DOCUMENT 00 91 13

ADDENDA 1

DATE:	January 22, 2026
PROJECT:	Well No. 5 Production Well, Pumphouse, SCADA Updates & Well No. 2 Demolition
PROJECT NUMBER:	240564
OWNER:	City of Prairie du Chien
ENGINEER:	Vierbicher
TO:	Planholders

This Addendum is issued to clarify, revise, add to or delete from the Bidding Documents. Please attach to the Bidding Documents and acknowledge receipt in the space provided on the BID FORM.

This Addendum forms a part of the Contract Documents and modifies the Bidding Documents dated January 2026, with amendments and additions noted below.

This Addendum consists of 44 pages and 1 drawing.

CHANGES TO THE PROJECT MANUAL

*All changes are in ***BOLD ITALICS***

DOCUMENT 00 52 13 – Standard Form or Agreement

1. Article 4-Contract Times, Section 4.02 was updated to reflect changes Contract B – The Substantial Completion date has been changed to August 2027, and the Final completion date has been changed to September 2027.

DOCUMENT 01 32 16 – Construction Progress Schedule

1. Contract B – The Substantial Completion date has been changed to August 2027, and the Final completion date has been changed to September 2027.

DOCUMENT 40 23 50 – Potable Water Well Pump, Piping & Equipment

1. Subsection 2.5. Process Valves; A., B., C., & D.: Additional approved models and manufactures have been added for gate valves, butterfly valves, check valves, and the well pump air release/vacuum valve.
2. Subsection 2.5 Process Valves; B. 3.: Short Body Flanged butterfly valves have been added. Butterfly valves may be furnished as Wafter or Short Body Flanged body types.

CHANGES TO THE DRAWINGS

1. Q101 – List of Materials, item 43 was updated to include the option of a flanged butterfly valve.

REQUIRED FORMS

1. Bid Form
2. Bid Bond
3. Form 8700-294A EIF DBE Worksheet

VIRTUAL BID OPENING INSTRUCTIONS

1. Per the Advertisement for Bid, we will be conducting a virtual bid opening for the above referenced project. We will be utilizing Google Meet, a Google video conferencing method. We will be logged into Quest and ready for the Bid Opening 5-10 minutes before the clock reaches zero.

   If you would like to be invited to the virtual bid opening via Google Meet, please contact Missy Frenz before the bid opening at (608) 234-5518 or mfre@vierbicher.com.

   If you have never used Quest before, please read through the **VirtuBid Online Bidding User Guide** found on Quest, under resources. It can take some time to get used to the steps required. You must download forms, print and sign forms, upload forms, complete the Quest online bid worksheet page and then submit before your bid will be accepted. Please do not wait until 30 minutes before the bid opening if this is your 1st time bidding on Quest. The table of contents is also useful in detailing all the steps required. Please note, the excel bid form does NOT have to be completed, this is only provided as a courtesy/resource. Bid items are entered individually on Quest or you can download the CSV file and enter your Unit Prices ONLY. If you edit anything else it will cause the system to error on bid submission.

END OF DOCUMENT

SECTION 00 52 13

STANDARD FORM OF AGREEMENT
BETWEEN OWNER AND CONTRACTOR
FOR CONSTRUCTION CONTRACT

THIS AGREEMENT is by and between City of Prairie du Chien ("Owner") and

_____ ("Contractor").

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

1.01 *Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:*

Contract A – Public Water Supply Well No. 5: Construction of a 1,200 gallon per minute (gpm) municipal well to a depth of 106 feet, well development, performance pump testing of constructed well, WDNR NR 809 water quality analysis, erosion control restoration of the work area, and other miscellaneous items in conformance with the Contract Documents.

Contract B - Well No. 5 Pumphouse, SCADA Updates & Demolition of Well No. 2 Pumphouse: Construction of the Well No. 5 Pumphouse building, including furnishing and installing all well pump equipment, piping, valves, accessories and controls. The building includes a pump room, chemical room, and restroom. The Well No. 5 Pumphouse contract also includes installation of a natural gas-powered emergency electrical generator, erosion control measures, site work, site piping, driveway, pavement, restoration of the work area, pump testing, water quality testing, and other miscellaneous items in conformance with the Contract Documents.

Also, to include demoltion of the Well No. 2 Pumphouse including building demolition, excavation, water main and other utilities disconnections/abandonments, backfilling, grading, and site restoration. The existing Well No. 2 motor control center and well pump equipment are to be salvaged and reused in the proposed Well No. 5 Pumphouse. Well No. 2 is to be abandoned including removal and off-site disposal, or salvaging for the Owner, of existing well pump, column pipe, electrical cables, and motor, removing the casing to 3 feet below final finish grade, filling with concrete, neat cement grout or approved bentonite chips, and submitting a Well/Drillhole Abandonment Report.

In addition, the project includes SCADA system updates which include removal and disposal of existing SCADA system equipment and installation of new equipment at the existing Well Nos. 1, 3, & 4, pumphouses, reservoirs site, and the proposed Well No. 5 Pumphouse.

ARTICLE 2 – THE PROJECT

The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows: Well No. 5 Pumphouse

ARTICLE 3 – ENGINEER

3.01 *The Project has been designed by* Vierbicher *(Engineer), which is to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.*

ARTICLE 4 – CONTRACT TIMES

4.01 *Time of the Essence*

All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 *Days to Achieve Substantial Completion and Final Payment*

A. Comply with and complete the Work in accordance with the following construction schedule:

Contract A - Well No. 5 Production Well:

1. Award Contract (March 2026)

2. Notice to Proceed (April 2026)

3. Start Construction: Work may begin following the execution of the Contract documents, issue of Notice to Proceed, and the preconstruction meeting.

4. Substantial Completion: The work shall be substantially completed by June 2026 (Well construction complete).

5. Final Completion: The work shall be complete and ready for final payment by July 2026 (Water quality test results obtained). Final completion shall include all work as shown on the Contract Drawings and detailed in these specifications, including all the items addressed in final project closeout punchlist.

6. Within 30 days of final completion, submit final project closeout documentation inclusive of lien waivers, affidavit of compliance with prevailing wage rate determination, and final pay request.

Contract B - Well No. 5 Pumphouse, SCADA Updates, & Well No. 2 Demolition:

1. Award Contract (March 2026)

2. Notice to Proceed (July 2026)

3. Start Construction: Work may begin following the execution of the Contract documents, issue of Notice to Proceed, and the preconstruction meeting.

4. Substantial Completion: The work shall be substantially completed by ***August*** 2027

5. Final Completion: The work shall be complete and ready for final payment by ***September*** 2027. Final completion shall include all work as shown on the Contract Drawings and detailed in these specifications, including all the items addressed in final project closeout punchlist.

6. Within 30 days of final completion, submit final project closeout documentation inclusive of lien waivers, affidavit of compliance with prevailing wage rate determination, and final pay request.

4.03 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner $1,500 for each day that expires after the time specified in Paragraph 4.02 above for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner $1,500 for each day that expires after the time specified in Paragraph 4.02 above for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 5 – CONTRACT PRICE

5.02 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraph 5.01.A below:

A. For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the actual quantity of that item:

The Bid prices for Unit Price Work set forth as of the Effective Date of the Agreement are based on estimated quantities. As provided in Paragraph 11.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer as provided in Paragraph 9.07 of the General Conditions.

For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 15th day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A

of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions.

    a. 95 percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and

    b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 98 percent of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 14.02.B.5 of the General Conditions and less 110 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

6.03 *Final Payment*

A. Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07.

ARTICLE 7 – INTEREST

7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the rate of 12 percent per annum.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

8.01 In order to induce Owner to enter into this Agreement, Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.
B. As referenced in Supplementary Conditions 00 73 00, contractor also understands the goods and services under this Agreement are being funded with monies made available by the Clean Water State Revolving Fund and/or Drinking Water State Revolving Fund, that have statutory requirements commonly known as "American Iron and Steel" and "Build America, Buy America;" that require all of the iron and steel, manufactured products, and construction materials used in the project to be produced in the United States, including iron and steel products provided by the Contractor pursuant to this agreement.

C. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

D. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

E. Contractor has considered the information known to Contractor; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents; and (3) Contractor's safety precautions and programs.

F. Based on the information and observations referred to in Paragraph 8.01.D above, Contractor does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 *Contents*

A. The Contract Documents consist of the following:

1. This Agreement (pages 1 to 7, inclusive).

2. Performance bond (pages 1 to 3, inclusive).

3. Payment bond (pages 1 to 3, inclusive).

4. General Conditions (pages 1 to 61, inclusive).

5. Supplementary Conditions (pages 1 to 6, inclusive).

6. Specifications as listed in the table of contents of the Project Manual.

7. Drawings:

a. Contract A: Consisting of 3 sheets with each sheet bearing the following general title: Public Water Supply Well No. 5

b. Contract B: Consisting of 28 sheets with each sheet bearing the following general title: Public Water Supply Well No. 5 Pumphouse & Well No. 2 Pumphouse Demolition.

8. Addenda (numbers ___ to ___, inclusive).

9. Exhibits to this Agreement (enumerated as follows):

a. Contractor's Bid (pages ___ to ___, inclusive).

b. 8700-294A DBE Contacts Worksheet

10. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:

a. Notice to Proceed (pages 1 to 1, inclusive).

b. Work Change Directives.

c. Change Orders.

B. The sections listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

ARTICLE 10 – MISCELLANEOUS

10.01 *Terms*

A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

10.02 *Assignment of Contract*

A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 *Successors and Assigns*

A. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal

representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 *Severability*

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 *Contractor's Certifications*

A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

10.06 *Other Provisions*

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement. Counterparts have been delivered to Owner and Contractor. All portions of the Contract Documents have been signed or have been identified by Owner and Contractor or on their behalf.

This Agreement will be effective on ___ (which is the Effective Date of the Agreement).

OWNER:	CONTRACTOR
City of Prairie du Chien	
By:	By:
Title:	Title:
	(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)
Attest:	Attest:
Title:	Title:
Address for giving notices:	Address for giving notices:
214 E. Blackhawk Ave	
Prairie du Chien, WI 53821	
	License No.:
(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)	(Where applicable) Agent for service of process:

SECTION 01 32 16

CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Schedule Requirements.

B. Liquidated Damages.

C. Warranty.

D. Submittals.

E. Format of Schedule.

F. Revisions to Schedules.

G. Delays and Recovery.

1.2 SCHEDULE REQUIREMENTS

A. Submit a proposed work schedule for the entire project at the pre-construction conference. This schedule shall include any and all restrictions and special considerations indicated in the Contract Documents. After review by the Engineer, resubmit required revised data within ten days.

B. Distribute copies of reviewed schedules to Engineer, subcontractors, suppliers, and other concerned parties.

C. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

D. Submit computer generated horizontal bar chart with separate line for each major portion of Work or operation, identifying first work day of each week.

E. Complete the work in a continuous and timely manner, in coordination with the Owner and other Contractors working on the project.

F. Comply with and complete the Work in accordance with the following construction schedule:

Contract A - Well No. 5 Production Well:

1. Award Contract (March 2026)
2. Notice to Proceed (April 2026)
3. Start Construction: Work may begin following the execution of the Contract documents, issue of Notice to Proceed, and the preconstruction meeting.

4. Substantial Completion: The work shall be substantially completed by June 2026 (Well construction complete).
5. Final Completion: The work shall be complete and ready for final payment by July 2026 (Water quality test results obtained). Final completion shall include all work as shown on the Contract Drawings and detailed in these specifications, including all the items addressed in final project closeout punchlist.
6. Within 30 days of final completion, submit final project closeout documentation inclusive of lien waivers, affidavit of compliance with prevailing wage rate determination, and final pay request.

Contract B - Well No. 5 Pumphouse, SCADA Updates, & Well No. 2 Demolition:

1. Award Contract (March 2026)
2. Notice to Proceed (July 2026)
3. Start Construction: Work may begin following the execution of the Contract documents, issue of Notice to Proceed, and the preconstruction meeting.
4. Substantial Completion: The work shall be substantially completed by ***August*** 2027
5. Final Completion: The work shall be complete and ready for final payment by ***September*** 2027. Final completion shall include all work as shown on the Contract Drawings and detailed in these specifications, including all the items addressed in final project closeout punchlist.
6. Within 30 days of final completion, submit final project closeout documentation inclusive of lien waivers, affidavit of compliance with prevailing wage rate determination, and final pay request.

1.3 LIQUIDATED DAMAGES

Owner and Contractor recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in paragraph 1.2 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They also recognize the delays, expense, and difficulties involved in proving the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty) Contractor shall pay Owner One Thousand Five Hundred Dollars ($1,500.00) for each day that expires after the time specified in paragraph 1.2 for Substantial Completion until the Work is substantially complete.

1.4 WARRANTY

A. Provide a one-year warranty for the project against any defects in the materials and workmanship. The date of the one-year warranty shall commence on the date that the project is accepted by the Public Works Committee. It shall be the responsibility of the Contractor to request acceptance of the improvements.

1.5 SUBMITTALS

A. Furnish four (4) copies of preliminary schedule, and subsequent revisions thereof, to Engineer three (3) days before each progress meeting or by such date agreed to at the preconstruction meeting.

1.6 FORMAT OF SCHEDULE

A. Prepare schedule in form of horizontal bar chart.
   1. Provide separate horizontal bar for each trade, activity or operation.
   2. Provide continuous vertical line to identify first working day of each week.
   3. Scale and space to allow for notations and future revisions.

1.7 REVISIONS TO SCHEDULE

A. Each month Contractor shall receive updated information form Subcontractors and Suppliers that shall be included in current schedule. Revised schedule shall indicate changes such as:
   1. Major changes in scope.
   2. Activities modified since previous submittal.
   3. Revised projections of progress and completion.
   4. Other identifiable changes.

B. Provide narrative report to define following:
   1. Problem area and anticipated delays and their impact on schedule.
   2. Corrective action recommended and its effect.

1.8 DELAYS AND RECOVERY

A. If, at any time during the Project, Contractor fails to complete activity by its latest scheduled completion date, Contractor shall, within five (5) working days, submit to Engineer written statement as to how and when work force will be reorganized to return to current construction schedule.

B. If, during schedule review meetings, it becomes apparent that milestone completion dates or Contract completion dates will not be met. Contractor shall take some or all of the following actions:
   1. Increase construction staffing in such quantities and crafts as shall eliminate backlog of Work.
   2. Increase number of working hours per shift, shifts per day, Work days per week, amount of construction equipment or combination of foregoing sufficient to substantially eliminate backlog of Work.
   3. Reschedule Work activities to achieve concurrency of accomplishment.

C. Under no circumstances will addition of equipment or construction forces, increasing working hours or other method, manner or procedure to return to current Construction Progress Schedule be considered justification for Contract modification or treated as acceleration.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

SECTION 40 23 25

POTABLE WATER WELL PUMP, PIPING & EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Potable Water Well Pump
2. Potable Water Chemical Feed Equipment
3. Potable Water Process Piping & Fittings
4. Potable Water Process Valves
5. Potable Water Flow Metering Equipment

1.2 RELATED SECTIONS

A. Division 26 - Electrical

1.3 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Well No. 5 Well Pump, Chemical Feed Equipment, Process Piping, Valves & Flow Metering Equipment:

1. Basis of Measurement: By lump sum.
2. Basis of Payment: Payment for furnishing and installing the well pump, well pump motor, chemical feed equipment, process piping, valves & flow metering equipment shall be included in the bid item for the Pumphouse bid item. Payment includes full compensation for furnishing and installing all specified equipment, testing, start-up, owner training, operation and maintenance manuals, and furnishing all materials, equipment, labor and incidentals necessary to complete the work in accordance with the Contract Documents.

a. The **base bid item** includes payment for salvaging the pump base, column assembly (pipe, line shaft, bearings) and suction pipe from the Well No. 2 Pumphouse and installing those items along with a new motor, new bowl assembly, and new cone strainer to provide the specified flow rate at the specified total dynamic head (TDH).

b. The **alternate bid item** includes payment for salvaging and rebuilding the Well No. 2 pump bowl assembly with new bearings, wear rings, & shaft and adding one stage to the bowl assembly to provide the specified flow rate at the specified total dynamic head (TDH) instead of furnishing a new bowl assembly as specified in the base bid item.

1.4 REFERENCES

A. American National Std. Institute (ANSI) / American Water Works Assoc. (AWWA)

1. AWWA C104 - ANSI Standard for Cement Mortar Lining for Ductile-Iron Pipe and Fittings for Water.

2. AWWA C105 - ANSI Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems.
3. AWWA C110 - ANSI Standard for Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (76 mm Through 1,219 mm), for Water.
4. AWWA C111 - ANSI Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
5. AWWA C115 - ANSI Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
6. AWWA C151 - ANSI Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids.
7. AWWA C153 - ANSI Standard for Ductile-Iron Compact Fittings for Water Service.
8. AWWA C509 - Resilient-Seated Gate Valves for Water-Supply Service.
9. AWWA C550 - Protecting Epoxy Interior Coating for Valves and Hydrants.

B. American Society for Testing and Materials (ASTM):
1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
2. ASTM A48 – Gray Iron Castings
3. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
4. ASTM A126 – Valves, Flanges, and Pipe Fittings
5. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.

C. National Sanitation Foundation:
1. NSF 61 - Drinking Water System Components - Health Effects

D. Public Works Industry Improvement Program:
1. "Standard Specifications for Sewer and Water Construction in Wisconsin", most current edition, with all addendums.

E. State of Wisconsin Administrative Code:
1. Chapter NR 811 – Requirements for the Operation and Design of Community Water Systems.
2. Chapter SPS 332 – Public Employee Safety and Health

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. **All American Iron and Steel (AIS) materials need to be certified by the manufacturer.**

C. **Contractor shall certify upon substantial completion of the project that all iron and steel and BABA products installed were produced in the United States of America.**

D. Design Data: Submit manufacturer's latest published literature including illustrations, installation instructions, maintenance instructions and parts lists.

E. Product Data: Submit data on pipe materials, pipe fittings, valves, equipment, paint, and accessories.

F. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

G. Certified Pump Tests and Curve: A certified factory hydrostatic and performance test shall be performed on each pump unit in accordance with Hydraulic Institute Standards, latest edition. Tests shall be sufficient to determine the curves of head, input horsepower, and efficiency relative to capacity from shutoff to 150% of design flow. A minimum of six points, including shutoff, shall be taken for each test. At least one point of the six shall be taken as near as possible to each specified condition. Results of the performance tests shall be certified by a Registered Professional Engineer and submitted for approval before shipment.

1.6 CLOSE OUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations of valves, fittings and equipment.

C. Provide Operation and Maintenance Data for valves, pumping equipment and chemical feed equipment.

1.7 QUALITY ASSURANCE

A. Perform Work in accordance with State of Wisconsin Standard Specifications for Sewer and Water Construction.

B. Perform Work in accordance with Chapters NR 809, NR 811 & NR 812 of the State of Wisconsin Administrative Codes.

C. **All iron and steel (AIS) and Build America, Buy America (BABA) products must be consumed in, incorporated into, or affixed to an infrastructure project produced in the United States and meet American Iron and Steel (AIS) and Build America, Buy America (BABA) requirements as described in the contract documents. The term "iron and steel products" means the following products are made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.**

D. All pumping equipment furnished under this Section shall be of a design and manufacture that has been used in similar applications and it shall be demonstrated to the satisfaction of the Owner that the quality is equal to equipment made by that manufacturer specifically named herein.

E. Unit responsibility: Pump, complete with motor, necessary guards and all other specified accessories and appurtenances shall be furnished by the pump manufacturer to insure compatibility and integrity of the individual components, and provide the specified warranty for all components.

F. The pump specified in this section shall be furnished by and be the product of one manufacturer.

G. Pumps are to be engineered and manufactured under a written Quality Assurance program. The Quality Assurance program is to be in effect for at least ten years, to include a written record of periodic internal and external audits to confirm compliance with such program.

H. Pump is to be engineered and manufactured under the certification of ISO-9001:2000.

1.8 QUALIFICATIONS

A. Manufacturer: company specializing in manufacturing Products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing work of this section with minimum 3 years experience.

1.9 DELIVERY, STORAGE AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Protect piping from entry of foreign materials and water by temporary covers, completing sections of work, and isolating parts of completed system.

C. Prepare valves and accessories for shipment according to AWWA Standards and seal valve and ends to prevent entry of foreign matter into product body.

D. Accept system components on site in manufacturer's original containers or configuration. Inspect for damage.

E. Store products in areas protected from weather, moisture, or possible damage; do not store products directly on ground; handle products to prevent damage to interior or exterior surfaces.

PART 2 PRODUCTS

2.1 WELL PUMP – VERTICAL TURBINE LINE SHAFT

A. General

This specification covers a deep well lineshaft turbine pump with above ground discharge, arranged for water lubrication of the lineshaft bearings by the water being pumped and furnished with suitable driver and accessories as specified herein. The new pumping unit components and assemblies shall be designed and furnished in accordance with the latest Hydraulic Institute and AWWA specifications for lineshaft turbine pumps.

B. Operating Conditions

The deep well turbine pump shall be of the surface discharge type of standard manufacture and design to meet the following operating conditions:

Design pumping rate ..... 1,200 Gallons per minute

Design Head..... 366 Feet total dynamic head (TDH)

Minimum pump efficiency of .....84 Percent

Maximum allowable speed.....1,800 RPM

Liquid to be pumped .....Water

Well Casing diameter O.D. ..... 18 inches

Pump setting (Top of bowls) ..... 60 feet

Non-Overloading Motor Horsepower 150

C. Service Conditions

The pump shall be designed and constructed to operate satisfactorily with a reasonable service life, when installed in a typical continuous turbine pump application.

D. Manufacture

1. The pump shall be the product of, and manufactured by, Gould's Pumps, Peerless Pumps, or American-Marsh Pumps, or approved substitution per Section 01 60 00 - Product Substitution Procedures.

E. Bowl Assembly

1. The base bid item includes furnishing a new bowl assembly. The alternate bid item includes salvaging the Well No. 2 bowl assembly, rebuilding it with new bearings, wear rings, & shaft, and adding one stage to obtain the required pumping rate at the required total dynamic head. The following specifications apply to components required for rebuilding the bowl assembly and/or furnishing a new bowl assembly.
2. The bowls shall be flanged and constructed from close grained cast iron, and shall conform to ASTM designation A48, class 30. They shall be free from sand holes, blow holes, or other faults and must be accurately machined and fitted to close tolerances. They shall be capable of withstanding a hydrostatic pressure equal to twice the pressure at rated flow or 1.5 times shut-off head, whichever is greater. The bowls shall have porcelain enamel/vitra glass lined waterways for maximum efficiency and wear protection. All intermediate bowls shall be of identical design for

interchangeability. A flanged by threaded discharge bowl shall be used to connect the intermediate bowls to the discharge column. To ensure quality and consistency of product, cast iron components must be produced in a foundry owned by the pump manufacturer. A non-witnessed factory performance test shall be performed on the bowl assembly using a lab calibrated motor. The results of the factory performance test shall be approved by the Engineer prior to shipment of the bowl assembly. When bolted bowl construction is used, 316 stainless steel fasteners shall be used. All the bowls (including the discharge bowl) shall be fitted with sleeve type bearings of bronze alloy C89835.

3. Impellers: the impellers shall be constructed from Silicon Bronze ASTM B584 Modified Alloy C876 and shall be the enclosed type. They shall be free from defects and must be accurately cast, machined, balanced, and filed for optimum performance and minimum vibration. Impellers shall be balanced to grade G6.3 of ISO 1940 as minimum. Impellers are to be standard product of the pump manufacturer and not contain special workmanship to temporarily increase efficiency. They shall be securely fastened to the bowl shaft with taper locks of 416 stainless steel. The impellers shall be adjustable by means of a top shaft adjusting nut.
4. The suction bowl shall be provided with a non-soluble grease packed bronze bearing, and a bronze sand collar shall be incorporated in the pump design to protect this bearing from abrasives. The bearing housing shall have sufficient opening at the bottom for easy removal of the bearing.
5. Wear rings: pumps 6" and larger shall be fitted with replaceable wear rings of bronze material in the suction bowl and intermediate bowls. Wear rings shall have the minimum practical clearance to the mating cylindrical surface of the impeller to provide adequate sealing independent of vertical positioning of the impellers. Wear rings to be ASTM B584 Alloy C903 bronze.
6. The bowl shaft shall be constructed from ASTM 582 type 416 stainless steel. It shall be precision turned, ground and polished and shall be supported by water lubricated bronze bearings.
7. The Engineer will ask for the discharge and suction nozzles to be removed in the field prior to installation to verify the manufacturing characteristics as specified.

F. Column Assembly – Water Lubricated

1. The column assembly from the Well No. 2 well pump shall be salvaged and reused. If any components of the salvaged column assembly are found to require replacement, they shall meet the following specifications.
2. Pump speeds up to 2200 RPM shall have intermediate column lengths and lineshaft bearing spacing not to exceed 10 feet.
3. Column pipe: The column pipe shall be furnished in sections not exceeding nominal length of 10 feet. The length of the top and bottom sections shall not be more than 5 feet. The column pipe shall be 8" diameter ASTM A53 Grade A steel pipe with the ends machined with 8 threads per inch with 3/16" taper and faced parallel to butt against the centering spiders. Inside diameter of the pipe shall be such that the head losses shall not be over 5 feet per 100

feet of pipe, and shall weigh not less than 28.55 lbs./ft. (Sch. 40.) Pipe shall be connected with threaded sleeve type steel couplings.

4. Lineshaft shall be of ample size to operate the pump without distortion or vibration. Diameter of the shaft shall be such that it does not exceed the horsepower limitation indicated in the engineering section of the pump catalog. Shaft shall be furnished in interchangeable section not over ten feet in length, and shall be coupled with extra-strong threaded steel couplings machined from solid bar steel. Lineshaft and couplings shall be 416 stainless steel and shall have left-hand thread to tighten during pump operation. The diameter of the shaft and coupling shall be designed in accordance with AWWA E101 Standard. The shaft shall be provided with stainless steel sleeve to act as a journal at each bearing location. The sleeve shall be placed on a full size shaft without undercutting and secured in position by a suitable adhesive.
5. Silicon bronze ASTM B584 centering spiders of the drop-in type shall be furnished for shaft stabilization at each column pipe coupling. Bearings shall be fluted rubber retained in the spider by a shoulder on each end of the bearing.

G. Suction Pipe and Strainer

1. The suction pipe from the Well No. 2 well pump shall be salvaged and reused. If it is found to require replacement, a new suction pipe shall meet the following specifications.
2. The suction pipe shall be 10 feet in length and shall have a minimum inside diameter and weight equal to that of the discharge column pipe.
3. A suitable cone strainer of 304 stainless steel shall be provided having a free area of at least four times the flow area of the suction pipe. The strainer shall have female threads for connection to the suction pipe.

H. Discharge Head Assembly – Water Lubricated

1. The discharge head assembly from Well No. 2 shall be salvaged and reused. If any of its components are found to require replacement, they shall meet the following specifications.
2. Discharge head shall be of the high profile type and be suitable base of high grade cast iron, ASTM A48-30, or fabricated steel. It shall be provided for mounting the motor with a discharge elbow having an above ground flanged discharge outlet for 8-inch standard pipe. The design shall have sufficient capacity to carry the combined weight of the column assembly. The design shall allow the top shaft to couple above the stuffing box. The head shall have a 1/4" NPT connection for a pressure gauge. One 2" tapped hole for the vent, one 1" tapped hole for the airlines and one 1 ½" tapped hole shall allow access for the transducer. Provide a sanitary seal around the airline and transducer cable.
3. The stuffing box shall be cast iron and shall contain a minimum of five rings of packing. It shall have grease inlet and pressure relief connections. The packing gland shall be a 316 stainless steel split type secured in place with noncorrosive studs and nuts. The bearing shall be C89835 bronze. A rubber slinger shall be secured to the shaft above the packing gland.

4. The head shaft going through the stuffing box shall be of ASTM 582 type 416 stainless steel. It shall be precision ground and polished with surface finish better than 40 RMS.
5. The Contractor shall furnish, install and permanently grout the base plate onto the pump foundation. The Contractor shall provide stainless steel anchoring bolts and nuts to anchor the base plate to the concrete pump base.

I. Airline Assembly
1. Dual airlines of ¼" ID neoprene and polyethylene shall extend in continuous lengths from the tip of the bowl assembly through the head, one connected to a direct read drawdown gauge and the other sealed.

2.2 WELL PUMP MOTOR FOR VERTICAL TURBINE LINE SHAFT PUMP

A. Codes & Standards
1. The motors shall be fabricated, assembled and tested in accordance with the most current applicable standards as defined by the following institutions:
   a. American National Standards Institute (ANSI).
   b. Institute of Electrical and Electronic Engineers (IEEE).
   c. National Electrical Manufacturers' Association (NEMA).
   d. Anti-Friction Bearing Manufacturers' Association (AFBMA).
   e. American Society of Testing Materials (ASTM)
   f. Hydraulic Institute (HI)
   g. American Water Works Association (AWWA)
2. All materials and equipment shall be labeled or listed as being approved by the Underwriters Laboratories (U.L.) whenever applicable. Equipment offered as meeting the intent of the U.L. requirements may be acceptable subject to the approval of the Purchaser.
3. Motor manufacturer shall have experience in the design and manufacture of similar products for a minimum of 10 years. Buy-out or private labeled motors are not acceptable.

B. Submittal Data
1. Dimension Print and Frame Size
2. Approximate Motor Weight
3. Complete Motor Nameplate Information
4. Motor Performance Data, including the following:
   a. Guaranteed minimum efficiencies at 100%, 75% and 50% of full load.
   b. Guaranteed minimum power factor at 100%, 75% and 50% of full load.
   c. Locked Rotor Current
   d. Full Load Current
   e. Starting Torque
   f. 1Full Load Torque

g. Breakdown Torque

5. Job site Storage Requirements.
6. Recommended Spare Parts List
7. Required with motor upon shipment:
   a. Operation and Maintenance Manuals
   b. Connection Diagrams
   c. Test Reports

C. Acceptable Manufacturers:
Motors shall be U.S. Electrical Motors' "TITAN Line" , or approved substitution per Section 01 60 00 - Product Substitution Procedures.

D. Service Conditions
1. Motor shall be suitable for continuous operation on a 3-phase, 60 hertz system rated 480 volts.
2. Motor shall be designed to operate at rated load in a maximum ambient temperature of 40°C.
3. Indoor service.

E. Design Requirements
1. The motor shall be a vertical, heavy duty, squirrel cage induction type, 1.15 service factor, 1760 RPM, hollow shaft, NEMA P base, minimum 150 hp.
2. The horsepower rating of the motor shall be sufficient to satisfactorily operate the pump under the conditions and head specified without being overloaded.
3. The speed/torque and speed/current characteristics shall comply with NEMA Design B.
4. Motor shall be premium efficiency in accordance with NEMA PREMIUM values for enclosure, horsepower and poles.
5. Motor shall be capable of withstanding all normal forces which may be imposed upon it during the course of normal operation, including starting and normal stops.
6. Motor shall be suitable for across-the-line starting and shall be able to start and accelerate the connected load to full load speed with 90% of rated voltage at the motor terminals.
7. Motor shall be capable of continuous operation at full load and rated frequency with a voltage variation of +10%.
8. Motor shall be capable of continuous operation at full load and rated voltage with a frequency variation of +5%.
9. Combination of # 7 & # 8 above not to exceed 10%.
10. Motor starting current shall not exceed a value equal to 650% of the motor full load current.
11. Motor will be applied to variable frequency drive and shall adhere to NEMA MG-1, Part 31, and shall be name-plated accordingly.

F. Enclosure

1. NEMA Weather Protected, Type I (WP-I)
2. Openings on all Weather Protected designs shall be covered with zinc-galvanized or stainless steel guard screens having a mesh openings size no larger than 1/4 inch.
3. Enclosures shall be of fabricated steel or cast iron construction in accordance with the manufacturer's standard design. Canopy caps shall be of aluminum, cast iron or sheet metal and shall be easily removable for maintenance purposes.

G. Stator Construction

Stator laminations shall be of fully processed steel. Each lamination surface shall be given the necessary treatment so as to have core plate type C-5 insulation.

H. Insulation

1. Insulation shall be rated minimum Class F (155°C)
2. Maximum temperature rise by resistance at rated HP shall not exceed Class B limits (130°C).
3. Maximum temperature rise at 1.15 Service Factor shall not exceed Class F limits (155 ° C).
4. Magnet wire shall be copper and rated Class H (180 degrees C.) or better.
5. Magnet wire shall be classified Pulse Endurance, suitable for variable frequency applications.
6. Insulation systems shall receive a minimum of two vacuum pressure impregnation treatments using a 100% solids epoxy resin.

I. Rotor Construction

Rotors shall be of cast or fabricated aluminum in accordance with manufacturer's standard design.

J. Bearings

1. Bearings supplied shall be of type and size sufficient to satisfy thrust loading requirements for each motor in accordance with manufacturer's standard design. Bearings shall be rated for an in-service B-10 life of 8,800 hours.
2. For this vertical motor application, bearings shall be capable of withstanding a momentary up-thrust of at least 30% of the normal down-thrust.
3. The motor bearings shall be adequate to receive the entire hydraulic thrust load of the pump and weight of all of the rotating parts under all conditions of operation.
4. Thrust Bearings
   a. Motor shall be designed and constructed with thrust bearings on top to allow inspection and/or replacement without requiring complete disassembly of motor.
   b. Thrust bearings shall be deep-groove ball, angular contact ball or spherical roller type. Bearings mounted back-to-back or in tandem

are acceptable and may be furnished when required according to manufacturer's standard design.

c. Deep-groove ball bearings shall be used only on normal thrust design motors and shall be capable of handling thrust loads in either direction.

d. High thrust design motors shall be supplied with angular contact ball bearings whenever possible and in accordance with manufacturer's standard design.

e. Where thrust requirements restrict the use of angular contact bearings, spherical roller bearings shall be furnished.

1) Spherical roller bearings shall be oil lubricated and shall not require water cooling.

2) Spherical roller bearings shall be spring loaded to keep the lower bearing race in contact and prevent bearing damage during starting and momentary upthrust conditions.

5. Guide Bearings

a. Guide bearings shall be deep-groove ball type and shall be located at the bottom of the motor.

b. Guide bearings may be stacked when necessary according to manufacturer's standard design to accommodate specified upthrust conditions.

c. Guide bearings or bearing assemblies shall be provided with sufficient means for preventing the leakage of lubricant or entrance of foreign matter along the shaft.

K. Lubrication

1. Thrust bearings shall be oil lubricated and contained in an oil reservoir with oil sight level gauge and oil fill and drain openings with plugs.

2. Deep-groove ball bearings furnished as thrust bearings for normal thrust motors shall be grease lubricated. When furnished as guide bearings for high thrust units, they shall be oil lubricated.

3. Grease lubricated bearings shall be furnished with provisions for in-service positive lubrication. A drain shall be provided to guard against over lubrication.

L. Noise Level

Sound pressure levels shall be measured according to IEEE 85 and shall not exceed 90 decibels as measured on the A-Weighted Scale at a distance of five (5) feet from any motor surface under free field conditions.

M. Nameplates

Motor nameplate shall be of stainless steel and shall be securely fastened to the motor frame with pins of a like material.

N. Terminal Box

1. Terminal box shall be of fabricated steel or cast iron construction to be compatible with the motor enclosure specified and when possible, shall be diagonally split and capable of rotation in 90° increments. Boxes not suitable for rotation must be capable of top entry.
2. The area in which the main terminal box is connected with the motor frame shall be fully gasketed in order to prevent entrance of foreign matter into the motor and to provide support for the stator leads where they pass through the motor frame.
3. A properly sized grounding terminal shall be mounted in the main terminal box when specified.
4. The main terminal box shall be sufficiently oversized to allow stress cone terminations of shielded power cables and to allow mounting of any surge capacitors, lightning arrestors or current transformers as may be specified.

O. Leads
1. Main motor leads shall have EPDM or equal type jackets and shall be permanently tagged for identification.
2. The relationship between lead markings and the direction of rotation shall be indicated on a separate motor nameplate.

P. Lifting Lugs & External Fasteners
1. Motor shall have permanent lifting eyes or lugs capable of a safety factor of 10.
2. All external fasteners shall be hexagon-head, cadmium or zinc plated rated class 5 or better. Slotted head, Phillips head and socket head fasteners are acceptable only for use internally and not exposed to the external environment. Metric fasteners are not acceptable.

Q. Vibration
Vibration shall not exceed 0.08 inches per second, peak to peak.

R. Non-Reverse Ratchet
A ball-type non-reverse ratchet shall be provided to prevent backspin of the pump and motor. Maximum reverse rotation shall be limited to 5 degrees of arc.

S. Warranty
1. The motor shall be warranted to be free from defects in material or workmanship for a period of 24 months from start-up, not to exceed 30 months from shipment by the manufacturer.
2. Contractor shall be responsible for proper storage of equipment prior to placing in service in accordance with the manufacturers' recommendations and instructions.

2.3 TRANSDUCER & CARRIER PIPE

A. The Contractor shall furnish and install 1" diameter flush joint PVC piping or polyethylene piping in well casing for access to the level transducer. Furnish and

install a model PTX 1830 transducer as manufactured by GE/Druck or approved equal substitution per Section 01 60 00 - Product Substitution Procedures.

B. Provide adequate length of submersible cable to wire transducer to a model STE 110 Sensor Termination Enclosure (NEMA 4X with lightning arrestor and pipe mounting kit) as manufactured by GE/Druck or approved equal substitution per Section 01 60 00 - Product Substitution Procedures, furnished and installed by the Contractor. Sensor Termination Enclosure shall be mounted on carrier pipe.

C. Wire the well level transducer to be powered from the SCADA RTU panel such that the well levels will be displayed on the touch screen operator interface of the SCADA.

2.4 PROCESS PIPING

A. **All iron and steel products must be produced in the United States and meet American Iron and Steel requirements as described in the contract documents. The term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.**

B. Ductile Iron Pipe & Fittings:
1. Pipe Class:
   a. Exposed Piping: AWWA C115, Class 53
   b. Buried Piping: AWWA C151, Class 52
2. Coating and Lining:
   a. Exterior Coating:
      1) Exposed Piping: Shop prime coating & field applied intermediate & finish coatings.
      2) Buried Piping: Bituminous.
   b. Interior Lining: Cement Mortar, AWWA C104, double thickness, seal coated.
3. Pipe Marking: Weight, class or nominal thickness, and casting period shall be shown on each pipe. Manufacturer's mark, the year in which the pipe was produced, and the letters "DI" or the word "Ductile" shall be cast or stamped on the pipe.
4. Joints:
   a. Exposed Piping:
      1) Flanges: ANSI B16.1-Class 125 rated at 250 psi maximum pressure, minimum 1/8" thick full face rubber, or Flange-Tyte gaskets as manufactured by U.S. Pipe, conforming to the latest revision of AWWA Standard C111 (ANSI A21.11).
      2) Flange Bolts: Carbon steel (ASTM A307), cadmium-plated (ASTM B766), or zinc-coated (ASTM A153 or B633), bolts (ANSI B18.2.1) and nuts (ANSI B18.2.2) with hex heads and rated working pressures of the pipes and fittings.
   b. Buried Piping:

1) Push-on Joints: Rubber gaskets per AWWA C111

5. Fittings: Ductile iron, AWWA C110. Compact fittings AWWA C153.
   a. Coating and Lining: As specified for piping.
   b. Joints:
      1) Buried: Conductive Class 250 mechanical joints with rubber gaskets per AWWA C111
      2) Exposed: Flanges & Flange Bolts as specified for exposed piping.
6. Electrical Conductivity: All mechanical and push-on joints shall be furnished with bonding straps capable of carrying 500-600 amps for an extended period of time to provide electrical conductivity without field welding. Copper inserts in gaskets will be permitted in lieu of bonding straps.
7. Polyethylene Encasement: 8 mil. Thick. AWWA C105 (ASA A215). Encasement shall be placed around all buried ductile iron pipe and fittings where indicated on the plans or ordered by the Engineer in the field.
8. Buried Pipe Bedding & Cover Materials:
   a. Bedding: Type 3 Embedment as specified in Section 31 23 17.
   b. Cover: Type 3 Embedment as specified in Section 31 23 17.
   c. Soil Backfill from Above Pipe Cover to Finish Grade: Suitable Native Backfill or Select Granular Backfill as specified in Section 31 05 13 with no rocks over 3 inches in diameter, frozen earth or foreign matter.

C. Galvanized Iron Piping:
1. Pipe Class: Schedule 40, Specifications for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Uses, ASTM A-53.
2. Fittings: galvanized malleable iron.
3. Unions: An ample number of unions shall be provided for disassembling pipe.

D. Copper Tube:
1. Pipe Class:
   a. Exposed: ASTM B 88, Type L, hard temper.
   b. Buried: ASTM B88, Type K, seamless copper tubing, annealed.
2. Fittings:
   a. ASME B16.18, cast copper, or ASME B16.22, wrought copper.
   b. Each fitting shall be permanently and plainly marked with the name or trademark of the manufacturer.
   c. Unions: Extra heavy 3- part.
   d. Joints:
      1) Exposed: Join with lead free flux, ASTM B813, and solder, ASTM B32.
      2) Buried: Compression – type.

E. Pipe Supports:
1. Piping shall be supported, even though not shown on the drawings, with base fittings and concrete pads when bottom of pipe is less than 6 inches above the floor
2. Adjustable pipe saddle with floor flange to 6 feet above the floor: Galvanized cast iron pipe support with galvanized steel stanchion, Anvil #264 pipe support with #63T stanchion, or equal.
3. Adjustable iron or heavy steel pipe hangers with supporting clamps or inserts for pipe more than 6 feet above the floor: Anvil, Grinnell or equal.
4. Exposed piping in chemical feed rooms shall be supported with a plastic support system, Aikinstrut Series K, or equal.

F. Pipe Flange Adaptors:
1. Flange: Ductile iron ASTM A536 flange with ANSI/AWWA C110/A21.10 or ANSI B16.1, class 125 flange bolt circle.
2. Gasket: Buna-N.
3. Bolts & Nuts: Carbon steel (ASTM A307), cadmium-plated (ASTM B766), or zinc-coated (ASTM A153 or B633), bolts (ANSI B18.2.1) and nuts (ANSI B18.2.2) with hex heads and rated working pressures of the pipes and fittings.
4. Anchor Studs: Carbon steel ASTM 193 Grade B7 electro-galvanized with di-chromate seal anchor studs.
5. Pipe flange adaptors shall be E-Z Flange Series 1000 by EBAA Iron, Uni-flange Series 400-C by The Ford Meter Box Company, or approved substitution.

G. Buried Pipe Insulation: Two (2) inch thick, 4 foot wide sheets, minimum 25 psi, high density, polystyrene board, as manufactured by Dow Chemical Company, or equal.

H. Paint System:
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in the paint schedules.
2. Material Compatibility: Provide primers, undercoats, and finish-coat materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
3. The following manufacturers are referred to in the paint schedule found in Part 3: Tnemec Co., Inc.

2.5 PROCESS VALVES

A. Gate Valves
1. Gate valves shall conform to the latest revision of AWWA Standard C509 (cast iron) or C515 (ductile iron). All valve components shall conform to ANSI/NSF Standard 61.
2. Working Pressure: 200 psig.
3. Body & Bonnet: Class 150 iron per ASTM A126, Class B for Gray Cast Iron valves, or ASTM A395 or ASTM A536 for Ductile Iron valves.

4. Gate: Gray Cast Iron (ASTM A126, Class B) or Ductile Iron (ASTM A395 or ASTM A536).
5. Seat: Resilient wedge. Bonded or mechanically attached to gate.
6. Stem: Non-rising forged bronze.
7. Stem Seal: Two O-rings Buna-N or NBR rubber meeting ASTM D2240.
8. Connections: Flanged and bolted joint per ANSI/AWWA C111/A21.11, or ANSI B16.1, class 125. Carbon steel (ASTM A307), cadmium-plated (ASTM B766), or zinc-coated (ASTM A153 or B633), bolts (ANSI B18.2.1) and nuts (ANSI B18.2.2) with hex heads and rated working pressures of the valve.
9. Coatings: Interior and exterior coated with fusion bonded epoxy ANSI/NSF 61 certified for use with potable water
10. Handwheels: All interior valves shall be flanged and have high strength cast iron handwheels. Right angle actuators shall be provided if required because of valve location.
11. Manufacture & Model: Series 2500 as manufactured by American Flow Control, ***Series 45 as manufactured by American AVK***, or approved equal substitution per Section 01 60 00 - Product Substitution Procedures.

B. Butterfly Valves

1. Butterfly valves shall meet all requirements of the latest revision of AWWA C504. All valve components shall conform to ANSI/NSF Standard 61.
2. Working Pressure: 200 psig.
3. Body Type & Class: ***Short Body Flanged*** or Wafer, Class 150B.
4. Body: Valve bodies shall be epoxy coated gray cast iron (ASTM A126, Class B) or ductile iron ASTM A536. Valves shall be capable of withstanding bi-directional line hydrostatic test pressures up to 225 psi without leaking.
5. Shafts: 304 stainless steel with diameter meeting the 150B standard per AWWA C504 for butterfly valves.
6. Disk: ASTM A536 Grade 65-45-12 ductile iron with solid 316 stainless steel sealing edge.
7. Seats: Buna-N and shall be molded in and vulcanized to valve body. Seats shall also contain an integral shaft seal protecting the valve bearings and packing from line debris.
8. Bearings: Permanently lubricated, non-metallic bearings for smooth, low torque operation.
9. Shaft Seals: Self-compensating split-V-type of standard O-ring seal.
10. Interior: The interior of the valve body shall have a full rubber lining vulcanized to the valve body, and ANSI/NSF 61 certified for use with potable water
11. Connections: Wafer end connections designed for installation between ANSI B16.1 Class 125 iron flanges***, or flanged and bolted per ANSI/AWWA C111/A21.11, or ANSI B16.1, class 125***. Carbon steel (ASTM A307), cadmium-plated (ASTM B766), or zinc-coated (ASTM A153 or B633) bolts (ANSI B18.2.1) and nuts (ANSI B18.2.2) with hex heads and rated working pressures of the valve.
12. Exterior Coating: Fusion bonded epoxy

13. Latch Lock Levers: Latch lock levers shall provide automatic, positive latching in the open, closed or eight intermediate positions on all manually activated butterfly valves less than 8-inches in diameter.
14. Manual Actuators: Valves with 8 inch diameters or greater shall be furnished with a totally enclosed, water-tight sealed and lubricated gear box actuator with handwheels and valve disc position indicators.
    a. Handwheels: High-strength cast iron rotary manual hand wheels positively secured to the operator input shaft (in conformance with AWWA C500).
    b. Stop-Limiting Devices: Self-locking with a permanent factory set stop at each end of its travel. The disc shall not creep or flutter under service conditions. The valve shall seat close at an angle of 90o from full open.
    c. Torque Requirements: The actuator shall be designed for the output torque according to AWWA C504. Maximum input torque required to develop the rated output shall not exceed 150-foot pounds for any size valve.
    d. Seal: The actuator case shall be completely watertight, sealed by means of approved gaskets, gasket compounds, O-rings or threaded plugs.
    e. Lubricants: Actuators shall be filled with a suitable oil lubricant or thoroughly coated with an approved grease at the factory. If the operator lubricant is oil, provide suitable fill and drain plugs.
15. Electric Motor Actuators: Provide electric motor actuators where indicated on the plans. Electric motor actuators shall have totally enclosed oil-lubricated drive gearing, and shall comply with the requirements of the latest revision of AWWA Standard C540.
    a. Enclosure: NEMA 4 rated with an integral heater.
    b. Handwheel: Provide an auxiliary handwheel for each electrically operated actuator for manual override operation.
    c. Valve Disc Position Indicator: A valve disc position indicator shall be provided for each electrically actuated butterfly valve.
    d. Sizing: Properly sized for the required operating torque of each valve.
    e. Limit and Torque Switches: Provided in both the "open" and "closed" direction of travel.
    f. Stops: Provide "open" and "closed" mechanical end stops.
    g. Manufacture & Model: Model SG 10.1 as manufactured by AUMA, Series 2000 as manufactured by EIM, or approved equal.
16. Butterfly Valve Manufacture & Model: Model BAW as manufactured by DeZurick, Series 2000 as manufactured by Val-matic Valve and Manufacturing Corporation, approved equal substitution per Section 01 60 00 - Product Substitution Procedures. Valves larger than 12 inches in diameter shall be Mueller Lineseal III or approved equal substitution per Section 01 60 00 - Product Substitution Procedures equal.

C. Check Valves

1. Check valves shall conform to latest revision of AWWA Standard C508. All valve components shall conform to ANSI/NSF Standard 61.
2. Working Pressure: 200 psig.
3. Body & Cover: Ductile iron ASTM A536 Grade 65-45-12
4. Disc: molded Buna-N (NBR) ASTM D2000-BG
5. Valve Position Indicator: Mechanical rod in contact with disc at all times providing disc position indication
6. Connections: Flanged and bolted joint per ANSI/AWWA C111/A21.11, or ANSI B16.1, class 125. Carbon steel (ASTM A307), cadmium-plated (ASTM B766), or zinc-coated (ASTM A153 or B633), bolts (ANSI B18.2.1) and nuts (ANSI B18.2.2) with hex heads and rated working pressures of the valve.
7. Coatings: Interior and exterior coated with fusion bonded epoxy ANSI/NSF 61 certified for use with potable water
8. Model & Manufacture: Swing-Flex 500AMI series as manufactured by Val-Matic Valve and Manufacturing Corp., ***APCO CRF-100C as manufactured by DeZurik***, or approved equal substitution per Section 01 60 00 - Product Substitution Procedures equal.

D. Well Pump Air Release/Vacuum Valve

1. Air/Vacuum valve shall conform to latest revision of AWWA Standard C512. All valve components shall conform to ANSI/NSF Standard 61.
2. Working Pressure: 150 psig.
3. Body & Cover: Gray cast iron ASTM A126 Class B.
4. Float: Stainless steel.
5. Internal Parts: 316 stainless steel.
6. Seat: Resilient Buna-N
7. Accessories: The discharge orifice shall be fitted with an adjustable dual port or dual acting throttling device to regulate the flow of escaping air.
8. Inlet Connection: The air/vacuum valve shall have a 2-inch threaded inlet. Connect a ball valve to the inlet by threaded galvanized steel piping. Connect air valve inlet pipe to ductile iron process piping with threaded saddle as specified in the water main specification section.
9. Outlet Connection: The air/vacuum valve shall have a 2-inch outlet. Connect discharge piping to valve outlet. Screen end of discharge pipe with stainless steel or brass 24 mesh as shown on the Plans.
10. Coatings: Interior and exterior coated with fusion bonded epoxy ANSI/NSF 61 certified for use with potable water
11. Model & Manufacture: Model 102ST valve with dual port throttling device as manufactured by Val-Matic, **2-inch *APCO Model AVV with double acting throttling device (DAT), as manufactured by DeZurik***, or approved equal substitution per Section 01 60 00 - Product Substitution Procedures equal.

E. Ball Valves:

1. Body: Bronze, two piece, full port.

2. Ball: 316 stainless steel.
3. Seat and Seal: Reinforced Teflon.
4. Stem: blow-out proof rated at 600 psi nonshock WOG.
5. Valve shall be capable of disassembly without removing valve from piping.
6. Model T/S-585-70-66 as manufactured by Nibco or equal.
7. Motor Actuator:
    a. Furnish motor actuators for ball valves where indicated on the Plans.
    b. Construction: Capacitor type reversible electric motor, gear train, limit switches and terminal block all within a NEMA 4 die cast aluminum enclosure.
    c. Heater: integral heater.
    d. Actuator shall be properly sized for the required operating torque of each valve.
    e. Limit and Torque Switches: Provide in both "open" and "closed" directions of travel.
    f. Speed of Rotation: 10 seconds per 90°.
    g. Operational Power: 120 VAC/1-phase/60HZ power supply.
    h. Override: Manual handwheel.
    i. Status Indicator: Valve position indicator.
    j. Model MAR-10-10-4 as manufactured by Raymond Control Systems (RCS) or approved equal substitution per Section 01 60 00 - Product Substitution Procedures.

F. Prelube Solenoid Valve

1. Furnish and install a solenoid valve for the prelube line as shown on the Plans. Valve shall be rated for use with water, have a working pressure rating of at least 250 psi.
2. Valve shall have a cast bronze body, packless internal piston, pilot operated, class N coils rated NEMA 4X, stainless steel plunger tubes, brass piston assembly filled with Teflon piston rings and stainless steel expanders, stainless steel pilot valves and springs. Valve shall be Type M-3V as manufactured by J.D. Gould Company, Inc. or approved equal substitution per Section 01 60 00 - Product Substitution Procedures equal.
3. The valve shall be normally closed when de-energized (energized to open) and shall operate with a 120 VAC electrical power supply.

2.6 WATER FLOW METERING EQUIPMENT

A. Magnetic Flow Meter

1. Meters shall conform to latest revision of AWWA Standard C701 class II. All components shall conform to ANSI/NSF Standard 61.
2. Accuracy: +/- 0.25% of rate.
3. Repeatability: +/- 0.1%.
4. Power Supply: AC.

5. Output: 4-20mA signal output to RTU of SCADA system located in the pumphouse.
6. Measuring Tube: 316 Stainless steel.
7. Measuring Tube Size: As indicated on the Plans.
8. Flanges: ANSI B16.5/AWWA Class 150 steel.
9. Maximum Operation Pressure: 155 psi.
10. Liner: Hard rubber ANSI/NSF Standard 61 certified for use with potable water.
11. Electrodes: 316 stainless steel.
12. Grounding Rings: stainless steel.
13. Meter Enclosure Classification: NEMA 4.
14. Amplifier/Resister: microprocessor, programmable, noise dampening, empty pipe detection, unidirectional flow, cast aluminum powder coated housing mounted to meter flow tube.
15. Display/Measurement Units: 4 line x 20 character back-lit LCD display, six digit programmable/resettable totalizer in gallons, instantaneous flow rate indication in gallons per minute.
16. Manufacture & Model: ModMAG M-Series M2000 with M2000 Amplifier as manufactured by Badger Meter, Inc. or approved equal substitution per Section 01 60 00 - Product Substitution Procedures.
17. Locate flow meter required number of pipe diameters downstream and upstream of any valves, bends, obstructions, or fittings per manufacturer's direction.

B. Ductile Iron Spool Piece: Contractor shall also furnish a ductile iron pipe spool piece that can be interchanged with the flow meter at Owner's discretion.

C. Conduit & Wiring:
1. Furnish and install conduit(s) required for power supply and signal wire for the meter. Conduits shall be installed under the floor slab.
2. Furnish and install signal wiring in conduits from meter converter to RTU of SCADA system. Flow rate indicated by meter shall be transmitted to main SCADA panel.
3. Provide control components in MCC and wiring such that chlorine booster pump will not be energized unless flow meter detects flow and well pump controller indicates that the motor is energized.

2.7 PIPE COUPLINGS AND RESTRAINTS

A. Pipe Coupling: Pipe couplings identified on the drawings shall be equal to Smith-Blair 912 Flanged Coupling Adapter or equal. Contractor shall provide tension ties and tie ears as shown on the drawings and specified herein.

B. Tension Ties
1. All tension ties, rod ties, and control rods shall be provided to resist a minimum 150 psi (250 psi surge allowance) pressure in the pipe line.

2. Contractor shall provide tie ears to secure tension rods to flanges.
3. Rods shall be provided with nuts and washers on both sides of tie ears.
4. All nuts shall be carbon alloy steel conforming to A563 and washers shall be hardened steel conforming to ASTM F436.
5. Rods shall be ASTM A36 steel at a minimum.
6. Tie rods shall be equally spaced around pipe.

The following table lists the minimum number and diameter in inches for the tie rods for various sizes of pipe:

	150 psi Pressure		**250 psi Pressure**	
Pipe Size (inches)	**Minimum Number**	**Minimum Size (inches)**	**Minimum Number**	**Minimum Size (inches)**
4-10	4	5/8	4	5/8
12	4	5/8	4	¾
14	4	¾	4	7/8
16	4	¾	4	1
18	4	7/8	4	1-1/8
20	4	1	4	1-1/4
24	4	1-1/8	4	1-1/2

2.8 SAMPLE TAPS/FAUCETS

A. Provide lead-free cast brass sampling faucet with ½ inch male NPT threaded (MIP) inlet, plain/smooth outlet, and tee handle. Pressure rating: 80 to 125 psi. Model No. FY-692LF as manufactured by Matco-Norca, or approved substitution.

2.9 PRESSURE GAUGES

A. Furnish and install 3-1/2 inch dial, 0-300 psi pressure gauges, as shown on the plans. The gauges shall have a steel lower mount case, acrylic window with steel friction ring, brass movement, copper alloy tube and socket, ¼" NPT connection and aluminum black pointer. Gauges shall have an ASME Grade A accuracy of 2-1/2% (±1% of range across middle of half scale). Pressure gauges shall be model J8058B as manufactured by Marsh Instruments, or approved equal. Gauges shall be installed where indicated on the plans and as follows:

1. Discharge head gauge
2. System head gauge
3. Drawdown gauge
4. Chlorine Booster pump – upstream
5. Chlorine booster pump - downstream

B. Provide brass shut-off ball valve for each gauge.

2.10 NON-SHRINK MORTAR

A. Non-shrink mortar shall be All-Crete, as manufactured by Concrete Products, Inc., Woodland, California; Speed Crete, as manufactured by Tamms Industries, Inc.,

Itasca, Illinois; or approved equal substitution per Section 01 60 00 - Product Substitution Procedures. Non-shrink mortar shall be placed in accordance with manufacturer's recommendations.

2.11 CHEMICAL FEED EQUIPMENT

A. Chlorine Feed Equipment

1. Chlorinator System

a. The chlorinator system shall be a vacuum operated, solution-feed, type and shall automatically switch the chlorine supply from an empty cylinder to a full cylinder.

b. The Vacuum-Operated Automatic Switchover Chlorinator shall consist of the following components:

i. Two (2) automatic switchover vacuum regulators for mounting directly on chlorine gas cylinder valves

ii. One (1) pressure-relief (vent) valve

iii. One (1) chlorine gas flow meter panel with rate valve

iv. One (1) ejector/check valve assembly

v. Two (2) automatic emergency chlorine gas cylinder shutoff valves

c. The vacuum regulators shall mount directly onto the cylinder valve by means of a positive yoke type clamp having an integral tightening screw with slide bar handle. The main vacuum regulating diaphragm of each chlorinator shall have a minimum operating area of 13 sq. inches in order to achieve required accuracy and repeatability of the set chlorine flow rate. All metallic bolts shall mate with metallic threaded nuts or inserts. Plastic mating threads for metallic bolts shall not be acceptable. Each chlorinator vacuum regulator shall have its own diaphragm, safety-shutoff/inlet valve and switchover detent mechanism, thereby, allowing chlorination to continue should it become necessary to remove either vacuum regulator from service for leaning or servicing. Switchover detent mechanism shall be made of corrosion-resistant materials and shall not require any field adjustment.

d. The Emergency Shutoff Valve Actuator shall quickly close a gas cylinder valve when a leak is detected. The actuator must fit a 150 lb. gas cylinder, and the actuator system shall consist of a valve stem mounting adaptor, touch screen control panel, and valve actuator. The adaptor shall mount on the stem in seconds providing a tight fit onto the stem. The placement of the actuator on top of the adaptor shall not require tools.

e. The actuator shall be part of an emergency gas shutoff system. The actuator shall be connected to a gas detector and to a local control

system that provides an input signal to close based on a detected condition. The time from detection to valve closure shall be no longer than five seconds.

f. The control panel and each actuator shall have battery backups to ensure valve closure even with lost signal or power failure. The touch screen control panel shall show the status of each cylinder, gas detection level, and have an emergency shutoff button on the main screen. Additionally, it shall have a twenty-four hour historian that shows times and detected gas levels at individual time intervals.

g. The automatic emergency shutoff valve actuators shall be controlled by the Chlorine Gas Leak Monitoring System specified below.

h. The system shall have a maximum capacity of 50 lbs./24 hrs (2000 gms/hr) and shall be REGAL Model 216 Vacuum-Operated Automatic Switchover Chlorinator with Regal Series 9000 Emergency Shutoff Valve Actuators as manufactured by Chlorinators Incorporated, Stuart, Florida.

2. Scale

a. Provide an electronic operated dual cylinder scale system with electronic display/control module and a platform for each of the two cylinders with cylinder bar with restraining chains. The system shall have a 150% overload capacity, 32oF to 120oF operating temperature range, and +/- 1% accuracy.

b. The scale display/control module shall be electronic based, fuse protected and operate on 120 VAC, 1-phase electrical power. It shall have a bright, easy to read 4-digit LCD display, 0.5 inch annunciator LEDs indicating programming and alarm event conditions, front panel keypad with four tactile doom push buttons for operator interface and auto-zero feature (+/- 4 graduations) with back-up pushbutton. The unit shall display gross and net cylinder weight, be capable of 4-20mA (500ohms) output and include 5A or better, C form (N/O & N/C) relays for low weight alarm relay.

c. Each platform shall accommodate a maximum cylinder diameter of 14 inches and have a 300 lbs. capacity. Platforms shall be low profile (1.5" thick) solid PVC with stainless steel hardware, stainless steel electronic strain gage load cell (5 VDC excitation), and cylinder centering posts. Scale platforms shall tilt up for cleaning the floor underneath.

d. The dual cylinder scale system shall be Model ECS402 as manufactured by Chlorinators Incorporated, Stuart, Florida.

3. Chlorine Solution Booster Pump

a. Furnish and install as shown on the Plans, a booster pump to provide the flow rate at the differential pressure required by the chlorinator system specified in item #1 above which is a minimum flow rate of 28 gallons per minute (gpm) at a total dynamic head of 281 feet.

b. Pump Construction:

i. Casting: 316L stainless steel with 360 psi working pressure rating.
ii. Fixing Plate: Corrosion resistant cast aluminum base.
iii. Floating Neck Ring: Self-centering, floating neck rings composed of PPS included with each sage.
iv. Impller: Enclosed design, AISI 316 stainless steel with continuous welds along all vanes.
v. Diffuser Bowl: Each stage shall have a bowl & diffuser stage, constructed of AISI 316 SS and include a silicon carbide journal bearing.
vi. Mechanical Shaft Seal: Cartridge type mechanical shaft seal assembly composed of a Silicon Carbide (SiC) rotating face, Carbon graphite stationary, EPDM elastomers and AISI 316 stainless steel hardware.
vii. Integral Thrust Bearing & Coupling Housing Assembly: One-piece machined aluminum housing with oversized thrust bearings, capable of managing all pump thrust, include a coupling to securely connect the pump shaft to motor shaft and require no adjustment to the impeller stack. The thrust bearing(s) shall be standard automotive type bearings, easily replaced in the field by removal of circlips locking the bearing(s) into the aluminum housing and allow the use of standard off-the-shelf TC or TSC frame motors instead of special high-thrust motors.
viii. Pump Shell: AISI 316 SS steel, polished and with chamfered edges top and bottom.
ix. Motor: NEMA standard design TC-TSC frame suitable for vertical mounting and close coupled to the pump unit. Motors shall be of a manufacturer's standard catalog design and must not use special bearings as a thrust handling device. The motor rating shall be: 3 HP, 3600 RPM, 1- Phase, 60 Hz, 230 Volts, TEFC Enclosure with 1.15 Service Factor.
x. Inlet/Outlet Connections: 1.25" round flanges.

c. The booster pump shall be a VR Series vertical multi-stage booster pump, Model 6VR1100NF1A with a 3 Hp, 230 VAC, 1-phase motor as manufactured by Franklin Electric.

4. Provide control components in MCC and wiring such that booster pump will not be energized unless flow meter detects flow and well pump motor is energized.

B. Chemical Feed Conduit, Tubing and Injectors

1. Furnish and install conduit in floor between chemical feed room and wellhead discharge piping, as indicated on the Plans. Long sweep 90 degree bends shall be used in chemical feed tubing conduits.
2. Furnish and install polyethylene solution tubing from the chlorine booster pump to the injection point. Tubing shall be unaffected by chemical it carries and shall withstand the operating conditions of the chemical feed system it is installed for.
3. Conduit & tubing shall be color coded per requirements of NR 811.32(6).
4. Furnish and install 1" NPT polypropylene nozzle with bronze corporation stop model no. 10741 as manufactured by LMI Milton Roy or approved equal substitution per Section 01 60 00 - Product Substitution Procedures) for the chemical feed injection point.

C. Chlorine Gas Leak Monitor & Alarm System

1. System shall continuously monitor the Chlorine Room for the presence of chlorine gas and display the concentration level in parts per million while simultaneously indicating the highest level detected on an LED bar graph.
2. System shall be composed of a water-tight wall mounted sensor in the Chlorine Room and a wall mounted monitoring unit (NEMA 4X enclosure) located in the Pump Room adjacent to the Chlorine Room viewing window.
3. The system shall include an audible alarm horn and light activating for a WARNING condition (1 PPM) and for a DANGER condition (2 PPM).
4. The system shall be wired to the automatic emergency chlorine gas cylinder shutoff valves shutting off the cylinders in the event of a detected leak.
5. Alarm relays shall be wired to the SCADA system for remote alarm annunciation.
6. Monitor shall be provided with battery backup.
7. Manufacturer & Model: Regal Model No. 3001 as manufactured by Chlorinators Incorporated, Stuart, Florida.

D. Chemical Feed Accessories

1. Test Kit: Owner will provide one (1) chlorine test kit, DPD method, smallest increment 0.1 mg/l. Kit to be Pocket Colorimeter Model No. 58700-00 as manufactured by Hach.
2. Personal Protective Equipment: Owner will provide protective safety gloves, face shield and apron to protect water utility workers against the specific chemicals that are to be present in the chemical feed room.
3. Warning Signs: Contractor shall provide warning signs per requirements of Chapter SPS 332, Wisconsin Administrative Code for the chemical room entrance door, tanks and equipment.
    a. Chemical Room Door: Furnish 6"x6" diamond shaped sign(s) meeting the NFPA 704 standard and constructed of a durable, exterior-grade material with a hard-coated plastic, impact resistant top layer which functions as a UV filter to prevent fading for mounting to the exterior side of the chemical room door. The

sign should show the appropriate NFPA® health, fire, instability and special hazard ratings for chemicals within the room.

b. Scale Indicators Chemical Identification: Furnish and install an engraved plastic wall tag indicting chemical measured above scale indicator units.

PART 3 EXECUTION

3.1 WELL NO. 2 WELL PUMP SALVAGE & REUSE

A. BASE BID (NEW BOWL ASSEMBLY):

1. Remove the well pump motor, pump base, column assembly (column pipe, line shaft & bearings), bowl assembly, and suction pipe from the Well No. 2 Facility.
2. The salvaged pump base, column assembly, and suction pipe shall be reused for the new well pump.
3. Disassemble the column assembly and inspect bearings for wear. Inspect the pump base for wear. Furnish a condition report with recommendations for reuse or replacement of the bearings to the Owner for review and approval prior to proceeding with any further work.
4. Install the salvaged pump base, column assembly, and suction pipe with a new motor, bowl assembly, and cone strainer at Well No. 5.

B. ALTERNATE BID ITEM (REUSE WELL NO. 2 BOWL ASSEMBLY):

1. Transport the bowl assembly to the Contractor's facility. Furnish and provide all labor, tools, equipment, materials, and incidentals required to load, transport, and off-load the bowl assembly at the Contractor's facility. Contractor shall be responsible for any damage, including but not necessarily limited to piping, bolts, nuts, washers, mounting brackets and hardware, caused by its own operations to transport and disassemble the bowl assembly.
2. Disassemble, inspect and clean the bowl assembly. Inspect shaft for straightness and all parts for wear. Furnish condition report with rehabilitation/rebuild recommendations to Owner for review and approval prior to proceeding with any further work.
3. Upon written approval of the Owner, the following shall be performed:
   a. Rebuild bowl assembly with new wear rings, bearings and shaft.
   b. Furnish and install an additional stage trimmed to provide specified flow rate at the specified total dynamic head (TDH).
4. Transport the rebuilt bowl assembly to the Well No. 5 Pumphouse and install with salvaged column assembly (pipe, shaft & bearings), salvaged discharge head, and new cone strainer and motor.

3.2 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

3.3 INSTALLATION

A. Handle and assemble pipe and valves in accordance with manufacturer's instructions and as indicated on the Plans.

B. Install Work in accordance with State of Wisconsin Standard Specifications for Sewer and Water Construction standards.

C. Support

1. All interior or exposed pipelines, shall be securely supported by adjustable metal saddles, brackets, or adjustable hangers supported directly by concrete, masonry work, or tile.
2. In general, the maximum spacing of supports shall not exceed 10 feet on centers unless approved by Engineer.
3. Contractor shall furnish and place hangers, supports, wall pipes, sleeves, and floor boxes in the forms before concrete is poured wherever needed or shown on the Plans.
4. All piping shall be adequately supported and braced to resist thrust at bends and joints. Use base elbows, poured concrete or rod ties.
5. The weight of the piping shall be supported independently of connected equipment and valves.

D. The appropriate number, size, and lengths of spool pieces and flange fillers needed for plumbing and leveling any existing piping shall be included in the price bid.

3.4 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements.

B. Requirements 01 70 00 - Execution and Closeout Requirements: Field inspecting, and testing, adjusting.

C. All piping shall be flushed or blown out after installation prior to testing.

D. All piping, interior or exposed, shall be subject to test before being covered with insulation or paint. All piping and appurtenances shall be watertight or airtight and free from visible leaks.

E. Leak Testing: Test pipe and valve connections under normal static system pressure. Inspect for visible leaks. All leaks shall be repaired prior to installation of insulation or painting.

F. Well Pump Tests:

1. After installation of the well pump, motor, motor controls, chemical feed equipment, and other associated well equipment, the Contractor shall conduct a 2-hour pumping test to waste to prove the pump meets the head-capacity, power consumption and efficiency as specified in this section of the specifications. The back pressure shall be varied to provide a minimum of four testing points to plot on the factory certified pump curve. The following test parameters must be measured and recorded during the duration of the well pump test:
   a. Time
   b. Flow Rate (gpm)
   c. Altitude Gauge Reading (ft.)
   d. Pumping Water Level (ft.)
   e. Drawdown (ft.)
   f. Back Pressure (psi)
   g. Specific Capacity (gpm/ft.)
   h. Motor Power Consumption (amps)

2. The well pumping equipment shall be free of excessive vibration. Vibration measurements shall be taken during the well pump test. Measurement locations and procedures shall comply with the most recent edition of the Standard for Centrifugal and Vertical Pumps for Vibration Measurements and Allowable Values (ANSI/HI 9.6.4). Vibration probes shall not be placed on flexible panel or cylinder walls such as motor end cover. Such covers shall be removed to allow measurement on a stiff part of the motor. Unfiltered RMS velocity readings in inches per second shall be taken at the locations shown in Figure 9.6.4.13 of ANSI/HI 9.6.4. The input power in BHP or kW corresponding to each measurement made shall be recorded. Contractor shall furnish power and vibration measuring equipment. The maximum field measured value recorded in each of the three planes (vertical, horizontal and axial) shall not exceed the allowable values shown in Figure 9.6.4.13 of ANSI/HI 9.6.4.
3. If the pump motor does not have enough power to operate pump without overheating, or otherwise showing signs of inadequate power, or adjustment, or if the pump fails to operate satisfactorily from a mechanical or hydraulic standpoint, and does not comply with the proposal and specifications, the Well Contractor will be notified and it will be a part of his contract to put the unit in satisfactory operating condition so that it will comply with the specification. After it is finally adjusted, it should operate 50 days without signs of distress before final payment. Any extra expense caused the Owner or Engineer because of the Contractor's failure to supply equipment up to the standards and guarantee made with the bid, will be deducted from payments due to the Contractor.
4. The pump supplier is to guarantee the pump parts and workmanship for one year. If the pump fails or the rate of pumping decreases from the rate as specified, it is the supplier's responsibility to remove the pump and to replace

it in the well in satisfactory condition. If the failure is due to a change in water available, the Contractor shall not be held responsible.

G. Well Equipment Tests

1. Well Contractor shall demonstrate the proper operation of all the well pumping related equipment to the Owners and Engineers satisfaction. Tested equipment to include, but not necessarily limited to, the chemical feed systems, level transducer, flow meter, and well pump controls.

3.5 PAINTING

A. Surface Preparation:

1. Remove oil, grease, dirt, and other foreign substances from shop prime.
2. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with the same primer as the shop coat.

B. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

C. Application: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

D. Ferrous Metal Potable Water Piping Paint Schedule:

1. Surface Preparation: SSPC-SP10
2. Shop Primer: Tnemec Omnithane Series 1 or Pota-Pox Plus N140F @ 2.5 – 3.5 mils dry film thickness (DFT).
3. Intermediate: Tnemec Series 66 Hi-Build Epoxiline (polyamide epoxy) @ 4-6 mils DFT (200 s.f./gallon).
4. Finish Coat: Tnemec Series 66 Hi-Build Epoxiline (polyamide epoxy) @ 4-6 mils DFT (200 s.f./gallon)

3.6 CLEANING AND DISINFECTION

A. All equipment and materials shall be clean before installation. Contractor shall disinfect and flush the system before it is put in service.

B. A bacteriological safe sample shall be obtained as determined by the State Hygiene Lab before the work is accepted by the Owner.

3.7 OPERATION AND MAINTENANCE MANUALS

A. The Well Contractor shall provide the Owner with three complete operation and maintenance manuals with parts lists, supplier listings and wiring diagrams for all major mechanical equipment prior to approval of final payment on project.

3.8 TRAINING

A. The manufacturer's representative shall instruct the Owner's operating personnel as to the proper procedures for operating and maintaining the equipment as follows:

1. Start-up and Training Instruction – One (1) Eight-Hour Day (minimum)

2. The following equipment and systems require owner training.
   1) Pumps
   2) Valves
   3) Controls
   4) Chemical Feed Systems
   5) Flow Meter

3. The Owner Training Certificate included in Appendix A of this specification section shall be completed by the Contractor for each item requiring owner training. The completed form(s) shall be given to the Engineer prior to receiving final payment for this project.

APPENDIX A
OWNER TRAINING

Project: _____

Contractor: _____

Representative for the Contractor: _____

Equipment System: _____

_____

_____

_____

Instructions given for the following equipment systems: _____

_____

_____

_____

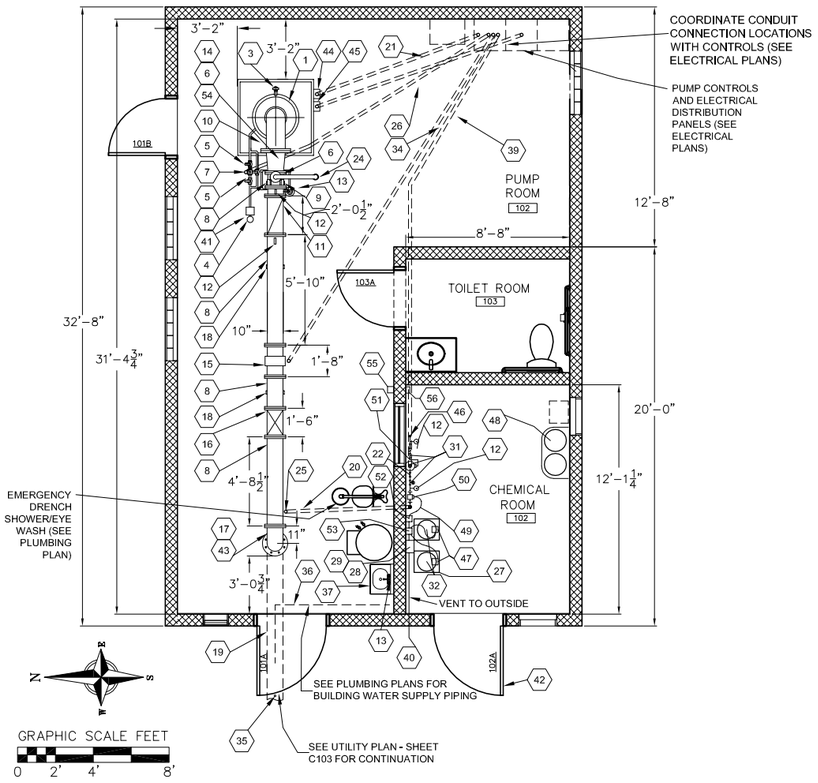
Operation and Maintenance Manual given for the system: _____Yes _____ No

We/I have received instructions on the operation of the above mentioned system and fully understand its operation and maintenance procedures. We/I have been given a booklet(s) describing the operation and maintenance of the equipment system.

Signed _____
For the Owner

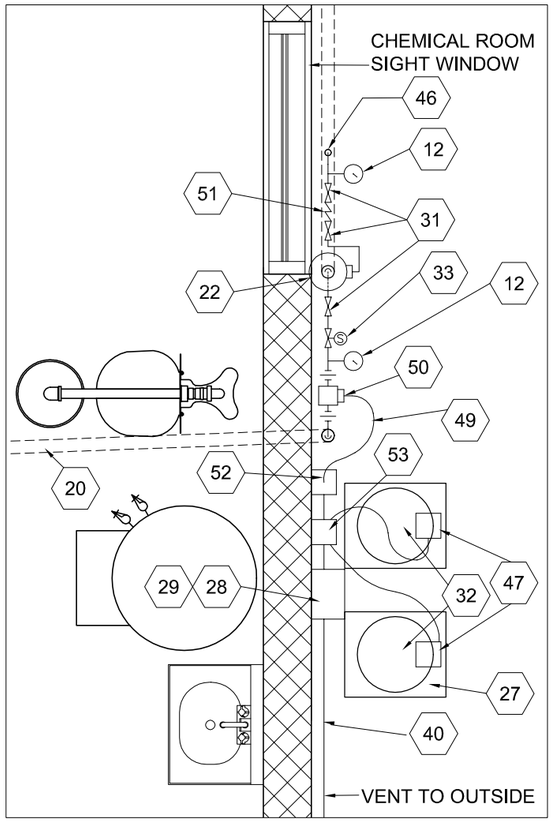
Signed _____
For the Contractor

END OF SECTION



1 Q101 PROCESS PIPING FLOOR PLAN

SCALE: 1/4" = 1'-0" (22"X34")
1/8" = 1'-0" (11"X17")

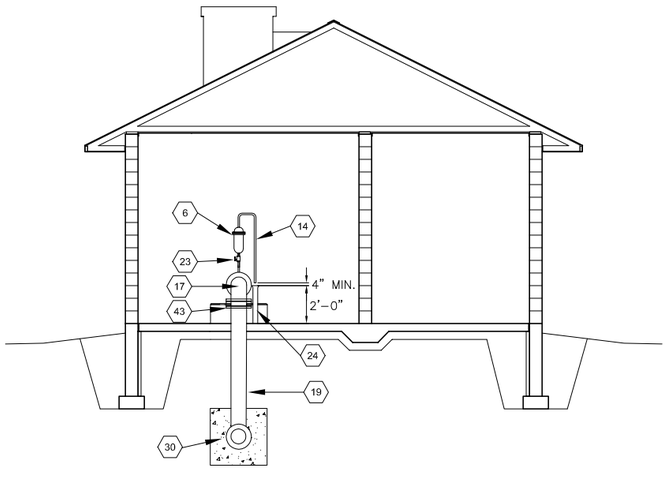


2 Q101 CHLORINE FEED EQUIPMENT LAYOUT

NOT TO SCALE

LIST OF MATERIALS

NUMBER	DESCRIPTION
1	WELL PUMP (10"ø X 10"ø DISCHARGE HEAD)
2	WELL VENT W/ 24 MESH NON-CORRODIBLE SCREEN (Min. 24" above finished floor) – 2" MIN. DIA.
3	AIRLINE & DRAWDOWN ASSEMBLY (2 REQ'D)
4	1/2" PRELUBE WATER SUPPLY PIPING. SEE PLUMBING PLANS.
5	1/2" BALL VALVE
6	AIR/VACUUM RELEASE VALVE W/DISCHARGE PIPING TO HUB DRAIN
7	PRELUBE SOLENOID VALVE (INTERWIRED W/ PUMP CONTROLS)
8	10" PIPE SPOOL (D.I. – CLASS 53)
9	10" DIA. FLANGED COUPLING ADAPTER
10	THREADED TIE RODS
11	10" CHECK VALVE
12	PRESSURE GAGE
13	SMOOTH END SAMPLING TAP
14	2" GALV. STEEL PIPE (VERIFY SIZE WITH AIR/VAC. VALVE MANUFACTURER) TERMINATING W/24 MESH NONCORRODIBLE SCREEN DOWN-TURNED OVER HUB DRAIN – LEAVE 2" AIR GAP – TERMINATE 24" ABOVE FLOOR
15	10" FLOW METER W/4 -20 M.A. OUTPUT TRANSMITTER
16	10" GATE VALVE
17	10" x 10" DIA. 90 DEGREE ELBOW (D.I. – CLASS 53)
18	ADJUSTABLE PIPE SUPPORT (3 REQ'D)
19	10" DIA. D.I. PIPE (CLASS 52)
20	1" DIA CHEMICAL POLYETHYLENE TUBING FEED LINE, CONTAINED WITHIN 2" CONDUIT (STUB UP THRU FLOOR 12") SEAL BOTH ENDS
21	CONDUITS FROM CONTROLS TO LEVEL TRANSDUCER & PUMP MOTOR
22	BOOSTER PUMP
23	2" BALL VALVE (VERIFY WITH AIR/VAC. VALVE MANUFACTURER)
24	4" DIAMETER HUB DRAIN PIPE (LOCATE MIN. 2' FROM WELL CASING)
25	CHLORINE INJECTOR
26	1" CONDUIT FROM SOLENOID VALVE TO CONTROLS
27	SCALES
28	SCALE INDICATOR (MOUNTED ON WALL)
29	CHEMICAL ID TAG (MOUNTED ON WALL ABOVE CHEM. FEEDER AND SCALE INDICATOR)
30	10" DIA. 90 DEGREE ELBOW – MECHANICAL JOINT – WITH CONCRETE THRUST BLOCK
31	1" BALL VALVE
32	CHLORINE GAS CYLINDER TANKS
33	1" SOLENOID VALVE (INTERWIRED WITH WELL PUMP & FLOW METER)
34	CONDUITS FROM CONTROLS TO FLOW METER – SIZE & NUMBER AS REQUIRED BY METER MANUFACTURER
35	1-1/2" CORPORATION STOP
36	1-1/2" COPPER PIPE
37	SAMPLE SINK
38	10" PIPE – FLANGE/PLAIN END (D.I. – CLASS 53)
39	1" CONDUIT FROM CONTROLS TO CHEMICAL FEED ROOM
40	1" MIN. DIA. PE OR PVC TANK VENT WITH 24 MESH NON-CORRODIBLE SCREEN COVER ON 90 DEGREE DOWN TURNED ELBOW AT EXTERIOR
41	1/2" MECHANICAL FLOW METER
42	EXTERIOR DOOR WITH VIEWING WINDOW & WARNING SIGN "DANGER-CHLORINE GAS"
43	10" WAFER OR FLANGED BUTTERFLY VALVE WITH HANDWHEEL & GEAR BOX
44	LEVEL TRANSDUCER TERMINATION ENCLOSURE
45	PUMP MOTOR POWER CABLE J-BOX (MAY BE FED FROM OVER HEAD CONDUIT IN CEILING)
46	1" WATER SUPPLY PIPE TO CHLORINE BOOSTER PUMP INLET
47	CHLORINATORS
48	SPARE CYLINDERS WITH CHAIN AND WALL HOOKS
49	VACUUM TUBING
50	CHLORINE EJECTOR WITH UNIONS
51	REDUCED PRESSURE BLACKFLOW PREVENTOR
52	PRESSURE RELIEF VALVE
53	FLOWMETER/RATE VALVE
54	10"X12" CONCENTRIC REDUCER
55	CHLORINE GAS LEAK DETECTION MONITOR WITH ALARM HORN & LIGHT
56	CHLORINE GAS LEAK DETECTION SENSOR

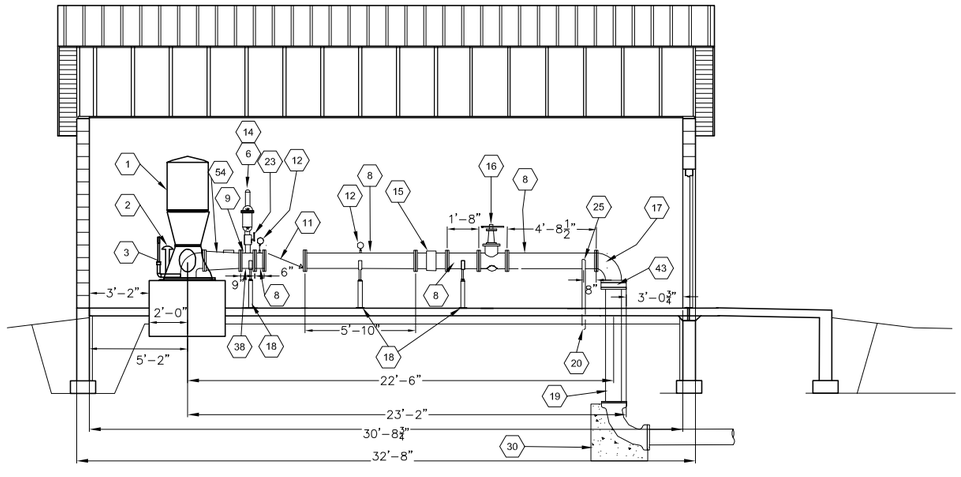


4 Q101 PROCESS PIPING ELEVATION

SCALE: 1/4" = 1'-0" (22"X34")
1/8" = 1'-0" (11"X17")

GRAPHIC SCALE FEET
0 2' 4' 8'

3 Q101 LIST OF MATERIALS



5 Q101 PROCESS PIPING ELEVATION

SCALE: 1/4" = 1'-0" (22"X34")
1/8" = 1'-0" (11"X17")

GRAPHIC SCALE FEET
0 2' 4' 8'

vierbicher
planners engineers advisors

PROCESS PIPING PLAN & SCHEDULE

PUBLIC WATER SUPPLY - WELL NO. 5 PUMPHOUSE
CITY OF PRAIRIE DU CHIEN
CRAWFORD COUNTY, WISCONSIN

REVISIONS NO.	DATE	REMARKS
1	7/10/25	PER WNDR
2	1/20/26	ADD NO.1 - FLG BFY VALVE

DATE: JUNE 2025
DRAFTER: CLEN
CHECKED: DPOP
PROJECT NO.: 240564

Q101