7.3 Design Year Freeway Operations (HCS) Analysis

The freeway operational analysis conducted in HCS does not vary between the No-Build and Build Alternatives as the changes to the study intersections do not impact the interchange ramp merge/diverge operations or I-4 mainline. The following tables contain the results of the freeway operational analysis, including LOS, speed, density, and ramp junction speed, where applicable.

TABLE 7-3: DESIGN YEAR (2027) I-4 MAINLINE ANALYSIS SUMMARY

Direction	Segment	AM Peak Hour			PM Peak Hour		
		LOS	Speed (mph)	Density (pc/mi/ln)	LOS	Speed (mph)	Density (pc/mi/ln)
Eastbound	East of SR 33 On-Ramp	C	70.7	18.4	C	67.8	23.6
	West of SR 33 On-Ramp	C	70.7	18.5	C	67.6	24.0
Westbound	East of SR 33 On-Ramp	C	68.4	22.8	C	70.5	19.0
	West of SR 33 On-Ramp	C	67.6	24.0	C	70.2	19.7

TABLE 7-4: DESIGN YEAR (2027) I-4 MERGE/DIVERGE ANALYSIS SUMMARY

Direction	Merge/Diverge	AM Peak Hour			PM Peak Hour		
		LOS	Ramp Junction Speed (mph)	Density (pc/mi/ln)	LOS	Ramp Junction Speed (mph)	Density (pc/mi/ln)
Eastbound	Diverge (EB Off-Ramp)	C	62.9	20.8	D	62.6	25.9
	Merge (EB On-Ramp)	C	61.8	21.1	C	60.8	26.4
Westbound	Diverge (WB Off-Ramp)	D	62.8	24.8	C	63.0	21.3
	Merge (WB On-Ramp)	C	60.8	26.7	C	61.7	22.5

Based on the analysis, all mainline segments will operate under acceptable conditions (LOS D or better) in the design year. All merge and diverge locations also operate under acceptable conditions (LOS D or better) in the design year.

7.4 Safety Impacts

In order to quantify the safety impact of the Build Alternative, a Crash Modification Factor (CMF) was applied to the number of historical crashes at each interchange ramp terminal intersection. CMF #325 was chosen via the CMF Clearinghouse as it meets the following criteria:

- Star Quality Rating: ★★★+
- Crash Type: All
- Crash Severity: All
- Area Type: Rural
- Intersection Geometry: 3-leg
- Traffic Control: Stop-controlled
- Major Road Traffic Volume: Minimum of 3261 to Maximum of 29926 AADT
- Minor Road Traffic Volume: Minimum of 101 to Maximum of 10300 AADT

TABLE 7-5: BUILD ALTERNATIVE CRASH MODIFICATION FACTOR

Ramp Terminal	Number of Crashes (2014-2018)	CMF ID	Countermeasure	Quality	CRF	Crashes Prevented (5 Years)	Crashes Prevented (Annual)
I-4 EB	23	325	Install a traffic signal	★★★★★	0.44	10	2
I-4 WB	19	325	Install a traffic signal	★★★★★	0.44	8	2

As shown in **Table 7-5**, CMF ID# 325 indicates that the proposed improvement results in a 44% reduction in total crashes, bringing the crash frequency at the Eastbound Ramp Terminal Intersection from 4.6 crashes per year to 2.6 crashes per year and at the Westbound Ramp Terminal Intersection from 3.8 crashes per year to 1.8 crashes per year. This reduction of crashes would theoretically continue until the Design Year of 2027 in which the configuration of these ramp terminal intersections would be changed again.