

ENCE 4330

HOMEWORK NUMBER 7

A small town obtains its water from a deep well in a confined aquifer. A small but steady growth has occurred so that the well must now pump continuously at 500 gpm to supply the town's needs. Casing limitations prevent installing a larger submersible pump and the pump cannot be lowered without reducing its capacity. A tourist facility wants to locate there. It is anticipated that the additional water needed would be 500 gpm pumped continuously for 100 days. The town owns a lot (A), of sufficient size to drill a deep well, 500 feet from well No. 1. A rancher, who adjoins the town, has offered to give the city enough land (B), on which to drill well No. 2, 4000 feet from well No. 1, in order to get city water for himself. Certain members of the Town Board want to save the cost of additional pipeline by using the town's lot (A). Tests have shown that the aquifer has a transmissivity of 10,000 gpd/ft and a coefficient of storage of .0002. The present well is 16 inches in diameter.

In order to make a proper decision the Town Board has asked you to analyze the merits of placing wells in the two possible locations. Assume that well No. 1 now runs with its pump submerged 45 feet. (That is, assume that well No. 1 can have an additional drawdown of 45 feet from the new well.)

- (a) Calculate the effect on well No. 1's drawdown of continuous pumping for 100 days from the wells at the two possible locations.
- (b) What would be the effect if the wells were to be pumped continuously for 300 days?
- (c) Would either of the proposed wells serve as an adequate solution for the town's water supply problem beyond that needed for the tourist facility?