

MEMORANDUM

To: Dave Corliss, Town Manager

Thru: Mark Marlowe, PE, Director of Castle Rock Water

From: Matt Benak, PE, Water Resources Manager
Heather Justus, PG, Water Resources Project Manager
Angie Brown, Water Resources Program Analyst

Date: March 25, 2020

Title: Contract for the Drilling, Construction, and Testing of monitoring wells for the quantification of East Plum Creek and Cherry Creek basin Lawn Irrigation Return Flows (LIRFs)

Executive Summary

We are writing this memorandum to request Town Manager approval for the Services Agreement (**Attachment A**) with [REDACTED], for the construction of monitoring wells as part of the quantification of East Plum Creek and Cherry Creek basin Lawn Irrigation Return Flows (LIRFs). Currently the Town claims approximately 100 acre-feet (AF) of LIRFs annually and has the potential to claim a total of 750 AF annually after additional quantification. In order to quantify the volume of additional LIRFs available to claim, the Town must implement a monitoring program consisting of streamflow and groundwater monitoring, which requires the drilling and construction of monitoring wells at various locations throughout the Town.

The scope of work includes the drilling, construction, and testing of twenty-six (26) monitoring wells which is expected to be completed within 24 weeks for a cost of up to \$198,000. Drilling is expected to begin towards the end of May 2020 with Final Completion no later than February of 2021. Thereafter, Castle Rock Water (CRW) Staff will begin implementing the LIRF monitoring program.

Discussion

Historically the Town of Castle Rock has relied on nonrenewable groundwater for its water supply which, in the early 2000's, was determined to be unsustainable at then current rates of use in combination with projected growth. Since that time, CRW has sought to diversify the sources of water used by the Town. A need for a sustainable long-term water supply was identified in the Town's Water Resources Strategic Master Plan (WRSMP) and one of the major goals of that plan is to establish a renewable, sustainable water supply that accounts for 75% of the annual demand for water in Castle Rock. Renewable water sources for Castle Rock include a combination of existing surface water rights, reusable lawn irrigation and wastewater return flows, and imported surface water from outside

of the Plum Creek and Cherry Creek basins.

When CRW customer's irrigate their landscaping, a portion of the water is consumed by vegetation, a portion evaporates, and a portion percolates down into the soil and eventually accumulates back into the stream, thereby increasing stream levels and providing more supply. These underground flows are known as Lawn Irrigation Return Flows (LIRFs), and if quantified, can be used as part of our water supply portfolio. It is anticipated that the Town's LIRFs will comprise roughly five percent (5%) of the Town's water resources by 2050.

Since the late 1980s the Town has been working toward quantifying LIRFs and putting them to beneficial use. Existing decrees dictate how LIRFs on the west-side of the Town (the East Plum Creek Basin) must be quantified and claimed in certain hydrogeologically defined boundaries referred to as Zones 1, 2, and 3 (**Attachment B**). The Town was able to quantify LIRFs in Zones 1 and 2 for a total claim of roughly 80 AF annually and recently began claiming an additional 20 AF annually in Zones 1 and 2 of the Meadows neighborhood for a total annual claim of roughly 100 AF.

While claiming 100 AF of LIRFs is significant, analyses have shown that the Town could potentially claim an additional 460 AF annually once LIRFs are quantified in Zone 3 of the East Plum Creek Basin (Zone 3). Over the years steps have been taken towards completing monitoring requirements for Zone 3, including the construction of two monitoring sites, but the monitoring program has never been fully completed.

In addition to the potential 560 AF available to claim in the East Plum Creek Basin, it is estimated that the Town could claim an additional 190 AF in the Cherry Creek Basin (where the Town does not currently claim any LIRFs). In total, between the two basins the Town currently claims 100 AF but has the potential to claim approximately 750 AF in LIRFs.

In 2019, Castle Rock Water began the process of quantifying LIRFs in Zone 3 and the Cherry Creek Basin, contracting with Wheeler & Associates, Inc. (Wheeler) to provide guidance on requirements of existing decrees in the East Plum Creek Basin and best practices in the Cherry Creek basin for the quantification of the remaining LIRF credits. In their analysis, they determined that monitoring programs in both basins could be conducted under best practices, as requirements of the East Plum Creek Basin decrees had lapsed.

The best practices for the quantification of LIRFs include a combination of stream flow monitoring and groundwater level monitoring at strategically placed sites along tributaries and main stems of the creek to show that LIRFs accumulate and travel through the soil and back into the creek. A set of four monitoring wells spread through each strategic location (in conjunction with the stream flow monitoring sites) will provide the Town with the strong evidence needed for Water Court, where the Town's ability to claim LIRFs will be determined.

Over the course of a year, Wheeler and Castle Rock Water Staff vetted potential monitoring well locations and were able to identify nine (9) strategic locations, eight of which the Town has the ability to begin drilling and constructing in 2020 (**Attachment B**). The ninth location will most likely need to be drilled in 2021 due to site access restrictions due to current development.

Between the eight sites, Castle Rock Water would like to drill twenty-six (26) new monitoring wells at depths ranging from 50 feet (ft) to 125 ft, depending on at what elevation the drillers reach groundwater. Well sites are generally located in HOA and Town owned parcels, often in close proximity to residences. Castle Rock Water Staff are asking that the selected driller finish each monitoring well as "flush mounts" (**Attachment C**) so as to be as inconspicuous as possible. Furthermore, the drilling, construction, and testing of each monitoring well should generally follow these guidelines:

- One to two days to complete all work.

- Work is to be conducted only between the hours of 7 AM and 7 PM Monday through Friday, and 8 AM through 6 PM on Saturdays.
- Traffic control may be needed in a select few locations as proposed by drillers and approved by the Town.

In early March, Staff released a Request for Proposals (RFP) for the drilling, construction, and testing of 26 monitoring wells. The Town received 4 responses in total for costs ranging from \$180,726 to \$318,618 and a project duration of 9 weeks to 24 weeks. The following table provides a summary of responses received by Castle Rock Water from drilling contractors:

Drilling Contractor	Estimated Cost	Estimated Project Duration
Alpine Remediation, Inc.	\$ 180,726	161 days (23 weeks)
Na Ali'I Consulting & Sales, LLC	\$ 231,357	61 days (9 weeks)
Tasman Geoscience, Inc.	\$ 318,618	162 days (24 weeks)
Terracon Consultant, Inc.	\$ 263,832	102 days (15 weeks)
Cascade Drilling	No Response	
Dakota Drilling	No Response	
Drilling Engineers	No Response	
Gcinc (?)	No Response	
Hydro Resources	No Response	

Castle Rock Water Staff are currently in the process of evaluating responses and will select a drilling contractor for approval by the Town Manager in the coming weeks.

Budget Impact

Funding for the project is available and will come from Other Professional Services 211-4340-443.30-70 which has a current balance of \$2,078,199.05. The cost proposed by [REDACTED] is \$ [REDACTED] which will include the construction of 26 wells. Staff further requests an additional ten-percent (10%) contingency in the amount of \$ [REDACTED] for a total authorization of \$ [REDACTED]. A breakdown of cost is provided in the table below:

Project Account	Scope of Work	Contingency	TOTAL
211-4340-443.30-70 – Other Professional Services			

Staff Recommendation

Staff recommends Town Manager approval to pursue a contract for the Drilling, Construction, and Testing of monitoring wells for the quantification of East Plum Creek and Cherry Creek basin Lawn Irrigation Return Flows (LIRFs) with [REDACTED].

Attachments

Attachment A: Services Agreement
Attachment B: Overview of LIRF Zones, Basins, and Monitoring Wells Sites
Attachment C: Flush Mount Design