

BID SOLICITATION



City of Chattanooga
101 East 11th Street, Suite G13
Chattanooga, TN 37402

BID OPENING DATE AND TIME:

10-APR-18 at 2:00 PM

BID NUMBER: 305057

SEALED BIDS

Mail or submit two (2) signed copies of bid form to this office in the enclosed envelope. Retain one copy for your file.

BUYER:

PHONE #: (423) 643-7230

DELIVERY REQUIRED:

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City of Chattanooga
101 East 11th Street, Suite G13
Chattanooga, TN 37402

Item	Class-Item	Quantity	Unit	Unit Price	Total
<p>Requisition No.: 167218 Ordering Dept.: Waste Resources Buyer: Geoffrey Hipp 423-643-7233 *****</p> <p>DESCRIPTION: VFD and Control Cabinet per specifications *****</p> <p>ATTACHMENTS: - Specifications - Iran Divestment Act - Affirmative Action Plan - Standard Terms and Conditions: (http://www.chattanooga.gov/purchasing/standard-terms-and-conditions) *****</p> <p>*** BIDS MUST BE RECEIVED NO LATER THAN *** ***** 2:00 PM ON APRIL 10, 2018 ***** *****</p> <p>PLEASE SUBMIT BIDS IN DUPLICATE INDICATING BID NUMBER (305057) ON OUTSIDE PACKAGING ALL ITEMS MUST BE QUOTED F.O.B. DESTINATION, FREIGHT ALLOWED. *****</p> <p>NOTE: All bids received are subject to the terms and conditions contained herein and as listed in the above referenced website. The undersigned Bidder acknowledges having received, reviewed, and agrees to be bound to these terms and conditions, unless specific written exceptions are otherwise stated.</p> <p>The City of Chattanooga reserves the right to reject any and/or all bids, waive any informalities in the bids received, and to accept any bid which in its opinion may be for the best interest of the city.</p> <p>The City of Chattanooga will be non-discriminatory in the purchase of all goods and services on the basis of race, color, or national origin. *****</p> <p>PLEASE PROVIDE US WITH THE FOLLOWING INFORMATION: Company Name _____ Address _____ Phone/Toll-Free No. _____ Fax No. _____ E-Mail Address _____ Contact Person's Name _____ Estimated Delivery _____ Minority-Owned Business _____ Small Business _____ Veteran _____ Minority Woman Owned Business _____ Disabled Veteran _____ Women-Owned Business _____</p>					

NOTE: ALL BIDS RECEIVED ARE SUBJECT TO THE TERMS AND CONDITIONS

ALL BIDS MUST BE SIGNED – The undersigned offers the above quoted prices under the conditions contained herein.

The City is Exempt from all Federal and State Tax.
Bids will be received at the above mentioned address.

COMPANY: _____

TERMS OF PAYMENT: _____

SIGNATURE: _____

TELEPHONE NUMBER: _____

NAME AND TITLE: _____

SEALED BIDS

Mail or submit two (2) signed copies of bid form to this office in the enclosed envelope. Retain one copy for your file.

VENDOR

RFQ

10-APR-18 at 2:00 PM

BID NUMBER: 305057

BUYER:

PHONE #: (423) 643-7230

DELIVERY REQUIRED:

MAIL TO

City of Chattanooga
101 East 11th Street, Suite G13
Chattanooga, TN 37402

Item	Class-Item	Quantity	Unit	Unit Price	Total
1	Variable Frequency Drive and Control Cabinet per specifications	1	Each	_____	_____

ALL BIDS MUST BE SIGNED – The undersigned offers the above quoted prices under the conditions contained herein.

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Bids will be received at the above mentioned address.**

TERMS OF PAYMENT: _____

TELEPHONE NUMBER: _____

COMPANY: _____

SIGNATURE: _____

NAME AND TITLE: _____

**SPECIFICATIONS FOR
VARIABLE FREQUENCY DRIVE AND CONTROL CABINET
MOCCASIN BEND WASTEWATER TREATMENT PLANT
CHATTANOOGA TENNESSEE
March 2018**

1.0 GENERAL INFORMATION

This specification is for the purchase of one (1) 300HP variable frequency drive and control cabinet.

The equipment will be used at the Moccasin Bend Wastewater Treatment Plant Influent Relief Pump Station. This specification describes the type of equipment needed and is for the equipment only. The City's contractor will install the equipment.

2.0 GENERAL SPECIFICATIONS

- 2.1 A minimum 1 year warranty is required
- 2.2 Vendor shall include all shipping cost in bid and state delivery time after receipt of PO.
- 2.3 Delivery shall be to 455 Moccasin Bend Road, Chattanooga Tenn., 37405.
- 2.4 City shall unload
- 2.5 All potential vendors are strongly encouraged to attend a pre-bid meeting / walk thru at the Moccasin Bend Wastewater Treatment Plant Operations and Control conference room on Monday, March 26th, 2018 at 2:00 pm.
- 2.6 Drawings of the project are attached showing the material and the installation. Bids are requested on the material only.

3.0 TECHNICAL SPECIFICATIONS

SECTION 26 29 23

VARIABLE-FREQUENCY MOTOR CONTROLLERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Variable frequency controllers.

1.02 REFERENCE STANDARDS

- A. NEMA ICS 7.1 - Safety Standards for Construction and Guide for Selection, Installation, and Operation of Adjustable-Speed Drive Systems; 2014.
- B. NEMA ICS 7 - Industrial Control and Systems: Adjustable-Speed Drives; 2014.
- C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- D. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.03 SUBMITTALS

- A. Product Data: Provide catalog sheets showing voltage, controller size, ratings and size of switching and overcurrent protective devices, short circuit ratings, dimensions, and enclosure details.
- B. Shop Drawings: Indicate front and side views of enclosures with overall dimensions and weights shown; conduit entrance locations and requirements; and nameplate legends.
- C. Test Reports: Indicate field test and inspection procedures and test results.
- D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- E. Manufacturer's Field Reports: Indicate start-up inspection findings.
- F. Operation Data: NEMA ICS 7.1. Include instructions for starting and operating controllers, and describe operating limits that may result in hazardous or unsafe conditions.
- G. Maintenance Data: NEMA ICS 7.1. Include routine preventive maintenance schedule.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Air Filters: Two of each type.

1.04 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience and with service facilities within 100 miles (160 km) of Project.
- C. Products: Listed, classified, and labeled as suitable for the purpose intended.

1.05 WARRANTY

- A. The manufacturer warrants the materials and workmanship of the drive to be free from defect for a period of thirty-six (36) months from date of shipment.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. TECO - Westinghouse.
- B. Substitutions: Not permitted

2.02 DESCRIPTION

- A. Variable Frequency Controllers: Enclosed controllers suitable for operating the indicated loads, in conformance with requirements of NEMA ICS 7. Select unspecified features and options in accordance with NEMA ICS 3.1.
 - 1. Employ microprocessor-based inverter logic isolated from power circuits.
 - 2. Employ pulse-width-modulated inverter system.
 - 3. Design for ability to operate controller with motor disconnected from output.
- B. Enclosures: NEMA 250, Type 4, suitable for equipment application in places accessible only to qualified personnel.
- C. Enclosure shall have integral Air Conditioning
- D. Finish: Manufacturer's standard enamel.

2.03 OPERATING REQUIREMENTS

- A. Rated Input Voltage: 480 volts, three phase, 60 Hertz.
- B. Displacement Power Factor: Between 1.0 and 0.95, lagging, over entire range of operating speed and load.
- C. Operating Ambient: 0 degrees C to 40 degrees C.
- D. Minimum Efficiency at Full Load: 97 percent.
- E. Volts Per Hertz Adjustment: Plus or minus 10 percent.
- F. Current Limit Adjustment: 60 to 110 percent of rated.
- G. Acceleration Rate Adjustment: 0.5 to 30 seconds.
- H. Deceleration Rate Adjustment: 1 to 30 seconds.
- I. Input Signal: 4 to 20 mA DC.
- J. Constant Torque (Heavy Duty 150% overload capability)

2.04 COMPONENTS

- A. Display: Provide integral digital display to indicate output voltage, output frequency, and output current.
- B. Status Indicators: Separate indicators for overcurrent, overvoltage, ground fault, overtemperature, input power ON and voltage indicator for each phase.
- C. Furnish HAND-OFF-AUTOMATIC selector switch and manual speed control.
- D. Include undervoltage release.
- E. Control Power Source: Integral control transformer.
- F. DC Choke and 5% Input Line Reactor
- G. Door Interlocks: Furnish mechanical means to prevent opening of equipment with power connected, or to disconnect power if door is opened; include means for defeating interlock by qualified persons.
- H. Safety Interlocks: Furnish terminals for remote contact to inhibit starting under both manual and automatic mode. Shall be field selectable for enabling/disabling.
- I. Control Interlocks: Furnish terminals for remote contact to allow starting in automatic mode.
- J. Manual Bypass: Furnish contactor, motor running overload protection, and short circuit protection for full voltage, non-reversing operation of the motor. Include isolation switch to allow maintenance of inverter during bypass operation.
- K. Disconnecting Means: Include integral circuit breaker on the line side of each controller.
- L. Wiring Terminations: Match conductor materials and sizes indicated.
- M. The VFD shall employ the following power components:
 - 1. Diode or fully gated bridge on the input.
 - 2. Switching logic power supply operating from the DC bus.

3. MOV protection - phase to phase and phase to ground with jumpers to remove the phase to ground unit when applicable.
 4. Gold plated plug-in connections on printed circuit boards.
 5. Microprocessor-based inverter logic isolated from power circuits.
 6. Inverter section with no commutation capacitors.
- N. The VFD shall have a standard built-in 7th IGBT for use as a dynamic braking chopper. This IGBT shall be able to provide at least 100% braking torque on a continuous basis with a properly sized externally-mounted brake resistor.
- O. The VFD shall have two EMC options to comply to IEC 61800-3 specification, each with an optional EMC earthing/grounding plate:
1. Embedded EMC filter - shall achieve 10 m for C2 and 20 m for C3.
 2. External EMC filter - shall achieve 30 m for C1 and 100 m for C2 and C3.
- P. The VFD shall have a standard USB port that connects to a PC for upgrading firmware or uploading/downloading parameter configurations.
- Q. With its RS-485 port, the VFD shall provide an interface for up to 2 independent peripherals to be connected at one time at 19.2K Bps. Connection and identification of peripheral interface DSI addresses shall require no user adjustments.
- R. A slot for an optional encoder card shall be available to perform simple positioning control. Closed loop with encoder feedback shall be available to replace slip compensation with trim for improved speed range and regulation.
- S. The VFD shall have embedded control I/O.
- T. The VFD's printed circuit board shall be conformal coated, certified to IEC60721-3-2 with 3C2 (Chemical & Gases at the minimum).
- U. The VFD's control module shall have an integral Human Interface Module (HIM).
1. LCD display with scrolling text, used to display drive operating conditions, fault/alarm indications and programming information and capable of showing multiple languages via selectable mode.
 2. Status LED for drive condition.
 3. Status LEDs for communications status, including embedded DSI status, adapter health and communications network status.
 4. Keys for navigation, start, stop and reverse.
 5. Potentiometer used to control speed of the drive.
- V. The VFD shall have an optional external Human Interface Module (HIM) available in two package styles:
- W. An IP66/UL Type 4X-12 remote-mounted version for cabinet/panel mounting that is connected via cable.

2.05 COMMUNICATIONS

- A. The variable frequency drive (VFD) shall be capable of communications through standard protocols, and Modbus and Profibus shall be the preferred networks.
1. Through its USB port, the VFD shall be capable of direct connection to a PC.
 2. Through its integral RS-485 port, the VFD shall be able to use Modbus RTU:
 - a. For programming from a PC.
 - b. In a multi-drop network configuration.
 3. Through its integral Ethernet port, the EtherNet/IP network is supported.
- B. The VFD shall be able to communicate with at least 2 networks at the same time.
- C. The VFD shall have available adapter cards, including:
1. Dual port EtherNet/IP - to support Device Level Ring topology.
 2. PROFIBUS DP.
 3. Modbus.

- D. VFD communications adapters shall have individually selectable fault actions in the case of a communications loss or if the controller is idle (in program mode or faulted):
 - 1. Faulting the VFD.
 - 2. Stopping the VFD.
 - 3. Zeroing data written to the VFD.
 - 4. Holding the VFD in its last state.
 - 5. Using a user-selectable fault configuration.

2.06 CONTROL FEATURES

- A. The variable frequency drive (VFD) shall be programmable for the following motor control modes:
 - 1. Volts per Hertz.
 - 2. Sensorless vector control.
 - 3. Closed loop velocity vector control.
 - 4. Sensorless vector control with Economizer.
 - 5. Permanent magnet motor control
- B. The VFD shall be capable of open loop and closed loop speed regulation applications.
- C. Programmable features shall include:
 - 1. Flying start
 - 2. V/F ratio
 - 3. Bus regulator
 - 4. Process PID
 - 5. Fiber-application-specific features
 - 6. Common DC bus
 - 7. 1/2 DC bus operation
 - 8. Regulation with encoder feedback or analog input
 - 9. Multi-drive connectivity (with communication option card)
 - 10. StepLogic Function (relay and timers)
 - 11. 16 preset speeds
- D. The VFD shall include energy cost reduction potential through energy monitoring features and Economizer and permanent magnet motor control modes.

2.07 CONTROL I/O

- A. The variable frequency drive (VFD) shall have 2 analog inputs (1 unipolar and 1 bipolar), independently isolated from the rest of the drive I/O.
- B. The VFD shall have 7 digital inputs (24 VDC, 6 programmable) to provide application versatility.
- C. The VFD shall have 1 analog output that is scalable, 10-bit, suitable for metering or as a speed reference for another drive.
- D. The VFD shall have 2 digital outputs and 2 relay outputs (1 form A and 1 form B) to be used to indicate various drive, motor or logic conditions.



















2.08 SOURCE QUALITY CONTROL



















- A. Shop inspect and perform standard productions tests for each controller.

ELECTRICAL SPECIFICATIONS

1. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL STATE, LOCAL, AND NATIONAL CODES AND ORDINANCES INCLUDING BUT NOT LIMITED TO THE NATIONAL ELECTRICAL CODE, NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 70B, AND ANY OTHER APPLICABLE CODES OR ORDINANCES THAT MAY BE REQUIRED.
2. PROVIDE ALL MATERIALS REQUIRED FOR TREATMENT CONNECTIONS, LIGHTS, AND POWER.
3. ALL EQUIPMENT AND MATERIALS USED SHALL BE IN EXCELLENT CONDITION.
4. ALL COMPONENT SHALL BE INSTALLED WITH NECESSARY ACCESSORIES, COMPONENTS, ETC. ON A COMPLETELY FUNCTIONING SYSTEM. THE CONTRACTOR SHALL BE RESPONSIBLE TO SECURE IN ADVANCE ALL PERMITS REQUIRED FOR ANY WORK AFTER STARTING CONNECTION.
5. PROVIDE HANDS-ON SUPPORT FOR ALL ELECTRICAL SYSTEMS AS REQUESTED BY THE CLIENT. CONSULTANTS, MAN-UNITS, SPECIALTIES, AND ALL ACCESSORIES SHALL BE INSTANT ON, IN NO DISCOUNT AND SUPPORTED.
6. CONTRACT SHALL BE PERFORMED FOR 12 MONTHS FOR SUPPORTING AND MAINTENANCE CONTRACT. SHALL BE SIGNED BY THE CONTRACTOR. ALL WORKS SHOULD BE COMPLETED WITHIN THE SPECIFIED TIME FRAME. CONTRACT SHALL BE SIGNED BY THE CONTRACTOR. ALL WORKS SHOULD BE COMPLETED WITHIN THE SPECIFIED TIME FRAME. CONTRACT SHALL BE SIGNED BY THE CONTRACTOR.
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8. MINIMUM UNIT SIZE IS 142.00. FOR MAINTENANCE CONTRACT, CONTRACTOR SHALL BE REQUIRED TO PROVIDE 20.00 PERCENT OF THE CONTRACT VALUE. CONTRACTOR SHALL BE REQUIRED TO PROVIDE 20.00 PERCENT OF THE CONTRACT VALUE. CONTRACTOR SHALL BE REQUIRED TO PROVIDE 20.00 PERCENT OF THE CONTRACT VALUE.
9. ALL MATERIALS, CABLES, WIRING, DISCONNECTS, ETC. SHALL BE LABELED AND IDENTIFIED FOR USE. INCLUDE MAINTENANCE MANUALS, INSTRUCTIONS, AND WIRING DIAGRAMS.
10. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL MATERIALS AND EQUIPMENT REQUIRED FOR THE PROJECT. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL MATERIALS AND EQUIPMENT REQUIRED FOR THE PROJECT. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL MATERIALS AND EQUIPMENT REQUIRED FOR THE PROJECT.
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ELECTRICAL LEGEND

- | LIGHTING | |
|---|---------------------------------|
|  | LUMEN FIXTURE |
|  | ACCESSORY 1A |
|  | SURFACE 3A |
|  | SURFACE 2A |
|  | ACCESSORY 2A |
|  | SURFACE 2A |
|  | ACCESSORY 1A |
|  | STRIP FIXTURE |
|  | WALL MOUNTED |
|  | HOLE, NICHE, RECESS |
|  | PENDANT |
|  | RECESSED |
|  | DOWN LIGHT |
|  | WALL MOUNTED |
|  | DUAL HEAD CEILING MOUNTING UNIT |
|  | EXIT LIGHT |
|  | EXIT LIGHT |
|  | EXIT LIGHT |

- | LIGHTING | |
|---|---------------------------------|
|  | LUMEN FIXTURE |
|  | ACCESSORY 1A |
|  | SURFACE 3A |
|  | SURFACE 2A |
|  | ACCESSORY 2A |
|  | SURFACE 2A |
|  | ACCESSORY 1A |
|  | STRIP FIXTURE |
|  | WALL MOUNTED |
|  | HOLE, NICHE, RECESS |
|  | PENDANT |
|  | RECESSED |
|  | DOWN LIGHT |
|  | WALL MOUNTED |
|  | DUAL HEAD CEILING MOUNTING UNIT |
|  | EXIT LIGHT |
|  | EXIT LIGHT |
|  | EXIT LIGHT |

DISCONNECT SWITCH	CAUTION
<p>1. Disconnect the battery.</p> <p>2. Disconnect the negative terminal of the battery.</p> <p>3. Disconnect the positive terminal of the battery.</p> <p>4. Disconnect the battery.</p>	<p>1. Disconnect the battery.</p> <p>2. Disconnect the negative terminal of the battery.</p> <p>3. Disconnect the positive terminal of the battery.</p> <p>4. Disconnect the battery.</p>

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Chapter No. 817 (HB0261/SB0377). "Iran Divestment Act" enacted.

Vendor Disclosure and Acknowledgement

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to § 12-12-106.

(SIGNED)

(PRINTED NAME)

(BUSINESS NAME)

(DATE)

For further information, please see website:

https://www.tn.gov/assets/entitles/generalservices/cpo/attachments/List_of_persons_pursuant_to_Tenn._Code_Ann._12-12-106,_Iran_Divestment_Act-July.pdf

Affirmative Action Plan

The City of Chattanooga is an equal opportunity employer and during the performance of this Contract, the Contractor agrees to abide by the equal opportunity goals of the City of Chattanooga as follows:

1. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, or handicap. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, national origin, or handicap. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
2. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, or handicap.
3. The Contractor will send to each labor union or representative of workers with which he/she has a collective bargaining agreement or other contract or understanding, a notice advising said labor union or workers' representatives of the Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
4. During the term of all construction contracts or subcontracts in excess of \$10,000 to be performed for the City of Chattanooga, the following non-discriminatory hiring practices shall be employed to provide employment opportunities for minorities and women:
 - a. All help wanted ads placed in newspapers or other publications shall contain the phrase "Equal Employment Opportunity Employer".
 - b. Seek and maintain contracts with minority groups and human relations organizations as available.
 - c. Encourage present employees to refer qualified minority group and female applicants for employment opportunities.
 - d. Use only recruitment sources which state in writing that they practice equal opportunity. Advise all recruitment sources that qualified minority group members and women will be sought for consideration for all positions when vacancies occur.

5. Minority statistics are subject to audit by City of Chattanooga staff or other governmental agency.
6. The Contractor agrees to notify the City of Chattanooga of any claim or investigation by State or Federal agencies as to discrimination.

(Signature of Contractor)

(Title and Name of Company)

(Date)