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MEMORANDUM

DATE: July 3, 2024
TO: Jeremy Boeckmann
FROM: Michael Hartvigsen
PROJECT: Lake Rockport Well
PROJECT NO: 2102-041
RE: Well Development and Alternative Sources Considered

Lake Rockport Estates Property Owners Association (POA) owns and operates a culinary water system. The system was designed to and has been operating part-time, generally between the months of March and November. The POA currently serves 80 full-time residential connections during these months and 41 weekend homes. There are an additional 55 water meters on lots that do not have structures. The water system source is comprised of three wells. Well #1 has been abandoned due to operational failures, Well #2 currently provides the water source for the system, and Well #3 was recently drilled, but has not been equipped. Well #2 pumps to the mid-mountain booster station and an 8,000-gallon receiving tank where it is chlorinated with a liquid chlorine injection system then pumped to a 300,000-gallon storage reservoir. The distribution piping consists of approximately 8 miles of 8-inch and 6-inch piping.

In 2010, the POA completed a draft master plan that identified the need for an additional 23 gpm beyond their existing source supply of 20 gpm (Well #1), to serve the demands at that time and an additional 170 gpm needed to meet the build-out demands. In 2011, a new source well was constructed (Well #2) with a yield of 80 gpm to meet the current and short-term needs and Well #1 was abandoned due to operational issues. Since 2010, POA has grown from 77 connections to 121 connections. Based on information from the 2010 master plan and current household demands, JDE believes that the POA needs about 300 gpm to support the system at buildout.

In 2021, the POA began working with Jones and DeMille Engineering (JDE) and Loughlin Water Associates to procure funding for a new well (Well #3) with a target yield of 100 gpm. Loughlin conducted an extensive well siting investigation and determined the best place to drill a new well was just east of the intersection of Holw Dr. and Rockprot Blvd. In 2023, the new well was drilled by Lang Equipment. Well #3 was designed to extend down to 1500 feet and it was expected that it would have a maximum yield of 100 gpm. As Lang Equipment reached approximately 1492 feet, the material changed from the Sandstone Kelvin formation material to a clay, signifying the bottom of the formation. The casing was installed and Lang began pump testing the well. The initial pumping results indicated that the well yield was significantly lower than anticipated and so, under direction from Loughlin, Lang proceeded to attempt several well development processes to increase the yield. These included surging, evacuating, a mud purge treatment, and several days worth of additional pumping. The final pump test resulted in a total flow rate of 21 gpm and a safe yield rate of only 14 gpm. With Well #2 producing between 80 gpm normally and as little as 20 gpm during drought years, a safe yield of only 14 gpm at Well #3 would leave the POA with a deficit of 206 to 266 gpm.

Having tried every method to develop Well #3 that could be reasonably be expected, Lang capped the well and the POA, JDE, & Loughlin (Team) began considering alternative methods for suppling the remaining water for the system demands. The following sections outline the alternatives explored and provide a brief explanation of the feasibility of each alternative.

Further Well Development:
The Team reevaluated each of the three wells and considered additional options, such as drilling deeper, reconstructing Well #1 & Well #2, and pumping from all three wells. Drilling deeper than 1,500 feet was not considered an advisable option due to the presence of clay found below the Kelvin formation in Well #3. Clay is generally avoided in the conduction of wells because of its low permeability, susceptibility to clogging wells, difficulty in installation (increasing cost and likelihood of structural problems), and the potential to introduce fine particles and contaminate into the well water.

Although reconstructing Well #1 and Well #2 is a viable alternative, the cost to do so would be similar to the cost of drilling a new well and would exceed the amount of funding remaining in the USDA loan. It is also very unlikely that the wells would produce any more than Well #2 is currently producing, in which case, it would not be enough to supply the full amount needed and still another source would be required.

Additional Wells:
The Team explored several options for acquiring additional wells to make up the remaining source capacity deficiency. The idea of acquiring wells within the Kelvin formation would likely be very costly for the yields that have been recorded. There is also a high probability that most of the currently constructed wells (private residential) were not constructed to DDW standards for public water systems and would be costly to bring them into compliance. There would also be the added expense of property easement procurement for each individual well and the piping required to route the water to the mid mountain booster station to be chlorinated and then pumped to the storage reservoir. Outside of the Kelvin formation there are some wells that have the potential to produce sufficient flows for the system, however, the costs of constructing a pipeline and the politics involved in acquiring easements for the pipeline, make this alternative very difficult and costly.

Reservoir Diversion/Treatment Plant:
Knowing that the water rights held by the POA were originally tied to the reservoir which is operated by Weber Basin Water Conservancy District (WBWCD), the Team reached out to WBWCD to investigate the feasibility of pulling water from the reservoir, treating it, and pumping it to the system. When approached, however, WBWCD indicated that they have had a campaign going for the last decade to remove instream diversions and transfer water rights to underground sources. They indicated that they would not allow the POA to pull water from the reservoir.

Spring Development:
The Team has investigated the potential for developing surface water in the area. There is a spring on the North side of the ridgeline, west of the existing system. The spring is an undeveloped spring, therefore no further information is available for the spring at this point. If more data becomes available this may be a viable solution.

Mountain Regional Water Connection:
Just to the west of the POA is a similar community called Promontory. They receive culinary water from Mountain Regional Water Special Service District (MRW) which was set up in part to provide water to the several small communities, like the POA, that exist in that area. The team met with MRW and determined that a connection to their system was feasible. MRW was willing to provide wholesale water

to the POA or annex the system into their system. Annexing the system in would require a master planning study to be completed on the system and it would have to be upgraded to meet their design standards. Upgrading the POA system would be costly and take time, however, MRW can supply wholesale water to the community until it can be upgraded and annexed into their system. The Team is currently looking into the feasibility of this option.