

MEMORANDUM

Date: May 26, 2022

To: City of Madison Finance Committee and Madison Common Council

From: Joe DeMorett, Water Supply Manager

Subject: Amendment of the 2022 Water Utility Capital Budget to authorize the transfer of Funds from the Unit Well 8 Sentinel Well Project to the Unit Well 14 Mitigation project.

Recommendation

Authorize amendment of the 2022 Water Utility Capital Budget to transfer \$50,000 from Account Number 12440-86-140 (Project Name: UW 8 Sentinel Well) to Account Number 11900-86-140 (Project Name: UW 14 Mitigation) for engineering services necessary to conduct a groundwater/borehole characterization study at UW 14. This study is necessary to mitigate the elevated and rising levels of sodium and chloride in Well 14 water.

Background

Well 14 is a water supply well that was drilled and constructed in 1960. Located at 5130 University Avenue, it serves Madison's West side neighborhoods including Spring Harbor, Old Middleton Greenway, Sunset Village, and Regent. Well 14 also serves the Village of Shorewood Hills and parts of the University of Wisconsin campus.

The well is 715 feet deep and extends into both the upper and lower sandstone aquifers that exist beneath Madison. It draws water almost exclusively from the upper aquifer. The well's far west location and high specific capacity characteristics (78 gpm per foot of drawdown) make it an important source of water in MWU's system. Over the last 5 years, it has supplied an average of 750 million gallons of water annually making it the Utility's largest producer.

In terms of water quality, Well 14 continues to show a dramatic rise in sodium and chloride levels. Nearly tripling over the last twenty years, concentrations of both ions have steadily increased and it is projected that water pumped from the well will soon exceed EPA recommended guidelines. Road salt applications are likely a significant contributor to the elevated sodium and chloride levels pumped at this well.

Previous Study

The well's borehole was recently logged with a variety of geophysical tools. From this exercise, it was determined that the majority of water produced at this well was coming from several different depths/levels within the upper aquifer. There appears to be very little water originating from the lower aquifer.

Water samples were subsequently taken at these and other depths/levels within the borehole to characterize the quality of the groundwater entering the borehole. Samples were collected under "non-pumping" conditions. Results indicated that the water entering from the upper aquifer is elevated in terms of sodium chloride (NaCl), while the lower aquifer water is not.

Remediation Considerations

One cost effective remediation method being explored in this situation would be to extend the well's steel casing deeper into, or potentially through the upper aquifer towards the deeper aquifer. This would potentially seal off the intervals contributing the sodium and chloride. Consequently, the well would draw less water from the upper aquifer and more water from the lower aquifer. The lower aquifer, however, can typically contain higher levels of iron and manganese. We would want to insure that the levels of these metals would not be too high.

Extending the well casing is conceptually estimated to cost approximately 1.5 million dollars. The Utility has tentatively placed the Well 14 Remediation project in the 2024 Capital budget.

Additionally, Utility Staff have recently applied for 2023 Community Project Funding through Congressman Mark Pocan, which could help recover the costs of the proposed Unit Well 14 remedial activity, including costs associated with the study (up to \$1.2 million). If we are fortunate enough to receive congressional appropriation, we would then reprioritize and advance this remedial project to 2023.

Proposed Study

Additional study is needed to further characterize the quality of the water entering the borehole under "pumping" conditions. The results of this study will be used to determine the feasibility of extending Well 14's casing and provide the data necessary to formulate a design plan. SCS Engineers, a local environmental engineering company, has already been retained to assist with the study. An RFP will be issued to hire a licensed well driller to perform the downhole tasks necessary to complete this study. MWU staff will also be used to conduct certain aspects. Total estimated cost to complete the groundwater and borehole characterization study is \$120,000, of which \$70,000 has already been encumbered from the existing \$82,000 project budget. An additional budget allocation of \$50,000 will be required to complete this work under the existing SCS Engineers contract. The Utility identified exiting budget in the Unit Well 8 Sentinel Well project that could accommodate transfer due to work that is not anticipated to be proceed on the Well 8 project in 2022. The Utility is requesting a budget amendment to transfer \$50,000 of existing budget authority from the Unit Well 8 Sentinel Well project to the Unit Well 14 Mitigation project for engineering services necessary to continue the groundwater/borehole characterization studies at Unit Well 14 in 2022.