

SAFETY ANALYSIS

7.0 SAFETY ANALYSIS

Crash data for the I-4 ramps was obtained from the FDOT D7 Crash Data Management System, which pulls data from the FDOT Crash Analysis Reporting (CAR) Online, and crash data for Thonotosassa Road was obtained from FDOT State Safety Office GIS (SSOGis). Crash data was provided for the available last five-year period from January 1, 2014 to December 31, 2018.

The I-4 at Thonotosassa Road (SR 566) interchange influence area for which crash data was analyzed includes 1.196 mile of I-4 from MP 26.193 (0.30 mile west of the I-4 eastbound off-ramp) to MP 27.389 (0.30 mile east of the I-4 westbound off-ramp) and each of the ramps. The crash data for Thonotosassa Road includes 1,000 feet south of the Goldfinch Drive intersection to 1,000 feet north of the Whitehurst Road intersection. **Table 7-1** provides a summary of the total crashes per year in the study area and the location of the crashes. **Table 7-2** provides a summary of the crash severity along I-4, the ramps, and Thonotosassa Road.

Table 7-1: Number of Crashes (2014-2018)

Year	Location			Total
	I-4 mainline	I-4 on/off ramps	Thonotosassa Road	
2014	50	7	6	63
2015	41	8	9	58
2016	65	6	11	82
2017	75	9	16	100
2018	84	15	15	114
Total	315	45	57	417

Table 7-2: Crash Severity (2014-2018)

Location	Total Number of Crashes	Number of Fatal Crashes	Number of Fatalities	Number of Injury Crashes	Number of Injuries	Number of Property Damage Only (PDO) Crashes
I-4 mainline	315	0	0	121	188	194
I-4 on/off ramps	45	0	0	16	24	29
Thonotosassa Road	57	0	0	30	44	27
Total	417	0	0	167	256	250

SAFETY ANALYSIS

As shown in **Tables 7-1 and Table 7-2**, 417 crashes occurred in the I-4 at Thonotosassa Road Interchange AOI, of which 167 were injury crashes, resulting in 256 injuries. No fatal crashes occurred in the AOI during the five years of analysis. 250 of crashes resulted in property damaged only (PDO). On average, the crash frequency for the I-4 at Thonotosassa Road interchange AOI is 83 crashes per year.

Table 7-3 summarizes the types of crashes. The most predominant crash types are rear end with 219 crashes (53%), hit fixed object with 65 crashes (16%), sideswipe with 55 crashes (13%), and angle with 25 crashes (6%).

Table 7-3: Crash Type Summary

Type of Crash	Location			Total
	I-4 mainline	I-4 on/off-ramps	Thonotosassa Road	
Rear End	180	23	16	219
Angle	2	5	18	25
Sideswipe	46	5	4	55
Head-on	2	0	0	2
Hit Fixed Object	59	4	2	65
Hit Non-Fixed Object	6	0	0	6
Single Vehicle	15	2	0	17
Bike	0	0	1	1
Run Off Road	1	0	0	1
Pedestrian	0	0	1	1
Right Turn	0	2	0	2
Left Turn	1	3	15	19
Unknown/Other	3	1	0	5
Total	315	45	57	417

Table 7-4 shows the common cause of crash is operating a motor vehicle in a careless or negligent manner with 221 crashes (53%) followed by failed to yield the right-of-way with 38 crashes (9%).

Table 7-5 shows 284 of the crashes (68%) occurred at daylight, and **Table 7-6** shows 325 of the crashes (80%) occurred on dry pavement.

SAFETY ANALYSIS

Table 7-4: Cause of Crashes

Type of Crash	Location			Total
	I-4 mainline	I-4 on/off-ramps	Thonotosassa Road	
Failed to Keep in Proper Lane	28	4	3	35
Followed too Closely	10	3	3	16
Failed to Yield Right-of-Way	8	8	22	38
No Contributing Action	31	1	4	36
Other Contributing Actions	10	3	1	14
Improper Turn	0	0	3	3
Operated MV in Careless or Negligent Manner	191	21	9	221
Drove Too Fast for Conditions	8	0	0	8
Ran off Roadway	3	1	1	5
Over-Correcting/Over-Steering	6	1	0	7
Unknown	15	1	4	20
Improper Passing	2	1	1	4
Swerved or Avoided: Due to Wind, Slippery Surface, MV, Object, Non-Motorist in Roadway, etc.	3	0	0	3
Operated MV in Erratic, Reckless or Aggressive Manner	0	0	1	1
Ran Stop Sign	0	1	0	1
Ran Red Light	0	0	5	5
Total	315	45	57	417

Table 7-5: Lightning Conditions

Type of Crash	Location			Total
	I-4 mainline	I-4 on/off-ramps	Thonotosassa Road	
Daylight	223	28	33	284
Dark-Lighted	70	13	17	100
Dusk	9	3	2	14
Dark-Not Lighted	2	0	2	4
Dawn	10	1	3	14
Unknown	1	0	0	1
Total	315	45	57	417

SAFETY ANALYSIS

Table 7-6: Pavement Conditions

Type of Crash	Location			Total
	I-4 mainline	I-4 on/off-ramps	Thonotosassa Road	
Dry	238	37	50	325
Wet	77	8	6	91
Mud, Dirt Gravel	0	0	1	1
Total	315	45	57	417

Table 7-7 shows the economic loss of the interchange study area using the FDOT KABCO injury classification scale crash costs. The costs were taken from the *2021 FDOT Design Manual Table 122.6.2* and are included in **Appendix L**.

Table 7-7: 2014-2018 Crash Estimated Economic Loss

Crash Severity	Crash Cost	Number of Crashes	Economic Loss
Fatal (K)	\$10,670,000	0	\$0
Severe Injury (A)	\$872,612	15	\$13,089,180
Moderate Injury (B)	\$174,018	65	\$11,311,170
Minor Injury (C)	\$106,215	87	\$9,240,705
Property Damage Only (O)	\$7,700	250	\$1,925,000
Total		417	\$35,566,055

Table 7-8 shows the intersection crash rate for the intersections in the AOI. The 2020 Annual Average Daily Traffic (AADT) volume taken during the data collection process were used to determine the crashes per million vehicles entering the intersection. The intersection crash rate for the I-4 WB ramp terminal intersections is just lower than the statewide average. The projected traffic volumes for the I-4 westbound off-ramp are expected to worsen the operations of the ramp terminal intersections and projected queues spillback for the off-ramp might impact the safety along I-4 mainline.

SAFETY ANALYSIS

Table 7-8: Average Intersection Crash Rates (2014-2018)

Branch Forbes Road Intersection	Number of Crashes	Crash Rate (MEV) ¹	Statewide Average Crash Rate
Whitehurst Road	0	0.000	0.386
I-4 WB Ramp Terminal	33	1.644	1.686
I-4 EB Ramp Terminal	18	0.575	1.686
Goldfinch Drive	34	4.140	0.544

¹Million entering vehicles

The Build Alternative improvements for the I-4 ramps and Thonotosassa Road (SR 566) intersection includes adding a traffic signal at the I-4 WB ramp terminal and widening Thonotosassa Road between I-4 EB and I-4 WB ramp terminal intersections. A crash modification factor (CMF) of 0.61 was obtained from the USDOT/FHWA CMF Clearinghouse. CMF ID 7848 represents a reduction of 39% in total crashes. Therefore, the improvement is expected to reduce 39% of the 28 applicable crashes (of the total of 33 crashes) that occur at the I-4 WB ramp terminal intersection.

CMFs are available for converting 2-lane undivided roadways to 4 lane divided roadways but not for available for 2-lane divided to 4-lane divided roadways. The section of Thonotosassa Road between ramp terminal intersection is a divided roadway. Even though there are no CMFs for converting 2-lane divided to a 4-lane divided roadway, the widening provides additional capacity on this segment, reducing queue length and congestion when compared to No-build conditions.

The CMFs information is included in **Appendix M**.