BROWNSVILLE
PUBLIC UTILITIES BOARD

Date: June 23, 2021
To: All Vendors
Subject: Addendum #1

REFERENCE: **B 062-21 Southmost 2.0 MG Elevated Storage Tank**

This Addendum forms part of the contract and clarifies, corrects or modifies original bid document.

See attached document.

The signature of the company agent, for the acknowledgement of this addendum, shall be required.
Complete information below and return via e-mail to: dsolitaire@brownsville-pub.com.

I hereby acknowledge receipt of this addendum.

Company: _____

Agent Name: _____

Agent Signature: _____

Address: _____

City: _____ **State:** _____ **Zip:**_____

Phone #:_____**E-mail address:**_____

If you have any further questions about the Bid, call 956-983-6366.

BY: *Diane Solitaire*
Purchasing

Dunham Engineering, LLC
an HMT Company
6102 Imperial Loop
College Station, TX 77845
Phone: (979) 690-6555

Addendum No. 1
B062-21 Southmost 2.0 MG Elevated Storage Tank
Brownsville PUB

July 22, 2021

The following additions, deletions, changes or clarifications to the Southmost 2.0 MG Elevated Storage Tank Project, are hereby made a part of the Bid Documents for the above referenced project as fully and as completely as though the same were included therein. There will be no extension provided to the Bid Deadline. The Bid Deadline remains July 27, 2021 at 2:00 pm.

1. The following items of the bid documents are hereby **altered as listed:**
    a. Section 13210 "Composite Elevated Storage Tank"
        i. 1.05 Quality Assurance A. Manufacturer paragraph 2 page 6, Add "Caldwell Tanks, Inc." to the list of acceptable manufacturers.
        ii. 3.04 Concrete Support Structure A. Architectural Concrete Construction paragraph 6 page 25, Delete "a minimum of 6 ft." and replace with "a minimum of 4 ft."
    b. Add map "Southmost Blvd. and 30th Street" to the contract documents to provide information regarding existing utilities.
    c. Drawing "Elevation View" Sheet T-5, Delete "304L STAINLESS STEEL" and replace with "316 STAINLESS STEEL"
    d. Drawing " Standard Details 1" Sheet T-7 is replaced with "Standard Details 1 Addendum 1" Sheet T-7 shown in the attachment provided by Dunham Engineering, LLC.
    e. Section 11210 "Horizontal Split-Case Centrifugal Pumping Units" is replaced with Section 11210 "Horizontal Split-Case Centrifugal Pumping Units" shown in the attachment provided by Freese and Nichols, Inc.
    f. Drawing "Elevated Storage Tank Plan" Sheet M-1 is replaced with "Elevated Storage Tank Plan" Sheet M-1 shown in the attachment provided by Freese and Nichols, Inc.
    g. Drawing "One Line Diagram and Panel Schedules" Sheet E2 is replaced with "One Line Diagram and Panel Schedules Addendum #1" Sheet E2 shown in the attachment provided by Square E Engineering.
    h. Drawing "EST Interior Plan View" Sheet E3 is replaced with "EST Interior Plan View Addendum #1" Sheet E3 shown in the attachment provided by Square E Engineering.
    i. Section 17711 "Instrumentation" is altered as shown in the attachment provided by Square E Engineering.
2. The following answers are provided based on questions submitted from prospective bidders:

    Q1: Please confirm substantial completion is Four Hundred-Fifty (450) days.

    A1: Confirmed.

    Q2: Subcontractors Pre-Bid Disclosure Statement – Final Subcontractors are usually not known until just before bid time making completing this form in time to submit with the bid very difficult. Can the Subcontractors Pre-Bid Disclosure Statement be submitted post bid, say within 72 hours?

A2: For the General Contractor's Bid to be considered responsive a list of Subcontractors must be provided with the Bid. The Subcontractor's Pre-Bid Disclosure Statement must be completed and submitted within 48 hours of the Bid closing.

Q3: Spec Section 13210, Item 3.06.C – please confirm the order of operations with respect to interior wet surface preparation as:

- Pressure wash per SSPC SP-1
- Abrasive blast (all surfaces) to SSPC-SP-6
- Remove all blast media and debris
- Test for soluble iron salt concentration and chloride concentration
- If concentrations are >10ppm, Pressure wash per SSPC SP-1
- Install DH equipment – operation to final paint application + 5 days
- Abrasive blast (all surfaces) to SSPC-SP-10

A3: The order of operations for interior wet surface preparation is confirmed. Salt test may be performed on limited "test patches", assuming acceptable results, to avoid blasting all areas to SP-6 and removing all blast media and debris prior to near white blast.

Q4: Per the contract drawings, this job site is near residential homes. Please confirm full containment will be required.

A4: It is up to the contractor to determine how to properly contain and prevent nuisance dust.

Q5: Spec Section 13210, Item 3.06.E.4 – Per the manufacturer Series 1075 is no longer in production and has been replaced with Series 1095. Please confirm Series 1095 is acceptable for the exterior intermediate coat.

A5: Series 1075 is still in production and should be used for the exterior intermediate coat. If this should change prior to coating operations, a manufacturer recommended alternative will be considered.

Q6: Spec Section 13210, Item 3.06.C.5 & 3.10.A – The specified interior coatings system minimum mils DFT does not add up to the specified minimum thickness required of 12 mils DFT. Please confirm the minimum DFTs is 10.5 mils or indicate the correct mils per coat.

A6: Total minimum system DFT is 12.0 mils. Individual coats may be within the specified ranges, but this does not negate the requirement for total system thickness. If all coats are applied at their per-coat minimums, additional coats will be required to meet the specified total minimum system DFT.

Q7: Spec Section 13210, Item 3.06.E.4 & 3.10.B - The specified exterior coatings system minimum mils DFT does not add up to the specified minimum thickness required of 12 mils DFT. Please confirm the minimum DFTs is 10.5 mils or indicate the correct mils per coat.

A7: Total minimum system DFT is 12.0 mils. Individual coats may be within the specified ranges, but this

does not negate the requirement for total system thickness. If all coats are applied at their per-coat minimums, additional coats will be required to meet the specified total minimum system DFT.

Q8: General Conditions Item 5.5.6 Transportation Insurance – typically coverage limits for this type of insurance are a set value, not based on a percentage of overall contract value. Industry standard is $ 1.0 M coverage limit, please confirm this is acceptable.

A8: This coverage limit is acceptable.

Q9: To reduce cost, can 8" of compacted crushed aggregate subbase, or crushed concrete subbase be used In lieu of the lime stabilized subgrade shown on the driveway detail on sheet T-7?

A9: Yes.

Q10: Drawing T-4 - To allow for more room between the north side of the tank and the limits of construction, can the silt fence be temporarily moved to the edge of the canal while we construct the tank at grade?

A10: The silt fence must remain at 50-ft from the centerline of the drainage ditch as there is an existing drainage easement that must not be encroached upon.

Q11: Drawing T-2.
How far from the pedestal are we to terminate the 20" watermain? Do we terminate with a cap and the other contractor connect to us or do we connect to the other contract?

A11: The 20" watermain will terminate six feet from the pedestal. The tank contractor will be responsible for the connection and the six feet of pipe to the 20" watermain.

Q12: Drawing T-2
When is the new incoming watermain work taking place?
Will that Contractor be terminating his work with a valve at the tank tie in point?
What is the pipe type being installed under the other contract?

A12: The new watermain will begin construction in the early part of 2022 and will be completed prior to the termination of the elevated storage tank. The contractor will be terminating his work at the tank tie in point with a valve. The watermain that is being installed is PVC.

Q13: Drawing T-9 Splash Pad Note 4 says 100 ft of concrete splash pad is required, however, Drawing T-2 scales about 50 ft. Please clarify.

A13: The distance provided is an approximation. The actual distance is not known. Please use 100 linear feet for all biding purposes.

Q14: Drawing T-2
What size and type of pipe is the sanitary sewer line?
What is the depth of the existing sanitary sewer line at the tie in?
Can a profile view be provided?

A14: The sanitary sewer line is to be 4" PVC, Schedule 40. Sizes and information about existing sanitary sewer lines can be found attached map titled "Southmost Blvd. and 30th Street". A profile view will not be provided.

Q15: Drawing T-2
What size and type of pipe is the existing sanitary sewer line at the tie in? Can a detail of the connection be provided?

A15: Sizes and information about existing sanitary sewer lines can be found attached map titled "Southmost Blvd. and 30th Street". A detail will not be provided.

Q16: Will work on Saturday be allowed at the tank site location?

A16: Saturday work with be allowed with prior approval.

Q17: Will work on Sunday be allowed at the tank site location?

A17: Sunday work if necessary will be allowed with prior approval.

Q18: Can a specification be provided for the 10 x 10 FRP Overhead Door? Section 13210 provides a description, but we required a make and model number in order to price a FRP door to handle the required wind rating.

A18: A specification will not be provided. The contractor will submit a product for approval by owner and engineer.

Q19: Drawing T-1 Testing Note 4 says soils / compaction testing is paid for by the Owner. However, Section 02210 says compaction testing is by The Contractor.
Please clarify soils/compaction testing is paid for by the Owner

A19: Construction testing will be paid by the owner. Failed and/or retests shall be paid by the Contractor.

Q20: Drawing T-1 General Note 19 says Contractor is to obtain and pay for all permits. However, both Section 01100 Item 3.01.A.1 and Section 13210 Item 1.07.A say the Owner will obtain and pay for any permits.
Please confirm any permits will be paid for by the Owner or issued at no charge to the Contractor.

A20: All permits along with their costs will be the responsibility of the Contractor.

Q21: Specification Section 13210-1.03.E references load combinations. The load combinations included are outdated and differ greatly from AWWA-D107. Please confirm we are to use the load combinations published in the latest version of AWWA-D107 for design of the composite water storage tank.

A21: The most up to date load combinations from AWWA-D107 should be used in design of this composite elevated storage tank.

Q22: Section 13210 Item 2.06.L specifies Type 316 stainless steel piping, as well as Drawing M-1. However, Drawing T-5 Mechanical Note 1 says piping is Type 304 stainless steel. Please clarify.

A22: Type 316 stainless steel piping is to be used.

Q23: Drawing T-6 – this seems to leftover from a previous project. Please confirm this sheet is not applicable to this project.

A23: This drawing is included for reference only and should not be used to make design decisions during the Bid. The contractor is expected to provide their own drawings similar to the ones provided.

Q24: Drawing T-9 EST Ladder Detail shows 17" clearance behind the ladder, our standard and industry standard is 7". Please confirm this is acceptable.

A24: A 7" clearance behind the ladder is acceptable.

Q25: Drawing T-5 shows 30" roof hatches, Section 13210 specifies 36" roof hatches. Please clarify.

A25: The roof hatches will be 36".

Q26: Drawing T-7, CLF Details seem to show a concrete mow strip under the fence. Is one required? If so, please provide a detail (width, thickness, reinforcement)

A26: The concrete mow strip will be 6"x6". See updated sheet attached.

Q27: Section 02820 Item 2.01.c – please confirm alternate fence contractor experience submittals is a post bid item.

A27: Please reference Answer 2 for this question.

Q28: Section 02820 starts at Part 2 and does not include the usual Part 1 General, or Part 3 Execution. Are we missing portions of this section?

A28: There are no missing portions to this specification.

Q29: Section 17711 – who is the Owners current I&C Systems Integrator?

A29: Please reference the attachment from Square E Engineering regarding this question.

Q30: Drawing M-1 General Note 4. Typically, the interior of the ductile iron pipe is factory cement lined and shipped with an exterior prime coat, with the exterior paint system field applied to the exterior only. Please confirm this is acceptable and no DIP interior field coatings are necessary.

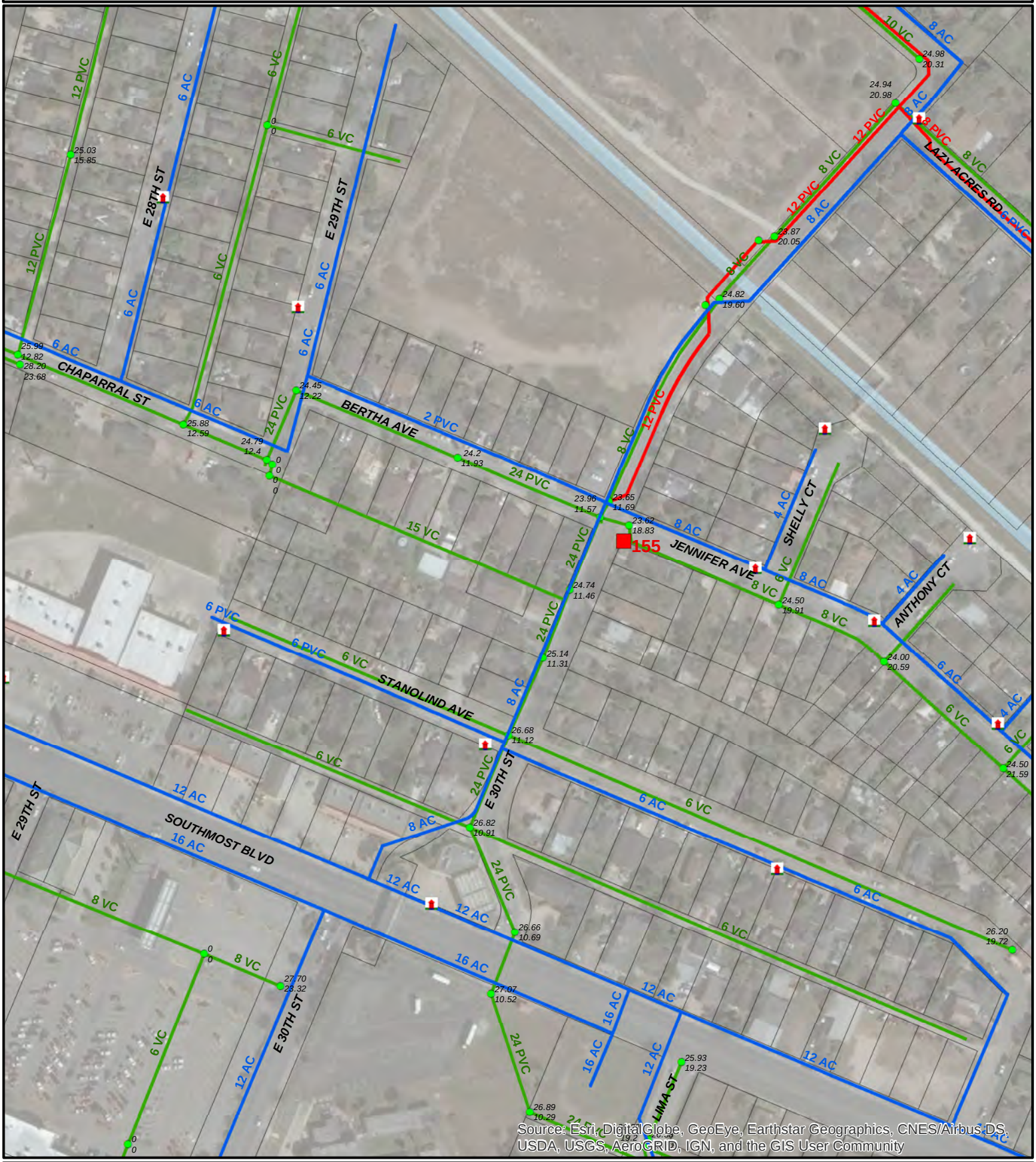
A30: Please refer to revised Drawing M-1 issued with this addendum.

Q31: Bid Item 13 is for 100 CY of lean concrete to fill voids discovered during foundation excavation. As bidders will have varying designs can this bid item be made a cash allowance, so all bidders are carrying the same value into their bid.

A31: No this item will not be added as a cash allowance and should be bid as indicated.

END OF ADDENDUM

Southmost Blvd. and 30th Street



Legend

- Water Hydrant
- Water Mainline
- Sewer Manhole
- Sewer Lift Station
- Sewer Force Main
- Sewer Gravity Main

N W E S

1 inch = 200 feet

BROWNSVILLE PUBLIC UTILITIES BOARD

Date: 7/22/2021 Drawn by: LGM

DISCLAIMER - PUBLIC UTILITIES OF BROWNSVILLE

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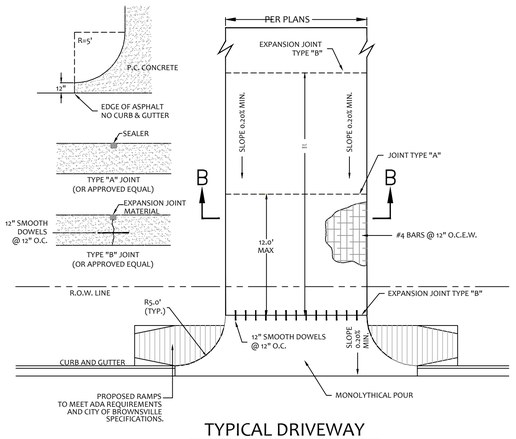
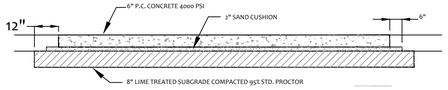
THIS MAP IS FOR REFERENCE ONLY

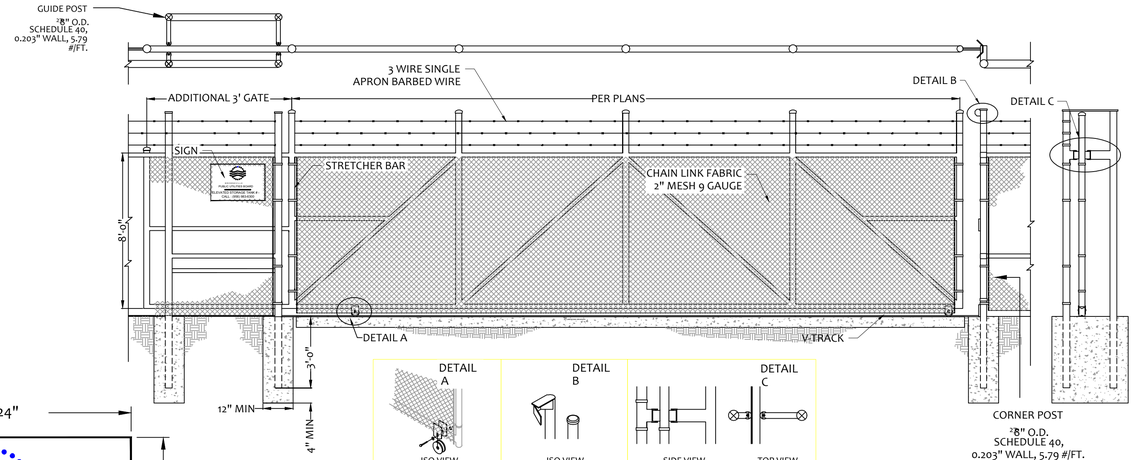


TYPICAL DRIVEWAY



SECTION VIEW B-B

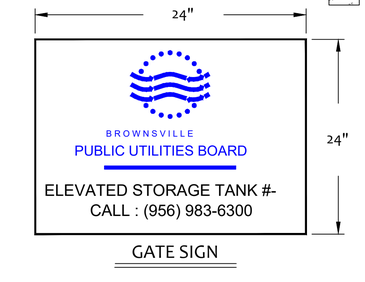
NOTE:
CONCRETE TO BE CLASS "A" WITH 3000 PSI MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS.



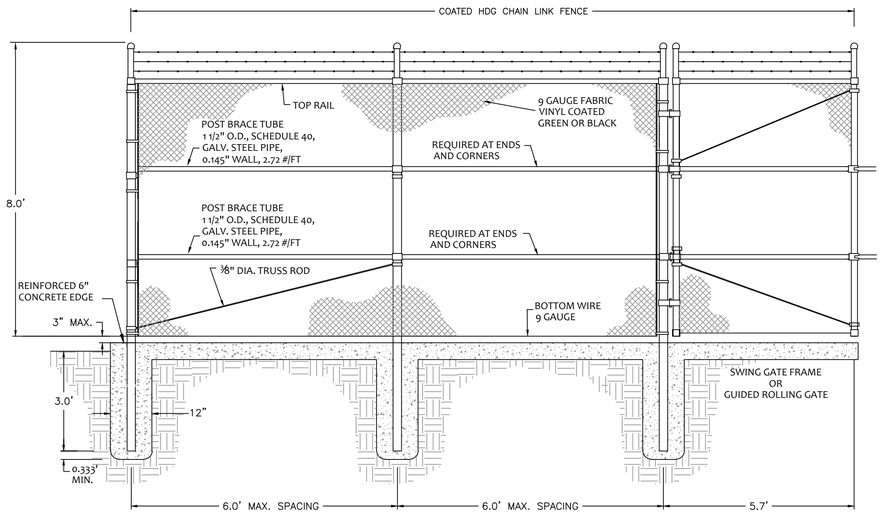
ROLLING GATE DETAIL

NOTES:

1. MANUAL ROLLING GATE TO MEASURE 25
2. GATE SHOWN IS FOR CHAIN LINK FENCE.
3. GATES:
   - BOTTOM RAIL: 2 1/2" NOMINAL STEEL PIPE, 2 7/8" O.D., SCH 40, 0.203" WALL, 5.75 #/LF, PVC COATED OVER HOT DIPPED.
   - TOP RAIL: 2" NOMINAL STEEL PIPE, 2 3/8" O.D., SCH 40, 0.154" WALL, 3.65#/LF, PVC COATED OVER HOT DIPPED.
   - VERTICAL POSTS: 2" NOMINAL STEEL PIPE, 2 3/8" O.D. SCH 40, 0.154" WALL, 3.65#/LF, PVC COATED OVER HOT DIPPED.
   - DIAGONAL BRACES: 1 1/2" NOMINAL STEEL PIPE, 1.9" O.D. SCH 40, 0.145" WALL, 2.72#/LF, PVC COATED OVER HOT DIPPED.



GATE SIGN



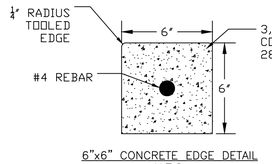
CORNER POST
2 7/8"Ø O.D.
SCHEDULE 40, GALV. STEEL PIPE,
0.203" WALL, 5.79 #/FT.

LINE POST
2 3/8"Ø O.D.
SCHEDULE 40, GALV. STEEL PIPE,
0.154" WALL, 3.65 #/FT.

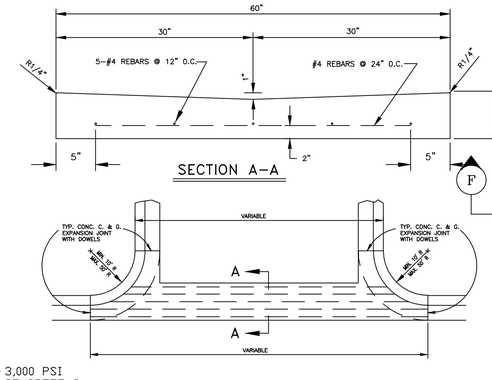
GATE POST
4 1/2"Ø O.D.
SCHEDULE 40, GALV. STEEL PIPE,
0.237" WALL, 10.79 #/FT.

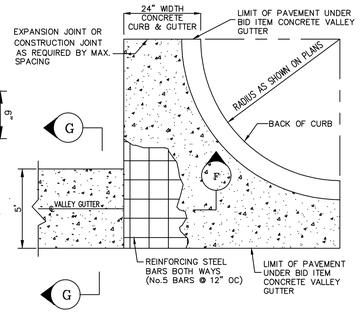
CHAIN LINK FENCE DETAILS

NOTE:
1. CHAIN-LINK AND FRAME SHALL BE ZINC-COATED GALVANIZED WITH GREEN PVC COLOR COATING AND BONDING AGENT FOR PROTECTION AGAINST CORROSION.



6"x6" CONCRETE EDGE DETAIL
N.T.S.





CONCRETE VALLEY GUTTER
NTS

TYPICAL 5' WIDE CONCRETE VALLEY GUTTER

NOTE:
CONCRETE TO BE CLASS "A" WITH 3000 PSI MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS, WITH 1.5 LBS/CY "FIBERMESH". 2" DEEP DUMMY JOINTS 10' O.C. MAX EXPANSION JOINTS WILL BE PLACED AT THE END OF EACH POUR WITH INTERVALS NOT TO EXCEED 40 L.F. JOINTS WILL CONSIST OF ½" PRE-MOULDED BITUMINOUS EXPANSION JOINT MATERIAL WITH REINFORCING RODS SPACED AS SHOWN.

Revision Schedule

Revision Number	Revision Description	Revision Date
1	Mow Strip Detail	7/22/2021

Southmost 2.0 MG Elevated Storage Tank

Brownsville Public Utilities Board

DUNHAM ENGINEERING
INSPECTION.DESIGN.RESULTS.
6102 Imperial Loop
College Station,
Texas 77845
Phone: 979-690-6555
TX FIRM NO. 22537

STATE OF TEXAS
TRAVIS C. TATUM
110343
LICENSED
PROFESSIONAL ENGINEER
7/22/2021

Standard Details 1 Addendum 1

Drawn By:	DW
Sheet:	T - 7
Date:	April 28, 2020
Project No:	275-00003

ADDENDUM NO. 1
SOUTHMOST 2.0 MG ELEVATED STORAGE TANK

Owner: Brownsville Public Utility Board

Project: Southmost 2.0 MG Elevated Storage Tank (Bid No.: B062-21)

FNI Project No.: BPU21286

Addendum No. 01

Addendum Date: July 21, 2021

The following additions, deletions, modifications, or clarifications shall be made to the appropriate portions of the Contract Documents. Offerors must acknowledge receipt of this Addendum in the space provided on the Bid Form.

ARTICLE 1 – ADDENDUM

1.01 Amend the Contract Documents

Make the additions, modifications, or deletions to the Contract Documents described in this Addendum.

1.02 Acknowledge Addenda

Acknowledge receipt of this Addendum in the Bid Form submitted for this Project. Failure to acknowledge receipt of this addendum in the Bid Form may render the Bid as non-responsive and serve as the basis for rejecting the Bid.

ARTICLE 2 – SPECIFICATIONS

2.01 Replace the following Specification Sections:

Replace Section		With Section	
Section	**Section Title**	**Section**	**Section Title**
11210	Horizontal Split-Case Centrifugal Pumping Units	11210	Horizontal Split-Case Centrifugal Pumping Units

ARTICLE 3 – DRAWINGS

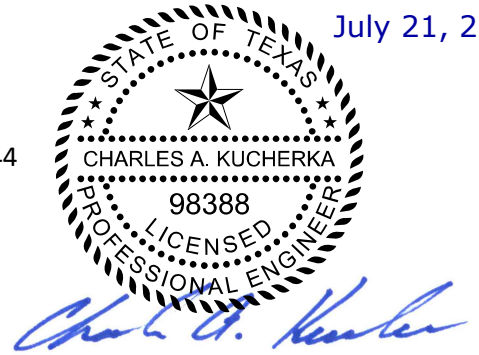
3.01 Replace the following Drawings:

Replace Drawing		With Drawing	
Drawing No.	**Drawing Title**	**Drawing No.**	**Drawing Title**
M-1	Elevated Storage Tank Plan	M-1	Elevated Storage Tank Plan

END OF ADDENDUM NO. 01

July 21, 2021

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144



SECTION 11210
HORIZONTAL SPLIT-CASE CENTRIFUGAL PUMPING UNITS

SOUTHMOST 2.0 MG ELEVATED STORAGE TANK

1.00 GENERAL

1.01 WORK INCLUDED

A. Furnish labor, materials, equipment and incidentals necessary to design, manufacture, fabricate, test, deliver, and install one (1) horizontal centrifugal pumping unit and electric motor driver inside the Southmost Elevated Tank (EST #8) pedestal.

B. Pumping units include but are not necessarily limited to horizontal split-case, double suction centrifugal pump with side suction and side discharge, horizontal motor, coupling, common pump and motor base, anchor bolts and template, electrical, instrumentation, special services, spare parts, and all lubrication and oil. Furnish accessories as required for a complete functioning pumping unit in accordance with the specified performance and installation conditions.

C. For this specification section, the Equipment Manufacturer is defined as the Pump Manufacturer or their designated representative. The Equipment Manufacturer is responsible for supplying and coordinating the design, testing, and supervising the installation of the pump and motor. The Equipment Manufacturer is responsible for the adequacy and compatibility of the pump and motor. The Motor Manufacturer shall act as a supplier of the Equipment Manufacturer. The Motor Manufacturer must provide a representative who is capable of coordinating the design, testing, and installation of the motors. The Installation Contractor will install the pumping unit under the supervision and guidance of the Equipment Manufacturer's representative.

D. Pumping units will be operated by variable frequency drive (VFD). The Motor Manufacturer must issue a letter of compatibility with the VFD Manufacturer. Pump Motor Manufacturer must ensure that motor is Inverter Duty Rated and must provide a statement detailing the motor's compatibility with Variable Frequency Drives.

1.02 ACCEPTABLE MANUFACTURERS

A. PUMPS

1. Flowserve
2. ITT Goulds
3. Patterson
4. Pentair (Fairbanks Nijhuis)
5. Xylem (Flygt A-C Series)
6. No other manufacturers will be accepted.

B. Acceptable Motor Manufacturers

1. Reliance (Baldor)
2. TECO-Westinghouse
3. U. S. Electrical Motors
4. G.E.
5. WEG
6. No other manufacturers will be accepted.

1.03 QUALITY ASSURANCE

A. EXPERIENCE REQUIREMENTS

1. Pumps and motors must be the product of manufacturers who have had at least ten (10) years of successful experience in the design, manufacture, and application of pumping units of the type, size, and performance capabilities as specified. The pump model and size must be an existing design that has been manufactured and is in operation. Prototype pumps will not be allowed.
2. Equipment Manufacturer must maintain a quality assurance system in compliance with ISO 9001:2015 during the life of the contract.
3. All components of the pump and baseplate must be supplied, assembled, and warranted by one of the approved pump manufacturers. Pump components shall NOT be acquired from separate entities and assembled as a final product by a manufacturer's representative.

B. FACTORY INSPECTION AND TESTS

1. PUMP

a. Pumps must be factory performance tested using the previously tested job motor or and certified copies of test data and test curves must be furnished to the Engineer. The efficiency, capacity, head, and horsepower requirements must be determined for not less than seven (7) points throughout the specified head range from shut-off to maximum specified operating capacity. Test procedures, interpretation and conversion of data, must conform to the latest requirements of the Test Code of the Hydraulic Institute standards. The pump test results must indicate that the performance of the pump from run-out head to shut-off head is similar to the pump curve submitted with the bid submittal. If the test results indicate that the pump performs substantially different from the curve submitted with the bid, the Owner, at their option, may accept the unit at a reduced price, or may refuse to accept the unit as a consequence of breach of contract on the part of the Manufacturer.

Seven (7) days prior to the shop test the manufacturer must submit a test procedure booklet which provides a plan and profile view of the test piping layout including locations of the test instruments. A description of the test must be included along with the calibration sheets on the proposed instrumentation.

Test results must show no minus tolerance or margin with respect to capacity, total head or guaranteed efficiency at the specified conditions. Pumps must have a

continuous down slope in the head-capacity curve. Pumps must be within the following plus tolerance at the evaluated points:

At rated heads: +10% of rated capacity

At rated capacities: +5% of rated heads

b. Following completion of factory performance tests, the manufacturer must submit to the Engineer for review and approval, certified copies of all test data and test curves for each of the pumps. The Engineer will promptly review test data and, upon determining that the pump meets contract requirements, authorization will be given for shipment. Shipment must not be made without written approval of test data by the Engineer, except at the risk of the Vendor.

c. The manufacturer must perform a hydrostatic pressure test of the pump castings at 1.5 times shut-off head for a minimum of thirty minutes.

2. 460 VOLT MOTORS

a. All 460 volt motors must receive a short commercial test in accordance with NEMA MG-1.

b. Following completion of factory tests, the Equipment Manufacturer must submit to the Engineer for review and approval, certified copies of all test data for each motor. The Engineer will promptly review test data and, upon determining that the motor meets contract requirements, authorization will be given for shipment. Shipment must not be made without written approval of test data by the Engineer, except at the risk of the Equipment Manufacturer.

C. MANUFACTURER'S REPRESENTATIVE FOR STARTUP AND TESTING:

Provide the services of the pump and motor manufacturer's technical representative in accordance with the Contract Documents and as follows:

1. The Pump & Motor Manufacturer must furnish the services of a competent Service Representative, who has a minimum of five (5) years experience in the installation, adjustment, and operation of the equipment which is being furnished under this contract. At the manufacturers' option, the Service Representative may provide services for both the pump and motor. This service is for the purpose of insuring proper installation and adjustment of the equipment; instructing operating personnel in proper operation, maintenance, and care of the equipment; for making operation tests of equipment and making recommendations for obtaining the most efficient use thereof.

2. The service representative must be at the site at any time the Contractor is assembling, setting, aligning, connecting or adjusting and testing the pump and motor assembly. They must direct and assist the Contractor in the installation and certify in writing to the Owner that it has been properly installed and operates satisfactorily during acceptance tests.

3. The minimum time required to be on-site is 8 hours a day, not including travel time, for installation, start-up, and training must be 2 days with 2 trips.

4. The Installation Contractor is responsible for installing the pumping units including all labor, tools, and equipment required for assembling, setting, aligning, connecting, adjusting, and grouting the pump and motor baseplate assemblies. The drain line connections must be installed and supplied by the Contractor and connect to the drip line on the fabricated baseplate.

1.04 SUBMITTALS

A. All submittals must be in English with US Customary units. Submittals must be in accordance with this Section and the General Requirements. ANY DEVIATIONS FROM THE SPECIFICATIONS MUST BE CLEARLY NOTED AND IDENTIFIED IN THE SUBMITTALS.

B. SHOP DRAWINGS

Submit drawings as a complete package of all equipment furnished. Partial drawings will not be reviewed. Shop drawings must include the following:

1. Data sheets supplying the following information for the pumping unit must be submitted with the Bid Proposal:
   a. Complete Pump Data Sheet at end of this Section.
   b. Complete Motor Data Sheet at end of this Section.
2. Pump Outline drawings of the pumps, motors and appurtenances, showing layout dimensions for all components, anchor bolts, external connections, and appurtenances.
3. Pump sectional drawings with all components and materials of construction identified.
4. Variable speed performance curves.
5. Pipe layout drawings for drainage and seal piping.
6. Weights, including “wet” and “dry” weights of equipment, shipping weights and dimensions, and center of gravity for lifting.
7. Characteristic Pump Curves: Curves must show the capacity, head, minimum continuous stable flow (MCSF), preferred operating range (POR), best efficiency point (BEP), allowable operating range (AOR), efficiency, required NPSH, and brake horsepower throughout the operating range of the pump from shut-off to maximum specified operating capacity. Characteristic curves must have the capacity plotted as abscissa and the operating head, brake horsepower, efficiency and required NPSH plotted as ordinates.
8. Motor Manufacturer must supply documentation for the motors as follows:
   a. Complete dimensional data including the following:
      1). Dimensional outline drawings
      2). Maintenance clearances
      3). Locations and sizes of lubrication connections, vents, drains, etc.
   b. Data Sheet: Fill out and submit with the Shop Drawing submittal the information requested on the Motor Submittal Data Sheet (Attachment B).
   c. Letter of Compatibility with VFD Manufacturer: The Motor Manufacturer in conjunction with the VFD manufacturer must issue a letter of compatibility stating that the VFD and motor are compatible.
   d. Complete nameplate data.
   e. Allowable time periods between starts.
   f. Using design files, include the following:

g. Subtransient reactance and X/R.

h. Speed-torque curve at 100% and 80% of rated voltage.

i. Speed-current curve at 100% and 80% of rated voltage.

j. Acceleration time at 100% and 80% of rated voltage.

k. Thermal damage curve (I2t)

l. Locked rotor withstand time.

m. Rotor inertia.

n. Schematic and interconnection diagrams.

o. Bearing descriptions.

p. Motor weights.

q. Temperature curve for Thermal Switches and temperature at which winding thermostats activate.

r. Detailed conduit layout for motor.

s. Dimensions of terminal boxes.

t. Results of tests.

u. Motor insulation voltage rating.

v. Measured locked rotor current and torque and locked rotor power factor.

w. Motor no load data (i.e. amps, power factor, etc.)

x. Maximum kVAR allowed for power factor correction. Maximum kVAR must be included on motor nameplate as well.

y. Instruction Manual.

z. Component Bill of Materials

aa. Manufacturer's cut sheets for all major equipment, winding thermostats, terminal blocks, etc. Clearly identify on cut sheets the exact model number being provided.

bb. Note: All documentation listed above must be supplied with the motor's initial submittal with the exception of the motor test results, component bill of material and instruction manual, which must be furnished later on in the project. Component Bill of Material must be submitted prior to installation of motor. Incomplete data will not be reviewed and submittal will be returned "Not Approved, Revise and Resubmit".

C. CERTIFIED TEST REPORTS

Submit certified test reports (CTR) for factory pump and motor performance tests and hydrostatic test.

D. EQUIPMENT INSTALLATION REPORT

Submit Equipment Installation Reports (EIR) from the motor manufacturer and pump manufacturer.

E. OPERATION AND MAINTENANCE MANUALS

1. Submit Manuals with instructions for installation, adjustment, lubrication, operation and maintenance of the equipment.
2. Manuals must be prepared by the Equipment Manufacturer. "Operations and Maintenance Data" and must incorporate storage and installation instructions and operations and maintenance procedures, appropriate final certified shop drawings, performance curves, and test data. Manuals may be manufacturer's standard instructions, but must be supplemented as necessary to cover any special feature not included in standard material. Submit preliminary manuals for review prior to delivery of the equipment.
3. Final O&M manuals must include CTR and EIR.

F. SAMPLES

Provide samples of pump and motor coating color and finish selection for approval by the Owner.

1.05 STANDARDS

A. The applicable provisions of the following standards (latest edition unless otherwise indicated) apply as if written here in their entirety:

1. American Water Works Association (AWWA)

AWWA C210	Standard Specification for Liquid Epoxy Coating Systems
AWWA E103	Standard Specification for Horizontal and Vertical Line-Shaft Pumps

2. American National Standards Institute (ANSI)

ANSI B16.1	Standard Specification for Cast Iron Pipe Flanges and Fittings
ANSI/NSF Standard 61	Standard Specification for Drinking Water System Components – Health Effects
ANSI/NSF Standard 372	Standard Specification for Drinking Water System Components – Lead Content

3. Hydraulic Institute Standards (ANSI/HI)

All applicable sections for Centrifugal and Rotodynamic Pumps

4. American Standards for Testing and Materials (ASTM)

ASTM A48	Standard Specification for Gray Iron Castings

ASTM A276	Standard Specification for Stainless Steel Bars and Shapes
ASTM A345	Standard Specification for Flat-Rolled Electrical Steels for Magnetic Applications
ASTM A487	Standard Specification for Steel Castings Suitable for Pressure Service
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A582	Standard Specification for Free-Machining Stainless Steel Bars
ASTM E689	Standard Reference Radiographs for Ductile Iron Castings
ASTM E802	Standard Reference Radiographs for Gray Iron Castings up to 4 ½ in. (114 mm) in Thickness

5. American Society of Mechanical Engineers (ASME)

ASME Section V	Nondestructive Examination
ASME Section VIII	Pressure Vessels
ASME Section IX	Welding, Brazing, and Fusing Qualifications

6. American Petroleum Institute (API)

API 610	Centrifugal Pumps for Petroleum, Petrochemical and Natural Gas Industries
API 682	Pumps-Shaft Sealing Systems for Centrifugal and Rotary Pumps

7. International Standards Organization (ISO)

ISO 21940-11:2016	Mechanical vibration -- Rotor balancing -- Part 11: Procedures and Tolerances for Rotors with Rigid Behavior
ISO 9001:2015	Quality Management systems – Requirements

8. Manufacturers Standardization Society of the Valves and Fittings Industry (MSS)

MSS - SP-55	Quality Standard for Steel Castings for Valves, Flanges, Fittings, and Other Piping Components, Visual Method for Evaluation of Surface Irregularities

9. National Electrical Manufacturers Association (NEMA)
10. Institute of Electrical and Electronic Engineers (IEEE)
11. National Electrical Code (NEC)
12. Underwriters Laboratories (UL)

1.06 DELIVERY AND STORAGE

A. The manufacturer is responsible for delivery of the pumps, drivers, and accessories, to the job site or to such storage site as may be designated by the Owner or Construction Contractor in

good condition and undamaged. The manufacturer must submit a shipping notice and storage and installation instructions at least one (1) week prior to shipment.

B. Unloading and storage of the equipment is the responsibility of the Construction Contractor who must inspect the equipment for apparent damage. Equipment which is found to be damaged will not be accepted until properly repaired or replaced by the manufacturer.

C. The pumps, motors, and accessories must be stored indoors, and the motor space heaters must be energized upon delivery. If motors are to be stored for longer than 14 days, the oil reservoirs should be filled. The Construction Contractor must rotate the motor rotor and pump impeller by hand several rotations each week until the pumping unit is placed into service.

1.07 EQUIPMENT WARRANTY

A. Manufacturer must warrant the equipment furnished under this specification for a period of 2 years of service against defects in materials and workmanship and operational failure.

B. In the event of failure of any part or parts of the equipment during the first two years of service and provided that the equipment has been operated and maintained in accordance with good practice, the manufacturer must furnish, deliver, and install the defective part or parts at their own expense.

C. The first two years of service is interpreted as the 24 month period following the installation, adjusting and acceptance testing, and the start of actual operation of the equipment, or 30 months following delivery to the project site of all equipment, whichever occurs first.

1.08 PUMPING CRITERIA, PERFORMANCE REQURIEMENTS AND DATA

A. GENERAL CRITERIA

1. The pumps will be used to pump treated drinking water in the Owner's distribution system. The pump components must be resistant to damage from chlorine, chloramine residual, fluoride, and chloramines.

2. Pumps will be started against a check valve and partially open (five percent +/-) butterfly valve. The butterfly valve will open and close slowly (approximately five minutes per cycle). During power failure, the check valve will quickly close to prevent reverse flow through the pump.

3. The pump suction will be from the intake tower and reservoir, which are open to the atmosphere.

4. The pumps and motors will be mounted on a steel baseplate provided with the pumps.

5. The pumping heads tabulated below are total dynamic heads (TDH) under field conditions and are inclusive of all pump losses from pump suction flange to pump discharge flange. The more explicit definition is "Pump Total Head" as defined by ANSI/HI 14.6, Paragraph 14.6.1.3.1.31. The Total Discharge Head component of the Total Head calculation is understood as the head produced at the discharge flange of the pump as installed in the field.

6. It is desired that the pump has its highest efficiency to the left of Rated Point, and this efficiency will be considered in evaluating the pump. In addition, the efficiency at the minimum and maximum operating heads may be used in evaluating the pumps.

7. The pump must be designed such that the pump curves safely pass through all system curves within the Manufacturer's acceptable operating range.
8. All wetted materials must be designed for drinking water contact and the pumps must be NSF Standard 61 Certified. Leaded bronze materials must not be used.
9. The pumping heads shown below are total dynamic heads (TDH) under field conditions and are exclusive of all internal pump losses.
10. The top of the pump casing must have a 2" threaded outlet for an air valve assembly that will release air if the pump is drained and re-filled. The air-valve assembly will be provided and installed by the Contractor.
11. Pumps must have a continuously rising performance curve from pump run-out to shut-off head with no intermediate flat places.

B. PERFORMANCE REQUIREMENTS

1. The tabulations below show the required flows and various head conditions at which the pumps must operate and the pump setting requirements for all pumps.

PUMPING CONDITIONS AT FULL SPEED (U.N.O.)	PUMP #E100
Minimum Capacity at Rated Head, GPM (full speed)	3,400
Rated Head, FT (full speed)	35
Maximum Operating Head, FT (full speed, w/in AOR)	56
Minimum Operating Head, FT (full speed, w/in AOR)	18
NPSHa at Rated Head, FT (with 5' margin applied)	128
Maximum Shutoff Head, FT	67.92
Maximum Pump Brake Horsepower, HP	40
Motor Voltage	460
Maximum Motor Horsepower, HP	40
Maximum Motor Speed, RPM	1,185
Minimum Speed (% of max rated)	50%
Minimum Pump Efficiency at Rated Head	82%
Minimum Pump Efficiency at BEP	83%

2. Intent of the pump is to operate within distribution pressures expected from normal tank operations. This will be a typical range of a minimum 48 psi to a maximum 58 psi.

C. PUMP SETTING REQUIREMENTS

PUMP SETTING REQUIREMENTS	PUMP #E100
Elev. Concrete Support Block	To be determined by Contractor
Elev. Operating Floor	29.00
Elev. Pump Centerline	31.27 (Mfr. to confirm)
Discharge Diameter (ID), IN (min. TBD by Pump Mfr.)	10
Suction Diameter (ID), IN (min. TBD by Pump Mfr.)	14
Max. Dimension Suction Flange to Discharge Flange, IN	19.4
Max. Dimension Pump and Motor Base, IN	16 x 36[1]
Elev. Max. Water Level, Reservoir	167.00
Elev. Min. Water Level, Reservoir	127.00
Max. Dry Weight of Pump, Motor or Base, TONS	1

[1] *Approximate dimension is to outer edge of motor, pump or baseplate, whichever is greater. Equipment Manufacturer must field verify with the assistance of Contractor and provide a base that will support the pump and new motor per the Contract Documents.*

D. The pump must have suitable Net Positive Suction Head Required (NPSHr). Note that NPSHr is defined as the 3% head drop net positive suction head requirement. The NPSH margin, i.e. ratio of NPSHa to NPSHr must be consistent with the suction energy conditions as defined by the HI standards. Minimum margin must be 10 percent within POR, or five (5) feet, whichever is greater. The NPSHr with the margin applied within POR must be less than the NPSHa with the minimum suction water level as shown in the pump setting table. The NPSHr with the margin applied at pump run-out must be less than 50 feet. The Reservoir will be open to the atmosphere. For the purposes of calculating NPSHa, the manufacturer may assume the total friction and minor losses in the suction piping (to pump flange) to be 2.0 feet from the reservoir to the pump for analysis.

2.00 PRODUCTS

2.01 PUMPS

A. GENERAL

1. Pumps must be horizontal, single-stage, axial split-case, double-suction, single volute, centrifugal pumps with side suction and side discharge for pumping potable water. Provide pump and motor rotation based on pump suction and discharge orientation and flow direction as indicated on the drawings.

2. Pumps must be designed, manufactured, inspected and tested in accordance with the applicable requirements of AWWA E103, the Hydraulic Institute Standards and special requirements of this specification.

3. The pump manufacturer must furnish all bolts, nuts, washers, and gaskets for the pumping units, except bolts, nuts, washers, and gaskets for the suction and discharge flanges, which must be supplied by the Contractor. All bolts, nuts and washers must be stainless steel.
4. The Pump Manufacturer must stress relieve all fabricated components, and pump/motor base prior to final machining.

B. CASING

1. Pump casing must be of strong close-grain cast iron in accordance with ASTM A48 Class 30, or ductile iron in accordance with ASTM A536 designed for heavy duty service, double volute design, free of blow holes, or other detrimental defects. The casing must be horizontally split with the suction and discharge flanges cast integrally with the lower half in order that the upper part may be removed for inspection of the rotating element without disturbing pipe connections or pump alignment. The joint between halves of the casing must be heavily flanged and bolted, and provided with dowel pins to insure accurate alignment. The interior must be smooth and free from surface defects. The diameter and drilling dimensions of suction and discharge flanges must be ANSI Standard and must be adequate to withstand shut-off pressure plus 50 percent.
2. Casings must be drilled and tapped for air/vacuum valve, gauge, and drain connections. Suitable lifting lugs or eye bolts must be provided. Casing must be tested in accordance with Hydraulic Institute Standards under a hydrostatic pressure of 150% of maximum shut-off head.

C. IMPELLER

1. Impellers must be of strong dense castings free of structural defects with uniform thickness of vanes and shrouds. They must be the enclosed type and have smooth water passages for high efficiency and must be statically and dynamically balanced to ISO 2.5.
2. Impellers must be of cast nickel aluminum bronze, ASTM B148 C95800 or Type 316 stainless steel.
3. Impellers must be the enclosed type design.
4. Welding on the raw castings will be allowed as long as the proposed repaired defect is within allowable standards and prior to any machining, polishing, and/or balancing. Welding, fillers or coatings for head, flow, and/or efficiency performance reasons will not be allowed.
5. The Impeller must be keyed to the shaft and securely held in axial position on the shaft by means of stainless steel sleeves properly secured to the shaft so that it cannot become unfastened when the pump is reversed. All rotating parts of pumps must be machined true to insure rotational balance with the impeller, coupling, and other parts that may be mounted on the shaft, such that the pump must operate within a maximum of 50% of the allowable vibration tolerances specified in Hydraulic Institute Standards.

D. WEARING RINGS

At the running joint between the suction and discharge chambers, there must be provided on both the casing and impeller, renewable wearing rings with large running surface area and designed for smooth flow areas. The casing rings must be secured by stainless steel screws or other suitable method. Impeller rings must be securely attached and so fastened that they cannot become loose when the pump is reversed. Wearing ring material must be 316 or 400

Series stainless steel and be compatible with the impeller material. Casing wear ring must be an alloy with a Brinnel hardness of 100 points greater than the impeller wear ring.

E. SHAFT

Pump shaft must be of ample conservative design such that it will be suitable to transmit the maximum brake horsepower required by the pump, and be of sufficient stiffness to prevent contact of the wearing rings under any condition of operation. Shaft must be heat treated steel, accurately machined and ground, with non-corrosive 316 or 416 stainless steel sleeves in the pump and through the stuffing box area.

F. MECHANICAL SEAL

1. Stuffing boxes must be water sealed and be designed for tight seal without excessive wear or friction on the shaft sleeve, and to prevent air leakage into the pump under all conditions of operation.
2. The stuffing box must be fitted with a mechanical seal. Mechanical seals must be the split type as manufactured by Chesterton, Type 442, or John Crane, Model 3740. The hardware must be 316 stainless steel, rotary face must be silicon carbide, stationary face must be carbon, and elastomers must be EPDM. Stainless steel piping for recirculation must be provided from the discharge side of pump to the seal (API Plan 11). The seal installation must be inspected by the seal manufacturer prior to testing the pump.

G. BEARINGS

Bearings must be grease lubricated anti-friction ball type adequately sized to carry radial and thrust loads without the addition of external cooling. Anti-friction bearings must have a L-10 bearing life of 100,000 hours at the rated head and flow of the pump in accordance with the standards of the Bearings Manufacturers Association. No cast-in bearings will be allowed, so that a spare rotating assembly could be easily installed.

H. COUPLING AND GUARD

Flexible couplings must be the heavy duty type, designed so that the pump shaft may be removed without disturbing the position or adjustment of the driving unit. Coupling must be all carbon steel, Falk Lifelign Gear Couplings Type GL20-1 as manufactured by the Rexnord Corporation, or approved equal. Minimum factor of safety of 1.5 times shaft strength must be used. Horizontal surface of the coupling must be machined parallel to the axis of the shaft, and faces must be machined perpendicular to the axis of the shaft. Provide an appropriate coupling guard, acceptable to OSHA, securely attached to the pump base with stainless steel bolts and nuts. Coupling guard must have slots for coupling inspection.

I. PUMP AND MOTOR BASE

Pump and motor must have a common one-piece base. The base must be fabricated steel of sufficient strength and depth to insure rigidity and so designed as to make a good appearance, and provided with adequate grout holes. The base must be heat induced stress relieved, at the factory prior to shipment. The base must be provided with planed supports or bearing pads for the pump and motor. Base must be drilled to receive a suitable number of foundation bolts. Base must have a minimum of eight heavy duty jacking bolts welded to the base, positioned around the motor base to aid in alignment. Stainless steel foundation bolts complete with sleeves, washers, nuts, etc., must be furnished for each pumping unit by the pump manufacturer. The pump and motor must be mounted on the supports or bearing pads with full faced brass shims. The Equipment Manufacturer must furnish foundation bolts,

sleeves and a steel template for setting anchor bolt sleeves and shipped ahead of the pumps as necessary to meet the schedule of installation by the Construction Contractor. The base plate must include a drip lip around the entire base. Do not supply a drip pan. Design the base plate so that anchor bolts are not in the drip lip area. Provide 1" NPT connection for piping to route collected drain water to a drain in the pump room floor. Piping to floor drain must be 304 stainless steel.

J. COATINGS

Pump must be shop prepared and primed inside and out. Interior must be coated with NSF61 approved epoxy, 2 coats, 10 mils DFT total minimum thickness. Exterior must be coated with 2 coats minimum Epoxy-Polyamide coating (6 mils total DFT min) and a third topcoat of high build acrylic enamel (3 mils DFT min). Pump coating must be the same color of blue, per OSHA Recommended Standards. Prior to final coating, Manufacturer must submit a color sample for final approval.

2.02 460 VOLT MOTORS

A. GENERAL

1. Motors must be horizontal, air cooled, solid shaft, copper wound stator, aluminum or copper bar rotor construction, squirrel cage induction type. The motors must be designed for use with a VFD.
2. Motors must be of premium efficiency design and rated for inverter duty in accordance with MG-1, Part 31.
3. Motors must be inverter duty rated and designed for starting using soft starters, variable frequency drives, and across the line starters.
4. Horsepower nameplate rating of motor, at the 1.0 service factor, must be equal to or greater than the total horsepower requirement of the pump when operating at any head between shut-off and minimum specified operating heads. Motor must have a service factor of 1.15 on sine wave power and a service factor of 1.0 with VFD power and must be designed and manufactured in accordance with applicable provisions of the latest NEMA Standard Publication for Motors and Generators, MG1 Part 20, subject to modifications and additions as herein set forth.
5. The locked rotor torque and breakdown torque must not be less than show in NEMA MG-1 20.10.
6. The locked rotor KVA/HP must be no greater than NEMA Code Letter G (6.29 KVA/HP).
7. Motor must have a sound pressure level of no more than 85 dBA average at 1 meter (3.3 ft.) distance when measured per NEMA MG-1 and ANSI S12.51.
8. Rotor must be "refined" balanced to within an amplitude peak to peak in accordance with the requirement of NEMA MG-1.
9. Motor must be rated at 460 volts, three-phase, 60 Hertz.
10. Motor efficiency must not be less than the efficiency listed in MG-1 for premium efficiency motors when operating at maximum speed, full load and rated voltage and frequency. The minimum efficiency must be 93%. Motor must be of a Premium

Efficiency Design. The motor must have a minimum uncorrected power factor of 0.85 when operating at full load, and rated voltage and frequency.

11. Motor leads must have the same insulation level as the motor.
12. Motors must be capable of bringing the pumps up to speed with a closed control valve and 80% of rated voltage.
13. Motors must be painted with two (2) coats of manufacturer's standard exterior enamel.

B. ENCLOSURE

Motor enclosure must be Totally Enclosed Fan Cooled (TEFC) in accordance with NEMA MG-1. Motor must be suitable for an outdoor environment.

C. INSULATION

1. Motor windings must be full Class H insulated and inverter duty rated. The motor stator windings must receive an epoxy resin coating. The windings must comply with the latest applicable provisions of NEMA MG 1, and end winding coils must be braced to limit displacement to no more than 5.0 mils under any condition of starting or running.
2. Motor must operate continuously at rated voltage and frequency at 40 degrees C ambient temperature, with a temperature rise not to exceed:

   A 40 degrees C rise, per NEMA MG-1 20.8 measured by resistance at a 1.0 service factor when operating at 100% of the nameplate rated horsepower.
3. Insulation must be capable of preventing failure as a result of common mode voltages. Motor leads must have the same insulation class as the windings.

D. BEARINGS

Bearings must be grease, ball bearing type. Bearings must be insulated to prevent shaft-bearing-frame current. Insulating means must also be provided for any oil-supply connections and monitoring equipment to prevent electrical bypassing of the bearing insulation.

E. MOTOR TERMINAL BOX

1. Motor must have accessory leads from space heaters terminated in either the motor terminal box or in a separate accessories box. If a separate accessories terminal box is provided it must be located on the same side as the motor terminal box. Accessories box must have phenolic nameplates, black and white letters, attached with stainless steel screws or as an alternative nameplates must be 304 stainless steel attached with stainless steel screws. The nameplates must say “SPACE HEATER”. Accessories box must be bottom or side entry.
2. Front of motor and accessory boxes must be removable. Conduits must not penetrate the top of terminal boxes. Conduit box must receive motor and accessory cables from the bottom or side. Terminal box must be oversized to accommodate terminating the following without exceeding the bending radius of the conductors per the National Electrical Code. Motor must have accessory leads from space heaters, and winding thermostats terminated in the motor terminal box or in a separate accessories terminal box.

3. Terminal box(es) must be adequately insulated to prevent excessive vibration and must be sealed to prevent moisture from entering the terminal box. The terminal box(es) must be bottom entry. The motor terminal box must be located on the F-2 side of the motor.
4. Terminal box must be adequately insulated to prevent excessive vibration. Terminal box size, position, and layout must be submitted to the Engineer for approval.

F. GROUNDING MEANS

Provide a grounding lug threaded into the motor frame within the motor terminal box and other motor conduit boxes. Lug must be similar and equal to Burndy KC Servit. The grounding lug must be capable of accepting a #4 ground wire minimum. Provide stainless steel ground pad at base of motor and suitable for terminating #4/0 ground conductor.

G. APPURTENANCES:

1. All wires and electrical connections must be copper. All wiring penetrating motor frame must be protected against chaffing with a rubber grommet.
2. Space Heaters

   Motor must be equipped with space heaters for operation on 120 volt, 60 hertz, single-phase. They must maintain the internal temperature above dew point when motor is not operating. Space heaters must not be located directly in the access holes where they may pose a danger of burn or shock to servicemen. Space heater wiring must be routed to prevent wire being between the frame and the space heater.

H. MOTOR NAMEPLATE:

1. The motors are to be equipped with a stainless steel name plate securely attached to the motor with stainless steel screws.
2. All data is to be permanently stamped in the name plate including the motor horsepower, RPM, NEMA design, phase, hertz, service factor, ambient temperature, frame size, duty, class of insulation, locked KVA code, full load amps, locked rotor amps, Maximum kVAR allowed for power factor correction, model and catalog number, bearing identification by AFBMA number and NEMA nominal efficiency.
3. Nameplate must indicate the motor is inverter duty rated.

2.03 SPECIAL TOOLS

Furnish with the equipment, one (1) set of any special tools or devices required for the assembly, operation, and maintenance of all equipment furnished.

2.04 SPARE PARTS [NOT USED]

3.00 EXECUTION

3.01 INSTALLATION

A. The Equipment Manufacturer's Representative, including Motor Manufacturer, have responsibilities in the installation and field testing of the equipment as described in this section. Installation of equipment must be performed by the Installation Contractor who is required to assemble the equipment and install it in accordance with Installation, Operation and Maintenance instructions which must be furnished by the Equipment Manufacturer, the installation drawings for this project and applicable Installation Instructions of the Hydraulic Institute Standards.

B. The Installation Contractor must schedule the service of the Equipment Manufacturer to assist in the assembly installation, lubrication, adjustment, testing and acceptance of the equipment.

C. The Installation Contractor must furnish all labor, tools, equipment and machinery necessary to receive, inspect, unload, store, protect, and install completely, in proper operating condition, the equipment. Installation Contractor must protect and store the motors indoors and as recommended by the manufacturer, keeping bearings lubricated and the motor space heaters energized during storage and until they are put into service.

D. The Installation Contractor must also furnish such incidental items not supplied with the equipment, but which may or may not be described in the Plans and Specifications, for complete installation, such as welding, drain lines, gaskets, flange bolts for suction and discharge piping, connecting piping, wiring, conduit, ducts, mounting brackets, anchors and other appurtenances as necessary.

E. Certain items of equipment due to its size or character will be disassembled for shipping and must be assembled by the Contractor as it is installed. It is the Contractor’s responsibility, in establishing their costs for installation, to determine the degree of disassembly that the equipment will be shipped in.

F. The Contractor must make the power, control, and instrumentation connections at points designated by the Equipment Manufacturer.

3.02 FIELD QUALITY CONTROL

A. GENERAL

1. The Equipment Manufacturer must inspect and determine that the pump and motor base has been installed correctly and field verified to the recommended tolerance prior to installation of the pump. This determination must be made prior to grouting with the base properly welded or shimmed. Before placing the grout, scarify the adjoining concrete and pour a non-shrink grout. After properly curing, remove the temporary wedges or shims and hand pack voids with grout. Then torque the anchor bolts to the appropriate values. A second inspection must be made after the base has been completely grouted in place, but prior to installation of the pump.

2. The Installation Contractor must use a Class III non-shrink epoxy grout under the baseplate and up into the baseplate at least 2 inches. The Class III non-shrink grout must have a compressive strength of at least 12,000 psi after 28 days. A Class II non-shrink grout with a minimum 7000 psi compressive strength at 28 days can be used to fill the remainder of

the baseplate and motor base. Installation contractor must provide a submittal on the proposed grouting procedure and grout products to be used.

3. Calibrated testing equipment must be provided by the Equipment Manufacturer to measure setting, alignment, speed, noise, temperature, pressure, and vibration of the pump.

B. PRELIMINARY OPERATIONAL TEST

1. After the pumps have been installed, including all piping connections, and electrical system construction is complete, and after the piping has been tested, the Installation Contractor, with assistance from the Equipment Manufacturer, must perform preliminary operational tests over a period of not less than two 2-hour tests performed with the elevated tank water elevation near the high level and near the low level. The test must be conducted in a manner approved by and in the presence of the Owner's representative. Equipment must be checked for excessive noise, alignment, vibration and lateral deflection, general performance, etc.

2. The pumping units must be operated throughout its full range of operating heads, if possible, recording data including suction pressure, pump discharge pressure, pump speed, flow rates, water levels, motor voltage and current, power factor, vibration, noise, deflection, pump and motor bearing temperatures, and motor winding temperatures, as applicable. This information must be properly documented and included in the Equipment Installation Report. The unit must perform in a manner acceptable to the Owner and Engineer before Final Acceptance of the installation will be made.

3. Vibration must be no greater than the "Acceptable Field Vibration Limits" as defined by the Hydraulic Institute Standards and as modified by this specification above. Vibration must be measured in the x, y, and z direction on the outboard pump bearing and motor bearing. Vibration must be measured in the x and y direction of the inboard pump and motor bearings.

4. Vibration data must be recorded for variable speed pumps within the specified operating speed range at increments of 5% from minimum speed to full speed. Actual pump rotational speed must also be recorded with each vibration data set.

5. The Equipment Manufacturer must furnish calibrated testing devices to measure setting, alignment, speed, noise, and vibration of the pump. Vibration data must be recorded with a Vibscanner as manufactured by Pruftechnik or approved equal.

6. The Installation Contractor and their Equipment Manufacturer is responsible for operating the equipment and recording and submitting the necessary data from the test. All information required above must be properly documented and included in the Equipment Installation Report. The units must perform in a manner acceptable to the Owner and Engineer prior before Final Acceptance of the installation will be made.

7. The Equipment Manufacturer must submit to the Installation Contractor an Equipment Installation Report certifying that the equipment is properly installed, lubricated, is in accurate alignment and is free from undue stress from connecting appurtenances, that it has been operated under full load conditions and that it is operating satisfactorily. The Installation Contractor must provide copies of the report as required by this specification.

3.03 PAINTING

Touch-up all damage of painting of the pumping unit with extra paint furnished by the manufacturer.

END OF SECTION

SECTION 11210 "HORIZONTAL SPLIT-CASE CENTRIFUGAL PUMPING UNITS" – ATTACHMENT A, SUBMITTAL PUMP DATA SHEET

Equipment Supplier: _____

Submit the following data with Proposal for each size of Pumping Unit:

Pump Data	Tag:
Make and Type Design	
Full Speed	
Speed at Rated Point	
Impeller Diam. vs. Max. Impeller Diam. for Bowls	
Impeller Material	
Suction and Discharge Flange Sizes	
Shutoff Head	
Max. Allowable Operating Head at 100% Speed	
Min. Allowable Operating Head at 100% Speed	
Impeller Specific Speed	
Maximum Backspin Speed	
Suction Specific Speed	
Maximum Brake Horsepower	
NPSH Required at Rated Head	
NPSH Required at Minimum Head	
Wire-to-Water Efficiency at Rated Point No. 1	
Wire-to-Water Efficiency at Rated Point No. 2	
Rotor polar moment of inertia WR^2 or equivalent WR^2, as viewed from the pump end for the driver, coupling, pump and enclosed fluid as applicable.	
Weights	
Pump	
Base Plate for Pump and Motor	
Motor	
Complete Unit Including Base Plate	
Miscellaneous Information	
Motor Factory Test Location (City, State, Country)	
Pump Factory Test Location (City, State, Country)	

END OF SECTION 11210 – ATTACHMENT A

SECTION 11210 "HORIZONTAL SPLIT-CASE CENTRIFUGAL PUMPING UNITS" – ATTACHMENT B, SUBMITTAL MOTOR DATA SHEET

Submit the following data for each size and type of motor:

Manufacturer		Motor HP	
Frame		Enclosure	
Type		RPM	
Voltage		Phase	
Starting Method		Hertz	
Shaft Size		Rotor WK2 (lb-ft^2)	
Insulation Class		Duty	
Full Load Amps		No Load Amps	
Locked Rotor Amps		Locked Rotor Torque	
Locked Rotor Torque		% Breakdown Torque	
Locked Rotor KVA/HP			

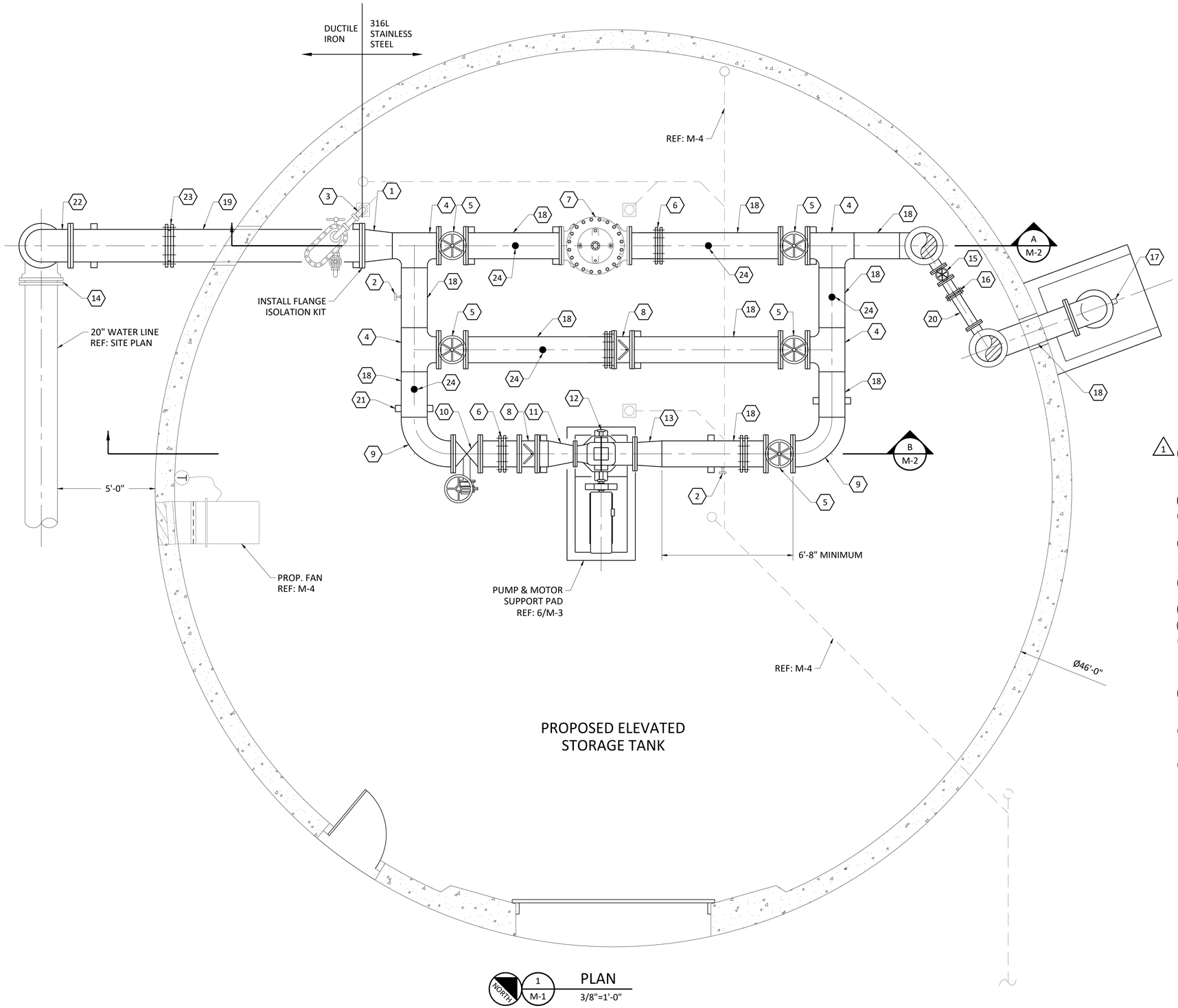
NEMA Design	
Service Factor	
Inrush Current (% of Full Load)	
Max Safe Stalled Time (seconds)	
Number of Safe Starts Per Day	
Number of Consecutive Starts	
*Full Load Temp Rise, in Degree Celsius over 50 deg C Ambient (at 1.0 S.F.)	
*Service Factor Temp Rise, in Degree Celsius over 50 deg C Ambient (at 1.15 S.F.)	
*Limiting Temperature Rise	

Resistance (at 25°C)		Bearings:	
Exhaust Air (CFM)		Type/Size	
Exhaust Air Temp Rise (F)		Life	
		Lubrication	

	Efficiency	Power Factor	Current
1.15 S.F. Load			
4/4 Load			
3/4 Load			
1/2 Load			
1/4 Load			

Vibration Alarm and Trip Set Points	
RTD Types and Mounting	
RTD (Winding & Bearing) Trip Set Points	
Motor Sound Power Level	
Maximum KVAR Allowed for power factor correction without overexciting the motor	
Space Heater Voltage	
Space Heater Wattage	

END OF SECTION 11210 – ATTACHMENT B



1 PLAN
NORTH M-1
3/8"=1'-0"

NOTES BY SYMBOL: "X"

1. 20"X16" ECCENTRIC REDUCER
2. PRESSURE GAUGE WITH TRANSMITTER, REF: 4/M-3
3. 2" COMBINATION AIR VALVE, REF: 2/M-3
4. 16"X16" TEE
5. 16" GATE VALVE. RE: SPECIFICATION SECTION 02620 FOR GATE VALVE REQUIREMENTS. PROVIDE HANDWHEEL OPERATOR.
6. 16" RESTRAINED FLANGED COUPLING ADAPTER WITH SS RODS
7. 16" ALTITUDE VALVE
8. 16" DUAL DISC CHECK VALVE
9. 16" 90 DEGREE BEND, LONG RADIUS
10. 16" ELECTRICALLY-ACTUATED BUTTERFLY VALVE
11. 16"X10" ECCENTRIC REDUCER
12. HORIZONTAL SPLIT-CASE PUMP
13. 16"X14" ECCENTRIC REDUCER
14. 20" 90 DEGREE BEND, MJ, WITH CONCRETE THRUST BLOCK
15. 6" GATE VALVE. REFER TO SPECIFICATION SECTION 02620 FOR GATE VALVE REQUIREMENTS. PROVIDE HANDWHEEL OPERATOR.
16. 6" FLANGED COUPLING ADAPTER WITH SS RODS
17. 16" FLAP VALVE W/ COUNTER WEIGHT
18. 16" SPOOL, SS
19. 20" SPOOL, DI
20. 6" SPOOL, SS
21. PIPE SUPPORT, TYP., REF: 1/M-3
22. 90 DEGREE BEND, DI, FLG.
23. 20" RESTRAINED FLEXIBLE COUPLING
24. DRAIN OUTLET, REF: 3/M-3

1 GENERAL NOTES:

1. ALL PIPING TO BE 316L STAINLESS STEEL UNLESS INDICATED OTHERWISE.
2. ALL FLANGE COUPLING ADAPTERS AND MECHANICAL HARNESS COUPLINGS MUST HAVE A 1" MIN. GAP BETWEEN PIPE ENDS.
3. AIR RELEASE VALVE AND, CONTROL VALVE DRAIN PIPING TO BE SUPPORTED VERTICALLY AND HORIZONTALLY WITH S.S. UNISTRUT SUPPORTS.
4. ALL ABOVE GRADE DUCTILE IRON PIPE AND FITTINGS AND ALL SPOOL PIECES TRANSITIONING FROM ABOVE GRADE TO BELOW GRADE MUST HAVE A FACTORY APPLIED EPOXY PRIME COAT. COAT ABOVE-GRADE DUCTILE IRON PIPE ON THE INTERIOR AND EXTERIOR OF THE PEDESTAL WITH SAME COATING SYSTEM AS EXTERIOR OF THE TANK.
5. COAT FACTORY COATED VALVES WITH PENETRATING SEALER AND POLYURETHANE TOP COAT, 2-3 MILS DFT, MIN. REPAIR ANY DAMAGED COATINGS WITH EPOXY MASTIC COATING PRIOR TO APPLYING PENETRATING SEALER.
6. DUCTILE IRON PIPE AND FITTINGS MUST HAVE A CEMENT MORTAR LINING IN ACCORDANCE WITH AWWA C104 AND BITUMINOUS SEAL COAT. THICKNESS OF LINING MUST BE AS SPECIFIED IN AWWA C104. COAT THE EXTERIOR OF BURIED DUCTILE IRON PIPE AND FITTINGS WITH A 1 MIL BITUMINOUS COATING IN ACCORDANCE WITH AWWA C110 AND AWWA C151. IN ADDITION TO THE FACTORY APPLIED ASPHALTIC COATING, ALL BURIED DUCTILE IRON PIPE AND FITTINGS MUST HAVE A TUBE-TYPE POLYETHYLENE ENCASEMENT IN ACCORDANCE WITH AWWA C105. POLYETHYLENE ENCASEMENT SHALL BE 8 MILS THICK. BOTH ENDS OF THE PIPE SHALL BE THOROUGHLY SEALED WITH ADHESIVE TAPE OR PLASTIC TIE STRAPS AT THE JOINT OVERLAP. PLACE CIRCUMFERENTIAL WRAPS OF TAPE AT 2-FOOT INTERVALS ALONG THE BARREL OF THE PIPE TO MINIMIZE THE SPACE BETWEEN THE ENCASEMENT AND THE PIPE.

0 1' 2' 4'
3/8"=1'-0

ISSUED FOR BID

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

July 21, 2021

STATE OF TEXAS
CHARLES A. KUCHERKA
98388
LICENSED
PROFESSIONAL ENGINEER

FREESE NICHOLS
1251 Sadler Drive, Building 1
Suite 1150
San Marcos, Texas 78666
Phone - (512) 213-3200
Web - www.freese.com

BROWNSVILLE PUBLIC UTILITIES BOARD, TEXAS

SOUTHMOST ELEVATED STORAGE TANK (EST #8)

MECHANICAL

ELEVATED STORAGE TANK PLAN

NO.	ISSUE	BY	DATE
1	ADDENDUM NO. 1	CAK	07/21/2021

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

F&N JOB NO. BPU21286
DATE 7/21/2021
DESIGNED RCE
DRAWN JAR
REVISED -
CHECKED CAK
FILE NAME WW-BPU-PL-TANK01.dwg

SHEET M-1
SEQ. -

ACAD Rel: 24.0s (LMS Tech)
Filename: N:\WW\Drawings\WW-BPU-PL-TANK01.dwg
Last Saved: 7/21/2021 4:10 PM Saved By: 07155

Plot Date: 7/21/2021 4:23 PM Plot By: 07155 Filename: N:\WW\Drawings\WW-BPU-PL-TANK01.dwg

SQUARE E Engineering
32238 Whipple Rd.
Los Fresnos TX 78566
Firm # 12247
Phone: 956-466-3492 Fax: 956-233-4826

Addendum

TO	Freese and Nichols Inc.
Location	1251 Sadler Dr. Bldg.1 Suite 1150
	San Marcos TX 78666
ATTN	Attn. Charles Kucherka, PE
DATE	7/22/2021
SUBJECT	Brownsville BPUB Southmost EST. Addendum #1

Mr. Kucherka,

Please accept the for Addendum #1 for the aforementioned project:

- Drawing E2
  - The Bidders shall remove all reference to Cathodic Protection. There will be no Cathodic Protection on this project.
  - The Bidders shall remove all reference to a Sump Pump. There will be no Sump Pump on this project
  - The Bidders shall include a 20A circuit for motor winding heaters. This Heater system shall be controlled in the Pump Control Panel and can either have the source of power originate in the Pump Control Panel or from the Mini Power Zone. The Contractor shall include all conduit, conduit supports, wiring control relays, and any other required appurtenances as needed to accomplish this heater system as per the manufacturer's requirements. The heaters shall only operate when the motor is in the off position.
  - The Bidders shall find these changes on drawing E2 submitted for Addendum #1 attached.

- Drawing E3
  - The Bidders shall find the following changes on Drawing E3 submitted for Addendum #1 attached.
  - Additional callouts have been included to show routing of the addition of a power circuit to the motor heaters.

- Section 17711
  - Sub Section Loop 100 from the original Bid Specifications shall be removed and replaced by the following Loop 100 loop description:

Loop 100

Booster Pump Control

1. ***The I&C Contractor shall provide all conduit and wiring for control and status wires from field to the PLC and Pump Control Panel as needed. This wiring shall provide the necessary I/O for proper operation and indication of these of the system. The I&C Contractor shall coordinate all requirements with other Contractors to meet this requirement. The PLC in the RTU shall be designed to process these signals and ultimately produce an indication on the HMI at WTP #2.***

2. ***The Booster Pump shall have a control panel provided that will have a VFD Controlled 40HP booster Pump. This Pump Control Panel shall be provided with all cooling, required for proper VFD operation. The Intent of the Plans and specifications is to have a Pump Control Panel that will work seamlessly with the RTU either Integral to the PUMP Control Panel or externally. The Pump Control Panel shall have all of the required protection for the pump including but not limited to Over Loads, Breakers, MCP, Motor Winding Heaters etc., for proper and safe operation of the VFD and RTU equipment. It is the intent of these plans and specifications that the Booster Pump will be given a manual start command either from the HMI at WTP #2 or from the Open Close Switch on the Control Panel Door. It shall be noted that in the event that Pressure Switch (PS E410) indicates a low suction pressure situation the Booster Pump shall not be allowed to run. A hydraulic minimum level shall be the lowest level that the EST can be pumped down to but not surpassed. The I and C Contractor shall coordinate with the Engineer to establish this Hydraulic minimum. The Contractor shall coordinate with the Engineer to establish this minimum setting and program into the RTY as a permissive***

3. ***The pump in this panel shall have the following functionality in the Control Panel/RTU:***

   A. ***The Control panel shall have a Pump Motor Protective relay provided by the Pump Manufacturer as required. This relay shall protect the pump motor as needed. Control wires and conduits for this relay shall be included as part of this scope of work. Said relay shall be integral to the Control Panel and shall provide permissive as required for proper operation of the pump motor.***

   B. ***The Manufacturer Pump Protection Relay shall be provided as required to provide manufacturer approved protection for each pump. These relays shall, at a minimum, provide a seal failure; motor over temperature. These indications shall operate as pilot lights on the front of the Control Panel. Further these alarms, shall also engage (Y2 106) after time delay.***

   C. ***(HAD 100) shall be a contact from the Pump Control Panel. to indicate that the motor is in Hand or Automatic Mode. The switch shall be a manual hand switch located on the Pump Starter.***

      - ***In Auto Mode the PLC via the Pressure Switch (PS 410) shall have control of the Pump. A contact (HAD 100) shall indicate that the switch is in this mode. In Automatic mode a contact from the VFD shall indicate that the VFD is running the pump (YR 105). In Auto Mode the RTU shall be capable of starting and stopping with an input from (HAT 102), from the HMI.***

      - ***In Hand Mode, all Automatic Control shall be bypassed and an indication on the TOUCHPAD shall indicate that the pumps is running in this mode. Local control shall be indicated by a contact in (Y1 100). Low Suction Side Pressure Switch shall still provide the permissive for the pump to be able to run in this mode. In Hand Mode the pump shall be capable of starting and stopping with an input from (HAT 102) that will be controlled with the buttons on the Control Panel Door.***

   D. ***In the event that the Pump is called to run but does not send a run status with a 10 second period, the TOUCHPAD will indicate a Pump Fault Failed to Start alarm (Y2 107)***

   E. ***Other indications from contacts in the field and indicated on the TOUCHPAD shall be as follows:***

- ***Alarm O/L Trip (Y2 106)***
- ***Alarm Fail to Start (Y2 107)***
- ***Running status that will be a contact provided from the VFD to the PLC to indicate the motor is running (YR 105)***
- ***In Run Mode the RTU shall be capable of tracking runtime with a graphic on the HMI (KQI 108).***

F. The intent of the VFD for the Booster Pump is to allow the Booster Pump to force the Elevated Storage Tank to drain during certain conditions where the water in the tank requires circulation, but cannot drain due to hydraulic conditions.

G. In order to force drain the tank, the Operator shall first put the Altitude Valve in Manual Position via (HAD 500) at this point the RTU will send a close command to the Altitude Valve. Once closed and as indicated via switch (Y2 505) the Booster Pump can then be put in Auto Mode via (HAD 202). The Operator shall then be required to input the required pressure input that the booster pump will pace. It is expected that this pressure will be high enough delta compared to the Distribution Pressure that will allow the booster pump to run to the low level cut off input setting. The second input by the Operator shall be the Low Level Cutoff setting. This input will be a minimum level in the tank that will allow proper drainage of the tank without reaching a low level that will empty the tank completely and/or run the booster outside of its recommended operating range. Once the settings are input, the HMI will allow for the VFD to ramp up or ramp down as necessary to match the system pressure. The Distribution System for the purposes of this scope of work shall be taken from the System Pressure (PE E400). This shall be an Endress and Hauser PIT cable of working in the ranges as needed to meet existing conditions. The RTU shall be able to process the Signal form (PE E400) and compare to the Operator input for system Pressure. As the pressure indication from (PE E400) varies from the Operator input pressure, the RTU shall generate a 4 – 20mA Speed Control signal for the VFD (SC 206). The VFD shall receive this signal and ramp up or down to meet these conditions. The VFD shall be capable of generating a Speed Indication Signal that will directly correlate to the Speed Indication of the VFD (SI 207). The HMI shall receive this signal and display it on the HMI in Hz. Level Pacing shall continue until such time as the level of the water in the EST reaches the Low Level Cutoff input by the operator. As such the HMI shall be capable of comparing the Low Level Cutoff input to the dynamic level of the tank and performing the required operations as detailed herein. In the event that the Suction Side Pressure reaches the Low Pressure condition as established by (PS E410) or the operator gives the stop command for the Booster Pump, the sequence will stop and the Booster Pump will turn off.

H. Sub Section Loop 500 from the original Bid Specifications shall be removed and replaced by the following Loop 500 loop description:

Loop 500

Altitude Valves

A. The Altitude Valve shall be equipped with a Hand Off Auto Switch (HAD 500); This switch shall provide a signal and a graphic at the HMI that the Altitude Valve is in Auto; Off; or Hand mode. The functionality shall be as described herein:

In Auto Mode the Tank Level Indicator signal from PIT (LI 420) shall be used as the Controlling signal for the Altitude valve. The pressure signal from PIT (LI 420) shall be processed in the RTU to provide a means of set points for the Altitude Valve to open and close. The set points shall be programmed as manual input set points to be put into the HMI by the operator. These manual inputs shall control the opening and the closing of the Altitude Valve so as to allow it to hydraulically control the level of the Elevated Storage Tank.

In Manual Mode the RTU will send a close command to the Altitude Valve. In this state, the Altitude Valve will originate from a closed position and can be open or closed manually if needed by the operator at the EST only if needed.

Otherwise, the Manual Mode shall be a state that will close the Altitude Valve and allow water to flow out of the tank either by normal flow or flow as forced by the Booster pump. In this state, Switch (Y1 510) will show a status in Manual mode; Switches (Y2 505) or (Y3 506) will indicate the valve as opened or closed. It shall be noted that the booster pump will only be allowed to force the drain EST with the Altitude Valve in the Closed Position. As such this will be a permissive to allow forced drained procedure to commence.

B. The Altitude Valve shall be equipped with 3ea. Switches (Y1 510); (Y2 505); (Y3 506). Said switches shall act as an indication that will show the following indication: (Y1 510) shall be a status signal from the HOA switch of the valve to indicate positioning of this switch. (Y2 505) shall be a signal from the valve to indicate that the valve is in the closed position. (Y3 506) shall be a signal from the valve to indicate that the valve is in the open position. These Contact Switches can take any configuration as is standard by each Valve manufacturer, i.e., Form C; individual Switches, dry contacts, etc.; and the Contractor shall make accommodations in each RTU to accommodate said conditions. These signals shall be wired in a conduit from each valve to each RTU. These Switches shall be powered from a local source or from each RTU as needed. The I&C Contractor shall provide all conduit and wiring for control and status wires from field to the RTU and control panel. This wiring shall provide the necessary DI and DO for proper operation and indication of these signals in this system. The I&C Contractor shall coordinate all requirements with other Contractors/Owner to meet this requirement. The PLC in the RTU shall be designed to process these signals and ultimately produce an indication on the touchpad for each pump and ultimately at the HMI. The Touchpad shall be capable of displaying a graphic that shows a real-time indication at the HMI.

(Y1 510) – HOA status
(Y2 505) – Valve is Closed.
(Y3 506) – Valve is Open.

Question: 29 of RFI #1 submitted directly to BPUB dated July 19, 2021

29. Section 17711 – who is the Owners current I&C Systems Integrator?

For the purposes of this project the Brownsville Public Utilities Board requires a turn key project including all controls, instrumentation, software, etc. to meet the requirements of the plans and specifications.

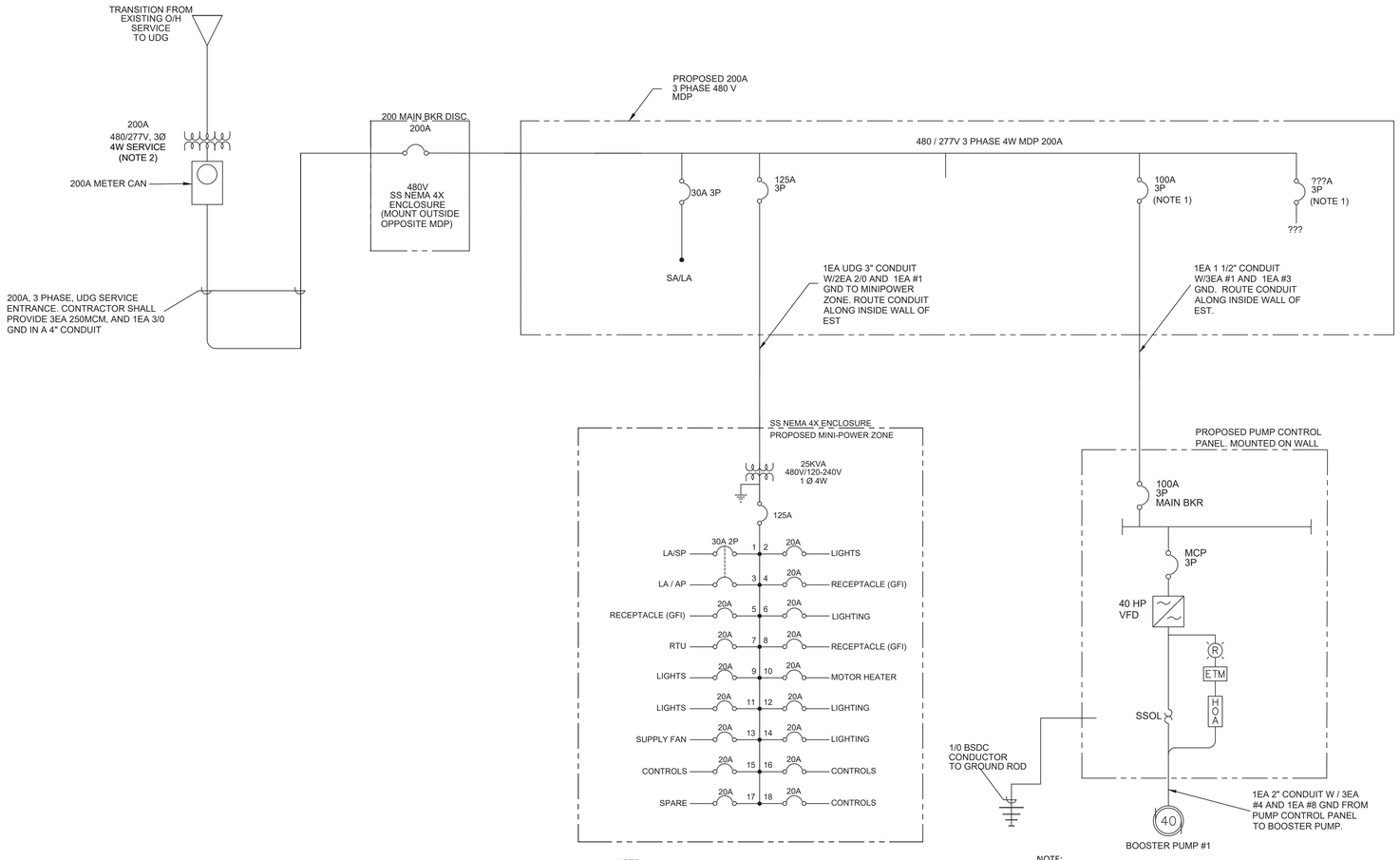
Feel free to call me with any questions

JPC

Engineering Manager
Square E Engineering
(956) 466-3492
jpcantu@squareeeng.com

Juan-Pablo Cantu, P.E.

The Seal appearing on this
Document was authorized by
Juan-Pablo Cantu PE, #90105
On 7/22/2021



NOTE:
SEE MINIPOWER ZONE PANEL SCHEDULE BELOW.

NOTE:
VERIFY MAIN BREAKER OF CONTROL PANEL AND ADJUST THE BREAKER AND CIRCUIT ACCORDINGLY
VERIFY MOTOR STARTING CHARACTERISTIECS AND ADJUST MCP ACCORDINGLY.

GENERAL NOTES:
1. VERIFY MOTOR STARTING CHARACTERISTICS WITH MFGR. AND SIZE ALL CIRCUIT BREAKERS OR MOTORS CIRCUIT PROTECTORS TO MOTOR MFG. SPECIFICATIONS IF OTHER THAN SHOWN ON ONE-LINE DIAGRAM. THE CONTRACTOR SHALL ADJUST CONSTRUCTION TO MEET THESE CHANGES IF DIFFERENT FROM DESIGN. PROVIDE LOCKABLE HASPS FOR BREAKERS FOR EACH PUMP AND MAIN BREAKER. THE CONTRACTOR SHALL SUBMIT ON THIS CONSTRUCTION FOR APPROVAL BY ENGINEER.
2. ONE-LINE DIAGRAM AND ACCOMPANYING DRAWINGS REPRESENT TYPICAL LAYOUT OF PANELS AND ELECTRICAL EQUIPMENT. PANELS MAY VARY PER MANUFACTURER AND CONSTRUCTION SHALL BE ADJUSTED AS REQUIRED TO INSTALL ELECTRICAL EQUIPMENT SHOWN AND REFERENCED IN THESE PLANS AND SPECIFICATIONS.
3. LIGHTNING & SURGE PROTECTOR BY CONTROL PANEL MFGR.
4. PUMP CONTROL PANEL TO BE FURNISHED BY PUMP MANUFACTURE. IT SHALL BE THE RESPONSIBILITY OF THE PUMP SUPPLER TO PROVIDE THE CONTROL PANEL WITH ALL NECESSARY APPURTENANCES, INCLUDING PUMP PROTECTION RELAYS, BREAKERS OVERLOADS ETC. FOR A PROPERLY FUNCTIONING PUMP SYSTEM AND APPROVED BY THE PUMP MANUFACTURER.
5. SEAL ALL CONDUITS INTO PANELS WITH ELECTRICAL DUCTSEAL.

INTERRUPTING RATING: 20 KAIC
EQUIPMENT GROUND BUS
SOLID NEUTRAL

MINI POWER ZONE

MAIN BKR: 125A VOLTAGE:240/ 120V PHASES :1 WIRES: 3 AMPERES: 125A MTG: SURFACE ENCLE: NEMA 4X SS MAIN BKR: 125A 2P 24CKT PANEL

LOAD SERVED	WIRE SIZE A & N	WIRE SIZE GND	PHASE LOAD IN VA A	PHASE LOAD IN VA B	BKR SIZE / POLE	A	B	BKR SIZE / POLE	PHASE LOAD IN VA A	PHASE LOAD IN VA B	WIRE SIZE GND	WIRE SIZE A & N	LOAD SERVED
LA/SP	10	10	0	0	30A,2P	1	2	20A,1P	1200		8	10	LIGHTS
LS/AP	10	10	0	0	30A,2P	3	4	20A,1P		720	10	10	RECEPTACLES (GFI)
RECEPTACLES (GFI)	10	10		720	20A,1P	5	6	20A,1P		1800	8	10	LIGHTING
RTU (FUTURE)	10	10	1440		20A,1P	7	8	20A,1P		720	6	8	RECEPTACLE (GFI)
LIGHTS	8	10		1800	20A,1P	9	10	20A,1P	1900		10	10	MOTOR HEATER
LIGHTS	8	4	1800		20A,2P	11	12	20A,1P	1200		10	10	LIGHTING
SUPPLY FAN	10	10		1200	20A,2P	13	14	20A,1P		1200	10	10	LIGHTING
CONTROLS	10	10		1200	20A,2P	15	16	20A,1P	1200		10	10	CONTROLS
SPARE	-	-		-	20A,2P	17	18	20A,1P	1200		10	10	CONTROLS
SPACE	-	-	-		-	19	20	-	-		-	-	SPACE
SPACE	-	-	-		-	21	22	-	-		-	-	SPACE
SPACE	-	-	-		-	23	24	-	-		-	-	SPACE

TOTAL CONNECTED PHASE LOADS IN VA A 9,940 B 10,560 TOTAL CONNECTED PHASE LOAD IN VA 20,500 DEMAND LINE AMPERES 90

PROPOSED LIGHTING FIXTURE SCHEDULE

MARK	DESCRIPTION	VOLTAGE	LAMPS	MOUNTING	POLE DATA	MANUFACTURER	CATALOG NUMBER
A	RSXF3 LED FLOOD FIXTURE SIZE 3 P3 FLOOD LIGHT (DUAL FIXTURE)	120	P3	POLE	12' RTS DARK BRONZE	LITHONIA LIGHTTING	RSXF3 LED - P3-40K-NSP
B	LED WALL MOUNT FIXTURE WITH FROSTED GLASS AND WIRE GUARD. BLACK FINISH	120	2700 Lm	WALL	———	SPECTRUM LIGHTING INC.	WJ1GV 27L 35K XX FJ1 NW
C	METAL HALIDE WALL PACK	120	1-70W M85	WALL	———	HUBBEL OR APPROVED EQUAL	PVL-070H-128L

7/22/2021

SQUARE E ENGINEERING, LLC
Texas Registered Engineering Firm F-12247
STATE OF TEXAS
JUAN PABLO CANTU
90105
REGISTERED PROFESSIONAL ENGINEER
SQUARE E NGINEERING
FIRM # 12247
PHONE: (956) 466-3492
32238 WHIPPLE RD.
LOS FRESNOS TX. 78566

BROWNSVILLE PUBLIC UTILITIES BOARD

SOUTHMOST ELEVATED STORAGE TANK (EST #8)

ONE LINE DIAGRAM AND PANEL SCHEDULES ADDENDUM #1

F&N JOB NO. BPU21286
DATE 6/29/2021
DESIGNED JPC
DRAWN EG
CHECKED
FILE NAME EST Elec Square E Eng-FNI.dwg

NO.	ISSUE	BY	DATE
1	ADDENDUM NO.1	JPC	7/22/2021

VERIFY SCALE 1 0
Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

SHEET E2
SEQ.

FIXTURE C
QUAD GFCI W/ WEATHERPROOF COVER
PROVIDE CONDUIT AND WIRING TO LIGHT FIXTURES AS REQUIRED
INTERIOR BASE LIGHTS
1EA. 1" CONDUIT W/1EA. 12EA. #12 FOR CONTROL WIRING FROM RTU TO ACTUATED VALVE
1EA. 1" CONDUIT W/1EA. 18GA TPS FROM PIT TO RTU CABINET. 1EA 1" CONDUIT WITH 12EA #12 CONDUCTORS FOR DI FROM FIELD TO RTU
INSTALL FLANGE ISOLATION KIT
1EA. 1" CONDUIT W/1EA. 18GA TPS FROM PIT TO RTU CABINET. 1EA 1" CONDUIT WITH 12EA #12 CONDUCTORS FOR DI FROM FIELD TO RTU
FIXTURE C PROVIDE CONDUIT AND WIRING TO LIGHT FIXTURES AS REQUIRED
INTERIOR BASE LIGHTS
1EA. 1" CONDUIT W/1EA. #10, 1EA #10 N, AND 1EA. #10 GND, FROM BOOSTER PUMP VALVE TO PUMP CONTROL PANEL
1EA. 2" CONDUIT W/3EA. #4 AND 1EA. #8 FROM BOOSTER PUMP TO PUMP CONTROL PANEL
1EA. 1" CONDUIT W/1EA. 1EA #10; 1EA #10 GND; AND 1EA #10 N FROM CONTROL PANEL TO MOTOR WINDING HEATER
1EA. 1" CONDUIT W/1EA. 18GA TPS FROM PIT TO RTU CABINET. 1EA 1" CONDUIT WITH 12EA #12 CONDUCTORS FOR DI FROM FIELD TO RTU
QUAD GFCI W/ WEATHERPROOF COVER
INTERIOR BASE LIGHTS
EXTERIOR LIGHT (TYP.)
PROVIDE CONDUIT AND WIRING TO LIGHT FIXTURES AS REQUIRED
PROVIDE SWITCH(S) AS NEEDED TO OPERATE BASE LIGHTS/INTERIOR LIGHTS FROM THIS LOCATION
FIXTURE C
1EA. 1" CONDUIT W/1EA. 18GA TPS FROM PIT TO RTU CABINET. 1EA 1" CONDUIT WITH 12EA #12 CONDUCTORS FOR DI FROM FIELD TO RTU
1EA. 1" CONDUIT W/1EA. 12EA. #12 FOR CONTROL WIRING FROM RTU TO ACTUATED VALVE
1EA. 1" CONDUIT W/1EA. 1EA #10; 1EA #10 GND; AND 1EA #10 N FROM CONTROL PANEL TO MOTOR WINDING HEATER
1EA. 2" CONDUIT W/3EA. #4 AND 1EA. #8 FROM BOOSTER PUMP TO PUMP CONTROL PANEL
3EA. 1" CONDUIT W/1EA. 18GA TPS FROM PIT TO RTU CABINET. 1EA 1" CONDUIT WITH 12EA #12 CONDUCTORS FOR DI FROM FIELD TO RTU
PROVIDE 1EA 1" CONDUIT WITH 1EA #10; 1EA #10 GND; AND 1EA #10N FROM MPZ TO BOOSTER PUMP CONTROL PANEL TO POWER MOTOR WINDING HEATER
PROPOSED 480V 3 PHASE 4W MDP. PROVIDE WIRING TO OTHER PANELS AS REQUIRED.
PROPOSED 480V - 240V / 120V MINI POWER ZONE. PROVIDE WIRING TO OTHER PANELS AS REQUIRED.
QUAD GFCI W/ WEATHERPROOF COVER
PUMP CONTROL PANEL
PROPOSED RTU
FIXTURE C
UDG DUCTBANK FEED FROM POA. CONTRACTOR SHALL SUPPLY 2EA 4" CONDUIT WITH 3EA. 250 MCM, 1EA 3/0 GND IN EACH TO MDP
METER CAN
JBOX FOR TRANSITION FROM METER LOOP TO INSIDE EST
2EA 50A NEMA 4X SS LOCAL DISCONNECT
LADDER ACCESS TO TANK C/W SAFETY RAIL
PROVIDE 2-WAY SWITCH TO CONTROL LADDER AND CATWALK LIGHTS FROM THIS POINT
QUAD GFCI W/ WEATHERPROOF COVER
INTERIOR BASE LIGHTS
FIXTURE C

GENERAL NOTES:

1. ALL CONDUIT SUPPORTS AND ENCLOSURES TO BE 316L STAINLESS STEEL UNLESS INDICATED OTHERWISE.
2. ALL WORK SHALL COMPLY WIHT THE LATEST EDITION OF THE NEC, APP APPLICABLE STATE AND LOCAL CODES.
3. ALL WORK SHALL BE PERFORMED IN A NEAT AND WORKMAN LIKE MANNER.
4. THE CONTRACTOR SHALL COORDINATE FINAL LOCATION OF ALL PANELS, LIGHTING FIXTURES, AND CONDUIT ROUTES PRIOR TO CONSTRUCTION.
5. ALL CONDUITS SHALL BE INSTALLED ALONG TANK INTERIOR WALL AND/OR NEXT TO ANY WATER LINES SO AS NOT TO INTRODUCE A TRIP HAZARD. ANY CONDUITS FOUND INSTALLED CAUSING A TRIP WILL BE REMOVED AND RELOCATED AT THE CONTRACTORS EXPENSE.

SQUARE E ENGINEERING, LLC
Texas Registered Engineering Firm F-12247

STATE OF TEXAS
JUAN PABLO CANTU
90105
REGISTERED
PROFESSIONAL ENGINEER

7/22/2021

SQUARE E ENGINEERING
FIRM # 12247
PHONE: (956) 466-3492
32238 WHIPPLE RD.
LOS FRESNOS TX. 78566

BROWNSVILLE PUBLIC UTILITIES BOARD

SOUTHMOST ELEVATED STORAGE TANK (EST #8)

EST INTERIOR PLAN VIEW ADDENDUM #1

NO.	ISSUE	BY	DATE
1	ADDENDUM NO.1	JPC	7/22/2021

Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
VERIFY SCALE 0 1"

F&N JOB NO. BPU21286
DATE 6/29/2021
DESIGNED JPC
DRAWN EG
REVISED
CHECKED
FILE NAME EST Elec Square E Eng-FNI.dwg

SHEET E3
SEQ.