

Town of Needham  
**Department of Public Works**  
 Public Services Administration Building, 500 Dedham Avenue  
 Needham, Massachusetts 02492  
 Telephone (781) 455-7550

**ACKNOWLEDGEMENT OF RECEIPT**

Release Date	<b>July 2, 2026</b>
Bid Title	<b>Well 1A Pump Replacement</b>
27DPW049G	<b>27DPW049G</b>
Number of Documents	The Bid Package consists of 2 PDF documents. Returning this form confirms receipt of all the documents.
Pre-Bid Meeting	<b>NA</b>
Questions Due	<b>July 14, 2026, at 12:00PM</b>
Bids are Due	<b>July 21, 2026, at 1:00PM to the</b> Administration Office of the Department of Public Works located at the Public Services Administration Building, 500 Dedham Ave., Needham, MA, 02492
<p>Please provide the requested information below as acknowledgment that you have received our bid package noted above. It is <b>recommended</b> that interested bidders complete this <b>acknowledgment and return via email to <a href="mailto:dpwbids@needhamma.gov">dpwbids@needhamma.gov</a></b>. Only by doing this, will the Town be able to provide notification of any addenda or answered questions relating to this bid. <b>Only those companies or individuals shown on the Distribution Register will receive addenda to this bid. By completing and returning this acknowledgement will ensure you are recorded on the Distribution Register.</b> Proposals from companies or individuals <b>not</b> acknowledging the addenda may be <u>rejected</u> as <b>not responsive</b>.</p>	
Name of Company or Individual	
Name / Title of Contact	
Address	
City/Town, State, Zip Code	
Telephone Number	
Fax Number	
Email Address	
Signature	
Date	
<p>Addenda will be posted to the Town's website. Please check the website for addenda before submitting your bid to the Town. Bidders who access the bid package from the Town's website are responsible for checking the website periodically for any addenda that may be issued by the Town.</p>	

**Well 1A Pump Replacement  
27DPW049G**



Release Date	<b>July 2, 2026</b>
Pre-Bid Conference	<b>NA</b>
Deadline for Questions	<b>July 14, 2026, at 12:00PM</b> to <a href="mailto:dwpbids@needhamma.gov">dwpbids@needhamma.gov</a>
Bids Due	<b>July 21, 2026 at 1:00PM</b> at the Administration Office of the Public Works Department, 500 Dedham Ave., Needham, MA 02492

**(Advertised in the Hometown Weekly issue of Thursday, July 2, 2026)**  
**(Advertised on the MNPA's website, Thursday, July 2, 2026)**  
**(Published in Good and Services issue of Monday, June 29, 2026 )**  
**(Advertised in CommBuys on Thursday, July 2, 2026)**

**LEGAL NOTICE**

**Town of Needham**  
**Invitation for Bid (IFB)**  
**Bid # 27DPW049G**  
**Well 1A Pump Replacement**

The Town of Needham is accepting sealed bids for a **Well 1A Pump Replacement**. Copies of the Invitation for Bid (IFB) package will be available beginning **July 2, 2026**, at the Administration Office of the Public Works Department, 500 Dedham Ave., Needham, MA 02492 during normal business hours, or from the Town's web site [www.needhamma.gov/bids.aspx](http://www.needhamma.gov/bids.aspx) and will be available until submission deadline.

Sealed bids must be submitted no later than **July 21, 2026, at 1:00PM** to the Administration Office of the Public Works Department, Town of Needham, 500 Dedham Ave., Needham, MA 02492. LATE BIDS WILL NOT BE CONSIDERED. Bids will be publicly opened after submission deadline. The Town reserves the right to reject any and all bids as determined to be in the best interests of the Town and to waive minor informalities.

**Kathleen King**  
**Town Manager**  
**July 2, 2026**

**IFB  
Well 1A Pump Replacement  
Index**

<b>Description</b>	<b>Page</b>
Acknowledgement of Receipt	<b>1</b>
Title Page	<b>2</b>
Legal Notice	<b>3</b>
Index	<b>4</b>
Procurement in Brief	<b>5</b>
<b>PART 1 – GENERAL CONDITIONS AND REQUIREMENTS</b>	<b>6</b>
<ol style="list-style-type: none"> <li>1. About Needham</li> <li>2. Intent</li> <li>3. Quantities</li> <li>4. General Contract Terms</li> <li>5. Questions</li> <li>6. Information about Changes to the Bid (Addenda)</li> <li>7. Bid Deposits and Bonds</li> <li>8. Minimum Wage Rates (Prevailing Wages)</li> <li>9. Payment and Discount Terms, Adjustments for Incomplete or Unacceptable Work</li> <li>10. Bid Modifications or Withdrawals</li> <li>11. Premature Opening of a Bid</li> <li>12. Unexpected Closure or Delays</li> <li>13. Late Submissions</li> <li>14. Rejection of Bids</li> <li>15. Taxes</li> <li>16. Public Records</li> <li>17. Conflict of Interest</li> <li>18. Other Notices</li> <li>19. Pre-Bid Conference</li> <li>20. Tie Breaker Rule</li> <li>21. Contract Award</li> <li>22. Submission Requirements</li> </ol>	
<b>PART 2 – SCOPE OF SERVICES / PRODUCT SPECIFICATIONS</b>	<b>14</b>
<b>PART 3 – CHECKLIST AND REQUIRED FORMS FOR SUBMISSION</b>	<b>17</b>
<ol style="list-style-type: none"> <li>1. Checklist</li> <li>2. Bidder Information Response</li> <li>3. Certificate of Good Faith</li> <li>4. Certificate of Compliance with Massachusetts Tax Laws</li> <li>5. Certificate of Authority</li> <li>6. Professional Reference Form</li> <li>7. Non-Submittal Response Form</li> <li>8. Bid Price Form</li> </ol>	
Appendices <ul style="list-style-type: none"> <li>• Specimen Agreement</li> </ul>	<b>Separate Document</b>

**IFB  
Well 1A Pump Replacement  
Procurement in Brief**

Primary Procurement Contact	<b>Katie Bamber, Administrative Analyst 781-455-7550 x72229</b>
Contract Manager	<b>Michael Retzky: Superintendent Water, Sewer &amp; Drain Division</b>
Bid Package Available	<b>July 2, 2026</b> - Information and details of bidding requirements may be obtained at the Administration Office DPW, PSAB, 500 Dedham Ave., Needham, MA 02492, or online at the Town's web site <a href="http://www.needhamma.gov/bids.aspx">http://www.needhamma.gov/bids.aspx</a>
Pre-Bid Meeting	<b>NA</b>
Bid Deposit	<b>Not Required.</b>
Deadline for Written Questions	<b>July 14, 2026 at 12:00PM</b> By Mail: DPW - 500 Dedham Ave., Needham, MA 02492 By Email: <a href="mailto:dpwbids@needhamma.gov">dpwbids@needhamma.gov</a> <b>Questions are to be clearly labeled as: QUESTIONS - Well 1A Pump Replacement, 27DPW049G</b>
Addenda	If any changes are made to this bid, an addendum will be issued. Addenda will be posted on the Town's webpage and emailed to all bidders on record as having received the bid package.
When and where bids are due	<b>1:00PM July 21, 2026, Administration Office DPW, PSAB, 500 Dedham Ave. Needham, MA 02492.</b>  <b>LATE BIDS WILL NOT BE CONSIDERED</b>
Where bids will be opened	<b>Charles River Room, PSAB, 500 Dedham Ave., Needham, MA, 02492, after submission deadline</b>
Number of Required Paper Copies	<b>1 copy</b>
Contract Award	<b>Anticipated July 2026</b> Approval of Town Manager and Town Counsel is REQUIRED
Contract Length	<b>This agreement will start upon execution and expire December 31, 2026.</b>

<b>Upon Award of Contract</b>	
Payment Bond	Will NOT be Required
Performance Bond	Will NOT be Required
Insurance	Refer to Contract Terms
<p>* Any delivery received after the due date and time will not be addressed. The time/date stamp located in the receiving office will govern for the date and time requirements mentioned in the table above and throughout this document. Please allow enough time for delivery.</p> <p>** The time for award may be extended by the Town. The Town reserves the right to change, delay, cancel, or expedite the contract award date. The Bidder agrees that the offer is effective for (a) at least ninety (90) calendar days from the opening date of the bids (b) a contract is executed, or (c) this bid is cancelled, whichever of (a), (b) or (C) occurs first. The Town reserves the right to reject any and all bids as determined to be in the best interests of the Town and to waive minor informalities.</p>	

## **PART 1 – GENERAL CONDITIONS AND SUBMISSION REQUIREMENTS**

### **1.01 About Needham**

The Town of Needham is located in Norfolk County, 10 miles southwest of Boston. It is bordered on the west and northwest by the Town of Wellesley, on the north and northeast by the City of Newton, on the east by the West Roxbury section of the City of Boston, on the southeast by the Town of Dedham, and on the south by the Towns of Westwood and Dover. Needham has a population of 28,886 (2010 Federal Census) and occupies a land area of approximately 12.75 square miles. Established as a town in 1711, Needham is governed by a representative form of town meeting and a five-member Board of Selectmen. The day-to-day management is under the direction of a Town Manager. School affairs are administered by a seven-member School Committee and a Superintendent of Schools. The Town is classified as an economically developed suburb with above average wealth levels and higher education attainment. The Town has an "AAA" credit rating from Standard and Poor's.

The Town provides a full range of governmental services including police and fire protection, emergency medical services, collection, disposal, and recycling of solid waste, sewers, streets, water services, health and human services, town library, and recreation. The Town also provides public education in grades kindergarten through twelve. The Town operates 1 pre-school, 5 elementary schools (K – 5), 1 sixth-grade center, 1 middle school (7 - 8), and a senior high school (9 – 12). Technical education is offered to grades nine through twelve by the Minuteman Regional Vocational Technical School District. The total expenditures in the most recent fiscal year exceeded \$160 million.

### **1.02 Intent**

The Town of Needham is circulating this Invitation for Bids (IFB) with the intention of acquiring bids for Well 1A Pump Replacement. All bids are subject to the provisions of M.G.L. Chapter 30B. The Town will award the contract to the lowest responsive and responsible bidder. The Town of Needham reserves the right to reject any and all bids as determined to be in the best interests of the Town and to waive minor informalities. Such actions will be deemed to be in the best interests of the Town. Unless sooner rejected or accepted, all bid proposals must be firm and continue in effect for ninety calendar days (90) following the date of bid opening.

The intention of this IFB is to supply and deliver the equipment as specified.

### **1.03 Quantities**

Unless otherwise stated, the quantities set forth herein are ESTIMATES ONLY. Any quantities indicated on the Bid Price Form or elsewhere in the bid package are estimates only and are given solely as a basis for the comparison of bids. The Vendor shall have no claim for additional compensation, or refuse to do the work called for, or provide the requested items, by reason of the actual quantities involved being greater or lesser by any amount than those called for in the bid.

### **1.04 General Contract Terms**

The successful Bidder must enter into the Form Agreement prepared by Town Counsel (Sample Available Online). In accordance with Massachusetts General Laws, the contract continuation beyond first year is subject to annual appropriation and/or availability of funding.

The Town may terminate the Contract at any time upon written notice for any reason including its own convenience or for cause, including but not limited to, failure to perform the work required under the contract, failure to document satisfactorily to the Town amounts being charged, failure to have any necessary local, State or Federal licenses and/or permits, failure to pay any and all required taxes, failure to comply with any local, State or Federal regulations pertaining to services to be provided, failure to promptly correct any performance or lack of performance which conflicts with the Town's use, and failure for satisfactory behavior of all staff and management. In the case of a termination for cause, the Town shall give the Contractor a written notice as provided in the Agreement.

## 1.05 Questions Regarding Bid

The Bidder shall be satisfied as to the requirements to enable intelligent preparation of your bid. The Bidder shall be familiar with all the Bid material requirements and documents before submitting the bid in order that no misunderstanding shall exist. Bidders shall promptly raise the issue of any ambiguity, inconsistency or error, which they may discover upon examination of the bid documents, specifications, services, work site or any other conditions which may apply. No allowance will be made for any claim that the bid is based on incomplete information.

Inquiries concerning any part of this Bid shall be directed to the individual(s) listed under the **Procurement in Brief**. Bidders should note that **oral communications are not binding on the Town and only written responses by the Town will be considered**. All requests/questions must be submitted in writing. Questions may be delivered by hand, fax or email as referenced under the **Procurement in Brief** by the deadline. Questions that may be asked during any pre-bid conference should also be sent in writing in order to receive an official response. Requests properly presented that in the opinion of the Town require interpretation, correction, or change in the Bid Documents will result in an issuance of an Addendum to the Bid Documents. Such Addendum shall subsequently become part of the contract. The Town will forward responses to all persons who are on record as receiving the bid package. Questions received after the due date will not be responded to unless the Town determines it is necessary. Bidders, please allow enough time for hand delivery.

## 1.06 Information about Changes to the Bid (Addenda)

In the event that changes/additions are made to this bid, an addendum will be issued to every person (entity) on record as receiving the bid package. Addenda will be emailed, if an email address was not provided, then it will be faxed. If a fax number was not provided, then the addenda will be mailed. **Addenda will also be posted to the website**. Please check back on the website for addendums before submitting your bid to the Town. Bidders may not be notified individually of Addendums.

## 1.07 Bid Deposits, Bonds, Insurance, and Indemnification

Refer to the Procurement in Brief section to see whether bid deposits, surety, payment and/or performance bonds are required.

### 1.07.01 Bid Bond – **NOT REQUIRED**

If a bid deposit is required, it must be made payable to the TOWN OF NEEDHAM in the form of a bid bond, or cash, or a certified check or a treasurer's check issued by, a responsible bank or trust company. A bid bond shall be (a) with a surety company qualified to do business in the Commonwealth of Massachusetts and satisfactory to the Town, and (b) conditioned upon the faithful performance by the principal of the agreements contained in the bid. The bid deposit shall be in the amount specified in the request for Bids. Bid deposits of the three (3) lowest bidders will be returned upon the issuance of the contract or bid is cancelled whichever is later. Bid deposits of all other bidders will be returned within 15 days of the bid opening date.

### 1.07.02 Payment Bond – **NOT REQUIRED**

- a) The contractor shall furnish a payment bond from a surety company qualified to do business under the laws of the Commonwealth of Massachusetts and satisfactory to the Town, in an amount of one half of the total contract price for payment for labor performed or furnished and materials used or employed therein, when the contract is executed.
- b) It is distinctly agreed and understood that any changes made in the specifications for this work, whether such changes increase or decrease the amount of work required, or any change in the manner or time of payments made by the Town to the contractor, shall in no way void, release or affect the liability and surety on the bond given by the contractor.

### 1.07.03 Performance Bond – **NOT REQUIRED**

In accordance with Massachusetts General Laws Chapter 149, Section 44E, prior to execution of a contract pursuant to this section, the CONTRACTOR shall furnish to the OWNER payment bond and a performance bond of a surety company qualified to issue bonds in the Commonwealth and satisfactory to the OWNER each in the sum of the contract price. The performance bond shall remain in full force and effect for at least one year after the project's completion, and longer if required covering guarantees and/or pending claims. OR In accordance with Massachusetts General Laws Chapter 149, Section 29, prior to execution of a contract pursuant to this section, the CONTRACTOR shall furnish to the OWNER a payment bond of a surety company qualified to issue bonds in the Commonwealth and satisfactory to the OWNER in the sum of at least one half the contract price. OR Prior to execution of a contract, the CONTRACTOR shall furnish to the OWNER such payment bond and a performance bond of a surety company qualified to issue bonds in the Commonwealth and satisfactory to the OWNER in the amounts requested by the OWNER in the bid specifications. Any performance bond shall remain in full force and effect for at least one year after the project's completion, and longer if required covering guarantees and/or pending claims.

#### Insurance

Bidder awarded a contract under this bid must provide proof of insurances in at least the minimum amounts required in the contract and when requested shall name the Town of Needham as an additional insured for the amounts written.

The Bidder awarded a contract shall deposit with the Town Certificates of Insurance for the coverage required, in form and substance satisfactory to the Town, and shall deliver to the Town new policies and certificates thereof for any insurance about to expire at least ten (10) days before such expiration. All such insurance policies shall contain an endorsement requiring thirty (30) days written notice to the Town prior to cancellation of change in coverage, scope or amount of any such policy or policies. Compliance by the Bidder with the insurance requirement, however, shall not relieve the Bidder from liability under the indemnity provisions.

#### Indemnification

The Bidder shall indemnify, defend, and save harmless the Town and all of the Town's officers, agents and employees from and against all suits and claims of liability of every name and nature, including costs of defending any action, for or on account of any injuries to persons or damage to property of the Town or any person, Contractor, corporation or association arising out of or resulting from any negligent act, omission, or negligence of the Bidder, its subcontractors and its and their agents or employees in the performance of the work covered by the Contract and/or failure to comply with terms and conditions of the Contract, but only in respect of such injuries or damages sustained during the performance and prior to the completion and acceptance of the work covered by the Contract and to the extent such injuries or damages are not covered by the Town's insurance. The foregoing provisions shall not be deemed to be released, waived or modified in any respect by reason of any surety or insurance provided by the Bidder under the Contract.

### **1.08 Prevailing Wages**

The state prevailing wage law, MGL Chapter 149, Section 27B requires contractors and subcontractors to submit certified payroll records to the Town. Contractors and subcontractors must submit weekly payroll records either by (1) first class mail, or (2) electronic mail. Furthermore, every weekly submittal of payroll records must contain a signed statement by the employer that indicates (1) that the records are correct, and (2) the rate of wages that each worker receives. Please feel free to contact the Department of Labor Standards at (617) 626-6953 if you have any questions. Questions about enforcement of the prevailing wage law may be directed to the Attorney General's Fair Labor and Business Practices Division at (617) 727-3465.

## **1.09 Payment and Discount Terms, Adjustments for Incomplete or Unacceptable Work**

### Payment and Discount Terms

Payment terms for the Town of Needham are net 30 days. Indicate discounts, if any, for payments made less than 30 days. The Prompt Payment Discount "Clock" begins at the date of receipt of the invoice, or the date of the receipt of the product or service, whichever occurs later.

The unit bid price shall be the basis for payment for purchased items or services. Payment shall be based on the items or services purchased. Invoicing may be performed after delivery, work has been completed, or monthly, for items or services that have been fulfilled.

Invoices are to itemize charges for labor, equipment, and supplies. The Town will not be responsible for payment of any charges not itemized to the Town's satisfaction. Pre-payment is NOT allowed. Invoices must include the Town's purchase order number. The Purchase Order number will change with each fiscal year.

Invoices for additional services must include the date and times of the work, the type of the services performed, the number of hours or units to be charged, and the name of the person who authorized the work. They are to be sent in duplicate directly to the Town's designee for processing and are not to be included on the regular monthly invoice.

### Adjustments for Incomplete or Unacceptable Work

The Town reserves the right to withhold payment for incomplete or unacceptable work, as outlined in this IFB. The Town shall provide notice of any work that is deemed to be incomplete or unacceptable, for which the Vendor shall rectify that condition to the satisfaction of Town. The Town will also reduce the bill for any services deemed unsatisfactory. At no time will penalty assessment be recoverable by the Vendor.

The Vendor shall take all proper precautions to protect Town and private property from damage and/or loss. Should any damage to, and/or loss of, property be caused by the Vendor, the Vendor will be required to make repairs and/or restitution immediately at its expense.

## **1.10 Bid Modifications or Withdrawals**

Bids may be corrected, modified, or withdrawn prior to the submission deadline; requests to do so must be received in writing to the Town Manager. After the submission deadline, bids may not be changed. Minor mistakes may be waived by the Town.

## **1.11 Premature Opening of a Bid**

The Town will not be responsible for the premature opening of any bid not properly identified. The Town may reject bids which are incomplete, not properly endorsed, or signed, or which otherwise are contrary to these instructions.

## **1.12 Unexpected Closure or Delays**

If, at the time of the scheduled bid submission deadline, the designated location for delivery of the bid is closed due to uncontrolled events such as fire, snow, ice, wind, building evacuation or other the deadline will be postponed until **the same time** on the next normal business day. Bids will be accepted at the same location until that date and time.

## **1.13 Late Submissions**

The Town assumes no responsibility for late submissions due to mail, courier, or delivery problems. LATE BIDS WILL NOT BE CONSIDERED.

#### **1.14 Rejection of Bids**

The bid must satisfy all the requirements in order to be considered for award. Failure to complete the required forms, answer any questions, or provide the required documentation will be deemed NON-RESPONSIVE and result in rejection of the bid unless the Town determines that such failure constitutes a minor informality that can be corrected without prejudice to other Bidders. A bid may be rejected if the Bidder:

- Fails to adhere to one or more of the provisions established in the bid package;
- Fails to submit its bid by the time or in the format specified herein or to supply the minimum information requested herein;
- Fails to submit its bid to the required address on or before the specified submission deadline;
- Misrepresents its service or provides demonstrably false information in its bid, or fails to provide material information.

#### **1.15 Taxes**

Purchases made by the Town are exempt from the payment of all Federal excise tax and the payment of Commonwealth of Massachusetts sales tax and any such taxes must not be included in the bid prices. If requested, the Town will provide the awarded bidder with a copy of the Certificate of Exemption.

#### **1.16 Public Records**

Under the Massachusetts General Laws, the Town cannot assure the confidentiality of any materials or information that may be submitted by a contractor in response to this Bid. Thus, contractors who choose to submit confidential information do so at their own risk. All bids or other materials submitted by the contractor in response to this Bid will be open for inspection by any person and in accordance with Massachusetts General Laws, Chapter 66 (Public Records Law). Any statements reserving any confidentiality or privacy rights in the submitted responses or otherwise inconsistent with these statutes will be void and disregarded.

#### **1.17 Conflict of Interest**

By execution of a contract with the Town of Needham, the Bidder acknowledges that the Town of Needham is a municipality for the purposes of Massachusetts General Laws, Chapter 268A (the Massachusetts conflict of interest statute), and agrees, as circumstances require, to take actions and to forbear from taking actions so as to be in compliance at all times with the obligations of the contractor based on said statute.

#### **1.18 Other Notices**

The consideration of all bids and subsequent selection of the successful applicant shall be made without regard to race, color, sex, age, handicap, religion, political affiliation or national origin.

The Bidder shall adhere to the provisions of the Fair Employment Practices Law of the Commonwealth (Massachusetts General Laws, Chapter 151B).

The provisions relating to non-discrimination and affirmative action in employment shall flow through all contracts and subcontracts that the successful Bidder may receive or award as a result of this contract.

Any services provided by the Bidder shall be rendered through a professional services contract; the Bidder will not be considered an employee of the Town and will not receive any benefits of an employee.

The Bidder shall comply with Massachusetts General Laws, Chapter 66A if the Bidder becomes a "holder" of "personal data". The Bidder shall also protect the physical security and restrict any access to personal or other Town data in the Bidder's possession, or used by the Bidder in the performance of the Contract, which shall include, but is not limited to the Town's public records, documents, files, software, equipment or systems.

### **1.19 Pre-Bid Conference**

Refer to Procurement in Brief for details, if any.

### **1.20 Tie Bid**

In the event that there is a **tie bid** between two (2) responsive and responsible bidders, the award of the contract will be determined by a coin toss. The bidder's whose submission was received earliest shall be assigned "Heads" in the coin toss. In the event that there is a **tie bid** with three (3) or more responsive and responsible bidders, the award shall be made by a draw by lot limited to those bidders. The coin toss/draw by lot shall be scheduled within two (2) business days from when it was determined by the Town to be a tie bid. The bidders involved shall be given an opportunity to attend. The coin toss/drawing shall be witnessed by at least three (3) Town officials. The tie breaker event shall be held at the Needham Town Hall during regular business hours.

### **1.21 Contract Award**

**The Town reserves the right to reject any and all bids as determined to be in the best interests of the Town and to waive minor informalities.**

The Town will review all bids and will award the contract to the lowest responsible and eligible bidder based upon the total bid price, including any selected add alternates.

The Town herein declares its express purpose not to award the contract to any Bidder unable to furnish evidence, satisfactory to the Town, that it has sufficient ability, experience, and capital to execute and complete the work in accordance with the contract. If requested, any Bidder may be required to demonstrate financial stability satisfactory to the Town.

The Town Manager is the awarding authority for the contract. Further the contract will not be binding until it has been approved as to form by Town Counsel. Award, payment and performance obligations shall depend on the availability and appropriation of funds.

The Town reserves a period up to ninety (90) calendar days following the opening of the bids in which to evaluate and award the contract.

Upon bidder selection, the Town of Needham will mail or email the contract to be executed by the Bidder, who will returned the required number of copies with the required insurances and bonds. The Town of Needham will then counter-sign the contracts and will return one complete contract to the Bidder. Unless otherwise noted by the Town, the terms and conditions contained therein are **NOT** negotiable.

### **1.22 Submission Requirements**

#### **Quality Requirements**

- ✓ **All bidders must furnish proof of a minimum of three (3) continuous years in business.**
- ✓ **All bidders must provide owner contact information for five (5) projects of similar nature and scope completed within the last five (5) years.**
- ✓ The bidder shall submit their proposal upon the bid forms supplied within these specifications. The bidder shall specify the unit prices as requested for each bid item. All bids shall be signed correctly with ink; in order to qualify, the bidder must provide bids for each required item within a section.

## **Submission Requirements**

1. The bid is to be submitted and addressed as follows: Director of Administration, PSAB, 500 Dedham Ave., Needham, MA 02492.
2. The bid is to be clearly marked: IFB 27DPW049G, Well 1A Pump Replacement.
3. Bidder must acknowledge all addenda related to this IFB, if any.
4. Bidder must submit a completed **Bid Form A: Bid Form** or an exact copy, signed by an individual authorized to negotiate for and contractually bind the Bidder. All prices must be reflective of all costs for delivery. No price adjustments will be allowed. Fuel surcharges or vehicle surcharges or adjustments will not be allowed.
5. Bidder must submit a completed **Bid Form B: Bidder Information Response** form.
6. Bidder must submit a completed **Bid Form C: Authentication Form**.
7. Bidder must submit a signed **Bid Form D: Certificate of Good Faith**.
8. Bidder must submit a completed **Bid Form E: Certificate of Compliance with Massachusetts Tax Laws** or Certificate of Good Standing issued by the Massachusetts Department of Revenue.
9. Bidder must provide the required number of references. For each, provide the following: a contact person and title, customer's name, address, telephone number, email, and a brief description of the actual services provided (sample format included in bid package).
10. Bidder must submit a completed **Bid Form F: Certificate of Authority** (attached) or **Corporate Resolution**; if applicable.
11. Bids must be received and time stamped no later than the deadline stated in the **Procurement Schedule** (Where and When Bids are Due). LATE BIDS WILL NOT BE CONSIDERED.
12. A **Bid Deposit** is **NOT** required.
13. Delivery will be at the expense of the Bidder. Any and all damages that may occur due to packaging or shipping will be at the sole responsibility of the Bidder.
14. Any additional requirements as required in the Scope of Service.

**The Town reserves the right to reject any and all bids as determined to be in the best interests of the Town and to waive minor informalities.**

## **PART 2 – SCOPE OF WORK**

### **2.01 General**

Under these specifications, it is intended that the CONTRACTOR shall furnish equipment for the replacement of the submersible pump, motor, VFD, and harmonic filter in Well 1A, including thermal heat sensor. All equipment will be owned by the Town and installed by on-call contractors. All information which the BIDDER may require may be secured by means of a personal site visit to the Charles River water treatment facility. Arrangement for such a visit may be made by contacting the Water Treatment Facility Manager.

### **2.02 Hours of Work**

Normal hours of work shall be between the hours of 7:00 am and 3:30 pm, Monday through Friday, unless otherwise specified. No work shall be performed on Saturdays, Sundays, Holidays, or any other times other than normal hours of work without express permission from the Director of Public Works or his designee. All work in this contract will be identified by the Director of Public Works and shall be constructed in accordance to Town Specification or as directed by the Director.

### **2.03 Response Time**

The contractor must designate an employee or contact with the authority to speak on behalf of the contractor for initiating requests for service. The Town will select a designee or designees to initiate work on behalf of the Town.

A request for service will be generated in writing (including email, mail, and fax) for work as scheduled. For emergency work, the first point of contact may be a phone call with a follow up written request.

Contractor must respond to emergency calls within two (2) hours after receipt of notification. Contractor must respond to on-call immediate response calls within forty-eight (48) hours after receipt of notification. Contractor must respond to scheduled work within forty-eight (48) hours after receipt of notification and schedule work to be completed within two (2) weeks.

Failure to meet these obligations may subject the contractor to penalties of \$500 per business day for noncompliance. Failure to meet these objectives may subject the contractor to loss of contract and the contractor may assess the difference between their bid price and the next lowest responsible and eligible bidder.

### **2.04 Supervision**

The contractor shall designate a project supervisor in writing upon a receipt of awarded contract. Any change in supervision shall require the prior approval in writing of the Director of Public Works or his designee. Failure of the contractor complying with this requirement may result in the Town, after one written warning, and at its sole option, charging a penalty of \$200 per day until an approved project supervisor is on site. The project supervisor shall be present at each project during the execution of work. Once project has begun, the contractor shall pursue and coordinate all work in a continuous and diligent manner until all work is completed, unless otherwise directed by the Director of Public Works or his designee. The contractor shall employ a minimum of 2 competent workers on site daily. Failure to comply with this requirement may result in a penalty of \$200 per business day of noncompliance as determined by the Director of Public Works.

## 2.05 Specifications

### Bid Item A – Furnish Submersible Pump and Motor for Well 1A

1. The contractor shall furnish and deliver at the site all specified equipment. Furnish submersible turbine pumps with the appropriate accessories as specified herein. Motor shall be compatible with and operated by a variable frequency drive (VFD) to be furnished under this contract. Coordinate with the existing piping and pitless adapter.
2. Basis of Payment: Equipment shall be paid for at the unit price per stated in the Bid Schedule Said unit price shall be full compensation for all equipment and necessary to complete this work in accordance with State regulations; and for all other work and expenses incidental thereto for which payment is not provided under other items.
3. Quality assurance:
  - a. Submersible vertical turbine pumps shall meet the requirements of AWWA Standard E102-17. All components in contact with potable water, or water being processed to become potable water, shall be compliant with NSF 61 and shall be constructed of "Lead-free" material in compliance with NSF 372.
  - b. Acceptable Manufacturers:
    - i. Flowserve
    - ii. Goulds
    - iii. Sulzer
    - iv. Or equal.
  - c. All pumps, motors and accessories form an integrated system and as such shall be furnished by one supplier, regardless of manufacture and be responsible to the Contractor for the satisfactory operation of the entire system.
  - d. All the equipment shall be of the manufacturer's latest and proven design.
  - e. Pumping units furnished shall be complete in all particulars and ready for final assembly, installation, and operation.
4. Submittals:
  - a. Submit shop drawings, manufacturers' literature, maintenance data, operating instructions, and a list of spare parts and maintenance materials.
  - b. Submit Testing Submittals
    - i. Factory Certified Testing: All pumps shall be tested with a Standard Running Test as defined in the American Standard for Vertical Turbine Pumps (ANSI B58.1-1971) and latest Hydraulic Institute Performance Test Acceptance Grade 1U and in accordance with requirements of Hydraulic Institute standard ANSI/HI 14.6-2016 or latest version. Test shall be performed on the complete assembled pump for this project. Factory certified test reports including pump curves shall be submitted for approval by the Engineer before the pump is shipped.
    - ii. Field Acceptance Testing: Pumps shall be given a running test in the Engineer's presence to demonstrate the ability to operate without vibration or overheating, to pump satisfactorily and to meet the performance specified. Contractor shall furnish all labor, piping, equipment and materials necessary for conducting tests. Upon completion of installation, one electronic copy of the results of field acceptance tests as specified under this section shall be submitted to the Engineer.
  - c. Submit complete dimensions of pump and motor unit, series and types of shafts, type of bowl lining, drawings detailing all dimensions and components, locations and dimensions of passageway openings for cables, motor specifications, and specifications and drawings for all components included in this specification.
5. Warranty:
  - a. The pump manufacturer and the motor manufacturer shall each individually and separately warranty that the equipment they supplied under this Section fully meets the criteria specified herein and shall further warranty that the equipment is free from all defects in materials and workmanship.
  - b. The manufacturer's warranties from defects shall contain a provision that the manufacturer shall repair or replace any defects including all labor and materials, to the satisfaction of and at no additional cost to the Owner, for a period of twenty-four (24) months for the

pump and motor from the documented date of installation.

6. Products:

a. The pump shall have the following specifications:

<b>Parameter</b>	<b>Specification</b>
Location	Well 1A
Function	Pump water from the well to the treatment facility
Static water level (measured from well head down)	22 ft
Drawdown (pumping) water level (measured from well head down)	24 ft
Operating Range	1000 - 1300 gpm
Design operating point	1300 gpm @ 340 ft TDH
Minimum efficiency rating	72%
Fluid	Water
Stage	2
Type	Submersible vertical turbine
Pitless adapter	Existing
Flow sleeve diameter	10"
Casing diameter	18"
Drop pipe diameter	8"
Well Casing Screen (measured from well head down)	57' to 77'
Well depth	77'
Bowl material	Close-grained cast iron (ASTM A48, class 30) or stainless steel, glass lined  Ni. Al. Bronze wear ring
Bowl strength	Minimum strength of 30,000 pounds per square inch
Impeller material	316 SS SISI Type 316

- i. Pump, equipment, and appurtenances shall be designed for continuous operation under submergence, without leakage, in the applicable well with minimum submerged depth below ground surface as specified here in.
- ii. A motor heat sensor thermostat shall protect the motor against excess heat in compliance with its U.L. rating. Sensor shall reset automatically at the motor when the motor cools. The heat sensor switch will be hardware interlocked at the VFD to shut down the pump and activate an alarm. The alarm and interlock shall be manually reset at the VFD. The VFD shall have control and signal wiring to and from the PSCP to send out pump motor alarms back to SCADA.

b. The motor shall have the following specifications:

<b>Parameter</b>	<b>Specification</b>
HP	150
Volts	460
Phase	3
Cycle (Hz)	60
Column Diameter	8"
Motor bracket size	8"
Motor speed	3600 rpm
Type	Submersible
Service factor	1.15
Efficiency	Highest possible
Torque	Variable

- i. Motors shall comply with NEMA standard requirements. They shall be capable of continuous operation in water temperature up to 86°F (30°C). Motors shall be water cooled and lubricated and capable of continuous operation over the full capacity range without exceeding the service factor.

- ii. Motors shall be inverter-duty rated for operation with VFDs manufactured by:
  - 1. Centripro
  - 2. Franklin Electric
  - 3. Eaton
  - 4. or equal.
- c. The bowls and impellers shall have the following specifications:
  - i. Vertical multi-stage water lubricated submersible type with submersible motor, factory assembled and lubricated.
  - ii. The bowl assembly shall consist of the minimum number of bowls necessary to meet the service requirements.
  - iii. The impeller shaft shall be of type 416 stainless steel or bronze of not less than 12% chrome content and shall be supported by bronze or neoprene bearings located on both sides of each impeller.
  - iv. The impellers shall be bronze or 410 stainless steel enclosed type, statically and dynamically balanced. They shall be securely fastened to the shaft with taper lock collets. Each impeller shall be fitted with Al. Bronze wear ring. They shall be adjustable vertically.
- v.

**Bid Item B – Furnish VFD and Harmonic Filter for Well 1A**

- d. The VFD shall have the following specifications:

Parameter	Specification
Amps (FLA)	197A
Volts	460V
Line and load reactors/ Harmonic Filter	Included
Replace wiring from VFD to well casing	Included
Re-work bounding and grounding	Included
Programming	Not included
Starting speed	Adjustable (Refer to Specification 16469)
Ramp up time	Adjustable (Refer to Specification 16469)
VFD parameters	Refer to specification 16469

- i. Contractor shall furnish and deliver at the site all specified equipment. Furnish, install, test, and program equipment.
- ii. Contractor shall provide well level low and motor high temperature shut down alarms and shall be interlocked to the variable frequency drive.
- iii. Contractor shall coordinate variable frequency drive Manufacturer selection with all equipment Manufacturers. Coordination, Short Circuit and Arch Flash studies are required for this gear, refer to Section 16010 for requirements.
- iv. Contractor shall coordinate variable frequency drive Manufacturer selection with all equipment Manufacturers and shall be solely responsible for ensuring that the individual variable frequency drives furnished are completely compatible with all requirements and intended functions of the driven equipment.
- v. Acceptable Manufacturers are Eaton, Toshiba, Square D, Cutler Hammer, or equal.
- e. Variable Frequency Drive (VFD) Motor Supply Cable
  - i. Cable consisting of three (3) phase conductors with integral symmetrical grounding conductors, constructed of tinned stranded copper with cross-linked polyethylene insulation (XLP/XHHW-2 or approved thermoset equivalent), rated 600V or 1000V.
  - ii. Cable shall include an overall composite shield consisting of:
    - iii. Aluminum/polyester foil shield with 100% coverage, and
    - iv. Tinned copper braid with minimum 85% coverage,
    - v. In continuous contact with a minimum No. 12 AWG tinned copper drain wire.
  - vi. Provide a sunlight-resistant, oil-resistant, and moisture-resistant thermoset outer jacket (CPE or equivalent) suitable for wet and corrosive environments.
  - vii. Cable shall be listed and labeled for VFD/inverter-duty applications in accordance with UL 1277 and/or UL 2277 (Type TC-ER, WTTC, or equivalent) and suitable for installation in conduit, cable tray, and direct burial where indicated.
  - viii. Thermoplastic insulation types (e.g., THHN/THWN-2) are not acceptable.

- ix. Cable shall be specifically designed for inverter-duty applications and suitable for high-frequency switching, reflected wave voltage, and voltage rise times (dv/dt) associated with PWM drives.
- x. Cable shall be rated for wet locations, including direct burial, where installed underground.
- xi. Provide cable with low impedance symmetrical grounding conductors sized in accordance with NEC Article 250 and manufacturer recommendations for VFD applications.
- xii. Acceptable Manufacturers: Belden, LAPP (ÖLFLEX), Houston Wire & Cable / Southwire, Prysmian Group, or equal.

**PART 3 – CHECKLIST AND REQUIRED FORMS FOR SUBMISSION**

**Well 1A Pump Replacement  
27DPW049G**

Company Name: \_\_\_\_\_

- Bidder has completed and returned the **Acknowledgment of Receipt** form (via fax or email).
- Bidder has completed, signed, and enclosed the **Bid Form A: Bid Price Form** or an exact copy.
- Bidder has completed, signed, and enclosed the **Bid Form B: Bidder Information Response** form.
- Bidder has completed, signed, and enclosed the **Bid Form C: Authentication Form**.
- Bidder has completed, signed, and enclosed the **Bid Form D: Certificate of Good Faith**.
- Bidder has completed, signed, and enclosed the **Bid Form E: Certificate of Compliance with Massachusetts Tax Laws** or Certificate of Good Standing issued by the Massachusetts Department of Revenue.
- Bidder has provided at least five (5) references on the **Bid Form F: Professional Reference Form** of which at least three (3) are governmental units (municipal/county/regional district/state agency/special district).
- If the bid submission is signed by someone other than the Owner/President of the company, a completed **Bid Form G: Certificate of Authority of Corporate Resolution** for the person who signed the proposal or a valid Corporate Resolution stating the individual has the authority to submit the proposal on behalf of the Company and can bind the Company to the contract if awarded.
- Bidder acknowledged all addenda, if any  
Addendum Number 1 dated \_\_\_\_\_  
Addendum Number 2 dated \_\_\_\_\_  
Addendum Number 3 dated \_\_\_\_\_  
Addendum Number 4 dated \_\_\_\_\_  
Addendum Number 5 dated \_\_\_\_\_

This form must be completed and filed with bid submission

**Bid Form A: Bid Sheet  
Well 1A Pump Replacement  
27DPW049G**

Description		Bid Proposal
A	Furnish pump, motor, and thermal sensor	\$
B	Furnish VFD and harmonic filter	\$
C	<b>Total Not To Exceed Value (Sum of A:B)</b>	\$
D	Prompt Payment Discount	___%/___ Days

**Bidder Acknowledges Addenda #:** \_\_\_\_\_

Company Name: \_\_\_\_\_ Number of Years in Business: \_\_\_\_\_

Address: \_\_\_\_\_

Authorized Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Printed Name & Title: \_\_\_\_\_

This form must be completed and filed with bid submission

**Bid Form B: Bidder Information Response  
Well 1A Pump Replacement  
27DPW049G**

Legal Name of the Bidder: \_\_\_\_\_

Company Name: \_\_\_\_\_

Company Address: \_\_\_\_\_

City State Zip: \_\_\_\_\_

Company Web Address: \_\_\_\_\_

Company Telephone: \_\_\_\_\_ Company Fax Number: \_\_\_\_\_

State of Incorporation (Date): \_\_\_\_\_

If the bidder is a partnership, give full names and addresses of all partners; and if an individual, give residential address if different from business address.

**Company Contacts – Required**

**Individual submitting the bid:** (This is the individual who should sign the Certificate of Good Faith)

Name: \_\_\_\_\_ Title: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Telephone: \_\_\_\_\_ Fax Number: \_\_\_\_\_

Email Address: \_\_\_\_\_

**Individual to be contacted about the bid:** (If different from the individual submitting the bid)

Name: \_\_\_\_\_ Title: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Telephone: \_\_\_\_\_ Fax Number: \_\_\_\_\_

Email Address: \_\_\_\_\_

Best Times to Contact: \_\_\_\_\_

**Individual authorized to contractually bind the company:** (This will be the individual whose name and title will appear in the contract documents and will execute the contract if the contract is awarded to the company)

Name: \_\_\_\_\_ Title: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Telephone: \_\_\_\_\_ Fax Number: \_\_\_\_\_

Email Address: \_\_\_\_\_

Best Times to Contact: \_\_\_\_\_

1. Has the bid been signed by a person legally authorized to commit the Bidder (Company) to the contract, if awarded?  **Yes**  **No**
2. Is the Bidder prepared to provide the insurances as required?  **Yes**  **No**
3. Has the Bidder placed any conditions or restrictions with its bid to the Town which conflict with the Scope of Services? (If yes, the bid may be deemed conditional.)  **Yes**  **No**
4. Has the Bidder identified any and all exceptions to the Town's specifications and are they included in the submission?  **Yes**  **No**
5. Is the Bidder prepared to execute the Town's contract, if awarded?  **Yes**  **No**

Signature of the Bidder: \_\_\_\_\_

Printed Name and Title of Signatory: \_\_\_\_\_

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

This form must be completed and filed with bid submission

**Bid Form C: Authentication Form  
Well 1A Pump Replacement  
27DPW049G**

The undersigned agrees that, if selected as the contractor for any or all of the above bid items, the contractor shall be obligated to provide those services in accordance with the terms of these specifications at the bid price upon receipt of a fully executed contract.

Name of Bidder: \_\_\_\_\_

Address: \_\_\_\_\_

Authorized Signature: \_\_\_\_\_

Printed Name and Title: \_\_\_\_\_

Date: \_\_\_\_\_ Phone Number: \_\_\_\_\_

Fax Number: \_\_\_\_\_ Email: \_\_\_\_\_

This form must be completed and filed with bid submission

**Bid Form D: Certificate of Good Faith  
Well 1A Pump Replacement  
27DPW049G**

**CERTIFICATE OF GOOD FAITH**

The undersigned hereby certifies that s/he will comply with all laws and regulations applicable to awards made subject to Massachusetts General Laws, Chapter 30B.

The undersigned certifies under penalties of perjury that this bid or proposal has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word "person" shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity, or group of individuals.

\_\_\_\_\_  
Signature of individual submitting the bid or proposal

\_\_\_\_\_  
Individual Full Name (Print/Type)

\_\_\_\_\_  
Name of Business (Print/Type)

\_\_\_\_\_  
(Date)

**Two Witnesses or Notary**

\_\_\_\_\_  
Witness One Signature

\_\_\_\_\_  
Witness Two Signature

\_\_\_\_\_  
Witness One Full Name (Print/Type)

\_\_\_\_\_  
Witness Two Full Name (Print/Type)

\_\_\_\_\_  
Witness One Primary Address

\_\_\_\_\_  
Witness Two Primary Address

**OR**

Commonwealth of Massachusetts

County of \_\_\_\_\_

On this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, before me, the undersigned notary public, personally appeared \_\_\_\_\_(name of document signer), proved to me through satisfactory evidence of identification, which were \_\_\_\_\_, to be the person whose name is signed on the preceding or attached document, and acknowledged to me that (he) (she) signed it voluntarily for its stated purpose.

- as partner for \_\_\_\_\_, a partnership.
- as \_\_\_\_\_ for \_\_\_\_\_, a corporation.
- as attorney in fact for \_\_\_\_\_, the principal.
- as \_\_\_\_\_ for \_\_\_\_\_, (a) (the) \_\_\_\_\_.

\_\_\_\_\_(official signature and seal of notary)

My commission expires: \_\_\_\_\_

This form must be completed and filed with bid submission

**Bid Form E: Certificate of Compliance with Massachusetts Tax Laws  
Well 1A Pump Replacement  
27DPW049G**

Certificate of Good Standing issued by the Massachusetts Department of Revenue dated no earlier than 90 days before the bid submission deadline may be submitted in place of this certificate.

Pursuant to M.G.L. c.62C, §49A , the undersigned acting on behalf of the Contractor\* certifies under the penalties of perjury that the Contractor is in compliance with all laws of the Commonwealth relating to taxes including payment of all local taxes, fees, assessments, betterments and any other local or municipal charges (unless the Contractor has a pending abatement application or has entered into a payment agreement with the entity to which such charges were owed), reporting of employees and contractors, and withholding and remitting child support.\*\*

(1) Contractor: \_\_\_\_\_ Date: \_\_\_\_\_

Print Name: \_\_\_\_\_

Social Security Number: \_\_\_\_\_

Corporation, Association, or Partnership: \_\_\_\_\_

Federal Tax ID Number or Social Security Number: \_\_\_\_\_

(2) By: \_\_\_\_\_ Date: \_\_\_\_\_

(Authorized Corporate Signature)

Name and Title: \_\_\_\_\_

Note to Contractor\*\*\*: Please sign at (1) or (2), whichever applies.

In order to comply with all laws of the Commonwealth relating to taxes, the undersigned certifies that Contractor (check applicable item):

1. \_\_\_\_\_ has filed all tax returns and paid all taxes required by law; or
2. \_\_\_\_\_ has filed a pending application for abatement of such tax; or
3. \_\_\_\_\_ has a pending petition before the appellate tax board contesting such tax; or
4. \_\_\_\_\_ does not derive taxable income from Massachusetts Sources such that it is subject to taxation by the Commonwealth

\* As used in this certification, the word "Contractor" shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity, or group of individuals.

\* The provision in this Certification relating to child support applies only when the Contractor is an individual.

\*\*\* Approval of a contract or other agreement will not be granted until the Town of Needham receives a signed copy of this Certification.

This form must be completed and filed with bid submission

**Bid Form F: Professional References  
Well 1A Pump Replacement  
27DPW049G**

Customer: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Period of Service (MM/YYYY): \_\_\_\_\_ through \_\_\_\_\_

Is this a Municipal or other Governmental Unit?:  Yes  No

Project Name: \_\_\_\_\_

Primary Contact: \_\_\_\_\_ Title: \_\_\_\_\_

Telephone: \_\_\_\_\_ Ext: \_\_\_\_\_

Email: \_\_\_\_\_

---

Customer: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Period of Service (MM/YYYY): \_\_\_\_\_ through \_\_\_\_\_

Is this a Municipal or other Governmental Unit?:  Yes  No

Project Name: \_\_\_\_\_

Primary Contact: \_\_\_\_\_ Title: \_\_\_\_\_

Telephone: \_\_\_\_\_ Ext: \_\_\_\_\_

Email: \_\_\_\_\_

---

**(Make as many copies as necessary. A minimum of 5 references required)**

**THIS FORM OR SUBSTITUTE WITH THE REQUESTED  
INFORMATION MUST BE FILED WITH BID SUBMISSION**

**Bid Form G: Certificate of Authority  
Well 1A Pump Replacement  
27DPW049G**

Complete Only If Applicable

1. I hereby certify that I am the Clerk/Secretary of \_\_\_\_\_  
(insert full name of Corporation)
2. corporation, and that \_\_\_\_\_  
(insert the name of officer who signed the contract and bonds.)
3. is the duly elected \_\_\_\_\_  
(insert the title of the officer in line 2)
4. of said corporation, and that on \_\_\_\_\_  
(insert a date that is **ON OR BEFORE** the date the officer signed the **contract and bonds.** )

at a duly authorized meeting of the Board of Directors of said corporation, at which all the directors were present or waived notice, it was voted that

5. \_\_\_\_\_ the \_\_\_\_\_  
(insert name from line 2) (insert title from line 3)

of this corporation be and hereby is authorized to execute contracts and bonds in the name and on behalf of said corporation, and affix its Corporate Seal thereto, and such execution of any contract of obligation in this corporation's name and on its behalf, with or without the Corporate Seal, shall be valid and binding upon this corporation; and that the above vote has not been amended or rescinded and remains in full force and effect as of the date set forth below.

6. ATTEST: \_\_\_\_\_ AFFIX CORPORATE  
(Signature of Clerk or Secretary)\* SEAL HERE

7. Name: \_\_\_\_\_  
(Please print or type name in line 6)\*

8. Date: \_\_\_\_\_  
(insert a date that is **ON OR AFTER** the date the officer signed the **contract and bonds.**)

The name and signature inserted in lines 6 & 7 must be that of the Clerk or Secretary of the corporation.

SECTION 16010ELECTRICAL - GENERALPART 1 - GENERAL1.1 DESCRIPTION

- A. Provide all labor, materials, equipment, operations, methods and procedures as indicated in the Contract Documents, together with all items necessary for or incidental to the completion of the work.
- B. All systems or additions to existing systems indicated in the Contract Documents shall mean all necessary supervision, labor, equipment and materials required to provide complete, properly functioning systems.
- C. All systems shall be adjusted, tested, inspected and turned over to the Owner in working order.
- D. The words "provide", "furnish" and "install" are defined in DIVISION 0.
- E. References:
  - 1. Additional requirements outlined in DIVISION 0 and DIVISION 1 , are part of DIVISION 16.
- F. Division 16 Contract Requirements and Responsibilities:
  - 1. The requirements of Division 16 - Electrical is based on the information provided in the Contract Documents. This information has been outlined in either the Specifications or the Drawings or both. The Contractor's responsibility is to review all information in both the specifications in order to determine the complete work required. Whether the work is specified in the Specifications required as part of the work. No additional compensation or interpretations stating that it was not shown in both locations will be acceptable or allowed. The Engineer will have the authority to make the final determination for unresolved conflicts between Specifications. No additional compensation will be allowed due to the Engineer's determination.
- G. Work Specified Herein:
  - 1. Visit and examine the project site and become familiar with all existing conditions pertinent to the work to be performed thereon. No additional compensation will be allowed for failure to be so informed. The Contractor is responsible for becoming familiar with the conditions of the project during the bidding period in order to bring any clarifications or issues to the attention of the Engineer prior to submission of their final bid price.
  - 2. The following scope of work is a brief generalization of the type and extent of the work specified under DIVISION 16. Detailed requirements are indicated on the Drawings and in related sections of the Specifications. The work specified under DIVISION 16 includes, but is not limited to the following, as shown on the Drawings and as specified herein:
    - a. Provide Electrical Service and Distribution Systems as indicated on the "Single-Line Diagrams There is a significant amount of electrical demolition and reconnection of equipment to remain for the work required for this project and therefore a thorough understanding of the existing

- conditions is critical. It is to be understood that the Drawings do not intend to show or provide details for all of the existing conditions or equipment to be demolished. In addition, not all existing condition information may reflect exact conditions due to the accuracy of existing data and information.
- b. Provide all required 480 Volt, 208 Volt, 240V, and 120 Volt Power and Control wiring, Signal wiring, grounding, and connections for equipment specified under DIVISIONS 11, 13, 14, and 15 except as indicated.
  - c. Provide complete branch circuit wiring systems including all raceways, conductors, cables, outlet and junction boxes, wiring devices and device connections.
  - d. Provide complete TVSS and/or lightning arrestor and surge capacitor devices for distribution equipment and/or instrumentation devices.
  - e.
- H. Work Specified Elsewhere:
1. The materials and methods used for all Electrical Work indicated in the Contract Documents shall meet the requirements specified in Division 16.
  2. The Contractor is to review all Contract Documents and Drawings and shall coordinate closely with the other related areas which will affect their work under this Contract to avoid all conflicts.
- I. Removals and Relocations and Rearrangements:
1. Examine the existing site, structure(s) and installation(s) for the work of all trades which will influence the cost of the work under DIVISION 16. This work shall include removals, relocations, rewiring and rearrangements relating to the work of all trades which may interfere with, disturb or complicate the performance of the work under DIVISION 16; and relating to the work involving systems, equipment and related service lines which shall continue to be utilized as part of the finished project.
  2. When the Contract Documents indicate elimination of, or structural changes in walls, floors, ceilings, enclosures, pipe chases, etc., remove, relocate, rearrange and reconnect as required, all existing Electrical Work such that systems to remain shall continue to function properly.
  3. Provide all associated labor, material, and costs to include all removals, relocations, rewiring, rearrangements, and reconnections herein specified, necessary or required to provide approved operation and coordination of the combined new and existing systems and equipment.
  4. Demolition:
    - a. Disconnect and remove existing equipment, devices, boxes, conduit, and associated electrical equipment as shown on the Contract Drawings.
    - b. Any demolition, relocation or rearrangement work performed which results in unused openings in existing-to-remain control panels, instrument panels, control stations, pull or junction boxes, etc., shall be plugged by appropriate means such that it maintains the integrity of the NEMA classification as provided in the NEMA Classification for Electrical Equipment and Enclosure Schedule provided on the Drawings.

- c. Any demolition, relocation or rearrangement work performed which results in unused openings in walls, ceilings, floors, etc. shall be sealed using approved methods to maintain the fire rating and NEMA classification of the existing structure.
  - d. Review all Contract Documents and coordinate with all disciplines for a complete understanding of this demolition work.
  - e. There are areas where the demolition shall require that existing pullboxes, conduit, wiring and associated devices be disconnected, removed, relocated and in some cases, be replaced so the new equipment, walls, structures, etc. may be constructed and installed. In most cases, the detail of these existing conditions has not been shown. The Contractor will be responsible for performing all work necessary to demolish all required conduit, wiring, boxes and associated equipment for the noted and intended demolition.
  - f. Disconnect and remove all abandoned conduits, wiring, boxes, equipment, controls, hangers, etc. shown or not shown, which are located within the area of construction under this contract.
  - g. Per the request of the Owner, disconnect, remove, protect and return to the Owner specific equipment scheduled for demolition. No additional compensation will be allowed.
5. The Contractor is responsible for temporary power associated with Removals, Relocations, and Rearrangements to maintain the existing facility operational. Refer to section within this section for requirements.
- J. Fees:
- 1. Secure and pay for all permits, fees and licenses necessary for the proper execution of the work under DIVISION 16.
- K. Tests and Procedures Prior To Start-up:
- 1. Refer to Section 16469 - Testing Electrical Systems and start-up for testing and scheduling requirements.
- L. Demonstration of Complete Electrical Systems:
- 1. The Owner will assume no liability or responsibility for any portions of the installation under this Contract until they are demonstrated and accepted by the Engineer in writing. Final demonstrations shall be made only after the Engineer is satisfied that the work has been completed in accordance with the intent of the Contract Documents.
- M. All electrical equipment shall be suitable for the areas where mounted in accordance with Area Classifications indicated on Electrical Drawings. In specific, refer to the NEMA Classification for Electrical Equipment and Enclosure Schedule provided on the Drawings for specific requirements and these specifications. In addition, there are several areas which have been indicated to meet NEC National Electrical Code requirements based on the final location of the equipment. Coordinate and provide these NEMA ratings whether or not specifically stated on the Drawings. Contractor shall assure that the proper type, enclosure, mounting and catalog numbers are provided during the Submittal phase.

## 1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily

limited to, General Conditions, Supplementary Conditions, and Division 1.

1. Section 01010 – Summary of Work (construction sequencing requirements that affect number and duration of equipment startups and certifications)
2. Section 01340 – Submittals
3. Section 01600 – Delivery, Storage and Handling
4. Section 01800 – Equipment Startup, Testing and Operator Training
5. Section 03320 – Concrete Placement
6. Section 09905 – Surface Preparation and Shop Coatings

### 1.3 QUALITY ASSURANCE

- A. Provide all new materials, devices and equipment in conformance with:
  1. Underwriter's Laboratory, Inc.
  2. National Electrical Manufacturers Association.
  3. American National Standards Institute.
  4. National Electrical Code (N.F.P.A. No. 70).
  5. Life Safety Code (N.F.P.A. No. 101)
  6. Local Utility Company standards, specifications, and requirements.
  7. Local Telephone Company standards, specifications, and requirements.
  8. Local Internet Provider standards, specifications, and requirements.
  9. Occupational Safety and Health Act (O.S.H.A.) - regarding construction practices.
  10. State and Local electrical codes, building codes, and fire codes for the locale where the work is to be performed.
  11. N.F.P.A. 820 Standards for Fire Protection in Wastewater Treatment and Collection Facilities.
- B. All materials provided under this Contract shall be equal in quality, appearance, and performance to that specified herein and shall be subject to no exceptions taken by the Engineer. Verify the availability of all materials proposed to be used in the execution of the work prior to submitting same for the Engineer's review. The discontinuance of production of any material or product after the Engineer's review has been made shall not relieve the Contractor from providing an alternate of equal quality and design without additional cost.
  1. All discontinued products after submittal approval shall require resubmittal.
- C. Materials and equipment provided under this Contract shall be standard products of manufacturers regularly engaged in manufacture of such products and shall be manufacturer's latest standard design that complies with Specification requirements.
- D. The Contractor shall have supplied comparable systems to those specified herein and shall maintain engineering and service departments capable of designing and maintaining these systems. For a period of twelve (12) months from the date of acceptance of the work, provide all necessary supervision, labor, materials, and equipment, in order to correct any defects in any system due to faulty materials, equipment, installation methods, or workmanship and consequent damage resulting from such defects. This work shall be scheduled during normal working hours and at the convenience of the Owner.
- E. All switchboards, motor control centers, panelboards, motor starters, transformers, and distribution equipment shall be by the same Manufacturer based on providing the Owner with equipment of the same type. This will allow for replacement and spare

parts of the same type and efficient maintenance of this equipment. This coordination shall be demonstrated in the submittals.

- F. All electrical equipment shall be suitable for the areas where mounted in accordance with the NEMA Classification for Electrical Equipment and Enclosure Schedule provided on the Drawings . The Contractor shall assure all equipment is installed in strict accordance with the latest version of the National Electrical Code.
- G. Compliance with the above codes, standards, etc., does not relieve the Contractor of the requirements of the Contract Documents which may exceed these codes, standards, etc. but which are not contrary to them.
- H. If it is observed that the Contract Documents are at variance with any of the above codes, standards, etc., promptly notify the Engineer in writing, and necessary changes shall be adjusted by appropriate modification. If any work is performed which is contrary to such codes, standards, etc., the Contractor shall assume full responsibility therefore and shall bear all costs in correcting such work in order to comply with such codes, standards, etc.

#### 1.4 SEISMIC CONTROL

- A. Design, furnish and install Seismic Restraints for Nonstructural Components of electrical systems per Division 13 Specifications.

#### 1.5 SUBSTITUTIONS

- A. Refer to Instructions to Bidders, General Conditions and Supplemental Conditions for requirements.

#### 1.6 SUBMITTALS TO THE ENGINEER

- A. Submit Shop Drawings, O&M documentation, and Manufacturer certificates per Section 01340.
- B. Submit additional specific information as follows:
  - 1. All materials proposed to be used for the project, including short-term and long-term storage instructions.
  - 2. Provide all certificates of inspection and approval from all regulatory agencies having jurisdiction over the Work under Division 16.
  - 3. Coordination, Short Circuit and Arch Flash Study.
  - 4. Submit properly documented and witnessed test and checkout reports prior to energizing the Electrical system.
  - 5. Submit conduit layout plan prior to any conduit installation.
  - 6. Record drawings
- C. These requirements for Shop Drawings are in addition to the standards in Section 01340.
  - 1. Shop Drawings Shall Consist of:
    - a. Project name and location.
    - b. Contractor's name.
    - c. Index Sheet - Listing the equipment being submitted utilizing equipment designations, or symbols, indicated on the Contract Documents together with the proposed manufacturer, style/ type and catalog number.

- d. Manufacturer's scale or dimensioned drawings along with standard catalog "cut" sheets. These cut sheets shall be marked up to indicate equipment, sizes, types, etc., of equipment and all options being provided.
  - e. Equipment ratings, service clearances and configuration.
  - f. Listing of accessories to be provided.
  - g. Single-line and schematic diagrams where applicable. All text and symbols shall be easily legible and submitted on an 11"x17" sized drawing(s) as necessary.
  - h. Refer to related sections of the specifications for special shop drawing requirements for individual equipment types.
2. All Cut Sheets shall be marked up to indicate specific equipment, specific sizes, specific types, etc., for all equipment and materials with all options provided for this project. Catalog cut sheets that are not properly marked up or are difficult to read and understand as to what equipment or application that it is used for will be returned un-reviewed for re-submittal.
  3. The Contract Drawings have provided detailed customized schematic wiring diagrams for all motor control center equipment as well as individual wall mounted starters, control panels, etc. These are very detailed and a lot of effort has been expended to compile these diagrams. The equipment manufacturer/supplier of this equipment as specified shall be responsible to provide the following detailed and customized schematic wiring diagrams.
    - a. A separate customized and detailed schematic for each piece of equipment (i.e. RAS pumps No. 1, No. 2 and No. 3). Even though the schematic appears to be the same for this equipment a separate schematic for each will be provided with the referenced title (i.e. RAS Pump No. 1, etc.) noted on the respective schematic.
    - b. Each schematic shall indicate and show the specific devices (hand-off-auto, run light, ETM, etc.) and a reference to where this is located.
    - c. All contacts and interlocks shall be identified as to their location.
    - d. All metering and interface devices such as digital metering, TVSS, lightning protection, etc., shall be shown, identified, and dimensional heights from bottom of equipment shall be noted.
    - e. Failure to provide the proper customized schematic wiring diagrams shall be grounds for automatic rejection. Any delays, scheduling issues and additional contract time and cost associated with these delays due to equipment not being approved or being rejected for these reasons shall be the responsibility of the Contractor.

#### 1.7 RECORD DRAWINGS

- A. At the completion of the installation, provide reproducible Record Drawings indicating the final configuration of all Electrical Systems as they were installed. Symbols, equipment designations, etc. shall be consistent with the Contract Documents. Provide exact locations of all work which has been concealed in concrete, masonry or underground.
- B. Electrical Contractor shall provide detailed, red-lined instrumentation loop diagrams, control panel diagrams, and motor schematics indicating exact point to point wiring. The electrical contractor shall coordinate and provide red line information to the

instrumentation vendor. The instrumentation vendor shall revise diagrams and motor schematics based on red lined information.

- C. The requirements above are in addition to the standards for Record Drawings in Section 01720.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Refer to additional requirements of Section 01600.

1.9 GUARANTEE/WARRANTY

- A. Guarantee all equipment, materials and workmanship in accordance with the General Conditions and Supplemental Conditions of the Construction Contract and Section 11000.
- B. Warrant that all material provided and work executed is in accordance with all applicable laws and regulations.

1.10 SUBCONTRACTOR COORDINATION AND RESPONSIBILITY

- A. Coordination with Division 13
  - 1. Instrumentation supplier shall provide point to point wiring schematics to electrical subcontractor to allow completion of all instrumentation and control conduit and wiring between all devices, system control panels, and all equipment provided by Division 11, Division 13, Division 15 and Division 16.
  - 2. The instrumentation supplier shall coordinate all power, control and signal needs or requirements with the electrical contractor prior to construction.
- B. Coordination with Division 2 and Division 3
  - 1. The electrical subcontractor is required to provide a substantial amount of underground work and coordination relating to the following items:
    - a. Underground duct banks and installation
    - b. Pad-mounted transformer and Standby Generator
    - c. Electrical manholes and handholes
    - d. Existing and new underground utilities and process equipment
      - i. The electrical manholes and handholes shall be furnished and installed under Division 2 - Site Work. The electrical subcontractor shall coordinate all required elevations, manhole or handhole openings, elevations, wall openings and final locations of these structures with this section to provide for a proper installation. Coordinate and verify that all manhole and hand-hole covers are "stamped" with the proper designation for power, control, signal and other wiring identifications.
      - ii. Excavation, bedding and backfilling shall be furnished and installed under Division 2 - Site Work. The electrical subcontractor shall coordinate all excavations for duct bank locations for both new and existing conditions with this section in order to provide a complete understanding of where and how these duct banks are to be installed.
      - iii. Concrete encasement for duct banks shall be furnished and installed under Division 3 - Concrete. Duct banks shall be formed up neat and tight to provide for proper encasement of conduits. Reinforcing steel shall also be furnished and installed under Division 3 -

Concrete.

- iv. Concrete pads for pad mounted transformers or standby power generators shall be furnished and installed by Division 3 - Concrete. The excavation; bedding and backfill shall be furnished and installed under Division 2 - Site Work. Coordinate pad sizing, openings and orientation with this section for proper installation.
- C. Coordination with Miscellaneous Divisions
1. The electrical contractor shall coordinate all coring, cutting and patching of openings in existing structures and locations with the General Contractor in a timely manner not to delay scheduling of the project.
- D. Schedules:
1. The electrical subcontractor shall always maintain close contact and coordination with the work of these related Divisions in order to provide a complete electrical system or delay the scheduling of the project.
  2. Perform all coordination and scheduling of all cutting, temporary power usage with all other trades. patching, trenching, painting, trench covers, plastering, chases, slots, furring, grounds, masonry foundations, piers, excavating, pole bases, backfilling, pads, duct banks and other work incidental to installation of apparatus as required for electrical work.

1.11 CONDUIT LAYOUT PLANS AND DETAILS FOR CONCEALED AND EXPOSED WORK

- A. The Contract Documents require that conduit be concealed in walls, floors, ceilings or below floor slab in non-structural slab on ground areas.
- B. In areas of exposed conduits, conduits shall be installed via vertical drops down to equipment in order to maintain a clean and consistent look of conduit for this installation. Horizontal runs shall be limited to ceiling racked installation and shall drop down to equipment. In areas of hung ceilings and accessible space above ceilings conduits shall be installed concealed within these areas with vertical drop down to the equipment to be fed.
- C. A detailed conduit layout plan and routing path shall be submitted for review and with no exceptions taken by the engineer prior to performing any work. The plan shall clearly indicate the equipment locations and path of runs along with overall sizes of conduits to be installed for a complete layout plan.
- D. A pre-concrete and pre-electrical meeting shall be held to discuss the amount of raceways to be concealed in a slab to ensure there are no structural foundation concerns. Any concerns shall be brought to the attention of the RPR, the Structural Engineer and the Electrical Engineer.
- E. The Contract Drawings specifically note areas with block out structural openings for the installation of conduits into and within the proposed building. A coordination review of equipment locations and layouts will be required such that the conduit layout plan has been pre-planned and approved prior to the commencing of the work.
- F. Conduits embedded in concrete shall meet the requirements specified in Section 03320.
- G. The contractor shall be allowed to reduce the number of conduit runs by combining conduit runs and increasing overall conduit sizes based on the National Electrical Code (NEC) allowable sizing and derating requirements. The Contract Documents

will limit this however based on the allowable sizing of conduits within the slab and this will be limited to smaller branch circuit feeders. Individual motor feeders to equipment such as pumps, process equipment runs, electrical distribution feeders and HVAC larger loads will not be allowed to be combined as further stated within the contract documents.

- H. The Conduit and Wire Schedule has provided a summary of individual conduit runs throughout the project in order to clearly indicate where conduit and wiring is to be installed. The Contractor shall utilize the schedule along with the electrical plans to develop the overall Conduit Layout Plan as required under this section. The submitted plans shall be formatted on 2' x 3' full size plans and submitted as part of the shop drawings requirements for this project prior to commencing any and all work.
- I. The Electrical Drawings are diagrammatic and may not specifically show exact locations of the equipment. The Contractor shall coordinate all conduit layout, and dimensions with the final equipment locations for the entire project for both concealed and exposed conduit runs.

#### 1.12 SEQUENCE OF CONSTRUCTION/TEMPORARY REQUIREMENTS

- A. Requirements for Sequence of Construction: Refer to Section 01010A.
- B. Maintain the existing treatment facility operational during all times of the work of this contract. Provide the following during demolition, installation, start-up and testing:
  - 1. All necessary temporary power, control, signal, telephone, and telemetry system requirements necessary for this application.
  - 2. All temporary relocations, conduit, wiring, re-wiring, temporary electrical equipment, etc., necessary.
  - 3. All emergency/standby power requirements necessary.
- C. The Electrical Sub-contractor shall provide all necessary material, labor, equipment, and associated costs, etc. necessary to maintain the existing facility operation and sequence of construction. No additional costs or compensation shall be allowed for any temporary power requirements necessary for this project.
- D. The General Contractor shall pay for all energy usage associated with temporary power and start-up operations. The Owner will be responsible for the share of the power associated with continuing to operate the baseline existing facilities.
- E. Refer to Section 01500, Temporary Facilities and Controls, for separate requirements related to job trailers and other temporary facilities.

#### 1.13 MEASUREMENT AND PAYMENT

- A. Measurement and payment for the work described in this section will be made in accordance with the provisions of DIVISION 1 MEASUREMENT AND PAYMENT.

#### 1.14 REQUEST FOR INFORMATION

- A. When there is a conflict or coordination issue, or if additional information is necessary for the Contractor to proceed with the intended work, a Request for Information (RFI) form shall be submitted through the General Contractor to the Engineer. The specific issue shall be described in the RFI and shall be sent to the

Engineer for review and response. RFI form shall be available via the General Contractor through the Engineer as required for this contract.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Materials shall be as specified in the appropriate Sections of DIVISION 16.

## PART 3 - INSTALLATION

### 3.1 INSTALLATION

- A. Installation shall be as specified in the appropriate Sections of DIVISION 16.

### 3.2 TESTS

- A. Refer to all related requirements as set forth within SECTION 16950 and additional testing as indicated in the appropriate Sections of the Specifications.

### 3.3 CLEANING

- A. Do not allow refuse and surplus materials to accumulate on the project site during the course of the work. Areas shall be cleaned and picked up on a daily basis.
- B. Upon completion of the work, remove all refuse and surplus materials and leave the premises neat and clean on a daily basis.
- C. Clean all equipment surfaces and touch up all damaged surfaces to the satisfaction of the Engineer prior to requesting Final Completion.
- D. Clean all lighting fixture reflector assemblies, lenses, louvers and lamps upon completion of the installation.
  - 1. Relamp all fixtures that have been in use longer than 6 months prior to Substantial Completion.

END OF SECTION

SECTION 16469VARIABLE FREQUENCY DRIVESPART 1 - GENERAL1.1 DESCRIPTION

- A. Provide a variable frequency drive (VFD) housed in a standalone enclosure with an external harmonic filter. This will be replacing the existing VFD at Well 1A Pump Station. Contractor shall coordinate variable frequency drive Manufacturer selection with all equipment Manufacturers.
- B. Contractor shall coordinate variable frequency drive Manufacturer selection with all equipment Manufacturers and shall be solely responsible for ensuring that the individual variable frequency drives furnished are completely compatible with all requirements and intended functions of the driven equipment.
- C. Variable frequency drives which are shown to be located in a standalone enclosure are not required to be of the same Manufacturer as the variable frequency drives installed within the motor control center.
- D. Acceptable Manufacturers are Eaton, Toshiba, Square D, ABB, or equal.

1.2 REQUIREMENTS SPECIFIED ELSEWHERE

- A. Additional Requirements are specified elsewhere including, but not necessarily limited to, General Conditions, Supplementary Conditions, and Division 1.
  - 1. Section 16010 – Electrical – General (and as referenced)

1.3 QUALITY ASSURANCE

- A. The equipment specified herein is based upon the first Manufacturer named after the phrase "Acceptable Manufacturer's". Equipment types, device ratings, dimensions, etc. correspond to the nomenclature dictated by that Manufacturer. Equipment of other acceptable Manufacturers shall be equivalent in every way to that of the equipment specified.
- B. Suppliers deemed equivalent shall be responsible to support and supply equivalent equipment which shall meet the intended design. Any extensive modifications or rework to facilitate acceptability shall be the responsibility of this Contractor at no additional cost to the Owner.
- C. All equipment shall be tested at the factory. Unless specified elsewhere, standard factory inspection and operational tests will be acceptable.
- D. Refer to equipment Manufacturer requirements under 16010, Section 1.2.

1.4 SUBMITTALS TO THE ENGINEER

- A. Shop Drawings are required for all items provided under this section. Submittals shall be provided in accordance with Sections 01340, 16010 and as specified in this section.
  - 1. Prior to fabrication
    - a. Components
    - b. Assembly

- c. Diagrams
- d. System analysis documentation and verification for application
2. Prior to startup
  - a. VFD Parameter Setup Checklist
3. After startup
  - a. VFD parameter setup verification and record version of VFD Parameter Setup

## PART 2 - PRODUCTS

### 2.1 MATERIALS

#### A. Variable Frequency Drives

1. The drive shall be capable of varying the speed of a standard or inverter duty rated NEMA Design B induction motor from a virtual standstill to the standard speed of the motor. The unit shall transform input power into a variable voltage, adjustable frequency three phase output of suitable capacity and waveform.
2. Input voltage shall be as specified in the equipment specification sections. Frequency shall be 60 Hz.
3. Output shall be three (3) phase voltage as indicated as specified in the equipment specification sections.
4. The drive shall be a PWM (Pulse Width Modulated) transistorized inverter.
5. The drive Manufacturer shall have not less than five years of experience in the manufacture of drives in the United States.
6. The drives shall be rated for constant or variable torque applications (460V - 1 HP to 150 HP), depending on the individual driven load requirements. For constant torque applications, the output transistors shall be low-gain, fully rated. Derated high-gain transistors are not acceptable.
7. Power Line Considerations
  - a. Each VFD or multiple sets of VFD's shall be designed and installed such that: the total harmonic distortion reflected back to the power source is a maximum of 5%, the notch depth reflected back to the power source is a maximum of 20%, and the notch area reflected back to the power source is a maximum of 22,800 volt-microseconds. The total harmonic distortion, notch depth and notch area shall be as defined by IEEE-519-2014.
  - b. Line reactors and other required devices shall be provided for individual VFD's where indicated in the VFD schedule.
8. Enclosures
  - a. Unless otherwise noted in drive schedule, all variable frequency drives and all associated equipment and control devices shall be located within motor control centers or contain within their respective individual enclosure. Separately submitted and mounted devices will not be accepted.
  - b. Refer to schematic diagrams and VFD schedule for further information.
9. Filtering
  - a. RFI/EMI filters shall be provided by supplier and shall be rated for, and compatible with, each VFD. They shall function as a complete system.

- Additional line reactors may be required in order to comply with the above parameters.
- b. 5% line reactors shall be mounted inside the respective VFD enclosure reactors and shall be TCI Harmonic Guard or equivalent.
  - c. Harmonic matrix filters and switching capacitor shall be provided.
  - d. Provide DV/DT or Sine Wave long lead filters where required per the Specifications.
10. System Analysis
- a. The VFD supplier shall perform a computer simulated power system study to verify compliance with the parameters as stated herein. The results of this study shall be submitted to the engineer. At a minimum the submitted results of this study shall include:
    - i. A brief summary of the equations and calculation procedures used in the study.
    - ii. A results summary sheet which briefly describes the power system configuration analyzed and which states the calculated values of total harmonic distortion, notch depth and notch area.
    - iii. Computer generated graphs which illustrate the voltage and current waveforms of the power system with the VFD's operating. These waveform graphs shall directly illustrate the results of the power system computer model study.
    - iv. Detailed list of the amplitude of harmonic currents and voltages to the 50th harmonic.
    - v. Verification that the VFD and compatible DV/DT or Sine Wave filter are appropriate for the application based on lead length.
  - b. The Contractor shall supply the VFD supplier with all power system data required to perform the above-described study. These data may include but are not limited to:
    - i. A complete one line diagram of the subject electrical distribution system. The diagram must show the lengths of all bus and cable runs, impedance values of all types of bus and cable used, and number of conductors per phase.
    - ii. Complete electrical data on all equipment shown on the one line diagram is required. At a minimum this data shall consist of: Transformers - kVA, Primary voltage, Secondary voltage, Short circuit capacity or impedance. Motors - Stator resistance, No load RMS current, No load kVA, No load kW, Locked rotor RMS current, Locked rotor kVA, Locked rotor kW, Horsepower, Base speed, Number of poles, Efficiency at relevant speeds, Power factor at relevant speeds, Full load RMS current. Generators - Short circuit capacity or Subtransient reactances (Xd), Power factor, kW, X/R Ratio.
    - iii. If the distribution system can function in more than one configuration, the configuration(s) to be analyzed shall be clearly defined. Any other information which may affect the behavior of the distribution system shall also be provided.

11. Ambient Conditions
  - a. Environment - Indoors, NEMA rating to match areas as depicted by the NEMA Classification for Electrical Equipment and Enclosure Schedule.
  - b. Ambient Temperature - 10 degrees C to 40 degrees C
  - c. Altitude - Less than 3,300 feet
  - d. Relative humidity - 90% maximum
  - e. Vibration - less than .5G
12. Control System
  - a. Input power:
    - i. Main circuit: 460V/60Hz.
    - ii. Control circuit: no external power for input shall be required.
  - b. Tolerance: Voltage + 10%. Frequency + 2 Hz.
  - c. Control method: Sinusoidal PWM control
  - d. Output Voltage: 3PH 460 Volt.
  - e. Output Frequency: 0.01 Hz to 60 Hz
  - f. Frequency resolution: 0.01 Hz Operating panel input; 0.03 Hz Analog input; 0.01 Hz Computer interface input
  - g. Frequency accuracy: + 0.5% of max frequency at 25 deg. C + 10 degC
  - h. Volts/Hz characteristics:
    - i. Either constant V/f or variable V/f (user selectable)
    - ii. Base frequency adjustable from 25 Hz to 60 Hz
    - iii. Voltage boost adjustable from 0% to 30%
    - iv. Starting frequency adjustable from 0 Hz to 10 Hz
  - i. Overload current: 150% for 1 minute (constant torque applications).
  - j. Frequency command signal: 3k Potentiometer 0-10 VDC; 0-5 VDC; 4-20 mA
  - k. Frequency jump - 3-point settings: Setting jump frequency (0 to Max frequency), and width (0 to max frequency).
  - l. Upper/lower limit frequencies: Upper limit 0 to Max frequency. Lower limit 0 to upper limit.
  - m. PWM carrier frequency: Adjustable from 400Hz to 2000Hz.
14. The drive shall provide a minimum displacement power factor of 0.95 throughout the speed range.
15. Minimum lead length to motors for VFD drive without requiring an additional output filter shall be 250 feet.
16. The efficiency of the drive at full speed shall be a minimum of 98 percent.
17. The drive shall be provided with an MCP type circuit breaker to serve as a disconnect and shall be coordinated with the drive protective features for the motor to form a complete combination type starter/controller. If necessary, the drive shall also be provided with current limiting fuses on the input side of the drive, sized and rated as required by the drive Manufacturer, so that the drive is rated for the available fault current.
18. The drive shall contain relays, push buttons, timers, and all other appurtenances necessary for the specific application as specified in the equipment specification sections.
19. Operational Functions:

- a. Acceleration/deceleration times: 0.1 to 600 seconds, 2 separate acceleration and deceleration times.
  - b. Forward or reverse run can be chosen.
  - c. Jogging
    - i. Running - 0 to 20 Hz
    - ii. Braking - Deceleration, DC injection, or coasting
  - d. Multispeed run: up to 7 preset speeds can be chosen.
  - e. VFD shall be capable of accepting a 4-20 mA input signal and adjusting speed accordingly.
  - f. Automatic Restart: Recovers a normal run of a coast-stopping motor.
  - g. Soft Stall: Sustains a run in overload mode. (90% - 150% adjustable)
  - h. Overload: Adjustable from 60 - 100%
  - i. Complete adjustment of parameters gives thousands of volt/frequency patterns.
20. Protective Features:
- a. Functions individually identified by 18 fault codes:
    - Overcurrent during acceleration (OC1)
    - Overcurrent during deceleration (OC2)
    - Overcurrent during run (OC3)
    - Overcurrent detected at start-up (OCA)
    - Short circuit at load (OCL)
    - Overcurrent in regenerative discharge resistor (OCr)
    - Overvoltage during deceleration (OP2)
    - Overvoltage (OP)
    - Overload (OL)
    - Overload of regenerative discharge resistor (OLr)
    - Overhead (OH)
    - Ground Fault (EF)
    - Emergency Stop (E)
    - Frequency Setting Signal Abnormality (Err.1)
    - EE Prom abnormality (EEP, EEP2, EEP3)
    - Computer link abnormality (Err.t)
  - b. Drive shall have an external fault trip input terminal.
  - c. Drive shall reset when a designated contact is closed on the terminal strip.
21. Monitor Functions
- a. The drive shall have display scaler of monitoring frequency. (Range 0.10 to 200)
  - b. The drive shall be able to monitor different parameters.
  - c. The drive shall have an LED on the front panel showing that the main DC circuit capacitor is charged.
22. Controller
- a. All parameters should be adjustable from the keypad.
  - b. One key shall toggle between panel control and terminal control.
  - c. The drive shall have a reset to factory settings.
  - d. The keypad shall match enclosure NEMA rating.

- e. The keypad shall allow for parameters to be changed while drive is running.
  - f. Most commonly used parameters should be labeled on the keypad.
23. Variable Frequency Drive Shutdown
- a. The drive shall be able to accept a 4th pole auxiliary contact (from a local disconnect) to be wire directly to an input of the drive. Upon opening of the auxiliary contact, the drive shall be programmed to function such that the drive stops the motor immediately rather than coasting to a stop.
24. All models shall be UL listed.
25. The drive shall be provided with thermal overload function.
26. The drive shall be provided with auxiliary run contact to indicate running status.
27. Variable frequency drive vendor must be a local distributor which has factory-trained personnel and warranty authorization; capable of testing unit(s) with motor loads.
28. Individual control panels: provide a complete VFD system and a customized and modified control panel for each pump motor installation.
29. Provide each of the VFD control panels with the following:
- a. Single VFD NEMA rated as depicted by the NEMA Classification for Electrical Equipment and Enclosure Schedule.
  - b. Provide vented type enclosure control panel for each piece of equipment. No separately mounted devices and equipment outside of this enclosure. Refer to acceptable Manufacturers list in section 1.1.D.
  - c. Line reactor 5%, matrix filter, RFI/EMI filter, and/or dv/dt filter as specified and as shown. Provide a matrix harmonic filter switching contactor for capacitor portion of filter as applicable.
  - d. Through the door disconnect operator.
  - e. Front panel mounted keypad, run light, elapsed time meter and all specified items.
  - f. The application shall provide for a 480, 3 phase input to each of the respective VFD control panels. The size of the VFD shall be based on motor ampacity and not strictly HP rating. The following information is being supplied for submersible equipment/pumps only:
    - i. Submersible Pump No. 1:
      - Motor Horsepower = 150 HP
      - Full Load Current = 197 Ampere
      - Maximum Full Load Current at Service Factor = 226.5 Ampere
      - Locked Rotor Current = 1182 Ampere
    - ii. Provide three (3), 8-hour days of start-up and training for commissioning and final acceptance of this VFD equipment. All equipment must be pre-started, tested and certified ready for testing prior to any of these days being used. Provide a two-week written schedule ahead of time to the Engineer and Owner to schedule final start-up and testing as well as training. Training will not be held the same day as start-up and shall be scheduled only upon start-up completion and acceptance.

- h. VFD shall be calibrated to the input signal based upon minimum and maximum flow settings.
- i. Provide VFD Parameter Setup and Verification. See Part 3 of this specification.

B. Conductors and Cables

1. Variable Frequency Drive (VFD) motor supply cable shall be four (4) conductor, tinned stranded copper with cross-linked polyethylene (XLP/XHHW-2 or equivalent thermoset) insulation. Cable shall include overall foil shield (100% coverage) and tinned copper braid (minimum 85% coverage), with a No. 12 AWG tinned copper drain wire and outer PVC or CPE jacket. Cables shall be listed to UL 1277 and/or UL 2277 and suitable for flexible motor supply applications. Thermoplastic insulations (e.g., THWN-2) are not acceptable. All underground power cables shall be UL Listed and Labeled for underground use in wet locations. Acceptable Manufacturers: Belden, Olflex, Houston Wire & Cable, or equal.
2. All cables to be installed underground shall be UL Listed and Labeled for underground use in wet locations. This applies to all cables, wires and conductors specified and used throughout the project installation.
3. All power wiring conductors shall be insulated for 600 volts, Type XHHW insulation, unless otherwise noted. Conductors shall be standard AWG and KCMIL sizes. Conductors shall be 98 percent copper, stranded, heat and moisture resistant with cross-linked synthetic polymer insulation for all sizes No. 12 AWG and larger. Smaller sizes shall not be used except for communications and special systems. For lighting and receptacle circuits, solid wire may be used in lieu of stranded wire, for No. 12 and No. 10 AWG only. Conductors shall be labeled with U.L. approval and be marked with the manufacturer's name, wire size and insulation type. All underground power cables shall be UL Listed and Labeled for underground use in wet locations. Acceptable Manufacturers: Okonite, Southwire, Prysmian, or equal. Submit power and control conductor colors for review.
4. Control Wiring:
  - a. All control wiring (120 or 24 volt, AC or DC) conductors within buildings or above grade shall be insulated for 600 volts, unless otherwise noted, and shall be No. 14 AWG minimum size, or larger. Conductors shall be 98 percent copper, stranded, heat and moisture resistant, and thermal plastic insulated and shall be type THWN/THHN.
  - b. All conductors for control wiring located below grade shall be 600V, 98 percent copper, stranded, heat and moisture resistant, with cross-linked synthetic polymer insulation type XHHW. All underground control cables shall be U.L. Listed and Labeled for underground use in wet locations. Acceptable Manufacturers: Okonite, Southwire, Prysmian, or equal.
  - c. Submit conductor colors of all control wiring for review.
  - d. Testing: Cables shall be subjected to insulation resistance test in accordance with ICEA S-66-524.

- e. Cable termination fittings shall be suitable for use with jacketed continuous-armor cable. Terminators shall be watertight, and shall be suitable for bottom, side, or top entry into boxes. O-Z/Gedney – a division of Emerson, PLM, or equal.
- f. Acceptable Manufacturers: USA Cable and Wire, Rockbestos Guardex, or equal.

2.2 VARIABLE FREQUENCY DRIVE SCHEDULE:

Equipment Name	Motor HP	Constant or Variable Torque	Full Load Current	Maximum Full Load Current at Service Factor	Locked Rotor Current	Harmonic Filter (HF) /Line Reactor(LR)/ RFI/EMI/(EMI) dv/dt (DVDT) or Sine Wave,(SW) long lead filter	Supplier MCC Manufacturer /Electrical Contractor	Lead Length (ft)	Notes
Submersible Pump No. 1	150	Constant	197A	226.5A	1182A	Active Harmonic Filter & Sine Wave Filter	EC	100ft	

#### Filtration Abbreviations

1. Harmonic Filter = HF; Line Reactor = LR;

#### Supplier Abbreviations

2. MCC Manufacturer = MCC
3. Electrical Contractor = EC

#### Notes:

1. The cable size for the application is oversized for the size motor due to the distance to account for voltage drop. The VFD supplier shall review the capacitance effect of the cable from oversized feeders when sizing the dv/dt long lead filter and VFD drive. Provide calculations for sizing dv/dt filter to the system will operate properly. Refer to conduit and wire schedule for size of wire being provided.
2. The VFD Manufacturer shall review the long lead length to determine if the selected filter is the best for the application.
3. Electrical Contractor and VFD Manufacturer shall be responsible for the final sizing of the VFDs based on the actual equipment submitted for the project. VFDs shall meet both the horsepower, torque and amperage needs.
  - a. 110% of continuous output current.
  - b. 250% of overload current for 2 minutes.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. The Contractors shall install all equipment per the Manufacturer's instructions, Drawings and the latest edition of the National Electrical Code accepted by the Authority Having Jurisdiction.
- B. Freestanding variable frequency control panels shall be mounted on 4" high concrete pads which shall extend 2" on exposed sides. Securely bolt each unit to its pad for proper horizontal and vertical alignment. Use shims where necessary.
- C. Ground all motor frames (operating on Variable Frequency Drives) and VFD shielded cable per the recommendations of the Manufacturer of the Variable Frequency Drive.
- D. Install Safety Labels in compliance with NEMA 260.
- E. Inspect all bus bolts prior to energization to check for looseness developed during shipment or handling.
- F. Coordinate with VFD manufacturer for equipment mounting heights.

#### 3.2 TESTS

- A. VFD Start-Up, Testing and Parameter Setup and Verification
  1. Responsibility and Coordination: The VFD supplier/electrical Contractor is responsible for adjusting all of the VFD parameters for a fully functional system

integrated with the instrumentation and control systems for this project. The VFD supplier/electrical Contractor is responsible for coordinating with the instrumentation Contractor and the instrumentation programmer so the control systems function as intended as described in the instrumentation control descriptions.

2. VFD Parameter Setup: Complete the VFD Parameter Setup Checklist and Verification below in the presence of the specifying engineer.
3. The electrical Contractor shall be responsible to coordinate an onsite meeting with the VFD supplier and the specifying engineer. This meeting shall take place prior to the initial startup of the equipment.

**VFD PARAMETER SETUP CHECKLIST**

**WELL 1A PUMP STATION**

- 1. Ramp up speed \_\_\_\_\_
- 2. Ramp down speed \_\_\_\_\_
- 3. Min speed (Hz) \_\_\_\_\_
- 4. Max speed (Hz) \_\_\_\_\_
- 5. 4-20mA setting at min speed (mA) \_\_\_\_\_
- 6. 4-20mA setting at max speed (mA) \_\_\_\_\_
- 7. Output scale calibration \_\_\_\_\_
- 8. Auto restart after power failure (yes/no) \_\_\_\_\_
- 9. Auto restart after overcurrent fault (yes/no) \_\_\_\_\_
- 10. Speed reference (internal/external) \_\_\_\_\_
- 11. If external - signal source \_\_\_\_\_
- 12. If external - signal type \_\_\_\_\_
- 13. Restart after E-Stop (yes/no) \_\_\_\_\_
- 14. Discrete outputs - Run (yes/no) \_\_\_\_\_
- 15. Discrete outputs - Fault (yes/no) \_\_\_\_\_
- 16. Analog outputs - Amps (absolute units) \_\_\_\_\_
- 17. Analog outputs - KW (absolute units) \_\_\_\_\_
- 18. Analog outputs - Speed (Hz) \_\_\_\_\_
- 19. Analog outputs - Speed (RPM) \_\_\_\_\_
- 20. Analog inputs - 4mA set to 0Hz (yes/no) \_\_\_\_\_
- 21. Analog inputs - 20mA set to 60Hz (yes/no) \_\_\_\_\_
- 22. Analog inputs - min speed limit set (yes/no) \_\_\_\_\_
- 23. Analog inputs - max speed limit set (yes/no) \_\_\_\_\_
- 24. Voltage boost (%) \_\_\_\_\_
- 25. Starting frequency (Hz) \_\_\_\_\_
- 26. PMW carrier frequency (Hz) \_\_\_\_\_
- 27. Acceleration time (sec) \_\_\_\_\_
- 28. Deceleration time (sec) \_\_\_\_\_
- 29. Forward run (yes/no) \_\_\_\_\_
- 30. Reverse run (yes/no) \_\_\_\_\_
- 31. Overload (60%-100%) \_\_\_\_\_

**VFD PARAMETER SETUP VERIFICATION**

**WELL 1A PUMP STATION**

Date: \_\_\_\_\_  
General Contractor: \_\_\_\_\_  
Electrical Subcontractor: \_\_\_\_\_  
VFD Supplier: \_\_\_\_\_

This certifies that the VFD parameters have been coordinated per the specifications and the requirements of Section 16469.

_____ (Authorized Representative of the General Contractor)	_____ Date
_____ (Authorized Representative of the Electrical Subcontractor)	_____ Date
_____ (Authorized Representative of the VFD Supplier)	_____ Date

**END OF SECTION**

# CI Harm c ard S I t Ce ter

## Rep rt for Needham Well 1A - VFD Replacement

**Project ID: 153126**

**Project Location: USA**

**Generated for Cameron M or**

**Company: Wright-Pierce**

**Email: camero .minor@wright-p erce.com**

**Date/ ime: June 7, 2026 at 8:30 PM CD**

## Power System I formati

### Transformer Primary

<b>Enter Data</b>	No
<b>Voltage</b>	0.00 kV RMS
<b>Short Circu t Current</b>	0.00 kA RMS

### Transformer Secondary

<b>Voltage</b>	480.00 V RMS
<b>Frequency</b>	60.00 Hz
<b>kVA</b>	1,000.00 kVA
<b>Z</b>	5.75 %

### Seco dary Correction Target

<b>Harm nic Correction</b>	Yes
<b>Desired iTDD</b>	15.00 %
<b>IEEE-519</b>	Yes
<b>Power Fact r Correction</b>	No

### Non-Linear Loads

Qty	Rectif er ype	Passive Filter	VFD HP	% DC Choke	% AC Line Reactor	KDR Line Reactor	% Load	Notes
1	6 Pulse Diode	HGP (5%)	150 HP	4 %	5 %	0 %	85 %	

**inear oa**

Qty	Load Type	HP	kVA	% Load
1	Other	0 HP	15 kVA	100 %

**Calculated Solution**

<b>Corrective Current Required</b>	0.0 A
<b>Chosen Active Filter Current Rating</b>	0.00 A

**Secondary Correction Data**

<b>iTDD with Chosen Filter</b>	4.5 %
<b>vTHD with Chosen Filter</b>	0.2 %
<b>ISC/IL (SCR)</b>	128.4
<b>Desired iTDD</b>	15.0 %
<b>iTDD Compliance</b>	iTDD Compliant

**Power System Electrical Quantities**

	<b>Baseline System</b>	<b>Chosen System</b>	<b>Compliant System</b>
<b>Total RMS Current (IRMS)</b>	163.1	163.1	163.1
<b>Fundamental Current (I60)</b>	162.9	162.9	162.9
<b>Harmonic Current (IH)</b>	7.3	7.3	7.3
<b>iTDD % (iTHD)</b>	4.5	4.5	4.5
<b>Reactive Current (IQ)</b>	11.9	11.9	11.9
<b>vTHD %</b>	0.2	0.2	0.2
<b>kW</b>	135.1	135.1	135.1
<b>kVAR</b>	11.6	11.6	11.6
<b>kVA</b>	135.6	135.6	135.6
<b>Displacement Power Factor (PF)</b>	1.00	1.00	1.00
<b>Distortion Power Factor (PF)</b>	1.00	1.00	1.00
<b>Total Power Factor (PF)</b>	1.00	1.00	1.00

**Warning Message**

o Warning

**Disclaimer: The result of this analysis may not accurately represent actual system performance due to insufficient system data or limitations of the estimation software. TCI, LLC assumes no liability for damages that may occur as a result of equipment placed in service based on the results of this analysis.**

Copyright © 2026 [TCI, LLC](#). All rights reserved.



# SUBMERSIBLE MOTOR INSTALLATION RECORD

## Form 2207 - Page 1

RMA Number

KEY DEALER #

DISTRIBUTOR	INSTALLER	END USER
Name: _____	Name: <u>Mahe Services</u>	Name: <u>Needham Water</u>
City: _____	City: <u>N. Reading</u>	City: <u>Needham</u>
State: _____ Zip: _____	State: <u>MA</u> Zip: _____	State: <u>MA</u> Zip: _____

Well ID or GPS: \_\_\_\_\_ Water Temperature: \_\_\_\_\_ °F  °C

Application/Water Use (e.g. potable water, irrigation, municipal, fountain, etc.): \_\_\_\_\_

Date Installed (mm/yy): \_\_\_\_\_ Date Failed (mm/yy): \_\_\_\_\_ Motor Position Shaft-Up:  Yes  No

Operating Cycle: ON Time Per Start \_\_\_\_\_  Hrs.  Mins. Time OFF Between Stop & Restart \_\_\_\_\_  Hrs.  Mins.

### MOTOR

Model: 2391068509 Serial Number: 13D19-16-08010-8 Date Code (if updated): 13D19

### MOTOR OVERLOAD

System Typical Operating Current: \_\_\_\_\_ Amps @ \_\_\_\_\_ Volts

Overload:  FE SubMonitor Input Amps \_\_\_\_\_ D3 Attached  Yes  No Fault Settings Attached  Yes  No

Other Manufacturer Model: \_\_\_\_\_ Dial Set at: \_\_\_\_\_ or Heater# \_\_\_\_\_

NEMA Class:  10  20  30 Ambient Compensated:  Yes  No

Power to Motor by:  Full Volt Starter  VFD  Soft Starter VFD or Soft Starter Mfr. & Model: \_\_\_\_\_

### PUMP

Manufacturer: Goulds

Model: 9TLC

Stages: 3

Design Rating: 1300 gpm @ 330 ft TDH

Horsepower Required by Pump End: 136

Actual Pump Delivery: \_\_\_\_\_ gpm @ \_\_\_\_\_ psi

What Controls When System Runs & Stops: \_\_\_\_\_

(e.g. pressure, level, flow, manual on/off, timer, time clock etc.)

### WELL DATA (All measurements from well head down.)

Casing Diameter 18" in

Drop Pipe Diameter 8" in

Number of Sticks of Drop Pipe 2

Static Water Level 20' ft

Drawdown (pumping) Water Level 24' ft

Spring Assist Check Valves:  
(Measured from Well Head Down)

#1 1' #2 \_\_\_\_\_ #3 \_\_\_\_\_ #4 \_\_\_\_\_ ft

Solid  Drilled Poppet  Break-Off Plug

Pump Inlet Setting \_\_\_\_\_ ft

Flow Sleeve  No  Yes, Dia. 10" in

Case Ends \_\_\_\_\_ ft

Well Screen  Perforated Casing

#1 from 57 to 77 & #2 from \_\_\_\_\_ to \_\_\_\_\_ ft

Well Depth 77 ft

Screen (57')

### YOUR NAME / DATE