

SECTION 009113 - ADDENDA

1.1 PROJECT INFORMATION

- A. Project Name: Chiller Replacement Eastern WV Community & Technical College.
- B. Owner: WV Community and Technical College System.
- C. Owner Project Number: RFB 24136.
- D. Architect: Omni Architects
- E. Architect Project Number: 2023047.01.
- F. Date of Addendum: September 15, 2023.

1.2 NOTICE TO BIDDERS

- A. This Addendum is issued to all registered plan holders pursuant to the Instructions to Bidders. This Addendum serves to clarify, revise, and supersede information in the Project Manual, Drawings, and previously issued Addenda. Portions of the Addendum affecting the Contract Documents will be incorporated into the Contract by enumeration of the Addendum in the Owner/Contractor Agreement.
- B. The Bidder shall acknowledge receipt of this Addendum in the appropriate space on the Bid Form.
- C. The date for receipt of bids is unchanged by this Addendum, at same time and location.
 - 1. Bid Date: September 22, 2023.
 - 2. Location: 6th Floor, WV Community and Technical College System, 1018 Kanawha Boulevard, East, Charleston, WV 25301

1.3 ATTACHMENTS

- A. This Addendum includes the following attached Documents and Specification Sections:
 - 1. Document: Bid Form, dated 09/15/2023, (reissued).
 - 2. Section 232513, Water Treatment for Closed Loop Hydronic System, dated 09/15/2023, (reissued).
- B. This Addendum includes the following attached Sheets:
 - 1. Mechanical Sheet ME-1, dated 09/15/23, (reissued).

1.4 REVISIONS TO DIVISIONS 02 - 49 SPECIFICATION SECTIONS

- A. Division 23 and Division 26 Specification Sections (not reissued): Delete references to Division 01 throughout. Refer back to Specification Section 230500 and 260100 for common requirements.
- B. Specification Section 236423.13, AIR COOLED SCROLL WATER CHILLERS, (not reissued).
 - 1. Paragraph 2.2.A: Add to the list of available Manufacturers: Carrier, Trane.
 - 2. Paragraph 2.11: ADD subparagraph B. "See schedule on drawing for additional accessories."
- C. Specification Section 230533, HEAT TRACE FOR HVAC PIPING, (not reissued)
 - 1. PART 2 - PRODUCTS: REVISE to "PART 2 – PRODUCTS (NOT USED)"
 - a. All sections under PART 2 will be deleted. As noted on drawing ME-1 the heat trace will be owner supplied and installed by the Contractor. PART 1 and PART 3 of the specification still apply.

END OF DOCUMENT 009113

BID FORM

RFB 24136 – Chiller Replacement, Eastern WV Community & Technical College

Dated: _____
(Bidder to insert date bid submitted)

SUBMITTED BY:

_____ (hereinafter called "Bidder")

SUBMIT BID TO:

Senior Director of Facilities

RFB 24136

WV Community & Technical College System

1018 Kanawha Boulevard, East, Suite 700

Charleston, WV 25301 (hereinafter called "Owner")

The Bidder, being familiar with local conditions affecting the cost of the Work and the Contract Documents, including Instructions to Bidders, Bid Form, Terms and Conditions, Drawings, Specifications, and any Addenda or Clarifications issued, hereby propose to furnish all Work, material, equipment, taxes, transportation, tools, and expendable equipment necessary for the satisfactory delivery and installation of:

CHILLER REPLACEMENT EASTERN WV COMMUNITY & TECHNICAL COLLEGE MOOREFIELD, WEST VIRGINIA

in every detail and ready for operation, all in full accordance with, and in conformity to, the Contract Documents, for the stipulated sums as follows:

The Undersigned Bidder Agrees:

1. To accept the provisions of all sections of the documents listed above.
2. That the amounts stated in this Form of Proposal represents the entire cost of the Work which includes but is not limited to all labor, material, equipment, supplies, transportation, tools and incidentals to remove and lawfully dispose of the existing Carrier Chiller and replace it with a new Chiller as specified in the Bid/Contract Documents, and providing all related Electrical, Mechanical, Plumbing, and Site Work associated with its installation, start-up, demonstration, and customer training.

BASE BID:

For the sum of: _____

_____ (\$_____).

CHILLER MANUFACTUER:

Manufacturer of Chiller & Model Number (attach Chiller datasheet): _____

ADD ALTERNATE NO. H-1:

As an add alternate, provide pricing to furnish and install the glycol system including filling the existing chilled water system with a 30% propylene glycol solution. Refer to Alternate H-1 in Addendum No. 1 for a full description of the work required.

For the sum of: _____

(\$ _____).

If awarded contract on Base Bid, I (we) agree to deliver, install, start up, and have the chiller fully operational (Substantial Completion) on or before April 1, 2024.

The Owner will suffer financial loss if the Work is not Substantially Complete within the time specified. For each calendar day of delay in achieving Substantial Completion, the Contractor shall be liable for and shall pay the Owner Five Hundred Dollars (\$500) per day, not as a penalty but as liquidated damages. For each calendar day of delay in achieving Final Completion, the Contractor shall be liable for and shall pay half the amount of liquidated damages stated above, plus any additional fees of the Architect and the Architect's consultants that may accrue. Allowances may be made for delays due to shortages of materials and/or energy resources, subject to proof by documentation, and for delays due to strikes or other delays beyond the control of the Contractor. The Contractor must properly document all delays and any claim for extension of the Contract Time.

The Bidder agrees that the Owner reserves the right to reject any or all bids, and to waive any formalities in the bidding.

The Bidder agrees that this bid shall be good and may not be withdrawn for a period of 30 days.

The Bidder acknowledges receipt of the following Addenda: (Please list by number and date.)

_____	_____	_____
_____	_____	_____
_____	_____	_____

SIGNATURE OF BIDDER: _____

Firm: _____

Print Signer's Name: _____

Address: _____

Title: _____

Address: _____

Phone: _____

Address: _____

Email: _____

FEIN: _____

END OF BID FORM

SECTION 232513 - WATER TREATMENT FOR CLOSED LOOP HYDRONIC SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. All Division 23 Specification Sections also apply to this Section.

1.2 SUMMARY

- A. Section includes the following water treatment for closed loop hydronic systems:
 - 1. Manual and automatic chemical feed equipment.
 - 2. Chemicals.

1.3 DEFINITIONS

- A. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote control, signaling power limited circuits.
- B. TSS: Total suspended solids are solid materials, including organic and inorganic, that are suspended in the water. These solids may include silt, plankton, and industrial wastes.

1.4 PERFORMANCE REQUIREMENTS

- A. Water quality for HVAC systems shall minimize corrosion, scale buildup, and biological growth for optimum efficiency of HVAC equipment without creating a hazard to operating personnel or the environment.
- B. Base HVAC water treatment on quality of water available at Project site, HVAC system equipment material characteristics and functional performance characteristics, operating personnel capabilities, and requirements and guidelines of authorities having jurisdiction. A report shall be supplied to the General Contractor, Architect and Engineer documenting that the Water Treatment Service Provider analyzed the project's incoming site water describing its characteristics.
- C. The pre-cleaning and flushing of the systems must be done with the oversight of the Water Treatment Service Provider. It must also be documented in a formal report supplied to the General Contractor, Architect and Engineer, documenting the steps taken during pre-cleaning and flushing, the water analyses done during each of the steps and

a final flushing water quality analysis with particle size distribution analyses being conducted on the final flush water.

- D. The formal report shall also document the quality of the treated system. The quality of the treated water or glycol fluid must meet the specifications set forth by the HVAC equipment manufacturer, if there are any. If no such specifications exist for the equipment a full analysis must be done, including a particle size distribution analysis that documents the quality of the water/fluid. When glycol is required in the project the full analysis must include organic acidity, glycol degradation products, corrosion inhibitors, scale promoters, contaminants, corrosion by-products and general qualities of the glycol including concentration, type and freeze point.
- E. The water chemistry and quality of the chemical treatment program will influence the corrosion rates of the system. These shall be measured by corrosion coupons using un-passivated coupons and following the ASTM procedures for monitoring corrosion rates. A 30 day coupon installed after cleaning, flushing and treatment of the system should yield the following results for the closed loop systems being treated with a formal report being issued to the general contractor and project engineer:
1. Carbon Steel (C101): Less than or equal to 0.2 mpy.
 2. Copper (CDA110): Less than or equal to 0.1 mpy.

Note: These rates assume that the metal loss is uniform with no pitting or localized attack including gouging, etching, microbial attack or crevice attack. Conditions such as those are not acceptable. If they are noted the cause should be addressed with follow-up testing to confirm improvement. Localized attack at the coupon holder may be ignored if the treatment is unable to interact with the coupon in this area and no other abnormalities are noted.

- F. The water chemistry and quality of the chemical treatment program will influence the biological growth in the system. This shall be measured by Biological Dip Slides, SRB and IRB analyses. All protocols should yield a non-detectable biological growth. A formal report shall be issued to the General Contractor, Architect and Engineer to provide evidence of this.
- G. The corrosion rates in the system must be maintained at the above levels for the full year of service. They must be monitored quarterly for the first year and documented in reports sent to the Architect, Engineer and the Owner's Facility Manager.
- H. The biological growth rates in the system must be maintained at non-detectable levels for the full year of service. They must also be monitored quarterly for the first year and documented in reports sent to the Architect, Engineer and the Owner's Facility Manager.
- I. A full water or fluid analysis on each closed loop system must be done semi-annually, including a particle size distribution analysis, during the first year of service. When glycol is required in the project, the full analysis must include organic acidity, glycol degradation products, corrosion inhibitors, scale promoters, contaminants, corrosion by-products and general qualities of the glycol including concentration, type and freeze point. The

findings of each analysis shall be documented and submitted in a report sent to the Architect, Engineer and the Owner's Facility Manager.

1.5 SUBMITTALS

- A. Product Data: Include rated capacities; water pressure drops; shipping, installed, and operating weights; and furnished products listed below. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 1. Chemical test equipment.
 - 2. Chemicals.
 - 3. Chemical material safety data sheets.
 - 4. **Initial Water Analysis.**
 - 5. **Quarterly Water Analysis for the first year after Substantial Completion.**
- B. Wiring Diagrams: Detail power and control wiring and differentiate between manufacturer-installed and field installed wiring.
- C. Water Analysis Provider Qualifications: Verification of experience and capability of HVAC water treatment service provider.
- D. Water Treatment Program: Written sequence of operation on an annual basis for the application equipment required to achieve water quality defined in "Performance Requirements" article.
- E. Water Analysis and Formal Reports: Refer to the "Performance Requirements" article in this Section for water analysis and formal report requirements.
- F. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.
- G. Operation and Maintenance Data: For sensors, injection pumps, filters, system controls, and accessories to include in emergency, operation, and maintenance manuals specified in Division 01.

1.6 QUALITY ASSURANCE

- A. HVAC Water Treatment Service Provider Qualifications: An experienced HVAC water treatment service provider capable of analyzing water qualities, installing water treatment equipment, and applying water treatment as specified in this Section.

1.7 MAINTENANCE SERVICE

- A. Scope of Maintenance Service: Provide chemicals and service program to maintain water conditions required above to inhibit corrosion and scale formation for hydronic piping and equipment. Services and chemicals shall be provided for a period of one year from date of Substantial Completion and shall include the following:
1. Initial water analysis and HVAC water treatment recommendations.
 2. Startup assistance for Contractor to flush the systems, clean with detergents, and initially fill systems with required chemical treatment prior to operation.
 3. Periodic field service and consultation.
 4. Customer report charts and log sheets.
 5. Laboratory technical analysis.
 6. Analyses and reports of all chemical items concerning safety and compliance with government regulations.

1.8 CURRENT CHILLED WATER CHEMISTRY REPORT **(for contractor info only)**

- A. pH = 8.1
- B. Total Hardness = 77.1 ppm
- C. Iron = 6.32 ppm
- D. Copper = 0.64 ppm
- E. Moly = 0.04 ppm
- F. Nitrite = < 1.0 ppm
- G. Nitrate = 1.9 ppm
- H. Azole = 5.3 ppm

I. The report also indicates the potential biological fouling in the system.

1.9 CURRENT SYSTEM

- A. The system consists of a chiller, constant volume pumps, chemical pot feeder and two (2) air-handling units. The coil information is provided for informational purposes to assist in bidding the system cleaning:**
- 1. AHU-1:**
 - a. Carrier Aero unit, installed ~2008**
 - b. Coil: 30.35 sq.ft face area, 6-row, 14 FPI, Double Circuit, Right side connection, ½-in tube diameter, AL fins, Galv. Casing, Steel header**
 - 2. AHU-2:**
 - a. Daikin Vision unit, installed ~ 2014**

- b. Coil: 20.13 sq.ft. face area, 10-row, 9 FPI, 0.625-in tube diameter, AL fins, Copper header, Stainless steel casing

PART 2 - PRODUCTS

2.1 WATER TREATMENT SERVICE PROVIDER

- A. Acceptable Water Treatment Service Providers - subject to compliance with requirements, provide water treatment services by one of the following:
 - 1. Capitol Technologies, Inc. (located in McKeesport, PA).
 - 2. Chem Aqua
 - 3. Complete Care of Virginia
 - 4. Craft Products Company (located in Pittsburgh, PA).
 - 5. GLA Consultants
 - 6. Other Contractors with approval.

2.2 MANUAL CHEMICAL FEED EQUIPMENT

- A. Water Meter
 - 1. Service: Water.
 - 2. Wetted Materials:
 - a. Body: Brass, polyethylene.
 - b. Couplings: Brass.
 - c. Measuring Chamber: Polyethylene, ABS plastic, ferrite, acetal.
 - 3. Flow Range: 2 to 30 gpm.
 - 4. Accuracy: Transitional Flow: $\pm 5\%$; Nominal Flow: $\pm 2\%$.
 - 5. Temperature Limit: 104°F
 - 6. Pressure Limit: 232 psi (16 bar)
 - 7. Maximum Pressure Drop: 9 psi @ 30 gpm
 - 8. Totalizing Display Maximum: 10,000,000 gallons.
 - 9. Output Signal: Pulse output with frequency proportional to flow rate.
 - 10. Pulse Options: 1 gallon per pulse.
 - 11. Electrical Rating: 0.01 A @ 24 VAC/VDC.
 - 12. Electrical Connections: Color-coded lead wires, 4.5' long.
 - 13. Mounting Orientation: Horizontal.
 - 14. Maximum Pressure Loss at Design Flow: 3 psig.
 - 15. Registration: Gallons or cubic feet.
 - 16. End Connections: Threaded.
 - 17. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ADD Alternate H-1: Glycol Make-Up System: The glycol make-up system shall consist of the following:

1. One 15-20 gallon polyethylene solution tank.
2. System shall include the storage mixing tank with molded-in liquid level gauge, 4-in fill/access opening and cover; pump suction hose with inlet strainer, pressure pump with fuse protection, low fluid level pump cut-out float switch; manual diverter valve for purging air and agitating contents of the storage tank, adjustable digital pressure switch (0 – 45 psig) cut-out pressure, digital pressure display, visual alarm on low level with dry contacts, UL listed and fused power supply adapter with LED power indicator light, 120V to 24 VDC for field installation.
3. Pump capable of running dry.
4. The glycol feeder shall be similar to Axiom DMF300 or Wessels G-Series.
5. Estimated system volume = 1000 gallons (for cost estimating only. Contractor to verify amount of glycol required to reach 30% mixture)

2.3 CHEMICAL TREATMENT TEST EQUIPMENT

- A. Test Kit: Manufacturer recommended equipment and chemicals in a wall-mounting cabinet for testing pH, TDS, inhibitor, chloride, alkalinity, hardness, and percentage of glycol.
- B. Four Station - Corrosion Coupon Test Rack and Assembly: Constructed of corrosion resistant material, complete with piping, valves, strainer, flow monitoring gauge, quick disconnect O-ring sealed coupon holders, and mild steel and copper coupons. Locate copper coupon downstream from mild steel coupon in the test coupon assembly.

2.4 CHEMICALS

- A. Chemicals shall be furnished and installed as recommended by the Water Treatment Service Provider that are compatible with piping system components and connected equipment, and that can attain water quality specified in the "Performance Requirements" article in this Section.
- B. Hydrostatic Test Inhibitor: All hydrostatic test water shall contain a corrosion inhibitor package and biocide provided by the Water Treatment Service Provider to protect the system from corrosion and biological growth during stagnant periods or draining. This inhibitor package must be added during all hydrostatic testing. (NOTE: THE WATER TREATMENT SERVICE PROVIDER MUST VERIFY THAT THE HYDROSTATIC TESTING INHIBITOR PACKAGE SUPPLIED AND USED IS COMPATIBLE WITH THE EQUIPMENT CONNECTED TO THE SYSTEM.)
- C. System Cleaner: System cleaner shall be provided as recommended by the Water Treatment Service Provider and equipment manufacturer(s) to remove grease and petroleum products, flash rusting agents and other particulate in the system. (NOTE: THE WATER TREATMENT SERVICE PROVIDER MUST VERIFY THAT THE SYSTEM

CLEANER USED IS COMPATIBLE WITH THE EQUIPMENT CONNECTED TO THE SYSTEM.)

- D. Closed loop Water Piping Chemicals: Closed loop water piping chemicals shall be provided as recommended by the Water Treatment Service Provider and equipment manufacturer(s) to reduce deposits, inhibit corrosion and control biological growth. It also must comply with the system water quality performance requirements specified in the "Performance Requirements" article in this Section. This product is for use during the time between flushing and glycol addition to keep the system from corroding and from bacteria from growing. (NOTE: THE WATER TREATMENT SERVICE PROVIDER MUST VERIFY THAT THE SYSTEM CORROSION INHIBITORS AND BIOCIDES ARE COMPATIBLE WITH THE EQUIPMENT CONNECTED TO THE SYSTEM.)
- E. **ADD Alternate H-1: Anti-freeze Solution:** Furnish and install the proper amount of inhibited propylene glycol hydronic fluid to achieve a 30% propylene glycol-water solution by volume. The inhibited propylene glycol hydronic fluid with the integral inhibitor package supplied by the manufacturer shall only be one that is manufactured for HVAC systems and shall not be an industrial grade glycol with a secondary inhibitor package added by the Water Treatment Service Provider. All dilution water for the glycol/hydronic fluid must be deionized water. (NOTE: THE WATER TREATMENT SERVICE PROVIDER MUST VERIFY THAT THE GLYCOL OR HYDRONIC FLUID IS COMPATIBLE WITH THE EQUIPMENT CONNECTED TO THE SYSTEM.)

PART 3 - EXECUTION

3.1 WATER ANALYSIS

- A. Perform an analysis of supply water to determine quality of water available at the Project site and to determine the type and quantities of chemicals needed to maintain the water quality as specified in "Performance Requirements" article of each closed loop system on the project.

3.2 INSTALLATION

- A. Install chemical application equipment on concrete bases, level and plumb. Maintain manufacturer's recommended clearances. Arrange units so controls and devices that require servicing are accessible. Anchor chemical tanks and floor-mounting accessories to substrate.
- B. For each system included in this specification, a water meter shall be used the first time it is filled to determine the exact volume, in gallons, that the system holds. All hydrostatic test water shall contain a corrosion inhibitor and biological treatment to protect the system from corrosion, flash rusting and biological growth during stagnant periods or draining. The volume of each system shall be recorded and provided to the Water Treatment Service Provider, the Architect and the Engineer. In addition, the volume of each system shall be recorded and included in the Operating and Maintenance Manuals.

- C. Prior to treating the system, thoroughly and completely clean the entire chilled water systems of all dirt and debris. Cleaning shall consist of the following procedure:
1. Step 1: Fill the closed loop system with hydrostatic test water. All hydrostatic test water shall contain a corrosion inhibitor to prevent corrosion and biological growth. If any portion of the system is subject to freezing temperatures at the time of the cleaning, postpone the cleaning procedure until weather permits or verify pumps can be kept continuously running during that time period.
 2. Step 2: Add cleaning chemicals in sufficient quantity as recommended by the Water Treatment Service Provider. **All new chemicals shall be provided. Any old onsite chemicals shall be disposed of by the Contractor.**
 3. Step 3: Circulate solution throughout entire system for a minimum of 96-hours with filtration. Every 24 hours, check bag filter to determine how much dirt it has collected during that period. Clean or replace bag as necessary. Continue circulation process until bag filter in filter feeder is clean after the prior 24-hour circulation period.
 4. Step 4: Drain and flush the system until the cleaner is all removed from the system.
 5. Step 5: If the fluid being drained is dirty, repeat step 1 through step 4 until fluid being drained from system is clear. Take sample for laboratory analysis by the Water Treatment Service Provider.
 6. Step 6: Fill the entire system with water and the corrosion inhibitor package.
 7. Step 7: Remove all air from system.
 8. Step 8: Add the proper amount of chemicals as recommended by the Water Treatment Service Provider to reduce deposits, inhibit corrosion, and bring the water quality within the specified limits as recommended by the Water Treatment Service Provider.
 9. Circulate the system with filtration on-line to verify the system is clean. After 96-hours take a sample for laboratory analysis by the Water Treatment Service Provider.
 10. If glycol is to be added, only drain the system 12-hours before the glycol is to be added to prevent flash rusting. After the glycol is added and all the air is removed, circulate the system with filters installed in the filter feeder. Change the bags in the filter feeder every 24-hours until the bag filters come out clean. Take sample for laboratory analysis by the Water Treatment Service Provider.
- D. Install water testing equipment on wall near water chemical application equipment.
- E. Install interconnecting control wiring for chemical treatment controls and sensors.

3.3 WATER METER INSTALLATION

- A. Provide a water meter on the make-up water connection to each make-up system to meter the water used by the following closed loop system(s):
1. Chilled water closed loop system.
- B. Install full-port ball isolation valves on the inlet and outlet of the water meter.

3.4 CHEMICAL TREATMENT TEST EQUIPMENT INSTALLATION

- A. Provide a four-station corrosion test coupon rack for the following:
 - 1. Chilled water closed loop system.
 - a. The piping for the chilled water corrosion test coupon assembly shall be schedule 80 PVC plastic with socket-type PVC plastic pipe fittings. Pipe shall be joined using solvent cement and adhesive primer as recommended by the PVC pipe manufacturer.
- B. Install a full-port ball isolation valve on the inlet of each coupon rack assembly.

3.5 ADD Alternate H-1: GLYCOL FEED UNIT INSTALLATION

- A. Provide a glycol make-up system and install on floor or wall (per manufacturer's recommendations) following closed loop system(s):
 - 1. Chilled water closed loop system.
- B. Install a full-port ball isolation valve on each pump outlet of the glycol feed unit.
- C. Install a swing check on the outlet of each pump upstream of the isolation valve.
- D. Connect dry contacts to building controls for remote alarm notification.

3.6 CHEMICAL TREATMENT OF SYSTEMS

- A. System Cleaner - provide system cleaner for the following systems:
 - 1. Chilled water closed loop system.
- B. Closed loop, Water Piping Chemicals - provide closed loop water piping chemicals for the following systems:
 - 1. Chilled water closed loop system.

3.7 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where installing piping adjacent to equipment, allow space for service and maintenance.
- C. Make piping connections between HVAC water treatment equipment and dissimilar-metal piping with dielectric fittings. Comply with requirements in Division 23 Section 232113 "Hydronic Piping."

- D. Install shutoff valves on HVAC water treatment equipment inlet and outlet. Metal general-duty valves are specified in Division 23 Section 232113 "Hydronic Piping."

3.8 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections:
1. Inspect field assembled components and equipment installation, including piping and electrical connections.
 2. Confirm that the water system piping has been tested and is free of leaks before cleaning system piping.
 3. Inspect piping and equipment to determine that systems and equipment have been cleaned, flushed, and filled with water, and are fully operational before introducing chemicals for water treatment system.
 4. Place HVAC water treatment system into operation and calibrate controls during the preliminary phase of hydronic systems' startup procedures.
 5. Do not enclose, cover, or put piping into operation until it is tested and satisfactory test results are achieved.
 6. Test for leaks and defects. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 7. Leave uncovered and unconcealed new, altered, extended, and replaced water piping until it has been tested and approved. Expose work that has been covered or concealed before it has been tested and approved.
 8. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow test pressure to stand for four hours. Leaks and loss in test pressure constitute defects.
 9. Repair leaks and defects with new materials and retest piping until no leaks exist.
- C. Equipment will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.
- E. At quarterly intervals following Substantial Completion, perform separate water analyses on hydronic systems to show that chemical feed systems are maintaining water quality within performance requirements specified in this Section. Submit written reports of water analysis advising Owner of changes necessary to adhere to Part 1 "Performance Requirements" article.
- F. Comply with ASTM D 3370 and with the following standards:
1. Silica: ASTM D 859.
 2. Acidity and Alkalinity: ASTM D 1067.
 3. Iron: ASTM D 1068.
 4. Water Hardness: ASTM D 1126.

3.9 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain HVAC water treatment systems and equipment. Include the following in the training:
 - 1. Review procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining equipment and closed water systems.
 - 2. Review manufacturer's safety data sheets for handling of chemicals.
 - 3. Review data in maintenance manuals, especially data on recommended parts inventory and supply sources and on availability of parts and service. Refer to Division 1.
- B. Schedule at least four (4) hours of training with Owner, through the Architect, with at least seven days' advance notice.

END OF SECTION 232513



EXISTING 12" X 12" X 6" PVC JUNCTION BOX SHALL REMAIN. THE TWO EXISTING 1" CONDUITS ENTERING JUNCTION BOX FROM BELOW GRADE SHALL REMAIN. THE TWO EXISTING METALLIC CONDUITS EXITING JUNCTION BOX TO GRADE AND OVER TO CHILLER SHALL REMAIN AND BE REUSED FOR HEAT TRACE CABLING. DISCONNECT CIRCUITING FROM JUNCTION BOX TO EACH RECEPTACLE MOUNTED UNDER CHILLER FOR CORD AND PLUG CONNECTION TO HEAT TRACE.

EXISTING 600 AMP FUSIBLE DISCONNECT SWITCH WITH 600 AMP FUSES SHALL REMAIN. DISCONNECT SWITCH FEEDER ORIGINATES AT A 600A/3P CIRCUIT BREAKER MOUNTED IN SWITCHBOARD INSIDE MAIN BUILDING; FEEDER SHALL BE EXISTING TO REMAIN. DISCONNECT CONDUCTORS AND LIQUID-TIGHT FLEXIBLE METAL CONDUITS FROM DISCONNECT SWITCH TO EXISTING CHILLER AND REMOVE.

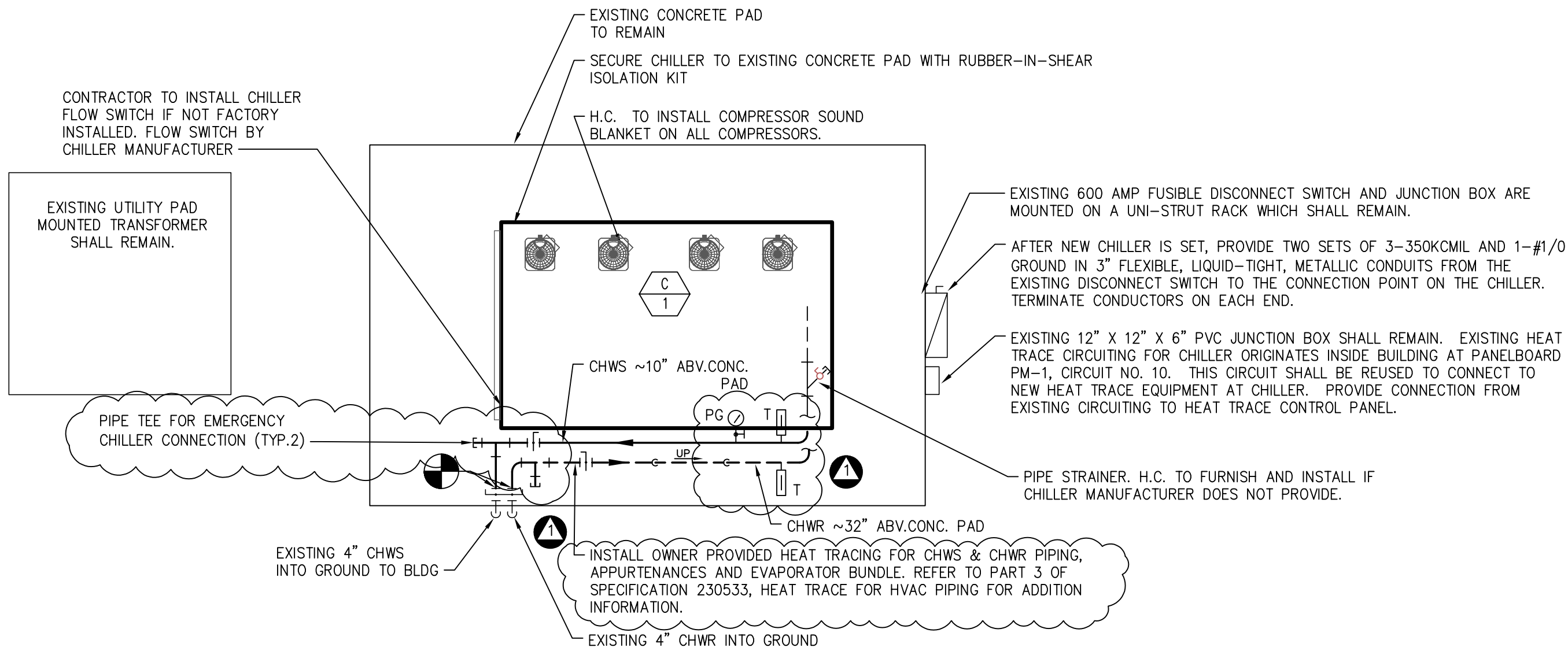
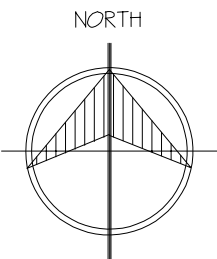
REMOVE EXISTING CHILLER AND DISPOSE OF PROPERLY.

REMOVE CHILLED WATER SUPPLY & RETURN PIPING FROM CHILLER TO ISOLATION VALVES.

REMOVE EXISTING PIPE INSULATION AND ELECTRIC HEAT TRACE FROM CHILLER TO GROUND.

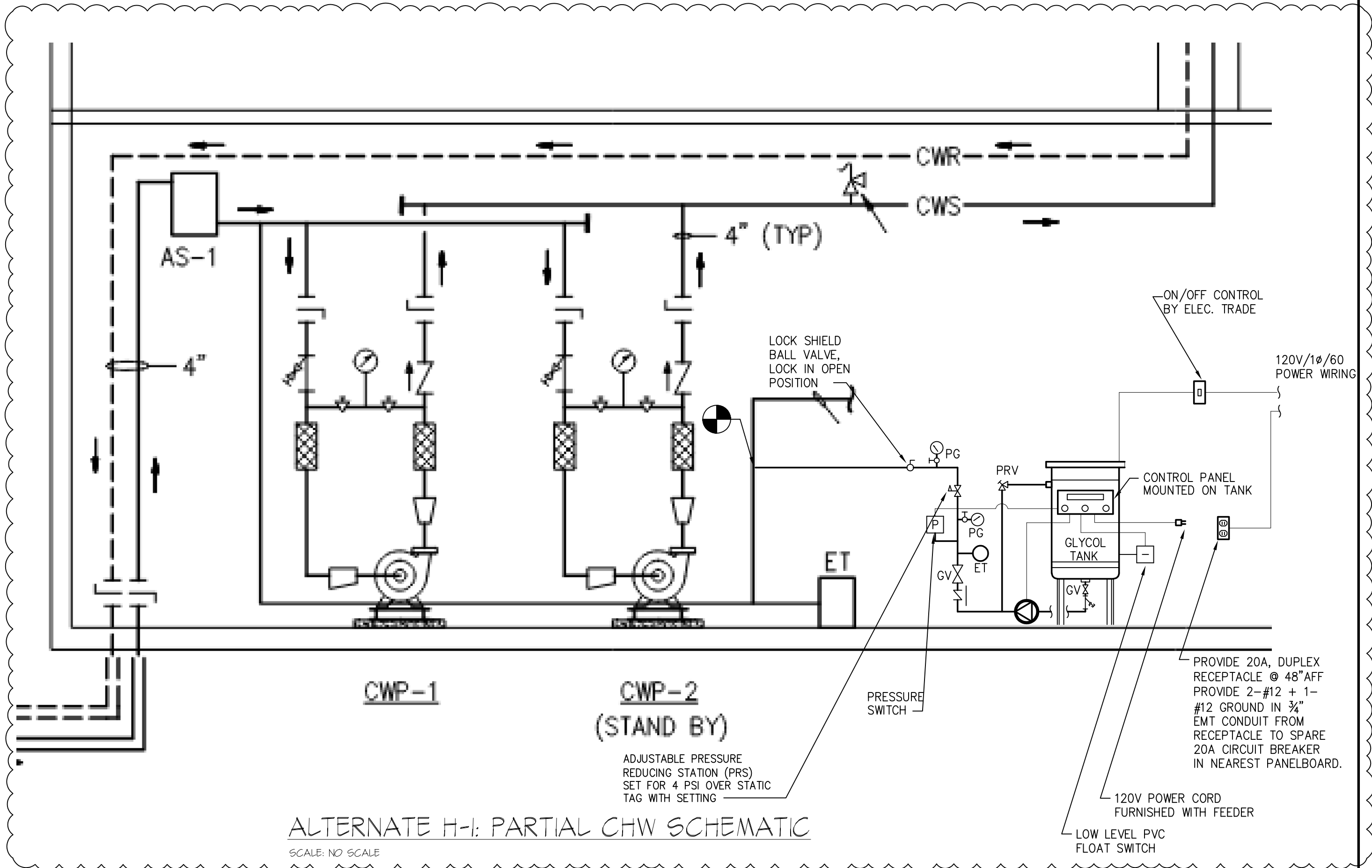
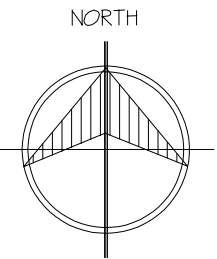
AIR-COOLED CHILLER DEMOLITION PLAN

SCALE: NO SCALE



AIR-COOLED CHILLER NEW WORK PLAN

SCALE: 1/4"=1'-0"

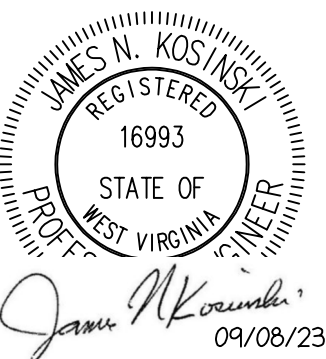
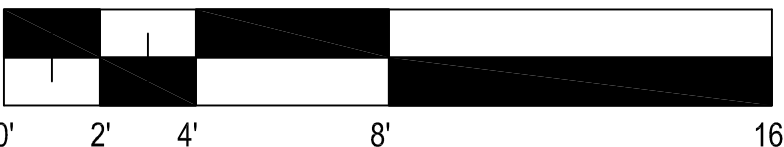


ALTERNATE H-I: PARTIAL CHW SCHEMATIC

SCALE: NO SCALE

AIR COOLED CHILLER SCHEDULE																	
UNIT NO.	CAPACITY (TONS)	GPM	MAX PD (FT WG)	EWT (°F)	LWT (°F)	REFRIG. TYPE	SAT-COND. TEMP (°F)	COMPRESSOR		ELECTRICAL DATA							REMARKS
								NO. (MIN.)	TYPE	TOTAL KW	UNIT MCA	UNIT MOCP	V	PH	EER (MIN.)	IPLV (MIN.)	
C-1	110	285	9.0	54	42	REMARK 4	95	4	SCROLL	125.1	505	600	208	3	9.4	13.7	1 - 9
<div>REMARKS:</div> <div>1. SINGLE POINT POWER CONNECTION.</div> <div>2. INTEGRAL DISCONNECT.</div> <div>3. WATER SIDE FOULING FACTOR OF 0.000100.</div> <div>4. REFRIGERANT R410a, R134a, R454B ARE ACCEPTABLE.</div> <div>5. HOT GAS BYPASS.</div> <div>6. COMPRESSOR SOUND BLANKETS. FIELD INSTALLED.</div> <div>7. BACnet MS/TP INTERFACE. FACTORY OR FIELD INSTALLED.</div> <div>8. RUBBER IN SHEAR ISOLATORS. FIELD INSTALLED.</div> <div>9. HAIL GUARD.</div>																	

Scale: 1/4" = 1'



TOWER ENGINEERING

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Project No: 2023189



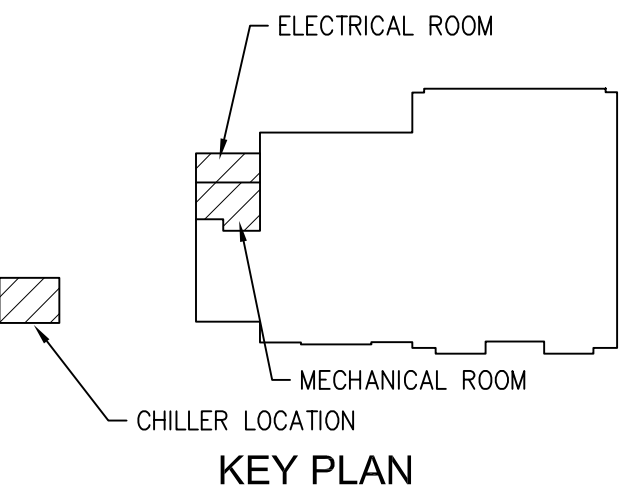
MOOREFIELD MAIN CAMPUS
316 EASTERN DRIVE
MOOREFIELD, WV 26836

COMMUNITY and TECHNICAL COLLEGE SYSTEM of WV

1018 KANAWHA BOULEVARD EAST
CHARLESTON, WV 25301

09/15/23 ADDENDUM #1

REVISIONS



SCALE: AS NOTED
DRAWN BY: RPM
CHECKED BY: JW

DATE: 09/08/23

AIR-COOLED CHILLER REPLACEMENT DEMO AND NEW WORK PLANS

ME-1

DRAWING NUMBER
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