HEATING VENTILATING AND AIR CONDITIONING

General

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 manual.
C. Electrical: all electrical equipment shall be ul listed and approved.
D. Record drawings: contractor shall maintain an accurate record of all as-built conditions during the progress of the work and turn them over to the owner at completion.
E. Operating manuals: contractor shall furnish owner 3 sets of operation and 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

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.

PIPING

A. Steel piping shall be black steel, a53 or a120, buttwelded or threaded end. Copper piping shall be hard drawn, seamless copper pipe and fittings, ASTM b88, 95-5/silfos soldered joints. Welded nipples on branch connections are not allowed. Minimum design of all components of the piping system is 125 psig and 250° f. Provide dielectric fittings where copper & ferrous metals are joined. Gas piping shall be sch. 40 black steel. Steam condensate piping shall be sch. 80 black steel.
B. Ball valves shall be 400 psi WOG. Balancing valves shall be B&G circuit setters.
C. Clean and flush all piping systems before filling. Test systems at 100 psig for 30 minutes.
D. Install air vents at all high points and drains at all low points.
E. Install piping in neat and orderly manner. All lines shall be parallel with building walls. Provide space for insulation.
F. Identify pipe w/ stencils every 40 feet and at least once in each room. Show flow direction.
G. Provide initial water treatment for systems. Maintain treatment until 30 days after substantial completion.
H. Piping on roof shall be supported by Tolco classic 50H6 pipe supports.
I. Pipe size - maximum hanger spacing
   a. 1/2", 3/4" - 6'
   b. 1", 1-1/4" - 8'
   c. 1-1/2", 2" - 10'
   d. 2-1/2", 3" - 12'
   e. 4" and larger - 16'

INSULATION

A. PIPING - INSIDE
   a. Insulation shall be fiberglass (JM micro-LOK hp or equal) or Dow Trymer 9501 modified polyisocyanurate cellular plastic with "k" factor of 0.14. Smoke density shall not exceed 50 and flame spread shall not exceed 20 per ul 723. All insulation shall have 8 oz canvas cover sized with foster 30-36 @ 50 sq. Ft/gallon minimum. Insulation shall be minimum of 1.5" thick. Insulate all pipe, valves, fittings, equipment, etc. There shall be no condensation on the chilled water piping system.
B. PIPING - OUTSIDE
   a. Same as inside except insulation shall be 2" thick. Provide 0.016" Childers aluminum rolled jacketing fastened w/ aluminum bands @ 12" o.c. fittings shall be covered with 2-piece factory fabricated jackets. Refer to refrigerant piping for refrigerant piping specification. JM micro-LOK hp or equal.

Execution

Installation

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 diffusers and seal with rubber gaskets to prevent leakage.
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 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) Motor speed, fan speed and amp reading for each fan.
      3) Average velocity, EAT, LAT, and pressure drop across each coil.
      4) Water gpm @ each pump, pump pressures, balance valve position, motor amps.
      5) 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 owner.
F. Instruction: Upon completion of all work and balancing, thoroughly train and instruct owner's personnel in all aspects of the operation and 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 be permitted.
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 and responsibility of the Contractor.
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 and disposal.
   c) At the end of demolition, thoroughly clean area to prepare for new work.

HEAT TRACING

PART 1 - GENERAL

1.1 SUMMARY

A. Performance Requirements: Heat trace system shall protect piping systems against freezing with specified cable, two inch thick glass fiber insulation, and at ambient temperature down to 0 deg F.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Heating Cable:
   1. Flat, flexible, low heat density, self-regulating, parallel circuit heat trace cable with overall jacket, rated at 8 watts/ln ft. at 120 volts AC and at 50 deg F, and can be cut in field to any length without effect on operation. UL listed system.
   2. Quality Standard: Type 3XL by Raychem Corp.

2.2 ACCESSORIES

A. Connection, Splice, and Accessory Kits:
   1. Class Two Quality Standard. See Section 01 6000.
      a. Type XLK by Raychem Corporation, Menlo Park, CA www.tycothermal.com.

B. Control Thermostat: Surface mounted with ambient sensor, non-adjustable setpoint of 40 deg F, enclosure with conduit opening, rated at 22 amps at 120 volt AC, and UL listed.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install cable for full length of piping before installing piping insulation. Tape at 2 foot intervals on straight pipe and on each side of valves, fittings, and piping accessories with glass cloth adhesive tape furnished by Heat Trace Cable Manufacturer. Make splices, tee connections, end seals, and power connections with accessory kits furnished by Heat Trace Cable Manufacturer.
B. Route 120 volt power connections to heating cable through control thermostat and energize only when room ambient temperature is at 40 deg F, fixed setpoint of thermostat, and lower.
C. Mount control thermostat on wall near piping. Coil and tape sensor capillary. Secure sensor element and coiled capillary to wall with metal clips to prevent damage and to accurately sense room temperature near piping.
D.

LEGEND

- CHILLED WATER RETURN AND SUPPLY TO BE REMOVED
- CHILLED WATER RETURN AND SUPPLY EXISTING TO REMAIN
- CHILLED WATER RETURN AND SUPPLY NEW
- HOT WATER RECLAIMATION TO BE REMOVED
- HOT WATER RECLAIMATION EXISTING TO REMAIN
- HOT WATER RECLAIMATION NEW
- CONDENSER WATER RETURN AND SUPPLY TO BE REMOVED
- CONDENSER WATER RETURN AND SUPPLY EXISTING TO REMAIN
- CONDENSER WATER RETURN AND SUPPLY NEW
- COOLING TOWER EXISITNG TO REMAIN
- BASE MOUNTED PUMP EXISTING TO REMAIN
- CHILLER EXISTING TO BE REMOVED
- CHILLER NEW

NORTH CAROLINA STATE BUILDING CODE

MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT
METHOD OF COMPLIANCE:
PRESCRIPTIVE [X] ENERGY COST BUDGET [ ]

THERMAL ZONE 3A

EXTERIOR DESIGN CONDITIONS
- winter dry bulb 18° F.
- summer dry bulb 95° F.

INTERIOR DESIGN CONDITIONS
- winter dry bulb 72° F.
- summer dry bulb 75° F.
- relative humidity 50% R.H.

BUILDING HEATING LOAD NO CHANGE BTUH (peak)
BUILDING COOLING LOAD NO CHANGE BTUH (peak)

MECHANICAL SPACING CONDITIONING SYSTEM

UNITARY
- description of unit SEE SCHEDULES
- heating efficiency SEE SCHEDULES
- cooling efficiency SEE SCHEDULES
- heat output of unit SEE SCHEDULES
- cooling output of unit SEE SCHEDULES

BOILER
- total boiler output of unit N/A

CHILLER
- total chiller capacity N/A

LIST EQUIPMENT EFFICIENCIES

Equipment schedules with motors (mechanical systems).
- motor horsepower SEE SCHEDULES
- number of phases SEE SCHEDULES
- motor efficiency SEE SCHEDULES
- motor type SEE SCHEDULES
- # of poles SEE SCHEDULES

DESIGNER STATEMENT: 1

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: NAME: Michael A. Maloney, PE
TITLE: MECHANICAL ENGINEER

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HEAT TRACE

Maintenance Temperature, T_m:	40°F
Minimum Ambient Temperature, T_a:	0°F
Location, Indoor/ Outdoor:	Outdoor
Wind Speed, if applicable:	10 mph
Nominal Pipe/ Tubing Size, D_p:	8" Steel
Additional Safety Factor, if required:	None
Thermal Insulation	2"
Type and Thickness:	Cellular Glass
Watts/foot:	8.2

HEAT TRACE 1 | NEW CT ELEVATION 2

COOLING TOWER - BASIS OF DESIGN

MARLEY

Open Cooling Tower Datasheet

Job Information

Selected by

Air Carolinas
9006 Perimeter Woods Dr., Suite E
Charlotte, North Carolina 28216

Sam Braddock
7148337069
sbraddock@insightusa.com

Marley NC8403QAN2

Marley NC Steel Crossflow Induced Draft Double-Flow Open Cooling Tower
Standard Low Sound (A)
https://spxcooling.com/cooling-towers/marley-nc/

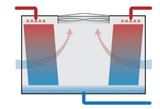
Selection

Model	NC8403QAN2
Number of Cells	2
Capacity	110.4%
ASHRAE 90.1 Eff. (gpm/Hp)	68.1
Fill Type	MX75

This selection satisfies your design conditions.

Design Conditions

	Water
Fluid	
Total Flow (gpm)	2010
HWT (°F)	95
CWT (°F)	85
WBT (°F)	78
Total Heat Load (Btu/h)	9987400



Mechanical

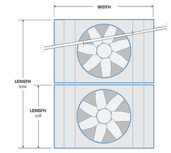
	Per Cell	Total
Fan Type	Low Sound	
Fans	1	2
Fan Speed (rpm)	434	
Fan Motor Speed (rpm)	1800	
Fan Motor Nameplate (Hp)	25	50
Fan Motor Rated (BHp)	25	50
Fan Motor Required (BHp)*	14.72	29.44
Airflow (cfm)	93733	187470

** Fan Motor Required power assumes variable speed operation.*

Weights / Dimensions (options NOT included, refer to drawings)

	Per Cell	Total
Width	18'-2"	18'-2"
Length	8'-4 ¾"	17'-1"
Height	11'-11 ¾"	11'-11 ¾"
Shipping Weight (lb)	7089	14180
Heaviest Section (lb)	7089	7089
Max Operating Weight (lb)	15490	30980
Clearance Solid Wall *	5'-8 ¾"	
Clearance 50% Open Wall *	3'-5 ¼"	

** Air inlet clearances with no performance impact; reduced if tower elevated*



Plan View

Stainless Steel Cooling Tower basin.

Other Data

Static Lift (ft)	12.2
Distribution Head Loss (ft)	NA
Evaporation, 50% RH (gpm)	20.8

Heater Sizing (to prevent collection basin freezing during shutdown)

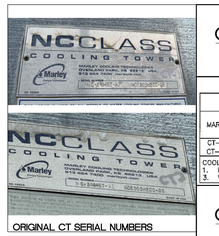
kW/Cell	15	12	9	7.5	6	4.5
Ambient (°F)	-21.1	-8.11	4.87	11.4	17.8	24.3

COOLSPEC Version 8.3.3

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NOTES:

1. Equals include BAC, Evapco and Marley.
2. Refer to Scope of Work and Cooling Tower Specifications for additional requirements.
3. New CTs shall match existing CT footprint, Pipe Connections, Weights, Electrical Connections, GFIs, etc.
4. Re-use and reconnect to existing CT fan VFDs.
5. Ladder extension down to grade level.



ORIGINAL CT SERIAL NUMBERS

ORIGINAL COOLING TOWER - 2006 FOR INFORMATION ONLY

COOLING TOWER SCHEDULE

MARK	BASIS OF DESIGN MANUF.	MODEL-SIZE	GPM	MIN. CAP. (TONS)	ENT/ AIR WBT (°F)	WATER CONDITION ENT (°F)	LVG (°F)	PRESSURE DROP (PSI)	BASIN HTR. (KW)	FAN MOTOR (HP)	ELECTRICAL V/Ø/HZ	CONTROL	REMARKS
CT-1	BAC	350	1,155	375	78	95	85	6.0	12	25	460/3/60	VFD-19	1,2,3
CT-2	BAC	350	1,155	375	78	95	85	6.0	12	25	460/3/60	VFD-20	1,2,3

COOLING TOWER SCHEDULE REMARKS:
1. UNIT SHALL HAVE TWO POINT POWER CONNECTION. 2. BASIN HTR SHALL BE PROTECTED BY GFI.
3. VFD FURNISHED BY HVAC CONTRACTOR.

ORIGINAL COOLING TOWER - PURCHASE INFO 2004 FOR INFORMATION ONLY

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View Service Record 248457A1

Orig. Order# : 248457A1
User Name : AUDREY KELL HIGH SCHOOL
Location : CHARLOTTE, NC
Cust Twr Name :
Manufacturer : MARLEY
Model : NC8303H-2CS
Specification :
 # Towers : 1
 # Cells : 2

Design Flow Per Tower (gpm) : 2010
Hot Water (F) : 95
Cold Water (F) : 85
Wet Bulb (F) : 78
Dry Bulb (F) :

Tower Destroyed : N
Perf Test : N

Warranty : STANDARD

Year Booked : 2004
P.O. Date : 09/02/2004
P.O. # : M2630
Final Ship : 01/24/2005

Motor HP :
Fan BHP :
Fan RPM :
Fan Pitch :

Additive Type :
Additive % :

NOTE: ORIGINAL PURCHASE SPECS ARE AVAILABLE FROM MARLEY THRU SERIAL NUMBERS ON COOLING TOWERS.

PIPE AND INSULATION SCHEDULE

SYSTEM	MATERIAL	PIPE SIZE	CONNECTIONS	INTERIOR CONCEALED INSULATION MATERIAL	JACKET	SIZE (IN)	INTERIOR EXPOSED INSULATION MATERIAL	JACKET	SIZE (IN)	EXTERIOR INSULATION MATERIAL	JACKET	SIZE (IN)
CONDENSER WATER	COPPER TYPE "L"	3/4" - 1-1/2"	ASTM 88 95-5/SILFOS SOLDERED JOINTS	B	1	1-1/2"	B	1 & 3	2"	B	1 & 2	2"
	COPPER TYPE "L"	2"	ASTM 88 95-5/SILFOS SOLDERED JOINTS	B	1	2"	B	1 & 3	2"	B	1 & 2	2"
	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"
	SCH 40 BLACK STEEL - ASTM A53 OR A120	2"	THREADED JOINTS & MALLEABLE FITTING	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.**
A — FIBERGLASS (JM MICRO-LOK HP OR EQUAL).
B — PROVIDE POLYISOCYANURATE PIPE INSULATION EQUAL TO TRYMER 2000
C — CLOSED CELL FIBER-FREE ANTI-MICROBIAL ELASTOMERIC (ARMAFLEX OR EQUAL).
* — INSTALL ALUMINUM JACKET ON ALL PIPING < 6' AFF.

JACKET — **ALL INSULATION MATERIALS USED IN RETURN AIR PLENUMS SHALL NOT EXCEED 50 AND FLAME SPREAD SHALL NOT EXCEED 20 PER UL 723.**
1 — PROVIDE WITH ALL SERVICE JACKET (ASJ) WITH PREMOLDED ZESTON (OR EQUAL) PVC FITTING COVERS
2 — 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 FABRICATED JACKETS.
3 — PROVIDE 8 OZ CANVAS COVER SIZED WITH FOSTER 30-36 @ 50 SQ. FT/GALLON MINIMUM.
4 — PROVIDE 2 COATS OF ARMALEX WB (OR EQUAL) WEATHER RESISTANT COATING
5 — 2 COATS OF RUST INHIBITING ENAMEL PAINT

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27616
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CMS Charlotte-Mecklenburg Schools

Charlotte-Mecklenburg Schools
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Charlotte, North Carolina

SEAL:

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 15332 MICHAEL A. MALONEY

10/27/2026

- ○ PRELIMINARY - NOT FOR CONSTRUCTION
- ● FOR CONSTRUCTION
- ○ AS-BUILT DRAWINGS

PROJECT NAME: Mechanical Renovations - Replacement of Cooling Towers - "Like for Like"
LOCATION: Ardrey Kell HS, 10220 Ardrey Kell Rd, Charlotte, NC 28277
SHEET TITLE: MECH/ELEC SCHEDULES, DETAILS, SPECS

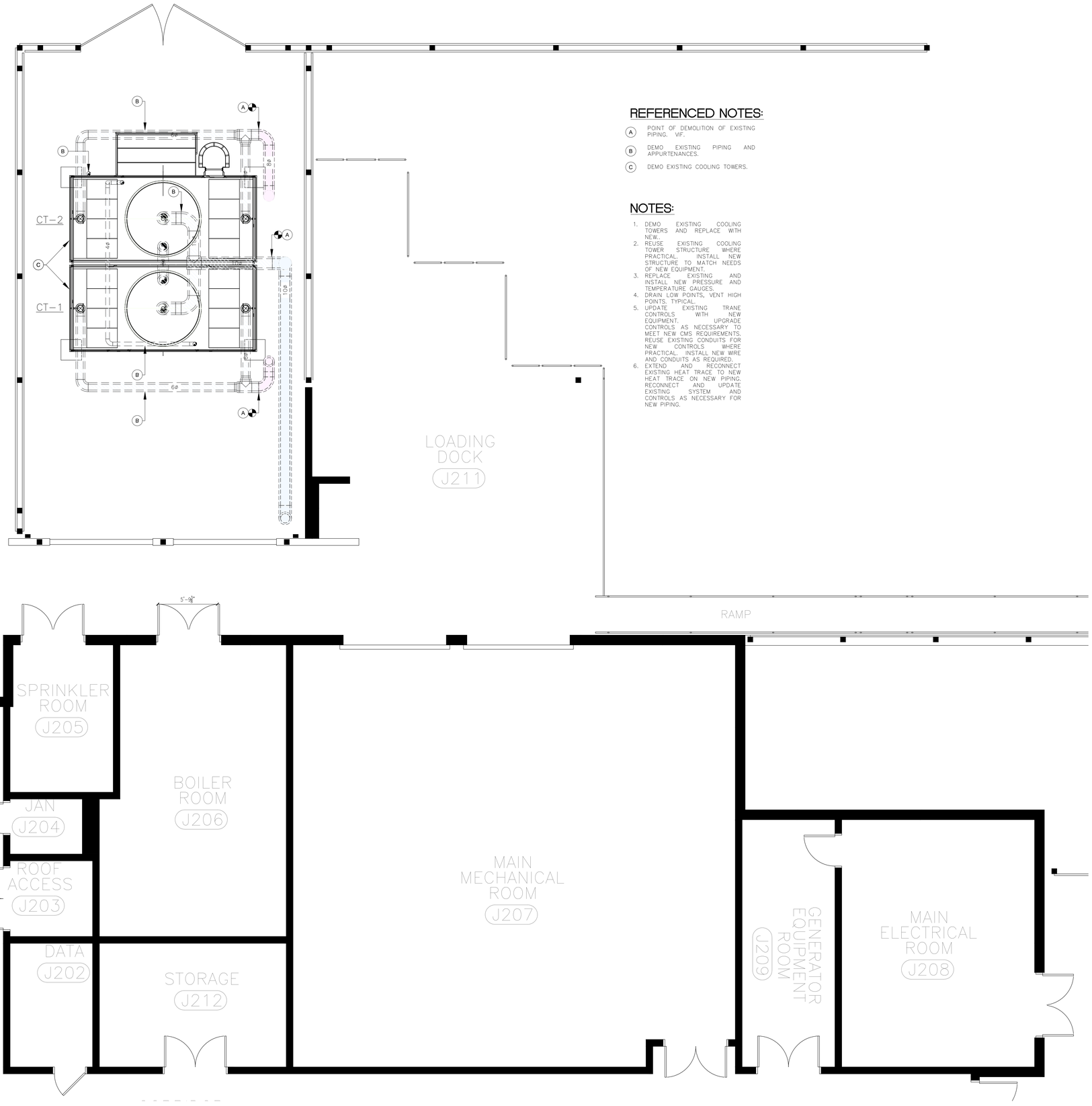
PROJECT NO: 26017	DRAWN BY: MM
CAD NO: 26017 ME	CHECKED BY: RM, MM
SCALE: AS NOTED	DATE: 10-27-2026
REVISIONS:	

SHEET NUMBER: M 0.1

1 OF 5



EXISING CTs - Demo and Replace



1 M1.1 MECHANICAL PLAN - Demo
SCALE: 1/4" = 1'-0"

REFERENCED NOTES:

(A) POINT OF DEMOLITION OF EXISTING PIPING. VIF.

(B) DEMO EXISTING PIPING AND APPURTENANCES.

(C) DEMO EXISTING COOLING TOWERS.

NOTES:

1. DEMO EXISTING COOLING TOWERS AND REPLACE WITH NEW.
2. REUSE EXISTING COOLING TOWER STRUCTURE WHERE PRACTICAL. INSTALL NEW STRUCTURE TO MATCH NEEDS OF NEW EQUIPMENT.
3. REPLACE EXISTING AND INSTALL NEW PRESSURE AND TEMPERATURE GAUGES.
4. DRAIN LOW POINTS, VENT HIGH POINTS. TYPICAL.
5. UPDATE EXISTING TRANE CONTROLS WITH NEW EQUIPMENT. UPGRADE CONTROLS AS NECESSARY TO MEET NEW CMS REQUIREMENTS. REUSE EXISTING CONDUITS FOR NEW CONTROLS WHERE PRACTICAL. INSTALL NEW WIRE AND CONDUITS AS REQUIRED.
6. EXTEND AND RECONNECT EXISTING HEAT TRACE TO NEW HEAT TRACE ON NEW PIPING. RECONNECT AND UPDATE EXISTING SYSTEM AND CONTROLS AS NECESSARY FOR NEW PIPING.

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704-599-4930
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Charlotte-Mecklenburg Schools
3301 Stafford Drive
Charlotte, North Carolina

SEAL:

NORTH CAROLINA PROFESSIONAL 15332 ENGINEER MICHAEL A. MALONEY

10/27/2026

- ○ PRELIMINARY - NOT FOR CONSTRUCTION
- ● FOR CONSTRUCTION
- ○ AS-BUILT DRAWINGS

PROJECT NAME: Mechanical Renovations - Replacement of Cooling Towers - "Like for Like"

LOCATION: Ardrey Kell H.S., 10220 Ardrey Kell Rd. Charlotte, NC 28277

SHEET TITLE: MECHANICAL DEMO

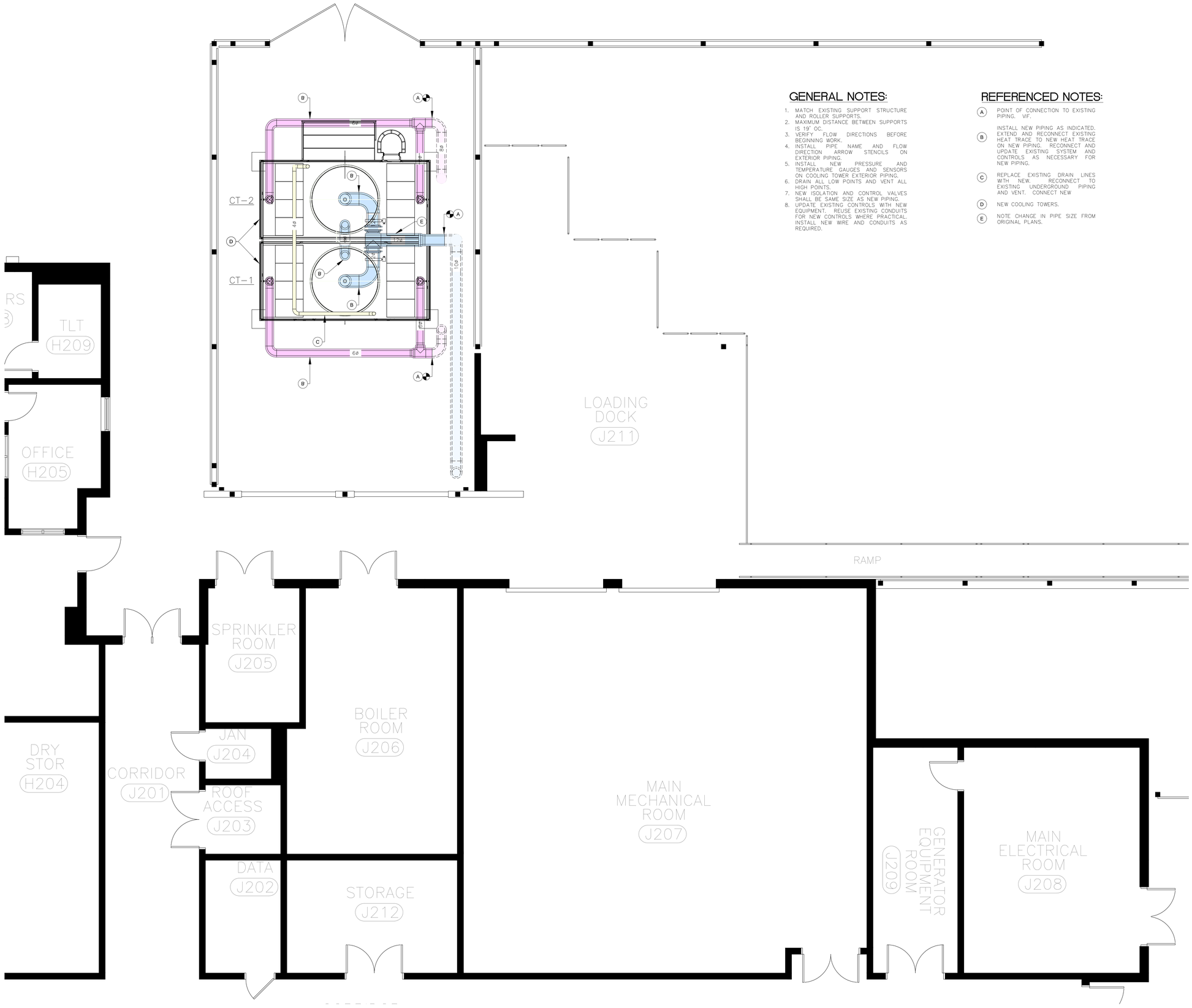
PROJECT NO:	DRAWN BY:
26017	MM
CAD NO: 26017 ME	CHECKED BY: RM, MM
SCALE: AS NOTED	DATE: 10-27-2026

REVISIONS:

SHEET NUMBER:

M 1.1

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GENERAL NOTES:

1. MATCH EXISTING SUPPORT STRUCTURE AND ROLLER SUPPORTS.
2. MAXIMUM DISTANCE BETWEEN SUPPORTS IS 19' OC.
3. VERIFY FLOW DIRECTIONS BEFORE BEGINNING WORK.
4. INSTALL PIPE NAME AND FLOW DIRECTION ARROW STENCILS ON EXTERIOR PIPING.
5. INSTALL NEW PRESSURE AND TEMPERATURE GAUGES AND SENSORS ON COOLING TOWER EXTERIOR PIPING.
6. DRAIN ALL LOW POINTS AND VENT ALL HIGH POINTS.
7. NEW ISOLATION AND CONTROL VALVES SHALL BE SAME SIZE AS NEW PIPING.
8. UPDATE EXISTING CONTROLS WITH NEW EQUIPMENT. REUSE EXISTING CONDUITS FOR NEW CONTROLS WHERE PRACTICAL. INSTALL NEW WIRE AND CONDUITS AS REQUIRED.

REFERENCED NOTES:

- (A) POINT OF CONNECTION TO EXISTING PIPING. VIF.
- (B) INSTALL NEW PIPING AS INDICATED. EXTEND AND RECONNECT EXISTING HEAT TRACE TO NEW HEAT TRACE ON NEW PIPING. RECONNECT AND UPDATE EXISTING SYSTEM AND CONTROLS AS NECESSARY FOR NEW PIPING.
- (C) REPLACE EXISTING DRAIN LINES WITH NEW. RECONNECT TO EXISTING UNDERGROUND PIPING AND VENT. CONNECT NEW
- (D) NEW COOLING TOWERS.
- (E) NOTE CHANGE IN PIPE SIZE FROM ORIGINAL PLANS.

M2.1 MECHANICAL PLAN - New
SCALE: 1/4" = 1'-0"

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10/27/2026

- ○ PRELIMINARY - NOT FOR CONSTRUCTION
- ● FOR CONSTRUCTION
- ○ AS-BUILT DRAWINGS

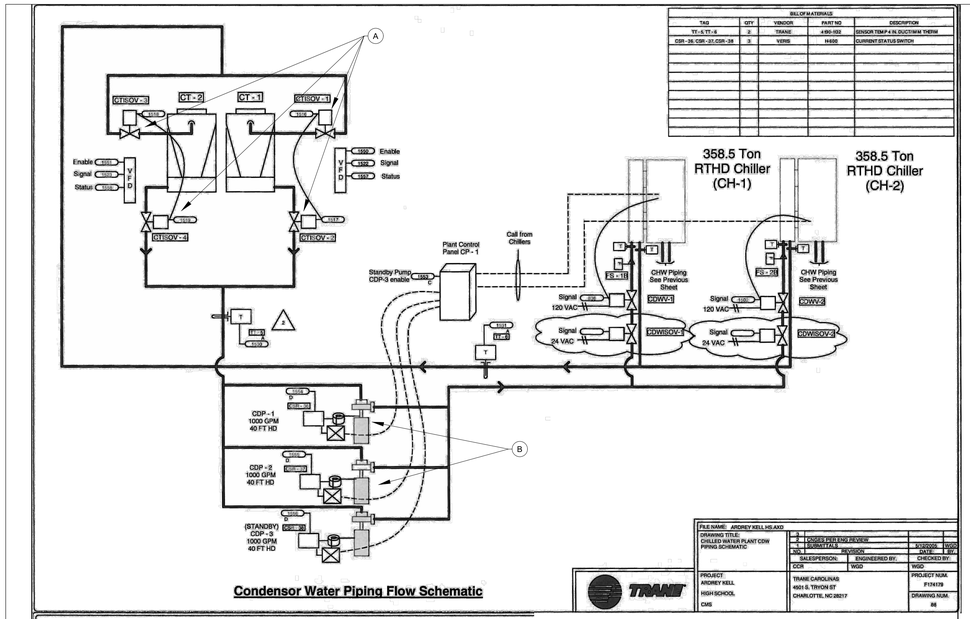
PROJECT NAME: Mechanical Renovations - Replacement of Cooling Towers - "Like for Like"
LOCATION: Ardrey Kell H.S. 10220 Ardrey Kell Rd, Charlotte, NC 28277
SHEET TITLE: MECHANICAL PLAN - NEW

PROJECT NO: 26017	DRAWN BY: MM
CAD NO: 26017 ME	CHECKED BY: RM, MM
SCALE: AS NOTED	DATE: 10-27-2026

REVISIONS:

SHEET NUMBER:
M 1.2

M 1.2, 10/28/2026 6:59:00 AM, ARCH full bleed E1 (30.00 x 42.00 Inches), 1:1



Condensor Water Piping Flow Schematic

BILL OF MATERIALS				
TAG	QTY	VENDOR	PART NO.	DESCRIPTION
TT-1, TT-2	2	TRANE	4-BID-003	SENSOR TEMP 4 IN. DUCT/IMM THERM
CSR - 36, CSR - 37, CSR - 38	3	VERIS	H-600	CURRENT STATUS SWITCH

FILE NAME: ARDREY KELL HS.AXD			
DRAWING TITLE: CHILLED WATER PLANT CDW PIPING SCHEMATIC	3 CHGES PER ENG REVIEW 2 SUBMITTALS	4/28/2006 DATE	WDD BY
	NO. REVISION	DATE	CHECKED BY:
	SALESPERSON: CCR	ENGINEERED BY: WDD	WDD
PROJECT: ARDREY KELL HIGH SCHOOL CMS	TRANE CAROLINAS 4501 S. TRYON ST CHARLOTTE, NC 28217		PROJECT NUM. P126729
			DRAWING NUM. R6

Condenser Water Pump:

The condenser water pump shall run anytime the chiller is called to run.

The condenser water pump shall start prior to the chiller being enabled and shall stop only after the chiller is disabled. The chilled water pump shall therefore have:

- **A user adjustable delay on start.**
- **AND a user adjustable delay on stop.**

The delay times shall be set appropriately to allow for orderly chilled water system start-up, shutdown and sequencing.

Alarms shall be provided as follows:

1 Condenser Water Pump Failure: Commanded on, but the status us off.
2 Condenser Water Pump Running in Hand: Commanded off, cut the status is on.
3 Condenser Water Pump Runtime Exceeded: Status runtime exceeds a user definable limit.

Cooling Tower VFD Fan – Condenser Water Temperature Control:

The controller shall measure the cooling tower condenser water supply (basin) temperature and modulate the bypass valve and fan VFD in sequence to maintain setpoints.

The following setpoints are recommended values. All setpoints shall be field adjusted during the commissioning period to meet the requirements of actual field conditions.

On rising supply temperature, the controller shall modulate the bypass valve to maintain setpoint of 78°F (adj.) and the fan VFD to maintain setpoint of 82°F (adj.).

Alarms shall be provided as follows:

Fan

4 Failure: Commanded on, but the status us off.
5 Running in Hand: Commanded off, cut the status is on.
6 Runtime Exceeded: Status runtime exceeds a user definable limit.
7 VFD fault.

High Cooling Tower Supply (Basin) Temp: If greater than 86°F (adj.).

Low Cooling Tower Supply (Basin) Temp: If less than 38°F (adj.).

Condenser Water Temperature Monitoring:

The following temperatures shall be monitored:

- **Condenser water supply temperature.**
- **Condenser water return temperature.**

Alarms shall be provided as follows:

Cooling Tower Vibration Switch:

The chiller and cooling tower shall shut down and an alarm generated upon receiving a vibration switch status.

NOTES:

1. DEMO EXISTING COOLING TOWER CONTROLS AND REPLACE WITH NEW.
2. UPDATE OBSOLETE CHW PLANT CONTROLLER TO NEW BACNET CONTROLLER.
3. UPDATE CONTROLS TO EXISTING CMS STANDARDS, SEQUENCES, POINTS AND SCHEMATICS FOR COOLING TOWERS.
4. REPLACE EXISTING AND INSTALL NEW PRESSURE AND TEMPERATURE GAUGES OUTSIDE OF BUILDING.
5. UPDATE EXISTING TRANE CONTROLS FOR NEW EQUIPMENT. UPGRADE CONTROLS AS NECESSARY TO MEET NEW CMS REQUIREMENTS. REUSE EXISTING CONDUITS FOR NEW CONTROLS WHERE PRACTICAL. INSTALL NEW WIRE AND CONDUITS AS REQUIRED.
6. EXTEND AND RECONNECT NEW AND EXISTING HEAT TRACE TO NEW HEAT TRACE ON NEW PIPING. RECONNECT AND UPDATE EXISTING SYSTEM AND CONTROLS AS NECESSARY FOR NEW PIPING. UPDATE CONTROL AND ALARMS FOR FAILURE OF HEAT TRACE.

REFERENCED NOTES:

(A) REPLACE EXISTING CTISOV 1–4 WITH NEW. NOTE NEW 12" SIZE FOR CTISOV 2 AND 4.

(B) RE–USE EXISTING VFDs FOR CT–1 AND CT–2.

2006 ORIGINAL TRANE CONTROL NARRATIVE

Cooling Tower Replacement

Project: Replacement of Two Marley Cooling Towers
Location: Ardrey Kell High School
10220 Ardrey Kell Road
Charlotte, NC 28277

Existing Equipment:

(2) Marley Cooling Towers

Model No.: **NC8303H2CG-05**

Project Description

Provide all labor, supervision, equipment, materials, rigging, and disposal services necessary to remove and replace two existing Marley Model NC8303H2CG-05 cooling towers serving the facility HVAC system at Ardrey Kell High School.

All work shall be performed in accordance with applicable local, state, and federal codes, manufacturer recommendations, and industry standards.

All work shall be performed in strict accordance with the project drawings, specifications, applicable codes and regulations, manufacturer recommendations, and recognized industry standards. In the event of any discrepancy, conflict, ambiguity, or omission among these requirements, the Contractor shall immediately notify the Project Manager and Engineer of Record in writing and obtain direction and resolution prior to proceeding with the affected work.

2. Scope of Work

Pre-Construction Activities

Conduct site visit and field verification of existing equipment and site conditions.

Coordinate project schedule with school administration and facility personnel.

Develop rigging and safety plan for removal and installation activities.

Verify utility connections, structural supports, piping connections, electrical requirements, and access routes.

Provide and install new electric heat trace on the makeup water line serving the stainless-steel cooling tower basin. Heat trace systems shall be complete with all required power connections, controls, accessories, weatherproofing, testing, and commissioning, and shall be installed in accordance with the project drawings, specifications, manufacturer recommendations, and applicable codes.

Existing Equipment Removal

Isolate cooling towers from the existing HVAC system.

Drain towers and associated piping as required.

Disconnect electrical, controls, piping, and mechanical connections.

Provide crane and rigging services required for removal.

Remove and legally dispose of existing cooling towers and related materials.

New Cooling Tower Installation

Furnish and install two replacement cooling towers meeting or exceeding the performance specifications of the existing Marley NC8303H2CG-05 units.

Set and level new cooling towers on existing structural supports or new supports if required.

Reconnect condenser water supply and return piping.

Reconnect make-up water, overflow, drain, and equalizer piping as applicable.

Install vibration isolation devices where required.

Reconnect electrical power and control wiring.

Install all necessary accessories, fittings, gaskets, sealants, and hardware required for a complete installation.

This Project Needs to be Coordinated with the School

Controls and Electrical

Reconnect existing control systems.

Verify operation of fan motors, controls, safety, and associate equipment.

Program and adjust controls as required for proper operation.

Perform electrical testing and verification of connections.

Trane Controls shall be utilized as the Controls Contractor for this project.

Start-Up and Commissioning

Coordinate manufacturer start-up if required.

Fill, clean, and prepare cooling towers for operation.

Verify proper water flow, fan operation, motor rotation, and control functionality.

Conduct operational testing under normal operating conditions.

Complete system commissioning and document results.

Training and Closeout

Provide operational overview and training for maintenance personnel.

Deliver manufacturer operation and maintenance manuals.

Provide warranty documentation for equipment and installation.

Submit as-built documentation reflecting final installation conditions.

Materials Included

Two replacement cooling towers.

Required rigging and lifting equipment.

Piping connection materials.

Electrical connection materials.

Controls interface components.

Vibration isolation components.

Miscellaneous installation of hardware and accessories.

4. Exclusions

Unless specifically stated otherwise, the following are excluded:

Structural modifications beyond existing support requirements.

Asbestos abatement or hazardous material remediation.

Major electrical service upgrades.

Water treatment system replacement.

Building automation systems upgrades beyond required reconnections.

Roof repairs unrelated to cooling tower replacement.

5. Safety Requirements

Contractor shall follow all OSHA regulations and site-specific safety requirements.

Work area should be secured and protected by students, staff, and public access.

Crane operations shall be performed by qualified personnel with approved lift plans.

6. Warranty

Manufacturer's standard equipment warranty.

Minimum one-year workmanship warranty on labor and installation unless otherwise specified.

Deliverable

Provide a complete, operational cooling tower system with all associated mechanical, electrical, and control connections tested, commissioned, and functioning as designed.

Scheduling and Coordination Requirements

All project activities shall be coordinated with the **Ardrey Kell High School Principal and the Project manager Damon Crump.**

Contractors should work closely with school **administration** to develop a project schedule that minimizes disruption to school operations, staff, students, and campus activities.

Major activities, including crane operations, equipment delivery, removal of existing cooling towers, installation of new cooling towers, and system shutdowns, shall be scheduled in advance and approved by the **principal** or designated school representative.

Contractor shall provide a minimum of two (2) weeks' notice for any planned utility interruptions, HVAC outages, or major site activities impacting school operations.

Work may be required during non-school hours, weekends, school breaks, or other approved periods as directed by the **Project Manager** and coordinated with the **principal.**

Contractors shall attend coordination meetings as required with Charlotte-Mecklenburg Schools staff, the principal, facility personnel, Trane Controls, and other project stakeholders to ensure successful project execution.

Controls Scope and Cooling Tower Freeze Protection

1. Basin Heater Operation and Control

Provide cooling tower basin heaters as recommended by the cooling tower manufacturer. Basin heaters shall operate through a standalone control package furnished with the cooling tower and shall be powered and wired by the Mechanical/Electrical Contractor. Heater operation shall maintain basin water temperature above freezing conditions.

2. Basin Temperature Monitoring and Alarms

Provide basin water temperature sensors for monitoring of cooling tower basin temperature. Sensors shall be integrated into the Building Automation System (BAS) by the Controls Contractor. BAS shall generate a low-temperature alarm upon detection of temperatures approaching freezing conditions. Alarm setpoints shall be coordinated with the cooling tower manufacturer.

3. Cooling Tower Fan Operation During Cold Weather

Controls Contractor shall implement cold weather fan control sequences as recommended by the cooling tower manufacturer and/or Engineer of Record. Sequence shall include minimum fan speed limitations and operating restrictions necessary to prevent icing, freezing, and equipment damage. Fan operation below manufacturer-recommended minimum speeds shall not be permitted.

4. Anti-Icing and Freeze Protection Sequences

Implement all manufacturer-recommended anti-icing and freeze protection sequences. Sequences may include, but are not limited to:

Minimum fan speed control

Fan cycling

Fan reversal (if applicable and approved by manufacturer)

Other freeze protection strategies recommended by the manufacturer

Final sequence shall be coordinated with the cooling tower manufacturer and incorporated into BAS programming.

5. Condenser Water Pump Operation During Freeze Conditions

The BAS shall automatically enable condenser water pumps whenever outside air temperature falls to the freeze protection setpoint established by the Engineer and/or cooling tower manufacturer. Pump operation shall be maintained as required to protect tower components and condenser water piping from freezing.

6. Bypass Valves and Additional Freeze Protection Measures

N/A per cooling tower manufacturer's recommendations.

BAS Monitoring, Trending, and Alarming

The Controls Contractor shall provide BAS integration, monitoring, trending, and alarming for all freeze protection functions recommended by the cooling tower manufacturer. At a minimum, monitoring shall include:

Basin water temperature

Outside air temperature

Tower fan status and speed

Condenser water pump status

Freeze protection mode status

Low-temperature and freeze protection alarms

Final BAS points list shall be coordinated with the cooling tower manufacturer and Owner.

8. Functional Performance Testing and Commissioning

Upon completion of installation and programming, perform functional testing of all freeze protection sequences. Testing shall be conducted jointly by the Mechanical Contractor, Controls Contractor, Cooling Tower Manufacturer's Representative, and Owner. Seasonal verification testing during cold weather conditions is recommended to confirm proper operation of all freeze protection sequences.

9. Coordination Responsibility

The Mechanical Contractor, Controls Contractor, and Cooling Tower Manufacturer shall coordinate all freeze protection requirements to ensure a complete and fully functional system. Any gaps between equipment, controls, and installation responsibilities shall be identified and resolved prior to project execution.

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704-882-0220
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cms Charlotte-Mecklenburg Schools

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Charlotte, North Carolina

SEAL:

NORTH CAROLINA PROFESSIONAL 15332 ENGINEER MICHAEL A. MALONEY

10/27/2026

- ○ PRELIMINARY - NOT FOR CONSTRUCTION
- ● FOR CONSTRUCTION
- ○ AS-BUILT DRAWINGS

PROJECT NAME: Mechanical Renovations - Replacement of Cooling Towers - "Like for Like"

LOCATION: Ardrey Kell H.S., 10220 Ardrey Kell Rd, Charlotte, NC 28277

SHEET TITLE: CHILLER SPECIFICATIONS

PROJECT NO: 26017	DRAWN BY: MM
CAD NO: 26017 ME	CHECKED BY: RM, MM
SCALE: AS NOTED	DATE: 10-27-2026

REVISIONS:

SHEET NUMBER:

M 1.3

5 OF 5

M 1.3, 10/28/2026 6:59:02 AM, ARCH full bleed E1 (30.00 x 42.00 Inches), 1:1

ELECTRICAL SPEC.

Part 1: General

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 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 service 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.
B. Branch circuits shall not be smaller than #12 AWG. Control wiring may be #14 AWG.
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 (NAC) power extenders as required.

Part 6: Renovation of Existing

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 additions to the contract.
B. Existing portions of the facility shall remain in operation during this renovation 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 shall be closely coordinated with the owner's representative.
C. Project involves work on existing electrical panels and feeders required in operating the facility. Temporary power arrangements shall be made to serve those areas affected by this project.
D.

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 be permitted.
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 and responsibility of the Contractor.
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 and disposal.
   c) At the end of demolition, thoroughly clean area to prepare for new work.

———	CONDUIT CONCEALED IN OR ABOVE CEILING, IN OVERHEAD SLAB OR IN WALL, AS APPLICABLE.
———→	HOMERUN TO PANELBOARD, MOTOR CONTROL CENTER, OR SWITCHBOARD AS APPLICABLE.
ⓙ ⓙ	JUNCTION BOX SIZED PER N.E.C. UNLESS OTHERWISE INDICATED.
ⓙ~	JUNCTION BOX WITH FLEX CONNECTION TO EQUIPMENT.
$ $2	SINGLE OR DOUBLE POLE SWITCH AS INDICATED. MOUNTED 48" AFF.
$3 $4	THREE-WAY OR FOUR-WAY SWITCH AS INDICATED, MOUNTED 48" AFF.
$WP	SWITCH AS SPECIFIED ABOVE WITH CAST WEATHERPROOF COVER AND OUTLET AND BOX ADAPTER IF REQUIRED.
$α	SWITCH AS SPECIFIED ABOVE WITH OUTLETS CONTROLLED INDICATED BY BY SUBSCRIPT.
$V	DUAL TECHNOLOGY OCCUPANCY SENSOR MOUNTED AT 48" AFF.
	NEMA 5-20R DUPLEX CONVENIENCE RECEPTACLE MOUNTED 20", UNLESS NOTED OTHERWISE. NEMA 5-20R QUAD CONVENIENCE RECEPTACLE MOUNTED 20", UNLESS NOTED OTHERWISE.
	NEMA 5-20R DUPLEX CONVENIENCE RECEPTACLE MOUNTED 48" AFF OR BACKSPLASH.
	RECEPTACLE AS SPECIFIED ABOVE EXCEPT WITH INTEGRATED GROUND FAULT CIRCUIT INTERRUPTER (GFCI).
WP	GFCI RECEPTACLE SIMILAR TO THOSE SPECIFIED ABOVE EXCEPT U.L. "WR" (WEATHER-RESISTANT) LISTED AND PROVIDED WITH A WEATHERPROOF COVER.
TWC	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.
	FUSIBLE OR NON-FUSIBLE DISCONNECT FURNISHED WITH EQUIPMENT UNDER OTHER DIVISIONS OF THESE SPECIFICATIONS. TERMINATE WIRING ON LINE SIDE OF DISCONNECT
30/2	NON-FUSIBLE DISCONNECT. NUMERALS INDICATE SIZE AND POLES. WP INDICATES NEMA 3R ENCLOSURE OR WITH OTHER ENCLOSURE AS INDICATED.
30/3F20	FUSIBLE DISCONNECT. NUMERALS INDICATE SIZE, POLES, AND FUSETRON SIZE. WP INDICATES NEMA 3R ENCLOSURE OR WITH OTHER ENCLOSURE AS INDICATED.
30/3 HD WP	CIRCUIT BREAKER NUMERALS INDICATE AMPERE RATING, POLES, AND FRAME. WP INDICATES 3R ENCLOSURE OR WITH OTHER ENCLOSURE AS INDICATED.
$M	MOTOR RATED 1-POLE SWITCH.
	CEILING MOUNTED OCCUPANCY SENSOR, WITH DUAL TECHNOLOGY CAPABILITIES. 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.

ABBREVIATIONS

A = ampere
AF = amp frame
AT = amp trip
ADA = Americans with Disabilities Act
AFF = above finished floor
ATS = automatic transfer switch
AHJ = authority having jurisdiction
C = conduit
D/C = disconnect
EX = existing
E.C. = empty conduit for future use
EMT = electrical metallic tubing
EV = electric vehicle
ECB = enclosed circuit breaker
FLA = full load amps
FMC = flexible metal conduit
GFCI = ground fault circuit interrupter
IG = isolated ground
KV = kilovolt
KVA = kilovolt ampere
KCMIL = thousand circular mils
KW = kilowatt
LT = liquid tight flexible metal conduit
MCB = main circuit breaker
MCC = motor control center
MLO = main lug only
MTS = manual transfer switch
N/A = not applicable
NEC = National Electrical Code
NTS = not to scale
NW = Newø = phase
P = pole (3-pole, 2-pole, 1-pole)
RM = Remain
RL = Relocate
RV = Remove
TYP = typical
V = volt
VFD = variable frequency drive
U.O.N. = unless otherwise noted
W = wire (3W-3-wire system, etc)
WP = weatherproof
XFMR = transformer
3R = NEMA 3R enclosure

ELECTRICAL NOTES:

1. DEMO EXISTING COOLING TOWER POWER SYSTEM AND APPURTENANCES. AND REPLACE WITH NEW FOR NEW COOLING TOWER AND APPERTENANCES.
2. COORDINATE WORK WITH MECHANICAL CONTRACTOR AND CONTROLS CONTRACTOR.

ELECTRICAL REFERENCED NOTES:

(A) DEMO EXISTING CT-1,2 AND REPLACE WITH NEW CT-1,2. DEMO EXISTING BASIN HEATER-1,2 AND REPLACE WITH NEW BASIN HEATER-1,2. CONNECT HEAT TAPE TO NEW PIPING.

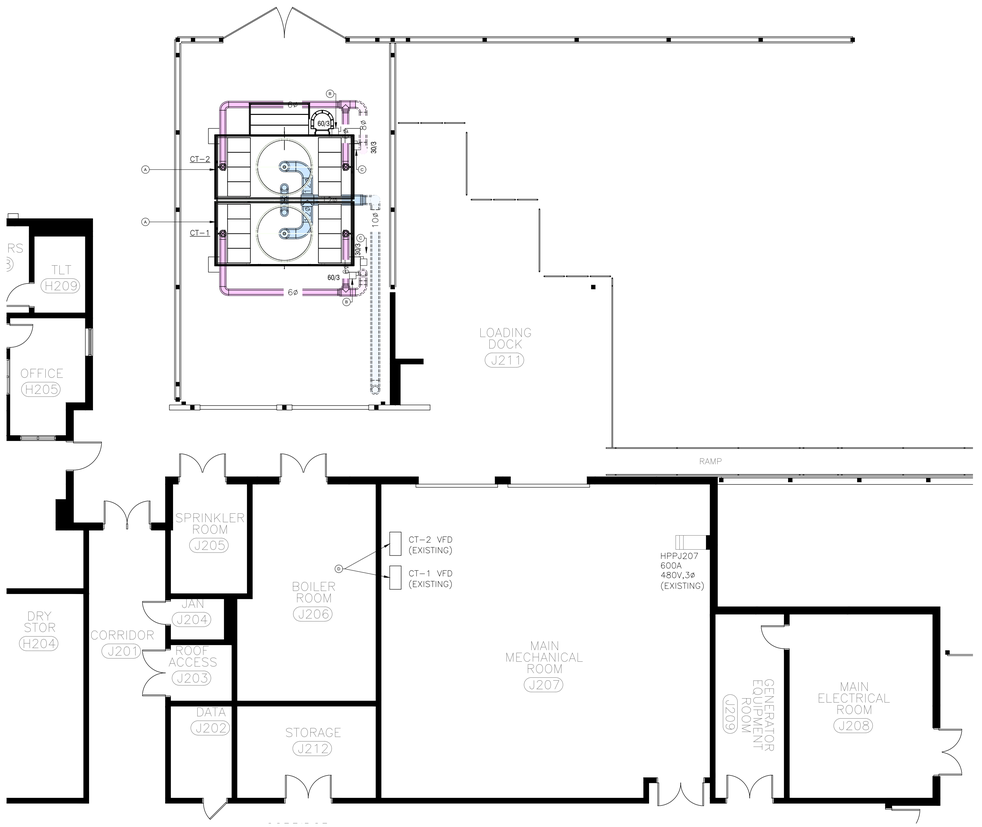
(B) RE-USE EXISTING 60/3 HD DISCONNECT FOR CT-1 AND CT-2 FED FROM HPPJ207.

(C) RE-USE EXISTING 30/3 HD DISCONNECT FOR BASIN HEATERS CT-1 AND CT-2 FED FROM HPPJ207.

(D) RE-USE EXISTING VFD FOR CT-1 AND CT-2.

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 NUMBERS ON ALL DEVICES – NEW AND EXISTING.
2. EXISTING CONDITIONS WERE DETERMINED FROM SITE SURVEY. FIELD VERIFY ALL EXISTING CONDITIONS AND NOTIFY ENGINEER IMMEDIATELY OF IRRECONCILABLE CONFLICTS.
3. MINIMUM CIRCUIT RUN IS 2/12, 1#12G, ¾"C FOR 20A, 1P CIRCUIT BREAKER.
4. VERIFY ALL NEW EQUIPMENT VOLTAGE, PHASE, POWER, METHODS OF CONNECTION, ETC. WITH EQUIPMENT MANUFACTURER BEFORE BEGINNING WORK. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
5. CONTRACTOR MAY RE-USE EXISTING WIRE AND CONDUIT TO THE EXTENT PRACTICAL. ALL UNUSED CONDUCTORS SHALL BE REMOVED.
6. DEMO ALL EXISTING CIRCUITS THAT ARE NOT BEING RE-USED. VERIFY ALL CIRCUITS IN FIELD.
7. ALL ELECTRICAL MATERIALS, DEVICES, APPLIANCES, AND EQUIPMENT SHALL BE LABEL/LISTED BY UL OR A NORTH CAROLINA APPROVED THIRD PARTY TESTING AGENCY.
8. UPDATE EXISTING CONTROLS WITH NEW EQUIPMENT. REUSE EXISTING CONDUITS FOR NEW CONTROLS WHERE PRACTICAL. INSTALL NEW WIRE AND CONDUITS AS REQUIRED.
9. EXTEND AND RECONNECT EXISTING HEAT TRACE TO NEW HEAT TRACE ON NEW PIPING. RECONNECT AND UPDATE EXISTING SYSTEM AND CONTROLS AS NECESSARY FOR NEW PIPING.



1 E1.1 ELECTRICAL PLAN
SCALE: 1/8" = 1'-0"

Detail #1 Notes:
1. Demand Calculations:
   - Existing Cooling Towers - 2 @ 12 kW
   - New Cooling Towers - 2 @ 12 kW
   - Existing Basin Heaters - 2 @ 12 kW
   - New Basin Heaters - 2 @ 12 kW
   - kW Added = 0.0 kW
   - "LIKE FOR LIKE" Replacement

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SEAL:

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 15332 MICHAEL A. MALONEY

10/27/2026

- ○ PRELIMINARY - NOT FOR CONSTRUCTION
- ● FOR CONSTRUCTION
- ○ AS-BUILT DRAWINGS

PROJECT NAME: Mechanical Renovations - Replacement of Cooling Towers - "Like for Like"

LOCATION: Ardrey Kell H.S. 10220 Ardrey Kell Rd. Charlotte, NC 28277

SHEET TITLE: ELECTRICAL PLAN AND RISER

PROJECT NO: 26017	DRAWN BY: MM
CAD NO: 26017 ME	CHECKED BY: RM, MM
SCALE: AS NOTED	DATE: 10-27-2026

REVISIONS:

SHEET NUMBER:

E1.1

E1.1, 10/28/2026 6:59:06 AM, ARCH full bleed E1 (30.00 x 42.00 Inches), 1:1