PROCUREMENT PACKAGE

FOR THE

HERITAGE RANCH COMMUNITY SERVICES DISTRICT
4870 HERITAGE ROAD
PASO ROBLES, CA 93446
(805) 227-6230

DISINFECTION BYPRODUCTS REDUCTION PROJECT

FEBRUARY 2026

NOTICE REQUESTING PROPOSALS

February 2026
HRCSD DBP Reduction Project

HERITAGE RANCH COMMUNITY SERVICES DISTRICT

DISINFECTION BYPRODUCTS REDUCTION PROJECT

NOTICE REQUESTING PROPOSALS

NOTICE IS HEREBY GIVEN that the HERITAGE RANCH COMMUNITY SERVICES DISTRICT (Owner) hereby invites proposals which will be received at:

Heritage Ranch Community Services District
Attention: Doug Groshart
4870 Heritage Road
Paso Robles, CA 93446
(805) 227-6230
Email: doug@heritageranchcsd.ca.gov

Until **Friday, March 10, at 3:00 pm PDT**, or such later date as may be set by Addendum, at which time and at the above address, they will be reviewed and scored by District Staff based on the criteria and requirements detailed below in the Request for Proposals (RFP). Please include the price schedule in a separate sealed envelope (or in a separate, clearly labeled attachment if the proposal is emailed.) The price schedule will be opened after the other criteria have been scored.

The District reserves the right to retain all proposals for a period of sixty days after the above date for further evaluation as necessary. The District also reserves the right to delete any portion of the work from the scope of the project. Lastly, the District reserves the right to waive or disregard any non-substantial irregularities in any or all of the proposals, or to reject all proposals altogether. Price alone will not be the only determining factor in the award of the contract for procurement.

DESCRIPTION OF PROJECT: The Project is comprised of one Granular Activated Carbon (GAC) Vessel System (including the initial first fill of GAC) complete and functional, as specified herein on the Contract Documents.

LOCATION OF THE WORK - The work is located in Heritage Ranch, California, and more specifically at District's Water Treatment Plant site.

AWARD OF CONTRACT- The OWNER intends to award a contract **to the vendor determined to have the highest scoring proposal, per the evaluation criteria delineated in these contract documents.** All proposals submitted shall be in accordance with the provisions of the Contract Documents and the OWNER may waive any minor irregularities or reject any and all proposals. Any proposal may be withdrawn prior to proposal opening but not afterward.

FORM OF THE PROPOSAL - Vendors must submit proposals on the proposal form provided. Proposals will not be considered unless submitted on proposal forms included in the Contract Documents obtained from the OWNER.

Date:_ February 20, 2026_____

Owner: 

SCOTT DUFFIELD, GENERAL MANAGER

REQUEST FOR PROPOSALS

February 2026
HRCSD DBP Reduction Project

HERITAGE RANCH COMMUNITY SERVICES DISTRICT

DISINFECTION BYPRODUCTS (DBP) REDUCTION PROJECT

REQUEST FOR PROPOSALS

1) General Overview: The District owns and operates intake facilities at the Nacimiento River and the Water Treatment Plant (WTP) that treats the water for distribution through the District-owned distribution system. DBPs have been detected in the treated water at concentrations exceeding the state mandated minimum concentration level (MCL). The District has completed a pilot study and determined that a GAC treatment system is the preferred method for reducing DBPs. The pilot study has ended but the temporary treatment of approximately 150 gpm (of the total flow of 700-800 gpm) is ongoing in order to maintain DBP levels below the MCL.

   The purpose of this request to Vendors is to procure a GAC treatment system for later installation at the District's WTP. Once a Vendor is selected and the equipment is on order, the District will complete the design of the required modifications to the existing WTP in order to accommodate the new equipment. The installation of the equipment and associated system modifications will be by others and under a separate contract. It is expected that the selected Vendor will work with the District in the design of system modifications, the installation and commissioning of the equipment, and subsequent operation of the equipment.

2) Design Basis: The equipment shall have capacity to treat up to 700-800 gpm and sized to fit within the existing facility. Modifications to the existing facility to accommodate the new equipment may be necessary, but consideration of equipment size and how it fits within the facility are a part of the determination of the final selection. The District can provide site photos and approximate dimensions upon request. Additionally, the District can provide water quality information upon request. The vendor shall specify the information required so that the District can efficiently and effectively provide it. Vendors shall include cut sheets (including dimensions, sizes and weights), general layout drawings and recommended clearance/working space as a part of their submittal so that the District may determine any required modifications to the existing facility (and associated costs) as part of their analysis.

3) Submittals:
   A. Upon completion of the evaluation and determination of a selected Vendor, the Vendor (once under contract) shall supply two hard copies and one electronic copy of detailed technical submittals in pdf format. CAD files (dwg) will be also required for incorporation into the final design of the project for construction.
   B. Vendor shall also supply two hard copies and one electronic copy of installation, operation and maintenance manuals to the District.
   C. Vendor proposals shall include a schedule including lead times for preparing final submittals and expected delivery lead time upon receipt of approved submittals from the District. For the purposes of this proposal, assume that the District will take two weeks to review and approve submittals.
   D. Refer to the project specification for any additional submittals, information, etc. required from the Vendor.

4) Conditions: The District reserves the right to reject any proposal deemed incomplete or non-responsive. The price quoted in the RFP must be valid for 120 days after proposal due date. The Vendor shall include terms of payment (deposits, progress payments, retention, etc.) as a part of their proposal. The District's standard terms for the Purchase Order are:

   A. The only terms that will be honored are those issued by the Heritage Ranch Community Services District
   B. No acknowledgement of this purchase order is required. If this purchase order is the result of a written bid or quotation, the purchase order shall serve as acceptance thereof. If this purchase order is the result of an informal, oral or written quote, acceptance will be assumed unless otherwise advised within (10) days of the date of the purchase order. Unless otherwise specified, the U.S. Mail or Email shall be the accepted means of communication.
   C. Purchase order numbers shall appear on all invoices, packages, crates, boxes, etc.
   D. Invoices must include only items shown on this purchase order. In the event any item included on this purchase order is not delivered, please notify Heritage Ranch Community Services District at once as to the reason for the delay and the date we can expect delivery. Do not include any item which is back ordered on your invoice. Any invoice or claim on this contract must be presented within 1 year from delivery of goods or services.
   E. Changes of any kind are not authorized without written approval from the Heritage Ranch Community Services District.
   F. The Heritage Ranch Community Services District reserves the right to cancel any or all items not shipped within the time specified.
   G. No charges for transportation, containers, packing, etc. will be allowed unless specified on the purchase order.
   H. All material furnished must be as specified and will be subject to inspection and approval of the Heritage Ranch Community Services District after delivery. The right is reserved to reject and return at the risk and expense of the vendor such portion of any shipment which may be defective or fail to comply with specifications without invalidating the remainder of the purchase order. Rejected material will be held for disposition at the expense and risk of the vendor.
   I. This purchase order is subject to sales tax where noted.
   J. All goods and/or services shall be in compliance with all federal, state and local law including but not limited to OSHA and CAL OSHA.
   K. The vendor shall provide the Heritage Ranch Community Services District with a Safety Data Sheet for each product containing substances on the List of Hazardous Substances published by the California Administrative Code, Title 8, Section 5194. These sheets must be sent to the Heritage Ranch Community Services District. Please reference the purchase order number.

5) Proposal: A proposal shall include the following items, at a minimum, in order to be considered complete and responsive:
   A. Name and address of vendor and its authorized agent.
   B. Purchase price and complete Price Schedule in a separate sealed envelope or separate email. Include any requirements for deposits, progress payments, etc. and the amounts and projected due dates for each. Include freight/delivery fees, site visits, applicable taxes, etc.
   C. Lead time for preparation of technical submittals

D. Lead time to deliver equipment upon receipt of Purchase Order, approved submittals and any required deposits/payments. Note that there will be two “delivery” dates for this project. One will be delivery of empty equipment to the site for installation by Others. The second will be the delivery and installation of the GAC itself once the equipment is installed.
E. Equipment Cut Sheets, including information for the proposed GAC (see technical specifications for required information) and the source of the GAC.
F. Detailed itemized list of all materials and equipment included in the vendor's scope of supply and any exclusions.
G. Basis of design, process summary, flow chart and description of the process including estimated capacities and sizing/selection of materials and equipment, including the GAC itself.
H. Estimated O&M costs for a 20-year operating period.
I. Name and number of contact person to whom technical questions may be directed. Additionally, name and number (if different) for staff that will be onsite for startup/commissioning.
J. Description of the equipment, controls, and operation of the equipment.
K. Materials used in construction including coatings and special finishes. Include relevant standards (ASME, AWWA, etc.)
L. Experience of Vendor and list of at least three similar projects along with references and contact information. At least five of these projects must be within the State of California and within the last year.
M. Nearest service center, both for the equipment and GAC replacement, etc..
N. Warranty information on all components including when warranty periods begin. Include options for extended warranties and the associated costs for them.

6) Proposal Evaluation: District Staff will evaluate each proposal using the evaluation criteria detailed below. A score between 1 and 10 will be assigned for the evaluation and weighted accordingly for each proposed item. These will be totaled and the proposal with the highest score will be recommended to the District Board for selection. In the event there is a tie, or additional clarification is needed, informal oral interviews may be conducted. Any information that will assist the evaluation committee in evaluating the proposals based on the criteria listed above is encouraged. The proposal should address all of the items below in order to be considered responsive. Pricing must be provided in either a separate envelope (if mailed) or as an attachment to a separate email from the rest of the proposal documents.

The District shall evaluate all proposals using the following metrics:

A. Equipment Operation and Maintenance – This score will be determined based on the relative ease of operating the system, mainly on the equipment provided in the proposal, operation and maintenance costs and time associated with operating and maintaining the equipment, method of equipment operation, and scheduled preventative maintenance. The vendor shall detail equipment operation and routine maintenance in their respective proposals. Key items that will be considered for this criterion are as follows:
    - Equipment that can be easily operated and contains controls and alarms that are easy to navigate, program, and understand. Additionally, the integration of the proposed equipment, controls, instrumentation, etc. into the District’s SCADA system will be considered.

- Equipment which requires minimal preventative maintenance to maintain system performance.
- Proposed backwash volumes, flow rates, frequency and duration.
- Equipment which allows for easy access for plant personnel to perform routine tasks without disrupting plant operation while maintaining the safety of the staff.
- Cost for providing recommended spare parts (if not included in proposal costs.)
- List of SCADA/controls system for which the proposed controls hardware and programming is compatible for determination of integration factors.
- The total estimated power draw of the system operating at maximum capacity.It is assumed that, given the nature of this equipment, this will be minimal.
- Estimated costs for maintenance/replacement parts for preventative and routine maintenance of all components associated with the Vendor's equipment package. Include an estimate of time required for personnel to perform the maintenance, repairs, etc. or, if outside contractors are required, please note.
- Estimated life cycle of the proposed coating system (both internal and external).
- If any software is required, include initial and any recurring costs.

B. Installed Capital Cost – Compares the actual cost of the equipment as well as the facility footprint size and height restrictions and other factors that affect the total installation cost associated with the equipment. As each piece of equipment has different dimensions, weights and required clearances, the Vendor shall provide as much information as possible to assist the District in determining final installation cost. Expected head loss through the system while in operation is a part of this section, as it impacts the size of pump required for the final design, as well as electrical costs associated with it.

C. Quality of Components – Compares various components and construction methods including comparison with regulatory standards, sizing, capacity, quality, and reputation of sub-vendor components, controls, coatings, fittings, valves, etc.

D. Adherence to Technical Specification – The Technical Specifications included as part of this package are the standard guidelines for the equipment, performance, and overall functionality.

E. Experience - List vendor experience with facilities of similar size and complexity. Include how long vendor has been in business along with key personnel experience.

F. Lead Time – This project is time-sensitive. The lead time required to provide full submittals for review and, upon receipt of approved submittals, to deliver equipment (including later installation of GAC and lead time for start-up/commissioning support).

G. Local Service - Provide the location of the nearest service providers and their ability to assist with questions and technical issues during procurement, design, installation and operation.

H. Warranties - Evaluate the warranty provided and variations between vendor warranties. Note if vendor provides: Extended warranties, non-proration limited warranties, warranties including service, warranties that cover parts, and warranties that provide on-line, telephone or in-person support (and the associated duration of each). Analyze costs of extended warranties to compare equivalent warranty lengths and coverages.

I. District Preference - The District has reviewed the applicability, positives and negatives of several packaged systems through research and discussion with current operators of various equipment manufacturers' systems. This section will be scored using this information and the preferences of District operations personnel.

The table below shows the weighting associated with each item listed above:

Evaluation Criteria	Weighted Value
Equipment Operation and Maintenance	6
Installed Capital Cost	5
Quality of Components	5
Adherence to Technical Specification	5
Experience	3
Lead Time	6
Local Services	3
Warranties	4
Owner's Preference	5

END REQUEST FOR PROPOSALS

PRICE SCHEDULE

HERITAGE RANCH COMMUNITY SERVICES DISTRICT
DISINFECTION BYPRODUCT REDUCTION PROJECT

Item	Description	Qty.	Unit	Total
1	Fixed price for GAC Vessel System (including support/site visits per Specifications)	1	LS	$
2	Fixed Price for Shipping of GAC Vessel System	1	LS	$
3	Fixed Price for GAC to fill two 20,000 lb. adsorbers (40,000 lbs. total) or weight required to fill the proposed equipment (if different)	1	LS	$
4	Fixed Price for Shipping and Installation of GAC	1	LS	$
5	Applicable taxes, fees, etc. (7.25% sales tax on all tangible goods. Does not apply to labor, shipping/freight, etc.)	1	LS	$
Total all items				$

Total Price Amount in Words: _____

Signature of Proposer: _____ Date: _____

The undersigned agrees to provide, for the benefit of the OWNER, the equipment and materials itemized herein, and in accordance with all San Luis Obispo County, State, and Federal laws.

All materials and equipment used in the execution of the Project shall comply with all applicable State and Federal codes, regulations and requirements.

The receipt of the following addenda to the Specifications is acknowledged:

Addendum No._____ Date _____ Addendum No. _____Date_____
Addendum No. _____ Date _____ Addendum No._____ Date_____

The representations made herein are made under penalty of perjury.

Dated: _____ Vendor:_____

By: _____

TECHNICAL SPECIFICATIONS

February 2026
HRCSD DBP Reduction Project

GRANULAR ACTIVATED CARBON (GAC) VESSEL SYSTEM

PART 1 GENERAL

1.1 DESCRIPTION

This section describes materials, fabrication, coating, testing, delivery and installation of complete pre-engineered granular activated carbon adsorption vessel systems (GAC systems), including the initial load of virgin carbon, for the treatment of drinking water for DBP removal.

1.2 WORK TO BE INCLUDED

A. The GAC system supplier (Vendor) shall be responsible for design, fabrication, assembly, and delivery of complete GAC systems including all mechanical components, vessels, inter-vessel manifold piping, and instrumentation described in this specification section. The GAC system shall be sized to accommodate full water treatment plant flows up to 700-800 gallons per minute.

B. Vendor shall furnish and install the initial load of virgin carbon in each vessel.

C. The GAC system shall be comprised of the following basic components:

1. Two downflow adsorber vessels interconnected with manifold piping that allows for either series or parallel flow operation of the vessels and for operation of one vessel while carbon in the other vessel is being changed out.

2. Factory interior lining and exterior finish coating.

3. Process and utility piping, valves, and accessories integral to operation of the two-vessel system.

4. Independent GAC fill and discharge piping with flush nozzles.

5. Vent and pressure relief piping.

6. Pneumatic connections for GAC transfers.

7. Nozzles required for contingency caustic/acid disinfection of the carbon media.

8. Pressure gauges.

9. Sample ports.

10. Spray nozzle for GAC vessel interior washdown.

11. Independent magnetic flow meters for each GAC vessel.

12. Initial load of virgin activated carbon

13. Seismic design of the vessel and manifold supports including specification of vessel anchorage requirements.

14. Technical submittals and operation and maintenance manuals.

15. Third party coating and lining inspection & certification.

D. The following construction work will be completed by Others unless otherwise agreed between the Vendor and the Owner:

1. Concrete foundation.

2. System offloading from delivery truck.

3. Field assembly of system components and system installation.

4. Leak testing and disinfection of systems prior to GAC fill.

5. Supply and installation of anchor bolts for foundation.

6. Soaking and initial backwashing of activated carbon after install.

E. The following field work will be completed by the Vendor.

1. Delivery of the system to the project site.

2. Site visits.

3. Furnish and install initial load of activated carbon by slurry transfer. To be installed upon completion of the construction portion of the project (by Installation Contractor), including piping/valving/controls/SCADA modifications, structural concrete (as necessary), anchor bolts, system leak testing, etc.

F. The following field work will be completed by the Owner.

1. Confirmation bacteriological testing of the vessels after initial vessel disinfection by the Installation Contractor per AWWA standards. Subsequent re-tests will be at the Contractor's expense.

2. Initial backwashing of the carbon.

3. Confirmation bacteriological testing of the water in the vessels after the carbon has been loaded, soaked, and backwashed.

1.3 SUBMITTALS

A. Provide vessel specifications and catalog cut sheets including design pressure, dimensions, capacity, underdrain, and upper distributor configuration as part of the proposal.

B. Provide Carbon Vendor qualification per 1.4 of this section as part of the proposal.

C. Provide proposed GAC information per K.1 of this section as part of the proposal.

D. Provide GAC system process flow diagrams showing all valves, components, and instrumentation, and their sizing as part of the proposal.

E. Provide GAC system general arrangement drawing showing dimensions, weights, elevations and all nozzle locations. Label all valves, sample taps, and lines, and their sizing.

F. Provide pressure drop information between influent and effluent manifold nozzles (without media) as designed for this project. Provide expected pressure drop range between influent and effluent manifold nozzles (with media) as designed for this project.

G. Exterior finish coating color charts.

H. Shop Drawings

1. Catalog cuts for purchased components and details of manufactured components. Identify materials, surface preparation, and finishes. Include calculations of wall thickness for adsorber vessel.

2. Structural and seismic calculations for adsorber vessels, piping, manifold supports, and appurtenances. Include calculations for reactions at anchor bolts and selection of the size and number of anchor bolts required. Calculations shall be prepared, stamped, and signed by a Civil or Structural Engineer licensed in the state of California.

3. Shop inspection procedure and schedule.

4. Plan and elevation AutoCAD .DWG or .DXF files. Three-dimensional model of the vessel skids in AutoCAD 3D .DWG format.

I. Test Reports - The following test reports shall be provided:

1. Pressure test reports and certificates of inspection for each vessel in accordance with procedures for ASME pressure rating and ASME Boiler and Pressure Vessel Code. Reports shall be furnished not later than the time of delivery of the vessels.

2. Factory test and inspection reports for all factory-applied linings and coatings for adsorber vessels and piping. Reports shall document that the linings and coatings have been applied in accordance with these specifications on surfaces receiving the specified preparation. Records of film thickness and holiday testing shall be included. Reports shall be furnished not later than the time of delivery of the vessels.

3. Owner may request factory inspections and/or visits during the manufacturing process at no additional cost to the Owner.

J. Vendor's Installation Instructions - Prior to shipment of systems, Vendor shall submit:

1. Instructions for the field personnel on handling and installation of the systems.

K. Activated Carbon

1. The initial submittal must include the following information:

a. Standard product datasheets including typical ranges of:

1) U.S. mesh size;

2) Uniformity coefficient;

3) Apparent density;

4) Iodine number;

5) Hardness;

6) Water soluble ash.

b. Temperature-specific media downflow pressure drop curves and backwash bed expansion curves.

c. Proof of ANSI/NSF-61 certification

d. Description of GAC supply chain including where the carbon will be shipped from; how much of the applicable carbon type is typically stockpiled and at what location; and a description of the Vendor's delivery truck fleet.

2. Prior to delivery of the carbon, the Vendor must submit the following additional information:

a. Soaking and backwashing instructions.

b. A list of site features and Owner activities required to support carbon delivery.

c. Test Reports - The following test reports shall be provided:

1) The Vendor's Certificate of Analysis for the lot of virgin GAC provided. Certificate to include a guarantee that the carbon is virgin material. The procedure for sampling, analysis, and reporting shall be as follows:

a) The certified laboratory selected by the Vendor shall analyze the material based upon the requirements of these specifications. Testing methods shall be in accordance with Section 4 (Testing Methods) of the AWWA B604, the Food Chemical Codex protocol (National Academy press), and appropriate ASTM standards. Tests shall include apparent density, U.S. mesh size, uniformity coefficient, hardness, iodine number, moisture as packed, and water soluble ash.

b) Submit with the test report a statement certifying that the

material for shipment is equal in quality to and from the same lot as the representative sample submitted.

c) Test reports on the representative samples of GAC shall contain the Manufacturer's name, date of sampling, lot number, and the following information:

d. Operation and Maintenance Manuals – manuals shall contain, at a minimum, the following information:

1) Safety warnings
2) Equipment description
3) Process description
4) Instructions for disinfection of vessels and carbon
5) Instructions for carbon changeout and backwashing
6) Valve sequence table describing valve positions for all operational conditions
7) Procedures for temporarily removing system from service
8) Troubleshooting recommendations

3. The Vendor shall submit the following information upon delivery of the carbon:

a. Weight tickets for the delivered GAC.

b. Carbon delivery truck wash-out certificates.

c. Approximately five (5) pound sample of the lot of GAC provided in accordance with AWWA B604, paragraph 1.4.3, "Sampling and testing after delivery of shipment"

1.4 REQUIRED QUALIFICATIONS FOR CARBON VENDOR

A. The Carbon Vendor shall include in their proposal documentation describing their carbon supply and delivery experience and facilities. Sufficient information shall be provided to assure the Owner that the Vendor can fulfill its obligations under the contract.

B. The Carbon Vendor shall have had a California-based carbon delivery fleet (dedicated to GAC delivery only) and been responsible for slurry delivery of carbon in California for at least five years.

C. The Carbon Vendor shall not have delivered carbon contaminated with E. Coli bacteria within the past five years.

D. GAC removal and loading operations shall be under the direct supervision of the Carbon Vendor's employee having a minimum of 5 years' experience in performing

carbon exchanges.

1.5 REGULATORY REQUIREMENTS

A. The Vendor shall comply with all applicable regulatory requirements including, but not limited to, the following:

1. Occupational safety and health requirements of OSHA and Cal-OSHA.

2. U.S. Department of Transportation requirements for transportation of the GAC.

3. ANSI/NSF-61 certification of all components, carbon, and coatings in contact with the potable water.

4. California lead-free requirements (AB 1953)

B. The Vendor shall obtain all necessary permits related to the manufacture, coating and delivery of the system at their own expense.

1.6 DESIGN CRITERIA

A. Seismic - The GAC systems shall be designed to meet current California Building Code seismic requirements.

B. Anchorage: Design the GAC systems and the associated supports and anchor bolts to support the equipment per CBC, Section 1613 and ASCE 7-10, Chapters 13 and 15.

C. Seismic design shall conform to the CBC using the following criteria for WTP Site:

1. Occupancy Category: III.

2. Importance Factor: 1.25.

3. Seismic Design Category D.

4. S_s: 1.08

5. S_1: 0.39

6. S_{DS}: 0.87

7. S_{D1}: 0.39

8. S_{MS}: 1.30

9. S_{M1}: 0.59

10. F_a: 1.2

11. F_v: 1.5

D. Wind Design shall conform to the CBC using the following criteria for WTP Site:

1. Risk Category: III
2. Wind Velocity: 110 mph
3. I: 1.0
4. K_d: 0.85
5. Exposure Category: C
6. K_{zt}: 1.0
7. G: 0.85
8. K_z: 1.1
9. K_h: 0.98
10. q_z: 29.0 psf
11. C_f: 0.7

E. Functionality

1. The equipment and all components shall not undergo loss of their intended function after application of the Design Earthquake Motions.

F. Hydraulic Capacity – The GAC system shall be designed for a nominal flow rate of 700-800 gpm per vessel and in total when operated in series configuration.

G. Carbon Capacity - Each vessel shall be designed to hold and operate with 20,000 pounds of activated carbon (or the required weight to completely fill the proposed vessel sized for the required flow, if different) having an apparent density of between 0.40 and 0.62 g/cc. Where this specification makes reference to a full load of carbon it shall be understood to mean 20,000 pounds per vessel, or the applicable weight to fill the proposed and adequately sized vessels.

H. Each adsorber vessel shall allow for 25 percent minimum expansion of the GAC bed during backwashing.

I. Pressure Drop – Total pressure drop across the two vessels in series shall be limited to 5 psig (without carbon) at the design flow rate.

J. System Size - Adsorber vessel outside diameter shall be 12’ nominal maximum.

K. Adsorber Vessel Support – Each adsorber vessel shall include four support legs coped to the bottom head. The manifold piping valve tree shall include anindependent support stand. The systems shall be anchored to an existing concrete foundation or one constructed by Installation Contractor. Non-shrink grout, one-inch thick, will be placed between the system and the foundation slab

by Installation Contractor.

L. System Design and Operating Pressure - Adsorber vessels, piping, valves, and appurtenances subject to internal pressure during normal operation, backwashing (reverse normal water flow direction), or GAC filling or removal shall be designed, rated, and constructed for a working pressure of not less than 125 psig at 65°C (150°F). Normal operating pressure on the inlet connection to the system is to be determined. Available pressure for backwashing at the effluent nozzle is also to be determined. Vendor to provide Owner with minimum and maximum allowable inlet and effluent pressures in order to facilitate an adequate design of the connecting piping system.

M. System Design Orientation - The pair of adsorber vessels shall be aligned along a common centerline. The orientation of vessel appurtenances are to be determined by the Owner based on the layout of the treatment site. The maximum overall length from the outside of the first vessel to the outside of the last vessel shall be provided by the Vendor as a part of their submittal. Vendor shall also supply Owner with recommended clear space dimensions around the unit for normal operations. The GAC system influent, effluent and backwash out valve tree nozzles shall be oriented as required to accommodate the site yard piping at the project site.

N. System Overall Height – Vendor to provide Owner with the maximum overall height of the unit, including any vent piping, valving, grout thickness, etc. so as to assist in determining if/how the proposed equipment will fit into the available space.

1.7 MODES OF OPERATION

A. Carbon Adsorption: The GAC systems shall be designed to allow operation in parallel or series, with one vessel out of service, and for the lead/lag order of the vessels to be reversed.

B. Carbon Backwashing: The vessels shall be capable of operating in a backwash mode using water from the WTP system.

C. GAC Removal and Replacement: The GAC system shall be designed and constructed to allow each adsorber vessel to be isolated from the other vessel for removal of spent GAC while one vessel remains in operation. 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.

1.8 WARRANTY

A. The Vendor shall warrant the GAC against the following conditions occurring within one month of the vessel entering service. Should any of these conditions occur, the Owner will test the raw well water from all active supply wells and the blended GAC influent water to confirm that the source of the contamination is not the Owner's water supply. The Vendor will not be responsible for any contamination originating from the Owner's raw water supply

1. The Vendor shall warrant against any coliform bacteria or greater than 500

CFU/ml of HPC bacteria being detected in the vessel intermediate or effluent sample ports.

2. The Vendor shall warrant against the leaching of any regulated inorganic or organic contaminant from the carbon. This provision shall not apply to nitrate if the raw water nitrate level exceeds one-half of the nitrate MCL (i.e. nitrate sloughing).

B. Should any of the above provisions come into effect, the Vendor shall be given two working days following notification to propose a mitigation strategy (e.g. carbon disinfection) to bring the carbon back into compliance. The problem must be corrected, or the carbon replaced within two weeks. All costs for correcting the problem including labor, disinfection, laboratory charges and materials shall be paid for by the Vendor.

C. Should E. Coli bacteria be detected in the carbon and detected again in a confirmation sample, the Vendor shall remove the carbon and replace it with new carbon. All costs for correcting the problem including labor, disinfection, laboratory charges and materials shall be paid for by the Vendor.

PART 2 MATERIALS

2.1 ALLOWABLE VENDORS

A. The system shall be manufactured by Evoqua Water Technologies, Calgon Carbon Corporation, AqueoUS Vets, or equal.

B. Vendors shall have furnished at least five similar 2-vessel GAC system with 20,000 pounds per vessel for a municipal application within the past year. Vendors shall provide a project list for the past two years with reference contact information as a part of the proposal.

2.2 ALLOWABLE GAC PRODUCTS

A. The supplied GAC shall be one of the products listed below or pre-approved equal. See Section 2.12 of this specification for additional requirements.

1. Filtrasorb (Calgon)

2. AquaCarb (Evoqua)

3. EcoCarb (AqueoUS Vets)

B. The selected Vendor shall provide Owner with a list of water quality tests required in order to optimize the selection of GAC product for the Owner's water. Owner will sample and have the requested tests completed by a certified laboratory (at Owner's expense) to facilitate the final GAC selection. If multiple types of GAC are applicable as part of the submittal, Vendor shall submit pricing for one option as part of their bid, and provide separate pricing for each additional option.

2.3 SYSTEM COMPONENTS

A. The systems shall be shipped to the job site in the least number of pieces permissible for transportation while still allowing for safe transport. At a minimum, the valve module shall be pre-assembled at the factory, prior to shipment.

2.4 ADSORBER VESSELS

A. Adsorber vessels shall be vertical, cylindrical pressure vessels with elliptical or flanged and dished top and bottom heads. The straight side lengths shall be sufficient to allow for expansion of the carbon bed during backwash. Vessel bottoms and appurtenances shall be designed for complete removal of spent GAC and even distribution of treated water. Vessels shall be designed, constructed, tested, certified, and stamped in accordance with the most recent revision of the ASME Boiler and Pressure Vessel Code, Section VIII. The vessel shell shall be constructed of SA-516 Grade 70 pressure vessel quality carbon steel plate. Vessels shall be provided with all necessary supports and accessories required to support and contain the GAC.

B. The vessels, system piping, and all other shop assembled appurtenances of the system shall be reinforced and supported with structural members as required such that the assembled components can be transported and off-loaded without distortion. The components shall be provided with lifting lugs to enable setting the equipment on a concrete foundation with a suitable capacity crane. System supports shall be designed and drilled for installation and anchoring to a concrete slab. Structural components shall conform to ASTM A 36 specifications.

C. Vessel Access: A minimum of two accessways shall be provided on each vessel. One accessway on the top head shall be 14-inch by 18-inch minimum elliptical, equipped with a stainless-steel chain to prevent the cover from falling. The second manway shall be located on the side shell near the bottom but above the underdrain system. The manway shall be a minimum of 24 inches in diameter, circular. The manways shall be sized to accommodate the repair and/or removal of the largest single internal component. Removable davits or hinge system shall be provided to support the 24-inch manway cover when opened or removed from the vessel.

D. Vessel Nozzles: Each vessel shall be provided with a minimum of the following nozzles:

1. Minimum 8-inch-diameter raw water inlet.

2. Minimum 8-inch-diameter treated water outlet.

3. Minimum 8-inch diameter backwash water outlet.

4. Minimum 4-inch-diameter inlet for loading GAC.

5. Minimum 4-inch-diameter outlet for removing spent GAC.

6. A 2-inch-diameter potable water connection above the carbon bed with spray nozzle for carbon wash-down during exchange.

7. Three 2-inch-diameter sample taps through the vessel shell for intermediate bed sampling.

8. A combination air valve installed at the high point of the vessel.

9. A pressure-relief valve to prevent the vessel from exceeding maximum operational pressure.

10. Pneumatic connections for carbon loading and unloading.

11. Nozzles in the underdrain and carbon fill lines suitable for use during caustic/acid disinfection of loaded carbon.

E. Sample Taps: Three intermediate bed sample taps shall be provided along the vertical shell of each adsorber vessel. Taps shall consist of 2-inch flanged nozzles with 1/2-inch or larger diameter Type 316L stainless-steel probes extending 1 foot inside the vessels. At the end of the probes shall be 4 inches of Type 316L stainless-steel wound 0.01-inch opening well screens or slots designed to allow withdrawal of water and retainage of carbon. The probes shall be removable from outside the vessel. In each vessel there shall be three taps located at 25, 50, and 75 percent of the carbon bed depth (based on an assumed carbon load of 714 cubic feet). Sample outlets, without probes, shall be located in the inlet and outlet piping of each vessel.

F. Underdrain System

1. The underdrain shall be of the internal cone, multi-septa variety. External header-lateral underdrains will not be accepted.

2. The underdrain system shall comply with the following performance, design, and materials criteria:

a. A design maximum flow rate of 700-800 gpm per vessel in normal operating mode.

b. A design backwash flow rate of 400 to 1,500 gpm.

c. The minimum screened area of the underdrain shall be 7.85 ft^2.

d. All stainless-steel threaded connections shall be made with tape or paste to facilitate future removal.

e. Design shall facilitate carbon change-out.

f. The underdrain shall be designed such that, following initial backwashing to remove fines, the GAC will be retained by the bottom underdrain screens when the vessel is in normal operation.

g. Underdrain designs utilizing plastic or FRP pipe, plastic distributors, sand, gravel, and concrete will not be accepted.

h. All underdrain material internal to the adsorber vessel or in contact with GAC (including septa) shall be 316L stainless steel.

i. Underdrains shall be designed to withstand the weight of the GAC bed in a flooded state.

3. Upper Distributor: The upper distributor shall meet the following criteria:

a. The upper distributor shall be designed to distribute the water flow evenly across the GAC bed and to allow for the free passage of accumulated carbon fines to waste while not plugging during backwash. The upper distributor open area shall be at least 1.5 times that of the underdrain system.

All upper distributor material internal to the adsorber vessel shall be 316L stainless steel.

b. The distribution point(s) shall be located near, but not closer than 3 inches to the upper head.

c. All support structures shall be fabricated of 316L stainless steel, use bolting rather than "band-it" banding, and shall support the weight of any additional attached internal fixture such as the spray nozzle.

2.5 LINING

The interior of the vessel and all interior carbon steel internals shall be properly coated with: Plasite 4110 to a minimum/maximum dry film thickness of 35/45 mils respectively and per Plasite Bulletins PA-3 and PA-4,000 and instructions; or Enviroline 230 NSF to a minimum/maximum dry film thickness of 35/45 mils respectively and per Industrial Environmental Coatings Corporation guidelines and instructions; or an approved equal. Interior lining must be certified to ANSI/NSF Standard 61 for direct potable water contact.

A. The surface preparation (after grinding all welds and sharp edges smooth/radiused), and lining application including testing shall be certified by an independent third-party Inspector selected and paid for by the Vendor.

B. Surface Preparation:

1. Degrease surfaces prior to sandblasting to completely remove dirt, grease, oil, etc.

2. Sandblast to SSPC-SP5 White Metal using a venturi blast nozzle at 100 psi minimum.

3. The degree of blast profile shall be a minimum of 4 mils.

4. Remove all traces of grit and dust and imbedded abrasives with a vacuum cleaner.

C. Lining inspection shall include:

1. General Appearance: film shall be free of runs, sags, orange peel, pin-holing, fish-eyes, over-spray, trash in the film, and voids.

2. Film thickness shall be determined using a Micro test thickness gauge as manufactured by KTA-Tater, Inc. or functionally equivalent non-destructive dry film thickness gauge for use on protective coatings with an accuracy of ±5%, and which has been properly calibrated.

3. Discontinuity void testing shall be performed using a voltage detector Midel AP-W as manufactured by Tinker and Rasor (San Gabriel, CA). Void testing shall only be performed after all interior manifold piping and other internal equipment has been completely installed.

4. The Vendor shall pay for all of the above coating testing and any required re-testing of the lining prior to shipment.

5. Detailed requirements for lining inspection shall be as further described in Carboline Bulletin PA-3.

D. At the Owner's cost and discretion, additional void testing may be conducted

at the project site after delivery. Any voids or cracks found will be repaired and retested by the Vendor, at their expense.

2.6 PROCESS AND UTILITY PIPING

A. General

1. All pipe which will operate under pressure shall be properly tied or blocked, restrained, and supported at all fittings where the pipe changes direction, changes size, or ends, using suitable anchors. Exposed pipe shall be installed in straight runs parallel to the axis of the structures or equipment. Pipe runs shall be horizontal and vertical except that gravity drain lines shall be pitched down in the direction of flow not less than 1/8 inch per foot.

2. Piping shall be made up with a sufficient number of unions, flanged joints, grooved end joints, or flexible couplings to permit ready breaking of lines as necessary for inspection and maintenance and to allow for expansion and contraction and general flexibility.

3. Pipe and fittings shall be assembled so there will be no distortion or springing of the pipelines. Flanges, unions, flexible couplings, and other connections shall come together at the proper orientation. The fit shall not be made by springing any piping nor shall orientation or alignment be corrected by taking up on any flange bolts. Flange bolts, union halves, flexible connectors, etc., shall slip freely into place. If the proper fit is not obtained, the piping shall be altered to fit.

4. Piping shall be designed for a maximum liquid velocity of 6.5 fps unless otherwise noted. Vendor shall submit calculations to verify that requirements for maximum head loss and velocity are met with the proposed piping design. Noise generation shall be a consideration in the selection of size for pipe and valves.

5. Exceptions to the maximum velocity requirement may be permitted on relatively short piping runs where the treated water line can serve as the backwash inlet and where the raw water line serves as the backwash outlet.

6. Pipe shall be fusion-bonded epoxy coated and lined or liquid epoxy coated and lined as described below unless otherwise indicated in this specification. The coating material shall be compliant with ANSI/NSF-61.

    a. For fusion epoxy-lined and coated steel pipe, the coating material shall be a 100 percent powder epoxy applied in accordance with ANSI/AWWA C213. The coating shall be applied using the fluidized bed or electrostatic spray process. Coating DFT = 16 mils, Scotchkote 134 (electrostatic) or 206N (fluidized bed), or approved equal, applied in one coat.

b. For liquid epoxy-lined and coated steel pipe, the coating material shall be liquid epoxy applied in accordance with ANSI/AWWA C210. The coating system shall consist of one coat of a two-part chemically cured inhibitive epoxy primer, and one or more coats of a two-part chemically cured epoxy finish coat for a total DFT = 16 mil. TNEMEC Epoxoline Series 141, Carboline Carboguard 891, or approved equal.

7. Apply topcoat to exterior of fusion epoxy-lined and coated steel pipe to match color of vessel.

B. Piping 4 Inches and Smaller

1. Unless otherwise specified, piping shall be Schedule 40 black carbon steel conforming to ASTM A 53, Grade B, Type E or S, or ASTM A 135.

2. Fittings shall be flanged, screwed, or grooved-end.

C. Piping Larger Than 4 Inches

1. Unless otherwise specified, piping shall be Schedule 40 black carbon steel conforming to ASTM A 53, Grade B, Type E or S.

2. Fittings shall be flanged or grooved-end.

D. Air Piping 2 Inches and Smaller

1. Unless otherwise specified, piping shall be Schedule 40 black carbon steel conforming to ASTM A 53, Grade B, Type E or S.

2. Fittings shall be screwed, welded, or flanged.

E. GAC Exchange piping shall be 4 inches in diameter and constructed of one of the following:

1. Piping shall be Schedule 10 316L stainless-steel pipe conforming to ASTM A 312 with 316 fittings.

2. Fusion bonded epoxy lined and coated schedule 40 carbon steel conforming to ASTM A 53, Grade B, Type E or S.

F. Vessel influent and media fill piping shall be side or top entry provided that the overall maximum height requirement for the system is met.

2.7 FITTINGS

A. Flanges and flanged fittings shall conform to ANSI B16.5.

1. All fasteners shall include washers under both bolt head and nut.

2. Bolts, nuts and washers for joining hardware and flanges constructed of materials other than stainless steel shall be carbon steel conforming to ASTM A307, Grade B with ASTM A563A nuts and ASTM F436 washers. Hardware shall be hot dip galvanized in accordance with ASTM F2329.

3. Fasteners for joining stainless steel hardware and flanges shall be Type 304 or 316 stainless steel per ASTM A320 or ASTM A193; nuts shall be 304 or 316 stainless steel per ASTM A194 and washers shall be ASTM F436 Type 3.

4. Gaskets shall be full face, 1/16- to 1/8-inch thick for piping shall be one of the following nonasbestos materials:

   a. Cloth-inserted rubber. Products: Manville 109, John Crane Co. Style 777, or equal. Gaskets shall be suitable for a pressure of 350 psi at a temperature of 82°C (180°F).

   b. Acrylic or aramid fiber bound with nitrile. Products: Garlock "Bluegard," Klinger "Klingersil C4400," or equal. Gaskets shall be suitable for a water pressure of 500 psi at a temperature of 204°C (400°F).

   c. EPDM/EPT elastomer gasket material in accordance with ASTM D 2000, SAE J-200, BA-CA-DA. Gaskets shall be suitable for a pressure of 350 psi at a temperature of 82°C (180°F).

5. Flanges at site manifold piping interface connection points shall be AWWA C207, Class D, flat face flanges.

B. Threaded fittings shall be Class 300, malleable iron conforming to ANSI B16.3 or forged steel fittings conforming to ANSI 16.11.

C. Flexible couplings (if used) shall be as follows:

1. Steel couplings, Dresser Style 38, Smith-Blair Type 411, Baker Series 200, or equal.

2. Bellows-type flexible expansion joints shall be Proco Style 240 with EPDM liner and cover or equal. Bellows-type joints shall incorporate stainless steel flanges to provide reliable sealing at the system design pressure.

D. Grooved-end couplings shall be flexible type, square cut groove, per AWWA C606. Couplings shall be Victaulic Style 77, Gustin-Bacon Figure 100 or equal. Grooved-end coupling shall not be used inside of the adsorber vessels. Bolts and nuts shall be Type 316 stainless steel.

E. Butt-welded steel fittings shall be carbon steel pipe of the same wall thickness as adjoining pipes conforming to ASTM 234 WPB and ANSI B16.9. Welds shall be in conformance with AWWA C206.

2.8 PROCESS VALVES

A. General

1. The Vendor shall furnish all valves as called for in these specifications, or as required for proper operation of the equipment in general. Valves shall be manufactured by a Manufacturer whose valves have had successful operational experience in comparable service.

2. Wherever stainless steel is specified in this section, it shall be Type 316 or Type 304 unless otherwise specified. Where dissimilar metals are being bolted, stainless-steel bolts shall be used.

3. The Vendor shall furnish all incidental materials necessary for installation of the valves such as flange gaskets, flange bolts, nuts and washers, and all other materials required for the complete installation.

4. The centerline of manually operated valves shall be located not more than 5 feet above the foundation level and shall be provided with handwheels. Valves over 5 feet to centerline shall be rolled toward the operating side to make the handwheel more accessible to an operator of average height. Valves shall be installed in all cases so that handles clear all obstructions when moved from full-open to full-closed position. All aboveground valves shall have a valve position indicator arrow to determine if the valve is open or closed.

B. Butterfly Valves

1. Butterfly valves shall be one-piece wafer type or short body, flanged type, conforming to AWWA C504, Class 150B. Minimum working differential pressure across the valve disc shall be 150 psi. Flanged ends shall be Class 125, ANSI B16.1. Valve shafts shall be Type 304 or 316 stainless-steel journals and static seals. Valve shafts shall be stub shaft or one-piece units extending completely through the valve disc. Materials of construction shall be as follows:

COMPONENT	MATERIAL	SPECIFICATION
Body	Cast iron or ductile iron	ASTM A 48,Class 40, ASTM A 126, Class B; or ASTM A 536, Grade 65-45-12
Exposed body capscrews and bolts and nuts	Stainless steel	ASTM A 276, Type 304 or 316
Discs	Stainless steel or EPDM coated cast iron	ASTM A 276, Type 304 or 316
Disc fasteners, seat retention segments, and seat fastening devices	Stainless steel	ASTM A 276, Type 304 or 316
Seat material	EDPM	--

2. Where the seat is applied to the disc, it shall be vulcanized to a stainless-steel seat retaining ring which is clamped to the disc by Type 304 or 316 stainless-steel screw fasteners. The valve seat shall be secured to or retained in the valve body.

3. Valves shall be Bray, Pratt, DeZurik, or approved equal.

4. Manual actuators on valves 6 inches and larger shall be gear actuators with handwheels. Manual operators shall be designed in accordance with AWWA C504 and shall have a disk position indicator designating the opened and closed position of the valve.

C. Ball Valves

1. Valves in carbon exchange piping and sample probe lines shall be full-bore stainless steel. Bodies, balls, and stems shall be Type 304 or 316 stainless steel. Seats shall be R-PTFE, and stem seals shall be R-PTFE or Viton.

2. Valves for carbon steel piping, including flush connections, pressure gauges, and compressed air connections shall be stainless steel, bronze, forged brass, or barstock brass body rated for 500 psi at 38°C (100°F). Seats and seals shall be EPDM. Valves shall be Apollo, Watts, or approved equal.

D. Check Valves: Check valves 2.5 inches and smaller shall be Class 200, wye pattern, bronze body, swing check valves with screw ends. Valves shall be Crane, Kennedy, Milwaukee, or equal.

E. Combination Air Valves: Valves shall have an operating pressure of 200 psi, with 2-inch screwed or flanged fitting. Valves shall be of all-metal construction; plastic valves will not be allowed. Valves shall be APCO, Val-Matic, or equal.

F. Adsorber Pressure Relief: The adsorber vessel pressure relief system shall be designed to protect against overtemperature expansion while isolated from the system and from extreme system pressure excursions. The pressure relief system shall consist of one or more pressure-relief valves sized to maintain a pressure less than the maximum allowable working pressure at a flow rate of 1,000 gpm. Valve shall be Class 125, cast iron body, and bronze main valve trim. Valve shall be Cla-Val 50-01 or equal. Burst discs will not be accepted.

G. Valve Tags – All valves shall include a corrosion and UV resistant tag securely wired to the operating handle. The tag shall include a unique valve tag number corresponding to the Vendor's process flow diagram.

2.9 FLOW METERS

A. Each vessel shall be equipped with a flow meter consisting of a sensor and transmitter capable of measuring flow in the forward direction and backwash flow in the reverse direction.

B. Flow meters shall be Siemens MAG 5100 W or approved equal. Sensor and transmitter enclosures shall have a NEMA 4X environmental rating.

C. Flow indicators shall be mounted in a location visible to operators from ground level and shall include a sun-cap or sun-shade designed for continuous exposure to direct sunlight, durable, and sufficient to protect the indicator screen from sunlight.

2.10 MISCELLANEOUS

A. Spray Nozzle: Spray water piping for washdown of the vessel during and after spent GAC transfer shall extend to a spray wash nozzle in the top dish of each vessel. This line shall be provided with a 2-inch ball valve and 2-inch cam-lock adapter located at an operable elevation. A full cone spray nozzle shall be installed in the top dish. The spray water piping shall include a tee and a second ball valve located downstream of the check valve to facilitate manual air release from the vessel.

B. Flush Connections: Stainless steel flush connections shall be provided on each spent and fresh GAC line downstream of the ball valve and at the spray nozzle supply line. Flush connections shall consist of a short section of 3/4-inch pipe, and a 3/4-inch full port ball valve and 3/4-inch quick disconnect adapter (Chicago Fitting) to match water hose fittings.

C. Pressure Gauges: The vessel manifold piping shall be equipped with pressure gauges to indicate the pressure of water entering and exiting each vessel. Connection size shall be ½ inch. Range shall be 0-100 psi with an accuracy of 1 percent of full range. Gauges shall not be less than 4-1/2 inches in diameter, liquid filled, and designed for outdoor, uncovered service. Pressure gauge assemblies shall be isolated from process piping with a 1/2-inch bronze or stainless steel ball valve. Gauges shall have stainless steel or bronze bourdon tube and be fitted with shatterproof glass. Gauges shall be manufactured by Ashcroft, Crosby, Marshalltown, Marsh, or equal.

D. Transfer Hose Connectors: The GAC slurry piping shall be fitted with hose connectors, such that carbon transfer to and from the adsorber vessels can be facilitated with transfer hoses. These connectors shall be 4-inch quick disconnect (cam-lock) adapters constructed of 304 stainless steel or aluminum as manufactured by OPW Division of Dover Corporation as Kamlok Part No. 633-F or equal equipped with dust caps.

E. Sample Piping

1. The following sample taps shall be provided as a minimum:
    a. Influent water to each adsorber vessel.
    b. Treated Water from each adsorber vessel.
    c. GAC intermediate taps at the 25, 50, and 75 percent bed depth point on each vessel.

2. The sample piping shall be 1/2-inch-diameter stainless steel tubing with 1/2-inch diameter stainless steel ball valves.

2.11 PAINTING AND COATING

A. The exterior of the vessel, supports, piping (including air vent piping) and appurtenances shall be coated with a 2-part catalyzed epoxy primer followed by a urethane top coat.

B. All surfaces shall be prepared for coating in accordance with SSPC SP-6

C. Prime Coat: Apply 4 – 6 mils dry film thickness of a rust inhibitive 2-component epoxy coating with a minimum solids content of 66 percent by volume. Products shall be Ameron 385, Carboline 893, Tnemec 69, or equal.

D. Finish Coat: Apply 2 – 4 mils dry film thickness of a two-component aliphatic acrylic polyurethane coating with a minimum solids content of 58 percent. Products shall be Ameron Amerishield, Carboline 134 HS, Tnemec 74, or equal.

E. Surfaces Not to be Coated: Aluminum, brass, bronze, copper, plastic, rubber, or stainless steel. Grease fitting, nameplates, or serial numbers.

F. The color shall be selected by the Owner.

2.12 GRANULAR ACTIVATED CARBON

A. General

1. The granular activated carbon shall be virgin material manufactured from anthracite or bituminous coal only. Activation shall be carefully controlled to produce a material having a high internal surface area with optimum pore size for effective adsorption of small molecular weight trace SOCs.

B. Physical Characteristics

1. Physical characteristics of the product delivered shall be consistent with the typical physical characteristics of the manufacturer's standard bulk product for municipal water treatment clients.

2. The carbon shall be visually free from deleterious foreign material such as clay, dirt, plastic, etc.

3. The carbon shall have the following physical properties:

PROPERTY	COAL VALUE	METHOD
Standard US Mesh Size	12x30 - 12x40	AWWA B604
Apparent Density	0.52 – 0.56 g/cc	AWWA B604
Uniformity Coefficient (maximum)	2.0	AWWA B604
Iodine Number (minimum)	1000 mg/g	ASTM D4607
Moisture (maximum)	5%	AWWA B604
Hardness number by Ro-Tap (minimum)	80%	AWWA B604
Water-Extractable Ash (maximum)	1%	AWWA B604

C. Handling Characteristics

1. The GAC's physical size and density must be such that it shall flow readily within the GAC transfer piping and must form a workable slurry with a concentration of approximately 0.21 kg of carbon per liter (2 pounds of carbon per gallon) of water.

2. Quantity: Each vessel will be loaded with a full load of carbon as defined in Part 1 of this specification.

PART 3 EXECUTION

3.1 OWNER OVERSIGHT

A. The Owner reserves the right to visit all fabrication facilities and perform independent inspections of materials and coatings at any time during the fabrication period. Such visits and inspections shall be at the Owner's expense but will not result in any additional compensation to the Vendor.

3.2 DELIVERY

A. The Vendor's bid price shall include all costs associated with shipping of the systems to the Owner's facility location indicated. Any applicable taxes shall also be included. Local sales tax is 7.25% for unincorporated areas of San Luis Obispo County. Sales taxes do not apply to services such as shipping/transport fees, labor costs for site visits, etc. but do apply to all tangible items (GAC System, GAC, etc.)

B. All vessel openings, including manways and nozzles, shall be securely covered in the factory prior to shipment to prevent the entrance of debris and animals.

C. Vessel delivery shall be during normal business hours.

3.3 INSPECTION

A. The Owner may retain the services of an independent, third-party testing entity to inspect the linings and coatings of the vessels once they arrive on-site. The Vendor shall provide all materials, labor and equipment necessary and bear all costs associated with repair of the linings and coatings if holidays or other defects are identified during the inspection.

3.4 INSTALLATION

A. Installation of the GAC systems and related appurtenances shall be performed by Installation Contractor unless otherwise agreed between the Vendor and the Contractor, and will be in accordance with the Vendor's drawings, instructions, and recommendations.

3.5 TECHNICAL/CUSTOMER SUPPORT DURING DESIGN, START-UP SERVICES AND TESTING

A. Once the Vendor is selected, a representative for the Vendor shall provide design requirements/recommendations for the Owner as a part of finalizing the project design. This shall include consultations re: pipe routing, controls, instrumentation, SCADA integration, GAC selection, etc. The person shall be knowledgeable about the design, construction, and proper installation of the system. The Vendor shall include a total of 8 hours of design support (emails,

phone calls, etc.). Site meetings are not required.

B. The Vendor shall include one (1) 4-hour site visit trip (travel time shall be included in bid, but not counted towards the 4 hours) to verify proper installation of the vessels. Field visit shall be by a person knowledgeable about the design, construction, and proper installation of the systems. An additional site visit (if necessary) for startup and training of staff shall be included. If installation verification and startup/training can be accomplished in one site visit, that is acceptable as well. The expectation is that all site visits required for installation verification, startup/training, GAC installation, etc., if necessary, are included.

3.6 VESSEL DISINFECTION

A. The interior of the vessels and manifold piping shall be free of debris when received at the job site. The equipment shall be in a condition to be immediately pressure tested and disinfected without cleaning or extensive flushing required.

B. Disinfection of the vessels and manifold piping shall be by Installation Contractor unless otherwise agreed between the Vendor and the Owner.

C. The carbon vessels and manifold piping will be disinfected per the requirements and procedures in AWWA C653/C652.

D. Each empty vessel shall be sampled and tested for coliform and HPC bacteria after disinfection. Carbon shall not be loaded into the vessels until non-detect results are achieved.

E. The vessels shall remain completely full of water with a chlorine residual of at least 5 mg/L in the time period between disinfection and carbon loading.

F. The Vendor shall be responsible for as many disinfection cycles as are necessary to obtain non-detect coliform results.

3.7 DELIVERY AND INSTALLATION OF GAC

A. Following disinfection of the GAC vessels, each vessel shall be filled with a full load of virgin GAC in accordance with these specifications.

B. Total coliform and HPC test results following disinfection of the empty vessels will be made available to the Vendor. Should the Vendor wish to independently confirm the bacteriological quality of the water in the vessels or in the Owner's water supply, it shall be at their own expense.

C. Carbon delivery shall be during normal business hours.

D. The Vendor shall deliver GAC in trailers used solely for the transport of 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.

E. A trailer washout validation certificate shall be provided at carbon delivery.

F. All trailer openings, hoses and fittings shall be disinfected and sealed by numbered security seals upon arrival to the job site. Hoses and fittings shall be dedicated to potable water projects.

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

H. 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.

I. GAC shall be transferred as a water slurry only with the carbon pre-wet in the trailer, 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 vessels is prohibited. 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.

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

3.8 MATERIAL TESTING AND START-UP

A. Following completion of soaking and initial backwashing of the newly delivered carbon, samples will be collected by the Owner from the vessel influent water or the distribution system (whichever is the source of the slurry and backwash water) and the effluent and/or intermediate sample ports at each vessel. These samples will be analyzed by a State of California certified laboratory for bacteriological contamination. Refer to Warranty requirements in Part 1 of this specification.

B. Contaminated carbon shall be disinfected or replaced at the Vendor’s expense, including all costs for materials, labor, and chemicals. If the carbon tests positive for fecal coliform or Escherichia Coli in both initial and confirmation samples, the carbon shall be rejected and must be removed and replaced after re-disinfection of the vessel(s) all at the Vendor’s cost.

C. The carbon shall not leach quantities of inorganics into the effluent which result in violation of any primary or secondary inorganic drinking water standards including iron, arsenic, etc. At the Owner’s discretion, the effluent may be sampled (after the soaking and backwashing is considered complete) and tested by an independent laboratory. This inorganics test may be repeated within four (4) weeks after the systems are placed into

service. The treatment system must provide water that does not exceed the MCLs for primary or secondary inorganic contaminants or organic contaminants not present in the raw water. If any primary or secondary standards are exceeded, the carbon shall be considered contaminated. Contamination of carbon shall be mitigated or the carbon replaced at the Vendor's expense, including all costs for materials, labor, and chemicals.