

## Executive Summary

As per Chapter 4 of the *FDOT Interchange Access Request User's Guide* published in January 2018, herein referred to as "FDOT IARUG", this Systems Interchange Modification Report (SIMR) re-evaluation has been initiated by the design-build firm based on the proposed design change (New Concept) to the Request for Proposal (RFP) concept and to show that the New Concept satisfies the Safety Operational and Engineering (SO&E) requirements and Federal Highway Administration (FHWA) policy points. The intent of this re-evaluation is to demonstrate that the New Concept operates equal to or better than the RFP Concept (see **Appendix A** for RFP Concept and New Concept Designs; New Concept design changes described in **Section 1.2**).

Per Table 4-1 of the FDOT IARUG, the RFP Concept has been used as the basis for comparison when evaluating the New Concept initially developed as Alternative Technical Concept (ATC) 12C during the Technical Proposal Phase. The RFP Concept for State Road (SR) 836 is based on the SR 836 SIMR Alternative 11-A provided in the *RFP Reference Document MDXRD-01 Concept Plans*.

The results from the freeway, ramp and intersection operational analyses demonstrate that the New Concept will operate equal to or better than the RFP Concept and that the proposed improvements will provide the following major operational benefits:

- SR 836 mainline (viaduct), two elevated bypass lanes in each direction:
  - Eliminates I-95 system degradation associated with both existing and RFP Concept conditions from impacting the operation of SR 836.
  - Eliminates all existing weaving movements providing uninterrupted flow between SR 836 and I-395 in both the eastbound (EB) and westbound (WB) directions.
  - Provides direct off-ramp to southbound (SB) I-95 eliminating existing weaving condition with NW 12 Avenue on-ramp traffic.
- SR 836 WB collector distributor system reconfiguration:
  - Traffic from SB I-95 is isolated from traffic exiting to NW 12 Avenue addressing the degraded existing weaving conditions.

- New lane configuration eliminates RFP Concept northbound (NB) I-95 to WB SR 836 drop lane into NW 12 Avenue which would require all traffic to change lanes in order to continue onto WB SR 836.
- Widening of the EB SR 836 to NB I-95 ramp:
  - Provides the capacity to meet the demand while eliminating the underutilized flyover ramp proposed under RFP Concept.
  - Eliminates existing and RFP Concept speed differential between vehicles destined for NB I-95 and adjacent EB SR 836 lanes.
- NB I-95 lane re-purposing
  - Eliminates RFP Concept weaving on NB I-95 between NE 29 Street and I-195 for vehicles originating from NW 12 Avenue destined for I-95 northbound.

A Safety Analysis Report (SAR) was prepared by FDOT in October 2018 to document the crash statistics for the most recent five years and perform a quantitative safety analysis to predict the safety performance of the RFP Concept. Similar to the operational analysis, the safety performance of the RFP Concept was used as the basis for comparison when performing the quantitative safety analysis of the New Concept. Results from the safety analysis demonstrate that overall the New Concept performs equal to the RFP Concept.

Based on the findings of this SIMR re-evaluation, the New Concept is recommended for construction as the proposed improvements to the RFP Concept will:

- Enhance operations and safety
- Reduce right-of-way impacts
- Meet the two FHWA Policy Requirements.

### 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, and 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 (Title 23, Code of Federal Regulations (CFR), paragraphs 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)).*

The operational analysis conducted for this SIMR re-evaluation confirmed that the proposed modifications under the New Concept will operate equal to or better than the RFP Concept and that the modifications are not expected to have any significant adverse impacts on safety and operations. Overall, the proposed improvements under the New Concept will significantly improve interchange operations through reduced weaving, separation of movements (EB/WB viaduct), and more balanced lane utilization. The following describes the operational and safety results of the analysis:

### **Eastbound SR 836**

- **Lower Level:** Operational results show that the widening of the EB SR 836 to NB I-95 Ramp improves operations from LOS F to LOS D under the New Concept. The proposed ramp under the New Concept will eliminate the uneven volume distribution between the two proposed RFP ramps for which the existing inside ramp is projected to be overcapacity and the new flyover ramp from the CD system underutilized. Overall, improvements under the New Concept to all the ramps

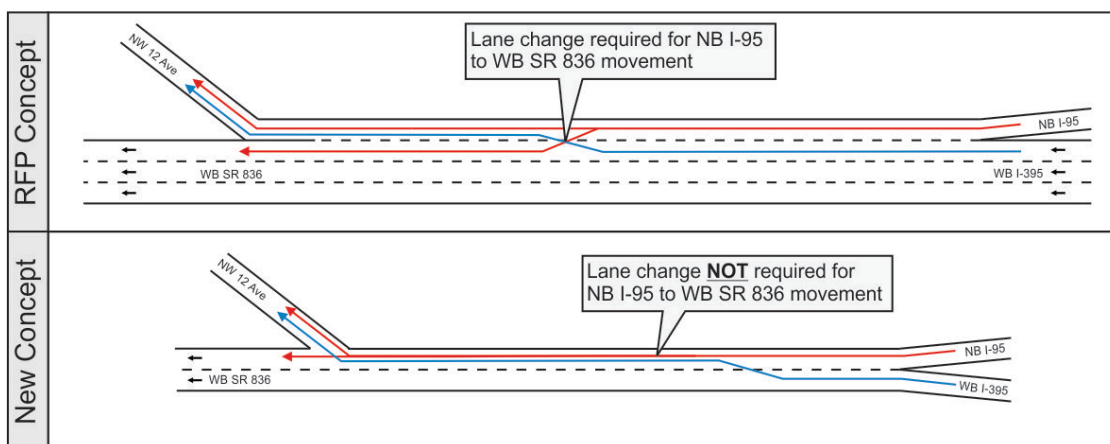
originating from EB SR 836 also results in a better lane utilization of the SR 836 collector distributor. This can be observed from a nearly 50/50 split at the viaduct/Local movement diverge and on the collector distributor where large speed differentials between lanes (NB I-95 Off Ramp, EB SR 836 Mainline) no longer occur. Under the New Concept, the CORSIM Analysis projects the segment between the NW 12 Avenue on-ramps and ramps to I-95/I-395 to operate at LOS F during the AM Peak. Once the NB NW 12 Avenue on-ramp merges with EB SR 836, the weaving segment consists of just a one lane weave from the outside lane (NW 12 Avenue) to the center lane to access either NB I-95 or EB I-395. This operational projection is equal to the RFP Concept's SR 836 collector distributor section just before the NB I-95 (Flyover) and I-395 (Ramp A) diverge point which operates at LOS F. It should be noted that additional capacity on the EB SR 836 lower level and extension of the NB NW 12 Avenue On-Ramp merge lane were considered to further improve operations. However, several design constraints such as the proximity to the Metrorail crossing and limited available R/W, restrict the ability to increase capacity and the length of the merge lane.

- Upper Level: Results show that the upper level is projected to operate at LOS C during the AM and PM peak hours. The most significant improvement along this segment is the coupling of increasing the capacity at the EB SR 836 to NB I-95 ramp and the provision of the viaduct to by-pass the interchange when it is experiencing heavy congestion as a result of NB I-95 spillbacks (a common occurrence).
- Overall, the EB SR 836 system operations under the RFP Concept and New Concept are equal at LOS C.

### Westbound SR 836

- CD System: The SB I-95 to WB SR 836 consist of three ramps (1) to WB SR 836, (2) to NW 14 Street and (3) to NW 12 Avenue. All three ramps are anticipated to operate equal to the RFP Concept. The WB SR 836 weaving segment between the NB I-95 to WB SR 836 on-ramp and the NW 12 Avenue exit for the New Concept is projected to operate equal to the RFP at LOS D/C (AM/PM). The New

Concept also improves operations by reducing the number of vehicles that need to weave by eliminating the NB I-95 to WB SR 836 on-ramp lane drop to NW 12 Avenue exit found in RFP Concept. See **Figure ES-1** schematic of the New Concept vs RFP Concept weaving sections.



**Figure ES-1: WB SR 836 Weaving Section Schematic**

- **Upper Level:** The WB viaduct will provide a bypass of the I-95 connections and is projected to operate at LOS C/C (AM/PM).
- Overall, the WB SR 836 system operations under the RFP Concept and New Concept are equal at LOS C.

### Northbound and Southbound I-95

- **NB I-95:** The New Concept is anticipated to increase NB I-95 throughput by approximately 1,300 vehicles/hour during the AM Peak hour. These improved operations are achieved by eliminating the RFP Concept weave on NB I-95 between NE 29 Street and I-195 for vehicles originating from NW 12 Avenue destined for NB I-95. It should be noted that while some densities on NB I-95 are higher under the New Concept when compared to the RFP Concept, this is a result of more volume being processed.
- **NB I-95 On-Ramp:** Under the New Concept, the NB I-95 on-ramp from EB SR 836 and WB I-395 is anticipated to operate equal to the RFP Concept during both the AM Peak Hour (LOS F) and PM Peak Hour (LOS E). Additional capacity improvements and increasing the length of the transition lane was considered;

however, several geometric constraints exist at this location including the bridge over NW 17 Avenue, I-195 queue jumper, and elevations differences between the EB SR 836 to NB I-95 and WB I-395 to NB I-95 ramps.

- SB I-95 Mainline: Under the New Concept SB I-95 is to remain as described in the RFP Concept. As shown in the CORSIM results, modifications to adjacent roadway systems are not anticipated to impact SB I-95.

## Safety Analysis

The quantitative safety analysis shows that the total predicted crash rates increase under the New Concept as a result of the additional 1.5 miles of segments analyzed. In terms of weighted predicted crash rates, the New Concept and RFP Concept result in similar values for both SR 836 and I-95 freeway segments. For I-95 ramp/CD segments, the New Concept results in a weighted predicted crash rate reduction from 1.68 to 0.75 compared to the RFP concept. For SR 836 ramp/CD segments, the New Concept results in a weighted predicted crash rate minor increase from 1.21 to 1.62 compared to the RFP Concept. Given the overall increase in segments analyzed under the New Concept compared to the RFP Concept and similar results obtained from the quantitative safety analysis, it is determined that the safety performance of the New Concept is equal to the RFP Concept.

## 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 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.*

This SIMR re-evaluation does not propose any new interchanges along SR 836. This existing facility and interchange provide access to public roads only. The improvements proposed at the interchange will maintain full access to the existing cross streets and accommodate all movements.