Florida Department of TRANSPORTATION

FDOT's Concrete Test Road

Project Description

FDOT Office
State Materials Office

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Project Overview

The Florida Concrete Test Road will include 2.5 miles of experimental concrete pavement open to real world traffic. It will allow for a comprehensive in-service performance assessment of new/emerging concrete pavement technologies and innovative concepts while giving a full consideration to the interaction between factors such as traffic loading, design features, materials properties, construction practices, and environmental conditions.

The test road will be constructed parallel to an existing roadway to allow traffic to be diverted from the test road periodically for extensive performance monitoring without impacting the traveling public. It will be unique in that it is the only full-scale concrete pavement test facility of this type in the Southeastern United States. The climate and environmental conditions of Florida distinguish this test road from the few other full-scale concrete pavement test facilities such as MnROAD in Minnesota. A facility of this type, coupled with a well-recognized and established Accelerated Pavement Testing (APT) program, will definitely set forth the Florida Department of Transportation (FDOT) as a worldwide leader in innovations and advancement in pavement engineering knowledge and practices.

Test Road Description

FDOT reviewed several potential sites for the test road location and selected a northbound segment of US-301 in Clay County (county segment 71030000, mile marker 0.116 to 3.510). The basic selection criteria included the presence of a large volume of trucks and minimal driveways or side streets. In addition, the site is less than 40 miles to the State Materials Office (SMO). The SMO will monitor the performance of the test road through periodic surveys and through pavement instrumentation measurements. The existing northbound asphalt pavement will remain in place and will be used to carry all northbound traffic during evaluations of the test sections. A weigh-in-motion (WIM) installation will be located at the beginning of the test sections to document vehicle types and weights that travel the test road.

The test road will be constructed through two phases. The first phase, scheduled to begin in June 2016, will include earthwork and installation of infrastructure such as roadside data collection cabinets and a central data collection building. The second phase is scheduled to begin in July 2018 and will include paving of the asphalt base and concrete test sections. The test road is expected to open to traffic in late 2020. Figures 1 and 2 show the location and details of the test road.

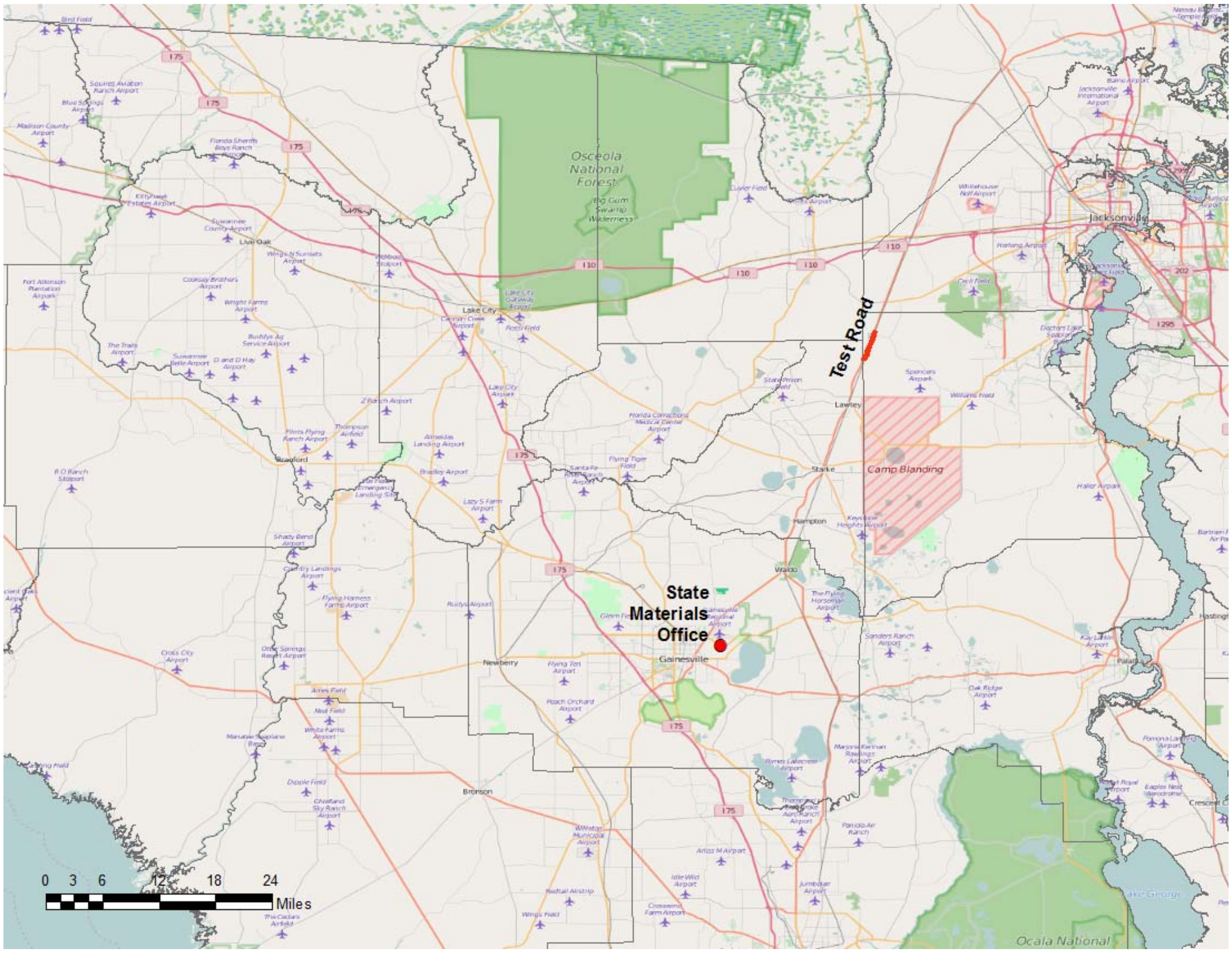

Figure 1 Test road site on US-301.

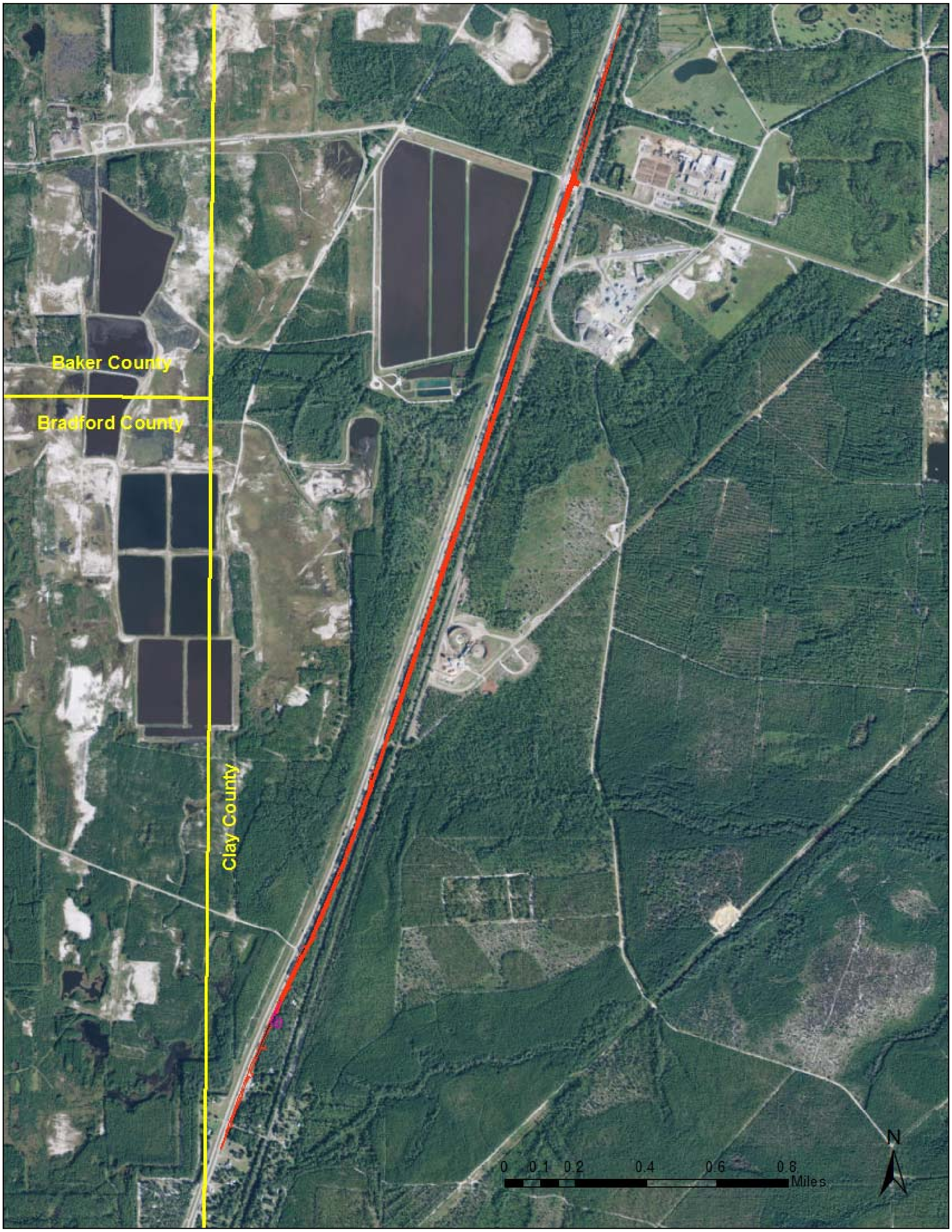

Figure 2. Test road project limits and details.

Project Scope and Objectives

Three experiments will be conducted to provide insight into FDOT’s current concrete pavement design practices as well as generate data that will be used to locally calibrate the existing mechanistic-empirical design procedure. These main experiments are described below.

1. **Structural Experiment:** The Structural Experiment will consist of 20 test sections. The primary purpose of these sections is to investigate different concrete thicknesses and base types. The concrete thickness will range from 6 inches to 10 inches and five different base configurations will be utilized. In addition, the use of reclaimed asphalt pavement (RAP) as an aggregate source for the concrete pavement will be studied.

2. **Drainage Experiment:** The Drainage Experiment will include 16 test sections constructed with and without edge drains. Concrete pavement joints will also be sealed or unsealed to study the effect of water infiltration through joints. Two concrete pavement thicknesses will be used while keeping the base type constant. The primary purpose of this experiment is to study the effectiveness of edge drains.

3. **Calibration Experiment:** The Calibration Experiment will consist of 16 test sections and will be used to more accurately calibrate the fatigue cracking equation within the mechanistic-empirical design guide developed by the American Association of Highway and Transportation Officials (AASHTO). Concrete pavement joints will be sawed at two different lengths and curing and construction techniques will be modified to ensure crack initiation at different ages.

In addition to the experiments listed above, several different surface textures will be applied to the passing lane to evaluate the effect on pavement friction, surface drainage, and pavement/tire noise. The proposed alternative surface textures include longitudinal grooving, a combination of longitudinal diamond grinding and transverse grooving, and a new longitudinal diamond grinding technique known as the Next Generation Concrete Surface (NGCS). Longitudinal diamond grinding, the standard surface texturing method on FDOT concrete pavements, will be performed on the entire travel lane.

Performance Measurements

Two performance surveys will be conducted each year, one in the summer and one in the winter. Additional surveys will be performed following extreme events such as hurricanes and tropical storms. At a minimum, pavement performance measurements will include the following:

1. Structural capacity and load transfer capability of joints
2. Surface distresses (e.g., number and severity of cracks)
3. Pavement smoothness
4. Joint faulting
5. Surface friction and texture

The pavement response (i.e., strain) to traffic loads and daily temperature cycles will be measured with embedded strain gauges. Thermocouples placed at different depths within the concrete will be used to record the temperature gradient throughout the depth of the slab. Moisture sensors will be placed at strategic locations within the Drainage Experiment to understand how water moves through a pavement system and edge drains will be instrumented to measure the drainage volume. Monitoring wells will also be used to track the water table.

Figure 3 shows the layout of a typical test section. The first and last slabs will be reserved as transitions between test sections and for cores that will be used to document the in-place concrete strength. Two slabs will include embedded sensors. The interior slabs will be used to monitor the performance of the concrete test sections through periodic evaluations by SMO personnel. The travel lane will be the focus of the pavement performance evaluations since they will carry most of the traffic, but performance of the passing lane will also be measured.

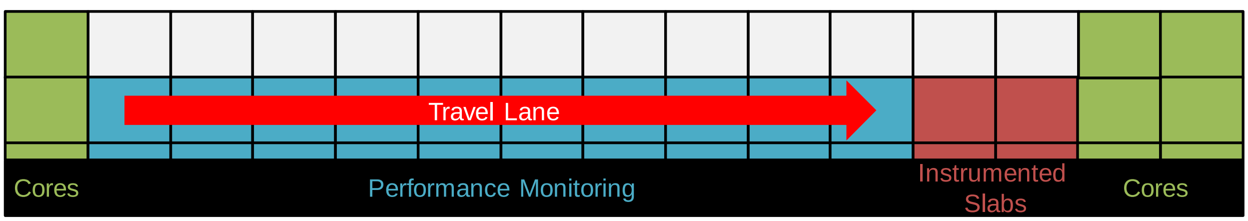

Figure 3 Typical test section layout.