

SECTION FIVE

Future Traffic Conditions

5.3 SAFETY ANALYSIS OF THE 2045 NO-BUILD AND BUILD ALTERNATIVES

5.3.1 HSM Analysis

A safety analysis was conducted to study the impacts of the proposed Build Alternative on the local street network within the AOI. The study area focused on the Florida's Turnpike freeway segments, ramp terminals and ramp segments, and Martin Highway arterial segment and major intersections along the arterial. The analysis was conducted using the predictive methods in Chapters 12 and 19 of the Highway Safety Manual (HSM), where available, and the Enhanced Interchange Safety Analysis Tool (ISATe), which apply a combination of Safety Performance Functions (SPFs), crash modification factors (CMFs), and calibration factors to estimate frequency and cost of crashes for each segment and intersection.

It is important to note that the current edition of the HSM does not include a predictive method for arterial segments with six or more lanes. A research effort under the NCHRP Project 17-58 is underway to develop predictive methods for six-lane urban and suburban arterials and will be included in the next edition of the HSM (Chapter 12). The analysis was conducted assuming the predictive methods for four-lane divided arterials for both the No-Build and the Build alternatives.

The No-Build scenario assumes widening on the Florida's Turnpike mainline to eight lanes. Under the Build alternative, approximately 3,500 feet south of Martin Highway, the northbound off-ramp diverts from the Turnpike mainline and curves to the right. The ramp splits into two, one-lane ramps that intersect Martin Highway at SW Martin Downs Boulevard. The outside ramp provides drivers the ability to make a right turn onto Martin Highway, while the inside ramp provides drivers the ability to continue through onto SW Martin Downs Boulevard, as well as turn left onto Martin Highway. The two-lane northbound on-ramp begins approximately 800 feet south of the Martin Highway and SW Martin Downs Boulevard intersection and loops from the south to the north, to tie into the Turnpike mainline approximately 1,900 feet north of Martin Highway.

Approximately 750 feet north of Martin Highway, the southbound off-ramp diverts from the Turnpike mainline and curves to the right, splitting into a one-lane ramp and a two-lane ramp. A single-lane ramp continues to the west until ending at SW Leighton Farm Avenue at a proposed roundabout. Note that ISATe does not support roundabout configuration. Leighton Farm Avenue is realigned to intersect Martin Highway at SW Deggeller Court. Drivers can turn left or right onto Martin Highway or continue through on SW Deggeller Court. At the southbound off-ramp split, a two-lane ramp curves from the west to the east, crossing at a bridge over the Turnpike mainline, until it loops to the north to intersect Martin Highway at SW Martin Downs Boulevard. Drivers can continue through onto SW Martin Downs Boulevard or turn right onto Martin Highway. The southbound on-ramp begins approximately 800 feet south of SW Martin Highway and curves to the west, crossing at a bridge over the Turnpike mainline, before looping around to tie into the Turnpike mainline approximately 3,500 feet south of Martin Highway. Between SW High Meadows Avenue and SW Armellini Avenue, Martin Highway is widened from the existing four-lane typical section to a six-lane typical section with three

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lanes in each direction. West of SW Armellini Avenue until SW Deggeller Court, Martin Highway is widened from the existing two-lane typical section to a six-lane typical section with three lanes in each direction.

The No-Build and Build Alternatives were evaluated, and the predicted number of crashes and associated costs were compared for the 2025 to 2045 analysis period. The results of the safety analysis are summarized in **Table 5.8**. It is important to note that the safety analysis tools available to date are deterministic in nature and estimate future crashes mainly based on AADT and roadway characteristics. These tools do not account for vehicle interactions. The overall predicted crashes are lower for Build compared to No-Build. Based on these results, the Build alternative is predicted to have a 20-year crash cost savings of approximately \$27 Million compared to the No-Build alternative, in 2019 present value. Detailed analysis tables are provided in **Appendix L**.

Table 5.8
2025 to 2045 Predicted Number of Crashes and Cost Saving

Site	No-Build		Build	
	N _{predicted} *	2019 Present Value	N _{predicted} *	2019 Present Value
SW Martin Highway Interchange				
Freeway segments	918.53	\$83,853,990.18	749.73	\$68,513,848.85
Ramp segments	242.70	\$18,182,248.44	184.19	\$13,784,511.09
Ramp Terminals	198.77	\$20,271,107.94	197.01	\$20,041,119.71
SUBTOTAL	1,360.00	\$122,307,346.56	1,130.94	\$102,339,479.64
SW Martin Highway Intersection				
SW Martin Highway/SW 42 nd Avenue	311.13	\$36,180,888.66	304.70	\$35,431,470.63
SW Martin Highway/SW Leighton Farm Avenue	412.47	\$47,960,357.59	343.43	\$39,943,041.03
SW Martin Highway/SW High Meadows Avenue	598.52	\$69,613,547.12	613.74	\$71,373,764.87
SUBTOTAL (Intersection)	1,322.12	\$153,754,793.37	1,261.87	\$146,748,276.54
SW Martin Highway Segments				
Between SW 42 nd Avenue and SW Deggeller Court	9.50	\$1,106,099.37	9.27	\$1,079,050.89
Between SW Leighton Farm Avenue and SW Armellini Avenue	88.28	\$10,272,351.12	81.76	\$9,523,600.28
Between SW Martin Downs Boulevard and SW High Meadows Avenue	30.31	\$3,527,077.27	31.25	\$3,634,875.61
Leighton Farm Avenue Segments				
Between SW Martin Highway and SW 39 th Street	2.45	\$309,863.18	3.40	\$428,167.06
SUBTOTAL (Segment)	130.54	\$15,215,390.94	125.67	\$14,665,693.84
TOTAL	2812.66	\$291,277,530.87	2518.48	\$263,753,450.02
CRASH COST SAVING	\$27,524,080.85			

*Predicted Crashes; Source: FDOT 2020 Design Manual Crash Cost Table 122.6.2 and HSM Crash Distribution for Florida Table 122.6.4