Title:	Design, Construction, and Performance Monitoring of Stabilization of Expansive Soils and Cement
The Problem:	Traditionally, stabilization of expansive soils and aggregate bases have been done chemically using either lime, cement, fly ash, emulsion, foamed asphalt, or in combination. Expansive soils are also called swelling soils, and these soils cause extensive pavement heaves, bumps and longitudinal cracks. The soil mechanisms which cause these pavement distresses can be described as follows: When soils are saturated with water their volume increases substantially, and when they dry, their volume decreases and they shrink. This repetitive shrinking and swelling is responsible for the development of cracks, heaves and bumps on Texas roads. In addition, reflection cracks from cement treated bases have been reported in numerous projects. Roadway surface cracks allow water intrusion which degrades underlying pavement layers, and prematurely fails the pavement structure. Surface heaves and bumps are a driver safety issue. Cracks, heaves and bumps are extremely expensive to treat over the life of the pavement, and it would be more economical and safer to the public to mitigate their occurrence during construction. TxDOT studies have found that mitigation of expansive soils using polypropylene fiber may be an effective method to enhance the physical and mechanical properties of these problematic soils. The research results indicate that the fiber reinforced clays were able to reduce volumetric shrinkage strains and swell pressures. Also, fiber reinforcement of cement treated bases has shown to increase performance. Significant improvements in both shear and compressive strengths as well as flexibility have been reported in fiber reinforced clays and fiber reinforced cement treated bases. It is expected that these types of improvements would directly mitigate the aforementioned distresses to pavements. Many areas in Texas have problems stabilizing these soils with traditional stabilizers because of the high levels of sulfates in the soil. Many major pavement failures have occurred due to lime/cement induced sulfate heaves. Many of the Districts with high levels of sulfates are actively looking for alternatives to traditional stabilizers.
Technical Objectives:	There are huge potential benefits of applying polypropylene fiber to stabilize expansive clays and cement treated bases to (1) Increase strength; (2) reduce chemical stabilizer content; and (3) increase flexibility/ductility. Several TxDOT districts have expressed an interest in applying polypropylene fiber to stabilize expansive clays and cement treated bases. To evaluate this promising technology, assistance is required for specification and plan note development, test section construction and evaluation, and construction quality control. The project tasks are listed as follows: 1. Verify test methods and application rates to be tested in the field through laboratory testing. 2. Select construction and test sites, likely 1000 ft long for each iteration, with preference given to the Paris District for test sites. 3. Plan test section construction. 4. Develop construction specifications. 5. Monitor construction of test sections and verify that specifications are followed. 6. Monitor construction test sections quantifying, at a minimum, profile, FWD, and crack counts for two years post construction. 7. Prepare workshop training modules on construction and test methods. 8. Present training workshops. 9. The expectation of this project is that the end product will obtain a TRL level 7.
Desired Deliverables:	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 the research, including district specific construction specifications. 5. Presentation materials. 6. Instructor's guide. 7. Student workbook. 8. Project Summary Report.

Proposal Requirements:	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.
Pre-Proposal Meeting Information:	Friday, December 7, 2018 1 0 :00 AM - 11:30 AM Austin Riverside Campus 118 E. Riverside Drive RTI Conference Room, 1st Floor Webex Information: 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". Teleconference information: Provide your phone number when you join the meeting to receive a call back. Alternatively, you can call: Call-in toll-free number: 1-855-437-3563 (US) Conference Code: 734 619 030
Proposal Deadline:	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.