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# Geotechnical Report

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## A. Geotechnical Report

The results of the explorations and laboratory testing are usually presented in the form of a geology and soils report. This report should contain sufficient descriptions of the field and laboratory investigations performed, the conditions encountered, typical test data, basic assumptions, and the analytical procedures utilized; to allow a detailed review of the conclusions, recommendations, and final pavement design. The amount and type of information to be presented in the design analysis report should be consistent with the scope of the investigation. For pavements, the following items (when applicable) should be included and used as a guide in preparing the design analysis report:

1. A general description of the site, indicating principal topographic features in the vicinity. A plan map should show surface contours, the locations of the proposed structure, and the location of all borings.
  2. A description of the general geology of the site, including the results of any previous geologic studies performed.
  3. The results of field investigations, including graphic logs of all foundation borings, locations of pertinent data from piezometers (when applicable), depth to bedrock, and a general description of the subsurface materials based on the borings. The boring logs or report should indicate how the borings were made, the type of sampler used, and any penetration test results, or other field measurement data taken on the site.
  4. Groundwater conditions, including data on seasonal variations in groundwater level and results of field pumping tests, if performed.
  5. Computation of the resilient modulus for the total vertical and horizontal stresses using the constitutive relationship.
  6. A generalized soil profile used for design, showing average or representative soil properties and values of design shear strength used for various soil strata. The profile may be described in writing or shown graphically.
  7. Recommendations on the type of pavement structure and any special design feature to be used, including removal and replacement of certain soils and stabilization of soils or other foundation improvements, and treatments.
  8. Basic assumptions, imposed wheel loads, results of any settlement analyses, and an estimate of the maximum amount of swell to be expected in the subgrade soils. The effects of the computed differential settlement, and also the effects of the swell on the pavement structure, should be discussed.
  9. Special precautions and recommendations for construction techniques. Locations at which material for fill and backfill can be obtained should also be discussed as well as the amount of compaction required and procedures planned for meeting these requirements.
- In summary, the horizontal and vertical variations in subsurface soil types, moisture contents,

densities, and water table depths should be identified for both new and existing pavements. FHWA Report No. FHWA-RD-97-083 (VonQuintus and Killingsworth 1997) provides general guidance and requirements for subsurface investigations for pavement design and evaluations for rehabilitation designs. Each soil stratum encountered should be characterized for its use to support pavement structures and whether the subsurface soils would impose special problems for the construction and long-term performance of pavement structures.

## B. References

VonQuintus, H.L. and B.M. Killingsworth. *Design Pamphlet for the Determination of Design Subgrade in Support of the 1993 AASHTO Guide for the Design of Pavement Structures*. McLean, VA: Publication No. FHWA-RD-97-083. 1997.

### Additional Resources:

Geotechnical Bulletin. *Plan Subgrades*. Ohio: Ohio Department of Transportation Division of Planning. 2003.

Mayne, P.W., B.R. Christopher, and J. DeJong. *Subsurface Investigation*. Washington, DC: National Highway Institute Federal Highway Administration, Report No. FHWA-NHI-01031, U.S. DOT. 2002.

Skok, E.L., E.N. Johnson, and M. Brown. *Special practices for design and construction of subgrades in poor, wet, and/or saturated soil condition*. Minnesota: Report No. MN/RC-2003-36, Minnesota Department of Transportation. 2003.