Ohio Department of Transportation

Specifications for Geotechnical Explorations

2007 Revisions

SPECIFICATIONS FOR GEOTECHNICAL EXPLORATIONS

January 2007
Timeline

- Sep ’96  Last revision to 1995 SSI
- Sep ’03  Solicited internal comments
- Mar ’04  Solicited external comments
- Apr ’04  External comments received (6 firms)
- Dec ’05  Draft of Red Flag Study and
          Instrumentation Sections
Timeline

• Apr ’06 Presented proposed changes and asked for additional comments at Consultant Workshop
• May ’06 Began intensely working on SGE
• Jan ’07 Released SGE as part of DRCC quarterly update
Major Revisions

- Title
- Format – consistent with other ODOT Manuals and Standards
- Back to English
- Voice – Present tense, imperative mode
- Plan review by geotechnical designer in Section 100
- New Section 200 – Geotechnical Red Flag Study
Major Revisions

- Several minimum boring requirement adjustments in Section 300
- Exploration Identification Number system for borings, probes, test pits, etc. in Section 300
- Required automatic SPT hammers (except skid rig) and calibration to the drill rod energy ratio (ER) in Section 400
- New Section 500 – Instrumentation
Major Revisions

• Revised ODOT Soil Classification method to now include A-8a Organic Silt and A-8b Organic Clay in Section 600
• Provides more detail and standardization for visually classified soil and rock in Section 600
• Updated and revised reporting requirements for Structure Foundation Explorations, Soil Profiles, and Geohazard Explorations in Section 700
• Standard report format in Section 700
• Proposal submission requirements in Section 800
SGE Revisions

Specifications for Subsurface Investigations (SSI)

becomes

Specifications for Geotechnical Explorations (SGE)
SGE Revisions

**Format** – Changed to be consistent with other ODOT manuals

Chapter 1 — Section 100
## SGE Revisions

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<td>Section 200: Geotechnical Red Flag Study</td>
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## SGE Revisions

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# SGE Revisions

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<td>Appendix F: Policy for Sealing Geotechnical Exploratory Boreholes</td>
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</tbody>
</table>
Section 100 General Information

• 102 Project Development Process
• 103 Extent of Exploration
  – Red Flag Study added to the list
• 104 Consultant Prequalification
  – Find it all at: www.dot.state.oh.us/CONTRACT/consultant.htm
• 105 Review of the Plans
  • “The consultant will ensure any plans submitted to ODOT for review…are reviewed by the registered engineer responsible for the Geotechnical Exploration Report prior to submittal to ODOT.”
Section 200 Geotechnical Red Flag Study

- New section
  - Literature Search
  - Interviews
  - Site Visit – “a windshield tour”
- Report
Section 200 Geotechnical Red Flag Study

• 205 Report
  – Description of Geology
  – Observations of the Project
  – Documentation of Interviews

– Geotechnical Portion of Red Flag Summary
  – Literature References
Section 200 Geotechnical Red Flag Study

- PDP Revisions (Appendix H)
  - Minor Projects – by the District
  - Major Projects – by the District or Consultant

ONLY COMPLETE THE RED FLAG SUMMARY
Section 300 Reconnaissance and Planning

• 301 Reconnaissance
  – Not a one time event
  – Plans needed to get started (moved from Chapter 1)
  – Office – Like the Red Flag Study – Don’t repeat
  – Field – Boots on the ground
    • Cleaned up language
    • Identify land usage and geotechnical features
Section 300 Reconnaissance and Planning

- **302 Planning**
  - Based on drilled borings, consider other methods as appropriate
  - Utilize previous explorations to the fullest extent possible
  - As subsurface information becomes available, review and adjust the exploration program as necessary
Section 300 Reconnaissance and Planning

- 302.2 Exploration Identification Number
Section 300 Reconnaissance and Planning

- **302.2 Exploration Identification Number**
  - X-ZZZ-W-YY
    - X = Method of Geotechnical Exploration
    - ZZZ = Number, 001 to 999
    - W = Offset or between consecutive #s, 0 to 9
    - YY = Year that program began

  - B-001 = B-001-0-07
Section 300 Reconnaissance and Planning

• 302.2 Exploration Identification Number
  – Number in the cardinal direction
  – Consider mainline first, side road and ramps second
  – Do not repeat numbers
  – Renumber historic explorations
    • EB-56 = E-056-0-00
    • B-24A = B-024-A-97
    • Duplicate historic boring numbers are acceptable
Section 300 Reconnaissance and Planning

- Changed boring planning order; find sampling requirements here
- **302.3 Borings for Evaluation of Existing Pavement Subgrade**
  - GB1 adopted and slightly modified
  - <3.0 feet variation from existing subgrade
  - 6.0 feet below proposed subgrade, continuous sampling
  - Do not terminate boring in $N_{60}<8$ bpf
Section 300 Reconnaissance and Planning

• 302.4 Roadway Borings
  – *Maximum* 400-foot spacing
  – Boring at beginning and end of project
  – Utilize boring locations that contribute to more than one alignment whenever possible
  – Do not terminate boring in $N_{60} < 8$ bpf
Section 300 Reconnaissance and Planning

• **302.4.1 Embankment Foundations**
  – Maximum height of embankment – measure vertically from existing ground line to the proposed ground line

  – Minimum depth = 10’ + ½ embankment height and stiff or medium dense soil
Section 300 Reconnaissance and Planning

- 302.4.2 Section of Cut
  - Defined maximum section of cut
  - Minimum depth of soil = 10’ below grade and last 5’ is stiff or medium dense soil
  - Cut sections involving bedrock – core 10’ below cut at maximum 1000-ft intervals, typically in ditch line
  - More severely weathered rock conditions typically found on sides and ends of a cut
Section 300 Reconnaissance and Planning

- More severely weathered rock conditions are typically found on sides and ends of a cut.
Section 300 Reconnaissance and Planning

- 302.4.3 Sidehill Cut Sections
  - Boring at the back of uphill ditch line
  - Boring at cut line intercept with ground line, 10’ overlap
Section 300 Reconnaissance and Planning

- Sidehill Cut-Fill Sections (>10’) and Sidehill Fill on Unstable Slopes
Section 300 Reconnaissance and Planning

- 302.4.6 Lakes, Ponds, and Low-Lying Areas
  
  “At least one boring at the center of the area in question”

  “Determine the depth of lakes and ponds and the thickness of muck. Determine thickness of soft surface soils in wetlands and low-lying areas.”
Section 300 Reconnaissance and Planning

• **302.4.7 Peat Deposits, Compressible Soils, and Low Strength Soils**
  – Combined peat with compressible and low strength soils
  – No boring spacing requirements – confusing
  – “Locate borings to identify the vertical and lateral extents of areas…”
  – “Consider geophysical or CPT…”
Section 300 Reconnaissance and Planning

- 302.4.8 Uncontrolled Fills, Waste Pits, and Reclaimed Surface Mines
  - Man-Made Fills Renamed Uncontrolled Fills
  - Included Reclaimed Surface Mines
Section 300 Reconnaissance and Planning

• 302.4.9 Underground Mines
  – Contact the DGE
  – Less boring depth and spacing direction
  – Preliminary: 5-20’ below lowest mined interval; additional: 5’ below
  – Consider angled borings and/or geophysical
  – Refer to ODOT AUMIRA
Section 300 Reconnaissance and Planning

• **302.4.10 Landslides**
  - Obtain Offset Borings, if possible
  - Continuous Sampling
  - Consider the Repair
Section 300 Reconnaissance and Planning

• **302.4.11 Karst**
  – Contact the DGE if suspected

• **302.4.12 Proposed Underground Utilities**
  – No Change
Section 300 Reconnaissance and Planning

• **302.5.1 Bridges**
  
  – Depth, \( D \), for borings in soil: \( 30' < D < 100' \)

  – Core 10’ of bedrock where encountered below footing

  – Core additional bedrock if drilled shafts are being considered
Section 300 Reconnaissance and Planning

• 302.5.2 Culverts
  – 3-sided and box: 2 borings, 20’ of 20 blow, >30’ or 5’ bedrock
  
  – Pipe culverts with diameters or spans <10’: use embankment borings; >10’: same as box

  – Bored, jacked, tunneled: at least 2 borings – define the material to be penetrated
Section 300 Reconnaissance and Planning

• 302.5.3 Retaining Walls
  – Still 150’ spacing, walls > 100’ = at least 2 borings
  – Sloping ground – consider borings in front for stability check
  – Back-to-back walls<100’ apart – alternate
  – Wall ≤ 7.5’ high: boring ≥ 2x wall height
Section 300 Reconnaissance and Planning

• 302.5.3 Retaining Walls
  – Wall > 7.5’ high
    • New fill (MSE, Bin, etc.)
      – 20’ of 30 blow below bottom of wall face, not less than 1.5x wall height or 5’ bedrock

    • Existing fill (sheet or soldier pile, tied-back, etc.)
      – 20’ of 30 blow below bottom of wall face, not less than 1x wall height or 5’ bedrock
      – Drilled-in foundation: extend borings below bottom of wall face = 1x wall height, regardless of soil/rock
      – Anchor zone borings as necessary, 1-1.5x wall height behind wall, same spacing, same elevation depth
Section 300 Reconnaissance and Planning

- **302.5.4 Noise Barrier**
  - No difference between sound and soft bedrock
  - 2.5-foot sampling

- **302.5.5 High Mast Lighting Tower**
  - Refer to ODOT Traffic Engineering Manual
  - Nearby roadway and structure borings should be sufficient
  - Otherwise, same as noise barrier
Section 300 Reconnaissance and Planning

- **302.5.6 Buildings and Salt Domes**
  - Minimum of 2 borings if <100’ dimension
  - Additional borings spaced 100 to 150 feet if >100’ dimension
  - At least 10’ below foundation for lightly loaded buildings – maintenance garages
  - At least 20’ below foundation for heavily loaded buildings – salt domes
  - Or bedrock
  - WATCH OUT FOR UNCONTROLLED FILL!
Section 400 Boring, Sampling, and Field Testing

- 401.5 Permits
  - MR505 for work performed in ODOT ROW

- 401.14 Traffic Maintenance
  - Refer to the Typical Application Number from the Ohio Manual of Uniform Traffic Control Devices
Section 400 Boring, Sampling, and Field Testing

- **402 and 403**
  - Separate and update “Method of Advancing Borings” from “Types and Methods of Sampling”
  - 3 Types of samples: disturbed, undisturbed, rock cores
  - Sampling Requirements moved to Section 300
  - **Require the use of automatic hammers except for skid rig**
Section 400 Boring, Sampling, and Field Testing

• 404 SPT Calibration
  – ASTM D4633, calculate a drill rod energy ratio, ER
  – Perform on a yearly basis for each hammer system

  – \( N_{60} = N_m \times (ER/60) \)
  – Record to the nearest whole number
Section 400 Boring, Sampling, and Field Testing

- ODOT Calibration: 1.39 and 1.37

<table>
<thead>
<tr>
<th>SPT Rig No.</th>
<th>(1) Rod Length</th>
<th>(2) Begin Depth</th>
<th>(2) Final Depth</th>
<th>Blows Applied</th>
<th>Average Hammer Rate (bpm)</th>
<th>Average Transf’d Energy (kip-ft)</th>
<th>(3) Average Transfer Ratio (%)</th>
<th>Avg. Max. Compressive Force (kips)</th>
<th>Average Maximum Velocity (ft/sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CME 55</td>
<td>9</td>
<td>5</td>
<td>6.5</td>
<td>15</td>
<td>56.1</td>
<td>0.291</td>
<td>83.2</td>
<td>37</td>
<td>15.0</td>
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<td></td>
<td>14</td>
<td>10</td>
<td>11.5</td>
<td>20</td>
<td>56.8</td>
<td>0.287</td>
<td>82.0</td>
<td>38.8</td>
<td>13.7</td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>15</td>
<td>16.5</td>
<td>86</td>
<td>54.6</td>
<td>0.296</td>
<td>84.4</td>
<td>36.9</td>
<td>12.1</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>20</td>
<td>21.5</td>
<td>52</td>
<td>55.1</td>
<td>0.294</td>
<td>83.9</td>
<td>35.7</td>
<td>11.9</td>
</tr>
<tr>
<td>Overall Average Values:</td>
<td>55.7</td>
<td>0.292</td>
<td>83.4</td>
<td>37.1</td>
<td>13.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| CME 75      | 9              | 5              | 6.5            | 12           | 54.0                      | 0.284                         | 81.1                            | 37.1                            | 15.6                            |
|             | 14             | 10             | 11.5           | 11           | 53.6                      | 0.274                         | 78.3                            | 37.9                            | 14.8                            |
|             | 19             | 15             | 16.5           | 71           | 53.2                      | 0.299                         | 85.3                            | 37.1                            | 12.0                            |
|             | 24             | 20             | 21.5           | 106          | 52.8                      | 0.291                         | 83.0                            | 37.1                            | 12.5                            |
| Overall Average Values: | 53.4          | 0.287          | 81.9          | 37.3                     | 13.7                        |

Notes:
1. Below location of gages
2. Depth below existing ground
3. Computed from the ratio of average transferred energy (EMX) to that of the SPT hammer potential energy of 0.35 kip-ft assuming a drop height of 30 inches
Section 400 Boring, Sampling, and Field Testing

- 405 Size, Identification, Preservation, Handling, and Storage of Samples
  - Much improved detail and reference to ASTM specs
  - Figure 400-1. Rock Core Labeling
  - Preserve rock core to be tested in accordance with ASTM D5079, excluding wax
Section 400 Boring, Sampling, and Field Testing

• 406 Field Tests
  – Expanded to include:
    • Test Pits
    • CPT
    • DCP
    • Pressuremeter
    • Vane Shear
    • Flat Plate Dilatometer
    • Geophysical
    • Void Imaging
Section 400 Boring, Sampling, and Field Testing

- **407 Field Boring Logs and Other Records**
  - Reorganized
  - GPS coordinates of exploration locations
  - Document method and material for backfilling or sealing boreholes
  - Digital rock core photograph required
  - Field test pit log details
Section 500 Instrumentation

• All new
• Includes materials, borehole construction and preparation, installation and reporting details for:
  – Open Standpipe Piezometers
  – Monitoring Wells
  – Inclinometers
  – TDR Cable
Section 500 Instrumentation

- Other instrumentation may include:
  - Pneumatic piezometers
  - Vibrating wire piezometers
  - Extensometers
  - Strain gages

- CONTACT THE DGE
Section 600 Laboratory Testing

- **601 General**
  - Visually describe and determine the moisture content for every soil sample

- **602 Visual Descriptions of Soils**
  - compactness or consistency, color, primary component, modifiers, supplementary descriptive terms (when appropriate), and water content

- Very stiff, mottled brown and yellow silty clay, some sand, little rock fragments, moist
Section 600 Laboratory Testing

- **602.1 Compactness or Consistency**
  - Use $N_{60}$, hand penetrometer preferred for cohesive
  - Use Non-cohesive for non plastic A-4, A-8

- **602.4.1 Organic in Soils Except Peat**
  - Describe organics by characteristics such as smell, texture, staining, color, or presence of organic material

- **602.4.2 Peat Soils**
  - Describe soils composed primarily of plant tissue in various stages of decomposition and having a fibrous to amorphous texture, a dark brown to black color, and an organic odor as a peat
### Section 600 Laboratory Testing

**602.7 Water Content**

<table>
<thead>
<tr>
<th>Term</th>
<th>Criteria</th>
</tr>
</thead>
</table>
| **Dry** | • Soil leaves no moisture when pressed between fingers.  
         • For cohesive soils, is brittle to powdery.  
         • Water content well below the plastic limit |
| **Damp** | • Soil leaves very little moisture when pressed between fingers.  
          • Soil contains a small amount of moisture.  
          • Water content below the plastic limit. |
| **Moist** | • Soil leaves small amount of moisture when pressed between fingers.  
           • Water content above the plastic limit to -3% of the liquid limit. |
| **Wet** | • For cohesive soils, the water content is near or above the liquid limit.  
          • For granular soils, the pore space is filled with water and water can be poured from sample with ease. |
Section 600 Laboratory Testing

- **603.1 ODOT Soil Classification Method**
  - Pulled in from Appendix A
  - Created an A-8 Classification
    - Organic silt (A-8a), organic clay (A-8b), not peat
    - \( \text{LL}_o/\text{LL} \times 100 \leq 75 \)
  - Material classified by visual inspection only
    - Sod and topsoil
    - Pavement or base
    - **UNCONTROLLED FILL – DESCRIBE**
    - Bouldery zone
    - Peat
  - Group Index Value lower bound changed from 1 to 0
Section 600 Laboratory Testing

- **603.2 Testing Requirements**

<table>
<thead>
<tr>
<th>TEST METHOD</th>
<th>AASHTO DESIGNATION</th>
<th>ASTM DESIGNATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Content Determination</td>
<td>T 265</td>
<td>D 2216</td>
</tr>
<tr>
<td>Organic Content by Loss on Ignition</td>
<td>T 267</td>
<td>D 2974</td>
</tr>
<tr>
<td>Particle-Size Analysis</td>
<td>T 88</td>
<td>D 422</td>
</tr>
<tr>
<td>Liquid Limit</td>
<td>T 89</td>
<td>D 4318</td>
</tr>
<tr>
<td>Plastic Limit and Plasticity Index</td>
<td>T 90</td>
<td>D 4318</td>
</tr>
</tbody>
</table>
Section 600 Laboratory Testing

• 603.3 Modifications to Test Methods
  – Perform the organic content by loss on ignition test only on samples visually described as moderately to highly organic or as peat.
  
  – Limit the length of the hydrometer test to two hours
  
  – Determine the liquid limit of silt-clay soils visually described as moderately to highly organic on each sample twice
Section 600 Laboratory Testing

- **603.4 Organic Silts and Clays**
  - Organic silts and organic clays are designated as such when they have sufficient organic content to influence the soil properties

  - Classify as A-8a or A-8b

  - Perform the organic content by loss on ignition test to determine the percent organic content
Section 600 Laboratory Testing

- **603.5 Granular and Silt-Clay Soils Containing Organics**
  - Classify granular soils and silt-clay soils which contain organics but retain 75 percent or more of its liquid limit value after oven drying according to the ODOT classifications A-2 through A-7
  - Verify the organic content of soils containing organic material visually described as moderately to highly organic by performing the organic content by loss on ignition test
Section 600 Laboratory Testing

- Organic Content of Soils

<table>
<thead>
<tr>
<th>Percentage of Organic Matter (By Weight)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 to 4</td>
<td>Slightly Organic</td>
</tr>
<tr>
<td>4 to 10</td>
<td>Moderately Organic</td>
</tr>
<tr>
<td>&gt; 10</td>
<td>Highly Organic</td>
</tr>
</tbody>
</table>
Section 600 Laboratory Testing

• 605 Bedrock Description
  – Overhaul includes much more detail. See Appendix A

• 605.1 General - Visually describe in the following order:
  – bedrock type, color, weathering, strength, texture, bedding, other descriptors, type and condition of discontinuities, unit RQD, and unit loss
  • Sandstone, gray, unweathered, strong, very fine to coarse grained, thick bedded, argillaceous, RQD 90%, Loss 5%
Section 600 Laboratory Testing

• 605.2 Bedrock Type
  – The primary bedrock types encountered in Ohio are: claystone, coal, dolomite, limestone, sandstone, shale, siltstone, and underclay. Refer to Appendix A for a complete listing and brief description of all rock types.

  – When alternating layers occur between two distinct rock types describe the material as “Interbedded” with the major rock type first, with estimated percentage, and the secondary rock type second, with estimated percentage.
### Section 600 Laboratory Testing

- **605.4 Weathering**

<table>
<thead>
<tr>
<th>Description</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unweathered</td>
<td>No evidence of any chemical or mechanical alternation of the rock mass. Mineral crystals have a bright appearance with no discoloration. Fractures show little or no staining on surfaces.</td>
</tr>
<tr>
<td>Slightly Weathered</td>
<td>Slight discoloration of the rock surface with minor alterations along discontinuities. Less than 10 percent of the rock volume presents alteration.</td>
</tr>
<tr>
<td>Moderately Weathered</td>
<td>Portions of the rock mass are discolored as evident by a dull appearance. Surfaces may have a pitted appearance with weathering “halos” evident. Isolated zones of varying rock strengths due to alteration may be present. 10 to 15 percent of the rock volume presents alterations.</td>
</tr>
<tr>
<td>Highly Weathered</td>
<td>Entire rock mass appears discolored and dull. Some pockets of slightly to moderately weathered rock may be present and some areas of severely weathered materials may be present.</td>
</tr>
<tr>
<td>Severely Weathered</td>
<td>Majority of the rock mass reduced to a soil-like state with relic rock structure discernable. Zones of more resistant rock may be present, but the material can generally be molded and crumbled by hand pressures.</td>
</tr>
</tbody>
</table>
Section 600 Laboratory Testing

• Section 605.5: Relative Strength

<table>
<thead>
<tr>
<th>Description</th>
<th>Field Parameters</th>
<th>Range of Unconfined Compressive Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>psi  (ksf)</td>
</tr>
<tr>
<td>Extremely Strong</td>
<td>REMOVED FOR THIS PRESENTATION</td>
<td>Greater than 30,000 (&gt; 4320)</td>
</tr>
<tr>
<td>Very Strong</td>
<td></td>
<td>15,000 to 30,000 (2160 to 4320)</td>
</tr>
<tr>
<td>Strong</td>
<td></td>
<td>7500 to 15,000 (1080 to 2160)</td>
</tr>
<tr>
<td>Moderately Strong</td>
<td></td>
<td>3600 to 7500 (520 to 1080)</td>
</tr>
<tr>
<td>Slightly Strong</td>
<td></td>
<td>1500 to 3600 (215 to 520)</td>
</tr>
<tr>
<td>Weak</td>
<td></td>
<td>750 to 1500 (108 to 215)</td>
</tr>
<tr>
<td>Very Weak</td>
<td></td>
<td>40 to 750 (6 to 108)</td>
</tr>
</tbody>
</table>
Section 600 Laboratory Testing

- 605.6 Texture
- 605.7 Bedding
- 605.8 Descriptors
  - Describe secondary characteristics of bedrock as necessary. Use no more than three characteristics in the description.
- 605.9 Discontinuities

SEE TABLES
Section 600 Laboratory Testing

- **605.10 Rock Quality Designation (RQD)**
  - Determine the RQD value for each core run (Run RQD) and for the total length of each bedrock unit encountered by a boring (Unit RQD)

- **605.11 Core Loss**
  - Calculate any core loss within each core run (Run Loss) and for each rock unit (Unit Loss)
Section 600 Laboratory Testing

- **606 Testing of Rock**
  - From just $q_u$ to:

<table>
<thead>
<tr>
<th>ROCK TESTING</th>
<th>TEST METHOD</th>
<th>ASTM DESIGNATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Slake Durability</td>
<td>D 4644</td>
</tr>
<tr>
<td></td>
<td>Point Load Strength Index</td>
<td>D 5731</td>
</tr>
<tr>
<td></td>
<td>Unconfined Compressive Strength of Intact Rock</td>
<td>D 7012, Method C</td>
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<td>Compressive Strength and Elastic Moduli</td>
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Section 700 Geotechnical Exploration Reports

- 701 General
  - Provide the following:
    - Geotechnical information according to PDP
    - Paper and electronic copy of all geotechnical submissions to the DGE
    - Label 1st version “Draft”
    - After ODOT review/approval, label 2nd version “Final”
Section 700 Geotechnical Exploration Reports

- 701 General
  - Submit final geotechnical documents to the OGE's ftp site at: 
    ftp://ftp.dot.state.oh.us/pub/Geotech/transfer/ (individual company folder)/(project folders) for inclusion in the ODOT GDMS

- Each company will have the ability to upload and download files into their project folders. Include the following in the project folder name:
  - C-R-S
  - PID number
  - Product (Red Flag Study, Preliminary Geotechnical Exploration, Subgrade Exploration, Roadway Exploration, Structure Foundation Exploration, or Geohazard Exploration)

- Submit all electronic documents in their native format

- Use ODOT file naming conventions
Section 700 Geotechnical Exploration Reports

• 702 Soil Profile
  – Example in Appendix D?? – Not yet

• 702.1 Form of Presentation
  – Conform to the ODOT CADD Engineering Standards Manual regarding the size, format, lettering, and file management for the plan sheets
Section 700 Geotechnical Exploration Reports

• 702.2 Scale
  – SSI
    • Length ≤ 1500’ use 1”=50’
    • Length > 1500’ use 1”=100’
  – SGE
    • Length ≤ 1500’ use largest standard horizontal scale to fit on one sheet
    • Length > 1500’ use 1”=50’
    • Cross Sections: More than 1/page if space permits
Section 700 Geotechnical Exploration Reports

- **702.3 Front Sheet**
  - General Information
  - Legend
    - Symbols – only those on project
    - Miscellaneous symbols
    - Number of tests, both visual and mechanical
    - **NO AVERAGE TEST RESULTS**
  - Location Map
  - Index of sheets if >1500’, multiple alignments, cross sections included
Section 700 Geotechnical Exploration Reports

• 702.3.5 Summary of Test Data
  – Present on front sheet if it all fits
  – For each boring, provide:
    • Exploration ID number
    • Coordinates
    • Station and offset
  – For each sample provide:
    • Depth interval
    • Type of sample
    • % Recovery
    • Classification test results – INCLUDE PL
    • ODOT Classification
    • Visual classification, if not tested
Section 700 Geotechnical Exploration Reports

- **702.5.2 Surface Features**
  - Use appropriate symbols and labels as defined in the ODOT CADD Engineering Standards Manual. Otherwise, identify features with text and boundary limits as necessary

- **702.5.4 Surface Contours**
  - Present existing ground surface contours developed for the design project
Section 700 Geotechnical Exploration Reports

- 703 Structure Foundation Exploration
  - Sample in Appendix D – YES, as of March 6, 2007
  - Same as Soil Profile, except:
    - No summary of soil test data
    - No Index of Sheets
    - Scour Analysis, if done, on cover
    - Plan/Profile, same scale as Site Plan, following cover
    - Boring Logs
    - Undisturbed test data following logs
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Section 700 Geotechnical Exploration Reports

• 704 Geohazard Profile

  – Present like a Structure Foundation Exploration at the scale of a Soil Profile
Section 700 Geotechnical Exploration Reports

- 705 Report of Geotechnical Exploration, Findings, and Recommendations. Present information using the following title:
  
  - 705.1 Report Title
  - Preliminary Geotechnical Exploration
  - Subgrade Exploration
  - Roadway Exploration
  - Structure Foundation Exploration
  - Geohazard Exploration – (Identify Type of Geohazard)
Section 700 Geotechnical Exploration Reports

- **705 Report of Geotechnical Exploration, Findings, and Recommendations.** Present information using the following headings:
  - **705.2 Executive Summary**
    - List recommendations that will result in a deviation from CMS and standard practice
  - **705.3 Introduction**
  - **705.4 Geology and Observations of the Project**
  - **705.5 Exploration**
  - **705.6 Findings**
Section 700 Geotechnical Exploration Reports

• **705.7 Analyses and Recommendations**
  – Clearly document analyses which have been performed in order to develop recommendations and factors of safety used
  – Include a diagram(s) showing the section(s) analyzed
  – Present calculations in a logical format
  – Describe how soil and bedrock parameters used in the analyses were determined
  – Acknowledge and explain any discrepancies between these parameters and field or laboratory test data
  – Incorporate special drawings of a size that produce a clear presentation and permit compact and neat folding for inclusion into the report
  – Do not restate ODOT CMS; include only recommended exceptions
Section 700 Geotechnical Exploration Reports

• **705.8 Appendices**
  – Boring plan
  – Boring logs with rock core pictures
  – NO GRADATION CURVES (except for $D_{50}$)
  – Undisturbed test data
  – Calculations
Section 800 Proposal

- A copy of the proposal cost summary form in Excel format can be obtained at [http://www.dot.state.oh.us/CONTRACT/consultant_forms.htm](http://www.dot.state.oh.us/CONTRACT/consultant_forms.htm)

- For all subsurface exploration programs proposed, include:
  - a scaled boring plan, showing all project and historic borings, and a schedule of borings in tabular format. In the schedule of borings, present the following information for each boring:
    - exploration identification number
    - location by station and offset
    - estimated amount of rock and soil. Also show the total of each for the entire program.
SGE Revisions

- What we’re working on for next update:
  - FHWA’s comments!
  - Sample plans
  - CADD Standards
  - Proposal/Invoice
  - Red Flag Summary only
  - Standard boring log
  - Undisturbed test data presentation
  - Electronic submissions
  - Drilling prequalification