

## Notes on soil characterization in Found Meadow

### Hydraulic Conductivity Using *in situ* Well Pump Tests

Manual pumping tests were performed on several of the wells throughout Found meadow. For this technique each well was pumped dry and water level measurements were taken at specific time intervals until the well had recovered. For the shallow wells recovery usually occurred within 1 ½ hours. However, a few shallow wells that were installed more deeply in the dense Bt or C layer took as long 5 hours to recover.

Hydraulic conductivity values were calculated using the pumping test data. For this study both the Hvorslev (Hvorslev 1951) and Bouwer and Rice (Bouwer and Rice 1976) methods were used. The Hvorslev method utilizes the equation;

$$K = r^2 \ln(L_e/R) / 2L_e T_o$$

Where:         $K$  = hydraulic conductivity in cm/s

$r$  = radius of the well casing

$R$  = radius of the well screen

$L_e$  = length of the well screen

$T_o$  = the time it takes for the water level to rise to 37% of the initial change

The Bouwer and Rice method is designed specifically for unconfined aquifers with wells that are either fully or partially penetrating the aquifer. The equation for this method is;

$$K = r_c^2 \ln(R_e/R) / 2L_e * 1/t * \ln(H_o/H_t)$$

Where:         $K$  = hydraulic conductivity in (cm/s)

$r_c$  = radius of the well casing

$R$  = radius of the gravel envelope

$R_e$  = effective radial distance over which head is dissipated

$L_e$  = length of the screen

$H_o$  = drawdown at time  $t = 0$

$H_t$  = drawdown at time  $t = t$

$t$  = the time since  $H = H_o$

Hydraulic conductivity was calculated for the deep wells utilizing the Bouwer and Rice method. Detailed pumping tests with regular measurements taken every few minutes were not performed on the deep wells because recovery took up to a day. Instead, for these wells water levels were taken, the wells were pumped dry and the next day the water level was taken again to get the recovered water level, with an estimated 24 hour recovery period. For this reason, K values for the deep wells are considered estimated values.

(Hazen 1893, Krumbein and Monk 1943, Harleman et al. 1963, Puckett et al. 1984)

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