ADDENDUM NO. 2
TO
CONTRACT DOCUMENTS

December 7, 2015

PROJECT TITLE: TOWN OF JUPITER
REPLACEMENT OF HIGH SERVICE PUMPS (HSPs) 3, 4, 5 & 6
(W1402A)

TO: All Plan Holders of Record

This addendum forms a part of the Contract Documents and modifies the original Project Documents as noted below. Acknowledge receipt of this Addendum in the space provided on the Bid Proposal form.

GENERAL

PRE-BID MEETING

A pre-bid meeting for this project was held on December 1st, 2015, the meeting minutes and attendance list is included as part of this addendum.

IN THE FRONT ENDS

PROPOSAL-BID SCHEDULE OF VALUES

DELETE the Bid Schedule of Values in its entirety and REPLACE it with the revised Bid Schedule of Values included in this addendum.

PROPOSAL-SUBTANTIAL AND FINAL COMPLETION DURATIONS

DELETE the Substantial Completion and Final Completion durations included in the Front End Documents, Proposal section and REPLACE them with the following:

Substantial Completion: 240 calendar days from Notice to Proceed
Final Completion: 270 calendar days from Notice to Proceed

AGREEMENT (CONTRACT) BETWEEN OWNER AND CONTRACTOR

DELETE Article 3.1 in its entirety and REPLACE it with revised Article 3.1 as follows:

“3.1. The Work will have a substantial completion date after the date when the Contract Time commences to run as provided in paragraph 2.03 of the General Conditions, and as outlined below. The work will be
completed and ready for substantial and final payment in accordance with Article 14 of the General Conditions and as outlined below:

Substantial Completion: 240 calendar days from Notice to Proceed
Final Completion: 270 calendar days from Notice to Proceed

IN THE TECHNICAL SPECIFICATIONS

SECTION 01025, MEASUREMENT AND PAYMENT

Part 2, Paragraph J

ADD Paragraph J as follows:

J. ELECTRICAL AND PUMP ROOM INTERIOR PAINTING (Bid Item No. 10, Additive Alternate)

1. Method of Measurement: The quantity to be paid for under this Section shall be on a lump sum basis.

2. Basis of Payment: Payment shall be at the Contract Lump Sum Price and shall include, but not limited to, furnishing all materials, labor, and equipment required to paint the interior walls and floors of the high service pump room and the electrical room.

SECTION 11932, HIGH SERVICE PUMPS-HORIZONTAL SPLIT CASE

DELETE specification Section 11932 in its entirety and REPLACE it with revised Section 11932 included in this addendum.

IN THE DRAWINGS

SHEET M-1, DEMOLITION PLAN

DELETE drawing Sheet M-1 in its entirety and REPLACE it with the revised drawing Sheet M-1, titled “W1402A Addendum 2- Drawing M-1” posted to demandstar.com as part of Addendum 2.

SHEET M-2, MECHANICAL FLOOR PLAN

DELETE drawing Sheet M-2 in its entirety and REPLACE it with the revised drawing Sheet M-2, titled “W1402A Addendum 2- Drawing M-2” posted to demandstar.com as part of Addendum 2.
DELETE drawing Sheet M-3 in its entirety and REPLACE it with the revised drawing Sheet M-3, titled "W1402A Addendum 2- Drawing M-3" posted to demandstar.com as part of Addendum 2.

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A pre-bid meeting for the above referenced project was held on December 1st, 2015 at the Town of Jupiter Water Treatment Plant located at 17403 Central Boulevard, Jupiter, Florida 33458. The meeting was not mandatory. The meeting started at 1:30 pm.

A sign-in sheet was circulated for all attendees to complete. A copy of the sign-in sheet is provided as an attachment to these meeting minutes.

I. Introductions

Introductions of the Town of Jupiter representatives and the design engineering firm were made as follows.

Amanda Barnes – Town of Jupiter Assistant Director of Utilities, Project Manager
Larry Tress – Utilities Electrician
Jason Lee – Kimley-Horn & Associates, Design Engineer

II. DemandStar

The Town reviewed the process for obtaining bid documents for the project.

Plans and specs are available on www.demandstar.com.

All Bidders must be a plan holder of record on demandstar.com in order to be considered for contract award.

Instructions for obtaining plans and specs from demandstar.com are provided in the Invitation to Bid and the Instructions to Bidders in the Front End Documents for the project.

Interested parties do not need to become a member of demandstar.com to obtain the documents rather; interested parties may sign up on demandstar.com for a free agency subscription with the Town of Jupiter.

Payment for plans and specifications is non-refundable

Complete sets of Bidding Documents are to be used in preparing Bids’. Neither Owner nor Engineer assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

All addenda will be issued through demandstar.com and plan holders on record with Demandstar.com will be notified of addenda.
III. Bid Opening

Sealed bids must be delivered to the Town of Jupiter at the office of the Town Clerk, 210 Military Trail up to 2:00 pm on Tuesday, December 22\textsuperscript{nd}, 2015.

Bids received after 2:00 pm EST will not be accepted.

Bids will be publicly opened and read aloud in the Town Council Chambers.

IV. Questions Concerning the Bid

All questions concerning the bid documents must be submitted in writing to Amanda Barnes, Assistant Director of Utilities (fax 561-747-5634 or email amandab@jupiter.fl.us). Questions received less than three days prior to the date for opening Bids will not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

If questions are emailed it is recommended that the project name is included in the subject section of the email and that the email is sent with a read response returned to the sender as there may be a chance that your email was held up in the Town's spam filter and did not reach the intended recipient.

Bidders shall report any conflicts, errors, or discrepancies in the Contract Documents, immediately in writing to Amanda so that clarification or interpretation can be provided.

A site visit was conducted as part of the Pre-Bid Meeting. Additional site visits, if needed in preparation for Bid submittal must be scheduled with Chris McKenzie, the WTP Maintenance Supervisor, with 48 hours' notice. Chris may be contacted at 561-741-2605 or chrism@jupiter.fl.us.

V. Bid Security

Bid security in the amount of 5% of the total bid amount is required to be submitted with each bid.

VI. Contractor Qualifications

- The successful bidder must be a General Contractor licensed in the State of Florida.
- The successful bidder must have completed and submitted with their bid all of the information requested in the Bid Proposal:
  
  Including the Bid Schedule of Values, Qualification Requirements questionnaire, Bidder/and major subcontractors experience and references, Contractor Safety Qualification Form, Sworn Statement, and Bid Bond.
- Bidder must perform a minimum of 60% of the work of this contract with his/her own forces.
VII. Contract Duration

- The contract duration is as follows:
  
  Substantial completion is 180 calendar days from the date of Notice to Proceed. Final completion is 210 calendar days from the date of Notice to Proceed.

IX. Permits

- Contractor is required to obtain all necessary permits to complete the work in accordance with local, State, and Federal regulations, including but not limited to dewatering withdrawal and discharge permits.

- The Town of Jupiter has obtained the following permits:
  - PBCHD/FDEP Permit No. 138279-3337-W. A copy of the permit is included in the appendix of the bid documents.

- As a courtesy to the contractor the Town will submit the construction plans to the Town of Jupiter Bldg Department to start the permit review process. The Town will pay all Town of Jupiter Bldg Department fees. The contractor will be responsible to provide any additional information required by the Building Dept and obtain the permit.

- A Town of Jupiter occupational license is required before work commences.

X. Contract Administration

- The Town of Jupiter, will administer the contract and provide the Resident Project Representative. The Engineer, Kimley-Horn & Associates, will serve as the Owner’s representative and be involved in the project during shop drawing review, testing, and construction on an as needed basis as determine by the Town.

- Neither Bidders nor Contractor of Award should contact the Engineer directly. All correspondence from Contractor shall be to Owner’s Project Manager. Contractor shall not contact Engineer directly without prior approval from Town.

- The Contractor of award will be required to attend a pre-construction meeting with the Owner and Engineer after Notice to Proceed, plant safety orientation, and weekly construction progress meetings.

XI. Project Description

- The estimated construction cost for this project is $545,000.

- A summary of the project was discussed as outlined below.

  Replacement of four existing high service pumps with two new horizontal split case pumps inside an existing concrete masonry building, including demolition of existing pumps, motors, concrete equipment pads, piping, pipe supports, electrical equipment and wiring; construction of two new 4,000 gpm, 250 HP motors and variable frequency drives, new piping, valves, instrumentation,
electrical equipment, cabinets, and wiring; testing, disinfection, and bacteriological clearance for PBCHD/FDEP release.

The Town will provide programming services for control communication with the water treatment plant’s SCADA system. The Contractor will be required to coordinate work and testing with the Town. The Town’s consulting programmer is Control Systems Design.

XII. Other Items Discussed

- Bidders are responsible to familiarize themselves with the Bid Documents, the job sites and the work to be performed by the Contract.

- The Town anticipates a Notice to Proceed to be issued in February 2016.

- Normal work hours for this contract will be limited to Monday-Friday, 7:00 am – 4:00 pm. No work will be allowed on weekends or Town observed holidays. Work requiring Town inspection must be schedule to be completed prior within normal working hours.

- Town will make temporary power available to the contractor however contractor will be required to furnish and install all necessary equipment associated with obtaining the temporary power in accordance with current building codes.

- Contractor is responsible to make sanitary provisions for him workers on site.

- Contractor is required to submit a pre-construction video of the site including contractor’s access and surrounding areas for Owner’s acceptance prior to mobilizing to the site.

- Contractor is responsible to schedule and coordinate the Work of this contract with water plant operations. A recommended work sequence is provided in Section 01010 of the Technical Specifications with limitations for shut downs and advance notice.

- Town will provide an area onsite for contractor’s construction staging and laydown. Additional space can be made available at the Town’s Central Blvd ground storage and high serving pumping facility.

- Contractors should refer to Section 01025 Measurement and Payment when preparing their bid.

- Bidders must indicate their intent regarding bacteriological sampling and testing on the Bid Schedule of Values. Bidder’s may utilize the Town’s certified lab staff or hire an outside certified lab to perform the work.

- The undefined conditions allowance included on the Bid Schedule of Values is explained in Section 01025 and must have Town’s prior approval before being used by the Contractor.

- Town will confirm with pump suppliers that contract durations include sufficient time for ordering and delivery of pumps.
• The Contract does contain provisions for large equipment such as the pumps and motors to be supplied by the Contractor under the Sales Tax and Use Saving Program. The Program is explained in detail in the Supplementary Conditions of the bid documents.

• The existing flange adapter located at existing western most pump is to be replaced with a restrained flange adaptor. This will be clarified by addendum.

cc: Plan Holders via Demandstar.com
    W1402A Meeting Minutes File
    Jason Lee - KHA
    Chris McKenzie/Larry Tress – TOJ

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## Mandatory Pre-Bid Meeting Sign-In Sheet
**December 1, 2015**
**1:30 PM**

<table>
<thead>
<tr>
<th>Name</th>
<th>Company Name</th>
<th>Phone Number</th>
<th>Email Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amanda Barnes</td>
<td>Town of Jupiter</td>
<td>561-741-2537</td>
<td><a href="mailto:amandab@jupiter.fl.us">amandab@jupiter.fl.us</a></td>
</tr>
<tr>
<td>Jason Lee</td>
<td>Kimley-Horn &amp; Associates</td>
<td>561-840-0256</td>
<td><a href="mailto:Jason.lee@kimley-horn.com">Jason.lee@kimley-horn.com</a></td>
</tr>
<tr>
<td>Larry White</td>
<td>Farmer &amp; Irwin</td>
<td>561-719-5799</td>
<td>lirwhite@f BMW.com</td>
</tr>
<tr>
<td>Brian Schneider</td>
<td>Farmer &amp; Irwin</td>
<td>561-215-7087</td>
<td><a href="mailto:bschneider@fBMW.com">bschneider@fBMW.com</a></td>
</tr>
<tr>
<td>Rene Vian</td>
<td>EnergyElec, Inc.</td>
<td>561-617-7211</td>
<td><a href="mailto:vian@energyelec.com">vian@energyelec.com</a></td>
</tr>
<tr>
<td>John Monaco</td>
<td>TLC Diversified</td>
<td>561-411-2025</td>
<td><a href="mailto:JMCNA0002@GMAIL.COM">JMCNA0002@GMAIL.COM</a></td>
</tr>
<tr>
<td>John Chalke</td>
<td>Cedar Electric, Inc.</td>
<td>561-588-4088</td>
<td><a href="mailto:john@cedarinc.com">john@cedarinc.com</a></td>
</tr>
<tr>
<td>Abel Marquez</td>
<td>AM Construction</td>
<td>561-907-7833</td>
<td><a href="mailto:amconstruction@bealls.com">amconstruction@bealls.com</a></td>
</tr>
<tr>
<td>Joe Godfrey</td>
<td>Godfrey Electric</td>
<td>561-333-8325</td>
<td><a href="mailto:godfrey@godfreyelec.com">godfrey@godfreyelec.com</a></td>
</tr>
<tr>
<td>Tom Clarke</td>
<td>Florida Orient Corp.</td>
<td>561-275-2230</td>
<td><a href="mailto:tclarke@focorp.com">tclarke@focorp.com</a></td>
</tr>
<tr>
<td>Mark Thomas</td>
<td>AIB</td>
<td>663-336-4058</td>
<td><a href="mailto:mark.at.thasi@us.aib.com">mark.at.thasi@us.aib.com</a></td>
</tr>
<tr>
<td>Adam Bunting</td>
<td>D &amp; Higgins</td>
<td>941-332-3100</td>
<td><a href="mailto:abunting@dahliggins.com">abunting@dahliggins.com</a></td>
</tr>
<tr>
<td>Chase Rogers</td>
<td>Hunterland Group, Inc.</td>
<td>561-640-3503</td>
<td><a href="mailto:cros@hunterlandgroup.com">cros@hunterlandgroup.com</a></td>
</tr>
<tr>
<td>Jeff Host</td>
<td>HL Drilling</td>
<td>561-813-3213</td>
<td><a href="mailto:jeff@hldrilling.com">jeff@hldrilling.com</a></td>
</tr>
<tr>
<td>James Carter</td>
<td>Morton Smith, Inc.</td>
<td>(407)321-8110</td>
<td><a href="mailto:jim.carson@smith.com">jim.carson@smith.com</a></td>
</tr>
<tr>
<td>Bruce Rahmani</td>
<td>Global Tech, Inc.</td>
<td>561-747-6433</td>
<td><a href="mailto:Bruce@GlobalTech.com">Bruce@GlobalTech.com</a></td>
</tr>
<tr>
<td>Richard Taylor</td>
<td>TAW</td>
<td>561-4523</td>
<td><a href="mailto:Richard.Taylor@TAW.com">Richard.Taylor@TAW.com</a></td>
</tr>
</tbody>
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*Utilities Water/WWTP (OF Projects) 14-2014-14-02 Pump Replacement Program 1402A On Site 1166.3 Meeting Minutes Pre-Bid Mtg W1402A Pre Bid Sign In sheet.doc*
**BID PROPOSAL (CONT.)**

**TOWN OF JUPITER**

**REPLACEMENT OF HIGH SERVICE PUMPS (HSPS) 3, 4, 5 & 6**

(W1402A)

**Revised Bid Schedule of Values-Addendum 2**

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<th>Item No.</th>
<th>Item Description</th>
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<th>Total Amount</th>
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<td>Control System and Instrumentation</td>
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<td>8</td>
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<td>9</td>
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**Total Base Bid Price : (Item Nos. 1 - 9) =** $____________

Total Base Bid Price (Item Nos. 1-9) in Words: _______________________________________________
________________________________________________________________________________________

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<th>Item No.</th>
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<td>Interior Painting of Electrical and Pump Room</td>
<td>LS</td>
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**Total Additive Alternate Bid Price : (Item No. 10) =** $____________

Total Additive Alternate Bid Price (Item No. 10) in Words: __________________________________________
________________________________________________________________________________________

Total Base Bid + Additive Alternate Bid Price (Item Nos. 1 - 10) in Figures: $____________

Total Base Bid + Additive Alternate Bid Price (Item Nos. 1 - 10) in Words: _____________________________
________________________________________________________________________________________
Bacteriological Clearance Laboratory
Contractor must check one of the following indicating the means by which bacteriological sampling and testing will be accomplished for this project:

[ ] Approved State Department of Health Laboratory (DOH Certified)

[ ] Town of Jupiter Water System Laboratory (DOH Certified). Use of Town of Jupiter Water System Lab will result in no charge to Owner for Bacteriological Sampling and Testing on the Bid Schedule of Values above.

END OF BID SCHEDULE OF VALUES.

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PART I - GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and install, place in operation, and start up variable speed electric motor driven, horizontal, axially split case, double suction, single volute pumps as specified herein and shown on the Drawings.

B. These Specifications are intended to give a general description of what is required, but do not cover all details which will vary in accordance with the requirements of the equipment application. It is, however, intended to cover the furnishing, the shop testing, the delivery and complete installation and start up (including field testing) of all materials, equipment and appurtenances for the complete pumping units as herein specified, whether specifically mentioned in these specifications or not.

1.02 RELATED WORK

A. Section 01300 - Submittals

B. Section 09900 - Painting

C. Section 11930 - Pumps – General

D. Section 15100 – Piping and Valves

E. Section 16405 - Electric Motors

1.03 DESCRIPTION OF SYSTEMS

A. Two new high service pumping units are required under this contract to discharge water into the distribution system. The pumping units shall be located and arranged as shown on the Contract Drawings.

B. All working parts of the pump, motor and drive such as bearings, wearing rings, shaft sleeves, motor windings, etc., shall be of standard dimensions built to limit gauges or formed to templates, such that parts will be interchangeable between like units, and such that the Owner may at any time in the future obtain replacement and repair parts for those furnished in the original machine. All parts shall be properly stamped for identification and location in the machine as shown on the assembly drawings in the instruction books furnished.

1.04 REFERENCE STANDARDS
A. Design, manufacture and assembly of elements of the equipment herein specified shall be in accordance with, but not limited to, published standards of the following, as applicable:

1. American Gear Manufacturers Association (AGMA)
2. American Institute of Steel Construction (AISC)
3. American Iron and Steel Institute (AISI)
4. American Society of Mechanical Engineers (ASME)
5. American National Standards Institute (ANSI)
6. American Society for Testing Materials (ASTM)
7. American Welding Society (AWS)
8. American Bearing Manufacturers Association (ABMA)
10. Institute of Electrical and Electronics Engineers (IEEE)
11. National Electric Code (NEC)
12. National Electrical Manufacturers Association (NEMA)
13. Occupational Safety and Health Administration (OSHA)
14. Steel Structures Painting Council (SSPC)
15. Underwriters Laboratories, Inc. (UL)

B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALITY ASSURANCE

A. To assure unity of responsibility, the motor and base plate shall be furnished and coordinated by the pump manufacturer.

B. The equipment covered by these specifications is intended to be standard pumping equipment of proven ability as manufactured by companies having experience in the production of such equipment. The equipment furnished shall be designed, constructed and installed to operate satisfactorily when installed as shown on the Contract Drawings and as specified herein.

C. Pump shall be manufactured in accordance with the Hydraulic Institute Standards, except where otherwise specified herein.

D. The manufacturer shall be fully responsible for the design, arrangement and operation of all connected rotating components, of the assembled pumping unit mounted on a fabricated steel baseplate, to ensure that neither harmful nor damaging vibrations occur anywhere within the specified operating range.

E. For all variable speed units, the Manufacturer shall perform both lateral and torsional critical speed analyses to identify and ensure that (a) the first lateral critical speed shall be at least 25 percent above the maximum pump speed, (b) the first torsional critical speed shall be at least 25 percent above the maximum pump speed, and that, (c) any blade excited resonant frequency shall be no closer than plus or minus 25 percent of the natural frequency of any part of the installed assembled pumping unit. Prior to manufacture, a statement must be forwarded to the Owner and Engineer indicating that the required analyses have been made and that the specified limitations will be met.
1.06 SUBMITTALS

A. Shop drawings and product data, in accordance with Section 01300, shall include the following:

1. Certified dimensional drawings of each item of equipment and auxiliary apparatus to be furnished.
2. Certified foundation, pump support and anchor bolt plans and details.
3. Schematic electrical wiring diagram and other data as required for complete pump installation.
4. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the detail specifications.
5. Total weight of pumping unit.
6. A statement of guarantee that the critical speed analyses as required under Paragraph I .05E have been completed and that the specified limitations will be met.

B. Design Data

1. Manufacturer’s certified rating curves, to satisfy the specified design conditions, showing pump characteristics of discharge, head, brake horsepower, efficiency and guaranteed net positive suction head required (NPSHR). Curves shall show the full recommended range of performance and include shut-off head. This information shall be prepared specifically for the pump proposed. Catalog sheets showing a family of curves will not be acceptable.

C. Test Reports

1. Certified motor test data as described in Section 16405.
2. The pump manufacturer shall factory test all pumps prior to shipment in accordance with the standards of the Hydraulic Institute (HI). The performance test acceptance grade shall be 1UE as defined by HI 14.6.
3. Tabulated data for the drive motors including rated HP, full load RPM, power factor and efficiency curves at 1/2, 3/4 and full load, service factor and KW input, including when the pump is at its design point. Submit a certified statement from the motor manufacturer that the motors are capable of continuous operation on the power supply without affecting their design life for bearings or windings.
4. Description of pump factory test procedures and equipment.
5. The pumping unit and electric motor shall be designed and constructed to withstand the maximum turbine run-away speed of the unit due to back flow through the pump. A statement of compliance and calculations demonstrating the ability of the units to meet this requirement shall be supplied with initial shop drawing submission.

D. Operation and Maintenance Data

1. Complete operating and maintenance instructions shall be furnished for all equipment included under these specifications as provided in Section 01730.
maintenance instructions shall include troubleshooting data and full preventative maintenance schedules and complete spare parts lists with ordering information.

1.07 OPERATING INSTRUCTIONS

A. Operating and maintenance manuals shall be furnished. The manuals shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, descriptions, etc. that are required to instruct operation and maintenance personnel unfamiliar with such equipment. The number and special requirements shall be as specified in Section 01730.

1.08 TOOLS AND SPARE PARTS

A. One (1) set of all special tools required for normal operation and maintenance shall be provided. All such tools shall be furnished in a suitable steel tool chest complete with lock and duplicate keys.

B. The manufacturers of the equipment specified herein shall furnish a complete set of recommended spare parts necessary for the first five (5) years operation of the pumping system. Minimum spare parts to be furnished are listed in Paragraph 2.02 I. of this Section.

C. Spare Parts shall be properly bound and labeled for easy identification without opening the packaging and suitably protected for long term storage.

1.09 PRODUCT HANDLING

A. All parts shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are operational.

B. All equipment and parts must be properly protected against any damage during a prolonged period at the site.

C. Factory assembled parts and components shall not be dismantled for shipment unless permission is received in writing from the Engineer.

D. Finished surfaces of all exposed pump openings shall be protected by wooden blanks, strongly built and securely bolted thereto.

E. Finished iron or steel surfaces not painted shall be properly protected to prevent rust and corrosion.

F. After hydrostatic or other tests, all entrapped water shall be drained prior to shipment and proper care shall be taken to protect parts from the entrance of water during shipment, storage and handling.

G. Each box or package shall be properly marked to show its net weight in addition to its contents.
1.10 MANUFACTURER’S SERVICE REPRESENTATIVE

A. The Contractor shall provide the services of one or more qualified manufacturer’s technical representatives who shall adequately supervise and certify the installation, conduct field testing of the pumping equipment furnished under this Contract, and instruct the Contractor’s personnel and the Owner’s personnel in its maintenance and operation of the units. The services of the manufacturer’s representative shall provide for at least three days as follows:

1. One trip which includes one (1) day of time on-site for start-up and for operational assistance and training.

1.11 WARRANTY

A. The equipment shall be warranted to be free of defects in workmanship, design or material for a period of one year from date of startup or 18 months from delivery, whichever occurs first. If the equipment should fail during the warranty period due to a defective part(s), it shall be replaced in the machine and the unit(s) restored to service at no expense to the Owner.

PART 2- PRODUCTS

2.01 MATERIAL AND EQUIPMENT

A. The pumping units required under this section shall be complete including pump, motor, and baseplate with proper alignment and balancing of the individual unit. All parts shall be so designed and proportioned as to have liberal strength, stability, and stiffness and to be especially adapted for the work to be done. Ample room shall be provided for inspection, repairs, and adjustment.

B. The baseplate for the pump shall be rigidly and accurately anchored into position. The manufacturer shall list all necessary foundation bolts, plates, nuts, and washers for purchase and installation by the Contractor.

C. A stainless steel nameplate giving the name of the manufacturer, the rated capacity, head, speed, and all other pertinent data shall be attached to the pump and motor.

D. The pumping unit and electric motor shall be designed and constructed to withstand the maximum turbine run-away speed of the unit due to back flow through the pump. A statement of compliance and calculations demonstrating the ability of the units to meet this requirement shall be supplied with initial shop drawing submission.

2.02 PUMP

A. General:

1. The pump shall be of the horizontal, centrifugal, axially split case, double suction, single volute type and shall be of proven design with the same make, size and
model installed and operating for at least ten (10) years. A list of installations and contact information shall be provided with initial shop drawings.

2. The pumps shall be of standard dimensions, built to limit gauges or formed to templates.

3. The pumps shall be as manufactured by Flowserve, Aurora, or Fairbanks-Morse.

B. Performance Requirements:

1. When operating at the maximum output speed of the motor, the pump shall have a characteristic performance curve, which meets all the minimum conditions listed in Table 11932-1. The pump and drive motor shall be capable of operating satisfactorily under the full range of conditions as defined by Table 11932-1. The secondary pump capacity, head and efficiency defined in Table 11932-1 shall be the “design point”.

2. Maximum motor speed shall not exceed that listed in Table 11932-1 to satisfy the specified hydraulic duty requirements. The pump “design speed” shall be the maximum output speed of the motor when operating at the pump “secondary” capacity and head.

3. With the pumping unit operating at full speed, the maximum brake horsepower required by the pump shall not exceed the maximum horsepower listed in Table 11932-1.
TABLE 11932-1
HIGH SERVICE PUMP DESIGN REQUIREMENTS

<table>
<thead>
<tr>
<th>Item</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Motor Full Load Speed (rpm)</td>
<td>1750</td>
</tr>
<tr>
<td>Motor to be Supplied (hp) Maximum</td>
<td>250</td>
</tr>
<tr>
<td>Pump Design Speed (rpm)</td>
<td>(motor full load speed)</td>
</tr>
<tr>
<td>Rated Pumping Temperature</td>
<td>82 F</td>
</tr>
<tr>
<td>Pumping Medium</td>
<td>Clear water</td>
</tr>
<tr>
<td>Suction Size, minimum (inches)</td>
<td>12</td>
</tr>
<tr>
<td>Discharge Size, minimum (inches)</td>
<td>10</td>
</tr>
<tr>
<td>Minimum Pump Shut-off Head at Design Speed (feet)</td>
<td>216</td>
</tr>
<tr>
<td>Maximum Allowed Pump Horsepower at Design Speed (hp)</td>
<td>250</td>
</tr>
<tr>
<td>Primary Capacity (gpm)</td>
<td>4,000</td>
</tr>
<tr>
<td>TDH at Primary Capacity (feet)</td>
<td>168.5</td>
</tr>
<tr>
<td>Minimum Pump Efficiency at Primary Capacity (%)</td>
<td>85%</td>
</tr>
<tr>
<td>NPSH Required (feet) at primary point</td>
<td>17</td>
</tr>
<tr>
<td>Capacity at Secondary (design) TDH (gpm)</td>
<td>5,000</td>
</tr>
<tr>
<td>TDH at Secondary Capacity (feet)</td>
<td>146</td>
</tr>
<tr>
<td>Minimum Pump Efficiency at Secondary Capacity (%)</td>
<td>83%</td>
</tr>
<tr>
<td>NPSH Required (feet) at secondary point</td>
<td>34</td>
</tr>
</tbody>
</table>
C. Certified Factory Tests:
   1. Factory testing in accordance with the standards of the Hydraulic Institute shall be required for each pump. The performance test acceptance grade shall be 1UE as defined by HI 14.6. Certified pump performance curves shall be submitted, including head, capacity, brake horsepower, and pump efficiency for the pump supplied. Certified data shall be provided to indicate the NPSH required by the pump at the primary operating point listed in Table 11932-1. Prior to conducting a pump test, notification of such test and a list of test equipment and test procedures shall be forwarded to the Owner and Engineer at least ten (10) working days before the scheduled test date. All electronic transducers, meters, gauges, and other test instruments shall be calibrated within forty-five (45) days of the scheduled test and certified calibration data shall be provided to the Engineer at least ten days prior to the Factory test. Differential pressure type flow meters, such as venturis shall have been calibrated within 5 years. Mechanical variation of the meter throat diameter will be accepted as verification of calibration validity.

   2. Each pump shall be tested through the specified range of flow, and head/capacity/efficiency with curves plotted at speeds of 70%, 80%, 90% and 100% rated speed. During each test, the pump shall be run at each head condition for sufficient time to accurately determine discharge, head, power input, and efficiency. The pump will be tested with a suction head (including vapor pressure, velocity head friction loss and static suction head) as required to demonstrate the NPSH required by the pump at the primary operating point listed in Table 11932-1. If the pump fails to meet any specification requirement it will be modified until it meets all specification requirements.

D. Pump Casing Construction:
   1. The pump case shall be of cast iron construction ASTM A48, Class 30.
   2. Casing shall be free from blowholes, sand pockets or other imperfections. Casing shall be hydro-statically tested at 150% of the maximum working pressure under which the pump could operate at design speed and an affidavit that the case has withstood this pressure test shall be furnished to the Owner/Engineer before shipment.
   3. The interior and exterior surfaces of the casing shall be smooth with matching flanges.
   4. The horizontal casing joint shall be a scraped or machined fit, requiring a gasket not more than 0.032-inch thick. These joints shall be made up with stud bolts screwed into the lower casing flange or bolts and nuts. Cap screws will not be considered. Joints shall be fitted with jacking screws.
   5. Suction and discharge flanges shall be faced and drilled ANSI Class 125 Standard. There shall be 2-inch I.P.T. tapped holes in both the suction and discharge flanges of the pump for test gauge connections.
   6. All holes for flange bolts, studs and cap screws in the casing shall be spot faced.
   7. The top half of each case at the topmost part shall have a bossed pipe tap opening for mounting an air release valve specified under Section 15100. Pipe taps shall be not less than 1/2-inch I.P.T.
   8. At the highest part of the case over each suction eye there shall be a pipe tap, not less than 1/2-inch I.P.T. for air release from the suction chambers.
9. The bearing brackets shall be cast as an integral part of the lower casing and have removable bracket caps. The bearing housing shall be dowelled for location and anti-rotation. The pump feet shall also be cast as an integral part of the lower casing.

10. Bronze renewable casing rings shall be furnished, dowelled and shouldered in the casing. Ring dowels shall be located in slots on the split surface of the lower casing.

E. Pump Impeller Construction:

1. The impeller shall be of one piece cast bronze, double suction type. The impeller shall be balanced, keyed to the shaft and fixed in an axial position by threaded shaft sleeves. The impeller skirt shall be grooved and fit with close tolerances to the casing ring to permit a minimum of recirculation between the impeller and the casing ring for maximum efficiency. Renewable bronze impeller rings shall be shrunk on the impeller and locked in place with stainless steel set screws.

F. Pump Bearings:

1. The weight of the pump shaft and impeller assembly shall be carried on journal or anti-friction bearings at each end of the pump shaft. Bearings shall be oil lubricated, double roll tapered type anti-friction bearings designed for an ABMA L-10 life of 100,000 hours for any point within the pump operating conditions specified. Alternate bearing designs shall be of a design acceptable to the Engineer.

2. The outboard bearing of the pump shall be designed to support the weight of the rotating assembly and accept all thrust loads and shall function so that the impeller rotor will be centered in the end play (axial movement) of the wearing rings.

G. Pump Shaft:

1. The shaft shall be stainless steel, adequately sized for the loads transmitted. Shaft deflection shall not exceed .002 inches at the face of the stuffing box when operating between 95% and 105% of capacity at best efficiency at the pump’s maximum 60 Hz. Speed and with full diameter impeller. The shaft shall be protected through the stuffing box by means of stainless steel shaft sleeves and they shall be threaded against shaft rotation. The sleeves shall be sealed at the impeller hub by a Teflon coated steel gasket to prevent pumped liquid between the shaft and sleeve. Shaft sleeves shall extend beyond the mechanical seal flanges.

H. Pump Stuffing Boxes:

1. Sealing of the pump liquid cavity shall be with a face type mechanical seal with Ni-resist stationary seat, carbon sealing washer, EPDM flexible members, stainless steel metal parts and spring. Seal to be rated for 225 degree Fahrenheit (107 degrees Celsius) @ 150 psig maximum. Seal shall be mounted over a stainless steel shaft sleeve.
I. Minimum numbers of spare parts to be furnished with the pumps:
   1. 2 - complete set of inboard and outboard bearings, lip seals and deflectors.
   2. 4 - complete sets of o-rings and gaskets.
   3. 2 - sets of mechanical seals.
   4. 2 - complete set of shaft sleeves, keys and accessories.
   5. 2 – spare coupling, complete

2.03 COUPLINGS AND ACCESSORIES

A. The shaft coupling between the motor shaft and the pump shaft is to be a flexible spacer coupling similar to the Woods Sure-Flex Spacer Coupling. The coupling must have a drop out center spacer to allow the shafts to be disconnected without disturbing the pump or motor. Coupling hubs are to be keyed into position on both shafts. The flexible rubber insert is to be EPDM. The coupling must be selected properly by horsepower rating and shaft size for the pump and motor combination specified.

B. An OSHA approved coupling guard shall be furnished over the coupling for protection.

2.04 BASE PLATES

A. The pump and driver shall be mounted on a common steel base with drip rim. Pump and driver shall be aligned and bolted in place prior to factory shipment. Final alignment must be performed at the jobsite in accordance with the standards of the Hydraulic Institute and the pump installation, operation and maintenance instructions. Base is to be grouted to eliminate vibration.

B. The baseplate must be fabricated steel drip rim baseplate with integral drip channels incorporated on each side. Each channel shall include an NPT connection and plug. The baseplate must conform to ANSI/ASME B73.1M 1984 Standard Dimensions and have pre-drilled holes for pump and motor mounting as well as grout holes. The baseplate design must provide sufficient rigidity to maintain alignment between pump and motor. Baseplate shall be equipped with jack bolts for alignment of pump and driver.

2.05 MOTORS

A. Drive motor shall be as specified in Section 16405.

PART 3- EXECUTION

3.01 INSTALLATION

A. Installation shall be in strict accordance with the manufacturer’s instructions and recommendations in the locations shown on the Drawings. Installation shall include furnishing the required oil and grease for initial operation. The grades of oil and grease shall be in accordance with the manufacturer’s recommendations. Anchor bolts shall be supplied by the Contractor and set in accordance with the manufacturer’s recommendations.
B. The Contractor shall submit a certificate from the manufacturer stating that the installation of the equipment is satisfactory, that the equipment is ready for operation, and that the operating personnel have been suitably instructed in the operation, lubrication and care of each unit. Refer to Section 01730.

3.02 SHOP PAINTING

A. Before exposure to weather and prior to shop painting, all surfaces shall be thoroughly cleaned, dry and free from all mill-scale, rust, grease, dirt and other foreign matter.

B. All pumps and motors shall be shop printed with primer compatible with field painting as specified in Section 09900.

C. All nameplates shall be properly protected during painting.

D. Gears, bearing surfaces, and other similar surfaces obviously not to be painted shall be given a heavy shop coat of grease or other suitable rust resistant coating. This coating shall be maintained as necessary to prevent corrosion during periods of storage and erection and shall be satisfactory to the Engineer up to the time of the final acceptance test.

3.03 FIELD PAINTING

A. Field painting is specified under Section 09900. The primer and paint used in the shop shall be products of the same manufacturer as the field paint to assure compatibility. Finish colors shall match existing pumping equipment.

B. All nameplates shall be properly protected during painting.

3.04 INSPECTION AND TESTING

A. General:

1. The Engineer shall have the right to inspect, test or witness tests of all materials or equipment to be furnished under these specifications, prior to their shipment from the point of manufacture.

2. The Engineer shall be notified in writing prior to initial shipment, in ample time so that arrangements can be made for inspection by the Engineer.

3. The Engineer or his representative shall be allowed proper time for inspection and testing of material and equipment.

4. Materials and equipment shall be tested or inspected as required by the Engineer, and the cost of such work shall be included in the cost of the equipment. The Contractor shall anticipate that delays may be caused because of the necessity of inspection, testing and accepting materials and equipment before their use is approved.

5. The manufacturer shall furnish the services of a competent and experienced representative who has complete knowledge of proper operation and maintenance of the equipment for a period of not less than one (1) day to inspect the installed equipment, supervise the initial test run, and to provide instructions to the plant.
personnel. The representative shall provide at least ten days’ notice in advance of
the site visit with the Owner. The final copies of operation and maintenance
manuals specified in Section 01730 must have been delivered to the Engineer
prior to scheduling the instruction period with the Owner.

6. Field tests shall not be conducted until such time that the entire installation is
complete and ready for testing. All field tests shall be coordinated with the Owner
to allow for scheduling of water plant shut downs and coordination with water
plant operations to meet current water production demands.

B. Pumps:

1. After the pump has been completely installed, and working under the direction of the
manufacturer, conduct in the presence of the Owner and Engineer, such tests as necessary
to indicate that the pumping system operates satisfactorily and generally meets the
conditions of service specified. The factory witnessed tests are the basis of equipment
efficiency demonstration. The field test shall demonstrate correct mechanical operation
after pump startup. Supply all labor, equipment and incidentals required to complete the
field tests. Power will be furnished by the Owner.

2. If the pump performance does not meet the Specifications, corrective measures shall be
taken or pumps shall be removed and replaced with pumps which satisfy the conditions
specified. A 24-hour continuous operating period of the pump will be required before
acceptance. During this 24-hour operating period, the Owner shall supply all power
necessary.

3. The Contractor shall megger the motor winding before energizing the motor, and, if
insulation resistance is found to be low, shall notify the Engineer and shall not energize
the motor.

4. The Contractor shall check the motor for correct clearances and alignment and for correct
lubrication in accordance with the motor manufacturer’s instructions. The Contractor
shall check direction of rotation of the motor and reverse connections if necessary.

5. Field test pumps for conformance to specified operating conditions. Record initial flow,
head, voltage and amperage for each power leg. Adjust tolerances, if necessary and retest.
Confirm that the amplitude and frequency of vibration during pump operation is within
the tolerances of the Standards of the Hydraulic Institute. Measure noise (dBA) adjacent
to pump, and at 10 feet and 50 feet away.

END OF SECTION

END OF ADDENDUM 2