

The design and construction of the Florida Department of Transportation (FDOT) SunTrax test facility, to be located east of Polk Parkway and north of Braddock Road in Polk County, are underway (FPID: 437300-1). The test facility is being sponsored by Florida's Turnpike Enterprise (FTE), at a cost of \$56.2 million, and is planned to test new transportation technologies and support research by students at the nearby Florida Polytechnic University. New SunPass data collection equipment and techniques will also be tested at the facility. Equally important is the need for research and development of new technologies to support the rapidly growing autonomous and connected vehicle industry, which will be conducted at the test facility.

A new interchange has been proposed at Braddock Road and Polk Parkway at Milepost (MP) 21 to support the SunTrax test facility and the expected land use development in the vicinity of the interchange within the City of Auburndale, such as the proposed Regional Activity Center (RAC), Commerce Center Development of Regional Impact (DRI), and the recently established Florida Polytechnic University. A Project Development and Environment (PD&E) study is underway to evaluate the proposed interchange and widening of Braddock Road from Polk Parkway to Berkley Road (FPID: 438018-1). The PD&E study is being conducted concurrently with the Design-Build project for widening the two-lane section of Polk Parkway to four lanes, from MP 18 to MP 22. This Interchange Justification Report (IJR) has been developed to support the PD&E study and the need for the proposed interchange. The Methodology Letter of Understanding (MLOU) for the IJR was approved by the requestor, FTE, and the FDOT Systems Planning Office (SPO) in August 2016. The proposed interchange is supported by the City of Auburndale and is included in the *Lakeland Area Draft 2040 Cost-Feasible Highway Network* as a 2019-2040 unfunded need by the Polk Transportation Planning Organization. The proposed interchange is included in the Turnpike Five-Year Work Program and Master Plan with an anticipated opening year of 2021.

The IJR provides traffic forecasts, lane requirement evaluations, traffic operations analysis, and safety evaluations within the Area of Influence (AOI) of the proposed interchange. Lane requirement analysis shows that two lanes in each direction of Polk Parkway and single-lane interchange ramps will be required through the 2041 design year within the study limits, with or without the proposed interchange and the planned RAC. The widened Polk Parkway and the ramps are expected to be largely under-saturated in the future. The effect on safety within the study area due to the proposed interchange is expected to be negligible.

The analysis evaluated both signalized intersections and roundabout intersections at the proposed interchange ramp terminals and at the SunTrax test facility access road to determine the required lane geometry for the design year, considering traffic from the planned RAC. The analysis showed that the proposed lane geometry would provide acceptable operations during the design year: the projected demand would be processed, while the delays and queues would be within acceptable levels. The proposed lane geometry at the Braddock Road interchange ramp terminals would be the same with or without the traffic from the planned RAC, for both the signalized and the roundabout alternatives. From a safety perspective, the single-lane roundabouts at the interchange ramp terminal intersections are recommended over the signalized intersections. It is expected that

the single-lane roundabouts would result in 30 percent fewer crashes than the signalized intersections.

At the SunTrax access road intersection with Braddock Road, additional lane geometry would be required with the planned RAC traffic in the design year, such as an exclusive southbound left-turn lane for the signalized intersection and a second circulatory lane for the roundabout. The signalized intersection is recommended at this location over the roundabout due to the right-of-way requirements and safety concerns associated with multi-lane roundabouts.

The analysis showed that the unsignalized intersection of Braddock Road and Berkley Road would operate at an unacceptable LOS F in the design year, and delays would be long with the traffic from the planned RAC. Signalization of this intersection and addition of turn lanes should be considered in the future as traffic demand increases. Traffic data can be collected to perform signal warrant analysis five to 10 years after the interchange is open and additional development has occurred in the area.