Title:	Synthesis of Best Application and Verification Practices for Long-Life Pavement Markings
The Problem:	Pavement markings are a vital component of a highway system as they convey guidance information to the traveling public. Transportation agencies use a variety of pavement markings ranging from relatively inexpensive traffic paints to permanent prefabricated pavement marking tapes that cost significantly more. The choice of pavement marking material used is dependent on the marking's ability to meet both day and night functionality on the roadway it is being used on and the material's expected life-cycle costs. In addition, roadway characteristics such as surface topography, AADT, truck volume and regional weather conditions and maintenance operations also highly influence the type of marking used. Application considerations such as moving operation versus lane-closure, required ambient conditions, difficulties in ensuring proper application, and the ability of the marking to adhere to the roadway surface or overcome any surface topography issues also affect the type of marking used. NCHRP Synthesis 306, Long-Term Pavement Marking Practices, synthesizes the various materials and practices transportation agencies use to achieve long-term marking performance. The report identified the top four problems for transportation agencies in regard to long-term pavement marking performance as being: 1. securing funding for pavement marking programs; 2. nighttime visibility in rain and fog; 3. quality control when markings are installed; and 4. a shortage of quality labor. Of these problems, ensuring the quality of marking installations is the only problem transportation agencies have direct control over. The report notes that transportation agencies utilize prescriptive/material specifications, performance-based specifications, and warranty provision specifications to achieve quality control of pavement marking installations and ensure long-term performance. The NCHRP 306 synthesis report does not make any recommendations, nor attempts to differentiate or rank order pavement marking materials or practices. With such an array of variables affecting the long-term performance of pavement markings and the number and variability of pavement marking materials and specifications available, most transportation agencies rely on common regional practice when determining their pavement marking policies and practices. Of particular interest is the ability of a transportation agency to control the amount of pavement marking material applied in both liquid and thermoplastic marking applications, as the amount applied has a direct bearing on the pavement marking's longevity and life-cycle costs.
Technical Objectives:	The purpose of this synthesis is to identify best case examples of quality control of liquid and thermoplastic pavement marking applications. The research team will scan practices across the United States and other countries with a focus on the following: 1. Types of markings materials used and reasons for their use on different pavement types, including application thickness. 2. Quality control approaches and methods, including verifying selected thickness or quantity of markings. 3. Types of specifications used and recommended language. 4. Application rate verification in the field; i.e., thickness, volume, or rate. 5. Equipment ability to measure quantity of marking applied and modifications to existing equipment. 6. How markings are paid for; i.e., subsidiary, by volume, or by length. The expectation of the project end product(s) shall attain a Technology Readiness Level of 2.
Anticipated 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 final research report; not a stand-alone deliverable. 4. Research report documenting the findings of the research, including literature review and recommended guidelines to improve placement and maintenance of pavement markings. 5. Project Summary Report

Proposal Requirements:	1. The project duration shall not exceed 12 months. 2. The project budget shall not exceed $65,000. 3. Utilize the “Proj/Agre” and “PA_Form” templates located at the TxDOT RTI website. 4. 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, which is also located at the RTI website. 5. Proposals should be submitted in PDF format, 1 PDF file per proposal. File name should include project name and university abbreviation. 6. This project will be tracked during the life of the project using a Technology Readiness Level (TRL) scale. For more information about the use of a TRL, click.