

ES473 Environmental Geology

In-Class Assignment Groundwater Flow and Contaminant Risk Assessment

Refer to the map on the second page (see back). Monsanto has built a chemical plant within ~ 1 mile of an orphanage. Their tank farm stores numerous hazardous substances. Your goal is to assess the risk of contamination to the groundwater / drinking water resource of the orphanage. The base map shows the locations of about 1 dozen wells in the area, with surface elevation and depth to water. The aquifer characteristics are as follows:

- Homogeneous aquifer
- Unconfined
- Sand and gravel, unconsolidated
- Saturated Thickness = 20 ft
- Hydraulic Conductivity = 10^{-2} cm/sec

Task 1. Draw groundwater contours, using a contour interval of 20 ft.

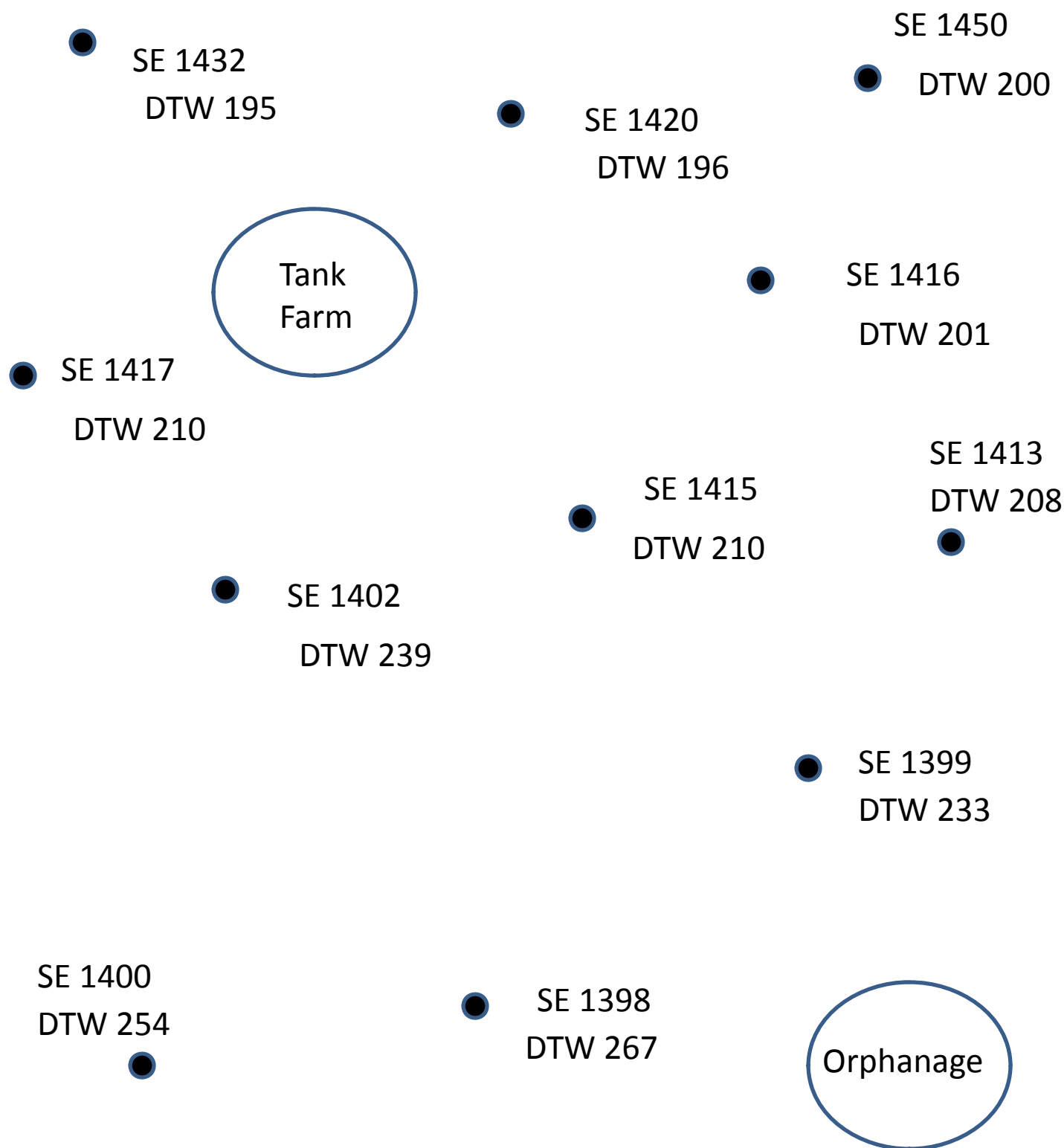
Task 2. Draw 4-5 flow line vectors across the map area, showing general flow direction.

Task 3. Calculate the average hydraulic gradient across the map area.

Task 4. Assess the contamination risk to the orphanage, in 10 words or less.

Task 5. Calculate the total groundwater discharge across the full map width of the study site. Answer in Gal/day. Show all of your unit algebra and math work.

Monsanto Chemical Plant – Well Field



SE = surface elevation in ft AMSL
DTW = depth to water (ft)

0 1000 ft