

Appendix B. Infiltration Testing

B.1 General Notes Pertinent to All Geotechnical Testing

A geotechnical report is recommended for all underground BMPs, including infiltration-based practices, filtering systems, ponds and wetlands. The following should be taken into account when producing this report:

- ✧ Testing should be conducted by a qualified professional such as a professional engineer, soils scientist, or geologist.
- ✧ Soil boring or test pit information should be obtained from at least one location on the site. However, the location, number, and depth of borings or test pits should be determined by a qualified professional, and be sufficient to accurately characterize the site soil conditions.
- ✧ Depth to the ground water table and estimated depth to the seasonally high ground water table should be included in the boring logs/geotechnical report.
- ✧ The geotechnical report should include soil descriptions from each boring or test pit. Based upon the proposed development, the geotechnical report also may include evaluation of settlement, bearing capacity, and slope stability of the proposed structures.
- ✧ All soil profile descriptions should provide enough detail to identify the boundary and elevations of any problem (boundary/restrictions) conditions such as fills and seepage zones, type and depth of rock, etc.
- ✧ In addition to the testing recommendations described above, infiltration tests should be performed for all BMPs which rely upon infiltration, including permeable pavement systems, bioretention, infiltration, and dry swales. Specific recommendations for infiltration testing are discussed below.

B.2 Initial Feasibility Assessment

The feasibility assessment is conducted to determine whether full-scale infiltration testing is necessary, screen unsuitable sites, and reduce testing costs. However, a designer or landowner may opt to skip the initial feasibility assessment at his or her discretion, and begin with soil borings.

The initial feasibility assessment typically involves existing data, such as the following:

- ✧ On-site septic percolation testing, which can establish initial rate, water table, and/or depth to bedrock
- ✧ Previous geotechnical reports prepared for the site or adjacent properties
- ✧ Natural Resources Conservation Service (NRCS) Soil Mapping

If the results of initial feasibility assessment show that a suitable infiltration rate (greater than 0.3 inches per hour) is possible or probable, then test pits should be dug or soil borings drilled to verify the infiltration rate.

B.3 Test Pit/Boring Recommendations for Infiltration Tests

1. Excavate a test pit or drill a standard soil boring to a depth of 2 feet below the proposed facility bottom.
2. Determine depth to groundwater table (if within 2 feet of proposed bottom), and the estimated seasonally high groundwater table.
3. Determine Unified Soil Classification (USC) System textures at the proposed bottom and 2 feet below the bottom of the BMP.
4. The soil description should include all soil horizons. If any of the soil horizons below the proposed bottom of the infiltration practice appear to be a confining layer, additional infiltration tests should be performed on this layer (or layers), following the procedure described below.
5. The location of the test pits or borings shall correspond to the proposed BMP locations.

At least one test pit should be dug or encased soil boring drilled for each proposed infiltration-based BMP. For larger practices, additional test pits or soil borings are recommended for infiltration testing, as described in Table B.3-1.

| Table B.3-1. Number of Infiltration Tests Required per BMP | |
|---|--|
| Area of Practice (ft²) | Minimum Number of Test Pits/Soil Borings |
| < 1,000 | 1 |
| 1,000–1,999 | 2 |
| 2,000–9,999 | 3 |
| ≥ 10,000 | Add 1 test pit/soil boring for each additional 5,000 ft ² of BMP. |

When more than one test pit or boring is necessary for a single BMP, the pit or boring locations should be equally spaced throughout the proposed area of the practice, as directed by the qualified professional. The reported infiltration rate for a BMP should be the median or geometric mean of the observed results from the soil boring/test pit locations.

B.4 Infiltration Testing Requirements

The following tests are acceptable for use in determining soil infiltration rates. The geotechnical report should include a detailed description of the test method and published source references:

- ✧ Well Permeameter Method (USBR 7300-89)
- ✧ Tube Permeameter Method (ASTM D 2434);
- ✧ Double-Ring Infiltrometer (ASTM D 3385);
- ✧ Other constant head permeability tests that utilize in-situ conditions and are accompanied by a recognized published source reference.
- ✧ Falling head tests may be substituted for constant head tests at the discretion of the qualified professional overseeing the infiltration testing. If a falling head test is used, the measured rate must be adjusted, as appropriate, based on the depth of water each time a measurement is taken during head depth used in the test.