

CITY OF IMPERIAL
IMPERIAL, CALIFORNIA

ADDENDUM NO. 1

TO THE PLANS AND SPECIFICATIONS FOR
CLEARWELL PUMP STATION REPLACEMENT AND GAC TREATMENT
EXPANSION AND FILTER PIPING REPLACEMENT AT THE WATER
TREATMENT PLANT
BID NO. 2022-05

Bidders are advised that the plans and specifications for the above referenced contract are hereby amended in the following manner and the following manner only:

A. GENERAL

1. All provisions of this Addendum No. 1 are hereby incorporated into the Contract Documents and bidders shall account for all provisions pursuant to this Addendum No. 1 in submitting their bid proposals. **Each Bidder shall include a dated and signed copy of this Addendum No. 1 with his sealed bid proposal.**

B. SPECIFICATIONS

1. Division 11 has been revised and replaced in its entirety and is included in **Attachment A.**



By: Shane Bloomfield 7/18/22
Shane Bloomfield date
P. E. CA77435

By: _____
(Bidder's Company Name)

Date Received by Bidder:

(Bidder's Signature)

(Type or Print Name)

Bidder shall include a signed copy of this Addendum No. 1 with the bid proposal.

Attachment A

DIVISION 11

EQUIPMENT

DIVISION 11
EQUIPMENT
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SECTION 11300

GAC ADSORPTION SYSTEM

PART 1 – GENERAL

1.01 Section Includes

- A. Adsorption System Description
- B. Adsorption System Specifications
- C. Installation and Start-up Services

1.02 References

- A. ASME Section VIII, Division 1 – American Society of Mechanical Engineers Boiler and Pressure Vessel Code
- B. ASME/ANSI B16.5 – American Society of Mechanical Engineers/American National Standard Institute
- C. U.S. Food and Drug Administration, 21 CFR 175.300 and 177.2420
- D. Steel Structures Painting Council Surface preparation Specifications and National Association of Corrosion Engineers
- E. ASME Section II, American Society of Mechanical Engineers – Materials, Parts A, B & C
- F. American Society of Testing Materials (ASTM)
- G. American Water Works Association (AWWA) – B604, Standard for Granular Activated Carbon
- H. ANSI/NSF Standard Drinking Water System Components – Health Effects

1.03 System Description

- A. The complete adsorption system includes the following.
 - a. Carbon adsorbers with internals for carbon retention
 - b. Activated carbon
 - c. Influent, effluent and backwash piping with valves
 - d. Carbon fill and discharge piping with valves
 - e. Vent and pressure relief piping
 - f. Water piping and utility connections
 - g. Accessories as shown below
 - h. Manufacturer's services
- B. The vessels, piping, valves, and carbon function as a system in order to achieve standardization for appearance, operation, maintenance, spare parts, and manufacturer's services.

1.04 Manufacturers

- A. Basis of design for the GAC System is *Model 10 by Calgon Carbon Corporation* as the existing GAC system was provided by *Calgon Carbon Corporation*. The GAC System shall be *Model 10 by Calgon Carbon Corporation*, or approved equal. Companies requesting to be considered an approved equal shall submit their qualifications and a submittal package at the time of the bid. Supplier of the adsorption system will have the following minimum qualifications and will submit affidavits attesting to these facts:
- a. At least 20 years of experience successfully supplying both adsorption systems and GAC to treat water with flow rates greater than 300 gpm average daily flow.

1.05 Alternate GAC Manufacturer Requirements

Submission of an alternate GAC manufacturer shall require that the Contractor provide the City with a \$4,000 cash deposit within ten (10) calendar days following Award of Contract to cover engineering expenses related to the detailed review for an "approved equal" status. The evaluation will be performed on a time and material basis; and any unexpended portion of the deposit will be returned to the Contractor. Submission of a bid proposal with an alternate GAC manufacturer is at the bidder's risk since no detailed review or "or equal" status determination of any alternate GAC manufacturer will be performed prior to the bid opening.

Submission of a non-approved manufacturer may be subject to rejection. Authority for determination of "approved equal" GAC manufacturer, including conformance with Specification requirements, shall rest solely with the City. In the event that the Contractor's submission of an alternate GAC manufacturer is rejected, Contractor shall submit the specified GAC manufacturer at no additional cost to the City. No additional contract time extension will be granted for the City's review and evaluation.

Should the equipment selected by the Contractor require revisions to the structures, piping, electrical, or other work shown on the drawings, the Contractor shall include the cost of such revisions in his bid for the equipment, and no extra payment shall be made for such revisions. All such revisions shall be submitted for City approval, and shall be subject to the approval of the Engineer.

1.06 Submittals

- A. One submittal package with the following information will be provided for approval by the Owner. Fabrication will begin upon receipt of Owner's approval.
 - a. Adsorber vessel specifications and drawing including design pressure, dimensions, and capacity.
 - b. System flow diagram showing all valves, components, instrumentation and utilities.

- c. System general arrangement showing dimensions, weights, and elevations including influent, effluent, backwash, and carbon exchange pipe connection locations.
 - d. Pressure drop information across the system.
 - e. Specification of the granular activated carbon to be utilized in the system.
 - f. Material specifications for pipe, fittings and instrumentation.
 - g. Specifications for vessel lining.
 - h. Specifications for vessel painting.
- B. The system Operating & Maintenance Manual will be provided upon completion of the project/shipment of the system.

PART 2 – PRODUCTS

2.01 General

- A. The Contract Documents indicate specific required features of the equipment, but do not purport to cover all details of design and construction.

2.02 Carbon Adsorber Vessels

- A. The carbon adsorber vessels shall be fabricated of carbon steel, conforming to ASTM A516 grade 70, 10'-0" diameter by 12'-0" straight side height with 2:1 elliptical top and bottom heads. Each vessel will be sized to contain 20,000 pounds of GAC and to accommodate approximately 30% bed expansion within the straight side of the vessel. The vessels shall be designed, constructed and stamped in accordance with ASME Section VIII, Division 1 and registered with the National Board for a design pressure rating of 125 psig at 140°F. Each vessel will be provided with one (1) 20" diameter round manway located on the lower straight side portion of the vessel and one (1) 14" x18" elliptical manway located on the bottom head. The vessels will be free standing utilizing four (4) structural steel support legs.
- B. The structural aspects of the vessel shall be sufficient to meet the California Building Code - IBC 2013 requirements of $PGA_M = 0.75$, Site Class D, $I=1.5$. Vendor shall submit detailed calculations on request illustrating the seismic characteristics of the proposed vessel.
- C. Each vessel shall be designed with an internal cone underdrain system that provides uniform distribution of the treated water using a minimum of one (1) septa nozzle for every nominal square foot of vessel cross section, facilitates GAC removal without the need to open the manway to manually hose out the remaining spent GAC, and allows replacement of the septa without the need to remove external piping. The septa shall be designed to contain the GAC within the adsorber and be constructed of polypropylene (pp) material.
- D. All surfaces shall be degreased prior to sandblasting. The adsorber internal surface shall be blasted to a white metal finish (SSPC-SP5) to

provide a 3 to 4 mil anchor pattern. The exterior surfaces of the adsorber shall be prepared by blasting per SSPC-SP7.

- E. The interior surfaces of the vessel shall be lined. The surfaces above the internal cone with a nominal lining thickness of 35 to 45 mil dry film (dft) and the surfaces under the internal cone bottom a nominal lining thickness of 10 to 12 mil dft. The lining material shall be a vinyl ester combined with a special curing system and inert flake pigment that meets the requirements of the U. S. Federal Register, Food and Drug Regulations Title 21, Paragraphs 175.300 and 177.2420 and the requirements of ANSI 61 when applied and cured per the manufacturer's requirements.
- F. The exterior surface of the adsorbers shall be painted to a dry film thickness of 5 to 7 mil with a high solids epoxy (gray color) paint material.

2.03 Process and Utility Piping

A. The process and utility piping on the adsorption system shall include influent water to the system, treated water (effluent), backwash water supply and discharge, adsorber vent lines and granular activated carbon fill and discharge piping. The GAC piping shall be designed for downward flow. A flow meter shall be provided at the adsorber vessel for flow measurement during normal operation and during backwashing. An air valve *with shut-off ball valve* shall installed at the highest point of the inlet piping.

1. Carbon Backwashing – The GAC shall be capable of operating in a backwash mode where the vessel is isolated from the raw waterline and treated water flows upward through the bed and out to the backwash waste. The system shall be designed with a backwash flow capacity sufficient to expand the GAC bed up to at least 25 percent. The GAC Supplier shall submit calculations that identify the necessary backwash flow rate to accomplish this with the submitted bid. In any case, the system shall be designed to permit backwashing with a flow of not more than 1500 gpm. Headloss shall not exceed 8 psig during backwashing. Water temperature used in calculations shall be 60 deg. F.
2. GAC Removal and Replacement – System shall be designed and constructed to allow the adsorber vessel to be isolated for removal of spent GAC. Removal shall be accomplished by pressurizing the vessel with compressed air to displace the spent GAC into an empty shipping container or trailer. The bottom of the adsorber vessel and GAC slurry piping shall be designed to allow complete removal of spent GAC from the adsorber vessel and piping, using manual hosing from the access manholes if necessary.

The Plant does not have compressed air available at the GAC facility. Manufacturer/Supplier of GAC shall provide his own mobile compressor necessary for GAC loading and removal operations.

- B. The influent and effluent pipe network shall allow series (lead/lag) and parallel operating modes. Lead/lag operation allows either; a) flow from the influent flange, to Adsorber A, to the pipe module, to Adsorber B, to the pipe module then to the effluent flange, or b) flow from the influent flange, to Adsorber B, to the pipe module, to Adsorber A, to the pipe module then to the effluent flange. The change in flow pattern shall be accomplished with a change of valve positions. The purpose of lead/lag operation allows an adsorber to act as an on-line backup and/or provides for sufficient contact time to allow adsorption of the contaminants of concern.
 - C. Process piping (influent, effluent and backwash) shall be 8" diameter, constructed of schedule 40 carbon steel or *ductile iron pipe*, ASTM A53 Grade B materials with 125# ASTM A126 Class B cast iron flanged fittings cement mortar lined per AWWA C205 with ANSI 61 approved materials.
 - D. Vent piping shall be 3" diameter, constructed of schedule 40 carbon steel, ASTM A53 Grade B materials.
 - E. Carbon fill and discharge piping shall be 4" diameter, constructed of Schedule 10 304 stainless steel, ASTM A-312, Grade TP 304/304L.
 - F. Utility piping shall be constructed of threaded schedule 80 carbon steel, ASTM 53 Grade B materials.
 - G. All piping surfaces shall be prepared by blasting per SSPC-SP7.
 - H. The exterior surface of the piping shall be painted to a dry film thickness of 5 to 7 mil with a high solids epoxy (gray color) paint material prior to assembly to ensure minimum oxidation at flanged connections.
 - I. The piping network shall be provided with a structural steel support frame for support of the piping module.
- 2.04 Process and Utility Valves (Per GAC System)
- A. The process and utility piping; excluding GAC fill and discharge piping shall be equipped with butterfly valves for flow control. A total of ten (10) 8" diameter butterfly valves shall be supplied to accommodate the process and backwash control functions for each GAC system. Two (2) valves are needed for backwash control, two (2) valves are needed for influent isolation, two (2) valves for effluent isolation, two (2) valve for staging of the vessels and two (2) valves for the vent function.
 - B. The influent, effluent, and backwash valves shall be 8" AWWA butterfly valves, having an ANSI 125# wafer cast iron body, a cast iron disc with a polished 316SS edge, SS shaft, and an EPDM one-piece bonded seat that provides a flange face gasket surface. Valves conform to NSF-61, AWWA Class 150B, and 150 psig working pressure. Valves supplied complete with a mounted manual gear operator with handwheel.
 - C. The carbon fill and discharge valves shall be 4" diameter full port ball valves, 316 stainless steel construction with TFE seats and seals. A total of four (4) valves shall be supplied, two (2) for carbon fill and two (2) for carbon discharge.

- D. Utility valves for the compressed air supply will be bronze or brass or barstock brass body regular port ball valves.

2.05 Instrumentation

- A. Instrumentation will be accessible from grade.
- B. Pressure relief will be provided by a 3" rupture disk constructed of impervious graphite and designed to relieve pressure at the design pressure of the vessel and at the maximum flow to the system. The rupture disks shall be mounted off the vessel vent line and vent to atmosphere. A total of two (2) will be provided for the system.
- C. Each vessel shall be provided with an indicating differential pressure switch, 4" diameter dial, scaled for 20-0-20psi. The switch is rated at 1.0 amps @ 115 volts AC for remote indication. A total of two (2) shall be provided for the system.
- D. The process piping shall be equipped with pressure gauges to indicate the pressure entering and exiting each adsorber and to provide information on pressure drop across each adsorber and the system. The pressure gauges will have 4 1/2" face diameter with a stainless steel bourdon tube in a phenolic case housing (1 to 100 psig range). A total of three (3) will be provided for the system.
- E. The process piping will be equipped with sample taps to enable sampling of the water entering and exiting each adsorber. A total of three (3) will be provided for the system.

2.06 Miscellaneous

- A. The carbon fill and discharge shall be fitted with hose connections, such that carbon transfer to and from the adsorbers can be facilitated using carbon transfer hoses. These connectors will be 4" Quick Disconnect Adaptors constructed of aluminum as manufactured by Dover Corp. as Kamlock connectors or equal.
- B. Two (2) flush connections shall be provided on each GAC fill line, one upstream and one downstream of the valve. One (1) flush connection will be provided on each GAC discharge line, downstream of the valve. The connections will be welded into the steel or stainless steel pipe or screwed into solid propylene "spacers" for the lined pipe. Flush connections will consist of a short section of 3/4" pipe, a 3/4" full port ball valve and a 3/4" quick disconnect adaptor to match with water hose fittings.
- C. Each vessel shall be provided with one (1) 8" stainless steel effluent strainer basket mounted in the effluent line from the vessel. The basket strainer shall be constructed of 316 stainless 14 gage plate with 1/8" diameter holes drilled on 3/16" centers, covered with 40 mesh 316 stainless steel screen and topped by a 4 mesh 316 stainless steel support screen (0.063" wire diameter). A total of two (2) will be provided for the system.
- D. The influent and effluent pipe for each vessel shall be provided with a molded rubber double arch type expansion joint, with cover and tube constructed of EPDM. Expansion joints are ANSI/NSF 61 certified.

Joints allow for axial compression and extension, lateral deflection and minimum 18 degrees angular misalignment. Steel backing flanges, 150 # drilling, to be galvanized or zinc plated. The expansions joints are rated at 190 psi at 170°F. A total of four (4) will be provided for the system.

- E. Gaskets will be 1/8” thick, 85 durometer EPDM with a temperature range of -40°F to 275°F and a pressure rating of 175 psig. Gaskets will meet the requirements of ANSI/NSF Standard 61.

2.07 Granular Activated Carbon

Approved GAC suppliers are Calgon Carbon. The GAC supplier will provide activated carbon that will meet or exceed the following specifications:

ANSI/NSF Standard 61 Classified

<u>ANALYSIS</u>	<u>SPECIFICATIONS</u>
	ANSI/NSF Standard 61 Classified
Type	Bituminous coal
PSD, U.S. Standard Mesh Size	12 x 40 mesh, 5% max over, 4% max under
Iodine Number, mgI ₂ /g	1000 min
Abrasion Number	75 min
Hardness Number, wt. %	90 min
Mean Particle Diameter, mm	0.8 – 1.1
Effective Size, mm	0.55 – 0.75
Uniformity Coefficient	1.9 max
Moisture as Packed, wt. %	2% max
Apparent Density, g/cc	0.47 - 0.54
Total Ash Content, wt. %	11% max
Water Soluble Ash, wt. %	0.5% max

The activated carbon shall be bituminous coal based and the supplier of the activated carbon being proposed comply with the following requirements:

- The carbon is ANSI/NSF Standard 61 classified and meets all the physical, performance and leachability requirements established by ANSI/AWWA B604 and the Food Chemical Codex
- The carbon shall be pre-washed to reduce the amount of fines in the water and duration of the initial backwash.
- The carbon has been shown through prior experience to be effective in removing TOC and DBPs from drinking water.
- The supplier must operate a quality control laboratory within the United States that uses fully documented QA/QC procedures. These QA/QC procedures must be based on ASTM and AWWA testing

protocols and be used to establish and guarantee the quality of the activated carbon being supplied.

1. Material Quality and Testing

The quality of the GAC shall be determined by testing in accordance with the following standards:

Particle Size Distribution Sieve Analysis	AWWA B604
Effective Size	AWWA B604
Uniformity Coefficient	AWWA B604
Moisture	AWWA B604
Bulk Density	AWWA B604
Abrasion Number	AWWA B604
Iodine Number	ASTM D4607-86
Butane Number	ASTM D5742
Total Ash	ASTM D2866-83
Water Soluble Ash and Water Extractable Phosphate Water Extractables Test	Food Chemical Codex, Third Edition Activated Carbon Specifications,

All tests required shall be performed on a representative sample of the lot (or lots) of the carbon to be supplied at the bidders expense by a qualified testing Laboratory. Certified test results and a 50 lb. representative sample (if requested) of the GAC media shall be submitted to the system owner a minimum of 3 weeks prior to delivery along with a written statement certifying that the sample of the GAC material is representative of the GAC media that is ready for shipment and installation under this contract.

The system owner will have 2 weeks from the date of delivery of the 50 lb. representative sample of the GAC media, corresponding test results, and certifications as outlined above to notify the supplier in writing of shipment quality acceptance.

PART 3 – ADDITIONAL

3.01 GAC Supplier

- A. GAC Supplier shall assign a Project Manager (PM) to facilitate the execution of the project. The PM will interface with the customer for both the technical and commercial aspects of the project.
- B. GAC Supplier shall provide an Engineering Submittal Package as outlined in paragraph 1.05A.
- C. GAC Supplier shall supply Operation and Maintenance Instructions upon completion of the project/shipment of the system.
- D. A manufacturer's trained specialists, experienced in the installation of the GAC Adsorption Systems, and with at least five (5) years of field experience will be present at the job site and/or classroom designated by the Owner/Contractor to provide the following services:
 - Inspection of the installed equipment
 - Supervision of carbon loading
 - Start-up assistance
 - Troubleshooting
 - Operator training
- E. GAC Supplier shall retain design and fabrication documentation for a minimum period of seven (7) years following completion of the project.

3.02 Installation of GAC Material

Following testing, inspection, and disinfection of the system, the adsorber vessel shall be filled with a minimum 20,000 pounds of virgin GAC in accordance with the specifications.

GAC Supplier shall deliver GAC in company owned and maintained trailers or approved subcontractors owned and maintained trailers used solely for the transport of Potable Water GAC. Trailers shall be thoroughly cleaned prior to filling with GAC and shall be lined or constructed with materials suitable for transporting GAC that will be in contact with potable water. Weight tickets for all carbon shall be provided to the Owner for the actual carbon delivered.

Makeup or rinse water needed for the transfer shall be potable water provided by the Owner. The GAC Supplier and the Contractor shall provide any necessary hoses, site glasses, piping, and appurtenances for using this water. The compressed air supply required for transfer of carbon shall be provided by the GAC Supplier or Contractor.

All water used in the transfer process shall be discharged to the point on site designated by the Owner; no discharges will be permitted without the Owner's permission.

GAC shall be transferred as water slurry only, using air pressure on the trailer as the motive force. Use of a pump or eductor to transfer the carbon from the trailer

into the adsorber vessel will not be allowed. Bag loading or dry loading of the GAC into the adsorber vessel is prohibited. The GAC shall be loaded into the trailers before the units are driven on to the site.

The GAC Supplier and the Contractor will be responsible for cleanup of all GAC and slurry spills that may occur during the GAC transfer operation.

Following installation of the GAC in all adsorber vessels, the GAC Supplier and the Contractor shall assist the Owner's operating personnel in placing the system in initial operation in the filter-to-waste and backwashing modes, in accordance with the GAC Supplier's recommendations, for removal of fines from the newly installed GAC beds. When the beds have been adequately rinsed and are ready for normal operation, the Supplier shall so advise the Owner and assist with placing the system in operation.

3.03 Material Testing and Start-up

The surface water provided by the Owner meets all the maximum contaminant levels (MCLs) for secondary inorganic contaminants. The quality of the virgin carbon will be reflected by the quantity of inorganics leached into the effluent in terms of secondary inorganic contaminations of phosphates, ash, etc. The effluent shall be sampled (after the washing is considered complete) and tested by an independent laboratory. The GAC Supplier shall arrange and pay for all testing described herein. The treatment system must provide water that does not exceed the MCLs for secondary contaminants. GAC Suppliers' representatives shall be present to oversee the start-up procedure and instruct the Owner.

3.04 Services By Others

- A. The designated general contractor will be responsible for installation and site services, typically including:
1. Site preparation, foundation design and foundation installation
 2. Receipt, off-loading (and storage) of adsorption system equipment
 3. Installation of adsorption system equipment
 4. Provision of a means to keep the vessel flooded in all operating modes
 5. Any hydrostatic test of the installed system at the site
 6. System connection to existing infrastructure
 7. System disinfection prior to initial fill of carbon
 8. Utilities for bulk loading of GAC (clean water source, backwash water disposal)
 9. Operation of the system during carbon fill operation
 10. Mechanical startup of the system

END OF SECTION 11300