



# CITY OF HOUSTON INVITATION TO BID

Issued October 29, 2010

## Bid Opening

Sealed bids, in duplicate, will be received by the City Secretary of the City of Houston, in the City Hall Annex, Public Level, 900 Bagby, Houston, Texas 77002 until **10:30 a.m. Thursday, December 02, 2010**, and all bids will be opened and publicly read in the City Council Chamber at 11:00 A.M. on that date for the purchase of:

**PUMPS, VARIOUS TYPES & SIZES  
FOR THE  
PUBLIC WORKS AND ENGINEERING DEPARTMENT  
BID INVITATION NO. S12-N23798  
NIGP CODE 720-64**

## Buyer:

Questions regarding this solicitation should be addressed to Martin L. King, Sr. Staff Analyst, at 832.393.8705 or email to [martin.king@cityofhouston.net](mailto:martin.king@cityofhouston.net).

## Pre-Bid

A Pre-Bid Conference will be held for all Prospective Bidders in the Strategic Purchasing Division, Conference Room No.1, 901 Bagby, City Hall Basement, Houston, Texas 77002 at 10:00 a.m. Thursday, November 18, 2010.

## Electronic Bidding:

In order to submit a bid for the items associated with this procurement, you must fill in the pricing information on the "**PLACE BID**" page.

All Prospective Bidders are urged to be present. It is the bidder's responsibility to ensure that they have secured and thoroughly reviewed all aspects of the solicitation documents prior to the Pre-Bid Conference. Any revisions to be incorporated into this solicitation document arising from discussions before, during and subsequent to the Pre-Bid Conference will be confirmed in writing by Letter(s) of Clarification prior to the bid due date. Verbal responses will not otherwise alter the specifications, terms and conditions as stated herein.

Bidding forms, specifications, and all necessary information should be downloaded from the Internet at <https://purchasing.houstontx.gov/>. By registering and downloading this solicitation document, all updates to this solicitation document will be automatically forwarded via e-mail to any registered bidders. This information may also be obtained from the Supplier Assistance Desk, Strategic Purchasing Division, 901 Bagby, Concourse Level, Houston, Texas 77002.

**The place of the bid opening may be transferred in accordance with Paragraph (b), (5) of Section 15-3 of The Code of Ordinances, Houston, Texas. The bid-opening meeting may be rescheduled in accordance with Paragraph (b), (6) of said Section 15-3.**

The City reserves the right to reject any or all bids, or to accept any bid or combination of bids deemed advantageous to it.

City employees are prohibited from bidding on this solicitation in accordance with the Code of Ordinances Section 15-1.

### **\*CONTENTS:**

- A. OFFER
- B. SCOPE OF WORK/SPECIFICATIONS
- C. GENERAL TERMS & CONDITIONS

\*Note 1: Actual page numbers for each section may change when the solicitation document is downloaded from the Internet or because of Letters of Clarification. Therefore, bidders must read the solicitation document in its entirety and comply with all the requirements set forth therein.

\*Note 2: To be considered for award, please submit the electronic bid form and the forms listed in Section A, including the official signature page which must be signed by a company official authorized to bind the company.

**SECTION A  
OFFICIAL BID FORM**



**PUMPS, VARIOUS TYPES & SIZES**

**FOR  
PUBLIC WORKS AND ENGINEERING DEPARTMENT  
BID INVITATION NO. S12-N23539**

**FORMAL ONE-TIME BID**

To The Honorable Mayor  
and City Council Members  
of the City of Houston, Texas (the "City"):

The undersigned hereby offers to **furnish and deliver** Prepaid F.O.B. destination point Houston, Texas, the item(s) listed on the **electronic bid form** and on individual Purchase Orders, in accordance with the price(s) bid and other conditions shown herein, and in accordance with the City's Specifications and General Terms & Conditions and/or samples/drawings provided herein. When issued by the City of Houston, Letters of Clarification shall automatically become part of this bid document and shall supersede any previous specifications or provisions in conflict with Letters of Clarification. It is the responsibility of the bidder to ensure that it has obtained all such letters. By submitting a bid on this project, bidder shall be deemed to have received all Letters of Clarification and to have incorporated them into the bid.

The City may accept this bid offer by issuance of a Notice of Award Letter and/or a Purchase Order at any time on or before the 120th day following the day this Official Bid Form is opened by the City. This offer shall be irrevocable for 120 days after bid opening or for 90 days after City Council awards the bid, whichever comes last, but this period may be extended by written agreement of the parties.

**The City reserves the right to INCREASE quantities during the twelve-month period following the issuance of the first purchase order subject to agreement in writing by the Supplier to honor the same bid price.**

The City reserves the option, after bids are opened, to adjust the quantities listed on the electronic bid form upward or downward, subject to the availability of funds, and/or make award (s) on a line item basis.

## SECTION A

### Documents/forms must be downloaded from the City's Website:

<https://purchasing.houstontx.gov/>

#### Additional Required Forms to be Included with this Bid:

In addition to the electronic Bid Form and the Official Signature Page, the Forms listed in Table 1 **must be completed and submitted to the Office of the City Secretary on or before the date and time the bid is due:**

Table 1
<a href="#">Affidavit of Ownership</a>
<a href="#">Fair Campaign Ordinance</a>
<a href="#">Statement of Residency</a>
<a href="#">Conflict of Interest Questionnaire</a>
<a href="#">Bidders Attachments Supply</a>

**Table 2 lists other documents and forms that should be viewed/downloaded from the City's website, but are not required to be submitted with the bid.** The City will request these forms, as applicable, to be completed and submitted to the City by the recommended awarded supplier:

Table 2 – Documents and Forms
Drug Forms
Sample Insurance Over \$50000
<a href="#">MWBE</a>
Formal Instructions for Bid Terms
EEOC

Questions concerning the Bid should be submitted in writing to: City of Houston, Strategic Purchasing Division, 901 Bagby, Room B109, Houston, TX 77002, Attn: Martin L. King or via fax: 832-393-8764 or via email (preferred method) to [martin.king@cityofhouston.net](mailto:martin.king@cityofhouston.net) no later than 10:30 A.M., Thursday, January 15, 2009.

**SECTION B**  
**PART I - GENERAL SPECIFICATIONS**

**1.0 BIDDING AND AWARD:**

- 1.1 The City may accept this bid offer by issuance of a Notice of Award Letter and/or a Purchase Order at any time on or before the 120th day following the day the Official Bid Form is opened by the City. This offer shall be irrevocable for 120 days after bid opening or for 90 days after City Council awards the bid, whichever comes last, but this period may be extended by written agreement of the parties.
- 1.2 Prices quoted shall remain firm through delivery and shall not be subject to increases (or supplemented on the Supplier's invoice(s) for payment).
- 1.3 The City reserves the option to adjust the quantities listed on the City's Official Bid Form upward or downward, subject to the availability of funds, and/or make award on a line item basis. It is the intent of the City to order items on an as needed basis. Therefore, the City shall not be liable for any contractual agreements/obligations the Bidder enters into based on the City purchasing all the quantities specified herein.
- 1.4 The City reserves the right to INCREASE quantities during the twelve-month period following the issuance of the first purchase order subject to agreement in writing by the Supplier to honor the same bid price.

**2.0 APPLICABLE SPECIFICATIONS:**

- 2.1 "Notice to Bidders", the "Official Bid Forms", the "General Specifications", the "Technical Specifications", the "General Terms and Conditions" and other specifications that may be included herewith and the purchase orders which refer to these specifications.

**3.0 TECHNICAL LITERATURE:**

- 3.1 To evaluate the bids, the user department and the City purchasing staff may require product literature/specification sheets. Technical literature may be provided with the bid submittal but is not required. However, the City reserves the right to request literature or clarifications, as needed, after bid submittal.
- 3.2 If required, the Bidder must submit a minimum of TWO SETS of the requested catalogue information, descriptive literature specifications and/or (if applicable) engineering drawings that completely identify the items bid. Bidder(s) shall furnish the requested literature within seven (7) calendar days after the receipt of the City's written request. FAILURE ON BIDDER'S PART TO FURNISH THE REQUESTED TECHNICAL DATA IN THE TIME LIMIT GIVEN MAY BE CAUSE FOR REJECTION OF THE BID.

**4.0 WARRANTY:**

- 4.1 A minimum twelve (12) month warranty in addition to the Standard Manufacturer's warranties shall be provided on both materials and workmanship. The warranty period shall commence the date the City officially accepts the completed item(s). When extended warranties are available as standard, they shall be included as a part of the bid for the benefit of the City. Any and all documents necessary to effect warranty shall be properly applied for and submitted by the Bidder.
- 4.2 Additional warranties required are listed in the Technical Specifications for each item.

- 4.3 With respect to any goods, materials, equipment, supplies and parts furnished by it, Supplier warrants:
- That all items are new and free of defects in title, design, material and workmanship.
  - That each item meets or exceeds the manufacturer's specifications and requirements for the equipment structure, or other improvement in which the item is installed and conforms in all respects to the terms of the City Purchase Order and Specifications.
  - That each replacement item is new, in accordance with original equipment
  - Manufacturer's specifications are of a quality of at least as good as the quality of the item that it replaces (when the replaced item was new).
  - That no item or its use infringes any patent, copyright or proprietary right.
- 4.4 The Supplier's product shall be supported by an authorized service facility that can provide warranty repair, service and maintenance work within 24 hours from notification by the City.
- 4.5 Any warranty work shall be completed without cost to the City. The Supplier shall be responsible for all shipping and/or freight expense from the City's designated location to the Supplier's facility for all warranty repair and/or maintenance and return to the City's designated location.

#### 5.0 **DELIVERY/INSPECTION:**

- 5.1 The item(s) specified above, with delivery tickets and/or other required documents shall be delivered FOB Destination, to the location(s) shown on the purchase order(s) **within the delivery time(s) as listed in the Technical Specifications** after receipt of City of Houston Purchase Order.
- 5.2 The Supplier shall notify the City Contact listed in the "Ship To" section of the purchase order not less than three (3) days prior to expected delivery/arrival to permit inspection scheduling. The City Contact shall advise the Supplier as to the date, time and location of authorized delivery/location. An authorized representative of the

Supplier shall supervise delivery to the City. The City will not assume any liability for equipment delivered to an unauthorized location.

- 5.3 Documentation at time of Delivery:  
The Supplier shall provide the following documentation **per purchase order** upon delivery:
- Copy of purchase order(s) and original invoice(s).
  - Warranty policy (ies) and/or certifications as may be required in the Specifications.
  - **Parts, service, operators and maintenance manual(s) as may be required in the Technical Specifications.**

#### 6.0 **SHIPPING TERMS:**

- 6.1 Prices shall be prepaid F.O.B. Destination to the delivery locations, Houston, TX, as indicated on individual City of Houston purchase orders. The Supplier shall retain title and control of all goods until they are delivered and the contract of coverage has been completed. All risk of transportation and all related charges shall be the responsibility of the Supplier. All claims for visible or concealed damage shall be filed by the Supplier. The City will notify the Supplier promptly of any damaged goods and shall assist the Supplier in arranging for inspection.

#### 7.0 **CONFLICT IN TERMS:**

- 7.1 Should there be any conflict between the General Specifications and the Technical Specifications, the Technical Specifications shall prevail.

## 8.0 Resolution Of Late Delivery For Equipment:

- 8.1 Time is of the essence in this award and accordingly all time limits shall be strictly construed and rigidly enforced. The work shall be furnished and fully completed within the delivery time specified in the Bid Proposal and Purchase Order to be furnished to the awarded supplier by the City. In the event that the work or any portions thereof shall remain uncompleted after expiration of the specified time, the awarded supplier shall furnish to the City a like number of comparable equipment for the City's use until such time as the ordered equipment are delivered. The equipment shall be furnished to the City with insurance to cover the use of this equipment by City personnel and in pursuit of the City's business. Should the awarded supplier not furnish such specified equipment during the late delivery period, the City retains the right to lease such equipment from an equipment leasing firm and awarded supplier agrees and authorizes the City to deduct all such costs associated with such leases from the amounts due and owing to awarded supplier under the Purchase Order. The City may avail itself of other remedies that may be available to it in law or equity as to any other event of default
  
- 8.2 Awarded supplier will not be liable for delays in performing its obligations to the extent such delays are caused by unforeseeable conditions that are beyond the awarded supplier's reasonable control and directly interfere with performance, and are without awarded supplier's fault or negligence (force majeure). However, awarded supplier shall provide written notice to the City of the cause and extent of an **excusable delay** requesting a time extension equal to the estimated duration thereof. Upon cessation of the event causing the delay, awarded supplier shall provide written notice to the City of the actual delay incurred. Determination of force majeure shall rest solely with the City Purchasing Agent and the receiving department.

**SECTION B**  
**PART II - TECHNICAL SPECIFICATIONS**  
**FOR**  
**PUMPS, VARIOUS TYPES & SIZES**

**1.0 SCOPE:**

The intent of these specifications is for the successful bidder/offer to furnish and deliver, FOB destination, each pump specified herein in strict accordance with the specifications.

1.0.1 If the bidder elects to offer a pump that is not the referenced manufacturer's product, including the serial/model numbers as specified in the electronic bid form and these technical specifications, the bidder "must" provide documentation with its bid which shows the name of the manufacturer, product name, product serial/model numbers and detailed specifications, of the pump bid, including applicable warranty information, which shall not be less than the warranty specified.

1.0.2 **Note: If the bidder/supplier offers to supply a pump which different than the referenced/recommended manufacturer, the bidder/supplier shall be required to install and wire unit(s) bid at the unit price bid.**

**1.1 PUMP TYPES/SIZES:**

1.1.1 GROUP I - Bid Line Item No. 1

Pump, Submersible, 270HP De-Rated from 280HP, 100 Cable, 1240 impeller, 2350 GPM @ 96' TDH, Size: 3". Referenced Manufacturer: Flygt Corporation, Model No. CP-3602X.

1.1.2 GROUP I - Bid Line Item No. 2

Pump, Submersible, 450HP De-Rated from 500HP, 100 Cable, 1040 impeller, 10 Pole, Size: 12". Referenced Manufacturer: Flygt Corporation, Model No. CP-3602X.

1.1.3 GROUP I - Bid Line Item No. 3

Pump, Submersible, 135HP, 100 Cable, 460 Volt, 10,000 GPM @ 39.5' TDH, Size: 12". Referenced Manufacturer: ITT Flygt Corporation, Model No. LL-3400.

1.1.4 GROUP I - Bid Line Item No. 4

Pump, Submersible, 250HP, 60 Cable, 460 Volt, 27,000 GPM @ 19' TDH, Size: 12". Referenced Manufacturer: ITT Flygt Corporation, Model No. PL-7081.

1.1.5 GROUP I - Bid Line Item No. 5

Pump, Submersible, 45HP, 60 Cable, 460 Volt, 27,000 GPM @ 19' TDH, Size: 12". Referenced Manufacturer: ITT Flygt Corporation, Model No. NT-3202.

1.1.6 GROUP I - Bid Line Item No. 6

Pump, Submersible, 11HP, 3450 RPM, 150GPM @ 77' TDH, Size: 2". Referenced Manufacturer: Flygt Corporation, Model No. CP-3127X.

1.1.7 GROUP II - Bid Line Item No. 7

Pump, Dry Pit, 25HP, 1800RPM, 695 GPM @ 78.5' Size: 6". Referenced Manufacturer: ITT A-C, Model No. NSWV 300.

1.1.8 GROUP II - Bid Line Item No. 8

Pump, Abrasive Sludge, 25HP, 695 GPM @ 78.5' Size: 6". Referenced Manufacturer: ITT Goulds, Model No. JC.

1.1.9 GROUP II - Bid Line Item No. 9

Pump, Abrasive Sludge, 10HP, 880RPM, Size: 4". Referenced Manufacturer: ITT Goulds, Model No. HSD.



- 1.1.10 GROUP III - Bid Line Item No. 10  
Pump, Vertical Dry Pit, 30 HP, 480V, 870 RPM, Size: 10". Referenced Manufacturer: Chicago Yeomans Pump, Model No. VPM-OLC10.
- 1.1.11 GROUP II I -Bid Line Item No. 11  
Pump, Wasting, 7.5 HP, 480V, 1,750 RPM, 300 GPM @ 38.3' TDH Size: 4". Referenced Manufacturer: Chicago Pump Series 2110, Model No.LMC4.
- 1.1.12 GROUP III - Bid Line Item No. 12  
Pump, Horizontal Bare, 125 HP, 572 RPM, 30' TDH Size: 4". Referenced Manufacturer: Chicago Pump TSP, Model No. 4315SC-3D.
- 1.1.13 GROUP IV - Bid Line Item No. 13  
Pump, Centrifugal, 250-850 GPM @ 33-67' TDH, 40 HP, 1,157 RPM with 213TC Frame, 6" Size. Referenced Manufacturer: Vaughan Chopper Pump, Model No. HE4P6S-118 DSP.
- 1.1.14 GROUP V - Bid Line Item No. 14  
Pump, Submersible, 95 HP, Referenced Manufacturer: KSB, Model No. Model No. KRTUK 350-460/458 or City approved equal.
- 1.1.15 GROUP V - Bid Line Item No. 15  
Pump, Submersible, 153 HP, Referenced Manufacturer: KSB, Model No. Model No. KRTUK 350-500/758 or City approved equal.
- 1.1.16 GROUP II -Bid Line Item No. 16  
Pump, Submersible, 268 HP, Referenced Manufacturer: KSB, Model No. Model No. KRTUK 500-520/4512 or City approved equal.
- 1.1.17 GROUP V - Bid Line Item No. 17  
Pump, Submersible, 34 HP, Referenced Manufacturer: KSB, Model No. Model No. KRTUK 15-315/184 or City approved equal.
- 1.1.18 GROUP V - Bid Line Item No. 18  
Pump, Submersible, 330 HP, Referenced Manufacturer: KSB, Model No. Model No. KRTUK 600-710/16012 or City approved equal.
- 1.1.19 GROUP V - Bid Line Item No. 19  
Pump, Submersible, 64 HP, Referenced Manufacturer: KSB, Model No. Model No. KRTUK 250-370/306 or City approved equal.
- 1.1.20 GROUP V - Bid Line Item No. 20  
Pump, Submersible, 20 HP, Referenced Manufacturer: KSB, Model No. Model No. KRTUK 100-251/164XG or City approved equal.
- 1.1.21 GROUP VI - Bid Line Item No. 21  
Pump, Sludge Pump, 15HP, 400 GPM @ 880 RPM. Referenced Manufacturer: Fairbanks Morse Pump, ITT A-C Series, NSW, , 4X4X14, Model No. 998425-0 TSP or City approved equal.
- 1.1.22 GROUP VII - Bid Line Item No. 22  
Pump, 18HP, 1800 RPM, 250 GPM @ 61.5' TDH, 1800 RPM. Referenced Manufacturer Fibroc Pump, Series 1500 or City approved equal.
- 1.1.23 GROUP VIII - Bid Line Item No. 23  
Pump, Thickened Sludge, 6" Referenced Manufacturer: Netzsch Pump, Model No. NM076SY01L04K or City approved equal.
- 1.1.24 GROUP IX - Bid Line Item No. 24  
Pump, Sewage, 5HP @ 1150 RPM, 545 GPM @ 14-10' TDH, Referenced Manufacturer: PACO, Model No. 52-49513 or City approved equal.

- 1.1.25 GROUP X - Bid Line Item No. 25  
Pump, Sludge, 10HP, 65 GPM @ 278 RPM, Referenced Manufacturer: Moyno, Model No. 1G065G1 CDQX3AAA or City approved equal.
- 1.1.26 GROUP XI - Bid Line Item No. 26  
Pump, Self-Priming, Sump, 30HP, 3PH, 1800 RPM, Referenced Manufacturer: Pioneer Pumps, Inc., Model No. P409L72-HO-30-4 or City approved equal.
- 1.1.27 GROUP XII - Bid Line Item No. 27  
Pump, Sump, 7.5HP, 4" 3PH, Referenced Manufacturer: Hydromatic, Model No. S4M750M4-4 or City approved equal.
- 1.1.29 GROUP XII - Bid Line Item No. 28  
Pump, Sump, 75HP, 8" 3PH, Referenced Manufacturer: Hydromatic, Model No. S8L7500M4-4 or City approved equal.
- 1.1.30 GROUP XIII - Bid Line Item No. 29  
Pump, Sludge/Grinder, 15HP, 300 GPM, 6", 3PH, Referenced Manufacturer: Monoflo, Model No. C18KC11RMA-E58K or City approved equal.
- 1.1.31 GROUP XIV - Bid Line Item No. 30  
Pump, Dry Pit, 40HP, 3500 GPM @ 34.3' TDH, Referenced Manufacturer: Ingersoll Rand, Model No. AS4986402 or City approved equal.
- 1.1.32 GROUP XV - Bid Line Item No. 31  
Rotating Assembly for 14" Dry Pit Pump, 75HP @ 885 RPM, 3,920 GPM @ 45'TDM, Referenced Manufacturer: Fairbanks Morse, Model No. B5711 or City approved equal.
- 1.1.33 GROUP XV - Bid Line Item No. 32  
Rotating Assembly for Sump Pump, 125HP, 12,000 GPM @ 30'TDM, Referenced Manufacturer: RAS PUMP, Model No. 20MNZ24 or City approved equal.

2.0 **DELIVERY:**

- 2.1 The supplier agrees to make deliveries only upon notification by a designated City of Houston representative and only after it is in receipt of duly signed and approved Purchase Order(s) issued by the City of Houston Purchasing Agent or designee. Deliveries made without such Purchase Order and notification shall be at Supplier's risk and shall leave the City the option of canceling any agreement implied or expressed herein.
- 2.2 All individual deliveries received by the City are subject to testing to determine if the items meet specifications. Items/Pumps that fail to meet specifications shall be rejected.

## SECTION B PART II TECHNICAL SPECIFICATIONS FOR PUMPS CONT'D.

### 3.0 GROUP I- BID LINE ITEM NOs. 1 and 2: PUMP, 3" SUBMERSIBLE:

Furnish 3" Submersible non-clog wastewater pump(s) capable of handling raw unscreened sewage.

3.01 The pumps supplied shall be direct replacements for the existing pumps at the Clinton Drive Lift Station. No modifications to the facility structure, mechanical features, electrical or controls shall be allowed.

### 3.1 REFERENCE STANDARDS:

Comply as a minimum with applicable provisions and recommendations of the following:

- 3.1.1 American National Standards Institute (ANSI)
- 3.1.2 American Society for Testing and Materials (ASTM)
- 3.1.3 Anti-Friction Bearing Manufacturers Association (AFBMA)
- 3.1.4 Hydraulic Institute.
- 3.1.5 Institute of Electrical and Electronic Engineers (IEEE)
- 3.1.6 National Electric Code (NEC)
- 3.1.7 National Electrical Manufacturers Association (NEMA)
- 3.1.8 Steel Structures Painting Council (SSPC)

3.2 Pumps shall be designed for continuous operation without cavitations within the specified operating range. The pump shall have a minimum hydraulic efficiency of 65 percent at the rated capacity. The NPSHR at the maximum operating capacity shall not exceed 30 feet.

3.3 Deliver equipment to the City's Cullen facility.

3.3.1 The City will store all equipment after delivery.

3.3.2 The pump cable end shall be sealed with a high quality protective covering to make it impervious to moisture or water seepage from submersion or other causes prior to electrical installation. Power and control cables shall match the cables on the existing pumps.

### 3.4 ACCEPTABLE MANUFACTURERS

3.4.1 Through shop drawing submittals, the following named manufacturers will be considered, provided the submitted equipment meets the specified requirements and system operating conditions:

- Flygt Pumps, Inc.
- KSB Pumps, Inc.

### 3.5 PUMP CONSTRUCTION

3.5.1 Major pump components shall be of fine grained gray cast iron, ASTM A48, Class 35B or better, with smooth surfaces devoid of blow holes and other irregularities. Surfaces coming into contact with sewage, other than stainless steel shall be protected by an approved sewage resistant coating. All exposed nuts or bolts shall be AISI type 304 stainless steel.

3.5.2 Mating surfaces where watertight sealing is required shall be machined and fitted with nitrile rubber o-rings. Fitting shall be such that sealing is accomplished by metal-to-metal contact between machined surfaces. This will result in controlled compression of nitrile rubber o-rings without the requirement of a specific torque limit. No secondary sealing compounds, rectangular gaskets, elliptical o-rings, grease or other devices shall be used.

3.5.3 Pump suction flange shall be drilled to ANSI standard, class 125.

### 3.6 POWER CABLE

3.6.1 All Power and control cables shall be 100 feet minimum. The cable entry water seal design shall preclude specific torque requirements to ensure a watertight and submersible seal. The cable entry shall be sealed by an elastomer grommet, epoxy potting material, or a combination of both. The cable entry sealing system shall provide strain relief for the terminal connections and allow access to the terminal connections without adversely affecting the integrity or function of the seal system.

3.6.2 Cables shall be oil, grease and abrasion resistant, and meet applicable standards. The outer jacket shall be polyurethane or other material equally suitable for immersion in wastewater.

3.6.3 Cables shall be capable of operating on either 230 volt or 480 volt, 3 phase service and under continuous submergence without loss of watertight integrity to a depth of 65 feet.

3.6.4 No parallel power cables are acceptable unless they are size #1/0 or larger.

3.6.5 The pilot cable shall be designed specifically for use with submersible pumps and shall be type SUBCAB (Submersible Cable). The cable shall be multi-conductor type with stainless steel braided shielding, a chlorinated polyethylene rubber outer jacket and tinned copper conductors insulated with ethylene-propylene rubber. The conductors shall be arranged in twisted pairs. The cable shall be rated for 600 Volts and 90°C (194°F) with a 40°C (104°F) ambient temperature and shall be approved by Factory Mutual (FM). The cable length shall be adequate to reach the junction box without the need for splices.

### 3.7 MOTOR

3.7.1 Motors shall have reconnectable terminal blocks. AH leads shall be numbered.

3.7.2 The pump motor shall be a NEMA Design B squirrel-cage, induction, shell type design, housed in an oil-filled or air-filled watertight chamber. The stator winding and stator leads shall be insulated with moisture resistant Class H insulation rated for 180°C (356°F), The stator shall be insulated by the trickle impregnation method using Class H monomer-free polyester resin resulting in a winding fill factor of at least 95%. The motor shall be inverter duty rated in accordance with NEMA MG1, Part 31. The stator shall be heat-shrink fitted into the cast iron stator housing. The use of multiple step dip and bake-type stator insulation process is not acceptable. The use of bolts, pins or other fastening devices requiring penetration of the stator housing shall be rejected. The rotor bars and short circuit rings shall be of aluminum. The motor shall be designed for continuous duty, capable of sustaining a minimum of 8 starts per hour, evenly spaced. The pump/motor shall be capable of operating at liquid temperature of 104 degrees F per FM requirements-without overheating or operating in the service factor. Motor shall be non-overloading over the entire range of the operating curve within the nameplate HP, A performance chart shall be provided showing curves for torque, current, a minimum service factor of 1.15, input/output kw and efficiency.

- 3.7.3 Thermal switches shall be embedded in the stator end coils to monitor the temperature of each phase winding. One PT-100 type temperature sensor shall be installed in the stator winding, to allow reading actual motor temperature. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the control panel. The junction chamber shall be sealed off from the stator housing and shall contain a terminal board for connection of power and pilot sensor cables. A pump memory module shall be provided and mounted in the pump junction chamber and be capable of recording pump run time, number of starts as well as contain the motor unit performance and manufacturing data and service history. The use of wire nuts or crimp-type connectors is not acceptable. The motor and the pump shall be produced by the same manufacturer.
- 3.7.4 The motor shall be UL listed or FM approved as explosion-proof, suitable for NEC Class I, Division 1, Group C and D environments.
- 3.7.5 Each unit shall be provided with an adequately designed cooling system totally self-contained with no external mechanical devices. Pumps shall be designed to operate continuously with the fluid level at the top of the pump volute.
- 3.7.6 Maximum motor speed shall be 720 rpm
- 3.7.7 Thermal sensors shall be used to monitor stator temperatures. The stator shall be equipped with 3 thermal switches, embedded in the end coils of the stator winding (one switch in each stator phase). These shall be used in conjunction with and supplemental to external motor overload protection and wired to the control panel.
- 3.7.8 For motor sizes larger than 100 HP, an independent thermal switch shall be included to monitor the lower motor bearing temperature.
- 3.7.9 Motors larger than 20 HP shall be equipped with a leakage sensor to detect water in the stator chamber.
- 3.7.10 Each pump/motor unit shall be provided with an integral, self-supplying cooling system. The motor water jacket shall encircle the stator housing and shall be of cast iron, ASTM A-48, Class 35B. The water jacket shall thus provide heat dissipation for the motor regardless of whether the motor unit is submerged in the pumped media or surrounded by air. After passing through a classifying labyrinth, the impeller back vanes shall provide the necessary circulation of the cooling liquid, a portion of the filtered pump media, through the cooling system. Two cooling liquid supply pipes, one discharging low and one discharging high within the jacket, shall supply the cooling liquid to the jacket. An air evacuation tube shall be provided to facilitate air removal from within the jacket. Any piping internal to the cooling system shall be shielded from the cooling media flow allowing for unobstructed circular flow within the jacket about the stator housing. Two cooling liquid return ports shall be provided. The internals to the cooling system shall be non-clogging by virtue of their dimensions. Drilled and threaded provisions for external cooling and, seal flushing or air relief are to be provided. The cooling jacket shall be equipped with two flanged, gasketed and bolted inspection ports of not less than 4"Ø located 180° apart. The cooling system shall provide for continuous submerged or completely non-submerged pump operation in liquid or in air having a temperature of up to 40°C (104°F), in accordance with NEMA standards. Restrictions limiting the ambient or liquid temperatures at levels less than 40°C are not acceptable.

### 3.8 SHAFT

3.8.1 Each pump shaft shall be one piece of AISI type 420 stainless steel, or heat-treated carbon steel C 1035 protected from the pumped liquid by the seal. The shaft shall be of sufficient diameter to assure rigid support of the impeller and to prevent excessive vibration at all speeds.

### 3.9 PUMP SEAL

3.9.1 Each pump shall be provided with a tandem mechanical shaft seal system. The upper seal of the tandem set of seals shall operate in an oil chamber located just below the stator housing. This set shall contain one stationary tungsten-carbide ring and one positively driven rotating carbon (or better) ring, and functions as an independent secondary barrier between the pumped liquid and the stator housing. The lower seal of the tandem set of seals functions as the primary barrier between the pumped liquid and the oil housing. This set shall consist of a stationary ring and a positively driven rotating ring both of which shall be silicon carbide or tungsten carbide. Shaft seals without positively driven rotating members or conventional double mechanical seals containing either a common single or double spring action between upper and lower seal faces shall not be acceptable.

### 3.10 BEARINGS

3.10.1 The pump shaft shall rotate on at least three grease-lubricated bearings. The upper bearing, provided for radial forces, shall be a single roller bearing. The lower bearings shall consist of at least one roller bearing for radial forces and one or two angular contact ball bearings for axial thrust. The minimum L10 bearing life shall be 100,000 hours at any point along the usable portion of the pump curve at maximum product speed. The lower bearing housing shall include an independent thermal sensor to monitor the bearing temperature. If a high temperature occurs, the sensor shall activate an alarm and shut the pump down.

### 3.11 IMPELLER

3.11.1 The impeller shall be of fine grained gray cast iron, Class 35B 30 or better, dynamically or statically balanced, double shrouded non-clogging design having a long thrulet without acute turns. The impeller shall be capable of handling 3 inch minimum diameter solids, fibrous materials, heavy sludge and other matter found in normal sewage application. The impeller hub shall be accurately fitted and mechanically secured to the motor shaft.

3.11.2 The volute shall be of a single piece, concentric or non-concentric design, and shall have smooth fluid passages large enough at all points to pass any size solids which can pass through the impeller. The volute bottom shall be of a suction bell design for pumps with 12-inch discharge and larger.

3.11.3 A replaceable wear ring shall be installed to provide efficient sealing between the volute and impeller. The wear rings shall consist of AISI Series 300 or better heat-treated stainless steel. For pumps 10 HP and below the pump shall be equipped with brass or nitrite rubber volute wear ring only.

### 3.12 ACCESSORIES

- 3.12.1 A Pump Guide System, whereby the pumps shall attach to and utilize the existing guide rail system.
- 3.12.2 Bolts, Studs and Nuts
- 3.12.3 All bolts, studs and nuts shall have American National form right-hand machine cut threads which shall be in conformity with the current ANSI B1.1, "Screw Threads", Coarse Thread Series, unless otherwise specified.
- 3.12.4 Bolt heads and nuts shall be semi-finished and shall be in conformity with ANSI B18.2, "Wrench-Head Bolts and Nuts and Wrench Openings", Heavy Series, unless otherwise specified. AH nuts shall be hexagonal in shape.
- 3.12.5 Anchor bolts, flange bolts, studs and nuts shall be Type 316 stainless steel in conformity with ASTM A276.

### 3.13 PUMP PROTECTION SYSTEM

- 3.13.1 All pumps shall work with existing solid state, intrinsically safe monitoring system. If the supplied pump does not work with existing monitoring system, the pump supplier will at no cost to the city install all new monitoring devices in parallel with the existing devices to allow the use of the existing pumps as backup to the new pumps without any expense to the City. Monitoring system shall accept inputs from the sensors specified and shall output independent contacts which close to alarm each condition, or separate independent output terminals suitable for direct connection to interposing relays for alarm contact development. Provide a separate N.C, alarm contact, rated at 120V, 5A inductive, which opens on any failure. Monitor system shall be suitable for operation from a 24VAC unregulated, unlimited power supply. Provide any additional equipment or appurtenances required providing current and voltage limited intrinsically safe installation as specified. The monitoring system shall accept separate isolated N.O. contacts which close to indicate pump running and to reset after pump trip.
- 3.13.2 Sensors shall be independently wired to the monitoring system. Provisions for the following sensors for each pump:
  - 3.13.3 Junction chamber leakage (one required).
  - 3.13.4 Stator leak (one required).
  - 3.13.5 Stator temperature shut down switches (one per phase).
- 3.13.6 A single independent thermal switch shall be included to monitor the motor temperature.
- 3.13.7 Upper and lower bearing temperature sensors capable of outputting temperature readings (two required).

### 3.14 SHOP PAINTING

- 3.14.1 Pump motor size greater than 100 HP.
- 3.14.2 Pre-treatment. Abrasive blast cleaning and removal of all oil and dust.
- 3.14.3 Primer. One coat of acrylic dispersion zinc phosphate primer, 1.6 mils minimum.
- 3.14.4 Finish Polyester resin paint, 2.4 mils minimum.
- 3.14.5 Machine finished surfaces:
- 3.14.6 Machined parts are cleaned to remove all dirt and grease.
- 3.14.7 Cleaning is done so as not to affect primer or deteriorate adherence to finish paint.
- 3.14.8 Storage and transport is carried out in such a way that rust-attack on machined surfaces does not occur,
- 3.14.9 At assembly, surfaces are coated with a corrosion preventive paint.

### 3.15 WARRANTY:

The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

### 3.16 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

### 3.17 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than 100 calendar days after receipt of a City of Houston Purchase Order.

### 3.18 TRAINING:

A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

#### 4.0 GROUP I-BID LINE ITEM NO. 3: PUMP, 4" SUBMERSIBLE:

Furnish submersible non-clog vertical mixed flow pump(s).

4.1 Pump should be capable of delivering 10,000 GPM at 39.5 ft. TDH. An additional point on the same curve shall be 13,500 GPM at 15 ft. TDH. Pump shut off head shall be no less than 55 feet. Each pump shall be equipped with 55 Ft. SS Cable. The working load of the lifting system shall be 50% greater than the pump unit weight.

4.2 The specification is for electric submersible pump(s) to be supplied with motor, cast iron housing, power cable and accessories. The pumps are normally installed within a vertical tube.

#### 4.3 QUALITY ASSURANCE

The pump(s) shall be heavy duty, electric submersible, centrifugal non-clog units designed for handling raw, unscreened sewage and wastewater and shall be fully guaranteed for this use. The pumps provided shall be capable of operating in a liquid temperature up to 104 DEGREES F. Since the high temperature of 104 DEGREES F is specified by the National Electrical Manufacturers Association (NEMA) and Factory Mutual (FM), motors operating below 104 DEGREES F shall not be acceptable.

4.4 The pump and motor unit shall be suitable for continuous operation at full nameplate load while the motor is completely submerged, partially submerged or totally non-submerged. The use of shower systems, secondary pumps or cooling fans to cool the motor shall not be acceptable.

4.5 The pump, mechanical seals and motor units provided under this specification shall be from the same manufacturer in order to achieve standardization of operation, maintenance, spare parts, manufacturer's service and warranty.

#### 4.6 SUBMITTALS

Submittal data shall be provided to show compliance with these specifications, plans or other specifications that will influence the proper operation of the pump(s).

4.6.1 Standard submittal data for approval must consist of:

- Performance Curves.
- Pump Outline Drawing.
- Station Drawing for Accessories.
- Detailed Electrical Data.
- Technical Manuals.
- Parts List.
- Printed Warranty.
- Manufacturer's Equipment Storage Recommendations.
- Lack of the above requested submittal data is cause for rejection.

#### 4.7 TESTING

Testing performed upon each pump shall include the following inspections:

4.7.1 Impeller, motor rating and electrical connections shall be checked for compliance with this specification.

4.7.2 Prior to submergence, each pump shall be run dry to establish correct rotation.

4.7.3 Each pump shall be run submerged in water.

4.7.4 Motor and cable insulation shall be tested for moisture content or insulation defects.

4.7.5 Upon request, a written quality assurance record confirming the above testing/inspections shall be supplied with each pump at the time of shipment.

4.7.6 The pump(s) shall be rejected if the above requirements are not satisfied.

#### 4.8 START-UP SERVICE

The equipment manufacturer shall furnish the services of a qualified factory trained field service engineer for one 8-hour working day at the site to inspect the installation and instruct the owner's personnel on the operation and maintenance of the pumping units. After the pumps have been completely installed and wired, the contractor shall have the manufacturer do the following:

- 4.8.1 Megger stator and power cables.
- 4.8.2 Check seal lubrication.
- 4.8.3 Check for proper rotation.
- 4.8.4 Check power supply voltage.
- 4.8.5 Measure motor operating load and no load current.
- 4.8.6 Check level control operation and sequence.

4.9 During this initial inspection, the manufacturer's service representative shall review recommended operation and maintenance procedures with the owner's personnel.

#### 4.10 FACTORY SERVICE

Factory-Approved service facilities with qualified factory-trained mechanics shall be available for prompt emergency and routine service.

#### 4.11 GUARANTEE

- 4.11.1 The pump shall be warranted for 18 months from date of shipment to the job site.
- 4.11.2 The warranty shall be in printed form and previously published as the manufacturer's standard warranty for all similar units manufactured.

#### 4.12 EXPERIENCE

The pump manufacturer shall have a minimum of 10,000 heavy-duty submersible wastewater pumps installed and operating for no less than 5 years in the United States.

#### 4.13 MANUFACTURERS

The pump, mechanical seals and motor manufacturer shall be ITT Flygt or approved equal.

4.14 EXPLOSION-PROOF PUMPS (X): The pump system including the pump, motor and power cable shall be approved for use in areas classified as hazardous locations in accordance with the NEC Class I, Div. 1, Group C and D service as determined and approved by a U.S. nationally recognized testing agency (U.L., FM) at the time of the bidding of the project. As required by Factory Mutual (FM) the motor shall be capable of operating in pumped media up to 104 DEGREES F. The motor thermal switch shall allow safe motor operation up to 260°F (125°C). In addition, an internal Float Switch shall be available, as an option, in the motor chamber. Service of explosion-proof submersible units shall be performed by qualified FM experienced personnel. The pump manufacturer must provide training schools to qualify personnel in the proper service and repair of explosion-proof pumps.

#### 4.15 PUMP CONSTRUCTION

4.15.1 Major pump components shall be of gray cast iron, ASTM A-48, Class 35B, with smooth surfaces devoid of blow holes or other casting irregularities. All exposed nuts or bolts shall be AISI type 304 stainless steel. All metal surfaces coming into contact with the pumped media, other than stainless steel, shall be protected by a factory applied coating of an acrylic dispersion primer with a final coat of polyester resin paint finish coat on the exterior of the pump. Pumps utilizing fabricated steel weldments are not acceptable.

4.15.2 Sealing design shall incorporate metal-to-metal contact between machined surfaces. Pump/Motor unit mating surfaces where watertight sealing is required shall be machined and fitted with Nitrile or Viton rubber O-rings. Joint sealing will be the result of controlled compression of rubber O-rings in two planes and O-ring contact of four sides without the requirement of a specific bolt torque limit.

4.15.3 Rectangular cross sectioned rubber, paper or synthetic gaskets that require specific torque limits to achieve compression shall not be considered as adequate or equal. No secondary sealing compounds, elliptical O-rings, grease, silicone or other devices shall be used.

#### 4.16 COOLING SYSTEM

4.16.1 Each pump/motor unit shall be cooled simply by the passage of the pumped fluid up, about and past the motor housing within the discharge column.

4.16.2 In complying with standard NEMA 40°C design criteria, the motor shall be capable of continuous operation in ambient conditions of up to 104°F (40°C). Restrictions below this temperature are not acceptable.

#### 4.17 CABLE PROTECTION AND SUSPENSION

Engineer approved cable protection and suspension system shall be provided on all installations with in-tube cable runs over 10 feet in length.

#### 4.18 CABLE ENTRY SEAL

The cable entry seal design shall preclude specific torque requirements to insure a watertight and submersible seal. The cable entry shall consist of dual cylindrical elastomer grommets, flanked by washers, all having a close tolerance fit against the cable outside diameter and the cable entry inside diameter. The grommets shall be compressed by the cable entry unit, thus providing a strain relief function. The assembly shall provide ease of changing the cable when necessary using the same entry seal. The cable entry junction chamber and motor shall be separated by a feed through type terminal board of non-hygroscopic material, which shall isolate the stator housing from foreign material gaining access through the pump top. Epoxies, silicones, or other secondary sealing systems shall not be considered acceptable.

#### 4.19 MOTOR

The pump motor shall be induction type with a squirrel cage rotor, shell type design, housed in an air filled, watertight chamber, NEMA B type. The stator windings shall be insulated with moisture resistant Class H insulation rated for 180°C (356°F). The stator shall be insulated by the trickle impregnation method using Class H monomer-free polyester resin resulting in a winding fill factor of at least 95%. The motor shall be inverter duty rated in accordance with NEMA MG1, Part 31. The stator shall be heat-shrink fitted into the cast iron stator housing. The use of multiple step dip and bake-type stator insulation process is not acceptable. The use of bolts, pins or other fastening devices requiring penetration of the stator housing is not acceptable. The motor shall be specifically designed for submersible pump usage and designed for continuous duty pumping media of up to 40°C (104°F) and capable of up to 15 evenly spaced starts per hour. The rotor bars and short circuit rings shall be made of cast aluminum. Thermal switches shall be embedded in the stator end coils to monitor the temperature of each phase winding. One PT-100 type temperature sensor shall be installed in the stator winding. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the control panel. The junction chamber shall be sealed off from the stator housing and shall contain a terminal board for connection of power and pilot sensor cables using threaded compression type terminals. A mechanical float switch (FLS) shall be mounted in the junction chamber to signal if there is water intrusion. A pump memory module shall be provided and mounted in the junction chamber to record pump run time, number of starts as well as contain the motor unit performance and manufacturing data and service history. The use of wire nuts or crimp-type connectors is not acceptable. The motor and the pump shall be produced by the same manufacturer.

- 4.19.1 The combined service factor (combined effect of voltage, frequency and specific gravity) shall be a minimum of 1.15. The motor shall have a voltage tolerance of plus or minus 10%. The motor shall be designed for operation up to 40°C (104°F) ambient and with a temperature rise not to exceed 80°C. A performance chart shall be provided showing curves for torque, current, power factor, input/output kW and efficiency. This chart shall also include data on starting and no-load characteristics.
- 4.19.2 The power cable shall be sized according to the NEC and ICEA standards and shall be of sufficient length to reach the junction box without the need of any splices. The outer jacket of the cable shall be oil resistant chlorinated polyethylene rubber. The motor and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet or greater.
- 4.19.3 The motor horsepower shall be adequate so that the pump is non-overloading throughout the entire pump performance curve from shut-off through run-out.

#### 4.20 PILOT CABLE

The pilot cable shall be designed specifically for use with submersible pumps and shall be type SUBCAB (Submersible Cable). The cable shall be multi-conductor type with stainless steel braided shielding, a chlorinated polyethylene rubber outer jacket and tinned copper conductors insulated with ethylene-propylene rubber. The conductors shall be arranged in twisted pairs. The cable shall be rated for 600 Volts and 90°C (194°F) with a 40°C (104°F) ambient temperature and shall be approved by Factory Mutual (FM). The cable length shall be adequate to reach the junction box without the need for splices.

#### 4.21 BEARINGS

The pump shaft shall rotate on three grease-lubricated bearings. The upper bearing, provided for radial forces, shall be a single roller bearing. The two lower bearings shall consist of at least one roller bearing for radial forces and one angular contact ball bearing for axial thrust. The minimum L<sub>10</sub> bearing life shall be 100,000 hours at any point along the usable portion of the pump curve at maximum product speed. The lower bearing housing shall include an independent thermal sensor to monitor the bearing temperature. The sensor shall be in direct contact with the outer race of the thrust bearing. If a high temperature occurs, the sensor shall activate an alarm and shut the pump down.

#### 4.22 MECHANICAL SEAL

Each pump shall be provided with a tandem mechanical shaft seal system consisting of two totally independent seal assemblies. The lower seal shall be independent of the impeller hub. The seals shall operate in an oil reservoir that hydrodynamically lubricates the lapped seal faces at a constant rate. The lower, primary seal unit, located between the pump and the oil chamber, shall contain one stationary and one positively driven rotating corrosion resistant tungsten-carbide ring. The upper, secondary seal unit, located between the oil chamber and the motor housing, shall contain one stationary corrosion resistant tungsten-carbide seal ring and one positively driven rotating corrosion resistant tungsten-carbide seal ring. Each seal interface shall be held in contact by its own spring system. The seals shall require neither maintenance or adjustment and shall be capable of operating in either clockwise or counter clockwise direction of rotation without damage or loss of seal. For special applications, other seal face materials shall be available. Should both seals fail and allow fluid to enter the stator housing, a port shall be provided to direct that fluid immediately to the stator float switch to shut down the pump and activate an alarm. Any intrusion of fluid shall not come into contact with the lower bearings.

- 4.22.1 The following seal types shall not be considered acceptable nor equal to the dual independent seal specified: Shaft seals without positively driven rotating members, or conventional double mechanical seals containing either a common single or double spring acting between the upper and lower seal faces. Cartridge type systems will not be acceptable. No system requiring a pressure differential to offset pressure and to effect sealing shall be used.

4.22.2 Each pump shall be provided with an oil chamber for the shaft sealing system. The oil chamber shall be designed to prevent overfilling and to provide oil expansion capacity. The drain and inspection plug, with positive anti-leak seal shall be easily accessible from the outside. The seal system shall not rely upon the pumped media for lubrication.

4.23 PUMP SHAFT

Pump and motor shaft shall be a solid continuous shaft. Couplings shall not be acceptable. The pump shaft shall be of carbon steel ASTM A 572 and shall be completely isolated from the pumped liquid. Shaft material on 6x5 and 7x5 drive units shall be stainless steel – ASTM A479 S43100-T. The use of intermediate gear boxes or gear speed reducers shall not be acceptable as they lower wire-to-water efficiency and increase maintenance costs.

4.24 IMPELLER

The impeller(s) shall be of gray cast iron, Class 35B, Factory balanced, multiple vaned, double shrouded non-clogging design having long throughlets without acute turns. The impeller(s) shall be capable of handling solids, fibrous materials, heavy sludge and other matter found in wastewater. Impeller(s) shall be retained with an expansion ring and shall be capable of passing a minimum 4 inch diameter solid. All impellers shall be coated with alkyd resin primer.

4.25 WEAR RINGS

A wear ring system shall be used to provide efficient sealing between the volute and suction inlet of the impeller. Each pump shall be equipped with a Nitrile rubber coated steel or brass ring insert that is drive fitted to the volute inlet.

4.25.1 This pump shall also have a stainless steel impeller wear ring heat-shrink fitted onto the suction inlet of the impeller.

4.26 VOLUTE

Pump volute(s) shall be single-piece gray cast iron, Class 35B, concentric design with smooth passages large enough to pass any solids that may enter the impeller. Minimum inlet and discharge size shall be as specified.

4.27 PROTECTION

All stators shall incorporate three thermal switches, connected in series, to provide over temperature protection of the motor winding. Should high temperature occur, the thermal switches shall open, stop the motor and activate an alarm. The stator shall also include one PT-100 type temperature probe to provide for monitoring of the stator temperature

4.28.1 A lower bearing temperature sensor shall be provided. The sensor shall directly contact the outer race of the thrust bearing providing for accurate temperature monitoring.

4.28.2 Two leakage sensors shall be provided to detect water intrusion into the stator chamber and junction chamber. A Float Leakage Sensor (FLS), a small float switch, shall be used to detect the presence of water in either the stator chamber or junction chamber. When activated, the FLS will stop the motor and activate an alarm. USE OF VOLTAGE SENSITIVE SOLID STATE SENSORS SHALL NOT BE ALLOWED.

4.28.3 The solid-state pump memory unit, three thermal switches, two FLS switches, PT-100 stator temperature monitor and the lower bearing PT-100 temperature monitor shall all be connected to a MAS (Monitoring and Status) monitoring unit. The MAS shall be designed to be mounted in the control panel and shall come with an Operator Panel that is dead-front panel mounted. The Operator Panel shall have soft-touch operator keys and provide local indication of the status of the alarms within the connected pump unit by means of an LCD screen read-out. Local MAS system change shall be made by use of the soft-touch keypad or local connection by means of a laptop computer. Remote indication of pump unit status shall be possible with connection to customer PLC or via LAN.

- 4.28 WARRANTY:  
The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.
- 4.29 LITERATURE:  
The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.
- 4.30 DELIVERY:  
Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than 100 calendar days after receipt of a City of Houston Purchase Order.
- 4.31 TRAINING:  
A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

5.0 GROUP I-BID LINE ITEM NO. 4: PUMP, 12" SUBMERSIBLE:

Furnish 12" submersible pump(s).

- 5.1 Pump shall be electrically operated submersible propeller pump/motor unit(s). The pump/motor unit(s) shall be close coupled to form one integrated direct drive unit. The pump/motor unit shall be designed for installation into a discharge column onto a seat at the bottom of the column. The pump/motor unit shall be held in place by its own weight and the pumping head.
- 5.2 Each pump/motor unit, hereafter called pump(s) or unit(s), shall be equipped with a 250 HP, submersible electric motor connected for operation on a 460 volt, 3-phase, 60 Hertz, 4 wire service with 60 Ft. lengths of power and signal cable. Pump(s) shall be capable of delivering a minimum of 27,000 GPM at 19 feet TDH at a minimum overall efficiency of 74 %, and shall be able to supply flows of 24250 GPM minimum, at 24 ft. of head and 29500 GPM maximum, at 11 ft. of head and shall be non-overloading throughout the specified performance range. The NPSH required for any of the above design points shall not exceed 36ft. of water, when referenced to the lowest point on the pump bellmouth.
- 5.3 The pump(s) shall be heavy duty, electric submersible, centrifugal non-clog units designed for handling raw, unscreened sewage and wastewater and shall be fully guaranteed for this use. The pumps provided shall be capable of operating in an ambient liquid temperature of 104 DEGREES F. Since the high temperature of 104 DEGREES F is specified by the National Electrical Manufacturers Association (NEMA) and Factory Mutual (FM), motors with a maximum ambient temperature rating below 104 DEGREES F shall not be acceptable.
- 5.4 The pump and motor unit shall be suitable for continuous operation at full nameplate load while the motor is completely submerged, partially submerged or totally non-submerged. The use of shower systems, secondary pumps or cooling fans to cool the motor shall not be acceptable.
- 5.5 The pump, mechanical seals and motor units provided under this specification shall be from the same manufacturer in order to achieve standardization of operation, maintenance, spare parts, manufacturer's service and warranty.

5.6 SUBMITTALS

Submittal data shall be provided to show compliance with these specifications, plans or other specifications that will influence the proper operation of the pump(s).

5.6.1 Standard submittal data for approval must consist of:

- a. Pump Performance Curves.
- b. Pump Outline Drawing.
- c. Station Drawing for Accessories.
- d. Detailed Electrical Data.
- e. Control Drawing and Data.
- f. Access Frame Drawing.
- g. Typical Installation Guides.
- h. Technical Manuals.
- i. Parts List.
- j. Printed Warranty.
- k. Manufacturer's Equipment Storage Recommendations.
- l. Manufacturer's Standard Recommended Start-Up Report Form.
- m. Motor Performance Curve.

5.6.2 Lack of the above requested submittal data is cause for rejection.

5.7 TESTING

Testing performed upon each pump shall include the following inspections: (Impeller, motor rating and electrical connections shall be checked for compliance with this specification.)

- a. Prior to submergence, each pump shall be run dry to establish correct rotation.
- b. Each pump shall be run submerged in water.
- c. Motor and cable insulation shall be tested for moisture content or insulation defects.

5.7.1 Upon request, a written quality assurance record confirming the above testing/inspections shall be supplied with each pump at the time of shipment.

5.7.2 Each pump (when specified) shall be tested in accordance with the latest test code of the Hydraulic Institute (H.I.) at the manufacturer to determine head vs. capacity and kilowatt draw required. Witness tests shall be available at the factory upon request.

5.7.3 The pump(s) shall be rejected if the above requirements are not satisfied.

5.8 START-UP SERVICE

The equipment manufacturer shall furnish the services of a qualified factory trained field service engineer for one 8-hour working day(s) at the site to inspect the installation and instruct the owner's personnel on the operation and maintenance of the pumping units. After the pumps have been completely installed and wired, the contractor shall have the manufacturer do the following:

- a. Megger stator and power cables.
- b. Check seal lubrication.
- c. Check for proper rotation.
- d. Check power supply voltage.
- e. Measure motor operating load and no load current.
- f. Check level control operation and sequence.

5.9 During this initial inspection, the manufacturer's service representative shall review recommended operation and maintenance procedures with the owner's personnel.

5.10 FACTORY SERVICE

Factory-Approved service facilities with qualified factory-trained mechanics shall be available for prompt emergency and routine service.

5.11 GUARANTEE

The Pump shall be warranted for 18 months from date of shipment to the job site.

5.12 The warranty shall be in printed form and previously published as the manufacturer's standard warranty for all similar units manufactured.

5.13 EXPERIENCE

The pump manufacturer shall have a minimum of 10,000 heavy-duty submersible wastewater pumps installed and operating for no less than 5 years in the United States.

5.14 MANUFACTURERS

The pump, mechanical seals and motor shall be from the same manufacturer.

5.15 The pump, mechanical seals and motor manufacturer shall be ITT Flygt.

5.16 EXPLOSION-PROOF PUMPS (X)

The pump system including the pump, motor and power cable shall be approved for use in areas classified as hazardous locations in accordance with the NEC Class I, Div. 1, Group C and D service as determined and approved by a U.S. nationally recognized testing laboratory (U.L., FM, CSA) at the time of the bidding of the project. As required by Factory Mutual (FM) the motor shall be capable of operating in pumped media up to 104 DEGREES F. Motor thermal switches shall monitor and protect the motor from excessive temperature. An internal Float Switch shall be available, as an option, in the motor chamber. Service of explosion-proof submersible units shall be performed by qualified FM experienced personnel. The pump manufacturer must provide training schools to qualify personnel in the proper service and repair of explosion-proof pumps.

5.17 PUMP DESIGN

The discharge column shall be permanently installed in the wet well. The design shall be such that the pump unit(s) will be automatically and firmly connected to the discharge tube when lowered into place. A locking device, located on the external surface of the pump housing, shall prohibit rotational movement of the pump/motor unit(s) within the tube(s). The pump(s) shall be easily removable for inspection or service with no need for personnel to enter the wet well. The pump(s) shall not require any bolts, nuts or fasteners for connection to the discharge column. Stiffening and guiding webs shall be provided at the pump support seat to ensure concentric positioning of pump within the discharge column. An O-ring shall be provided on the bottom of the inlet (suction) bellmouth so that the weight of the pump unit, when acting on the O-ring, will provide an effective seal between pump and discharge column.

5.18 POWER CABLES

The power cable shall be designed specifically for use with submersible pumps and shall be type SUBCAB (Submersible Cable). The cable shall be sized according to the National Electrical Code (NEC) and the Insulated Cable Engineers Association (ICEA). The outer jacket shall be lubricant resistant chlorinated polyethylene rubber, and the copper conductors shall be insulated with ethylene-propylene rubber (EPR). The filler and conductor separator materials shall be of non-wicking vulcanized rubber. The cable shall be rated for 600 volts and 90°C (194°F) with a 40°C (104°F) ambient temperature and shall be approved by Factory Mutual (FM). The cable length shall be adequate to reach the junction box without the need for splices.

5.19 PILOT CABLE

The pilot cable shall be designed specifically for use with submersible pumps and shall be type SUBCAB (Submersible Cable). The cable shall be multi-conductor type with stainless steel braided shielding, a chlorinated polyethylene rubber outer jacket and tinned copper conductors insulated with ethylene-propylene rubber. The conductors shall be arranged in twisted pairs. The cable shall be rated for 600 Volts and 90°C (194°F) with a 40°C (104°F) ambient temperature and shall be approved by Factory Mutual (FM). The cable length shall be adequate to reach the junction box without the need for splices.

5.20 CABLE PROTECTION AND SUSPENSION

Engineer approved cable protection and suspension system shall be provided on all installations with in-tube cable runs over 10 feet in length.

5.21 CABLE ENTRY

The cable entry water seal design shall preclude specific torque requirements and ensure a watertight and submersible seal. The cable entry shall be comprised of two cylindrical elastomer grommets, flanked by four stainless steel washers, a spacer ring and an O-ring; all having a close tolerance fit against the cable outside diameter and the cable entry inside diameter. This design shall combine the sealing function with the cable strain relief function so that when the cable entry is mounted onto the junction box, the cable entry will be 100% watertight during immersion of 65 feet or greater, while providing sufficient strain relief to prevent the cable from pulling out when handling, installing, or operating the pump. The assembly shall bear against a shoulder in the pump top and direct the cable axially upwards. Epoxies, silicones, or other secondary sealing systems shall not be considered

acceptable for the cable entry and sealing system.

## 5.22 CABLE JUNCTION BOX

The junction chamber shall contain two separate terminal boards, one for connecting the signal wires and signal cable, and the second one to connect the stator leads and power cables. The lower terminal board shall use terminal posts equipped with screw type cable terminals to connect the cable conductors and motor stator leads. The junction chamber shall be sealed from the motor housing.

5.22.1 The junction box shall contain a collection cavity placed so that any leakage into the junction box shall terminate in the collection cavity. A mechanical float switch shall be mounted at the lowest point in the collection cavity. This sensor shall be separately wired to provide an alarm in the event of water intrusion into the cable junction box.

## 5.23 ELECTRIC MOTOR

The pump motor shall be specifically designed for submersible operation and be of a 3-phase, squirrel-cage induction, shell type design, housed in an air-filled, watertight chamber. The stator windings shall be insulated with moisture resistant Class H insulation rated for 180°C (356°F). The stator shall be insulated by the trickle impregnation method using Class H monomer-free polyester resin resulting in a winding fill factor of at least 95%. The motor shall be inverter duty rated in accordance with NEMA MG1, Part 31. The stator shall be heat-shrink fitted into the cast iron stator housing. The use of multiple step dip and bake-type stator insulation process is not acceptable. The motor shall be designed for continuous duty. The use of bolts, pins or other fastening devices requiring penetration of the stator housing is not acceptable.

5.23.1 The motor shall be rated at 250HP and have a best efficiency of not less than 92%. The motor full load current shall not exceed 310 amps., at a voltage of 460 Volts.

5.23.2 Each unit shall be provided with an adequately designed cooling system. The motor shall be cooled by the pumped water flowing along the stator housing when the pump is working. A water jacket or any external cooling system shall not be considered acceptable designs.

5.23.3 Thermal switches shall be embedded in the stator end coils to monitor the temperature of each phase winding. One PT-100 type temperature sensor shall be installed in the stator winding. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the control panel. The junction chamber shall be sealed off from the stator housing and shall contain a terminal board for connection of power and pilot sensor cables using threaded compression type terminals. A mechanical float switch (FLS) shall be mounted in the junction chamber to signal if there is water intrusion. A pump memory module shall be provided and mounted in the junction chamber to record pump run time, number of starts as well as contain the motor unit performance and manufacturing data and service history. The use of wire nuts or crimp-type connectors is not acceptable. The motor and the pump shall be produced by the same manufacturer.

5.23.4 The motor/propeller shaft shall be a single piece of carbon steel ASTM A 572 and shall be completely isolated from the pumped liquid. Units with multiple piece shafts or gearboxes are not acceptable.

## 5.24 PUMP AND MOTOR BEARING ARRANGEMENT

The motor shaft shall rotate on four grease-lubricated and sealed bearings. The upper motor bearing shall be a cylindrical roller bearing. The lower bearing arrangement shall consist of two single-row angular contact ball bearings in tandem together with one cylindrical roller bearing. The bearings shall have a minimum L<sub>10</sub> bearing life of 100,000 Hrs.

5.24.1 The lower thrust bearing housing shall include a thermal sensor (RTD) of the platinum-100 type to monitor the temperature of the thrust bearing outer race during operation.

## 5.25 PUMP CONSTRUCTION

Major pump components shall be of gray cast iron, Class 35, with smooth surfaces devoid of blow holes and other irregularities. All exposed nuts and bolts shall be of stainless steel 304. The propeller shall be of a 4-bladed fixed pitch, cast design, ASTM B 148 (aluminum bronze), Factory balanced. The blades shall be noticeably backward curved so that any clogging tendency is minimized. A wear ring system shall be installed to provide sealing between the pump housing and the propeller. The wear ring shall be of stainless steel ASTM A320 Type (316). The propeller assembly shall be available in 1° increments to optimize the pump efficiency. The propeller pump shall have seven guide vanes designed in such a way as to minimize clogging by carrying debris normally prone to clog the guide vanes from the inside of the guide vanes towards the outside of the guide vane. Here the flow shall be partially and deliberately destabilized to help material disengage itself from the vanes, to continue its passage through and out of the pump.

5.25.1 The fastening of the propeller hub assembly shall be made by a locking assembly.

5.25.2 All mating surfaces where watertight sealing is required shall be machined and fitted with nitrile rubber O-rings. Fitting shall be such that sealing is accomplished by metal-to-metal contact between machined surfaces. This will result in controlled compression of nitrile rubber O-rings without requiring a specific torque limit. No secondary sealing compounds, rectangular gaskets, elliptical O-rings, grease or other devices shall be used.

5.25.3 All metal surfaces coming into contact with the pumped media, other than stainless steel, shall be protected by a factory applied spray coating of acrylic dispersion zinc phosphate primer with a polyester resin paint finish on the exterior of the pump.

## 5.26 MECHANICAL SEALS

Between the propeller and the motor there shall be a tandem mechanical rotating shaft seal system. Seals shall run in an lubricant reservoir. Lapped seal faces must be hydrodynamically lubricated at a constant rate. The lower seal unit, between the pump and lubricant chamber, shall contain one stationary and one positively driven rotating corrosion resistant tungsten carbide ring. The upper seal unit, between the lubricant reservoir and motor, shall contain one stationary corrosion resistant tungsten-carbide ring and one positively driven rotating corrosion resistant tungsten carbide ring. Each interface shall be held in contact by its own spring system. The seals shall require neither maintenance nor adjustment, but shall be easily inspected and replaceable.

5.26.1 Seal lubricant shall be FDA Approved, non-toxic.

## 5.27 PUMP MONITORING

All stators shall incorporate three thermal switches, connected in series, to provide over temperature protection of the motor winding. Should high temperature occur, the thermal switches shall open, stop the motor and activate an alarm. The stator shall also include one PT-100 type temperature probe to provide for monitoring of the stator temperature

5.27.1 A lower bearing temperature sensor shall be provided. The sensor shall directly contact the outer race of the thrust bearing providing for accurate temperature monitoring.

5.27.2 Two leakage sensors shall be provided to detect water intrusion into the stator chamber and junction chamber. A Float Leakage Sensor (FLS), a small float switch, shall be used to detect the presence of water in either the stator chamber or junction chamber. When activated, the FLS will stop the motor and activate an alarm. USE OF VOLTAGE SENSITIVE SOLID STATE SENSORS SHALL NOT BE ALLOWED.

5.27.3 The solid-state pump memory unit, three thermal switches, two FLS switches, PT-100 stator temperature monitor and the lower bearing PT-100 temperature monitor shall all be connected to a MAS (Monitoring and Status) monitoring unit. The MAS shall be designed to be mounted in the control panel and shall come with an Operator Panel that is dead-front panel mounted. The Operator Panel shall have soft-touch operator keys and provide local indication of the status of the alarms within the connected pump unit by means of an LCD screen read-out. Local MAS system change shall be made by use of the soft-touch keypad or local connection by means of a laptop computer. Remote indication of pump unit status shall be possible with connection to customer PLC or via LAN.

5.28 WARRANTY:

The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

5.29 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

5.30 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than 100 calendar days after receipt of a City of Houston Purchase Order.

5.31 TRAINING:

A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

6.0 GROUP I-BID LINE ITEM NO. 5: PUMP, 12" SUBMERSIBLE:

Furnish 12" submersible pump(s).

6.1 DESIGN REQUIREMENTS

- 6.1.1 12 Inch Discharge
- 6.1.2 Electric Submersible Sewage Pump(s)
- 6.1.3 45 H.P, 460 Volt, 3 Phase, 60 Hertz, 1170 RPM Motor
- 6.1.4 Impeller No 616
- 6.1.5 50' Of Power Cable.

6.2 The portable hydraulic submersible trash pump specified in this section will be used to pump raw sludge and slurry.

6.3 The pump and accessories shall be supplied by the pump manufacturer.

6.4 The hydraulic submersible pump shall be powered by a fixed piston motor capable of being powered by any open center hydraulic oil circuit.

6.5 The diesel engine hydraulic power unit shall be capable of powering comparably sized hydraulic motors on a submersible pump on a continuous operation.

6.6 Equipment acceptance shall be contingent upon its ability to run in a completely dry condition for periods up to 24 continuous hours at full speed. The engineer may require a demonstration.

6.7 The pump offered shall be a manufacturer's standard production model. It shall have been in continuous use by municipal and industrial owners for a minimum of five years. A list of five user contacts including contact names and telephone numbers shall be provided with the bid submittal. Failure to supply a verifiable users list will be cause for rejection of the bid.

6.13 WARRANTY:

The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

6.14 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

6.15 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than 100 calendar days after receipt of a City of Houston Purchase Order.

6.16 TRAINING:

A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

7.0 GROUP I-BID LINE ITEM NO. 6: PUMP, 2" SUBMERSIBLE:

Furnish 2" submersible pump(s).

7.1 2" discharge, 11 HP Submersible Pumps, or approved equivalent to replace 10 ITT Flygt Pumps, Model NS 3102, 3 inch discharge, 282 GPM @50' TDH, Explosion-Proof electric submersible cutter type pump, 3450 RPM.

7.1.1 Pumps shall be complete with motors and all fittings, parts and modifications required for replacement of the existing sump pumps at the 69 Street Treatment Plant Facility.

7.2 PUMP PERFORMANCE:

7.2.1 Pump shall operate at 3450 RPM.

7.2.2 Pump shall be able to pump 150 GPM at 77' TDH.

7.2.3 Pump Impeller No. 212, or approved equivalent.

7.2.4 Pump shall operate under the same conditions as the original units they are replacing under all applicable conditions.

7.3 PHYSICAL CHARACTERISTICS OF THE PUMP:

7.3.1 Pump shall be constructed of metal or approved equivalent capable of withstanding conditions as typically experienced in a wastewater sludge pumping station.

7.3.2 Pump Impeller should have the high chrome impeller and wear plate adder or equivalent manufacture from a corrosion resistant material and coated with a corrosive resistant coating to prolong life and reduce wear.

7.3.3 Pump Impeller shall be dynamically balanced.

7.3.4 Pump shall be equipped with sufficient mounting mechanisms to allow connection onto existing pump mounts and supports.

7.3.5 Pump shall include discharge elbow and portable stand.

7.4 MOTOR:

7.4.1 Shall be 11 HP, 3-phase, 60-hertz, 230/460 volt, 3450 RPM rated for continuous duty in at least 40° C fluid.

7.4.2 Motor shall have NEMA PREMIUM electrical efficiency or equivalent.

7.4.3 Voltage tolerance shall be at least plus or minus 10%.

7.4.4 Power cable shall be sized according to NEC standards and shall be at least 50 feet long.

7.4.5 The motor and cable shall be capable of withstanding continuous submergence typical of sump pump operation of existing equipment without loss of integrity.

7.4.6 Motor horsepower shall be 6.5 hp or greater so the motor will not overload throughout the entire range of pump performance.

7.4.7 Motor and pump shall be on the same shaft.

7.4.8 Motor shall be fully compatible and be able to function as intended when connected to the existing switchgear for any of the existing sump pumps.

7.5 WARRANTY:

The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City.

All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

7.6 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

7.7 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than 100 calendar days after receipt of a City of Houston Purchase Order.

7.8 TRAINING:

A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

8.0 GROUP II-BID LINE ITEM NO. 7: PUMP, 4" NON-CLOG CENTRIFUGAL, 25 HP:

Furnish 4" centrifugal pump(s).

- 8.1 This specification covers two (2) ITT A-C vertical, non-clog, centrifugal pumps & motors. Pumps shall be ITT, Model NSWV, size 6x4x10LC. Pumps shall be rated for 695 GPM @ 78.5 feet when running 1755 RPM. Pumps shall match existing units dimensionally and allow for mounting on existing bases.
- 8.2 PUMP CONSTRUCTION: Pumps shall be designed to perform satisfactorily with a reasonable service life when operated either continuously or intermittently in typical wastewater services. Pumps shall be mounted on pedestal bases and have fabricated steel motor.
- 8.2.1 Casing: Casing shall be close-grained cast iron ASTM A48 Class 30 of sufficient strength, weight and metal thickness to insure long life, accurate alignment, and reliable operation.
- 8.2.2 Volute shall have smooth fluid passages large enough at all points to pass any size solid which can pass through the impeller and provide smooth unobstructed flow.
- 8.2.3 A large clean-out opening with removable cover, having its interior surface matching the volute contour, shall be located on the casing at the impeller centerline, to allow access to interior of the impeller.
- 8.2.4 Casing shall be split perpendicular to the shaft, with removable suction cover and stuffing box cover. Machined fits for these parts shall be accurately aligned and identical so that casing may be installed for either clockwise or counter-clockwise direction of rotation.
- 8.2.5 Casing shall be arranged so that the impeller may be removed without disturbing either suction or discharge piping.
- 8.3 DISCHARGE FLANGE: Flange shall be ANSI 125-pound flat face (4"). All flanges shall have slotted bolt holes for ease of installation and removal. Each discharge nozzle shall be drilled and tapped with two 1.0" IPS taps, one on either side. One of the taps in the discharge shall serve as a vent.
- 8.4 DISCHARGE POSITION: Pump discharge nozzle orientation shall be tangential, centerline discharge is not acceptable, and shall be capable of rotation to any of eight discharge positions for each direction of rotation.
- 8.5 SUCTION COVER: Pump shall be manufactured with a removable suction cover to allow for access to the impeller. It shall be made of cast iron, ASTM A-48 Class 30. A 1/4" IPS tap shall be provided next to the suction flange. The suction flange shall be ANSI 125-pound flat face. Flange bolt holes shall be slotted for ease of assembly and disassembly. Pump shall be fitted with an increasing suction elbow with 6" connection and shall be provided with a tapped port for seal water return.
- 8.5.1 A replaceable 11.5%-14% chrome steel wear plate shall be furnished. It shall provide 1/4" minimum wear and shall be installed with its wear surface parallel to the end of the impeller inlet.
- 8.6 IMPELLER: Impeller shall be of the single-suction, enclosed type with two vanes, made of ductile Iron. Impellers shall be specially designed with smooth water passages to prevent clogging by stringy or fibrous materials, and shall be capable of passing solids having at least a sphere size of 3". Impeller shall be dynamically balanced. Impeller shall have a tapered bore and shall be keyed and secured to the shaft by an 18-8 Stainless Steel nut locked in place. It shall be readily removable without the use of special tools.
- 8.6.1 A replacement 11.5-14% chrome steel AL@ shaped wear ring shall be provided. Ring shall be mounted on impeller to provide a renewable surface opposite the suction cover wear plate.
- 8.6.2 Pump shall have provisions for adjustment of axial clearance. This adjustment shall be made through the use of shims placed between the frame and outboard bearing housing.

- 8.7 SHAFT: Pump shaft shall be high-strength carbon steel, AISI #1045 or 4140, accurately machined, tapered at the impeller end and of sufficient size to transmit full driver output. It shall be protected from the pumped liquid by a shaft sleeve. A seal shall be provided, by a synthetic rubber AO@ ring between the shaft and shaft sleeve to prevent leakage of pumped liquid out and/or air into the pump.
- 8.8 SHAFT SLEEVE: Renewable shaft sleeve shall be 316 SS with a Ni-CR-Boron coating to a hardness of 58-63RC(approximately 650 Brinell). The sleeve provided shall extend through the seal housing.
- 8.9 Each pump shall be provided with a Dynamic Seal System.
- 8.10 SEAL BOX: The pumps shall be fitted with a single stage Dynamic Seal capable of balancing out positive suction heads. A throttle bushing and sleeve shall be placed in the stuff box cover. Both pieces shall be made of 316 SS with a Ni-CR-Boron coating to a hardness of 58-63RC(approximately 650 Brinell). The Dynamic Seal expeller shall be made of nodular iron, ASTM 536 or 304 Stainless Steel. A pressure relief connection with elbow, fittings, and tubing shall be provided in the seal cover to bleed liquid back to the suction cover of the pump.
- 8.11 STATIC SEAL: Dual static seals, provided with a grease cavity between them, shall be installed in the seal cover to provide leakage along the shaft, when the pump is not running. A positive means for adding grease shall be provided in the suction cover. Seals shall contact a 316 SS sleeve with a Ni-CR-Boron coating to a hardness of 58-63RC(approximately 650 Brinell).
- 8.12 BEARING FRAME AND BEARINGS
- 8.12.1 Bearing Frame: Pump bearing frame shall be one-piece rigid cast iron construction. Frame shall be provided with a cast iron bearing housing at the outboard end, and a cast iron end over at the inboard end. Both ends of the frame shall be provided with lip type grease seals and labyrinth type deflectors to prevent the entrance of contaminants. Bearing Frame shall be designed so that complete rotation element, including motor, can be removed from casing without disconnecting piping or coupling.
- 8.12.2 Bearings shall be designed for 50,000 hours minimum life at 50% of B.E.P. Radial inboard bearings shall be roller type suitable for all loads encountered in the service conditions. Outboard bearing arrangement shall consist of one deep groove ball bearing to take the radial loads and one angular contact bearing to take axial loads.
- 8.12.3 Bearing lubrication: Bearings shall be grease lubricated with provisions for addition and relief of grease.
- 8.13 SUCTION ELBOW: Each pump shall be provided with a clean-out type cast iron suction elbow with 6" inlet, which is bolted directly to the pump suction flange. The clean-out handhole shall be provided with a removable cover of the largest possible size. The inner surfaces of each handhole cover shall generally conform to the curvature and radius of the suction elbow. A 1/4" tapped hole for gauge connection shall be provided. Also a 2" tapped hole shall be provided in the side of the elbow for use in applying water pressure to unclog the pump in case of blockage.
- 8.14 COUPLING: Coupling shall be of the manufacturer's choice and of the flexible type. Coupling hubs shall be secured to the driver and driven shafts by setscrew located over the key.
- 8.15 DATA PLATE: All data plates shall be stainless steel suitable attached to the pump. Data plates shall contain the manufacturer's name, pump size and type, serial number, speed, impeller diameter, rated capacity and head, and other pertinent data. A separate nameplate shall identify the frame and bearing numbers.
- 8.16 PUMP DRIVE - Direct Connected Pump shall be designed for direct connection to a standard vertical solid shaft, normal thrust, 284HP frame, 25HP, 230/460 Volt, 1800 RPM motor with P base, Class F insulation w/Class B rise, 115 Volt space heater and shall be furnished complete with a suitable cast motor support and flexible coupling. Motor support shall be accurately positioned and bolted to pump frame to insure proper alignment of motor and pump shafts.

- 8.17 FACTORY TESTING - Pumps shall be hydrostatically tested in accordance with the Standards of the Hydraulic Institute.
- 8.18 NOTE: Supply of pumps other than Flygt, will require supplier to install and wire their protection units at their expense.
- 8.19 WARRANTY:  
The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.
- 8.20 LITERATURE:  
The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.
- 8.21 DELIVERY:  
Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than 100 calendar days after receipt of a City of Houston Purchase Order.
- 8.22 TRAINING:  
A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

9.0 GROUP II-BID LINE ITEM NO. 8: PUMP, 6" SUBMERSIBLE:

Furnish two 6x6 pump(s) specifically designed for pumping abrasive slurries. Pumps shall replace existing units without the need of piping or base modifications.

9.1 PUMP PERFORMANCE - Each pump shall be designed for pumping at a capacity of Goulds model JC, size 6x6, s/n 435A312.

9.2 PUMP CONSTRUCTION

9.2.1 Casing Pump casing shall be of the end suction type and shall be constructed of cast iron. Double volute design shall be used to minimize radial. Casing shall be designed so that it may be rotated in the field to any of 8 discharge positions (45° increments) without special provision or exchange of parts. Discharge flange shall be 125 lb. ANSI standard.

9.2.2 Impeller Impeller shall be of the semi-open type constructed of 316SS; shall be threaded to the pump shaft (no shaft nut shall be used); and shall be statically balanced. Back vanes shall be incorporated to reduce stuffing box pressure. Impeller shroud shall contain no thrust balancing holes.

9.2.3 Rotation Pump rotation shall be clockwise when viewed from the driven end.

9.2.4 Suction Cover Suction cover shall be constructed of cast iron and shall be integrally cast with 125lb. ANSI standard flange. Cover shall be quickly removable for access to liner and impeller.

9.2.5 Suction Cover Liner Replaceable suction cover liner shall be clamped in place by the suction cover and shall be fully machined at casing fits. Suction Cover Liner shall be constructed of cast iron and shall contain no studs or tapped holes.

9.2.6 Stuffing Box Cover Stuffing box cover shall be constructed of HC600 and shall be designed with a machined, self-centering fit with the pump casing. Two tapped holes shall be provided for seal water connections (one or both may be used, depending upon application requirements).

9.2.7 Stuffing Box Pump shall be specially equipped with Goulds hydrodynamic seal.

9.2.8 Shaft Pump shaft shall be constructed of 316SS, with machined shoulders for bearing location.

9.2.9 Shaft Sleeve Shaft sleeve shall be constructed of 416SS and shall be of the "hooked" design, locked in place by the impeller with no other mechanical attachment.

9.2.10 Bearings Ball radial and thrust bearings shall be selected to provide a minimum B-10 life of 24,000 hours; shall be oil lubricated; and shall be protected by closures at each end and a slinger on the pump end.

9.2.11 Bearing Housing Bearings shall be fully enclosed by a single cast iron housing incorporating a seal water catch basin with a tapped drain and overflow ports.

9.2.12 Wear Adjustment Rotating assembly shall be readily adjustable by jack screws at the end of the bearing housing so that, as wear occurs, proper impeller-to-suction cover liner clearance can be maintained without dismantling the pump.

9.2.13 Testing - Pumps shall be hydrostatically tested in accordance with the Standards of the Hydraulic Institute.

- 9.3 WARRANTY:  
The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.
- 9.4 LITERATURE:  
The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.
- 9.5 DELIVERY:  
Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than 100 calendar days after receipt of a City of Houston Purchase Order.
- 9.6 TRAINING:  
A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

10.0 GROUP II-BID LINE ITEM NO. 9: PUMP, 4" SUBMERSIBLE:

Furnish 12" non-clog centrifugal pump(s).

10.1 Size 4x4-12

10.2 Chromium iron construction

10.3 HC600 casing impeller

10.4 Casing Wear Ring & Stuff box Cover

10.5 Greased Lube bearings

10.6 Packed Stuffing Box

10.7 10 HP, 880 RPM, 460 Volt Motor w/Class F insulation w/Class B rise & 120V space heater

10.8 Vertical Solid Shaft

10.9 Cast iron base and direct frame with greased lube bearings

10.10 WARRANTY:

The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

10.11 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

10.12 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than 100 calendar days after receipt of a City of Houston Purchase Order.

10.13 TRAINING:

A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

11.0 GROUP III-BID LINE ITEM NO. 10: PUMP, 10”:

Furnish wastewater vertical dry pit pump(s).

11.1 Reference Chicago Yeoman’s Vertical Dry Pit Pump

11.2 Special Iron Construction

11.3 Right Hand Rotation

11.4 Position RA

11.5 Bronze Packing Gland Assembly

11.6 10-Inch Suction

11.7 Cast Iron Pump Pedestal

11.8 324TC Frame Motor Mounting Parts

11.9 Impeller Diameter 15-1/8” Balanced To 870 RPM

11.10 Existing 30HP, 870 RPM TEFC Motor To Be Re-Used

11.11 WARRANTY:

The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

11.12 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

11.13 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than 100 calendar days after receipt of a City of Houston Purchase Order.

11.14 TRAINING:

A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

12.0 GROUP III-BID LINE ITEM NO. 11: PUMP, 4”:

Furnish vertical wasting pump(s).

12.1 Vendor shall provide the pumps and all fittings, parts and modifications required for replacement of the existing pumps at the 69 Street Treatment Plant. These will be coupled to existing 125HP drives.

12.2 PUMP PERFORMANCE:

12.2.1 Pump shall operate at 572 RPM.

12.2.2 Pump shall be able to operate at 30' TDH.

12.2.3 Pump shall operate under the same conditions as the original units they are replacing under all applicable conditions.

12.3 PHYSICAL CHARACTERISTICS OF THE PUMP:

12.3.1 Pump shall be constructed of metal or approved equivalent capable of withstanding conditions as typically experienced in a wastewater sludge pumping station.

12.3.2 Pump Impeller shall be manufactured from a corrosion resistant material and coated with a corrosive resistant coating to prolong life and reduce wear.

12.3.3 Pump Impeller shall be dynamically balanced.

12.3.4 Pump shall be equipped with sufficient mounting mechanisms to allow connection onto existing pump mounts and supports.

12.4 Reference Chicago Pump Type Vertical Pedestal Mounted (Model LMC4) Wasting Pumps, or approved equivalent to replace 12,000 GPM, Model No. 20MNZ24, Serial No. 78-ZUS-8165-2, 572 RPM.

12.5 WARRANTY:

The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

12.6 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

12.7 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than 100 calendar days after receipt of a City of Houston Purchase Order.

12.8 TRAINING:

A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

13.0 GROUP III-BID LINE ITEM NO. 12: SLUDGE PUMP:

Furnish submersible grind pump(s).

13.1 Vendor shall provide the pumps and all fittings, parts and modifications required for replacement of the existing pumps at the 69 Street Treatment Plant Facility. These will be coupled to existing 125HP drives.

13.2 PUMP PERFORMANCE:

13.3.1 Pump shall operate at 572 RPM.

13.3.2 Pump shall be able to operate at 30' TDH.

13.3.3 Pump shall operate under the same conditions as the original units they are replacing under all applicable conditions.

13.3 PHYSICAL CHARACTERISTICS OF THE PUMP:

13.3.1 Pump shall be constructed of metal or approved equivalent capable of withstanding conditions as typically experienced in a wastewater sludge pumping station.

13.3.2 Pump Impeller shall be manufactured from a corrosion resistant material and coated with a corrosive resistant coating to prolong life and reduce wear.

13.3.3 Pump Impeller shall be dynamically balanced.

13.3.4 Pump shall be equipped with sufficient mounting mechanisms to allow connection onto existing pump mounts and supports.

13.4 Reference Chicago Pump Type TSP (Model 4315SC-3D), or approved equivalent, to replace existing pumping equipment.

13.5 WARRANTY:

The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

13.6 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

13.7 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than 100 calendar days after receipt of a City of Houston Purchase Order.

13.8 TRAINING:

A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

14.0 GROUP IV-BID LINE ITEM NO. 13: PUMP, 6" SUBMERSIBLE:

Furnish horizontal chopper pump(s).

14.1 Vendor shall provide the pump and all fittings, parts and modifications required for replacement of the existing pumps at the 69 Street Treatment Plant. These will be coupled to existing 40HP drives;

14.2 PUMP PERFORMANCE:

14.3.1 Pump shall be capable of 250-850GPM @ 33 – 67 Ft. TDH.

14.3.2 Pump shall operate at 1157 RPM.

14.3.3 Pump shall operate under the same conditions as the original units they are replacing under all applicable conditions.

14.3 PUMP PHYSICAL CHARACTERISTICS:

14.3.1 Pump shall be constructed of metal capable of withstanding environments and conditions as typically experienced in a wastewater sludge pumping station.

14.3.2 Pump Impeller shall be manufactured from a corrosion resistant material and coated with a corrosive resistant coating to prolong life and reduce wear.

14.3.3 Pump Impeller shall be dynamically balanced.

14.3.4 Pump shall be equipped with sufficient mounting mechanisms to allow connection onto existing pump mounts and supports.

14.4 Reference Chopper Pumps (Vaughan Model HE4P6S-118 Bare Horizontal DSP Pump), 250-850 GPM @ 33-67 ft. TDH, or approved equivalent to replace ITT 'A-C' Series NSW, Size 6x4x14, 1157 RPM.

14.5 WARRANTY:

The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

14.6 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

14.7 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than 100 calendar days after receipt of a City of Houston Purchase Order.

14.8 TRAINING:

A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

- 15.0 GROUP V-BID LINE ITEM NO. 14: PUMP, SUBMERSIBLE, ELECTRIC, 95HP:  
Furnish KSB Submersible Pump(s), Model KRT, 95 HP, Cast Iron Construction, Motor Version UN, XN, w/cooling jacket – installation type K.
- 15.1 This specification is for a KSB 95 HP submersible wet pit pump model KRT.
- 15.2 Submersible wet pit pump – spare lift pump for emergency and/or replacement at lift station.
- 15.3 This pump will be used in the treatment plant to insure sanitary sewer is pumped properly to the plant for proper processing.
- 15.4 Maximum motor HP: 95 HP
- 15.5 Pump Case: Cast Iron, ASTM A48, Class 35B
- 15.6 Motor Housing: Cast Iron, ASTM A48, Class 35B
- 15.7 Impeller: Cast Iron, ASTM A48, class 35B
- 15.8 Intermediate Housing (Backplate): Cast Iron, ASTM A48, Class 35B
- 15.9 Discharge Base Elbow: Cast Iron, ASTM A48, class 35B
- 15.10 Pump/Motor Shaft: Carbon Steel, C 45 N with replaceable ASTM A276 Type 420 shaft protection sleeve or entire shaft to be ASTM A276 Type 420 stainless steel with an ASTM A276 Type 420 shaft protection sleeve.
- 15.11 Shaft Sleeve: Stainless Steel, ASTM A276 Type 420
- 15.12 Wear Ring, case: Cast Iron SATM A48, minimum 200 Brinell
- 15.13 Wear Ring, impeller (enclosed impellers only): Stainless Steel, AISI329, 350 Brinell
- 15.14 O-Rings: Nitrate Rubber (NBR)
- 15.15 Fasteners (including impeller fastener): Stainless Steel, ASTM A276 Type 316Ti
- 15.16 Lower Seal Faces: Silicon Carbide/Silicon Carbide
- 15.17 Upper Seal Faces: Silicon Carbide stationary/Carbon rotating
- 15.18 Guide rails/cables and mounting brackets: Stainless Steel, ASTM A276 Type 316 (cables shall be nylon coated)
- 15.19 Lifting Chain or cable: Stainless Steel, ASTM A276 Type 316
- 15.20 Oil-all uses(seal lubrication, etc): Ecologically safe, paraffin or mineral base
- 15.21 Power/Control Cable Jacket: Chloroprene with non-wicking fillers
- 15.22 ACCESSORIES
- 15.22.1 Power Cable
- 15.22.2 Temperature Protection
- 15.22.3 Seal leak detection
- 15.22.4 “PumpSafe” Motor Sensor Monitoring Relay
- 15.23 FABRICATION
- 15.23.1 Provide pumps capable of handling raw unscreened wastewater. Allow for removal and reinstallation without the need to enter the wet well and without removal of bolts, nuts or other fasteners.
- 15.23.2 Major Components (pump case, impeller, intermediate housing, motor housing)
- 15.23.3 Impeller and Wear Rings – single vane or multivane enclosed type
- 15.23.4 Shaft – Provide common pump/motor shaft of sufficient size to transmit full driver output with maximum deflection of 0.002 inches measured at the lower mechanical seal.
- 15.23.5 Shaft Seal
- 15.23.6 Bearings
- 15.23.7 Motor – housed in a completely watertight and air filled chamber, with a min 1.15 service factor.
- 15.24 WARRANTY:  
The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

15.25 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

15.26 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than 240 calendar days after receipt of a City of Houston Purchase Order.

15.27 TRAINING:

A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

- 16.0 GROUP V-BID LINE ITEM NO. 15: PUMP, SUBMERSIBLE, 153HP:  
Furnish KRT Submersible Pump(s), 153 HP, Cast Iron construction, Motor Version UN, XN, w/cooling jacket – installation type K.

16.1 MATERIALS

- 16.1.1 Pump Case: Cast Iron, ASTM A48, Class 35B
- 16.1.2 Motor Housing: Cast Iron, ASTM A48, Class 35B
- 16.1.3 Impeller: Cast Iron, ASTM A48, class 35B
- 16.1.4 Intermediate Housing (Backplate): Cast Iron, ASTM A48, Class 35B
- 16.1.5 Discharge Base Elbow: Cast Iron, ASTM A48, class 35B
- 16.1.6 Pump/Motor Shaft: Carbon Steel, C 45 N with replaceable ASTM A276 Type 420 shaft protection sleeve or entire shaft to be ASTM A276 Type 420 stainless steel with an ASTM A276 Type 420 shaft protection sleeve.
- 16.1.7 Shaft Sleeve: Stainless Steel, ASTM A276 Type 420
- 16.1.8 Wear Ring, case: Cast Iron SATM A48, minimum 200 Brinell
- 16.1.9 Wear Ring, impeller (enclosed impellers only): Stainless Steel, AISI329, 350 Brinell
- 16.1.10 O-Rings: Nitrate Rubber (NBR)
- 16.1.11 Fasteners (including impeller fastener): Stainless Steel, ASTM A276 Type 316Ti
- 16.1.12 Lower Seal Faces: Silicon Carbide/Silicon Carbide
- 16.1.13 Upper Seal Faces: Silicon Carbide stationary/Carbon rotating
- 16.1.14 Guide rails/cables and mounting brackets: Stainless Steel, ASTM A276 Type 316 (cables shall be nylon coated)
- 16.1.15 Lifting Chain or cable: Stainless Steel, ASTM A276 Type 316
- 16.1.16 Oil-all uses(seal lubrication, etc): Ecologically safe, paraffin or mineral base
- 16.1.17 Power/Control Cable Jacket: Chloroprene with non-wicking fillers

16.2 ACCESSORIES

- 16.2.1 Power Cable
- 16.2.2 Temperature Protection
- 16.2.3 Seal leak detection
- 16.2.4 "PumpSafe" Motor Sensor Monitoring Relay

16.3 FABRICATION

- 16.3.1 General – Provide pumps capable of handling raw unscreened wastewater. Allow for removal and reinstallation without the need to enter the wet well and without removal of bolts, nuts or other fasteners.
- 16.3.2 Major Components (pump case, impeller, intermediate housing, motor housing)
- 16.3.3 Impeller and Wear Rings – single vane or multivane enclosed type
- 16.3.4 Shaft – Provide common pump/motor shaft of sufficient size to transmit full driver output with maximum deflection of 0.002 inches measured at the lower mechanical seal.
- 16.3.5 Shaft Seal
- 16.3.6 Bearings
- 16.3.7 Motor – housed in a completely watertight and air filled chamber, with a min 1.15 service factor.

16.4 WARRANTY:

The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

16.5 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

16.6 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than 240 calendar days after receipt of a City of Houston Purchase Order.

16.7 TRAINING:

A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

- 17.0 GROUP V-BID LINE ITEM NO. 16: PUMP, SUBMERSIBLE, ELECTRIC, 268HP:  
 Furnish KSB Submersible Pump(s), Model KRT, 268 HP, Cast Iron Construction, Motor Version UN, XN, w/cooling jacket – installation type K.
- 17.1 Identical replacement pump for the existing pump at Facility #190 to insure TCEQ required permits are met.
- 17.2 Pump will be used in the treatment plant to insure sanitary sewer is pumped properly to the plant for proper processing.
- 17.3 Maximum motor HP: 268 HP
- 17.4 MATERIALS
- 17.4.1 Pump Case: Cast Iron, ASTM A48, Class 35B
- 17.4.2 Motor Housing: Cast Iron, ASTM A48, Class 35B
- 17.4.3 Impeller: Cast Iron, ASTM A48, class 35B
- 17.4.4 Intermediate Housing (Backplate): Cast Iron, ASTM A48, Class 35B
- 17.4.5 Discharge Base Elbow: Cast Iron, ASTM A48, class 35B
- 17.4.6 Pump/Motor Shaft: Carbon Steel, C 45 N with replaceable ASTM A276 Type 420 shaft protection sleeve or entire shaft to be ASTM A276 Type 420 stainless steel with an ASTM A276 Type 420 shaft protection sleeve.
- 17.4.7 Shaft Sleeve: Stainless Steel, ASTM A276 Type 420
- 17.4.8 Wear Ring, case: Cast Iron SATM A48, minimum 200 Brinell
- 17.4.9 Wear Ring, impeller (enclosed impellers only): Stainless Steel, AISI329, 350 Brinell
- 17.4.10 O-Rings: Nitrate Rubber (NBR)
- 17.4.11 Fasteners (including impeller fastener): Stainless Steel, ASTM A276 Type 316Ti
- 17.4.12 Lower Seal Faces: Silicon Carbide/Silicon Carbide
- 17.4.13 Upper Seal Faces: Silicon Carbide stationary/Carbon rotating
- 17.4.14 Guide rails/cables and mounting brackets: Stainless Steel, ASTM A276 Type 316 (cables shall be nylon coated)
- 17.4.15 Lifting Chain or cable: Stainless Steel, ASTM A276 Type 316
- 17.4.16 Oil-all uses(seal lubrication, etc): Ecologically safe, paraffin or mineral base
- 17.4.17 Power/Control Cable Jacket: Chloroprene with non-wicking fillers
- 17.5 ACCESSORIES
- 17.5.1 Power Cable
- 17.5.2 Temperature Protection
- 17.5.3 Seal leak detection
- 17.5.4 PumpSafe” Motor Sensor Monitoring Relay
- 17.6 FABRICATION
- 17.6.1 Provide pumps capable of handling raw unscreened wastewater. Allow for removal and reinstallation without the need to enter the wet well and without removal of bolts, nuts or other fasteners.
- 17.6.2 Major Components (pump case, impeller, intermediate housing, motor housing)
- 17.6.3 Impeller and Wear Rings – single vane or multivane enclosed type
- 17.6.4 Shaft – Provide common pump/motor shaft of sufficient size to transmit full driver output with maximum deflection of 0.002 inches measured at the lower mechanical seal.
- 17.6.5 Shaft Seal
- 17.6.6 Bearings
- 17.6.7 Motor – housed in a completely watertight and air filled chamber, with a min 1.15 service factor.
- 17.7 WARRANTY:  
 The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

- 17.8 LITERATURE:  
The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.
- 17.9 DELIVERY:  
Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than 100 calendar days after receipt of a City of Houston Purchase Order.
- 17.10 TRAINING:  
A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

18.0 GROUP V-I BID LINE ITEM NO. 17: PUMP, SUBMERSIBLE, 34HP:

Furnish 4" wasting Submersible Pump(s), Model KRT, 34 HP, Cast Iron Construction, Motor Version UN, XN, w/cooling jacket – installation type K.

18.1 This pump will be used in the treatment plant to insure sanitary sewer is pumped properly to the plant for proper processing.

18.2 Maximum motor HP: 34 HP

18.3 MATERIALS

18.3.1 Pump Case: Cast Iron, ASTM A48, Class 35B

18.3.2 Motor Housing: Cast Iron, ASTM A48, Class 35B

18.3.3 Impeller: Cast Iron, ASTM A48, class 35B

18.3.4 Intermediate Housing (Backplate): Cast Iron, ASTM A48, Class 35B

18.3.5 Discharge Base Elbow: Cast Iron, ASTM A48, class 35B

18.3.6 Pump/Motor Shaft: Carbon Steel, C 45 N with replaceable ASTM A276 Type 420 shaft protection sleeve or entire shaft to be ASTM A276 Type 420 stainless steel with an ASTM A276 Type 420 shaft protection sleeve.

18.3.7 Shaft Sleeve: Stainless Steel, ASTM A276 Type 420

18.3.8 Wear Ring, case: Cast Iron SATM A48, minimum 200 Brinell

18.3.9 Wear Ring, impeller (enclosed impellers only): Stainless Steel, AISI329, 350 Brinell

18.3.10 O-Rings: Nitrate Rubber (NBR)

18.3.11 Fasteners (including impeller fastener): Stainless Steel, ASTM A276 Type 316Ti

18.3.12 Lower Seal Faces: Silicon Carbide/Silicon Carbide

18.3.13 Upper Seal Faces: Silicon Carbide stationary/Carbon rotating

18.3.14 Guide rails/cables and mounting brackets: Stainless Steel, ASTM A276 Type 316 (cables shall be nylon coated)

18.3.15 Lifting Chain or cable: Stainless Steel, ASTM A276 Type 316

18.3.16 Oil-all uses(seal lubrication, etc): Ecologically safe, paraffin or mineral base

18.3.17 Power/Control Cable Jacket: Chloroprene with non-wicking fillers

18.4 ACCESSORIES

18.4.1 Power Cable

18.4.2 Temperature Protection

18.4.3 Seal leak detection

18.4.4 PumpSafe™ Motor Sensor Monitoring Relay

18.5 FABRICATION

18.5.1 General – Provide pumps capable of handling raw unscreened wastewater. Allow for removal and reinstallation without the need to enter the wet well and without removal of bolts, nuts or other fasteners.

18.5.2 Major Components (pump case, impeller, intermediate housing, motor housing)

18.5.3 Impeller and Wear Rings – single vane or multivane enclosed type

18.5.4 Shaft – Provide common pump/motor shaft of sufficient size to transmit full driver output with maximum deflection of 0.002 inches measured at the lower mechanical seal.

18.5.5 Shaft Seal

18.5.6 Bearings

18.5.7 Motor – housed in a completely watertight and air filled chamber, with a min 1.15 service factor.

18.6 WARRANTY:

The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

18.7 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

18.8 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than 100 calendar days after receipt of a City of Houston Purchase Order.

18.9 TRAINING:

A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

19.0 GROUP V-BID LINE ITEM NO. 18: PUMP, SUBMERSIBLE. 330HP:

Furnish KSB Submersible Pump(s), Model KRT, 330 HP, Cast Iron Construction, Motor Version UN, XN, w/cooling jacket – installation type K.

19.1 This pump will be used in the treatment plant to insure sanitary sewer is pumped properly to the plant for proper processing.

19.2 Maximum motor HP: 330 HP

19.3 MATERIALS

19.3.1 Pump Case: Cast Iron, ASTM A48, Class 35B

19.3.2 Motor Housing: Cast Iron, ASTM A48, Class 35B

19.3.3 Impeller: Cast Iron, ASTM A48, class 35B

19.3.4 Intermediate Housing (Backplate): Cast Iron, ASTM A48, Class 35B

19.3.5 Discharge Base Elbow: Cast Iron, ASTM A48, class 35B

19.3.6 Pump/Motor Shaft: Carbon Steel, C 45 N with replaceable ASTM A276 Type 420 shaft protection sleeve or entire shaft to be ASTM A276 Type 420 stainless steel with an ASTM A276 Type 420 shaft protection sleeve.

19.3.7 Shaft Sleeve: Stainless Steel, ASTM A276 Type 420

19.3.8 Wear Ring, case: Cast Iron SATM A48, minimum 200 Brinell

19.3.9 Wear Ring, impeller (enclosed impellers only): Stainless Steel, AISI329, 350 Brinell

19.3.10 O-Rings: Nitrate Rubber (NBR)

19.3.11 Fasteners (including impeller fastener): Stainless Steel, ASTM A276 Type 316Ti

19.3.12 Lower Seal Faces: Silicon Carbide/Silicon Carbide

19.3.13 Upper Seal Faces: Silicon Carbide stationary/Carbon rotating

19.3.14 Guide rails/cables and mounting brackets: Stainless Steel, ASTM A276 Type 316 (cables shall be nylon coated)

19.3.15 Lifting Chain or cable: Stainless Steel, ASTM A276 Type 316

19.3.16 Oil-all uses(seal lubrication, etc): Ecologically safe, paraffin or mineral base

19.3.17 Power/Control Cable Jacket: Chloroprene with non-wicking fillers

19.4 ACCESSORIES

19.4.1 Power Cable

19.4.2 Temperature Protection

19.4.3 Seal leak detection

19.4.4 "PumpSafe" Motor Sensor Monitoring Relay

19.5 FABRICATION

19.5.1 General – Provide pumps capable of handling raw unscreened wastewater. Allow for removal and reinstallation without the need to enter the wet well and without removal of bolts, nuts or other fasteners.

19.5.2 Major Components (pump case, impeller, intermediate housing, motor housing)

19.5.3 Impeller and Wear Rings – single vane or multivane enclosed type

19.5.4 Shaft – Provide common pump/motor shaft of sufficient size to transmit full driver output with maximum deflection of 0.002 inches measured at the lower mechanical seal.

19.5.5 Shaft Seal

19.5.6 Bearings

19.5.7 Motor – housed in a completely watertight and air filled chamber, with a min 1.15 service factor.

19.6 WARRANTY:

The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

19.7 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

19.8 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than 100 calendar days after receipt of a City of Houston Purchase Order.

19.9 TRAINING:

A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

20.0 GROUP V-BID LINE ITEM NO. 19: PUMP, SUBMERSIBLE, 64 HP:

Furnish KSB Submersible Pump(s), Model KRT, 64 HP, Cast Iron Construction, Motor Version UN, XN, w/cooling jacket – installation type K.

20.1 This pump will be used in the treatment plant to insure sanitary sewer is pumped properly to the plant for proper processing.

20.2 Maximum motor HP: 64 HP

20.3 MATERIALS

20.3.1 Pump Case: Cast Iron, ASTM A48, Class 35B

20.3.2 Motor Housing: Cast Iron, ASTM A48, Class 35B

20.3.3 Impeller: Cast Iron, ASTM A48, class 35B

20.3.4 Intermediate Housing (Backplate): Cast Iron, ASTM A48, Class 35B

20.3.5 Discharge Base Elbow: Cast Iron, ASTM A48, class 35B

20.3.6 Pump/Motor Shaft: Carbon Steel, C 45 N with replaceable ASTM A276 Type 420 shaft protection sleeve or entire shaft to be ASTM A276 Type 420 stainless steel with an ASTM A276 Type 420 shaft protection sleeve.

20.3.7 Shaft Sleeve: Stainless Steel, ASTM A276 Type 420

20.3.8 Wear Ring, case: Cast Iron SATM A48, minimum 200 Brinell

20.3.9 Wear Ring, impeller (enclosed impellers only): Stainless Steel, AISI329, 350 Brinell

20.3.10 O-Rings: Nitrate Rubber (NBR)

20.3.11 Fasteners (including impeller fastener): Stainless Steel, ASTM A276 Type 316Ti

20.3.12 Lower Seal Faces: Silicon Carbide/Silicon Carbide

20.3.13 Upper Seal Faces: Silicon Carbide stationary/Carbon rotating

20.3.14 Guide rails/cables and mounting brackets: Stainless Steel, ASTM A276 Type 316 (cables shall be nylon coated)

20.3.15 Lifting Chain or cable: Stainless Steel, ASTM A276 Type 316

20.3.16 Oil-all uses(seal lubrication, etc): Ecologically safe, paraffin or mineral base

20.3.17 Power/Control Cable Jacket: Chloroprene with non-wicking fillers

20.4 ACCESSORIES

20.4.1 Power Cable

20.4.2 Temperature Protection

20.4.3 Seal leak detection

20.4.4 "PumpSafe" Motor Sensor Monitoring Relay

20.5 FABRICATION

20.5.1 Pumps shall be capable of handling raw unscreened wastewater. Allow for removal and reinstallation without the need to enter the wet well and without removal of bolts, nuts or other fasteners.

20.5.2 Major Components (pump case, impeller, intermediate housing, motor housing)

20.5.3 Impeller and Wear Rings – single vane or multivane enclosed type

20.5.4 Shaft – Provide common pump/motor shaft of sufficient size to transmit full driver output with maximum deflection of 0.002 inches measured at the lower mechanical seal.

20.5.5 Shaft Seal

20.5.6 Bearings

20.5.7 Motor – housed in a completely watertight and air filled chamber, with a min 1.15 service factor.

20.6 WARRANTY:

The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

20.7 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

20.8 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than 100 calendar days after receipt of a City of Houston Purchase Order.

20.9 TRAINING:

A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

21.0 GROUP V-BID LINE ITEM NO. 20: PUMP, SUBMERSIBLE, 20HP:

Furnish Submersible Pump(s), KSB Model KRT K100-251/164XG.

21.1 Design: 675 GPM @ 63' TDH

21.2 Minimum Shutoff Head: 15'

21.3 Maximum Motor HP: 20 HP

21.4 Minimum Hydraulic Efficiency (at design): 74.5%

21.5 Maximum Motor RPM: 1765 RPM

21.6 Pump Case: Cast Iron, ASTM A48, Class 35B

21.7 Motor Housing: Cast Iron, ASTM A48, Class 35B

21.8 Impeller: Cast Iron, ASTM A48, Class 35B

21.9 Wear Ring, case: Cast Iron, ASTM A48, and a minimum 200 Brinell

21.10 Wear Ring, impeller (enclosed impellers only): Stainless Steel, AISI329, 350 Brinell

21.11 O-Rings: Nitrile Rubber (NBR)

21.12 Lifting Chain or cable: 30' Stainless Steel chain, ASTM A276 Type 316

21.13 WARRANTY:

The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

21.14 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

21.15 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than 100 calendar days after receipt of a City of Houston Purchase Order.

21.16 TRAINING:

A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

22.0 GROUP VI- BID LINE ITEM NO. 21: PUMP, 15HP:

Furnish FAIRBANKS MORSE 998425-0 TSP Pump(s) or approved equivalent to replace 2 Pumps, ITT 'A-C' Series NSW, Size 4x4x14, 15 HP, 400 GPM, 880 RPM, with dynamic seals and grease lube bearings, woods coupling fabricated steel base plate.

22.1 Pump shall be complete with motors and all fittings, parts and modifications required for replacement of the existing pumps at the 69 Street Treatment Plant.

22.2 PUMP PERFORMANCE:

22.2.1 Pump shall operate at 880 RPM.

22.2.2 Pump shall operate under the same conditions as the original units they are replacing under all applicable conditions.

22.3 PHYSICAL CHARACTERISTICS OF THE PUMP:

22.3.1 Pump shall be constructed of metal capable of withstanding conditions as typically experienced in a wastewater sludge pumping station.

22.3.2 Pump Impeller shall be manufactured from a corrosion resistant material and coated with a corrosive resistant coating to prolong life and reduce wear.

22.3.3 Pump Impeller shall be dynamically balanced.

22.3.4 Pump shall be equipped with sufficient mounting mechanisms to allow connection onto existing pump mounts and supports.

22.4 WARRANTY:

Pump supplier(s) shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

22.5 LITERATURE:

Pump supplier(s) shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

22.6 DELIVERY:

Pump unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than 100 calendar days after receipt of a City of Houston Purchase Order.

22.7 TRAINING:

Pump supplier(s) shall provide a minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

- 23.0 GROUP VII- BID LINE ITEM NO. 22: PUMP, RECIRCULATION, 18HP:  
Furnish Recirculation Pump(s) Series 1500 FYBROC 3X4X10 (Ref Serial No.970812), or approved equivalent to replace 18HP, Size 3x4x10, 1800 RPM pump.
- 23.1 Pump shall have all fittings, parts and modifications required for replacement of the existing pump at the 69 Street Treatment Plant. These will be coupled to existing 10HP drive.
- 23.2 PUMP PERFORMANCE:  
23.2.1 Pump shall be capable of delivering 250GPM @ 61.5 ft TDH.  
23.2.2 Pump shall operate at 1800 RPM.  
23.2.3 Pump shall operate under the same conditions as the original units they are replacing under all applicable conditions.
- 23.3 PHYSICAL CHARACTERISTICS OF THE PUMP:  
23.3.1 Pump shall be constructed of metal or approved equivalent capable of withstanding conditions as typically experienced in a wastewater sludge pumping station.  
23.3.2 Pump Impeller shall be manufactured from a corrosion resistant material and coated with a corrosive resistant coating to prolong life and reduce wear.  
23.3.3 Pump Impeller shall be dynamically balanced.  
23.3.4 Pump shall be equipped with sufficient mounting mechanisms to allow connection onto existing pump mounts and supports.
- 23.4 WARRANTY:  
The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.
- 23.5 LITERATURE:  
The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.
- 23.6 DELIVERY:  
Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than sixty (60) calendar days after receipt of a City of Houston Purchase Order.
- 23.7 TRAINING:  
A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

24.0 GROUP VIII- BID LINE ITEM NO. 23: PUMP, SLUDGE TRANSFER:

Furnish Thickened Sludge Pump(s).

24.1 Referenced Equipment Manufacture: Netzsch Pump

24.2 TECHNICAL SPECIFICATIONS:

24.2.1 Serial Number: NM076SY01L04K

24.2.2 Pump Pedestal material: Cast Iron 0.0625"

24.2.3 Pump Housing Material: Cast Iron 0.6025"

24.2.4 Suction Flange Nom Dia. & Pressure: 6" – 125# ANSI Flange

24.2.5 Discharge Flange Nom Dia. & Pressure: 6" – 125# ANSI Flange

24.2.6 Shaft Type: Double Mechanical Seal

24.2.7 Shaft Seal Material: Silicone Carbide Faces – Vinton Elastomers

24.2.8 Shaft Seal Type: Burgmann MG1-G60-Q1Q1VGG

24.2.9 Rotating Parts Material: ANSI 420

24.2.10 Joint Type: Gear Joint (K), Sealing Type: Double Sealed, Seal Material: 316 SS

24.2.11 Rotor Material: ANSI C 1045 w/ Tungsten Carbide Coating

24.2.12 Temp Range: 62 – 84 °F

24.2.13 Stator Material: NEMOLAST® S65L

24.3 WARRANTY:

The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

24.4 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

24.5 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than sixty (60) calendar days after receipt of a City of Houston Purchase Order.

24.6 TRAINING:

A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

25.0 GROUP IX- BID LINE ITEM NO.. 24: PUMP, SEWAGE, 5HP:

Furnish PACO Centrifugal Pump(s) Model Number 52-49513.

25.1 Referenced Equipment Manufacture: PACO Pump Model-52-49513, Size 4" X 4" X 9.5", CW rotation.

25.2 Design Conditions: 545 GPM @ 17-10 ft. TDH

25.3 Motor: 5HP @ 1150 RPM, S/N 9878030-101

25.4 Pump shall be fitted with impeller ASTM A48 Cast Iron is standard now for sewage.

25.5 WARRANTY:

The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

25.6 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

25.7 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than sixty (60) calendar days after receipt of a City of Houston Purchase Order.

25.8 TRAINING:

A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

26.0 GROUP X- BID LINE ITEM NO..25: PUMP, SLUDGE, 10HP:

Furnish vertical solid shaft pump(s) motor.

26.1 Referenced Equipment Manufacture: Moyno 2000 Pump Model: 1G065G1 CDQX3AAA.

26.2 65 GPM per 100 RPM

26.3 Pump Elements (rotor and stator) Are Rated At 87 PSI On Water

26.4 Shaft is 8620 Carbon Steel.

26.5 278 RPM

26.6 Service Factor 1.15

26.7 Enclosure TEFC

26.8 10 HP

26.9 60 Hertz

26.10 3 Phase

26.11 230/460 Volt

26.12 Severe Duty - 89.5 Efficiency

26.13 B3 Mounting

26.14 6.26:1 Gear Ratio

26.15 WARRANTY:

The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

26.16 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

26.17 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than sixty (60) calendar days after receipt of a City of Houston Purchase Order.

26.18 TRAINING:

A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

27.0 GROUP XI- BID LINE ITEM NO. 26: PUMP, SUBMERSIBLE:

Furnish Thickened Sump Pump(s).

27.1 Referenced Equipment Manufacture: Pioneer Pumps, Inc.

27.2 Self Priming Electric Pump Package, Model: P409L72-HO-30-4

27.3 Volute Casing: ASTM A536, Grade 65-45-12 Ductile Iron

27.4

27.5 Filling Cover: ASTM A5636, Grade 65-45-12 Ductile Iron

27.6 Wear Plate: Removable Steel (1020) or ASTM A48 Class 30 w. Stainless hardware

27.7 Removable Cover Plate: ASTM A48, Class 30 Gray Iron

27.8 Seal Housing: ASTM A48 Class 30 Gray Iron

27.9 Mechanical Seal: Single Seal w/ Silicone Carbide Seal Face, Vinton Elastomers, 400 Series Stainless Steel hardware & Springs

27.10 Impeller: ASTM A536 Grade 65-45-12 Ductile Iron

27.11 Bearing Housing: ASTM A48 Class 30 Gray Iron

27.12 Radial bearing: Open Single Ball, thrust Bearing: Open Double Ball

27.13 Shaft Material: 17-4 PH Stainless Steel in Condition 925 or 1150

27.14 Pressure Relief Valve: Brass, O-Rings: Vinton Standard

27.15

27.16 9.75" Full Diameter Ductile Iron Impeller

27.17 30 HP, 1800 RPM, 3 PH, 230/460 V, 60 HZ, TEFC

27.18 WARRANTY:

The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

27.19 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

27.20 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than sixty (60) calendar days after receipt of a City of Houston Purchase Order.

27.21 TRAINING:

A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

28.0 GROUP XII-BID LINE ITEM NO. 27: PUMP, SUBMERSIBLE, 4":

Furnish 4" Submersible Sump Pump(s).

28.1 Referenced Equipment Manufacture: Hydromatic

28.2 Model: S4M750M4-4

28.3 4" Submersible Pump

28.4 Horse Power: 7.5 HP

28.5 Volts: 460

28.6 Phase: 3

28.7 Ambient Temp Rating: 155°C

28.8 Service Factor: 1.15

28.9 Time Rating: Cont.

28.10 NEMA Code: H

28.11 Insulation Class: F

28.12 Enclosure Material: Cast Iron

28.13 WARRANTY:

The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

28.14 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

28.15 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than sixty (60) calendar days after receipt of a City of Houston Purchase Order.

28.16 TRAINING:

A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

29.0 GROUP XII-BID LINE ITEM NO. 28: PUMP, SUBMERSIBLE, 8":

Furnish Bypass Raw Sludge Pump(s).

29.1 Referenced Equipment Manufacture: Hydromatic

29.2 Model #: S8L7500M4-4

29.3 8" Submersible non clog pump

29.4 Horse Power: 75 HP

29.5 Volts: 460

29.6 Phase: 3

29.7 Service Factor: 1.2

29.8 Hertz : 60

29.9 Ambient Temperature Rating: 155°C

29.10 Code Letter: G

29.11 Insulation Class: F

29.12 WARRANTY:

The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

29.13 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

29.14 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than sixty (60) calendar days after receipt of a City of Houston Purchase Order.

29.15 TRAINING:

A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

**GROUP XIII-BID LINE ITEM NO. 29: PUMP, SLUDGE GRINDER:**

Furnish Waste water Sludge Pump(s).

**30.1 PUMP SPECIFICATIONS:**

30.1.1	Capacity:	300 US gal/min (MAX)	50 US gal/min (MIN)
30.1.2	Concentration:	Not Specified	
30.1.3	Suction:	Flooded	S.G.: 1
30.1.4	Delivery:	58 psi (MAX)	Temperature: Assumed Ambient
30.1.5	Differential:	58 psi (MAX)	Viscosity: 200 cP (Assumed)
30.1.6	NPSH(r):	13.51 feet	pH: Assumed Neutral

(Variation of above information may affect pump duty point, drive kW / rpm or selected pump materials.)

**30.2 PUMP BUILD/MATERIAL AND DRIVE SPECIFICATIONS:**

30.2.1	Casing:	Cast Iron with Access Ports	Absorbed Power:	<del>7</del>
			hp	
30.2.2	Drive Mechanism:	Coupling Rod – Carburized	Installed Power:	15.00 hp
30.2.3	Stator:	Nitrile Rubber	Starting Method:	Across the line
30.2.4	Rotor:	Hard Chrome Plated Tool Steel		
30.2.5	Drive Type:	Mechanical Variable Speed Gearbox		
30.2.6	Drive Shaft:	Stainless Steel		
30.2.7	Electricity Supply:	230/460V / 3ph / 60Hz		
30.2.8	Baseplate:	Mild Steel	Motor Enclosure:	TEFC
30.2.9	Pins & Bushes:	N/A	Motor Speed:	1750 rpm
30.2.10	Pin Caps:	N/A	Pump Speed:	336-56 rpm
30.2.11	Seal:	Single Component Mechanical Seal (SiC/SiC/Viton)		
30.2.12	Coupling:	Close Coupled		
30.2.13	Solids Handling:	Soft 2.09 in, Hard 0.63 in		
30.2.14	Rotation:	Suction On Gland		
30.2.15	Suction:	6in ANSI B16.1 (Class 125) FF Flange		
30.2.16	Discharge:	6in ANSI B16.1 (Class 125) FF Flange		
30.2.17	Paint Finish:	Mono Two Pack Acrylic - BLUE to RAL5005		

**30.3 MUNCHER BUILD/MATERIAL AND DRIVE SPECIFICATIONS:**

30.4.1	Casing:	Cast Iron	Absorbed Power:	N/A
30.4.2	Throat Size:	Throat 300mm(12in)	Installed Power:	3.00 hp
30.4.3	Flange Bore:	Pipeline 4” NB to ANSI	Drive Type:	Fixed Speed Gearbox
30.4.4	Build Option:	c/w 3HP Motor	Electricity	Supply:
		230/460V/3ph/60Hz		
30.4.5	Cutter: ETOS	Motor Enclosure:	TEFC	
30.4.6	No. of Teeth:	9 Teeth	Motor Speed:	1750 rpm
30.4.7	Thickness:	8.0mm	Drive Shaft Speed	65 rpm
30.4.8	Cutter material:	Chromium Molybdenum	Driven Shaft Speed	55 rpm

**30.4 CONTROL PANEL SPECIFICATION:**

Customer will use their existing control panel to operate and protect the TR Muncher.

**30.5 WARRANTY:**

The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

30.6 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

30.7 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than sixty (60) calendar days after receipt of a City of Houston Purchase Order.

30.8 TRAINING:

A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

31.0 GROUP XIV-BID LINE ITEM NO. 30: DRY PIT, 40HP:  
Furnish Muni Base AS4986402 replacement bare pump(s).

31.1 PUMP SPECIFICATIONS:

31.1.1 3500 GPM

31.1.2 34.3' TDH

31.1.3 890 RPM

31.1.4 40 HP

31.1.5 Cast Iron Impeller

31.1.6 Cast Iron Casing

31.1.7 Impeller Wear Ring CA15 Stainless Stl. 200-250BHN

31.1.8 Casing Wear Ring ID2126 440 17% Chrome SS 300-350BHN

31.2 WARRANTY:

The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

31.3 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

31.4 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than sixty (60) calendar days after receipt of a City of Houston Purchase Order.

31.5 TRAINING:

A minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

32.0 GROUP XV-BID LINE ITEM NO. 31: ROTATING ASSEMBLY:

Furnish Rotating Assembly for 14" Dry Pit Pump, Referenced Manufacturer: Fairbanks Morse, Model No. B5711 or City approved equal.

32.1 SPECIFICATIONS:

- 32.1.1 Fairbank Morse Rotating Assembly, non-clog, centrifugal 14" Pump Model Number B5711
- 32.1.2 Pump: Fairbanks Morse 14", Mod-B-5711, 10" X 10". S/N K4E7-062446-3
- 32.1.3 Design Conditions: 3,920 GPM @ 45 ft. TD
- 32.1.4 Motor: 75HP @ 885 RPM

32.2 WARRANTY:

The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

32.3 LITERATURE:

The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

32.4 DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than sixty (60) calendar days after receipt of a City of Houston Purchase Order.

32.5 TRAINING:

If requested by the City, a minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

33.0 GROUP XV-BID LINE ITEM NO. 32: ROTATING ASSEMBLY:  
Furnish Rotating Assembly for Sump Pump, 125HP, 12,000 GPM @ 30'TDM, Referenced Manufacturer: RAS PUMP, Model No. 20MNZ24 or City approved equal.

33.1 SPECIFICATIONS:  
Rotating Assembly Will Include:

- 33.1.1 Impeller
- 33.1.2 S/S Impeller Wear Ring & Suction Head Wear Ring
- 33.1.3 Wear Ring Screws
- 33.1.4 Casing To Stuffing Box Gasket
- 33.1.5 Stuffing Box Head
- 33.1.6 Shims
- 33.1.7 Sleeve
- 33.1.8 Gland
- 33.1.9 Seal Cage
- 33.1.10 Packing
- 33.1.11 Impeller Nut
- 33.1.12 Bearing Frame
- 33.1.13 Shaft With Keys
- 33.1.14 Line and Thrust Bearings
- 33.1.15 Bearing Covers
- 33.1.16 Lip Seals
- 33.1.17 Cover Gaskets
- 33.1.18 Bearing Locknut-Lockwasher-Washer
- 33.1.19 Grease Retainers
- 33.1.20 Hardware For Assembly

**(Does not include: Casing, Suction Head or Pump To Motor Coupling)**

32.6 WARRANTY:  
The supplier shall provide a full one-year warranty on the pump, which includes parts and labor. The warranty work shall be conducted within three working days after receipt of written notice from the City. All shipping charges for warranty work that is required outside of the Houston area will be borne by the supplier.

32.7 LITERATURE:  
The supplier shall provide two sets of operation, maintenance and parts manuals for each pump and hydraulic unit at the time of delivery.

32.8

DELIVERY:

Unit(s) as specified above, with delivery ticket and other documents and manuals, if requested shall be delivered to the location (s) as stated on each individual purchase order as expeditiously as possible, but no later than sixty (60) calendar days after receipt of a City of Houston Purchase Order.

32.9

TRAINING:

If requested by the City, a minimum of four- (4) hours of training shall be conducted by the successful bidder. All training will be conducted at a City of Houston location to be determined at a later date.

## SECTION C

### GENERAL TERMS AND CONDITIONS

#### **1.0 COMPETITIVE BIDDING:**

- 1.1 It is the intent of the City of Houston to solicit the lowest and best responsible bid or price under competitive conditions. All materials and/or equipment shall be new unless stated otherwise. Prospective bidders are advised that the specifications within this bid invitation are not to be considered restricted to any referenced manufacturer.

#### **2.0 AWARD:**

- 2.1 The City reserves the right to consider and make awards of bids on articles of similar nature that will in all respects serve the purpose for which the purchase is being made. The City reserves the right to be the sole judge as to whether such articles will serve the purpose.
- 2.2 Unless otherwise specified, the City reserves the right to accept or reject in whole or in part any bid submitted or to waive any informalities that are in the best interests of the City.

#### **3.0 CONDITIONS PART OF BID:**

- 3.1 In the event of any conflict, the terms and provisions incorporated in the bid specifications shall control over the terms and provisions of the General Terms & Conditions for any or all purposes. Otherwise, all the terms and provisions appearing within the General Terms & Conditions shall be given full effect and shall be construed in harmony to the maximum extent by the parties hereto.
- 3.2 The failure of the City to insist, in any one or more instances, upon performance of any of the terms, covenants or conditions of this Contract, General Terms & Conditions or Specifications shall not be construed as a waiver or relinquishment of the future performance of such term, covenant or condition by the City, but the obligation of the Supplier with respect to such future performance shall continue in full force and effect.

#### **4.0 SILENCE OF SPECIFICATIONS:**

- 4.1 The apparent silence of these specifications as to any detail or the apparent omission from them of a detailed description concerning any point shall be regarded as meaning that only the best commercial practice shall prevail and only materials and workmanship of first quality are acceptable. All interpretations of these specifications shall be made upon the basis of this statement.

#### **5.0 SPECIFIED EQUIPMENT, OR EQUIVALENT:**

- 5.1 Wherever in the specifications any materials or processes are indicated or specified by patent of proprietary name and/or by name of manufacturer, such specifications shall be deemed to be used for the purpose of facilitating descriptions of the performance, materials and/or processes desired and shall be deemed to be followed by the words, "or equivalent", if not so stated in the specifications herein.
- 5.2 The burden of proof shall rest with the bidder, in the course of a technical evaluation, to prove that the proposed item(s) are equivalent to the performance, materials, processes, or articles specified. DETERMINATION AS TO WHETHER THE ITEM (S) BID IS (ARE) EQUIVALENT TO THOSE SPECIFIED SHALL REST SOLELY WITH THE CITY PURCHASING AGENT AND THE RECEIVING DEPARTMENT.

**6.0 BRAND NAME OR TRADE NAME:**

6.1 Any manufacturer's names, trade names, brand names, or catalog numbers used in the specifications are for the purpose of describing and establishing the general quality level, design and performance desired. Such references are not intended to limit or restrict bidding by other Suppliers, but are intended to approximate the quality design or performance that is desired. Any bid that proposes like quality, design or performance, will be considered. Equivalent products will be considered, provided a complete description and product literature is provided. Unless a specific exception is made, the assumption will be that the item bid is exactly as specified in the Invitation to Bid.

**7.0 PATENTS:**

7.1 The Supplier agrees to indemnify and save harmless the city, its agents, employees, officers, and legal representatives from all suits and actions of every nature and description brought against them or any of them, for or on account of the use of patented appliances, products or processes, and it shall pay all royalties and charges which are legal and equitable. Evidence of such payment or satisfaction shall be submitted, upon request of the City Purchasing Agent, as a necessary requirement in connection with the final estimate for payment in which such patented appliance, products or processes are used.

**8.0 TERMINATION OF AGREEMENT:**

8.1 By the City for Convenience:

8.1.1 The City Purchasing Agent may terminate this Contract at any time upon 30-calendar days notice in writing to the Supplier. Upon receipt of such notice, the Supplier shall, unless the notice directs otherwise, discontinue all services in connection with the performance of the contract and shall proceed to cancel promptly all existing orders and contracts insofar as such orders and contracts are chargeable to this Contract. As soon as practicable after the receipt of notice of termination, the Supplier shall submit a statement to the appropriate department(s) showing in detail the services performed or items delivered under this Contract to date of termination. The City agrees to compensate the Supplier for that portion of the prescribed charges for which the services were actually performed or items delivered under this project and not previously paid.

8.2 By the City for Default by the Supplier:

8.2.1 In the event that the materials and/or services furnished by the Supplier do not conform to the standard set forth herein, or if the deliveries and servicing of this award do not conform to the requirements detailed herein, the City through a written notice from the City Purchasing Agent to the Supplier describing such default may as its options:

- (1) Terminate the award for default and the City shall have no further obligation under the Award.
- (2) Allow the Supplier to cure default within a reasonable time as specified in the notice. The City, at its sole option, may extend the proposed date of termination to a later date. If prior to the proposed date of termination, the Supplier cures such default to the City's satisfaction, then the proposed termination shall be ineffective. If the Supplier fails to cure such default prior to the propose date of termination, then the City may terminate its performance under this award as of such date and have no further obligation under the award.

8.2.2 In the event of failure to deliver any or all of the items or to perform required services, the City may cover its loss by reasonably procuring from another source the items not delivered or the services not performed. The Supplier shall be responsible for and shall pay to the City immediately upon demand the difference in price between that offered by the Supplier and that which the City was forced to pay for covering the Supplier's failure to deliver or perform services.

8.3 By the Supplier for Default by City:

8.3.1 Default by the City shall occur if the City fails to perform or observe the terms and conditions of this Award required to be performed or observed by the City, and the Supplier gives notice in writing to the City within 30 calendar days of the act or omission claimed by the Supplier to constitute default on the part of the City.

8.3.2 Upon receipt of such notice in writing from the Supplier, however, the City shall have 30 calendar days to cure such default. The Supplier, at its sole option, may extend the proposed date of termination to a later date.

8.3.3 If City cures such default prior to the proposed date of termination, the proposed termination shall be ineffective. If the City fails to cure such default prior to the proposed date of termination, then the Supplier may terminate its performance under this award as of such date

## **9.0 SUCCESSORS & ASSIGNS:**

9.1 The Supplier may not assign this award or dispose of substantially all of its assets without the written consent of the City Purchasing Agent. The Supplier's failure to obtain such consent shall be an event of default, authorizing the City Purchasing Agent to terminate this award according to its terms.

## **10. RELEASE:**

**10.1 THE SUPPLIER AGREES TO AND SHALL RELEASE THE CITY, ITS AGENTS, EMPLOYEES, OFFICERS, AND LEGAL REPRESENTATIVES (COLLECTIVELY THE "CITY") FROM ALL LIABILITY FOR INJURY, DEATH, DAMAGE, OR LOSS TO PERSONS OR PROPERTY SUSTAINED IN CONNECTION WITH OR INCIDENTAL TO PERFORMANCE UNDER THIS AGREEMENT, EVEN IF THE INJURY, DEATH, DAMAGE, OR LOSS IS CAUSED BY THE CITY'S SOLE OR CONCURRENT NEGLIGENCE AND/OR THE CITY'S STRICT PRODUCTS LIABILITY OR STRICT STATUTORY LIABILITY.**

## **11.0 INDEMNIFICATION:**

**11.1 THE SUPPLIER AGREES TO AND SHALL DEFEND, INDEMNIFY, AND HOLD THE CITY, ITS AGENTS, EMPLOYEES, OFFICERS, AND LEGAL REPRESENTATIVES (COLLECTIVELY THE "CITY") HARMLESS FOR ALL CLAIMS, CAUSES OF ACTION, LIABILITIES, FINES, AND EXPENSES (INCLUDING, WITHOUT LIMITATION, ATTORNEYS' FEES, COURT COSTS, AND ALL OTHER DEFENSE COSTS AND INTEREST) FOR INJURY, DEATH, DAMAGE, OR LOSS TO PERSONS OR PROPERTY SUSTAINED IN CONNECTION WITH OR INCIDENTAL TO PERFORMANCE UNDER THIS AGREEMENT INCLUDING, WITHOUT LIMITATION, THOSE CAUSED BY:**

**(1) THE SUPPLIER'S AND/OR ITS AGENTS', EMPLOYEES', OFFICERS', DIRECTORS', SUCCESSFUL BIDDERS', OR SUBSUCCESSFUL BIDDERS' (COLLECTIVELY IN NUMBERED PARAGRAPHS 1-3, "THE SUPPLIER") ACTUAL OR ALLEGED NEGLIGENCE OR INTENTIONAL ACTS OR OMISSIONS;**

**(2) THE CITY'S AND SUPPLIER'S ACTUAL OR ALLEGED CONCURRENT NEGLIGENCE, WHETHER SUPPLIER IS IMMUNE FROM LIABILITY OR NOT; AND**

**(3) THE CITY'S AND SUPPLIER'S ACTUAL OR ALLEGED STRICT PRODUCTS LIABILITY OR STRICT STATUTORY LIABILITY, WHETHER SUPPLIER IS IMMUNE FROM LIABILITY OR NOT.**

**11.2 SUPPLIER SHALL DEFEND, INDEMNIFY, AND HOLD THE CITY HARMLESS DURING THE TERM OF THIS AGREEMENT AND FOR FOUR YEARS AFTER THE AGREEMENT TERMINATES. SUPPLIER'S INDEMNIFICATION IS LIMITED TO \$500,000 PER OCCURRENCE. SUPPLIER SHALL NOT INDEMNIFY THE CITY FOR THE CITY'S SOLE NEGLIGENCE.**

**11.3 INDEMNIFICATION PROCEDURES:**

11.3.1 Notice of Claims. If the City or Supplier receives notice of any claim or circumstances which could give rise to an indemnified loss, the receiving party shall give written notice to the other party within 10 days. The notice must include the following:

- (a) a description of the indemnification event in reasonable detail,
- (b) the basis on which indemnification may be due, and
- (c) the anticipated amount of the indemnified loss.

11.3.2 This notice does not stop or prevent the City from later asserting a different basis for indemnification or a different amount of indemnified loss than that indicated in the initial notice. If the City does not provide this notice within the 10 day period, it does not waive any right to indemnification except to the extent that the Supplier is prejudiced, suffers loss, or incurs expense because of the delay.

11.3.3 Defense of Claims.

- (a) Assumption of Defense. The Supplier may assume the defense of the claim at its own expense with counsel chosen by it that is reasonably satisfactory to the City. The Supplier shall then control the defense and any negotiations to settle the claim. Within 10 days after receiving written notice of the indemnification request, the Supplier must advise the City as to whether or not it will defend the claim. If the Supplier does not assume the defense, the City shall assume and control the defense, and all defense expenses constitute an indemnification loss.
- (b) Continued Participation. If the Supplier elects to defend the claim, the City may retain separate counsel to participate in (but not control) the defense and to participate in (but not control) any settlement negotiations. The Supplier may settle the claim without the consent or agreement of the City, unless it (i) would result in injunctive relief or other equitable remedies or otherwise require the City to comply with restrictions or limitations that adversely affect the City, (ii) would require the City to pay amounts that Awardee does not fund in full, (iii) would not result in the City's full and complete release from all liability to the plaintiffs or claimants who are parties to or otherwise bound by the settlement.

**12.0 INSURANCE: (See City of Houston's website for sample certificate)**

12.1 The Supplier shall have insurance coverage as follows:

- Commercial General Liability shall be \$500,000 per occurrence; \$1,000,000 aggregate, per 12-month policy period.
- Automobile Liability Insurance for autos furnished or used in the course of performance of this Award. Including Owned, Non-owned, and Hired Auto coverage. (Any Auto coverage may be substituted for Owned, Non-owned and Hired Auto coverage.) If no autos are owned by the Supplier, coverage may be limited to Non-owned and Hired Autos. If Owned Auto coverage cannot be purchased by the Supplier, Scheduled Auto coverage may be substituted for Owned Auto coverage. EACH AUTO USED IN PERFORMANCE OF THIS AWARD MUST BE COVERED IN THE LIMITS SPECIFIED. \$1,000,000 - Combined Single Limit per occurrence; \$1,000,000 aggregate, per 12-month policy period.
- **Worker's Compensation** including Broad Form All States endorsement shall be in statutory amount.
- **Employer's Liability:** Bodily Injury/Accident \$100,000; Bodily Injury/Disease \$100,000 (per employee); Bodily Injury/Disease \$100,000 (policy limit).

12.2 The issuer of any policy (1) shall have a Certificate of Authority to transact insurance business in Texas or (2) shall be an eligible non-admitted insurer in Texas, and shall have a Best's rating of at least B+, and a Best's Financial Size Category of Class VI or better, according to the most current edition of Best's Key Rating Guide.

12.3 All insurance policies required by this Award shall require on their face that 1) the City of Houston is named as an additional insured; 2) the insurance carrier waives any rights of subrogation against the City; and 3) it shall give thirty (30) days written notice to the City before any policy required by this Award is cancelled. Within such thirty (30) day period, the Supplier covenants that it will provide other suitable policies in lieu of those about to be cancelled so as to maintain in effect the coverage required under the provisions hereof. Failure or refusal of the Supplier to obtain and keep in force the above-required insurance coverage shall authorize the City, at its option, to terminate this Award at once.

**12.4 REQUIREMENTS FOR CERTIFICATE OF INSURANCE:**

12.4.1 Certificate must not be more than 30 days old.

12.4.2 Name and Address of Producer writing coverage.

12.4.3 Name of each insurance company providing coverage (as listed or on company's Certificate of Authority on file with the Texas Department of Insurance, or in Best's Key Rating Guide.)

12.4.4 Name and address of insured (as shown on policy).

12.4.5 Letter in the column must reference the insurer of the policy being described.

12.4.6 Must be a policy number; no binders will be accepted.

12.4.7 Date policy became effective.

12.4.8 Expiration date must be at least **60** days from date of delivery of certificate.

12.4.9 Name and file number of project (Bid Name and Bid Number).

12.4.10 Name of project manager (Buyer).

12.4.11 Signature or facsimile signature of authorized representative of Producer (blue ink preferred).

**12.5 Prior to award and/or starting work, Supplier must present a Certificate of Insurance evidencing the insurance coverage specified above. This is a mandatory requirement.**

**Forward to Buyer at:**

**City of Houston  
Strategic Purchasing Division  
901 Bagby, room B500  
Houston, Texas 77002**

**INSURANCE IS NOT REQUIRED IF ITEM IS DROP-SHIPED BY MANUFACTURER OR IS DELIVERED BY COMMON CARRIER.**

### **13.0 MINORITY AND WOMEN BUSINESS ENTERPRISES:**

- 13.1 These provisions apply to goal-oriented contracts. A goal oriented contract means any contract awarded for the supply of goods or non-professional services of approximately \$100,000.00 for which competitive bids are required by law and which the City Purchasing Agent has determined to have City of Houston Certified MWBE subcontracting potential.
- 13.2 The Supplier agrees to comply with the City's Minority and Women Business Enterprise programs as set out in Chapter 15, Article V of the City of Houston Code of Ordinances insofar as such programs apply to this Contract. The Supplier further agrees that it will make good faith efforts to award subcontracts or supply agreements in at least **0%** of the value of this Award to Minority and Women-owned Business Enterprises certified by the City's Affirmative Action Division. In addition, Supplier acknowledges that it has reviewed the requirements for good faith efforts that are on file with the City's Affirmative Action Division, is familiar with such requirements, and will comply with them.
- 13.3 The Supplier shall require written subcontracts with all MWBE bidders and suppliers, which must contain the terms, set out in the documents attached herein. If the Supplier is an individual person (as distinguished from a corporation, partnership, or other legal entity), and the amount of the subcontract is \$50,000 or less, then the subcontract must also be signed by the attorneys of the respective parties.
- 13.4 Refer to the "City of Houston Goal-Oriented Minority and Women Business Enterprises Contract Provisions" attachment, which is incorporated in the specifications herein by this reference for all purposes, for more detailed information on this requirement.

The above-mentioned goal will apply to Item Nos. **N/A.**

### **14.0 REJECTIONS:**

- 14.1 Articles not in accordance with samples and specifications must be removed by the Supplier and at its expense. All disputes concerning quality of supplies delivered under this offer will be determined by the City Purchasing Agent or designated representative.
- 14.2 All articles enumerated in the offer shall be subject to inspection on delivery by an officer designated for the purpose and if found inferior to the quality called for, or not equal in value to the Department's samples, or deficient in weight, measurements, workmanship or otherwise, this fact shall be certified to the City Purchasing Agent who shall have the right to reject the whole or any part of the same.

### **15.0 INVOICING:**

- 15.1 **In order to expedite payments all invoices must be submitted in triplicate, itemized as to quantity, part and/or model number, description in the same order and form as in the City of Houston Purchase Order. Variations will only delay payment. In addition, invoices must show the name of the Department, Division or Section to which the merchandise was delivered, and the City of Houston Purchase Order Number.**
- 15.2 **All delivery tickets must have a description of the item delivered.**
- 15.3 **Mail invoices to the Accounts Payable Section of the Department and to the address, as noted on individual purchase orders.**
- 15.4 **Delivery tickets and packing slips will contain the same information as the invoice.**
- 15.5 **All packing slips and delivery tickets must be signed by the receiving employee with their City Employee Number and must be signed by Supplier's Representative.**

**16.0 TAXES:**

**16.1** The City is exempt from the Federal Excise and Transportation Tax, and the limited Sales and Use Tax. Unless the Bid Form or Specifications specifically indicate otherwise, the bid price must be net exclusive of above-mentioned taxes. A Supplier desiring refunds of, or exemptions from, taxes paid on merchandise accepted by the City, must submit the proper forms, and the City Purchasing Agent, if satisfied as to the facts, may approve or issue the necessary certificates.

**17.0 PAYMENT:**

**17.1** Payment is due thirty (30) days after the City has approved the invoice or after the City has accepted the equipment and all required documents, whichever occurs later. Invoices received that do not agree with the provisions set forth herein shall be returned for correction and will result in payment being delayed.

**17.2 PAYMENT OF SUBSUCCESSFUL BIDDERS:**

**17.2.1** The Supplier shall make time payments to all persons and entities supplying labor, materials or equipment for the performance of this Award. The Supplier agrees to protect, defend, and indemnify the City from any claims or liability arising out of the Supplier's failure to make such payments. (Disputes relating to payment of MWBE bidders shall be submitted to arbitration in the same manner as any other disputes under the MWBE subcontract. Failure of the Successful bidder/Supplier to comply with the decisions of the arbitrator may be deemed, at the sole discretion of the City, a material breach leading to termination of this Award.)

**18.0 INSPECTIONS AND AUDITS:**

**18.1** The City reserves all rights to review all payments made to Suppliers by auditing at a later date. Subject to such audit, any overpayments may be recovered from the Supplier.

**18.2** City representatives may have the right to perform, or have performed, (1) audits of the Supplier's books and records, and (2) inspections of all places where work is undertaken in connection with this Agreement. The Supplier shall keep its books and records available for this purpose for at least three years after this Agreement terminates. This provision does not affect the applicable statute of limitations.

**18.3** City representatives have the right to examine the books of all bidders and/or suppliers supplying goods and/or services under the purchase order(s) insofar as those books and records relate to performance under the purchase order(s).

**19.0 CITY OF HOUSTON FAIR CAMPAIGN ORDINANCE:**

**19.1** The City of Houston Fair Campaign Ordinance makes it unlawful for a Supplier to offer any contribution to a candidate for City elective office (including elected officers and officers-elect). All respondents to this invitation to bid must comply with Houston Code of Ordinances Chapter 18 as amended relating to the contribution and solicitation of funds for election campaigns. Provisions of this ordinance are provided in part in the paragraphs that follow. Complete copies may be obtained from the office of the City Secretary.

**19.2** Candidates for city office may neither solicit nor receive contributions except during a period commencing 270 calendar days prior to an election date for which a person is a candidate for such office and ending 90 calendar days after the election date, including run off elections if such candidate is on the ballot.

**19.3** Further, it shall be unlawful either for any person who submits a bid or proposal to contribute or offer any contribution to a candidate or for any candidate to solicit or accept any contribution from such person for a period commencing at the time of posting of the City Council Meeting Agenda including an item for the award of the Contract and ending upon the 30th day after the award of the Contract by City Council.

19.4 For the purposes of this Ordinance, a **Contract** is defined as each Contract having a value in excess of \$30,000 that is let by the City for professional services, personal services, or other goods or services of any other nature whether the Contract is awarded on a negotiated basis, request for proposal basis, competitive proposal basis or formal sealed competitive bids. The term **Supplier** includes proprietors of proprietorships, partners having an equity interest of 10% or more of partnerships, (including limited liability partnerships and companies), all officers and directors of corporations (including limited liability corporations), and all holders of 10% or more of the outstanding shares of corporations.

19.5 **A STATEMENT DISCLOSING THE NAMES AND BUSINESS ADDRESSES EACH OF THOSE PERSONS WILL BE REQUIRED TO BE SUBMITTED WITH EACH BID OR PROPOSAL FOR A CITY CONTRACT.** Completion of the attached form entitled "**Supplier Submission List**" will satisfy this requirement. Failure to provide this information may be just cause for rejection of your bid or proposal.

## **20.0 CITY OF HOUSTON CONTRACTOR OWNERSHIP DISCLOSURE ORDINANCE:**

20.1 City Council requires knowledge of the identities of the owners of entities seeking to do business with the City in order to review their indebtedness to the City and other qualifying governmental entities prior to entering into contracts. Therefore, all respondents to this invitation to bid must comply with Houston Code of Ordinances Chapter 15, as amended (Sections 15-122 through 15-126) relating to the disclosure of owners of entities bidding on, proposing for or receiving City business. Provisions of this ordinance are provided in part in the paragraphs that follow. Complete copies may be obtained from the office of the City Secretary.

20.2 Contracting entity means a sole proprietorship, corporation, non-profit corporation, partnership, joint venture, limited liability company, or other entity that seeks to enter into a award requiring approval by the Council but excluding governmental entities.

20.3 A contracting entity must submit at the time of its bid or proposal, an affidavit listing the full names and the business and residence addresses of all persons owning 5% or more of a contracting entity or, where a contracting entity is a non-profit corporation, the full names and the business and residence addresses of all officers of the non-profit corporation.

20.4 Completion of the "**Affidavit of Ownership or Control**", included herein, and submitted with the Official Bid or Proposal Form will satisfy this requirement. Failure to provide this information with your bid or proposal may be just cause for rejection of your bid or proposal.

## **21.0 CHANGE ORDERS:**

21.1 At any time during the Agreement Term, the City Purchasing Agent, or designated representative, may issue a change order to increase or decrease the scope of services, or change plans and specifications, as may be necessary to accomplish the general purposes of this Agreement. The Supplier shall furnish the services or deliverables in the change order in accordance with the requirements of this Agreement plus any special provisions, specifications, or special instructions issued to execute the additional work.

21.2 The Supplier shall not make any changes to the specifications or drawings contained herein without written authorization from the City Purchasing Agent or designated representative. The City may refuse to accept all or part of the work performed or equipment/supplies delivered if changes are made to the specifications or drawings without the written authorization of the City Purchasing Agent or designated representative. The City shall not be responsible for costs incurred by the Supplier on unauthorized change orders.

- 21.3 Documentation acceptable to the City Purchasing Agent as evidence of the Supplier's change(s) shall reference the City's bid specification by section(s) and page number(s). A letter with supporting documentation of the requested change(s) shall be submitted to the City Purchasing Agent, and the City Purchasing Agent must approve any requested changes PRIOR TO ANY CHANGES BEING PERFORMED. The face of the envelope containing this letter shall clearly state, "CHANGE ORDER REQUEST" and THE NUMBER OF THE BID INVITATION AND THE NUMBER(S) OF THE PURCHASE ORDER(S) referenced. Failure to provide clear and concise evidence as stated above and in the format requested will result in denial until Supplier complies with these provisions. Documentation shall be mailed to:

City Purchasing Agent  
City of Houston  
Strategic Purchasing Division  
901 Bagby  
Houston, TX 77002

- 21.4 The City Purchasing Agent, or designated representative, may issue change orders, subject to the following limitations:

21.4.1 City Council expressly authorizes the City Purchasing Agent to approve change orders of \$25,000 or less. A change order of more than \$25,000 over the approved award amount must be approved by City Council.

21.4.2 The total of all change orders issued under this section may not increase the Original Agreement amount by more than 25%.

21.4.3 For any items described in a change order that the Supplier is otherwise required to provide under the Original Agreement, the City shall not pay additional money to the Supplier.