

REVIEW OF NEW SPECIFICATION OR SPECIFICATION CHANGE

211-1

Specification Section No.: 211

Item: In Situ Soil Stabilization

Originating Office: Materials Advisory Committee

By: Thomas

Date Sent For Review: 09.20.16

Date Comments Due: 10.18.16

**Submit response to: STANDARDS AND SPECIFICATIONS UNIT, DIVISION OF PROJECT SUPPORT
4TH FLOOR, CDOT HEADQUARTERS**

Vote Y/N	Concurrent Reviews – Others Commenting	
	Spec Committee Members:	✓
	Co-Chairman: Lacey	
	Region 1: Quirk	
	Region 1: Stratton	
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	Traffic Engineering: Matthews	
	Maintenance: Weldon	
	FHWA: Feery	
	Attorney General: Milan	
	Others:	
	Colorado Contractors Assoc.: Moody	
	Technical Committees:	
	PDAC	
	Drainage Advisory Committee (DAC)	
	Water Quality Advisory Committee (WQAC)	

The attached Draft Specification is submitted for your review and comments. If not returned by Date Comments Due, the draft specification will be considered to be approved unless the Standards and Specifications Unit of the Project Development Branch [(303) 757-9474, (303) 757-9402] is advised otherwise.

REMARKS:

If this draft special provision is approved, it will be issued as a new Pilot Project Special Provision

REVIEWER COMMENTS:

() Approved () Disapproved () Modified

If disapproved or modified, give reason why and show any modifications on the attached draft copy:

Name/Signature

Date

COLORADO DEPARTMENT OF TRANSPORTATION SUBMITTAL OF NEW SPECIFICATION OR SPECIFICATION CHANGE		Log No. (Assigned by Standards and Specifications Unit) 211-1
TO: Standards and Specifications Unit, Project Development, Suite 290		FROM: Materials Advisory Committee (Region, Branch or Technical Committee)
SPECIFICATION SECTION NO. 211 or as determined by the Committee	ITEM In-Situ Soil Stabilization	Priority Routine <input checked="" type="checkbox"/> Fast <input type="checkbox"/>
Reason for this new or changed specification: Using injected material for correcting ground conditions is more popular. There are currently two methods for this work and required sole sourcing although they reach the same end. This specification is to level the playing field and allow for competitive bidding between the two methods. The changes were developed under a Materials Advisory Committee (MAC) Task Force TF 2012-04 involving industry (Hayward Baker and CST). The specification changes were approve by the MAC.		
New or Revised Specification: See Attached.		
NOTE: See Procedural Directive 513.1 for a description of appropriate specification development procedures.		

SECTION 211
IN-SITU SOIL STABILIZATION

Section 211 is hereby added to the Standard Specifications for this project as follows:

DESCRIPTION

211.01 General.

This work shall consist of furnishing all labor, equipment, and materials necessary to drill and inject material to improve the in-situ soil along with any raising and supporting the existing pavement or structures in accordance with this specification and in conformance with the lines, grades and associated tolerances shown on the plans or established in the field by the Engineer.

211.02 Contractor Qualifications. The Contractor shall provide on-site supervisors and operators with experience in injection in-situ soil stabilization on at least 3 transportation projects during the past 3 years. The Contractor shall not use consultants or manufacturer's representatives to meet the requirements of this subsection.

211.03 Site Evaluation. A preliminary ground surface profile shall be performed by the Contractor to be used as a monitoring baseline during the stabilization. The interval between each point on the profile shall not exceed 10 feet. The plot of the preliminary ground surface profile shall be provided to the Engineer prior to injection.

For pavement, the profile shall be taken in each wheel path of the area to be raised. At least one profile shall be taken in the shoulders of the area to be raised.

A site evaluation report including a minimum of one boring for subsurface information will be provided to the Contractor. Additional subsurface information can be obtained by conducting geotechnical explorations at the Contractor's expense. Additional geotechnical explorations by the Contractor shall be conducted by a licensed Professional Engineer, Geologist, or Technician. Additional geotechnical explorations shall be advanced great enough to fully penetrate unsuitable foundation soils into competent material of suitable bearing resistance (stiff or dense soils or bedrock). Any site evaluation report conducted by CDOT or the Contractor shall include the name of operator, type of equipment and method used, date started, date completed, location of hole, depth of hole, sampling methods, sampling depth and intervals, type and depth of materials encountered, and any possible chemical interaction that may occur between the in-situ materials and injection material shall be submitted by the Contractor to the Engineer for acceptance.

211.04 Deliverables. The Contractor shall submit their proposed injection method for improving in-situ soil that may be contributing to distress at the ground surface identified in the plans and any needed pavement or structure improvements as a result of the stabilization procedure. The Contractor shall provide an Injection Plan for review and acceptance by the Engineer 10 working days prior to starting work. The Contractor design shall ensure the performance of no more than one inch of settlement in the mitigated area within one year of project acceptance based on verification methods in Subsection 211.06. The Injection Plan shall include:

- (1) The work schedule outlining mobilization and injection (sequence, location and depth).
- (2) A description of the program for monitoring the injection process as applicable (pressures, volume, pounds, etc.) and associated depths of injections.
- (3) A monitoring program that shall include a description of instrumentation, measurements, survey, or other means that are proposed to detect and measure movement of overlying pavement and adjacent structures during the work. The monitoring program shall include threshold values or a tolerance of movement that can occur without damage to overlying pavement or adjacent structures, and shall list corrective action that will be taken during the work in the event these threshold values or tolerances are exceeded.

- (4) Target pressures, volumes, elevations, and actions during injection as applicable.
- (5) Injection materials. Handling and disposal of injection materials and excess injection materials shall conform to Specification 250.
- (6) Other additional information as requested by the Engineer

The Contractor shall furnish all supervision, labor, materials, transportation, plant, operations and equipment to supply, transport, store, mix and inject materials for the purpose of achieving the injection plan as presented in the plans and specifications or as amended by the Engineer during construction. The Contractor shall monitor their work per the injection plan to insure that damage will not occur to any existing pavement or structures due to their processes.

The Contractor shall prepare daily injection reports when advancing injection pipes. The injection reports shall be available for review by the Engineer by noon the following work day after injection to determine if changes need to be made to the Injection Plan. The injection reports shall contain:

- (1) Name of injection technician.
- (2) Injection point identification.
- (3) Method of injection being used.
- (4) Proportions and rate of injected material as applicable.
- (5) Date started and date completed.
- (6) Depth of injection.
- (7) Type and depth of material encountered if the material can be visually inspected.
- (8) Difficulties or unforeseen conditions which were encountered.

211.05 Protection and Cleanup. During work operations, the Contractor shall take such precautions as may be necessary to prevent drill cuttings, equipment exhaust, oil, wash water, and other materials from defacing or damaging the landscape, pavement, and structures. The Contractor shall furnish such pumps as may be necessary to handle waste water and material from the operations, and clean up all waste resulting from the operations. The Contractor is responsible for the stability of the highway facility, traffic control, and /or the structure(s).

VERIFICATION

211.06 Final profile elevations shall be within ¼-inch of the elevations proposed in subsection 211.04 or as approved by the Engineer. A tight string line may be used to monitor and verify elevations for areas with a length less than 50 feet. For longer sections, a laser level shall be used to monitor and verify elevations. A final profile shall be taken in each wheel path of the area that was treated if applicable. At least one profile shall be taken in the shoulders of the area that was treated if applicable. The interval between each point on the profile shall not exceed 10 feet. The plot of the verification profile shall be provided to the Engineer for acceptance.

METHOD OF MEASUREMENT

211.07 The area of stabilization will be measured as the number of square feet of the plan area stabilized.

BASIS OF PAYMENT

211.08 Payment shall constitute full compensation for all materials, labor, equipment, mixing, pumping, waste, cleanup, and environmental protection.

Payment will be made under:

PAY ITEM

PAY UNIT

Area of Stabilization

Square foot

Payment will be full compensation for all work and materials necessary to stabilize the in-situ soils. All sampling and testing will not be measured and paid for separately, but shall be included in the work.