

Basic Knowledge Hydrogeology



What is hydrogeology?

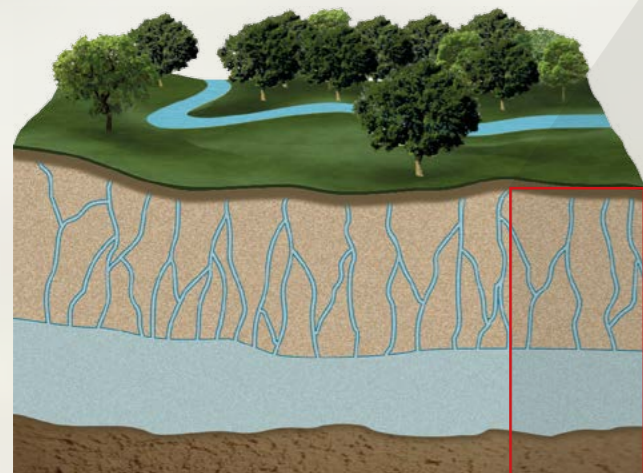
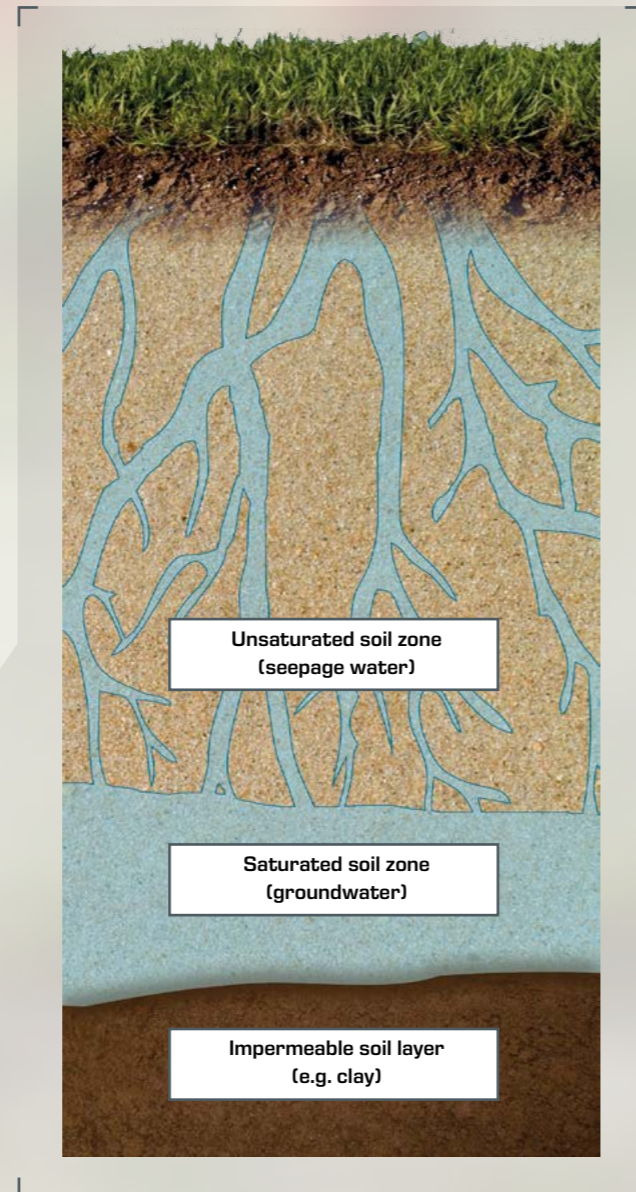
Hydrogeology is an applied discipline of geosciences. Unlike hydrology, which deals with above-ground water, hydrogeology covers all aspects which are related to water contained in the ground. These include the following topics in particular:

- seepage and storage of precipitation
- flow processes in soils (e.g. seepage flows)
- regeneration, flow and pumping of groundwater
- drainage measures
- impact of construction on the hydrogeological conditions in the ground

Flow processes in soils

Flow processes in soils are of central importance in hydrogeology. Such flow processes take place in different soil layers. We must always distinguish between the unsaturated and saturated soil zones. The upper layer is usually not completely saturated with water, so some pores also contain air. Below this region is a soil zone whose pores are completely filled with water. This zone is therefore also referred to as the saturated soil zone.

Basic knowledge of these topics is necessary, for example in the exploration, evaluation and use of groundwater resources. Other applications include the protection of groundwater through safeguarding and remedial measures and the drainage of precipitation.



Groundwater: vital reservoir

Groundwater is underground water which fills the pores of the earth's crust and whose possibility for movement is determined solely by the force of gravity. Groundwater fulfils many important functions, for example as a reservoir for drinking water production. Furthermore, an intact groundwater table is an important component of the global water cycle.

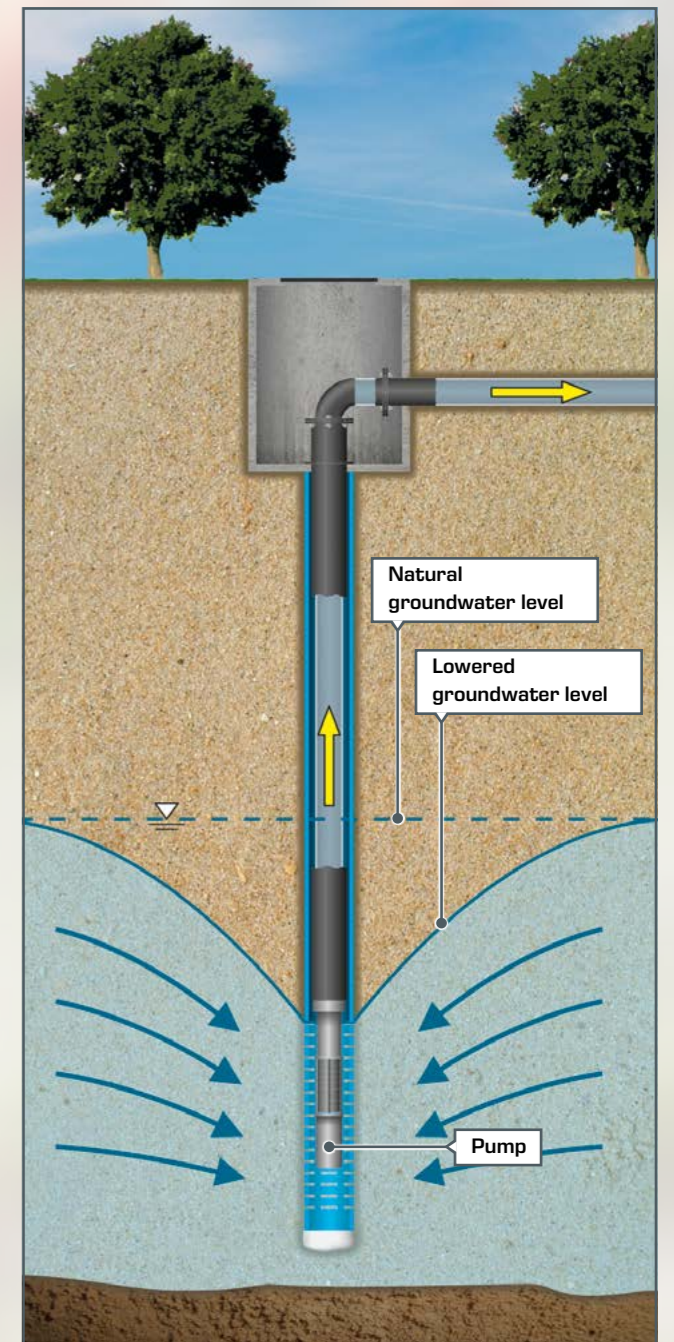
Interventions in hydrogeology

In the past, the improper handling of chemicals has allowed many toxic substances to enter groundwater. The aim of sustainable environmental engineering is therefore to provide a sustainable use of groundwater whilst largely avoiding the harmful effects on the groundwater table at the same time. Where contaminants have already entered the groundwater, safeguarding or remedying of the affected area is required to prevent further spread of the contamination.

Many structural measures affect hydrogeological conditions in the soil. Therefore such construction projects require solid hydrogeological knowledge and must be planned with great care.

For example, the extraction of groundwater by production wells results in a funnel-shaped lowering of the groundwater level.

In structures where flow passes underneath or through, such as sheet piles and dams, exact knowledge of the course of seepage flows is a crucial factor in the stability of the structures. Such structures must therefore be realised while taking the hydrogeological impact into account.



Depression cone in the extraction of groundwater