

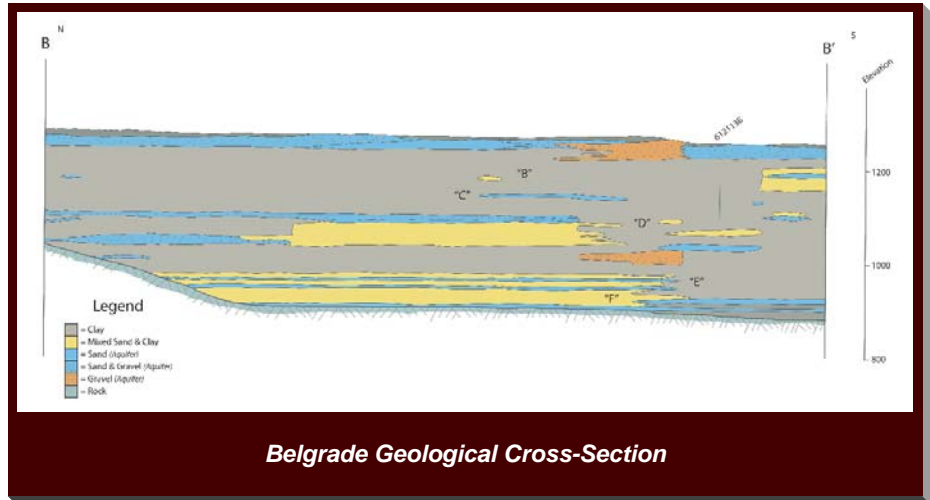


Well Siting Study and Test Well Construction Belgrade, MN



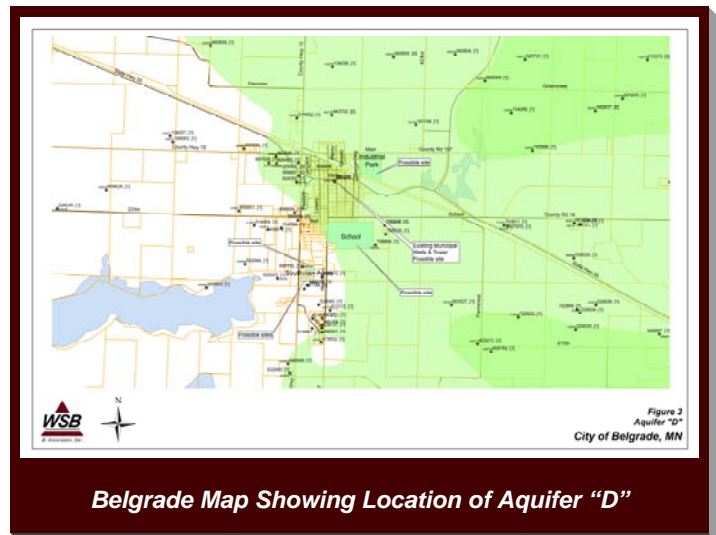
WSB & Associates, Inc. was retained by the City of Belgrade to study their three wells which are all in unconsolidated sand and gravel aquifers. Well 1 is old, and yields a rapidly decreasing volume of clean water from a confined aquifer. Well 2 is in the water table aquifer, and produced clean water until a contaminant plume reached the well and it had to be shut down. Well 3 produces the vast majority of Belgrade's water from another confined aquifer, but the water has unsafe levels of arsenic.

WSB research identified that the studies done by the U.S. Geological Survey, published in the 1970's and 1990's, reported many stacked confined sand and gravel aquifers in the region, covering multiple counties. While these studies were extensive and full of valuable information, they did not have the level of detail necessary to site a well at a particular spot. WSB provided additional research and studies to assist the City with their water issues.



Since Belgrade's aquifers are unevenly located and produce different quality water, it was especially important to locate and identify all the aquifers. WSB investigated the locations of the five identified confined sand and gravel aquifers. One of the five confined aquifers (Aquifer "D") was determined to be much lower in arsenic, iron, and manganese and was targeted for a new municipal well.

A test well and observation well were constructed in September and October of 2008. A pumping test was conducted to determine water yield and identify the potential for and amount of well interference. Drawdown during test pumping was measured in both of these wells, which allowed the amount of interference from any nearby well to be accurately estimated and accounted for in the design of the production well.



The study identified which aquifer to use, where it was located within a three dimensional view of its surroundings, and estimated the available pumping capacity. The City was assured that Aquifer "D" was located within the area the City wanted to construct and that it will meet their expectations guaranteeing successful operation of a production well before one was constructed.

Client: City of Belgrade
Total project cost: \$43,500
Completion: October 2008

