

**Basin Management Objective
Butte County
Sub-Inventory Unit – PENTZ**

Butte County Water Advisory Committee Member – Rick Ponciano (interim until a full time representative can be found)

Contact Information

Phone Number: (530) 891-8455

Email Address: rcponciano@hotmail.com

Description of the Pentz Sub-Inventory Unit –

The Pentz Sub-Inventory Unit (SIU) covers an area of about 1,900 acres in the northern portion of the East Butte Inventory Unit. It is bordered by Butte Creek to the north, the North Fork of Dry Creek to the south, foothills to the east, and Highway 99 to the west. The land uses within this SUI are non-irrigated native vegetation, pasture, and low density residential. Current groundwater use in the Pentz SUI is minimal.

Management Objective –

It is the intent of this objective to maintain the groundwater surface elevation during the peak summer irrigation season (July and August) in all aquifer systems at a level that will assure an adequate and affordable irrigation groundwater supply, and to assure a sustainable agricultural supply of good quality water now and into the future. The management objective is also to assure an adequate groundwater supply of adequate quality from the alluvial aquifer system for all domestic users in the sub-inventory unit and to assure the water supply can be utilized without injuring groundwater quality or inducing land subsidence.

Geologic Formations Identified In Sub-Inventory Unit –

Geologic formations in the Esquon SIU, from youngest (shallowest) to oldest (deepest), include:

- Modesto Formation
- Tuscan Unit C (Upper Tuscan)
- Tuscan Unit B (Lower Tuscan)

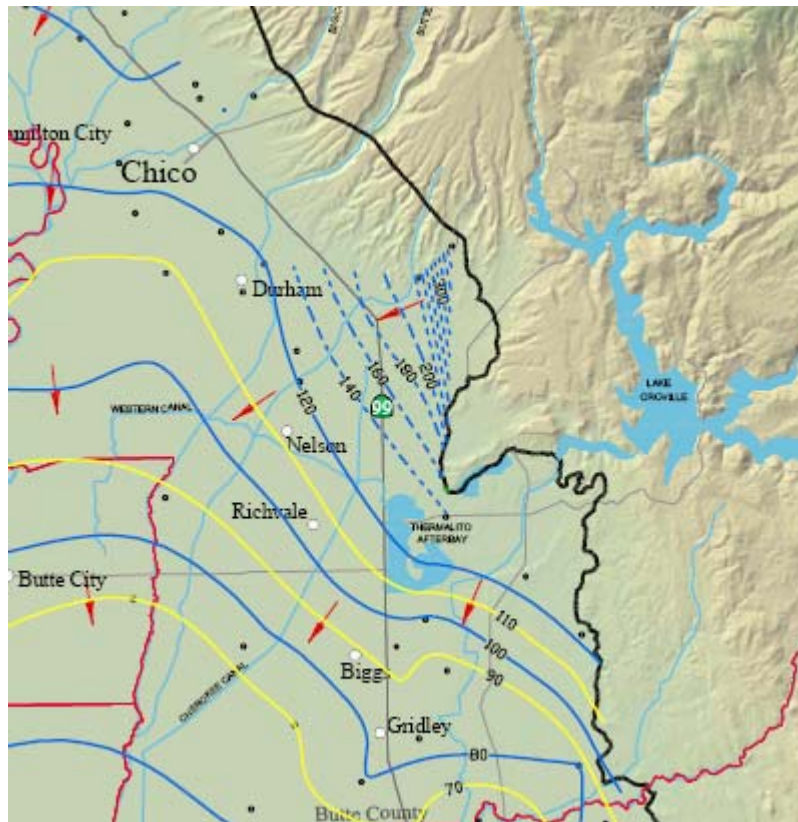
Fresh Water-bearing Units. In the Sacramento Valley Region of Butte County, fresh groundwater-bearing units include, from youngest (shallowest) to oldest (deepest), the Modesto, Riverbank, Laguna, Tehama and Tuscan Formations. Those included in the Esquon SIU are:

- Modesto Formation
- Tuscan Unit C (Upper Tuscan)
- Tuscan Unit B (Lower Tuscan)

Groundwater Flow in the Pentz Sub-Inventory Unit –

The below figure is a cropped segment of a map prepared by DWR Northern District. It shows the groundwater elevation contours in your sub-inventory unit with arrows indicating the direction of groundwater movement. This graphic indicates that the regional pattern of spring groundwater movement in the Pentz SIU is in a west-to-southwesterly direction. Not

enough groundwater level data exist to make an estimate of the local direction of groundwater movement in the sub-inventory unit.



Arrows show the direction of groundwater movement.

2008 Groundwater contours were constructed using groundwater level measurements taken by the Department of Water Resources and Local Cooperators between March 1st and March 20th, 2008. Groundwater contours are based on groundwater level measurements taken from wells constructed within the middle portion of the aquifer system (100 to 400 feet deep). This portion of the aquifer supplies approximately 70% of all domestic, agricultural and municipal wells. Blue contour lines represent 20 foot intervals and yellow contour lines represent 10 foot intervals. Full size contour maps are included in the annual Groundwater Status Report posted on the Department of Water and Resource Conservation website.

BMO Key Wells Selected for Groundwater Level Monitoring –

The DWR completed installation of a multi-completion monitoring well, SWN 21N02E26E003-6 in September 2007. This well was constructed as a quadruple completion well, which means that the bore hole contains four casings isolated in separate geologic strata, allowing for monitoring of the groundwater levels contained in the respective aquifer systems. Dedicated monitoring wells are constructed specifically for measuring groundwater levels and groundwater will not be extracted from the newly installed monitoring well. There is currently only one full year of measurements available for this new well, and therefore the Alert Stages cannot be established for this data set.

Additionally, five of the monitoring wells installed by Butte County Public Works at the Neal Road Landfill have been selected for inclusion in this BMO. These are identified as MW-4, 6, 8A, 8B, and 10. Monitoring of groundwater is a regulatory requirement for operation of the landfill. Groundwater is monitored quarterly at each of the landfill's monitoring wells, and both

level and quality measurements are taken. The monitoring wells are located within the landfill property. A function of the monitoring wells is to calculate ground water flow direction and velocity.

The operation and monitoring of the wells located at the landfill are under the direction of the Department of Public Works. Public Works staff will continue to provide groundwater elevation data, however, at this time, Alert Stages will not be established for these wells.

BMO Key Wells Selected for Groundwater Quality Monitoring–

When the Butte County Groundwater Trend Monitoring Program began, a well was sampled close to the border of the Pentz and Cherokee sub-inventory units. Data was monitored at that well from 2002 through 2005. This year, a new well was located and sampled approximately 2.4 miles from the Pentz-Butte Valley well. Tabular data and established Alert Stages for this well will be presented in the Pentz and Cherokee documents in the 2009 BMO.

Groundwater Temperature - 2002 through 2008

Sub-area	2002 Temp °C	2003 Temp °C	2004 Temp °C	2005 Temp °C	2006 Temp °C	2007 Temp °C	2008 Temp °C
Pentz						22.2	21.5
*Pentz-Butte Valley	27.0	26.4	26.7	23.2			

Groundwater pH - 2002 through 2008

Sub-area	2002 pH	2003 pH	2004 pH	2005 pH	2006 pH	2007 pH	2008 pH
Pentz						7.6	7.4
*Pentz-Butte Valley	7.1	6.9	7.3	6.2			

Groundwater EC - 2002 through 2008

Sub-area	2002 EC	2003 EC	2004 EC	2005 EC	2006 EC	2007 EC	2008 EC
Pentz						218.0	229.0
*Pentz-Butte Valley	195.0	186.0	211.0	240.0			

BMO Key Well(s) Selected for Land Subsidence Monitoring–

State Well Number 20N01E18L03M located in the Western Canal Water District. Maximum annual inelastic land subsidence shall not exceed 0.01 feet per year.

Butte County staff participated in the Sacramento Valley Height Modernization Project during March 2008 as a means to enhance the subsidence monitoring program in the county and the region. This cooperative project between the Department of Water Resources (DWR), the Bureau of Reclamation and local County agencies helped to establish baseline ground elevations in Butte County and other portions of the valley. Land elevations were measured using Global Positioning System (GPS) survey equipment and survey monuments located on an approximate three to five mile grid. Re-observations are to be done in approximately three

years, and will give measurements to compare against the baseline data in order to determine whether or not any subsidence has occurred.

BMO Alert Stage Definitions and Compliance Methodologies–

When enough years of data have been collected from the newly installed BMO monitoring well, the Pentz Sub-Inventory Unit will determine guidelines in the management of the groundwater resources. The groundwater level and land subsidence management objectives are intended to trigger predetermined voluntary Ground Water Management Actions, as defined in the accompanying Cover Report, to remedy declining ground water levels that are not recovering to compliance levels for each index well.

Groundwater Quality –

Stakeholders in the Pentz SIU will work with staff to locate additional wells in the DWR monitoring network, either irrigation or domestic, with sufficient historical construction information to include in the water quality monitoring network.

Land Subsidence –

Land Subsidence will be monitored at the closest extensometers located in the M&T and Western Canal sub inventory units. Maximum annual inelastic land subsidence shall not exceed 0.01 feet per year.

Stage 1: is reached when the annual elastic subsidence exceeds the average annual elastic subsidence measured over the period of record of the extensometer.

Stage 2: is reached when the annual elastic subsidence exceeds the maximum recorded elastic subsidence over the period of record for the extensometer.

Stage 3: is when inelastic subsidence is detected. Inelastic subsidence shall be detected by comparing reading from the extensometer taken on March 1 of each year against previous March 1 measurements.

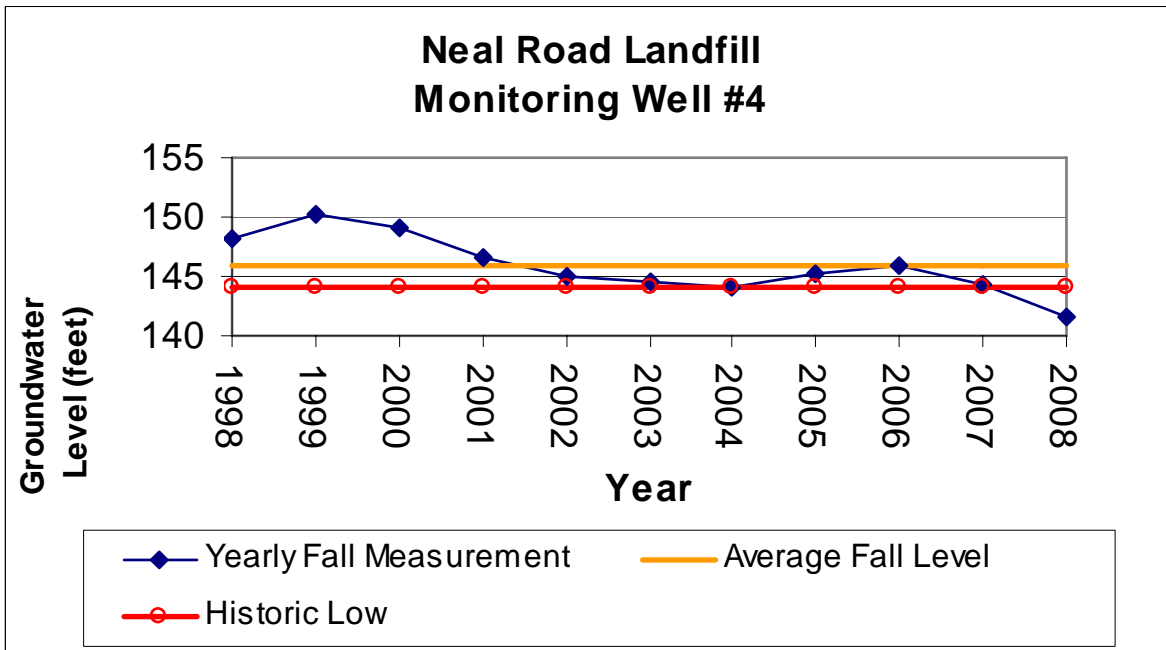
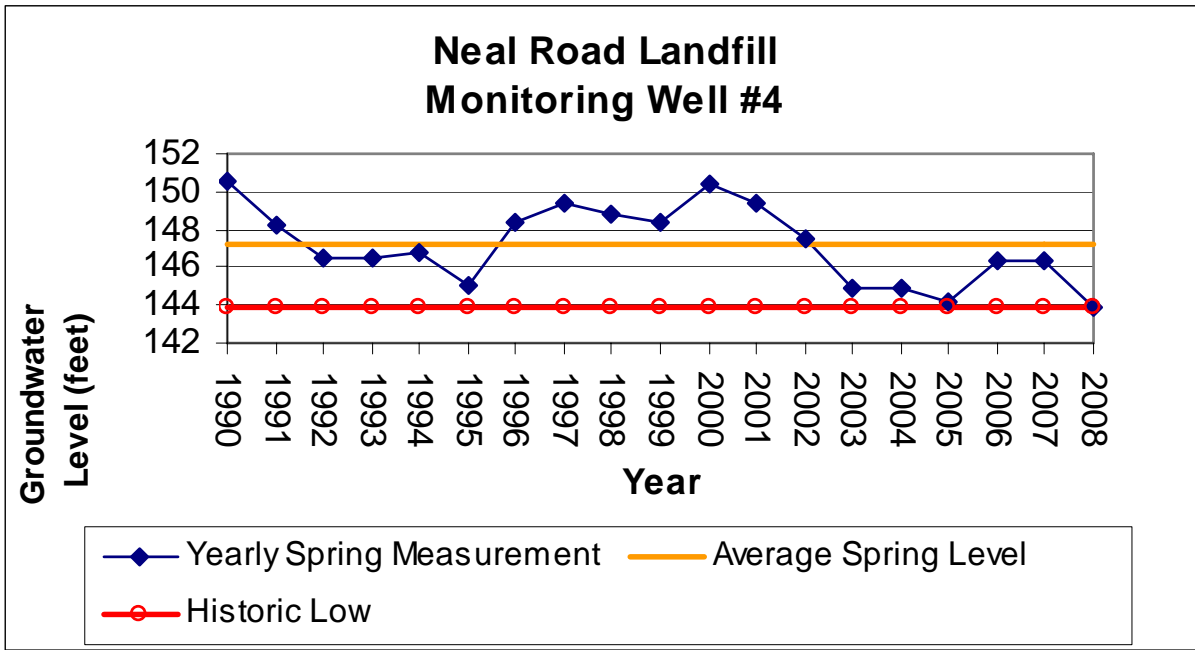
Future Monitoring Recommendations –

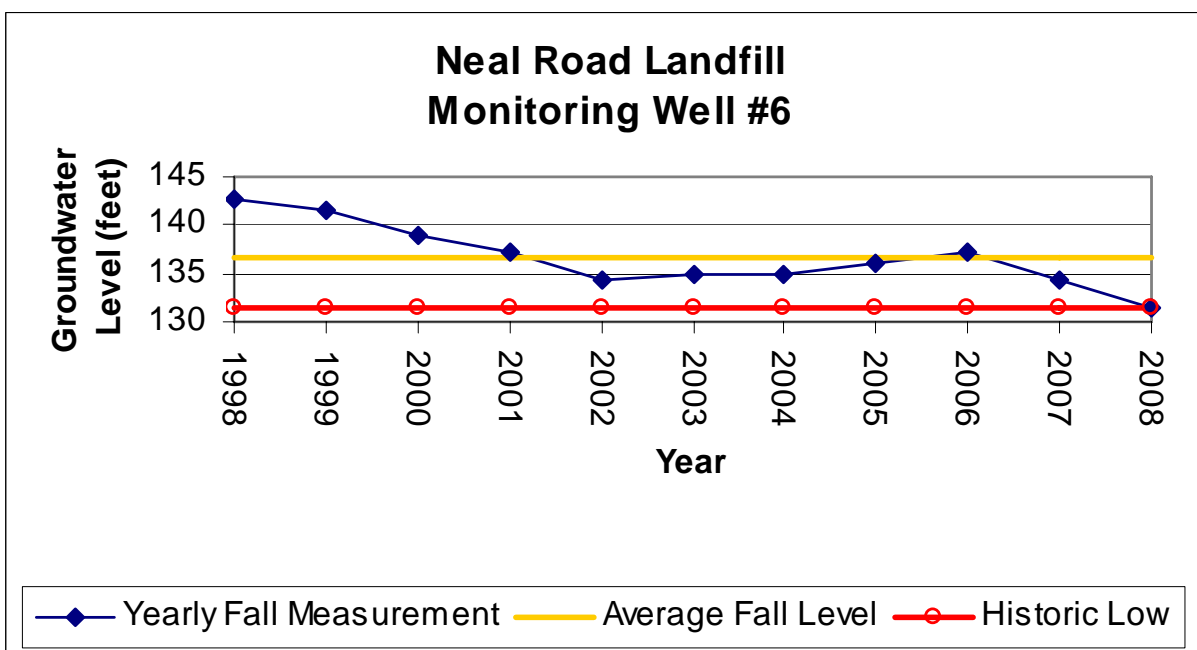
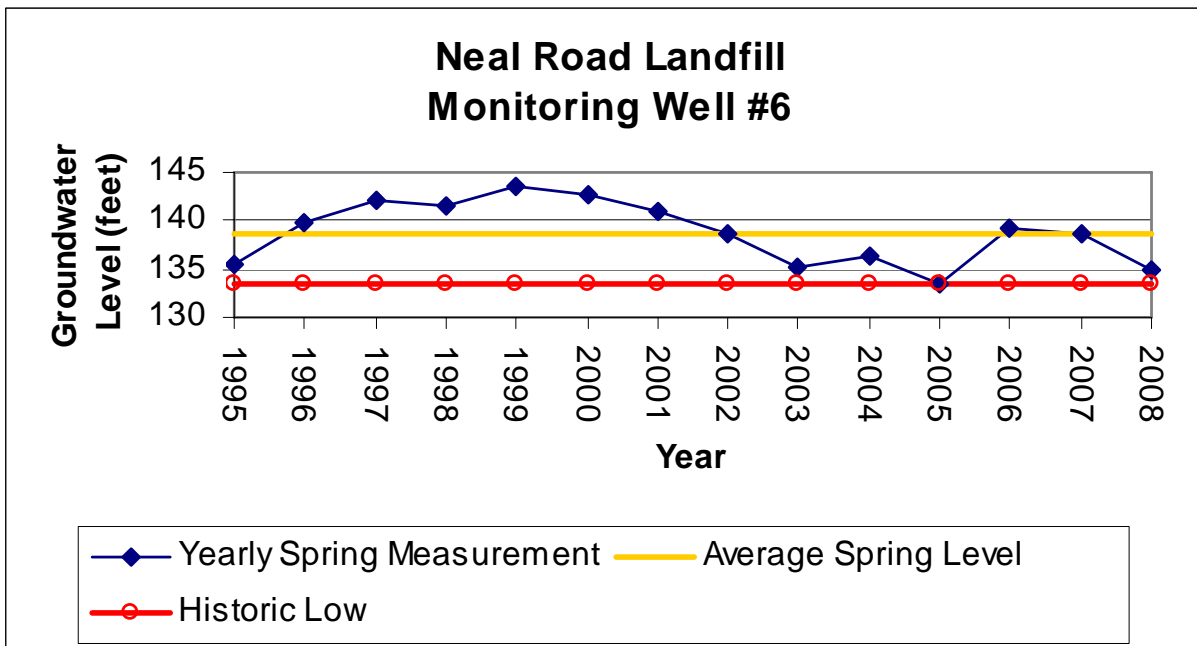
Efforts will be made to identify additional domestic wells that could be added to the existing monitoring well network in the sub-inventory unit to allow for development of additional management objectives for the alluvial aquifer system. Locate additional wells, either irrigation or domestic, with sufficient historical construction information to include in the water quality monitoring network, and initiate data collection in August 2009.

Supporting Data –

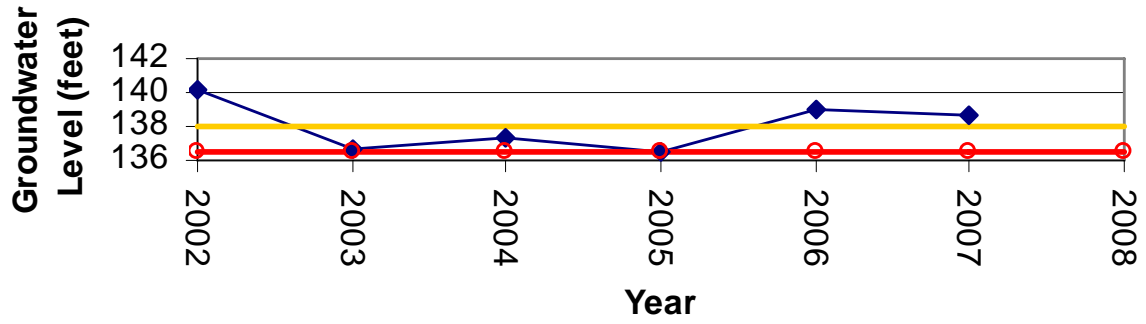
Hydrographs depicting yearly spring level measurements, including 2008 data, with established alert levels.

Summary charts of water quality monitoring.



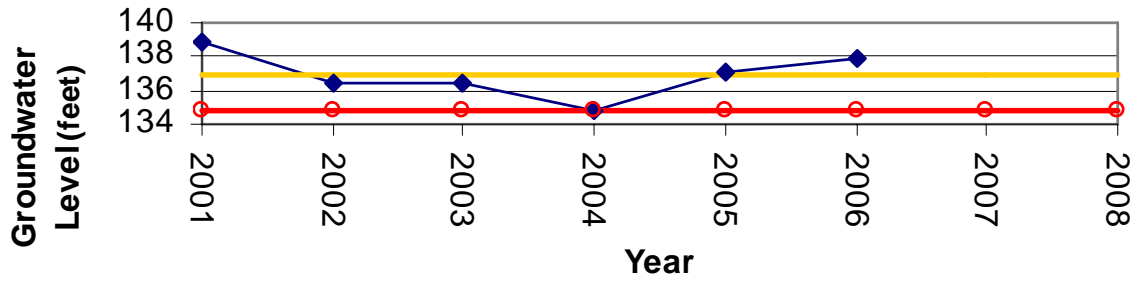


Neal Road Landfill Monitoring Well #8A



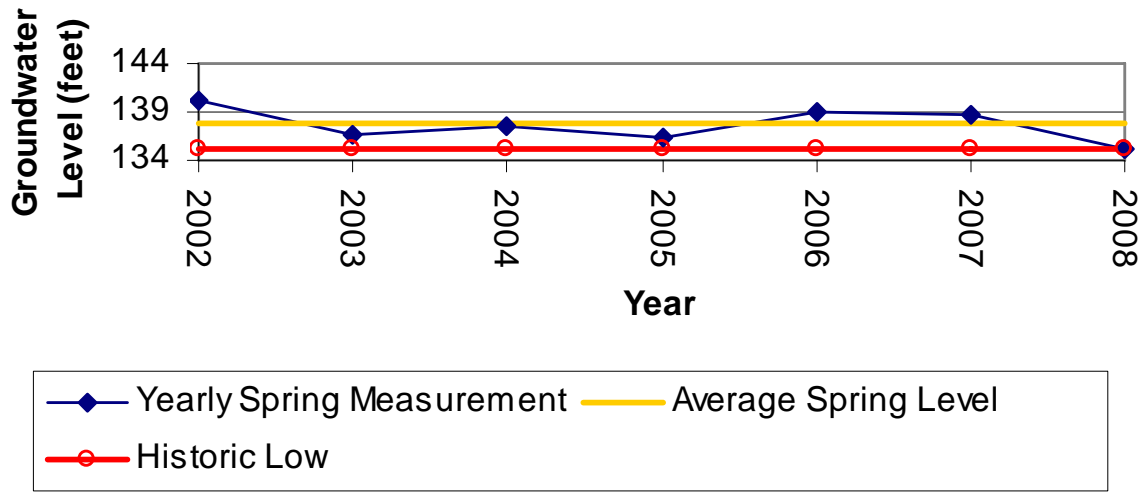
◆ Yearly Spring Measurement — Average Spring Level
—○ Historic Low

Neal Road Landfill Monitoring Well #8A

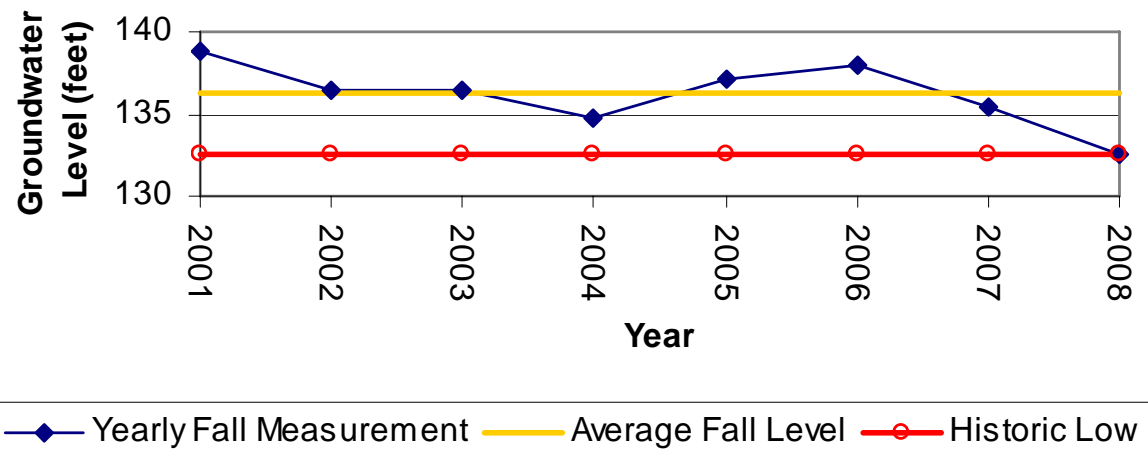


◆ Yearly Fall Measurement — Average Fall Level —○ Historic Low

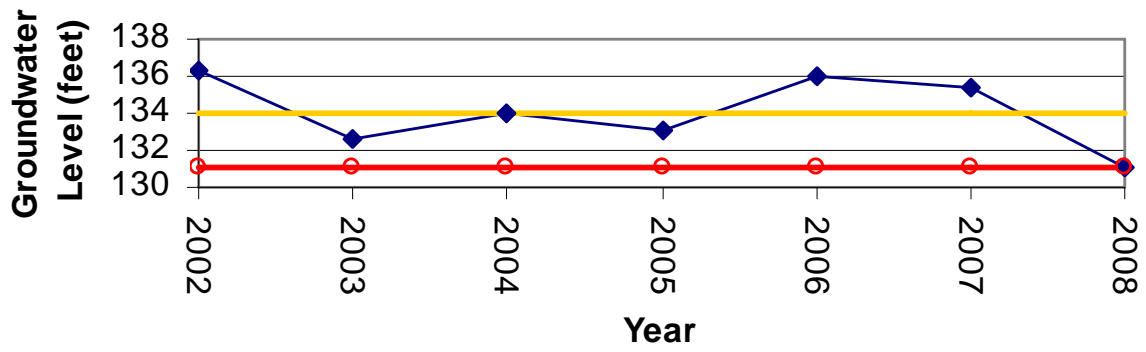
Neal Road Landfill Monitoring Well #8B



Neal Road Landfill Monitoring Well #8B

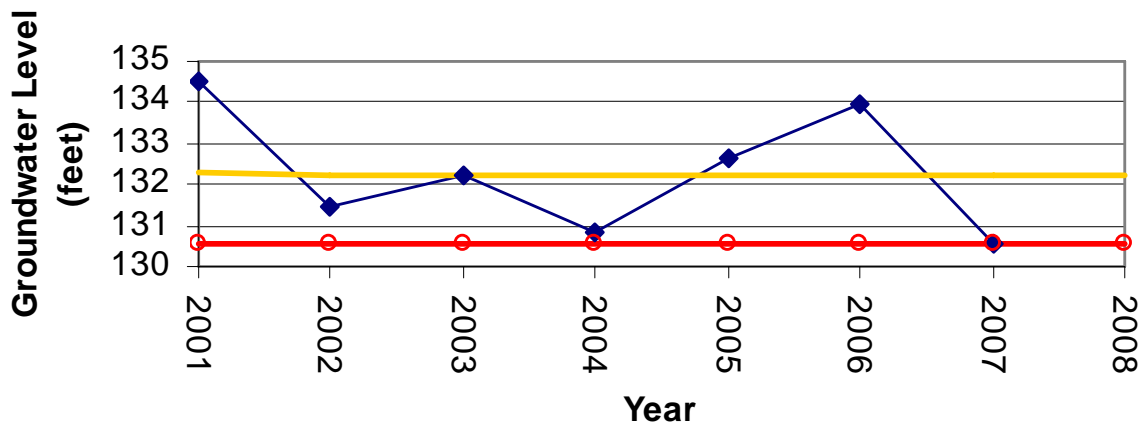


Neal Road Landfill Monitoring Well #10



◆ Yearly Spring Measurement — Average Spring Level
○ Historic Low

Neal Road Landfill Monitoring Well #10



◆ Yearly Fall Measurement — Average Fall Level — Historic Low

