

MEMO

To: Jeff Hornacek
From: Ken Schmidt
Topic: Scenic Wonders Wells
No. 3 and 4
Date: November 16, 2022

I have reviewed the historical water-level measurements for the Scenic Wonders Wells No. 3 and 4, the results of the 2019 pump tests, and the pumpage data for Well No. 4 during September 2022. Following is my interpretation of these data.

Pumpage

For the 2019 10-day pump tests, a total of 694,000 gallons, or 2.13 acre-feet, of water was pumped from Well No. 3 and 180,600 gallons, or 0.56 acre-feet, from Well No. 4. The pumpage from Well No. 4 between September 15 and September 22, 2022 was 67,200 gallons, or an average of 9,600 gpd. The State Allocated Pumping Rate is 23.5 gpm for Well No. 3 and 5 gpm for Well No. 4, or a total of 28.5 gpm. Pumping 7,200 gpd is equal to 5 gpm. If the two wells were pumped at this rate continuously for one year, they would produce about 8.07 acre-feet of water. The pumpage from the two wells during the 10-day pump tests alone was 2.69 acre-feet, or 34 percent of this value. It is more applicable to evaluate pumpage during the period of no recharge, and this is considered to be 120 days. If the wells were pumped continuously for 120 days at a total of 5 gpm, they would produce 2.66 acre-feet of water. This is about equivalent to what was pumped during the 10-day pump tests. The State Allocated Rate of 28.5 gpm is 5.7 times greater than the 5 gpm or 7,200 gpd rate. The wells can readily produce 7,200 gpd.

Water Levels

The two primary factors influencing depth to water in the wells are 1) recharge from winter precipitation, and 2) pumpage. We obtained records of precipitation at the Highway 41 entrance to Yosemite National Park for water years 2019-2022. Because of a lack of measurements, records for August-November, 2022 were taken from a nearby station (Yosemite at Wawona). Following are the annual precipitation values.

Water Year 2019 (Oct 1, 2018 to Sept 30, 2019) 45.3 inches
Water Year 2020 (Oct 1, 2019 to Sept 30, 2020) 25.2 inches
Water Year 2021 (Oct 1, 2020 to Sept 30, 2021) 25.4 inches
Water Year 2022 (Oct 1, 2021 to Sept 30, 2022) 36.9 inches

The long-term average annual precipitation at the Highway 41 station is 39.5 inches. Water years 2020 and 2021 are considered drought years, with the precipitation about one-third less than the long-term average.

Water-level measurements for Well No. 3 are available for the period September 23, 2019 to November __, 2022. Numerous measurements are available for this well for September 13, 2022 through November __, 2022, associated with the pump test on Yosemite Conservancy Well No. 2. The static water level in Well No. 3 ranged from 629.2 feet deep prior to the 2019 pump tests on Wells 3 and 4 to 637.5 feet, near the end of the Well No. 2 pump test and following pumpage from Well No. 4 in September 2022. There was a drawdown of 7.1 feet (637.5 minus 630.4 feet) in Well No. 3 due to pumpage of Wells No. 2 and 4. By September 13, 2022, the water level in Well No. 3 was 630.4 feet deep, or 1.2 feet below the static level prior to the 2019 pump tests.

A substantial amount of water-level measurements are available for Well No. 4 for 2019-22. The shallowest level was 766.5 feet on September 13, 2022. The deepest static level was 773.4 feet on March 19, 2020, or 1.9 feet below the static level of 771.5 feet before the 2019 pump tests. Records indicate that following the Fall 2019 pump tests, the water level in Well No. 4 rose to a depth of 769.9 feet through June 8, 2021, and to a depth of 766.6 feet through September 13, 2022. The water level rose 3.5 feet during the Winter of 2021-2022. This was associated with precipitation that was near the long-term average.

Winter recharge has been sufficient to maintain water levels in Wells No. 3 and 4. Following the 10-day pump tests in 2019, water levels rose due to the expected normal recovery once pumping stopped and due to winter recharge. Recharge occurred even when the precipitation was about a third less than normal.

Summary

Wells No. 3 and 4 can produce 7,200 gpd in the future. Pumpage of Wells 3 and 4 at the State Allocated Pumping Rate of 28.5 gpm would require about four hours of pumping per day to obtain 7,200 gallons, which is readily achievable.

Please call me if you have any questions.