

SOILS AND HYDROLOGY

Soils are the interface between the land and water. What happens in the upper metre of the ground is crucial to issues such as surface water flooding, aquifer recharge and water quality. Soil surveys can provide key detailed information to improve assessments of site hydrology.

HYDROLOGY OF SOIL TYPES

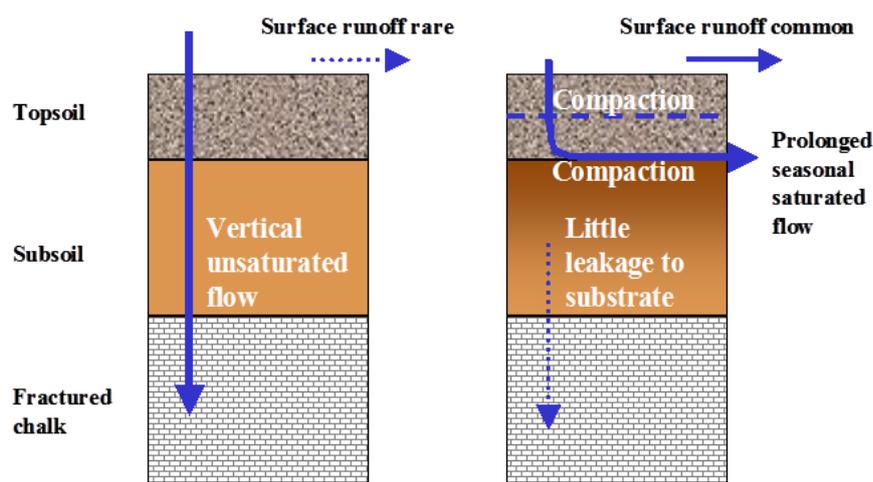
Natural soils in the UK can be divided into three broad hydrological groups:

1. Slowly permeable soils – these soils have poorly-structured subsoil layers which restrict the downward movement of water, resulting in waterlogging. This drainage restriction is difficult to remove.
2. Groundwater-affected soils – these soils are usually formed in permeable materials in low-lying positions where groundwater is near the land surface. If the groundwater table can be artificially lowered, these soils usually become freely-draining.
3. Freely-draining soils – these soils are permeable and unaffected by groundwater.

SOILS AND FLOODING

Three important properties determine the soil impact on flooding:

1. The ability of a soil profile to let rainfall **infiltrate** into the soil surface
2. The volume of water that the soil profile can **absorb** before it becomes saturated, and
3. The speed at which water **percolates** through the soil voids and matrix towards groundwater or surface water courses.



Effect of topsoil compaction on the hydrological response of a permeable soil over chalk.

Development of greenfield sites results in an increase in impermeable surfaces, which adversely affects local surface water flooding risk. Properly assessing the impact of such development requires an understanding of baseline drainage properties. Under modern planning regulations, the impact of development on flood risk needs to be quantified and effectively mitigated.

Soil degradation can have disastrous effects when heavy rainfall occurs and has contributed to increased regularity of severe flooding in the UK in recent years.

Some of the most significant impacts on soil physical properties occur as a result of construction and mineral extraction. Both activities usually involve soil stripping, storage and restoration.

Poor soil management during construction can often result in added surface water flooding by causing structural damage which reduces the capacity of greenspace areas to absorb rainfall.



Effect of compaction during heavy rain – muddy discharges to watercourses.

HOW CAN SOIL SURVEY HELP?

The important role of soils is recognised in the planning system, which requires that a detailed soil survey is undertaken and a soil management plan developed for sites. Soil management plans provide detailed advice on different soils types within a site and specific management techniques to prevent damage.

An assessment of the impact of the development on flooding is also a requirement of the planning system. By using the information gained from the detailed soil survey and soil management plan a high resolution map of ground conditions can be produced. This map provides a much more accurate picture of a site's hydrology and can be used to specifically target flood risk mitigation measures such as SUDS, swales and soakaways.



Compaction-induced waterlogging on restored urban greenspace

WE ARE HERE TO HELP

Envireau Water specialise in all aspects water management and working with our associates at Land Research Associates, who offer comprehensive soil resource surveys, we are able to use their findings to provide detailed information on the potential for surface water storage and infiltration within different areas of a site to improve runoff and provide flood risk assessments to maximise the value of the site layout.

Visit our website for more information.

www.envireauwater.co.uk

