

CITY COUNCIL LETTER

Meeting of: May 27, 2014

CITY MANAGER	ORIGINATING DEPARTMENT: PUBLIC WORKS	NO: AGENDA SECTION: BID CONSIDERATION
		ITEM: ACCEPTING BIDS AND AWARDDING A CONTRACT FOR PUMP STATION NO. 2 VFD DRIVES AND ELECTRICAL MODIFICATIONS, CITY PROJECT 1407
BY: K. Hansen	DATE: May 21, 2014	BY: K. Hansen
DATE:		DATE:

Background:

Plans and specifications were prepared and advertised for bids in the Sun Focus on April 17, 2014 and in Finance and Commerce (trade journal) on April 17, 2014. The project was also advertised electronically through Quest Construction Data Network and the Builders Exchange. Ten contractors requested a copy of the bidding documents. Six bids were received and publicly read aloud at the May 6, 2014 bid opening. A copy of the bid opening minutes is attached.

Issues:

The replacement of the pump motors at Water Pump Station #2 is the second part of a 2-phase project initiated in 2013 following the recommendations of the Water Model Update. In 2013, the Pressure Reducing Valve, vault and piping was replaced at pump station #2. The Variable Frequency Drives (VFD) and associated electrical upgrades at water pumping station #2 was addressed in the 2014 Public Works budget as a critical project. The water model completed in 2012 found significant pressure spikes occurring in the distribution system from the on/off cycle at pump station #2. This likely has a significant impact to the number of water main breaks the City experiences in this pressure zone. VFD's will remove the pressure gradients during the normal operation of the pumps.

The apparent low bid was submitted by Ultimate Controls of Fridley, Minnesota, in the amount of \$102,828. As Ultimate Controls is a relatively new company, the bid was discussed with the contractor. It was discovered that a critical section of the bid (bid section 16950) detailing systems integration was not followed and not provided in their bid – rendering the bid non-responsive. The next low, responsive bid was provided by Forest Lake Contracting in the amount of \$119,500. The bidding documents included a \$15,000 allowance for the reconditioning of the two pumps. The extent of the pump reconditioning is unknown until they are pulled and tested for pumping rates. The responsive base bid was 3.9% above the Engineer's Estimate of \$115,000.

A summary of the bids is as follows:

Bidder	Ultimate Controls Electric LLC	\$102,828
	Forest Lake Contracting, Inc.	\$119,500
	Municipal Builders, Inc.	\$126,900
	Killmer Electric	\$132,600
Base Bid		

Recommended Motion: Move to accept bids and award the contract for Pump Station No. 2 Electrical Modifications, City Project No. 1407, to Forest Lake Contracting of Forest Lake, MN based upon their low, qualified responsible bid in the amount of \$119,500.00 with funds to be appropriated from Fund 651-51407; and, furthermore, to authorize the Mayor and City Manager to enter into a contract for the same.

Attachment:

Bid Opening Minutes
Bolton & Menk Recommendation Letter

COUNCIL ACTION:



BOLTON & MENK, INC.
Consulting Engineers & Surveyors
www.bolton-menk.com
DESIGNING FOR A BETTER TOMORROW
Bolton & Menk is an equal opportunity employer.

Bolton & Menk Project No. N15.10772

2014

Columbia Heights, Minnesota

Pump Station No. 2 Electrical Modifications

CONTRACT DOCUMENTS
and
PROJECT MANUAL

2014-2597

ORIGINAL

A. Check lubrication, drive alignment and condition, indication of proper rotation, and other matters relating to operative readiness. When all checks are satisfactorily accomplished, the readiness of the unit for operation shall be indicated by a conspicuous and legible tag.

3.1 START UP

PART 3 – EXECUTION

	HP	6-pole	4-pole	2-pole	6-pole	4-pole	2-pole
Totally Enclosed Fan-Cooled	82.5	85.5	77.0	82.5	85.5	77.0	82.5
Open Drip-Proof	86.5	89.5	84.0	87.5	89.5	84.0	87.5
1	82.5	85.5	77.0	82.5	85.5	77.0	82.5
1.5	86.5	89.5	84.0	87.5	89.5	84.0	87.5
2	87.5	89.5	85.5	88.5	89.5	85.5	88.5
3	88.5	89.5	85.5	89.5	89.5	85.5	89.5
5	89.5	89.5	86.5	89.5	89.5	86.5	89.5
7.5	90.2	91.7	88.5	91.0	91.7	88.5	91.7
10	91.7	91.7	89.5	91.0	91.7	89.5	91.7
15	91.7	93.0	90.2	91.7	92.4	90.2	91.7
20	92.4	93.0	91.0	91.7	93.0	91.0	91.7
25	93.0	93.6	91.7	93.0	93.6	91.7	93.6
30	93.6	94.1	91.7	93.0	93.6	91.7	93.6
40	94.1	94.1	92.4	94.1	94.1	92.4	94.1
50	94.1	94.5	93.0	94.1	94.5	93.0	94.1
60	94.5	94.5	93.6	94.5	94.5	93.6	94.5
75	94.5	95.0	93.6	94.5	95.0	93.6	94.5
100	95.0	95.4	93.6	95.0	95.4	93.6	95.0

- Y. Energy Efficiency:
1. Motors 1 horsepower and larger shall be of the energy efficient type. Energy efficient motors shall have a 1.15 service factor rating. Efficiency shall be defined in NEMA MG-1-12.54.1.
 2. Efficiency shall meet or exceed the values in the following tables. If a higher value is specified in the respective equipment section, then the higher value shall apply.

- X. Operating Characteristics:
1. Motors shall meet or exceed the starting locked rotor and maximum breakdown torques specified by NEMA for the NEMA design. The locked rotor starting currents shall not exceed NEMA maximum values for the specified NEMA design and rating. The current density and heating characteristics shall be such that the motors will not suffer damage if subjected to a maximum of ten (10) seconds stall at six times full load current. Except as noted, the service factor of the motor shall be in accordance with NEMA Standards. The insulation system of the motor shall be designed for 40,000 hours operation under usual service conditions as described under NEMA 1-14.02. The motor manufacturer shall use IEEE standards to establish the suitability of the insulation system to meet these requirements.

- W. Preparation for Shipment:
1. Before shipment, the shaft extension and any other bare exposed metal parts of each motor shall be coated with an easily removable rust preventative. All motors shall be securely fastened to a hardwood skid or pallet for fork truck handling, and be covered for protection against dirt and moisture during transit and for short time outdoor storage.

2.3 VARIABLE FREQUENCY DRIVES

A. Variable frequency drive (VFD) units shall be pulse width modulated (PWM) type incorporating volts per Hertz control. Units shall bear the UL label.

B. Input characteristics and requirements:

1. 208 volt (nominal) 10%, 3 phase, 1.0 to 60 Hz

2. Efficiency, 97.0% at full speed; input to output; input line pf, 0.95 minimum.

3. Drive shall automatically shut down on input power abnormalities and shall automatically restart upon restoration of "normal" power.

4. Surge protection, arresters and surge capacitors, minimum.

5. VFD input circuitry shall employ 3% per unit series line reactors and 6-pulse (minimum) rectifier circuitry.

C. Ambient conditions:

1. Temperature: 0-40°C.

2. Humidity: 5-95% non-condensing.

D. Output conditions:

1. 208 volt, 3 phase.

2. Operate 208 volt, nominal 3-phase, Design B, motor with NEMA Code F locked rotor characteristics. Size VFD for not less than motor nameplate full-load ampacity.

3. Rated for 110% of drive ampere rating overload for one minute, minimum.

4. The Contractor shall be responsible for furnishing and installing all auxiliary equipment recommended by the drive manufacturer to prevent equipment damage and excessive noise. This auxiliary equipment shall include, but not be limited to, line reactors, shielded cable, motor terminators, and increased cable insulation. Such devices shall reduce ripple in the rectifier output and reduce harmonic distortion reflected into incoming power feeders to acceptable levels. These output series devices shall also protect the motor from damaging overvoltage resulting from reflected higher-order frequencies.

5. Maximum peak voltage of PWM VFD output pulse of 1200 volts, with pulse rise time of greater than 2 microseconds. Maximum frequency of PWM VFD output pulse (carrier) frequency of 3000 Hz. Should magnitudes of these characteristics be more stressful to motor insulation than specified values, furnish filter network on VFD output to protect motors.

6. Coordinate with the VFD manufacturer which devices are required and will be supplied, based on estimated motor lead lengths from the drive to the motor and VFD manufacturer recommendations.

a. As part of the shop drawing submittals, submit a VFD performance study for each VFD installation which provides documentation justifying the use of devices which show conformance to the VFD manufacturer's recommendations on motor lead lengths and other