
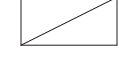







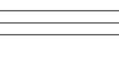

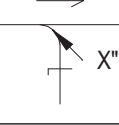
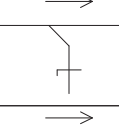
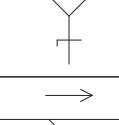
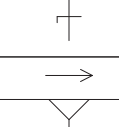
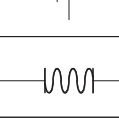

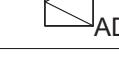
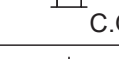






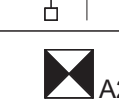

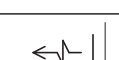
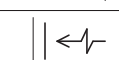
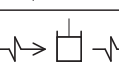

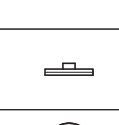

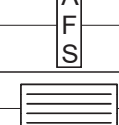
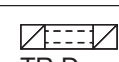
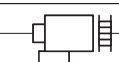

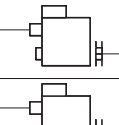
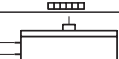
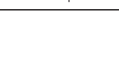



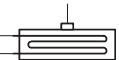
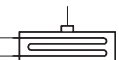
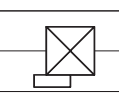



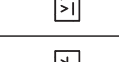



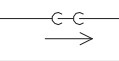
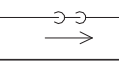
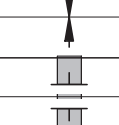
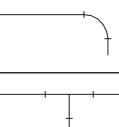

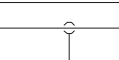
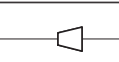

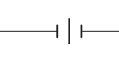
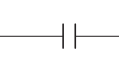







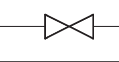


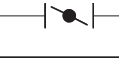





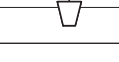
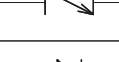

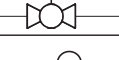

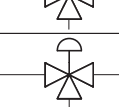
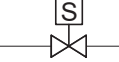




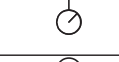
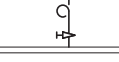





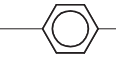
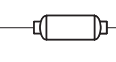


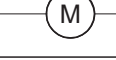
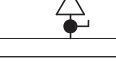

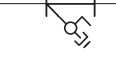

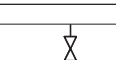
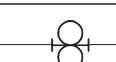
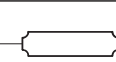
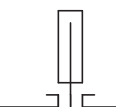
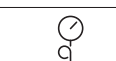
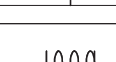
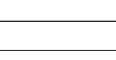
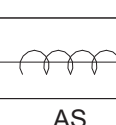
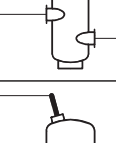
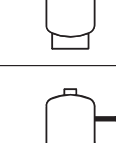
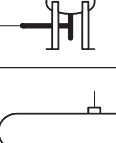
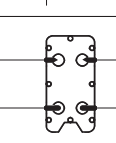






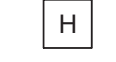

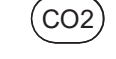
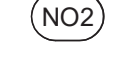



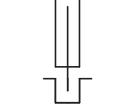
ABBREVIATIONS			
ABV.	ABOVE	LRD	LINEAR RETURN DIFFUSER (CEILING, WALL, SILL, OR FLOOR)
AC	AIR CONDITIONER	LSD	LINEAR SUPPLY DIFFUSER (CEILING, WALL, SILL, OR FLOOR)
AD	ACCESS DOOR	LTHW	LOW TEMPERATURE HOT WATER
AFF	ABOVE FINISHED FLOOR	LVL	LEVEL
AHU	AIR HANDLING UNIT	LWS	LOUVER WITH WIRE SCREEN
AL	ACOUSTICAL LINING	LWT	LEAVING WATER TEMPERATURE
ALD	AUTOMATIC LOUVER DAMPER (MOTORIZED)	MAT	MIXED AIR TEMPERATURE
ATC	AUTOMATIC TEMPERATURE CONTROL	MAX	MAXIMUM
B.D.D.	BACK DRAFT DAMPER	MBH	THOUSAND BTU PER HOUR
BMS	BUILDING MANAGEMENT SYSTEM	MBTU	BRITISH THERMAL UNIT (1000 BTU)
BOD	BOTTOM OF DUCT	MIN	MINIMUM
BHP	BRAKE HORSE POWER	MO (WO)	MASONRY OPENING (WALL OPENING)
BRD	BAROMETRIC RELIEF DAMPER	NC	NORMALLY CLOSED
BTU	BRITISH THERMAL UNIT	NFA	NET FREE AREA
CC	COOLING COIL	NIC	NOT IN THIS CONTRACT
CD	CEILING DIFFUSER	NO	NORMALLY OPEN
CFM	CUBIC FEET PER MINUTE	NTS	NOT TO SCALE
CG	CEILING GRILLE	OA	OUTSIDE AIR
CO2	CARBON DIOXIDE	OAT	OUTSIDE AIR TEMPERATURE
CHW	CHILLED WATER	OBD	OPPOSED BLADE DAMPER
CO	CLEAN OUT	OED	OPEN ENDED DUCT
COD	CABLE OPERATED VOLUME DAMPER	P	PUMP
CDP	CONDENSATE DRAIN PIPING	PHC	PRE-HEAT COIL
CP	CONDENSATE PUMP RETURN	PHX	PLATE & FRAME HEAT EXCHANGE
CAV	CONSTANT AIR VOLUME TERMINAL	PSI	POUNDS PER SQUARE INCH (GAUGE)
DN	DOWN	RA	RETURN AIR
EAT	ENTERING AIR TEMPERATURE	RF	RETURN FAN
EXH FN	EXHAUST FAN	RHC	REHEAT COIL
EHC	ELECTRIC HEATING COIL	RPM	REVOLUTIONS PER MINUTE
EV	EXPANSION VESSEL/EXPANSION TANK	RR	RETURN REGISTER
EWI	ENTERING WATER TEMPERATURE	RX	RECYCLING ROOM EXHAUST
ETK	EXPANSION TANK	SA	SUPPLY AIR
FC	FLEXIBLE CONNECTION	SCHW	SECONDARY CHILLED WATER
FCU	FAN COIL UNIT	SD	SMOKE DAMPER
FD/AD	FIRE DAMPER/ACCESS DOOR	SD/ALD	SMOKE DAMPER AND AUTOMATIC LOUVER COMBINATION
FD/GA	FIRE DAMPER/GRILLE ACCESS	SF	SUPPLY FAN
FTR	FIN TUBE RADIATOR	SG	SUPPLY GRILLE
FL	FLOOR	ST	SOUND TRAP
FLA	FULL LOAD AMPS	SEF	SMOKE EXHAUST FAN
FSD	FIRE SMOKE DAMPER	TOD	TOP OF DUCT
FSD/AD	FIRE SMOKE DAMPER/ACCESS DOOR	TF	TRANSFER FAN
FSD/GA	FIRE SMOKE DAMPER/GRILLE ACCESS	TG	TOP GRILLE
GPM	GALLONS PER MINUTE	TR	TOP REGISTER
GX	GENERAL EXHAUST	TD	TRANSFER DUCT
HC	HEATING COIL	TRX	TRASH EXHAUST
HHW	HEATING HOT WATER	TX	TOILET EXHAUST
HPS	HIGH PRESSURE STEAM	UH	UNIT HEATER
HP	HORSE POWER	VAV	VARIABLE AIR VOLUME
HX	HEAT EXCHANGER (SHELL & TUBE)	VD	VOLUME DAMPER
ID	INSIDE DIMENSION	VFD	VARIABLE FREQUENCY DRIVE
KW	KILOWATT	WMS	WIRE MESH SCREEN
LAT	LEAVING AIR TEMPERATURE	(300)	CUBIC FEET OF AIR PER MINUTE OR GALLONS PER MINUTE
LED	LINEAR EXHAUST DIFFUSER (CEILING, WALL, SILL, OR FLOOR)		

HVAC SYMBOLS (DUCTWORK)	
	RECTANGULAR DUCT SUPPLY
	RECTANGULAR DUCT RETURN
	RECTANGULAR DUCT EXHAUST
	ROUND DUCT SUPPLY
	ROUND DUCT RETURN
	ROUND DUCT EXHAUST
	FALT OVAL DUCT SUPPLY
	FLAT OVAL DUCT RETURN
	FLAT OVAL DUCT EXHAUST
	DOUBLE WALL DUCTWORK
	DUCT WITH ACOUSTIC LINING
	DUCT WRAPPED WITH FIRE RATED INSULATION
	BRANCH DUCT WITH RADIUSED SIDE SPLIT - RECTANGULAR DUCT
	BRANCH DUCT TAP, SINGLE BOOT - RECTANGULAR DUCT
	BRANCH DUCT TAP, DOUBLE BOOT - RECTANGULAR DUCT
	BRANCH DUCT TAP, SINGLE BOOT - ROUND & FLAT OVAL DUCT
	BRANCH DUCT TAP, DOUBLE BOOT - ROUND & FLAT OVAL DUCT
	FLEXIBLE DUCT
	FLEXIBLE CONNECTION
	ACCESS DOOR
	CLEAN OUT
	DUCT THROUGH BEAM PENETRATION
	AUTOMATIC DAMPER - OPPOSED BLADE
	AUTOMATIC DAMPER - PARALLEL BLADE
	FIRE SMOKE DAMPER
	FIRE DAMPER
	BACKDRAFT DAMPER
	BAROMETRIC DAMPER
	SQUARE CEILING DIFFUSER (SHADED SECTORS INDICATE BLANK OFFS)
	ROUND CEILING DIFFUSER (SHADED SECTORS INDICATE BLANK OFFS)
	ROUND FLOOR DIFFUSER (UFAD)
	REGISTER - SIDEWALL/CEILING/FLOOR - SUPPLY
	REGISTER/GRILLE - SIDEWALL/CEILING/FLOOR - RETURN/EXHAUST
	WALL TRANSFER GRILLES
	LINEAR DIFFUSER/GRILLE - SUPPLY/RETUN/EXHAUST (UNSHADED SECTIONS INDICATE ACTIVE LINEAR, SHADED SECTIONS INDICATE BLANK OFF)
	PLENUM FOR LINEAR DIFFUSER/GRILLE
	DUCT SMOKE DETECTOR
	DUCT FIRESTAT
	AIRFLOW STATION
	SOUND TRAP
	ACOUSTIC TRANSFER DUCT
	TERMINAL UNIT - VAV BOX - WITH/WITHOUT HEATING COIL
	TERMINAL UNIT - FAN COIL UNIT
	TERMINAL UNIT - FAN POWERED BOX WITH/WITHOUT HEATING COIL
	TERMINAL UNIT - FAN POWERED CHILLED BEAM - WITH HEATING & COOLING COILS
	TERMINAL UNIT - ACTIVE CHILLED BEAM - CEILING MOUNTED (SEE EQUIPMENT SCHEDULES)

HVAC SYMBOLS (DUCTWORK)	
	TERMINAL UNIT - ACTIVE CHILLED BEAM - HORIZONTAL ABOVE CEILING MOUNTED (SEE EQUIPMENT SCHEDULES)
	TERMINAL UNIT - ACTIVE CHILLED BEAM - VERTICAL ABOVE CEILING MOUNTED (SEE EQUIPMENT SCHEDULES)
	TERMINAL UNIT - AIRFLOW REGULATOR (SLIP IN TYPE)
	TERMINAL UNIT - FAN BOOSTER UNIT (UFAD)
	LINT TRAP
	DUCT MOUNTED COIL
	DUCT MOUNTED UVGI
	DUCT MOUNTED HUMIDIFIER

HVAC SYMBOLS (PIPING)	
	PIPE TURNING UP
	PIPE TURNING DOWN
	SLOPE RISE IN DIRECTION OF FLOW
	SLOPE DROP IN DIRECTION OF FLOW
	PIPE THROUGH BEAM PENETRATION
	WALL SLEEVE WITH WATER STOP
	ELBOW
	TEE
	BRANCH PIPE TOP CONNECTION
	BRANCH PIPE BOTTOM CONNECTION
	REDUCER/INCREASER CONCENTRIC
	REDUCER/DECREASER ECCENTRIC
	UNION
	FLANGED JOINT
	BLIND FLANGE
	END CAP
	PIPE GUIDE
	PIPE ANCHOR
	BALL VALVE - MANUAL (LEVER HANDLE)
	BALL VALVE - MANUAL (TEE HANDLE)
	BALL VALVE - MOTORIZED
	GENERAL DUTY ISOLATION VALVE (SEE SPEC FOR TYPE)
	GATE VALVE
	GLOBE VALVE
	BUTTERFLY VALVE - MANUAL
	BUTTERFLY VALVE - MOTORIZED
	ORBIT VALVE
	FLOWSETTER VALVE (BALANCING)
	CARTRIDGE FLOW BALANCER
	PRESSURE REDUCING VALVE
	PLUG VALVE
	CHECK VALVE (SWING TYPE)
	CHECK VALVE (SILENT TYPE, CENTER GUIDED)
	PRESSURE INDEPENDENT CONTROL VALVE (PICV)
	2 WAY CONTROL VALVE
	3 WAY CONTROL VALVE (MIXING TYPE)
	3 WAY CONTROL VALVE (DIVERTING TYPE)
	SOLENOID VALVE
	RELIEF VALVE
	BACKFLOW PREVENTOR
	BACKFLOW PREVENTER (RP2 TYPE)
	AIR VENT (AUTOMATIC)
	TEMPERATURE GAUGE (DUCT MOUNTED)
	PRESSURE GAUGE W/ PIGTAIL AND PETCOCK

HVAC SYMBOLS (PIPING)	
	SIGHTGLASS
	SIGHTGLASS WITH MOISTURE INDICATOR (REFRIGERANT)
	FILTER-DRYER
	LEAK DETECTOR, PROBE TYPE
	LEAK DETECTOR, CABLE TYPE
	METER
	AIR VENT (MANUAL)
	Y-STRAINER WITH HOSE END
	Y-STRAINER WITH BLOW OFF BALL VALVE
	Y-STRAINER
	DRAIN VALVE WITH CAPPED HOSE END
	DUPLEX BASKET STRAINER
	NOISE SUPPRESSOR (STEAM PRV)
	TEMPERATURE GAUGE
	PRESSURE GAUGE W/ PIGTAIL AND PETCOCK
	FLEXIBLE COUPLING
	PIPE IN PIPE (FUEL OIL)
	HEAT TRACED PIPE
	AIR SEPARATOR
	EXPANSION TANK
	CHEM SHOT FEEDER
	SHELL AND TUBE HEAT EXCHANGER
	PLATE AND FRAME HEAT EXCHANGER
	PUMP

CONTROLS SYMBOLS	
	THERMOSTAT
	TEMPERATURE SENSOR
	HUMIDISTAT
	HUMIDITY SENSOR
	CARBON MONOXIDE SENSOR
	CARBON DIOXIDE SENSOR
	NITROGEN DIOXIDE SENSOR
	HYDROGEN SENSOR
	REFRIGERANT SENSOR
	EMERGENCY POWER OFF SWITCH
	TEMPERATURE GAUGE WITH PIPE WELL

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**Key Plan**

Description	Date
Filing Set	06/17/22

**Project**  
Storm King  
Art Center  
Welcome  
Pavilions

**Seal**

**NOT FOR CONSTRUCTION**  
**Drawing Title**  
Abbreviations,  
Symbols, and  
Legends

Date	06/17/22
Scale	Not to Scale
Drawing Number	M-W-001
Sheet Size	ARCH D



A. GENERAL NOTES

- EXECUTE THE WORK IN THE BEST AND MOST THOROUGH MANNER AND TO THE SATISFACTION OF THE CONSULTING ENGINEER, WHO WILL JOINTLY INTERPRET THE MEANING OF THE DRAWINGS AND SPECIFICATIONS AND SHALL HAVE THE POWER TO REJECT ANY WORK AND MATERIALS, WHICH IN THEIR JUDGMENT ARE NOT IN FULL ACCORDANCE THEREWITH.
- EXCEPT FOR CHANGES AS MAY BE SPECIFICALLY APPROVED BY THE CONSULTING ENGINEERS, IN ACCORDANCE WITH ALTERNATES OF OPTIONS STATED HEREINAFTER, ALL WORK MUST BE IN FULL ACCORDANCE WITH THE INTENT OF THE PLANS AND SPECIFICATIONS, COMPLETE IN EVERY WAY AND READY FOR SATISFACTORY AND EFFICIENT OPERATION WHEN DELIVERED TO THE OWNER.
- WHERE DISAGREEMENTS OCCUR BETWEEN THE PLANS AND THE SPECIFICATIONS, OR WITHIN EITHER DOCUMENT ITSELF, THE ITEM OR ARRANGEMENT OF BETTER QUALITY, GREATER QUANTITY OR HIGHER COST SHALL BE INCLUDED IN THE BASE BID.
- THE CONTRACTOR COVENANTS AND AGREES THAT THEY AND THEIR SUBCONTRACTORS AND THEY AND THEIR AGENTS, SERVANTS AND EMPLOYEES WILL PROVIDE AND MAINTAIN A SAFE PLACE TO WORK AND THAT THEY AND THEIR WILL COMPLY WITH ALL LAWS AND REGULATIONS OF ANY GOVERNMENTAL AUTHORITY HAVING JURISDICTION THEREOF AND THE CONTRACTOR AGREES TO INDEMNIFY, DEFEND AND HOLD HARMLESS THE CONSULTING ENGINEER, ARCHITECT AND OWNER FROM AND AGAINST ANY LIABILITY, LOSS, DAMAGE OR EXPENSE, INCLUDING ATTORNEY'S FEES ARISING FROM A FAILURE OR ALLEGED FAILURE ON THE PART OF THE CONTRACTOR, THEIR SUBCONTRACTORS AND THEY AND THEIR AGENTS, SERVANTS AND EMPLOYEES TO PROVIDE AND MAINTAIN A SAFE PLACE TO WORK OR TO COMPLY WITH ALL LAWS AND REGULATIONS OF ANY GOVERNMENTAL AUTHORITY HAVING JURISDICTION THEREOF.
- THE CONTRACTOR AND EACH SUBCONTRACTOR COVENANTS AND AGREES TO INDEMNIFY, DEFEND AND HOLD HARMLESS THE CONSULTING ENGINEER, ARCHITECT AND OWNER FROM AND AGAINST ANY LIABILITY, LOSS, DAMAGE OR EXPENSE, INCLUDING ATTORNEY'S FEES ARISING FROM A FAILURE OR ALLEGED FAILURE ON THE PART OF THE CONTRACTOR, THEIR SUBCONTRACTORS AND THEY AND THEIR AGENTS, SERVANTS AND EMPLOYEES PROPERLY TO DISCHARGE THE OBLIGATIONS ASSUMED BY HIM OR THEM IN THE PERFORMANCE OF THE WORK, INCLUDING ANY ACT OR OMISSION ALLEGEDLY RESULTING IN DEATH OR PERSONAL INJURY OR PROPERTY DAMAGE OR IMPROPER CONSTRUCTION, CONSTRUCTION TECHNIQUES OR THE USE OF IMPROPER OR INAPPROPRIATE MATERIAL OR TOOLS.
- THE CONTRACTOR AGREES THAT ANY CONTROVERSY OR DISPUTE TO WHICH THE CONTRACTOR, THE ARCHITECT, AND THE CONSULTING ENGINEERS ARE PARTIES SHALL BE SUBMITTED TO ARBITRATION FOR DECISION IN ACCORDANCE WITH THE RULES OF SUCH ASSOCIATION FOR CONSTRUCTION INDUSTRY DISPUTES. ALL SUBCONTRACTORS LIKEWISE AGREE TO SUBMIT TO SUCH ARBITRATION ANY DISPUTE BETWEEN OR AMONG THEM, THE CONTRACTOR, THE ARCHITECT AND THE CONSULTING ENGINEERS, AND THE CONTRACTOR AGREES TO MAKE AVAILABLE TO THE CONSULTING ENGINEERS ON DEMAND SIGNED COPIES OF THE CONTRACT BETWEEN THE OWNER AND THE CONTRACTOR AND BETWEEN THE CONTRACTOR AND THEIR SUBCONTRACTORS. THE CONTRACTOR AND EACH SUBCONTRACTOR AGREE THAT BY SUBMITTING A BID WHICH IS ACCEPTED, THIS PARAGRAPH SHALL BE DEEMED A WRITTEN AGREEMENT TO SUBMIT ANY CONTROVERSY THEREAFTER ARISING ARBITRATION.
- ALL WORK SHALL BE DONE IN CONFORMANCE WITH ALL GOVERNING CODES, INCLUDING AMENDMENTS, BULLETINS, ETC., AS WELL AS STANDARDS OF INSTALLATION AND EQUIPMENT ESTABLISHED FOR THE BUILDINGS, AND REQUIREMENTS OF THE OWNER.
- OBTAIN ALL NECESSARY PERMITS AND APPROVAL FROM GOVERNING AUTHORITIES AND FILE ALL NECESSARY FORMS. PAY ALL INSPECTION FEES.
- COORDINATE SCHEDULING OF ALL WORK TO BE PERFORMED WITH OWNER AND/OR THEIR AGENT AND INCLUDE ALL NECESSARY PREMIUM TIME REQUIRED FOR SHUTDOWNS, WORK IN OCCUPIED AREAS, ETC.
- BEFORE COMMENCING WORK, EXAMINE ALL ADJOINING WORK ON WHICH THIS WORK IS IN ANY WAY DEPENDENT FOR PERFECT WORKMANSHIP ACCORDING TO THE INTENT OF THIS SPECIFICATION, AND REPORT TO THE CONSTRUCTION MANAGER ANY CONDITION WHICH PREVENTS PERFORMANCE OF FIRST-CLASS WORK NO "WAIVER OF RESPONSIBILITY" FOR INCOMPLETE, INADEQUATE OR DEFECTIVE ADJOINING WORK WILL BE CONSIDERED UNLESS NOTICE HAS BEEN FILED BEFORE SUBMITTAL OF A PROPOSAL.
- COORDINATE ALL WORK WITH OTHER TRADES TO INSURE INSTALLATION IS MADE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
- FURNISH ADEQUATE LIABILITY INSURANCE AND BONDING AS REQUIRED BY OWNER.
- INCLUDE ALL LABOR, MATERIALS, AND APPURTENANCES REQUIRED FOR THE FURNISHING, INSTALLING AND TESTING OF ALL WORK. COMPLETE AND MAKE READY FOR OPERATION IN A MANNER SATISFACTORY TO THE ARCHITECT AND CONSULTING ENGINEER. ALL WORK SHOWN ON DRAWINGS AND SPECIFIED HEREIN.
- ALL WORK SHALL BE GUARANTEED FOR TWO (2) FULL YEARS FROM THE DATE WHEN THE OWNER HAS ISSUED A "CERTIFICATE OF SUBSTANTIAL COMPLETION".
- PROVIDE TEMPERATURE CONTROL DEVICES FOR ALL EQUIPMENT, THERMAL ZONE, HEATING & COOLING COILS AND EACH
- DIMENSIONS INDICATED ON THESE DRAWINGS ARE CLEAR, INSIDE DIMENSIONS.
- CONTRACTOR SHALL ALLOW FOR ADEQUATE FLEXIBLE DUCT AND PIPE CONNECTIONS. CONNECTION SHALL CONFORM TO THE REQUIREMENTS OF THE MECHANICAL DETAILS AND SPECIFICATIONS.
- IN ADDITION TO ROTATING EQUIPMENT CONNECTIONS, FLEXIBLE ACOUSTIC ISOLATION, BUILDING CONNECTIONS SHALL OCCUR AT ALL MOVEMENT JOINTS, AND AT ALL "BOX-IN BOX" CONSTRUCTION. COORDINATE REQUIREMENTS WITH ALL OTHER DRAWINGS.
- ALL SUSPENDED EQUIPMENT TO BE HUNG WITH VIBRATION ISOLATORS PER SPECIFICATION SECTION. MECHANICAL DETAILS AND
- CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THE VIBRATION ISOLATION REQUIREMENTS IN THE SPECIFICATIONS & STANDARD DETAILS.
- PROVIDE FIRE DAMPERS WHEN CROSSING RATED WALLS. REFER TO RATED WALL LOCATIONS AND ARCHITECTURAL DRAWINGS FOR FIRE TYPES.
- BUILDING SMOKE PURGE SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF ANY LOCAL AHJ REQUIREMENTS..
- SUPPORT ANCHORS SECURED TO THE BOTTOM OF FLOOR SLABS SHALL BE OF THE DROP-IN OR SLEEVE ANCHOR TYPE. POWDER CHARGED ANCHORING METHODS SHALL NOT BE USED.
- COORDINATE WITH ARCHITECT FOR FINAL LOCATIONS OF ALL THERMOSTATS PRIOR TO INSTALLATION AND SEEK ENGINEER CONFIRMATION.

- ALL CONTROL POWER WIRING AND TRANSFORMERS FOR DAMPERS, ACTUATORS, VAV PANELS, ETC SHALL BE PROVIDED BY THE CONTROLS CONTRACTOR. BOXES, CONTROL POWER FOR CONTROL DEVICES SHALL BE DERIVED FROM SOURCE DESIGNATED BY THE ELECTRICAL CONTRACTOR.
- PROVIDE ACCESS PANELS IN CEILINGS FOR ACCESS TO EQUIPMENT WHERE NECESSARY. CONTRACTOR SHALL ALLOW FOR ADEQUATE ACCESS FOR ALL BALANCING COMPONENTS AND HVAC EQUIPMENT. ENSURE ALL MECHANICAL ELEMENTS ARE A MINIMUM 8" ABOVE FALSE CEILING.
- ALL MECHANICAL EQUIPMENT SHALL BE MOUNTED ON HOUSEKEEPING PADS AS INDICATED IN THE DRAWINGS. COMPLETE WITH ACOUSTIC AND VIBRATION MOUNTS AS INDICATED IN THE STANDARD DETAILS.
- ALL SUPPLY & RETURN / EXHAUST GRILLES SHALL BE VISION PROOF WHERE REQUIRED.
- REFER TO ARCHITECTS DRAWINGS FOR CEILING AND FLOOR MOUNTED GRILLE & DIFFUSER SETTING OUT DIMENSIONS.
- THESE DRAWINGS ARE DIAGRAMMATIC IN NATURE. REFERENCE ARCHITECTURAL DRAWINGS FOR DIMENSIONS/RELATIONSHIPS OF ALL EXPOSED ELEMENTS. COORDINATE ALL HIDDEN WORK WITH ALL OTHER TRADES AND WITH THE FINAL, DIMENSIONED LAYOUT OF ELEMENTS FROM ALL TRADES PRIOR TO THE START OF ANY WORK. REPORT ANY CONFLICTS TO ARCHITECT FOR RESOLUTION PRIOR TO START OF ANY WORK.
- ALLOW FOR ACCESS GRATINGS TO EQUIPMENT AND DAMPERS HIGHER THAN 10 FEET ABOVE FLOOR LEVEL IN MECHANICAL ROOMS.
- PROVIDE ACCESS PANEL IN CEILINGS FOR ACCESS TO EQUIPMENT WHERE NECESSARY. REFER TO ARCHITECT'S CEILING PLANS AND DETAILS.
- DRAIN LINES FROM ROOF MOUNTED EQUIPMENT SHALL BE PIPED TO THE NEAREST ROOF DRAIN.

B MECHANICAL DUCTWORK

- COMBINATION FIRE SMOKE DAMPERS SHALL BE INSTALLED WHEREVER DUCTWORK PENETRATES A SHAFT ENCLOSURE.
- MAXIMUM LENGTH OF FLEXIBLE DUCTWORK BETWEEN BRANCH AND AIR TERMINAL SHALL BE 3'-0".
- PROVIDE VOLUME DAMPERS IN BRANCH AND RUN OUT DUCTWORK FOR ALL AIR OUTLETS AND INLETS. WHERE DAMPERS ARE ABOVE NON-ACCESSIBLE CEILINGS OR ARE WITHIN CONSTRUCTION, CABLE OPERATED, WORM-GEAR TYPE, REMOTE NON-ACCESSIBLE VOLUME DAMPERS SHALL BE PROVIDED.
- PROVIDE 1" INTERNAL DUCT ACOUSTICAL & THERMAL LINING (TYPE: JOHNS MANVILLE PERMACOTE LINAACOUSTIC R-300 TYPE II BOARD OR EQUAL AND APPROVED) ON ALL SUPPLY DUCTWORK FOR THE FIRST 18ft FROM SUPPLY FAN.
- SUPPORT ANCHORS SECURED TO THE BOTTOM OF FLOOR SLABS SHALL BE OF THE DROP-IN OR SLEEVE ANCHOR TYPE. POWDER CHARGED ANCHORING METHODS SHALL NOT BE USED.
- PROVIDE DUCT ACCESS DOORS AND CEILING ACCESS PANELS FOR ALL FIRE, SMOKE AND, COMBINATION FIRE/SMOKE DAMPERS. CEILING ACCESS PANELS SHALL BE COORDINATED WITH ARCHITECTS REQUIREMENTS.
- PROVIDE SMOKE DETECTORS IN ALL DUCTWORK WHERE REQUIRED BY CODE. COORDINATE ALL SMOKE DETECTORS WITH THE ELECTRICAL CONTRACTOR AND THE FIRE ALARM.
- AIR OUTLETS LOCATED IN HIGH CEILINGS SHALL BE FIELD ADJUSTED FOR OPTIMUM DRAFT AND THROW PERFORMANCE.
- ALL EXPOSED DUCTWORK SHALL BE INTERNALLY LINED, CLEAN, STICKER FREE AND FREE OF DEFORMITIES AND MARKS.
- LINEAR FLOOR GRILLES AND DIFFUSERS SHALL BE SHOWN ON ARCHITECTURAL DRAWINGS AND SHALL BE HEAVY DUTY.
- MOUNT ALL SIDEWALL REGISTERS AT THE SAME ELEVATION OR AS SHOWN ON ARCHITECTURAL DRAWINGS.
- ALL SUPPLY AND RETURN GRILLES AND OPENINGS MUST BE COORDINATED WITH ARCHITECTURE USING THE DESIGN REQUIREMENTS SHOWN ON THE MECHANICAL DRAWINGS AND SCHEDULES.
- APPROVED COORDINATION DRAWINGS TO BE USED FOR ELEVATIONS AND LOCATIONS OF DUCTWORK AND EQUIPMENT.
- ALL OPEN ENDED DUCTS TO HAVE WIRE MESH SCREENS.
- OUTDOOR AIR OPENINGS WITHIN 10' OF CONTAMINANTS SHALL POSITIONED TO CONFORM TO ASHRAE 62.1 2007 REQUIREMENTS.
- ALL AIR PLENUM SHALL BE 18 GAGE SHEET METAL.

C MECHANICAL PIPEWORK

- ALL PIPING TO ALLOW FOR EXPANSION BY MEANS OF EXPANSION LOOP AND PIPE ANCHORS.
- ALL GAS-FIRED APPLIANCES SHALL BE VENTED IN ACCORDANCE WITH NFPA-54, REFERENCED IN THE NYC BUILDING CODE AND WITH LOCAL E-DESIGNATION CODE.
- PROVIDE GAS SAFETY SHUT-OFF VALVES ON BOTH THE FIRM AND INTERRUPTIBLE GAS MAINS LOCATED IN THE BOILER ROOM. THE CONTRACTOR SHALL PRESSURE TEST ALL PIPING AS PER THE SPECIFICATION.
- ALL PIPING IN UNHEATED AREAS OR OUTSIDE SHALL BE HEAT TRACED.
- COORDINATE WITH PLUMBING CONTRACTOR FOR ALL GAS CONNECTIONS TO GAS FIRED EQUIPMENT.
- DRAIN LINES FROM CEILING MOUNTED EQUIPMENT SHALL BE PIPED TO THE NEAREST FLOOR DRAIN OR SANITARY LINE.
- HEAT TRACE ALL HEATING HOT WATER PIPE LOCATED ABOVE GRADE OUTSIDE OF BUILDINGS, OR IN COVERED WALKWAYS.
- ALL PIPING PASSING THROUGH MASONRY WALLS SHALL HAVE A SLEEVE, SEE SPECIFICATIONS.
- ALL PIPING PASSING THROUGH FIRE-RATED WALLS SHALL HAVE A FIRE-RATED SLEEVE - SEE SPECIFICATIONS.
- REFRIGERANT PIPE INSULATION AND VAPOR BARRIERS SHALL BE CONTINUOUS THROUGH PIPE HANGERS.
- ALL BLACK STEEL PIPE HANGERS SHALL BE PAINTED PRIOR TO INSTALLATION.
- PROVIDE A STRAIGHT RUN OF PIPING AT PUMP SUCTIONS OF LENGTH AT LEAST 5 PIPE DIAMETERS.

D. DIRECT DIGITAL CONTROL (DDC) OVERAL SYSTEM

(BASES OF DESIGN : DISTECH CONTROLS BY AUTOMATED BUILDING SOLUTIONS )  
CONTRACTOR SHALL INCLUDE A NEW AND OPEN COMMUNICATION PROTOCOL STATE OF THE ART DIRECT DIGITAL CONTROL (DDC) SYSTEM, COMPOSED OF AN OPERATING SYSTEM CAPABLE TO TREND READING DATA, ALARM CONTROL, SETPOINTS OUT OF RANGE, SCHEDULE SPECIAL AND REGULAR EVENTS AND DISPLAY 3D GRAPHICS. THIS OPERATING SYSTEM SHALL BE HOSTED BY A RACK SERVER WITH ALL THE NECESSARY ACCESSORIES IN ORDER TO BE SEATED INTO THE OWNER'S BUILDING IT NETWORK OR DEDICATED DDC FOR PASSWORD PROTECTED REMOTE ACCESS AND ACT AS A VIRTUAL SERVER. THE OPERATING DDC SYSTEM SHALL BE THE LATEST VENDOR'S VERSION AND ANY FUTURE UPGRADES SHALL BE INCLUDED AS PART OF THE SCOPE FOR AT LEAST THE PERIOD OF THE WARRANTY. THE SYSTEM SHALL SUPPORT API PROTOCOLS

- TRAINING SHALL BE INCLUDED AND IT SHALL INCLUDE THREE PHASES:
- A GENERAL SYSTEM OVERALL TRAINING.
  - HANDS-ON TRAINING.
  - FOLLOW UP TRAINING - THIS FOLLOW UP TRAINING SHALL BE SIX MONTHS AFTER FINAL CONSTRUCTION.

THE DDC SYSTEM SHALL INCLUDE DATA MANAGER CONTROLLERS PER EACH LEVEL OR FLOOR WITH NETWORK LOOPS OF A MINIMUM OF 64 DEVICES OR UNITARY CONTROLLERS. THE DDC SYSTEM ALSO SHALL BE CAPABLE OF EXPANSION. DEDICATED UNITARY CONTROLLERS SHALL BE PROVIDED FOR ALL TYPE OF MECHANICAL SYSTEMS AS WELL AS ALL THE ASSOCIATED END DEVICES. EACH DDC CONTROLLER SHALL HAVE UNIVERSAL INPUTS AND OUTPUTS.

CONTROLS WILL HAVE THE CAPABILITY OF TREND LOGGING SPECIFIC PARAMETERS IN ORDER TO COMMISSION THE SYSTEM AND TRACK ENERGY COSTS AS REQUIRED (THIS INCLUDES ANY METERING STRATEGIES REQUIRED BY LEED E.G. MEASUREMENT & VERIFICATION). IT IS ENVISAGED THAT AN ENERGY "DASHBOARD" WILL BE PROVIDED IN THE FACILITY FOR THE BUILDING MANAGERS TO VIEW THE CURRENT ENERGY USAGE AND HISTORICAL ENERGY USAGE AND BE CONFIGURE PER THE OWNER'S DIRECTIOEN.

THE DDC SYSTEM SHALL HAVE INTEGRATION CAPABILITIES. THE INTENT OF THE INTEGRATION IS TO FORM THE ABILITY TO HAVE A SINGLE ACCESS TO ALL INTEGRATED SYSTEMS. THIS IS NOT LIMITED TO THE FOLLOWING: BOILER MASTER PANELS, VRF INTERFACES, CHILLERS, CRAC UNITS, VFD'S , GAS AND WATER FLOW METERS, WATER TREATMENT SYSTEM, SECURITY, ACCESS CONTROL, CCTV, VIDEO SURVEILLANCE, LIGHTING CONTROL, UPS/BATTERY POWER SYSTEM, ATS SWITCHES, POWER METERS, DIGITAL SIGNAGE, ELEVATOR CONTROLS AND PACKAGED HVAC EQUIPMENT SUCH AS AHUS AND RTUS. ALTHOUGHALL FEATURES MAY NOT BE INSTALLED IN THIS PROJECT, THE DDC SHALL HAVE THE CAPABILITY. IF NECESSARY THE DDC SYSTEM SHALL ALSO BE CAPABLE TO MANAGE WIRELESS COMMUNICATION SYSTEMS. THIS APPLIES TO DATA-MANAGERS AS WELL AS UNITARY CONTROLLERS AND CRITICAL SENSORS.

THE DDC VENDOR SHALL INCLUDE A SEQUENCE OF OPERATIONS GRAPHIC AND DEDICATED PAGE(S). ALL THE SEQUENCES SHOULD BE IN A SEPARATE PART OF THE NAVIGATION TREE, BUT ALSO ORGANIZED BY INDIVIDUAL ROOM, BY AHU EQUIPMENT , AND/OR BY SYSTEM. THE SEQUENCE SHOULD BE THE AS-BUILT

SEQUENCE THAT MATCHES EXACTLY WHAT IS PROGRAMMED. AS COMMISSIONING OCCURS AND SEQUENCE CHANGES ARE MADE, THESE PAGES SHALL BE UPDATED.

SMART BUILDING FEATURE

THE DDC SYSTEM SHALL BE CAPABLE TO ACT AS "THE DRIVER" IN COLLECTING DATA, MONITOR PERFORMANCE AND ENERGY USAGE OF SEVERAL, THIRD PARTY SYSTEM VIA DDC INTEGRATION. THE DDC SYSTEM SHALL HAVE INTEGRATION CAPABILITIES. THE INTENT OF THE INTEGRATION IS TO FORM THE ABILITY TO HAVE A SINGLE ACCESS TO ALL INTEGRATED SYSTEMS. THIS IS NOT LIMITED TO THE FOLLOWING: HEAT PUMPS, AIR HANDLING UNITS, VRF INTERFACES, FAN COIL UNITS, UNITS, UNIT HEATERS, VFD'S , WATER FLOW METERS, WATER TREATMENT SYSTEM, SECURITY, ACCESS CONTROL, CCTV, VIDEO SURVEILLANCE, LIGHTING CONTROL, UPS/BATTERY POWER SYSTEM, ATS SWITCHES, POWER METERS, DIGITAL SIGNAGE, ELEVATOR CONTROLS, SHADERS AND PACKAGED HVAC EQUIPMENT SUCH AS AHUS AND RTUS. IF NECESSARY THE DDC SYSTEM SHALL ALSO BE CAPABLE TO MANAGE WIRELESS COMMUNICATION SYSTEMS THIS APPLIES TO DATA-MANAGERS AS WELL AS UNITARY CONTROLLERS AND CRITICAL SENSORS.

DDC GENERAL NOTES

- THE DDC CONTRACTOR SHALL FURNISH AND INSTALL ALL STATE OF THE ART HARDWARE AND ALL THE LATEST OPERATING AND APPLICATIONS SOFTWARE NECESSARY TO PERFORM THE CONTROL SEQUENCES OF OPERATION AS CALLED FOR IN THIS SPECIFICATION.
- AS A MINIMUM, ONE DEDICATED DDCP SHALL BE PROVIDED FOR EACH MAIN HVAC EQUIPMENT (AHU, RTU, WATER SYSTEMS, VAV, FAN POWERED VAV BOXES, FCU), IT IS ACCEPTABLE TO HAVE EXPANSION DDC CONTROLLER WITHIN THE SAME SYSTEM DDCP.
- ALL SETPOINTS INDICATED IN THE SEQUENCES SHALL BE ADJUSTABLE AT THE FRONT END DDC MAIN SOFTWARE SYSTEM OR ANY USER INTERFACE STATION CONNECTED TO ANY MAIN DATA MANAGER CONTROLLER.
- UNLESS OTHERWISE NOTED, THE DDC SYSTEM ARCHITECTURE SHALL TIE INTO THE BUILDING IT INFRASTRUCTURE AND IT SHALL INTERACT BETWEEN EACH OTHER FOR REMOTE ACCESS. BUILDING IT SHALL PROVIDE STATIC IP ADDRESS AS REQUIRED BY THE DDC CONTRACTOR FOR DESIGN.
- THE DDC CONTRACTOR SHALL COMPLY WITH ALL BUILDING IT INFRASTRUCTURE SECURITY POLICIES FROM REMOTE ACCESS.
- UNLESS OTHERWISE NOTED, THE DDC CONTRACTOR SHALL PROVIDE, FOR THE PRIMARY NETWORK, AN INDIVIDUAL ETHERNET VERTICAL HOMERUNS FROM DDC SERVER SWITCHHUB TO EACH DATA MANAGER OR PRIMARY CONTROLLER AS LONG AS ETHERNET MAXIMUM DISTANCE LIMITATION ARE NOT EXCEEDED.
- THE DDC CONTRACTOR SHALL BE RESPONSIBLE TO FOLLOW ALL THE TECHNICAL REQUIREMENTS IN A DDC SYSTEM ARCHITECTURE DESIGN FOR DISTANCE LIMITATIONS ON ETHERNET AND FIBER NETWORK. ALL ETHERNET SWITCHES OR FIBER TO ETHERNET CONVERTERS AND ASSOCIATED ACCESSORIES TO BE FURNISH BY THE DDC CONTRACTOR. THE DDC VENDOR SHALL PROVIDE PRIMARLY 24VAC POWER INPUT SWITCHES OR CONVERTERS TYPE.
- THE DDC BMS SYSTEM SHALL ALLOW THE DISTRIBUTION OF SYSTEM FUNCTIONS SUCH AS MONITORING AND CONTROL AND GRAPHICAL USER INTERFACE ETC. ACROSS THE NETWORK TO ACHIEVE MAXIMUM FLEXIBILITY, ACCESSIBILITY AND PERFORMANCE.
- IT IS NOT ACCEPTABLE TO UTILIZE THE NETWORK TO SEND CRITICAL DATA REQUIRED BY A CONTROL ALGORITHM FROM ONE CONTROLLER TO ANOTHER. CRITICAL DATA SHALL BE A DIRECT HARDWARE INPUT TO THE CONTROLLER CONTAINING THE CONTROL ALGORITHM. IF MULTIPLE CONTROLLERS REQUIRE THE SAME PIECE OF DATA FOR A CONTROL ALGORITHM, THE DATA SHALL BE A DIRECT HARDWARE INPUT TO EACH CONTROLLER.
- IT IS NOT ACCEPTABLE TO RESTRICTED ACCESS TO DDC SYSTEM DATA BY THE HARDWARE CONFIGURATION OF THE BMS. HARDWARE CONFIGURATION OF THE BMS NETWORK SHALL BE TOTALLY OPEN AND TRANSPARENT TO THE USER WHEN ACCESSING DATA OR DEVELOPING CONTROL PROGRAMS.
- THE DDC CONTRACTOR BMS DESIGN SHALL BE MADE TO ALLOW THE CO-EXISTENCE OF CURRENT (IF APPLICABLE) AND FUTURE EXPANSION OF DATA MANAGER CONTROLLERS AND PERSONAL COMPUTER OPERATOR WORKSTATIONS ON THE SAME PRIMARY NETWORK.
- IT IS NOT ACCEPTABLE TO RESTRICTED ACCESS TO A DDC SYSTEM DATA BY THE HARDWARE CONFIGURATION OF THE BMS. HARDWARE CONFIGURATION OF THE BMS NETWORK SHALL BE TOTALLY OPEN AND TRANSPARENT TO THE USER WHEN ACCESSING DATA OR DEVELOPING CONTROL PROGRAMS.
- THE DDC CONTRACTOR SHALL PROVIDE NETWORK WIRING AS REQUIRED TO ENSURE TOTAL SYSTEM OPERATION AND COMMUNICATION WITHOUT INTERRUPTION, EVEN IF THE NETWORK WIRING IS OPEN IN ONE (1) LOCATION.
- THE PRIMARY NETWORK SHALL ALLOW ANY DATA MANAGER CONTROL PANEL TO ACCESS ANY DATA FROM, OR SEND CONTROL COMMANDS AND ALARM REPORTS DIRECTLY TO, ANY OTHER PRIMARY CONTROL PANEL OR COMBINATION OF CONTROLLERS ON THE NETWORK WITHOUT DEPENDENCE UPON A CENTRAL OR INTERMEDIATE PROCESSING DEVICE.
- THE PEER-TO-PEER NETWORK SHALL ALSO ALLOW ANY PRIMARY CONTROL PANEL TO ACCESS, EDIT, MODIFY, ADD, DELETE, BACK UP, RESTORE ALL SYSTEM POINT DATABASE AND ALL PROGRAMS, ASSIGN PASSWORD ACCESS AND CONTROL PRIORITIES TO EACH SYSTEM INDIVIDUALLY. THE LOGON PASSWORD (AT ANY PC WORKSTATION OR PORTABLE OPERATOR TERMINAL) SHALL ENABLE THE OPERATOR TO MONITOR, ADJUST AND CONTROL ONLY THE SYSTEM THAT THE OPERATOR IS AUTHORIZED FOR.
- A RACK SERVER WITH BUILT-IN MONITOR SHALL BE FURNISHED LOADED WITH THE DDC CONTRACTOR OPERATING BUILDING MANAGEMENT SYSTEM (BMS) SOFTWARE PLUS ALL THE NECESSARY ACCESSORIES FOR MOUNTING AND CONNECTING TO AN IT NETWORK. AN ADDITIONAL UI STATION TO ACCESS DDC SERVER AT THE MAIN LOCATION POINTS OF CONTROL OF THE DDC SYSTEM SHOULD BE ALSO PROVIDED AND SET UP BY THE DDC CONTRACTOR.
- ALL GLOBAL COMMON INFORMATION (OUTSIDE AIR TEMP & HUMIDITY, ETC) SHALL BE MEASURED AND COMMUNICATED FROM THE CENTRAL WEATHER STATION.
- WEATHER STATION SHALL BE VAISALA WXT536 & IT SHALL BE PROVIDED WITH ALL NECESSARY ACCESSORIES TO MEASURE PRESSURE, TEMPERATURE, HUMIDITY, RAIN, WIND. INTERFACE CONNECTIVITY AS WELL AS HARDWARE TERMINATIONS ARE ACCEPTABLE.
- THE DDC CONTRACTOR SHALL FURNISH COMMUNICATIONS INTERFACE (INCLUDING NECESSARY SOFTWARE) BETWEEN THE DDC SYSTEM AND EACH MANUFACTURER SUPPLIED CONTROL PANEL SPECIFIED. THE DDC SYSTEM SHALL BE CAPABLE OF READING AND DISPLAYING ALL DATA USED BY THE MANUFACTURER'S CONTROL PANEL. SOFTWARE INTERFACE SHALL BE THROUGH LONMARK/BACNET/MOD BUS COMPLIANT PROTOCOL. WHERE THE DDC SYSTEM IS REQUIRED TO CONTROL THE OPERATION OF THE EQUIPMENT, PROVIDE INPUT AND OUTPUT INTERFACE AS REQUIRED.
- DDC SYSTEM SHALL BE EXPANDABLE WITHOUT HAVING TO PHYSICALLY RECONFIGURE THE NETWORK.
- AN UNINTERRUPTIBLE POWER SUPPLY (UPS) SHALL BE PROVIDED AND INSTALLED BY THE DDC CONTRACTOR FOR EACH OF THE FOLLOWING DEVICES THAT ARE POWERED BY THE BMS INCLUDING; NETWORK SWITCHES, BMS PRIMARY CONTROL PANEL, BMS SECONDARY CONTROL PANEL, OPERATOR'S WORKSTATION, PRINTER AND FIELD DEVICE. EACH UPS SHALL POWER THE DEVICE FOR A MINIMUM OF 30 MINUTES, IN THE CASE OF POWER INTERRUPTION.
- EACH UPS SHALL BE PROVIDED WITH DRY CONTACTS FOR STATUS, RECOMMENDED MANUFACTURER: FUNCTIONAL DEVICES PART# PSH650-UPS-STAT.

PRIMARY NETWORK

- ALL OPERATOR WORKSTATIONS AND DATA MANAGER CONTROLLERS SHALL DIRECTLY RESIDE ON A NETWORK WHICH THE USER SHALL ACCESS, EDIT, MODIFY, ADD, DELETE, BACK UP, REPORT, TREND, RESTORE ALL SYSTEM POINT DATABASE AND ALL PROGRAMS) MAY BE EXECUTED DIRECTLY BETWEEN SERVERS, PRIMARY CONTROL PANELS, AND OPERATOR WORKSTATIONS ON A PEER-TO-PEER BASIS.
- ALL OPERATOR DEVICES EITHER NETWORK RESIDENT OR CONNECTED VIA INTRANET AND INTERNET, SHALL HAVE THE ABILITY TO ACCESS ALL POINT STATUS AND APPLICATION REPORT DATA OR EXECUTE CONTROL FUNCTIONS FOR ANY AND ALL OTHER DEVICES VIA THE PRIMARY NETWORK OR THE SECONDARY NETWORK.
- ACCESS TO DATA SHALL BE BASED UPON LOGICAL IDENTIFICATION OF BUILDING EQUIPMENT.
- THE PRIMARY NETWORK SHALL PROVIDE A HIGH-SPEED DATA TRANSFER RATES FOR ALARM REPORTING, QUICK REPORT GENERATION FROM MULTIPLE CONTROLLERS AND UPLOAD/DOWNLOAD EFFICIENCY BETWEEN NETWORK DEVICES. SYSTEM PERFORMANCE SHALL INSURE THAT AN ALARM OCCURRING AT ANY CONTROL PANEL IS DISPLAYED AT ANY PC WORKSTATION, STANDALONE ALARM PRINTER AND/OR CONTROL PANEL WITHIN 5 SECONDS.
- THE PRIMARY NETWORK SHALL PROVIDE MESSAGE AND ALARM BUFFERING TO PREVENT INFORMATION FROM BEING LOST, ERROR DETECTION, CORRECTION AND RE-TRANSMISSION TO GUARANTEE DATA INTEGRITY.
- THE PRIMARY NETWORK SHOULD BE CAPABLE TO DO SYNCHRONIZATION OF REAL-TIME CLOCKS BETWEEN SERVER, PRIMARY CONTROL PANELS, AND OPERATOR WORKSTATIONS, INCLUDING AUTOMATIC DAYLIGHT SAVINGS TIME CORRECTIONS.
- THE DDC CONTRACTOR SHALL PROVIDE NETWORK WIRING AS REQUIRED TO ENSURE TOTAL SYSTEM OPERATION AND COMMUNICATION WITHOUT INTERRUPTION, EVEN IF THE NETWORK WIRING IS OPEN IN ONE (1) LOCATION.
- THE PRIMARY NETWORK SHALL ALLOW THE PRIMARY CONTROL PANELS TO ACCESS ANY DATA FROM, OR SEND CONTROL COMMANDS AND ALARM REPORTS DIRECTLY TO, ANY OTHER PRIMARY CONTROL PANEL OR COMBINATION OF CONTROLLERS ON THE NETWORK WITHOUT DEPENDENCE UPON A CENTRAL OR INTERMEDIATE PROCESSING DEVICE.
- THE PRIMARY CONTROL PANEL SHALL SEND ALARM REPORTS TO MULTIPLE OPERATOR WORKSTATIONS WITHOUT DEPENDENCE UPON A CENTRAL OR INTERMEDIATE PROCESSING DEVICE.
- THE PEER-TO-PEER NETWORK SHALL ALSO ALLOW ANY DATA MANAGER CONTROL PANEL TO ACCESS, EDIT, MODIFY, ADD, DELETE, BACK UP, RESTORE ALL SYSTEM POINT DATABASE AND ALL PROGRAMS, ASSIGN PASSWORD ACCESS AND CONTROL PRIORITIES TO EACH SYSTEM INDIVIDUALLY. THE LOGON PASSWORD (AT ANY PC WORKSTATION OR PORTABLE OPERATOR TERMINAL) SHALL ENABLE THE OPERATOR TO MONITOR, ADJUST AND CONTROL ONLY THE SYSTEM THAT THE OPERATOR IS AUTHORIZED FOR.

SECONDARY NETWORK

- THIS NETWORK SHALL CONNECT AND SUPPORT STAND-ALONE SECONDARY CONTROL PANELS AND SHALL COMMUNICATE BI-DIRECTIONALLY WITH THE PRIMARY NETWORK THROUGH ANY DATA MANAGER CONTROL PANELS FOR TRANSMISSION OF GLOBAL DATA. SUFFICIENT NUMBER OF DATA MANAGER CONTROL PANELS SHALL BE PROVIDED FOR CONNECTION OF SECONDARY NETWORKS BASED ON QUANTITY OF SECONDARY CONTROLS PANELS AND DISTANCE LIMITATIONS.
- SECONDARY CONTROL PANELS SHALL BE ARRANGED ON THE SECONDARY NETWORK IN A FUNCTIONAL RELATIONSHIP MANNER WITH THE DATA-MANAGER CONTROL PANELS. FOR EXAMPLE, A VAV SECONDARY CONTROL PANEL ON A SECONDARY NETWORK OF A PRIMARY CONTROL PANEL THAT IS CONTROLLING THE VAV'S CORRESPONDING AHU. PRIMARY CONTROL PANEL HARDWARE (DATA MANAGER)

PRIMARY CONTROL PANEL HARDWARE (DATA MANAGER)

- PROVIDE ONE (1) DATA MANAGER OR PRIMARY CONTROL PANEL AT EACH FLOOR OR LEVEL TO MONITOR AND SEQUENCING EQUIPMENT WITHIN ASSOCIATED FLOOR.
- IT IS NOT ACCEPTABLE TO HAVE (1) DATA MANAGER OR PRIMARY CONTROLLER SERVING SEVERAL FLOORS UNLESS THE MECHANICAL EQUIPMENT IS INTERACTING WITH EACH OTHER FOR EXAMPLE: AN AHU UNIT IS LOCATED ON THE FIRST FLOOR AND ALL ASSOCIATED VAV BOXES ARE ON A SECOND FLOOR IF THIS IS THE CASE THEN IT IS ACCEPTABLE.
- HVAC EQUIPMENT THAT INTERACT WITH EACH OTHER SHALL BE WITHIN THE SAME DATA MANAGER OR PRIMARY CONTROLLER.
- DATA MANAGER CONTROLLER SHALL BE ASHRAE 135 COMPLIANCE AND USE THE LATEST VERSION OF BACNET/ASHRAE 135 PROTOCOL AND COMMUNICATE USING ISO 8802-3 (ETHERNET) DATALINK/PHYSICAL LAYER PROTOCOL.
- ALL PRIMARY CONTROL PANELS SHALL BE INSTALLED WITH 30% SPARE MEMORY CAPACITY FOR FUTURE CONNECTIONS. PROVIDE ALL HARDWARE MODULES, SOFTWARE MODULES, PROCESSORS, POWER SUPPLIES, REPEATERS ETC. REQUIRED TO ENSURE ADDING A CONTROLLER TO THE SPARE MEMORY.
- PROVIDE ALL PROCESSORS, POWER SUPPLIES AND COMMUNICATION CONTROLLERS SO THAT THE IMPLEMENTATION OF ADDING A CONTROLLER TO THE SPARE MEMORY ONLY REQUIRES THE ADDITION OF THE APPROPRIATE END DEVICES AND FIELD WIRING.
- THE DATA MANAGER OR PRIMARY NETWORK CONTROLLER SHALL BE PROVIDED WITH ALL COMMUNICATION CARDS NEEDED FOR PROJECT INCLUDING CARDS FOR SPARE PORTS LEFT ON CONTROLLER.
- EACH DATA MANAGER SHALL BE EQUIPPED TO MONITOR ALL INDUSTRY STANDARD TYPES OF INTERFACE PROTOCOLS WITHOUT THE ADDITION OF EQUIPMENT TO THE DATA MANAGER CONTROL PANEL OR ADDITIONAL SOFTWARE DRIVERS.
- THE OPERATOR SHALL HAVE THE ABILITY TO MANUALLY OVERRIDE AUTOMATIC OR CENTRALLY EXECUTED COMMANDS AT THE DATA MANAGER OR PRIMARY CONTROL PANELS VIA A DISPLAY MOUNTED ON THE FRONT DOOR (FOR EXAMPLE: DISTECH CONTROLS' HORIZON-C DISPLAYS OR EQUAL).
- EACH DATA MANAGER PRIMARY CONTROL PANEL SHALL CONTINUOUSLY PERFORM SELF-DIAGNOSTICS ON ALL HARDWARE MODULES AND NETWORK COMMUNICATIONS. THE PRIMARY CONTROL PANEL SHALL PROVIDE BOTH LOCAL AND REMOTE ANNUNCIATION OF ANY DETECTED COMPONENT FAILURES, OR REPEATED FAILURE TO ESTABLISH COMMUNICATION WITH ANY SYSTEM.

DATA MANAGER SOFTWARE

- FURNISH SOFTWARE TO FORM COMPLETE OPERATING SYSTEM FOR BUILDING AND ENERGY MANAGEMENT. DATA MANAGER SOFTWARE.
- DDC SOFTWARE SHALL BE CAPABLE TO HOST AN UNLIMITED AMOUNT OF DATA MANAGER OR PRIMARY CONTROLLER FOR EXPANDABILITY (E.G. EC-NET 4 SUPERVISOR UNL OR EQUAL).
- ALL PROGRAMS POINTS SHALL BE IDENTIFIED BY A 30 CHARACTER NAME AND A 16 CHARACTER POINT DESCRIPTOR. THE SAME NAMES SHALL BE DISPLAYED AT BOTH THE DATA MANAGER CONTROL PANEL(S) (VIA PORTABLE TERMINAL) AND THE VIRTUAL RACK SERVER OR ANY UI WORKSTATION(S). MULTI-SYSTEM CONSISTENCY ON POINT NAMES SHOULD BE MAINTAINED.
- TREND DATA SHALL BE STORED AT THE DATA-MANAGER CONTROL PANELS AND AUTOMATICALLY UPLOADED TO THE VIRTUAL DDC RACK SERVER.
- UPLOADS SHALL OCCUR BASED ON USER-DEFINED INTERVALS, MANUAL COMMANDS, OR AUTOMATICALLY WHEN THE TREND BUFFER IS 80% FULL. ALL TREND DATA SHALL BE AVAILABLE FOR USE IN ANY 3RD PARTY PERSONAL COMPUTER APPLICATIONS LOCATED IN THE DDC.

SECONDARY CONTROL PANEL HARDWARE

- EACH SECONDARY CONTROL PANEL SHALL OPERATE AS A STAND-ALONE CONTROLLER CAPABLE OF PERFORMING ITS USER SELECTABLE CONTROL ROUTINES INDEPENDENTLY OF ANY OTHER CONTROLLER IN THE SYSTEM. EACH SECONDARY CONTROL PANEL SHALL BE A MICROPROCESSOR-BASED, MULTI-TASKING, REAL-TIME DIGITAL CONTROL PROCESSOR.
- EACH SECONDARY CONTROL PANEL SHALL INCLUDE ALL POINT INPUTS AND OUTPUTS NECESSARY TO PERFORM THE SPECIFIED CONTROL SEQUENCES. THE SECONDARY CONTROLLER SHALL ACCEPT INPUT AND PROVIDE OUTPUT SIGNALS THAT COMPLY WITH INDUSTRY STANDARDS. CONTROLLERS UTILIZING PROPRIETARY CONTROL SIGNALS SHALL NOT BE ACCEPTABLE. OUTPUTS MAY BE UTILIZED EITHER FOR 2-STATE, MODULATING, FLOATING OR PROPORTIONAL CONTROL, ALLOWING FOR ADDITIONAL SYSTEM FLEXIBILITY.
- CONTROL APPLICATIONS; OPERATING PROGRAMS SHALL BE FIELD-SELECTABLE FOR SPECIFIC APPLICATIONS. IN ADDITION, SPECIFIC APPLICATIONS MAY BE MODIFIED TO MEET THE USER'S EXACT CONTROL STRATEGY REQUIREMENTS, ALLOWING FOR ADDITIONAL SYSTEM FLEXIBILITY. CONTROLLERS THAT REQUIRE FACTORY CHANGES OF ALL APPLICATIONS ARE NOT ACCEPTABLE.
- CONTROLLERS SHALL INCLUDE ALL POINT INPUTS AND OUTPUTS NECESSARY TO PERFORM THE SPECIFIED CONTROL SEQUENCES AS A MINIMUM, 50% OF THE POINT OUTPUTS SHALL BE OF THE UNIVERSAL TYPE, THAT IS, THE OUTPUTS MAY BE UTILIZED EITHER AS MODULATING OR TWO-STATE, ALLOWING FOR ADDITIONAL SYSTEM FLEXIBILITY. IN LIEU OF UNIVERSAL OUTPUTS, PROVIDE A MINIMUM OF 50% SPARE OUTPUTS OF EACH TYPE VIA ADDITIONAL POINT TERMINATION BOARDS OR CONTROLLERS. ANALOG OUTPUTS SHALL BE INDUSTRY STANDARD, ALLOWING FOR INTERFACE TO A VARIETY OF END DEVICES. TERMINAL EQUIPMENT CONTROLLERS UTILIZING PROPRIETARY CONTROL SIGNALS AND ACTUATORS SHALL NOT BE ACCEPTABLE.
- PROVIDE A SECONDARY CONTROL PANEL FOR EACH OF THE FOLLOWING TYPES OF EQUIPMENT (IF APPLICABLE):
  - ROOFTOP UNITS (UNLESS IT HAS BEEN SPECIFIED AS A FACTORY PROVIDED SECONDARY CONTROLLER WITH INTEGRATED CAPABILITY)
  - AHU (UNLESS IT HAS BEEN SPECIFIED AS A FACTORY PROVIDED SECONDARY CONTROLLER WITH INTEGRATED CAPABILITY)
  - VARIABLE AIR VOLUME (VAV) BOXES
  - VRF CONDENSING UNITS AND FAN COIL UNITS
  - PERIMETER HEATING CONTROLS
  - HEAT EXCHANGER SYSTEM
  - HEAT PUMP SYSTEMS
  - HYDRONIC PUMPS
  - RADIANT FLOOR SYSTEM
  - AC UNITS (UNLESS IT IS A FACTORY PROVIDED SECONDARY CONTROLLER WITH INTEGRATED CAPABILITY)
  - UNIT/CABINET UNIT HEATERS.
  - EXHAUST FANS.
  - OTHER TERMINAL CRITICAL EQUIPMENT.
- EACH SECONDARY CONTROL PANEL SHALL, AT A MINIMUM, BE PROVIDED WITH:
  - APPROPRIATE NEMA RATED ENCLOSURE FOR ITS APPLICATION.
  - A STAND-ALONE REAL-TIME DIGITAL CONTROL MICROPROCESSOR MODULE.
  - BUILT-IN DISPLAY OR DOOR MOUNTED TYPE (WITH THE EXCEPTION OF VAV CONTROLLERS)
  - SECONDARY NETWORK COMMUNICATIONS ABILITY.
  - POWER SUPPLIES AS REQUIRED FOR ALL ASSOCIATED MODULES, SENSORS, ACTUATORS, ETC.
  - EXPANSION CAPABILITIES
- THERE SHALL BE PROVISIONS FOR BURRO HAPPOLD TO HAVE REMOTE ACCESS VIA A USERNAME AND PASSWORD TO THE DDC SYSTEM FOR THE COLLECTION OF DATA PERFORMANCE OF ALL SYSTEM.

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Key Plan

Description	Date
Filing Set	06/17/22

Project

# Storm King Art Center Welcome Pavilions

Seal

NOT FOR CONSTRUCTION

Drawing Title

## General Notes

Date	06/17/22
Scale	Not to Scale
Drawing Number	M-W-002
Sheet Size	ARCH D



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Key Plan



Description  
Filing Set

Date  
06/17/22

Project

Storm King  
Art Center  
Welcome  
Pavilions

Seal

NOT FOR CONSTRUCTION

Drawing Title

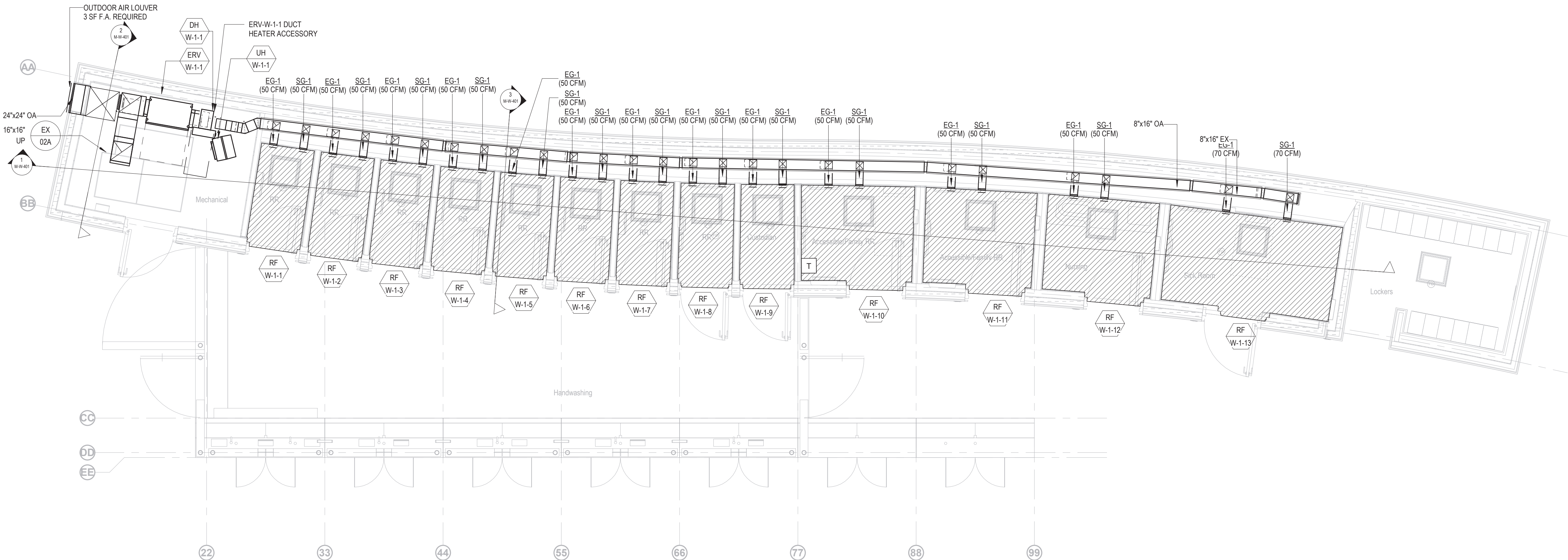
Restroom - Duct Plan  
- Ground Level

Date 06/17/22

Scale 1/4" = 1'-0"

Drawing Number M-W-101

Sheet Size ARCH D





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Key Plan



Description	Date
Filing Set	06/17/22

Project

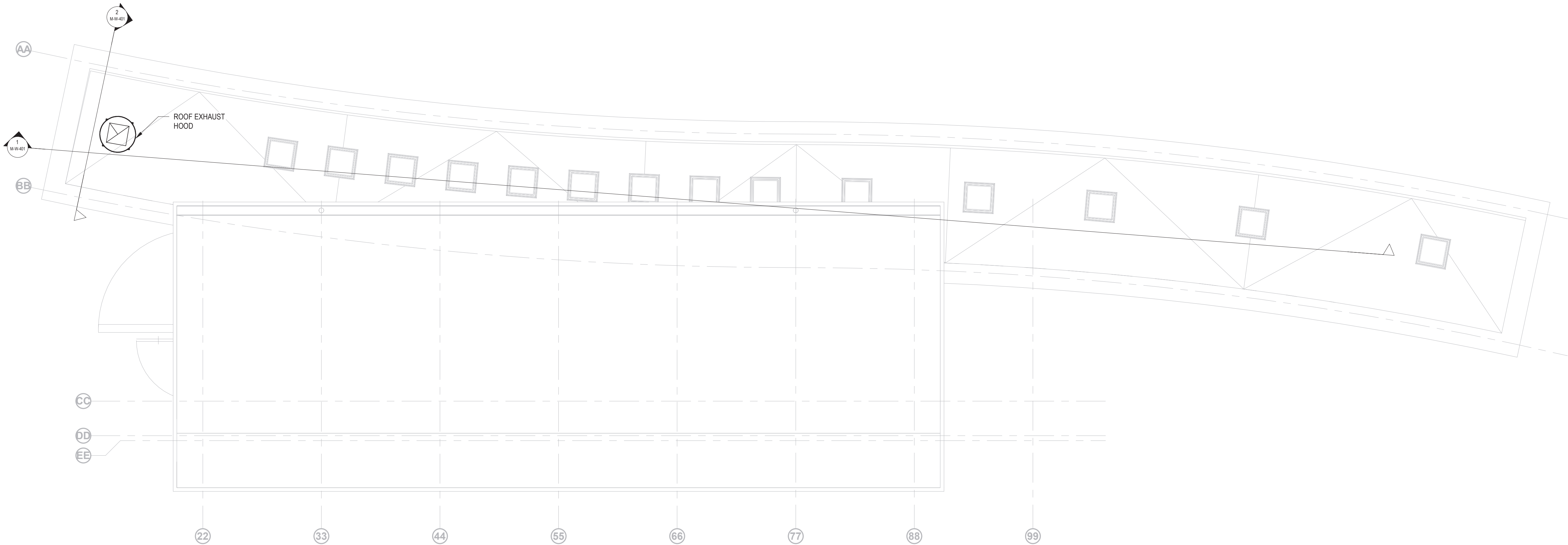
Storm King  
Art Center  
Welcome  
Pavilions

Seal

NOT FOR CONSTRUCTION

Drawing Title  
Restroom - Duct Plan  
- Roof Level

Date	06/17/22
Scale	1/4" = 1'-0"
Drawing Number	M-W-102
Sheet Size	ARCH D



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**Key Plan**

N

Description

Filing Set

Date

06/17/22

Project

Storm King  
Art Center

Welcome  
Pavilions

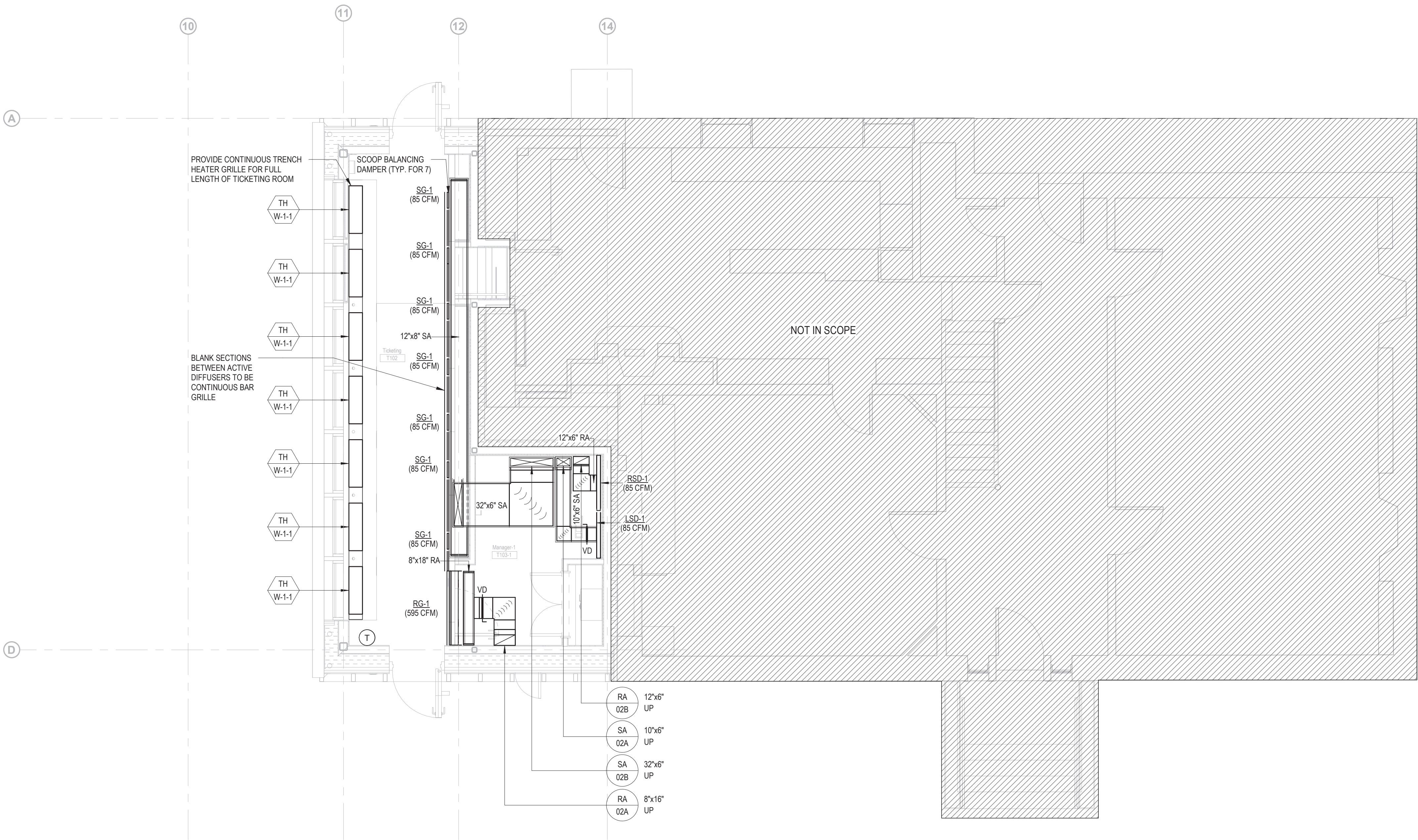
Seal

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Drawing Title

Ticketing - Duct Plan  
- Ground Level

Date	06/17/22
Scale	1/4" = 1'-0"
Drawing Number	M-W-111
Sheet Size	ARCH D





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Key Plan



Description  
Filing Set

Date  
06/17/22

Project

Storm King  
Art Center  
Welcome  
Pavilions

Seal

NOT FOR CONSTRUCTION

Drawing Title

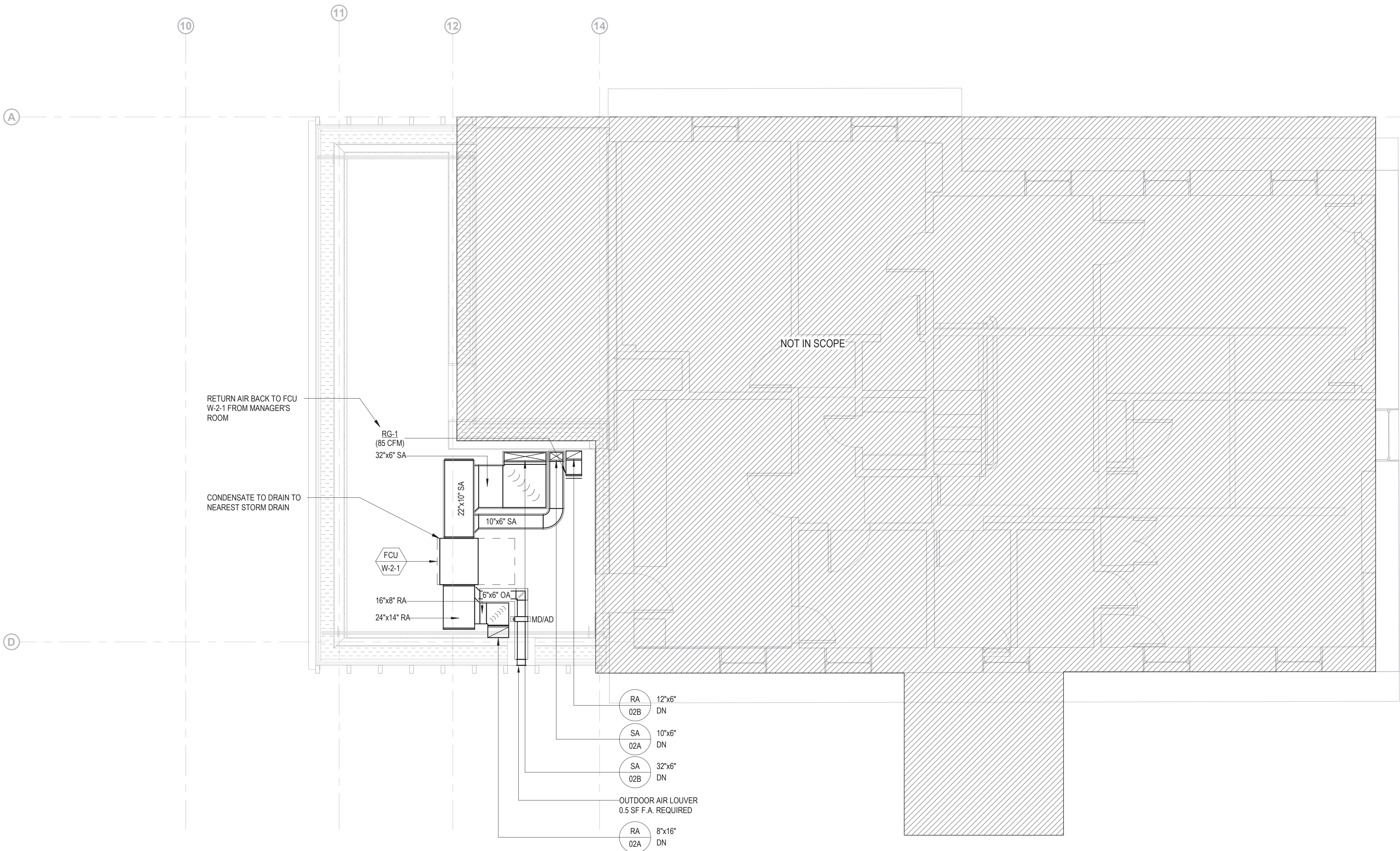
Ticketing - Duct Plan  
- Second Level

Date  
06/17/22

Scale  
1/4" = 1'-0"

Drawing  
Number  
M-W-112

Sheet Size  
ARCH D





GENERAL NOTES

DRAWINGS ARE PRESENTED HERE AT A 90% CONSTRUCTION DOCUMENTS LEVEL. WHERE DETAIL IS NOT YET SHOWN, PROVIDE ALL COMPONENTS REQUIRED FOR A FULLY FUNCTIONAL HVAC SYSTEM INCLUDING, BUT NOT LIMITED TO:

- THERMOSTATS FOR ALL ZONES ASSOCIATED WITH HEATING AND COOLING UNITS
- CO2 SENSORS IN ALL DENSELY OCCUPIABLE AREAS
- FACTORY PACKAGED CONTROLS FOR ALL COMPLEX EQUIPMENT.
- FULL STORM KING FACILITY CENTRAL BUILDING MANAGEMENT SYSTEM, CONNECTING ALL CURRENT AND FUTURE BUILDINGS, AS DESCRIBED ON THE MECHANICAL COVER SHEET
- BALANCING DAMPERS AT ALL AIR TERMINALS
- ACOUSTIC DUCT LINING 10FT UPSTREAM AND DOWNSTREAM OF ALL FANS
- DUCT SILENCERS AT ALL DUCT CONNECTIONS TO AIR HANDLING UNITS AND ROOF MOUNTED UNITS
- FIRE DAMPERS AND FIRE/SMOKE DAMPERS AT ALL DUCT PENETRATIONS THROUGH RATED WALLS.
- INSULATION ON ALL AIR DUCT, HYDRONIC PIPES AND REFRIGERANT PIPES
- DOUBLE-WALL CONSTRUCTION ON ALL EXPOSED DUCT VISIBLE FROM OCCUPIED SPACES.
- SHUTOFF VALVES AT ALL PIPED COMPONENTS
- SPRING VIBRATION ISOLATION AT ALL EQUIPMENT WITH MOVING PARTS
- FIRESTOPPING OF ALL DUCT AND PIPE PENETRATIONS THROUGH ALL WALLS
- HEAT TRACING FOR ALL HYDRONIC PIPING OUTSIDE OF THE BUILDING ENVELOPE
- CONDENSATE DRAIN PIPING FROM ALL COOLING COILS TO DRAIN (INCLUDE CONDENSATE PUMPS WHERE NECESSARY FOR GRAVITY DRAIN)
- AUXILIARY DRIP PANS AND LEAK DETECTION UNDERNEATH ANY HYDRONIC EQUIPMENT (INCLUDING ASSOCIATED VALVING/TRIM)
- AIRFLOW MONITORING STATIONS ON AHUS
- VFDS FOR ANY FAN OR PUMP MOTOR WHICH IS NOT AN ECM
- ACOUSTICALLY LINED RETURN AIR TRANSFER DUCTWORK ABOVE CEILINGS WHERE WALLS EXTEND TO UNDERSIDE OF STRUCTURE ABOVE.
- ALL COMPONENTS REQUIRED FOR A FULLY FUNCTIONAL VRF SYSTEM INCLUDING VALVING AND CONTROL WIRING

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Key Plan



Description  
Filing Set

Date  
06/17/22

Project

Storm King  
Art Center  
Welcome  
Pavilions

Seal

NOT FOR CONSTRUCTION

Drawing Title

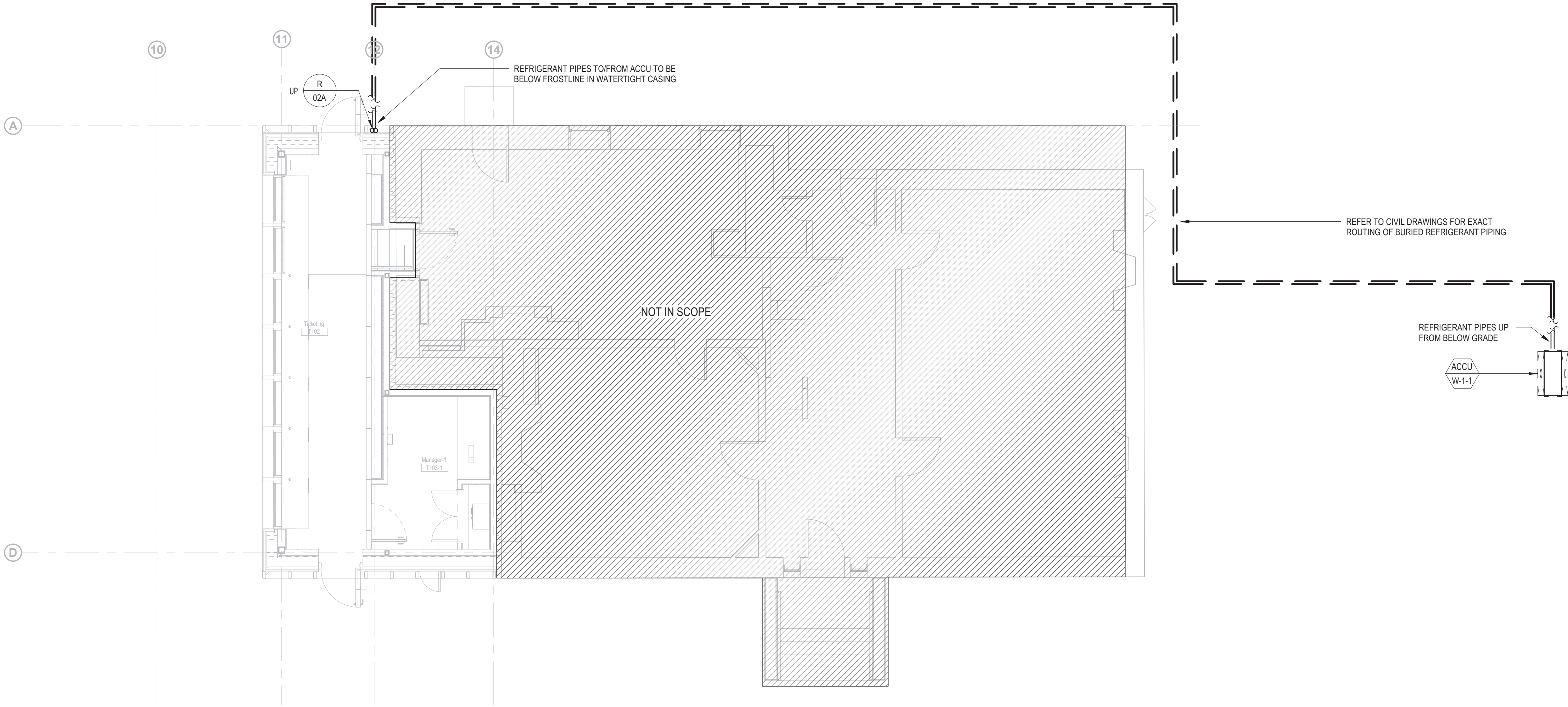
Ticketing - Pipe Plan  
- Ground Level

Date 06/17/22

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Drawing Number M-W-211

Sheet Size ARCH D



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Key Plan



Description	Date
Filing Set	06/17/22

Project

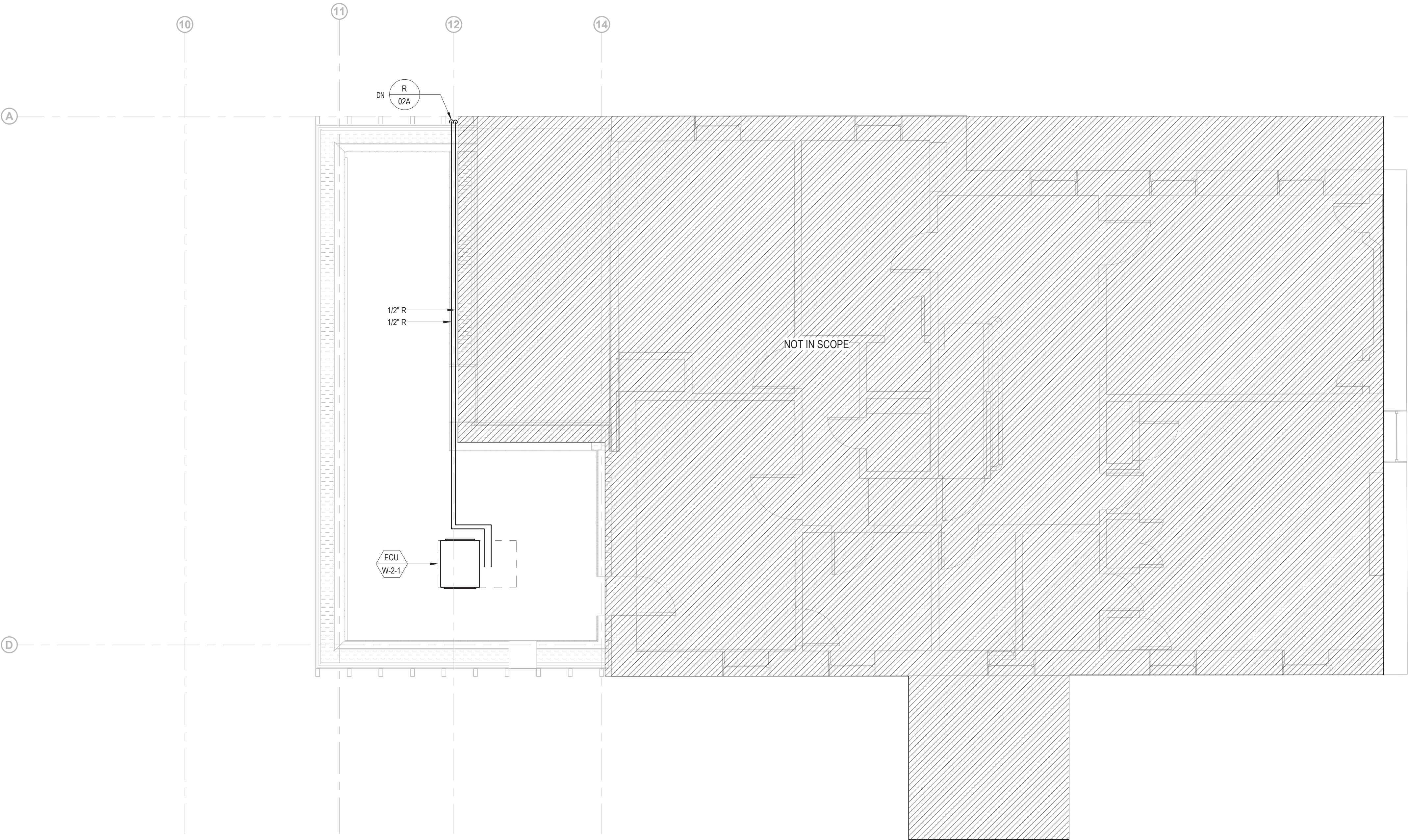
Storm King  
Art Center  
Welcome  
Pavilions

Seal

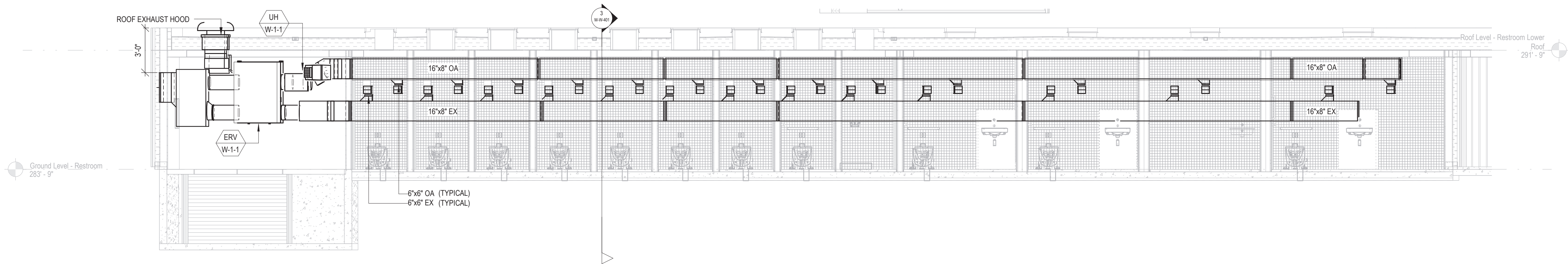
NOT FOR CONSTRUCTION

Drawing Title  
Ticketing- Pipe Plan -  
Second Level

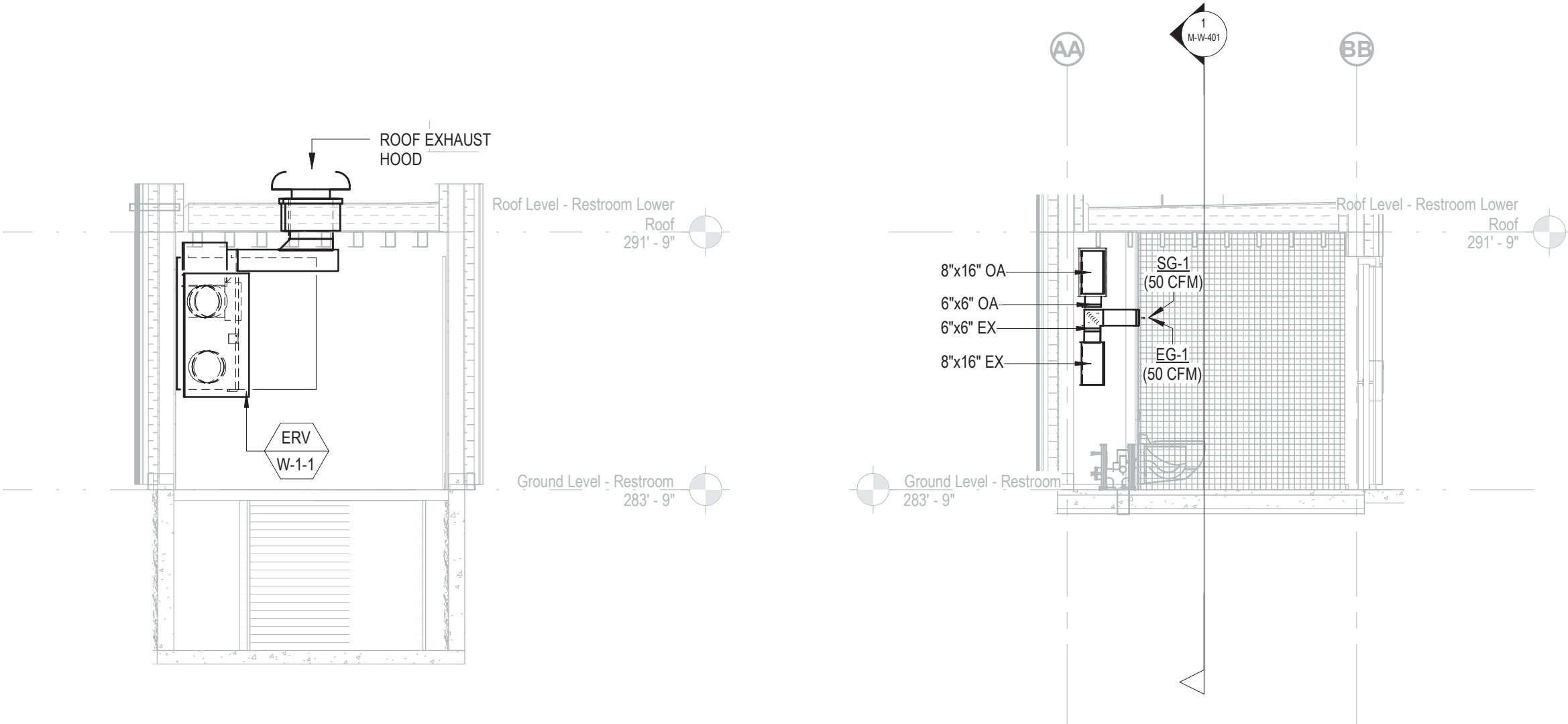
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Scale	1/4" = 1'-0"
Drawing Number	M-W-212
Sheet Size	ARCH D







1 RESTROOM SECTION - MECHANICAL  
SCALE 1/4" = 1'-0"



2 RESTROOM SECTION - MECHANICAL ROOM (1/2)  
SCALE 1/4" = 1'-0"

3 RESTROOM SECTION - MECHANICAL ROOM (2/2)  
SCALE 1/4" = 1'-0"

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<b>Key Plan</b>	

Description	Date
Filing Set	06/17/22

Project

Storm King  
Art Center

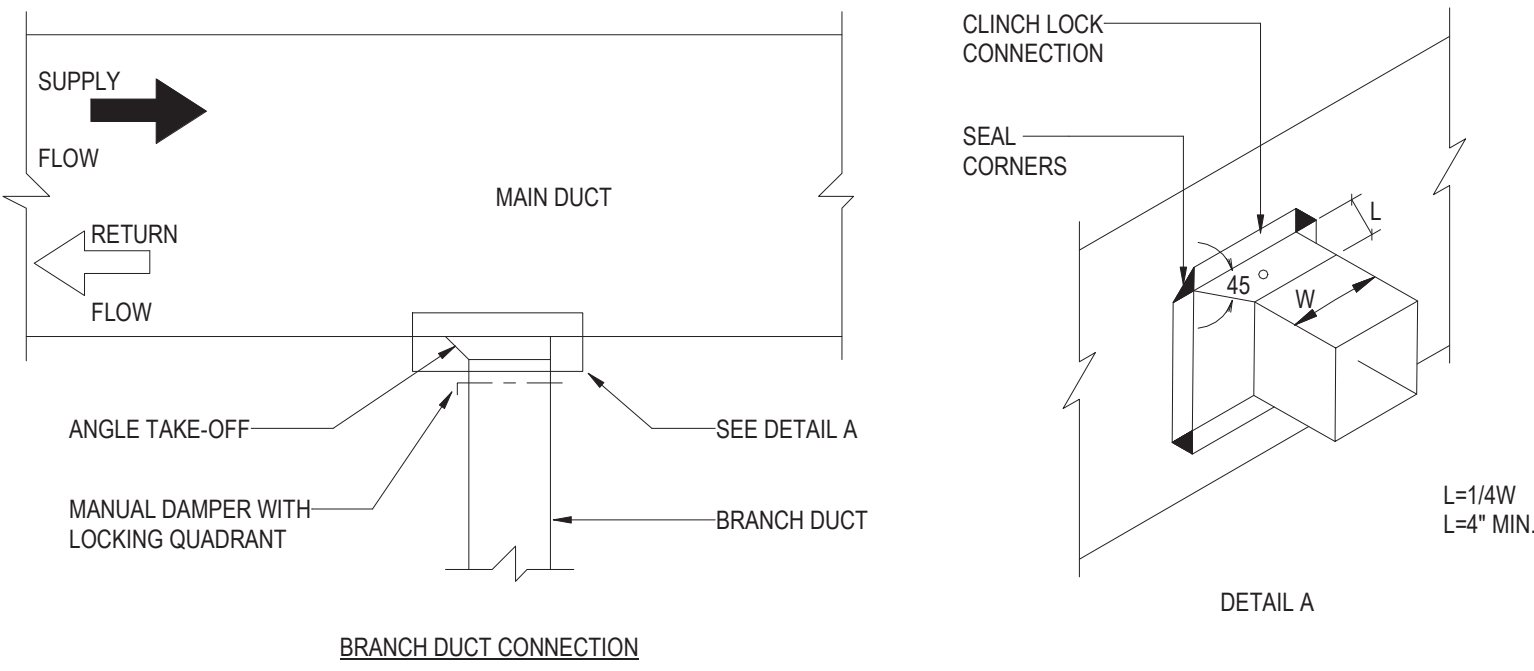
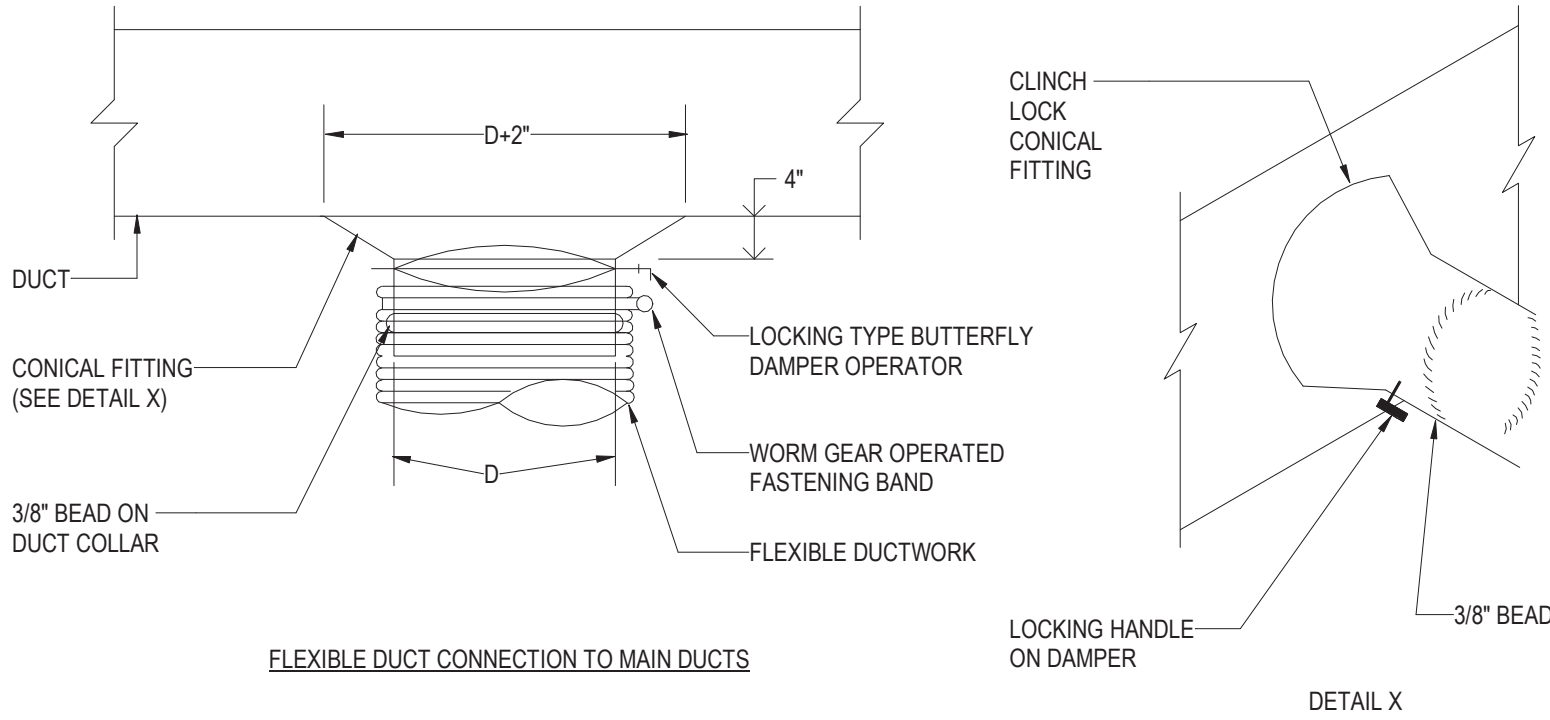
Welcome  
Pavilions

Seal

NOT FOR CONSTRUCTION  
Drawing Title  
Mechanical Sections

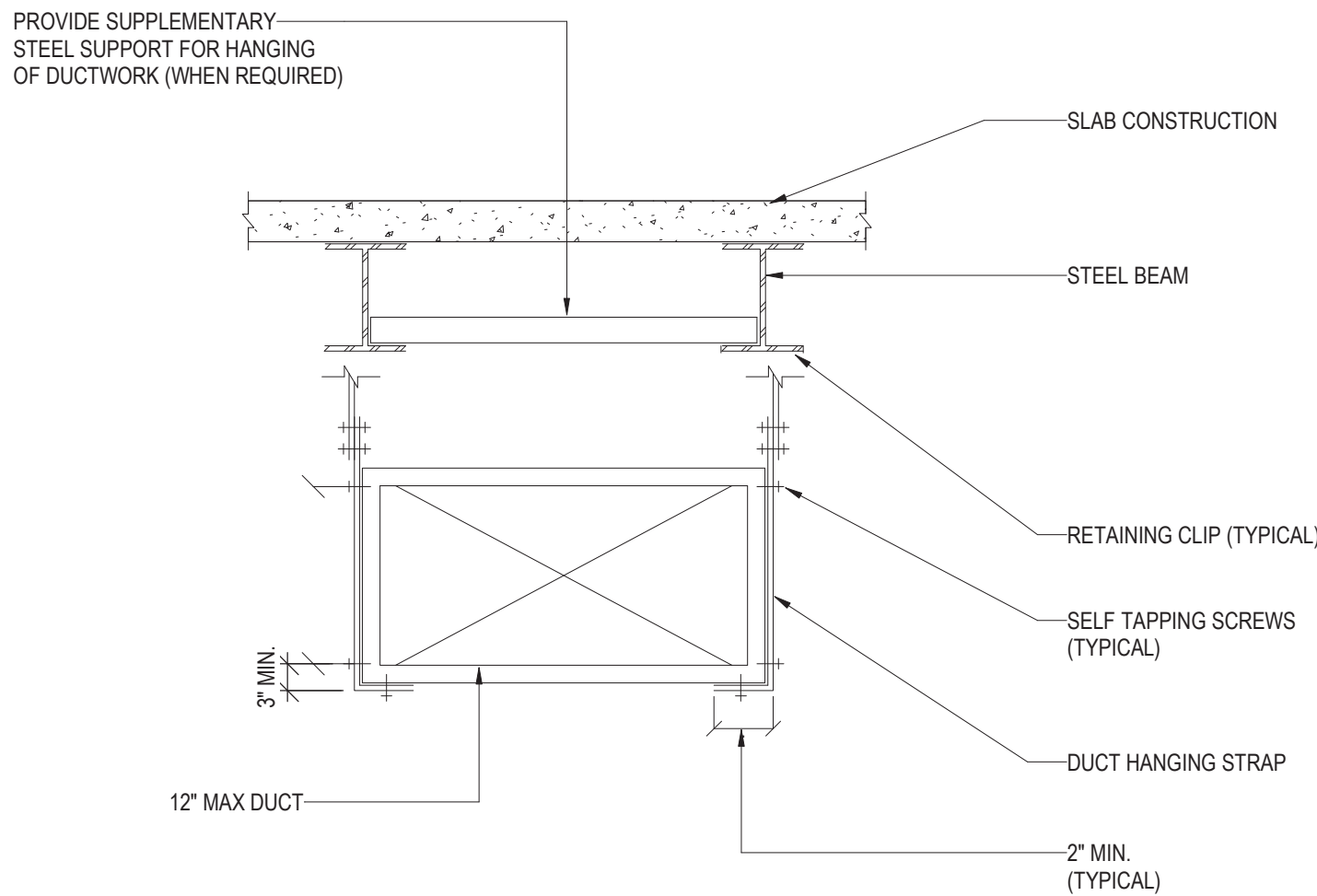
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Drawing Number	M-W-401
Sheet Size	ARCH D





#### 1 LOW PRESSURE BRANCH DUCT CONNECTIONS

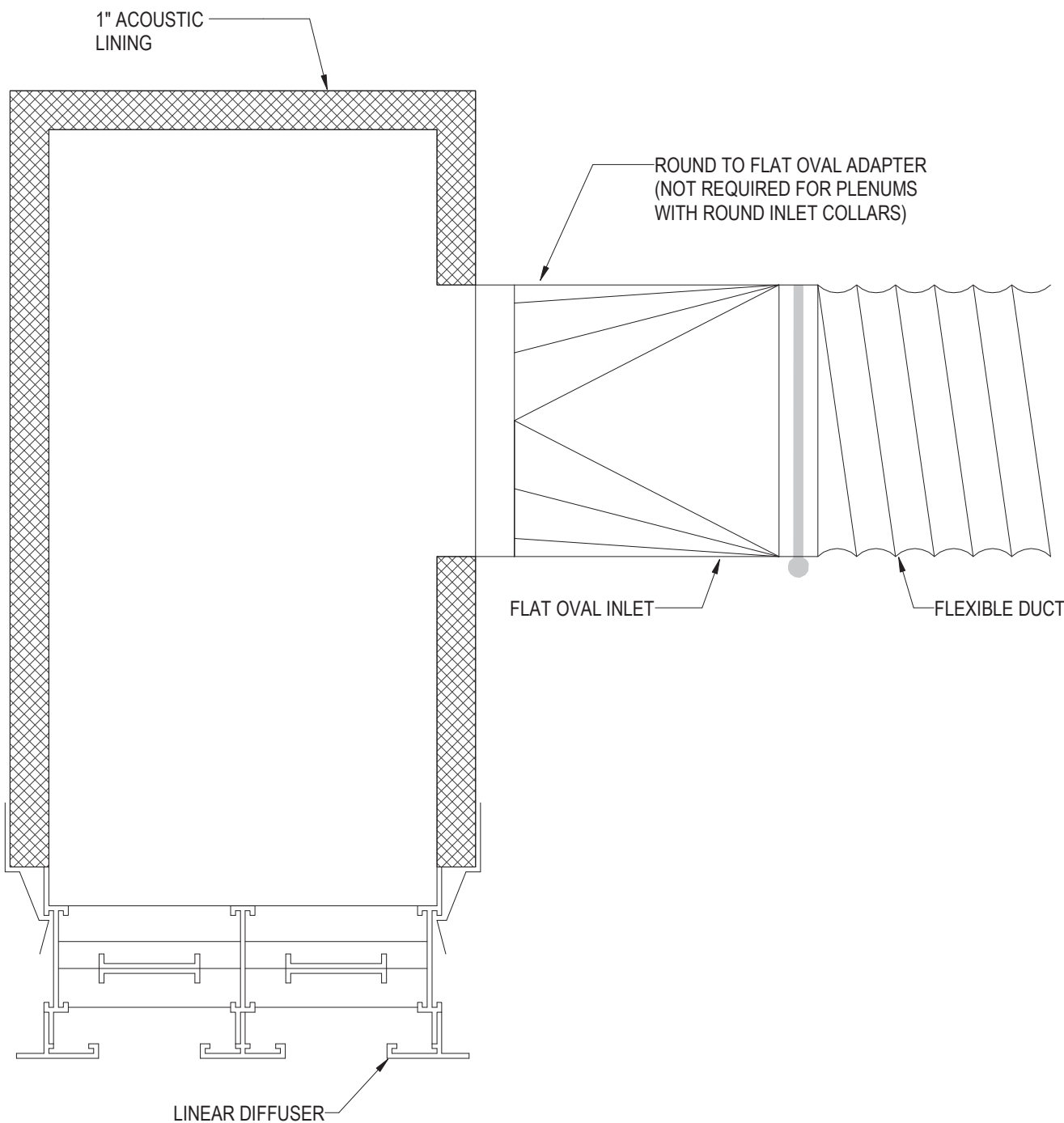
NOT TO SCALE



NOTES:  
1. DUCT SHALL BE SUSPENDED WITH GALVANIZED BAND IRON STRAPS SECURELY FASTENED TO THE BOTTOM AND SIDE OF THE DUCT. STRAPS TO BE SIZED IN ACCORDANCE WITH SMACNA TABLE 4-1 OR ACCORDING TO LOCAL CODES, WHICHEVER IS MORE STRINGENT.  
2. DUCTS WIDER THEN 60 INCHES TO BE SUPPORTED BY THE TRAPEZE ANGLES IN ACCORDANCE WITH SMACNA TABLE 4-3.  
3. REFERENCE SHALL ALSO BE MADE TO SPECIFICATION SECTION 230548

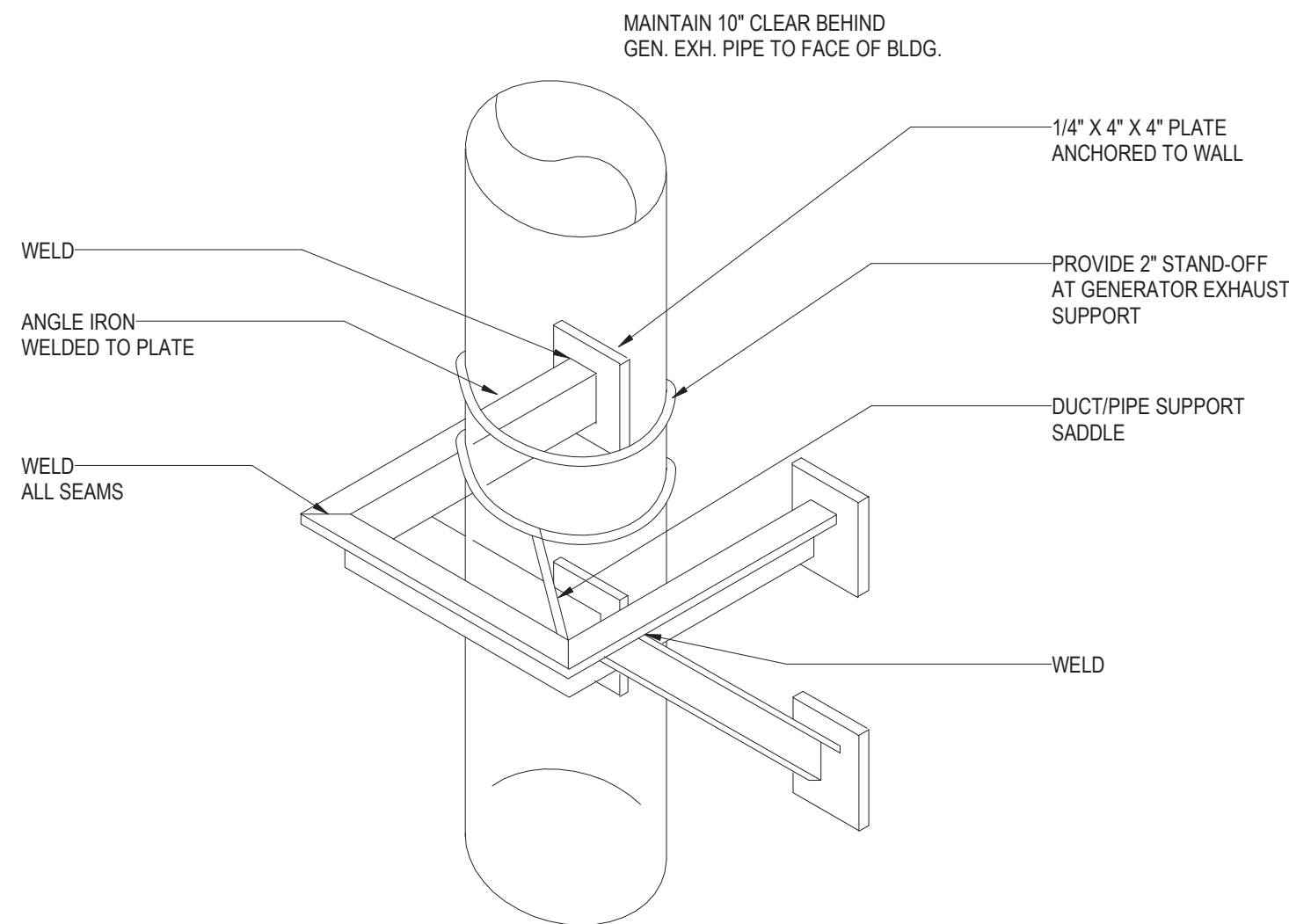
#### 4 DUCT HANGING FROM STRUCTURAL STEEL

NOT TO SCALE



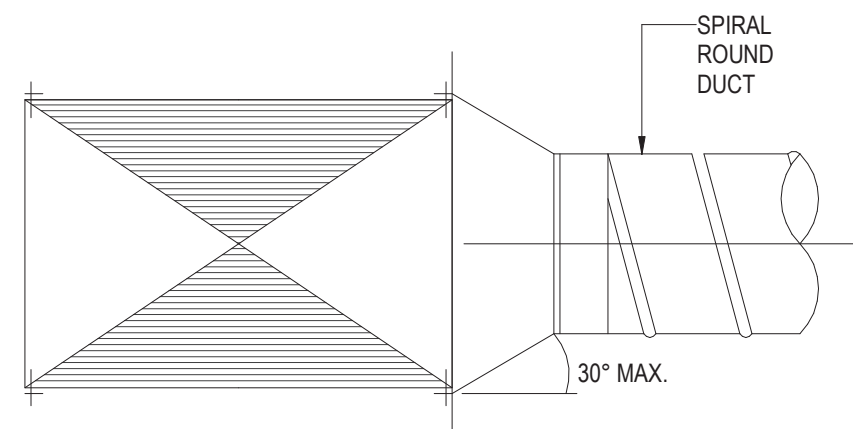
#### 5 LINEAR DIFFUSER PLENUM

NOT TO SCALE

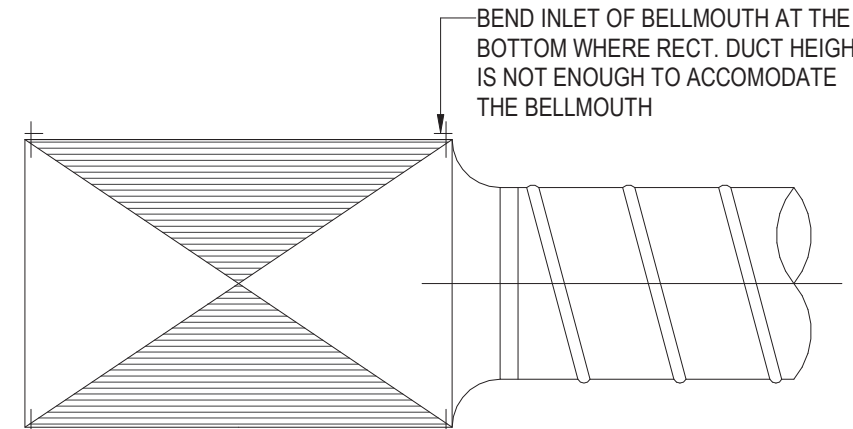


#### 3 SUPPORT SYSTEM FOR VERTICAL DUCTS

NOT TO SCALE



CONICAL



BELLMOUTH

NOTE:  
1. SECURE ALL CONNECTIONS TO COMPLY WITH THE REQUIREMENTS OF THE PRESSURE CLASS SPECIFIED.  
2. SUPPLY ROUND DUCT TAKE-OFF IS SHOWN. RETURN/EXHAUST SIMILAR.  
3. \*SPIN-INS\* PERMITTED ONLY WIDUCT CONSTRUCTION OF 2" W.C. OR LESS.

#### 6 ROUND TAKE OFF CONNECTION FROM RECTANGULAR

NOT TO SCALE

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Key Plan

Description Date  
Filing Set 06/17/22

Project  
Storm King  
Art Center  
Welcome  
Pavilions

Seal

NOT FOR CONSTRUCTION  
Drawing Title  
Mechanical Details

Date 06/17/22  
Scale Not to Scale  
Drawing Number M-W-501  
Sheet Size ARCH D





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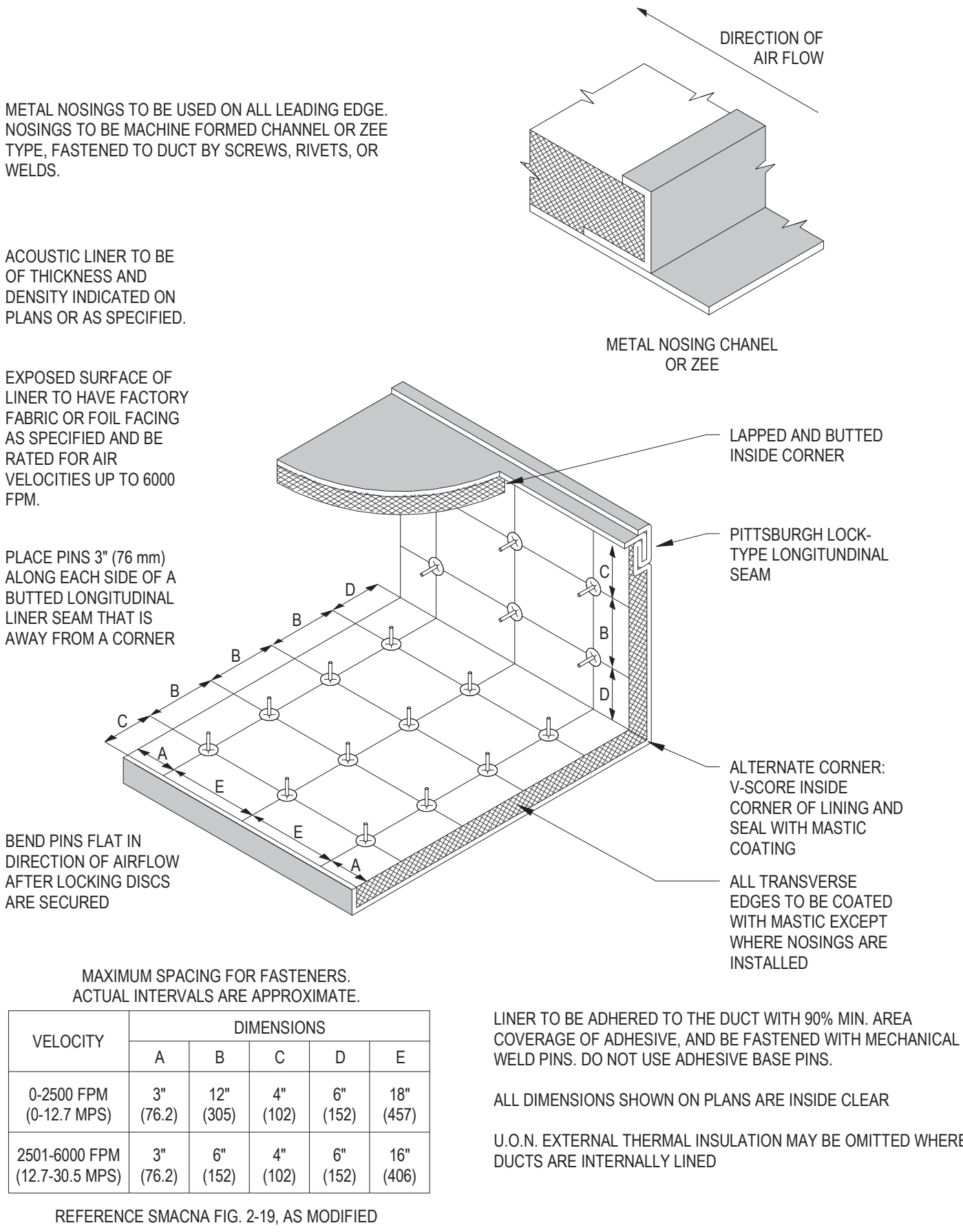
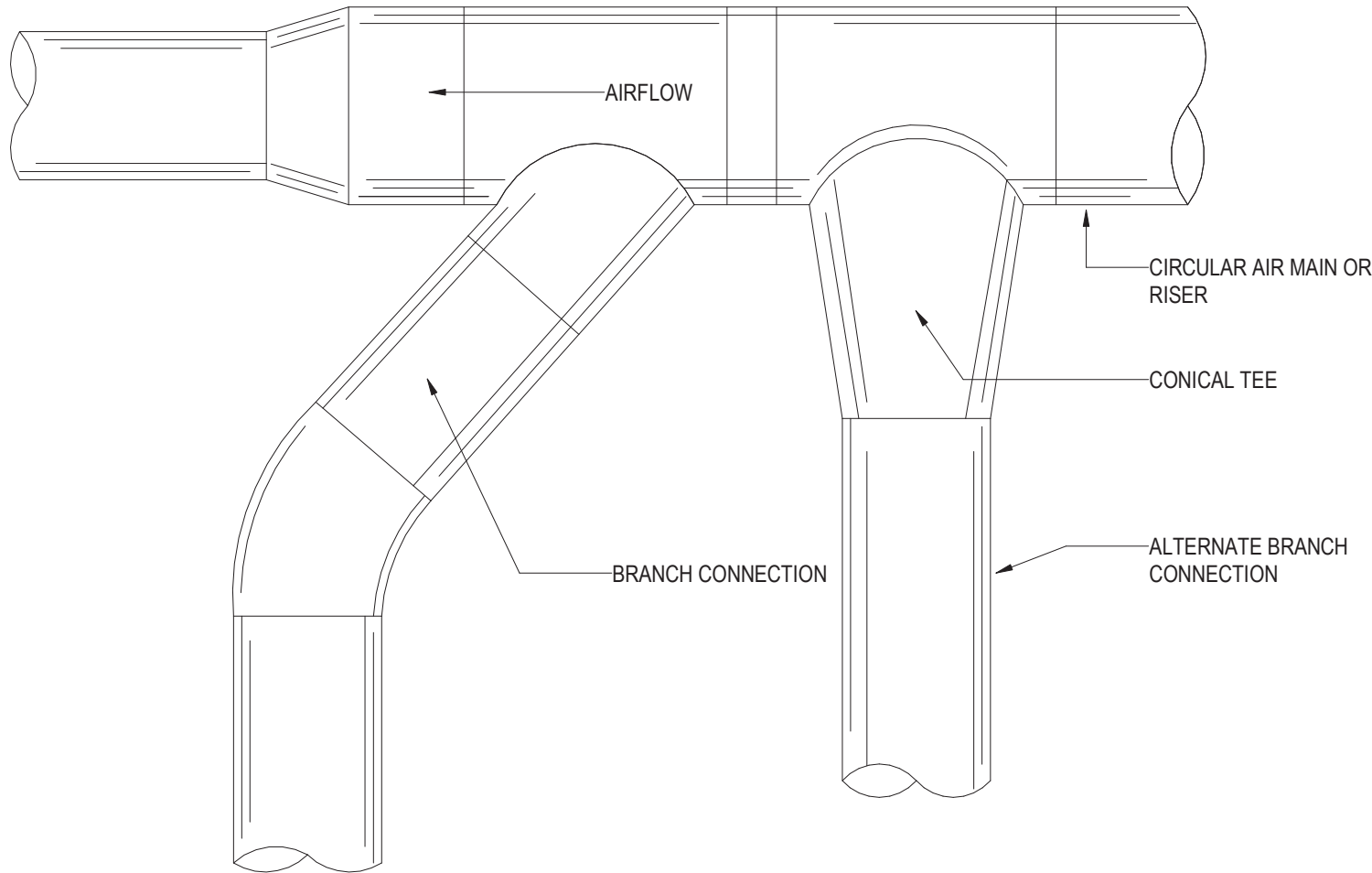
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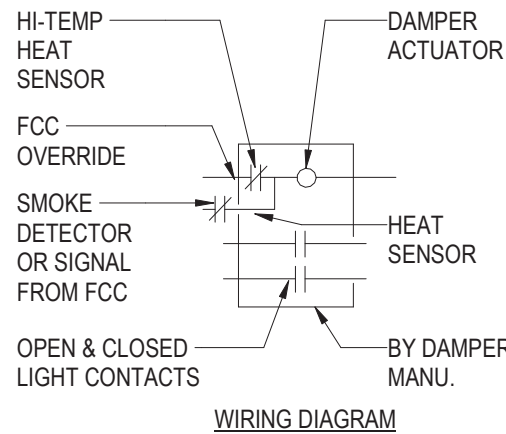
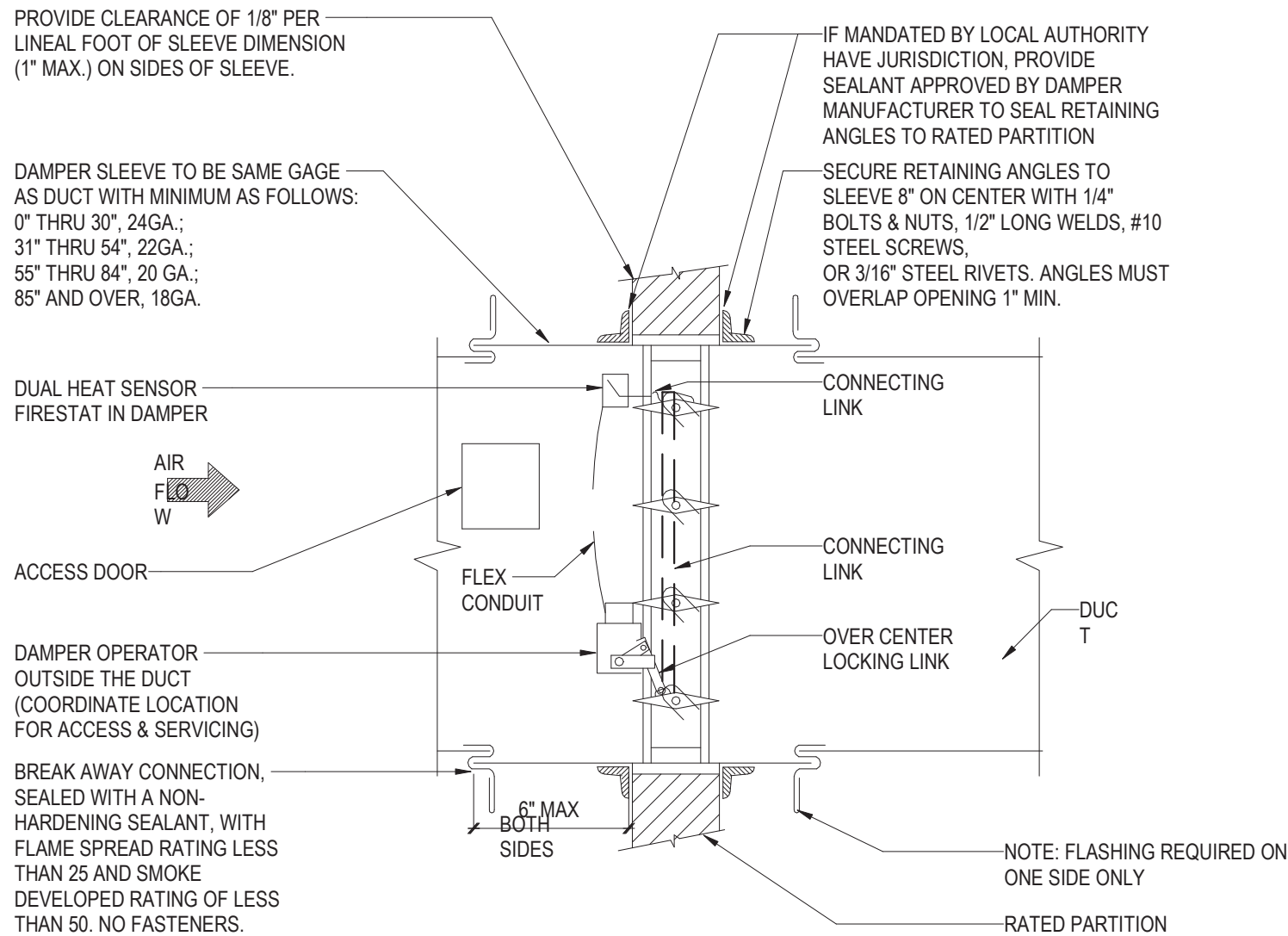


## 2 DUCTWORK ACOUSTIC LINING

NOT TO SCALE

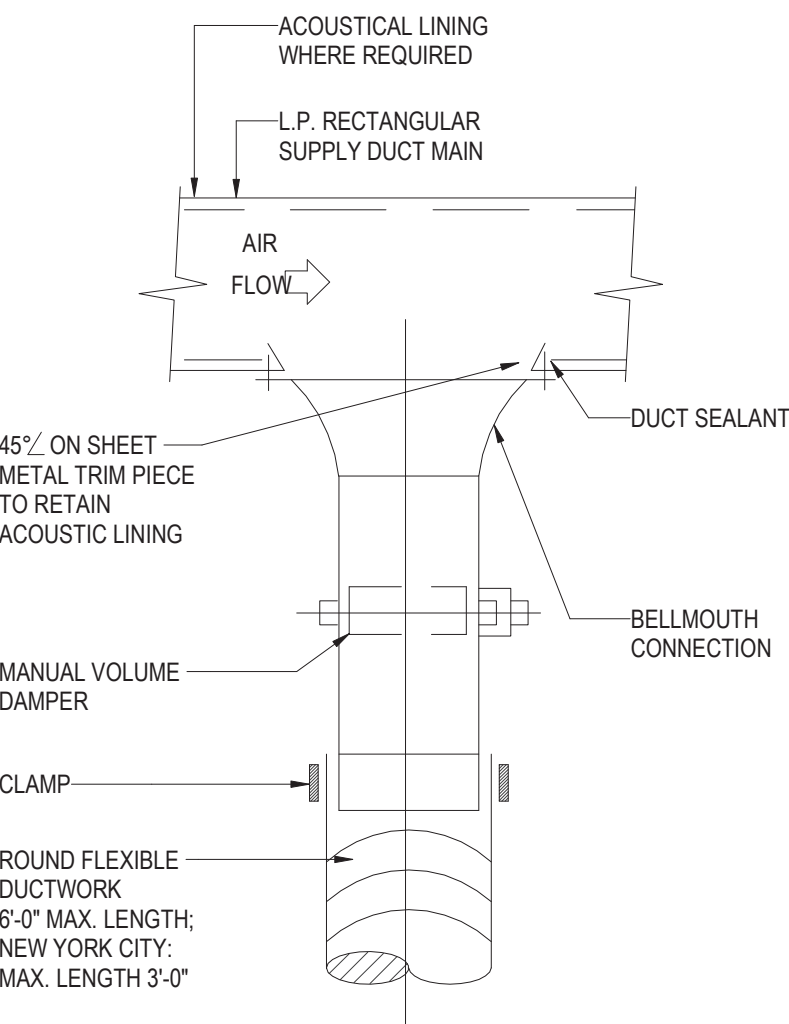
## 3 CIRCULAR DUCT CONNECTIONS

NOT TO SCALE



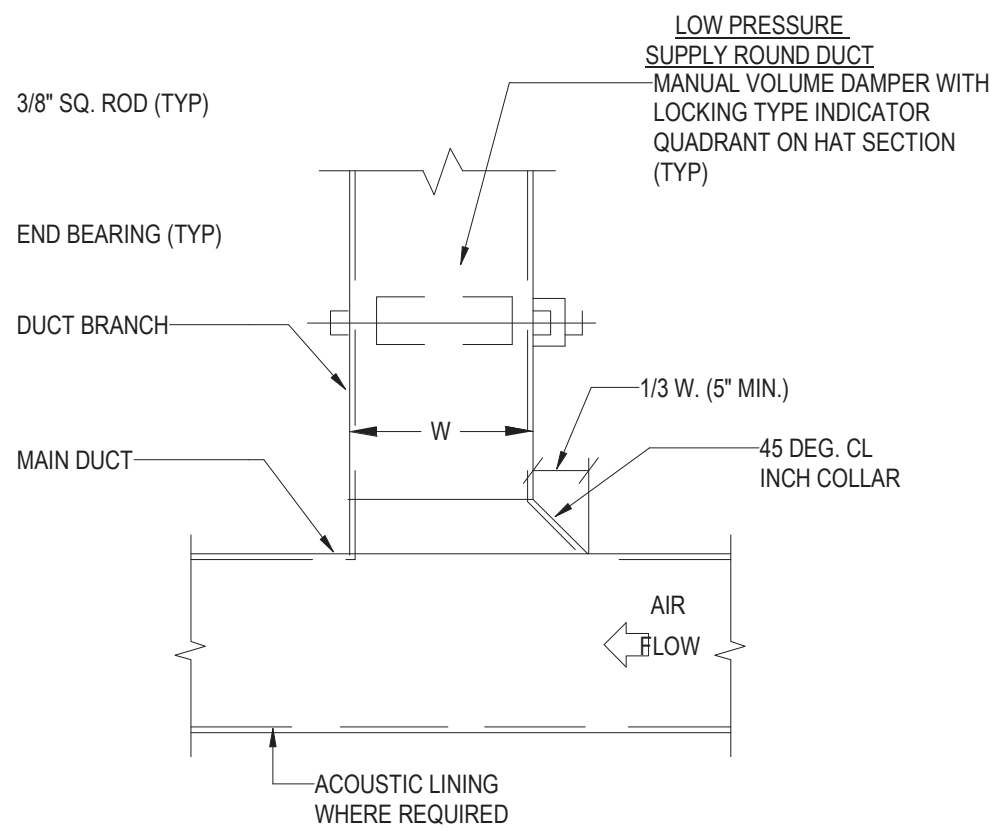
### NOTES:

- DAMPER TO BE U.L. LABELED N.F.P.A. 90A APPROVED.
- N.F.P.A. APPROVED INSTALLATION DETAILS TO BE PART OF SUBMISSION OF COMBINATION FIRE & SMOKE DAMPER FOR APPROVAL, WHICH SHALL MEET N.F.P.A. STANDARD 90A.
- DETAILS SHOWN ARE FOR COMBINATION FIRE SMOKE DAMPERS IN HORIZONTAL DUCTWORK. FOR DAMPERS IN VERTICAL DUCTWORK, DETAIL IS SIMILAR.
- INSTALL DAMPER IN ACCORDANCE WITH MANUFACTURERS REQUIREMENTS.
- ACTUATOR TO HAVE AN ADDRESSABLE DAMPER POSITION INDICATOR.



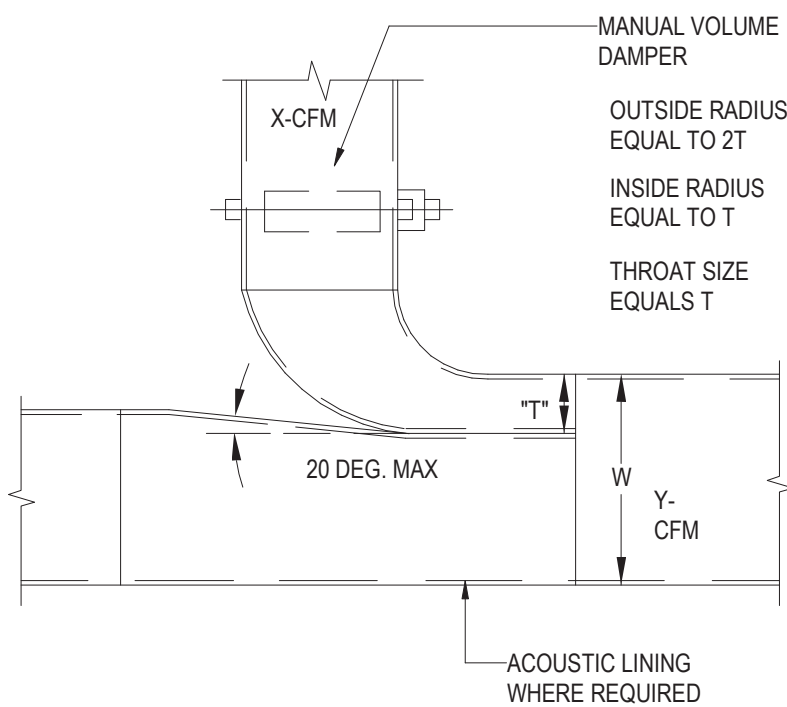
### NOTE:

FLEXIBLE DUCT CONNECTIONS ARE ONLY PERMITTED IN AREAS WITH PNC-35 OR GREATER.



### NOTE:

FURNISH THIS TYPE CONNECTION WHEN SINGLE-LINE DUCTWORK IS INDICATED AS THIS FOR L-BRANCHES WITH LESS THAN 25% OF THE TOTAL AIR FLOW.



### NOTES:

- FURNISH THIS TYPE CONNECTION WHEN SINGLE-LINE DUCTWORK IS INDICATED AS THIS FOR BRANCHES WITH LESS THAN 25% OF THE TOTAL AIR FLOW.
- THIS TYPE OF CONNECTION MUST BE USED WHEN W 36 IN.
- T=X(BRANCH DUCT)x W Y (TOTAL CFM)

## 4 COMBINATION FIRE AND SMOKE DAMPER

NOT TO SCALE

## 5 LOW PRESSURE SUPPLY CONNECTION DETAILS

NOT TO SCALE

Description	Date
Filing Set	06/17/22

### Project

# Storm King Art Center Welcome Pavilions

### Seal

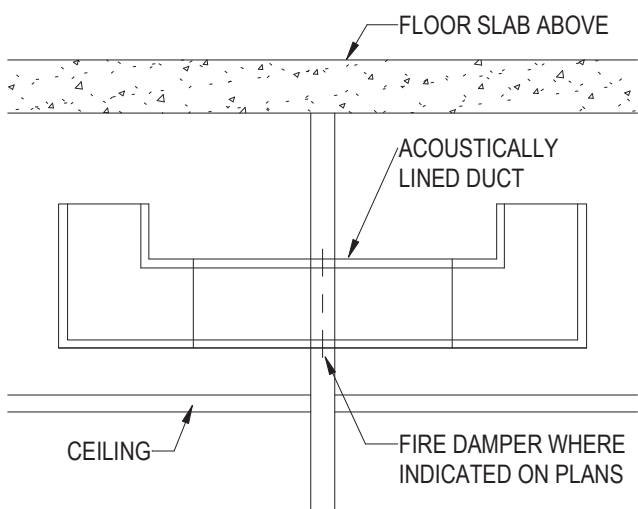
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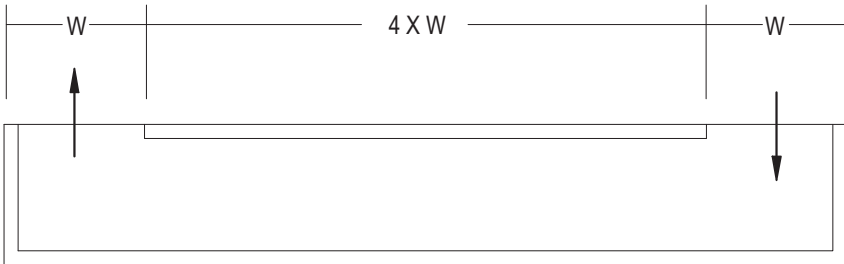
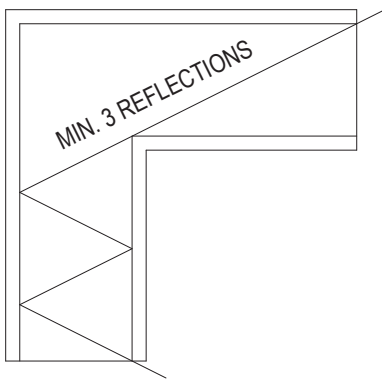
## Mechanical Details

Date	06/17/22
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Sheet Size	ARCH D



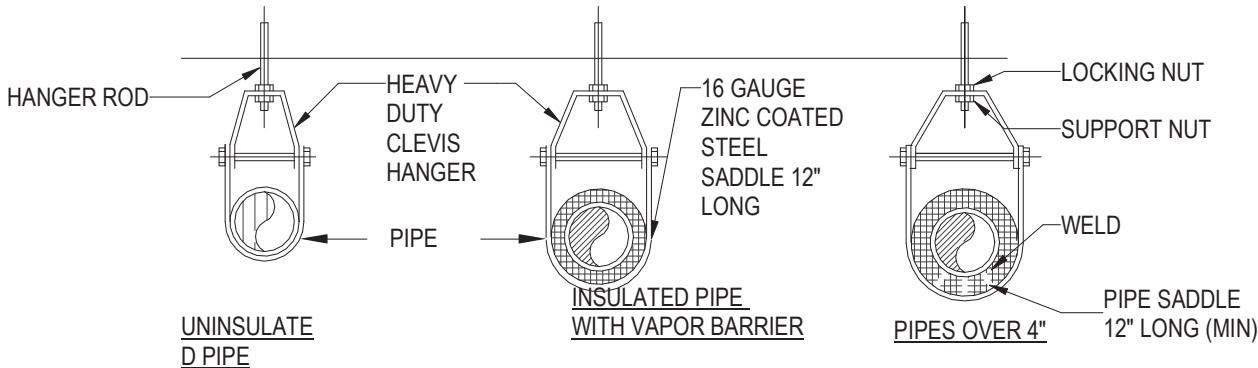


NOTES:	
1. REFER TO DRAWINGS AND SPECIFICATIONS FOR ACOUSTICAL INSULATION THICKNESS AND DENSITY.	
2. PROVIDE TRANSFER DUCT WHERE INDICATED ON PLANS.	
3. REFER TO SCHEDULE BELOW FOR TRANSFER DUCT SIZE.	
4. FOR AIR QUANTITIES IN EXCESS OF 2000 CFM USE MULTIPLE TRANSFER DUCTS	
5. TRANSFER DUCT SIZES ARE INSIDE CLEAR	
6. EQUIVALENT DUCT SIZES ALLOWED	
TRANSFER AIR QUANTITY (CFM)	TRANSFER AIR DUCT SIZE (W x H)
0-500	18 x 10
501-1000	20 x 18
1001-1500	30 x 20
1501-2000	30 x 24



## 1 ACOUSTIC AIR TRANSFER DUCT

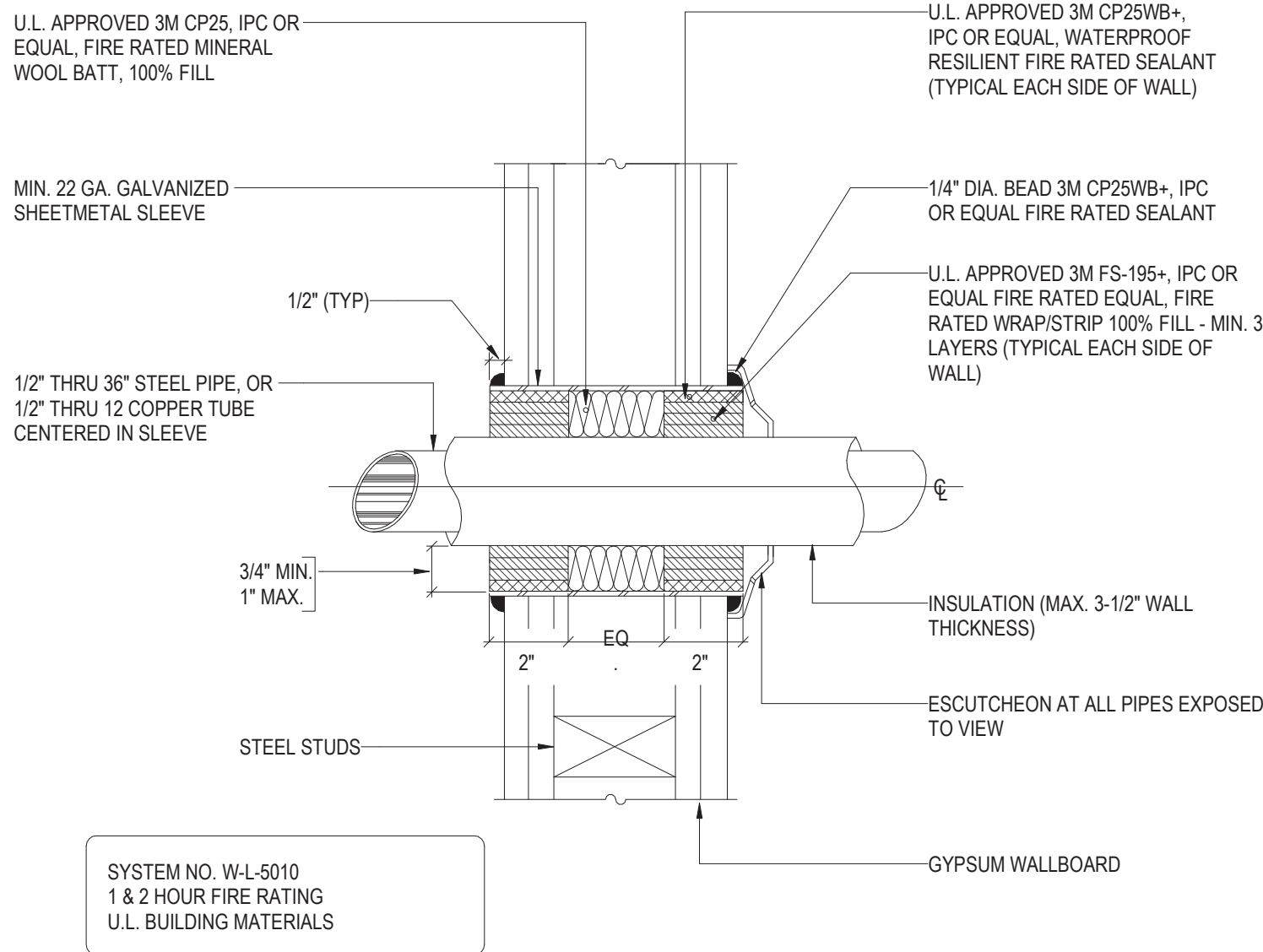
NOT TO SCALE



INDIVIDUAL PIPE HANGER ROD & SPACING SCHEDULE											
NOMINAL PIPE OR TUBE SIZE- INCHES	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	--
HANGER ROD SIZE-INCHES	3/8	3/8	3/8	3/8	1/2	1/2	5/8	5/8	7/8	7/8	--
MAXIMUM SPACING BETWEEN PIPE SUPPORT- FEET	6	7	9	10	11	12	14	16	17	19	--
MAXIMUM SPACING BETWEEN CU. TUBE SUPPORT- FEET	6	6	8	9	10	10	12	14	14	16	--
NOTES: TRAPEZE SPACING SHALL BE BASED ON SPACING OF SMALLEST PIPE ON TRAPEZE. TRAPEZE SHALL BE DESIGNED WITH A FACTOR OF SAFETY 5 FOR CENTER OF SPAN CONCENTRATED LOAD. METHOD OF HANGING, TYPE OF INSERT, BEAM CLAMP, ROD, ETC. MUST BE APPROVED BY STRUCTURAL ENGINEER PER SHOP DRAWINGS.											

## 4 TYPICAL CLEVIS HANGER SUPPORTS

NOT TO SCALE



## 6 INSULATED PIPE THROUGH FIRE RATED GYPSUM WALLS

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### Key Plan

Description	Date
Filing Set	06/17/22

## Project

# Storm King Art Center

# Welcome Pavilions

### Seal

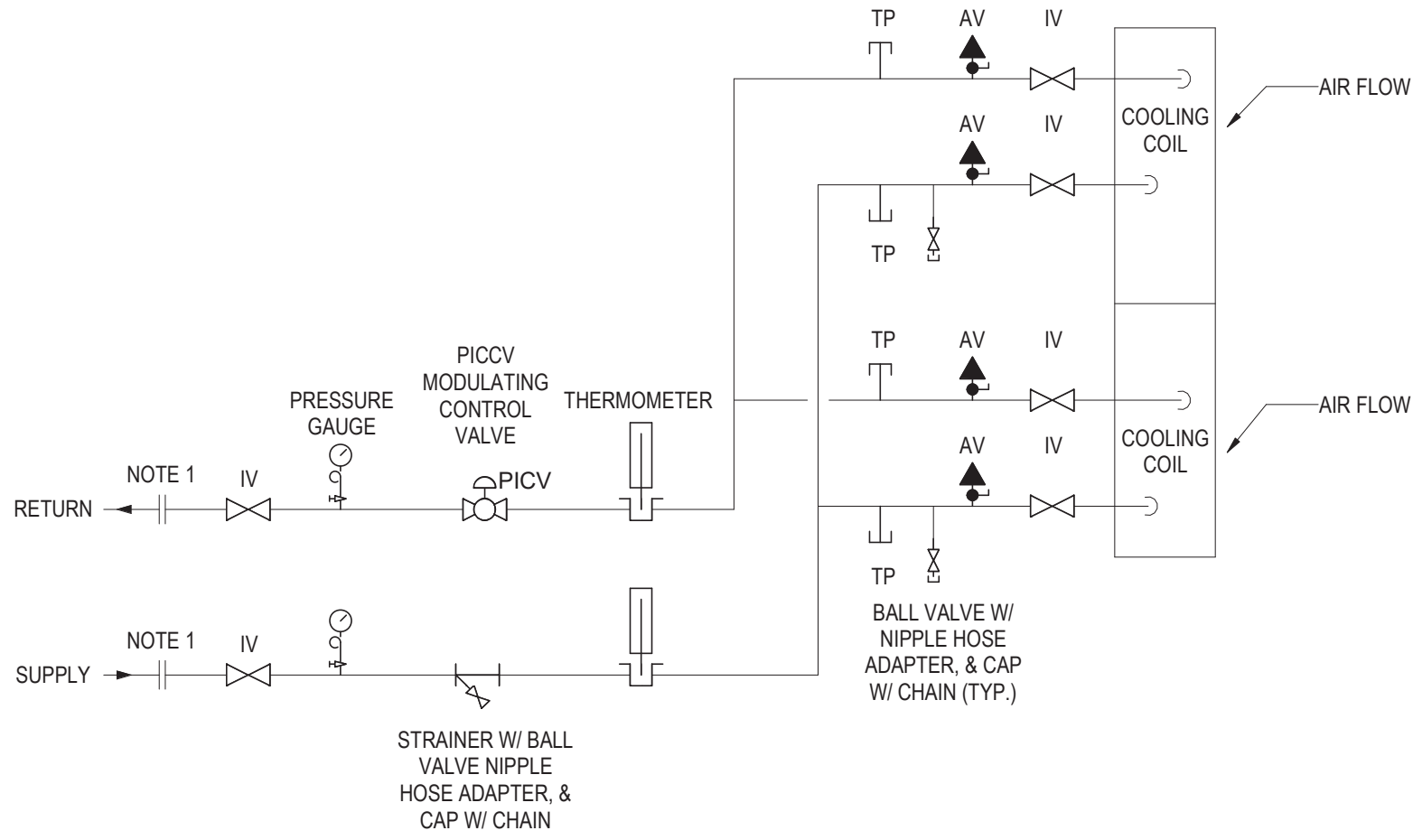
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### Drawing Title

## Mechanical Details

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Drawing Number	M-W-504
Sheet Size	ARCH D

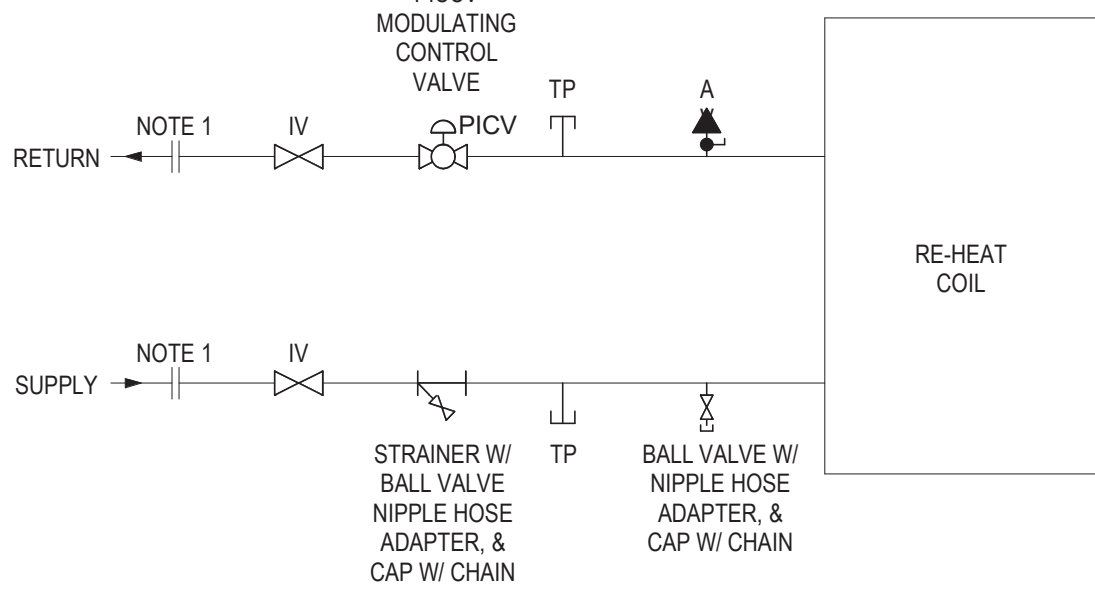




- NOTES:
- ELECTROLYTICALLY ISOLATED COUPLING. (ONLY REQUIRED WHERE THERE IS A CHANGE IN PIPING MATERIAL.)
  - ALL VALVES AND FITTINGS SHALL BE LINE SIZE
  - MODULATING CONTROL VALVE TO BE SELECTED BY CONTROLS CONTRACTOR TO PROVIDE APPROPRIATE CONTROL VALVE AUTHORITY.
  - PROVIDE EXTENSIONS FOR ALL PIPING ACCESSORIES IN ORDER TO PERTRUDE BEYOND AND AVOID DAMAGE TO PIPE INSULATION.
  - PROVIDE APPROPRIATELY FITTED REMOVABLE INSULATION COVERS AT ALL PIPING ACCESSORY LOCATIONS REQUIRING FUTURE ACCESS.
  - CONNECT HHWS DOWN STREAM OF COIL IN RELATION TO AIR FLOW.

1 COOLING COILS (AHU)

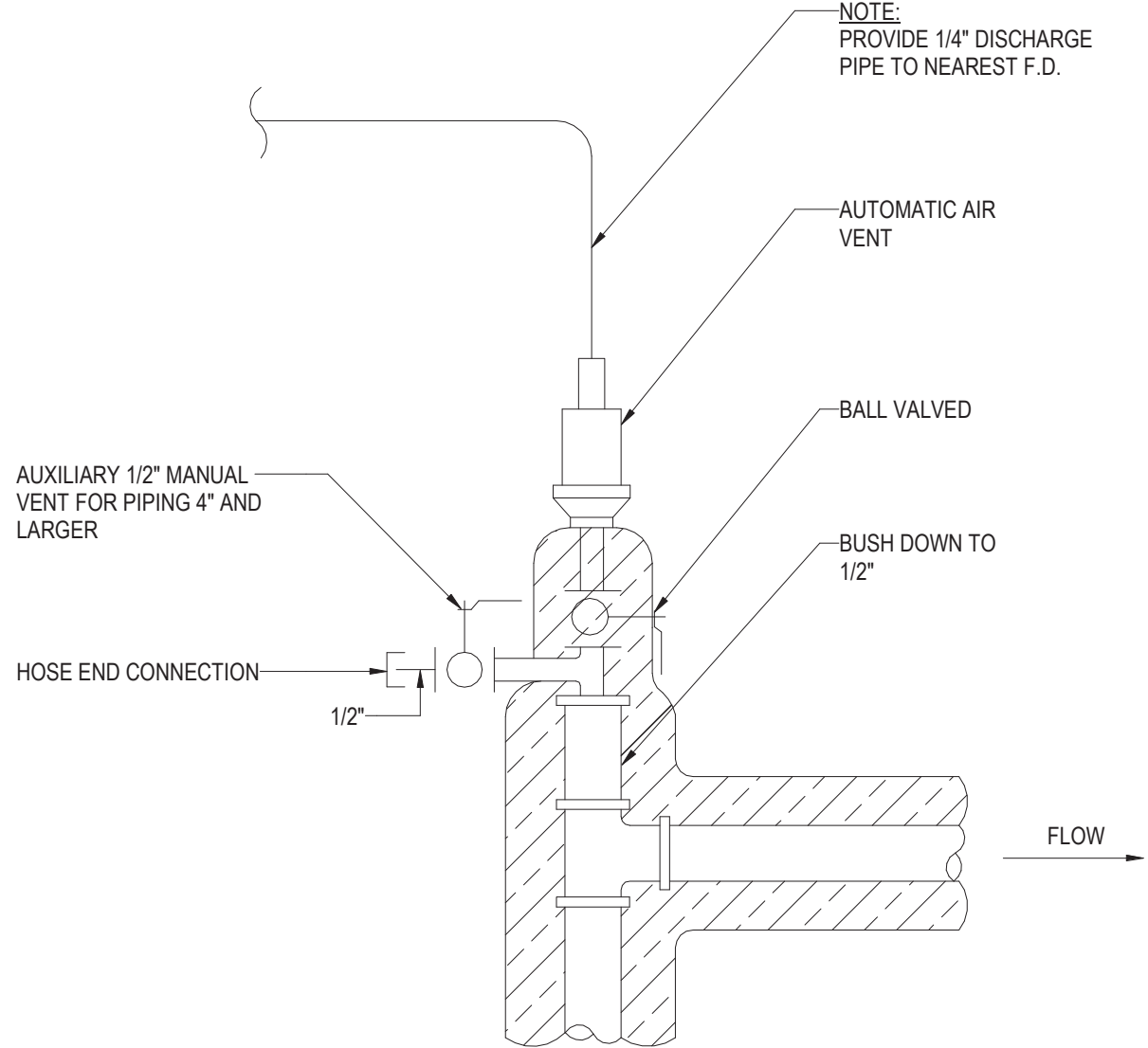
NOT TO SCALE



- NOTES:
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  - CONNECT HHWS DOWN STREAM OF COIL IN RELATION TO AIR FLOW.

2 RE-HEAT COIL & AHU HEATING COILS

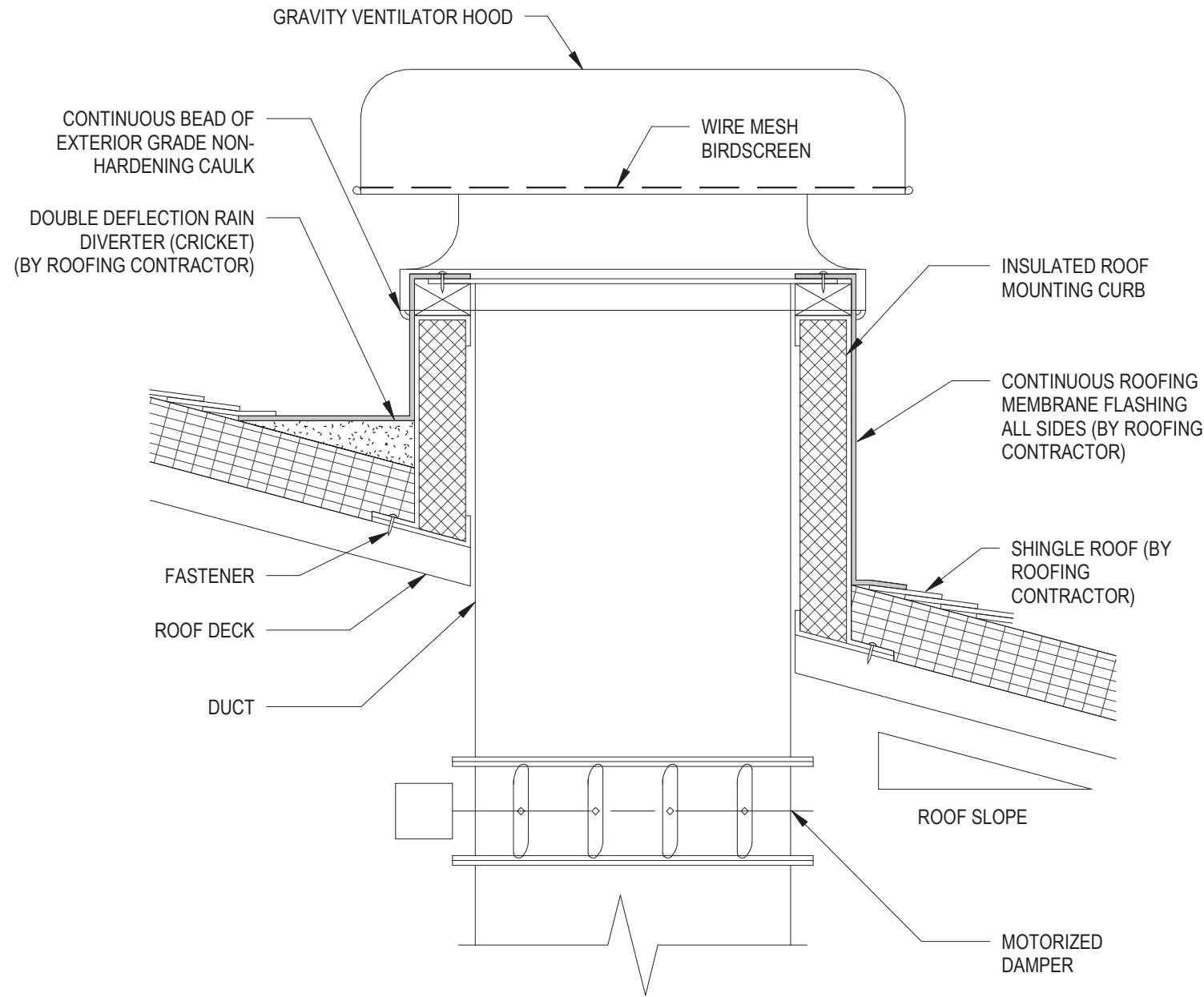
NOT TO SCALE



- NOTES:
- DETAIL TO BE USED AT ALL AUTOMATIC AIR VENT LOCATIONS, INCLUDING AT THE TOP OF ALL PIPE RISERS CONNECTING TWO OR MORE FLOORS.
  - AAV TO BE INSTALLED AT ALL PIPING HIGH POINTS.

3 AUTOMATIC AIR VENT DETAIL

NOT TO SCALE



5 GRAVITY VENTILATOR AND ROOF CURB (SLOPED ROOFS)

NOT TO SCALE

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**Key Plan**

Description	Date
Filing Set	06/17/22

**Project**

Storm King  
Art Center  
Welcome  
Pavilions

**Seal**

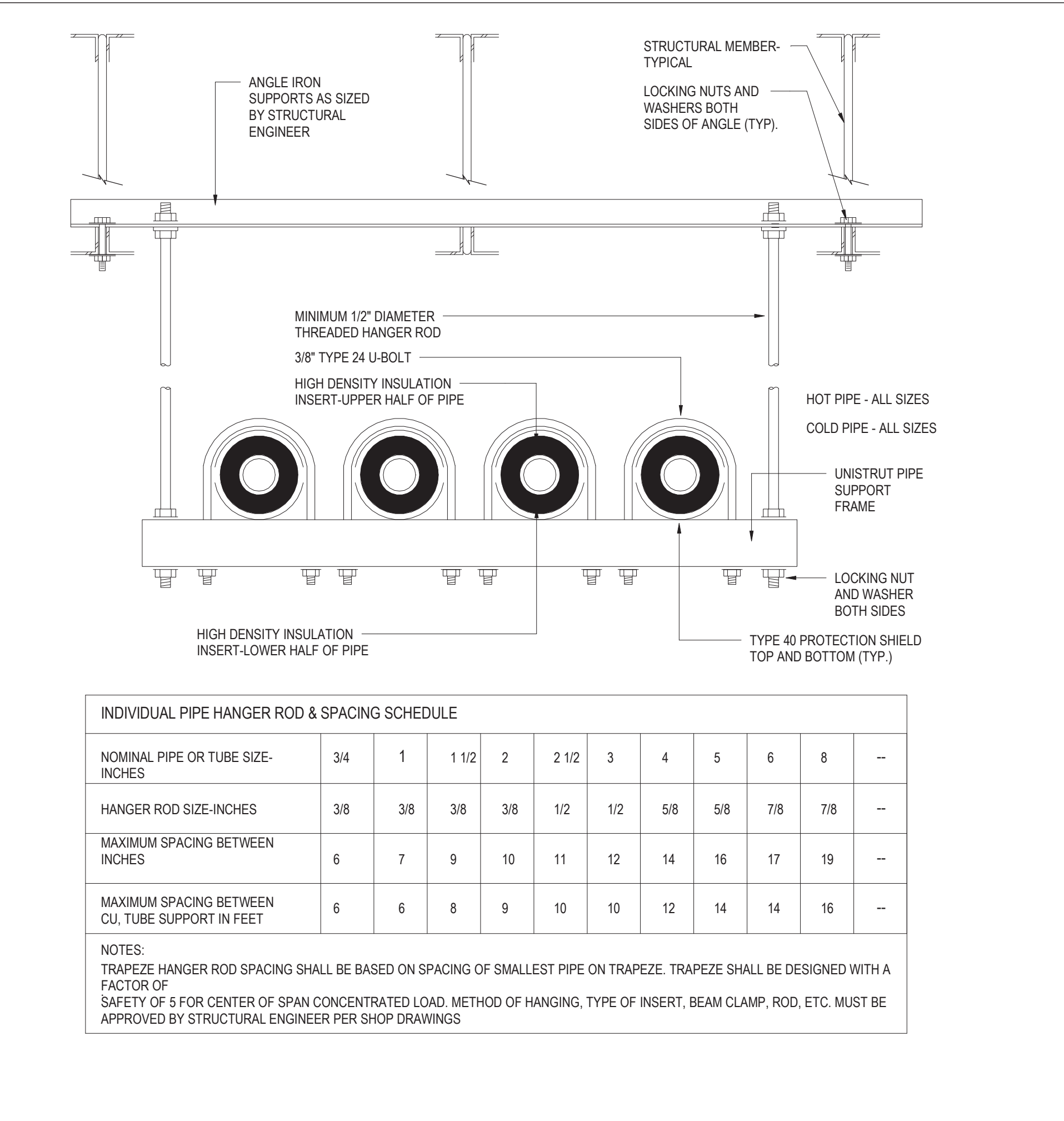
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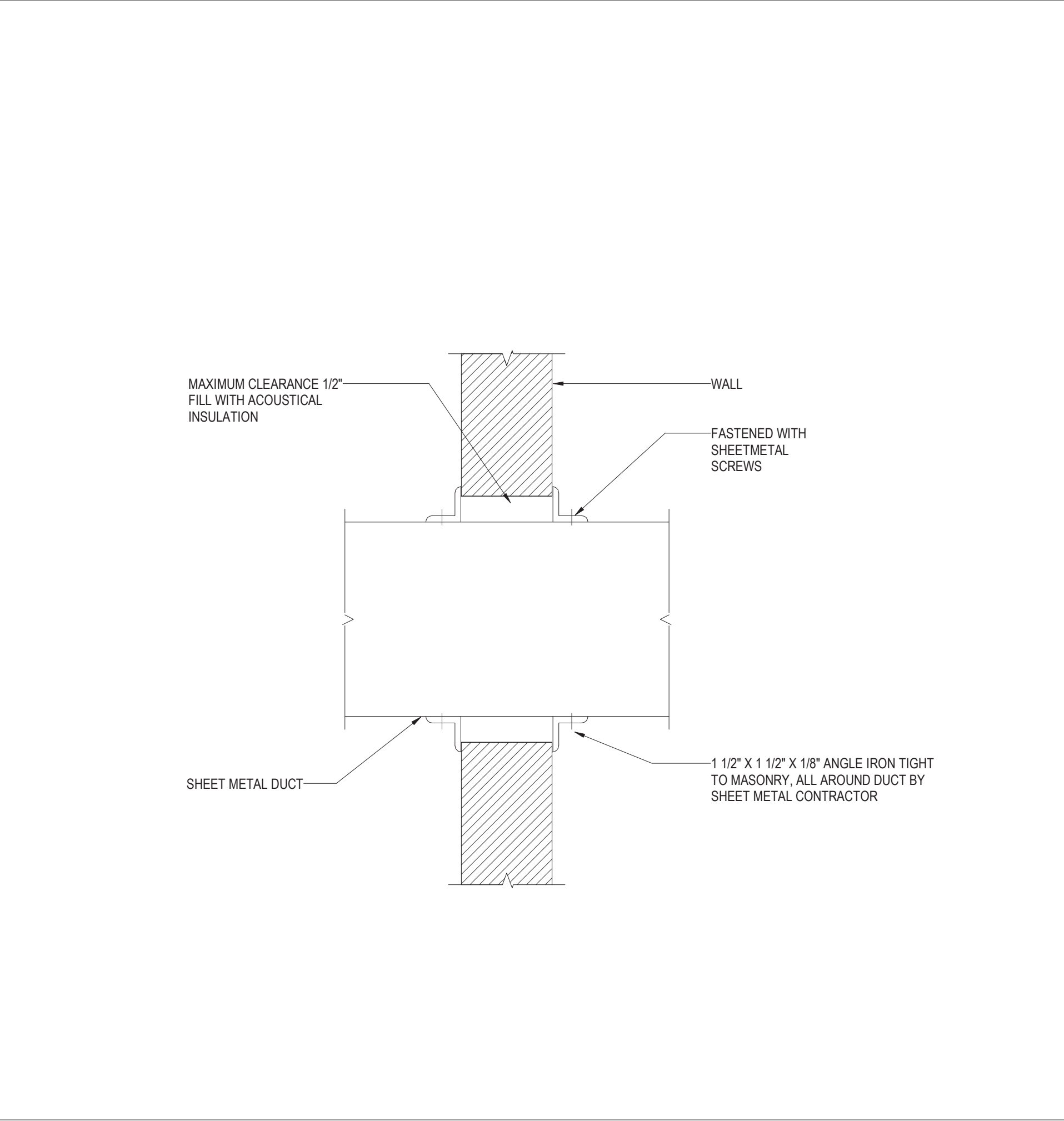
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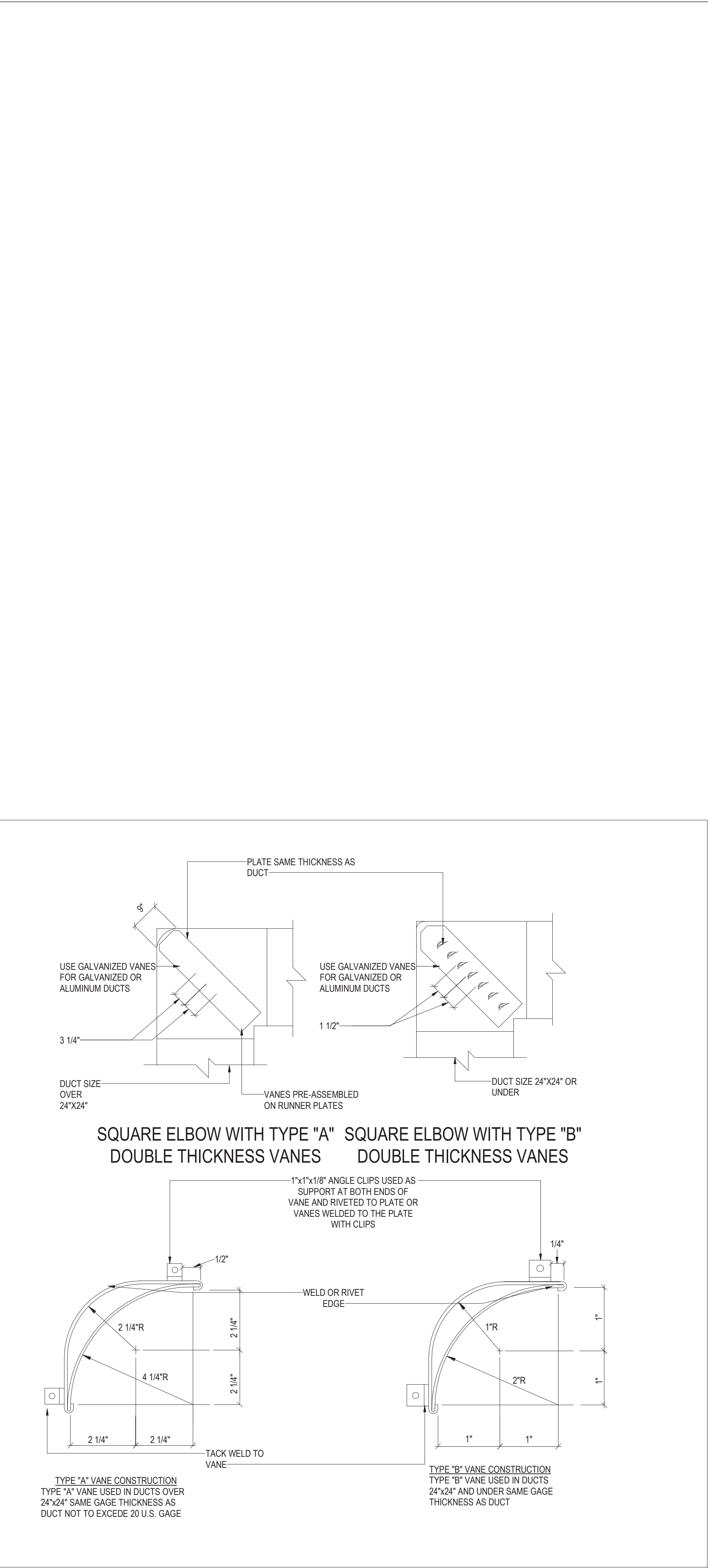




1 TRAPEZE PIPE HANGER (MULTIPLE PIPES)  
NOT TO SCALE



4 DUCT PENETRATING NON - RATED WALLS  
NOT TO SCALE



5 TURNING VANE CONSTRUCTION (RECTANGULAR)  
NOT TO SCALE

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Key Plan

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Project  
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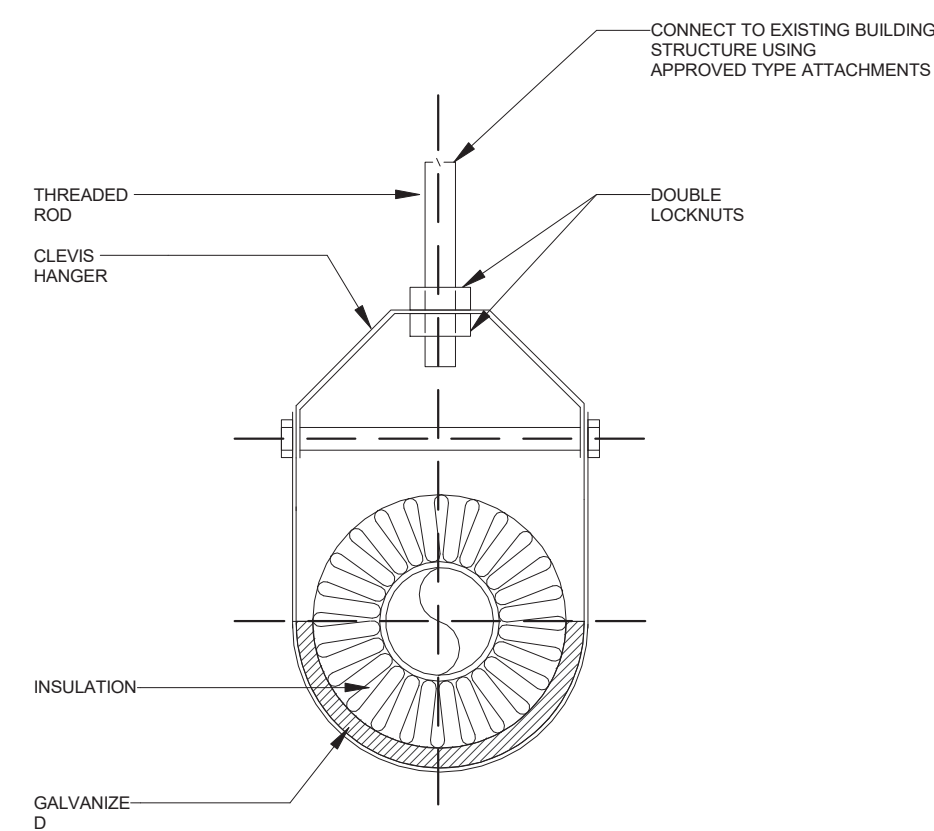
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WITHOUT INCOMPRESSIBLE INSULATING BLOCK AT HANGER		
PIPE DIAMETER	SHIELD LENGT H	SHIELD THICKNESS USSG
UP TO 3"	6"	18

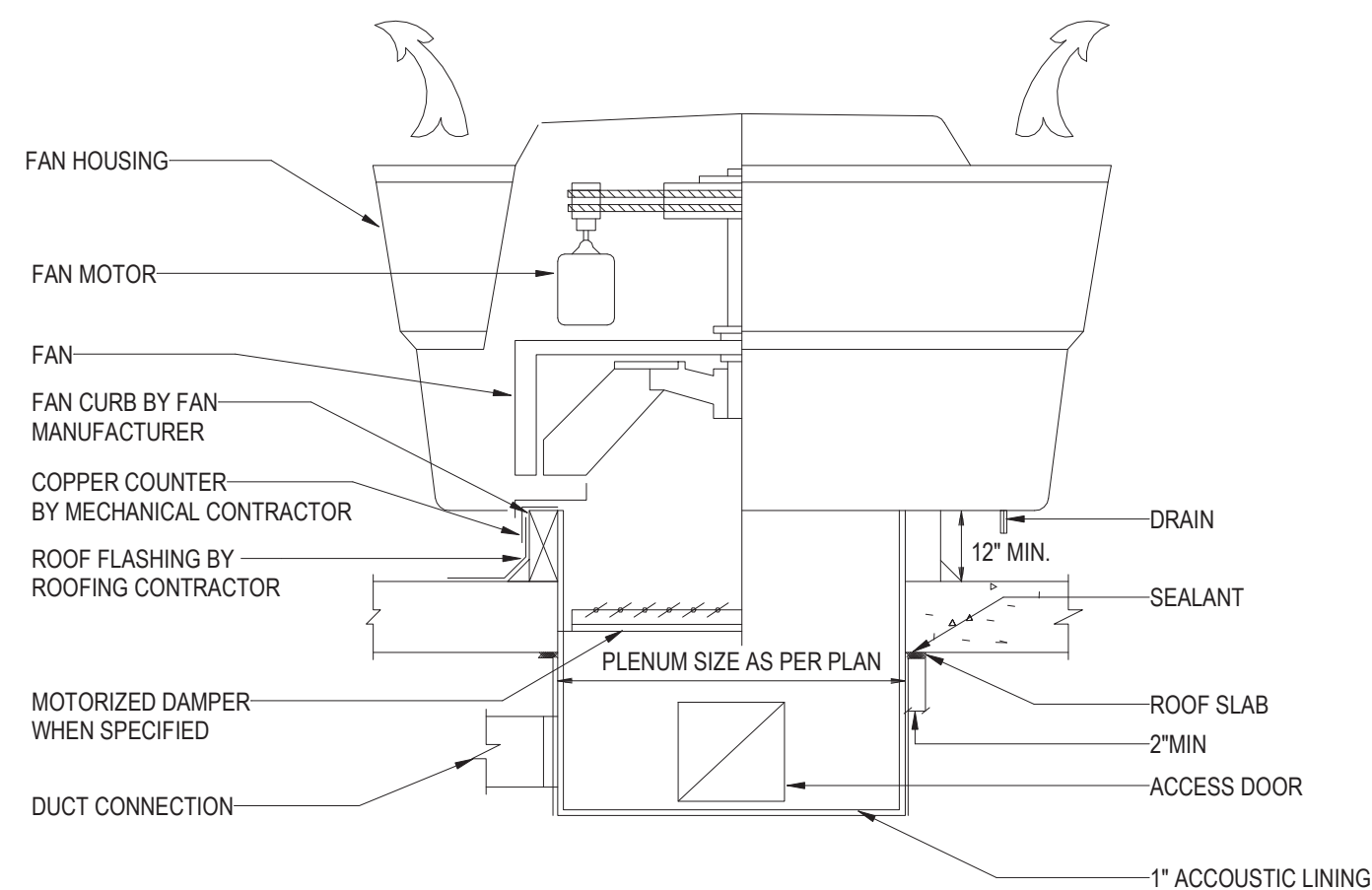
WITHOUT INCOMPRESSIBLE INSULATING BLOCK AT HANGER		
PIPE DIAMETER	SHIELD LENGT H	SHIELD THICKNESS USSG
UP TO 3"	12"	18



**NOTE:**  
HANGER, ROD & INSERT SHALL BE DIPPED IN ZINC  
CHROMATE PRIMER PRIOR TO INSTALLATION

## 1 TYPICAL INSULATION OF PIPES SMALLER THAN 3

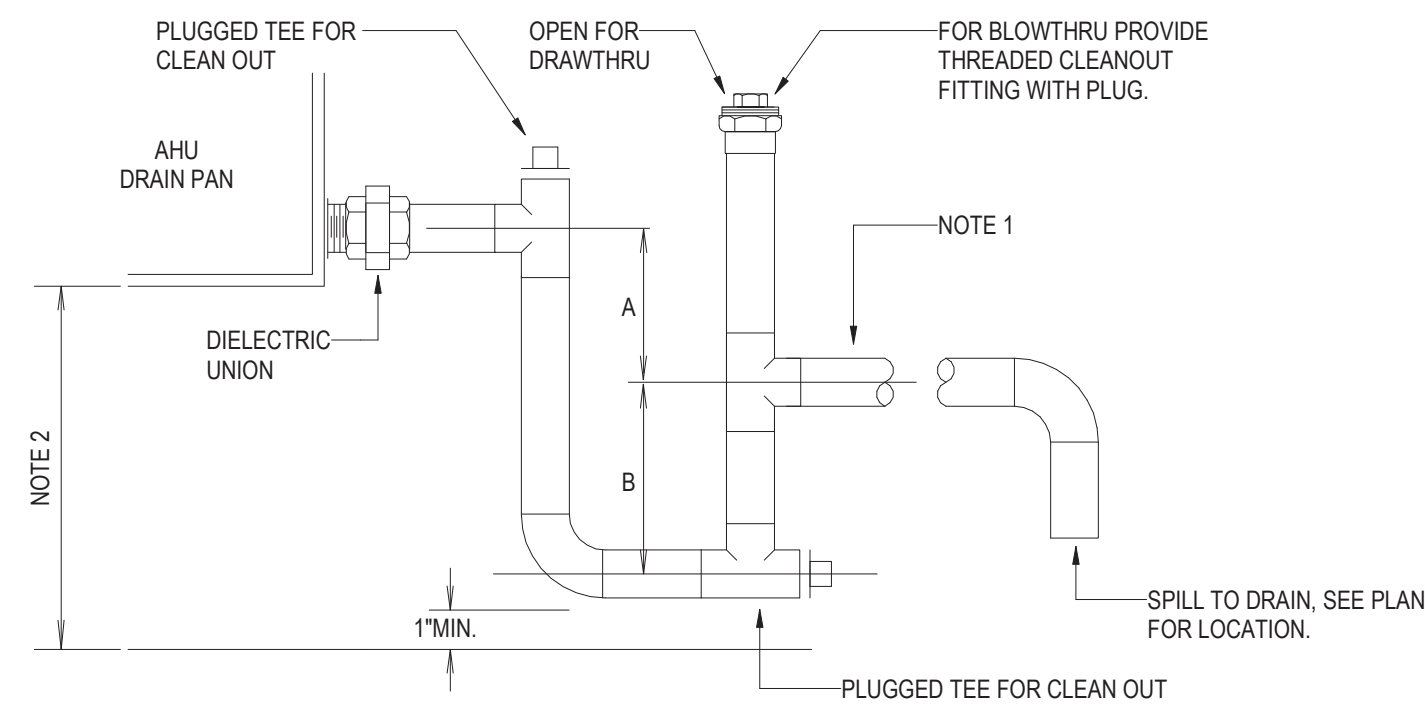
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② ROOF EXHAUST FAN UPBLAST

NOT TO SCALE

CONDENSATE PIPE SIZE	
EQUIPMENT CAPACITY	MIN. PIPE SIZE
TONS	INCH
UP TO 20	3/4
21-40	1
41-90	1 1/4
91-125	1 1/2
126-250	2



DRAWTHRU :

A = GREATER OF 4" OR 1/2" PLUS AHU  
TOTAL PRESSURE IN INCHES-WC

BLOWTHRU :

B = GREATER OF 4" OR 1/2" PLUS AHU  
TOTAL PRESSURE IN INCHES-WC

NOTES:

1. REF. PLAN DWG'S FOR CONDENSATE DRAIN PIPE SIZE, (1" MIN. AT EACH AHU DRAIN CONNECTION POINT). REF. SPECIFICATIONS FOR PIPE AND INSULATION MATERIAL REQUIREMENTS.
2. AHU TO BE ELEVATED ON HOUSEKEEPING PAD OR MOUNTING STRUCTURE AS REQUIRED FOR TRAP HEIGHT ABOVE FLOOR

## 2 MECHANICAL UNIT CONDENSATE DRAIN

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### Key Plan

Description	Date
Filing Set	06/17/22

## Project

Storm King  
Art Center  
**Welcome  
Pavilions**

Seal

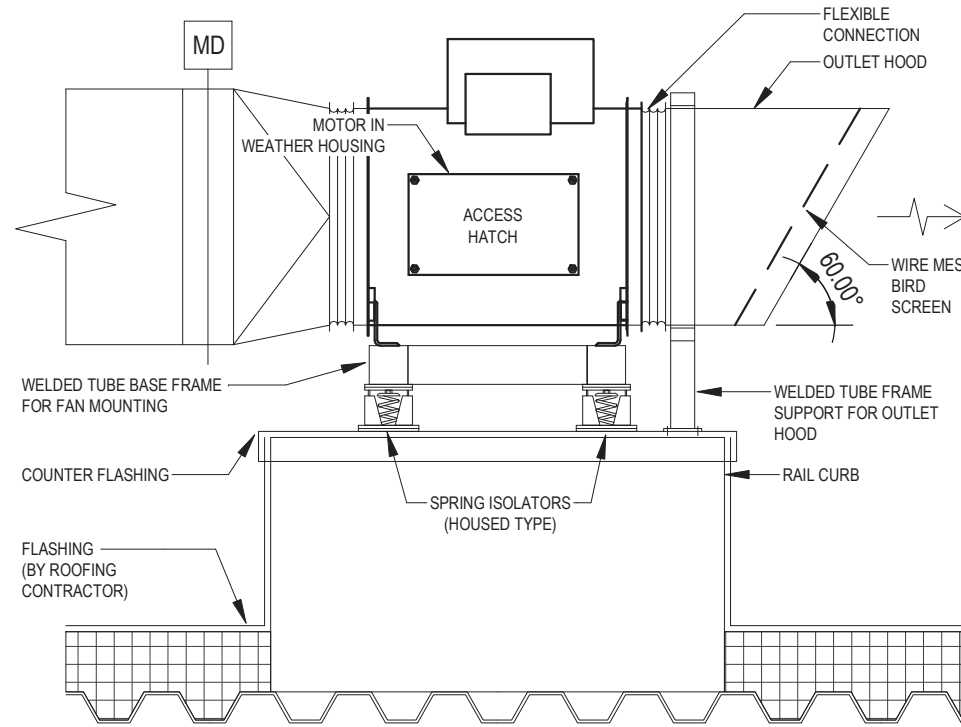
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Drawing Title

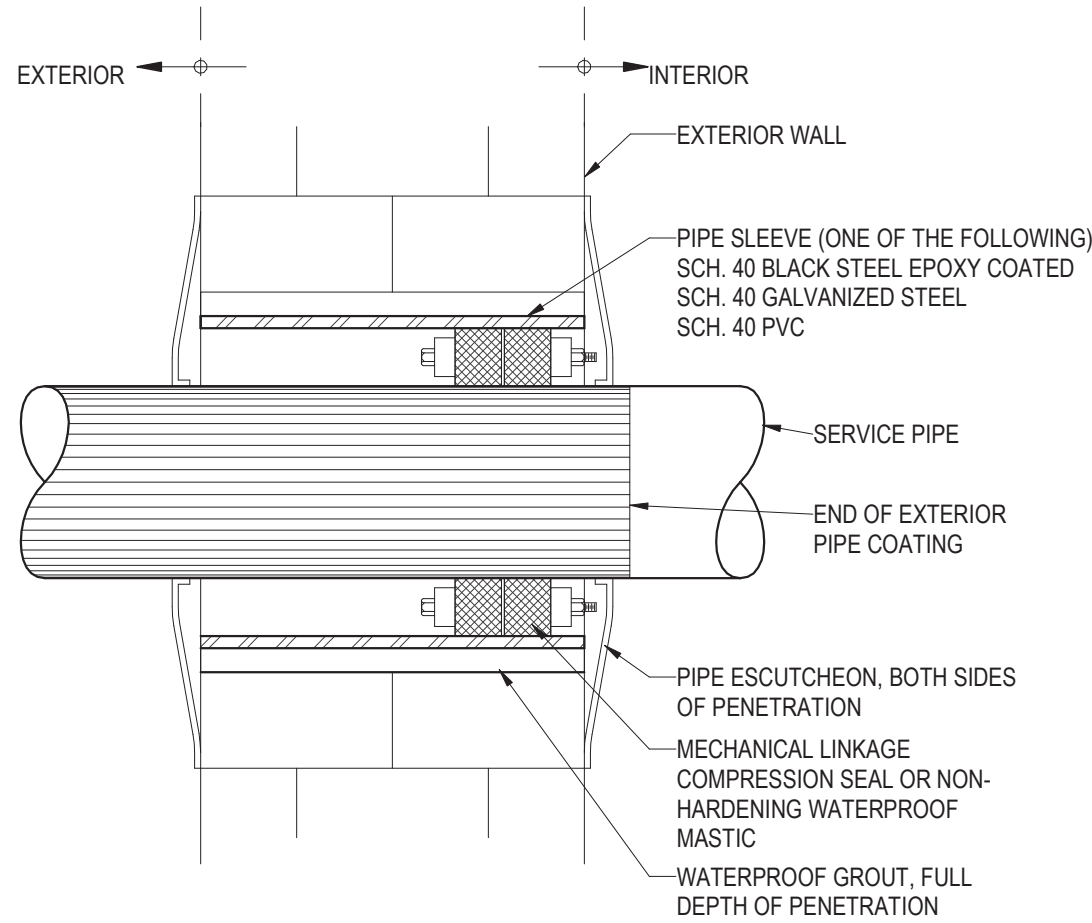
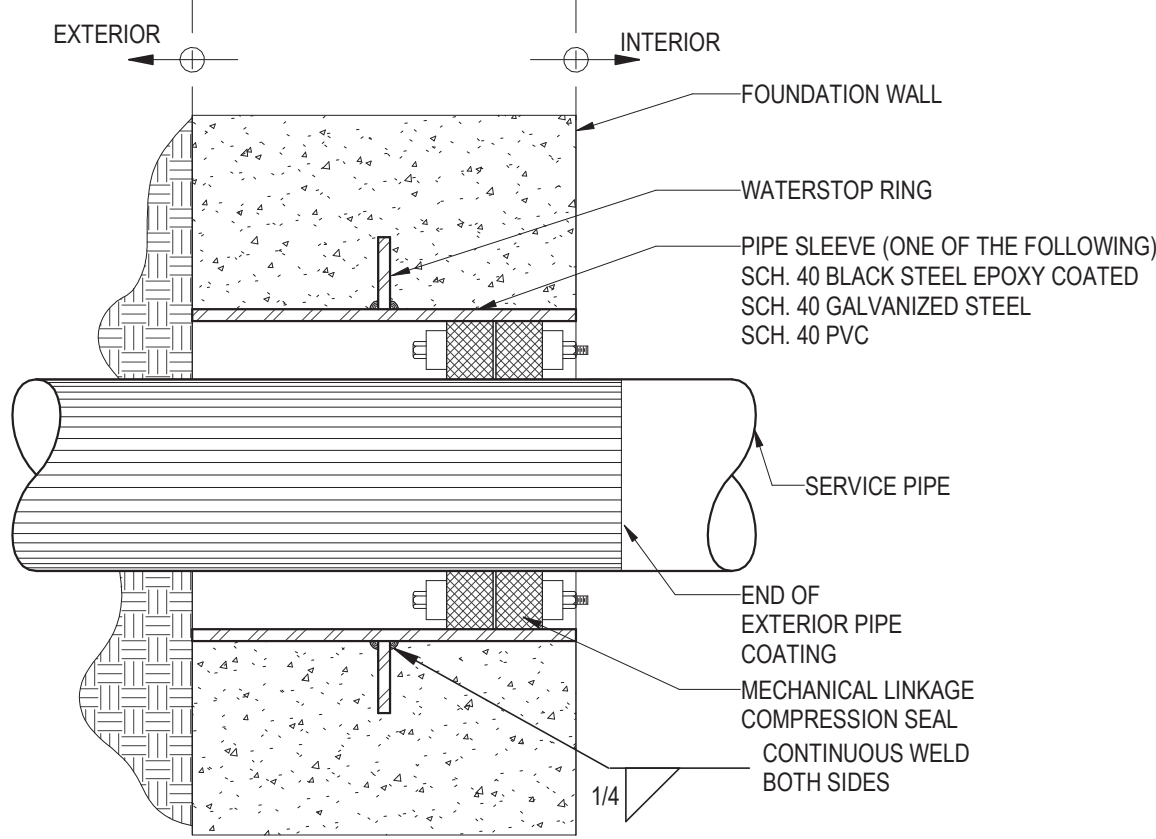
## Mechanical Details

Date	06/17/22
Scale	Not to Scale
Drawing Number	M-W-507
Sheet Size	ARCH D





NOTES:  
1. ALL EXTERIOR DUCTWORK TO BE STAINLESS STEEL



## 1 MIXED FLOW INLINE FAN

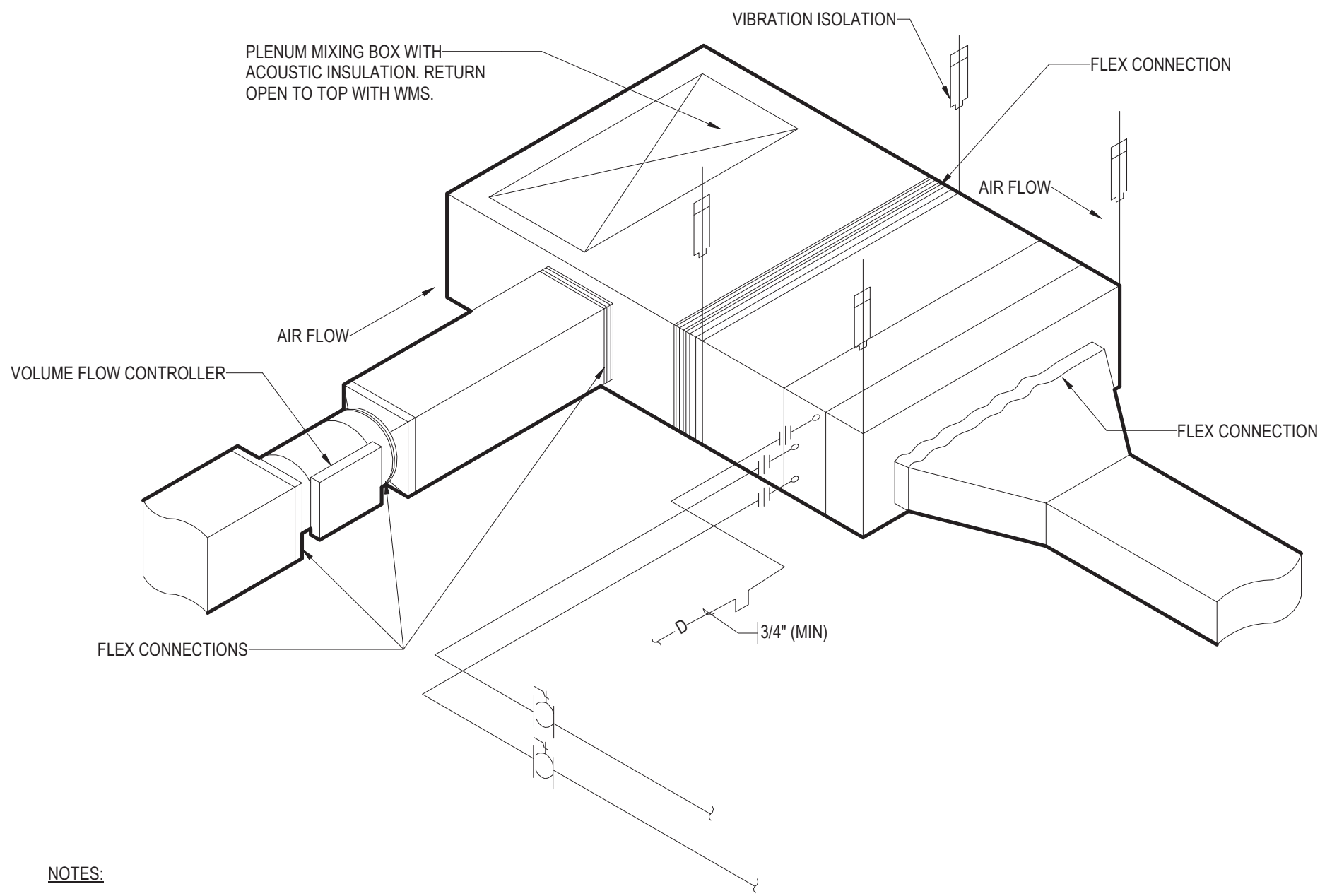
NOT TO SCALE

## 2 PIPE PENETRATION THROUGH FOUNDATION WALLS

NOT TO SCALE

## 3 PIPE PENETRATIONS THROUGH EXTERIOR WALLS ABOVE GRADE

NOT TO SCALE



NOTES:

- 1) A BEND WITH A CURVATURE RADIUS OF AT LEAST 1 X DIAMETER, WITHOUT AN ADDITIONAL STRAIGHT DUCT SECTION UPSTREAM OF THE FLOW CONTROLLER, IS RECOMMENDED BY THE MANUFACTURER AS HAVING A NEGLIGIBLE EFFECT ON VOLUME FLOW RATE ACCURACY.
- 2) A STRAIGHT DUCT SECTION OF AT LEAST 1.5 X DIAMETER IS REQUIRED UPSTREAM THE FLOW CONTROLLER. SHORTER UPSTREAM SECTIONS REQUIRE A PERFORATED PLATE IN THE BRANCH AND BEFORE THE FLOW CONTROLLER.
- 3) FLOW CONTROLLER REQUIRES AT LEAST 1" OF CLEARANCE IN ALL DIRECTIONS FOR COMMISSIONING AND MAINTENANCE.
- 4) INSTALL COMPONENTS SUCH THAT A SINGLE COMMON CLEARANCE AREA FOR MAINTENANCE ACCESS IS PROVIDED TO FCU, FLOW CONTROLLER, FILTER REPLACEMENT AND REFRIGERANT VALVING.
- 5) PROVIDE ACOUSTIC LINING IN SUPPLY DUCT FOR 10 FT DOWN STREAM FROM FCU.

## 4 HORIZONTAL VRF FAN COIL UNIT

NOT TO SCALE

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**Key Plan**

Description	Date
Filing Set	06/17/22

**Project**

# Storm King Art Center Welcome Pavilions

**Seal**

**NOT FOR CONSTRUCTION**

**Drawing Title**  
Mechanical Details

Date	06/17/22
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Sheet Size	ARCH D



M - ENERGY RECOVERY UNIT SCHEDULE																
DESIGNATION	SERVICE	LOCATION	SUPPLY AIR QUANTITY (CFM)	EXHAUST AIR QUANTITY (CFM)	SUPPLY FAN DATA			RETURN FAN DATA		ELECTRICAL					APPROXIMATE WEIGHT (LB)	REMARKS
					CFM	EXTERNAL STATIC PRESSURE (IN WG)	HP	CFM	VOLTAGE	PHASE	FREQ	MCA	MOCP	SINGLE POINT CONNECTION		
ERV - W-1-1	RESTROOM	GROUND LEVEL	670	670	670	0.6	1	670	208 V	1	60	11 A	15	Yes	275	INCLUDE 11.5 kW DUCT HEATER ACCESSORY

M - VRF FCU SCHEDULE											
DESIGNATION	SERVICE	LOCATION	COOLING AT AHRI		HEATING AT AHRI		ELECTRICAL			FAN	
			TOTAL COOLING CAPACITY (MBH)	SENSIBLE COOLING CAPACITY (MBH)	TOTAL HEATING CAPACITY (MBH)		VOLTAGE	PHASE	FREQUENCY	CFM	MOTOR CONTROL
FCU-W-2-1	TICKETING	GROUND LEVEL	24.0	18.3	27.0		208 V	1	60	671 CFM	ECM

M - VRF AIR COOLED CONDENSING UNIT SCHEDULE														
DESIGNATION	SERVICE	LOCATION	TOTAL COOLING CAPACITY (MBH)	TOTAL HEATING CAPACITY (MBH)	COOLING EER	HEATING COP	ELECTRICAL				REFRIGERANT TYPE	DIMENSIONS		
							VOLTAGE	PHASE	FREQUENCY	MCA		LENGTH (IN)	WIDTH (IN)	HEIGHT (IN)
ACCU-W-1-1	TICKETING	OUTSIDE	36	42	12.6	3.7	208 V	1	60	36 A	R410A	3' - 5 11/32"	1' - 1"	4' - 4 11/16"

M - UNIT HEATER SCHEDULE													
DESIGNATION	SERVICE	LOCATION	TYPE	AIR QUANTITY (CFM)	FAN			ELECTRIC COIL		CAPACITY (KW)	MODEL NUMBER	MANUFACTURER	REMARKS
					VOLTAGE	PHASE	FREQUENCY	CAPACITY (BTU/H)	EAT (°F)				
UH - W-1-1	RESTROOM	MECHANICAL ROOM	ELECTRIC	250	208 V	3	60	6825	55 °F	2	ASHU0283CTCH4R	OXFORD	1

NOTES:  
1. PROVIDE WITH UNIT-MOUNTED THERMOSTAT.

M - TRENCH HEATER SCHEDULE									
DESIGNATION	SERVICE	LOCATION	ELECTRICAL			R LENGTH	CONTROL BY	MANUFACTURER	MODEL NUMBER
			KW	VOLTAGE	# OF POLES				
TH-W-1-1	TICKETING	TICKETING COUNTER	0.75	208 V	1	3' - 0"	SWITCH POWERED WITH TIMER	JAGA	OTS0750

M - ELECTRIC DUCT HEATER SCHEDULE									
DESIGNATION	SERVICE	LOCATION	CFM	EAT (°F)	LAT (°F)	CAPACITY (KW)	MANUFACTURER	MODEL NUMBER	REMARKS
DH-W-1-1	RESTROOM	GROUND LEVEL	670	0 °F	50 °F	11.5	RENEWAIRE	RH SERIES	PROVIDE SCR CONTROL

M - DIFFUSER AND GRILLE SCHEDULE									
DESIGNATION	USAGE	MAX CFM/F	MAX NC	FACE SIZE	SLOT SIZE	MANUFACTURER	MODEL NUMBER	REMARKS	
EG-1	EXHAUST	190	25	6"x6"	-	PRICE	LBP CORE 15A	1	
LSD-1	SUPPLY	30	25	-	1	PRICE	SDS	2	
RG-1	OED RETURN		25	-	-	PRICE	RPD		
RSD-1	RETURN	30	25	-	1	PRICE	SDS	2	
SG-1	SUPPLY	190	25	6"x6"	-	PRICE	LBP CORE 15A	1	

NOTES:  
1. LINEAR BAR DIFFUSERS IN SOFFITS TO BE CONTINUOUS WITH ACTIVE SECTIONS FOR SUPPLY AND INACTIVE SECTIONS FOR RETURN BACK TO FCU.  
2. PROVIDE WITH PLENUM.

DESIGNATION	SERVICE	LOCATION	ELECTRIC HEATING			MANUFACTURER	MODEL NUMBER	REMARKS
			AREA (SQFT)	W/SQFT	WATTAGE			
RF - W-1-3	RESTROOM	RR R103	26	15	390	NVENT NUHEAT	X1M021030	
RF - W-1-1	RESTROOM	RR R104	26	15	390	NVENT NUHEAT	X1M021030	
RF - W-1-2	RESTROOM	RR R105	26	15	390	NVENT NUHEAT	X1M021030	
RF - W-1-4	RESTROOM	RR R106	26	15	390	NVENT NUHEAT	X1M021030	
RF - W-1-5	RESTROOM	RR R107	26	15	390	NVENT NUHEAT	X1M021030	
RF - W-1-6	RESTROOM	RR R108	26	15	390	NVENT NUHEAT	X1M021030	
RF - W-1-7	RESTROOM	RR R109	26	15	390	NVENT NUHEAT	X1M021030	
RF - W-1-8	RESTROOM	RR R110	26	15	390	NVENT NUHEAT	X1M021030	
RF - W-1-9	RESTROOM	CUSTODIAN R11	26	15	390	NVENT NUHEAT	X1M021030	
RF - W-1-10	RESTROOM	ACCESSIBLE/FAMILY RR R112	51	15	765	NVENT NUHEAT	X1M051060	
RF - W-1-11	RESTROOM	ACCESSIBLE/FAMILY RR R113	50	15	750	NVENT NUHEAT	X1M051060	
RF - W-1-12	RESTROOM	NURSING R114	50	15	750	NVENT NUHEAT	X1M051060	
RF - W-1-13	RESTROOM	SICK ROOM R115	76	15	1140	NVENT NUHEAT	X1M071080	

NOTES:  
1. ELECTRIC IN FLOOR HEATING MATS POURED IN TOPPING SLAB.

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**Key Plan**

Description	Date
Filing Set	06/17/22

**Project**

Storm King  
Art Center

**Welcome  
Pavilions**

**Seal**

**NOT FOR CONSTRUCTION**

Drawing Title

Welcome -  
Mechanical  
Schedules

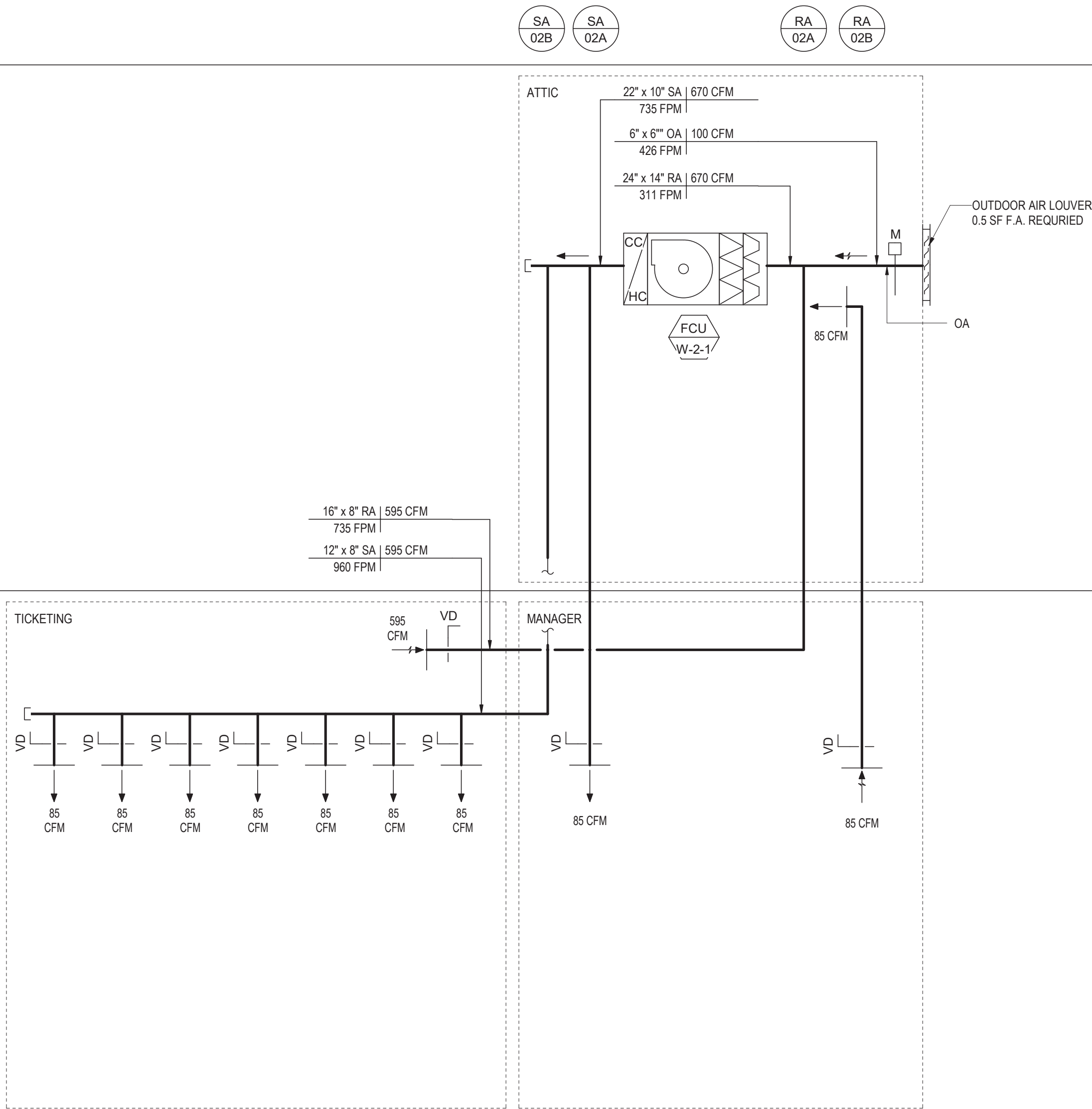
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Sheet Size	ARCH D



ROOF LEVEL

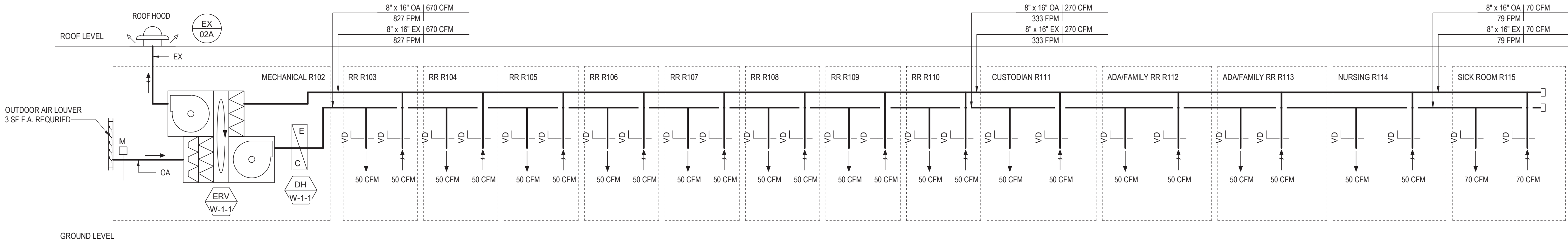
SECOND LEVEL

GROUND LEVEL



2 MECHANICAL DUCTWORK SCHEMATIC RISER DIAGRAM - TICKETING

NOT TO SCALE



1 MECHANICAL DUCTWORK SCHEMATIC RISER DIAGRAM - RESTROOM

NOT TO SCALE

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**Key Plan**

Description	Date
Filing Set	06/17/22

**Project**

Storm King  
Art Center  
**Welcome  
Pavilions**

**Seal**

**NOT FOR CONSTRUCTION**  
**Drawing Title**  
Welcome - Duct Riser

Date	06/17/22
Scale	Not to Scale
Drawing Number	M-W-701
Sheet Size	ARCH D



GENERAL NOTES

SINGLE LINES ARE INTENDED TO SHOW CONNECTIVITY OF REFRIGERANT SYSTEM. EACH LINE REPRESENTS 3X REFRIGERANT PIPES. MODE CONTROL UNIT (MCU) LAYOUT IS PRELIMINARY AND SUBJECT TO MANUFACTURER REQUIREMENTS.

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**Key Plan**

Description	Date
Filing Set	06/17/22

Project

# Storm King Art Center Welcome Pavilions

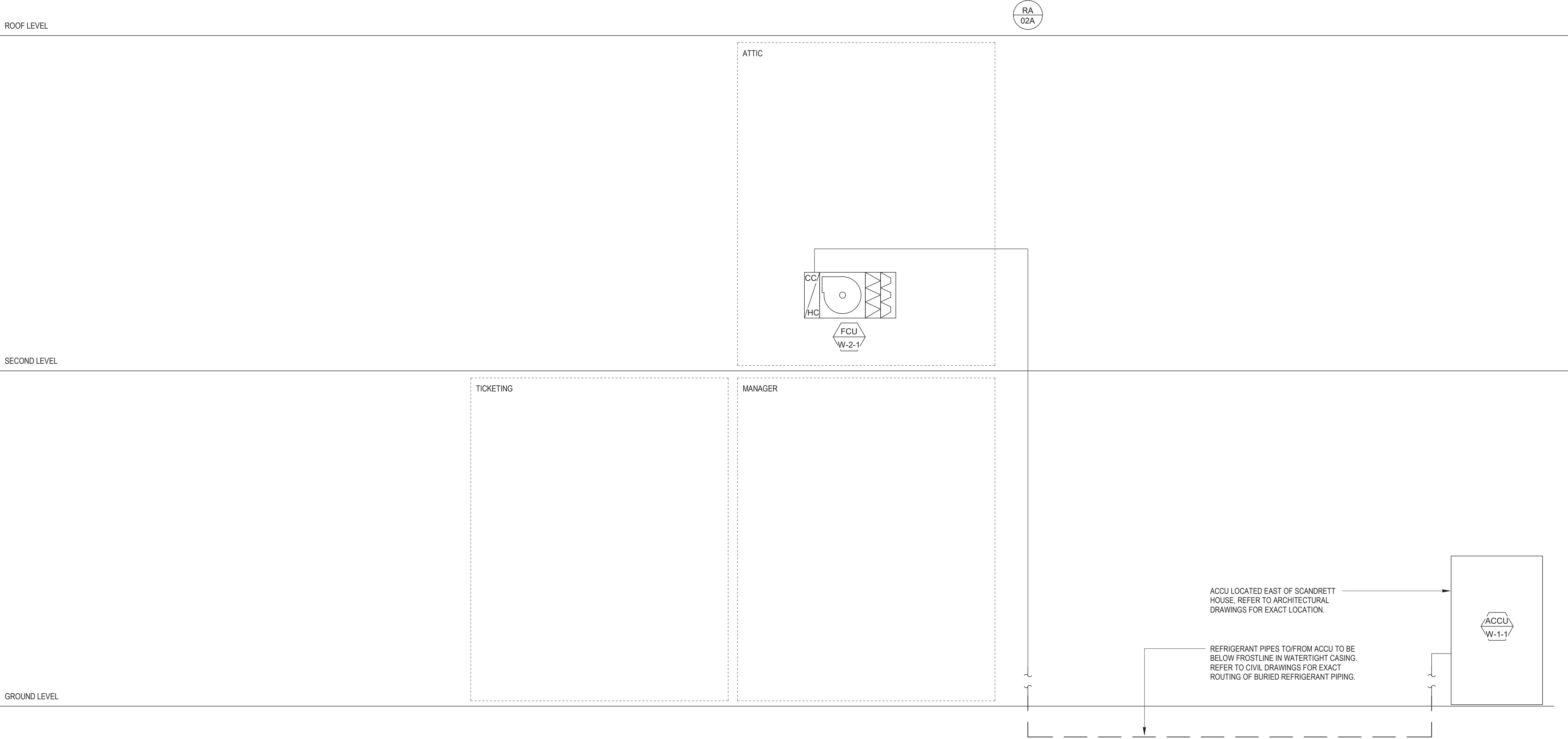
Seal

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Drawing Title

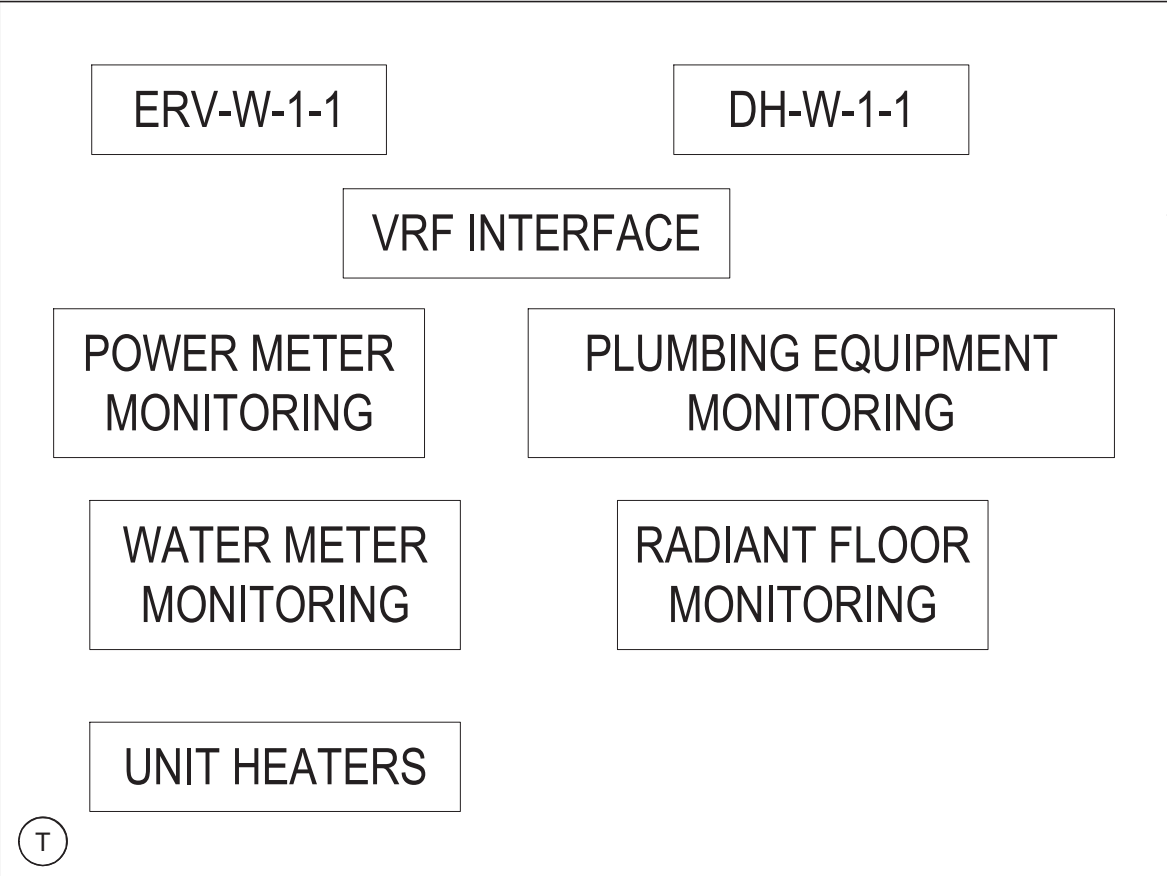
Refrigerant Riser

Date	06/17/22
Scale	Not to Scale
Drawing Number	M-W-702
Sheet Size	ARCH D



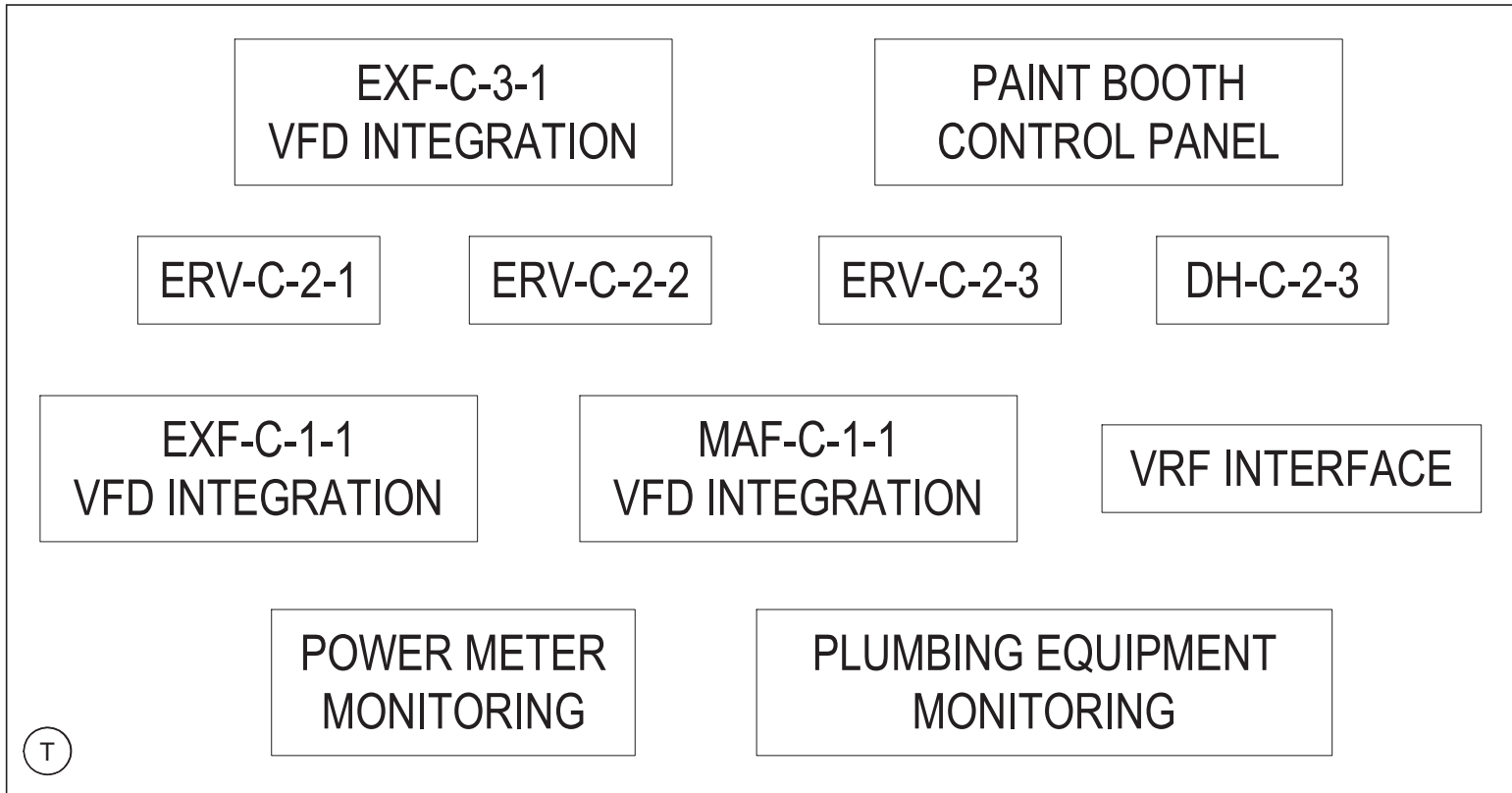


WELCOME PAVILIONS



BUILDING IT

CONSERVATION, FABRICATION & MAINTENANCE BUILDING



BUILDING IT



BMS ALARMS / MODES (ALL BLDGS/SYSTEMS)

- FREEZE PROTECTION
- HIGH/LOW SPACE TEMPERATURE
- HIGH/LOW SPACE HUMIDITY
- FILTER STATUS
- UNIT FAILURE
- ONLINE/OFFLINE
- OCCUPIED/UNOCCUPIED
- MORNING WARMUP/COOLDOWN
- HIGH/LOW DISCHARGE AIR TEMPERATURE
- VFD FAILURE
- HIGH/LOW CO2

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Key Plan

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Storm King  
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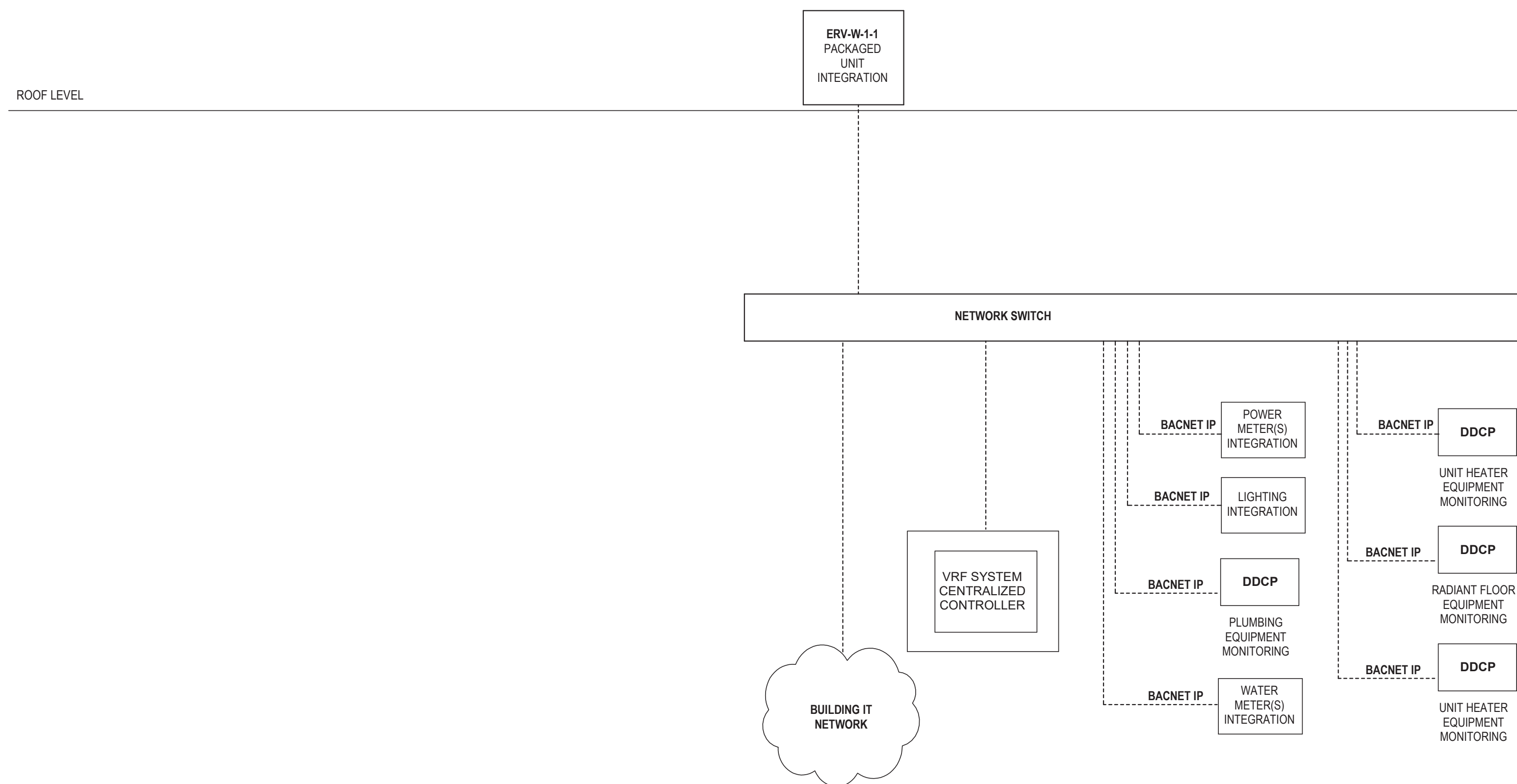
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Drawing Title

Site Controls Plan

Date	06/17/22
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Sheet Size	ARCH D





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## Key Plan

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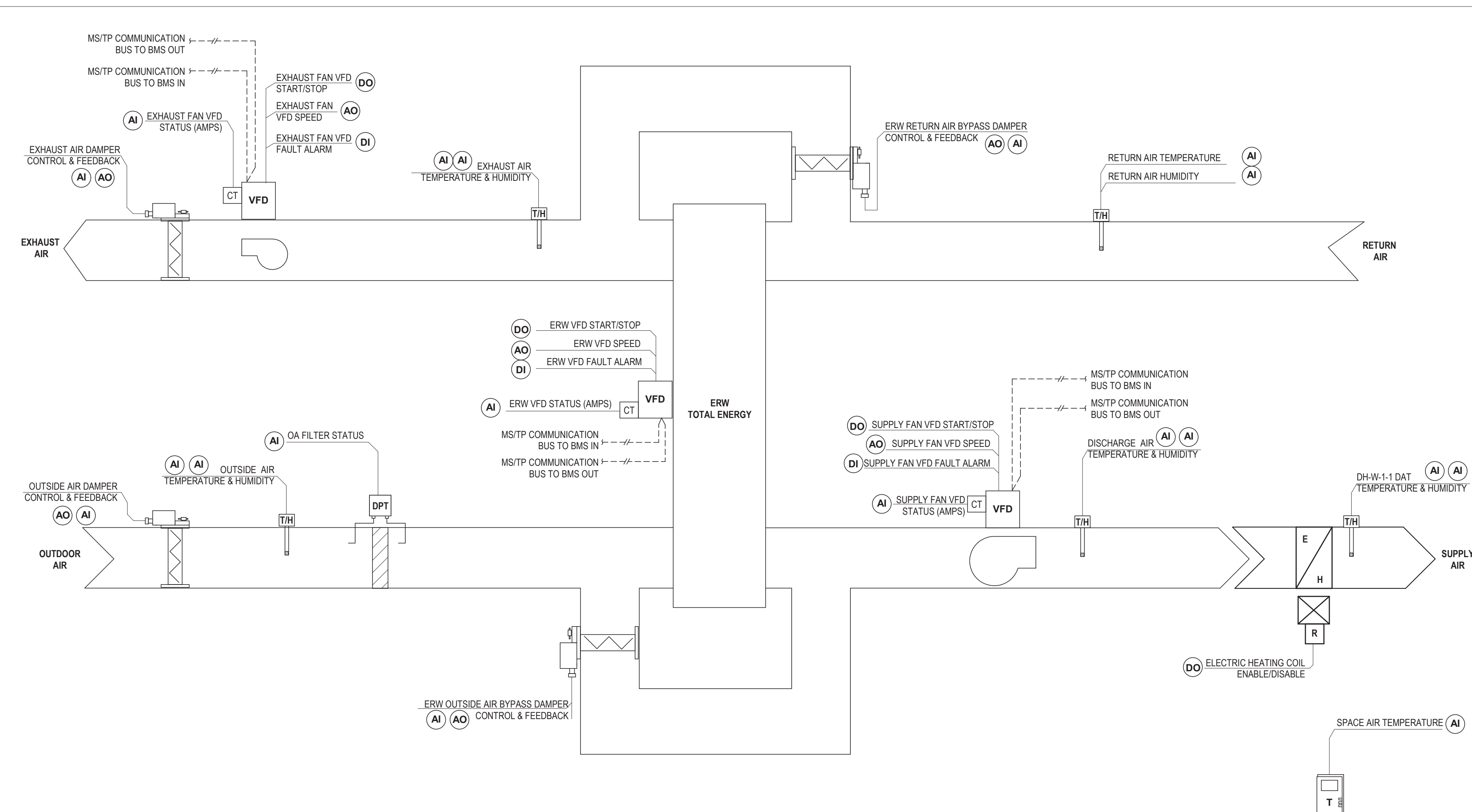
Drawing Title

## Control Details

Date	06/17/22
Scale	12" = 1'-0"
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Sheet Size	ARCH D



### ERV-W-1-1 FLOW DIAGRAM



## SEQUENCE OF OPERATIONS

**ENERGY RECOVERY WHEEL CONTROL:** ENERGY WHEEL IS EQUIPPED WITH BYPASS DAMPERS ON THE RETURN AND EXHAUST SIDE WITH END SWITCH TO INDICATE FULL OPEN, A VARIABLE FREQUENCY DRIVE TO CONTROL ROTATION SPEED, AND A ROTATION DETECTION MODULE. ALL VALUES SHALL BE DISPLAY AS 0% TO 100% WHERE 0% IS 0% OPEN MINIMUM, AND 100% IS FULL OPEN / MAXIMUM.

THE ENERGY WHEEL SHALL BE ENABLED/ DISABLED WITH THE AIR HANDLING UNIT SUPPLY FAN AND RETURN FAN. WHEN THE AIR HANDLING UNIT SUPPLY AND RETURN FAN HAS PROVEN "ON" AND THE ENERGY WHEEL VARIABLE FREQUENCY DRIVE IS NOT IN FAULT THE DDC SYSTEM SHALL SEND A START COMMAND TO THE ENERGY WHEEL.

THE PROGRAM SHALL CALCULATE THE ENERGY WHEEL'S ENTHALPY, DEWPOINT, AND WETBULB TEMPERATURE FOR THE LEAVING SUPPLY SIDE AND THE ENTERING AND LEAVING EXHAUST SIDE. THESE VALUES SHALL BE BASED ON THE RESPECTIVE TEMPERATURE AND HUMIDITY INPUT VALUES.

THERE SHALL BE FOUR OPERATIONAL MODES FOR THE ENERGY WHEEL

1. FROST/CONDENSATE PREVENTION MODE
2. HEAT RECOVERY MODE
3. COOLING RECOVERY MODE

FROST/CONDENSATE PREVENTION MODE... SHALL BE CONTROLLED WITH A DIRECT ACTING PROPORTIONAL AND INTEGRAL LOOP WITH THE LOOP OUT PUT REPRESENTED IN 0% TO 100% UNITS CALCULATED WITH THE DEVIATION BETWEEN THE PROCESS SET POINT AND THE PROCESS VARIABLE. THE PROCESS SET POINT SHALL BE THE VALUE OF THE ENERGY WHEEL'S CALCULATED FROST DEWPOINT PLUS FIVE DEGREES F. THE PROCESS VARIABLE SHALL BE REPRESENTED BY THE VALUE OF THE ENERGY WHEEL'S LEAVING EXHAUST TEMP.

**HEAT RECOVERY MODE.** SHALL BE ENABLED BY A DEAD BAND SWITCH BASED ON OUTDOOR AIR TEMPERATURE. "ON" AT 48 DEGREES F. AND "OFF" AT 52 DEGREES F. AND SHALL BE CONTROLLED WITH A REVERSE ACTION PROPORTIONAL AND INTEGRAL LOOP WITH THE LOOP OUT PUT REPRESENTED IN 0% TO 100% UNITS CALCULATED WITH THE DEVIATION BETWEEN THE PROCESS SET POINT AND THE PROCESS VARIABLE. THE PROCESS SET POINT IS THE VALUE OF THE AIR HANDLING UNITS DISCHARGE AIR TEMPERATURE SET POINT. THE PROCESS VARIABLE SHALL BE REPRESENTED BY THE VALUE OF THE ENERGY WHEEL INLET AIR TEMPERATURE. THE COMMAND FOR THE ENERGY WHEEL'S VARIABLE FREQUENCY DRIVE SHALL BE THE MINIMUM VALUE OF THE ENERGY WHEEL ACCEL. RAMP. FROST/CONDENSATE PREVENTION LOOP OUTPUT, AND THE HEAT RECOVERY LOOP OUTPUT, AND SHALL MODULATE TO MAINTAIN SETPOINT.

**COOLING RECOVERY MODE.** DURING IT MODE A DEAD BAND SWITCH BASED ON OUTDOOR AIR TEMPERATURE MINUS THE AIR HANDLING UNITS RETURN AIR TEMPERATURE WILL BE ENABLED "ON" AT 5 DEGREES F. DEVIATION AND "OFF" AT 2 DEGREES F. DEVIATION. ADDITIONALLY IT SHALL BE CONTROLLED WITH A DIRECT ACTING PROPORTIONAL AND INTEGRAL LOOP WITH THE LOOP OUT PUT REPRESENTED IN 0% TO 100% UNITS CALCULATED WITH THE DEVIATION BETWEEN THE PROCESS SET POINT AND THE PROCESS VARIABLE. THE PROCESS SET POINT IS THE VALUE OF THE AIR HANDLING UNITS DISCHARGE AIR TEMPERATURE. THE PROCESS VARIABLE SHALL BE REPRESENTED BY THE VALUE OF THE THERMISTY WIND LEAVING SURFACE TEMPERATURE. THE COMMAND FOR THE ENGINE HEAT EXCHANGER VALVE SHALL BE THE VALUE OF THE PROCESS VARIABLE MINUS THE VALUE OF THE FRESH AIR FROST/CONDENSATE PREVENTION LOOP OUTPUT, AND THE COOLING RECOVERY LOOP OUTPUT, AND SHALL MODULATE TO MAINTAIN SETPOINT.

**SYSTEM SHUT DOWN.**...THE DDC SYSTEM SHALL STOP THE ENERGY WHEEL AND OPEN THE BYPASS DAMPERS TO FULL BYPASS, SET ZERO IN ALL RAMPS AND CONTROLL OUTPUTS, AND DISABLE THE RATATION DETECTION CONTROL MODULE.

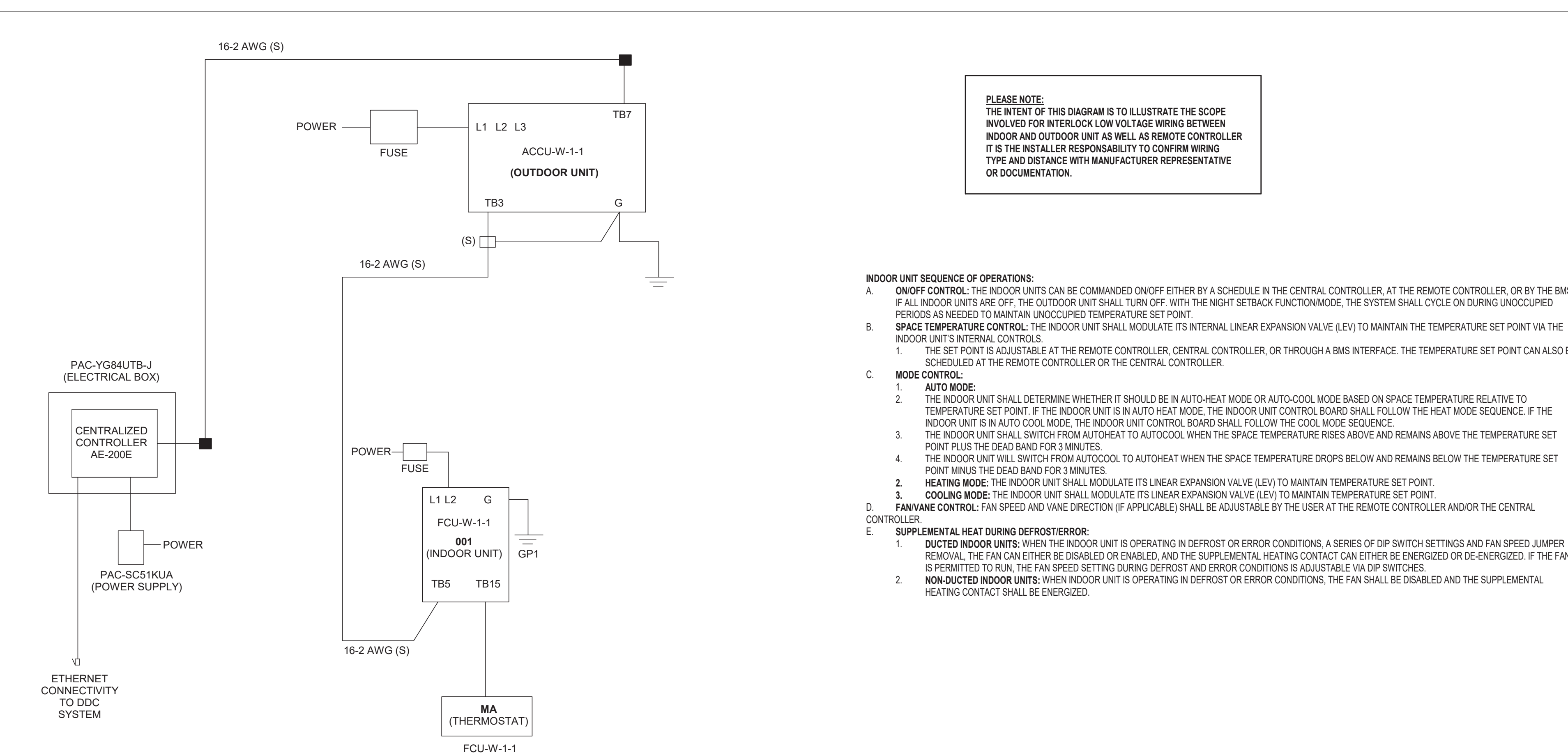
#### SUPPLY, RETURN AND ERW VFD COMMUNICATIONS BAS INTERFACE:

THE VFD INTERFACE SHALL BE CONNECT DIRECTLY TO THE MAIN DDC SYSTEM MS/TP NETWORK TRUNK TO MONITOR, DISPLAY, TREND AND REPORT THE FOLLOWING MINIMUM POINTS:

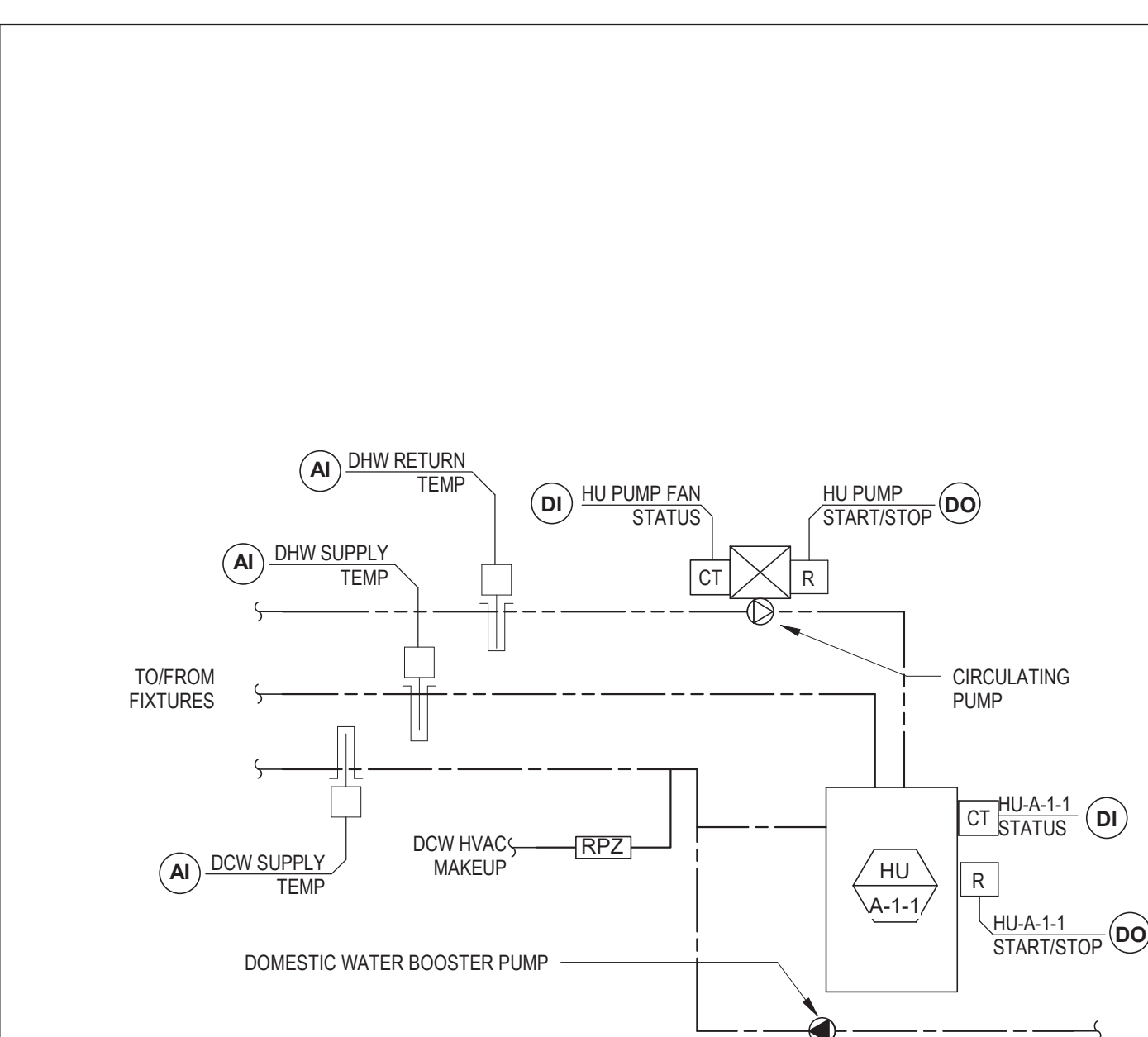
1. SPEED OUTPUT
2. HAND/AUTO SELECTION INDICATION
3. DRIVE AMPS
4. KW (COMPARE INSTANTANEOUS VALUE, THE CONNECTED MOTOR NAMEPLATE HP/KW (CONSTANT) AND THE RATIO)
5. KWHRS (INCLUDE CALCULATED ENERGY SAVINGS FROM BASELINE IF MOTOR KW AT FULL SPEED KW RAN CONTINUOUSLY AT FULL SPEED)
6. OPERATING HOURS
7. WARNINGS
8. FAULTS

**FILTER:** THERE SHALL BE A DIFFERENTIAL PRESSURE TRANSMITTER MEASURING THE PRESSURE DIFFERENTIAL ACROSS THE FILTER BANKS. IF THE PRESSURE DIFFERENTIAL PRESSURE ACROSS THE FILTER BANKS IS ABOVE THE FILTER DP SETPOINT (ADJUSTABLE) THEN AN ALARM SHALL BE SEND TO THE DDC SYSTEM.

## VRF SYSTEM DETAILS



## TYPICAL DOMESTIC WATER CONTROL STRATEGY



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