SPACE COAST TPO

PEDESTRIAN / BICYCLE SAFETY REVIEW

US 1 / Broadway Boulevard to Fay Boulevard

Prepared for:
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February 2016

Pedestrian / Bicycle Safety Action Plan

Pedestrian/Bicycle Safety Review Report for
US 1 (North) from Broadway Boulevard to Fay Boulevard

Section Number: 70020000
Mile Post: 28.597 – 29.869
Brevard County

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Project Title: US 1 (North) Pedestrian/Bicycle Safety Review

Field Review Dates: July 13th and 14th, 2015 (daytime/nighttime reviews and follow up meeting)

Participants:
John R. Freeman, Jr., P.E., PTOE - Kittelson and Associates, Inc. – Team Leader
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Trevor Traphagen – City of Titusville
Pat Ryan – Space Coast Area Transit
Joann Gulliver – Bicycle/Pedestrian/Trails Advisory Committee
Lt. Channing Taylor (July 13th only) – Florida Highway Patrol
Deputy Bryan Kanipe (July 13th only) – Brevard County Sheriff's Office
Travis Hills, E.I. – Kittelson and Associates, Inc.

Project Characteristics:
Field Review Type: Pedestrian, Bicycle, Existing Road
Adjacent Land Use: Urban; Commercial, Industrial, Residential
Posted Speed Limit: 55 miles per hour (mph) from Broadway Boulevard to Aron Street and 45 mph from Aron Street to Fay Boulevard
Opposite Flow Separation: Raised Grass Median
Service Function: Urban Principal Arterial
Terrain: Flat
Climatic Conditions: Sunny, Hot

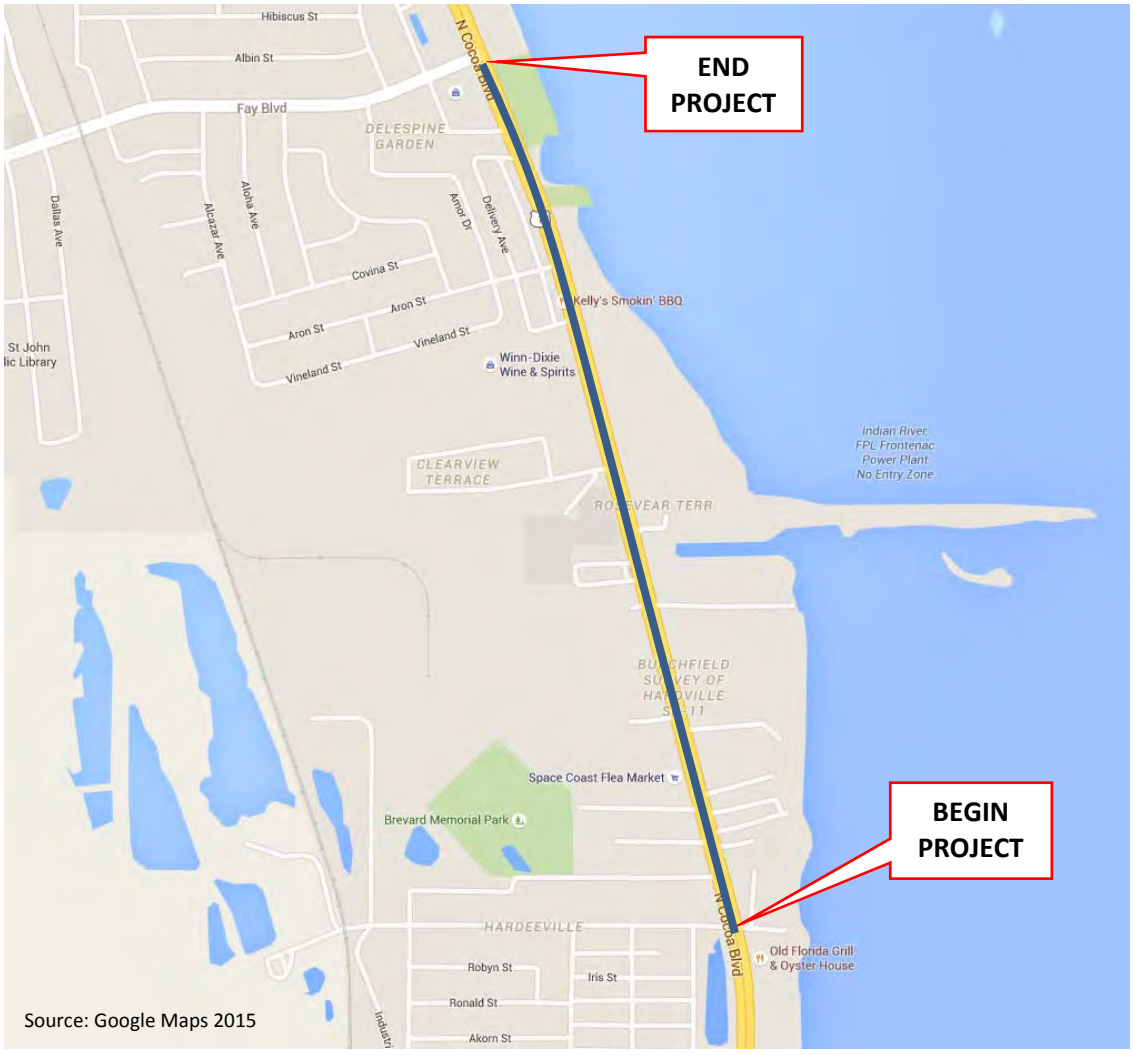


Figure 1 – US 1 Study Corridor

Background

In late 2014, the Florida Department of Transportation (FDOT) released its Pedestrian and Bicycle Focused Initiative for 2015 and identified Brevard County as a Top 15 High Priority County. The goal of the Pedestrian/Bicycle Safety Action Plan is to generate a list of suggested improvements at select locations having a pedestrian and/or bicycle crash history to address pedestrian/bicycle safety in Brevard County. US 1 from Broadway Boulevard to Fay Boulevard (**Figure 1**), a 1.25 mile corridor in North Brevard County, was identified as one of these locations. In order to suggest improvements along this corridor, the crash history was evaluated and a field review was conducted.

This pedestrian/bicycle safety review was commissioned by the Space Coast Transportation Planning Organization (SCTPO) to develop maintenance-type, near-term, and long term suggestions to improve pedestrian and bicyclist safety within the study limits.

The pedestrian/bicycle safety review process involves multi-disciplinary representatives from various stakeholders, potentially including representatives from traffic operations, roadway design, safety, and law enforcement. Pedestrian/bicycle safety reviews are conducted to identify potential safety issues and

provide improvement suggestions in a team collaborative environment. This safety review is limited in scope and should not be construed as a comprehensive safety study; nor is it a formal Road Safety Audit. It is intended to identify potential operational and safety improvements related to pedestrians and bicyclists to be considered by SCTPO staff and partner agencies (i.e. FDOT District Five (D5), Brevard County, City of Titusville, SCAT, local law enforcement). Some improvements presented in this report may be implemented as maintenance-type activities while other suggested safety improvements may be considered for future study. Each suggestion identified in this study is classified into one of three categories:

- Maintenance – issues identified for maintenance may be addressed by public agency staff on a short timeframe and at a relatively low cost.
- Near-Term Improvement (within 3 to 5 years) – activities that may be incorporated into an upcoming construction project in the area, including 3R milling and resurfacing projects.
- Long-Term Improvement (5+ years) – activities that may be incorporated into upcoming construction projects and may need to be programmed for funding as separate projects.

The issues and suggested improvements reflect the consensus of the pedestrian/bicycle safety review team and not necessarily that of the SCTPO.

The field review was conducted on Monday July 13th, 2015. The team met in the morning at the Port St. John Public Library to discuss the study corridor and crash history. After lunch, the study team drove the entire corridor, south to north then north to south, to gain an understanding of the facility characteristics from a driver's perspective. Due to the lack of sidewalks along the study corridor, the study team drove to specific locations to observe pedestrian/bicyclist conditions throughout the afternoon. The team reassembled in the evening, after sunset, to make observations in nighttime conditions. A follow-up debrief meeting was held at the Port St. John Public Library the following morning (July 14th) to discuss the corridor's issues and potential improvements identified by the team. Study corridor characteristics are reviewed below:

- Broadway Boulevard to Fay Boulevard – 1.27 miles
    - The posted speed varies along the study corridor limits:
        - 55 mph from Broadway Boulevard to Aron Street (0.95 miles); and
        - 45 mph from Aron Street to Fay Boulevard (0.30 miles).
    - Two (2) signalized intersections at Port St. John Plaza and Fay Boulevard;
    - One exclusive northbound left-turn lane at the Port St. John Plaza intersection operating under protected phasing;
    - Dual northbound and eastbound protected left-turn lanes at the Fay Boulevard intersection operating under protected phasing;
    - The signalized intersection of US 1 and Port St. John Plaza is a continuous green T-intersection where the outermost northbound through lane along US 1 is given the continuous green phase;
    - Special emphasis crosswalks with pedestrian countdown signals are located on the west and south legs of the US 1/Fay Boulevard intersection;
    - Sidewalks are located between Broadway Boulevard and Fay Boulevard on the west side of US 1. Sidewalks are also located along US 1 between the CVS Driveway and Fay Boulevard (both sides), on US 1 north of Fay Boulevard (west side only), and along Fay Boulevard west of US 1 (both sides of road).

- As part of the US 1 resurfacing project (completed in May 2015), a five (5) foot bicycle lane was constructed. At some right turn lanes throughout the corridor, bicycle lane "keyholes" were constructed.
- Overhead street lighting is located at the US 1 at Fay Boulevard intersection, but is not present along the remainder of the corridor.

Crash History (2009 – 2014)

Six (6) years of available pedestrian and bicycle related crash data, 2009 to 2014, were utilized for the US 1 crash analysis. Crash data was obtained from two sources: 1. The FDOT Crash Analysis Reporting System (CARS) database from 2009 to 2013 and 2. The Signal Four Analytics database maintained by University of Florida from 2009 to 2014. The 2014 CARS data was not yet FDOT certified at the time this study was initiated, thus the reason for six years of crash data instead of the traditional five. The 2014 FDOT CARS data was approved in September 2015. The additional crashes from the Signal Four database supplemented the CARS data along US 1. Crash diagrams were created along the corridor to summarize the pedestrian/bicycle-related crash history. The crash diagrams are included in **Appendix A**.

Twelve (12) pedestrian or bicycle-related crashes were reported over the six-year study period, 75 percent of which involved pedestrians (9). Of the twelve (12) pedestrian and bicycle crashes, there were six (6) fatal crashes (50 percent), four (4) injury crashes (33 percent), and two (2) property-damage-only (PDO) crashes (17 percent) during the study period. The six fatal pedestrian crashes (all during dark conditions) are summarized below (summarized from south to north):

- Crash Number 837123460
  - On February 2, 2014 at 10:14 PM a crash involving a pedestrian occurred just north of the intersection of US 1 and Spring Street under dark lighting conditions. The pedestrian was walking eastbound toward Spring Street. The vehicle was traveling northbound on US 1 on the outside travel lane when it collided with the pedestrian at approximately 45 miles per hour. The pedestrian had a blood alcohol content (BAC) of 0.21 and was pronounced deceased on the scene.
- Crash Number 837291850
  - On January 29, 2014 at 9:36 PM a crash involving a pedestrian occurred north of the intersection of US 1 and Merchants Drive under dark lighting conditions. The pedestrian was attempting to cross US 1 east to west. The vehicle was traveling south on US 1 in the outside travel lane when it collided with the pedestrian at approximately 55 miles per hour. The pedestrian had a BAC of 0.40 and was pronounced deceased on the scene.
- Crash Number: 774452920
  - On June 20, 2009 at 10:00 PM, a crash involving a pedestrian occurred at the intersection of US 1 and Cottrell Drive under dark lighting conditions. The pedestrian attempted to cross US 1 from east to west toward the BP Gas Station. The vehicle was traveling south on US 1 in the outside lane when it collided with the pedestrian at approximately 50 miles per hour. The pedestrian had a BAC of 0.31 and was pronounced deceased on the scene.
- Crash Number: 822419830
  - On May 8, 2011 at 1:00 AM a crash involving a pedestrian occurred just north of the intersection of US 1 and Cottrell Drive under dark lighting conditions. The pedestrian attempted to cross US 1 from west to east. The vehicle was traveling north on US 1 in the outside lane when it collided with the pedestrian at approximately 55 miles per

hour. The report stated that the vehicle committed a hit and run, however the driver and vehicle were later identified. The pedestrian had a BAC of 0.14 and was pronounced deceased on the scene.

- Crash Number 845462620
  - On November 27, 2014 at 6:35 PM a crash involving a pedestrian occurred at the intersection of US 1 and Cottrell Drive under dark lighting conditions. The pedestrian attempted to cross US 1 from east to west toward the BP Gas Station. The vehicle was traveling south on US 1 in the outside lane when it collided with the pedestrian at approximately 53 miles per hour. The pedestrian had a BAC of 0.14 and was pronounced deceased on the scene.
- Crash Number 836514050
  - On August 10, 2013 at 9:00 PM a crash involving a pedestrian occurred at just north of the US 1 and Lafair Street intersection under dark lighting conditions. The pedestrian was attempting to cross US 1 from west to east. The vehicle was traveling southbound on US 1 on the inside travel lane when it collided with the pedestrian at approximately 35 miles per hour. The pedestrian was transported to Holmes Regional Medical Center where he was pronounced deceased on September 3, 2013 due to injuries suffered from the crash.

Seventy-five percent of the crashes occurred in dark lighting conditions, and the majority (83 percent) occurred under dry roadway conditions. The reported crashes are displayed by different measures of time (year, month, day, and hour) in **Figure 2** through **Figure 4** below.

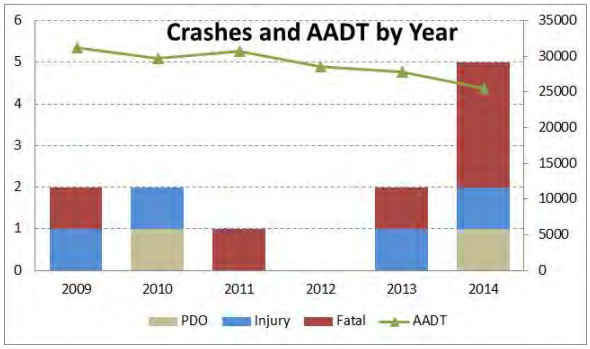


Figure 2

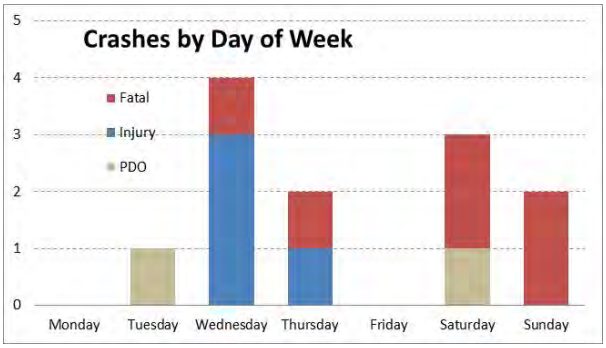


Figure 3

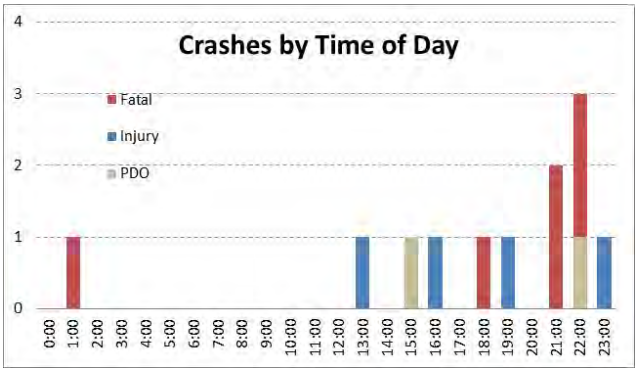


Figure 4

Overall the number of pedestrian and bicycle crashes have been relatively steady (with the exception of a spike in 2014) over the study period. Over this same time period, there has been a slight decline in the Average Annual Daily Traffic (AADT) along the corridor. No crashes occurred in 2012 and the corridor experienced a spike in pedestrian and bicycle crashes in 2014 with 5 reported crashes, 3 of which resulted in fatalities. A third of the total crashes (4 crashes) were reported on Wednesday and five (5) total crashes occurred over the weekend. Of the six (6) fatal crashes, four (4) occurred over the weekend.

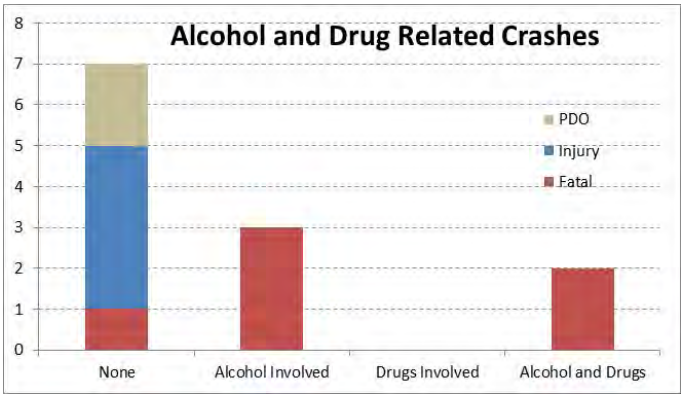


Figure 5

Seven (7) of the 12 crashes occurred between 8:00 PM and 2:00 AM with five (5) of the six (6) fatal crashes occurring within that timeframe. Six (6) of the 12 crashes, including the five (5) fatal crashes, involved alcohol, drugs, or a combination of the two (**Figure 5**).

A few other crash statistics worthy to note:

- Nine (9) of the 12 crashes occurred with the vehicle traveling at or above 35 mph, but none were reported traveling above the posted speed limits of 55 mph (between Broadway Boulevard and Aron Street) or 45 mph (between Aron Street and Fay Boulevard) (based on the crash reports);
- The vehicle had the right-of-way in all nine (9) pedestrian crashes;
- The bicyclist had the right-of-way in all three (3) bicycle crashes;
- All of the pedestrians and bicyclists were from the state of Florida based upon their provided zip codes;
- Only one (1) crash (bicycle crash) occurred at a signalized intersection (Port of St. John Plaza); and
- For all nine (9) pedestrian crashes, the pedestrian was attempting to cross US 1 at an unmarked mid-block or unsignalized intersection location.

The locations of reported crashes are shown in the crash diagram (see **Appendix A**) and are summarized as follows:

- Signalized Intersections – One (1) bicycle-related crash (8 percent) occurred at or near one of the two signalized intersections along the corridor. The signalized intersection with this bicycle crash is identified below:
    - Port of St. John Plaza – One (1) bicycle crash
        - Bicyclist was traveling north on the shoulder against traffic.

        - Incident resulted in one injury.
        - No crosswalks, sidewalks, or designated bicycle lanes provided within the vicinity of the intersection.
- Segments – The remaining 11 pedestrian or bicycle-related crashes (92 percent) occurred at unsignalized intersections, driveways, or mid-block along the US 1 segment. The unsignalized intersections, driveways, and mid-block locations with more than one (1) crash are identified below:
    - Cottrell Avenue/BP Gas Station
        - Four (4) pedestrian crashes in which the pedestrian was crossing US 1 heading west to the gas station. All four (4) crashes occurred at night. Two (2) of these crashes resulted in fatalities and in both crashes, the pedestrian was under the influence.
        - 1 pedestrian crash in which the pedestrian was crossing US 1 heading east from the gas station. This crash occurred at night, involved an intoxicated pedestrian, and resulted in a fatality.

PEDESTRIAN/BICYCLE FIELD REVIEW FINDINGS

Transit Related Improvements

Space Coast Area Transit (SCAT) recently completed the Bus Stop Americans with Disabilities (ADA) Assessment Report for every transit stop within their network. The US 1 study corridor has eight transit stops reviewed as part of this assessment. The recommendations from the ADA report are summarized for each stop below:

Broadway Boulevard Southbound

- Pave a level 5'x8' slab with a raised 6" curb for the boarding and alighting (B&A) area;
- Add a 9' path to connect the B&A area to the existing sidewalk;
- Resurface the transition at the base of the curb ramp so that it is flush;
- Add detectable warnings to the nearby curb ramps; and
- Stripe a crosswalk at the nearby intersection (Broadway Boulevard).

Broadway Boulevard Northbound

- Pave a level 5'x8' slab with a raised 6" curb for the B&A area and pave a ramp from the B&A area to the shoulder of the road, which will act as the accessible path; and
- Add detectable warnings to the ramp.

Cocoa Flea Market Southbound

- Pave a level 5'x8' slab with a raised 6" curb for the B&A area and connect to the sidewalk constructed as part of the resurfacing project; and
- Add detectable warnings to the nearby curb ramps.

Cocoa Flea Market Northbound

- Pave a level 5'x8' slab with a raised 6" curb for the B&A area and pave a ramp from the B&A area to the shoulder of the road, which will act as the accessible path; and
- Add detectable warnings to the ramp.

Cottrell Avenue Northbound

- Pave a level 5'x8' slab with a raised 6" curb for the B&A area and connect to the sidewalk constructed as part of the resurfacing project;
- Add detectable warnings to the ramp; and
- Move the bench and trash can so they are flush with the edge of the sidewalk and outside the B&A area.

Port St. John Plaza Southbound

- Pave a level 5'x8' slab with a raised 6" curb for the B&A area and connect to the sidewalk constructed as part of the resurfacing project;
- Add detectable warnings to the ramp; and
- Move the bench and trash can so they are flush with the edge of the sidewalk and outside the B&A area.

Fay Boulevard Southbound

- Move the stop 100' north;
- Resurface the B&A area to have a cross slope of <=2%;
- Remove the pavement at the existing B&A area and repave a level 5'x8' slab with a raised 6" curb to create a raised and level B&A area;
- Add detectable warnings to the curb ramp; and
- Move the bench and trash can so they are flush with the edge of the sidewalk and outside the B&A area.

Fay Boulevard Northbound

- Resurface the B&A area to have a cross slope of <=2%;
- Pave a level 5'x8' slab with a raised 6" curb for the B&A area;
- Construct a curb ramp with a slope <=8.3%;
- Add detectable warnings to the nearby curb ramps; and
- If a crosswalk is added to the north leg of the intersection and a sidewalk connection is made in the northeast corner, consider relocating the northbound bus stop at Fay Boulevard to be far side just north of the intersection as discussed in **Issue #19: Pedestrian Facilities**.

The detailed ADA bus stop sheets from the assessment report are located in **Appendix B**.

Note what is outlined above takes into account the recent resurfacing project which incorporated some of the recommendations outlined in the detailed ADA bus stop sheets, thus they will not match exactly.

Location: Corridor-Wide

Issue #1: Lighting

Figure 6

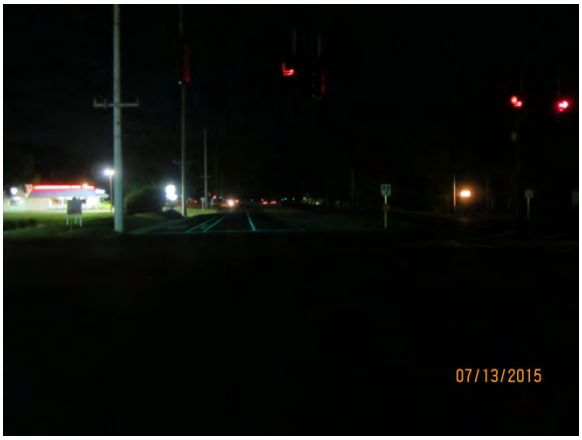


Figure 7

Description of Issue:
The crash statistics showed 75 percent of the pedestrian/bicycle crashes, including all six (6) fatal crashes, occurred during non-daylight conditions. During the nighttime field review, the study team observed the lack of corridor lighting (**Figure 6** and **Figure 7**). It would be difficult for a motorist to see a pedestrian/bicyclist along this corridor at night, especially if that vehicle is traveling at or near the posted speeds of 55 or 45 mph.

Where lighting was present (just south of Broadway Boulevard and intermittently between Spring Street and Cottrell Avenue), the field review team observed inconsistent lighting (lights would randomly turn on/off).

Suggestions for Improvement:
FDOT D5 recently completed a lighting justification project along US 1 from Camp Road to Fay Boulevard, including the entire length of the study corridor. The study found lighting is justified along the corridor and the project is currently funded by FDOT for construction during fiscal year 2017.

When the lighting is installed throughout the corridor, it should alleviate the issue of inconsistent lighting (lights turning on/off) observed at specific locations.

Location: Corridor-Wide

Issue #2: Sidewalk Gaps

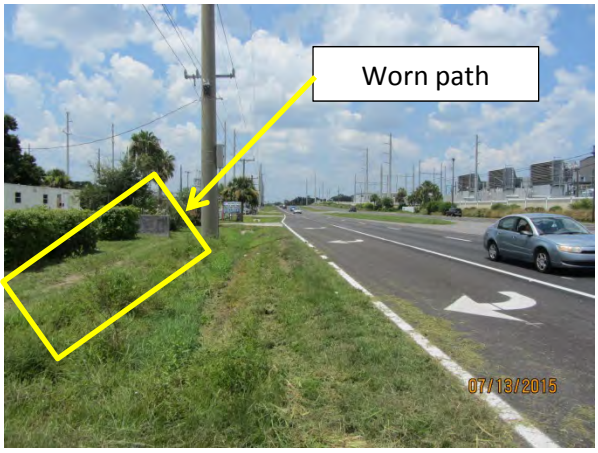


Figure 8

Figure 9

Figure 10

Figure 11

Description of Issue:
Very little sidewalk connectivity is present along the corridor (see **Figure 8** and **Figure 9**). The only continuous sidewalk located along the corridor is between Broadway Boulevard and Spring Street (which is cracked in spot locations and may need to be replaced) and in front of the CVS (southwest corner of Fay Boulevard intersection), both along the west side of the roadway. Spot sidewalks have also been constructed at three transit stops along the corridor (see **Figure 10**). Sidewalks are present on the west side of the roadway south of Broadway Boulevard and north of Fay Boulevard.

Without sidewalks along most of the corridor, pedestrians are forced to walk on uneven ground in a drainage ditch or on the shoulder next to 55/45 mph traffic.

Suggestions for Improvement:
Sidewalks should be considered along the west side of the roadway throughout the study corridor length. Constructing the sidewalk on the west side would connect the gaps between the sidewalk south of Spring Street and the sidewalk north of Fay Boulevard. Based on observed pedestrian activity during the field review, the sidewalk could be constructed in phases:

- Phase 1 – Spring Street to southernmost Cocoa Flea Market entrance (across from Mahi Mahi Lane)
    - Also consider reconstructing sidewalk from Broadway Boulevard to Spring Street if in poor condition
- Phase 2 – Cottrell Avenue/BP Gas Station to Port St. John Plaza
    - Also consider constructing sidewalk on the east side of the roadway for this segment
- Phase 3 – Port St. John Plaza to CVS driveway just south of Fay Boulevard
- Phase 4 – Southernmost Cocoa Flea Market entrance to Cottrell Avenue
    - During the field review, pedestrians and bicyclists were observed utilizing the frontage road adjacent to the Cocoa Flea Market parking area (see **Figure 11**), thus the reason for this section to be Phase 4

The section of US 1 from MP 24.380 to 35.700 (including the study corridor) is a priority 1 on the FDOT Sidewalk Gap Priorities List. Priority 1 gaps are defined as gaps within close proximity to a school or pedestrian incident; gaps identified by local agency or FDOT Local Maintenance Unit as an area (gap) of concern. Based upon this corridor being a Priority 1 gap, the six (6) fatal crashes, and the sidewalk connectivity south and north of the study area, sidewalks should be strongly considered.

Location: Corridor-Wide

Issue #3: Access Management

Source: Google Earth 2015

Figure 12

Source: Google Earth 2015

Figure 13

Figure 14

Description of Issue:

Full median openings are present throughout the study corridor. In two specific locations, the study team noted multiple full median openings spaced closely together:

- Broadway Boulevard to Merchants Drive/Vintage Lane (**Figure 12**)
  - 3 full median openings within approximately 650 feet
- Cottrell Avenue to Florida Power and Light (FPL) Employee Entrance (**Figure 13**)
  - 3 full median openings within approximately 550 feet

Pedestrians/bicyclists were observed crossing US 1 at these full median openings (**Figure 14**) and six (6) of the 12 crashes occurring along this segment were located at or within the direct vicinity of a full median opening. Having multiple full median openings within a short distance creates many conflict points for motorists and non-motorists to process.

Suggestions for Improvement:

US 1 is an access class 3 facility within the study corridor, with a full median spacing standard of 2,640 feet. An access management study is suggested to review the usage of the full median openings identified in **Figure 12** and **Figure 13** in order to possibly close/reconcile a few median openings. The study team recognizes it may not be feasible to close two of the three openings at each location in order to meet the spacing standards, thus converting one or more of the full openings to be directional may be more appropriate. If the study finds one or more median openings can be closed, provisions must be made for U-turns at downstream median openings.

Location: Corridor-Wide

Issue #4: Undeveloped Parcels

Figure 15

Description of Issue:
A few undeveloped wooded parcels are located on the east side of US 1 between Broadway Boulevard and Cottrell Avenue. These parcels have trees/shrubbery encroaching on the shoulder of the roadway, as seen in **Figure 15**. The study team also observed pedestrians walking out from the trees/underbrush on these undeveloped parcels to cross US 1. During the day, these pedestrians were obscured by shadows from the vegetation. No pedestrians were observed coming from the vegetation at night, but it would be difficult to impossible to see a pedestrian coming out from this area to cross the road.

Suggestions for Improvement:
Consider clearing the underbrush back to the right of way (ROW) line, making the pedestrians more visible to motorists.

Location: Corridor-Wide

Issue #5: Signage

Figure 16

Figure 17

Description of Issue:
The study team observed no pedestrian crossing warning signs installed along the corridor. At Cottrell Avenue (**Figure 16** and **Figure 17**), five (5) pedestrian crashes occurred, with three (3) being fatal, and no pedestrian warning signage was present. The field review team also observed multiple pedestrians walking east and west across US 1 in this location.

Suggestions for Improvement:
Consider adding pedestrian warning signage at high exposure locations throughout the corridor (**W11-2**). A few sample locations could include Cottrell Avenue or at high boarding/alighting bus stop locations.

W11-2*

Location: Corridor-Wide

Issue #6: Bike Lanes

Figure 18

Description of Issue:
As part of the US 1 resurfacing project, the five foot paved shoulder was converted to a bicycle lane, as shown in **Figure 18**. The Plans Preparation Manual, Section 8.4.1 discusses that on divided roadways in or within one mile of an urban area and a design speed equal to or less than 45 mph, travel lanes shall be 11 feet with a 7 foot buffered bicycle lane.

Suggestions for Improvement:
Consider expanding the current five foot bicycle lanes to be a seven foot buffered bicycle lanes in the 45 mph section between Aron Street and Fay Boulevard. For corridor consistency, a seven foot buffered bicycle lane should be considered in the 55 mph section from Broadway Boulevard to Aron Street. In addition to the buffered bicycle lanes in the 55 mph section, “keyholes” should be considered at right turn locations where they are not currently constructed. In order to obtain the extra four feet of pavement required for the buffered bicycle lane, the median could be slightly reconstructed or additional pavement outside of the existing bicycle lane/paved shoulder could be provided.

Location: Corridor-Wide

Issue #7: Bus Stop Benches

Figure 19

Figure 20

Description of Issue:
Some of the bus stop benches were not located next to a hard surface (sidewalk), as shown in **Figure 19** and **Figure 20**. In the case of both figures, the sidewalk was built with the US 1 resurfacing project but the bench was not moved accordingly.

Suggestions for Improvement:
Review ADA guidance and consider moving the benches so they are accessible from a hard surface such as a sidewalk.

Location: Broadway Boulevard Intersection

Issue #8: Missing/Worn Pavement Markings

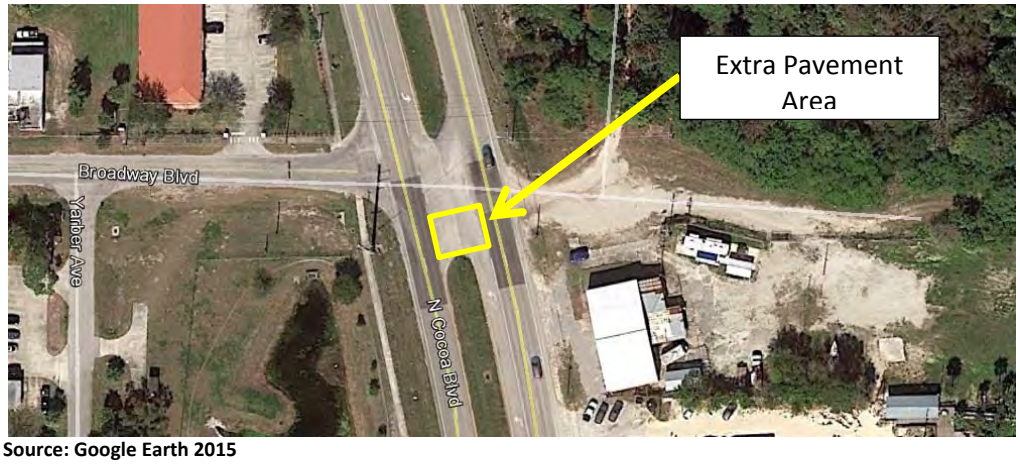
Figure 21

Description of Issue:
No crosswalk is provided on the Broadway Boulevard approach to US 1 (**Figure 21**). The centerline and stop bar striping for this approach is worn.

Suggestions for Improvement:
Consider painting a crosswalk across the Broadway Boulevard approach. Consider restriping the centerline and stop bar for this approach as well.

Location: Broadway Boulevard Intersection

Issue #9: Full Median Opening



Source: Google Earth 2015

Figure 22

Description of Issue:
The full median opening at the intersection is larger than it needs to be, creating an unnecessary large pavement area (**Figure 22**). Pedestrians/bicyclists on the southeast corner of the intersection attempting to access the bus stop and businesses on the northwest corner have to walk across this large pavement area in the median opening, creating non-motorist/motorist conflict.

Suggestions for Improvement:
Consider moving the median nose north and remove the extra pavement or converting this to a directional median opening.

Location: Mid-Block between Spring Street and Cottrell Avenue

Issue #10: Pedestrian Crossing near Cocoa Flea Market

Figure 23

Description of Issue:
During the field review, multiple pedestrians were observed crossing US 1 near the Cocoa Flea Market (in the vicinity of **Figure 23**). With the Flea Market operational, there is a higher potential for conflicts between pedestrians attempting to cross US 1 and northbound/southbound traveling vehicles. Two pedestrian crashes, one being fatal, also occurred within this section.

Suggestions for Improvement:
Through discussions with study team members, pedestrian warning signage, as outlined in **Issue #5: Signage**, should be considered along this segment.

The study team also discussed the possibility of a concrete pedestrian refuge in the median to help facilitate east/west pedestrian movements. The refuge would not include marked crossings across US 1, but may be preceded by pedestrian warning signage.

Location: Mid-Block between Spring Street and Cottrell Avenue

Issue #11: Median Opening just North of Canebreakers Drive

Source: Google Earth 2015

Figure 24

Description of Issue:
A southbound vehicle was observed driving through the full median opening, into the northbound travel lanes, in order to make a left turn onto Canebreakers Drive, as depicted in **Figure 24**. If a pedestrian/bicyclist is attempting to cross US 1 at Canebreakers Drive, they may not be expecting a wrong way driver coming from the north, thus leading to a non-motorist/motorist conflict.

Suggestions for Improvement:
Consider shifting the full median opening south to align with Canebreakers Drive. Longer term, the study team discussed the possibility of a signal at this location if the Flea Market property ever redevelops and traffic warrants are met. At the end of Canebreakers Drive is a condominium complex and with its proximity to the flea market site, more pedestrian crossings could be generated in the future. A signal at this location would help facilitate pedestrian movements across US 1 in this area.

Location: Cottrell Avenue Intersection

Issue #12: Access Management/Turn Lanes

Source: Collision Diagrams

Figure 25

Description of Issue:
As mentioned in **Issue #3: Access Management**, access management at the Cottrell Avenue intersection is an issue (**Figure 25** displays two of the three median openings at this location). Along with these access management issues, northbound and southbound left turn lanes along with a southbound right turn lane make the pavement area wider than the standard four lane cross section at this intersection. The wider pavement area due to the turn lanes, plus the full median opening and no roadway lighting, makes this a difficult crossing location for pedestrians. This intersection experienced five (5) of the 12 (42 percent) crashes observed along the study corridor, with three (3) of those being fatal.

Suggestions for Improvement:
As discussed in **Issue #3**, a study should be performed to review closing/modifying these median openings. One possibility would be to convert the Cottrell Avenue intersection to a directional median opening, thus reducing the amount of pavement shown in **Figure 25**. As part of this study, the volumes for the exclusive southbound right turn lane should be reviewed and removal of this right turn lane should be considered. By possibly removing the right turn lane and converting to a directional median opening, pedestrian exposure during crossings would be reduced.

Location: Cottrell Avenue Intersection

Issue #13: Lighting

Figure 26

Description of Issue:
This location is a high priority for lighting due to all five pedestrian crashes at this intersection occurring at night, with three of those being fatal. This location had the highest number of nighttime crashes along the corridor. **Figure 26** displays the night condition of this location.

Suggestions for Improvement:
As noted in **Issue #1: Lighting**, lighting is justified throughout the study corridor and lighting is planned for construction during fiscal year 2017.

Location: Port St. John Plaza Intersection

Issue #14: Driveway just South of Intersection

Figure 27

Figure 28

Description of Issue:
When approaching US 1 from the driveway just south of the Port St. John Plaza intersection driving eastbound, sight distance is limited looking south, as shown in **Figure 27** (south is to the right on the figure). If a motorist pulled up to US 1 and was looking left to make the right turn, it would be difficult to see a northbound pedestrian or bicyclist. One crash occurred at this intersection with a right turning vehicle and a northbound bicyclist riding on the shoulder. No stop sign was observed for this driveway, thus allowing for someone to speed up while making the right turn maneuver without necessarily looking south for pedestrians or bicyclists. This driveway is also a one-way street and the Do Not Enter sign, located on the south side of the driveway facing eastbound, was also faded and not visible for southbound vehicles possibly making a right turn from US 1 (**Figure 28**).

The turning radius of the corner also allows for a higher speed southbound right turn onto US 1.

Suggestions for Improvement:
Consider trimming the trees/bushes within the right-of-way line to give motorists a better line of sight looking southbound. Northbound pedestrians and bicyclists will also see right turning vehicles better at this driveway. Consider adding a stop sign to this approach. Consider replacing the Do Not Enter sign with a new sign and moving the sign east, out of the bush area.

Also consider reviewing the current radii on the southwest corner of the driveway and reducing the radii to slow right turning movements.

Location: Port St. John Plaza Intersection

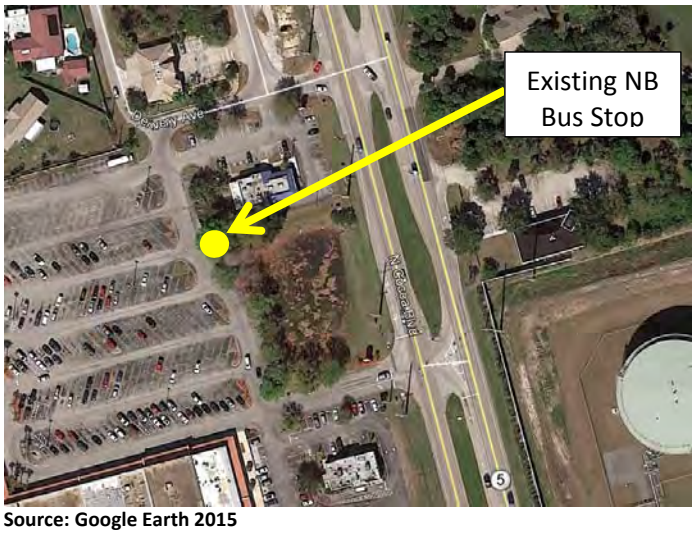
Issue #15: Pedestrian Facilities

Figure 29

Figure 30

Figure 31

Figure 32



Source: Google Earth 2015

Figure 33

Description of Issue:
A continuous green northbound through lane is provided at the Port St. John Plaza intersection, as displayed in **Figure 29**. The following signage improvements were proposed for this intersection per the Qualitative Assessment report performed by FDOT Traffic Operations:

- Replace the yellow continuous green through lane sign (**Figure 30**) with a white background continuous lane sign mounted at seven (7) feet.
- Replace the "signal ahead" warning sign just south of the intersection with a custom warning sign indicating approach to continuous green lane.

Currently no pedestrian sidewalks or marked crosswalks are constructed at the intersection (**Figure 31**) taken from southwest corner). Due to this, the southbound bus stop is located approximately 400' north of the intersection and there is no northbound bus stop located along US 1 (**Figure 32**). The buses traveling in the northbound direction left turn onto Delivery Avenue (425' north of Port St. John Plaza) and stop behind the Burger King in the Winn Dixie parking lot (**Figure 33**). To get back onto northbound US 1, the buses make eastbound left turns at the Port St. John Plaza intersection.

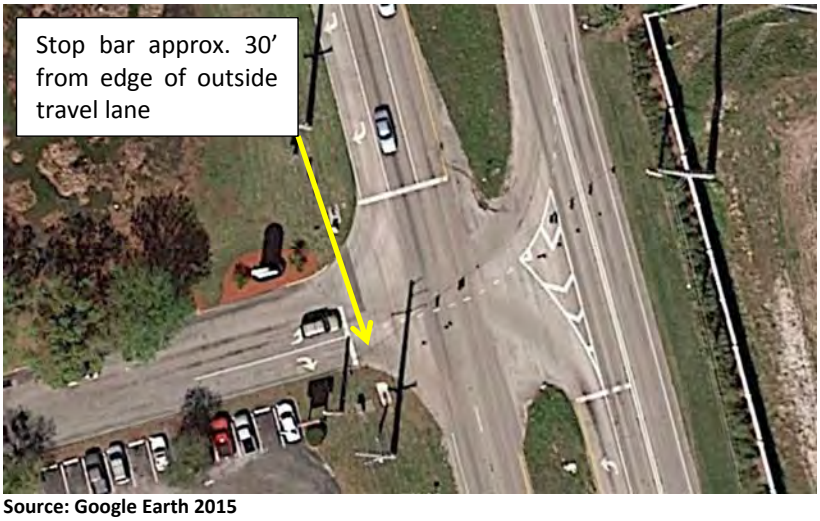
Suggestions for Improvement:
As maintenance-type activity, consider installing the signage improvements as noted in the Qualitative Assessment (see **Appendix C** for Conceptual Improvement Diagram). The continuous green lane sign should also make note of the southbound bicycle lane crossing the intersection.

In the longer term, consider removing this lane in order to accommodate pedestrian movements east/west across the intersection. As discussed in **Issue #2: Sidewalk**, sidewalks should be considered along both sides of US 1 between Cottrell Avenue and Port St. John Plaza (Phase 2) and on the west side of US 1 between Port St. John Plaza and the CVS driveway just south of Fay Boulevard (Phase 3). When sidewalks are constructed, marked crosswalks with pedestrian activated push buttons and signal heads should be considered across the west and south legs of the Port St. John Plaza intersection. Once the sidewalks and crosswalks are constructed, the northbound bus stop located inside the Winn Dixie parking lot could be moved onto US 1 near the intersection. The southbound bus stop could also be moved closer to the intersection.

Location: Port St. John Plaza Intersection

Issue #16: West Leg Stop Bar

Figure 34



Source: Google Earth 2015

Figure 35

Description of Issue:
The west approach stop bar is even with the traffic controller cabinet, as displayed in **Figure 34**. When a motorist stops at the existing stop bar location to make an eastbound right turn, the traffic controller cabinet and the signal pole are blocking the view southbound. In most observed cases, the motorist disregarded the existing stop bar position (which is approximately 30' west of the edge of the southbound travel lane as shown in **Figure 35**) and pulled forward approximately 10-15 feet past the stop bar before stopping. There was one crash in which an eastbound right turning vehicle struck a northbound bicyclist at this intersection.

Suggestions for Improvement:
Review guidance for stop bar placement relative to signal head locations and consider moving the stop bar further east, if possible.

Location: Fay Boulevard Intersection

Issue #17: Eastbound Signal Heads

Source: Google Earth 2015

Figure 36

Figure 37

Figure 38

Figure 39

Figure 40

Description of Issue:
Currently, the eastbound approach at Fay Boulevard has the following lane and signal head configuration (**Figure 36** and **Figure 37**):

- Three section head with left turn arrows for the inside left turn lane; and
- Five section head for the outside left turn lane and exclusive right turn lane.

When the eastbound phase begins, the three section head will display a green left turn arrow and the five section head will display both the green left turn and right turn arrows. Once the eastbound phase is finished, the northbound left turn phase will begin. The eastbound right turns have an overlap with the northbound left turns, as displayed in **Figure 38** and **Figure 39**.

When the pedestrian phase is activated for the south leg of the intersection (conflicting with eastbound right turning vehicles), the eastbound right turn arrow will remain blank while the two left turn arrows will become green (**Figure 40**). The field review team observed multiple vehicles not yielding the right-of-way to the pedestrian in the crosswalk when the pedestrian had the walk symbol. A newly installed "Turning Vehicles Yield to Pedestrians" sign was observed on the approach, but this sign was disregarded more often than not. The driver does not realize when the signal is blank that they are supposed to yield to the pedestrian in the crosswalk.

Suggestions for Improvement:
For the observed conflicts between the eastbound right turning vehicles and the pedestrians in the south leg crosswalk, consider replacing the five section head with two (2) three section heads. One of those will be for the outside left turn lane while the other will control the eastbound right turn lane. As part of this change, the signal timing should be modified so when a pedestrian activates the walk symbol during the eastbound phase, the two left turn arrows will become green but the right turn arrow will remain red. Another consideration is to install a four section head which includes the flashing yellow arrow. The green arrow would display anytime the pedestrian phase was not active but the flashing yellow arrow would display when the pedestrian phase was active.

Location: Fay Boulevard Intersection

Issue #18: Intersection Lighting

Figure 41

Description of Issue:
No intersection lighting is present (**Figure 41**). Pedestrians are not visible in the crosswalks during non-daylight conditions.

Suggestions for Improvement:
As noted in **Issue #1**, lighting will be installed from Camp Road to Fay Boulevard during fiscal year 2017. The Fay Boulevard intersection will be included in this lighting project.

Location: Fay Boulevard Intersection

Issue #19: Pedestrian Facilities

Figure 42

Figure 43

Figure 44

Description of Issue:
From field observations and signal timing sheets obtained from Brevard County, the "Flashing Don't Walk" time for the south and west leg crosswalks were timed at 25 seconds, which are insufficient based on the crossing distance. Both crossings are 95 feet in length and with the Manual of Uniform Traffic Control Devices (MUTCD) standard of 3.5 feet/second walking speed, the "Flashing Don't Walk" time for both of these crossings should be 27 seconds.

Eastbound right turning vehicles make it uncomfortable for a pedestrian standing on the southwest corner of the intersection (**Figure 42**). There is no vertical separation between the corner and the travel lane, with the asphalt being flush with the most of the pedestrian landing area for the south leg crosswalk. Some vehicles were observed cutting the corner close, making some of the field review team members stand 3-7 feet back from the roadway. Due to no vertical separation being present, the strain pole in the southwest corner is within the roadway clear zone.

No pedestrian crosswalk was observed on the north leg of the intersection (**Figure 43**). Due to this being

a T-intersection with no westbound leg, a crosswalk on the north leg would conflict with all signal phases of the intersection. No pedestrian facilities (sidewalks) are provided on the northeast corner of the intersection as well.

Suggestions for Improvement:
Consider extending the "Flashing Don't Walk" time to meet the minimum standard of 27 seconds for both the west and south leg crosswalks.

Consider constructing a Type F curb before and after the truncated dome landing areas on the southwest corner of the intersection. Doing so will help better define the vehicle turning area vs where the pedestrian feels safe to stand. Also by adding the Type F curb, the existing strain pole will be outside the clear zone due to the vertical separation being added. Drainage on this corner should be evaluated and additional inlets should be provided if necessary.

Consider the addition of a crosswalk on the north leg of the intersection as a long term improvement. Without pedestrian facilities on the northeast corner to connect to, it would be preferred to add the north leg crosswalk along with any future sidewalks on the east side of US 1 north of the Fay Boulevard intersection. Currently a drainage flume for the intersection is located in the north leg median, as displayed in **Figure 44**. Drainage patterns for the intersection should be reviewed near the north leg flume to help aid in the placement of the crosswalk.

If a crosswalk is added to the north leg of the intersection and a sidewalk connection is made in the northeast corner, consider relocating the northbound bus stop at Fay Boulevard to be far side just north of the intersection.

Summary of Suggestions

This pedestrian/bicycle safety review considers operational and safety related issues for pedestrians and bicyclists on US 1 from Broadway Boulevard to Fay Boulevard. This study was commissioned by the SCTPO to develop suggestions to improve the safety of pedestrians and bicyclists within the study limits. Each suggestion identified in this study is classified into one of three categories:

- Maintenance – issues identified for maintenance may be addressed by public agency staff on a short timeframe and at a relatively low cost.
- Near-Term Improvement (within 3 to 5 years) – activities that may be incorporated into an upcoming construction project in the area, including 3R milling and resurfacing projects.
- Long-Term Improvement (5+ years) – activities that may be incorporated into upcoming construction projects and may need to be programmed for funding as separate projects.

A table containing the transit related improvements is provided on the next page. The tables following the transit table summarize the corridor suggestions by priority (maintenance, near-term, or long-term) of this study.

Location	Issue Number	Issue	Suggestion
TRANSIT RELATED			
Corridor Wide	7	Bus Stop Benches	Review ADA guidance and consider moving bus stop benches along the corridor so they are accessible from a hard surface such as a sidewalk.
Port St. John Plaza Intersection	15	Pedestrian Facilities	If sidewalks and crosswalks are constructed at the intersection, the northbound bus stop located inside the Winn Dixie parking lot could be moved onto US 1 near the intersection. The southbound bus stop could also be moved closer to the intersection.
Fay Boulevard Intersection	19	Pedestrian Facilities	If a crosswalk is added to the north leg of the intersection and a sidewalk connection is made in the northeast corner, consider relocating the northbound bus stop at Fay Boulevard to be far side just north of the intersection.
Broadway Boulevard Southbound	N/A	Bus Stops	Pave a level 5'x8' slab with a raised 6" curb for the boarding and alighting (B&A) area; Add a 9' path to connect the boarding and alighting area to the existing sidewalk; Resurface the transition at the base of the curb ramp so that it is flush; Add detectable warnings to the nearby curb ramps; and Stripe a crosswalk at the nearby intersection (Broadway Boulevard).
Broadway Boulevard Northbound	N/A	Bus Stops	Pave a level 5'x8' slab with a raised 6" curb for the B&A area and pave a ramp from the B&A area to the shoulder of the road, which will act as the accessible path; and Add detectable warnings to the ramp.
Cocoa Flea Market Southbound	N/A	Bus Stops	Pave a level 5'x8' slab with a raised 6" curb for the B&A area and connect to the sidewalk constructed as part of the resurfacing project; and Add detectable warnings to the nearby curb ramps.
Cocoa Flea Market Northbound	N/A	Bus Stops	Pave a level 5'x8' slab with a raised 6" curb for the B&A area and pave a ramp from the B&A area to the shoulder of the road, which will act as the accessible path; and Add detectable warnings to the ramp.
Cottrell Avenue Northbound	N/A	Bus Stops	Pave a level 5'x8' slab with a raised 6" curb for the B&A area and connect to the sidewalk constructed as part of the resurfacing project; Add detectable warnings to the ramp; and Move the bench and trash can so they are flush with the edge of the sidewalk and outside the B&A area.
Port St. John Plaza Southbound	N/A	Bus Stops	Pave a level 5'x8' slab with a raised 6" curb for the B&A area and connect to the sidewalk constructed as part of the resurfacing project; Add detectable warnings to the ramp; and Move the bench and trash can so they are flush with the edge of the sidewalk and outside the B&A area.
Fay Boulevard Southbound	N/A	Bus Stops	Move the stop 100' north; Resurface the B&A area to have a cross slope of <=2%; Remove the pavement at the existing B&A area and repave a level 5'x8' slab with a raised 6" curb to create a raised and level B&A area; Add detectable warnings to the curb ramp; and Move the bench and trash can so they are flush with the edge of the sidewalk and outside the B&A area.
Fay Boulevard Northbound	N/A	Bus Stops	Resurface the B&A area to have a cross slope of <=2%; Pave a level 5'x8' slab with a raised 6" curb for the B&A area; Construct a curb ramp with a slope <=8.3%; Add detectable warnings to the nearby curb ramps; and If a crosswalk is added to the north leg of the intersection and a sidewalk connection is made in the northeast corner, consider relocating the northbound bus stop at Fay Boulevard to be far side just north of the intersection as discussed in **Issue #19: Pedestrian Facilities**.

Location	Issue Number	Issue	Suggestion
MAINTENANCE			
Corridor Wide	4	Undeveloped Parcels	Consider clearing and grubbing the vegetation back to the right of way (ROW) line, making the pedestrians more visible to motorists.
Corridor Wide	5	Signage	Consider adding pedestrian warning signage at high crash/high exposure locations throughout the corridor.
Broadway Boulevard Intersection	8	Missing/Worn Pavement Markings	Consider painting a crosswalk across the Broadway Boulevard approach. Consider restriping the centerline and stop bar for this approach as well.
Mid-Block between Spring Street and Cottrell Avenue	10	Pedestrian Crossing near Cocoa Flea Market	Pedestrian warning signage, as outlined in **Issue #5**, should be considered along this segment.
Port St. John Plaza Intersection	14	Driveway just South of Intersection	Consider trimming the trees/bushes within the right-of-way line to give motorists a better line of sight looking southbound. Consider adding a stop sign to this approach. Consider replacing the Do Not Enter sign with a new sign and moving further east, out of the bush area.
Port St. John Plaza Intersection	15	Pedestrian Facilities	Consider installing the signage improvements as noted in the FDOT Qualitative Assessment (see **Appendix C** for Conceptual Improvement Diagram). The continuous green lane sign should also make note of the southbound bicycle lane that crosses the intersection.
Fay Boulevard Intersection	19	Pedestrian Facilities	Consider extending the “Flashing Don’t Walk” time to meet the minimum standard of 27 seconds for both the west and south leg crosswalks. Consider constructing a Type F curb before and after the truncated dome landing areas on the southwest corner of the intersection. The existing strain pole will not be within the clear zone due to the vertical separation being added. Drainage on this corner should be evaluated and additional inlets should be provided if necessary.

Location	Issue Number	Issue	Suggestion
NEAR-TERM PRIORITY			
Corridor Wide	1	Lighting	FDOT D5 recently completed a lighting justification project along US 1 from Camp Road to Fay Boulevard, including the entire length of the study corridor. The study found lighting is justified along the corridor and the project is currently funded by FDOT for construction during fiscal year 2017.
Corridor Wide	3	Access Management	A study is recommended to review the usage of the full median openings identified near Broadway Boulevard and Cottrell Avenue in order to possibly close/reconcile a few of the median openings. The study team recognizes it may not be feasible to close two of the three openings at each location in order to meet the spacing standards, thus converting one or more of the full openings to be directional may be more appropriate.
Broadway Boulevard Intersection	9	Full Median Opening	Consider moving the median nose north and remove the extra pavement or converting this to a directional median opening.
Mid-Block between Spring Street and Cottrell Avenue	10	Pedestrian Crossing near Cocoa Flea Market	A concrete pedestrian refuge in the median to help facilitate east/west pedestrian movements should be considered.
Cottrell Avenue Intersection	12	Access Management/Turn Lanes	As discussed in **Issue #3**, a study should be performed to review closing/modifying these median openings. As part of this study, the volumes for the exclusive southbound right turn lane should be reviewed and removal of this right turn lane should be considered.
Cottrell Avenue Intersection	13	Lighting	As noted in **Issue #1**, lighting is justified throughout the study corridor and lighting is planned for construction during fiscal year 2017.
Port St. John Plaza Intersection	14	Driveway just South of Intersection	Consider reviewing the current radii on the southwest corner of the driveway and reducing the radii to slow right turning movements.
Port St. John Plaza Intersection	16	West Leg Stop Bar	Review guidance for stop bar placement relative to signal head locations and consider moving the stop bar further east, if possible.
Fay Boulevard Intersection	17	Eastbound Signal Heads	Consider replacing the five section head with two (2) three section heads. One of those will be for the outside left turn lane while the other will control the eastbound right turn lane. As part of this change, the signal timing should be modified so when a pedestrian activates the walk symbol during the eastbound phase, the two left turn arrows will become green but the right turn arrow will remain red. Another consideration is to install a four section head which includes the flashing yellow arrow. The green arrow would display anytime the pedestrian phase was not active but the flashing yellow arrow would display when the pedestrian phase was active.
Fay Boulevard Intersection	18	Intersection Lighting	As noted in **Issue #1**, lighting is justified throughout the study corridor and lighting is planned for construction during fiscal year 2017.

Location	Issue Number	Issue	Suggestion
LONG-TERM PRIORITY			
Corridor Wide	2	Sidewalks	Sidewalks should be considered along the length of the corridor in phases: Phase 1 - Spring Street to southernmost Cocoa Flea Market entrance (across from Mahi Mahi Lane). Also consider reconstructing sidewalk from Broadway Boulevard to Spring Street if in poor condition. Phase 2 – Cottrell Avenue/BP Gas Station to Port St. John Plaza. Also consider constructing sidewalk on the east side of the roadway for this segment. Phase 3 – Port St. John Plaza to CVS driveway just south of Fay Boulevard Phase 4 – Southernmost Cocoa Flea Market entrance to Cottrell Avenue
Corridor Wide	6	Bike Lanes	Consider expanding the current five foot bicycle lanes to be a seven foot buffered bicycle lanes in both the 45 mph and 55 mph sections. Also consider adding "keyholes" at right turn lanes where they aren't currently provided. In order to obtain the extra four feet of pavement required, the median could be slightly reconstructed or additional pavement outside of the existing bicycle lane/paved shoulder could be provided.
Mid-Block between Spring Street and Cottrell Avenue	11	Median Opening just North of Canebreakers Drive	Consider shifting the full median opening south to align with Canebreakers Drive once the Flea Market property redevelops.
Port St. John Plaza Intersection	15	Pedestrian Facilities	Consider removing the continuous green lane in order to accommodate pedestrian movements east/west across the intersection. When sidewalks are constructed, marked crosswalks with pedestrian activated push buttons and signal heads should be considered across the west and south (if the continuous through lane is removed) legs of the Port St. John Plaza intersection. Once the sidewalks and crosswalks are constructed, the northbound bus stop located inside the Winn Dixie parking lot could be moved onto US 1 near the intersection. The southbound bus stop could also be moved closer to the intersection.
Fay Boulevard Intersection	19	Pedestrian Facilities	Consider the addition of a crosswalk on the north leg of the intersection as a long term improvement. Without pedestrian facilities on the northeast corner to connect to, it would be preferred to add the north leg crosswalk along with any future sidewalks on the east side of US 1 north of the Fay Boulevard intersection. Drainage patterns for the intersection should be reviewed near the north leg flume to help aid in the placement of the crosswalk.

Appendix A – Collision Diagrams

US 1 Ped/Bike Field Review
Collision Diagram (2009 – 2014)
Broadway Boulevard to Vintage Lane

Figure **1**

US 1 Ped/Bike Field Review
Collision Diagram (2009 – 2014)
Merchants Drive to just south of Canebreakers Drive

Figure **2**

US 1 Ped/Bike Field Review
Collision Diagram (2009 – 2014)
Canebreakers Drive to south of Cottrell Avenue

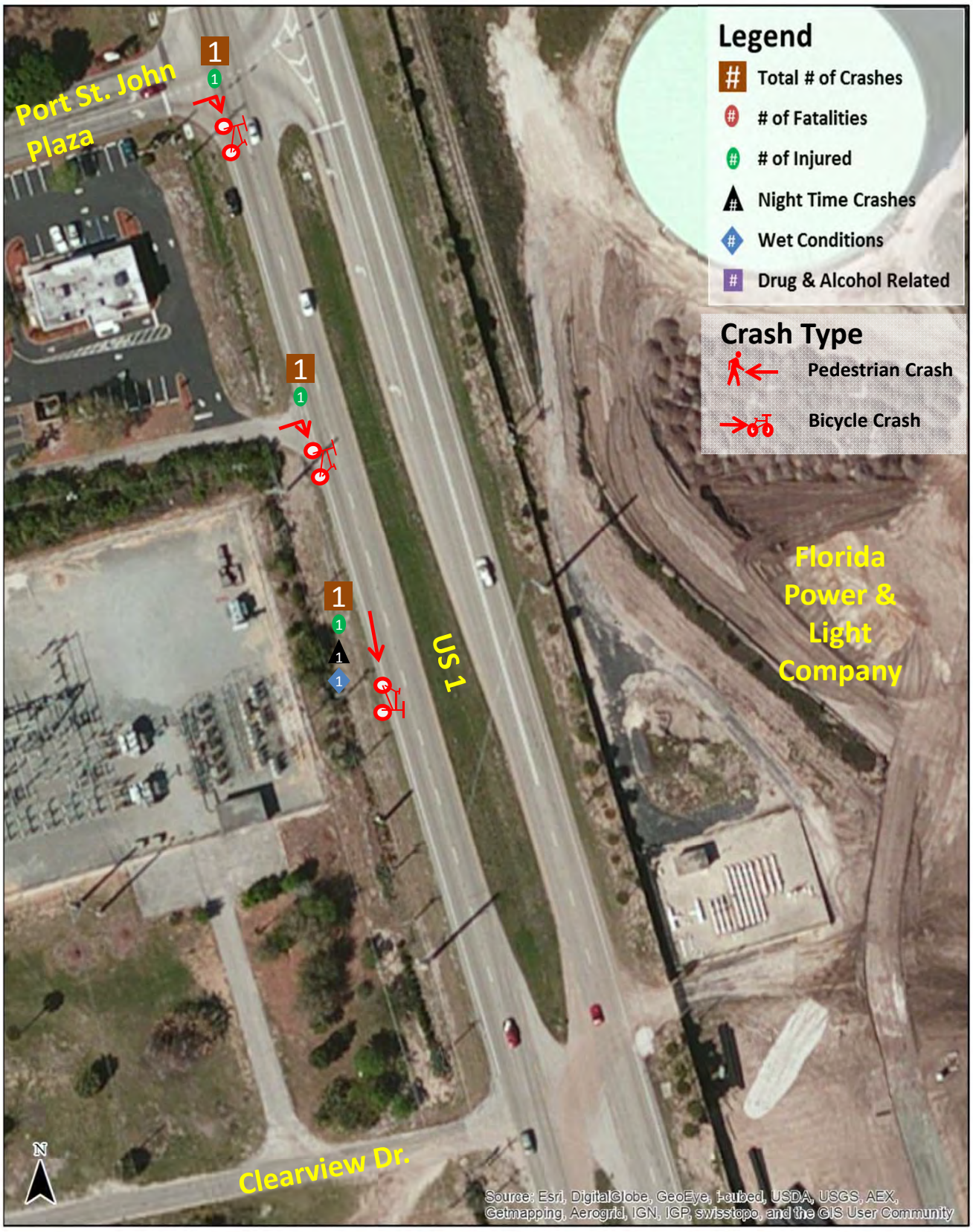
Figure **3**

US 1 Ped/Bike Field Review
Collision Diagram (2009 – 2014)
Cottrell Avenue to Tilkwade Lane

Figure **4**

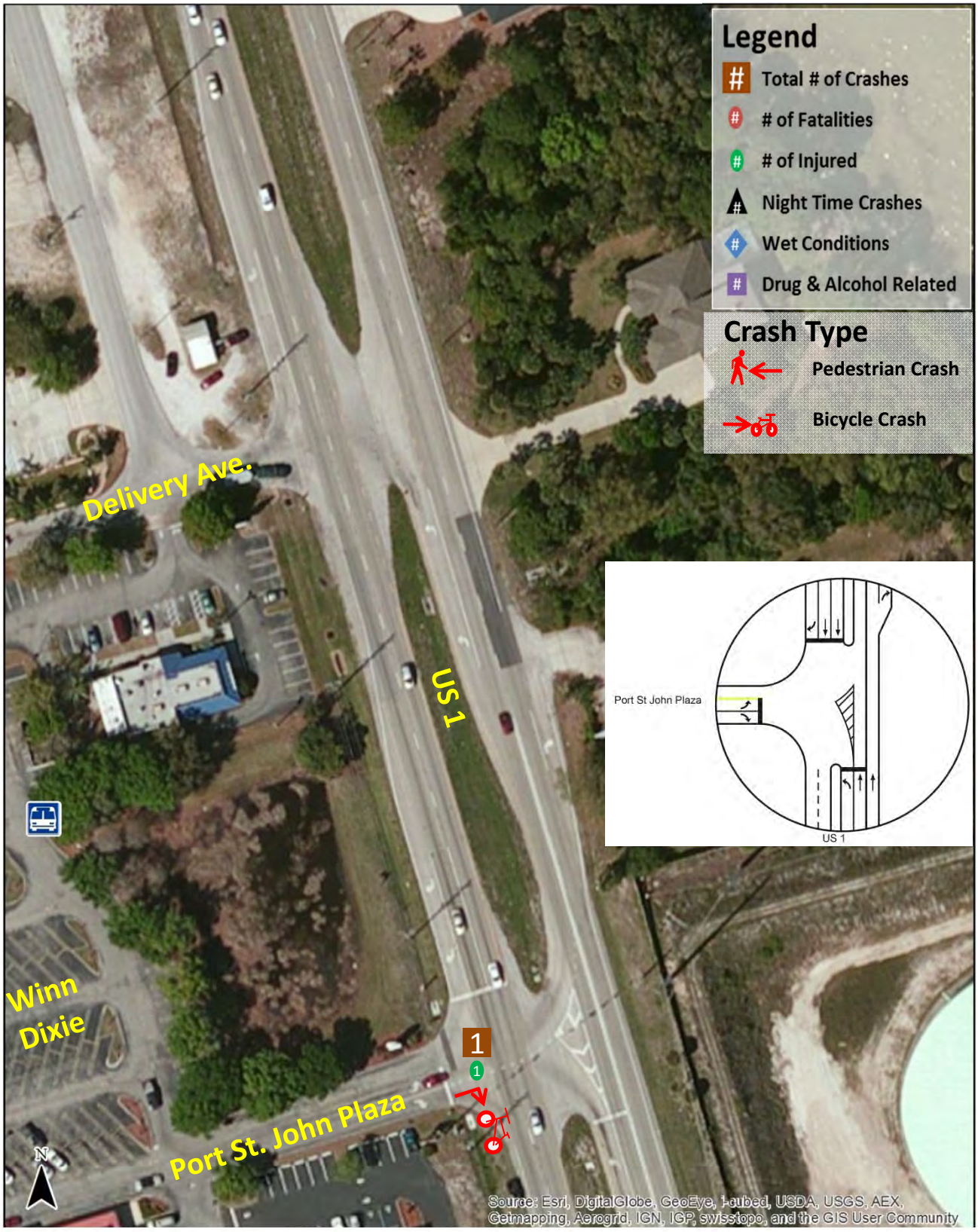
US 1 Ped/Bike Field Review
Collision Diagram (2009 – 2014)
North of Tilkwade Lane to Clearview Drive

Figure **5**



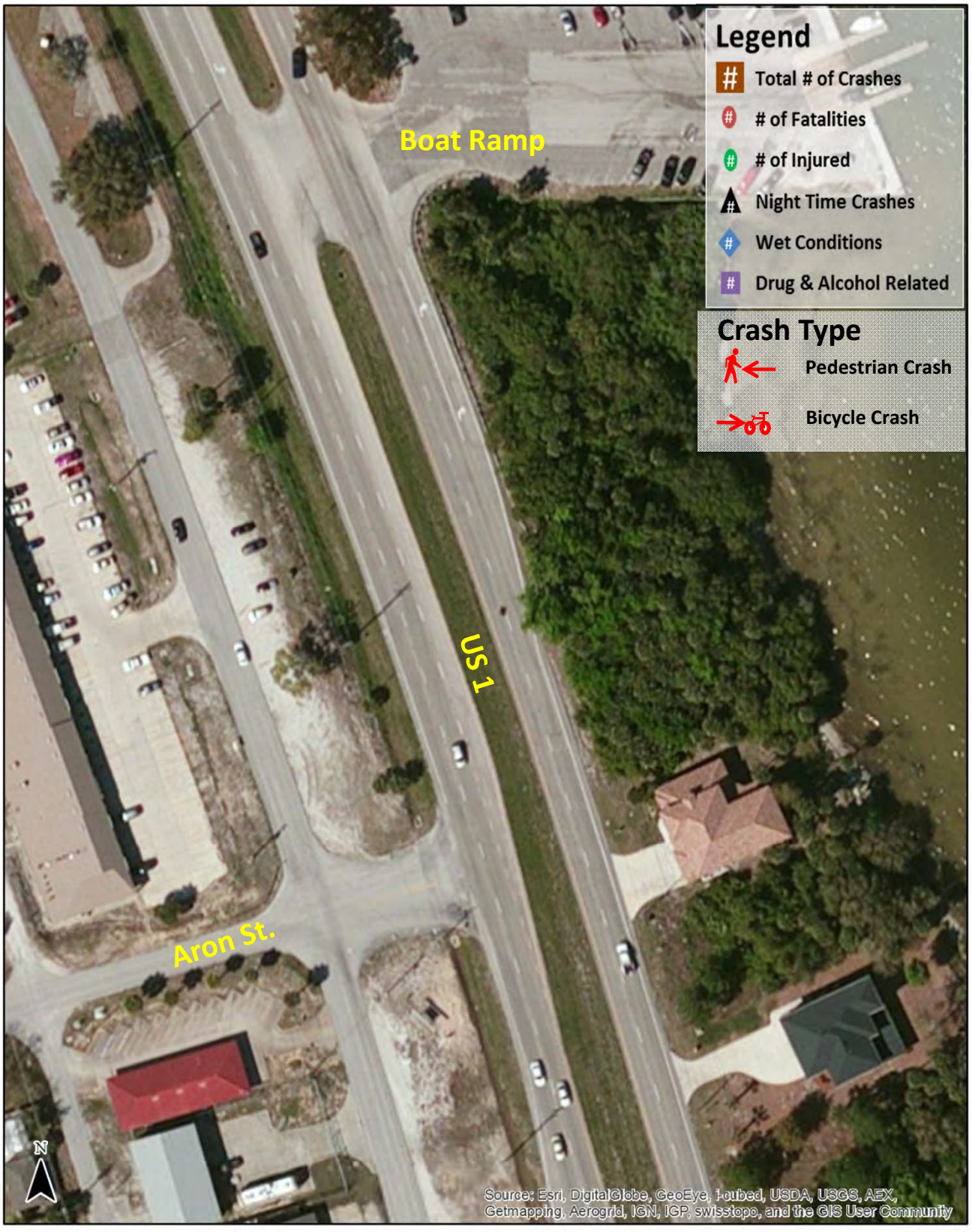
US 1 Ped/Bike Field Review
Collision Diagram (2009 – 2014)
Clearview Drive to Port St. John Plaza

Figure **6**



US 1 Ped/Bike Field Review
Collision Diagram (2009 – 2014)
Port St. John Plaza to south of Aron Street

Figure **7**

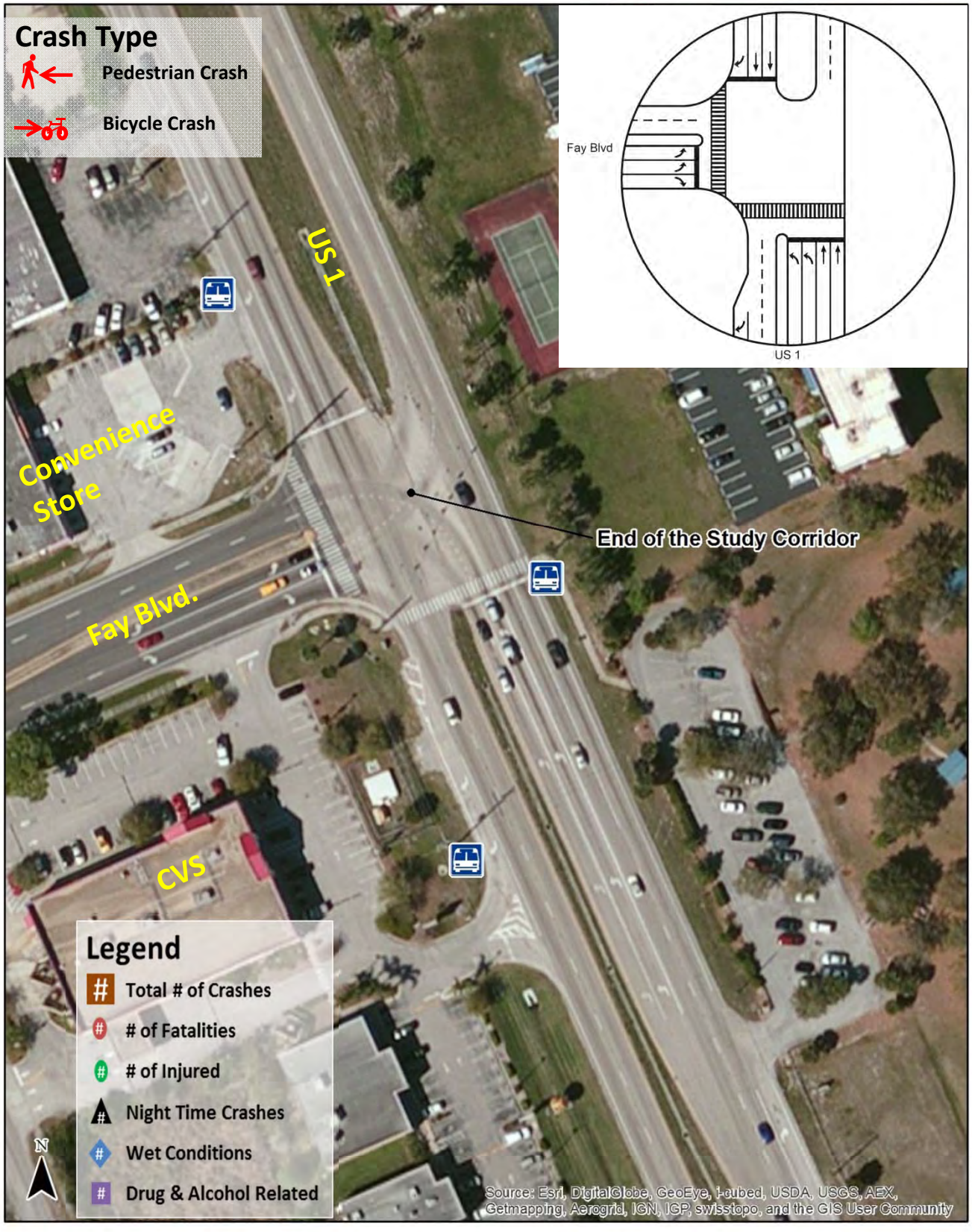


US 1 Ped/Bike Field Review
Collision Diagram (2009 – 2014)
Aron Street to the Boat Ramp

Figure **8**

US 1 Ped/Bike Field Review
Collision Diagram (2009 – 2014)
Boat Ramp to Lafair Street

Figure **9**



US 1 Ped/Bike Field Review
Collision Diagram (2009 – 2014)
North of Lafair Street to Fay Boulevard

Figure **10**

Appendix B – SCAT ADA Assessment Bus Stop Sheets

Location: N COCOA BLVD & BROADWAY BLVD **ID:** 880

Quick Fix: Yes **ADA Compliant:** No **Direction:** Southbound

Quick Fix Items: Relocate Bench

Non-Compliant Features: Bench not accessible, Boarding and alighting area not compliant, Detectable Warnings, No Raised Curb

Average Ridership per Run: 0

Scoring: Accessibility: 1 **Safety** 3 **Operational:** 2 **Cost:** -5 **Rideship:** 0 **Total:** 1

Rank: 656 **Total Cost: $4,100**

Northbound

Southbound

Supplemental Photo

Eastbound

Westbound

Stop Location: On an unpaved shoulder of roadway
Bus Location: In a travel-thru lane
Releation to Intersection: At street, on nearside of intersection
Hazards None

Curb Type/Height: None
Signage: Standard bus stop sign post
Sign Mounted Correctly: Yes
Amenities: Bench (3rd Party)
Bench Accessible: No
Bench Obstruction: No
Trashcan Accessible:
Trashcan Obstruction:
Schedule Accessible:

Is there a B&A area: Yes
Max Clear Space:
What prevents a B&A area:
Is the B&A 5'x8':
B&A Materials: Dirt/Grass
Is the B&A Safe: Yes
B&A Condition: Surface not firm, stable, or slip r
Running Slope (%): 0.4
Cross Slope (%): 2.8
B&A Obstructions: No obstruction
B&A Barriers: No barriers
Sidewalk Connection: No
1/4" Change in Elevation: No
Sidewalk Width (feet): 5

Marked Crosswalk: No
Protected Crosswalk: Yes
Detectable Warning: No
Detectable Warning Condition:
Detectable Full Width:
24" Detectable Warning:
Curb Ramp: Yes
Smooth Transition at Curb Ramp: No
Curb Ramp Slope: Yes
Curb Ramp Surface: Yes

Shelter: No **Shelter Condition:** **Wheelchair Into:**
Distance from Curb (inches): **Accessible Connection:**

Trip Generators: Medical/Rehab, Office/Commercial, Residential, Retail

Recommendations: Pave a level 5'x8' slab with a raised 6" curb for the B&A area. Add a 9' path to connect the B&A to the existing sidewalk. Resurface the transition at the base of the curb ramp so that it is flush. Add detectable warnings to the nearby curb ramps. Stripe a crosswalk at the nearby intersection.

Location: N COCOA BLVD & BROADWAY BLVD **ID:** 924

Quick Fix: No **ADA Compliant:** No **Direction:** Northbound

Quick Fix Items:

Non-Compliant Features: Boarding and alighting area not compliant, Detectable Warnings, No Raised Curb

Average Ridership per Run: 2

Scoring: Accessibility: -3 **Safety** 0 **Operational:** 4 **Cost:** -5 **Rideship:** 4 **Total:** 0

Rank: 683 **Total Cost: $4,500**

Northbound

Southbound

Supplemental Photo

Eastbound

Westbound

Stop Location: On an unpaved shoulder of roadway
Bus Location: In a travel-thru lane
Releation to Intersection: At street, on far side of intersection
Hazards None

Curb Type/Height: None
Signage: Standard bus stop sign post
Sign Mounted Correctly: Yes
Amenities: Lighting
Bench Accessible: N/A
Bench Obstruction: N/A
Trashcan Accessible:
Trashcan Obstruction:
Schedule Accessible:

Is there a B&A area: Yes
Max Clear Space:
What prevents a B&A area:
Is the B&A 5'x8':
B&A Materials: Dirt/Grass
Is the B&A Safe: Yes
B&A Condition: Surface not firm, stable, or slip r
Running Slope (%): 0
Cross Slope (%): 5.5
B&A Obstructions: No obstruction
B&A Barriers: No barriers
Sidewalk Connection: No
1/4" Change in Elevation: No
Sidewalk Width (feet):

Marked Crosswalk: No
Protected Crosswalk:
Detectable Warning:
Detectable Warning Condition:
Detectable Full Width:
24" Detectable Warning:
Curb Ramp: No
Smooth Transition at Curb Ramp:
Curb Ramp Slope:
Curb Ramp Surface:

Shelter: No **Shelter Condition:** **Wheelchair Into:**
Distance from Curb (inches): **Accessible Connection:**

Trip Generators: Medical/Rehab, Office/Commercial, Retail

Recommendations: Pave a level 5'x8' slab with a raised 6" curb for the B&A area and pave a ramp from the B&A area to the shoulder of the road, which will act as the accessible path. See note 1 and note 3. Add detectable warnings to the ramp.

Location: N COCOA BLVD & SPACE COAST FLEA MARKET **ID:** 521

Quick Fix: Yes **ADA Compliant:** No **Direction:** Southbound

Quick Fix Items: Relocate Bench

Non-Compliant Features: Bench not accessible, Boarding and alighting area not compliant, Detectable Warnings, No Raised Curb

Average Ridership per Run: 2

Scoring: Accessibility: 1 **Safety** 3 **Operational:** 2 **Cost:** -5 **Rideship:** 4 **Total:** 5

Rank: 584 **Total Cost: $4,200**

Northbound

Southbound

Supplemental Photo

Eastbound

Westbound

Stop Location: On an unpaved shoulder of roadway
Bus Location: In a travel-thru lane
Releation to Intersection: At street, on nearside of intersection
Hazards None

Curb Type/Height: None
Signage: Standard bus stop sign post
Sign Mounted Correctly: Yes
Amenities: Bench (3rd Party)
Bench Accessible: No
Bench Obstruction: No
Trashcan Accessible:
Trashcan Obstruction:
Schedule Accessible:

Is there a B&A area: Yes
Max Clear Space:
What prevents a B&A area:
Is the B&A 5'x8':
B&A Materials: Dirt/Grass
Is the B&A Safe: Yes
B&A Condition: Surface not firm, stable, or slip r
Running Slope (%): 0.3
Cross Slope (%): 3.5
B&A Obstructions: No obstruction
B&A Barriers: No barriers
Sidewalk Connection: Yes
1/4" Change in Elevation: No
Sidewalk Width (feet): 5

Marked Crosswalk: No
Protected Crosswalk: Yes
Detectable Warning: No
Detectable Warning Condition:
Detectable Full Width:
24" Detectable Warning:
Curb Ramp: Yes
Smooth Transition at Curb Ramp: Yes
Curb Ramp Slope: Yes
Curb Ramp Surface: Yes

Shelter: No **Shelter Condition:** **Wheelchair Into:**
Distance from Curb (inches): **Accessible Connection:**

Trip Generators: Office/Commercial, Retail

Recommendations: Pave a level 5'x8' slab with a raised 6" curb for the B&A area and connect to the existing sidewalk. See note 1. Add detectable warnings to the nearby curb ramps.

Location: N COCOA BLVD & SPACE COAST FLEA MARKET **ID:** 15

Quick Fix: No **ADA Compliant:** No **Direction:** Northbound

Quick Fix Items:

Non-Compliant Features: Boarding and alighting area not compliant, Detectable Warnings, No Raised Curb

Average Ridership per Run: 2

Scoring: Accessibility: -3 **Safety** 0 **Operational:** 2 **Cost:** -5 **Rideship:** 4 **Total:** -2

Rank: 723 **Total Cost: $4,200**

Northbound

Southbound

Supplemental Photo

Eastbound

Westbound

Stop Location: On an unpaved shoulder of roadway
Bus Location: In a travel-thru lane
Releation to Intersection: At street, on nearside of intersection
Hazards None

Curb Type/Height: None
Signage: Standard bus stop sign post
Sign Mounted Correctly: Yes
Amenities: Lighting
Bench Accessible: N/A
Bench Obstruction: N/A
Trashcan Accessible:
Trashcan Obstruction:
Schedule Accessible:

Is there a B&A area: Yes
Max Clear Space:
What prevents a B&A area:
Is the B&A 5'x8':
B&A Materials: Dirt/Grass
Is the B&A Safe: Yes
B&A Condition: Surface not firm, stable, or slip r
Running Slope (%): 3.9
Cross Slope (%): 0.2
B&A Obstructions: No obstruction
B&A Barriers: No barriers
Sidewalk Connection: No
1/4" Change in Elevation: No
Sidewalk Width (feet):

Marked Crosswalk: No
Protected Crosswalk:
Detectable Warning:
Detectable Warning Condition:
Detectable Full Width:
24" Detectable Warning:
Curb Ramp: No
Smooth Transition at Curb Ramp:
Curb Ramp Slope:
Curb Ramp Surface:

Shelter: No **Shelter Condition:** **Wheelchair Into:**
Distance from Curb (inches): **Accessible Connection:**

Trip Generators: Residential, Retail

Recommendations: Pave a level 5'x8' slab with a raised 6" curb for the B&A area and pave a ramp from the B&A area to the shoulder of the road, which will act as the accessible path. See note 1 and note 3. Add detectable warnings to the ramp.

Location: N COCOA BLVD & COTTRELL AVE **ID:** 925

Quick Fix: Yes **ADA Compliant:** No **Direction:** Northbound

Quick Fix Items: Relocate Bench, Relocate Trash Can

Non-Compliant Features: Bench not accessible, Boarding and alighting area not compliant, Trashcan not compliant, Detectable Warnings, No Raised Curb

Average Ridership per Run: 2

Scoring: Accessibility: -2 **Safety** 0 **Operational:** 2 **Cost:** -5 **Rideship:** 4 **Total:** -1

Rank: 710 **Total Cost: $4,500**

Northbound

Southbound

Supplemental Photo

Eastbound

Westbound

Stop Location: On an unpaved shoulder of roadway
Bus Location: In a travel-thru lane
Releation to Intersection: At street, on nearside of intersection
Hazards None

Curb Type/Height: None **Signage:** Standard bus stop sign post
Sign Mounted Correctly: Yes
Amenities: Bench (3rd Party), Trash Can
Bench Accessible: No **Bench Obstruction:** No
Trashcan Accessible: No **Trashcan Obstruction:** No
Schedule Accessible:

Is there a B&A area: Yes **Max Clear Space:**
What prevents a B&A area:
Is the B&A 5'x8': **B&A Materials:** Dirt/Grass
Is the B&A Safe: Yes **B&A Condition:** Surface not firm, stable, or slip r
Running Slope (%): 2.9 **Cross Slope (%):** 10.7
B&A Obstructions: No obstruction
B&A Barriers: No barriers
Sidewalk Connection: No **1/4" Change in Elevation:** No
Sidewalk Width (feet):

Marked Crosswalk: No **Protected Crosswalk:**
Detectable Warning: **Detectable Warning Condition:**
Detectable Full Width: **24" Detectable Warning:**
Curb Ramp: No **Smooth Transition at Curb Ramp:**
Curb Ramp Slope: **Curb Ramp Surface:**

Shelter: No **Shelter Condition:** **Wheelchair Into:**
Distance from Curb (inches): **Accessible Connection:**

Trip Generators: Retail

Recommendations: Pave a level 5'x8' slab with a raised 6" curb for the B&A area and pave a ramp from the B&A area to the shoulder of the road, which will act as the accessible path. See note 1 and note 3. Add detectable warnings to the ramp. Move the bench and trash can so that they are flush with the edge of the sidewalk and outside of the B&A area.

Location: N COCOA BLVD & PORT ST JOHN PLAZA **ID:** 472

Quick Fix: Yes **ADA Compliant:** No **Direction:** Southbound

Quick Fix Items: Relocate Bench

Non-Compliant Features: Bench not accessible, Boarding and alighting area not compliant, No Raised Curb

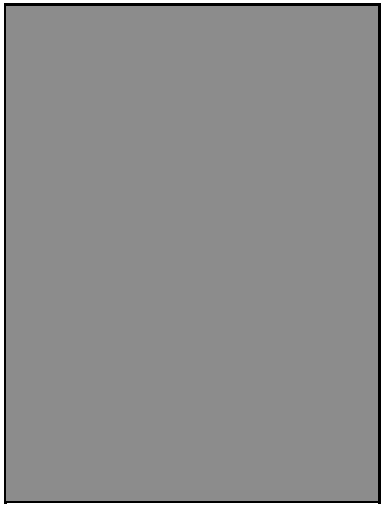
Average Ridership per Run: 1

Scoring: Accessibility: -2 **Safety** 0 **Operational:** 4 **Cost:** 0 **Rideship:** 0 **Total:** 2

Rank: 635 Total Cost: $4,000

Northbound

Southbound



Supplemental Photo

Eastbound

Westbound

Stop Location: On an unpaved shoulder of roadway
Bus Location: In a travel-thru lane
Releation to Intersection: At street, on far side of intersection
Hazards None

Curb Type/Height: None
Signage: Standard bus stop sign post
Sign Mounted Correctly: Yes
Amenities: Bench (3rd Party)
Bench Accessible: No
Bench Obstruction: No
Trashcan Accessible:
Trashcan Obstruction:
Schedule Accessible:

Is there a B&A area: Yes
Max Clear Space:
What prevents a B&A area:
Is the B&A 5'x8':
B&A Materials: Dirt/Grass
Is the B&A Safe: Yes
B&A Condition: Surface not firm, stable, or slip r
Running Slope (%): 1.1
Cross Slope (%): 5.2
B&A Obstructions: No obstruction
B&A Barriers: No barriers
Sidewalk Connection: No
1/4" Change in Elevation: No
Sidewalk Width (feet):

Marked Crosswalk: No
Protected Crosswalk:
Detectable Warning:
Detectable Warning Condition:
Detectable Full Width:
24" Detectable Warning:
Curb Ramp: No
Smooth Transition at Curb Ramp:
Curb Ramp Slope:
Curb Ramp Surface:

Shelter: No **Shelter Condition:** **Wheelchair Into:**
Distance from Curb (inches): **Accessible Connection:**

Trip Generators: Office/Commercial, Residential, Retail

Recommendations: Pave a level 5'x8' slab with a raised 6" curb for the B&A area and pave a ramp from the B&A area to the shoulder of the road, which will act as the accessible path. See note 1 and note 3. Add detectable warnings to the ramp. Move the bench so that it is flush with the edge of the sidewalk and outside of the B&A area.

Location: N COCOA BLVD & FAY BLVD **ID:** 879

Quick Fix: Yes **ADA Compliant:** No **Direction:** Southbound

Quick Fix Items: Relocate Bench

Non-Compliant Features: Bench not accessible, Boarding and alighting area not compliant, Detectable Warnings, No Raised Curb

Average Ridership per Run: 0

Scoring: Accessibility: 3 **Safety** 5 **Operational:** 3 **Cost:** -10 **Rideship:** 0 **Total:** 1

Rank: 671 **Total Cost: $5,400**

Northbound

Southbound

Supplemental Photo

Eastbound

Westbound

Stop Location: On an unpaved shoulder of roadway
Bus Location: In a right turn only lane
Releation to Intersection: At street, on far side of intersection
Hazards None

Curb Type/Height: Type F-6
Signage: Standard bus stop sign post
Sign Mounted Correctly: Yes
Amenities: Bench (3rd Party)
Bench Accessible: No
Bench Obstruction: No
Trashcan Accessible:
Trashcan Obstruction:
Schedule Accessible:

Is there a B&A area: Yes
Max Clear Space:
What prevents a B&A area:
Is the B&A 5'x8':
B&A Materials: Dirt/Grass
Is the B&A Safe: Yes
B&A Condition: Surface not firm, stable, or slip r
Running Slope (%): 0.4
Cross Slope (%): 3.5
B&A Obstructions: No obstruction
B&A Barriers: No barriers
Sidewalk Connection: Yes
1/4" Change in Elevation: No
Sidewalk Width (feet): 6

Marked Crosswalk: Yes
Protected Crosswalk: Yes
Detectable Warning: No
Detectable Warning Condition:
Detectable Full Width:
24" Detectable Warning:
Curb Ramp: Yes
Smooth Transition at Curb Ramp: Yes
Curb Ramp Slope: Yes
Curb Ramp Surface: Yes

Shelter: No **Shelter Condition:** **Wheelchair Into:**
Distance from Curb (inches): **Accessible Connection:**

Trip Generators: Office/Commercial, Residential, Retail

Recommendations: Move the stop 100' north. Resurface the B&A area to have a cross slope of <=2%. Remove the pavement at the existing B&A area and repave a level 5'x8' slab with a raised 6" curb to create a raised and level B&A area. See note 1. Add detectable warnings to the curb ramp. Move the bench so that it is flush with the edge of the sidewalk and outside of the B&A area.

Location: N COCOA BLVD & FAY BLVD **ID:** 926

Quick Fix: No **ADA Compliant:** No **Direction:** Northbound

Quick Fix Items:

Non-Compliant Features: Boarding and alighting area not compliant, Detectable Warnings, No Raised Curb

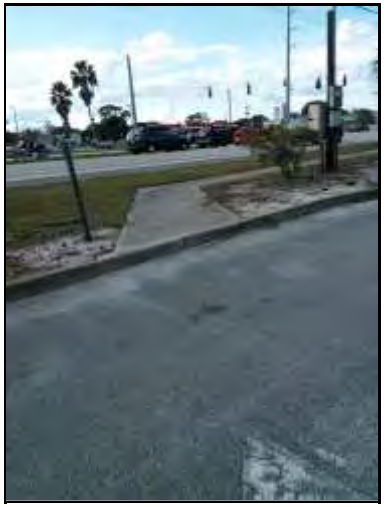
Average Ridership per Run: 2

Scoring: Accessibility: 2 **Safety** 5 **Operational:** 3 **Cost:** 0 **Rideship:** 4 **Total:** 14

Rank: 375 Total Cost: $3,900

Northbound

Southbound



Supplemental Photo

Eastbound

Westbound

Stop Location: On an unpaved shoulder of roadway
Bus Location: In a travel-thru lane
Releation to Intersection: At street, on nearside of intersection
Hazards None

Curb Type/Height: None
Signage: Standard bus stop sign post
Sign Mounted Correctly: Yes
Amenities: Lighting
Bench Accessible: N/A
Bench Obstruction: N/A
Trashcan Accessible:
Trashcan Obstruction:
Schedule Accessible:

Is there a B&A area: Yes
Max Clear Space:
What prevents a B&A area:
Is the B&A 5'x8':
B&A Materials: Partially Paved
Is the B&A Safe: Yes
B&A Condition: Surface not firm, stable, or slip r
Running Slope (%): 2.4
Cross Slope (%): 5.9
B&A Obstructions: No obstruction
B&A Barriers: No barriers
Sidewalk Connection: Yes
1/4" Change in Elevation: No
Sidewalk Width (feet): 5

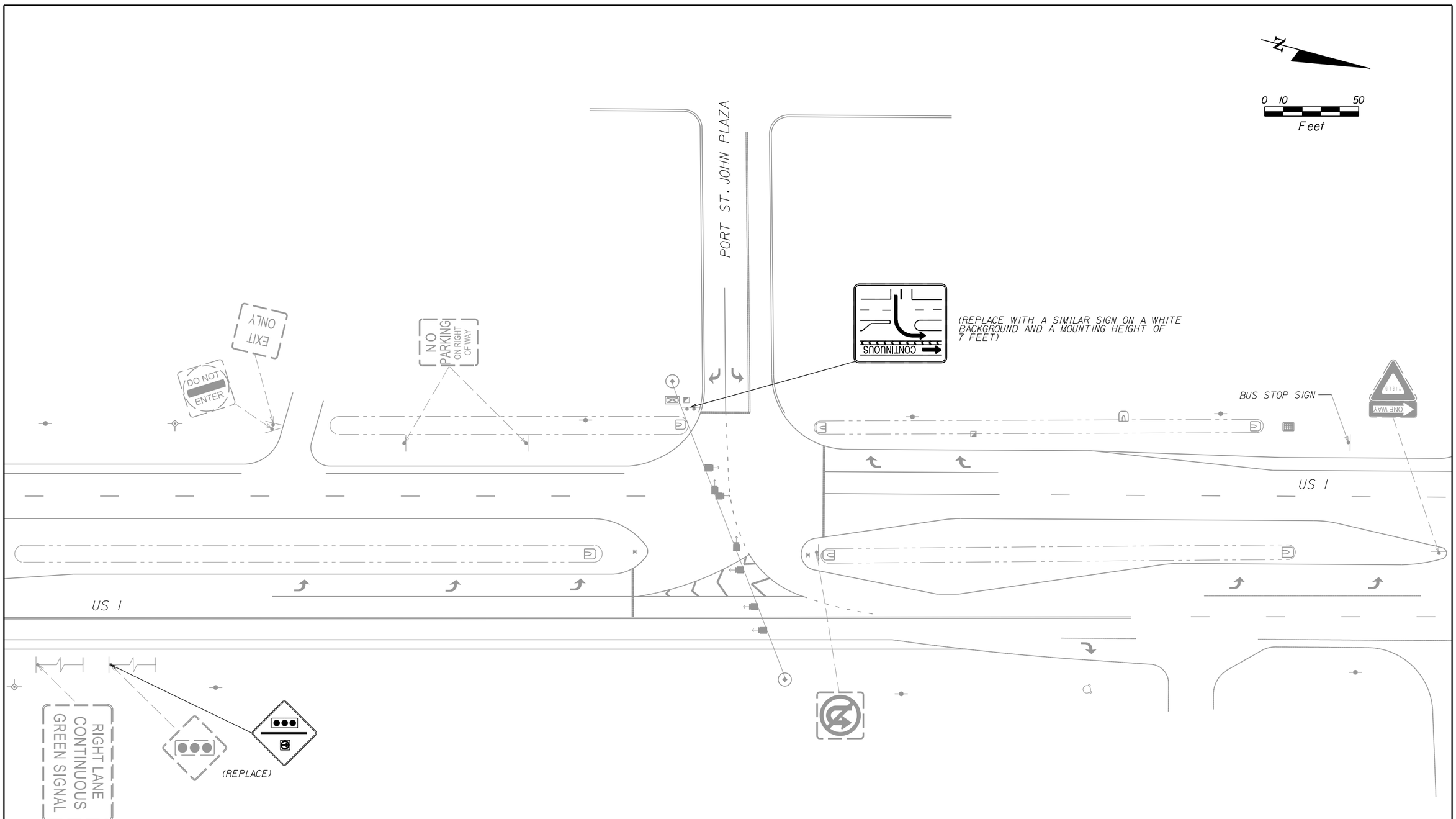
Marked Crosswalk: Yes
Protected Crosswalk: Yes
Detectable Warning: No
Detectable Warning Condition:
Detectable Full Width:
24" Detectable Warning:
Curb Ramp: Yes
Smooth Transition at Curb Ramp: Yes
Curb Ramp Slope: Yes
Curb Ramp Surface: Yes

Shelter: No **Shelter Condition:** **Wheelchair Into:**
Distance from Curb (inches): **Accessible Connection:**

Trip Generators: Government, Medical/Rehab, Office/Commercial, Retail

Recommendations: Resurface the B&A area to have a cross slope of <=2%. Pave a level 5'x8' slab with a raised 6" curb for the B&A area. Construct a curb ramp with a slope <=8.3%. Add detectable warnings to the nearby curb ramps.

Appendix C – Port St. John Plaza Conceptual Improvement Diagram



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

GMB Engineers & Planners, Inc.
2602 E. Livingston St
Orlando, FL 32803
Phone: 407-898-5424 Fax: 407-898-5425

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
US 1	BREVARD	06-154.108

CONCEPTUAL IMPROVEMENT DIAGRAM
US 1 AT PORT ST. JOHN PLAZA

FIGURE NO. 4

kfreeman 5/12/2011 4:07:36 PM P:\PROJECTS\YR 2006\06-154.99 FDOT D5 Traffic Ops Continuing Services\06-154.108 WO #108\