



## EXECUTIVE SUMMARY

The primary purpose of the I-95 Systems Interchange Modification Report (SIMR) project is to identify the long-term needs of I-95 interchange at SW 10<sup>th</sup> Street (SR 869) and the adjacent interchange at Hillsboro Boulevard (SR 810) through 2040, to develop design concepts to address traffic spillbacks onto I-95, improve interchange operations, reduce congestion, and enhance safety, and to obtain the determination of safety, operational and engineering (SO&E) acceptability of the preferred alternative, Build 2. This SIMR evaluates the traffic operations of the No-Build, Build 1, and Build 2 alternatives and also presents the performance of Build 2 with the presence of the SW 10<sup>th</sup> Street Connector Lane PD&E Study preferred alternative as Build 2 sub-scenario.

The information and analyses indicate that several of the merge, diverge and weaving areas have been designated as High Crash Locations at some point within the last three years of analysis (2013-2015). Similarly, the No-Build Alternative is projected to experience operational failures at multiple merge, diverge and weave locations along I-95 within the study interchanges. It is important to note that both Build alternatives have similar modifications to SW 10<sup>th</sup> Street and differ only in their forecast traffic volumes depending on provisions of direct-connect ramps between I-95 Express Lanes (ELs) and SW 10<sup>th</sup> Street connector lanes. Build 1 has no direct-connect ramps and Build 2 has direct-connect ramps terminating west of Military Trail. For Build 2, a sub scenario with higher traffic demand was also evaluated. The sub scenario of Build 2 has direct-connect ramps connecting to Sawgrass Expressway (refer to Conceptual Plans in Appendix J). The following modifications are proposed to the SW 10<sup>th</sup> Street interchange configuration for Build alternatives:

### Southbound Ramp Terminal at SW 10<sup>th</sup> Street:

- The traffic signal for the westbound left-turn from SW 10<sup>th</sup> Street traffic to southbound I-95 will be eliminated and combined with the I-95 southbound off-ramp signal.
- The existing single westbound left turn lane will be converted into dual westbound left-turn lanes and the storage will be extended approximately 250 feet east of the northbound off-ramp signal.
- A barrier separation will be provided between the eastbound through lanes and the eastbound to northbound right turn movement to eliminate weaving and allow for concurrent movement of the southbound left turn and eastbound right turn movement. The single lane eastbound to northbound loop ramp will be widened to provide for two lanes.
- The existing single free-flow southbound right turn lane has been widened to provide for signal controlled dual right-turn lanes to improve operations and safety in the westbound direction. In addition, a signal will provide adequate gaps for pedestrians to cross the SB off-ramp safely to address the safety concern for



pedestrians in the cross-walk. Also, due to the proximity of the signalized intersection at Newport Center Drive, the free-flow right turn induces weaving with the westbound traffic. This condition is likely to become worse with the introduction of the access to the westbound connector lanes immediately west of the Newport Center Drive.

Northbound Ramp Terminal at SW 10<sup>th</sup> Street:

- The westbound to northbound left-turn movement will be converted to a free-flow westbound to northbound right turn movement. This eliminates the westbound left turn phase and provides more green time to the eastbound movement.
- The northbound off-ramp will be widened to provide for triple left turn and triple right turn lanes.
- The eastbound to northbound loop ramp and the westbound to northbound on-ramp will merge together before merging with the I-95 mainline traffic.

Proposed modifications to the interchange are recommended to address projected deficiencies in the future. Listed below are specific modifications and projected benefits:

- The proposed Build 1 and 2 alternatives with a 7,900 foot SB auxiliary lane on I-95 between the SB entrance ramp from SW 10<sup>th</sup> Street and the SB exit ramp to Sample Road creates a 4-lane mainline segment on SB I-95 and is projected to significantly improve the operations in the SB direction.
- The proposed NB braided ramps at the SW 10<sup>th</sup> Street interchange and the SB braided ramps at Hillsboro Boulevard not only reduce the number of merge and diverge points along I-95 but also provides for longer off-ramp storage lengths. Freeway analysis projects significant improvements over the No-Build conditions in the merge, diverge and mainline operations in both directions.
- As discussed above, the SW 10<sup>th</sup> Street interchange ramp terminal improvements proposed under the Build 1 and 2 alternatives are projected to significantly improve the operations at the ramp terminals and potentially eliminate the possibility of off-ramp queues spilling on to the mainline.
- The proposed elimination of the SB on-ramp signal at SW 10<sup>th</sup> Street and the proposed improvements along SW 10<sup>th</sup> Street are expected to significantly improve the flow of traffic along the arterial, particularly at the interchange. The improved operations are projected to improve the safety along the corridor.
- For Build 2 alternative, a new I-95 NB on-ramp is introduced from WB SW 10 Street as a free-flow right turn on the NE quadrant of the interchange. The new I-95 NB on-ramp connects with EB on-ramp and the EB SW 10 Street Connector carrying traffic destined to the I-95 general-purpose lanes(GPLs). A combination of these on-ramps forms a NB CD



road. The NB CD road braids over the NB Hillsboro Boulevard off-ramp, continues northward, and connects with Hillsboro Blvd. EB and WB on-ramps. Then the NB CD road merges with the I-95 mainline north of Hillsboro Blvd. The proposed NB CD road is anticipated to shift a portion of I-95 mainline traffic between SW 10<sup>th</sup> Street and Hillsboro Boulevard, thereby relieving the mainline congestion.

These improvements are anticipated to address the traffic operation deficiencies by eliminating or improving the failing conditions within the interchange influence area and improving safety along SW 10<sup>th</sup> Street and Hillsboro Boulevard. A traditional crash reduction analysis shows that the proposed improvements are likely to reduce approximately 42 crashes per year resulting in an annual safety benefit of more than six (6) million dollars.

Considering the overall operations along I-95, ramp terminals, and along Hillsboro Boulevard and SW 10<sup>th</sup> Street, Build 2 Alternative is projected to provide better operating conditions than Build 1 and No-Build alternatives. Similar VISSIM analysis conducted under the SW 10<sup>th</sup> Street Connector PD&E Study, FM 439891-1, confirms that a sub scenario of Build 2 Alternative with higher traffic demand is expected to provide better operations than the No-Build alternative in 2040 and the proposed interchange modifications under Build 2 Alternative can handle the additional traffic demand with the planned SW 10<sup>th</sup> Connector Lanes (FM 439891-1)

Access Management Plan and the typical section package were prepared and are contained in Appendix R.

The Federal Highway Administration's (FHWA's) adopted policy on *Access to the Interstate System* became effective on May 22, 2017 and replaced the policy of August 27, 2009 on *Access to the Interstate System*, published at 74 Federal Register 43743. The changes in this policy were made to ensure this policy focuses on safety, operational, and engineering issues. The consideration of social, economic, and environmental impacts discussed in the 2009 policy are removed from this policy. However, the removal from this policy does not eliminate the need to consider those matters. Those issues will be addressed under the National Environmental Policy Act and other statutes and regulations applicable to the approval process.

It is in the national interest to preserve and enhance the Interstate System to meet the needs of the 21st Century by assuring that it provides the highest level of service in terms of safety and mobility. Full control of access along the Interstate mainline and ramps, along with control of access on the crossroad at interchanges, is critical to providing such service. Therefore, the Federal Highway Administration's (FHWA) decision to approve new or revised access points to the Interstate System under Title 23, United States Code (U.S.C.), Section 111, must be supported by substantiated information justifying and documenting that decision. The FHWA's decision to approve a request is dependent on the proposal satisfying and documenting the following requirements:



## **Considerations and Requirements**

- 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 the SIMR confirmed that the proposed interchange modifications are not expected to have any adverse impacts on safety and operations on the interstate facility (I-95). The proposed elimination of the loop ramp in the northeast quadrant of the Hillsboro Boulevard interchange will remove the weaving movement between the ramp terminals and thereby improve the safety and flow of traffic along Hillsboro Boulevard. The proposed improvements along SW 10<sup>th</sup> Street under the Build 2 alternative is expected to significantly improve the operations at the NB off-ramp terminal intersection from LOS E and F to LOS C and B. According to the VISSIM analysis, the queue length at the NB and SB off-ramp at SW 10<sup>th</sup> Street is anticipated to exceed the off-ramp length for the 2040 No-Build conditions and it could adversely impact the flow of traffic along I-95. The proposed improvements under the 2040 Build conditions are projected to significantly reduce the queue length for this ramp and should prevent the queue from adversely affecting the operations along I-95. In terms of average travel speeds along the I-95 mainline derived from the HCS freeway segment analysis, the Build Alternative 2 is expected to increase travel speed from 58 MPH to 66 MPH during the AM peak hour and from 59 MPH to 67 MPH during the PM peak hour.

The projected failing conditions, where demand exceeds capacity extensively, under the No-Build Alternative are expected to increase future crash risk within the project corridor. This



potential for increased crash risk is alleviated by the capacity improvements proposed in the Build 2 Alternative.

Many of the improvements proposed for this project such as adding a collector-distributor (C-D) road, express lane direct connection, and braided ramps are not supported by the procedures in the Highway Safety Manual (HSM). The limitations in the HSM analysis methodology does not capture the benefits of the proposed operational and capacity improvements proposed under the Build 2 alternative and consequently does not quantify the crash reduction in a meaningful way for this project.

I-95 EL lanes are proposed to directly connect with ramps to and from west along SW 10<sup>th</sup> Street. I-95 EL lanes are proposed to braid over GP lanes to connect to off-ramps, and thus eliminate the need for two-sided weaving. The proposed C-D road between Hillsboro Blvd. and SW 10<sup>th</sup> Street eliminates the existing weaving section between these interchanges, thereby reducing I-95 merge and diverge conflict points from five(5) in the southbound direction to four(4) conflict points, and from six(6) in the northbound direction to four(4) conflict points. A traditional crash reduction analysis was conducted to quantify the potential safety benefits of the proposed freeway, interchange, and arterial improvements. The analysis shows that the proposed improvements are likely to reduce approximately 42 crashes per year resulting in an annual safety benefit of more than six (6) million dollars.

The comparison between No-Build and Build Alternative 2 Sub Scenario for year 2040 conditions shows greater benefits of the Build 2 alternative in terms of annual travel time saving, network-wide delay and speed, and queue lengths on the SW 10th Street off-ramps. Build Alternative 2 Sub Scenario incorporates the approved SW 10th Connector, thereby inducing additional traffic demand.

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 does not propose any new interchanges along I-95. These existing interchanges provide access to public roads only. The improvements proposed at the interchanges will maintain full access to the existing cross streets and accommodate all movements

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