

# **Appendix O      Geotechnical Information Requirements for Underground BMPs**

## **O.1    General Notes Pertinent to All Geotechnical Testing**

A geotechnical report is required for all underground stormwater best management practices (BMPs), including infiltration-based practices, filtering systems, and storage practices, as well as stormwater ponds and wetlands. The following must be taken into account when producing this report.

- Testing is to be conducted by a qualified professional. This professional shall either be a registered professional engineer, soils scientist, or geologist and must be licensed in the District of Columbia.
- Soil boring or test pit information is to be obtained from at least one location on the site. However, the location, number, and depth of borings or test pits shall 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 must be included in the boring logs/geotechnical report.
- Laboratory testing must include grain size analysis. Additional tests such as liquid limit and plastic limit tests, consolidation tests, shear tests and permeability tests may be necessary based on the discretion of the qualified professional.
- The geotechnical report must include soil descriptions from each boring or test pit, and the laboratory test results for grain size. Based upon the proposed development, the geotechnical report may also 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 requirements described above, infiltration tests must be performed for all BMPs in which infiltration will be relied upon, including permeable pavement systems, bioretention, infiltration, and dry swales. Specific requirements for infiltration testing are discussed below.

## **O.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.; or
- Natural Resources Conservation Service (NRCS) Soil Mapping.

If the results of initial feasibility assessment show that a suitable infiltration rate (typically greater than 0.5 inches per hour) is possible or probable, then test pits must be dug or soil borings drilled to verify the infiltration rate.

### **O.3 Test Pit/Boring Requirements for Infiltration Tests**

- a. Excavate a test pit or drill a standard soil boring to a depth of 2 feet below the proposed facility bottom.
- b. Determine depth to groundwater table (if within 2 feet of proposed bottom), and the estimated seasonally high groundwater table.
- c. Determine Unified Soil Classification (USC) System textures at the proposed bottom and 4 feet below the bottom of the BMP.
- d. Determine depth to bedrock (if within 2 feet of proposed bottom).
- e. The soil description must 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 must be performed on this layer (or layers), following the procedure described below.
- f. The location of the test pits or borings shall correspond to the BMP locations; test pit/soil boring stakes are to be left in the field for inspection purposes and shall be clearly labeled as such.

At least 1 test pit must be dug or encased soil boring drilled for each proposed infiltration-based BMP. For larger practices, additional test pits or soil borings are required for infiltration testing, as described in Table O.1 below.

**Table O.1 Number of Infiltration Tests Required per BMP**

Area of Practice (ft <sup>2</sup> )	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 <sup>2</sup> of BMP.

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

#### **O.4 Infiltration Testing Requirements**

The following tests are acceptable for use in determining soil infiltration rates. The geotechnical report shall 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.

An infiltration test does not require ground water quality protection approval if

- the test is conducted to a depth of fifteen feet or less below the ground surface, and
- a Professional Engineer licensed in the District of Columbia certifies the infiltration rate and that the test was carried out in compliance with this guidance and accepted professional standards.

Note: If the infiltration testing procedure reveals smells or visual indications of soil or groundwater contamination then the boring or test hole must be filled in accordance with wellhead protection best practices, unless laboratory analysis determines groundwater or soil is not contaminated, as defined in the District of Columbia Brownfield Revitalization Act of 2000, as amended (D.C. Official Code §§ 8-631 et seq).

#### **O.5 Infiltration Restrictions**

If a Phase I Environmental Site Assessment determines that site contamination is likely, or if DDOE is aware of the presence of a brownfield or historic hotspot uses, such as current or previously existing leaking underground storage tanks (LUSTs), gas stations, or asphalt plants, an impermeable liner must be used for BMPs, and infiltration is restricted. If a Phase II Environmental Site Assessment is performed, and a qualified professional determines that the use of infiltration-based practices will not increase the likelihood of groundwater contamination, infiltration is not restricted. If there is no evidence of a history of contamination, impermeable liners are not required, and infiltration is not restricted.

