

7.0 EVALUATION OF ALTERNATIVES

I-75 at SR 121/331 IMR

7.5. Environmental Impacts

The Build Alternative has no significant environmental impacts. The Build Alternative will have some right of way impacts as well as impacts to contamination sites. A detailed environmental analysis will be performed as part of the PD&E study.

7.6. Safety

The crash data evaluated in Section 3.4 showed that the predominant crash type along I-75 in the study area are rear end crashes accounting for 36.6% of the crashes. The predominant crash type along SR 121/331 in Alachua County is rear end crashes accounting for 45.0% of the crashes. From a safety perspective, the recommendations of this study will not have a negative impact and will help in reducing the crashes. The dominant crash types are representative of urban congested conditions along arterials and intersections. The improvements proposed at SR 121/331 at the ramp terminals and SR 121/331 at SW 34th Street intersection will provide better signal operations reducing congestion and queue lengths along SR 121/331, thereby improving safety.

7.6.1 Predictive Safety Analysis

A predictive safety analysis was performed for this project. The predictive safety analysis was performed per the guidelines in the American Association of State Highway and Transportation Officials (AASHTO) HSM and the IARUG Safety Analysis Guidance.

Predictive safety analysis was performed using a quantitative and qualitative approach. Quantitative safety analysis, using the Enhanced Interchange Safety Analysis Tool (ISATe), was performed where applicable in the study area. The quantitative safety analysis was performed for a 20-year design period from 2025 to 2045 for the No-Build and Build Alternatives. For sections where the HSM Part C and CMF methodologies could not be applied, a qualitative safety analysis was performed. The following improvements were analyzed either quantitatively or qualitatively:

- Quantitative
 - The addition of a diverge area along I-75 Northbound
 - Improvements at I-75 Northbound and Southbound ramp terminals
 - The addition of a new I-75 Northbound exit ramp
- Qualitative
 - The addition of one through lane along SR 121/331
 - Improvements at SR 121/331 and SW 34th Street intersection
 - The addition of U-turn along SW 34th Street north of SR 121/331

7.6.2 Quantitative Safety Analysis

A quantitative safety analysis was performed as part of this study, where applicable. To perform the analysis, the ISATe tool was used. The ISATe tool is intended to apply the HSM Part C methodology to freeway facilities, including freeway segments and interchanges in urban and rural areas. ISATe was developed as part of the National Cooperative Highway Research Program (NCHRP) Project 17-45. To perform the safety analysis in ISATe, the study area, where improvements are being recommended, was segmented into homogenous sections. Once the study area was segmented, the applicable inputs were provided to produce a predicted number of crashes for the 2025 to 2045 study period. The total number of crashes were then distributed using the KABCO injury classification scale. The KABCO distribution provided in the FDOT Design Manual (FDM) Chapter 122 was used.

For the safety analysis, the No-Build alternative used the existing roadway. The Build Alternative used the proposed improvements. The No-Build and Build Alternatives predictive crash results were compared to determine the safety benefits of the proposed improvements. Since the Build alternative does require significant changes in the geometric configuration, the predictive safety analysis did not utilize the Empirical-Bayes Method for the No-Build or Build Alternative, as recommended in the Safety Guidance. The following quantitative safety analysis compares the No-Build and Build Alternatives for the I-75 mainline and SR 121/331 interchange improvements. **Appendix G** presents the input data used to perform the analysis and output summary for the No-Build and Build Alternatives.

I-75

Predictive safety analysis was performed for I-75 from south of the SR 121/331 interchange to the adjacent on and off ramps of SR 24 (Archer Road) interchange. The addition of a new NB Off-ramp to SR 121/331 and the new Northbound diverge area were coded for the Build alternative. **Table 7-7a**, presented below, shows the expected crash frequencies for the No-Build and Build Alternatives.

Table 7-7a: Predicted Crash Frequency along I-75 Mainline (Crashes/Year)

Alternative	K	A	B	C	PDO	Total
No-Build	0.2	1.2	3.8	6.9	21.4	33.4
Build	0.2	1.2	3.8	7.0	21.6	33.8
Change	0.0	0.0	0.0	-0.1	-0.2	-0.4

The analysis indicates the new diverge area provided along I-75 should increase the number of crashes along the I-75 mainline by 0.4 crashes/year. This slight increase in crashes is most likely a result of the additional diverge segment as a result of the new northbound exit ramp. However, these increased crashes are less severe and does not cause any injury or loss of life.

I-75 at SR 121/331 Interchange

Predictive safety analysis was performed for I-75 at SR 121/331 interchange. The improvements

to the I-75 northbound and southbound ramp terminals were coded in the Build alternative. **Table 7-7b**, presented below, shows the expected crash frequencies for the No-Build and Build Alternatives for the ramp terminal intersections.

Table 7-7b: Predicted Crash Frequency at the I-75 and SR 121/331 Interchange (Crashes/Year)

Ramp Terminal	Alternative	K	A	B	C	PDO	Total
Northbound Ramp Terminal	No-Build	0.2	0.9	2.8	4.8	13.6	22.2
	Build	0.1	0.5	1.4	2.5	7.1	11.6
	Change	0.1	0.4	1.3	2.3	6.5	10.7
Southbound Ramp Terminal	No-Build	0.1	0.8	2.5	4.3	12.1	19.8
	Build	0.1	0.7	2.0	3.5	10.0	16.3
	Change	0.0	0.1	0.4	0.8	2.1	3.5
Total	No-Build	0.3	1.7	5.2	9.1	25.7	42.1
	Build	0.2	1.1	3.5	6.1	17.0	27.9
	Change	0.1	0.6	1.8	3.1	8.7	14.2

The analysis shows the proposed improvements provided for the northbound and southbound ramp terminals should decrease the number of crashes by 14.2 crashes/year.

I-75 Ramps

Predictive safety analysis was performed for I-75 On and Off-ramps at SR 121 interchange. The new proposed northbound Off-ramp to SR 121 eastbound was coded for the Build Alternative. **Table 7.7c** shows the expected crash frequencies for the No Build and Build Alternative.

Table 7.7c: Predicted Crash Frequency I-75 Ramps (Crashes/Year)

Alternative	K	A	B	C	PDO	Total
No-Build	0.0	0.2	0.8	1.4	4.3	6.7
Build	0.0	0.3	0.8	1.5	4.7	7.4
Change	0.0	0.0	-0.1	-0.1	-0.4	-0.7

The analysis indicates that the proposed exit ramp in the Build Alternative should increase the number of crashes at the I-75 ramps by 0.7 crashes/year. This slight increase in crashes is likely the additional northbound exit ramp.

7.6.3 Qualitative Safety Analysis

The HSM Part C methodology and CMF methodology cannot always account for unique configurations and as a result, quantitative predictive safety analysis cannot be performed. However, to still account for the proposed improvements that cannot be analyzed using HSM Part C or with CMFs, a qualitative safety analysis has been performed for these applicable improvements.

Along SR 121 and the SR 121/331 at SW 34th Street Intersection

The additional through lane along SR 121 will provide additional capacity and improve delay and queues which should result in a reduction of crashes along SR 121. The proposed design modifications will provide additional storage, increase capacity and improve intersection delay and queues at the intersection of SR 121/331 and SW 34th Street. The additional storage and operational improvements should result in a reduction of crashes as a result of reduced congestion.

7.7. Alternatives Comparison

The No-Build and the Build Alternatives were compared and a summary is provided in the sections below.

7.7.1. Planning

This section provides a comparison of planning impacts associated with the No-Build and Build Alternatives. The modified interchange will provide better and safer traffic operations leading to better roadway connectivity.

The Build Alternatives are in conformance with the Gainesville MTPO LRTP. The No-Build Alternative is not in conformance with these plans.

The Build Alternatives (modified I-75 at SR 121/331 interchange) are part of the transportation improvement plans for Alachua County. Special considerations were taken in developing and evaluating the Build Alternative to avoid and minimize the environmental impacts associated with this project to the greatest extent possible.

7.7.2. Operational Comparisons

The Design Year 2045 Intersection Analysis comparison for No-Build and Build Alternatives is shown in **Table 7-8**. For the No-Build Alternative in the PM peak hour, SR 121/331 at SW 41st Boulevard, and SW 34th Street operate below the LOS standard. The LOS of these intersections improved to acceptable standards for all the Build Alternatives except SR 121/331 at SW 41st Boulevard that continues to operate at LOS F. This intersection will operate at acceptable LOS if operated under signal control.

Additionally, in Opening Year 2025 and Design Year 2045, the mainline segments and ramp merge/diverge junctions operate at acceptable LOS for the No-Build and the Build Alternative as documented earlier in the report.