

## **Village of East Troy Well #7 History**

During 2001 and 2002, the Village of East Troy engaged a consultant to find a site for a proposed high capacity, municipal well needed to improve both the quality and quantity of its water supply to service planned growth. The consultant recommended that the proposed well be drilled in a shallow, gravel aquifer about a quarter-mile from Lake Beulah on the Grafenauer/Thomas property that had been annexed by the Village from the Town of East Troy.

Part of the Grafenauer/Thomas property was later developed by Bielinski Brothers as the Lake Bluff Subdivision. Village Well #7 was later drilled within the boundary of the subdivision. The sloping land between the subdivision boundary and Lake Beulah has been set aside as public parkland.

During the Lake Beulah Management District annual meeting on August 24, 2002, Chairman David Skotarszak expressed great concern over the possible effect of the proposed high capacity well on the water level and health of Lake Beulah as well as the impact on private wells of many riparian owners. Electors at the meeting confirmed their concern. One example cited was based on first hand experience with the water level of Long Lake in Illinois that was severely altered by the drilling of high capacity wells in the area.

Electors unanimously agreed at the meeting that LBMD must express our opposition to the well, that monitoring wells should be constructed near the well site to develop water flow data and that funds should be budgeted to oppose the well location subject to proof showing that the well would not be detrimental to Lake Beulah.

LBMD filed concerns with the Village, SEWRPC (Southeast Wisconsin Regional Planning Commission), Governor Doyle and the State Attorney General's office citing that Lake Beulah and the wetland area between the lake and the well could be adversely affected by the high capacity well's removal of water from the aquifer that feeds Lake Beulah and ultimately impact water flow from the lake into the Mukwonago River affecting prime fish habitat.

The DNR approved full construction of the well after only a short (71 hour) pumping test. The Village agreed only to compensate private well owners that might be affected by the well.

### **The LBMD Lake Beulah Water Monitoring Program**

LBMD's hydrogeology consultant (RSV Engineering, Inc) was contracted to begin the process of data collection during the summer of 2003 for the purpose of calculating the balance of water inflows and outflows from all sources prior to any large volume water removal from the aquifer with a high capacity well.

A drive-point monitoring well “nest” was installed adjacent to the wetland at the southern end of Lake Beulah to establish a database of normal fluctuations of groundwater flow into the wetland and the lake. Water flow over the Lake Beulah Dam under Highway J was also measured on a weekly basis.

In order to expand the monitoring program, LBMD and RSV Engineering, Inc requested a funding grant from the DNR’s Wisconsin Lake Planning Grant Program. A grant of \$10,000 was awarded to the District in April 2004 based on a projected total cost of \$15,745.

The funds were used to install four additional monitoring well “nests” providing a total of four sites on Lake Beulah’s upper lake and one on Mill Lake. Initially, six riparian owners volunteered to take weekly water level measurements from the five monitoring wells. Over time, a total of thirteen dedicated volunteers have gathered weekly data from May to November every year.

In 2005, LBMD authorized the development of a water balance study as an initial step in the development of an overall lake management plan. LBMD contributed funding toward the development of a computerized, three-dimensional groundwater flow model initially based on the above collected data to be updated each year with new data.

The model was developed as part of a Master’s Thesis by Ms. Hilary Gittings at the University of Wisconsin-Madison Department of Geology & Geophysics with oversight provided by Professor Jean Bahr, Department Chair. A report (RSV Project #04-566) detailing results and next steps was published for the District by Robert Nauta, VP and Principal Hydrogeologist, of RSV Engineering, Inc on June 30, 2006.

The above report recommended that a data logger be installed in the outflow stream below the Highway J dam to continuously monitor flow rate and water depth. The data logger was installed during 2007.

The report also recommended development of an overall lake management strategy to include baseline water quality data. These data would again track both normal chemical and temperature changes over time and would be used for comparison with quality changes after a possible reduction of incoming groundwater flow due to withdrawal of water from the aquifer feeding Lake Beulah.

Sites have now been established, and mapped by GPS, for the on-going monitoring of water temperature. A Joint Funding Agreement was established with the U.S. Geological Survey Dept. of the Department of the Interior on December 1, 2007 to conduct water quality monitoring at two locations, four times a year. Total annual cost is estimated at \$13,000 with LBMD paying 70% and USGS 30% of the cost. The Lake Beulah Protective and Improvement Association has agreed to contribute \$10,000 toward this program.

LBMD and RSV Engineering have also applied for a \$10,000 Lake Planning Grant from the DNR to help fund the water quality monitoring program. We also plan to apply for a much larger Lake Protection Grant to fund costs of implementing future changes that may be necessary based on monitoring results.

#### LBMD and Village of East Troy Cooperative Monitoring

The Village agreed on October 3, 2007 to a proposal from Aquifer Science and Technology, a Division of Ruekert/Mielke, to install three monitoring well “nests” at an estimated total cost of \$45,000 to “provide background water level data prior to Well Number 7 going on-line and during its operation.”

The location of the monitoring wells was later established with two well sites on the Village public park (Outlot #2) between the Lake Bluff Subdivision and Lake Beulah and a third site near Beulah Bog on farming property owned by riparian lake residents, John and Carolyn Becker.

The Becker’s agreed to the well location on their property with the proviso that the Village and LBMD establish a Cooperation Agreement to work together in the collection, sharing and evaluation of data collected from data loggers installed in the Village monitoring wells. LBMD also agreed to share all past and future groundwater flow and water quality data as described in the above Lake Beulah Water Monitoring Program.

The Cooperative Agreement was approved on February 15, 2008 signed by David Skotartzak, Chairman LBMD and William Loesch, President Village of East Troy.

The agreed upon plan is to begin collecting weekly data as soon as weather permits in order to develop a database before the planned start of Well #7 pumping at the initial volume of 400 gallons per minute in September 2008.