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

SR/CR A1A PEDESTRIAN SAFETY & MOBILITY STUDY

PEDESTRIAN / BICYCLE SAFETY REVIEW

Focus Area C / International Speedway Boulevard to South of Earl St. and
North of Oakridge Boulevard to North of University Boulevard (Daytona Beach)

Prepared for:
River to Sea Transportation Planning Organization
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October 2016

SR/CR A1A
Pedestrian Safety & Mobility Study

Pedestrian/Bicycle Safety Review Report for
Focus Area C: SR A1A from International Speedway Boulevard to just south of Earl Street and Just north of Oakridge Boulevard to just north of University Boulevard (Daytona Beach)

Section Number: 79080000
Mile Post: 1.407 – 2.003 and 2.298 – 2.998
Volusia County

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

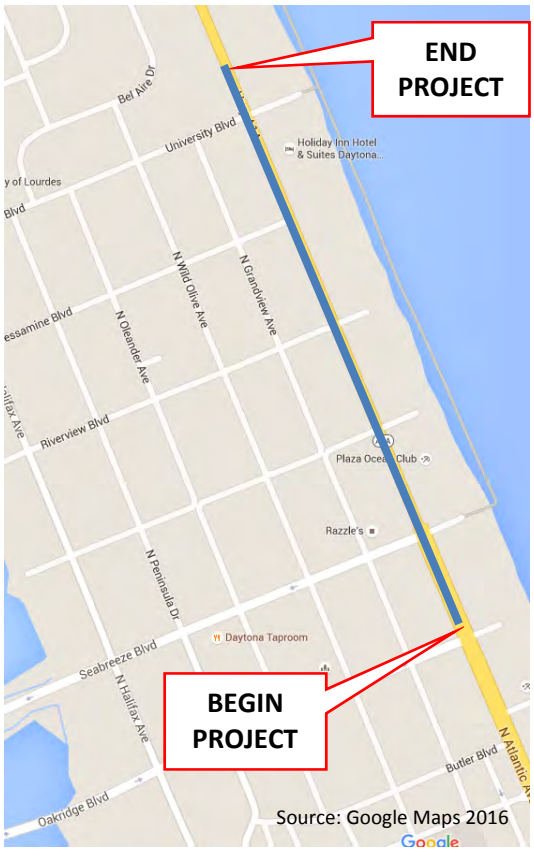
Field Review Dates: February 25th and 26th, 2016 (daytime/nighttime reviews and follow up meeting)

Participants:
Ryan Cunningham – Kittelson & Associates, Inc. – Team Leader
Stephan Harris – River to Sea Transportation Planning Organization
Chad Lingenfelter – Florida Department of Transportation, District 5 (February 25th only)
Joan Carter – Florida Department of Transportation, District 5
Jon Cheney – Volusia County (February 25th only)
Tracy Manning – City of Daytona Beach
Reed Berger – City of Daytona Beach
Officer Jason Kilker – Daytona Beach PD (February 25th only)
Heather Blanck - VoTran
Michael Eagle – Kittelson & Associates, Inc.

Project Characteristics:
Field Review Type: Pedestrian, Bicycle, Existing Road
Adjacent Land Use: Urban, Commercial, Hotels, Residential
Posted Speed Limit: 35 miles per hour (mph) along the length of the study corridor
Opposite Flow Separation: Raised median from International Speedway Boulevard to Earl Street and from Oakridge Boulevard to Seabreeze Boulevard, center two-way left-turn lane (TWLTL) from Seabreeze Boulevard to just north of University Boulevard
Service Function: Urban Principal Arterial
Terrain: Flat
Climatic Conditions: Sunny, Warm

Source: Google Maps 2016

Figure 1 – Focus Area C Study Corridor: South Section



Source: Google Maps 2016

Figure 2 – Focus Area C Study Corridor: North Section

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 International Speedway Boulevard to just south of Earl Street (**Figure 1**) and just north of Oakridge Boulevard to just north of University Boulevard (**Figure 2**) in Daytona Beach was identified as one of these high crash locations (the 0.31-mile segment between the north and south sections was the subject of a 2014 pedestrian safety audit commissioned by FDOT). 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 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 R2CTPO staff and partner agencies (i.e. FDOT District Five (D5), Volusia County, Daytona Beach, VoTran, 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 February 25th, 2016. The team met in the morning at the Daytona Beach City Hall 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 then walked the length of sidewalk along the east and west sides of the roadway. The team reassembled in the evening, after sunset, to make observations in nighttime conditions. A follow-up debrief meeting was held at Daytona Beach City Hall the following morning (February 26th) to discuss the corridor's issues and potential improvements identified by the team. Study corridor characteristics are reviewed below:

International Speedway Boulevard to just south of Earl Street – 0.60 miles

- Typical cross section is a four-lane, divided roadway;
- The posted speed along the study corridor limits is 35 MPH;
- Four (4) signalized intersections at International Speedway Blvd., Harvey Ave., Main St., and Auditorium Blvd.:
    - International Speedway Blvd.
        - Standard crosswalk markings in textured pavement on all four legs.
    - Harvey Ave.
        - Standard crosswalk markings in textured pavement along the south, east, and west legs.
    - Main St.
        - Standard crosswalk markings in textured pavement along all four legs
    - Auditorium Blvd.
        - Standard crosswalk markings in textured pavement along all four legs.
- There is a marked unsignalized crossing on the north leg of the intersection of SR A1A and Kemp St.;
    - The crosswalk is marked with concrete pavers;
    - The roadway median allows for a two-stage crossing;
    - Pedestrian warning surfaces are located at the edges of the roadway;
    - A Pedestrian Warning sign (W11-2) and downward arrow plaque (W16-7P) are present on the right side of each roadway approach;
    - Crosswalk lighting is present on the east side of the crosswalk;
- Continuous sidewalks along both sides of the roadway for the length of the study corridor;
- No bicycle lanes are provided along the length of the study corridor;
- Type F curb and gutter along the length of the study corridor;
- Votran, Volusia County's public transit system, serves SR A1A within the study limits;
- Overhead street lighting is present along both sides of the study corridor; and
- The study corridor has experienced an average AADT of 16,600 over the last six years (2009-2014).

Just north of Oakridge Boulevard to just north of University Boulevard – 0.70 miles

- Typical cross section as follows:
    - Four-lane, divided roadway from Oakridge Blvd. to Seabreeze Blvd.;
    - Five-lane roadway with a center two-way left-turn lane (TWLTL) from Seabreeze Blvd. to north of University Blvd.;
- The posted speed along the study corridor limits is 35 MPH;
- Two (2) signalized intersections at Seabreeze Blvd. and University Blvd.:
    - Seabreeze Blvd.
        - Standard crosswalk markings in textured pavement along all four legs.
    - University Blvd.
        - Old special emphasis crosswalk markings along all four legs.
- There is a marked unsignalized crossing on the north and south legs of the intersection of SR A1A and Glenview Blvd. that provides crossing to a public beach access;
    - The crosswalks are marked with concrete pavers;
    - Pedestrian warning surfaces are located at the edges of the roadway;

    - Crosswalk lighting is present on the east side of the crosswalk;
- There is a marked unsignalized crossing on the north and south legs of the intersection of SR A1A and Riverview Blvd. that provides crossing to a public beach access;
    - The crosswalks are marked with concrete pavers;
    - Pedestrian warning surfaces are located at the edges of the roadway;
    - Crosswalk lighting is present on the east side of the crosswalk;
- Continuous sidewalks along both sides of the roadway for the length of the study corridor;
- No bicycle lanes are provided along the length of the study corridor;
- Type F curb and gutter along the length of the study corridor;
- Votran, Volusia County's public transit system, serves SR A1A within the study limits;
- Overhead street lighting is present along both sides of the study corridor; and
- The study corridor has experienced an average AADT of 17,850 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 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 additional crashes from the Signal Four database supplemented the CARS data along SR A1A.

The two sections below summarize the crashes for the south section (International Speedway Boulevard to just south of Earl Street) and the north section (just north of Oakridge Boulevard to just north of University Boulevard) of the study corridor.

SR A1A South Section

Eleven (11) pedestrian or bicycle-related crashes were reported in the South Section over the six-year study period, nine (9) of which involved pedestrians. Of the eleven (11) pedestrian and bicycle crashes, there were no fatal crashes and seven (7) injury crashes (64 percent) during the study period.

Crash diagrams were created along the SR A1A South Section 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, signalized intersection crashes, and locations with more than one crash, are provided below:

- Seven (7) of the eleven (11) crashes occurred in dark lighting conditions;
- All crashes occurred under dry roadway conditions;
- There was at least one crash each year during the study period. Four (4) of the eleven (11) crashes occurred in 2011, the year that experienced the lowest Average Annual Daily Traffic (AADT) during the six-year study period. The corridor has experienced an average AADT of 17,500 over the six year analysis period;
- The months with the highest number of crashes were April (3 crashes), March (2 crashes), and October (2 crashes);

- At least one crash occurred each day of the week. Three (3) crashes occurred on Sunday, two (2) crashes occurred on Saturday, and two (2) crashes occurred on Monday;
- Five (5) crashes occurred between 6:00 PM and 9:00 PM and four (4) crashes occurred between 12:00 AM (midnight) and 1:00 AM;
- Eight (8) of the pedestrians or bicyclists were from the state of Florida based upon their provided zip codes, one (1) pedestrian was from outside of the state of Florida, and zip codes were not reported for two (2) of the pedestrians or bicyclists;
- Two (2) the reported crashes involved alcohol;
- The pedestrian had the right-of-way in six (6) of the nine (9) pedestrian crashes;
- The vehicle had the right-of-way in both bicycle crashes;
- In four (4) of the crashes, the pedestrian was attempting to cross SR A1A at a signalized intersection in the crosswalk;
- One (1) crash occurred at the signalized intersection at International Speedway Boulevard when a pedestrian was attempting to cross SR A1A in the north leg crosswalk at night and was struck by an eastbound left-turning vehicle.
- One (1) crash occurred in the marked crossing at the unsignalized intersection of Kemp St. when a pedestrian was attempting to cross SR A1A at night and was struck by a vehicle traveling southbound;
- Four (4) crashes occurred at the signalized intersection of Main St.:
    - Two (2) pedestrian crashes occurred in the south leg crosswalk when pedestrians were attempting to cross SR A1A and were struck by vehicles traveling southbound. Both crashes occurred at night and one involved alcohol;
    - One (1) pedestrian crash occurred in the north leg crosswalk when a pedestrian was attempting to cross SR A1A and was struck by an eastbound left-turning vehicle; and
    - One (1) bicycle crash occurred in the south leg crosswalk when a bicyclist was traveling eastbound on SR A1A and was struck by a vehicle traveling northbound.

SR A1A North Section

Twelve (12) pedestrian crashes were reported in the North Section over the six-year study period. There were no bicycle crashes reported. Of the twelve (12) pedestrian crashes, there was one (1) fatal crash and eleven (11) injury crashes during the study period. The fatal pedestrian crash is summarized below:

- Crash Number 837123460
    - On August 9, 2010 at 4:22 AM a crash involving a pedestrian occurred approximately 200 feet south of the intersection of SR A1A and Jessamine Blvd. under dark lighting conditions. The pedestrian was walking westbound across SR A1A and failed to yield the right-of-way to a northbound vehicle. The vehicle was traveling northbound on SR A1A when it collided with the pedestrian. The pedestrian was transported to the hospital and later died from injuries sustained during the crash.

Crash diagrams were created along the SR A1A North Section 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, signalized intersection crashes, and locations with more than one crash, are provided below:

- Seventy-five percent of the crashes occurred in dark lighting conditions;

- The majority (92 percent) of crashes occurred under dry roadway conditions;
- Seven (7) of the twelve (12) crashes (58 percent) occurred from 2010-2011, when the Average Annual Daily Traffic (AADT) was highest along the corridor. The corridor has experienced an average AADT of 17,850 over the six year analysis period;
- The highest number of crashes (5) occurred in March. There were also crashes reported in August (2), January (1), April (1), July (1), September (1), and October (1).
- At least one crash occurred on each day of the week. Three (3) crashes occurred on both Saturday and Sunday;
- Eighty-three percent of the crashes (10 crashes) occurred between 9:00 PM and 4:00 AM;
- Two (2) of the pedestrians were not from the state of Florida based upon their provided zip codes and a zip code was not reported for one (1) pedestrian;
- Four (4) of the reported crashes involved alcohol;
- The vehicle had the right-of-way in ten (10) of the twelve (12) pedestrian crashes;
- In seven (7) of the crashes, the pedestrian was attempting to cross SR A1A at a mid-block location;
- Two (2) crashes occurred at the signalized intersection at Seabreeze Blvd. when pedestrians were attempting to cross SR A1A in the south leg crosswalk and were struck by northbound vehicles;
- One (1) crash occurred in the unsignalized, marked crossing at Riverview Blvd. when a pedestrian was attempting to cross A1A and was struck by a northbound vehicle;
- Two (2) crashes occurred mid-block in front of the Daytona Beach Club:
    - One crash occurred when the pedestrian was attempting to cross A1A eastbound at night and was struck by a southbound vehicle;
    - One crash involved alcohol and occurred when the pedestrian was attempting to cross A1A eastbound at night and was struck by a northbound vehicle;
- One (1) crash, involving alcohol, occurred at the signalized intersection at University Blvd. when a pedestrian was attempting to cross SR A1A in the north leg crosswalk at night and was struck by a northbound vehicle.

FIELD REVIEW FINDINGS

Location: Corridor-Wide South Section

Issue #1: Crosswalk Markings

Figure 3

Figure 4

Figure 5

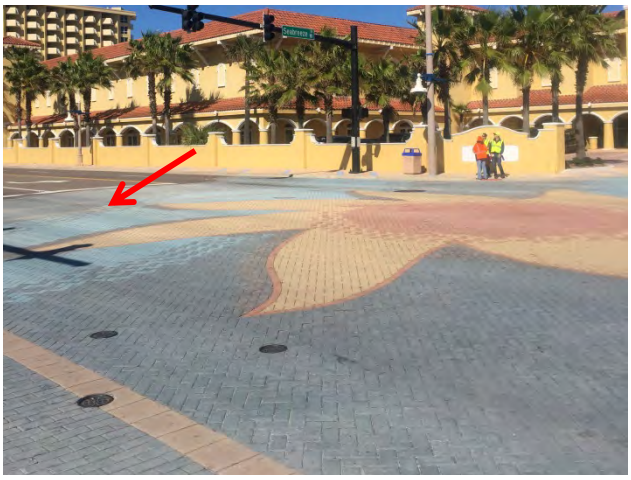


Figure 6

Description of Issue:
The four signalized intersections along the south section have decorative paver patterns. Examples of the overhead view of these patterns are shown in **Figure 3** and **Figure 4**. The intersections generally include a blue background with the crosswalks distinguished by grey pavers (see **Figure 5**). The combination of the grey crosswalk pavers and decorative pattern at the intersection makes it difficult for drivers to distinguish crosswalks at the intersections. An example of the crosswalks limited visibility is provided in **Figure 6**. The grey crosswalk pavers do not provide any retro-reflectivity, exacerbating the crosswalks' limited visibility issues during nighttime conditions.

Suggestions for Improvement:
Consider removing decorative pavers within the crosswalks and installing material that thermoplastic crosswalk markings will properly adhere to. Special emphasis markings as shown on sheet 9 of Design Index 17346 should be used for the signalized crossings at the four signalized intersections included within the study limits.

Location: Corridor-Wide South Section

Issue #2: Lack of Bicycle Facilities

Figure 7

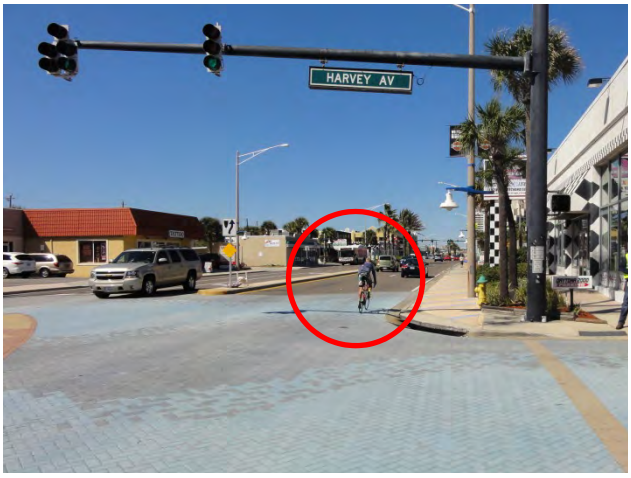


Figure 8

Figure 9

Figure 10

Description of Issue:
No bicycle lanes are provided along the length of the south section. Bicyclists were observed riding in the road as illustrated in **Figure 7** and **Figure 8**. The study team also observed bicyclists riding along the sidewalk (see **Figure 9** and **Figure 10**). Two bicycle crashes were reported within the south section over the crash analysis period. Right-of-way (ROW) is limited within the south section and bicycle lanes could not be implemented without adjusting the existing curb lines.

Suggestions for Improvement:
Based upon the existing pavement and without adjusting the existing curb line, there is not adequate width to accommodate buffered bicycle lanes or 4' striped bicycle lanes on each side of the roadway. Because right-of-way is not available to provide a bicycle lane or paved shoulder, as a near-term suggestion consider posting BIKES MAY USE FULL LANE (R4-11) signs along the study corridor to encourage bicycles to use the street rather than the sidewalks. As stated in Section 9B.06 of the Manual of Uniform Traffic Control Devices (MUTCD):

01 *The Bicycles May Use Full Lane (R4-11) sign (see Figure 9B-2) may be used on roadways where no bicycle lanes or adjacent shoulders usable by bicyclists are present and where travel lanes are too narrow for bicyclists and motor vehicles to operate side by side.*
02 *The Bicycles May Use Full Lane sign may be used in locations where it is important to inform road users that bicyclists might occupy the travel lane.*

Because the posted speed along this section of SR A1A is 35 MPH, also consider installing shared lane markings (sharrows) in addition to the R4-11 signs, as specified on pages 1 and 2 of FDOT Standard Index 17347.

As a long-term improvement, the City of Daytona Beach has discussed the idea of encouraging bicyclists to use parallel facilities. One parallel facility under consideration based upon lower volumes and vehicular speeds is Grandview Avenue. Grandview Avenue is two blocks west of SR A1A (approximately 475 feet) and is a residential roadway with one travel lane in each direction and areas for on-street parking. Consider conducting a feasibility study to provide enhanced bicycle facilities along Grandview Avenue and install guide signage along SR A1A directing bicyclists to the designated parallel facility.

Location: Corridor-Wide South Section

Issue #3: Detectable Warning Surfaces

Figure 11

Figure 12

Figure 13

Figure 14

Description of Issue:
Some detectable warning surfaces were missing or no longer adhere to the curb ramps (examples shown in **Figure 11** and **Figure 12**). Some of the detectable surfaces were worn down as illustrated in **Figure 13**. The safety review team also observed two different types of detectable warning surfaces as some have been replaced recently. **Figure 14** shows a newer detectable warning surface observed along the study corridor.

Suggestions for Improvement:
Consider replacing the worn or deteriorating detectable warning surfaces along the corridor at both the signalized and unsignalized intersections to match the newer detectable warning surfaces as illustrated in **Figure 14**.

Location: Corridor-Wide South Section

Issue #4: U-Turn Demand

Figure 15

Figure 16

Description of Issue:
The south section is a four-lane divided section. Many drivers attempt U-turn maneuvers and the narrow ROW results in drivers tracking over the curb near pedestrians standing on the corner of the intersection. The safety review team observed tire marks on the edges of curbs where drivers had tracked over the curb. Examples are shown in **Figure 15** and **Figure 16**. The team also observed drivers completing three-point turns on SR A1A in order to successfully complete the U-turn maneuvers. U-turns are restricted during special events such as Bike Week and portable temporary signs are placed in the medians to indicate to drivers of the restriction.

Suggestions for Improvement:
Consider performing a study along this section to restrict NB and SB U-turns at the signalized intersections and review potential opportunities for U-turns at designated locations. This will reduce pedestrian exposure to vehicular conflicts at the signalized crosswalks and will reduce the risk of vehicular crashes associated with three-point turns on SR A1A.

Location: Corridor-Wide South Section

Issue #5: Pedestrian Signage Consistency

Figure 17

Figure 18

Description of Issue:
The study review team observed an inconsistency between the street names on push button signage and the existing street name signage. In some cases the push button signage directs pedestrians to cross SR A1A (**Figure 17**), but the existing street name signage present at the intersection states the local street name (Atlantic Avenue – shown in **Figure 18**). The high level of tourists unfamiliar with the state road designation may lead to confusion at the crossings.

Suggestions for Improvement:
Consider replacing pedestrian push button signage where necessary to be consistent with the street name signage at each of the signalized intersections along the corridor.

Location: International Speedway Boulevard Intersection

Issue #6: Decorative Structures and Pedestrian Signal Detector

Figure 19

Figure 20

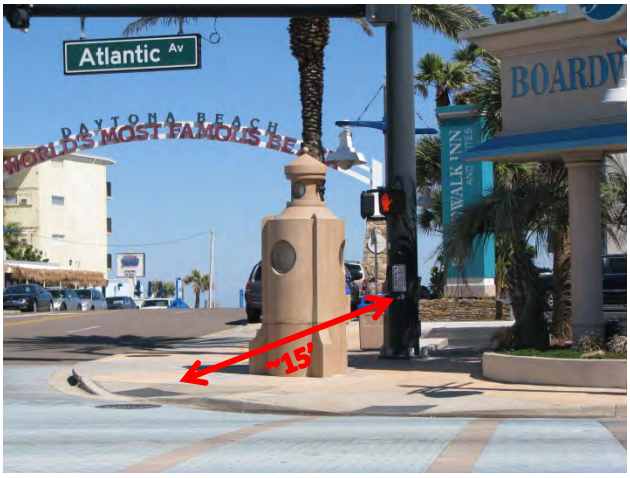


Figure 21

Figure 22

Description of Issue:
The decorative structures on the northeast and southeast corners of the intersection (shown in **Figure 21** and **Figure 22**) obstruct pedestrian visibility of the pedestrian push buttons. The obstructions may encourage pedestrians to disregard the pedestrian push buttons and cross against the pedestrian signal.

The push button on the southeast corner of the intersection is located more than 10’ away from the curb ramps as illustrate in **Figure 21** and **Figure 22**.

Suggestions for Improvement:
Consider relocating or removing the structures or installing a separate push button pole on the southeast corner for the southern and eastern crosswalks less than 10’ from the pedestrian ramp.

Location: International Speedway Boulevard Intersection

Issue #7: Stop Bars

Figure 23

Description of Issue:
The stop bar on the westbound approach is worn (illustrated in **Figure 23**) and difficult for drivers to see. This may lead to additional conflicts between drivers and pedestrians or bicyclists in the crosswalk.

Suggestions for Improvement:
Consider restriping the westbound stop bar at the intersection.

Location: International Speedway Boulevard Intersection

Issue #8: Intersection Lighting

Figure 24

Description of Issue:
During the nighttime review the review team observed that the mast arm street light is out in the southwest corner of the intersection. The lighting fixture is depicted in **Figure 24**.

Suggestions for Improvement:
Consider replacing the bulb as part of routine lighting maintenance.

Location: Mid-Block between International Speedway Boulevard and Harvey Avenue

Issue #9: Sidewalk Obstruction

Figure 25

Figure 26

Description of Issue:
A hotel is currently undergoing renovations on the southwest corner of SR A1A and Kemp Street. The construction fencing and its footings shown in **Figure 25** extend over the west sidewalk along SR A1A and reduce the effective sidewalk width. This forces pedestrians using the sidewalk to be walking closer to vehicles traveling along SR A1A. The construction fencing takes up the entire sidewalk width of the south sidewalk along Kemp Street (illustrated in **Figure 26**). A Sidewalk Closed Cross Here sign (R9-11a) is provided on the southwest curb ramp.

Suggestions for Improvement:
Consider coordinating with the hotel and/or contractor at the site to verify that a continuous and unobstructed width of at least four feet is provided (exclusive of the width of curb) based on Americans with Disabilities Act (ADA) guidelines, or that advanced guidance is properly given to pedestrians needing to cross SR A1A in advance to avoid the temporary obstruction.

Location: Mid-Block between International Speedway Boulevard and Harvey Avenue

Issue #10: Kemp Street Mid-Block Crosswalk

Figure 27

Figure 28

Figure 29

Figure 30

Description of Issue:
An unsignalized crossing is located on the north leg of the SR A1A and Kemp Street intersection as shown in **Figure 27** and **Figure 28**. The review team noted the following observations at this crosswalk location:

- There is low vehicular yield compliance at the crossing.
- Bushes located in the median obstruct sight distance between pedestrians standing in the median refuge and northbound vehicles approaching the crosswalk (**Figure 29** and **Figure 30**).

Suggestions for Improvement:
Consider installing an active warning device, such as Rapid Rectangular Flashing Beacons (RRFB), at the crosswalk to improve yield compliance. Consider trimming the bushes or planting a smaller plant in the median to improve sight distance. Consider removing decorative pavers within the crosswalk and marking with special emphasis crosswalk markings as shown on sheet 10 of Design Index 17346.

Location: Harvey Avenue Intersection

Issue #11: Brick Patterned Sidewalk

Figure 31

Figure 32

Description of Issue:
The northeast corner pedestrian ramp is offset from the SR A1A sidewalk alignment as illustrated in **Figure 31**. The sidewalk alignment (shown in **Figure 31** and **Figure 32)** drops into the drainage inlet on the northeast corner. One pedestrian was observed stepping off the curb into the inlet gutter and nearly fell. Local business owners indicated that people accidentally step off into the drainage inlet frequently. This poses a hazard for pedestrians to injure themselves or fall into the street.

Suggestions for Improvement:
Consider painting the curb return yellow on the northeast corner to make pedestrians aware of the hazard and direct them around the corner and to the curb ramp. Also consider reviewing this location based on FDOT Plans Preparation Manual (PPM) Figure 8.8.1 to see if a railing is needed along the curb return due to the drop off into the drainage inlet.

Location: Harvey Avenue Intersection

Issue #12: Pedestrian Facilities

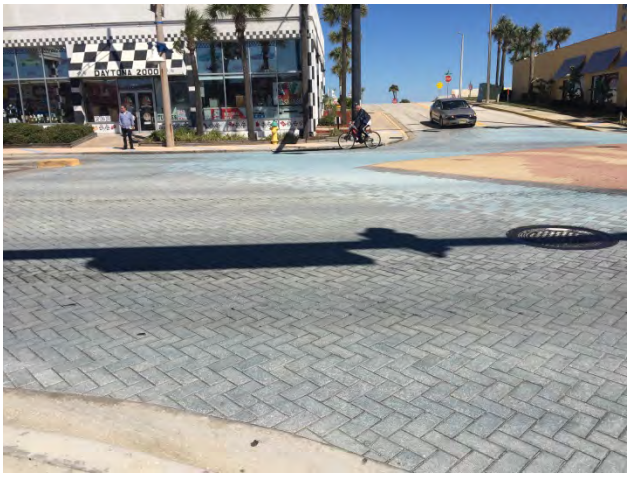


Figure 33

Figure 34

Figure 35

Figure 36

Description of Issue:
The following issues related to pedestrian facilities were observed at the Harvey Avenue intersection:

- A marked crosswalk is not provided on the north leg of the intersection (**Figure 33**).
- The pedestrian push buttons on the southeast and southwest corners are greater than 10' away from the ramp and a traffic signal controller box is located between the push button and curb ramp on the southeast corner (see **Figure 34**).
- Pedestrian push button signage is outdated and does not indicate instructions for the pedestrian

countdown phase (shown in **Figure 35**).

- The cross slopes for the sidewalks adjacent to the curb ramps on the northwest and southwest corners exceed the maximum two percent cross slope per ADA requirements (shown in **Figure 34** and **Figure 36**).
- The connection between the sidewalk and curb ramp on the northwest corner shown in **Figure 36** has an effective width of less than 4 feet.

No pedestrian and bicycle crashes were reported at this location over the crash analysis period.

Suggestions for Improvement:
The following are considerations to address the pedestrian facilities issues identified at this intersection:

- Consider the addition of a crosswalk on the north leg of the intersection as well as the necessary pedestrian signals and signage. The crosswalk would either have to be shifted to the north to avoid the drainage inlet on the northeast corner or the drainage inlet could be relocated.
- Consider installing a separate push button poles on the southeast and southwest corners for the south and west crosswalks less than 10’ from the pedestrian ramp.
- Replace the outdated push button signage with new signage (R10-3i).
- Consider reconstructing the curb ramps on the northwest and southwest corners to address the cross slopes and effective width ADA issues.

Location: Mid-Block between Harvey Avenue and Main Street

Issue #13: Driveways

Figure 37

Description of Issue:
There are two locations along the east side of SR A1A with abandoned/unused driveway cuts as illustrated in **Figure 37**. At these locations, a level path (with a cross-slope less than two percent) is not provided.

Suggestions for Improvement:
Coordinate with the City of Daytona Beach's Redevelopment Department to review the redevelopment plans for this site. If no redevelopment is planned, consider rebuilding the abandoned driveways to provide a level surface and continuous curb. These improvements could be done during the roadway's next 3R project or as a sidewalk maintenance project.

Location: Main Street Intersection

Issue #14: Pedestrian Facilities

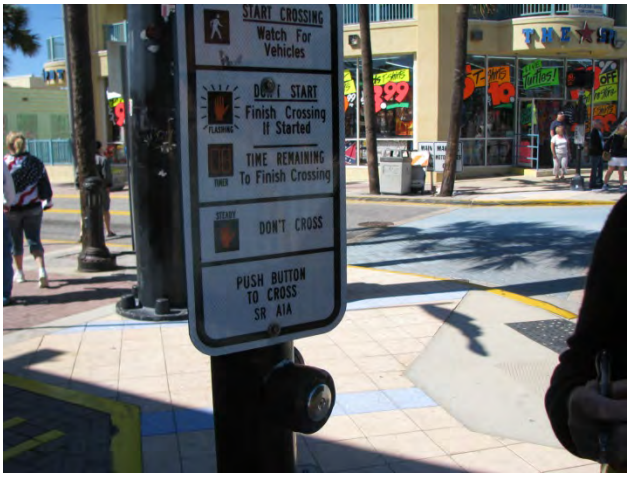


Figure 38

Figure 39

Description of Issue:
The following issues related to pedestrian facilities were observed at the Main Street intersection:

- The push buttons on the northwest and southwest corners (eastbound crossings) are able to provide audible confirmation (i.e., chirp) when pushed, but they were not functioning properly (**Figure 38**). Four crashes occurred in the north or south crosswalks involving eastbound pedestrians and bicycles.
- The crosswalk on the north leg is skewed and creates a longer crossing distance for pedestrians. **Figure 39** illustrates the skew at this location. Pedestrians crossing eastbound within the crosswalk have a more difficult time seeing vehicles making an eastbound left-turn onto SR A1A. It appears that the crosswalk was aligned with this skew to avoid impacting the decorative pattern in the middle of the intersection. One crash occurred in the crosswalk involving an eastbound pedestrian and an eastbound left-turning vehicle.

Suggestions for Improvement:
The following are considerations to address the pedestrian facilities issues identified at this intersection:

- Dispatch a signal technician to review if all pedestrian push buttons are working properly.
- Consider realigning the crosswalk perpendicular to the NE corner to provide a shorter crossing distance for pedestrians during the next resurfacing project.

Location: Main Street Intersection

Issue #15: Intersection Lighting

Figure 40

Description of Issue:
No intersection lighting is provided on the southwest corner as shown in **Figure 40**. Two pedestrian-related crashes occurred in the crosswalk at the southwest corner in nighttime conditions.

Suggestions for Improvement:
Consider upgrading the lighting at the intersection to meet the requirements of section 7.3 in Volume 1 of the FDOT PPM. Installation of lighting on the existing mast arms could be considered.

Location: Auditorium Boulevard Intersection

Issue #16: Pedestrian Facilities

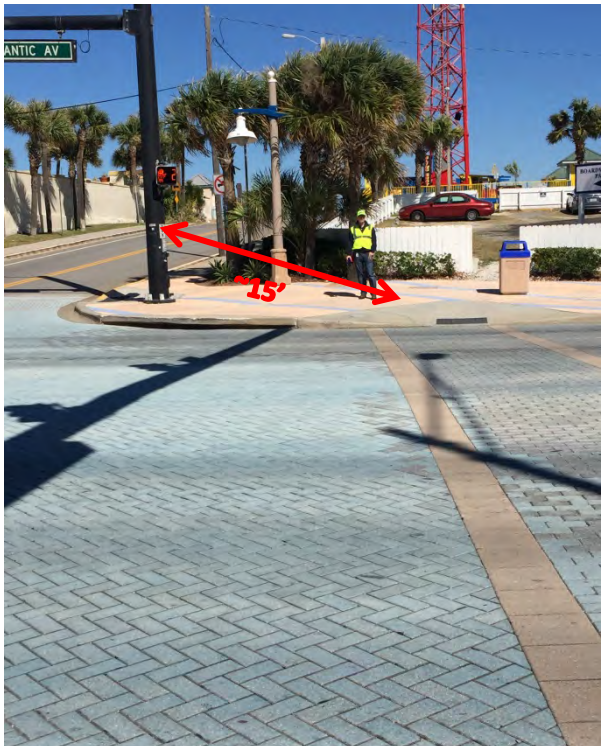


Figure 41

Figure 42

Description of Issue:
The following issues related to pedestrian facilities were observed at the Auditorium Boulevard intersection:

- The pedestrian signal and push button on the southeast corner is not aligned with the south leg crosswalk, located approximately 15 feet from the crosswalk and curb ramp as shown in **Figure 41**. This exceeds the 10' minimum distance to the curb ramp as defined in section 4E.08 of the 2009 MUTCD.
- Pedestrian push button signage is outdated and does not indicate instructions for the pedestrian countdown phase. **Figure 42** also shows that some of the signage has been peeled away on the northwest corner. Part of the signage on the southwest pole has been peeled away also.

Suggestions for Improvement:
The following are considerations to address the pedestrian facilities issues identified at this intersection:

- Consider installing a separate push button pedestal and pedestrian signal on the southeast corner for the southern crosswalk within 10' from the pedestrian ramp.
- Consider replacing the existing push button signage with new signage (R10-3i) on the northwest and southwest corners.

Location: Mid-Block between Auditorium Boulevard and Earl Street

Issue #17: Hilton Hotel Driveways

Figure 43

Description of Issue:
The Hilton driveways just north of the Auditorium Boulevard intersection are long (approximately 100 feet) and do not include a stop bar or crosswalk markings. Vehicles entering or exiting the Hilton are not provided direction as to where to stop or yield to pedestrians. The driveways are shown in **Figure 43**

Suggestions for Improvement:
Consider striping a stop bar on the exiting approach and using standard crosswalk markings across the driveway, consistent with sheet 9 of the FDOT Design Standard Index 17346.

Location: Corridor-Wide North Section

Issue #18: Crosswalk Markings

Figure 44

Figure 45

Figure 46

Figure 47

Description of Issue:
There are inconsistencies between the crosswalk markings at the two signalized intersections within the north section. The signalized intersection of Seabreeze Boulevard and the unsignalized intersections of Glenview Boulevard and Riverview Boulevard have the decorative paver patterns (**Figure 44** and **Figure 45**) described in **Issue #1**. As described earlier, the decorative pavers in the intersection make the marked crosswalks less distinguishable to drivers and do not provide retro-reflectivity at night (see **Figure 46**).

The City's streetscape project ends immediately north of Riverview Boulevard, so the decorative pavers are not included at the signalized intersection of University Boulevard. However, it was noted the marked crosswalks at University Boulevard are old special emphasis markings that are beginning to fade. This is illustrated in **Figure 47**.

Suggestions for Improvement:

Consider removing decorative pavers within the crosswalk and installing material that thermoplastic crosswalk markings will properly adhere to. At the signalized intersection of SR A1A and University Boulevard, consider marking special emphasis crosswalk markings as shown on sheet 9 of Design Index 17346. Consider striping special emphasis crosswalk markings consistent with sheet 9 of the Design Index 17346 for the unsignalized intersections at Glenview Boulevard and Riverview Boulevard.

Location: Corridor-Wide North Section

Issue #19: Lack of Bicycle Facilities

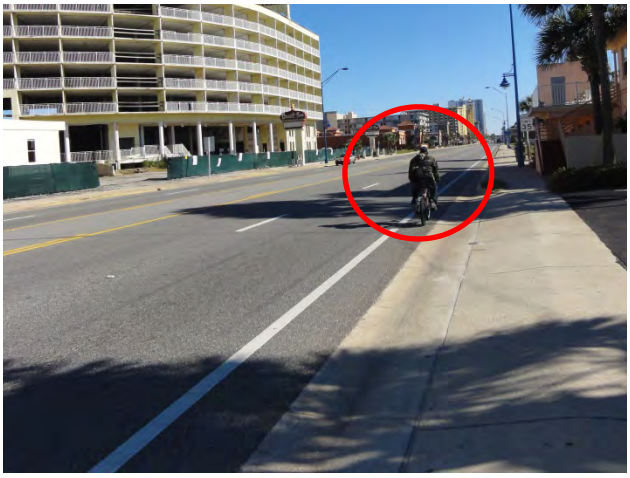


Figure 48

Figure 49

Description of Issue:
Similar to the south section, no bicycle facilities are provided within the study limits. No bicycle crashes were reported within the north section over the crash analysis period. The majority of bicyclists observed in this section were riding within the paved shoulder as shown in **Figure 48** and **Figure 49**.

The curb-to-curb width in the north section is approximately 64 feet (five 12' lanes and two 2' outside shoulders). Travel lanes could be reduced to 11 feet to allow 4.5' marked bicycle lanes. The preferred bicycle lane width, if not buffered, is 5', but the minimum allowed is 4'.

Suggestions for Improvement:
Consider reducing the lanes widths to 11 feet to provide for restriping of 4.5 foot bicycle lanes. Consider including the north section of SR A1A in a feasibility study to provide enhanced bicycle facilities along a parallel facility such as Grandview Avenue, and guide signage along SR A1A directing bicyclists to the designated parallel facility.

Location: Corridor-Wide North Section

Issue #20: Corridor Lighting

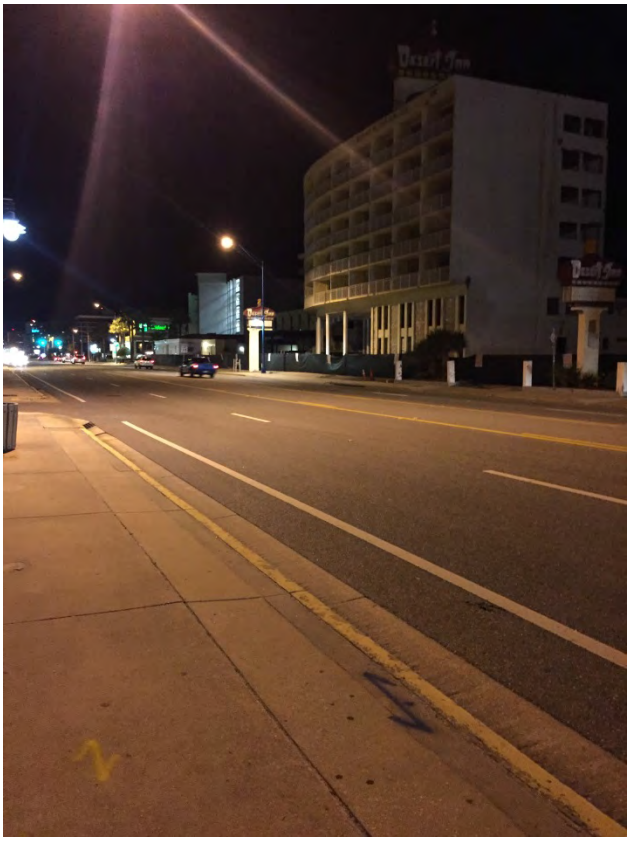


Figure 50

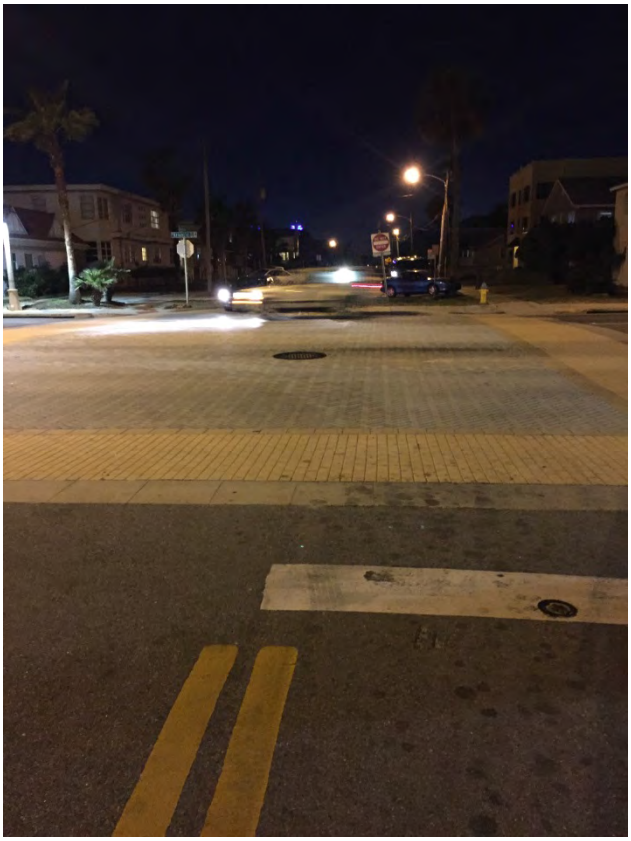


Figure 51

Description of Issue:
During the nighttime review of the corridors, the review team observed better lighting conditions along the south section due to street lighting, pedestrian-level lighting, and ambient lighting from businesses. There was a noticeable difference between the lighting conditions in the south and north sections. There are fewer businesses in the north section contributing ambient lighting. **Figure 50** and **Figure 51** illustrate the lighting conditions observed by the safety review team during the nighttime review. The field review team noted multiple street lights were burnt out along the corridor. Though pedestrian activity appears to increase along the SR A1A corridor at night, the poor lighting conditions may have contributed to the eight crashes (75% of the corridor's total) occurring at night.

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

- Replace the lights on the corridor that are burnt out.
- Consider conducting field measurements of existing lighting levels to evaluate lighting uniformity levels and add lighting where necessary. Consider light poles on the east side that are angled westerly away from the beach. These light poles cast their light to the west and illuminate the roadway as needed. The light bulb is not seen by the turtles due to the angle and orientation of the light fixture.

- 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.
- Consider implementation of pedestrian-level lighting, with less visibility from the beach, to supplement areas where street lighting is not able to provide adequate lamination.
- As a long-term consideration, upgrade 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 North Section

Issue #21: Pedestrian Signage Consistency

Figure 52

Figure 53

Description of Issue:
The study review team observed an inconsistency between the street names on push button signage and the existing street name signage along the north section. In some cases the push button signage directs pedestrians to cross SR A1A (**Figure 52**), but the existing street name signage present at the intersection states the local street name (Atlantic Avenue – shown in **Figure 53**). The high level of tourists unfamiliar with the state road designation may lead to confusion at the crossings.

Suggestions for Improvement:
Consider replacing pedestrian push button signage where necessary to be consistent with the street name signage at each of the signalized intersections along the corridor.

Location: Seabreeze Boulevard Intersection

Issue #22: Pedestrian Facilities

Figure 54

Description of Issue:
The north crosswalk doesn't tie into a curb ramp on the east side of SR A1A (shown in **Figure 54**).

Suggestions for Improvement:
Consider realigning the crosswalk to tie into the existing curb ramp or reconstructing the curb ramp on the northeast corner to include separate curb ramps for the northern and eastern crosswalks.

Location: Seabreeze Boulevard Intersection

Issue #23: Intersection Lighting

Figure 55

Figure 56

Description of Issue:
Pedestrian-level lighting is present (**Figure 55**), but there is limited intersection lighting at this location (**Figure 56**). Three pedestrian crashes occurred within the influence area of the intersection over the crash analysis period, two of which occurred at night.

Suggestions for Improvement:
Consider upgrading the lighting at the intersection to meet the requirements of section 7.3 in Volume 1 of the FDOT PPM. Installation of lighting on the existing mast arms could be considered.

Location: Mid-Block between Seabreeze Boulevard and University Boulevard

Issue #24: Sidewalk Clutter

Figure 57

Description of Issue:
There was one location on the western sidewalk where newspaper/magazine stands are located within the sidewalk. The sidewalk is eight feet wide in the north section, but the stands reduce the effective sidewalk width to 3 to 5 feet as shown in **Figure 57**.

Suggestions for Improvement:
Consider coordinating with the City of Daytona Beach to either remove the newspaper/magazine stands or move them off the sidewalk so that the effective sidewalk width at those locations is not restricted.

Location: Mid-Block between Seabreeze Boulevard and University Boulevard

Issue #25: Glenview Boulevard Pedestrian Facilities

Figure 58

Figure 59

Figure 60

Figure 61

Description of Issue:

The following issues related to pedestrian facilities were observed at the Glenview Boulevard intersection:

- No pedestrian crossing signage is provided on the uncontrolled intersection approaches as illustrated in **Figure 58**. Vehicular yield compliance was observed to be low in the field.
- There are trip hazards on the northwest and northeast corners. There is a broken curb in the northwest corner and a utility cover that is not flush with the curb ramp on the northeast corner (shown in **Figure 59** and **Figure 60**, respectively).
- Pedestrian-level lighting is present on each corner with the exception of the northeast corner and there is a street light on the southwest corner. During the nighttime review, the northeast corner appeared to be darker than the rest of the intersection. **Figure 61** illustrates the lighting at the northeast corner looking towards the southwest corner.

- As described in **Issue #18**, there is no retro-reflectivity at the crosswalk markings, making it difficult to see the crosswalks at night (see **Figure 61**).

No pedestrian or bicycle-related crashes were observed during the crash analysis period.

Suggestions for Improvement:
The following considerations to address the pedestrian facilities issues were identified at this intersection:

- Consider installing signage and striping pavement markings consistent with sheet 9 of Design Index 17346.
    - Install pedestrian Crossing signage (W11-2) with the supplemental diagonal downward pointing arrow plaque (W16-7P) for the northbound and southbound approaches of SR A1A.
    - Install Stop Here for Peds signage (R1-5bL)
    - Stripe a stop bar in advance of each crosswalk
- Repair the broken curb in the northwest corner and reconstruct the northeast curb ramp so that the utility box is flush and will not pose a trip hazard.
- Consider increasing the wattage for existing street lights at the intersection.
- Consider removing decorative pavers in the crosswalks and installing material that thermoplastic crosswalk markings will properly adhere to.

Location: Mid-Block between Seabreeze Boulevard and University Boulevard

Issue #26: Riverview Boulevard Pedestrian Facilities

Figure 62

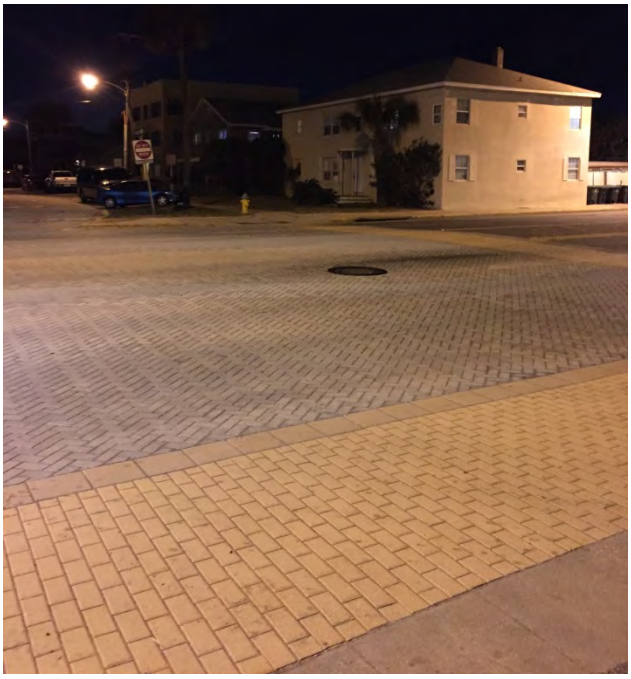


Figure 63

Description of Issue:
The following issues related to pedestrian facilities were observed at the Riverview Boulevard intersection:

- No pedestrian crossing signage is provided at the intersection as illustrated in **Figure 62**.
- As described in **Issue #18**, there is no retro-reflectivity at the crosswalk markings, making it difficult to see the crosswalks at night (see **Figure 63**).

Suggestions for Improvement:
The following are considerations to address the pedestrian facilities issues identified at this intersection:

- Consider installing signage and striping pavement markings consistent with sheet 9 of Design Index 17346.
    - Install pedestrian Crossing signage (W11-2) with the supplemental diagonal downward pointing arrow plaque (W16-7P) for the northbound and southbound approaches of SR A1A.
    - Install Stop Here for Peds signage (R1-5bL)
    - Stripe a stop bar in advance of each crosswalk
- Consider removing decorative pavers in the crosswalks and installing material that thermoplastic crosswalk markings could properly adhere to.

Location: Mid-Block between Seabreeze Boulevard and University Boulevard

Issue #27: Trip Hazard

Figure 64

Description of Issue:
The safety review team noted a trip hazard on the eastern sidewalk in front of the La Quinta Inn (approximately 250 feet to the north of the Riverview Boulevard intersection). There is a utility box cover that has been depressed into the sidewalk and is collecting sand and debris. An example is shown in **Figure 64**.

Suggestions for Improvement:
Consider replacing the utility box (or cover) to be flush with the sidewalk. If the utility box is no longer in use, consider removing it and patching the sidewalk.

Location: Mid-Block between Seabreeze Boulevard and University Boulevard

Issue #28: Mid-Block Crossing

Figure 65

Figure 66

Figure 67

Description of Issue:
The Desert Inn (located on the northeast corner of the intersection of SR A1A and Jessamine Boulevard), is being rehabilitated and will become a Westin Hotel. The new hotel plans to include an off-site overflow parking lot on the southwest corner of the intersection (shown in **Figure 65**). A public parking lot is planned for the southeast corner of the intersection (also illustrated in **Figure 65**).

The provision of an opportunity to cross SR A1A will be important to consider when the redevelopment of the hotel and the vacant lots are complete as an increase in pedestrian traffic and crossing demand is expected.

Currently there are no marked crosswalks at the intersections. **Figure 66** and **Figure 67** show the existing cross section of SR A1A in the vicinity of the intersection. Two transit stops are located near the intersection (northeast and southwest corners). One fatal pedestrian crash and one injury pedestrian crash were reported within the vicinity of Jessamine Boulevard. Both occurred at night and involved pedestrians crossing SR A1A.

Suggestions for Improvement:
Consider providing a marked crosswalk at the Jessamine Boulevard intersection. If required, 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 the demands of the hotel and vacant lots being redeveloped. If a marked crosswalk is approved:

- Install the crossing on the north side of the intersection due to existing one-way and right-turn only configuration along Jessamine Boulevard. If southbound left-turn volumes are expected to be high, consideration should be given to installing the crosswalk on the south side as a northbound left-turn does not exist at the intersection.
- Provide a z-shaped median refuge island for pedestrians in the TWLTL, if possible.
- Consider an active warning device, such as Rapid Rectangular Flashing Beacons (RRFB), at the crosswalk. RRFBs may also be used on the advance crosswalk signs per FHWA's interim approval memorandum.
- Install lighting on the crosswalk's west and east sides.
- Stripe the crosswalk with Special Emphasis Crosswalk markings consistent with sheet 10 of the FDOT Design Index 17346.

Location: University Boulevard Intersection

Issue #29: Pedestrian Facilities

Figure 68

Figure 69

Figure 70

Description of Issue:

The following issues related to pedestrian facilities were observed at the University Boulevard intersection:

- The span wire pole in the southwest corner is missing a pedestrian push button sign indicating to push the button to cross Atlantic Avenue (shown in **Figure 68**).
- The push button and push button signage on the span wire pole located on the northwest corner is not on the same side of pole as depicted in **Figure 69**.
- Parts of the detectable warning surface on the southeast corner are missing (**Figure 70**).

Suggestions for Improvement:
In the short-term, consider replacing the missing push button sign on the pole in the southwest corner and moving the push button signage on the northwest corner to be on the same side as the push button. Also, consider replacing the detectable warning surfaces at the intersection, consistent with the newer surfaces along the corridor (as illustrated in **Issue #3: Detectable Warning Surfaces**).

FDOT reported an official request for accessible pedestrian signals (APS) at this location. These upgrades could be implemented at this location as part of a signal upgrade. The signal upgrade could include the conversion from the existing strain wire to mast arms, basic ADA upgrades, and implementation of APS. Installing APS at this signalized intersection could improve crossing performance for visually impaired pedestrians.

Summary of Suggestions

This pedestrian/bicycle safety review considers operational and safety related issues for pedestrians and bicyclists on SR A1A from International Speedway Boulevard to just south of Earl Street and just north of Oakridge Boulevard to just north of University Boulevard. This study was commissioned by the 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 #11: Brick Patterned Sidewalk on page 19
- Issue #25: Glenview Boulevard Pedestrian Facilities on page 36
    - Repair the broken curb in the northwest corner and reconstruct the northeast curb ramp so that the utility box is flush and will not pose a trip hazard.
- Issue #27: Trip Hazard on page 39

The following tables summarize the suggestions of this study by priority (short-term maintenance, near-term, or long-term) for the south and north sections.

Location	Issue Number	Issue	Suggestion
SHORT-TERM MAINTENANCE - SOUTH SECTION			
Corridor Wide - South Section	3	Detectable Warning Surfaces	Consider replacing the worn or deteriorating detectable warning surfaces along the corridor at both the signalized and unsignalized intersections to match the newer detectable warning surfaces along the corridor.
Corridor Wide - South Section	5	Pedestrian Signage Consistency	Consider replacing pedestrian push button signage where necessary to be consistent with the street name signage at each of the signalized intersections along the corridor.
International Speedway Boulevard Intersection	7	Stop Bars	Consider restriping the westbound stop bar at the intersection.
International Speedway Boulevard Intersection	8	Intersection Lighting	Consider replacing the bulb as part of routine lighting maintenance.
Harvey Avenue Intersection	11	Brick Patterned Sidewalk	Consider painting the curb return yellow on the northeast corner to make pedestrians aware of the hazard and direct them around the corner and to the curb ramp. Also consider reviewing this location based on FDOT Plans Preparation Manual (PPM) Figure 8.8.1 to see if a railing is needed along the curb return due to the drop off into the drainage inlet.
Harvey Avenue Intersection	12	Pedestrian Facilities	Replace the outdated push button signage with new signage (R10-3i).
Main Street Intersection	14	Pedestrian Facilities	Dispatch a signal technician to review if all pedestrian push buttons are working properly.
Auditorium Boulevard Intersection	16	Pedestrian Facilities	Consider replacing the existing push button signage with new signage (R10-3i) on the northwest and southwest corners.
Mid-Block between Auditorium Boulevard and Earl Street	17	Hilton Hotel Driveways	Consider striping a stop bar on the exiting approach and using standard crosswalk markings across the driveway, consistent with sheet 9 of the FDOT Design Standard Index 17346.

Location	Issue Number	Issue	Suggestion
NEAR-TERM IMPROVEMENT - SOUTH SECTION			
Corridor Wide - South Section	1	Crosswalk Markings	Consider removing decorative pavers within the crosswalks and installing material that thermoplastic crosswalk markings will properly adhere to. Special emphasis markings as shown on sheet 9 of Design Index 17346 should be used for the signalized crossings at the four signalized intersections included within the study limits.
Corridor Wide - South Section	2	Lack of Bicycle Facilities	Because right-of-way is not available to provide a bicycle lane or paved shoulder, consider posting BIKES MAY USE FULL LANE (R4-11) signs along the study corridor to encourage bicycles to use the street rather than the sidewalks. Because the posted speed along this section of SR A1A is 35 MPH, consider installing shared lane markings (sharrows) in addition to the R4-11 signs, as specified on pages 1 and 2 of FDOT Standard Index 17347.
Corridor Wide - South Section	4	U-Turn Demand	Consider performing a study along this section to restrict NB and SB U-turns at the signalized intersections and review potential opportunities for U-turns at designated locations.
International Speedway Boulevard Intersection	6	Decorative Structures and Pedestrian Signal Detector	Consider relocating or removing the structures or installing a separate push button pole on the southeast corner for the southern and eastern crosswalks less than 10' from the pedestrian ramp.
Mid-Block between ISB and Harvey Avenue	9	Sidewalk Obstruction	Consider coordinating with the hotel and/or contractor at the site to verify that a continuous and unobstructed width of at least four feet is provided (exclusive of the width of curb) based on Americans with Disabilities Act (ADA) guidelines, or that advanced guidance is properly given to pedestrians needing to cross SR A1A in advance to avoid the temporary obstruction.
Mid-Block between ISB and Harvey Avenue	10	Kemp Street Mid-Block Crosswalk	Consider installing an active warning device, such as Rapid Rectangular Flashing Beacons (RRFB), at the crosswalk to improve yield compliance. Consider trimming the bushes or planting a smaller plant in the median to improve sight distance. Consider removing decorative pavers within the crosswalk and marking with special emphasis crosswalk markings as shown on sheet 10 of Design Index 17346.
Harvey Avenue Intersection	12	Pedestrian Facilities	The following are considerations to address the pedestrian facilities issues identified at this intersection: • Consider the addition of a crosswalk on the north leg of the intersection as well as the necessary pedestrian signals and signage. The crosswalk would either have to be shifted to the north to avoid the drainage inlet on the northeast corner or the drainage inlet could be relocated. • Consider installing a separate push button poles on the southeast and southwest corners for the south and west crosswalks less than 10' from the pedestrian ramp. • Replace the outdated push button signage with new signage (R10-3i). • Consider reconstructing the curb ramps on the northwest and southwest corners to address the cross slopes and effective width ADA issues.
Mid-Block between Harvey Avenue and Main Street	13	Driveways	Coordinate with the City of Daytona Beach's Redevelopment Department to review the redevelopment plans for this site. If no redevelopment is planned, consider rebuilding the abandoned driveways to provide a level surface and continuous curb. These improvements could be done during the roadway's next 3R project or as a sidewalk maintenance project.
Main Street Intersection	14	Pedestrian Facilities	Consider realigning the crosswalk perpendicular to the NE corner to provide a shorter crossing distance for pedestrians during the next resurfacing project.
Main Street Intersection	15	Intersection Lighting	Consider upgrading the lighting at the intersection to meet the requirements of section 7.3 in Volume 1 of the FDOT PPM. Installation of lighting on the existing mast arms could be considered.
Auditorium Boulevard Intersection	16	Pedestrian Facilities	Consider installing a separate push button pedestal and pedestrian signal on the southeast corner for the southern crosswalk within 10' from the pedestrian ramp.

Location	Issue Number	Issue	Suggestion
LONG-TERM IMPROVEMENT - SOUTH SECTION			
Corridor Wide - South Section	2	Lack of Bicycle Facilities	The City of Daytona Beach has discussed the idea of encouraging bicyclists to use parallel facilities. One parallel facility under consideration based upon lower volumes and vehicular speeds is Grandview Avenue. Grandview Avenue is two blocks west of SR A1A (approximately 475 feet) and is a residential roadway with one travel lane in each direction and areas for on-street parking. Consider conducting a feasibility study to provide enhanced bicycle facilities along Grandview Avenue and install guide signage along SR A1A directing bicyclists to the designated parallel facility.

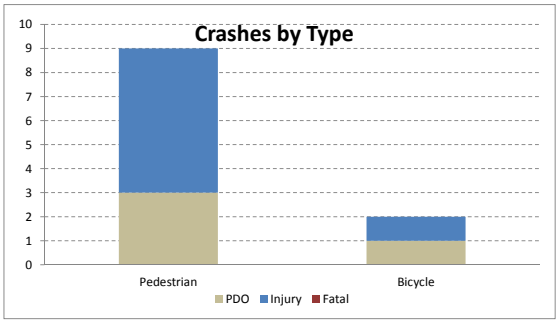
Location	Issue Number	Issue	Suggestion
SHORT-TERM MAINTENANCE - NORTH SECTION			
Corridor Wide - North Section	20	Corridor Lighting	Consider contacting the operator/maintainer of the lighting system to replace the burnt out light bulbs along the corridor.
Corridor Wide - North Section	21	Pedestrian Signage Consistency	Consider replacing pedestrian push button signage where necessary to be consistent with the street name signage at each of the signalized intersections along the corridor.
Mid-Block between Seabreeze Boulevard and University Boulevard	24	Sidewalk Clutter	Consider coordinating with the City of Daytona Beach to either remove the newspaper/magazine stands or move them off the sidewalk so that the effective sidewalk width at those locations is not restricted.
Mid-Block between Seabreeze Boulevard and University Boulevard	25	Glenview Boulevard Pedestrian Facilities	The following are considerations to address the pedestrian facilities issues identified at this intersection: • Consider installing signage and striping pavement markings consistent with sheet 9 of Design Index 17346. o Install pedestrian Crossing signage (W11-2) with the supplemental diagonal downward pointing arrow plaque (W16-7P) for the northbound and southbound approaches of SR A1A. o Install Stop Here for Peds signage (R1-5bL) o Stripe a stop bar in advance of each crosswalk • Repair the broken curb in the northwest corner and reconstruct the northeast curb ramp so that the utility box is flush and will not pose a trip hazard. • Consider increasing the wattage for existing street lights at the intersection.
Mid-Block between Seabreeze Boulevard and University Boulevard	26	Riverview Boulevard Pedestrian Facilities	The following are considerations to address the pedestrian facilities issues identified at this intersection: • Consider installing signage and striping pavement markings consistent with sheet 9 of Design Index 17346. o Install pedestrian Crossing signage (W11-2) with the supplemental diagonal downward pointing arrow plaque (W16-7P) for the northbound and southbound approaches of SR A1A. o Install Stop Here for Peds signage (R1-5bL) o Stripe a stop bar in advance of each crosswalk
Mid-Block between Seabreeze Boulevard and University Boulevard	27	Trip Hazard	Consider replacing the utility box (or cover) to be flush with the sidewalk. If the utility box is no longer in use, consider removing it and patching the sidewalk.
University Boulevard	29	Pedestrian Facilities	Consider replacing the missing push button sign on the pole in the southwest corner and moving the push button signage on the northwest corner to be on the same side as the push button. Also, consider replacing the detectable warning surfaces at the intersection, consistent with the newer surfaces along the corridor (as illustrated in **Issue #3: Detectable Warning Surfaces**).

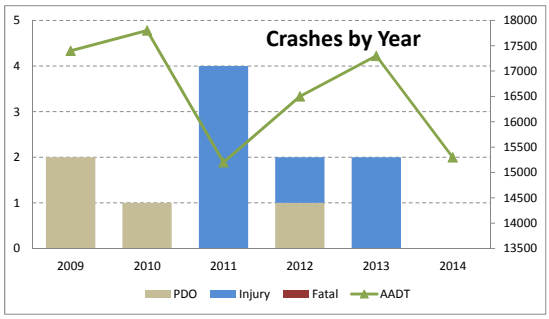
Location	Issue Number	Issue	Suggestion
NEAR-TERM IMPROVEMENT - NORTH SECTION			
Corridor Wide - North Section	18	Crosswalk Markings	Consider removing decorative pavers within the crosswalk and installing material that thermoplastic crosswalk markings will properly adhere to. At the signalized intersection of SR A1A and University Boulevard, consider marking special emphasis crosswalk markings as shown on sheet 9 of Design Index 17346. Consider striping special emphasis crosswalk markings consistent with sheet 9 of the Design Index 17346 for the unsignalized intersections at Glenview Boulevard and Riverview Boulevard.
Corridor Wide - North Section	20	Corridor Lighting	The following are considerations for lighting along the corridor: • Consider conducting field measurements of existing lighting levels to evaluate lighting uniformity levels and add lighting where necessary. Consider light poles on the east side that are angled westerly away from the beach. These light poles cast their light to the west and illuminate the roadway as needed. The light bulb is not seen by the turtles due to the angle and orientation of the light fixture. • 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. • Consider implementation of pedestrian-level lighting, with less visibility from the beach, to supplement areas where street lighting is not able to provide adequate lamination.
Seabreeze Boulevard Intersection	22	Pedestrian Facilities	Consider realigning the crosswalk to tie into the existing curb ramp or reconstructing the curb ramp on the northeast corner to include separate curb ramps for the northern and eastern crosswalks.
Seabreeze Boulevard Intersection	23	Intersection Lighting	Consider upgrading the lighting at the intersection to meet the requirements of section 7.3.2.2 in Volume 1 of the FDOT PPM. Installation of lighting on the existing mast arms could be considered.
Mid-Block between Seabreeze Boulevard and University Boulevard	25	Glenview Boulevard Pedestrian Facilities	Consider removing decorative pavers in the crosswalks and installing material that thermoplastic crosswalk markings will properly adhere to.
Mid-Block between Seabreeze Boulevard and University Boulevard	26	Riverview Boulevard Pedestrian Facilities	Consider removing decorative pavers in the crosswalks and installing material that thermoplastic crosswalk markings could properly adhere to.
Mid-Block between Seabreeze Boulevard and University Boulevard	28	Mid-Block Crossing	Consider providing a marked crosswalk at the Jessamine Boulevard intersection. If required, 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 the demands of the hotel and vacant lots being redeveloped. If a marked crosswalk is approved: • Install the crossing on the north side of the intersection due to existing one-way and right-turn only configuration along Jessamine Boulevard. If southbound left-turn volumes are expected to be high, consideration should be given to installing the crosswalk on the south side as a northbound left-turn does not exist at the intersection. • Provide a z-shaped median refuge island for pedestrians in the TWLTL, if possible. • Consider an active warning device, such as Rapid Rectangular Flashing Beacons (RRFB), at the crosswalk. RRFBs may also be used on the advance crosswalk signs per FHWA's interim approval memorandum. • Install lighting on the crosswalk's west and east sides. • Stripe the crosswalk with Special Emphasis Crosswalk markings consistent with sheet 10 of the FDOT Design Index 17346.

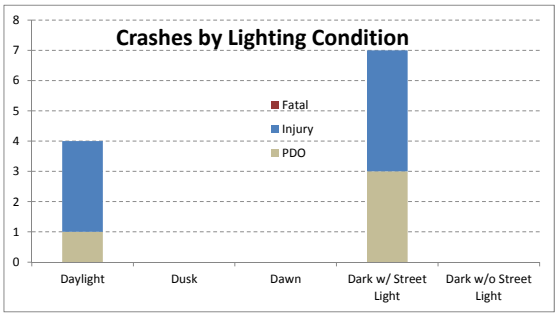
Location	Issue Number	Issue	Suggestion
LONG-TERM IMPROVEMENT - NORTH SECTION			
Corridor Wide - North Section	19	Lack of Bicycle Facilities	Consider reducing the lanes widths to 11 feet to provide for restriping of 4.5 foot bicycle lanes. Consider including the north section of SR A1A in a feasibility study to provide enhanced bicycle facilities along a parallel facility such as Grandview Avenue, and guide signage along SR A1A directing bicyclists to the designated parallel facility.
Corridor Wide - North Section	20	Corridor 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.
University Boulevard	29	Pedestrian Facilities	FDOT reported an official request for accessible pedestrian signals (APS) at this location. These upgrades could be implemented at this location as part of a signal upgrade. The signal upgrade could include the conversion from the existing strain wire to mast arms, basic ADA upgrades, and implementation of APS. Installing APS at this signalized intersection could improve crossing performance for visually impaired pedestrians.

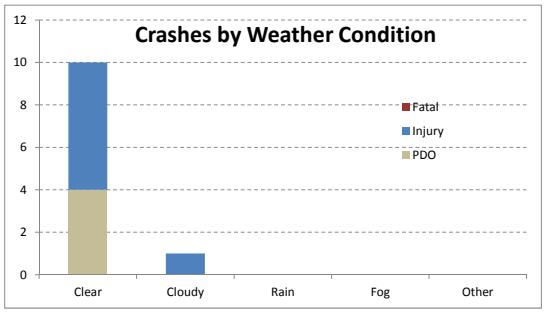
Appendix A – Crash Analysis Reference Materials

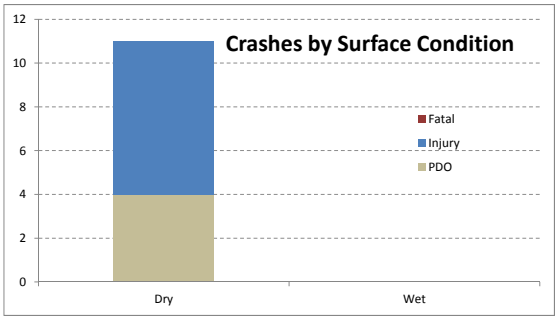
CRASH ANALYSIS - SR A1A from International Speedway Blvd. to Just South of Earl Street

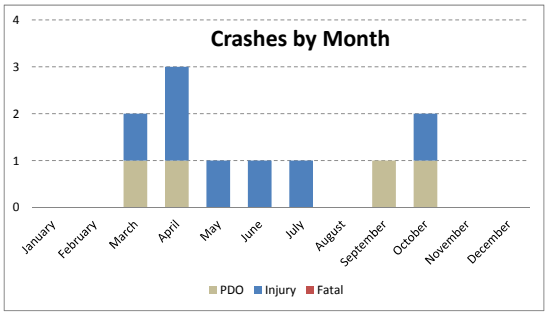


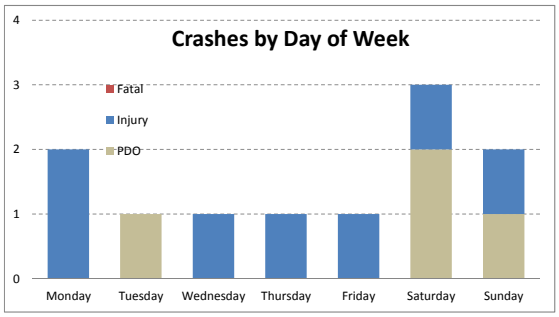


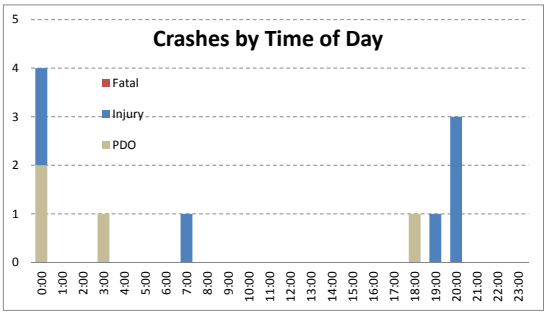


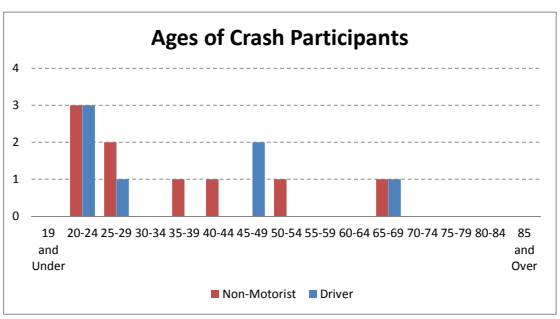


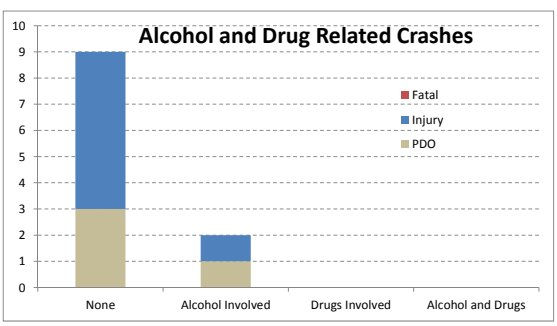


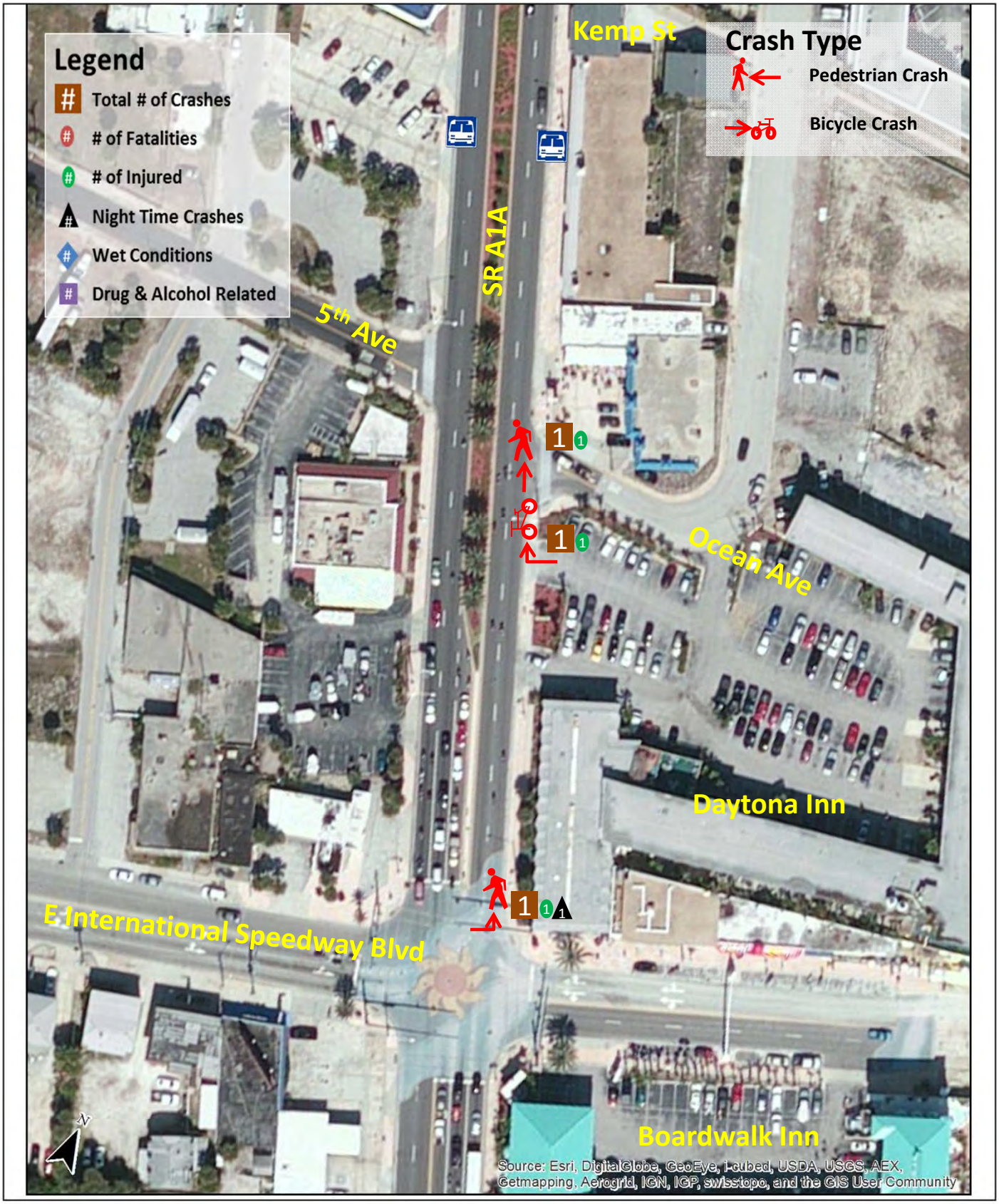










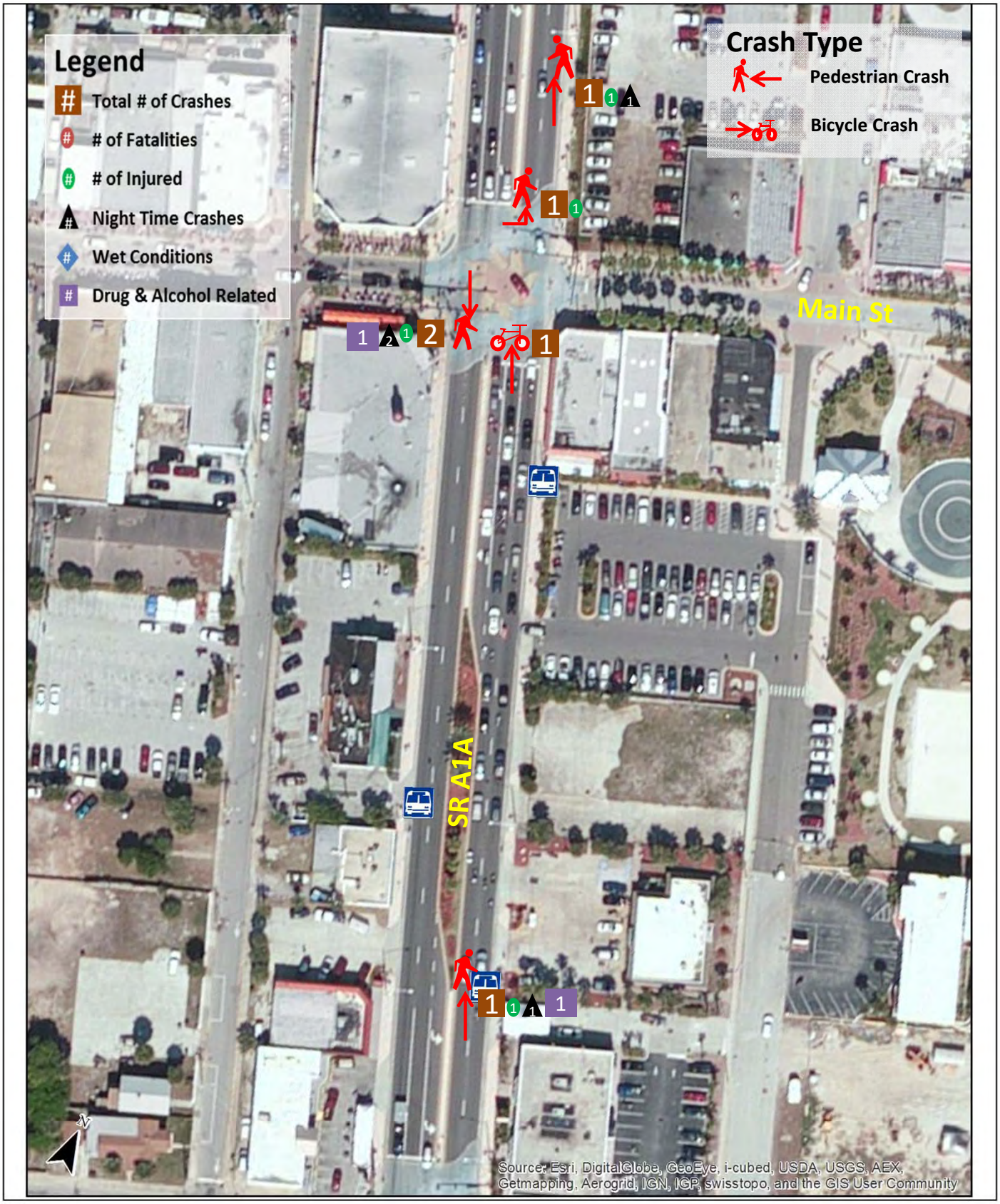


SR/CR A1A Pedestrian Safety & Mobility Study
Collision Diagram (2009 – 2014)
Location C South: International Speedway Blvd. to Kemp St.

Figure **1**

SR/CR A1A Pedestrian Safety & Mobility Study
Collision Diagram (2009 – 2014)
Location C South: Kemp St. to Harvey Ave.

Figure **2**



SR/CR A1A Pedestrian Safety & Mobility Study
Collision Diagram (2009 – 2014)
Location C South: Harvey Ave. to Main St.

Figure **3**

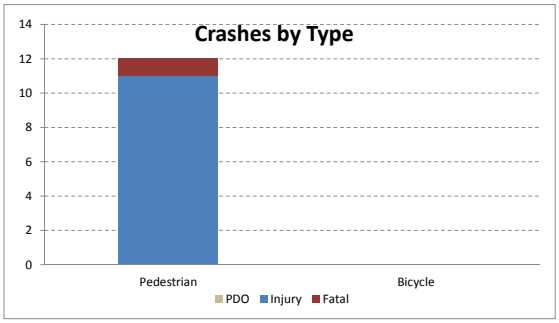
SR/CR A1A Pedestrian Safety & Mobility Study
Collision Diagram (2009 – 2014)
Location C South: Main St. to Auditorium Blvd.

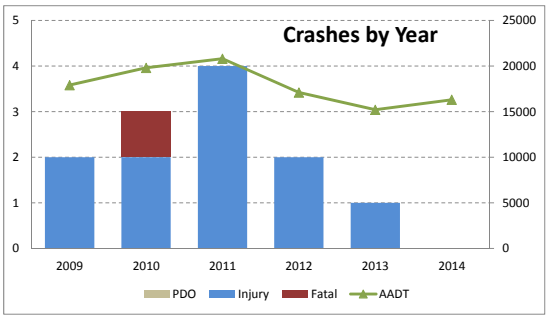
Figure **4**

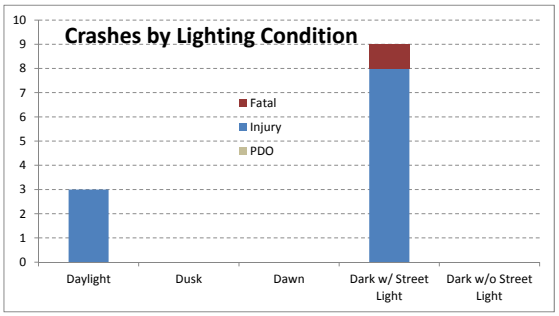
SR/CR A1A Pedestrian Safety & Mobility Study
Collision Diagram (2009 – 2014)
Location C South: Auditorium Blvd. to Earl St.

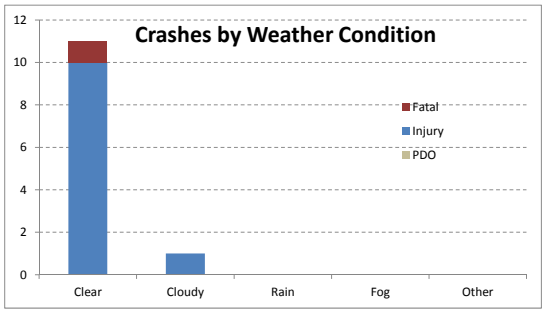
Figure **5**

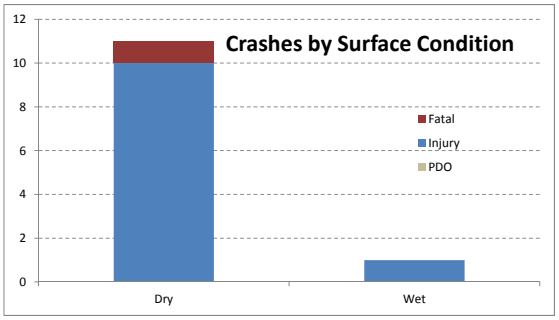
CRASH ANALYSIS - SR A1A from Just North of Oakridge Boulevard to Just North of University Boulevard

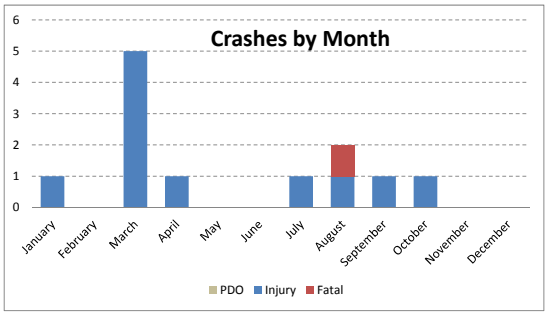


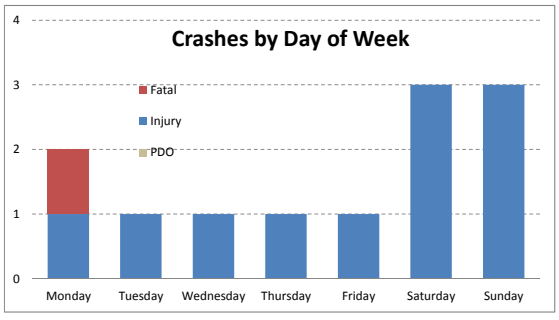


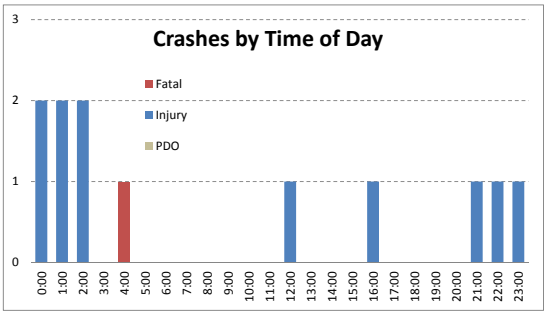


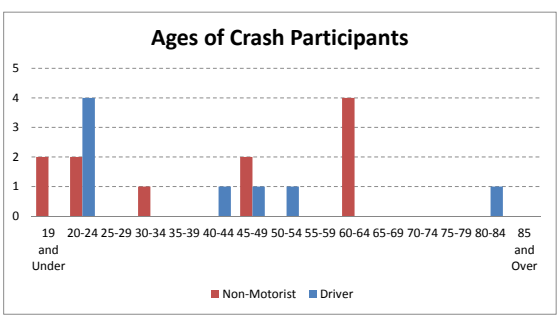


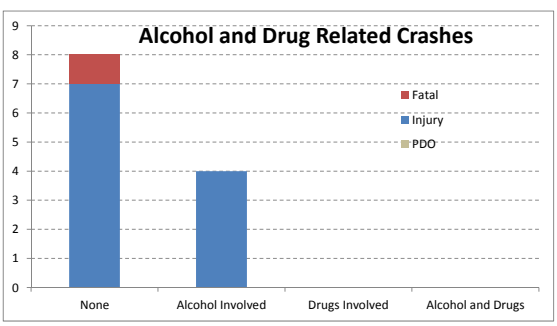












SR/CR A1A Pedestrian Safety & Mobility Study
Collision Diagram (2009 – 2014)
Location C North: Oakridge Blvd. to Seabreeze Blvd.

Figure **6**

SR/CR A1A Pedestrian Safety & Mobility Study
Collision Diagram (2009 – 2014)
Location C North: Seabreeze Blvd. to Glenview Blvd.

Figure **7**

SR/CR A1A Pedestrian Safety & Mobility Study
Collision Diagram (2009 – 2014)
Location C North: Glenview Blvd. to Riverview Blvd.

Figure **8**

SR/CR A1A Pedestrian Safety & Mobility Study
Collision Diagram (2009 – 2014)
Location C North: Riverview Blvd. to Jessamine Blvd.

Figure **9**

SR/CR A1A Pedestrian Safety & Mobility Study
Collision Diagram (2009 – 2014)
Location C North: Jessamine Blvd. to University Blvd.

Figure **10**