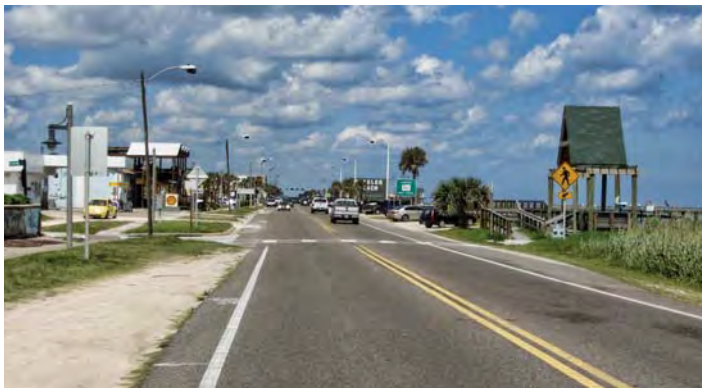
RIVER TO SEA TPO
Transportation Planning Organization
VISION - PLAN - IMPLEMENT

SR/CR A1A PEDESTRIAN SAFETY & MOBILITY STUDY

PEDESTRIAN / BICYCLE SAFETY REVIEW

Focus Area H / 9th Street S to 13th Street N



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May 2017

SR/CR A1A
Pedestrian Safety & Mobility Study

Pedestrian/Bicycle Safety Review Report for
SR A1A from 9th Street S to 13th Street N
(Flagler Beach)

Section Number: 73030000
Mile Post: 3.630 to 4.708
Flagler County

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Project Title: Focus Area H Pedestrian/Bicycle Safety Field Review

Field Review Dates: September 22 and 23, 2016 (daytime/nighttime reviews and follow up meeting)

Participants:
Adam Burghdoff – Kittelson & Associates, Inc. – Team Leader
Stephan Harris – River to Sea Transportation Planning Organization
Chad Lingenfelter – Florida Department of Transportation, District 5
Joan Carter – Florida Department of Transportation, District 5
Larry Newsome – City of Flagler Beach (September 23rd only)
Kris Torres – Flagler County
Captain Matthew Doughney – Flagler Beach Police Department
Deputy Bret Wood – Flagler County Sheriff
Travis Hills – Kittelson & Associates, Inc.

Project Characteristics:
Field Review Type: Pedestrian, Bicycle, Existing Road
Adjacent Land Use: Urban, Residential, Commercial
Posted Speed Limit: 30 miles per hour (MPH) from 9th Street S to 3rd Street N and 35 (MPH) from 3rd Street N to 13th Street N
Opposite Flow Separation: None
Service Function: Urban Minor Arterial
Terrain: Flat
Climatic Conditions: Sunny

Source: Google Maps 2016

Figure 1 – Focus Area H Study Corridor

Background

Volusia County is ranked in Florida's top 10 counties for pedestrian injuries and fatalities. Pedestrians and bicyclists are identified as Vulnerable Road Users in the Florida Strategic Highway Safety Plan (SHSP). The goal of the SR/CR A1A Pedestrian Safety & Mobility Study is to generate a list of suggested improvements at high pedestrian/bicycle crash locations to address the growing need for pedestrian/bicycle safety along SR A1A in Volusia and Flagler Counties. SR A1A from 9th Street S to 13th Street N (**Figure 1**), a 1.1 mile corridor in Flagler Beach, was identified as one of these high crash locations. In order to suggest improvements along this high crash corridor, the crash history was evaluated and a field review was conducted. The methodology for selecting high crash corridors is explained in the SR A1A Pedestrian Safety and Mobility Study Final Report. This report will be available

on the River to Sea TPO's website upon the completion of the study: http://www.r2ctpo.org/bicycle-pedestrian-program/overview/.

The pedestrian/bicycle safety review process involves multi-disciplinary representatives from various stakeholders, potentially including representatives from transportation planning, 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 pedestrian/bicycle safety review was commissioned by the Florida Department of Transportation (FDOT) District Five in coordination with the River to Sea Transportation Planning Organization (R2CTPO) to develop short-term, near-term, and long-term suggestions to improve pedestrian and bicyclist safety within the study limits. 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 related improvements related to pedestrians and bicyclists to be considered by FDOT staff, R2CTPO staff, and partner agencies (i.e. City of Flagler Beach, Flagler County, local law enforcement). Some improvements presented in this report may be implemented in the short-term while other suggested safety improvements may be considered for future study. Each suggestion identified in this study is classified into one of three categories:

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

The field review was conducted on Thursday, September 22, 2016. The team met in the morning at the Flagler Beach City Hall Commission Chambers 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. The team walked the length of sidewalk along the west side of the roadway (no sidewalks present on east side). The team members reassembled in the evening, after sunset, to make observations in nighttime conditions. A follow-up debrief meeting was held at Flagler Beach City Hall the following morning (September 23rd) to discuss the corridor's issues and potential improvements identified by the team. Study corridor characteristics are reviewed below:

- 9th Street S to 13th Street N – 1.10 miles.
- Two-lane, undivided cross section along the length of the study corridor with no passing zones.
- The posted speed along the study corridor varies:
    - 30 MPH from 9th Street S to 3rd Street N; and
    - 35 MPH from 3rd Street N to 13th Street N.
- One (1) signalized intersection at SR AIA and SR 100/Moody Boulevard:
    - Crosswalks with special emphasis markings on the west, south, and north legs.
- Unsignalized crosswalks at the following locations:
    - South leg of 8th Street S – striped with special emphasis markings.
    - North leg of 3rd Street S (access to Flagler Beach Pier) –
        - This crosswalk has recently been reconstructed with bulb-outs for pedestrians to stand on the east and west sides of the roadway.

        - The crosswalk markings were upgraded from old special emphasis (continental style) markings to special emphasis (ladder style) markings.
    - South leg of 4th Street N – striped with special emphasis markings.
- Sidewalk present along the west side of the corridor. A boardwalk is present on the on the east side of the corridor from 8th Street S to 4th Street N connecting the south and north ends of Flagler Beach to the Flagler Beach Pier.
- No marked bike lanes are provided along the length of the study corridor, but a three to four foot paved shoulder is provided on the west side of the roadway. No paved shoulder is provided on the east side of the roadway except at locations where a dune crossing is present (this paved area is mainly for vehicles).
- On street head-in angle parking is located on the east side of the study corridor from 8th Street S to SR 100/Moody Boulevard. On street parallel parking is present along the west side of the study corridor from 6th Street S to 2nd Street S.
- Twenty-three (23) public or private beach accesses are provided along the length of the study corridor. The Flagler Beach Pier is located at 3rd Street S.
- Flagler County does not operate public transit along SR A1A within the study limits.
- Overhead street lighting is present on both sides of the roadway from 8th Street S to 4th Street N. Overhead street lighting with turtle shielding is present intermittently along the west side of the roadway along the remainder of the corridor.
- The corridor has experienced an average AADT of 7,250 over the last six years (2009-2014).

Crash History (2009 – 2014):

Six (6) years of available pedestrian and bicycle related crash data, 2009 to 2014, were utilized for the SR A1A crash analysis. Crash data was obtained from two sources: 1. The FDOT Crash Analysis Reporting System (CARS) database from 2009 to 2014 and 2. The Signal Four Analytics database was maintained by University of Florida from 2009 to 2014. The crashes from the Signal Four database supplemented the CARS data along SR A1A.

Seven (7) pedestrian or bicycle-related crashes were reported over the five-year study period, 57 percent of which involved pedestrians (4 crashes). All seven (7) pedestrian and bicycle crashes resulted in at least one injury.

Crash diagrams were created along the corridor to summarize the pedestrian/bicycle-related crash history. The crash diagrams are included in **Appendix A**. The pedestrian/bicycle crash data was also summarized by the crash metrics displayed in the charts in **Appendix A**. A summary of these metrics is provided below:

- Six (6) of the seven (7) crashes (86 percent) occurred in daylight lighting conditions.
- Three (3) of the seven (7) crashes (43 percent) during the months of September and October.
- Three (3) of the seven (7) crashes (43 percent) occurred on a Thursday and five (5) of the seven (7) crashes (72 percent) occurred between Thursday and Sunday.
- Five (5) of the seven (7) crashes occurred (72 percent) occurred after 2:00 PM.
- One (1) of the seven crashes (14 percent) involved alcohol.
- Five (5) of the seven (7) bicyclists or pedestrians (72 percent) were above the age of 55 and two (2) of the drivers (29 percent) were above the age of 70.

- Three (3) out of the seven (7) crashes (43 percent) occurred within the crosswalks at the SR 100/Moody Boulevard signalized intersection, with all three occurring when vehicles were turning left.
- Two (2) out of three (3) bicycle crashes (67 percent) occurred at a driveway/minor street when the bicycle was riding on the sidewalk against the flow traffic.
    - Three (3) of the seven (7) pedestrians and bicyclists (43 percent) were not from the local area based upon their provided zip codes.

FIELD REVIEW FINDINGS

Location: Corridor-Wide

Issue #1: Minor Street Intersections

Figure 2

Figure 3

Description of Issue:
Along the corridor, north of 6th Street N, the unsignalized minor street approaches do not include marked crosswalks and do not include detectable warning surfaces (**Figure 2**). The study team also noted some stop bars were beginning to wear along some of the minor street approaches along the corridor (**Figure 3**). Some of the minor street intersections did have crosswalk markings; however, some were also beginning to fade (**Figure 3**).

Suggestions for Improvement:
As a maintenance-type suggestion, consider emphasizing the pedestrian realm across minor stop-controlled intersection approaches by adding or restriping crosswalk markings (standard or special emphasis to be determined on a case-by-case basis) as shown on sheet 12 of FDOT Design Standard Index 17346.

Consider installing detectable warning surfaces at minor street intersections along the corridor per FDOT Design Standard Index 304.

The City is planning on restriping all stop bars along SR A1A with thermoplastic pavement markings. The City could consider restriping minor street stop bars and double yellow lines as shown on sheet 7 of FDOT Design Standard Index 17346.

Location: Corridor-Wide

Issue #2: Beach Parking

Figure 4

Figure 5

Figure 6

Figure 7

Description of Issue:

There are different types of beach parking along the study corridor and parking is offered on both the east and west sides of SR A1A in most locations. Angle parking is provided between 8th Street S and SR 100 (as illustrated in **Figure 4**) and parallel parking is provided north of SR 100 (as shown in **Figure 5**). The parking to the south of SR 100 is primarily angle parking, but parking spaces are not defined. The study team also observed higher utilization of the parking spaces on the east side (beach side) of SR A1A compared to the utilization of the parking spaces on the west side of the roadway.

Along the east side of SR A1A, drop offs were observed between the sand parking areas and the shoulder (see **Figure 6** and **Figure 7**). This poses a hazard for bicyclists traveling in the shoulder. Vehicles were observed “bottoming out" on the drop off. This also serves as a distraction for drivers as they may be focused on maneuvering their vehicles onto the roadway without paying attention to potential bicyclists or pedestrians walking in the parking area or traveling along the shoulder.

Suggestions for Improvement:

As a near-term improvement, consider converting the parking areas along the east side of SR A1A south of SR 100 to lattice style parking areas. The lattice style parking area has been implemented on adjacent city roads with an example provided in **Figure 8**. Implementing this parking area style along the corridor would reduce the risk of bicyclists dropping off into the sand. This also provides a more consistent and level parking area for beach patrons. Providing the lattice style parking area would provide better drainage than paving over the sand with impervious asphalt or concrete.

Figure 8

Location: Corridor-Wide

Issue #3: Mid-Block Crossings

Figure 9

Figure 10

Figure 11

Description of Issue:
There are several beach accesses along the study corridor. At some of the access points, a marked crosswalk is provided to facilitate non-motorists across SR A1A (**Figure 9**). An example of dune crossover without a marked crosswalk is provided in **Figure 10**. Three of the seven pedestrian/bicycle crashes occurred with a pedestrian/bicyclist crossing SR A1A at or near a beach access point. Even though the roadway is only two lanes wide, the relatively high traffic volumes during peak beach times makes it difficult for pedestrians to judge gaps when trying to cross the roadway (**Figure 11**).

Suggestions for Improvement:
The study team discussed crosswalk locations along the corridor and considered evaluating the following locations for new crosswalks or maintenance-type improvements to existing crossings:

- 8th Street S (existing crosswalk)
    - Consider adding advanced pedestrian warning signage (W11-2 and W16-9P) along the northbound and southbound approaches to the crossing.
- 6th Street S or 5th Street S (new crosswalk)
- 4th Street N (existing crosswalk)
    - Consider relocation of the southbound pedestrian warning sign to the southwest corner as it is currently blocked by a business sign.
    - Consider adding advanced pedestrian warning signage (W11-2 and W16-9P) along the northbound approach to the crossing.

In addition to the maintenance-type suggestions noted above, the team discussed a tiered approach to enhancing the mid-block crossings if the desired performance (crash mitigation/reduction and/or vehicle yield compliance) was not obtained with the current tier suggestions:

Tier 1 – 6th Street S or 5th Street S Only

- Conduct a mid-block crossing study per Section 3.8 of the FDOT *Traffic Engineering Manual (TEM)* to evaluate if a crosswalk is warranted based upon existing demands.
- If warranted, consider removing one parking space in the northeast corner and extending the concrete landing area so a crosswalk can be added on the north leg of the intersection.
- If warranted, stripe the crosswalk with special emphasis crosswalk markings consistent with sheet 13 of the FDOT Design Index 17346.
- If warranted, install advanced pedestrian warning signage (W11-2 and W16-9P) consistent with sheet 13 of the FDOT Design Index 17346 to indicate a pedestrian crossing is ahead.

Tier 2 – 8th Street S, 6th Street S or 5th Street S, and 4th Street N

- Provide a median refuge island with a minimum length of 90 feet for pedestrians.
    - The roadway would have to be widened to fit the refuge island between the northbound and southbound lanes but this impact could be minimized by reducing the travel lanes to be 11' wide.
- Consider replacing the standard yellow background pedestrian warning signs with those having the fluorescent yellow-green background with Type 11 sheeting.
- Install crosswalk specific lighting.
    - Directional lighting oriented towards the crosswalk could be provided on the east side; or
    - LED lighting could turn on when the traffic control device is activated and could turn off when the traffic control device is not active.

Tier 3 – 8th Street S, 6th Street S or 5th Street S, and 4th Street N

- Install an active traffic control warning device. The following active traffic control devices could be considered based upon a mid-block crossing study:
    - Rectangular Rapid Flashing Beacons (RRFBs);
    - Pedestrian Hybrid Beacon; or
    - Pedestrian Traffic Signal.

Location: Corridor-Wide

Issue #4: Signage

Figure 12

Figure 13

Description of Issue:
The street signs along the corridor to the north of SR 100 were beginning to fade and crack, had a varying letter height, and lacked retro reflectivity, as displayed in **Figure 12** and **Figure 13**. Differences in street name sizes and lack of retro-reflectivity may impact the driver or non-motorist expectancy. Conflicts may occur at night if a vehicle is driving slowly trying to find a specific street and a following vehicle gets impatient and decides to pass them. If a pedestrian is attempting to cross the roadway at the same time, the passing driver may not see the pedestrian causing a pedestrian related crash.

Suggestions for Improvement:
The City indicated they are working towards replacing the street signs with 9" lettering within the City limits. Consider coordinating with the City to prioritize replacing old and faded signs with new street name signage (**D3-1**). Also, in the near-term, consider a signage study/plan for the study corridor to evaluate the amount of signage, applicability, retro-reflectivity, and location along the study corridor. This signage study/plan should include replacing the older signs with signs meeting current standards.

Location: Corridor-Wide

Issue #5: Lack of Bicycle Facilities

Figure 14

Figure 15

Figure 16

Description of Issue:
The study team observed a lack of formal bicycle facilities along SR A1A within the project limits. In some locations along the east side of the roadway, there is a paved shoulder; however, the effective width varies as sand and parked vehicles use part of the shoulder (see **Figure 14**). On the west side of the roadway, an approximate 4'-5' shoulder is present along the length of the study limits. The study team observed bicyclists riding off the roadway either on the sidewalk (**Figure 15**) or along the boardwalk on the east side of SR A1A (**Figure 16**). Three bicycle crashes occurred during the crash analysis period with one bicyclist crossing SR A1A and two traveling on the sidewalk against the flow of traffic being struck at driveways/minor street intersections.

Suggestions for Improvement:
The team discussed installing bicycle lanes along SR A1A. The parking spaces along the west side of SR A1A are less utilized and could provide opportunity for bicycle lanes without the need to widen SR A1A.

The City would be in support of removing some parking spots along the west side of the roadway to add bicycle lanes. In the near-term, consider conducting a study to evaluate the feasibility of removing parking spaces and implementing Complete Streets-type enhancements along the corridor.

The sidewalk on the west side of SR A1A is part of the Florida Shared-Use, Nonmotorized (SUN) Trail network. As a long-term improvement, consider reconstructing the sidewalk on the west side of the roadway to be a 10'-12' wide shared-use path. As noted previously, the lack of bicycle facilities along the study corridor encourages a lot of bicyclists to utilize the sidewalk. In order to accommodate both the bicycle and pedestrian traffic in the area, a wider shared-use path would serve both of those modes.

Location: Corridor-Wide

Issue #6: Lighting

Figure 17

Figure 18

Figure 19

Figure 20

Description of Issue:
Flagler Beach is a destination for sea turtle nesting. The sea turtle nesting season is from May 1 to October 31. **Figure 17** and **Figure 18** show examples of 360 degree turtle shielding on overhead lights on both sides of the roadway to minimize light emittance. The reduced lighting conditions can make it difficult for drivers to see pedestrians or bicyclists at night, especially those wearing dark clothing. **Figure 19** illustrates the lighting levels the study team observed during the nighttime review. The lone nighttime crash occurred in June during turtle season.

Pedestrian-level lighting is present along the west side of the corridor. The study team noticed some of the pedestrian lighting needs maintenance. **Figure 20** shows an example of a pedestrian-level light cover hanging from the light fixture. This poses a risk for pedestrians or bicyclists walking/riding underneath the light fixture.

Suggestions for Improvement:
The following are considerations for lighting along the corridor:

- As a maintenance-type consideration, consider reviewing the pedestrian-level lighting fixtures along the corridor and replace any burnt out bulbs and reconnect any hanging covers.
- Consider conducting field measurements of existing lighting levels to evaluate lighting uniformity levels and add lighting where necessary. Consider implementing a lighting plan for the time the sea turtle nesting season is not active as roadway lighting levels should not be reduced at this time.
- As a long-term consideration, consider upgrading to an adaptive roadway lighting system along the corridor. Lighting levels could be programmed to be reduced during the sea turtle nesting season and increased to normal levels outside of the nesting season. This could be coupled with replacing the current high pressure sodium lighting with LED lighting.

Location: Corridor-Wide

Issue #7: Sight Distance

Figure 21

Figure 22

Description of Issue:
The study team observed the stop bars at the minor streets to be set back 10'-20' from the edge of the travel lane, as displayed on **Figure 21**. The stop bar is set back due to the location of the sidewalk but this creates sight distance issues for vehicles turning from the minor street. The sight distance was observed to be restricted by a variety of things such as buildings (restaurant on the southwest corner of 5th Street S shown in **Figure 21**), business signs, or on-street parking along SR A1A (**Figure 22**). Because the sight distance is restricted, vehicles were seen driving through the stop bar and stopping near the roadway across either the marked or unmarked crosswalk. This creates a conflict with pedestrians and bicyclists who may be attempting to cross the minor street as a vehicle is turning onto SR A1A.

Suggestions for Improvement:
Consider moving the stop bars to be the minimum of 4' away from the marked crosswalks discussed in **Issue #1: Minor Street Intersections**, per sheet 7 of FDOT Design Standard Index 17346. Another consideration is to conduct a sight distance study along the corridor to evaluate whether on-street parking spaces are restricting sight distance. Removal of select parking spaces along the west side of SR A1A in conjunction with the considerations of **Issue #5: Lack of Bicycle Facilities** could help alleviate sight distance issues.

Location: Corridor-Wide

Issue #8: Sidewalk Maintenance

Figure 23

Figure 24

Figure 25

Figure 26

Description of Issue:
There were several locations along both sides of the corridor where landscaping encroaches onto the sidewalk (**Figure 23** and **Figure 24**) or where sand has built up onto the sidewalk or detectable warning surfaces (**Figure 25** and **Figure 26**). This was especially apparent just north of 8th Street N, just south of SR 100, and for the curb ramps coming from the boardwalk at 2nd Street N. The landscaping restricts the effective width of the sidewalk and the sand build up creates a trip hazard and reduces the effectiveness of the detectable warning surfaces to visually impaired users.

Suggestions for Improvement:
Consider coordinating with FDOT to trim the obstructions and encourage better sidewalk and landscape maintenance along the entire length of the study corridor. Consider creating a routine maintenance schedule to remove sand from the sidewalks and pedestrian warning surfaces.

Location: 9th Street S to 8th Street S

Issue #9: Shoulder Width

Figure 27

Figure 28

Description of Issue:
The study team noted the shoulder width along the east side of the roadway is approximately 3 feet wide between 9th Street S and 8th Street S. As shown in **Figure 27** and **Figure 28**, the shoulder widens to 5 feet approximately 75' south of 8th Street S. Most bicycle riders do not feel comfortable riding alongside traffic within a 3-foot wide shoulder. Instead, bicyclists may be inclined to take part of the lane, potentially causing vehicular drivers to become impatient and attempt to make unsafe passing maneuvers.

Suggestions for Improvement:
In the near-term, consider widening the shoulder to provide a consistent width for bicyclists. In the long-term, consider bicycle lanes or a shared-use path as introduced in **Issue #5: Lack of Bicycle Facilities**.

Location: Shell Gas Station just South of 7th Street S

Issue #10: Driveway Widths

Figure 29

Description of Issue:
The gas station on the southwest corner of 7th Street S has four driveway accesses (three along SR A1A and one along 7th Street S). These driveways are relatively wide (**Figure 29**) and create a large conflict area between non-motorists using the sidewalk and vehicles turning into and out of the driveway. Vehicles were observed stopping on the sidewalk prior to turning onto SR A1A.

Suggestions for Improvement:
Consider driveway reconstruction during the roadway's next 3R project to reduce the driveway widths down to the 36' maximum per FDOT Standard Index 515. Also as part of this future 3R project, consider eliminating/consolidating unused driveways for the gas station.

Location: Between 6th Street S and 5th Street S

Issue #11: Landscape Maintenance

Figure 30

Figure 31

Description of Issue:
Figure 30 and **Figure 31** illustrate a 30 MPH speed limit sign on the east side of SR A1A between 6th Street S and 5th Street S. The signage is obstructed by a palm tree.

Suggestions for Improvement:
As a maintenance-type treatment, consider coordinating with FDOT or the City to trim the tree so the sign is visible to motorists.

Location: SR A1A at 5th Street S

Issue #12: Sidewalk Width

Figure 32

Figure 33

Description of Issue:
During the review, the study team observed concrete landscaping blocks encroaching into the sidewalk and curb ramp on the southwest corner of 5th Street S. These landscaping features restrict the no turning space at the top of the ramp as displayed in **Figure 32** and **Figure 33**. A person in a wheelchair would not be able to travel around this corner while staying on the sidewalk/pedestrian warning surface and would have to navigate themselves into the roadway or gutter.

Suggestions for Improvement:
Consider reviewing right-of-way (ROW) on this corner and if applicable, coordinate with the property owner to relocate the landscaping features within their (ROW). This could help provide adequate sidewalk and curb ramp widths so non-motorists aren't forced to travel into the roadway and/or gutter.

Location: SR A1A at SR 100/Moody Boulevard

Issue #13: Adjacent Intersection Parking

Figure 34

Figure 35

Description of Issue:
Parking is restricted on the northeast corner of the SR A1A/SR 100 intersection as illustrated in **Figure 34** and is intended for emergency vehicles. City staff indicated that beach patrons still park in this area.

Parking is allowed southeast of the intersection; however, the study team observed southbound vehicles stopping along SR A1A to wait for a gap to turn left into the parking spaces (**Figure 35**). This creates not only an operational issue at the intersection, but also creates a conflict with bicyclists riding in the northbound direction on the shoulder.

Suggestions for Improvement:
Consider formalizing the emergency vehicle area by paving an asphalt surface and applying yellow striping. Also, consider increased enforcement of the emergency vehicle parking area to dissuade the general public from parking or unloading their vehicles at this location.

As a near-term improvement, consider removing some of the parking spots southeast of the intersection. If removal of beach parking is not desired, consider constructing a raised median extending south of SR 100 to restrict the southbound left-turn movements into the beach parking spaces.

Location: SR A1A at SR 100/Moody Boulevard

Issue #14: Vehicle/Pedestrian Crosswalk Conflicts

Figure 36

Figure 37

Description of Issue:
Three of the seven (43 percent) pedestrian crashes along the study corridor occurred at the intersection of SR A1A and SR 100. All three crashes occurred within the crosswalk (two on the west leg and one on the north leg) and involved left-turning vehicles. As shown in **Figure 36** and **Figure 37**, the northbound left-turn signal phasing is protected/permitted phasing. During the permitted northbound left-turn phase the pedestrian walk phase is active for the west leg crosswalk and vehicles must yield to pedestrians in the crosswalk.

Suggestions for Improvement:
As a maintenance-type improvement, consider installing Turning Vehicles Yield to Pedestrian (**R10-15**) signage on the mast arms next to the left-turn signal head for the northbound and westbound left-turn movements. In the near-term, consider programming a leading pedestrian interval phase on the north and west legs. This will allow pedestrians to enter the crosswalk prior to the vehicle phases. The leading interval can result in increased visibility of the non-motorist in the crosswalk. Signal phasing may need to be reviewed and adjusted to allow for this leading pedestrian interval phase.

Location: SR A1A at SR 100/Moody Boulevard

Issue #15: Pedestrian Pushbutton Accessibility

Description of Issue:
The study team noted the pedestrian pushbutton faces on the southwest, northeast, and southwest corners are positioned perpendicular to the crosswalk to be used. Guidance in section 4E.08 of the 2009 *Manual on Uniform Traffic Control Devices (MUTCD)* indicates pedestrian pushbuttons should be located with the face of the pushbutton parallel to the crosswalk to be used.

The pushbuttons on the northwest corner (to cross the north and west legs) are located on one pedestrian signal pedestal; however, the pushbutton for the north leg is more than ten feet from pedestrian ramp, exceeding Public Right of Way Access Guidelines (PROWAG) guidance.

Suggestions for Improvement:
As a near-term improvement, consider installing new pedestals on the northwest corner within ten feet of the pedestrian ramps. Consider installing new pushbuttons oriented with the faces parallel to the crosswalk on the southwest, northeast, and southeast corners.

Location: Between 2nd Street N and 3rd Street N

Issue #16: Landscape Maintenance

Figure 38

Description of Issue:
Roadside landscaping obstructs the 35 MPH speed limit sign on the east side of SR A1A between 2nd Street N and 3rd Street N as displayed in **Figure 38**.

Suggestions for Improvement:
As a maintenance-type treatment, consider coordinating with FDOT maintenance to trim the tree.

Location: 3rd Street N to 13th Street N

Issue #17: Utility Poles

Figure 39

Figure 40

Description of Issue:
The study team observed utility poles located within the western sidewalk from 3rd Street N to the end of the study limits at 13th Street N. Examples are shown in **Figure 39** and **Figure 40**. The pole locations still provide adequate effective sidewalk widths; however, they are potential conflicts to non-motorists using the sidewalk.

Suggestions for Improvement:
As a long-term improvement, consider relocating the poles to be at the front or back of the sidewalk as the poles are replaced as part of scheduled maintenance.

Location: 4th Street N to 13th Street N

Issue #18: Formalize Intersection Turning Radii

Figure 41

Figure 42

Figure 43

Description of Issue:
The intersection turning radii on the northwest and southwest corners from 4th Street N to 13th Street N are flush with the roadway. As shown in **Figure 41** and **Figure 42**, sand and debris is tracked onto the crosswalks and detectable warning surfaces because of this. The lack of curb and gutter has also allowed for pooling of water onto the sidewalk, forcing non-motorists to walk or bike through or around the puddles (**Figure 43**).

Suggestions for Improvement:
As a long-term improvement, consider formalizing the intersection turning radii at these intersections with a curb and gutter. Installing curb and gutter also allows for the opportunity to create bulb-outs, reducing the distance pedestrians need to cross. Curb and gutter will also help to minimize for potential vehicle off-tracking and water pooling.

Location: Between 8th Street N and 9th Street N

Issue #19: Sidewalk Rehabilitation

Figure 44

Description of Issue:
Approximately 100 feet south of 9th Street N the sidewalk transitions from concrete to asphalt. There are several potholes within this stretch of asphalt sidewalk as illustrated in **Figure 44**. These create a potential trip hazard for non-motorists using the sidewalk.

Suggestions for Improvement:
As a maintenance-type improvement, consider patching the potholes. As a long-term improvement, consider removing the asphalt sidewalk and reconstructing the sidewalk in this section with concrete to provide a consistent surface throughout the corridor.

Summary of Suggestions

This pedestrian/bicycle safety review considers operational and safety related issues for pedestrians and bicyclists on SR A1A from 9th Street S to 13th Street N. This study was commissioned by the Florida Department of Transportation (FDOT) District Five in coordination with the River to Sea Transportation Planning Organization (R2CTPO) 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:

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

The following Short-Term Maintenance suggestions should be prioritized for implementation before the other suggestions identified in this report:

- Issue #8: Sidewalk Maintenance on page 17
- Issue #19: Sidewalk Rehabilitation on page 28

The following tables summarize the suggestions of this study by priority (maintenance, near-term, or long-term).

Location	Issue Number	Issue	Suggestion
SHORT-TERM MAINTENANCE			
Corridor Wide	1	Minor Street Intersections	Consider emphasizing the pedestrian realm across minor stop controlled intersection approaches by adding or restriping crosswalk markings (standard or special emphasis to be determined on a case-by-case basis) as shown on sheet 9 of FDOT Design Standard Index 17346. Consider installing detectable warning surfaces at minor street intersections along the corridor per FDOT Design Standard Index 304. The City could consider restriping minor street stop bars and double yellow lines as shown on sheets 2 and 4 of FDOT Design Standard Index 17346.
Corridor Wide	3	Mid-Block Crossings	8th Street S (existing crosswalk) o Consider adding advanced pedestrian warning signage (W11-2 and W16-9P) along the northbound and southbound approaches to the crossing. 4th Street N (existing crosswalk) o Consider relocation of the southbound pedestrian warning sign to the southwest corner as it is currently blocked by a business sign. o Consider adding advanced pedestrian warning signage (W11-2 and W16-9P) along the northbound approach to the crossing.
Corridor Wide	6	Lighting	Consider reviewing the pedestrian-level lighting fixtures along the corridor and replace any burnt out bulbs and reconnect any hanging covers.
Corridor Wide	7	Sight Distance	Consider moving the stop bars to be the minimum of 4' away from the marked crosswalks discussed in **Issue #1: Minor Street Intersections**, per sheets 2 and 4 of FDOT Design Standard Index 17346.
Corridor Wide	8	Sidewalk Maintenance	Consider coordinating with FDOT to trim the obstructions and encourage better sidewalk and landscape maintenance along the entire length of the study corridor. Consider creating a routine maintenance schedule to remove sand from the sidewalks and pedestrian warning surfaces.
Between 6th Street S and 5th Street S	11	Landscape Maintenance	Consider coordinating with FDOT or the City to trim the tree so the sign is visible to motorists.
SR A1A at SR 100	14	Vehicle/Pedestrian Crosswalk Conflicts	Consider installing Turning Vehicles Yield to Pedestrian (**R10-15**) signage on the mast arms next to the left-turn signal head for the northbound and westbound left-turn movements.
Between 2nd Street N and 3rd Street N	16	Landscape Maintenance	Consider coordinating with FDOT maintenance to trim the tree.
Between 8th Street N and 9th Street N	19	Sidewalk Rehabilitation	Consider patching the potholes in the asphalt sidewalk

Location	Issue Number	Issue	Suggestion
NEAR-TERM IMPROVEMENT			
Corridor Wide	2	Beach Parking	Consider converting the parking areas along the east side of SR A1A south of SR 100 to lattice style parking areas. The lattice style parking area has been implemented on adjacent city roads with an example provided in **Figure 8**. Implementing this parking area style along the corridor would reduce the risk of bicyclists dropping off into the sand. This also provides a more consistent and level parking area for beach patrons. Providing the lattice style parking area would provide better drainage than paving over the sand with impervious asphalt or concrete.

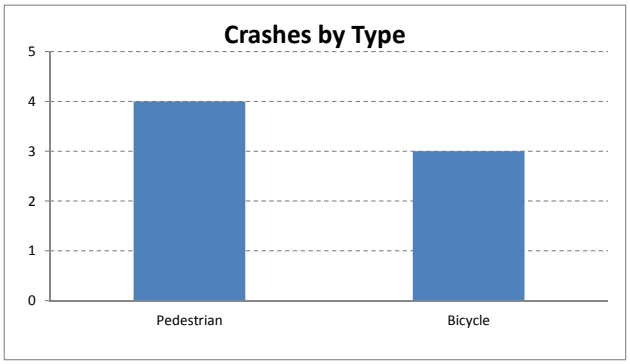
Location	Issue Number	Issue	Suggestion
NEAR-TERM IMPROVEMENT			
Corridor Wide	3	Mid-Block Crossings	The team discussed a tiered approach to enhancing the mid-block crossings if the desired performance (crash mitigation/reduction and/or vehicle yield compliance) was not obtained with the current tier suggestions: **Tier 1 – 6th Street S or 5th Street S Only** • Conduct a mid-block crossing study per Section 3.8 of the FDOT Traffic Engineering Manual (TEM) to evaluate if a crosswalk is warranted based upon existing demands. • If warranted, consider removing one parking space in the northeast corner and extending the concrete landing area so a crosswalk can be added on the north leg of the intersection. • If warranted, stripe the crosswalk with special emphasis crosswalk markings consistent with sheet 10 of the FDOT Design Index 17346. • If warranted, install advanced pedestrian warning signage (W11-2 and W16-9P) consistent with sheet 10 of the FDOT Design Index 17346 to indicate a pedestrian crossing is ahead. **Tier 2 – 8th Street S, 6th Street S or 5th Street S, and 4th Street N** • Provide a median refuge island with a minimum length of 90 feet for pedestrians. o The roadway would have to be widened to fit the refuge island between the northbound and southbound lanes but this impact could be minimized by reducing the travel lanes to be 11' wide. • Consider replacing the standard yellow background pedestrian warning signs with those having the fluorescent yellow-green background with Type 11 sheeting. • Install crosswalk specific lighting. o Directional lighting oriented towards the crosswalk could be provided on the east side; or o LED lighting could turn on when the traffic control device is activated and could turn off when the traffic control device is not active. **Tier 3 – 8th Street S, 6th Street S or 5th Street S, and 4th Street N** • Install an active traffic control warning device. The following active traffic control devices could be considered based upon a mid block crossing study: o Rectangular Rapid Flashing Beacons (RRFBs); o Pedestrian Hybrid Beacon; or
Corridor Wide	4	Signage	Consider coordinating with the City to prioritize replacing old and faded signs with new street name signage (D3-1). Consider a signage study/plan for the study corridor to evaluate the amount of signage, applicability, retro-reflectivity, and location along the study corridor. This signage study/plan should include replacing the older signs with signs meeting current standards.
Corridor Wide	5	Lack of Bicycle Facilities	The parking spaces along the west side of SR A1A are less utilized and could provide opportunity for bicycle lanes without the need to widen SR A1A. The City would be in support of removing some parking spots along the west side of the roadway to add bicycle lanes. Consider conducting a study to evaluate the feasibility of removing parking spaces and implementing Complete Streets-type enhancements along the corridor.
Corridor Wide	6	Lighting	Consider upgrading to an adaptive roadway lighting system along the corridor. Lighting levels could be programmed to be reduced during the sea turtle nesting season and increased to normal levels outside of the nesting season. This could be coupled with replacing the current high pressure sodium lighting with LED lighting.
Corridor Wide	6	Lighting	Consider conducting field measurements of existing lighting levels to evaluate lighting uniformity levels and add lighting where necessary. Consider implementing a lighting plan for the time the sea turtle nesting season is not active as roadway lighting levels should not be reduced at this time.
Corridor Wide	7	Sight Distance	Consider conducting a sight distance study along the corridor to evaluate whether on street parking spaces are restricting sight distance.
9th Street S to 8th Street S	9	Shoulder Width	Consider widening the shoulder to provide a consistent width for bicyclists.
Shell Gas Station just South of 7th Street S	10	Driveway Widths	Consider driveway reconstruction during the roadway's next 3R project to reduce the driveway widths down to the 36' maximum per FDOT Standard Index 515. Also consider eliminating/consolidating unused driveways for the gas station.

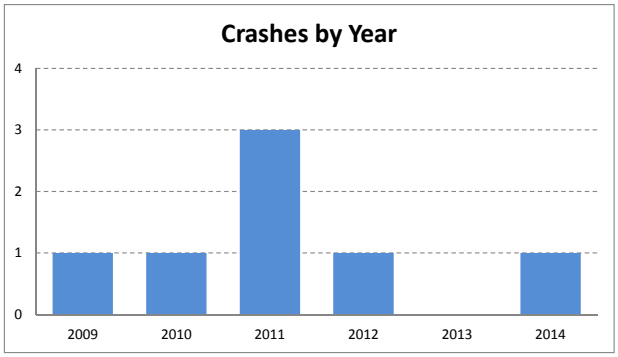
Location	Issue Number	Issue	Suggestion
NEAR-TERM IMPROVEMENT			
SR A1A at 5th Street S	12	Sidewalk Width	Consider reviewing right-of-way (ROW) on this corner and if applicable, coordinate with the property owner to relocate the landscaping features within their (ROW).
SR A1A at SR 100	13	Adjacent Intersection Parking	Consider formalizing the emergency vehicle area by paving an asphalt surface and applying yellow striping. Consider increased enforcement of the emergency vehicle parking area to dissuade the general public from parking or unloading their vehicles at this location. Consider removing some of the parking spots southeast of the intersection. If removal of beach parking is not desired, consider constructing a raised median extending south of SR 100 to restrict the southbound left-turn movements into the beach parking spaces.
SR A1A at SR 100	14	Vehicle/Pedestrian Crosswalk Conflicts	Consider programming a leading pedestrian interval phase on the north and west legs. Signal phasing may need to be reviewed and adjusted to allow for this leading pedestrian interval phase.
SR A1A at SR 100	15	Pedestrian Pushbutton Accessibility	Consider installing new pedestals on the northwest corner within ten feet of the pedestrian ramps. Consider installing new pushbuttons oriented with the faces parallel to the crosswalk on the southwest, northeast, and southeast corners.

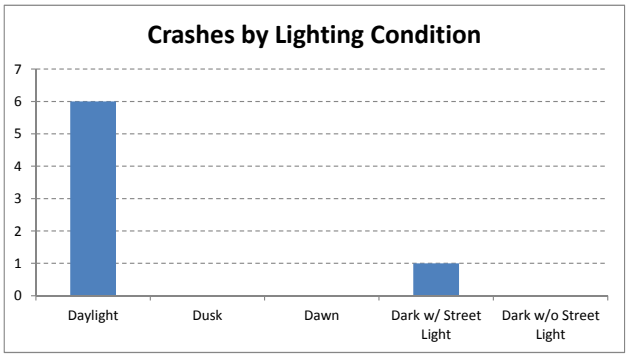
Location	Issue Number	Issue	Suggestion
LONG-TERM IMPROVEMENT			
Corridor Wide	5	Lack of Bicycle Facilities	Consider reconstructing the sidewalk on the west side of the roadway to be a 10'-12' wide shared-use path. As noted previously, the lack of bicycle facilities along the study corridor encourages a lot of bicyclists to utilize the sidewalk. In order to accommodate both the bicycle and pedestrian traffic in the area, a wider shared-use path would serve both of those modes.
Corridor Wide	6	Lighting	Consider upgrading to an adaptive roadway lighting system along the corridor. Lighting levels could be programmed to be reduced during the sea turtle nesting season and increased to normal levels outside of the nesting season. This could be coupled with replacing the current high pressure sodium lighting with LED lighting.
3rd Street N to 13th Street N	17	Utility Poles	Consider relocating the poles to be at the front or back of the sidewalk as the poles are replaced as part of scheduled maintenance.
4th Street N to 13th Street N	18	Formalize Intersection Turning Radii	Consider formalizing the intersection turning radii at these intersections with a curb and gutter. Installing curb and gutter also allows for the opportunity to create bulb-outs, reducing the distance pedestrians need to cross.
Between 8th Street N and 9th Street N	19	Sidewalk Rehabilitation	Consider removing the asphalt sidewalk and reconstructing the sidewalk in this section with concrete to provide a consistent surface throughout the corridor.

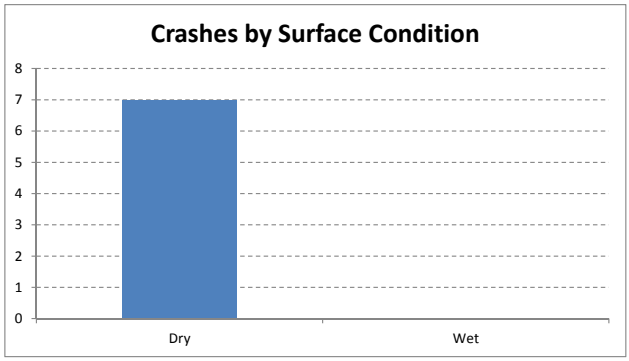
Appendix A – Crash Analysis Reference Materials

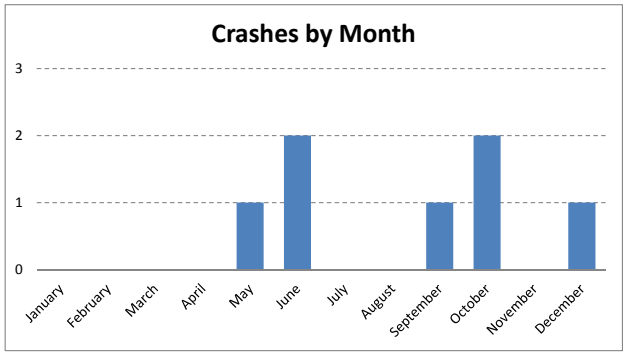
CRASH ANALYSIS - Focus Area H - Flagler Beach from 9th St. S to 13th St. N

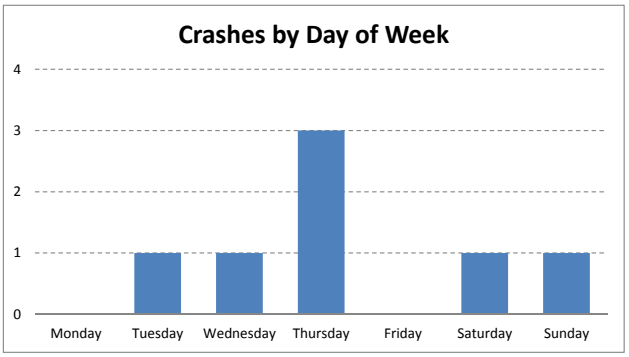


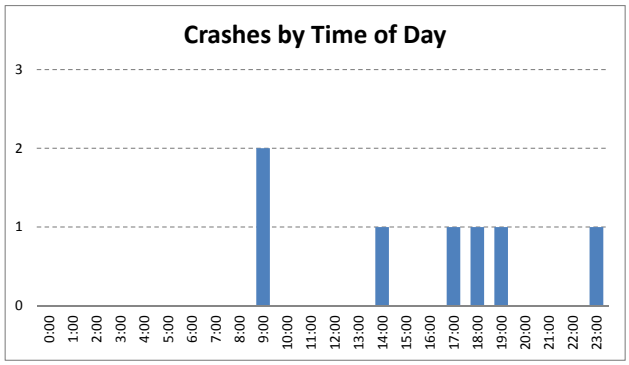


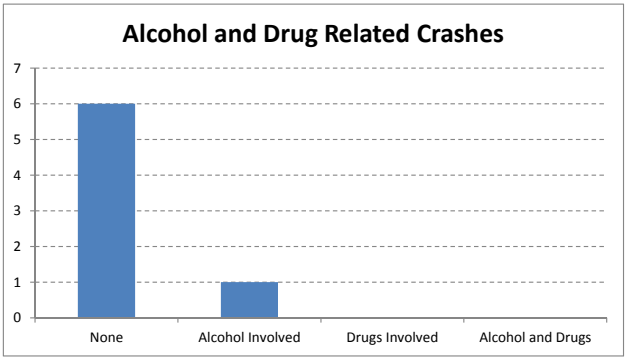




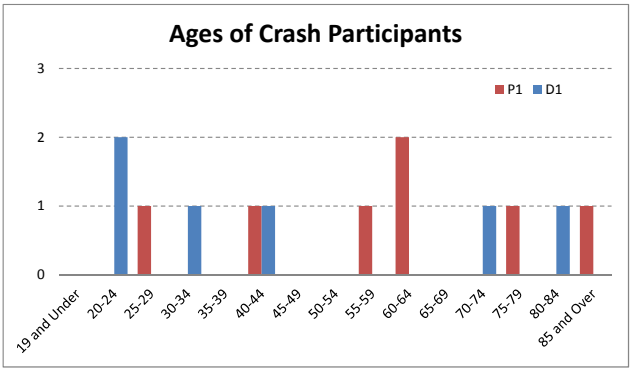


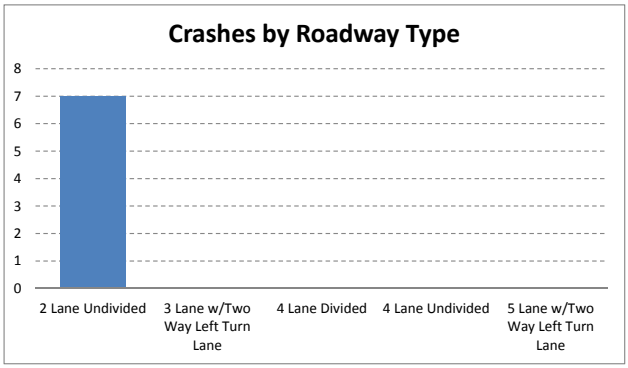


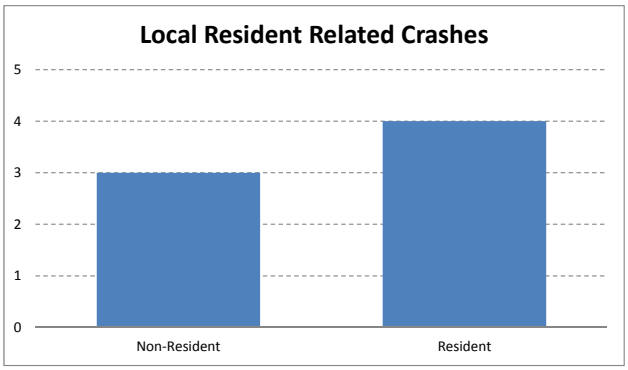




CRASH ANALYSIS - Focus Area H - Flagler Beach from 9th St. S to 13th St. N







SR/CR A1A Pedestrian Safety & Mobility Study
Collision Diagram (2009 – 2014)
Location H: S 9th St. to S 6th St.

Figure **1**

SR/CR A1A Pedestrian Safety & Mobility Study
Collision Diagram (2009 – 2014)
Location H: S 6th St. to S 3rd St.

Figure **2**

SR/CR A1A Pedestrian Safety & Mobility Study
Collision Diagram (2009 – 2014)
Location H: S 3rd St. to N 2nd St.

Figure **3**

SR/CR A1A Pedestrian Safety & Mobility Study
Collision Diagram (2009 – 2014)
Location H: to N 2nd St. to N 4th St.

Figure **4**

SR/CR A1A Pedestrian Safety & Mobility Study
Collision Diagram (2009 – 2014)
Location H: N 4th St. to N 7th St.

Figure **5**

SR/CR A1A Pedestrian Safety & Mobility Study
Collision Diagram (2009 – 2014)
Location H: N 7th St. to N 9th St.

Figure **6**

SR/CR A1A Pedestrian Safety & Mobility Study
Collision Diagram (2009 – 2014)
Location H: N 9th St. to N 11th St.

Figure **7**

SR/CR A1A Pedestrian Safety & Mobility Study
Collision Diagram (2009 – 2014)
Location H: N 12th St. to N 13th St.

Figure **8**