# **HEATING VENTILATING AND AIR CONDITIONING**

- A. Qualifications of installers: all work shall be performed by thoroughly trained and experienced workmen completely familiar with the items
- required and with manufacture's recommend methods and procedures. B. Codes: all work shall comply with applicable state and local codes. All ductwork shall be installed in accordance with the latest SMACNA duct
- C.Electrical: all electrical equipment shall be ul listed and approved. D.Record drawings: contractor shall maintain an accurate record of all
- the owner at completion. E. Operating manuals: contractor shall furnish owner 3 sets of operation and

as-built conditions during the progress of the work and turn them over to

maintenance manuals for major pieces of equipment. F. Guarantee: provide one-year guarantee on all materials, equipment and

work. Provide five (5) year guarantee on all compressors.

- G.Contractor shall obtain and pay for all necessary permits, licenses, inspections, etc. required by state, municipal and local codes. H.Drawings show general arrangement of equipment and systems and should be followed as close as practical. Contractor shall coordinate with
- other contractors and provide all necessary offsets, bends, etc. Required to provide a complete project with no extra charges to the contract. Coordinate diffusers and grilles w/ ceiling plans.

## **Products**

DUCTWORK

**EQUIPMENT** All equipment shall be of the capacity and types shown on the equipment schedules and shall be the listed manufacturer and model number. Contractor may bid "or equal" equipment at his own risk. Engineer will be the sole judge whether equipment is "equal" to that specified. If determined to not be equal, contractor will furnish equipment scheduled at no expense to the owner.

- A.Ductwork shall be G90 galvanized sheet metal fabricated in accordance with SMACNA & ASHRAE standards.
- B. All branch duct take-offs shall be made with volume extractor and volume control damper. Straight taps are not allowed.
- C.Install flexible connections between a/c units, fans and ductwork.
- D.Provide splitter dampers or volume dampers where required for proper balancing of the system. E. Flexible duct installation: refer to SMACNA standards, section iii. Ducts shall be continuous, single pieces not over 6 feet long (NFPA 90a), as straight and short as feasible, formaldehyde-free, adequately supported.
- Centerline radius of bends shall be not less than two duct diameters. Make connections with clamps as recommended by SMACNA. Clamp per SMACNA s3.33 and s3.34 with one clamp on the core duct and one on the insulation jacket. Flexible ducts shall not penetrate floors, or any chase or partition designated as a fire or smoke barrier, including corridor partitions fire rated one hour or two hours. Support ducts SMACNA standards. JM
- quiet flex or equal. F. Install turning vanes @ all tees & elbows.
- G.All duct dimensions given are inside clear dimensions. H. Unless otherwise noted, all fire dampers shall be type "B"

### INSULATION A.Duct - external

a. Flexible glass fiber; 2" thick, ANSI/ASTM c553, type 1; commercial grade; 1.0 pcf; 'k' value of 0.29 btu-in./hr. Ft2-f at 75 degrees f. CertainTeed standard duct wrap with FSK facing, or equal. Facing shall have maximum vapor transmission rate of 0.02 perms. Adhesives: waterproof fire-retardant type. Lagging adhesive: fire resistive to ASTM e84. Impale anchors: galvanized steel, 12 gage, self-adhesive pad or welded pins. Joint tape: glass fiber cloth, open mesh. R=5 minimum. JM microlite XG or equal. B. DUCT - INTERNAL

a. 1.5" thick. 2# density meeting FS HH-1-545 type ii and NFPA 90-a. Apply flame-retardant black plastic coating on air side surface. Apply insulation with EC-1128 on inside surface of clean duct. Firmly butt all joints ANS seal with adhesive to form continuous smooth sealed liner. Install stick-clips or weld-pins @ 12" oc each way in addition to adhesive. Increase duct size as necessary to provide clear air stream as

A. Coordinate and avoid interference with structure and with work of other trades. Preserve adequate head room and service room. All piping to be hung with clevis hangers fastened to structure with power inserts or

clamps. Support pipe and equipment from angles. B. When obstructions require a change in the duct shape, maintain the equivalent area and pressure drop of original duct. All sizes shown are net inside dimensions of clear airstream. Make all duct elbows right angles with elbow turns or turning blades or construct with a radius of 1.5 times the duct width. Install flat braided wire ground strap across flexible connects at ahu's and ducts. Securely anchor all grilles, registers and

C. Thoroughly clean all ducts, equipment, parts, etc. Free from all dirt, grease, oil and foreign substances. D.Do not close-in any work until it has been inspected, tested and approved

by authorities having jurisdiction. E. Test and adjusting a. Provide all necessary personnel, equipment and services necessary

diffusers and seal with rubber gaskets to prevent leakage.

to demonstrate integrity of the complete installation. All work shall be in accordance with AABC standards and by MC's independent tab sub-contractor. Note: tab services may be provided directly by MC in accordance with AABC with owner's prior approval. b. HVAC system:

1) Test and regulate all components to conform to quantities shown on the drawings. Provide larger or smaller pulleys as required at no additional cost. For each system submit as a minimum the following:

2) Air volumes at each supply, return, and exhaust outlet. 3) Total CFM and SP supplied or exhausted by each fan. 4) Motor speed, fan speed and amp reading for each fan.

5) Average velocity on intake of each fan. 6) Average velocity, EAT, LAT, and pressure drop across each

7) Water gpm @ each pump, pump pressures, balance valve position, motor amps.

8) Water gpm @ each coil, balance valve position, pressure drop across coil. c. If contractor's independent tab subcontractor fails to perform the

above tests to the satisfaction of the engineer, the engineer may

retain the services of an outside consultant to perform said services at

the sole expense of the contractor and without any expense to the F. Instruction: Upon completion of all work and balancing, thoroughly train and instruct owner's personnel in all aspects of the operation and

STATE BUILDING CODE

ENERGY COST BUDGET

50% R.H.

NO CHANGE BTUH (peak)

NO CHANGE BTUH (peak)

SEE SCHEDULES

NAME: Michael A. Maloney, PE

N/A

To the best of my knowledge and belief, the design of this building complies with the mechanical systems, service systems and equipment requirements of the North Carolina State Building Code.

SIGNED: hale to have microse to make microse microse to make microse microse to make microse m

MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT

METHOD OF COMPLIANCE:

PRESCRIPTIVE X

MECHANICAL SPACING CONDITIONING SYSTEM

Equipment schedules with motors (mechanical systems) motor horsepower SEE SCHEDULES

EXTERIOR DESIGN CONDITIONS

INTERIOR DESIGN CONDITIONS

winter dry bulb summer dry bulb

winter dry bulb summer dry bulb

relative humidity

BUILDING HEATING LOAD

description of unit

heating efficiency cooling efficiency heat output of unit

CHILLER total chiller capacity

number of phases minimum efficiency

DESIGNER STATEMENT: 1

cooling output of unit BOILER total boiler output of unit

LIST EQUIPMENT EFFICIENCIES

BUILDING COOLING LOAD

THERMAL ZONE 3A

maintenance of the installed systems.

# **DEMOLITION** A.General

1. Work Included

a) All demolition except asbestos abatement. 2. Asbestos Abatement

a) No Asbestos. b) No other work shall be carried out in any area where asbestos removal is to be done by others until the asbestos removal has been accepted as complete. c) If any material is encountered which the Contractor believes may contain asbestos, do not disturb it. Notify Owner's representative. Owner will provide any testing required.

3. Scope of Work a) Remove and dispose of as herein specified all equipment and materials indicated on drawings. Minor components may not be shown on drawings. Remove as necessary to present a neat and finished appearance. Remove supports, hangers, etc. and patch holes in structure. Patch structure which is exposed when components are removed. Finish to match surrounding surfaces. Nothing is to be abandoned in place unless specifically noted. Clean area. B. Execution 1. Procedures

a) The procedures used shall provide for safe conduct of the work, careful removal and disposition of materials specified to be salvaged, protection of property which is to remain undisturbed, coordination with other work in progress, and timely disconnection of utility services. Before beginning any cutting or demolition work, the Contractor shall carefully survey the existing work and examine the drawings and specifications to determine the extent of the work. The Contractor shall take all necessary precautions to insure against damage to existing work to remain in place, to be reused, or to remain the property of the Owner, and any damage to such work shall be repaired or replaced. The Contractor shall carefully coordinate the work of this section with all other work and construct and maintain shoring, bracing and supports, as required. The Contractor shall insure that structural elements are not overloaded and be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work

performed under any part of this contract. b) The amount of dust resulting from demolition shall be controlled to prevent the spread of dust to other portions of the building and to avoid creation of a nuisance in the surrounding area. Use of water will not be permitted when it will result in, or create, hazardous or objectionable conditions such as ice, flooding and pollution. c) Utilities shall be disconnected as required. Where such disconnection will interrupt the utility services to an area not included in the contract, arrangements for such interruption shall be made with the Owner's representative at least 72 hours in advance of the interruption.

d) The use of burning at the project site for the disposal of refuse and debris will not 2. Protection of Existing Work a) Existing work to remain shall be protected from damage. Work damaged by the Contractor shall be repaired to match existing work.

b) Cover items to remain as necessary to protect from dust. c) Floors to remain shall be covered to protect them from damage. d) At end of each work day and during inclement weather, close exterior openings with weatherproof cover. 3. Disposition of Materials

a) All material and equipment except where otherwise noted shall be the property

4. Clean-Up a) Remove debris and rubbish from building regularly. Do not allow it to accumulate in building or on site. b) Remove and transport debris and rubbish in a manner as to prevent spillage on streets or adjacent area. Comply with all applicable regulations concerning hauling

c) At the end of demolition, thoroughly clean area to prepare for new work.

# Scope of Work

and responsibility of the Contractor.

Replace Existing: (2) 385 Ton Trane Chillers. New chiller shall be minimum of AHRI 385 tons.

Model # RTAC 4004 UDON / Serial # U01J01683 & Serial # U01J01684 School Name: Philip O Berry (Main Building)

Location: 1430 Alleghany St. Charlotte, NC 28208

Scope of Work: Contractor is responsible for ensuring the following requirements are met to install replacement of like sized new chiller. The contractor shall provide a quote for replacement of chillers and any alternates listed. Quotes should include separate line items for materials, labor and tax.

 Provide all permits, documents and fees required by CMS and the Authority Having Jurisdiction (AHJ) for the completion of this project.

 Contractors license number must be on bid. Must provide permit numbers to project manager before project begins.

• The contractor is responsible for meeting the attached insurance requirements.

 Permit numbers must be on invoices. Contractor is responsible for Miscellaneous trade permits and fees.

 Equipment submittals must be provided with bid documents. • CMS reserves the right to remove any parts and refrigerant from the chiller to be replaced.

 Disconnect, remove, and dispose of existing chiller. Extend concrete pad as needed for replacement chiller. Factory recommended vibration pads must be installed.

• Contractor to provide vibration pads a (min. 2 1/2" in depth) if not supplied by manufacturer.

 Install new chiller to factory specifications. Provide and install any new piping needed to complete installation. • Provide new isolation valves for supply and return piping connections

• Provide full line size Y Strainer on inlet of new chiller with full line size manual blow down if not provided by manufacturer.

 Provide manual drains with ball valve and plug. Provide new pipe stands for supply and return piping. • Install new tees, new isolation butterfly valves, and 2 new chiller taps for rental hook-up.

• Install new liquid filled gauges, hand valves, (ball valves) and thermometers as required to install new equipment. Install new heat tracing on chiller supply and return piping.

Provide new insulation to match existing insulation with new aluminum

 Provide and install new fused electrical disconnect to meet new chiller requirements. • Field verification of all existing electrical components is required.

Provide any modifications necessary for a turnkey operating system. • Factory start-up and check out required. (documentation must accompany invoice). • Field Verify all existing control points and integrate new network

connection for BAS controls to match. (Existing Control System is • Factory provided 5-year warranty on parts, labor, and refrigerant.

 Chillers shall meet or exceed AHRI ratings as follows: Chillers shall meet or exceed AHRI ratings as follows: o Full Load EER less than or equal to 10.283 with part load EER less than or equal to 13.438 to meet the Duke Energy rebate requirements. Efficiency ratings are based upon AHRI design conditions (KW/Ton

Replacement chiller to have a minimum capacity of 385 Tons.

and IPLV values shall include all connected loads such as compressors, condenser fans and control KW.) List efficiency rating on quote for comparison. Note, if a Chiller is available with a higher efficiency than the minimum, please supply a quote for it as an alternate. o If a chiller is not available that meets the minimum requirements,

Micro-channel condenser coils are now acceptable for use by CMS. Provide chiller submittals with quotation. All chillers larger than 130 tons must be a "Screw" type machine

please indicate such and suggest the most efficient alternative.

 Evaporator Freeze Protection Suction Line Insulation

 Wye-Delta Motor Starter Non-fused Disconnect (If required)

 Standard Ambient Operation to 32 F Service Option - Navigator Port & 115V GFI Receptacle Standard Minimum Unloading Capability (down to 15% capacity)

 Suction Service Valves Control Transformer

Coil Trim Panels, Security Grilles & Upper Hail Guards

 Navigator Display CMS will be responsible for integrating the new chillers to the existing control system. This cost may be added to the contract amount as an Allowance (CMS to provide this amount on Bid Form) amount to be provided in the contract for control integration.

 Note that the installing mechanical contractor is to provide all required control power wiring and power distribution (including breakers, disconnects, changes in wire sizes, etc.) and include these costs on their bid. Digital Communications to from new chillers to BAS system shall

consist of a BACnet IP interface. BACnet MS/TP in not acceptable. • REFER TO CHILLER SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

# **HEAT TRACE**

LEGEND

CHILLED WATER RETURN AND SUPPLY

CHILLED WATER RETURN AND SUPPLY

CONDENSER WATER RETURN AND SUPPLY

CONDENSER WATER RETURN AND SUPPLY

COOLING TOWER EXISITNG TO REMAIN

CHILLED WATER RETURN AND SUPPLY TO BE REMOVED

HOT WATER RECLAIMATION

HOT WATER RECLAIMATION

EXISTING TO REMAIN

EXISTING TO REMAIN

CHILLER EXISTING TO BE REMOVED

CONDENSER WATER RETURN AND SUPPL'S

TO BE REMOVED

BASE MOUNTED PUMP EXISTING TO REMAIN

CHILLER NEW

CHILLED WATER NEIGH

HOT WATER RECLAIMATION

TO BE REMOVED

**Maintenance Temperature, T<sub>m</sub>:** Minimum Ambient Temperature, T<sub>a</sub>: Location, Indoor/ Outdoor: Wind Speed, if applicable: Nominal Pipe/ Tubing Size, D<sub>P</sub>: **Additional Safety Factor, if required:** Thermal Insulation Type and Thickness: Watts/foot:

-20°F Outdoor 10 mph 8" Steel None Cellular Glass 8.2

# MAXIMUM PIPE/TUBING SUPPORT SPACING MATERIAL: Carbon Steel (ASTM A36) base, stand and axle with

NOTE: FOR TRAPEZE HANGER TAKE SPACING OF SMALLEST SIZE ON TRAPEZE. WHERE NEW PAD IS BEING PLACED NEXT TO EXISTING PAD. INSTALL #4 @ 48" OC 24" IN NEW PAD AND DRILL AND Gray Cast Iron (ASTM A48, Grade 30) roll. EXTEND 24" INTO EXISTING PAD @ 48" OC. MATCH ELEVATION Stainless Steel (ASTM A240, Type 304) base, stand and axle with Cast (ASTM 351, Grade CF8) roll. Black stand and roll with Electro—Galvanized (ASTM FINISH: B633) axle and hardware; or Hot-Dip Galvanized (ASTM A123) base, stand and roll with Electro-Galvanized (ASTM B633) axle and hardware. ┌45° CHAMFER CRUSHER-WELDED TO BEAM 2XØH-∼95% COMPACTED EARTH LIN GRASSED AREAS, SPRAY ROUND-UP TO KILL GRASS

EQUIPMENT EQUIP. PAD

# MOUNTING HOLES

**DETAIL** 

AIR COOLED SCREW CHILLER - BASIS OF DESIGN Job Name: CMS-Phillip O Berry Prepared For: Mike Maloney **Unit Overview** Chiller Model RTAF air-cooled screw chiller Unit Nominal Tonnage 410 nominal tons Unit efficiency High efficiency Refrigeration Capacity 400.4 tons Cooling Efficiency 10.21 EER (Btu/W-h) IPLV.IP 16.38 EER (Btu/W-h) NPLV.IP 16.38 EER (Btu/W-h) Unit Voltage 460.V/60.Hz/3 phase

Agency Listing UL listed

Refrigerant Type Refrigerant charge R-513A Pressure Vessel Code ASME pressure vessel code ASHRAE 90.1 Compliance ASHRAE 90.1 all versions up to Model Number RTAF410EUAHHXUA1N11X3NLN CCV1CAPBXXXAA1XXXX\*

**Evaporator Information Evaporator Application** Standard cooling Fluid Temperatures Flow Rate Construction Features Evaporator Leaving 44.00 F Design Flow 956.8 gpm Configuration 1 pass evaporator **Evaporator Entering** 54.00 F Min Flow 446.0 gpm Fouling Factor Fluid Pressure Drop 0.000100 hr-sq ft-deg F/ Btu Fluid Properties Fluid Type Water Design PD 13.5 ft H2O Freeze Point 32.00 F Min PD 2.98 ft H2O

ondenser Information Unit Application Low ambient Condenser Coil Option Long Life Alloy Aluminum Coil Fan Type Variable speed fans Ambient Air Temp. 95.0 F Number of Fans 24 Auxiliary Items Oil cooler

Unit Electrical Unit Voltage 460.V/60.Hz/3 phase Condenser Fan RLA (each) 2.50 A RLA/AFD input - Compressor 1A 164.00 A Frequency 60 hertz RLA - Compressor 1B 168.00 A Compressor Starter Variable speed compressors Total Power 470.5 kW RLA/AFD input - Compressor 2A 164.00 A Compressor Power 438.5 kW RLA - Compressor 2B 168.00 A Fan Power 30.40 kW Incoming Power Line Conn. Type Single point unit power Compressor 1B Y-delta 346.00 A Power Line Conn. Type Circuit breaker Compressor 1B X-line 1065.00 A Short Circuit Current Option Default amp rating Compressor 2B Y-delta 346.00 A Short Circuit Current Rating 10000. A Compressor 2B X-line 1065.00 A Single Point Power MCA 778 A Single Point Power MOP 800. A

**Physical Information**  
 Operating Weight
 22877 lb
 Circuit 1
 253.5 lb
 4.25 gal
 Length 546 in Width 87 in **Shipping Weight** 22719 lb **Circuit 2** 260.1 lb 4.28 gal Height 94 in



\*Note: at 30 feet in free field

			IPLV.II	P 16.38 EER (B1	:u/W-h)			
Load %	Cap. tons	LWT Evap F	EWT Evap F	Flow Evap gpm	WPD Evap ft H2O	Amb. F	Power kW	Eff. EE (Btu/W
100	400.4	44.00	54.00	956.8	13.5	95.0	470.5	10.21
75	300.3	44.00	51.50	956.8	13.5	80.0	253.9	14.19
50	200.2	44.00	49.00	956.8	13.6	65.0	135.2	17.76
25	100.1	44.00	46.50	956.8	13.6	55.0	62.14	19.33
AHRI Relief at 10% interval								
Load %	Cap. tons	LWT Evap F	EWT Evap F	Flow Evap gpm	WPD Evap ft H2O	Amb. F	Power kW	Eff. Ef (Btu/W
100	400.4	44.00	54.00	956.8	13.5	95.0	470.5	10.21
90	360.4	44.00	53.00	956.8	13.5	89.0	365.4	11.83
80	320.3	44.00	52.00	956.8	13.5	83.0	290.7	13.22
70	280.3	44.00	51.00	956.8	13.5	77.0	233.8	14.39
60	240.2	44.00	50.00	956.8	13.5	71.0	186.0	15.50
50	200.2	44.00	49.00	956.8	13.6	65.0	135.3	17.76
40	160.2	44.00	48.00	956.8	13.6	59.0	99.14	19.38
30	120.1	44.00	47.00	956.8	13.6	55.0	78.75	18.30
20	80.08	44.00	46.00	956.8	13.6	55.0	45.52	21.1

Standard Warranty Information for LEED Projects Refrigerant (R-513A) - ckt 1 253.5 lb ASHRAE 90.1 all versions up to 2022 Refrigerant (R-513A) - ckt 2 260.1 lb This product meets the minimum efficiency requirements of ASHRAE Standard 90.1 and CANS/CSA C743 for all versions (which are based on Rated Capacity (AHRI) 400.4 tons AHRI standard rating conditions) and, therefore, also meets the LEED

Compress Power 438.5 kW Fan Motor Power 30.40 kW Certified in accordance with the AHRI Air-Cooled Water-Chilling Packages Certification Program, which is based on AHRI Standard 550/590 (I-P) and AHRI Standard 551/591 (SI). Certified units may be found in the AHRI Directory at www.ahridirectory.org.

Cooling Efficiency 10.21 EER (Btu/W-h)

Rated Efficiency (AHRI) 10.21 EER (Btu/W-h)

Refrigeration Capacity 400.4 tons

**IPLV** 16.38 EER (Btu/W-h)

"Minimum Energy Performance" prerequisite in the Energy and

building project meets green building and performance measures.

The LEED Green Building Rating System™, developed by the U.S. Green Building Council, provides indepenent, third-party verification that a

# NOTES

Trane Select Assist

Data Generation Date: 1/9/2025

Version Number:

2025/01/09 10:42:42

Note: In Accordance with AHRI 370

Equals include Trane, Carrier, Daikin, York.

Refer to Scope of Work and Chiller Specifications for additional requirements.

PIPE AND INSULATION SCHEDULE CHECKED BY: CAD NO: BS, RM, MM 25002 ME INTERIOR EXPOSED INTERIOR CONCEALED FXTFRIOR **SYSTEM** MATERIAL PIPE SIZE CONNECTIONS INSULATION | SIZE | INSULATION | SIZE | INSULATION | SIZ SCALE: 3/10/2025 AS NOTED OPPER TYPE "L 3/4" - 1-1/2" | ASTM 88 95-5/SILFOS SOLDERED JOINTS OPPER TYPE "L" ASTM 88 95-5/SILFOS SOLDERED JOINTS B | 1 & 3 | 2" | B | 1 & 2 | 2" CHILLED WATER SCH 40 BLACK STEEL - ASTM A53 OR A120 | 3/4" - 1-1/2" | THREADED JOINTS & MALLEABLE FITTING B | 1 |1-1/2"| B | 1&3 | 2" | B | 1&2 | 2 THREADED JOINTS & MALLEABLE FITTING SCH 40 BLACK STEEL - ASTM A53 OR A120 B | 1 | 1-1/2" | B | 1 & 3 | 2" | B | 1 & 2 | 2 SCH 40 BLACK STEEL - ASTM A53 OR A120 | 2.5" AND UP |3-PASS BUTT-WELDED JOINTS B | 1 | 2 | B | 1&3 | 2" | B | 1&2 | 2"

MATERIAL ALL INSULATION MATERIALS USED IN RETURN AIR PLENUMS SHALL NOT EXCEED 50 AND FLAME SPREAD SHALL NOT EXCEED 20 PER UL 723. FIBERGLASS (JM MICRO-LOK HP OR EQUAL). PROVIDE POLYISOCYANURATE PIPE INSULATION EQUAL TO TRYMER 2000

CLOSED CELL FIBER-FREE ANTI-MICROBIAL ELASTOMERIC (ARMAFLEX OR EQUAL). INSTALL ALUMINUM JACKET ON ALL PIPING < 6' AFF. ALL INSULATION MATERIALS USED IN RETURN AIR PLENUMS SHALL NOT EXCEED 50 AND FLAME SPREAD SHALL NOT EXCEED 20 PER UL 723. JACKET

PROVIDE WITH ALL SERVICE JACKET (ASJ) WITH PREMOLDED ZESTON (OR EQUAL) PVC FITTING COVERS PROVIDE 0.016" CHILDERS ALUMINUM ROLLED JACKETING (CHILDERS OR EQUAL). FASTENED W/ ALUMINUM BANDS @ 12" O.C. FITTINGS SHALL BE COVERED WITH 2-PIECE FACTORY

PROVIDE 8 OZ CANVAS COVER SIZED WITH FOSTER 30-36 @ 50 SQ. FT/GALLON MINIMUM.

PROVIDE 2 COATS OF ARMALEX WB (OR EQUAL) WEATHER RESISTANT COATING 2 COATS OF RUST INHIBITING ENAMEL PAINT

Charlotte-Mecklenburg Schools

3/10/2025

PRELIMINARY - NOT

FOR CONSTRUCTION

AS-BUILT DRAWINGS

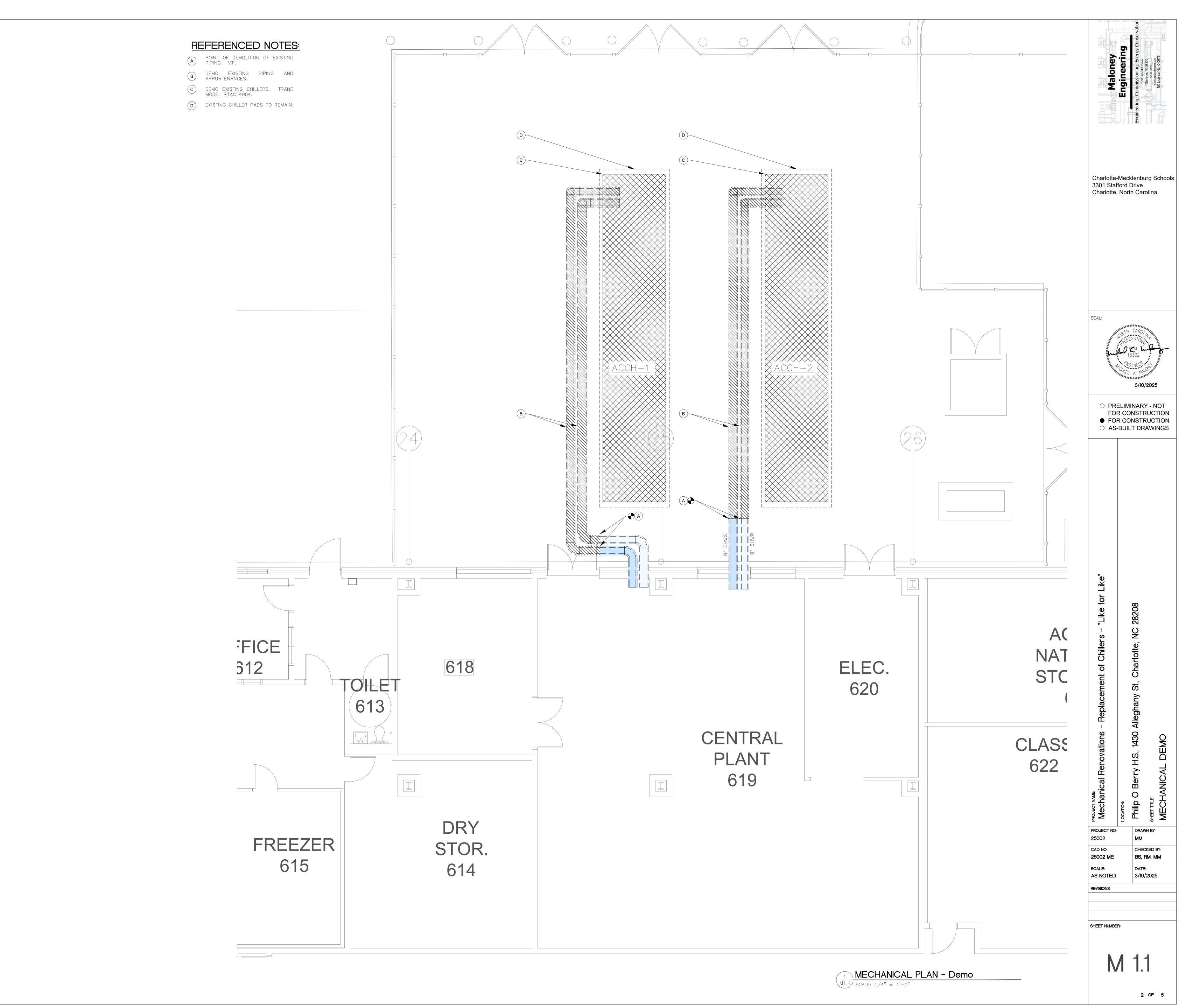
FOR CONSTRUCTION

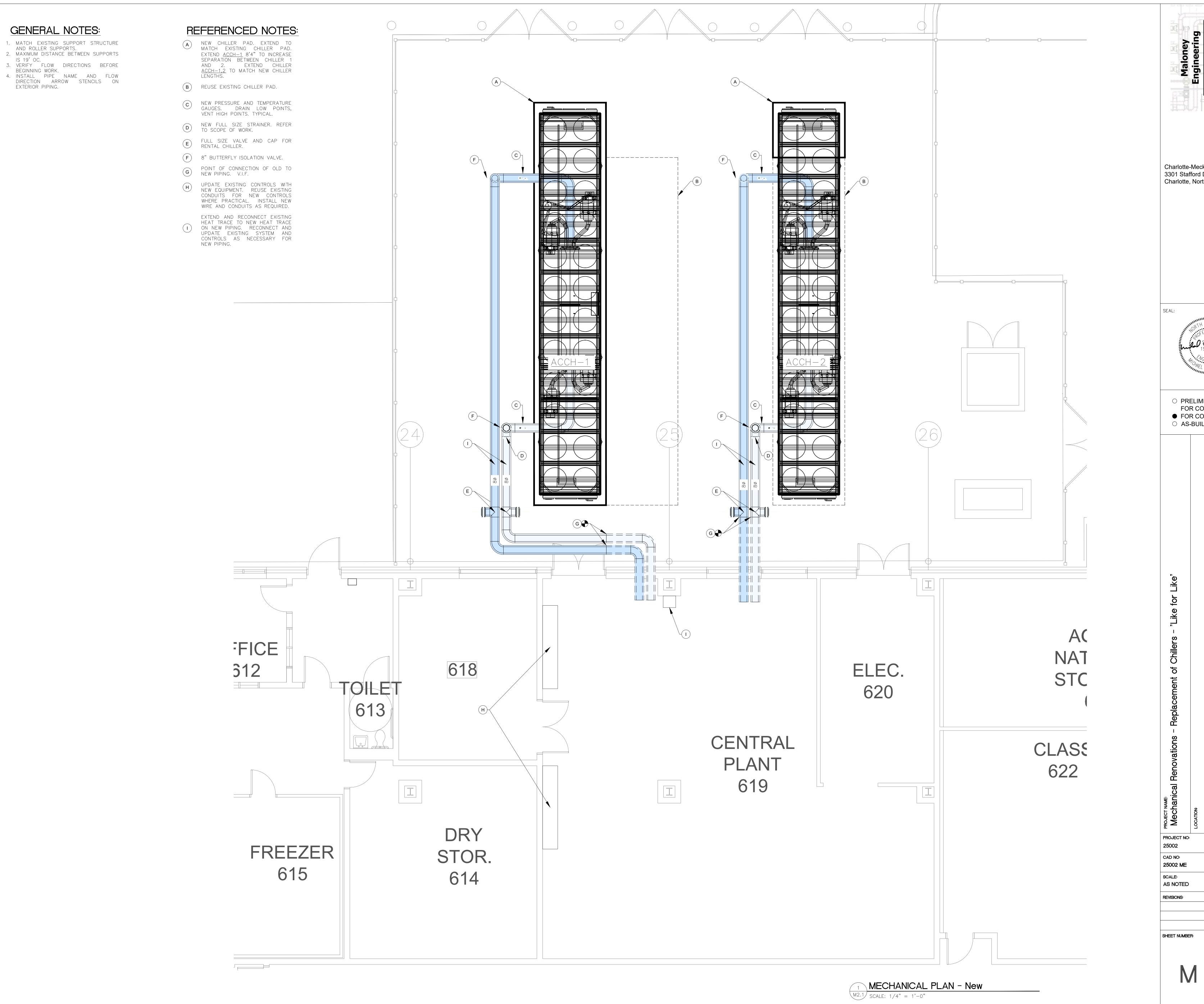
3301 Stafford Drive

Charlotte, North Carolina

SHEET NUMBER:

1 OF 5



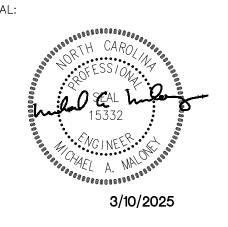


IS 19' OC.

BEGINNING WORK.

EXTERIOR PIPING.

Charlotte-Mecklenburg Schools 3301 Stafford Drive Charlotte, North Carolina



O PRELIMINARY - NOT FOR CONSTRUCTION FOR CONSTRUCTIONAS-BUILT DRAWINGS

3/10/2025

M 1.2

3 OF 5

cutout sensors.

factory of origin. A. All condenser fan TEAO motors have permanently lubricated ball bearings and

external overload protection. B. All condenser fans shall have drives to provide variable speed for optimized efficiency. Direct—drive, vertical—discharge

condenser fans shall be used. The

capacities, accessories and any special data.

1.04 VERIFICATION OF CAPACITY AND EFFICIENCY A. All proposals for chiller performance must include an AHRI approved selection method. Verification of date and version of computer program selection or catalog is available

A. Comply with manufacturer's installation instructions for rigging, unloading, and

-40°F (-40°C) to 158°F (70°C) storage temperatures for an indefinite period of

A. Provide a full parts warranty for one year from start-up or 18 months from shipment,

have screw compressor and meet the

A. Chiller shall be able to start and operate in ambient conditions down to -4% (-20%) and up to 115°F (46°C). Low ambient operation is accomplished with factory installed and tested protection. If field

B. Chiller shall be capable of operating with a leaving solution temperature range 40°F to

C. Chiller shall be capable of starting up with 95℉ (35℃) entering fluid temperature to the evaporator. Maximum water temperature that can be circulated with the Chiller not

protection and low limit control to avoid low evaporator refrigerant temperature trip—outs during critical periods of chiller operation. Whenever this control is in effect, the controller shall indicate that the chiller is in adaptive mode. If the condition exists for more than 30 seconds, a limit warning

A. Construct chiller using semi-hermetic, variable speed drive, helical rotary screw

gas cooled with robust construction and

refrigerant returning to compressor during

E. Provide compressor with automatic capacity reduction equipment consisting of capacity control via variable speed drive and/or slide valve. Compressor must start unloaded for

A. The evaporator shall be designed, tested, and stamped in accordance with ASME code for a refrigerant side working pressure of 200 psig. Waterside working pressure shall

0.75 inch (K=0.28) UV rated insulation. If the insulation is field installed, the additional money to cover material and installation costs in the field should be included in the

C. Evaporator heaters shall be factory installed and shall protect chiller down to -4°F (−20℃). Contractor shall wire separate power to energize heat tape and protect evaporator while chiller is disconnected from

D. Provide shell and tube type evaporator, seamless or welded steel construction with seamless internally and externally finned

G. Provide water drain connection, vent and fittings. Factory installed leaving water

temperature control and low temperature

H. Water connections shall be grooved pipe. I. Proof of flow shall be provided by the equipment manufacturer, mechanically installed and electrically wired, at the

without the use of codes, look-up tables, or gauges: 1. Run time.

3. Current chiller operating mode.

4. Chilled water set point and set point source.

5. Electrical current limit set point and set point source.

6. Entering and leaving evaporator water temperatures.

13. Compressor motor voltage per phase.

14. Phase reversal/unbalance/single phasing

compressor loading on high return water

and over/under voltage protection.

15. Low chilled water temperature

16. High and low refrigerant pressure

17. Load limit thermostat to limit

18. Condenser fan sequencing to

load, expansion valve pressure,

20.0il pressure control based off of

containing starters, power and control

wiring, factory wired with terminal block

power connection. Provide primary and

H. The chiller controller shall utilize a

secondary fused control power transformer.

microprocessor that will automatically take

action to prevent chiller shutdown due to

abnormal operating conditions associated

with: evaporator refrigerant temperature,

Provide the following safety controls with

indicating lights or diagnostic readouts:

1. Low chilled water temperature

2. High refrigerant pressure.

5. Loss of chilled water flow.

7. Motor current overload.

9. Over/under voltage.

used by controller.

6. Contact for remote emergency

8. Phase reversal/unbalance/single phasing.

10. Failure of water temperature sensor

11. Compressor status (on or off).

. Provide the following operating controls:

1. A variable method to control capacity in

order to maintain leaving chilled water

timer to prevent compressor from short

temperature based on PI algorithms.

Five minute solid state anti-recycle

stop—to—start time limit shall be 2

start-to-start, or greater than 2

hot gas bypass shall be provided to

temperature control in light load

2. Chilled water pump output relay that

closes when the chiller is given a signal

compressor loading on high return water

temperature to prevent nuisance trip

controller that unloads compressors to

keep head pressure under control and

help prevent high pressure nuisance trip

outs on days when outside ambient is

chiller that unloads compressors to help

prevent current overload nuisance trip

7. Condenser fan sequencing which adjusts

the speed of all fans automatically in

pressure and expansion valve pressure

differential thereby optimizing chiller

response to ambient, condensing

K. Provide user interface on the front of the

panel. If display is on the inside of the

panel, then a control display access door

shall be provided to allow access to the

user interface with a minimum of the

1. Leaving chilled water setpoint

adjustment from LCD input

3. Percent RLA output for each

4. Pressure output of condenser

5. Pressure output of evaporator

8. Current limit setpoint adjustment from

.. The chiller control panel shall provide leaving

6. Ambient temperature output

temperature output

2. Entering and leaving chilled water

display without removal of panels. Provide

5. Compressor current sensing unloader

6. Low ambient lockout control with

adjustable setpoint.

efficiency.

following features:

compressor

7. Voltage output

LCD input.

insure accurate chilled water

3. Load limit thermostat to limit

4. High ambient unloader pressure

applications.

above design.

to start.

minutes. If a greater than 5 minute

minute stop-to-start timer is included,

cycling. Compressor minimum

3. Low oil flow protection.

4. Loss of Oil diagnostic

high condensing pressure and motor current

condenser pressure, and differential

pressure to optimize chiller efficiency.

maintaining system differential pressure.

21. Compressors: Status (on/off), %RLA,

anti-short cycle timer, and automatic

condenser fan motors shall be permanent 7. Saturated evaporator and condenser magnet motors with integrated drive to provide variable speed fan control for all refrigerant temperatures. 8. Evaporator and condenser refrigerant

pressure.

protection.

protection.

temperature.

19. Display diagnostics.

compressor lead—lag.

22.0il loss indication.

overload.

protection.

shutdown.

fans. Units shall be equipped with EC condenser fan motors with permanently lubricated ball bearings and internal overload 9. Oil tank pressure. and over-current protection. Fans shall have 10. Differential oil pressure. insulation IP54 compliance. 11. Compressor motor current per phase. 2.06 CONDENSER 12. Compressor motor percent RLA.

A. Construct condenser coils of Long Life Alloy Aluminum brazed fin construction. The condenser coils shall have an integral sub-cooling circuit and shall be designed for at least 350 psig working pressure. Leak tested at 1.5 times working pressure (525 psig). Coils can be cleaned with high pressure water.

B. Condenser coils shall be transverse design. If coils are not transverse design, provide coil protection for shipping.

2.07 ENCLOSURES/CHILLER CONSTRUCTION A. Chiller panels, base rails and control panels shall be finished with a baked on powder

paint. Control panel doors shall have door B. Mount starters and Terminal Blocks in a UL 1995 rated weatherproof panel provided with full opening access doors. If a circuit breaker is chosen, it should be a lockable,

chiller indicating if power is on or off. C. The coating or paint system shall withstand 500 hours in a salt—spray fog test in accordance with ASTM B117.

through—the—door type with an operating

handle and clearly visible from outside of

2.08 CHILLER MOUNTED VARIABLE SPEED DRIVE

shown on the drawings.

A. The water chiller shall be furnished with an air cooled variable speed drive (VSD) as

B. The VSD efficiency shall be 97% or better at full speed and full load. Fundamental displacement power factor shall be a minimum of 0.96 at all loads for VSD. All other starters shall have a minimum

displacement power factor of 0.85. C. Power semi-conductor and capacitor cooling shall be from a liquid or air cooled heatsink.

E. A molded case standard interrupting capacity circuit breaker shall be factory pre-wired with terminal block power connections and equipped with a lockable external operator handle, making it available to disconnect the chiller from main power. F. A control power transformer shall be

D. Unit shall have a single point power

factory—installed and factory—wired to provide unit control power. G. Unit wiring shall run in liquid—tight conduit. H. High short circuit current rating (SCCR) of

I. Customer wired 15 amp, 115—volt GFCI convenience outlet shall be factory mounted on the exterior of the control panel.

2.09 REFRIGERANT CIRCUIT A. All chillers shall have 2 refrigeration circuits, each with one or two (manifolded) compressor(s) on each circuit.

B. Provide for refrigerant circuit: 1. Liquid line shutoff valve 2. Suction service valve 3. Discharge service valve

4. Filter (replaceable core type) 5. Liquid line sight glass. 6. Electronic expansion valve sized for maximum operating pressure

> Charging valve 8. Discharge and oil line check valves 9. High side pressure relief valve 10. Integrated oil loss sensor

C. Full operating charge of R513A and oil. 1. Provide a fully convertible and compatible next generation low GWP refrigerant chiller.

2. If the chiller cannot be factory supplied as a fully convertible and compatible next generation low GWP refrigerant chiller, then the contractor shall provide a field retrofit or a refrigerant

2.10 CONTROLS

guarantee.

A. A color, touch sensitive liquid crystal display (LCD) shall be unit mounted and a minimum of 7" diagonal. Animated graphical representations of chiller subsystem operation shall be used to enhance the user

B. Display shall consist of a menu driven interface with easy touch screen navigation to organized sub-system reports for compressor, evaporator, and motor information as well as associated

diagnostics. C. The chiller control panel shall provide password protection of all setpoints

D. The controller shall have the ability to display all primary sub-system operational parameters on dedicated trending graphs. The operator must be able to create up to 6 additional custom trend graphs, choosing up to 10 unique parameters for each graph to trend log data parameters simultaneously over an adjustable period and frequency

E. Chilled water temperature control shall be microprocessor—based, proportional and integral controller to show water and refrigerant temperature, refrigerant pressure, and diagnostics. This microprocessor—based controller is to be supplied with each chiller by the chiller manufacturer.

F. The front of the chiller control panel shall display the following in clear language,

2. Number of starts.

decibels. Sound pressure data per AHRI 370 must be provided in 8 octave band format at full load. In addition, A—weighted sound pressure at 30 feet should be provided at 100%, 75%, 50% and 25% load points to

> B. If manufacturer cannot meet the noise levels, sound attenuation devices and/or barrier walls must be installed to meet this performance level.

> > 2.12 ACCESSORIES

PART 3 - EXECUTION

2.11 SOUND

A. Chiller shall have full architectural louvers B. Chiller shall ship with elastomeric isolators

chilled water temperature reset based upon

return water temperature.

M.Digital Communications to

MS/TP in not acceptable.

BAS system shall consist of a

BACnet IP interface. BACnet

A. Acoustics: Manufacturer must provide both

sound power and sound pressure data in

identify the full operational noise envelope.

3.01 INSTALLATION A. Install in accordance with manufacturer's

requirements. 1. Level the chiller using the base rail as a reference. The chiller must be level within 1/2 in over the entire length and width. Use shims as necessary to level the chiller.

SERVICE AND START-UP automatically cycle fans in response to A. Startup — Provide all labor and materials to

perform startup. Startup shall be performed by a factory—trained technician from the original equipment manufacturer (OEM). Technician shall confirm that equipment has been correctly installed and passes specification checklist prior to equipment becoming operational and covered under OEM warranty. This shall be done in strict accordance with manufacturer's

specifications and requirements. G. On chiller, mount weatherproof control panel, Third—party service agencies are not permitted. B. A start-up log shall be furnished by the

factory approved start-up technician to document the chiller's start—up date and shall be signed by the owner or his authorized representative prior to C. Chiller manufacturers shall maintain service

capabilities no more than X miles from the D. Provide local service agent with direct

access to factory support on equipment. E. During the first 12 months of operation, a factory—trained technician from the original equipment manufacturer (OEM) shall perform quarterly on—site operating inspections to confirm the chiller's operational performance. The manufacturer shall provide the owner with a report describing the condition of the equipment, current operating log, any issues found needing to be addressed, and recommended corrective actions.

END OF SECTION

Charlotte-Mecklenburg Schools 3301 Stafford Drive Charlotte, North Carolina



O PRELIMINARY - NOT FOR CONSTRUCTION FOR CONSTRUCTION AS-BUILT DRAWINGS

PROJECT NO: 25002 ME

AS NOTED REVISIONS:

SCALE:

SHEET NUMBER:

5 OF 5

3/10/2025

### ELECTRICAL SPEC. **----**A. Provide all work and materials for the installation of complete wiring systems as specified herein and indicated on the drawings. B. All electrical permits and inspection fees shall be obtained and paid for by the electrical contractor. C. Electrical contractor shall guarantee all work and materials for one year effective \$ \$2 the day the project is accepted by the owner. D. Work shall be in accordance with the 2020 National Electrical Code, OSHA, State Building Code and all other applicable local requirements. All work shall comply with the latest addition of NECA standards of installation. E. All materials, devices, and appliances shall be new, except where otherwise noted, and shall be listed by an approved testing agency where such a listing is available. Factory assembled equipment shall be listed and labeled as an assembly, any equipment not listed shall have prior approval from the local authority having jurisdiction. All materials shall comply with applicable ANSI, IEEE and NEMA standards. F. An electrical inspection certificate shall be issued by the local inspection authorities before approval for final payment. G. Wiring shall be tested for continuity and grounds before being energized. Faulty wiring shall be replaced at no additional expense to the owner. H. The electrical contractor shall connect all equipment requiring electrical connections, unless otherwise noted, except for control wiring for equipment not provided by the electrical contractor. Control wiring for such equipment shall be provided by the respective discipline. Part 2: Raceway A. Conduit shall be zinc-coated EMT indoors. EMT fittings shall be steel screw. Minimum size shall be ½"c, unless otherwise noted. Use IMC where required by code or exposed below 8'-0". B. Support all conduits with straps and clamps. Run all conduit parallel or perpendicular to building walls. C. Junction and pull boxes shall be code gauge galvanized sheet metal. D. Liquid-tight flexible metal conduit shall be used for equipment connections, but not as a wiring method otherwise. E. Conduit installed underground or in concrete shall have joints made water-tight by use of polytetra-fluoroethylene tape. Part 3: Conductors A. All conductors shall be single conductor copper. THHN/THWN, solid for sizes #14 through #10. THHN/THWN stranded for sizes #8 and larger. 30/3 HD WP B. Branch circuits shall not be smaller than #12 AWG. Control wiring may be #14 C. Conductors shall be color coded black/red/blue for 120/208-volt systems for a, b, and c phases, respectively. D. All equipment and device terminations shall be ul listed for use with 150°c insulated conductors at their 150°c ampacity. Part 4: Disconnect Switches A. Disconnect switches shall be heavy-duty type in NEMA 1 enclosures (unless otherwise indicated), fused or non-fused as indicated. Fused switches shall have rejection-type fuse clips. Switches shall be square d, or equal. Fuses shall be class r-5, time delay. A set of 3 spare fuses of each size and type shall be furnished to the owner. Part 5: Fire Alarm System A. New devices shall be connected to the existing fire alarm system in compliance with all applicable NFPA 72 and other standards as well as the American's with disabilities act (ADA). All final connections, testing and adjustments shall be performed by or under direct supervision of an authorized factory representative. New devices shall be compatible with the existing fire alarm system. The

contractor shall field verify exact system manufacturer and type. The fire alarm supplier shall verify the existing system can accommodate the new devices prior to bid. When the existing system cannot handle the devices, the fire alarm supplier shall include in their price the addition of notification appliance circuits

A. Each bidder shall visit the project site prior to bid and familiarize himself with the

existing conditions. Failure to visit the site shall not excuse the contractor from

performing the required work nor shall it be an acceptable reason for requesting

and/or addition. The contractor shall cause as little disruption as possible to maintain the comfort and safety of the building occupants. All power outages

B. Existing portions of the facility shall remain in operation during this renovation

C. Project involves work on existing electrical panels and feeders required in operating the facility. Temporary power arrangements shall be made to serve

b) No other work shall be carried out in any area where asbestos removal is to be done by

c) If any material is encountered which the Contractor believes may contain asbestos, do not disturb it. Notify Owner's representative. Owner will provide any testing required.

a) Remove and dispose of as herein specified all equipment and materials indicated on drawings. Minor components may not be shown on drawings. Remove as necessary to present a neat and finished appearance. Remove supports, hangers, etc. and patch holes in structure. Patch structure which is exposed when components are removed. Finish to match surrounding surfaces. Nothing is to be abandoned in place unless specifically

a) The procedures used shall provide for safe conduct of the work, careful removal and disposition of materials specified to be salvaged, protection of property which is to remain

undisturbed, coordination with other work in progress, and timely disconnection of utility services. Before beginning any cutting or demolition work, the Contractor shall carefully survey the existing work and examine the drawings and specifications to determine the extent of the work. The Contractor shall take all necessary precautions to insure against damage to existing work to remain in place, to be reused, or to remain the property of the Owner, and any damage to such work shall be repaired or replaced. The Contractor shall carefully coordinate the work of this section with all other work and construct and maintain shoring, bracing and supports, as required. The Contractor shall insure that structural elements are not overloaded and be responsible for increasing structural

supports or adding new supports as may be required as a result of any cutting, removal,

b) The amount of dust resulting from demolition shall be controlled to prevent the spread

of dust to other portions of the building and to avoid creation of a nuisance in the

surrounding area. Use of water will not be permitted when it will result in, or create,

c) Utilities shall be disconnected as required. Where such disconnection will interrupt the utility services to an area not included in the contract, arrangements for such interruption

shall be made with the Owner's representative at least 72 hours in advance of the

d) The use of burning at the project site for the disposal of refuse and debris will not be

a) Existing work to remain shall be protected from damage. Work damaged by the

d) At end of each work day and during inclement weather, close exterior openings with

a) All material and equipment except where otherwise noted shall be the property and

a) Remove debris and rubbish from building regularly. Do not allow it to accumulate in

or demolition work performed under any part of this contract.

Contractor shall be repaired to match existing work.

b) Cover items to remain as necessary to protect from dust.

c) Floors to remain shall be covered to protect them from damage.

hazardous or objectionable conditions such as ice, flooding and pollution.

shall be closely coordinated with the owner's representative.

others until the asbestos removal has been accepted as complete.

(NAC) power extenders as required. Part 6: Renovation of Existing

those areas affected by this project.

a) All demolition except asbestos abatement.

**DEMOLITION** 

1. Work Included

Scope of Work

noted. Clean area. **B. Execution** 

2. Protection of Existing Work

weatherproof cover.

3. Disposition of Materials

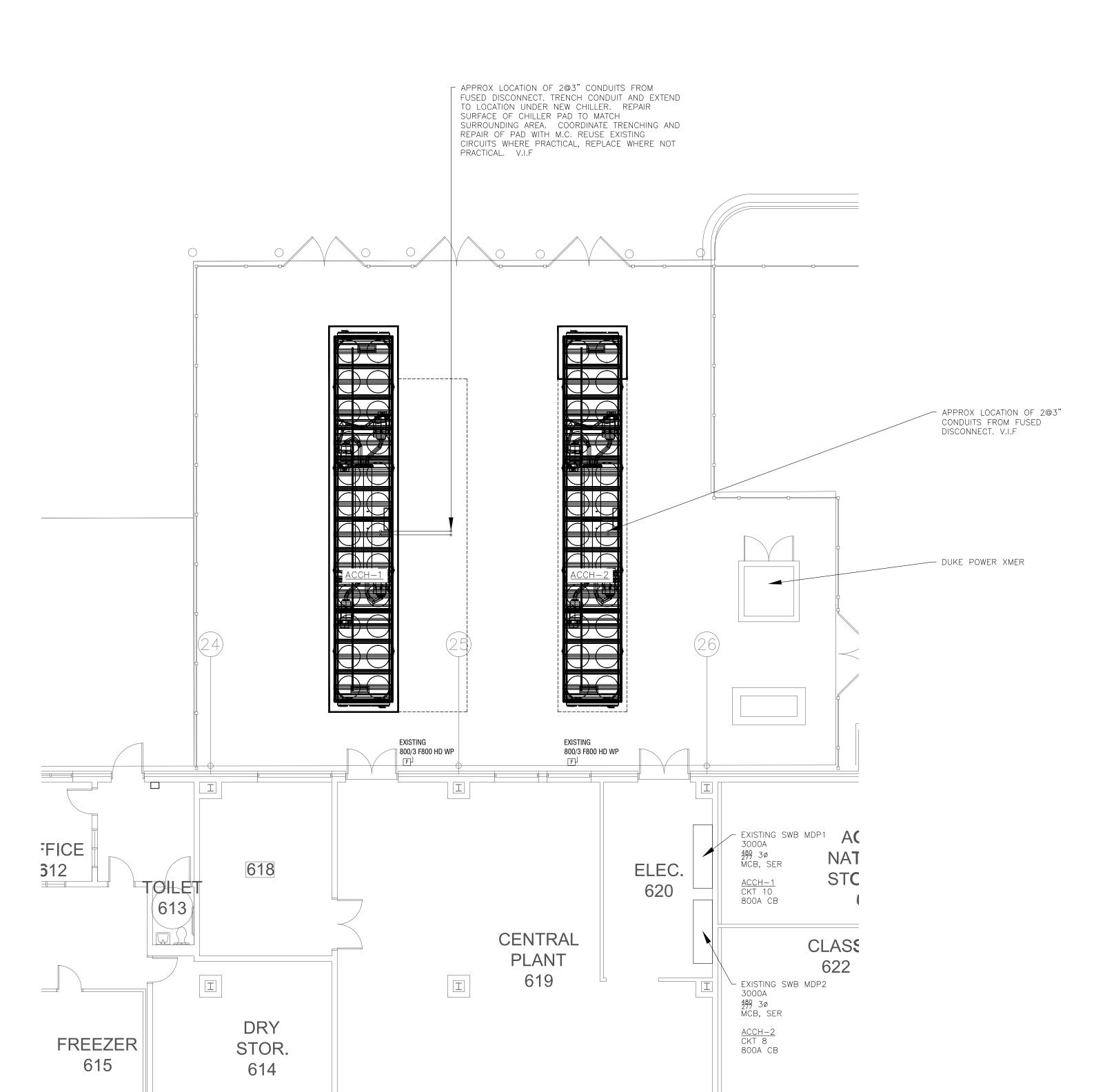
responsibility of the Contractor.

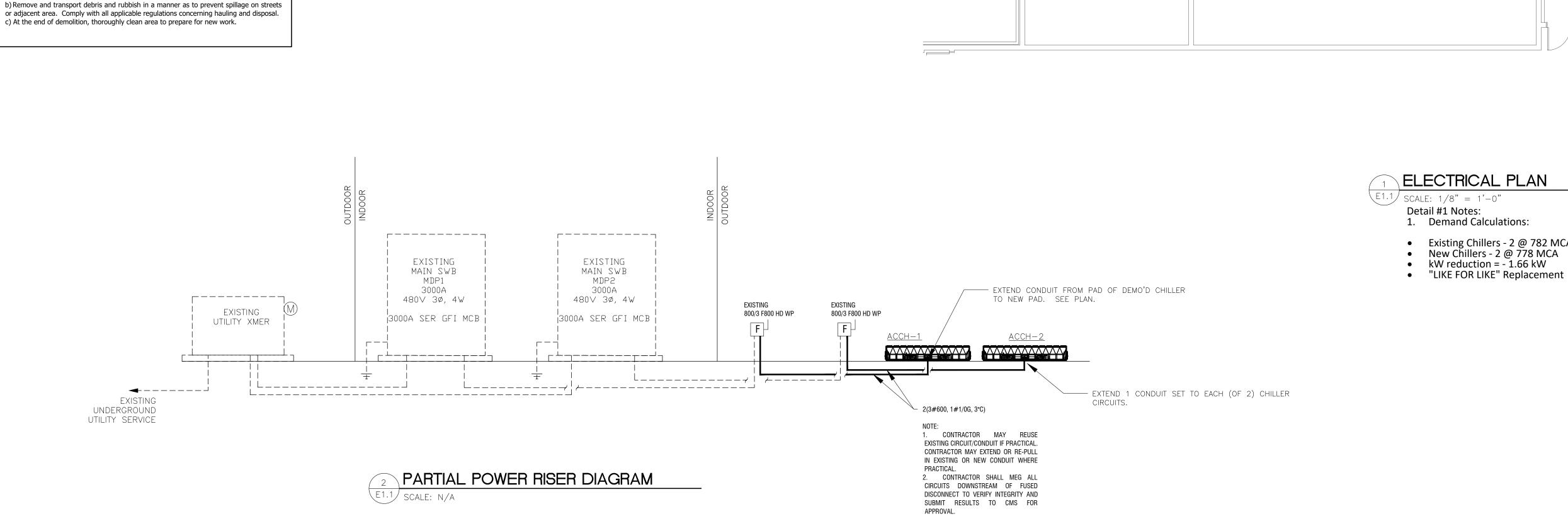
Procedures

2. Asbestos Abatement a) No Asbestos.

additions to the contract.

	CONDUIT CONCEALED IN OR ABOVE CEILING, IN OVERHEAD SLAB OR IN WALL, AS APPLICABLE.	ABBREVIATIONS
	HOMERUN TO PANELBOARD, MOTOR CONTROL CENTER, OR SWITCHBOARD AS APPLICABLE.	A = ampere
	JUNCTION BOX SIZED PER N.E.C. UNLESS OTHERWISE INDICATED.	AF = amp frame AT = amp trip ADA = Americans with Disabilities Act
	JUNCTION BOX WITH FLEX CONNECTION TO EQUIPMENT.	AFF = above finished floor ATS = automatic transfer switch
	SINGLE OR DOUBLE POLE SWITCH AS INDICATED, MOUNTED 48" AFF.	AHJ = authority having jurisdiction C = conduit D/C = disconnect
	THREE-WAY OR FOUR-WAY SWITCH AS INDICATED, MOUNTED 48" AFF.	EX = existing E.C. = empty conduit for future use EMT = electrical metallic tubing
	SWITCH AS SPECIFIED ABOVE WITH CAST WEATHERPROOF COVER AND OUTLET AND BOX ADAPTER IF REQUIRED.	EV = electric vehicle ECB = enclosed circuit breaker
,	SWITCH AS SPECIFIED ABOVE WITH OUTLETS CONTROLLED INDICATED BY BY SUBSCRIPT.	FLA = full load amps FMC = flexible metal conduit GFCI = ground fault circuit interrupter
	DUAL TECHNOLOGY OCCUPANCY SENSOR MOUNTED AT 48" AFF.	IG = isolated ground KV = kilovolt KVA = kilovolt ampere
	NEMA 5-20R DUPLEX CONVENIENCE RECEPTACLE MOUNTED 20", UNLESS NOTED OTHERWISE. NEMA 5-20R QUAD CONVENIENCE RECEPTACLE MOUNTED 20", UNLESS NOTED OTHERWISE.	KCMIL = thousand circular mils  KW = kilowatt  LT = liquid tight flexible metal conduit
	NEMA 5-20R DUPLEX CONVENIENCE RECEPTACLE MOUNTED 48" AFF OR BACKSPLASH.	MCB = main circuit breaker MCC = motor control center
	RECEPTACLE AS SPECIFIED ABOVE EXCEPT WITH INTEGRATED GROUND FAULT CIRCUIT INTERRUPTER (GFCI).	MLO = main lug only MTS = manual transfer switch N/A = not applicable
	GFCI RECEPTACLE SIMILAR TO THOSE SPECIFIED ABOVE EXCEPT U.L. "WR" (WEATHER-RESISTANT) LISTED AND PROVIDED WITH A WEATHERPROOF COVER.	NEC = National Electrical Code NTS = not to scale NW = Newφ = phase
	NEMA 5-20R RECEPTACLE TO POWER ELECTRIC WATER COOLER (WHERE APPLICABLE). FURNISH GFCI TYPE DEVICE AT UNIT. COORDINATE EXACT COORDINATE EXACT PLACEMENT WITH PLUMBING CONTRACTOR & LOCAL CODE ENFORCEMENT.	P = pole (3-pole, 2-pole, 1-pole)  RM = Remain  RL = Relocate
	FUSIBLE OR NON-FUSIBLE DISCONNECT FURNISHED WITH EQUIPMENT UNDER OTHER DIVISIONS OF THESE SPECIFICATIONS. TERMINATE WIRING ON LINE SIDE OF DISCONNECT.	RV = Remove TYP = typical
	NON-FUSIBLE DISCONNECT. NUMERALS INDICATE SIZE AND POLES. WP INDICATES NEMA 3R ENCLOSURE OR WITH OTHER ENCLOSURE AS INDICATED.	V = volt VFD = variable frequency drive U.O.N. = unless otherwise noted
	FUSIBLE DISCONNECT. NUMERALS INDICATE SIZE, POLES, AND FUSETRON SIZE. WP INDICATES NEMA 3R ENCLOSURE OR WITH OTHER ENCLOSURE AS INDICATED.	W = wire (3W=3-wire system, etc) WP = weatherproof
	CIRCUIT BREAKER NUMERALS INDICATE AMPERE RATING, POLES, AND FRAME. WP INDICATES 3R ENCLOSURE OR WITH OTHER ENCLOSURE AS INDICATED.	XFMR = transformer 3R = NEMA 3R enclosure
	MOTOR RATED 1-POLE SWITCH.	
	CEILING MOUNTED OCCUPANCY SENSOR, WITH DUAL TECHNOLOGY CAPABILITES. AUTO ON/OFF. FIELD CHANGEABLE TO VACANCY SENSOR.	
	WALL OUTLET WITH DIRECT CONNECTION TO KITCHEN EQUIPMENT	
	ENCLOSED CIRCUIT BREAKER. VOLTAGE, AMPERAGE, AND ENCLOSURE TYPE AS NOTED ON DRAWINGS	
	120 OR 240-VOLT, SINGLE PHASE MOTOR, HORSEPOWER AS INDICATED.	
	208 OR 240-VOLT, THREE PHASE MOTOR, HORSEPOWER AS INDICATED.	
		1





 Existing Chillers - 2 @ 782 MCA New Chillers - 2 @ 778 MCA

CAD NO: CHECKED BY: 25002 ME BS, RM, MM SCALE: AS NOTED 3/10/2025 REVISIONS:

ELECTRICAL GENERAL NOTES:

1. LABEL EXISTING ELECTRICAL PANEL

CIRCUITS - NEW AND EXISTING - TO

MATCH CONDITIONS AT THE COMPLETION

OF ALL WORK. LABEL PANEL AND CIRCUIT

2. EXISTING CONDITIONS WERE DETERMINED

3. MINIMUM CIRCUIT RUN IS 2/12, 1#12G,

4. VERIFY ALL NEW EQUIPMENT VOLTAGE,

PHASE, POWER, METHODS OF CONNECTION,

ETC. WITH EQUIPMENT MANUFACTURER

BEFORE BEGINNING WORK. INSTALL PER

3"C FOR 20A, 1P CIRCUIT BREAKER.

MANUFACTURER'S RECOMMENDATIONS.

5. CONTRACTOR MAY RE-USE EXISTING WIRE

6. DEMO ALL EXISTING CIRCUITS THAT ARE

7. ALL ELECTRICAL MATERIALS, DEVICES,

AND CONDUIT TO THE EXTENT PRACTICAL.

ALL UNUSED CONDUCTORS SHALL BE

NOT BEING RE-USED. VERIFY ALL

APPLIANCES, AND EQUIPMENT SHALL BE

LABEL/LISTED BY UL OR A NORTH

CAROLÍNA APPROVED THIRD PARTY TESTING

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3/10/2025

O PRELIMINARY - NOT

FOR CONSTRUCTION

FOR CONSTRUCTION AS-BUILT DRAWINGS

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Charlotte, North Carolina

CONFLICTS.

CIRCUITS IN FIELD.

NUMBERS ON ALL DEVICES - NEW AND

FROM SITE SURVEY. FIELD VERIFY ALL

EXISTING CONDITIONS AND NOTIFY

ENGINEER IMMEDIATELY OF IRRECONCILABLE

4 OF 5

SHEET NUMBER: