NOTICE
INVITATION TO BID

Notice is hereby given that sealed proposals for the following will be received by the El Paso County School District #2 - Harrison, located at 1060 Harrison Road, El Paso County, Colorado Springs, Colorado on Friday, September 4th until 2:00 P.M. Mountain Daylight Time.

Harrison School District 2 Otero Elementary School Chiller

Point of Contact:
Jeffrey Clemens
Supervisor of Facilities
or
Seth Wait
Maintenance Group Leader
Harrison School District 2
1060 Harrison Road
Colorado Springs, CO 80905
Phone: (719) 579-2045
Email: jclemens@hsd2.org

The proposals will be publicly opened on Friday, September 4, 2015 at 2:30 P.M. Mountain Daylight Time. Proposals received after the stated time on Friday, September 4 will not be accepted. Plans and Specifications may be secured from and bids shall be delivered or mailed to:

Jeffrey Clemens, Supervisor of Facilities
El Paso County School District #2 - Harrison
1060 Harrison Road
Colorado Springs, CO 80905
Table of Contents

Submission of Bid .......................................................................................................................... 3

Security ........................................................................................................................................ 4

Rejection of Bids ............................................................................................................................ 4

Award .......................................................................................................................................... 5

Insurance ....................................................................................................................................... 5

Indemnity ....................................................................................................................................... 5

Subcontractors ............................................................................................................................... 6

Billing ........................................................................................................................................... 6

General Specifications ................................................................................................................... 6
GENERAL REQUIREMENTS

El Paso County School District #2 - Harrison invites your bid for the items and/or installation of items as per the attached specifications.

In addition to the detailed plans and specifications of bidding enclosed herewith, your attention is drawn to the following general requirements.

Submission of Bid

1. Bids are returnable not later than the time and date on the enclosed Invitation to Bid, to the office of:

   Jeffrey Clemens, Supervisor of Facilities
   El Paso County School District #2 - Harrison
   1060 Harrison Road
   Colorado Springs, CO 80905

2. All bids must be on the official bid form and enclosed in an envelope which must be sealed, addressed to Jeffrey Clemens and marked Bid for "Otero Elementary School Chiller", Bid Opening September 4, 2015 at 2:30 P.M. The district will not be responsible for premature opening of bids not properly labeled or sealed.

3. Prices quoted must be net and exclusive of all federal, state, municipal sales and excise taxes and include the cost of delivery and shipping.

4. In setting forth specifications, it is the intention of El Paso County School District to offer equal opportunity to all bidders. Items referred to by number or company name are for descriptive purposes and are to be used to denote a minimum standard of quality only.

5. If any person, planning to submit a bid for the proposed contract, is in doubt as to the meaning of any part of the plans and specifications, or should discover discrepancies or conflicts therein, they shall submit to the owner a written request for interpretations thereof not later than five (5) working days prior to the bid opening. Interpretations will be made only by addendum duly issued, and a copy of such addendum will be mailed or delivered to each person receiving a set of specifications. The owner will not be responsible for any other interpretations.

6. All items bid must be bid F.O.B., delivery site, El Paso County School District #2 - Harrison, Colorado Springs, Colorado.

7. Preference will be given to materials, supplies and provisions produced, manufactured, or grown in Colorado, quality being equal to competitors outside of the state. In accordance with Sections 8-17-101 and 8-17-102, C.R.S., Colorado labor shall be employed to perform the work in the extent of not less than eighty percent of skilled and common labor in the several classifications of skilled and common labor employed. "Colorado labor" as used, means any person who is a resident of the state of Colorado at the time of employment, without discrimination as to race, color, creed, sex, age, or religion except when sex or age is a bona fide occupational qualification.

8. All materials or workmanship supplied by this bid must be guaranteed for five (5) years from the date of final acceptance of the entire work, and the installation contractor shall guarantee to repair or replace any part which may show defects during that time without cost to the district, provided such defect is due to imperfect material or workmanship and not carelessness or improper use.
9. Contractor waives all of its rights with regard to withdrawal of amounts retained by the District under this contract prior to final completion and acceptance of the work by the District, as described in C.R.S. S24-91-105 to S24-91-110.

10. Contractor agrees to abide by all storm water controls as mandated in the District program and in the City of Colorado Springs ordinance. The District has the right to stop work and to hold the contractor liable and responsible for all violations of the City of Colorado Springs ordinance.

11. Contractor shall ensure that all legal requirements of HB 06S-1023 are met, for both the Contractor and all subs utilized by the Contractor, will assume all liability as defined in HB 06S-1023, and will provide appropriate substantiating documentation to the Owner upon request.

**Security**

1. A Cashier's or Certified Check for five percent (5%) of the total bid price or a bid bond, issued by an insurance company licensed in the State of Colorado, made payable to El Paso County School District #2 - Harrison must accompany each bid as a guarantee that if the bid is accepted the bidder will enter into a contract with the owner for the proposed purchase.

Bid deposits will be returned to the unsuccessful bidders three (3) days after the awarding of contracts and the approval of the successful bidders' performance bond. Unless otherwise indicated, the bid deposit of the successful bidder will be returned upon satisfactory completion of the contract or after receipt of a performance payment bond.

___  ____ A performance payment bond is not required.

____ XXX ____ A performance payment bond is required.

The bidder to whom the Contract has been awarded shall furnish and deliver within ten (10) days after receipt of Notice of Award, a Performance Payment Bond satisfactory to the Owner. Performance Payment Bond shall be in the amount of one hundred percent (100%) of the Contract amount and must be issued by an insurance company licensed in the State of Colorado. The surety on such bond shall be a Surety Company satisfactory to the owner and authorized to do business in the State of Colorado. The bond shall:

a. Be included in the contractor’s bid,

b. Guarantee contractor's performance of work under their contract and their prompt and full payment for all labor and material involved therein,

c. Guarantee protection to the School District, and

d. Have a "Power of Attorney" form attached to each bond copy.

**Rejection of Bids**

1. Harrison School District reserves the right to:

   a. Reject any and all bids received.

   b. Reject any and all changes in the bid form or specifications.
c. Waive any immaterial informality when it is deemed to be in the best interest of El Paso County School District #2 - Harrison.

**Award**

1. El Paso County School District #2 - Harrison reserves the right to:
   
a. Award bids on an item-by-item basis or in total.

b. Award the contract to the bidder that appears, in their judgment to be in the best interest of the school district, whether or not such contract award results in the lowest possible expenditure to the school district.

c. Award the bid to the second lowest responsible bidder if the original low bidder does not perform or deliver within the times established in the specifications. Any additional resultant costs to the district will be the responsibility of the original low bidder.

2. Any bid submitted will be binding for thirty (30) days subsequent to the bid opening. This could be extended beyond the thirty (30) days if consensus is reached by all bidders.

**Insurance**

1. **Prior to the start of any work:** the successful bidder shall furnish a Certificate of Insurance to the owner showing the following minimum insurance requirements in forms and with insurance companies acceptable to the owner. Further, it is agreed that no less than 30 days' notice will be given to the owner prior to cancellation, termination, or material alterations of said insurance.

   a. Workers' Compensation and Employer's Liability in accordance with the statutory requirements of the State of Colorado. Contractor shall require all subcontractors to similarly provide the same coverage.

   b. Comprehensive General Liability Insurance with the following minimum coverage:

      i. Bodily Injury - $100,000/person/$500,000/occurrence

      ii. Property Damage - $50,000 each occurrence

   c. The insurance coverage outlined above are to include the owner as an additional insured with respect to its liability arising out of operations performed under this contract or purchase order.

   d. No policies of insurance shall contain any exclusions relating to the work to be performed pursuant to the contractual documents.

**Indemnity**

The successful bidder shall assume the entire responsibility and liability in and for any and all damages and/or injuries of any kind of nature whatsoever to all persons, whether employees or otherwise, and to property growing out of or resulting from the services performed as herein set forth and provided for in these specifications, and for any and all damages and/or injuries of any kind which shall occur in connection therewith and agreed to indemnify, defend and save harmless El Paso County School District #2 - Harrison, its agents, servants and employees from and against any and all loss, expenses including legal fees and disbursements, damages and/or injuries growing out of or resulting from or occurring in connection with the execution of the work herein provided for and including by way of example and not by way of limitations, any losses, expenses, including legal fees and disbursements, damages or injuries
occurring in connection with, or resulting from the use by the successful bidder, its agents or employees, of any equipment, stock, appliance, implements, works, tools or machinery or any other property owned, rented, borrowed by or assigned to El Paso County School District #2 - Harrison arising under any law whatever, which may be in effect in the locality in which the work is situated or otherwise.

**Subcontractors**

El Paso County School District #2 - Harrison will recognize only the successful bidder for the proper execution of the entire work under the contract. No subcontractor will perform any work without prior written notification to and approval by El Paso County School District #2 - Harrison. Approval of a subcontractor by El Paso County School District #2 - Harrison in no way relieves the contractor from full responsibility for fulfilling all conditions of the contract.

**Billing**

The contractor or supplier must submit their request for payment by the 10th or 20th of the month to the Executive Director of Operations for El Paso County School District #2 - Harrison. The district will make payments of 90% of work in place and further will pay for material that is stored in a bonded warehouse if proper warehouse documents accompany the request for payment.

No payment shall constitute final acceptance of any part of this project. Contractor shall submit notarized lien waivers stating that all subcontractors, supplies, labor costs and material costs have been paid in full; or if there are any bills outstanding for costs pertaining to this project, the contractor shall submit a notarized statement showing extent of outstanding bills and shall indicate intent to pay such outstanding bills and relieve the school district from any liability that may result from non-payment of these bills. This provision will apply to all contracts over $10,000 and those where subcontractors are involved.

Requests for payments should not include any billing for any federal, state or local taxes. If city sales taxes are to be rebated, all sales receipts must be furnished to the district for collection prior to final payment being made.

**General Specifications**

Otero Elementary School Chiller Design and Replacement

Harrison School District #2

BACKGROUND:

Otero Elementary School is a 55,500 square foot facility built in 1987. The school has occupancy of just over 380 students and staff. The current chiller system consists of one Air-cooled Chiller, model RAUAC80, and one tube-style remote evaporator. The chiller is unable to keep up with the heat load generated in the facility and leaks refrigerant.

This project requires the Contractor to design a new chiller system based on the existing configuration of the building and the load generated by the building’s activities and occupants.

1.0 **SCOPE OF WORK:**

1.1 Contractor shall furnish all labor, tools, materials, equipment, transportation and supervision, except as specified herein as district furnished, to manage and perform all operations for the design and
replacement of the existing chiller system at Otero Elementary School to include electrical disconnects.

1.2 Upon final completion of this project, the chiller and all of its associated piping, controls, and electrical connections shall be complete at this time and the contractor shall be demobilized from the site. The Contractor shall include provisions within their bid for full factory start up, testing, and commissioning as recommended by the manufacturer. Harrison School District shall hold a retainage of 5% on the contract until the completion of the factory start up, testing, and commissioning has been completed and signed off by the District Facilities Maintenance Staff.

1.3 All bidders are required to attend the mandatory site visit at Otero Elementary School. The address is 1650 Charmwood Drive, Colorado Springs, CO 80906. The date and time are Monday, August 24 at 2:00 p.m. MST. Please notify Jeffrey Clemens via email at jclems@hsd2.org if you are not able to attend.

2.0 PERSONNEL

2.1 Contractor shall designate, in writing, a supervisor who shall be responsible for the overall management and coordination of this contract and shall act as the central point of contact with the district. Contractor will also notify, in writing, any change in supervisory personnel.

2.2 Each contractor vehicle shall have a T.V. backup monitor, or at least two people, at all times when operating at district facilities.

3.0 PROTECTION AND SAFETY REQUIREMENTS

3.1 Protection: The contractor shall be responsible for the protection of structures and all contents against damage resulting from operations. Damage to structures or contents resulting from the contractor’s operation or negligence shall be repaired or replaced by the contractor at no cost to the district. Any damage to paving, walkways, grassed areas, trees, or shrubbery shall be repaired or replaced by the contractor at no cost to the district. Repair and/or replacement shall be subject to district approval.

3.2 Backing or reversing of contractor vehicles will not be performed without a T.V. backup monitor or use of a “spotter” placed in a proper position to assist the driver. Vehicles will be equipped with an approved warning device.

4.0 VEHICLES:

4.1 All contractor vehicles shall be specifically designed for the purpose of completing the Otero Chiller Replacement. Contractor vehicles will be kept closed and locked when not occupied. The district will not be responsible for theft or vandalism resulting from unsecure vehicles.

4.2 All vehicles shall be in a safe operable condition and meet local, state, and federal safety requirements.

Basic HVAC Materials and Methods

PART 1 – GENERAL

1.1 SUMMARY
A. This Section includes the following:
   1. Piping materials and installation instructions common to most piping systems.
   2. Mechanical demolition.
   3. Equipment installation requirements common to equipment sections.
   4. Supports and anchorages.

1.2 SUBMITTALS

A. Retain this Article if procedures for welder certification are retained in "Quality Assurance" Article.

B. Welding certificates.

1.3 QUALITY ASSURANCE

A. AWS states that welding qualifications remain in effect indefinitely unless welding personnel have not
   welded for more than six months or there is a specific reason to question their ability.

B. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code-
   Steel."

C. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code:
   Section IX, "Welding and Brazing Qualifications."
   1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
   2. Certify that each welder has passed AWS qualification tests for welding processes involved
      and that certification is current.

D. Electrical Characteristics for Mechanical Equipment: Equipment of higher electrical characteristics may be
   furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit
   breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified,
   equipment shall comply with requirements.

PART 2 - PRODUCTS

2.1 PIPE, TUBE, AND FITTINGS

A. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.2 JOINING MATERIALS

A. Pipe-Flange Gasket Materials: ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness
   unless thickness or specific material is indicated.

B. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system
   manufacturer, unless otherwise indicated.

C. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

D. Brazing Filler Metals: AWS A5.8, BCuP Series or BAg1, unless otherwise indicated.

E. Welding Filler Metals: Comply with AWS D10.12.
PART 3 - EXECUTION

3.1 MECHANICAL DEMOLITION

A. Provide complete removal and disposal of existing chiller. Refrigerant will be recovered by the district.

B. Contractor shall employ the services of a fully-licensed electrical contractor to disconnect and secure the chiller electrical service in preparation of the chiller replacement.

3.2 PIPING SYSTEMS – COMMON REQUIREMENTS

A. Install piping to permit valve servicing.

B. Install piping free of sags and bends.

C. Install fittings for changes in direction and branch connections.

D. Install piping to allow application of insulation. Provide insulation per the requirements of the 2009 WSEC. Cover all exterior insulation with aluminum cover.

E. Select system components with pressure rating equal to or greater than system operating pressure.

3.3 PIPING JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.


E. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
   1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
   2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

F. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

G. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.4 PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:
1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.

3.5 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

B. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

C. Install equipment to allow right of way for piping installed at required slope.

3.6 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Refer to Division 5 Section "Metal Fabrications" for structural steel.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.

C. Field Welding: Comply with AWS D1.1.

CHILLERS

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes design, performance criteria, refrigerants, controls, and installation requirements for the replacement of the existing chiller with a new chiller system.

1.2 BASIS OF DESIGN

A. New chiller shall be manufactured by Carrier, Trane or York, and be adequately sized to handle the heat load generated by the occupants and activities within Otero Elementary School.

B. Provide an analysis of the existing piping system to determine if it can be retrofitted to the new chiller system.

1.3 REFERENCES

A. Comply with applicable Standards/Codes including ARI, ANSI/ASHRAE 15, ASME Section VIII Div 1 and NEC.

B. Equipment efficiency shall meet ASHRAE Standard 90.1.
1.4 SUBMITTALS

A. Submit shop drawings and product data in accordance with contract specification requirements.

B. Submittals shall include the following:
   1. Dimensioned plan and elevation view drawings, required clearances and location of all field connections.
   2. Summary of all auxiliary utility requirements such as electricity, water, compressed air, etc. Summary shall indicate quality and quantity of each required utility.
   3. Single line schematic drawing of the power field hookup requirements, indicating all items that are furnished.
   4. Schematic diagram of control system, indicating points for field connection. Diagram shall fully delineate field and factory wiring.
   5. Certification of factory run test with evaporator water flow, signed by company officer.
   6. Installation and operating manuals.

C. Source quality-control test reports.

D. Startup service reports.

E. Operation and maintenance data.

F. Warranties.

1.5 QUALITY ASSURANCE

A. ARI Certification: Signed by manufacturer certifying compliance with appropriate ARI requirements based on the system type selected.

B. ASHRAE Certification: Signed by manufacturer certifying compliance with ASHRAE 15 for safety code for mechanical refrigeration. Comply with ASHRAE Guideline 3 for refrigerant leaks, recovery, and handling and storage requirements.

C. ASME Compliance: Fabricate and label water chiller heat exchangers to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

D. Comply with NFPA 70.

E. Comply with UL 1995.

F. Equipment efficiency shall meet ASHRAE Standard 90.1.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Unit shall be stored and handled per unit manufacturer’s recommendations.

B. Unit controls shall be capable of withstanding 150 F (66 C) storage temperature in the control compartment for an indefinite period of time.

1.7 WARRANTY
A. Provide a five-year warranty on all parts and labor.

B. Warranty: Include coverage of chiller package as manufactured and delivered to site.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**
Trane products are preferred by the district. However, subject to compliance with aforementioned requirements, provide proposals with products by one of the following:
1. Carrier.
2. Trane.

**2.2 GENERAL**

A. Provide and install as shown on the plans, factory assembled, factory charged with appropriate refrigerant and factory run-tested, air-cooled, chiller. The chiller shall consist of multiple compressors, shell-and-tube evaporator, air-cooled condenser section, control system and all components necessary for protected and controlled unit operation.

B. Performance: Refer to the attached Summary Performance Report. The chiller shall be capable of stable operation down to 15 percent of full load without hot gas bypass. Performance shall be in accordance with ARI Standard 550/590-98. The unit shall be capable of operating at ambient temperatures down to 35°F, and high ambient temperatures up to 125°F.

**2.3 CHILLER COMPONENTS**

A. Compressors: The compressors shall be field serviceable and semi-hermetic. Compressor capacity shall be controlled with an infinite position slide valve, accurately matching compressor capacity to load. An economizer shall be provided, either compressor-integrated or external, for added efficiency. Compressors shall be sound and vibration isolated from the frame by neoprene compression mounts. If a twin screw design is used, the manufacturer shall provide an extended 5-year parts and labor warranty covering all moving parts.

B. Electric motors: Motors shall be high torque, two pole, semi-hermetic, squirrel cage induction type with inherent thermal protection on all three phases and cooled by suction gas.

C. Solid-State Motor Starters (for each compressor): Starter shall be designed using the current generation of reliable solid-state technology. Each starter shall provide controlled motor acceleration and deceleration, and shall extend protections covering the following conditions: phase rotation, electronic thermal overload, over/under current, stalled motor, single phase, high load current and current unbalance. Across-the-line or wye-delta starters are not the same and not acceptable. Acceptable solid-state starter manufacturers are General Electric, Cutler-Hammer, Benshaw or Reliance. The solid state starters shall be capable of self- diagnostics, metering, and have an LED display to include the following operating and fault messages:
   1. Operating Messages:
   2. Line voltage not present
   3. Voltage present, starter ready
   4. Motor accelerating
   5. Motor at full speed
   6. Stop command received, motor decelerating
   7. Thermal overload has reached 90% to 99%
   8. Thermal overload at 100%, motor stopped
9. Thermal overload reduced to 60%, motor can restart
10. Passcode enabled
11. Passcode disabled
12. Thermal overload content in percentage

D. Fault Messages:
1. System power not three phase
2. Phase sequence incorrect
3. Line frequency less than 25 Hz
4. Line frequency more than 72 Hz
5. Excessive current unbalance
6. Operating parameters lost
7. No current after "Run" command
8. Undercurrent trip occurred
9. Overcurrent trip occurred
10. Control power too low
11. Motor stalled during acceleration
12. External fault

E. Evaporator: The evaporator shall be direct expansion shell-and-tube type with individual refrigerant circuits. The evaporator shall be made up of a carbon steel shell, polypropylene water baffles and high efficiency internally finned copper tubes rolled into steel tubesheets. Flows shall be single pass on both the refrigerant and water sides for high efficiency counter-flow heat transfer and low pressure drops. Refrigerant heads shall be removable for serviceability. Water connections shall be left-handed. The evaporator shall be insulated with minimum 3/4 inch (19mm) closed cell polyurethane insulation and be electrically heated to help provide ambient freeze protection to -20°F (-29°C). The evaporator shall be designed, inspected and stamped in accordance with ASME Section VIII requirements. The evaporator shall be operationally freeze-protected by a chilled water-flow detection device wired to designated terminals in the control panel. Acceptable flow sensing devices include electronic thermal-dispersion sensors and field installed paddle-type flow switches. A suction shut-off valve shall be provided to isolate the compressor for serviceability.

F. Condenser: The condenser coils shall have seamless copper tubing, mechanically bonded into aluminum plate type fins. The fins shall have full drawn collars, completely covering the tubes for protection against atmospheric corrosion and to provide greater heat transfer. A sub-cooling coil shall be an integral part of the main condenser coil. All external coil surfaces shall be protected by PVC coated welded-wire-mesh grills. Condenser fans shall be propeller type, arranged for vertical air discharge and individually driven by direct drive motors. Each fan shall be housed in its own compartment to eliminate condenser-air cross flow during fan cycling and shall be equipped with a heavy-gauge close-meshed PVC coated fan guard. Fan motors shall be weather protected, three-phase, direct-drive, totally enclosed air-over motors with class F insulation or better. Open drip-proof (ODP) motors are not acceptable. Vertical service clearance under the condenser coil shall allow for access to the compressor and major components. Horizontal condenser coils are not acceptable. The condenser shall permit pump-down and storage of the full refrigerant charge for compressor serviceability.

G. Refrigerant Circuit: The unit shall have two or more refrigerant circuits, completely independent of each other. Each circuit shall be equipped with one compressor, one microprocessor controller, a factory-mounted control circuit transformer, oil separator, electronic expansion valve, compressor suction shutoff valve, combination discharge check and shutoff valve, liquid line shutoff valves, replaceable core filter-dryers, liquid line solenoid valve and sight-glass with moisture indicator. Each circuit shall be capable of operating independently, not being disabled in the event of fault(s) on the other circuit(s).
H. Unit casing and all structural members and rails shall be painted to meet ASTM B117, 500-hour salt-spray test. The control enclosure and unit panels shall be cleaned, phosphatized and then corrosion resistant urethane painted before assembly.

I. Advanced microprocessor based control system: The control system architecture shall provide distributed control where each compressor circuit has its own microprocessor controller so in the event that one controller becomes inoperative, the other circuits will continue to operate uninterrupted.

1. Control Panel: A NEMA Type 3R weatherproof control panel shall contain the unit control system, control interlock terminals and field-power connection points. Hinged control panel access doors shall be lockable. Barrier panels shall be provided to protect against accidental contact with line voltage when accessing the control system.

2. Factory-supplied power components shall include: single-point power connection with circuit breaker, factory-mounted non-fused type service disconnect switch, individual contactors and circuit breakers for fan motors, circuit breakers and factory mounted transformers for each control-circuit, terminals for power supply to the evaporator heater circuit, and 115 volt 15 amp, ground-fault protected service-convenience outlet. Fan motors shall have inherent overload protection and compressor motors shall have three phase motor overload protection.

3. Control system starting components shall include solid-state start timer.

4. The control logic shall be designed to maximize operating efficiency and equipment life with protections for operation under unusual conditions and to provide a history of operating conditions. The system shall intelligently stage the unit to sustain leaving water temperature precision and stability while minimizing compressor cycling.

5. Equipment protection functions controlled by the microprocessor shall include high discharge pressure, loss of refrigerant, loss of water flow, freeze protection, and low refrigerant pressure.

6. User controls shall include auto/stop switch, chilled water set-point adjustment, anti-recycle timer, and digital display with water temperature and set-point, operating temperatures and pressures, and diagnostic messages.

7. The following features and functions shall be included:
   a. Durable liquid crystal display (LCD) screen type, having minimum four 20-character lines with 6 key input pad conveniently mounted on the unit controller. Default language and units of measure shall be English and I-P respectively. Messages shall be in plain English. Coded messages, LED indicators and LED displays are not acceptable.
   b. Separate control section and password protection for critical parameters.
   c. Remote reset of chilled water temperature using a 4-20mA signal.
   d. Soft-load operation, protecting the compressor by preventing full-load operation during the initial chilled fluid pull-down period.
   e. BAS communication flexibility through protocol selectability. Optional modular plug-ins that enable the unit controller to communicate using standardized protocols such as BACnet®, MODBUS® and LONWORKS®.
   f. Non-volatile program memory allowing auto-restart after a power failure without requiring a UPS (Un-interruptible power supply).
   g. Recording of safety shutdowns, including date-and-time stamp with system temperatures and pressures. A minimum of six previous occurrences shall be maintained in a revolving memory.
   h. Start-to-start and stop-to-start cycle timers, further optimizing motor protection.
   i. Lead-lag compressor staging for part-load operation by manual selection or automatically by circuit run hours.
j. Discharge pressure control through intelligent cycling of condenser fans to maximize efficiency.

k. Pro-active compressor unloading when selected operating parameters exceed design settings, such as high discharge pressure or low evaporator pressure.

l. Diagnostic monitoring of unit operation, providing a pre-alarm signal in advance of a potential shutdown, allowing time for corrective action.

8. Factory mounted DDC controller(s) shall support operation via District’s existing DDC system. District currently uses Andover software by the Westover Corporation.

2.4 OPTIONS AND ACCESSORIES

A. The following options are to be included:
   1. Low noise sound attenuation kit consisting of low noise fans and compressor attenuator package.
   2. Chilled water flow switch to be factory mounted in the chilled water outlet nozzle and factory wired to terminals in the control panel.

PART 3- EXECUTION

3.1 WATER CHILLER INSTALLATION

A. Install in strict accordance with manufacturer’s requirements, shop drawings, and contract documents.

B. Adjust and level chiller in alignment on supports.

C. Coordinate electrical installation with electrical contractor.

D. Coordinate controls with control contractor.

E. Vibration Isolation: Elastomeric pads with a minimum deflection of 0.25 inch. Vibration isolation devices and installation requirements are specified in Division 23 Section "Mechanical Vibration Controls."

F. Maintain manufacturer's recommended clearances for service and maintenance.

G. Install separate devices furnished by manufacturer.

H. Provide all requirements to give a fully operational and properly functional chiller.

3.2 CONNECTIONS

A. Extend existing piping to new chiller and connect. Visit site prior to bid to verify existing piping locations.

B. Install piping adjacent to chiller to allow service and maintenance.

C. Evaporator Connections: Connect inlet to evaporator with controller-bulb well, shutoff valve, thermometer, strainer, pressure gage, and union or flange. Connect outlet to evaporator with shutoff valve, flow switch, balancing valve, thermometer, pressure gage, and union or flange. Provide flexible pipe connectors.

D. Contractor shall employ the services of a fully-licensed electrical contractor to connect the new chiller to the existing chiller electrical service.
E. Contractor shall make arrangement with the Harrison School District Maintenance Department to coordinate and install interface between existing building controls and new chiller.

3.3 STARTUP SERVICE

A. Inspect field-assembled components, equipment installation, and piping and electrical connections for proper assemblies, installations, and connections.

B. Provide factory trained personnel for starting of the chiller, and instruct the owner on proper chiller operation and maintenance. Complete installation and startup checks according to manufacturer's written instructions and perform the following:
   1. Verify that refrigerant charge is sufficient and water chiller has been leak tested.
   2. Verify that pumps are installed and functional.
   3. Verify that thermometers and gages are installed.
   4. Operate water chiller for run-in period according to manufacturer's written instructions.
   5. Check bearing lubrication and oil levels.
   7. Verify static deflection of vibration isolators, including deflection during water chiller startup and shutdown.
  10. Test and adjust controls and safeties. Replace damaged or malfunctioning controls and equipment.

C. Prepare a written startup report that records results of tests and inspections.
Photos of Existing Chiller at Otero Elementary School
**MODEL NO.**
RAUAC806PF002

**SERIAL NO.**
J87L732459

**REFRIGERATION MACHINE FOR OUTDOOR INSTALLATION ONLY**
SEE ADDITIONAL NAMEPLATE IN GAS HEAT SECTION WHEN USED

### UNIT POWER SUPPLY

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Voltage</td>
<td>200 V</td>
</tr>
<tr>
<td>Hz</td>
<td>60</td>
</tr>
<tr>
<td>Phase</td>
<td>3</td>
</tr>
</tbody>
</table>

**Utilization Voltage Range**
207-230 V

**This unit is suitable for operation on**
**The following nominal system voltages**
200-208 V

**Minimum Circuit Ampacity**

<table>
<thead>
<tr>
<th>Circuit</th>
<th>Circuit-1</th>
<th>Circuit-2</th>
<th>Circuit-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amps</td>
<td>146</td>
<td>218</td>
<td>218</td>
</tr>
</tbody>
</table>

**Recommended Dual Element Fuse**

<table>
<thead>
<tr>
<th>Circuit</th>
<th>Circuit-1</th>
<th>Circuit-2</th>
<th>Circuit-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amps</td>
<td>70</td>
<td>300</td>
<td>300</td>
</tr>
</tbody>
</table>

**Maximum Fuse Size**

<table>
<thead>
<tr>
<th>Circuit</th>
<th>Circuit-1</th>
<th>Circuit-2</th>
<th>Circuit-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amps</td>
<td>110</td>
<td>350</td>
<td>350</td>
</tr>
</tbody>
</table>

**Compressor Motor**

<table>
<thead>
<tr>
<th>QTY.</th>
<th>Volt</th>
<th>Hz</th>
<th>PH</th>
<th>RLA, EA</th>
<th>LRA, EA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>200</td>
<td>60</td>
<td>3</td>
<td>174.0</td>
<td>729</td>
</tr>
</tbody>
</table>

**Cond. Fan Motor**

<table>
<thead>
<tr>
<th>QTY.</th>
<th>Volt</th>
<th>Hz</th>
<th>PH</th>
<th>FLA, EA</th>
<th>HP, EA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>200</td>
<td>60</td>
<td>3</td>
<td>9.3</td>
<td>7.50</td>
</tr>
</tbody>
</table>

**Evap. Fan Motor**

<table>
<thead>
<tr>
<th>QTY.</th>
<th>Volt</th>
<th>Hz</th>
<th>PH</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>200</td>
<td>60</td>
<td>3</td>
</tr>
</tbody>
</table>

**Exhaust Fan Motor**

<table>
<thead>
<tr>
<th>QTY.</th>
<th>Volt</th>
<th>Hz</th>
<th>PH</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>200</td>
<td>60</td>
<td>3</td>
</tr>
</tbody>
</table>

**Burner Motor**

<table>
<thead>
<tr>
<th>QTY.</th>
<th>Volt</th>
<th>Hz</th>
<th>PH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>200</td>
<td>60</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electric Heater Circuit**

<table>
<thead>
<tr>
<th>QTY.</th>
<th>Volt</th>
<th>Hz</th>
<th>PH</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>200</td>
<td>60</td>
<td>3</td>
</tr>
</tbody>
</table>
### RECOMMENDED DUAL ELEMENT FUSE
- Amps: 70, 300, 300

### MAXIMUM FUSE SIZE
- Amps: 110, 350, 350

### COMPRESSOR MOTOR
- Qty: 2
- Volt: 200
- Hz: 60
- Ph: 3
- RLA, EA: 174.0
- LRA, EA: 729

### COND. FAN MOTOR
- Qty: 2
- Volt: 200
- Hz: 60
- Ph: 3
- FLA, EA: 25.3
- HP, EA: 7.5

### EVAP. FAN MOTOR
- Qty: 2

### EXHAUST FAN MOTOR
- Qty: 2

### BURNER MOTOR
- Qty: 2

### ELECTRIC HEATER CIRCUIT
- Qty: 2

### FACTORY CHARGED — EACH SYSTEM
- 2 LBS. OF R-22

### FIELD CHARGED — EACH SYSTEM
- LBS. OF R-12
- LBS. OF R-22

### UNIT WEIGHT
- 5910

### DESIGN PRESSURE
- High: 405 PSIG
- Low: 300 PSIG

### TEST PRESSURE
- High — 450 PSIG

---

**FOR NONRESIDENTIAL INSTALLATION ONLY**

**FOR CONTINUED EFFICIENT OPERATION OF THIS UNIT REFER TO**

**OPERATION MAINTENANCE MANUAL**
Proposal for Otero Elementary School Chiller
Harrison School District #2
1060 Harrison Road
Colorado Springs, Colorado 80905

TO: El Paso County School District #2 – Harrison
   Jeffrey Clemens, Supervisor of Facilities
   1060 Harrison Road
   Colorado Springs, CO 80905

Having carefully examined the Invitation to Bid and General Requirements, the information for Bidders, the general conditions of the contract, specifications, and reviewing the conditions of work, the undersigned proposes to furnish all labor and materials and do all work in connection with replacing the Otero chiller so specified in said documents for the sum of:

$ __________________________
Design
$ __________________________
Material
$ __________________________
Labor
$ __________________________
Total Cost

________________________________
Name and Title (Print)

________________________________
Company Name

________________________________
Signature

________________________________
Street Address

________________________________
Date

________________________________
City, State and Zip Code

________________________________
Telephone Number