



**400 SOUTH WELL NO. 2
FURNISHING AND INSTALLING DEEP WELL
VERTICAL TURBINE PUMP, MOTOR &
APPURTENANCES**

BID REQUEST

Project Engineer

**HANSEN, ALLEN, & LUCE, INC.
Consultants/Engineers
859 West South Jordan Pkwy Ste 200
South Jordan, Utah 84095
(801) 566-5599**

**11/2018
260.44.200**

**INSIDE COVER
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SALT LAKE AREA OFFICE
859 W South Jordan Pkwy – Ste 200
South Jordan, Utah 84095
Phone: (801) 566-5599
www.hansenallenluce.com

Well Pump and Motor Providers

November 30, 2018

Re: Springville City – 400 South Well No. 2
Furnishing and Installing Deep Well Vertical Turbine Pump, Motor & Appurtenances

Dear Well Pump and Motor Providers:

Springville City intends to pre-order several “long lead” items that are required for their proposed new 400 South Well No. 2 Pump House. One of those items includes the deep well vertical turbine pump, motor and appurtenances. We invite you to review the attached documents and specifications and ask you to provide a bid to supply and install the deep well vertical turbine pump, motor and appurtenances as defined herein.

Please direct your response to: **SPRINGVILLE CITY**
 110 SOUTH MAIN
 SPRINGVILLE, UTAH 84663-1399
 ATTENTION: Bruce Riddle, Finance Director

Springville City will execute a purchase contract with the successful bidder. The purchase contract will be assigned to the successful bidder for the 400 South Well No. 2 Pump House.

Your bid must be received by the due date and time indicated in the attached document 00 11 13 – Advertisement for Bids.

All communication/questions relative to the project shall be submitted on-line (<https://tinyurl.com/springvillebids>) at the “Questions and Answers” section for this project. (From the link above, search for Springville City - 400 South Well No.2 Pump and Motor project).

Sincerely,

HANSEN, ALLEN & LUCE, INC.

A handwritten signature in cursive script, appearing to read 'Vern G. Conder', is written over a horizontal line.

Vern G. Conder, P.E.
Associate

Attachments:

- 00 11 13 – Advertisement for Bids
- 00 41 43 – Bid Form
- 00 43 30 – Purchase Order Assignment
- 22 11 24 – Pump and Pump Motor
- Drawing C-7 – Pump Base and Pump Setting Details

DOCUMENT 00 11 13

ADVERTISEMENT FOR BIDS

Notice is hereby given that SPRINGVILLE CITY, (OWNER) will accept bids for furnishing and installing a product lubricated surface discharge deep well turbine pump into their new 400 South Well No. 2 . The work is described in general as:

The work is comprised of furnishing, delivering to the project site (located at approximately 900 East and 400 South in Springville City, Utah), and installing a deep well vertical turbine pump complete, including discharge head, pump column assembly, pump bowl assembly, strainer, motor, and all necessary appurtenances, installation, materials, equipment, machine work, delivery and other requirements as specified in contract specification 22 11 24 – Pump and Pump Motor.

Separate sealed bids will be received by OWNER in their office located at Springville City, 110 South Main, Springville, Utah 84663-1399 Attention: Bruce Riddle, Finance Director, until 10:00 a.m. on December 13, 2018 and then at said office publicly opened and read aloud. Bids shall be addressed and delivered to the City offices prior to the bid opening.

Bidding Documents may be obtained on or after November 30, 2018 on-line at <https://tinyurl.com/springvillebids>. (From the link above, search for Springville City - 400 South Well No.2 Pump and Motor project).

Bid security in the amount of 5% of the base bid will be required to accompany bids.

A pre-bid conference will not be held.

All communication/questions relative to the project shall be submitted on-line (<https://tinyurl.com/springvillebids>) at the “Questions and Answers” section for this project. (From the link above, search for Springville City - 400 South Well No.2 Pump and Motor project).

The OWNER reserves the right to reject any or all bids; or to accept or reject the whole or any part of any bid; or to waive any informality or technicality in any bid in the best interest of Springville City. Only bids giving a firm quotation properly signed will be accepted.

Note that it is the intent of OWNER to execute a purchase contract with the successful BIDDER for work defined herein and in the attached documents. The purchase contract will then be assigned to the successful bidder for the contract for the entire 400 South Well No. 2 Pump House.

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DOCUMENT 00 41 43
BID FORM

Project Identification: **SPRINGVILLE CITY – 400 SOUTH WELL NO. 2 FURNISHING AND
INTALLING DEEP WELL VERTICAL TURBINE PUMP, MOTOR , &
APPURTENANCES**

Contract Identification and Number:

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

**SPRINGVILLE CITY
110 SOUTH MAIN
SPRINGVILLE, UTAH 84663-1399
ATTENTION: BRUCE RIDDLE, FINANCE DIRECTOR**

1.02 The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into an Agreement with OWNER in the form of a Purchasing Contract to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – ASSIGNMENT OF PURCHASING CONTRACT

2.01 OWNER will execute a purchasing contract with successful BIDDER. The purchasing contract will be assigned to the successful bidder for the contract for the entire 400 South Well No. 2 Pump House, for which the pump and pump motor and associated appurtenances will become part of. The purchase order assignment will be made using attached document Section 00 43 30 – Purchase Order Assignment.

ARTICLE 3 – BIDDER’S ACKNOWLEDGEMENTS

3.01 BIDDER accepts assignment by OWNER of the purchasing contract for furnishing and installing the pump and motor and associated appurtenances to the successful bidder for the 400 South Well No. 2 Pump House, which the pump and pump motor and associated appurtenances will become part of.

3.02 BIDDER acknowledges to OWNER that the Bid provided herein includes total costs required to furnish and install the items as outlined within Specification 22 11 24 Pump and Pump Motor.

ARTICLE 4 – BIDDER’S REPRESENTATIONS

4.01 In submitting this Bid, BIDDER represents that:

A. BIDDER has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda:

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

<u>Addendum No.</u>	<u>Addendum, Date</u>

- B. BIDDER has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
- C. BIDDER is familiar with and has satisfied itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work.
- D. BIDDER is aware of the general nature of work to be performed by OWNER and others at the Site that relates to the Work as indicated in the Bidding Documents.
- E. BIDDER has given ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies that BIDDER has discovered in the Bidding Documents, and confirms that the written resolution thereof by ENGINEER is acceptable to BIDDER.
- F. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work.
- G. The submission of this Bid constitutes an incontrovertible representation by BIDDER that BIDDER has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 5 – BIDDER’S CERTIFICATION

5.01 BIDDER certifies that:

- A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;
- B. BIDDER has not directly or indirectly induced or solicited any other bidder to submit a false or sham Bid;
- C. BIDDER has not solicited or induced any individual or entity to refrain from bidding; and
- D. BIDDER has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 5.01.D:
 - 1. “corrupt practice” means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process;
 - 2. “fraudulent practice” means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of OWNER, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive OWNER of the benefits of free and open competition;
 - 3. “collusive practice” means a scheme or arrangement between two or more Bidders, with or without the knowledge of OWNER, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

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

ARTICLE 6 – BASIS OF BID

6.01 BIDDER will complete the Work in accordance with the Contract Documents for the following price(s):

BID SCHEDULE

ITEM	DESCRIPTION	EST QUANTITY	UNIT	TOTAL AMOUNT
1	Furnish and Deliver Deep Well Vertical Turbine Pump, Motor, and Appurtenances Complete	1	LS	
2	Install Deep Well Vertical Turbine Pump, Motor, and appurtenances Complete	1	LS	
BID SCHEDULE TOTAL				

ARTICLE 7 – TIME OF COMPLETION

7.01 If awarded, the BIDDER will supply the vertical turbine pump and motor complete within: _____ weeks.

ARTICLE 8 – BID SUBMITTAL

9.01 This Bid is submitted by:

If BIDDER is:

An Individual

Name (typed or printed): _____

By: _____

(Individual's signature)

SEAL, if required

Doing business as:

A Partnership

Partnership Name: _____

By: _____

SEAL,
if required

(Signature of general partner -- attach evidence of authority to sign)

Name (typed or printed):

A Corporation

Corporation Name:

State or Jurisdiction of Incorporation: _____

Type (General Business, Profession, Service, Limited Liability):

By: _____

(Signature -- attach evidence of authority to sign)

Name (typed or printed):

Title: _____

Attest _____

(Signature of Corporate Secretary)

CORPORATE
SEAL,
if required by State

Date of Qualification to do business in _____ [State or other jurisdiction where
Project is located] is ___/___/_____

A Joint Venture

Name of Joint Venture:

First Joint Venture Name: _____

SEAL, if required by State

By: _____
(Signature of joint venture partner -- attach evidence of authority to sign)

Name (typed or printed):

Title: _____

Second Joint Venture Name:

SEAL, if required by State

By: _____
(Signature of joint venture partner -- attach evidence of authority to sign)

Name (typed or printed):

Title: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is party to the venture should be in the manner indicated above.)

BIDDER's Business address:

Business Phone No. (_____) _____

Business FAX No. (_____) _____

Business E-Mail Address

State Contractor License No. _____ (If applicable)

Employer's Tax ID No. _____

Phone and FAX Numbers, and Address for receipt of official communications, if different from Business contact information:

9.02 Bid submitted on _____, 20____.

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SECTION 00 43 30
PURCHASE ORDER ASSIGNMENT

FOR VALUE RECEIVED, Springville City, a body of the State of Utah, Assignor, hereby assigns, transfers and sets over to _____,

All of Assignor's right, title and interest in and to the following described Purchase Order(s) (copies of which are attached hereto and incorporated by reference as though fully set forth herein), subject to all the terms and conditions thereof, to wit:

Purchase Order No. _____, dated _____

THIS ASSIGNMENT IS MADE pursuant to and in accordance with the terms of the Contract Documents and Specifications entered into by and between Assignor and Assignee for the "Springville City 400 South Well No. 2 Pump House", dated the _____ of _____ 2018.

ASSIGNOR HEREBY DELEGATES to Assignee and Assignee, upon execution hereof, hereby expressly assumes all of the obligations and duties to be performed by Assignor under the aforesaid Purchase Orders in accordance with the terms thereof and as provided in said Contract Documents and Specifications.

IN WITNESS WHEREOF, Assignor has executed this Assignment this _____ day of _____ 2018.

ASSIGNOR: Springville City

By _____ (Seal)

Its Mayor

Attest

BY: _____

Its Secretary- Treasurer

_____, Assignee, on this _____ day of _____, 2018, hereby accepts the assignment of the above-described Purchase Order(s), subject to the terms and conditions thereof and in accordance with the terms of this Assignment.

ASSIGNEE:

By _____ (Seal)

Title _____

- END OF SECTION -

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SECTION 22 11 24
PUMP AND PUMP MOTOR

PART 1 GENERAL

1.1 DESCRIPTION

- A. Furnish, deliver and install a product lubricated surface discharge deep well turbine pump into existing 20-inches in diameter (outside diameter) well casing to depths as shown on the drawings.

1.2 REFERENCES

- A. Work covered by this Specification shall meet or exceed the provisions of the latest editions of the following Codes and Standards in effect at the time of award of the Contract:

B. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

1. ANSI B16.1 Cast Iron Pipe Flanges and Flanged Fittings Class 25, 125, 250 and 800
2. ANSI/HI 9.6.4 Rotodynamic Pumps for Vibration Measurements and Allowable Values

C. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

1. ASTM A 36 Structural Steel
2. ASTM A 48 Gray Iron Castings
3. ASTM A 53 Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
4. ASTM A 108 Steel Bars, Carbon, Cold Finished, Standard Quality
5. ASTM A 269 Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
6. ASTM A 536 Standard Specification for Ductile Iron Castings
7. ASTM A 582 Standard Specification for Free-Machining Stainless Steel Bars
8. ASTM B 584 Standard Specification for Copper Alloy Sand Castings for General Applications

D. AMERICAN WATER WORKS ASSOCIATION

1. AWWA C 651 Standard for Disinfecting Water Mains
2. AWWA C 654 Standard for Disinfecting of Wells
3. AWWA E 103 Standard Specifications for Horizontal and Vertical Turbine Line-Shaft Pumps

E. NATIONAL SANITATION FOUNDATION

1. NSF/ANSI 60 Drinking Water Treatment Chemicals
2. NSF/ANSI 61 Drinking Water System Components – Health Components
3. NSF/ANSI 372 Drinking Water System Components – Lead Content

1.3 SUBMITTALS

- A. CONTRACTOR shall submit for review to ENGINEER, sufficient literature, detailed specifications, and drawings to show dimensions, make, style, speed, size, type, horsepower, head-capacity, efficiency, materials used, design features, internal construction, weights, and any other information required by ENGINEER for review of all pumping equipment. No pumping equipment will be accepted, and installation will not be allowed, until such review has been completed. All submittals shall clearly state any deviations from the specified requirements. The following shall also be furnished with the submittal:
1. Performance data curves showing head, capacity, horsepower demand, and pump efficiency over the entire operating range of the pump, from shutoff to maximum capacity. The equipment manufactured shall indicate separately the head, capacity, horsepower demand, overall efficiency, and minimum submergence required at the specified design point.
 2. Equipment manufactured shall provide complete and detailed information regarding the installation of the pumps. Any installation requirements or operating conditions which the supplier or manufacturer' feel to be critical to the safe and reliable operation of the pumps should be identified and described in detail.
 3. Shop drawings submitted for review also shall include detailed description of motor, including electrical diagrams, schematic control diagrams, and a detailed description of how the control system is to function, where applicable.

1.4 OPERATING CONDITIONS

- A. Table I indicates the operating conditions of the pumps.

**TABLE I
OPERATING CONDITIONS DEEP WELL TURBINE PUMP**

DESCRIPTION	400 S. WELL NO. 2
Design capacity of pump (gpm)	4,000
Design total dynamic head at discharge of bowl assembly (feet)	298
Pump Setting Depth	220
Nominal Operating Speed (rpm)	1770
Minimum Efficiency at Design Point	83.5%
Maximum NPSHR at Design Point	36 feet
Minimum Motor Horsepower	400
Column Size (diameter) (0.375" Wall)	14-inch
Minimum Shaft Size (inches)	1-15/16 (SS 416)
Diameter of Well Casing	20-inch (19.25" I.D.)

DESCRIPTION	400 S. WELL NO. 2
Maximum Bowl Diameter	15.6 in.
Approx. Elevation (ft. above MSL)	4645
Model No.: National	H16MC
Utility Power (volts, phase, hertz)	480, 3, 60

1.5 MECHANICAL DEFECTS AND REJECTIONS

- A. CONTRACTOR furnished pumps that have mechanical defects or do not meet the requirements for head-capacity, horsepower, efficiency, and vibration requirements will be rejected, and shall be replaced without additional cost to OWNER for furnishing, removal, reinstallation, and retesting. Mechanical defects shall include excessive vibration, improper balancing of any rotating parts, improper tolerances, binding, excessive bearing or motor heating, defective materials, including materials that do not conform to the Specifications, improper fitting of parts, and any other defect which will in time damage the pump or unreasonably impair its efficiency or operation.

1.6 WARRANTY

- A. CONTRACTOR furnished equipment covered by these specifications shall be warranted against defective parts due to faulty material or workmanship for one (1) year after date of start-up. CONTRACTOR shall guarantee to replace any defective parts within the period of time specified at no additional cost to OWNER. If CONTRACTOR has to pull pump to replace defective parts, CONTRACTOR shall guarantee to pull and replace pump at no additional cost to OWNER.

1.7 MEASUREMENT AND PAYMENT

- A. **METHOD OF MEASUREMENT** This bid item shall not be measured but shall be paid for on a lump sum price for furnishing and installing the deep well vertical turbine pump complete, including discharge head, pump column assembly, pump bowl assembly, suction pipe and strainer, and motor with cables.
- B. **BASIS OF PAYMENT** Payment shall be made at the contract lump sum bid price for an acceptable and complete vertical turbine pump meeting the requirements detailed in the specifications, Payment shall include furnishing the deep well vertical turbine pump complete, including discharge head, pump column assembly, pump bowl assembly, suction pipe and strainer, motor and cables, and all necessary appurtenances, materials, equipment, machine work, delivery and installation and other requirements as specified herein.

1.8 FACTORY TESTING

- A. Equipment shall be factory tested and inspected as specified hereinafter. All costs for the tests shall be borne by CONTRACTOR. CONTRACTOR shall submit the complete shop test procedures to ENGINEER for approval at least 30 days prior to the shop test. In the event any equipment fails to meet the performance values set forth in this specification, the equipment shall be modified and re-tested or replaced with equipment that performs in accordance with this specification.
 - 1. Impeller, motor rating and electrical connections shall be checked for compliance to the customer's purchase order.
 - 2. Pump and motor shall be performance tested as specified hereinafter. Three copies of certified test reports, including actual test records, shall be submitted and approved by ENGINEER prior to shipment of the equipment.
- B. Any deficiencies identified shall be corrected and appropriate testing redone. A certified test report on the results of the factory testing shall be supplied with each pump at the time of shipment.
- C. Factory test of the pumping equipment shall be made in accordance with the Test Code of Hydraulic Institute 14.6-2011 Test Acceptance Grade 1B. Each pump shall be tested for performance at the factory to determine the head vs. capacity, motor total electrical power draw (KVA), and motor active electrical power draw (KW) for the full speed at which the pumps are specified and shown on a performance test curve, certified by a registered professional engineer, as continuous functions throughout the pump's performance range. Tests of models, prototypes or similar units will not be acceptable. All tests shall be run in accordance with the test code for centrifugal pumps of the Standards of Hydraulic Institute, latest edition.
- D. Test curves for each pump shall have the capacity plotted as abscissas, and the operating head, brake horsepower, and efficiency plotted as ordinates. Test curves shall cover the full range of operation from shut-off to maximum capacity. The characteristics of the pumps shall conform with this specification.
- E. All pumping equipment which fails to meet the requirements of the Test Code shall be removed and shall be replaced with pumping equipment which meets the specifications requirements. Three (3) notarized copies of certified factory performance test curves for each pump shall be furnished and approved before shipment of the pumps to the site.
- F. Pumps shall have design and operational characteristics which provide for maximum efficiency and minimum hydraulic turbulence in the pump casing at the design capacity of the pump and design total dynamic head specified in Table I, "Operating Conditions Deep Well Turbine Pump". Each pump shall operate without excessive noise, vibration, heating, cavitation, or damage to the pump. The actual certified pump capacities shall at a minimum meet the design conditions specified in Table 1.

PART 2 PRODUCTS

2.1 DEEP WELL VERTICAL TURBINE PUMP

- A. The pumps shall be of the deep well, product lubricated, vertical turbine type suitable for pumping culinary water. All material, manufacturing and performance standards shall be in compliance with AWWA E 103, NSF 60, NSF 61 and NSF 372 as applicable.
- B. Performance Requirements
 - 1. Pump Speed - The pumps shall operate as specified in Table I.
 - 2. Pump Characteristics - The pump shall be characterized by head capacity curves of steadily decreasing head with increasing capacity. Maximum head shall be at zero flow. The pump shall have a minimum efficiency as provided in Table I during operation against the system head. Pump head - capacity curves shall indicate that these losses have been included. Pumps shall have head-capacity curves similar to that of the specified pump. Pumps having curves that show a flatter or near horizontal slope over a section in the head – capacity curve will not be accepted. Curves with head-capacity curves with slopes of the curve flatter than that shown for the specified pump will not be accepted.
 - 3. The pump and motor shall be capable of producing the flow rate and total dynamic heads indicated in Table I.
 - 4. Motor Characteristics - Under no operating conditions shall the required pump brake horsepower exceed the nameplate rating of the motor being furnished.
 - 5. The pump shall be designed to operate throughout its entire range without excessive vibration or noise. Pump shall meet the requirements of the Hydraulic Institute (2016) paragraph 9.6.4 vibration limits.
- C. Vertical Turbine Pump Components
 - 1. Pumps
 - a. The vertical turbine pump for the wells shall be as manufactured by National Pump Company or approved equal and shall be a multi stage product lube bowl assembly (or equal).
 - b. Unless otherwise stated herein, the pump shall in all respects conform to the American National Standard ANSI/AWWA-E103 for “Horizontal and Vertical Turbine Line Shaft Pumps” and shall comply with all local and state sanitary and safety regulations.
 - 2. Discharge Head
 - a. The discharge head shall be fabricated steel (ASTM A53 Grade B Pipe and ASTM A 36 Steel Plate), accurately machined and with a surface discharge. Discharge flange shall be machined and drilled to ANSI standards for 150 lb. rating and shall be sized to match the specified system. The top of the discharge head shall have a rabbet fit to accurately locate the vertical hollow shaft driver, and have a diameter equal to the driver base diameter (BD) and not less than 24.5 inches. Lifting lugs of sufficient strength to support the weight of the complete unit shall be provided. The base shall be round or square. Head must be able to accept the monitoring tube, well vent, and other tubing as shown on the drawings. CONTRACTOR shall modify the well base dimensions on the drawings to match supplied head.
 - b. The high pressure bleed-off stuffing box shall be cast iron and rated for 250 psi discharge pressure and shall contain a minimum of five acrylic graphite packing

rings and shall have a grease chamber. The packing gland shall be bronze secured in place with stainless steel studs and adjusting nuts. The stuffing box bearing shall be C-844 bronze. A rubber slinger shall be installed on the top shaft above the packing gland. The top shaft shall be 416 S.S. and shall extend through the stuffing box.

- c. Discharge head shall be equipped with a connection for a 1" prelube pipe and solenoid valve (120 VAC), as shown on drawings and provisions for chemical injection.
 - d. The top line shaft (head shaft) shall be of ASTM A582 Grade 416 Stainless Steel and shall not exceed 10 feet in length. Impeller adjustment shall be provided at the top of the head shaft by means of a bronze adjusting nut of ASTM B 584 alloy C876/C903 which shall be positively locked in position.
 - e. A lifting soleplate shall be supplied and installed, if required by the pump manufacturer.
 - f. The pump manufacturer shall include the method of adjusting the pump impellers at the top of the head shaft.
 - g. CONTRACTOR shall be responsible for ensuring that the discharge head is structurally and mechanically adequate for the provided and installed pump configuration.
 - h. Head shall be painted inside and out with an NSF 60 approved epoxy paint conforming to AWWA C210 and D102. OWNER shall select the color.
3. Column Assembly
- a. The line shaft for the well shall be of A582 Grade 416 Stainless Steel (118,000 psi min.). They shall be furnished in interchangeable sections not over 10 feet in length.
 - b. The butting faces shall be machined square to the axis of the shaft, with maximum permissible axial misalignment of the thread axis with the shaft axis 0.002" in 6". The size of the shaft shall be no less than that determined by ANSI/AWWA E103 Specifications, Section 4.4.2.2 - Line Shaft, for C1045 line shaft, adjusted for A582 Grade 416 Stainless Steel material, and shall be such that elongation due to hydraulic thrust will not exceed the axial clearance of the impellers in the pump bowls. Maximum runout in 10-feet shall not exceed 0.005-inches.
 - c. The line shaft bearing shall be of 70 minimum shore hardness, neoprene, snap-in type, internally spiral grooved to flush out sand and other abrasives and mounted in CDA -836 Bronze bearing retainers held in position in the column coupling by means of the butted ends of the column pipe. Bearing spacing shall not exceed 10 feet.
 - d. The outer column piping shall be of ASTM A53 Grade B Standard Wall steel pipe in interchangeable sections not over 10 feet in length with the ends of each section faced parallel and machined with 8 straight threads per inch permitting the ends to butt and ensuring alignment when connected by standard mill steel couplings. The weight of the column pipe shall be no less than that stated in ANSI E 103, Section E.3 Table E.1, "Diameters and Weights of Standard Discharge Column Pipe Sizes". Top and bottom sections of column pipe shall not exceed 5-feet in length.
 - e. CONTRACTOR shall be responsible for ensuring that the column piping is structurally and mechanically adequate for the provided and installed pump configuration.

- f.
- 4. Pump Bowl Assembly
 - a. Pump bowl castings shall be of close-grained cast iron ASTM A48 Class 30 or ASTM A536 ductile iron Class 60-40-18 where required to meet the hydrostatic pressure criteria listed below. The water passages shall be free of blowholes, sand holes, and other detrimental defects, shall be lined with porcelain enamel, and shall be accurately machined and fitted. The finished bowls shall be capable of withstanding a hydrostatic pressure equal to twice the head at rated capacity or equal to or greater than the shut-off head, whichever is greater.
 - b. The impellers shall be ASTM B584 alloy C87600 lead free bronze, enclosed type, and shall be statically balanced, and shall be fastened securely to the impeller shaft with 316 stainless steel collets. Impellers shall be adjustable vertically by an external means. Impeller skirt and series case throat area shall be thick enough to allow for machining and wearing at the time of repair. The bowl wear rings and impeller wear rings shall be hardened 17-4 stainless steel with a Rockwell C-Scale Hardness number of 44.
 - c. The pump shaft shall be of A582 Grade 416 Stainless Steel turned, ground and polished. Bearings shall be Morse or Durmax Marine Bearings consisting of sleeve bearings with a Naval Brass outer shell super-bonded to a fluted rubber bearing surface (or approved equal) above and below each impeller. The pump shaft shall have chromed journals at the bearing points. The size of the shaft shall be no less than that determined by ANSI/AWWA Specifications E103.
 - d. The discharge case shall be threaded on the outside for column sizes up to 14 inches and fitted with a cast iron ASTM A48 Class 30 column adaptor of the proper size to connect to the column selected. Likewise, the suction case shall also be threaded on the I.D. and fitted with a cast iron or steel suction adaptor.
- 5. Suction Pipe and Strainer.
 - a. The suction pipe shall not be required.
 - b. A galvanized cone strainer shall be provided having a net inlet area equal to at least four times the suction pipe area. The maximum opening size shall not be more than 75% of the minimum opening of the water passage through the bowl or impeller.

2.2 ANALYSIS

- A. Tests may be conducted with shop motor to facilitate the manufacturing process.
- B. A minimum speed curve shall be plotted on the performance curve, based on the affinity laws and the test data.
- C. All gauges shall be calibrated annually per Hydraulic Institutes and certified calibration data shall be provided. All flow meters and other test instruments shall be calibrated as required by ANSI/HI standards.
- D. In order to ensure that neither harmful nor damaging vibrations occur to the pump structure at any speed within the specified operating range, the following analysis shall be required:
 - 1. Pump manufacturer shall perform a structural frequency analysis of the above ground structural components utilizing a FEA method to ensure that no structural natural frequencies are excited to a degree that would cause measured vibration amplitudes at the top of the discharge head to exceed the requirements of ANSI/HI

- 9.6.4-2009. When deemed necessary by the experience of the manufacturer, the below ground structural components shall also be included in the analysis.
2. The FEA method should include the use of ProE/Mechanica or an equivalent software. All pump assembly components, including the motor, shall be represented as solid elements, and if idealizations are used in place of solid elements, then a complete description of method for the idealization shall be included in the report. The analysis shall also include all modes of interest and pictorially represent each mode shape. Modes of interest are defined as those structural frequencies that exist below 120% of the maximum operating speed. When significant modifications are required to lower the system's natural frequency, the pump structure's stresses and deflections shall also be reviewed. Analysis reports shall conclude acceptable operation at the analyzed operating speeds. The design critical frequency shall be at least 20% above or below the operating range of the pump.
- E. Manufacturer to provide documentation of the analysis ensuring that the specified requirements have been met, and that documentation should be signed and stamped by the professionally licensed engineer who performed the analysis work.
 - F. When measured in the direction of maximum amplitude on the pump and motor bearing housings, shall not exceed limits given in the latest ANSI/HI nomograph for the applicable pump type.

2.3 MOTOR

- A. Pump motor shall be a vertical hollow shaft, premium efficiency, inverter duty, WP1 enclosure, electric motor, and shall be sized as noted in Table 1. Motor shall have a non-reverse ratchet, P-base, squirrel cage induction design. Motor shall have Class B or Class F insulation with temperature rise as specified by NEMA standards for class of insulation used and shall have a 1.15 service factor. The pump motor will be operating in an ambient temperature range of 50° - 110° Fahrenheit.
- B. Pump motors shall be provided with a vibration switch. Switch rating 120 VAC, 2 amps minimum.
- C. Pump motors shall have over temperature protection, which shall consist of a minimum of six RTD's embedded in the motor windings and two RTD's at the two bearings. Wiring to an external junction box shall be provided. RTD's shall be 100- ohm platinum three wire elements.
- D. Thrust bearing shall be chosen to handle the continuous down-thrust as specified by the pump manufacturer with an AFMBA L-10 bearing life of 12,320 hours and an L-50 of 61,600 hours. Provisions shall be made for momentary up-thrust equal to 30% of rated down-thrust.
- E. The motor shall be suitable for across-the-line starting, soft start, be inverter duty, and shall be capable of reduced-voltage starting. It shall also have shaft grounding rings.
- F. The motor rating shall be such that at design it will not be loaded beyond nameplate rating and at no place on the pump curve shall the loading exceed the service factor.

- G. The motor temperature shall be rated no higher than the allowable operating temperature of the motor thrust and radial bearings and in no case shall it exceed the temperature rating of the insulation class used to wind the motor.
- H. The junction box shall be oversized to accommodate wiring connection, and shall be a minimum of 24"H x 18"W x 14"D with 2 - 4" conduit penetrations on the bottom.
- I. Motors connected to VFD's shall have factory installed shaft grounding rings. Supplier shall provide a warranty against VFD-induced bearing damage or failure for the life of the motor. Motor shall also include insulated bearings to prevent circulation and other bearing currents.

2.4 APPURTENANCES

A. Well Monitoring Tube

- 1. The CONTRACTOR shall furnish and install two 1 1/2-inch diameter well monitoring tubes in each well consisting of Schedule 80 PVC pipe. The tubes shall be furnished in sections not over 20 feet in length and shall be joined with flush threaded couplings. The PVC tube shall be joined and banded to the pump column with stainless steel bands at maximum of 10 feet. A minimum of two 1/4-inch diameter vent holes for every 10 feet of length shall be provided throughout the entire length of the monitoring tube. The depth of the monitoring tube shall be as indicated on the drawings. The bottom end shall be capped with a 1/4-inch hole drilled in the end.

B. Well Vent

- 1. The well vent shall consist of galvanized steel 1 inch diameter pipe through the well surface plate extended up to 18" above the bottom plate of the pump discharge head with a 180 degree bend made of two steel ells. The outlet end of the vent pipe shall be covered with No. 14 stainless steel wire mesh securely fastened by a stainless steel band. The lower end of the vent pipe shall be threaded into the well surface plate and provide a water tight seal.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install new pump and motor at the location shown on the drawings and according with manufacturer's recommendations.
- B. All pumps, complete with drive system, in place at the jobsite, shall not exceed acceptable field vibration limits given in the latest revisions of the Hydraulic Institute Standards. All pumps shall be free of static unbalance; shall be free of dynamic unbalance up to the maximum speed of the pump and drive system; shall be free of torsional vibration from 10 percent below the minimum speed to 10 percent above the maximum speed of the pump and drive system; and shall be free of apparent unbalance caused by defective bearings, by close fittings parts which may rub on the rotating parts intermittently, or by loose discs or rotor parts, or unbalanced loads.

- C. The motor/discharge head assembly shall be shimmed with respect to the well casing flange to bring the motor/discharge assembly into optimum alignment with any variations that the pump column and line shaft may exhibit from being truly plumb. Such shims must be structurally sound and securely attached. The water tight seal between the discharge head and the well casing flange must be maintained.

3.2 FIELD TESTS

- A. After installation, the pump shall be given an operating test to demonstrate freedom from mechanical defects, excessive noise, and vibration. The test shall include operating the pump continuously while throttling the discharge as needed. The operating test shall be performed for a minimum of one hour, or as directed by ENGINEER. Pumps with variable speed drives shall be tested at maximum speed, and at the average and minimum speeds listed under the specification for the pumps. A copy of actual test data shall be furnished to ENGINEER.
- B. Tests for acceptable vibration shall be made, at no additional cost to OWNER, in the field on each pump system, which in the opinion of ENGINEER, seem to have excessive vibration. All field tests shall be running tests with the pump pumping the product for which it is intended and each pump system shall be tested separately with no other pumps running. All testing shall be done in the presence of ENGINEER. Amplitude as used in this Specification, shall mean total peak-to-peak displacement. The required test for acceptable vibration will be the measurement of this peak-to-peak displacement and will be performed with an IRD Vibration Meter, Model 306; Bently-Nevada TK-8; or equal.

3.3 DISINFECTING

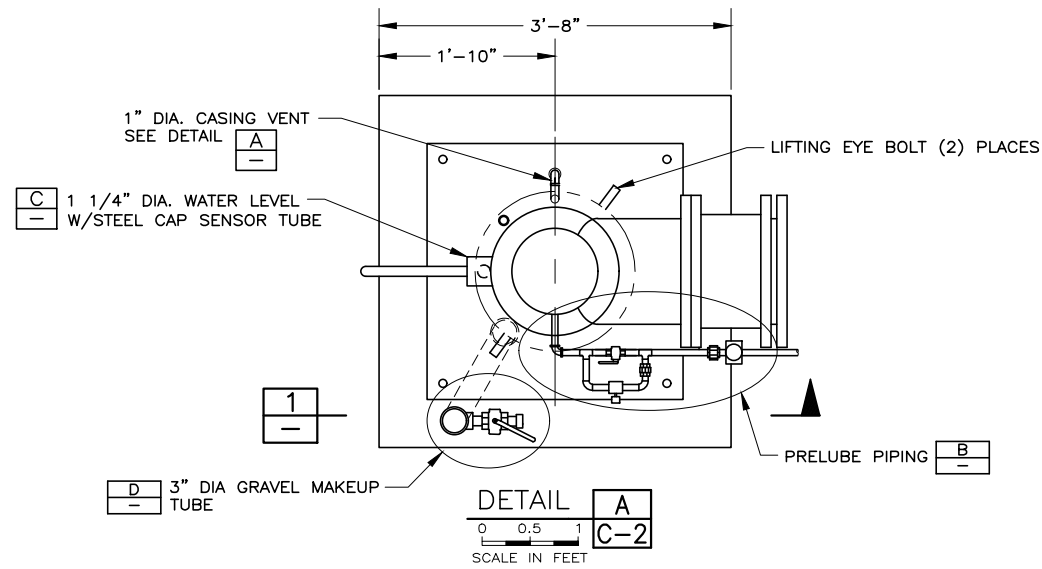
- A. Source of Water
 - 1. The Contractor shall assume all responsibility to obtain the necessary water supplies for disinfection of the pumping system.
- B. Testing Procedure
 - 1. Leakage and pressure testing must be completed, and all leaks repaired prior to disinfection procedures.
 - 2. Pump and related piping installed under this Contract shall be disinfected using an approved disinfection method in accordance with the "American Water Works Association Standard for Disinfecting Water Mains" (AWWA C651) and "American Water Works Association Standard for Disinfecting Wells" (AWWA C654).
 - 3. Heavily chlorinated water shall not be discharged onto the ground. Upon completion of disinfection, Sodium Bisulfate (NaHSO_3) shall be applied to the heavily chlorinated water to neutralize thoroughly the chlorine residual remaining. Water shall be neutralized to less than 1 ppm.
 - 4. After completion of the disinfection, CONTRACTOR shall flush the new system until the chlorine residual is a maximum of 0.3 ppm after which bacteriological test will be performed by OWNER.
 - 5. At the end of 24 hours after the first sample is taken, a second bacteriological test will be performed by OWNER to insure adequate disinfection. If the initial or second disinfection fails to provide satisfactory bacteriological results, or shows the presence

of coliform, then the well line shall be re-chlorinated, flushed, and retested until satisfactory results are obtained at the expense to the Contractor.

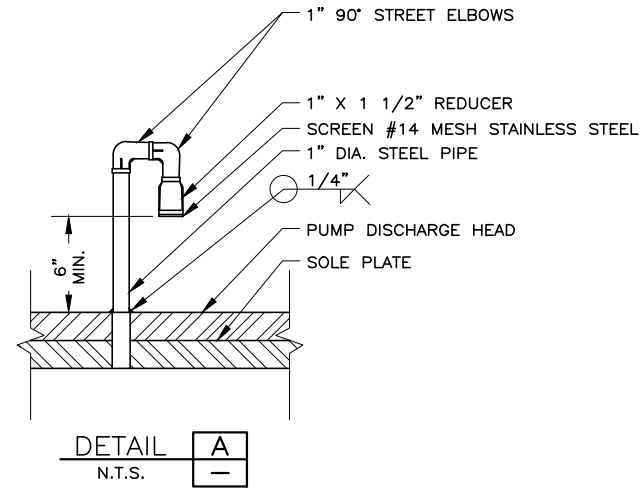
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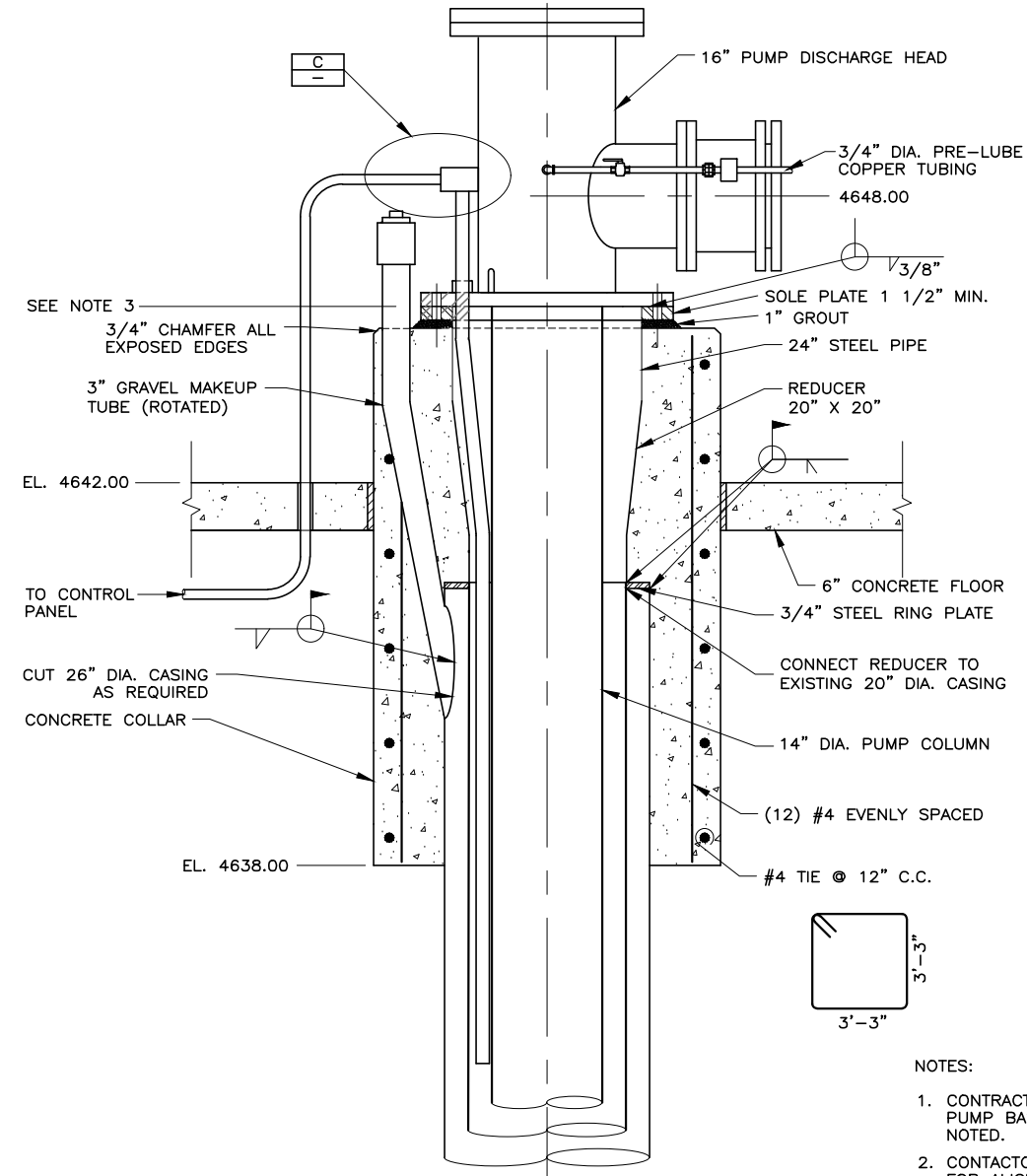
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 FILE DATE: 11.27.2018 07:34:16 (GAR)



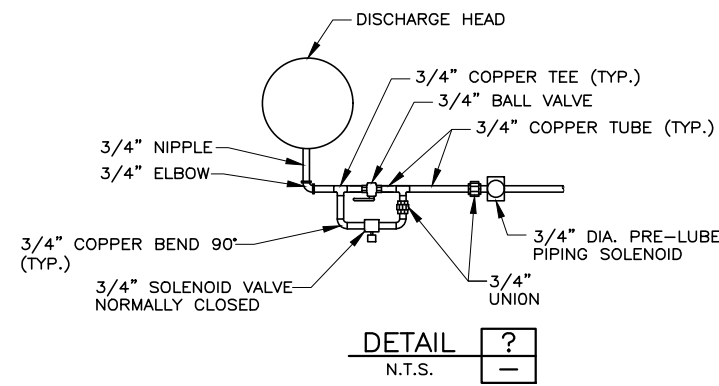
DETAIL A
 SCALE IN FEET



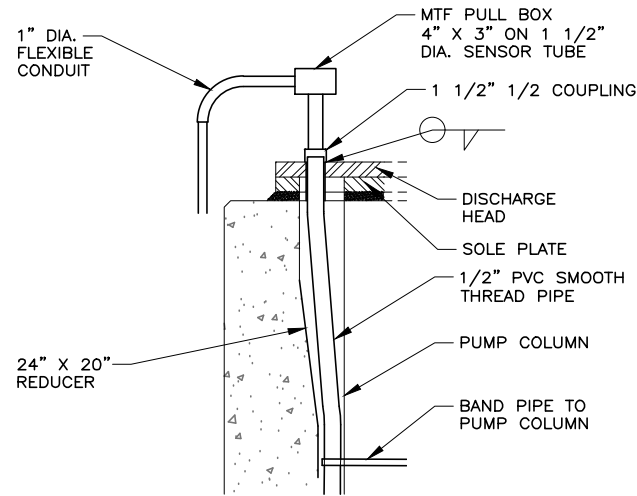
DETAIL A
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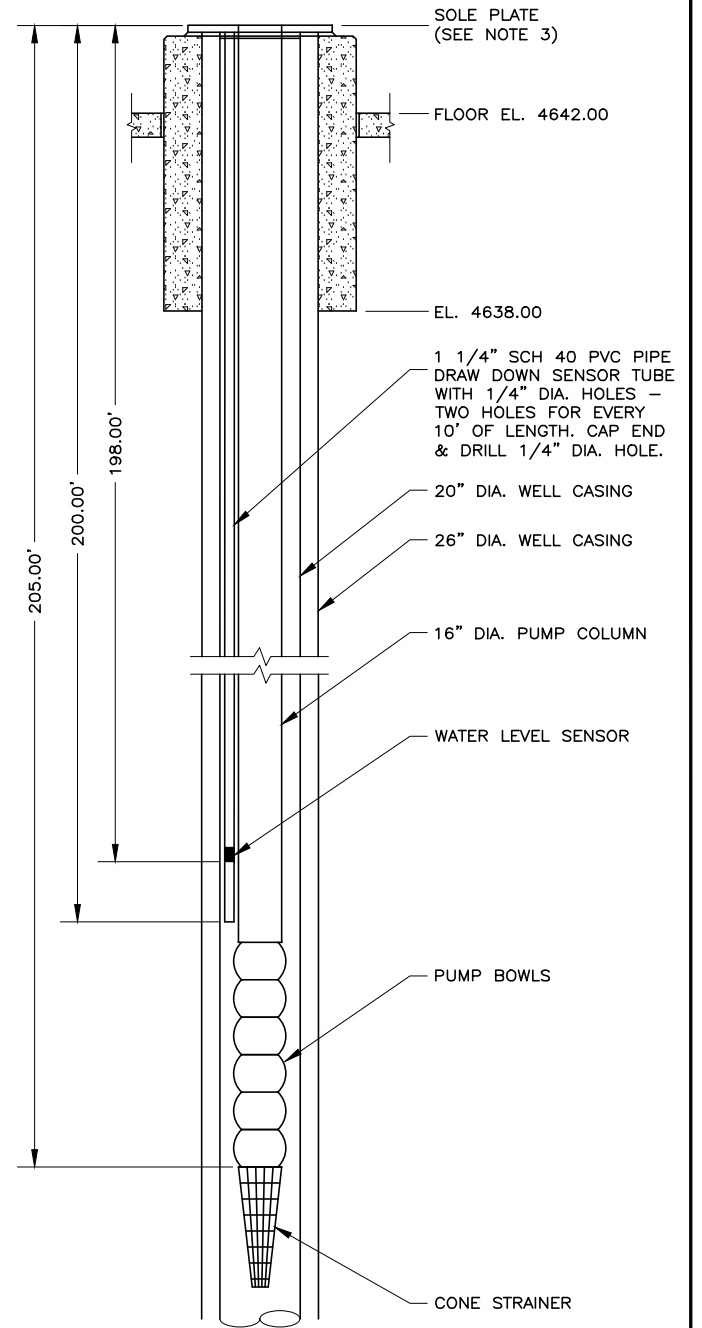
SECTION 1
 SCALE IN FEET



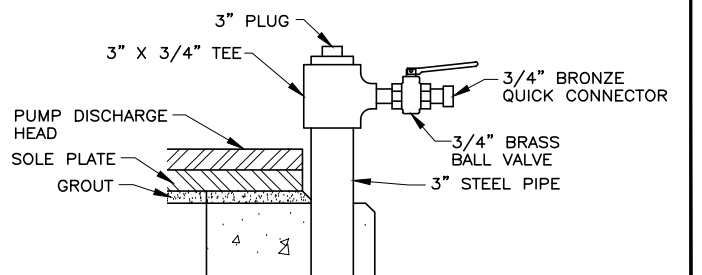
DETAIL ?
 N.T.S.



DETAIL C
 N.T.S.

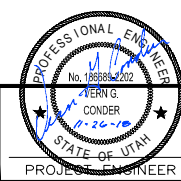


WELL PUMP DETAIL D
 N.T.S.



GRAVEL MAKEUP TUBE DETAIL D
 N.T.S.

- NOTES:
1. CONTRACTOR TO REMOVE EXISTING PUMP BASE & REPLACE AS NOTED.
 2. CONTRACTOR TO SHIM PUMP BASE FOR ALIGNMENT.
 3. ELEVATION OF TOP OF SOLE PLATE TO BE SET BASED ON PROVIDED PUMP DISCHARGE HEAD DIMENSIONS.



DESIGNED	VGC	3
DRAFTED	BKC	2
CHECKED	MEA	1
DATE	NOVEMBER 2018	NO.

NO.	DATE	REVISIONS	BY	APVD.

SCALE
 AS SHOWN

springville PUBLIC WORKS
 110 S. MAIN ST
 SPRINGVILLE, UTAH
 84663

400 SOUTH WELL-NO. 2 WELL HOUSE
 CIVIL
 PUMP BASE & PUMP SETTING DETAILS

SHEET NO.
 C-7
 260-44-200