INVITATION TO BID

23-0043-UT

RO1 DUAL MEDIA FILTER REHAB

INSTRUCTIONS TO BIDDERS

1. COPIES OF BIDDING DOCUMENTS

1.1. Bid Documents, any attachments and addenda are available for download at: https://procurement.opengov.com/portal/myclearwater/projects/177416.Bidding Documents may include, but are not limited to, plans, specifications, bond forms, contract form, affidavits, bid/proposal form, and addendums.

1.2. Complete sets of Bidding Documents must be used in preparing bids. Neither the City nor the Engineer shall be liable for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents, by Bidders, sub-bidders, or others.

2. QUALIFICATION OF BIDDERS

2. 1 Each prospective Bidder must pre-qualify to demonstrate, to the complete satisfaction of the City of Clearwater, that the Bidder has the necessary facilities, equipment, ability, financial resources and experience to perform the work in a satisfactory manner. An application package for pre-qualification may be obtained by contacting the City of Clearwater, Engineering Division by phone at (727) 562-4750. Pre-qualification requirement information is also available on the City of Clearwater Website at address:

www.myclearwater.com/government/city-departments/engineering/construction-management.

Contractors wanting to pre-qualify to bid on a project as a General Contractor must do so two weeks (ten workdays) prior to the bid opening date. Bidders currently pre-qualified by the City do not have to make reapplication. It is the Contractor's responsibility to confirm pre-qualification status before a Bid Opening.

The Contractor shall include copies of their current license/registration with the State of Florida and Pinellas County (if applicable) with their bid response.

3. EXAMINATION OF CONTRACT DOCUMENTS AND SITE

3.1.It is the responsibility of each Bidder, before submitting a Bid, to (a) examine the Contract Documents thoroughly; (b) visit the site to become familiar with local conditions that may in any manner affect cost, progress, performance or furnishing of the work; (c) consider and abide by all applicable

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federal, state and local laws, ordinances, rules and regulations; and (d) study and carefully correlate Bidder's observations with the Contract Documents, and notify Engineer in writing of all conflicts, errors or discrepancies in the Contract Documents.

3.2.For the purposes of bidding or construction, bidder may rely upon the accuracy of the technical data contained in reports of explorations and tests of subsurface conditions at the site which have been utilized by the Engineer in the preparation of the Contract Documents, but not upon non-technical data, interpretations or opinions contained therein or for the completeness thereof. Drawings relating to physical conditions of existing surface and subsurface conditions (except Underground Facilities) which are at or contiguous to the site and which have been utilized by the Engineer in preparation of the Contract Documents, may be relied upon by Bidder for accuracy of the technical data contained in such drawings but not upon the completeness thereof for the purposes of bidding or construction.

3.3.Information and data reflected in the Contract Documents with respect to Underground Facilities at or contiguous to the site are based upon information and data furnished to the City and Engineer by owners of such Underground Facilities or others, and the City does not assume responsibility for the accuracy or completeness thereof unless expressly provided in the Contract Documents.

3.4.Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders on subsurface conditions, Underground Facilities, other physical conditions, possible conditions, and possible changes in the Contract Documents due to differing conditions appear in the General Conditions.

3.5. Before submitting a Bid, each Bidder shall, at Bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests and studies and obtain any additional information and data which pertain to the physical conditions (surface, subsurface and Underground Facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance or furnishing the work in accordance with the time, price and other terms and conditions of the Contract Documents.

3.6. On request in advance, City will provide each Bidder access to the site to conduct such explorations and tests at Bidder's own expense as each Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the site to its former condition upon completion of such explorations and tests.

3.7. The lands upon which the Work is to be performed, rights-of-way and easements for access thereto and other lands designated for use by the Contractor in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by the Contractor. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by the City unless otherwise provided in the Contract Documents.

3.8. The submission of a Bid will constitute an unequivocal representation by the Bidder that the Bidder has complied with every requirement of these Instructions to Bidders and that, without exception, the Bid is premised upon performing and furnishing the Work required by the Contract Documents by such means, methods, techniques, sequences or procedures of construction as may be indicated in or required by the Contract Documents, and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions of performance and furnishing of the work.

4. INTERPRETATIONS AND ADDENDA

4.1. All questions as to the meaning or intent of the Contract Documents are to be directed in writing to the Engineer. Interpretations or clarifications considered necessary by the Engineer in response to such

questions will be issued by Addenda, via OpenGov. Questions received after the time frame specified on the pre-bid meeting agenda, prior to the date for opening of Bids, may not be answered. Only information provided by formal written Addenda will be binding. Oral and other interpretations of clarifications will be without legal effect.

4.2. Addenda may also be issued to modify the Bidding Documents as deemed advisable by the City or Engineer.

5. BID SECURITY OR BID BOND

5.1. Each Bid must be accompanied by Bid Security made payable to the City of Clearwater in an amount equal to ten percent (10%) of the Bidder's maximum Bid price and in the form of a certified or cashier's check or a Proposal/Bid Bond (on form provided in Section V) issued by a surety meeting the requirements of the General Conditions.

5.2. The Bid Security of the Successful Bidder will be retained until such Bidder has executed the Agreement and furnished the required Payment and Performance bonds, whereupon the Bid Security will be returned. If the Successful Bidder fails to execute, deliver the Agreement and furnish the required Bonds within ten (10) days after the award of contract by the City Council, the City may annul the bid and the Bid Security of the Bidder will be forfeited. The Bid Security of any Bidder whom the City believes to have a reasonable chance of receiving the award may be retained by the City until the successful execution of the agreement with the successful Bidder or for a period up to ninety (90) days following bid opening. Security of other Bidders will be returned approximately fourteen (14) days after the Bid Opening.

5.3. The Bid Bond shall be issued in the favor of the City of Clearwater by a surety company qualified to do business in, and having a registered agent in, the State of Florida.

6. CONTRACT TIME

6.1. The number of consecutive calendar days within which the work is to be completed is set forth in the Technical Specifications.

7. LIQUIDATED DAMAGES

7.1. Provisions for liquidated damages are set forth in the Contract Agreement, Section V.

8. SUBSTITUTE MATERIAL AND EQUIPMENT

8.1. The contract, if awarded, will be on the basis of material and equipment described in the Drawings or specified in the Specifications without consideration of possible substitute or "or equal" items. Whenever it is indicated in the Drawings or specified in the Specifications that a substitute or "or equal" item may be furnished or used, application for its acceptance will not be considered by the Engineer until after the effective date of the Contract Agreement. The procedure for submittal of any such application is described in the General Conditions and as supplemented in the Technical Specifications.

9. SUBCONTRACTORS

9.1. If requested by the City or Engineer, the Successful Bidder, and any other Bidder so requested, shall, within seven (7) days after the date of the request, submit to the Engineer an experience statement with pertinent information as to similar projects and other evidence of qualification for each Subcontractor, supplier, person and organization to be used by the Contractor in the completion of the Work. The amount of subcontract work shall not exceed fifty percent (50%) of the Work except as may

be specifically approved by the Engineer. If the Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, supplier, other person or organization, he may, before recommending award of the Contract to the City Council, request the Successful Bidder to submit an acceptable substitute without an increase in Contract Price or Contract Time. If the Successful Bidder declines to make any such substitution, the City may award the contract to the next lowest and most responsive Bidder that proposes to use acceptable Subcontractors, Suppliers, and other persons and organizations. Declining to make requested substitutions will not constitute grounds for sacrificing the Bid Security to the City of any Bidder. Any Subcontractor, supplier, other person or organization listed by the Contractor and to whom the Engineer does not make written objection prior to the recommendation of award to the City Council will be deemed acceptable to the City subject to revocation of such acceptance after the Effective Date of the Contract Agreement as provided in the General Conditions.

9.2. No Contractor shall be required to employ any Subcontractor, supplier, person, or organization against whom he has reasonable objection.

10. BID/PROPOSAL FORM

10.1. The Bid/Proposal Form is included with the Contract Documents and shall be printed in ink or typewritten. All blanks on the Bid/Proposal Forms must be completed. Unit Prices shall be to no more than two decimal points in dollars and cents. The Bidder must state in the Bid/Proposal Form in words and numerals without delineation's, alterations or erasures, the price for which they will perform the work as required by the Contract Documents. Bidders are required to bid on all items in the Bid/Proposal form. The lump sum for each section or item shall be for furnishing all equipment, materials, and labor for completing the section or item as per the plans and contract specifications. Should it be found that quantities or amounts shown on the plans or in the proposal, for any part of the work, are exceeded or should they be found to be less after the actual construction of the work, the amount bid for each section or item will be increased or decreased in direct proportion to the unit prices bid for the listed individual items.

10.2. Bids by corporations shall be executed in the corporate name by the president or a vice-president (or other corporate officer accompanied by evidence of authority to sign) and the corporate seal shall be affixed. The corporate address and state of incorporation shall be shown below the Signature. If requested, the person signing a Bid for a corporation or partnership shall produce evidence satisfactory to the City of the person's authority to bind the corporation or partnership.

10.3. Bids by partnerships shall be executed in the partnership name and signed by a general partner, whose title shall appear under the signature and the official address of the partnership shall be shown below the signature.

10.4. All names shall be typed or printed below the signature.

11. SUBMISSION OF BIDS

11.1. It is recommended that bids are submitted electronically through the City's e-Procurement Portal located at https://procurement.opengov.com/portal/myclearwater. By way of the e-Procurement Portal, responses will be locked and digitally encrypted until the submission deadline passes.

Sealed Bids not submitted electronically shall be submitted at or before the time and at the place indicated in the Advertisement for Bids and shall be submitted in a sealed envelope with the project name and number on the bottom left-hand corner. If forwarded by mail, the Bid shall be enclosed in another envelope with the notation "Bid Enclosed" on the face thereof and addressed to the City of Clearwater,

attention Purchasing Manager. Bids will be received at the office indicated in the Advertisement until the time and date specified. Bids in any other form will not be accepted.

E-mail or fax submissions will not be accepted.

No responsibility will attach to the City of Clearwater, its employees or agents for premature opening of a bid that is not properly addressed and identified.

11.2. If submitting a hard copy, the sealed bid envelope shall contain, but not be limited to, the Proposal/Bid Bond and corresponding Power of Attorney, Affidavit, Non-Collusion Affidavit, Proposal (pages one and two), Addendum Sheet, Bidder's Proposal, Scrutinized Companies and Business Operations with Cuba and Syria Certification Form, and E-Verify form.

12. MODIFICATION AND WITHDRAWAL OF BIDS

12.1. For bids submitted electronically, vendors may use the "Unsubmit Response" button located on the Response Details page of their submission. Responses may be resubmitted once they have been edited or modified as needed.

For mailed in or hand delivered bids, written requests to modify or withdraw the bid received by the City prior to the scheduled opening time will be accepted and will be corrected after opening. Written requests must be addressed and labeled in the same manner as the bid and marked as a MODIFICATION or WITHDRAWAL of the bid.

No oral requests will be allowed.

Requests for withdrawal after the bid opening will only be granted upon proof of undue hardship and may result in the forfeiture of any bid security. Any withdrawal after the bid opening shall be allowed solely at the City's discretion.

13. REJECTION OF BIDS

13.1. To the extent permitted by applicable State and Federal laws and regulations, the City reserves the right to reject any, and all Bids, and to waive any, and all informalities. Grounds for the rejection of a bid include but are not limited to a material omission, unauthorized alteration of form, unauthorized alternate bids, incomplete or unbalanced unit prices, or irregularities of any kind. Also, the City reserves the right to reject any Bid if the City believes that it would not be in the best interest of the public to make an award to that Bidder, whether because the Bid is not responsive or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by the City. The City reserves the right to decide which bid is deemed to be the lowest and best in the interest of the public.

14. DISQUALIFICATION OF BIDDER

14.1. Any or all bids will be rejected if there is any reason for believing that collusion exists among the bidders, the participants in such collusion will not be considered in future proposals for the same work. Each bidder shall execute the Non-Collusion Affidavit contained in the Contract Documents.

15. OPENING OF BIDS

15.1. Bids will be opened and read publicly at the location and time stated in the Advertisement for Bids. Bidders are invited to be present at the opening of bids.

16. LICENSES, PERMITS, ROYALTY FEES AND TAXES

16.1. The Contractor shall secure all licenses and permits (and shall pay all permit fees) except as specifically stated otherwise in the Technical Specifications. The Contractor shall comply with all Federal and State Laws, County and Municipal Ordinances and regulations, which in any manner effect the prosecution of the work. City of Clearwater building permit fees and impact fees will be waived except as specifically stated otherwise in the Technical Specifications.

16.2. The Contractor shall assume all liability for the payment of royalty fees due to the use of any construction or operation process, which is protected by patent rights except as specifically stated otherwise in the Technical Specifications. The amount of royalty fee, if any, shall be stated by the Contractor.

16.3. The Contractor shall pay all applicable sales, consumer, use, and other taxes required by law. The Contractor is responsible for reviewing the pertinent State Statutes involving the sales tax and sales tax exemptions and complying with all requirements.

16.4. The City of Clearwater is exempt from state sales tax on materials purchased by the City and incorporated into the WORK. The City of Clearwater reserves the right to implement the Owner Direct Purchase (ODP) Option, as may be indicated in the Scope of Work Description in Section IV – Technical Specifications and as defined in Section III – General Conditions.

17. IDENTICAL TIE BIDS/VENDOR DRUG FREE WORKPLACE

17.1. In accordance with the requirements of Section 287.087 Florida Statutes regarding a Vendor Drug Free Workplace, in the event of identical tie bids, preference shall be given to bidders with drug-free workplace programs. Whenever two or more bids which are equal with respect to price, quality, and service are received by the City for the procurement of commodities or contractual services, a bid received from a business that certifies that it has implemented a drug-free workplace program shall be given preference in the award process. Established procedures for processing tie bids will be followed if none or all of the tied bidders have a drug-free workplace program. In order to have a drug-free workplace program, a contractor shall supply the City with a certificate containing the following six statements and the accompanying certification statement:

(1)Publish a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the workplace and specifying the actions that will be taken against employees for violations of such prohibition.

(2) Inform employees as to the dangers of drug abuse in the workplace, the business's policy of maintaining a drug-free workplace, any available drug counseling, rehabilitation, and employee assistance programs, and the penalties that may be imposed upon employees for drug abuse violations.

(3) Give each employee engaged in providing the commodities or contractual services that are under bid a copy of the statement specified in subsection (1).

(4) In the statement specified in subsection (1), notify the employees that, as a condition of working on the commodities or contractual services that are under bid, the employee will abide by the terms of the statement and will notify the employer of any conviction of, or plea of guilty or nolo contendere to, any violation of chapter 893, or of any controlled substance law, of the United States, or of any state, for a violation occurring in the workplace no later than five (5) days after such conviction.

(5) Impose a sanction on or require the satisfactory participation in a drug abuse assistance or rehabilitation program if such is available in the employee's community, by any employee who is so convicted.

(6) Make a good faith effort to continue to maintain a drug-free workplace through implementation of this section.

I certify that this firm does/does not (select only one) fully comply with the above requirements.

18. AWARD OF CONTRACT

18.1. Discrepancies between words and figures will be resolved in favor of words. Discrepancies in the multiplication of units of work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

18.2. In evaluating the Bids, the City will consider the qualifications of the Bidders, whether the Bids comply or not with the prescribed requirements, unit prices, and other data as may be requested in the Bid/Proposal form. The City may consider the qualifications and experience of Subcontractors, suppliers and other persons and organizations proposed by the Contractor for the Work. The City may conduct such investigations as the City deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of Bidders, proposed Subcontractors, Suppliers and other persons, and organizations to perform and furnish the Work in accordance with the Contract Documents to the City's satisfaction within the prescribed time.

18.3. If the Contract is to be awarded, it will be awarded to the lowest responsible, responsive Bidder whose evaluation by the City indicates to the City that the award will be in the best interest of the City.

18.4. Award of contract will be made for that combination of base bid and alternate bid items in the best interest of the City, however, unless otherwise specified all work awarded will be awarded to only one Contractor.

18.5. The successful bidder/contractor will be required to comply with Section 119.0701, Florida Statutes, specifically to:

A. Keep and maintain public records that ordinarily and necessarily would be required by the City of Clearwater in order to perform the service;

B. Provide the public with access to public records on the same terms and conditions that the City of Clearwater would provide the records and at a cost that does not exceed the cost provided in this chapter or as otherwise provided by law;

C. Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law; and

D. Meet all requirements for retaining public records and transfer, at no cost, to the City of Clearwater all public records in possession of the contractor upon termination of the contract and destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. All records stored electronically must be provided to the public agency in a format that is compatible with the information technology systems of the City of Clearwater.

19. BID PROTEST

19.1. RIGHT TO PROTEST:

Pursuant to Section 2.562(3), Clearwater Code of Ordinances, a bidder who submitted a response to a competitive solicitation and was not selected may appeal the decision through

the bid protest procedures, a copy of which shall be available in the Procurement Division. A protesting bidder must include a fee of one percent of the amount of the bid or proposed contract to offset the City's additional expenses related to the protest. This fee shall not exceed $5,000.00 nor be less than $50.00. Full refund will be provided should the protest be upheld. No partial refunds will be made.

20. TRENCH SAFETY ACT

20.1. The Bidder shall comply with the provisions of the City of Clearwater's Ordinance related to trench digging (Ordinance No. 7918-08) along with the Florida Trench Safety Act (Sections 553.60-553.64, Florida Statutes) and the provisions of the Occupational Safety and Health Administration's (OSHA) excavation safety standards, 29 C.F.R.s 1926.650 Subparagraph P, or current revisions of these laws.

21. CONSTRUCTION SITE EROSION AND SEDIMENT CONTROL MANAGEMENT MEASURES

21.1. The Bidder shall comply with the provisions of the Environmental Protection Agency (EPA) National Pollution Discharge Elimination System (NPDES) stormwater permit and implement stormwater pollution prevention plans (SWPPP's) or stormwater management programs (both using best management practices (BMPs) that effectively reduce or prevent the discharge of pollutants into receiving waters.

A. The control of construction-related sediment loadings is critical to maintaining water quality. The implementation of proper erosion and sediment control practices during the construction stage can significantly reduce sediment loadings to surface waters.

B. Prior to land disturbance, prepare and implement an approved erosion and sediment control plan or similar administrative document that contains erosion and sediment control provisions.

NPDES Management Measures available at City of Clearwater Engineering Environmental Division and EPA websites to help address construction-related Best Management Practices.

GENERAL CONDITIONS

Section III - General Conditions can be found on the City's website at:
https://www.myclearwater.com/Business-Development/Doing-Business-with-the-City/Engineering-Construction-Bid-Information/Contract-Specifications

TECHNICAL SPECIFICATIONS

3.1 SCOPE OF WORK

Project Name: RO1 Dual Media Filter Rehab

Project Number: 23-0043-UT

Scope of Work:

The project scope includes addressing issues at the Reverse Osmosis Water Treatment Plant No. 1 (RO1), located at 1657 Palmetto St, Clearwater, FL 33755. The work involves rehabilitation of four Dual

Media Filters including the removal and disposal of existing filter media, loading of new media, interior and exterior coatings, and associated appurtenances.

3.2 Section IV - Technical Specifications

Section IV - Technical Specifications can be found on the City's website at: https://www.myclearwater.com/Business-Development/Doing-Business-with-the-City/Engineering-Construction-Bid-Information/Contract-Specifications

3.3 Section V - Contract Documents

Section V - Contract Documents can be found on the City's website at: https://www.myclearwater.com/Business-Development/Doing-Business-with-the-City/Engineering-Construction-Bid-Information/Contract-Specifications

SUPPLEMENTAL TECHNICAL SPECIFICATIONS - Section IVA

4.1 SECTION 01 20 00 MEASUREMENT AND PAYMENT

1. SUMMARY

1. Section Includes:

1. This Section includes administrative and procedural requirements for unit cost and lump sum prices. Delineation of measurement and payment criteria applicable to Work performed under Contract by the unit price payment method.

2. There are numerous incidental items of work that are required to complete the Project. While these items may not be specifically mentioned or illustrated by the Contract Documents and there may be no specific pay items listed for them, the Contractor will be required to perform those incidental tasks that can be anticipated through inspection of the Contract Documents, inspection of the construction areas, and experience in this class of construction.

3. Items considered incidental work shall not be measured for payment or paid for as such unless specified as unit price by items on the Bid Form. These items and their costs shall be included in the unit prices or lump sum bid for the pay items unless bid separately. Incidental items include but are not limited to the following:

1. Permits – if required.

2. Project sign(s) – Up to 2 signs at location(s) directed by the Owner.

3. Material royalties.

4. Temporary utility connections.

5. Coordination with utilities for relocations or support services (including relocations, removal, and replacement of ancillary appurtenances).

6. Clearing and grubbing/tree removal.

7. Stakeout and surveying.

8. Site security.

9. Temporary lighting.

10. Bedding materials as detailed (excluding materials required to replace trench undercutting).
11. Handling, placing, manipulating, and compacting excavated material suitable as backfill material.
12. Temporary pipe thrust restraint.
13. Maintenance of pipeline operations during pipe shutdowns.
14. Testing materials, equipment, media, and execution.
15. Offsite disposal of surplus and unsuitable excavated material.
16. Offsite disposal of pipe and appurtenances removed to accommodate the proposed pipe.
17. Daily site cleanup.
18. Allaying of dust.
19. Temporary pavement.
20. Site cleanup.
21. Recordkeeping.
22. Documentation of pre and post construction conditions with photographs/video
23. All other items required to complete the project, for which pay items are not provided, will not be measured nor paid for as such, but their cost shall be included in the price for other items of work.

4. The prices included in the Schedule of Prices (Schedule of Values) will be full compensation for all labor, materials, tools, equipment and incidentals, permit fees, bonds, taxes, mobilization/demobilization, insurance, overhead and profit, temporary access roads and facilities, and other miscellaneous costs necessary to complete the construction as shown on the Drawings and/or as specified in the Contract Documents to be performed under this Contract. Actual quantities of each item bid on a unit price basis will be determined upon completion of the construction in the manner set up for each item in this section of the specifications. Payment for all items listed in the Schedule of Prices will constitute full compensation for all work shown and/or specified and required to accomplish the intent of this Contract.
5. The actual amounts of work done, and materials furnished under unit price items may differ from the estimated quantities. In some cases, a unit price item has been added to the bid schedule to establish a cost basis in the event work associated with that item is required. No guarantee is expressed or implied that the quantities shown in the bid schedule shall be required to fulfill the Contract.
6. Retainage and other payment conditions apply to all payments.

2. PROCEDURES

1. Rates: The selected Contractor shall provide a listing of all equipment and staff labor rates available for the project and their hourly, daily, and weekly rates prior to the submittal of the first pay application.

2. List of Unit and Lump Sum Prices: A list of unit and lump sum prices is included at the end of this Section. Specification Sections referenced in the schedule contain requirements for materials described under each unit price. The unit price and payment made for each item listed constitutes full compensation for furnishing all plant, labor, materials, equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, services required and reasonably implied by the Contract Documents, tests and reports, and for performing all work required for each of the unit price items.

3. Pay items in the bid form with a number correspond to the numerical equivalent in the Base Bid and the appropriate pay item descriptions below apply.

2. EXECUTION

1. PAYMENT REQUESTS

1. General

1. No payment shall be made for stored materials.

2. Record Drawings and Photographs

1. Prior to each monthly partial payment request, the Contractor shall furnish the Engineer one set of acceptable Construction Photographs and Working Drawings, including Shop Drawings for equipment, materials, systems, interconnection wiring diagrams, etc., which delineate the work installed prior to that month's request for payment. All required documents shall be complete and current with regard to the entire project at the closing date of the pay period and shall be full-size color electronic copies in Portable Document Format (PDF). The Contractor shall also submit photos taken up to the closing date of the payment period.

2. Prior to the final payment request, the Contractor shall furnish the Engineer one complete set of all accepted Final As-Built Drawings in PDF format and Other Record Documents. All required documents shall be complete and finalized as of the date of submission.

3. Working Drawings furnished shall be corrected to include any departures from previously accepted Drawings.

3. PAY ITEMS

1. General Conditions and Mobilization (PAY ITEM #1)

2. Percent of Original Contract Amount Earned Allowable Percent of the Lump Sum Price for the Item 10 25 25 50 60 75 100 100

2. Remove & Dispose of Media from Existing Filter Vessel (PAY ITEM #2)

1. Opening existing ports and hatches for access into the filter

2. Obtain and pay for any testing (e.g. TCLP analyses, paint filter tests, etc.) required to allow for disposal of the removed materials

3. Suitably prepare area to receive removed media while awaiting transport offsite

4. Removal of filtration media and gravel materials from inside pressure vessel

5. Providing and implementing media removal means and methods that will not damage pressure vessel internal piping and pipe support systems
6. Transporting removed materials to a proper, lawful site of disposal provided by the Contractor
7. Pay any tipping charges or landfill fees
8. Pressure wash interior of pressure vessel after filtration media and gravel materials are removed
9. Disposal of wash-down water
10. Clean-up
11. All other work needed to completely remove existing material from inside the existing pressure vessel to the satisfaction of the Engineer.

3. Clean, Prepare, and Coat Filter Vessel Interior Surface (PAY ITEM #3)

1. Opening existing ports and hatches for access into the filter
2. Flush cleaning of underdrain and air lateral piping
3. Preparing all metal surfaces of pressure filter vessel interior tank walls and support systems for recoating with specified coating system
4. Checking air lateral piping for proper air distribution
5. Coating all pressure filter vessel interior metal surfaces with specified coating system
6. Other related work needed to restore the internal surfaces of an existing filter to the condition required by the drawings and technical specifications.

4. Remove and Replace Filter Vessel Feet (PAY ITEM #4)

1. Supporting the filter pressure vessel to alleviate weight from the filter legs Cutting and removing filter legs one at a time per the drawings and specifications.
2. Installation of new flange per plans and specifications. New flange and connection to be prepared and coated per specifications.
3. Installation of new, fabricated stainless-steel replacement leg sections with all insulating materials per drawings and specifications
4. Other related work needed to replace the filter pressure vessel feet as required by the drawings and technical specifications.

5. Repair, Prepare, and Coat Manway Hatches (PAY ITEM #5)

1. Opening existing ports and hatches for access. Hatches may be removed if required to complete cleaning, prep and coating
2. Preparing all metal surfaces of manway hatches for recoating with specified coating system
3. Coating all manway hatch metal surfaces with specified coating system

4. Other related work needed to restore the surfaces of an existing manway hatch to the condition required by the drawings and technical specifications.

6. Furnish and Place Pressure Filter Gravel Media (PAY ITEM #6)

1. Coordinating with gravel manufacturer to obtain and submit to the Engineer certified copies of material test results of media to be shipped to the project
2. Coordinating with and paying an Independent Materials Testing Laboratory to conduct testing and provide certified copies of material test results of the media delivered to the project both before and after placement into each pressure vessel
3. Furnishing sufficient gravel media of the sizes called for by the plans
4. Providing suitable temporary onsite storage for media material while awaiting installation into a pressure vessel
5. Marking interior of pressure vessel to guide media placement
6. Cleaning and disinfecting interior of pressure vessel before media placement including supply and application of chlorinating & dechlorinating chemicals
7. Transferring media from temporary storage to an existing pressure vessel in a manner that protects interior piping and surfaces while also protecting media from damage
8. Placing gravel media into pressure vessel as individual media layers, each with the depth called for by the plans
9. For manway hatches, furnish and install new gasket and close by re-bolting, including furnishing (at no additional cost to the City) new stainless-steel hardware (to match existing size) to replace existing bolts, nuts, or washers
10. Keeping media clean
11. Checking elevation of media top surface with water and making adjustments to the media surface
12. After all gravel media layers have been placed, wash the gravel media
13. Adding additional gravel media that may be necessary to achieve proper depth and level surface after washing
14. All other work necessary to properly place and make ready each gravel media layer to receive the filter media layer to be placed above.

7. Furnish and Place Pressure Filter Sand Media (PAY ITEM #7)

1. Coordinating with sand media manufacturer to obtain and submit to the Engineer certified copies of material test results of media to be shipped to the project
2. Coordinating with and paying an Independent Materials Testing Laboratory to conduct testing and provide certified copies of material test results of the media delivered to the project both before and after placement into each pressure vessel
3. Furnishing sufficient filter sand media of the sizes called for by the plans

4. Providing suitable temporary onsite storage for media material while awaiting installation into a pressure vessel
5. Transferring media from temporary storage to an existing pressure vessel in a manner that protects interior piping and surfaces while also protecting media from damage
6. Placing filter sand media into pressure vessel as an individual media layer with the depth called for by the plans
7. Keeping media clean
8. Checking elevation of media top surface with water and making adjustments to the media surface
9. After filter sand media layer has been placed, wash and scrape the filter sand media layer
10. Remove, and properly dispose of offsite at a location provided by the Contractor, any media scrapings or media that becomes contaminated after placement
11. Adding additional filter sand media that may be necessary to achieve proper depth and level surface after washing and scraping
12. All other work necessary to properly place and make ready each filter sand and gravel media layer to receive the filter media layer to be placed above.

8. Furnish and Place Pressure Filter Anthracite Media (PAY ITEM #8)

1. Coordinating with anthracite media manufacturer to obtain and submit to the Engineer certified copies of material test results of media to be shipped to the project
2. Coordinating with and paying an Independent Materials Testing Laboratory to conduct testing and provide certified copies of material test results of the media delivered to the project both before and after placement into each pressure vessel
3. Furnishing sufficient anthracite media of the sizes called for by the plans
4. Providing suitable temporary onsite storage for media material while awaiting installation into a pressure vessel
5. Transferring media from temporary storage to an existing pressure vessel in a manner that protects interior piping and surfaces while also protecting media from damage
6. Placing anthracite media into pressure vessel as an individual media layer with the depth called for by the plans
7. Keeping media clean
8. Checking elevation of media top surface with water and making adjustments to the media surface
9. After anthracite media layer has been placed, wash and scrape the filter sand media layer
10. Remove, and properly dispose of offsite at a location provided by the Contractor, any media scrapings or media that becomes contaminated after placement

11. Adding additional anthracite media that may be necessary to achieve proper depth and level surface after washing and scraping

12. All other work necessary to properly place and make ready the anthracite media layer in order to place the pressure filter vessel into operation.

9. Replace 2" SS316 Pipe Nipple (PAY ITEM #9)

1. Removing existing air release valve from pressure vessel including disconnecting attached pipe nipple

2. Furnish and installing a pipe nipple and connect to pressure vessel and existing air release valve. Removed nipple shall become the property of the Contractor and removed from the site.

3. All other work necessary to properly replace the pipe nipple in order to place the pressure filter vessel into operation.

10. Replace Unistrut Pipe Supports (PAY ITEM #10)

1. Detaching and removing existing Unistrut pipe supports as identified in the drawings and specifications

2. Furnish and installing Unistrut pipe supports and reattaching existing piping and appurtenances to the configuration as was prior to construction. Removed Unistrut pipe supports shall become the property of the Contractor and removed from the site.

3. All other work necessary to properly replace the Unistrut pipe supports.

11. Clean, Prepare, and Coat Filter Vessel Exterior Surface (PAY ITEM #11)

1. Properly protecting existing external equipment, piping and instrumentation from paint

2. Preparing all metal surfaces of pressure filter vessel exterior tank walls and support systems for recoating with specified coating system

3. Coating all pressure filter vessel exterior metal surfaces with specified coating system

4. Other related work needed to restore the external surfaces of an existing filter to the condition required by the drawings and technical specifications.

12. Return Pressure Vessel to Service (PAY ITEM #12)

1. Coordinating with City operation staff to test and startup each filter vessel

2. Collecting data and preparing a written Field Installation Report

3. Disinfecting each filter vessel

4. Washing and rinsing media as required by the technical specifications with potable water provided by the City

5. For each bolted manway, furnish and install new gasket and close by re-bolting, including furnishing (at no additional cost to the City) new stainless-steel hardware

6. Worksite clean-up

7. All other work necessary to make ready and properly return the pressure vessel to service

13. Preparation of O&M Manual (PAY ITEM #13)

1. Maintaining approved shop drawings in a safe secure location during the progress of the work and inserting them into the O&M Manual
2. Furnishing binders and dividers
3. Preparation and assembly of the O&M Manual, acceptable to the Engineer
4. Reproduction costs

14. Replace Crab-Type Manway Hatch (12" x 16") (PAY ITEM #14)

1. Upon direction from the engineer, the existing 12” x 16” crab-type manway hatch shall be removed from pressure vessel. Removed crab-type manway hatch shall become the property of the Contractor and removed from the site.
2. Furnishing and installing a new 12” x 16” crab-type manway hatch and connect to pressure vessel. The new hatch shall be prepped and coated in accordance with the plans and specifications
3. All other work necessary to properly replace the 12” x 16” crab-type manway hatch in order to place the pressure filter vessel into operation.

15. Replace Crab-Type Manway Hatch (18" x 24") (PAY ITEM #15)

1. Upon direction from the engineer, the existing 18” x 24” crab-type manway hatch shall be removed from pressure vessel. Removed crab-type manway hatch shall become the property of the Contractor and removed from the site.
2. Furnishing and installing a new 18” x 34” crab-type manway hatch and connect to pressure vessel. The new hatch shall be prepped and coated in accordance with the plans and specifications
3. All other work necessary to properly replace the 18” x 34” crab-type manway hatch in order to place the pressure filter vessel into operation.

16. Replace SS316 Air Lateral (PAY ITEM #16)

1. Upon direction from the engineer, removing existing air lateral from pressure vessel
2. Furnishing and installing a new SS316 air lateral and connect to pressure vessel and existing air piping. Removed air lateral shall become the property of the Contractor and removed from the site.
3. All other work necessary to properly replace the SS316 air lateral in order to place the pressure filter vessel into operation.

17. Replace SS316 underdrain Lateral (PAY ITEM #17)

1. Upon direction from the engineer, removing existing air lateral from pressure vessel

2. Furnishing and installing a new SS316 underdrain lateral and connect to pressure vessel and existing piping. Removed underdrain lateral shall become the property of the Contractor and removed from the site.

3. All other work necessary to properly replace the SS316 underdrain lateral in order to place the pressure filter vessel into operation.

18. Contingency Allowance

4.2 SECTION 02 41 19 SELECTIVE DEMOLITION

1. GENERAL

1. SUMMARY

1. The Work of this Section Includes:

1. Demolition and removal of selected portions of structure and site elements.

2. DEFINITIONS

1. Remove: Detach items from existing construction and legally dispose of off-site unless indicated to be removed and salvaged or removed and reinstalled.

2. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner as indicated.

3. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage; prepare for reuse; and reinstall where indicated.

4. Existing to Remain: Existing items of construction that are not to be removed.

3. MATERIALS OWNERSHIP

1. Unless otherwise indicated, demolition waste becomes property of Contractor.

4. COORDINATION

1. Arrange selective demolition schedule so as not to interfere with Owner's operations.

5. PREINSTALLATION MEETINGS

1. Predemolition Conference: Conduct conference at Project site.

1. Inspect and discuss condition of construction to be selectively demolished.

2. Review and finalize selective demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.

3. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.

4. Review areas where existing construction is to remain and requires protection.

5. Review and finalize protection requirements.

6. Review procedures for noise control and dust control.

7. Review storage, protection, and accounting for items to be removed for salvage or reinstallation.

6. INFORMATIONAL SUBMITTALS

1. Survey of Existing Conditions: document existing conditions with photographs. Including filtration vessels, slabs, and surrounding site.

2. Proposed Protection Measures: Submit written report, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.

3. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.

2. Temporary interruption of utility services. Indicate how long utility services will be interrupted.

3. Coordination for shutoff, capping, and continuation of utility services.

4. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

7. CLOSEOUT SUBMITTALS

1. Inventory: Submit a list of items that have been removed and salvaged.

8. FIELD CONDITIONS

1. Owner will occupy portions of site immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

2. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

3. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

4. Hazardous Materials:

1. It is not expected that hazardous materials will be encountered in the Work.

1. Hazardous materials will be removed by Owner before start of the Work.

2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Engineer and Owner. Hazardous materials will be removed by Owner under a separate contract.

9. WARRANTY

1. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding. Existing warranties include the following:

2. Notify warrantor on completion of selective demolition and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

2. PRODUCTS

1. PERFORMANCE REQUIREMENTS

1. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

3. EXECUTION

1. EXAMINATION

1. Verify that utilities have been disconnected and capped before starting selective demolition operations.

2. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

3. Verify that hazardous materials are not present before proceeding with demolition operations.

4. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

1. Inventory and record the condition of items to be removed for salvage or reinstallation. Photograph or video conditions that might be misconstrued as damage caused by removal.

2. Photograph or video existing conditions of adjoining construction including finish surfaces, that might be misconstrued as damage caused by selective demolition operations or removal of items for salvage or reinstallation.

2. PREPARATION

1. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

2. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.

3. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Engineer, items may be removed to a suitable, protected storage location and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3. UTILITY SERVICES

1. Existing Services/Systems to Remain: Maintain utilities and systems and equipment to remain and protect against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

2. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utilities and systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated utilities when requested by Contractor.

2. Arrange to shut off utilities with utility companies.

3. If disconnection of utilities and systems will affect adjacent occupied parts of the facility, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems.

4. Demolish and remove existing systems, equipment, and components indicated on Drawings to be removed.

1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.

2. Equipment to Be Removed: Disconnect and cap services and remove equipment and components.

5. Abandon existing systems, equipment, and components indicated on Drawings to be abandoned in place.

1. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.

6. Remove and reinstall/salvage existing systems, equipment, and components indicated on drawings to be removed and reinstalled or removed and salvaged:

1. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment and components; when appropriate, reinstall, reconnect, and make equipment operational.

2. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and components and deliver to Owner.

4. SALVAGE/REINSTALL

1. Removed and Salvaged Items:

1. Clean salvaged items.

2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.

3. Store items in a secure area until delivery to Owner.

4. Transport items to Owner's storage area designated by Owner.

5. Protect items from damage during transport and storage.

2. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.

2. Pack or crate items after cleaning and repairing. Identify contents of containers.

3. Protect items from damage during transport and storage.

4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

5. SELECTIVE DEMOLITION, GENERAL

1. General: Demolish and remove existing construction only to extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.

2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.

3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.

5. Maintain fire watch during and for at least 1 hour after flame-cutting operations.

6. Maintain adequate ventilation when using cutting torches.

7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.

8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.

9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

2. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed trafficways if required by authorities having jurisdiction.
2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

6. DISPOSAL OF DEMOLISHED MATERIALS

1. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

7. CLEANING

1. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

4.3 SECTION 05 50 00 METAL FABRICATIONS

A. GENERAL

A. SUMMARY

A. Section Includes:

A. Structural-steel and stainless-steel materials.

B. Shrinkage-resistant grout.

C. Miscellaneous framing and supports.

D. Loose bearing and leveling plates.

E. Thermal/electrical insulating fiberglass reinforced composite plates, washers, bushings

B. COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves,

concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

C. ACTION SUBMITTALS

A. Product Data:

A. Structural steel and stainless-steel materials.

B. Structural fasteners and anchor rods.

C. Shrinkage-resisting grout.

D. Slotted channel framing.

E. Thermal/Electrical insulating fiberglass composite plates, washers, bushings

B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

A. Include details of cuts, connections, splices, camber, holes, and other pertinent data.

B. Include embedment Drawings.

C. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.

D. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.

C. Provide Shop Drawings for the following:

A. Structural-steel and stainless-steel fabrications.

B. Jacking and shoring systems.

D. INFORMATIONAL SUBMITTALS

A. Mill Certificates: Signed by stainless steel manufacturers, certifying that products furnished comply with requirements.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

D. Research Reports: For post-installed anchors.

E. QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel in accordance with the following welding codes:

A. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

F. FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

G. DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

A. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

A. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.

B. Clean and relubricate bolts and nuts that become dry or dirty before use.

B. PRODUCTS

A. METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

C. Stainless Steel Sheet, Strip, and Plate: alloy 316L unless otherwise indicated.

D. Stainless Steel Bars and Shapes: alloy 316L unless otherwise indicated.

E. Stainless steel tubing or pipe: alloy 316L, or ASTM A554, ASTM A312, ASTM A790, ASTM A999.

F. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.

G. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.

A. Size of Channels: 1-5/8 by 1-5/8 inches unless otherwise indicated

B. Material: alloy 316 stainless steel.

B. FASTENERS

A. General: Unless otherwise indicated, provide stainless steel fasteners.

B. The bolts, washers, and nuts shall all have equivalent or greater corrosion resistance than the most corrosion resistant of the metal alloys joined. Bolt, washer, and nut material conforming to one of the following ASTM standards is approved for use under this Specification. In addition to the alloys listed in Section A3.1b, precipitation hardening stainless steel S66286 is also approved for use.

A. Bolts: ASTM A193, A320, A453, A1082, F593

B. Nuts: ASTM A194, A453, A962, F594

C. Washers: Stainless steel washers hardened to at least Brinell HBW (31 Rockwell HRC) shall be used under both the bolt head and the nut and on both sides of fiberglass washers.

C. Bolts: ASME B18.2.1 Bolts used in bearing-type connections shall have either hex heads or heavy hex heads. Bolts used in pretensioned, or slip-critical connections shall have heavy hex heads. Threads shall be cut or rolled in accordance with ASME B1.1 unified coarse (UNC) or 8 thread series (8 UN), Class 2A.

D. Nuts: ASME B18.2.2 Nuts used in bearing-type connections shall be either hex or heavy hex. Nuts used in pretensioned, or slip-critical connections shall be heavy hex. Threads shall be in accordance with ASME B1.1 UNC or 8 UN, Class 2B.

E. Stainless Steel Washers: ASME B18.21.1

F. Anchor Rods and Threaded Rods: 316 stainless steel, of dimensions indicated; with nuts, and flat washers.

A. Anchor rod and threaded rod made of austenitic, duplex, or precipitation hardening stainless steel material shall conform to one of the following ASTM standards: ASTM F1554, ASTM A193/A193M ASTM A320/A320M ASTM A1082/A1082M ASTM F593

B. Threads on anchor rods and threaded rods shall conform to the Unified Standard Series of ASME B18.2.1 and shall have Class 2A tolerances.

C. Manufacturer’s certification shall constitute sufficient evidence of conformity with the standards.

C. MISCELLANEOUS MATERIALS

A. Fiberglass-Reinforced Laminate Composite plates, washers, bushings

A. Material Properties:

A. Tensile Strength ASTM D638 11,000 psi (75.8 MPa)

B. Flexural Strength ASTM D790 25,000 psi (172.4 MPa)

C. Compressive Strength ASTM D695 38,900 psi (268.2 MPa)

D. Compressive Modulus ASTM D695

E. 1/2” thk (12.7mm) 291,194 psi (2,007.7 MPa)

F. 1” thk (25.4mm) 519,531 psi (3,582.0 MPa)

G. Shear Strength ASTM D732 15,000 psi (103.4 MPa)

H. Thickness 1” (25.4mm) or as indicated

I. Oxygen Index ASTM D2863 21.8%

J. Coefficient of Thermal Expansion ASTM D696 2.2

K. Thermal Conductivity ASTM C177 1.8 BTU/Hr/ft2/in/°F (0.259 W/m*°K)

L. Density 107.83 lb/ft3 (1727 Kg/M3)

B. Shrinkage-Resistant Grout

A. Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

C. Consumables for Welding

A. Filler and base metal combinations shall be in accordance with the prequalified materials listed in AWS D1.6/D1.6M, clause 5, or a filler and base metal combination documented to meet the structural and corrosion performance requirements of the application. AWS D1.6/D1.6M, clause 6, shall be used to qualify all filler and base material combinations that do not meet the prequalification requirements of AWS D1.6/D1.6M, clause 5. Manufacturer’s certification shall constitute sufficient evidence of conformity with the standards.

D. FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:

A. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

B. Obtain fusion without undercut or overlap.

C. Remove welding flux immediately.

D. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing.

F. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

G. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

H. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

E. MISCELLANEOUS FRAMING AND SUPPORTS

A. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

B. Fabricate stainless steel pipe columns from stainless steel pipe with stainless steel baseplates and top plates as indicated. Drill or punch baseplates and top plates for anchor and connection bolts and weld to pipe with fillet welds all around. Make welds the same size as pipe wall thickness unless otherwise indicated.

F. LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items indicated.

B. Drill plates to receive bolts.

G. GENERAL FINISH REQUIREMENTS

A. Finish metal fabrications after assembly.

B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

C. EXECUTION

A. PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep vessels secure, plumb, and in alignment against temporary construction loads and loads equal in intensity

to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated on Drawings.

B. INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded. Do not weld, cut, or abrade surfaces after fabrication unless otherwise indicated.

C. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

D. Tighten bolts to snug tight condition.

E. Field Welding: Comply with the following requirements:

A. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

B. Obtain fusion without undercut or overlap.

C. Remove welding flux immediately.

D. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

C. INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

B. Install pipe columns on concrete with grouted baseplates. Position and grout column baseplates as specified in "Installation of Bearing and Leveling Plates" Article.

END OF SECTION 05 50 00

4.4 SECTION 09 96 00 HIGH PERFORMANCE COATINGS

A. GENERAL

A. RELATED DOCUMENTS (NOT USED)

B. SUMMARY

A. Provide all labor, materials, apparatus, scaffolding, and all appurtenant work in connection with painting and protective coatings, complete as indicated, specified and required.

B. Principal items to be coated per PART 3 of this document include, but are not limited to:

A. Interiors of Dual Media Filters

B. Exterior of Dual Media Filters

C. In addition to the application of coatings, the following procedures are to be performed:

A. Not Used.

D. It is the Contractor's responsibility to examine areas and conditions under which coating systems are to be applied, and to notify the Owner of areas or conditions which are not acceptable. Do not begin surface preparation or application until areas or conditions have been corrected.

C. DEFINITIONS

A. Owner – City of Clearwater, or their appointed representative.

B. Specifier – Mead & Hunt, or their appointed representative.

C. Contractor – Selected contractor who is awarded the project.

D. Manufacturer – Coating manufacturer or manufacturer's authorized representative:

E. DFT – Dry film thickness

F. Mils – All listed mils are dry film thicknesses.

G. Paint and Coating – The words "Paint" and Coating" may be used interchangeably within this document to refer to paints and high-performance coatings.

D. ACTION SUBMITTALS

A. All submittals must comply with Owner-specified submittal procedures.

B. Product Data Sheets.

A. Contractor shall submit coating material manufacturer's printed technical data sheets for products intended for use in each coating system.

B. Data sheets shall fully describe material as to its intended use, generic description, recommended surface preparation and application conditions, primers, material mixing and application (including recommended dry mil thickness recoat time), precautions, safety and maintenance cleaning directions.

C. Safety Data Sheets. Safety Data Sheets (SDS) shall accompany all submittals and shall be easily available for access at the job site during all activities.

D. Project references as outlined in Article 1.6.

E. Copy of any required certificates, to demonstrate compliance with Article 1.6.

F. Coating Schedule: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

E. ONE MANUFACTURER

A. All coatings shall be the product of one manufacturer as specified in this document.

F. QUALITY ASSURANCE

A. Third party Inspection:

A. Owner reserves the right to utilize third-party inspection services on this project.

B. If utilized, initial third-party inspection services shall be provided at no additional cost to the Contractor.

B. Guarantee

A. A one (1) year guarantee against failure which commences on the date of final completion shall be provided for all coatings, unless more stringent requirements are specified hereinafter. Failure of any coating during the guarantee period shall be repaired by the Contractor who shall absorb all costs related to the repair of the coating. Failure shall be defined as peeling, blistering, delamination or loss of adhesion of any of the coatings.

C. Manufacturer’s Qualifications:

A. Specialize in manufacture of high-performance coatings with a minimum of 25 years successful experience.

B. Able to demonstrate successful performance on comparable projects.

C. Must manufacture a water-based epoxy which is certified and listed with www.nsf.org to meet the extraction requirements of NSF Std. 600.

D. Single-Source Responsibility: All coatings shall be products of a single manufacturer.

D. Manufacturer’s Representative:

A. The Contractor shall require the manufacturer to furnish a manufacturer’s qualified technical representative to visit the project site for technical support as required and ordered and as may be necessary to resolve field questions or problems attributable to or associated with the manufacturer's products furnished under this Contract or the application thereof.

E. Applicator’s Qualifications:

A. Applicator must have a minimum AMPP Basic (Level 1) certified inspector on staff for no less than 6 months.

B. Experience in application of specified coatings for a minimum of 5 years on projects of similar size and complexity to this work.

C. Applicator must comply with all relevant OSHA safety regulations.

D. Use best practices to carry out corrosion prevention activities in the field.

E. Use best practices in environmental protection to prevent environmental degradation, and to ensure careful handling of all hazardous materials.

F. The Contractor must submit, with their bid, a letter of recommendation from the basis of design product manufacturer. This letter shall confirm that the Contractor's ability to apply the specified coatings.

G. The Contractor must submit, with their bid, a list of a minimum 5 completed projects of similar size and complexity to this work. Include for each project:

A. Project name & location

B. Name and contact of owner

C. Name and contact of specifier

D. Approximate area of coatings applied

E. Total project amount value

F. Date of completion

F. Pre-Application Meeting:

A. A pre-application meeting shall be held at least two (2) weeks before the start of application of coating systems. All parties who directly affect the project shall attend, including the Contractor, Manufacturer, and Owner.

B. The pre-application meeting shall include a review of any circumstances which may impact the project including, but not limited to, the following:

A. Environmental requirements

B. Protection of Surfaces not scheduled to be coated

C. Surface Preparation

D. Ventilation

E. Application

F. Cleaning

G. Disinfection

H. Repair

I. Field Quality Control

J. Protection of coating systems

K. 11-month walkthrough

L. Coordination of other projects

G. 11-Month Walkthrough:

A. The Owner shall organize a project meeting for 11 months after the final completion date which the Contractor, Manufacturer, and Owner shall attend. Participants will perform a walkthrough of the project and resolve any workmanship or materials discrepancies.

G. DELIVERY, STORAGE, AND HANDLING

A. All coatings shall be delivered to the mixing room in unbroken containers, bearing the manufacturer's brand, date of manufacture, and name. They shall be used without alteration and mixed, thinned, and applied in strict accordance with manufacturer's directions for the applicable materials and surface before using.

B. Coatings shall be delivered to the job site in the original unopened containers, bearing the manufacturer's label. A Product Data Sheet and Safety Data Sheets for all coatings shall be obtained from the manufacturer for each shipment of materials to the job site. Coatings shall be stored in a dry, well-ventilated area, not in direct contact with the ground, where the temperature is maintained within the manufacturer’s written recommended limits.

C. Damaged materials and/or materials exceeding the shelf life shall not be used.

D. The Contractor will be responsible for storing coatings onsite in accordance with the Manufacturer’s latest written recommendations.

E. Coatings shall be mixed in proper containers of adequate capacity. All coatings shall be mixed in accordance with the Manufacturer’s latest written recommendations. No unauthorized thinners or other materials shall be added to any coatings. Air shall not be used directly for agitation. Pigmented material shall be strained after mixing. Catalyzed materials may not be used beyond the recommended pot life.

F. Work areas will be designated by the Owner for storage and mixing of all materials. Materials shall be in full compliance with the requirements of pertinent codes and fire regulations. Proper containers outside of the buildings shall be provided and used for wastes, and no plumbing fixture shall be used for this purpose.

G. Contractor will be responsible for disposal of all waste, empty containers, etc.

H. All recommendations of the Manufacturer in regard to the health and safety of workmen shall be followed.

H. FIELD CONDITIONS

A. All coatings shall be applied in dry and dust-free environment.

B. No coating shall be applied when temperatures are outside the manufacturers written recommended limits.

C. No coating shall be applied to wet or damp surfaces, and shall not be applied in rain, fog, or mist.

D. No coating shall be applied when the temperature is less than 5°F above the dew point.

E. No coating shall be applied when unsuitable environmental conditions are expected within 1 hour of the listed “Dry to Touch” time for a coating.

B. PRODUCTS

A. MANUFACTURERS

A. Coatings shall be a product of Tnemec, or Specifier Approved Equal. Alternate coatings of other manufacturers may be approved by the Specifier, provided they are equal or better.

B. To allow time for Specifier and Owner review, all requests for substitution shall be submitted by the coating manufacturer a minimum of 10 days prior to the project bid date.

B. PROTECTIVE COATINGS, GENERAL

A. The specified basis of design is intended to provide the longest service life possible, lowest life cycle cost and most sustainable solution. Contractors must provide pricing based on the basis of design. If submitting alternate products, this must be shown in the Bid Schedule as an ADD or DEDUCT to the overall Base Bid, so the Owner can decide which coating system to accept.

B. Potential alternate products must include side-by-side comparisons of equality including generic coating description, volume solids, ASTM performance test results, etc.

C. Substitutions which decrease the total film thickness, change the generic type of coating, or fail to meet the performance criteria of the specified materials shall not be approved.

D. All coatings shall be furnished by the same manufacturer.

E. Coatings shall be sealed in containers that plainly show the designated name, formula or specification number, batch number, color, date of manufacture, manufacturer's directions, and name of manufacturer, all of which shall be plainly legible at the time of use.

F. All coatings shall be produced and applied as herein called for or, if not specifically called for, it shall be applied in accordance with the manufacturer's latest printed recommendations as approved by the Specifier.

G. Coating materials shall meet Volatile Organic Compounds (VOC) requirements of not more than 3.5 lbs/gal after thinning.

H. No coatings containing lead will be allowed.

I. Material Compatibility:

A. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

B. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

J. Colors: All colors and shades of colors of all coats of material shall be as identified in the color schedule. Each coat shall be of a slightly different shade, as directed by the Manufacturer to facilitate inspection of surface coverage of each coat.

C. SOURCE QUALITY CONTROL

A. Testing of Coatings: Owner reserves the right to invoke the following procedure:

A. Owner will engage the services of a qualified testing agency to sample coatings. Contractor will be notified in advance and may be present when samples are taken. If coatings have already been delivered to project site, samples may be taken at project site. Samples will be identified, sealed, and certified by testing agency.

B. Testing agency will perform tests for compliance with product requirements.

C. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying coatings from project site, pay for testing, and repaint surfaces that were coated with rejected materials.

C. EXECUTION

A. EXAMINATION

A. Proceed with coating application only after unsatisfactory conditions have been corrected.

B. Application of coating indicates acceptance of surfaces and conditions.

C. The Contractor shall conduct wet film thickness measurements and shall recoat and repair as necessary for compliance with the specifications.

D. Coating thickness shall be determined by the use of a properly calibrated "Nordson-Mikrotest" or "Positest" Coating Thickness Gauge (or equal) for metal. Note that a “Tooke” gauge may also be used if necessary, and that use of the "Tooke" gauge is classified as a destructive test.

E. Before performing any destructive tests on a newly applied coating system, the Owner and Contractor shall determine which of them is responsible for the cost of repairing the damaged coatings.

F. Coatings not in compliance with the specifications will not be acceptable and shall be corrected and re-inspected at Contractor’s expense until the specifications are met.

G. After each coat has been allowed to dry, the dry film thickness will be measured and recorded in the daily inspection reports. The Contractor shall not apply a successive coat until the dry film thickness of the preceding coat or coats has been approved by the Owner.

H. Measurement of dry film thickness over steel surfaces will be done in accordance with SSPC-PA 2.

I. Measurement of dry film thickness over concrete surfaces may be estimated by comparison of the used material to the theoretical coverage rate.

J. Holiday Testing:

A. All interior tank surfaces shall be holiday tested for discontinuities such as pinholes, missed and skipped areas, using an appropriate holiday tester. Testing shall be performed in accordance with NACE SP0188, Discontinuity (Holiday) Testing of Protective Coatings, and in accordance with the Manufacturer's latest written recommendations.

B. Holiday tests shall not be performed until the finish coat has cured sufficiently that it can be walked on without damage, and water will not have a detrimental effect on the coating. Holidays shall be repaired in accordance with the manufacturer's recommendations, and then retested.

C. The Contractor shall perform the holiday test and shall provide the rigging and support personnel for observations by the Owner.

B. PREPARATION

A. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

A. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

B. General (ALL Surfaces):

A. All surfaces are to receive the following surface preparation prior to any other specified surface preparations in the remainder of Article 3.2.

B. The Contractor shall examine all surfaces to be coated and shall correct all surface defects before application of any coatings. Any required removal, repair, or replacement of this work caused by unsuitable conditions shall be done at no additional cost to the Owner.

C. All weld seams, sharp protrusions and edges shall be ground smooth prior to the surface preparation or application of any coatings.

D. Remove all loose existing coatings, dirt, dust, grease, oil, mold, mildew, salts, and other soluble contaminants by High Pressure Water Cleaning (using potable water, 3500 - 5000 psi, 3-5 gallons / minute, oscillating tip). A degreaser may be required for oil-soaked areas or heavily contaminated areas.

E. Neutralize and remove all mold & mildew using a solution made by adding two (2) ounces of tri-sodium phosphate and eight (8) ounces of sodium hypochlorite to one (1) gallon warm water. Use a scouring powder, if necessary, to remove mildew spores, and then perform a final rinse with potable water.

F. Spall repairs: Repair spalls in accordance with ICRI Guideline No.310.1R. Areas to be repaired are to be prepared in accordance with SSPC-SP13/NACE No.6 with a minimum surface profile of ICRI-CSP5. Series N218 shall be used for shallow concrete repairs. For deeper repairs, Series

217 may be used. Exposed steel rebar is to be prepared in accordance with SSPC-SP10/NACE No.2, and primed the same day using Tnemec Series 1 @ 4.0 – 6.0 mils DFT.

G. All surfaces must be clean, dry, and free of contaminants prior to the application of any coatings.

H. All prepared surfaces must be coated as soon as possible in order to prevent re-contamination of the substrate. Areas which are re-contaminated must be re-cleaned to the proper level of cleanliness prior to application of coatings. If necessary, this may also involve re-sandblasting, which will be performed at no additional cost to the Owner.

C. Interior Ferrous Metal Substrates (Dual Media Filter Tank Interiors):

A. Prepare all surfaces in accordance with Article 3.2.B.

B. Abrasive blast or mechanically abrade in accordance with SSPC-SP10 Near-White Metal Blast Cleaning to remove all existing coatings and create a uniform angular anchor profile.

D. Exterior Ferrous Metal Substrates (Dual Media Filter Tank Exteriors):

A. Prepare all surfaces in accordance with Article 3.2.B.

B. Remove all loose coatings and lifted edges.

C. Feather edges of well-adhered preexisting coatings.

D. Prepare areas of bare metal in accordance with SSPC-SP2 or SSPC-SP3 Hand or Power Tool Cleaning.

E. Abrade all glossy areas with medium grit sandpaper or similar to thoroughly and uniformly scarify and de-gloss all surfaces, and to create a uniform angular anchor profile.

F. All surfaces must be tightly adhered, clean, dry, and contaminant-free prior to coating.

C. COATING SCHEDULE

A. Interior, Ferrous Metal Substrates (Headworks Interior)

A. Pit Filler: Series 215 is to be used as needed to fill angular pits and voids, and holidays which are unable to be filled using the specified high-performance coatings. The pit filler may be thickened in accordance with the manufacturer’s recommendations.

B. Care should be taken to ensure thorough ventilation during all phases of coating cure.

C. 1st Coat: Series 1 @ 2.5 – 3.5 mils.

D. Stripe Coat (Weld Seams, Edges): Series 1220, applied by brush.

E. 2nd Coat: Apply Series 1220 in one or two coats to achieve a total thickness of @ 9.0 – 12.0 mils.

B. Exterior Ferrous Metal Substrates (Dual Media Filter Tank Exteriors):

A. 1st Coat: Series 108 @ 1.0 – 2.0 mils.

B. Spot Prime (Previously Bare Metals): Series N69 @ 3.0 – 5.0 mils.

C. 2nd Coat: Series N69 @ 3.0 – 5.0 mils.

D. 3rd Coat: Series 1094 @ 3.0 – 5.0 mils.

D. COLOR SCHEDULE

A. Colors are to be applied per the schedule in the table below. Stainless steel surfaces are to remain uncoated.

Area	Color Name	Color Number
Tank Exterior	Teardrop	37BL
Tank Interior	Tank White	15BL
Stainless Steel Surfaces	N/A	N/A

E. APPLICATION

A. Apply all paints and coatings in accordance with the Manufacturer's latest written instructions and recommendations.

A. Use applicators and techniques suited for coatings and substrate indicated.

B. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation of new or removed permanently fixed items, coat surfaces behind these items.

C. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Each coat must be tinted a different shade to facilitate identification of each coat when multiple coats are required. Provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform finish, color, and appearance.

D. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Sufficient time shall be allowed to elapse between successive coats to permit satisfactory recoating but, once commenced, the entire coating operation shall be completed without delay. Contractor is responsible for compliance with the Manufacturer’s listed minimum and maximum recoat windows.

F. FIELD QUALITY CONTROL

A. The Contractor shall regularly conduct wet film thickness measurements and shall recoat and repair as necessary for compliance with the specifications.

B. On metal substrates, coating thickness shall be determined by the use of a properly calibrated "Nordson-Mikrotest" or "Positest" Coating Thickness Gauge (or equal). Please note that a “Tooke” gauge may be used on cementitious surfaces, and that use of the "Tooke" gauge is classified as a destructive test.

C. Before performing any destructive tests on a newly applied coating system, the Owner and Contractor shall determine which of them is responsible for the cost of repairing the damaged coatings.

D. Coatings not in compliance with the specifications will not be acceptable and shall be replaced and re-inspected at Contractor’s expense until the specifications are met.

G. COATING PERFORMANCE CRITERIA

A. The following shall serve as a basis of comparison for material substitution requests. Any substitutions which decrease the total film thickness, change the generic type of coating, or fail to meet the performance criteria of the specified materials shall not be approved.

A. Series 1 Omnithane - Zinc/Micaceous Iron Oxide Urethane:

A. Adhesion: ASTM D4541 (Method B, Type II) - No less than 1,433 psi (9.88 MPa) adhesion, average of three tests.

B. Hardness: ASTM D3363 – No less than 5H pencil hardness.

C. Humidity: ASTM D4585 – No blistering, cracking or delamination of film. No more than .03% rusting on plane after 5,000 hours exposure.

D. Immersion: ASTM D870 – No blistering, cracking, rusting or delamination of film after 2,000 hours continuous immersion in deionized water at 140°F.

E. Impact: ASTM 2794 – No cracking or delamination of film after 160 inch-pounds direct impact (18.1 J indirect).

F. Salt Spray (Fog): ASTM B117 - No blistering, cracking or delamination of film. No more than .03% rusting on plane and no more than 3/16" rust creepage at scribe after 10,000 hours exposure.

1. Adhesion: ASTM D4541 – No less than 1,943 psi (13.40 MPa) pull, average of three tests.

2. Exterior Exposure: ASTM D1014 - No blistering, cracking, checking, rusting or delamination of film. No rust creepage at scribe after 5 years exposure.

3. Humidity: ASTM D4585 - No blistering, cracking, checking, rusting or delamination of film after 10,000 hours exposure.

4. Immersion: ASTM D870 - No blistering, cracking, rusting or delamination of film after 2,000 hours continuous immersion in deionized water at 140°F, average of three tests.

5. Prohesion: ASTM G85 – No blistering, cracking, checking, rusting or delamination of film. No more than 1/8" rust creepage at scribe after 5,000 hours exposure.
6. Salt Spray: ASTM B117 (2 Coats Series N69) - No blistering, cracking or delamination of film. No more than 1% rusting on plane. No more than 1/16" rust creepage at scribe after 6,700 hours exposure.
7. Salt Spray: ASTM B117 (Series 90-97 with 2 Coats Series N69) - No blistering, cracking, rusting or delamination of film. No more than 1% rusting on plane. No more than 3/16" rust creepage at scribe after 20,000 hours exposure.

3. Series 1094 Endura-Shield – Aliphatic Acrylic Polyurethane:

1. Volatile Organic Compounds (Thinned 15%): 0.80 lbs/gallon (96 grams/litre)
2. Cyclic Salt Fog / UV Exposure: ASTM D5894 – No blistering, cracking, rusting or delamination of film after 5,000 hours (15 cycles) of cyclic salt fog/UV cycling.
3. Hardness: ASTM D3363 – No less than 3B scratch hardness after 30 days cure.
4. Prohesion: ASTM G85 – No blistering, cracking, rusting or delamination of film and no rust creepage at the scribe after 3,000 hours of exposure.
5. QUV Exposure: ASTM D4587 (UVA-340 bulbs, 8 hours UV, 4 hours condensation) - No blistering, cracking or delamination of film. No less than 80% gloss retention, no more than 16 units gloss loss and no more than 1.89 DECIE2000 color change after 4,000 hours QUV exposure.

4. Series 1220 Tnemec Epoxy – Glass Flake Inorganic Hybrid Water-Based Epoxy

1. Volatile Organic Compounds: 0.02 lbs/gallon (2.0 grams/litre)
2. Special Qualification: Certified and listed with www.nsf.org to meet the requirements of approval for potable water use as established by NSF Std 600 for tanks and reservoirs of 200 gallons capacity or greater (Max thickness: 18.0 mils).
3. Special Qualification: Meets the requirements set forth in AWWA C210-15 testing.
4. Cyclic Sale Fog/ UV Exposure: ASTM D5894 - No blistering, cracking, rusting or delamination of film after 5,000 hours (15 cycles) of cyclic salt fog/UV cycling.
5. Cathodic Disbondment: ASTM G8 – Classification Grout A (<0.5 in).
6. Dielectric Strength: ASTM D149 – No less than 603 V/mil dielectric strength, average of five tests.
7. Humidity: ASTM D4585 – No blistering, cracking, rusting or delamination of the film after 2,000 hours.
8. Immersion: ASTM D870 – No blistering, cracking, rusting or delamination of the film after nine months in continuous tap water immersion.
9. Prohesion: ASTM G85 – No blistering, cracking, rusting or delamination of the film after 5,000 hours.

10. Salt Spray: ASTM B117 – No blistering, cracking, rusting or delamination of the film and no rust creepage at the scribe after 5,000 hours.

8. CLEANING AND PROTECTION

1. Upon completion of the work, staging, scaffolding, drop-cloths, and containers shall be removed from the site or destroyed in an approved manner. Paint spots, oil, or stains upon adjacent surfaces shall be removed.

G.

4.5 SECTION 46 61 12 FILTER MEDIA REMOVAL

A. GENERAL

A. SCOPE OF WORK

A. The Contractor shall supply all labor, equipment, materials and incidentals necessary to remove existing filter and support gravel material from the pressure filter vessels. The work shall also include protection of internal piping and may include limited selective removal of internal piping components from the pressure vessels to make them ready to receive new filter and support gravel material.

A. The existing pressure vessels have been used to filter raw water pumped from groundwater wells after the addition of chlorine. After filtering by the media present in the pressure vessels, the filter water becomes feedwater to the water treatment plant's RO membrane treatment units that produce potable water for the City's customers.

B. The purpose of this project is to replace the existing filter media and support gravel materials. It is also the intent that interior damage and corrosion be removed only to the extent necessary for repair of internal components in order for them to function properly, have a useful life equal to that of the new media, and create surfaces satisfactory for proper adherence of the specified coatings. Items damaged during existing media removal, tank cleaning, or new media installation shall also be removed and replaced at no additional cost to the City.

C. To keep the water plant in operation, at least three pressure filter vessels must be in operation at all times. Media removal and selective demolition will need to occur sequentially and will likely result in periods when no vessel interior work.

B. This work shall include, but not be limited to the following:

A. Open bolted manways; remove gaskets.

B. Carefully remove filter media and support gravels from within pressure filter vessel, remove from the site, and lawfully dispose at a Contractor provided location.

C. Selectively dismantle and remove piping, piping support structure components, and vessel interior accessory items as necessary to accomplish repairs and to remove and reinstall filter

media material. It is intended that only severely corroded or damaged, non-repairable components be dismantled and removed.

D. Carefully remove broken connection bolt hardware. Replace missing or damaged bolting hardware with SS316 materials of in-kind size.

E. Selectively remove by mechanically wire brushing, grinding, or water pressure blasting corroded and or tuberculated areas of interior tank walls and the steel lateral support structure as necessary to effect repair prior to preparing surfaces for re-coating (refer to paint prep and coating specification).

F. Removed items and the dirt and debris resulting from tank cleaning, shall be collected by the Contractor, removed from the site, and shall be lawfully disposed at a Contractor provided location.

G. Preparation of pressure filter vessel interior surfaces prior to re-coating is described in Technical Specification section 09 96 00, “High Performance Coatings.”

B. SUBMITTALS

A. Submit to the Engineer for review and approval a detailed description of the work sequence to be followed for removing filter media and underdrain gravels from within each pressure vessel. Suggested work sequence is provided in the plans.

A. Submit six (6) copies of the written plan at the preconstruction conference.

B. Specifically identify staging area requirements, equipment to be used, temporary material storage, and place of final lawful disposal of removed material.

B. Submit to the Engineer for review and approval, digital (JPEG) photographs detailing the interior condition of each pressure filter vessel at the following stages of the Work:

A. After each pressure vessel is opened and drained, but before any media is removed.

A. Prior to removal of media, the contractor and owner shall agree on media level to calculate the volume of media to be removed and disposed of.

B. After media is removed and the pressure vessel has been cleaned.

C. Contractor to notify the Chief Operator at least 72 hours in advance of opening a filter vessel for rehab for inspection.

C. JOB CONDITIONS

A. Work shall be performed in strict compliance with the City’s Building Code, and other applicable laws, ordinances, and regulations pertinent to the Work.

B. Character of filter and support gravel material to be removed:

A. Material originally placed into each pressure filter vessel had the properties noted on the plans and described in the technical specifications; and met AWWA and FDEP requirements for contact with potable water.

B. Particulate matter removed by the filter media consists of chemical precipitates formed by the addition of chlorine to raw water pumped from production wells that supply water to the treatment plant. The raw water also includes sands, silts, and clays that also were removed by the filter media. The chemical precipitates are primarily iron oxides.

C. The material to be removed is nonhazardous. Included as Appendix material in the Project Manual is an example TCLP analysis that was performed on the City's Bayoxide filters at the same facility. This material is provided as information only and not as part of the Contract Documents. Contractor to arrange and pay for required testing for media disposal, see Section 3.2C.2.

C. Procedures shall be arranged so as not to interfere with the water treatment plant's ability to produce potable water.

A. Space for material and equipment storage at the water plant is limited.

B. Facilities to temporarily store removed media material shall be arranged to minimize any possibility of the removed media from contaminating new media material that is also being stored onsite and waiting to be placed into a pressure vessel.

C. Means and methods for material handling and temporary storage shall be selected that are appropriate for locations that are immediately adjacent to residential areas.

D. Work shall be executed in an orderly manner, during normal working hours, and in a manner that will not produce excessive noise or dust.

B. PRODUCTS (NOT USED)

C. EXECUTION

A. GENERAL

A. Work of media removal and selective demolition shall not proceed until a detailed schedule has been received and approved by the Engineer.

B. Contractor shall select selective demolition equipment and methods that will minimize the potential for causing damage to other components within the pressure filter vessel.

C. After each pressure filter vessel is opened, document interior condition with digital (JPEG) photographs. Contractor shall not proceed with media removal until the digital photographs have been received and approved by the Engineer. Digital photographs shall also be taken of each tank's interior after it has been cleaned. A sufficient number of photographs shall be taken to fully document all interior surfaces and components inside the tank.

D. Carefully remove only those items designated by the drawings or Engineer to be removed. Protect from damage existing components to remain. Any piping, supports, or accessories

removed without proper authorization shall be replaced to the satisfaction of the Engineer at the Contractor's expense.

E. Accumulation of old materials and/or debris will not be permitted. All such materials and/or debris shall be removed promptly. Securing of locations for lawful disposal of removed materials, and delivery of material to those locations, shall be the Contractor's responsibility.

F. Properly authorized material removed by selective demolition that is not designated as salvage shall become the property of the Contractor.

B. MEDIA AND SUPPORT GRAVEL REMOVAL

A. Media Removal

A. Contractor shall provide all material, equipment, and personnel protective measures to effectively and safely remove existing filter and support gravel media from within each pressure vessel.

A. Provide appropriate equipment to ingress and egress the pressure vessel interior.

B. Before entering the interior of a pressure vessel, make sure the atmosphere is safe and properly ventilated.

C. Provide appropriate personnel protective equipment for the work to take place within the confined space of the pressure vessel.

B. The Contractor shall provide any transfer containers, carts, pumps, compressors, hoses, and other tools necessary to remove the media from the pressure vessel and convey it to the temporary storage area. Equipment shall be of sufficient size and number to allow media transfer to be completed within the time scheduled. Backup equipment shall be provided so that mechanical breakdown does not delay the work schedule. Hoses shall be of sufficient length to reach between pressure vessel and temporary storage area. Equipment and hoses shall be free of leakage or other defects that would cause a dust, sediment, noise, or other nuisance.

C. Unless required by the Contractor or the owner of the final disposal site, segregation of removed media by type is not necessary.

D. Removed filter media and support gravel material shall not be reused.

E. Trucks used to hold and/or transport the removed media offsite to disposal shall be in good condition and equipped appropriately to prevent spillage of contained media onto roadway surfaces; or dust to blow off the load.

F. Filter media and support gravel may not be wet or have water dripping from it when removed from site for disposal.

G. Contractor shall exercise extreme care while removing media from within each pressure vessel so as not to damage internal piping and support structures. If in the sole opinion of the Engineer the Contractor's means and methods of media removal are causing unnecessary damage, the Engineer will notify the Contractor in writing of his determination, and request that the Contractor make immediate changes to avoid the unnecessary damage. Contractor shall repair or replace the internal piping and support structures unnecessarily damaged to the satisfaction of the Engineer; and at no additional cost to the City. Replacement of air laterals that are unnecessarily

damaged shall not be included with the count of air laterals measured for payment. When determining if the Contractor's means and methods of media removal are causing unnecessary damage, the Engineer will consider the cost to be incurred by the Contractor's revised means and methods in relation to the cost to repair/replace the damage.

B. Temporary On-Site Storage of Removed Media

A. Media may be transferred from within each pressure vessel to a temporary storage area specially set-up to receive the removed media, or directly into a truck.

B. A temporary storage area shall be provided with control measures that effectively prevent wind-blown dust or migration of sediment away from the area. These measures may include tarps and silt barriers. Contractor shall repair or replace any control measure that becomes damaged or ineffective at no additional cost to the City.

C. Should the Engineer determine that the control measures are ineffectively controlling dust or sediment; or should the temporary storage area begin to interfere with water plant operations, the Contractor shall promptly, and at no additional expense to the City, modify the temporary storage area to be effective and/or to cease interfering with plant operations.

D. Maintain the temporary storage area in good condition throughout construction.

E. When the temporary storage area is no longer needed, Contractor shall promptly remove the dust and sedimentation control measures, cleanup the temporary storage area, and restore it to a condition equal to or better than the site's prior condition. Washing contained media into the stormwater swale or detention area is not an acceptable method of site cleanup.

C. Media Disposal

A. Removed filter media and support gravel material shall be transported by the Contractor to a lawful site for final, permanent disposal. Transport and disposal costs shall be paid by the Contractor.

B. Contractor shall arrange for and pay all costs to test removed media(s) material as may be needed by the disposal site owner/operator in order for the material to be accepted at the site. Such testing may include, but not necessarily be limited to, a TCLP analysis and a Paint Filter Test. Testing must be performed by a NELAP certified lab.

C. All filter media and support gravel material removed from the treatment plant site shall become the property of the Contractor.

C. PIPING, PIPE SUPPORT STRUCTURE, AND ACCESORY ITEMS

A. Broken or damaged air lateral piping that are non-repairable shall be removed from the header pipe.

B. Broken or damaged air lateral support structure components that are non-repairable shall be dismantled and carefully removed from the pressure vessel tank by unbolting connections. If necessary, cut bolts to effect removal. Do not cut support members unless approved by the Engineer in advance of performing any cutting.

C. Remove existing gasket material from tank access hatch openings

D. TANK CLEANING

A. After all filter media and support gravel material has been removed from pressure vessel, the vessel interior shall be cleaned and prepped per Technical Specification section 09 96 00, “High Performance Coatings.”

B. It is the intent of this project that existing piping, pipe supports, and other internal components inside each filter vessel be retained to the greatest extent practicable; and that repairs be performed as necessary to provide a useful life to these components that will equal that of the new media to be installed. Contractor shall select effective washing methods consistent with this intent that facilitates identification of needed repairs while at the same time minimizes further damage inside the vessel.

E. REUSE OF MATERIAL

A. Pipe supports and stainless-steel hardware are to be reused unless deemed severely damaged by the Engineer.

B. Manway hatch bolts, nuts, washers, and crabs are to be set aside in a safe place and reused for re-bolting when the hatches are shut. The Contractor shall replace at no additional cost to the City lost, missing, or damaged bolts, nuts, or washers. The Contractor shall expect that there will be some lost or otherwise unusable bolting hardware.

C. At the City’s option, the Engineer may direct that minor components of the selective demolition work that will not be reused in the work instead be salvaged for the City. Salvaged items shall be delivered to a location in the water treatment plant as designated by the Engineer.

D. Removed material not designated as salvage by the Engineer, shall become the property of the Contractor and shall promptly be removed from the site.

END OF SECTION 46 61 12

4.6 SECTION 46 61 13 FILTER MEDIA

A. GENERAL

A. SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals necessary to install new anthracite, sand and gravel filter media in the existing dual media pressure filter beds for Filters No. 1, 2, 3, and 4 at the City of Clearwater Reverse Osmosis Plant No. 1, as specified herein, and as directed by the Engineer. The Contractor shall be responsible for maintaining the satisfactory operation of the existing filters during media replacement and for disinfection of the filters after media replacement.

B. New filter media shall be installed into each pressure filter vessel after the existing media has been completely removed and the interior of the pressure filter vessel prepared in accordance with the specifications.

C. The Supplier of the filter media shall be responsible for its proper installation and oversight of the media replacement.

D. The filtration system at the City of Clearwater Reverse Osmosis Plant No. 1 consists of four (4) dual media pressure filters. Each of the four pressure filters provides approximately 113 square feet of filter surface area. The anthracite depth in each filter shall be a total depth of 38 inches (existing is 18 inches). The sand depth in each filter shall be a total depth of 12 inches (existing is 32 inches). The gravel depth in each filter shall be a total depth of 34 inches (existing is 34 inches) with manufacturer recommended gravel gradations in increments as specified herein.

E. The replacement filter media shall be as manufactured by F.B. Leopold Co., Inc., Zelienople, Pennsylvania, Red Flint Sand and Gravel Company, Eau Claire, Wisconsin, Unifilt Corporation Wilkes Barre, Pennsylvania, Midwest Filter Rehab Specialists, Oshkosh, WI, or equal. The installation shall be as shown on the Drawings, and the Manufacturer shall be required to submit to the Engineer an installation drawing.

F. At any time during the project, no more than one (1) existing filter vessels may be out of service; and the remaining three (3) filter vessels shall be in service supplying filtered water for the water treatment plant.

G. The water plant operating staff will make every effort to make reasonable adjustments in plant operating times in order to expedite media replacement. On the other hand, the Contractor shall also expect that there will be situations where media replacement operations will need to be delayed because the requirement to produce sufficient potable water to meet customer demand is the priority. The Contractor will be required to make the necessary schedule adjustment at no additional cost to the City.

B. DESCRIPTION

A. The filter media anthracite, sand and support gravel shall be capable of sustained operation at a filtration rate of up to 7.5 gpm per square foot of filter area, filtering chlorinated well water without excessive use of backwash water, undue rate of head loss buildup, or rapid turbidity breakthrough.

B. The anthracite, sand and gravel filter media for Filters No. 1, 2, 3, and 4 shall be removed and replaced with new filter media as described herein and as defined in AWWA B100, Granular Filter Material (latest edition).

C. QUALITY ASSURANCE

A. Except as supplemented herein, materials and construction methods shall meet or exceed the applicable provisions of the following standards:

A. ANSI/AWWA B100, Granular Filter Media (latest edition)

A. Acid solubility testing shall be in accordance with the procedures described in this standard.

B. ANSI/AWWA C653, Disinfection of Water Treatment Plants

C. NSF/ANSI Standard 61

D. NSF/ANSI 372: Drinking Water System Components – Lead Content

B. Filter Media Supplier

A. The Contractor shall furnish the filter media from a firm regularly engaged in supplying this type of material. The source of the media shall be regularly engaged in manufacturing or producing material for the water supply industry for a period of not less than 10 years. The Contractor shall be prepared to document the filter media supplier's technical competence and experience in providing the filter media specified herein. All media shall be obtained from a source acceptable to the Engineer and from the same supplier for each media type.

B. The Contractor shall engage the services of one company or firm to be the party responsible for furnishing all media for the project. This company or firm (Supplier) may or may not also be a manufacturer of one or more of the filter media materials. However, the single company or firm that the Contractor engages to be the Supplier shall be responsible for coordinating and furnishing media materials that will be compatible with each other under backwash conditions.

C. Rejection of Filter Media

A. Failure of the filter media to meet the requirements of Paragraph 2.1 for anthracite, Paragraph 2.2 for Sand, and Paragraph 2.3 for Gravel, shall be cause for rejection. Filter media which has been delivered to the site, and which does not meet the specified requirements shall be immediately segregated from other media awaiting installation into a pressure vessel, promptly removed from the site and replaced with acceptable material at the Contractor's expense. Filter media upon delivery to the site, shall be tested for compliance to the requirements listed in the specifications. Filter media shall not be installed in each filter until this testing has occurred.

B. The Engineer shall determine if media shall be rejected, guided by available testing information; and the Engineer's decision shall be final.

D. Filter Media Installation

A. The filter media shall be installed by the filter media supplier's trained representative, or under his supervision, who is qualified and experienced in the installation requirements for filter media in a pressure filter.

D. SUBMITTALS

A. The Contractor shall obtain, and submit with the bid the following experience and qualification information for each type of media to be furnished:

A. Name, address, and mine location for media source.

B. Number of years the media supplier/manufacturer has been supplying media for public potable water treatment applications.

C. Experience statement by media Supplier with pertinent information regarding their history and qualifications for supplying media for public potable water treatment application.

D. Name, address, and phone number of the media supplier/manufacturer's local representative/distributor.

B. Proper operation of the filters requires very careful selection of the relative sizes of the various media. Before shipment of the media, submit to the Engineer for review, certified analyses from an approved independent testing laboratory for the media. An affidavit of compliance with applicable provisions of AWWA B100 (latest edition) shall be provided.

C. The certified laboratory analyses shall be in accordance with AWWA B100 (latest edition) and include the following information for the submitted material.

A. Average specific gravity (apparent).

B. Total percentage of material passing each sieve.

C. Total percentage of material retained on each sieve.

D. A plot on probability paper, showing the cumulative percent by weight of the material passing through the sieve size opening.

E. Effective size.

F. Uniformity coefficient.

G. Acid solubility.

H. Anthracite Moh hardness.

I. Visual sphericity.

D. The Contractor shall obtain, and submit to the Engineer for approval in accordance with the Contract Documents, manufacturer published data sheets; and shall specifically include the following:

A. Volume and weight of each media to be shipped. The excess volume of media being furnished in anticipation of losses due to handling, washing, and scraping shall be noted.

B. Appropriate documentation showing NSF/ANSI-61 certification (including NSF/ANSI-372), or compliance with other applicable standards, regulations, or requirements referenced in paragraph 62-555.320(3)(b), F.A.C. [see also paragraph 62-555.320(3)(d)].

C. As part of the shop drawing submittal, provide a representative sample of each filter media to be supplied.

D. A copy of the manufacturer's warranty that will be provided for each media type.

E. Special shipping, storage, protection, and handling instructions for each media type.

F. A copy of the media supplier/manufacturer's written instructions and recommendations for installing media into pressure filter vessel.

G. For approval by the Engineer, the name, address, and phone number of independent testing laboratory to be retained by each media supplier/manufacturer to perform the media testing described in this Technical Specification section to be performed prior to shipment of media to the project.

H. For approval by the Engineer, the name, address, and phone number of independent testing laboratory to be retained by the Contractor to perform the media testing described in this Technical Specification section to be performed after media has been delivered to the project.

E. No material shall be shipped to the site of the Work until such material is accepted by the Engineer. The Owner reserves the right to conduct independent tests to verify conformity of the media to these Specifications.

F. After delivery to the site, but before placing the media, the Contractor, under the Engineer's supervision, shall take random test samples of the media to be tested by a laboratory approved by the Engineer in accordance with the specifications. Failure of the samples to meet the Specifications shall be cause of rejections in accordance with Paragraph 1.4B. No plus or minus tolerances shall be allowed on any uniformity coefficients.

G. Submit a Field Installation Report.

A. A written Field Installation Report shall be prepared for each pressure filter vessel, and each report shall consist of the following:

A. Description and pictures of filter vessel interior condition after rehabilitation work was completed.

B. Field measured distance from top of pressure vessel (crown) to top of each installed media layer. Provide a minimum of three measurements equally spaced along the long axis of the vessel.

C. Field measured depth of filter sand, gravel, and anthracite media layers as determined from core samples. Measurements shall be taken after each media type layer is completed and before the starting placement of the next media type layer. Provide a measurement from each third of the vessel (middle and each end).

D. Field measured distance from top of pressure vessel to top to the surface of installed media after all washing and scraping is complete.

E. Field measure media depths as determined by two 2-inch diameter core samples of the entire media depth from media surface to the top layer of support gravel.

F. Description and pictures of filter interior condition after final rinsing (before disinfection). Include backwash rates and durations used to prepare filter vessel for service.

G. Description of final disinfection of filter vessel. Include time and date performed, chemical concentrations used, and test results.

B. Submit one copy of the Field Installation Report to Engineer PRIOR to returning each filter vessel to service. Report shall be submitted five (5) days prior to placing the filter vessel into service unless other arrangements have been agreed to by the Engineer. Also, include an additional copy of each report with each O&M manual submitted.

C. Submit a project O&M manual in accordance with the specifications.

A. Submit complete O&M manual when the first pressure filter is returned to service.

B. If the project scope requires that pressure filters be returned to service at different times, or if the work required to place subsequent filters into service requires a change or modification to the submitted O&M Manual, provide an addendum to modify the previously submitted O&M Manual.

E. DELIVERY, STORAGE, AND HANDLING

A. Shipment of media material shall not take place until written approval has been obtained from the Engineer for both the shop drawing submittal and the Approval Sample testing results.

B. Deliver each media material to the job site in bags containing one (1) cubic foot of material or less. Bags shall be heavy duty woven cloth, paper or plastic. Each bag shall be clearly marked in accordance with the requirements of AWWA B100 (latest edition). The bags shall be placed on pallets for shipment and covered with plastic shrink-wrap. Include with each media delivery a certified test report.

C. Contractor shall receive and unload media deliveries.

D. Each size and type of media material shall be stored off the ground and separately. Pallets shall be covered with opaque tarps to block from sunlight and to provide protection from weather. The Contractor shall be fully responsible for keeping media material clean from debris and foreign materials while stored on site awaiting placement into a filter vessel.

E. Except as required for media sampling, media storage bags shall remain unopened and no material shall be removed from a bag prior to media placement into a filter vessel.

F. Delivery, storage and handling shall be in full accordance with manufacturer's written instructions.

B. PRODUCTS

A. ANTHRACITE FILTER MEDIA

A. All media shall comply with the standards of AWWA Specification B-100-09, Granular Filter Material. Filter media shall be as furnished by the F. B. Leopold Co., Inc. Zelienople, Pennsylvania, Red Flint Sand and Gravel Company, Eau Claire, Wisconsin, Unifilt Corporation Wilkes Barre, Pennsylvania, or equal.

B. Anthracite

A. The top layer of the filter shall consist of specifically selected and graded anthracite media with a final depth, after backwashing and skimming, of 38 inches.

B. The Anthracite shall be crushed anthracite coal having an effective size of 0.60 mm to 0.80 mm, a maximum uniformity coefficient of 1.65 and a specific gravity of not less than 1.4 nor greater than 1.65 and shall be clean and free from slate, dust, dirt, and foreign matter of any kind as it is placed on the filters. The average hardness shall be 2.7 to 4.0 on the Moh scale.

C. The processed anthracite furnished shall be visibly free from iron sulfides, clay, shale, dirt, or other foreign matter.

D. Acid solubility shall be less than two (2) percent.

E. Sufficient excess anthracite media shall be provided to make up for material loss due to scraping of fines from the media surface and to replace flat particle loss during initial washings of the media.

F. Anthracite meeting the above requirements shall be purchased from a supplier meeting the requirements of Paragraph 1.4A.

B. SAND

A. Filter sand shall be composed of hard, durable, and dense grains of at least 85 percent siliceous material, visibly free of micaceous matter, and that will resist degradation during handling and use. The filter sand shall be uncoated grains that have been thoroughly washed, screened and free of clay, loam, dirt, organic matter, and other foreign material.

B. The acid solubility of the sand shall not exceed 5% by weight, using method specified under AWWA B100 (latest edition).

C. The filter sand shall have an effective size of not less than 0.45 millimeter and not more than 0.55 millimeter with a uniformity coefficient less than or equal to 1.5 and a specific gravity of not less than 2.5.

D. The depth of filter sand in the filters after washing shall be not less than 12 inches.

C. GRAVEL

A. Gravel shall be obtained from an approved source and shall consist of hard, rounded stones with an average specified gravity of not less than 2.5. Not more than 0.5% by weight of the material shall have a specific gravity of not less than 2.0.

B. The gravel shall contain not more than 2% by weight of thin, flat, or elongated pieces (pieces in which the largest dimension exceeds five times the smallest dimension), determined by hand picking; and shall be free of shale, mica, clay, sand, loam, and organic impurities of any kind.

C. The acid solubility of the gravel shall not exceed 10% by weight for sizes 3/8 inch or larger and not more than 5% by weight for the gravel smaller than 3/8 inch, using method specified under AWWA B100-09 (latest edition).

D. The gravel shall be screened to proper sizes and placed in the filter in layers as specified herein and the gravel within each layer shall be uniformly graded. Gravel over ¼ inch in diameter may be screened through wire screens with square openings or plates with round openings. Wire screens shall be used for sizes smaller than ¼ inch. Not more than 8% of the weight of any layer shall be finer or coarser than the limits specified for that layer.

E. Gravel Gradation

Size Range (inches) Depth (inches)

1/8 x No. 12 3

1/4 x 1/8 3

1/2 x 1/4 3

C. EXECUTION

A. GENERAL

A. The Contractor shall obtain sufficient media and arrange for media delivery sufficiently in advance of its placement into a filter vessel. If additional media is required to make up any insufficiency in media depth, the Contractor shall obtain the additional media and have it delivered on an expedited basis so as not to delay returning a filter vessel to service; and at no additional expense to the City.

B. Carefully inspect the existing piping and pipe support components inside the filter vessel for mechanical and spatial integrity prior to beginning the work of installing new filter media. If any defect, conflict, or incompatibility is discovered, immediately notify the Engineer. Resolve any defect, conflict, or incompatibility in a manner satisfactory to the Engineer.

C. Placement of media into pressure filter vessel can be a dusty and potentially hazardous job. Contractor shall provide, institute, and enforce all necessary safety measures to provide for personnel safety. Adequate ventilation and cooling shall be provided.

D. Throughout the work of installing new filter media into the existing pressure filter vessel, Contractor shall employ such means and methods necessary to protect the underdrain piping, the air lateral piping, and keep the newly placed media clean of contaminants. Any filter media that becomes contaminated by contact with dirt, or any other foreign substance, shall be immediately removed and replaced by the Contractor at no additional cost to the City.

E. Underdrain or air lateral piping that is damaged during the placement of new media into a pressure filter vessel shall be repaired or replaced in a manner satisfactory to the Engineer prior to covering the lateral piping with media.

F. Any media types that become inappropriately mixed during the media placement work shall be removed and replaced with clean media of the proper type and gradation.

G. In order to keep the inside of the pressure vessel as clean as possible, once the work of installing new media into a pressure filter vessel has started, do not allow the hatches into the vessel to remain open when media placement activity is not taking place.

H. Contractor shall coordinate the construction activities of placing new media into the pressure vessel and returning a filter to service with the City’s Representative.

I. Plant operators shall perform all backwashing operations and filter control at all times.

B. PREPARING FOR FILTER MEDIA INSTALLATION

A. The pressure filter shall be thoroughly cleaned before any gravel is placed, and shall be kept clean throughout the operation.

A. All debris, dust, dirt, and other foreign materials shall be removed from the surfaces of the filter vessel, internal piping, and pipe supports.

B. Cleaning shall be accomplished by low pressure spray washing with potable water followed by vacuuming.

B. After cleaning the filter vessel, and before placement of any media material, disinfect the vessel and interior piping. Disinfection shall be in accordance with ANSI/AWWA C653.

A. Continuously inject chlorine solution (furnished via the water plant chorine solution piping) into the filter influent water while the filter is also discharging to the auxiliary backwash basin via the filter underdrain piping. This operation must be coordinated with the plant chief operator to ensure chlorinated water does not enter the process stream to the Plant's RO system.

B. Inject chlorine solution at a sufficient strength to achieve a free chlorine residual of at least 25 mg/L throughout the filter vessel.

C. When the water being discharged to the auxiliary backwash basin has at least a 25 mg/L free residual, the flow of water shall be stopped and the filter vessel shall be held full of the chlorinated water for a period of not less than twelve (12) hours.

D. At the end of the contact period, the chlorinated water shall be tested to determine the free chlorine residual is at least 15 mg/L. Tests shall be conducted on water obtained from the top and the bottom of the pressure vessel. If the tests do not indicate that sufficient chlorine residual is present, the disinfection process shall be repeated.

E. If the tests indicate that sufficient chlorine residual is present, the filter may be drained to the auxiliary backwash basin and thoroughly rinsed with backwash water to remove the highly chlorinated water. When the rinse water has chlorine residual approximately equal to the backwash water residual prior to entering the filter, obtain samples for bacteriological testing. The City will arrange for the samples to be tested by an approved laboratory.

F. Do not release highly chlorinated water into the sewer system until the chlorine level has decreased to sufficiently as determined by the plant operations supervision. If necessary to provide volume in the auxiliary backwash basin to receive additional filter backwash water, the Contractor shall furnish and mix one of the neutralizing chemicals listed in AWWA C653 with the water in the auxiliary backwash basin to lower the chlorine level to an acceptable level for discharge to the sewer.

C. Guide markings for media placement:

A. Before placing any media material, mark the inside wall of the vessel with a continuous level line as follows:

A. A line at the top elevation of each media layer

B. A line one (1) inch above the sand media top elevation

C. A line one (1) inch above the anthracite media top elevation

D. Workers shall not walk or stand directly on the filter media. Use boards of plywood or plastic that has sufficient thickness that they can sustain the weight placed on them without displacing the material below.

E. Any media that becomes dirty, contaminated, or mixed with another material shall be removed and replaced with clean material of the proper type and size.

F. Material scraped from the surface of filter media after washing shall be removed and promptly transported to a lawful place of disposal by the Contractor.

C. GRAVEL INSTALLATION

A. Gravel made dirty in any way shall be removed and replaced with clean gravel. The bottom layer shall be placed carefully by hand to avoid movement of the underdrain system and to assure a free passage of water from the orifices. Each layer shall be completed before the next layer above is started. For materials less than ½ inch in diameter, the workman shall not stand or walk directly upon the gravel, but upon boards which will sustain the weight of the workmen without displacing the gravel. Any gravel becoming mixed shall be removed and replaced as herein specified.

B. The correct thickness of each layer shall be obtained as follows;

C. Before the gravel is placed, the top of each layer shall be marked on the side of the filter. The filter material shall be within ± .5 inches of the water surface, with the area of material above and below the surface within 10% of each other.

D. After all support gravel layers are placed into a filter vessel (but before placing the filter sand layer), wash the support gravels to remove excess fine material.

A. First, slowly fill the filter vessel with backwash water to the level line previously marked on the inside wall of the vessel for the top gravel surface layer. Backwash water shall be introduced into the pressure vessel using only the head from the distribution system, and flow rate into filter vessel shall not exceed 150 gpm.

B. Check that the upper surface of the support gravel layer is level. Make adjustments in material placement as needed to level the media; add or remove material as necessary.

C. After checking the top gravel layer surface for level, continue slowly adding backwash water until the air lateral piping is submerged to a depth of at least one (1) foot.

D. After submerging the air lateral piping, the gravel support media shall be washed for five (5) minutes at the maximum rate available; but not to exceed 25 gpm/sq. foot (2,500 gpm). Ramping up to the maximum wash rate shall take place over at least a three (3) minute period.

E. Care shall be taken during washing of the support gravel media that it is not disturbed, especially if air is present in the underdrain piping.

F. Any support gravel media that becomes disturbed by the washing operation shall be removed and replaced with clean material of the proper type and size.

D. SAND INSTALLATION

A. Sand shall be transported and placed carefully to prevent contamination of any sort, and sand made dirty before or after placing shall be replaced with clean sand. Sand shall be placed in the

filter, preferably through water, so as not to disturb the top layer of gravel and shall be finished off smooth to the proper elevation.

B. The final depth of sand shall be 12 inches (including up to 9/16 inch of sand removed by skimming or scrapping). The depth of sand shall be measured after the sand has been backwashed three times, at a rate to give 30% expansion of the sand, and then allowed to compact by closing the backwash valve slowly. Final closure of the valve from the opening that gives 10% expansion shall extend over not less than 30 seconds. Up to the top, 3/16-inch thick layer of any very fine material shall be scraped off after each washing and before final measurement.

C. After placing filter sand into a filter vessel, and checking the top surface for level, check for proper operation of the air distribution laterals.

A. Slowly fill the vessel with water to a depth one (1) foot above the filter sand surface.

B. Run blower to check air distribution pattern.

C. Correct any deficiencies discovered with the air laterals to the satisfaction of the Engineer.

D. After the sand has been backwashed three (3) times and the fines scraped off, a 38-inch layer of crushed anthracite coal shall be placed on top of the sand, as described herein.

E. ANTHRACITE COAL INSTALLATION

A. The media system shall be installed in accordance with the Manufacturer's specific detailed instructions, and the Manufacturer shall provide supervision of the installation for the first filter to ensure proper compliance with installation specifications by the Contractor's forces on subsequent filter installations. Extreme care shall be exercised in the placing of all filter media to avoid damage or displacement of the filter bottom or previously placed media.

B. Installation of Anthracite:

A. The anthracite media should be placed with the filter partially filled with water. The media shall be placed in a gentle manner so as to avoid any degradation of the media. Place the anthracite to approximately 1 ½ inches above the mark and slowly fill the filter upward through the underdrain to remove air from the bed. The filter shall then be backwashed at a slow rate in 3 gpm/square feet increments for 3 to 5 minutes at each rate to remove entrapped air and up to 7.5 gpm/square foot until the water becomes clear. After draining of the filter, the top ½–inch of the anthracite shall be skimmed with a shovel to remove fines and trash. Again, platforms shall be utilized for laborers. Additional anthracite shall be placed to bring the media up to the desired depth.

B. The filter should be slowly refilled, backwashed for at least 15 minutes and the fines skimmed again two more times.

C. The Contractor shall take an anthracite auger core boring sample from each filter bay and perform a sieve analysis for each filter bay sample to indicate compliance with the specified media characteristics.

D. At this point the filter media is complete and ready for disinfection and operation.

F. INSPECTION AND TESTING

A. The media Supplier shall furnish the services of a competent and experienced representative who has complete knowledge of proper operation and maintenance of the equipment for a period of four (4) days in two separate visits to inspect the installed equipment, supervise the initial test run, and to provide instructions to the plant personnel.

B. Approval Sample Testing

A. Independent Testing Laboratory retained by the Contractor shall test each Approval Sample selected by the Engineer to be tested.

A. Samples shipped to the project shall be collected by a representative of the independent testing laboratory and transported to the lab for testing.

B. More than one trip to the project site to collect Approval Samples may be required.

B. Test samples of support gravels, filter sand, and anthracite media in accordance with each of the verification test procedures described by ANSI/AWWA B100, Granular Filter Media (latest edition).

C. For each Approval Sample tested, submit to the Engineer and Contractor a written report presenting the results of the testing.

C. “Thief” Sample Testing

A. Independent testing laboratory retained by the Contractor shall collect in the field “thief” samples for filter media size verification.

B. Collect and test “thief” samples just prior to placing each media type into each filter vessel. Collect each sample only from the bags designated to be placed into a specific filter vessel.

C. Sample collection method and minimum number of bags sampled shall be in accordance with AWWA B100, Granular Filter Media (latest edition) (including “thief” samples collected for media).

D. A Sieve analysis shall be performed for “thief” sample (being a composite of the material collected from all the bags sampled) in accordance with ASTM C136 as modified and supplemented by AWWA B100 or AWWA B102 (latest editions).

D. Water quality testing for bacteriological or chlorine residual determinations will be performed by the City using either the City’s laboratory at the water plant, or the independent testing laboratory retained by the City to provide water quality testing.

A. Contractor shall assist with sample collection.

B. Bacteriological and chlorine residual testing will be paid for by the City.

G. DISINFECTION

A. After placement of the anthracite media, but before the filters are placed in service, the entire depth of filter, media and underdrain system in each filter shall be disinfected in accordance with ANSI/AWWA C653 as described in the following procedure:

A. With all other filter valves closed, the filter shall be filled with water from the backwash system while simultaneously adding sufficient disinfectant (chlorine solution or sodium hypochlorite) to the incoming water to maintain a level of 50 mg/l of free chlorine in the filter box.

B. The backwash valve shall then be closed and the disinfectant allowed to remain in the filter. The water level shall be maintained to the top of the filter for not less than twenty-four (24) hours.

C. Upon completion of disinfection, the filter contents shall be backwashed to waste until acceptable chlorine residual and bacteriological quality as determined by the Engineer are measured, after which the filter shall be filled with pretreated water and put into normal service. The Contractor shall provide representative samplers to the Engineer for testing in the laboratory at the water plant by the Owner. If acceptable bacteriological quality is not obtained, the disinfection of the filter by the Contractor shall be repeated as directed by the Engineer until acceptable quality is obtained.

D. If for any reason the pressure filter vessel must be reopened after it has been disinfected and bolted shut, the Contractor shall disinfect the filter when it is again ready to be closed up and returned to service. Reopening and re-disinfecting the filter vessel shall be performed at no additional cost to the City unless, at the sole opinion of the Engineer, the re-disinfection was caused by reasons outside the control of the Contractor.

H. DISPOSAL OF MEDIA

A. Media that is removed, wasted or spilled from or at the existing water plant and not intended for reuse shall be disposed of by the Contractor in an appropriate manner off-site.

END OF SECTION 46 61 13

PRICING SHEET

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
1	General condition and mobilization	1	LS		
2	Remove & Dispose of Media from Existing Filter Vessel	2,200	FT3		
3	Clean, Prepare, and Coat Filter Vessel Interior Surface	4	EA		
4	Remove and Replace Filter Vessel Feet	16	EA		
5	Repair, Prepare, and Coat Manway Hatches	8	EA		

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
6	Furnish and Place Pressure Filter Gravel Media	4	EA		
7	Furnish and Place Pressure Filter Sand Media	4	EA		
8	Furnish and Place Pressure Filter Anthracite Media	4	EA		
9	Replace 2" SS316 Pipe Nipple	1	EA		
10	Replace Unistrut Pipe Supports	1	LS		
11	Clean, Prepare, and Coat Filter Vessel Exterior Surface	4	EA		
12	Return Pressure Vessel to Service	4	EA		
13	Preparation of O&M Manual	1	LS		
14	Replace Crab-Type Manway Hatch (12" x 16")	1	EA		
15	Replace Crab-Type Manway Hatch (18" x 24")	1	EA		
16	Replace SS316 Air Lateral	1	EA		
17	Replace SS316 underdrain Lateral	1	EA		
TOTAL					

CONTINGENCY

Calculated at 10% of the subtotal from lines 1-17 above.

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total
18	CONTINGENCY (10%)	1	LS		
TOTAL					

SUBMITTAL REQUIREMENTS

1 Certified Business*

Are you a Certified Small Business or a Certified Minority, Woman or Disadvantaged Business Enterprise?

☐ Yes

☐ No

*Response required

When equals "Yes"

*Certified Business Type**

Pick one of the following

Select all that apply

☐ Certified Small Business

☐ Certified Minority, Woman, or Disadvantaged Business Enterprise

*Response required

When equals "Yes"

*Certifying Agency**

List the Agency that provided your certification.

*Response required

When equals "Yes"

*Certification Documentation**

Provide a copy of your certification

*Response required

2 Vendor Certification*

By submitting this response, the Vendor hereby certifies that:

A. It is under no legal prohibition on contracting with the City of Clearwater.

B. It has read, understands, and is in compliance with the specifications, terms and conditions stated herein, as well as its attachments, and any referenced documents.

C. It has no known, undisclosed conflicts of interest.

D. The prices offered were independently developed without consultation or collusion with any of the other vendors or potential vendors or any other anti-competitive practices.

E. No offer of gifts, payments or other consideration were made to any City employee, officer, elected official, or consultant who has or may have had a role in the procurement process for the commodities or services covered by this contract. The Vendor has not influenced or attempted to influence any City employee, officer, elected official, or consultant in connection with the award of this contract.

F. It understands the City may copy all parts of this response, including without limitation any documents or materials copyrighted by the Vendor, for internal use in evaluating respondent's offer, or in response to a public records request under Florida's public records law (F.S. Chapter 119) or

other applicable law, subpoena, or other judicial process; provided that the City agrees not to change or delete any copyright or proprietary notices.

G. It hereby warrants to the City that the Vendor and its subcontractors will comply with, and are contractually obligated to comply with, all federal, state, and local laws, rules, regulations, and executive orders.

H. It certifies that Vendor is not presently debarred, suspended, proposed for debarment, declared ineligible, voluntarily excluded, or disqualified from participation in this matter from any federal, state, or local agency.

I. It will provide the commodities or services specified in compliance with all federal, state, and local laws, rules, regulations, and executive orders if awarded by the City.

J. It is current in all obligations due to the City.

K. It will accept all terms and conditions as set forth in this solicitation if awarded by the City.

L. The signatory is an officer or duly authorized representative of the Vendor with full power and authority to submit binding offers and enter into contracts for the commodities or services as specified herein.

☐ Please confirm

*Response required

3 E-Verify System Certificattion*

PER FLORIDA STATUTE 448.095, CONTRACTORS AND SUBCONTRACTORS MUST REGISTER WITH AND USE THE E-VERIFY SYSTEM TO VERIFY THE WORK AUTHORIZATION STATUS OF ALL NEWLY HIRED EMPLOYEES.

The affiant, by virtue of confirming below, certifies that:

A. The Contractor and its Subcontractors are aware of the requirements of Florida Statute 448.095.

B. The Contractor and its Subcontractors are registered with and using the E-Verify system to verify the work authorization status of newly hired employees.

C. The Contractor will not enter into a contract with any Subcontractor unless each party to the contract registers with and uses the E-Verify system.

D. The Subcontractor will provide the Contractor with an affidavit stating that the Subcontractor does not employ, contract with, or subcontract with unauthorized alien.

E. The Contractor must maintain a copy of such affidavit.

F. The City may terminate this Contract on the good faith belief that the Contractor or its Subcontractors knowingly violated Florida Statutes 448.09(1) or 448.095(2)(c).

G. If this Contract is terminated pursuant to Florida Statute 448.095(2)(c), the Contractor may not be awarded a public contract for at least 1 year after the date on which this Contract was terminated.

H. The Contractor is liable for any additional cost incurred by the City as a result of the termination of this Contract.

☐ Please confirm

*Response required

4 Scrutinized Company Certification*
Please download the below documents, complete, and upload.

- SCRUTINIZED_COMPANIES_AND_B...

*Response required

5 Compliance with Anti-Human Trafficking Laws*
Please download the below documents, complete, and upload.

- Compliance_with_787.06_form...

*Response required

6 Section V - Contract Documents*
Please download the below documents, complete, and upload.

- Section_V_-_Contract_Docume...

*Response required

7 W-9*
Upload your current W-9 form. (available at https://www.irs.gov/pub/irs-pdf/fw9.pdf)

*Response required