



Legislation Text

File #: 16-0114, **Version:** 1

ITEM TITLE:

Update on New Municipal Well

SUBMITTED BY: Jason Miles, Capital Facilities Director

FISCAL NOTES:

Expenditure Required: \$28,000

Unencumbered Balance: \$41,651.32

Funding Source: Account Code 15-350-1602 New Water Well

RECOMMENDATION:

N/A

SUMMARY STATEMENT:

New Well Project Update

Over the past year we have been working with Shannon & Wilson and Dean Day of Day Engineering to determine a preferred location for an additional well. The reports from both Shannon & Wilson and Day Engineering are optimistic regarding developing a new well near Hermon Hutchens Elementary School.

Summary of the Aquifer Modeling Report from Shannon & Wilson (full report is attached):

'Based on nearly 4-months of water level measurements at Boring B-1 the current operation of Well 4 has a minimal impact on water levels in Boring B-1. If Well 4 is operated for longer periods of time in the future we would expect more significant impact to water levels in the vicinity of Boring B-1. Using the current pumping scenario, the model predicts that steady-state conditions are reached in the aquifer after 20 days with a maximum predicted drawdown of 2.4 feet at Boring B-1. Based on the water level measurements, the aquifer appears to respond rapidly to recharge events; however, based on the information available, we are unsure if the recharge events were precipitation or snow melt.

Based on our conclusion about the similarity of the aquifer between the two locations and the results of the numerical modeling, it appears that a production well located near Boring B-1 should be able to produce similar amounts of water as Well 4. To achieve this production a significant development effort would be needed and there is the possibility that the aquifer can't be developed enough to realize similar production. If operated simultaneously for longer periods of time than Well 4 is currently operated it is likely that additional interference (increased drawdown and potentially less production) will be observed. Based on the modeling conducted it appears that 0.5 feet of additional drawdown will be observed in the aquifer near the wells with

two wells pumping under the current pumping schedule.'

Summary from Day Engineering's 'Comments on Shannon & Wilson's elementary school well feasibility report' (full report is attached):

'1. Shannon & Wilson's report indicates that there is change in the groundwater level due to circumstances other than well pumping, and there will be a need to prove that a new well is not under the direct influence of groundwater. Variable water levels would explain why the well has a hard time keeping up at 1,700 gpm at certain times in the summer while it can pump 14 hours straight at other times. Recommend continuing to monitor the water levels for a better idea of the variations. As we proceed, we will likely have a lively discussion with the DNR and DEC proving that the new well (and our existing south well) is not under direct influence of surface water.'

2. The proposed well at the elementary school will be hydraulically influenced by the south well near Egan. The water bearing gravel and aquifer we are after is shallow, and is not thick. The model showed a possible scenario of pumping the existing well and a new proposed elementary school well at 1,800 gpm for 1 hour on and 4 hours off. Based on the water system operator's observations over time, 1,800 gpm will likely be too high of a pumping rate for the new well. We won't know for sure until we drill a well and test pump. I'm guessing the new well will pump about 1,000 gpm to be safe, and we should probably re-equip the existing south well with a smaller pump.

3. The advantages of the location of the elementary school well (power is there, we own the property, the south tank is nearby, etc.) outweigh negatives (south well influence, surface water influence, etc.) encountered so far. We recommend drilling the well at the school, but before the new well is drilled, get rid of the large underground fuel storage tank at the elementary school. The groundwater is shallow (less than 20 feet deep), and a leaking fuel tank that close would get to the well considering the shallow water table and large radius of influence.'

Summary of Continued Maintenance Recommendations from Shannon & Wilson (full report is attached):

'Accurate well performance data is an important component of a long-term well monitoring plan that includes regular monitoring and periodic maintenance/rehabilitation. Water level measurements and pumping rates should be determined and logged as frequently as possible so well performance can be tracked over time allowing potential pump problems to be identified early on. Currently there is no monitoring of the water levels in Well 4. The water levels in the well should also be compared to the predicted water level of 5.6 feet after 14 hours of pumping. This will allow a calculation of well efficiency.'

Specific capacity (flow rate divided by drawdown) is a good indicator for determining when routine maintenance may be needed. Shannon & Wilson suggests that the specific capacity be monitored at least monthly during operation, and a simple database be established to record the information. An initial baseline specific capacity should be estimated while pumping at the normal production rate. When the specific capacity has declined by 10-percent, Shannon & Wilson recommends that a more thorough analysis be performed to determine the cause of the decline and develop options for regaining or reducing additional losses in specific capacity.'

Day Engineering's Suggested Steps Moving Forward:

1. Remove the old underground fuel tank at the elementary school, and replace with an above ground tank including whatever clean-up we need (hopefully none). A large leaking tank that close to the new

well is a show-stopper for the new well. The City has their underground tank removal engineers, so we don't need to be involved in that.

2. Get with CVEA on power requirements and CVEA expense to get power to the new well house for construction estimate.
3. Get with Jim Swanson (telemetry contractor for the City) on telemetry equipment and upgrades needed for construction estimate.
4. Get with City staff (Brad and Rob) on how they want to heat the building, how they want well pump access, type of pump (lineshaft or submersible), type of meter, generator vs. well pump direct drive, etc. for construction estimate.
5. Get with City staff (Rusty and Lisa) on building and zoning requirements for construction estimate.
6. Get well design and construction funding approved by City Council showing total estimated construction costs also in case it's a good well. If the well is no good, we stop there.
7. Coordinate with ADEC and ADNR on well requirements and set up well drilling contract per the requirements including water rights. We would use Shannon and Wilson to help us on the well. We will at least have a surface water discussion and back and forth with ADEC and ADNR since we are close to Mineral Creek.
8. Drill the well, test pump, and get water quantity / quality results approved by ADEC and ADNR.
9. If the well is good and we have all of our approvals / permitting done, go back to City Council and get the funding authorized to equip the well with a pump, build a new well house, generator / right angle drive, etc., and connect water piping from the new well to the South Tank.
10. Design project and bid out the construction of the well equipment and piping project.
11. Award bid, construct / inspect project, and turn the well on.

Current Progress:

We are in the process of executing a Professional Services Agreement with Day Engineering to assess the In-Town Water System for \$28,000. Day Engineering will provide an improvement plan/report outlining the water system improvement needs and preliminary costs to construct the improvements (proposal attached).

Currently two underground storage tanks are located at the elementary school. The 2016 budget included a project to remove one of the tanks and replace it with an above-ground storage tank (HHES Underground Fuel Tank Replacement - Activity Code 1601 - Budget \$250,000). Both tanks should be removed and replaced with above-ground storage tanks. Additional funds will be requested in the 2017 CIP budget. We have asked RSA Engineering for a proposal to make an initial site visit, so they may develop a design proposal for removing both underground storage tanks and replace them with two above-ground storage tanks.