

Olsson
Consulting Engineers
201 East 2nd Street, P.O. Box 1072
Grand Island, Nebraska 68802
June 7, 2022

ADDENDUM NO. 1

Lift Station No. 28 Equalization Tank; City Project No. 2022-S-3
Grand Island, Nebraska
OA Project # 021-05281

Letting Date: June 21, 2022 @ 2:00pm (CST)

TO ALL WHO HAVE RECEIVED PLANS AND SPECIFICATIONS FOR THE
REFERENCED PROJECT.

This addendum supersedes all conflicting portions of the drawings and specifications. Contractor shall include all omissions, additions, and adjustments of all trades as may be necessary because of each change, substitution, or omission. Such omission, addition, or adjustment shall conform to recognized and accepted engineering practice.

1. Refer to the Specifications, Form of Contractor's Bid

Delete the existing Form of Contractor's Bid and insert the attached Form of Contractor's Bid.

2. Refer to the Specifications, Section 01005

Delete the existing Section 01005 and insert the attached Section 01005.

3. Refer to the Specifications, Section 13150

Delete the existing Section 13150 and insert the attached Section 13150.

4. Refer to the Specifications, Section 13200

Delete the existing Section 13200 and insert the attached Section 13200.

5. Refer to the Specifications, Section 15130

Delete the existing Section 15130 and insert the attached Section 15130.

6. Refer to the Specifications

Insert the attached Appendix B – Quote from Electric Pump dated June 1st, 2022

7. Refer to the Plans, Sheet G2.0

Delete the existing Sheet G2.0 and insert the attached Sheet G2.0

8. Refer to the Plans, Sheet C8.1

For Clarification: The allowable soil bearing pressure of 1,800 PSF is for a differential

settlement of 0.50 inches. Varying bearing pressures may be acceptable if the acceptable settlement is higher. A strip footing with a bearing pressure of 2,250 PSF results in a settlement of 0.68 inches.

Each Bidder must acknowledge receipt of all Addenda in the space provided on the Proposal Form.

Douglas W. Loudon



CONTRACTOR'S BID
Revised with Addendum No. 1

LIFT STATION 28 EQUALIZATION TANK- 2022
CITY PROJECT 2022-S-3
CITY OF GRAND ISLAND, NE

TO THE MEMBERS OF THE COUNCIL
CITY OF GRAND ISLAND
GRAND ISLAND, NEBRASKA

THE UNDERSIGNED BIDDER, having examined the plans, specifications, general and special conditions, other proposed Contract documents, all addenda thereto and being acquainted with and fully understanding (a) the extent and character of the work covered by this bid, (b) the location, arrangement and specified requirements for the proposed work, (c) the location, character and condition of existing streets, roads, highways, railroads, pavements, surfacing, walks, driveways, curbs, gutters, trees, sewers, utilities, drainage courses and structures and other installations, both surface and underground, which may affect or be affected by the proposed work, (d) the nature and extent of the excavations to be made and the handling and re-handling requirements, including the possible constraints of dewatering due to ground water, (f) the difficulties and hazards to the work which might be caused by storm and flood water, delivery facilities, and (h) all other factors and conditions affecting or which may be affected by the work,

HEREBY PROPOSES to furnish all required materials, supplies, equipment, tools and plant, to perform all necessary labor and supervision, and to construct, install, erect, equip and complete all work stipulated in, required by and in accordance with the Contract documents and the plans, specifications and other documents referred to therein (as altered, amended or modified by all addenda thereto) for;

IN CONSIDERATION OF THE FOLLOWING UNIT PRICES. These prices shall be used to adjust the bid price in the event the specifications or plans and drawings are altered or changed by the City due to unforeseen conditions. The unit prices shall be used in conjunction with, DIVISION I GENERAL SPECIFICATIONS, Section 9.04, titled "Payment for Extra Work." These prices will be used as the established price for any additions or deductions to the contract work. Unit prices shall include all materials, supplies, equipment, labor, and taxes necessary to furnish and install the unit complete. **The contractor will be paid on the basis of actual quantity times unit price:**

Base Bid Section

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>	<u>ESTIMATED QUANTITY</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
1.	MOBILIZATION/DEMobilIZATION	LS	1	\$ _____/LS	\$ _____
2.	REMOVE AND SALVAGE HORIZONTAL SLIDE GATE	EA	2	\$ _____/EA	\$ _____
3.	REMOVE DEWATERING WELL	LS	1	\$ _____/LS	\$ _____
4.	REMOVE BARBED WIRE FENCE	LF	377	\$ _____/LF	\$ _____

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>	<u>ESTIMATED QUANTITY</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
5.	REMOVE CHAIN LINK FENCE	LF	280	\$ _____/LF	\$ _____
6.	REMOVE AND STOCKPILE CRUSHED ROCK SURFACING	SY	916	\$ _____/SY	\$ _____
7.	REMOVE BOLLARD	EA	7	\$ _____/EA	\$ _____
8.	REMOVE 24" RCP STORM DRAIN	LF	20	\$ _____/LF	\$ _____
9.	REMOVE FLARED END SECTION	EA	2	\$ _____/EA	\$ _____
10.	GRIND EXISTING CURB	LF	57	\$ _____/LF	\$ _____
11.	REMOVE AND REPLACE PIPE SUPPORT GROUT	LS	1	\$ _____/LS	\$ _____
12.	VALVE VAULT INTERIOR PIPING	LS	1	\$ _____/LS	\$ _____
13.	EARTHWORK, CLEARING, AND GRUBBING	LS	1	\$ _____/LS	\$ _____
14.	INSTALL 8" DI PIPE	LF	23	\$ _____/LF	\$ _____
15.	INSTALL 12" DI PIPE	LF	213	\$ _____/LF	\$ _____
16.	INSTALL 4" PVC WATER PIPE	LF	58	\$ _____/LF	\$ _____
17.	INSTALL 24" RCP STORM PIPE	LF	84	\$ _____/LF	\$ _____
18.	ADJUST MANHOLE TO GRADE	EA	1	\$ _____/EA	\$ _____
19.	INSTALL 48" VALVE MANHOLE	EA	3	\$ _____/EA	\$ _____
20.	INSTALL 8" ELECTRIC ACTUATED PINCH VALVE	EA	1	\$ _____/EA	\$ _____
21.	INSTALL 12" ELECTRIC ACTUATED PINCH VALVE	EA	1	\$ _____/EA	\$ _____

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>	<u>ESTIMATED QUANTITY</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
22.	INSTALL 12" CHECK VALVE	EA	1	\$ _____/EA	\$ _____
23.	INSTALL 12" DI MJ 90° BEND	EA	1	\$ _____/EA	\$ _____
24.	INSTALL 12" DI MJ 45° BEND	EA	2	\$ _____/EA	\$ _____
25.	INSTALL 12" SANITARY WYE	EA	1	\$ _____/EA	\$ _____
26.	INSTALL 12"X8" DI MJ CONCENTRIC REDUCER	EA	1	\$ _____/EA	\$ _____
27.	INSTALL DROP CONNECTION IN EXISTING MANHOLE	LS	1	\$ _____/LS	\$ _____
28.	INSTALL WATER SERVICE LOWERING	EA	1	\$ _____/EA	\$ _____
29.	INSTALL WATER WELL	LS	1	\$ _____/LS	\$ _____
30.	INSTALL 8' CHAIN LINK FENCE	LF	656	\$ _____/LF	\$ _____
31.	RESET 12' HORIZONTAL SLIDE GATE	EA	1	\$ _____/EA	\$ _____
32.	REUSE CRUSHED ROCK SURFACING	TON	119	\$ _____/TON	\$ _____
33.	INSTALL BOLLARD	EA	4	\$ _____/EA	\$ _____
34.	INSTALL VENT ON EXISTING MANHOLE	LS	1	\$ _____/LS	\$ _____
35.	INSTALL AREA INLET	EA	1	\$ _____/EA	\$ _____
36.	PLACE 4" CONCRETE WALK	SF	1607	\$ _____/SF	\$ _____
37.	PLACE 6" CONCRETE PAVEMENT	SY	1111	\$ _____/SY	\$ _____
38.	INSTALL ADA RAMP	EA	3	\$ _____/EA	\$ _____

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>	<u>ESTIMATED QUANTITY</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
39.	INSTALL SUBMERSIBLE PUMP	LS	1	\$ _____/LS	\$ _____
40.	SANDBLAST AND RECOAT ALL VALVE VAULT PIPING	LS	1	\$ _____/LS	\$ _____
41.	EROSION CONTROL	LS	1	\$ _____/LS	\$ _____
42.	ELECTRICAL WORK	LS	1	\$ _____/LS	\$ _____
43.	CONTROLS	LS	1	\$ _____/LS	\$ _____
44.	IMPORTED TOPSOIL	LS	1	\$ _____/LS	\$ _____
45.	LANDSCAPING AND SEEDING	LS	1	\$ _____/LS	\$ _____

ITEM

C.1 Total Base Bid Section (Item C.1 must equal total sum of Items 1 through 45)

_____ \$ _____
 (Words) (Figures)

Alternate Bid Section "A"

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>	<u>ESTIMATED QUANTITY</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
Alt A	INSTALL 400,000 GALLON PRESTRESSED CONCRETE TANK	LS	1	\$ _____/LS	\$ _____

ITEM

C.Alt A Total Base Bid Section (Item C.Alt A must equal total sum of Items 1-45 and Alt A)

_____ \$ _____
 (Words) (Figures)

Alternate Bid Section "B"

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>	<u>ESTIMATED QUANTITY</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
Alt B	INSTALL 600,000 GALLON PRESTRESSED CONCRETE TANK	LS	1	\$ _____/LS	\$ _____

ITEM

C.Alt B Total Base Bid Section (Item C.Alt B must equal total sum of Items 1-45 and Alt B)

_____ (Words) \$ _____ (Figures)

Alternate Bid Section "C"

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>	<u>ESTIMATED QUANTITY</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
Alt C	INSTALL 400,000 GALLON WELDED STEEL TANK	LS	1	\$ _____/LS	\$ _____

ITEM

C.Alt C Total Base Bid Section (Item C.Alt C must equal total sum of Items 1-45 and Alt C)

_____ (Words) \$ _____ (Figures)

Alternate Bid Section "D"

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>	<u>ESTIMATED QUANTITY</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
Alt D	INSTALL 600,000 GALLON WELDED STEEL TANK	LS	1	\$ _____/LS	\$ _____

ITEM

C.Alt D Total Base Bid Section (Item C.Alt D must equal total sum of Items 1-45 and Alt D)

_____ (Words) \$ _____ (Figures)

BASE BID WITH ALTERNATES: The “Base Bid” is the sum stated in the Bid for which Bidder offers to furnish Goods and Special Services described in Bidding Documents as the base, to which work may be added for sums stated in Alternate Bids. An “Alternate Bid” (or Alternate) is an amount stated in the Bid to be added to the amount of the Base Bid if the corresponding change in Goods and Special Services, as described in Bidding Documents, is accepted.

Bidder shall submit a Bid for the Base Bid, and include a separate Alternate Bid for at least one Alternate described in the Bidding Documents as set forth in Bid Form. Discrepancies between words and figures will be resolved in favor of words.

BASIS FOR AWARD: Bidder hereby agrees to accept an award of contract based on the Bid that provides the best overall value to OWNER. The award of the contract will be based on the base bid and one (1) of the bid alternates.

COMPLETION DATE: All contract work shall be substantially complete by **November 1, 2023**; with all work except landscaping final by **December 1, 2023**. The complete project with landscaping shall be final by **June 1, 2024**.

LIQUIDATED DAMAGES: Liquidated damages shall be \$500.00 per calendar day for every calendar day past the completion date for all portions of the work and as summarized in the labor standard clauses.

EXPERIENCE DATA: Each bidder shall supply the following data on their experience:

Name of Bidder: _____

<u>Project Owner/Contact/Phone No.</u>	<u>Project Location</u>	<u>Completion Date</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

Additional Data: _____

INSURANCE: Bidder acknowledges that bid includes compliance with the attached insurance requirements.

ADDENDA: Bidder acknowledges that the following Addendums were received and considered in Bid preparation:

<u>Addendum No.</u>	<u>Addendum Date</u>	<u>Signature</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

Bidder acknowledges that Addenda Number(s) _____ were received and considered in bid preparation.

The undersigned bidder agrees to furnish the required bond and to enter into a contract within fifteen (15) days after acceptance of this bid, and further agrees to complete all work covered by the foregoing bid in accordance with specified requirements. **No work shall commence until the Certificate of Insurance and bonds are approved by the City, the contract is executed, and the Notice to Proceed is issued.**

Enclosed herewith is the required bid guarantee in the amount of

_____ Dollars (_____)

which the undersigned bidder agrees is to be forfeited to and become the property of the City of Grand Island, Nebraska, as liquidated damages should this bid be accepted and a contract be awarded to them and then fail to enter into a contract in the form prescribed and to furnish the required bond within fifteen 15 days, but otherwise the aforesaid bid guarantee will be returned upon signing the contract and delivering the approved bond.

It is understood and agreed that time is of the essence of the contract.

In submitting this bid it is understood that the right is reserved by the City to reject any and all bids; to waive irregularities therein and to accept whichever bid that may be in the best interest of the City. It is understood that this bid may not be withdrawn until after forty-five (45) days from bid opening.

In submitting this bid, the bidder states that bidder fully complies with, and will continue to comply with, applicable State Fair Labor standards as required by section 73-102 RRS, 1943 and also complies with, and will continue to comply with, section 48-657 RRS, 1943 pertaining to contributions to the Unemployment Compensation Fund of the State of Nebraska.

The undersigned bidder hereby certifies (a) that this bid is genuine and is not made in the interest of or in the behalf of any undisclosed person, firm or corporation, and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation, (b) that bidder has not directly or indirectly induced or solicited any person, firm or corporation to refrain from bidding, (c) that bidder has not sought, by collusion or otherwise, to obtain for themselves an advantage over any other bidder or over the City of Grand Island, and (d) that bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid.

DATED _____

SIGNATURE OF BIDDER:

If an Individual: _____ doing business

as _____

If a Partnership _____

by _____, member of firm.

If a Corporation: _____

by _____ (Seal)

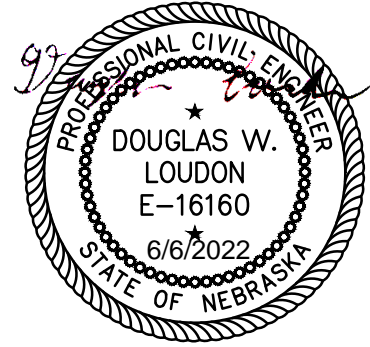
Title _____

BUSINESS ADDRESS OF BIDDER _____

TELEPHONE NUMBER OF BIDDER _____

FAX NUMBER OF BIDDER _____

SECTION 01005
ADMINISTRATIVE PROVISIONS



PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Contract Method.
- B. Contractor Use of Premises.
- C. Schedule of Values.
- D. Applications for Payment.
- E. Coordination.
- F. Progress Meetings.
- G. Reference Standards.
- H. Correction Period.
- I. Clean-Up

1.2 CONTRACT METHOD

- A. Construct the work on a unit price basis.
- B. Minor items necessary to provide a complete and service facility shall be included in the bid and furnished even if not specifically called for in the plans and specifications.

1.3 CONTRACTOR USE OF PREMISSES

- A. Limit use of premises for Work and for construction operations to area designated for construction purposes.
- B. Coordinate use of premises under direction of Owner.
- C. Save the Owner and its agents harmless for all damages resulting from disruption of private or public property outside the designated lands for work.

1.4 APPLICATIONS FOR PAYMENT

- A. Submit a .pdf copy of each application on AIA Form G702 -Application and Certificate for Payment or Engineer approved format.
- B. Content and Format: Utilize Bid Items for listing items in Application for Payment.

- C. Payment Period: Monthly.
- D. Include a .pdf copy of an updated construction progress schedule.

1.5 COORDINATION

- A. Coordinate work of the various Sections of Specifications to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items installed later.
- B. Verify characteristics of elements of interrelated operating equipment are compatible; coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Execute cutting and patching to integrate elements of Work, uncover ill-timed, defective, and non-conforming work, and provide samples for testing.

1.6 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at monthly intervals.
- B. Engineer will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Engineer, as appropriate to agenda topics for each meeting.
- D. Agenda:
 - 1. Review of Work progress.
 - 2. Field observations, problems, and decisions.
 - 3. Identification of problems which impede planned progress.
 - 4. Review of submittals schedule and status of submittals.
 - 5. Review of off-site fabrication and delivery schedules.
 - 6. Planned progress during succeeding work period.
 - 7. Coordination of projected progress.
 - 8. Maintenance of quality and work standards.
 - 9. Effect of proposed changes on progress schedule and coordination.
 - 10. Other business relating to Work.
- E. Engineer will record minutes and distribute copies to participants.

1.7 REFERENCE STANDARDS

- A. For products specified by association or trade standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. The date of the standard is that in effect as of the Bid date, or date of Owner-Contractor Agreement when there are no bids, except when a specific date is specified.

- C. Obtain copies of standards when required by Contract Documents. Maintain copy at jobsite during progress of the specific work.

1.8 CORRECTION PERIOD

- A. Correct all defective work for one (1) year after acceptance of the project.
- B. Promptly repair or replace at no cost to the Owner all defects in material or workmanship which may appear during the correction period.

1.9 CLEAN UP

- A. Clean up areas of the project as work progresses.
- B. Before acceptance of the project, clean all work areas of rubbish, excess materials, equipment, broken concrete, etc.
- C. Return all areas to original condition, grade and rake all disturbed earth areas.

1.10 ALLOWANCES

- A. The lump sum unit price for the "Install Submersible Pump" pay item for the Base Bid shall include cash allowances for certain portions of the work as follows:

1. Pump and variable frequency drive: \$131,595.00

One (1) Flygt NP3202-458HT submersible pump. Pump to be furnished with the following:

- 67 HP, 460V, 3-phase, 60Hz, explosion proof, premium efficient motor
- Hard Iron Impeller
- Outlet adapter modified for drop-in on existing Flygt 8" elbow
- 50' Power cable
- SS Lifting chain with bow shackle
- Factory performance test
- One (1) Spare Flygt hard iron impeller, 458HT Code, 310mm

One (1) ABB ACQ580 Variable Frequency Drive Package including:

- NEMA Type 1 – Steel Enclosure, with back panel
- NEMA cooling fan and thermostat
- Incoming Power Terminal Block
- Main Circuit Breaker with door mount operator
- Control Power Transformer with Primary Fuses
- Control Power Circuit Breaker
- QOU Circuit Breaker, as required
- 30mm Push-To-Test Run Pilot Light
- Elapsed Time Meter
- 30mm Push-To-Test VFD Stopped Pilot Light
- 30mm Push-To-Test Drive Fault Pilot Light
- ABB ACQ580 Variable Frequency Drive with Remote Mount Keypad and Ethernet Adapter Module
- MiniCas SF/HT Module, Outer Door Installed
- Engraved Nameplates
- UL Label 508

- Self Laminating Wire Numbers
- Control Relays as required
- Terminal Blocks and Ground Lugs as required

One (1) Lot of freight and startup services

- a. No substitutions will be accepted because this is the preferred manufacturer for the City of Grand Island for lift stations.

PART 2 PRODUCTS

Not Used.

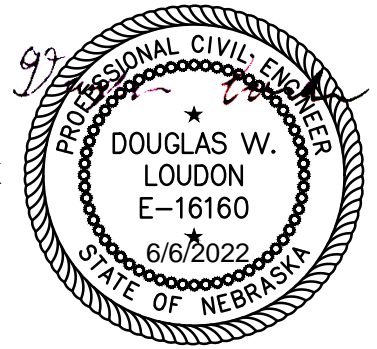
PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 13150

GROUND-SUPPORTED STEEL WATER STORAGE TANK



PART 1 GENERAL

1.1 WORK INCLUDED

- A. This section specifies the design and construction of the ground supported flat-bottom steel water storage tank; including all site work, excavation, tank welding, appurtenances, testing, and backfill directly related to the tank unless otherwise specified. .
- B. The Contractor shall furnish all labor, materials, tools, and equipment necessary to construct, disinfect and test the ground supported flat-bottom water storage tank and appurtenances as indicated on the drawings, and as specified.

1.2 RELATED SECTIONS

- A. Section 09910 – Coating System for Steel Water Storage Tanks

1.3 REFERENCES

- A. ACI 301 – Specifications for Structural Concrete
- B. ACI 318 – Building Code Requirements for Reinforced Concrete and Commentary
- C. AWWA D100 Standard for Welded Steel Tanks for Water Storage
- D. AWWA D102 – Standard for Painting Steel Water Storage Tanks
- E. AWWA C652 – Standard for Disinfection of Water-Storage Facilities.
- F. AWS (American Welding Society)
- G. NSF 61 – Materials in contact with Potable Water
- H. Steel Structures Painting Council Manual – Volume 1 – Good Painting Practice
- I. Steel Structures Painting Council Manual – Volume 2 – Systems and Specifications

1.4 DESIGN CRITERIA

- A. The ground supported steel water storage tank shall be designed and constructed in accordance with AWWA D100 Standard for Welded Steel Tanks for Water Storage except as modified by the requirements of these contract documents. The Contractor may use Section 14 of the AWWA D100 as a part of the design. Tanks designed on this basis must incorporate all the provisions of this section. The requirements of Section 3 of the AWWA D100 are superseded by any differing requirements of Section 14. Foundations shall be designed in accordance with AWWA D100 and ACI 318 – Building Code Requirements for Reinforced Concrete.

- B. The Contractor shall use the following loadings and requirements in design:
1. Storage Capacity: 400,000 or 600,000 gallons
 2. Dimensions: 60'-0" inside diameter x 21'-0" or 30'-0"
 3. Live Load: Shall be the weight of all the liquid when the reservoir is filled to overflowing. Unit weight of liquid 62.4 pounds per cubic foot.
 4. Dead Load: Shall be the estimated weight of all permanent imposed loads. Unit weight of concrete – 150 pounds per cubic foot, steel – 490 pounds per cubic foot.
 5. Total
 6. Live Load: 20 pounds per square foot & Total Roof Snow Load 30 pounds per square foot (City of Grand Island requirement).
 7. Seismic Zone: 0
 - a. The following design parameters shall be used:
 - 1) $S_S = 0.085$
 - 2) $S_1 = 0.041$
 - 3) $S_{DS} = 0.091$
 - 4) $S_{D1} = 0.065$
 8. Foundation Loads: The tank foundation shall be proportioned so that soil pressure shall be less than the soil bearing capacity. The allowable soil bearing capacity is as noted in the geotechnical report.
 9. Wind Loads: 107 mph, Risk Cat 1, Basic Design Wind Speed 2013 IBC
 10. Overflow Rate: 2.52 MGD maximum; Withdrawal Rate: 2.52 MGD maximum. The overflow piping shall be sized to permit waste of water in excess of the filling rate.
- C. Loads to be considered in the tank design shall include internal liquid pressure, backfill, seismic effects, temperature and moisture gradients, dead loads and live loads.

1.5 SUBMITTALS

- A. Upon request by Owner, Contractor shall submit the following prior to award of bid:
1. A list of five (5) ground supported flat-bottom water storage tanks constructed by the proposed tank manufacturer within the last five (5) years including the Owner, tank capacity, and the Engineer..
 2. A preliminary drawing of the tank showing major dimensions and plate thickness upon which the bid is based, tank diameter, the high water level and the dimensions of the supporting foundation..
 3. A foundation design drawing showing preliminary dimensions and approximate quantities of concrete and reinforcing steel.
- B. Submit shop drawings under provisions of Section 01300. After contract award and prior to construction, the Contractor shall provide working drawings and design calculations for the steel tank and the foundation. Drawings shall show the size and location of all structural components and reinforcement, the required strength and grade of all materials and the size and arrangement of principle piping and equipment. The drawings and calculations shall bear the certification of a professional Engineer licensed in the State of Nebraska. The design coefficients and resultant loads for snow, wind and seismic forces, and the methods of analysis shall be documented. Shop drawing to also include:

1. Catalog cuts or shop drawings of all appurtenances, i.e. hatch, vent, waterstops, etc.

1.6 QUALIFICATION OF MANUFACTURER

- A. The design and construction of the Ground-Supported Water Storage Tank shall only be undertaken by a Contractor with a minimum of five (5) years experience with tank construction. The Contractor must be able to demonstrate experience through the design and construction of at least five Ground-Supported Water Storage Tanks.

1.7 GUARANTEES AND WARRANTIES

- A. Workmanship and Material Guarantee:

The tank contractor shall guarantee that the tank structure is free of defects in workmanship and material for a period of one year. If, within one year from tank completion, workmanship or material is proven defective, the tank contractor shall repair such defects at its own expense.

- B. Design Warranty:

The tank contractor shall warrant its design of the proposed tank structure to be structurally and functionally suitable to serve the intended use of the projected work. Such intended use is exemplified by the criteria of design, workmanship, and material expressed by the requirements of the specifications and drawings prepared by the Engineer. The Owner's or Engineer's review of the tank contractor's design, or the Owner's acceptance and final payment for the work shall not relieve the tank contractor of design responsibility. The Owner shall be the direct beneficiary of the warranty.

PART 2 PRODUCTS

2.1 STEEL TANK

- A. The materials, design, fabrication, erection, welding, testing and inspection of the steel tank shall be in accordance with the applicable sections of AWWA D100 except as modified in this document. shall conform to ACI 301.
- B. The minimum thickness for any part of the structure shall be 3/16 inch for parts not in contact with water and 1/4 inch for parts in contact with water.
- C. The tank roof shall be designed as per the project drawings. All interior lap joints will be sealed by means of caulking or continuous seal welding. The interior lap joints shall be defined to include roof plate laps. If roof is supported by rafters, the rafter shall be welded to the roof plates as required structurally. Any unwelded rafter to plate joints shall be sealed by caulking. All penetrations of roof accessories inside the tank. The minimum thickness for roof plates not in contact with water will be 3/16”.

2.2 APPURTENANCES

- A. The Contractor shall provide and install all appurtenances as shown on the drawings. All items shall be in full conformity with the current applicable OSHA safety

regulations and the operating requirements of the structure.

1. Inlet-Outlet Piping - The vertical inlet/outlet pipe connection to the bottom of the tank shall be standard weight ductile iron pipe with appropriate transition to a base elbow of the same diameter. The vertical pipe shall be attached through the bottom of the tank as near to the shell wall as feasible. The connection from the piping to the tank floor shall be a watertight connection.
2. Overflow Piping and Weir - The overflow pipe shall be a ductile iron overflow pipe shall have a minimum wall thickness of ¼". A suitable weir shall be provided inside the tank with the crest located at High Water Level. The overflow pipe shall extend from the weir and down the interior of the tank below grade.
3. Roof Hatch - Provide one access hatch on the roof of the tank. The hatch will be hinged and equipped with a hasp for locking. The hatch cover shall have a 2 inch downward edge. The opening shall have a minimum 4 inch curb.
4. Tank Vent - The tank vent shall be centrally located on the tank roof above the maximum weir crest elevation. The tank vent shall have an intake and relief capacity sufficiently large that excessive pressure or vacuum will not develop during maximum flow rate. The vent shall be designed, constructed and screened so as to prevent the ingress of wind driven debris, rain, insects, birds and animals. The vent shall be designed to operate when frosted over or otherwise clogged. The screens or relief material shall not be damaged by the occurrence and shall return automatically to operating position after the blockage is cleared.
5. Tank Washdown System
 - a. The tank constructor shall provide and install a complete functioning washdown system to completely and uniformly clean the inside of the tank from high water level to the floor drain.
 - b. The system shall come with one (1) cleaning machine.
 - c. Manufacturer:
 - i. Scanjet Systems.
 - ii. Approved equal.
 - d. The cleaning unit shall be turbine driven with a set turning angle to be determined by the manufacturer and provided on the installation drawing.
 - e. The spray pattern shall be programmable by use of external mechanical actuators.
 - f. The cleaning unit shall be set up and programmed specifically for the tank on this project to cover the floor and wall up to the high water elevation.
 - g. The unit shall operate without pneumatic or electrical drives or controls.
 - h. The automated cleaning system shall include the required quantity of nozzles to provide complete and uniform cleaning of the inside of the tank. A shallow analysis shall be performed and submitted as part of the shop drawing submittal.

- i. The wash down system shall have the capability to create a spray pattern that completely covers the interior surface of the tank wall and floor.
 - j. Single nozzle tank cleaning machine shall be Scanjet SC30T or approved equal.
 - i. Nozzle: 20 MM
 - ii. Flow Rate: 110 GPM
 - iii. Pressure at cleaning machine: 140 PSIG
 - iv. Wash Cycle Time: 90 minutes
 - k. Spray unit characteristics
 - i. Entirely mechanical operation with no electrical motors or controls.
 - ii. Self draining
 - iii. Inlet shutoff valve and strainer.
 - iv. Grease lubricated mechanism.
 - l. Spray Unit Construction
 - i. Stainless steel body with base flange
 - ii. Stainless steel and Teflon mechanism and accessories.
 - iii. Nozzle shall be 316 stainless steel.
 - m. Interior piping shall be cement lined ductile iron pipe. Pipe is to be properly supported from wall or ceiling. Supports are to be designed by the tank manufacturer.
6. Exterior Staircase: A welded steel staircase shall extend from the finished grade to the tank roof. Location as shown on the drawings.
 7. Shell Access Manway - One 24 inch diameter shell manway shall be provided near grade level to allow access to the tank interior. The manhole lid shall be hinged or otherwise self-supported and open outward.
 8. Rigging – A painter’s rail attached to the roof, pipe couplings with plugs in the roof or other attachments that provide complete access for painting shall be furnished.
 9. Identification Plate - A tank identification plate shall be mounted above a shell manhole. The identification plate shall be corrosion resistant and contain the following information:
 - a. Tank Contractor
 - b. Contractor’s project or file number
 - c. Tank Capacity
 - d. Tank Diameter and height to High Water Level
 - e. Date Erected

PART 3 EXECUTION

3.1 CONCRETE FOUNDATION

- A. The foundation shall be designed and constructed to safely and permanently support the structure. The basis of the foundation construction shall be commensurate with

the geotechnical report included herein at the end of these specifications. Appropriate changes to construction schedule and price will be negotiated if, during excavation, soil conditions are encountered which differ from those described in geotechnical report. The concrete foundation shall be constructed in accordance with ACI 301. Minimum concrete compressive strength shall be as specified in Section 03300, "Cast-In-Place Concrete".

3.2 STEEL TANK CONSTRUCTION

- A. The erection of the steel tank shall comply with the requirements of Section 10 of AWWA D100 except as modified by these documents.
- B. All field welding shall conform to AWS and Section 10, AWWA D100. Before any welding is performed, the constructor shall make certain that the welders or welding operators have their credentials for acceptance.
- C. All fabrication and shop assembly shall conform to the requirements of AWWA D100, Section 9, Shop Fabrication.
- D. Erection
 - 1. Plates subjected to stress by the weight or pressure of the contained liquid shall be assembled and welded in such a manner that the proper curvature of the plates in both directions is maintained. Plates shall be assembled and welded together by a procedure that will result in a minimum of distortion from weld shrinkage.
 - 2. Joints in bottom of tank shall be continuously lap welded on top side only. The bottom ring of the tank wall shall be continuously welded to the floor plate both inside and outside.
- E. Testing for both shop and field welds shall be in accordance with AWWA D100, Section 11, Inspection and Testing. All testing shall be performed prior to interior and exterior field painting. The testing shall be performed by an independent testing agency with all cost included in the Contractor's bid and paid by the Contractor.

3.3 SUBGRADE PREPARATION AND BACKFILL

- A. The subgrade shall be prepared in accordance with the requirements of the specifications and drawings, and as recommended in the provided geotechnical report.
- B. A leveling base material consisting of a minimum six inch thick layer of compacted select fill shall be placed beneath the entire tank foundation. A non-woven geotextile fabric such as Mirafi 1100N, Propex 4545, or equal, shall be placed between the subgrade and leveling base material as shown on the drawings or directed by the tank builder. Select fill shall consist of a clean, well graded angular or subangular material having not more than 8 percent by weight passing the No. 200 sieve. The maximum size stone shall be 1½ inch. Select fill shall be placed in layers not exceeding twelve inches and compacted to a minimum density equal to 95 percent of the maximum laboratory density in accordance with ASTM D1557. Field testing for density achieved shall be in accordance with ASTM D1556 or D2922. If directed by

the tank builder, a uniformly graded $\frac{3}{4}$ inch minus crushed stone shall be used as the leveling base material. The crushed stone shall be $\frac{3}{4}$ inch sieve size with 100 percent passing the one inch. If uniformly graded crushed stone is used for the leveling base material, compaction performance criteria shall be used to gauge the degree of compaction. Crushed stone shall be placed in layers not exceeding 9 inches and compacted with at least two passes in each direction with vibratory roller compaction equipment. Compaction shall be inspected and verification of compaction effort shall be documented by an approved testing laboratory.

- C. The surface elevation of the leveling base shall be fine graded to a tolerance of plus zero inches to minus $\frac{1}{2}$ inch over the entire foundation areas. Fine grading tolerances for floor pipe encasements shall be plus zero inches to minus six inches.
- D. The tank shall be backfilled and rough graded to the contours shown on the drawings. Unless other material is specified by the Engineer, materials used for backfilling shall be suitable on site material.
- E. Frozen material shall not be used for backfill nor shall fill material be placed on snow, ice, or frozen material. Rock or concrete spoils (greater than six inches) shall not be used in backfill within two feet of the tank wall.

3.12 WATERTIGHTNESS TEST

- A. Upon completion, the tank shall be tested to determine watertightness. The tank shall be filled with clean water to the maximum level. Water will be furnished to the tank by the owner. The test shall consist of measuring the liquid level over the next 24 hours to determine if any change has occurred. If a change is observed and exceeds the maximum allowance, the test shall be extended to a total of five days. If at the end of five days the average daily change has not exceeded the maximum allowance, the test shall be considered satisfactory.
- B. The liquid volume loss for a period of 24 hours shall not exceed one-twentieth of one percent of the tank capacity, $0.0005 \times$ tank volume. If the liquid volume loss exceeds this amount, it shall be considered excessive, and the tank shall be repaired and retested.
- C. Damp spots will not be permitted at any location on the tank wall. Damp spots are defined as spots where moisture can be picked up on a dry hand. All such areas shall be repaired as necessary
- D. Damp spots or standing water on the footing may occur upon tank filling and are permissible within the allowable volume loss. Measurable flow in this area is not permissible and must be corrected.

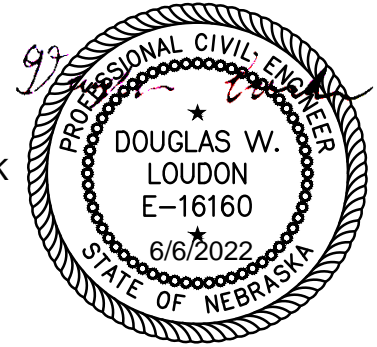
3.13 CLEAN-UP

- A. The premises shall be kept clean and orderly at all times during the work. Upon completion of construction, the contractor shall remove or otherwise dispose of all rubbish and other materials caused by the construction operation. The Contractor shall leave the premises in as good a condition as it was found.

END OF SECTION

SECTION 13200

WIRE-WOUND PRESTRESSED CONCRETE TANK
AWWA D110, Type III



PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. This section describes the design and construction of the circular precast, wire-wound prestressed concrete tank complete with steel diaphragm. The selection of the prestressed concrete tank is predicated upon the design criteria and construction methods specified. Deviations from the requirements of this section will not be considered. In the case of conflict between this and other sections, the requirements of this section shall govern.

1.02 RELATED SECTIONS

- A. The following related work specifically applies except as modified in this section:
 - 1. Section 15400 – Ductile Iron Plant Piping

1.03 REFERENCES

- A. When an edition or effective date of a reference is not given, it shall be understood to be the current edition or latest revision published.
- B. The following documents may be referenced in this section:
 - 1. American Concrete Institute (ACI):
 - a. 301 Specifications for Structural Concrete
 - b. 305 Hot Weather Concreting
 - c. 306 Cold Weather Concreting
 - d. 309R Guide for Consolidation of Concrete
 - e. 318 Building Code Requirements for Structural Concrete and Commentary
 - f. 350 Code Requirements for Environmental Engineering Concrete Structures and Commentary
 - g. 350.3 Seismic Design of Liquid Containing Concrete Structures and Commentary
 - h. 350.5 Specification for Environmental Concrete Structures
 - i. 372R Guide to Design and Construction of Circular Wire- and Strand-Wrapped Prestressed Concrete Structures
 - j. 506R Guide to Shotcrete

2. American Society of Testing and Materials (ASTM):
 - a. A185/185M Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
 - b. A416/A416M Standard Specification for Steel Strand, Uncoated Seven-Wire for Prestressed Concrete
 - c. A475 Standard Specification for Zinc Coated Steel Wire Strand
 - d. A615/615M Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement
 - e. A821/821M Standard Specification for Steel Wire, Hard Drawn for Prestressing Concrete Tanks
 - f. A1008/1008M Standard Specification for Steel, Sheet, Cold-Rolled Carbon Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
 - g. C31/31M Standard Practice for Making and Curing Concrete Test Specimens in the Field
 - h. C33/33M Standard Specification for Concrete Aggregates
 - i. C39/39M Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
 - j. C42/42M Standard Test Method for Obtaining and Testing Drilled Cores and sawed Beams of Concrete
 - k. C618/618M Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
 - l. C881 Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
 - m. C920 Standard Specification for Elastomeric Joint Sealants
 - n. D1056/1056M Standard Specification for Flexible Cellular Materials – Sponge or Expanded Rubber
 - o. C1140 Standard Practice for Preparing and Testing Specimens from Shotcrete Test Panels
 - p. C1385 Standard Practice for Sampling Materials for Shotcrete
 - q. C1604 Standard Test Method for Obtaining and Testing Drilled Cores of Shotcrete
 - r. D1752 Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
 - s. D1556 Standard Test Method for Density and Unity Weight of Soil in Place by the Sand-Cone Method
 - t. D2000 Classification System for Rubber Products in Automotive Applications
 - u. D2240 Standard Test Method for Rubber property – Durometer Hardness

3. American Society of Civil Engineers (ASCE): ASCE 7-10 Minimum Design Loads for Buildings and Other Structures
4. American Water Works Association (AWWA):
 - a. C652 Standard Disinfection of Water-Storage Facilities
 - b. D110 Wire- and Strand-Wound, Circular, Prestressed Concrete Water Tanks
5. US Army Corps of Engineers: CRD-C572 Specification for Polyvinylchloride Waterstop

1.04 PERFORMANCE REQUIREMENTS

- A. Wire-Wound Prestressed Concrete Tank: The wire-wound prestressed concrete tank shall consist of a cast in place reinforced concrete floor, precast wire-wound prestressed concrete wall with a mechanically bonded steel diaphragm and a cast-in-place, clear-span concrete dome roof. The dimensions of the wire-wound prestressed concrete tank shall be in accordance with these specifications and the project drawings.
- B. Accessories: The tank shall include accessories in the number and fabricated from material as required in this specification.
- C. Painting and Coating: The tank shall include coatings as required by this specification.
- D. Design Requirements: The tank shall be designed in accordance with the applicable requirements of: *AWWA D110 Wire- and Strand-Wound, Circular, Prestressed Concrete Water Tanks*; *ACI 350 Code Requirements for Environmental Engineering Concrete Structures*; *ACI 372R Guide to Design and Construction of Circular Wire- and Strand-Wrapped Prestressed Concrete Structures*; and currently accepted engineering principles and practices for the design of such structures. An intrinsic feature of that standard and this specification is the use of continuous, circumferential, wire-wound prestressing. The use of circumferential tendon prestressing is not permitted.
- E. Design Criteria: Loads and conditions to be considered in the design of the tank shall include; internal liquid pressure, backfill, seismic loads, prestressing, edge restraint, temperature and moisture gradients and dead and live loads. The following criteria shall be used:
 1. Storage Capacity: 400,000 Gallon Alternate Bid "A" or 600,000 Gallon Alternate Bid "B".
 2. Dimensions:
 - a. Inside Diameter: 30.0 ft
 - b. Liquid Depth: 20.0 ft for 400,000 gallon tank

29.0 ft for 600,000 gallon tank

3. Liquid Unit Weight: 62.4 lbs/ft³
 4. Maximum Liquid Fill/Withdraw Rates:
 - a. Fill Rate: 4.0 MGD
 - b. Withdraw Rate: 4.0 MGD
 5. Backfill Height:
 - a. Maximum: 3.0 ft
 - b. Minimum: 0.5 ft
 6. Wind Load:
 - a. 107 mph, Risk Cat 1, Basic Design Wind Speed 2013 IBC
 7. Snow Load: 30 psf (City of Grand Island requirement)
 8. Seismic Load:

Seismic design shall be in accordance with the requirements of the ASCE 7-10 and AWWA D110 with the most stringent requirements controlling with the following design loads. Tank Contractor shall provide calculations for both criteria and indicate the most stringent.

 - a. Site Classification: Type 0, IBC Site Class: D
 - b. The following design parameters shall be used:
 - 1) $S_s = 0.085$
 - 2) $S_1 = 0.041$
 - 3) $S_{DS} = 0.091$
 - 4) $S_{D1} = 0.065$
 9. Allowable Soil Bearing Pressure: 1,800 psf
 10. Ground Water Table Elevation: 1860.0 ft (approximate)
 11. Dome Rise: 1:8 to 1:12
- F. Loads to be considered in the tank design shall include internal liquid pressure, backfill, seismic effects, prestressing, end restraints, temperature and moisture gradients, dead loads and live loads.
- G. Floor: The floor shall be a reinforced, cast-in-place, membrane slab designed to transfer the load of the liquid contents directly to the subgrade. The floor shall be watertight and shall meet the following requirements:
1. The wall footing shall be an integral part of the membrane slab and designed to resist loads imposed by the tank wall and dome as well as any stresses caused by anticipated differential settlement between the footing and the membrane slab.

2. The minimum floor thickness shall be 4".
 3. The minimum floor thickness at pipe encasements, sumps and under baffle walls shall be 8" and shall include two layers of reinforcement. Reinforcement shall be designed to accommodate anticipated differential settlement in these areas.
 4. The minimum ratio of mild reinforcement shall be 0.6 percent of the concrete area in each direction. The minimum cover over the reinforcing steel shall be 1- $\frac{1}{4}$ " inch. Maximum spacing of steel reinforcement shall be two times the floor thickness.
- H. Wall Design: The prestressed tank wall design shall be based on elastic cylindrical shell analysis and shall meet the following requirements:
1. Precast Core Wall: The core wall shall be constructed of precast panels and vertical joints filled with shotcrete or cast-in-place concrete. The minimum design requirements shall be as follows:
 - a. The minimum core wall thickness shall be 4 inches.
 - b. The maximum allowable compressive stress in the core wall extreme fiber shall not exceed:
 - 1) $0.55 f'_c$ initial where f'_c represents the concrete strength at time of prestressing.
 - 2) $0.45 f'_c$ final where f'_c represents the concrete strength at a time after prestressing is complete and losses have taken place.
 - c. Place concrete for each panel in one continuous operation.
 - d. The prestressing force applied to the core wall shall result in a minimum of 200 psi residual compression for the aboveground portion of the wall tapering to 50 psi at 6 feet below grade.
 - e. Reduction in hoop tension due to edge restraint shall not be allowed.
 - f. Backfill loads shall not be used in the design of the core wall to counteract hydraulic loads or provide residual compression in the wall. The thickness of the core wall shall be calculated to accept the initial compressive force of the backfill.
 - g. The core wall shall be reinforced using nonprestressed, mild reinforcement as necessary to account for edge effects as well as the effects due to shrinkage, differential drying and temperature and moisture gradients where required. Reinforcing steel shall be designed in accordance with the requirements of the Alternate Design Method of ACI 350. The strength requirements of ACI 350 shall also be satisfied. The minimum concrete or shotcrete cover over steel reinforcement shall be 1 inch. At a minimum, the following nonprestressed, mild reinforcement shall be incorporated into the core wall:
 - 1) Inside Face: The inside face of the wall shall contain vertical nonprestressed reinforcement in the minimum amount of 0.25 percent of the core wall concrete area.

- 2) Outside Face: The outside face of the wall shall contain vertical nonprestressed reinforcement in the minimum amount of 0.25 percent of the core wall concrete area.
 - 3) Steel Shell Diaphragm: The cross-sectional area of the steel diaphragm may be considered as part of the required vertical nonprestressed reinforcement.
2. Steel Shell Diaphragm: Provide full length continuous watertight, mechanically bonded, steel diaphragm which is continuous the full wall height to within 2 inches of the top without horizontal splices. The minimum design requirements shall be as follows:
 - a. Mechanically seam vertical diaphragm joints except where located between wall panels, where either mechanical seaming or sealing with polysulfide may be employed.
 - b. Seal all vertical diaphragm joints to be watertight.
 - c. Do not allow form ties to pierce the diaphragm.
3. Prestressing: The prestressing shall be designed to resist the forces due to internal loads after accounting for stress losses and residual compression and shall meet the following requirements:
 - a. The maximum permissible initial stress in the prestressing wire immediately after application to the wall shall not exceed:
 - 1) $0.75 f_{pu}$, where f_{pu} represents the ultimate strength of the wire.
 - b. Stress losses due to shrinkage, creep and relaxation shall be calculated; however, the value used for the total of the losses shall not be less than 25,000 lb/in².
4. Wire Cover: The minimum cover over the prestressing wire shall be as follows:
 - a. The minimum cover over prestressing wires measured to the outside face of the wall shall be 1".
 - b. The minimum cover at penetrations in the tank wall measured from the edge of the penetration to the wire shall be 2".
 - c. The minimum cover at the base of the tank wall measured from the base of the wall to the wire shall be 3".
- I. Dome Roof: The design of the dome roof shall be based on elastic shell analysis with a circumferentially prestressed dome ring to counteract the horizontal component of the thrust caused by the dome load and shall meet the following requirements:
 1. The edge regions of the dome shall be designed for bending moments caused by loads and the restraint of the dome.
 2. The minimum thickness of the dome shell shall be proportioned to resist buckling but in no case shall be less than 3 inches for cast-in-place and 4 inches for precast domes.

3. Nonprestressed mild steel reinforcement shall be provided to control shrinkage and temperature effects as well as edge effects as follows:
 - a. Typical Dome Shell: A minimum of 0.25% of the net cross-sectional area shall be placed in two perpendicular directions with two layers required when the typical shell thickness is greater than 6 inches in thickness.
 - b. Dome Edge: A minimum of 0.25% of the net cross-sectional area with two layers of reinforcing steel where required by analysis.
4. The minimum cover over steel reinforcement shall be 1 inch.

1.05 SUBMITTALS

A. Prequalified Tank Contractor Declaration:

1. All tank contractors are to be prequalified. Upon request from the Owner, the Bidder shall submit the name of the prequalified manufacturer prior to award of the bid.

B. Prequalification Submittals:

All tank contractors must be prequalified. Tank contractors not specifically listed in Article 1.06.B shall submit to the Engineer the following supporting documents at least fifteen (15) days prior to the date set for receipt of bids:

1. Detailed design drawings and calculations, of the tank specified, signed and sealed by a Professional Engineer registered in the State of Nebraska. The signing Engineer shall certify the tank design is in conformance with the AWWA Standard D110 for a Type III tank.
2. A detailed description of construction procedures.
3. A complete list of tank contractor's experience, in the company's own name, in the design and construction of precast wire-wound prestressed concrete tanks conforming to AWWA Standard D110, Type III. The tank contractor shall indicate the size of the tank, the location, the year of construction, and the name of the Owner for each project included on the list.
4. A complete list of AWWA D110, Type III precast wire-wound prestressed concrete tanks designed by the Tank Design Professional in accordance with the requirements of Article 1.06.A.2. The Tank Design Professional shall submit verification affirming that he/she acted in the capacity of Engineer of Record.

C. Design: The following items shall be submitted for review and approval by the Engineer prior to the start of construction:

1. Drawings: Provide complete plan, elevation and sectional views of the wire-wound prestressed concrete tank which detail the tank geometry, materials of construction and primary dimensions. Construction drawings shall be signed

and sealed by a licensed design professional in accordance with Article 1.06.A.2. Construction drawings should clearly show the following:

- a. Details of foundation preparation.
- b. Thickness of all concrete sections.
- c. Details of reinforcement in concrete sections including location, spacing, splice dimensions as well as fabrication dimensions.
- d. Required number of prestressing wires as well as a detailed schedule of application including the initial force and number of wires in each increment.
- e. All pipe penetrations in the tank wall as well as under floor piping and encasement details.
- f. Details of accessories as well as their location on the tank structure.

2. Design Calculations: Provide complete design calculations which meet the requirements of Article 1.04.E. The design calculations shall be signed and sealed by a licensed design professional meeting the requirements of Article 1.06.A.2.

D. Construction: The following items shall be submitted for review by the Engineer and approved prior to use in the construction of the finished product:

1. Concrete and Shotcrete Mix Designs: Provide a mix design and strength data for each concrete and shotcrete mix proposed for individual portions of the work. Mix designs shall clearly show ingredient proportions and quantities of admixtures which are used and shall meet Articles 2.01 and 2.02.
2. Quality Control Plan: Provide a written quality control plan for compliance and monitoring of quality on the project.
3. Accessories: Provide product data for all accessories required which demonstrate compliance with these Specifications.
4. Coatings: Provide product data for all coatings which demonstrate compliance with these Specifications.
5. Disinfection Procedure: Provide a disinfection plan and procedure.

E. Project Close Out Documents:

1. Quality Control Reports: The following quality control reports shall be submitted to the engineer for record purposes prior to final inspection of the project:
 - a. Concrete and Shotcrete Testing Reports: Submit test reports from an independent laboratory demonstrating concrete and shotcrete quality which meets the Specifications.
 - b. Quality Control Checklist: Submit completed quality control checklists for each portion of the work.

- c. Prestressing Logs: Submit logs of the completed prestressing demonstrating compliance with the design including the total force and number of wires in each increment. Complete at least one wire stress reading for every coil or a minimum of one per foot of wall height for each wire phase.
2. Record Drawings: Record actual locations and final configuration of the tank and accessories on the shop drawings.
3. Warranty Document: Submit warranty document in Owner's name in accordance with Article 1.07.

1.06 QUALITY ASSURANCE

A. Qualification of Bidders:

Tank contractors must be prequalified to bid on the design and construction of the AWWA D110, Type III tank specified and shall meet with the following minimum requirements for prequalification:

1. Tank contractor shall be a specialist in the design and construction of AWWA D110, Type III precast wire-wound prestressed concrete tanks with the skill and financial stability to construct and guarantee the tank in accordance with these specifications. The tank contractor shall have constructed (in the company's own name) a minimum of twenty (20) AWWA D110, Type III Precast Wire-wound Prestressed Concrete Tanks with Steel Shell Diaphragm of 2.0 MG or greater which have been in successful service a minimum of five (5) years.
2. Each tank contractor shall have in its employ a full-time Tank Design Professional who is Licensed as a Professional Engineer in the State of Nebraska with a minimum of 10 years' experience designing AWWA D110, Type III precast wire-wound prestressed concrete tanks with a steel shell diaphragm. The Tank Design Professional shall have designed and acted in the capacity of Engineer or Record on a minimum of ten (10) AWWA D110, Type III tanks, with a capacity equal or greater than the tank specified, in the last ten (10) years. The Tank Design Professional shall have signed and sealed the tank construction drawings and calculations for the tanks included in his/her experience record.
3. Each tank contractor shall have in its employ a project team consisting of a Project Manager along with the following key persons: a LEAD tank builder, erection foreman, a nozzleman, and a wire-winding specialist. Each member of the project TEAM shall have constructed a minimum of five (5) AWWA D110, Type III tanks of equal or larger capacity than that specified.
4. Equipment: The qualified firm shall own and maintain all specialty equipment used in the turn-key construction of the prestressed concrete tank as specified herein including the following:

- a. A specially designed machine for fabrication of the steel shell diaphragm which is capable of forming the material with the proper profile to provide a mechanical lock between the inside and outside concrete or shotcrete.
 - b. A specially designed machine for wire- wrapping the prestressed concrete tank which is capable of meeting the performance and tolerance requirements specified herein.
5. Singular Responsibility: It is the express intent of this specification to create a singular responsibility for the design and construction of the prestressed concrete tank. The design and construction of all aspects of the floor slab, wall, prestressing, shotcrete and roof of the prestressed concrete tank must be performed by the tank contractor and shall not be subcontracted with the exception of labor only for reinforcing steel installation and concrete placement, which may be performed under the direct supervision of the tank contractor.

B. Prequalified tank contractors are as follows:

1. Preload, LLC, Louisville, Kentucky
2. DN Tanks, Wakefield, Massachusetts

Additional companies wishing to be considered shall submit the items listed in Articles 1.05.B and 1.06.A to the Engineer at least 15 days prior to the date set for receipt of bids.

1.07 WARRANTY

- A. Workmanship and Material Guarantee: The Tank Contractor shall provide a written warranty covering the workmanship and materials on the complete structural portion of the tank for a 1-year period from the date of acceptance of the work. In the event that any defects occur in workmanship or materials within the warranty period they shall be replaced or repaired by the tank construction company at its own expense upon written notification by the owner.
- B. Design Warranty: The Tank Contractor shall warrant its design of the proposed tank structure to be structurally and functionally suitable to serve the intended use of the projected work. Such intended use is exemplified by the criteria of design, workmanship, and material expressed by the requirements of the specifications and drawings prepared by the Engineer. The Owner's or Engineer's review of the Tank Contractor's design, or the Owner's acceptance and final payment for the work shall not relieve the Tank Contractor of design responsibility. The Owner shall be the direct beneficiary of the warranty.

PART 2 – PRODUCTS

2.01 CONCRETE

- A. General Requirements: Concrete shall conform to ACI 301 except as modified herein:
 - 1. Cement shall be Portland Type I or Type II
 - 2. Air-entraining and water reducing admixtures shall be permitted. No other admixtures shall be used in the concrete mix unless approved by the engineer.
 - 3. Concrete in direct contact with prestressed reinforcement shall not contain water-soluble chloride ions in excess of 0.06 percent by weight of cement.

- B. Pipe Encasement: Concrete used for pipe encasement shall have minimum 28-day strength of 3500 psi. The course and fine aggregate shall meet the requirements of ASTM C33.

- C. Floor and Footing: Concrete used for the floor and footing shall have a minimum 28-day compressive strength of 3500 psi at 28 days and shall have the following properties:
 - 1. Air Content: 0%
 - 2. Maximum Water-Cementitious Material Ratio: 0.42
 - 3. Fine and Course Aggregate: Meeting requirements of ASTM C33
 - 4. Fibers: Concrete for floor and footing construction shall contain polypropylene fibrillated fibers, (Grace Fibers™ or equal) or polypropylene monofilament fibers (Grace MicroFiber™ or equal), at a minimum addition rate of 1.0 lb. per cubic yard.

- D. Core Wall: Concrete used for precast wall panels shall have a minimum 28-day compressive strength of 4000 psi at 28 days with the following properties:
 - 1. Air Content: 4.5% +/- 1½%
 - 2. Maximum Water-Cementitious Material Ratio: 0.42
 - 3. Fine and Course Aggregate: Meeting requirements of ASTM C33

- E. Dome: Concrete used for precast wall panels shall have a minimum 28-day compressive strength of 4000 psi at 28 days with the following properties:
 - 1. Air Content: 4.5% +/- 1½%
 - 2. Maximum Water-Cementitious Material Ratio: 0.42
 - 3. Fine and Course Aggregate: Meeting requirements of ASTM C33

2.02 SHOTCRETE

- A. General Requirements: Shotcrete shall be wet mix conforming to ACI Standard 506 except as modified herein.
 - 1. Cement shall be Portland Type I or Type II.

2. Shotcrete in direct contact with prestressed reinforcement shall not contain water-soluble chloride ions in excess of 0.06 percent by weight of cement.
- B. Wire Coat: Shotcrete used for the wire coat shall have a minimum compressive strength equal to that for which the core wall is design but not less than of 4500 psi at 28 days with the following properties:
1. Shotcrete covering the prestressing wire shall consist of not more than three parts sand to one part Portland cement by weight. Additional coats of shotcrete shall consist of not more than four parts sand to one part Portland cement by weight. Either the dry mix or wet mix process referred to in ACI 506R for shotcreting may be employed.
 2. Air Content: Entrained air may be used in wet mix shotcrete to facilitate placement in the amount of 6% +/- 1½%
- C. Covercoat: Shotcrete used for the covercoat shall have a minimum 28-day compressive strength of 4000 psi at 28 days with the following properties:
1. The shotcrete covercoat shall consist of not more than four parts sand to one part Portland cement by weight.
 2. Air Content: Entrained air may be used in wet mix shotcrete to facilitate placement in the amount of 6% +/- 1½%
 3. Maximum Water-Cementitious Material Ratio: 0.42

2.03 NON-PRESTRESSED REINFORCEMENT

- A. Non-prestressed deformed bar reinforcement shall conform to the requirements of ACI 350, Grade 60 steel meeting the requirements of ASTM A615.
- B. Non-prestressed welded wire reinforcement shall be plain and shall conform to the requirements of ASTM A185.
- C. Strand for seismic cables shall be galvanized and shall conform to the requirements of ASTM A416 prior to galvanizing.
- D. Protect reinforcing steel and wire fabric from damage and from dirt, oil, grease, other foreign matter, and rust-causing conditions.

2.04 PRESTRESSED REINFORCEMENT

- A. Prestressed reinforcement shall conform to the requirements of ASTM A821.
- B. The diameter of prestressed reinforcement may be 0.162" (8 gauge) or 0.192" (6 gauge).
- C. Splices for prestressed reinforcement shall be ferrous material compatible with the reinforcement and shall develop the full ultimate strength of the wire.

2.05 STEEL DIAPHRAGM

- A. The steel shell diaphragm shall conform to ASTM A1008 and shall be a minimum thickness of 0.017 inches (26 gauge).
- B. The steel diaphragm shall be vertically ribbed with adjacent and opposing channels. The base of the channels shall be wider than the throat with reentrant angles which provide a mechanical lock to the inner and outer concrete or shotcrete.

2.06 BASE RESTRAINT CABLES

- A. Base restraint cables shall be galvanized, meeting the requirements of ASTM 416 for grade 250 or 270 before galvanizing and ASTM 475 after galvanizing.

2.07 ELASTOMERIC MATERIALS

- A. Bearing Pad: Bearing pads shall be neoprene or natural rubber meeting the following requirements:
 - 1. Neoprene Bearing Pads shall be 40 or 50 durometer hardness with a minimum ultimate tensile strength of 1500 psi, a minimum elongation of 500% and a maximum compressive set of 50% complying with ASTM D2000 Line Call Out M2BC410 A14 B14 or M2BC510 A14 B14.
 - 2. Natural Rubber Bearing Pads shall comply with D2000 Line Call Out M4AA414 A13 or M4AA514 A13.
- B. PVC Waterstop: Waterstops shall be composed of polyvinylchloride (PVC) meeting the requirements of CRD-C-572. Splices shall be made in accordance with the manufacturer's recommendations. Waterstop shall be manufactured by Sika-Greenstreak or equal.
- C. Polysulfide Sealants: Polysulfide sealants used to seal diaphragm joints between precast wall panels shall be a two-component elastomeric compound meeting the requirements of ASTM C920, type M and must have permanent characteristics of bonding to metal surfaces, flexibility, and resistance to extrusion due to hydrostatic pressure. Air-cured sealants shall not be used.
- D. Epoxy Sealants: Epoxy sealants shall be a two component, 100% solids, moisture insensitive material meeting the requirements of ASTM C 881, Type III, Grade 1.
- E. Sponge Filler: Sponge filler shall be closed-cell neoprene or rubber conforming to ASTM D1056, Type 2, Class A and Grade 1.
- F. Epoxy Adhesives: Epoxy adhesives shall be 100% solids, moisture insensitive, two component systems conforming to ASTM C 881, Type II, Grade 2.

2.08 DECORATIVE COATING

- A. A decorative coating shall be applied to all exterior above grade surfaces. The exterior coating shall be an elastomeric system specifically developed for application on concrete surfaces. Acceptable products are as follows:
 - 1. Series 156 Enviro-Crete, Tnemec Inc., Kansas City, Missouri
 - 2. Tammscoat Smooth, Euclid Chemical Company, Cleveland, Ohio
 - 3. Approved Equal
- B. Complete coating system including primer, intermediate, and finish coats. Color to be selected by the Owner.
- C. Low VOC waterborne acrylic or modified waterborne acrylate.
 - 1. Breathable, flexible coating capable of filling and bridging minor hairline cracks.
 - 2. Elastomeric that provides protection against driving rain and UV light.
- D. Provide primer coat as recommended by coating manufacturer.
- E. Intermediate coat to be minimum 4 mils DFT.
- F. Finish coats:
 - 1. Two coats each at 8 mils DFT minimum.
 - 2. Finish coat to have sand texture.
 - 3. Allow for one color for the finish coats.
 - 4. Similar to Tnemec Series 156 and 157 or Tamms Tamoseal with AKKRO-7T, and Tammscoat.

2.09 ACCESSORIES

- A. The tank construction company shall provide and install all appurtenances as shown on the drawings. Appurtenances shall include the following:
 - 1. Influent/Effluent Piping: Influent and effluent piping shall be ductile iron lined with Protecto 401 or approved equal. Pipe brackets fabricated from 304SS or concrete encasement of the pipe shall be included in sufficient number to secure pipe to the tank wall as required.
 - 2. Overflow Piping: Overflow piping shall be ductile iron lined with Protecto 401 or approved equal. Pipe brackets fabricated from 304SS or concrete encasement of the pipe shall be included in sufficient number to secure pipe to the tank wall as required.
 - 3. Wall Manhole: The tank shall have a minimum of one manhole for access to the interior of the tank. The manhole shall be fabricated using 304SS and shall have a minimum unobstructed clear opening of 24". The manhole shall include a locking hinged cover also fabricated from 304SS.
 - 4. Roof Vent: The roof vent shall be manufactured from fiberglass or aluminum with 316SS fasteners and shall be sized to comply with the venting

requirements of Article 1.04.E. The vent shall be screened with 24 x 24 mesh insect screen and shall be designed to relieve vacuum or pressure when the screen is iced over.

5. Interior Ladder: Not required.
6. Exterior Stairs: The exterior stairs shall be fabricated from painted welded steel with a 4'-0" landing and railing.
7. Roof Hatch: The roof hatch shall be fabricated from T6061 aluminum, or fiberglass, with a minimum opening of 3'-6" x 3'-6".
8. Handrail: The handrail shall encircle the roof hatch and shall be manufactured from T6061 aluminum with 316SS fasteners and a 316SS chain gate at each access point. The handrail shall include an access point for the exterior ladder and the dome.
9. Dome Probes: Dome sleeves shall be formed and cast monolithic with the dome. Dome penetrations shall be fabricated of 304SS or PVC with flanged end and blind flange.

2.10 TANK WASHDOWN SYSTEM

- A. The tank constructor shall provide and install a complete functioning washdown system to completely and uniformly clean the inside of the tank from high water level to the floor drain.
- B. The system shall come with one (1) cleaning machine.
- C. Manufacturer:
 1. Scanjet Systems.
 2. Approved equal.
- D. The cleaning unit shall be turbine driven with a set turning angle to be determined by the manufacturer and provided on the installation drawing.
 1. The spray pattern shall be programmable by use of external mechanical actuators.
 2. The cleaning unit shall be set up and programmed specifically for the tank on this project to cover the floor and wall up to the high water elevation.
 3. The unit shall operate without pneumatic or electrical drives or controls.
 4. The automated cleaning system shall include the required quantity of nozzles to provide complete and uniform cleaning of the inside of the tank. A shallow analysis shall be performed and submitted as part of the shop drawing submittal.
 5. The wash down system shall have the capability to create a spray pattern that completely covers the interior surface of the tank wall and floor.
 6. Single nozzle tank cleaning machine shall be Scanjet SC30T or approved equal.
 - i. Nozzle: 20 MM

- ii. Flow Rate: 110 GPM
 - iii. Pressure at cleaning machine: 140 PSIG
 - iv. Wash Cycle Time: 90 minutes
7. Spray unit characteristics
- i. Entirely mechanical operation with no electrical motors or controls.
 - ii. Self draining
 - iii. Inlet shutoff valve and strainer.
 - iv. Grease lubricated mechanism.
8. Spray Unit Construction
- i. Stainless steel body with base flange
 - ii. Stainless steel and Teflon mechanism and accessories.
 - iii. Nozzle shall be 316 stainless steel.
9. Interior piping shall be cement lined ductile iron pipe. Pipe is to be properly supported from wall or ceiling. Supports are to be designed by the tank manufacturer.

PART 3 - CONSTRUCTION

3.01 SITE PREPARATION

- A. Clearing and Grubbing: All trees, shrubs and other vegetation in the tank area and temporary work areas designated for construction shall be removed as follows:
- 1. All trees and vegetation will be disposed of offsite in an approved landfill.
 - 2. All approved topsoil deemed suitable by the Engineer for finish grading may be stockpiled on the site as directed by the Engineer.
- B. EXCAVATION:
- 1. The site shall be excavated to an elevation and width as necessary to provide adequate work room for tank construction. A minimum radius 10' larger than the radius of the foundation at the subgrade elevation shall be provided.
 - 2. The tank site shall be dewatered when required. The dewatering method shall prevent disturbance of the foundations soils.
- C. SUBGRADE PREPARATION
- 1. Subgrade material which is disturbed or over excavated during the preparation of the site or loose foundation material shall be removed and replaced with compacted select fill.
 - 2. After the excavation is complete, the site shall be proof rolled in the presence of the geotechnical professional prior to placement of any compacted select fill to determine the suitability of the subgrade for the tank foundation. Select fill

shall consist of a clean, well graded angular or subangular material as directed by the geotechnical professional.

D. GRANULAR SUBBASE

1. A minimum 12-inch thick layer of a granular leveling base shall be placed beneath the tank foundation prior to construction of the tank floor. The leveling base material shall be a clean, densely-graded crushed stone material with a balanced fine content to produce an easily constructed, low friction surface meeting the requirements of ASTM C33 or with gradation in accordance with the geotechnical report.
2. The leveling base material shall be fine graded to produce a subgrade elevation that is within a tolerance of +0", - 1/2" over the entire tank subgrade.
3. Compaction shall be by capable vibratory roller with a minimum of two passes in each direction.
4. Prior to construction of the floor, a 6-mil polyethylene vapor barrier shall be placed over the granular subbase. Edges of the polyethylene shall be overlapped a minimum 6 inches.

3.02 INSTALLATION

A. Concrete: All concrete shall be placed and cured as required to meet ACI standards and the following requirements:

1. Concrete placement, finishing and curing shall be in accordance with the requirements of ACI 350.5.
2. Curing shall be by membrane-forming curing compound, by covering exposed surfaces with polyethylene sheets, or by water curing.
3. Environmental Requirements: The following shall be required when placing concrete:
 - a. Cold Weather: Concrete shall not be placed without special protection when the ambient temperature drops below 35 degrees Fahrenheit and the concrete is likely to be subjected to freezing temperatures before the initial set has occurred and the concrete strength has reached 500 psi. Concrete shall be protected in accordance with ACI 306R. The temperature of the concrete shall be maintained in accordance with the requirements of ACI 301 and ACI 306R.
 - b. Hot Weather: In periods of high ambient temperature, low relative humidity, and high wind, concrete shall be placed in accordance with the requirements of ACI 305R.

B. Shotcrete: All concrete shall be placed and cured as required to meet ACI standards and the following requirements:

1. Shotcrete Placement: Shotcrete shall be placed in accordance with the requirements of ACI 506.
 2. Placement of shotcrete may start without special protection when the ambient temperature is 35°F and rising, but shall be suspended when the ambient temperature is 40°F and falling. Special protection for cold weather shotcreting shall be in accordance with the requirements of ACI 306R.
 3. Hot-weather shotcreting shall be in accordance with the requirements of ACI 305R. Shotcrete shall not be placed when shotcrete temperature exceeds 95°F.
 4. Each layer of circumferential prestressing shall be protected by a shotcrete wire coat of a thickness not less than 1/4 inch. Each prestressing wire shall be individually encased in mortar. The outer wire layer shall be protected by the wire coat plus two or more additional coats of shotcrete, totaling at least 1 inch in thickness over the outer layer of wire.
 5. Dust, efflorescence, oil and other foreign material shall be removed from surfaces to be shotcreted. The nozzle distance from the prestressing wires shall be such that shotcrete does not build up or cover the front face of the wire until the spaces between the prestressing elements are filled.
 6. Vertical shooting wires shall be installed under tension and spaced no more than 3 feet apart to maintain a uniform and correct coating thickness. Wires of 18 or 20 gage high tensile steel or monofilament shall be used.
 7. All exposed shotcrete coatings shall be kept moist for at least three days. Moist curing shall be started as soon as possible without damaging the shotcrete. Curing shall be by fog spraying or sprinkling. Curing may be interrupted for subsequent application of prestressing and shotcreting. After completion of the final coat, wet cure for seven days.
 8. Exterior shotcrete shall have a natural gun finish.
- C. Floor: The floor and footings shall be cast monolithically without the use of construction joints to the dimensions shown on the construction drawings and shall incorporate the following:
1. Concrete floors or floor sections shall be cast monolithically with no cold joints. Horizontal waterstops shall be installed in all construction joints, and the floor shall be thickened as necessary for proper placement.
 2. The floor shall be vibratory screeded to effect consolidation of the concrete and ensure proper encasement of the reinforcement.
 3. The floor shall be cured by fogging during the placement of concrete. The floor shall be wet cured for a minimum of seven days, and then continue to be kept moist during the duration of the construction. An NSF-61 approved membrane forming curing compound may be used in conjunction with water.
 4. The floor slab shall receive a fresno finish.

- D. Waterstop: A PVC Waterstop shall be embedded in the concrete at the floor to wall joint and provide a water tight seal. The waterstop shall meet the requirements of Article 2.07.B and shall meet the following criteria:
1. The vertical waterstop shall be placed and supported so that the bottom of the center bulb is at the elevation of the top of the footing. The vertical tolerance of the waterstop shall be less than $\pm 1/4$ ". The radial tolerance of the waterstop shall be less than $\pm 1/2$ ".
 2. The waterstop shall be supported in a secure manner that ensures proper positioning and consolidation of concrete around the waterstop and prevents displacement during concrete casting.
 3. The waterstop shall be secured using pre-manufactured holes or rings supplied by the manufacturer and shall not be punctured in the field.
 4. The waterstop shall be spliced using a thermostatically controlled splicing iron. Each splice shall be electronically spark tested prior to concrete encasement and any defects shall be repaired prior to installation.
- E. Precast Core Wall: The tank wall shall incorporate a steel diaphragm which meets the requirements of Article 2.05 and shall meet the following criteria:
1. The core wall shall be constructed of precast panels and vertical joints filled with shotcrete, mortar or cast-in-place concrete.
 2. A continuous watertight steel diaphragm shall be provided throughout and within the tank wall, and shall be located between the stored tank contents and the prestressing wires. The steel diaphragm shall be full length without horizontal joints. Vertical diaphragm joints shall be mechanically seamed except where located between wall panels, in which case joints shall be sealed with polysulfide or other suitable sealant. All vertical diaphragm joints shall be sealed to be fully watertight. Piercing of the diaphragm shall not be permitted except by design.
 3. The steel diaphragm shall be protected from damage before, during and after placement. Holes for form ties, nails or punctures will not be permitted unless they are predetermined due to penetrations.
 4. The tolerance requirements for the construction of the tank wall shall be as follows:
 - a. Tank Radius: The maximum out-of-round tolerance of the wall shall be $\pm 1/2$ inch per 100-foot diameter.
 - b. Wall Thickness: The core wall thickness should not vary more than $+ 1/2$ " or $- 0$ " from the specified thickness.
 5. After each precast panel has firmed sufficiently, it shall be covered with polyethylene sheet for curing.
 6. The interior of precast wall panels shall be given a fine broom finish.

7. The precast panels shall be erected around the circumference of the tank and aligned to proper tolerances.
 8. Bearing pads shall be located and held in their proper position prior to erection of wall panels. Nailing of pads shall not be permitted.
 9. Sponge filler pads shall be properly secured. All voids around the bearing pads and the sponge shall be caulked with an approved nontoxic sealant to prevent mortar seepage.
 10. The steel diaphragm shall be covered with a minimum of $\frac{1}{2}$ " of shotcrete prior to prestressing.
- F. Dome Roof: The dome shall be cast to the dimensions shown on the construction drawings and shall incorporate the following:
1. The dome shall be cast-in-place concrete constructed to proper spherical curvature. Circumferential and radial construction joints, if required, shall be configured with a vertical joint above the reinforcement while that point below the reinforcing steel shall be sloped at approximately 45 degrees. Joints that become cold due to concrete hardening shall be cleaned and coated with a thixotropic fresh cement grout prior to placement off the adjacent fresh concrete.
 2. Dome forms shall be designed to resist all forces acting with respect to its sloped surface. No portion of formwork for domes shall be removed until the concrete has attained sufficient strength, and until the full circumferential prestressing force has been applied to the dome ring, unless otherwise directed by the Tank Design Professional.
 3. The dome reinforcement shall be supported using non-corrosive bolsters spaced at a maximum of 36" center to center.
 4. The average radius of curvature of any dome surface imperfection should not exceed 1.4 times the radius of the dome.
 5. The dome form shall be left in place a minimum of 7 days or until a sufficient amount of prestressing force has been applied to the dome ring to support anticipated dome dead and live loads.
 6. The exterior surface of the dome shall receive a fine broom finish. The dome soffit shall be a form finish.
 7. The exterior dome surface shall receive a coat of membrane-forming curing compound immediately after completion of the final finishing operation.
- G. Prestressing: Circumferential prestressing of the tank shall be achieved by the application of prestressing wire meeting the requirements of Article 2.04 as follows:
1. Circumferential prestressing shall be accomplished by the application of high tensile steel wire. An essential feature of the wire-wound stressing system is the proper application of tension to the prestressing element before it is placed on

the wall. Stressing may be performed by die-drawing or another process that results in continuous, uninterrupted elongation of the wire, thereby assuring a uniform stress throughout its length.

2. The stressing system shall be capable of consistently producing a stress at any point around the wall, within a +/- 7 percent tolerance of the specified initial stress, f'_{si} . A calibrated stress-measuring device which can be easily recalibrated shall be used to determine wire stress levels frequently throughout the wrapping process. At least one stress reading for every coil or foot of wall height shall be taken immediately after application on the wall, and all such readings shall be on straight lengths of wire. A written record of stress readings shall be maintained.
3. If the measured wire stress falls below design f'_{si} , additional prestress wire shall be applied. If the applied stress in the wire exceeds $1.07 f'_{si}$, the wrapping operation shall be discontinued immediately upon discovery and satisfactory adjustment made to the stressing equipment before resuming. The total prestress force measured on the wall per vertical foot of height shall not be less than the specified force, nor more than 5 percent greater.
4. Each coil of prestressing wire shall be temporarily anchored. Ends of the individual coils shall be joined by suitable steel splicing devices capable of developing the full strength of the wire.
5. The force diagram shall be prepared for minimum spacing between the prestressing elements of $3/8$ inch, and the average minimum clear space between wires on the wall shall be $5/16$ inch or 1.5 wire diameters, whichever is greater. Wires in areas adjacent to openings or inserts shall be uniformly spaced in accordance with the above.
6. A properly designed stress plate shall be used at all permanent wall penetrations that are located above the final backfill elevation and are greater than 24 inches in height. The stress plate shall accommodate a portion of the prestressing wires normally required over the height of the penetration. The remaining prestressing wires normally required shall be relocated into circumferential bands immediately above and below the penetration. The effect of banded prestressing shall be taken into account in the design.

H. Wire Coat and Covercoat:

1. Subsequent layers of circumferential prestressing and shotcrete shall proceed when the underlying layer has developed sufficient bond and compressive strength.
2. Visible covercoat surfaces shall be uniform and even textured. Finishing techniques shall be used includes a natural gun or nozzle finish.
3. After completion, the covercoat shall be moist cured by wrapping the tank with a polyethylene film or other means conforming to the requirements of ACI 308R.

I. Coating Applications:

1. Clean all concrete surfaces to be coated to remove dust, laitance, efflorescence or other foreign matter.
2. Repair any surface defects prior to the application of coatings with materials which are compatible with the coating. Repair materials shall provide a consistent finish with the exterior finish of the tank surfaces and shall be applied in accordance with the recommendations of the manufacturer.
3. Apply coatings in accordance with the recommendations of the manufacturer.

3.03 QUALITY CONTROL:

A. Testing: All concrete and shotcrete used in the construction of the tank shall be tested in accordance with the following requirements by an independent testing laboratory at the tank construction company's expense:

1. Concrete: Concrete shall be tested in accordance with ASTM C31 and C39 by an independent testing laboratory. A minimum of one sample for each 50 cubic yards shall be taken as follows:
 - a. Concrete Cylinders: A minimum of two sets of four cylinders for 6 x 12 cylinders or three sets of four cylinders for 4 x 8 cylinders. Test one cylinder at 7 days and 28 days and hold two
 - b. Slump and Air: Slump and air content shall be tested once for each 50 cubic yards of material placed.
2. Shotcrete: Shotcrete shall be tested in accordance with the requirements of ACI 506 as follows:
 - a. Panels: One panel shall be constructed and tested in accordance with the requirements of ACI 506 for the wire coat and the covercoat. The panel should be stored on the site and cured in the same manner as the shotcrete. The panels shall be cored or sawn to obtain 3 in. diameter cores or 3 in. cubes. Three cores or cubes should be tested at 7 days, three shall be tested at 28 days and three shall be held as spares.

3.04 CLEANUP

- A. Tank Interior: Remove all construction debris and thoroughly clean interior floor and wall surfaces, and piping, using a low-pressure wash.
- B. Exterior Site: Remove and dispose of all construction debris, materials and equipment prior to leaving site. Dispose of all construction waste in an approved landfill.

3.05 DISINFECTION

- A. Disinfection shall be carried out in accordance with the approved Disinfection Plan as required in Article 1.05.D.5.
- B. Disinfection shall be performed using Method 2 or 3 in accordance with AWWA C652 and shall meet the requirements of local and state agencies.
- C. A bacteriological test shall be performed prior to placing the tank into service.

3.06 WATERTIGHTNESS TESTING

- A. Upon completion of the tank, it shall be filled to overflowing with water from the onsite well. The tank shall remain filled for a period of at least 24 hours to allow for absorption and initial settlement.
- B. Measure the drop in liquid level over the next 72 hours. The net drop in liquid level shall not exceed the maximum allowable of 0.05 of 1 percent per 24-hour period.
- C. If the net drop in liquid level exceeds the maximum allowable, the liquid level test shall be extended to a total of 5 days. If at the end of 5 days, the average net drop in liquid level does not exceed the maximum allowable, the test shall be considered satisfactory. If the net liquid loss exceeds the maximum allowable, the test shall be considered unsuccessful, the source of leakage shall be corrected, and the tank shall be retested.
- D. Damp spots on the exterior wall surface shall not be permitted. Damp spots are defined as spots where moisture can be picked up on a dry hand. The source of water movement through the wall shall be located and permanently sealed in an acceptable manner. No leakage that includes visible flow through the wall-floor joint shall be permitted. Damp spots on the footing are permissible.
- E. Water for the initial watertightness test shall be furnished to the tank by the Owner. Water for any subsequent tests which are required will be at the expense of the tank construction company.

3.07 TANK BACKFILL

- A. Backfill material around the tank shall be placed in uniform layers and compacted as specified for the material and site conditions. Asymmetrical backfill placement, except as may be required by the design and site conditions, shall be avoided.

SECTION 15130
ELECTRIC ACTUATED PINCH VALVES



PART 1 GENERAL

1.1 WORK INCLUDED

- A. Furnishing and installing of electric actuated pinch valves.
- B. Provide pinch valves complete with modulating electric actuators, and all other appurtenances required.

1.2 SUBMITTALS

- A. Submit shop drawings under provisions of Section 01300.
- B. Submit complete drawings, detail, and appurtenances covering the valves and appurtenances.
- C. Submit installation instructions and special requirements.
- D. Submit operation and maintenance data in accordance with Section 01700.

1.3 REFERENCE STANDARDS

- A. American Water Works Association:
 - 1. AWWA C541 - Hydraulic and Pneumatic Cylinder and Vane-Type Actuators for Valves
 - 2. AWWA C542 - Electric Motor Actuators for Valves and Slide Gates.
 - 3. AWWA C550 - Protective Interior Coatings for Valves and Hydrants.
- B. ASTM International:
 - 1. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.
 - 2. ASTM B584 - Standard Specification for Copper Alloy Sand Castings for General Applications.
- C. Manufacturers Standardization Society:
 - 1. MSS SP-25 - Standard Marking System for Valves, Fittings, Flanges, and Unions.
- D. National Electrical Manufacturers Association:
 - 1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- E. NFPA:
 - 1. NFPA 70 - National Electrical Code (NEC).
- F. UL:
 - 1. Equipment Directory.
- G. ASME International:
 - 1. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.

2. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard.
3. ASME B16.34 - Valves - Flanged, Threaded, and Welding End.
4. ASME B16.42 - Ductile Iron Pipe Flanges and Flanged Fittings: Classes 150 and 300.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Red Valve Company, Inc.
- B. FNW: Ferguson Enterprises, Inc.
- C. Approved Equal.

2.2 GENERAL

- A. Equipment furnished and installed under this section shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with drawings, specifications, engineering data, instructions, and recommendations of the equipment manufacturer unless exceptions are noted by the Engineer.
- B. Pinch valves shall be complete with electric actuators, and all other appurtenances specified or required for proper operation.
- C. Pinch valves and actuators shall be capable of closing against 80 psi of line pressure.

2.3 QUALITY ASSURANCE TESTING

- A. Provide shop inspection and testing of completed assembly. Test valves according to manufacturer's standard testing protocol, including hydrostatic, seal, and performance testing.

2.4 VALVE CONSTRUCTION

- A. Design:
 1. Double Seated
 2. Opening: Full Port
- B. Materials:
 1. Sleeve: Buna-N
 2. Body: Ductile Iron
 3. Lining: Elastomer suitable for process fluid
 4. Connecting hardware: Type 316 stainless steel
- C. Valve Ends:
 1. Valve ends shall be as required to match connecting piping.
 2. All 3 inch or larger valves shall have flanged ends. Flanges shall be ANSI 125 lb.

2.5 ELECTRIC OPERATORS

- A. All pinch valves shall be provided with modulating electric operators.
- B. Each motor operator shall include, as a self-contained unit, the motor, , double torque switch, declutchable auxiliary handwheel, multi-turn worm gear reducer, removable splined shaft adapter, and integral motor controls. The motor operator and all control enclosures shall be, at a minimum, weather-proof NEMA 4X.

Drives shall be designed for modulating operation and shall be, at a minimum, 30 minute continuous duty rated. Each drive shall deliver sufficient torque to open or close the valve at 90% of the specified nominal voltage.

- C. Motors shall be high starting torque, TENV totally enclosed, non-ventilated type (TEFC acceptable where required for continuous duty), suitable for operation on a 3 phase, 60 hertz, 480 volt power supply. Motor insulation shall be a minimum of Class F. Motor bearings shall be anti-friction type and shall be permanently lubricated. Motors shall include auto reset thermal overload contacts embedded in the windings. Motor duty rating shall be selected to accommodate a complete open-close-open cycle of gate travel and shall be sized to open or close the gate at a rate of 12" per minute.

Motors shall be independent subassemblies direct coupled to the gear reducer. The power gearing shall not be an integral part of the motor assembly.

- D. Electric drive shall be supplied with an electrically and mechanically interlocked motor reversing starter/controller, control transformer with fused secondary, local control station, terminal strip. Motor controls shall be completely factory wired to the motor, limit switches, and torque switches. The only field wiring required shall be for the connections to external power, remote control station, and position feedback, all to clearly marked terminal strips provided within the drive's control enclosure. The local integral control station shall include open-stop-close pushbuttons on a 3-position Local/Off/Remote lockable selector switch.
- E. In addition to limit switch contacts, a positive means of gate position indication shall be supplied via a mechanical dial position indicator on the electric drive graduated in 5% increments. 1,000 ohm potentiometer and/or R/I converter if 4-20 mA position feedback is required.
- F. All rotating power train components shall be grease lubricated and suitable for ambient temperature conditions of -20 degrees to +150 degrees Fahrenheit.
- G. Manual Operation - A permanently attached auxiliary hand wheel (metallic) with open-close direction indication arrows shall be provided. The handwheel shall not rotate during motor operation, and a fused motor shall not prevent manual operation. Maximum allowable rim effort shall not exceed 80# under worst-case actual operation conditions. Handwheel operation shall be accomplished via a declutch lever/mechanism which mechanically disengages the motor and related gearing. When in the manual mode, the unit shall stay in this mode until the motor is energized, at which time the operator will automatically return to electric operation. It shall be impossible for simultaneous manual and motor operation to occur. Friction type declutch mechanisms are not acceptable.
- H. Position limit switches and associated gearing shall be an integral part of the valve drive with contacts for open/close and intermediate position feedback. Switches shall be fully adjustable for trip positions from any position between fully open and

fully closed, and shall not be subject to slippage or breakage due to over travel of the gate. A minimum of 16 contacts on (4) rotors shall be provided. Contacts shall be "dry" type and shall be convertible from normally open to normally closed or reverse. Switch design shall permit visual verification of switch position without disassembly.

- I. Torque Switch – Valve drive shall have a double torque switch that will interrupt the control circuit in either direction of travel if a torque overload should occur. The switch shall function without the use of auxiliary relays, latches, or other devices. Contacts shall be silver plated, and the switch shall have a graduated dial for both directions of travel and shall be independently adjustable. A maximum limiter plate shall be supplied to prevent unauthorized setting beyond the manufacturer's recommendations. Switch design shall allow visual verification of settings without any disassembly. Limit and torque switches shall be rated at 600 volt per NEMA standards ICS 2-125, heavy duty.

- J. Electric Controls: Electrical controls shall include, but not be limited to, reversing starter, control power transformer, open-stop-close push-buttons and position indication light for open-close and throttling service; or reversing starter, control power transformer, open-close pushbuttons, indicating light(s), feedback potentiometer, local-off-remote selector switch, and solid-state position comparator circuit for modulating service. Controls shall be in accordance with the following:
 - 1. Reversing Starter: Control voltage shall be 120 V, single-phase, 60 Hz. Seal-in latching contacts shall be supplied for use in the pushbutton circuits. Additional auxiliary contacts [one N.O. (normally open) and one N.C. (normally closed)] shall be supplied. The starter shall be electrically interlocked.
 - 2. Control Power Transformer: The transformer shall be designed to transform 480 V three-phase, 60 Hz. power to 120 V, single-phase power. The transformer shall be complete with a grounded and fused secondary.
 - 3. Pushbuttons: Each actuator shall be supplied complete with open-stop-close pushbuttons. Pushbuttons or selector switch shall be furnished integral or, when specified, in a separate enclosure for remote mounting. As a minimum, the remote enclosure shall meet NEMA 4X, watertight and corrosion resistant construction.
 - 4. Indicating Light: Each actuator shall be furnished complete with open-close light indication for valve position. Lenses shall be red for open and green for close. Both lenses shall be lit during intermediate travel. Light(s) shall be an integral part of the actuator.

- K. Modulating Service: Controls for modulating service shall be as specified for throttling service plus the following additional requirements:
 - 1. Positioning: The actuator shall accept a 4-20 ma signal for positioning of the valve.
 - 2. Reversing Starter: Seal-in latching contacts of the reversing starter shall not be supplied for the selector-switch remote position.
 - 3. Selector Switch: A local-off-remote selector-switch function shall be supplied to isolate the incoming process-signal control function from the manual pushbutton controls.
 - 4. Position Comparator Circuit: The position comparator circuit shall be of solid-state printed circuit board design and shall include, but not be limited to, zero,

span, and dead-band adjustments. Positioning of the valve shall be accomplished by comparing the input from the feedback potentiometer with an incoming process-control signal. The process-control signal shall be 4-20 milliampere.

5. Position Transmitter: A position potentiometer transmitter shall be supplied. It shall be mechanically driven by gearing from the valve and in step at all times whether the unit is being electrically or manually operated. The transmitter shall be mounted internally to the valve operator. The output of the transmitter shall be 4-20 ma.
6. Wiring: All electrical components shall be shop-wired to a terminal strip(s) to facilitate a minimum of field wiring at the time of installation, including wiring of space heater, limit and torque switches.

2.6 SHOP PAINTING

- A. All ferrous metal surfaces of valve and accessories, both interior and exterior, shall be shop painted for corrosion protection.

PART 3 EXECUTION

3.1 VALVE INSTALLATION

- A. Install valves, actuators and accessories according to manufacturer instructions.
- B. Firmly support valves to avoid undue stresses on piping.
- C. Coat studs, bolts and nuts with anti-seizing lubricant.
- D. Clean field welds of slag and splatter to provide a smooth surface.
- E. Install valves with stems upright or horizontal, not inverted.

END OF SECTION



4280 E. 14th St.
Des Moines, IA 50313
Office: 515-265-2222
Toll Free: 800-383-7867
Fax: 515-265-8079

201 4th Ave SW
New Prague, MN 56071
Office: 952-758-6600
Toll Free: 800-536-5394
Fax: 952-758-7778

TO: Doug Loudon; dloudon@olsson.com
REF: Lift Station No. 28 EQ Basin project
Grand Island, NE
DATE: June 1st, 2022

Electric Pump is pleased to submit this proposal for the following equipment:

Base Bid
Flygt Submersible Pump & ABB VFD

Flygt Submersible Pump:

- One (1) Flygt NP3202-458HT submersible pump. Pump to be furnished with the following:
- 67 HP, 460V, 3-phase, 60Hz, explosion proof, premium efficient motor
 - Hard Iron Impeller
 - Outlet adapter modified for drop-in on existing Flygt 8" elbow
 - 50' Power cable
 - SS Lifting chain with bow shackle
 - Factory performance test
- One (1) Spare Flygt Hard Iron Impeller, 458HT Code, 310mm

VFD:

- One (1) ABB ACQ580 Variable Frequency Drive Package including:
- NEMA Type 1 - Steel Enclosure, with back panel
 - NEMA cooling fan and thermostat
 - Incoming Power Terminal Block
 - Main Circuit Breaker with door mount operator
 - Control Power Transformer with Primary Fuses
 - Control Power Circuit Breaker
 - QOU Circuit Breaker, as required
 - 1 - 30mm Push-To-Test Run Pilot Light
 - 1 - Elapsed Time Meter
 - 1 - 30mm Push-To-Test VFD Stopped Pilot Light
 - 1 - 30mm Push-To-Test Drive Fault Pilot Light
 - ABB ACQ580 Variable Frequency Drive with Remote Mount Keypad & Ethernet Adapter Module
 - MiniCas SF/HT Module, Outer Door Installed
 - Engraved Nameplates
 - UL Label 508
 - Self Laminating Wire Numbers
 - Control Relays as required
 - Terminal Blocks and Ground Lugs as Required

Freight & Field Services:

- One (1) Lot of freight and startup services

Base Bid Price: \$ 131,595.00 plus tax

Note the following:

- Guide Rail, Mini-Cas, Discharge Elbow for this pump are noted to have been supplied in the previous project and are not included on the scope of this proposal.
- Guide Rail, Controls, Hatches, Hoists, Instrumentation Anchor bolts, Concrete, Junction Box, Reducers, Valves, Piping, Conduit, Installation of equipment and anything that's not specifically mentioned in this proposal is the responsibility of others
- Pricing on this quotation is valid for **45** days.

Thank you for your consideration,

Jim Gray (712) 420-5679

Dave Bloch (515) 707-6032

cc: Kyle Zaegel (515) 265-2222

cc: Cornelius Caudle (515) 265-2222

Purchase Agreement:

****Ship to Address: (Pump)**

ATTN:

Tagging Instructions:

****Ship to Address: (VFD)**

ATTN:

Tagging Instructions:

Note the following:

- Return this purchase agreement to Kyle Zaegel at kylez@electricpump.com or via fax (515) 265-8079

Submittals: Pumps: 1 – 2 weeks
 VFD: 6 - 10 weeks

Est. Delivery: 18 – 22 Weeks after approval of submittals

Payment: Net 30 Days – Retainage upon completion

We are pleased to make the following offer to sell the listed Merchandise which is firm for (45) days from the above date, and is automatically withdrawn thereafter without any further notice.

1. Signing and returning this document to Electric Pump's office in Des Moines, IA may accept this offer.
2. This offer and acceptance constitutes the entire Agreement between the parties and may be modified only by a writing signed by both parties.
3. The prices quoted for equipment are valid for (45) days. If the quote includes start up services and it is scheduled by the request of the buyer for a time other than Monday through Friday 8:00 to 5:00 additional charges will be due.
4. Payment terms are NET 30 (thirty days) after the mailing of seller's invoice.
5. Delivery terms are F.O.B. Place of Shipment. Seller agrees to put the merchandise in the possession of the carrier, to make a reasonable contract of carriage for their transportation, to obtain and deliver or tender such documents as may be necessary to enable Buyer to obtain possession, and to promptly notify the Buyer of shipment. After seller has delivered the merchandise to the carrier, the risk of loss of the merchandise will be borne by the Buyer. The prices quoted herein include transportation charges based on existing truckload rates, any change in delivery rates existing at the time of delivery will be billed to your account. Dates of delivery are determined from the date of Seller's acceptance of any order or orders by Buyer and are estimates of approximate dates of delivery, not a guaranty of a particular day of delivery.
6. Sales and use tax are not included.
7. Buyer shall notify seller in writing at Seller's place of business as shown on the reverse side of this page, within twenty (20) days of receipt of merchandise, or any complaint whatsoever buyer may have concerning such merchandise. Failure to give such notice shall constitute a waiver by Buyer of all claims in respect to such goods.
8. If notice of complaints is provided within twenty (20) days of Buyer's receipt of the merchandise, Seller agrees to inspect the merchandise at Seller's place of business during Seller's normal business hours and days. Upon inspection, if the merchandise is determined to be defective in material or workmanship, Seller, at Seller's option, shall repair or replace said merchandise at no cost to Buyer, or Seller may refund the purchase price. If the examined merchandise is found not to be defective or is not for some other reason within the warranty coverage, Seller's service time expended on and off-location will be charged to Buyer.
9. Seller will have no further warranty obligation under this Agreement if the Equipment is subjected to abuse, misuse, negligence or accident or if buyer fails to perform any of its duties set forth in Paragraphs 8 and 9.

10. THE WARRANTY PRINTED ABOVE IS THE ONLY WARRANTY MADE BY THE SELLER REGARDING THIS PURCHASE. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. NOTHING HEREIN CONTAINED SHALL LIMIT BUYER'S RIGHTS AGAINST THE MANUFACTURER, WITH RESPECT TO MANUFACTURER'S WARRANTIES, IF ANY.
11. WARRANTY REPAIRS (which fall under the manufacturer's warranty, if any) ARE F.O.B. ELECTRIC PUMP, INC. SERVICE LOCATION. ELECTRIC PUMP, INC. WILL NOT ASSUME ANY EXTENDED WARRANTIES UNLESS APPROVED BY PRIOR WRITTEN CONSENT. THIS INCLUDES SERVICE CALLS TO JOB SITES ON PRODUCT COVERED DURING THE WARRANTY PERIOD. *PLEASE REFER TO THE ATTACHED PRODUCT WARRANTY STATEMENT FOR CLARIFICATION.*
12. IT IS UNDERSTOOD AND AGREED THAT SELLER'S LIABILITY WHETHER IN CONTRACT, IN TORT, UNDER ANY WARRANTY, IN NEGLIGENCE OR OTHERWISE SHALL NOT EXCEED THE RETURN OF THE AMOUNT OF THE PURCHASE PRICE PAID BY BUYER AND UNDER NO CIRCUMSTANCES SHALL SELLER BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES. THE PRICE STATED FOR THE MERCHANDISE IS A CONSIDERATION IN LIMITING SELLER'S LIABILITY. NO ACTION, REGARDLESS OF FORM, ARISING OUT OF THE TRANSACTION UNDER THIS AGREEMENT MAY BE BROUGHT BY BUYER MORE THAN ONE-YEAR AFTER THE CAUSE OF ACTION HAS ACCRUED.
13. This Agreement shall be governed by and interpreted in accordance with the laws of the State of Iowa. Any dispute or disputes arising between the parties hereunder, insofar as the same cannot be settled by friendly agreement, shall be litigated only in The Iowa District Court for Polk County, in Des Moines, Iowa. Seller also has the right to commence an action against the Buyer in the County of the Buyer's principal place of business.

****A hard copy of this agreement and/or a Purchase Order is required to start the submittal process****

Business Name: _____

Street Address: _____

City/State/Zip: _____

Phone: _____

Fax: _____

Email: _____

Purchase Order Number: _____

Purchase Order Amount: _____

SIGNATURE: _____

DATE: _____

**A signed copy of this must be returned with your P.O.
Is Project Taxable? Y or N, if No a tax-exempt form must be supplied for our records

GENERAL NOTES:

- ALL WORK SHALL BE IN ACCORDANCE WITH ALL OF THE CITY OF GRAND ISLAND STANDARD SPECIFICATIONS AND STANDARD DRAWINGS WHETHER INCORPORATED IN THESE PLANS OR NOT. CITY OF GRAND ISLAND STANDARD PLANS AND SPECIFICATIONS ARE AVAILABLE ON THE CITY OF GRAND ISLAND WEB SITE. CONTRACTOR IS RESPONSIBLE FOR MAKING THEM SELF FAMILIAR WITH THESE SPECIFICATIONS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING ADJACENT PROPERTY OWNERS A MINIMUM OF SEVEN (7) DAYS PRIOR TO ANY CONSTRUCTION AND ABIDING BY PERMANENT AND TEMPORARY EASEMENT BOUNDARIES.
- CONTRACTOR SHALL MAINTAIN ACCESS TO ALL PROPERTIES DURING CONSTRUCTION WHEN POSSIBLE. IF PROPERTY ACCESS NEEDS TO BE BLOCKED DURING CONSTRUCTION CONTRACTOR SHALL COORDINATE CLOSURE OF ACCESS WITH PROPERTY OWNER AND CITY PRIOR TO BLOCKING ACCESS.
- CONTRACTOR SHALL PRESERVE ALL PROPERTY CORNER MONUMENTS OR RE-ESTABLISH THEM IF THEY ARE DISTURBED DURING CONSTRUCTION.
- THE CONTRACTOR SHALL PROTECT ALL TREES NOT MARKED FOR REMOVAL.
- THE CONTRACTOR SHALL OBTAIN AND PAY THE COST OF ALL REQUIRED PERMITS AND FEES. THE PERMITS TO BE OBTAINED INCLUDE, BUT ARE NOT LIMITED TO, THE BUILDING PERMIT, NDEE CONSTRUCTION PERMIT HAS BEEN SUBMITTED AND APPROVED. CONTRACTOR SHALL ADHERE TO ALL REQUIREMENTS OF THIS PERMIT.
- THE CONTRACTOR SHALL USE EXTREME CAUTION IN THE AREA OF EXISTING MANHOLES, POWER POLES, AND EXISTING UTILITIES, AND SHALL BE RESPONSIBLE FOR DAMAGES.
- CONTRACTOR SHALL BE RESPONSIBLE FOR TRAFFIC CONTROL. TRAFFIC CONTROL PLAN SHALL BE IN ACCORDANCE WITH THE MOST CURRENT EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD). THE TRAFFIC CONTROL PLAN SHALL BE REVIEWED AND APPROVED BY THE CITY PRIOR TO CONSTRUCTION.
- SAW CUTTING PAVEMENT FOR REMOVAL SHALL BE SUBSIDIARY. PAVEMENT THAT IS REMOVED SHALL BE FULL PANELS.
- PAVEMENT SUBGRADE SHALL BE COMPACTED AND PREPARED ACCORDING TO CITY OF GRAND ISLAND STANDARD SPECIFICATIONS.
- TESTING OF SUBGRADE COMPACTION AND MOISTURE AS WELL AS CONCRETE TESTING SHALL BE COMPLETED PER GRAND ISLAND CITY SPECIFICATIONS.
- THE CONTRACTOR SHALL REPLACE DISTURBED AREAS OF SPRINKLER SYSTEM ACCORDING TO LANDSCAPING PLANS. APPROXIMATE LOCATION OF THE SPRINKLER SYSTEM IS SHOWN ON THESE PLANS. LOCATION BASED ON RECORD DRAWINGS PROVIDED BY THE CITY AND MAY NOT BE COMPLETELY ACCURATE.
- TOPSOIL IS TO BE STRIPPED 8" BELOW FINISHED GRADE IN ALL SEEDED AREAS (SEE LANDSCAPE PLAN). 8" OF NEW TOPSOIL TO BE BROUGHT ON SITE AND SPREAD OVER ALL DISTURBED AREAS INCLUDING STAGING AREAS AND ANY OTHER AREA COMPACTED DURING CONSTRUCTION.
- CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF ALL TESTING PROCEDURES REQUIRED. THE ENGINEER SHALL CONDUCT THE CONCRETE AND SOIL COMPACTION TESTS. COSTS FOR ALL OTHER TESTING SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- ANY FILL MATERIAL REQUIRED TO RETURN TRENCHES BACK TO ORIGINAL GRADE SHALL BE CONSIDERED SUBSIDIARY TO THE INSTALLATION OF THE SANITARY SEWER OR FORCE MAIN.
- THE LOCATIONS OF AERIAL AND UNDERGROUND UTILITY FACILITIES HAVE BEEN LOCATED BASED UPON THE BEST AVAILABLE INFORMATION. UNDERGROUND UTILITIES, WHETHER INDICATED OR NOT, SHALL BE LOCATED AND FLAGGED BY THE UTILITIES AT THE REQUEST OF THE CONTRACTOR. PRIOR TO THE START OF CONSTRUCTION ACTIVITY, THE CONTRACTOR SHALL CONTACT THE NEBRASKA ONE CALL HOT LINE FOR UTILITY LOCATION AT 1-800-331-5666.
- THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND VERIFYING THE DEPTH OF ALL UTILITIES. NO EXCAVATION WILL BE PERMITTED UNTIL ALL SUCH UTILITIES HAVE BEEN LOCATED AND IDENTIFIED TO THE SATISFACTION OF ALL PARTIES. EXCAVATION MUST BE ACCOMPLISHED WITH EXTREME CARE IN ORDER TO AVOID ANY POSSIBLE DAMAGE TO THE UTILITY FACILITY. THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ANY AND ALL DAMAGES TO EXISTING UTILITIES.
- ALL WATER MAIN AND SEWER CROSSINGS SHALL BE CONSTRUCTED AS PER CITY OF GRAND ISLAND STANDARD PLAN 138.
- CONTRACTOR TO PROVIDE ALL INCIDENTAL FITTINGS AND ITEMS NECESSARY TO COMPLETE WORK.
- PRIOR TO MOVING OFF SITE THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING REQUESTING A FINAL WALK-THROUGH OF THE PROJECT.
- CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL PIPE LENGTHS.
- THE AREA WEST OF THE EXISTING LIFT STATION AND NORTH OF THE PROPOSED TANK MAY BE USED FOR STAGING AS NOTED ON THE PLANS. STREET RIGHT-OF-WAY AND EXISTING DRAINAGE WAYS SHALL NOT BE USED AS A STAGING AREA WITHOUT PRIOR APPROVAL FROM THE CITY. THE CONTRACTOR SHALL LOCATE AND OBTAIN ANY NECESSARY STAGING AREAS OUTSIDE THE PUBLIC RIGHT-OF-WAY. PROPER AGREEMENTS SHALL BE MADE WITH THE LANDOWNER(S). WRITTEN COPIES OF THE AGREEMENTS SHALL BE SUBMITTED TO THE ENGINEER PRIOR TO CONSTRUCTION. ALL STAGING AREAS, WHETHER NOTED ON THESE PLANS OR OBTAINED BY THE CONTRACTOR, SHALL BE RESTORED TO PRE-CONSTRUCTION CONDITION AND ALL DAMAGES SHALL BE REPAIRED BY THE CONTRACTOR. ALL WORK AND PAYMENT FOR STAGING AREAS SHALL BE SUBSIDIARY TO "MOBILIZATION".
- ALL TOPSOIL SHALL BE STRIPPED FROM BELOW THE TANK PRIOR TO BEGINNING WORK ON THE TANK AND ASSOCIATED GRADING WORK.

CONSTRUCTION SEQUENCING:

- LIFT STATION NO. 28 SHALL NOT BE TAKEN OUT OF SERVICE FOR MORE THAN 8 HOURS. A MINIMUM OF 12 HOURS OF OPERATION SHALL BE MAINTAINED BETWEEN SERVICE OUTAGES. IF THE LIFT STATION MUST BE TAKEN OUT OF SERVICE FOR MORE THAN 8 HOURS, THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING AND MAINTAINING BYPASS PUMPING IN ORDER TO MAINTAIN WASTEWATER FLOW. THE CONTRACTOR IS RESPONSIBLE FOR DEVELOPING AND SUBMITTING A DETAILED CONSTRUCTION PHASING PLAN AND BYPASSING PUMPING PLAN FOR LIFT STATION NO. 28 TO THE ENGINEER AND OWNER FOR REVIEW AND COMMENT PRIOR TO BEGINNING ANY WORK.

STORM WATER AND EROSION CONTROL:

- THE CONTRACTOR IS RESPONSIBLE FOR IMPLEMENTING AND MAINTAINING ALL EROSION CONTROL MEASURES NECESSARY TO PROVIDE ADEQUATE PROTECTION FOR CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL INSTALL SILT FENCE ON THE DOWN SLOPE SIDE OF THE CONSTRUCTION ACTIVITIES AND SHALL INSTALL INLET PROTECTION WHERE NECESSARY.
- DUE TO THE SIZE OF THIS PROJECT, A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) IS NOT REQUIRED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ALL BEST MANAGEMENT PRACTICES (BMP) AS SHOWN ON THESE PLANS OR AS REQUIRED TO CONTROL THE STORM WATER DISCHARGE FROM THE SITE. ALL COSTS RELATED TO THE BMP'S SHALL BE SUBSIDIARY TO "EROSION CONTROL".
- ALL EROSION CONTROL MEASURES SHALL BE MAINTAINED BY THE CONTRACTOR UNTIL PERMANENT STABILIZATION IS ESTABLISHED ON 95% OF THE SITE, OR AS DIRECTED BY THE ENGINEER. ALL EROSION CONTROL MEASURES INCLUDING SILT FENCE, INLET PROTECTION, CONSTRUCTION ENTRANCES, ETC. SHALL BE AT THE EXPENSE OF THE CONTRACTOR AND SHALL BE SUBSIDIARY TO "EROSION CONTROL".
- THE CONTRACTOR SHALL CLEAN ANY CONSTRUCTION RELATED MUD OR DEBRIS FROM ADJACENT STREETS OR HIGHWAYS ON A DAILY BASIS OR MORE OFTEN AS NEEDED.
- THE CONTRACTOR SHALL USE A DESIGNATED AREA FOR A CONCRETE WASHOUT. THIS AREA SHALL BE A CONTAINMENT AREA WHERE THE WASTE CONCRETE CAN SOLIDIFY IN PLACE AND EXCESS WATER CAN SAFELY EVAPORATE. WHEN CONSTRUCTION IS COMPLETE, ALL CONCRETE SHALL BE REMOVED FROM THE WASHOUT AND IT SHALL BE RETURNED TO PRE-CONSTRUCTION CONDITION. THE INSTALLATION, REMOVAL, AND CLEAN-UP OF THE CONCRETE WASHOUT(S) SHALL BE SUBSIDIARY TO THE CONCRETE BID ITEMS.
- THE CONTRACTOR SHALL INSTALL SILT FENCE OR OTHER APPROVED EROSION CONTROL MEASURES AROUND THE PERIMETER OF ALL MATERIAL STOCKPILES. SILT FENCE SHALL BE COMPRISED OF MIRAFI 1120N, OR APPROVED EQUIVALENT.

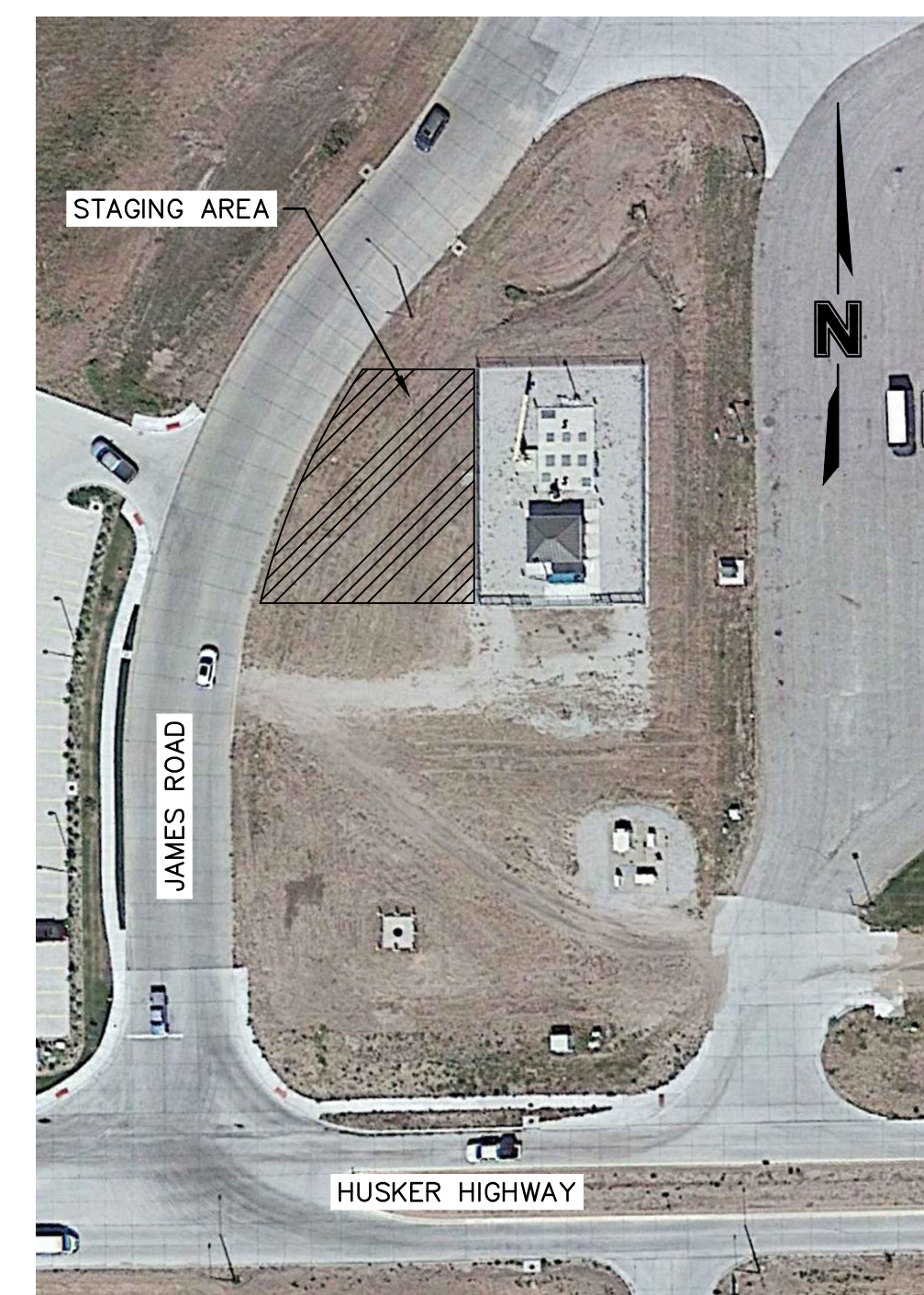
DEWATERING:

- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING THE NECESSARY NPDES PERMIT FROM NDEE AND DEWATERING PERMIT FROM THE CITY OF GRAND ISLAND FOR DISCHARGE OF WATER FROM DEWATERING OPERATIONS DURING CONSTRUCTION. IF DEWATERING IS REQUIRED FOR THIS PROJECT.
- THE CONTRACTOR IS TO SUBMIT A DETAILED DEWATERING PLAN TO THE OWNER AND ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF DEWATERING OPERATIONS. THE CONTRACTOR IS TO SECURE APPROVALS FOR ALL DISCHARGE LOCATIONS.
- THE CONTRACTOR IS TO HAVE MEASURES IN PLACE TO PREVENT EROSION FROM DISCHARGE OF DEWATERING WATER.
- THE DEWATERING DISCHARGE PIPING SHALL NOT CLOSE ANY INTERSECTIONS OR DRIVE ENTRANCES THAT ARE NOT CLOSED DUE TO ACTIVE CONSTRUCTION. DRIVE OVER RAMPS OR OTHER MEANS SHALL BE USED TO KEEP INTERSECTIONS AND DRIVES OPEN TO TRAFFIC.
- DEWATERING SHALL BE SUBSIDIARY TO THE BID ITEM BEING INSTALLED.
- DEWATERING MAY BE DISCHARGED TO EXISTING DRAINAGE DITCH ON SITE. EROSION CONTROL MEASURES SHALL BE PLACED TO PROTECT WASHOUT.
- THE APPROXIMATE GROUND WATER ELEVATION IS 1860.00 BASED ON GEOTECHNICAL BORINGS OBTAINED ON 1/24/2022.

LEGEND

- ☐ POWER POLE
- ☐ ELECTRIC BOX
- ☉ LIGHT POLE
- GUY WIRE
- ⊙ YARD HYDRANT
- ⊙ SANITARY MANHOLE
- ⊙ SANITARY SEWER CLEANOUT
- ⊙ STORM SEWER INLET
- △ FLARED END SECTION
- ⊙ BUSH
- ⊙ DECIDUOUS TREE
- ☀ CONIFEROUS TREE
- ☐ TREE STUMP
- ⊙ SIGN
- SPRINKLER HEAD
- ⊙ BOLLARD
- ⊙ WOOD POST
- ⊙ GDP GUARD POST
- ⊙ FP FLAG POLE
- W — WATER LINE
- SS — SANITARY SEWER LINE
- FM — FORCE MAIN
- — STORM DRAIN
- P-UG — UNDERGROUND ELECTRIC
- P-OH — OVERHEAD ELECTRIC
- FO — FIBER OPTIC LINE
- CHAIN LINK FENCE
- X — BARBED WIRE FENCE
- ▭ CONCRETE SURFACE
- ▭ CRUSHED ROCK SURFACE

QUANTITIES TABLE			
Item #	DESCRIPTION	QUANTITIES	UNITS
1	MOBILIZATION/DEMOBILIZATION	1	LS
2	REMOVE AND SALVAGE HORIZONTAL SLIDE GATE	2	EA
3	REMOVE DEWATERING WELL	1	LS
4	REMOVE BARBED WIRE FENCE	377	LF
5	REMOVE CHAIN LINK FENCE	280	LF
6	REMOVE AND STOCKPILE CRUSHED ROCK SURFACING	916	SY
7	REMOVE BOLLARD	7	EA
8	REMOVE 24" RCP STORM DRAIN	20	LF
9	REMOVE FLARED END SECTION	2	EA
10	GRIND EXISTING CURB	57	LF
11	REMOVE AND REPLACE PIPE SUPPORT GROUT	1	LS
12	VALVE VAULT INTERIOR PIPING	1	LS
13	EARTHWORK, CLEARING, AND GRUBBING	1	LS
14	INSTALL 8" DI PIPE	23	LF
15	INSTALL 12" DI PIPE	213	LF
16	INSTALL 4" PVC WATER PIPE	58	LF
17	INSTALL 24" RCP STORM PIPE	84	LF
18	ADJUST MANHOLE TO GRADE	1	EA
19	INSTALL 48" VALVE MANHOLE	3	EA
20	INSTALL 8" ELECTRIC ACTUATED PINCH VALVE	1	EA
21	INSTALL 12" ELECTRIC ACTUATED PINCH VALVE	1	EA
22	INSTALL 12" CHECK VALVE	1	EA
23	INSTALL 12" DI MJ 90° BEND	1	EA
24	INSTALL 12" DI MJ 45° BEND	2	EA
25	INSTALL 12" SANITARY WYE	1	EA
26	INSTALL 12"x8" DI MJ CONCENTRIC REDUCER	1	EA
27	INSTALL DROP CONNECTION IN EXISTING MANHOLE	1	LS
28	INSTALL WATER SERVICE LOWERING	1	EA
29	INSTALL WATER WELL	1	LS
30	INSTALL 8" CHAIN LINK FENCE	656	LF
31	RESET 12' HORIZONTAL SLIDE GATE	1	EA
32	REUSE CRUSHED ROCK SURFACING	119	TON
33	INSTALL BOLLARD	4	EA
34	INSTALL VENT ON EXISTING MANHOLE	1	LS
35	INSTALL AREA INLET	1	EA
36	PLACE 4" CONCRETE WALK	1607	SF
37	PLACE 6" CONCRETE PAVEMENT	1111	SY
38	INSTALL ADA RAMP	3	EA
39	INSTALL SUBMERSIBLE PUMP	1	LS
40	SANDBLAST AND RECOAT ALL VALVE VAULT PIPING	1	LS
41	EROSION CONTROL	1	LS
42	ELECTRICAL WORK	1	LS
43	CONTROLS	1	LS
44	IMPORTED TOPSOIL	1	LS
45	LANDSCAPING AND SEEDING	1	LS



6415 Second Avenue,
Suite 1
Kearney, NE 68847
TEL 308.708.7650
www.olsson.com

olsson

REV. NO.	DATE	REVISIONS DESCRIPTION
1	6/7/2022	ADDENDUM 1

REVISIONS

GENERAL NOTES

2022

LIFT STATION 28 EQUALIZATION TANK
CITY PROJECT #2022-S-3

GRAND ISLAND, NE

drawn by: _____ ORV
checked by: _____ DWL
approved by: _____ JRB
QA/QC by: _____ MDM
project no.: 021-05281
drawing no.: G2.0
date: 6/8/22

SHEET
G2.0

USER: dfloudon

DWG: F:\2021\05001-05500\021-05281\40-Design\AutoCAD\Final Plans\Sheets\GNCV\C_GEN01_02105281.dwg
DATE: Jun 06, 2022 6:33pm
XREFS: C_PTBK_02105281