

Declining Groundwater Level Requires City of Plains to Drill New Well



The city of Plains is located in Meade County in the southwest part of the state at the intersection of US Highways 54 and 160. Plains has a population of 1,088 and has the distinction of having the widest main street in the United States measuring 155 feet 5 inches. Plains was originally platted in 1885 and until about 1916, city residents used private wells or windmills as their source of water. The original public water system including the existing 50,000-gallon elevated storage tank was installed in 1916. Over the years the city has been using wells with an apparent abundance of water pumping anywhere from 388 to 569 gpm. Problems have been occurring though largely due to a declining water table in



The wellhead has been properly sealed to the concrete pedestal with a vent and drawdown gauge installed.

the area. Dave Ratzlaff, Water System Manager, noted that in 1964 the static water table was at 162 feet. Now the static water level is at 265 feet, a decline of 103 feet in 54 years. According to Dave, this declining water level has been the primary cause of the loss of wells at Plains. The city lost Well No. 1 and No. 2 previously and just recently lost the use of Well No. 3 due to pumping air into the distribution system causing customer complaints. The loss of Well No. 3 left the city with only two operating wells that according to June Bender, City Clerk, were keeping up with the demand fairly well but the city was concerned about the future, especially with regard to a possible water shortage with the next drought.



The new submersible well pump with a 125 HP motor, which while capable of delivering 750 gpm, will be set to deliver 550 gpm to the system.

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ECWAG Program Overview

The Emergency Community Water Assistance Grants (ECWAG) program helps eligible rural communities recover from or prepare for emergencies that result in a decline in capacity to provide safe, reliable drinking water for households and businesses. Grants up to \$150,000 are available for repairs to breaks or leaks in existing water distribution lines, and related maintenance. Grants up to \$500,000 are available for construction of a new water source, intake and/or treatment facility or waterline extensions.

To be eligible, projects must be located in rural areas and towns with 10,000 or fewer people and with a median household income less than \$62,883. Federally recognized Tribal lands are also eligible. Eligible applicants include most state and local governmental entities, nonprofit organizations and federally recognized tribes. Privately owned wells are not eligible. To check eligibility, please visit the following website:
<http://eligibility.sc.egov.usda.gov>.

What action to take

The city contacted Don Hellar with EBH engineering, Pratt, Kansas. The first step was to investigate Well No. 3 to possibly return it to production. Contractors tried cleaning the well screen with both acid solution and brushes and inspected the screen by lowering a camera inside the casing three different times. The various cleaning procedures were not successful in returning the well to a reasonable pumping rate. Also, a variable frequency drive (VFD) was installed attempting to reduce the pump rate to a usable level but the well continued to pump air. Eventually it was decided to

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This photo shows the well pump discharge piping after installation.

abandon the well due to the low water level. The only real solution was to locate another well by drilling deeper in the aquifer. Funding such a project would be a challenge. After some time, the United States Department of Agriculture, Rural Development, (USDA-RD) was contacted for funding assistance. Fortunately, for the city, Rural Development has a grant program that can be used as a result of a natural disaster and the loss of the water table at Plains constituted such a disaster. The city worked with Dave Barber in the Hays USDA-RD office to obtain a grant through the Emergency Community Water Assistance Grants (ECWAG) program. The application process to obtain an ECWAG is an accelerated procedure allowing funding to be awarded in a more timely manner to deal with emergencies.

Moving forward

With no hope of returning Well No. 3 to production, Hydro Resources, Garden City, Kansas was contacted to do test drilling. Two test holes were drilled which, according to Dave Ratzlaff, were very expensive because of the depth. The first test well on the

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This photo with the USDA Rural Development project sign in the foreground, shows Sargent Drilling in the process of drilling the new Well No. 6 which will replace Well No. 3 that was abandoned due to low static water level.

west side of town was in a desired location with electrical service readily available but the water contained excessive nitrate. The second location and the eventual site of the new well is located on the east side of town and the water quality is satisfactory.

The new well was drilled by Sargent Drilling, Broken Bow, Nebraska. It was completed in November 2017. The well was completed utilizing a 16-inch casing inside a 30-inch drill hole to a total depth 532 feet. Static water level was at 265 feet providing 267 feet of water in the well. The estimated yield was 750 gpm but the actual pumping rate was set at 550 gpm.

The pipeline connecting the well to the city distribution system was installed by King Enterprises, Liberal, Kansas. Dave noted that the pipeline contractor did a very good job on this project and has been very helpful to the city over the years.

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The overall cost of the project was \$650,000. The city received an emergency grant of \$499,000 leaving them with a difference of \$151,000 which was covered by funds the city had on hand. City Clerk June Bender noted that without the emergency grant, the city would have had to borrow money for this type of project. With receipt of the grant, the city did not need to increase water rates to customers. Current water rates are as follows: \$31.00 for the first 3,000 gallons; \$1.00 per 1,000 above 3,000 to 13,000 gallons; \$1.50 per 1,000 above 13,000 to 43,000 gallons, and \$2.00 per 1,000 for usage in excess of 43,000

gallons. By ordinance, the minimum rate will increase by \$2.00 until monthly rates reach a level that is more consistent with the minimum needed to qualify with USDA grants and loans, which is somewhere in the range of \$45 to \$47 per month for 5,000 gallons. At that time, the city plans to revisit the ordinance.

Bert Zerr is currently a consultant with KRWA. He has been with KRWA since 2005. Prior to that, Bert was a District Engineer with the KDHE in the Salina District Office for 32 years.

