ENVIRONMENTAL GEOLOGY - Flow Nets

The Water Table, Flow Nets and Groundwater Flow

Water table contour lines (or flow lines) are similar to topographic lines on a map. They essentially represent "elevations" in the subsurface. These elevations are the hydraulic head. (see module 7 - part 2)

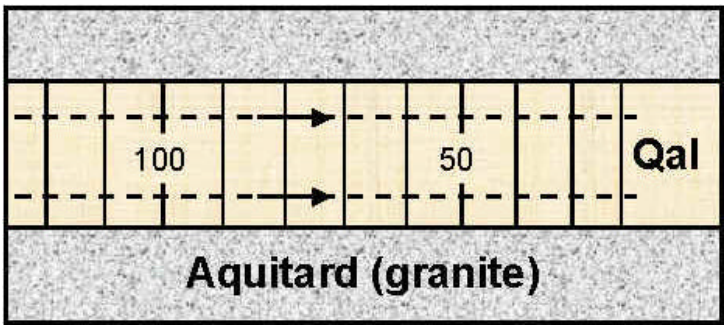
Water table contour lines can be used to tell which way groundwater will flow in a given region. Lots of wells are drilled and hydraulic head is measured in each one. Water table contours are drawn that join areas of equal head (like "connect-the-dots"!). These water table contours lines are also called **equipotential lines**.

The map of contour lines is called a **flow net**. Remember, groundwater always moves from an area of higher hydraulic head to an area of lower hydraulic head, and perpendicular to equipotential lines.

Some flow net sketches that will help clarify the relationships between aquifer matrix, and groundwater movement

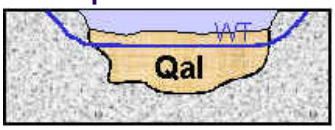
Qal	**=**	**Quaternary alluvium**
_____	**=**	**WT Contour**
---------- >	**=**	**Flow Direction**
o	**=**	**Producing Well**

1.

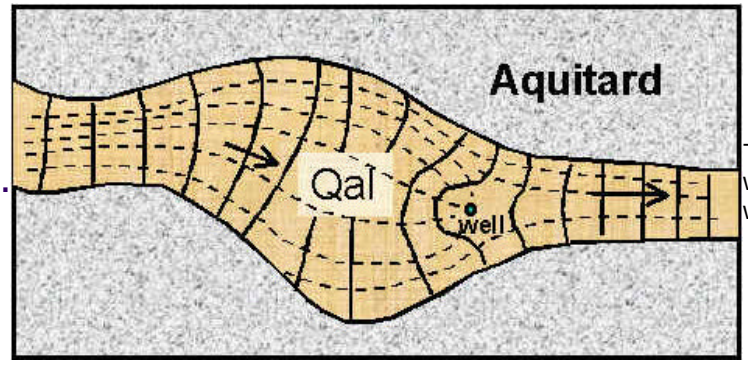


A simple flow net.

Cross-profile view:

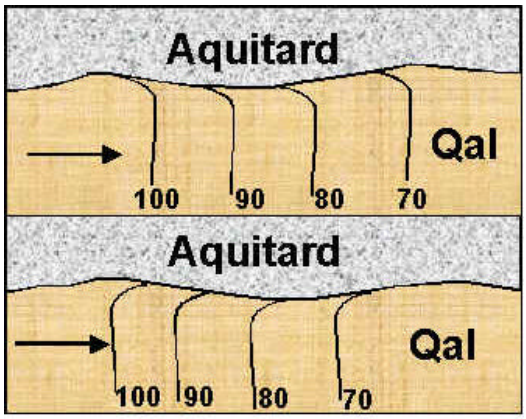


2.



The effect of a producing well in a narrow, variable width, aquifer.

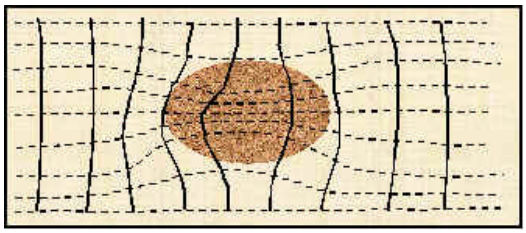
3.



Water is moving from Qal to granite.

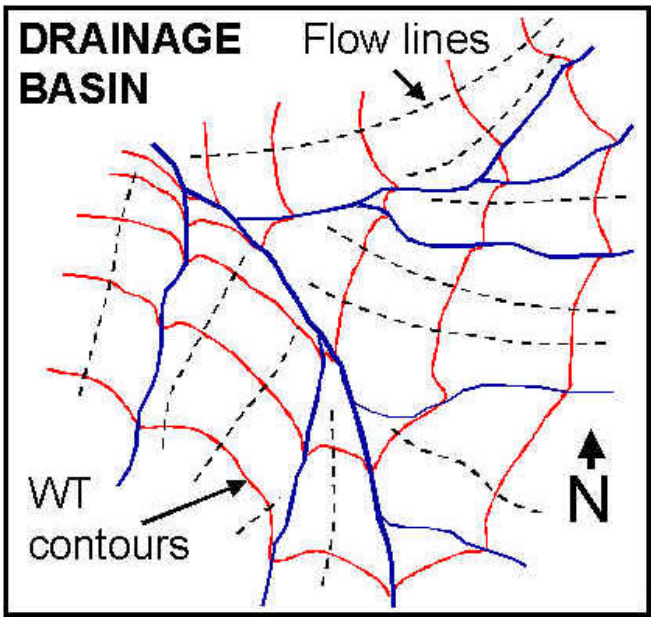
Water is moving from Granite to Qal.

4.

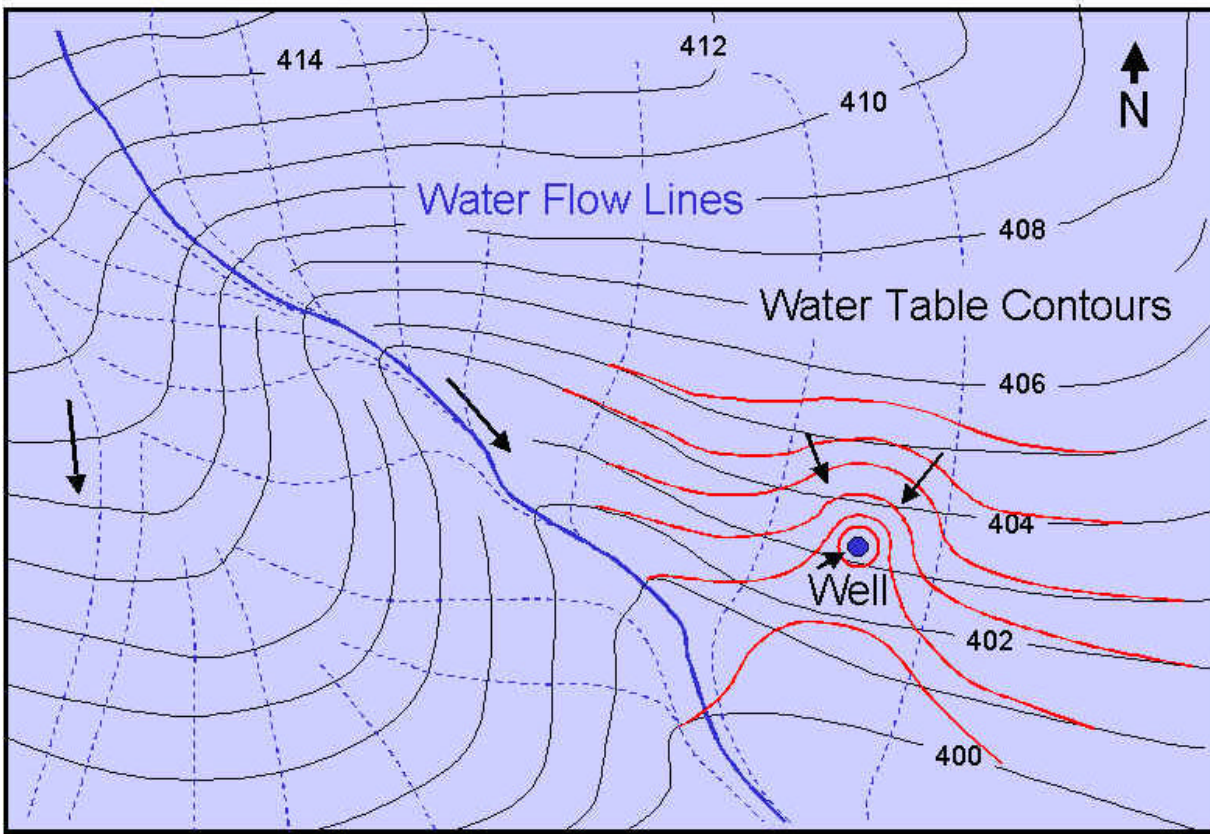


An area of high permeability (ellipse in brown). Distorted contours may occur due to anisotropic conditions (changes in aquifer properties from one place to the next).

5.



An example drainage basin.



Groundwater Flow Net

Red lines indicate positions of water table contours when well is pumping. (How would a downslope cross-section appear if drawn straight through the well?)