Table 7-4: 95th Percentile Queue Length Summary – Design Year 2045 Build Alternative

Intersection	Time Period	Peak Hour Queues (feet)												Remarks
		Eastbound			Westbound			Northbound			Southbound			
		L	T	R	L	T	R	L	T	R	L	T	R	
68th Terrace	AM	41			38		30	14	140	0	13	70		**Signalized Intersection**
	PM	46			78		45	57	198	0	50	72		
	Actual Storage	250			60		60	250	1,000	500	245	430		
I-10 EB Ramps	AM	32	-	0	-	-	-	-	9	0	2	5	-	**Signalized Intersection**
	PM	51	-	0	-	-	-	-	7	0	3	3	-	
	Actual Storage	260	-	300	-	-	-	-	560	320	340	340	-	
I-10 WB Ramps	AM	-	-	-	74	-	0	1	1	-	-	87	-	**Signalized Intersection**
	PM	-	-	-	80	-	0	4	8	-	-	91	-	
	Actual Storage	-	-	-	205	-	245	340	340	-	-	1,025	-	
Busy Bee South Entrance	AM	-	-	-	-	-	-	-	0	0	2	0	-	**Unsignalized Intersection**
	PM	-	-	-	-	-	-	-	0	0	1	0	-	
	Actual Storage	-	-	-	-	-	-	-	385	385	595	285	-	
Busy Bee North Entrance	AM	-	-	-	129	-	21	-	33		-	54	-	**Signalized Intersection**
	PM	-	-	-	183	-	21	-	50		-	58	-	
	Actual Storage	-	-	-	400	-	60	-	285		-	500	-	

7.5 Build Alternative Safety Analysis

To determine the potential safety benefits of the proposed Build Alternative a crash modification factor (CMF) based safety evaluation was performed for this study. CMFs were obtained from the CMF Clearinghouse funded by FHWA.

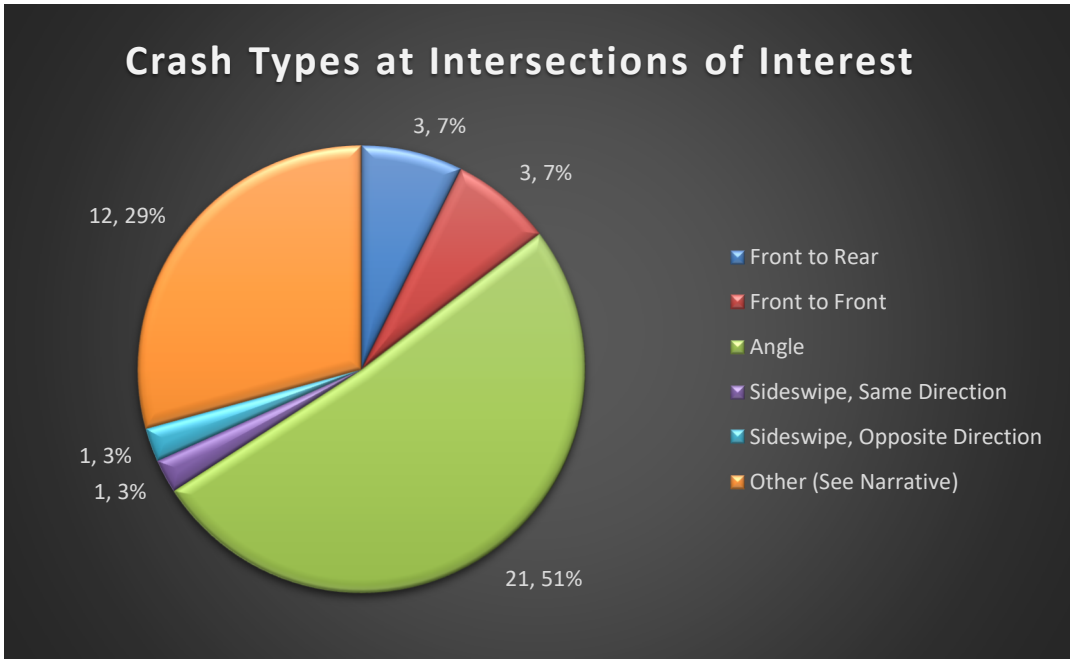
The safety evaluation was developed for the following intersections: SR 51 at the Eastbound Ramp Terminal, SR 51 (US 129) at the Westbound Ramp Terminal, and SR 51 (US 129) at the Northern Busy Bee Entrance. The proposed build improvements will mainly affect operations at these intersections through installing signalization. Three CMFs were identified to be applied to the historical crash frequency at the three intersections. The CMFs identified were developed for use at non-interchange related intersections. CMFs were not available for the interchange related intersections (EB and WB Ramp Terminals); therefore, the best available CMFs were used for this analysis. The CMFs used are summarized in **Table 7-5**.

Table 7-5: Crash Modification Factor (CMF) Summary Table

CMF ID	Description	CMF
322	Install A Traffic Signal - All Types (All Severities)	0.95
323	Install A Traffic Signal - Angle (All Severities)	0.33
324	Install A Traffic Signal - Rear-end (All Severities)	2.43

The CMFs are applied to the aggregate of the crashes at all three intersections. These crashes were obtained from the FDOT State Safety Office Car Online System for the years 2014 through 2018. There were a total of 41 crashes within these limits, from 2014 through 2018. The majority of the crashes were Angle crashes (21 crashes or 51%).

Figure 7-1: Crash Types at Intersections of Interest (2014 - 2018)



The CMFs are applied to the crashes at the three intersections examined along SR 51 (US 129). At these locations, the crashes will result in a 67 percent decrease in angle crashes, 143 percent increase in rear end crashes, and 5 percent decrease in all other applicable crash types for the Build Alternative. This will result in an estimated reduction of 2.814 angle crashes and a reduction of 0.170 all other crashes. However, there will be an estimated increase of 0.858 rear-end crashes; signalized intersections tend to increase rear end crashes because of interrupted traffic flow; however, signalized intersections tend to have lower fatality rates compared to unsignalized intersections because of slower average speeds associated with the interrupted traffic flow. This results in a reduction of a total of 2.126 crashes per year by the Build Alternative. The effects of the Build Alternative on crashes are summarized in **Table 7-6** and the CMF Clearinghouse summary reports are provided in **Appendix G**.

Table 7-6: Build Alternative Crash Reduction

Crash Type	Historical Crashes (2014-2018)		Build Alternative		
	Total Crashes	Crashes per Year	CMF	Est. Crash per Year After Improvements	% Change
Angle	21	4.200	0.33	1.386	-67%
Rear-End	3	0.600	2.43	1.458	143%
Other	17	3.400	0.95	3.230	-5%
Totals:	41	8.200		6.074	-26%

7.5.1 Pedestrian and Bicycle facilities

The Build Alternative includes adding pedestrian and bicycle facilities such as sidewalks, crosswalks, bike lanes, and key holes to the project area that were previously not present. From a qualitative perspective, accommodating pedestrians and bicyclist through the project area compared to the No-Build conditions. The Build Alternative should improve safety and operations for vehicles, pedestrians, and bicyclists alike.

7.6 Alternatives Comparison

The No-Build Alternative and the Build Alternative were compared, and a summary is provided in the sections below.

7.6.1 Operational Comparison

This section compares the mainline, merge/diverge and intersections traffic operational performance of the No-Build and Build Alternatives.

The No-Build Alternative intersections of SR 51 (US 129) at the Eastbound Ramps, SR 51 (US 129) at the Westbound Ramps, and SR 51 (US 129) at the Northern Busy Bee Entrance do not operate at an acceptable LOS and individual movements operate at LOS F in the Design Year 2045. The Build Alternative will improve traffic operations at these intersections to an acceptable LOS (LOS D or better) during the Design Year 2045.

7.6.2 Safety Comparison

The quantifiable safety benefits of the Build Alternative were predicted to decrease crashes by 2.126 per year when compared to the No-Build Alternative. This is a 26% decrease in overall crashes within the study areas. Additionally, from a qualitative perspective, crashes are expected to decrease around the Busy Bee Southern entrance because of the Build Alternatives modifications to the right turn lane into the Busy Bee. The Build Alternative will increase bicycle and pedestrian safety with the addition of bicycle and pedestrian facilities that are not present under the No-Build Alternative.