PYRITE CONTAMINATION IN BACKFILL

Applicable sections of the Technical Manual

- Section 1 - Ground Conditions
- Appendix C.1 – Materials, Products, and Building Systems

Background

Pyrite (FeS2-Iron Sulphide) is a very common mineral. Traces of it are found in the sedimentary rock used to make crushed stone for backfill.

In the presence of humidity and oxygen, pyrite oxidizes and produces sulphuric acid. Pyrite oxidation also leads to the formation of gypsum crystals which increase in volume. This increase in volume can lead to backfill swelling which in turn may damage any concrete slabs, foundations or other structures that are laid on top of the backfill.

There are no specific guidelines for visual detection of pyrite in hard-core filling. The qualitative method of detection is by chemical analysis.

Performance requirements

The designer shall ensure the suitability of the ground conditions for the purpose of supporting the development, by carrying out necessary site investigations including chemical analysis of soils to ensure that there are no harmful contaminants or hazards, which could cause deterioration of any element of the development.

Further information can be found within the 'Ground Conditions' section of our Technical Manual.

Guidance

Where backfill is specified it should be certified by a competent laboratory that they are of a suitable nature and quality in relation to the purpose and conditions of their use. They should be chemically analysed to check if such materials contain any chemicals, which should also include the petrographic indicator of swelling potential.

The Petrographic Swelling Potential Indicator (PSPI) varies from 0 to 100 but is not a percentage. It is intended to be a visual evaluation of the sulphatic swelling potential of the materials used.

The following figures present the petrographic swelling potential that may generally be associated with the different PSPI values:

0 – 10	Negligible	41 – 60	Medium to high
11 – 20	Low	61 – 80	High
21 – 40	Low to medium	81 – 100	Very high

Any materials with a PSPI in excess of 20 will not be acceptable for Warranty purposes.

Additional References:

Building Regulations:	Regulation 7: Materials and Workmanship. Approved Document C
BRE Digest DG 522:	Hard-core for supporting ground floors of buildings: Part 1: Selecting and specifying materials Part 2: Placing hard-core and the legacy of problem materials (Replaces BRE Digest 276 which has been withdrawn)