

Water Plant #3 & 4 Control & Scade Upgrade
BID # 2019-703

Addendum #1
July 10, 2019



NOTICE TO BIDDERS

The following corrections, revisions, additions, and/or information for the above referenced project and shall be incorporated into the Plans, Specifications, and/or Contract Documents for the project as described below. The corrections, revisions, additions, and/or information shall henceforth be regarded as an integral part of the project, carrying the same weight and force as original sections of the plans, specifications, and/or contract documents.

Ensure that you indicate receipt of this Addendum on your Bid.

Bid Due Date: **Wednesday, July 24, 2019, 3:00 PM**

Amended scope of work (changes are bold)

A SCOPE OF WORK

The Scope of Work for this design/build project is divided into the *five* main items listed below. It is intended that the control and monitoring for each of these items will be integrated with each other and the existing control and monitoring (SCADA) system.

1. REMOVE AND REPLACE THE EXISTING CONTROL PANEL FOR WATER TREATMENT PLANTS 3 & 4, REPLACE FLOW METERS, PRESSURE LOSS GAGES AND BLOWER MOTOR STARTERS, AND CONNECT ALL SYSTEMS TO THE EXISTING SCADA SYSTEM

The work under this task includes the following:

- a. Remove and dispose of the existing Plants 3 & 4 control panel
- b. Design, provide and install two (2) new Plants 3 & 4 control panels (one for electrical controls, one for pneumatic controls) and HMI units. Provide for control and monitoring of all components as listed in Table 1 - Water Plants 3 & 4 Control Panels.
- c. Design, provide and install (and connect to panels and SCADA system) two new flow meters (see Table 1 for specification).
- d. Design, provide and install (and connect to panels and SCADA system) two new filter to waste valves and actuators (see Table 1 for specifications).
- e. Design, provide and install (and connect to panels and SCADA system) two new pressure loss gages (see Table 1 for specifications).
- f. Design, provide and install all wire, conduit and air tubing to connect new and existing components to the new control panels and SCADA system.
- g. Design, provide and install two new motor starters for the Plants 3 & 4 blowers (see Table 1 for specifications).

- h. Select, provide and install above the catwalk between Plants 3 & 4, two (2) new cameras for monitoring plant operations. Connect the cameras to the SCADA system for remote viewing of the treatment units.
- i. ***(ALTERNATE BID 1) Design, provide and install (and connect to panels and SCADA system) two new plant water level sensors. Sensors shall be ultrasonic level sensors mounted on each filter to detect water level and control the water level via the automatic valve on the filter effluent pipe.***

2. INSTALL VARIABLE FREQUENCY DRIVES ON PRODUCTION PUMPS 1 & 4 AND CONNECT ALL PRODUCTION PUMP CONTROL AND MONITORING TO THE EXISTING SCADA SYSTEM

The work under this task includes the following:

- a. Design, provide and install (and connect to SCADA system) a VFD for Production Pump 1 [refer to Table 2 – Production Pumps (Control and Monitoring)].
- b. Design, provide and install (and connect to SCADA system) a VFD for Production Pump 4 [refer to Table 2 – Production Pumps (Control and Monitoring)].
- c. Design, provide and install all wire and conduit to connect new and existing VFDs and all existing pumps to the SCADA system [refer to Table 2 – Production Pumps (Control and Monitoring)].
- d. ***Remove and dispose of existing control valve on Production Pump 1 discharge pipe.***
- e. ***Design, provide and install a check valve to replace the automatic valve removed on the Production Pump 1 discharge pipe.***
- f. ***(ALTERNATE BID 2) Design, provide and install a refrigerated air conditioning system with a local automatic temperature control for the Production Pump Room where the new VFDs will be housed. Air conditioning system shall be capable of reducing the air temperature in the room from 120 degrees F to 80 degrees F.***

3. REPLACE POLYMER INJECTION SYSTEM, POLYMER AND ALUM INJECTION PORTS AND CONNECT ALL CHEMICAL FEED PUMPS INTO THE EXISTING SCADA SYSTEM

The work under this task includes the following:

- a. Design, provide and install (and connect to SCADA system) a new two pump polymer feed system ***for Plants 3 & 4*** [refer to Table 3 – Chemical Feed Pumps (control and monitoring)].
- b. Select, provide and install new polymer injection ports in the pipe that feeds Plants 3 & 4.
- c. Design, provide and install all wire and conduit to connect existing alum feed pumps to the SCADA system [refer to Table 3 – Chemical Feed Pumps (control and monitoring)].
- d. Select, provide and install new ***alum*** injection ports in the pipe that feeds Plants 3 & 4.
- e. ***(ALTERNATE BID 3) Design, provide and install (and connect to SCADA system) a new 2 pump polymer feed system for Plants 1 & 2 (refer to Table 3 – Chemical Feed Pumps (control and monitoring). Utilize the proposed mix and day tank system required for item a. above.***

4. PROGRAM EXISTING SCADA SYSTEM WITH NEW SCREENS TO CONTROL AND MONITOR THE EXISTING AND PROPOSED COMPONENTS AND SYSTEMS DESCRIBED IN ITEMS 1 THROUGH 3

The work under this task includes the following:

- ~~**a. Provide and install all software upgrades (with licenses) needed to integrate the new and existing equipment and devices into the existing SCADA system. ClearSCADA software is required. The current software is ClearSCADA (1,500 to 5,000) TBUCLPG-1000S5000.**~~
- Upgrade the existing City ClearSCADA 2010 R2.1 software used for the water and wastewater treatment facilities to the ClearSCADA 2017 R3 version. Kepware shall also be updated to the latest revision. The city will provide a new server for the system. Existing PC work stations for both plants shall remain and receive the software upgrades.**
- b. Design, program and install SCADA screen pages similar to those already in the Plants 1 & 2 SCADA for ease of operation.
 - c. Design, program and install a separate SCADA screen page for Plant 3 that includes all Plant 3 control and monitoring.
 - d. Design, program and install a separate SCADA screen page for Plant 4 that includes all Plant 4 control and monitoring.
 - e. Design, program and install a separate SCADA screen page that includes all production pump control and monitoring, or integrate control and monitoring into existing screens as approved by owner.
 - f. Design, program and install a separate SCADA screen page that includes all chemical feed pump control and monitoring, or integrate control and monitoring into existing screens as approved by owner.
 - g. Program Plant 3 and Plant 4 operations to include 3 modes with variable activation times and durations as follows:
 - a. Filter Mode
 - b. Backwash Mode (occurs approximately every 3-5 days based on headloss measurement),
 - c. Flush Mode (occurs approximately every 4-6 hours based upon time setting).
 - d. Multiple conditions will also initiate modes.
 - h. The City will supply an operator to provide operation logic direction and assistance during programming.
 - i. Provide one work day (8 hours) of programmers time prior to programming to spend time observing current plant operations.
 - j. Program polymer and alum feed controls to vary pump speed to maintain a set point (adjustable by operator on-screen).
 - k. Program chlorine feed to vary pump speed to maintain a chlorine residual set point (adjustable by operator on-screen) as measured by the chlorine residual monitor.
 - l. Program data base to store turbidity, chlorine residual and flow data collected every 15 minutes.

5. REPLACE EXISTING COMPRESSED AIR DRYER LOCATED IN COMPRESSOR ROOM

The work under this task includes the following:

- a. Remove and dispose of existing compressed air dryer in the compressor room.***

- b. Design, provide and install a new compressed air dryer to be located in the compressor room. Dryer should be designed for the capacity of the complete compressed air system.***
- c. Design, provide and install drip pots or filters on compressed air lines to be located adjacent to pneumatic control panel.***

B. GENERAL REQUIREMENTS

- 1) Equipment shall be new, not used and of current year model and have been in production a minimum of 12 months. Hybrid, one-off or prototype equipment is unacceptable.
- 2) All equipment shall be as specified herein and submittals approved prior to installation. Design review and approval shall occur prior to submission of submittals for approval.
- 3) All motors and equipment shall be 480V 3 phase. Lighting and outlet circuits to remain, 120V.
- 4) All unused conduit or wiring shall be removed. All unused air piping and equipment shall be removed.
- 5) All items to be replaced, demolished or removed shall be removed from the site and disposed of properly unless requested by Owner to remain on site.
- 6) All equipment and panels shall be labeled with plastic self adhesive engraved labels. Text shall be ¼" high.
- 7) Sole Source Equipment: Due to the City's need to maintain interoperability with the existing control systems at the other treatment plants and systems, all equipment specified as Allen Bradley shall have no substitutes.
- 8) ClearSCADA software and programming is required for use on the project. Contractor shall program and create all Allen Bradley HMI and ClearSCADA interface screens. The programming of the interface screens must allow the operators to adjust timing, set points, speeds and other parameters of the automation. Contractor shall provide all software and hardware required for automation of the plant.
- 9) All functions and set points must be fully accessible and adjustable as needed by the operators on the SCADA and HMI screens.
- 10) Complete system and all equipment must have the ability to operate manually as well as automated. HOA switches and on/off lights will be required on all pumps and equipment. Valves must have the ability to be operated manually. The plant must be able to operate if some part of the automation goes down or if there is no air to operate the valves.
- 11) Manuals: Offeror to provide 4 sets of paper manuals and one electronic manual for the operation maintenance and service of all systems and equipment. Such manual shall include:
 - a. a full listing of manufacturers, model numbers, serial numbers and service and replacement vendors of all equipment installed;
 - b. A complete set of as-constructed electrical drawings;
 - c. Pertinent operations and maintenance instructions for SCADA system; and
 - d. Manufacturers cut sheets, and operations and maintenance instructions for all equipment installed.
- 12) Training and support: Offeror to provide the following training and support:

- a. Staff training including fourteen (14) 8-hour days of onsite training and monitoring of the plant after substantial completion; and
- b. One year of technical support. Such support shall be available within 3 hours during normal business hours of the necessity.

13) ***Provide alarm notification (one for Plant 3, one for Plant 4) to existing call out system installed for Plants 1 & 2.***

C. REQUIRED QUALIFICATIONS

Offeror must employ, either through contract or direct employment, a NM registered professional engineer in electrical engineering and/or controls engineering. All designs must be sealed by such engineer.

Offeror must have completed at least one (1) municipal (or equivalent) water or wastewater projects with a contract value over \$250,000 in the past 3 years.

Offeror must have at least five (5) years of experience designing, procuring, and installing automation systems with Allen Bradley Automation Equipment and Programming as well as Electronic Control Systems (SCADA). ClearSCADA software will be utilized for this project. Offeror must employ a programmer that has an Allen Bradley Programmer Certificate and an employee proficient in ClearSCADA software programming.

End Addendum #1

Issued 07/10/2019
Kathy Lamb
Finance Director

**TABLE 1
WATER PLANTS 3 & 4 CONTROL PANELS**

ITEM			CONTROL					MONITORING			DESCRIPTION
			HMI/SCADA			Manual		HMI/SCADA	Ind. Light	Information	
Name	Existing	Proposed	HMI/SCADA	SCADA	Type	Switch	Type				HMI/SCADA
PLANT 3											
Plant 3 Influent Valve	X		X	X	variable position, position indication	Switch	HOA	X	X	X	wafer butterfly, pneumatic actuator
Plant 3 Effluent Valve	X		X	X	variable position, position indication	Switch	HOA	X	X	X	wafer butterfly, pneumatic actuator
Plant 3 Backwash Valve	X		X	X	open/closed, condition indication	Switch	On/Off	X	X	X	wafer butterfly, pneumatic actuator
Plant 3 Surface Wash Valve	X		X	X	open/closed, condition indication	Switch	On/Off	X	X	X	wafer butterfly, pneumatic actuator
Plant 3 Flush Valve	X		X	X	open/closed, condition indication	Switch	On/Off	X	X	X	wafer butterfly, pneumatic actuator
Plant 3 Filter to Waste Valve		X	X	X	open/closed, condition indication	Switch	On/Off	X	X	X	wafer butterfly, pneumatic actuator
Plant 3 Waste Valve	X		X	X	open/closed, condition indication	Switch	On/Off	X	X	X	knife gate, pneumatic actuator
Plant 3 Backwash Pump	X		X	X	on/off, condition indication	Push Button	Start	X	X	X	centrifugal pump, electric motor
Plant 3 Surface Wash Pump	X		X	X	on/off, condition indication	Push Button	Start	X	X	X	submersible pump, electric motor
Plant 3 Influent Flow Meter		X						X	X		ultrasonic, outside pipe mount
Plant 3 Pressure Loss Gage		X						X	X		
Plant 3 Blower Motor Starter		X	X	X	on/off, condition indication	Switch	HOA	X	X	X	
Plant 3 Level Sensor (Aternate Bid 1)		X	X	X				X	X		ultrasonic level sensors
PLANT 4											
Plant 4 Influent Valve	X		X	X	variable position, position indication	Switch	HOA	X	X	X	wafer butterfly, pneumatic actuator
Plant 4 Effluent Valve	X		X	X	variable position, position indication	Switch	HOA	X	X	X	wafer butterfly, pneumatic actuator
Plant 4 Backwash Valve	X		X	X	open/closed, condition indication	Switch	On/Off	X	X	X	wafer butterfly, pneumatic actuator
Plant 4 Surface Wash Valve	X		X	X	open/closed, condition indication	Switch	On/Off	X	X	X	wafer butterfly, pneumatic actuator
Plant 4 Flush Valve	X		X	X	open/closed, condition indication	Switch	On/Off	X	X	X	wafer butterfly, pneumatic actuator
Plant 4 Filter to Waste Valve		X	X	X	open/closed, condition indication	Switch	On/Off	X	X	X	wafer butterfly, pneumatic actuator
Plant 4 Waste Valve	X		X	X	open/closed, condition indication	Switch	On/Off	X	X	X	knife gate, pneumatic actuator
Plant 4 Backwash Pump	X		X	X	on/off, condition indication	Push Button	Start	X	X	X	centrifugal pump, electric motor
Plant 4 Surface Wash Pump	X		X	X	on/off, condition indication	Push Button	Start	X	X	X	submersible pump, electric motor
Plant 4 Influent Flow Meter		X						X	X		external mounted ultrasonic
Plant 4 Pressure Loss Gage		X						X	X		
Plant 4 Blower Motor Starter		X	X	X	on/off, condition indication	Switch	HOA	X	X	X	
Plant 4 Level Sensor (Aternate Bid 1)		X	X	X				X	X		ultrasonic level sensors
PLANT WIDE											
Surface Wash Booster Pump	X		X	X	on/off, condition indication	Switch	HOA	X	X	X	submersible pump, electric motor
Visual Monitoring Devices (2)		X		X	rotation of camera			X	X		mounted above walk between Plants 3 & 4
Clear Well Water Level Sensor	X							X	X		existing pressure transducer
Plant Effluent pH Sensor	X								X		
Raw Water Turbidity Sensor	X								X		

SPECIFICATIONS:

1. Filter to Waste Valves: 8" wafer butterfly valve by Keystone, Bray or equal.
2. Filter to Waste Valve Actuators: Approved actuator (preferably pneumatic) for valve selected, Keystone, Bray or equal
3. Flow Meters: External mounted ultrasonic flow meter for 12' Pipe, Flexim or equal

4. Pressure Loss Gage: To be specified by designer
5. Blower Motor Starters): Match existing, or equal

TABLE 2
PRODUCTION PUMPS (CONTROL AND MONITORING)

ITEM			CONTROL					MONITORING			DESCRIPTION
			HMI/SCADA			Manual		HMI	SCADA	Ind. Light	
Name	Existing	Proposed	HMI	SCADA	Type	Switch	Type				Information
Production Pump 1	X			X	on/off, condition indication	Switch	HOA		X	X	submersible pump, electric motor
Production Pump 1 VFD		X		X	Percent speed	Switch	Variable		X		
Production Pump 2	X			X	on/off, condition indication, % speed	Switch	HOA		X	X	submersible pump, electric motor
Production Pump 3	X			X	on/off, condition indication, % speed	Switch	HOA		X	X	
Production Pump 4	X			X	on/off, condition indication	Switch	HOA		X	X	submersible pump, electric motor
Production Pump 4 VFD	X	X		X	Percent speed	Switch	Variable		X		
Production Pump 5	X			X	on/off, condition indication	Push Button	HOA		X	X	submersible pump, electric motor
Production Pump 5 VFD	X	X		X	Percent speed	Switch	Variable		X		

SPECIFICATIONS:

1. Variable Frequency Drives: As recommended by designer; Eaton, Allen Bradley, or equal

TABLE 3
CHEMICAL FEED PUMPS (CONTROL AND MONITORING)

ITEM			CONTROL				MONITORING			DESCRIPTION	
			HMI/SCADA		Manual		HMI	SCADA	Ind. Light		
Name	Existing	Proposed	HMI	SCADA	Type	Switch	Type	HMI	SCADA	Ind. Light	Information
Chlorine Feed Pump 1	X			X	vary pump speed to maintain chlorine residual (variable) set point	switch on pump	rotating dial		X		Prominent positive displacement pumps
Chlorine Feed Pump 2	X			X	vary pump speed to maintain chlorine residual (variable) set point	switch on pump	rotating dial		X		Prominent positive displacement pumps
Chlorine Residual Monitor	X					switch on pump	On/Off	X	X		Hach CL17 monitor. Connect into SCADA to be used to control chlorine feed pumps
Alum Feed Pump 1	X			X	vary pump speed to maintain (variable) set point	switch on pump	rotating dial		X		Pulsafeeder diaphragm pump
Alum Feed Pump 2	X			X	vary pump speed to maintain(variable) set point	switch on pump	rotating dial		X		Pulsafeeder diaphragm pump
Alum Feed Pump 3	X			X	vary pump speed to maintain (variable) set point	switch on pump	rotating dial		X		Pulsafeeder diaphragm pump
Alum feed Pump 4	X			X	vary pump speed to maintain (variable) set point	switch on pump	rotating dial		X		Pulsafeeder diaphragm pump
Polymer Feed Pump 1 (Alternate Bid 3)		X			vary pump speed to maintain (variable) set point	switch on pump	rotating dial		X		Indicate on/off and percent speed positive displacement pump
Polymer Feed Pump 2 (Alternate Bid 3)		X			vary pump speed to maintain (variable) set point	switch on pump	rotating dial		X		Indicate on/off and percent speed positive displacement pump
Polymer Feed Pump 3		X		X	vary pump speed to maintain (variable) set point	switch on pump	rotating dial		X		Indicate on/off and percent speed positive displacement pump
Polymer Feed Pump 4		X		X	vary pump speed to maintain (variable) set point	switch on pump	rotating dial		X		Indicate on/off and percent speed positive displacement pump

SPECIFICATIONS:

1. Polymer Feed Pump System: Automatic mix, day tank with mixer and positive displacement feed pump, or equal