7.5 Alternatives Safety Analysis

The AASHTO Highway Safety Manual (HSM) methodology was used to compare the observed crashes to the predicted crashes of the Build Alternative. The locations analyzed were along the SR 79 facility within a 250 foot radius of the I-10 ramp terminal intersections which is considered to be the intersection area of influence. The intersection influence areas experienced a total of 4 crashes. The locations analyzed have the same geometry between No-Build and Build Alternatives with an intersection treatment of installing a traffic signal at the ramp terminal intersections.

Crash Modification Factors (CMFs) are applied to the observed crash frequency in order to estimate the predicted crashes for the Build Alternative. According to Table 14-7 in the HSM, the CMFs for installing a traffic signal on a rural minor road are applied based on the following crash types and severities:

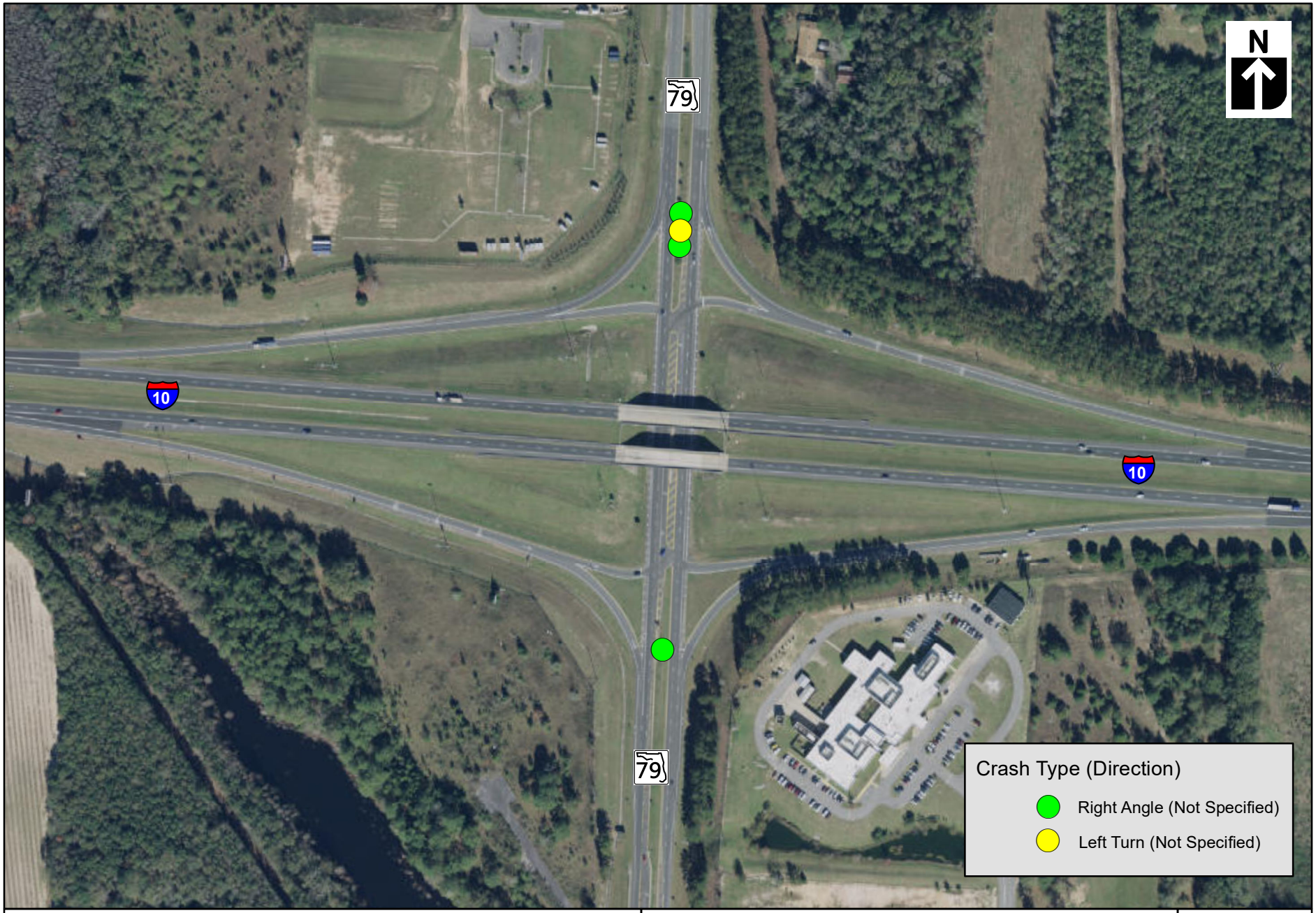
- All Types (All severities)
- Right Angle (All severities)
- Left Turn (All severities)
- Rear End (All severities)

The CMFs listed in **Table 7-13** are applied to the observed crash frequency by crash type to determine the effectiveness of the alternative and determine the reduction in crashes. **Table 7-13** also contains the total observed crashes and total predicted crashes for the Build Alternative for each applicable crash type separated by intersection location. As indicated by the CMF values, the installation of a traffic signal decreases the number of right angle and left turn crashes while increasing the number of rear end crashes. Introducing signalized protected left turn phases provides safer conditions for vehicles traveling to and from the off ramps. Vehicles traveling on the major road, SR 79, now have to stop for these protected left turn phases which introduces the increased probability of the occurrence of rear end crashes. However, zero rear end crashes were observed in the 5 years of crash data. **Figure 7-1** displays the crash types analyzed with respect to their geographical location. **Appendix G** contains the HSM analysis summary.

Table 7-13 Total Predicted Crashes (per year)

Crash Type	Observed Crash Frequency (Crashes/Year)		*CMF*[1]	Build Alternative Predicted Crash Frequency (Crashes/Year)		Total Reduction in Crashes
	Eastbound Terminal	Westbound Terminal		Eastbound Terminal	Westbound Terminal	
Rear End	0	0	*1.58*	0	0	0.00
Right Angle	0.2	0.4	*0.23*	0.05	0.09	-0.31
Left Turn	0	0.2	*0.4*	0	0.08	-0.12
Other	0	0	*0.56*	0	0	0.00
Total Predicted Crashes	**0.8**		**-**	**0.22**		**-0.58**

[1]Italic text is used to show the information obtained from the Highway Safety Manual Table 14-7



FDOT **SR 79 at I-10 Interchange Operational Analysis Report (IOAR)**	Intersection Influence Area Crashes (2011-2015)	Figure 7-1

The crash data evaluated in Section 3.2.2 showed that there are high crash locations within the study area defined as locations in which the segment actual crash rate exceeds the statewide average crash rate for similar facilities. SR 79 is a high crash location for years 2013-2015. The number of crashes on this 1 mile segment are 5 crashes, 3 crashes, and 7 crashes for 2013, 2014, and 2015, respectively, for a total of 15 crashes. Only four of the total 15 crashes on the SR 79 segment are located within the intersection area of influence, a 250 foot radius.

In regards to the four crashes that are located within the intersection area of influence, right angle crashes were the most common type of crash accounting for 75% of total crashes. These primarily occur due to vehicles approaching the intersection at a perpendicular angle and colliding due to one vehicle's failure to stop or yield. The intersection area of influence also had 1 left turn crash accounting for 25% of total crashes.

The Build Alternative is expected to reduce the 0.8 observed crashes per year by 0.58 crashes per year, a 73% reduction. The signal implementation will reduce both right angle and left turn crashes since both are attributed to failure to stop in the event of an opposing vehicle. For these reasons, the Build Alternative is expected to provide safety enhancements over the No-Build, which is upheld by the results of the HSM-based safety analysis discussed above.

7.6 Recommended Alternative

The No-Build Alternative will not be able to accommodate the future travel needs within the study area. The analysis presented in this IOAR shows that the Build Alternative provides acceptable operations within the study area through the Design Year 2045. This report supports the conclusion that the installation of traffic signals at the study interchange will benefit the safety and operations of the study area.

The Design Year 2045 operational analysis results show that the SR 79/I-10 interchange performs significantly better under the Build Alternative. The No-Build Alternative operates at LOS F at the eastbound ramp terminal during both peak hours in Design Year 2045. The Build Alternative provided substantial operational improvements at the interchange with both intersections in Design Year 2045 operating at LOS B or better. In terms of safety, the HSM-based analysis shows that the Build Alternative is expected to reduce facility crashes by 0.58 crashes per year, which is a reduction of approximately 73%.

Based on safety and traffic operational benefits, the Build Alternative is considered the preferred alternative for this IOAR.