

## 1. EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT) District Five has prepared an Interchange Operational Analysis Report (IOAR) for the proposed improvements at the I-75 at CR 484 interchange. The findings of the operational and safety analysis and the FHWA Policy Point discussion are summarized as follows:

### Purpose and Need

- The purpose of this project is to add turn lanes to increase the safety and operational efficiency at the I-75 at CR 484 interchange and at the intersection of CR 484 at CR 475A.
- The need for the project is based on existing operational deficiencies at the existing I-75 interchange at CR 484. During average weekday conditions, the northbound left-turn movement at the CR 484/I-75 northbound ramps intersection approaches capacity (volume-to-capacity ratio of 0.99). During higher demand conditions (above average) this capacity constraint results in spillback onto the I-75 mainline during the PM peak hour, creating a safety concern. The project improvements are needed to improve the safety and operations of the I-75 mainline and CR 484 arterial.

### Proposed Improvements

- The FDOT District Five is currently designing turn lane improvements at the I-75 at CR 484 interchange and CR 484 at CR 475A intersection.
  - I-75 Southbound Ramp at CR 484
    - Bring the southbound right-turn movement under signal control
    - Add a 2nd southbound right-turn lane
    - Provide additional storage for the downstream eastbound left-turn lanes at the I-75 northbound ramp
  - I-75 Northbound Ramp at CR 484
    - Add a 2nd eastbound left-turn lane
    - Add an exclusive westbound right-turn lane
    - Add a 2nd northbound left-turn lane
    - Widen the on-ramp to accommodate dual eastbound left-turn lanes
  - CR 475A/SW 16th Avenue at CR 484
    - Add a 2nd east bound left-turn lane
    - Add a 2nd northbound left-turn lane
    - Add an exclusive southbound right-turn lane
    - Widen the north leg of CR 475A to accommodate dual eastbound left-turn lanes

### Future Traffic Operations

- The microsimulation (VISSIM) analysis shows that the Build Scenario provides improved operations to the No-Build scenario on the southbound off-ramp, the northbound ramps, and the CR 484 arterial.
  - These improvements are expected to mitigate queue spillback onto the interstate observed in the No-Build microsimulation analysis and reduce the maximum queue lengths along both off-ramps. Spillback onto the mainline I-75 lanes is not expected to occur under the Build scenario during Design Year (2034) peak hour.

- The improvements in the Build scenario reduce the travel times in both peak hours by at least 32% and at most 80% based on the simulation analysis conducted.
- Each of the network wide performance metrics such as average delay, average speed, total delay, latent demand, latent delay, and vehicles arrived perform better in the Build scenario when compared to the No-Build scenario.

### **Future Safety Performance**

- The I-75 ramp and ramp terminal improvements are predicted to reduce crashes and save over \$46.5 million in crash costs over the 10-year life cycle of the project.
- It is anticipated that crashes would be reduced at the CR 484/CR 475A intersection which would save nearly \$2.5 million in crash costs under the Build configuration.
- The project improvements (interchange and arterial intersection improvements) are anticipated to reduce crashes by approximately 240 crashes, equating to approximately \$49 million in in crash cost savings over the 10-year life cycle of the project.
- The access management improvements are anticipated to reduce overall crashes and reduce the number of severe injury crashes through the I-75 and CR 484 interchange area from a qualitative perspective.

### **FHWA Policy Points**

- The proposed improvements satisfy FHWA's Two Policy Point Requirements included in the May 22, 2017 update to "Policy on Access to the Interstate System".
- 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 microsimulation (VISSIM) analysis shows that the Build Scenario will improve operations over the existing and No-Build scenarios along the I-75 mainline, ramps, and the CR 484 arterial. The Build scenario improvements are expected to mitigate queues onto the interstate from the off-ramps that were observed in the No Build microsimulation analysis and have been observed in above average days in the field under the existing conditions.

- Maximum queues in the Build scenario are expected to be reduced by up to 4,500 feet versus the No-Build scenario resulting in maximum queues of less than 450 feet during both design year (2034) peak hours. The maximum queues from the Build microsimulation analysis do not encroach into the portions of the ramp intended for deceleration. The Build scenario improvements are also expected to improve the arterial with increased intersection throughput (up to 53 percent) and improved travel times (up to 80 percent improvement) when compared to the No-Build scenario. The I-75 mainline operation remains the same between the Build and No-Build scenarios. The capacity constraints on the interstate will be evaluated/addressed by the ongoing I-75 Master Plan.
- The results of the predictive safety analysis show the proposed improvements in the Build scenario are predicted to experience approximately 215 less crashes along the I-75 ramps and ramp terminals than the No-Build scenario, equating to approximately \$46.5 million in crash cost savings over the 10-year life cycle of the project. It is also anticipated that crashes would be reduced at the CR 484 and CR 475A/SW 16th Avenue intersection by approximately 25 crashes which would save nearly \$2.5 million in crash costs under the Build configuration. The overall project improvements are anticipated to reduce crashes by approximately 240 crashes, equating to approximately \$49 million in in crash cost savings over the 10-year life cycle of the project.
- 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.
  - The existing interchange is a full diamond interchange providing full access to all traffic movements on the connecting crossroad (CR 484). The proposed improvements will maintain the current access to/from CR 484 and the existing gore points will remain unchanged as part of the proposed improvements.

The interchange improvements evaluated as part of the Build scenario fulfill the project's purpose and need and satisfy the FHWA Policy Points.