

DISTRICT 4 ROAD SAFETY AUDIT REPORT

SR-9 (I-95) WORK ZONE

FROM: SR-808 (GLADES ROAD)

TO: CONGRESS AVENUE

SECTION: 93 322 000

MILE POST: 2.521 TO 6.881

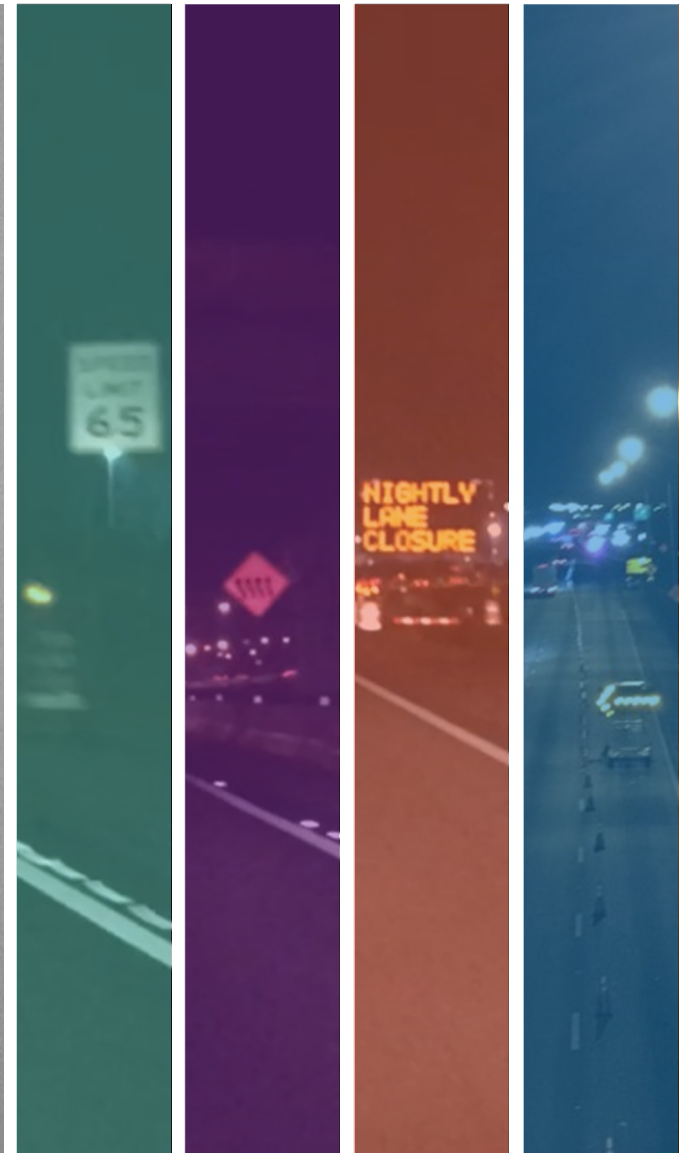
TASK WORK ORDER No. 27

CONTRACT No: C-9E65

FM No. 429650-2-32-01

PREPARED FOR:

FLORIDA DEPARTMENT OF TRANSPORTATION, DISTRICT 4



Engineer's Certification

I, Anthony D. Chaumont, P.E. #72473, 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-9 (I-95) Work Zone
Section No: 93 322 000
Project Start: Milepost 2.521
Project End: Milepost 6.881
Project Location: Palm Beach County

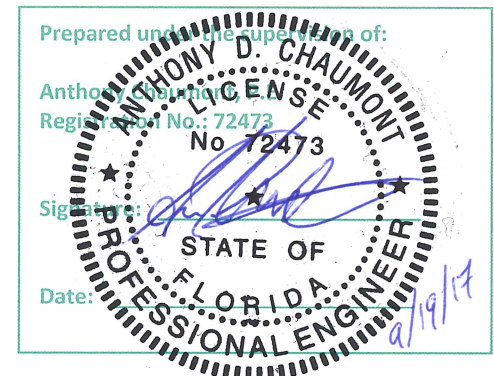


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Project Location

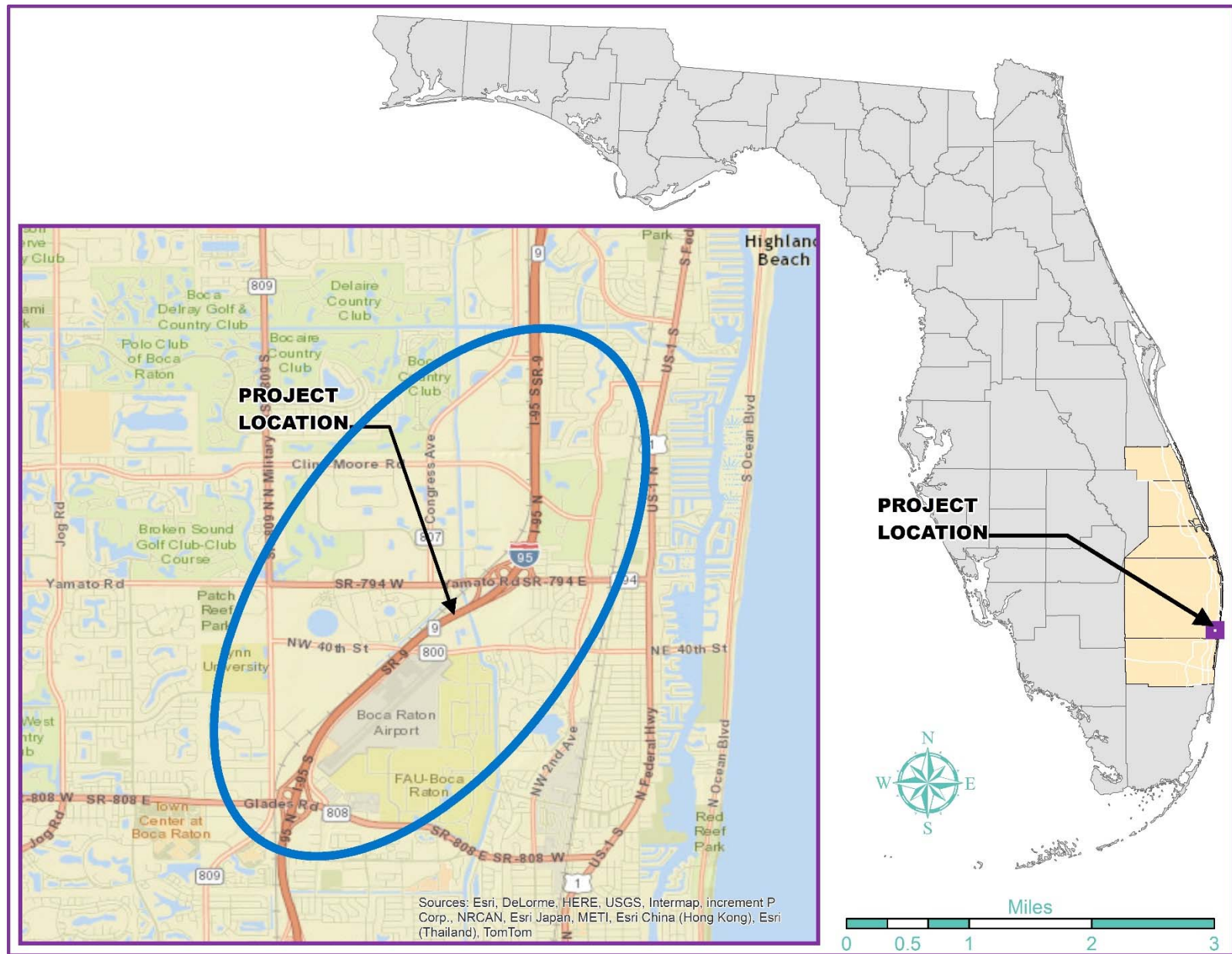


Figure 1: Project Location

Introduction

Road Safety Audit Process

The Federal Highway Administration's (FHWA) Safety Office has established the Road Safety Audits (RSA) process as a way to further enhance the overall safety performance of roadways for all users. An RSA is the 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 work zone safety along SR-9 (I-95) from SR-808 (Glades Road) to Congress Avenue/Peninsula Corp Drive. There is an active construction project (FM 41240) with nightly lane closures; the project will continue for approximately 18 months. This RSA was conducted on the weekdays of November 9-11, 2015.

The RSA along SR-9 (I-95) 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 crashes.
- Review firsthand the interaction of the various design elements with each other the surrounding road network, and the behavior of work zone operations.
- Determine if the needs of all roadway users have been adequately and safely met.
- Explore emerging operational trends and/or safety issues at that location.
- Observe driver behavior throughout the work zone.

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

- What environmental, design, and behavioral elements present potential safety concerns at this location; 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 also to provide the 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.

Core Road Safety Audit Team Members

- Anthony Chaumont, P.E., Tindale Oliver
- Rudy Umbs, P.E., Tindale Oliver
- Kevin Moderie, E.I., Tindale Oliver

Road Safety Audit Stakeholders

- Jonathan Overton, P.E., Assistant District Traffic Operations Engineer
- Yujing “Tracey” Xie, P.E., District 4 Safety Engineer
- Andrew Hipolito, Project Administration Palm Beach Operations Center
- Jagan Katkuri, P.E., EAC Consulting – Senior Engineer
- Ricardo Estripeaut, P.E., Creative Engineering Group – Senior Project Engineer
- Al Miller, Creative Engineering Group – Project Administrator

Stakeholder Coordination

Key findings from correspondence with the stakeholders include the following:

- Barrel spacing is more frequent than minimum standard to better delineate shoulder.
- Barrels are placed both northbound and southbound in areas where they are only required where work is being done.
- Barrels are regularly inspected and marked for replacement when their retro-reflectivity is diminished.
- Great relationship exist with law enforcement liaison Jeff Johnson
- On-duty police is used nightly for speed enforcement; there is no speed reduction during construction.
- Off-duty police is used nightly (parked with flashing lights) on approach to work areas.
- Project managers do not currently know if they receive all crash data in their work zone.

Report Structure

The 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 are also assigned one of three time frame 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 as well as images of recommended items. Spot observations are shown in yellow. Figure 13 on page 2 illustrates the relative location of observations on an aerial photo.

Introduction

Study Corridor

SR-9 (I-95) is a north-south eight-lane divided freeway, including one high occupancy vehicle lane and a posted speed limit of 65 miles per hour (mph); note that the construction contract disallows a speed limit reduction.

There are three interchanges in the study area; they are:

- 2-quadrant cloverleaf at SR-808 (Glades Road)
- 2-quadrant cloverleaf at SR-794 (Yamato Road)
- Diamond interchange at Congress Avenue/Peninsula Corp Drive.

Figure 1 on page *i* shows the project location. According to the FDOT Synopsis Report, SR-9 (I-95) has between 160,000-208,500 daily vehicles.

Generalized Observations

The following includes general observations developed by the RSA Core Team members during the field reviews.

Inside Lanes vs Outside Lanes

Due to the number of through lanes on SR-9 (I-95), the team noted there a large comparative difference in feel (and observed driver behavior) between traveling along the inside lanes (away from roadwork) and traveling along the outside lane (closer to roadwork and lane closures). Traffic flows smoothly at 70+ MPH on the inside lane; traffic flows between 55-60 MPH on the inside lanes. **Indicating to approaching through drivers along the interstate to opt for the inside lane (median) lane can reduce friction along the work zone from construction related lane closures.**

Small Work Zone Signs

The beginning of the work zone is signed with standard 48 in signs, the same signs are used on the Yamato Road on-ramps for drivers entering the work zone in the middle. While the signs clearly denoted the work zone at night from the on-ramps, they appear comparatively small while traveling in the 8-lane section of I-95. **There is an opportunity to more clearly announce the roadwork ahead with larger signs or additional variable message signs in advance or work zone indicating to drivers to KEEP LEFT along I-95.**

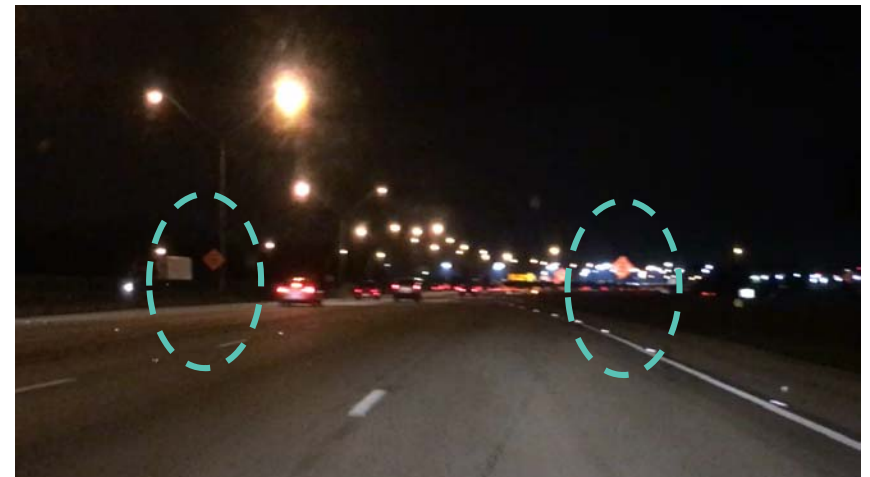


Figure 2: Road Work Signs

Introduction

Northbound Lane Closure Variable Message Sign

Variable message signs are located along I-95 both northbound and southbound indicating the nightly lane closures between 9:00PM and 5:00AM. During the nighttime review, there was no lane closure northbound as all the work was occurring on the west side of I-95. Increased driver compliance can be achieved by providing real-time information that conveys the conditions of the roadway ahead rather than possible conditions. **Replacing the sign's message to read "Right Lane Closed, Keep Left" will provide positive guidance. An additional variable message sign that reads "Right Lane Closed Ahead 1 Mile" will provide drivers with additional advance notice. Those messages should only be displayed during the times and directions where lane closures are taking place (real-time information).**



Figure 3: Variable Message Sign

Road Closure at Yamato

Barrels placed along northbound shoulder approaching SR-794 (Yamato Road) in conjunction to ROAD CLOSED signs (denoting that new interchange is not yet open) make it look like the SR-794 off-ramp is closed. **Additional delineation along gore area will more clearly indicate the exit lane.**



Figure 4: Road Closed at Yamato

Southbound Lane Drop at Congress Avenue

Due to paving operation on the southbound shoulder south of Congress Avenue/Peninsula Corp Drive, construction related lane closures on November 9, 2015, began upstream near the influence area of the southbound off-ramp lane drop. Conflicts were observed in this area, particularly when drivers entered southbound from Linton Boulevard. **Limiting the interaction of nightly lane closures and exit lane drops will limit vehicle conflicts.**



Figure 5: Southbound Lane Closure

Dump Trucks

Conflicts were observed for southbound drivers on the outside through lanes of I-95 between through vehicles and the dump trucks delivering asphalt during paving operations. Dump trucks were observed traveling in the outside lane southbound from Congress Avenue/Peninsula Corp Drive; from there drivers turned on the truck's hazard lights, slowed down and entered the work zone between traffic cones. Southbound drivers behind dump trucks were observed braking abruptly and changing lanes, this behavior can lead to sideswipe and rear-end crashes. **These conflicts can be reduced if truck drivers enter the work zone through the shoulder or closed lane from the on-ramp.**

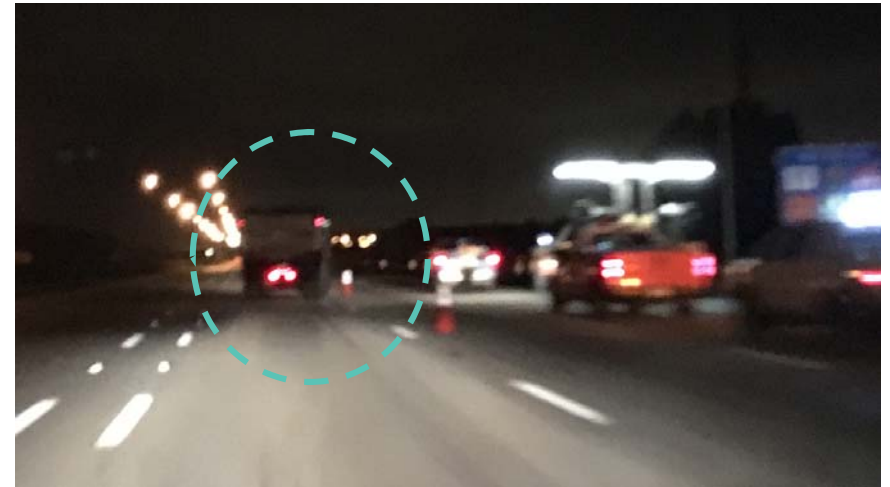


Figure 6: Dump Truck Entering Work Zone

Introduction

Lighting

The lighting on the west side of I-95 south of Congress Avenue/Peninsula Corp Drive was out. According to the project manager, the lighting has been relocated due to the lighting and wired; however, a collision disconnected the power on Monday, November 9th, 2015, **the lights will be operational again within 48 hours.**



Figure 7: Lighting Section Out

Police Lights Blinding

It was noted during the review that the police cars were placed at times near decision points in a location where the red/blue lights were blinding to oncoming drivers. This was most prominent at the southbound onramp from Congress Avenue/Peninsula Corp Drive for southbound drivers along I-95; a police car was placed near the gore area next to a arrow board (shown in the picture just right of the police lights) in the area where the overhead lighting was out. **Placement of police cruises in advance of conflict points rather than at the conflicts points can reduce driver confusion.**



Figure 8: Blinding Police Lights

Introduction

Raised Pavement Markings (RPMs)

Raised pavement markings (RPMs) through two lane shift transitions are installed to standard. RSA team members noted that the tangent section between lane shifts under the NW 40 Street / Spanish River Boulevard overpass appears shorter than the transitions. It appears to a driver than the RPMs in the tangent area, located in a darker spot under the overpass, are missing. **Continuing RPMs through the tangent area will better delineate the intended travel path.**



Figure 9: RPMs in Tangent Section

Barrels Faded

Barrels are regularly inspected and marked for replacement when their retro-reflectivity is diminished. **Continued regular inspection and replacement of faded barrels maintains delineation consistent.**



Figure 10: Non Reflective Barrel

Introduction

Pavement Markings

The thermoplastic and raised pavement markings were worn / missing in various locations throughout the work zone. This is not a part of the construction; nevertheless, **refurbishing the pavement markings can help guide drivers through the work zone; particularly the shoulder and gore areas.**



Figure 11: RPMs in Gore Area

Positive Observations

The RSA team noted that a high percentage of the barrel lights were “on.” Project PMs indicate that their lit-ratio is well above the minimum required. Barrels are also placed with a tighter spacing than required to better delineate the shoulder due to freeway speeds. Additionally, barrels are placed in both directions of travel in areas where the work is currently only in one direction.

Crash Data Analysis

Crash data from the State Crash Analysis Reporting System (CARS) were queried to review and identify any construction related crash patterns exist that could be addressed as part of the RSA recommendations.

Overall Annual Distribution

Crash data was selected within the study area for 12 month blocks from October 1, 2011 to September 30, 2015 to reflect “annual” distributions relative to the construction begin date from northbound on-ramp of SR-808 (Glades Road) to northbound Off-Ramp of Congress Avenue/Peninsula Corp Drive. Comparative data was selected for the same time frames for three miles south and north of the construction limits.

A total of 3,144 crashes were identified along the 9 miles of I-95. While overall crashes north and south of the work zone have increased and decreased over the past four years, the study area crashes have increased and decreased year to year during the past four years. **Although there has been an overall crash increase along the study area, from 2014 to 2015, the study area crashes increased (a 23% increase) less than the areas north (a 31% increase) and south (a 29% increase) of the study area.**

Figure 12 and Table 1 illustrate the annual crash distribution.

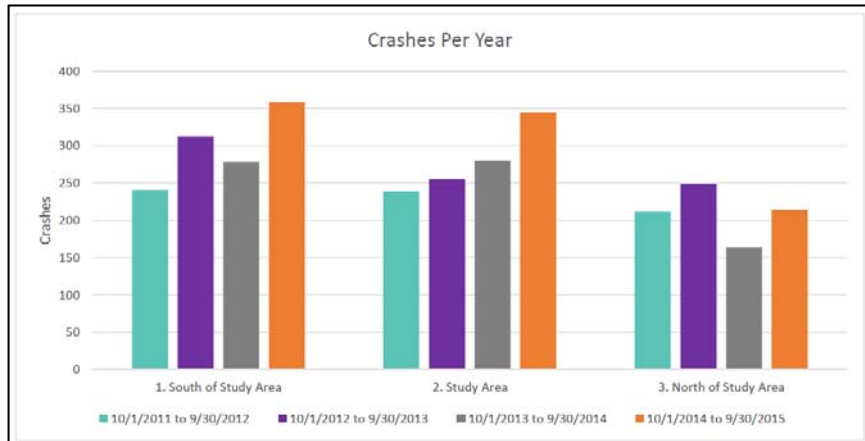


Figure 12: Crashes per Year

Table 1: Crashes per Year

	10/1/2011 to 9/30/2012	10/1/2012 to 9/30/2013	10/1/2013 to 9/30/2014	10/1/2014 to 9/30/2015	Grand Total
1. South of Study Area	240	312	278	358	1188
2. Study Area	239	255	280	344	1118
3. North of Study Area	212	249	163	214	838
Grand Total	691	816	721	916	3144

Overall crashes occurred during the late summer to fall months around PM peak hour with Monday or Saturday. The crashes tended to be northbound rear-end with few injuries and occurring under dry roadway conditions. These crashes could have occurred from distracted drivers during heavy congested times of the day.

Annual Distribution of Nighttime Crashes

To determine if crashes were associated with the construction project, crashes were evaluated by time of day during the work zone and lane closure hours (10:00 PM to 5:00 AM) within the study area. 160 (14%) crashes occurred within the study period from 10:00 PM to 5:00 AM, with 53 of the crashes occurring in the past year. **Study area crashes increased more (36% increase) from 2014 to 2015 than the prior years (9% average from 2012-2014).**

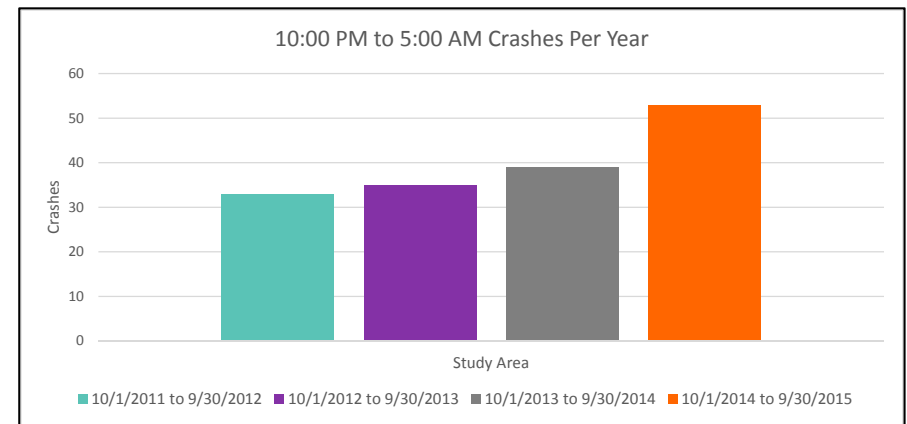


Figure 13: Nighttime Annual Crash Distribution

Crashes from 10:00 PM to 5:00 AM generally occurred during the late summer to fall months with a peak at 10:00 PM on Saturday. The crashes tended to be northbound rear ends with few injuries and occurring under dry roadway conditions. 8 (15.1%) of the 53 crashes were alcohol related crashes.

Data is summarized in Table 3 on page xii below.

Study Area Crash Stats

Crash data within the study area from the past year of 10/1/2014 to 9/30/2015 was then analyzed by surface conditions, injury type, direction, crash type, and drug use and is shown in. The following are crash overrepresentations compared to 15% overall nighttime crash history identified in Table 2:

- 80% (8 out of 10) of alcohol related crashes occur at nighttime crashes in the study area while 15% (53 out of 344) occur at night; **continued law enforcement presence may reduce the construction working hours alcohol related crashes.**
- 36% (20 out of 55) of run-off-road crashes occur at nighttime in the study area; **continued emphasis on advance warning, delineation of pavement markings and work zone may reduce run-off-road crashes.**
- 20% (17 out of 87) of wet weather related crashes occur during construction working hours; **continued emphasis on delineation of pavement markings and work zone may reduce weather crashes.**

The following categories have lower ratios compared to 15% overall nighttime crash history identified in Table 2.

- 13% of injury crashes occurred at night.
- 14% of rear-end crashes occurred at night.

Table 2: Crash Statistics within Study Area

Crash Statistics within Study Area					
		All Day		From 10:00 PM to 5:00 AM	
		All Reported Crashes	Crashes Reported in Work Zone	All Reported Crashes	Crashes Reported in Work Zone
Crashes by Surface Conditions	Wet	87 (25.3%)	4 (13.8%)	17 (32.1%)	1 (20%)
	Dry	256 (74.5%)	24 (82.8%)	35 (66.1%)	3 (60%)
	Other	1 (0.3%)	1 (3.5%)	1 (1.9%)	1 (20%)
	Total	344 (100%)	29 (100%)	53 (100%)	5 (100%)
Crashes by Injury Type	Injury	119 (34.6%)	10 (34.5%)	14 (26.5%)	1 (20%)
	Fatal	1 (0.3%)	0 (0%)	1 (1.9%)	0 (0%)
	PDO	224 (65.2%)	19 (65.6%)	38 (71.7%)	4 (80%)
	Total	344 (100%)	29 (100%)	53 (100%)	5 (100%)
By Direction	NB	167 (48.6%)	16 (55.2%)	30 (56.7%)	4 (80%)
	SB	156 (45.4%)	11 (38%)	21 (39.7%)	0 (0%)
	Other	21 (6.2%)	2 (6.9%)	2 (3.8%)	1 (20%)
	Total	344 (100%)	29 (100%)	53 (100%)	5 (100%)
By Crash Type	Rear end	177 (51.5%)	15 (51.8%)	16 (30.2%)	2 (40%)
	Off Road	55 (16%)	0 (0%)	20 (37.8%)	0 (0%)
	Side Swipe	49 (14.3%)	6 (20.7%)	8 (15.1%)	1 (20%)
	Rollover	9 (2.7%)	1 (3.5%)	3 (5.7%)	1 (20%)
	Head On	1 (0.3%)	0 (0%)	1 (1.9%)	0 (0%)
	Other	53 (15.5%)	7 (24.2%)	5 (9.5%)	1 (20%)
	Total	344 (100%)	29 (100%)	53 (100%)	5 (100%)
Alcohol and Drug Use	None	332 (96.6%)	29 (100%)	43 (81.2%)	5 (100%)
	Alcohol	10 (3%)	0 (0%)	8 (15.1%)	0 (0%)
	Drug	1 (0.3%)	0 (0%)	1 (1.9%)	0 (0%)
	Both	1 (0.3%)	0 (0%)	1 (1.9%)	0 (0%)
	Total	12 (3.5%)	0 (0%)	10 (18.9%)	0 (0%)

Table 3: Crash Statistics within Study Area by Time

Crash Statistics within Study Area by Time									
		All Day				From 10:00 PM to 5:00 AM			
		All Crashes		Reported Within Work Zone		All Crashes		Within Work Zone	
		Range	Crashes	Range	Crashes	Range	Crashes	Range	Crashes
10/1/2011 to 09/30/2015	Crashes Per Year	10/1/2011 to 9/30/2012	239 (21.4%)	10/1/2011 to 9/30/2012	1 (2.9%)	10/1/2011 to 9/30/2012	33 (20.7%)	10/1/2011 to 9/30/2012	1 (14.3%)
		10/1/2012 to 9/30/2013	255 (22.9%)	10/1/2012 to 9/30/2013	0 (0%)	10/1/2012 to 9/30/2013	35 (21.9%)	10/1/2012 to 9/30/2013	0 (0%)
		10/1/2013 to 9/30/2014	280 (25.1%)	10/1/2013 to 9/30/2014	5 (14.3%)	10/1/2013 to 9/30/2014	39 (24.4%)	10/1/2013 to 9/30/2014	1 (14.3%)
		10/1/2014 to 9/30/2015	344 (30.8%)	10/1/2014 to 9/30/2015	29 (82.9%)	10/1/2014 to 9/30/2015	53 (33.2%)	10/1/2014 to 9/30/2015	5 (71.5%)
		Total	1118 (100%)	Total	35 (100%)	Total	160 (100%)	Total	7 (100%)
From 10/1/2014 to 9/30/2015	Highest Months of Crashes	October	35 (10.2%)	October	4 (13.8%)	December	6 (11.4%)	October	1 (20%)
		July	33 (9.6%)	March	5 (17.3%)	July	7 (13.3%)	November	1 (20%)
		August	43 (12.5%)	July	5 (17.3%)	August	6 (11.4%)	March	1 (20%)
		September	57 (16.6%)	August	4 (13.8%)	September	10 (18.9%)	July	1 (20%)
		4 Highest Months	176 (51.2%)	4 Highest Months	11 (38%)	4 Highest Months	24 (45.3%)	4 Highest Months	1 (20%)
		Other 8 Months	168 (48.9%)	Other 8 Months	18 (62.1%)	Other 8 Months	29 (54.8%)	Other 8 Months	4 (80%)
		Total	344 (100%)	Total	29 (100%)	Total	53 (100%)	Total	5 (100%)
	Crashes by Day of the Week	Monday	69 (20.1%)	Monday	6 (20.7%)	Monday	9 (17%)	Monday	1 (20%)
		Tuesday	50 (14.6%)	Tuesday	2 (6.9%)	Tuesday	6 (11.4%)	Tuesday	1 (20%)
		Wednesday	42 (12.3%)	Wednesday	3 (10.4%)	Wednesday	5 (9.5%)	Wednesday	1 (20%)
		Thursday	43 (12.5%)	Thursday	5 (17.3%)	Thursday	3 (5.7%)	Thursday	0 (0%)
		Friday	68 (19.8%)	Friday	4 (13.8%)	Friday	9 (17%)	Friday	0 (0%)
		Saturday	42 (12.3%)	Saturday	7 (24.2%)	Saturday	12 (22.7%)	Saturday	2 (40%)
		Sunday	30 (8.8%)	Sunday	2 (6.9%)	Sunday	9 (17%)	Sunday	0 (0%)
		Total	344 (100%)	Total	29 (100%)	Total	53 (100%)	Total	5 (100%)
	Highest Hours of Crashes	4:00 PM	40 (11.7%)	8:00 AM	4 (13.8%)	1:00 AM	9 (17%)	12:00 AM	1 (20%)
		5:00 PM	41 (12%)	9:00 AM	4 (13.8%)	3:00 AM	7 (13.3%)	5:00 AM	1 (20%)
		6:00 PM	25 (7.3%)	10:00 AM	3 (10.4%)	5:00 AM	7 (13.3%)	10:00 PM	1 (20%)
		7:00 AM	21 (6.2%)	5:00 PM	3 (10.4%)	10:00 PM	8 (15.1%)	11:00 PM	2 (40%)
		4 Highest Hours	127 (37%)	4 Highest Hours	14 (48.3%)	4 Highest Hours	31 (58.5%)	4 Highest Hours	5 (100%)
		Other 20 Hours	217 (63.1%)	Other 20 Hours	15 (51.8%)	Other 3 Hours	22 (41.6%)	Other 3 Hours	0 (0%)
		Total	344 (100%)	Total	29 (100%)	Total	53 (100%)	Total	5 (100%)

Road Safety Audit Findings Summary

ID	Location Description:	Spot Observation Overview:	Suggestions for Consideration:	Assigned to:
01	Approaches to work zone	Standard size work zone signs	Enhance advance signage	FDOT
02	NIGHTLY LANE CLOSURE signs	Signs indicate lane closures in both directions	Only indicate closures in direction of closure	FDOT
03	Northbound approach to Yamato Road	Exit appears to be closed	Delineate gore area	FDOT
04	Southbound approach to Congress Avenue	Conflicts at lane closure where construction lane drops	When possible locate lane closures away from off ramps	FDOT
05	Southbound at Congress Avenue	Dump trucks creating conflicts in through lanes	Encourage use of shoulder when possible	FDOT
06	Lighting southbound at Congress Avenue	Overhead lighting out	Fix lighting section	FDOT
07	Approach to southbound lane closure at Congress Avenue	Police lights blinding	Located off duty police in advance of lane closure	FDOT
08	Tangent section between lane shifts	Short section of RPMs at normal spacing	Extend tight spacing through tangent section	FDOT
ID	Location Description:	Corridorwide Observation Overview:	Suggestions for Consideration:	Assigned to:
C01	Shoulders throughout	Faded barrels	Replace barrels	FDOT
C02	Pavement markings throughout	Pavement markings area worn	Refurbish markings where appropriate	FDOT

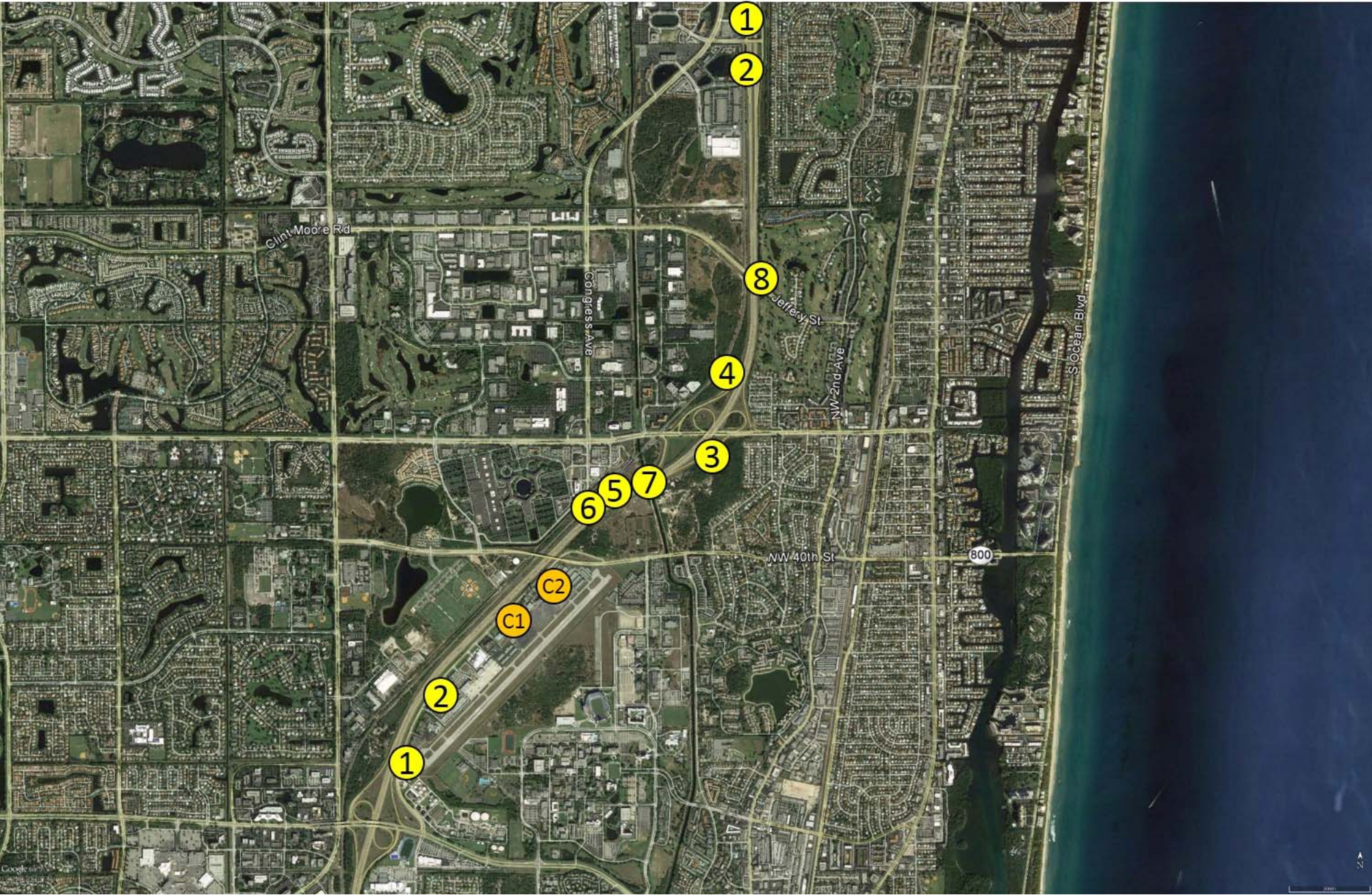


Figure 10: Project Overview

Road Safety Audit Findings Details - Spot Observations

ID	Location Description:	Spot Observation Overview:	Suggestions for Consideration:
01	Approaches to work zone	Standard size work zone signs	Enhance advance signage



Spot Observation Details:

The beginning of the work zone is signed with standard 48 in signs, the same signs are used on the Yamato Road on-ramps for drivers entering the work zone in the middle. While the signs clearly denoted the work zone at night from the on-ramps, they appear comparatively small while traveling in the 8-lane section of I-95.

Suggestion Details:

There is an opportunity to more clearly announce the roadwork ahead with larger signs or additional variable message signs in advance or work zone indicating to drivers to KEEP LEFT along I-95.

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

ID	Location Description:	Spot Observation Overview:	Suggestions for Consideration:
02	NIGHTLY LANE CLOSURE signs	Signs indicate lane closures in both directions	Only indicate closures in direction of closure




Spot Observation Details:

Variable message signs are located along I-95 both northbound and southbound indicating the nightly lane closures between 9:00PM and 5:00AM. During the nighttime review, there was no lane closure northbound as all the work was occurring on the west side of I-95. Increased driver compliance can be achieved by providing real-time information that conveys the conditions of the roadway ahead rather than possible conditions.

Suggestion Details:

Replacing the sign’s message to read “Right Lane Closed, Keep Left” will provide positive guidance. An additional variable message sign that reads “Right Lane Closed Ahead 1 Mile” will provide drivers with additional advance notice. Those messages should only be displayed during the times and directions where lane closures are taking place (real-time information).

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

ID	Location Description:	Spot Observation Overview:	Suggestions for Consideration:
03	Northbound approach to Yamato Road	Exit appears to be closed	Delineate gore area
		<i>Spot Observation Details:</i>	
		Barrels placed along northbound shoulder approaching SR-794 (Yamato Road) in conjunction to ROAD CLOSED signs (denoting that new interchange is not yet open) make it look like the SR-794 off-ramp is closed.	
		<i>Suggestion Details:</i>	
		Additional delineation along gore area will more clearly indicate the exit lane.	
		<i>Agency:</i>	<i>Improvement Type:</i>
		FDOT	Markings
		<i>Time Frame:</i>	<i>EEE:</i>
		Short-term	Engineering
		<i>Level of Effort:</i>	<i>Comment:</i>
		Low	

ID	Location Description:	Spot Observation Overview:	Suggestions for Consideration:
04	Southbound approach to Congress Avenue	Conflicts at lane closure where construction lane drops	When possible locate lane closures away from off ramps




Spot Observation Details:


Due to paving operation on the southbound shoulder south of Congress Avenue, construction related lane closures on November 9, 2015, began upstream near the influence area of the southbound off-ramp lane drop. Conflicts were observed in this area, particularly when drivers entered southbound from Linton Boulevard.

Suggestion Details:

Limiting the interaction of nightly lane closures and exit lane drops will limit vehicle conflicts.

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

ID	Location Description:	Spot Observation Overview:	Suggestions for Consideration:
05	Southbound at Congress Avenue	Dump trucks creating conflicts in through lanes	Encourage use of shoulder when possible
		Spot Observation Details: <p>Conflicts were observed for southbound drivers on the outside through lanes of I-95 between through vehicles and the dump trucks delivering asphalt during paving operations. Dump trucks were observed traveling in the outside lane southbound from Congress Avenue; from there drivers turned on the truck's hazard lights, slowed down and entered the work zone between traffic cones. Southbound drivers behind dump trucks were observed braking abruptly and changing lanes, this behavior can lead sideswipe and rear-end crashes.</p>	
		Suggestion Details: <p>These conflicts can be reduced if truck drivers enter the work zone through the shoulder or closed lane from the on-ramp.</p>	
		Agency: FDOT	Improvement Type: Other
		Time Frame: Short-term	EEE: Engineering
		Level of Effort: Low	Comment:

ID	Location Description:	Spot Observation Overview:	Suggestions for Consideration:
06	Lighting southbound at Congress Avenue	Overhead lighting out	Fix lighting section
		Spot Observation Details: <p>The lighting on the west side of I-95 south of Congress Avenue was out. According to the project manager, the lighting has been relocated due to the lighting and wired; however, a collision disconnected the power on Monday, November 9th, 2015.</p>	
		Suggestion Details: <p>Ensure that lights will be operational again within 48 hours.</p>	
		Agency: FDOT	Improvement Type: Lighting
		Time Frame: Short-term	EEE: Engineering
		Level of Effort: Low	Comment:

ID	Location Description:	Spot Observation Overview:	Suggestions for Consideration:
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07	Approach to southbound lane closure at Congress Avenue	Police lights blinding	Located off duty police in advance of lane closure
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Spot Observation Details:

It was noted during the review that the police cars were placed at times near decision points in a location where the red/blue lights were blinding to oncoming drivers. This was most prominent at the southbound onramp from Congress Avenue for southbound drivers along I-95; a police car was placed near the gore area next to a variable message board in the area where the overhead lighting was out.

Suggestion Details:

Placement of police cruises in advance of conflict points rather than at the conflicts points can reduce driver confusion.

Agency:	Improvement Type:
FDOT	Enforcement
Time Frame:	EEE:
Short-term	Enforcement
Level of Effort:	Comment:
Low	

ID	Location Description:	Spot Observation Overview:	Suggestions for Consideration:
08	Tangent section between lane shifts	Short section of RPMs at normal spacing	Extend tight spacing through tangent section



Spot Observation Details:

Raised pavement markings (RPMs) through two lane shift transitions are installed to standard. RSA team members noted that the tangent section between lane shifts under the NW 40 Street / Spanish River Boulevard overpass appears shorter than the transitions. It appears to a driver than the RPMs in the tangent area, located in a darker spot under the overpass, are missing.

Suggestion Details:

Continuing RPMs through the tangent area will better delineate the intended travel path.

<i>Agency:</i>	<i>Improvement Type:</i>
FDOT	Markings
<i>Time Frame:</i>	<i>EEE:</i>
Short-term	Engineering
<i>Level of Effort:</i>	<i>Comment:</i>
Medium	

Road Safety Audit Findings Details - Corridorwide Observations

ID	Location Description:	Corridorwide Observation Overview:	Suggestions for Consideration:
C01	Shoulders throughout	Faded barrels	Replace barrels



Corridorwide Observation Details:


Barrels are regularly inspected and marked for replacement when their retro-reflectivity is diminished.

Suggestion Details:

Continued regular inspection and replacement of faded barrels maintains delineation consistent.

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

ID	Location Description:	Corridorwide Observation Overview:	Suggestions for Consideration:
C02	Pavement markings throughout	Pavement markings area worn	Refurbish markings where appropriate



Corridorwide Observation Details:

The thermoplastic and raised pavement markings (RPMs) were worn / missing in various locations throughout the work zone. This is not a part of the construction.

Suggestion Details:

Refurbishing the pavement markings can help guide drivers through the work zone; particularly the shoulder and gore areas. Consider providing additional RPMs in exit gore areas.

Agency:	Improvement Type:
FDOT	Markings
Time Frame:	EEE:
Short-term	Engineering
Level of Effort:	Comment:
Medium	