MECHANICAL SYMBOL LIST

NOTE: THIS IS A MASTER SCHEDULE. NOT ALL SYMBOLS CONTAINED HEREIN MAY APPEAR ON THE DRAWINGS.

- ITEM TO BE REMOVED
- POINT OF CONNECTION/DISCONNECTION
- SHEET NOTE
- REVISION NUMBER
- TAG / UNIT — EQUIPMENT MARK
- TAG / CFM — DIFFUSER TAG
- ACCESS PANEL
- SUPPLY AIR DUCT UP/DOWN
- RETURN AIR DUCT UP/DOWN
- EXHAUST AIR DUCT UP/DOWN
- RETURN GRILLE
- EXHAUST GRILLE
- 4-WAY BLOW SUPPLY DIFFUSER
- 3-WAY BLOW SUPPLY DIFFUSER
- 2-WAY BLOW SUPPLY DIFFUSER
- 1-WAY BLOW SUPPLY DIFFUSER
- AIRFLOW DIRECTION
- --"ϕ — ROUND DUCTWORK (INCHES)
- --"X--" — RECTANGULAR DUCTWORK (INCHES)
- ROUND FLEXIBLE DUCT
- SQUARE TO ROUND TRANSITION
- SINGLE LINE RIGID DUCT
- SINGLE LINE RIGID DUCT (ACOUSTICALLY LINED)
- DOUBLE LINE RIGID DUCT
- DOUBLE LINE RIGID DUCT (ACOUSTICALLY LINED)
- EXISTING DUCTWORK
- FD — FIRE DAMPER
- SD — SMOKE DAMPER
- FSD — FIRE/SMOKE DAMPER
- MOTORIZED DAMPER (OPPOSED BLADE TYPE)
- MOTORIZED DAMPER (PARALLEL BLADE TYPE)
- BACKDRAFT DAMPER
- MANUAL VOLUME DAMPER
- RVD — REMOTE VOLUME DAMPER
- SD — SMOKE DETECTOR
- T — THERMOSTAT
- H — HUMIDISTAT
- S — SENSOR
- C — CARBON DIOXIDE SENSOR
- C — CARBON MONOXIDE SENSOR
- U — DOOR UNDERCUT
- FS — FLOW SWITCH
- —CHR— CHILLED WATER RETURN PIPING
- —CHS— CHILLED WATER SUPPLY PIPING
- —CR— CONDENSER WATER RETURN PIPING
- —CS— CONDENSER WATER SUPPLY PIPING
- —HWR— HEATING WATER RETURN PIPING
- —HWS— HEATING WATER SUPPLY PIPING
- —RL— REFRIGERANT LIQUID PIPING
- —RS— REFRIGERANT SUCTION PIPING
- —CD— CONDENSATE DRAIN PIPING
- —PC— PUMPED CONDENSATE DRAIN PIPING
- CIRCUIT SETTER
- 2-WAY ELECTRONIC CONTROL VALVE
- 3-WAY ELECTRONIC CONTROL VALVE
- 2-WAY PNEUMATIC CONTROL VALVE
- 3-WAY PNEUMATIC CONTROL VALVE
- SOLENOID VALVE
- BUTTERFLY VALVE
- PLUG VALVE
- BALL VALVE
- CHECK VALVE
- GATE VALVE
- HOSE END DRAIN VALVE
- PRESSURE REDUCING VALVE
- RELIEF VALVE
- TEMPERATURE PRESSURE RELIEF VALVE
- THERMOMETER
- PRESSURE GAUGE WITH GAUGE COCK
- MANUAL AIR VENT
- PRESSURE TEMPERATURE PORT
- Y-STRAINER WITH BLOWDOWN
- PIPE GUIDE
- UNION
- PIPE ANCHOR
- FLEXIBLE CONNECTOR
- PIPE CAP/STUB-OUT
- DIRECTION OF FLOW
- PIPE DOWN
- PIPE UP
- PIPE TEE UP
- PIPE TEE DOWN

MECHANICAL ABBREVIATIONS

NOTE: THIS IS A MASTER SCHEDULE. NOT ALL ABBREVIATIONS CONTAINED HEREIN MAY APPEAR ON THE DRAWINGS.

AABC	AMERICAN AIR BALANCE COUNCIL
ACD	AUTOMATIC CONTROL DAMPER
AFF	ABOVE FINISHED FLOOR
AP	ACCESS PANEL
ASHRAE	AMERICAN SOCIETY OF HEATING, REFRIGERATION, AND AIR CONDITIONING ENGINEERS
ASPE	AMERICAN SOCIETY OF PLUMBING ENGINEERS
BFD	BACKFLOW PREVENTION DEVICE
BHP	BRAKE HORSE POWER
BTUH	BRITISH THERMAL UNIT PER HOUR
CFM	CUBIC FEET PER MINUTE
CHAR	CHARACTERISTICS
CHR	CHILLED WATER RETURN
CHS	CHILLED WATER SUPPLY
CR	CONDENSER WATER RETURN
CS	CONDENSER WATER SUPPLY
D	DRAIN
DB	DRY BULB TEMPERATURE
DDC	DIRECT DIGITAL CONTROL
DIA	DIAMETER
DN	DOWN
DX	DIRECT EXPANSION
(E)	EXISTING TO REMAIN
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EER	ENERGY EFFICIENCY RATIO
EFF	EFFICIENCY
ELEC	ELECTRICAL
ESP	EXTERNAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE
°F	FAHRENHEIT
FD	FIRE DAMPER
FPM	FEET PER MINUTE
FSD	FIRE/SMOKE DAMPER
GA	GAGE OR GAUGE
GAL	GALLONS
GPM	GALLONS PER MINUTE
GR	GLYCOL RETURN
GS	GLYCOL SUPPLY
HD	HEAD
HP	HORSEPOWER
HR	HOUR
HSPF	HEATING SEASONAL PERFORMANCE FACTOR
HWR	HEATING HOT WATER RETURN
HWS	HEATING HOT WATER SUPPLY
IBC	INTERNATIONAL BUILDING CODE
IMC	INTERNATIONAL MECHANICAL CODE
IPC	INTERNATIONAL PLUMBING CODE
KW	KILOWATT
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MBH	ONE THOUSAND BTUH
MCA	MINIMUM CIRCUIT AMPS
MIN	MINIMUM
MOCP	MAXIMUM OVER CURRENT PROTECTION
MVD	MANUAL VOLUME DAMPER
N/A	NOT APPLICABLE
NC	NORMALLY CLOSED
NEBB	NATIONAL ENVIROMENTAL BALANCING BUREAU
NEC	NATIONAL ELECTRIC CODE
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OAT	OUTSIDE AIR TEMPERATURE
OBD	OPPOSED BLADE DAMPER
OED	OPEN END DUCT
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
PD	PRESSURE DROP
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH ABSOLUTE
PSID	POUNDS PER SQUARE INCH DIFFERENTIAL
PSIG	POUNDS PER SQUARE INCH GAUGE
(R)	EXISTING TO BE RELOCATED
RA	RETURN AIR
RH	RELATIVE HUMIDITY
RL/S	REFRIGERANT LIQUID/SUCTION
RPM	REVOLUTIONS PER MINUTE
RPPA	REDUCED PRESSURE PRINCIPAL ASSEMBLY
RVD	REMOTE VOLUME DAMPER
SA	SUPPLY AIR
SD	SMOKE DAMPER
SEER	SEASONAL ENERGY EFFICIENCY RATIO
"SP	STATIC PRESSURE (INCHES OF)
SPECS	SPECIFICATIONS
SQ	SQUARE
SQFT	SQUARE FEET
SS	STAINLESS STEEL
T	TEMPERATURE
TAB	TEST AND BALANCE WORK AND REPORT
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
UBC	UNIFORM BUILDING CODE
UMC	UNIFORM MECHANICAL CODE
UON	UNLESS OTHERWISE NOTED
UPC	UNIFORM PLUMBING CODE
V/PH/HZ	VOLTAGE/PHASE/HERTZ
VFD	VARIABLE FREQUENCY DRIVE
WB	WET BULB TEMPERATURE
WG	WATER GAUGE
WMS	WIRE MESH SCREEN
(X)	EXISTING TO BE REMOVED

DRAWING INDEX

SHEET NUMBER	SHEET TITLE	PERMIT ISSUE DATE: 08-16-2011	ADDENDUM #1 09-02-2011 (1)	ADDENDUM #2 09-19-2011 (2)	ADDENDUM #3 10-19-2011 (3)	ADDENDUM #4 10-27-2011 (4)	ASI #05 03-05-2012 (5)	PR-15 04-06-2012 (6)	PR 18 05-09-2012 (7)
M000	SYMBOL LIST AND ABBREVIATIONS	●	●	●	●	●	●	●	●
M001	MECHANICAL SPECIFICATIONS	●		●					
M002	MECHANICAL SCHEDULES	●		●			●		
M003	MECHANICAL SCHEDULES	●	●	●	●	●			●
M004	MECHANICAL SCHEDULES	●		●		●			
M005	MECHANICAL DIAGRAMS	●		●					
M006	MECHANICAL DIAGRAMS	●		●	●				
M007	MECHANICAL CONTROLS AND DIAGRAMS	●							
M008	MECHANICAL CONTROLS AND DIAGRAMS	●		●	●				
M009	MECHANICAL CONTROLS AND DIAGRAMS	●		●	●				
M010	MECHANICAL CONTROLS AND DIAGRAMS	●		●					
M011	MECHANICAL PIPING DIAGRAMS	●		●	●	●			
M012	MECHANICAL PIPING DIAGRAMS	●		●	●				
M013	IECC COMPLIANCE CERTIFICATE	●							
M100	MECHANICAL SITE PLAN	●			●		●	●	
M210	MECHANICAL FLOOR PLAN AREA 'A'	●	●				●		
M211	MECHANICAL FLOOR PLAN AREA 'B'	●	●				●		●
M220	MECHANICAL PIPING FLOOR PLAN AREA 'A'	●		●	●		●		
M221	MECHANICAL PIPING FLOOR PLAN AREA 'B'	●			●	●	●		
M310	MECHANICAL UNDERFLOOR AIR DISTRIBUTION PLAN	●							
M450	MECHANICAL ROOF PLAN	●					●		
	TOTAL	21	4	13	10	5	8	2	3

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NUMBER	DATE	REVISION
3	10-19-2011	ADDENDUM #3
4	10-27-2011	ADDENDUM #4
5	03-05-2012	ASI #05
6	04-06-2012	PR-15
7	05-09-2012	PR 18

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ISSUE 02
BUILDING PACKAGE

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L11123

DRAWN BY
MSA

CHECKED BY
PE

SHEET TITLE
SYMBOL LIST AND ABBREVIATIONS

M000

$USERNAME$ $TIME$ $DATE$ $FILE$

MECHANICAL GENERAL NOTES

PART ONE - GENERAL

1. THE CONTRACTOR SHALL PROVIDE THE WORK SHOWN ON THE DRAWINGS AND SPECIFIED FOR THEIR INDIVIDUAL SECTIONS OF WORK. THE WORD "WORK" SHALL MEAN ALL LABOR, TRANSPORTATION, MATERIAL, EQUIPMENT, TOOLS, INSTALLATION, SUPERVISION AND ANY OTHER INCIDENTAL ITEMS OR SERVICES NECESSARY FOR THE PROPER INSTALLATION AND OPERATION OF THE COMPLETE SYSTEMS, WHICH SHALL BE PROVIDED WHETHER OR NOT SPECIFICALLY INDICATED OR NOTED.
2. ALL GENERAL CONDITIONS, SPECIAL REQUIREMENTS OR GENERAL REQUIREMENTS OF THE CONSTRUCTION SPECIFICATIONS ARE MADE PART OF THIS SPECIFICATION AND HAVE THE SAME FORCE AND AFFECT AS IF COMPLETELY REPRODUCED.
3. THE WORD "PROVIDE" SHALL MEAN FURNISH AND INSTALL, MAKE ALL FINAL CONNECTIONS AND LEAVE IN AN APPROVED COMPLETE OPERATING CONDITION.
4. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE LATEST ADOPTED EDITIONS OF THE APPLICABLE INTERNATIONAL BUILDING CODE (IBC), INTERNATIONAL MECHANICAL CODE (IMC), UNIFORM PLUMBING CODE (UPC), NATIONAL ELECTRIC CODES (NEC) AND ALL OTHER APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PAYING ALL FEES AND OBTAINING ALL PERMITS AND INSPECTIONS REQUIRED FOR THE WORK.
6. THE CONTRACTOR SHALL CAREFULLY EXAMINE ALL CONTRACT DOCUMENTS. THE CONTRACTOR SHALL COORDINATE THE WORK WITH ALL OTHER TRADES INCLUDING, BUT NOT LIMITED TO, THE CONTRACT DOCUMENTS, SHOP DRAWINGS, ETC. FOR ALL GENERAL CONSTRUCTION, STRUCTURAL, MECHANICAL, ELECTRICAL AND SPECIALTY CONTRACTOR WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER FITTING OF MATERIAL INTO THE BUILDING AS PLANNED, WITHOUT INTERFERENCE WITH OTHER WORK, AND SHALL MAKE REASONABLE MODIFICATIONS IN THE LAYOUTS NEEDED TO PREVENT CONFLICT WITH OTHER TRADES, TO PROVIDE ACCESS AND FOR THE PROPER EXECUTION OF THE WORK.
7. DRAWINGS ARE DIAGRAMMATIC AND SCHEMATIC IN NATURE, AND INDICATE THE TYPE, SIZE, ARRANGEMENT AND LOCATION OF MATERIALS AND EQUIPMENT. WORK INCLUDES CERTAIN COMPONENTS, APPURTENANCES AND RELATED SPECIALTIES THAT MAY NOT BE SHOWN. CONTRACTOR SHALL PROVIDE ALL NECESSARY ITEMS TO COMPLETE THE WORK ACCORDING TO INDUSTRY STANDARDS. IT IS THE INTENT OF THE DRAWINGS AND SPECIFICATIONS TO CALL OUT FOR FINISHED WORK, TESTED AND READY FOR OPERATION. DO NOT SCALE DRAWINGS. ARRANGEMENT OF EQUIPMENT AND ROUTING OF PIPES AND DUCTWORK, ETC. INDICATED ON DRAWINGS SHALL BE ROUTED PLUMB AND AT RIGHT ANGLES TO BUILDING CONSTRUCTION AND MAY REQUIRE MODIFICATION DUE TO UNFORESEEN CONDITIONS AND REQUIRE ON SITE REVISIONS DURING CONSTRUCTION. (SEE ALSO "BIDDING").
8. ALL WORK REQUIRED FOR IDENTICAL ITEMS SHOWN ON THE DRAWINGS SHALL BE PROVIDED, ALTHOUGH EACH SPECIFIC IDENTICAL ITEM MAY NOT BE SHOWN IN DETAIL.
9. THE CONTRACTOR SHALL SUBMIT FIVE SETS OF SHOP DRAWINGS AND TECHNICAL DATA SHEETS FOR ALL EQUIPMENT AND MATERIALS SPECIFIED HEREIN TO THE ENGINEER. THE ENGINEER SHALL REVIEW SHOP DRAWINGS AND TECHNICAL DATA SHEETS FOR CONFORMANCE WITH THE CONTRACT DOCUMENTS AND ISSUE A WRITTEN ASSESSMENT TO THE OWNER PRIOR TO COMMENCEMENT OF WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ENGINEERING FEES NECESSARY TO CHANGE PERMIT DOCUMENTS BASED ON ALTERNATE SUBMITTAL PACKAGES/EQUIPMENT SUBSTITUTIONS.
10. ALL SUBSTITUTIONS SHALL BE SUBMITTED TO THE ENGINEER FOR CONSIDERATION PRIOR TO BIDDING. THE OWNER'S REPRESENTATIVE SHALL PREAPPROVE ANY PROPOSED SUBSTITUTION IN WRITING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL REQUIREMENTS ASSOCIATED WITH SUBSTITUTED EQUIPMENT OR MATERIALS WITH OTHER BUILDING TRADES, INCLUDING ALL ELECTRICAL, STRUCTURAL, OR ARCHITECTURAL ELEMENTS. THE CONTRACTOR SHALL IDENTIFY AND ANNOTATE ALL REVISED REQUIREMENTS PER BUILDING TRADE ON THE SHOP DRAWINGS. THE CONTRACTOR SHALL ALSO IDENTIFY ALL COST DEBITS OR CREDITS IN WRITING FOR THE PROPOSED CHANGES PER BUILDING TRADE.
11. UPON COMPLETION OF CONSTRUCTION, THE CONTRACTOR SHALL SUPPLY THE ENGINEER WITH FIVE (5) COMPLETE SETS OF AS-BUILT DOCUMENTS ACCURATELY SHOWING THE MATERIALS AND EQUIPMENT AS INSTALLED.
12. ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED FOR A MINIMUM OF ONE (1) YEAR FROM DATE OF ACCEPTANCE BY OWNER. REFRIGERATION COMPRESSORS SHALL BE GUARANTEED FOR A MINIMUM OF FIVE (5) YEARS FROM DATE OF OWNER'S ACCEPTANCE. IN ADDITION, THE CONTRACTOR SHALL GUARANTEE THAT THE INSTALLATION WHEN OPERATED IN ACCORDANCE WITH THE CONTRACTOR'S INSTRUCTIONS WILL DEVELOP CAPACITY AND CHARACTERISTICS AS SPECIFIED AND WILL FULFILL EACH AND EVERY REQUIREMENT OF THE DRAWINGS AND SPECIFICATIONS. SHOULD THE INSTALLATION IN ANY WAY FAIL TO DO SO, THE CONTRACTOR WILL, WITHOUT DELAY OR WITHOUT COST TO THE OWNER, PROVIDE WHATEVER ADDITIONAL EQUIPMENT, MATERIAL, AND LABOR REQUIRED TO CORRECT THE DEFICIENCY AND COMPLY WITH THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS.
13. CONTRACTOR SHALL CHECK AND VERIFY ALL SIZES, DIMENSIONS, AND CONDITIONS BEFORE STARTING ANY WORK. ANY DEVIATIONS OR PROBLEMS SHALL BE TRANSMITTED TO THE ENGINEER FOR REVIEW.
14. PROVIDE BASE AND COUNTER FLASHING FOR ITEMS PENETRATING THE ROOF OR EXTERIOR WALLS.
15. STARTERS AND CONTROLS FOR MOTORS, ETC. TO BE FURNISHED BY MECHANICAL CONTRACTOR. ELECTRICAL CONTRACTOR TO INSTALL THE AFOREMENTIONED ITEMS, AND FURNISH ALL POWER WIRING. ALL CONTROL AND INTERLOCKING WIRING SHALL BE FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR.
16. ALL WORK SHOWN IS NEW UNLESS NOTED OTHERWISE.
17. MAINTAIN OCCUPANCY AND FIRE WALL SEPARATION INTEGRITY AS REQUIRED. REFER TO ARCHITECTURAL PLANS FOR LOCATIONS OF ALL OCCUPANCY/FIREWALL SEPARATIONS AND SPECIFIC DETAILS FOR CONSTRUCTION. PROVIDE ALL NECESSARY FIRE AND SMOKE FIRE DAMPERS, ACCESS DOORS, CAULKING, ETC. FOR APPROVED INSTALLATION.

BIDDING

1. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING A BID TO BECOME FAMILIAR WITH THE EXISTING CONDITIONS. THE CONTRACTOR SHALL COMPARE THE WORK SPECIFIED IN THE CONTRACT DOCUMENTS WITH THE EXISTING CONDITIONS. THE CONTRACTOR SHALL IDENTIFY AND NOTATE ALL WORK OR CONDITIONS THAT ARE DIFFERENT FROM THE CONTRACT DOCUMENTS OR THEIR INTENT. THE CONTRACTOR SHALL, UPON DISCOVERY, IMMEDIATELY NOTIFY AND REPORT, IN WRITING, ANY DISCREPANCIES TO THE ENGINEER. NO EXTRAS OR CHANGE ORDERS WILL BE ALLOWED FOR FAILURE TO PERFORM THE PRE-BID SITE VISIT.
2. BASE PROPOSAL ON MANUFACTURER NAMES LISTED UNLESS "OR EQUAL" IS INDICATED. PROVIDE SUBSTITUTION REQUESTS A MINIMUM OF FIVE (5) BUSINESS DAYS PRIOR TO BID DATE CLOSING TO ALLOW TIME FOR DUE CONSIDERATION OF PROPOSED ALTERNATE. DETERMINATION OF SUBSTITUTION OF EQUALITY RESTS SOLELY WITH THE ENGINEER.

PART TWO - PRODUCTS

HVAC EQUIPMENT

1. PROVIDE HVAC EQUIPMENT AS SPECIFIED AND/OR SCHEDULED HEREIN AND IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED INSTALLATION INSTRUCTIONS. EQUIPMENT SHALL OPERATE ACCORDING TO THE MANUFACTURER'S "OWNER'S OPERATING AND MAINTENANCE MANUAL" TROUBLE-FREE PRIOR TO STARTING TEST AND BALANCE (TAB) WORK.

DUCTWORK

1. DUCTWORK SHALL BE ASTM A525 OR A527 GALVANIZED SHEET METAL LOCK-FORMING QUALITY HAVING ZINC COATING OF 1.25 OZ PER SQ. FT. FOR EACH SIDE PER ASTM A90 AND INSTALLED ACCORDING TO ASHRAE RECOMMENDATIONS, AND SMACNA DUCT CONSTRUCTION STANDARDS. DUCTWORK SYSTEMS SHALL BE (2" CLASSIFICATION SUPPLY, AND 1" CLASSIFICATION RETURN AND EXHAUST).
2. PROVIDE MANUAL VOLUME DAMPERS WITH LOCKING QUADRANTS AND IDENTIFYING RIBBONS AT DAMPER HANDLES FOR AIR BALANCING EACH BRANCH DUCT TAKE-OFF OR PIECE OF AIR DISTRIBUTION EQUIPMENT.
3. SEAL ALL DUCT PENETRATIONS THROUGH WALLS, FLOOR AND ROOF. SEAL ALL TRANSVERSE DUCT SEAMS WITH APPROVED MASTIC. DUCT TAPES SHALL NOT BE ALLOWED FOR RIGID DUCTWORK. SUPPLY AND RETURN DUCTWORK SHALL BE INSULATED WITH 1 1/2" THICK FLEXIBLE GLASS FIBER ANSI/ASTM C612: MAXIMUM 'K' VALUE OF 0.29 AT 75°F, WITH FOIL-KRAFT FLAME RESISTANT VAPOR BARRIER, 3/4 #/CUFT. DENSITY.
4. ALL DUCTWORK SIZES SHOWN ARE FREE AREA DIMENSIONS. EXHAUST DUCTWORK SHALL BE UNINSULATED. DUCTWORK INTERIOR BEHIND DEVICES SHALL BE PAINTED FLAT BLACK.
5. LINE DUCTWORK TEN FEET UPSTREAM AND DOWNSTREAM OF ALL FANS (EXCEPT FOR HOOD OR DISHWASHER EXHAUST) AND WHERE INDICATED WITH 1" THICK, 1 1/2# DENSITY DUCT LINER. LINING SHALL BE APPLIED TO DUCTWORK WITH FIRE RESISTANT ADHESIVES, (FOSTER 85-10 OR EQUAL) AND COPPER OR CADMIUM PLATED MECHANICAL FASTENERS, (GRAHAM, OMARK OR EQUAL). ALL DUCT SIZES INDICATED ARE CLEAR INSIDE.
6. FLEXIBLE DUCTWORK WHERE INDICATED ON THE DRAWINGS SHALL BE INSULATED, WITH PLASTIC VAPOR BARRIER AT INTERIOR AND EXTERIOR, STEEL WIRE COIL REINFORCED. JOINTS SHALL BE BAND-CLAMPED AND TAPE SEALED TO MAINTAIN INTEGRITY OF VAPOR BARRIER. FLEXIBLE INSTALLATION SHALL BE SUPPORTED TO ELIMINATE SAGS. FLEXIBLE GLASS FIBER INSULATION SHALL HAVE A MAXIMUM 0.23 K VALUE AT 75°F.
7. KITCHEN HOOD EXHAUST DUCT SHALL BE MINIMUM 16 GAUGE CARBON STEEL WITH CONTINUOUS EXTERNAL WELDED JOINTS. FABRICATE IN ACCORDANCE WITH SMACNA DUCT CONSTRUCTION STANDARDS, UNIFORM MECHANICAL CODE AND ASTM A569.
8. DISHWASHER EXHAUST DUCT SHALL BE A304 STAINLESS STEEL, WHERE CONCEALED, AND 316 STAINLESS STEEL WHERE EXPOSED. COORDINATE FINISH WITH ARCHITECT. PROVIDE CONTINUOUS EXTERNAL WELDED JOINTS. FABRICATE IN ACCORDANCE WITH ASTM A240, A276, A480 AND SMACNA DUCT CONSTRUCTION STANDARDS.
9. FIRE DAMPERS SHALL MEET UL 555 AND SHALL HAVE BLADES OUT OF AIR STREAM IN COILED POSITION. FUSIBLE LINK SHALL BE RATED AT 165°F.
10. COMBINATION FIRE/SMOKE DAMPERS SHALL MEET UL 555S AND SHALL HAVE BLADES OUT OF AIR STREAM IN COILED POSITION.

MECHANICAL PRODUCTS

1. PIPE HANGERS: PIPE SIZES 1/2" TO 1 1/2": MALLEABLE IRON, CARBON STEEL, ADJUSTABLE SWIVEL, SPLIT RING. PIPE SIZES 2" TO 4": CARBON STEEL, ADJUSTABLE, CLEVIS. PIPE SIZES 6" AND OVER: ADJUSTABLE STEEL YOKE, CAST IRON ROLL, DOUBLE HANGER.
2. REFRIGERANT PIPING: PROVIDE PIPING BETWEEN AIR-COOLED CONDENSING UNIT AND FAN COIL UNIT OR HEAT PUMP. PROVIDE ALL NECESSARY AUXILIARIES AND APPARATUSES TO MAKE SYSTEM COMPLETE AND OPERABLE UNDER FULLY AUTOMATIC CONTROL. PIPING SHALL BE ACR COPPER TUBING MADE UP WITH WROUGHT COPPER FITTINGS USING SILVER SOLDER OF SIZES AS RECOMMENDED BY MANUFACTURER. SUCTION LINES, HOT GAS BYPASS AND OUTDOOR LIQUID LINES SHALL BE INSULATED WITH 3/4" THICK RIGID CLOSED CELL FOAM INSULATION. DO NOT RUN PIPE INSULATION IN RETURN AIR PLENUM.
3. VALVES: PROVIDE THE NAME OF MANUFACTURER AND GUARANTEED WORKING PRESSURE CAST OR STAMPED ON VALVE BODIES AND BE BY SINGLE MANUFACTURER FOR SIMILAR TYPE. ACCEPTABLE MANUFACTURERS: MILWAUKEE, STOCKHAM, NIBCO, APOLLO.
4. DIFFUSERS, REGISTERS AND GRILLES: MAXIMUM SOUND PRESSURE LEVELS SHALL NOT EXCEED NC 30. COORDINATE FINISH AND MOUNTING TYPE WITH ARCHITECT. ACCEPTABLE MANUFACTURERS: TITUS, METAL AIRE, TUTTLE AND BAILEY, PRICE
5. FANS: PROVIDE WITH 12" ROOF CURB, DISCONNECT SWITCH, FORWARD CURVED BELT DRIVEN OR DIRECT DRIVEN STEEL FAN, BACK DRAFT DAMPER AND CAST IRON OR STEEL DYNAMICALLY BALANCED VARIABLE OR ADJUSTABLE PITCH MOTOR SHEAVES. ACCEPTABLE MANUFACTURERS: GREENHECK, COOK, ACME.
6. PIPING: HYDRONIC WATER PIPING (ABOVE GROUND) - SCHEDULE 40 STEEL (ASTM A53), MALLEABLE IRON OR FORGED STEEL WELDED TYPE FITTINGS, SCREWED OR WELDED JOINTS; OR TYPE L HARD DRAWN COPPER TUBING (ASTM B88), CAST BRASS OR SOLDER WROUGHT COPPER FITTINGS, SOLDER GRADE 95TA JOINTS. PIPING OVER 2" SHALL BE STEEL WITH WELDED JOINTS. EQUIPMENT DRAIN OVERFLOWS SHALL BE TYPE M HARD DRAWN COPPER.
7. PIPE INSULATION: GLASS FIBER INSULATION WITH MAXIMUM K VALUE OF .27 AT 75 DEGREES F. MINIMUM THICKNESS SHALL BE 1" FOR PIPING LESS THAN 2". AND 2" HOT WATER/ 1 1/2" CHILLED WATER FOR PIPING 2" AND GREATER. OUTDOOR INSULATION THICKNESS SHALL BE DOUBLE INDOOR THICKNESS WITH A MAXIMUM THICKNESS OF 2". INTERIOR APPLICATIONS SHALL HAVE KRAFT REINFORCED FOIL VAPOR BARRIER WITH ONE PIECE PREMOLDED PVC JACKETS FOR FITTINGS. EXTERIOR APPLICATIONS SHALL HAVE 0.16 THICK ALUMINUM JACKETS. ACCEPTABLE MANUFACTURERS: OWENS CORNING, CERTAINTEED, JOHNS MANVILLE, KNAUF. (2)
8. AIR HANDLING UNITS: UNIT SHALL HAVE COILS AND HEATING SECTION. UNITS SHALL BE FURNISHED WITH 2 SETS OF 1" THROWAWAY PLEATED 30% FILTERS. UNITS TO BE INSTALLED AS PER MANUFACTURER RECOMMENDATIONS, ROOF CURB, ITEMS AS SCHEDULED AND ALL NECESSARY ACCESSORIES REQUIRED FOR EFFICIENT AND PROPER OPERATION. ACCEPTABLE MANUFACTURERS: MCQUAY, YORK, ENERGY LABS, TRANE, McQUAY, CARRIER, SEMCO.
9. AIR COOLED CONDENSER: PROVIDE COILS WITH INTEGRAL SUBCOOLING AND CASING WITH STAND. COILS SHALL BE ALUMINUM PLATE FINS ON COPPER TUBES (LEAK TESTED 150 PSIG, PRESSURE TESTED 420 PSIG). FANS SHALL BE DIRECT DRIVE PROPELLER WITH FAN GUARD. FAN SHAFT AND BLADES SHALL BE CORROSION PROTECTED. HEAD PRESSURE CONTROL SHALL BE BY FAN CYCLING. COMPRESSOR SHALL BE HERMETIC WITH EXTERNAL SPRING ISOLATORS AND UNLOAD IN RESPONSE TO SUCTION PRESSURE IN STEPS FOR PARTIAL LOAD OPERATION. ACCEPTABLE MANUFACTURERS: TRANE, CARRIER, YORK.

AUTOMATIC TEMPERATURE CONTROLS

1. THE MECHANICAL CONTRACTOR SHALL PROVIDE A COMPLETE SYSTEM OF AUTOMATIC TEMPERATURE CONTROLS. THIS SYSTEM SHALL INCLUDE BUT NOT BE LIMITED TO: HEAT/OFF/COOL/AUTO - THERMOSTAT, AUTO/MANUAL - FAN, TRANSFORMERS AND ALL REQUIRED RELAYS, WIRING AND CONDUIT. THERMOSTAT SHALL BE 7 DAY PROGRAMMABLE WITH AUTOMATIC CHANGE OVER FROM HEATING TO COOLING AND VICE VERSA.
2. MECHANICAL CONTRACTOR SHALL PROVIDE AND INSTALL, IN ACCORDANCE WITH NEC AND THIS PROJECT ELECTRICAL SPECIFICATIONS, ALL CONDUIT, WIRE, JUNCTION BOXES, THERMOSTAT BACK BOXES AND CIRCUIT BREAKERS REQUIRED FOR A FULLY OPERATIONAL ATC SYSTEM.
3. SUBMIT SHOP DRAWINGS OF TEMPERATURE CONTROL WIRING, LOCATION OF DEVICES AND INSTALLATION DATA FOR REVIEW PRIOR TO INSTALLATION.

TEST AND BALANCE REPORT (TAB)

1. BALANCE ALL DUCTS, DIFFUSERS, AND GRILLES TO OBTAIN THE AIR QUANTITIES AS SHOWN ON PLANS. TEST AND BALANCE WORK SHALL BE PERFORMED BY AN INDEPENDENT, APPROVED, AND CERTIFIED AABC OR NEBB CONTRACTOR.
2. THE TEST AND AIR BALANCE (TAB) REPORT SHALL INCLUDE DESIGN AIR QUANTITIES AND AIR QUANTITIES AFTER ADJUSTMENTS. FURNISH OWNER'S REPRESENTATIVE WITH THREE (3) COPIES OF THE FINAL TAB REPORT.

NOTES

1. DIELECTRIC FITTINGS SHALL BE USED WHEREVER DISSIMILAR METALS ARE JOINED.
2. PROVIDE ACCESS PANELS IN CEILING TO ACCESS VOLUME DAMPERS WHERE REQUIRED.
3. FIRE AND SMOKE FIRE DAMPERS SHALL MEET UL 555 AND UL 555S AND FIRE DAMPERS SHALL HAVE BLADES OUT OF AIR STREAM IN COILED POSITION.

PART THREE - EXECUTION

1. THE CONTRACTOR SHALL PROVIDE ALL SLEEVES, OPENINGS, CUTTING AND PATCHING NECESSARY FOR THE INSTALLATION OF THE WORK. CUTTING AND PATCHING SHALL BE DONE BY WORKMEN SKILLED IN THE TRADES REQUIRED AND PAID BY THE CONTRACTOR REQUIRING THE WORK COMPLETED.
2. THE CONTRACTOR SHALL PROVIDE ALL RIGGING, HANDLING OF MATERIALS AND EQUIPMENT, AND THE NECESSARY PROTECTION FOR MATERIALS AND EQUIPMENT.
3. THE CONTRACTOR WILL PROTECT THE WORK AND MATERIAL AGAINST DIRT, THEFT, INJURY OR DAMAGE UNTIL ACCEPTED BY OWNER. ALL WORK SHALL BE TURNED OVER TO OWNER CLEAN AND IN NEW CONDITION.
4. PIPES AND/OR CONDUITS PASSING THROUGH WALL, FLOORS AND PARTITIONS SHALL BE PROVIDED WITH SLEEVES. SLEEVES PASSING THROUGH WATER PROOFING OR DAMP PROOFING SHALL BE WATER TIGHT. SLEEVES PASSING THROUGH FIRE RATED CONSTRUCTION SHALL BE FIRE PROOFED WITH MATERIAL APPROVED FOR THE FIRE RATING OF THE SEPARATION AREA AND U.L. LISTED.
5. EACH CONTRACTOR SHALL PROVIDE ALL FOUNDATIONS, HANGERS, AND SUPPORTS FOR ALL EQUIPMENT SUPPLIED AND/OR INSTALLED UNDER THEIR WORK. ANY EQUIPMENT WITH MOVING PARTS SHALL BE PROVIDED WITH VIBRATION ISOLATION AND FLEXIBLE CONNECTIONS TO PIPING AND OR DUCTWORK IF APPLICABLE.
6. WHERE PIPES OR CONDUITS PASS THROUGH WALLS, FLOORS, OR CEILINGS IN FINISHED AREAS, THEY SHALL BE FURNISHED WITH ESCUTCHEON PLATES (COLOR PER ARCHITECT AND/OR INTERIOR DESIGNER).
7. AT THE CONCLUSION OF THE JOB, EACH PIECE OF EQUIPMENT, VALVE, SWITCH, STARTER, PANEL, PIPE LINE, CONDUIT, DUCT, ETC., SHALL BE CLEARLY IDENTIFIED WHETHER EXPOSED OR CONCEALED, COVERED OR UNCOVERED, IN ACCORDANCE WITH OSHA AND ANSI REGULATIONS. IDENTIFY PIPES NEAR EACH VALVE WITH "BRANDY-PERMA' CODE PIPE TAPE" OR T. & B. WESTLINE "TEL-A-PIPE" INDICATING DIRECTION OF FLOW, SERVICE, ZONE, AND SIZE. TAPE SHALL BE APPLIED TO PIPE, CONDUIT, OR COVERING. VALVES, CONTROLS, AND DAMPERS SHALL BE IDENTIFIED BY 2-INCH LACQUERED BRASS TAGS WITH STAMPED LETTERS FASTENED WITH "S" HOOKS OR CHAINS. EQUIPMENT IS TO BE IDENTIFIED AS TO FUNCTION AND PURPOSE BY MEANS OF PERMANENTLY ATTACHED LAMINATED ENGRAVED PHENOLIC NAMEPLATES WITH BEVELED EDGES, AND WHITE LETTERS ON BLACK BACKGROUND. (NO ADHESIVE LABELS ALLOWED).
8. AT THE CONCLUSION OF THE WORK, ALL EQUIPMENT AND SYSTEMS SHALL BE BALANCED, ADJUSTED, AND TESTED TO PROVIDE A QUIET-OPERATING, STABLE, AND SAFELY OPERATING SYSTEM(S). DEMONSTRATE OPERATION OF ALL SYSTEMS TO THE OWNER'S DESIGNATED REPRESENTATIVE. THE TEST AND BALANCE WORK SHALL BE PERFORMED IN ACCORDANCE WITH NEBB OR AABC STANDARDS, BY INDEPENDENT, APPROVED, AND CERTIFIED TEST AND BALANCE PERSONNEL.
9. THE CONTRACTOR SHALL SUBMIT SEISMIC RESTRAINT DOCUMENTS BY A PROFESSIONAL STRUCTURAL ENGINEER REGISTERED IN THE SAME STATE AS THE PROJECT CERTIFYING AND INDICATING THAT ALL THE ASSOCIATED SYSTEMS MEET THE SEISMIC REQUIREMENTS SET FORTH IN ALL THE APPLICABLE CODES ASSOCIATED WITH THE PROJECT.
10. CONTRACTOR SHALL REFER TO THE ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION OF GRILLES, REGISTERS AND DIFFUSERS.
11. PIPE HANGERS: PIPE SIZES 1/2" TO 1 1/2" - 6'-0" MAX SPACING, 3/8" ROD DIAMETER; PIPE SIZES 2" TO 3" - 10'-0" MAX SPACING, 1/2" ROD DIAMETER; PIPE SIZES 4 TO 6"-10'-0" MAX SPACING, 5/8" ROD DIAMETER. DAMPERS.

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REGISTERED PROFESSIONAL ENGINEER
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OKLAHOMA
05-09-12

NUMBER	DATE	REVISION
2	09-19-2011	ADDENDUM #2

CHEROKEE NATION. Entertainment

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ISSUE DATE
08-16-2011

PROJECT NO.
L11123

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SHEET TITLE
MECHANICAL SPECIFICATIONS

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PACKAGED CENTRAL UTILITY PLANT SCHEDULE

MARK	MANUFACTURER	COMPONENTS						ELECTRICAL			REMARKS
		CHILLER	CHW PUMPS	CW PUMPS	BOILER	HW PUMPS	EXPANSION TANK	V/PH/HZ	MCA	MOCP	
CUP 1	MCQUAY	REFER TO SCHEDULE	REFER TO SCHEDULE	REFER TO SCHEDULE	REFER TO SCHEDULE	REFER TO SCHEDULE	REFER TO SCHEDULE	460/3/60	768	1200	1, 2, 3, 4

1. PROVIDE SINGLE POINT CONNECTION AT 460V, 3 PHASE.
2. PROVIDE PACKAGED DX HVAC SYSTEM TO MAINTAIN EACH ROOM AT 85°F AT 100°F AMBIENT.
3. PROVIDE 4" HOUSEKEEPING PAD
4. PROVIDE COMPUTER TO MONITOR WITH PLANT.

BOILER SCHEDULE

MARK	MANUFACTURER MODEL	SYSTEM	INPUT (MBH)	OUTPUT (MBH)	GPM	EWT (°F)	LWT (°F)	EFF (%)	WATER CONNECTION SIZE	GAS CONNECTION SIZE	AIR INLET SIZE	ELECTRICAL			OPERATING WEIGHT (LBS)	REMARKS
												MCA	MOCP	V/PH/Hz		
B 1	CAMUS 3500	HEATING WATER SYSTEM	3500.0	2975.0	149	140	180	85	1 1/2"	2"	12"	20	30	460/3/60	1000	1, 2, 3, 4, 5, 6, 7
B 2	CAMUS 3500	HEATING WATER SYSTEM	3500.0	2975.0	149	140	180	85	1 1/2"	2"	12"	20	30	460/3/60	1000	1, 2, 3, 4, 5, 6, 7

1. PROVIDE FACTORY PIPED CIRCULATING PUMP
2. MOUNT BOILERS ON 4" HOUSEKEEPING PAD.
3. PROVIDE ELECTRONIC LOW WATER CUT OFF WITH MANUAL RESET.
4. PROVIDE COMMUNICATION INTERFACE TO EMS.
5. PROTOCOL TO BE SELECTED BY BAS CONTRACTOR.
6. FLOW SWITCH HARDWIRED TO CONTROLS (CCT)
7. 20% INHIBITED PROP GLYCOL.

AIR COOLED CHILLER SCHEDULE

MARK	MANUFACTURER MODEL	SERVICE	TYPE	NOMINAL CAPACITY (TONS)	REFRIGERANT TYPE	REFRIGERANT CHARGE (LBS)	EVAPORATOR DATA					ELECTRICAL					OPERATING WEIGHT (LBS)	MAX. UNIT FOOT PRINT (LxWxH)	REMARKS
							GPM	EWT (°F)	LWT (°F)	PRESS DROP (FT)	NUMBER OF PASSES	FULL LOAD KW/TON	NPLV	V/PH/HZ	MCA	MOCP			
CH 1	MCQUAY #AWS400BDP	CASINO	SCREW	348	R-134A	620.0	530	42	58	4.9	2	1.34	19.2	460/3/60	725	1000	26,000	496"x88"x100"	1, 2, 3, 4, 5

1. PROVIDE 4" HOUSEKEEPING PAD.
2. UNIT SHALL COMPLY WITH ASHRAE 90.1-2007
3. PROVIDE FACTORY MOUNTED AFD.
4. MIN. EVAPORATOR FLOW : 450 GPM.
5. 20% INHIBITED PROP GLYCOL.

5

HYDRONIC PUMP SCHEDULE

MARK	GENERAL DATA				GPM	HEAD (FT)	EEF (%)	NPSHR (FT)	IMPELLER SIZE (IN)	MOTOR				OPERATING WEIGHT (LBS)	REMARKS
	MANUFACTURER MODEL	LOCATION	TYPE	SERVICE						BHP	HP	RPM	V/PH/HZ		
CHP 1	ARMSTRONG	CENTRAL PLANT	DUAL ARM INLINE	PRIMARY CHILLED WATER	530	115	70	19.5	6.6	22.1	25	3600	460/3/60	-	1,2,3,4,5,6
CHP 2	ARMSTRONG	CENTRAL PLANT	DUAL ARM INLINE	PRIMARY CHILLED WATER	530	115	70	19.5	6.6	22.1	25	3600	460/3/60	-	1,2,3,4,5,6
HP 1	ARMSTRONG	CENTRAL PLANT	DUAL ARM INLINE	PRIMARY HOT WATER	149	20	61	15.2	1.9	2	2	1750	460/3/60	-	1,2,3,4,5,6
HP 2	ARMSTRONG	CENTRAL PLANT	DUAL ARM INLINE	PRIMARY HOT WATER	149	20	61	15.2	1.9	2	2	1750	460/3/60	-	1,2,3,4,5,6
HP 3	ARMSTRONG	CENTRAL PLANT	DUAL ARM INLINE	SECONDARY HOT WATER	149	115	67	15.2	14.8	20	70	3500	460/3/60	-	1,2,3,4,5,6
HP 4	ARMSTRONG	CENTRAL PLANT	DUAL ARM INLINE	SECONDARY HOT WATER	149	115	67	15.2	14.8	20	70	3500	460/3/60	-	1,2,3,4,5,6

1. PROVIDE VFD.
2. MOTOR SHALL BE NON-OVERLOADING.
3. PROVIDE SUCTION INLET GUIDE.
4. PROVIDE OUTSIDE BALANCED SEALS.
5. PUMP RATED FOR 150 PSI DUTY.
6. 20% INHIBITED PROP GLYCOL.

5

AIR / DIRT SEPARATOR SCHEDULE

MARK	MANUFACTURER MODEL	TYPE	SERVICE	GPM	CONNECTION SIZE (IN)	MAX PD (FT)	SIZE (IN)		OPERATING WEIGHT (LBS)	REMARKS
							DIA	HEIGHT		
AS 1	SPIROTHERM #VDN800	AIR / DIRT	CHILLED WATER	509	8"	.08	16	51.8	436	-
AS 2	SPIROTHERM #VDN400FA	AIR / DIRT	HOT WATER	149	4"	.059	8.6	31.4	150	-

EXPANSION TANK SCHEDULE

MARK	MANUFACTURER MODEL	TYPE	SERVICE	TANK VOLUME (GAL)	ACCEPTANCE VOLUME (GAL)	SIZE (IN)		ASME RATED PRESSURE (PSI)	SYSTEM TEMP (°F)		SYSTEM PRESSURE @ TANK MIN (PSI)	OPERATING WEIGHT (LBS)	REMARKS
						DIA	HT/LEN		MIN.	MAX.			
ET 1	WESSELS #NLA35	VERTICAL BLADDER	CHILLED WATER	10	10	12	25	125	42	90	65	50	1
ET 2	WESSELS #NLA85	VERTICAL BLADDER	HOT WATER	23	23	16	37	125	50	180	65	100	1

1. FINAL SYSTEM PRESSURE TO BE DETERMINED IN THE FIELD BY THE AIR/WATER BALANCE CONTRACTOR. ADJUST TO PROVIDE 10 PSI AT THE TOP OF THE SYSTEM UNDER STATIC CONDITIONS.

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05-09-12

NUMBER	DATE	REVISION
2	09-19-2011	ADDENDUM #2
5	03-05-2012	ASI #05

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AIR DISTRIBUTION SCHEDULE

MARK	MANUFACTURER MODEL	AIRFLOW RANGE	SERVICE TYPE	MAX NC	NECK SIZE	PANEL SIZE	REMARKS
D-1 CFM	TITUS MCD	0-100	CEILING SUPPLY	30	6"X6"	12"X12"	1, 2, 3
D-2 CFM	TITUS MCD	101-200	CEILING SUPPLY	30	8"X8"	12"X12"	1, 2, 3
D-3 CFM	TITUS MCD	201-350	CEILING SUPPLY	30	10"X10"	12"X12"	1, 2, 3
D-4 CFM	TITUS MCD	351-500	CEILING SUPPLY	30	12"X12"	14"X14"	1, 2, 3
D-5 CFM	TITUS MCD	501-680	CEILING SUPPLY	30	14"X14"	16"X16"	1, 2, 3
D-6 CFM	TITUS MCD	681-890	CEILING SUPPLY	30	16"X16"	18"X18"	1, 2, 3
D-7 CFM	TITUS MCD	891-1125	CEILING SUPPLY	30	18"X18"	20"X20"	1, 2, 3
D-8 CFM	TITUS MCD	1126-1400	CEILING SUPPLY	30	20"X20"	22"X22"	1, 2, 3
D-9 CFM	TITUS MCD	0-100	CEILING SUPPLY	30	6"X6"	24"X24"	1, 2, 3
D-10 CFM	TITUS MCD	101-200	CEILING SUPPLY	30	8"X8"	24"X24"	1, 2, 3
D-11 CFM	TITUS MCD	201-350	CEILING SUPPLY	30	10"X10"	24"X24"	1, 2, 3
D-12 CFM	TITUS MCD	351-500	CEILING SUPPLY	30	12"X12"	24"X24"	1, 2, 3
D-13 CFM	TITUS MCD	501-680	CEILING SUPPLY	30	14"X14"	24"X24"	1, 2, 3
D-14 CFM	TITUS MCD	681-890	CEILING SUPPLY	30	16"X16"	24"X24"	1, 2, 3
D-15 CFM	TITUS MCD	891-1125	CEILING SUPPLY	30	18"X18"	24"X24"	1, 2, 3
D-16 CFM	TITUS MCD	1126-1400	CEILING SUPPLY	30	20"X20"	24"X24"	1, 2, 3
D-17 CFM	TROX FBM-3-VF-K-200	80	FLOOR SUPPLY	30	8"	24"X24"	-
D-18 CFM	TITUS PAS	500-800	CEILING SUPPLY	30	12"X12"	24"X24"	1
D-19 CFM	TITUS PAS	801-1100	CEILING SUPPLY	30	15"X15"	24"X24"	1
D-20 CFM	TITUS TMR	0-180	ROUND SUPPLY	30	6"	11 1/8"	1, 6
D-21 CFM	TITUS TMR	181-300	ROUND SUPPLY	30	8"	14 3/4"	1, 6
D-22 CFM	TITUS TMR	301-430	ROUND SUPPLY	30	10"	18 1/4"	1, 6
D-23 CFM	TITUS TMR	431-630	ROUND SUPPLY	30	12"	22	1, 6
D-24 CFM	TITUS TMR	631-825	ROUND SUPPLY	30	14"	26	1, 6
D-25 CFM	TITUS FL25	200-300	LINEAR SUPPLY	30	10"	4'-0"	1, 4
D-26 CFM	TITUS FL30	301-400	LINEAR SUPPLY	30	12"	4'-0"	1, 5
D-27 CFM	TITUS FL30	401-600	LINEAR SUPPLY	30	12"	5'-0"	1, 5
R-1 CFM	TITUS 50F	0-600	RETURN CEILING	30	12"X12"	24"X24"	1
R-2 CFM	TITUS 50F	601-2000	RETURN CEILING	30	22"X22"	24"X24"	1
R-3 CFM	TITUS 350FL	350-900	RETURN SIDEWALL	30	14"X14"	16"X16"	1, 3
R-4 CFM	TITUS 50F	0-150	RETURN CEILING	30	6"X6"	12"X12"	1
R-5 CFM	TITUS FL30	301-400	LINEAR RETURN	30	12"	4'-0"	1, 5
R-6 CFM	TITUS TMR	400-500	ROUND RETURN	30	12"	22"	1, 6
R-7 CFM	TITUS FL30	401-600	LINEAR RETURN	30	12"	5'-0"	1, 5
EX-1 CFM	TITUS 50F	0-100	EXHAUST CEILING	30	6"X6"	12"X12"	1
EX-2 CFM	TITUS 50F	101-200	EXHAUST CEILING	30	8"X8"	12"X12"	1
EX-3 CFM	TITUS 50F	201-300	EXHAUST CEILING	30	10"X10"	12"X12"	1
EX-4 CFM	TITUS 50F	301-500	EXHAUST CEILING	30	12"X12'	24"X24"	1
EX-5 CFM	TITUS FL25	200-300	EXHAUST LINEAR	30	10"	4'-0"	1, 4
EX-6 CFM	TITUS FL30	301-400	EXHAUST LINEAR	30	12"	4'-0"	1, 5

1. COORDINATE BORDER, COLOR, FINISH AND EXACT LOCATION WITH ARCHITECT
2. WHERE A BALANCING DAMPER IS SHOWN IN THE DUCTWORK TAKEOFF - NO OBD REQUIRED.
3. PROVIDE SQUARE TO ROUND TRANSITION FROM FACTORY.
4. 2.5" SLOT, 1 - SLOT 10" INLET.
5. 3.0" SLOT, 1 - SLOT 12" INLET.
6. FLEX DUCT CONNECTION NOT ACCEPTABLE.

AIR HANDLING UNIT SCHEDULE

MARK	GENERAL DATA: MANUFACTURER MODEL	LOCATION	SERVICE	SUPPLY FAN: OUTSIDE AIR (CFM)	SUPPLY AIR (CFM)	ESP (IN)	OUTLET VELOCITY (FPM)	FAN: TYPE	MIN. DIA. (IN)	QTY.	MOTOR: RPM	BHP	MIN. HP
AHU 1	SEMCO	ROOF	CASINO	18,000	18,000	2.0	500	AF	30	1	1,593	20.11	25.0
AHU 2	SEMCO	ROOF	CASINO	18,000	18,000	2.0	500	AF	30	1	1,593	20.11	25.0
AHU 3	MCQUAY 0AH010GDDC	ROOF	RESTAURANT KITCHEN	900	3,000	1.0	500	AF	15.00	1	1,750	1.78	3.0
AHU 4	MCQUAY 0AH012GDDC	ROOF	RESTAURANT	1,000	4,000	1.0	500	AF	16.50	1	1,750	2.48	5.0
AHU 5	MCQUAY 0AH017GDDM	ROOF	BOH	2,100	7,500	2.5	500	AF	18.25	1	1,750	8.38	10.0
AHU 6	MCQUAY 0AH010GDDC	ROOF	WAREHOUSE	1,000	3500	1.5	500	AF	16.50	1	1,750	1.87	3.0
AHU 7	MCQUAY 0AH014GDDC	ROOF	BOH	1,800	6,600	1.5	500	AF	20.0	1	1,750	4.16	5.0
AHU 8	MCQUAY CAH005GDAM	ROOF	BOH	200	1,200	1.0	500	AF	9.50	1	1,750	0.87	2.0

MARK	EXHAUST FAN: EXHAUST AIR (CFM)	ESP (IN)	FAN: TYPE	DIA. (IN)	QTY.	MOTOR: RPM	BHP	MIN. HP
AHU 1	18,000	1.5	AF	33	1	1,236	15.2	20.0
AHU 2	18,000	1.5	AF	33	1	1,236	15.2	20.0
AHU 3	3,000	0.50	AF	14.56	1	1,750	0.69	1.5
AHU 4	4,000	0.50	AF	16.19	1	1,750	0.89	1.5
AHU 5	7,500	1.00	AF	14.56	1	1,750	7.66	10.0
AHU 6	3,500	0.50	AF	14.56	1	1,750	0.97	2.0
AHU 7	6,600	0.50	AF	19.69	1	1,750	1.61	3.0
AHU 8	-	-	-	-	-	-	-	-

MARK	COOLING COIL: TOTAL MBH	SENSIBLE MBH	EAT (DB)	EAT (WB)	LAT (DB)	LAT (WB)	MAX FACE VEL (FPM)	MAX AIR PD (IN WC)	EWT (°F)	LWT (°F)	GPM	MIN. ROWS	MAX WATER PD FT HD
AHU 1	1,007.5	780.1	90.8	69.3	51.1	51.8	500	0.99	42	58	128.0	10	5.75
AHU 2	1,007.5	780.1	90.8	69.3	51.1	51.8	500	0.99	42	58	128.0	10	5.75
AHU 3	163.3	116.0	87.5	69.0	51.2	51.0	500	0.81	42	58	20.8	8	8.40
AHU 4	218.5	155.0	87.5	69.0	51.2	51.0	500	0.55	42	58	27.7	8	10.6
AHU 5	388.0	273.2	87.5	69.0	50.9	50.6	500	0.72	42	58	48.4	8	15.9
AHU 6	168.4	126.1	87.5	69.0	53.7	53.5	500	0.64	42	58	24.3	8	3.60
AHU 7	332.2	234.0	87.5	69.0	50.9	50.7	500	0.73	42	58	41.6	8	16.1
AHU 8	65.6	46.5	87.5	69.0	51.2	51.0	500	0.39	42	58	8.3	8	2.90

AIR HANDLING UNIT SCHEDULE (CONTINUED)

MARK	HEATING COIL (IN WINTER): TOTAL MBH	EAT °F DB	LAT °F DB	MAX FACE VEL (FPM)	MAX AIR PD (IN WC)	EWT (°F)	LWT (°F)	GPM	MIN. ROWS	MAX WATER PD FT HD
AHU 1	501.0	54.0	80.0	500	0.08	180	140	26.0	1	1.73
AHU 2	501.0	54.0	80.0	500	0.08	180	140	26.0	1	1.73
AHU 3	142.0	52.0	96.4	429	0.13	180	140	7.1	2	0.30
AHU 4	182.2	52.0	94.7	427	.012	180	140	9.5	2	0.40
AHU 5	98.3	52.0	65.0	446	0.13	180	140	4.9	1	0.40
AHU 6	166.1	52.0	96.5	500	0.19	180	140	8.3	2	0.40
AHU 7	259.8	52.0	92.6	500	0.12	180	140	14.2	1	0.80
AHU 8	54.7	52.0	94.7	500	0.17	180	140	2.80	2	0.10

MARK	REHEAT COIL (IN SUMMER): TOTAL MBH	EAT (DB)	LAT (DB)	MAX FACE VEL (FPM)	MAX AIR PD (IN WC)	EWT (F)	LWT (F)	GPM	MIN. ROWS	MAX WATER PD FT HD	ELECTRICAL V/PH/HZ	OPERATING WEIGHT (LBS)	REMARKS
AHU 1	-	-	-	-	-	-	-	-	-	-	460/3/60	19,950	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
AHU 2	-	-	-	-	-	-	-	-	-	-	460/3/60	19,950	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
AHU 3	63.7	48.1	68.0	500	0.05	180	140	3.3	1	0.30	460/3/60	6,300	3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15
AHU 4	86.3	48.1	68.3	500	0.05	180	140	4.4	1	0.30	460/3/60	6,900	3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15
AHU 5	321.9	48.1	68.1	500	0.10	180	140	7.7	1	0.40	460/3/60	8,200	3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15
AHU 6	76.5	48.1	68.6	500	0.08	180	140	3.8	1	0.40	460/3/60	6,600	3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15
AHU 7	132.1	48.1	68.8	500	0.09	180	140	6.6	1	0.80	460/3/60	8,000	3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15
AHU 8	17.1	54.8	68.2	500	0.13	180	140	0.9	1	0.10	460/3/60	1,750	3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15

1. PROVIDE 4" DEEP, MERV 8 (CAMFLFARR 30/30) BEFORE THE ENERGY RECOVERY WHEEL FOR BOTH EXHAUST AIR AND SUPPLY AIR PATHS.
2. THIS UNIT COMPLETE WITH AN ENERGY RECOVERY WHEEL.
3. PROVIDE 14" CURB.
4. PROVIDE FACTORY INSTALLED VFD ON SUPPLY FAN AND EXHAUST FAN.
5. F/A TO PROVIDE SMOKE DETECTORS IN SUPPLY AND RETURN.
6. PROVIDE COVER FOR HYDRONIC PIPING ROUTED EXTERIOR OF AIR HANDLING UNIT.
7. PROVIDE SERVICE RECEPTACLE.
8. PROVIDE FREEZE STAT.
9. PROVIDE LIGHT AND TRANSFORMER.
10. PROVIDE EXTENDED 5 YEAR SERVICE WARRANTEE.
11. PROVIDE INSULATED DRAIN PANS.
12. PROVIDE SINGLE POINT CONNECTION.
13. PROVIDE THREE WAY VALVES.
14. 20% INHIBITED PROP GLYCOL.
15. SEPERATE POWER FEED REQUIRED FOR INTERIOR LIGHT/DUPLEX OUTLET, SUPPLY AND RETURN FANS.

MAKE-UP AIR UNIT SCHEDULE

MARK	MANUFACTURER MODEL	SERVICE	TYPE	CFM	ESP (IN)	RPM	COOLING: TOTAL MBH	SENS MBH	EAT (DB)	EAT (WB)	LAT (DB)	LAT (WB)	EWT (°F)	LWT (°F)	GPM	PRESSURE DROP (FT)	MAX PD (IN)	FACE VELOCITY	MIN ROWS
MAU 1	GREENHECK MSX-118-H32	KITCHEN HOOD	MAKE-UP AIR	8,000	1.75	967	352.7	276.3	105	76	73.2	68.5	42	58	45.1	8.6	10.0	376	2

MARK	HEATING: TOTAL MBH	EAT (DB)	LAT (DB)	EWT (°F)	LWT (°F)	GPM	PRESSURE DROP (FT)	MAX PD (IN)	FACE VELOCITY	MIN ROWS	ELECTRICAL: HP	V/PH/HZ	OPERATING WEIGHT (LBS)	REMARKS
MAU 1	575.1	3	63.3	180	140	30.2	0.5	2.0	720	2	7.5	480/3/60	3,200	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17

1. PROVIDE UNIT MOUNTED DUCT SMOKE DETECTOR.
2. PROVIDE 14" ROOF CURB.
3. ALL FREEZE STATS SHALL BE LOCATED ON THE INSIDE OF ALL MAKE-UP AIR UNITS.
4. PROVIDE 4" MERV 8 FILTERS.
5. PROVIDE SINGLE POINT ELECTRICAL CONNECTION.
6. PROVIDE AIR FOIL FC BELT DRIVE.
7. PROVIDE COVER FOR HYDRONIC PIPING ROUTED EXTERIOR OF MAKE-UP AIR UNIT.
8. PROVIDE WEATHERHOOD WITH BIRDSCREEN.
9. PROVIDE INLET DAMPER MODULE.
10. PROVIDE HINGED ACCESS PANELS.
11. PROVIDE RELAY FOR SUPPLY FAN TO BAS.
12. PROVIDE SERVICE RECEPTACLE.
13. PROVIDE FREEZE STAT.
14. PROVIDE LIGHT AND TRANSFORMER.
15. PROVIDE INSULATED DRAIN PANS.
16. PROVIDE SINGLE POINT CONNECTION.
17. 20% INHIBITED PROP GLYCOL.

ENERGY RECOVERY WHEEL SCHEDULE

MARK	OUTSIDE AIR CONDITIONING COIL: CFM	EAT °F SUMMER DB/WB	EAT °F WINTER DB	RETURN AIR CONDITION	SUPPLY AIR CONDITIONING COIL: CFM	LAT °F WINTER DB/WB	LAT °F SUMMER DB	EXHAUST AIR CONDITIONING COIL: CFM	LAT °F SUMMER DB/WB	LAT °F WINTER DB	REMARKS
AHU 1	18,000	105/76	-3	80	18,000	52/51.5	90.8	17,000	99.8/73.8	29.4	
AHU 2	18,000	105/76	-3	80	18,000	52/51.5	90.8	17,000	99.8/73.8	29.4	

TERMINAL BOX SCHEDULE

MARK	MANUFACTURER MODEL	AIR FLOW (CFM): MAX.	COOLING MIN.	HEATING MIN.	INLET DIA (IN)	OUTLET SIZE WXH (IN)	AIR PRESSURE DROP (IN WG)	NC RATING @ 1" SP: DISCHARGE	RADIATED	REHEAT COIL (HEATING WATER): MBH	GPM	EAT (°F)	EWT (°F)	PD (FT)	ROWS	OPERATING WEIGHT (LBS)	REMARKS
VAV 5-1	TITUS DESV08	745	480	280	8	12"X10"	0.12	23	24	10.6	1.1	55	180	0.69	1	24	1, 2, 3, 4
VAV 5-2	TITUS DESV08	400	200	200	8	12"X10"	0.12	23	24	10.6	1.1	55	180	0.69	1	24	1, 2, 3, 4
VAV 5-3	TITUS DESV06	300	150	150	6	12"X8"	0.125	20	23	5.7	0.6	55	180	0.50	1	23	1, 2, 3, 4
VAV 5-4	TITUS DESV08	510	255	255	8	12"x10"	0.12	23	24	9.7	1.0	55	180	0.69	1	24	1, 2, 3, 4
VAV 5-5	TITUS DESV10	810	405	405	10	14"X12"	0.45	24	29	20.8	2.0	55	180	0.65	2	36	1, 2, 3, 4
VAV 5-6	TITUS DESV12	1100	550	550	12	15"X16"	0.58	28	31	32.3	3.25	55	180	0.84	2	38	1, 2, 3, 4
VAV 5-7	TITUS DESV08	450	225	225	8	12"X10"	0.12	23	24	10.6	1.1	55	180	0.69	1	24	1, 2, 3, 4
VAV 5-8	TITUS DESV14	1710	855	855	14	18"X20"	0.2	20	27	30.0	3.0	55	180	-	1		1, 2, 3, 4
VAV 5-9	TITUS DESV06	345	180	180	6	12"X8"	0.125	20	23	5.7	0.6	55	180	0.50	1	23	1, 2, 3, 4
VAV 5-10	TITUS DESV08	625	325	325	8	12"X10"	0.12	23	24	12.0	1.25	55	180	-	1	24	1, 2, 3, 4
VAV 5-11	TITUS DESV06	300	150	150	6	12"X8"	0.125	20	23	5.7	0.6	55	180	0.50	1	23	1, 2, 3, 4
VAV 5-12	TITUS DESV08	460	140	140	8	12"X10"	0.12	23	24	10.6	1.1	55	180	0.69	1	24	1, 2, 3, 4
VAV 5-13	TITUS DESV08	450	225	225	8	12"X10"	0.12	23	24	10.6	1.1	55	180	0.69	1	24	1, 2, 3, 4

1. DUCT TO VAV BOX TO BE ONE DUCT SIZE LARGER THAN SCHEDULED INLET SIZE. TRANSITION TO SCHEDULED SIZE WITH A 3 DIAMETER IN INLET SIZE DUCT TO BOX CONNECTION.
2. HEATING WATER CONNECTION SHALL BE 3/4" UNLESS NOTED OTHERWISE.
3. PROVIDE SENSOR INLET AND OUTLET OF BOX.
4. 20% INHIBITED PROP. GLYCOL

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OKLAHOMA
05-09-12

NUMBER	DATE	REVISION
1	09-02-2011	ADDENDUM #1
2	09-19-2011	ADDENDUM #2
3	10-19-2011	ADDENDUM #3
4	10-27-2011	ADDENDUM #4
7	05-09-2012	PR 18

CHEROKEE NATION. Entertainment

CNE PERMANENT
CASINO - RAMONA
31501 US 75 HIGHWAY
RAMONA, OK 74061

ISSUE 02
BUILDING PACKAGE

ISSUE DATE
08-16-2011

PROJECT NO.
L11123

DRAWN BY
MSA

CHECKED BY
PE

SHEET TITLE
MECHANICAL SCHEDULES

M003

$USERNAME$ $TIME$ $DATE$ $FILE$

FAN COIL UNIT SCHEDULE

MARK	GENERAL DATA: MANUFACTURER MODEL	GENERAL DATA: LOCATION	SUPPLY FAN: SUPPLY AIR (CFM)	SUPPLY FAN: MIN. OUTSIDE AIR (CFM)	SUPPLY FAN: ESP (IN)	SUPPLY FAN: HP	COOLING COIL: TOTAL MBH	COOLING COIL: SENSIBLE MBH	COOLING COIL: EAT (DB)	COOLING COIL: EAT (WB)	COOLING COIL: LAT (DB)	COOLING COIL: LAT (WB)	COOLING COIL: MAX FACE VEL (FPM)	COOLING COIL: MAX AIR PD (IN WC)	COOLING COIL: EWT (°F)	COOLING COIL: LWT (°F)	COOLING COIL: GPM	COOLING COIL: MIN. ROWS	COOLING COIL: MAX WATER PD (FT)	HEATING COIL: TOTAL MBH	HEATING COIL: EAT (DB)	HEATING COIL: LAT (DB)	HEATING COIL: MAX FACE VEL (FPM)	HEATING COIL: MAX AIR PD (IN WC)	HEATING COIL: EWT (°F)	HEATING COIL: LWT (°F)	HEATING COIL: GPM	HEATING COIL: MIN. ROWS	HEATING COIL: MAX WATER PD (FT)	ELECTRICAL: V/PH/HZ	ELECTRICAL: MCA	ELECTRICAL: MOCP	OPERATING WEIGHT (LBS)	REMARKS
FC 1	MCQUAY #THC2H08	ELECTRICAL	1200	0	0.6	1.00	40.1	28.5	80.0	67.0	57.7	56.4	500	0.35	42	58	5.25	6	3.02	25.4	70.0	89.7	500	0.07	180	140	1.5	1	0.17	208/3/60	3.75	15	250	1, 2, 3, 4, 5, 6
FC 2	MCQUAY #BCHC024	RESTROOM	800	0	0.4	0.75	25.0	18.3	80.0	67.0	58.7	57.1	500	0.51	42	58	3.25	6	3.23	15.8	70.0	88.4	500	0.11	180	140	1.0	1	0.53	208/3/60	4.0	15	160	1, 2, 3, 4, 5, 6
FC 3	MCQUAY #THC2H08	VESTIBULE 101	1200	0	0.6	1.00	40.1	28.5	80.0	67.0	57.7	56.4	500	0.35	42	58	5.25	6	3.02	25.4	70.0	89.7	500	0.07	180	140	1.5	1	0.17	208/3/60	3.75	15	250	1, 2, 3, 4, 5, 6
FC 4	MCQUAY #THC2H08	VESTBULE 166	800	0	0.6	0.75	28.6	19.7	80.0	67.0	56.7	55.5	500	0.30	42	58	3.75	6	3.28	19.3	70.0	92.4	500	0.06	180	140	1.0	1	1.02	208/3/60	4.0	15	185	1, 2, 3, 4, 5, 6
FC 5	MCQUAY #THC2H06	CORRIDOR 110	600	0	0.6	0.75	20.9	14.6	80.0	67.0	57.1	55.9	500	0.33	42	58	2.75	6	2.33	13.8	70.0	91.4	500	0.07	180	140	0.75	1	0.41	208/3/60	4.0	15	160	1, 2, 3, 4, 5, 6

1. FLOWDESIGN MODEL #AC. (2-32 PSID RANGE) OR NEXUS MODEL ULTRAMATIC UM (2-45 PSID RANGE) AUTOMATIC FLOW CONTROL VALVE. PROVIDE VALVE TO MATCH GPM SPECIFIED - ROUNDUP FOR VALVE SELECTION AS NECESSARY.
2. PROVIDE 1" THROWAWAY FILTER.
3. PROVIDE FACTORY MOUNTED STARTER AND DISCONNECT.
4. F/A CONTRACTOR TO PROVIDE SMOKE DETECTOR.
5. PROVIDE CONDENSATE PUMPS AS REQUIRED.
6. 20% INHIBITED PROP GLYCOL.

COMPUTER ROOM AIR CONDITIONING UNIT

MARK	GENERAL DATA: MANUFACTURER MODEL	GENERAL DATA: LOCATION	FANS: CFM	FANS: ESP (IN)	FANS: QUANTITY	FANS: MOTOR RPM	FANS: MOTOR BHP	FANS: MOTOR HP	COOLING COIL: TOTAL MBH	COOLING COIL: SENS MBH	COOLING COIL: EAT (DB)	COOLING COIL: EAT (WB)	COOLING COIL: LAT (DB)	COOLING COIL: LAT (WB)	COOLING COIL: EWT (°F)	COOLING COIL: LWT (°F)	COOLING COIL: GPM	COOLING COIL: MIN ROWS	COOLING COIL: MAX WATER PD (FT HD)	DX COOLING: TOTAL MBH	DX COOLING: SENS MBH	DX COOLING: EAT (DB)	DX COOLING: EAT (WB)	DX COOLING: LAT (DB)	DX COOLING: LAT (WB)	HUMIDIFICATION: CAPACITY (LB/HR)	HUMIDIFICATION: WATER CONN (IN)	ELECTRICAL: V/PH/HZ	ELECTRICAL: MCA	ELECTRICAL: MOCP	OPERATING WEIGHT (LBS)	REMARKS
CRAC 1	LIEBERT #BF067ASADE1	IDF 157	2800	0.5	1	-	1.5	2	60,500	55,700	75	61	64.6	57.1	42	58	7.5	2	26.7	60,500	55,700	75	61	55.9	53.1	11	1/4	460/3/60	40.5	45.0	700	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
CRAC 2	LIEBERT #BF067ASADE1	IDF 157	2800	0.5	1	-	1.5	2	60,500	55,700	75	61	64.6	57.1	42	58	7.5	2	26.7	60,500	55,700	75	61	55.9	53.1	11	1/4	460/3/60	40.5	45.0	700	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
CRAC 3	LIEBERT #BF067ASADE1	IDF 147	2800	0.5	1	-	1.5	2	60,500	55,700	75	61	64.6	57.1	42	58	7.5	2	26.7	60,500	55,700	75	61	55.9	53.1	11	1/4	460/3/60	40.5	45.0	700	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
CRAC 4	LIEBERT #BF067ASADE1	IDF 147	2800	0.5	1	-	1.5	2	60,500	55,700	75	61	64.6	57.1	42	58	7.5	2	26.7	60,500	55,700	75	61	55.9	53.1	11	1/4	460/3/60	40.5	45.0	700	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 (4)

1. PROVIDE REFRIGERANT LINES SIZED PER MANUFACTURER'S RECOMMENDATIONS.
2. PROVIDE CLEARANCE AROUND UNIT PER MANUFACTURER'S RECOMMENDATIONS.
3. PROVIDE P-TRAPS AND ARRANGE SLOPE OF REFRIGERANT PIPING FOR OIL RETURN.
4. PROVIDE SAFETY CONTROLS.
5. PROVIDE LON OR BACNET CONTROL INTERFACE. VERIFY WHICH TO PROVIDE WITH CONTROLS CONTRACTOR PRIOR TO PRODUCTION.
6. PROVIDE SPACE TEMPERATURE SENSOR.
7. PROVIDE TRAPS IN REFRIGERANT/SUCTION LINES AS REQUIRED TO MEET MANUFACTURER'S OVERALL LENGTH REQUIREMENTS.
8. PROVIDE PREMIUM EFFICIENT MOTOR.
9. PROVIDE CONDENSATE PUMP.
10. PROVIDE HUMIDIFIER.
11. ~~F/A CONTRACTOR TO PROVIDE SMOKE DETECTOR.~~
12. 20% INHIBITED PROP GLYCOL. (4)

AIR BALANCE SCHEDULE

UNIT	KITCHEN: SUPPLY	KITCHEN: RETURN	KITCHEN: OUTSIDE	KITCHEN: EXHAUST	BUILDING: SUPPLY	BUILDING: RETURN	BUILDING: OUTSIDE	BUILDING: EXHAUST
AHU-1	-	-	-	-	18,000	18,000	18,000	-
AHU-2	-	-	-	-	18,000	18,000	18,000	-
AHU-3	3,000	2,100	900	-	-	-	-	-
AHU-4	-	-	-	-	4,000	3,000	1,000	-
AHU-5	-	-	-	-	7,500	4,900	2,100	-
AHU-6	-	-	-	-	3,500	2,500	1,000	-
AHU-7	-	-	-	-	6,600	4,200	1,800	-
AHU-8	-	-	-	-	1,200	1,000	200	-
EF-1	-	-	-	-	-	-	-	1,000
EF-2	-	-	-	-	-	-	-	900
EF-3	-	-	-	-	-	-	-	600
EF-4	-	-	-	-	-	-	-	300
EF-5	-	-	-	-	-	-	-	330
EF-6	-	-	-	-	-	-	-	75
EF-7	-	-	-	-	-	-	-	300
MAU-1	8,000	-	-	-	-	-	-	-
KEF-1	-	-	-	600	-	-	-	-
KEF-2	-	-	-	3,200	-	-	-	-
KEF-3	-	-	-	1,440	-	-	-	-
KEF-4	-	-	-	2,025	-	-	-	-
KEF-5	-	-	-	2,625	-	-	-	-
TOTAL	11,000	2,100	900	9,890	58,800	51,600	42,100	3,505

KITCHEN = SA - RA - EA -990
BUILDING = SA - RA - EA = 3,695

EXHAUST FAN SCHEDULE

MARK	GENERAL DATA: MANUFACTURER MODEL	GENERAL DATA: LOCATION	GENERAL DATA: SERVICE	FAN: TYPE	FAN: CFM	FAN: ESP (IN WG)	FAN: RPM	ELECTRICAL: BHP	ELECTRICAL: HP (W)	ELECTRICAL: FLA	ELECTRICAL: V/PH/HZ	OPERATING WEIGHT (LBS)	REMARKS
EF 1	GREENHECK GB-101-3	ROOF	TOILET ROOM	CENTR.	1000	0.5	1490	-	1/3	2.07	115/1/60	80	1, 2, 3
EF 2	GREENHECK GB-091-4	ROOF	TOILET ROOM	CENTR.	900	0.5	1545	-	1/4	1.55	120/1/60	75	1, 2, 3
EF 3	GREENHECK GB-091-4	ROOF	TOILET ROOM	CENTR.	600	0.4	1278	-	1/4	1.55	120/1/60	75	1, 2, 3
EF 4	GREENHECK GB-091-4	ROOF	EVS ROOM	CENTR.	300	0.4	1725	-	1/4	1.55	120/1/60	75	1, 2, 3
EF 5	GREENHECK GB-091-4	ROOF	COUNT ROOM	CENTR.	330	0.4	1725	-	1/4	1.55	120/1/60	75	1, 2, 3
EF 6	GREENHECK SP-B80	CEILING	JANITORS CLOSET	CENTR.	75	0.25	900	-	(54)	0.6	120/1/60	15	2, 5, 6
EF 7	GREENHECK GB-091-4	ROOF	WAREHOUSE	CENTR.	300	0.4	1725	-	1/4	1.55	120/1/60	75	1, 2, 3
KEF 1	GREENHECK CUBE-101HP-4	ROOF	DISHWASHER	CENT.	600	0.75	1,959	0.19	1/4	5.8	120/1/60	90	1, 2, 3, 5, 7, 8, 9, 10
KEF 2	GREENHECK CUBE-240XP-30	ROOF	HOOD IV	CENT.	3,200	1.50	2,124	1.75	3	4.8	480/3/60	250	1, 3, 4, 5, 6, 7, 8, 9
KEF 3	GREENHECK CUBE-161XP-10	ROOF	HOOD III	CENT.	1,440	1.25	2,257	0.64	1	2.1	480/3/60	120	1, 3, 4, 5, 6, 7, 8, 9
KEF 4	GREENHECK CUBE-240XP-15	ROOF	HOOD II	CENT.	2,025	1.50	1,733	0.94	1 1/2	3	480/3/60	200	1, 3, 4, 5, 6, 7, 8, 9
KEF 5	GREENHECK CUBE-180XP-20	ROOF	HOOD I	CENT.	2,625	1.50	1,603	1.06	2	3.4	480/3/60	200	1, 3, 4, 5, 6, 7, 8, 9

1. PROVIDE ROOF CURB.
2. PROVIDE MOTOR WITH THERMAL OVERLOADS.
3. PROVIDE DISCONNECT SWITCH.
4. PROVIDE VENTED ROOF CURB EXTENSION.
5. PROVIDE HEAT BAFFLE.
6. PROVIDE DRAIN CONNECTION WITH ABSORBENT MATERIAL.
7. PROVIDE UL/cUL-762 LISTING.
8. INTERLOCK WITH MAU-1
9. PROVIDE HINGED BASE AND BASE KIT PER IMC 506.5.3.
10. PROVIDE 60°F TEMPERATURE FAN.

COMPUTER ROOM AIR COOLED CONDENSER UNIT SCHEDULE

MARK	MANUFACTURER MODEL	INDOOR UNIT	LOCATION	NOMINAL CAPACITY (TONS)	CONDENSER FANS: NO.	CONDENSER FANS: HP (EA)	CONDENSER FANS: RPM	OA AMBIENT °F: MIN	OA AMBIENT °F: MAX	ELECTRICAL: V/PH/HZ	ELECTRICAL: MCA	ELECTRICAL: MOCP	OPERATING WEIGHT (LBS)	REMARKS
CCU 1	LIEBERT #DCSL165-A	CRAC 1	ROOF	5	2	3/4	950	-10	105	460/3/60	4.8	15.0	450	1, 2, 3, 4, 5, 6
CCU 2	LIEBERT #DCSL165-A	CRAC 2	ROOF	5	2	3/4	950	-10	105	460/3/60	4.8	15.0	450	1, 2, 3, 4, 5, 6
CCU 3	LIEBERT #DCSL165-A	CRAC 3	ROOF	5	2	3/4	950	-10	105	460/3/60	4.8	15.0	450	1, 2, 3, 4, 5, 6
CCU 4	LIEBERT #DCSL165-A	CRAC 4	ROOF	5	2	3/4	950	-10	105	460/3/60	4.8	15.0	450	1, 2, 3, 4, 5, 6

1. PROVIDE REFRIGERANT LINES SIZED PER MANUFACTURER'S RECOMMENDATIONS.
2. PROVIDE CLEARANCE AROUND UNIT PER MANUFACTURER'S RECOMMENDATIONS.
3. PROVIDE P-TRAPS AND ARRANGE SLOPE OF REFRIGERANT PIPING FOR OIL RETURN.
4. PROVIDE SAFETY CONTROLS.
5. PROVIDE LOW AMBIENT KIT FOR UNIT OPERATION DOWN TO -20°F.
6. PROVIDE HOT GAS BY-PASS.

ELECTRIC UNIT HEATER SCHEDULE

MARK	MANUFACTURER MODEL	LOCATION	CAPACITY MBH	ELECTRICAL: KW	ELECTRICAL: AMPS	ELECTRICAL: V/PH/HZ	OPERATING WEIGHT (LBS)	REMARKS
EH 1	BROAN #194	FIRE RISER ROOM	10.2	3.0	12.5	208/3/60	25	1, 2, 3
EH 2	BROAN #194	MAN TRAP	10.2	3.0	12.5	208/3/60	25	1, 2, 3

1. PROVIDE SURFACE MOUNTING KIT.
2. PROVIDE LINE VOLTAGE THERMOSTAT SET @ 48" A.F.F.
3. FRONT MOUNTED THERMOSTAT.

HEATING WATER UNIT HEATER SCHEDULE

MARK	MANUFACTURER MODEL	LOCATION	TYPE	CAPACITY MBH	AIR: CFM	AIR: EAT (DB)	AIR: LAT (DB)	ELECTRICAL: HP (W)	ELECTRICAL: RPM	ELECTRICAL: V/PH/HZ	HEATING WATER: GPM	HEATING WATER: EWT (°F)	HEATING WATER: LWT (°F)	HEATING WATER: PD (FT)	OPERATING WEIGHT (LBS)	REMARKS
HUH 1	RENOR WS	WAREHOUSE	VERTICAL	50.0	1250	40.0	84.4	0.15	1600	120/1/60	3.0	180	140	0.12	70.0	1
HUH 2	RENOR WS	WAREHOUSE	VERTICAL	50.0	1250	40.0	84.4	0.15	1600	120/1/60	3.0	180	140	0.12	70.0	1

1. 20% INHIBITED PROP GLYCOL.

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NUMBER	DATE	REVISION
2	09-19-2011	ADDENDUM #2
4	10-27-2011	ADDENDUM #4

CHEROKEE NATION Entertainment

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ISSUE 02
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ISSUE DATE
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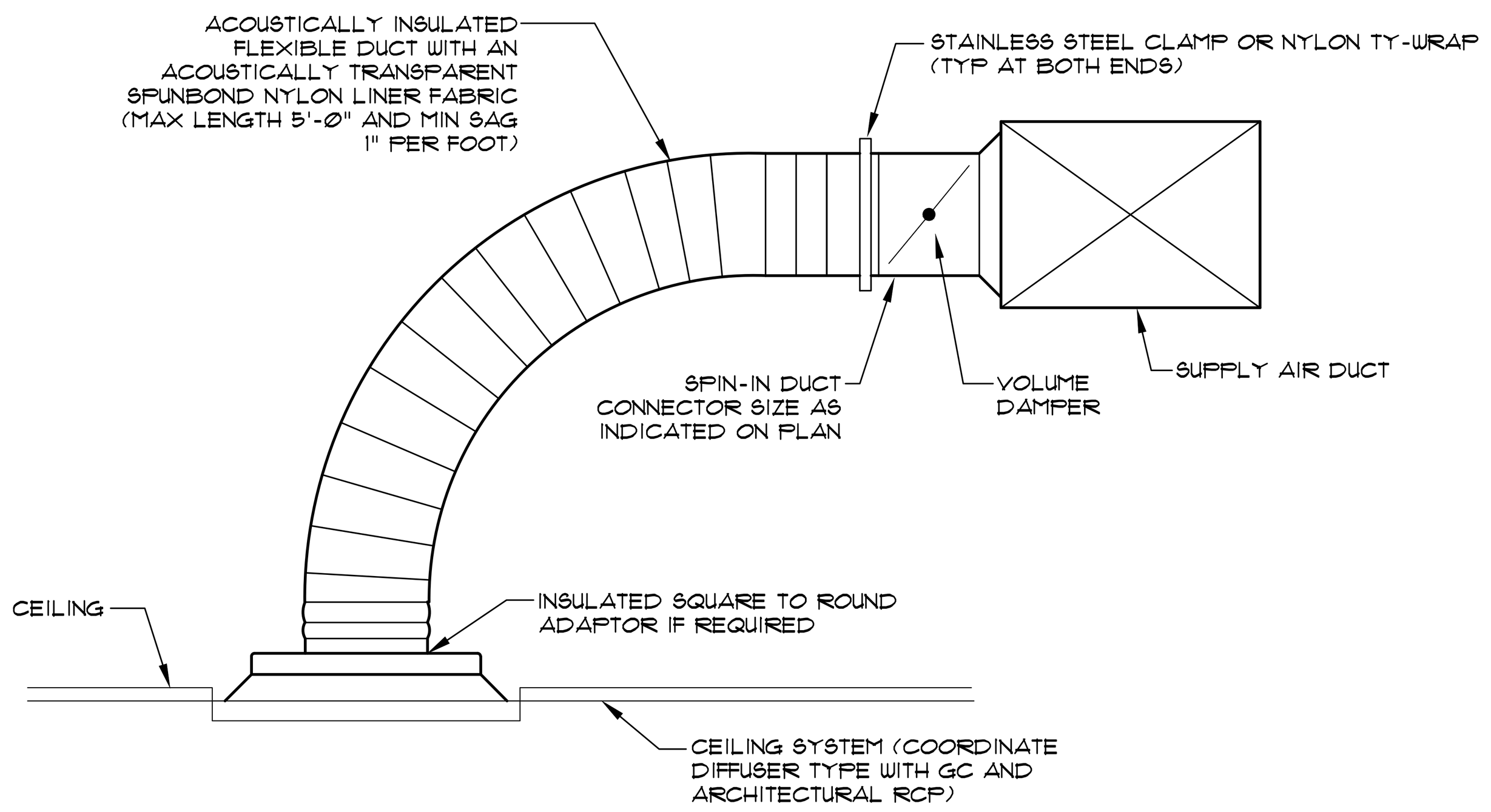
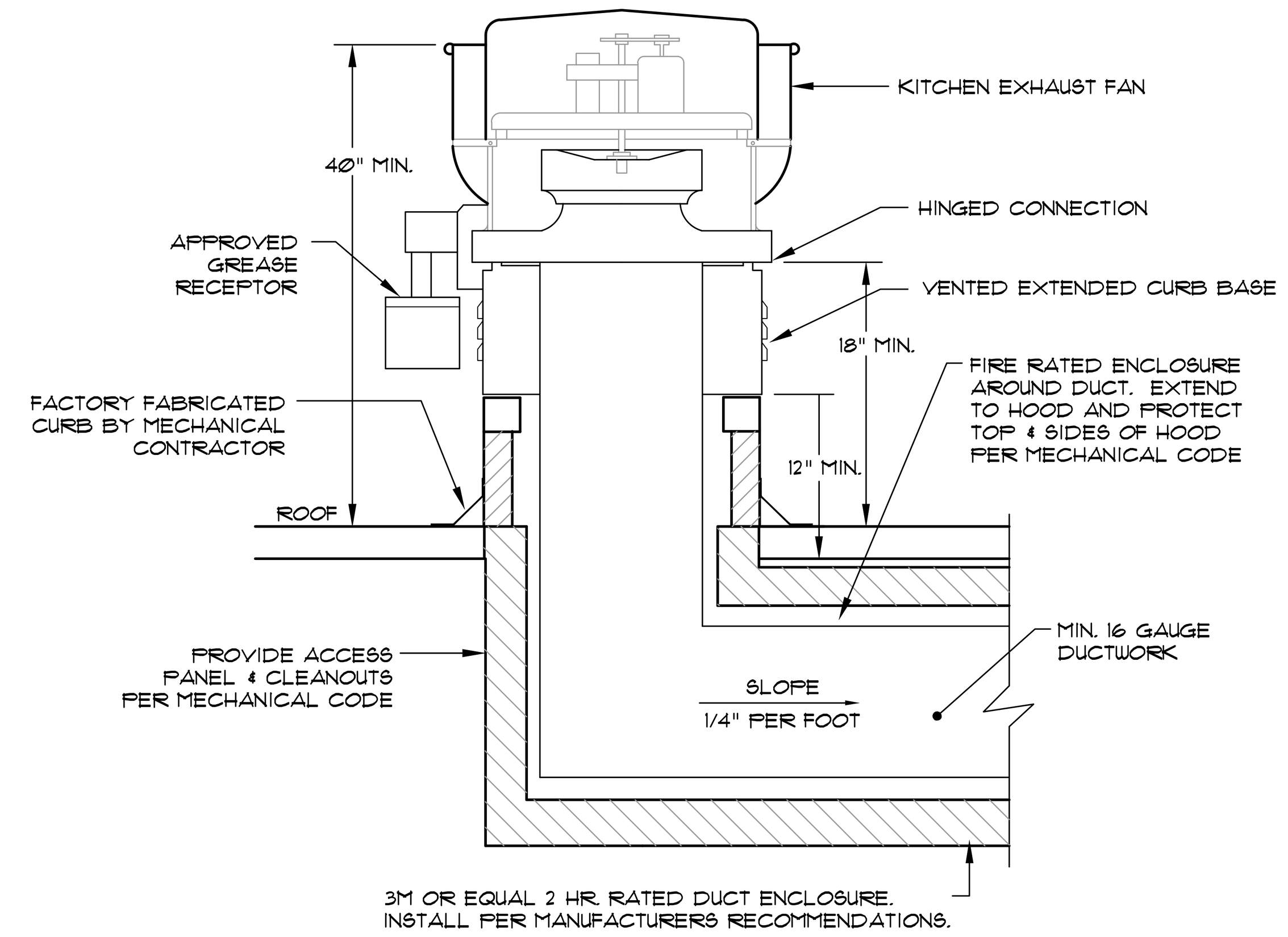
SHEET TITLE
MECHANICAL SCHEDULES

M004

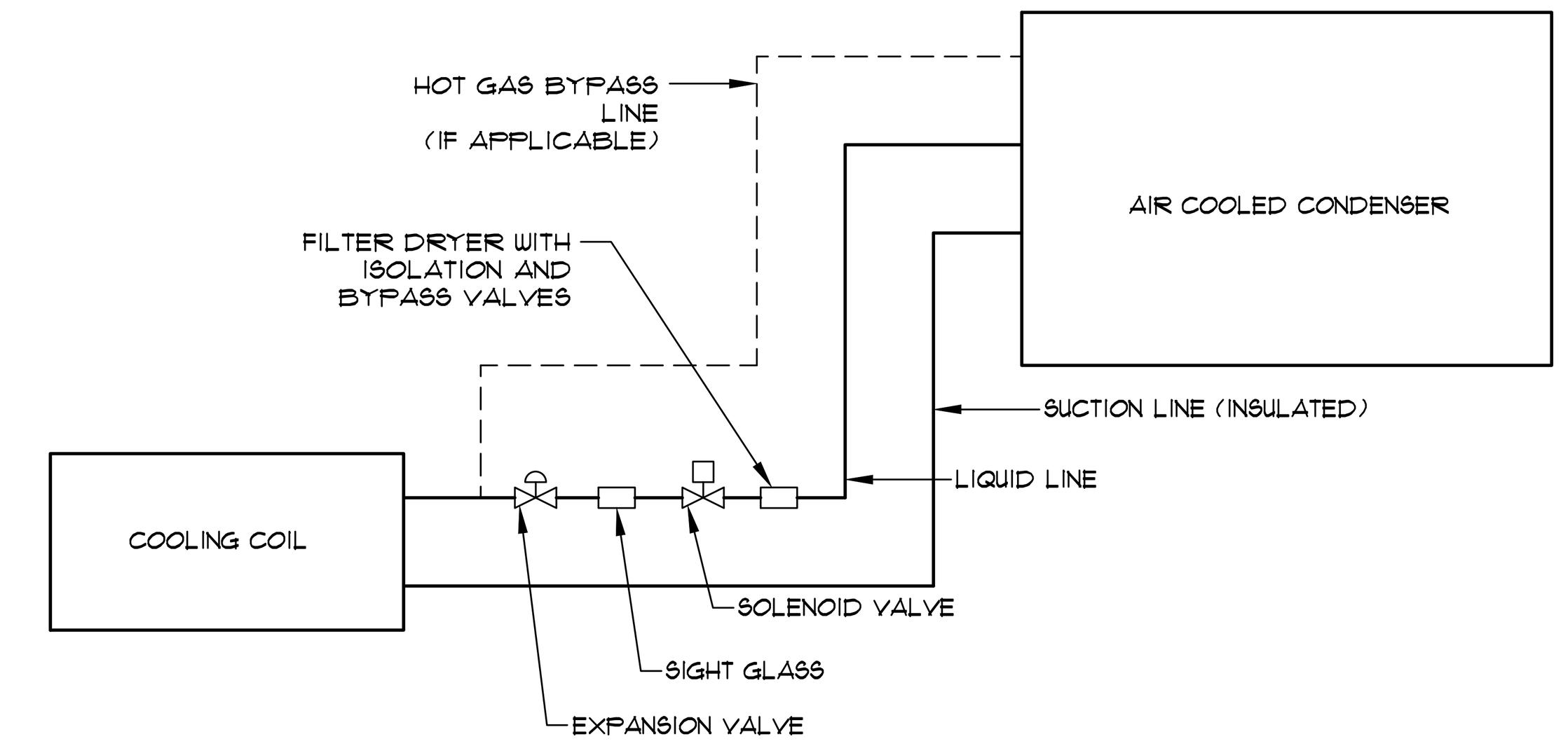


NOTES:
1. USE WORM DRIVE CLAMPS OR DRAW BANDS FOR CONNECTING FLEXIBLE AIR DUCT TO DIFFUSER AND BRANCH DUCT. SPLICES IN FLEXIBLE AIR DUCT SHALL NOT BE ALLOWED.

A/M005 CEILING DIFFUSER WITH FLEX DUCT
NTS

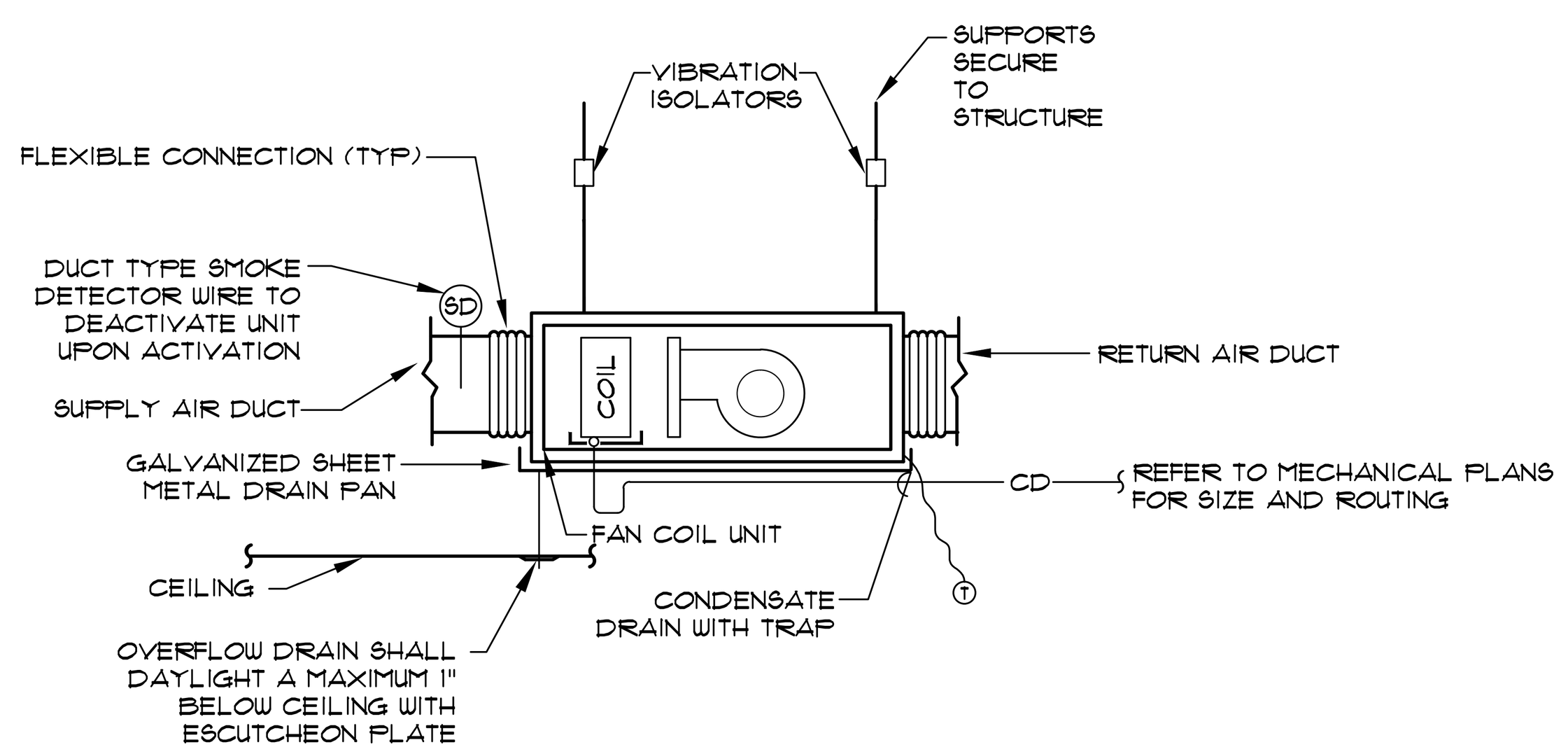


B/M005 KITCHEN HOOD EXHAUST FAN
NTS

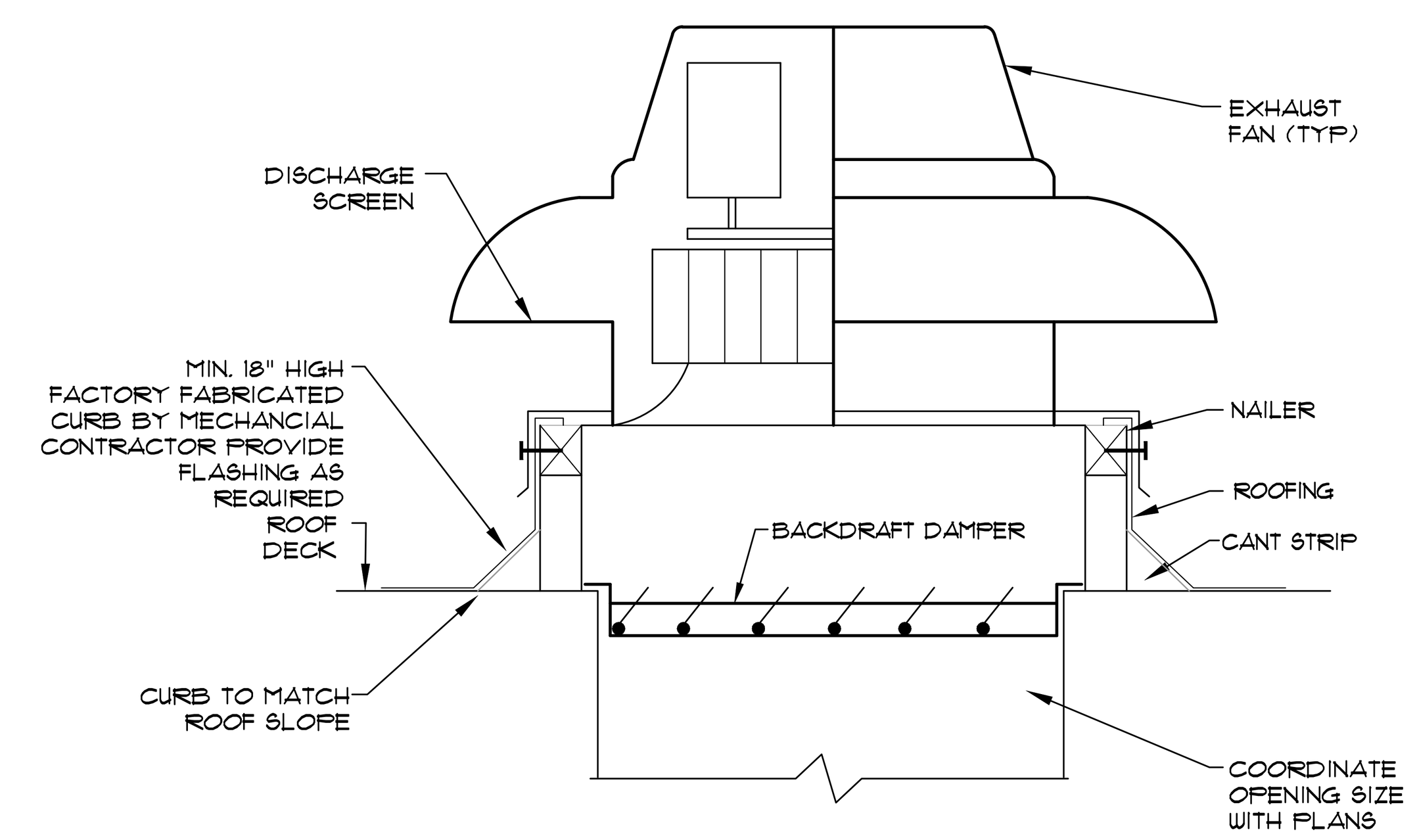


NOTES:
1. ALL PIPING, TRAPS AND CONTROL EQUIPMENT SHALL BE SIZED AS REQUIRED BY MANUFACTURER.

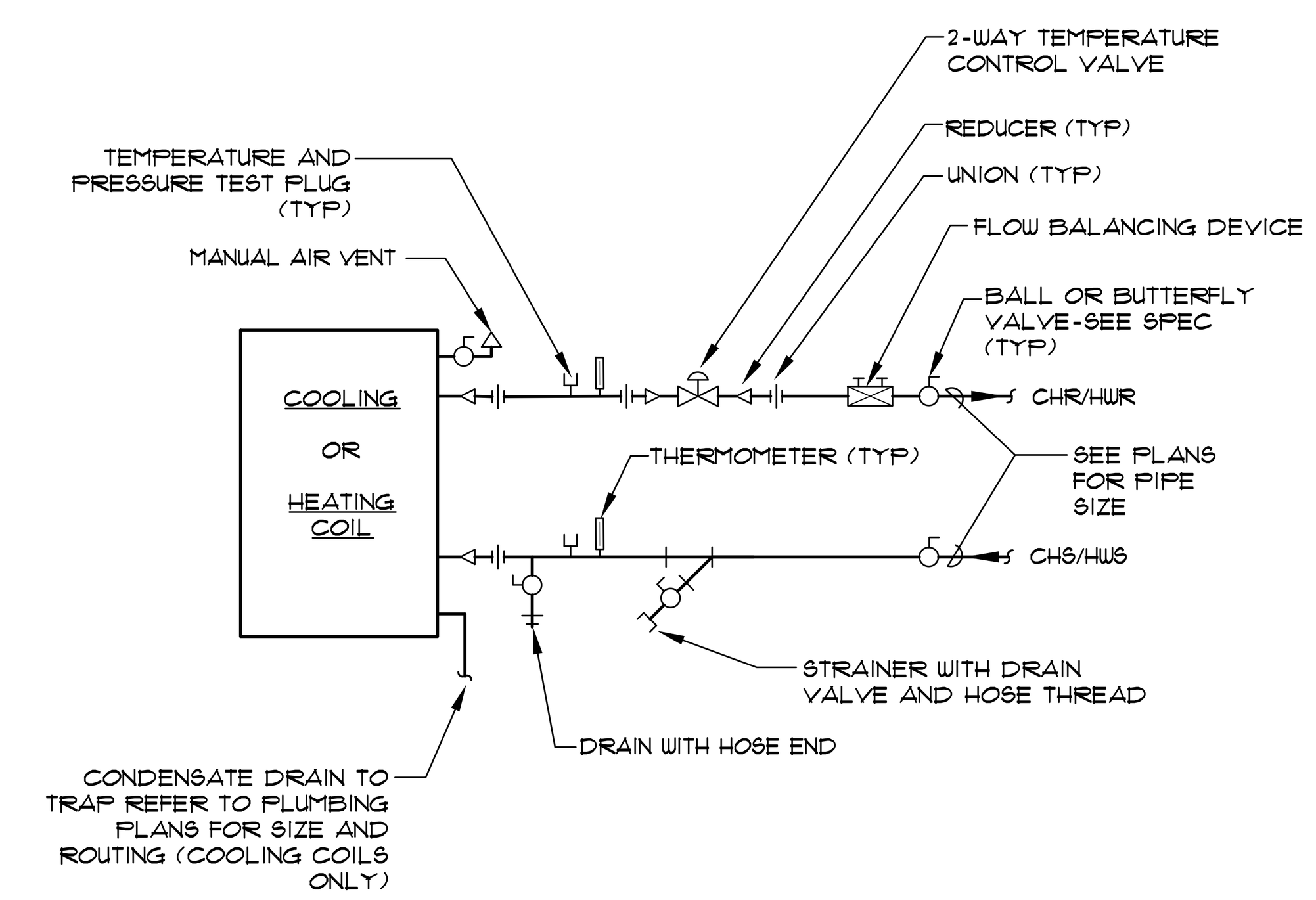
C/M005 SPLIT SYSTEM DX PIPING
NTS



D/M005 HORIZONTAL FAN COIL UNIT (W/O FLOAT)
NTS

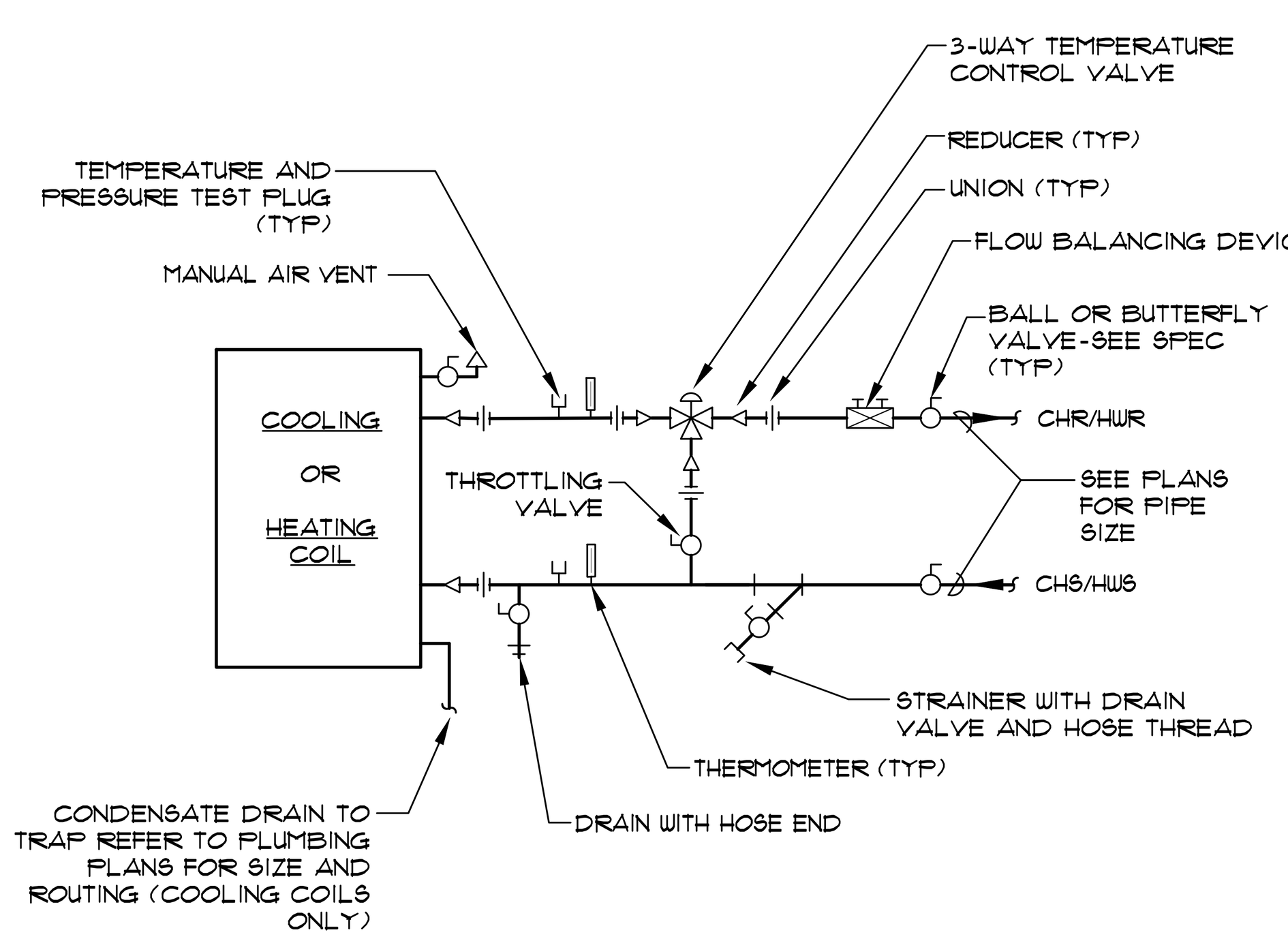


E/M005 ROOF UPBLAST EXHAUST FAN
NTS



F/M005 2-WAY COOLING OR HEATING COIL
NTS

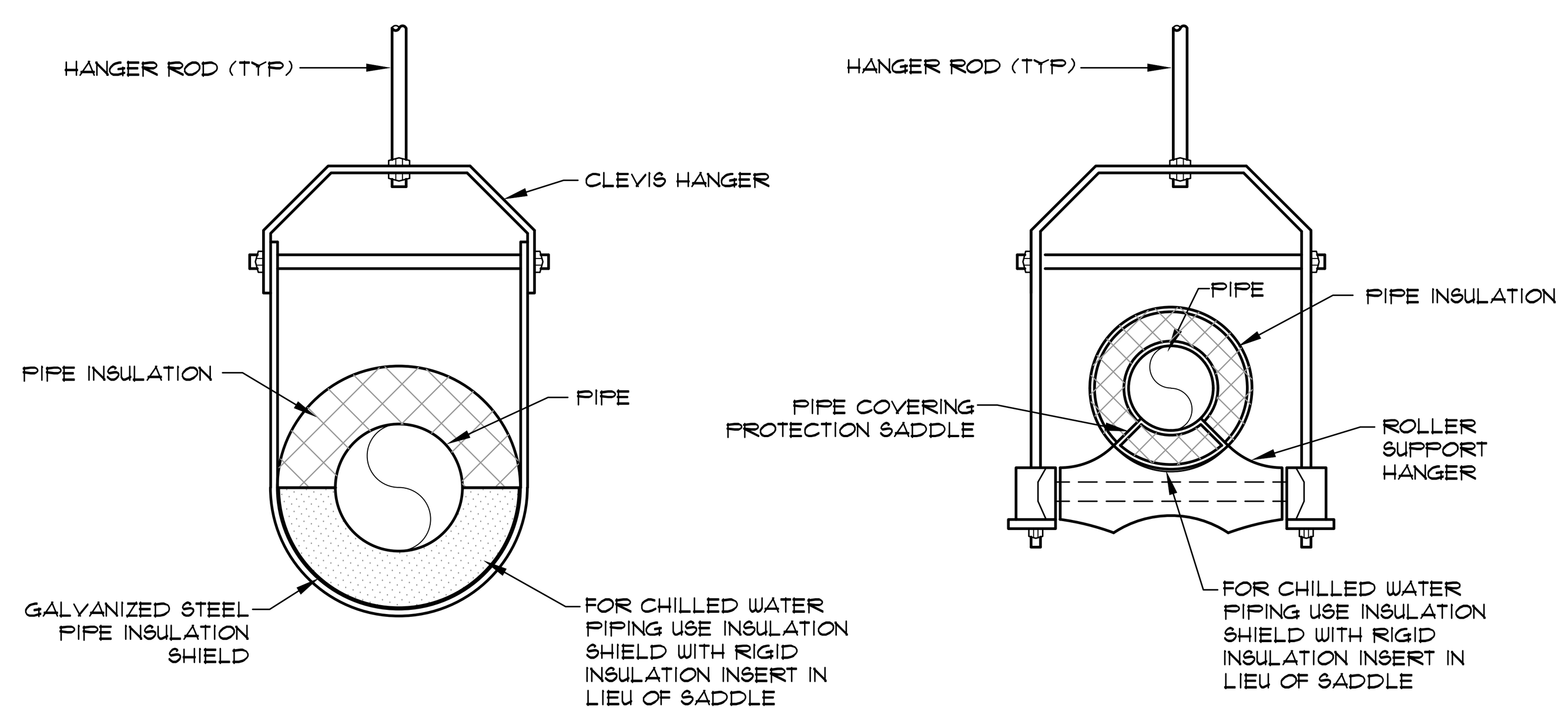
NOTES: FLOW BALANCING DEVICE
1. CONSTANT VOLUME SYSTEMS - B & G CIRCUIT SETTER
2. VARIABLE VOLUME SYSTEMS - DYNAMIC BALANCING VALVE, IE: NEXUS ULTRAMATIC UM.
3. AIR HANDLERS WHERE GPM GREATER THAN 25 NO BALANCING DEVICE



G/M005 3-WAY COOLING OR HEATING COIL
NTS

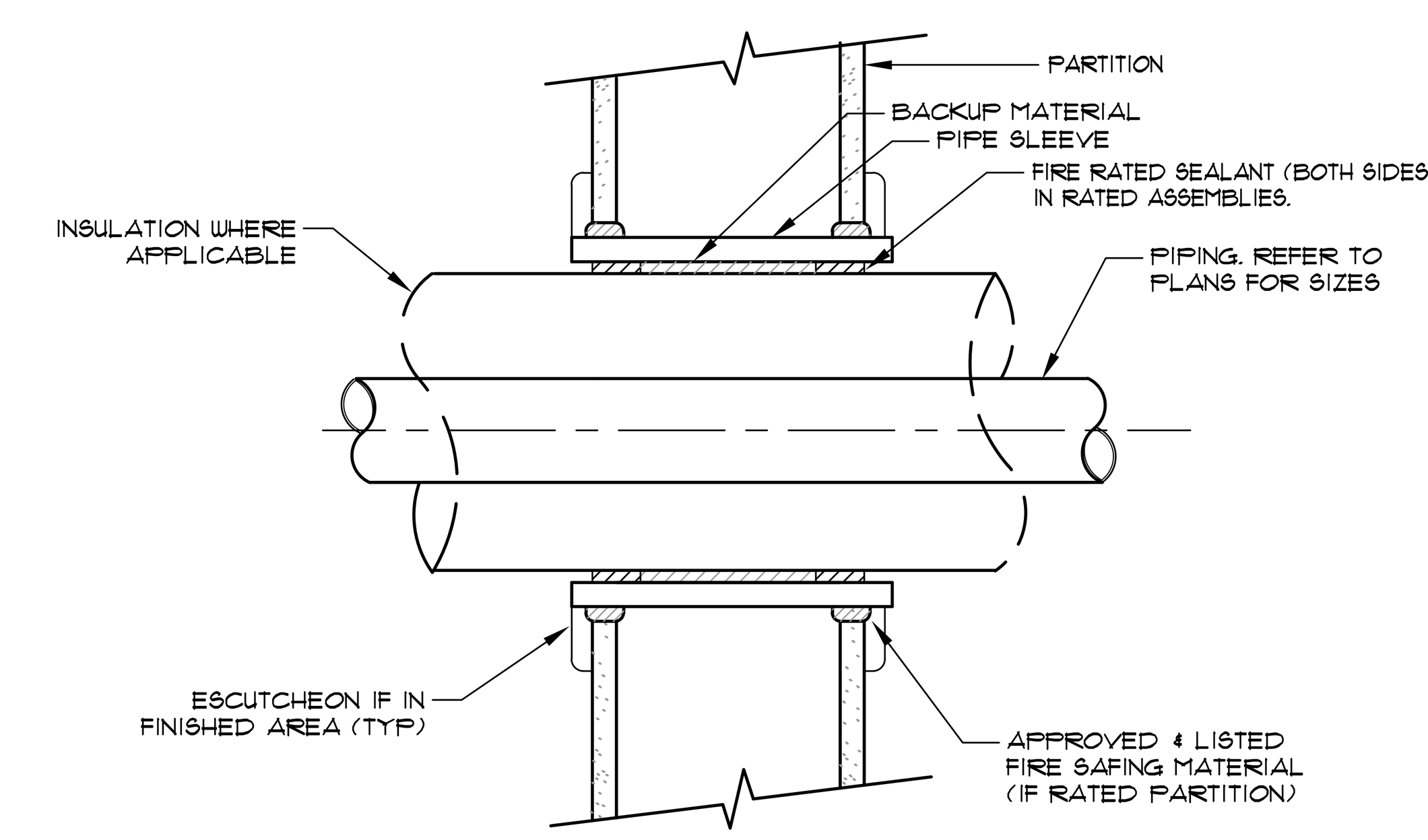
NOTES: FLOW BALANCING DEVICE
1. CONSTANT VOLUME SYSTEMS - B & G CIRCUIT SETTER
2. VARIABLE VOLUME SYSTEMS - DYNAMIC BALANCING VALVE, IE: NEXUS ULTRAMATIC UM.
3. AIR HANDLERS WHERE GPM GREATER THAN 25 NO BALANCING DEVICE

2



NOTES:
1. USE CLEVIS HANGER FOR 1/2" UP TO 4".
2. USE ROLL SUPPORT HANGER FOR 6" TO 8".
3. PIPE 10" AND LARGER SHALL HAVE ROLLER SUPPORT HANGER WITH DUAL RODS.

H/M005 PIPE HANGER FOR INSULATED PIPING
NTS



I/M005 PIPE THROUGH WALL
NTS

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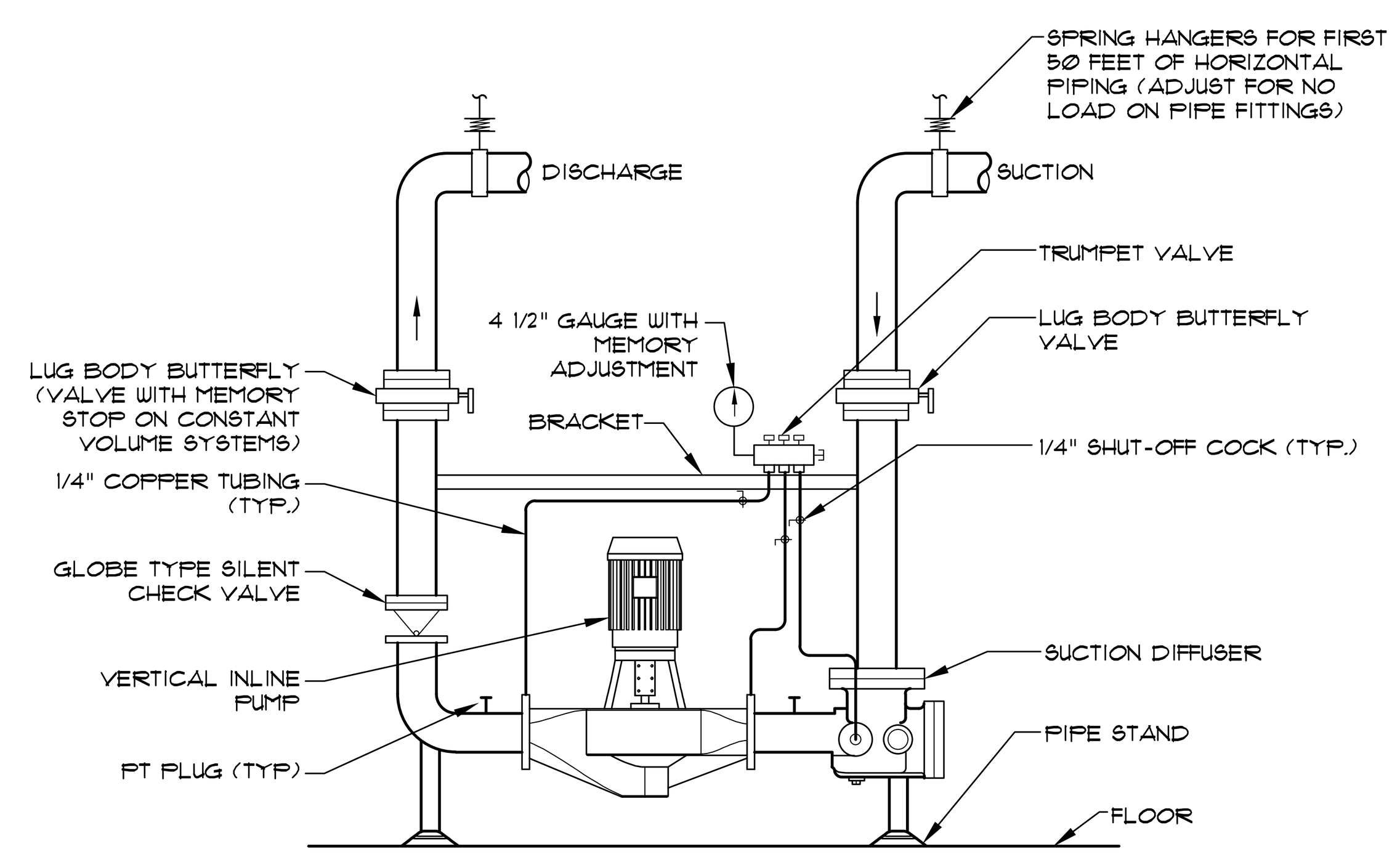
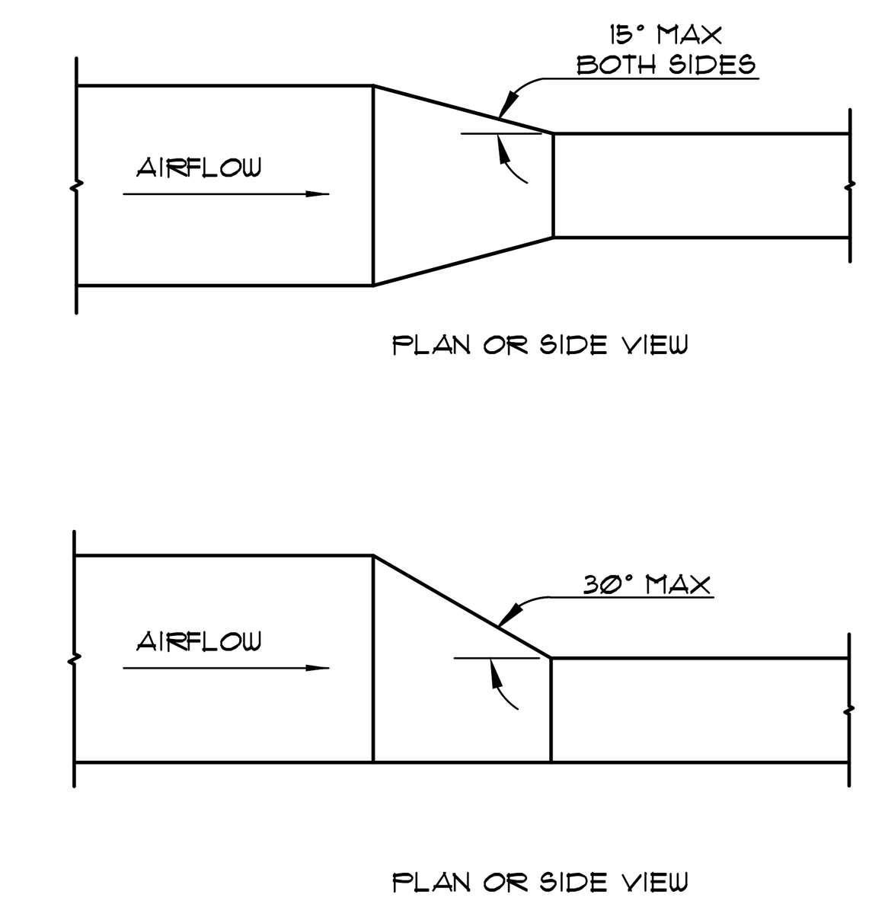
M005

$USERNAME$ $TIME$ $DATE$ $FILE$



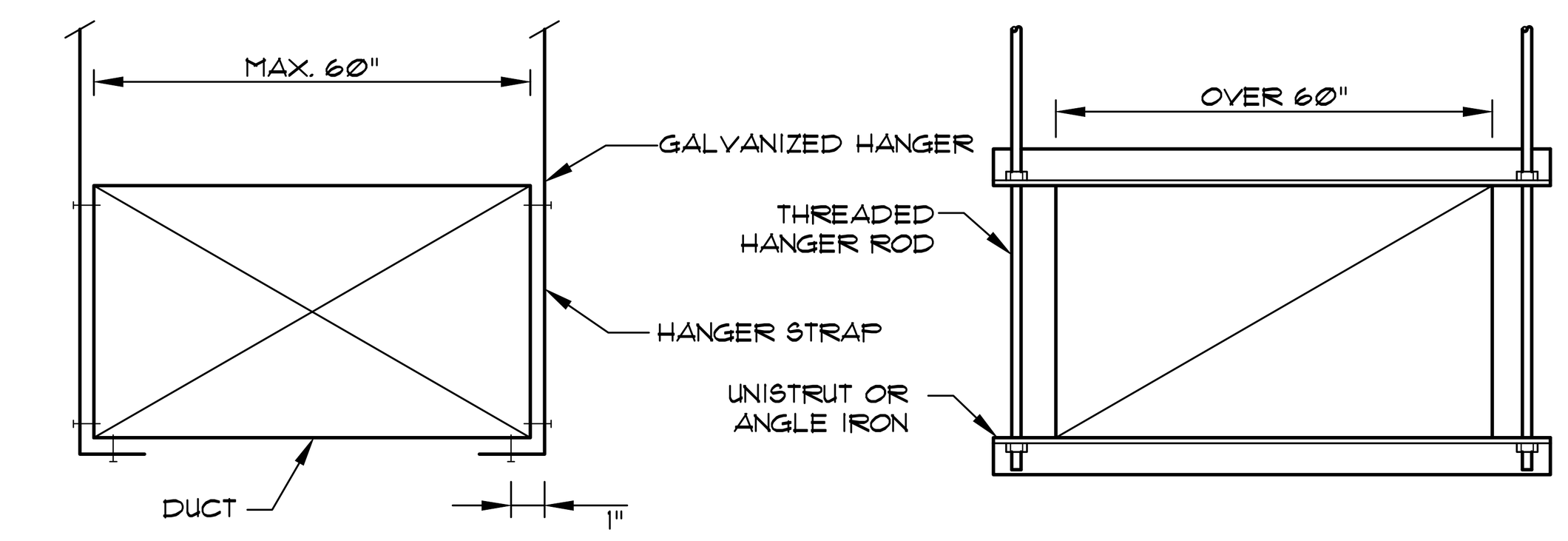
A / M006 **VERTICAL INLINE PUMP (2 1/2" PIPING AND OVER)**

NTS



B / M006 **DUCT TRANSITION**

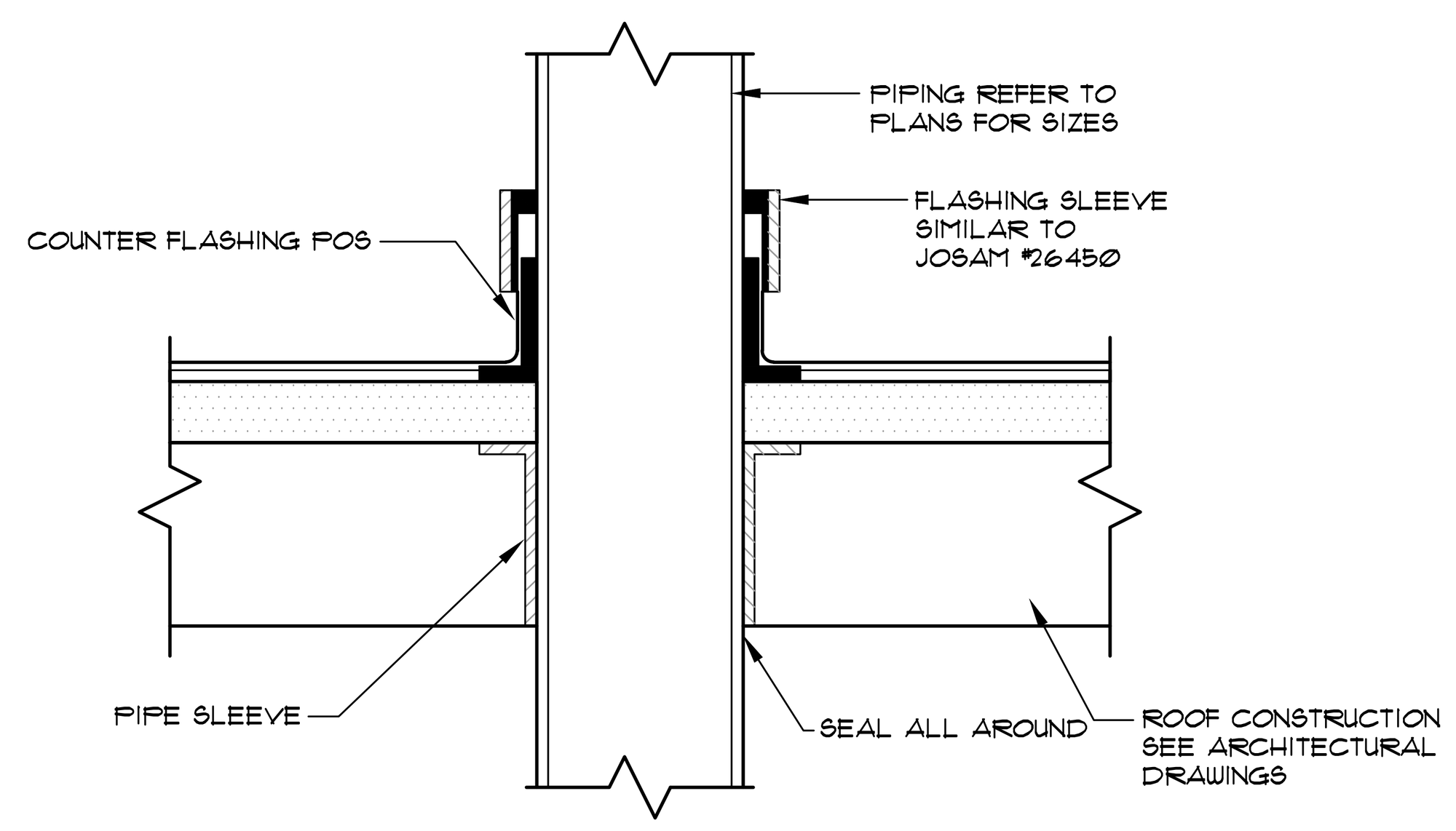
NTS



NOTES:
1. ON DUCTS OVER 48" WIDE, BOTTOM SHALL BE BRACE BY ANGLE. FOR CROSS SECTION AREA MORE THAN 8 SQUARE FEET, DUCT SHALL BE BRACED BY ANGLES ON ALL FOUR SIDES.
2. SUPPORTS SHALL BE SPACED AND SIZED AS PER SMACNA STANDARDS.

C / M006 **DUCT HANGER SUPPORT**

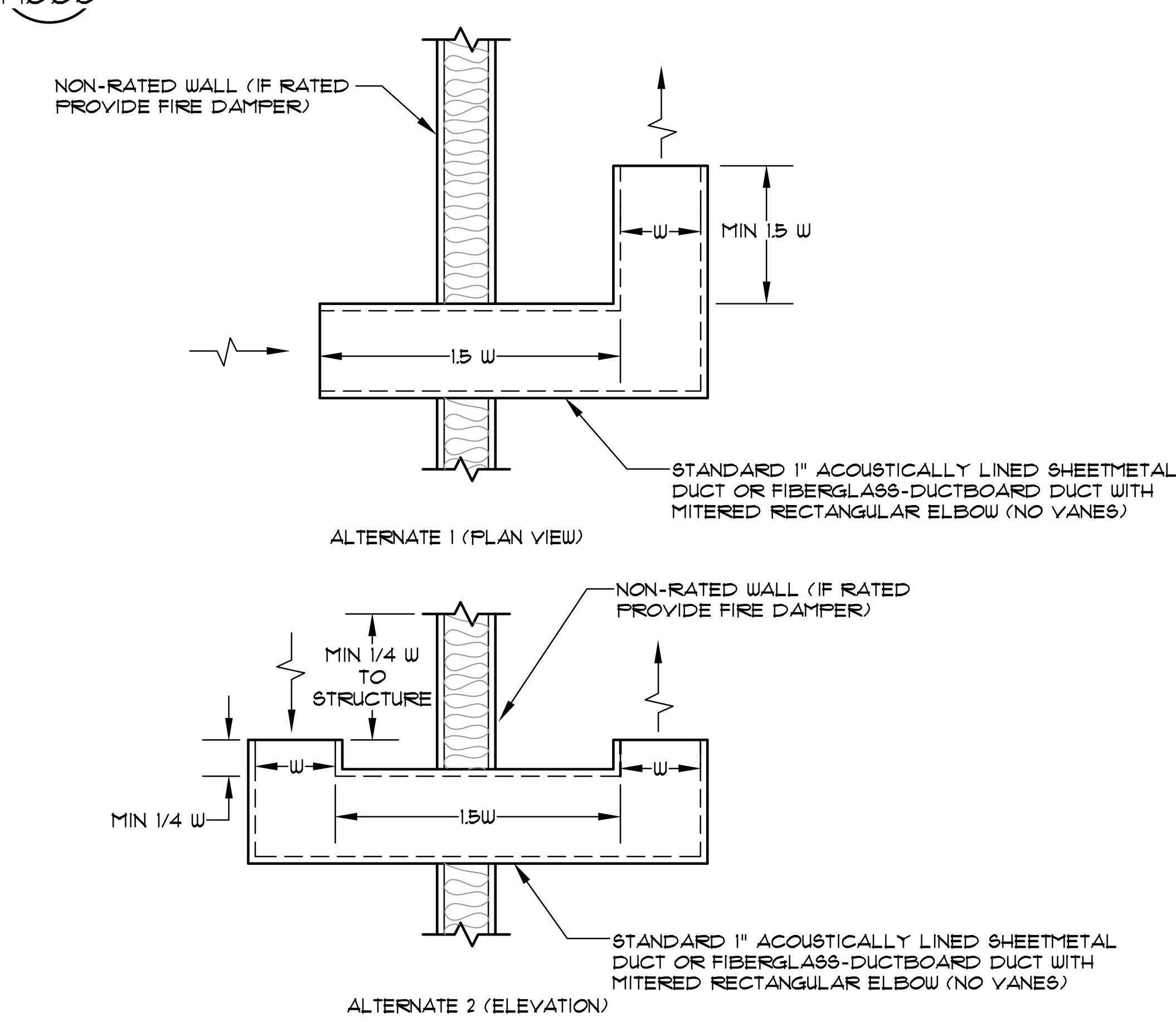
NTS



D / M006 **PIPE THROUGH ROOF**

NTS

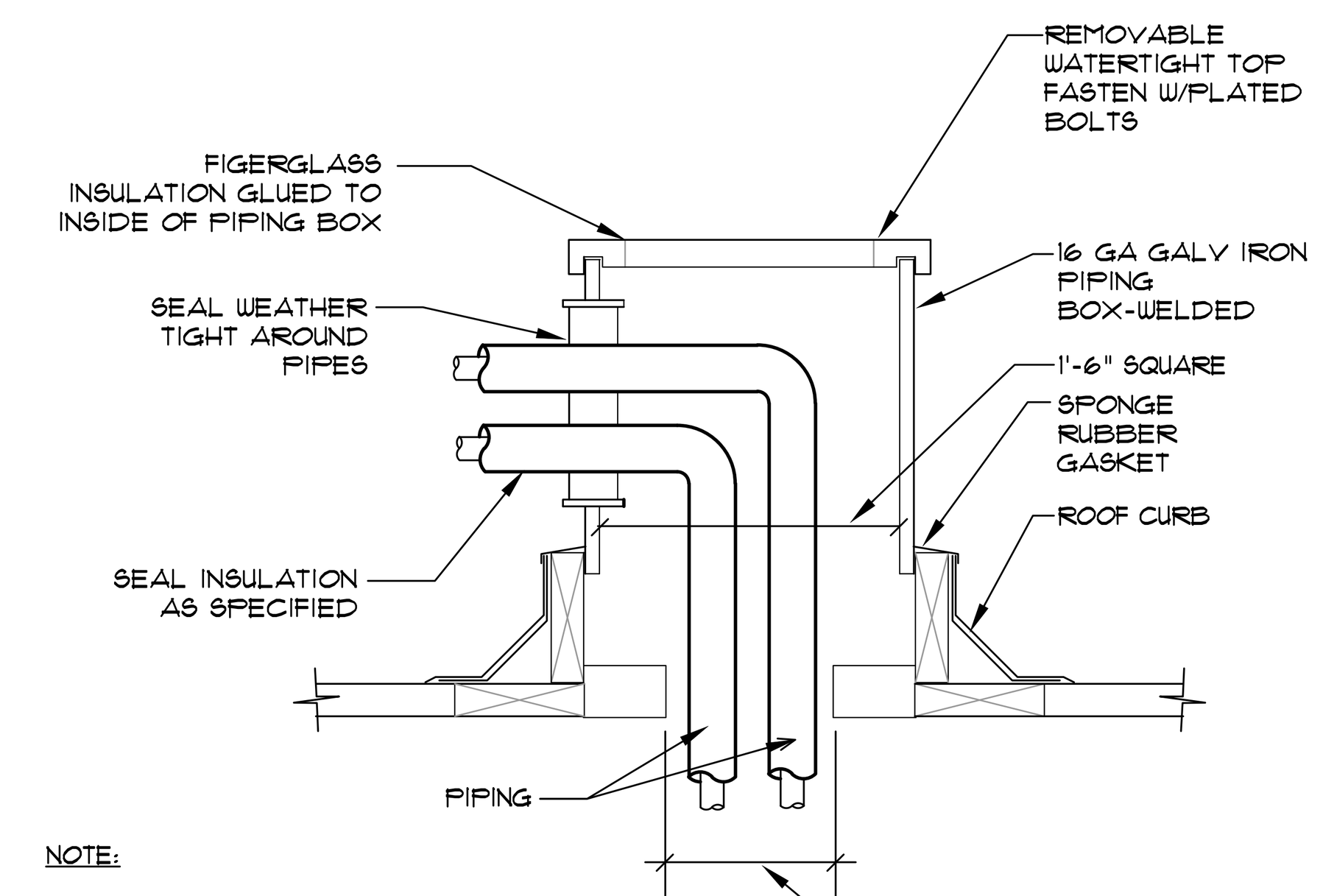
NOTES:
1. SHOWN FOR REFERENCE ONLY
2. ROOF PENETRATIONS TO BE FLASHED AND MADE WATERTIGHT IN A METHOD COMPATIBLE WITH THE ROOF SYSTEM USED.



NOTES:
1. SEE PLANS FOR SIZE AND LOCATION OF AIR TRANSFER DUCT.

E / M006 **TRANSFER DUCT**

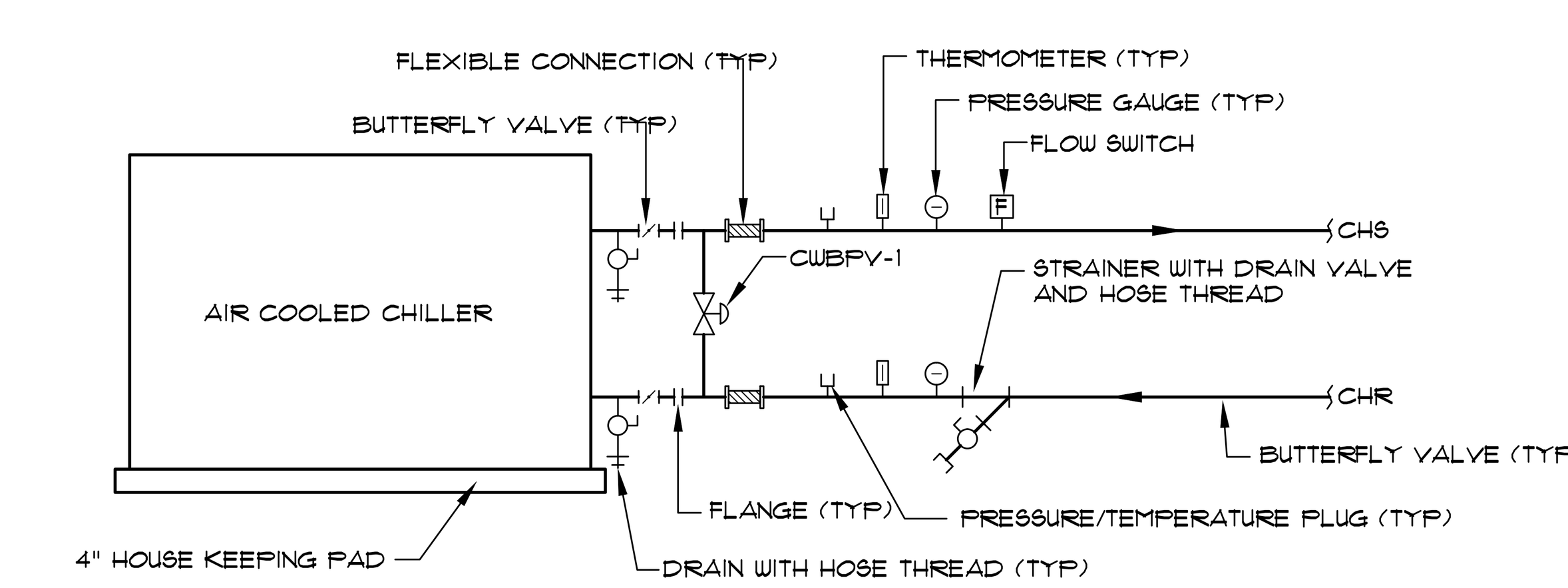
NTS



NOTE:
1. BOX AND SUPPORT TO BE PAINTED WITH ONE COAT ZINC CHROMATE PRIMER AND TWO COATS BLACK OIL BASE EXT GRADE PAINT
2. MOUNT CURB ON BLOCKING SO BOTTOM IS LEVEL W/TOP OF ROOF INSULATION

F / M006 **PIPING DOG HOUSE**

NTS



NOTES:
1. PROVIDE HEAT TRACING AND INSULATION FOR PIPING EXPOSED TO FREEZING CONDITIONS.

G / M006 **AIR COOLED CHILLER PIPING**

NTS

3

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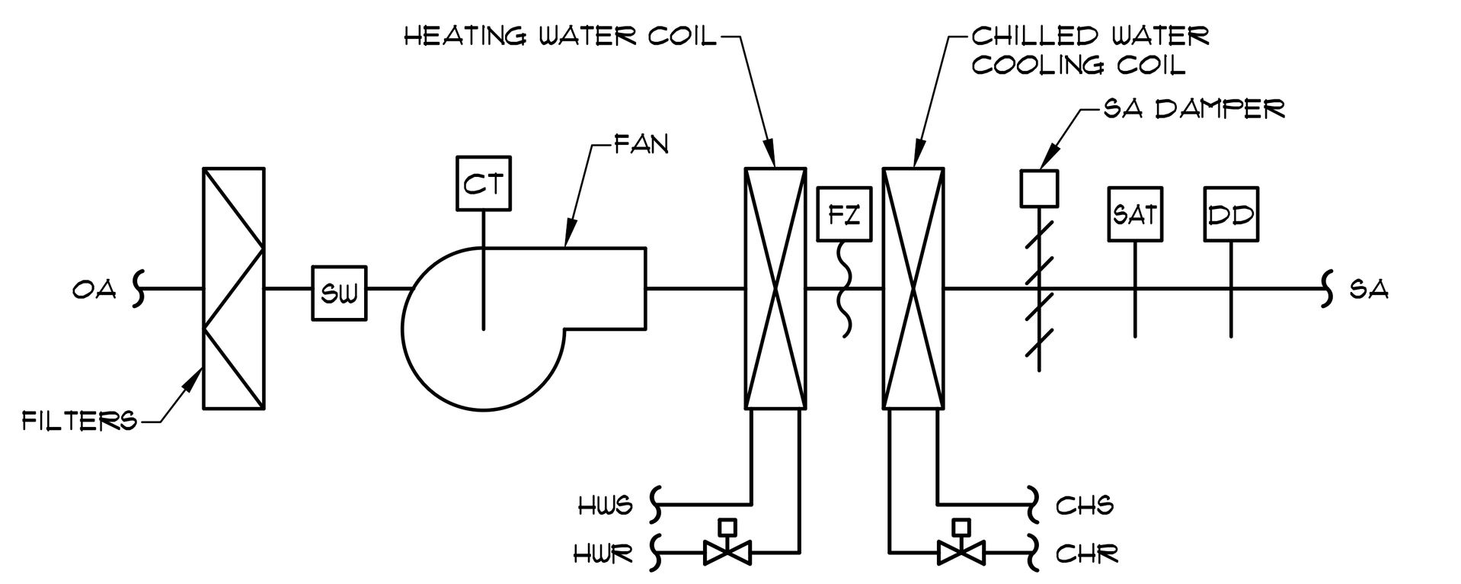
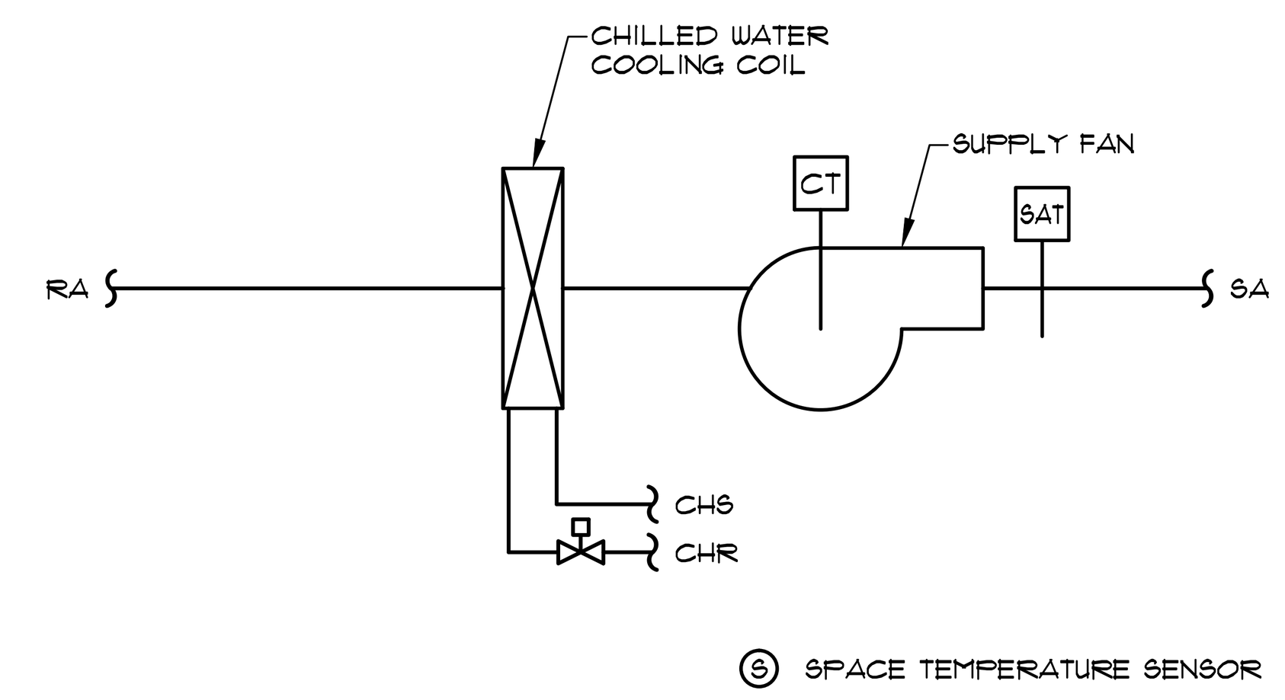
SHEET TITLE
MECHANICAL DIAGRAMS

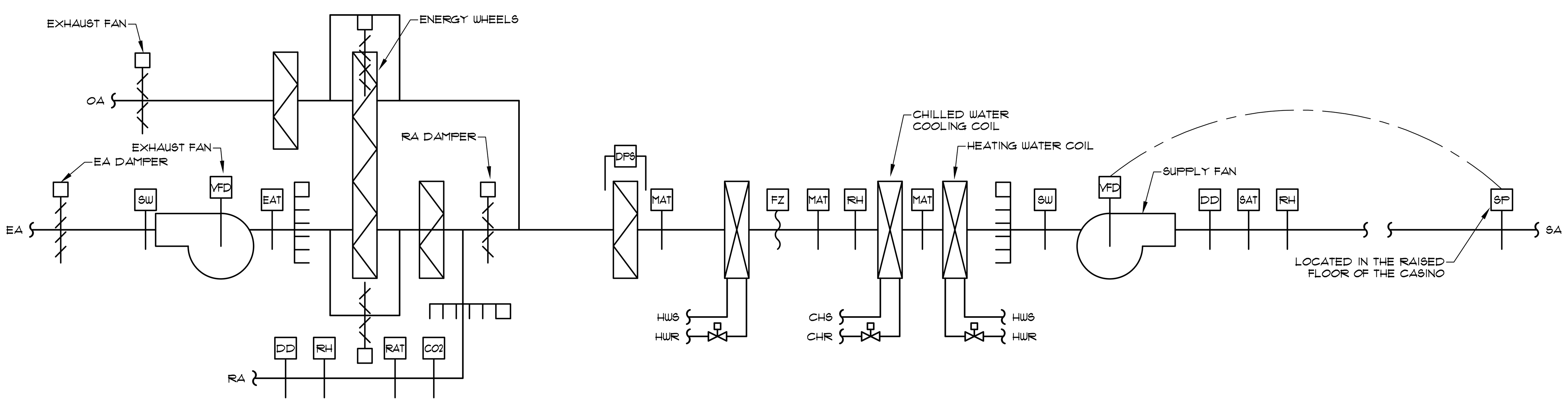
M006



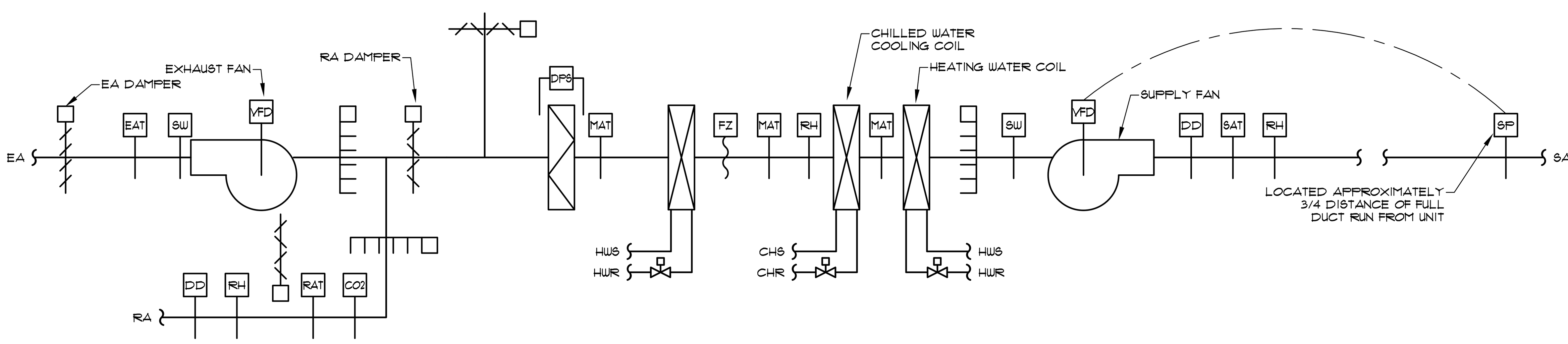
A TEMPERED MAKE UP AIR UNIT CONTROL
M007
NTS



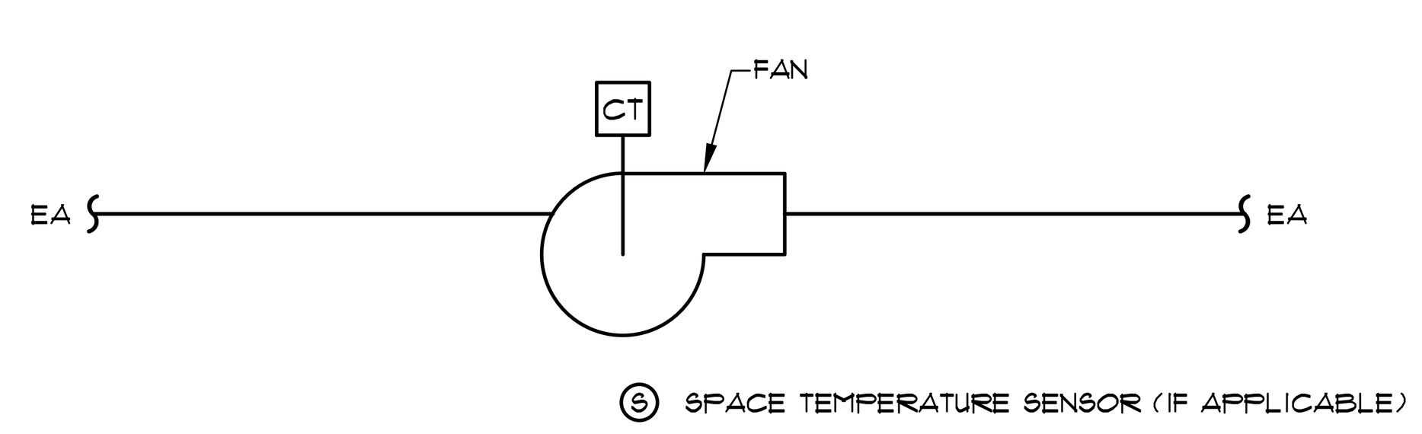
B FAN COIL UNIT CONTROL W/ COOLING ONLY
M007
NTS



C AIR HANDLING UNIT CONTROL W/ ENERGY WHEEL
M007
NTS



D AIR HANDLING UNIT CONTROL
M007
NTS



E TYPICAL EXHAUST FAN CONTROL
M007
NTS

CONTROL SYMBOLS AND ABBREVIATIONS

NOTE: THIS IS A MASTER SCHEDULE. NOT ALL SYMBOLS CONTAINED HEREIN MAY APPEAR ON THE DRAWINGS.

CO2	DUCT MOUNTED CARBON DIOXIDE SENSOR
DD	DUCT TYPE SMOKE DETECTOR
EAT	EXHAUST AIR TEMPERATURE SENSOR
FZ	FREEZE STAT
HXT	HEAT EXCHANGER AIR TEMPERATURE SENSOR
LAT	LEAVING AIR TEMPERATURE SENSOR
MAT	MIXED AIR TEMPERATURE SENSOR
OAT	OUTDOOR AIR TEMPERATURE SENSOR
RH	DUCT MOUNTED RELATIVE HUMIDITY SENSOR
RAT	RETURN AIR TEMPERATURE SENSOR
SP	DUCT MOUNTED STATIC PRESSURE SENSOR
SPH	DUCT MOUNTED STATIC PRESSURE HIGH LIMIT
SPL	DUCT MOUNTED STATIC PRESSURE LOW LIMIT
SAT	SUPPLY AIR TEMPERATURE SENSOR
TS	TEMPERATURE SENSOR
ASP	AIR SAMPLING PROBE
	BACKDRAFT DAMPER
	AUTOMATIC TEMPERATURE CONTROL DAMPER (PARALLEL BLADE TYPE)
	AUTOMATIC TEMPERATURE CONTROL DAMPER (OPPOSED BLADE TYPE)
	AIRFLOW MEASURING STATION
C	SPACE MOUNTED CARBON DIOXIDE SENSOR
H	SPACE MOUNTED RELATIVE HUMIDITY SENSOR
S	SPACE MOUNTED TEMPERATURE SENSOR
T	SPACE MOUNTED THERMOSTAT
SP	SPACE MOUNTED STATIC PRESSURE SENSOR
SW	SWITCH
DPS	DIFFERENTIAL PRESSURE SENSOR
CT	CURRENT TRANSDUCER
VFD	VARIABLE FREQUENCY DRIVE
FS	FLOW SWITCH
	PUMP
	PRESSURE GAUGE
	THERMOMETER
	RELIEF VALVE
	3-WAY ELECTRIC CONTROL VALVE, NC BYPASS LEG
	2-WAY ELECTRIC CONTROL VALVE, NC BYPASS LEG
	TRUMPET VALVE
ACD	AUTOMATIC CONTROL DAMPER
EA	EXHAUST AIR
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OA	OUTSIDE AIR
RA	RETURN AIR
SA	SUPPLY AIR

NOTES:
1. NOT ALL CONTROL ACCESSORIES REQUIRED ARE SHOWN. SEE SEQUENCE OF OPERATIONS FOR DETAILS.

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SHEET TITLE
MECHANICAL CONTROLS AND DIAGRAMS

M007

BUILDING AUTOMATION SYSTEM
PROJECT: CNE CASINO - RAMONA
DESCRIPTION: PRELIMINARY/MINIMUM CONTROLS SEQUENCES

REV: 2 REV: 3 REV:

BUILDING AUTOMATION SYSTEM

1 .00 THE BAS SHALL CONTROL AUTOMATIC OPERATIONS ASSOCIATED WITH MOST INSTALLED EQUIPMENT, INCLUDING BUT NOT LIMITED TO AIR HANDLERS, PUMPS, CONTROL VALVES, VAV BOXES, FAN COILS, MOTORIZED DAMPERS, CHILLERS, BOILERS AND FANS. BAS COMPONENTS SHALL BE POWERED FROM THE SECONDARY POWER SOURCE (GENERATOR). THE BAS CONTRACTOR SHALL PROVIDE UPS DEVICES FOR CRITICAL CONTROL FUNCTIONS TO STAY UP DURING SWITCH OVER TO GENERATOR. MINIMUM EQUIPMENT TO BE ON THE SECONDARY POWER SOURCE:

.01 BAS SERVER
.02 BAS OPERATOR MAIN STATION
.03 CENTRAL PLANT OPERATIONS
.04 AIR HANDLER CONTROLLERS
.05 AIR HANDLER VAV BOX CONTROLS
.06 SUPPLY AND EXHAUST FAN CONTROLS

2 .00 MINIMUM BAS EQUIPMENT CONTROLS TO BE COMPLETE WITH UPS DEVICES
.01 BAS SERVER
.02 BAS OPERATOR MAIN STATION
.03 CENTRAL PLANT BAS OPERATIONS
.04 CASINO AIR HANDLER CONTROLLERS

3 .00 DEFINITIONS: TERMS USED THROUGHOUT THIS SPECIFICATION
.01 GUI: GRAPHICAL USER INTERFACE. THE MAIN OPERATOR WORK STATION WHERE BAS OPERATIONS CAN BE OBSERVED AND WHERE USER INPUTS CAN HAPPEN.
.02 GUI ADJ: MEANS A POINT IS DISPLAYED ON THE GUI AND IS ADJUSTABLE FROM THAT SCREEN. WHEN THE POINT IS ADJUSTED, IF A PROGRAM DEFAULT VALUE EXISTS THAT POINT VALUE SHALL BE DISPLAYED AND THE NEW VALUE DISPLAYED ADJACENT AND IN A DIFFERENT COLOUR.
.03 BAS, BUILDING AUTOMATION SYSTEM = FMS, FACILITIES MANAGEMENT SYSTEM = BMS, BUILDING MANAGEMENT SYSTEM = DDC, DIRECT DIGITAL CONTROL SYSTEM = EMS, ENERGY MANAGEMENT SYSTEM
.04 FAIL EQUIPMENT DEFINITION:
.05 FOR A CHILLER MEANS STOP THE CHILLER, CLOSE ISOLATION VALVES AND ALARM.
.06 FOR A CHILLED WATER PUMP (CHP) OR HEATING WATER SECONDARY PUMP (HP) MEANS STOP THE PUMP AND ALARM.
.07 FOR A BOILER OR ASSOCIATED BOILER PRIMARY PUMP MEANS SHUT DOWN THE BOILER, STOP ITS ASSOCIATED PRIMARY PUMP, ISOLATE THE BOILER AND ALARM.
.08 FOR A FAN COIL MEANS STOP THE FAN, CLOSE COIL CONTROL VALVES AND IF APPLICABLE, CLOSE THE VENTILATION AIR CONNECTION VAV BOX AND ALARM.
.09 FOR A VAV BOX MEANS CLOSE THE VAV BOX, CLOSE THE HEATING CONTROL VALVE (IF APPLICABLE) AND ALARM.
.10 FOR AN EXHAUST FAN MEANS TURN OFF THE FAN, ISOLATE WHERE APPLICABLE AND ALARM.
.11 FOR AN AIR HANDLING UNITS MEANS STOP FAN(S), CLOSE OUTSIDE AIR AND EXHAUST AIR DAMPERS, OPEN MIXED AIR DAMPER IF AVAILABLE, CLOSE THE COOLING COIL VALVE, CLOSE THE HEATING COIL VALVE – IF A MIXED AIR TEMPERATURE TRANSMITTER EXISTS MODULATE THE HEATING COIL VALVE TO MAINTAIN 55°F, FREEZE STAT REMAINS OPERATIONAL, IF AN ENERGY RECOVERY WHEEL EXISTS, STOP THE WHEEL AND ALARM.
.12 FOR MAKE-UP AIR UNITS MEANS STOP FAN(S), CLOSE COIL CONTROL VALVES, CLOSE THE OUTSIDE AIR DAMPER, FREEZE STAT REMAINS OPERATIONAL AND ALARM.

4 .00 GENERAL:
.01 ALARMS: SHALL BE NOTED ON THE GUI AND REQUIRE USER INPUT THROUGH THE WORK STATION TO RESET FOR NORMAL OPERATION TO RESUME. WHEN RESET THE SYSTEM SHALL REVERT IN A CONTROLLED MANNER TO THE NORMAL OPERATING SEQUENCE.
.02 ALERTS: SHALL BE NOTED ON THE GUI AND RECORD OF THE EVENT SHALL REMAIN UNTIL CLEARED BY THE OPERATOR, IF THE SYSTEM OR CONDITION CLEARS ITSELF THE EQUIPMENT IS ALLOWED TO RETURN TO NORMAL CONTROL SEQUENCE AND THE ALERT SHALL CHANGE COLOUR STATUS TO INDICATE NORMAL OPERATION HAS RESUMED. THE ALERT MUST BE CLEARED THROUGH THE GUI.
.03 EACH PIECE OF EQUIPMENT CONTROLLED BY THE BAS SHALL HAVE AN AUTO/OFF/MAINTENANCE/ALARM/ALERT SWITCH ON THE GUI. AUTO COMMAND WILL PLACE THE EQUIPMENT UNDER BAS CONTROL. USER INPUTS AND COMMANDS ARE ALLOWED TO CHANGE/OVERRIDE BAS PROGRAMMED OPERATIONS. ANY USER INPUT SHALL BE IDENTIFIED BY COLOUR CHANGE OR TAG UNTIL RELEASED TO AUTO MODE. ANY USER INPUTS SHALL TIME OUT AND RETURN TO PROGRAMMED OPERATION AFTER 7 DAYS. THE COUNT DOWN TIMER SHALL DISPLAY ON THE GUI AND NOTE COMMAND TO BE RESET. (MAY BE MULTIPLE TIMERS, ACCEPTABLE TO GO TO A SECOND SCREEN). OFF COMMAND WILL STOP THE UNIT, WHERE APPLICABLE CLOSES ASSOCIATED VALVES, DAMPERS AND DOES NOT ALLOW ANY MANUAL INPUTS FROM THE GUI – DISPLAY ALERT STATUS.
.04 MAINTENANCE TURNS THE EQUIPMENT OFF, CLOSES ASSOCIATED VALVES, DAMPERS AND ALLOWS MANUAL OVERRIDES FROM THE GUI. WHEN USER INPUTS ARE INSERTED TO OVERRIDE A CONDITION, THE OVERRIDE SHALL CHANGE STATE ON THE GUI VIA COLOUR OR TAG TO NOTE OVERRIDE – DISPLAY ALERT STATUS. ALARM CONDITION NOTES A FAILURE THAT NEEDS USER INPUT TO CORRECT. EQUIPMENT WILL NOT TRY TO RESTART UNTIL THE ALARM IS ACKNOWLEDGED. IN THE CASE OF MULTIPLE PIECES OF EQUIPMENT SERVING A COMMON SOURCE – IE: CHILLERS, BOILERS, CHILLED WATER PUMPS AND HEATING SYSTEM SECONDARY PUMPS, IF THE BAS ATTEMPTS TO START A PIECE OF EQUIPMENT IN ALARM THE BAS SHALL AUTOMATICALLY GO TO THE NEXT AVAILABLE PIECE OF EQUIPMENT - DISPLAY ALARM STATUS. ALERT CONDITION NOTES A NON-CRITICAL CONDITION EXISTED THAT CAUSED THE EQUIPMENT TO OPERATE OUTSIDE OF NORMAL OPERATING CONDITIONS FOR A GIVEN TIME FRAME - DISPLAY ALERT STATUS.
.05 CENTRAL PLANT PUMPS, CHILLERS AND BOILERS SHALL HAVE A LEAD/LAG SEQUENCE BASED UPON RUN TIME WITH THE GOAL TO EQUALLY EXERCISE EQUIPMENT. TOTAL RUN TIME FOR EACH PIECE OF EQUIPMENT SHALL BE DISPLAYED ON THE GUI. THE LEAD/LAG SEQUENCE SHALL CHANGE EVERY WEEK ON MONDAY AT 9:00AM. THE LEAD/LAG SEQUENCE CAN BE OVERRIDDEN BY THE USER BUT WILL CHANGE STATUS IN COLOUR OR BY TAG TO NOTE THE OVERRIDE. ANY PIECE OF EQUIPMENT THAT HAS BEEN PLACED IN AN OUT OF SERVICE MODE (OFF, MAINTENANCE, ALARM) WHICH HAS CAUSED THE LEAD/LAG SEQUENCE TO SKIP THAT DEVICE SHALL, WHEN THE EQUIPMENT IS PLACED BACK INTO SERVICE, ORDERLY ASSUME ITS CORRECT POSITION IN THE LEAD/LAG SEQUENCE. EQUIPMENT SHALL GO INTO A FORCED STAGE UP AND THEN RELEASE TO NORMAL OPERATION.

.06 DURING COMMISSIONING THE CONTROLS CONTRACTOR SHALL ADJUST THE INITIAL SET POINTS TO ACHIEVE A STABLE OPERATING CONDITION. CASINO FRONT AND BACK OF HOUSE EQUIPMENT OPERATING SCHEDULE WILL BE PROVIDED BY FACILITIES OR OWNER OPERATIONS DURING COMMISSIONING. OPTIONS ARE 24/7 OR A TIMED SETBACK SCHEDULE. INITIAL TEMPERATURE SET BACK, UNLESS NOTE BY THE OWNER WILL BE 5°F OFF SET POINT. INITIAL TEMPERATURE SET POINTS: CASINO FLOOR – 72°F; RESTAURANTS – 75° COOLING, 70 HEATING; OFFICES AND MOST BOH SPACES – 75°F COOLING, 70° HEATING. THE CENTRAL PLANT IS A 24/7 OPERATION. SPACE SET POINTS WILL HAVE A STANDARD +/-2°F DEADBAND (ADJ PER SPACE) ALERT ANY SPACE 5°F ABOVE OR BELOW SET POINT FOR MORE THAN 30 MINUTES.

.07 DURING COMMISSIONING THE CONTROLS CONTRACTOR SHALL ALLOW FOR UP TO 80 HRS OF PROGRAM CHANGES AS DIRECTED BY THE ENGINEER OR THEIR DESIGNATE.

5 .00 GLOBAL COMMANDS TO BE AVAILABLE FROM THE GUI
.01 ENABLE/DISABLE CENTRAL PLANT CHILLED WATER / CHILLER COMPONENTS
.02 ENABLE/DISABLE CENTRAL PLANT HEATING WATER COMPONENTS
.03 OPEN/CLOSE ALL VAV BOX CHW VALVES ASSOCIATED WITH EACH AHU
.04 OPEN/CLOSE ALL VAV BOX HW VALVES ASSOCIATED WITH EACH AHU
.05 OPEN CLOSE VAV BOX DAMPER ASSOCIATED WITH EACH AHU
.06 OPEN/CLOSE ALL FCU CHW WATER VALVES PER LEVEL
.07 OPEN/CLOSE ALL FCU HW WATER VALVES PER LEVEL
.08 OPEN/CLOSE ALL AHU CHW WATER VALVES
.09 OPEN/CLOSE ALL AHU HW WATER VALVES

6 .00 THE BAS SHALL BE WEB ACCESSIBLE. THE BAS CONTRACTOR TO PROVIDE THE LINE TO THE INTERNET AND PAY FOR SERVICE FOR THE FIRST YEAR FROM SYSTEM ACCEPTANCE.
.01 THE CONTROL SYSTEM SHALL BE DESIGNED AND PROGRAMMED FOR THE ULTIMATE PLANT EQUIPMENT BUILD-OUT. EQUIPMENT NOT INSTALLED SHALL BE TAGGED AS OFF.
.02 SPACE TEMPERATURE TRANSMITTERS SHALL HAVE A FIELD ADJUSTABLE SPACE TEMPERATURE AND BE CAPABLE TO DISPLAY THE SET POINT. ENABLE/DISABLE OF THE FIELD ADJUSTABLE TEMPERATURE CONTROL SHALL BE SET FROM THE GUI. THE RANGE OF ADJUSTABILITY SHALL BE SET FROM THE GUI. DEFAULT IS NO FIELD CONTROL.

7 .00 MISC GUI DISPLAY ITEMS:
.01 OUTSIDE AIR TEMPERATURE
.02 OUTSIDE AIR HUMIDITY
.03 SPACE TEMPERATURE SET POINT
.04 SPACE TEMPERATURE
.05 SPACE HUMIDITY SET POINT
.06 SPACE HUMIDITY
.07 OUTSIDE CO2 (WHEN A CO2 SYSTEM IS SPECIFIED)
.08 SPACE CO2 SET POINT (WHEN A CO2 SYSTEM IS SPECIFIED)
.09 SPACE CO2 (WHEN A CO2 SYSTEM IS SPECIFIED)
.10 CONTROL VALVES SHALL NOTE "% OPEN"
.11 DAMPERS SHALL NOTE "% OPEN"
.12 VFDS SHALL NOTE "%SPEED " OR "HZ"
.13 VFD DEVICES SHALL DISPLAY CURRENT DRAW
.14 DUCT DETECTOR STATUS FOR ASSOCIATED AIR HANDLER (AHU, MAU, FCU, FAN)
.15 CASINO FLOOR BUILDING STATIC PRESSURE RELATIVE TO EXTERIOR
.16 BUILDING POWER SOURCE – LOCAL UTILITY OR GENERATOR
.17 CENTRAL PLANT MAIN EQUIPMENT HOUR METERS OF OPERATION - CHILLERS, BOILERS, PUMPS

8 .00 CONTROL VALVES
.01 COILS LISTED FOR 25 GPM OR LESS ARE EQUIPPED WITH DYNAMIC BALANCING VALVES. COILS OVER 25 GPM DO NOT HAVE DYNAMIC BALANCING VALVES AND ARE TO BE EQUIPPED WITH PRESSURE INDEPENDENT TYPE CONTROL VALVES. AIR HANDLERS - HEATING WATER VALVES REGARDLESS OF SIZE TO BE PRESSURE INDEPENDENT. AHU-1 & 2 (CHW & HW) TO BE 3 WAY, MIN. 50 PSI CLOSE OFF. THREE WAY VALVES MAY BE TURNED INTO A TWO WAY VALVE BY USE OF THE BY-PASS ISOLATION VALVE.

9 .00 GENERAL
.01 AIR HANDLERS MAY BE PROVIDED WITH FACTORY FREEZE STATS - COORDINATE WITH THE EQUIPMENT SUPPLIER TO ENSURE COMMUNICATION WITH THE FREEZE STAT.

10 .00 OPERATOR WORKSTATION - MINIMUM REQUIREMENTS
.01 THE WORKSTATION SHALL BE HARD WIRE CONNECTED TO THE BAS NETWORK.
.02 MINIMUM SPECIFICATION:
.03 a. DELL OPTIPLEX 980, MINI-TOWER
.04 b. WINDOWS 7 ULTIMATE WITH XP MODE, 64-BIT
.05 c. INTEL I5 DUAL CORE PROCESSOR 660 (3.33 GHZ)
.06 d. 4 GB DDR3 NON-ECC SDRAM, 1333 MHZ (2 DIMM)
.07 e. 512MB ATI RADEON HD 4550
.08 f. 1TB 7,200 RPM 3.5" SATA DRIVE AND 16MB CACHE
.09 g. 16X DVD +/-RW, ROXIO CREATOR CYBERLINKPOWER DVD
.10 h. CHASSIS INTRUSION SWITCH
.11 i. INTERNAL BUSINESS AUDIO SPEAKER
.12 j. KEYBOARD AND OPTICAL MOUSE
.13 k. 27" - 32" LCD MONITOR, 1920X1080 RES, 1 MS RESPONSE
.14 l. 1350 VA UPS
.15 m. HP OFFICEJET 7000 PRINTER

11 .00 SCOPE OF WORK
.01 THE ELECTICAL DESIGN HAS PROVIDED FOR SOME SPECIFIC KNOWN POWER NEEDS, SEE THE ELECTRICAL DOCUMENTS. THE BAS CONTRACTOR IS ULTIMATELY RESPONSIBLE FOR ALL WIRING AND POWER NEEDS FOR THEIR EQUIPMENT, REGARDLESS OF VOLTAGE. THE BAS SYSTEM POWER SHALL BE TAKEN FROM A GENERATOR BACKED UP SOURCE AT A POWER PANEL. SEE ELECTRICAL DOCUMENTS FOR PANEL LOCATIONS.
.02 BAS CONTRACTOR IS RESPONSIBLE TO PROVIDE A COMPLETE AND FUNCTIONAL DDC BUILDING AUTOMATION SYSTEM RESPONSIBLE FOR THE CONTROL OF ALL MECHANICAL SYSTEM COMPONENTS UNLESS STATED OTHERWISE. THE BAS CONTRACTOR SHALL PROVIDE A MINIMUM OF 20 HOURS TRAINING IN 5 FOUR HOUR SESSIONS. THE BAS CONTRACTOR SHALL ALLOW FOR 80 HOURS OF PROGRAM CHANGES, FOR NO ADDITIONAL FEE, TO BE USED AS REQUESTED BY THE DESIGN ENGINEER.
.03 THE "CENTRAL PLANT IN A BOX" IS PROVIDED WITH A BAS SYSTEM TO OPERATE THE CHILLERS, BOILERS, INSIDE THE BOX CONTROL VALVES, CHILLER CONTROL VALVES AND INSIDE THE BOX PUMPS. THE BAS SHALL INTERFACE WITH THE "CENTRAL PLANT IN THE BOX" TO DISPLAY ALL PROVIDED AND AVAILABLE POINTS. THE GUI DISPLAY SHALL BE CREATED TO REPRESENT THE CENTRAL PLANT COMPONENTS. MINIMUM DISPLAY:
.04 a. CHILLER STATUS
.05 b. BOILER STATUS
.06 c. PUMP STATUS
.07 d. CHILLER ISOLATION VALVE STATUS
.08 e. BOILER ISOLATION VALVE STATUS
.09 f. CHILLED WATER SUPPLY TEMP
.10 g. CHILLED WATER RETURN TEMP
.11 f. HEATING WATER SUPPLY TEMP
.12 g. HEATING WATER RETURN TEMP
.13 h. CHILLER RUN TIME
.14 i. BOILER RUN TIME
.15 j. PUMP RUN TIME
.16 k. CENTRAL PLANT ENABLE/DISABLE CONTROL
.17 l. ALARMS

AIR HANDLING UNIT , CH & HTG WATER, WITH ENERGY WHEEL AND DEHUMIDIFICATION

GENERAL

20 .00 PERTAINS IN GENERAL TO AHUS WITH THE FOLLOWING UNIT CONFIGURATION - SUPPLY PATH: OUTSIDE AIR DAMPER, FILTER, ENERGY WHEEL, ENERGY WHEEL BY-PASS, OUTSIDE AIR & RETURN AIR MIXING SECTION, FILTER, HEATING COIL #1, COOLING COIL, HEATING COIL #2, SUPPLY FAN AIR FLOW STATION, SUPPLY AIR FAN, DUCT DETECTOR, SAT, RH. EXHAUST PATH: RETURN DUCT WITH CO2, RH AND TEMPERATURE TRANSMITTERS, DUCT DETECTOR, AIR FLOW STATION, FILTER, ENERGY WHEEL, ENERGY WHEEL BY-PASS, EXHAUST FAN AIR FLOW STATION, EXHAUST FAN, EXHAUST DAMPER. A MIXED AIR/RETURN AIR DAMPER EXISTS ON ALL UNITS.

.01 BAS INTERFACE EQUIPMENT – EQUIPMENT SUPPLIED BY BAS UNLESS NOTED OTHERWISE. ALL ITEMS TO BE DISPLAYED ON THE GUI
.02 FREEZE PROTECTION – UNITS TO HAVE AN AVERAGING FREEZE CAPILLARY TUBE ON THE DOWNSTREAM SIDE OF HEATING COIL #1, SET AT 35°F. ACTIVATION OF THE FREEZE STAT SWITCH WILL FAIL THE UNIT AND ALARM. COORDINATE WITH THE AHU MANUFACTURER - THIS SENSOR MAY NEED TO BE FACTORY INSTALLED DUE TO LIMITED SPACE BETWEEN COILS.
.03 HIGH STATIC SWITCH – UNITS TO HAVE A HIGH STATIC SWITCH ON THE EXHAUST FAN DISCHARGE WHERE A MOTORIZED DAMPER EXIST ON THE FAN DISCHARGE. ACTIVATION OF THE HIGH STATIC SWITCH WILL FAIL THE UNIT AND ALARM.
.04 LOW STATIC SWITCH – UNITS TO HAVE A LOW STATIC SWITCH ON THE EXHAUST (OR RETURN) FAN INTAKE WHERE A MOTORIZED DAMPER OR FIRE OR FIRE/SMOKE DAMPER EXIST ON THE FAN INTAKE. ACTIVATION OF THE HIGH STATIC SWITCH WILL FAIL THE UNIT AND ALARM.
.05 HIGH STATIC SWITCH - UNITS TO HAVE A HIGH STATIC SWITCH ON THE SUPPLY FAN DISCHARGE WHERE A MOTORIZED DAMPER, FIRE OR FIRE/SMOKE DAMPER IN THE SUPPLY DUCT CAN CLOSE OFF 90% OR MORE OF THE SUPPLY AIR PATH. ACTIVATION OF THE HIGH STATIC SWITCH WILL FAIL THE UNIT AND ALARM.
.06 LOW STATIC SWITCH - UNITS TO HAVE A LOW STATIC SWITCH ON THE SUPPLY FAN INTAKE. ACTIVATION OF THE LOW STATIC SWITCH WILL FAIL THE UNIT AND ALARM.
.07 SUPPLY DUCT STATIC PRESSURE CONTROL & SENSOR FAILURE – DEFAULT TO LAST KNOW VALUE AND ALERT GUI.
.08 EXHAUST FAN AIR FLOW STATION. FAILURE OF THE FLOW STATION – CONTROL TO MATCH SUPPLY FAN % SPEED LESS X% (THIS NUMBER "X", TO BE DETERMINED DURING COMMISSIONING) OF THE NOTED SUPPLY FAN % SPEED - ALERT
.09 SUPPLY FAN AIR FLOW STATION. FAILURE OF THE FLOW STATION – CONTROL TO LAST KNOWN VALUE IF FAN SPEED IS DEPENDANT UPON AIR FLOW STATION INPUT - ALERT

.10 OUTSIDE AIR FLOW STATION. FAILURE OF THE FLOW STATION – CONTROL TO LAST KNOWN VALUE. OVERRIDE IF SA TEMP CANNOT BE MAINTAINED - ALERT
.11 DAMPER OPERATORS SUPPLIED BY BAS, DAMPERS SUPPLIED WITH UNIT. DAMPERS ARE FULL MODULATING AND TO BE CAPABLE OF INDEPENDENT OPERATION - DO NOT SHARE A COMMON SIGNAL.
.12 SUPPLY AIR DUCT STATIC PRESSURE TRANSMITTER APPROXIMATELY ¾ DISTANCE DOWN THE LENGTH OF THE DUCT RUN – INITIAL SET POINT 1.5"W.G. FINAL SET POINT DETERMINED BY THE AIR BALANCING CONTRACTOR.
.13 SAT TRANSMITTER DOWNSTREAM OF SA FAN, IN SA DUCT IF POSSIBLE.
.14 RH TRANSMITTER DOWNSTREAM OF SA FAN
.15 RH TRANSMITTER AFTER THE FIRST HEATING COIL. COORDINATE WITH THE AHU MANUFACTURER - THIS SENSOR MAY NEED TO BE FACTORY INSTALLED DUE TO LIMITED SPACE BETWEEN COILS.
.16 RH TRANSMITTER IN THE RETURN AIR
.17 AVERAGING TEMPERATURE TRANSMITTER BEFORE THE FIRST HEATING COIL
.18 AVERAGING TEMPERATURE TRANSMITTER AFTER THE COOLING COIL
.19 AVERAGING FREEZE STAT AFTER THE FIRST HEATING COIL. COORDINATE WITH THE AHU MANUFACTURER - THIS SENSOR MAY NEED TO BE FACTORY INSTALLED DUE TO LIMITED SPACE BETWEEN COILS.
.20 EXHAUST AIR TEMPERATURE TRANSMITTER LEAVING THE ENERGY WHEEL.
.21 OUTSIDE AIR FILTER STATIC PRESSURE - ONE DEVICE FOR EACH FILTER BANK.
.22 RETURN AIR FILTER STATIC PRESSURE
.23 MODULATING OUTSIDE AIR DAMPER – DAMPERS WITH THE UNIT, OPERATOR & CONTROL BY BAS
.24 MODULATING RETURN AIR/MIXED AIR DAMPER - DAMPER WITH UNIT, OPERATOR & CONTROL BY BAS.
.25 TWO POSITION DAMPER ON UNIT EXHAUST - DAMPER WITH UNIT, OPERATOR & CONTROL BY BAS
.26 ENERGY WHEEL BY-PASS DAMPER - SUPPLY AIR PATH - DAMPER WITH UNIT, TWO POSITION CONTROL BY BAS
.27 ENERGY WHEEL BY-PASS DAMPER - RETURN AIR PATH - DAMPER WITH UNIT, TWO POSITION CONTROL BY BAS
.28 ENERGY WHEEL DIFFERENTIAL PRESSURE - OUTSIDE AIR PATH
.29 ENERGY WHEEL DIFFERENTIAL PRESSURE - RETURN AIR PATH
.30 AVERAGING TEMPERATURE TRANSMITTER IN RETURN AIR DUCT TO UNIT
.31 CO2 TRANSMITTER IN RETURN AIR DUCT.
.32 VFD FOR SUPPLY FAN CONTROL, CONTROL BY BAS – VFD SUPPLIED WITH UNIT
.33 VFD FOR EXHAUST FAN CONTROL, CONTROL BY BAS – VFD SUPPLIED WITH UNIT
.34 VFD FOR ENERGY WHEEL
.35 SUPPLY AIR PATH DUCT DETECTOR SUPPLIED BY F/A CONTRACTOR AND UNIT INTERLOCK WIRED BY F/A CONTRACTOR. BAS TO SHOW DUCT DETECTOR STATUS AND SEND A SIMULTANEOUS FAIL COMMAND TO THE UNIT ON DUCT DETECTOR ACTIVATION.

.36 RETURN AIR PATH DUCT DETECTOR (WHERE APPLICABLE) SUPPLIED BY F/A CONTRACTOR AND UNIT INTERLOCK WIRED BY F/A CONTRACTOR. BAS TO SHOW DUCT DETECTOR STATUS AND SEND A SIMULTANEOUS FAIL COMMAND TO THE UNIT ON DUCT DETECTOR ACTIVATION.
.37 AIR FLOW MEASURING STATIONS: RETURN AIR DUCT TO BE EBTRON GTx116-PD; SUPPLY AND EXHAUST FAN TO BE EBTRON GTx116-F. AIR EBTRON AIR FLOW MEASURING DEVICES PROVIDED BY BAS.

AHU, CH & HW, 100% OSA, ENERGY WHEEL W/RH - RAISED FLOOR

SEQUENCE

21 .00 AUTO – UNIT OPERATES 24/7
.01 DEFAULT AND POSITION BEFORE START, OUTSIDE AND EXHAUST AIR DAMPERS CLOSED, RETURN AIR DAMPER OPEN, FANS OFF, COIL CONTROL VALVES CLOSED, ENERGY WHEEL STOPPED, ENERGY WHEEL BY-PASS DAMPERS CLOSED. AUTO/START – OPEN THE EXHAUST AIR AND OUTSIDE AIR DAMPERS, CLOSE THE RETURN AIR DAMPER, START THE ENERGY WHEEL AND RAMP ENERGY WHEEL TO 100% SPEED. IF THE RAT IS > OAT AND OAT IS > 55° THEN STOP THE ENERGY WHEEL AND OPEN THE ENERGY WHEEL BY-PASS DAMPERS. START THE SUPPLY AND EXHAUST FANS. THE SUPPLY FAN VFD IS TO MODULATE TO MAINTAIN A STATIC PRESSURE DIFFERENTIAL ACROSS A RAISED FLOOR HVAC SYSTEM. THE EXHAUST FAN IS TO TRACK CFM OF THE SUPPLY FAN BASED UPON A GUI ADJUSTABLE %. INITIAL SET POINT 95%. MODULATE HEATING COIL #1 VALVE OR THE COOLING COIL VALVE TO MAINTAIN AN INITIAL SAT OF 63°F.

21 .02 WHEN THE SAT IS WITHIN 3 DEGREES OF THE SAT SETPOINT (SP), RELEASE TO AUTO MODE. THE ENERGY WHEEL IS TO BE USED AS THE FIRST SOURCE OF HEATING AND COOLING.
.03 IT IS ACCEPTABLE TO USE ENTHALPY AS A TRIGGER TO START AND STOP THE ENERGY WHEEL AND OPEN/CLOSE THE ENERGY WHEEL BY-PASS DAMPERS IE: BETWEEN OUTDOOR ENTHALPY OF 21 AND 27 DISABLE THE ENERGY WHEEL AND BY-PASS.

.04 FAILURE OF ANY DAMPER OR MOTOR TO CONFIRM OPERATION OR HAS A STATUS MISS-MATCH FOR >30 SECONDS, ALARM SPECIFIC PROBLEM AND FAIL THE UNIT.
.05 **AUTO OPERATION: RA ENTHALPY > OA ENTHALPY AND OA ENTHALPY > SA ENTHALPY**

.06 THE SUPPLY FAN VFD IS TO MODULATE TO MAINTAIN DIFFERENTIAL STATIC PRESSURE ACROSS A RAISED FLOOR HVAC SYSTEM INITIAL SP IS 0.08" WC. (GUI ADJ) THE EXHAUST FAN IS TO TRACK CFM OF THE SUPPLY FAN BASED UPON A GUI ADJUSTABLE %. INITIAL SET POINT 95%. ENERGY WHEEL IS OFF AND WHEEL BY-PASS DAMPERS OPEN. MODULATE HEATING COIL #1 VALVE OR THE COOLING COIL VALVE TO MAINTAIN AN INITIAL SAT OF 63°F. THE SAT IS TO MODULATE TO MAINTAIN SPACE TEMPERATURE CONDITIONS BASED UPON AN AVERAGE OF SPECIFIC TEMPERATURE TRANSMITTERS. A SAT ABOVE 66° AND BELOW 60° IS TO BE AN ALERT ON THE GUI.

.07 IF THE SPACE HUMIDITY IS > THAN THE SPACE HUMIDITY SP, DRIVE THE TEMPERATURE LEAVING THE COOLING COIL DOWN TO A 55° LAT AND CONTROL UNIT SAT BY MODULATING HEATING COIL #2. WHEN SPACE HUMIDITY LEVEL IS SATISFIED RELEASE TO NORMAL CONTROL.
.08 **AUTO OPERATION: RA ENTHALPY > OA ENTHALPY AND OA ENTHALPY < SA ENTHALPY**

.09 THE SUPPLY FAN VFD IS TO MODULATE TO MAINTAIN DIFFERENTIAL STATIC PRESSURE ACROSS THE RAISED FLOOR HVAC SYSTEM - INITIAL SP IS 0.08"WC. THE EXHAUST FAN IS TO TRACK CFM OF THE SUPPLY FAN BASED UPON A GUI ADJUSTABLE %. INITIAL SET POINT 95%. ENERGY WHEEL IS ENERGIZED AND WHEEL BY-PASS IS CLOSED. MODULATE THE ENERGY WHEEL VFD TO ATTEMPT TO MAINTAIN UNIT SAT. ALERT THE GUI IF THE EXHAUST AIR LEAVING THE ENERGY WHEEL IS LESS THAN 35°F. REDUCE THE SPEED OF THE ENERGY WHEEL TO PREVENT THE EXHAUST AIR TEMPERATURE FROM GOING BELOW 35°F. IF THE SAT CANNOT BE MAINTAINED BY THE ENERGY WHEEL MODULATE HEATING COIL #1 VALVE TO MAINTAIN SAT. IF HEATING COIL #1 CANNOT MAINTAIN SAT, DRIVE HEATING COIL #1 VALVE TO A 55° LAT DOWNSTREAM OF THE COOLING COIL AND MODULATE HEATING COIL #2 VALVE TO MAINTAIN SAT. IF HEATING COIL#2 IS AT 100% OPEN AND THE SAT CANNOT BE MAINTAINED ALERT THE GUI AND OPEN (MODULATE) THE RETURN AIR DAMPER, THE OUTSIDE AIR DAMPER AND REDUCE THE SPEED OF THE EXHAUST FAN AS REQUIRED TO MAINTAIN SAT AND CFM OFFSET BETWEEN THE SUPPLY AIR AND RETURN AIR.

.10 **AUTO OPERATION: RA ENTHALPY < OA ENTHALPY AND OA ENTHALPY > SA ENTHALPY**

.11 THE SUPPLY FAN VFD IS TO MODULATE TO MAINTAIN DIFFERENTIAL STATIC PRESSURE ACROSS THE RAISED FLOOR HVAC SYSTEM - INITIAL SP IS 0.08"WC. THE RETURN FAN IS TO TRACK CFM OF THE SUPPLY FAN BASED UPON A GUI ADJUSTABLE %. INITIAL SET POINT 95%. ENERGY WHEEL ENERGIZED AND WHEEL BY-PASS DAMPERS ARE CLOSED. MODULATE THE WHEEL VFD SPEED TO ATTEMPT TO MAINTAIN UNIT SAT. (NOTE: THE ENERGY WHEEL IS PRE-COOLING THE OUTSIDE AIR) IF THE SAT CANNOT BE MAINTAINED BY THE ENERGY WHEEL MODULATE THE COOLING COIL VALVE TO MAINTAIN SAT.
.12 IF THE SPACE HUMIDITY IS > THAN THE SPACE HUMIDITY SP, DRIVE THE TEMPERATURE LEAVING THE COOLING COIL DOWN TO A 55° LAT AND CONTROL UNIT SAT BY MODULATING HEATING COIL #2. WHEN SPACE HUMIDITY LEVEL IS SATISFIED RELEASE TO NORMAL CONTROL.
.13 MONITOR THE ENERGY WHEEL OUTSIDE AIR AND RETURN AIR PATH DIFFERENTIAL STATIC PRESSURE. PROVIDE A GUI ADJUSTABLE SET POINT FOR AN ALERT CONDITION. IE: IF THE ENERGY WHEEL RETURN AIR DIFFERENTIAL PRESSURE EXCEEDS "1.5 IN WG" ALERT THE GUI.
.14 FILTER PRESSURE SWITCH:
.15 THE AIR HANDLING UNIT FILTER BANK PRESSURE DIFFERENCE SHALL BE MONITORED THROUGH A DIFFERENTIAL PRESSURE DEVICE FOR EACH FILTER BANK.
.16 WHEN THE FILTER BANK DIFFERENTIAL PRESSURE SWITCH MAKES (SET AT 1.25" W.C. – ADJ UP TO 3" AND DOWN TO 0.75"), THEN ALERT THE BUILDING MANAGEMENT SYSTEM.

VAV AIR HANDLING UNIT, <50% OA, CH & HTG WATER, WITH REHEAT

GENERAL

22 .00 PERTAINS IN GENERAL TO AHUS WITH THE FOLLOWING UNIT CONFIGURATION - SUPPLY PATH: OUTSIDE AIR DAMPER, OUTSIDE AIR & RETURN AIR MIXING SECTION, FILTER, MAT, HEATING COIL, FZ STAT, RH, MAT, COOLING COIL, HEATING COIL, SUPPLY FAN AIR FLOW STATION, SUPPLY AIR FAN, DUCT DETECTOR, SAT, RH. EXHAUST PATH: RETURN DUCT WITH CO2, RH AND TEMPERATURE TRANSMITTERS, AIR FLOW MEASURING STATION, DUCT DETECTOR, RETURN AIR DAMPER SECTION, EXHAUST FAN AIR FLOW STATION, EXHAUST FAN, EXHAUST DAMPER.
.01 BAS INTERFACE EQUIPMENT – EQUIPMENT SUPPLIED BY BAS UNLESS NOTED OTHERWISE. ALL ITEMS TO BE DISPLAYED ON THE GUI
.02 FREEZE PROTECTION – UNITS TO HAVE AN AVERAGING FREEZE CAPILLARY TUBE ON THE DOWNSTREAM SIDE OF HEATING COIL, SET AT 35°F. ACTIVATION OF THE FREEZE STAT SWITCH WILL FAIL THE UNIT AND ALARM. COORDINATE WITH THE AHU MANUFACTURER - SENSORS BETWEEN THE FIRST HEATING COIL AND THE COOLING COIL MAY NEED TO BE FACTORY INSTALLED DUE TO LIMITED SPACE BETWEEN COILS.

.03 HIGH STATIC SWITCH – UNITS TO HAVE A HIGH STATIC SWITCH ON THE EXHAUST FAN DISCHARGE WHERE A MOTORIZED DAMPER EXIST ON THE FAN DISCHARGE. ACTIVATION OF THE HIGH STATIC SWITCH WILL FAIL THE UNIT AND ALARM.
.04 LOW STATIC SWITCH – UNITS TO HAVE A LOW STATIC SWITCH ON THE EXHAUST (OR RETURN) FAN INTAKE WHERE A MOTORIZED DAMPER OR FIRE OR FIRE/SMOKE DAMPER EXIST ON THE FAN INTAKE. ACTIVATION OF THE HIGH STATIC SWITCH WILL FAIL THE UNIT AND ALARM.
.05 HIGH STATIC SWITCH - UNITS TO HAVE A HIGH STATIC SWITCH ON THE SUPPLY FAN DISCHARGE WHERE A MOTORIZED DAMPER, FIRE OR FIRE/SMOKE DAMPER IN THE SUPPLY DUCT CAN CLOSE OFF 90% OR MORE OF THE SUPPLY AIR PATH. ACTIVATION OF THE HIGH STATIC SWITCH WILL FAIL THE UNIT AND ALARM.
.06 LOW STATIC SWITCH - UNITS TO HAVE A LOW STATIC SWITCH ON THE SUPPLY FAN INTAKE. ACTIVATION OF THE LOW STATIC SWITCH WILL FAIL THE UNIT AND ALARM.
.07 SUPPLY DUCT STATIC PRESSURE CONTROL & SENSOR FAILURE – DEFAULT TO LAST KNOW VALUE AND ALERT GUI.
.08 EXHAUST FAN AIR FLOW STATION. FAILURE OF THE FLOW STATION – CONTROL TO MATCH SUPPLY FAN % SPEED LESS X% (THIS NUMBER "X", TO BE DETERMINED DURING COMMISSIONING) OF THE NOTED SUPPLY FAN % SPEED - ALERT
.09 SUPPLY FAN AIR FLOW STATION. FAILURE OF THE FLOW STATION – CONTROL TO LAST KNOWN VALUE IF FAN SPEED IS DEPENDANT UPON AIR FLOW STATION INPUT - ALERT

.10 OUTSIDE AIR FLOW STATION. FAILURE OF THE FLOW STATION – CONTROL TO LAST KNOWN VALUE. OVERRIDE IF SA TEMP CANNOT BE MAINTAINED - ALERT
.11 DAMPER OPERATORS SUPPLIED BY BAS, DAMPERS SUPPLIED WITH UNIT. DAMPERS ARE FULL MODULATING AND TO BE CAPABLE OF INDEPENDENT OPERATION - DO NOT SHARE A COMMON SIGNAL.
.12 FOR VAV SYSTEMS, THE SUPPLY AIR DUCT STATIC PRESSURE TRANSMITTER TO BE INSTALLED APPROXIMATELY ¾ DISTANCE DOWN THE LENGTH OF THE DUCT RUN – INITIAL SET POINT 1.5"W.G. FINAL SET POINT DETERMINED BY THE AIR BALANCING CONTRACTOR.

△3 REVISED ENTIRE SHEET

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NUMBER	DATE	REVISION
△		
△2	09-19-2011	ADDENDUM #2
△3	10-19-2011	ADDENDUM #3
△		
△		
△		

CHEROKEE NATION. Entertainment

CNE PERMANENT CASINO - RAMONA
31501 US 75 HIGHWAY
RAMONA, OK 74061

ISSUE 02
BUILDING PACKAGE

ISSUE DATE
08-16-2011

PROJECT NO.
L11123

DRAWN BY
MSA

CHECKED BY
PE

SHEET TITLE
MECHANICAL CONTROLS AND DIAGRAMS

M008

22 .13 SAT TRANSMITTER DOWNSTREAM OF SA FAN, IN SA DUCT IF POSSIBLE.
.14 RH TRANSMITTER DOWNSTREAM OF SA FAN
.15 RH TRANSMITTER AFTER THE FIRST HEATING COIL. COORDINATE WITH THE AHU MANUFACTURER - THIS SENSOR MAY NEED TO BE FACTORY INSTALLED DUE TO LIMITED SPACE BETWEEN COILS.
.16 RH TRANSMITTER IN THE RETURN AIR
.17 AVERAGING TEMPERATURE TRANSMITTER BEFORE THE HEATING COIL
.18 AVERAGING TEMPERATURE TRANSMITTER AFTER THE COOLING COIL
.19 OUTSIDE AIR FILTER STATIC PRESSURE - WHERE MULTIPLE FILTER BANKS EXIST, ONE DEVICE FOR EACH FILTER BANK.
.20 MODULATING OUTSIDE AIR DAMPER – DAMPERS WITH THE UNIT, OPERATOR & CONTROL BY BAS
.21 MODULATING RETURN AIR/MIXED AIR DAMPER - DAMPER WITH UNIT, OPERATOR & CONTROL BY BAS.
.22 TWO POSITION DAMPER ON UNIT EXHAUST - DAMPER WITH UNIT, OPERATOR & CONTROL BY BAS
.23 AVERAGING TEMPERATURE TRANSMITTER IN RETURN AIR DUCT TO UNIT
.24 CO2 TRANSMITTER IN RETURN AIR DUCT.
.25 VFD FOR SUPPLY FAN CONTROL, CONTROL BY BAS – VFD SUPPLIED WITH UNIT
.26 VFD FOR EXHAUST FAN CONTROL, CONTROL BY BAS – VFD SUPPLIED WITH UNIT
.27 SUPPLY AIR PATH DUCT DETECTOR SUPPLIED BY F/A CONTRACTOR AND UNIT INTERLOCK WIRED BY F/A CONTRACTOR. BAS TO SHOW DUCT DETECTOR STATUS AND SEND A SIMULTANEOUS FAIL COMMAND TO THE UNIT ON DUCT DETECTOR ACTIVATION.
.28 RETURN AIR PATH DUCT DETECTOR (WHERE APPLICABLE) SUPPLIED BY F/A CONTRACTOR AND UNIT INTERLOCK WIRED BY F/A CONTRACTOR. BAS TO SHOW DUCT DETECTOR STATUS AND SEND A SIMULTANEOUS FAIL COMMAND TO THE UNIT ON DUCT DETECTOR ACTIVATION.
.29 AIR FLOW MEASURING STATIONS: RETURN AIR DUCT TO BE EBTRON GTx116-PD; SUPPLY AND EXHAUST FAN TO BE EBTRON GTx116-F. AIR EBTRON AIR FLOW MEASURING DEVICES PROVIDED BY BAS.

VAV AIR HANDLING UNIT, <50% OA, CH & HTG WATER, WITH REHEAT

SEQUENCE

23 .00 AUTO – UNIT OPERATES 24/7
.01 DEFAULT AND POSITION BEFORE START, OUTSIDE AND EXHAUST AIR DAMPERS CLOSED, RETURN AIR DAMPER OPEN, FANS OFF, COIL CONTROL VALVES CLOSED. AUTO/START – START THE SUPPLY FAN. THE SUPPLY FAN VFD IS TO MODULATE TO MAINTAIN A DUCT STATIC PRESSURE. MODULATE THE CONTROL VALVES OF HEATING COIL #1 OR THE COOLING COIL TO MAINTAIN A LAT OF 55°F. WHEN THE LAT IS WITHIN 3° OF SETPOINT RELEASE TO AUTOMATIC MODE.
.02 FAILURE OF ANY DAMPER OR MOTOR TO CONFIRM OPERATION OR HAS A STATUS MISS-MATCH FOR >30 SECONDS, ALARM SPECIFIC PROBLEM AND FAIL THE UNIT.
.03 **AUTO OPERATION: RA ENTHALPY > OA ENTHALPY, OAT > 45°F - ECONOMIZER**
.04 THE SUPPLY FAN VFD IS TO MODULATE TO MAINTAIN A SPECIFIED DUCT STATIC. OPEN THE EXHAUST AIR DAMPER. THE EXHAUST FAN IS TO RAMP TO THE SCHEDULED CFM - SET BY THE AIR BALANCE CONTRACTOR. THE RETURN AIR DAMPER IS TO MODULATE CLOSED TO MAINTAIN THE SA SETPOINT. AS THE MIXED AIR DAMPER MODULATES CLOSED THE EXHAUST FAN IS TO RAMP UP TO MAXIMUM DESIGN CFM (7,300) WHEN THE SA FAN IS AT MAXIMUM DESIGN CFM (8,500). THE EXHAUST FAN SHALL MODULATE BETWEEN MAXIMUM DESIGN CFM AND ACTUAL NEEDED BASED UPON CURRENT SA FAN CFM AS DETERMINED BY VAV BOX TOTALS. IF THE SETPOINT CANNOT BE MAINTAINED, MODULATE HEATING COIL #1 VALVE OR THE COOLING COIL VALVE TO MAINTAIN AN INITIAL SAT OF 55°F. THE SAT IS TO BE RESET UP BASED UPON VAV BOX OPENING PERCENTAGE UNTIL AT LEAST ONE VAV BOX IS OPEN 90%.
.05 IF THE SPACE HUMIDITY IS > THAN THE SPACE HUMIDITY SP, DRIVE THE TEMPERATURE LEAVING THE COOLING COIL DOWN TO A 52° LAT AND CONTROL UNIT SAT BY MODULATING HEATING COIL #2. WHEN SPACE HUMIDITY LEVEL IS SATISFIED RELEASE TO NORMAL CONTROL.
.06 **AUTO OPERATION: OA ENTHALPY > RA ENTHALPY**
.07 THE SUPPLY FAN VFD IS TO MODULATE TO MAINTAIN A SPECIFIED DUCT STATIC. THE EXHAUST FAN IS TO RAMP UP TO THE SCHEDULED MINIMUM EXHAUST CFM - SET BY THE AIR BALANCE CONTRACTOR. IF THE SUPPLY AIR VOLUME CFM DROPS BELOW THE SCHEDULED MINIMUM OUTSIDE AIR VOLUME (AS CALCULATED BY THE SUM OF VAV BOX CFM VALUES), STOP THE EXHAUST FAN. RESTART THE EXHAUST FAN WHEN THE SUPPLY AIR VOLUME IS 2,000 CFM OVER THE EXHAUST FAN CFM. MODULATE HEATING COIL #1 VALVE OR COOLING COIL VALVE TO MAINTAIN SAT. RESET THE SAT TO MAINTAIN AT LEAST ON VAV BOX OPEN 90%
.08 IF THE SPACE HUMIDITY IS > THAN THE SPACE HUMIDITY SP, DRIVE THE TEMPERATURE LEAVING THE COOLING COIL DOWN TO A 52° LAT AND CONTROL UNIT SAT BY MODULATING HEATING COIL #2. WHEN SPACE HUMIDITY LEVEL IS SATISFIED RELEASE TO NORMAL CONTROL.
.09 **AUTO OPERATION: RA ENTHALPY > OA ENTHALPY, OAT < 45°F**
.10 THE SUPPLY FAN VFD IS TO MODULATE TO MAINTAIN A SPECIFIED DUCT STATIC. THE EXHAUST FAN IS TO RAMP UP TO THE SCHEDULED MINIMUM EXHAUST CFM - SET BY THE AIR BALANCE CONTRACTOR. IF THE SUPPLY AIR VOLUME CFM DROPS BELOW THE SCHEDULED MINIMUM OUTSIDE AIR VOLUME (AS CALCULATED BY THE SUM OF VAV BOX CFM VALUES), STOP THE EXHAUST FAN. RESTART THE EXHAUST FAN WHEN THE SUPPLY AIR VOLUME IS 2,000 CFM OVER THE EXHAUST FAN CFM. MODULATE HEATING COIL #1 VALVE OR COOLING COIL VALVE TO MAINTAIN SAT. IF HEATING COIL #1 CANNOT MAINTAIN SAT, DRIVE HEATING COIL #1 VALVE TO 95% OPEN AND MODULATE HEATING COIL #2 VALVE TO MAINTAIN SAT. OUTSIDE AIR AND RETURN AIR DAMPERS ARE TO MODULATE IF HEATING COIL#2 IS AT 100% OPEN AND THE SAT CANNOT BE MAINTAINED. ALERT THE GUI AND OPEN (MODULATE) THE RETURN AIR DAMPER, THE OUTSIDE AIR DAMPER AND REDUCE THE SPEED OF THE EXHAUST FAN AS REQUIRED.
.11 IF THE SPACE HUMIDITY IS > THAN THE SPACE HUMIDITY SP, DRIVE THE TEMPERATURE LEAVING THE COOLING COIL DOWN TO A 55° LAT AND CONTROL UNIT SAT BY MODULATING HEATING COIL #2. WHEN SPACE HUMIDITY LEVEL IS SATISFIED RELEASE TO NORMAL CONTROL.
.12 FILTER PRESSURE SWITCH:
.13 THE AIR HANDLING UNIT FILTER BANK PRESSURE DIFFERENCE SHALL BE MONITORED THROUGH A DIFFERENTIAL PRESSURE DEVICE FOR EACH FILTER BANK.
.14 WHEN THE FILTER BANK DIFFERENTIAL PRESSURE SWITCH MAKES (SET AT 1.25" W.C. – ADJ UP TO 3" AND DOWN TO 0.75"), THEN ALERT THE BUILDING MANAGEMENT SYSTEM.

CV AIR HANDLING UNIT, CH & HTG WATER, WITH DEHUMID AND <50% OUTSIDE AIR

GENERAL

24 .00 PERTAINS IN GENERAL TO AHUS WITH THE FOLLOWING UNIT CONFIGURATION - SUPPLY PATH: OUTSIDE AIR DAMPER, AIR FLOW MEASURING STATION, RETURN AIR/OUTSIDE AIR MIXED AIR SECTION, FILTER 1, FILTER 2 (OPTION), HEATING COIL #1, COOLING COIL, HEATING COIL #2, AIR FLOW MEASURING STATION, SUPPLY AIR FAN, SAT, RH AND DUCT DETECTOR. EXHAUST PATH: RETURN DUCT WITH DUCT DETECTOR, RH, RAT, CO2, RETURN AIR/OUTSIDE AIR MIXING SECTION, AIR FLOW MEASURING STATION, EXHAUST FAN, EXHAUST DAMPER.

24 .01 BAS INTERFACE EQUIPMENT – EQUIPMENT SUPPLIED BY BAS UNLESS NOTED OTHERWISE. ALL ITEMS TO BE DISPLAYED ON THE GUI
.02 FREEZE PROTECTION – UNITS TO HAVE AN AVERAGING FREEZE CAPILLARY TUBE ON THE DOWNSTREAM SIDE OF HEATING COIL #1, SET AT 35°F. ACTIVATION OF THE FREEZE STAT SWITCH WILL FAIL THE UNIT AND ALARM. COORDINATE WITH THE AHU MANUFACTURER - THIS SENSOR MAY NEED TO BE FACTORY INSTALLED DUE TO LIMITED SPACE BETWEEN COILS.
.03 HIGH STATIC SWITCH – UNITS TO HAVE A HIGH STATIC SWITCH ON THE EXHAUST FAN DISCHARGE WHERE A MOTORIZED DAMPER EXIST ON THE FAN DISCHARGE. ACTIVATION OF THE HIGH STATIC SWITCH WILL FAIL THE UNIT AND ALARM.
.04 LOW STATIC SWITCH – UNITS TO HAVE A LOW STATIC SWITCH ON THE EXHAUST FAN INTAKE WHERE A MOTORIZED DAMPER OR FIRE OR FIRE/SMOKE DAMPER EXIST ON THE FAN INTAKE. ACTIVATION OF THE HIGH STATIC SWITCH WILL FAIL THE UNIT AND ALARM.
.05 HIGH STATIC SWITCH - UNITS TO HAVE A HIGH STATIC SWITCH ON THE SUPPLY FAN DISCHARGE WHERE A MOTORIZED DAMPER, FIRE OR FIRE/SMOKE DAMPER IN THE SUPPLY DUCT CAN CLOSE OFF 90% OR MORE OF THE SUPPLY AIR PATH. ACTIVATION OF THE HIGH STATIC SWITCH WILL FAIL THE UNIT AND ALARM.
.06 LOW STATIC SWITCH - UNITS TO HAVE A LOW STATIC SWITCH ON THE SUPPLY FAN INTAKE. ACTIVATION OF THE LOW STATIC SWITCH WILL FAIL THE UNIT AND ALARM.
.07 SUPPLY DUCT STATIC PRESSURE CONTROL SENSOR FAILURE – DEFAULT TO LAST KNOW VALUE AND ALERT GUI.
.08 EXHAUST FAN AIR FLOW STATION. FAILURE OF THE FLOW STATION – CONTROL TO MATCH SUPPLY FAN % SPEED LESS X% (THIS NUMBER "X", TO BE DETERMINED DURING COMMISSIONING) OF THE NOTED SUPPLY FAN % SPEED - ALERT
.09 SUPPLY FAN AIR FLOW STATION. FAILURE OF THE FLOW STATION – CONTROL TO LAST KNOWN VALUE IF FAN SPEED IS DEPENDANT UPON AIR FLOW STATION INPUT - ALERT
.10 OUTSIDE AIR FLOW STATION. FAILURE OF THE FLOW STATION – CONTROL TO LAST KNOWN VALUE. OVERRIDE IF SA TEMP CANNOT BE MAINTAINED - ALERT
.11 DAMPER OPERATORS SUPPLIED BY BAS, DAMPERS SUPPLIED WITH UNIT
.12 SUPPLY AIR DUCT STATIC PRESSURE TRANSMITTER APPROXIMATELY ¾ DISTANCE DOWN THE LENGTH OF THE DUCT RUN – INITIAL SET POINT 1.5"W.G. FINAL SET POINT DETERMINED BY THE AIR BALANCING CONTRACTOR.
.13 SAT TRANSMITTER DOWNSTREAM OF SA FAN, IN SA DUCT IF POSSIBLE.
.14 RH TRANSMITTER DOWNSTREAM OF SA FAN
24 .15 SUPPLY AIR PATH DUCT DETECTOR SUPPLIED BY F/A CONTRACTOR AND UNIT INTERLOCK WIRED BY F/A CONTRACTOR. BAS TO SHOW DUCT DETECTOR STATUS AND SEND A SIMULTANEOUS FAIL COMMAND TO THE UNIT ON DUCT DETECTOR ACTIVATION.
.16 RETURN AIR PATH DUCT DETECTOR (WHERE APPLICABLE) SUPPLIED BY F/A CONTRACTOR AND UNIT INTERLOCK WIRED BY F/A CONTRACTOR. BAS TO SHOW DUCT DETECTOR STATUS AND SEND A SIMULTANEOUS FAIL COMMAND TO THE UNIT ON DUCT DETECTOR ACTIVATION.
.17 AVERAGING TEMPERATURE TRANSMITTER BEFORE THE FIRST HEATING COIL
.18 AVERAGING TEMPERATURE TRANSMITTER AFTER THE FIRST HEATING COIL
.19 AVERAGING TEMPERATURE TRANSMITTER AFTER THE COOLING COIL AND BEFORE HEATING COIL #2
.20 AVERAGING TEMPERATURE TRANSMITTER IN RETURN AIR DUCT TO UNIT
.21 AVERAGING FREEZE STAT AFTER THE FIRST HEATING COIL. COORDINATE WITH THE AHU MANUFACTURER - THIS SENSOR MAY NEED TO BE FACTORY INSTALLED DUE TO LIMITED SPACE BETWEEN COILS.
.22 RH TRANSMITTER AFTER THE FIRST HEATING COIL. COORDINATE WITH THE AHU MANUFACTURER - THIS SENSOR MAY NEED TO BE FACTORY INSTALLED DUE TO LIMITED SPACE BETWEEN COILS.
.23 OUTSIDE AIR FILTER STATIC PRESSURE SWITCH - ONE SWITCH FOR EACH FILTER BANK.
.24 MODULATING OUTSIDE AIR DAMPER – DAMPERS WITH THE UNIT, OPERATOR & CONTROL BY BAS
.25 MODULATING RETURN AIR/MIXED AIR DAMPER - DAMPER WITH UNIT, OPERATOR & CONTROL BY BAS.
.26 TWO POSITION DAMPER ON UNIT EXHAUST - DAMPER WITH UNIT, OPERATOR & CONTROL BY BAS.
.27 CO2 TRANSMITTER IN RETURN AIR DUCT.
.28 RH TRANSMITTER IN THE RETURN AIR
.29 VFD FOR SUPPLY FAN CONTROL, CONTROL BY BAS – VFD SUPPLIED WITH UNIT
.30 VFD FOR EXHAUST FAN CONTROL, CONTROL BY BAS – VFD SUPPLIED WITH UNIT

CV AIR HANDLING UNIT, CH & HTG WATER, WITH DEHUMID AND <50% OUTSIDE AIR

SEQUENCE

25 .00 AUTO – UNIT OPERATES 24/7
.01 DEFAULT AND POSITION BEFORE START, OUTSIDE AND EXHAUST AIR DAMPERS CLOSED, RETURN AIR DAMPER OPEN, FANS OFF, COIL CONTROL VALVES CLOSED. AUTO/START – START THE SUPPLY FAN. THE SUPPLY FAN VFD IS TO MODULATE TO MAINTAIN A DUCT STATIC PRESSURE. MODULATE THE CONTROL VALVES OF HEATING COIL #1 OR THE COOLING COIL TO MAINTAIN A LAT OF 55°F. WHEN THE LAT IS WITHIN 3° OF SETPOINT RELEASE TO AUTOMATIC MODE.
.02 FAILURE OF ANY DAMPER OR MOTOR TO CONFIRM OPERATION OR HAS A STATUS MISS-MATCH FOR >30 SECONDS, ALARM SPECIFIC PROBLEM AND FAIL THE UNIT.
.03 **AUTO OPERATION: RA ENTHALPY > OA ENTHALPY, OAT > 45°F - ECONOMIZER**
.04 THE SUPPLY FAN VFD IS TO MODULATE TO MAINTAIN A SPECIFIED CFM. OPEN THE EXHAUST AIR DAMPER. THE EXHAUST FAN IS TO RAMP TO THE DESIGN SUPPLY AIR CFM - LESS AN OFFSET. (CFM FIGURES TO BE DETERMINED BY THE AIR BALANCE CONTRACTOR) THE RETURN AIR DAMPER IS TO MODULATE CLOSED. IF THE SA SETPOINT CANNOT BE MAINTAINED, MODULATE HEATING COIL #1 VALVE OR THE COOLING COIL VALVE TO MAINTAIN SPACE SETPOINT.
.05 IF THE SPACE HUMIDITY IS > THAN THE SPACE HUMIDITY SP, DRIVE THE TEMPERATURE LEAVING THE COOLING COIL DOWN TO A 55° LAT AND CONTROL UNIT SAT BY MODULATING HEATING COIL #2. WHEN SPACE HUMIDITY LEVEL IS SATISFIED RELEASE TO NORMAL CONTROL.
.06 **AUTO OPERATION: OA ENTHALPY > RA ENTHALPY**
.07 THE SUPPLY FAN VFD IS TO RAMP TO MAINTAIN A SPECIFIED CFM. THE EXHAUST FAN IS TO RAMP TO THE DESIGN MINIMUM CFM. MODULATE THE RETURN AIR AND OUTSIDE AIR DAMPERS TO MAINTAIN DESIGN OUTSIDE AIR/RETURN AIR CFM. MODULATE HEATING COIL #1 VALVE OR COOLING COIL VALVE TO MAINTAIN SAT. (CFM FIGURES TO BE DETERMINED BY THE AIR BALANCE CONTRACTOR.)
.08 IF THE SPACE HUMIDITY IS > THAN THE SPACE HUMIDITY SP, DRIVE THE TEMPERATURE LEAVING THE COOLING COIL DOWN TO A 55° LAT AND CONTROL UNIT SAT BY MODULATING HEATING COIL #2. WHEN SPACE HUMIDITY LEVEL IS SATISFIED RELEASE TO NORMAL CONTROL.
.09 **AUTO OPERATION: RA ENTHALPY > OA ENTHALPY, OAT < 45°F**
.10 THE SUPPLY FAN VFD IS TO RAMP TO MAINTAIN A SPECIFIED CFM. THE EXHAUST FAN IS TO RAMP TO THE DESIGN MINIMUM CFM. MODULATE THE RETURN AIR AND OUTSIDE AIR DAMPERS TO MAINTAIN DESIGN OUTSIDE AIR/RETURN AIR CFM. MODULATE HEATING COIL #1 VALVE OR COOLING COIL VALVE TO MAINTAIN SAT. (CFM FIGURES TO BE DETERMINED BY THE AIR BALANCE CONTRACTOR.)
.11 IF THE SPACE HUMIDITY IS > THAN THE SPACE HUMIDITY SP, DRIVE THE TEMPERATURE LEAVING THE COOLING COIL DOWN TO A 55° LAT AND CONTROL UNIT SAT BY MODULATING HEATING COIL #2. WHEN SPACE HUMIDITY LEVEL IS SATISFIED RELEASE TO NORMAL CONTROL.
.12 FILTER PRESSURE SWITCH:
.13 THE AIR HANDLING UNIT FILTER BANK PRESSURE DIFFERENCE SHALL BE MONITORED THROUGH A DIFFERENTIAL PRESSURE DEVICE FOR EACH FILTER BANK.
.14 WHEN THE FILTER BANK DIFFERENTIAL PRESSURE SWITCH MAKES (SET AT 1.25" W.C. – ADJ UP TO 3" AND DOWN TO 0.75"), THEN ALERT THE BUILDING MANAGEMENT SYSTEM.

MAKEUP AIR UNIT - CHILLED WATER, HEATING WATER - VAV & CV

GENERAL

30 .00 PERTAINS IN GENERAL TO A 100% OA UNIT WITH THE FOLLOWING UNIT CONFIGURATION - SUPPLY PATH: OUTSIDE AIR DAMPER, FILTER, HEATING COIL, COOLING COIL, SUPPLY AIR FAN, DUCT DETECTOR, SAT.
.01 BAS INTERFACE EQUIPMENT – EQUIPMENT SUPPLIED BY BAS UNLESS NOTED OTHERWISE. ALL ITEMS TO BE DISPLAYED ON THE GUI
.02 FREEZE PROTECTION – UNITS TO HAVE AN AVERAGING FREEZE CAPILLARY TUBE ON THE DOWNSTREAM SIDE OF HEATING COIL, SET AT 35°F. ACTIVATION OF THE FREEZE STAT SWITCH WILL FAIL THE UNIT AND ALARM. COORDINATE WITH THE AHU MANUFACTURER - THIS SENSOR MAY NEED TO BE FACTORY INSTALLED DUE TO LIMITED SPACE BETWEEN COILS.
.03 HIGH STATIC SWITCH - UNITS TO HAVE A HIGH STATIC SWITCH ON THE SUPPLY FAN DISCHARGE WHERE A MOTORIZED DAMPER, FIRE OR FIRE/SMOKE DAMPER IN THE SUPPLY DUCT CAN CLOSE OFF 90% OR MORE OF THE SUPPLY AIR PATH. ACTIVATION OF THE HIGH STATIC SWITCH WILL FAIL THE UNIT AND ALARM.
.04 LOW STATIC SWITCH - UNITS TO HAVE A LOW STATIC SWITCH ON THE SUPPLY FAN INTAKE. ACTIVATION OF THE LOW STATIC SWITCH WILL FAIL THE UNIT AND ALARM.
.05 DAMPER OPERATORS SUPPLIED BY BAS, DAMPERS SUPPLIED WITH UNIT. DAMPERS ARE TWO POSITION. ACTUATOR AND CONTROL BY BAS.
.06 FOR VAV UNITS: SUPPLY AIR DUCT STATIC PRESSURE TRANSMITTER APPROXIMATELY ¾ DISTANCE DOWN THE LENGTH OF THE DUCT RUN – INITIAL SET POINT 1.5"W.G. FINAL SET POINT DETERMINED BY THE AIR BALANCING CONTRACTOR.
.07 SAT TRANSMITTER DOWNSTREAM OF SA FAN, IN SA DUCT IF POSSIBLE.
.08 VAV UNITS WILL BE PROVIDED WITH A VFD TO CONTROL FAN MOTOR SPEED. CONSTANT VOLUME UNITS MAY HAVE A VFD OR MOTOR STARTER.
.09 OUTSIDE AIR FILTER STATIC PRESSURE - ONE DEVICE FOR EACH FILTER BANK.
.10 VFD FOR SUPPLY FAN CONTROL OR MOTOR STARTER FOR FAN CONTROL, CONTROL BY BAS.
.11 SUPPLY AIR PATH DUCT DETECTOR SUPPLIED BY F/A CONTRACTOR AND UNIT INTERLOCK WIRED BY F/A CONTRACTOR. BAS TO SHOW DUCT DETECTOR STATUS AND SEND A SIMULTANEOUS FAIL COMMAND TO THE UNIT ON DUCT DETECTOR ACTIVATION.
.12 TWO POSITION OUTSIDE AIR DAMPER - ACTUATOR PROVIDED BY BAS.

MAKEUP AIR UNIT - CHILLED WATER, HEATING WATER - CV UNIT

SEQUENCE

31 .00 THE KITCHEN EXHAUST AND MAKE-UP AIR SYSTEM SHALL BE ENABLED THROUGH THE USE OF A LOCAL KITCHEN EXHAUST HOOD CONTROL PANEL OR A SIMPLE TOGGLE SWITCH..
.01 UPON START SIGNAL OF KITCHEN EXHAUST HOOD, ENABLE KEF OR MONITOR THE KEF START SIGNAL FROM THE EXHAUST HOOD PANEL. IF THE KITCHEN EXHAUST FAN RUN STATUS IS NOT RECEIVED WITHIN 60 SECONDS, ALERT THE GUI. (CT PROVIDED BY BAS)
.02 UPON RECEIPT OF STATUS SIGNAL OF KITCHEN EXHAUST HOOD/FAN RUN, ENABLE THE MAU UNIT.
.03 IF OAT IS <35°F OPEN THE HEATING WATER CONTROL VALVE 25%
.04 OPEN THE OUTSIDE AIR DAMPER, WHEN CONFIRMED, START THE SA FAN. RELEASE THE HEATING WATER CONTROL VALVE TO NORMAL LEAVING AIR TEMPERATURE CONTROL.

31 .05 MODULATE THE HEATING AND COOLING WATER VALVES TO MAINTAIN SAT SP.
.06 IF THE MAKE-UP AIR UNIT SUPPLY AIR FAN RUN STATUS SIGNAL IS NOT RECEIVED WITHIN 60 SECONDS, FAIL THE MAU AND ALARM THE GUI.
.07 INITIAL SET POINT FOR SAT: 68°F (GUI ADJUSTABLE).
.08 THE MAXIMUM ALLOWABLE SUPPLY AIR TEMPERATURE IS 75°F; THE MINIMUM ALLOWABLE SUPPLY AIR TEMPERATURE IS 55°F. IF SAT IS OUTSIDE THESE PARAMETERS FOR MORE THAN 120 SECONDS, ALERT GUI.
.09 ACTIVATION OF THE FREEZE STAT SWITCH WILL FAIL THE UNIT. OUTSIDE AIR DAMPER CLOSES, HEATING COIL OPENS, COOLING COIL CLOSES AND ALARM. AFTER CONFIRMATION OF THE OUTSIDE AIR DAMPER CLOSED AND 60 MINUTES CLOSE THE HEATING WATER COIL VALVE. OPEN THE HEATING WATER COIL VALVE EVERY 60 MINUTES FOR 15 MINUTES UNTIL THE ALARM IS CLEARED.

FAN COIL SYSTEM - COOLING/HEATING (MODULATING CHW VALVE/MODULATING HW VALVE)

40 .00 SPACE CONDITION INFORMATION PROVIDED BY A WALL MOUNTED SENSOR (TEMPERATURE TRANSMITTER). ON DEMAND FOR COOLING START THE FAN COIL FAN. IF THE FC SUPPLY AIR FAN CURRENT SWITCH SIGNAL IS NOT RECEIVED WITHIN 60 SECONDS, CLOSE COIL CONTROL VALVES AND ALARM. COOLING MODE A: MODULATE THE COOLING CONTROL VALVE TO MAINTAIN SPACE CONDITIONS. FAN COIL FAN RUNS CONTINUOUS. COOLING MODE B: OPEN THE COOLING VALVE TO MAINTAIN A LEAVING AIR TEMPERATURE OF 55°F. WHEN THE ROOM SENSOR IS SATISFIED, CLOSE THE CONTROL VALVE AND STOP THE FC FAN. COOLING MODE SELECTABLE FROM GUI. PROVIDE AN OPTION SWITCH ON THE GUI FOR CONTINUOUS FC FAN OPERATION.
.01 ON DEMAND FOR HEATING START THE FAN COIL FAN. IF THE FC SUPPLY AIR FAN CURRENT SWITCH SIGNAL IS NOT RECEIVED WITHIN 60 SECONDS, CLOSE COIL CONTROL VALVES AND ALARM. HEATING MODE A: MODULATE THE HEATING CONTROL VALVE TO MAINTAIN SPACE CONDITIONS. CONTROL THE FC LAT TO A MAXIMUM OF 85°F. FAN COIL FAN RUNS CONTINUOUS. HEATING MODE B: MODULATE THE HEATING COIL TO MAINTAIN A LAT OF 90°F. WHEN ROOM SENSOR IS SATISFIED CLOSE THE CONTROL VALVE AND STOP THE FC FAN. PROVIDE AN OPTION SWITCH ON THE GUI FOR CONTINUOUS FC FAN OPERATION.
.02 UPON LOSS OF RUN STATUS OF THE FAN COIL UNIT FOR 60 SECONDS, FAIL THE UNIT AND CLOSE WATER COIL VALVES. ALARM THE UNIT.
.03 DUCT DETECTOR SHUT DOWN IS A F/A CONTRACTOR INTERLOCK. THE BAS SHALL MONITOR DUCT DETECTOR STATUS AND SEND A SIMULTANEOUS FAIL COMMAND TO THE UNIT ON DUCT DETECTOR ACTIVATION.

VARIABLE AIR VOLUME VAV) BOX CONNECTED TO A VAV AHU

50 .00 THE VARIABLE AIR VOLUME BOX SHALL MODULATE TO MAINTAIN TEMPERATURE SET-POINT WITHIN THE ZONE IT SERVES. THE BOX SHALL CONTROL BETWEEN ITS PRE-SET MAXIMUM AND MINIMUM VOLUMETRIC AIR FLOW SET-POINTS PROVIDED BY THE AIR BALANCER. THESE SET POINTS TO BE ADJUSTABLE FROM THE GUI.
.01 IF THE VARIABLE AIR VOLUME BOX IS EQUIPPED WITH A RE-HEAT MECHANISM, AND THE SPACE TEMPERATURE IS BELOW ITS TEMPERATURE SET-POINT FOR MORE THAN 60 SECONDS, AND THE VARIABLE AIR VOLUME BOX IS AT ITS MINIMUM POSITION THEN MODULATE THE RE-HEAT CONTROL VALVE AND RESET THE VAV BOX DAMPER TO THE DESIGNATED HEATING CFM VALUE (ADJ).
.02 IF A VAV BOX WITHOUT REHEAT CAPABILITY IS AT ITS MINIMUM POSITION AND THE SPACE TEMPERATURE IS BELOW ITS TEMPERATURE SET-POINT FOR MORE THAN 600 SECONDS THEN ALERT THE GUI.

GENERAL EXHAUST FAN

60 .00 APPLIES TO EF: "X"
.01 ENABLE GENERAL EXHAUST FAN.
.02 IF NO RUN STATUS IS RECEIVED WITHIN ONE MINUTE, ALARM THE GUI.
.03 DEPENDING UPON APPLICATION EXHAUST FANS MAY REQUIRE A TIME OF DAY SCHEDULE, PROVIDE AS DIRECTED.
61 .00 ELECTRICAL ROOM EXHAUST FAN
.01 OPERATES WHEN CHILLER IS OFF LINE, BELOW SPECIFIED OAT.
.02 ON HIGH SPACE TEMPERATURE: OPEN OUTSIDE AIR INTAKE DAMPER, OPEN EXHAUST FAN DAMPER, ENERGIZE EXHAUST FAN AS REQUIRED TO MAINTAIN SPACE SET POINT.

CRAC UNITS

70 .00 INTERNAL CONTROLS MAINTAIN OPERATION OF THE CRAC UNITS.
.01 AUTOMATIC SWITCH OVER BETWEEN CHILLED WATER AND DX IS CONTROLLED BY INTERNAL CRAC UNIT CONTROLS.
.02 BAS TO PROVIDE TEMPERATURE AND HUMIDITY SENSORS IN EACH ROOM WITH CRAC UNITS TO BE DISPLAYED ON THE GUI.
.03 BAS CONTRACTOR TO PROVIDE CHILLED (AND HEATING IF REQUIRED) WATER REMOTE TRANSMITTER WIRING BETWEEN THE CRAC PANEL AND THE REMOTE TEMPERATURE TRANSMITTERS.
.04 BAS TO CONNECT TO THE CRAC UNIT CONTROL PANEL AND TRANSFER POINTS AVAILABLE TO THE GUI.

DATA LOGGING

100 .00 SOFTWARE SHALL BE CAPABLE OF DATA LOGGING A MINIMUM OF 20 SIMULTANEOUS OPERATIONS WITH A TOTAL OF 1,000,000 COLLECTION POINTS

CENTRAL PLANT CONTROL

150 .00 ALL CENTRAL PLANT OPERATIONS ARE PERFORMED BY THE "PLANT IN THE BOX" SUPPLIER. THIS INCLUDES CHILLER STAGING, BOILER STAGING, CHILLED WATER AND HEATING WATER PUMP SPEED CONTROL - VARIABLE PRIMARY AND SECONDARY PUMP DP CONTROL SHALL BE CONTROLLED FROM REMOTE SENSORS AS A PRIMARY AND LOCAL PLANT SENSORS AS A BACK-UP WHEN THE REMOTE SENSOR FAILS. THE PLANT SHALL PROVIDE CHILLED WATER TO THE BUILDING TO AN AMBIENT CONDITION OF 50°F. (GUI ADJ). BELOW 50°F THE CHILLER SHALL ISOLATE AND THE BY-PASS VALVE CHBPV-1 SHALL OPEN. THE THREE WAY VALVE ON AHU-1 SHALL OPEN 100% TO THE AHU COIL. THE CHILLED WATER PUMP SHALL RUN TO MAINTAIN THE SET POINT DP. IF THE CIRCULATING WATER TEMPERATURE RISES ABOVE 80°F OPEN THE THREE WAY VALVE ON AHU-2 100% TO THE AHU COIL. (THIS FLOW IS REQUIRED TO MAINTAIN WATER COOLED ICE MACHINE OPERATION)
.01 CHILLED WATER SUPPLY TEMPERATURE, MECHANICAL COOLING: 42°F SUPPLY, DESIGN RETURN: 58°F
.02 CHILLED WATER MINIMUM WATER FLOW: THE CHILLER REQUIRES A MINIMUM GPM FOR OPERATION. AHU-1 & AHU-2 ARE EQUIPPED WITH THREE WAY VALVES. IN BY-PASS THE AHU THREE WAY VALVES ARE CAPABLE OF MOVING 145 GPM EACH. THERE IS A THROTTLING VALVE AVAILABLE TO RESTRICT FLOW. THE BUILDING BAS IS TO MODULATE THE CHBPV-2 TO MAINTAIN A MINIMUM CHILLED WATER FLOW AS RECORDED BY THE ULTRA SONIC FLOW METER. WHEN THE CHILLER IS NOT OPERATIONAL THIS VALVE SHALL BE CLOSED.
.03 HEATING WATER SUPPLY TEMPERATURE: 180°F, DESIGN RETURN: 140°F. CENTRAL PLANT CONTROL SHALL PROVIDE A HEATING WATER TEMPERATURE RESET BASED UPON OUTSIDE AIR TEMPERATURE. AT 32°F - HEATING WATER SUPPLY TEMPERATURE = 180°F. AT 65°F - HEATING WATER SUPPLY TEMPERATURE = 120°F (GUI ADJ)

151 .00 CENTRAL PLANT AND WINTER ECONOMIZER OPERATION
.01 DURING THIS OPERATIONAL TIME PERIOD THE CHILLER BY-PASS CONTROL VALVE, CHBPV-1, SHALL BE OPENED AND THE CHILLED WATER CONTROL VALVES ON MAU1, AHU-1, AHU-2, AHU-4, AHU-5, AHU-6 AS REQUIRED TO MAINTAIN A <80°F CHILLED WATER TEMPERATURE ENTERING THE BUILDING. SECONDARY CHILLED WATER PUMPS SHALL RUN TO MAINTAIN SYSTEM OPERATING PRESSURE. (THIS OPERATION IS DESIGNED TO EXTRACT HEAT FROM THE CHILLED WATER SYSTEM THAT HAS BEEN ADDED BY THE WATER COOLED REFRIGERATION RACKS AND INSERT THE HEAT INTO THE AHU/MAU AIR STREAM.)

END OF SECTION

3 REVISED ENTIRE SHEET

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NUMBER	DATE	REVISION
2	09-19-2011	ADDENDUM #2
3	10-19-2011	ADDENDUM #3

CHEROKEE NATION Entertainment

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ISSUE 02
BUILDING PACKAGE

ISSUE DATE
08-16-2011

PROJECT NO.
L11123

DRAWN BY
MSA

CHECKED BY
PE

SHEET TITLE
MECHANICAL CONTROLS AND DIAGRAMS

M009

Building Automation System

Project: CNE CASINO - RAMONA

Description: Controls Points List, see Dwgs for Aditional Points

X denotes physical I/O, C denotes calculated I/O

Where tags are not shown the contractor is to create a tag in a similar nomenclature.

BAS contractor to coordinate communication protocol when required.

Line	Description	AI	AO	DI	DO	Tag	Alert/ Alarm
1	**General**						
2							
3	Outside Air Temperature (Two Sensors)	X				TT-OSA	
4	Outside Air Humidity (Two Sensors)	X				H-OSA	
5	Outside Air Enthalpy	C				ENTH-OSA	
6	Outside Air Dewpoint	C				DEWPT-OSA	
7	Bldg Dif. Pres. Trans. Relative to Outside	X				DP-BLDG-LEVEL(x)	
8	Domestic Hot Water Circ Pump Status (Each Pump CT)			X		CT-HWC-PUMP(x)	
9	Dom. Hot Water Temp in Common Header	X				TT-DHW-COM	
10	Domestic Water Pressure	X				CITY-H2O-PRESSURE	ALM
11	Generator Status			X		STATUS-GEN(x)	
12	Generator Fuel Level	X					
13	Generator Call for Fuel			X			
14	% Load of Generator	X				LOAD - GEN(x)	
15	Generator Alarm			X			
16	Main Transfer Switch - Currently Using Utility Power			X		TRANS-SWITCH-XPWR	
17	Main Transfer Switch - Currently Using Generator Power			X		TRANS-SWITCH-GPWR	ALT
18	Flywheel UPS Status			X			
19	Flywheel UPS - % load	X					
20	Lighting Inverter alarm			X			
21	Lighting Inverter % Load	X					
22	Spare for Electrical Component	X					
23	Spare for Electrical Component			X			
24							
25							
26	**CONSTANT OR VARIABLE AIR VOLUME AIR HANDLING UNIT WITH ENERGY WHEEL AND DEHUMIDIFICATION**						
27							
28	AHU-X SFan S/S				X	SS-SFAN-AHU(x)	
29	AHU-X SFan Status or VFD Run Status			X		STAT-SFAN-AHU(x)	
30	AHU-X SVFD Command Fan Speed		X			CSPD-SFAN-AHU(x)	
31	AHU-X SVFD Fan Speed	X				SPD-SFAN(x)-AHU(x)	
32	AHU-X SVFD Alarm			X		ALM-SFAN-AHU(x)	ALM
33	AHU-X Supply Static Pressure	X				DSP-SFAN-AHU(x)	
34	AHU-X RFan S/S (Each Fan)				X	SS-RFAN(x)-AHU(x)	
35	AHU-X RFan Status or VFD Run Status (Each Fan)			X		STAT-RFAN(x)-AHU(x)	
36	AHU-X RVFD Command Fan Speed (Each Fan)		X			CSPD-RFAN(x)-AHU(x)	
37	AHU-X RVFD Fan Speed (Each Fan)	X				SPD-RFAN(x)-AHU(x)	
38	AHU-X RVFD Alarm (Each Fan)			X		ALM-RFAN(x)-AHU(x)	ALM
39	AHU-X Supply Air Volume (Each Fan)	X				CFM-SFAN(x)-AHU(x)	
40	AHU-X Supply Air Volume Total	C				TCFM-SPLY-AHU(x)	
41	AHU-X Return Air Volume (Each Fan)	X				CFM-RFAN(x)-AHU(x)	
42	AHU-X Return Air Volume Total	C				TCFM-RTN-AHU(x)	
43	AHU-X Energy wheel S/S				X	SS-EWHL-AHU(x)	
44	AHU-X Energy Wheel Status or VFD Run Status			X		STAT-EWHL-AHU(x)	
45	AHU-X Energy Wheel VFD Command speed		X			CSPD-EWHL-AHU(x)	
46	AHU-X Energy Wheel VFD speed	X				SPE-EWHL-AHU(x)	
47	AHU-X Energy Wheel VFD Alarm			X		ALM-EWHL-AHU(x)	ALM
48	AHU-X OSA Damper Command		X			CMD-OAD-AHU(x)	
49	AHU-X OSA Damper Position	X				POS-OAD-AHU(x)	
50	AHU-X RA Damper Command		X			CMD-OAD-AHU(x)	
51	AHU-X RA Damper Position	X				POS-OAD-AHU(x)	
52	AHU-X EA Damper Command		X			CMD-RAD-AHU(x)	
53	AHU-X EA Damper Position	X				POS-RAD-AHU(x)	
54	AHU-X RA Wheel Bypass Damper Command		X			CMD-RAWHLD-AHU(x)	
55	AHU-X RA Wheel Bypass Damper Position	X				POS-RAWHLD-AHU(x)	
56	AHU-X SA Wheel Bypass Damper Command		X			CMD-SAWHLD-AHU(x)	
57	AHU-X SA Wheel Bypass Damper Position	X				POS-SAWHLD-AHU(x)	
58	AHU-X Mixed Air Temperature - before heating coil 1	X				TT-MAT-AHU(x)	
59	AHU-X Supply Air Temperature after cooling coil	X				TT-CCL-AHU(x)	
60	AHU-X Discharge Air Temperature after supply fan	X				TT-DAT-AHU(x)	
61	AHU-X Discharge Air Temperature Command		X			CMD-DAT-AHU(x)	
62	AHU-X Return Air Temperature - before fan	X				TT-RAT-AHU(x)	
63	AHU-X Exhaust Air Temp after wheel	X				TT-EAT-AHU(x)	
64	AHU-X Return Air Humidity - before fan	X				HT-RA-AHU(x)	
65	AHU-X Supply Air Humidity after heating coil, before CC	X				HT-SA1-AHU(x)	
66	AHU-X Supply Air Humidity after Supply Fan	X				HT-SA2-AHU(x)	
67	AHU-X Return Air Enthalpy	C				ENTH-RA-AHU(x)	
68	AHU-X HW Valve Command - primary coil		X			CMD-HWV-AHU(x)	
69	AHU-X CHW Valve Command		X			CMD-CHV-AHU(x)	
70	AHU-X HW Valve Command - reheat coil		X			CMD-HWRHTV-AHU(x)	
71	AHU-X HW Valve Position - primary heating coil	X				POS-HWV-AHU(x)	
72	AHU-X CHW Valve Position	X				POS-CHV-AHU(x)	
73	AHU-X HW Valve Position - reheat coil	X				POS-HWRHTV-AHU(x)	
74	AHU-X Return Air Duct Detector			X		ALM-RADD-AHU(x)	ALM
75	AHU-X Supply Air Duct Detector			X		ALM-SADD-AHU(x)	ALM
76	AHU-X Freeze Temp Detector - after primary heating coil			X		ALM-FRZ-AHU(x)	ALM
77	AHU-X Low static pressure alarm			X		ALM-LSP-AHU(x)	ALM
78	AHU-X High static pressure alarm			X		ALM-HSP-AHU(x)	ALM
79	AHU-X Supply Air Filter static pressure	X				ALT-SAFSP-AHU(x)	ALT
80	AHU-X Return Air Filter static pressure	X				ALT-RAFSP-AHU(x)	ALT
81	AHU-X Status vs Command Alert	C				ALT-CMDSTAT-AHU(x)	ALT
82							
83							
84	**CONSTANT OR VARIABLE VOLUME AIR HANDLING UNIT WITH DEHUMIDIFICATION - < 50% OA**						
85							
86	AHU-X SFan S/S				X	SS-SFAN-AHU(x)	
87	AHU-X SFan Status or VFD Run Status (Each Fan)			X		STAT-SFAN-AHU(x)	
88	AHU-X SFVFD Command Fan Speed		X			CSPD-SFAN-AHU(x)	
89	AHU-X SFVFD Fan Speed (Each Fan)	X				SPD-SFAN(x)-AHU(x)	
90	AHU-X SFVFD Alarm (Each Fan)			X		ALM-SFAN-AHU(x)	ALM
91	Return Fan info if present:						
92	AHU-X RFan Status or VFD Run Status (Each Fan)			X		STAT-RFAN(x)-AHU(x)	
93	AHU-X RFVFD Command Fan Speed (Each Fan)		X			CSPD-RFAN(x)-AHU(x)	
94	AHU-X RFVFD Fan Speed (Each Fan)	X				SPD-RFAN(x)-AHU(x)	
95	AHU-X RVFD Alarm (Each Fan)			X		ALM-RFAN(x)-AHU(x)	ALM
96	AHU-X OSA Damper Command		X			CMD-OAD-AHU(x)	
97	AHU-X OSA Damper Position	X				POS-OAD-AHU(x)	
98	AHU-X RA Damper Command		X			CMD-RAD-AHU(x)	
99	AHU-X RA Damper Position	X				POS-RAD-AHU(x)	
100	AHU-X EA Damper Command		X			CMD-EAD-AHU(x)	
101	AHU-X EA Damper Position	X				POS-EAD-AHU(x)	
102	AHU-X Mixed Air Temperature - before heating coil 1	X				TT-MAT-AHU(x)	
103	AHU-X Freeze Temp Detector - after heating coil 1			X		ALM-FRZ-AHU(x)	ALM
104	AHU-X Air Temperature - after chilled water coil	X				TT-CC-AHU(x)	
105	AHU-X Discharge Air Temperature after supply fan	X				TT-DAT-AHU(x)	
106	AHU-X Discharge Air Temperature Command		X			CMD-DAT-AHU(x)	
107	AHU-X Unit Return Air Temperature	X				TT-RAT-AHU(x)	
108	AHU-X Unit Return Air Humidity	X				HT-RA-AHU(x)	
109	AHU-X Return Air Enthalpy	C				ENTH-RA-AHU(x)	
110	AHU-X HW Valve Command - heating coil 1		X			CMD-HWV1-AHU(x)	
111	AHU-X CHW Valve Command		X			CMD-CHV-AHU(x)	
112	AHU-X HW Valve Command - heating coil 2		X			CMD-HWV2-AHU(x)	
113	AHU-X HW Valve Position - heating coil 1	X				POS-HWV1-AHU(x)	
114	AHU-X CHW Valve Position	X				POS-CHV-AHU(x)	
115	AHU-X HW Valve Position - heating coil 2	X				POS-HWV2-AHU(x)	
116	AHU-X Return Air Duct Detector status (if present)			X		ALM-RADD-AHU(x)	ALM
117	AHU-X Supply Air Duct Detector status			X		ALM-SADD-AHU(x)	ALM
118	AHU-X Low static pressure alarm - Supply Fan			X		ALM-LSPSF-AHU(x)	ALM
119	AHU-X High static pressure alarm - Return Fan			X		ALM-HSPRF-AHU(x)	ALM
120	AHU-X Supply Air Filter Bank 1 static pressure	X				ALT-SAF1SP-AHU(x)	ALT
121	AHU-X Supply Air Filter Bank 2 static pressure (if present)	X				ALT-SAF2SP-AHU(x)	ALT
122	AHU-X Status vs Command Alert	C				ALT-CMDSTAT-AHU(x)	ALT
123							
124							
125	**CONSTANT OR VARIABLE AIR VOLUME AIR HANDLING UNIT - MAKE-UP AIR UNIT**						
126							
127	MAU-X SFan S/S				X	SS-SFAN-MAU(x)	
128	MAU-X SFan Status or VFD Run Status			X		STAT-SFAN-MAU(x)	
129	MAU-X SVFD Command Fan Speed		X			CSPD-SFAN-MAU(x)	
130	MAU-X SVFD Fan Speed	X				SPD-SFAN(x)-MAU(x)	
131	MAU-X SVFD Alarm			X		ALM-SFAN-MAU(x)	ALM
132	MAU-X OSA Damper Command		X			CMD-OAD-MAU(x)	
133	MAU-X OSA Damper Position	X				POS-OAD-MAU(x)	
134	MAU-X Face & Bypass Dampers		X			CMD-FBD-MAU(x)	
135	MAU-X Face & Bypass Damper Position Feedback	X				POS-FBD-MAU(x)	
136	MAU-X Supply Air Temperature after heating coil	X				TT-HCL-MAU(x)	
137	MAU-X Supply Air Temperature after cooling coil	X				TT-CCL-MAU(x)	
138	MAU-X Discharge Air Temperature after supply fan	X				TT-DAT-MAU(x)	
139	MAU-X Discharge Air Temperature Command		X			CMD-DAT-MAU(x)	
140	MAU-X Supply Air Humidity after Supply Fan	X				HT-SA2-MAU(x)	
141	MAU-X CHW Return Temperature	X				TT-CHWR-MAU(x)	
142	MAU-X HW Valve Command - primary heating coil		X			CMDV-HWV-MAU(x)	
143	MAU-X CHW Valve Command		X			CMD-CHV-MAU(x)	
144	MAU-X HW Valve Position - primary heating coil	X				POS-HWV-MAU(x)	
145	MAU-X CHW Valve Position	X				POS-CHV-MAU(x)	
146	MA-X Supply Air Duct Detector			X		ALM-SADD-MAU(x)	ALM
147	MAU-X Freeze Temp Detector - after primary heating coil			X		ALM-FRZ-MAU(x)	ALM
148	MAU-X Low static pressure alarm			X		ALM-LSP-MAU(x)	ALM
149	MAU-X Supply Air Filter static pressure	X				ALT-SAFSP-MAU(x)	ALT
150	MAU-X Status vs Command Alert	C				ALT-CMDSTAT-MAU(x)	ALT
151							
152							
153	**TERMINAL UNIT CONTROL - VAV BOX**						
154							
155	Space Temperature	X				TT-VAV(x)	
156	Primary Air Valve		X			CMD-VAV(x)	
157	Primary Air CFM	X				CFM-VAV(x)	
158	Reheat Valve command		X			CMD-HWV-VAV(x)	
159	Discharge Air Temperature (Each Reheat Box)	X				TT-DAT-VAV(x)	
160	VAV-X Status vs Command Alert	C				ALT-CMDSTAT-VAV(x)	ALT
161							
162							
163	**TERMINAL UNIT CONTROL - FANCOIL**						
164							
165	Space Temperature	X				TT-FCU(x)	
166	Cooling Valve Command		X			CMD-CHV-FCU(x)	
167	Heating Valve Command		X			CMD-HWV-FCU(x)	
168	Fan Motor CT			X		CT-SFAN-FCU(x)	
169	Discharge Air Temperature	X				TT-DAT-FCU(x)	
170	Fan S/S				X	SS-FCU(x)	
171	VAV-X Status vs Command Alarm	C				ALM-CMDSTAT-FCU(x)	ALM
172							
173							
174	**EXHAUST FAN**						
175							
176	EFan S/S (Each Fan)				X	SS-EF(x)	
177	EFan Status (Each Fan) Motor CT			X		CT-EF(x)	
178	EF speed (each) (When VFD equipped)	X				SPD-EF(x)	
179	Status vs Command Alarm	C				ALM-CMDSTAT-EF(x)	ALM
180	Outside air damper command associated with EF (where applicable)			X			
181	Outside air damper command associated with EF fresh air intake			X			
180							
181							
182	**KITCHEN EXHAUST FAN**						
183							
184	KEF S/S (Each Fan)				X	SS-KEF(x)	
185	KEF status (each) Motor CT				X	CT-KEF(x)	
186	KEF speed (each) (When VFD equipped)	X				SPD-KEF(x)	
187	Status vs Command Alarm				X	ALM-CMDSTST-EF(x)	ALM
188							
189							
190	**CHILLER PLANT - POINTS FROM THE PLANT (minimum)**						
191							
192	Primary Chilled Water Pump S/S (each pump)				X	SS-CHW-P(x)	
193	Primary Chilled Water Pump Status - CT (each pump)			X		STAT-CHW-P(x)	
194	Primary Chilled Water Pump VFD Command (each pump)		X			CSPD-VFD-CHWP(x)	
195	Primary Chilled Water Pump VFD Speed (each pump)	X				SPD-VFD-CHWP(x)	
196	Primary Chilled Water Pump kW (each pump)	X				KW-CHWP(x)	
197	Status vs Command Alarm	C				ALM-CMDSTAT-CHWP(x)	ALM
198	Chiller Points - applies to each chiller						
199	Chiller Enable				X	SS-CHLR(x)	
200	Chiller Status - Auto			X		AUTO-CHLR(x)	
201	Chiller Status - Operational			X		STAT-CHLR(x)	
202	Chilled Water Isolation Valve Command			X		CMD-CHWVLV-CHLR(x)	
203	Chilled Water Isolation Valve Open				X	OPN-CHWVLV-CHLR(x)	
204	Chilled Water Isolation Valve Closed				X	CLS-CHWVLV-CHLR(x)	
205	Chiller kW		X			KW-CHLR(x)	
206	Chiller Load %		X			LOAD-CHLR(x)	
207	Chiller Anti-Short Cycle Timer Count Down		X			TIMER-CYCL-CHLR(x)	
208	Evaporator - Supply Water Temperature		X			TT-CHWS-CHLR(x)	
209	Evaporator - Return Water Temperature		X			TT-CHWR-CHLR(x)	
210	Status vs Command Alarm					ALM-CMDSTAT-CHLR(x)	ALM
211	Chiller Alarm Code		X			ALM-CODE-CHLR(x)	ALM
212	Chilled Water System Common Points						
213	Evaporator - Supply Water Temperature Command	X				CMD-CHWS-TEMP	
214	Primary Chilled Water Pump Speed		X			CMD-VFD-CHWS	
215	Chilled Water Temperature Entering the Plant					TT-CHWR	
216	Chilled Water Temperature Leaving the Plant					TT-CHWS	
219	Chilled Water Differential Pressure Set-Point 1 (at plant)		X			SET-DP1-CHW	
220	Chilled Water Differential Pressure 1	X				DP1-CHW	
221	Chilled Water Differential Pressure Set-Point 2 (AHU-1)		X			SET-DP2-CHW	
222	Chilled Water Differential Pressure 2	X				DP2-CHW	
223	Primary Chilled Water Pump Rotation Command		X			ROTATION-CHWP	
224	Chiller Rotation Command		X			ROTATION-CHLR	
225							
226							
227	**BOILER PLANT - POINTS FROM THE PLANT (minimum)**						
228							
229	Heating Water Pump S/S (each pump)				X	SS-HW-P(x)	
230	Heating Water Pump Status - CT			X		STAT-HW-P(x)	
231	Htg Water Pump VFD Command (ea pump)		X			CSPD-VFD-HWP(x)	
232	Htg Water Pump VFD Speed (each pump)	X				SPD-VFD-HWP(x)	
233	Heating Water Pump kW (each pump)	X				KW-HWP(x)	
234	Status vs Command Alarm	C				ALM-CMDSTAT-HWP(x)	ALM
235	Points Apply to Each Boiler - Headered Primary Pump System						
236	Boiler Isolation Valve 1 Command		X			CMD-VLV1-B(x)	
237	Boiler Isolation Valve 1 Position	X				POS-VLV1-B(x)	
238	Boiler Isolation Valve 2 Command		X			CMD-VLV2-B(x)	
239	Boiler Isolation Valve 2 Position	X				POS-VLV2-B(x)	
240	Enable Boiler Command				X	SS-B(x)	
241	Boiler Run Status			X		STAT-B(x)	
242	Boiler Leaving Water Temperature		X			TT-LWT-B(x)	
243	Boiler Alarm Code		X			ALM-CODE-B(x)	ALM
244	Heating Water System Common Points						
245	Heating Supply Water Temperature Command	X				CMD-HWS-TEMP	
246	Heating Water Temperature entering the Plant	X				TT-HWR	
247	Heating Water Temperature in Bridge	X				TT-BRIDGE-HW	
248	Heating Water Temperature leaving the Plant	X				TT-HWS	
249	Heating Water Differential Pressure Set-Point 1 (at plant)		X			SET-DP1-HW	
250	Heating Water Differential Pressure 1	X				DP1-HW	
251	Heating Water Differential Pressure Set-Point 2 (AHU-1)		X			SET-DP2-HW	
252	Heating Water Differential Pressure 2	X				DP2-HW	
253	Heating Water Pump Rotation Command		X			ROTATION-SHWP	
254	Boiler Rotation Command		X			ROTATION-BOILER	
255	Boiler Plant Pump Hour Meter (each)	X					
256							

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REGISTERED PROFESSIONAL ENGINEER
BENJAMIN W. YEUNG
21888
OKLAHOMA
05-09-12

NUMBER 2 DATE 09-19-2011
REVISION ADDENDUM #2

CHEROKEE NATION Entertainment

CNE PERMANENT CASINO - RAMONA
31501 US 75 HIGHWAY
RAMONA, OK 74061

ISSUE 02
BUILDING PACKAGE

ISSUE DATE
08-16-2011

PROJECT NO.
L11123

DRAWN BY
MSA

CHECKED BY
PE

SHEET TITLE
MECHANICAL CONTROLS AND DIAGRAMS

M010

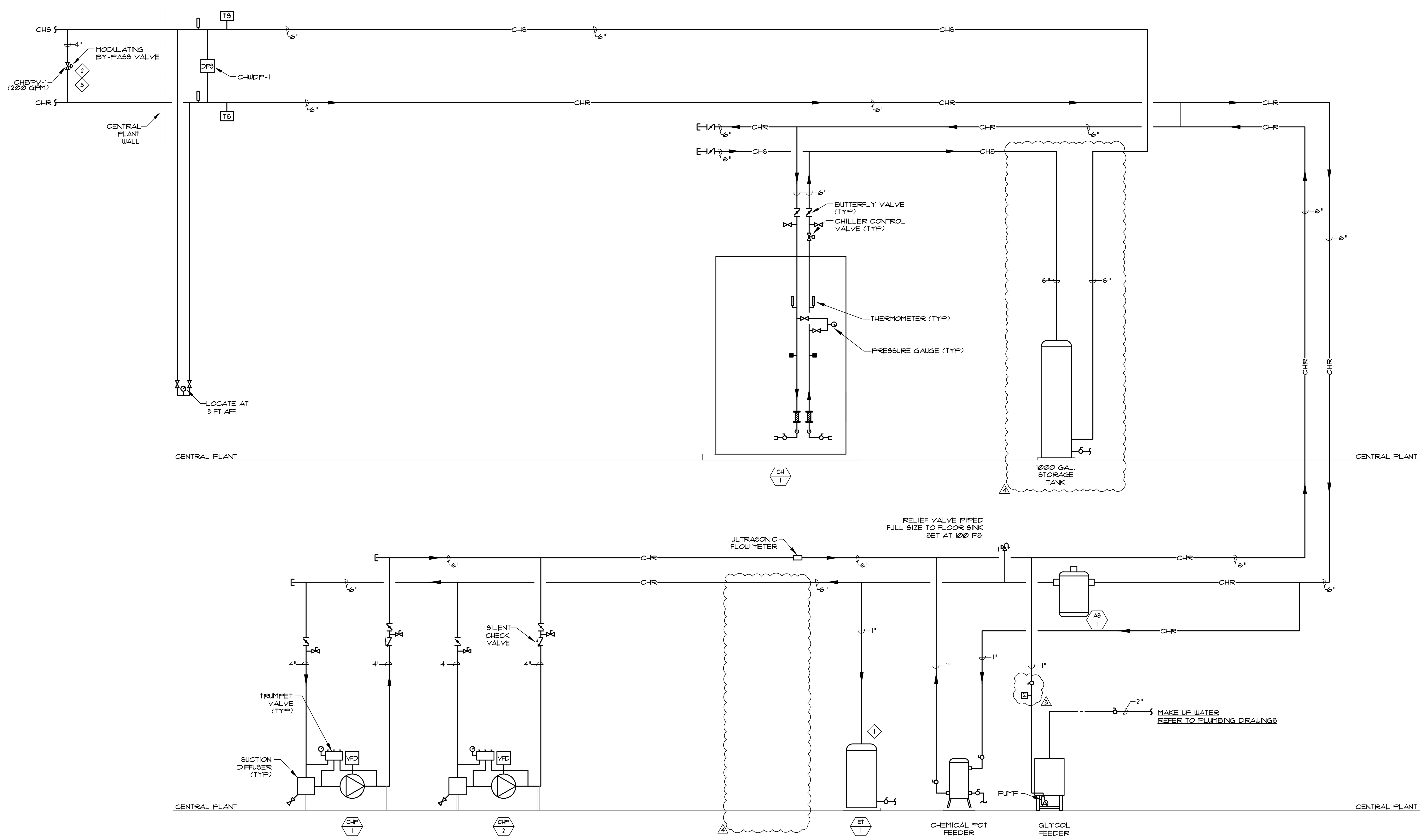
GENERAL NOTES:

1. REFER TO PUMP AND MAKE-UP WATER DETAILS FOR ADDITIONAL REQUIREMENTS.
2. SET CHP VFD MIN SPEED / FREQUENCY TO 6 HZ.
3. BAS TO COLLECT EVAPORATOR EWT / LAT AND CONDENSER EWT / LWT FROM EACH CHILLER CONTROL PANEL.
4. BAS TO COLLECT EVAPORATOR DP AND CONDENSER DP FROM EACH CHILLER CONTROL PANEL.
5. TEMPERATURE GAUGES: WEISS VARI-ANGLE DIGITAL (PROVIDE WEATHERPROOF COVER IN EXTERIOR LOCATIONS).
6. PRESSURE GAUGES: WEISS DUGY1-0100-4L-SG.

SHEET NOTES:

1. ADJUST TANK CHARGE VALUE TO SUIT SYSTEM REQUIREMENTS.
2. THIS VALVE MIMIMUM SPEC TO BE VALVE-TECK BF-HP SERIES. PROVIDE GLOBE VALVE IF NEEDED.
3. BY-PASS LOCATED IN BUILDING.

REFER TO SPECIFICATIONS FOR VIBRATION ISOLATION REQUIREMENTS ASSOCIATED WITH CHILLERS, PUMPS, AND PIPING.



A / M011 CHILLED WATER PIPING DIAGRAM
NTS

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REGISTERED PROFESSIONAL ENGINEER BENJAMIN W. YOUNG 21888 OKLAHOMA
05-09-12

NUMBER	DATE	REVISION
2	09-19-2011	ADDENDUM #2
3	10-19-2011	ADDENDUM #3
4	10-27-2011	ADDENDUM #4

CHEROKEE NATION. Entertainment

CNE PERMANENT CASINO - RAMONA
31501 US 75 HIGHWAY
RAMONA, OK 74061

ISSUE 02: BUILDING PACKAGE
ISSUE DATE: 08-16-2011
PROJECT NO.: L11123
DRAWN BY: MSA
CHECKED BY: PE
SHEET TITLE: MECHANICAL PIPING DIAGRAMS

M011

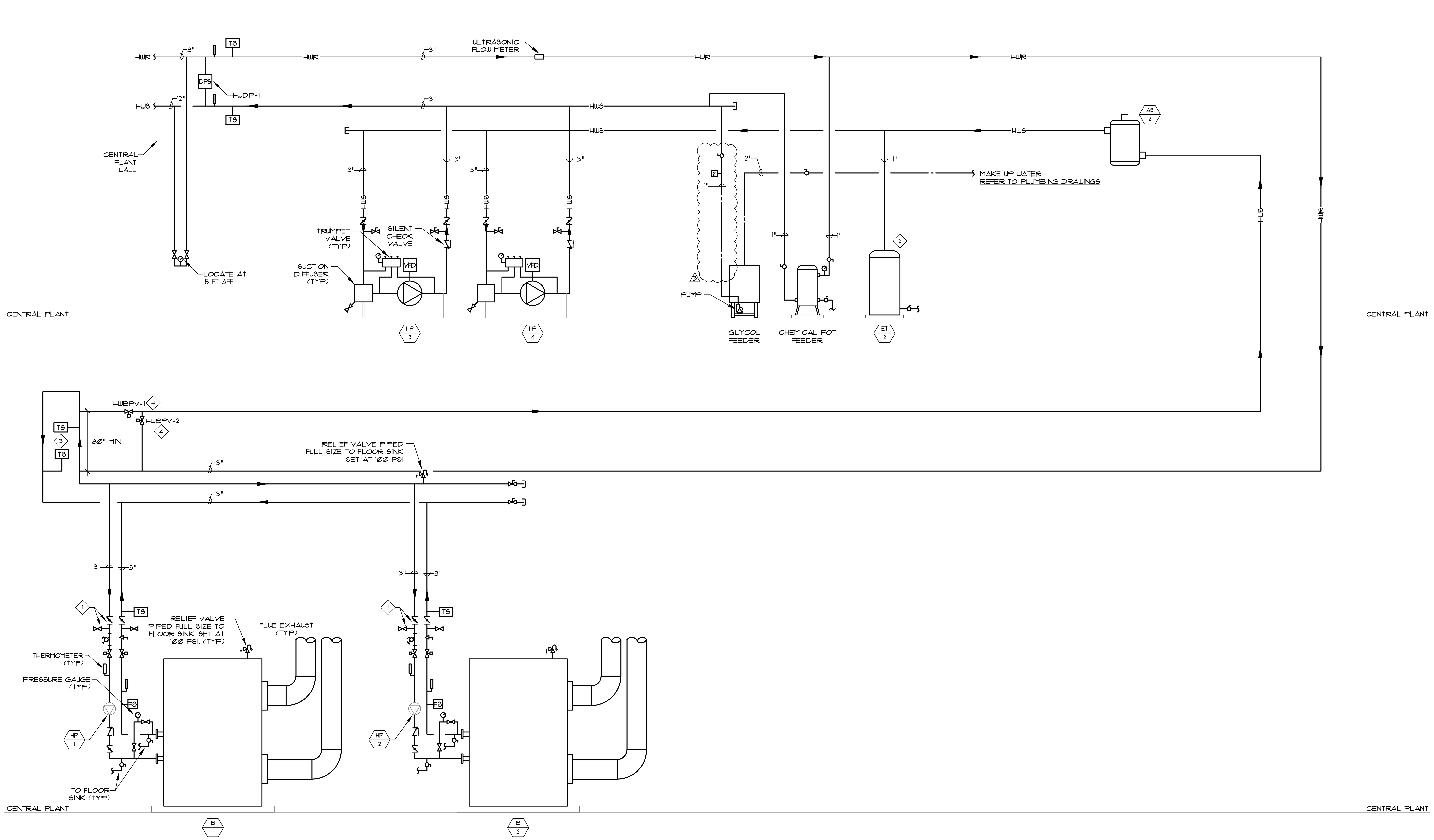
GENERAL NOTES:

1. TEMPERATURE GAUGS: WEISS VARI-ANGLE DIGITAL (PROVIDE WEATHERPROOF COVER IN EXTERIOR LOCATIONS).
2. PRESSURE GAUGES: WEISS DUGY1-0100-4L-SG.

SHEET NOTES:

1. BOILER ISOLATION VALVES AND AIR BLEED VALVES SHALL BE PHYSICALLY INSTALLED HIGHER THAN THE TOP OF THE BOILER. PROVIDE CHAIN WHEELS ON THE BOILER ISOLATION VALVES.
2. ADJUST CHARGE TO SUIT SYSTEM REQUIREMENTS.
3. LOCATE TRANSMITTER MIDPOINT ON BRIDGELINE.
4. THIS VALVE TO BE VALVE-TECK BF-HP SERIES.

REFER TO SPECIFICATIONS FOR VIBRATION ISOLATION REQUIREMENTS ASSOCIATED WITH BOILERS, PUMPS, AND PIPING.



A / M012 **HEATING WATER PIPING DIAGRAM**

NTS

NOTE: REFER TO PUMP AND MAKE-UP WATER DETAILS FOR ADDITIONAL REQUIREMENTS.

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REGISTERED PROFESSIONAL ENGINEER
BENJAMIN W. YEUNG
21888
OKLAHOMA
05-09-12

NUMBER	DATE	REVISION
2	09-19-2011	ADDENDUM #2
3	10-19-2011	ADDENDUM #3

CHEROKEE NATION. Entertainment

CNE PERMANENT CASINO - RAMONA
31501 US 75 HIGHWAY
RAMONA, OK 74061

ISSUE 02
BUILDING PACKAGE

ISSUE DATE
08-16-2011

PROJECT NO.
L11123

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SHEET TITLE
MECHANICAL PIPING DIAGRAMS

M012

IECC COMPLIANCE CERTIFICATE

COM*check* Software Version 3.8.0

Mechanical Compliance Certificate

2006 IECC

Section 1: Project Information

Project Type: **New Construction**
Project Title : Ramona - Cherokee Nation Enterprises

Construction Site:	Owner/Agent:	Designer/Contractor:
	CHEROKEE NATION ENTERTAINMENT	Robbie Jones MSA ENGINEERING 370 E. W indmill Ln. Las Vegas, NV 89123 702-896-1100 rjones@msa-lv.com

Section 2: General Information

Building Location (for weather data): **Fort Gibson, Oklahoma**
Climate Zone: **3a**

Section 3: Mechanical Systems List

Quantity	System Type & Description
1	AHU-1 AND 2: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 501 kBtu/h / Cooling: Cooling equipment (Hydronic Coil), Capacity 1008 kBtu/h / Single Zone
1	AHU-3: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 142 kBtu/h / Cooling: Cooling equipment (Hydronic Coil), Capacity 164 kBtu/h / Single Zone
2	AHU-4: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 183 kBtu/h / Cooling: Cooling equipment (Hydronic Coil), Capacity 219 kBtu/h / Single Zone
1	AHU-5: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 322 kBtu/h / Cooling: Cooling equipment (Hydronic Coil), Capacity 388 kBtu/h / Single Zone
1	AHU-6: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 167 kBtu/h / Cooling: Cooling equipment (Hydronic Coil), Capacity 169 kBtu/h / Single Zone
1	AHU-7: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 260 kBtu/h / Cooling: Cooling equipment (Hydronic Coil), Capacity 333 kBtu/h / Single Zone
1	AHU-8: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 55 kBtu/h / Cooling: Cooling equipment (Hydronic Coil), Capacity 66 kBtu/h / Single Zone
1	FCU-1: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 67 kBtu/h / Cooling: Cooling equipment (Hydronic Coil), Capacity 73 kBtu/h / Single Zone
1	FCU-2: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 16 kBtu/h / Cooling: Cooling equipment (Hydronic Coil), Capacity 25 kBtu/h / Single Zone
1	FC-3: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 26 kBtu/h / Cooling: Cooling equipment (Hydronic Coil), Capacity 41 kBtu/h / Single Zone
1	FC-4: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 20 kBtu/h / Cooling: Cooling equipment (Hydronic Coil), Capacity 29 kBtu/h / Single Zone
1	VAV-1: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 11 kBtu/h / Single Zone
1	VAV-2: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 8 kBtu/h / Single Zone
1	VAV-3: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 6 kBtu/h / Single Zone
1	VAV-4: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 10 kBtu/h / Single Zone
1	VAV-5: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 16 kBtu/h / Single Zone
1	VAV-6: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 21 kBtu/h / Single Zone
1	VAV-7: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 17 kBtu/h / Single Zone
1	VAV-8: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 33 kBtu/h / Single Zone
1	VAV-9: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 7 kBtu/h / Single Zone
1	VAV-10: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 8 kBtu/h / Single Zone
1	VAV-11: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 6 kBtu/h / Single Zone
1	VAV-12: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 9 kBtu/h / Single Zone
1	VAV-13: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 9 kBtu/h / Single Zone
1	CRAC-1 and CRAC-2: Cooling: Cooling equipment (Hydronic Coil), Capacity 103 kBtu/h / Single Zone
1	MAU-1: Heating: Heating equipment (Hydronic or Steam Coil), Hot Water, Capacity 576 kBtu/h / Cooling: Cooling equipment (Hydronic Coil), Capacity 277 kBtu/h / Single Zone
1	EH-1: Heating: Heating equipment (Unit Heater), Electric, Capacity 11 kBtu/h
2	HUH-1 AND HUH-2: Heating: Heating equipment (Unit Heater), Electric, Capacity 50 kBtu/h
1	EH-1 copy 2: Heating: Heating equipment (Unit Heater), Electric, Capacity 11 kBtu/h
1	CH-1: Cooling: Water Chiller, Capacity 300 tons, Condenser Air-Cooled, Efficiency: 2.50 COP, Standard Centrifugal Chiller: leaving chilled water temperature = 44.0 deg. F, entering condenser water temperature = 85.0, condenser flow rate = 3 gpm/ton
1	B-1: Heating: Hot Water Boiler, Capacity 3500000 kBtu/h, Gas, Efficiency: 85.00 % Ec
1	WH-1: Gas Storage Water Heater, Capacity: 100 gallons, Input Rating: 75 Btu/h w/ Circulation Pump, Efficiency: 0.48 EF

Section 4: Requirements Checklist

Requirements Specific To: AHU-1 AND 2 :

- ❑ 1. Discharge dampers prohibited with fan motors > 10 hp
- ❑ 2. Balancing and pressure test connections on all hydronic terminal devices
- ❑ 3. Separate hot and cold water supply and returns
- ❑ 4. Multiple boilers must have automatic controls that sequence operation with load
- ❑ 5. Single boiler >500 kBtu/h input capacity must have a multistaged or modulating burner
- ❑ 6. Two-pipe changeover heating/cooling controls must have:
  a) 15 degrees F deadband where boiler and chiller can not operate,
  b) allow operation in either heating or cooling for at least 4 hrs. and
  c) prevent difference between heating and cooling set points greater than 30 degrees F

Requirements Specific To: AHU-3 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices
- ❑ 2. Separate hot and cold water supply and returns
- ❑ 3. Multiple boilers must have automatic controls that sequence operation with load
- ❑ 4. Single boiler >500 kBtu/h input capacity must have a multistaged or modulating burner
- ❑ 5. Two-pipe changeover heating/cooling controls must have:
  a) 15 degrees F deadband where boiler and chiller can not operate,
  b) allow operation in either heating or cooling for at least 4 hrs. and
  c) prevent difference between heating and cooling set points greater than 30 degrees F

Requirements Specific To: AHU-4 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices
- ❑ 2. Separate hot and cold water supply and returns
- ❑ 3. Multiple boilers must have automatic controls that sequence operation with load
- ❑ 4. Single boiler >500 kBtu/h input capacity must have a multistaged or modulating burner
- ❑ 5. Two-pipe changeover heating/cooling controls must have:
  a) 15 degrees F deadband where boiler and chiller can not operate,
  b) allow operation in either heating or cooling for at least 4 hrs. and
  c) prevent difference between heating and cooling set points greater than 30 degrees F

Requirements Specific To: AHU-5 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices
- ❑ 2. Separate hot and cold water supply and returns
- ❑ 3. Multiple boilers must have automatic controls that sequence operation with load
- ❑ 4. Single boiler >500 kBtu/h input capacity must have a multistaged or modulating burner
- ❑ 5. Two-pipe changeover heating/cooling controls must have:
  a) 15 degrees F deadband where boiler and chiller can not operate,
  b) allow operation in either heating or cooling for at least 4 hrs. and
  c) prevent difference between heating and cooling set points greater than 30 degrees F

Requirements Specific To: AHU-6 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices
- ❑ 2. Separate hot and cold water supply and returns
- ❑ 3. Multiple boilers must have automatic controls that sequence operation with load
- ❑ 4. Single boiler >500 kBtu/h input capacity must have a multistaged or modulating burner

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- ❑ 5. Two-pipe changeover heating/cooling controls must have:
  a) 15 degrees F deadband where boiler and chiller can not operate,
  b) allow operation in either heating or cooling for at least 4 hrs. and
  c) prevent difference between heating and cooling set points greater than 30 degrees F

Requirements Specific To: AHU-7 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices
- ❑ 2. Separate hot and cold water supply and returns
- ❑ 3. Multiple boilers must have automatic controls that sequence operation with load
- ❑ 4. Single boiler >500 kBtu/h input capacity must have a multistaged or modulating burner
- ❑ 5. Two-pipe changeover heating/cooling controls must have:
  a) 15 degrees F deadband where boiler and chiller can not operate,
  b) allow operation in either heating or cooling for at least 4 hrs. and
  c) prevent difference between heating and cooling set points greater than 30 degrees F

Requirements Specific To: AHU-8 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices
- ❑ 2. Separate hot and cold water supply and returns
- ❑ 3. Multiple boilers must have automatic controls that sequence operation with load
- ❑ 4. Single boiler >500 kBtu/h input capacity must have a multistaged or modulating burner
- ❑ 5. Two-pipe changeover heating/cooling controls must have:
  a) 15 degrees F deadband where boiler and chiller can not operate,
  b) allow operation in either heating or cooling for at least 4 hrs. and
  c) prevent difference between heating and cooling set points greater than 30 degrees F

Requirements Specific To: FCU-1 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices
- ❑ 2. Separate hot and cold water supply and returns
- ❑ 3. Multiple boilers must have automatic controls that sequence operation with load
- ❑ 4. Single boiler >500 kBtu/h input capacity must have a multistaged or modulating burner
- ❑ 5. Two-pipe changeover heating/cooling controls must have:
  a) 15 degrees F deadband where boiler and chiller can not operate,
  b) allow operation in either heating or cooling for at least 4 hrs. and
  c) prevent difference between heating and cooling set points greater than 30 degrees F

Requirements Specific To: FCU-2 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices
- ❑ 2. Separate hot and cold water supply and returns
- ❑ 3. Multiple boilers must have automatic controls that sequence operation with load
- ❑ 4. Single boiler >500 kBtu/h input capacity must have a multistaged or modulating burner
- ❑ 5. Two-pipe changeover heating/cooling controls must have:
  a) 15 degrees F deadband where boiler and chiller can not operate,
  b) allow operation in either heating or cooling for at least 4 hrs. and
  c) prevent difference between heating and cooling set points greater than 30 degrees F

Requirements Specific To: FC-3 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices
- ❑ 2. Separate hot and cold water supply and returns
- ❑ 3. Multiple boilers must have automatic controls that sequence operation with load
- ❑ 4. Single boiler >500 kBtu/h input capacity must have a multistaged or modulating burner
- ❑ 5. Two-pipe changeover heating/cooling controls must have:
  a) 15 degrees F deadband where boiler and chiller can not operate,
  b) allow operation in either heating or cooling for at least 4 hrs. and
  c) prevent difference between heating and cooling set points greater than 30 degrees F

Requirements Specific To: FC-4 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices
- ❑ 2. Separate hot and cold water supply and returns
- ❑ 3. Multiple boilers must have automatic controls that sequence operation with load
- ❑ 4. Single boiler >500 kBtu/h input capacity must have a multistaged or modulating burner
- ❑ 5. Two-pipe changeover heating/cooling controls must have:
  a) 15 degrees F deadband where boiler and chiller can not operate,
  b) allow operation in either heating or cooling for at least 4 hrs. and
  c) prevent difference between heating and cooling set points greater than 30 degrees F

Requirements Specific To: VAV-1 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices

Requirements Specific To: VAV-2 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices

Requirements Specific To: VAV-3 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices

Requirements Specific To: VAV-4 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices

Requirements Specific To: VAV-5 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices

Requirements Specific To: VAV-6 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices

Requirements Specific To: VAV-7 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices

Requirements Specific To: VAV-8 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices

Requirements Specific To: VAV-9 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices

Requirements Specific To: VAV-10 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices

Requirements Specific To: VAV-11 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices

Requirements Specific To: VAV-12 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices

Requirements Specific To: VAV-13 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices

Requirements Specific To: CRAC-1 and CRAC-2 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices

Requirements Specific To: MAU-1 :

- ❑ 1. Balancing and pressure test connections on all hydronic terminal devices
- ❑ 2. Separate hot and cold water supply and returns
- ❑ 3. Multiple boilers must have automatic controls that sequence operation with load
- ❑ 4. Single boiler >500 kBtu/h input capacity must have a multistaged or modulating burner
- ❑ 5. Two-pipe changeover heating/cooling controls must have:
  a) 15 degrees F deadband where boiler and chiller can not operate,
  b) allow operation in either heating or cooling for at least 4 hrs. and
  c) prevent difference between heating and cooling set points greater than 30 degrees F

Requirements Specific To: EH-1 :

None

Requirements Specific To: HUH-1 AND HUH-2 :

None

Requirements Specific To: EH-1 copy 2 :

None

Requirements Specific To: CH-1 :

- ❑ 1. Equipment minimum efficiency: Chiller: 2.5 COP (2.5, IPLV)

Requirements Specific To: B-1 :

- ❑ 1. Equipment minimum efficiency: Boiler Combustion Efficiency 80% Ec

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- ❑ 2. Two-pipe changeover heating/cooling controls must have:
  a) 15 degrees F deadband where boiler and chiller can not operate,
  b) allow operation in either heating or cooling for at least 4 hrs. and
  c) prevent difference between heating and cooling set points greater than 30 degrees F
- ❑ 3. Newly purchased heating equipment meets the efficiency requirements
  - used equipment must meet 80% Et @ maximum capacity
- ❑ 4. Systems with multiple boilers have automatic controls capable of sequencing boiler operation
- ❑ 5. Hydronic heating systems comprised of a single boiler and >500 kBtu/h input design capacity include either a multistaged or modulating burner

Requirements Specific To: WH-1 :

- ❑ 1. Gas Storage Water Heater efficiency: 0.5 EF
- ❑ 2. Hot water system sized per manufacturer's sizing guide
- ❑ 3. All piping in circulating system insulated
- ❑ 4. Hot water storage temperature adjustable down to 120°F or lower
- ❑ 5. Automatic time control of heat tapes and recirculating systems present
- ❑ 6. Controls will shut off operation of circulating pump between water heater/boiler and storage tanks within 5 minutes after end of heating cycle

Generic Requirements: Must be met by all systems to which the requirement is applicable:

- ❑ 1. Load calculations per ASHRAE Fundamentals
- ❑ 2. Plant equipment and system capacity no greater than needed to meet loads
  - ❑ Exception: Standby equipment automatically off when primary system is operating
  - ❑ Exception: Multiple units controlled to sequence operation as a function of load
- ❑ 3. Minimum one temperature control device per system
- ❑ 4. Minimum one humidity control device per installed humidification/dehumidification system
- ❑ 5. Automatic Controls: Setback to 55°F (heat) and 85°F (cool); 7-day clock,
  2-hour occupant override, 10-hour backup
  - ❑ Exception: Continuously operating zones
  - ❑ Exception: 2 kW demand or less, submit calculations
- ❑ 6. Outside-air source for ventilation; system capable of reducing OSA to required minimum
- ❑ 7. R-5 supply and return air duct insulation in unconditioned spaces
  R-8 supply and return air duct insulation outside the building
  R-8 insulation between ducts and the building exterior when ducts are part of a building assembly
  - ❑ Exception: Ducts located within equipment
  - ❑ Exception: Ducts with interior and exterior temperature difference not exceeding 15°F.
- ❑ 8. Mechanical fasteners and sealants used to connect ducts and air distribution equipment
- ❑ 9. Ducts sealed - longitudinal seams on rigid ducts; transverse seams on all ducts;
  UL 181A or 181B tapes and mastics
- ❑ 10. Hot water pipe insulation: 1 in. for pipes <=1.5 in. and 2 in. for pipes >1.5 in.
  Chilled water/refrigerant/brine pipe insulation: 1 in. for pipes <=1.5 in. and 1.5 in. for pipes >1.5 in.
  Steam pipe insulation: 1.5 in. for pipes <=1.5 in. and 3 in. for pipes >1.5 in.
  - ❑ Exception: Piping within HVAC equipment.
  - ❑ Exception: Fluid temperatures between 55 and 105°F.
  - ❑ Exception: Fluid not heated or cooled with renewable energy.
  - ❑ Exception: Runouts <4 ft in length.
- ❑ 11. Operation and maintenance manual provided to building owner
- ❑ 12. Piping, insulated to 1/2 in. if nominal diameter of pipe is <1.5 in.;
  Larger pipe insulated to 1 in. thickness
- ❑ 13. Lavatory faucet outlet temperatures in public restrooms limited to 110°F (43°C)
- ❑ 14. Thermostatic controls have 5°F deadband
  - ❑ Exception: Thermostats requiring manual changeover between heating and cooling
  - ❑ Exception: Special occupancy or special applications where wide temperature ranges are not acceptable and are approved by the authority having jurisdiction.
- ❑ 15. Hot water distribution systems >=300 kBtu/h must have one of the following:
  a) controls that reset supply water temperature by 25% of supply/return delta T
  b) mechanical or electrical adjustable-speed pump drive(s)
  c) two-way valves at all heating coils
  d) multiple-stage pumps
  e) other system controls that reduce pump flow by at least 50% based on load
  - calculations required
  - ❑ Exception: Where the supply temperature reset controls cannot be implemented without causing improper operation of heating, cooling, humidification, or dehumidification systems.
  - ❑ Exception: Hydronic systems that use variable flow to reduce pumping energy.
- ❑ 16. Balancing devices provided in accordance with IMC (2006) 603.17
- ❑ 17. Motorized, automatic shutoff dampers required on exhaust and outdoor air supply openings
  - ❑ Exception: Gravity dampers acceptable in buildings <3 stories
  - ❑ Exception: Gravity dampers acceptable in systems with outside or exhaust air flow rates less than 300 cfm where dampers are interlocked with fan
- ❑ 18. Three-pipe systems not used
- ❑ 19. Exhaust air heat recovery included for systems 5,000 cfm or greater with more than 70% outside air fraction or specifically exempted
  - ❑ Exception: Systems serving spaces that are not cooled and heated to <60°F.
  - ❑ Exception: Commercial kitchen hoods (grease) classified as Type 1 by NFPA 96.
  - ❑ Exception: Systems exhausting toxic, flammable, paint, or corrosive fumes or dust.
  - ❑ Exception: Where the largest exhaust source is less than 75% of the design outdoor airflow.
  - ❑ Exception: Systems requiring dehumidification that employ energy recovery in series with the cooling coil.

Section 5: Compliance Statement

Compliance Statement: The proposed mechanical design represented in this document is consistent with the building plans, specifications and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 2006 IECC requirements in COM*check* Version 3.8.0 and to comply with the mandatory requirements in the Requirements Checklist.

Name - Title ____________ Signature ____________ Date ____________

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05-09-12

NUMBER	DATE	REVISION
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△		
△		

CHEROKEE NATION. Entertainment

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ISSUE 02
BUILDING PACKAGE

ISSUE DATE
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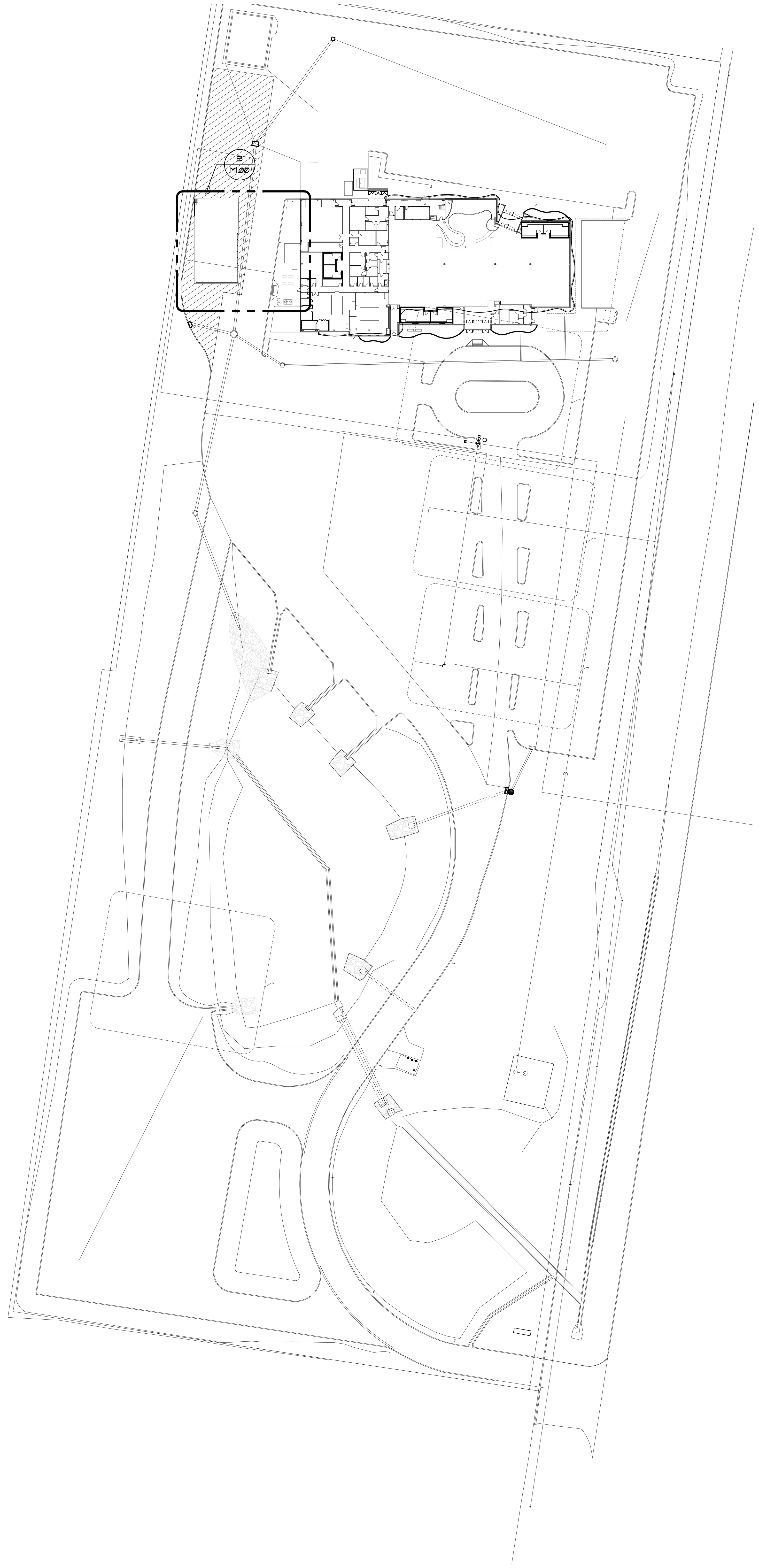
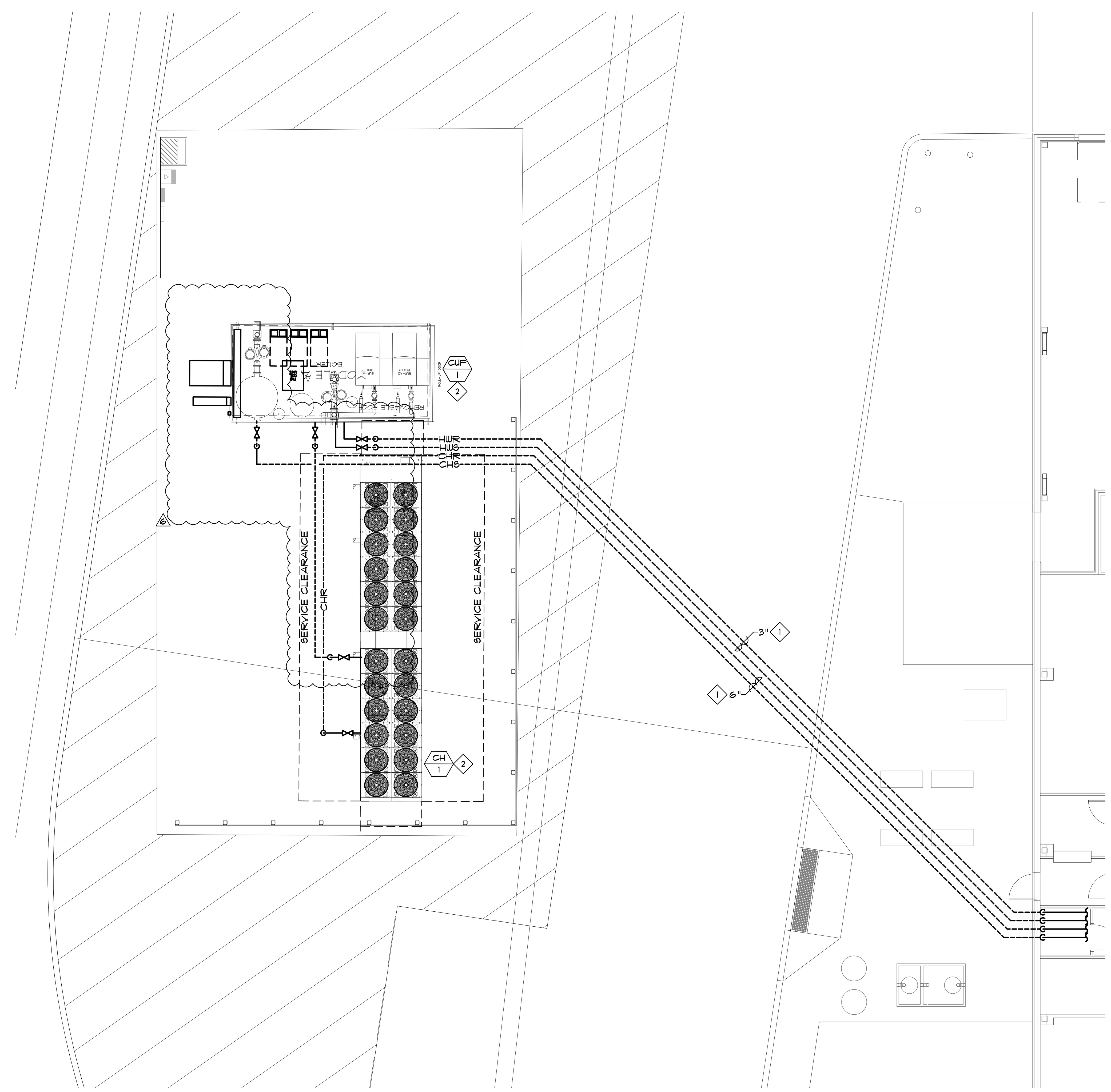
M013



A
M100
MECHANICAL SITE PLAN
1" = 60'-0"

NORTH



B
M100
ENLARGED MECHANICAL SITE PLAN
1/8" = 1'-0"

NORTH

GENERAL NOTES:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING AS REQUIRED TO ACCOMMODATE HIS WORK.
2. REFER TO THE MECHANICAL DIAGRAMS THAT APPLY TO THE WORK ON THIS DRAWING. THESE DIAGRAMS PROVIDE GUIDANCE AS TO INSTALLATION INTENT AND DO NOT NECESSARILY SHOW ALL COMPONENTS REQUIRED.

SHEET NOTES:

1. UNDERGROUND CHILLED AND HEATING PIPE, DUCTILE IRON WITH 2' OF GILSULATE INSULATION ALL AROUND AND 4" OF DOW HI-60 ON TOP, EXTENDING 2 FT EACH SIDE OF THE PIPING.
2. PROVIDE 4" HOUSEKEEPING PAD.

6

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5	03-05-2012	ASI #05
6	04-06-2012	PR-15

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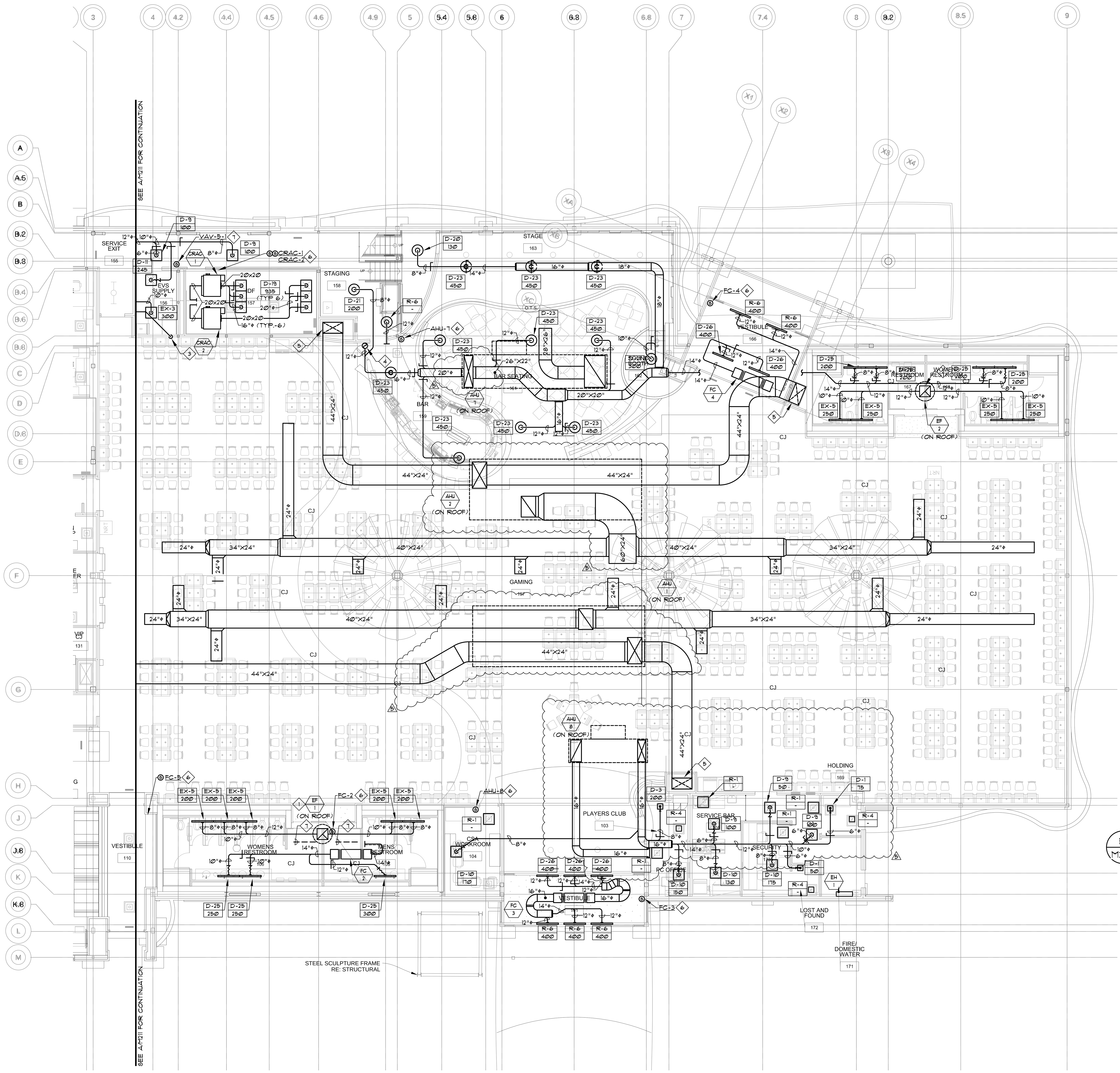
SHEET TITLE
MECHANICAL SITE PLAN

M100



MECHANICAL FLOOR PLAN AREA 'A'

A / M210

1/8" = 1'-0"

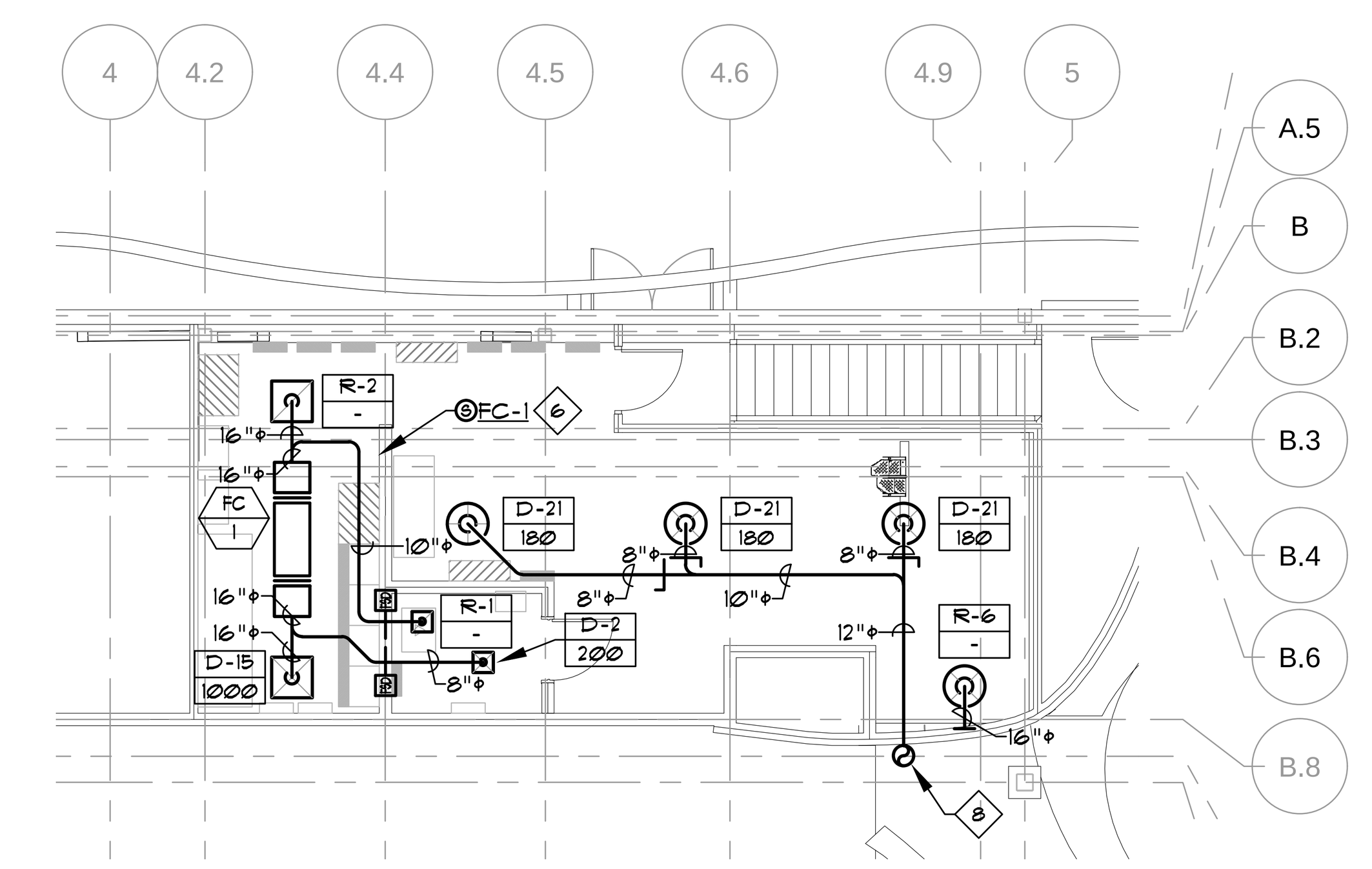
NORTH

GENERAL NOTES:

1. ACCESS DOORS ARE REQUIRED FOR ALL DAMPERS INSTALLED ABOVE INACCESSIBLE CEILINGS. COORDINATE EXACT LOCATION OF ALL ACCESS DOORS WITH ARCHITECT PRIOR TO INSTALLATION.
2. VERIFY LOCATION OF ALL THERMOSTATS WITH ARCHITECT PRIOR TO INSTALLATION. MOUNT ALL THERMOSTATS @48" AFF. IN ACCORDANCE WITH ADA STANDARDS. PROVIDE LOCKING COVERS FOR T-STATS.
3. VERIFY AND COORDINATE FRAME AND BORDER TYPE REQUIREMENTS FOR AIR DEVICES WITH ARCHITECTURAL CEILING PLANS PRIOR TO ORDERING.
4. DUCT SIZES SHOWN ARE THE CLEAR INSIDE DIMENSIONS.
5. THE MECHANICAL CONTRACTOR SHALL VERIFY THE LOCATION OF ALL ROOF MOUNTED EQUIPMENT AND ROOF PENETRATIONS WITH ARCHITECT AND STRUCTURAL ENGINEER PRIOR TO COMMENCING WORK.
6. THE MECHANICAL CONTRACTOR SHALL COORDINATE LOCATION AND ROUTING OF HVAC EQUIPMENT AND DUCTWORK WITH OTHER TRADES PRIOR TO COMMENCING WORK.
7. ALL EXHAUST OUTLETS SHALL BE LOCATED MIN. OF 10'-0'' FROM ANY OUTSIDE AIR INTAKES.
8. THE CUTTING, NOTCHING AND BORING OF HOLES IN FLOOR JOIST AND WALL STUDS SHALL BE IN ACCORDANCE WITH THE LATEST APPROVED EDITION OF THE INTERNATIONAL BUILDING CODE.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING AS REQUIRED TO ACCOMMODATE HIS WORK.
10. REFER TO THE MECHANICAL DIAGRAMS THAT APPLY TO THE WORK ON THIS DRAWING. THESE DIAGRAMS PROVIDE GUIDANCE AS TO INSTALLATION INTENT AND DO NOT NECESSARILY SHOW ALL COMPONENTS REQUIRED.
11. PROVIDE DUCT LINER FOR FIRST 10'-0".
12. CONTRACTOR SHALL REFERENCE ARCHITECTURAL DRAWINGS FOR FINAL DIFFUSER LOCATIONS.

SHEET NOTES:

1. 14"X14" EXHAUST DUCT UP TO EF-1.
2. 14"X12" EXHAUST DUCT UP TO EF-2.
3. 4" DRYER OUTLET.
4. 12" SUPPLY AIR DUCT UP TO EQUIPMENT PLATFORM. REFER TO B/M210 FOR CONTINUATION.
5. 44"X24" SUPPLY DOWN TERMINATE ABOVE 2'-0" FINISH FLOOR.
6. PROVIDE TEMPERATURE SENSOR AND WIRING UP TO AHU, FAN COIL/CRAC UNIT AS INDICATED.
7. PROVIDE 2" ARCHITECTURAL OPENING FOR RETURN AIR PATH.
8. 12" SUPPLY AIR DOWN. REFER TO A/M210 FOR CONTINUATION.



MECHANICAL PIPING EQUIPMENT PLATFORM PLAN

B / M210

1/8" = 1'-0"

NORTH

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1	09-02-2011	ADDENDUM #1
5	03-05-2012	ASI #05

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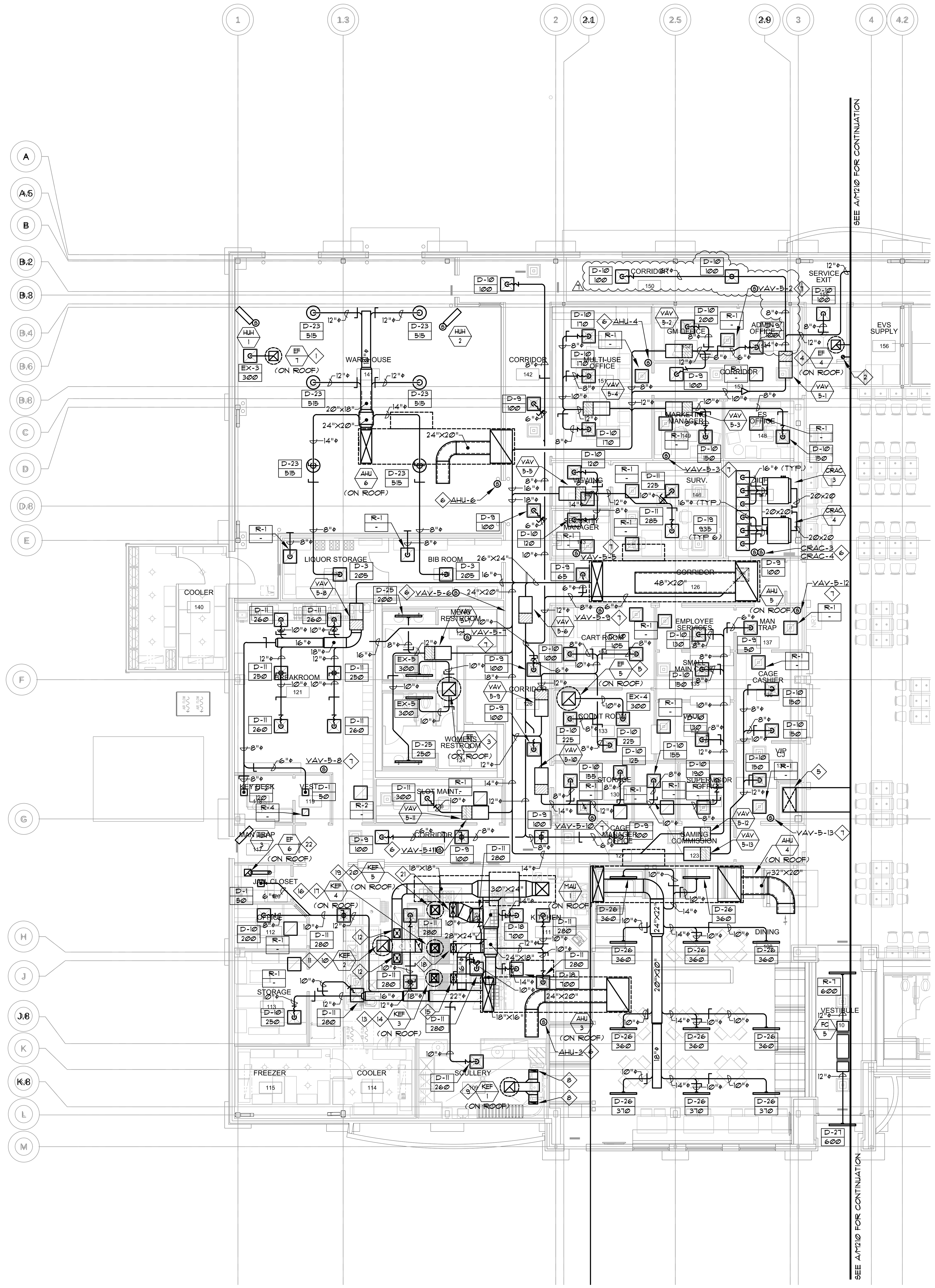
SHEET TITLE
MECHANICAL FLOOR PLAN AREA 'A'

M210



A / M211 MECHANICAL FLOOR PLAN AREA 'B'
1/8" = 1'-0"

NORTH

GENERAL NOTES:

1. ACCESS DOORS ARE REQUIRED FOR ALL DAMPERS INSTALLED ABOVE INACCESSIBLE CEILINGS. COORDINATE EXACT LOCATION OF ALL ACCESS DOORS WITH ARCHITECT PRIOR TO INSTALLATION.
2. VERIFY LOCATION OF ALL THERMOSTATS WITH ARCHITECT PRIOR TO INSTALLATION. MOUNT ALL THERMOSTATS @48" A.F.F. IN ACCORDANCE WITH ADA STANDARDS. PROVIDE LOCKING COVERS FOR T-STATS.
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7. ALL EXHAUST OUTLETS SHALL BE LOCATED MIN. OF 10'-0'' FROM ANY OUTSIDE AIR INTAKES.
8. THE CUTTING, NOTCHING AND BORING OF HOLES IN FLOOR JOIST AND WALL STUDS SHALL BE IN ACCORDANCE WITH THE LATEST APPROVED EDITION OF THE INTERNATIONAL BUILDING CODE.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING AS REQUIRED TO ACCOMMODATE HIS WORK.
10. REFER TO THE MECHANICAL DIAGRAMS THAT APPLY TO THE WORK ON THIS DRAWING. THESE DIAGRAMS PROVIDE GUIDANCE AS TO INSTALLATION INTENT AND DO NOT NECESSARILY SHOW ALL COMPONENTS REQUIRED.
11. PROVIDE DUCT LINER FOR FIRST 10'-0".
12. CONTRACTOR SHALL REFERENCE ARCHITECTURAL DRAWIGNS FOR FINAL DIFFUSER LOCATIONS.

SHEET NOTES:

1. 12"X8" EXHAUST DUCT UP TO EF-7.
2. 6" DRYER VENT UP THRU ROOF, TERMINATE WITH APPROVED ROOF CAP.
3. 12"X10" EXHAUST DUCT UP TO EF-3.
4. 12"X8" EXHAUST DUCT UP TO EF-4/EF-5.
5. 44"X24" SUPPLY DOWN TERMINATE ABOVE 2'-0" FINISH FLOOR.
6. PROVIDE TEMPERATURE SENSOR AND WIRING UP TO AHU, FAN COIL, OR CRAC UNIT AS INDICATED.
7. PROVIDE TEMPERATURE SENSOR AND WIRING UP TO VAV BOX AS INDICATED.
8. 16"X4" EXHAUST DUCT DOWN, CONNECT TO HOOD (ITEM #M01, M02).
9. 12"X10" EXHAUST DUCT UP TO KEF-1.
10. 24"X12" GREASE EXHAUST, CONNECT TO HOOD (ITEM #M03).
11. 24"X12" GREASE EXHAUST DUCT UP TO KEF-2.
12. 16"X12" MAKE-UP AIR DUCT DOWN TO HOOD (ITEM #M04, M05).
13. 14"X10" GREASE EXHAUST DUCT, CONNECT TO HOOD (ITEM #M06).
14. 14"X10" GREASE EXHAUST DUCT UP TO KEF-3.
15. 16"X10" MAKE-UP AIR DUCT DOWN TO HOOD (ITEM #M07).
16. 14"X14" GREASE EXHAUST DUCT, CONNECT TO HOOD (ITEM #M08).
17. 14"X14" GREASE EXHAUST DUCT UP TO KEF-4.
18. 16"X14" MAKE-UP AIR DUCT DOWN, CONNECT TO HOOD (ITEM #M09).
19. 16"X14" GREASE EXHAUST DUCT, CONNECT TO HOOD (ITEM #M010).
20. 16"X14" GREASE EXHAUST DUCT UP TO KEF-5.
21. 26"X12" MAKE-UP AIR DUCT DOWN, CONNECT TO HOOD (ITEM #M011).
22. 6"φ EXHAUST DUCT UP THROUGH ROOF WITH APPROVED ROOF CAP.

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1	09-02-2011	ADDENDUM #1
5	03-05-2012	ASI #05
7	05-09-2012	PR 18

CHEROKEE NATION. Entertainment

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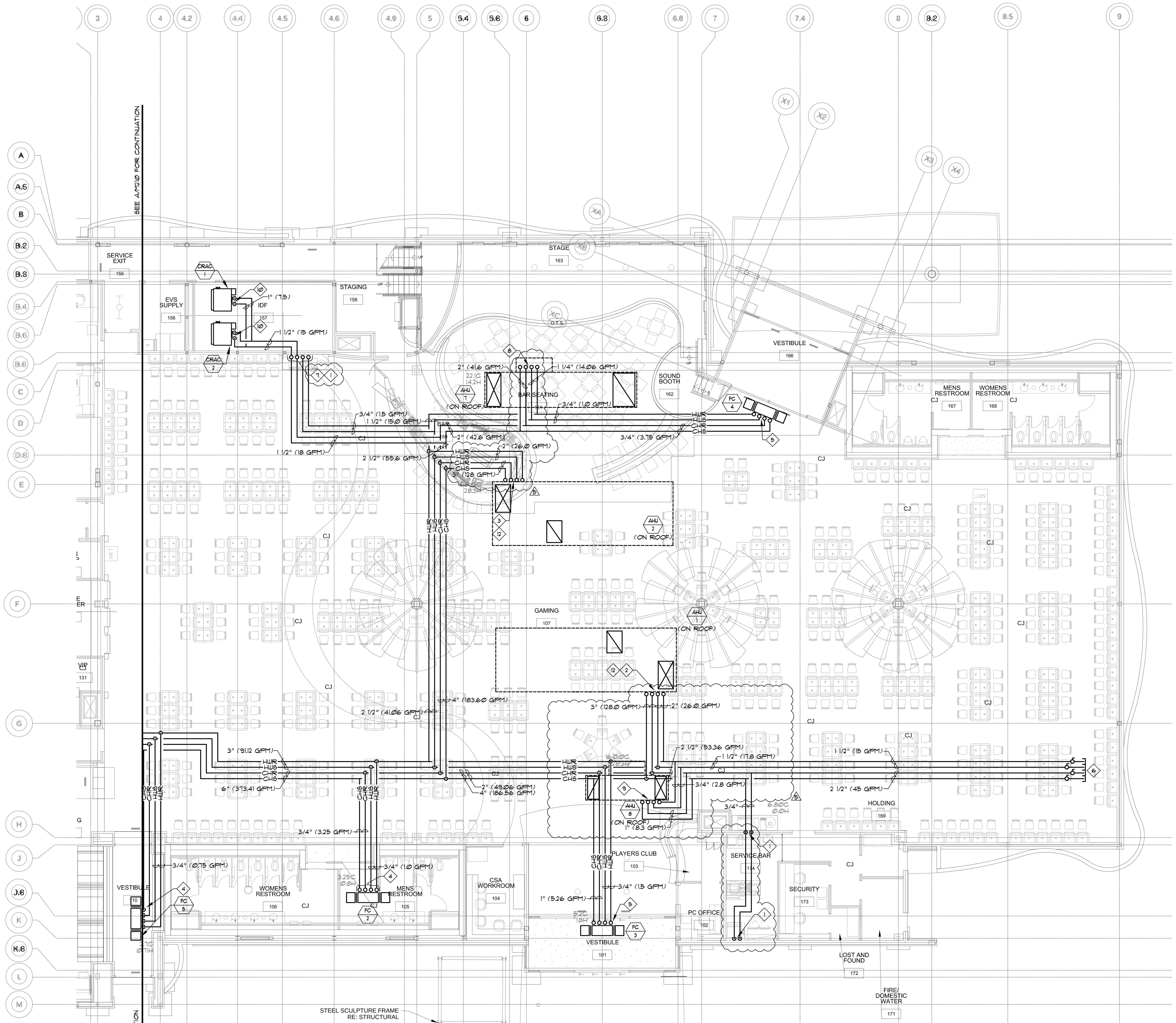
SHEET TITLE
MECHANICAL FLOOR PLAN AREA 'B'

M211



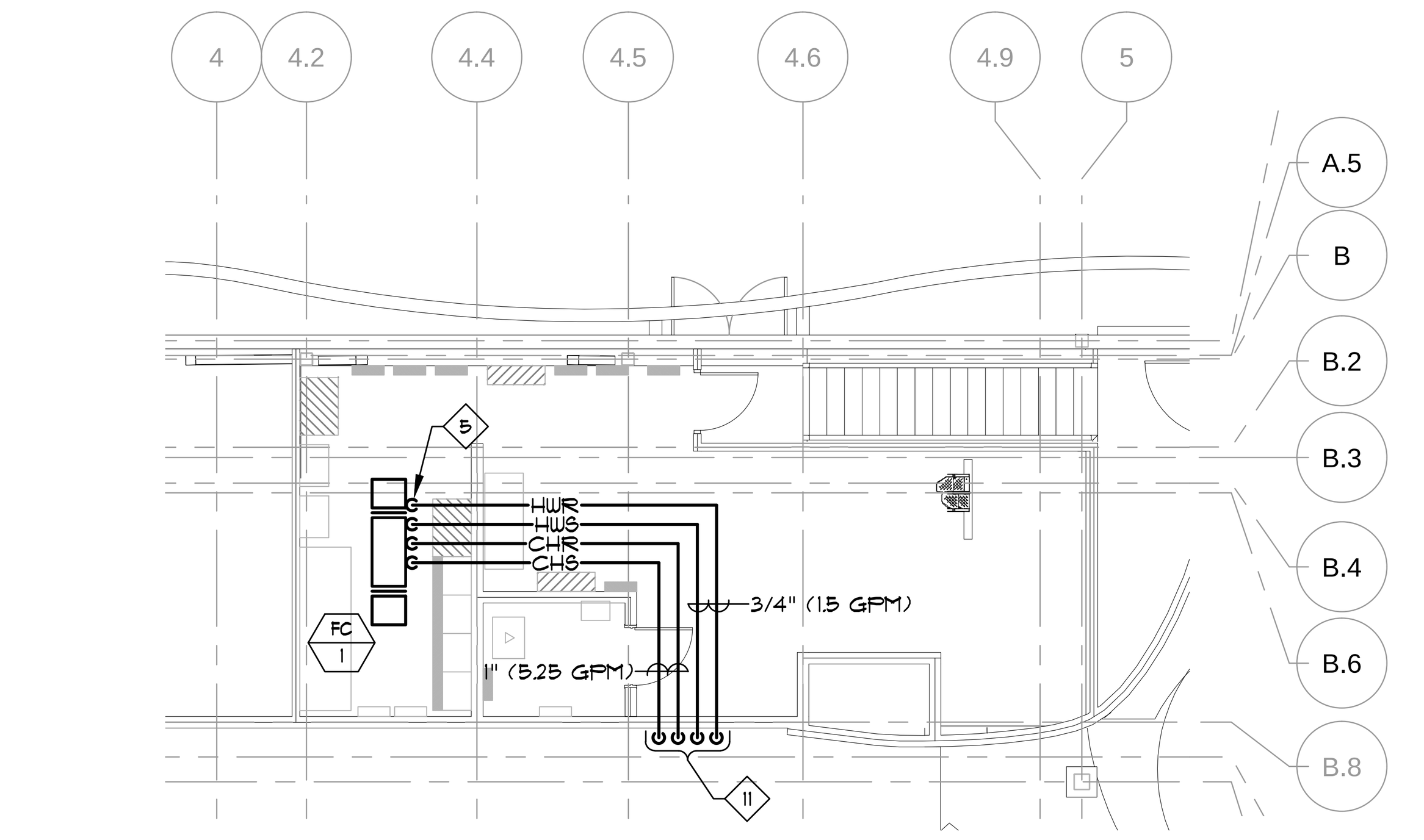
A M220 **MECHANICAL PIPING FLOOR PLAN AREA 'A'**
1/8" = 1'-0"
NORTH

GENERAL NOTES:

1. ACCESS DOORS ARE REQUIRED FOR ALL DAMPERS INSTALLED ABOVE INACCESSIBLE CEILINGS. COORDINATE EXACT LOCATION OF ALL ACCESS DOORS WITH ARCHITECT PRIOR TO INSTALLATION.
2. THE MECHANICAL CONTRACTOR SHALL VERIFY THE LOCATION OF ALL ROOF MOUNTED EQUIPMENT AND ROOF PENETRATIONS WITH ARCHITECT AND STRUCTURAL ENGINEER PRIOR TO COMMENCING WORK.
3. THE MECHANICAL CONTRACTOR SHALL COORDINATE LOCATION AND ROUTING OF HVAC EQUIPMENT AND DUCTWORK WITH OTHER TRADES PRIOR TO COMMENCING WORK.
4. THE CUTTING, NOTCHING AND BORING OF HOLES IN FLOOR JOIST AND WALL STUDS SHALL BE IN ACCORDANCE WITH THE LATEST APPROVED EDITION OF THE INTERNATIONAL BUILDING CODE.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING AS REQUIRED TO ACCOMMODATE HIS WORK.
6. REFER TO THE MECHANICAL DIAGRAMS THAT APPLY TO THE WORK ON THIS DRAWING. THESE DIAGRAMS PROVIDE GUIDANCE AS TO INSTALLATION INTENT AND DO NOT NECESSARILY SHOW ALL COMPONENTS REQUIRED.

SHEET NOTES:

1. 3/4" CHS/CHR DOWN TO ICE MAKER (ITEMS # P32, P33, P34). PROVIDE BALL VALVES
2. 3" CHS/CHR AND 2" HWS/HWR UP TO AHU-1.
3. 3" CHS/CHR AND 2" HWS/HWR UP TO AHU-2.
4. 3/4" CHS/CHR AND 3/4" HWS/HWR DOWN TO FC-2/FC-5.
5. 1" CHS/CHR AND 3/4" HWS/HWR DOWN TO FC-1/FC-3/FC-4.
6. FUTURE EXPANSION.
7. 1" CHS/R AND 3/4" HWS/R UP TO EQUIPMENT PLATFORM. REFER TO B/M220 FOR CONTINUATION.
8. 2" CHS/CHR AND 1" HWS/HWR UP TO AHU-7.
9. 1" CHS/CHR AND 3/4" HWS/HWR UP TO AHU-8.
10. 1" CHS/CHR DOWN TO CRAC-1 AND CRAC-2.
11. 1" CHS/R AND 3/4" HWS/R DOWN. REFER TO A/M220 FOR CONTINUATION.
12. PROVIDE 3-WAY VALVES.



B M220 **MECHANICAL PIPING EQUIPMENT PLATFORM PLAN**
1/8" = 1'-0"
NORTH

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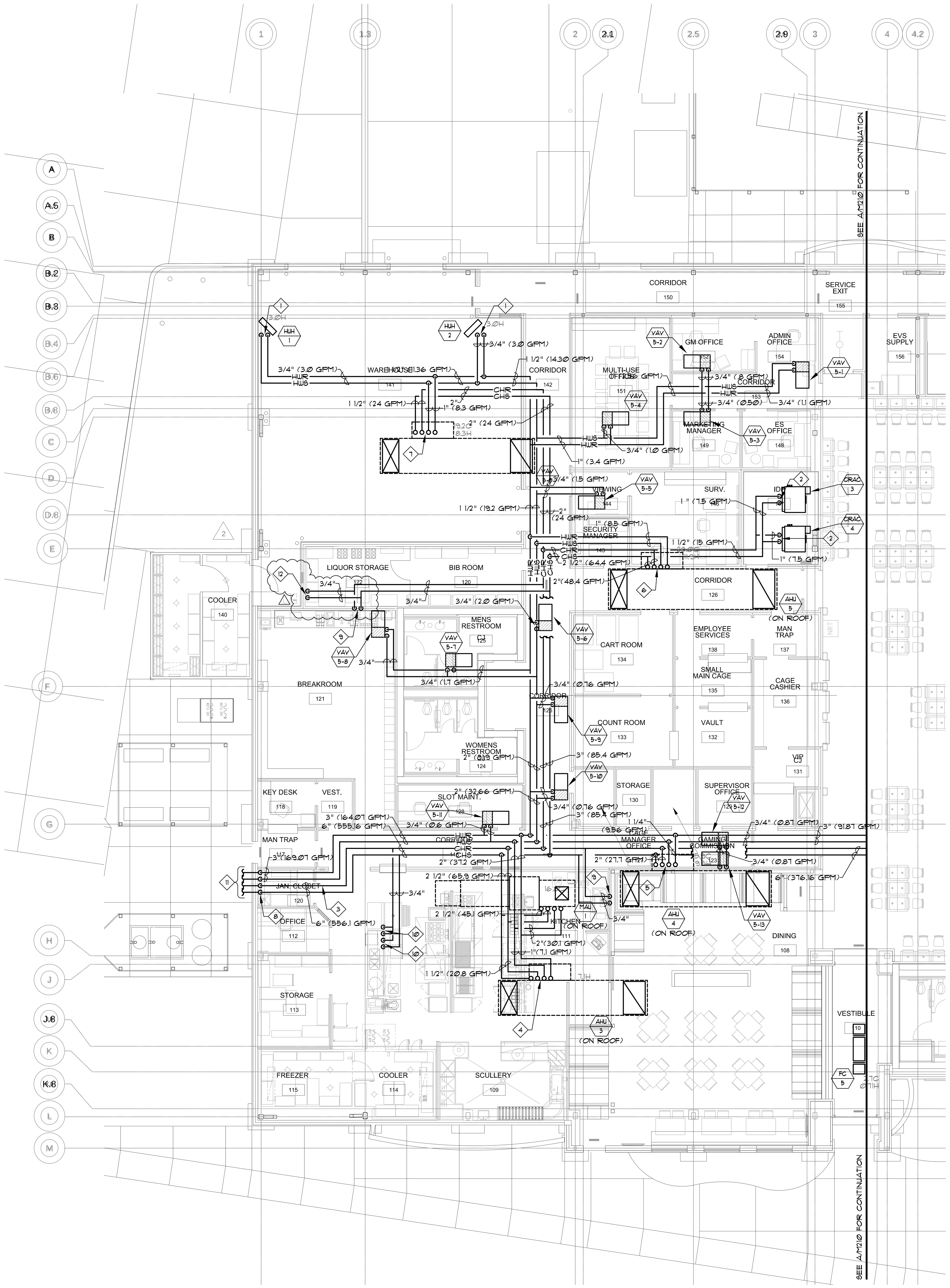
SHEET TITLE
MECHANICAL PIPING FLOOR PLAN AREA 'A'

M220



A
M221

MECHANICAL PIPING FLOOR PLAN AREA 'B'

1/8" = 1'-0"

NORTH

GENERAL NOTES:

1. ACCESS DOORS ARE REQUIRED FOR ALL DAMPERS INSTALLED ABOVE INACCESSIBLE CEILINGS. COORDINATE EXACT LOCATION OF ALL ACCESS DOORS WITH ARCHITECT PRIOR TO INSTALLATION.
2. THE MECHANICAL CONTRACTOR SHALL VERIFY THE LOCATION OF ALL ROOF MOUNTED EQUIPMENT AND ROOF PENETRATIONS WITH ARCHITECT AND STRUCTURAL ENGINEER PRIOR TO COMMENCING WORK.
3. THE MECHANICAL CONTRACTOR SHALL COORDINATE LOCATION AND ROUTING OF HVAC EQUIPMENT AND DUCTWORK WITH OTHER TRADES PRIOR TO COMMENCING WORK.
4. THE CUTTING, NOTCHING AND BORING OF HOLES IN FLOOR JOIST AND WALL STUDS SHALL BE IN ACCORDANCE WITH THE LATEST APPROVED EDITION OF THE INTERNATIONAL BUILDING CODE.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING AS REQUIRED TO ACCOMMODATE HIS WORK.
6. REFER TO THE MECHANICAL DIAGRAMS THAT APPLY TO THE WORK ON THIS DRAWING. THESE DIAGRAMS PROVIDE GUIDANCE AS TO INSTALLATION INTENT AND DO NOT NECESSARILY SHOW ALL COMPONENTS REQUIRED.

SHEET NOTES:

1. 3/4" HWS AND HWR DOWN TO HUH-1 AND HUH-2.
2. 1" CHS/CHR DOWN TO CRAC-1 AND CRAC-2.
3. PROVIDE 4" BY-PASS WITH CONTROL VALVE TO MAINTAIN MINIMUM FLOW.
4. 1 1/2" CHS/CHR AND 1" HWS/HWR UP TO AHU-3.
5. 2" CHS/CHR AND 1 1/4" HWS/HWR UP TO AHU-4.
6. 2" CHS/CHR AND 1" HWS/HWR UP TO AHU-5.
7. 1 1/2" CHS/CHR AND 1" HWS/HWR UP TO AHU-6.
8. PROVIDE SHUT OFF VALVE IN BASE OF RISER.
9. 3/4" CHS/CHR DOWN TO ICE MAKER (ITEMS # P32, P33, P34).
10. PROVIDE BALL VALVES3/4" CHS/CHR DOWN TO ICE MAKER (ITEMS # P30, P31). PROVIDE BALL VALVES.
11. REFER TO SHEET M1.00 FOR CONTINUATION.
12. 3/4" CHS/CHR TO BEER COOLER.

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5	03-05-2012	ASI #05

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SHEET TITLE
MECHANICAL PIPING FLOOR PLAN AREA 'B'

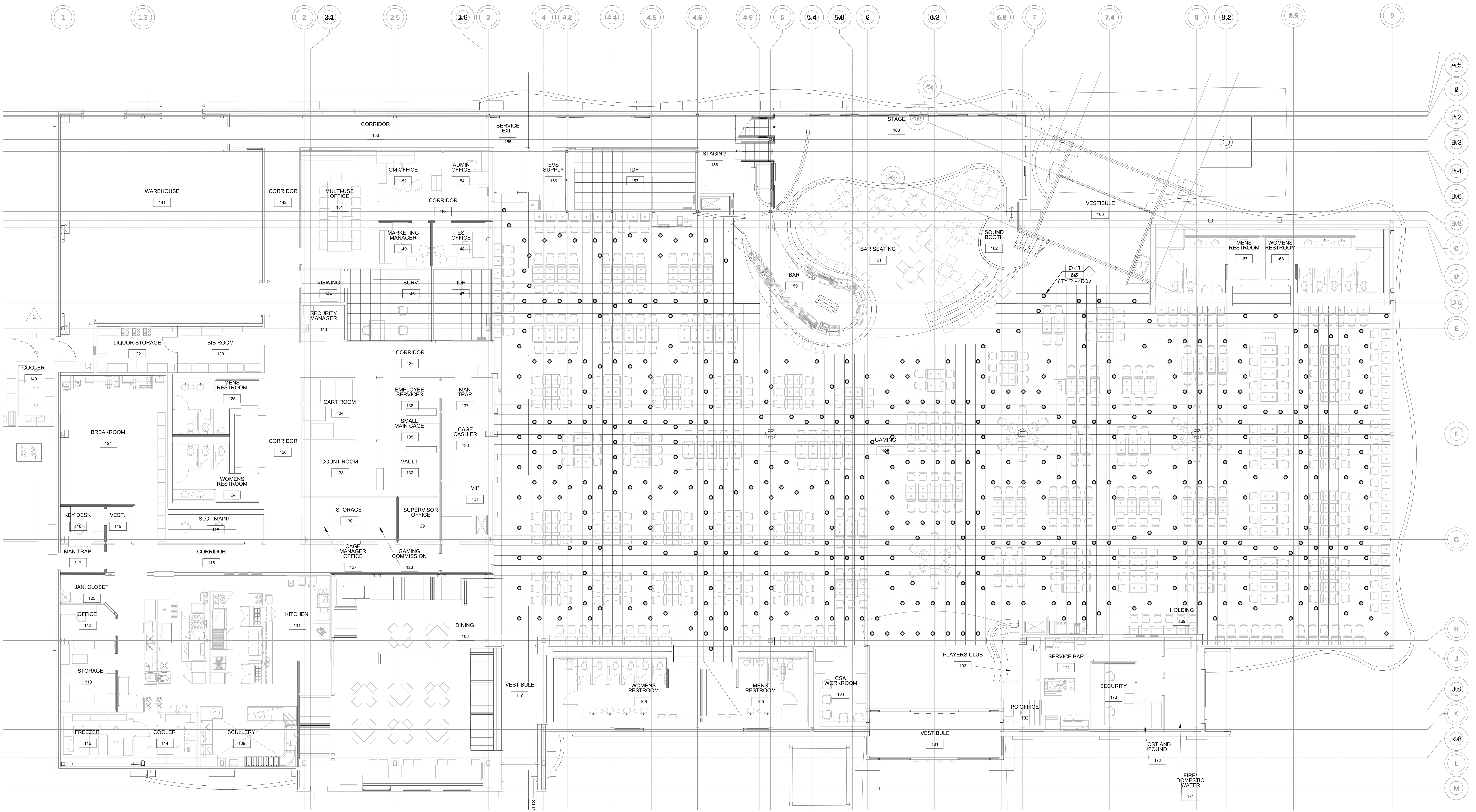
M221

GENERAL NOTES:

1. ACCESS DOORS ARE REQUIRED FOR ALL DAMPERS INSTALLED ABOVE INACCESSIBLE CEILINGS. COORDINATE EXACT LOCATION OF ALL ACCESS DOORS WITH ARCHITECT PRIOR TO INSTALLATION.
2. VERIFY LOCATION OF ALL THERMOSTATS WITH ARCHITECT PRIOR TO INSTALLATION. MOUNT ALL THERMOSTATS @48" A.F.F. IN ACCORDANCE WITH ADA STANDARDS. PROVIDE LOCKING COVERS FOR T-STATS.
3. VERIFY AND COORDINATE FRAME AND BORDER TYPE REQUIREMENTS FOR AIR DEVICES WITH ARCHITECTURAL CEILING PLANS PRIOR TO ORDERING.
4. DUCT SIZES SHOWN ARE THE CLEAR INSIDE DIMENSIONS.
5. THE MECHANICAL CONTRACTOR SHALL COORDINATE LOCATION AND ROUTING OF HVAC EQUIPMENT AND DUCTWORK WITH OTHER TRADES PRIOR TO COMMENCING WORK.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING AS REQUIRED TO ACCOMMODATE HIS WORK.
7. REFER TO THE MECHANICAL DIAGRAMS THAT APPLY TO THE WORK ON THIS DRAWING. THESE DIAGRAMS PROVIDE GUIDANCE AS TO INSTALLATION INTENT AND DO NOT NECESSARILY SHOW ALL COMPONENTS REQUIRED.

SHEET NOTES:

1. PROVIDE 453 TROX DIFFUSERS.



MECHANICAL UNDERFLOOR AIR DISTRIBUTION PLAN

A / M310

1/8" = 1'-0"

NORTH

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SHEET TITLE
MECHANICAL UNDERFLOOR AIR DISTRIBUTION PLAN

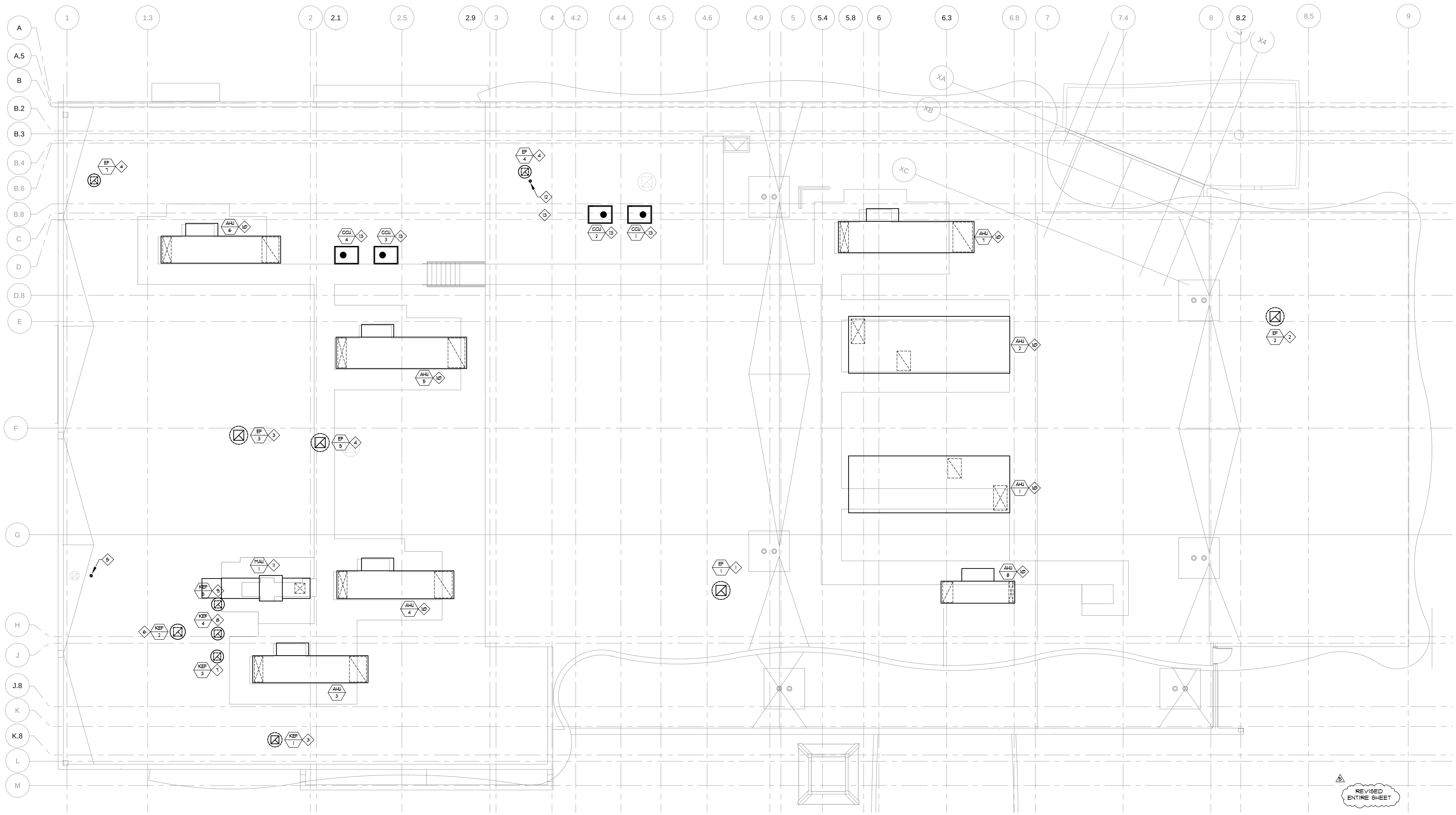
M310

GENERAL NOTES:

1. DUCT SIZES SHOWN ARE THE CLEAR INSIDE DIMENSIONS.
2. THE MECHANICAL CONTRACTOR SHALL VERIFY THE LOCATION OF ALL ROOF MOUNTED EQUIPMENT AND ROOF PENETRATIONS WITH ARCHITECT AND STRUCTURAL ENGINEER PRIOR TO COMMENCING WORK.
3. THE MECHANICAL CONTRACTOR SHALL COORDINATE LOCATION AND ROUTING OF HVAC EQUIPMENT AND DUCTWORK WITH OTHER TRADES PRIOR TO COMMENCING WORK.
4. ALL EXHAUST OUTLETS SHALL BE LOCATED MIN. OF 10'-0" FROM ANY OUTSIDE AIR INTAKES.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING AS REQUIRED TO ACCOMMODATE HIS WORK.
6. REFER TO THE MECHANICAL DIAGRAMS THAT APPLY TO THE WORK ON THIS DRAWING. THESE DIAGRAMS PROVIDE GUIDANCE AS TO INSTALLATION INTENT AND DO NOT NECESSARILY SHOW ALL COMPONENTS REQUIRED.

SHEET NOTES:

1. 14"x14" EXHAUST DUCT DOWN THROUGH ROOF.
2. 14"X12" EXHAUST DUCT DOWN THROUGH ROOF.
3. 12"X10" EXHAUST DUCT DOWN THROUGH ROOF.
4. 12"X8" EXHAUST DUCT DOWN THROUGH ROOF.
5. 6"ø EXHAUST DUCT DOWN THROUGH ROOF.
6. 24"X12" GREASE EXHAUST DUCT DOWN THRU ROOF.
7. 14"X10" GREASE EXHAUST DUCT DOWN THRU ROOF.
8. 14"X14" GREASE EXHAUST DUCT DOWN THRU ROOF.
9. 16"X14" GREASE EXHAUST DUCT DOWN THRU ROOF.
10. FULL SIZE SUPPLY AND RETURN DUCT DOWN THRU ROOF.
11. FULL SIZE SUPPLY DUCT DOWN THROUGH ROOF.
12. 6" DRYER EXHAUST DUCT DOWN THROUGH ROOF.
13. ROUTE LIQUID AND SUCTION LINES DOWN THROUGH ROOF. SIZE AS PER MANUFACTURER'S RECOMMENDATIONS.



A M450 **MECHANICAL ROOF PLAN**
1/8" = 1'-0"

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SHEET TITLE
MECHANICAL ROOF PLAN

M450