



Research Project Statement 19-E02 FY 2019 Annual Program

Title:	Implementation of Advanced Geophysical Tools for Geotechnical Analysis
The Problem:	<p>Up to 50 percent of major infrastructure projects suffer impacts to schedule or cost due to geotechnical issues. Many of these issues relate to risks identified directly or indirectly to the scope and quality of site characterization work. Effective site characterization is critical for recognizing potential problems that may affect design and construction and for ensuring safe, well-performing, and cost-effective projects.</p> <p>Current TxDOT practice for characterizing a site typically includes a minimum number of borings with samples obtained every few feet with depth. For highway construction, sampling frequency depends on the level of investigation, uniformity of soils, and the potential for detrimental reaction from chemical stabilization. General recommendations for various soil conditions are 0.5 to 1.0 mile for uniform and 0.25 to 0.5 mile for non-uniform soils. For highly variable soils, the frequency of sampling may be extended to every 0.2 to 0.25 mile, and for potential sulfate bearing and soil organic content, it may be every 500 feet. However, it has been a difficult decision for design engineers to specify the frequency of sampling due to lack of geotechnical information. Despite the best effort by the design engineers, the reconstructed idealized soil profiles from the scarce data are uncertain.</p> <p>Through Federal Highway Administration's (FHWA) Every Day Counts (EDC) program, several proven, effective, and underutilized technologies have been identified that, when combined with processes that assess risk and variability, allow optimization of subsurface exploration programs for improved site characterization and maximum return-on-investment. These technologies include cone penetration testing, seismic and electrical geophysics, measurement while drilling and optical and acoustic tele-viewers.</p>
Technical Objectives:	<p>The following items are to be considered for the research:</p> <ol style="list-style-type: none">1. Identify and conduct an overview analysis of proposed EDC-suggested geotechnical tests not currently used by TxDOT and compare to current TxDOT practice.2. Develop recommendations for improvements to TxDOT geotechnical practices in light of these identified tests, including, if possible, worksheets and flowcharts for appropriate selection of tests based on differing conditions and different parts of the state.3. Create a document related to Electrical Resistivity Profiling, appropriate for inclusion in a TxDOT best practices guide or a stand-alone TxDOT manual.4. Perform Electrical Resistivity Profiling on at least one TxDOT project, with step by step demonstrations to TxDOT staff.5. Create text and video training materials for TxDOT staff to learn how to conduct and analyze results from Electrical Resistivity Profiling.6. Perform a series of district or regional workshops to train TxDOT staff and share project results.7. The expectation of this project is that the end product will obtain a TRL level 9.

<p>Desired Deliverables:</p>	<ol style="list-style-type: none"> 1. Technical memorandum for each task completed. 2. Monthly progress reports. 3. Value of Research (VoR) that includes both qualitative and economic benefits, to be included in the research report. 4. Research report documenting the findings of EDC geotechnical recommendations in comparison with TxDOT standards and other findings of the research. 5. TxDOT best practices guide or stand-alone manual. 6. Training materials related to Electrical Resistivity Profiling. 7. Workshops. 8. Project Summary Report.
<p>Proposal Requirements:</p>	<ol style="list-style-type: none"> 1. Utilize the deliverable based templates (see the appendices provided). 2. Proposals will be considered non-responsive and will not be accepted for technical evaluation if they are not received by the deadline or do not meet the requirements stated in RTI's University Handbook. 3. Proposals should be submitted in PDF format, 1 PDF file per proposal. The PDF File name should include Project Statement Title, Project Statement Number and abbreviated Performing Agency(ies) Name. 4. This project will be tracked during the life of the project using a Technology Readiness Level (TRL) scale. More information about the use of a TRL can be found at https://www.fhwa.dot.gov/publications/research/ear/17047/17047.pdf.
<p>Pre-Proposal Meeting Information:</p>	<p>Friday, December 7, 2018 10:00 AM - 11:30 AM</p> <p>Austin Riverside Campus 118 E. Riverside Drive RTI Conference Room, 1st Floor</p> <p>Webex Information:</p> <ol style="list-style-type: none"> 1. See attached Webex meeting notification. 2. If requested, enter your name and email address. 3. If a password is required, enter the meeting password: De8Mft7N 4. Click "Join". <p>Teleconference information:</p> <p>Provide your phone number when you join the meeting to receive a call back. Alternatively, you can call:</p> <p>Call-in toll-free number: 1-855-437-3563 (US) Conference Code: 734 619 030</p>
<p>Proposal Deadline:</p>	<p>Proposals are due to RTI by 3:00 PM Central Time, Thursday, January 24, 2019. Email proposal submissions are to be sent to RTIMain@txdot.gov.</p>