

## EXECUTIVE SUMMARY

The purpose of this study is to determine enhancements that can be programmed to improve traffic spillback onto I-95, interchange operations and safety by reducing congestion at the I-95 at SR 16 interchange location. Improvements are aimed at increasing the efficiency of I-95, SR 16 and the interchange ramps. The primary need of the project is to improve future traffic conditions thereby improving safety at the interchange. The interchange of I-95 at SR 16 is a diamond interchange providing full access. It is an important component of the Strategic Intermodal System (SIS) providing access to the City of St. Augustine.

If no improvements are made to the interchange, traffic operations and safety within the interchange area will continue to deteriorate as traffic volumes increase.

The Methodology Letter of Understanding (MLOU) was prepared in April 2018 to document the methodology for the analysis and evaluation of this IOAR. The primary basis for traffic projections in this Interchange Operational Analysis Report (IOAR) are the 2014 field traffic counts obtained from the I-95 Express Phase 1 – From International Golf Parkway to I-295 Systems Interchange Operational Analysis Report (SIMR), FDOT Traffic Online (FTO) 2017 and the latest version of Northeast Regional Planning Model-Activity Based version 3 (NERPM-AB3) with base year 2010 and horizon year 2040. The analysis years for this study include Existing Year 2018, Opening Year 2023 and Design Year 2043. The operational analysis for this study was performed using the Highway Capacity Software (HCS 7) and Synchro 10. All operational analysis followed the guidelines of the Highway Capacity Manual (HCM) 6<sup>th</sup> Edition.

Two alternatives were evaluated to address the purpose and needs identified for this project and presented in this IOAR. These include the No-Build Alternative and the Build Alternative. Transportation Systems Management and Operations (TSM&O) improvements were considered and include implementation of non-capacity improvements to improve traffic flow within the project area. The Build Alternative developed for this IOAR incorporates TSM&O improvements. The alternatives analyzed include:

- No-Build Alternative – This alternative includes the existing configuration plus all programmed improvements with future traffic.
- Build Alternative – This alternative includes widening the SR 16 roadway from 4 lanes to 6 lanes with curb, gutter and sidewalk improvements between the interchange ramp

terminals. This Build Alternative also includes extending left turn movements for eastbound and westbound approaches along SR 16 past the off-ramp terminal intersections and accommodating them via U-Turn. This allows off-ramp left turn to the arterial and arterial left turn to the on-ramp to be processed during the same signal phase.

As part of this study, an existing crash analysis was performed. The data provided from FDOT State Safety Office Map Based Query Tool (SSOGis) shows along I-95 and SR 16 rear end crashes and angle crashes are the most prominent crashes within the project area. The Recommended Build Alternative shows improved traffic operations and safety within the project study area due to reduction in congestion and improved geometric design.

Based on the evaluations of the No-Build and Build Alternatives, the recommended alternative, for approval in this study, is the Build Alternative. The recommended alternative will incorporate viable TSM&O improvements and will be developed further in the next phase.

This IOAR has been developed in accordance with the FDOT Policy No. 000-525-015: Approval of New or Modified Access to Highways on the State Highway System (SHS), FDOT Procedure No. 525-030-160: New or Modified Interchanges, Interchange Access Request User's Guide (IARUG) and the FDOT Traffic Forecasting Handbook (Procedure No. 525-030-120).

## E.1 Compliance with FHWA General Requirements

The following requirements serve as the primary decision criteria used in approval of interchange modification projects. Responses to each of the FHWA 2 policy points are provided to show that the proposed modification for the I-95 at SR 16 interchange is viable based on the conceptual analysis performed to date.

### E.1.1 FHWA Policy Point 1

*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 should 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 should 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 in-depth operational and safety analysis was conducted to study the impacts of the proposed improvements at the I-95 at SR 16 interchange. Several performance measures were used to compare the operations of the existing system under No-Build and Build conditions. Key measures included freeway densities, intersection delays, 95<sup>th</sup> percentile queue lengths and safety under existing and proposed conditions.

From an operational perspective in the Design Year 2043 under No-Build Alternative, operational and safety deficiencies will exist. The intersections along SR 16 at Toms Road, I-95 Southbound On/Off Ramps and Outlet Mall Boulevard will operate at LOS E or worse in the PM peak hour. These deficiencies are attributed to the insufficient capacity at all three intersections. At the I-95 southbound ramp terminal intersection, queues are longer than the available storage in the eastbound and westbound directions in 2043 under the No-Build.

The Build Alternative for this study performs substantially better than the No-Build Alternative for all future years. The proposed interchange improvements provide additional capacity for the heavy left turn volumes as well as for the arterial through volumes. By implementing these improvements, the study intersections of I-95 at SR 16 will operate at acceptable LOS C or better in both AM and PM peak hour. SR 16 arterial will also benefit from the increase in number of through lanes and improved ramp terminal intersections configuration which allows off ramp left turn to arterial and from arterial left turn to on ramp movements to be processed through the intersection together, resulting in lower intersection delay when traveling through the proposed interchange.

The safety analysis performed for this study indicated a total of 443 crashes occurred within the project area, of which 341 of the total crashes occurred on the project segment SR 16 from 2012 to 2016. The predominant crash types that occurred within the study area were rear end and

angled collisions. Crashes of these types are typically attributed to congestion along the interstate, arterials and interchange ramps.

With the improved operations under the Build Alternative, it is anticipated to enhance safety within the project area. A predictive safety analysis was performed for the study area where improvements are to be implemented. Based on the safety analysis, it is predicted that a reduction of 10.13 crashes will occur annually due to the recommended improvements.

Overall, the Build Alternative provides significantly better traffic operations and enhanced safety when compared to the No-Build Alternative.

In conclusion, the comparison of the No-Build and Build alternatives show that the proposed interchange improvements provide enhanced operation and safety conditions. The proposed modifications in the build alternative are not anticipated to have a negative impact on operations or safety of the I-95 mainline or the adjacent interchanges.

#### E.1.2 FHWA Policy Point 2

*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, HOVs, HOT 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 the I-95 at SR 16 interchange and adjacent intersections will provide full access and cater to all traffic movements from SR 16 to and from I-95. The proposed modifications are designed to meet current standards for federal-aid projects on the interstate system and conform to American Association of State Highway and Transportation Officials (AASHTO) and the FDOT design standards.