

September 26, 2019

Mr. David Bruzzone  
Utilities Planning Manager  
City of Pleasanton  
P.O. Box 520  
Pleasanton, CA 94566

Subject: PFAS Treatment Alternatives and Implementation Plan

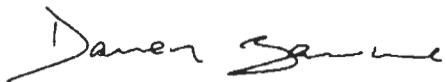
Dear David:

This letter proposal includes a scope of work, engineering budget estimate, and schedule to rapidly identify PFAS treatment alternatives and help the City develop an implementation plan to address PFAS compounds of concern. This work will be integrated with the other improvements being considered at Wells 5, 6, and 8 as part of the Water Supply and Distribution System Improvements Project.

Please review and let me know if you have any questions or comments. We look forward to working with the City on this Project.

Respectfully,

CAROLLO ENGINEERS, INC.



Darren Baune, PE  
Project Manager



Tom Gillogly, PE  
Principal in Charge

DGB:lmo

Attachment - Exhibits A, B, and C

## Exhibit A-1 – Scope of Work

# SCOPE OF WORK

## PFAS Treatment Alternatives and Implementation Plan

### VISION STATEMENT

Carollo Engineer, Inc. (CONSULTANT) is currently under contract with the City to perform the Water Supply and Distribution Facilities Improvements Project (Project). This scope of work is proposed as an amendment to the Project to rapidly identify PFAS treatment alternatives and help the City develop an implementation plan to address PFAS compounds of concern. This work will be integrated with the other improvements being considered at Wells 5, 6, and 8 as part of the Project

### PROJECT BACKGROUND

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In May 2016, the United States Environmental Protection Agency (EPA) issued a lifetime Health Advisory (HA) Level for perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) for drinking water, advising municipalities that they should notify their customers of the presence of levels over 70 parts per trillion (ppt; ng/L) in community water supplies. These are fluorinated organic chemicals that are part of a large group of chemicals referred to as per- and poly-fluoroalkyl substances (PFASs). On July 13, 2018, the State Water Resources Control Board Division of Drinking Water (DDW) established interim Notification Levels (NLs) for concentrations 13 ppt for PFOS and 14 ppt for PFOA. At the same time, DDW also established an interim Response Level (RL) of 70 ppt for the total combined concentration of PFOS and PFOA, consistent with the EPA HA Level. In August 2019, the DDW issued revised NLs of 5.1 ppt for PFOA and 6.5 ppt for PFOS. The revised levels were based on updated health recommendations by the Office of Environmental Health Hazard Assessment (OEHHA). The DDW may also revise the RL for PFOA and PFOS later this year.

In March 2019, DDW announced the PFAS Phased Investigation Approach. With the implementation of Phase I of the Approach, DDW issued a Compliance Order identifying 612 wells in water systems across the state that must initiate quarterly source water sampling for one year by June 30, 2019. The City of Pleasanton (CITY) and its three active wells (5, 6, and 8) were on that list for one year starting in April 2019.

Of the thousands of possible PFAS compounds, EPA Method 537 Rev 1.1 provides information on 14 PFAS compounds, and EPA Method 537.1 reports on 18 PFAS analytes. The CITY has already collected the initial source water monitoring samples and had them analyzed by EPA Method 537.1 (18 PFAS), which is one of the two approved analytical methods. All three wells have measurable concentrations of multiple PFAS compounds, including PFOS and PFOA above NLs, and with Well 8 above the current RL.

# SCOPE OF WORK

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## **Task 1 - Project Management**

The CONSULTANT will extend the on-going project management activities to include the efforts included in this Amendment below.

## **Task 2 - Existing Information Collection and Review**

### **Task 2.1 - Regulatory Background**

The CONSULTANT will review and summarize the status of the California Division of Drinking Water (DDW) and EPA's Office of Drinking Water's management approach for per- and poly-fluoroalkyl substances, along with currently-projected plans for implementing MCLs, response levels, and notification levels for these compounds. Current levels and guidance for these compounds established by other states will also be summarized to provide a broader perspective on this rapidly changing environment.

### **Task 2.2 - Groundwater Quality**

Based on available information provided by the CITY, the CONSULTANT will request, review, and tabulate PFOS, PFOS, and other available PFAS compounds. It is anticipated that data from CITY Wells 5, 6 and 8, and data on water purchased from Zone 7 will be included in this summary. Water impacted at levels exceeding specific DDW Notification Level(s) will be identified. Additional water quality data for Wells 5, 6, and 8 will be obtained from the CITY to facilitate evaluation of blending opportunities and treatment alternatives. These additional data will include parameters that may affect the treatment technologies evaluated in Task 3, such as temperature, pH, total organic carbon, and specific inorganic parameters.

### **Task 2.3 - Groundwater Production and Distribution**

The CONSULTANT will compile summary tables of information critical to evaluating treatment alternatives, including:

- Annual average well production data and well pump curves.
- Purchased water volumes.
- Well site parcel information and well depth.
- Basic characteristics of utilities available to the Well 5/6 and Well 8 sites: including electric power, potable water supply, and sanitary capacity/quality constraints.
- Currently-planned conveyance/distribution infrastructure improvements by the CITY that may benefit water quality at the affected sites via blending.

### **Task 2.4 - Site Visit**

Since site visits and site information has been included in existing services, additional site visit are not anticipated as a part of this scope.

### **Task 3 - Goal Setting**

The CONSULTANT will prepare and lead one (1) meeting with CITY staff to facilitate the selection of a treatment goal for the PFAS compounds. The meeting will establish up to three (3) treatment targets for consideration during the Task 4 (Treatment Alternatives Evaluation), following an introduction summary introduction to PFAS compounds, health effects, and treatment technologies. For example, these targets may include:

- Current (70 ng/L PFOS + PFOA) CA Response Level compliance.
- Treatment to below CA DDW public notification levels.
- Barrier to address a suite of PFAS compounds to below detection limits and other contaminants below Public Health Goals (PHGs).

Non-cost treatment alternative evaluation parameters to be considered for the evaluation (i.e. complexity, operation time, and operator certifications, chemical usage, residuals, etc.) will be discussed and selected.

### **Task 4 - Treatment Alternatives Evaluation**

#### **Task 4.1 - Treatment Alternatives**

Each treatment alternative will include development of conceptual design criteria for the components listed below. For the purposes of streamlining the alternative evaluations, the CONSULTANT and CITY staff will work together to simplify/limit the variations of each item listed below based on the CONSULTANT's experience with similar facilities and CITY staff preferences.

Pretreatment for removal of solids produced by the wells:

Solids, including sand/silt, corrosion byproducts, etc., can be present in groundwater production wells. Solids produced by the wells, which tend to increase with well age, pose a risk to groundwater treatment systems and can significant challenges for routine operations and maintenance of groundwater treatment systems. Pre-treatment systems to be considered in development of alternatives include:

- Manually-cleaned basket strainers.
- Automatic backwashing screens.
- Bag or cartridge filters.
- None

PFOS/PFOA treatment processes:

- Blending.
- GAC adsorption.
- IX resin treatment.
- Reverse osmosis (RO) treatment.

Ancillary elements associated with the treatment facilities:

- Backwash supply and backwash waste management for GAC vessels.
- RO reject and clean-in-place management.
- Other residuals handling requirements.
- Treatment power estimate.

#### **Task 4.2 - Evaluation of Alternatives**

The evaluation of each blending/treatment alternative will include the following presented in graphical or tabular format:

- Simplified process flow schematic.
- Treated water quality goals.
- Conceptual design criteria (including conceptual level power requirements).
- Residuals management strategies.
- Anticipated ancillary water quality or distribution system improvements.
- A brief comparative assessment of "non-cost" advantages and disadvantages of each alternative, presented in tabular format.
- Conceptual opinion of probable cost (capital and annual operation and maintenance).
- Present worth comparison of cost opinions.
- Conceptual site plans

Cost opinions will be consistent with Class 5 Estimates as defined by the Association for the Advancement of Cost Engineering (AACE) International. This level of engineering cost estimating is generally made with limited information, including process block diagrams, and preliminary equipment lists.

It's assumed the City will provide the existing site plan for each well site. The conceptual site plans developed by the CONSULTANT will show approximate equipment area and other major site improvements, if required.

#### **Task 5 - Treatment Alternatives Workshop**

This task includes a treatment alternatives workshop to summarize and discuss the evaluation and recommendations developed in Tasks 3 and 4. The workshop will include a comparative conceptual level (AACE International, Class 5) cost differential to reach the treatment targets based on the preliminary results of Task 4 (Treatment Alternatives Evaluation). This information will be used to facilitate a discussion to help the CITY select a treatment goal and preferred process and will be used to guide the development of Task 6 (Implementation Plan Preparation).

#### **Task 6 - Implementation Plan Preparation**

Based upon the results of evaluations in Task 3 - 5, and in consultation with CITY staff, the CONSULTANT

will recommend a plan for full-scale implementation plan to achieve the selected PFAS goals for Wells 5, 6 and 8.

Conceptual site plan(s) of the recommended treatment approach for Well 8 and Wells 5 & 6, will be prepared using existing facility site plans provided by the CITY. The conceptual site plans will be based on preliminary equipment sizing. A tentative implementation approach, including recommending treatability testing (as applicable), and full- scale project delivery method and schedule, will also be included.

Conceptual cost opinions will be summarized for the recommended implementation plan, including the potential for phasing of facilities to address prioritized water quality improvement goals, where applicable. Additional staffing requirements for operation and maintenance will also be projected.

## **Task 7 - Draft and Final Reports**

The CONSULTANT will compile the results of the alternatives development/evaluation and recommended implementation plan into one report, as follows:

- Prepare and submit a Draft report documenting the results of Tasks 2 through 6 above. Submit Draft report for CITY staff review in \*.pdf format.
- Incorporate the CITY review comments and prepare a final report.

The Final Report will be delivered as five (5) hard copies and electronically in \*.pdf format.

## **Task 8 - Bench Scale Testing (Optional)**

### **Task 8.1 – Bench Testing (Optional)**

The purpose of this task is to more accurately estimate the media replacement frequency during an accelerated time frame without performing pilot of full-scale testing. This information provides a more detailed basis for estimating granular activated carbon (GAC) media and anion exchange (AIX or IX) media consumption for O&M and life cycle costs, and also pre-screens the effectiveness of the tested media. Details of the testing will be agreed upon with the CITY prior to approval and execution of this task.

## **Services Not Included in Scope of Work**

The following are services that have not been included in this scope of work. These services may be provided under additional task order(s) if deemed necessary by the CITY, and only after approval in writing:

- Public outreach efforts.
- Meetings with regulatory, permitting, or other municipal (i.e. Zone 7) agencies.
- Groundwater sampling and laboratory analyses.
- Design, permitting, or construction phase services for groundwater quality improvements/wellhead treatment recommended through the course of the study.
- Electrical arc flash studies in accordance with NFPA 70E requirements.
- Surveying or geotechnical investigations.

- Detailed CAD drawings of facility layouts.

## **Schedule**

The Engineering Estimate for this Scope of Work is shown in Exhibit B-1 and the Schedule is shown in Exhibit C-1.



## Exhibit B-1 – Engineering Estimate



**WATER**  
OUR FOCUS  
OUR BUSINESS  
OUR PASSION



## Exhibit C-1 – Schedule

