City Council Meeting Agenda

Tuesday, February 15, 2022

10:00 AM

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1) Call to Order

2) Roll Call of Members

3) Jeffrey Mansion Cooling Tower Bid Sheet

A) Bid Tabulation Sheet

B) Cooling Tower Bid Sheet

4) Public Comments (No Speaker Slip Required)

5) Adjourn

All agendas are subject to change.

City Council Policy for Correspondence:
All correspondence addressed to City Council or requested to be distributed to City Council by the sender is a matter of public record and will be placed on the City of Bexley Website (www.bexley.org) at Public Documents > City Council > Council Correspondence. If the subject of the correspondence is not on the Council Agenda, the sender may discuss the issue during Public Comments. If the subject of the correspondence is on the Council Agenda, the sender may discuss the issue at the time the issue is addressed during the Council meeting.

City Council Policy for Public Comments:
Members of the public are encouraged to provide comments to City Council at the following times:

For issues that are not on Council's agenda:

- At a designated public comment period near the beginning of the meeting

For items on Council's agenda (when speaker slip has been filled out in advance):

- During an ordinance or resolution that is being discussed
- Residents may submit up to two separate speaker slips per meeting
- Please note that the speaker slip must be filled out prior to entering Council chambers and must be promptly handed to the Council secretary

For items on Council's agenda (when a speaker slip has not been filled out in advance):

- During the public comment period after a motion has been made and seconded to adopt an ordinance or resolution (typically the third reading)

- During a designated public comment period at the end of the meeting

Time limits for public comments:
While City Council will not routinely impose time limits on either Agenda or Non-Agenda visitors who wish to address City Council, those commenting are asked to confine their remarks to approximately five (5) minutes and for Agenda items, to direct their comments to the subject matter being addressed in the legislation. This five minute limitation also applies to City Council members per 220.01 (rule 13).

Additional guidelines for public comments:

- Any speaker addressing Council shall provide his/her name and address.
- Undue interruption or other interference with the orderly conduct of remarks is not permitted.
- Defamatory or abusive remarks are always out of order.
- Violation of this policy may result in termination of the speaker's comments and/or removal from the meeting

SCHOOLEY CALDWELL

ARCHITECTURE. INSPIRED.

BID TABULATION SHEET

PROJECT: **Jeffrey Mansion Cooling Tower Replacement**

BID DATE/TIME: January 28, 2022, 10:00 AM

Project # 19020.90

Tabulation By: **Lee Dunfield**

Sheet _____ of _____

			REQUIRED FORMS *(Check Box if Receiv*							
BIDDER INFORMATION	**ITEM 1 BASE BID**	**ITEM 2 Alternate 1 - Cooling Tower Stainless Steel**	**GRAND TOTAL Base Bid + Alternates**	Addend 1 Ackn.	Addend 2 Ackn.	Certificate of Insurance	Compensation Ohio Workers	Contract Bond	Bid Guaranty and	Responsible Bidder	REMARKS
Farber Corporation	$279,000.00	$25,740.00	**$304,740.00**			x	x	x	x		
Regal Plumbing & Heating Co.	$259,750.00	$22,500.00	**$282,250.00**			x	x	x			
Ohio Heating & Air Conditioning, Inc.	$201,998.00	$14,584.00	**$216,582.00**			x	x	x	x		

SCHOOLEY CALDWELL

ARCHITECTURE. INSPIRED.

BID TABULATION SHEET

PROJECT:_____

BID DATE/TIME: _____, ___:___ **AM/PM**

Project # _____

Tabulation By:

Sheet _____ of _____

ESTIMATE:								REQUIRED FORMS *(Check Box if Received)*								
BIDDER INFORMATION	**ITEM 1 GENERAL BASE BID**	**ITEM 2 FIRE PROTECTION BASE BID**	**ITEM 3 MECHANICAL BASE BID**	**ITEM 4 ELECTRICAL BASE BID**	**ITEM 5 COMBINED BASE BID**	**ITEM 6 ALTERNATE 1**	**GRAND TOTAL Base Bid + Alternates**	Addenda								REMARKS

Schooley Caldwell

300 Marconi Blvd. Columbus, Ohio 43215

Date bids received: _____, ___:___ a.m./p.m.

Tabulation by:

BID TABULATION SHEET

For: _____

Job Number: _____ Sheet **1** of **1**

ESTIMATES	$_____	$_____	$_____	$_____	$_____	$_____	BID GUARANTY/BOND	SUBCONTRACTORS	ADDENDUM ACK'D.	PROJECT MANAGER	SCHEDULE	QUALIFICATIONS (AIA 305	TAX AFFIDAVIT	SUBSTITUTIONS	REMARKS
	ITEM 1 GENERAL BASE BID	**ITEM 2** MECHANICAL BASE BID	**ITEM 3** FIRE PROTECTION BASE BID	**ITEM 4** ELECTRICAL BASE BID	**ITEM 5** COMBINED BID	**GRAND TOTAL Including All Alternates and Base Bid**									

Jeffrey Mansion Cooling Tower Replacement

165 North Parkview Avenue
Bexley, OH 43209

Prepared For:

The City of Bexley
Recreation and Parks Department

Drawing Index

SCHOOLEY CALDWELL
ARCHITECTURE. INSPIRED.

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Columbus OH 43215 F 614-628-0311
schooleycaldwell.com

Consultants:
MEP Engineer
Annex Engineering
589 W Nationwide Blvd. Suite B
Columbus, OH 43215

Drawing Issue Dates

Bid/Permit Set
12/10/21

Revision Schedule

#	Description	Date

Jeffrey Mansion
Cooling Tower
Replacement

165 North Parkview Avenue
Bexley, OH 43209

Cover Sheet

General

G000

12/10/2021

19020.90

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12/10/2021 9:23:42 AM

ABBREVIATIONS

(D)	DEMOLITION	EXH	EXHAUST
(E)	EXISTING	FPI	FINS PER INCH
(F)	FUTURE	GTC	GENERAL TRADES CONTRACTOR
(R)	(RELOCATE)	ID	INNER DIAMETER
AAV	AUTOMATIC AIR VENT	LAT	LEAVING AIR TEMPERATURE
AFF	ABOVE FINISHED FLOOR	LWT	LEAVING WATER TEMPERATURE
AMB	AMBIENT	MFR	MANUFACTURER
APD	AIR PRESSURE DROP	N/A	NOT APPLICABLE
BAS	BUILDING AUTOMATIC SYSTEM	NC	NORMALLY CLOSED
BDD	BACKDRAFT DAMPER	NO	NORMALLY OPEN
BFP	BACKFLOW PREVENTER	NTS	NOT TO SCALE
BLDG	BUILDING	OA	OUTSIDE AIR
BOB	BOTTOM OF BEAM	OD	OUTSIDE DIAMETER
BOD	BOTTOM OF DUCT	PD	PRESSURE DROP
BOP	BOTTOM OF PIPE	PRV	PRESSURE REDUCING VALVE
BOS	BOTTOM OF STRUCTURE	RA	RETURN AIR
CL	CENTER LINE	REL	RELIEF AIR
CR	CHILLED WATER RETURN	SA	SUPPLY AIR
CS	CHILLED WATER SUPPLY	SCC	SENSIBLE COOLING CAPACITY
CO	CLEAN OUT	SP	STATIC PRESSURE
DB	DRY BULB	TCP	TEMPERATURE CONTROL PANEL
DIA	DIAMETER	TS	TEMPERATURE SENSOR
DN	DOWN	TSP	TOTAL STATIC PRESSURE
EA	EXHAUST AIR	TYP	TYPICAL
EAT	ENTERING AIR TEMPERATURE	UNO	UNLESS NOTED OTHERWISE
EFF	EFFICIENCY	VFD	VARIABLE FREQUENCY DRIVE
EG	ETHYLENE GLYCOL	WB	WET BULB
ESP	EXTERNAL STATIC PRESSURE	WG	WATER GAUGE
EWT	ENTERING WATER TEMPERATURE	WPD	WATER PRESSURE DROP

MECHANICAL LEGEND

SUPPLY DUCT UP	PIPING DOWN
SUPPLY DUCT DOWN	PIPING UP
RETURN DUCT UP	TURNING VANES
RETURN DUCT DOWN	VOLUME DAMPER
FIRE DAMPER (FD)	CONDENSATE DRAIN (C)
SMOKE DAMPER (SD)	MOTORIZED DAMPER (M)
COMB. FIRE/SMOKE DAMPER (CD)	BACKDRAFT DAMPER
BACKDRAFT DAMPER (BD)	REMOTE ANNUNCIATOR (A)
SMOKE DETECTOR (SD)	REMOTE TEMP. SENSOR (S)
SPIN-IN WITH VOLUME DAMPER	THERMOSTAT (T)
45° RETURN DUCT TAP WITH VOL. DAMPER	FLEX DUCT
DIFFUSER	LINEAR DIFFUSER WITH FLEX CONNECTION
DIFFUSER WITH FLEX CONNECTION	ROUND DUCT UP
GRILLE/REGISTER	ROUND DUCT DOWN
SIDEWALL GRILLE/ REGISTER/ DIFFUSER	REDUCER
CONNECT TO EXISTING	EXTENT OF DEMOLITION
TEMPERATURE SENSOR (TS)	

SEQUENCE OF OPERATION

PROVIDE STAND ALONE OR APPLICATION SPECIFIC CONTROLLERS AS REQUIRED TO PERFORM THE FOLLOWING SEQUENCES OF OPERATIONS. COOLING TOWER TO BE INTEGRATED INTO EXISTING BUILDING AUTOMATION SYSTEM.

COOLING TOWER SYSTEM

PROVIDE THE COOLING TOWER WITH TOWER CONTROL PANEL WHICH INTEGRATES WITH THE BUILDING AUTOMATION SYSTEM. THE COOLING TOWER SHALL RUN ON A COMMAND FROM THE BUILDING AUTOMATION SYSTEM. UPON THE COMMAND THE TOWER PUMP SHALL TURN ON. PROOF OF THE TOWER WATER PUMP SHALL BE MADE BY A DIFFERENTIAL PRESSURE TRANSMITTER THROUGH THE CONTROL PANEL ACROSS THE PUMP. UPON CONFIRMATION OF FLOW THE COOLING TOWER WILL START. THE TOWER WATER TEMPERATURE SHALL BE CONTROLLED BY THE TEMPERATURE OF THE LOOP WHERE THE MINIMUM TEMPERATURE FOR THE LOOP SHALL BE 65 DEGREES AND THE MAXIMUM TEMPERATURE SHALL BE 80 DEGREES. IF THE TEMPERATURE IS ABOVE 80 DEGREES THE SYSTEM SHALL ALARM. THE VFD ON THE COOLING TOWER SHALL MODULATE THE COOLING TOWER AS REQUIRED TO STAY IN THE TEMPERATURE RANGE.

GENERAL NOTES:

A. ALL WORK TO BE PERFORMED TO MEET ALL STATE, CITY & LOCAL CODE REQUIREMENTS.

B. ALL WALL PATCHING TO BE BY THE GENERAL CONTRACTOR.

C. ALL CUTTING AND PATCHING OF THE ROOF IS TO BE BY THE GENERAL CONTRACTOR.

D. HVAC CONTRACTOR IS TO COORDINATE WITH OTHER TRADES BEFORE INSTALLING PIPING. IF THE HVAC CONTRACTOR FAILS TO COORDINATE WITH OTHER TRADES AND THE WORK MUST BE ALTERED, THE HVAC CONTRACTOR WILL CHANGE IT AT HIS OWN EXPENSE.

E. HVAC CONTRACTOR IS TO VISIT THE SITE PRIOR TO SUBMITTING A BID & INCLUDE IN THE BID ANY ITEMS NECESSARY FOR A COMPLETE & OPERATIONAL SYSTEM.

F. DRAWINGS ARE SCHEMATIC IN NATURE. HVAC CONTRACTOR IS TO INCLUDE ANY ITEMS REQUIRED FOR A COMPLETE & OPERATIONAL SYSTEM, WHETHER SHOWN OR NOT SHOWN ON THE DRAWINGS.

G. HVAC CONTRACTOR TO FURNISH ALL PERMITS REQUIRED FOR HIS PORTION OF THE WORK.

H. HVAC CONTRACTOR TO COORDINATE WITH ELECTRICAL CONTRACTOR CONCERNING ELECTRICAL REQUIREMENTS BEFORE ORDERING ANY EQUIPMENT.

I. CONTRACTORS TO ENSURE THAT THERMOSTATS ARE PROTECTED DURING CONSTRUCTION.

J. ALL MATERIALS ABOVE THE CEILING SHALL BE PLENUM RATED.

K. CONTRACTOR IS RESPONSIBLE FOR ADHERING TO THE ENTIRETY OF THIS DRAWING SET, INCLUDING BUT NOT LIMITED TO: PLANS, ELEVATIONS, DETAILS, SCHEDULES, AND SPECIFICATIONS. CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF ALL DRAWINGS OF OTHER TRADES, INCLUDING BUT NOT LIMITED TO, ARCHITECTURAL, PLUMBING, ELECTRICAL, CIVIL, AND STRUCTURAL.

L. SUCCESSFUL CONTRACTOR SHALL SUBMIT ONE (1) SET OF CONSTRUCTION DOCUMENTS TO LOCAL UTILITY COMPANIES THAT APPLY TO THEIR TRADE.

M. MECHANICAL CONTRACTOR SHALL SUPPLY AND INSTALL ALL MATERIAL REQUIRED TO COMPLY WITH ALL STATE AND LOCAL CODES.

N. COORDINATE WATER CHEMICAL TREATMENT SUPPLY VENDOR CONTRACT WITH OWNER FOR CONTINUED SERVICE AFTER INITIAL SUPPLY IS USED.

FIELD VERIFY ALL CONDITIONS:

DESIGN DRAWINGS ARE DIAGRAMMATIC. THIS CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING OR AWARD OF CONTRACT TO INSPECT EXISTING FIELD CONDITIONS. THIS CONTRACT SHALL INCLUDE ALL LABOR AND MATERIALS NECESSARY FOR FIELD MODIFICATIONS DUE TO EXISTING CONDITIONS.

THE CONTRACTOR SHALL CONTACT THE ARCHITECT, ENGINEER OR OWNER PRIOR TO BIDDING FOR INTERPRETATIONS AND CLARIFICATIONS OF THE DESIGN AND INCLUDE IN HIS BID ALL COSTS TO MEET THE DESIGN INTENT. CLARIFICATIONS MADE BY THE ARCHITECT, ENGINEER OR OWNER AFTER BIDDING WILL BE FINAL AND SHALL BE IMPLEMENTED AT CONTRACTORS COST.

BIDDING CONTRACTORS SHALL HAVE A WORKING KNOWLEDGE OF LOCAL CODES AND ORDINANCES AND SHALL INCLUDE IN THEIR BIDS THE COSTS FOR ALL WORK INSTALLED IN STRICT ACCORDANCE WITH GOVERNING CODES. THE PLANS AND SPECIFICATIONS NOT WITHSTANDING. THE CONTRACTOR SHALL ALERT ARCHITECT, ENGINEER OR OWNER OF ANY APPARENT DISCREPANCIES BETWEEN GOVERNING CODES AND DESIGN INTENT.

CLOSED CIRCUIT COOLER

UNIT DATA									FAN DATA							
TAG	MANUFACTURER	FUNCTION	MODEL	GPM	EWT/LWT	ENTERING WB TEMP	TOWER PUMPING HEAD (PSI)	SOUND AT 50 FEET (DBA)	NUMBER OF FANS	NUMBER OF MOTORS	TOTAL HP	AIRFLOW (CFM)	OPERATING WEIGHT (LBS)	VOLTAGE	PHASE	COMMENTS
CT-1	EVAPCO	EQUIPMENT COOLING	LSWE 4-5J9-Z-F	100	94/83	77	7.4	50	3	1	15	21,600	8,000	240	1	1

FACTORY OPTIONS:
1. IBC STRUCTURAL DESIGN.
2. 3-PROBE ELECTRONIC WATER LEVEL CONTROL PACKAGE
3. CONTACTOR WITH TRANSFORMER AND DISCONNECT FOR HEATER PACKAGE.
4. FMF SMART SHIELD
5. FACTORY MOUNTED CROSSOVER PIPING
6. 1.0 IMPORTANCE FACTOR SPECIFIED
7. ALUMINUM LADDER
8. BASIC BAFFLE DISCHARGE SOUND ATTENUATION WITH DAMPERS
9. FAN MOTOR: INVERTER CAPABLE, PREMIUM EFFICIENT
10. SERIES FLOW OPERATION
11. CROSSCOOL COIL
12. ELECTRIC HEATERS- 4KW, 240V/1PHASE
13. BASIC INLET SOUND ATTENUATION
14. FAN MOTOR: SPACE HEATERS
13. SMART SHIELD WATER TREATMENT PACKAGE: MODEL FMF-6-3 BCF.

PUMP SCHEDULE

UNIT DATA												
TAG	MANUFACTURER	FUNCTION	SERIES / MODEL	TYPE	HEAD (FT)	IMPELLER SIZE	RPM	INLET/OUTLET/ IMPELLER (")	FLOW RATE (GPM)	HP	VOLTAGE	PHASE	COMMENTS
(E)P-1	BELL & GOSSETT	COOLING TOWER	E-1510	END SUCTION	55	7.625"	1725	9	100	3	230	1	1

NOTES: 1. REBALANCE EXISTING PUMP TO GPM SHOWN

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JEFFREY MANSION- COOLING TOWER
165 NORTH PARKVIEW AVE.
COLUMBUS, OH 43215
FOR
SCHOOLEY CALDWELL ASSOCIATES
300 MARCONI BLVD, COLUMBUS OH 43215

PROJECT NUMBER: A21-SCA005

ISSUE	DATE
PERMIT	2021-12-8

GENERAL INFORMATION MECHANICAL

SHEET: M0.0

DEMOLITION NOTES:

A. WHILE EVERY ATTEMPT HAS BEEN MADE IN THE PREPARATION OF THESE PLANS TO AVOID MISTAKES, THE DESIGNER AND COMPANY CANNOT GUARANTEE AGAINST ERROR OR UNFORESEEN FIELD CONDITIONS. THE CONTRACTOR OR BUILDER MUST CHECK ALL DIMENSIONS, DETAILS AND EXISTING CONDITIONS AND REPORT ANY DISCREPANCIES.

B. REFER TO ARCHITECTURAL DOCUMENTATION FOR ADDITIONAL SCOPE/INFORMATION REGARDING DEMOLITION/REMODELING WORK, INCLUDING IDENTIFICATION OF AREAS AND ITEMS INVOLVED, AS WELL AS INFORMATION OF BOTH A GENERAL AND SPECIFIC NATURE.

C. PRIOR TO SUBMITTING BID, THIS CONTRACTOR SHALL EXAMINE THE PROJECT CONTRACT DOCUMENTS TO DEVELOP A COMPLETE UNDERSTANDING OF THE SCOPE OF WORK. FAILURE TO REVIEW ALL CONTRACT DOCUMENTS SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITIES TO PERFORM ALL WORK REQUIRED. THE CONTRACTOR SHALL, UPON REVIEW OF THE CONTRACT DOCUMENTS, ADVISE THE ARCHITECT/ENGINEER OF ANY DISCREPANCIES WHICH WILL AFFECT THE EXECUTION OF HIS WORK.

D. FIELD VERIFY THE EXTENT OF DEMOLITION WORK PRIOR TO BIDDING, AND FOR COORDINATING THE EXTENT OF DEMOLITION WITH THE INSTALLATION OF NEW CONSTRUCTION INDICATED IN THE CONTRACT DOCUMENTS.

E. WHERE EXISTING WALLS TO REMAIN ARE DAMAGED BY THE REMOVAL OF ANY EQUIPMENT, WALLS SHALL BE PATCHED AND REPAIRED TO MATCH ADJACENT SURFACES.

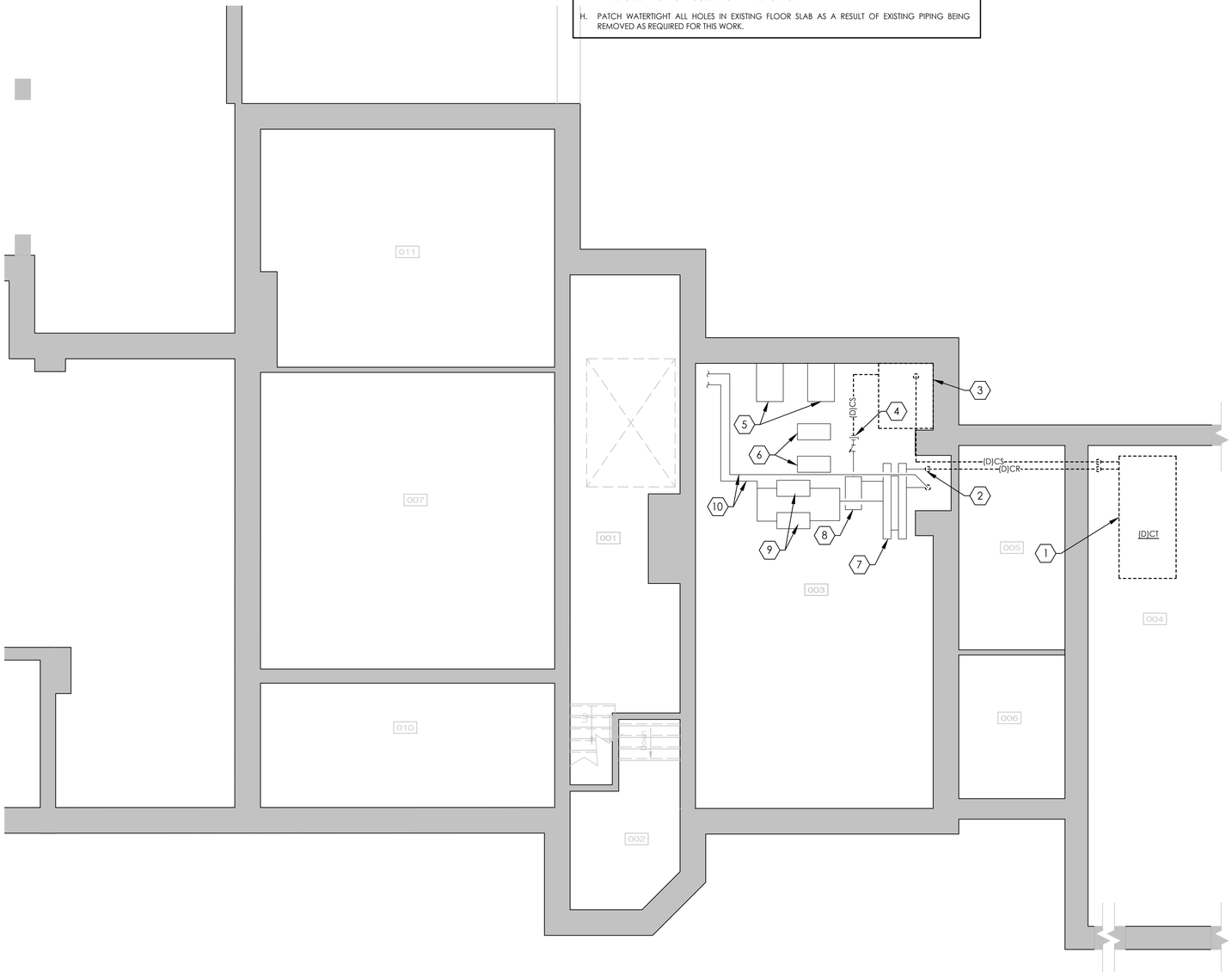
F. AFTER THE DEMOLITION OF EQUIPMENT, ITEMS, OR MATERIALS, THE RESULTING EXPOSED SURFACES SHALL BE SMOOTH AND FLUSH WITH ADJACENT EXISTING SURFACES. PATCHED SURFACES SHALL MATCH ADJACENT EXISTING MATERIALS, FINISHES, AND TEXTURES AND WILL BE PROPERLY PREPARED FOR THE FINISHING PROCESS.

G. COORDINATE WITH THE OWNER ALL PLUMBING ITEMS AND/OR MATERIALS THAT ARE TO BE SALVAGED AND STORED PRIOR TO PROCEEDING WITH DEMOLITION.

H. PATCH WATERTIGHT ALL HOLES IN EXISTING FLOOR SLAB AS A RESULT OF EXISTING PIPING BEING REMOVED AS REQUIRED FOR THIS WORK.

CODED NOTES: (#)

1. REMOVE COOLING TOWER AND ALL ASSOCIATED ACCESSORIES. CUT AND PATCH ROOF AS REQUIRED TO MAINTAIN ROOF WARRANTY. ROOF WARRANTY IS HELD BY MODERN EXTERIORS. REFER TO FLOW DIAGRAM ON DRAWING M401 FOR ADDITIONAL INFORMATION.
2. REMOVE COOLING TOWER RETURN PIPING BACK TO RISER AND CAP.
3. CHEMICAL TREATMENT SYSTEM AND ALL ASSOCIATED ACCESSORIES INCLUDING CHEMICAL TREATMENT PUMP TO BE REMOVED.
4. REMOVE COOLING TOWER SUPPLY PIPING BACK TO ISOLATION VALVE.
5. BOILERS AND HEATING WATER SYSTEM TO REMAIN.
6. HEATING WATER PUMPS TO REMAIN.
7. HEAT EXCHANGER TO REMAIN.
8. COOLING WATER PUMP TO REMAIN. REBALANCE PER SCHEDULE ON M0.0.
9. SECONDARY PUMPS TO REMAIN.
10. HEAT PUMP SUPPLY AND RETURN PIPING TO REMAIN.



1 HVAC DEMOLITION PLAN
1/4" = 1'-0"

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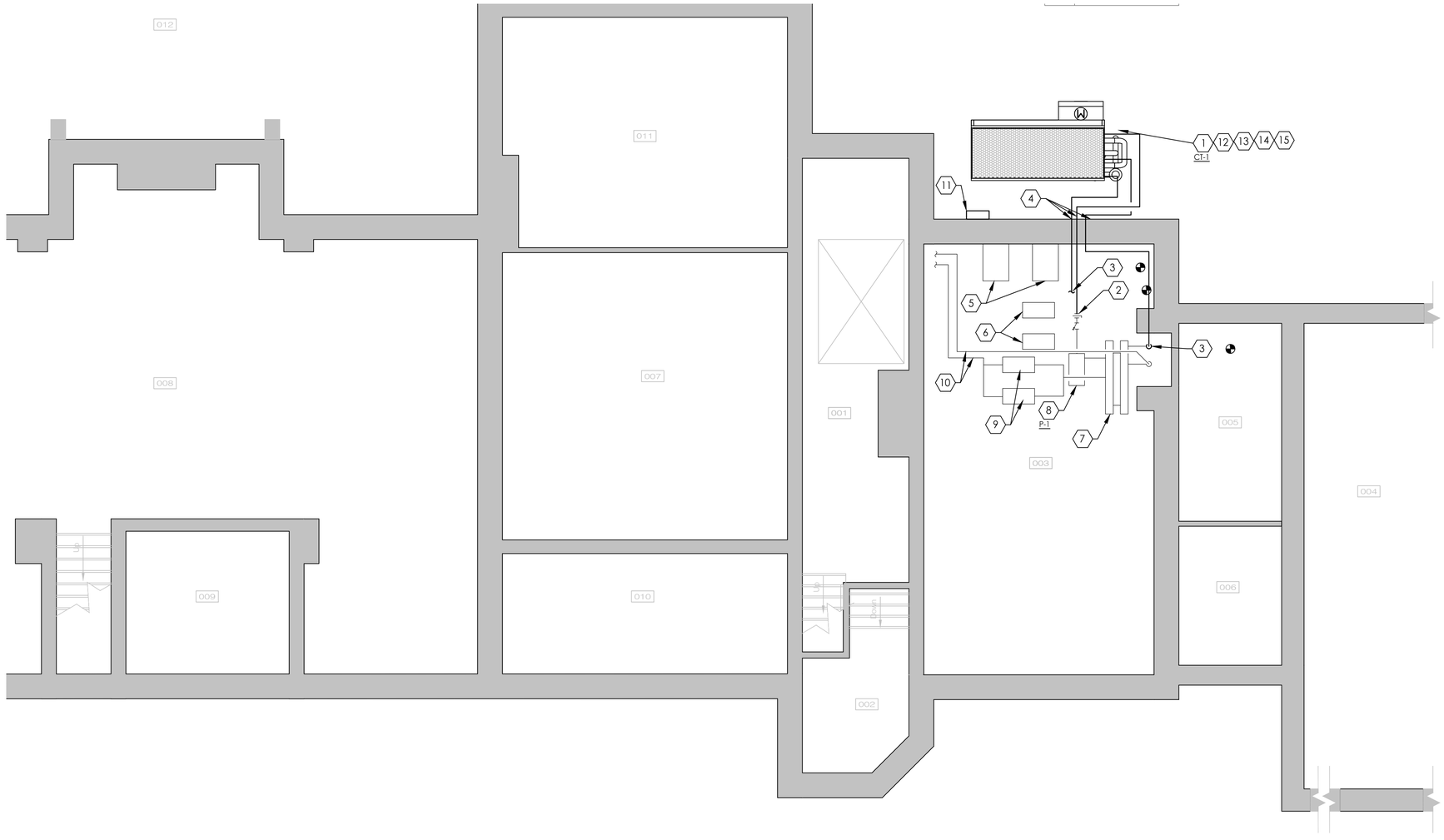
ISSUE	DATE
PERMIT	2021-12-8

HVAC DEMOLITION PLAN

SHEET:
MD.1

CODED NOTES: (#)

1. PROVIDE COOLING TOWER AT LOCATION SHOWN ON 6" CONCRETE PAD WITH VIBRATION ISOLATORS. PROVIDE ALL REQUIRED SUPPORTS AND ACCESSORIES FOR A COMPLETE INSTALLATION. COORDINATE EXACT LOCATION WITH GC/OWNER PRIOR TO CONSTRUCTION. PROVIDE DRAINAGE PIPING TO AREA DRAIN. PROVIDE 5" TOWER WATER SUPPLY AND RETURN PIPING TO TOWER AND CONNECT. REFER TO DETAILS FOR MORE INFORMATION. INSTALL PER MANUFACTURERS RECOMMENDATIONS.
2. PROVIDE CS/CR WATER TO CAPPED CS/CR WATER SUPPLY SYSTEM AND CONNECT. REFER TO DIAGRAM ON DRAWING M401 FOR MORE INFORMATION.
3. PROVIDE MAKE-UP WATER TO CAPPED MAKE-UP WATER LINE AND CONNECT. REFER TO DIAGRAM ON DRAWING M401 FOR MORE INFORMATION.
4. PROVIDE CS/CW/AND MAKE-UP WATER THROUGH WINDOW AT LOCATION SHOWN. COORDINATE EXACT ROUTING PRIOR TO CONSTRUCTION. PROVIDE FILL PANEL FOR SPACE AROUND PIPING.
5. EXISTING BOILERS TO REMAIN.
6. EXISTING BOILER PUMPS TO REMAIN.
7. EXISTING HEAT EXCHANGERS TO REMAIN.
8. EXISTING PUMP TO REMAIN. PUMP TO BE RE-BALANCED. REFER TO SCHEDULE ON DRAWING M00 FOR MORE INFORMATION.
9. EXISTING SECONDARY WATER SOURCE HEAT PUMPS TO REMAIN.
10. EXISTING HEAT PUMP SUPPLY AND RETURN PIPING TO REMAIN.
11. PROVIDE HEAT TRACE PANEL ON WALL AT LOCATION SHOWN COORDINATE EXACT LOCATION WITH OWNER.
12. PROVIDE HEAT TRACE ON ALL EXTERIOR PIPING SERVING THE COOLING TOWER INCLUDING THE TOWER WATER SUPPLY AND RETURN AND DRAIN WATER. PROVIDE HEAT TRACE ON COOLING TOWER WATER PAN AND INTERIOR PIPING. INSTALL PER MANUFACTURERS RECOMMENDATIONS. HEAT TRACE TO BE RAYCHEM XL WITH A POWER REQUIREMENT OF 5W/SQ FT, 120V/1PHASE.
13. WATER TREATMENT SYSTEM TO BE FURNISHED WITH COOLING TOWER. INSTALL PER MANUFACTURERS RECOMMENDATIONS.
14. PROVIDE REDUCED PRESSURE BACKFLOW PREVENTER, MAKE-UP WATER METER, AND PRESSURE RELIEF VALVE STACKED ON WALL. INSTALL PER MANUFACTURERS RECOMMENDATIONS. REFER TO SHEET M401 FOR ADDITIONAL INFORMATION. PROVIDE MAKE UP WATER TO COLD WATER AND CONNECT. COORDINATE EXACT LOCATION OF ASSEMBLY WITH OWNER.
15. PROVIDE BLOWDOWN ASSEMBLY AT COOLING TOWER. PROVIDE DRAINAGE PIPING TO AREA DRAIN BELOW.



1 HVAC OVERALL PLAN
1/16" = 1'-0"

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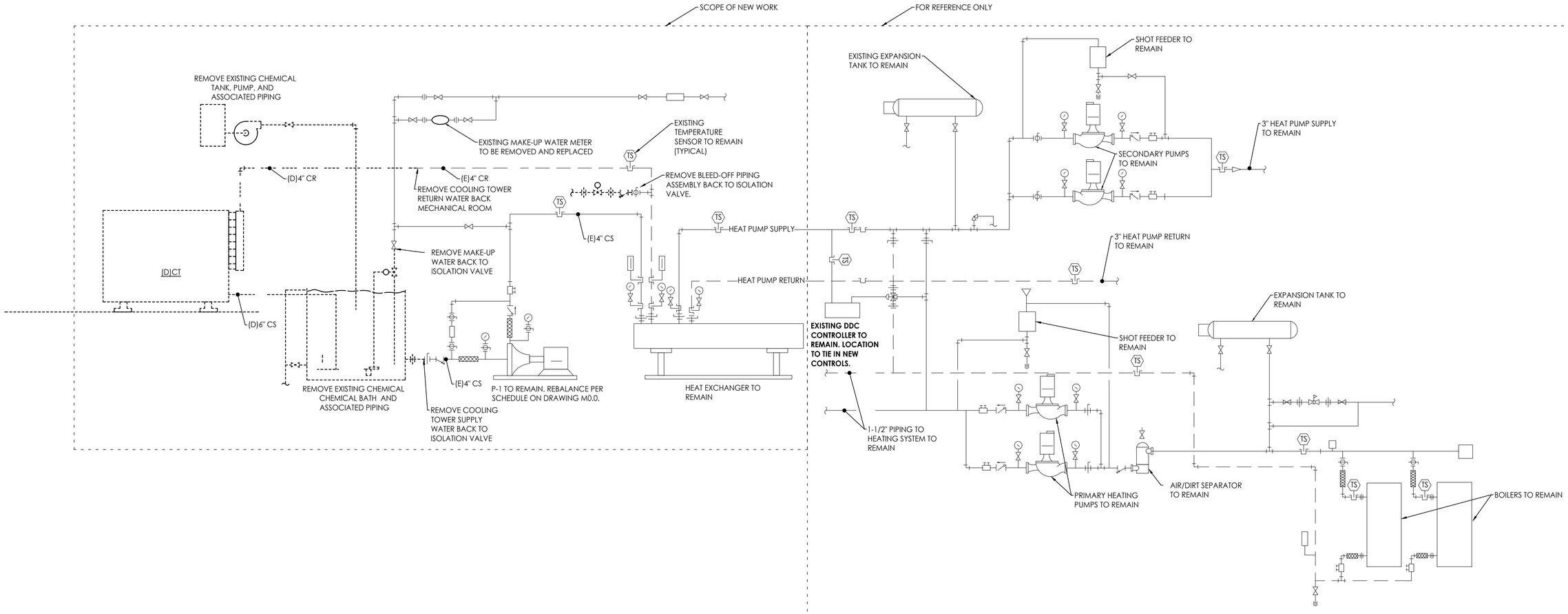
300 MARCONI BLVD, COLUMBUS OH 43215

PROJECT NUMBER: A21-SCA005

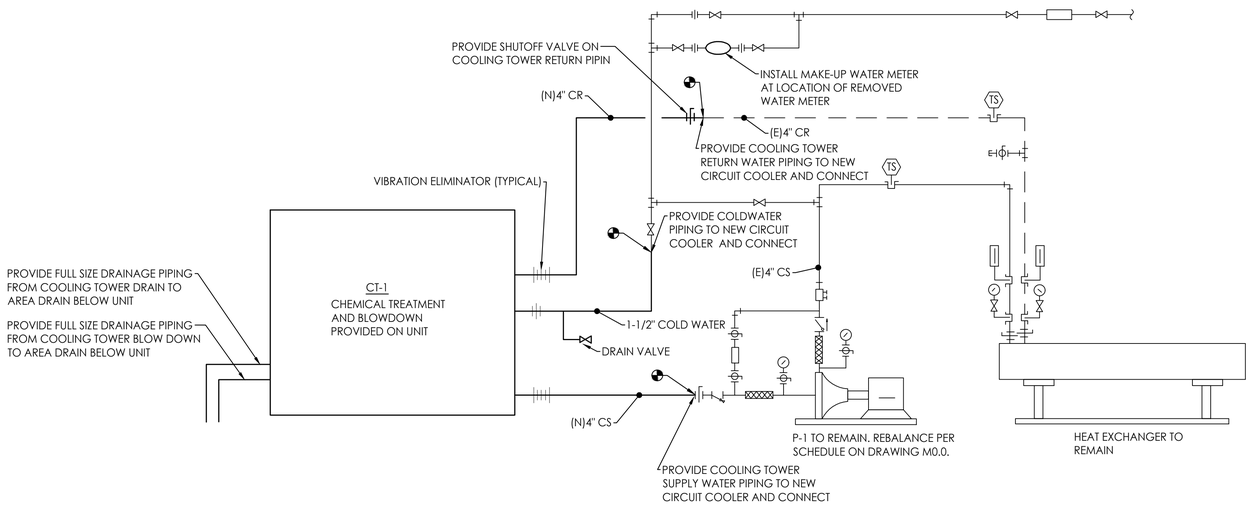
ISSUE	DATE
PERMIT	2021-12-8

HVAC OVERALL PLAN

SHEET: M1.1



1 HVAC FLOW DIAGRAM-DEMOLITION
N.T.S.



2 HVAC FLOW DIAGRAM-NEW WORK
N.T.S.

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DETAILS
MECHANICAL

SHEET:
M4.1

SPECIFICATIONS - DIVISION 23 - HVAC

SECTION 230500 - GENERAL MECHANICAL REQUIREMENTS:

HVAC SUBCONTRACTOR SHALL PROVIDE AT BID TIME A BID TO PROVIDE PREVENTATIVE MAINTENANCE SERVICES FOR ONE YEAR.

INCLUDE IN PRICE A ONE YEAR WARRANTY FOR ALL COMPONENTS OF THE THE OWNERS CONSTRUCTION PROJECT. ALL PARTS AND ALL LABOR ARE COVERED FOR ALL REPAIRS ALL INCLUSIVE FOR **2 YEARS** FROM THE OWNERS OPENING DATE.

FURNISH TO THE OWNER ALL OPERATING & MAINTENANCE MANUALS, RECORD DRAWINGS, TEST & BALANCE REPORT. CONTRACTOR SHALL COORDINATE WITH MANUFACTURER REPRESENTATIVES FOR EMPLOYEE TRAINING REQUIREMENTS FOR ALL EQUIPMENT.

MECHANICAL CONTRACTOR SHALL SUBMIT COMPLIANCE CHECKLIST TO BUILDING OFFICIAL UPON SUBSTANTIAL COMPLETION OF PROJECT.
PROVIDE EQUIPMENT INDICATED ON THE DRAWINGS, AND AS REQUIRED FOR A COMPLETE FUNCTIONING SYSTEM.

DEFINITIONS:
FURNISH MEANS TO SUPPLY AND DELIVER TO PROJECT SITE, READY FOR INSTALLATION.
INSTALL MEANS TO PLACE IN POSITION AND MAKE CONNECTIONS FOR SERVICE OR USE.
PROVIDE MEANS TO FURNISH AND INSTALL, COMPLETE AND READY FOR INTENDED USE.

WARRANTY:
PROVIDE LABOR AND MATERIALS TO REPAIR OR REPLACE DEFECTIVE PARTS AND MATERIALS AS REQUIRED FOR **TWO YEARS** AFTER SUBSTANTIAL COMPLETION OR OWNER ACCEPTANCE OF THE COMPLETED PROJECT. PROVIDE A SEPARATE LINE ITEM DEDUCT AMOUNT ON THE PROPOSAL FORM TO DELETE WARRANTY SERVICE, AT THE OWNER'S OPTION. CONTRACTOR SHALL INCLUDE ONE YEAR WARRANTY ON OWNER FURNISHED EQUIPMENT. CONTRACTOR SHALL INCLUDE COSTS FOR RECEIVING, HANDLING, STORAGE, AND HOISTING OF OWNER FURNISHED EQUIPMENT.

COORDINATION:
COORDINATE WITH THE WORK OF OTHER SECTIONS, EQUIPMENT FURNISHED BY OTHERS, REQUIREMENTS OF THE OWNER, AND WITH THE CONSTRAINTS OF THE EXISTING CONDITIONS OF THE PROJECT SITE.

TEMPERATURE CONTROLS:
REFER TO M0.0 FOR TEMPERATURE CONTROLS REQUIREMENTS.

END OF SECTION

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. SUBMITTALS:
   1. CERTIFIED TAB REPORTS.

B. TAB FIRM QUALIFICATIONS: NBC CERTIFIED.

C. TAB REPORT FORMS: STANDARD TAB CONTRACTOR'S FORMS APPROVED BY ARCHITECT.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXAMINATION

A. EXAMINE THE CONTRACT DOCUMENTS TO BECOME FAMILIAR WITH PROJECT REQUIREMENTS AND TO DISCOVER CONDITIONS IN SYSTEMS' DESIGNS THAT MAY PRECLUDE PROPER TAB OF SYSTEMS AND EQUIPMENT.

B. EXAMINE THE APPROVED SUBMITTALS FOR HVAC SYSTEMS AND EQUIPMENT.

C. EXAMINE SYSTEMS FOR INSTALLED BALANCING DEVICES, SUCH AS TEST PORTS, GAGE COCKS, THERMOMETER WELLS, FLOW-CONTROL DEVICES, BALANCING VALVES AND FITTINGS, AND MANUAL VOLUME DAMPERS. VERIFY THAT LOCATIONS OF THESE BALANCING DEVICES ARE ACCESSIBLE.

D. EXAMINE SYSTEM AND EQUIPMENT INSTALLATIONS AND VERIFY THAT FIELD QUALITY-CONTROL TESTING, CLEANING, AND ADJUSTING SPECIFIED IN INDIVIDUAL SECTIONS HAVE BEEN PERFORMED.

E. EXAMINE HVAC EQUIPMENT AND FILTERS AND VERIFY THAT BEARINGS ARE GREASED, BELTS ARE ALIGNED AND TIGHT, AND EQUIPMENT WITH FUNCTIONING CONTROLS IS READY FOR OPERATION.

F. EXAMINE TERMINAL UNITS, SUCH AS VARIABLE-AIR-VOLUME BOXES, AND VERIFY THAT THEY ARE ACCESSIBLE AND THEIR CONTROLS ARE CONNECTED AND FUNCTIONING.

G. EXAMINE AUTOMATIC TEMPERATURE SYSTEM COMPONENTS TO VERIFY THE FOLLOWING:
   1. DAMPERS, VALVES, AND OTHER CONTROLLED DEVICES ARE OPERATED BY THE INTENDED CONTROLLER.
   2. DAMPERS AND VALVES ARE IN THE POSITION INDICATED BY THE CONTROLLER.
   3. INTEGRITY OF DAMPERS AND VALVES FOR FREE AND FULL OPERATION AND FOR TIGHTNESS OF FULLY CLOSED AND FULLY OPEN POSITIONS. THIS INCLUDES DAMPERS IN MULTIZONE UNITS, MIXING BOXES, AND VARIABLE-AIR-VOLUME TERMINALS.
   4. AUTOMATIC MODULATING AND SHUTOFF VALVES, INCLUDING TWO-WAY VALVES AND THREE-WAY MIXING AND DIVERTING VALVES, ARE PROPERLY CONNECTED.
   5. THERMOSTATS AND HUMIDISTATS ARE LOCATED TO AVOID ADVERSE EFFECTS OF SUNLIGHT, DRAFTS, AND COLD WALLS.
   6. SENSORS ARE LOCATED TO SENSE ONLY THE INTENDED CONDITIONS.
   7. SEQUENCE OF OPERATION FOR CONTROL MODES IS ACCORDING TO THE CONTRACT DOCUMENTS.
   8. CONTROLLER SET POINTS ARE SET AT INDICATED VALUES.
   9. INTERLOCKED SYSTEMS ARE OPERATING.
   10. CHANGEOVER FROM HEATING TO COOLING MODE OCCURS ACCORDING TO INDICATED VALUES.

H. REPORT DEFICIENCIES DISCOVERED BEFORE AND DURING PERFORMANCE OF TEST AND BALANCE PROCEDURES.

3.2 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. PERFORM TESTING AND BALANCING PROCEDURES ON EACH SYSTEM ACCORDING TO THE PROCEDURES CONTAINED IN AABC'S "NATIONAL STANDARDS FOR TOTAL SYSTEM BALANCE", NBC, ASHRAE 111, NEBB'S "PROCEDURAL STANDARDS FOR TESTING, ADJUSTING, AND BALANCING OF ENVIRONMENTAL SYSTEMS" OR SMACNA'S "HVAC SYSTEMS - TESTING, ADJUSTING, AND BALANCING" AND IN THIS SECTION.

B. CUT INSULATION, DUCTS, PIPES, AND EQUIPMENT CABINETS FOR INSTALLATION OF TEST PROBES TO THE MINIMUM EXTENT NECESSARY FOR TAB PROCEDURES. AFTER TESTING AND BALANCING, PATCH PROBE HOLES IN DUCTS WITH SAME MATERIAL AND THICKNESS AS USED TO CONSTRUCT DUCTS. INSTALL AND JOIN NEW INSULATION THAT MATCHES REMOVED MATERIALS. RESTORE INSULATION, COVERINGS, VAPOR BARRIER, AND FINISH.

C. MARK EQUIPMENT AND BALANCING DEVICES, INCLUDING DAMPER-CONTROL POSITIONS, VALVE POSITION INDICATORS, FAN-SPEED-CONTROL LEVERS, AND SIMILAR CONTROLS AND DEVICES, WITH PAINT OR OTHER SUITABLE, PERMANENT IDENTIFICATION MATERIAL TO SHOW FINAL SETTINGS.

3.3 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. PREPARE SCHEMATIC DIAGRAMS OF SYSTEMS' "AS-BUILT" DUCT LAYOUTS.

B. FOR VARIABLE-AIR-VOLUME SYSTEMS, DEVELOP A PLAN TO SIMULATE DIVERSITY.

C. DETERMINE THE BEST LOCATIONS IN MAIN AND BRANCH DUCTS FOR ACCURATE DUCT AIRFLOW MEASUREMENTS.

D. VERIFY THAT MOTOR STARTERS ARE EQUIPPED WITH PROPERLY SIZED THERMAL PROTECTION.

E. CHECK FOR AIRFLOW BLOCKAGES.

F. CHECK CONDENSATE DRAINS FOR PROPER CONNECTIONS AND FUNCTIONING.

G. CHECK FOR PROPER SEALING OF AIR-HANDLING UNIT COMPONENTS.

H. CHECK FOR PROPER SEALING OF AIR DUCT SYSTEM.

3.4 TOLERANCES

A. SET HVAC SYSTEM AIRFLOW AND WATER FLOW RATES WITHIN THE FOLLOWING TOLERANCES:
   1. SUPPLY, RETURN, AND EXHAUST FANS AND EQUIPMENT WITH FANS: PLUS OR MINUS 5 PERCENT.
   2. AIR OUTLETS AND INLETS: PLUS OR MINUS 10 PERCENT.

END OF SECTION

SECTION 23 2113
HYDRONIC PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. HYDRONIC SYSTEM REQUIREMENTS.

B. CONDENSER WATER PIPING, ABOVE GRADE.

C. EQUIPMENT DRAINS AND OVERFLOWS.

D. PIPE HANGERS AND SUPPORTS.

E. UNIONS, FLANGES, MECHANICAL COUPLINGS, AND DIELECTRIC CONNECTIONS.

F. VALVES:
   1. BUTTERFLY VALVES.
   2. CHECK VALVES.
   3. PRESSURE INDEPENDENT TEMPERATURE CONTROL VALVES AND BALANCING VALVES.

G. FLOW CONTROLS.

1.02 RELATED REQUIREMENTS

A. SECTION 23 2500 - HVAC WATER TREATMENT: PIPE CLEANING.

1.03 REFERENCE STANDARDS

A. ANSI/FCI 70-2 - CONTROL VALVE SEAT LEAKAGE; 2013.

B. ASME BPVC-IX - BOILER AND PRESSURE VESSEL CODE, SECTION IX - QUALIFICATION STANDARD FOR WELDING, BRAZING, AND FUSING PROCEDURES; WELDERS; BRAZERS; AND WELDING, BRAZING, AND FUSING OPERATORS; 2021.

C. ASME B16.15 - CAST COPPER ALLOY THREADED FITTINGS: CLASSES 125 AND 250; 2018.

D. ASME B16.34 - VALVES -- FLANGED, THREADED, AND WELDING END; 2020.

E. ASME B31.9 - BUILDING SERVICES PIPING; 2020.

F. ASTM D1785 - STANDARD SPECIFICATION FOR POLY(VINYL CHLORIDE) (PVC) PLASTIC PIPE, SCHEDULES 40, 80, AND 120; 2021A.

G. ASTM D2241 - STANDARD SPECIFICATION FOR POLY (VINYL CHLORIDE) (PVC) PRESSURE-RATED PIPE (SDR SERIES); 2020.

H. ASTM D2466 - STANDARD SPECIFICATION FOR POLY(VINYL CHLORIDE) (PVC) PLASTIC PIPE FITTINGS, SCHEDULE 40; 2021.

I. ASTM D2467 - STANDARD SPECIFICATION FOR POLY(VINYL CHLORIDE) (PVC) PLASTIC PIPE FITTINGS, SCHEDULE 80; 2020.

J. ASTM D2855 - STANDARD PRACTICE FOR THE TWO-STEP (PRIMER & SOLVENT CEMENT) METHOD OF JOINING POLY (VINYL CHLORIDE) (PVC) OR CHLORINATED POLY (VINYL CHLORIDE) (CPVC) PIPE AND PIPING COMPONENTS WITH TAPERED SOCKETS; 2020.

K. ASTM F1476 - STANDARD SPECIFICATION FOR PERFORMANCE OF GASKETED MECHANICAL COUPLINGS FOR USE IN PIPING APPLICATIONS; 2007 (REAPPROVED 2019).

L. AWWA C606 - GROOVED AND SHOULDERED JOINTS; 2015.

M. MSS SP-58 - PIPE HANGERS AND SUPPORTS - MATERIALS, DESIGN, MANUFACTURE, SELECTION, APPLICATION, AND INSTALLATION; 2018.

1.04 SUBMITTALS

A. SEE SECTION 01 3000 - ADMINISTRATIVE REQUIREMENTS FOR SUBMITTAL PROCEDURES.

B. PRODUCT DATA:
   1. INCLUDE DATA ON PIPE MATERIALS, PIPE FITTINGS, VALVES, AND ACCESSORIES.
   2. PROVIDE MANUFACTURERS CATALOG INFORMATION.

1.05 QUALITY ASSURANCE

A. MANUFACTURER QUALIFICATIONS: COMPANY SPECIALIZING IN MANUFACTURING PRODUCTS OF THE TYPE SPECIFIED IN THIS SECTION, WITH MINIMUM THREE YEARS OF DOCUMENTED EXPERIENCE.

1.06 DELIVERY, STORAGE, AND HANDLING

A. ACCEPT VALVES ON SITE IN SHIPPING CONTAINERS WITH LABELING IN PLACE. INSPECT FOR DAMAGE.

B. PROVIDE TEMPORARY END CAPS AND CLOSURES ON PIPING AND FITTINGS. MAINTAIN IN PLACE UNTIL INSTALLATION.

C. PROTECT PIPING SYSTEMS FROM ENTRY OF FOREIGN MATERIALS BY TEMPORARY COVERS, COMPLETING SECTIONS OF THE WORK, AND ISOLATING PARTS OF COMPLETED SYSTEM.

PART 2 PRODUCTS

2.01 HYDRONIC SYSTEM REQUIREMENTS

A. COMPLY WITH ASME B31.9 AND APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.

B. PIPING: PROVIDE PIPING, FITTINGS, HANGERS, AND SUPPORTS AS REQUIRED, AS INDICATED, AND AS FOLLOWS:
   1. WHERE MORE THAN ONE PIPING SYSTEM MATERIAL IS SPECIFIED, PROVIDE JOINING FITTINGS THAT ARE COMPATIBLE WITH PIPING MATERIALS AND ENSURE THAT THE INTEGRITY OF THE SYSTEM IS NOT JEOPARDIZED.
   2. USE NON-CONDUCTING DIELECTRIC CONNECTIONS WHENEVER JOINTING DISSIMILAR METALS.
   3. GROOVED MECHANICAL JOINTS MAY BE USED IN ACCESSIBLE LOCATIONS ONLY.
      a. ACCESSIBLE LOCATIONS INCLUDE THOSE EXPOSED ON INTERIOR OF BUILDING, IN PIPE CHASES, AND IN MECHANICAL ROOMS, ABOVEGROUND OUTDOORS, AND AS APPROVED BY ARCHITECT.
      b. USE RIGID JOINTS UNLESS OTHERWISE INDICATED.
   4. PROVIDE PIPE HANGERS AND SUPPORTS IN ACCORDANCE WITH ASME B31.9 OR MSS SP-58 UNLESS INDICATED OTHERWISE.

C. PIPE-TO-VALVE AND PIPE-TO-EQUIPMENT CONNECTIONS: USE FLANGES, UNIONS, OR GROOVED COUPLINGS TO ALLOW DISCONNECTION OF COMPONENTS FOR SERVICING; DO NOT USE DIRECT WELDED, SOLDERED, OR THREADED CONNECTIONS.

D. VALVES: PROVIDE VALVES WHERE INDICATED:
   1. PROVIDE DRAIN VALVES WHERE INDICATED, AND IF NOT INDICATED, PROVIDE AT LEAST AT MAIN SHUT-OFF, LOW POINTS OF PIPING, BASES OF VERTICAL RISERS, AND AT EQUIPMENT. USE 3/4 INCH (20 MM) GATE VALVES WITH CAP; PIPE TO NEAREST FLOOR DRAIN.
   2. FOR THROTTLING, BYPASS, OR MANUAL FLOW CONTROL SERVICES, USE GLOBE, BALL, OR BUTTERFLY VALVES.
   3. FOR THROTTLING AND ISOLATION SERVICE IN CHILLED AND CONDENSER WATER SYSTEMS, USE ONLY BUTTERFLY VALVES.
   4. FOR SHUT-OFF AND TO ISOLATE PARTS OF SYSTEMS OR VERTICAL RISERS, USE GATE, BALL, OR BUTTERFLY VALVES.
   5. FOR THROTTLING SERVICE, USE PLUG COCKS. USE NON-LUBRICATED PLUG COCKS ONLY WHEN SHUT-OFF OR ISOLATING VALVES ARE ALSO PROVIDED.

E. WELDING MATERIALS AND PROCEDURES: COMPLY WITH ASME BPVC-IX.

2.02 CONDENSER WATER PIPING, ABOVE GRADE

A. PVC PIPE: ASTM D1785, SCHEDULE 40, OR ASTM D2241, SDR 21 OR 26.
   1. FITTINGS: ASTM D2466 OR ASTM D2467, PVC.
   2. JOINTS: SOLVENT WELDED IN ACCORDANCE WITH ASTM D2855.

2.03 EQUIPMENT DRAINS AND OVERFLOWS

A. PVC PIPE: ASTM D1785, SCHEDULE 40, OR ASTM D2241, SDR 21 OR 26.
   1. FITTINGS: ASTM D2466 OR D2467, PVC.
   2. JOINTS: SOLVENT WELDED IN ACCORDANCE WITH ASTM D2855.

2.04 PIPE HANGERS AND SUPPORTS

A. PROVIDE HANGERS AND SUPPORTS THAT COMPLY WITH MSS SP-58.
   1. IF TYPE OF HANGER OR SUPPORT FOR A PARTICULAR SITUATION IS NOT INDICATED, SELECT APPROPRIATE TYPE USING MSS SP-58 RECOMMENDATIONS.
   2. HANGERS FOR PIPE SIZES 1/2 TO 1-1/2 INCHES (13 TO 38 MM): MALLEABLE IRON, ADJUSTABLE SWIVEL, SPLIT RING.
   3. HANGERS FOR COLD PIPE SIZES 2 INCHES (50 MM) AND GREATER: CARBON STEEL, ADJUSTABLE, CLEVIS.
   4. HANGERS FOR HOT PIPE SIZES 2 TO 4 INCHES (50 TO 100 MM): CARBON STEEL, ADJUSTABLE, CLEVIS.

B. IN GROOVED INSTALLATIONS, USE RIGID COUPLINGS WITH OFFSETTING ANGLE-PATTERN BOLT PADS OR WITH WEDGE-SHAPED GROOVES IN HEADER PIPING TO PERMIT SUPPORT AND HANGING IN ACCORDANCE WITH ASME B31.9.

2.05 UNIONS, FLANGES, MECHANICAL COUPLINGS, AND DIELECTRIC CONNECTIONS

A. UNIONS FOR PIPE OF 2 INCHES (50 MM, DN) AND LESS:

B. FLANGES FOR PIPE 2 INCHES (50 MM, DN) AND GREATER:

C. MECHANICAL COUPLINGS FOR GROOVED AND SHOULDERED JOINTS: TWO OR MORE CURVED HOUSING SEGMENTS WITH CONTINUOUS KEY TO ENGAGE PIPE GROOVE, CIRCULAR C-PROFILE GASKET, AND BOLTS TO SECURE AND COMPRESS GASKET.
   1. DIMENSIONS AND TESTING: IN ACCORDANCE WITH AWWA C606.
   2. MECHANICAL COUPLINGS: COMPLY WITH ASTM F1476.
   3. BOLTS AND NUTS: HOT DIPPED GALVANIZED OR ZINC-ELECTROPLATED STEEL.
   4. WHEN PIPE IS FIELD GROOVED, PROVIDE COUPLING MANUFACTURER'S GROOVING TOOLS.

2.06 BUTTERFLY VALVES

A. MANUFACTURERS:
   1. ANVIL INTERNATIONAL: WWW.ANVILINTL.COM/#SLE.
   2. APOLLO VALVES: WWW.APOLLOVALVES.COM/#SLE.
   3. VICTAULIC COMPANY: WWW.VICTAULIC.COM/#SLE.

B. BODY: CAST OR DUCTILE IRON WITH RESILIENT REPLACEABLE EPDM SEAT, WAFER, LUG, OR GROOVED ENDS, EXTENDED NECK.

C. DISC: CONSTRUCT OF ALUMINUM BRONZE, STAINLESS STEEL, OR DUCTILE IRON WITH EPDM ENCAPSULATION.

D. OPERATOR: 10 POSITION LEVER HANDLE.

2.07 SWING CHECK VALVES

A. MANUFACTURERS:
   1. ANVIL INTERNATIONAL: WWW.ANVILINTL.COM/#SLE.
   2. APOLLO VALVES: WWW.APOLLOVALVES.COM/#SLE.
   3. VICTAULIC COMPANY; _____: WWW.VICTAULIC.COM/#SLE.

2.08 SPRING LOADED CHECK VALVES

A. MANUFACTURERS:
   1. ANVIL INTERNATIONAL: WWW.ANVILINTL.COM/#SLE.
   2. VICTAULIC COMPANY: WWW.VICTAULIC.COM/#SLE.

B. IRON BODY, BRONZE TRIM, SPLIT PLATE, HINGED WITH STAINLESS STEEL SPRING, RESILIENT SEAL BONDED TO BODY, WAFER, OR THREADED LUG ENDS.

2.09 PRESSURE INDEPENDENT TEMPERATURE CONTROL VALVES AND BALANCING VALVES

A. MANUFACTURERS:
   1. DANFOSS; AB-QM VALVE: WWW.DANFOSS.COM/#SLE.
   2. SCHNEIDER ELECTRIC: WWW.SCHNEIDER-ELECTRIC.US/#SLE.

B. CONTROL VALVES: FACTORY-FABRICATED PRESSURE INDEPENDENT WITH INTERNAL DIFFERENTIAL PRESSURE REGULATOR (DPRV), WHICH AUTOMATICALLY ADJUSTS TO NORMAL CHANGES IN SYSTEM PRESSURE AND PROVIDES 100 PERCENT CONTROL VALVE AUTHORITY AT ALL POSITIONS OF THE VALVE.
   1. MAINTAIN PROPORTIONAL AND LINEAR FLOW COIL CHARACTERISTICS.
   2. PICV TO ACCURATELY CONTROL THE FLOW FROM 0 TO 100 PERCENT FULL RATED FLOW WITH AN OPERATING PRESSURE DIFFERENTIAL RANGE OF 3 TO 60 PSIG (21 TO 414 KPA).
   3. PROVIDE ANSI/FCI 70-2 CLASS 4 SHUT-OFF ON ALL SIZES AND FIELD SERVICEABLE.
   4. PROVIDE CONTROL VALVE TO INCORPORATE CONTROL, BALANCING, AND FLOW LIMITING. HYDRONIC SYSTEM PRESSURE INDEPENDENT CONTROL VALVE BODIES TO COMPLY WITH ASME B16.34 OR ASME B16.15 PRESSURE AND TEMPERATURE CLASS RATINGS BASED ON THE DESIGN OPERATING TEMPERATURE AND 150 PERCENT OF THE SYSTEM DESIGN OPERATING PRESSURE AND HAVE THE FOLLOWING CHARACTERISTICS:
      a. 2 NPS (50 DN) AND SMALLER: CLASS 150 BRONZE OR BRASS BODY WITH UNION CONNECTIONS, STAINLESS STEEL TRIM, STAINLESS STEEL RISING STEM, STAINLESS STEEL DISC OR BALL, AND SCREWED ENDS WITH BACKSEATING CAPACITY REPACKABLE UNDER PRESSURE.
      b. 2-1/2 NPS (65 DN) AND LARGER: CLASS 125 IRON OR DUCTILE IRON BODY, STAINLESS STEEL TRIM, STAINLESS STEEL RISING STEM, STAINLESS STEEL DISC OR BALL, FLANGED ENDS WITH BACKSEATING CAPACITY REPACKABLE UNDER PRESSURE.
      c. PRESSURE CONTROL SEAT: BRASS CONSTRUCTION WITH VULCANIZED EPDM.
      d. SIZING: LINE-SIZE.

C. ELECTRONIC ACTUATORS: DIRECT-MOUNTED, SELF-CALIBRATING TYPE DESIGNED FOR MINIMUM 60,000 FULL-STROKE CYCLES AT RATED FORCE.

D. PROVIDE ACTUATOR WITH VISIBLE POSITION INDICATION. FAIL POSITIONS ON POWER FAILURE TO INCLUDE IN-PLACE, OPEN OR CLOSED AS INDICATED IN THE CONTROLS SPECIFICATIONS.

2.10 FLOW CONTROLS

A. MANUFACTURERS:
   1. ANVIL INTERNATIONAL; _____: WWW.ANVILINTL.COM/#SLE.
   2. BELL & GOSSETT, A BRAND OF XYLEM, INC; _____: WWW.BELLGOSSETT.COM/#SLE.
   3. ITT BELL & GOSSETT; _____: WWW.BELLGOSSETT.COM/#SLE.
   4. TACO, INC; _____: WWW.TACO-HVAC.COM/#SLE.
   5. VICTAULIC COMPANY; _____: WWW.VICTAULIC.COM/#SLE.

B. CONSTRUCTION: CLASS 125, BRASS OR BRONZE BODY WITH UNION ON INLET AND OUTLET, TEMPERATURE AND PRESSURE TEST PLUG ON INLET AND OUTLET, BLOWDOWN/BACKFLUSH DRAIN.

C. CALIBRATION: CONTROL FLOW WITHIN 10 PERCENT OF SELECTED RATING, OVER OPERATING PRESSURE RANGE OF 10 TIMES MINIMUM PRESSURE REQUIRED FOR CONTROL, MINIMUM PRESSURE 2 PSI (13.7 KPA).

PART 3 EXECUTION

3.01 PREPARATION

A. REAM PIPE AND TUBE ENDS. REMOVE BURRS. BEVEL PLAIN END FERROUS PIPE.

B. PREPARE PIPE FOR GROOVED MECHANICAL JOINTS AS REQUIRED BY COUPLING MANUFACTURER.

C. REMOVE SCALE AND DIRT ON INSIDE AND OUTSIDE BEFORE ASSEMBLY.

D. PREPARE PIPING CONNECTIONS TO EQUIPMENT USING JOINTING SYSTEM SPECIFIED.

E. KEEP OPEN ENDS OF PIPE FREE FROM SCALE AND DIRT. PROTECT OPEN ENDS WITH TEMPORARY PLUGS OR CAPS.

F. AFTER COMPLETION, FILL, CLEAN, AND TREAT SYSTEMS. SEE SECTION 23 2500 FOR ADDITIONAL REQUIREMENTS.

3.02 INSTALLATION

A. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

B. PVC PIPE: MAKE SOLVENT-WELDED JOINTS IN ACCORDANCE WITH ASTM D2855.

C. ROUTE PIPING IN ORDERLY MANNER, PARALLEL TO BUILDING STRUCTURE, AND MAINTAIN GRADIENT.

D. INSTALL PIPING TO CONSERVE BUILDING SPACE AND TO AVOID INTERFERENCE WITH USE OF SPACE.

E. GROUP PIPING WHENEVER PRACTICAL AT COMMON ELEVATIONS.

F. SLOPE PIPING AND ARRANGE TO DRAIN AT LOW POINTS.

END OF SECTION

annex ENGINEERING GROUP
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JEFFREY MANSION- COOLING TOWER
165 NORTH PARKVIEW AVE.
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FOR
SCHOOLEY CALDWELL ASSOCIATES
300 MARCONI BLVD, COLUMBUS OH 43215

PROJECT NUMBER:
A21-SCA005

ISSUE	DATE
PERMIT	2021-12-8

MECHANICAL SPECIFICATIONS

SHEET:
M7.1

Mechanical Specification

evapco for LIFE
Andrew Stotz
2300 CityGate Drive
Suite 100
Columbus, Ohio 43219
andrew_stotz@marley.com

SECTION 23 65 00
CLOSED CIRCUIT COOLERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes factory assembled and tested, closed circuit mechanical forced-draft vertical discharge closed circuit cooler.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, pressure drop, performance curves with selected points indicated, furnished specialties, and accessories.

B. Shop Drawings: Complete set of manufacturer's prints of equipment assemblies, control panels, sections and elevations, and unit isolation. Include the following:

1. Assembled unit dimensions.
2. Weight and load distribution.
3. Required clearances for maintenance and operation.
4. Sizes and locations of piping and wiring connections.
5. Wiring Diagrams: For power, signal, and control wiring. Differentiate between manufacturer installed and field installed wiring.

C. Operation and Maintenance Data: Each unit to include operation and maintenance manual.

1.4 QUALITY ASSURANCE

A. Verification of Performance:

1. The thermal performance shall be certified by the Cooling Technology Institute in accordance with CTI Certification Standard STD-201. Lacking such certification, a field acceptance test shall be conducted within the warranty period in accordance with CTI Acceptance Test Code ATC-105, by a Certified CTI Thermal Testing Agency.
2. Unit Sound Performance ratings shall be tested according to CTI ATC 128 standard, Test Code for Measurement of Sound from Water-Cooling Towers, by an Independent CTI-licensed sound test agency. Sound ratings shall not exceed specified ratings.

1.5 WARRANTY

A. Submit a written warranty executed by the manufacturer, agreeing to repair or replace components of the unit that fail in materials and workmanship within the specified warranty period.

1. The Entire Unit shall have a comprehensive one (1) year warranty against defects in materials and workmanship from startup, not to exceed eighteen (18) month from shipment of the unit.

2. Fan Motor/Drive System: Warranty Period shall be Five (5) years from date of unit shipment from Factory (fan motor(s), fan(s), fan shaft(s), bearings, mechanical support, sheaves, bushings and belt(s)).
3. Heat Transfer Coil: Warranty Period shall be One (1) year from date of unit shipment from Factory.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide closed circuit coolers manufactured by one of the following:

1. EVAPCO Model LSWE 4-5J9-Z-F
2. Approved Substitute

2.2 THERMAL PERFORMANCE

A. Each unit shall be capable to cool 100.0 GPM of water entering at 94.0° F leaving at 83.0° F at a design entering wet bulb of 77.0° F with a pressure drop across the coil not to exceed 7.39 psi.

2.3 IBC COMPLIANCE

A. The unit structure shall be designed, analyzed, and constructed in accordance with the latest edition of International Building Code (IBC) for: $I_P = 1.0$, $S_{DS} = 0.67$; z/h = 0, P = 288 psf.

2.4 COMPONENTS

A. Description: Factory assembled and tested, forced draft counter flow closed circuit cooler.

B. Materials of Construction

1. All panels including the fan snouts, housings and supports shall be constructed of heavy gauge mill hot-dip galvanized steel. All galvanized steel shall be coated with a minimum of 2.35 ounces of zinc per square foot of area (G-235 Hot-Dip Galvanized Steel designation). During fabrication, all galvanized steel panel edges shall be coated with a 95% pure zinc-rich compound.

C. Fan(s):

1. Fans shall be forward curved centrifugal of hot dipped galvanized construction. The fans shall be factory installed, and statically and dynamically balanced for vibration free operation

D. Drift Eliminators

1. Drift eliminators shall be constructed entirely of Polyvinyl Chloride (PVC) in easily handled sections. Design shall incorporate three changes in air direction and limit the water carryover to a maximum of 0.001% of the recirculating water rate. Drift eliminators shall be self-extinguishing, have a flame spread of less than 25 under ASTM E84, and shall be resistant to rot, decay and biological attack.

E. Water Distribution System

1. Spray nozzles shall be precision molded ABS with large orifice threaded into branch piping with internal sludge ring to eliminate clogging. Spray header and branches shall be schedule 40 Polyvinyl Chloride (PVC) for corrosion resistance.

F. Heat Transfer Media

1. Heat transfer coil shall be elliptical tubes of prime surface steel, encased in steel

framework with entire assembly hot-dip galvanized after fabrication. The coil assembly shall be designed with sloping tubes for liquid drainage and air pressure tested to 390 psig air under water. Coil shall be in compliance with ASME/ANSI B31.5.

G. Pump

1. Unit shall have EISA close-coupled centrifugal pump with mechanical seal. The pump shall be installed in a vertical position so that water will drain from the pump when the cold water basin is emptied. Pump motor shall be totally enclosed with protective canopy for outdoor operation.

H. Bleed-off

1. Unit shall have a waste water bleed line with a manual adjustable valve provided.

I. Air Inlet Screens

1. Protective screens shall be provided over air inlet

J. Electronic Water Level Control

1. Electronic water level control package shall have three (3) stainless steel water level sensors (one (1) high level, one (1) low level and one (1) ground) with a NEMA 4x enclosure mounted in a cleanable Schedule 40 PVC external standpipe with slow closing solenoid valve(s) and "y" strainer(s). Wiring is not included and components must be field mounted. Valves shall be sized for 25 psi minimum to 125 psi maximum pressure. Standpipe may require heat tracing by others in cold weather applications.

K. Pan Strainer

1. Pan Strainer(s) shall be all Type 304 Stainless Steel construction with large area removable perforated screens.

L. Pipe Connection Type

1. Any connections provided with a Groove (GVD) or Beveled for Welding/Grooved (BFW/GVD) shall conform to standard groove specification (SGS).

2.5 MOTORS AND DRIVES

A. General requirements for motors are specified in Division 23 Section "Motors"

B. Fan Motor

1. Fan motor(s) shall be totally enclosed, ball bearing type electric motor(s) suitable for moist air service. Motor(s) are Premium Efficient, Class F insulated, 1.15 service factor design. Inverter rated per NEMA MG1 Part 31.4.4.2 and suitable for variable torque applications and constant torque speed range with properly sized and adjusted variable frequency drives.
2. Fan motor(s) shall include strip-type space heaters with separate leads brought to the motor conduit box.

C. Fan Drive

1. The fan drive shall be V-belt type with QD tapered bushings designed for 150% of the motor nameplate power. The belt material shall be neoprene reinforced with polyester cord and specifically designed for evaporative equipment service. Belt adjustment shall be accomplished from the exterior of the unit.

D. Fan Shaft

1. Fan shaft shall be tubular, ground and polished steel with forged bearing journals. Exposed surface shall be coated with rust preventative.

E. Fan Shaft Bearings

1. Fan Shaft Bearings shall be heavy-duty, self-aligning ball type bearings with extended lubrication lines to grease fittings located on exterior of unit.

2.6 MAINTENANCE ACCESS

A. Fan Section

1. Fan screens shall be removable for fan motor and drive access at grade.

B. Basin Section

1. Circular access door shall be located above the basin to allow for easy access to pan interior

C. Ladder

1. A vertical aluminum ladder shall be provided for access to the water distribution and heat transfer media.

2.7 ACCESSORIES

A. Basin Heater Package

1. Cold water basin shall be fitted with copper element, electric immersion heater(s) with a separate thermostat and low water protection device. Heaters shall be selected to maintain +40° F pan water at -20° F ambient temperature.
2. Electric immersion heater package shall include a factory-supplied NEMA 4x enclosure containing a magnetic contactor with 120 VAC control circuit, transformer, and main power disconnect. Control package wired by others.

B. Sound Attenuation

1. The unit shall be provided with factory assembled sound attenuation on the air intake of the unit. Attenuation shall include standard baffled panels to change the path of air entry and shall capture radiated noise. A large access door shall be provided for maintenance purposes. Reference unit specific sound data for sound performance.
2. Unit shall be provided with a factory assembled straight-sided discharge sound attenuation package designed to reduce overall discharge sound levels. Attenuation shall be provided with motorized actuator(s) and low-leakage dampers. The discharge attenuator shall be supported entirely by the unit and shipped as an assembled section for easy mounting in the field. It shall be constructed of G-235 Hot-Dip Galvanized Steel (or Type 304 Stainless Steel) and include insulated walls and baffles lined with high density fiberglass. A large panel to allow access to the water distribution system and drift eliminators shall be provided.

2.8 EVAPORATIVE COOLING WATER TREATMENT SYSTEM

A. GENERAL

1. DESCRIPTION
   a. Work Includes:
      1) Furnish all labor, materials, tools, equipment and services for condenser water treatment system as indicated, in accordance with provisions of the contract documents.
      2) Completely coordinate with work of all other trades.
      3) See Division 1 for General Requirements.
      4) Manufacturer's representative company will provide automatically controlled water treatment program and equipment as specified herein.
      5) Provide monthly service for the condenser water treatment program, including

the necessary chemicals designed to minimize corrosion, scale formation and biological growth in the following mechanical systems:

a) Condenser Water Piping System

b. Description of System:

1) Riser mounted solid-chemistry inhibitor feeder by equipment manufacturer.
2) Unit mounted bio-control feeder(s) (by equipment manufacturer) capable of feeding granular biocide without supplemental makedown water.
3) Solid, controlled release chemicals as specified below.
4) Factory mounted (by equipment manufacturer) conductivity controller and bleed valve as specified below. System shall be self-draining.
   a) The complete drive system, including the electric motor, belts, bearings, fan, and drives shall be completely enclosed in a protective housing which covers the drive system and provides sound reduction.

2. SUBMITTALS (See Division 1)

a. Submit per the requirements Division 1.

b. Shop drawings: Show all water treatment equipment, including the following:

1) Piping diagrams of all factory mounted components (show all field piping required, if any).
2) Conductivity control panel and wiring diagrams (show all field wiring required). Include bill of materials showing model number, manufacturer, physical layout drawings, panel and equipment catalog cuts.

c. Operation and maintenance manuals: Include testing procedures for each of the treated systems.

d. List of chemicals and methods to be used for each system: Use generic names. Provide Material Safety Data Sheets (MSDS) for each chemical used.

e. Laboratory analysis of project site make-up water: Submit a copy of a laboratory analysis documenting the quality of the project's make-up water. Make-up water analysis to include the following analytes as a minimum:

1) *Calcium Hardness (as ppm $CaCO_3$)*
2) *Total Hardness (as ppm $CaCO_3$)*
3) *Total Alkalinity or m-Alkalinity (as ppm $CaCO_3$)*
4) *pH*
5) *Silica (as SiO_2)*
6) *Specific Conductivity (micro S/cm)*
7) *Sulfate (as SO_4)*
8) *Chloride (as Cl-)*
9) *Phosphate (as PO_4)*

3. QUALITY ASSURANCE

a. The water treatment supplier shall:

1) Obtain water samples from the site and furnish a laboratory analysis of the water supply with submittal.
2) Review the make-up water analysis to ensure compatibility with the water

treatment program.

3) Propose water treatment methods and appropriate chemicals required to minimize scale, corrosion and biological growth. Submit all of the above with shop drawings and other required submittals.

b. Methods and chemicals selected shall comply with all the requirements of the American Public Health Association (APHA), the Environmental Protection Agency (EPA) and local environmental agencies.

4. PERFORMANCE CRITERIA

a. Maintain the conditions listed below in the water system(s):

1) Conductivity range of 300 to 5,000 micro S/cm.
2) pH range of 7.0 to 8.8
3) Local environmental regulations may dictate the highest pH permitted for blowdown. The conductivity setting can be adjusted up or down to change the pH by the balancing of fresh make-up water.
4) Total bacteria count (TBC) of less than 10,000 CFU/ml.
5) Keep condenser water system scale free and corrosion to levels acceptable by AWT guidelines.

B. PRODUCTS

1. WATER TREATMENT SYSTEM

a. Acceptable Products:

1) Chemical Feed & Control Equipment
   a) Factory mounted inhibitor feeder
   b) Factory mounted biocide feeder
   c) Factory mounted conductivity controller, piping manifold with conductivity probe and sampling port

b. Chemicals

1) Chromates, zinc, or any liquid chemicals shall not be used.
2) Scale and corrosion inhibitor shall be non-toxic to humans and animals for its intended use.
3) Phosphates are allowed as permitted by EPA and local authorities.
4) Scale and corrosion inhibitor chemistry shall be provided in a solid form with controlled released polymer coating for safe handling and easy reloading.
5) The chemical feed equipment shall operate and feed chemicals into the condenser water system only when the systems recirculating pumps are in operation.
6) The granular biocide shall be packaged such that handling of the chemistry directly is minimized.

c. Condenser Water System:

1) Chemical feed and control equipment - condenser system: Provide the following components (including all factory piping and wiring).
   a) Factory mounted assembly for controlling conductivity and providing automatic solid chemical treatment to the condenser water system(s). The assembly system shall have the following features and capabilities:

Conductivity controller: Shall provide linear, temperature compensated measurements directly in micromhos over full range. Conductivity measurement will be displayed on an LED display. Controller will have a USB port and shall be capable of retrieving operational frequency of bleed valve, output contact, make-up/bleed metering over a 60 day period.

1) Inhibitor feed: Inhibitor chemical shall be fed directly from the unit riser pipe. A solid chemistry inhibitor shall be used with time released control mechanism. No pumps, timers or liquids shall be accepted.
2) Biocide feed: Biocide chemical feeds will be controlled by a factory mounted feeder. Solid biocide will be fed directly into the recirculating stream. No pumps, timers or liquids shall be accepted.
3) Basis of design - EVAPCO Smart Shield®

b) The conductivity controller, chemical feeders and sample stream piping assembly shall be factory mounted on the closed circuit cooler or evaporative condenser. All components of the system shall be pre-plumbed and pre-wired to minimize field connections required to provide an operational treatment system. The packaged system shall consist of the following:

1) One (1) sample stream piping assembly consisting of:
   a) Two (2) 1 inch inlet/outlet shut-off valves.
   b) One (1) conductivity probe of PVC construction, with a temperature compensating torodial probe mounted in the sample stream.
2) One (1) pre-piped bleed-off piping assembly consisting of inlet shut-off valve, sample valve, throttling valve and motorized ball valve. Bleed-off piping assembly shall be sized to provide the proper bleed-off rate of the system. Bleed piping and controller should prevent the feed of biocide during the bleed cycle.
3) Factory mounted solid chemical inhibitor feeder(s) shall be provided for feed of the scale and corrosion inhibitor. Feed rate shall be adjustable based on a multiple chamber feeder arrangement.
4) Factory mounted solid biocide chemical feeder(s) shall be provided for feed of the biocide. Feeder shall be completely factory mounted for easy commissioning and refill.

2) Water treatment chemicals: Calculate and furnish 1-year supply of the recommended product for control of scale and corrosion in the open recirculating system. Additionally, calculate and furnish a 1-year supply of biocide for control of microbiological growth in the same system. The one year supply of chemistry shall be calculated based on the most efficient cycles of concentration the make-up water quality will allow. Biocide product recommended shall be properly registered with the Environmental Protection Agency and EPA registration number shall be clearly shown on all product literature and package labels. To ensure operator safety, all chemical products shall be provided in solid or granular form for reduced material handling.

d. Testing equipment: Provide water test kits and equipment necessary to control the condenser water systems treatment program. Test kits to include the following as a minimum:

1) Reagents and apparatus for determination of corrosion inhibitor level in the condenser water systems.
2) Reagents and apparatus for determination of pH, total alkalinity, free and total chlorine, and calcium hardness.
3) Apparatus for determination of microbiological colony population and biocide effectiveness.

C. EXECUTION

1. INSTALLATION AND SERVICES

a. Installation of water system will include:

1) All components shall be mounted by the evaporative equipment manufacturer during unit construction and prior to shipment from the factory.
2) Supply all components (coils, transformers, conductivity meters, blow down valves etc) necessary for a completely automated stand-alone system. Blow down valves shall be motorized ball valves power open, spring return factory mounted during unit construction.
3) Immediately after hydrostatic testing of piping is completed the mechanical contractor shall drain, flush, clean and passivate all systems. Subsequent to the cleaning process, each system shall be re-filled with clean water prior to the system being placed into operation. Once filled the condenser water pump and cooling tower fans shall be operated until conductivity set point is achieved.
4) Mechanical contractor shall pipe all bleed and drain lines to sanitary sewer.
5) If the working height of the water treatment system will be elevated, there shall be a safe way to service the system provided.

b. Provide all consulting services, for a period of 1-year from start-up of the cooling system, which will include:

1) Installation and system start-up procedure recommendations.
2) Pre-operation system clean-out procedure supervision.
3) Initial water analysis and recommendations.
4) Training of operating personnel on proper feeding and control techniques.
5) Monthly field service visits during wet operation.
6) Any necessary log sheets and record forms.

c. All services will be provided by a factory authorized service provider of the evaporative condenser or closed circuit cooler manufacturer.

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COLUMBUS, OH 43215
FOR
SCHOOLEY CALDWELL ASSOCIATES
300 MARCONI BLVD, COLUMBUS OH 43215

PROJECT NUMBER:
A21-SCA005

ISSUE	DATE
PERMIT	2021-12-8

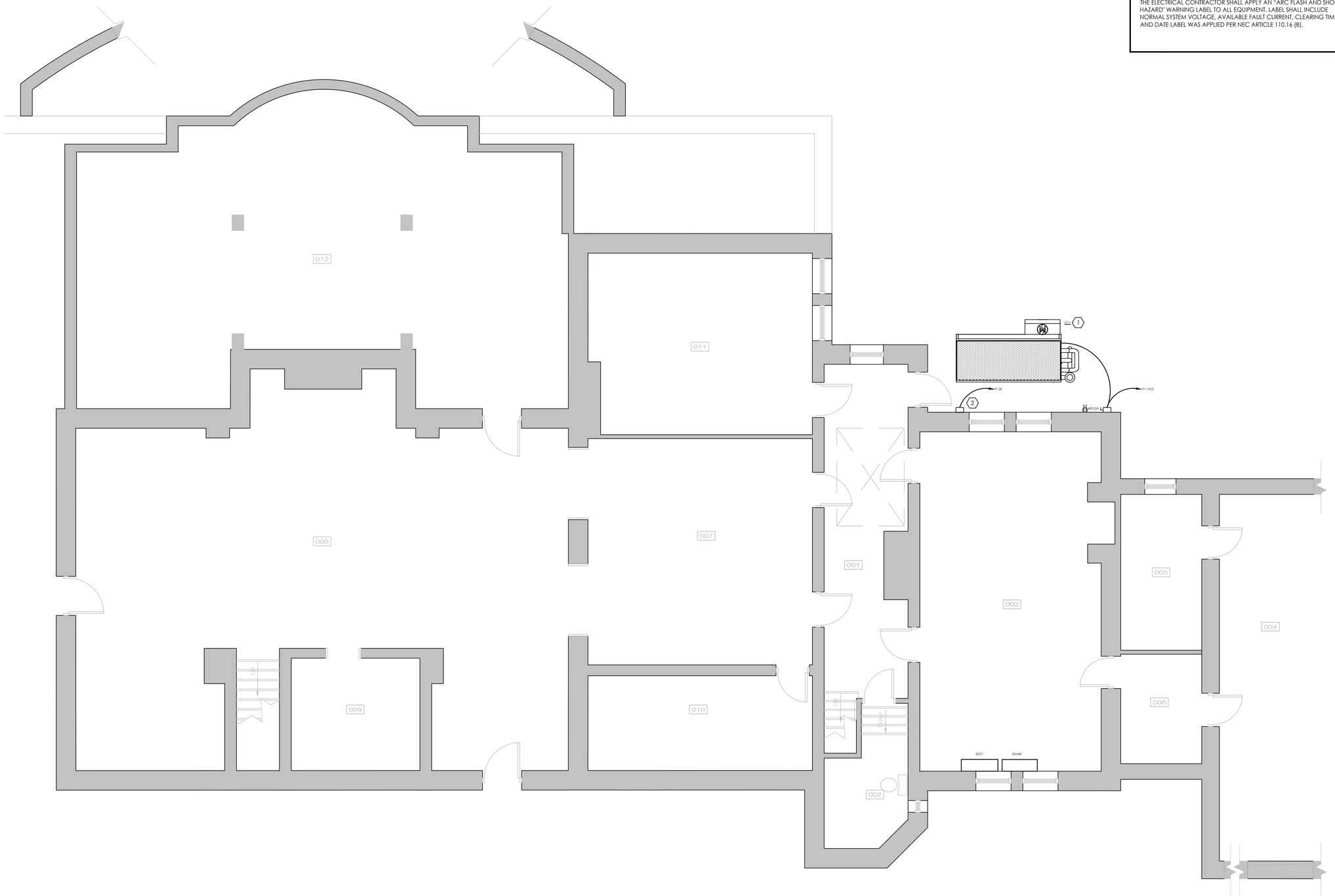
MECHANICAL SPECIFICATIONS

SHEET:
M7.2

CODED NOTES: (#)

1. CT-1: 15 HP, 240V/1PH. RUN (2) #4, #10G IN 1" COND FROM 60A/3P BREAKER IN PANEL P1 (LOCATED IN STAIR 119 LANDING) THRU 60A/2P NON FUSED DISC SWITCH TO UNIT. MAKE FINAL CONNECTION.
2. HEAT TRACE BY M.C. PROVIDE POWER TO HEAT TRACE PANEL AND MAKE FINAL CONNECT. COORDINATE EXACT LOCATION WITH M.C. INSTALL PER MANUFACTURERS RECOMMENDATIONS.

NOTE:
THE ELECTRICAL CONTRACTOR SHALL APPLY AN "ARC FLASH AND SHOCK HAZARD" WARNING LABEL TO ALL EQUIPMENT. LABEL SHALL INCLUDE NORMAL SYSTEM VOLTAGE, AVAILABLE FAULT CURRENT, CLEARING TIMES, AND DATE LABEL WAS APPLIED PER NEC ARTICLE 110.16 (B).



1 POWER PLAN
1/4" = 1'-0"

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POWER PLAN

SHEET:
E2.1

SPECIFICATIONS - DIV. 26 - ELECTRICAL

1. ELECTRICAL CONTRACTOR TO FURNISH AND INSTALL ALL LABOR, MATERIALS, FIXTURES AND EQUIPMENT AS SHOWN ON DRAWINGS OR SPECIFIED HEREIN AND ANY AND ALL DETAILS OR ITEMS ESSENTIAL TO COMPLETE THE INSTALLATION WHETHER SAME ARE SPECIFICALLY MENTIONED OR NOT. ANY MATERIAL OR LABOR WHICH IS NEITHER SHOWN ON DRAWINGS NOR CALLED FOR HEREIN, BUT ARE OBVIOUSLY NECESSARY TO COMPLETE THE WORK AND WHICH IS USUALLY INCLUDED IN WORK OF SIMILAR CHARACTER SHALL BE FURNISHED AND INSTALLED WITHOUT ADDITIONAL COST.
2. ELECTRICAL CONTRACTOR SHALL ARRANGE AND PAY FOR ALL FEES, PERMITS, INSPECTIONS, CERTIFICATES AND MISCELLANEOUS COSTS INCURRED DUE TO STATE AND/OR LOCAL GOVERNING AUTHORITIES' REQUIREMENTS FOR THE ELECTRICAL PORTION OF THE WORK.
3. ALL ELECTRICAL WORK SHALL BE DONE IN ACCORDANCE WITH ALL APPLICABLE NATIONAL, STATE AND/OR LOCAL CODES AND REGULATIONS HAVING JURISDICTION OVER THIS PROJECT.
4. ALL ELECTRICAL WORK SHALL ALSO COMPLY WITH APPLICABLE SECTIONS OF NFPA 70, NATIONAL ELECTRICAL CODE AND U.L. INC.
5. ALL WORK SHALL BE DONE BY SKILLED CRAFTSMEN AND SHALL BE OF HIGHEST QUALITY IN ACCORDANCE WITH THE BEST PRACTICES OF THIS TRADE.
6. ELECTRICAL CONTRACTOR TO COORDINATE AND VERIFY WITH THE GENERAL CONTRACTOR INSTALLATION AND/OR HOOK UP OF OWNER SUPPLIED EQUIPMENT.
7. MINIMUM WIRE SIZE SHALL BE #12 AWG TYPE THHN/THWN (#14 TW FOR CONTROL) UNLESS OTHERWISE NOTED. ALL WIRE SHALL BE COPPER UNLESS NOTED OTHERWISE.
8. ALL WIRE SHALL BE "MC" CABLE UNLESS OTHERWISE PROHIBITED BY LOCAL AUTHORITIES (NMS SHALL BE USED WHERE ALLOWED BY N.E.C. AND LOCAL JURISDICTION).
   A. BELOW GRADE SHALL BE "RMC" OR "PVC", SCHEDULE 80. UNDER SLAB TO BE BURIED AT 2" DEEP INTO GRAVEL BASE. EXTERIOR MISCELLANEOUS CONDUITS (INCLUDING FUTURE STUBOUTS AND DIRECT BURIAL WIRE) TO BE BURIED AT 24" MIN. (2005 NEC) BELOW GRADE.
   B. EXTERIOR EXPOSED CONDUIT SHALL BE "RMC" (LIQUID-TIGHT FLEXIBLE CONDUIT FOR EXTERIOR EQUIPMENT CONNECTIONS - NOT TO EXCEED 3 FEET).
9. SWITCHES SHALL BE MOUNTED AT 48" A.F.F. TO CENTERLINE OF BOX UNLESS NOTED OTHERWISE.
10. RECEPTACLES SHALL BE MOUNTED AT 18" A.F.F. TO CENTERLINE OF BOX UNLESS NOTED OTHERWISE.
11. FOLLOW NEC ARTICLE 110.26 FOR WORKING CLEARANCES, DEDICATED SPACES AND EGRESS REQUIRED ABOUT ELECTRICAL EQUIPMENT.
12. PANEL LOADS AND HOME RUNS MAY BE MODIFIED BY ELECTRICAL CONTRACTOR TO OBTAIN MORE ECONOMICAL RUNS. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR BALANCING PANEL LOADS.
13. ELECTRICAL CONTRACTOR SHALL MAKE FINAL CONNECTIONS FOR ALL MISCELLANEOUS EQUIPMENT SUPPLIED AND INSTALLED BY OTHER TRADES THAT REQUIRE ELECTRIC.
14. ALL PENETRATIONS OF FIRE RATED ASSEMBLIES SHALL HAVE PENETRATIONS CAULKED OR CLOSED OFF WITH FIRE RATED PACKING, CONFORMING TO ASTM E119.
15. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR KEEPING A SET OF RECORD DRAWINGS COVERING THE SCOPE OF HIS WORK. THESE DRAWINGS ARE TO BE KEPT CURRENT AS JOB PROGRESSES AND MUST BE TURNED OVER TO THE GENERAL CONTRACTOR AT COMPLETION OF PROJECT BEFORE FINAL RETAINAGE WILL BE PAID.

CONSTRUCTION NOTES:

A. ALL WORK TO BE SCHEDULED IN ADVANCE WITH THE OWNER AND CONSTRUCTION MANAGER TO MINIMIZE DOWNTIME OF THE AFFECTED AREA, INCLUDING ALL ASSOCIATED WORK REQUIRED IN ADJACENT AREAS.

B. HOURS AND AREAS OF ACCESS FOR CONSTRUCTION TO BE PER THE OWNER'S AND CONSTRUCTION MANAGER'S DIRECTION, INCLUDING ALL ASSOCIATED WORK REQUIRED IN ADJACENT AREAS.

C. SEQUENCING AND PHASING OF WORK TO BE PER THE OWNER'S AND CONSTRUCTION MANAGER'S DIRECTION.

D. DESIGNATED WORK AREAS ARE AS INDICATED BY THE ARCHITECTURAL PLANS AND BY THE OWNER AND CONSTRUCTION MANAGER. ANY WORK REQUIRED OUTSIDE OF THESE AREAS TO BE APPROVED BY AND SCHEDULED IN ADVANCE WITH THE CONSTRUCTION MANAGER, INCLUDING ALL ASSOCIATED WORK REQUIRED IN ADJACENT AREAS.

E. WORK TO BE DONE IN SUCH A MANNER AS TO AVOID OR MINIMIZE INTERRUPTION OF NORMAL ACTIVITIES IN ADJACENT AREAS REMAINING IN OPERATION DURING CONSTRUCTION. ANY UTILITY OUTAGES OR IMPAIRMENTS TO BE SCHEDULED WITH THE OWNER AND CONSTRUCTION MANAGER IN ADVANCE, AND EXECUTED IN THE MANNER DIRECTED.

F. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR FIRESTOPPING AT ALL PENETRATIONS OF FIRE, SMOKE AND OTHER RATED STRUCTURES, INCLUDING FLOORS, WALLS, PARTITIONS, ETC. REFER TO ARCHITECTURAL DOCUMENTATION FOR LOCATIONS OF ALL RATED STRUCTURES, AND SPECIFIC INFORMATION AND REQUIREMENTS PERTAINING TO SAME.

G. ALL WORK LOCATED INSIDE THE LIMITS OF CONSTRUCTION LINE CAN BE INSTALLED DURING REGULAR BUSINESS HOURS UNLESS OTHERWISE NOTED.

H. ALL EQUIPMENT AND FURNITURE SHALL BE PROTECTED FROM DUST AND DEBRIS.

I. ALL CONDITIONS UPON COMPLETION OF WORK INCLUDED UNDER THIS CONTRACT TO MATCH CONDITIONS PRIOR TO START OF WORK.

J. CONTRACTOR SHALL FIELD VERIFY CONDITIONS AND MAKE ALL NECESSARY ADJUSTMENTS TO COMPLETE INSTALLATION OF HIS WORK AT NO ADDITIONAL COST.

FIELD VERIFY ALL CONDITIONS

A. DESIGN DRAWINGS ARE SCHEMATIC. THIS CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING OR AWARD OF CONTRACT TO INSPECT EXISTING FIELD CONDITIONS. THIS CONTRACT SHALL INCLUDE ALL LABOR AND MATERIALS NECESSARY FOR FIELD MODIFICATIONS DUE TO EXISTING CONDITIONS.

B. THE CONTRACTOR SHALL CONTACT THE CONSTRUCTION MANAGER PRIOR TO BIDDING FOR INTERPRETATIONS AND CLARIFICATIONS OF THE DESIGN AND INCLUDE IN HIS BID ALL COSTS TO MEET THE DESIGN INTENT. CLARIFICATIONS MADE BY THE CONSTRUCTION MANAGER AFTER BIDDING WILL BE FINAL AND SHALL BE IMPLEMENTED AT CONTRACTORS COST.

C. BIDDING CONTRACTORS SHALL HAVE A WORKING KNOWLEDGE OF LOCAL CODES AND ORDINANCES AND SHALL INCLUDE IN THEIR BIDS THE COSTS FOR ALL WORK INSTALLED IN STRICT ACCORDANCE WITH GOVERNING CODES. THE PLANS AND SPECIFICATIONS NOT WITHSTANDING, THE CONTRACTOR SHALL ALERT THE CONSTRUCTION MANAGER OF ANY APPARENT DISCREPANCIES BETWEEN GOVERNING CODES AND DESIGN INTENT.

PANEL NAME	EXIST PANEL P1	VOLTAGE	240	PHASE	1	WIRE	3	LOCATION: 225A M.L.O.

#	K	L	R	M	X	H	C	BREAKER AMP	BREAKER POLE	DESCRIPTION	KVA/PHASE A	KVA/PHASE B	DESCRIPTION	BREAKER AMP	BREAKER POLE	K	L	R	M	X	H	C	#
1		0.6						E20	1	LTG 111	1.2		RCPT 101	E20	1			0.6					2
3			0.6					E20	1	RCPT 111		1.2	RCPT 101	E20	1			0.6					4
5		0.6						E20	1	LTG NEW ADD	1.2		LTG 112	E20	1		0.6						6
7		0.6						E20	1	LTG NEW ADD		1.2	LTG 118	E20	1		0.6						8
9		0.6						E20	1	LTG NEW ADD	1.2		LTG 118	E20	1		0.6						10
11			0.6					E20	1	RCPT NEW ADD		1.2	RCPT KITCH	E20	1			0.6					12
13			0.6					E20	1	BARR OFFICE	1.2		OUTDOOR LT 118	E20	1		0.6						14
15		0.6						E20	1	HALL LTG BATH		0.6	SPACE										16
17			0.6					E20	1	BATH GFCI	1.2		RECEPT HALL KITCH	E20	1			0.6					18
19				5.5				**60**	**2**	**CT-1**		5.5	SPACE										20
21				5.5							6.1		LTG KITCH BACK	E20	1		0.6						22
23				1.2				E20	1	FP-1		1.2											24
25		0.6						E20	1	BASEMENT LTG	0.6		NO LABEL	E100	3								26
27			0.6					E20	1	RCPT 101		0.6											28
29			0.4					E20	1	RCPT	0.6		**HEAT TRACE**	**20**	**1**					0.2			30
31		0.6						E20	1	LOWER LVL LTG		0.6	SPACE										32
33			0.6					E20	1	RCPT MAIN RM	0.6		SPACE										34
35			0.6					E20	1	RCPT MAIN RM		0.6	SPACE										36
37			0.6					E20	1	POP MACHINE	1.2		LTG STAIRS	E20	1		0.6						38
39										SPACE		0.0	SPACE										40
41										SPACE	0.0		SPACE										42
										TOTAL CONNECTED LOAD/PH	15.1	12.7											
	0.0	7.8	7.6	12.2	0.2	0.0	0.0																
										TOTAL CONNECTED LOAD	27.76												

K = KITCHEN	0.0	KVA
L = LITE	9.8	KVA
R = RCPT	7.6	KVA
M = MOTOR	15.0	KVA
X = MISC	0.0	KVA
H = HEAT	0.0	KVA
C = COOL	0.0	KVA
TOTAL PANEL DEMAND =	32.3	KVA
	134.4	AMPS

BREAKER NOTES
L = PROVIDE A BREAKER LOCK ON DEVICE
T = PROVIDE A SHUNT TRIP BREAKER.
G = PROVIDE A GFI BREAKER.
E = EXISTING BREAKER TO REMAIN
BOLD = NEW BREAKER

COMMENTS
1. PROVIDE (2)#12,(1)#12GND,3/4"C FOR ALL BRANCH CCTS UNLESS STATED OTHERWISE.
2. PROVIDE LOCKING TYPE BREAKER FOR ALL LIFE SAFETY AND NIGHT LIGHTING BRANCH CIRCUITS.

NEC ELECTRICAL LOAD SUMMARY

DESCRIPTION	CONNECTED LOAD (KVA)	N.E.C. DEMAND FACTOR	N.E.C. FEEDER DEMAND (KVA)
EXISTING PEAK DEMAND (8/2019) PRIOR TO CONSTRUCTION	37.86	1.25	47.33
NEW COMPRESSOR LOAD	11.00	1.25	13.75
TOTAL	59.86		61.08

N.E.C. DEMAND KVA x 1000 / SYSTEM VOLTAGE = MIN FEEDER AMPS

61.08 KVA x 1000 / 240.00 = 254.48

THEREFORE THE 1200A SERVICE IS ADEQUATE

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ELECTRICAL SCHEDULES

SHEET: E3.1