

EXECUTIVE SUMMARY

The purpose of this study is to identify long-term needs of I-95 and develop concepts to address traffic spillback onto I-95, reduce congestion on I-95 and Woolbright Road, improve interchange operations, and improve safety at the I-95 and Woolbright Road interchange through the 2045 design year horizon.

The primary need of the project is to alleviate existing and future traffic congestion and improve safety at the interchange. Recent studies completed in the region such as the Concept Development Report completed in 2014 and I-95 Interchange Master Plan for Palm Beach County completed in 2015 identified operational deficiencies at ramps, the terminal intersections, and the adjacent intersections.

A Methodology Letter of Understanding (MLOU) was prepared to document the methodology for the analysis and evaluation of this Interchange Modification Report (IMR). The MLOU was approved in by the Florida Department of Transportation (FDOT) District 4 Interchange Review Coordinator (IRC) and FDOT Central Office in October 2019. The primary basis for traffic projections in this IMR is existing field traffic counts and the Southeast Regional Planning Model 7.062 (SERPM 7.062) with base year 2010 and horizon year 2040. The analysis years for this study include Existing Year 2019, Opening Year 2025, and Design Year 2045. The operational analysis for this study was performed using the Highway Capacity Software (HCS 7.7) and Synchro 10.3. All operational analysis followed the guidelines of the Highway Capacity Manual 6th Edition (HCM 6th Edition).

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 Woolbright Road rear-end crashes, sideswipe, and angle crashes are the most prominent crashes within the project area.

The existing (2019) annual average daily traffic (AADT) along I-95 south of Woolbright Road is approximately 228,000, and I-95 north of Woolbright Road is approximate 237,000. Along Woolbright Road, the existing AADT ranges from 40,500 to 42,500 vehicles per day. The existing AM and PM peak hour operating conditions for the I-95 mainline sections show Level of Service (LOS) D or better for the ramps, LOS E for the I-95 NB mainline segment south of Woolbright Road during the PM peak hour, LOS E for the I-95 SB mainline segment south of Woolbright Road during the AM peak hour, LOS E for the I-95 NB mainline segment between Woolbright Road ramp during the PM peak hour, LOS F for the I-95 NB

weave segment during the PM peak hour and LOS E for the I-95 SB weave segment during the AM peak hour.

The Existing Year 2019 intersection analysis results indicated that Woolbright Road at SW 8th street intersection operates at overall LOS D in the AM and PM peak hours. The Woolbright Road at Seacrest Boulevard intersection operates at overall LOS D in the AM peak hour and overall LOS E in the PM peak hour. For the ramp terminal intersections, both operate at LOS E or worse during the AM and PM peak hours.

Four alternatives were evaluated to address the purpose and needs identified for this project. These include the No-Build Alternative and three Build Alternatives. The No-Build Alternative assumes as a baseline for comparison against the Build Alternatives. The three Build Alternatives developed as part of the alternative's analysis include the following:

- Build Alternative 1 – Tight Diamond Interchange (TDI)
- Build Alternative 2 – Diverging Diamond Interchange (DDI)
- Build Alternative 3 – Single Point Urban Interchange (SPUI)

Based on the future operational analysis, the 2045 No-Build Alternative will result in LOS F at both the I-95 NB and SB ramp terminals with extended queues backing onto the I-95 exit ramps during the AM and PM peak hours, if no additional improvements are done. In addition, the weaving freeway segments within the project limit will all operate at LOS F and the basic freeway segments between the on and off ramps will operate at LOS C or worse. Consequently, it was determined that the No-Build Alternative will be inadequate to accommodate the future travel demand within this interchange.

In order to accommodate the future travel demand while enhancing safety within the interchange area, a Tight Diamond Interchange (TDI) configuration was recommended as the primary Build Alternative.

The Build Alternative shows improved traffic operations and safety within the project study area when compared to the No-Build Alternative due to reduction in congestion and improved geometric design to improve safety.

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Project Development and Environment Study
FPID: 437279-1-22-02

Based on the evaluations of the No-Build and Build Alternatives, the recommended alternative, for approval in this study, is the Build Alternative.

This IMR has been developed in accordance with the FDOT Policy No. 000-525-015: Approval of New or Modified Access to Limited Access Highways on the State Highway System (SHS), FDOT Procedure No. 525-030-160: New or Modified Interchanges, Interchange Access Request User's Guide (IARUG), FDOT Policy No. 000-525-006: Level of Service Targets for the SHS, and the FDOT Procedure No. 520-030-120: Project Traffic Forecasting.

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 Woolbright Road interchange is viable based on the conceptual analysis performed to date. The following demonstrate compliance with the FHWA's requirements and justification for the proposed modifications to the I-95 at Woolbright Road Interchange.

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)).

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An in-depth operational and safety analysis was conducted to study the impacts of the proposed improvements. Several performance measures were used to compare the operations and safety of the existing system under No-Build and Build conditions. Key measures included freeway densities, freeway V/C ratios, intersection delays, level of service and 95th percentile queue lengths, crash rates and frequency, predominant crash patterns, expected crashes, and potential crash reduction using crash modification factors. Based on the results of this comprehensive evaluation, Build Alternative 1 with the Tight Diamond Interchange (TDI) configuration was selected as the preferred alternative due to the significantly higher safety and traffic operational benefits it provides to offset its relatively higher construction cost.

From an operational perspective, the traffic analysis performed for the signalized intersections indicated that the all the study intersections will operate at an overall LOS F during the peak hours by Design Year 2045 if no improvements are done. Under Build Alternative 1, the study indicated that TDI Interchange performs substantially better than the No-Build Alternative for all future year scenarios, particularly for the I-95 ramp terminal intersections, which are the primary focus for this study. Both I-95 ramp terminals will operate at LOS D during both AM and PM peak hours for the 2045 design compared to LOS F for the No-Build Alternative. The southbound (SB) ramp terminal intersection will experience 66.6% and 69.7% reduction in delay for the AM and PM peak hours, respectively, whereas the northbound (NB) ramp terminal will experience 58.2% and 75.5% reduction in delay during the AM and PM peak hours, respectively compared to the No-Build Alternative. Significant queuing will also be observed at the ramp terminals and adjacent intersections.

From a safety perspective, a total of 734 crashes occurred along I-95 and the ramps at Woolbright Road within the study area from 2013 to 2017. And a total of 341 crashes occurred along Woolbright Road within the same period. The predominant crash types that occurred within the study area were rear-end collisions, sideswipe collisions and angled collisions. Crashes of these types are typically attributed to congested conditions along the arterials and interchange ramps and terminals. The proposed improvements under the preferred Build Alternative 1 is anticipated to result in an overall crash reduction of approximately 1% compared to the No-Build Alternative due to the significant reduction in delays resulting from the TDI configuration. This will enhance safety within the interchange area.

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Overall, the preferred Build Alternative 1 provides significantly better traffic operations and enhanced safety when compared to the No-Build Alternative.

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 Woolbright Road interchange and adjacent intersections will provide full access and cater to all traffic movements from Woolbright Road 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 the American Association of State Highway and Transportation Officials (AASHTO) and the FDOT Design Manual.