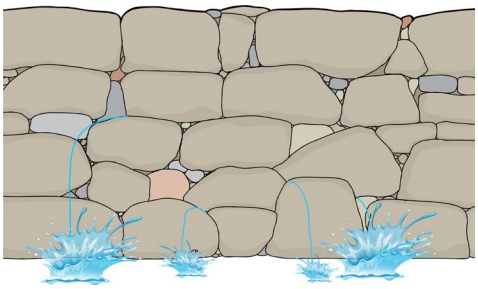
Info Sheet

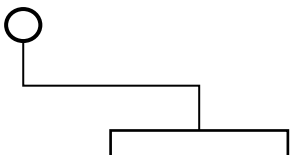
WHAT IS A BREACH?



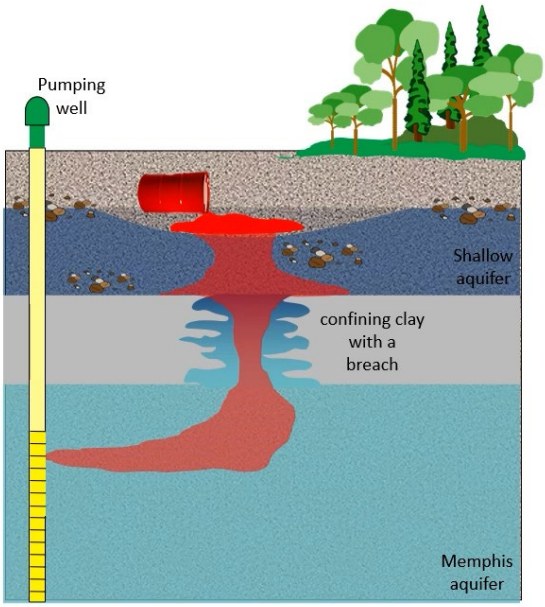
The term **breach** is not foreign to us. We hear of it in different contexts: there is a breach in the dam, we have a breach in the security perimeter, and when we talk about groundwater, there is a breach in the protective clay to our drinking water aquifer.

Many people rely on drinking water from the deep, regional Memphis (or Sparta) aquifer. In many places, including much of Shelby County, TN, the Memphis aquifer is **protected** from contamination by a clay layer that sits on top of it. However, there are **naturally occurring** breaches in this protective clay layer that allow water of poorer quality to **pass through easily**.

We say naturally occurring because these breaches are not man-made. We observe that the majority of breaches are **paleochannels** and that a lesser number are the result of faulting (from ancient earthquakes).



Paleochannel /pālēō · CHanl/ – an ancient river scar remnant usually cut into into another geologic material.



We define breaches as **confirmed** or **suspected**. A confirmed breach is defined using a variety of data AND is validated by drilling through it to *confirm* there is no clay (*left image*). A suspected breach is suggested by one or more pieces of data, only. **Data** can be: (1) an anomalous water table depression; (2) interpretation of drilling records; (3) geophysical subsurface mapping; (4) signatures to water quality change; and (5) others.

Because breaches allow for **water of poorer quality** and **contaminants** to bypass the protective nature of a confining clay, locating them and characterizing their shape and material composition is critical. However, because they exist in geologic layers underground, finding them can be difficult. Scientists use the different methods (data) listed above to determine where a breach may exist before drilling.