

Executive Summary

Florida's Turnpike Enterprise (FTE) conducted a Project Development and Environment (PD&E) Study (FPID: 438547-1-22-01) for the Orlando South Ultimate Interchange at Florida's Turnpike (State Road 91) and Beachline Expressway (SR 528), in Orange County, Florida. The project study limits extend from south of the Taft Vineland Road to south of Sand Lake Road (SR 482) along Florida's Turnpike and from west of John Young Parkway (CR 423) to the Beachline West Toll Plaza along SR 528. The purpose of this project is to enhance the integrity of the systems interchange while accommodating future traffic demands, improving overall safety, meeting current design standards, and assessing operational impacts of the improvements to the study area. This Systems Interchange Justification Report (SIJR) documents traffic forecasts, lane requirement evaluations, traffic operations analysis, and safety evaluation for the proposed ultimate configuration of the interchange.

The Orlando South Interchange is a complex interchange that includes a combination of ramps that connect Florida's Turnpike, SR 528, and Orange Blossom Trail (US 17/92/441). Since the existing interchange does not provide many of the direct connections needed, motorists utilize US 17/92/441 and Consulate Drive and other local streets as a pass-through to access numerous destinations. The pass-through traffic exacerbates traffic congestion at the intersections within the interchange. The proposed Build Alternative will enhance safety, add capacity, increase mobility, accommodate future traffic demands, and reduce evacuation travel times in Central Orange County.

The existing traffic analysis indicates that SR 528 is currently experiencing reductions in travel speeds during the AM peak hour commute period west of Consulate Drive due to the proximity of interchanges and associated weaving maneuvers. In addition, traffic queues currently spill back along the SR 528 mainline in the westbound direction at Florida's Turnpike off-ramp during the PM peak hour, resulting in a reduction in mainline travel speeds. The queue backups start downstream of the SR 528 westbound off-ramp where it merges with the US 17/92/441 southbound on-ramp to Florida's Turnpike, forming a single-lane section that is currently over capacity. Note that the existing conditions analysis (2017) did not include the SR 528 westbound to Florida's Turnpike single lane off-ramp improvement downstream of the US 17/92/441 southbound on-ramp to two lanes. This improvement was not completed until 2018. Overall, intersection delays and queues for most of the intersections are within acceptable levels. However, the SR 482 and CR 423 intersection and the intersections along US 17/92/441 experience long delays, especially at Landstreet Road during the PM peak hour.

Crash data for the most recent five years (2012-2016) reported a total of 763 crashes along Florida's Turnpike mainline and a total of 412 crashes along the SR 528 mainline. Both Florida's Turnpike and SR 528 have actual crash rates lower than the critical crash rate. The Consulate Drive interchange ramps at Florida's Turnpike and SR 528 have a safety ratio greater than one, indicating that these may be high crash locations. Also, Landstreet Road loop-ramps at SR 528 have a safety ratio greater than one. Actual crash rates at the intersections were computed and compared with average crash rates for similar facilities within Orange County to assess the safety conditions within the study area. The high crash intersections are:

- CR 423 and SR 482
- US 17/92/441 at SR 482, Landstreet Road, Consulate Drive, and Taft Vineland Road
- Turnpike southbound off-ramp/westbound on-ramp to SR 528, SR528 eastbound off-ramp to Consulate Drive

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- Taft Vineland Road and Satellite Boulevard
- CR 423 and SR 528 westbound ramps

Various Build Alternatives (Alternative 1, Alternative 2.1, Alternative 2.2 and Alternative 3) were evaluated for this study. Alternative 3 was developed following a Public Information Meeting (PIM) for the project and internal coordination. Refinements were made to Alternative 2 based on the comments received at the PIM, to minimize right-of-way impacts, reduce cost and improve constructability. With these refinements, Alternative 3 was selected as the Preferred Build concept. This SIJR only documents traffic analysis for the No-Build condition and the Preferred Build Alternative 3 (referred to as Build or Preferred Build herein). The future No-Build network was updated to include the following planned and programmed improvements within the study area:

- Florida's Turnpike mainline widening (FPN: 411406-1) from four to eight lanes: two general toll lanes (GTL) and two express lanes (EL) in each direction. This project extends from Osceola Parkway interchange at MP 248.93 to the Orlando South interchange at MP 254. It will include widening ramps to and from the north at Orlando South to two lanes. It is expected to be completed by year 2020.
- Implementation of ELs from Orlando South to I-4 (MP 254 to 259) and direct connect ramps to/from I-4 (FPN: 437166-2 and 437987-3). This project is expected to be implemented by year 2021/2022. It includes an EL ingress/egress weaving zone between SR 482 and I-4, direct connection of the EL from Florida's Turnpike (south of I-4) to I-4 (east of Florida's Turnpike) and widening of to/from north ramps at the I-4 interchange. The I-4 ramps will be converted to All Electronic Tolling (AET). This project will also include implementation of the following interim improvements at the Florida's Turnpike southbound off-ramp terminal intersection with Consulate Drive: an exclusive free southbound right turn lane with a receiving lane along Consulate Drive, a second westbound left turn lane, and a second receiving lane on the westbound on-ramp to SR 528 that terminates upstream of the gore.
- SR 528 widening (FPN: 406090-5) from four to eight lanes to include two GTLs, two ELs, and an auxiliary lane in each direction from I-4 (MP 0.0) to the Florida's Turnpike (MP 4.3). The construction of this project has been completed.
- SR 528 widening (FPN: 437156-1) from six to eight lanes to include three GTLs and one EL in each direction from the Florida's Turnpike (MP 4.3) to the McCoy Road interchange (MP 8.4). The construction of this project has been completed.
- Orlando South interchange resurfacing (FPN: 437156-2). This project included widening of the SR 528 westbound to Florida's Turnpike single lane off-ramp downstream of the US 17/92/441 southbound on-ramp to two lanes. The two-lane ramp widening has been completed in 2018.
- Florida's Turnpike interchange at SR 482 at MP 257 (FPN: 433663-1). This will be a full interchange with tolled ramps to and from the north.
- AET conversion at tolled ramps (FPN: 441322-1).
- Single Point Urban Interchange (SPUI) at the SR 482 and CR 423 intersection. The construction has been completed.

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- Taft Vineland Road widening from two to four lanes from US 17/92/441 to the bridge over the Florida's Turnpike.
- SR 482 and Destination Parkway widening to six lanes just west of CR 423.

The evaluation of future lane requirements indicates that five lanes per direction will be needed along the Florida's Turnpike mainline under No-Build conditions from north of I-4 to south of SR 417 by 2040. The analysis of SR 528 under No-Build conditions indicates that the mainline will require four lanes per direction between Orlando South and McCoy Road by year 2028, and by 2044 to the west of CR 423.

Several Transportation System Management and Operations (TSM&O) measures have been implemented within the study area. However, TSM&O improvements are not expected to adequately satisfy the need for direct access ramps between the Florida's Turnpike and SR 528, improve access to the surface streets, and alleviate traffic congestion within the interchange.

It is anticipated that most of the intersections within the area of influence (AOI) will be over capacity by the 2045 design year under No-Build conditions. Key deficiencies of the No-Build condition include no direct ramps between SR 528 west and Florida's Turnpike, resulting in travelers using the surface street roadways to connect between the two freeway facilities. Congestion along US 17/92/441, Consulate Drive and CR 482 are expected to propagate onto the freeway system. However, operations within the AOI are expected to improve under the Build conditions. Overall, Synchro results indicated a 45 and 48 percent reduction in total signalized intersection control delay within the AOI during the 2045 design year AM and PM peak hours, respectively, when compared to No-Build condition.

In the Build conditions it is estimated that the reductions in network travel time for the study area will range between 24 and 30 percent during the 2045 peak periods. The average delay reduction for the study area network is estimated to be 41 to 44 percent in the 2045 peak period. This reduction is due to the anticipated diversion of traffic from surface streets to the proposed GTLs system-to-system connections, added capacity and higher speed ramps. Following are the list of improvements under Build alternative:

- Direct GTLs system-to-system connections that will improve system and surface street operations
- Northbound collector-distributor (C-D) road that will improve Florida's Turnpike northbound mainline congestion and reduces turbulence experienced with No-Build conditions
- Two new reliever interchanges at Taft Vineland and Florida's Turnpike and at Voltaire Drive Extension and SR 528 are projected to accommodate future traffic demand
- Ramp braiding along the Florida's Turnpike between the new reliever interchange at Florida's Turnpike and Taft Vineland Road interchange and the SR 528 direct connect ramps to preclude adverse weaving
- Ramp braiding along SR 528 between CR 423 and Consulate Drive to preclude adverse weaving
- Additional auxiliary lanes between interchanges southbound along Florida's Turnpike between the exit to the SR 528 and the entry from SR 482 will improve traffic operations

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- Additional auxiliary lanes eastbound and westbound along SR 528 between Florida's Turnpike and the new reliever interchange at the Voltaire Drive Extension will improve traffic operations
- Surface street ramp modifications will improve traffic operations, including the following:
 - Removal of the Landstreet Road ramps connecting to SR 528, which will also improve safety as loop ramps have higher crash rates
 - Maintaining Consulate Drive entry/exit ramps connecting to SR 528 and the southbound exit from Florida's Turnpike with a new Diverging Diamond Interchange (DDI) configuration
 - Removal of Florida's Turnpike ramps connecting to US 17/92/441, except the northbound Florida's Turnpike exit to northbound US 17/92/441
 - A new southbound entry ramp to Florida's Turnpike via Consulate Drive
 - A new direct northbound entry ramp to Florida's Turnpike from southbound US 17/92/441
- Reconfiguration of the Consulate Drive and US 17/92/441 intersection to provide triple left turn lanes eastbound and a turbo lane configuration along northbound US 17/92/441 for through movements to provide additional intersection capacity
- Reconfiguration of the SR 482 and Voltaire Drive intersection will provide additional capacity
- Reconfiguration and signalization of the Taft Vineland Road and Bachman Road intersection will provide additional capacity
- A new arterial connection Road X (Voltaire Drive Extension) between Landstreet Road and SR 482 will be constructed

A user benefit over a 20-year project life span of the proposed Orlando South ultimate interchange modification was estimated using projected reductions in network travel time and improved safety. Fuel consumption and emissions were not included. Based on 2017 dollars, the estimated user benefit is \$1.6 Billion for travel time from year 2025 to 2045. The Build alternative is predicted to have a 20-year crash cost savings of approximately \$504 Million compared to the No-Build alternative, in 2019 present value.

The analysis showed that the proposed interchanges meet the requirements for the Federal Highway Administration's (FHWA) two policy points. First, the operational and safety analysis conducted for this SIJR confirmed that the proposed improvements under the Build alternative do not have an adverse impact on the operations and safety of Florida's Turnpike, SR 528 or the local street network, and improves traffic operations through the design year. Second, the proposed accesses connect to public roads only and will provide for all traffic movements.

The Orlando South PD&E study (FPID: 438547-1-22-01) is expected to be completed by Spring 2020. Design of the system interchange (FPID: 438547-2) is programmed in Fiscal Year (FY) 2020, right of way in 2022-2024 and construction in 2027. Design of the Taft Vineland Road and Florida's Turnpike interchange (FPID: 444980-1) is programmed in FY 2020 and 2026-2027. Design of the Voltaire Drive and SR 528 interchange (FPID: 444979-1) is programmed in FY 2026-2027. Right of way and construction of the last two projects are not yet programmed.