

**ADDENDUM NO. 2  
TO THE CONTRACT DOCUMENTS  
FOR THE CONSTRUCTION OF  
Brine Pump Station and Maintenance Facilities Project**

Date: August 2, 2018

**To All Planholders and/or Prospective Bidders:**

The following changes, additions, and/or deletions are hereby made a part of the Contract Documents for the Construction of the Brine Pipeline Pump Station and Maintenance Facilities Project, dated June 2018 as fully and completely as if the same were fully set forth therein:

**A. CLARIFICATIONS**

1. **Question:** Is it possible to extend the project completion date to account for potential delay caused from material long lead times?

**Answer:** Yes, the substantial completion date has been changed to **July 31, 2019** and the final completion date has been changed to **August 31, 2019**. All references to the substantial and final completion dates found within the contract documents shall be considered changed to the dates defined above.

2. **Question:** Provide information on how to connect conduit to the 4,000 Amp switchgear?

**Answer:** Use weatherproof Myers Hubs to connect the conduits to the side of the enclosure, at the load side of the 4,000 Amp circuit breaker. This is on the south side of the enclosure near the east end. The location of the switchgear is shown on drawing E-02, the size of the conduits and conductors are shown on drawing E-07. The installation shall comply with Key note #2 on drawing E-07.

3. **Question:** The Lucent Technologies Accumax fiber optic cable may not be available, can an equivalent be used? How many strands are specified for the fiber optic cable?

**Answer:** The Lucent Technologies Accumax cable is no longer available. The cable shall be a Corning, single mode (OS2), FREEDM One, Tight-Buffered, fiber optic cable; the 6-strand is a part number 006E8F-31131-29 and the 12-strand is a part number 012E8F-31131-29. Or equal. The number of strands for the fiber optic cable at the Brine Pump station is specified in Key note #7 on drawing E-10. The number of strands for the fiber optic cable used at the PSV Vault is specified in Key note #5 on drawing E-11.

4. **Question:** In the Low Voltage MCC Specification 26 24 19, only integrators are listed for manufacturers, if this can be built at one of the manufacturer's factories is that acceptable?

**Answer:** Yes, if the Low Voltage MCC is built at one of the named manufacturer's factories, with one of the VFD's specified in specification 26 29 23 that would be acceptable.

5. **Question:** What is the engineer's estimate for the Brine Pump Station and Maintenance Facilities Project?

**Answer:** The engineer's estimate for the Brine Pump Station and Maintenance

Facilities Project is \$2,760,100.

6. **Question:** Can alternative linings and coatings be accepted on the steel fabricated pipe?

**Answer:** The linings specified for fabricated steel are designed to slow the scaling process that occurs from the brine water. The lining thickness is designed to provide a thicker barrier between the brine and steel. No alternative linings and coatings will be considered.

7. **Question:** Will alternative door hardware manufacturers be accepted?

**Answer:** It was not the intention of the hardware sets listed on sheet A-02 to limit the use of other products but to provide a basis of design for bidding purposes. Specification Section 08 71 00 Door Hardware, paragraph 2.2.B.1 states: "Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing minimum requirements." Any manufacturer may be used as long as the product meets the minimum specification requirements.

8. **Question:** Can a temporary gravity bypass be constructed around the pump station to convey brine water during construction of the pump station?

**Answer:** It shall be the contractor's responsibility to determine means and methods for bypass piping/pumping during construction of the pump station.

9. **Question:** What is the discharge rate of the existing EDR building?

**Answer:** The discharge rate of the existing EDR building is up to 4,300 gpm.

10. **Question:** Can the contractor use umbrella coverage insurance to meet General Liability Aggregate Limits and the Auto Liability Combined Single Limit?

**Answer:** Umbrella or excess liability insurance coverage may be used to satisfy general liability and automobile liability limit requirements.

11. **Question:** Can the contractor use the Engineer's Professional Liability Insurance?

**Answer:** The contractor may not use the Engineer's Professional Liability Insurance.

## B. SPECIFICATIONS

1. Section 00 11 16, Delete paragraph "Completion of Work" and replace with the following:

**COMPLETION OF WORK:** All Work shall be substantially completed by ~~March 31, 2019~~ July 31, 2019 with final completion of all work by ~~April 30, 2019~~ August 31, 2019. Time is of the essence.

2. Section 00 52 13, Delete paragraph 4.02 A and replace with the following:

1. The Work will be substantially completed by ~~March 31, 2019~~ July 31, 2019 as provided in Paragraph 4.01 of the General Conditions and completed and ready for final payment by ~~April 30, 2019~~ August 31, 2019 in accordance with Paragraph 15.06 of the General Conditions.

3. Section 01 14 40, Delete paragraph 1.4 C 1 and replace with the following:

1. Construction Schedule Constraints: The project installation in its entirety shall be substantially complete by ~~March 31, 2019~~ July 31, 2019 with final surface restorations and all other work completed by ~~April 30, 2019~~ August 31, 2019. In addition to satisfying this overall schedule, the CONTRACTOR shall schedule and perform all Work as required to meet the following intermediate schedule constraints. Failure to meet these intermediate deadlines will subject the CONTRACTOR to the liquidated damages specified in Article 14.07 of the General Conditions.

4. Section 05 50 00 – Metal Fabrications

1. Delete paragraph 2.3 E.9 and replace with the following:

a. When required by Drawings, every ladder that does not have an exterior handhold shall be equipped with a pop-up extension **that extends a minimum of 30 inches above the top of hatch**. Pop-up extension device shall be manufactured of the same material and finish as the ladder with telescoping tubular section that locks automatically when fully extended. Upward and downward improvement shall be controlled by stainless steel spring balancing mechanisms. Units shall be completely assembled with fasteners for securing to the ladder rungs in accordance with the manufacturer's instructions.

5. Section 43 20 10 – Pumps, General

1. Delete paragraph 1.3. A.2 and replace with the following:

a. Pump Systems: All centrifugal pump systems ~~400-HP~~ 15 hp and larger shall be tested at the pump factory in accordance with the Test Code for Centrifugal Pumps of the Standards of the Hydraulic Institute, Inc. Tests shall be performed using the complete pump system to be furnished, including the motor. **Structural Frequency Analysis shall be performed as noted in paragraph 1.2G.**

2. Delete paragraph 1.3. A.3 and replace with the following:

a. For motors smaller than ~~400-hp~~ 15 hp, the Manufacturer's certified test motor and VFD shall be acceptable. Testing of prototype pump models will not be acceptable. The following minimum test data shall be submitted:

- (a) Hydrostatic test data
- (b) A minimum of five hydraulic test readings between shutoff head and 25 percent beyond the maximum indicated capacity, recorded on data sheets as defined by the Hydraulic Institute.
- (c) Pump curves showing head, flow, bhp, efficiency, and NPSH requirements.
- (d) Certification that the pump horsepower demand did not exceed the rated motor hp beyond the 1.15 service rating at any point on the curve.

6. Section 40 05 56 – Plunger Valves, Delete paragraph 2.7 and replace with the following:

**1. 2.7 PLUNGER VALVE MANUFACTURERS – No Equal**

a. Plunger Valve manufacturer shall be:

- (a) VAG Armaturen GmbH  
Carl-Reuther-Str. 1  
68305 Mannheim, Germany

(b) ERHARD GmbH  
 Meeboldstrasse 22  
 89522 Heidenheim, Germany

(c) **AV-Tek**  
**Mustafakemalpaşa Organize Sanayi Bölgesi 3.sok. No:3**  
**16500 Mustafakemalpaşa Bursa-Turkey**

7. Section 00 73 00 – Supplementary Conditions (EJCDC C-800), Delete paragraph SC-6.03 and replace with the following:

**SC 6.03 Add the following new paragraph immediately after Paragraph 6.03.J:**

**K. The limits of liability for the insurance required by Paragraph 6.03 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:**

**1. Workers’ Compensation, and related coverages under Paragraphs 6.03.A.1 and A.2 of the General Conditions:**

<b>State:</b>	<u><b>Statutory</b></u>
<b>Employer’s Liability Limits</b>	
<b>Each Accident:</b>	<u><b>\$1,000,000</b></u>
<b>Policy Limit:</b>	<u><b>\$1,000,000</b></u>
<b>Each Employee:</b>	<u><b>\$1,000,000</b></u>

**2. Contractor’s Commercial General Liability under Paragraphs 6.03.B and 6.03.C of the General Conditions:**

<b>General Aggregate</b>	<u><b>\$ 5,000,000</b></u>
<b>Products - Completed Operations Aggregate</b>	<u><b>2,000,000</b></u> <u><b>\$ 3,000,000</b></u>
<b>Personal and Advertising Injury</b>	<u><b>\$ 1,000,000</b></u>
<b>Each Occurrence (Bodily Injury and Property Damage)</b>	<u><b>2,000,000</b></u> <u><b>\$ 3,000,000</b></u>

**3. Automobile Liability under Paragraph 6.03.D. of the General Conditions:**

<b>Bodily Injury:</b>	
<b>Each person</b>	<u><b>1,500,000</b></u> <u><b>\$ 2,000,000</b></u> <u><b>1,500,000</b></u>
<b>Each accident</b>	<u><b>\$ 2,000,000</b></u>

**Property Damage:**

	<del>1,500,000</del>
Each accident	\$ <u>2,000,000</u>
<i>[or]</i>	
Combined Single Limit of	\$ <u>5,000,000</u>

**4. Excess or Umbrella Liability:**

Per Occurrence	\$ <u>4,000,000</u>
General Aggregate	\$ <u>4,000,000</u>

Coverage shall apply over General Liability, Automobile Liability and Employers Liability. The Contractor may satisfy these limits by purchasing coverage with any combination of primary and excess insurance, so long as the total amount of insurance meets the required limits specified above.

**5. Contractor's Pollution Liability:**

Each Occurrence	\$ <u>2,000,000</u>
General Aggregate	\$ <u>2,000,000</u>

If box is checked, Contractor is not required to provide Contractor's Pollution Liability insurance under this Contract

**6. ~~Additional Insureds: 1. Magna Water District 2. Bowen, Collins & Associates, Inc.~~ Policy Conditions:**

- a) Policies #2 and #3 policy shall list Magna Water District and Bowen Collins & Associates as Additional Insured, for ongoing (ISO 2010 or equivalent) and completed operations (ISO 2037 or equivalent).
- b) Policies #2 and #3 shall apply on a primary and non-contributory basis to any insurance or self-insurance maintained by Magna Water District or Bowen Collins & Associates.
- c) Policies #1, #2 and #3 shall include a waiver of subrogation endorsement.
- d) No owner or officer may be excluded on the contractor's workers' compensation policy, who is working on this project.
- e) All policies shall with the exception of Policy #1, shall be written with insurance carriers having an AM Best rating of A- or better and a financial size of X or higher.

**7. Contractor's Professional Liability:**

**If design changes are proposed and stamped by the Contractor's licensed professional engineer, the Contractor is required to carry Professional Liability in the following amounts:**

<b>Each Claim</b>	<b>\$ <u>2,000,000</u></b>
<b>Annual Aggregate</b>	<b>\$ <u>5,000,000</u></b>

8. Section 26 05 19 – Low-Voltage Electrical Power Conductors and Cables, Delete paragraph 2.1 A.6 and replace with the following:

Fiber optic cables.

- a. For single mode fiber, ~~Lucent Technologies ACCUMAX LGBC-XXXD-VRX (indoor applications) where XXX is strand count, or Lucent Technologies 4DNX (outdoor applications) cable, and shall meet the following technical specifications.~~

- 1) ~~Core Diameter: 8.3 (+/- 6) microns~~
  - 2) ~~Core Eccentricity: 1.5% Nominal- 7.5% Max. Core~~
  - 3) ~~Ovality: 4% Nominal- 20% Max~~
  - 4) ~~Cladding Diameter: 125 (+/- 2) microns~~
  - 5) ~~Cladding Non-Circularity: 2% Max~~
  - 6) ~~Coating Diameter: 245 (+9/- 13) microns~~
  - 7) ~~Refracting Index Delta: 2.0% (+/- .3%)~~
  - 8) ~~Numerical Aperture: 0.29~~
  - 9) ~~Maximum Attenuation/km: 1.0db @ 1300nm .75db @ 1550nm~~
- Corning, single mode (OS2), FREEDM One, Tight-Buffered, fiber optic cable; the 6-strand is a part number 006E8F-31131-29 and the 12-strand is a part number 012E8F-31131-29, Or equal.

9. Delete Section 43 24 03 – Vertical turbine Pumps and replace the entire section with the following attached section 43 24 03.

**C. DRAWINGS - None**

All Bidders shall acknowledge receipt and acceptance of this Addendum No. 2 in the Bid Form. Bid Forms submitted without acknowledgment of this Addendum will be considered non-responsive.

BOWEN COLLINS & ASSOCIATES



Jordan Oyler  
Project Engineer

**END OF ADDENDUM**

**SECTION 43 24 03  
VERTICAL TURBINE PUMPS (ADD. 2)**

**PART 1 - GENERAL**

1.1 SUMMARY

- A. The Contractor shall provide vertical turbine pumps and drives with associated appurtenances, complete and operable, in accordance with the Contract Documents.
- B. The requirements of Section 43 20 10 – Pumps, General apply to this Section.
- C. The Supplier shall examine the Site conditions, intended application, and operation of the pump system and recommend the pump that will best satisfy the indicated requirements. The supplier of the pump, motor and appurtenances shall have been in business for not less than 10 years. The primary function of the supplier shall be water pumps and motors. All items in this section shall be provided under a single source of responsibility.

1.2 CONTRACTOR SUBMITTALS

- A. Shop Drawings: Submittals shall be made in accordance with Section 01 33 20 – Submittal Procedures and Section 43 20 10 – Pumps, General.
- B. Spare Parts List: The Contractor shall obtain from the manufacturer and submit at the same time as Shop Drawings a list of manufacturer suggested spare parts for each piece of equipment specified. The Contractor shall also furnish the name, address and telephone number for the nearest distributor for each piece of equipment.
- C. Operation and Maintenance Manual: Provide technical operation and maintenance manuals in accordance with Section 01 33 20 – Submittal Procedures
- D. Factory Test Data, Engineered Structural Frequency Analysis, and Certifications in accordance with Section 43 20 10 – Pumps, General.

1.3 QUALITY ASSURANCE

- A. All pumps shall be factory tested and an engineered structural frequency analysis in accordance with Section 43 20 10 – Pumps, General.
- B. Provide pump manufacturer’s standard one-year warranty which starts upon substantial completion of the project.
- C. Proper Installation and Brine Fluid Service Certifications.
- D. Coordinate with foundation block and support with pump manufacturer for anchorage acceptability.

**PART 2 - PRODUCTS**

2.1 GENERAL

- A. Pumps shall be the product of a manufacturer regularly engaged in manufacturing pumps for the intended application. All equipment shall be of heavy duty construction and conform to related U. S. manufacturing and performance standards. Each pump shall be provided with a stainless steel nameplate with pump number, manufacturer name, model number, serial number, horsepower, flowrate, head capacity, speed, etc. All pumps and motors shall be capable of operating within specified parameters without permanent damage or excessive vibration.
- B. The complete pumping system consists of the vertical electric motor, vertical turbine pump, drive shaft, and pump bowls and impellers with related items furnished with each of these major elements. The pump manufacturer shall furnish all this equipment and any related and required components and systems under a single source responsibility, and shall coordinate the selection, design, fabrication and assembly of the complete and integrated pumping systems.
- C. Pumps will be operated by Variable Frequency Drives. The pump manufacturer is not required to furnish the VFD equipment, but shall ensure that the pumping systems are compatible with the drives and controls and suited for the intended operation and the pump supplier shall be the single source responsible for the pump, motor and VFD system combined. See applicable Sections in Divisions 26 and 40.
- D. The brine pump station will pump brine water from the wet well to an existing brine pipeline constructed in 2017. The brine water will be conveyed from the Owner’s WTP to the WWTP. Brine water quality data is provided in Appendix C. All pumps shall be certified as compatible for long term use in the brine fluid by the pump manufacturer in writing.

E. Pump Identification:

Pump Name	Brine Water Pumps
Equipment Numbers	BPS-P-131 BPS-P-132 BPS-P-133
Location	Brine Pump Station



## 2.2 OPERATING CONDITIONS

- A. The Pumps of this Section shall be suitable for long term operation under the following conditions:

Parameter	Units	Value
Duty		Continuous
Drive		Vertical electric motor for variable speed operation
Ambient environment		Indoors
Ambient temperature	Deg. F	35 to 110
Ambient relative humidity	%	20 to 95
Fluid service		EDR WTP brine concentrate , see Appendix C
Fluid temperature	Deg. F	40 to 85
Fluid pH range		6.5 to 9.5
Fluid specific gravity		1.0
Maximum Noise	dBA at 3 ft.	85
Pass Minimum Sphere Size	Inches	0.5
Fluid viscosity	absolute centipoises at 60 deg. F	1.14
Project site elevation	ft., msl	4249.5
Minimum water surface in wet well	ft., msl	4236.5
Max water surface elevation in wet well	ft., msl	4243.5
Approximate Bottom of Cone Strainer Elevation	ft., msl	4233.92 +/-
Centerline Discharge Flange Elevation	ft. msl	4249.50

## 2.3 PERFORMANCE REQUIREMENTS

A. The pumps shall meet the following minimum performance requirements:

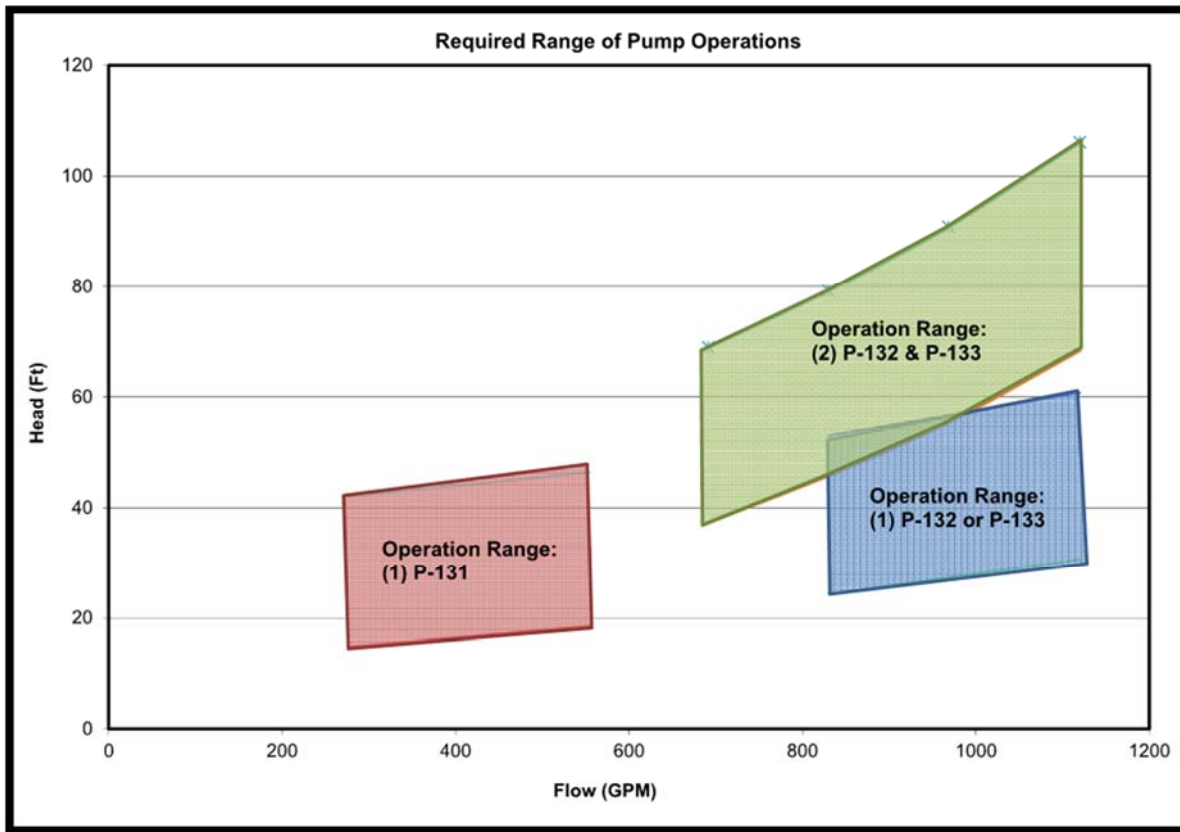
### 1. Pump # BPS-P-131

EDR WTP Operational Scenario (# Trains)	Capacity (GPM)	Maximum Head* (ft.)	Minimum Head * (ft.)	Required Bowl Efficiency	Comments
0	0	41	14	-	Static Lift
1	277	42	15	74% minimum	At reduced speed. Secondary performance point.
2	555	46	19	80% minimum	Most common (primary) operating point: May be at full speed or at reduced speed. Basis of design and selection.

### 2. Pumps # BPS-P-132 and # BPS-P-133

EDR WTP Operational Scenario (# Trains)	Total Flow (GPM)	Flow Each Pump (Capacity, GPM)	Maximum Head* (ft.)	Minimum Head * (ft.)	Pumping Scenario	Required Bowl Efficiency	Comments
0	0	0	41	14	-		Static Lift
3	830	830	53	24	1 Pump: P-132 or P-133	70% Min	At reduced speed. Secondary performance point.
4	1120	1120	61	31	1 Pump: P-132 or P-133	70% Min	At reduced speed. Secondary performance point.
5	1383	692	69	37	2 Pumps: P-132 & P-133	70% Min	At reduced speed. Secondary performance point.
6	1660	830	79	46	2 Pumps: P-132 & P-133	74% Min	At reduced speed. Secondary performance point.
7	1937	969	91	55	2 Pumps: P-132 & P-133	81% Min.	<i>Most common (primary) operating point: Basis of design and selection.</i>
8	2240	1120	106	68	2 Pumps: P-132 & P-133	78% Min.	At full speed. Secondary performance point.

3. A graphical representation of the operation scenarios required of the Brine Pumps is as follows:



4. \*Note performance points indicated are for the required flow and head conditions at the centerline of the discharge flange. Supplier to account for head losses within the column and other internal pump components and the water surface and pump system elevations in the design of the pump.

B. Each pump shall meet the following minimum performance requirements:

Parameter	Units	Value	
		Pumps # P-132, P-133	Pump # P-131
Design flow capacity	GPM	1120	555
Design flow head TDH (at CL discharge flange)	ft.	106	46
Minimum submergence required: absolute at any condition from shutoff to minimum pump head.	inches	Not to exceed 30 inches of water.	Not to exceed 30 inches of water
Maximum pump speed	rpm	1800	1800
Maximum motor speed	rpm	1800	1800
Minimum motor size(see note 1)	HP	50	15

Note 1. Motor size will vary by pump manufacture performance characteristics and may need to be larger than the minimum motor size indicated to achieve specified pumping system performance points.

C. Pump Dimensions: Each pump shall meet the following dimensional requirements:

Parameter	Units	Value	
		Pumps # P-132, P-133	Pump # P-131
Approximate length from Centerline of Discharge to suction bell, final length determined by manufacturer	ft.	15'-7"	15'-7"
Minimum column diameter	inch	<del>10</del> <u>8</u>	<del>8</del> <u>6</u>
Minimum discharge diameter	inch	8	6
Discharge flange rating.	psi	150	150
Minimum column shaft diameter	inch	1.50	1.50
Maximum bowl diameter	inch	12	10

## 2.4 MATERIALS OF CONSTRUCTION

A. Each vertical turbine pumps shall conform to the following requirements:

Bowls	Cast-iron or Ductile iron as required for hydraulic criteria, lined with 3 coats of epoxy having a total thickness of 9 mils and the exterior surfaces of the bowl units shall be coated with 12 mils of epoxy. Submerged epoxy (System No. 1) in accordance with Section 09 90 00 –Coatings and Painting. <u>All areas of bowls to be fully epoxy lined (lining of only the water ways is not acceptable.)</u>
Impeller	Bronze statically and dynamically balanced (aluminum bronze ASTM B148, heat treated for seawater/brine conditions)
Impeller shaft method of connection	Type 316 stainless steel impeller lock collet
Wear rings	Replaceable, Heat Treated 410 stainless steel – Non-galling with impeller wear rings heat treated to a hardness of at least 50 BHN above the bowl wear rings
Bowl shaft	Stainless steel, <del>416</del> <u>Type 17-4. (Rifle drilled type, rifling by pump manufacturer only) for potable water lubrication</u>
Suction bell	Cast iron bell, with bottom bearing (high lead tin bronze, ASTM B 584, 93800) and streamlined ribs, Epoxy lining and coating to match bowls. Permanently grease lubricated
Column	Steel pipe, ASTM A53 Grade B not less than Schedule 30, Flanged, epoxy lined and coated 18 MDFT, per section 09 90 00, System No. 1, in maximum 10-ft lengths.
Line shaft and couplings	Stainless steel, Type 17-4 PH or Type 416 in maximum 10-ft lengths, sized for a critical speed of min 20 percent above max operating speed open. Shaft coupling shall be Type 410 stainless steel, threaded or keyed to the shaft, spacer type.
Shaft lubrication	Potable Water Lubricated, enclosed
<u>Discharge</u> Shaft seal	Packed Tube tension assembly <del>with stuffing box</del> , bronze.

Shaft enclosing tube	Shaft enclosing (potable water tube for flushing, <del>seal</del> ) materials and dimensions shall conform with ASTM A53 or A120, Schedule 80 steel, machined to AWWA E101 tolerances and pressure tested to 1100 psi, minimum, <u>Epoxy Lined and Coated 18 MDFT per Section 09 90 00, System No. 1.</u>
Line shaft bearings	Line shaft bearings shall be highest quality bearing bronze, self-centering, with turnout lugs or other suitable feature to enable easy removal and installation, and spiral oil grooves. Maximum spacing 10 feet.
Discharge head	Fabricated steel, reinforced and anchored to withstand pipe thrust, pressure, and natural resonance frequencies (torsional, radial or axial), epoxy-lined and coated per 09 90 00, System No 1. 18 MDFT, with flange, base plate, and pressure switch, and drain connections as shown on the Drawings or as otherwise required.
Motor shaft coupling	Same as or similar to line shaft couplings
Bowl and suction case bearings	Potable water lubricated, High Lead Tin bronze sleeves case bearings above and below each impeller
Suction Strainer	316 Stainless steel
<u>Potable Water Feedline (from pump room to the suction bearings)</u>	<u>316 stainless steel pipe with swede lock fittings sized per pump manufacturer.</u>

2.5 ~~POTABLE SEAL~~ LUBRICATION AND FLUSHING WATER FOR BRINE PUMPS

- A. All brine pumps shall be equipped with potable water flushing and lubrication ~~and seals~~ line. For clarity, ~~seal~~ the pump's waterlines are not shown on the drawings ~~plan view~~, but detailed below to be coordinated by the pump manufacturer.
- B. The required piping and control vavles of these potable water flushing and ~~seal~~ lubrication water system for each brine pump shall be as indicated in the Figure 1 below and shall be coordianted and sized with the pump manufacturer. The piping shall be connected to the potable water line mounted around the building and shall be mounted on the wall adjacent to each pump. Piping shall extend to the pump overhead, supported from the ceiling with pipe supports at a minimum 9'-00" height above the finish floor.

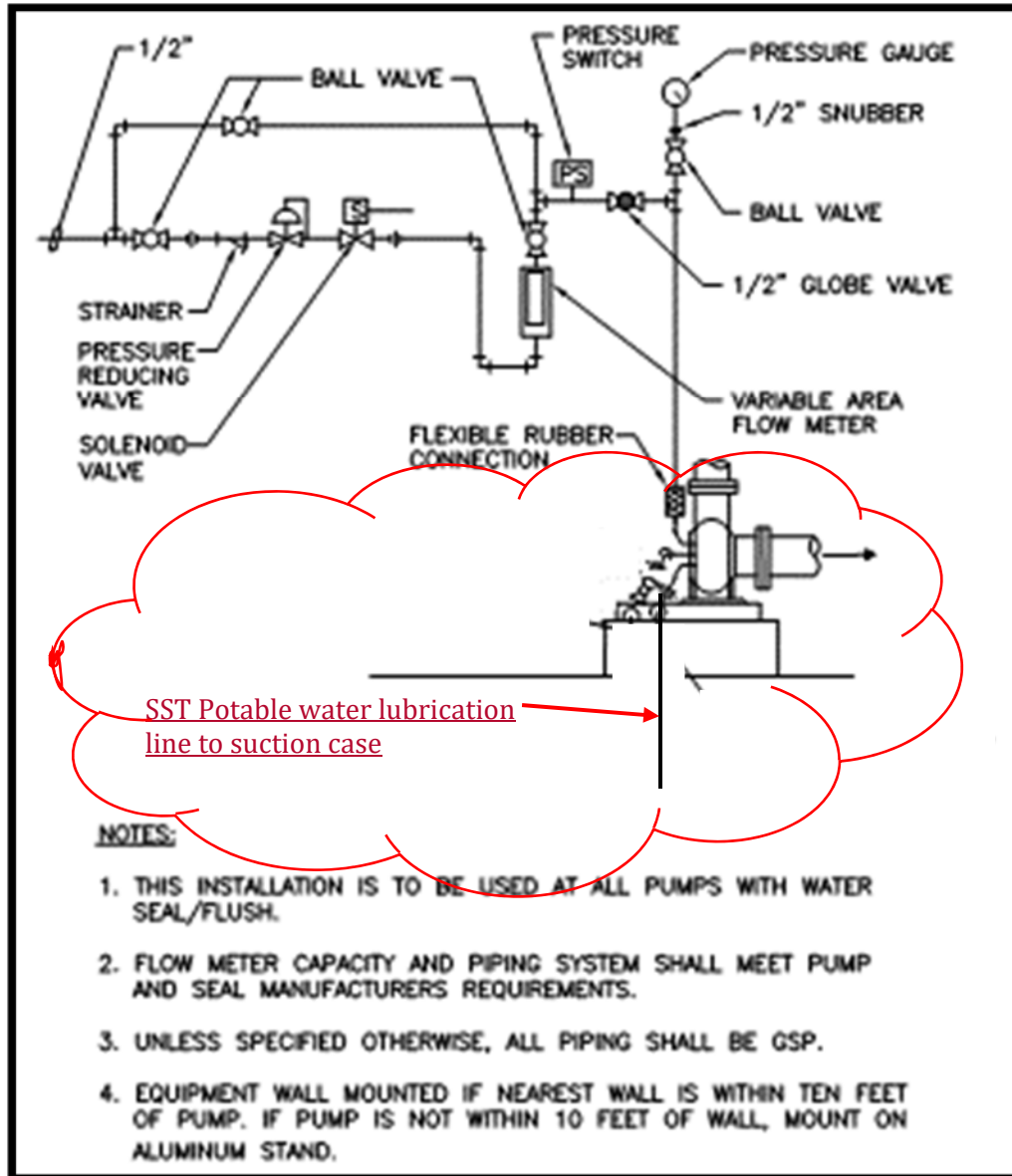


Figure 1 - Brine Pump Potable Water Flushing and Lubrication Seal-Piping.

## 2.6 ELECTRICAL REQUIREMENTS

- A. Drive: Each pump shall be provided with a vertical, hollow shaft, high efficiency, high thrust WP1, 480 volt, 3-phase, 60-Hertz heavy duty, electric motor in accordance with Section 26 20 00 - LOW-Voltage AC Induction Motors. Each electric motor shall be designed to accept the total, unbalanced thrust imposed by the pump. Thrust bearings shall be rated for a minimum L-10 life of 100,000 hours.
- B. Pumps shall be adjustable speed and Contractor shall coordinate supply of variable speed drives in accordance with Section 26 29 23 - Variable Frequency Drives.

2.7 CONTROLS & INSTRUMENTATION

A. Pumps shall be controlled in accordance with Divisions 40 and 26.

2.8 SPARE PARTS

A. Furnish the following spare parts for a single pump unit of each type specified:

Item	Number
Suction Bell Bearing Assembly	1
Set of Bowl and Discharge Case Bearings	1
Set of Impellers	1
Set of Wear Rings	1
Set of Pump Shaft Bearings	1
Mechanical Seal or Stuffing Box Rebuild Kit	1
Sets of Gaskets and O-rings	2

2.9 MANUFACTURER’S, OR EQUAL:

A. Listing of a manufacturer does not warrant that their equipment or commercial conditions will conform to the technical or bidding requirements given herein, or that their proposed standard or alternative offerings will be suited for the service, or that the equipment will be accepted by the Engineer, or that pricing, delivery or other terms will be competitive. The CONTRACTOR shall review information provided by prospective suppliers to assure compliance with the requirements of the Contract Documents and shall be fully responsible for the manufacturer’s conformance thereto.

1. Floway
2. FlowServe
3. Goulds Pumps, Inc.
4. National Pump Company

**PART 3 - EXECUTION**

3.1 SERVICES OF MANUFACTURER

- A. Factory Testing: Factory tests shall be performed on all full-size pumping equipment as specified in Section 43 20 10 –Pumps General
- B. The installation shall be in accordance with manufacturers written recommendations and as shown in the drawings.
- C. Anchor Design: The pump manufacturer shall provide analyses to determine the anchorage and other requirements necessary to insure that the pumping equipment is adequately designed, fabricated, installed, and anchored to resist operating forces and meet associated performance standards. Equipment design and anchorage shall be sufficient to resist pump dynamic forces without damage or vibration to the equipment (pump, pump can drive shaft and motor) and the supporting structure. Manufacturer shall determine the location, number, diameter, anchor embedment, and related requirements for anchor bolts and other associated elements of the installation.

- D. Inspection, Startup, and Field Adjustment: The service representative of the manufacturer shall be present at the Site for 3 working days, to furnish the services required by Section 43 20 10 – Pumps, General.
- E. Instruction of Owner's Personnel: The training representative of the manufacturer shall be present at the Site for 1 work day to furnish the services required by Section 43 20 10 – Pumps, General.
- F. For the purposes of this paragraph, a work day is defined as an 8 hour period at the Site, excluding travel time. All on-site work hours shall be coordinated with the Owner and/or General Contractor.
- G. The Engineer may require that the inspection, startup, and field adjustment services above be furnished in 3 separate trips.

### 3.2 FIELD TESTS

- A. Field tests shall be performed and documented test reports provided according to Section 43 20 10, as suited to the pumps provided under this section. Some of the listed requirements may not be applicable to the particular equipment installed. Provide a written plan identifying the field tests that will be performed, sequencing, etc.
- B. Prior to Owner acceptance and formal pump station start-up, all equipment shall be inspected for proper alignment, quiet operation, proper connection, and satisfactory performance by means of a function test in the presence of the Owner and the Engineer. A start up report showing function testing, motor voltages, and running amperages shall be provided to the engineer after pump station start-up. The Contractor and manufacturer shall also sign the certification of proper pump installation attached to this specification.

END OF SECTION



Certificate of Proper Installation

Project: Brine Pump Station and Maintenance Facilities Project

Contractor: \_\_\_\_\_

Pump Manufacturer: \_\_\_\_\_

I hereby certify that:

1. I am an authorized representative of the contractor/manufacturer
2. The pump installation has been made properly in accordance with the manufacturer's recommendations.
3. Field testing as specified in Sections 43 20 10 and 43 24 03 has been completed and the pump has satisfactorily met all performance requirements.

Signatures

Contractor: \_\_\_\_\_

Date: \_\_\_\_\_

Manufacturer: \_\_\_\_\_

Date: \_\_\_\_\_