

**AGREEMENT FOR THE SUPPLY OF
WELL 10B WATER TREATMENT FACILITY - FILTER EQUIPMENT
PROJECT #10549.C**

THIS AGREEMENT FOR EQUIPMENT / SUPPLIES PROCUREMENT is made this 23rd day of January, 2024, and entered into by and between the City of Meridian, a municipal corporation organized under the laws of the State of Idaho, hereinafter referred to as "CITY", 33 East Broadway Avenue, Meridian, Idaho 83642, and **KURITA AMERICA, INC. dba TONKA WATER**, hereinafter referred to as "SUPPLIER", whose business address is **6600 94th Ave. North, Minneapolis, MN 55445**.

INTRODUCTION

Whereas, the City has a need for WELL 10B FILTER EQUIPMENT; and

WHEREAS, the SUPPLIER is specially trained, experienced and competent to provide and has agreed to provide such equipment;

NOW, THEREFORE, in consideration of the mutual promises, covenants, terms and conditions hereinafter contained, the parties agree as follows:

TERMS AND CONDITIONS

1. Equipment / Supply Specifications & Requirements:

1.1 SUPPLIER shall supply the equipment, supplies and services to the City upon execution of this Agreement and receipt of the City's written notice to proceed, all items, and comply in all respects, as specified in the Request for Proposals titled "Well 10B Water Treatment Facility - Filter Equipment" and suppliers proposal dated September 7, 2023, which by this reference are incorporated herein, together with all addendums issued.

1.2 The SUPPLIER shall provide all equipment and services under this Agreement consistent with the requirements and standards established by applicable federal, state and city laws, ordinances, regulations and resolutions and the UCC. The SUPPLIER represents and warrants that it will perform its work in accordance with generally accepted industry standards and practices for the profession or professions that are used in performance of this Agreement and that are in effect at the time of performance of this Agreement.

2. Consideration

2.1 The SUPPLIER shall be compensated on a Fixed Price basis as provided in Attachment B "Payment Schedule" attached hereto and by reference made a part hereof, for the Not-To-Exceed amount of **\$887,164.00.**

2.2 The SUPPLIER shall provide the City with a detailed invoice upon delivery of all equipment and supplies, which the City will pay within 30 days of receipt of a correct invoice and approval by the City Project Manager. The City will not withhold any Federal or State income taxes or Social Security Tax from any payment made by City to SUPPLIER under the terms and conditions of this Agreement. Payment of all taxes and other assessments on such sums is the sole responsibility of SUPPLIER.

2.3 Except as expressly provided in this Agreement, SUPPLIER shall not be entitled to receive from the City any additional consideration, compensation, salary, wages, or other type of remuneration for services rendered under this Agreement., including , but not limited to, meals, lodging, transportation, drawings, renderings or mockups. Specifically, SUPPLIER shall not be entitled by virtue of this Agreement to consideration in the form of overtime, health insurance benefits, retirement benefits, paid holidays or other paid leaves of absence of any type or kind whatsoever.

3. Term:

3.1 This agreement shall become effective upon execution by both parties, and shall expire upon (a) completion of the agreed upon work, or (b) unless sooner terminated as provided below or unless some other method or time of termination is listed in Attachment A.

3.2 Should SUPPLIER default in the performance of this Agreement or materially breach any of its provisions, City, at City's option, may terminate this Agreement by giving written notification to SUPPLIER.

3.3 Should City fail to pay SUPPLIER all or any part of the compensation set forth in Attachment B of this Agreement on the date due, SUPPLIER, at the SUPPLIER's option, may terminate this Agreement if the failure is not remedied by the City within thirty (30) days from the date payment is due.

4. Liquidated Damages:

Initial submittal package must be submitted to the City within 40 (forty) calendar days from Notice to Proceed. Contractor shall be liable to the City for any delay beyond this time period in the amount of \$500.00 (five hundred dollars) per calendar day. Such payment shall be construed to be liquidated

damages by the Contractor in lieu of any claim or damage because of such delay and not be construed as a penalty.

All subsequent submittals must be provided within 20 (twenty) days of review comments from the City or its Engineer. Contractor shall be liable to the City for any delay beyond this time period in the amount of \$500.00 (five hundred dollars) per calendar day. Such payment shall be construed to be liquidated damages by the Contractor in lieu of any claim or damage because of such delay and not be construed as a penalty.

Delivery of all Equipment / Substantial Completion shall be accomplished within 480 (four hundred eighty) calendar days from Notice to Proceed. This project shall be considered Substantially Complete when the Owner has full and unrestricted use and benefit of the facilities, both from an operational and safety standpoint, and only minor incidental work, corrections or repairs remain for the physical completion of the total contract. Contractor shall be liable to the City for any delay beyond this time period in the amount of \$500.00 (five hundred dollars) per calendar day. Such payment shall be construed to be liquidated damages by the Contractor in lieu of any claim or damage because of such delay and not be construed as a penalty.

Upon receipt of a Notice to Proceed, the Contractor shall have 585 (five hundred eighty-five) calendar days to complete the work as described herein. Contractor shall be liable to the City for any delay beyond this time period in the amount of \$500.00 (five hundred dollars) per calendar day. Such payment shall be construed to be liquidated damages by the Contractor in lieu of any claim or damage because of such delay and not be construed as a penalty.

5. Termination:

If, through any cause, SUPPLIER, its officers, employees, or agents fails to fulfill in a timely and proper manner its obligations under this Agreement, violates any of the covenants, agreements, or stipulations of this Agreement, falsifies any record or document required to be prepared under this agreement, engages in fraud, dishonesty, or any other act of misconduct in the performance of this contract, or if the City Council determines that termination of this Agreement is in the best interest of CITY, the CITY shall thereupon have the right to terminate this Agreement by giving written notice to SUPPLIER of such termination and specifying the effective date thereof at least fifteen (15) days before the effective date of such termination.

Notwithstanding the above, SUPPLIER shall not be relieved of liability to the CITY for damages sustained by the CITY by virtue of any breach of this Agreement by SUPPLIER, and the CITY may withhold any payments to

SUPPLIER for the purposes of set-off until such time as the exact amount of damages due the CITY from SUPPLIER is determined. This provision shall survive the termination of this agreement and shall not relieve SUPPLIER of its liability to the CITY for damages.

6. Independent SUPPLIER:

6.1 In all matters pertaining to this agreement, SUPPLIER shall be acting as an independent SUPPLIER, and neither SUPPLIER nor any officer, employee or agent of SUPPLIER will be deemed an employee of CITY. Except as expressly provided in Attachment A, SUPPLIER has no authority or responsibility to exercise any rights or power vested in the City and therefore has no authority to bind or incur any obligation on behalf of the City. The selection and designation of the personnel of the CITY in the performance of this agreement shall be made by the CITY.

6.2 SUPPLIER, its agents, officers, and employees are and at all times during the term of this Agreement shall represent and conduct themselves as independent SUPPLIERS and not as employees of the City.

6.3 SUPPLIER shall determine the method, details and means of performing the work and services to be provided by SUPPLIER under this Agreement. SUPPLIER shall be responsible to City only for the requirements and results specified in this Agreement and, except as expressly provided in this Agreement, shall not be subjected to City's control with respect to the physical action or activities of SUPPLIER in fulfillment of this Agreement. If in the performance of this Agreement any third persons are employed by SUPPLIER, such persons shall be entirely and exclusively under the direction and supervision and control of the SUPPLIER.

7. Indemnification and Insurance:

a. SUPPLIER shall indemnify and save and hold harmless CITY from and for any and all losses, claims, actions, judgments for damages, or injury to persons or property and losses and expenses and other costs including litigation costs and attorney's fees, arising out of, resulting from, or in connection with the performance of this Agreement by the SUPPLIER, its servants, agents, officers, employees, guests, and business invitees, and not caused by or arising out of the tortuous conduct of CITY or its employees. SUPPLIER shall maintain, and specifically agrees that it will maintain, throughout the term of this Agreement, liability insurance, in which the CITY shall be named an additional insured in the minimum amounts as follow: General Liability One Million Dollars (\$1,000,000) per incident or occurrence, Professional Liability One Million Dollars (\$1,000,000) per

incident or occurrence, Automobile Liability Insurance One Million Dollars (\$1,000,000) per incident or occurrence and Workers' Compensation Insurance, in the statutory limits as required by law.. The limits of insurance shall not be deemed a limitation of the covenants to indemnify and save and hold harmless CITY; and if CITY becomes liable for an amount in excess of the insurance limits, herein provided, SUPPLIER covenants and agrees to indemnify and save and hold harmless CITY from and for all such losses, claims, actions, or judgments for damages or injury to persons or property and other costs, including litigation costs and attorneys' fees, arising out of, resulting from , or in connection with the performance of this Agreement by the SUPPLIER or SUPPLIER's officers, employs, agents, representatives or sub-SUPPLIERS and resulting in or attributable to personal injury, death, or damage or destruction to tangible or intangible property, including use of. SUPPLIER shall provide CITY with a Certificate of Insurance, or other proof of insurance evidencing SUPPLIER'S compliance with the requirements of this paragraph and file such proof of insurance with the CITY at least ten (10) days prior to the date SUPPLIER begins performance of it's obligations under this Agreement. In the event the insurance minimums are changed, SUPPLIER shall immediately submit proof of compliance with the changed limits. Evidence of all insurance shall be submitted to the City Purchasing Agent with a copy to Meridian City Accounting, 33 East Broadway Avenue, Meridian, Idaho 83642.

7.2 Any deductibles, self-insured retention, or named insureds must be declared in writing and approved by the City. At the option of the City, either: the insurer shall reduce or eliminate such deductibles, self-insured retentions or named insureds; or the SUPPLIER shall provide a bond, cash or letter of credit guaranteeing payment of losses and related investigations, claim administration and defense expenses.

7.3 To the extent of the indemnity in this contract, SUPPLIER's Insurance coverage shall be primary insurance regarding the City's elected officers, officials, employees and volunteers. Any insurance or self-insurance maintained by the City or the City's elected officers, officials, employees and volunteers shall be excess of the SUPPLIER's insurance and shall not contribute with SUPPLIER's insurance except as to the extent of City's negligence.

7.4 The SUPPLIER's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

7.5 All insurance coverages for Suppliers subs shall be subject to all of the insurance and indemnity requirements stated herein.

7.6 The limits of insurance described herein shall not limit the liability of the Supplier and Supplier's agents, representatives, employees or subcontractors.

7.7 The limits of insurance described herein shall not limit the liability of the Contractor and Contractor's agents, representatives, employees or subcontractors.

8. **Bonds:** Payment and Performance Bonds are required.
9. **Warranty:** In addition to any warranty required in the specifications, all equipment, coatings, valves, controls, and other components provided under this agreement shall be guaranteed for two (2) years against defects in workmanship and materials from the notice of acceptance.
10. **Notices:** Any and all notices required to be given by either of the parties hereto, unless otherwise stated in this agreement, shall be in writing and be deemed communicated when mailed in the United States mail, certified, return receipt requested, addressed as follows:

City of Meridian
Procurement Manager
33 E. Broadway Avenue
Meridian, Idaho 83642
Ph. (208) 489-0417
Email: kwatts@meridiancity.org

Kurita America, Inc.
Attn: Alan Schneider
6600 94th Ave. North
Minneapolis, MN 55445
Ph. 866-663-7633
Cell. 612-708-6517
e-mail: a.schneider@kurita-water.com

Either party may change their address for the purpose of this paragraph by giving written notice of such change to the other in the manner herein provided.

11. **Attorney Fees:** Should any litigation be commenced between the parties hereto concerning this Agreement, the prevailing party shall be entitled, in addition to any other relief as may be granted, to court costs and reasonable attorneys' fees as determined by a Court of competent jurisdiction. This provision shall be deemed to be a separate contract between the parties and shall survive any default, termination or forfeiture of this Agreement.

- 12. Time is of the Essence:** The parties hereto acknowledge and agree that time is strictly of the essence with respect to each and every term, condition and provision hereof, and that the failure to timely perform any of the obligations hereunder shall constitute a breach of, and a default under, this Agreement by the party so failing to perform.
- 13. Assignment:** It is expressly agreed and understood by the parties hereto, that SUPPLIER shall not have the right to assign, transfer, hypothecate or sell any of its rights under this Agreement except upon the prior express written consent of CITY.
- 14. Discrimination Prohibited:** In performing the Work required herein, SUPPLIER shall not unlawfully discriminate in violation of any federal, state or local law, rule or regulation against any person on the basis of race, color, religion, sex, national origin or ancestry, age or disability.
- 15. Reports and Information:**
- 15.1 At such times and in such forms as the CITY may require, there shall be furnished to the CITY such statements, records, reports, data and information as the CITY may request pertaining to matters covered by this Agreement.
- 15.2 SUPPLIER shall maintain all writings, documents and records prepared or compiled in connection with the performance of this Agreement for a minimum of four (4) years from the termination or completion of this or Agreement. This includes any handwriting, typewriting, printing, photo static, photographic and every other means of recording upon any tangible thing, any form of communication or representation including letters, words, pictures, sounds or symbols or any combination thereof.
- 16. Audits and Inspections:** At any time during normal business hours and as often as the CITY may deem necessary, there shall be made available to the CITY for examination all of SUPPLIER'S records with respect to all matters covered by this Agreement. SUPPLIER shall permit the CITY to audit, examine, and make excerpts or transcripts from such records, and to make audits of all contracts, invoices, materials, payrolls, records of personnel, conditions of employment and other data relating to all matters covered by this Agreement.
- 17. Publication, Reproduction and Use of Material:** No material produced in whole or in part under this Agreement shall be subject to copyright in the United States or in any other country. The CITY shall have unrestricted authority to publish, disclose and otherwise use, in whole or in part, any reports, data or other materials prepared under this Agreement.

18. **Compliance with Laws:** In performing the scope of work required hereunder, SUPPLIER shall comply with all applicable laws, ordinances, and codes of Federal, State, and local governments.
19. **Changes:** The CITY may, from time to time, request changes in the Scope of Work to be performed hereunder. Such changes, including any increase or decrease in the amount of SUPPLIER'S compensation, which are mutually agreed upon by and between the CITY and SUPPLIER, shall be incorporated in written amendments which shall be executed with the same formalities as this Agreement.
20. **Construction and Severability:** If any part of this Agreement is held to be invalid or unenforceable, such holding will not affect the validity or enforceability of any other part of this Agreement so long as the remainder of the Agreement is reasonably capable of completion.
21. **Waiver of Default:** Waiver of default by either party to this Agreement shall not be deemed to be waiver of any subsequent default. Waiver or breach of any provision of this Agreement shall not be deemed to be a waiver of any other or subsequent breach, and shall not be construed to be a modification of the terms of this Agreement unless this Agreement is modified as provided above.
22. **Advice of Attorney:** Each party warrants and represents that in executing this Agreement. It has received independent legal advice from its attorney's or the opportunity to seek such advice.
23. **Entire Agreement:** This Agreement contains the entire agreement of the parties and supersedes any and all other agreements or understandings, oral or written, whether previous to the execution hereof or contemporaneous herewith.
24. **Order of Precedence:** The order or precedence shall be the contract agreement, the Invitation for Bid document, then the winning bidders submitted bid document.
25. **Applicable Law:** This Agreement shall be governed by and construed and enforced in accordance with the laws of the State of Idaho, and the ordinances of the City of Meridian.
26. **Approval Required:** This Agreement shall not become effective or binding until approved by the City of Meridian.

CITY OF MERIDIAN

**KURITA AMERICA, INC.
dba TONKA WATER**

BY: _____
Keith Watts, Procurement Manager

Dated: _____


BY: _____
Mary Sitko
Sr. VP of Municipal Capital Projects and Services

Dated: 12/27/23

Approved by City Council: _____

CITY PROJECT MANAGER
Jared Hale

Attachment A

SCOPE OF WORK

REFER TO REQUEST FOR PROPOSALS PW-2331-10549.C ALL ADDENDUMS, ATTACHMENTS, AND EXHIBITS included in the Request for Proposals Package and written proposal by SUPPLIER dated September 13, 2023 are by this reference made a part hereof.

See the Attachment C Titled “5 – Well 10B Equipment – Final Pre-Purchase Specifications” below.

Attachment B

MILESTONE / PAYMENT SCHEDULE

- A. Total and complete compensation for this Agreement shall not exceed **\$887,164.00.**

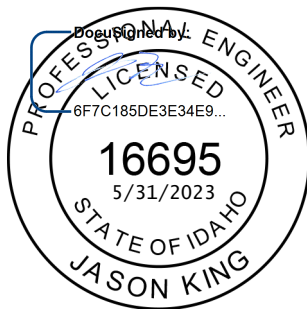
MILESTONE DATES/PRICING SCHEDULE			
	DESCRIPTION	DATE (Dependent on Council Approval)	AMOUNT
1.	Approval of Submittals (15% of Contract Price)	60 days from NTP	\$133,074.60
2	Delivery of all Equipment or Substantial Completion (60% of Contract Price)	480 Days from NTP	\$532,298.40
3	Successful Start-Up (10% of Contract Price)		\$88,716.40
4	O&M Receipt and Approval and Training Complete (10% of Contract Price)		\$88,716.40
5	Final Acceptance with Owner Trial Period	585 Days from NTP	\$44,582.20
CONTRACT TOTAL.....			<u>\$887,164.00</u>

Attachment C

Prepurchase Specifications

CITY OF MERIDIAN WELL 10B WATER TREATMENT FACILITY

Volume 1 of 1
Division 01 – Division 46



MAY 2023

PROJECT NO.214095-009

PREPARED BY:



100 East Bower Street, Suite 110
Meridian, ID 83642
(208) 288-1992

PREPARED FOR:



33 E Broadway Ave
Meridian, ID 83642
(208) 888-5500

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(UNDER A SEPARATE BOUND COVER)

SECTION 01 11 00 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 DEFINITIONS

- A. Equipment: Pressure filtration system for treating the groundwater from Meridian Well 10B as specified in Section 46 61 21 of these documents.
- B. Owner: City of Meridian, Idaho
- C. Vendor: Business entity supplying the pressure filtration equipment to the Owner.
- D. Engineer: Keller Associates, Inc.
- E. Contractor: Business entity installing the pressure filtration equipment.

1.2 PROJECT DESCRIPTION

- A. The overall project is the construction of a new filter building for installation of a new pressure filtration system to reduce aesthetic pollutants from the potable supply delivered by the City of Meridian's Well No. 10B. The filtration system will treat the full 2,250 gallons per minute well capacity. The filtration unit will be installed in a new building to be constructed as part of this project and will be integrated into the Owner's existing control system. The filter effluent will be routed directly to the distribution system at approximately 85 psi, and the backwash will be routed to the existing gravity sewer system after an equalization storage basin.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. Work Included in this Contract: Vendor shall supply and deliver the Equipment to the Owner, in accordance with these specifications and the associated contract documents. Vendor shall provide technical assistance during installation, programming, testing, startup, and provide operations training.
- B. The equipment shall be delivered in accordance with Section 01 65 00 of these specifications.
- C. The Vendor shall furnish operation, maintenance and technical manuals (Owner's manuals) pertaining to the equipment that is supplied in accordance with Section 01 33 01 – Vendor Submittals.
- D. Work Not Included in this Contract: Offloading the EQUIPMENT at the delivery site. Installation of the EQUIPMENT to be furnished hereunder.

1.4 CONTRACT METHOD

- A. The Equipment, hereunder, shall be furnished under a lump sum Contract. Payment shall be made in accordance with schedule of payments listed in Section 01 29 76 – Schedule of Payments.

1.5 CODES AND STANDARDS

- A. Where codes and standards are referred to, they are the current approved codes. It is the duty of the Vendor to obtain from its supplier any material on this work to submit evidence, if requested, that provided material is in compliance with the applicable codes and standards.

1.6 STATE AND LOCAL LAWS

- A. Conform to all applicable State and local laws in carrying out obligations under the contract.
- B. All equipment, materials, and components in contact with the potable water shall meet the current NSF standards for potable water applications.

1.7 FACTORY REPRESENTATIVE

- A. Vendor shall provide the services of a qualified factory representative as specified in Section 01 31 13 – Project Coordination and 01 43 33 –Manufacturer’s Field Services. Such services shall include installation coordination, startup, operator training assistance and testing. Any services of the factory representative required because of deficiencies in materials and workmanship shall be furnished and paid for by the Vendor.

1.8 EQUIPMENT FIELD TESTING

- A. After installation, all mechanical systems shall be tested for proper operation, efficiency, and capacity by the Contractor and the Vendor, in the presence of the Owner and Engineer. Vendor's factory representative shall perform any final adjustments and inspection during this test. All parts shall operate satisfactorily in all respects. If any part of a unit shows evidence of unsatisfactory or improper operation during the test period, correction or repairs shall be made by the Vendor and the full test operation shall be repeated. The Installation Contractor will furnish all personnel, water, fuel, oil, grease, and all other necessary materials for conducting the test operations.
- B. All tests shall be performed during normal working hours.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

END OF SECTION 01 11 00

SECTION 01 25 00 - SUBSTITUTIONS AND PRODUCT OPTIONS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. This document describes the requirements for submission of product information and procedures for consideration of substitutions by Owner, including products proposed to be used by Vendor under "or equal" or "acceptable alternate" provisions.
- B. Where equipment, materials, or processes have been specifically named, it is the intention of the Engineer to use these items. If a Vendor desires to have an alternate considered, they are to provide the following information. It will be the responsibility of the Vendor to convince the Engineer that the alternate equipment, materials, or processes are equal and will perform the intended function. The burden of proof is on the Vendor to convince the Engineer that the product is equal for the purpose of a particular function

1.2 DEFINITIONS

- A. The word "Products" as used herein is defined to include purchased items for incorporation into the work, regardless of whether specifically purchased for the project or taken from Vendor's stock of previously purchased products. The word "Materials" is defined as products which must be substantially cut, shaped, worked, mix, finished, refined, or otherwise fabricated, processed, installed, or applied to form units of work. The word "Equipment" is defined as products with operation parts, regardless of where motorized or manually operated, and particularly including products with service connections (wiring, piping, and other like items). Definitions in this paragraph are not intended to negate the meaning of other terms used in the Contract Documents, including "specialties", "system", "structure", "finishes", "accessories", "furnishings", "special construction", and similar items, which are self-explanatory and have recognized meanings in the construction industry.
- B. Neither "Products" nor "Materials" nor "Equipment" includes machinery and equipment used for preparation, fabrication, conveying and erection of the Goods.

1.3 VENDOR'S OPTIONS

- A. For products specified only by reference standards, select a product that meets standards. Product shall be by a manufacturer that Vendor has used on similar projects.
- B. For products specified by naming several products or manufacturers, select any product and manufacturer named.
- C. For products specified by naming one or more products, but indicating the option of selecting equivalent products by stating "or equal" or "acceptable alternate" after specified product, Vendor must submit request, as required for substitution, for any product not specifically named.

1. “Or-Equal” Items: if in the Engineer’s sole judgment an item of material or equipment proposed by Vendor is functionally equal to that named and sufficiently similar so that no change in related work will be required, it may be considered by the Engineer as an “or-equal” item, in which case review and approval of the proposed item may in the Engineer’s sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposed of the paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:
 - a. It is at least equal in quality, durability, appearance, strength and design characteristics.
 - b. It will reliably perform at least equally well the function imposed by the design concept of the complete project as a functioning whole;
 - c. There is no increase in cost to the Owner, and
 - d. It will conform to the detailed requirements of the item named in the Contract Documents.
- D. For products specified by name, brand, model, etc., provide information as required below and convince the Engineer.

1.4 SUBSTITUTIONS

- A. If in the Engineer’s sole judgment an item of material or equipment proposed by Vendor does not qualify as an “or-equal” item, it will be considered a proposed substitute item and subject to review process.
- B. If Vendor wishes to furnish or use a substitute item of material or equipment, Vendor shall first make written application to the Engineer for review of a proposed substitute item of material or equipment. The application shall certify that the proposed substitute will perform adequately the function and achieve the results called for by the general design, be similar in substance to the specified and be suited to the same use that specified.
- C. The procedure for review by the Engineer will include the following:
 1. If the Vendor wishes to provide a substitution item, the Vendor shall make written application to the Engineer.
 2. Unless otherwise provided by law or authorized in writing by the Engineer, the request shall be submitted within a 35-day period after award of the Contract.
 3. Wherever a proposed substitution item has not been submitted within said 35-day period, or wherever the submission of a proposed substitution material or equipment has been judged to be unacceptable by the Engineer, the Vendor shall provide the material or equipment indicated in the Contract Documents.
 4. The Engineer will evaluate each proposed substitution within a reasonable period of time.

5. As applicable, no shop drawing submittals shall be made for a substitution item nor shall any substitution item be ordered, installed, or utilized without the Engineer's prior written acceptance of the Vendor's request.
- D. Vendor shall submit sufficient information as provided below to allow the Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefore. Requests for review of proposed substitute items of materials or equipment will not be acceptable by the Engineer from anyone other than the Vendor. Include in application:
 1. The Vendor shall certify that the proposed substitution will perform adequately the functions and achieve the results called for by the general design, and be similar and of equal substance to that indicated, and be suited to the same use as the specified.
 2. For products:
 - a. Product identification, including manufacturer's name and address.
 - b. Manufacturer's literature:
 - 1) Product description
 - 2) Performance and test data
 - 3) Reference standards
 - c. Samples
 - d. Name and address of similar projects on which product was used and date of installation.
 3. All variations of the proposed substitute item for the specified shall be identified in the application and available engineering, sales, maintenance, repair and replacement service shall be indicated.
 4. The application shall state the extent, if any, to which the use of the proposed substitute will prejudice Vendor's achievement of delivery on time, whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provision of any other direct contract with Owner for work on the project) to adapt the design to the proposed substitute item and whether or not incorporation or use of the substitute in connection with the work is subject to payment of any license fee or royalty.
 5. Relation to separate contracts.
 6. The application shall also contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other sellers affected by any resulting change, all of which will be considered by the Engineer in evaluating the proposed substitute item.

- E. In making request for substitution, Vendor shall:
1. Investigate proposed product or method and determined that it is equal or superior in all respects to that specified.
 2. Provide the same guarantee for substitution as for product or method specified will be provided.
 3. Coordinate installation of accepted substitution into work, making such changes as may be required for work to be complete in all respects.
 4. Waive all claims for additional costs related to substitution which consequently becomes apparent.
 5. Ensure cost data is complete and includes all related costs under this contract, but excludes:
 - a. Costs under separate contracts
 - b. Engineer's redesign
- F. Substitutions will not be considered if:
1. They are indicated or implied on shop drawings or project data submittals without formal request submitted in accordance with the Contract Documents.
 2. Acceptance will require substantial revision of work.
- G. Vendor shall provide all data in support of any proposed substitute or "or-equal" at Vendor's expense.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

END OF SECTION 01 25 00

SECTION 01 29 76 - SCHEDULE OF PAYMENTS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. This Section defines the partial payment milestones and the corresponding payment amount, specified as a percent of the lump sum total contract price as submitted on Vendor's bid forms.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. The requirements in the specifications listed below apply to this work:

<u>Section</u>	<u>Item</u>
01 11 00	Summary of Work

1.3 SCHEDULE OF PAYMENTS

- A. The schedule of payments for the supplying of the Goods and Special Services shall be based on the following schedule:
- | | | |
|----|---|-----|
| 1. | Upon Approved Submittals | 15% |
| 2. | Upon Delivery of all Goods | 60% |
| 3. | Upon Successful Startup | 10% |
| 4. | After O&M Manual is Approved and Training Complete | 10% |
| 5. | Upon Final Completion (including a 60 day owner trial period) | 5% |
- B. No payments shall be made beyond 75 percent until the final Owner's Manuals have been approved and received by Owner.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

END OF SECTION 01 29 76

SECTION 01 31 13 – PROJECT COORDINATION

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. The Vendor shall accommodate the overall design and construction schedule by submitting shop drawings of proposed equipment to Engineer as provided in Section 01 33 01 – Vendor Submittals.
- B. During the manufacturing of the Equipment, the interface will be between the Vendor, Owner, and the Contractor as stated in the contract documents.
- C. Before and during the installation and startup of the Equipment, the Vendor shall be interfacing with Owner, Engineer and the Contractor. It is understood that direct interface between the Vendor and Contractor may be necessary. However, it is the Vendor's responsibility to keep the Owner and Engineer informed of all information passing between itself and the Contractor. Therefore, the Vendor shall send copies of all letters, drawings, telephone notes, e-mails, faxes, etc. exchanged between itself and the Contractor, to the Owner and Engineer.
- D. Any notice, order, request or other communication shall be given in accordance with the provisions of the contract documents.
- E. The Vendor shall fully cooperate and coordinate its activity with the activities of the Owner, Contractor, and sub-contractors so that work on the entire scheme of development may be performed with utmost efficiency consistent with good practice.
- F. The Vendor shall submit a startup plan to Engineer and Owner in accordance with Section 01 33 01 – Vendor Submittals at least 60 days prior to scheduled startup date indicated by Contractor's schedule. The start-up plan shall satisfy requirements listed in Section 01 75 16 – Project Startup.
 - 1. Equipment testing schedule.
 - 2. Performance testing.
 - 3. Instrumentation calibration and alarm review.
 - 4. Programmable logic controller verification and testing.
 - 5. Develop on-going approach to move equipment from startup to full operational status.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

END OF SECTION 01 31 13

SECTION 01 33 01 - VENDOR SUBMITTALS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Vendor shall provide submittals for all aspects of filter system as identified in Specification 46 61 21.
- B. Preliminary Progress schedule shall indicate anticipated submittal approval, starting date of manufacture and assembly, shipping date of the Goods, and all other dates appropriate for tracking the project progress against the overall schedule. Schedule shall conform to the maximum number of days indicated in the contract documents and be submitted within 7 days of Notice to Proceed.
- C. Submittals as outlined in specification section 46 61 21 shall be submitted in the timelines as outlined below:
 - a. Initial submittal: Within 14 days of notice to proceed, provide initial submittal for engineer review.
 - b. Prior to shipment: No later than 30 days prior to shipping equipment, provide submittal(s) for engineer review.
 - c. Prior to startup: No later than 30 days prior to startup, provide submittal(s) for engineer review.

1.2 SHOP DRAWINGS

- A. Shop drawings shall show the layout of the equipment, hydraulic profile in the equipment at the design flows, sections of the equipment, installation details drawings, catalog sheets of pumps and valves, data sheets, and similar items. Whenever the Vendor is required to submit design calculations as part of a submittal, such calculations shall bear the signature and seal of an engineer registered in the appropriate branch and in the state of Idaho, unless otherwise directed.
- B. The submittals are to be accompanied by the transmittal form attached at the end of this Section. Sequentially number the transmittal forms; resubmittals shall have original number with an alphabetic suffix. A separate transmittal form shall be used for each specific item or class of material or equipment for which a submittal is required. Electronic submittals are required except where hard copies are requested by the Engineer.
- C. Submittals shall be transmitted using the web-based CONDOC construction program management software.
- D. Where the detailed Specifications require specific submittal data, submit all data at the same time.

- E. When preparing shop drawings, vendor shall utilize equipment naming conventions provided in the Contract Documents. Submittals with alternate naming will be returned as "Revise and Resubmit."
- F. Except as may otherwise be indicated herein, the Engineer will return electronic copies of each submittal or resubmittal to the Vendor with comments noted thereon, within 17 calendar days following their receipt by the Engineer. If more than one resubmittal on an item is needed, The Owner reserves the right to withhold monies due to the Vendor to cover additional costs of the Engineer's review beyond the second submittal.
- G. If a submittal is returned to the Vendor marked "NO EXCEPTIONS TAKEN" or "FURNISH AS CORRECTED", formal revision and resubmission of said submittal will not be required.
- H. Fabrication of an item shall be commenced only after the Engineer has reviewed the pertinent submittals and returned copies to the Vendor marked either "NO EXCEPTIONS TAKEN" or "FURNISH AS CORRECTED". Corrections indicated on submittals shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as the basis for changes to the contract requirements.
- I. Requirements of the contract documents regarding submittals shall be met. No consideration for review by the Engineer of any Vendor submittals will be made for any items which have not been certified by the Vendor. All non-certified submittals will be returned to the Vendor without action taken by the Engineer, and any delays caused thereby shall be the total responsibility of the Vendor.

1.3 OPERATIONS AND MAINTENANCE MANUAL

- A. The Vendor shall submit technical operation and maintenance information for each item of mechanical and electrical equipment in an organized manner in electronic format and 3-ring binders. It shall be written so that it can be used and understood by the Owner's operation and maintenance staff. The O&M manual information shall also be submitted in a text-searchable electronic format. All individual equipment sheets shall be submitted electronically as text-searchable PDFs.
- B. Manual Format:
 - 1. Manuals shall be divided into sections and indexed.
 - 2. Sections shall include Mechanical Equipment, Automatic and Special Valves, Control Systems, Electrical, and other component elements, as necessary.
 - 3. Under each section, there shall be a description of the operation and maintenance, lubrication schedules, and installation instructions of each component element.
 - 4. Sections shall be labeled and each item shall be sub-labeled.
 - 5. There shall be included in the front of each manual an index, laminated with plastic on both sides.
- C. Manual Contents:

1. Equipment Summary: A summary table shall indicate the equipment name, equipment number, Model number, and Serial Number.
2. Operational Procedures: Manufacturer-recommended procedures on the following:
 - a. Installation
 - b. Adjustment and calibration, and Startup
 - c. Location of controls, special tools, equipment required, or related instrumentation needed for operation
 - d. Operation procedures
 - e. Load changes and Shutdown
 - f. Troubleshooting, Disassembly, and Reassembly
 - g. Realignment
 - h. Testing to determine performance efficiency
 - i. Tabulation of proper settings for all pressure relief valves, low and high pressure switches, and other protection devices
 - j. List of all electrical relay settings including alarm and contact settings
3. Preventive Maintenance Procedures: Preventive maintenance procedures shall include all manufacturer-recommended procedures to be performed on a periodic basis, both by removing and replacing the equipment or component, and by leaving the equipment in place.
4. Schedules: Recommended frequency of preventive maintenance procedures shall be included. Lubrication schedules, including lubricant SAE grade, type, and temperature ranges, shall be covered.
5. Parts List: A complete parts list shall be furnished, including a generic description and manufacturer's identification number for each part. Addresses and telephone numbers of the nearest vendor and parts warehouse shall be included.
6. Drawings: Cross-sectional or exploded view drawings shall accompany the parts list.
7. Wiring Diagrams: Include complete internal and connection wiring diagrams for electrical equipment items.
8. Shop Drawings: This part shall include approved shop or fabrication drawings, complete with dimensions.
9. Safety: This part describes the safety precautions to be taken when operating and maintaining the equipment or working near it.

10. Documentation: All equipment warranties, affidavits, and certifications required by the Technical Specifications shall be placed in this part.
- D. The Vendor shall submit to the Owner one electronic and one hard copy of identical Operations and Maintenance Manuals a minimum of 90 calendar days prior to the scheduled startup of the Goods.
- E. The Engineer will review the Operations and Maintenance Manuals within 30 days following their receipt by the Engineer. The Vendor shall then make any corrections and changes noted and compile all the corrected Operations and Maintenance Manuals for final submittal to the Engineer.
- F. Vendor's copy of complete manuals shall be available at the site of the Work for use by field personnel and Engineer during startup and testing of equipment.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

END OF SECTION 01 33 01

STANDARD SUBMITTAL FORM

DATE: _____

SUBMITTAL NO. _____

FROM: _____

TO: _____

(To be completed afterward)

VENDOR: _____

This is: (Check one)

An Original Submittal _____

A 2nd Submittal _____

A ____ Submittal _____

Previous Submittal Nos. _____

No. of Submittal Copies _____

SPECIFICATION OR
SUBJECT OF SUBMITTAL

EQUIPMENT DESIGNATION

DRAWING REFERENCE

We have verified that this submittal contains all applicable material and information required for evaluation against the project Specifications. Furthermore, we submit these items, which comply with the Drawings and Specifications (check one):

____ With no exceptions

____ Except for the following deviations

NO. DEVIATIONS

Vendor's Authorized Representative

SECTION 01 43 33 - VENDOR'S FIELD SERVICES

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. The Vendor shall furnish erection assistance at the job site during installation of all equipment. The Vendor shall also furnish qualified personnel for inspection testing and startup of the finished installation and training of operational personnel.

1.2 SCHEDULE

- A. Each Vendor's representative for the equipment specified herein shall be present at the job site and/or classroom designated by the Owner for a minimum amount of workdays for service in the schedule listed below:

Schedule of Field Service Representative On Site Time		
Service	On Site Time	Trips to Site
Pressure Filter Equipment Installation	5 days	1
Field Testing, Startup and Instruction of personnel	8 days	2

- B. The Bid shall include all associated expenses incurred by the technical representative during the jobsite visits.
- C. Excluded for these time requirements shall be travel time, time spent during shipping of equipment, time spent at the jobsite correcting any fabrication or manufacturing errors, and time spent preparing and operating the equipment to meet performance requirements. However, the cost of all of the above shall be included in the Vendor's bid.
- D. Work Day: For all specifications, a "workday" and a "calendar day" shall both be defined as an eight (8) hour work period onsite, excluding all travel time to and from the site.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION

3.1 VENDOR'S SERVICES

- A. Vendor's services shall conform to the requirements of Section 01 31 13 – Project Coordination with the following additional requirements:

1. At least 30 working days prior to equipment startup, the Vendor shall submit a detailed resume with appropriate qualifications of each individual proposed as a technical representative. Substitution of an accepted individual shall require notification and resume submittal at least 10 working days prior to the involvement, and shall be subject to the Engineer's review and acceptance. Minimum qualifications include previous startup experience at a minimum of two (2) projects that have included similar Equipment.
2. Startup services and training of Owner's personnel shall be at such times as requested by the Owner. The Vendor shall submit an overall training plan and a detailed lesson plan for each training activity at least 10 working days prior to the training. The Owner shall notify the Vendor of the actual startup date, at least 15 working days prior to the startup date.
3. All Vendor on-site work hours shall be coordinated with the Owner.
4. Training session shall be divided into two equal time segments, with all segments being performed between 8:00 am and 5:00 pm Mountain Time. Training sessions may be performed in same day, however no training session for a single group shall last more than 4 hours.
5. The Vendor shall videotape all training sessions and provide such tapes to the Owner for future operator training.
6. Vendor shall not be paid for field startup services which are unauthorized or made necessary due to delays, omissions, errors or defects for which that Vendor is responsible.
7. Vendor's installation supervisor(s) shall not assume executive charge of such work but shall provide necessary direction to the Contractor so that the Owner, to the extent Contractor follows the recommendations of each Vendor, shall be relieved for any claims by each Vendor that failure is due to installation, startup and operation.
8. Within two weeks of each field visit, provide field reports for Owner and Engineer review.

3.2 TESTING

- A. The equipment shall not be considered ready for testing until the following conditions are satisfied:
 1. Manufacturer's certification of equipment installation has been submitted to the Engineer.
 2. Related Owner's Manual and Final Shop Drawing have been accepted by the Engineer.
 3. All required leakage tests, electrical tests, control/communication tests, and electrical/control adjustments have been completed to the satisfaction of the Engineer.

4. All safety devices and equipment are installed, fully functional, adjusted, and tested.
 5. Vendor has performed a full check of wiring, I/O, and HMI status to include monitoring the open/closed inputs coming back from each valve to the tank control panel.
- B. All testing shall be witnessed by the Owner or Engineer to be considered valid.
- C. Vendor's scope for field services is limited to supporting the equipment supplied under this procurement Contract and installed.

END OF SECTION 01 43 33

SECTION 01 45 00 - QUALITY CONTROL

PART 1 - GENERAL

1.1 DEFINITION

- A. The term Quality Control includes inspection, sampling and testing, and associated requirements.

1.2 INSPECTION AT PLACE OF MANUFACTURER

- A. Unless otherwise indicated, all products, materials, and equipment shall be subject to inspection by the Engineer at the place of manufacture, excluding access to Vendor's filter production facility.
- B. The presence of the Engineer at the place of manufacturer, however, shall not relieve the Vendor of the responsibility for furnishing products, materials, and equipment which comply with all requirements of the Contract Documents. Compliance is a duty of the Vendor and said duty shall not be avoided by any act or omission on the part of the Engineer.
- C. The Vendor shall hire a third party NACE (National Association of Corrosion Engineers) Inspector to certify in writing the surface preparation and application of interior coatings. Inspector shall be AMPP Senior Certified Coating Inspector. Reports shall be submitted to Engineer prior to shipment of the filter.

1.3 REGULATIONS RELATED TO HAZARDOUS MATERIALS

- A. The Vendor shall be responsible that all work included in the Contract Documents, regardless of shown or not, shall comply with all EPA, OSHA, RCRA, NFPA, and any other Federal, State, and Local Regulations governing the storage and conveyance of hazardous materials, including petroleum products.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION

3.1 INSTALLATION

- A. The Installation Contractor shall inspect materials or equipment upon the arrival on the job site and immediately, prior to installation, and reject damaged and defective items.
- B. The Vendor shall verify measurements and dimensions of the Work, as an integral step of starting each installation.

END OF SECTION 01 45 00

SECTION 01 65 00 – PRODUCT DELIVERY REQUIREMENTS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. The required delivery date for the Equipment shall be as set forth in these Contract Documents and approved by the Engineer.

1.2 EQUIPMENT DELIVERY

- A. The Vendor shall deliver the Equipment to the Contractor.
 - 1. The Vendor shall include the cost of shipment of all equipment associated with the Equipment to the job site in its lump sum bid.
 - 2. The Equipment delivery shall be coordinated by the Contractor to align with other construction and installation activities anticipated at the final Equipment installation site. The Contractor shall establish dates for the earliest possible delivery and the latest possible delivery in consultation with the Vendor. The Vendor shall deliver the Equipment between the established dates. The Vendor shall notify the Contractor five days prior to the firm delivery date and provide and full schedule for final delivery.
 - 3. The Vendor shall deliver the Equipment to site designated by the Contractor. It may be the installation site or a holding site. If used, the hold site shall be within 50 miles of the final installation site. The Contractor shall be responsible for the Equipment once it is delivered by the Vendor.
 - 4. The Vendor shall prepare all articles and materials for shipment in such a manner as to protect them from damage in transit. The Vendor shall be responsible for and make good any and all damage due to improper preparation and loading or unloading for shipment, and shall ship to the location(s) designated herein.
 - 5. Equipment shall be unloaded by the Contractor at the job site or holding site. The Vendor shall provide detailed instructions for off-loading and storage of equipment. The Vendor is hereby notified that all truck unloading activities may occur immediately upon receipt of shipment, and that the unloading activity will not be delayed to accommodate the schedule of the individual(s) designated by the Vendor to supervise unloading. The Vendor shall supply all special tools, slings, and components necessary for unloading Vendor's equipment. Such tools, slings, and components shall be included with the shipment in a separate, clearly marked container. Any articles or materials that might otherwise be lost shall be boxed or wired in bundles and plainly marked for identification.
 - 6. The Vendor shall obtain All Risk Transit Insurance covering the value of the materials and equipment being transported to the job site. This shall include ocean cargo coverage as applicable.

- B. The Vendor will arrange to have the Equipment delivered to the designated site between 8:00 A.M. and 5:00 P.M., Mountain Time, Monday to Friday, statutory holidays excepted. The Owner shall not be responsible for Equipment delivered outside the acceptable time for delivery.
- C. Once the Contractor has received delivery of the Equipment, the Contractor is responsible for storage and appropriate protection and maintenance including insurance of said Equipment as outlined in the General Conditions of the Installation Contract.

1.3 DELAYED DELIVERY

- A. The Owner shall have the right to delay delivery of the Equipment by a period of six months from the original delivery date to match the estimated construction dates. Any such delay shall not increase cost to the Owner. If such notification is provided to the Vendor, the Vendor shall provide the Engineer for approval the revised delivery dates for the Equipment.
- B. If delayed delivery notification is provided to the Vendor, the Vendor may at its sole discretion, fabricate equipment per original schedule and securely store and maintain the Equipment at a single location and deliver to site per revised schedule. Such location shall be previously approved in writing by the Engineer at least thirty (30) calendar days in advance. This location shall be indoors at the Vendor's factory or a bonded warehouse.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

END OF SECTION 01 65 00

SECTION 01 75 16 – PROJECT STARTUP

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Equipment testing and startup are requisite to satisfactory completion of the contract and, therefore, shall be completed within the contract time.
- B. The Vendor shall coordinate with the Contractor all work necessary for the successful operation of the Goods.

1.2 VENDOR SUBMITTALS

- A. Schedule: The schedule for testing and startup shall be submitted per Section 01 33 01 - Vendor Submittals, and in accordance with Section 01 31 13 – Project Coordination.
- B. Testing and Startup Plan: Not less than 60 Days prior to startup, submit for review a detailed Testing and Startup Plan. The Plan shall include schedules for Vendor's equipment certifications, submittal of final Owner's Manuals, and training the Owner's personnel; list of Owner-furnished supplies, electrical testing, and a detailed schedule of operations to achieve successful equipment testing, startup, and performance and acceptance testing. The Plan shall include test checklists and data forms for each item of equipment and shall address coordination with the Owner's staff. The Vendor and Owner shall revise the Plan as necessary based on review comments. The startup plan shall address the following components:
 - 1. Equipment testing schedule
 - 2. Instrumentation calibration and alarm review
 - 3. Completion of the Operational Readiness Testing (ORT)
 - 4. Programmable logic controller verification and testing
 - 5. Introduction of flow into filter
 - 6. Develop on-going approach to move facility from startup to full operational status.
- C. System Outage Requests: Request for shutdown of on-line systems as necessary to test or startup of equipment systems. Shutdown requests must be submitted at least two weeks prior to shutdown and shall be approved by Owner.
- D. Records and Documentation: Submit documentation that the equipment has been properly installed, is in accurate alignment, is free from undue stresses from connecting piping and anchoring, and has operated satisfactorily under full load conditions.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION

3.1 TESTING AND INSPECTION

- A. The Vendor shall provide the services of an experienced and authorized representative of each item of Goods who shall visit the site of the Work and inspect, check, adjust if necessary, and approve the installation of Goods. In each case, the Vendor shall arrange to have the representative revisit the project as often as necessary until any and all installation problems are corrected, and the Goods installation and operation are satisfactory to the Engineer.
- B. The Vendor shall coordinate the scheduling of all operations testing with the Owner. The Vendor is advised that the Engineer and the Owner's operating personnel will witness operations testing and that the Vendor's representative shall be required to instruct the Owner's operating personnel in correct operation and maintenance procedures in accordance with Section 01 43 33 – Manufacturer's Field Services. Prior to scheduling any operations testing, the Vendor shall have previously furnished the Owner's Manuals required under Section 01 33 01 - Vendor Submittals.
- C. The Vendor shall notify the Engineer at least 14 days in advance for testing installed Goods.

3.2 STARTUP

- A. The startup of the filter equipment is an operation requiring the combined technical expertise of the Vendor, Contractor, subcontractors, the Engineer, and the Owner. The Vendor shall provide the effective coordination of all parties necessary for successful startup.
- B. It is not the intent of the Engineer to instruct the Vendor in the startup of the Goods; however, the Engineer will be available prior to and during startup to provide technical support to the Vendor.
- C. The Vendor shall provide field service representative for the duration of the startup, and the Owner shall provide operating personnel.
- D. The startup shall not be commenced until all required equipment tests have been completed to the satisfaction of the Engineer.
- E. All defects in materials or workmanship supplied by Vendor which appear during this test period shall be immediately corrected by the Vendor.
- F. During the startup, the Vendor shall provide the services of authorized representative, in addition to those services required under operations testing, as necessary, to correct faulty equipment operation.
- G. During the startup, the Vendor shall keep records of the operations, in accordance with the instructions of the Engineer.

3.3 SUPPLIES

A. The Contractor shall furnish:

1. Electrical power
2. Water for the duration of testing.
3. Other necessary materials not listed for the Vendor or Owner to furnish

END OF SECTION 01 75 16

SECTION 01 77 00 – CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 CLOSEOUT TIMETABLE

- A. The Vendor shall coordinate dates for equipment testing, acceptance periods, and on-site instructional periods (as required under the Contract) with the installation Contractor. Such dates shall be established not less than two weeks prior to beginning any of the foregoing items, to allow the Owner, the Engineer, and their authorized representatives sufficient time to schedule attendance at such activities.

1.2 FINAL SUBMITTALS

- A. The Vendor, prior to requesting final payment, shall obtain and submit the following items to the Engineer for transmittal to the Owner:
 - 1. Written guarantees, where required.
 - 2. Operation and Maintenance Manuals as specified in Section 01 33 01 - Vendor Submittals.
 - 3. Recommended spare parts; special tools.
 - 4. Completed record drawings.
 - 5. Certificates of inspection and acceptance by local governing agencies having jurisdiction.
 - 6. Certificates indicating that all tests and activities required by Section 01 75 16 – Project Startup have been successfully completed to the satisfaction of the Engineer.
 - 7. Releases from all parties who are entitled to claims against the subject project, property, or improvement pursuant to the provisions of law.
 - 8. Written Filter Performance Guarantee.

1.3 MAINTENANCE AND GUARANTEE

- A. The Vendor shall comply with the maintenance and guarantee requirements contained in the Contract Documents.
- B. If the Goods fail to perform as warranted, the Vendor shall make all repairs and replacements promptly upon receipt of written order from the Owner. If the Vendor fails to make such repairs or replacements promptly, the Owner reserves the right to do the work and the Vendor and his surety shall be liable to the Owner for the cost thereof.

CITY OF MERIDIAN
WELL 10B WATER TREATMENT FACILITY

214095-009

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

END OF SECTION 01 77 00

SECTION 40 05 57 – ACTUATORS FOR PROCESS VALVES AND GATES

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. The Vendor shall provide all valve actuators and appurtenances, complete and operable, in accordance with the Contract Documents.
- B. The provisions of this Section shall apply to all valves and gates, except where otherwise indicated in the Contract Documents. This Section includes manual operators and motorized valve operators, and mechanical, gear type limit switches.
- C. Unit Responsibility: A single manufacturer shall be responsible for furnishing and coordinating design, assembly, testing, and installation of each type of valve; however, the Vendor shall be responsible to the Owner for compliance with the requirements of each valve section.
- D. Single Manufacturer: Where two or more valve actuators of the same type or size are required, the actuators shall all be produced by the same Manufacturer.

1.2 REFERENCE STANDARDS

- A. Unless otherwise indicated and where applicable, all actuators shall be in accordance with ANSI/AWWA C540 - AWWA Standard for Power-Actuating Devices for Valves and Sluice Gates.
- B. National Electrical Manufacturer's Association (NEMA).

1.3 SUBMITTALS

- A. Submittals shall be furnished in accordance with Section 01 33 01 – Vendor Submittals.
- B. Shop Drawings: Shop Drawings of all actuators shall be submitted together with the valve and gate submittals as a complete package.
- C. Motorized valve submittals shall include the following:
 - 1. Installation list of similar municipal applications with contacts and phone numbers to verify experience.
 - 2. Shop drawings and product data.
 - 3. Motor, gear type and design information.
 - 4. Design Data shall include:
 - a. Operating calculations for max break and max dynamic torques and minimum safety factor at which degree of valve opening and at break.
 - b. Submit data and calculations to substantiate operating time.
 - c. Submit proposed operator configuration and dimensions for each valve.

5. Wiring Schematics.
6. Manufacturer's published installation instructions.
7. Submit Operation and Maintenance Manuals in accordance with Section 01 33 01 – Vendor Submittals.
8. Warranty.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. The motorized operators offered for this project shall have a minimum of 5 years of commercial use in municipal water system installations of a similar scope and use. New and prototype hardware/software will not be accepted.
2. Submit evidence of satisfactory operation of the proposed product in at least five separate facilities in accordance with the following requirements. Include contact names and phone numbers.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Unless otherwise indicated, all shut-off and throttling valves, and externally actuated valves, shall be provided with manual or power actuators. The Vendor shall furnish all actuators complete and operable with mounting hardware, motors, gears, controls, wiring, solenoids, handwheels, levers, chains, and extensions, as applicable. All actuators shall be capable of holding the valve in any intermediate position between fully-open and fully-closed without creeping or fluttering. All wires of motor-driven actuators shall be identified by unique numbers.
- B. Where indicated, certain valves may be provided with actuators manufactured by the valve Manufacturer. Where actuators are furnished by different manufacturers, the Vendor shall coordinate selection to have the fewest number of manufacturers possible.
- C. Materials: All actuators shall be current models of the best commercial quality materials and liberally-sized for the maximum expected torque. All materials shall be suitable for the environment in which the valve is to be installed.
- D. Mounting: All actuators shall be securely mounted by means of brackets or hardware specially designed and sized for this purpose and of ample strength. The word "open" shall be cast on each valve or actuator with an arrow indicating the direction to open in the counter-clockwise direction. All gear and power actuators shall be equipped with position indicators. Where possible, manual actuators shall be located no more than 54 inches above the floor or the permanent working platform.
- E. Functionality: Electric actuators shall be coordinated with power and instrumentation equipment indicated elsewhere in the Contract Documents.

2.2 ACTUATORS

A. Manual Actuators: Unless otherwise indicated, all valves and gates shall be furnished with manual actuators as specified below:

1. Valves up to and including 4 inches in diameter shall have direct acting lever or handwheel actuators of the manufacturer's best standard design.
2. Larger valves and gates shall have gear-assisted manual actuators, with a maximum operating pull of 60 pounds on the rim of the handwheel.
 - a. Aboveground valves 6-inches to 24-inches in diameter may have traveling nut actuators, worm-gear actuators, spur- or bevel-gear actuators, as appropriate for each valve.
3. Chain Actuator: Manually-activated valves with the stem located more than 7 feet above the floor or operating level shall be furnished with chain drives consisting of sprocket-rim chain wheels, chain guides, and operating chains, and be provided by the valve Manufacturer. The wheel and guide shall be of ductile-iron, cast-iron, or steel, and furnish heavy cadmium plated operating chain looped to extend within 3-feet of the operating floor level. The valve stem of chain-actuated valves shall be extra strong to allow for the extra weight and chain pull. Hooks shall be provided for chain storage where chains interfere with pedestrian traffic.
4. Floor Boxes: Hot-dip galvanized cast-iron or steel floor boxes and covers to fit the slab thickness shall be provided for all operating nuts in or below concrete slabs. For operating nuts in the concrete slab, the cover shall be bronze-bushed.
5. Manual Worm-Gear Actuator: The actuator shall consist of a single or double reduction gear unit contained in a weather-proof cast-iron or steel body with cover and minimum 12-inch diameter handwheel. The actuator shall be capable of 90-degree rotation and shall be equipped with travel stops capable of limiting the valve opening and closing. The actuator shall consist of spur or helical gears and worm-gearing. The spur or helical gears shall be of hardened alloy steel and the worm-gear shall be alloy bronze. The worm-gear shaft and the handwheel shaft shall be of stainless steel. All gearing shall be accurately cut with hobbing machines. Ball or roller bearings shall be used throughout. Actuator output gear changes shall be mechanically possible by simply changing the exposed or helical gear set ratio without further disassembly of the actuator. All gearing shall be designed for a 100 percent overload.

B. Electric Motor Actuators

1. Where electric motor actuators are indicated, an electric motor-actuated valve control unit shall be attached to the actuating mechanism housing by means of a flanged motor adaptor piece.
2. Unless otherwise indicated, electric motor actuators shall be the AC reversing type, complete with local control station with open/close and local/auto/remote selector switches.
3. Gearing: The motor actuator shall include the motor, reduction gearing, reversing starter, torque switches, and limit switches in a weather-proof NEMA 4X assembly. The actuator shall be a single or double reduction unit consisting of spur and worm-gearing. The spur gears shall be of hardened alloy steel and the worm-gear shall be alloy bronze. All gearing shall be accurately cut with hobbing machines. All power gearing shall be grease- or oil-lubricated in a sealed housing. Ball or roller bearings shall be used throughout. Actuator output speed changes shall be mechanically possible by simply removing the motor and changing the exposed or helical gear set ratio without further disassembly of the electric actuator.
4. Starting Device: Except for modulating valves, the unit shall be so designed that a hammer blow is imparted to the stem nut when opening a closed valve or closing an open valve. The device should allow free movement at the stem nut before imparting the hammer blow. The actuator motor must attain full speed before stem load is encountered.
5. Switches and Wiring: Travel in the opening and closing directions shall be governed by a switch responsive to mechanical torque developed in seating the valve, or by an obstruction met in opening or closing the valve, or by an on-board microprocessor. The torque switch shall be adjustable and shall function without auxiliary relays or devices, or it shall be adjustable in one-percent increments. Position limit switches and associated gearing shall be an integral part of the valve actuator. To provide the best possible accuracy and repeatability, limit-switch gearing shall be of the "counting" intermittent type, made of stainless steel, grease-lubricated, and enclosed in its own gear case to prevent dirt and foreign matter from entering the gear train. Traveling nuts, cams, or microswitch tripping mechanisms shall not be used. Limit switches shall be of the heavy-duty open contact type with rotary wiping action.
6. Handwheel Operation: A permanently-attached handwheel shall be provided for emergency manual operation. The handwheel shall not rotate during electrical operation. The maximum torque required on the handwheel under the most adverse conditions shall not exceed 60 lb-ft, and the maximum force required on the rim of the handwheel shall not exceed 60 lb. An arrow and either the word "open" or "close" shall be cast or permanently affixed on the handwheel to indicate the appropriate direction to turn the handwheel.

7. Motor: The motor shall be of the totally-enclosed, non-ventilated, high-starting torque, low-starting current type for full voltage starting. It shall be suitable for operation on 120-volt, 1-phase, 60-Hz current, and have Class F insulation and a motor frame with all dimensions in accordance with the latest revised NEMA MG Standards.
 - a. The observed temperature rise by thermometer shall not exceed 55 degrees C above an ambient temperature of 40 degrees C when operating continuously for 15 minutes under full rated load.
 - b. With a line voltage ranging between 10 percent above to 10 percent below the rated voltage, the motor shall develop full rated torque continuously for 15 minutes without causing the thermal contact protective devices embedded in the motor windings to trip or the starter overloads to drop-out.
 - c. All bearings shall be of the ball type and thrust bearings shall be provided where necessary. All bearings shall be provided with suitable seals to confine the lubricant and prevent the entrance of dirt and dust.
 - d. Motor conduit connections shall be watertight. Motor construction shall incorporate the use of stator and rotor as independent components from the valve operation such that the failure of either item shall not require actuator disassembly or gearing replacement.
 - e. The motor shall be furnished with a space heater suitable for operation on 120-volt single-phase, 60-Hz circuit unless the entire actuator is a hermetically-sealed, non-breathing design with a separately sealed terminal compartment which prevents moisture intrusion.
8. Starter: The starter shall be a suitably-sized amperage rated reversing starter with its coils rated for operation on 120-volt, 1-phase, 60-Hz current. A control power transformer shall be included to provide a 120-volt source, unless otherwise indicated. The starter shall be equipped with 3 overload relays of the automatic reset type. The integral weatherproof compartment shall contain a suitably sized 120-volt ac, single-phase, 60-Hz space heater to prevent moisture condensation on electrical components.
9. Actuator Appurtenances: The actuator for each valve shall be supplied with open and close status lights; open, close and lock-out-stop push-buttons, and all other devices indicated.
10. Manufacturer, or Equal:

- a. Bray Series 70

PART 3 - EXECUTION

3.1 GENERAL

- A. Field representatives of manufacturers of valves or gates with electric actuators shall adjust actuator controls and limit switches in the field for the required function.
- B. All valve and gate actuators and accessories shall be installed in accordance with Manufacturer recommendations. Actuators shall be located to be readily accessible for operation and maintenance, without obstructing walkways. Actuators shall not be mounted where shock or vibrations will impair their operation, nor shall the support systems be attached to handrails, process piping, or mechanical equipment.

3.2 SOURCE QUALITY CONTROL

- A. Factory test each motorized operator assembly in accordance with AWWA C540, except as modified herein.
- B. Demonstrate that the stroke time is within the specified range.
- C. Verify limit switch and torque switch functions in both directions.
- D. Record details of specification, such as gear ratios for both manual and automatic drive, closing direction, wiring diagram, and serial number on the test certificates.
- E. Require the motorized actuator manufacturer to submit certified statements that proof-of-design tests were carried out per the "Valve Actuator" section of AWWA C540 and that all requirements were successfully met.

3.3 INSTALLATION

- A. Install operators in accordance with manufacturer's instructions.

3.4 MANUFACTURER'S FIELD SERVICES

- A. Coordinate field service work with Owner and Engineer prior to initiating such work.
- B. Contractor shall furnish a qualified Manufacturer's Representative to provide manufacturer's field services for inspection, testing, equipment startup, and operator training.
- C. Require manufacturer's representative to perform the following services as described below and as specified in Section 01 75 16 – Project Startup.
 1. Installation Assistance:
 - a. Advise/observe the Contractor on the installation of motorized operators.
 - b. Check and verify that installation of the motorized operators is in accordance with the Drawings and manufacturer's installation instructions.

c. Provide additional assistance as required.

2. Provide a 2 year warranty from date of substantial completion for the project.

3.5 COMMISSIONING KIT

- A. Each actuator shall be supplied with a start-up kit comprising installation instruction manual, electrical wiring diagram and cover seals to make good any site losses during the commissioning period. In addition, sufficient actuator commissioning tools shall be supplied to enable actuator set up and adjustment during valve/actuator testing and site installation commissioning.

END OF SECTION 40 05 57

SECTION 40 05 64 - BUTTERFLY VALVES

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Furnish all labor, materials, and equipment as required to furnish and install butterfly valves with manual, electric or pneumatic actuators as indicated on the Plans and in accordance with these specifications.

1.2 REFERENCE STANDARDS

A. Commercial Standards:

- | | | |
|-----|----------------|---|
| 1. | ANSI/AWWA C504 | Rubber-Seated Butterfly Valves. |
| 2. | ANSI/AWWA C540 | Power Actuating Devices for Valves and Sluice Gates |
| 3. | ANSI/AWWA C550 | Protective Epoxy Interior Coatings for Valves and Hydrants |
| 4. | ANSI B16.1 | Cast Iron Pipe Flanges and Flanged Fittings Class 25, 125, 250, and 800 |
| 5. | ANSI B16.5 | Pipe Flanges and Flanged Fittings |
| 6. | ASTM A48 | Specifications for Gray Iron Castings |
| 7. | ASTM A126 | Gray Iron Castings for Valves, Flanges and Pipe Fittings |
| 8. | STM A276 | Specifications for Stainless and Heat-Resisting Steel Bars and Shapes |
| 9. | ASTM A436 | Austenitic, Gray Iron Castings |
| 10. | ASTM A536 | Ductile Iron Castings |
| 11. | MSS SP67 | Butterfly Valves |

1.3 SUBMITTALS

- A. Provide shop drawings per Section 01 33 01 – Vendor Submittals including:
1. Complete Shop Drawings of butterfly valves and actuators.
 2. Drawings showing valve port diameter complete with dimensions, part numbers and materials of construction
 3. Certification of proof-of-design test form the valve manufacturer.
 4. If automatically actuated, provide actuator information in accordance with Section 40 05 57 – Actuators for Process Valves and Gates.

5. For above grade installations, provide literature regarding valve position indicators and installation information to indicate if valves must be installed in the upright position. If valve must be installed in upright position, provide modified valve position indicator that can be seen from the floor when opening or closing the valve.

1.4 QUALITY ASSURANCE

- A. Valves shall be subjected to performance, leakage, and hydrostatic test in accordance with procedures and acceptance criteria established by AWWA C504.
- B. Valves shall be NSF 61-G certified for potable water service.
- C. Valves shall meet NSF-372.

PART 2 - PRODUCTS

2.1 BUTTERFLY VALVES FOR GENERAL PURPOSE SERVICE

- A. Butterfly valves for general purpose service shall be rubber seated butterfly valves that conform to AWWA C504, rated for water working pressures up to 175 psig, subject to the following requirements. Valves shall be of the size and class indicated, suitable for bubble tight shut-off service as well as throttling service at rated pressure at ambient temperatures of 33 to 125 degrees F. Lug or wafer style valves shall have ANSI 125 lb flange bolt hole patterns.
- B. Body: The valve body shall be of cast iron conforming to ASTM A126 - Specifications for Gray Iron Castings for Valves, Flanges and Pipe Fittings, Class B, with either wafer, lug, or flanged design as indicated in drawings, drilled to ANSI B 16.1 - Cast Iron Pipe Flanges and Flanged Fittings, Class 125. The entire body shall be factory coated with an epoxy coating system in accordance with AWWA C550.
- C. Disc: The disc shall be a ductile iron conforming to ASTM A536, with factory applied epoxy coating in accordance with AWWA C550. The disc shall have no holes drilled into it for securing the disc to the stem with pins, screws, or any other such hardware. If the disc design is such that securing hardware is required then the disc and securing hardware shall both be type 316 stainless steel.
- D. Seat: The valve seat shall be Ethylene-Propylene-Diene Monomer (EPDM) or Buna N and shall be bonded or vulcanized to the valve body.
- E. Stem: The valve stem shall be a Type 316 stainless steel ASTM A276, with keyed slots on the stem to make with receiving slots on the inner part of the disc requiring no disc screws or pins for connection of the stem to the disc. If connecting pins or screws are required for a particular manufacturer's design, then the disc as well as the connecting hardware shall be type 316 stainless steel.
- F. Stem Bushing: The stem bushing shall be a non-corrosive, heavy duty acetal bushing.
- G. Stem Seal: The stem shall be a double "U" cup seal or O-ring designed which is self adjusting and provides positive sealing in both directions, and is suitable for the service condition.

- H. Flange / Style: Unless otherwise specified or noted on the drawings, the style of each butterfly valve shall be lug style. The Contractor shall not use any type of raised face type PVC flange on either side of any butterfly valve. Contractor shall be responsible to ensure that the selected butterfly valve will fully open and close without any physical interference at all.
- I. Testing: Valves shall be factory leak tested in accordance with AWWA C504.
- J. Manufacturers or equal:
 - 1. DeZurik Water Controls
 - 2. Henry Pratt Company
 - 3. Bray
 - 4. Val-Matic

2.2 BUTTERFLY VALVES FOR AIR SERVICE

- A. General: Butterfly valves for air service shall be specifically designed for this service and meet or exceed the design, strength, performance, and testing standards of AWWA C504. They shall be suitable for pressures from vacuum to 125 psi and temperatures from minus 40 degrees F to 300 degrees F.
- B. Body: The valve body shall be of cast iron conforming to ASTM A126, Class B, with lug or flanged design as indicated, drilled to ANSI B16.1, Class 25, 125, 250, and 800, Class 125.
- C. Disc: The disc shall be cast iron conforming to ASTM A126 with a nylon coating, bronze, or Type 316 stainless steel. The disc shall be designed with the air- profile or other suitable shape. Sprayed or plated disc edges are not acceptable.
- D. Seat: The elastomer seat shall be in the body. It shall be field-replaceable without special tools. The seat material shall be EPDM to provide a tight shut-off at the temperatures above.
- E. Shaft: The valve shaft shall be of Type 316 or 304 stainless steel, with sufficient strength to allow for the increased torque for air service.
- F. Bearings: Shaft bearings shall be of the self-lubricating corrosion resistant sleeve type.
- G. Packing: The packing shall be of the adjustable or self-adjustable (a-ring) type, suitable for the temperature and service conditions.
- H. Manufacturers, or Equal:
 - 1. DeZurik water Controls
 - 2. Henry Pratt Company
 - 3. Bray

2.3 ACTUATORS

- A. Manual Actuators: Actuators shall conform to Section 40 05 57 – Actuators for Process Valves and Gates and to ANSI / AWWA C540 - Power Actuating Devices for Valves and Sluice Gates, subject to the following requirements. Unless otherwise indicated, all manually actuated butterfly valves of 6 inch diameter and larger shall be equipped with a handwheel and 2-inch square actuating nut and position indicator. Manual lever type actuators shall allow for positive throttling and have at minimum 10 stop positions from open to close for positive locking of the valve. The manual lever type actuators as well as handwheel actuators shall have an epoxy coating in accordance with manufacturer recommendations.
- B. Electric Actuators: Where indicated on Plans, provide electric actuators that meet the requirements of AWWA C 540 and are in accordance with Section 40 05 57 – Valve and Gate Actuators. The maximum torque for the valve shall be input into the actuator program to be the maximum torque applied by the actuator.

2.4 PAINTING AND COATINGS

- A. All valves shall be coated with an epoxy coating in accordance with manufacturer recommendations for valves' intended service.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Prior to installation, inspect interconnecting piping and end connections to ensure compatibility.
- B. Prior to installation, inspect and verify condition of valve and appurtenances.
- C. Ensure exposed piping is sufficiently supported to bear weight of valve when it is installed.

3.2 PRODUCT HANDLING

- A. Protect valves and components against dirt and damage during shipment and storage.
- B. Handle valves to prevent damage or contamination.

3.3 INSTALLATION

- A. Install all valves in accordance with manufacturer's recommendations.

END OF SECTION 40 05 64

SECTION 40 61 96 – CONTROL STRATEGIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. General control strategies that shall apply to all control schemes.
2. Specific control strategies as they apply to the specific control loops of this project.

B. Related Sections:

1. The Contract Documents are a single integrated document, and as such all Divisions and Sections apply. It is the responsibility of the Vendor and its Sub-Contractors to review all sections to ensure a complete and coordinated project.
2. Items involving electrical, control, and instrumentation construction may be shown on drawings or referred to in specifications that do not apply specifically to electrical, control and instrumentation systems. Because the Contract Documents are a single integrated document, it is the responsibility of the Vendor and its Sub-Contractors to review all sections to ensure a complete and coordinated project.
3. Items not involving electrical, control, and instrumentation construction may be shown on drawings or referred to in specifications that do apply specifically to electrical, control and instrumentation systems. Because the Contract Documents are a single integrated document, it is the responsibility of the Vendor and its Sub-Contractors to review all sections to ensure a complete and coordinated project.

1.2 COMMON CONTROL FUNCTIONS

A. Common control functions are common to all control loops and devices and shall be incorporated into the control schemes for all devices.

1. By nature of the fact that these are common control functions they shall be incorporated into all control strategies, whether they are shown and/or described or not.
2. Controls shall be coordinated with the existing control structure and with the existing equipment.
3. Control system shall be such that it can be monitored and controlled remotely through the existing SCADA system or manually on site.
4. Vendor to provide all equipment, hardware, and software necessary to meet the requirements specified herein.

B. Common control functions are as follows:

1. Alarm fail condition, unless otherwise specified, shall be logically derived under and of the following conditions:
 - a. Device is commanded to start, and the starter auxiliary contact does not echo the command.
 - b. Device is commanded to stop, and the starter auxiliary contact does not echo the command.
 - c. Device is commanded to open, and the open limit switch does not echo the opened condition in two times the normal full travel time.
 - d. Device is commanded to close, and the close limit switch does not echo the closed condition in two times the normal full travel time.
2. Motor overload switches shall always stop the motor, by de-energizing the motor starter.
3. Elapsed run time shall be determined through an auxiliary contact on the starter which is an input to the PLC.
 - a. Elapsed run time shall be displayed at the HMI and SCADA level for each and every motor controlled through the PLC system.
 - b. Individual elapsed run time accumulation shall be reset by the operator after entering a password if the proper security level is associated with said password.
 - c. Elapsed run time shall be displayed in tenths hours.
 - d. Provisions shall be made to allow the operator to enter a start value for runtime accumulation.
 - e. Elapsed run time shall be accumulated and stored in PLC registers.
4. Status run shall be determined through an auxiliary contact on the starter which is an input to the PLC.
5. PID control algorithms:
 - a. PID control algorithms shall have operator selectable slew rates for setpoints that will allow the setpoint to slowly ramp to its final value in order to minimize system disturbance.
 - 1) Individual setpoint slew rates shall be set at a local HMI.
 - 2) Each PID control algorithm shall have a face plate associated with the individual PID control algorithm that shall be displayed at its associated HMI. Said face plate shall have the following functions:
 - 3) Display Output, CV.

- 4) Display Setpoint, SP.
 - 5) Display Process Variable, PV.
 - 6) Allow for operator selection of Automatic or Manual control of output.
 - 7) Under manual control of output, allow the Operator to enter the desired output value.
 - 8) Allow for input of the three PID tuning parameters.
6. Programmable settling and proving timers shall be provided in all control sequences for starting and stopping of pumps, in order to let the process settle down before proceeding with any additional control functions.
- a. These timers shall be embedded in the PLC logic, tuned in the field, and listed separately as part of the software submittal and O&M manual.
7. Status indication:
- a. For each valve and pump, the HMI shall position or operational status by constantly illuminating the corresponding status indication and report this condition.
 - b. As previously described, a fault condition shall flash the associated status indicator and alarm at the HMI.
 - c. When a valve is in transition (not fully closed and not fully opened), then the valve open and valve closed status indicator for HMI and graphic displays shall state that the valve is in transition.
8. When setpoints or actions are identified to occur on more than one HMI, or both the HMIs and SCADA, the last action or setpoint shall override the current condition, unless otherwise noted.
9. Control software and/or hardware shall be so configured and designed as to monitor for loss of analog signal (signal <4 mA), analog signal too large (signal >20 mA), or rate of signal change too fast (individual rate parameter for each analog input signal to be imbedded in software), when any of these conditions are detected the control system shall alarm this condition, and close the appropriate valve and or stop the appropriate motor in order to prevent the process from running away.
10. The manual control mode shall be completely manual and under operator control. There shall be no programmed interlocks requiring completion of a previous step before operating a device, unless specifically identified in the individual loop descriptions as occurring in the manual mode.
11. Number of starts shall be accumulated for each motor.
- a. The number of starts for the current day shall be moved into a register and held as the previous day's number of starts at 0:01 hours each day.

- b. The number of starts for the current day shall be moved and entered into the historical data base time and date stamped at 0:01 hours each day.
 - c. The current day number of starts shall be reset at 0:01 hours each day.
- C. Alarm/Fault Indication/Acknowledgment:
 - 1. Furnish an alarm acknowledgment pushbutton at each pulse-code module (PCM) that shall signal the PLC that an alarm or fail condition has been acknowledged. This device shall only affect the alarms that are present on the panel where the device is located.
 - 2. In general, any fault condition shall flash the appropriate pilot light and/or graphic at a rate of on for 0.5 seconds and then off for 0.5 seconds.
 - 3. The individual alarm acknowledgment pushbutton or action shall function as follows:
 - a. Shall change the flashing alarm indication to continuously ON if the alarm or fail condition persists after the acknowledgment button or action has been depressed.
 - b. Shall turn OFF the alarm indication if the alarm or fail condition has been corrected and the alarming system has returned to normal.
 - 4. All alarm and fail conditions shall flash their respective pilot lights, indicators, HMI, or SCADA graphics, until the condition is acknowledged by the operator.
 - a. Once the operator acknowledges the alarm or fail condition, the pilot light, indicator, HMI, or SCADA graphic shall remain ON in a steady condition.
 - b. Once the alarm has been cleared and the operator again acknowledges the alarm or fail condition, the pilot light, indicator, HMI, or SCADA graphic shall turn OFF.
 - 5. All valves, pumps, motors, and other process equipment shall have fail alarms displayed and reported at the HMI and SCADA level.
- D. Lamp Test:
 - 1. Furnish a lamp test pushbuttons or command through the HMI for each local control panel and control station that shall signal the PLC to turn on all pilot lights on the panel.
 - a. Minimum on time for each lamp during lamp test 15 seconds.
- E. Power failure:
 - 1. The control system, upon sensing a power failure, shall store, within the PLC memory, the time-stamped status of all devices at time of failure (i.e., ON or OFF)
 - 2. Upon restoration of power the control system shall then sequence ON all equipment that was running prior to the power failure condition. Provide special startup sequencing protocol and criteria if required for extended power outages.

F. PLC System Status:

1. There shall be a minimum of one indication on the HMI that shows the status of the PLC.
2. There shall be a minimum of indication on the HMI that shows the status of the PLC communications LAN.

G. Common Control Functions for Filter Operation:

1. The Filter HMI and SCADA system display shall display the following conditions whether or not shown on the P&IDs. These conditions shall be available for current conditions as well as historic data for XX days:
 - a. Position of each cell in the backwash queue.
 - b. Which cell the backwash queue pointer is pointing to.
 - c. A table displaying the setpoint value and the time remaining for each timer in the backwash sequence, as well as the next scheduled backwash date and time.
 - d. A display showing the status of each valve, pump, and blower, associated with the backwash sequence that shall simultaneously display:
 - 1) The backwash Step No.
 - 2) The status of each device for the previous backwash step.
 - 3) The status of each device for the current backwash step.
 - 4) The status of each device for the next backwash step.
 - e. Alarm condition for every valve and motor.
2. The Filter HMIs shall display the following conditions whether or not shown on the P&IDs.
 - a. A table showing all of the setpoints and measured values for the filters associated with that HMI.

H. Plant Shutdowns:

1. Overflow condition at backwash equalization storage tank.
2. Upon sensing an overflow condition the PLC shall take the following actions:
 - a. Close the plant influent valve and stop the well pump.
 - b. Stop all chemical feeders.

3. After the shutdown condition has been cleared, the operator through SCADA/Local HMI shall reset the shutdown condition and then shall re-start the plant and all associated process through the SCADA/Local HMI system.
- I. Analog device calibration override.
 1. Provide an HMI screen for each and every analog input that allows the Operator to access said analog input to:
 - a. Disable the analog input in the PLC control system.
 - b. Enter a value for the analog input from the HMI system to the PLC.
 - c. Hold the last analog input value while the actual analog input is disabled.
 2. Provide a HMI screen for each and every analog output that allows the Operator to access said analog output to (see Section 46 61 21 – Pressure Filtration System for all required HMI screens):
 - a. Force an output value entered from the HMI system to the PLC.
 - b. Hold the last analog output value while the programmed output is disabled.

1.3 DEFINITIONS

- A. Specific Definitions:
 1. The term PLC in the loop descriptions is a generic term used to include all PLCs in the system as well as communications between PLCs via the PLC LAN.
 2. When the term PCM is used in conjunction with I/O points it also refers to the PLC within the PCM.

PART 2 - PRODUCTS

2.1 EQUIPMENT

- A. The Vendor shall provide hardware as indicated in Specification 46 61 21 – Pressure Filtration System.
 1. HMI: Allen Bradley PanelView 2711P – 10” screen
 2. PLC: Allen Bradley CompactLogix 5380 Controller, 5069
 3. PLC programming software shall be AB RSLogix 5000 V30.
 4. Ethernet Switch

2.2 LOOP DESCRIPTIONS

- A. The Vendor shall develop complete English language narrative loop descriptions which reflect information depicted on the Vendor’s complete set of P&IDs ladder diagrams.

- B. The loop descriptions contained herein provide a general overview of system operating requirements and are not intended to provide a complete and detailed narrative description of all system operating requirements and features, which is required to be developed and submitted by the Vendor.
- C. Control Description for the Well 10B Pressure Filtration Facility:
 - 1. Well Pump Control: Provide control signals to the existing well pump control system via hardwire or Ethernet communications as determined by the vendor and the City, to allow the well pump control system to modulate well flow and/or pressure as needed for the operation and backwash of the pressure filters. Modifications to the existing well control system will be by the City's SCADA Manager.
 - 2. Chemical Addition: Chemical feed system shall be capable of feeding 12.5% Sodium Hypochlorite to the filter influent at a calculated flow rate of the chemical feed pump to achieve the desired preset dosage. System shall also be capable of adding Sodium Hypochlorite to the bypass and treated flow stream in a similar manner. Vendor shall include I/O for chemical equipment in PLC. Chemical equipment shall be provided by Contactor.
 - 3. Filter Effluent:
 - a. The flow to be treated enters the filter treatment chain. Electrically operated valves will control inlet flow and backwash functions at each cell in the filter as described below. A motor-operated backwash flow control valve will control backwash flow.
 - b. The differential pressure between the filter influent and filter effluent pressure gauges will initiate a backwash once the pressure has built up to a preset operator-entered value. Filter controls shall also provide the capability to backwash the filters based on a preset timer, time of day, or preset amount of flow. Filter controls shall also allow operators to identify times of day where backwash is not allowed unless a high pressure set point is reached. Only one cell will be allowed to backwash at a time, and there will be a delay step before another one is allowed to backwash.
 - c. The first step in the backwash cycle will be to close the effluent valve at the filter cell, and close the filter inlet valve and open the backwash waste drain valve at the cell to be backwashed. The backwash flow rate is controlled by the backwash flow control valve. When backwash of a cell is complete, the backwash waste drain valve at the backwashed cell will be closed and valves at the next cell to be backwashed will be opened/closed as described above. After the backwash cycle for the entire filter is complete, the backwash flow control valve is closed, all cell filter inlet valves will be opened, and all backwash waste drain valves will be closed.

- d. Prior to conveying filtered effluent to the system (after a backwash cycle) the filter to waste valve (on the drain line) will be opened for a short period when the filter/cell is first placed back in service. The filter effluent valve will then be opened as the filter to waste valve is closed to send filtered effluent too the system.
- e. The backwash cycle must include air scour. Controls and logic for all equipment (blowers, automated valves, and any other appurtenances) needed to provide a fully functional backwash with air scour, shall be incorporated.
- f. Control panel shall monitor the status of floats located in backwash equalization storage tank. Floats will include a high level alarm and a high-high level alarm that triggers an overflow condition to shutdown the backwash.

PART 3 - EXECUTION

3.1 FORMAT

- A. Based upon the information furnished in the Contract Documents the Vendor shall develop detailed loop descriptions.
- B. There shall be one loop description for each and every loop in the system.
 - 1. Where there are similar loops, i.e. multiple loops for individual raw water pumps, only one loop description need be developed and the remaining loops may be referenced to said loop description.
- C. The loop descriptions shall follow the format as outlined below:
 - 1. Abstract:
 - a. General description of how the loop works, what devices are involved, and how the process is to be controlled.
 - b. Process variable information including flow rates, level ranges, pH, turbidity, etc. shall be listed including measurement range, span, limits, setpoints, and units.
 - c. Control variable output as it relates to process variable deviation from setpoint.
 - d. Any delays, averaging, or restraints put into place in the programming to take into account natural process times.
 - e. Final recording of each loop's PID constants.
 - 2. Local Level:
 - a. Detailed description of the control functions at the Local Level.
 - b. Function of local operator interfaces.

- c. Detailed explanation of the operation of system interlocks and hardwired permissive conditions.
- 3. PLC Level:
 - a. Detail description of the control functions that are under control of the PLC.
 - b. Detailed description of the operator controls and automatic controls.
 - c. Detailed description of setpoints, alarms, etc.
 - d. Detailed description of the operation of system interlocks.
 - e. Detailed description of the control sequence.
- 4. HMI Level:
 - a. Detailed description of the operator controls.
 - b. Detailed description of setpoints, alarms, etc.

END OF SECTION 40 61 96

SECTION 40 70 13 - IN-LINE LIQUID FLOW MEASURING SYSTEMS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. The Contractor shall provide in-line liquid flow measuring systems, complete and operable, in accordance with the Contract Documents. The transmitter portion of the system shall be remotely mounted as shown on Contract Drawings.

1.2 REFERENCE STANDARDS

A. Commercial Standards:

- | | | |
|----|----------------|---|
| 1. | ISA – S 5.1 | Instrumentation Symbols and Identification |
| 2. | ANSI – B16.1 | Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800 |
| 3. | ANSI/AWWA C207 | Steel Pipe Flanges for Waterworks Service – Sized 4-inch through 144-inch |
| 4. | ANSI/AWWA C700 | Cold Water Meters |
| 5. | ASME Report | Fluid Meters, Sixth Edition, 1971 |

1.3 SUBMITTALS

- A. Shop Drawings: At a minimum, the following information shall be submitted with each meter supplied:
1. Data sheets and catalog literature for the flow meter and the microprocessor-based signal converter.
 2. Connection diagrams for equipment wiring.
 3. Materials of construction and connection fittings.
 4. Recommended spare parts list.
- B. Test Data: Signed, dated, and certified calibration data for each flow metering system which requires factory testing, submitted before shipment of equipment.
- C. Certifications: The Contractor shall provide Manufacturer's certification of proper installation and certification of satisfactory field testing.
- D. Owner's Manual: Submit Owner's manual as specified in Special Provisions, to include operation and maintenance data and other information for the equipment.

1.4 QUALITY ASSURANCE

- A. Each flow metering system shall be hydraulically calibrated at a facility which is traceable to the National Institute of Standards and Technologies. The calibration procedure shall conform to the requirements of ANSI/NCSL Z 540-1 Calibration. A real-time computer-generated printout of the actual calibration data shall be submitted to the Engineer at least 30 days prior to shipment to the site.
- B. Accuracy Requirements: Unless otherwise indicated, flow meters shall be guaranteed to register flow to an accuracy of plus and minus 0.3% of actual flow throughout the range indicated.
- C. Guarantees, Warranties: After completion the Contractor shall furnish to the Owner the manufacturer's written guarantee that the metering system will operate within the published accuracies and flow ranges and meet these specifications. The Contractor shall also furnish the manufacturer's warranties as published in its literature.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All meters shall be NSF 61-G certified and meet requirements of NSF 372.
- B. All meters shall be capable of operating at an minimum ambient temperature ranging from 14 to 140 degrees F.
- C. The Vendor shall be responsible for confirming necessary cable length with meter manufacturer prior to ordering any meter equipment.

2.2 ELECTROMAGNETIC (MAG) FLOW METERS

- A. The electromagnetic flowmeter shall consist of a flow sensor based on Faraday's Law of Electromagnetic Induction, the flow of liquid through the sensor induces an electrical voltage that is proportional to the velocity of the flow.
- B. Electromagnetic flowmeter systems shall be the low frequency electromagnetic induction type which produces a DC pulsed signal directly proportional to and linear with the liquid flow rate. Complete zero stability shall be an inherent characteristic of the flowmeter system. Each magnetic flow metering system shall include a metering tube, signal cable, transmitter, and flowmeter grounding rings.
- C. Meter Tube: The tube shall be constructed of 304 or 316 stainless steel tube with ductile iron flanged or Carbon Steel connections and include a minimum of two (2) self-cleaning electrodes. The electrodes shall be constructed of materials conforming to the manufacturer's recommendation for the intended service. The meter housing shall be IP67 or IP68, rated for a submergence depth of 3 meters for a duration of 48 hours. Grounding rings shall conform to the manufacturer's bore and material recommendation for the intended service. Grounding rings shall be designed to protect and shield the liner's edge interface from abrasion at the meter end.
- D. Flow meter shall be capable of measuring and monitoring flow in units of thousands of gallons (kgals).

- E. Performance Requirements: The flow metering system shall conform to the following:

No.	Item	Units	Value
1	Pipe Run Requirements	D	1 upstream, 0 downstream
2	Accuracy	%	0.5 of actual Flow
3	Repeatability	%	0.05 full scale
4	Conductivity	μs/cm	5.0
5	Pressure Rating	psi	150
6	Power Requirements	VAC	120

- F. Flow Meter Options to be provided.

1. ProComm Converter
2. HART Converter
3. Smart Output for Sensus
4. SS ID tag

- G. Transmitter: The microprocessor-based signal converter/transmitter shall be remote mounted indoors on disconnect support structure and shall have the following:

1. Transmitter shall be suitable for installation outdoors, subject to direct sunlight and full temperature range at installed location. Transmitter housing to be NEMA 4X, with min. IP65 ingress protection. Provide with sun shield and/or other accessories as recommended by manufacturer.
2. DC pulse technique to drive flux-producing coils and capability to convert DC pulse signal from the tube to a standardized flow VDC pulse contact and a 4-20 mA DC signal into a minimum of 700 ohms.
3. Six digit LCD displays for flow rate, percent of span, and totalization. An operator interface with keypad which responds to English text entry.
4. Integral low flow cutoff and zero return to produce a consistent zero output signal in response to an external dry contact closure.
5. Automatic range change and capability to measure flow in both directions.
6. Programmable parameters including meter size, full scale Q, magnetic field frequency, primary constant, time constant.
7. Data retention for minimum of five (5) years without auxiliary power (main or battery).
8. Self diagnostics and automatic data checking.
9. Protected terminals and fuses in a separate compartment which isolates field connection from electronics.

H. Manufacturer

1. McCrometer Ultra Mag with ProComm Electromagnetic Meter Converter with Optional AMI outputs.

PART 3 - EXECUTION

3.1 GENERAL

- A. The Installation Contractor shall assemble and install all equipment specified herein, in strict accordance with the manufacturer's published instructions, under the supervision of the manufacturer's representative, under the general review of the Engineer. All installations shall be accomplished by competent craftsmen in a workmanlike manner.
- B. Final acceptance of the equipment is contingent on satisfactory operation after installation.

3.2 INSTALLATION

- A. The meters shall be installed in easily accessible locations for ease of reading and maintenance, and where shown, for balancing of flow in several lines, in conjunction with throttling and shut-off valves. Where possible, all meters shall be installed in such a way to provide the manufacturer's recommended straight approach and straight piping downstream. All meters, shut-off and balancing valves shall be firmly supported from the structure or from the floor with approved supports. In-line meters shall be installed to provide full-line flow and not less than the manufacturer's recommended head at all items.
- B. Wiring between flow sensors and remote mounted signal converters shall use cable type and procedures as per the manufacturer's recommendations. Provide sufficient cable from meter vault to location where local display will be located. Confirm cable lengths prior to submitting shop drawings.

3.3 TESTING

- A. Equipment shall be prepared for operational use in accordance with manufacturer's instructions, including bench test and calibration, where required.
- B. Each item shall be subjected to an operating test over the total range of capability of the equipment. Where applicable, tests shall be conducted in accordance with the Test Code of the Standards of the Hydraulic Institute. The Vendor shall notify the Engineer one week in advance of all tests to be conducted on site.

3.4 CLEANUP

- A. After completion and testing of its work, the Vendor shall remove all debris from the site, clean all meters, controls, cabinets, and other metering appurtenances, to hand over each system in perfect operating condition.

3.5 MANUFACTURERS SERVICE REPRESENTATIVE

- A. Erection and Startup Assistance: During erection and startup of the magnetic flow meters, the Vendor shall obtain all necessary assistance from an experienced factory service representative to ensure a correct and first-class installation, in accordance with the manufacturer's instructions.
- B. Vendor shall provide a modem allowing remote access for at least 30 days after commissioning to enable quick resolution to operational issues during this timeframe.

END OF SECTION 40 70 13

SECTION 46 61 21 - PRESSURE FILTRATION SYSTEM

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Vendor shall furnish all materials, equipment, and incidentals required for supplying the filter equipment as specified herein, tested and ready for operation. The filter system shall be a complete packaged single-media, self-backwash, iron and manganese filtration system, including steel pressure vessels complete with internals and filtration media, automatic control system, all actuated valves and operators, and all other appurtenances in accordance with the requirements of the Contract Specifications and Drawings as specified herein. Vendor shall incorporate City of Meridian Asset Tagging standards into submitted drawings. Required asset tags will be provided to Vendor during design. Vendor shall utilize equipment tags provided in the contract documents in vendor submittal/shop drawing documents.
- B. A pilot test was conducted on this well in June 2021 and is attached in Appendix A. The pilot test is provided for reference only and is not intended to be used as a substitution to these specifications.

1.2 VENDORS

- A. Filter system shall be as manufactured by one of the following vendors, or approved equal:
 - 1. Tonka Water
 - 2. Loprest
- B. Substitute items of material or equipment proposed by Vendors listed in Paragraph A are also subject to provisions of Section 01 25 00 – Substitution Procedures.

1.3 PERFORMANCE AND DESIGN REQUIREMENTS

A. Design Criteria

1. Filtration system design criteria are listed in the table below.

Description	Units	Criteria
Design Flow Rate	gpm	2,250
Maximum Operating Pressure	Psi	150
Normal Operating Pressure	Psi	100
Minimum Operating Pressure	Psi	40
Filter Media		Manganese Greensand
Effluent Concentrations		
Manganese	mg/L	≤ 0.05
Iron	mg/L	≤ 0.03
Ammonia	mg/L	≤ 0.04
Filters: Pressure, Horizontal Tanks		
Number of Vessels	qty	1
Number of Fully Isolated Cells	qty	3
Filter Vessel Diameter (maximum)	ft	10
Filter Vessel Length (maximum)	ft	30
Minimum Effective Filter Area	sqft	287
Filter Loading Rate (maximum)	gpm/sqft	8
Manganese Greensand Depth	in	36
Supporting Gravel Depth (minimum)	in	12
Backwash		
Backwash supply from Distribution System	gpm	0
Maximum Backwash rate	gpm/sqft	3.0
Maximum Backwash rate to Sewer/cell	gpm	375
Minimum Filter Run Length	hrs	24
Air Scour Rate	cfm/sqft	3.0
Oxidant		
Sodium Hypochlorite	%	12.5
Dosage	mg/L	2.0 – 5.0
Targeted free chlorine residual	mg/L	1.0

2. Method of Influent Feed: Pumped flow.

3. Filter media shall be manganese greensand and have an effective size within the range of 18x60 mesh or 0.30 – 0.35 millimeters and a uniformity coefficient not exceeding 1.60.
4. Backwash water collectors are to be a minimum of 18 inches above surface if equipped with field-proven means of media retention. Collectors shall be 30-inches above the surface if no media retention is provided and media expansion calculations shall be required. All systems, with or without media retention, are required to meet the media loss requirements in this specification.
5. All components - including but not limited to controls, wiring and electrical devices, valve operators, materials, piping, and valves - shall be suitable for a moist, humid, indoor installation.
6. The filtration system shall be an isolated cell design with three (3) filter cells. Backwash system shall backwash one (1) filter cell at a time and have the ability to use finished water from the remaining two (2) cells for the backwash supply.
 - a. After a backwash is completed on each cell the filter to waste valve shall be opened for a short period of time (operator adjustable) prior to conveying filtered effluent to the system.
7. The filtration system shall have the proper piping and controls to allow any number of cells to remain in operation without exceeding the Maximum Filter Loading Rate specified above and include the ability to reduce overall flow to the filtration system.

B. Performance Guarantee:

1. Effluent performance requirements as indicated in item 1.3.A.1 shall apply for all conditions where daily average influent water quality to the filter units is at or below the following (in mg/L):

Well No. 10B Raw Water Quality

Parameter	Average Concentration (mg/L)
Iron	0.31
Manganese	0.068
Ammonia	0.16
Free Chlorine	0

2. Vendor shall provide a written performance guarantee that the filter system will consistently produce filter effluent that meets performance requirements. The guarantee shall indicate the Vendor's review and acceptance of raw water quality/quantity data, filter effluent requirements, scope of supply and services required as described in the Contract Documents to meet performance requirements.

1.4 EQUIPMENT WARRANTY

- A. The equipment furnished under this Procurement Contract shall be free of defects in materials and workmanship, including damages that may be incurred during shipping, for a period of two (2) years. Vendor shall provide material warranty for a minimum 24-month period after Final Acceptance. During warranty period Vendor shall respond to Owner's operation and maintenance inquiries in a timely manner. Labor for warranty period shall be the responsibility of the Installation Contractor.
- B. A media loss warranty with no limit on the time of continuous combined air and water backwash shall be provided by the Vendor such that no more than 2-inches of media shall be lost per year. The warranty shall provide for the replacement or retrofit of a media retention system as deemed necessary by the Engineer.

1.5 SUBMITTALS

- A. All submittals shall be provided in accordance with Section 01 33 01 – Vendor Submittals. Below is a table with a general list of submittals required for this project. This table is not intended to be exhaustive. Vendor is responsible for all submittals indicated in this specification to be provided.

Deliverable	Specification Reference	When to Submit
Performance Guarantee	1.3.B	Initial Submittal
Warranty	1.4	Initial Submittal
Shop Drawings	1.5.A.1	
AutoCad Drawing	1.5.A.1	Initial Submittal
Filter Tank Drawings	1.5.A.1	Initial Submittal
Hydraulic Headloss Calculations	1.5.A.4	Initial Submittal
Structural Requirements and Calculations	1.5.A.3	Prior to Shipment
Product Data	1.5.A.2	
List of Major Products Proposed	1.1.A	Initial Submittal
Filter System Data, Design Calculations, Equipment, and Materials	2.2	Initial Submittal
Factory Inspection Logs and Testing Logs	1.5.A.2.A	Initial Submittal
Manufacturer's Installation Instructions	1.5.A.3	Prior to Shipment
Manufacturer's Certification of Proper Installation	01 75 16	Prior to Startup
List of Supplier Recommended Filter Media(s)	1.5.A.2.B	Initial Submittal
Process Calculations	1.5.A.4.A	Initial Submittal
List of hardware, fasteners, or materials required to interface with mechanical, structural, electrical, control, and monitoring instrumentation	1.5.A.2C	Prior to Shipment
Bill of Materials	1.5.A.2.D	Prior to Shipment
Deliver and Storage Requirements	01 65 00	Prior to Shipment
Panel Factory Acceptance Testing	2.3.G	Prior to Shipment
Field Testing Plan	3.3	Prior to Shipment
Performance Testing Plan	01 75 16	Initial Submittal
NACE Coating Reports	2.2.D.3.g	Prior to Shipment
Operational Readiness Testing (ORT) forms	01 75 16	Prior to Shipment
Performance and ORT Testing Reports, including I/O checklist	01 75 16	Startup
Startup Procedures	01 75 16	Prior to Shipment
Operation and Maintenance Manual	01 33 01	90 days prior to Startup
Final PLC and HMI Applications and Passwords to Owner	2.3.A.3	Startup

Deliverable	Specification Reference	When to Submit
Operator Training	3.2.F	Startup

1. Shop Drawings: Complete layout drawings, including connection drawings, dimensions, wiring diagrams, terminal strip details, weights, and details of components. Identify all devices that require electrical connections. Shop drawings shall include three-dimensional layout drawing of the filter vessel and all ancillary equipment, AutoCAD drawings for one line diagrams, process and instrumentation diagram and electrical schematics.
 - a. Drawings shall include dimensions, component details, materials, piping connections, control interface detail and power connection detail for proper installation and operation. PLC and related cabinet ARC Flash information shall also be included.
 - b. Description and location for all pipe, power and control connections.
 - c. Description and illustration of required access areas for all sides of filter (including overhead and below).
 - d. Detail of all mechanical and electrical process control systems being proposed.
 - e. Provide drawings for all control panels and power supply panels included with the filter system including panel layouts, dimensions, materials list, connection requirements and access requirements.
2. Product Data: Provide data verifying specification compliance of all products furnished hereunder, installed dimensions and weights of all items, coatings, and fabrication including connection drawings and wiring diagrams.
 - a. Submit factory inspection logs and performance testing logs for all equipment and materials supplied.
 - b. Submit details of the Vendor recommended filter media(s) that meet the performance requirements included in these Project Documents. This includes media type, size, layer depth, overall media depth and layering order.
 - c. Vendor shall provide a detailed list of all hardware, fasteners, or materials required to interface with the mechanical, structural, electrical, control and monitoring instrumentation, and any other system supplied as part of the filter system. This includes all required interfaces or connections and Vendor recommended size and/or type of connection.
 - d. Submit a detailed bill of materials prior to shipment with manufacturer name and contact information, product name, product model number and quantity for all equipment and materials installed. Bill of materials shall include a schedule that indicates Owner provided asset tag information for material/equipment provided.

3. Manufacturer's Installation Instructions: Provide detailed connection requirements and installation procedures for all elements of the filtration system equipment.
 - a. Anchor bolt details shall be provided by the Vendor and stamped by a Civil or Structural Engineer registered in the State of Idaho. Anchor bolts and all other fasteners required for the proper installation of the vendor-provided equipment shall be provided by the Vendor. All anchor bolt calculations shall take into account vertical and lateral (seismic) design loads for foundation requirements in accordance with the 2018 IBC.
4. Headloss calculations stamped by a Professional Engineer. Headloss calculations shall include backwash operation. Calculations shall illustrate the required pressure reduction during a backwash using the orifice plate, electric operated flow control valve, and manual butterfly valve to not exceed the Vendor's maximum backwash pressure requirements for the filter system.
 - a. Submit details on estimated backwash water quality, quantity and loading rate per filter cell backwash. This includes details on any air injection or scour system included with the backwash system.
5. Written control narrative for all system functions to be controlled, monitored or alarmed.
6. Manufacturer's Field Report: Indicate personnel present and actual tests and start-up procedures that were performed by manufacturer's representative.
7. Operation and Maintenance Manuals, as specified in Paragraph 1.3 of Section 01 33 01 – Vendor Submittals.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All products to be in contact with potable water shall be NSF 61 and NSF 372 certified.
- B. All piping, valves, and fittings (including nipples) 3" or less in diameter shall be type 304 stainless steel with no coating. All piping larger than 3" shall be cement mortar lined ductile iron with ANSI 16.1 Class 125 flanged connections.

2.2 FILTERS

- A. General: Provide one filter vessel and associated equipment, with a sufficient number of cells to meet the Performance Design Criteria. Unless otherwise specified, items such as sampling ports, pressure gauges, differential pressure switches, and other instruments that require isolation valves, piping, and/or fittings shall be stainless steel.

- B. Sampling ports shall be minimum ½-inch in size and come with type 304 stainless steel ¼ turn ball valves for isolation of the sampling port. Sampling points shall be installed with stainless steel saddle taps or fabricated taps. Direct tapping the pipe is not acceptable. Sampling ports shall be provided so that representative water samples may be secured at the following points:
1. Raw Water
 2. Filter Effluent (each cell)
 3. Plant Effluent
 4. Backwash Water
- C. Loss of Head Gauges
1. The filter system shall be equipped with a loss of head gauge assembly to indicate loss of head across the filter. The assembly shall consist of a minimum of two pressure gauges mounted on an aluminum nameplate mounting bracket and installed across the influent and effluent header piping. The loss of head assembly shall monitor pressure loss through the filter and initiate a backwash cycle at a Vendor recommended filter differential set point. The differential set point shall be Owner adjustable.
 - a. System shall be provided with three (3) different programmed differential pressure set points:
 - 1) Standard differential pressure backwash – provides backwash at Owner adjustable time windows.
 - 2) High differential pressure backwash – provides backwash based on Owner adjustable differential pressure. Backwash happens regardless of other settings and time configurations and provide an alarm to SCADA system.
 - 3) High-high differential pressure shutdown – Shuts filter down based on an Owner adjustable differential pressure, shuts down filter, and sends an alarm to SCADA system.
 2. Liquid filled manual pressure/vacuum gauges shall be provided for each filter cell inlet and outlet. Pressure gauges shall be industrial quality type with bronze bourdon tubes. Unless otherwise shown or specified, gauges shall have a 4.5" dial, ¼-inch threaded connection, with stainless steel fittings and isolation valves. Gauges shall be calibrated to read in applicable units, with an accuracy of + 1 percent, to 150 percent of the working pressure or vacuum of the pipe or vessel to which they are connected. All gauges shall be vibration and shock resistant and manufactured by Ashcroft, Wika, or approved equal. Pressure range shall be 0 to 200 psi.
 - a. Pressure / vacuum combination gauges shall be provided on influent/effluent/backwash lines to each filter cell.

3. An electronic differential pressure transmitter shall be included as part of the assembly to automatically initiate backwash when terminal headloss is reached. Headloss shall be measured from the inlet header to the effluent header.
 - a. Electronic differential transmitter shall consist of a capsule assembly, bottom works, vent plug, drain plug, cover flange, process connector and connection, amplifier unit, integral indicator, terminal box with cover, block and bleed valves, and conduit connections. Pressure applied to the unit shall be transmitted by a sealed fill fluid to both sides of a sensing diaphragm. The sensing diaphragm and the sensor body shall function as the moving and fixed electrodes, respectively, of a differential capacitor. As the applied pressure causes the diaphragm to move, the capacitance of the cell shall change.
 - b. Performance Requirements: The amplifier unit shall convert the change in capacitance to a 4 - 20 mA DC signal, 2 wire type, with an allowable loop load of no less than 600 ohms. Static pressure rating shall be a minimum of 500 psig. The maximum overrange pressure limit shall be a minimum of 150 percent of the range. Span shall be adjustable over a minimum of 5:1 range. External adjustments shall include zero and span. Output signal damping shall be provided as an internal adjustment.
 - 1) Equipment shall be suitable for an ambient operating range of minus 40 degree F to plus 212 degrees F.
 - 2) The integral indicator shall be calibrated in process units.
 - 3) Power supply shall be 24 VDC with transmitter powered over the signal loop.
 - 4) Accuracy, including linearity and repeatability, shall be a plus or minus 0.2 percent of span.
 - 5) Differential pressure transmitters used for flow service shall include square root extraction to produce an output signal linearly proportional to flow.
 - c. Wetted parts, including block and bleed valve parts, shall be constructed of Type 316 stainless steel.
 - d. Manufacturers, or equal.
 - 1) Endress+Hauser
 - a. PMP51
 - b. PMP71
 - 2) Rosemount

- a. 2088
- b. 3051
- 3) Yokogawa
 - a. EJA
 - b. EJX

D. Filter Vessels

1. Design, Construction and Materials

- a. The filter vessels shall have completely isolated cells.
- b. The filter vessels shall be straight sideshell, ends fitted with semi-elliptical heads.
- c. Filter vessels shall be fabricated in a facility with an ASME Code and Certifications. Facilities holding an ASME R (repair) certification shall not be considered acceptable for vessel fabrication. The vessel shall be constructed in accordance with ASME code Section VIII Division 1 requirements.
- d. Design shall be in accordance with the Pressure Vessel Handbook, including a design safety factor of 3.5. Equipment manufacturer shall submit a document certifying conformance with this requirement.
- e. Minimum thickness shall be furnished in accordance with ASME code requirements for the specified pressure. The tank shall have a minimum working pressure of 150 psig at 90°F. Manufacturer's test data report shall be submitted for each vessel.
- f. Verification of ASME head and shell thicknesses shall be approved by the Engineer prior to fabrication. The shells and heads shall be A516 Grade 70

- g. Ports and connections shall be as follows:
- 1) Inlet Raw Water: Flanged connection (one per cell). Sized for flow per cell, provide supporting calculation.
 - 2) Inlet Air Supply: Flanged connection (one per cell). Sized for air wash requirements, provide supporting calculation including blower flow rate and pressure.
 - 3) Outlet: Flanged connection (one per cell). Sized for flow per cell, provide supporting calculation.
 - 4) Access manways: Each filter cell is to include at least one (1) manway hatch near the top of the vessel to facilitate inspection and media loading and one (1) manway near the bottom of the sidewall for underdrain inspection. All manways shall be 24-inch minimum size and provided with flanged hatches and hinges to facilitate opening/closing operation. Hatches shall be designed and constructed as to not allow the formation of air pockets during backwash which should include a connection for air release piping on the top of the hatch.
 - 5) Air/vacuum vent: One each cell sized for flow per cell, 2" (minimum) flanged (top of vessel), provide supporting calculation.
 - 6) Drain: 3" Victaulic, equipped with media drain screen (if required) and valve.
- h. Inlet and outlet connections shall be located such that valves will be no higher than 60" above finished floor and on opposite sides of filter vessel.

2. Fabrication

- a. Filter vessel shall be constructed in an ASME code-certified shop with American Welding Society approved welders. Equipment manufacturer shall submit a document certifying conformance with this requirement.
- b. All welds shall be full penetration, continuous welds. All finish welds shall be ground smooth so that they are acceptable to be coated.
- c. Factory-assembled units to the greatest extent practical.
- d. Flanges shall be factory welded on split centers prior to shipping.
- e. The filter tank shall be supported on structural steel legs properly spaced and crossbraced on full-length angle skids. Legs shall be designed to extend full length to building finish floor elevation allowing all valves to not be higher than 60" above finish floor while maintaining access to filter cell drain connections.

3. Coating

- a. Interior and exterior shall be factory primed and finish painted in accordance with the following.

1) Interior Coating:

- 1) Surface preparation: SSPC SP-10 Near White Metal Blast Cleaning with a minimum 1.5 mil angular blast profile.
- 2) Primer: Series 21 off white to a dry mil thickness of 4-6 mils before any rust can form.
- 3) Stripe Coat: Series 21 off white to a dry mil thickness of 3-5 mils on all welds and hard to reach areas.
- 4) Finish Coat: Series 21 off white to a dry mil thickness of 4-6 mils to a dry mil thickness of 5-8 mils.

2) Coatings System Performance

- 1) Coating manufacturer shall submit certified documentation that interior coating in contact with potable water has been certified in accordance with the National Sanitation Foundation Standard No. 600. Meets zinc-rich primer requirements of AWWA D102-03 Standard for Inside System No. 5 and Outside system No.6.
- 2) Galvanic Protection:
Method: Primer applied to SSPC SP10 Near White Blast Clean hot rolled carbon steel.
Requirement: The average measured potential of primer is -878 mille-volts.
- 3) Adhesion:
Method: ASTM D4541(TTM-34) Type V Positester
Requirement: Not less than 2,083 psi (14.36 MPa) adhesion, average of three trials.
- 4) Prohesion:
Method: TTM-80 Prohesion Cabinet Testing
Requirement: No blistering, cracking, rusting or delamination of film. No more than 1/64" creepage at scribe after 15,000 hours.
- 5) Moisture Vapor Transmission
Method: ASTM D 1653
Requirement: No more than .31 US perms water vapor permeability.

b. Exterior Coatings:

- 1) Primer: Series 21 off white to a dry mil thickness of 3-5 mils before any rust can form.
- 2) Stripe Coat: one coat Series 21 off white to all welds and hard to reach areas, to a dry film thickness of 3-5 mils.
- 3) Finish Coat: Exterior finish coat shall be factory applied. Series 1075 Endura-Shield II Aliphatic Acrylic Polyurethane applied to a dry mil thickness of 2-5 mils.

c. Contractor shall clean and touchup after shipment and installation. Facepiping:

- 1) Gaps between flanges and all locations where a gap exists as flange hub/pipe intersection shall be caulked prior to finish painting with Sonneborn NP-1 by Sonneborn-Chem rex, Inc. Sika FLEX 1-A, or equal.
- 2) Ductile iron piping shall be prime painted at factory and finish painted by installing contractor with compatible system.
- 3) Exterior Coatings System Performance

Primer

- 1) Galvanic Protection:
Method: Primer applied to SSPC SP10 Near White Blast Clean hot rolled carbon steel.
Requirement: The average measured potential of primer is -878 mille-volts.
- 2) Adhesion:
Method: ASTM D4541(TTM-34) Type V Positester
Requirement: Not less than 2,083 psi (14.36MPa) adhesion, average of three trials.
- 3) Prohesion:
Method: TTM-80 Prohesion Cabinet Testing
Requirement: No blistering, cracking, rusting or delamination of film. No more than 1/64" creepage at scribe after 15,000 hours.

Finish

- 4) ASTM D 1014 (AAMA 2604-98). South Florida marine exposure.
Series 700 HydroFlon exceeds the exterior weathering requirements of the American Architectural Manufacturers Association (AAMA) 2604-98 standard.

- 5) Per ASTM D4141, Method C (EMMAQUA)
No blistering, cracking or chalking. No less than 98% gloss retention, no more than 1 unit gloss loss and no more than 0.18 DEHunter color change after 2,000 MJ/m² (EMMAQUA exposure).
 - 6) Per ASTM D4141, Method C (EMMAQUA)
No blistering, cracking or chalking. No less than 84% gloss retention, no more than 13 units gloss loss and no more than 0.41 DEHunter color change after 3,500 MJ/m² (EMMAQUA exposure).
- d. Manufacturers: One of the following manufacturers, or equal:
- a) Tnemec
 - b) Approved equal prior to bid opening.
- e. Apply all coatings in strict accordance with coating manufacturer's instructions.
- f. Coatings must be products manufactured by same manufacturer.
- g. The pressure vessel paint color shall be beige in color and the color shall be selected and approved by the Owner prior to factory painting of the pressure vessel by the Vendor. The Vendor shall submit a color palette to the Owner for selection of the pressure vessel color.
- h. The following inspection and testing requirements apply to all interior coatings of the filter vessel.
- 1) Where two (2) or more coats are required, alternate coats shall contain sufficient compatible color additive to act as indicator of coverage, or the alternate coats shall be of contrasting colors.
 - 2) Surface Preparation: NACE Inspector to verify specified surface preparation standard has been met, to include cleanliness, visual standard, and profile requirements.
 - 3) Unless otherwise specified, do not apply finish coats until all other work in the area is done and until the underlying coats have been inspected and accepted by the NACE Inspector.

- 4) Film Thickness: All paint and coating thickness stated in this specification are dry film thickness. The first coat on metal surfaces refers to the first full paint coat and not to conditioning or other pretreatment applications. All coatings shall be applied to the thickness in accordance with these Specifications and the Manufacturer's recommendations as stated in the product data sheets. The dry film thickness of each coating application will be measured using the SSPA-2 standard. The minimum/maximum thickness requirements shall meet the perimeters outlined in this standard. Where the minimums and maximums do not meet the requirements of this standard, corrections must be made.

- 5) Continuity: Holiday testing will be performed in accordance with NACE RP0188. All surfaces below the waterline shall be tested.

In testing for continuity, all pinholes and holidays located shall be repainted to the required dry film thickness. All ferrous metal surfaces shall meet minimum continuity requirements outlined the NACE RP0188 standard. All holiday repairs will be re-tested following the repairs.

- 6) It is intended that the dry film thickness and the continuity of painted ferrous metal surfaces be subject to continual check by the Vendor's quality control subcontractor. Dry-film thickness will be measured by an Elcometer or Mikrotest magnetic type dry-film thickness gauge. Continuity will be tested by a low voltage wet sponge transistorized device, as manufactured by Tinker-Rasor (Model M-1), or equal. The Vendor's quality control subcontractor shall use inspection devices that are in good working condition for detection of holidays and measurement of dry-film thickness. The Vendor's subcontractor shall also furnish U.S. Department of Commerce, National Bureau of Standards certified thickness calibration plates to test accuracy of dry-film thickness gauge and certified instrumentation to test accuracy of holiday detectors.

- 7) Vendor shall submit coatings inspections for Owner and Engineer review prior to shipment of filter vessel. Any defects in the coating of the tank must be repaired at the factory prior to shipment of the tank.

E. Piping

1. Water Piping

- a. All filter system piping 4" and larger shall be cement mortar lined ductile iron with ANSI 16.1 Class 125 flanged connections. All piping 3" and smaller is to consist of 304 stainless steel pipe and fittings with no coating.
- b. All piping exterior surfaces, except for stainless steel pipe, are to be sandblasted per SSPC SP-6 and shop applied primer.

- c. Finish coating of the piping exterior is to be field applied by the General Contractor in accordance with Supplier recommendation and Owner Specification.
 - d. All filter system face and interconnecting pipe shall be furnished with Type 316 stainless steel bolts and nuts and ethylene propylene diene monomer rubber (EPDM) gaskets.
 - e. All interior piping to have shop applied NSF 61 approved epoxy.
 - 2. Air Scour Piping
 - a. Air scour supply piping shall be stainless steel.
 - b. General Contractor to provide and install air scour piping between air scour manifold at vessel and Supplier-provided blower.
 - 3. Filter backwash piping shall be provided with an orifice plate, manual butterfly valve, check valve, flow meter, and electrical actuated butterfly valve (rate set valve) as shown on P&ID. These accessories shall be provided to reduce the pressure during a backwash cycle to the Vendor's filter system required backwash pressure. The existing well pump is operated on a VFD and is anticipated to be able to turn down to provide 1,200 gpm during backwash if required. Vendor shall provide calculations to illustrate the sizing of the orifice plate and valves to reduce the incoming pressure and flow prior to entering a cell for backwash.
 - 4. Influent header, underdrain collector header and drain shall terminate with flanged connections for external piping.
 - 5. Provide supports, bracing, and fittings as required and as acceptable to the Engineer. Couplings, support braces, and hardware shall be stainless steel.
 - 6. Provide additional internal piping to point(s) of external connections as required for proper operation of specific filter system provided, and air scour features. Face piping shall be provided as part of this filter package.
 - 7. Overall tank width from flange face to flange face shall be limited to 11'0".
- F. Curved Bottom Underdrain
- 1. Designed to provide uniform flow through the filter vessels in backwash and treatment modes of operation.
 - 2. Underdrain Plate:
 - a. Self-reinforcing, arched, 3/8" plate, placed in sections, or
 - b. Flat plate designs with structural beams are acceptable
 - c. Continuously welded to top flanges of support angles. All weld area surface conditions consistent with paint pre-application requirements.

- d. Fitted with 1" openings to accept underdrain nozzles.
 - e. Painted per interior paint specs elsewhere in section
 - f. Design differential pressure: 12 psi in both directions.
 - 1) Verified by calculations if required.
 - 2) Structurally reinforced as necessary.
3. Underdrain diffuser nozzles:
- a. Non-metallic, self-cleaning underdrain nozzles installed on underdrain plate to provide 0.3% service area to nozzle orifice area.
 - b. Provide nozzles with peripheral slot openings as required. Taper slot openings inward.
 - c. Diffuser nozzles using pressed or crimped sheet metal are not permitted.
 - d. Toggle-bolted designs are not permitted.
 - e. Designs using parallel metal or plastic plates, spacers and coupling bolts are not permitted.

G. Support Gravel

1. Material:
- a. Hard rounded stones with an average specific gravity of not less than 2.5.
 - b. Containing less than 2% by weight of stones with length three times or more than width.
 - c. Free of shale, mica, clay, sand, dirt and organic impurities.
2. Support Gravel material, size and layer depth as shown below:

Torpedo Sand	1.4 - 1.7 mm
Gravel	1/4 x 1/8
Gravel	1/2 x 1/4
Gravel	3/4 x 1/2

- 3. Place bottom layer of screened support gravel by hand to avoid damage to the diffuser assemblies.
- 4. Level each layer upon completion before starting placement of the next layer.
- 5. Gravel-less underdrains are not acceptable.

- H. Face Piping – Vendor shall provide the minimum amount of piping to provide a single, flanged connection for each process water and air stream including but not limited to the influent raw water, effluent finished water, filter to waste, bypass piping, and backwash water and air scour headers.
1. Influent face piping shall include all piping and appurtenances necessary for conveying influent flow from a single flange connection to each filter cell inlet including valves, flow meters, sample ports, etc. All necessary pipe taps shall be completed with stainless steel saddle taps. See P&IDs for more information.
 2. Effluent face piping shall include all piping and appurtenances necessary for conveying effluent flow from each filter cell to a single flange connection including valves, flow meter, sample ports, etc. All necessary pipe taps shall be completed with stainless steel saddle taps. See P&IDs for more information.
 3. Backwash supply piping shall include all piping and appurtenances necessary for conveying backwash supply from effluent line to each filter cell including all valves. All necessary pipe taps shall be completed with stainless steel saddle taps. See P&IDs for more information.
 4. Backwash effluent piping shall include all piping and appurtenances necessary for conveying backwash effluent from each filter cell to single flanged backwash discharge point including all valves and flow meter.
 5. Bypass piping shall include all piping and appurtenances necessary for conveying raw well water in bypass to the filter effluent line including manual bypass valve. Valve shall be suitable for adding an electric actuator in the future for automation. See P&IDs for more information.
 6. Backwash air piping shall include all piping and appurtenances necessary for conveying backwash air supply from a single flanged connection point to each filter cell including all valves. See P&IDs for more information.
- I. Valves and Operators: Furnish electrically operated valves in quantities and sizes necessary for proper function of the pressure filtration system and as specified in Section 40 05 57 – Actuators for Process Valves and Gates, Section 40 05 64 – Butterfly Valves, and Contract Drawings. All valve and operator status to be verified in the control system during FAT and on-site at the ORT.
1. Air Vacuum Combination Release Valves: Combination air valves (Air/vacuum and Air Release Valves (AVAR)) shall combine the characteristics of air and vacuum valves and air release valves by exhausting accumulated air in systems being filled; or re-admitting large quantities of air while a system is being drained; and venting accumulating, small pockets of air while the system is in service and under pressure.
 - a. Manufacturers:
 - 1) Vessel Cell Air Release

- 1) Val-Matic Model 202C with 2" SSTL ball isolation valve (Apollo Series 76F-100-A)
 - 2) Approved Equal
 - 2) Face Piping Air Release
 - 1) Val-Matic Model 22.9 with 1" SSTL Ball Isolation Valve (Apollo Series 76F-100-A)
 - 2) Approved Equal
- J. Flow Meters: Provide means to meter pressure vessel influent, effluent and backwash wastewater. Flow meters for influent, effluent, and backwash shall be electromagnetic flow meters. The influent and effluent meters shall be 12-inch diameter meters and the backwash wastewater shall be an 8-inch diameter meter. Vendor shall also provide flow meter for installation at each cell intake (three (3) total). Sizes shown are preliminary, Vendor shall verify sizes and provide recommended sizes in submitted information. All flow meters shall be provided as specified in Section 40 70 13 – In-Line Liquid Flow Measuring Systems.
- K. Drain Valves: Provide ball drain valves at tank drains. Drain valves should be SSTL construction. Provide Apollo Series 76F-100-27 or approved equal.
- L. Fasteners: The Vendor shall provide bolts and fasteners necessary to permanently stabilize and anchor the Vendor-supplied Equipment to the supporting structures or foundations or both at the final installation site.
- M. Airwash System
 1. Grid
 - a. The airwash system shall be a header/lateral system located at the media/gravel interface for complete scouring of filtration media. Vertical penetrations through the media shall be avoided and limited to one per header in those retrofit applications that preclude air pipe entrance into the filter cell laterally. Air header pipes shall generally enter the filter cells at the media/gravel interface elevation.
 - b. Materials. The system construction shall be stainless steel pipe and fittings with headers being supported at not greater than 4 ft. intervals using stainless steel U-bolts, steel angles, and stainless-steel anchorage. Laterals shall be shop fabricated from stainless steel, minimum 3/4" diameter and welded in place by the installing contractor. Laterals shall be evenly spaced at not more than 12" lateral to lateral spacing along the entire length of the header, each side. Laterals shall be supported at not greater than 2' intervals using steel angles, vertical supports, base plates, and anchorage. Supports shall be adjustable in two directions.

- c. Lateral Design. Each lateral shall be equipped with field-proven means for preventing media from entering the lateral. Each lateral shall be fitted with an end cap and a specially machined stainless male adapter for screwing or welding into the airwash header. A specially sized air metering slot shall be placed parallel to the axis of the lateral at 6" to 8" intervals.
- d. Configuration. Systems utilizing multiple penetrations into the filter cells shall be prohibited due to the high potential for hydraulic short circuiting. Systems utilizing flexible piping or hoses (rubber, polyethylene, polypropylene, etc.) shall be prohibited due to their inherent movement in the filtration bed and their inability to remain rigid during normal filter operation. Calculations verifying adequate air distribution design, including orifice headloss calculations, shall be submitted to the engineer for approval upon request.

N. Air Wash Blower

1. Airwash Blower and Accessories

- a. Vendor to provide a regenerative type airwash blower complete and operable sized in accordance with the filter design criteria. Vendor shall provide calculations and literature to illustrate that the submitted blower meets the pressure and flow requirements of the filter system. The blower and motor shall be coupled together and mounted on a common baseplate.
- b. The blower shall have bearings outside the compression chamber and be of oil-free design.
- c. The blower shall be rated for 83 dB (maximum) at 3' without sound enclosure.
- d. The filter manufacturer shall furnish the airwash blower with accessories as shown on the Project Drawings, including:
 - 1) Intake Filter
 - 2) Pressure relief valve with silencing enclosure
 - 3) Spring loaded steel discharge check valve
 - 4) Discharge isolation valve (butterfly valve)
 - 5) Discharge pressure sensor
 - 6) Discharge pressure gauge (0-10psi)
 - 7) Discharge temperature sensor
 - 8) Weighted pressure relief valve with silencing enclosure

- 9) Sound enclosure
 - i. FPZ Model SC9m or engineer pre-approved equal
 - ii. Shall reduce noise level by approximately 10dBa
 - iii. Shall include axial fan
 - iv. Shall not interfere with accessing accessories
 - v. Aluminum frame construction with quick-release insulated panels
 - vi. Cover entire blower package including blower, drive motor, inlet silencer and discharge silencer.
2. Components shall be installed by the Contractor where shown or directed by the Engineer. Standard piping, filters and other components not listed in in the Project Documents shall be furnished and installed by the Contractor where required.

2.3 CONTROL SYSTEM

- A. General. The filter manufacturer shall furnish an automatic control system consisting of a PLC-based control panel with OIT, necessary hardware, components, timers, operator interface terminal, enclosure, relays, switches, alarms, I/O, and other items necessary for a complete operational system. The automatic filter control system shall be as described below. The Control system components, programming, and SCADA integration shall be in accordance with the City of Meridian Standards provided as an appendix to these specifications.
 1. Instrumentation and controls equipment tagging and labeling shall adhere to the City of Meridian's *Above Ground Asset Management Identification & Data Capture Requirements*. Asset identification will be provided to the Supplier during design. Labeling shall be included in submitted shop drawings.
 2. Final submitted shop drawings shall include asset management labeling.
 3. On completion of startup Supplier will provide Owner a copy of the final PLC and HMI applications and any required passwords.
- B. Hardware
 1. PLC. The automatic control panel shall be PLC-based using CompactLogix Series PLC 5069 ver 30 model with corresponding Allen-Bradley I/O modules and network communication hardware (as necessary). Manufacturer to provide 10% spare I/O capacity including digital and analog I/O.
 - a. Controller –5069 model
 - b. Digital Inputs - 5069-IA16

- c. Digital Outputs - 5069-OW16/5069-OA16
 - d. Analog Inputs - 5069-IF8
 - e. Analog Outputs - 5069-OF8
2. Components. All HOA switches, lights, and indicators shall be NEMA 4 rated, Allen-Bradley or equal. Nameplates shall be black Phenolic with white lettering indicating all functions, displays, indication, etc.
3. Operator interface terminal (OIT) shall be Series 1000 Panel-View Plus OIT color touch screen by Allen-Bradley model HMI-2711P, 10" or better. Programming to comply with HMI Screen Summary specification and included the following:
- a. The OIT shall be mounted in a separate NEMA 4 *OIT Panel* enclosure of satisfactory dimensions, connected to the main control panel, and shall indicate the following, via a series of custom designed screens:
 - 1) Filter system status (flows, mode of operation, etc.)
 - 2) Backwash sequence and status to include:
 - a) Next scheduled backwash
 - b) Backwash cycle mode for timer (TMR) or time of day (TOD)
 - c) Times when backwash is inhibited.
 - 3) Bar graph and Digital Displays of Times in BW Monitor Screen
 - 4) Alarms/alarm acknowledges
 - 5) Status of exterior signals
 - 6) Individual cell status (service, backwash, alarm, etc.)
 - 7) Individual cell flow rate
 - 8) Individual valve status for all valves
 - 9) Other functions, indication and information as required for a complete operating system
4. The *Main Panel* shall include one, 15 minute UPS (uninterruptible power supply), UL rated, and shall be furnished to automatically trickle charge. Adequately sized NiCad batteries shall be included to insure function and indication for an uninterrupted power outage of 15 minutes duration.

5. Enclosure. UL/NEMA 4 rated enclosure shall be Rittal TS 8 8018802 or comparable, containing a separate back panel mounting of filter PLC, power supply, I/O racks, wiring terminal blocks properly labeled and numbered, circuit breakers, switches, recorders, communication modem, etc., all as required for a complete operating system. The panel shall interface with City's existing ControlLogix processor in the well control panel in Well 10B building using Ethernet/IP. The filter control panel shall have a single power feed. Enclosure shall be UL rated and bear the 508 UL stamp prior to shipment. Enclosure shall be painted with a high gloss enamel paint, tan in color as selected by the City of Meridian.
 6. Timers. Countdown timers shall be part of the OIT to indicate the following:
 - a. Draindown
 - b. Sustained simultaneous air/water
 - c. Refill / Purge
 - d. Backwash timers
 7. PLC programming software shall be AB RS Logix 5000. v32. Programming to include configured Filter Producer Tag List, sufficient to allow the well PLC complete monitoring of the filter system and emulating the functions of the filter OIT which will in-turn be provided to the SCADA system. Documented Producer Tag List will be provided by the vendor.
 - a. Well status signals needed by the filter control will be provided by hardwire, Ethernet message functions or producer/consumer as determined by the filter vendor and the City.
 8. Integration contractor will be responsible for implementing Filter Tag Consumer functions in the PLC and providing well status signals to the filter system as defined by the filter vendor.
 9. PLC panel wiring requirements
 - a. Provide one fused terminal block with blown fuse LED for each group of 8 digital inputs
 - b. Provide one fused terminal block and one ground terminal for each analog input signal.
 - c. Provide 20% spare area for future terminal blocks and I/O cards.
- C. Functional Control Description
1. General. During automatic operation the PLC shall control the filter functions and shall indicate and communicate filter status to the OIT and remote SCADA system as required.
 2. Filtration consists of opening filter influent and effluent valves, which are their normal positions. As filter develops headloss throughout the filter run, differential pressure will be sensed.

3. At a pre-selected differential pressure, as sensed by the differential pressure sensing device, the filter backwash panel shall automatically indicate backwash required on the appropriate OIT screen. Backwash will be either manually initiated by the operator at the OIT or automatically as programmed, see section 2.2.C.1.a for required backwash programs. Automatic backwash initiation shall be based on head-loss with a 7-day timer over-ride. The backwash procedure will automatically sequence through the pre-set simultaneous air/water procedure without operator action. Valves are to be powered through the control panel with 120V power.
- D. Power Failure. If power to the PLC is lost, the uninterruptible power supply shall engage and shall continue automatic operation of the filter control panel (all function and indication) for a minimum of 15 minutes. If after 15 minutes power has not been restored to the filter control panel, then all valves shall fail to “service” condition, meaning that all filters shall be placed into normal service mode. If a filter is in backwash then the backwash process will be placed in hold until the return of power at which time it will resume and complete the process.
- E. Alarms. The following alarms shall be indicated on the alarm OIT screen: backwash required; backwash abort; high and high-high wash water waste holding; backwash hold; low influent/effluent water pressure; high influent/effluent pressure; and other alarm conditions affecting filter operation.
- F. Communications. The filter control panel shall contain an Ethernet switch for connection and network communication to SCADA. Network communications to allow for remote access to the filter control panel PLC and OIT to monitor and troubleshoot the filter and to effect program changes remotely from the factory.
- G. Shop Testing Prior to Shipment. Prior to shipment the filter control panel shall be fully tested with all alarms, indication and I/O fully simulated at the factory prior to shipment (FAT). All screens shall be tested along with all alarm functions and other control parameters, verified by factory certification as to inspector and date inspected. Testing shall be subject to verified witnessing by the engineer if required. Submission of FAT IO certification checklist to be delivered to customer at the time of equipment delivery.

H. Filter panel screens, at a minimum, shall provide the following information.

Screen Name	Screen No.	Screen Description	Screen Components
Main Menu	1	Provides menu access to filter monitoring and operating menus	System Monitor
			System Setup Menu
			Backwash Monitor
			Filter Cell Manual Control
			Flow Totalizer Summary
			Backwash Schedule Setpoints
			Backwash Headloss Setpoints
			Backwash Time Window Setpoints
			Backwash Time Schedule
			Alarm History and Event Log
System Monitor	2	Provides monitoring and status of facility equipment	Display Well Pump Status (Remote/On/Off /Auto)
			Display Airwash Blower Status (Remote/On/Off/Auto)
			Display Chlorine Metering Pump Status (Remote/On/Off/Auto)
			Display Raw Water Free/Total Chlorine (ppm)
			Display Finished Water Free/Total Chlorine (ppm)
			Display Raw Water Flow Rate (gpm)
			Display Individual Cell Flow Rates (gpm)
			Display Finished Water Flow Rate (gpm)
			Display Backwash Flow Rate (gpm)
			Display Bypass Flow Rate (gpm)
			Display Differential Pressure (psi)
Backwash Monitor	3	Provides monitoring and status of backwash process	Display Electronic Control Valve Status (Open/Closed/Position/Local/Remote)
			Well Pump Status (Remote/On/Off/Auto)
			Airwash Blower Status (Remote/On/Off/Auto)
			Display Backwash Flow Rate (gpm)
			Display Backwash in Progress (Yes/No)
			Display Current Backwash Cycle Step
			Display Backwash Step/Cycle Timer (minutes remaining)
			Backwash Type Initiation (Headloss/Schedule/Both)

Screen Name	Screen No.	Screen Description	Screen Components
Filter Cell Manual Control	4-6	Provide manual control of actuated valves and system status. Provide one screen for each filter cell.	Well Pump Status (Remote/On/Off/Auto)
			Airwash Blower Status (Remote/On/Off/Auto)
			Filter Cell Operating Mode (Manual/Auto)
			Display Raw Water Flow Rate (gpm)
			Display Individual Cell Flow Rates (gpm)
			Display Finished Water Flow Rate (gpm)
			Display Backwash Flow Rate (gpm)
			Electronic Valve Actuator Control (Status/Open/Close/Local/Remote)
			Backwash Initiation (Start/Stop)
Flow Totalizer Summary	7	Display flow meter totalizer values for raw water (total), raw water (per cell), backwash, finished water and bypass flow	Display Current Day (kgal)
			Display Previous Week (each day, total for week, kgal)
			Display Previous Month (kgal)
			Display Total to Date (kgal)
			Totalizer Reset (yes/no)
Backwash Schedule Setpoints	8	Display setpoints for each step of the backwash cycle and the elapsed time for each step during a backwash cycle	Cell Isolation Setpoint (min)
			Cell Draindown Setpoint (min)
			Air/Water Backwash Setpoint (min)
			Purge Cell Setpoint (min)
			Refill Cell Setpoint (min)
			Repressurize Cell Setpoint (min)
			Filter to Waste Setpoint (min)
Backwash Headloss Setpoints	9	Display differential pressure setpoints and time interlock setpoints for backwash cycle	Delay between Cell Backwashes Setpoint (min)
			Normal Differential Pressure setpoint (psid)
			High Differential Pressure Setpoint (psid)
			High Alarm/Shutdown Differential Pressure Setpoint (psid)
			Timer Interlock (min, each differential pressure setpoint)
			Display Current Timer Interlock Value (min, each differential pressure setpoint, when timer active)
	10	Allows Adjustment of time window when	Display Current Differential Pressure (psid)
			Backwash Allowed (Yes/No, each hour, 24-hour clock)

Screen Name	Screen No.	Screen Description	Screen Components
Backwash Window Setpoints		backwash on normal differential pressure setpoint is permitted	Current Time Display (24-hour clock)
Backwash Schedule Setpoints	11	Allows adjustment of weekly schedule for backwashing at set times	Time setpoint (2 setpoints/day, HR:MM, 24-hour clock)
			Time Setpoint Active (enable/disable)
Alarm History	12	Display Alarm history and allow acknowledgement of alarms	Display alarm date/time, acknowledgement time and alarm message
			Display current date/time
			Acknowledge single alarm (yes/no)
			Acknowledge all alarms (yes/no)
Event Log	13	Display record of events logged automatically. Coordinate event logging requirements with Owner.	Display event date/time and message
			Display current date/time
System Setup Menu	14	Navigation to instrument and alarm calibration/configuration screens	Display SCADA communications status (connected/not connected)
			Toggle SCADA control (on/off)
			Navigate to analog output scaling adjustment menus for flow meter, differential pressure transmitter, and chlorine analyzers
			Navigate to limit switch fault setpoint configuration menu
			Navigate to alarm configuration menu
			Navigate to time/date set menu
Analog Output Scaling	15	Allow adjustment of the value of the process variable for 4 mA and 20 mA analog instrument outputs	4mA Process Variable Setpoints (flow meters, free/total chlorine analyzers, differential pressure transmitter)
			20 mA Process Variable Setpoints (flow meters, free/total chlorine analyzers, differential pressure transmitter)
			Display current process variable value (flow meters, free/total chlorine analyzers, differential pressure transmitter)
Limit Switch Fault Setpoints	16	Allow adjustment of delay time setpoints for electronic actuated valve fault indication/alarming	Limit switch time delay setpoints (each electronically actuated valve, seconds)

Screen Name	Screen No.	Screen Description	Screen Components
Alarm Configuration Menu	17	Allows enabling/disabling system alarms. Coordinate list of required alarms with Owner.	Alarm Type (enable/disable)

PART 3 - EXECUTION

3.1 INSTALLATION (BY OTHERS)

- A. Contractor shall install the Equipment in a building.
- B. Installation of the equipment shall be by an installation Contractor in accordance with the contract documents, Vendor's engineering drawings and instructions. The Vendor shall supervise the installation of the equipment and startup per Specification 01 43 33 – Vander's Field Services.
- C. Before placement of the media, Vendor shall verify underdrain system is level.
- D. Should any underdrain materials, including nozzle inserts and nozzles, become chipped, plugged, bent, or damaged in any way, they shall be removed and replaced before concrete encasement is poured.
- E. Vendor shall provide requirements for delivery, storage and handling of equipment as part of submittal process.

3.2 MANUFACTURER'S SERVICES

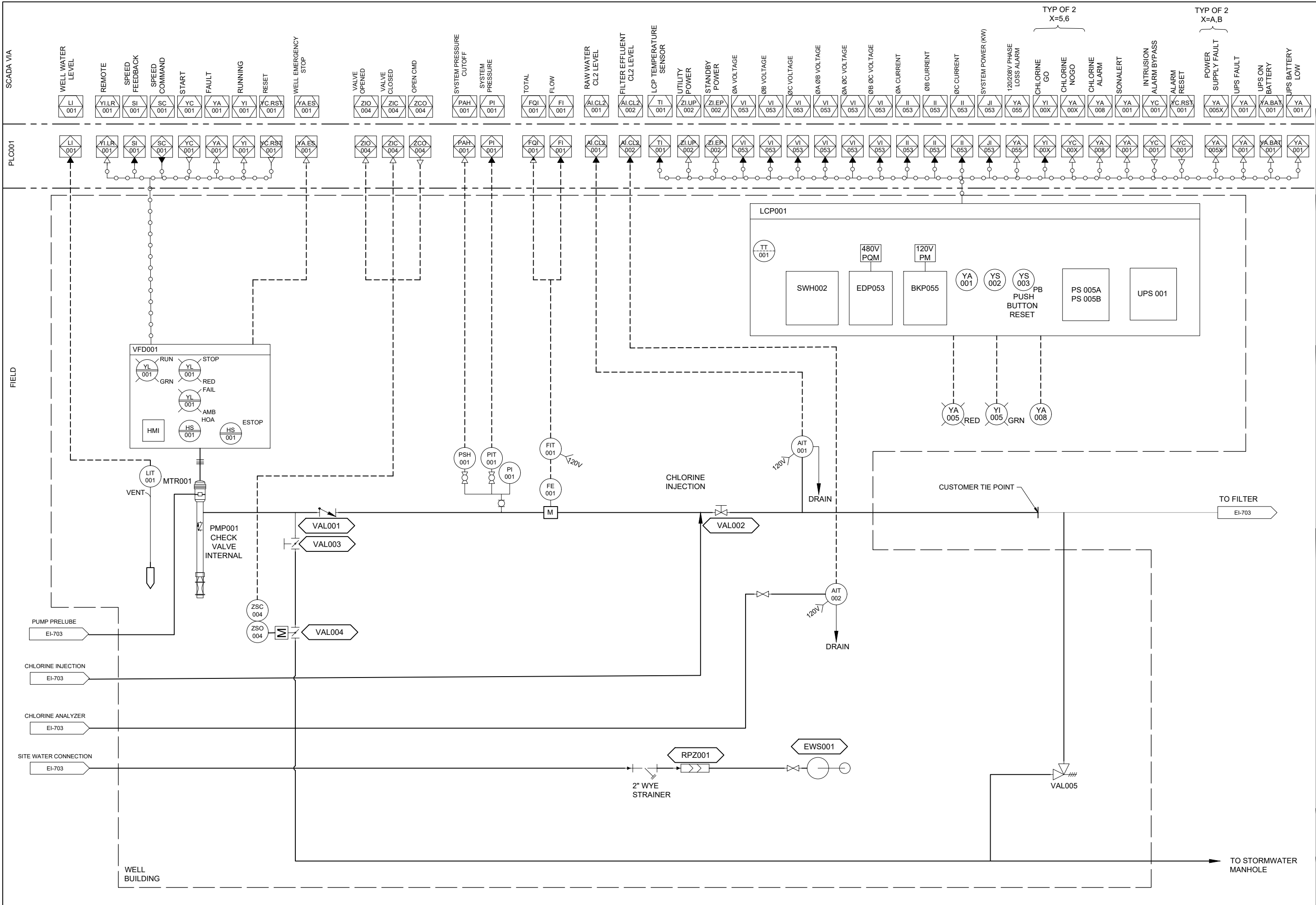
- A. Provide engineering services necessary to provide complete control drawings and to address Engineer's comments during shop drawing review. The Vendor shall provide process instrumentation and control drawings approved by the Engineer. These drawings will be included in the installation contract bid package.
- B. Provide engineering services necessary to perform a coordination review of bid documents for filter installation contract. Purpose of review shall be to ensure proper implementation of manufacturer's system and coordinate overall process, mechanical and control requirements. Provide review comments to Engineer for incorporation in final installation contract bid package.
- C. Vendor's field representative shall provide services and programming modification as needed to ensure proper installation, testing, and startup of the filter underdrain and integration with the well controller and the SCADA system. The Vendor's representative is not responsible for the well control system or the SCADA system programming, only for assistance with tasks related to the filter control system programming.
- D. The Vendor's representative shall be present at the jobsite for whatever period is necessary to assure proper installation. At a minimum, the Vendor's representative shall be present during all underdrain installation operations and testing.

- E. Startup and field testing: Per Section 01 43 33 – Vendor’s Field Services and Section 01 75 16 – Project Startup.
- F. Operator training: Per Section 01 43 33 – Vendor’s Field Services and Section 01 75 16 – Project Startup.
- G. Service Scheduling:
 - 1. By Owner on request, any time during warranty period for warranty claims.

3.3 FIELD TESTING

- A. Equipment Checks:
 - 1. Prior to the Final Acceptance field testing, the Vendor shall check that all equipment is installed properly, and functions as specified herein. The equipment checks shall include, but not be limited to:
 - a. Proper installation and alignment of support structure.
 - b. Electrical wiring and connections.
 - c. Signals and scaling from all remotely connected instruments and equipment.
 - d. Proper operation of instrumentation, alarms, and operating indicators associated with the equipment.
 - e. Proper control and signaling for all actuated valves.
- B. Upon completion of equipment checks, the Vendor shall submit to the Owner written certification that all equipment and accessory equipment associated with Vendor’s filtration system have been properly installed, are in good condition, are functioning properly, and are in accordance with the Contract Documents.

END OF SECTION 46 61 21



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Meridian, Idaho 83642
(208) 288-1992

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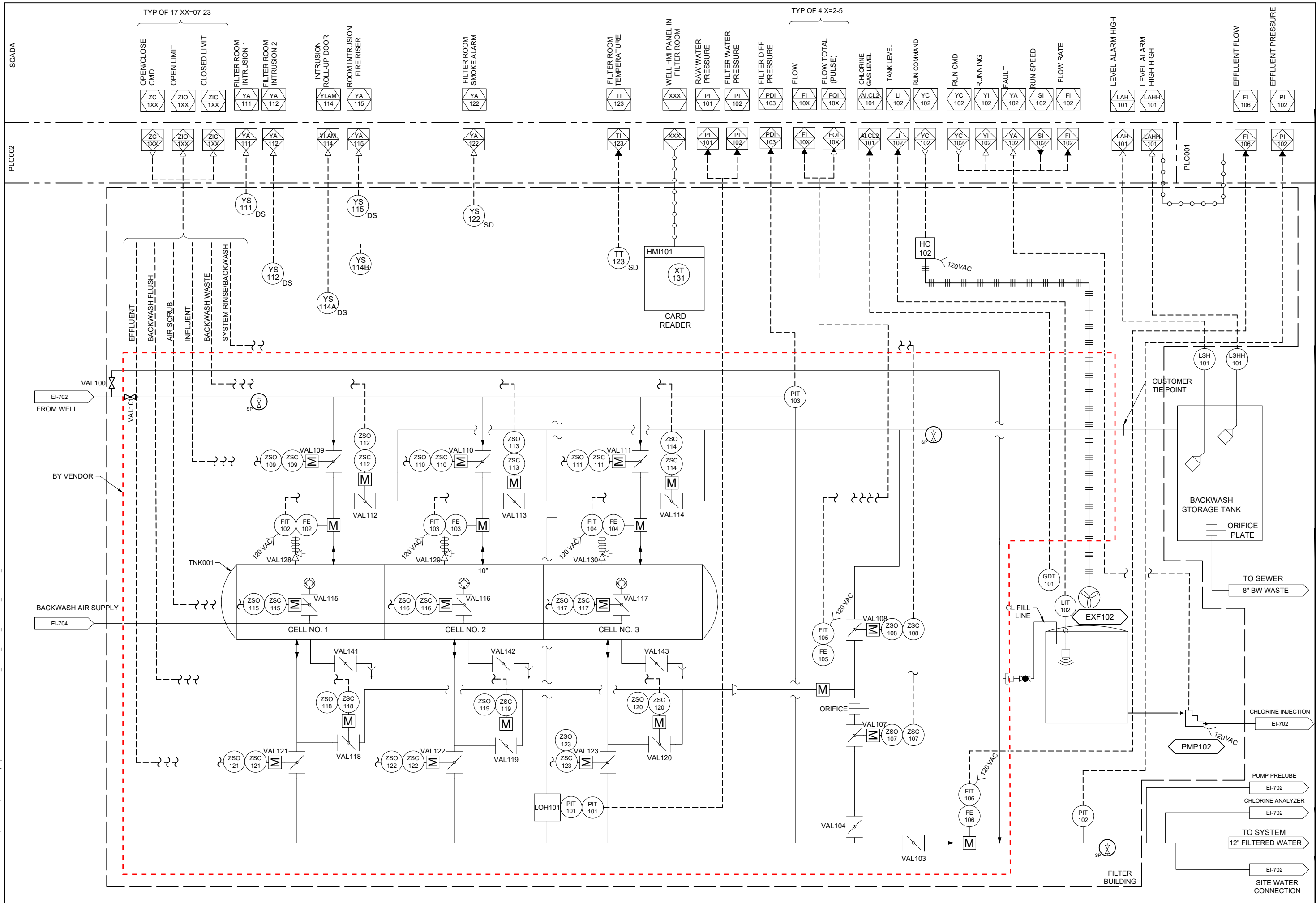
WELL 10B TREATMENT FACILITY

WELL - P&ID

DRAWN: TLL CHECK: ALN
VERIFY SCALE: Scales based on 22"x34" prints.
1-1/2 Inches

PROJECT NO. 214095-009 PAGE
SHEET NO. EI-702

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WELL 10B TREATMENT FACILITY

FILTER - P&ID

DRAWN: TLL CHECK: ALN
VERIFY SCALE: Scales based on 22"x34" prints.
1-1/2 Inches

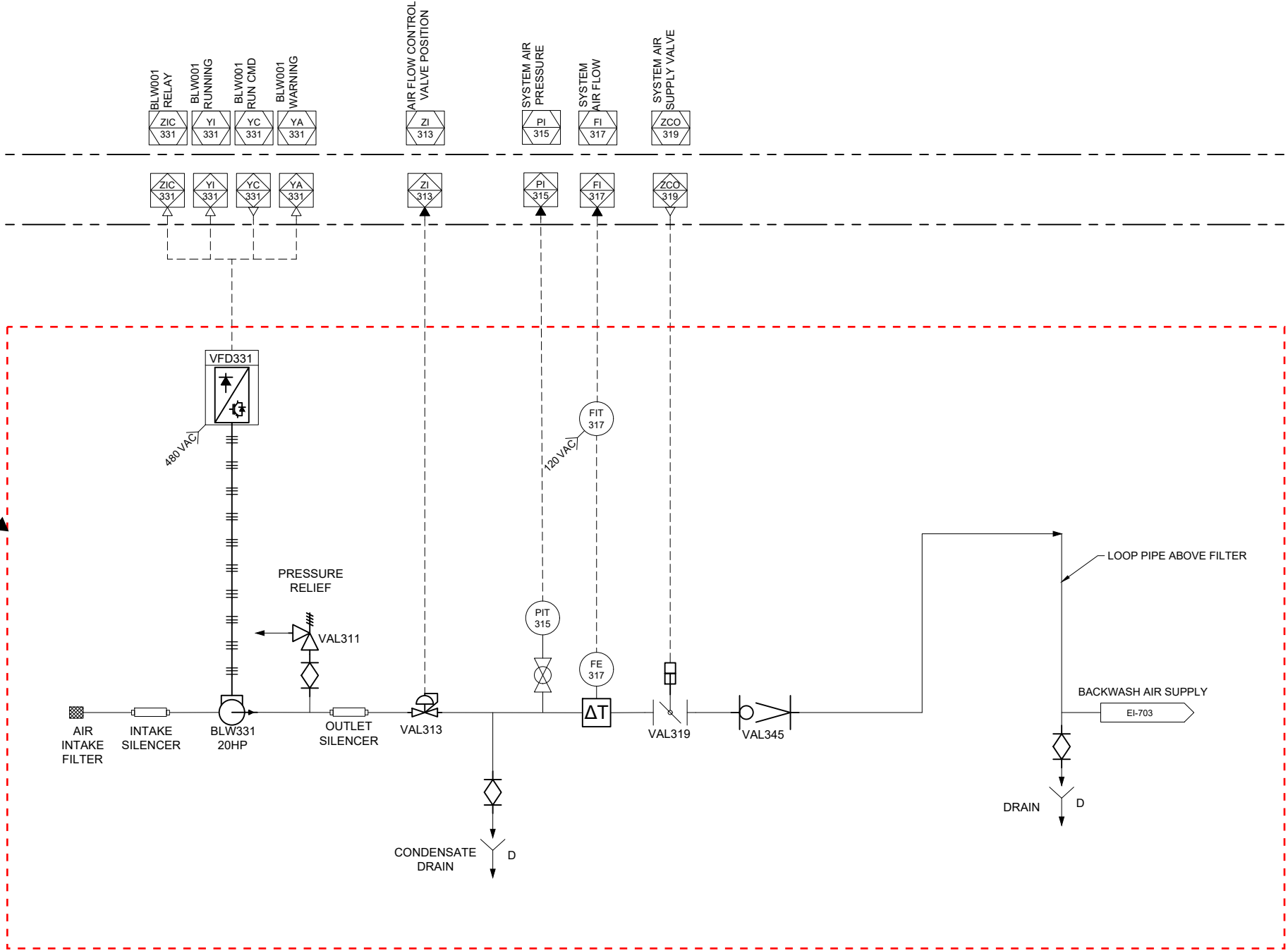
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SCADA

PLC002

FIELD

BY VENDOR



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WELL 10B TREATMENT FACILITY
P&ID - BLOWER PACKAGE