

### **6.3 FUTURE SAFETY EVALUATION**

A safety analysis was conducted to study the future impacts of the proposed interchange modification on U.S. 192 and the local street network. The study area focused on the U.S. 192 arterial segments and major intersections between Turnpike ramps/Shady Lane and the Turnpike northbound off-ramp, including the intersections of the proposed new ramps with U.S. 192. The analysis was conducted using the predictive methods in Chapters 12 and 19 of the Highway Safety Manual (HSM), where available, and the Interchange Safety Analysis Tool (ISAT), 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.

As previously mentioned in **Section 6.1**, both the No Build and Build alternatives assume that U.S. 192 will be widened from four to six lanes within the study area. 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 National Cooperative Highway Research Program (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). Given that the projected AADT along U.S. 192 is within the HSM range for arterial facilities with four lanes, the analysis was conducted assuming the predictive methods for four-lane divided arterials for both the No Build and Build.

The No Build and Build alternatives were evaluated and the predicted number of crashes and associated costs was compared for the 2020 to 2040 analysis period. The results of the safety analysis are summarized in **Table 6.20**. The resulting total number of annual predicted crashes is 101.9 for the No Build and 85.5 for the Build. This is due to the anticipated traffic shift from the Kissimmee-St. Cloud North interchange to Kissimmee-St. Cloud South. Relief in congestion at the Turnpike ramps/Shady Lane and Partin Settlement Road intersections is expected to result in a reduction in the number of potential crashes. The provision of medians and turn lanes on the interchange crossroad is also expected to reduce crashes. Based on these results, the Build alternative is predicted to have a 20-year crash cost savings of approximately \$5.3 million compared to the No Build alternative. Detailed crash cost calculation tables are provided in **Appendix E**.

**Table 6.20**  
**Predicted Number of Crashes and Crash Cost Savings from 2020 to 2040**

Site	N <sub>predicted</sub>	Present Value
<b>No Build</b>		
<b>U.S. 192 Intersections</b>		
Turnpike ramps/Shady Lane	23.2	\$39,969,224
Partin Settlement Road	21.1	\$37,447,842
Turnpike northbound off-ramp	16.6	\$28,733,902
<b>U.S. 192 Segments</b>		
Turnpike ramps/Shady Lane to Partin Settlement Road	13.1	\$22,810,822
Partin Settlement Road to Turnpike northbound off-ramp	27.9	\$48,404,695
TOTAL	<b>101.9</b>	<b>\$177,366,486</b>
<b>Build</b>		
<b>U.S. 192 Intersections</b>		
Turnpike ramps/Shady Lane	12.9	\$28,923,310
Partin Settlement Road	14.0	\$29,946,189
Turnpike southbound off-ramp	7.4	\$14,459,697
Turnpike northbound on-ramp	8.2	\$15,243,821
Turnpike northbound off-ramp	16.6	\$28,733,902
<b>U.S. 192 Segments</b>		
Turnpike ramps/Shady Lane to Partin Settlement Road	8.0	\$17,382,466
Partin Settlement Road to Turnpike southbound off-ramp	13.1	\$28,446,356
Turnpike southbound off-ramp to northbound on-ramp	2.9	\$4,957,103
Turnpike northbound on-ramp to northbound off-ramp	2.3	\$3,995,277
TOTAL	<b>85.5</b>	<b>\$172,088,121</b>
<b>CRASH COST SAVINGS</b>		<b>\$5,278,365</b>

### 6.3.1 User Benefit Analysis

The network travel time and safety results shown in **Tables 6.13** and **6.20** were used to estimate the user benefit for a 20-year life span of the proposed interchange modification. Fuel consumption and emissions were not included in the estimated benefits.

Based on 2016 dollars and a discount rate of 4 percent, the estimated user Benefit/Cost (B/C) ratio is 6.8 from year 2020 to 2040. A value of time of \$23.95 was used in estimating the user benefit per the 2012 Urban Mobility Report published by the Texas Transportation Institute. This value accounts for auto occupancy and trucks. The table used to estimate the user benefit is presented in **Appendix E**.