

*SR 7 MULTIMODAL IMPROVEMENTS CORRIDOR STUDY*

# TECHNICAL APPENDIX C: HOT SPOT PRELIMINARY SAFETY AND TRAFFIC OPERATIONS REVIEWS



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## HOT SPOT LOCATIONS

As discussed in Chapter 3-A: Baseline Conditions, an analysis of crashes within the corridor study area of SR 7 from the Miami-Dade County line to Sample Road was completed to identify five hot spot crash locations. For this analysis, a four-year history of crashes (2011-2014) was extracted from FDOT’s Crash Analysis Reporting System (CARS) to identify locations with high crash frequencies.

Based on this review, Table 1 depicts the intersections with SR 7 identified as having the top 10 highest crash frequencies:

**Table 1: Top 10 Crash Frequency Locations**

	Cross Street	Crashes	Percent of Total Corridor Crashes (%)
Top 10 Crash Frequency Locations	Hollywood Boulevard	320	4.5%
	Sheridan Street	313	4.4%
	Oakland Park Boulevard	310	4.3%
	Griffin Road	287	4.0%
	Broward Boulevard	246	3.4%
	Commercial Boulevard	223	3.1%
	Stirling Road	220	3.1%
	Pembroke Road	173	2.4%
	Johnson Street	171	2.4%
	Taft Street	124	1.7%
SR 7 from Miami-Dade County line to Sample Road		7,145	100%

SR 7 is currently under construction for improvements from just south of Miramar Parkway/Hallandale Beach Boulevard to just south of Stirling Road; therefore, intersections within these limits were removed from consideration to account for new infrastructure and safety improvements that will be implemented once construction is complete. The following cross streets are within the construction limits and also were removed from the analysis:

- > Hollywood Boulevard
- > Sheridan Street
- > Pembroke Road
- > Johnson Street

The Federal Highway Administration’s (FHWA) *Highway Safety Manual* uses the Equivalent Property Damage Only Average Crash Frequency performance measure to identify hot spot locations. FHWA assigns weighting factors to crashes by crash severity to develop a single

combined frequency and severity score per location. FHWA weighted factors/severity scores are based on crash costs with \$4,008,900 for a fatality crash, \$82,600 for an injury crash, and \$7,400 for a property damage-only crash. The weighting factors are calculated relative to Property Damage Only (PDO) crashes. Therefore the weighting factors are 542 for fatality crashes, 11 for injury crashes, and 1 for property damage-only crashes.

FHWA weighted factors weigh intersections with fatalities much higher than any other type of crash. Also, crashes with incapacitating injuries are weighted equivalently to a crash with possible injuries. FHWA allows local jurisdictions to modify weighted factors depending on local crash costs, injury severity, and/or monetary values. To prevent only studying crashes with fatalities and/or high crash frequency intersections, the study corridor was analyzed with more emphasis by injury severity by increasing the weighted factors for incapacitating injury crashes and non-incapacitating injury crashes while reducing the weighted factors for fatality crashes and possible injury crashes.

The top 10 crash frequency locations were analyzed using both FHWA weighted factors and the adjusted weighted factors. Five alternate cross streets were also reviewed which had had higher injuries and/or injury severity crashes. Table 2, summarizes the FHWA weighted factors and adjusted weight factors for the top 10 crash frequency locations as well as the 5 alternates.



**Table 2: FHWA/Adjusted Weight Factors of SR 7 Cross Streets**

	Cross Street	Crashes	Fatality Crashes	Incap. Injury Crashes	Non-Incap. Injury Crashes	Possible Injury Crashes	PDO Crashes	FHWA Weighted Factor	Adjusted Weight Factor	Notes
Top 10 Crash Frequency Locations	Hollywood Boulevard	320	2	5	31	36	246	2122	1696	Under Construction
	Sheridan Street	313	1	1	22	53	236	1614	1191	Under Construction
	Oakland Park Boulevard	310	0	6	30	72	202	1390	1462	Preliminary field reviews identified traffic operational and safety issues
	Griffin Road	287	0	4	24	51	208	1077	1143	Preliminary field reviews identified recent improvements
	Broward Boulevard	246	0	7	28	35	176	946	1261	Preliminary field reviews identified traffic operational and safety issues
	Commercial Boulevard	223	1	5	19	59	139	1594	1264	Preliminary field reviews identified traffic operational and safety issues
	Stirling Road	220	0	5	13	41	161	810	876	Preliminary field reviews identified traffic operational and safety issues
	Pembroke Road	173	0	4	16	27	126	643	781	Under Construction
	Johnson Street	171	1	3	18	20	129	1122	939	Under Construction
	Taft Street	124	0	0	13	26	85	514	475	-
Alternates	NW 26th Street	118	1	2	13	47	55	1279	850	-
	NW 19th Street	116	1	1	17	42	55	1257	855	Preliminary field reviews identified traffic operational and safety issues
	Burriss Road/SW 36th Street	115	0	3	13	17	82	445	577	-
	NW 16th Street	85	0	5	19	27	34	595	799	-
	Atlantic Boulevard	67	0	3	31	12	21	527	851	-
FHWA Weighted Factors			542	11	11	11	1		-	-
Adjusted Weighted Factors			200	50	20	5	1		-	-

As shown in Table 2, cross streets with SR 7 under construction were noted “Under Construction” These cross streets were not included as a hot spot location.

Oakland Park Boulevard, Griffin Road, Broward Boulevard, Commercial Boulevard, and Stirling Road were the five cross streets with the highest adjusted weight factors and higher crash frequencies. Preliminary field reviews were conducted at each of these intersections to confirm that the intersections had potential traffic operational and/or safety issues. During the field review at Griffin Road, it was found that the intersection had recently been reconstructed with a new signal in 2015. Due to the recent safety improvements, this intersection was not included as a hot spot location.

As an alternative to Griffin Road, NW 19<sup>th</sup> Street was selected as it was an alternate with a higher adjusted weight factor. During the preliminary field review at NW 19<sup>th</sup> Street, traffic operational issues and safety issues, such as red light running, were observed. Therefore, NW 19<sup>th</sup> Street was included as a hot spot location.

NW 26<sup>th</sup> Street, Burris Road/SW 36<sup>th</sup> Street/Oakes Road, NW 16<sup>th</sup> Street, and Atlantic Boulevard were identified as alternates with either higher crash frequencies, FHWA weighted factors, and/or adjusted weighted factors. These intersections were not included as a hot spot location in this report; however, these cross streets may be good candidates for subsequent review.

Based on the analysis and preliminary field reviews, the following intersections were identified as the hot spot locations for review:

- > Stirling Road
- > Broward Boulevard
- > NW 19<sup>th</sup> Street
- > Oakland Park Boulevard
- > Commercial Boulevard

Each of the five hot spot crash locations were reviewed for safety and traffic operational issues, the results of which are discussed further in this report.

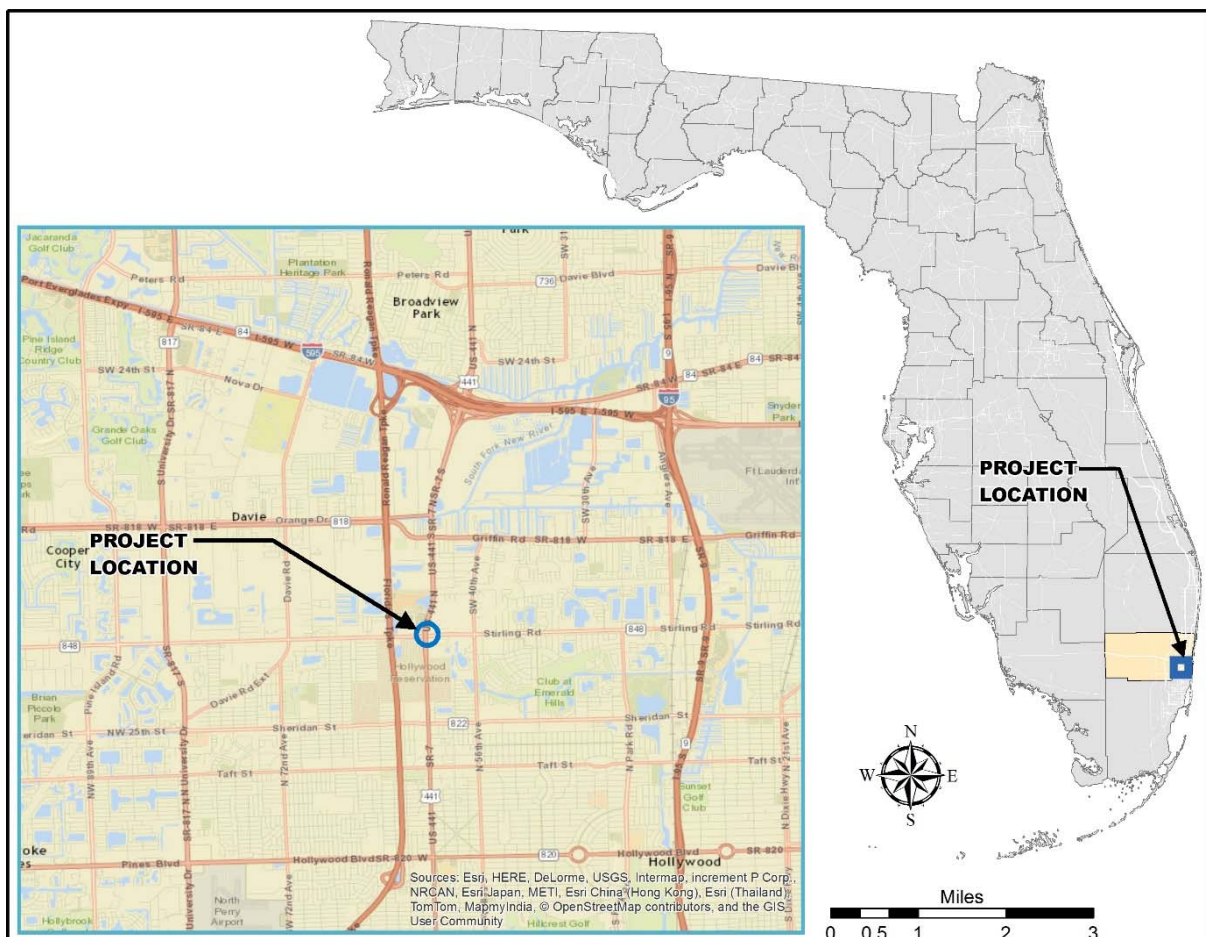
# SR 7 & STIRLING ROAD

## EXISTING CONDITIONS

The intersection of SR 7 and Stirling Road is a four legged signalized intersection within Hollywood. Map 1 depicts the location of the intersection and Map 2 is an aerial of the overall intersection.

SR 7 is a six-lane divided roadway with a speed limit of 45 miles per hour (mph) to the south and north of the intersection. There is lighting, sidewalks, and bike lanes along both sides. The southbound approach has two left-turn lanes, two through lanes, one shared through/right-turn lane, and a bike lane. The northbound approach has two left-turn lanes, three through lanes, one right-turn lane, and a bike lane.

**Map 1: Location Map of SR 7 and Stirling Road**



**Map 2: Aerial of SR 7 and Stirling Road**



Stirling Road is a six-lane divided roadway with a speed limit of 45 mph to the east and west of the intersection. There is lighting along the north side, sidewalks along both sides, and no bike lanes. Both the westbound and eastbound approaches have two left-turn lanes, three through lanes, and one right-turn lane.

### Signal and Pedestrian Features

The intersection has a diagonal span signal and older unused mast arm poles at each corner. The intersection operates with protected left turns and permissive right turns. There are no right-turn overlaps or right-turn restrictions at the intersection. The signal heads for each approach are vertical with two protected left-turn signal heads and two permissive signal heads for the three through lanes. The southbound and northbound approaches have signal heads with no backplates. The westbound approach has yellow backplates for the left-turn signals and black backplates for the through lanes. The eastbound approach has yellow backplates for all of the signal heads.

Within close proximity to this intersection are the following signalized intersections:

- > SR 7 and Osceola Drive/Sunset Drive - 0.48 miles south
- > SR 7 and Seminole Way - 0.27 miles north

- > Stirling Road and North 66<sup>th</sup> Avenue - 0.77 miles west
- > Stirling Road and North 56<sup>th</sup> Avenue/SW 40<sup>th</sup> Avenue - 0.50 miles east

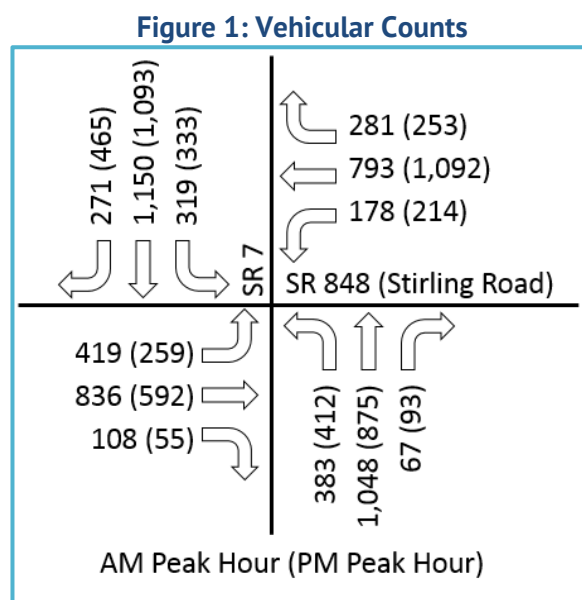
The existing pedestrian features of the SR 7/Stirling Road intersection include special emphasis crosswalks, yellow contrasting detectable warnings at each curb ramp, and pedestrian signals at each corner of the intersection. All of the pedestrian signals display the “WALK” symbol and then follows with an upraised hand symbolizing “DON’T WALK”. The pedestrian push buttons are all on separate poles and are on either the light poles or the old mast arm poles.

### Vehicular Volumes

FDOT 2014 Synopsis Reports were reviewed along SR 7 and Stirling Road. The following count stations were in the area of the intersection with the following daily volumes:

- > 860460–SR 7 south of Stirling Road -45,941 vehicles per day (vpd)
- > 867026 - Stirling Road west of SR 7 - 42,343 vpd
- > 860090 - Stirling Road east of SR 7 - 38,596 vpd

Six-hour vehicular volume counts were conducted on May 13<sup>th</sup> and May 14<sup>th</sup> of 2015 at the intersection of SR 7 and Stirling Road. Based on the counts collected on May 13<sup>th</sup>, the AM peak hour occurred from 7:45 AM to 8:45 AM with 5,853 total vehicles and the PM peak hour occurred from 4:45 PM to 5:45 PM with 5,376 total vehicles. Figure 1 shows the peak hour corresponding volumes for each approach. The vehicular counts are included in Appendix A.



## CRASH DATA ANALYSIS

Crash data from January 2011 to December 2014 extracted from CARS was reviewed to identify any crash patterns that could be addressed as part of this safety review.

During the 2011 to 2014 analysis period, a total of 219 crashes occurred at this intersection. Table 3 provides the overall number of crashes by their injury severity for each year.

**Table 3: Crash Distribution of SR 7 and Stirling Road**

		Number of Crashes				Total Crashes	Mean Crashes Per Year	%
		2011	2012	2013	2014			
Crash Type	Angle	6	12	10	1	29	7.3	13.2%
	Bike	1	0	2	1	4	1.0	1.8%
	Fixed Object	0	0	0	1	1	0.3	0.5%
	Head On	3	3	1	0	7	1.8	3.2%
	Left Turn	2	3	3	1	9	2.3	4.1%
	Off Road	0	1	0	1	2	0.5	0.9%
	Pedestrian	1	0	0	0	1	0.3	0.5%
	Rear End	30	30	29	34	123	30.8	56.2%
	Right Turn	0	0	1	4	5	1.3	2.3%
	Sideswipe	2	4	4	10	20	5.0	9.1%
	Other	4	7	6	1	18	4.5	8.2%
<b>Total</b>	<b>49</b>	<b>60</b>	<b>56</b>	<b>54</b>	<b>219</b>	<b>54.8</b>	<b>100.0%</b>	
Injury Severity	Fatal	0	0	0	0	0	0.0	0.0%
	Incapacitating	1	2	1	1	5	1.3	2.3%
	Non-Incapacitating	5	2	3	3	13	3.3	5.9%
	Possible Injury	8	9	14	10	41	10.3	18.7%
	None	35	47	38	40	160	40.0	73.1%
<b>Total</b>	<b>49</b>	<b>60</b>	<b>56</b>	<b>54</b>	<b>219</b>	<b>54.8</b>	<b>100.0%</b>	
Lighting Condition	Dark-Lighted	16	28	25	24	93	23.3	42.5%
	Dark-Not Lighted	0	0	1	1	2	0.5	0.9%
	Dawn	0	1	2	0	3	0.8	1.4%
	Daylight	34	27	27	27	115	28.8	52.5%
	Dusk	0	4	1	2	7	1.8	3.2%
	<b>Total</b>	<b>50</b>	<b>60</b>	<b>56</b>	<b>54</b>	<b>220</b>	<b>55.0</b>	<b>100.5%</b>
Surface Condition	Dry	41	47	37	36	161	40.3	73.5%
	Wet	9	13	19	18	59	14.8	26.9%
	<b>Total</b>	<b>50</b>	<b>60</b>	<b>56</b>	<b>54</b>	<b>220</b>	<b>55.0</b>	<b>100.5%</b>

Scanned police reports were reviewed to identify bicycle, pedestrian, incapacitating, and fatality crashes. Per Table 3, there were four bike crashes, one pedestrian crash, five crashes with incapacitating injuries, and no fatalities. These crashes were reviewed and summarized in Table 4.

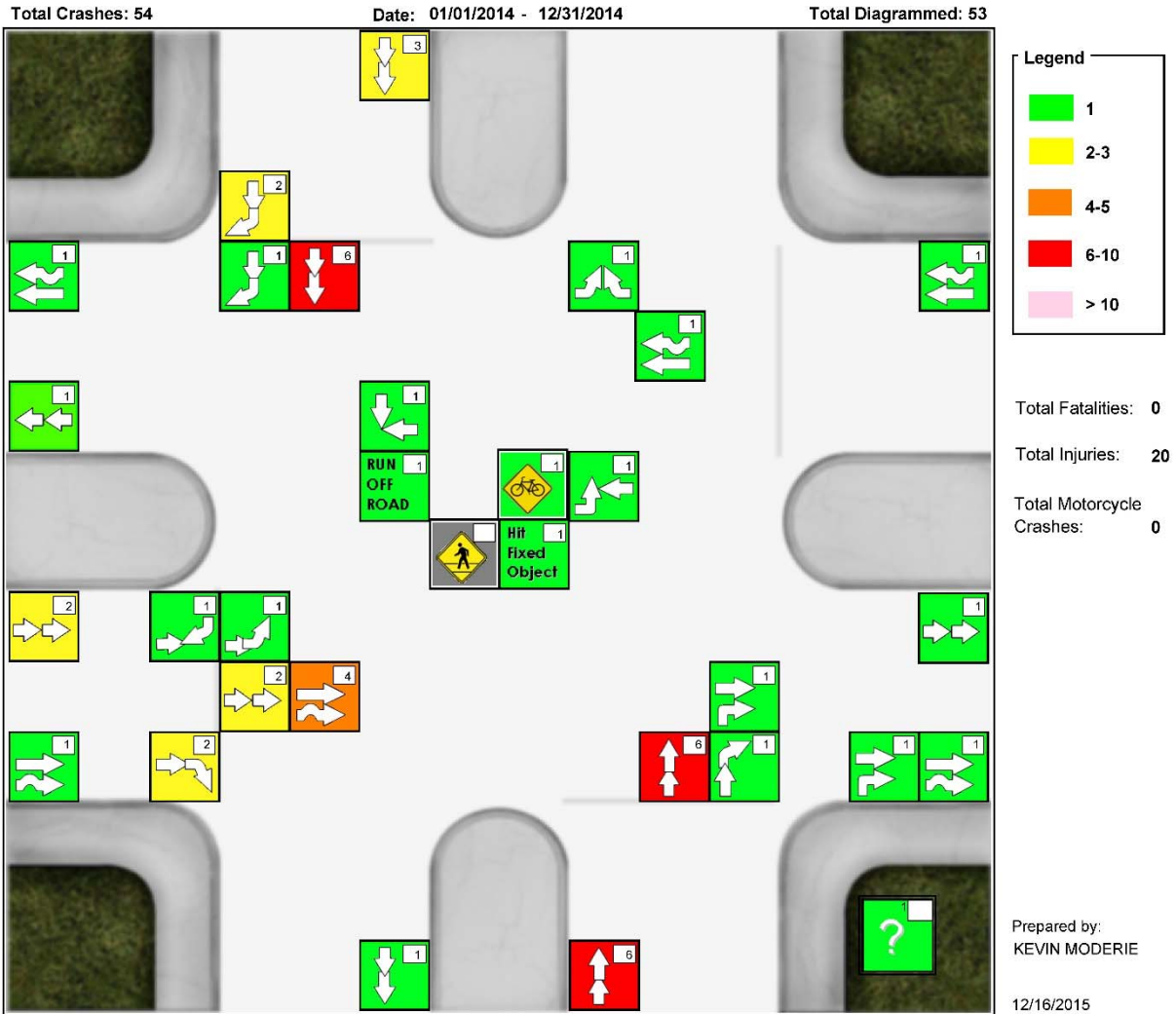
Figure 2 is a collision diagram of SR 7 and Stirling Road that depicts the 54 crashes that occurred in 2014.

**Table 4: Severe Crash Summaries for SR 7 and Stirling Road**

Date	Time	Crash Type	Injury Severity	Lighting Condition	Surface Conditions	Crash Summary
1/26/2011	7:41 AM	Pedestrian	None	Daylight	Dry	A pedestrian ran out in front of a westbound vehicle. The driver of the vehicle slammed on her brakes to avoid colliding with the pedestrian and a trailing vehicle rear ended her vehicle.
4/12/2011	8:49 PM	Bike	Possible	Dark-Lighted	Dry	A northbound bicyclist was crossing the intersection and was struck by a westbound vehicle. The westbound vehicle had a green light.
10/12/2011	10:42 AM	Angle	Incapacitating	Daylight	Dry	A northbound vehicle ran a red light and struck a westbound left turning vehicle. A witness advised the westbound left-turn lane had a green arrow.
8/19/2012	3:16 AM	Angle	Incapacitating	Dark-Lighted	Dry	A westbound vehicle ran a red light and struck a southbound vehicle. The impact caused the westbound vehicle to lose control and strike a stopped eastbound left turning vehicle as well.
10/8/2012	9:45 AM	Rear End	Incapacitating	Daylight	Wet	An eastbound vehicle was in the outside through lane and as he approached the intersection he switched lanes and ran the red light striking three southbound vehicles. The eastbound driver was reported positive for alcohol use.
4/5/2013	6:17 PM	Bike	Non-Incapacitating	Daylight	Wet	A westbound right turning vehicle struck a westbound bicyclist.
8/3/2013	12:20 AM	Other	Incapacitating	Dark-Lighted	Wet	A southbound vehicle lost control during wet roadway conditions and struck a stopped vehicle in the southbound left-turn lane.
9/25/2013	11:21 AM	Bike	Possible	Daylight	Dry	The light became green for westbound and the vehicle struck a northbound bicyclist.
1/21/2014	10:31 AM	Rear End	Incapacitating	Daylight	Wet	A northbound vehicle failed to stop for a light turning red and struck two vehicles. The vehicle had bald tires and the roads were reported as wet.
5/6/2014	5:33 PM	Bike	None	Daylight	Dry	An eastbound left turning vehicle had a green light and struck a northbound bicyclist.

**Figure 2: Collision Diagram of SR 7 and Stirling Road**

**District 4 FDOT Collision Diagram**





## FIELD OBSERVATIONS

AM and PM peak hour observations were conducted at SR 7 and Stirling Road on December 9, 2015. This section summarizes the safety and traffic operations issues observed at this intersection.

### Pedestrian Observations

Pedestrians were observed crossing during the “DO NOT WALK” pedestrian phase. Enforcement of pedestrians who do not obey pedestrian signals should be increased. The old pedestrian signals should be upgraded to countdown signals, provide separated pedestrian push buttons, and relocate the push buttons closer to the curb ramps for easier access.



Southbound right turning vehicles were observed not yielding to pedestrians. Consider installing a “YIELD TO PEDESTRIANS” (R10-15R) sign with a four-section flashing yellow (or red) right-turn arrow, which would display a flashing yellow

(or red) arrow when pedestrians are crossing to encourage drivers to yield to pedestrians.



### Vehicular Observations

Left-turn phase failures were observed for southbound and eastbound approaches. Both southbound and eastbound left-turning vehicles were observed running the red light. Signal timings should be reviewed to extend the left-turn timings.



The old unused signal pole in the southwest corner is damaged and appears to have been hit by a vehicle. The pole should be removed as it is no longer used.



The eastbound right-turn lane had low right-turn volumes with 108 vph during the AM peak hour and 55 vph during the PM peak hour. The right-turn lane is not heavily utilized and the need for the right-turn lane should be reviewed. Relocating the bus stop to the right-turn lane and consider a queue jump at this location could improve transit access and operations.

The southbound right-turn movement had 465 vph during the PM peak hour. Pedestrians were observed having difficulty crossing the northern and western crosswalks as the southbound right-turn movement was heavy. Consider a right-turn overlap with the left-turn movement by installing a four-section right-turn arrow to display a green arrow during the left-turn phase and a flashing yellow (or red) right-turn arrow during the pedestrian phase to encourage drivers to yield to pedestrians.

This improvement would require prohibiting the U-turn movement.

### Signs and Miscellaneous Observations

Poor pavement markings were observed throughout the intersection. The intersection should be restriped with new pavement markings.



Outside left turning vehicles were observed turning widely while the inside turn lanes were observed taking sharper turns as the left-turn skip striping for each approach is worn and poorly visible. A few conflicts were observed between left turning vehicles, and several crash reports involved sideswipes within the left-turn lanes. The left-turn skip striping should be restriped.



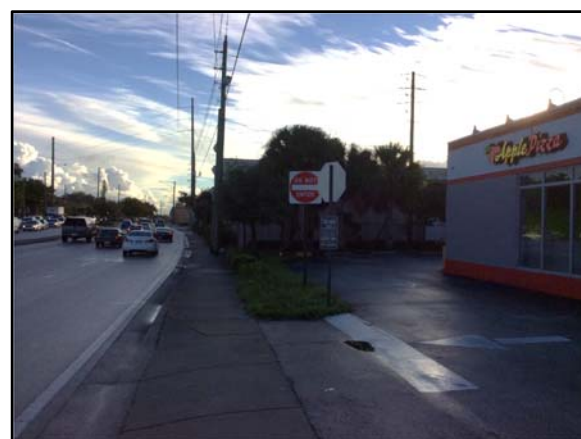
The eastbound “SCHOOL SIGN” (S1-1) is not visible as it is behind the signal pole. The “SCHOOL SIGN” should be relocated for better visibility.



The “DO NOT ENTER” sign is facing eastbound traffic; this sign should be rotated to reduce any potential confusion.



The “SPEED LIMIT 45” sign (R2-1) is covered by overgrown vegetation. The vegetation should be trimmed to allow for better visibility of the sign.



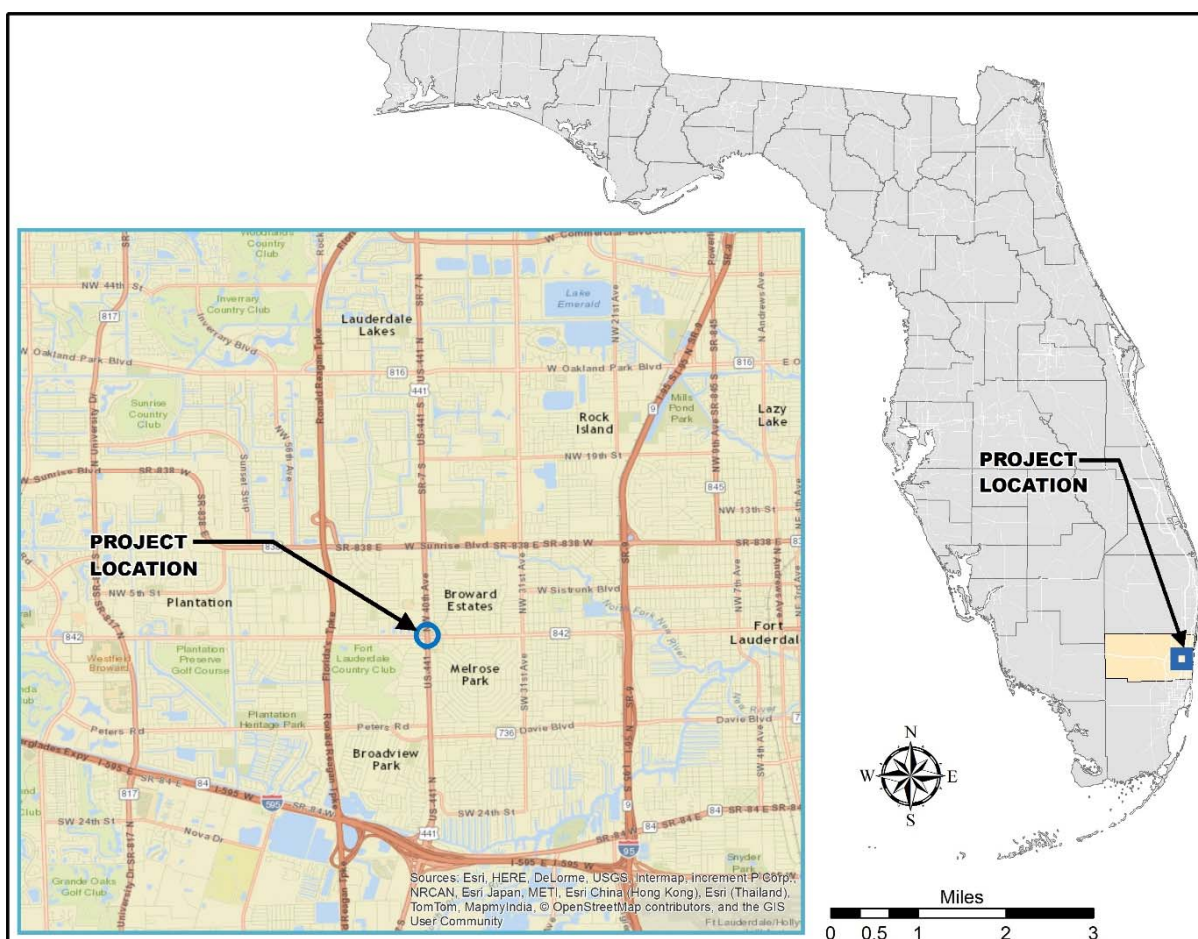
# SR 7 & BROWARD BOULEVARD

## EXISTING CONDITIONS

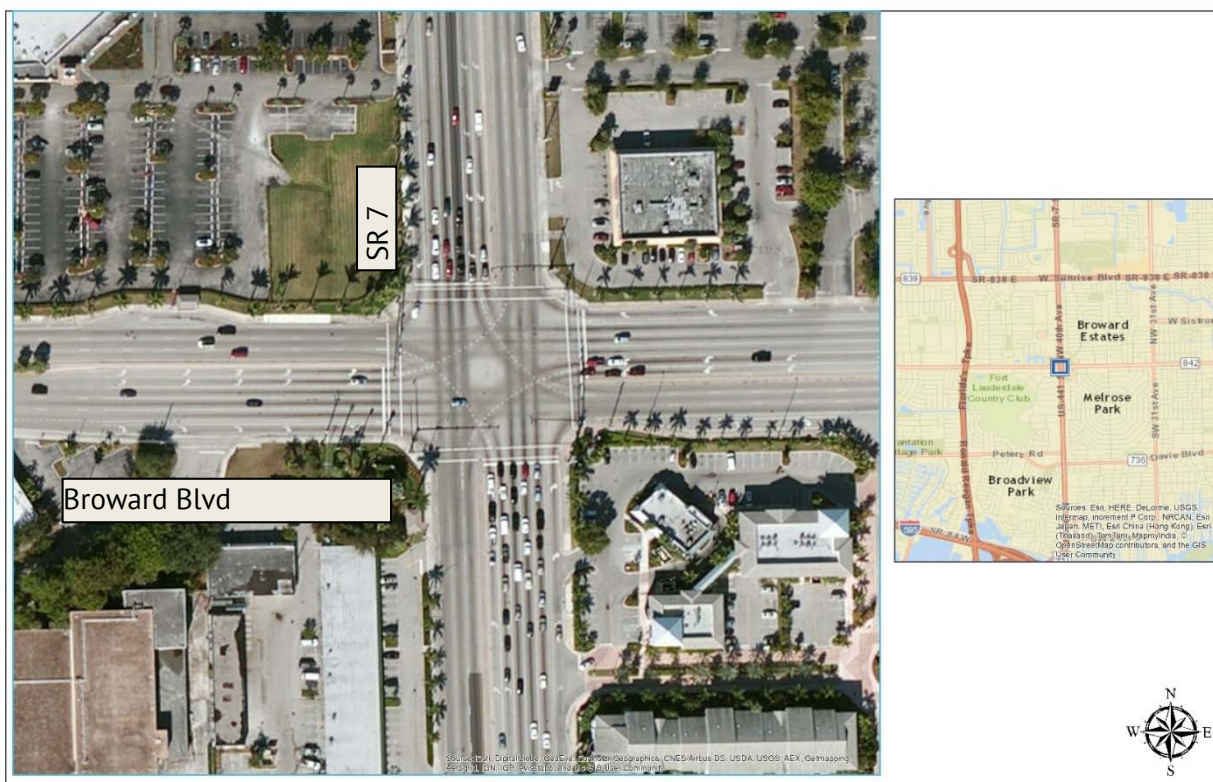
The intersection of SR 7 and Broward Boulevard is a four legged signalized intersection within Plantation. Map 3 depicts the location of the intersection and Map 4 is an aerial of the overall intersection.

SR 7 is a six-lane divided roadway with a speed limit of 45 mph to the south and 40 mph to the north of the intersection. There is lighting, sidewalks, and bike lanes along both sides. Both the southbound and northbound approaches have two left-turn lanes, three through lanes, one right-turn lane, and a bike lane.

**Map 3: Location Map of SR 7 and Broward Boulevard**



**Map 4: Aerial of SR 7 and Broward Boulevard**



Broward Boulevard is a six-lane divided roadway with a speed limit of 40 mph to the east and west of the intersection. The eastbound speed limit changes from 40 mph to 45 mph just west of the intersection. There is lighting along the north side, sidewalks and bike lanes along both sides. Both the westbound and eastbound approaches have two left-turn lanes, three through lanes, one right-turn lane, and a bike lane.

### Signal and Pedestrian Features

The intersection has four dual mast arm signals with far side vertical signal heads, one nearside signal head for the through movements, and black backplates for the eastbound and westbound approaches. The intersections operates with protected left-turns and permissive right turns. All four approaches have two protected left-turn signal heads over the left-turn lanes and two permissive signal heads over the through lanes. There is not a separate signal head for the right turns as right turns are permissive and there are no right-turn overlaps or right-turn restrictions.

Within close proximity to the intersection of SR 7 and Broward Boulevard are the following signalized intersections:

- > SR 7 and SW 6th Street - 0.51 miles south
- > SR 7 and North Hospital Drive/NW 5<sup>th</sup> Street - 0.37 miles north

- > Broward Boulevard and Park East Drive/Country Club Circle/NW 46<sup>th</sup> Avenue - 0.50 miles west
- > Broward Boulevard and NW 38<sup>th</sup> Avenue - 0.16 miles east

The existing pedestrian features of the intersection include standard crosswalks, yellow contrasting detectable warnings at each curb ramp, and countdown pedestrian signals with push buttons that share the mast arm pole at each corner of the intersection. The audible pedestrian signals display the “WALK” symbol and follows with the following countdown timers:

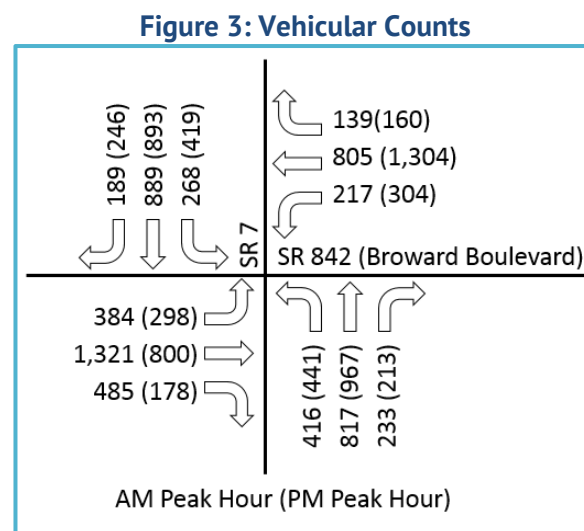
- > Crosswalk on the south and north sides – 34 seconds
- > Crosswalk on west side – 33 seconds
- > Crosswalk on east side – 30 seconds

### Vehicular Volumes

FDOT 2014 Synopsis Reports were reviewed along SR 7 and Broward Boulevard. The following count stations were in the area of the intersection with the following daily volumes:

- > 865201 – SR 7 north of Broward Boulevard - 47,286 vpd
- > 860461 - Broward Boulevard west of SR 7 - 45,452 vpd
- > 860493 - Broward Boulevard east of SR 7 - 44,896 vpd

Six-hour vehicular volume counts were conducted on May 13<sup>th</sup> and May 14<sup>th</sup> of 2015 at the intersection of SR 7 and Broward Boulevard. Based on the counts collected on May 13<sup>th</sup>, the AM peak hour occurred from 7:45 AM to 8:45 AM with 6,163 total vehicles and the PM peak hour occurred from 4:45 PM to 5:45 PM with 6,223 total vehicles. Figure 3 shows the peak hour corresponding volumes for each approach. The vehicular counts are included in Appendix A.



## CRASH DATA ANALYSIS

Crash data from January 2011 to December 2014 extracted from CARS was reviewed to identify any crash patterns that could be addressed as part of this safety review.

During the four-year analysis period, a total of 246 crashes occurred at the intersection. Table 5 provides the overall number of crashes by their injury severity for each year.

**Table 5: Crash Distribution of SR 7 and Broward Boulevard**

		Number of Crashes				Total Crashes	Mean Crashes	
		2011	2012	2013	2014		Per Year	%
Crash Type	Angle	6	15	15	2	38	9.5	15.4%
	Bike	0	1	2	0	3	0.8	1.2%
	Fixed Object	0	0	0	3	3	0.8	1.2%
	Head On	0	0	0	1	1	0.3	0.4%
	Left Turn	0	0	2	2	4	1.0	1.6%
	Off Road	0	2	2	0	4	1.0	1.6%
	Pedestrian	0	1	0	1	2	0.5	0.8%
	Rear End	34	34	41	41	150	37.5	61.0%
	Right Turn	2	0	1	7	10	2.5	4.1%
	Run Off Road	0	0	0	1	1	0.3	0.4%
	Sideswipe	6	3	6	12	27	6.8	11.0%
	Other	0	2	1	0	3	0.8	1.2%
<b>Total</b>	<b>48</b>	<b>58</b>	<b>70</b>	<b>70</b>	<b>246</b>	<b>61.5</b>	<b>100.0%</b>	
Injury Severity	Fatal	0	0	0	0	0	0.0	0.0%
	Incapacitating	1	1	2	3	7	1.8	2.8%
	Non-Incapacitating	6	8	9	5	28	7.0	11.4%
	Possible Injury	4	15	8	8	35	8.8	14.2%
	None	37	34	51	54	176	44.0	71.5%
	<b>Total</b>	<b>48</b>	<b>58</b>	<b>70</b>	<b>70</b>	<b>246</b>	<b>61.5</b>	<b>100.0%</b>
Lighting Condition	Dark-Lighted	6	12	11	18	47	11.8	19.1%
	Dark-Not Lighted	0	0	0	1	1	0.3	0.4%
	Dawn	1	3	2	0	6	1.5	2.4%
	Daylight	38	42	54	49	183	45.8	74.4%
	Dusk	3	1	3	2	9	2.3	3.7%
	<b>Total</b>	<b>48</b>	<b>58</b>	<b>70</b>	<b>70</b>	<b>246</b>	<b>61.5</b>	<b>100.0%</b>
Surface Condition	Dry	40	50	62	60	212	53.0	86.2%
	Wet	8	8	8	10	34	8.5	13.8%
	<b>Total</b>	<b>48</b>	<b>58</b>	<b>70</b>	<b>70</b>	<b>246</b>	<b>61.5</b>	<b>100.0%</b>

Scanned police reports were reviewed to identify bicycle, pedestrian, incapacitating, and fatality crashes. Per Table 5, there were three bike crashes, two pedestrian crashes, seven crashes with incapacitating injuries, and no fatalities. These crashes were reviewed and summarized in Table 6.

Figure 4 is a collision diagram of the SR 7 and Broward Boulevard that depicts the 70 crashes that occurred in 2014.

**Table 6: Severe Crash Summaries of SR 7 and Broward Boulevard**

Date	Time	Crash Type	Injury Severity	Lighting Condition	Surface Conditions	Crash Summary
1/3/2011	12:16 PM	Rear End	Incapacitating	Daylight	Dry	A northbound vehicle failed to stop in time and struck another northbound vehicle.
2/6/2012	6:05 AM	Bike	Non-Incapacitating	Dark-Lighted	Wet	An eastbound right turning vehicle lost control due to the driver's shoe falling off. The vehicle struck a bicyclist.
4/27/2012	3:16 PM	Rear End	Incapacitating	Daylight	Dry	A southbound vehicle failed to stop in time and rear ended another southbound vehicle.
5/28/2012	2:24 PM	Pedestrian	Non-Incapacitating	Daylight	Dry	A westbound right turning vehicle struck two pedestrians walking southbound.
4/3/2013	2:55 PM	Bike	Non-Incapacitating	Daylight	Dry	A westbound left turning vehicle struck a southbound bicyclist. The westbound left turning vehicle had a green turn arrow.
7/24/2013	11:15 AM	Bike	Non-Incapacitating	Daylight	Dry	A southbound vehicle struck a westbound bicyclist. The southbound vehicle had a green light.
8/26/2013	8:15 AM	Other	Incapacitating	Daylight	Wet	A scooter travelling southbound lost control and struck a light post.
11/19/2013	12:12 PM	Rear End	Incapacitating	Daylight	Dry	A westbound vehicle failed to stop in time and rear ended another westbound vehicle.
1/19/2014	6:20 PM	Rear End	Incapacitating	Dark-Lighted	Dry	A southbound vehicle failed to stop in time and rear ended another southbound vehicle.
5/18/2014	9:15 PM	Rear End	Incapacitating	Daylight	Dry	An eastbound vehicle failed to stop in time and rear ended another eastbound vehicle.
5/23/2014	5:55 PM	Pedestrian	Non-Incapacitating	Daylight	Dry	A pedestrian left an unknown southbound vehicle and darted across southbound traffic and was struck by a southbound vehicle.
10/20/2014	7:15 PM	Angle	Incapacitating	Dark-Lighted	Wet	A southbound vehicle ran the red light and struck an eastbound vehicle which then struck several other northbound vehicles. The southbound vehicle had stolen the vehicle.



**Figure 4: Collision Diagram of SR 7 and Broward Boulevard**

**District 4 FDOT Collision Diagram**



## FIELD OBSERVATIONS

AM and PM peak hour observations were conducted at SR 7 and Broward Boulevard on December 8, 2015. This section summarizes the safety and traffic operations issues observed at this intersection.

### Pedestrian Observations

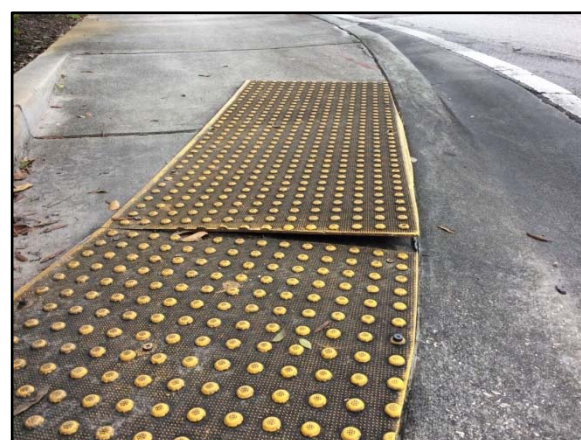
Pedestrians were observed crossing during the “DO NOT WALK” pedestrian phase. Enforcement of pedestrians who do not obey pedestrian signals should be increased. Crosswalks should also be upgraded to special emphasis or ladder style crosswalks for better visibility. Pedestrian push buttons also should be separated and relocated closer to the curb ramps.



Pedestrians were observed crossing midblock along both SR 7 and Broward Boulevard. Consider installing “NO PEDESTRIAN CROSSING” sign (R9-3) with “USE CROSSWALK” (R9-3b) within the median of each approach.



Detectable warning surfaces along the sidewalk of SR 7 are damaged at the driveway to Grove East Rental Apartments, which is just south of Broward Boulevard. The detectable warning surfaces should be replaced or removed at this location as it is currently a tripping hazard to pedestrians and not ADA-compliant.



The pedestrian push buttons share the mast arm poles at each corner and some are further than 10 feet from the curb ramp. Separate push buttons for each corner and relocating each push button closer than 10 feet to the curb ramp would enhance accessibility.



### Vehicular Observations

Vehicular conflicts were observed just south of Broward Boulevard as southbound vehicles were observed cutting off other southbound vehicles to avoid waiting behind the bus at the bus stop.



A southbound vehicle was observed speeding and running the red light. The vehicle did not clear the intersection prior to the start of the eastbound left-turn phase.



Northbound left-turn phase failures were observed during both the AM and PM peak periods and long queues were observed. All movements appeared to have high volumes during the PM peak hour.



The eastbound right-turn movement had 485 vph during turning movement counts. During field observations, the vehicle movement was heavy making it difficult for pedestrians to cross the southern and western crosswalks. Consider a right-turn overlap with the left-turn movement by installing a four-section right-turn arrow to display a green arrow during the left-turn phase and a flashing yellow (or red) right-turn arrow during the pedestrian phase to encourage drivers to yield to pedestrians. This improvement would require prohibiting the U-turn movement.



During the PM peak period, three buses were observed trying to stop at the southbound bus stop on SR 7 just south of Broward Boulevard. One of the buses was blocking traffic as it was trapped in the intersection. Consider reviewing bus schedules to reduce bus queues and backups and consider adding a queue jump at this location.



A westbound right turning vehicle was observed not yielding to eastbound left-turns. Consider installing a four-section right-turn arrow to display a solid red arrow and installing a blank out sign to display “NO RIGHT TURNS” symbol during the opposing left-turn movement.



## Signs and Miscellaneous Observations

Poor pavement markings were observed throughout the intersection. The intersection should be restriped with new pavement markings.



During field observations, a police officer was seen conducting a seat belt survey to see the effectiveness of the Thanksgiving “Click it or Ticket” seat belt campaign.

The southbound signal head is missing a signal visor. Consider replacing the visor and also consider installing one signal head per lane with yellow backplates for each approach.



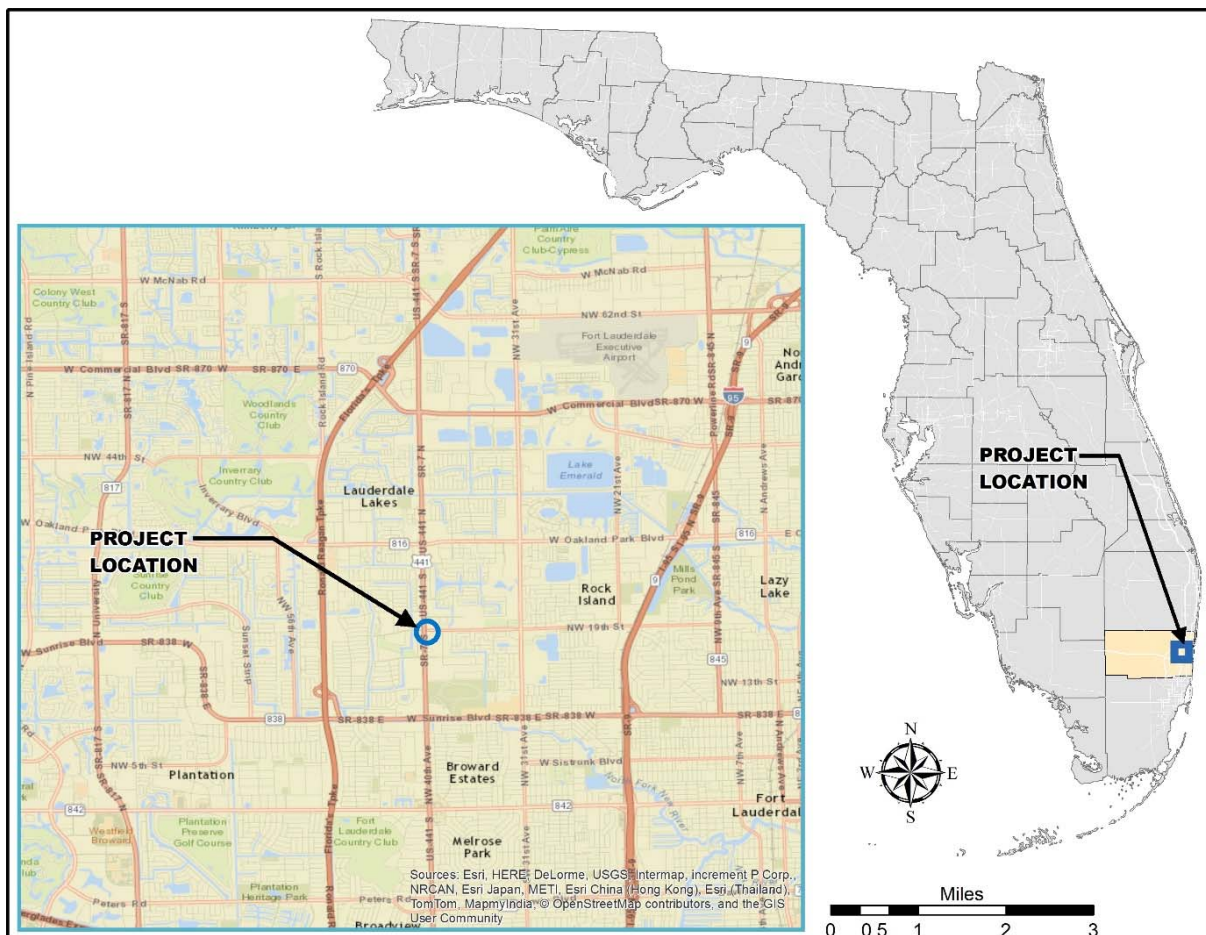
# SR 7 & NW 19<sup>TH</sup> STREET

## EXISTING CONDITIONS

The intersection of SR 7 and NW 19<sup>th</sup> Street is a four legged signalized intersection within Lauderdale and Lauderdale Lakes. Map 5 depicts the location of the intersection and Map 6 is an aerial of the overall intersection.

SR 7 is a six-lane divided roadway with a speed limit of 40 mph to the south and north of the intersection. There is lighting along the west side. There are sidewalks along both side and there are no bike lanes. Both the southbound and northbound approaches have one left-turn lane, two through lanes, and one shared through/right-turn lane.

**Map 5: Location Map of SR 7 and NW 19<sup>th</sup> Street**



**Map 6: Aerial of SR 7 and NW 19<sup>th</sup> Street**



NW 19<sup>th</sup> Street is a two lane divided roadway with a speed limit of 25 mph to the west. To the east it is a four lane undivided roadway with a two-way left-turn lane and a speed limit of 35 mph. Lighting is provided along the south side west of SR 7 and it provided on both sides east of SR 7. Sidewalks are provided on each side of each approach and there are no bike lanes. Both the westbound and eastbound approaches have one left-turn lane, one through lane, and one right-turn lane.

### Signal and Pedestrian Features

The intersection has mast arm signals with vertical signal heads. The southbound and northbound approaches have one protected left-turn signal head and two permissive signal heads over the through lanes. The southbound and northbound signal heads do not have backplates. The westbound and eastbound approaches have one protected/permissive left-turn signal head and one permissive signal head. The westbound and eastbound signal heads have black backplates. The intersections operates with protected left-turn phasing for the northbound and southbound approaches and protected/permissive left-turn phasing for the eastbound and westbound approaches. There is not a separate signal head for the eastbound and westbound right turns as right turns are permissive and there are no right-turn overlaps or right-turn restrictions.

Within close proximity to the intersection of SR 7 and NW 19<sup>th</sup> Street are the following signalized intersections:

- > SR 7 and NW 16th Street - 0.31 miles south
- > SR 7 and NW 21<sup>st</sup> Street - 0.15 miles north
- > NW 19<sup>th</sup> Street and NW 38<sup>th</sup> Avenue - 0.16 miles east

The existing pedestrian features of the intersection include continental style crosswalks, yellow contrasting detectable warnings at each curb ramp, and countdown pedestrian signals at each corner of the intersection. The pedestrian push buttons, in each corner, share the pedestrian pole with the exception of the northeast corner the pedestrian push buttons share the mast arm pole. All of the pedestrian signals displays the “WALK” symbol and then follows with the following countdown timers:

- > Crosswalk on the south and north sides – 24 seconds
- > Crosswalk on west and east side – 19 seconds

### Vehicular Volumes

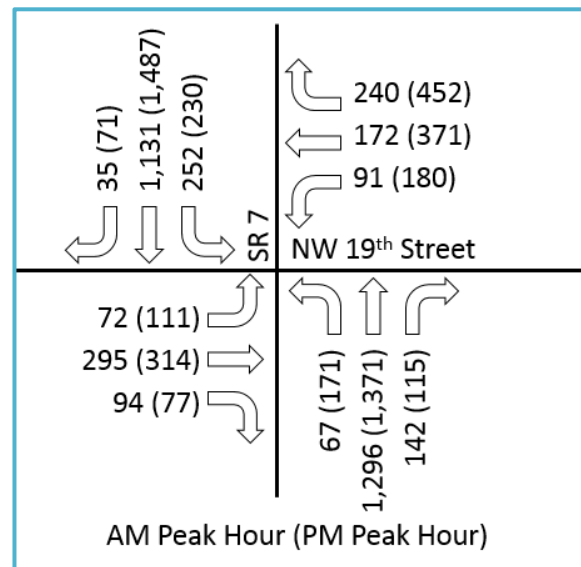
FDOT 2014 counts were reviewed along SR 7 and NW 19<sup>th</sup> Street. The following count stations were in the area of the intersection with the following daily volumes:

- > 860103 – SR 7 south of NW 19<sup>th</sup> Street - 55,533 vpd
- > 869246 – NW 19<sup>th</sup> Street east of SR 7 - 23,500 vpd

Six-hour vehicular volume counts were conducted on May 13<sup>th</sup> and May 14<sup>th</sup> of 2015 at this intersection. Based on the counts collected on May 13<sup>th</sup>, the AM peak hour occurred from 7:30 AM to 8:30 AM with 3,887 total vehicles and the PM peak hour occurred from 5:15 PM to 6:15 PM with 4,950 total vehicles. Figure 5 shows the peak hour corresponding volumes for each approach. The vehicular counts are included in Appendix A.



**Figure 5: Vehicular Counts**



## CRASH DATA ANALYSIS

Crash data from January 2011 to December 2014 extracted from CARS was reviewed to identify any crash patterns that could be addressed as part of this safety review.

During the four-year analysis period, a total of 116 crashes occurred at the intersection of SR 7 and NW 19<sup>th</sup> Street. Table 7 provides the overall number of crashes by their injury severity for each year.

**Table 7: Crash Distribution of SR 7 and NW 19th Street**

		Number of Crashes				Total Crashes	Mean Crashes Per Year	%
		2011	2012	2013	2014			
Crash Type	Angle	7	7	7	2	23	5.8	19.8%
	Bike	0	0	0	2	2	0.5	1.7%
	Head On	2	2	2	1	7	1.8	6.0%
	Left Turn	1	2	2	2	7	1.8	6.0%
	Off Road	1	0	0	0	1	0.3	0.9%
	Pedestrian	0	1	1	1	3	0.8	2.6%
	Rear End	5	19	16	6	46	11.5	39.7%
	Right Turn	1	1	1	2	5	1.3	4.3%
	Sideswipe	1	0	2	5	8	2.0	6.9%
	Other	0	5	9	0	14	3.5	12.1%
	<b>Total</b>	<b>18</b>	<b>37</b>	<b>40</b>	<b>21</b>	<b>116</b>	<b>29.0</b>	<b>100.0%</b>
Injury Severity	Fatal	0	0	1	0	1	0.3	0.9%
	Incapacitating	0	0	1	0	1	0.3	0.9%
	Non-Incapacitating	3	3	7	4	17	4.3	14.7%
	Possible Injury	8	13	12	9	42	10.5	36.2%
	None	7	21	19	8	55	13.8	47.4%
<b>Total</b>	<b>18</b>	<b>37</b>	<b>40</b>	<b>21</b>	<b>116</b>	<b>29.0</b>	<b>100.0%</b>	
Lighting Condition	Dark-Lighted	4	9	14	6	33	8.3	28.4%
	Dawn	0	1	0	0	1	0.3	0.9%
	Daylight	13	26	26	14	79	19.8	68.1%
	Dusk	1	1	0	1	3	0.8	2.6%
	<b>Total</b>	<b>18</b>	<b>37</b>	<b>40</b>	<b>21</b>	<b>116</b>	<b>29.0</b>	<b>100.0%</b>
Surface Condition	Dry	12	31	34	19	96	24.0	82.8%
	Wet	6	6	6	2	20	5.0	17.2%
	<b>Total</b>	<b>18</b>	<b>37</b>	<b>40</b>	<b>21</b>	<b>116</b>	<b>29.0</b>	<b>100.0%</b>

Scanned police reports were reviewed to identify bicycle, pedestrian, incapacitating, and fatality crashes. Per Table 7, there were two bike crashes, three pedestrian crashes, one crash with incapacitating injuries, and one fatality. These crashes were reviewed and summarized in Table 8.

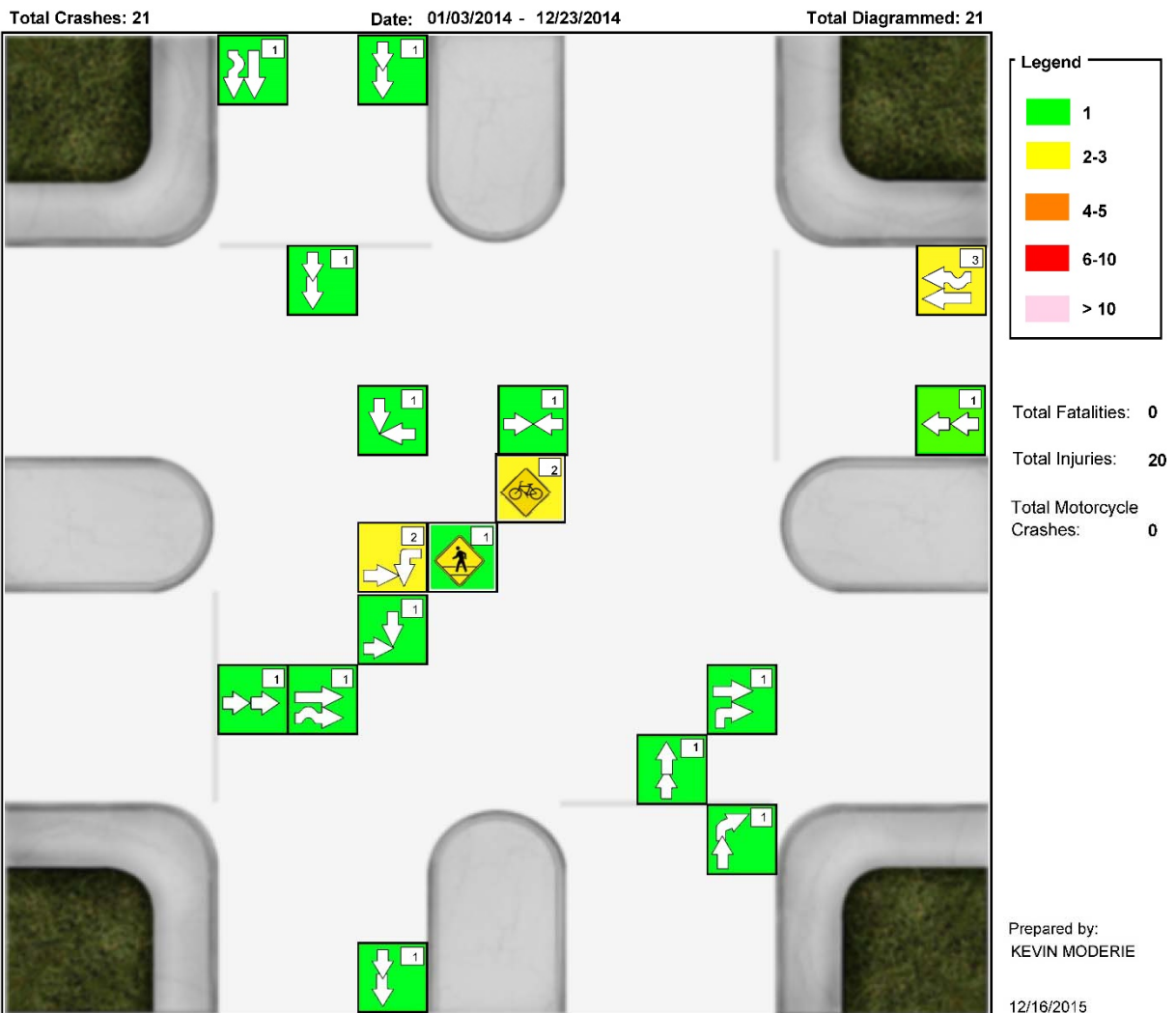
From January 1, 2014 to December 31, 2014, there were 21 crashes that occurred. Figure 6 is a collision diagram of SR 7 and NW 19<sup>th</sup> Street that depicts the crashes from 2014.

**Table 8: Severe Crash Summaries of SR 7 and NW 19th Street**

Date	Time	Crash Type	Injury Severity	Lighting Condition	Surface Conditions	Crash Summary
10/24/2012	6:44 AM	Pedestrian	Possible	Dawn	Wet	A westbound left turning vehicle struck a westbound pedestrian in the south crosswalk.
5/25/2013	12:20 PM	Angle	Incapacitating	Daylight	Dry	A westbound left turning vehicle ran the red light and struck a northbound motorcyclist. The westbound vehicle fled the scene.
6/6/2013	6:40 AM	Angle	Fatality	Dark-Lighted	Wet	A northbound vehicle was driving erratically, struck a northbound vehicle, and the struck a pole. The driver was pronounced deceased at the scene.
6/19/2013	11:02 PM	Pedestrian	Non-Incapacitating	Dark-Lighted	Dry	A westbound U-turning vehicle struck a pedestrian that was crossing. The driver ran over the pedestrian's foot.
7/3/2014	3:40 PM	Bike	Possible	Daylight	Dry	An eastbound right turning vehicle was making a right turn and struck a northbound bicyclist that was riding in the sidewalk.
12/8/2014	6:25 PM	Bike	Possible	Dark-Lighted	Dry	An eastbound left turning vehicle had a green light and was making a left turn and struck a southbound bicyclist riding in the crosswalk.
12/23/2014	7:33 AM	Pedestrian	Non-Incapacitating	Daylight	Dry	An eastbound right turning vehicle had a green light and was making a right turn and struck a westbound pedestrian in the crosswalk.

**Figure 6: Collision Diagram of SR 7 and NW 19<sup>th</sup> Street**

**District 4 FDOT Collision Diagram**



## FIELD OBSERVATIONS

AM and PM peak hour observations were conducted at SR 7 and NW 19<sup>th</sup> Street on December 10, 2015. This section summarizes the safety and traffic operations issues that were observed at this intersection.

### Pedestrian Observations

Pedestrians were observed crossing during the “DO NOT WALK” pedestrian phase. Enforcement of pedestrians who do not obey pedestrian signals should be increased. Separate push buttons for each corner and relocating the push buttons closer to the curb ramps would provide better accessibility. Installing “NO PEDESTRIAN CROSSING” sign (R9-3) with “USE CROSSWALK” (R9-3b) within the median for each approach could help deter unsafe mid-block crossings.



The westbound right-turn movement had 240 vph during the AM peak hour and 452 vph. During observations the vehicular movement was very heavy during the PM

peak hour and pedestrians had difficulty crossing the northern and eastern crosswalks. Consider a right-turn overlap with the left-turn movement by installing a four-section right-turn arrow to display a green arrow during the left-turn phase and a flashing yellow (or red) right-turn arrow during the pedestrian phase to encourage drivers to yield to pedestrians. This improvement would require prohibiting the U-turn movement.



## Vehicular Observations

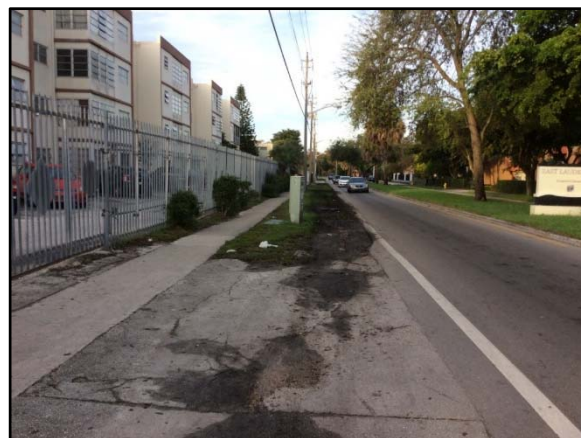
The eastbound approach was observed having large queues during the AM and PM peak hours.



For the eastbound approach, the PM peak hour had the highest volumes with 111 vph in the left-turn lane, 314 vpd in the through lane, and 77 vpd in the right-turn lane. Aggressive driving, including speeding and red light running, was observed as phase failures occurred. To increase capacity of the eastbound movement and to reduce aggressive driving, consider modifying the eastbound right-turn lane to a shared through/right-turn lane as there are two eastbound through lanes on the opposing side of the intersection.



Off tracking was observed 450 feet west of the intersection. If right of way is available and construction is feasible, consider extending the proposed shared through/right-turn lane back as far possible.



The westbound right-turn lane was observed having large queues during the PM peak hour.



The westbound left-turn lane was also observed having large queues during the PM peak hour.



Westbound right turns were observed cutting through the driveway to the Mobil gas station to skip the long right-turn queue. If feasible, consider adding dual right-turn lanes by modifying the through lane to a shared through/right-turn lane. If this improvement is implemented, a leading pedestrian interval with a “NO RIGHT TURN” blank out sign for westbound right-turns should also be considered to provide a protected crossing for pedestrians. A more detailed analysis should be conducted prior to implementing this improvement.



For the westbound approach, the PM peak hour had the highest volumes with 180 vph in the left-turn lane, 371 vpd in the through lane, and 452 vpd in the right-turn lane. Aggressive driving, including speeding and red light running, was observed as phase failures occurred. To reduce aggressive driving, consider reviewing the signal timings to allow additional time for NW 19<sup>th</sup> Street.



The median opening 250 feet west of SR 7 should be closed as westbound left turning vehicles block westbound through traffic.

During observations, two left-turning vehicles at this location were observed waiting to turn left within the westbound through lane. The vehicles were unable to turn left until after the eastbound phase turned red and an eastbound vehicle allowed them to turn. This resulted in westbound vehicles to queue and block the intersection. Consider closing the median to not allow this movement. This improvement would also allow the eastbound left-turn lane to be extended 140 feet west.



The northbound left-turn lane was observed having large queues during the PM peak hour.



The southbound left-turn lane was observed having large queues during the AM and PM peak hours.



The southbound left-turn lane had 252 vph during the AM peak hour and 230 vph during the PM peak hour. During the field reviews many southbound left-turn phase failures occurred. Many drivers were observed driving aggressively such as speeding and running the red light. To reduce aggressive driving, signal timings should be reviewed to allow more time for the southbound left-turn movement. During nonpeak hours, consider installing a four-section left-turn arrow to display a flashing yellow (or red) during the northbound/southbound through movements as gaps were available in traffic that left-turns could utilize.





A conflict was observed between a westbound right turning vehicle and a southbound U-turning vehicle. Consider prohibiting the southbound U-turn movement as U-turns are permitted at NW 21<sup>st</sup> Street which is 780 feet north of the intersection. Also, consider a right-turn overlap with the left-turn movement by installing a four-section right-turn arrow to display a green arrow during the left-turn phase.



### Signs and Miscellaneous

The “TURNING VEHICLES YIELD TO PEDESTRIANS” sign is outdated. This should

be replaced with a “YIELD TO PEDESTRIANS” (R10-15R) sign.



As a westbound driver approaches the intersection with the intention of traveling straight through, the right-through lane becomes a westbound right-turn lane. Uncertainty about downstream lane assignment produces hesitancy during the intersection approach; this in turn decreases available maneuver time and diminishes the driver’s attentional resources available for effective response to potential traffic conflicts at and near intersections. To warn motorists of the lane drop of the right-through lane to a right-turn lane in advance of the signalized intersection, install additional shoulder mounted “RIGHT TURN ONLY”(R3-5) sign and add additional “ONLY” pavement markings, per Section 2B.20 of the Federal Highway Administration’s (FHWA) Manual on Uniform Traffic Control Devices (MUTCD).



The westbound “SCHOOL SIGN” (S1-1) is not visible as it is behind the pole and the “TURNING VEHICLES YIELD TO PEDESTRIANS” sign. The “SCHOOL SIGN” should be relocated for better visibility.



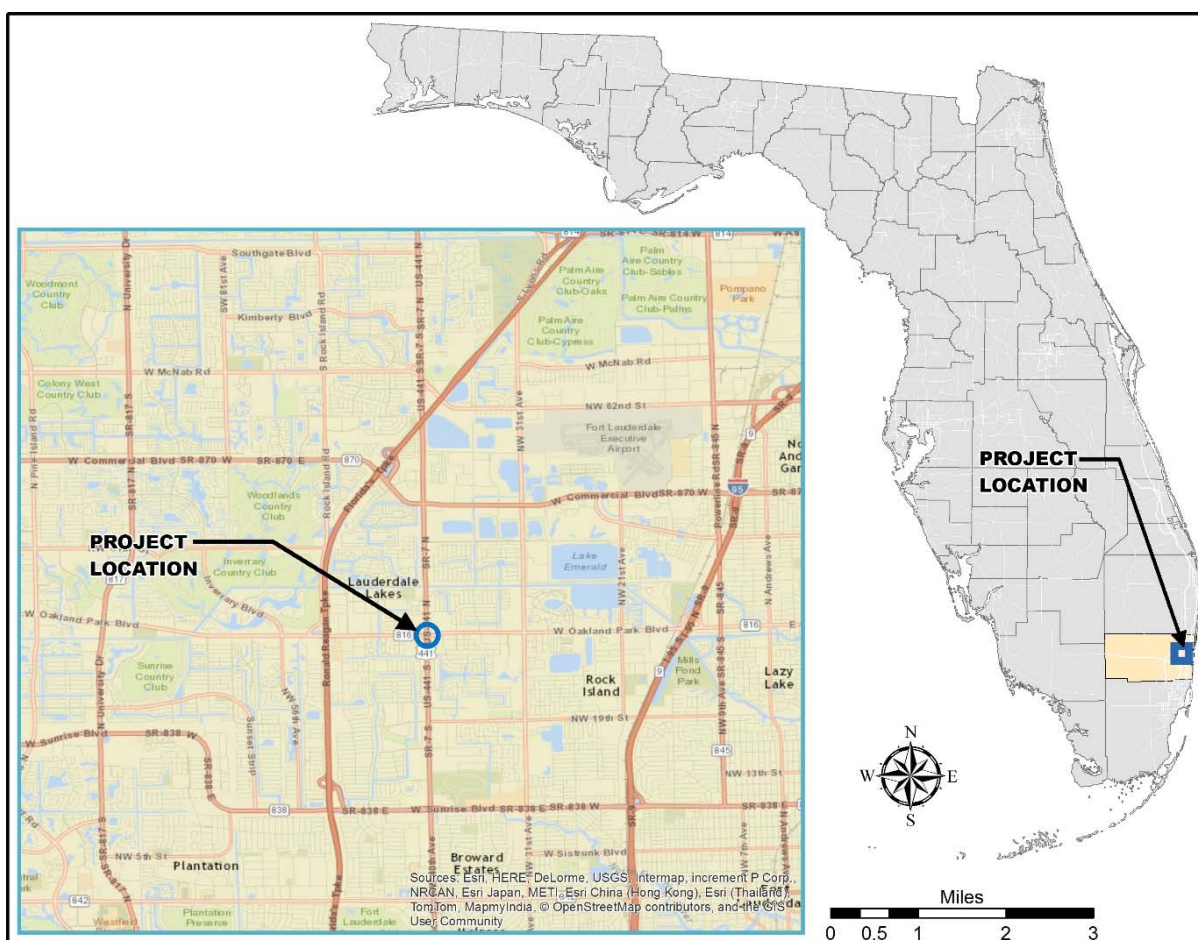
# SR 7 & OAKLAND PARK BOULEVARD

## EXISTING CONDITIONS

The intersection of SR 7 and Oakland Park Boulevard is a four legged signalized intersection within Lauderdale Lakes. Map 7 depicts the location of the intersection and Map 8 is an aerial of the overall intersection.

SR 7 is a six-lane divided roadway with a speed limit of 40 mph to the south and north of the intersection. There is lighting along the west side. There are sidewalks along both sides and no bike lanes; however, a southbound bike lane does begin just south of the intersection. Both the southbound and northbound approaches have two left-turn lanes, three through lanes, and one right-turn lane.

**Map 7 Location Map of SR 7 and Oakland Park Boulevard**



**Map 8: Aerial of SR 7 and Oakland Park Boulevard**



Oakland Park Boulevard is a six-lane divided roadway with a speed limit of 45 mph to the east and west of the intersection. There is lighting along the north side, sidewalks along both sides, and no bike lanes. Both the westbound and eastbound approaches have two left-turn lanes, three through lanes, and one right-turn lane.

### Signal and Pedestrian Features

The intersection has four mast arm signals with horizontal signal heads with black backplates on each arm. The intersection operates with protected left-turns and permissive right turns. All four approaches have two protected left-turn signal heads over the left-turn lanes and three permissive signal heads over the through lanes. There is not a separate signal head for the right turns as right turns are permissive and there are no right-turn overlaps or right-turn restrictions.

Within close proximity to the intersection of SR 7 and Oakland Park Boulevard are the following signalized intersections:

- > SR 7 and NW 29<sup>th</sup> Street - 0.21 miles south
- > SR 7 and NW 34<sup>h</sup> Street - 0.27 miles north
- > Oakland Park Boulevard and NW 43<sup>rd</sup> Avenue - 0.18 miles west
- > Oakland Park Boulevard and NW 36<sup>th</sup> Terrace - 0.31 miles east

The existing pedestrian features of the intersection include standard crosswalks, yellow contrasting detectable warnings at each curb ramp, and pedestrian signals at each corner of the intersection. All of the pedestrian signals are countdown and displays the “WALK” symbol and then follows with a 33 second timer to cross each crosswalk. The pedestrian push buttons all share pedestrian poles at each corner with the exception of the northeast corner where both buttons are on the pole of the mast arm.

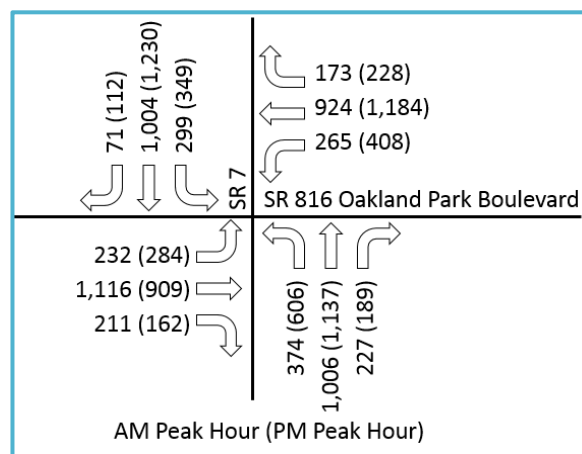
### Vehicular Volumes

FDOT 2014 counts were reviewed along SR 7 and Oakland Park Boulevard. The following count stations were in the area of the intersection:

- > 865207 – SR 7 south of Oakland Park Boulevard - 55,116 vpd
- > 865302- Oakland Park Boulevard west of SR 7 - 65,432 vpd

Six-hour vehicular volume counts were conducted on May 13<sup>th</sup> and May 14<sup>th</sup> of 2015 at the intersection. Based on the counts collected on May 13<sup>th</sup>, the AM peak hour occurred from 7:15 AM to 8:15 AM with 5,902 total vehicles and the PM peak hour occurred from 5:00 PM to 6:00 PM with 6,798 total vehicles. Figure 7 shows the peak hour corresponding volumes for each approach. The vehicular counts are included in Appendix A.

**Figure 7: Vehicular Counts**



### CRASH DATA ANALYSIS

Crash data from January 2011 to December 2014 extracted from CARS was reviewed to identify any crash patterns that could be addressed as part of this safety review.

During the four-year analysis period, a total of 267 crashes occurred at this intersection. Table 9 provides the overall number of crashes by their injury severity for each year.

**Table 9: Crash Distribution of SR 7 and Oakland Park Boulevard**

		Number of Crashes				Total Crashes	Mean Crashes Per Year	%
		2011	2012	2013	2014			
Crash Type	Angle	8	13	15	2	38	9.5	14.2%
	Bicycle	0	0	0	1	1	0.3	0.4%
	Bike	0	2	5	3	10	2.5	3.7%
	Fixed Object	0	0	0	2	2	0.5	0.7%
	Head On	0	4	1	1	6	1.5	2.2%
	Off Road	4	2	1	0	7	1.8	2.6%
	Other	0	2	5	0	7	1.8	2.6%
	Pedestrian	4	3	3	2	12	3.0	4.5%
	Rear End	27	44	35	39	145	36.3	54.3%
	Right Turn	2	9	6	5	22	5.5	8.2%
	Other	7	7	2	1	17	4.3	6.4%
<b>Total</b>	<b>52</b>	<b>86</b>	<b>73</b>	<b>56</b>	<b>267</b>	<b>66.8</b>	<b>100.0%</b>	
Injury Severity	Fatal	0	0	0	0	0	0.0	0.0%
	Incapacitating	1	3	1	1	6	1.5	2.2%
	Non-Incapacitating	8	6	9	7	30	7.5	11.2%
	Possible Injury	12	18	27	15	72	18.0	27.0%
	None	31	59	36	33	159	39.8	59.6%
<b>Total</b>	<b>52</b>	<b>86</b>	<b>73</b>	<b>56</b>	<b>267</b>	<b>66.8</b>	<b>100.0%</b>	
Lighting Condition	Dark-Lighted	17	25	25	20	87	21.8	32.6%
	Dawn	1	3	1	2	7	1.8	2.6%
	Daylight	37	59	51	52	199	49.8	74.5%
	Dusk	2	7	4	1	14	3.5	5.2%
	Unknown	0	0	1	0	1	0.3	0.4%
	<b>Total</b>	<b>57</b>	<b>94</b>	<b>82</b>	<b>75</b>	<b>308</b>	<b>77.0</b>	<b>115.4%</b>
Surface Condition	Dry	47	80	67	60	254	63.5	95.1%
	Wet	10	14	15	15	54	13.5	20.2%
	<b>Total</b>	<b>57</b>	<b>94</b>	<b>82</b>	<b>75</b>	<b>308</b>	<b>77.0</b>	<b>115.4%</b>

Scanned police reports were reviewed to identify bicycle, pedestrian, incapacitating, and fatality crashes. Per Table 9, there were ten bike crashes, twelve pedestrian crashes, six crashes with incapacitating injuries, and no fatalities. These crashes were reviewed and summarized in Table 10.

From January 1, 2014 to December 31, 2014, there were 56 crashes that occurred. Figure 10 is a collision diagram of SR 7 and Oakland Park Boulevard that depicts the crashes from 2014.

**Table 10: Severe Crash Summaries of SR 7 and Oakland Park Boulevard (2011-2012)**

Date	Time	Crash Type	Injury Severity	Lighting Condition	Surface Conditions	Crash Summary
1/10/2011	3:41 PM	Pedestrian	Incapacitating	Daylight	Dry	A pedestrian exited a vehicle that was travelling westbound and crossed in front of a westbound vehicle.
2/22/2011	3:14 PM	Pedestrian	Possible	Daylight	Dry	A southbound left turning vehicle struck a pedestrian walking eastbound through traffic. The pedestrian failed to walk in the crosswalk and was
6/8/2011	7:18 PM	Pedestrian	None	Daylight	Dry	An northbound left turning vehicle struck a westbound pedestrian at the crosswalk. The northbound left turning vehicle was reported running the
6/20/2011	5:34 PM	Pedestrian	None	Daylight	Dry	A westbound left turning vehicle was unable to stop in time and struck a pedestrian walking through traffic.
2/10/2012	10:14 AM	Bike	Possible	Daylight	Wet	An eastbound bicyclist was attempting to cross State Road 7 outside of the crosswalk and crashed into a southbound vehicle. The driver of the vehicle
3/21/2012	8:40 PM	Pedestrian	Incapacitating	Dark-Lighted	Dry	A westbound vehicle struck a pedestrian that crossed in front of him. The vehicle had a green light.
4/11/2012	9:10 PM	Pedestrian	Non-Incapacitating	Dark-Lighted	Dry	A southbound right turning vehicle struck a southbound pedestrian in the west crosswalk. The pedestrian appeared to be intoxicated.
4/25/2012	2:19 PM	Bike	Non-Incapacitating	Daylight	Dry	A northbound right turning vehicle struck a southbound bicyclist crossing in the east crosswalk. It was reported that the northbound vehicle had a
8/27/2012	10:37 AM	Rear End	Incapacitating	Daylight	Wet	An eastbound vehicle failed to slow down time and rear ended several vehicles.
10/26/2012	7:35 AM	Pedestrian	Possible	Daylight	Wet	An eastbound vehicle in the left turn lane was turning left when a pedestrian ran in front of the vehicle. The pedestrian was not in the
11/5/2012	12:56 PM	Right Turn	Incapacitating	Daylight	Dry	A northbound right turning vehicle collided with a southbound left turning vehicle.

**Table 11: Severe Crash Summaries of SR 7 and Oakland Park Boulevard (2013-2014)**

Date	Time	Crash Type	Injury Severity	Lighting Condition	Surface Conditions	Crash Summary
1/27/2013	5:00 PM	Bike	None	Dusk	Dry	A southbound left turning vehicle struck a bicyclist crossing in the north crosswalk. It is unknown who had the right of way.
8/22/2013	12:14 PM	Pedestrian	Possible	Daylight	Dry	A southbound left turning vehicle struck a bicyclist crossing in the north crosswalk. The southbound left turning vehicle did not see the bicyclist as
8/29/2013	9:12 PM	Pedestrian	Incapacitating	Dark-Lighted	Dry	A westbound vehicle struck a southbound pedestrian crossing outside of the crosswalk to the west of the intersection. The westbound vehicle had a
9/6/2013	11:10 AM	Bike	Possible	Daylight	Dry	A northbound left turning vehicle struck a westbound bicyclist at the crosswalk. The northbound left turning vehicle had a yellow turn arrow
10/14/2013	5:35 PM	Bike	Possible	Daylight	Dry	A southbound right turning vehicle struck a northbound bicyclist at the western crosswalk.
10/26/2013	9:56 AM	Bike	Non-Incapacitating	Daylight	Dry	A westbound right turning vehicle struck a southbound bicyclist. The driver of the vehicle ran the stop sign and did not see the bicyclist.
11/5/2013	6:30 AM	Pedestrian	Non-Incapacitating	Dawn	Dry	A westbound vehicle struck a southbound pedestrian that ran through traffic to the west of the intersection. The westbound vehicle had a green
12/24/2013	9:49 AM	Pedestrian	Possible	Daylight	Dry	An eastbound vehicle struck a southbound pedestrian just east of the intersection. The pedestrian darted through traffic just east of the
1/3/2014	5:42 PM	Pedestrian	Non-Incapacitating	Daylight	Dry	A southbound right turning vehicle struck a pedestrian crossing eastbound.
2/20/2014	1:00 PM	Pedestrian	None	Daylight	Dry	An northbound left turning vehicle struck a westbound pedestrian at the crosswalk. The pedestrian observed the northbound left turning driver was
3/5/2014	10:40 PM	Bike	None	Dawn	Wet	An northbound left turning vehicle struck a bicyclist attempting to cross the intersection. at the crosswalk. The northbound left turning vehicle had a
4/22/2014	9:23 PM	Bike	Incapacitating	Dark-Lighted	Dry	A westbound vehicle struck a southbound bicyclist crossing outside of the crosswalk to the west of the intersection. The westbound vehicle had a
10/5/2014	4:30 PM	Bike	None	Daylight	Dry	A northbound right turning vehicle struck a bicyclist crossing east. The bicyclist was not crossing within the crosswalk.



**Figure 8: Collision Diagram of SR 7 and Oakland Park Boulevard**

**District 4 FDOT Collision Diagram**



## FIELD OBSERVATIONS

AM and PM peak hour observations were conducted at SR 7 and Oakland Park Boulevard on December 3, 2015. This section summarizes the safety and traffic operations issues that were observed at this intersection.

### Pedestrian Observations

Many pedestrians were observed using transit during both peak hours.



Pedestrians were observed crossing during the “DO NOT WALK” pedestrian phase during the AM peak hour and while it was raining in the PM peak hour. Enforcement of pedestrians who do not obey pedestrian signals should be increased. Upgrading the crosswalks to special emphasis or ladder style crosswalks would provide better visibility. Separating the pedestrian push buttons and relocating the push buttons closer than 10 feet of the curb ramps would provide better accessibility.



Pedestrians were observed crossing midblock along both SR 7 and Oakland Park Boulevard. Consider installing “NO PEDESTRIAN CROSSING” sign (R9-3) with “USE CROSSWALK” (R9-3b) within the median for each approach that currently does not have these signs to direct pedestrians to use the crosswalks.



A pedestrian was observed waiting in the median to cross SR 7 while it was raining.



The bus stop along the east side of SR 7, just north of Oakland Park Boulevard, was flooded with over an inch of water over the sidewalk. Drainage at this location and along the intersection should be reviewed for potential improvements.



Pedestrians crossing the crosswalks had a difficult time crossing as right turning vehicles were not yielding to them. Consider a right-turn overlap with the left-turn movement by installing a four-section right-turn arrow to display a green arrow during

the left-turn phase and a flashing yellow (or red) right-turn arrow during the pedestrian phase to encourage drivers to yield to pedestrians. This improvement would require prohibiting the U-turn movement.



### Vehicular Observations

There were 606 vph in the dual northbound left-turn lanes during the PM peak hour. Aggressive driving, including speeding and red light running, was observed as phase failures occurred.

## Signs and Miscellaneous

Street lighting was observed at the intersection during the rain.

The roadway was flooded at the intersection. Consider reviewing the drainage at the intersection.



The west side of SR 7 just north of Oakland Park Boulevard has an area that is striped with chevrons that could be used as a bus bay. Consider relocating the bus stop 150 feet south and restriping the chevrons area to a bus bay. A queue jump could be evaluated for this location.



The signs on the cantilever pole along the east side of SR 7 for northbound traffic is behind a tree and not visible to northbound traffic. The vegetation should be trimmed for better visibility.



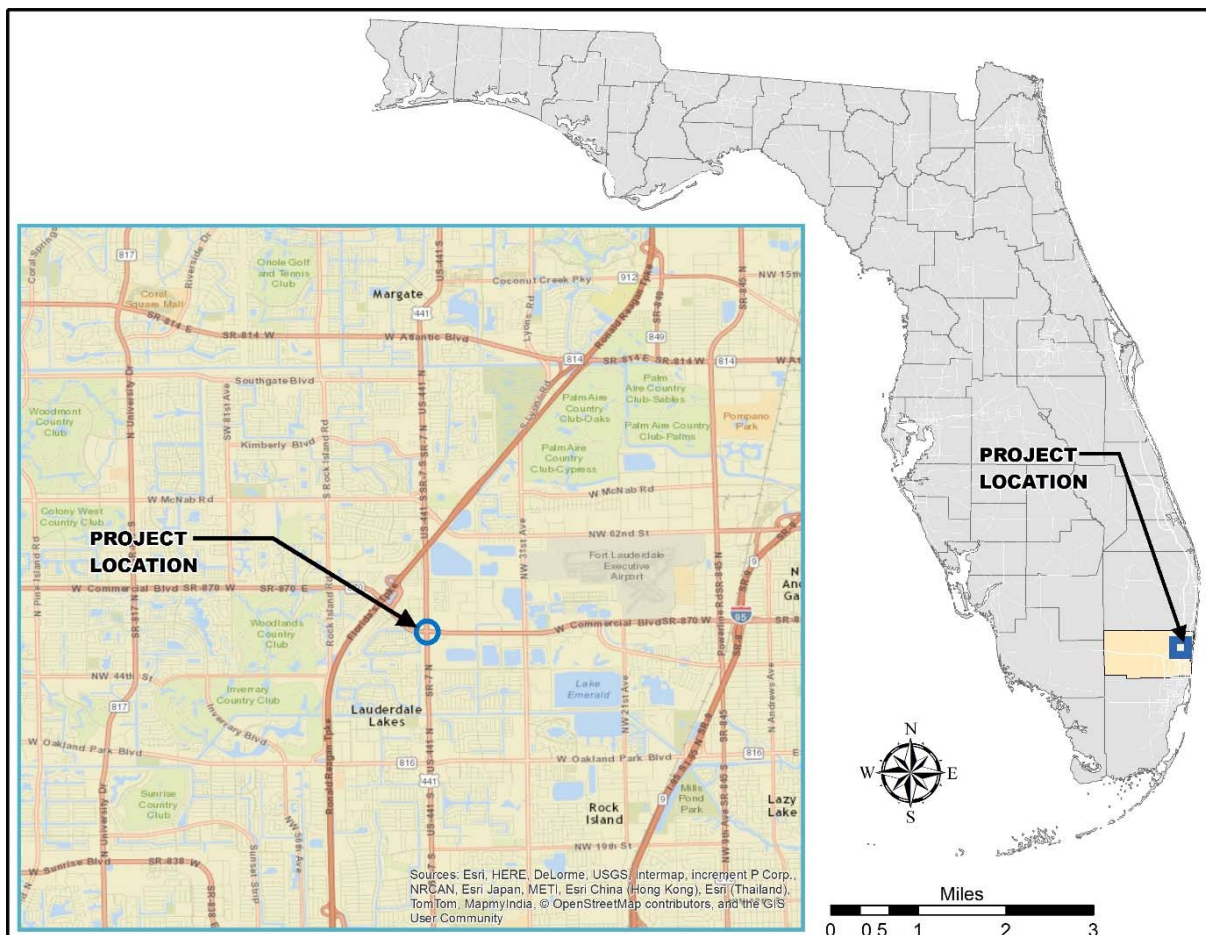
# SR 7 & COMMERCIAL BOULEVARD

## EXISTING CONDITIONS

The intersection of SR 7 and Commercial Boulevard is a four legged signalized intersection within Tamarac. Map 9 depicts the location of the intersection and Map 10 is an aerial of the overall intersection.

SR 7 is a six-lane divided roadway with a speed limit of 45 mph to the south and north of the intersection. There is lighting along the west side of the road. There are sidewalks and bike lanes along both sides. Both the southbound and northbound approaches have two left-turn lanes, three through lanes, one right-turn lane, and a bike lane.

**Map 9: Location Map of SR 7 and Commercial Boulevard**



**Map 10: Aerial of SR 7 and Commercial Boulevard**



Commercial Boulevard is a six-lane divided roadway with a speed limit of 45 mph to the east and west of the intersection. There is lighting along the south side, sidewalks along both sides, and no bike lanes. Both the westbound and eastbound approaches have two left-turn lanes, three through lanes, and one right-turn lane.

### Signal and Pedestrian Features

The intersection has mast arm signals with vertical signal heads with the westbound and eastbound signal heads having black backplates. The intersection operates with protected left-turns and permissive right turns. All four approaches have two protected left-turn signal heads over the left-turn lanes and two permissive signal heads over the through lanes. The southbound, westbound, and eastbound approaches also have an additional nearside signal head for the through movements. There is not a separate signal head for the right turns as right turns are permissive and there are no right-turn overlaps or right-turn restrictions. There are red light running cameras for the southbound, northbound, and westbound approaches.

Within close proximity to this intersection are the following signalized intersections:

- > SR 7 and Piccadilly Plaza/Headway Office Park - 0.31 miles south
- > SR 7 and West Prospect Road - 0.60 miles north

- > Commercial Boulevard and Mainland Drive - 0.10 miles west
- > Commercial Boulevard and NW 33<sup>rd</sup> Avenue - 0.77 miles east

The existing pedestrian features of the intersection include special emphasis crosswalks, yellow contrasting detectable warnings at each curb ramp, and pedestrian signals at each corner of the intersection. Each of the pedestrian signals display the “WALK” symbol; however, the northeast pedestrian signal is broken for eastbound pedestrians crossing in the north crosswalk as the “WALK” symbol does not illuminate. All of the pedestrian signals appear to have countdown timers but not all were working at the time the field observations were conducted. The following countdown timers were observed:

- > Crosswalk on the south side – 38 seconds
- > Crosswalk on the north side for westbound pedestrians only – 34 seconds
- > Crosswalk on the west side for southbound pedestrians only – 29 seconds

The pedestrian push buttons in each corner share the mast arm with the exception of the northwest corner, where the pedestrian push buttons share the pedestrian pole.

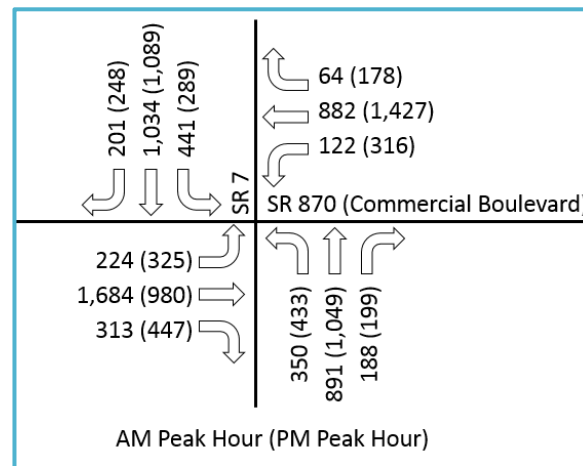
### Vehicular Volumes

FDOT 2014 Synopsis Reports were reviewed along SR 7 and Commercial Boulevard. The following count stations were in the area of the intersection:

- > 860478 – SR 7 south of Commercial Boulevard - 49,753 vpd
- > 865210 – SR 7 north of Commercial Boulevard - 46,485 vpd
- > 867085 - Commercial Boulevard west of SR 7 - 59,877 vpd
- > 860016 - Commercial Boulevard) east of SR 7 - 54,908 vpd

Six-hour vehicular volume counts were conducted on May 13<sup>th</sup> and May 14<sup>th</sup> of 2015 at the intersection of SR 7 and Commercial Boulevard. Based on the counts collected on May 13<sup>th</sup>, the AM peak hour occurred from 7:15 AM to 8:15 AM with 6,394 total vehicles and the PM peak hour occurred from 5:15 PM to 6:00 PM with 6,980 total vehicles. Figure 9 shows the peak hour corresponding volumes for each approach. The vehicular counts are included in Appendix A.

**Figure 9: Vehicular Volumes**



## CRASH DATA ANALYSIS

Crash data from January 2011 to December 2014 extracted from CARS was reviewed to identify any crash patterns that could be addressed as part of this safety review.

During the four-year analysis period, a total of 223 crashes occurred at this intersection. Table 12 provides the overall number of crashes by their injury severity for each year.

Scanned police reports were reviewed to identify bicycle, pedestrian, incapacitating, and fatality crashes. Per Table 12 there were five bike crashes, seven pedestrian crashes, five crashes with incapacitating injuries, and one fatality. These crashes were reviewed and summarized in Table 13.



**Table 12: Crash Distribution of SR 7 and Commercial Boulevard**

		Number of Crashes				Total Crashes	Mean Crashes Per Year	%
		2011	2012	2013	2014			
Crash Type	Angle	6	11	4	6	27	6.8	12.1%
	Bike	1	1	3	0	5	1.3	2.2%
	Head On	2	2	2	0	6	1.5	2.7%
	Left Turn	1	2	2	4	9	2.3	4.0%
	Off Road	1	2	0	1	4	1.0	1.8%
	Pedestrian	2	0	3	2	7	1.8	3.1%
	Rear End	24	27	25	35	111	27.8	49.8%
	Right Turn	1	1	3	7	12	3.0	5.4%
	Sideswipe	5	5	4	14	28	7.0	12.6%
	Other	4	3	7	0	14	3.5	6.3%
	<b>Total</b>	<b>47</b>	<b>54</b>	<b>53</b>	<b>69</b>	<b>223</b>	<b>55.8</b>	<b>100.0%</b>
Injury Severity	Fatal	0	1	0	0	1	0.3	0.4%
	Incapacitating	0	2	3	0	5	1.3	2.2%
	Non-Incapacitating	3	6	5	5	19	4.8	8.5%
	Possible Injury	14	16	12	17	59	14.8	26.5%
	None	30	29	33	47	139	34.8	62.3%
<b>Total</b>	<b>47</b>	<b>54</b>	<b>53</b>	<b>69</b>	<b>223</b>	<b>55.8</b>	<b>100.0%</b>	
Lighting Condition	Dark-Lighted	12	11	16	26	65	16.3	29.1%
	Dark-Not Lighted	0	0	1	0	1	0.3	0.4%
	Dawn	2	1	1	0	4	1.0	1.8%
	Daylight	32	41	33	40	146	36.5	65.5%
	Dusk	1	0	2	3	6	1.5	2.7%
	Unknown	0	1	0	0	1	0.3	0.4%
<b>Total</b>	<b>47</b>	<b>54</b>	<b>53</b>	<b>69</b>	<b>223</b>	<b>55.8</b>	<b>100.0%</b>	
Surface Condition	Dry	36	44	38	57	175	43.8	78.5%
	Other	0	0	1	0	1	0.3	0.4%
	Wet	11	10	14	12	47	11.8	21.1%
	<b>Total</b>	<b>47</b>	<b>54</b>	<b>53</b>	<b>69</b>	<b>223</b>	<b>55.8</b>	<b>100.0%</b>

From January 1, 2014 to December 31, 2014 there were 69 crashes that occurred. Figure 10 is a collision diagram of SR 7 and Commercial Boulevard that depicts the crashes from 2014.

**Table 13: Severe Crash Summaries of SR 7 and Commercial Boulevard (2011-2012)**

Date	Time	Crash Type	Injury Severity	Lighting Condition	Surface Conditions	Crash Summary
4/19/2011	9:27 PM	Pedestrian	None	Dark-Lighted	Dry	A southbound vehicle was travelling in the middle lane of SR 7 during a green light and a pedestrian crossed in front of the vehicle.
6/13/2011	4:14 PM	Bike	None	Daylight	Dry	A southbound bus was travelling westbound and a bicyclist attempted to turn right in front of the vehicle and collided with the bus.
8/29/2011	5:29 PM	Pedestrian	None	Daylight	Wet	A westbound vehicle was making a right turn on a red light and struck a pedestrian crossing in the north crosswalk. The pedestrian advised he ran in front of the vehicle as he was attempting to catch the bus.
3/9/2012	8:24 AM	Other	Incapacitating	Daylight	Wet	A southbound scooter was slowing down under wet roadway conditions, the scooter began to slide, and the driver fell off.
5/4/2012	9:33 AM	Angle	Fatal	Daylight	Dry	An eastbound left turn vehicle was attempting to make a left turn into Bank of America and was struck by a westbound vehicle travelling approximately 50 mph in the right through lane and then struck a utility pole. The westbound driver was pronounced deceased at the scene.
8/2/2012	7:37 AM	Bike	Incapacitating	Daylight	Dry	A southbound right turning vehicle was exiting the driveway of Homestead Studio Suites and struck an eastbound bicyclist. The driver did not see the bicyclist riding on the sidewalk.

**Table 14: Severe Crash Summaries of SR 7and Commercial Boulevard (2013-2014)**

Date	Time	Crash Type	Injury Severity	Lighting Condition	Surface Conditions	Crash Summary
1/4/2013	6:03 PM	Pedestrian	Incapacitating	Dark-Lighted	Dry	A southbound vehicle was in the right through lane when a westbound pedestrian ran in front of the vehicle. The pedestrian saw the vehicle but decided to cross anyways. The pedestrian was reported with incapacitating injuries.
1/24/2013	8:25 PM	Pedestrian	Non-Incapacitating	Dark-Lighted	Dry	A southbound vehicle was travelling approximately 20 mph when a pedestrian stepped in front of the vehicle. The driver was unable to react in time and struck the pedestrian. The pedestrian was reported with non-incapacitating injuries.
2/6/2013	2:15 AM	Angle	Incapacitating	Dark-Lighted	Dry	A southbound vehicle in the right through lane ran the red traffic signal and struck an eastbound vehicle in the left through lane. The southbound driver was reported with incapacitating injuries.
8/25/2013	6:45 AM	Bike	Possible	Dusk	Wet	A northbound vehicle was in the left turn lane and decided to go straight. As the driver continued northbound, the driver struck a bicyclist that was crossing. The bicyclist was reported with possible injuries.
9/29/2013	9:55 PM	Pedestrian	Incapacitating	Dark-Lighted	Dry	A westbound vehicle was in the outside lane and struck a northbound pedestrian that darted in front of the vehicle and was not crossing in the crosswalk. The pedestrian was reported with incapacitating injuries.
10/22/2013	5:37 PM	Bike	Possible	Daylight	Dry	A southbound vehicle in the right-turn lane turned right at the intersection and a southbound bicyclist struck the vehicle. The bicyclist was reported with possible injuries.
12/5/2013	11:50 AM	Bike	Non-Incapacitating	Daylight	Dry	A northbound vehicle was turning right from Walgreens parking lot and struck a bicyclist travelling westbound on the sidewalk. The driver stated she saw the bicyclist slow down, so she began to turn, and she struck the bicyclist. The bicyclist was reported with non-incapacitating injuries.
4/27/2014	9:49 AM	Pedestrian	Possible	Daylight	Dry	An eastbound vehicle struck a northbound pedestrian crossing in the crosswalk. The pedestrian stated he was intoxicated at the time and did not notice that eastbound traffic had a green light.
9/22/2014	12:29 PM	Pedestrian	Non-Incapacitating	Daylight	Dry	An eastbound right-turning vehicle had a green light and struck a northbound pedestrian that ran in the crosswalk. The pedestrian was reported with non-incapacitating injuries.

**Figure 10: Collision Diagram of SR 7 and Commercial Boulevard**

**District 4 FDOT Collision Diagram**

Total Crashes: 69

Date: 01/08/2014 - 12/24/2014

Total Diagrammed: 69



**Legend**

- 1
- 2-3
- 4-5
- 6-10
- > 10

Total Fatalities: 0  
Total Injuries: 29  
Total Motorcycle Crashes: 1

Prepared by:  
KEVIN MODERIE

12/15/2015

## FIELD OBSERVATIONS

AM and PM peak hour observations were conducted at SR 7 and Commercial Boulevard on December 2, 2015. This section summarizes the safety and traffic operations issues were observed at this intersection.

### Pedestrian Observations

Many pedestrians were observed using transit during both peak hours.



Pedestrians were observed crossing during the “DO NOT WALK” pedestrian phase. Enforcement of pedestrians who do not obey pedestrian signals should be increased. The pedestrian push buttons should be separated and relocated closer to the curb ramps for better accessibility.



Pedestrians were observed crossing midblock to reach the bus stops along both SR 7 and Commercial Boulevard. Enforcement of pedestrians who do not use the crosswalks.



All of the pedestrian signals were audible and all appear to have countdowns. However not all countdowns were utilized and the “WALK” signal for eastbound pedestrians for the north crosswalk was broken and was not displaying. The broken pedestrian signal should be fixed and all pedestrian signals modified to display countdowns



Northbound right turning vehicles were observed not yielding to pedestrians. Consider supplementing the “YIELD TO PEDESTRIANS” (R10-15R) sign with a four-section flashing yellow (or red) right-turn arrow which would display a flashing yellow (or red) arrow when pedestrians are crossing to encourage drivers to yield to pedestrians.



## Vehicular Observations

The southbound left-turn movement was observed having large queues during the AM peak hour with 441 vph in the left-turn lanes. Aggressive driving, including speeding and red light running, was observed as phase failures occurred often. Consider reviewing the timings to extend the southbound left-turn timings for the AM peak hour.



The westbound approach was observed having large queues during the AM and PM peak hours. The striping for the westbound approach is in poor condition and should be replaced.



During the PM peak hour the eastbound, westbound, and northbound left-turn movements had phase failures and long queues. Red light cameras are along the northbound, southbound, and westbound approaches. Despite the cameras, vehicles were observed running the red light and driving aggressively. To increase capacity, consider right-turn overlaps with the left-turn movements by installing a four-section right-turn arrow to display a green arrow during the left-turn phase and a flashing yellow (or red) right-turn arrow during the pedestrian phase to encourage drivers to yield to pedestrians. This improvement would require prohibiting the U-turn movements.



Commercial Boulevard had failures to the west of the intersection due to the Turnpike and/or the signal at Mainland Drive. Westbound traffic could not clear the intersection by the end of the phase and would block northbound left-turns and the southbound movement.



Northbound left-turn phase failures were observed and left-turning vehicles were not able to clear the intersection.

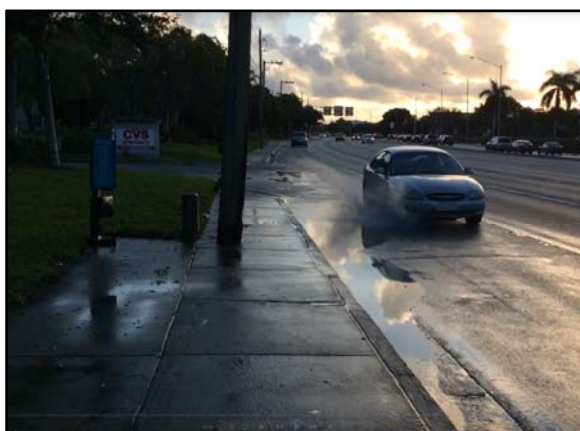


A northbound left-turning semi was observed stuck in the intersection as westbound Commercial Boulevard was too congested. Southbound vehicles had a green signal and could not move as the semi was blocking their route. The Turnpike and/or the signal at Mainland Drive may be causing the congestion. A more detailed study may be needed to review Commercial Boulevard just west of SR 7.



### Signs and Miscellaneous Observations

Standing water was observed during the AM and PM peak hours in the right-turn lane of westbound Commercial Boulevard. Drainage at this location should be reviewed further to identify potential improvements.



Sight distance is limited at the CVS driveway just north of Commercial Boulevard as vegetation is blocking visibility of northbound SR 7 traffic. Vegetation should be trimmed to provide better visibility.



The southbound right-turn lane on SR 7 is approximately 650 feet long and a driveway for the Sunshine Plaza is 415 feet north of the intersection. Southbound vehicles were observed entering the right-turn lane near the shopping plaza entrance but not entering the plaza. Instead vehicles would continue south to turn right at Commercial Boulevard. No conflicts were observed at this location. However, consider separating the right-turn lanes with chevrons or a concrete island to reduce any potential conflicts that could occur.





## ADDITIONAL RECOMMENDATIONS TO CORRIDOR

Many of the safety and traffic operational issues related to pedestrian and vehicular observations occurred at multiple locations along SR 7. Table 15 summarizes these observations and recommendations that could be considered along at each of the hot spot locations and could also be used at other locations along the corridor.

**Table 15: Additional Recommendations to Consider**

Observation	Cross Street with SR 7 Recommendations				
	SR 848 (Stirling Road)	SR 842 (Broward Boulevard)	NW 19th Street	SR 816 (Oakland Park Boulevard)	SR 870 (Commercial Boulevard)
Many midblock crossing pedestrians were observed.	Consider installing "NO PEDESTRIAN CROSSING" sign (R9-3) with "USE CROSSWALK" (R9-3b) within the median for each approach.				
Many pedestrians were observed crossing at the intersection.	There are special emphasis crosswalks at the intersection. However, consider restriping as they are worn.	Consider upgrading crosswalks to special emphasis or ladder style crosswalks for enhanced visibility.			
Pedestrian push buttons not separated and are further than ten feet from the curb ramp.	Consider relocating push buttons less than ten feet from the curb ramp for accessibility.	Consider separating the push buttons for each corner and relocating them less than ten feet from curb ramp for accessibility.			
Pedestrians signals are outdated.	Consider upgrading pedestrian signals to countdown.				Check pedestrian signals that are not utilizing countdown features.
The visibility of the signal heads could be enhanced.	Consider one signal head per lane with yellow backplates for each approach.	Consider one signal head per lane with yellow backplates for each approaches. Also replace visor for southbound signal head.	Consider one signal head per lane with yellow backplates for each approach.	Consider upgrading the black backplates to yellow.	Consider one signal head per lane with yellow backplates for each approach.
Conflicts were observed between right-turning vehicles and pedestrians.	Consider installing a "YIELD TO PEDESTRIANS" (R10-15R) sign with a four-section flashing yellow (or red) right-turn arrow which would display a flashing yellow (or red) arrow when pedestrians are crossing to encourage drivers to yield to pedestrians.				
The right-turn movement had high volumes.	Consider a right-turn overlap with the left-turn movement by installing a four-section right-turn arrow to display a green arrow during the left-turn phase. U-turns would have to be prohibited for this improvement.				
Buses were observed stuck in congestion and many transit users were observed.	Consider queue jumps at locations where right-turn lanes exist to give buses more priority.				