

**PROFESSIONAL SERVICES AGREEMENT
FOR
CITY OF PFLUGERVILLE WATER TREATMENT PLANT ENGINEERING SERVICES**

WORK AUTHORIZATION NO. 2020-7

This WORK AUTHORIZATION is made pursuant to the terms and conditions of the Professional Services Agreement executed the 20th day of January, 2015 by and between the City of Pflugerville and DCS Engineering, LLC., hereinafter referred to as the Agreement.

The Consultant will perform the scope of professional services as shown and as stipulated in Attachments A through B which will include the tasks to be performed, the deliverables to be provided by the Consultant, and the milestone schedule for completing the tasks and the deliverables.

Compensation to the Consultant for the services provided pursuant to this work authorization shall be in accordance with Article 4 of the Professional Services Agreement, as further detailed in Attachment A to this Work Authorization. Attachment A shall include the method and basis for determining the compensation for this work authorization. The maximum amount payable under this Work Authorization is \$64,940.00 unless amended by a Supplemental Work Authorization.

This Work Authorization does not waive any of the parties' responsibilities and obligations provided under the Professional Services Agreement.

This Work Authorization is hereby accepted, acknowledged, and is effective when fully executed below.

CITY OF PFLUGERVILLE

CONSULTANT
DCS Engineering, LLC

BY: _____
Public Works Director

BY:  _____

DATE: _____

TITLE: Principal

DATE: 3/4/2020

ATTACHMENT A
SCOPE OF SERVICES

City of Pflugerville Water Treatment Plant Engineering Services
Work Authorization No. 2020-7
Surface Water Treatment Plant -Rehabilitation Work
Attachment A

In accordance with the Professional Services Agreement for the Water Treatment Plant Engineering Support between City and Consultant ("Agreement"), City and Consultant agree as follows:

1. Specific Project Data

A. Title: Surface Water Treatment Plant -Rehabilitation Work

B. Consultant Project No.: 20101423

C. Description:

Per your request, we have prepared this Work Authorization to provide professional engineering services for the City related to the rehabilitation of the City's Surface Water Treatment Plant. The City has miscellaneous SWTP tasks requiring engineering input to facilitate resolution. The level of engineering input will vary based on the task identified. The work performed by the Consultant will be done confidentially at all times. No information will be shared or discussed with anyone other than the City and the City's specified interested parties unless prior authorization from the City is received in writing by the Consultant.

2. Services of Consultant

A. The scope of work to be completed under this work authorization is listed in the following attachments. These attachments enumerate the various issues identified to date at the SWTP. Although this list has attempted to capture all active items to resolve, we can't guarantee that more items will not be identified as we implement the work defined by the attached list due to field found conditions. These items may require additional engineering and/or capital costs to remedy.

1) Attachment B - List of Remaining Issues at SWTP Identified for Resolution by Consultant

3. Additional Services if required:

A. Additional Services are those that are not currently anticipated to be a part of this work authorization, but which could become necessary or desired at some time during the project. Consultant shall perform Additional Services only as authorized to do so by the City. If the City requests Additional Services, Consultant will prepare a specific scope and budget for the services requested for review and approval prior to initiating the services.

4. Schedule:

A. Consultant will coordinate with the City Staff to set priorities for the activities, projects, work tasks, etc. identified in Attachment B. Based on this coordination, an implementation schedule with completion dates will be developed. The total duration to complete the work identified in Attachments B is anticipated to take 2-3 months starting on March 1, 2020 and concluding by June 1, 2020.

B. It should be noted here that we understand the City Operations Staff likely has "todo" lists that they have created over the last few months. Those lists can be merged into the attached lists, if desired, so that one comprehensive list is being worked from.

C. The work outlined above shall commence after this agreement is signed by the City. The services outlined in the scope above are planned to be completed by June 1, 2020 (i.e. prior to peak flows beginning this summer).

5. Deliverables:

A. When the nature of the work requires or it is requested by the City, prepare summary of findings for work completed via email to the City.

6. Owner's Responsibilities

A. Owner shall have those responsibilities set forth in the Professional Services Agreement.

7. Payments to Consultant

A. City shall pay Consultant for services rendered as follows:

Consultant will invoice monthly for services rendered the preceding month based on the percentage of services completed. City shall pay Consultant within 30 days for the services rendered and invoiced.

B. Time & Material Fee

We propose to provide the services described above for data analysis and recommendations on a time and material basis and reimbursable fee basis as noted below. We shall obtain prior written approval from the City if this amount is to be exceeded. We propose to bill our Project Manager, Mr. Darren Strozewski,

City of Pflugerville Water Treatment Plant Engineering Services
 Work Authorization No. 2020-7
 Surface Water Treatment Plant -Rehabilitation Work
 Attachment A

P.E., at \$165/hour and project engineers at \$110 per hour. Other staff members will be billed separately per the below Standard Hourly Rate Table by Staff Category and utilized as needed.

- C. Our proposed fees for the above scope of work are shown by task in the below table. The above referenced services will be performed within the duration discussed above. The below reimbursable fees shall not be exceeded without prior written authorization from the City of Pflugerville. Consultant's liability to the Client for any cause or combination of causes is in the aggregate limited to an amount no greater than the fee earned under this agreement.
- D. The terms of payment are set forth in Article IV of the Professional Services Agreement and Work Authorization 2020-7- Attachment A.

Standard Hourly Rate Table

| Classification | Billing Rate | | |
|----------------------------|--------------|---|----------|
| | | | |
| Principal | \$215.00 | - | \$275.00 |
| Senior Project Manager | \$200.00 | - | \$240.00 |
| Project Manager | \$140.00 | - | \$210.00 |
| Design Manager | \$120.00 | - | \$170.00 |
| Senior Engineer | \$100.00 | - | \$160.00 |
| Project Engineer | \$90.00 | - | \$140.00 |
| CAD Manager | \$100.00 | - | \$200.00 |
| IT Manager | \$110.00 | - | \$160.00 |
| IT Technician | \$80.00 | - | \$140.00 |
| Senior Designer | \$90.00 | - | \$160.00 |
| Designer II | \$80.00 | - | \$145.00 |
| Designer I | \$70.00 | - | \$125.00 |
| Senior Computer Technician | \$70.00 | - | \$140.00 |
| Computer Technician II | \$50.00 | - | \$125.00 |
| Computer Technician I | \$40.00 | - | \$110.00 |
| Project Coordinator | \$45.00 | - | \$110.00 |
| Clerical | \$30.00 | - | \$90.00 |
| Document Control Clerk | \$30.00 | - | \$90.00 |

Fee Schedule

| Task | Description | Fee |
|------|-------------------------------|-------------|
| 230 | SWTP-Rehabilitation Work | \$64,940.00 |
| | Total Time and Material Fee = | \$64,940.00 |

8. SubConsultants:
None

9. Other Modifications to Agreement:
None

ATTACHMENT B

**LIST OF REMAINING ISSUES AT SWTP IDENTIFIED FOR
RESOLUTION BY CONSULTANT**

City of Pflugerville
Surface Water Treatment Plant
List of Remaining Issues at SWTP Identified for Resolution by Consultant
February 3, 2020

The below issues have been noted by Consultant starting on September 20, 2019 at the Surface Water Treatment Plant. The list has been prioritized by Consultant and will be coordinated with City Staff and City Management to address the immediate, short term, and long term issues listed below.

1.1 Historical Water Treatment Plant Flows and Flow Projections

1. Consultant to finalize review and update flow projection graph with historical flows, growth projections from FNI Water Master Plan using 400 gpd/LUE (Consultant) and 420 gpd/LUE (FNI), and TCEQ min supply capacity requirement for 0.60 gpm/LUE. Determine when construction is required to be completed for the SWTP Expansion from 17.14 mgd to 30,0 mgd based on this information to meet demands and avoid a moratorium on the City's growth.
2. Consultant to finalize project schedule with City showing preliminary design/ultimate plant layout; final design; bidding; and construction phase to expand the SWTP from 17.14 mgd to 30 mgd including addressing 2006 design issues plaguing the operation of the SWTP including SCADA system detailed overhaul/QC.

1.2 Colorado River Intake Pumping Station and Transmission Line

1. Prepare separate scope and fee for the design, bidding, and construction of plans and specs for the installation of the 4ili pump, electrical MCC, SCADA, and submittal to TCEQ for review and approval.

1.3 Lake Pflugerville

1. Evaluate with City having Consultant perform a second detailed inspection of lake for zebra mussels on piers, shorelines, fixed objects, etc. to match last year's inspection as risk assessment to recreational users of lake.

Lake Intake Pumping Station

1.4 Interim Sodium Permanganate System and Pretreatment System

1. Prepare separate scope and fee to oversee construction/startup of temporary sodium permanganate system (for manganese and odor and taste issues) installation package and coordinate SCADA modifications that are required.
2. Prepare separate scope and fee to obtain TCEQ approval letter prior to activating the system.
3. Prepare separate scope and fee to coordinate and develop an activation schedule for this system with considerations to the zebra mussel organics generated, shell fragments entering the plant, and PAC system reactivation. PAC system is recommended to be fully operational and tested prior to starting dosing sodium permanganate. Finalize the conceptual plan for relocating the Lake Intake Pumping Station 400 micron filters to the end of the 36" raw water transmission line to catch the zebra mussel shells once the "slow dose" of sodium permanganate begins, which will result in zebra mussel shells coming off the pipe interior. Evaluate disposal of the filter's automatic debris purge system to the membrane drain channel (thus the backwash clarifier) and then conveyed to the Weiss Forcemain by the clarifier sludge pumps to the Central WWTP.
4. Prepare separate scope and fee to develop an installation package for relocating the filters including piping, concrete, electrical, and SCADA modifications. Remove stainless steel "construction screen" in the pipe going to each membrane basin as part of these activities.
5. Prepare separate scope and fee to analyze and troubleshoot Lake Intake Pumping Station to determine issues limiting this facility to a reported flow of about 13.0 mgd to the SWTP. Complete analysis and remedies no later than June 1, 2020 when peak flows begin. Potential issues may include but not be limited to: pumps; restricted pump inlet screen on vertical turbine pumps in the pump cans; SCADA; zebra mussels in 48" pipe, 36" raw water transmission line, air release valve, or static mixer; pump screens clogged on discharge header; or inline construction screen clogged prior to each membrane basin.
6. Coordinate with Suez and calculate membrane life based on allowable oxidant exposure hours with a target sodium permanganate residual of 0.15 mg/L in the five membrane trains.

1.5 Permanent Sodium Permanganate System

1. Final design plans and specifications to be submitted to City at end of January for review. Anticipate the start of public bidding by end of February.

Membrane Trains & Associated Treatment Equipment

1.6 Membrane Trains

1. Consultant and City to coordinate on Membrane Repair Site Visit by Suez: Coordinate with JO Witlox (Suez) regarding membrane cleaning cycles/intervals and specific methods to maximize membrane life going forward. Start this process with a conference call in January with him/Suez so that his on-site visit-in mid January is coordinated with the repair work. Tentatively plan for the cleaning cycles to be done with him while he is on-site in parallel with repair work. Consultant will be on-site for 4 hours on 8 days (total one Engineer for 32 hours) during the two weeks Suez is on-site to observe, gather data, and direct priorities of work. Upon conclusion of the field work the following information will be obtained or work completed:
 - Determine if Train No. 3 membranes are beyond repair and require full replacement at a cost of about \$500k or if repairs can be made to restore their service life to pass MIT tests and return the train back to service.
 - Repair Train No. 3's large bubbles and evaluate extent of champagne bubble repairs that still remain to be done.
 - If Train No. 3 membranes are beyond repair, make decision with City to repopulate trains with only 4 cassettes each and use first cassette area as pretreatment basin using an NSF 61 approved tarp to catch Zebra Mussel shells; or continue the plan to relocate the Lake Intake Pumping Station filters on the 36" raw water transmission line. If the tarp is elected, the N-1 capacity of WTP would equal 16.4 mgd prior to purchasing and installing 5 new cassettes in one year (i.e. March 2021) to allow zebra mussel shells to slough off via intentional high flows induced by Lake Intake Pumping Station. Max capacity of WTP for N-1 is equal to 20.5 mgd (i.e. the existing firm membrane capacity of the WTP). Additionally, a submittal on reduced capacity of membranes to 16.4 mgd to TCEQ is required for review and approval.
 - Quantity of additional repairs performed on Trains No. 1, 2, 4, and 5 by Suez; and how much more work does the City have to do after Suez leaves to finish the repairs based on their full training (measured in labor hours and then in months)? Quantity of repairs may be by cassettes, membrane fibers (noodles), or modules.
 - Determine how soon and how many trains require replacement; and provide the City the fiscal year and amount to budget for the identified replacements.
2. Consultant will coordinate sodium permanganate dosing with Suez prior to implementation to assure negative impacts to the membranes are avoided.
3. After all Suez membrane repairs are complete, Consultant will work with Operators to perform a flow test on each train individually and all trains together to determine the membrane production capacity of the plant using the existing permeate pumps. This flow test may need to be performed again after the City completes its repair work after Suez leaves the site.

1.7 Rapid Tank Drain Equipment

1. NA

1.8 Membrane Aeration

1. NA

1.9 Clean-In-Place Equipment

1. NA

1.10 Backpulse Equipment

1. NA

1.11 Recirculation Equipment

1. NA

1.12 Air Compressors

1. Evaluate installation of box fans and louvers for air exchanges to keep blower room cool and allow doors to this room to be shut.

1.13 Vacuum Ejectors Vacuum Pumps

1. Consultant will work with City to perform startup and field testing on Trains No. 3 and 5 once they are back on-line to confirm each ejector is working correctly and evacuating the air upon completion of an MIT.

1.14 Permeate Pumps and Associated Piping

1. NA

1.15 Clearwells

1. NA

1.16 High Service Pumping Station

1. Prepare separate scope and fee for the design, bidding, and construction of plans and specs for the installation of the 4th pump to increase High Service Pumping Station capacity to match the membrane's firm capacity of 20.5 mgd, electrical MCC, SCADA, and submittal to TCEQ for review and approval. This also has to be programmed in with the modifications to the 1849 Park's meter which also takes water from Manville to achieve the 685,000 gpd.

1.17 Backwash Clarifier & Sludge Disposal

1. NA

Chemical Systems

1.18 Sodium Hypochlorite System and CT Study

1. Oversee construction of Installation Package by City and Contractor to implement the proposed modifications to reconfigure the system. Field modifications will begin immediately once ready to commence but the final tie-ins will not be completed prior to receiving TCEQ's written approval to activate the new systems.

1.19 Brine System

1. NA

1.20 Liquid Ammonium Sulfate (LAS) System

1. Consultant and City will work to oversee the field installation, startup, and testing to confirm the new LAS pumps are working correctly for dosing at the new manhole location that will be installed between Clearwell No. 1 and No. 2. Consultant will work with Alterman to make the required SCADA adjustments to return the system to automated dosing.
2. Consultant and City to continue to review sample results for free chlorine, total chlorine, and monochloroamine results to confirm results are correct for finished water going into the distribution system; and due to mixing with water from Manville WSC. This monitoring will occur prior to and after the proposed chemical dosing and process modifications. The proposed process in the City's WTP will result in finished water from the WTP mixing with finished water from Manville; thereby, addressing concerns with negative chemical reactions between the two finished waters.

1.21 Aluminum Chlorohydrate (ACH) System

1. NA

1.22 Citric Acid System

1. NA

1.23 Sodium Bisulfite System-

1. NA

1.24 Sodium Hydroxide (Caustic Soda)

1. NA

1.25 Powder Activated Carbon (PAC) System

1. Consultant and City discussed reactivating PAC system in detail on 1/23/20 and jointly agreed that slow dosing sodium permanganate poses a low risk of odor and taste generation per similar experiences at other entities in Central Texas. Consultant to participate in developing dosage plan with City Operators prior to start of dosing sodium permanganate. Dosage strength, duration, sampling protocol, and ORP use to monitor sodium permanganate residual will be part of the plan which will be developed.

1.26 Chemical Building and Storage Area

1. NA

1.27 SCADA Modifications (All SCADA items to be by City with Consultant Oversight. City to be primary lead on items highlighted in yellow.)

1. SCADA Team has been downsized to have one "gate keeper" from each entity required to have input in the SCADA system: Consultant (Darren), City (Brandon), Suez (Paul), Alterman (Matt). Only these individuals will be allowed from now on to personally make changes in the system. Brandon is the "ultimate" gate keeper and will approve any and all modifications prior to them being made by this team. It is recognized that this may slow down improvements but it is also recognized this will eliminate existing issues that are found in the SCADA system in a surgical methodology as we move forward.
2. Consultant will work on the SCADA program's nightly report for daily operational data to reconfigure/ reformat/update it for the modifications. This will also include clearly identifying the values that Operator needs to input into the daily SWMOR as part of their daily verification process.
3. Add alarm to notify operators when NTU reads 0.154 so the Operator can get manual readings at that time.
4. Add alarm (if not already present) to notify operators when a train fails its MIT with a reading of 0.330 psi/min or more. Confirm each train is not allowed to produce water until MIT test has been passed.
5. Review membrane water production programming to even out flow produced from SWTP by each month of the year. Reduce electrical usage by running fewer trains during low flows? Reduce wear on membranes by letting them be held in idle?
6. Review SCADA automated reporting accuracy and dataset source. Specifically, the irregularities in the daily report graphs showing sub-5 minute readings on trending graphs.
7. Perform required programming and instrument/wiring changes to ensure flow, pH, free chlorine, and temperature are being recorded accurately at the end of the disinfection zone in the SCADA system to calculate log removal for the peak permeate flow recorded during a day. Once this is fully operational and tested through validation sampling, cease manually sampling and reporting disinfection data on SWMOR and start using online recorded values.
8. Consultant: Return plant to fully automated mode including review of all tasks currently performed manually and address any programming, physical, or operational changes that are required to return those tasks to automatic mode. These may include but not be limited to:
 - Ejector Air Supply fixed to run MIT's in automatic and avoid 'death spirals' due to air entrainment.
 - Automatic running of weekly MIT's turned back on.
 - City: Review and correct, if necessary, the control formulas for all the flow-paced, chemical injection pumps in the SCADA system.
 - City: Eliminate conditions that cause the online analyzer to lose a sample stream.
9. Schedule all routine CIPs and MITs for 1:15 PM using automatic triggering in SCADA (currently disabled), to allow operators to be present for cleaning/MIT and avoid missing any required MITs.
10. With support from Alterman, perform testing of all instruments output signals to SCADA to confirm they are scaled correctly at the instrument and within SCADA.
11. In response to TCEQ report include information about SCADA and Suez PLC clock changes that were made on October 18, 2019 and subsequently updated on October 25, 2019 to ensure Suez PLC matches SCADA clock at all times. Specifically, the Plant SCADA clock will sync with Suez clock. Only change made was on City's SCADA. This needs to stay on this list. The dates are documenting what has happened so far for that item to be ultimately moved to the completed list once fully dosed out. However, the item has been left on the "Remaining to be Done List" because of issues that came up in January (again) since Suez did not fully fix it. Suez told us it was fixed in October.
12. Perform analysis and provide recommendations for SCADA alarms:
 - Use automated shut downs and alarms.
 - Meet with City Operations and generate list of desired alarms and designate which alarms to call out or log, which alarms have operator adjustable thresholds, and write detailed descriptions of the cause and required action for each alarm.
 - Suez and Alterman to send list of alarms in code right now for review with alarm tags; or alarms that could be made available.
 - Alarms to have very specific description for Operator understanding and action required
13. Consultant: Manville re-route SCADA modifications to be made:
 - The valve has on, off, and auto mode.

- SCADA to only turn on Manville when high service pumps are on
 - A time delay on cla-val to open of about 30 seconds after HSP turn on
 - Initially set flow in SCADA to 2,000 gpm via existing rate of flow control valve in vault. This equates to 5.7 hours of run time per day to get 0.685 mgd.
 - The pressure after the valve will be the height of the water in the clearwells (10-15 psi).
 - This valve is currently set to fail close when power is lost.
 - The solenoid valves on the rate of flow control valve open/close based on amount of water taken for the day. This is controlled by SCADA via a Cla-val controller in the Manville vault. The controller reads the flow meter (totalizes flow each day) and closes valve when operator set point is reached (0.685 mgd). Once this is reached, the valve will not open again until the next day. Modifications are required at the 1849 flow meter and SCADA programming to take the water used at the park into account for the total water used each day for the 685,000 gpd so that the total taken is not exceed by the City.
 - If CW No. 1 level = 0.5' (644.17') do not turn Manville on
 - If CW No. 2 level = 1.92' (637.5') do not turn Manville on
 - Additional layers of safety:
 - o Turn pumps off if > 10 psi at vault measured by pressure gauge on Manville line after rate of flow control valve. Pressure gauge to be installed with communication to SCADA.
 - o Turn hih service pump 1, 2, and 3 off at specified gpm depending on how inany pumps are runnmg
14. Alterman to add Consultant to new automatically generated daily report (not SWMOR) summarizing the SWTP performance to allow Consultant to monitor performance of SWTP. Consultant to discontinue this effort 2 months after smooth and error free SWTP operations.
 15. Suez to perform cleanup/update of their SCADA code to remove legacy coding, old regulatory code, etc. as of 11/14/20. This needs to stay on this list. 11/14/20 is documenting the date that Suez agreed to start cleaning up their code as described by that note. They agreed to start doing this after the Council meeting on 11/14/20 when we were talking with them in the parking lot.
 16. Alterman to add SCADA control logic for the temporary sodium permanganate system at the Lake Intake Pumping Station to flow pace the sodium permanganate pumps, record data, and add alarms.

1.28 Submittals toTCEQ

1. Prepare, submit, and obtain approval from TCEQ the CT Study with Manville reroute. CT Study used combined permeate flow instead of raw influent flow from the Lake Intake Pumping Station for flow to Clearwell No. 2.
2. Prepare, submit, and obtain approval from TCEQ the plans and specs for the proposed Manville WSC Interconnect Modifications including upgrades to the LAS and sodium hypochlorite systems with associated SCADA controls along with pump cut sheets, new sampling locations, and narrative explanation of any required SCADA modifications.
3. Prepare, submit, and obtain approval from TCEQ the Lake Intake Pumping Station temporary sodium permanganate dosing system including pictures, cut sheets, and relevant data.
4. Prepare and send written responses to TCEQ addressing all the items in the Special Evaluation report. File the report at the SWTP with the responses. Include installation packages with exhibits, cutsheets, etc. to document improvements in appendices.
5. Prepare, submit, and obtain approval per TCEQ's request for new exception letter for membrane capacity which includes:
 - Actual membrane production capacity bsd on field testing including anticipated down time due to CIP, Backpulse, MITs, etc.
 - How often backpulses occur
 - How often tank drains occur
 - How often mini-CIPS occur
 - Lowest allowable flow through unit
 - Volumetric Concentration Factor (VCF) data

1.29 Standard Operating Procedures (SOP)

1. NA

1.30 TCEQ Violation Letter and Public Notification

1. NA

1.31 General Items

1. Consultant: Macro Priorities (set on 10/7/19) per meeting the City Staff and City Manager. At this meeting, Consultant was assigned the lead role in resolving the various active SWTP and TCEQ-regulatory issues:
 - Five min for June 1, 2021.
 - Get pretreatment into place for all five trains to protect membranes from zebra mussel shells
 - Assessment by -Suez of damage to membranes and repairs
 - Prioritize and solve list of items.
2. Consultant : Complete evaluation to identify any remaining modifications and upgrades to the SWTP should be performed in order to increase plant capacity to 20.5 mgd to extend the anticipated date when the SWTP expansion has to be completed to allow enough time to design, bid, and construct the expansion. Modifications could include upsizing chemical dosing equipment.
3. Consultant continue to actively monitor the plant for any unintended process impacts from the changes that are made at the plant. This includes checking in with operators regularly, and analyzing reporting data that operators send out every day.