



City of Excelsior Springs, MO

Mineral Well Study

2014

May 12, 2014

Presented By: Layne Christensen Company
Luke Fanshier, Account Manager

WATER RESOURCES

May 12, 2014

Chad Birdsong
City of Excelsior Springs, MO
Public Works Dept.

Regarding: Mineral Well Study

Dear Chad,

Thanks again for allowing Layne to assist you with your water related needs. Below you will find our scope of work along with budgetary pricing as requested.

Project Scope

The city of Excelsior Springs, Mo would contract Layne Christensen Company to determine if the 5 selected mineral wells (CL-AS-010-011, CL-AS-010-031, CL-AS-010-018, CL-AS-010-021 & Well East of hall of waters in wooden building) still yield mineral water for bottling, bathing, swimming or drinking at the hall of waters in Excelsior Springs, Missouri. The project scope would entail:

1. **Water sampling of each well for analysis in a lab setting.**
 - a. To obtain a representative sample of each well, it is recommended that each well be pumped for a minimum of 12 hours prior to collecting the sample to allow natural aquifer recharge of the well and not to be influenced by standing water in the well or nearby in the aquifer. Well CL-AS-010-031 is still in operation and sample could be taken from the well relatively easy. The other four wells do not have an operational pump in the well and require a confined space entry to install a small submersible type pump if the well is still open and has not collapsed.
 - b. Well's CL-AS-010-011, CL-AS-010-018 & CL-AS-010-021 and the well East of the hall of waters in the wooden hut, all would require some kind of preliminary work before a sample could be obtained. It is unknown if these wells are still functional and if a pump could be temporarily installed. It is possibly that these wells still have old pumping equipment in them, which would require removal before gathering samples.
 - c. **Analysis of the samples.** Layne would contract Water Systems Engineering Laboratory out of Ottawa, KS to run a complete well profile analysis. A complete well profile includes inorganic chemistries: pH, alkalinity, bicarbonate, carbonates, chloride, total dissolved solids, conductivity, total hardness, calcium, magnesium, copper, iron, manganese, phosphate, nitrate, silica, sulfate, tannin, potassium, sodium, chlorine, Oxidation-Reduction Potential (ORP), Total Organic Carbon (TOC), Saturation Index

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- d. The complete well profile also includes the following bacterial assessment: Heterotrophic plate count, cell count made by adenosine triphosphate (ATP) method bacterial identification of the two major populations, assessment of aerobic and anaerobic growth, sulfate reducing bacteria (SRB), iron oxidizing bacteria and microscopic evaluation, Total and E.coli Coliform Bacteria Includes Report with observations and interpretation of data with regard to well operation, and if applicable, rehabilitation recommendations are presented. This data will also shed some light on the types of treatment needed if any if to meet Missouri Dept. of Natural Resources requirements along with Missouri Health and Safety.

2. Drilling new production wells and installation of pumping equipment.

- a. If the test show that mineral water is still present in the aquifer, and the city has decided to move forward with the project. Layne would recommend drilling replacement wells and abandoning the existing wells that do not meet MD&R current well completion regulations. At this current juncture, the cities wells are in violation of well completion and do not meet the standards for sanitary seals and ventilation above flood plain. It would be in the best interest of the city to offset and drill/ construct new 6" diameter wells with submersible pumps that meet today's well completion standards.
- b. Once the wells are completed, each well would need to be test pumped to determine the sustainable yield the well could produce. After this information is gathered, new pumping equipment would be installed. Note** Layne would not be responsible for discharge piping from well to final discharge point, nor would Layne be responsible for electrical service to new wells.
- c. Once new discharge piping and electrical services have been run to the new well, Layne would monitor each well's start up and completion.

3. **Budgetary Pricing-** Layne proposes to provide the testing and well sampling analysis on a time and material basis. Well drilling and construction along with pumping equipment will be quoted as a lump sum budgetary price, to be finalized upon completion of engineering and testing.

Water Sampling

- Water Sampling Per Well (Time and Material).....\$195/HR.
(Includes 2 man pump crew & equipment, 12 HR min pumping of well, Removal of existing pump if applicable, installation and pulling of temporary pump if applicable, safety considerations for confined space, site moves)
- Water Sample Analysis and Reporting Per Sample\$1,450/Per Sample
(Includes laboratory analysis of water samples along with detailed results report)

Drilling and New Well Construction (per well)

- Mobilize Drilling Rig and Support Equipment.....\$3800
- Drill and Construct 6” diameter well\$32,500
- Installation of New Pumping Equipment\$23,000
- Final startup and wellhead completion\$17,500
- Evaluation, Reporting, and Design.....\$7500

Subtotal (Drilling and Construction), per well.....\$84,300

Exclusions- Layne will not be responsible for:

- Site access
- Water generated during construction or pumping test procedures
- Traffic control if applicable
- Final discharge piping from new well to discharge point
- Electrical service to newly-constructed well
- Bonds, taxes, or specialized insurance (such as OCP)



Time and Material Rates

2 Man Pump Crew Field hours

○ Per Hour-

Regular.....\$195.00

Shop Hours

○ Per Hour-

Regular.....\$85.00

● Mileage- Per

mile.....\$NO CHARGE

Pricing is subject to change after 30 days.

We appreciate the opportunity to work for the City of Excelsior Springs. Please do not hesitate to contact me with any questions or concerns.

Regards,

Luke Fanshier
Account Manager
Layne Christensen Company

City of Excelsior Springs, MO

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