EXECUTIVE SUMMARY

In August 2016, the Federal Highway Administration approved the Interchange Modification Report (IMR) prepared by the Florida Department of Transportation (FDOT) for the improvements at the I-10 interchange with SR 121, which can be found in **Appendix A**. Following the IMR approval, FDOT proposed signalizing the ramp terminal intersection of westbound I-10 with SR 121 as an immediate enhancement to improve existing operational and safety deficiencies of the subject intersection. This concept was documented in the approved September 2019 Interchange Operational Analysis Report (IOAR), which can be found in **Appendix B**. To reduce the construction costs associated with the August 2016 IMR-approved Build Alternative, FDOT proposed interim improvements that will provide significant operational and safety improvements compared with the No-Build Alternative. An overview of the changes with the Interim Build Alternative are as follows:

- Add directional ramp for traffic from westbound I-10 to northbound SR 121
- Improve SR 121 in the northbound direction by widening the road to two lanes south of the SR 121 and George Hodges intersection
- Install a new traffic signal to control the northbound SR 121 and westbound I-10 off-ramp movements

This IMR documents the analysis findings of the Interim Build Alternative proposed at I-10 and SR 121 interchange.

The following deficiencies have been identified under the Existing Year (2020) conditions that are anticipated to improve as part of this project.

- The I-10 and SR 121 interchange is a partial cloverleaf configuration with nonstandard loops in the southeast and northwest quadrants. Under existing conditions, these loop ramps that were built with lower design speeds, hinder normal traffic operations, especially in the westbound I-10 direction. The westbound I-10 off-ramp is currently a three center radii loop ramp that terminates at a stop-controlled intersection with SR 121. This configuration results in interrupted flow and traffic backups, specifically during the AM and PM peak hours.
- Southbound SR 121 commuters encounter poor sight distance due to the vertical curve over I-10. The I-10 westbound ramp terminal intersection is unsignalized. Hesitation to perform the turning movement to head north on SR 121 due to poor sight distance over the vertical curve leads to high delays for motorists exiting the freeway. Drivers of heavy trucks making this movement have been observed making risky decisions. These conditions result in unsafe travel conditions and an increase in queue length that backs into mainline I-10 impeding its operations.
- The study area possesses heavy truck traffic, which accounts for more than 17 percent of peak hour traffic volumes. The grade differentials and curves of the loop ramps paired with the high truck volumes generate speed differentials that deteriorates operating conditions and safety.

The deficiencies found in the Existing Year (2020) analysis are anticipated to worsen with increased traffic volumes by Design Year (2045), even with the westbound I-10 ramp terminal signalization. Without improvements to this interchange, the traffic operations and safety within the study area will continue to deteriorate, the queue lengths and delays will increase, and the number of crashes will rise.

This IMR compares the operational and safety performance of the No-Build Alternative, the No-Build with Signal (IOAR Concept) Alternative, and the Interim Build Alternative.

Future traffic volumes were forecasted utilizing the growth rate established through historical traffic count information from Florida Traffic Online (FTO) and the Northeast Regional Planning Model (NERPM) Activity Based (AB1) Version 2 with the Base and Design Years of 2010 and 2040, respectively. For the purposes of this study, the analysis years included Existing Year (2020), Opening Year (2025), and Design Year (2045). Traffic operational analyses were completed using SYNCHRO version 10 (SYNCHRO) for the study intersections and Highway Capacity Software version 7 (HCS7) for the freeway segments and ramp merge and diverge areas.

Federal Highway Administration (FHWA) Policy Points

The following requirements serve as primary decision criteria used in the approval of interchange modification projects.

1. Proposal does not adversely impact operational safety of the existing freeway

An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis should, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, should be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d), and 23 CFR 655.603(d)).

An operational and safety analysis performed for the proposed Interim Build Alternative showed improved traffic operations, approximately 80 percent and over 95 percent reductions in network delay by Design Year (2045) for the AM and PM peak hour, respectively, that decrease excessive delays throughout the study area and thereby improving safety by a 1.3 percent and a 2.9 percent reduction in predictive average crash frequency in the Opening Year (2025) and Design Year (2045), respectively, when compared to the No-Build Alternative as presented in Section 7 and Section 8 of this IMR. No-Build with Signal (IOAR Concept) Alternative is recommended for construction first to improve interchange operations immediately, and its IOAR is approved in September 2019, and can be found in **Appendix B**. The Interim Build Alternative with a westbound to northbound directional ramp is recommended for implementation after this ramp terminal signalization project. The analysis was conducted in accordance with the approved methodology presented to DIRC (January 2020) (**Appendix C**) for this project. This project is located in an urban/transitioning area where the closest interchanges are SR 228, approximately 1.2 miles to the east, and CR 125, approximately 2.4 miles to the west. Additional signage is needed along the SR 121 study area as identified in the conceptual signing plan shown in **Figure 26** for Interim Build Alternative.

2. A full interchange with all traffic movements at a public road is provided

The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access, such as managed lanes (e.g., transit or high occupancy vehicle and high occupancy toll lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)). In rare instances where all basic movements are not provided by the proposed design, the report should include a full interchange option with a comparison of the operational and safety analyses to the partial interchange option. The report should also include the mitigation proposed to compensate for the missing movements, including wayfinding signage, impacts on local intersections, mitigation of driver expectation leading to wrong-way movements on ramps, etc. The report should describe whether future provision of a full interchange is precluded by the proposed design.

The proposed improvements to SR 121 interchange with I-10 will provide full interchange access and caters to all traffic movements from SR 121 to and from I-10. The proposed Interim Build Alternative were designed to meet all current FDOT and FHWA design standards as pertaining to federal-aid projects on the interstate system.