

## 7. Safety Analysis

A quantitative safety analysis was conducted to determine the future impacts of the proposed SR 516/Lake Orange County Connector on the existing arterial section of US 27 within the AOI, per the executed MLOU. The future safety analysis was conducted using the FDOT Manual on Uniform Traffic Studies (MUTS) Form No. 750-020-21d, *Present Worth Analysis for Urban and Suburban Arterials (6 to 8 Lanes and One-Way Streets)*, revised in September 2020. The spreadsheet applies the predictive methods in Chapter 12 of the Highway Safety Manual. A combination of Safety Performance Functions (SPFs), Crash Modification Factors (CMFs), and calibration factors is applied to estimate frequency of predicted crashes for each segment and intersection along an arterial. The spreadsheet was updated with the 2021 FDOT Design Manual (FDM) KABCO crash costs. The No-Build and Build (grade separated) conditions on US 27 were evaluated and the predicted number of crashes and associated costs from 2025 to 2045 are summarized in **Table 47**. Detailed safety analysis tables are provided in **Appendix J**.

The 20-year totals in **Table 47** show that predicted crashes and costs for the Build SR 516 project will be about three percent higher compared to No-Build, along the existing US 27 section within the AOI. This is mainly due to the expected increase in projected traffic along US 27 for the Build alternative. However, the grade-separated Build alternative reduces congestion compared to No-Build and the safety benefit would have been higher if the safety analysis tools could consider queuing impacts in estimating potential crashes. Also, grade separating the intersection movements reduces vehicle conflicts, which is expected to improve safety. It is important to note that there are facilities in the region that will benefit from the Build project but are not included in the safety analysis. SR 516 will provide a much-needed and shorter east-west connection between US 27 and SR 429. Trips currently using long and, in some cases, circuitous routes to travel from south Lake County to west Orange County will have the option to use a direct and faster connection. The Lake Orange Connector will also include north/south connections at CR 455 and Valencia Parkway, enhancing travel throughout the region. As a result, the Build alternative is expected to reduce Vehicle Hours of Travel (VHT) by approximately 9,900 hours in 2025 and 9,000 hours in 2045, within the travel demand model subarea for facilities impacted by SR 516, as presented in **Table 48**. The reduction in VHT (*aka*, travel time savings) translated to a 20-year user benefit of \$645 Million (**Table 48**) for the Build alternative compared to the No-Build. Reduction in regional travel time (i.e. reduction in congestion) for the Build alternative will inherently reduce potential crashes in the region that are related to congestion, such as rear-end, side-swipe, and angle crashes and improve safety. In addition, the design of the project follows FDOT standards to provide features that mitigate potential crashes such as long auxiliary lanes, adequate sight distances, gentle cross-slopes, super elevation, wide curve radii, wide shoulders, signing and lighting among others. Overall, it is expected that the Lake Orange Connector will significantly improve traffic operations and safety in the area. The value of time used in estimating the user benefit was obtained from the 2019 *Urban Mobility Report* published by the Texas Transportation Institute, and adjusted for local car and truck proportions. The table used to estimate the user benefit is presented in **Appendix J**.

Table 47: Predicted Number of Crashes and Costs from 2025 to 2045

Site	No-Build		Build	
	N <sub>predicted*</sub>	2021 Present Value	N <sub>predicted*</sub>	2021 Present Value
<b>US 27</b>				
Lake Louisa State Park to Sawgrass Bay Boulevard	916.5	\$93,852,972	-	-
Lake Louisa State Park to SR 516 Interchange	-	-	485.2	\$49,673,997
SR 516 Interchange to Sawgrass Bay Boulevard	-	-	471.3	\$48,264,589
<b>Intersections</b>				
US 27 and Lake Louisa State Park	295.2	\$22,825,761	300.9	\$23,249,942
US 27 and Sawgrass Bay Blvd	246.3	\$19,043,616	248.5	\$19,208,829
<b>20-YEAR TOTAL</b>	<b>1,458</b>	<b>\$135,722,348</b>	<b>1,506</b>	<b>\$140,397,357</b>
<b>20-YEAR DIFFERENCE (BUILD VS NO-BUILD)</b>			<b>48</b>	<b>\$4,675,008</b>

\*Predicted Crashes

Table 48: Subarea Vehicle Hours of Travel and User Benefit

Year	No-Build	Build	Difference
2025	202,132	192,207	-9,925
2045	319,730	310,674	-9,056
<b>20-YEAR USER BENEFIT (BUILD)</b>			<b>\$645,000,000</b>