       |       |       |          |         |   |   |    |    |        |         |
|                    |                            |   |         |       |       |       | adwa      | •   |                      |     |        |        |        |          | West Side of Roadway |                  |   |     |       |       |       |          |         |   |   |    |    |        |         |
| Zone               |                            | 1 | 2       | 3     | 4     | 5     | 6         | 7   | 8                    | 9   | 10     | 11     | 12     | Total    | Zo                   |                  | 1 | 2   | 3     | 4     | 5     | 6        | 7       | 8 | 9 | 10 | 11 | 12     | Total   |
|                    | NB BEG                     | 1 | 4       | 4     | 0     | 0     | 0         | 5   | 0                    | 0   | 1      | 1      | 0      | 16       |                      | NB BEG           | 0 | 0   | 5     | 1     | 0     | 1        | 1       | 0 | 1 | 0  | 0  | 0      | 9       |
| P.M                | NB END<br>SB BEG           | 0 | 0       | 0     | 2     | 0     | 0         | 1   | 1                    | 0   | 0      | 2      | 3<br>8 | 16<br>15 | P.M                  | NB END           | 0 | 0   | 0     | 0     | 0     | 0        | 4       | 0 | 1 | 0  | 0  | 3      | 9       |
| 15:00-16:00        | SB END                     | 0 | 2       | 5     | 0     | 0     | 0         | 0   | 0                    | 1   | 3      | 3<br>4 | 0      | 15       | 15:00-16:00          | SB BEG<br>SB END | 2 | 0   | 0     | 1     | 0     | 0        | 3       | 1 | 1 | 1  | 0  | 0      | 9       |
|                    | JULIAD                     | 0 |         | ,     | 0     | U     | U         | 0   | 0                    | 1   | ,      | 7      | 0      | 13       |                      | JD LIVD          |   | U   | 0     |       | 0     | 0        | 3       | 1 |   |    | 0  | U      |         |
|                    |                            |   | Ea      | st Si | de o  | f Roa | adwa      | y   |                      |     |        |        |        | _        |                      |                  |   | W   | est S | ide o | f Ro  | adw      | ay      |   |   |    |    |        |         |
| Zone               | e                          | 1 | 2       | 3     | 4     | 5     | 6         | 7   | 8                    | 9   | 10     | 11     | 12     | Total    | Zo                   | ne               | 1 | 2   | 3     | 4     | 5     | 6        | 7       | 8 | 9 | 10 | 11 | 12     | Total   |
|                    | NB BEG                     | 3 | 1       | 7     | 0     | 2     | 1         | 4   | 0                    | 0   | 0      | 2      | 0      | 20       |                      | NB BEG           | 0 | 3   | 2     | 0     | 0     | 1        |         | 0 | 0 | 0  | 0  | 0      | 8       |
| P.M                | NB END                     | 0 | 0       | 2     | 0     | _     | 1         | 6   | 5                    | 2   | 0      | 1      | 3      | 20       | P.M                  | NB END           | 0 | 0   | _     | 1     | 0     | 1        | 4       | 0 | 0 | _  | 0  | 0      | 8       |
| 16:00-17:00        | SB BEG                     | 0 | 0       | 0     | 1     | _     | -         | 1   | 2                    | 0   | 0      | 1      |        | _        | 16:00-17:00          |                  | 0 | 0   | _     | -     | 0     | 1        | 6       | 0 | 0 | _  | 0  | 1      |         |
|                    | SB END                     | 1 | 2       | 4     | 0     | 1     | 0         | 2   | 0                    | 1   | 0      | 1      | 0      | 12       |                      | SB END           | 1 | 0   | 2     | 0     | 1     | 2        | 2       | 0 | 1 | 0  | 0  | 0      | 9       |
|                    |                            |   | -       | ٠÷ د. | مام ن | f D-  | - d       |     |                      |     |        |        |        |          |                      |                  |   | 14. | ant C | اماد  | f D   |          |         |   |   |    |    |        |         |
| Zone               | •                          | 1 | Ea<br>2 | st Si | de o  |       | adwa<br>6 | 7   | 8                    | 9   | 10     | 11     | 12     | Total    | Zo                   | 200              | 1 | 2   |       | ide d | f Ro  | adw<br>6 |         | 8 | ۵ | 10 | 11 | 12     | Tota    |
| 20116              | -                          |   |         |       | _     | _     | _         | _   | _                    | _   | 0      | 7      | 0      | 22       | 20                   | NB BEG           | 0 | 0   | _     | _     | 0     | 1        | 4       | 0 | 0 |    | 0  | 0      | 5       |
|                    | NB RFG                     | 1 | n       | /     | ()    | ()    | (1)       | /   |                      |     |        |        |        |          |                      |                  |   |     |       |       |       |          |         |   |   |    |    |        |         |
| P.M                | NB BEG<br>NB END           | 0 | 0       | 7     | 3     | -     | 0         | 7   | 0                    | 0   | -      |        |        |          | P.M                  |                  | _ | _   | n     | n     |       |          | _       | _ | _ | _  | n  | n      | 5       |
| P.M<br>17:00-18:00 | NB BEG<br>NB END<br>SB BEG | 0 |         | 2     | 3     | -     | 1         | 6   | 0                    | 0   | 0      | 6      | 4      | 22       | P.M<br>17:00-18:00   | NB END           | 0 | 0   | _     | _     | 0     | 1        | 3       | 0 | 1 | 0  | 0  | 0<br>5 | 5<br>17 |

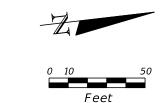


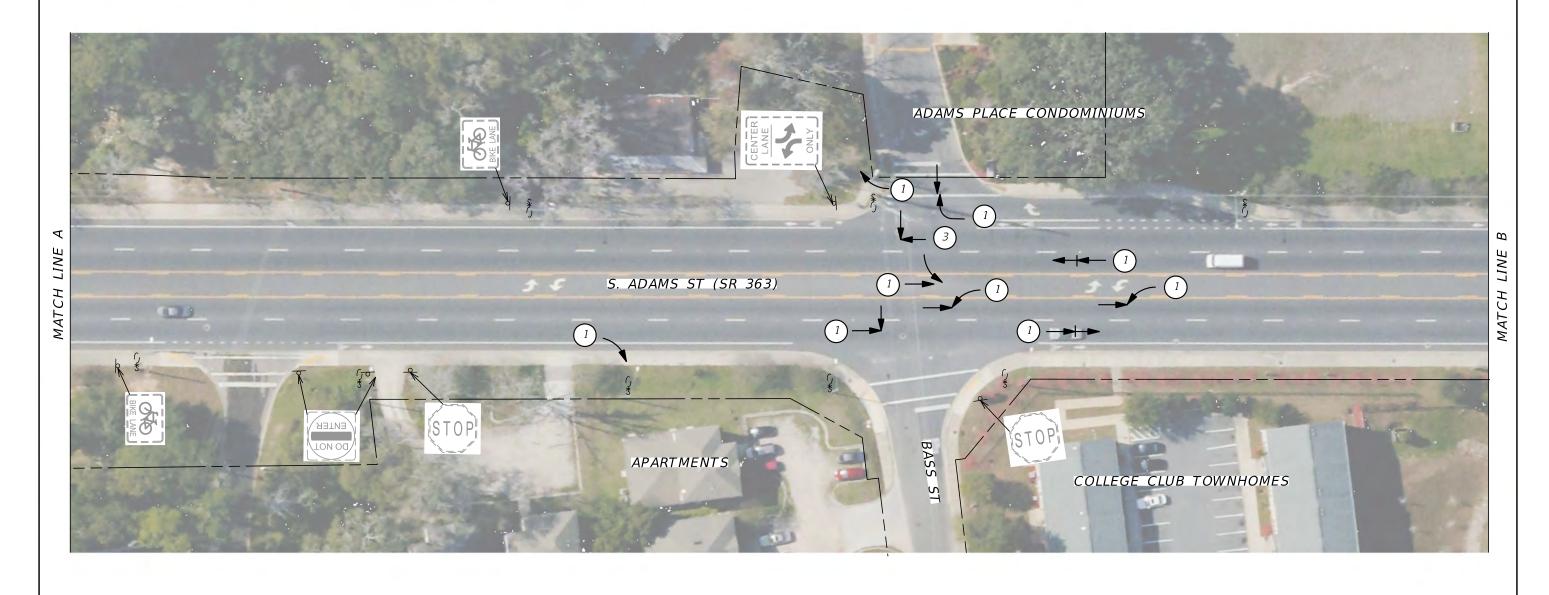
LEON COUNTY, FLORIDA

# Appendix C Collision Diagrams and Crash Summary Table









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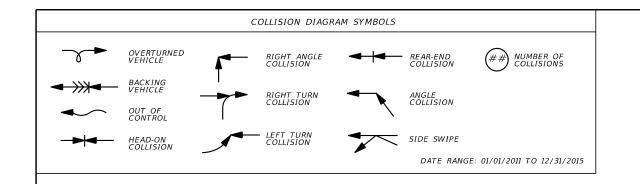
COLLISION DIAGRAM (2)

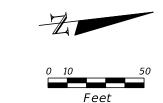
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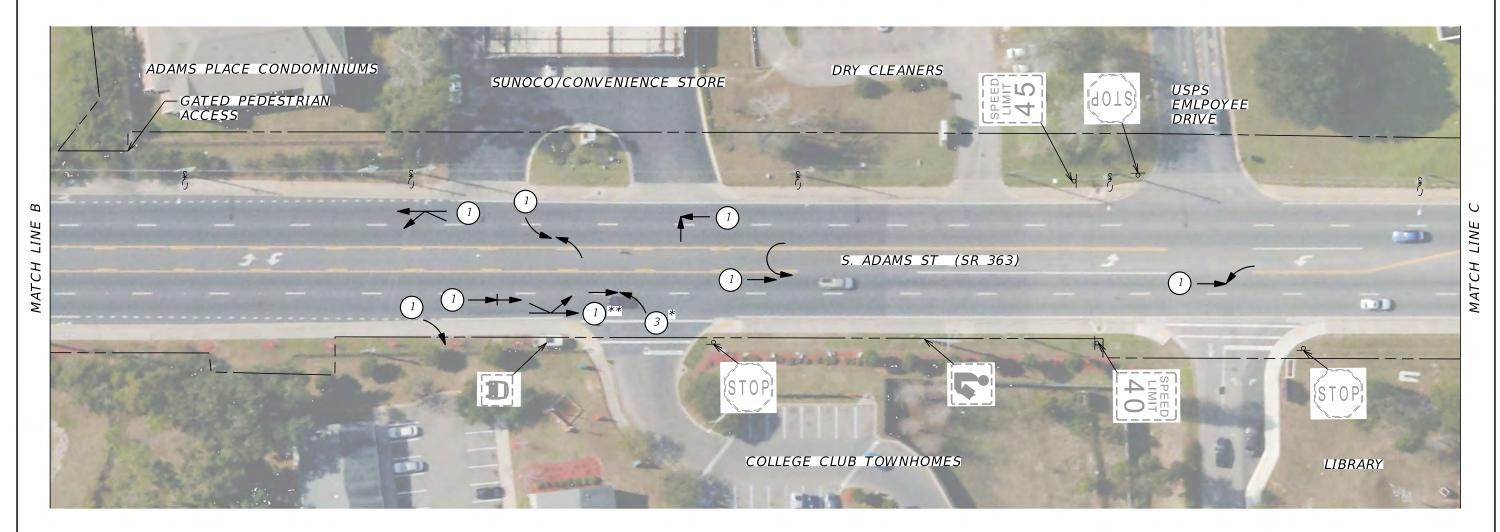
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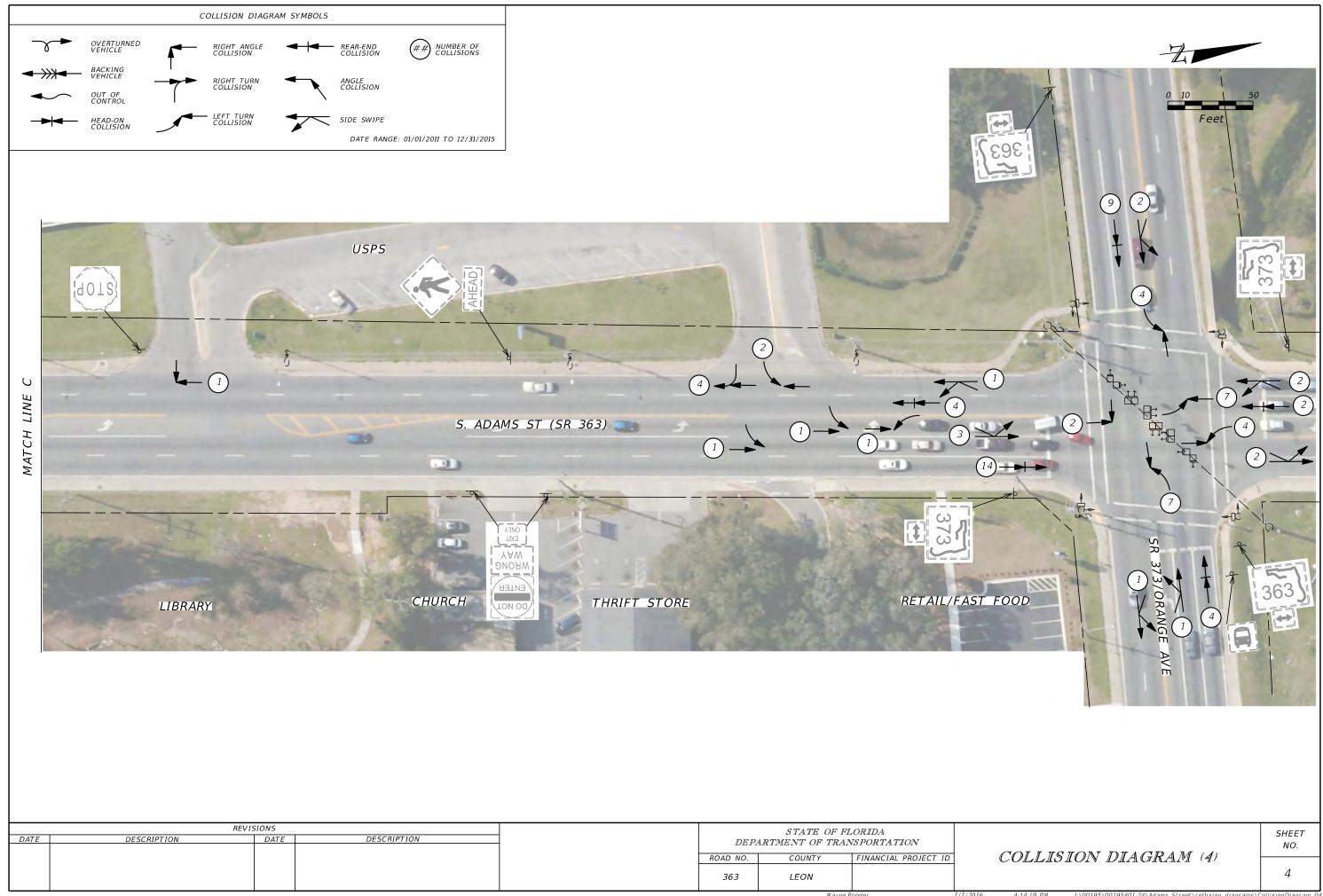
- \* ALL 3 CRASHES OCCURRED WHEN A BUS WAS \*\* MOTORIST STRUCK BUS

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COLLISION DIAGRAM (3)

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### **Table 3 - Pedestrian Crash Summary Table**

Location: Tallahassee State Route: SR 363/Adams Street

Study Period: 2011 to 2015 County: Leon

Number of Years: 5 Location: Paul Russell Road to Orange Avenue

| N | D. DATE   | DAY      | TIME    | ТҮРЕ | FATAL | INJURY | PROP<br>DAMAGE<br>ONLY | DAY/<br>NIGHT | WET/<br>DRY | UNDER<br>INFLUENCE | GENDER<br>PED/BIKE | AGE OF<br>PED/BIKE | AGE OF<br>DRIVER | AT-<br>FAULT | AT<br>SIGNAL | AT<br>DRIVEWAY | CENTER<br>TURN LANE | CONTRIBUTING<br>CAUSE    | COMMENTS   |
|---|-----------|----------|---------|------|-------|--------|------------------------|---------------|-------------|--------------------|--------------------|--------------------|------------------|--------------|--------------|----------------|---------------------|--------------------------|--|
| 1 | 8/2/2011  | Tuesday  | 6:29 PM | Ped  |       | х      |                        | Day           | Dry         |                    | Female             | 45                 | 39               | Driver       | х            |                |                     | FTYROW                   | ADAMS/ORANGE - Pedestrian crossing south leg of Adams St. from east to west with WALK signal was struck by a NB right-turn on red motorist who failed to yield the right-of-way.   |
| 2 | 1/8/2012  | Sunday   | 2:43 PM | Ped  |       | х      |                        | Day           | Dry         |                    | Female             | 19                 | 20               | Ped          |              |                | Х                   | In roadway<br>improperly | <b>2848 S. ADAMS ST.</b> - Pedestrian crossing Adams St. near bus stop in center turn lane was struck by a motorist exiting the Sunoco driveway located at 2848 S Adams St. Pedestrian was cited for improperly in roadway.                            |
| 3 | 4/18/2013 | Thursday | 6:01 AM | Ped  |       | х      |                        | Night         | Dry         |                    | Female             | 34                 | 70               | Driver       |              | х              |                     | FTYROW                   | <b>2800 S. ADAMS ST.</b> - Pedestrian on cell phone walking south across driveway located on west side of Adams St. was struck by an EB left-turn motorist who failed to yield the right-of-way. The crash report notes it was in a dark-lighted area. |
| 4 | 2/28/2014 | Friday   | 9:18 AM | Ped  |       | Х      |                        | Day           | Dry         |                    | Female             | 50                 | 20               | Driver       |              | х              |                     | FTYROW                   | <b>2833 S. ADAMS ST.</b> - Pedestrian crossing driveway located on east side of Adams St. (apartment complex) was struck by a WB right-turn motorist who failed to yield the right-of-way.   |
| ŗ | 6/6/2014  | Friday   | 5:16 PM | Ped  |       | Х      |                        | Day           | Dry         |                    | Female             | 21                 | 22               | Driver       |              |                | Х                   | FTYROW                   | <b>2848 S ADAMS ST.</b> - Pedestrian crossing Adams St. was struck by an EB left-turn motorist exiting the Sunoco parking lot located on the west side of Adams St.  |

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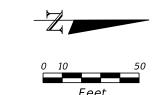
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CONDITION/COLLISION/ COUNTS DIAGRAM (1)

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DESCRIPTION

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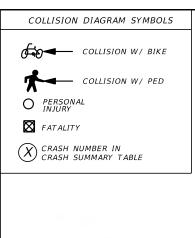
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CONDITION/COLLISION/ COUNTS DIAGRAM (2)

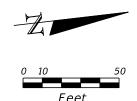
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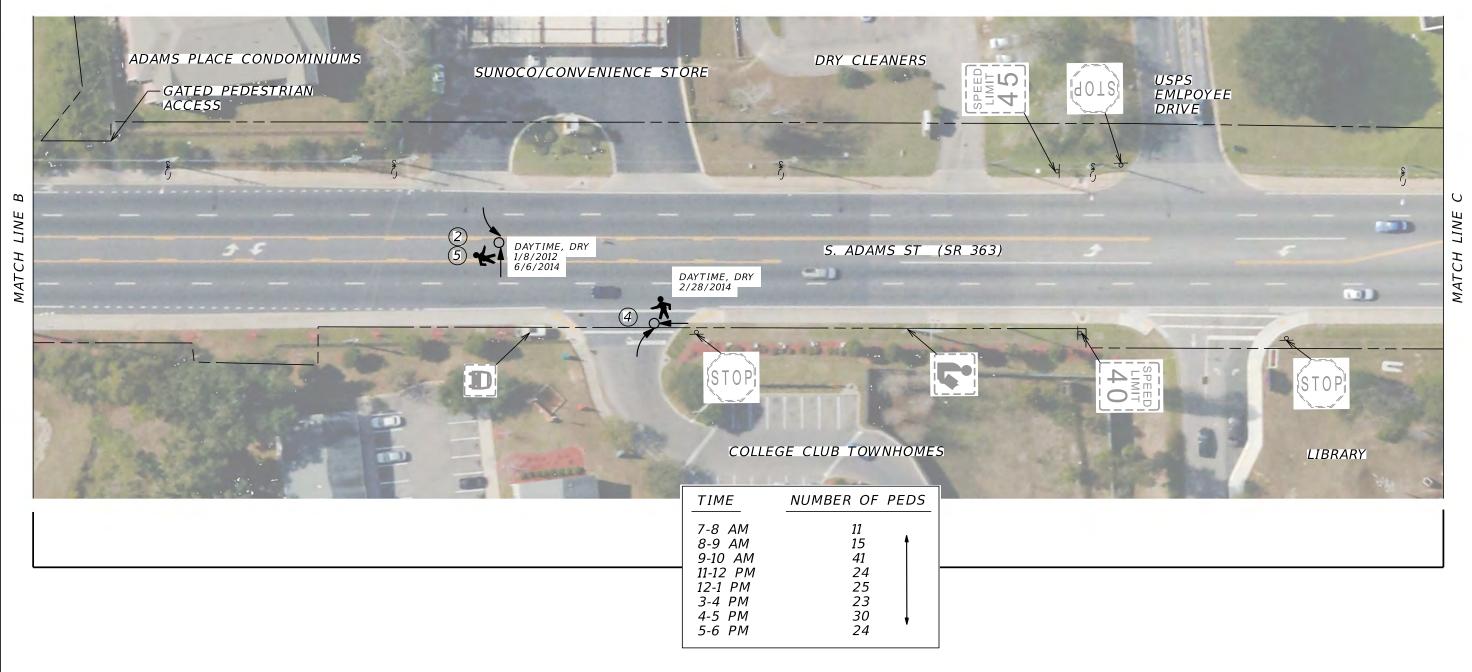
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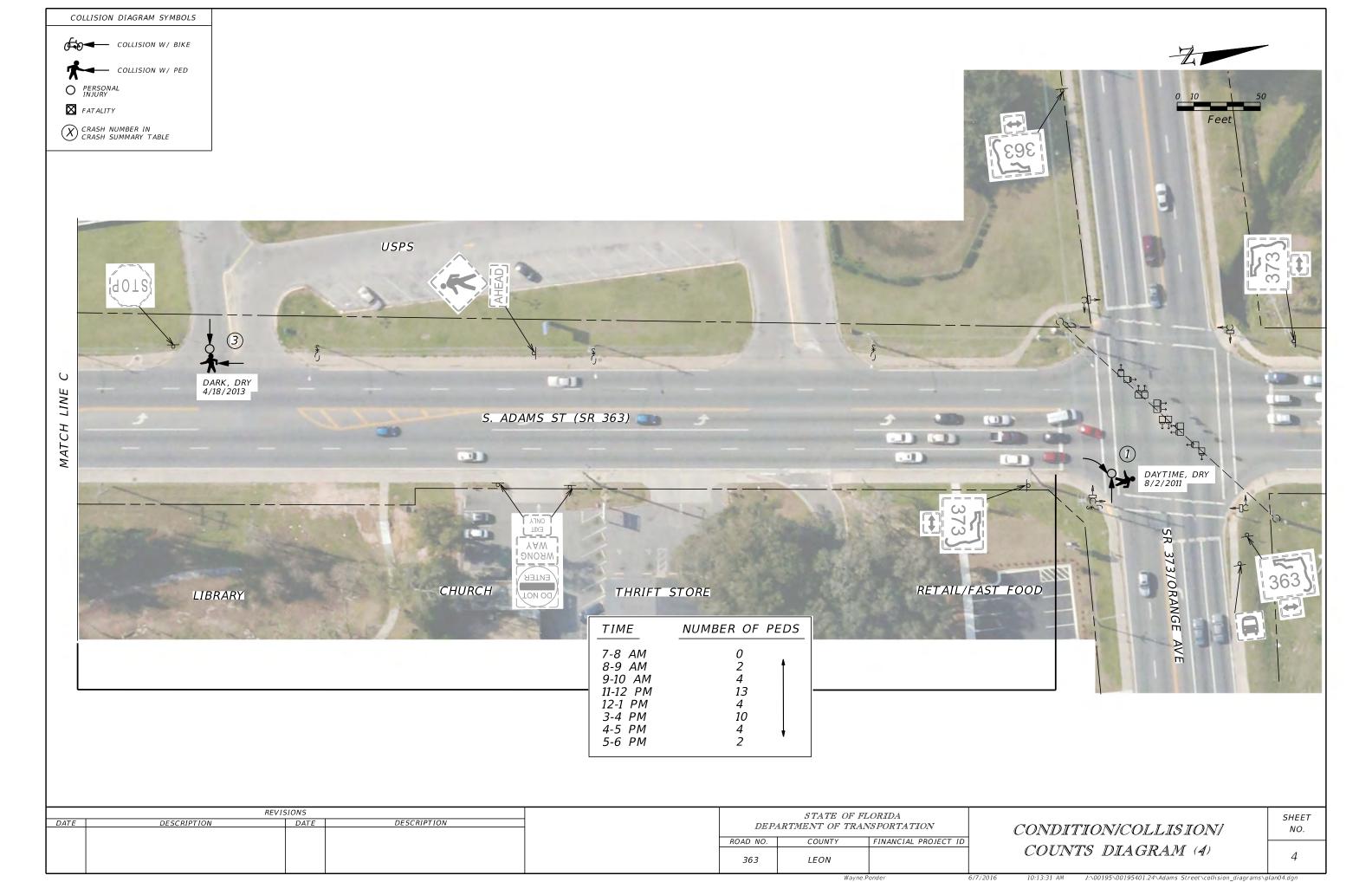
DEPARTMENT OF TRANSPORTATION

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LEON

ROAD NO.

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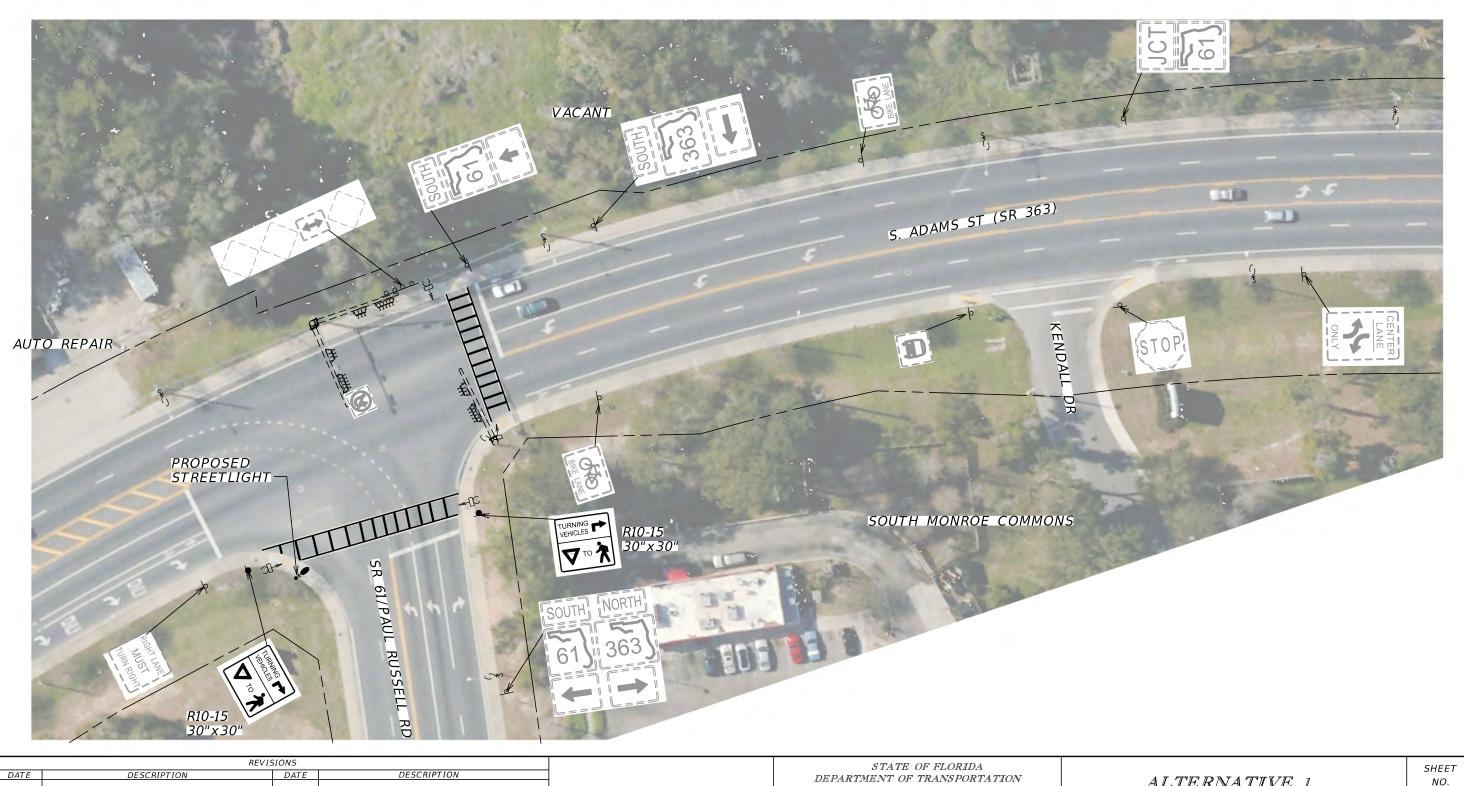




LEON COUNTY, FLORIDA

#### Appendix D Alternatives





DESCRIPTION

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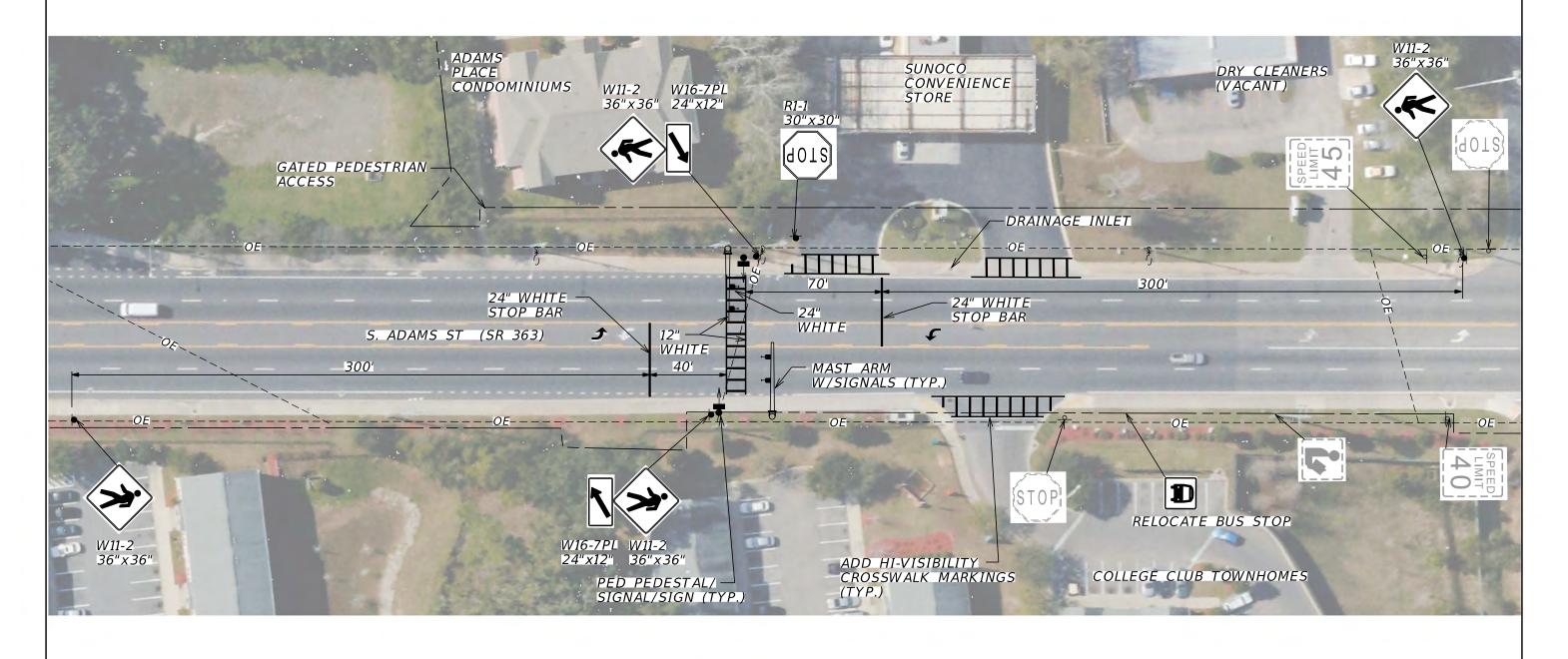
PEDESTRIAN IMPROVEMENTS

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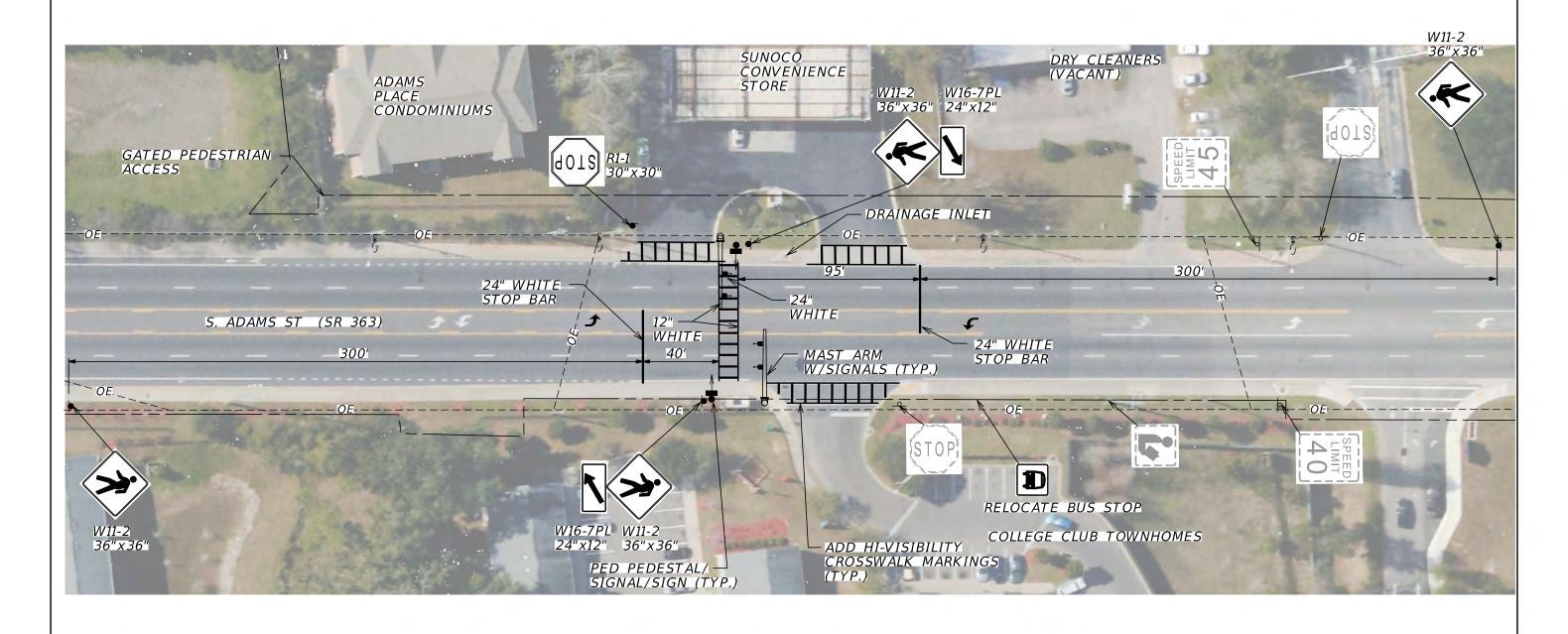


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PEDESTRIAN IMPROVEMENTS



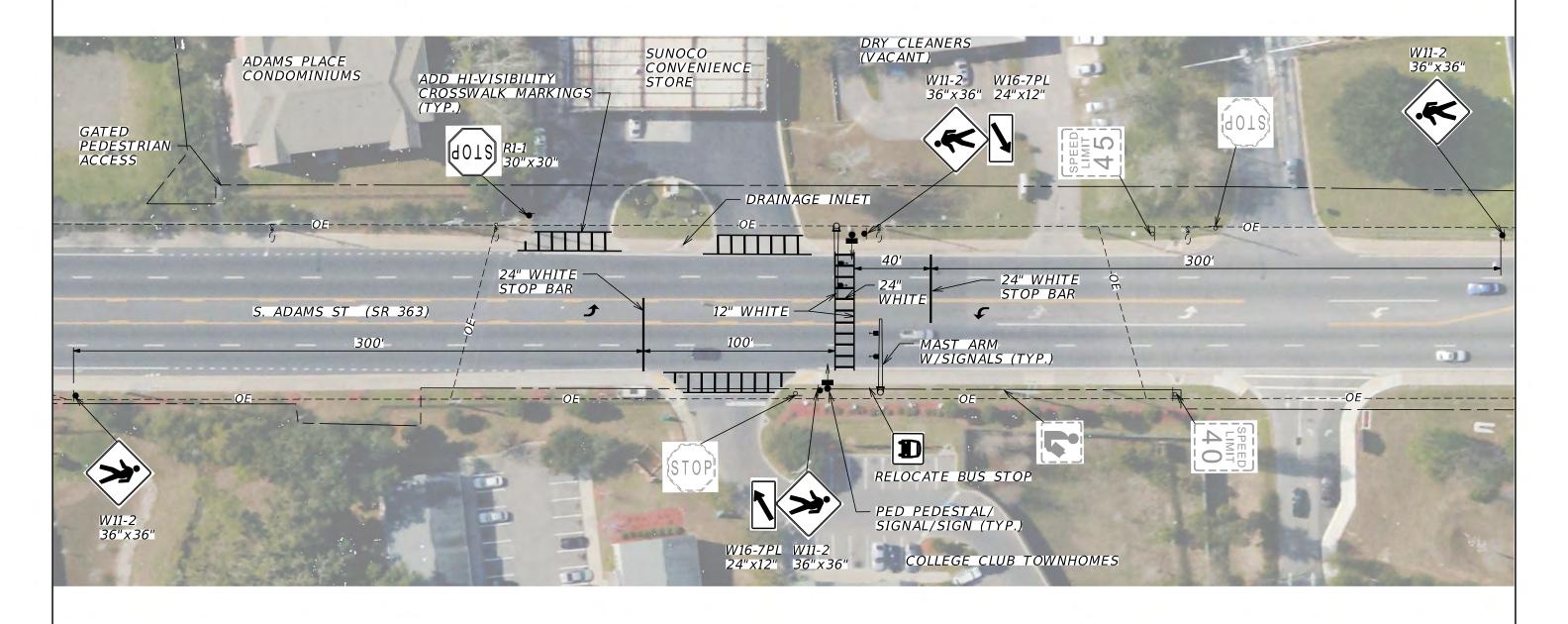


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ALTERNATIVE 1B PEDESTRIAN IMPROVEMENTS





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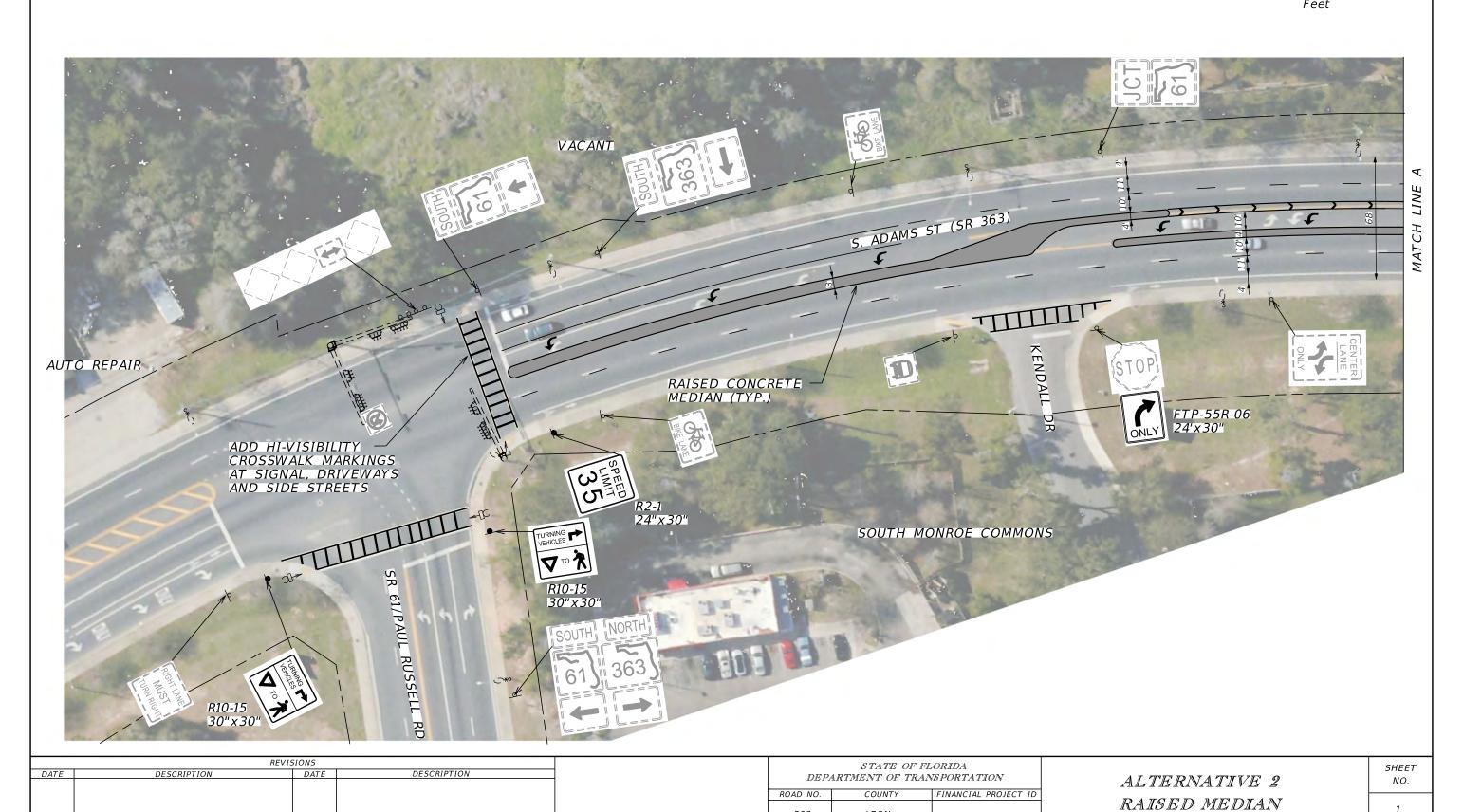
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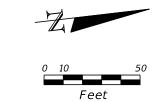
PEDESTRIAN IMPROVEMENTS

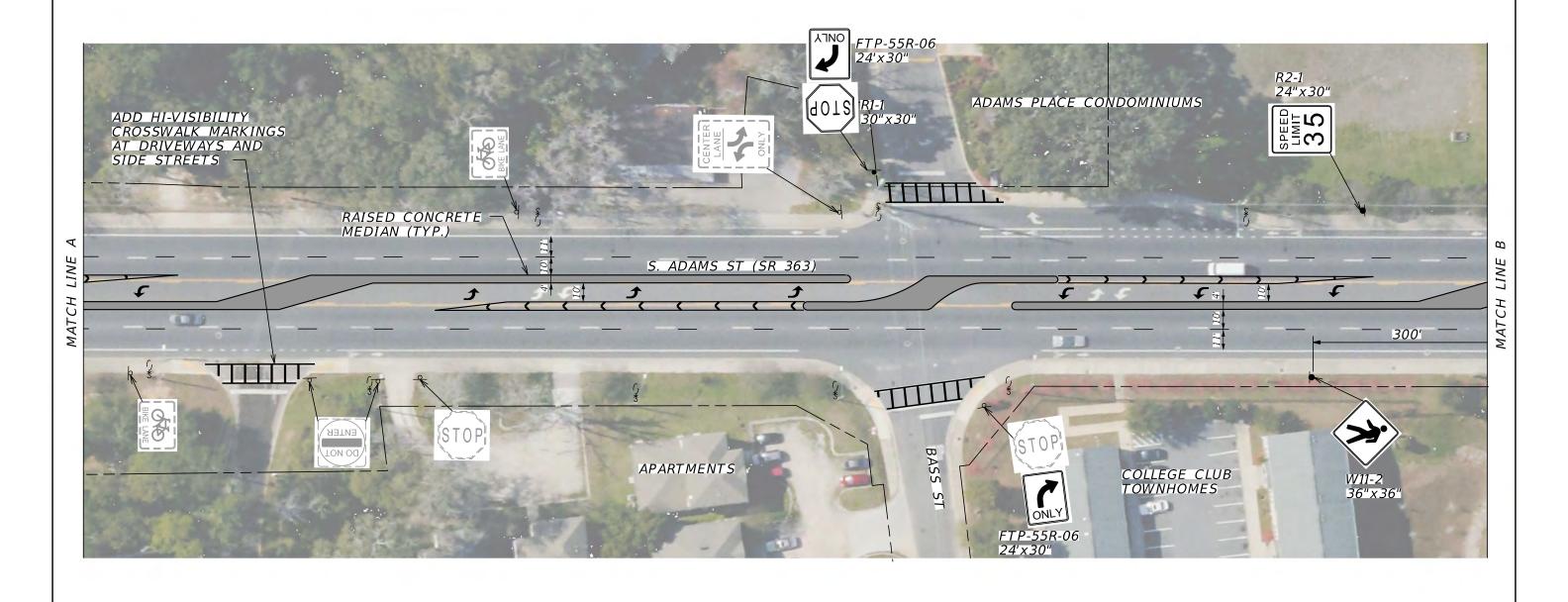




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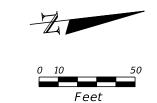
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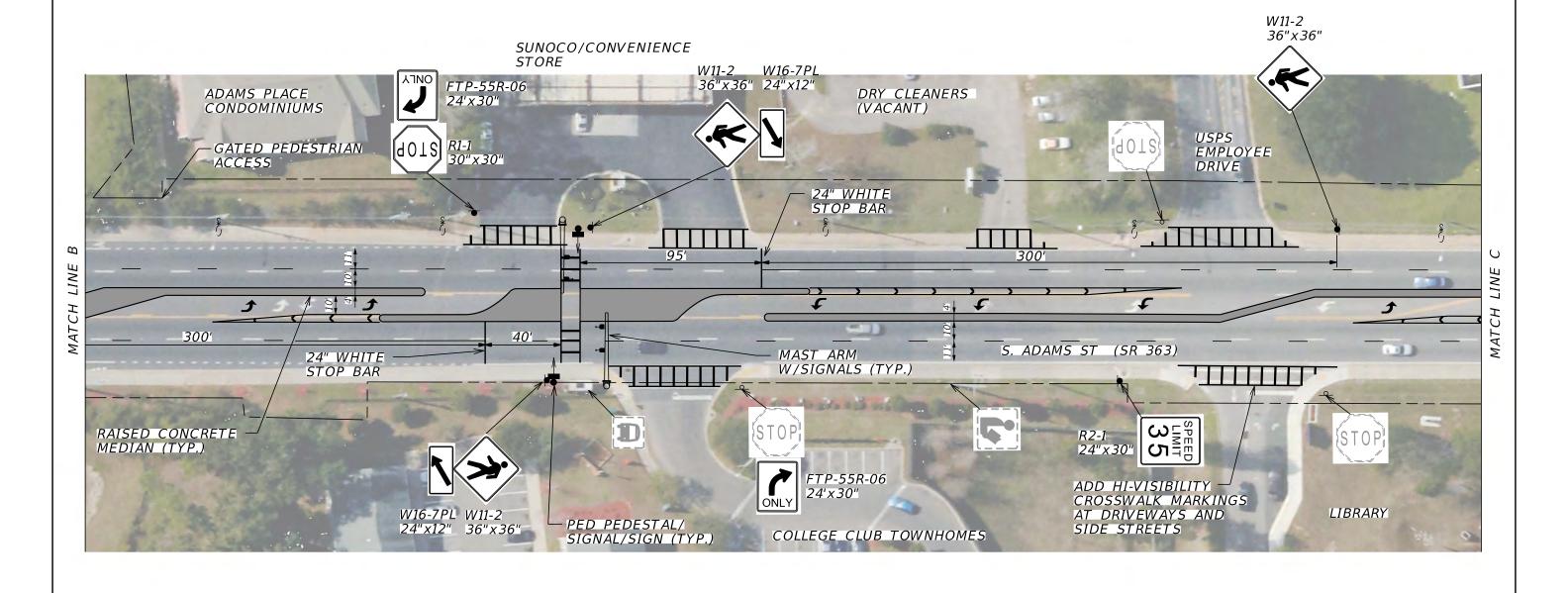




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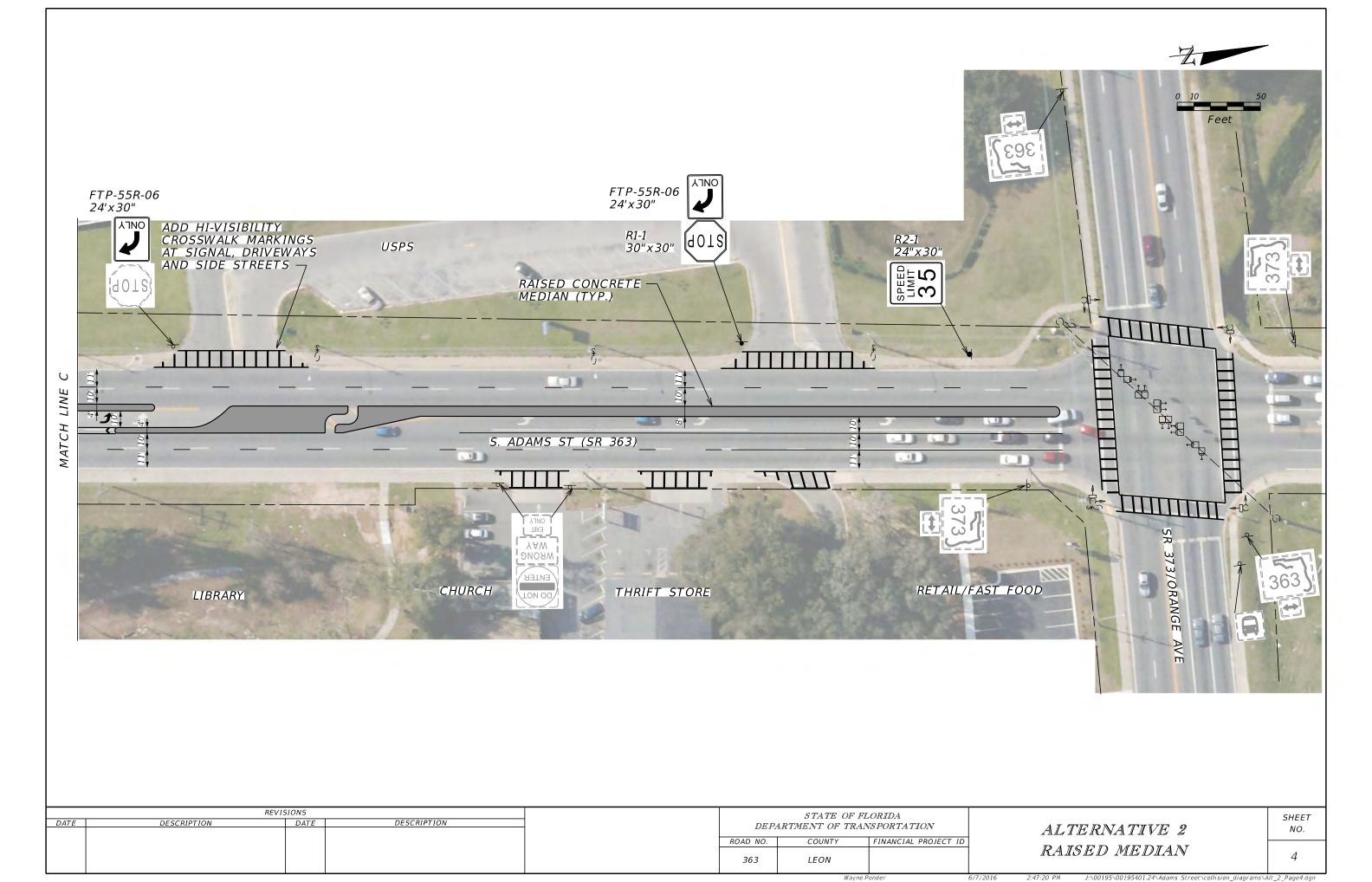
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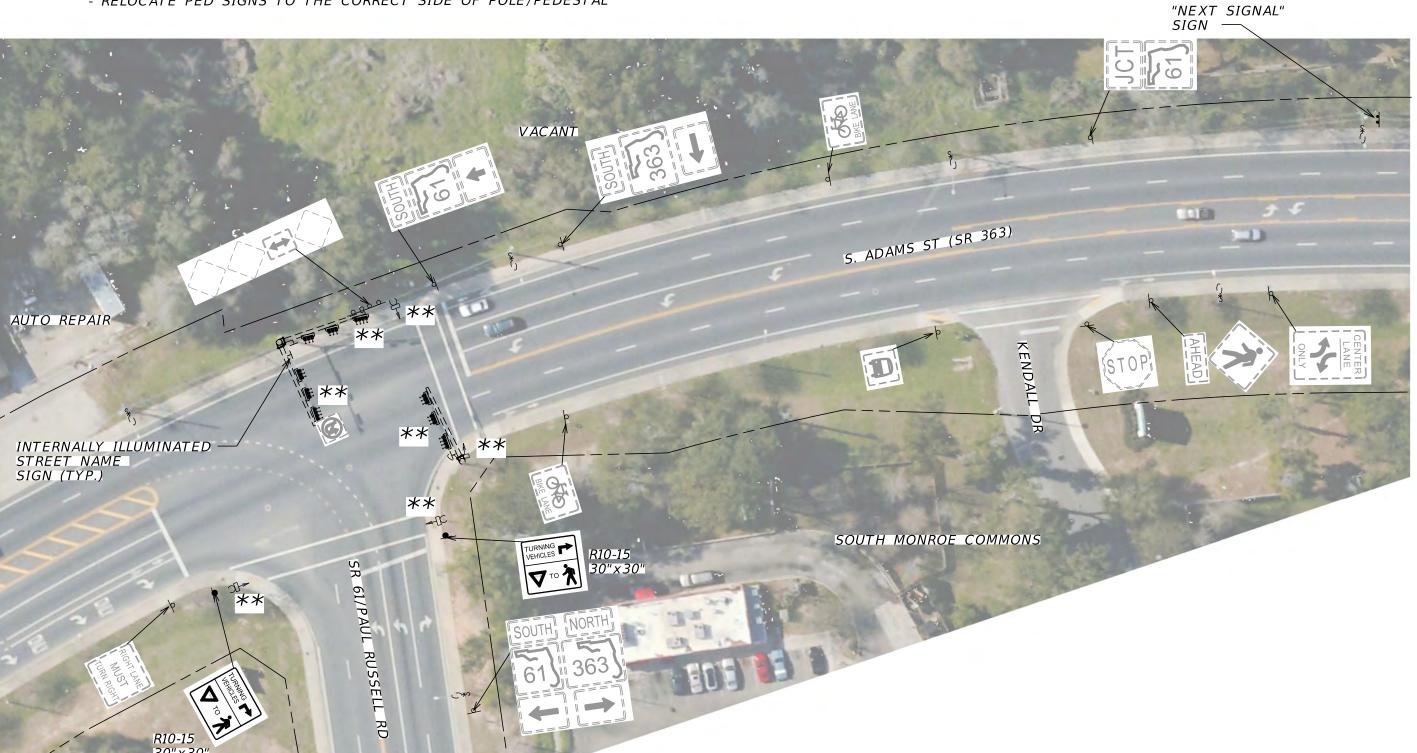
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| DATE | DESCRIPTION | DATE  | DESCRIPTION |   | DEPARTMENT OF TRANSPORTATION |                     |                      |     |
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|      |             |       |             |   | ROAD NO.                     | COUNTY              | FINANCIAL PROJECT ID | i   |
|      |             |       |             | Γ |                              |                     |                      | i   |
|      |             |       |             |   | 363                          | LEON                | 1                    | i   |
|      |             |       |             |   |                              |                     | 1                    | i . |

ALTERNATIVE 2 RAISED MEDIAN



- \*\*\* - REPLACE 5-SECTION SIGNAL HEADS WITH 4-SECTION FYA - PROVIDE ONE SIGNAL HEAD PER LANE

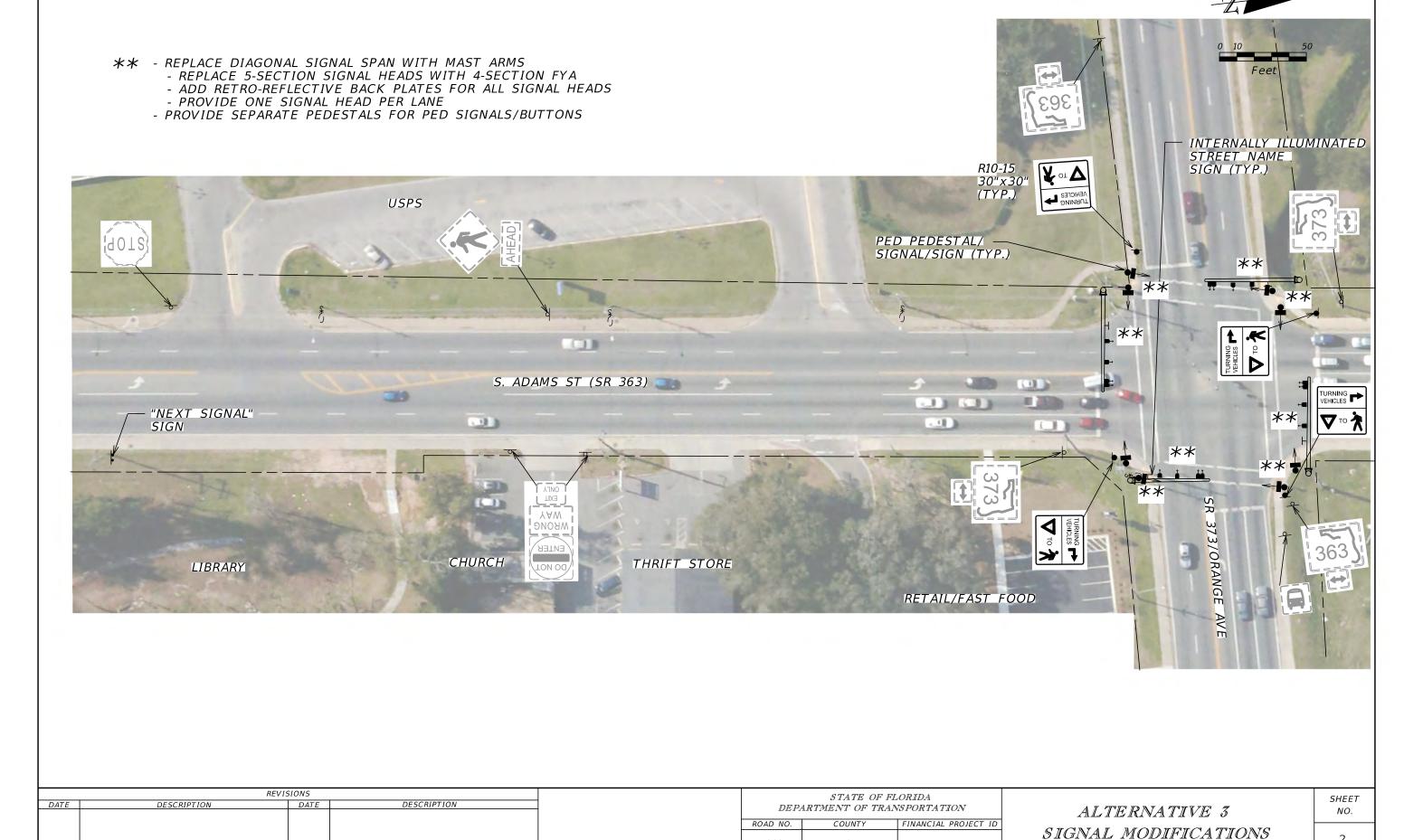
  - ADD RETRO-REFLECTIVE BACK PLATES FOR ALL SIGNAL HEADS RELOCATE PED PUSHBUTTONS TO CORRECT SIDE OF POLE/PEDESTAL RELOCATE PED SIGNS TO THE CORRECT SIDE OF POLE/PEDESTAL



| 1    | REVISIONS   |      |             |  |  |  |  |
|------|-------------|------|-------------|--|--|--|--|
| DATE | DESCRIPTION | DATE | DESCRIPTION |  |  |  |  |
|      |             |      |             |  |  |  |  |
| 1    |             |      |             |  |  |  |  |
| 1    |             |      |             |  |  |  |  |
|      |             |      |             |  |  |  |  |

| STATE OF FLORIDA<br>DEPARTMENT OF TRANSPORTATION |        |                      |  |  |  |  |  |
|--|--------|----------------------|--|--|--|--|--|
| ROAD NO.   | COUNTY | FINANCIAL PROJECT ID |  |  |  |  |  |
| 363  | LEON   |                      |  |  |  |  |  |

ALTERNATIVE 3 SIGNAL MODIFICATIONS



LEON



LEON COUNTY, FLORIDA

# Appendix E Cost Estimates, Benefit Cost and Net Present Value Analyses

DISTICT THREE SAFETY OFFICE BENEFIT COST ANALYSIS

Rev. 01/2014 Date Prepared: 07/12/16
County: 55 - Leon Prepared By: Cardno

County: **55 - Leon**Section: **55040000** S

SR: **363** US:

End MP: 0.942

Length: **0.512** 

Description of Location:

SR 363 (Adams St) - install pedestrian signal at College Club bus stop

Roadway Type:

4 - 5 Lanes Urban UnDivided

Cause of Crash Problems (List and Discuss):

Beg. MP: **0.43** 

Crash records for this segment were reviewed and analyzed for the 5-year period from 2011 to 2015 from Signal Analytics Four, per Arterial Study completed under Task Work Order No. 24, Contract C-9B63 with District Three. The crash results showed 2 pedestrian crashes near the College Club bus stop and 1 crash at Orange Avenue.

Proposed Improvements (List and Discuss):

Install a pedestrian signal at the College Club Townhomes bus stop. Install high emphasis crosswalks and R10-15 signs at Paul Russell Rd and Orange Ave.

#### **Crash Reduction Factor Selection**

Crash reduction factor 0.35 Install pedestrian signal - reduce .69 CRF to .35 since only 2 of 4 crashes at College Club

Crash reduction factor 0.2

Install high emphasis xwalk & R10-15 signs at signals - reduce .4 CRF to .2 since only 2 of 4 crashes related

Crash reduction factor

Overall CRF 0.48

| Crash Year          | 2011 | 2012 | 2013 | 2014 | 2015 | Avg. |
|---------------------|------|------|------|------|------|------|
| Total Crashes       | 1    | 1    | 1    | 2    | 0    | 1    |
| Correctable Crashes | 0.48 | 0.48 | 0.48 | 0.96 | 0.00 | 0.48 |

Number of crashes by type and year contributable to identified deficiency

| luentiji                          | identified deficiency |      |      |      |      |
|-----------------------------------|-----------------------|------|------|------|------|
| Crash Type                        | 2011                  | 2012 | 2013 | 2014 | 2015 |
| Collision with Pedestrian/Bicycle | 1                     | 1    | 0    | 2    | 0    |
|                                   |                       |      |      |      |      |
|                                   |                       |      |      |      |      |
|                                   |                       |      |      |      |      |
|                                   |                       |      |      |      |      |
|                                   |                       |      |      |      |      |
|                                   |                       |      |      |      |      |
|                                   |                       |      |      |      |      |
|                                   |                       |      |      |      |      |
| Total                             | 1                     | 1    | 0    | 2    | 0    |

Annual Benefit \$ 53,058

#### **Crash Information for Facility**

Cost per Crash: \$ 110,537.00 Crash Cleanup: \$ 100.00 Interest Rate: 4.0%

| interest Rate: 4.0% |                             |             |            |              |  |  |  |
|---------------------|-----------------------------|-------------|------------|--------------|--|--|--|
|                     | Annual Cost of Improvements |             |            |              |  |  |  |
| Туре                | Cost                        | Life        | Capital    | Annual Cost  |  |  |  |
| ROW                 |                             |             |            |              |  |  |  |
| P.E.C.E.I.          | \$92,000.00                 | 10          | 0.1233     | \$ 11,343.60 |  |  |  |
| Structure           |                             |             |            |              |  |  |  |
| Roadway             | \$11,000.00                 | 20          | 0.0736     | \$ 809.60    |  |  |  |
| Pavement            |                             |             |            |              |  |  |  |
| Drainage            |                             |             |            |              |  |  |  |
| Signal              | \$ 130,000.00               | 10          | 0.1233     | \$ 16,029.00 |  |  |  |
| Lighting            |                             |             |            |              |  |  |  |
| Sub-Total           | \$ 233,000.00               |             |            | \$ 28,182.20 |  |  |  |
|                     | С                           | hange in Mo | aintenance |              |  |  |  |
|                     | Crash Cleanup               |             |            |              |  |  |  |
|                     | Total Annual Cost           |             |            |              |  |  |  |
|                     | Benefit/Cost                |             |            |              |  |  |  |
|                     | Net Present Value           |             |            |              |  |  |  |

#### **Comments**

Lighting improvements were analyzed in a separate b/c since vehicle crashes can also be considered in the lighting b/c analysis.

DISTICT THREE SAFETY OFFICE BENEFIT COST ANALYSIS

Rev. 01/2014 Date Prepared: 07/12/16
County: 55 - Leon Prepared By: Cardno

County: **55 - Leon**Section: **55100000** SR: **363** US:

Beg. MP: **0.43** End MP: **0.942** Length: **0.512** 

Description of Location:

SR 363 (Adams St) - Reduce lane widths, reduce speed and install raised median throughout corridor

Roadway Type: 4 - 5 Lanes Urban UnDivided

Cause of Crash Problems (List and Discuss):

Crash records for this segment were reviewed and analyzed for the 5-year period from 2011 to 2015 from Signal Analytics Four, per Arterial Study completed under Task Work Order No. 24, Contract C-9B63 with District Three. The crash results showed 29 crashes that were types that were related to the presence of the TWLTL.

Proposed Improvements (List and Discuss):

Replace TWLTL with raised median and install pedestrian signal at College Club. Reduce speed with median and reduced lane widths.

#### **Crash Reduction Factor Selection**

Crash reduction factor 0.23 Replace TWLTL with raised median - considers specific crash types

Crash reduction factor 0.3 Reduce speed - .15 CRF for all inj crashes or 0.10 for all PD crashes - use 0.30 since 70+ crashes between signals

Crash reduction factor

Overall CRF 0.461

| Crash Year          | 2011  | 2012  | 2013  | 2014  | 2015  | Avg.  |
|---------------------|-------|-------|-------|-------|-------|-------|
| Total Crashes       | 4     | 7     | 6     | 8     | 4     | 5.8   |
| Correctable Crashes | 1.844 | 1.844 | 0.922 | 3.688 | 1.383 | 1.936 |

Number of crashes by type and year contributable to identified deficiency

| identified deficiency             |      |      |      |      |      |
|-----------------------------------|------|------|------|------|------|
| Crash Type                        | 2011 | 2012 | 2013 | 2014 | 2015 |
| Rear-end                          | 1    | 1    | 0    | 1    | 1    |
| Angle                             | 0    | 2    | 1    | 5    | 2    |
| Sideswipe                         | 2    | 0    | 0    | 1    | 0    |
| Run Off the Road/Lane Departure   | 1    | 0    | 1    | 0    | 0    |
| Collision with Pedestrian/Bicycle | 0    | 1    | 0    | 1    | 0    |
|                                   |      |      |      |      |      |
|                                   |      |      |      |      |      |
|                                   |      |      |      |      |      |
|                                   |      |      |      |      |      |
| Total                             | 4    | 4    | 2    | 8    | 3    |

Annual Benefit \$ 214,022

#### **Crash Information for Facility**

Cost per Crash: \$ 110,537.00 Crash Cleanup: \$ 100.00 Interest Rate: 4.0%

|            | Annual Cost of Improvements |             |            |               |  |  |  |  |
|------------|-----------------------------|-------------|------------|---------------|--|--|--|--|
| Туре       | Cost                        | Life        | Capital    | Annual Cost   |  |  |  |  |
| ROW        |                             |             |            |               |  |  |  |  |
| P.E.C.E.I. | \$ 433,000.00               | 20          | 0.0736     | \$ 31,868.80  |  |  |  |  |
| Structure  |                             |             |            |               |  |  |  |  |
| Roadway    | \$ 600,000.00               | 20          | 0.0736     | \$ 44,160.00  |  |  |  |  |
| Pavement   |                             | 20          | 0.0736     |               |  |  |  |  |
| Drainage   |                             |             |            |               |  |  |  |  |
| S& Mkg     | \$40,000.00                 | 10          | 0.1233     | \$ 4,932.00   |  |  |  |  |
| Lighting   |                             |             |            |               |  |  |  |  |
| Sub-Total  | \$ 1,073,000.00             |             |            | \$ 80,960.80  |  |  |  |  |
|            | C                           | hange in Mo | aintenance |               |  |  |  |  |
|            | Crash Cleanup               |             |            |               |  |  |  |  |
|            | \$ 81,154.42                |             |            |               |  |  |  |  |
|            | Benefit/Cost                |             |            |               |  |  |  |  |
|            |                             | Net Pre     | sent Value | \$ 132,867.32 |  |  |  |  |

#### **Comments**

The b/c is isolated to the median installation and reduced speed

DISTICT THREE SAFETY OFFICE BENEFIT COST ANALYSIS

Rev. 01/2014 Date Prepared: 07/12/16
County: 55 - Leon Prepared By: Cardno

Section: **55100000** SR: **363** US:

Beg. MP: **0.43** End MP: **0.942** Length: **0.512** 

Description of Location:

SR 363 (Adams St) - Upgrade lighting at the signalized intersections and at new ped signal

Roadway Type: 4 - 5 Lanes Urban UnDivided

Cause of Crash Problems (List and Discuss):

Crash records for this segment were reviewed and analyzed for the 5-year period from 2011 to 2015 from Signal Analytics Four, per Arterial Study completed under Task Work Order No. 24, Contract C-9B63 with District Three. The crash results showed 31 night-time crashes at the two signals with 14 resulting in injuries.

Proposed Improvements (List and Discuss):

Upgrade lighting at the Paul Russell and Orange Ave intersections and at proposed signalized crosswalk.

#### **Crash Reduction Factor Selection**

Crash reduction factor 0.19 Upgrade lighting at Paul Russell & Orange signals - reduce 0.38 from CRF to 0.19 for inj crashes.

Crash reduction factor 0 Upgrade lighting at College Club - 1 night-time crash no injuries

Crash reduction factor

Overall CRF 0.19

| Crash Year          | 2011 | 2012 | 2013 | 2014 | 2015 | Avg.  |
|---------------------|------|------|------|------|------|-------|
| Total Crashes       | 3    | 3    | 5    | 3    | 0    | 2.8   |
| Correctable Crashes | 0.57 | 0.57 | 0.95 | 0.57 | 0    | 0.532 |

Number of crashes by type and year contributable to identified deficiency

| identified deficiency |      |      |      |      |      |
|-----------------------|------|------|------|------|------|
| Crash Type            | 2011 | 2012 | 2013 | 2014 | 2015 |
|                       | 3    | 3    | 5    | 3    | 0    |
|                       |      |      |      |      |      |
|                       |      |      |      |      |      |
|                       |      |      |      |      |      |
|                       |      |      |      |      |      |
|                       |      |      |      |      |      |
|                       |      |      |      |      |      |
|                       |      |      |      |      |      |
|                       |      |      |      |      |      |
| Total                 | 3    | 3    | 5    | 3    | 0    |

Annual Benefit \$ 58,806

|  |  | Facility |
|--|--|----------|
|  |  |          |

Cost per Crash: \$ 110,537.00 Crash Cleanup: \$ 100.00 Interest Rate: 4.0%

| 1110       |                             |             |            |    |            |  |  |
|------------|-----------------------------|-------------|------------|----|------------|--|--|
|            | Annual Cost of Improvements |             |            |    |            |  |  |
| Туре       | Cost                        | Life        | Capital    | Ar | nnual Cost |  |  |
| ROW        |                             |             |            |    |            |  |  |
| P.E.C.E.I. | \$41,000.00                 | 15          | 0.0899     | \$ | 3,685.90   |  |  |
| Structure  |                             |             |            |    |            |  |  |
| Roadway    | \$ -                        |             |            |    |            |  |  |
| Pavement   |                             |             |            |    |            |  |  |
| Drainage   |                             |             |            |    |            |  |  |
| Signal     | \$ -                        |             |            |    |            |  |  |
| Lighting   | \$60,000.00                 | 15          | 0.0899     | \$ | 5,394.00   |  |  |
| Sub-Total  | \$ 101,000.00               |             |            | \$ | 9,079.90   |  |  |
|            | C                           | hange in Mo | aintenance |    |            |  |  |
|            | Crash Cleanup               |             |            |    |            |  |  |
|            | Total Annual Cost           |             |            |    |            |  |  |
|            | Benefit/Cost                |             |            |    |            |  |  |
|            | Net Present Value           |             |            |    |            |  |  |

#### **Comments**

Utilize existing lighting system for improvements.

DISTICT THREE SAFETY OFFICE BENEFIT COST ANALYSIS

Rev. 01/2014 07/12/16 Date Prepared: Prepared By: Cardno

County: 55 - Leon Section: 55100000 SR: **363** US:

Beg. MP: 0.43 End MP: 0.942 0.512 Length:

#### Description of Location:

SR 363 (Adams St) - Replace diagonal span with mast arms at Orange Ave and upgrade all signal features to latest standards. Upgrade signals at Paul Russell to one head per lane and replace the 5-section with a FYA.

Roadway Type: 4 - 5 Lanes Urban UnDivided

Cause of Crash Problems (List and Discuss):

Crash records for this segment were reviewed and analyzed for the 5-year period from 2011 to 2015 from Signal Analytics Four, per Arterial Study completed under Task Work Order No. 24, Contract C-9B63 with District Three. The crash results showed 57 crashes at Orange Avenue intersection on the approaches. Left-turn, rear end and sideswipe crashes are occurring. Additional crash reduction expected at Paul Russell with one head per lane and FYA.

Proposed Improvements (List and Discuss):

Replace diagonal span with mast arms at Orange Ave. Replace 5-section signals with 4-section FYA. Provide 1 signal head per lane at

#### **Crash Reduction Factor Selection**

Crash reduction factor 0.28 Add primary signal head - 28% reduction for all crashes

Crash reduction factor 0.21 Improve signal visibility with diagonal to mast arm at Orange Ave - 29% for inj and 21 % for PDO - use 21%

Add yellow backplates - 15% for all at Orange Ave Crash reduction factor 0.15

Overall CRF 0.517

| Crash Year          | 2011  | 2012  | 2013  | 2014  | 2015  | Avg.  |
|---------------------|-------|-------|-------|-------|-------|-------|
| Total Crashes       | 12    | 10    | 11    | 14    | 10    | 11.4  |
| Correctable Crashes | 6.198 | 5.165 | 5.682 | 7.231 | 5.165 | 5.888 |

Number of crashes by type and year contributable to identified deficiency

| identified deficiency |      |      |      |      |      |  |
|-----------------------|------|------|------|------|------|--|
| Crash Type            | 2011 | 2012 | 2013 | 2014 | 2015 |  |
|                       | 12   | 10   | 11   | 14   | 10   |  |
|                       |      |      |      |      |      |  |
|                       |      |      |      |      |      |  |
|                       |      |      |      |      |      |  |
|                       |      |      |      |      |      |  |
|                       |      |      |      |      |      |  |
|                       |      |      |      |      |      |  |
|                       |      |      |      |      |      |  |
|                       |      |      |      |      |      |  |
| Total                 | 12   | 10   | 11   | 14   | 10   |  |

Annual Benefit \$ 650,878

| _      | _      | _      | _   |          |
|--------|--------|--------|-----|----------|
| C      | I E    |        | - I | Facility |
| ı racn | Intorr | nation | TOF | Facility |
|        |        |        |     |          |

110,537.00 Cost per Crash: \$ Crash Cleanup: \$ 100.00 Interest Rate: 4.0%

| Annual Cost of Improvements |                       |      |              |               |  |
|-----------------------------|-----------------------|------|--------------|---------------|--|
| Туре                        | Cost                  | Life | Capital      | Annual Cost   |  |
| ROW                         |                       |      |              |               |  |
| P.E.C.E.I.                  | \$ 168,000.00         | 10   | 0.1233       | \$ 20,714.40  |  |
| Structure                   |                       |      |              |               |  |
| Roadway                     |                       | 20   | 0.0736       |               |  |
| Pavement                    |                       | 20   | 0.0736       |               |  |
| Drainage                    |                       |      |              |               |  |
| Signal                      | \$ 320,000.00         | 10   | 0.1233       | \$ 39,456.00  |  |
| Lighting                    |                       |      |              |               |  |
| Sub-Total                   | \$ 488,000.00         |      | \$ 60,170.40 |               |  |
|                             | Change in Maintenance |      |              |               |  |
| Crash Cleanup               |                       |      |              | \$ 588.83     |  |
| Total Annual Cost           |                       |      |              | \$ 60,759.23  |  |
| Benefit/Cost                |                       |      |              | 10.71         |  |
| Net Present Value           |                       |      |              | \$ 590,118.88 |  |

#### Comments

The crash reductions are isolated for the Orange Avenue intersection although costs include the Paul Russell Road signal head improvements. Assumes existing mast arms at Paul Russell can support additional signal head.