

The HYDRANT



CAPE SAN JUAN WATER DISTRICT
April 2023
Newsletter No. 142

2023 Projects: Well Replacement

The Cape's water supply originates in the Mt. Finlayson aquifer and is accessed through two separate wells located on land that is leased to the water district from the Washington State Department of Natural Resources (DNR). Water is pumped from the wells into two separate water tanks and is subject to various processes of purification and testing before it reaches your home through a vast system of distribution lines.

Well #1 was dug in 1963; Well #2 in 1978. Both wells utilize carbon steel casing with an exterior seal of bentonite (a cement-like material) for the top 20 feet. Wells such as ours should have a lifespan of 50 to 100 years, depending on many factors. For some reason Well #2 has had a long history of corrosion. There is an abundance of theories as to the cause of this, but nothing is definitive.

Well #2 was drilled to an original completed depth of 93 feet, with water at a static level of 79 feet. In 1993 the pump failed and when Mauldin Well Service pulled it out, the pump was essentially buried in flakes of rust. A camera was used to

determine that there had indeed been internal flaking of corroded material. Foam was introduced in an attempt to "float" the flakes to the top for removal, but was unsuccessful, as there was too much material. To mitigate further corrosion, Mauldin inserted a PVC pipe liner into the casing, and the approximate inch that was left between the PVC and the steel was filled with bentonite to help keep the PVC pipe stable.

Water quality tests and other structural tests performed during regular maintenance show that both wells have similar alkalinity and chemical composition, and more importantly, the water has always tested within the acceptable limits of what is considered healthy.

Unfortunately, and despite no indication of contaminants, cracking or leaking, these repairs did not permanently fix the problem of having an unstable well.

Every three to five years, the Washington State Dept. of Health performs a sanitary survey to inspect water system facilities, operations, and records to identify weaknesses in technology, financial or managerial capacity. In 2019, the DOH performed its routine sanitary survey. At that time, officials noted flaking on the outside of Well #2. Some corrosion is normal on the outside casing due to environmental conditions, but in light of the previous history of this well, the DOH is requiring that the district replace the well. The state does not consider this an immediate concern, but expects the district to begin the process and report on progress.

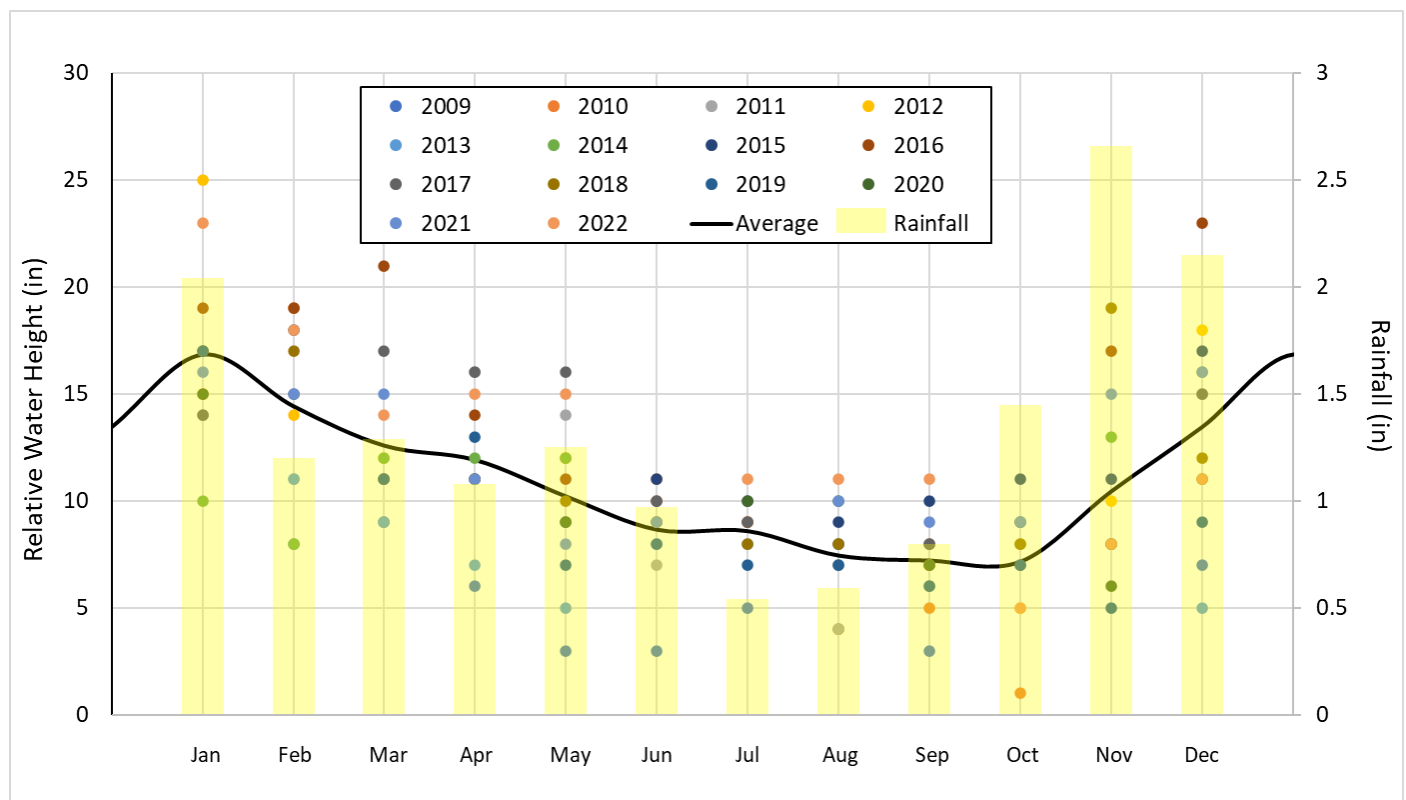
The well replacement project began in March 2020 with a close review of the district’s requirements per its lease with the DNR and initial site assessments with Mauldin Well Service. After multiple meetings, including Paul McFarland, DNR’s NW region Natural Area Manager, Water District Manager Sherri Phelps, and commissioners, a suitable and least invasive site was identified for the new well. It must remain within the established DNR easement boundaries and will be very close to the existing wells. Much discussion ensued over which, and how many, trees need to be felled. As of now, there are two Douglas Firs slated for removal to allow for the well driller’s rigs to safely maneuver.

The next step involves a licensed professional to perform a tree “cruising.” In forestry, the term “cruising” describes a woodland area survey that measures the volume and value of usable wood in standing trees. This information will be used to obtain the necessary permits and will help determine the overall cost of the project since the district must pay for the value of the trees felled. Tree professionals and well drillers may then proceed.

Our intention is to complete this project over the coming summer. We do not anticipate any water outages, as Well #1 can provide sufficient water during the transition.

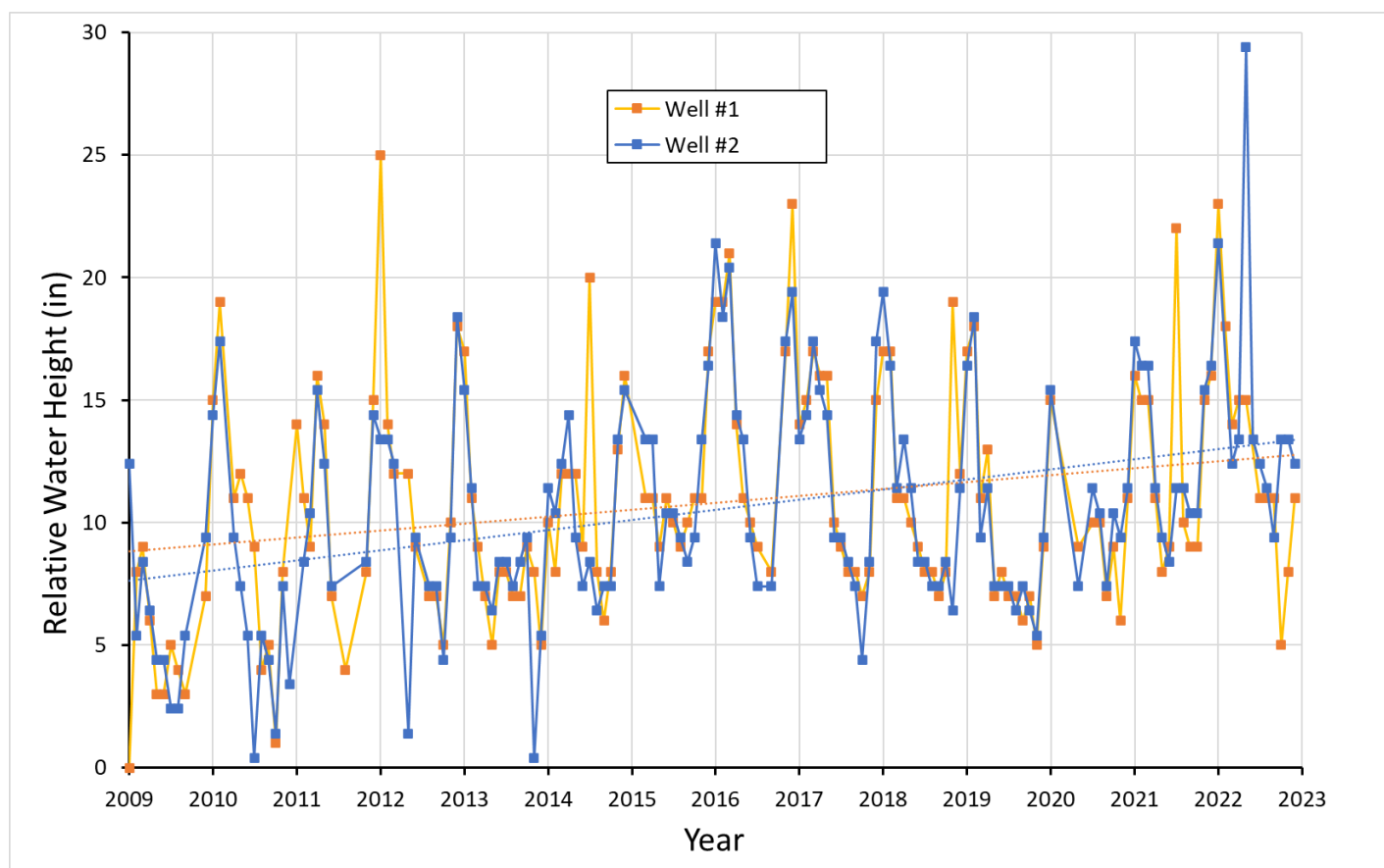
Science at the Wells Part 2

In this next exciting installment of “Science at the Wells” we’re going to look at the history of the height of water in our 2 primary wells. The height of water is measured monthly (although some months were missed); here are the data for Well #1 for the last 14 years grouped by month:



Not surprisingly, the height of water in the well is higher in winter than in summer. The height correlates well with rainfall if you allow a 2-month delay for the rainfall to reach the wells. It is also true that we pump more

water from the wells in the summer months, so some of the water height variation could be attributed to that. However, anecdotally, when we have measured water height in the wells immediately before and after periods of extended pumping, we don't see a significant drop in water height. It seems we are mostly at the mercy of the weather. So, how has the water height varied over time? Here are the data for both wells:



We can make some interesting observations: Notwithstanding that our overall water consumption has increased over the last 14 years, the height of water in our wells has not dropped. If anything, the height of water in our wells has increased. The dotted lines show the trend.

So why would the height of water in our wells be increasing? We haven't had significantly more rainfall in recent years, so it isn't increased supply. The simplest theory is that we're observing (indirectly) the local rise in sea level. The top of the water in our wells is about 24 feet above sea level. If you think of our wells as observation points into an aquifer which is constrained to fixed dimensions by the local geology, then if sea level rises and the aquifer flow stays the same, then the aquifer will back up, and we observe it in our wells. This does not mean we have more water available to us, just that our bubble of fresh water that floats on top of seawater is rising as sea level rises. Fortunately, we're high enough above (rising) sea-level that this is unlikely to be a problem in the foreseeable future.

The take-home message is that our well measurements show our water supply to be robust, and that available water is primarily determined by rainfall and doesn't seem to have been impacted by our increased usage over the years. That's the good news. The bad news is that we seem to be trending towards lower rainfall and this will eventually limit how much water we can pump. So, your careful conservation of this valuable resource is likely to become more and more important. Keep up the good work!

Budget Discussion

Each monthly meeting of the Cape San Juan Water District commissioners includes a discussion about monthly revenue, expenses and plans for capital projects. We also prepare and approve an annual budget in November of each year. For 2023, the budget amounts to approximately \$90,000. The budget covers three major cost categories. First, there are expenses that are variable and are dependent on the amount of water provided to Cape residents. This variable cost includes electricity, water treatment chemicals, and water testing and amounts to approximately \$9,500 per year. Typically, we deliver about 3,500,000 gallons of water annually. The next cost category is fixed costs that do not vary with the amount of water delivered. Fixed costs include system maintenance, insurance, lease payments to the State Department of Natural Resources, system management, and taxes. Fixed costs are budgeted to be approximately \$54,500. Finally, there are costs for capital projects. For 2023, we have budgeted \$26,000. The 2023 capital projects are the replacement of #2 well and two more system valves. In the past few years, capital projects have included hydrant and valve replacement as our system ages.

The other side of the budget equation is revenue. Revenue sources are water usage billing and interest on our savings account, and we project revenue of approximately \$72,000. From time to time, we have other revenue sources such as fines for excessive use and emergency sales to Cattle Point Estates when their reverse osmosis system is out of service for repairs. However, these sources are too unpredictable to include in our budget. Even though our budget appears to have a deficit, we do not plan to increase rates this year. The revenue shortfall is driven by the cost of the well replacement, and we will draw on our savings account for that capital project. However, inflation is driving up some of our operating expenses and we may need to plan for a rate increase in 2024. We have seen significant increases in some expenses, especially testing, treatment chemicals and insurance.

PFAS Testing

What are PFAS? They are a group of chemicals used to make coatings and products that resist heat, oil, stains, grease, and water. They are in many products and have been found to have contaminated some water supplies. They do not break down in the environment and can move through soil and contaminate drinking water sources. Their official name is Per-and polyfluoroalkyl substances.

Water systems are now required to test for PFAS. This involves filling some acid-treated test bottles, packing them with 20 pounds of ice in a large cooler in a very precise manner, then shipping by FedEx overnight to Pennsylvania. Washington State Department of Health offered free shipping and lab analysis for water systems that chose to be proactive and take part in their study as well as meet the 2023 test requirement. Cape San Juan Water District promptly enrolled in the program – it probably saved us a few hundred dollars in shipping alone! Due to a hiccup in the program in the summer of 2022, it was extended into 2023. Our test sample was collected in February 2023. No test results have been received yet.

If our sample contains no measurable PFAS, we will have to re-test every three years, although we may be able to get a waiver of that requirement. Considering the location of the wells, there is no reason to suspect any PFAS contamination. But the test results will tell us for sure. Stay tuned!

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