

- ### HVAC NEW WORK NOTES:
- THIN LINES INDICATE EXISTING CONDITIONS TO REMAIN, BACKGROUND INFORMATION, OR WORK OF OTHER TRADES.
 - THICK SOLID LINES INDICATES NEW WORK. CUT, PATCH, AND FINISH EXISTING WALLS, DRYWALL CEILINGS, FLOORS, ROOFS, ETC. AS REQUIRED FOR NEW WORK. PATCH AND FINISH TO MATCH EXISTING CONDITIONS. COORDINATE ALL ROOF WORK WITH THE OWNER TO MAINTAIN ANY/ALL ROOFING WARRANTIES.
 - THESE DRAWINGS, ALONG WITH THE SPECIFICATIONS, COMBINE TO FORM THE ENTIRE CONSTRUCTION DOCUMENT PACKAGE. IF NO SPECIFICATIONS ARE INCLUDED WITHIN THIS TRADE DOCUMENT PACKAGE, NOTIFY ENGINEER PRIOR TO SUBMITTING ANY BIDS OR PERFORMING ANY WORK.
 - REMOVE AND REINSTALL EXISTING LAY-IN CEILINGS AS REQUIRED TO COMPLETE WORK IN AREAS WHERE LAY-IN CEILINGS ARE TO REMAIN. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATIONS. REPLACE DAMAGED CEILING MATERIALS TO MATCH EXISTING CONDITIONS.
 - CONTRACTOR MAY ADJUST DUCTWORK DIMENSIONS TO ACCOMMODATE FIELD CONDITIONS PROVIDED THE REVISED FREE AREA IS EQUAL TO OR EXCEEDS THAT SHOWN ON THE DRAWINGS. DUCTWORK SHOWN AS RECTANGULAR SHALL BE INSTALLED AS RECTANGULAR AND DUCTWORK SHOWN AS ROUND SHALL BE INSTALLED AS ROUND. FITTING TYPES SHALL BE INSTALLED AS INDICATED. STRAIGHT & BELLMOUTH TAPS ARE NOT PERMITTED.
 - VENTILATION IS CALCULATED BY THE VENTILATION RATE PROCEDURE DESCRIBED IN ASHRAE 62.1 SECTION 6.2 AND TABLE 403.3 IN THE OHIO MECHANICAL CODE.
 - BRANCH DUCTWORK RUNOUTS SHALL MATCH THE INLET SIZE OF THE TERMINAL DEVICE UNLESS NOTED OTHERWISE. FLEXIBLE DUCTWORK TO DIFFUSERS SHALL MATCH NECK SIZE OF DIFFUSER WHERE INDICATED.
 - SIZES OF LINED DUCTWORK ARE ACTUAL SHEET METAL SIZES.
 - CONTRACTOR SHALL UTILIZE A MAXIMUM 5'-0" OF FLEXIBLE DUCT AT THE INLET OF EACH DIFFUSER.
 - ALL MATERIALS UTILIZED WITHIN THE CEILING PLENUM MUST COMPLY WITH NFPA 90A REQUIREMENTS FOR RETURN AIR CEILING CAVITY PLENUMS.
 - UNLESS INDICATED OTHERWISE, THE MC SHALL COORDINATE RETURN AIR PATHWAY FROM ENCLOSED SPACES TO MAIN RETURN AIR DUCTWORK WITHIN RESPECTIVE CEILING PLENUM BY PROVIDING OPENINGS ABOVE CEILING IN WALL NOT TO EXCEED 400 FPM. CLEARLY INDICATE RETURN AIR PATHWAY AND CALCULATIONS SHOWING VELOCITIES OF 400 FPM OR LESS WITH SHEET METAL DRAWINGS DURING SHOP DRAWING REVIEW.
 - INSTALL ALL MECHANICAL EQUIPMENT PER MANUFACTURERS INSTALLATION REQUIREMENTS INCLUDING RECOMMENDED SERVICE AND WORKING CLEARANCES.
 - ALL DUCTWORK CONNECTIONS TO VIBRATION ISOLATED EQUIPMENT SHALL HAVE CONNECTORS CAPABLE OF WITHSTANDING THE MAXIMUM DISPLACEMENT OF THE MACHINE WITHOUT STRAIN OR RUPTURE.
 - ALL DUCTWORK SHALL BE INSTALLED OVERHEAD TIGHT TO STRUCTURE AND ABOVE CEILING UNLESS NO CEILING EXISTS.
 - PROVIDE COMMISSIONING SERVICES ON THE PLUMBING SYSTEMS TO INCLUDE VERIFICATION OF PROPER INSTALLATION OF THE AIR DISTRIBUTION SYSTEM, INCLUDING VERIFYING INSTALLATION AND PROPER SET POINT OF BALANCE DAMPERS, TERMINAL BOX ACCESS, ROOFTOP UNIT ACCESS, COMPLETION OF INSULATION AND ASSOCIATED VAPOR BARRIER, AND BUILDING AUTOMATION SYSTEM CONNECTIVITY AND COMPLETE FUNCTIONALITY ALIGNING WITH VA REQUIREMENTS FOR CBQC BUILDINGS.
 - SUBSTITUTIONS NOT CLEARLY REQUESTED AND/OR INDICATED ON THESE DOCUMENTS ARE STRICTLY PROHIBITED.
 - ALL NEW WORK SHALL COMPLY WITH VA TIL PG 18-10.
 - BUILDING AUTOMATION SYSTEM (BAS) SHALL BE DESIGNED AS A STAND-ALONE SITE WITH PROVISIONS INCLUDED UNDER THIS CONTRACT FOR FUTURE CONNECTION TO A MASTER SYSTEM INTEGRATION PROJECT. TCC SHALL INCLUDE ALL NECESSARY LABOR AND MATERIALS FOR A FULLY-FUNCTIONAL LOCALIZED SYSTEM INCLUSIVE OF LABOR AND MATERIALS FOR FUTURE INTEGRATION.
 - TAB CONTRACTOR SHALL BE HIRED DIRECTLY BY THE GENERAL CONTRACTOR AND SHALL SEND REPORTS TO THE VA COR IN ADDITION TO THE LESSOR ENGINEER TEAM FOR REVIEW AND APPROVAL.
 - THERMOSTAT TO ALLOW FOR +/- 3-DEGREES CONTROL BY USERS AND NIGHT-TIME SETBACK.

HVAC DUCTWORK SYMBOL SCHEDULE

| SYMBOL | DESCRIPTION |
|--------|--|
| | SUPPLY AIR DIFFUSER |
| | RETURN AIR GRILLE |
| | EXHAUST AIR GRILLE |
| | 45° ENTRY BOOT TAKE-OFF (RECTANGULAR TO RECTANGULAR) |
| | 90° BRANCH TAKE-OFF (CONICAL FITTING) |
| | FLEXIBLE DUCT CONNECTION |
| | MITERED DUCT ELBOW WITHOUT TURNING VANES |
| | MITERED DUCT ELBOW WITH TURNING VANES |
| | RADIUS DUCT ELBOW |
| | DUCT OFFSET UP (IN THE DIRECTION OF AIR FLOW) |
| | DUCT OFFSET DOWN (IN THE DIRECTION OF AIR FLOW) |
| | RECTANGULAR TO ROUND TRANSITION |
| | SUPPLY OR OUTDOOR AIR DOWN |
| | SUPPLY OR OUTDOOR AIR DUCT UP |
| | RETURN OR RELIEF AIR DUCT DOWN |
| | RETURN OR RELIEF AIR DUCT UP |
| | EXHAUST AIR DUCT DOWN |
| | EXHAUST AIR DUCT UP |
| | BALANCING DAMPER - MANUAL |
| | DUCT SIZE (FIRST NUMBER IS SIDE SHOWN) |
| | THERMOSTAT |
| | HEAVY LINE WEIGHT INDICATES NEW WORK |
| | LIGHT LINE WEIGHT INDICATES EXISTING TO REMAIN OR WORK BY OTHER TRADES |
| | HEAVY DASHED LINE WEIGHT INDICATES DEMOLITION |
| | MECHANICAL EQUIPMENT WITH CLEARANCE |

HVAC ABBREVIATIONS

| SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION |
|--------|--|---------|---|--------|---|
| °C | DEGREES CELSIUS | EC | ELECTRICAL CONTRACTOR | NO. | NUMBER |
| °F | DEGREES FAHRENHEIT | EDB | ENTERING DRY BULB | NPSH | NET PUMP SUCTION HEAD |
| ø | DIAMETER | EER | ENERGY EFFICIENT RATIO | NTS | NOT TO SCALE |
| φ | FLAT OVAL | EF | EXHAUST FAN | OA | OUTSIDE AIR |
| ABBREV | ABBREVIATION | EFF | EFFICIENCY | OAD | OUTSIDE AIR DAMPER |
| ABD | ABANDONED | ELEC | ELECTRIC | OAC | ON CENTER |
| ABV | ABOVE | ELEV | ELEVATION OR ELEVATOR | OD | OUTSIDE DIAMETER |
| AC | AIR CONDITIONING | ENT | ENTERING | OED | OPEN END DUCT |
| AD | ACCESS DOOR | EQ | EQUIVALENT | PD | PRESSURE DROP |
| AFF | ABOVE FINISHED FLOOR | ESP | EXTERNAL STATIC PRESSURE | PH | PHASE |
| AFG | ABOVE FINISHED GRADE | ETR | EXISTING TO REMAIN | PHC | PREHEAT COIL |
| AHU | AIR HANDLING UNIT | EWB | ENTERING WET BULB | PLBG | PLUMBING |
| AL | ACOUSTICALLY LINED | EWV | ENTERING WATER TEMPERATURE | PPH | POUND PER HOUR (STEAM) |
| ALUM | ALUMINUM | EX | EXISTING | PPM | PARTS PER MILLION |
| AMB | AMBIENT | EXH | EXHAUST | PRESS | PRESSURE |
| AMP | AMPERES | EXP | EXPOSED | PRV | PRESSURE REDUCING VALVE |
| AP | ACCESS PANEL | EXT | EXTERNAL | PSI | POUNDS PER SQUARE INCH |
| APD | AIR PRESSURE DROP | F | FURNACE | PTAC | PACKAGED TERMINAL AIR CONDITIONER |
| APPROX | APPROXIMATE | FC | FLEXIBLE CONNECTION | PUH | PROPELLER UNIT HEATER |
| ARCH | ARCHITECT, ARCHITECTURAL | FCU | FAN COIL UNIT | PVC | POLYVINYL CHLORIDE |
| ARRG | ARRANGEMENT | FD | FLOOR DRAIN | QTY | QUANTITY |
| AS | AIR SEPARATOR | FDC | FIRE DEPARTMENT CONNECTION | R | RISE (DUCTWORK) |
| ASTM | AMERICAN SOCIETY FOR TESTING AND MATERIALS | FDR | FIRE DAMPER | RA | RETURN AIR |
| ATC | AUTOMATIC TEMPERATURE CONTROL | FF | FINISHED FLOOR | RAD | RADIATED |
| ATM | ATMOSPHERE | FLA | FULL LOAD AMPERES | RD | ROOF DRAIN |
| ATU | AIR TERMINAL UNIT | FLR | FLOOR | REG | REGISTER |
| AVG | AVERAGE | FM | FLOW MONITOR | REQ'D | REQUIRED |
| AWT | AVERAGE WATER TEMPERATURE | FOB | FLAT ON BOTTOM | RET | RETURN |
| BD | BALANCING (VOLUME) DAMPER | FOT | FLAT ON TOP | RH | RELATIVE HUMIDITY |
| BDD | BACK DRAFT DAMPER | FP | FIRE PROTECTION | RHC | REHEAT COIL |
| BEL | BELOW | FPI | FINS PER INCH | RHP | RADIANT HEATING PANEL |
| BFF | BELOW FINISHED FLOOR | FFM | FEET PER MINUTE | RL | REFRIGERANT LIQUID |
| BFP | BACKFLOW PREVENTER | FPS | FEET PER SECOND | RLA | RUNNING LOAD AMPERES |
| BHP | BRAKE HORSEPOWER | FS | FLOW SWITCH | RLF | RELIEF |
| BLDG | BUILDING | FSD | FIRE-SMOKE DAMPER | RPV | REVOLUTIONS PER MINUTE |
| BOD | BOTTOM OF DUCT | FT | FEET OR FOOT | RPS | REDUCED PRESSURE ZONE |
| BOP | BOTTOM OF PIPE | FT HEAD | FEET OF HEAD PRESSURE | RS | REFRIGERANT SUCTION |
| BOS | BOTTOM OF STEEL | FTR | FINNED TUBE RADIATION | RX | REMOVE EXISTING |
| BTM | BOTTOM | GA | GAGE | SA | SUPPLY AIR |
| BTU | BRITISH THERMAL UNITS | GAL | GALLONS | SATU | SUPPLY AIR TERMINAL UNIT |
| BTUH | BRITISH THERMAL UNITS PER HOUR | GALV | GALVANIZED | SD | SMOKE DETECTOR |
| BVV | BACK WATER VALVE | GC | GENERAL CONTRACTOR | SDP | SMOKE DAMPER |
| CAP | CAPACITY | GPM | GALLONS PER MINUTE | SENS | SENSIBLE |
| CAV | CONSTANT AIR VOLUME | GR | GRILLE | SF | SQUARE FEET |
| CC | COOLING COIL | H | HUMIDISTAT | SG | SPECIFIC GRAVITY |
| CD | CEILING DIFFUSER | HD | HEAD | SH | SENSIBLE HEAT OR SHOWER |
| CFM | CUBIC FEET PER MINUTE | HORIZ | HORIZONTAL | SL | SOUND LINING |
| CFH | CUBIC FEET PER HOUR | HP | HORSEPOWER | SMACNA | SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION |
| CHR | CHILLED WATER RETURN | H.P. | HIGH PRESSURE | SP | STATIC PRESSURE |
| CHS | CHILLED WATER SUPPLY | HR | HEATING WATER RETURN | SPEC | SPECIFICATION |
| CLG | CEILING | HS | HEATING WATER SUPPLY | SPL | SOUND POWER LEVEL |
| CO | CLEANOUT | HVAC | HEATING, VENTILATING & AIR CONDITIONING | SQ | SQUARE |
| CO2 | CARBON DIOXIDE | HW | DOMESTIC HOT WATER | SS | STAINLESS STEEL |
| COMP | COMPRESSOR | HWR | DOMESTIC HOT WATER RECIRCULATING | ST | SOUND TRAP |
| CONC | CONCRETE | HZ | HERTZ | STL | STEEL |
| COND | CONDENSATE | ID | INSIDE DIAMETER | STRUCT | STRUCTURAL |
| CONN | CONNECT, CONNECTION | IN | INCHES | SUP | SUPPLY |
| CONT | CONTINUATION | INV | INVERT ELEVATION | TAB | TESTING, ADJUSTING, & BALANCING |
| CP | CONDENSATE PUMP | KVA | KILOVOLT AMPERES | TEMP | TEMPERATURE |
| CR | CONDENSATE RETURN | KW | KILOWATT(S) | TP | TOTAL PRESSURE |
| CRU | CONDENSATE RETURN UNIT | LAT | LEAVING AIR TEMPERATURE | TSP | TOTAL STATIC PRESSURE |
| CS | CONDENSATE SUPPLY | LBS | POUNDS | TV | TURNING VANES |
| CU FT | CUBIC FEET | LF | LINEAR FEET | TYP | TYPICAL |
| CUH | CABINET UNIT HEATER | L.P. | LOW PRESSURE | UC | DOOR UNDER CUT |
| CK | CONNECT TO EXISTING | LRA | LOCKED ROTOR AMPERES | UH | UNIT HEATER |
| CW | DOMESTIC COLD WATER | LVG | LEAVING WATER TEMPERATURE | UON | UNLESS OTHERWISE NOTED |
| D | DRAIN OR DEPTH | LWT | LEAVING WATER TEMPERATURE | UTF | UP THROUGH ROOF |
| DB | DRY BULB OR DECIBEL | MAX | MAXIMUM | V | VOLTS |
| DBL | DOUBLE | MBH | THOUSAND BTU'S PER HOUR | VA | VOLTS AMPERES |
| DDC | DIRECT DIGITAL CONTROLS | MC | MECHANICAL CONTRACTOR | VAC | VACUUM |
| DEG F | DEGREES FAHRENHEIT | MCA | MINIMUM CIRCUIT AMPS | VAV | VARIABLE AIR VOLUME |
| DEPT | DEPARTMENT | MECH | MECHANICAL | VD | VOLUME DAMPER |
| DESIG | DESIGNATION | MFR | MANUFACTURER | VEL | VELOCITY |
| DFU | DRAINAGE FIXTURE UNITS | MIN | MINIMUM | VFD | VARIABLE FREQUENCY DRIVE |
| DIA | DIAMETER | MO | MOTOR OPERATED | VPI | VENT PIPE |
| DIFF | DIFFUSER | MOD | MOTOR OPERATED DAMPER | VTR | VENT THROUGH ROOF |
| DN | DOWN | MOP | MAXIMUM OVERCURRENT PROTECTION | W | WATTS |
| DP | DIFFERENTIAL PRESSURE | MTD | MOUNTED | W/ | WITH |
| DPT | DEW POINT TEMPERATURE | MVD | MANUAL VOLUME DAMPER | W/O | WITHOUT |
| DSP | DIFFERENTIAL STATIC PRESSURE | NA | NOT APPLICABLE | WB | WET BULB |
| DTF | DOWN THRU FLOOR | NC | NOISE CRITERIA | WC | WATER COLUMN |
| DTR | DUAL TEMPERATURE RETURN | N.C. | NORMALLY CLOSED | WG | WATER GAGE |
| DTS | DUAL TEMPERATURE SUPPLY | NIC | NOT IN CONTRACT | WMS | WIRE MESH SCREEN |
| DW | DOMESTIC WATER | N.O. | NORMALLY OPEN | WPD | WATER PRESSURE DROP |
| DWG | DRAWING | | | | |
| DX | DIRECT EXPANSION | | | | |
| EA | EXHAUST AIR | | | | |
| EAT | ENTERING AIR TEMPERATURE | | | | |
| EATU | EXISTING AIR TERMINAL UNIT | | | | |

HVAC DESIGN CONDITIONS

| LOCATION | SUMMER | WINTER |
|--------------------|-----------------------|-----------|
| OUTSIDE CONDITIONS | 88.2°F DB / 73.1°F WB | 0.1°F DB |
| INTERIOR DESIGN | 75.0°F DB / 50% RH* | 72.0°F DB |

* SUMMER HUMIDITY LEVEL OF 50% RH IS ATTAINED PSYCHROMETRICALLY.

PHASE 2 HVAC DRAWING INDEX

| SHEET NUMBER | SHEET NAME | ISSUE DATE | REVISION | REVISION DATE | DESCRIPTION |
|--------------|------------------------------|------------|----------|---------------|-------------|
| 2-M0.0 | HVAC GENERAL INFORMATION | 2024-04-10 | | | |
| 2-M1.0 | HVAC NEW WORK - AREA A | 2024-04-10 | | | |
| 2-M1.1 | HVAC NEW WORK - AREA B | 2024-04-10 | | | |
| 2-M2.0 | MECHANICAL - ROOF - OVERALL | 2024-04-10 | | | |
| 2-M3.0 | HVAC DETAILS | 2024-04-10 | | | |
| 2-M4.0 | HVAC CONTROLS - PART 1 | 2024-04-10 | | | |
| 2-M4.1 | HVAC CONTROLS - PART 2 | 2024-04-10 | | | |
| 2-M5.0 | HVAC SCHEDULES | 2024-04-10 | | | |
| 2-M6.0 | HVAC SPECIFICATIONS - PART 1 | 2024-04-10 | | | |
| 2-M6.1 | HVAC SPECIFICATIONS - PART 2 | 2024-04-10 | | | |
| 2-M6.2 | HVAC SPECIFICATIONS - PART 3 | 2024-04-10 | | | |

REVISIONS:

44702
 CANTON OHIO
 600 MARKET AVENUE NORTH
 WILMINGTON CBQC
 31 CLARK STREET WILMINGTON, OHIO
 MOTTER & MEADOWS
 ARCHITECTS

PRELIMINARY
NOT FOR
CONSTRUCTION
2024-04-10

Jared F. Singer
License: #PE-76168
Expiration Date:
2025-12-31

THIS DWG :
HVAC GENERAL
INFORMATION

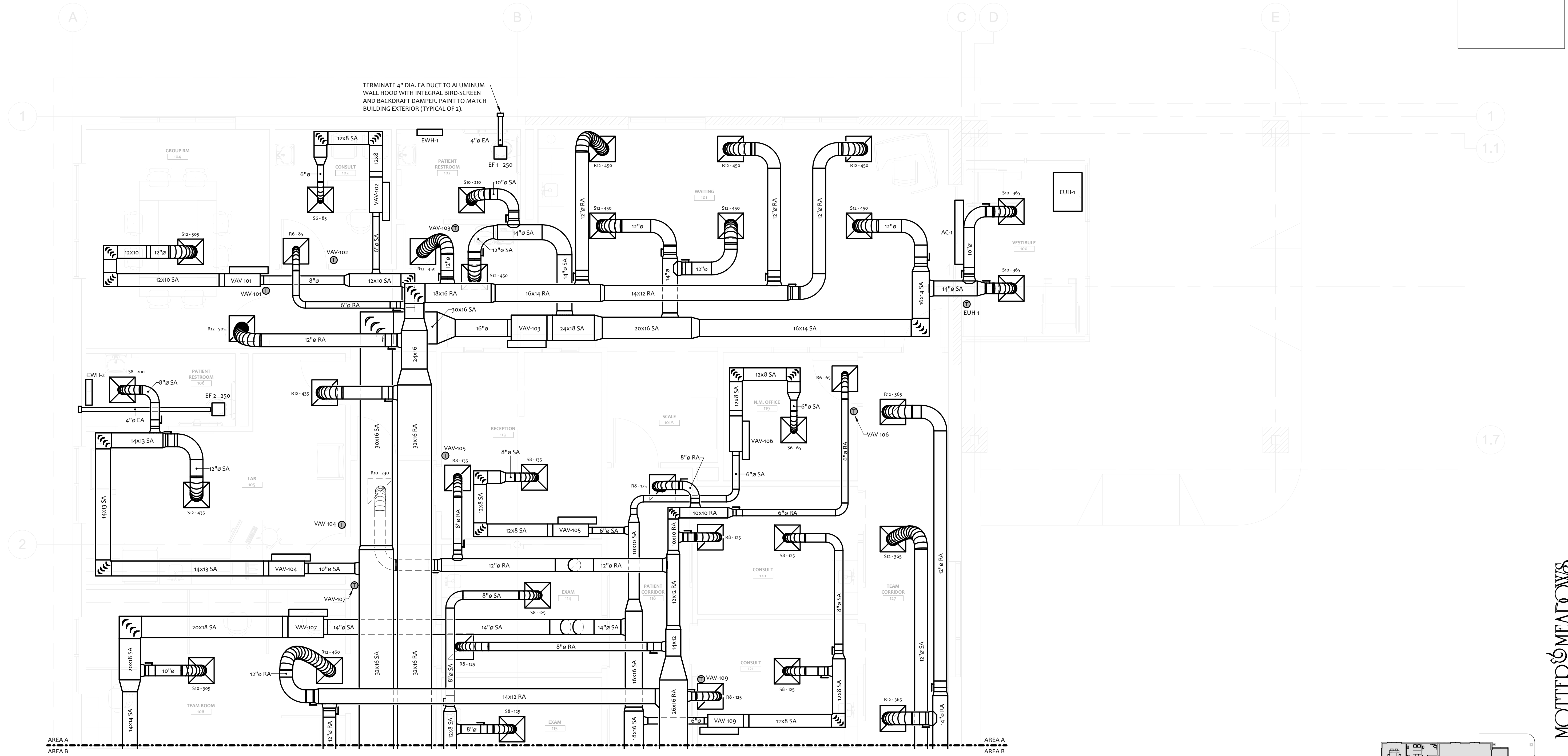
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DATE 04-10-2024

DWG
2-M0.0

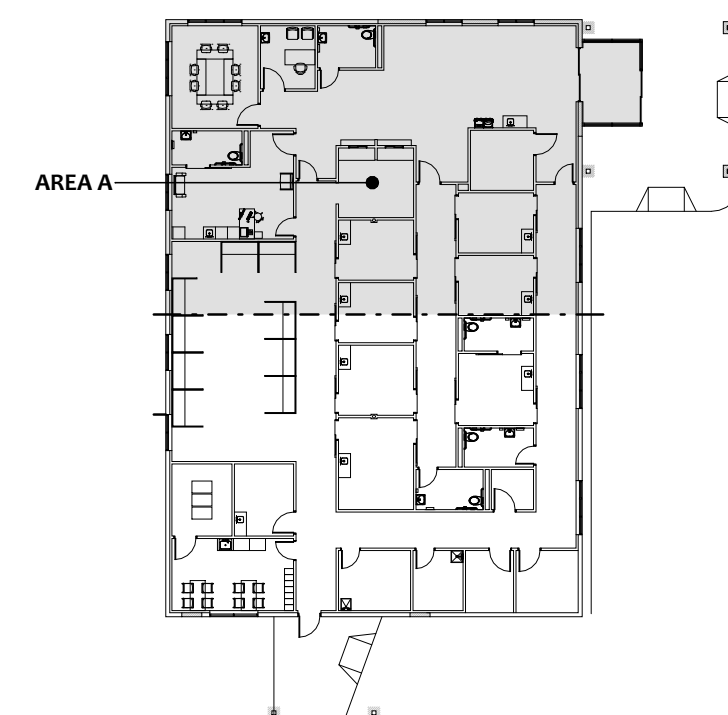


INTERIOR BUILD-OUT PACKAGE

| |
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| REVISIONS: |
|------------|



1 HVAC NEW WORK - AREA A
 SCALE: 1/4" = 1'-0"



KEY PLAN A
 SCALE: 1/32" = 1'-0"

SGA ENGINEERS
 MECHANICAL | ELECTRICAL | PLUMBING | FIRE | TECHNOLOGY
 engineer@SGAengineers.com | SGAengineers.com

MOTT & MEADOWS ARCHITECTS
 31 CLARK STREET WILMINGTON, OHIO

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 31 CLARK STREET WILMINGTON, OHIO

INTERIOR BUILD-OUT PACKAGE

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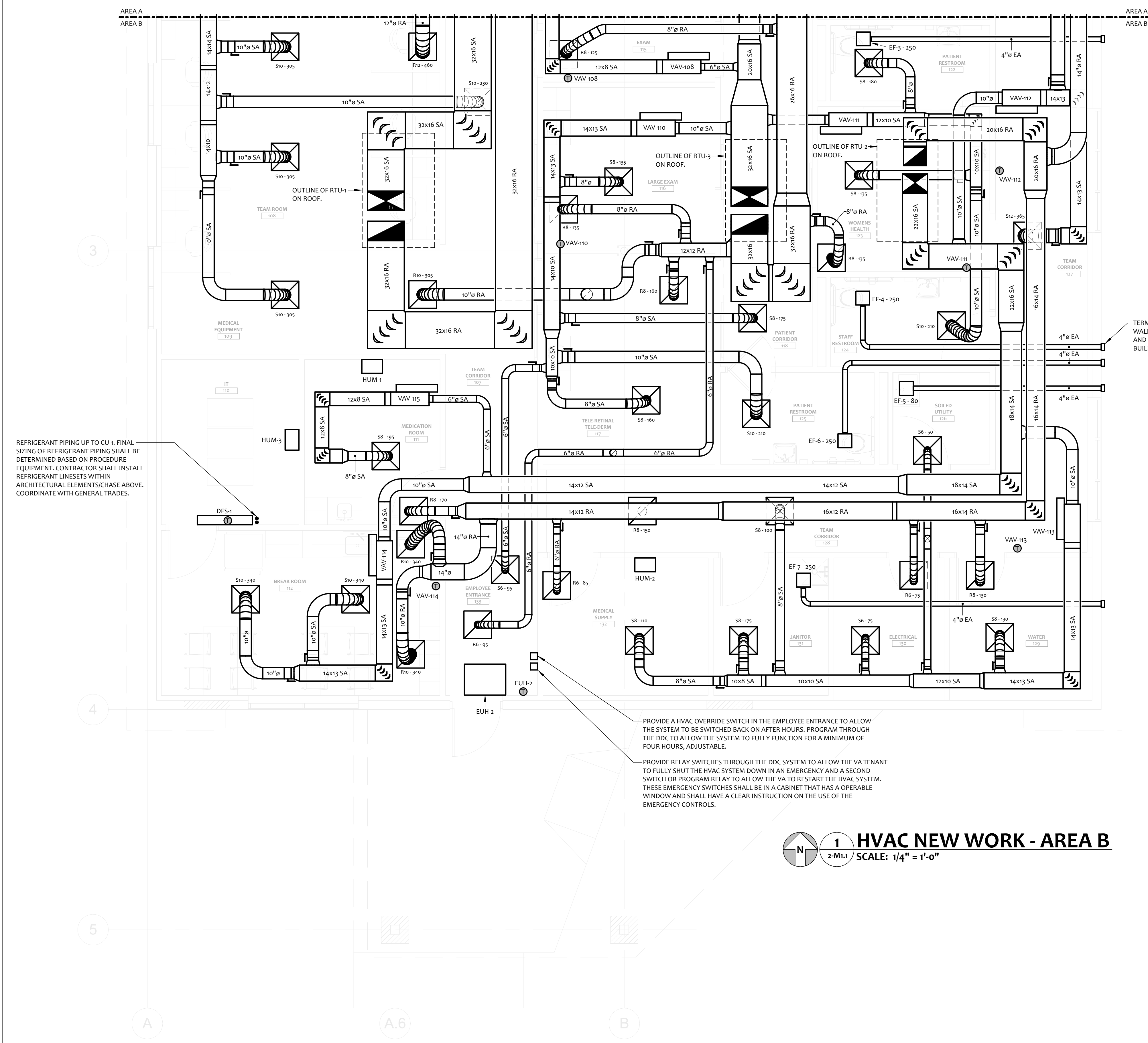
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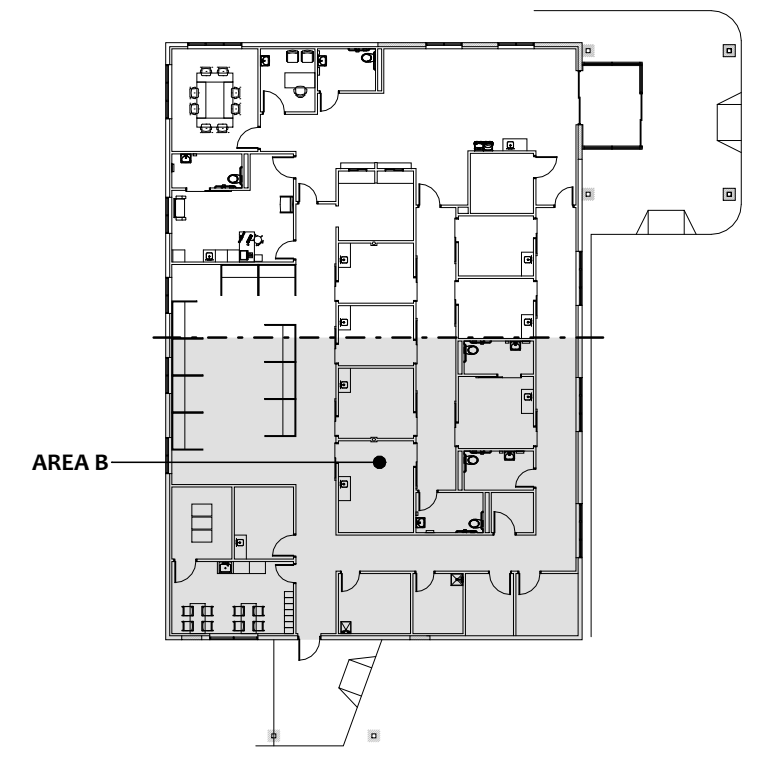
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 COMM 23144
 DATE 04-10-2024

DWG
 2-M1.1



1 HVAC NEW WORK - AREA B
 SCALE: 1/4" = 1'-0"



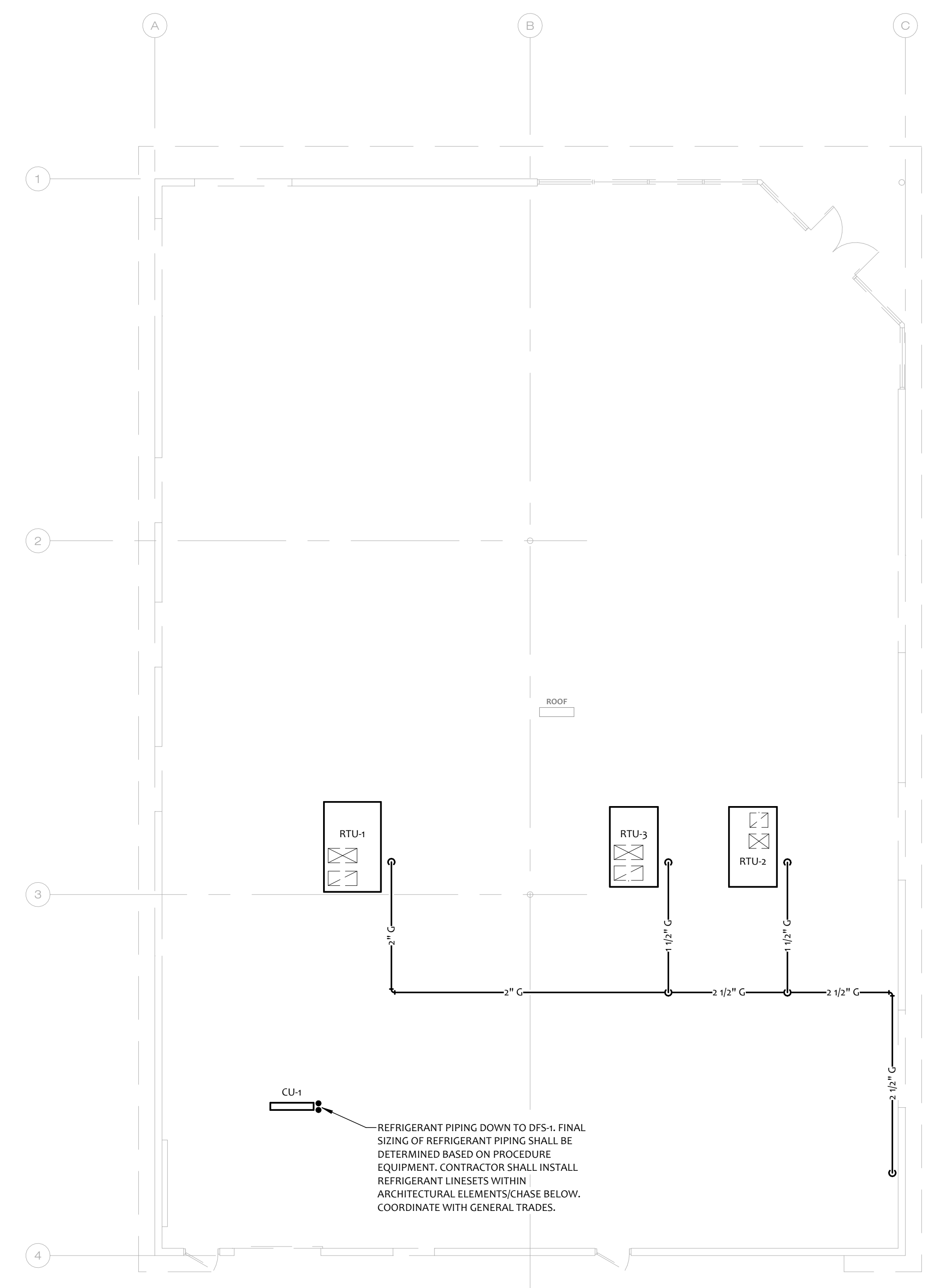
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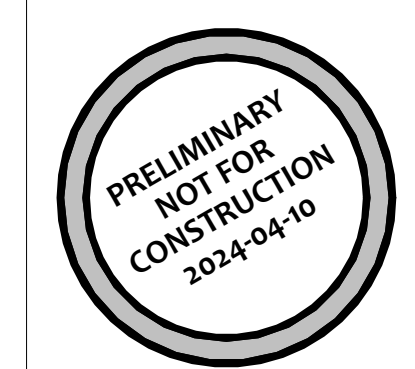
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MECHANICAL - ROOF - OVERALL
SCALE: 1/8" = 1'-0"

INTERIOR BUILD-OUT PACKAGE



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MECHANICAL - ROOF -
OVERALL

COMM 23144
DATE 04-10-2024

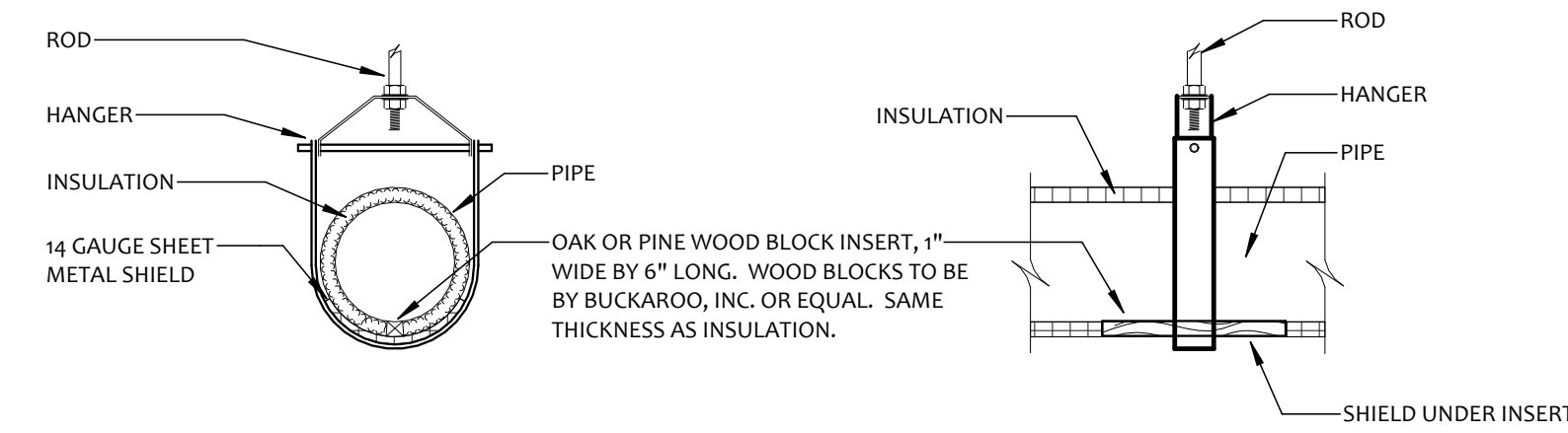
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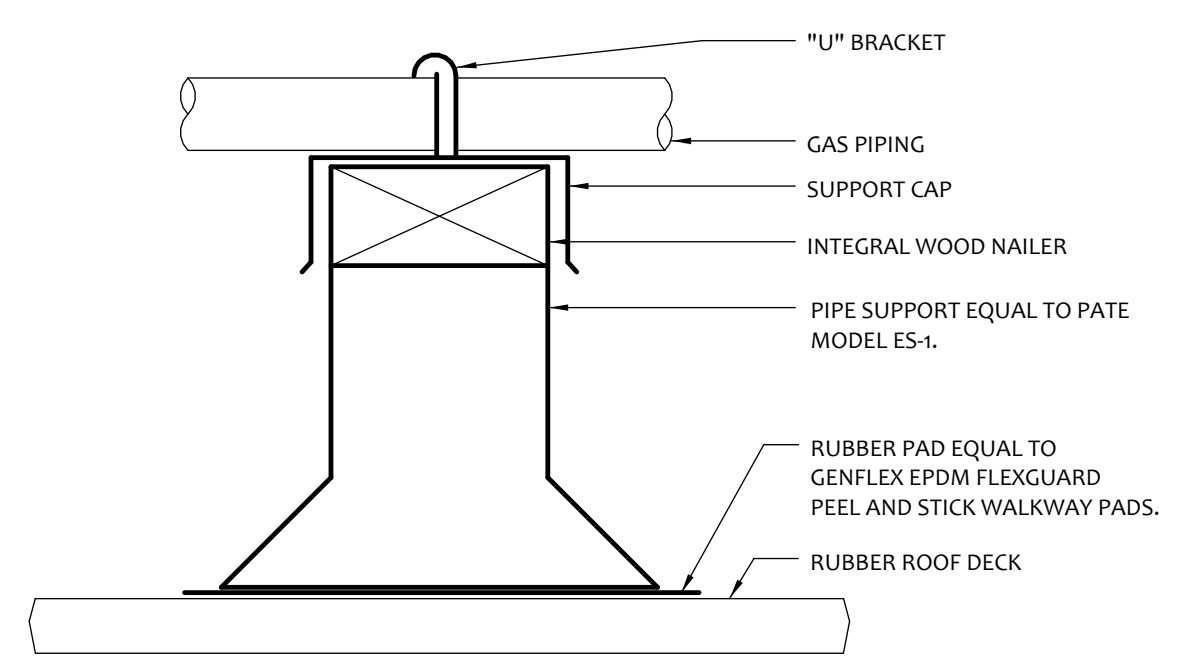
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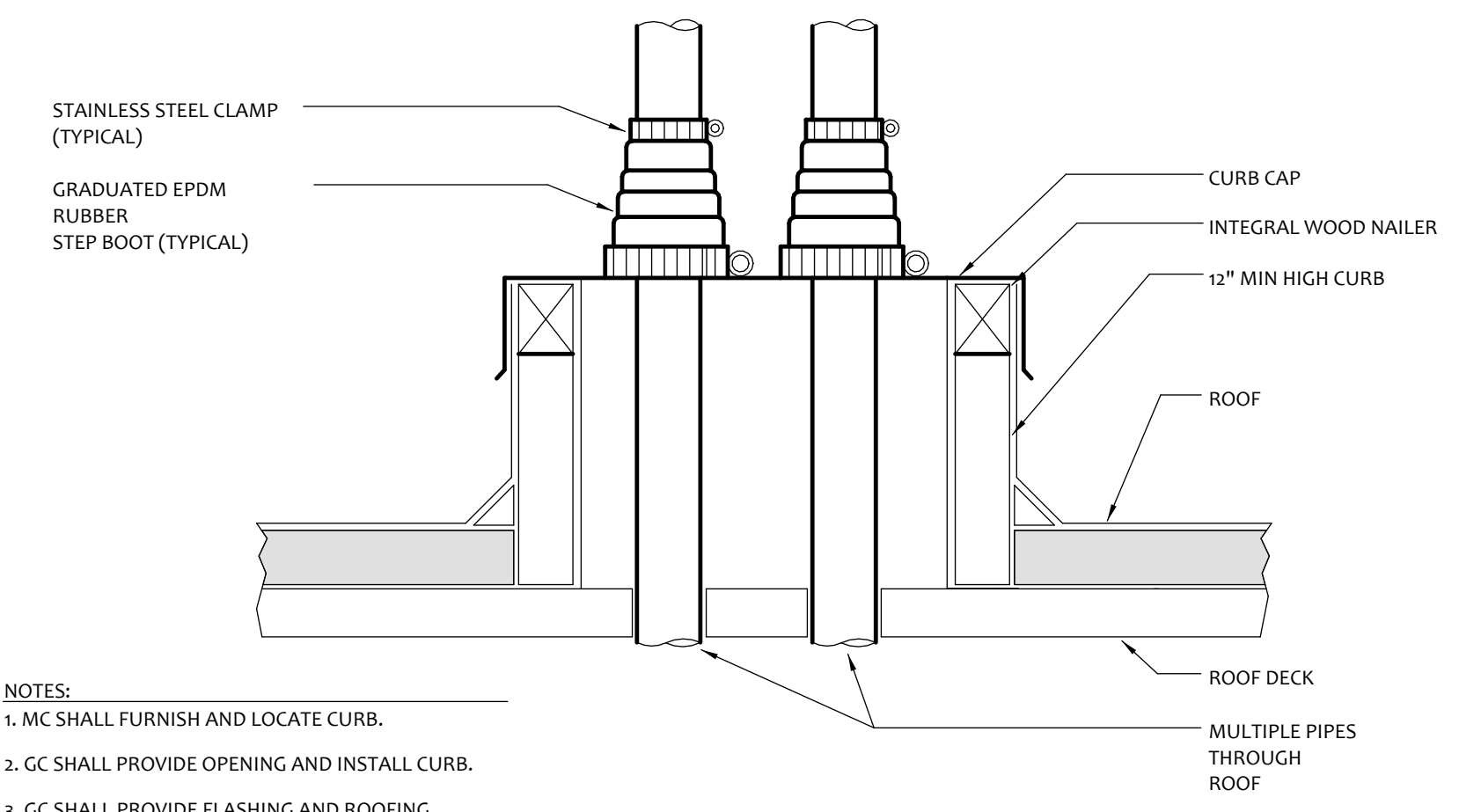
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3 HYDRONIC PIPE HANGER DETAIL
 2-M3.0

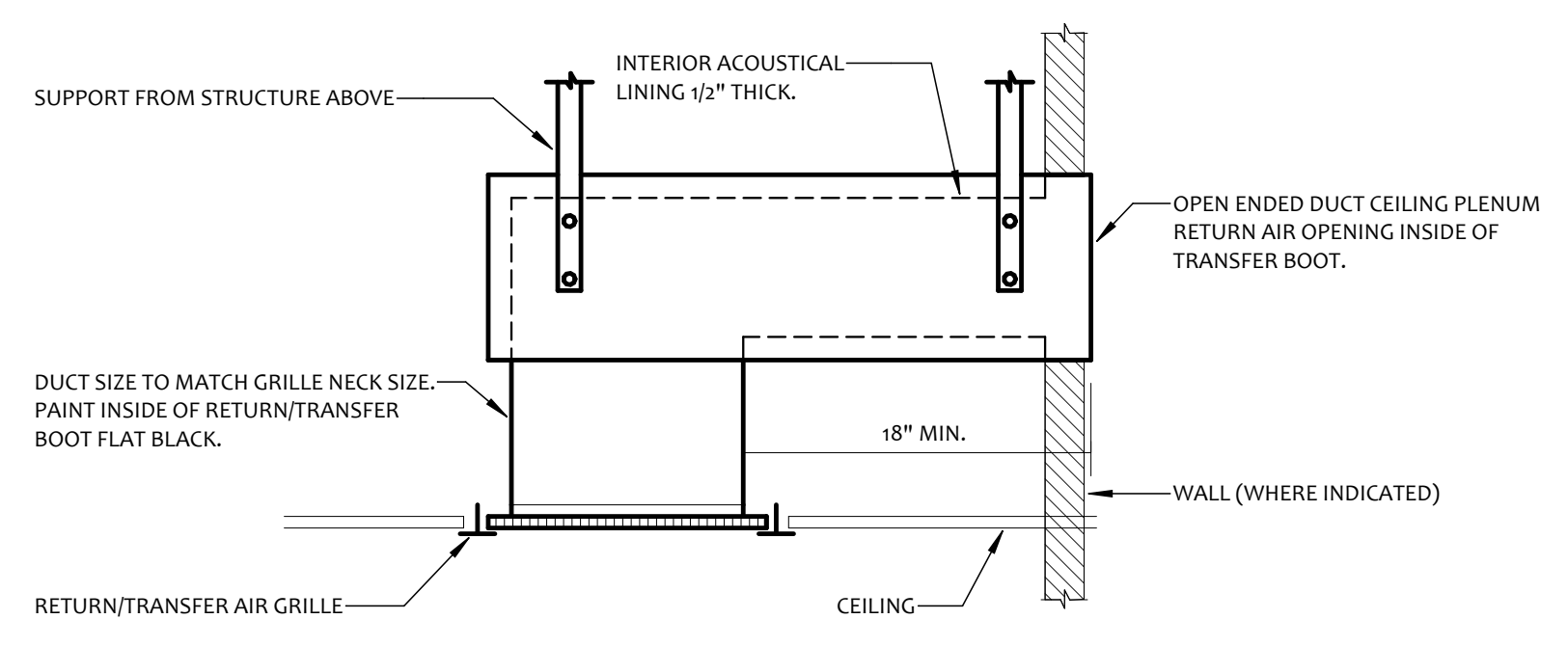


5 ROOF MOUNTED PIPE SUPPORT DETAIL
 2-M3.0

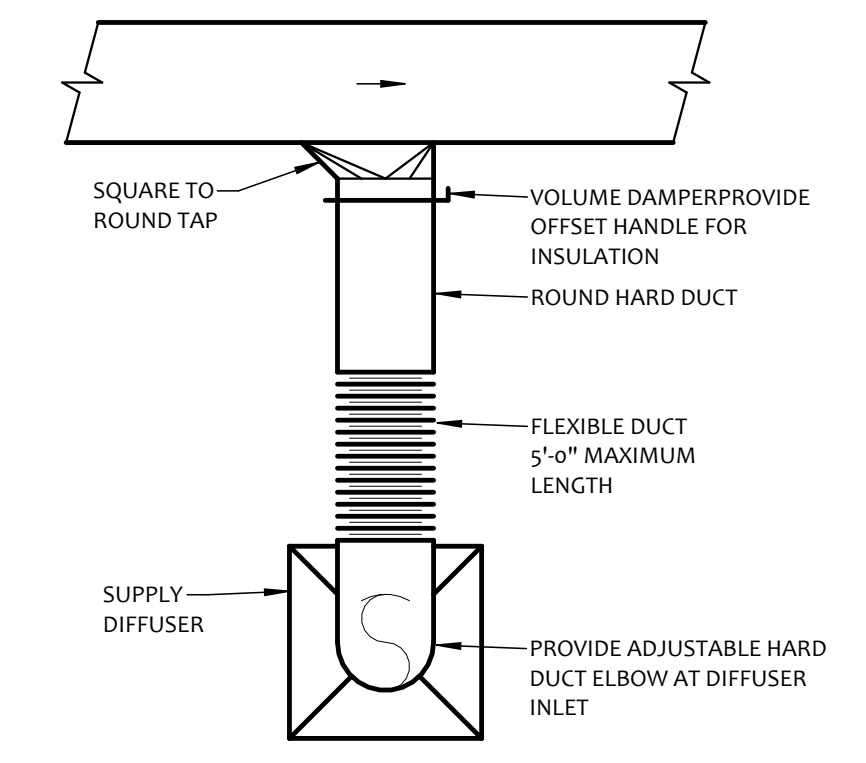


NOTES:
 1. MC SHALL FURNISH AND LOCATE CURB.
 2. GC SHALL PROVIDE OPENING AND INSTALL CURB.
 3. GC SHALL PROVIDE FLASHING AND ROOFING.
 4. COORDINATE ROOFWORK TO MAINTAIN ALL WARRANTIES.
 5. PROVIDE CURB WITH ADDITIONAL KNOCKOUTS FOR CONTROL AND POWER CONDUIT.

4 ROOF-MOUNTED PIPE CURB DETAIL
 2-M3.0



2 RETURN/TRANSFER AIR BOOT DETAIL
 2-M3.0



1 GRILLE AND DIFFUSER DETAIL
 2-M3.0

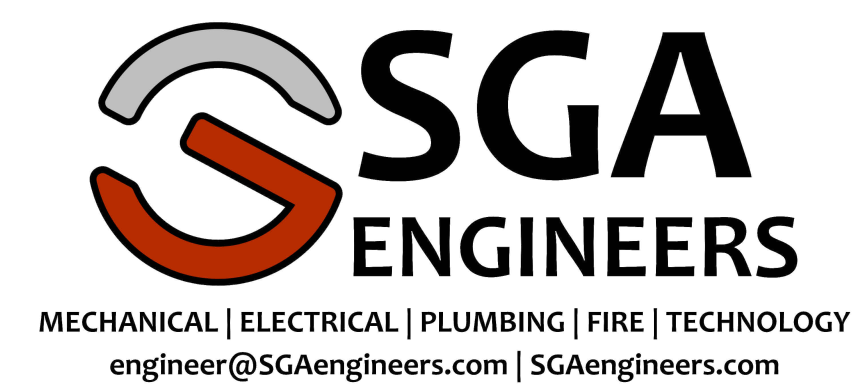
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 HVAC DETAILS

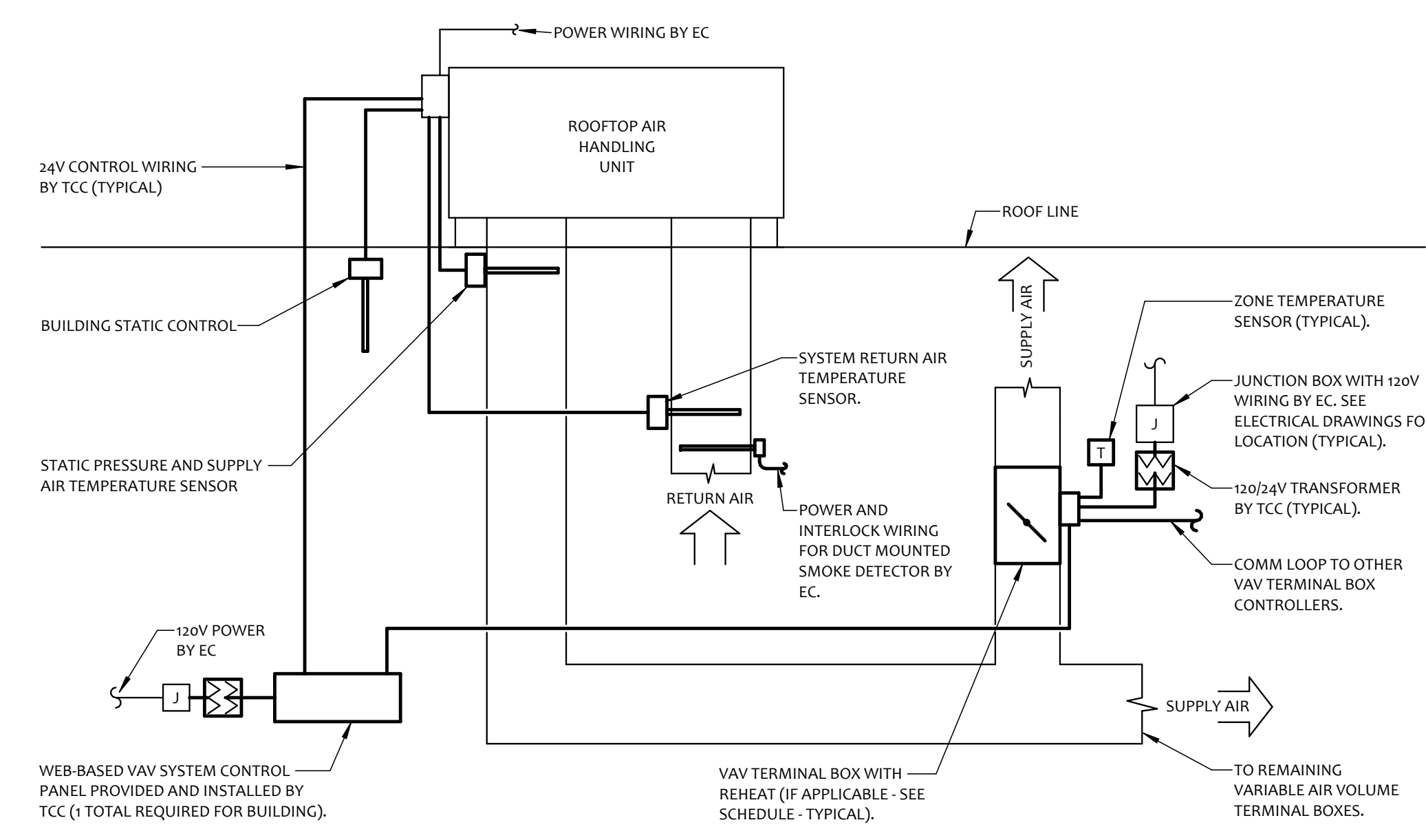
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 DATE 04-10-2024

DWG
 2-M3.0



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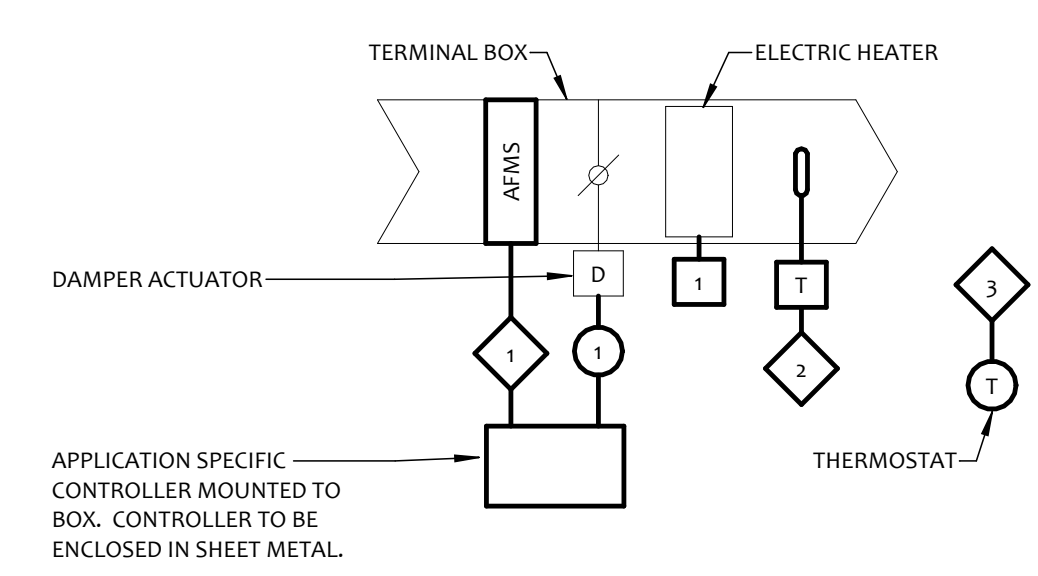


SEQUENCE OF OPERATION:
 THE ROOFTOP UNIT SUPPLY FAN SHALL RUN CONTINUOUSLY AND MODULATE AIRFLOW BASED ON DUCT STATIC PRESSURE. THE HEATING/COOLING CIRCUITS SHALL RUN AS REQUIRED TO DISCHARGE 55°F LEAVING AIR TEMPERATURE IN SUMMER AND 62°F LEAVING AIR TEMPERATURE IN WINTER (ADJUSTABLE). THE OUTSIDE AIR DAMPER SHALL BE OPEN TO MINIMUM AND MODULATE BASED ON REFERENCE ENTHALPY ECONOMIZER CAPABLE OF 100% DESIGN SUPPLY AIRFLOW.

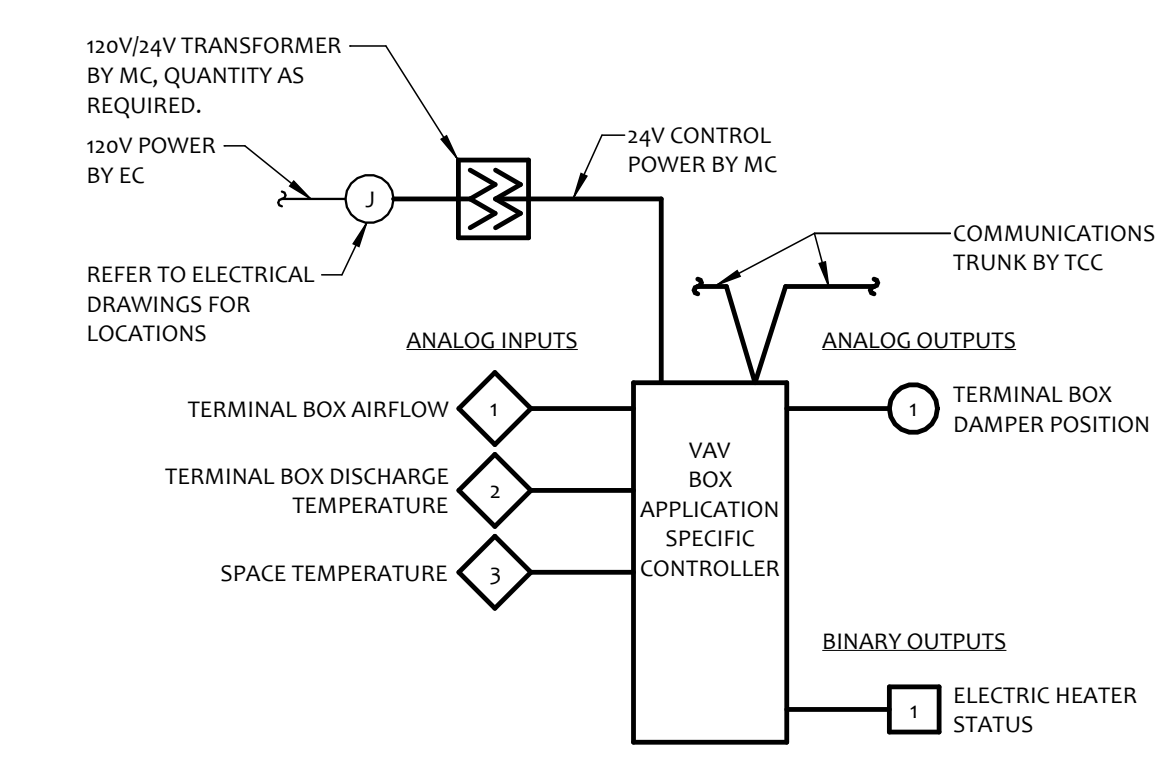
NOTE:
 1. ALL VAV COMPONENTS SHALL BE FURNISHED BY THE MC AND BE SET AND WIRED BY THE TCC.

3 VARIABLE VOLUME (VAV) SYSTEM CONTROL DIAGRAM
 2-M4.0

TERMINAL BOX SEQUENCE OF OPERATIONS:
 A ROOM TEMPERATURE SENSOR SHALL, THROUGH THE TERMINAL BOX CONTROLLER, MODULATE THE DDC AIR TERMINAL BOX DAMPER AND ELECTRIC HEATER IN SEQUENCE TO MAINTAIN ROOM SETPOINT REQUIREMENTS.
 THE SPACE TEMPERATURE SETPOINT SHALL BE MAINTAINED BY THE SPACE TEMPERATURE SENSOR MODULATING THE BOX DAMPER BETWEEN MINIMUM AND MAXIMUM CFM SETTINGS IN SEQUENCE WITH THE ELECTRIC HEATER.
 TERMINAL BOX CONTROLLERS SHALL BE TIED INTO THE RESPECTIVE ROOFTOP UNIT CONTROLLER. EACH TERMINAL BOX CONTROLLER SHALL ENABLE THE BAS OPERATOR TO MONITOR SPACE TEMPERATURE, DISCHARGE TEMPERATURE, ELECTRIC HEATER STATUS, AND AIR VOLUME.



1 TERMINAL BOX WITH ELECTRIC REHEAT CONTROL DIAGRAM
 2-M4.0

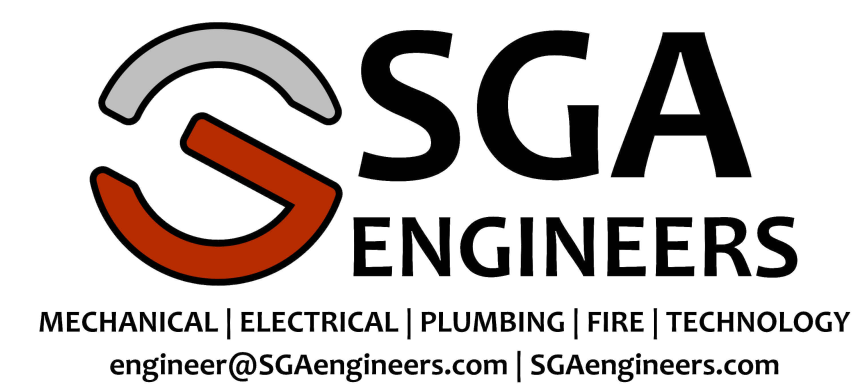


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 HVAC CONTROLS -
 PART 1

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DWG
2-M4.0



INTERIOR BUILD-OUT PACKAGE

| BUILDING AUTOMATION SYSTEM (BAS) DDC, CONTROLS, METERING, MONITORING AND INTEGRATION VIA THE VA NETWORK TO CHILlicothe VAMC ENGINEERING CONTROL CENTER (ECC) AND CHILlicothe MANAGEMENT SYSTEMS | | |
|--|--|---|
| <p>NOTE: IT IS THE DESIRED INTENT THAT THESE SYSTEM REPORT BACK OVER THE NETWORK TO THP CHILlicothe VAMC BAS IN THE ECO AND OTHER DESIGNATED CHILlicothe VAMC MANAGEMENT SYSTEMS, HOWEVER THE CHILlicothe VAMC BAS IN THE ECO IS CURRENTLY NOT ON THE INTERNET RATHER IT IS ON AN INTERNAL FIBER BACKBONE AND THERE IS NOT A DESIGNATED CHILlicothe VAMC MANAGEMENT SYSTEM IN PLACE OUTSIDE OF THE HONEYWELL BAS (THEY MAY BE DEVELOPED) THEREFORE THERE IS CURRENTLY NO SYSTEM IN PLACE FOR THE OBOC TO REPORT BACK TO OVER THE NETWORK (CURRENT AS OF 3/14/21). IF BY TIME THIS IS IN DESIGN A NETWORKED SYSTEM FOR MONITORING IS IN PLACE THEN THAT SYSTEM OR SYSTEMS SHALL BE INTEGRATED INTO. IF NOT, DESIGN/PROVIDE STAND ALONE NETWORK MANAGEMENT SYSTEMS VISIBLE OVER THE VA NETWORK TO CHILlicothe VAMC AND INCLUDE ALL EQUIPMENT TO ENABLE THE CAPABILITY FOR NETWORK INTEGRATION INTO A CHILlicothe VAMC MANAGEMENT SYSTEM IN THE FUTURE ONCE INSTALLED (EXAMPLE BEING UPS WITH NETWORK CARDS AND CAPABILITY TO REPORT SPECIFIED INFORMATION. FULL INTEGRATION BACK TO THE CHILlicothe VAMC ECO WOULD INCLUDE UPDATING GRAPHICS AT THE CHILlicothe VAMC.</p> <p>NOTE: INTEGRATION VIA THE VA NETWORK TO THE CHILlicothe VAMC ECC SHALL NOT RELIEVE THE LESSOR OF THEIR FULL RESPONSIBILITY FOR MAINTENANCE AND MONITORING OF THE BUILDINGS SYSTEMS (EXCEPT SPECIFICALLY OWNED VA IT EQUIPMENT). THIS INTEGRATION TO CHILlicothe VAMC IS FOR VA REQUIRED MONITORING, REPORTING, AND TRACKING CAPABILITIES NOT TO RELIEVE THE LESSOR OF THEIR REQUIRED MAINTENANCE.</p> <p>IMPLEMENTATION GUIDANCE (SOURCE PG18-12 OIT INFRASTRUCTURE STANDARD (OIT IS) FOR TELECOMMUNICATIONS SPACES V3.0 PARAGRAPH 4.3.7):</p> <p>A. MONITORING SHALL BE DEFINED A CONTINUAL REAL-TIME OBSERVATION OF A CONDITION OR SET OF CONDITIONS AFFECTING SPACES.</p> <p>B. CONNECT ALL VERTICAL RPDU TO THE RPDU MONITORING SYSTEM. MAXIMIZE CONNECTIVITY OF FACILITY EQUIPMENT WITHIN THE TELECOMMUNICATIONS.</p> <p>C. PROVIDE OUTPUT FEEDS FROM THE SYSTEM TO THE CHILlicothe MMAC ECC/BAS BUILDING MONITORING SYSTEM FOR REMOTE MONITORING CAPABILITIES.</p> <p>D. FUNCTIONAL DEFINITIONS OF MONITORING AND METERING SHALL NOT BE INTERPRETED TO REQUIRE SEPARATE SYSTEMS; A SINGLE SENSOR, DEVICE, OR SYSTEM MAY SUPPORT MULTIPLE MONITORING AND METERING FUNCTIONS.</p> <p>E. DETECTION, ALERTING, AND ALARMING FUNCTIONS, AS WELL AS AUTOMATIC TRIGGERING OF INTERVENTIONS, SHALL BE CONSIDERED PART OF A MONITORING SYSTEM. MONITORING SYSTEMS COLLECT FORENSIC DATA DURING A PERIOD WHEN A DETECTION THRESHOLD HAS BEEN EXCEEDED.</p> <p>F. ALERTS ARE COMMUNICATED WHEN A CONDITION THRESHOLD HAS BEEN REACHED OR EXCEEDED. ALERT TRIGGERS SHALL BE SET TO PROVIDE SUFFICIENT REACTION TIME TO RESPOND TO, INVESTIGATE, AND CORRECT THE UNDERLYING CAUSE OF THE CONDITION.</p> <p>G. ALARMING SYSTEMS SHALL COMMUNICATE WHEN AN ABSOLUTE LIMIT HAS BEEN EXCEEDED.</p> | | |
| SYSTEM | REQUIREMENTS | REFERENCES |
| CONTROL SYSTEM COMPUTER(S) (AKA OPERATORS TERMINAL), SERVERS, SOFTWARE, KEYS OARD— VISUAL -MOUSE | DESIGN AND SPECIFY TO REQUIRED A COMPUTER OR SERVER (AS REQUIRED) TO HOUSE ALL BAS, DDC, CONTROLS, MANAGEMENT SYSTEMS, MONITORING, AND METERING SYSTEMS, AND GRAPHICS. PROVIDE ALL REQUIRED HARDWARE AND SOFTWARE FOR THE SYSTEMS. IF RACK SPACE ALLOWS IN THE DESIGN, THE IDEAL SYSTEM WOULD BE LOCATED IN THE TELECOMMUNICATIONS ROOM AND BE RACK MOUNTED WITH A RACK MOUNTED KVM FOR SPACE SAVINGS (IF AN ALTERNATIVE LOCATION FOR THE DESK MOUNTED SOLUTION IS DETERMINED DURING DESIGN, THAT IS ACCEPTABLE AS WELL). | PG18-10 HVAC DESIGN MANUAL CHAPTER 5 HVAC CONTROL SYSTEMS |
| HVAC DDC | HVAC DDC CONTROL SYSTEM SHALL COMPLY WITH PG18-10 HVAC DESIGN MANUAL CHAPTER 5 HVAC CONTROL SYSTEMS. | PG18-10 HVAC DESIGN MANUAL CHAPTER 5 HVAC CONTROL SYSTEMS |
| COMMUNICATION PROTOCOLS IT DEVICES | MONITORED IT DEVICES SHALL USE THE SIMPLE NETWORK COMMUNICATION PROTOCOL (SNMP), CONFIGURED IN A SECURE MODE AS REQUIRED BY THE TRM. IMPLEMENTATIONS SHALL ADHERE TO THE VA I AN SECURITY STANDARD: | PG18-12 OIT INFRASTRUCTURE STANDARD (OIT IS) FOR TELECOMMUNICATIONS SPACES V3.0 TABLE 26 MONITORED CONDITIONS |
| COMMUNICATION PROTOCOLS MONITORING SYSTEMS | TO SUPPORT DATA STREAM INTEGRATION, MONITORING SYSTEMS SHALL SUPPORT SECURED SNMP V3.0 FOR UPSTREAM COMMUNICATION AND AT LEAST ONE OF THE FOLLOWING INDUSTRIAL COMMUNICATION PROTOCOLS TO RECEIVE SENSOR DATA: | PG18-12 OIT INFRASTRUCTURE STANDARD (OIT IS) FOR TELECOMMUNICATIONS SPACES V3.0 TABLE 26 MONITORED CONDITIONS |
| COMMUNICATION PROTOCOLS MONITORING DEVICES | MONITORING DEVICES AND SYSTEMS SHALL BE CAPABLE OF COMMUNICATION USING AT LEAST ONE OF THE FOLLOWING PROTOCOLS: | PG18-12 OIT INFRASTRUCTURE STANDARD (OIT IS) FOR TELECOMMUNICATIONS SPACES V3.0 TABLE 26 MONITORED CONDITIONS |
| TR ROOM POWER | MONITOR CONTINUITY AND QUALITY OF: UTILITY POWER DELIVERY AND BRANCH CIRCUIT POWER OUTPUT SUPPORTING IT EQUIPMENT (FROM EACH DISTRIBUTION PANEL SERVING THE TR ROOM (A SIDE AND B SIDE)). INTEGRATE WITH AUTOMATED ENERGY METERING SYSTEM AND BAS. | PG18—12 OIT IS V3.0 PARAGRAPH 4.2.10.1 METERED ENERGY CONSUMPTION DATA, TABLE 19, AND PARAGRAPH 4.2.10.1.4 TOTAL IT EQUIPMENT ENERGY CONSERVATION CONSUMPTION PG18—12 OIT IS V3.0 PARAGRAPH 4.3.7 MONITORING, TABLE 26 MONITORED CONDITIONS, POWER PG18-12 OIT IS V3.0 APPENDIX B ROOM TEMPLATES (OIT RT) PG. 2 NOTES 4 AND 5, PG. 5 (SHOWS THE DISTRIBUTION PANEL, A SIDE AND B SIDE) |
| TR ROOM PDU | POWER DISTRIBUTION EQUIPMENT (PDUS) IN THE DATA CENTER SHALL HAVE BRANCH LEVEL METERING, OR IF PDU IN THE RACKS HAVE RACK-LEVEL POWER MONITORING, THIS SHALL BE CONNECTED TO A FACILITY BUILDING AUTOMATION SYSTEM (BAS) ENERGY MANAGEMENT CONTROL SYSTEM (EMCS) (BAS/EMCS), COLLECT ACTUAL ENERGY USE DATA AT THE LEVEL CLOSEST TO THE IT EQUIPMENT USE OF A BAS/EMCS TO AUTOMATICALLY COLLECT AND CALCULATE THIS INFORMATION PROVIDES THE MOST ACCURATE MEASUREMENT. | PG18—12 OIT IS V3.0 PARAGRAPH 4.2.10.1 METERED ENERGY CONSUMPTION DATA, TABLE 19, AND PARAGRAPH 4.2.10.1.4 TOTAL IT EQUIPMENT ENERGY CONSERVATION CONSUMPTION AND 4.2.10.1.5 TOTAL UNINTERRUPTIBLE POWER SUPPLY LOAD ENERGY CONSUMPTION |
| TR ROOM UPS | NETWORK CARD AND REPORTING CAPABILITY OF THE UPS FOR THE FOLLOWING: UPS SHALL BE MANAGED AND REPORT THE FOLLOWING INFORMATION TO A MANAGEMENT SYSTEM | PG18—12 OIT IS V3.0 TABLE 26 MONITORED CONDITIONS, POWER VA OFHRM SITE INFRASTRUCTURE REQUIREMENTS V1.8 PARAGRAPH 2.4 C 4 PG18—12 OIT IS V3.0 PARAGRAPH 4.2.10.1 METERED ENERGY CONSUMPTION DATA, TABLE 19, AND PARAGRAPH 4.2.10.1.4 TOTAL IT EQUIPMENT ENERGY CONSERVATION CONSUMPTION |
| TR ROOM TEMPERATURE AND HUMIDITY | TR WIRING CLOSET CLASS B SPACE TEMPERATURE RANGE ITE TO 95T, RELATIVE HUMIDITY: 8 TO 80% NONCONDENSING TR WIRING CLOSET ENVIRONMENTAL MONITORING SOLUTION FOR TEMPERATURE AND HUMIDITY (E.G. UNINTERRUPTIBLE POWER SUPPLY (UPS) WITH NETWORK MANAGEMENT CARD, TEMPERATURE & HUMIDITY SENSOR, AND CENTRAL MONITORING BY WAY OF A SINGLE NETWORK CONNECTION IS REQUIRED USING A RJ— 45 PATCH CABLE) DUCTLESS SPLIT SYSTEMS AND STAND-ALONE HUMIDIFIER SHALL WORK ON THEIR OWN INTEGRAL CONTROLS. PROVIDE SPACE TEMPERATURE SENSOR, SPACE HUMIDITY SENSOR, AUXILIARY DRAIN PAN MOISTURE SENSOR (NOT FLOAT SWITCH) AND SUPPLY AIR TEMPERATURE SENSORS ON ALL DX UNITS AND/OR VAV TERMINALS AND CONNECT THESE TO THE CENTRAL CONTROL SYSTEM FOR TRENDDING AND ALARM PURPOSES. THE CENTRAL CONTROL SYSTEM SHALL ALSO BE INTEGRATED OVER THE VA NETWORK TO THE CHILlicothe VAMC ENGINEERING CONTROL CENTER (ECC) FOR MONITORING AND ALARMS. NOTE 8.6 ALARM MONITORING: THE CENTRAL CONTROL SYSTEM SHALL MONITOR SPACE CONDITIONS AND UNIT STATUS AND SHALL ALARM THE LESSOR'S MAINTENANCE STAFF WHENEVER TEMPERATURE OR HUMIDITY ARE OUT OF TOLERANCE, WHEN WATER IS IN THE HVAC SECONDARY DRAIN PAN IF ONE IS PROVIDED, AND WHEN ANY SUPPLY AIR TEMPERATURE DOES NOT MATCH WHAT IS REQUIRED BY ROOM CONDITIONS. THE CENTRAL CONTROL SYSTEM SHALL ALSO BE INTEGRATED OVER THE VA NETWORK TO THE CHILlicothe VAMC ENGINEERING CONTROL CENTER (ECC) FOR MONITORING AND ALARMS. | VA OFHRM SITE INFRASTRUCTURE REQUIREMENTS M1.8 PARAGRAPH 2.5A2 DG18—12 OIT IS V3.0 TABLE 24 STATES: MONITORING: "MONITORED WITH INDICATORS ALLOWING OPERATORS TO DETERMINE THE GENERAL CONDITION OF THE COMPUTER ROOM. HUMIDITY CONTROL EQUIPMENT: NO DEDICATED HUMIDITY CONTROL EQUIPMENT REQUIRED. PG18—12 OIT IS V3.0 TABLE 25 STATES: SPLIT SYSTEM AIR CONDITIONER EQUIPMENT, OPERATION: AUTOMATIC OPERATION TO MAINTAIN SET POINT TEMPERATURE IN THE TELECOMMUNICATIONS SPACE FOR OUTSIDE ENVIRONMENTAL CONDITIONS BETWEEN THE ASH RAE FUNDAMENTALS WEATHER DATA 99.6% COLUMN FOR HEATING (WINTER) AND 0.4% COLUMN COLLING (SUMMER). |

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THIS DWG :
HVAC CONTROLS - PART 2

COMM 23144
DATE 04-10-2024

DWG
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INTERIOR BUILD-OUT PACKAGE

ROOFTOP UNIT SCHEDULE (RTU-X)

Table with columns: MARK, MANUFACTURER, MODEL, SUPPLY AIRFLOW, OUTSIDE AIRFLOW, EXTERNAL STATIC PRESS., FAN RPM, DRIVE, NO. OF FANS, INDOOR MOTOR HP, SUPPLY MOTOR HP, TOTAL MBH, SENSIBLE MBH, EAT DB/WB (F), LAT DB/WB (F), NO. OF COMPRESSORS, COMPRESSOR TYPE, IEER, ENERGY SOURCE, INPUT MBH, OUTPUT MBH, EAT (F), MINIMUM LAT (F), HEATING, CONDENSER FAN DATA, ELECTRICAL DATA, FILTERS, WEIGHT (LBS), REMARKS.

- REMARKS: 1. PROVIDE WITH SINGLE POINT POWER CONNECTION. 2. FURNISH UNIT WITH EXTENDED 5-YEAR COMPRESSOR WARRANTY AND R-410A REFRIGERANT. 3. PROVIDE WITH 14" TALL FULL PERIMETER CURB FOR MOUNTING ON ROOF. 4. FURNISH WITH 0-100% REFERENCE DRY BULB ECONOMIZER, CONVENIENCE OUTLET, OUTSIDE AIR HOOD, 2-STAGE MODULATING GAS HEAT, AND STAINLESS STEEL HEAT EXCHANGER. 5. FURNISH WITH FACTORY MOUNTED AND WIRED SMOKE DETECTOR IN THE RETURN AIR STREAM FOR SELF-CONTAINED UNIT SHUTDOWN UPON SENSING OF SMOKE. 6. STARTUP SHALL BE PERFORMED BY FACTORY AUTHORIZED PERSONNEL. 7. UNIT SHALL BE FURNISHED WITH PACKAGED HARDWARE AND CONTROL SYSTEM CAPABLE OF VARIABLE AIR VOLUME OPERATION WITH NETWORK INTERFACE CARD FOR BACNET INTEGRATION.

FAN SCHEDULE (EF-X)

Table with columns: MARK, MANUFACTURER, MODEL, TYPE, AIRFLOW (CFM), ESP, FAN RPM, DRIVE TYPE, WEIGHT, VOLTAGE, PHASE, WATTS, REMARKS.

- REMARKS: 1. PROVIDE WITH INTEGRAL FACTORY-MOUNTED AND WIRED DISCONNECT. 2. PROVIDE WITH FACTORY-MOUNTED BACK-DRAFT DAMPER AND HANGING VIBRATION ISOLATION KIT. 3. EC SHALL POWER AND CONTROL WITH INTERLOCKED ROOM LIGHTING CIRCUIT.

TERMINAL BOX SINGLE DUCT WITH ELECTRIC REHEAT (VAV-X)

Table with columns: MARK, MANUFACTURER, MODEL, INLET SIZE, MIN COOLING, MAX COOLING, MIN HEATING, MAX HEATING, HEATING KW, VOLTS/PHASE, REMARKS.

- REMARKS: 1. PROVIDE WITH TERMINAL BOX CONTROLLER MATCHING SPECIFIED AND APPROVED BUILDING AUTOMATION CONTROLS SYSTEM NETWORK WITH DIGITAL READOUT THERMOSTAT. 2. PROVIDE WITH FIBER-FREE INTERNAL 1" CELLULAR INSULATION LINER, SOUND ATTENUATOR, 24V CONTROLS TRANSFORMER, HANGER BRACKETS, AND NEMA 1 STEEL ENCLOSURE. 3. HEATING WATER COIL PERFORMANCE SHALL BE BASED ON 140-DEG-F EVT AND 30-DEG-F DELTA, LIMITED TO 5' OF WPD AND 0.10" APD WITH MINIMUM 4-ROW HEATING COIL.

ELECTRIC UNIT HEATER SCHEDULE (EUH-X)

Table with columns: MARK, MANUFACTURER, MODEL, INPUT (KW), AIRFLOW (CFM), VOLTAGE, PHASE, FLA, WEIGHT, REMARKS.

- REMARKS: 1. PROVIDE WITH FACTORY MOUNTED AND WIRED DISCONNECT. 2. PROVIDE WITH REMOTE-MOUNTED LOW-VOLTAGE THERMOSTAT, FAN ON/AUTO SWITCH, AND CEILING MOUNTING BOX/KIT.

DUCTWORK SCHEDULE

Table with columns: MARK, SERVICE, DUCT MATERIAL, PRESSURE CLASS, INSULATION, REMARKS.

- REMARKS: 1. DUCT REQUIREMENTS FOR A GIVEN CONDITION ARE AS INDICATED UNLESS NOTED OTHERWISE. 2. DUCTWORK SHALL BE LEAK TESTED. 3. EXHAUST AIR DUCTWORK SHALL BE INSULATED WITH EXTERNAL 2" DUCTWRAP FROM EXTERIOR PENETRATION TO 1' PAST UPSTREAM ISOLATION DAMPER. 4. WRAP DUCTWORK WITH VENTURECLAD 1579GCV NATURAL ALUMINUM FLAT LAMINATE JACKET.

GRILLE AND DIFFUSER SCHEDULE

Table with columns: MARK, MANUFACTURER, MODEL, SERVICE, OVERALL SIZE, NECK SIZE, REMARKS.

- REMARKS: 1. SEE DRAWINGS FOR ACTUAL DESIGN AIRFLOW. 2. NOISE CRITERIA SHALL NOT EXCEED 20. 3. PROVIDE IN WHITE FACTORY FINISH UNLESS NOTED OTHERWISE. 4. EACH AIR TERMINAL DEVICE SHALL BE PROVIDED WITH A DUCT-MOUNTED BALANCE DAMPER AT BRANCH TAP.

AIR CURTAIN SCHEDULE (AC-X)

Table with columns: MARK, MANUFACTURER, MODEL, NOZZLE WIDTH (IN), MAX FPM AT NOZZLE, AVG. OUTLET VELOCITY FPM, AIRFLOW RATE (CFM), OUTLET VELOCITY UNIFORMITY, POWER RATING (KW), NUMBER OF MOTORS, MOTOR HP, HEATER KW, TEMP RISE (F), VOLTAGE, PHASE, WEIGHT, REMARKS.

- REMARKS: 1. PROVIDE WITH FACTORY MOUNTED AND WIRED DISCONNECT. 2. PROVIDE WITH INTEGRAL THERMOSTAT, FAN ON/AUTO SWITCH, AND SURFACE MOUNTING BOX/KIT.

AIR-COOLED CONDENSING UNIT SCHEDULE (CU-X)

Table with columns: MARK, MANUFACTURER, MODEL, COOLING CAPACITY (TONS), FAN QUANTITY, COMPRESSOR QUANTITY, MATED INDOOR UNIT, REFRIGERANT, SEER, MCA, MOCP, VOLTAGE, PHASE, WEIGHT (LBS), REMARKS.

- REMARKS: 1. DISCONNECT SWITCH SHALL BE FURNISHED, SET, AND WIRED BY THE EC. 2. FURNISH WITH SINGLE POINT ELECTRICAL CONNECTION. 3. PERFORMANCE BASED ON 95-DEG-F AMBIENT TEMPERATURE. 4. CONDENSING UNIT TO BE OF THE SAME MANUFACTURER AS EVAPORATOR UNIT. 5. FURNISH WITH ADVANCED WIND BAFFLE KIT FOR OPERATION DOWN TO MINIMUM -20-DEG-F AMBIENT TEMPERATURE.

HUMIDIFIER SCHEDULE (HUM-X)

Table with columns: MARK, MANUFACTURER, MODEL, TYPE, LBS/HR, SPACE DESIGN, NO. CYLINDERS, VOLTAGE, PHASE, KW, MCA, MOCP, FULL WEIGHT, REMARKS.

- REMARKS: 1. EC TO PROVIDE AND INSTALL DISCONNECT. 2. PROVIDE WITH FACTORY HUMIDISTAT. 3. PROVIDE WITH BACNET NETWORK INTERFACE COMMUNICATION PROTOCOL, INTEGRAL DISCHARGE MANIFOLD, USER-INTERFACE CONTROLLER, AND DRAIN COOLER.

FAN COIL UNIT SCHEDULE (DFS-X)

Table with columns: MARK, MANUFACTURER, MODEL, CFM, ESP, COOLING COIL (MBH), VOLTAGE, PHASE, WEIGHT (LBS), REMARKS.

- REMARKS: 1. FURNISH WITH FACTORY MOUNTED AND WIRED DISCONNECT SWITCH. 2. FURNISH WITH WIRED WALL THERMOSTAT. 3. SCHEDULED PERFORMANCE IS WITH MOTOR RUNNING AT HIGH SPEED. 4. FURNISH WITH CONDENSATE PUMP AND NETWORK CARD FOR INTEGRATION INTO THE BAS.

ELECTRIC WALL HEATER SCHEDULE (EWH-X)

Table with columns: MARK, MANUFACTURER, MODEL, INPUT (KW), AIRFLOW (CFM), VOLTAGE, PHASE, FLA, REMARKS.

- REMARKS: 1. PROVIDE WITH FACTORY MOUNTED AND WIRED DISCONNECT. 2. PROVIDE WITH INTEGRAL THERMOSTAT, FAN ON/AUTO SWITCH, AND SURFACE MOUNTING BOX/KIT.



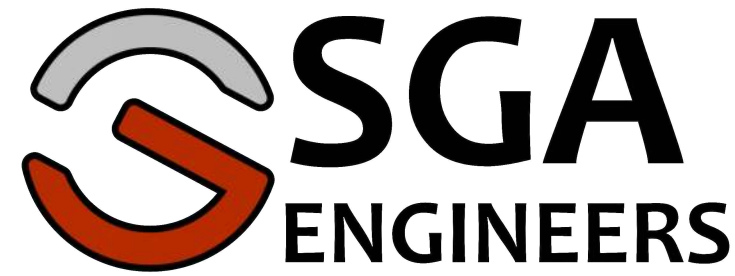
Jared F. Singer License: #PE-76168 Expiration Date: 2025-12-31

THIS DWG : HVAC SPECIFICATIONS - PART 1

DATE 04-10-2024

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COMM 23144



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MECHANICAL SPECIFICATIONS

PART 1 - GENERAL

1. SCOPE
 1. PROVIDE AND INSTALL ALL LABOR, EQUIPMENT, SUPPLIES, TRANSPORTATION, AND MATERIALS INDICATED ON THESE DRAWINGS FOR COMPLETE AND FULLY FUNCTIONAL HVAC, PLUMBING, AND FIRE SUPPRESSION SYSTEM.
 12. EXAMINATION OF PREMISES
 1. EXAMINE THE PREMISES AND BECOME FULLY ACQUAINTED WITH ALL EXISTING CONDITIONS SO THAT ALL PROBLEMS PERTAINING TO WORK UNDER THIS DIVISION ARE FULLY UNDERSTOOD. NO SUBSEQUENT ALLOWANCE WILL BE MADE IN THIS CONNECTION FOR ANY ERROR OF JUDGMENT OR NEGLIGENCE ON THE CONTRACTOR'S PART.
 2. SUBMISSION OF BID BY THIS CONTRACTOR SHALL BE UNDERSTOOD ADMISSION OF UNDERSTANDING AND KNOWLEDGE OF ALL ASPECTS OF THE PROJECT.
 13. CODES
 1. THIS CONTRACTOR SHALL PERFORM ALL WORK IN STRICT ACCORDANCE WITH ALL REQUIREMENTS OF NATIONAL, STATE, AND LOCAL CODES, INCLUDING, BUT NOT LIMITED TO THE FOLLOWING:
 1. OHIO BUILDING CODE INCLUDING MECHANICAL, PLUMBING, AND FIRE
 2. PUBLICATIONS OF THE AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR CONDITIONING ENGINEER (ASHRAE)
 3. THE NATIONAL ELECTRICAL CODE (NEC)
 4. THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
 5. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
 6. SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION (SMACNA)
 7. AIR CONDITIONING, HEATING, AND REFRIGERATION INSTITUTE (AHRJ)
 8. AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)
 9. NATIONAL BOARD OF FIRE UNDERWRITERS
 10. NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)
 11. UNDERWRITERS LABORATORIES, INC. (UL)
 12. UNITED STATES OF AMERICA STANDARD INSTITUTE
 13. NATIONAL INSTITUTE OF STANDARDS & TECHNOLOGY (NIST)
 14. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)
 15. AMERICAN NATIONAL STANDARD INSTITUTE (ANSI)
 16. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
 17. AMERICAN WITH DISABILITIES ACT (ADA)
 14. PERMITS
 1. THIS CONTRACTOR SHALL GIVE NECESSARY NOTICES, OBTAIN AND PAY FOR PERMITS, PREPARE ALL DOCUMENTS AND OBTAIN ALL NECESSARY APPROVALS OF ALL REGULATING AUTHORITIES HAVING JURISDICTION, OBTAIN ALL REQUIRED CERTIFICATES OF INSPECTION FOR THEIR WORK AND DELIVER SAME TO THE ARCHITECT/ENGINEER (A/E) BEFORE REQUEST FOR ACCEPTANCE AND FINAL PAYMENT FOR THE WORK.
 2. INCLUDE IN THE WORK, WITHOUT EXTRA COST TO THE OWNER, ALL LABOR, MATERIALS, SERVICES, APPARATUS, DRAWINGS (IN ADDITION TO CONTRACT DRAWINGS AND DOCUMENTS) REQUIRED TO COMPLY WITH ALL APPLICABLE LAWS AND REGULATIONS.
 3. ALL PERMITS OBTAINED FOR THIS PROJECT SHALL BE DELIVERED TO OWNER FOR RECORDS.
 15. GENERAL PROJECT REQUIREMENTS
 1. FURNISH EVERYTHING NECESSARY FOR THE COMPLETION OF WORK AND SUCCESSFUL OPERATION THEREOF INCLUDING ITEMS CLEARLY SPECIFIED HEREIN OR ANCILLARY TO THE COMPLETION OF WORK. ITEMS NOT DIRECTLY SPECIFIED HEREIN SHALL BE INSTALLED IN A MANNER CORRESPONDING WITH THE REST OF THE WORK AS THOUGH THEY WERE DISTINCTLY DESCRIBED AND SPECIFIED.
 2. THIS CONTRACTOR SHALL EMPLOY TRADESPEOPLE SPECIFICALLY TRAINED IN THE INSTALLATION OF EQUIPMENT AND MATERIALS INDICATED HEREIN.
 3. PROVIDE COMPLETE CONNECTIONS FOR EQUIPMENT FURNISHED UNDER SECTIONS OF THIS DIVISION, OR UNDER OTHER DIVISIONS, OR BY THE OWNER, WHICH REQUIRES CONNECTION UNDER THIS DIVISION.
 4. THE DRAWINGS ARE GENERAL DIAGRAMMATIC AND INTENDED TO CONVEY THE SCOPE OF WORK AND INDICATE THE GENERAL ARRANGEMENT OF EQUIPMENT, DUCTS, CONDUITS, PIPING AND FIXTURES. THE LOCATION OF ALL ITEMS NOT DEFINITELY FIXED BY DIMENSIONS ARE APPROXIMATE ONLY, BUT SHALL BE FOLLOWED AS CLOSELY AS POSSIBLE UNDER ALL CONDITIONS. BUILDING OPERATIONS AND LOCATION OF OTHER TRADES WILL PERMIT. THE EXACT LOCATIONS NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS MUST BE DETERMINED AT THE PROJECT BY THE CONTRACTOR AND SHALL HAVE THE APPROVAL OF THE ARCHITECT AND ENGINEER BEFORE BEING INSTALLED. MAKE REQUIRED OFFSETS AS TO MAINTAIN MAXIMUM HEADROOM WITH OTHER TRADES, OR AS REQUESTED BY THE ARCHITECT OR ENGINEER AT NO ADDITIONAL COST TO THE OWNER.
 5. THE ARCHITECT OR ENGINEER RESERVES THE RIGHT TO MAKE MINOR REVISIONS TO THE DUCTWORK, PIPING, OR EQUIPMENT DURING ROUGH-IN AT NO ADDITIONAL COST TO THE OWNER.
 6. DRAWINGS SCALES ARE INDICATED FOR REFERENCE ONLY AND SHALL NOT BE SCALED FOR EXACT MEASUREMENTS.
 7. DO NOT SLEEVE BEAMS, COLUMNS, STRUCTURAL MEMBERS, ETC., FOR THE PASSAGE OF PIPING OR DUCTS, EXCEPT WHERE NOTED ON THE DRAWINGS AND APPROVED BY THE ARCHITECT.
 8. MATERIALS AND EQUIPMENT INDICATED HEREIN AND ANCILLARY TO THE WORK INDICATED SHALL BE NEW UNLESS DIRECTLY STATED OTHERWISE.
 9. WHERE CONFLICTING INFORMATION IS STATED BETWEEN THESE DRAWINGS AND ASSOCIATED SPECIFICATIONS, THE MORE STRINGENT OF THE TWO OPTIONS SHALL BE INCLUDED AS THE BASIS OF DESIGN AND INCLUDED WITHIN THIS CONTRACT.
 10. ALL EQUIPMENT, MATERIALS, PIPING, AND DUCTWORK SHALL BE TEMPORARILY PROTECTED ON-SITE WHEN STORED OR STAGED FOR INSTALLATION. PIPE ENDS SHALL HAVE PLASTIC CAPS INSTALLED. DUCTWORK SHALL HAVE SELF-ADHESIVE PLASTIC SHEETING INSTALLED. ALL EQUIPMENT DUCTWORK CONNECTIONS SHALL BE TEMPORARILY PROTECTED IN SIMILAR MANNER.
 11. EQUIPMENT SHALL BE SUPPORTED SEPARATELY FROM PIPING AND DUCTWORK SYSTEMS, WHERE EQUIPMENT HAS MOVING PARTS, SUSPENSION, OR VIBRATION CHARACTERISTICS SPECIFICALLY INDICATED. FLEXIBLE PIPING CONNECTION TO MINIMIZE TRANSFERENCE OF VIBRATION TO THE SYSTEM.
 12. ALL EQUIPMENT PLACED ON GRADE OR FINISHED FLOOR SHALL BE INSTALLED ON 6" HIGH HOUSEKEEPING PAD WITH LENGTH AND WIDTH DIMENSIONS 2" LARGER THAN RESPECTIVE EQUIPMENT SERVICED.
 13. ALL PENETRATIONS MADE THROUGH FLOOR MEMBRANES SHALL BE MADE THROUGH CURB ASSEMBLIES PROPERLY INSTALLED AND COORDINATED WITH OTHER TRADES.
 14. ALL EQUIPMENT LOCATED ON ROOF MEMBRANES SHALL BE SET ON PROPERLY FLASHED AND COORDINATED ROOF CURBS. ROOF FLASHING SHALL BE INSTALLED AND FINISHED SPECIFICALLY AS INDICATED.
 15. ALL ROOF WORK SHALL BE COORDINATED WITH OTHER TRADES AND OWNER AS TO MAINTAIN ANY ROOFING WARRANTIES.
 16. WHERE DUCTWORK OR PIPING IS INDICATED TO BE REMOVED, THIS CONTRACTOR SHALL REMOVE ALL PIPING AND/OR DUCTWORK BACK TO THE EXISTING LOCATION OF THE IN AND CAP. DEAD-END RUNS ARE PROHIBITED UNLESS NOTED OTHERWISE.
 17. COORDINATE SYSTEM SHUTDOWNS (THE INS, CUTOVERS, ETC) WITH ARCHITECT, ENGINEER, AND OWNER AT LEAST 5 BUSINESS DAYS IN ADVANCE OF EVENT. THIS CONTRACTOR SHALL INCLUDE ALL TEMPORARY MEASURES FOR TEMPORARY INTERFERENCE SUCH AS BUT NOT LIMITED TO TEMPORARY HEATING, COOLING, HUMIDIFICATION, DEHUMIDIFICATION, DOMESTIC WATER SERVICE, FIRE WATCHES, SPRINKLERS, ETC.
 18. INCLUDE ALL PREMIUM TIME AS REQUIRED BY PROJECT SPECIFICS, OWNER REQUIREMENTS, UTILITY SHUTDOWNS OR CUTOVERS, AND PROJECT SCHEDULE WITHIN BASE BID OF PROJECT.
 16. QUALITY ASSURANCE AND GUARANTEE
 1. ALL MANUFACTURERS LISTED HEREIN REPRESENT PRODUCTS THAT MEET OR EXCEED MINIMUM PROJECT REQUIREMENTS.
 2. THIS CONTRACTOR SHALL BID THE PROJECT USING ONE OF THE MANUFACTURERS SPECIFIED AS ACCEPTABLE WHERE ONLY ONE MAKE OF EQUIPMENT IS NAMED, IT SHALL BE PROVIDED AS SPECIFIED. REQUESTS FOR SUBSTITUTIONS MUST BE SUBMITTED VIA A WRITTEN REQUEST TO THE ENGINEER PRIOR TO THE CONTRACTOR BID. ALL DEVIATIONS FROM BASIS OF DESIGN ARE REQUIRED TO BE INDICATED BY RED MARKINGS. EQUIPMENT AND MATERIAL SUBSTITUTIONS WILL NOT BE ENTERTAINED AFTER THE AWARD OF THE WORK, UNLESS PREVIOUSLY DECIDED BY THE CONTRACTOR SHALL PAY ALL COSTS (ENGINEERING, ARCHITECTURAL, SHIPPING, MCKUP, TESTS, ETC) TO DETERMINE ACCEPTABILITY OF THE PROPOSED SUBSTITUTION.
 3. IN THE EVENT THAT A SUBSTITUTED ITEM IS SUBMITTED TWICE AND APPROVAL IS NOT OBTAINED BY THE SECOND SUBMISSION, FURNISH THE SPECIFIED ITEM OF MATERIAL OR EQUIPMENT AT NO ADDITIONAL COST TO THE OWNER.
 4. PRODUCTS SUPPLIED BY LISTED OR ALTERNATE MANUFACTURERS SHALL BE OF EQUIVALENT OR BETTER QUALITY AS THE PRIMARY SPECIFIED MANUFACTURER BASIS OF DESIGN.
 5. ALL NEW MATERIAL BLENDED DURING CONSTRUCTION SHALL BE RESTORED TO FACTORY CONDITIONED PRIOR TO COMPLETION OF PROJECT AT NO ADDITIONAL COST.
 6. ALL EQUIPMENT, DUCTWORK, AND PIPING SHALL BE LABELED TO MATCH OWNER STANDARDS. IN THE ABSENCE OF OWNER STANDARDS, EQUIPMENT LABELS SHALL MATCH CONTRACT DOCUMENT TAGS AND BE 12" HIGH LETTERING ON PNEUMATIC TEMPLATE WITH CONTRASTING BACKGROUND. LABEL ALL DUCTWORK AND PIPING WITH SELF-ADHESIVE OR MECHANICALLY FASTENED LABELS MATCHING ANSI (ASME) A13.1-2015 PIPE MARKING GUIDELINES. PROVIDE LABELS AT ALL LOCATIONS WHERE DUCTWORK OR PIPING PASSES THROUGH WALLS, FLOORS, ROOFS, CHANGES IN DIRECTION, AT ALL BRANCHES, AND 10 FOOT INTERVALS OF STRAIGHT PIPE.
 7. ALL WORKMANSHIP, EQUIPMENT, AND MATERIALS SHALL BE GUARANTEED BY THIS CONTRACTOR FOR ONE YEAR AFTER PROJECT TURNOVER. THE GUARANTEE SHALL ALSO INCLUDE COMPLIANCE WITH THE CONTRACT DOCUMENTS.
 8. ALL DEFECTIVE EQUIPMENT, MATERIALS, AND WORK AND ASSOCIATED MATERIALS SHALL BE REPLACED AT THE EXPENSE OF THE CONTRACTOR.
 17. COORDINATION OF TRADES
 1. THE GENERAL ARRANGEMENTS AND DETAILS OF THE EQUIPMENT, PIPING, DUCTS, ETC., ARE SHOWN ON THE DRAWINGS. DIMENSION OR SCALE SHOWN ARE APPROXIMATE AND MUST BE CHECKED AT THE BUILDING BY THE CONTRACTOR PRIOR TO THE INSTALLATION OF ANY EQUIPMENT OR THE FABRICATION OF ANY EQUIPMENT. DO NOT SCALE DIMENSIONS FOR THE FABRICATION OF PIPING, EQUIPMENT, ETC., FROM THE DRAWINGS, BUT ACQUIRE BY ACCURATE MEASUREMENTS AT THE BUILDING.
 2. GIVE FULL COOPERATION TO OTHER TRADES AND FURNISH IN WRITING, WITH COPIES TO ARCHITECT, AND INFORMATION NECESSARY TO PERMIT THE WORK OF ALL TRADES TO BE INSTALLED IN PROPER SEQUENCE AND WITH THE LEAST POSSIBLE INTERFERENCE OR DELAY.
 3. ANY WORK IS INSTALLED WITHOUT COORDINATING WITH OTHER TRADES, AND THE INSTALLATION INTERFERES WITH THEIR INSTALLATION, MAKE ANY CHANGES NECESSARY IN THIS WORK TO CORRECT THE CONDITION, WITHOUT EXTRA CHARGE TO THE OWNER.
 4. THIS CONTRACTOR SHALL COORDINATE POSSIBLE LOCATIONS OF CLASSES & INTERFERENCE, PIPING SLEEVES, HANGERS, EQUIPMENT, REQUIRED CHASES, INSERTS, ETC WITH OTHER TRADES.
 5. ANY EQUIPMENT OR MATERIALS FABRICATED OFF THE SITE, OR ANY WORK WHICH IS INSTALLED ON THE JOB WHICH BLOCKS THE WORK OF OTHER TRADES, AND IS CALLED BY THE CONTRACTOR, MUST BE COORDINATED HIS WORK WITH THE WORK OF OTHER TRADES, AND MUST BE MODIFIED OR REINSTALLED WITHOUT CHANGE IN THE CONTRACT PRICE.
 18. COORDINATION DRAWINGS
 1. PREPARE COORDINATION DRAWINGS IN ACCORDANCE WITH DIVISION 0 SECTION "PROJECT COORDINATION" AND THE FOLLOWING REQUIREMENTS:
 1. PREPARATION OF COORDINATION DRAWINGS SHALL BE THE RESPONSIBILITY OF THE HVAC CONTRACTOR. DRAWINGS SHALL BE PREPARED IN REVIT-2023 AND THE MODEL SHALL BE PROVIDED TO THE DESIGN TEAM AS WELL AS THE DRAWINGS. AS-BUILT UPDATES OF THE MODEL SHALL BE REQUIRED.
 2. PREPARE COORDINATION DRAWINGS AT A MINIMUM SCALE OF 1/8" = 1'-0". SUBMIT REPRODUCIBLE DRAWINGS FOR REVIEW.
 3. QUANTITIES, DIMENSIONS AND LOCATIONS OF EQUIPMENT CONNECTIONS FOR PIPING, DUCTWORK AND ELECTRICAL SHALL BE VERIFIED WITH EQUIPMENT SUPPLIERS AND INCLUDED IN THE PREPARATION OF COORDINATION DRAWINGS. SHOW RELATION OF ALL ITEMS OF HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT, DUCTWORK AND PIPING, PLUMBING EQUIPMENT AND PIPING AND FIRE PROTECTION. INDICATE ALL ELECTRICAL DEVICES THAT AFFECT LOCATION OF HEATING, VENTILATING, AIR CONDITIONING AND PLUMBING EQUIPMENT, PIPING, DUCTWORK AND AIR INLETS OR OUTLETS. SHOW EXISTING ITEMS AFFECTING NEW INSTALLATION IN REMODELED AREAS. QUESTIONS AND INTERFERENCES SHALL BE INDICATED ON THE COORDINATION DRAWINGS FOR CLARIFICATION BY THE ARCHITECT/ENGINEER. IF THERE ARE NOT QUESTIONS AND INTERFERENCES INDICATED ON THE COORDINATION DRAWINGS, THE ARCHITECT/ENGINEER SHALL ASSUME THAT THE DRAWINGS AND SPECIFICATIONS ARE COMPLETE AND CORRECT AND WILL EXPECT THE INTENT OF SAID DOCUMENTS TO BE COMPLIED WITH, AND THE INSTALLATION TO BE COMPLETE IN ALL RESPECTS ACCORDING TO SAID INTENT.
 4. INDICATE LOCATION OF ALL ACCESS PANELS REQUIRED AND COORDINATE TYPE AND LOCATION WITH GENERAL TRADES.
 5. SECURE FROM OTHER TRADES (I.E., ACOUSTICAL CEILING, PLUMBING, ELECTRICAL, ETC.) ANY INFORMATION NECESSARY FOR THE DEVELOPMENT OF COORDINATION DRAWINGS. INCLUDE FRAMING AND SUSPENSION OF CEILINGS, LOCATION AND SIZE OF ELECTRICAL PULL BOXES, CONDUIT, BUS DUCTS, LIGHTING FIXTURES, ETC.
 6. PROVIDE COORDINATED SET OF WIRING DIAGRAMS FOR MOTORS, EQUIPMENT ITEMS AND TEMPERATURE CONTROL SHOWING LINE DIAGRAMS, POWER DIAGRAMS AND TERMINAL CONNECTIONS TO ENSURE PROPER OPERATION SPECIFIED. INCLUDE PROVISIONS TO ACCOMMODATE EQUIPMENT THAT IS SPECIFIED AS AN ACCEPTABLE ALTERNATIVE FROM EQUIPMENT THAT IS THE "SPECIFIED STANDARD" SO THAT, IF THE ACCEPTABLE ALTERNATIVE IS INSTALLED, THERE WILL BE NO CHANGE IN THE CONTRACT SUM.
 7. UNDERWRITERS LABORATORIES, INC. (UL) SHALL BE PROVIDED TO THE ARCHITECT FOR SUBMITTAL TO ARCHITECT/ENGINEER FOR REVIEW. EACH TRADE MUST INDICATE ACCEPTANCE OF ILLUSTRATED PROCEEDS BY ATTACHING HIS ENDORSEMENT TO EACH DRAWING.
 8. CONCORD WITH INSTALLATION ONLY AFTER REVIEW OF COORDINATION DRAWINGS BY ARCHITECT/ENGINEER.
 9. AMERICAN NATIONAL STANDARD INSTITUTE (ANSI) PHOTO-COPIED, REPRODUCED OR TRACED DRAWINGS OF THE ORIGINAL CONTRACT DOCUMENTS WILL NOT BE ALLOWED TO BE USED AS COORDINATION DRAWINGS. SINGLE LINE DRAWINGS OF THE DUCTWORK LAYOUT WILL NOT BE ALLOWED TO BE USED AS PART OF COORDINATION DRAWINGS. ELECTRONIC FILES OF THE ORIGINAL CONTRACT DOCUMENTS WILL NOT BE ALLOWED TO BE USED AS COORDINATION DRAWINGS.
 19. EQUIPMENT SUBMITTALS
 1. PROVIDE MANUFACTURER'S CERTIFIED SCALE DRAWINGS, CUTS, CATALOGS OR DESCRIPTIVE LITERATURE WITH COMPLETE LISTING OF CHARACTERISTICS OF EQUIPMENT, DIMENSIONS, CAPACITY, COLOR REQUIREMENTS, MOTOR DRIVE AND TESTING. IN ADDITION, PROVIDE WORKING SHOP DRAWINGS OF DUCTWORK, PIPING, SPRINKLERS, TANK VAULT AND ANY OTHER DETAILS WHICH MAY BE REQUIRED TO CLARIFY INSTALLATION OF PIPING OR EQUIPMENT.
 2. PRIOR TO SUBMITTAL, CHECK THE SUBMITTALS THOROUGHLY TO ASCERTAIN THAT THEY COMPLY IN DETAIL WITH THE PLANS AND SPECIFICATIONS, THE ELECTRICAL CHARACTERISTICS ARE CORRECT FOR THE AVAILABLE SERVICE, AND THAT DIMENSIONS ARE SHOWN AND CHECKED TO FIT AVAILABLE SPACE WITH UNCOMMANDED ACCESS. CLEARLY NOTE ANY DEVIATIONS FROM PLANS AND SPECIFICATIONS ON THE CERTIFIED SUBMITTALS IN RED MARKINGS. INCLUDE A REFERENCE TO THE APPROPRIATE SECTION, PAGE, PARAGRAPH NUMBER OF THE SPECIFICATION, STAMP THE SUBMITTAL WITH FIRM'S NAME, DATE, AND APPROVAL NOTED, INDICATING THAT THE ABOVE HAS BEEN COMPLIED WITH. SUBMITTALS RECEIVED WITHOUT THESE NOTICES WILL BE RETURNED UNRECORDED AND WITHOUT REFUND.
 3. ANY CHANGES IN ANY TRADE BROUGHT ABOUT BY SUBSTITUTIONS OF SPECIFIED EQUIPMENT SHALL BE DONE AT NO CHANGE IN THE CONTRACT PRICE.
 4. WHERE ONLY ONE MANUFACTURER IS LISTED FOR SPECIFIC EQUIPMENT, IT SHALL BE PROVIDED AS SPECIFIED. NO ALTERNATE OR SUBSTITUTIONS WILL BE ACCEPTED.
 5. FAILURE TO SUBMIT SHOP DRAWINGS OR MATERIAL LISTS IN AMPLE TIME FOR PROPER CHECKING AND NECESSARY RE-SUBMISSION, SHALL NOT BE ALLOWED AS REASON FOR ANY CLAIM FOR EXTENSION OF TIME OR DELAY.
 6. THE REVIEW OF A SHOP DRAWING OR MATERIAL LIST SHALL NOT BE CONSIDERED AS A GUARANTEE OF THE MEASUREMENTS OF THE BUILDING CONDITIONS, OR THAT THE SHOP DRAWINGS OR MATERIAL LISTS HAS BEEN CHECKED TO SEE THAT THE ITEM SUBMITTED PROPERLY FITS THE BUILDING CONDITIONS. REVIEW SHALL NOT IN ANY WAY RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR FURNISHING MATERIAL OR PERFORMING WORK AS REQUIRED BY THE SPECIFICATIONS AND CONTRACT DRAWINGS, OR RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITIES FOR CORRECTNESS OF DIMENSIONS AND QUANTITIES, OR FOR PROPER COORDINATION OF DETAILS AND INTERFACE WITH OTHER TRADES.
 7. UNDER SUBMITTAL TO THE EOR AND VA-COR FOR ITEMS OF EQUIPMENT SPECIFIED UNDER EACH SECTION OF THE SPECIFICATIONS, INDIVIDUALLY SCHEDULED ON THE DRAWINGS, AND/OR EXPLICITLY REQUESTED BELOW:
 1. FIRE STOPPING
 1. FIRE SPRINKLER LAYOUT
 2. PLUMBING FIXTURES
 3. PLUMBING EQUIPMENT
 4. DOMESTIC WATER PIPING AND SPECIALTIES
 5. NATURAL GAS PIPING AND SPECIALTIES
 6. SANITARY AND VENT PIPING AND SPECIALTIES
 7. AIR DISTRIBUTION EQUIPMENT
 8. EXHAUST FANS
 9. GRILLES AND DIFFUSERS
 10. ELECTRIC HEATING ELEMENTS
 11. BUILDING AUTOMATION CONTROLS SYSTEMS
 12. TESTING, ADJUSTING, AND BALANCING
 2. EXCAVATING, TRENCHING, AND BACKFILLING
 1. THIS CONTRACTOR SHALL FURNISH ALL TOOLS, EQUIPMENT, MATERIALS, LABOR, AND SUPERVISION REQUIRED FOR SUCCESSFUL INSTALLATION OF UNDERGROUND PIPING, DUCTWORK, UTILITIES, ETC.
 2. COORDINATE ALL EXCAVATING, TRENCHING, AND BACKFILLING WITH OTHER TRADES. EXACT ROUTING SHALL BE DETERMINED BY THIS CONTRACTOR AND CONFIRMED WITH THE OWNER PRIOR TO COMMENCEMENT OF WORK.
 3. INSTALL TEMPORARY TRAFFIC BEARING STEEL PLATING ACROSS ALL OPEN TRENCHES WHERE ACTIVE WORK IS NOT OCCURRING UNTIL TRENCH WORK IS COMPLETED.
 3. CUTTING, PATCHING, AND FIRESTOPPING
 1. THIS CONTRACTOR IS RESPONSIBLE FOR CUTTING, PATCHING, AND PAINTING ALL HOLES AND PASSAGeways ANCILLARY TO THE REMOVAL AND INSTALLATION OF WORK SPECIFIED HEREIN UNLESS NOTED OTHERWISE.
 2. WHERE EXISTING CONDITIONS HAVE BEEN REMOVED, PROPERLY PATCH OPENINGS BETWEEN FLOORS, MEASURES FOR TEMPORARY INTERFERENCE SUCH AS BUT NOT LIMITED TO TEMPORARY HEATING, COOLING, HUMIDIFICATION, DEHUMIDIFICATION, DOMESTIC WATER SERVICE, FIRE WATCHES, SPRINKLERS, ETC.
 3. PROVIDE STI, MILT, NELSON, OR TREMCO FIRESTOPPING DETAILS AND ASSOCIATED UL FIRESTOPPING SYSTEM NUMBER DURING SUBMITTAL REVIEW MATCHING ASSEMBLY AND PENETRATING PIPE/DUCTWORK.
 4. MAINTAIN FIRESTOPPING DETAILS ON-SITE FOR INSPECTORS AND AUTHORITIES HAVING JURISDICTION.
 4. CLEANING, DISINFECTING, AND TESTING
 1. NEW POTABLE WATER SYSTEMS SHALL BE PURGED OF DELETERIOUS MATTER AND DISINFECTED PRIOR TO UTILIZATION. THE METHOD TO BE FOLLOWED SHALL BE THAT PRESCRIBED BY THE HEALTH AUTHORITY OR THE PURVEYOR HAVING JURISDICTION OR IN THE ABSENCE OF THE PURVEYOR, THE PROCEDURE DESCRIBED IN EITHER AWWA C603 OR AWWA C653, OR AS DESCRIBED IN THIS SECTION.
 1. THE PIPE SYSTEM SHALL BE FLUSHED WITH CLEAN, POTABLE WATER UNTIL DIRTY WATER DOES NOT APPEAR AT THE POINTS OF OUTFLOW.
 2. THE SYSTEM OR PART THEREOF SHALL BE FILLED WITH A WATER/CHLORINE SOLUTION CONTAINING NOT LESS THAN 50 PARTS PER MILLION (50 MG/L) OF CHLORINE, AND THE SYSTEM OR PART THEREOF SHALL BE VALVED OFF AND ALLOWED TO STAND FOR 24 HOURS; OR THE SYSTEM OR PART THEREOF SHALL BE FILLED WITH A WATER/CHLORINE SOLUTION CONTAINING NOT LESS THAN 200 PARTS PER MILLION (200 MG/L) OF CHLORINE AND ALLOWED TO STAND FOR 3 HOURS.
 3. FOLLOWING THE REQUIRED STANDING TIME, THE SYSTEM SHALL BE FLUSHED WITH CLEAN POTABLE WATER UNTIL THE CHLORINE IS PURGED FROM THE SYSTEM.
 4. THE PROCEDURE SHALL BE REPEATED WHERE SHOWN BY A BACTERIOLOGICAL EXAMINATION THAT CONTAMINATION REMAINS PRESENT IN THE SYSTEM. SUBMIT FINAL BACTERIOLOGICAL CERTIFICATION TO OWNER, ARCHITECT, AND ENGINEER FOR RECORD.
 2. CLEAN ALL HYDRONIC HEATING AND COOLING SYSTEMS AND COLLINGS. FILL SYSTEM WITH CLEAN WATER AND FLUSH; REFILL WITH CLEAN WATER/DETERGENT MIXTURE, CIRCULATE FOR AT LEAST 8 HOURS. DRAIN SYSTEM AND FLUSH WITH CLEAN COLD WATER. ADD WATER TREATMENT AT THIS TIME.
 3. ALL PIPING SHALL BE TESTED FOR LEAKS AND REPAIRED ACCORDING TO ORIGINAL INSTALLATION AND JOINING METHOD, INCLUDING BUT NOT LIMITED TO THE FOLLOWING FITTINGS, PIPING, SOLDERING, AND BRAZING. FOLLOW ALL NATIONAL, STATE, AND LOCAL CODES IN ADDITION TO MANUFACTURER'S TESTING RECOMMENDATIONS. TESTING WITH AIR IS PROHIBITED UNLESS NOTED OTHERWISE.
 1. DOMESTIC WATER DISTRIBUTION SHALL BE TESTED WITH POTABLE WATER AT A PRESSURE OF 125 PSI FOR 8 HOURS.
 2. NATURAL GAS SHALL BE TESTED PER THE INTERNATIONAL FUEL AND GAS CODE.
 3. SANITARY DRAIN AND VENT AND STORM PIPING SHALL BE TESTED PER THE STATE PLUMBING CODE IN CONJUNCTION WITH THE STATE AND LOCAL HEALTH DEPARTMENTS.
 5. THIS CONTRACTOR SHALL CLEAN AREAS OF CONSTRUCTION DAILY AS TO MAINTAIN A TIDY WORKSPACE.
 13. PROJECT TURNOVER
 1. COORDINATE WITH THE OWNER, ARCHITECT, AND ENGINEER THE NUMBER AND TYPE OF OPERATIONS AND MATERIALS TO BE SUBMITTED TO PROJECT TURNOVER. PROVIDE THREE (3) HARDBOARD COPIES WITHIN A THREE-RING BINDER ALONG WITH A COMPOSITE AND SEARCHABLE SINGLE .PDF FILE. THE OPERATION AND MAINTENANCE MANUAL SHALL MINIMALLY INCLUDE THE FOLLOWING:
 1. NAME OF THIS CONTRACTOR AND ALL ASSOCIATED SUBCONTRACTORS ALONG WITH ADDRESSES, NAMES, AND EMERGENCY CONTACT INFORMATION.
 2. RELEVANT INFORMATION REQUIRED FOR DAILY OPERATION AND MANAGEMENT OF EQUIPMENT, INCLUDING REPLACEMENT PARTS LIST AND PERTINENT VENDOR INFORMATION.
 3. APPROVED SUBMITTALS OF MATERIALS AND EQUIPMENT BEARING THE ENGINEERS SUBMITTAL REVIEW.
 4. STARTUP REPORTS, CERTIFICATES OF INSPECTION, CHLORINATION AND DISINFECTATION PROCEDURES, AND BALANCE RECORDS.
 2. THIS CONTRACTOR SHALL INCLUDE TWO SEPARATE EIGHT-HOUR DAYS FOR ON-SITE MECHANICAL SYSTEM TRAINING AND SUPPORT. COORDINATE FINAL TRAINING AND SUPPORT SESSIONS WITH THE OWNER.
 3. AS THE WORK PROGRESSES, RECORD ON A SET OF WHITE PRINTS, THE INSTALLED LOCATIONS, ELEVATIONS, SIZES AND DEPTHS OF ALL PIPING, SERVICES, TRENCHES, ETC. IN THE PROJECT WHEREVER THEY DIFFER FROM THOSE INDICATED ON THE CONTRACT DRAWINGS. ESTABLISH ALL DIMENSIONS FROM THE DATUM POINTS APPROVED BY THE ARCHITECT. RECORD COMPLETION OF WORK, TURN OVER TO THE ARCHITECT ONE (1) NEAT COPY OF WHITE PRINTS SHOWING REQUIRED RECORDED CHANGES INFORMATION.
 20. PLUMBING EQUIPMENT
 1. DOMESTIC WATER HEATERS (GAS)
 1. NATURAL GAS TANK STYLE WATER HEATER WITH CAPACITY, INPUT, AND RECOVERY AS LISTED ON THE PROJECT DOCUMENTS, MINIMUM 95% THERMAL EFFICIENCY, MAXIMUM HYDROSTATIC WORKING PRESSURE OF 160 PSI, WITH POWERED ANODES THAT ARE NON-SACRIFICIAL AND MAINTENANCE-FREE, GLASS-LINED STEEL TANK CONSTRUCTION, MEETS THE THERMAL EFFICIENCY AND ENERGY EFFICIENCY REQUIREMENTS OF THE U.S. DEPARTMENT OF ENERGY AND CURRENT EDITION OF ASHRAE 90.1, WITH FOAM INSULATION AND A CSA CERTIFIED AND ASME RATED T&P RELIEF VALVE, AND BE APPROVED FOR 0" CLEARANCE TO OBSTACLES.
 2. POINT OF USE THERMOSTATIC MIXING VALVES SHALL BE LOW LEAD BRASS, MINIMUM ACTIVATION FLOW LESS THAN ASSOCIATED MIXTURE, ADJUSTABLE OUTLET PRESSURE TO 105°F, INTEGRAL CHECK VALVES AND STRAINERS, ASSE 1079 LISTED. APPROVED MANUFACTURERS: CASH ACME, SYMMONS, WATTS, ZURN
 2. THERMOSTATIC MIXING VALVES
 1. POINT OF USE THERMOSTATIC MIXING VALVES SHALL BE LOW LEAD BRASS, MINIMUM ACTIVATION FLOW LESS THAN ASSOCIATED MIXTURE, ADJUSTABLE OUTLET PRESSURE TO 105°F, INTEGRAL CHECK VALVES AND STRAINERS, ASSE 1079 LISTED. APPROVED MANUFACTURERS: CASH ACME, SYMMONS, WATTS, ZURN
 2. RECLINATION PUMPS
 1. REPLACEABLE CARTRIDGE STYLE, MULTISPEED PSC-HERMETICALLY PROTECTED MOTOR, SELF-LUBRICATING, NO MECHANICAL SEAL, STAINLESS STEEL FLANGES AND CASING CONSTRUCTION,
 21. FIRE SUPPRESSION SYSTEM
 1. PIPING, FITTINGS, AND VALVES
 1. SEE FIRE SUPPRESSION SYMBOL SCHEDULE UNLESS NOTED OTHERWISE.
 2. SPRINKLER HEADS
 1. ALL SPRINKLER HEADS SHALL BE NEW UNLESS NOTED OTHERWISE.
 2. TEMPERATURE RATING OF HEADS SHALL BE 165 DEGREES FAHRENHEIT UNLESS NOTED OTHERWISE.
 3. SPRINKLER HEADS SHALL BE UL LISTED AND FM APPROVED, MEETING NFPA REQUIREMENTS.
 4. SPRINKLER HEADS SHALL BE QUICK RESPONSE TYPE AND SHALL MATCH EXISTING HEADS INSTALLED IN ADJACENT AREAS.
 5. SPRINKLER HEADS INSTALLED IN CEILINGS, INCLUDING BULKHEADS, SOFFITS, ETC., BELOW 8'-0" SHALL BE CONCEALED TYPE WITH COVER PLATE COLOR MATCHING CEILING FINISH COLOR.
 6. SPRINKLER TYPE, COLOR, AND MANUFACTURER SHALL BE APPROVED BY THE OWNER, ARCHITECT, AND ENGINEER DURING THROUGH THE SUBMITTAL REVIEW PROCESS.
 7. APPROVED MANUFACTURERS: CENTRAL, RELIABLE, STARR, VIKING
 3. FLOW SWITCHES
 1. PROVIDE RED POTTER ROEMER OR EQUIVALENT VIKING TAMPER-PROOF SWITCH HOUSING WITH FLOW PADDLE WITH SIZE MATCHING ASSOCIATED PIPING, TWO SINGLE-POLE, DOUBLE-THROW MICROSWITCHES TO OPERATE SEPARATE CIRCUITS. COORDINATE FINAL VOLTAGE WITH FIRE ALARM SYSTEM WITH FINAL WIRING BY ELECTRICAL CONTRACTOR.
 2. TAMPER SWITCHES
 1. PROVIDE RED POTTER ROEMER OR EQUIVALENT VIKING NOTIFIER MATCHING MONITORED VALVE ASSEMBLY TYPE (OST, BALL VALVE, ETC) WITH TWO SINGLE-POLE, DOUBLE-THROW MICROSWITCHES TO OPERATE SEPARATE CIRCUITS, UL AND FM APPROVED. COORDINATE FINAL VOLTAGE WITH FIRE ALARM SYSTEM WITH FINAL WIRING BY ELECTRICAL CONTRACTOR.
 22. PLUMBING SYSTEMS
 1. PIPING, FITTINGS, VALVES, AND SPECIALTIES
 1. SEE PLUMBING SYMBOL SCHEDULE UNLESS NOTED OTHERWISE.
 2. ALL INTERIOR AND EXTERIOR GAS PIPING SHALL BE PAINTED EXTERIOR COLOR SELECTED BY THE ARCHITECT UNLESS NOTED OTHERWISE.
 3. PUSH-TO-CONNECT COLD-PRESS STYLE GAS FITTINGS ARE NOT PERMITTED.
 4. PROVIDE SHUT-OFF VALVES ON ALL PLUMBING EQUIPMENT PIPING CONNECTIONS. BALANCING VALVES WITH INTEGRAL BALL OR BUTTERFLY VALVES ARE ACCEPTABLE FOR THIS USE.
 5. FITTINGS SHALL BE FACTORY-FORMED AND NOT ALTERED IN ANY WAY. MITERED JOINTS ARE PROHIBITED. LEAKING JOINTS SHALL BE REPAIRED WITH NEW PIPING AND FITTINGS. SOLDERED JOINTS SHALL BE REWORKED BY RE-SOLDERING OR REPLACING ENTIRELY. WELDED JOINTS SHALL BE CHIPPED OR GROUND AWAY AND RE-WELDED. THE USE OF ANY FILLER, CAULKING, PUTTY TO STOP LEAKING PIPES IS PROHIBITED.
 6. PROVIDE UNIONS AT ALL LOCATIONS WHERE PIPING SERVICES EQUIPMENT, COILS, AND PIPING SPECIALTIES TO PERMIT REMOVAL, REPLACEMENT, SERVICING, AND CLEANING. UNIONS SHALL BE INSTALLED IN COORDINATION WITH THE STATE AND LOCAL HEALTH DEPARTMENTS FOR EQUIPMENT FOR REPLACEMENT THROUGH REMOVAL OF A SINGLE ASSEMBLY OF PIPING ON EACH HYDRONIC CONNECTION.
 7. PROVIDE TEMPERATURE AND PRESSURE (T&P) WATER RELIEF VALVES WITH ASSOCIATED DISCHARGE PIPING TO FLOOR DRAIN ON ALL HOT WATER GENERATION EQUIPMENT.
 8. PROVIDE CHECK PIPING ON ALL PUMP DISCHARGE. HORIZONTAL PIPING SHALL BE SWING-STYLE CHECK VALVES VERTICAL VALVES SHALL BE SILENT CHECK VALVES AND SHALL BE INSTALLED WHERE FLUID FLOW IS UPWARD. VERTICAL CHECK VALVES SHALL NOT BE INSTALLED IN VERTICAL SECTIONS OF PIPE WHEN FLOW IS DOWNWARD.
 9. WHERE EQUIPMENT FLUID FLOWS ARE INDICATED ON THESE DRAWINGS, WATER FLOW CONTROL VALVES SHALL BE PROVIDED WHERE SPECIFICALLY INDICATED OR NOT.
 10. FUTURE STOPS SHALL BE QUARTER TURN PRECISION MACHINED BRASS BALL, PTFE SEALS, HIGH-TEMPERATURE O-RINGS, SINGLE PIECE MACHINED BRASS BODY, BLOW-OUT PROOF CHROME-PLATED BRASS STEM, REMOVABLE METAL HANDLE, AND 100% LEAK TESTED. INCLUDE ESCUTCHEONS AT ALL VISIBLE WALL PIPING PENETRATIONS, INCLUDING THOSE WITHIN CABINET BASES.
 11. ALL SINK AND LAVATORY DRAINS SHALL BE SUPPLIED WITH GRID STRAINERS UNLESS NOTED OTHERWISE.
 2. PLUMBING FIXTURES
 1. WATER CLOSETS
 1. VITREOUS CHINA, HIGH EFFICIENCY, LOW CONSUMPTION (1.1-1.6 GPF), FULLY GATED TRAPWAY, ELONGATED BOWL, AND OPEN-FRONT FLIP DOWN SEAT. COORDINATE SPUD LOCATION, MOUNTING TYPE, AND ADA REQUIREMENT WITH DRAWINGS. APPROVED MANUFACTURERS: AMERICAN STANDARD, KOHLER, MANSFIELD, TOTO.
 2. URINALS
 1. VITREOUS CHINA, HIGH EFFICIENCY, LOW CONSUMPTION (0.125-1.0 GPF), FULLY GATED TRAPWAY, COORDINATE ADA MOUNTING HEIGHT WITH DRAWINGS. APPROVED MANUFACTURERS: AMERICAN STANDARD, KOHLER, MANSFIELD, SLOAN.
 3. FIXTURE CARRIERS
 1. FIXTURE CARRIERS SHALL BE COORDINATED WITH ASSOCIATED FIXTURE AS APPROVED DURING THE SUBMITTAL PROCESS. INCLUDE CARRIERS THAT ARE ADJUSTABLE TO MEET MULTIPLE INSTALLATION REQUIREMENTS AND SUPPORT FEET WITHIN WALL SPACE UNLESS NOTED OTHERWISE.
 4. FLUSH VALVES
 1. LOW CONSUMPTION MATCHING FIXTURE SCHEDULE, ADJUSTABLE TAILPIECE, HIGH COPPER/LOW ZINC BRASS CASTINGS FOR DEZINCIFICATION RESISTANT PER ASTM, COMPLIANCE WITH ASSE 1073 AND ADA LISTED. APPROVED MANUFACTURERS: AMERICAN STANDARD, KOHLER, MOEN, SLOAN
 5. LAVATORY SINKS
 1. VITREOUS CHINA, FRONT OVERFLOW, D-SHAPED BOWL WITH SELF-DRAINING DECK AREA AND COUNTERTOP BACK AND SIDE SPLASH GUARDS, ADA LISTED. INCLUDE GRID STRAINER, TAILPIECE, AND INSULATION. COORDINATE MOUNTING TYPE, NUMBER OF HOLES, AND SPACING WITH PLUMBING TRIM INDICATED ON SCHEDULE. APPROVED MANUFACTURERS: AMERICAN STANDARD, ELKAY, JUST, KOHLER, MANSFIELD, MOEN.
 6. STAINLESS STEEL SINKS
 1. STAINLESS STEEL SINKS SHALL BE FINISHED IN SATIN FINISH, 18 GAUGE, 304 STAINLESS, REAR CENTER DRAIN PLACEMENT, ADA LISTED. INCLUDE GRID STRAINER, TAILPIECE, AND INSULATION. COORDINATE MOUNTING TYPE, NUMBER OF HOLES, AND SPACING WITH PLUMBING TRIM INDICATED ON SCHEDULE. APPROVED MANUFACTURERS: ELKAY, JUST, KOHLER, MOEN.
 7. FAUCETS
 1. UNLESS NOTED OTHERWISE, FAUCETS SHALL BE SOLID BRASS CHROME PLATED, CERAMIC CARTRIDGE QUARTER TURN WIPER BLADE HANDLE OPERATION WITH AERATOR APPROVED BY THE LOCAL HEALTH DEPARTMENT, GOSSENECK SPOUT, ADA LISTED. APPROVED MANUFACTURERS: CHICAGO FAUCETS, KOHLER, MOEN.
 8. CLEANOUTS
 1. CLEANOUTS SHALL BE FULL LINE SERVICE SIZE UNLESS NOTED OTHERWISE. APPROVED MANUFACTURERS: JR SMITH, WATTS, ZURN
 9. FLOOR AND AREA DRAIN
 1. FLOOR SINKS SHALL BE CAST IRON RECEPTOR BODY WITH A WHITE ACID RESISTANT ENAMEL INTERIOR AND ANTI-SPLASH DOME STRAINER. COORDINATE FLOOR SINK FLANGE WITH FLOOR TYPE.
 2. INSTALL DRAINS WITH WATERPROOF ASSEMBLIES WITH FLASHING RISNG. FLOOR DRAINS SHALL INCLUDE FULL-SIZE TRAPS.
 3. FLOOR DRAINS SHALL HAVE REMOVABLE TOP GRADE RATED FOR 2,000-LB STATIC LOAD WITH TRAP SEALER, NICKEL BRONZE STRAINER, AND CAST IRON BODY. COORDINATE OUTLET TYPE WITH PIPING CONNECTION METHOD. APPROVED MANUFACTURERS: JR SMITH, WATTS, ZURN
 4. ROOF DRAINS SHALL BE MECHANICAL TYPE (THREADED, NO HUB, GROOVED).
 10. MOP BASINS
 1. MOLDED FROM ONE-PIECE HIGH IMPACT STRUCTURAL FIBERGLASS, SELF-DRAINING REMOVABLE STRAINER, 3" MOLDED-IN DRAIN, OFF-WHITE FACTORY FINISHED, WITH WALL-MOUNTED ADA WRIST BLADE TWO HANDLE SERVICE VACUUM BREAKER MOP FAUCET WITH 3/4" GARDEN HOSE OUTLET, PAIL HOOK AND WALL BRACKET WITH SERVICE HOSE AND HOLDER. THE PAN IS NOT RUNNABLE HANGAR, STAINLESS STEEL BUMPER GUARDS, TWO-PANEL STAINLESS WALL GUARDS. APPROVED MANUFACTURERS: AMERICAN STANDARD, EL MUSTAIE, FIAT
 11. LAUNDRY TUBS
 1. MOLDED FROM ONE-PIECE HIGH IMPACT STRUCTURAL FIBERGLASS, FLOOR MOUNT WITH LEGS, SINGLE 18 GALLON BOWL, 13" DEEP TUB, INTEGRALLY MOLDED-IN DRAIN WITH STOPPER, 1/2" DRAIN CONNECTION, SLOPED AND SELF-DRAINING BACK SHELF, MOLD AND MILDEW RESISTANT, OFF-WHITE FINISH, WITH WALL-MOUNTED ADA WRIST BLADE TWO HANDLE SERVICE VACUUM BREAKER MOP FAUCET WITH 3/4" GARDEN HOSE OUTLET. APPROVED MANUFACTURERS: EL MUSTIE, FIAT.
 12. SERVICE SINKS
 1. WALL HUNG, 14 GAUGE, 304 STAINLESS STEEL, SINGLE 19-GALLON BOWL, 2" DEEP TUB, INTEGRAL HIGH BACK SPLASH WITH BACK SPLASH MOUNTED ADA WRIST BLADE TWO HANDLE SERVICE VACUUM BREAKER MOP FAUCET WITH 3/4" GARDEN HOSE OUTLET, 3-1/2" DRAIN SIZE, CAST IRON P-TRAP FOR 8 HOURS.
 13. THERMOSTATIC MIXING VALVES
 1. POINT OF USE THERMOSTATIC MIXING VALVES SHALL BE LOW LEAD BRASS, MINIMUM ACTIVATION FLOW LESS THAN ASSOCIATED MIXTURE, ADJUSTABLE OUTLET PRESSURE TO 105°F, INTEGRAL CHECK VALVES AND STRAINERS, ASSE 1079 LISTED. APPROVED MANUFACTURERS: CASH ACME, SYMMONS, WATTS, ZURN
23. HVAC DUCTWORK SYSTEMS
 1. DUCTWORK AND FITTINGS
 1. SEE HVAC SYMBOLS SCHEDULE UNLESS NOTED OTHERWISE.
 2. RECTANGULAR DUCTWORK ELBOWS SHALL BE MADE WITH RADIUS ELBOWS EQUAL TO 1+1/2 TIMES THE DUCT WIDTH TURNING RADIUS OR WITH SQUARE ELBOWS WITH AIRFLOW TURNING VANES. SYSTEM WITH FINAL WIRING BY ELECTRICAL CONTRACTOR.
 3. ROUND DUCTWORK ELBOWS SHALL BE MADE WITH 5-PIECE ADJUSTABLE OR DIE-FORMED STAMPED 1-1/2 TIMES THE DIAMETER TURNING RADIUS.
 4. ROUND DUCTWORK ELBOWS SHALL BE MADE WITH 5-PIECE ADJUSTABLE OR DIE-FORMED STAMPED 1-1/2 TIMES THE DIAMETER TURNING RADIUS.
 5. ALL DUCTWORK SHALL BE CONSTRUCTED AND INSTALLED PER SMACNA REQUIREMENTS.
 6. ALL DUCTWORK SHALL BE GRADE 1 PRIME GALVANIZED SHEET METAL OF LOCK FORMING QUALITY. FLEXIBLE DUCTWORK SHALL BE LISTED UL 181 WITH FLAME SPREAD 1. SMOKE SPREAD EQUAL TO OR LESS THAN 25/50 AND SHALL BE INSULATED WITH 2" THICK FIBERGLASS WITH FOIL SCRIM FACE. UTILIZE 6" PRESSURE CLASS ON LOW PRESSURE SYSTEMS AND 10" PRESSURE CLASS ON HIGH PRESSURE SYSTEMS. DUCTS SHALL BE PROTECTED FROM OTHER TRADES BY BLACK FIRE-RETARDANT TYPE REFRIGERANT HARDENING OR CRACKING. FLEXIBLE DUCTWORK SHALL NOT BE USED ON NEGATIVE PRESSURE SYSTEMS. APPROVED MANUFACTURERS: CLEVAFLUX, FLEXMASTER, THERMAFLX.
 7. ACOUSTICAL DUCTWORK LINING SHALL BE ASTM C1071 TYPE 2 LISTED, RIGID FIBERGLASS WITH ANTI-CORROSION PROPERTIES, 2" MINIMUM WORKING TEMPERATURE RANGE PER ASTM C1071. MAXIMUM AIR VELOCITY OF 6,000 FPM PER ASTM C1071, WATER REPELLENCY 48 PER INDA 15T 8.6, FLAME SPREAD 1/ SMOKE SPREAD INDEX 05 25/50, MEETING SMACNA AND ASHRAE 61 REQUIREMENTS, GREEN GUARD CERTIFIED, NRC 0.9 (R6) AND R-VALUE OF 6.3 PER 1.5 INCH. APPROVED MANUFACTURERS: JOHNS MANVILLE, KNAUF, OWENS CORNING
 8. ALL EXPOSED DUCTWORK SHALL BE PAINTED COLOR SPECIFIED BY THE ARCHITECT UNLESS NOTED OTHERWISE. EXPOSED DUCTWORK WITHIN MECHANICAL ROOMS IS NOT REQUIRED TO BE PAINTED.
 9. UNLESS NOTED OTHERWISE, BALANCING DAMPERS SHALL BE SINGLE BLADE TYPE, SYNTHETIC BEARING, RATED FOR ASSOCIATED PRESSURE CLASS AND VELOCITY, 180°F MAXIMUM TEMPERATURE, MINIMUM 20 GAUGE FRAME AND BLADE, CONSTRUCTED PER SMACNA REQUIREMENT, WITH EXTENDED BURNING RESISTANCE.
 10. WHERE DIFFUSER OR GRILLE AIRFLOWS ARE INDICATED ON THESE DRAWINGS, DAMPERS SHALL BE PROVIDED WHETHER SPECIFICALLY INDICATED OR NOT.
 11. APPROVED MANUFACTURERS: GREENHECK, POTTOFF, RUSKIN, YOUNG REGULATOR
 2. GRILLES AND DIFFUSERS
 1. PROVIDE GRILLES AND DIFFUSERS, TRANSITIONS, HANGERS, AND OTHER APPURTENANCES AS INDICATED ON THE DRAWINGS AND IN ACCORDANCE WITH THE PROJECT SCHEDULE REQUIREMENTS INCLUDING THE FOLLOWING:
 1. PROVIDE GRILLES AND DIFFUSERS, TRANSITIONS, HANGERS, AND OTHER APPURTENANCES AS INDICATED ON THE DRAWINGS AND IN ACCORDANCE WITH THE PROJECT SCHEDULE REQUIREMENTS INCLUDING THE FOLLOWING:
 1. PROVIDE GRILLES AND DIFFUSERS, TRANSITIONS, HANGERS, AND OTHER APPURTENANCES AS INDICATED ON THE DRAWINGS AND IN ACCORDANCE WITH THE PROJECT SCHEDULE REQUIREMENTS INCLUDING THE FOLLOWING:
 1. PROVIDE GRILLES AND DIFFUSERS, TRANSITIONS, HANGERS, AND OTHER APPURTENANCES AS INDICATED ON THE DRAWINGS AND IN ACCORDANCE WITH THE PROJECT SCHEDULE REQUIREMENTS INCLUDING THE FOLLOWING:
 1. PROVIDE GRILLES AND DIFFUSERS, TRANSITIONS, HANGERS, AND OTHER APPURTENANCES AS INDICATED ON THE DRAWINGS AND IN ACCORDANCE WITH THE PROJECT SCHEDULE REQUIREMENTS INCLUDING THE FOLLOWING:
 1. PROVIDE GRILLES AND DIFFUSERS, TRANSITIONS, HANGERS, AND OTHER APPURTENANCES AS INDICATED ON THE DRAWINGS AND IN ACCORDANCE WITH THE PROJECT SCHEDULE REQUIREMENTS INCLUDING THE FOLLOWING:
 1. PROVIDE GRILLES AND DIFFUSERS, TRANSITIONS, HANGERS, AND OTHER APPURTENANCES AS INDICATED ON THE DRAWINGS AND IN ACCORDANCE WITH THE PROJECT SCHEDULE REQUIREMENTS INCLUDING THE FOLLOWING:
 1. PROVIDE GRILLES AND DIFFUSERS, TRANSITIONS, HANGERS, AND OTHER APPURTENANCES AS INDICATED ON THE DRAWINGS AND IN ACCORDANCE WITH THE PROJECT SCHEDULE REQUIREMENTS INCLUDING THE FOLLOWING:
 1. PROVIDE GRILLES AND DIFFUSERS, TRANSITIONS, HANGERS, AND OTHER APPURTENANCES AS INDICATED ON THE DRAWINGS AND IN ACCORDANCE WITH THE PROJECT SCHEDULE REQUIREMENTS INCLUDING THE FOLLOWING:

REVISIONS:

1. MATERIALS AND EQUIPMENT SHALL BE INSTALLED IN AN ORDERLY, NEAT, PLUMB, AND LEVEL, BY PROPERLY TRAINED AND CERTIFIED INSTALLERS ACROSS EACH DISCIPLINE.
 2. OWNER SHALL HAVE FIRST RIGHT OF REFUSAL FOR ANY AND ALL ITEMS BEING DEMOLISHED OR REMOVED FROM PROJECT SCOPE.
 3. WHERE EXISTING MECHANICAL, HVAC, PLUMBING, MEDICAL GAS, FIRE SUPPRESSION OR OTHER EQUIPMENT, DUCTWORK, PIPING, ETC, EXPLICITLY SHOWN OR INHERENTLY EXPRESSED WITHIN THESE CONTRACT DOCUMENTS ARE INDICATED TO BE REVISED, ALTERED, OR REMOVED, ALL APPURTENANCES ANCILLARY TO THE EFFORT SHALL BE INCLUDED WITHIN THIS SCOPE OF WORK, INCLUDING BUT NOT LIMITED TO PATCHING OF ROOFS, WALLS, FLOORS, ETC.
 4. PIPING, DUCTWORK, SPECIALTIES, AND EQUIPMENT SHALL BE INSTALLED TIGHT TO STRUCTURE ABOVE TO MAXIMIZE FUTURE CEILING HEIGHT OR OPEN CEILING HEAD SPACE.
 5. HVAC, PLUMBING, FIRE SUPPRESSION, SPECIALTIES, EQUIPMENT AND ANY/ALL ANCILLARY APPURTENANCES SHALL BE INSTALLED CONCEALED ABOVE CEILINGS WHERE APPLICABLE UNLESS SPECIFICALLY NOTED OTHERWISE OR WHERE NO PROPOSED CEILING EXISTS.
- 3.2 FIRE SUPPRESSION SYSTEM INSTALLATION
1. PROVIDE ALL MATERIALS, EQUIPMENT, PIPING, FITTINGS, HANGERS, VALVES, AND ALL OTHER APPURTENANCES NECESSARY FOR COMPLETE FIRE SUPPRESSION SYSTEMS IN ACCORDANCE WITH STATE AND LOCAL CODES, NFPA, AND AUTHORITIES HAVING JURISDICTION.
 2. THIS CONTRACTOR SHALL BE LICENSED BY THE STATE AS A CERTIFIED SPRINKLER DESIGNER OR PROFESSIONAL FIRE PROTECTION ENGINEER AND SHALL PREPARE SUBMITTAL DOCUMENTS FOR REVIEW INDICATING SPRINKLER PIPING LAYOUT, HEAD TYPES, ZONES, RISER LOCATIONS, FIRE PUMPS, AND HYDRAULIC CALCULATIONS. SUBMIT FIRE SUPPRESSION PACKAGE TO AUTHORITIES HAVING JURISDICTION, OWNER'S INSURANCE COMPANY, ARCHITECT, AND ENGINEER.
 3. THIS CONTRACTOR SHALL ACQUIRE A RECENT FLOW TEST PERFORMED WITHIN THE PAST YEAR OR PERFORM SAID TEST IN ACCORDANCE WITH THE FIRE DEPARTMENT AND WATER DEPARTMENT REQUIREMENTS.
 4. NEW SPRINKLER PIPING AND EXISTING PIPING TO BE REWORKED SHALL BE COORDINATED WITH EXISTING AND NEW MEP, STRUCTURAL AND ARCHITECTURAL ITEMS.
 5. RE-WORKED AND NEW SPRINKLER PIPING SHALL BE SUPPORTED PER NFPA 13 REQUIREMENTS.
 6. ALL PIPING SHALL BE COMPLETELY DRAINABLE.
 7. SPRINKLER PIPING COMPONENTS SHALL BE FACTORY SUPPLIED AND NOT MODIFIED IN ANY WAY.
- 3.3 PLUMBING SYSTEMS INSTALLATION
1. PROVIDE ALL MATERIALS, EQUIPMENT, PIPING, INSULATION, FITTINGS, HANGERS, VALVES, AND ALL OTHER APPURTENANCES NECESSARY FOR COMPLETE PLUMBING, DRAINAGE, AND PIPING SYSTEMS IN ACCORDANCE WITH STATE AND LOCAL CODES, ASPE, AND AUTHORITIES HAVING JURISDICTION.
 2. PROVIDE PLUMBING FIXTURES MATCHING PROJECT SCHEDULE AND SPECIFICATION REQUIREMENTS INCLUDING TRIM, QUARTER-TURN BALL VALVE STOPS, INSULATION KITS ON SUPPLY AND DRAINAGE PIPING (INCLUDING ADA FIXTURES), VACUUM BREAKERS WHERE BACK-SIPHONING MAY OCCUR, BRAIDED STAINLESS STEEL HOSES, FIXTURE CARRIERS AND PUBLIC FAUCET ASSE 1070 MIXING VALVES SPECIFIED OR INHERENTLY REQUIRED FOR INSTALLATION. METAL COMPONENTS SHALL BE CHROME PLATED BRASS UNLESS NOTED OTHERWISE.
 3. SANITARY P-TRAPS SHALL BE CHROME PLATED CAST BRASS BODY WITH CLEANOUT WITH 1/2 GAUGE SEAMLESS TUBULAR WALL BEND, CAST BRASS SLIP NUTS, AND CSA CERTIFICATION.
 4. ALL MATERIALS USED WITHIN RETURN AIR CEILING PLENUMS SHALL COMPLY WITH NFPA 90A AND BE RATED FOR SUCH USE.
 5. ALL PIPING VALVES, FITTINGS, SPECIALTIES, ETC, SHALL BE LISTED AS "DEZINCIFICATION RESISTANT" CONTAINING NO MORE THAN 1% ZINC.
 6. PLUMBING VENTS SHALL BE TERMINATED AT 18" ABOVE FINISHED ROOF ELEVATION.
 7. CHANGES IN PIPE SIZE SHALL BE USED WITH ECCENTRIC FITTINGS TO REDUCE AIR POCKETS IN PRESSURE PIPING.
 8. ALL SPECIALTIES REQUIRING PERIODIC MAINTENANCE AND OPERATION SHALL BE READILY ACCESSIBLE.
 9. PROVIDE DIELECTRIC FITTINGS IN CONNECTIONS OF DISSIMILAR METALS BETWEEN EQUIPMENT, PIPING, SPECIALTIES, AND ASSOCIATED HANGERS.
 10. ALL PIPING SYSTEMS SHALL BE COMPLETELY DRAINABLE, INCLUDING BASE OF RISERS, LOCATIONS OF TRAPPED WATER, AND INLET AND OUTLET OF COILS. DRAIN VALVE SHALL BE BALL-VALVE, QUARTER TURN, HOSE THREADED TERMINATION AND CAP.
 11. ALL HIGH-POINTS SHALL INCLUDE MANUAL AIR VENTS COMPRISED OF BALL-VALVE, QUARTER TURN, HOSE THREADED TERMINATION AND CAP.
 12. WHERE INTERIOR WALL PENETRATIONS OCCUR, PROVIDE MACHINE CUT STEEL SLEEVES 1" LARGER THAN OUTSIDE DIAMETER OF ASSOCIATED SERVICE PIPE. SEAL OPENING WATERTIGHT WITH APPROPRIATE MATERIAL OR FIRE CAULKING TO MAINTAIN RATING OF ASSEMBLY.
 13. WHERE EXTERIOR WALL PENETRATIONS OCCUR, PROVIDE MACHINE CUT STEEL SLEEVES 2" LARGER THAN OUTSIDE DIAMETER OF ASSOCIATED SERVICE PIPE. SEAL OPENING WATERTIGHT WITH MECHANICAL INTERLOCKING RUBBER WATER STOP RATED FOR 20 PSIG.
 14. BRANCH PIPING CONNECTIONS TO MAINS SHALL BE MADE AS INDICATED ON DRAWINGS (TOP / BOTTOM), CONNECTED WITH AMPLE SPACE FOR PIPING EXPANSION, PERMIT PROPER DRAINAGE OF SYSTEM, AND MINIMIZE HIGH-POINTS IN SYSTEM LEADING TO AIR POCKETS WHERE AIR VENTS ARE REQUIRED.
 15. SUPPORT ALL PIPING SYSTEMS AT INTERVALS REQUIRED BY CODE. SAGGING OR BENDS IN PIPING IS PROHIBITED. CLEVIS, TRAPEZE, SWIVEL, AND RISER CLAMPS ARE LISTED AS ACCEPTABLE. MAINTAIN DIELECTRIC SEPARATION OF DISSIMILAR METALS OR USE HANGERS OR SIMILAR MATERIAL.
 16. ALL PIPING SHALL BE CLEANED PRIOR TO INSTALLATION, INCLUDING UP-ENDING, POUNDING, OR SWABBING TO CLEAR ALL DEBRIS FROM PIPING INTERIOR.
 17. PROVIDE ALL VIBRATION AND EXPANSION CONTROL DEVICES INCLUDING GUIDES AND ANCHORS TO MITIGATE STRESS AND VIBRATION TO OTHER SYSTEM COMPONENTS, INCLUDING COILS, FIXTURES, PUMPS, AND EQUIPMENT.
 18. PROVIDE ALL HANGERS, RODS, CHANNEL, CLAMPS, WIRES, ETC REQUIRED FOR INSTALLATION OF PIPING SYSTEMS. WHERE PIPING IS INSULATED, HANGER SHALL BE OVERSIZED MATCHING OUTSIDE DIAMETER OF INSULATION AND SHALL REST IN INSULATION SHIELD WITH BLOCKING TO MAINTAIN INTEGRITY OF INSULATION. THERMAL BRIDGING IS PROHIBITED.
 19. PIPING INSULATION SHALL BE REPLACED WHERE REMOVED ON EXISTING PIPING DUE TO DEMOLITION OR NEW WORK. APPROVED FIBERGLASS INSULATION MANUFACTURERS: CERTANTEED, XMASI, JOHN MANVILLE, OWENS CORNING. APPROVED CLOSED-CELL ELASTOMERIC INSULATION MANUFACTURERS: ARMACELL, NOMACO.
 20. INSULATE ALL EQUIPMENT THAT SERVICES HEATING AND CHILLED WATER INCLUDING PUMPS, HEAT EXCHANGERS, EXPANSION/COMPRESSION TANKS, AIR/DIRT SEPARATORS, VALVE BODIES AND SPECIALTIES WITH FLEXIBLE ELASTOMERIC INSULATION OR MINERAL FIBER BOARD WITH FACTORY APPLIED JACKET.
 21. INSULATE ALL EQUIPMENT THAT SERVICES DOMESTIC HOT AND COLD WATER SYSTEMS INCLUDING PUMPS, HEAT EXCHANGERS, EXPANSION/COMPRESSION TANKS, VALVE BODIES AND SPECIALTIES WITH FLEXIBLE ELASTOMERIC INSULATION OR MINERAL FIBER BOARD WITH FACTORY APPLIED JACKET.
- 3.4 HVAC DUCTWORK SYSTEMS INSTALLATION
1. PROVIDE ALL MATERIALS, EQUIPMENT, PIPING, DUCTWORK, INSULATION, FITTINGS, HANGERS, DAMPERS, AND ALL OTHER APPURTENANCES NECESSARY FOR COMPLETE HEATING, VENTILATING, AND AIR CONDITIONING SYSTEMS IN ACCORDANCE WITH STATE AND LOCAL CODES, SMACNA, AND AUTHORITIES HAVING JURISDICTION.
 2. UNLESS NOTED OTHERWISE, THE MC SHALL COORDINATE RETURN AIR PATHWAY FROM ENCLOSED SPACES TO MAIN RETURN AIR DUCTWORK WITHIN RESPECTIVE CEILING PLENUM BY PROVIDING OPENINGS ABOVE CEILING IN WALL NOT TO EXCEED 400 F.P.M. CLEARLY INDICATE RETURN AIR PATHWAY AND CALCULATIONS SHOWING VELOCITIES OF 400FPM OR LESS WITH SHEET METAL DRAWINGS DURING THE SUBMITTAL REVIEW PROCESS.
 3. DUCTWORK SHALL BE SEALED AIR-TIGHT PER SMACNA REQUIREMENTS SEAL CLASS 'A'. DUCTWORK SEALING MATERIALS SHALL BE SPECIFICALLY INDICATED FOR SUCH USE, LEAD FREE, AND LOW VOC. APPROVED MANUFACTURERS: 3M, DOW, MCGILL
 4. CHANGES IN CROSS SECTIONAL AREA ARE PERMITTED PROVIDE PERCENTAGE OF FREE AREA MINIMALLY MEETS BASIS OF DESIGN AND ASPECT RATIO DOES NOT DEVIATE MORE THAN 25%.
 5. ALL DUCTWORK SHALL BE DIRECTLY SUSPENDED FROM STRUCTURE ABOVE. SUSPENSION FROM ANY OTHER ELEMENT BESIDES FROM STRUCTURE ABOVE IS STRICTLY PROHIBITED.
 6. ALL DUCTWORK INTERIOR TYPICALLY VISIBLE FROM BUILDING OCCUPANTS SHALL BE PAINTED FLAT BLACK.
 7. DUCTWORK SHALL BE CONTINUOUS WITH NO PENETRATIONS FROM OTHER MATERIALS, EQUIPMENT, PIPING, CONDUIT, WIRING, TELEDATA, ETC. PENETRATIONS OF DUCTWORK IS PROHIBITED.
 8. DUCTWORK SHALL BE PRESSURE TESTED PER ASHRAE 90.1, SECTION 6 REQUIREMENTS.
 9. INSULATE ALL EQUIPMENT THAT SERVICES HEATING AND CHILLED WATER SYSTEMS INCLUDING PUMPS, HEAT EXCHANGERS, EXPANSION/COMPRESSION TANKS, AIR/DIRT SEPARATORS, VALVE BODIES AND SPECIALTIES WITH FLEXIBLE ELASTOMERIC INSULATION OR MINERAL FIBER BOARD WITH FACTORY APPLIED JACKET.
 10. INSTALL REQUIRED DUCTWORK GUAGE IN ASSOCIATION WITH PROPER STIFFENER INSTALLATION REQUIREMENTS. PULSATING OF DUCTWORK IS PROHIBITED.
 11. SUSPEND DUCTWORK WITH GALVANIZED STRAPPING, RODS, TRAPEZE, AND CABLE LOOP HANGERS APPROVED BY SMACNA. HANGERS DIRECTLY FASTENED TO DUCTWORK SHALL BE MADE VIA SHEET METAL SCREWS AND SEALED APPROPRIATELY.

END OF MECHANICAL SPECIFICATIONS

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MOTTIER & MEADOWS ARCHITECTS

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THIS DWG : HVAC SPECIFICATIONS - PART 3

COMM 23144 DATE 04-10-2024

DWG 2-M6.2

INTERIOR BUILD-OUT PACKAGE



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