



**ROANOKE COUNTY DEVELOPMENT  
SERVICES**  
**Office of Building Safety**  
**COUNTY EXPANSIVE SOILS POLICY &  
PROCEDURES**  
**Commercial & Residential Projects**



### **INTRODUCTION**

Generally, expansive or "shrink-swell" type soils are those that are high in clay content and change volume with variations in moisture content. Expansive clay particles are invisible to the naked eye and swell by absorbing large amounts of water relative to their volume. When these particles dry out, they can shrink considerably. Most of us have seen expansive clays at work when they dry out and crack open in the bottom of a mud puddle in the summer heat. When winter rains fall on the dry, cracked ground, the clays swell; the cracks close; and the ground can heave up as much as several inches. Each year in the United States, expansive soils cause billions of dollars in damage to buildings, roads, pipelines, and other structures. This is more damage than that caused by floods, hurricanes, tornadoes, and earthquakes combined!

A home built on expansive soil will probably move if the foundation was not designed to take this soil type into account. Movement occurs because the soils expand so forcefully, the foundation actually moves. Different parts of the house can move at different rates and distances, thus cracking the foundation. Significant cracks often appear at the corners of windows and doors, in walls, garage slabs, walkways, and driveways. Doors and windows may become jammed. The "looks" of a home could be affected. During extreme drought conditions, even homes that are not normally affected by expansive soil problems may experience slight cracking.

Expansive soils can affect homes with suspended wood floors as well as those with concrete slab floors. Most of the movement occurs at the outside walls of a building, but the inside of a house can move if water finds its way under the house when it rains, through landscape watering or through a plumbing leak.

### **CODE REQUIREMENTS**

The 2021 International Building Code (IBC) requires the building official of any locality which has identifiable soils of expansive, compressible, shifting or unknown characteristics, to make a determination as to when soils testing shall be required. Such areas are identified in Roanoke County by the current soil survey performed by the United States Department of Agriculture.

### **POLICY**

Parcels whose county Tax ID # begins with any of the following numbers are considered to be located in a potential expansive soil area and are required to submit a soils test report from a qualified testing agency prior to issuance of a permit involving new construction or an expansion of existing construction

**1-23, 25-33, 35-41, 43-50, 54-56, 63-74, 76-77, 80, 87-88, 97**

If expansive soils are confirmed, submission of a foundation design prepared by a registered professional engineer is required prior to permit issuance. The design engineer will also be required to certify that the foundation has been installed per the design.

## **TESTING REQUIREMENTS**

1. The following minimum requirements shall be applicable to soils analysis reports prepared for a single lot to obtain a building permit:
  - a. A minimum of two soil borings per site shall be taken within the footprint of the proposed structure.
  - b. The minimum depth of test borings shall be five feet or to auger refusal on non-shrink/swell geologic strata. The investigation shall extend a minimum of 12 inches below the recommended footing depth unless auger refusal is encountered.
  - c. A sample which exhibits the "poorest" observed soil quality from each lot within a zone 0" to 12" below the proposed bottom of the footing, shall be taken for laboratory testing.
2. Report requirements:
  - a. The investigator shall provide soil bore logs of all soil bores or pits investigated at the site.
  - b. The report information shall include a site sketch to a scale which identifies a bore hole or pit locations and documents the location of the lot or parcel being investigated.
  - c. The report shall contain a tabulation of all laboratory test results obtained from samples collected from the site.
  - d. The report shall contain the signature and professional seal of the individuals who perform and/or supervise the field testing, laboratory testing and report preparation. (Laboratory test procedures shall, as a minimum, contain one set of index parameters which are performed using ASTM test procedures or a County approved test method). ASTM unified soil classification is not acceptable as a test standard for purposes of this policy.

## **SUBDIVISIONS**

As an alternative to the individual lot study method described above, a preliminary soil study may be performed by a qualified Geotechnical Engineer for all new subdivisions or expansions of existing subdivisions. Based on this study, further testing may be required on individual lots where deemed necessary and at a frequency prescribed by the Geotechnical Engineer. Such recommendations shall be included in the study and submitted to the building commissioner.

## **APPLICABILITY**

Testing is required for new commercial and residential construction in identified areas. Additions are excluded from testing provided there has been no evidence of soils-related damage to the existing structure. Testing is not required for detached accessory structures. The building department may require testing for any soil condition of a questionable nature or to verify proposed design documents.