

Soil - Need to Know

I. The professional will understand the factors of soil development and demonstrate their importance to site evaluations.

- A. Topography
 - 1. Landscape description
 - 2. Landform description
 - 3. Landscape position
- B. Parent materials
 - 1. Lacustrine
 - 2. Ice walled lake lacustrine deposits
 - 3. Alluvium
 - 4. River terrace deposits
 - 5. Glacial outwash
 - 6. Glacial till
 - 7. Loess
 - 8. Organic soils
 - 9. Bedrock
 - a. Weathering
 - b. Soil formation
 - c. Soil horizon development
- C. Climate
 - 1. Precipitation
 - 2. Temperature
- D. Time of soil development
- E. Vegetation and organisms

II. The professional will be able to identify and describe physical and morphological soil properties.

- A. Components of soil
 - 1. Organic matter
 - 2. Pore spaces
- B. Define and determine soil texture
 - 1. Soil separates
 - 2. Soil textural classes
 - 3. Use soil textural triangle to determine soil texture class
 - 4. Field determination of soil texture class
- C. Soil structure
 - 1. Define soil structure
 - 2. Factors influencing soil structure development
 - a. Time
 - b. Physical weathering
 - c. Gluing agent
 - 3. Field identification

- a. Shape
 - b. Grade
 - c. Consistence
- 4. Appropriate sampling procedures
- 5. Significance of soil structure to onsite systems
- 6. Impacts on soil structure
- D. Soil porosity
- E. Soil water movement
- F. Soil colors
 - 1. Influences on soil color
 - 2. Significance of soil color to onsite systems
 - 3. Use of soil color chart
 - a. Hue
 - b. Value
 - c. Chroma
 - d. Natural light conditions
 - e. Moisture
 - 4. Redoximorphic features
 - a. Conditions for formation
 - b. Identification
 - c. Description
 - (1) Concentrations
 - (2) Depletions
 - (3) Gleying
 - d. Limitations
 - 5. Interpretation of soil colors
 - a. Depth to seasonally saturated soil
 - 6. Field determination
 - 7. Mottles
 - a. Any color that differs from the matrix
 - b. Can occur any where in soil
 - 8. Stains and coatings
 - a. Soil component(s) coating soil
 - b. Occur in layers
 - 9. Nodules
 - 10. Other sources of soil color variation
 - a. E horizon formation
- G. Bedrock determination
- H. Lithologic discontinuities
 - 1. Abrupt textural boundary
 - 2. Abrupt structural boundary
 - 3. Abrupt color boundary
- I. Role of soil survey in site evaluation
 - 1. General landscape, landform, and parent material(s)
 - 2. Ranges of field and laboratory determined soil properties
 - 3. Use and management limitations

- J. Soil variability
- K. Disturbed soils
 - 1. Identification
 - 2. Determination
 - 3. Interpretation
 - 4. Solutions

III. The professional will be able to identify and describe the following external landscape features.

- A. Landscape position
 - 1. Identification
 - 2. Significance
- B. Slope
 - 1. Determination
 - 2. Significance
- C. Vegetation
 - 1. Identification
 - 2. Significance
- D. Flooding
 - 1. Determination
 - 2. Significance

IV. The professional will be able to demonstrate knowledge and apply the site evaluation procedures.

- A. Preliminary evaluation
 - 1. Easements and property lines
 - 2. Ordinary high water level of public water
 - 3. Floodplain designation and flooding elevation
 - 4. Soil survey determination of applicable characteristics
 - 5. Legal lot description
 - 6. Wellhead protection area
- B. Field evaluation
 - 1. Site restrictions
 - a. Utilities
 - b. Trees
 - 2. Setbacks - located, mapped and displayed on site plan
 - a. Well
 - b. Property lines
 - c. Building
 - d. Water lines
 - e. Easements
 - 3. Surface features
 - a. Vegetation
 - b. Slope percent and direction

- c. Disturbed or compacted soil
- d. Flooding or run-on potential
- e. Landscape position
- 4. Gopher state one call
 - a. Public utilities
 - b. Private utilities
- 5. Soil investigation equipment
 - a. Probe
 - b. Auger
 - c. Soil pit
- 6. Soil investigation procedure
 - a. Stake borings in system area
 - b. Elevation for each boring recorded
- 7. System sizing
 - a. sizing by morphology
 - b. Soil sizing by percolation tests/permeameter
- 8. Site protection
- 9. Site evaluation reporting requirements
 - a. Preliminary and field evaluations
 - b. All dates of work completed
 - c. Site map drawn to scale
 - d. Depth to seasonally saturated soil, limiting condition, standing water table or flooding elevation
 - e. Elevation of soil treatment system bottom
 - f. Final soil sizing factor
 - g. Potential construction issues
 - h. Certified statement of the site evaluator