Sample Project Special Provision: 105qoe

Date: 11/10/2016

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REVISION OF SECTIONS 105 AND 106

QUALITY OF EMBANKMENT

Sections 105 and 106 of the Standard Specifications are hereby revised for this project as follows:

Subsection 105.03 shall include the following:

Conformity to the contract of embankment construction shall be determined in accordance with the following:

(a) *Process Control Plan*. The Contractor shall be responsible for Process Control (PC) for all embankment material and embankment construction on this project. The Contractor shall submit a written Process Control Plan (PCP), including a methods statement, to the Engineer for acceptance. The PCP shall include the following:

1. Identification of the supervisor and technicians that are responsible for implementing the PCP throughout construction. The Contractor shall demonstrate that an appropriate number of technicians/inspectors will be present on the project to accommodate the laboratory testing and inspection items that are required to maintain PC requirements specified for daily earthwork operations.
2. Identification of the laboratory to be used throughout the project to conduct PC testing. The CDOT Central lab and the CDOT Regional labs will be not responsible for running tests on materials submitted to meet Contractor PC Requirements.
3. Methods to separate, process, or supply material for embankment fill that meets the material requirements specified in the contract documents.
4. Methods to control and document foundation preparation prior to placement of embankment fill; which will include clearing and grubbing in accordance with Section 201, removal of all top soil in accordance with Section 207, removal and replacement of any unsuitable material identified during excavation or foundation preparation, and scarifying, moisture conditioning, and compaction of the final embankment foundation surfaces using methods appropriate for the material types present.
5. Methods to control and document that placement, lift thickness, moisture conditioning, compaction equipment and methods, and compaction observation/testing are appropriate for the embankment material types being placed.
6. Methods to identify and communicate changes in embankment fill being placed that would require modification of placement, moisture conditioning, compaction methods, observation, and testing.
7. A plan to notify or communicate in advance to CDOT’s Engineer to satisfy OA testing requirements to minimize construction delays.
8. List of all inspection and materials testing forms and procedures to be utilized by the Contractor.
9. Adherence to Table 106-4 requiring minimum testing frequency.

The Contractor shall submit the PCP at least five working days prior to the start of the work. The Engineer’s review of the PCP will not exceed two working days. Work shall not begin until the PCP has been accepted in writing, unless otherwise approved.

(b) *Documentation.* The Contractor shall maintain current records of process control operation activities, observations made, and tests performed. These records shall be in the form shown in the PCP, and shall be submitted to the Engineer on a daily basis documenting any earthwork-related activities from the prior day. Documentation shall include at a minimum:

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REVISION OF SECTIONS 105 AND 106

QUALITY OF EMBANKMENT

1. Activities performed by the Contractor, subcontractors, personnel working, and equipment being used.
2. Weather conditions for the day and any impact that weather had on the work.
3. Construction delays and their cause.
4. A description of work performed that conforms with the Contract Documents, and a description of defective or deficient work that is not in compliance, and any corrective action taken.
5. Documentation of the material type being placed, location of where material is being placed, lift thickness, moisture conditioning methods, compaction equipment and methods, and observation and testing of the material placed for every lift of embankment fill constructed.
6. Documentation of changed material types and corresponding changes to placement, moisture conditioning, compaction methods, and observation/testing methods.
7. Daily test results, daily inspection reports, and monthly certification reports when required.

In addition to daily documentation requirements, a statement that work incorporated in the project complies with the Contract shall be submitted to the Engineer prior to payment for the work or upon request. Monthly certification reports shall be stamped with the seal of a Professional Engineer registered in Colorado. Failure to provide the Engineer with the necessary documentation may result in the suspension of work on embankment until the documentation has been completed and accepted by the Engineer. CDOT Owner Acceptance testing shall not be used as supporting documentation for the Contractors certification. CDOT or CDOT’s certified representative will be responsible for Owner Acceptance testing (OAT) and Independent Assurance Testing (IAT).

Add subsection 106.041, immediately following subsection 106.04 as follows:

**106.041 Embankment Testing.** The Supervisor responsible for implementing the Process Control Plan and for oversight to implement required sampling and testing frequencies shall be identified in the PCP and be qualified according to the requirements of CP-10 (Note: this will require a PE or a NICET Level III certification). The technicians taking samples and performing tests shall be qualified according to requirements of CP 10 (Note: this will require WAQTC [Western Alliance for Quality Transportation Construction] qualification and certification through CDOT’s Soils, Excavation, and Embankment certification program). At least one technician will be designated full time on the project who will have a minimum of one year of experience with soils testing and inspection of earthwork projects. The project verification sampling and testing procedures shown in the CDOT Field Materials Manual under the frequency guide schedule for minimum materials sampling, testing and inspection shall be used for the elements shown in Table 106-4.

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REVISION OF SECTIONS 105 AND 106

QUALITY OF EMBANKMENT

**Table 106-4**

**EXCAVATION AND EMBANKMENT TESTING SCHEDULE**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Element** | **Minimum Testing Frequency Contractor’s Process Control** | **Minimum Testing Frequency****CDOT’s Owner Acceptance** |
| Soil Embankment with < 30% Retained on ¾-inch Sieve | In-place Density / Relative Compaction | 1 per 500 cu yds. or fraction thereof with one additional test required per change in material type. | 1 per 1,000 cu yds. or fraction thereof with one additional test required per change in material type.  |
| In-place Density / Relative Compaction within 100 feet of bridge approach. | 1 per 250 cu yds. with minimum two tests per lift, and one additional test required per change in material type. | 1 per 500 cu yds. with minimum one test per lift, and one additional test required per change in material type. |
| Moisture Density Curve | 1 per 10,000 cu yds. with one additional test required per change in material type. | 1 per soil type.  |
| Moisture Density One-Point Verification | 1 per 2,000 cu yds, with one additional test per change in material type. Minimum of one test per day.  | 1 per soil type. |
| Soil Classification (AASHTO M145) | 1 per 2,000 cu yds, with one additional test per change in material type. Minimum of one test per day.  | 1 per soil type. |
| Gradation | 1 per 2,000 cu yds, with one additional test per change in material type. Minimum of one test per day.  | 1 per soil type.  |
| Atterberg Limits | 1 per 2,000 cu yds, with one additional test per change in material type. Minimum of one test per day.  | 1 per soil type. |
| Soil Embankment with > 30% Retained on ¾-inch Sieve, Rock Embankment, & Rock Fill | Test Strip Construction and Acceptance | 1 test strip required per change in material type.  | Observation and acceptance of roller pattern, moisture conditioning, and proof rolling. |
| Soil Classification (AASHTO M145) | 1 per 2,000 cu yds, with one additional test per change in material type. Minimum of one test per day.  | 1 per soil type.  |
| Gradation | 1 per 2,000 cu yds, with one additional test per change in material type. Minimum of one test per day.  | 1 per soil type. |
| Atterberg Limits | 1 per 2,000 cu yds, with one additional test per change in material type. Minimum of one test per day.  | 1 per soil type.  |
| Slake Durability | 1 per 2,000 cu yds, with one additional test per change in material type. Minimum of one test per day (for sedimentary rock only). | 1 per stockpile / borrow source and 1 per material type for sedimentary rock only.  |

Qualifications for testing and personnel are contained in Section 203, Chapter 200 of the CDOT Field Materials

Manual, CP-10, CP 13, CP 15, and CP 80, and the CDOT Inspectors Checklist.

All costs associated with the Contractor’s Process Control efforts will not be measured and paid for separately but shall be included in the work.

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**INSTRUCTIONS TO DESIGNERS** (delete instructions from final draft):

 Use at the discretion of the Region Materials Engineer.