



# WisDOT Geotechnical Manual Development

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National Center for Freight & Infrastructure Research & Education  
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16. Abstract <p>The Wisconsin Department of Transportation currently has a Soils Manual and a Geotechnical Bulletin that provides some guidance to Regional staff and consulting engineering firms on departmental policy and procedures. However, these two publications are outdated and need to be completely rewritten. There have been countless changes in technology, analytical procedures, and exploration guidelines since the drafting of the existing documents and they currently have little, if any value in their present form. Geotechnical engineering is one of the most complex fields of civil engineering and it is critical that an up to date manual be available to provide direction and technical guidance to new staff. In addition, increasing amounts of geotechnical work is being performed by engineering consulting firms. A reliable, up to date Geotechnical Manual (GM) is needed to ensure consistency and uniformity in the geotechnical work being performed statewide by non-WisDOT engineers. Such a manual is not intended to be a text book or a substitution for sound geotechnical engineering training, but rather an accumulation of current WisDOT policies, practices and procedures. Its purpose and content is to be very similar to the other essential WisDOT manuals, (e.g. the Facilities Development Manual, Construction and Materials Manual and Bridge Manual), and the GM needs to be coordinated and cross-referenced with them.</p>			
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Capstone Design

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Geotechnical Reports

February 19, 2015



# Geotechnical Reports

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- Purpose
  - To communicate site geotechnical and geological conditions and design and construction recommendations relevant to a proposed project.
  
- Report should be tailored to the purpose of the project and the information and geotechnical parameters needed.

# Geotechnical Reports

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- Many organizations and government entities (State DOTs, Counties, and Municipalities) have guidelines or recommendations for what needs to be in geotechnical reports based on project type.
  - FHWA – *Checklist and Guidelines for Review of Geotechnical Report and Preliminary Plans and Specifications*
  - ASCE – *Geotechnical Baseline Reports for Construction, Suggested Guidelines*
  - Wisconsin DOT – *Geotechnical Bulletin #1 – Instructions on Producing Geotechnical Investigations, Analyzing Data, and Reporting Results.*

# Typical Components of a Geotechnical Reports

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- Introduction
  - Project Background/Understanding
  - Scope of Work
  - Site Investigation
  - Subsurface Conditions
  - Specific Engineering  
Recommendations/Conclusions
  - Construction Recommendations
  - Limitations
  - Figures and Attachments
- Factual data only  
(avoid statements of  
interpretation, analysis,  
recommendations)



# Geotechnical Reports

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- Introduction
  - Typically 1 or 2 paragraphs
  - State the client, project name, high level project overview and what this report is about
- Project Background/Understanding
  - Describe the project in more detail. Provide project information that is relevant to your scope of work.
  - Important to describe your understanding of the project to protect liability, misuse of your data, and avoid confusion.
- Scope of Work
  - Provide brief description of what you were asked to do. Reference original proposal to client.

# Geotechnical Reports

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- Site Investigation
  - Site Description
    - Describe site location, topography, geomorphology, geographic features, historic/current land use, etc.
  - Investigation Program
    - Describe work performed:
      - Type of investigation (boreholes, CPTs, geophysics, etc.)
      - Quantity, depths, locations of investigations
      - Procedures followed (ASTM Standards) and who did work
  - Laboratory/Field Testing
    - Describe test performed (how many, types of tests, what samples, where were they tested, standards)
    - Summary of results of testing

# Geotechnical Reports

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- Subsurface Conditions
  - Geologic Setting
    - Review of public reports or other available data
    - Description of local geology, geohazards that may affect project
  - Geotechnical Conditions Encountered
    - Description of soils, rocks (according to USCS or other classification system)
    - Density/consistency, moisture content, etc.
    - Thickness of units encountered
  - Groundwater Conditions
    - Depth(s), variations, seepage rates

# Geotechnical Reports

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- Specific Engineering Recommendations/Conclusions
  - Results of any engineering analysis (typically part of a larger scope)
  - Recommended engineering properties to use for design (friction angle, hydraulic conductivity, bearing capacity, active/passive pressures, shear strengths, settlement, consolidation, thermal conductivity, etc.)
  - Interpreted lithology or geologic conditions
  - Risk of geohazards (seismic, landslide, flood, etc.)
  - Feasibility of specific engineering project
  - Recommendations on how geotechnical/geological issues affect the site and project

# Geotechnical Reports

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- ❑ Construction Recommendations
  - ❑ Tailored to actual project
  - ❑ Temporary Slopes or Shoring recommendations
  - ❑ Earthwork (subgrade preparation, structural fill placement/compaction recommendations)
  - ❑ Erosion Control
  - ❑ Water Control and Dewatering recommendations
  - ❑ Site access constraints
  - ❑ Recommendations on construction sequencing if appropriate
  - ❑ Identification of items that may affect schedule

# Geotechnical Reports - Figures

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- Limitations
  - Geotechnical Engineers have the highest rate of litigation.
  - Legal statement identifying the limitations of the report to protect the liability of the consultant or engineer.

# Geotechnical Reports - Figures

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- ❑ Site Map
  - ❑ Overview Inset (showing where in state/county)
  - ❑ Appropriate scale to show pertinent site, geographic indicators (major roads, rivers, structures)
  - ❑ Label!, north arrow, scale bar, legend/key
  - ❑ Investigation locations
  - ❑ Project components (i.e. proposed footprints)
- ❑ Geologic cross sections or maps when appropriate
- ❑ Conceptual Design plans when appropriate

# Geotechnical Reports - Attachments

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- Record of Borehole Logs
- Laboratory Testing Results
- Site Photos
- Design Plans
- Engineering Analysis calculations if needed



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# Questions?

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