

## 5.5 Future Safety Performance

All left turn movements leading into a ramp in the study area will experience increased capacity from the addition of an extra turn lane. The dual left turn lane movements will operate with protected only phasing operations at the Wickham Road and I-95 interchange. Additionally, increase in the storage length of the westbound left turn further improve queue storage at intersections. The improvements also aid in reducing crashes by effectively increasing the queue storage and service capacities of the movements to/from the interstate.

Federal Highway Administration (FHWA) Crash Modification Factors (CMF) and FDOT Crash Reduction Factors (CRF) were reviewed to quantify safety benefits. While there are no CMFs that can be applied to quantify the benefits for double left turn lanes, FDOT CRFs for the proposed improvements with their ID numbers and anticipated total percent crash reductions are shown below and in **Appendix D. Table 26** summarizes the future safety analysis and shows the total crash reduction due to the proposed improvement.

- Increase storage lane (ID #17) – 11% and
- Add turn bay (ID #18) – 10%

The improvement at the southbound ramp terminal included adding of a turn bay. A CRF of 10% is used for this intersection. The improvement at the northbound ramp terminal included adding a turn bay and increasing storage. A composite CRF of 20%, computed based on the following formula, is applied to the northbound ramp terminal.

$$CRF = CRF_1 + (1 - CRF_1)CRF_2 + (1 - CRF_1)(1 - CRF_2)CRF_3 + \dots \dots \dots$$

**Table 26 Projected Future Crashes**

Intersection	Total Crashes (Existing)	Existing Crash Frequency (crashes/year)	CRF (%)	Projected Crash Reduction (crashes/year)	Projected Crash Frequency (crashes/year)
I-95 Southbound Ramp Terminal	80	16.0	10	1.6	14.4
I-95 Northbound Ramp Terminal	52	10.4	20	2.1	8.3
Total	<b>132</b>	<b>26.4</b>	-	<b>3.7</b>	<b>22.7</b>

As shown in Table 26, a reduction of 3.7 crashes per year were anticipated due to the proposed improvements. These numbers were calculated by comparing the crash frequencies before and

after the implementation of the proposed improvement at the I-95 and Wickham Road southbound and northbound ramp terminal intersections.

Additionally, the FHWA Signalized Intersections Safety Guide cites studies performed at intersection with dual left turn lane improvements showing reduction in crashes. The literature review also found that dual left-turn lanes with protected-only phasing generally operate with minimal negative safety impacts. With the proposed dual left turns, we can anticipate at least a 20% reduction in angle fatal/injury collisions and 29% reduction in fatal/injury rear-end collisions for the Build scenario when compared to the No-Build. A snapshot of FHWA's anticipated safety benefits and the CRF factors reference table with improvement ID numbers of 17 and 18 are provided in **Appendix D**.