Geotechnical Specification and Construction Update

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Topics

- 2016 C&MS Revisions
- Supplemental Specifications & Supplements
  - Revisions & Additions
- Construction Manual Of Procedures
  - Update Schedule & Plans
- Consultant Inspection Prequalification
2016 C&MS Revisions

General Changes

- Emphasize when ODOT is responsible for compaction testing:
  - “Unless otherwise specified in the Contract Documents, the Engineer will perform all compaction tests according to Supplement 1015.”
  - Items 203, 204, 205, 206, 304, 411, and 503
  - Items 611 and SGB - Contractor is always responsible
- **RAP** (Reclaimed Asphalt Pavement) replaces RACP
Item 201  Clearing And Grubbing

- Removed the listing of the restrictions for material movement from quarantined areas associated with destructive insects (e.g., emerald ash borer, Asian longhorned beetle), due to it becoming outdated.
- Added Ohio Department of Agriculture web address for the listing of current restrictions.
Item 202  Removal of Structures And Obstructions

- Excess removed or excavated materials to be disposed according to 105.16 and 105.17
  - Recycle
  - Use in a legitimate fill operation
  - Dispose in appropriate waste area
  - Dispose in licensed C&D debris facility
- Renumbered sections 202.10 through 202.13
Items 205 & 206  Chemically Stabilized Embankment & Subgrade

- Removed Lime Kiln Dust (LKD) as an approved material for chemical stabilization
- LKD was not a successful economical alternative to cement
- LKD may still be used as a drying agent for moisture control of wet embankment material (203.07.A)
Item 206  Chemically Stabilized Subgrade

- Submit the construction procedure, for phased work, to ensure full depth and continuity of subgrade stabilization across phase interfaces
- Clarified that air temperatures must be above 40 °F for the curing period
- Discontinued allowing concrete curing compound (705.07 Type 2) to be used for the curing coat
Chemically Stabilized Subgrade

- Cobbles & boulders caused damage and excessive wear to reclaimer teeth
- FRA-270-17.28 & FRA-71-5.29. Also on FRA-70-3.41
- Occurred in both cut and fill sections
- Indicated in original soil profiles (FRA-71 project)
- Soil Survey - Crosby & Kokomo Series
Chemically Stabilized Subgrade

- RPCC from adjacent bridge demolition used in fill
- Although allowed, RPCC was placed to subgrade elevation
- Do not placed material at least 1-foot below the flow line of underdrains (203.03.E)
Item 208  Rock Blasting

- Deleted use of the term **trim blasting** as a synonym for cushion blasting
  - Trim blasting, still used in SS 862 Rockfall Protection, refers to low energy removal of large rock blocks or overhangs
- Changed a water quality test parameter to **sulfate**
- Removed a reference to a specific lightning detector model.
Supplemental Specifications and Supplements

- **Revised**
  - 4 Supplemental Specifications
  - 2 Supplements

- **Added**
  - 1 Supplemental Specification
  - 2 Supplements

- **Deleted**
  - S-1016 Loss On Ignition of Topsoil replaced by AASHTO T 267 in Items 653 and 659
Supplemental Specification 840
Mechanically Stabilized Earth Walls

- Added **two new systems**
  - Tabbed (punched) steel strips (*Sanders MSE*)
  - Modular block w/ geogrids (*Redi-Rock Positive Connection*)

- Revised design **submittal requirements**:
  - Competent individuals to prepare and check the design calculations and drawings
  - Preparers and checkers to initial each sheet, and shall be different individuals
  - One Ohio P.E. to sign, seal, and date design calculations and drawings submittal
Added emphasis to **design requirements**, which were sometimes not followed by the suppliers

- “Use only one soil reinforcement system for the entire length of the retaining wall.”
  → mixing steel strips and steel ladders

- “Aesthetic treatment limits extend from the top of the leveling pad to the top of the uppermost facing panel.”
  → plain finish panels below groundline, behind barriers, and behind coping
Supplemental Specification 861
Geogrids for Subgrade Stabilization

- Required that geogrids are to be punched and drawn polypropylene
- Modified geogrid material properties to include available products and qualify more suppliers
- Added Designer Guidance to include an Alternate design to be able to use a proprietary geogrid
Supplemental Specification 862
Rockfall Protection

- Added an excavation pay item for removal and disposal of material from the rock slope, which include both previously fallen and scaled material.
- Method of measurement determined during plan preparation by plan note, either:
  - By a three-dimensional volume method
  - By the “measured in vehicle” method
Supplemental Specification 863
Reinforced Soil Slopes

- Added guidance to the Designer Note to address:
  - Roadway geometrics may concentrate storm water runoff and cause severe erosion on the slope
  - Enhanced erosion protection measures, beyond simply establishing vegetation, may be needed
  - Potential measures: runoff diversion or armoring with dumped rock, geosynthetics, or tied concrete blocks
Supplement 1015  Compaction Testing of Unbound Materials

- Documentation requirements for technicians
  - Use separate forms for each material/pay item
  - Fill out forms completely
  - Provide phase number, test location (station, offset, wall number)
  - Provide gauge readings and backup calculations for trench or moisture corrections

- Require minimum weight of 30 lbs for the concrete block used for Proctor mold compaction
S 1015 - Compaction Testing

- Sample soil from area directly under the gauge
- Proctor mold on a concrete block or surface when compacting sample
- Block weight not in Supplement
  - 4” thick block or 8” cube
  - Technician was using this concrete cylinder, ≈ 12 lbs
S 1015 - Compaction Testing

- Added minimum weight of 30 pounds to Supplement

- Adequate size shown
  - Bottom of mold completely supported on block

- MOP lists minimums
  - Concrete block – 4” x 12”
  - ‘Cinder’ block – 6” x 12”
Supplement 1015  Compaction Testing of Unbound Materials

- Guidance on performing Test Sections
  - Use production equipment and materials
  - Construct a new test section when the material changes or supporting material changes
  - For Method A, use only the OMC from the laboratory moisture-density curve
  - For Method B, use new material on a new adjacent area for each moisture content section

- Maximum dry density from the test section is used for compaction control
Sulfate content now determined by new Supplement 1122, which is similar to TEX-145-E method

“For phased construction, collect in-place soil samples from locations distributed across the treated area of each phase...”

Additional reporting requirements

• Geographic coordinates of sample locations
• Station limits and construction phase of treatment recommendations
Supplemental Specification 867
Temporary Wire Faced Mechanically Stabilized Earth Wall

- Issued April 15, 2016
- Replaces designer written plan notes
- Similar to SS 840
SS 867 TWFMSE Wall

- Preconstruction meeting with supplier representative
- Bulging wire facing panels were not overlapped
SS 867 TWFMSE Wall

- Temporary crossing permanent reinforcements
  - Potential for damaging permanent system
  - Shop drawings submitted separately and only showed one wall system
- Temporary wall designer responsible for correcting conflict
New Supplement 1122
Determining Sulfate Content in Soil

- Issued July 17, 2015
- Replaces TEX-145-E method in S 1120 and GB-1
- Essentially same procedure, clarifies ambiguous steps
  - Make 3 filtrate samples from 3 soil sample splits
  - 16 to 24 hour soaking time
  - Gravimetric or vacuum filtration procedures
  - Specifies filter paper porosity
  - Zeroing of colorimeter to filtrate
  - Stop testing when sulfate content > 8000 ppm
New Supplement 1123
Geotextile Fabrics Prequalification Procedure

- Issued April 17, 2015
- All approved companies required to participate in the NTPEP audit program for geotextiles.
- Private Label companies allowed to be listed as long as they follow the NTPEP program.
- Allowed geotextiles listed on the Department’s Approved List, rather than the Qualified Products List.
- Primarily, affects how project personnel accept the materials in the field.
Construction Manual Of Procedures

- Revised to include changes made to 2016 C&MS
- Minor updates and edits for most Items
- SS 840 MSE Walls – cleaned up, brought up-to date, edited for content; no policy changes.
- S 1015 Compaction Testing of Unbound Material – reorganized, correct references, cleaned up.
Documentation Requirements sections being revised to point to a construction web SharePoint site that will house work inspection forms.

Eventually, these will be *Quality Conformance Checklists* and *the Quality Inspection Frequency Procedure* when e-construction is implemented.

Daily diaries stored in SiteManager cannot be electronically searched.
Consultant Inspection Prequalification

- Started in October 2013 – Supplement 1121
- Certification of Nuclear Density Gauges & Operators
- Currently administered through Office of Consultant Services
Written Testing

- Verify that Soil & Aggregate Inspectors know ODOT’s procedures for compaction testing of unbound materials – Supplement 1015
- Written test – 30 multiple choice questions
  - 90 percent to Pass
- Test taken 463 times to 309 individuals
Number of NDG Operators Tested = 309

Cumulative Passing Rate

- Not Passed, 101, 33%
- Passed Test, 208, 67%

Through 6/17/16
Attempts to Pass Test

- 1st Time: 71%
- 2nd Time: 18%
- 3rd Time: 6%
- > 3 Times: 5%

Testing through 6/17/16
MSE Wall Inspection

- Reject panels with connectors bent > 15°
- Bending may crack galvanization
MSE Wall Inspection

- Repair of coating not acceptable
- Replacement connector has been used, but should not become acceptable.
MSE Wall Inspection

- Power driver scratched galvanization on connector
- Washer will protect coating
- Install bolts from bottom with washer & nut on top
MSE Wall Inspection

- Backfill not placed to bottom of soil reinforcement at back of panel
Test Section Method A used for granular materials:

- Items 304, 611 & 840

Lab Moisture-Density Curve used only for the Optimum Moisture Content

For compaction acceptance, use Maximum Dry Density from the test section
S 1015 - Test Sections

- Actual production equipment
- Test Area: 400 to 10 SY
- Witnessed by ODOT
- Provide test section results to compaction inspector
- New test section needed when materials or supporting material changes
- Test Section Method B: Use new material on new area for each moisture content
QUESTIONS
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Lunch