

# DISTRICT 4 ROAD SAFETY AUDIT REPORT

SR-A1A (OCEAN BOULEVARD)

FROM: BOCA HIGHLAND BEACH CLUB

TO: NORTHERN TOWN LIMITS OF HIGHLAND BEACH

SECTION: 93 060 000

MILE POST: 4.887 TO 7.321

TASK WORK ORDER No. 38

CONTRACT No: C-9E65

FM No. 429650-2-32-01

PREPARED FOR:

FLORIDA DEPARTMENT OF TRANSPORTATION, DISTRICT 4



## Engineer's Certification

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I, W. T. Bowman, P.E. #69132, certify that I currently hold an active Professional Engineers License in the State of Florida and am competent through education or experience to provide engineering services in the civil and traffic engineering disciplines contained in this plan, print, specification, or report.

I further certify that this Road Safety Audit (RSA) was prepared by me or under my responsible charge as defined in Chapter 61G15-18.001 F.A.C. and that all statements, conclusions and recommendations made herein are true and correct to the best of my knowledge and ability.

Study Roadway: SR-A1A (Ocean Boulevard)  
From: Boca Highland Beach Club  
To: Northern Town Limits of Highland Beach

Section No: 93 060 000

Project Start: Milepost 4.887

Project End: Milepost 7.321

Project Location: Palm Beach County

This item has been electronically signed and sealed by W. T. Bowman, P.E. on May 24, 2017 using a digital signature.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

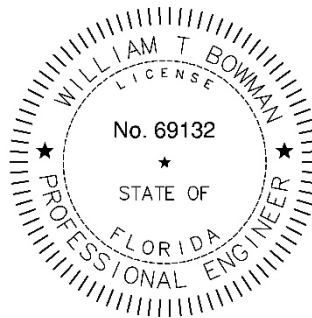


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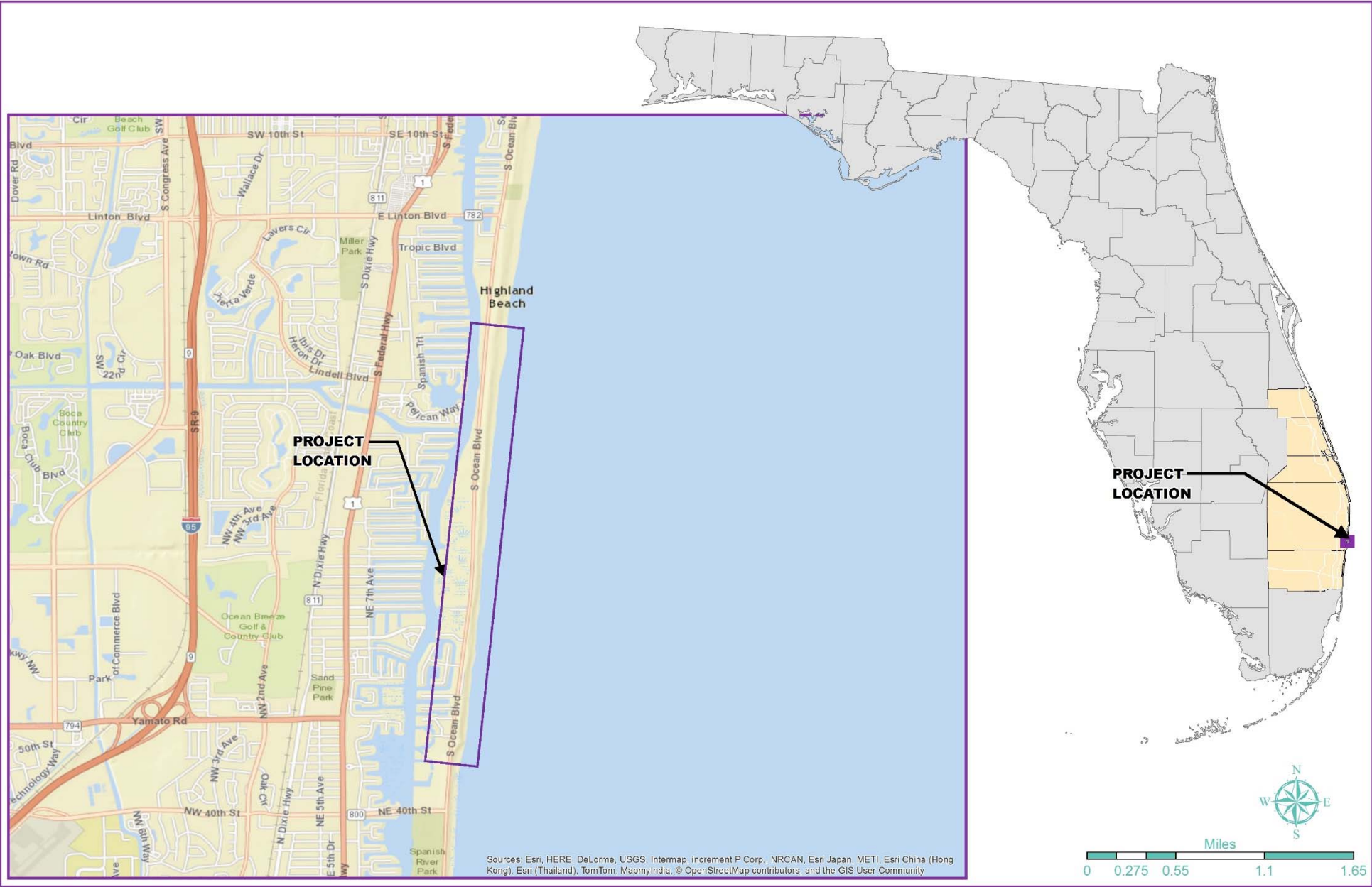


Figure 1: Project Location



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## Road Safety Audit Process

The Federal Highway Administration's (FHWA) Safety Office has established the Road Safety Audit (RSA) process as a way to further enhance the overall safety performance of roadways for all users. An RSA is a formal safety performance examination of an existing or future road or intersection by an independent, multidisciplinary team. It qualitatively estimates and reports on potential road safety issues and identifies opportunities for improvements in engineering, education, enforcement, and emergency response to improve safety for all road users.

The goal of an RSA is to save money and time and reduce the number and severity of crashes. RSAs are a low-cost, proactive approach to safety that considers all road users and identifies opportunities to enhance safety and reduce the number and severity of crashes.

A typical RSA consists of the following steps:

1. Identify project or road in service to be audited.
2. Select RSA team.
3. Conduct pre-audit meeting to review project information.
4. Perform field observations under various conditions.
5. Conduct audit analysis and prepare report of findings.
6. Present audit findings to Project Owner/Design Team.
7. Project Owner/Design Team prepares formal response.
8. Incorporate findings into project when appropriate.

## Road Safety Audit Purpose

This RSA was conducted to focus on pedestrian/bicycle safety along SR-A1A within the Town of Highland Beach from Boca Highland Beach Club to the northern town limits of Highland Beach particularly at the marked, but unsigned crossings. The study is located in Highland Beach in Palm Beach County. This RSA was conducted on Wednesday, January 18, 2016.

Observations times are follows:

- AM field observations at 8:00 AM to 9:30 AM
- Mid-day observations at 11:00 AM to 12:00 PM
- PM and Dark observations at 5:00 PM to 7:00 PM

The RSA along SR-A1A from Boca Highland Beach Club to the Carlton House was conducted to:

- Evaluate roadway and roadside features, design elements, and local conditions (glare, night visibility, adjacent land uses, etc.) that would increase the likelihood and severity of pedestrian or bicycle crashes. In particular, evaluate the eight existing midblock crossings within the corridor.
- Review first-hand the interaction of the various design elements with each other and the surrounding road network.
- Observe how roadway users are interacting with the roadway facility and other roadway users.
- Determine if the needs of all roadway users are adequately and safely met.
- Explore emerging operational trends and/or safety issues at the locations.

The objective of this RSA was to answer the following questions:

- What environmental, design, and behavioral elements present potential safety concerns in the interaction between

pedestrians/bicyclists and vehicles within this corridor; to what extent, and under what circumstances?

- What engineering, education, and enforcement opportunities exist to eliminate or mitigate identified safety concerns?

### Road Safety Audit Team Members

Tindale Oliver conducted pre-audit coordination with stakeholders to familiarize and engage potential partners on the RSA process and outcomes and to provide participants with an opportunity to exchange information and ideas and to ask questions. In addition to the core RSA team, stakeholders in the audit included representatives from FDOT Traffic Operations, and the MPO. The stakeholder email is included in Appendix A. Stakeholders that attended the field reviews are in **bold**.

#### Core Road Safety Audit Team Members

- **W. T. Bowman**, P.E., Tindale Oliver
- **Kevin Moderie**, P.E., Tindale Oliver

#### FDOT D4 Road Safety Audit Stakeholders

- **Thomas Miller**, Bike/Pedestrian Safety Program Specialist, FDOT D4
- Yujing “Tracey” Xie, P.E., Safety Engineer, FDOT D4

#### Local Agency Road Safety Audit Stakeholders

- Nick Uhren, P.E., Palm Beach MPO Executive Director
- Valerie Neilson, AICP, Palm Beach MPO
- **Francesca Taylor**, AICP, Palm Beach MPO
- **Anie Delgado**, Palm Beach MPO
- **Edward Soper**, Public Works Director
- Craig Hartmann, Chief of Police for Highland Beach
- Captain Earl Brown, Florida Highway Patrol Palm Beach District Commander

- Captain Patrick Johnson, Palm Beach County Sheriff's Office District 1 - West Palm Beach
- Captain David Moss, Palm Beach County Sheriff's Office District 7 - West Boca Raton
- **John Boden**, Citizen of Highland Beach

#### Stakeholder Coordination

Key information from stakeholders included the following:

- Concerns related to the use of midblock crossings and the interaction between pedestrians and vehicles.
- Signage is “cluttered” throughout the corridor and inconsistent/ineffective at midblock crossings
- Significant construction often results in disruption of travel lanes with construction vehicles and the absence of proper MOT.
- Significant bicycle traffic through the corridor. Confusing entry signage on both ends of the Town and unclear communication to bicyclists and vehicles.
- Dark conditions after sunset at the midblock crossing locations.
- Rear end crashes due to vehicles stopping for pedestrians (note the time of this writing, this is unverified and crash data from FDOT does not indicate this pattern)

### Road Safety Audit Findings

This RSA Findings Summary lists the location, observation overview, suggestion for consideration, and responsible agency for each observation. Observations and corresponding recommendations are assigned one of three levels of effort categories—Low, Medium, and High:

- “Low” improvements consist of basic improvements such as signs and pavement markings that can generally be done with in-house maintenance forces.

- “Medium” improvements are more involved and can typically be done by pushbutton forces.
- “High” improvements are the most involved in scope, may require right-of-way and public involvement, and typically will require a work program project to complete.

Observations also are assigned one of three timeframe categories: Short-Term, Mid-Term, and Long-Term.

- “Short-term” recommendations can take weeks to implement.
- “Mid-term” recommendations can months to implement.
- “Long-term” recommendations can take years to implement.

The observations and corresponding recommendations are grouped into spot observations, corridorwide observations:

- Spot observations relate to one issue at a single location.
- Corridorwide observations relate to a recurring issue throughout a study area.

The RSA Findings Details section includes field photos and images of recommended items. Spot observations are shown in yellow. The overview map figure on page 12 illustrates the relative location of observations on an aerial photo.

### Study Corridor

SR-A1A from Boca Highland Beach Club to the Carlton House is a north-south 2-lane undivided roadway with a speed limit of 35 miles per hour (mph). Nearby land uses include residential properties.

The Town of Highland Beach is primarily a residential community. The seasonal vs. non-seasonal population is estimated to fluctuate from 7,200 to 3,600 residents, respectively. Numerous properties on the west side of AR-A1A utilize midblock crossing in order to access the beach or east side uses through deeded access points.

The segment has unmarked (i.e. no bike symbols) paved shoulders on the east and west sides of SR-A1A. There are sidewalks provided along the east side of the corridor. Lighting is provided on utility poles along most of the east side of SR-A1A.

There are 8 mid-block crossings along the corridor:

- #1 - MP 5.017 at Grand Court
- #2 - MP 5.89 near the Regency Highland
- #3 – MP 6.15 near the Toscana Towers
- #4 – MP 6.293 at Highland Beach Club
- #5 – MP 6.507 at Coronado Ocean Club
- #6 – MP 6.577 near the Ambassadors East
- #7 – MP 6.817 near Monterey House
- #8 – MP 7.137 near Delray Sands Resort

Based on the traffic information from the Portable Traffic Monitoring Sites (PTMS), the roadway has the following 2015 Annual Average Daily Traffic (AADT) within the study area:

- Count Site ID: 930672 (SR-A1A – north of SR-800 (Spanish River Boulevard), at MP 4.7); 11,700 AADT
- Count Site ID: 937203 (SR-A1A – from Highland Beach to Delray Beach (Spanish River Boulevard), at MP 6.542); 10,000 AADT
- Count Site ID: 930250 (SR-A1A – south of Linton Boulevard, at MP 6.542); 12,600 AADT

Figure 1 on page 1 shows the project location. Figure 2 through Figure 5 show the treatments at the eight midblock crossing.



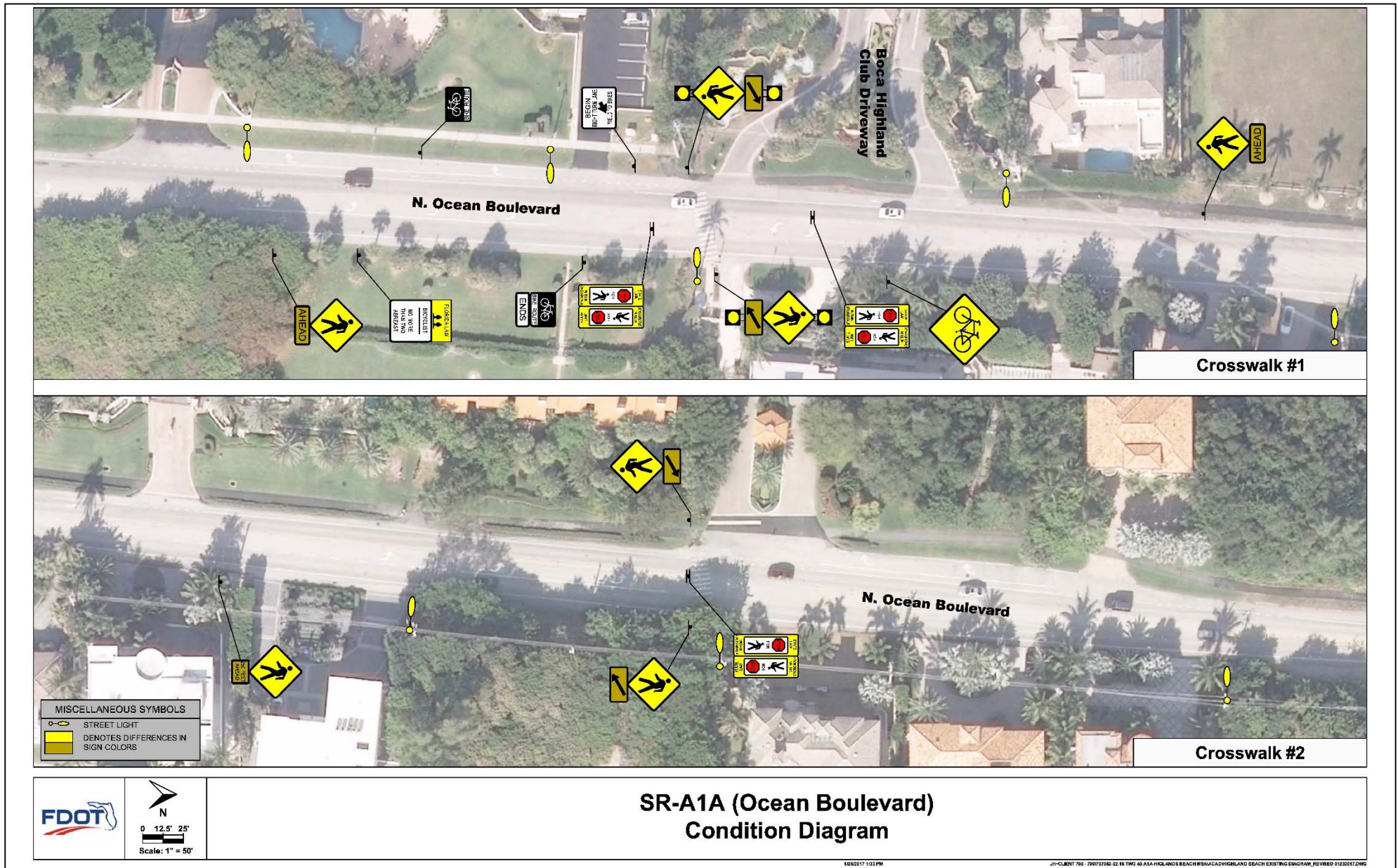


Figure 2: Mid-block Crossing #1 at Grand Court and Mid-block Crossing #2 near the Regency Highland



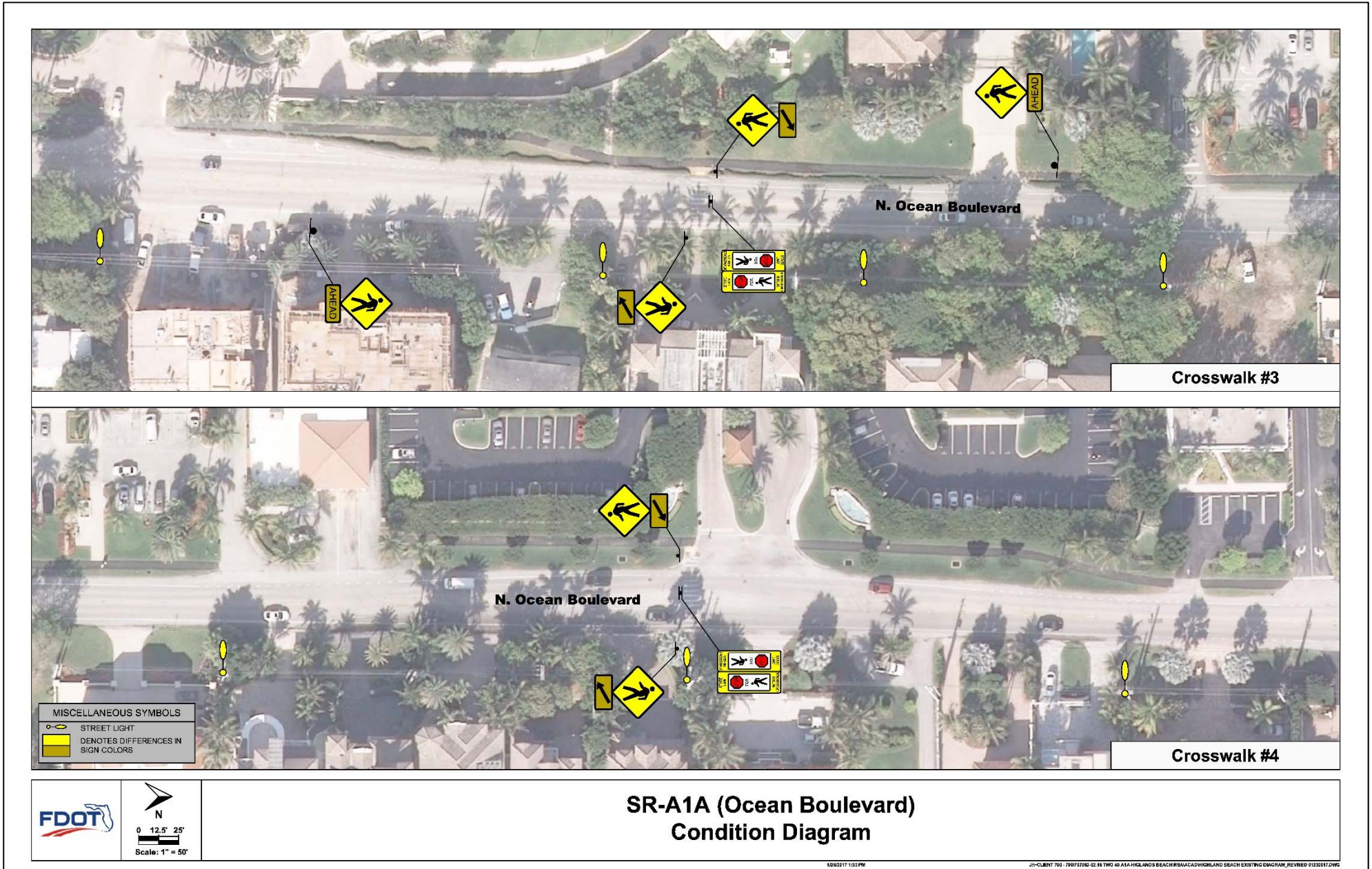


Figure 3: Mid-block Crossing #3 near the Toscana Towers and Mid-block Crossing #4 at Highland Beach Club



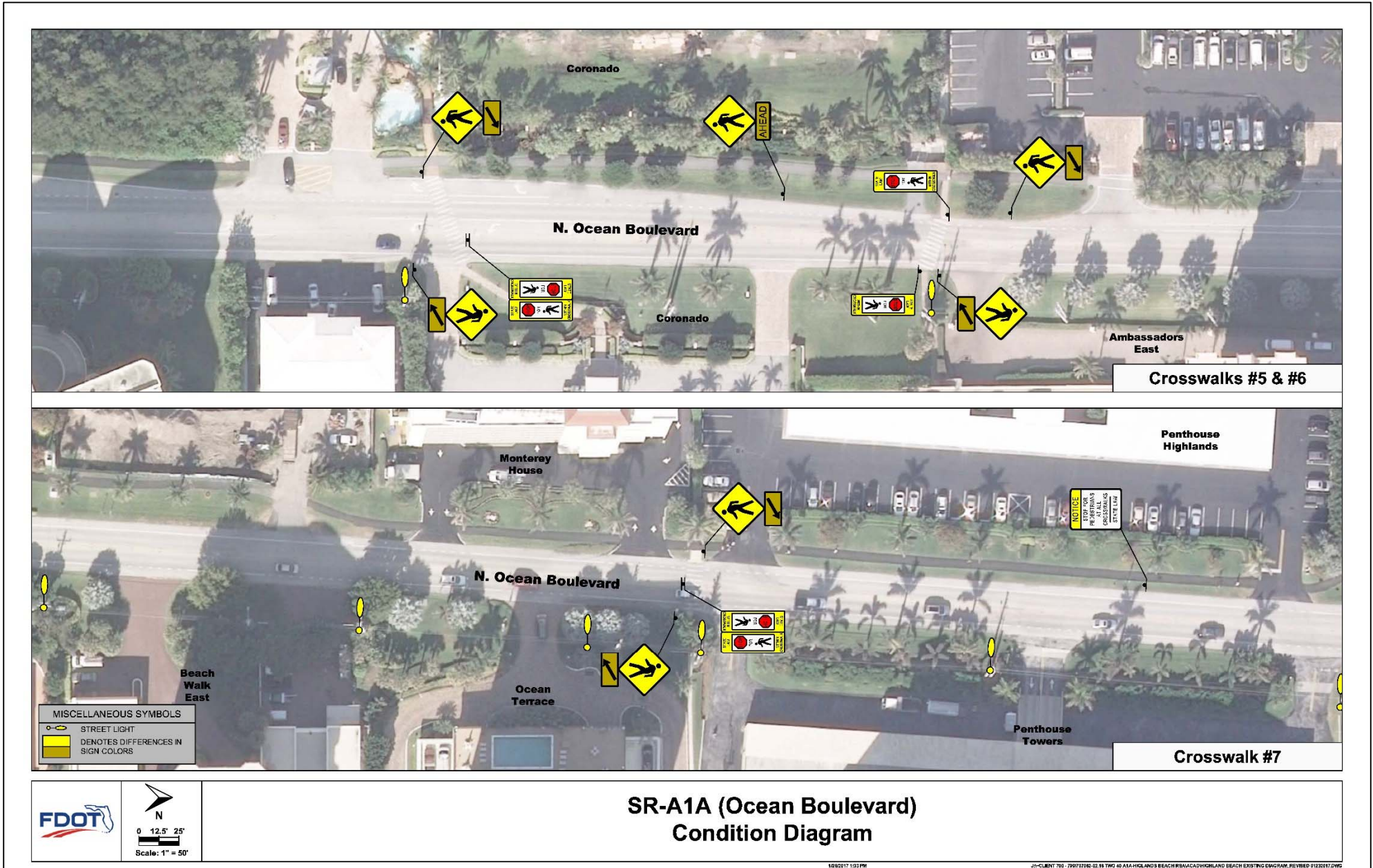


Figure 4: Mid-block Crossings #5 at Coronado Ocean Club, Mid-block Crossing #6 near the Ambassadors East, and Mid-block Crossing #7 near Monterey House

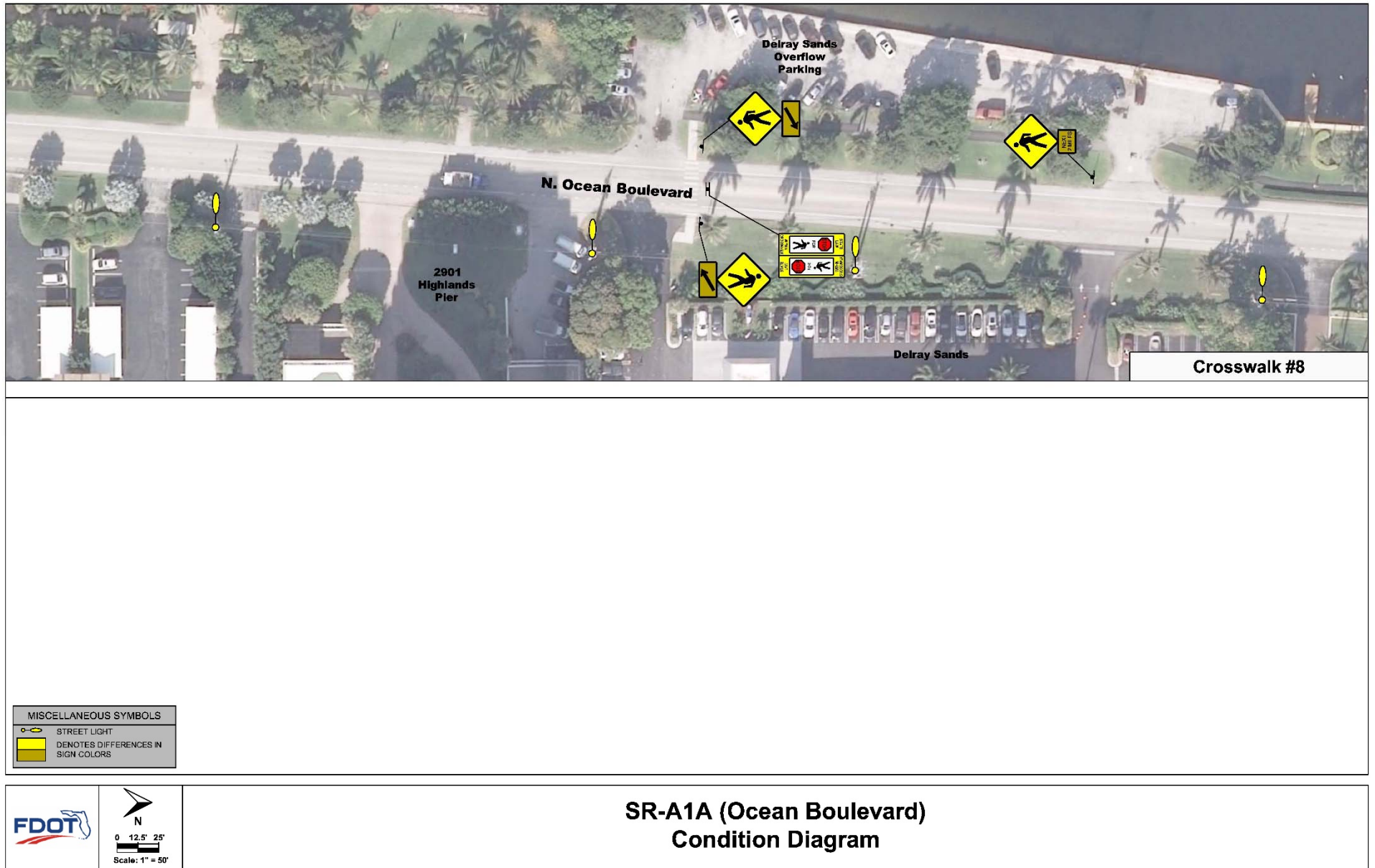


Figure 5: Mid-block Crossings #7 near Monterey House and Mid-block Crossings #8 near Delray Sands Resort



## Key Observations

Observations and recommendations are summarized, specifically in Road Safety Audit Findings Summary. Key general observations that resulted from this review include:

- Inconsistently marked crossings throughout the corridor
- Lack of compliant or marked bike lanes
- Extraneous signage and “sign clutter”
- Dark conditions at pedestrian crossings at night
- Potential desire (from residents) for additional crossings for:
  - Access from the west side of SR-A1A to deeded access points
  - Connections from uses on the east side to sidewalks on the west side

It is recommended that, beyond the recommendations that follow, that a consistent and uniform approach be reviewed and presented to address the primary concerns above.

## Crash Data Analysis

Crash data from January 2011 to December 2015, were extracted from the State Crash Analysis Reporting System (CARS), Signal Four, and Tindale Oliver’s Crash Data Management System (CDMS) along the study segment.

The five years of crash data were reviewed to identify any crash patterns that could be addressed as part of the RSA recommendations. During the 2011 to 2015 analysis period, 7 crashes were reported. Table 1 provides the overall number of crashes per study year, crash type, lighting, surface conditions, and injury severity.

**Table 1: Crash Statistics (2011 to 2015)**

SR-A1A		Number of Crashes					5 Year Total	Mean Crashes	%	Statewide %
		2011	2012	2013	2014	2015				
Crash Type	Angle	0	0	0	1	0	1	0.2	14%	20%
	Bicycle	0	0	0	1	1	2	0.4	29%	2%
	Front to Front	1	0	0	0	0	1	0.2	14%	2%
	Front to Rear	0	0	0	1	1	2	0.4	29%	45%
	Other, Explain in Narrative	0	0	0	1	0	1	0.2	14%	1%
	<b>Total</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>	<b>7</b>	<b>1.4</b>	<b>100%</b>	<b>83%</b>
Injury Severity	Fatal	0	0	0	0	1	1	0.2	14%	1%
	Incapacitating	1	0	0	0	1	2	0.4	29%	39%
	NonIncapacitating	0	0	0	1	0	1	0.2	14%	
	Possible Injury	0	0	0	2	0	2	0.4	29%	
	None	0	0	0	1	0	1	0.2	14%	60%
	<b>Total</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>	<b>7</b>	<b>1.4</b>	<b>100%</b>	<b>100%</b>
Lighting Condition	Daylight	0	0	0	3	2	5	1	71%	69%
	Dawn	0	0	0	0	0	0	0	0%	2%
	Dusk	0	0	0	0	0	0	0	0%	3%
	Dark-Lighted	0	0	0	0	0	0	0	0%	20%
	Dark-Not Lighted	1	0	0	1	0	2	0.4	29%	5%
	<b>Total</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>	<b>7</b>	<b>1.4</b>	<b>100%</b>	<b>99%</b>
Surface Conditions	Dry	1	0	0	4	2	7	1.4	100%	81%
	Wet	0	0	0	0	0	0	0	0%	19%
	Unknown	0	0	0	0	0	0	0	0%	-
	<b>Total</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>2</b>	<b>7</b>	<b>1.4</b>	<b>100%</b>	<b>100%</b>

From Table 1, there were 2 crashes with bicyclists, no pedestrian crashes, and 1 crash with a fatality. Table 2 summarizes each of the 2 crashes with bicyclists and the 1 crash involving a fatality. Figure 6 depicts the 2 crashes involving the bicyclists and the 1 fatality crash.

**Table 2: Crashes with Bicyclists**

	Date, Day, Time, Lighting, Road Conditions	HSMV Report Number	Location (MP)	Summary
Bicycle Crashes	10/02/14, Thursday, 07:55 PM, Dark-Not Lighted, Dry Roadway Conditions	82619495	4.843	Bicyclist was travelling northbound in the northbound bike lane and was rear-ended by a vehicle. This crash resulted in a non-incapacitating injury.
	04/24/15, Friday, 12:29 PM, Daylight, Dry Roadway Conditions	81415284	7.737	A southbound vehicle failed to slow down to a left-turning vehicle, swerved to the right to avoid the crash, and then struck the bicyclists. The driver was reported as being impaired. This crash resulted in a <b>fatality</b> .

The study area is not on the State of Florida’s high-crash segment list (2011–2013) from MP 4.887 to MP 7.321.



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A citizen noted that within the past year, there were rear-end crashes caused by vehicles stopping for pedestrians. Note the time of this writing, FDOT and Signal Four does not indicate this pattern. Therefore, the Highland Beach Police Department was contacted and provided any crash reports that FDOT and Signal Four may not have to date. The following additional crashes were reported in 2016:

- On Friday, March 11<sup>th</sup> 2016 at 11:23 AM during dry roadway conditions, a northbound vehicle stopped for a pedestrian crossing at Crosswalk 5 at Coronado Ocean Club and was rear-ended by a northbound vehicle. The crash resulted in a possible injury.
- On Thursday, August 18, 2016 at 3:20 PM during dry roadway conditions, a southbound vehicle was lost and pulled over. During this time, an approaching bicyclist was attempting to pass the vehicle on the shoulder but was unable to do so as another vehicle was travelling southbound in the through lane. Therefore, the bicyclist struck the parked car on the shoulder and resulted in non-incapacitating injuries.
- On Saturday, August 20, 2016 at 2:55 PM during dry roadway conditions, a southbound bicyclist was looking down and struck a parked delivery truck on the shoulder. The crash resulted in no injuries.
- On Sunday, October 23, 2016 at 1:45 PM during dry roadway conditions, a vehicle was making a northbound right turn and was struck by a motorcyclist that flew off the motorcycle as he applied the brakes too hard. The crash resulted in non-incapacitating injuries.
- On Thursday, November 03, 2016 at 5:55 PM during dry roadway conditions, a southbound left-turning vehicle was rear-ended by another vehicle. The crash resulted in non-incapacitating injuries.

From reviewing the crash reports provided by the Highland Beach Police Department, one (1) rear-end crash occurred at a mid-block crossing while pedestrians were present, and two (2) bicyclist crashes occurred on the shoulder involving a parked vehicle.

The additional 2 bicyclist crashes from 2016 were added to Figure 6.

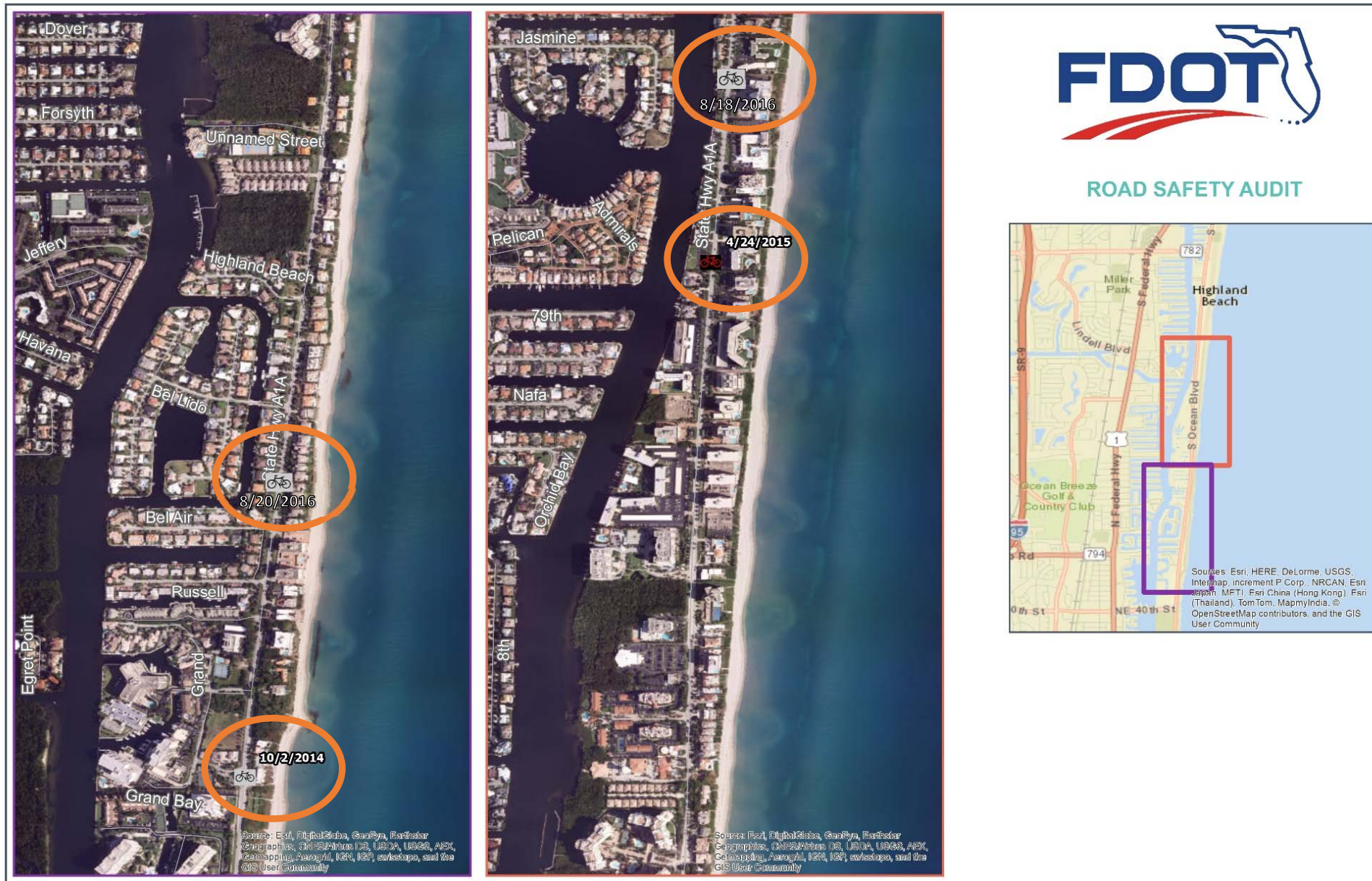


Figure 6: Collision Diagram of 4 Bicycle Crashes (2011-2016)

## Road Safety Audit Findings Summary

ID	Location Description:	Spot Observation Overview:	Suggestions for Consideration:	Assigned to:
01	SR-A1A, north of Town Hall and north of Casuarina Condominiums	From field reviews it was unclear why there are northbound and southbound "Hidden Driveway" signs with flashing beacons	Remove the northbound and southbound "Hidden Driveway" signs and flashing beacons	FDOT
02	SR-A1A at Crosswalk #1	Bike signage is unclear	Remove "FLORIDA LAW BICYCLIST NO MORE THAN TWO ABREAST" and add "SHARE THE ROAD" signs	FDOT
03	SR-A1A within Highland Beach	Shoulders are provided throughout Highland Beach but there are no bike lanes	Consider reviewing the feasibility of providing bike lanes or sharrows along SR-A1A in Highland Beach	FDOT
04	SR-A1A at 3 unmarked locations	Residents request additional crosswalk locations	No recommendation at this time	FDOT
05	SR-A1A at the 8 mid-block crosswalks	Vehicles were observed not stopping for pedestrians at mid-block crosswalks	Install advanced "PEDESTRIAN WARNING" (W11-2) with "AHEAD" (W16-9p) signs 250 feet from the crosswalks per FDOT Design Standards Index 17346 Sheet 13	FDOT
06	SR-A1A at the 8 mid-block crosswalks	Vehicles were observed not stopping for pedestrians at mid-block crosswalks	Install "STOP HERE FOR PEDESTRIANS" (R1-5bL) signs at the mid-block crosswalks per Scheme 2 of FDOT Design Standards Index 17346 Sheet 13	FDOT
07	SR-A1A at the 8 mid-block crosswalks	Vehicles were observed not stopping for pedestrians at mid-block crosswalks	Stripe mid-block crosswalks per Scheme 2 of FDOT Design Standards Index 17346 Sheet 13	FDOT
08	SR-A1A at Crosswalk 1 at the Boca Highland Beach Club	Pedestrian visibility during dark conditions is low and vehicles observed not stopping for pedestrians	Install "PEDESTRIAN WARNING" (W11-2) signs with LEDs and conduct a before and after compliance review	FDOT
09	SR-A1A, west sidewalk at crosswalk #1	Sidewalk transitions into the southbound shoulder	Add sidewalk on the west side of Crosswalk #1	FDOT

<i>ID</i>	<i>Location Description:</i>	<i>Corridorwide Observation Overview:</i>	<i>Suggestions for Consideration:</i>	<i>Assigned to:</i>
C01	SR-A1A at the 8 mid-block crosswalks	Missing detectable warning surfaces and ADA issues	Add missing detectable warning surfaces and correct ADA issues	FDOT, Private Properties
C02	SR-A1A in Highland Beach	Inconsistent and noncompliant sign colors, rotated sign, poor retroreflectivity	Replace signs as needed	FDOT
C03	SR-A1A in Highland Beach	Excessive use of signs	Conduct sign inventory to determine which signs could be removed	FDOT
C04	SR-A1A at construction sites	MOT not followed correctly at private developments	Enforce MOT	FDOT, Town of Highland Beach



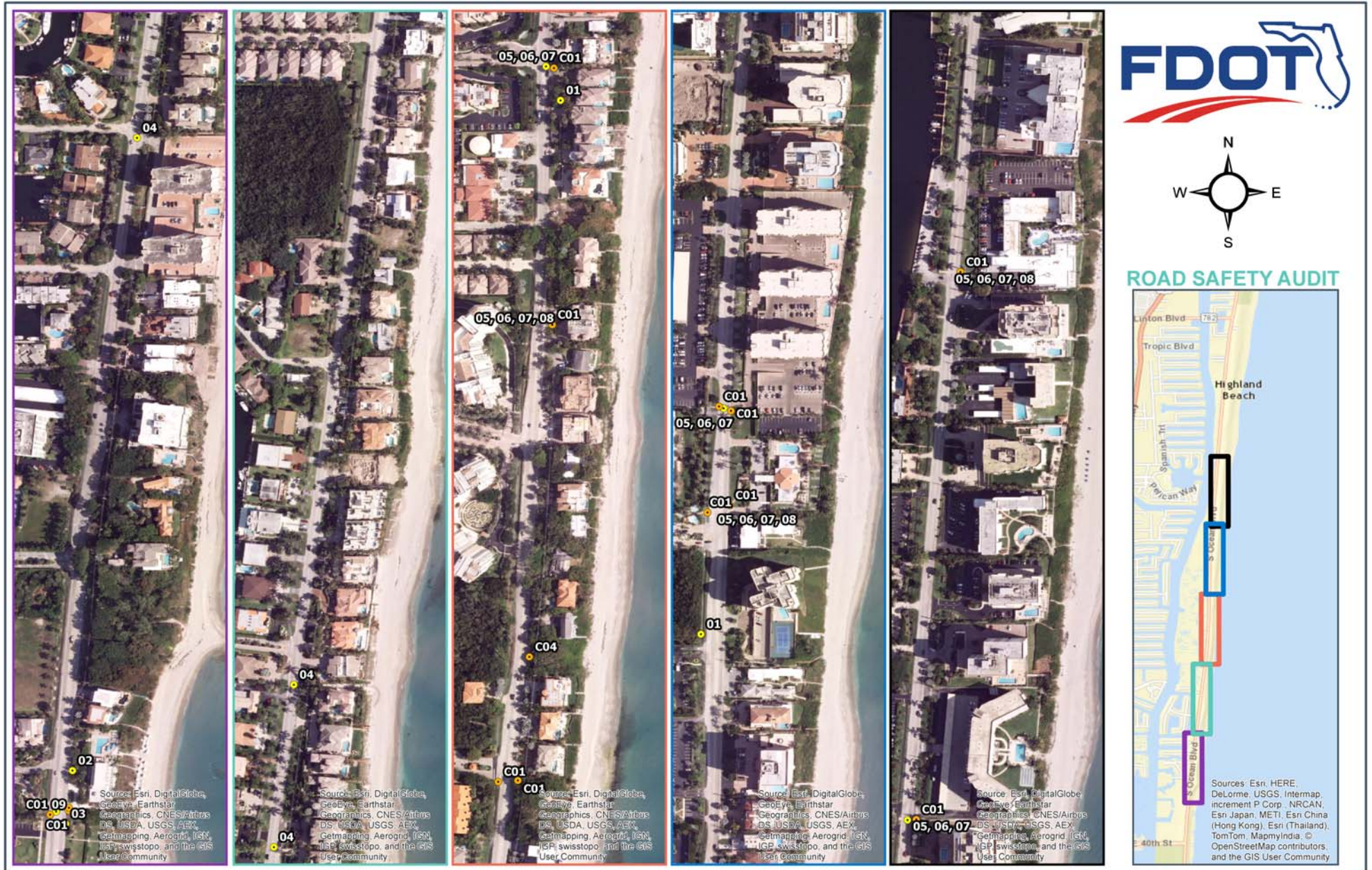


Figure 7: Project Overview



## Road Safety Audit Findings Details - Spot Observations

ID	Location Description:	Spot Observation Overview:	Suggestions for Consideration:
01	SR-A1A, north of Town Hall and north of Casuarina Condominiums	From field reviews it was unclear why there are northbound and southbound "Hidden Driveway" signs with flashing beacons	Remove the northbound and southbound "Hidden Driveway" signs and flashing beacons



### Spot Observation Details:

From field reviews it was unclear why there are northbound and southbound "HIDDEN DRIVEWAY" signs with flashing beacons just north of Town Hall for northbound traffic and north of Casuarina Condominiums for southbound traffic. The driveways in this section are no different than any of the others driveways along the rest of the study area on SR-A1A. The sign's purpose dates back to the 1980's and most likely the conditions for which the sign was installed for no longer applies, as the area has since changed.

In addition, it was noted that the northbound "HIDDEN DRIVEWAY" was not visible as trees were blocking its visibility.

### Suggestion Details:

As there are no hidden driveways along SR-A1A, remove the "HIDDEN DRIVEWAY" signs and flashing beacons.

Agency:	Improvement Type:
FDOT	Signs
Time Frame:	EEE:
Short	Engineering
Level of Effort:	Comment:
Low	-

ID	Location Description:	Spot Observation Overview:	Suggestions for Consideration:
02	SR-A1A at Crosswalk #1	Bike signage is unclear	Remove "FLORIDA LAW BICYCLIST NO MORE THAN TWO ABREAST" and add "SHARE THE ROAD" signs



#### Spot Observation Details:

Travelling northbound along SR-A1A from Boca Raton to Highland Beach, the bike lanes transition to shoulders. As the bike lane transitions, there are multiple signs advising bicyclists and vehicular traffic of the transition. The signs include the following:

- "FLORIDA LAW BICYCLIST NO MORE THAN TWO ABREAST"
- "BIKE LANE ENDS"
- "BICYCLIST" warning sign

Due to the different messages, the signs may be unclear to drivers about proper behavior.

#### Suggestion Details:

To better communicate to drivers and bicyclists that bicyclist may use the lanes or the shoulders, consider removing or relocating the first sign "FLORIDA LAW BICYCLIST NO MORE THAN TWO ABREAST" and adding "SHARE THE ROAD" (W16-1P) plaque to the existing "BICYCLE" warning sign.

Agency:	Improvement Type:
FDOT	Pedestrian, Signs
Time Frame:	EEE:
Short	Engineering
Level of Effort:	Comment:
Low	-

ID	Location Description:	Spot Observation Overview:	Suggestions for Consideration:
03	SR-A1A within Highland Beach	Shoulders are provided throughout Highland Beach but there are no bike lanes	Consider reviewing the feasibility of providing bike lanes or sharrows along SR-A1A in Highland Beach



#### Spot Observation Details:


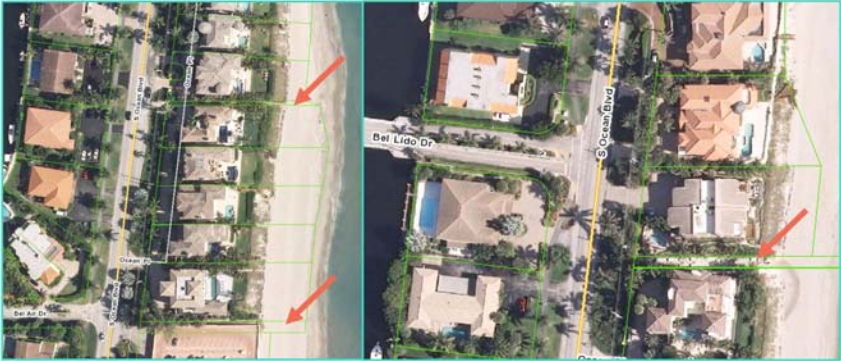
Shoulders are provided throughout Highland Beach but there are no bike lanes. Two crashes with bicyclists occurred in the study area in five years. Bicyclists were observed during all field observations and were observed riding along the shoulder or the traffic lanes.

#### Suggestion Details:

Due to the number of bicyclists using the shoulder and the lanes of SR-A1A, review the feasibility of providing bike lanes along SR-A1A in Highland Beach. If bike lanes are not feasible, it is recommended to stripe sharrows along SR-A1A within Highland Beach. Note that there are no resurfacing projects along this section of SR-A1A scheduled in the next five years per FDOT's Five Year Work Program.

Agency:	Improvement Type:
FDOT	Pedestrian, Pavement Markings
Time Frame:	EEE:
Moderate	Engineering
Level of Effort:	Comment:
Medium	-



ID	Location Description:	Spot Observation Overview:	
04	SR-A1A at 3 unmarked locations	Residents request additional crosswalk locations	No recommendation at this time
		<p><b>Spot Observation Details:</b></p> <p>Residents of Highland Beach requested additional crosswalks as the residents live on the west side and have beach access on the opposing side of SR-A1A. From the West Palm Beach Property Appraiser website, three (3) beach access locations were identified that do not have mid-block crossings. These locations include the following:</p> <ul style="list-style-type: none"> <li>- Bel Lido Drive at 45 Ocean</li> <li>- Bel Air Drive</li> <li>- 370 feet north of Bel Air Drive</li> </ul> <p>During field observations, no pedestrians were observed crossing at these locations. However, it is noted that field reviews were conducted on a weekday and the crossings may be busier during the weekend.</p>	
		<p><b>Suggestion Details:</b></p> <p>During field reviews no pedestrians were observed crossing at the requested mid-block crossing locations. Therefore, it is highly unlikely there is sufficient pedestrian demand to meet the thresholds of Section 3.8 of the Traffic Engineering Manual (TEM). Therefore, it is not recommended to add mid-block crossing at this time.</p> <p>If pedestrian demand does increase, conduct pedestrian and bicycle counts at these locations to determine if the minimum levels of pedestrian demand is met per Section 3.8 of the TEM.</p>	
<b>Agency:</b>		<b>Improvement Type:</b>	
FDOT		Pedestrian, Pavement Markings, Signs	
<b>Time Frame:</b>		<b>EEE:</b>	
Long		Engineering	
<b>Level of Effort:</b>		<b>Comment:</b>	
High		-	

ID	Location Description:	Spot Observation Overview:	Suggestions for Consideration:
05	SR-A1A at the 8 mid-block crosswalks	Vehicles were observed not stopping for pedestrians at mid-block crosswalks	Install advanced "PEDESTRIAN WARNING" (W11-2) with "AHEAD" (W16-9p) signs 250 feet from the crosswalks per FDOT Design Standards Index 17346 Sheet 13

Advanced Pedestrian Warning Signage Installed at Crosswalk?		
Crosswalk	Northbound	Southbound
1	Yes	Yes
2	Yes	No
3	Yes	Yes
4	No	No
5	No	Yes
6	No	No
7	No	No
8	No	Yes



#### Spot Observation Details:

Vehicles were observed not stopping for pedestrians with or without safety vests at the mid-block crosswalks along SR-A1A during all field observations. In addition, many of the crosswalks do not have advanced "PEDESTRIAN WARNING" (W11-2) with "AHEAD" (W16-9p) warning signs as shown on the table to the left.

#### Suggestion Details:

To increase visibility of the crosswalk and to properly warn drivers that pedestrians may be crossing at an upcoming mid-block crosswalk, install advanced "PEDESTRIAN WARNING" (W11-2) with "AHEAD" (W16-9p) signs 250 feet from the crosswalks per FDOT Design Standards Index 17346 Sheet 13.

Agency:	Improvement Type:
FDOT	Pedestrians, Signs
Time Frame:	EEE:
Short	Engineering
Level of Effort:	Comment:
Low	-

ID	Location Description:	Spot Observation Overview:	Suggestions for Consideration:
06	SR-A1A at the 8 mid-block crosswalks	Vehicles were observed not stopping for pedestrians at mid-block crosswalks	Install "STOP HERE FOR PEDESTRIANS" (R1-5bL) signs at the mid-block crosswalks per Scheme 2 of FDOT Design Standards Index 17346 Sheet 13



#### Spot Observation Details:

Vehicles were observed not stopping for pedestrians with or without safety vests at the mid-block crosswalks along SR-A1A during all field observations.

#### Suggestion Details:

To increase visibility of the crosswalk and to properly communicate to drivers that it is state law to stop for pedestrians, install "STOP HERE FOR PEDESTRIANS" (R1-5bL) signs at the mid-block crosswalks per Scheme 2 of FDOT Design Standards Index 17346 Sheet 13.

Agency:	Improvement Type:
FDOT	Pedestrians, Signs
Time Frame:	EEE:
Short	Engineering
Level of Effort:	Comment:
Low	-

ID	Location Description:	Spot Observation Overview:	Suggestions for Consideration:
07	SR-A1A at the 8 mid-block crosswalks	Vehicles were observed not stopping for pedestrians at mid-block crosswalks	Stripe mid-block crosswalks per Scheme 2 of FDOT Design Standards Index 17346 Sheet 13

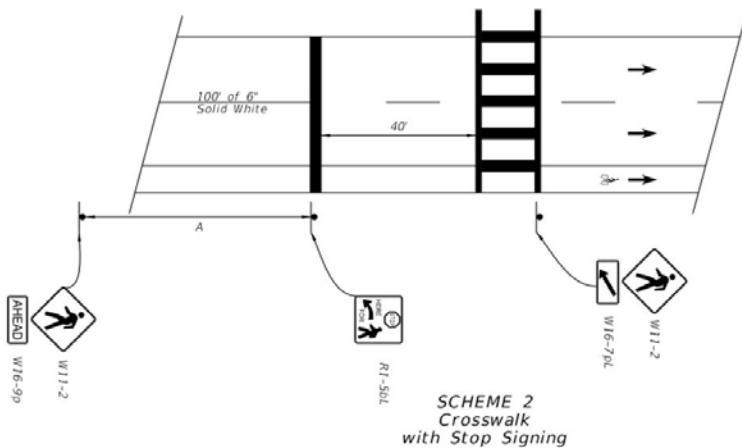


#### Spot Observation Details:

Vehicles were observed not stopping for pedestrians with or without safety vests at the mid-block crosswalks along SR-A1A during all field observations.

#### Suggestion Details:

To increase visibility of the crosswalk and to properly communicate to drivers that it is state law to stop for pedestrians, stripe the mid-block crossings with STOP bars and special emphasis crosswalk markings per FDOT Design Standards Index 17346 Sheet 13.



Agency:	Improvement Type:
FDOT	Pedestrian, Pavement Markings
Time Frame:	EEE:
Moderate	Engineering
Level of Effort:	Comment:
Medium	-



ID	Location Description:	Spot Observation Overview:	Suggestions for Consideration:
08	SR-A1A at Crosswalk 1 at the Boca Highland Beach Club	Pedestrian visibility during dark conditions is low and vehicles observed not stopping for pedestrians	Install "PEDESTRIAN WARNING" (W11-2) signs with LEDs and conduct a before and after compliance review



#### Spot Observation Details:

The crosswalks have limited lighting and pedestrian visibility is low during dark conditions. Vehicles were also observed not stopping for pedestrians with or without safety vests at the mid-block crosswalks along SR-A1A during all field observations.

#### Suggestion Details:

Per 2A.07 of the MUTCD, LED units may be used in a sign to improve the conspicuity of the sign. To increase visibility of the crosswalk and to properly communicate to drivers that pedestrians are crossing at the mid-block crosswalk, consider installing "PEDESTRIAN WARNING" (W11-2) signs with LEDs at Boca Highland beach Club as there is an existing flashing beacon at this crosswalk. Note this location would have a before and after compliance study to compare the compliance of vehicles stopping for pedestrians with the existing flashing beacon and the proposed LED signs. If the LED signs are found to have less compliance, the existing flashing beacon would be put back in place and the LED signs would be removed. If the LED signs are determined to have more compliance, the LED signs may be considered for additional mid-block crosswalks.

The following crosswalks could be considered (based on estimated units): Crosswalk 2 at the Regency Highland Beach Club and Marina, Crosswalk 3 at the Toscana Condominiums, Crosswalk 5 at the Coronado Ocean Club, and Crosswalk 8 at the Delray Sands Resort. Note that the Delray Sands Resort is considered as it could be used by tourists staying or eating at the resort.

<b>Agency:</b>	<b>Improvement Type:</b>
FDOT	Signs, Pedestrian
<b>Time Frame:</b>	<b>EEE:</b>
Moderate	Engineering
<b>Level of Effort:</b>	<b>Comment:</b>
Medium	-

ID	Location Description:	Spot Observation Overview:	
09	SR-A1A, west sidewalk at crosswalk #1	Sidewalk transitions into the southbound shoulder	Add sidewalk on the west side of Crosswalk #1



#### Spot Observation Details:

The sidewalk briefly transitions into the southbound shoulder at crosswalk #1.

#### Suggestion Details:

For better accessibility for pedestrians, consider reviewing the feasibility of adding a concrete sidewalk on the west side of crosswalk #1 where it is missing.

Agency:	Improvement Type:
FDOT	Pedestrian
Time Frame:	EEE:
Moderate	Engineering
Level of Effort:	Comment:
Medium	-

## Road Safety Audit Findings Details - Corridorwide Observations

ID	Location Description:	Corridorwide Observation Overview:	Suggestions for Consideration:
<b>C01</b>	SR-A1A at the 8 mid-block crosswalks	Missing detectable warning surfaces and ADA issues	Add missing detectable warning surfaces and correct ADA issues



### Corridorwide Observation Details:

During field observations, missing detectable warning surfaces were observed at the mid-block crossings. Note that missing detectable warning surfaces are shown at each of the crosswalks in the table to the left. In addition, many of the sidewalks within FDOT's right of way were decorative or had ADA issues as shown on the picture to the left.

### Suggestion Details:

Per the table to the left, add missing detectable warning surfaces at the mid-block crossings where they are noted as missing.

To make the crosswalks more accessible within FDOT right-of-way, take corrective measures to bring the sidewalk to ADA standards. At locations outside of FDOT's right-of-way, inform private properties of ADA issues so they may take appropriate corrective measures.

Detectable Warning Surfaces at Crosswalk?		
Crosswalk	West Side	East Side
1	No	No
2	No	No
3	Yes	No
4	Yes	No
5	No	No
6	No	No
7	Yes	No
8	Yes	No

Agency:	Improvement Type:
FDOT, Private Properties	Maintenance, Pedestrian
Time Frame:	EEE:
Short	Engineering
Level of Effort:	Comment:
Low	-



**ID** Location Description:**C02** SR-A1A in Highland Beach

## Corridorwide Observation Overview:

Inconsistent and noncompliant sign colors,  
rotated sign, poor retroreflectivity

## Suggestions for Consideration:

Replace signs as needed

## Corridorwide Observation Details:

During field observations maintenance issues were observed with the signs and include the following:

- "PEDESTRIAN WARNING" (W11-2) signs and the supplemental arrow plaques (W16-7p) signs were not consistent. The signs varied from yellow or yellow-green.
- The "PEDESTRIAN WARNING" (W11-2) sign and the supplemental arrow plaque (W16-7p) sign at crosswalks #4 was crooked and was not facing southbound traffic.
- Many of the signs had poor retroreflectivity.
- The In-Street Pedestrian Crossing signs do not follow the MUTCD as these signs were placed on the shoulder instead of being placed on the center line or on a lane line.

## Suggestion Details:

Replace signs that do not have consistent colors, rotate the sign at crosswalk #4, replace signs with poor retroreflectivity, and relocate or remove the In-Street Pedestrian Crossing signs that are on the shoulder. See Appendix B for inventory and recommendations.



## Agency:

FDOT

## Improvement Type:

Maintenance, Signs

## Time Frame:

Short

## EEE:

Engineering

## Level of Effort:

Low

## Comment:

-

**ID** Location Description:**C03** SR-A1A in Highland Beach

## Corridorwide Observation Overview:

Excessive use of signs

## Suggestions for Consideration:

Conduct sign inventory to determine which signs could be removed

## Corridorwide Observation Details:

Residents are concerned that there are too many signs along the corridor which may distract drivers of the upcoming 8 mid-block crosswalks.

## Suggestion Details:

Conduct a sign inventory to determine which signs could be removed along SR-A1A in Highland Beach.



Agency:

FDOT

Improvement Type:

Signs

Time Frame:

Moderate

EEE:

Engineering

Level of Effort:

Medium

Comment:

-

ID	Location Description:	Corridorwide Observation Overview:	Suggestions for Consideration:
C04	SR-A1A at construction sites	MOT not followed correctly at private developments	Enforce MOT



*Corridorwide Observation Details:*

During field observations, Maintenance of Traffic (MOT) for private developments along SR-A1A was not followed properly. MOT related issues included the following:

- Construction trucks observed parking in the bike lanes.
- Visibility of construction signs were blocked by trees and bushes.
- Minimal visibility of "Work Zone" or "Work Ahead" warning signs to properly warn drivers of construction vehicles blocking lanes
- Incorrect placement of cones

*Suggestion Details:*

Due to the number of private developments along SR-A1A, MOT plans need to be properly followed and enforced.



Agency:	Improvement Type:
FDOT, Town of Highland Beach	MOT
Time Frame:	EEE:
Short	Engineering, Enforcement
Level of Effort:	Comment:
Low	-



**APPENDIX A:**  
**Stakeholder Coordination**

## Kevin Moderie

---

**From:** Kevin Moderie  
**Sent:** Wednesday, December 28, 2016 3:43 PM  
**Cc:** W.T. Bowman  
**Subject:** Highland Beach RSA along SR-A1A

All,

At the request of FDOT D4 Traffic Operations, we will be conducting a Road Safety Audit along SR-A1A within the city limits of Highland Beach generally from Boca Highland Beach Club to the Carlton House. This RSA will focus on pedestrian and bicycle safety improvements in the area, particularly at the marked but unsigned crossings, based on both crash history and hazardous/unsafe conditions (in absence of a specific crash history). This RSA is being conducted based on pedestrian safety concerns presented by residents and staff of Highland Beach.

This RSA is being conducted to identify short-, mid-, and long-term improvements to enhance the safety of the corridor with a primary focus on pedestrians and bicyclists.

As defined by FHWA, a Road Safety Audit is a formal safety performance examination of an existing or future road or intersection by an independent, multidisciplinary team. It qualitatively estimates and reports on potential road safety issues and identifies opportunities for improvements in safety for all road users.

Per this email, we are requesting any upfront input you would care to offer related to the study area. Email or call me at any time.

Additionally, please be aware that we will be conducting the field reviews the week of January 16<sup>th</sup> (TBD). These will include a short intro, a walking review of the site during AM, midday, PM, and night time hour) and a short debrief with attendees to discuss the ideas from the field and refine to recommendations. We very much welcome you to join us for any (or all) of the field reviews and will provide a schedule shortly.

Lastly, the recommendations will be documented in an RSA findings report and provide for final approval and monitoring.

**\*\*Note, I used BCC to avoid “kick back” emails or reply all. The stakeholders included on this list are:**

Nick Uhren, PE, PBMPO  
Valerie Neilson, AICP, PBMPO  
Franchesca Taylor, AICP, PBMPO  
Anie Delgado, PBMPO  
Thomas Miller, FDOT D4  
Alexander Barr, FDOT D4  
Satya Pinapaka, FDOT D4  
Yujijing Xie, FDOT D4  
Captain Earl Brown, FLHSMV  
Edward J. Soper, City of Highland Beach  
Craig Hartmann, Chief of Police for the City of Highland Beach  
John Boden, Citizen of Highland Beach

Thank you and feel free to contact me anytime.

**Kevin Moderie, P.E.**  
TRANSPORTATION ENGINEER

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Wed 12/28/2016 3:43 PM

Kevin Moderie

Highland Beach RSA along SR-A1A

To

Cc W.T. Bowman

Bcc 'Alexander.Barr@dot.state.fl.us'; 'Satya.Pinapaka@dot.state.fl.us'; 'yujing.xie@dot.state.fl.us'; 'thomas.miller@dot.state.fl.us'; 'earlbrown@flhsmv.gov'; 'MossD@pbso.org'; 'District1Command@pbso.org'; 'esoper@d.highland-beach.fl.us'; 'chartmann@d.highland-beach.fl.us'; 'NUhren@PalmBeachMPO.org'; 'VNeilson@PalmBeachMPO.org'; 'FTaylor@PalmBeachMPO.org'; 'ADelgado@PalmBeachMPO.org'; 'jboden@elderissues.com'



**APPENDIX B:**  
**Crossing Inventory**

D4 Road Safety Audit: SR-A1A within the Town of Highland Beach

Crosswalk	Northbound									Southbound									Markings			
	Adv Sign	Retrorefle ctivity (5)	Adv Plaque	Retrorefle ctivity	W11-1	Retrorefle ctivity	Plaque	Retrorefle ctivity	Beacon	Adv Sign	Retrorefle ctivity (5)	Adv Plaque	Retrorefle ctivity (5)	W11-1	Retrorefle ctivity (5)	Plaque	Retrorefle ctivity (5)	Beacon	Crossing Type	Condition	Stop Bar	Paddle
1 (6)	Y	3	Y	3	FYG	2	Y	2	12" C	FYG	3	Y	2	FYG	2	Y	2	12" C	Cont.	Good	No	No
2	Y	3	Y	3	FYG	1	Y(2)	1	No	No		No		Y	2	Y	2	No	Cont.	Good	No	No
3	FYG	1	FYG	1	FYG	3	Y	3	No	FYG	1	FYG	1	FYG	3	Y	2	No	Cont.	Good	No	CL
4	No		No		FYG	2	Y	2	No	No		No		FYG (4)	Rotated	FYG (4)	Rotated	No	Cont.	Good	No	CL
5	No		No		FYG	3	Y	3	No	FYG	2	FYG	3	FYG	3	Y	3	No	Cont.	Good	No	CL
6	No		No		FYG	3	FYG (1)	3	No	No		No		FYG	2	Y	2	No	Cont.	Good	No	Shoulder
7	No		No		FYG	2	FYG (1)	2	No	No		No		FYG	3	Y	2	No	Cont.	Good	No	CL
8	No		No		FYG	2	FYG (1)	2	No	FYG	1	FYG (3)	3	Y	1	Y	2	No	Cont.	Good	No	CL

(1) Large arrow, different than others

(2) 250 ft ahead vs. AHEAD

(3) "2 Miles"

(4) Sign significantly rotated as to be difficult to see

(5) "1" = High, "2" = Medium, "3" = Low : Based on field observations and a video review. No measurements were taken

(6) Crosswalk 1 is to be replaced with a new LED border install

Replace

Consider install for corridor consistency

communication. However, could confuse motorists that they must stop