Groundwater Cycle

V2.4: Piezometric Maps

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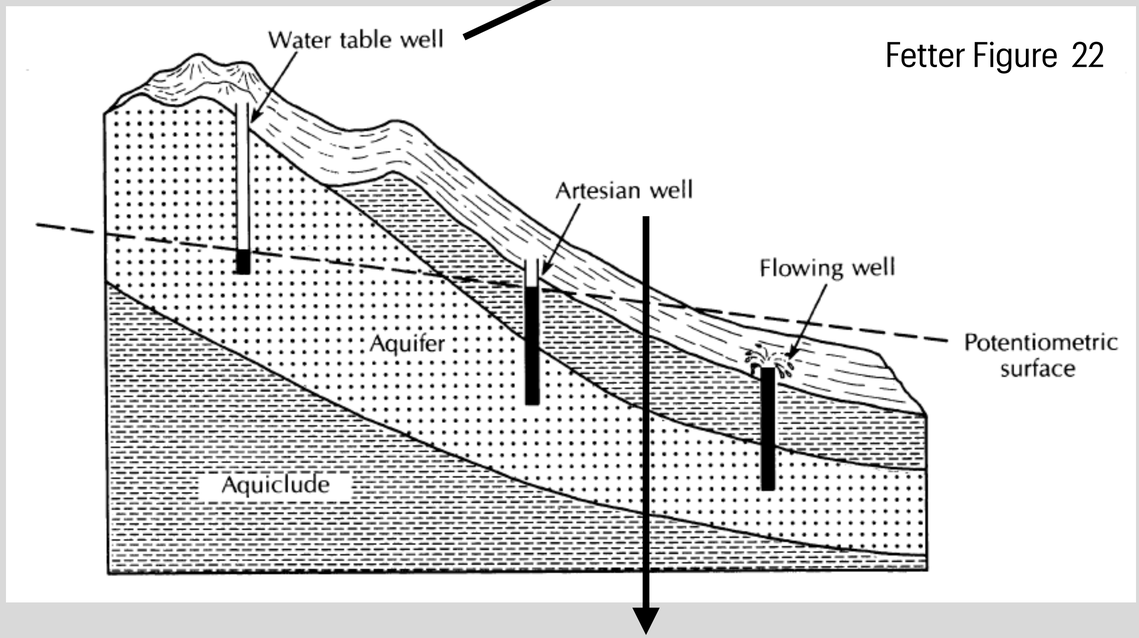
Groundwater Cycle Course

2.4: Piezometric Maps

Groudwater level maps: we need water levels in a number of wells!

Piezometric maps

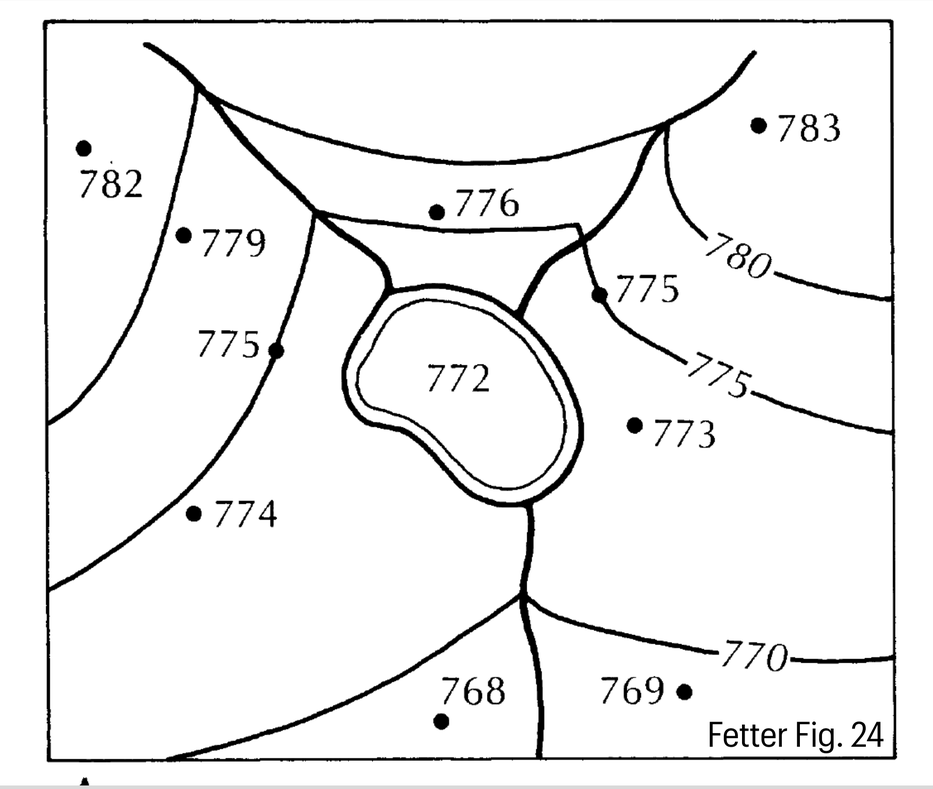


Potentiometric maps

2.4: Piezometric Maps

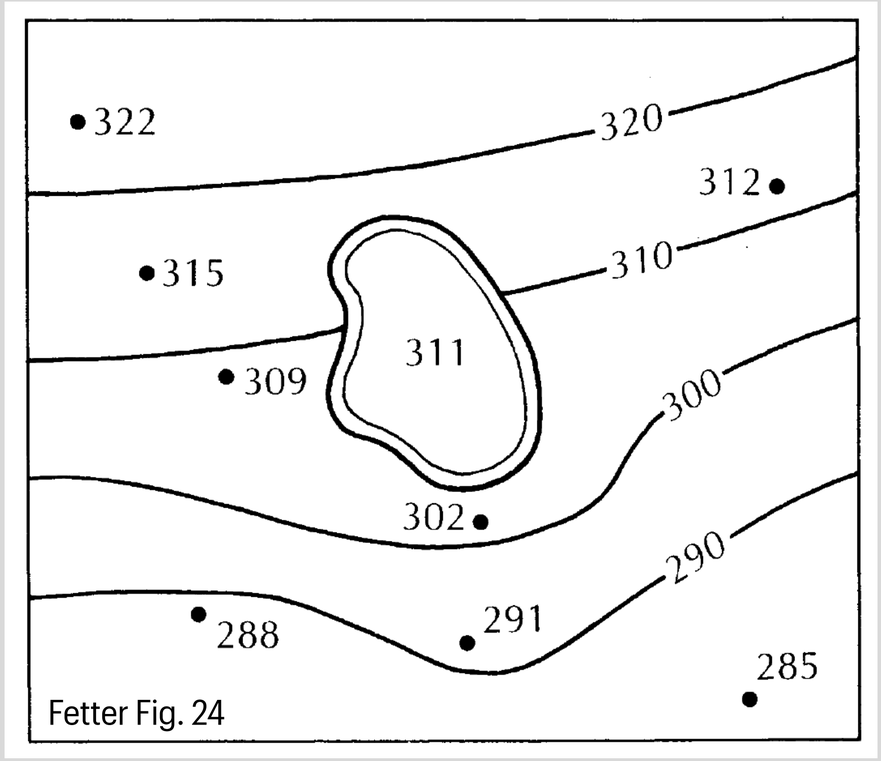
- Contours of equal ground-water elevations are drawn.
- Ground-water contours cannot be higher than the surface topography.
- The depth to ground water will typically be greater beneath hills than beneath valleys.
- If a lake is present, the lake surface is flat as is the water table beneath it. Hence, ground-water contours must go around it […] unless the lake is perched on low-permeability sediments and has a surface elevation above the main water table.
- Ground-water contours form a V pointing upstream when they cross a gaining stream and bend downstream when they cross a losing stream.

2.4: Piezometric Maps



Water-table map of a gaining stream and a lake that is hydraulically connected with the water table.

2.4: Piezometric Maps

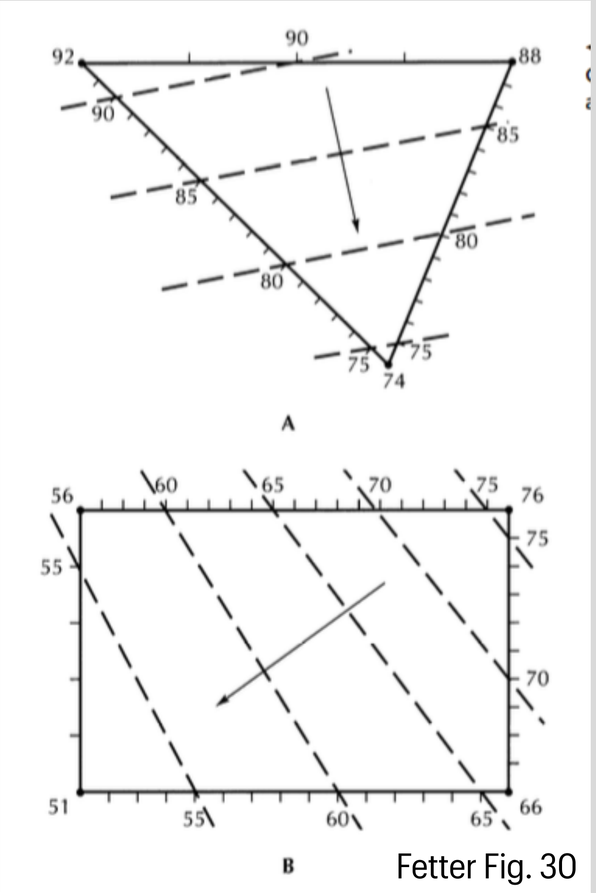


Fetter Fig. 24

A perched lake that, through outseepage, is recharging the water table

2.4: Piezometric Maps

Gradient of potentiometric surface

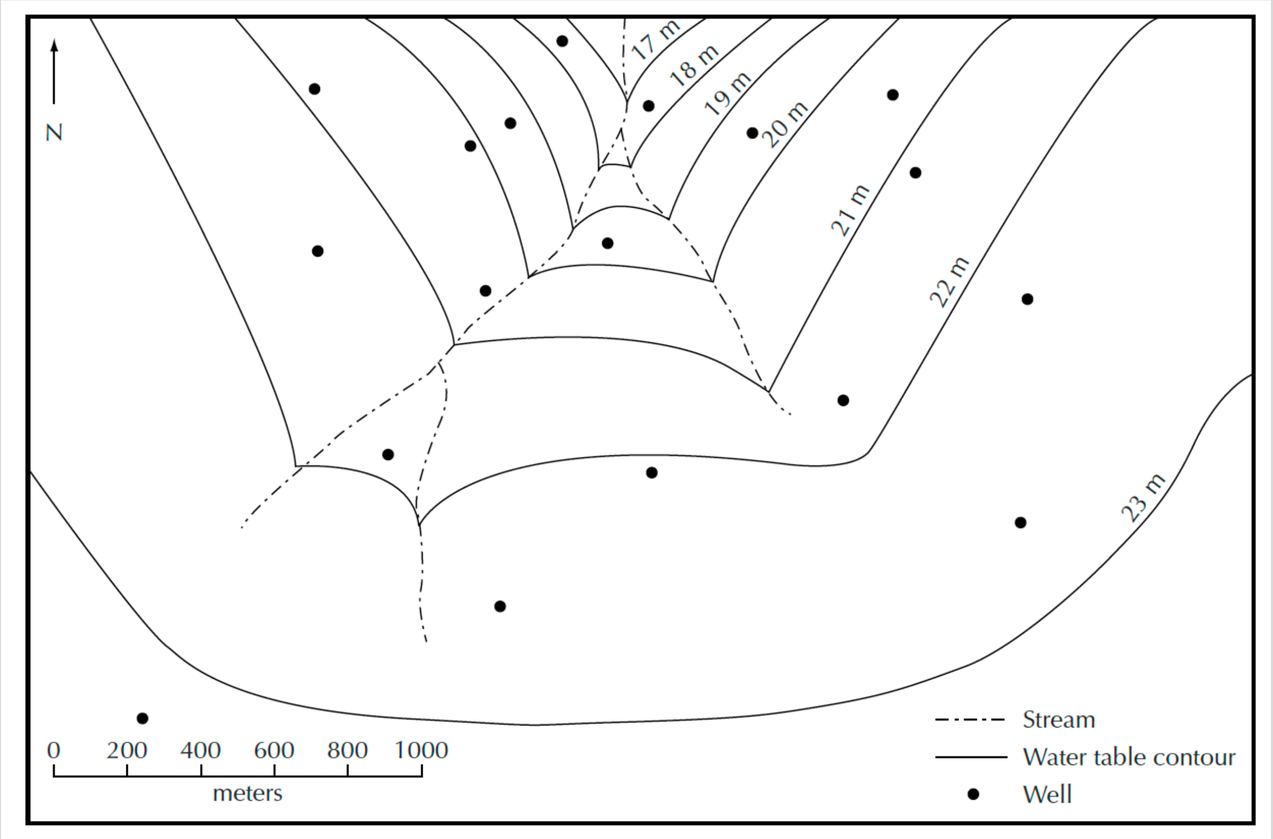


Fetter Fig. 30

1. Draw a line that connects each well of the three-well setup (Figure 30A) or the corner wells for the four-well setup (Figure 30B).
2. Note the water elevation in each well.
3. Measure the map distance between a well pair.
4. Find the difference in elevation between a well pair.
5. Find map distance for each unit change in head for a well pair by dividing the head difference by the map distance between the well pairs.
6. Mark even increments along the line between the well pair. Select the increment length so that each increment is a convenient length
7. Repeat steps 3 to 6 for all well pairs.
8. Create contour lines by joining all lines of equal head.
9. The gradient of the surface is in the direction of decreasing head and perpendicular to the contour lines.

$$\text{grad } h = \sqrt{(dh/dx)^2 + (dh/dy)^2}$$

2.4: Piezometric Maps



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