



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES. PERDUE  
GOVERNOR

EUGENE A. CONTI, JR.  
SECRETARY

January 13, 2011

**Addendum No. 1**

RE: Contract ID: C202241

WBS# 34430.3.3

**Camden County (R-2414B)**

US-158 From South of SR-1139 To East of NC-34 in Belcross

**January 18, 2011 Letting**

To Whom It May Concern:

Reference is made to the proposal recently furnished to you on this project.

The following revision has been made to the proposal:

On Page Nos. 53, 55, 61, 62 and 64 changes were made to the project special provision entitled "Mass Soil Mixing". Please void Page Nos. 53, 55, 61, 62 and 64 in your proposal and staple the revised Page Nos. 53, 55, 61, 62 and 64 thereto.

On Page No. 192 the project special provision entitled "Insurance Requirements" has been revised to provide information on the number of trains and their speed. Please void Page No. 192 in your proposal and staple the revised Page No. 192 thereto.

Sincerely,

A handwritten signature in black ink, appearing to read "R. A. Garris".

R. A. Garris, PE  
Contract Officer

RAG/jag  
Attachments

cc: Mr. J.G Nance, PE  
Mr. Ron Hancock, PE  
Mr. J. Jennings., PE  
Ms. D. M. Barbour, PE  
Mr. Art McMillan, PE  
Mr. J.V. Barbour, PE  
Project File (2)

Mr. R. E. Davenport, Jr., PE  
Mr. Ronnie Higgins  
Mr. Larry Strickland  
Ms. Marsha Sample  
Ms. Natalie Roskam, PE  
Ms. Lori Strickland

**MAILING ADDRESS:**  
NC DEPARTMENT OF TRANSPORTATION  
CONTRACT STANDARDS AND DEVELOPMENT UNIT  
1591 MAIL SERVICE CENTER  
RALEIGH NC 27699-1591

TELEPHONE: 919-250-4128  
FAX: 919-250-4119  
**WEBSITE: [WWW.NCDOT.ORG](http://WWW.NCDOT.ORG)**

**LOCATION:**  
CENTURY CENTER COMPLEX  
ENTRANCE B-2  
1020 BIRCH RIDGE DRIVE  
RALEIGH NC

Perform the work covered by this section including but not limited to preparing, grading, shaping, manipulating moisture content, and compacting either an unstabilized or stabilized roadbed to a condition suitable for placement of base course, pavement, and shoulders.

**AGGREGATE BASE COURSE:**

12-19-06

M5 R03

Revise the *2006 Metric Standard Specifications* as follows:

**Page 5-9, Article 520-5 Hauling and Placing Aggregate Base Material**, 6th paragraph, replace the first sentence with the following:

Base course that is in place on November 15 shall have been covered with a subsequent layer of pavement structure or with a sand seal. Base course that has been placed between November 16 and March 15 inclusive shall be covered within 7 calendar days with a subsequent layer of pavement structure or with a sand seal.

**MASS SOIL MIXING**

**1.0 GENERAL**

The work covered by this provision consists of furnishing all equipment, labor, and materials, and performing all operations required for installing and testing mass soil mixing as specified herein and shown on the contract plans. The term "Mass Soil Mixing" used in this provision is intended as a generic term to cover both wet soil mixing and dry soil mixing and refers to a mechanical method of blending in-situ soil with a reagent binder or grout using a mixing tool. The binder or grout is injected and in-situ soils are mixed to achieve a design strength. The Contractor shall hire a specialty subcontractor who meets the requirements of the subcontractor qualifications in Section 2.0 below. The Contractor shall perform all work described in this provision in accordance with this provision and the NCDOT Standard Specifications for Road and Structures unless otherwise directed by the Engineer.

**2.0 SUBCONTRACTOR QUALIFICATIONS**

The mass soil mixing subcontractor shall have a minimum of five continuous years of documented experience in soil mixing and shall provide at least one project manager, site superintendent, and operator with a minimum of three years of documented experience in soil mixing within the last five years. Both the site superintendent and the operator shall be on-site for this project on a full-time basis.

**3.0 SUBMITTALS**

3.1 Before beginning of mass soil mixing construction, the Contractor shall submit the following for approval by the Engineer. Send the submittals directly to both the Resident Engineer and the Geotechnical Engineering Unit (GEU). GEU's mailing address is as follows: Mr. K. J. Kim, Eastern Regional Geotechnical Office, 3301 Jones Sausage Road, Suite 100,

- b. date, start and finish time, and duration of mixing operation
- c. machine number
- d. type of mixing tool
- e. location of the treated area in terms of station number and offset from -L-
- f. surface area, depth, and volume of the treatment
- g. quantity of binder material and injection ratio
- h. installation air pressure
- i. rate of insertion and withdrawal of mixing tool
- j. description of obstructions or interruptions of mass soil mixing operation
- k. weather

#### **4.0 PRECONSTRUCTION MEETING**

After approval of the submittals in Section 3.0, but before starting any mass soil mixing work including the test section, the Contractor shall have a preconstruction meeting to discuss the details of materials, equipment, construction, inspection, and testing for the mass soil mixing. Schedule this meeting with the representatives of the Department's Resident Engineer, Construction Unit, and Geotechnical Engineering Unit, and the Contractor and the mass soil mixing subcontractor including the project manager, site superintendent, and operator. Notify them of the meeting schedule a minimum of seven days in advance of the meeting.

#### **5.0. SOIL MIXING EQUIPMENT AND STORAGE TANKS FOR BINDER OR GROUT MATERIALS**

##### **A. Soil Mixing Equipment**

Use self-contained soil mixing rigs for soil mixing. The minimum equipment requirements are:

- a. One or more pressure tanks rated to safely contain an air pressure 8 bar, if dry mixing is used.
- b. Base equipment capable of firmly supporting the mixing tool throughout the installation process.
- c. Torque and rotational speed suitable for thorough mixing.
- d. Specially designed mixing tools with the capacity to construct the required geometries and dimensions as shown in the plan

The soil mixing equipment shall have a real-time computer control system to permit accurate and continuous monitoring, recording, and control of the following: binder and water proportioning, grout mix, water-cement ratio, mixing tool depths, binder or grout injection pressures and quantities, auger rotational speeds, auger down pressure, auger advancement and withdrawal rates, and other operations required for mass soil mixing.

The soil mixing equipment shall be of sufficient size, capacity, and torque to perform the required mass soil mixing operations. The equipment shall be capable of advancing through the soft untreated ground or previously installed and cured mass soil mixing area as necessary to complete the work.

- 9.2 The Contractor shall undertake general Quality Control for construction of homogeneous mixed soil mass, which shall include, at a minimum, real time (computer) monitoring and graphical recording of the following soil mixing parameters continuously throughout the depth of each operation:
- a. Drilling and mixing depth
  - b. Mixing tool penetration and withdrawal rates
  - c. Mixing tool rotation speeds
  - d. Binder or grout injection rate of each auger
  - e. Amperage resistance to penetration, if applicable.
- 9.3 The Contractor shall obtain, form, preserve, cure, and transport the core samples, including all sample labeling and documentation in the format accepted by the Engineer.
- 9.4 QC Daily Reports shall be submitted for each work shift, within two hours of the end of each work shift. Each QC Daily Report shall document progress of the mass soil mixing construction, present the results of QC parameter monitoring, and present the results of the strength testing of wet-grab samples and continuity of core samples.
- 9.5 The QC Daily Report shall, at a minimum, include the following results of the QC parameters monitored for each mass soil mixing operation:
- a. Identification of Area of Work, by way of geographic orientation and stations/offsets
  - b. Rig number and names of the Superintendent and the Operator
  - c. Date and time (start and finish) of each operation
  - d. Mass soil mixing treated surface area, top and bottom elevations, and volume.
  - e. Binder or grout injection pressure, rate and volume
  - f. Date, time, plan location, and elevation and other details of all mass soil mix wet grab samples and any other samples taken during the work shift, and the names of persons responsible for obtaining the wet samples
  - g. Description of obstructions, interruptions, or other difficulties experienced during installation and how they were resolved, and notes of observations of any unusual behavior of any equipment during the mass soil mixing operation

- h. Graphical results derived from real time (computer) monitoring for each rig operation at each 0.3 meter of penetration and withdrawal, and for every minute of mixing tool rotation without vertical motion:
1. Shaft rotation speed and revolution number at each 0.3 meter of penetration.
  2. Penetration and withdrawal rates in meter per minute vs. depth.
  3. Quantity of binder or grout injection of each rig operation at every 0.3 meter vertical interval for insertion, mixing, and withdrawal.

## 10.0 TESTING REQUIREMENTS

The Contractor shall hire a geotechnical firm to conduct the following testing to verify that the mass soil mixing product meets the acceptance criteria specified in Section 11.0 of this provision. Use a geotechnical firm prequalified by the Contractual Services Unit of the Department for each type of testing. The Engineer reserves the right to request additional testing at no additional cost to the Department if the test was performed improperly or the test results are inconclusive or unreliable. In addition, the Contractor shall assist the Department's personnel to perform its own testing to assure the mass soil mixing product meets the design requirements.

### 10.1 Unconfined Compressive Testing of Wet Samples

The Contractor shall hire a geotechnical firm meeting the prequalification requirements for both drilling for geotechnical investigations (work code 3050) and laboratory and technician certification to collect wet samples for unconfined compressive testing. After completion of the mass soil mixing of every 200 square meters of surface area, collect a minimum of one sample at every two meter depth of the treated soil mass as directed by the Engineer. Prepare the test specimens and perform the compressive strength tests in accordance with the ASTM D 1633.

### 10.2 Cone Penetration Test (CPT)

The Contractor shall hire a geotechnical firm meeting the prequalification requirements for both geotechnical engineering services of roadway foundation investigation and design and drilling for geotechnical investigations (work code 3050) to conduct cone penetration tests as specified herein. The firm shall also have a minimum three (3) years of CPT experience and shall use a CPT rig capable of performing the test as specified herein. Conduct a minimum of one CPT per 100 square meter of mass soil mixing area a minimum of seven days after completion of the mass soil mixing work at a location designated by the Engineer. The CPT shall be performed down to a depth of two meters below the bottom of the mass soil mixing unless penetration refusal occurs as determined by the Engineer.

### 10.3 Coring and Unconfined Compressive Testing

The Contractor shall hire a geotechnical firm meeting the prequalification requirements for both drilling for geotechnical investigations (work code 3050) and laboratory and technician certification to perform coring of the treated soil mass and unconfined compressive strength

work. No work shall be performed in the defective area until the Engineer approves the remedial measures proposed by the Contractor.

- 11.1 The limits of the mass soil mixing in both horizontal and vertical dimensions shall be as shown in the contract plans or as directed by the Engineer.
- 11.2 All construction records including the QA/QC records have been submitted to the Engineer and demonstrate that the mass soil mixing operation was done in conformance with all of the requirements specified in this provision and produces a homogeneously mixed soil mass.
- 11.3 The results of the unconfined compressive testing of wet samples as specified in Section 10.1 show an average and a minimum unconfined compressive strength not less than 165 KPa and 83 KPa at seven days, respectively.
- 11.4 The Cone Penetration Test (CPT) as specified in Section 10.2 demonstrates a homogeneous and thorough treatment of the mass soil mixing throughout the entire depth of penetration. In addition, the CPT results show a minimum average corrected cone resistance ( $q_c$ ) of 1,100 KPa within any one (1) meter interval of the mass soil mixing depth. The cone resistance ( $q_c$ ) shall be corrected to  $q_t$  to account for pore water effects in accordance with ASTM D5778. If CPT refusal occurs after three (3) attempts within two (2) meters by two (2) meters area, this section is considered to meet the CPT requirements.
- 11.5 The coring performed as specified in Section 10.3 shows a homogeneous profile of the treated soil mass. In addition, the results of the unconfined compressive testing of core samples as specified in Section 10.3 show an average and a minimum unconfined compressive strength not less than 165 KPa and 83 KPa at seven days, respectively.
- 11.6 Any additional test conducted by the Engineer confirms that the mass soil mixing product meets the acceptance criteria stated above.

## **12.0 REMEDIAL WORK**

The Contractor shall submit a plan of remedial work for the mass soil mixing area determined by the Engineer as defective based on the acceptance criteria in Section 12.0. The Engineer will review the submittal and approve or reject it within seven days from the date the submittal is received. All remedial work shall be performed in accordance with this provision including the acceptance criteria unless otherwise approved by the Engineer. The Contractor shall perform all remedial work at his own expense. No additional compensation or time extension will be made for any remedial work.

## **13.0 MEASUREMENT AND PAYMENT**

The quantity of mass soil mixing to be paid for shall be the quantity of the completely treated and accepted soil mass in cubic meters. Measurement shall be made from the limits of mass soil mixing shown on the plans or from the revised limits as directed by the Engineer. No separate measurement for payment will be made of any remedial work. No separate measurement for

## APPENDIX C Insurance Requirements

CONTRACTOR shall, at its expense, procure, prior to commencement of the WORK, and shall maintain in full force and effect until the WORK has been completed and accepted, and shall require all subcontractors likewise to procure and maintain, unless they be covered by CONTRACTOR's insurance, the following kinds and minimum amounts:

1. Workmen's Compensation Insurance with minimum limits of not less than \$1,000,000 Bodily Injury by Accident, Each Accident; \$1,000,000 Bodily Injury by Disease, Policy Limit; \$1,000,000 Bodily Injury by Disease, Each Employee, and includes a waiver of subrogation in favor of RAILROAD.

2. CONTRACTOR's Public Liability, Property Damage Liability Insurance including Products & Completed Operations coverage with a minimum single combined limit of not less than \$2,000,000 per occurrence and \$6,000,000 aggregate. Coverage shall include Railroad Contractual Liability endorsement ISO GL 24 17 or its equivalent, have a cross-liability clause, name RAILROAD as an additional insured with endorsement ISO GL 20 10, and include a waiver of subrogation in favor of RAILROAD.

3. The CONTRACTOR shall maintain Commercial Automobile Insurance for all owned, non-owned and hired vehicles with a combined single limit of not less than \$1,000,000 for Bodily Injury and Property Damage Liability. Such policy shall be endorsed to provide Waiver of Subrogation in favor of RAILROAD and name RAILROAD as Additional Insured. If hauling hazardous materials, policy is to be endorsed with the MCS-90 endorsement.

4. CONTRACTOR shall acquire Railroad Protective Public Liability and Property Damage Liability Insurance with limits of \$2,000,000 per occurrence, \$6,000,000 annual aggregate, with RA and each of the RAILROADS as the named insured under (1) RPL for the entire contract. At RAILROAD's option and with the appropriate price reduction, RAILROAD may obtain such coverage for some projects where it is more economical for both CONTRACTOR and RAILROAD.

5. If required, the CONTRACTOR shall maintain Pollution Legal Liability Insurance with minimum limits of \$5,000,000 per occurrence covering all operations of the CONTRACTOR. Such policy shall be endorsed to provide Waiver of Subrogation in favor of RAILROAD and name RAILROAD as Additional Named Insured.

(b) Insurance shall be primary and without right of contribution from other insurance that may be in effect and without subordination. The insurance policies must be underwritten by a company licensed in the state where work is to be performed, and carry a minimum Best's rating of "A- VI" or better. Insurance shall not be materially modifiable or cancelable without thirty, (30) days prior written notice to RAILROAD. CONTRACTOR shall furnish RAILROAD with certificates of insurance showing compliance with these insurance provisions ten (10) days prior to the commencement of the WORK which must be signed by an authorized member of the insurance firm and which must show the name of the agreement to which the certificate is applicable.

(c) If any policies providing the required coverages are written on a claims-made basis, the following is applicable:

- The retroactive date shall be prior to the commencement of the work
- CONTRACTOR shall maintain such policies on a continuous basis
- If there is a change in insurance companies or policies are canceled or not renewed, CONTRACTOR shall purchase an extended reporting period of not less than three (3) years after the contract completion date.