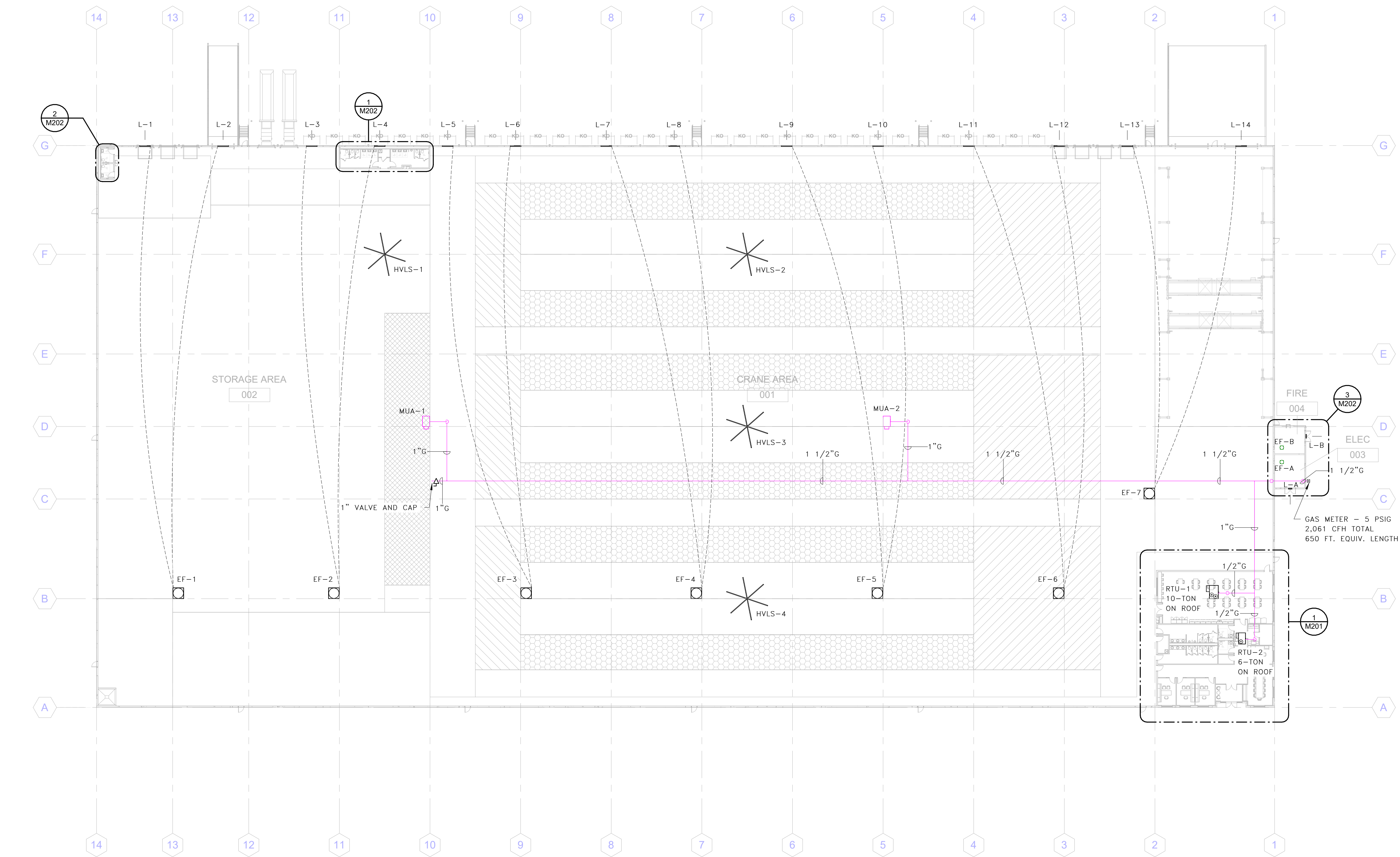




MECHANICAL OVERALL 01
1" = 30'-0"

SUBMITTALS / REVISIONS:		
NO.	DATE	DESCRIPTION
	07/09/2025	ISSUED FOR PERM

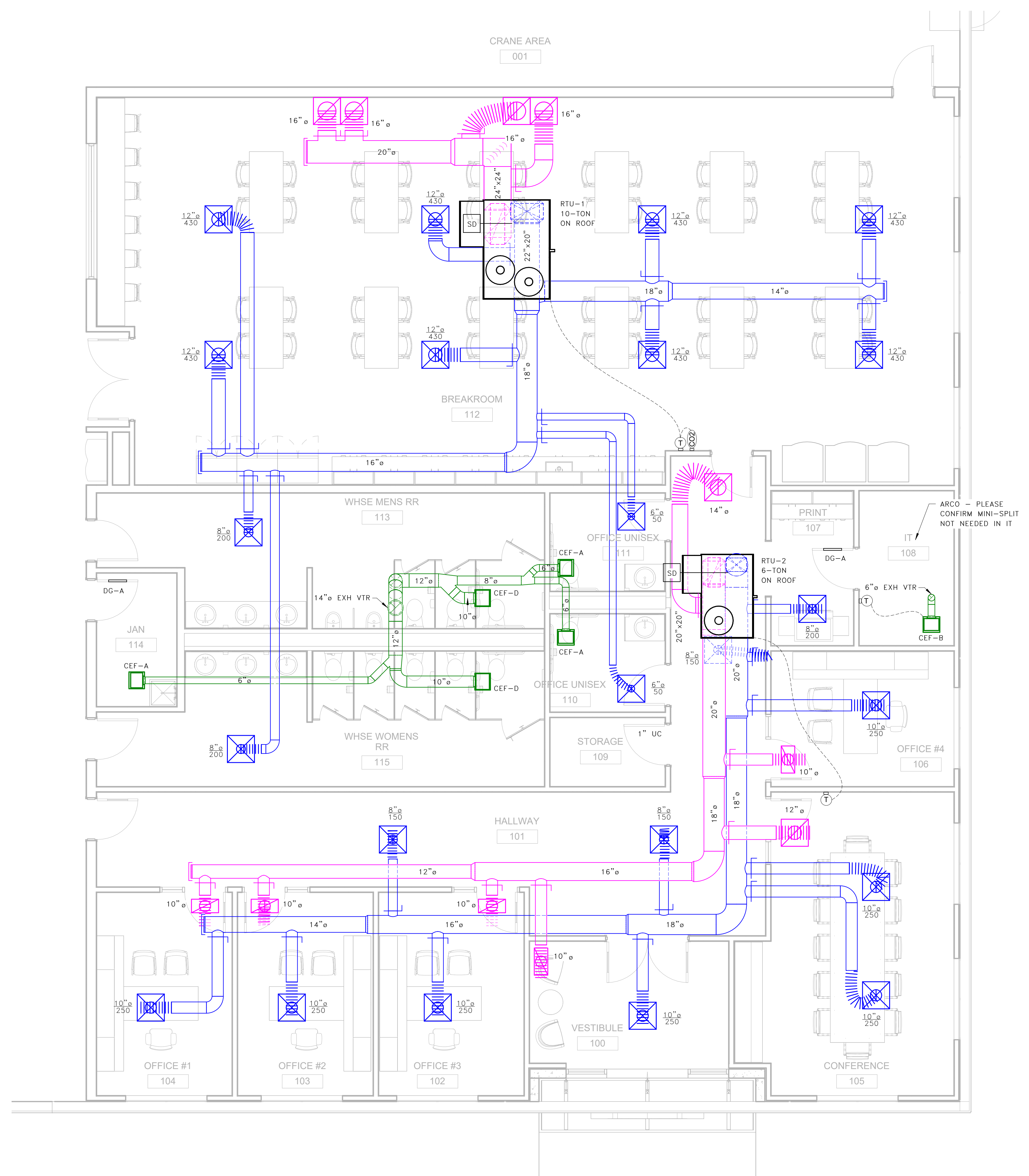
PROJECT NO.: PS059-25 <u>1 NE303</u>	DRAWN BY: TT/LS
SHEET TITLE:	

MECHANICAL
ENLARGED OFFICE

These drawings are the property of the registered Designer/ Engineer and may not be copied, reproduced or used without their written permission.

SHEET NUMBER: _____

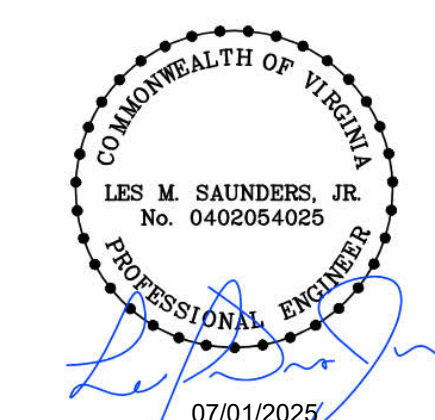
M201



1
M201

MECHANICAL ENLARGED OFFICE

1/4" = 1'-0"



SUBMITTALS / REVISIONS:		
NO.	DATE	DESCRIPTION
	07/09/2025	ISSUED FOR PERMIT

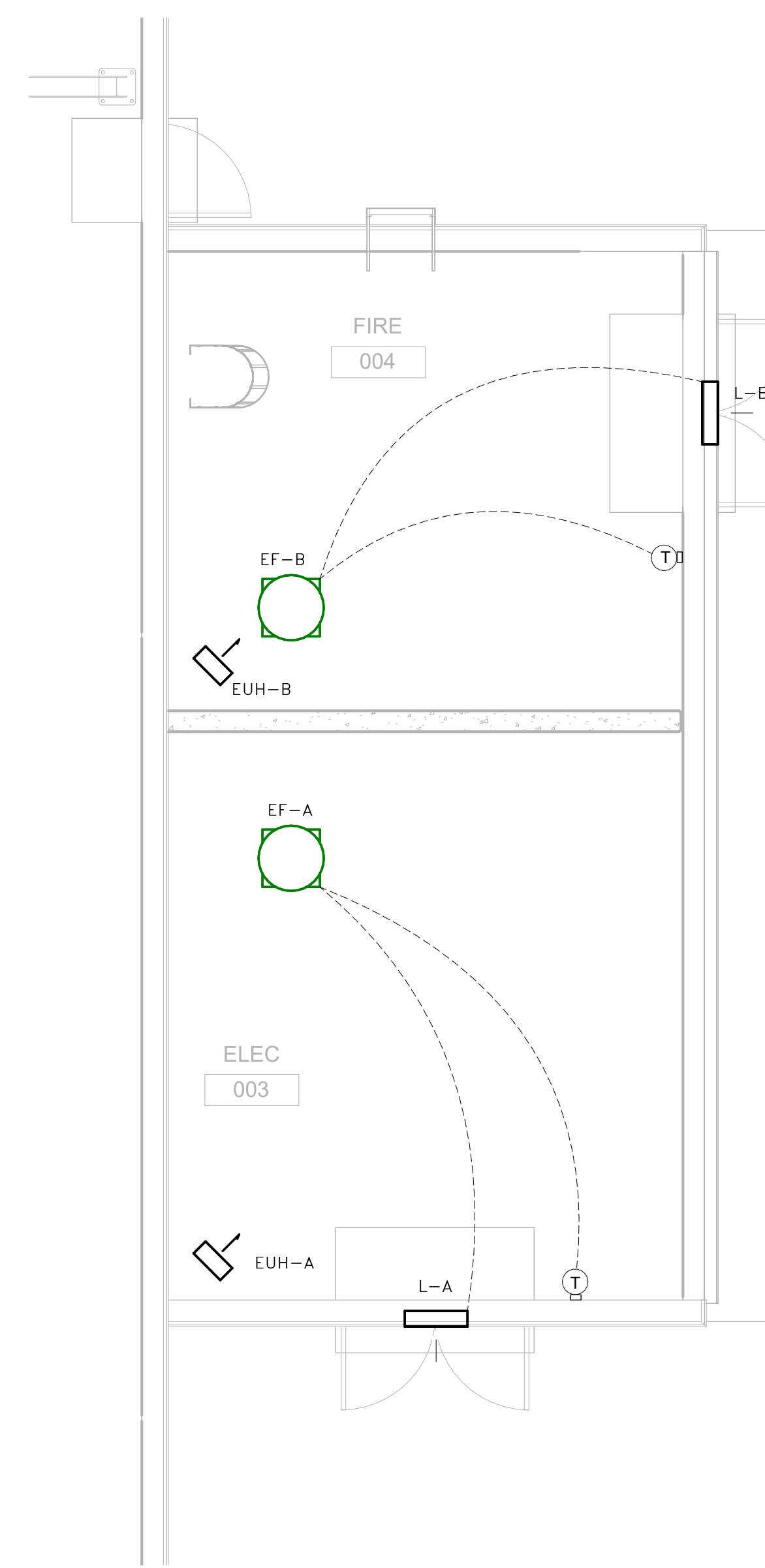
PROJECT NO.:	DRAWN BY:
PS059-25	TT/LS
1 NE303	
SHEET TITLE:	

MECHANICAL
ENLARGED
BATHROOMS &
UTILITIES

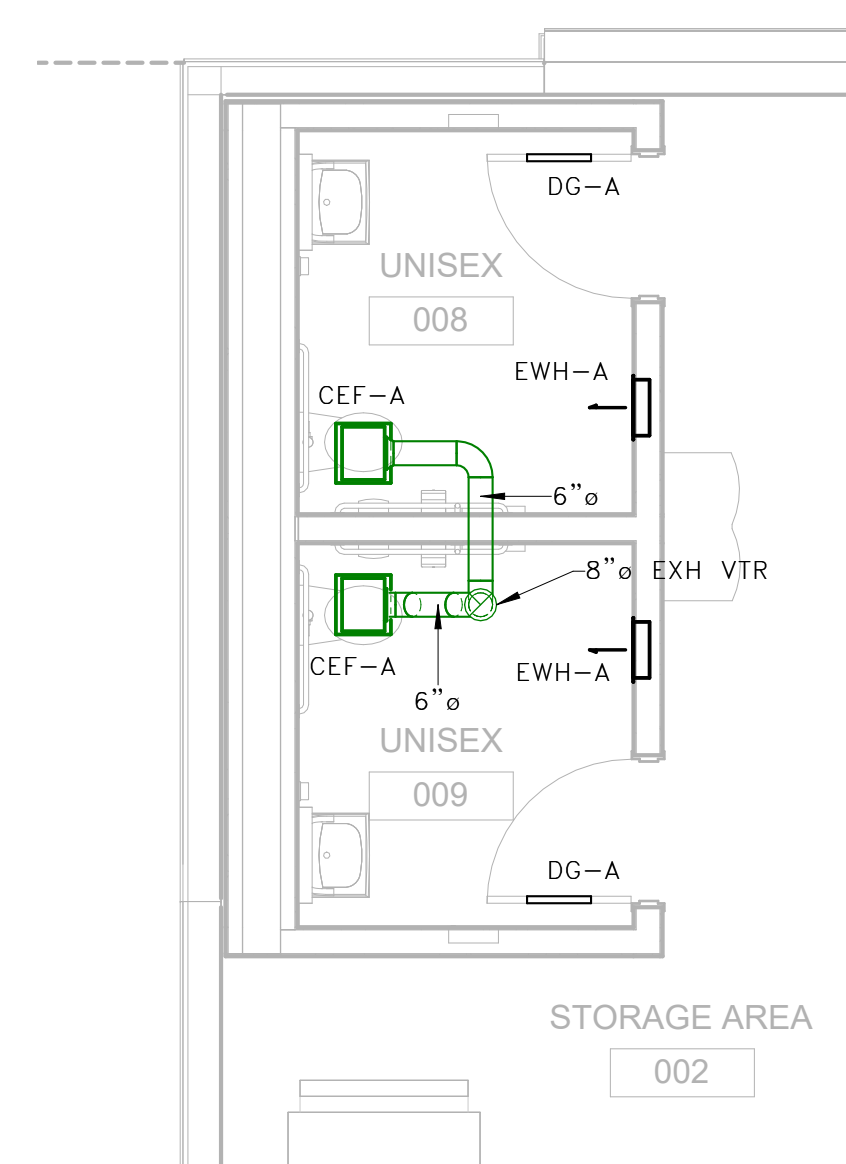
These drawings are the property of the registered Designer/ Engineer and may not be copied, reproduced or used without their written permission

SHEET NUMBER:

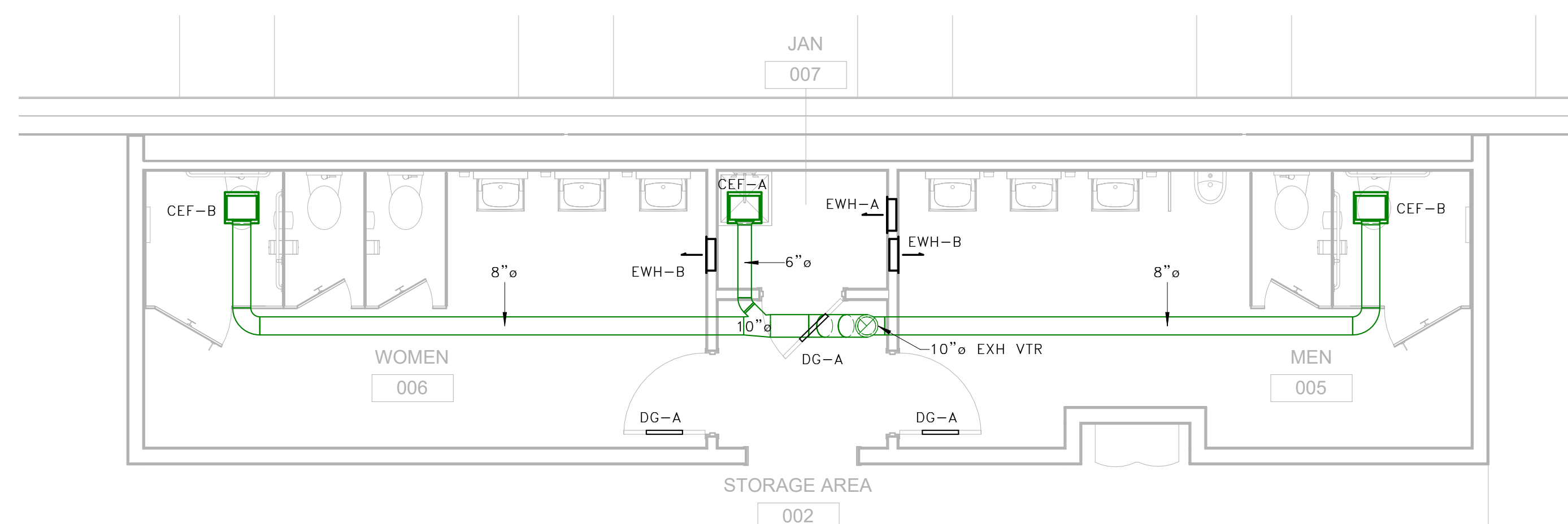
M202



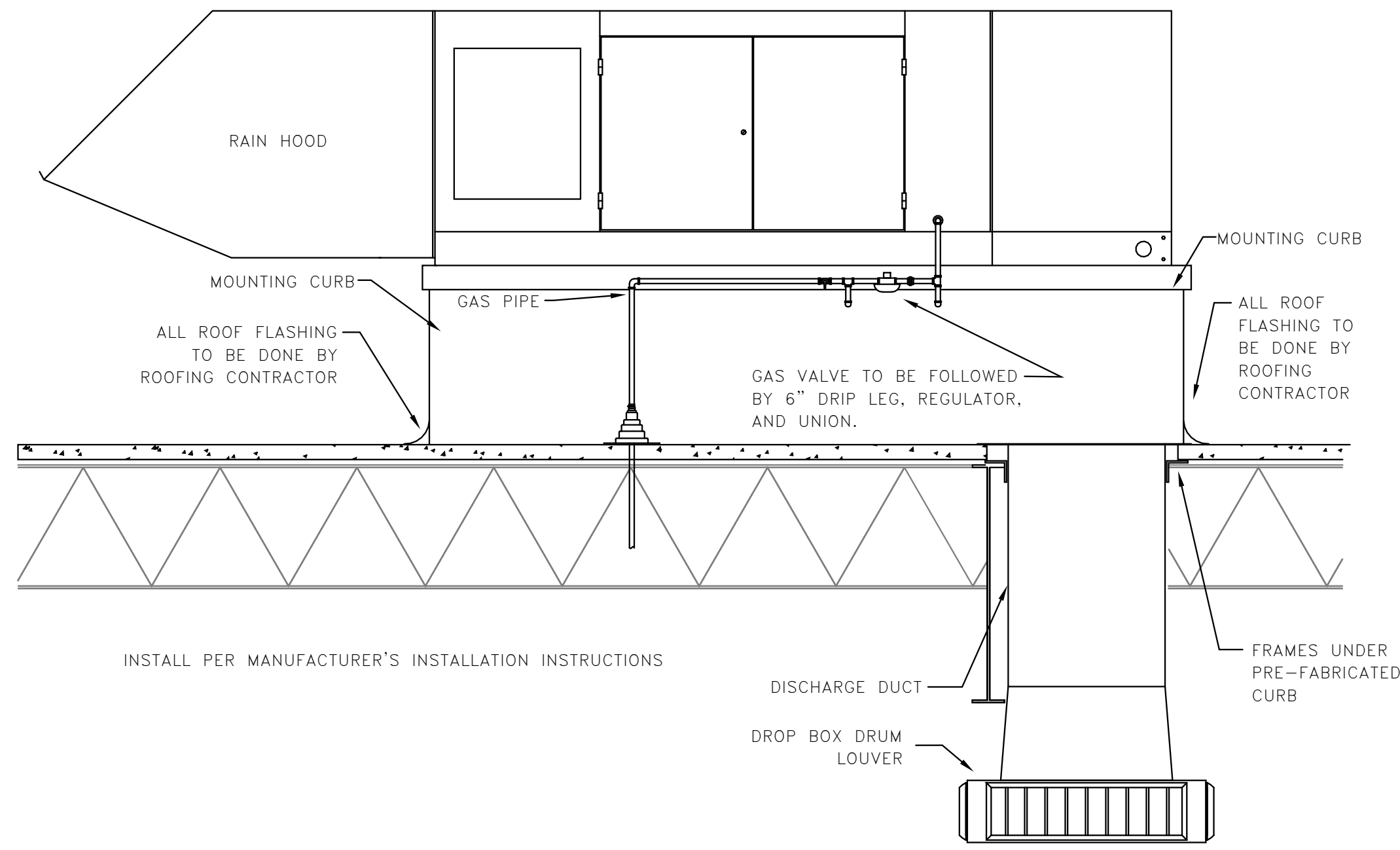
MECHANICAL ENLARGED UTILITIES



MECHANICAL ENLARGED BATHROOM 2

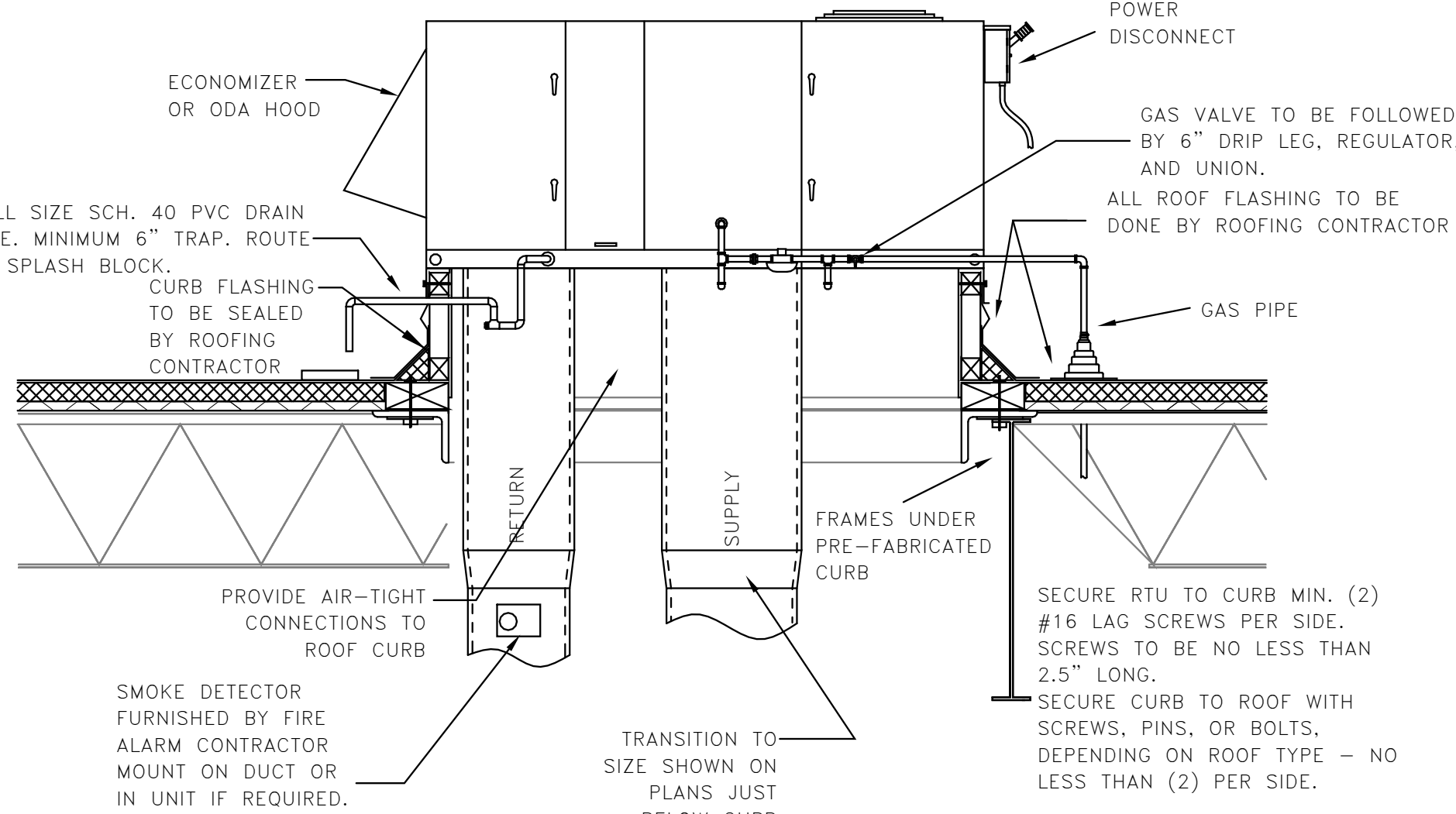


MECHANICAL ENLARGED BATHROOM 1



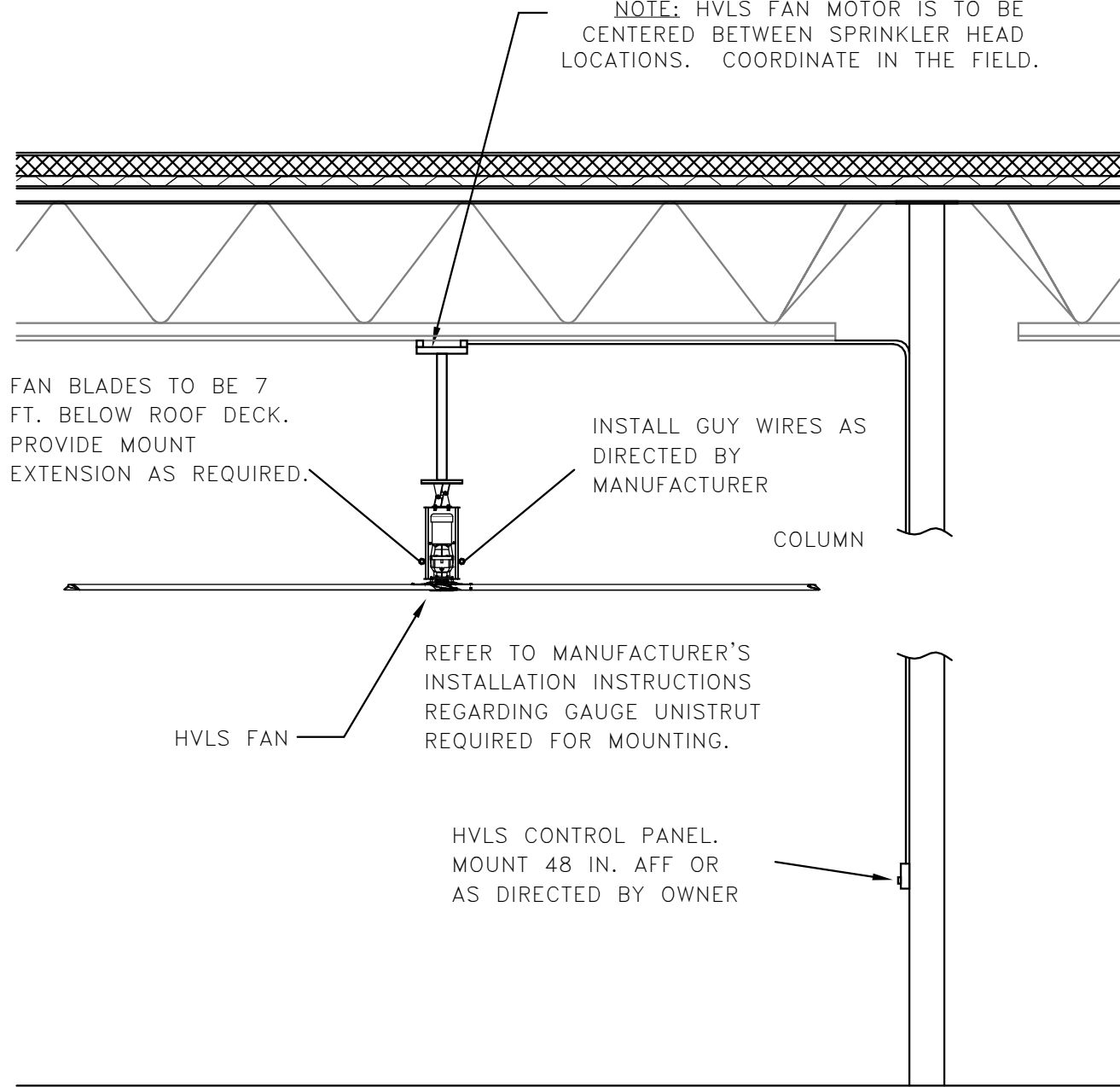
MAKE UP AIR UNIT INSTALLATION

NOT TO SCALE: MUA-1



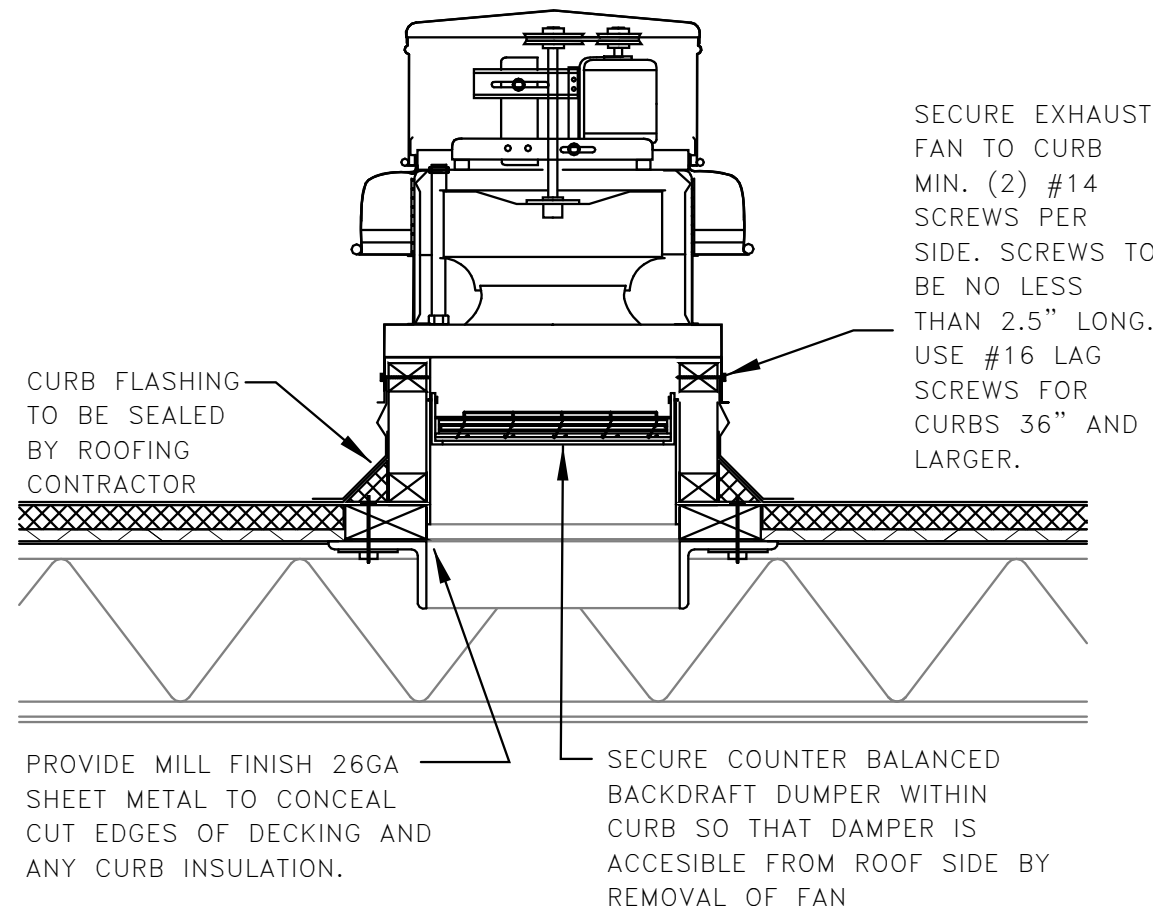
TYPICAL DUCTED ROOF TOP UNIT INSTALLATION

NOT TO SCALE



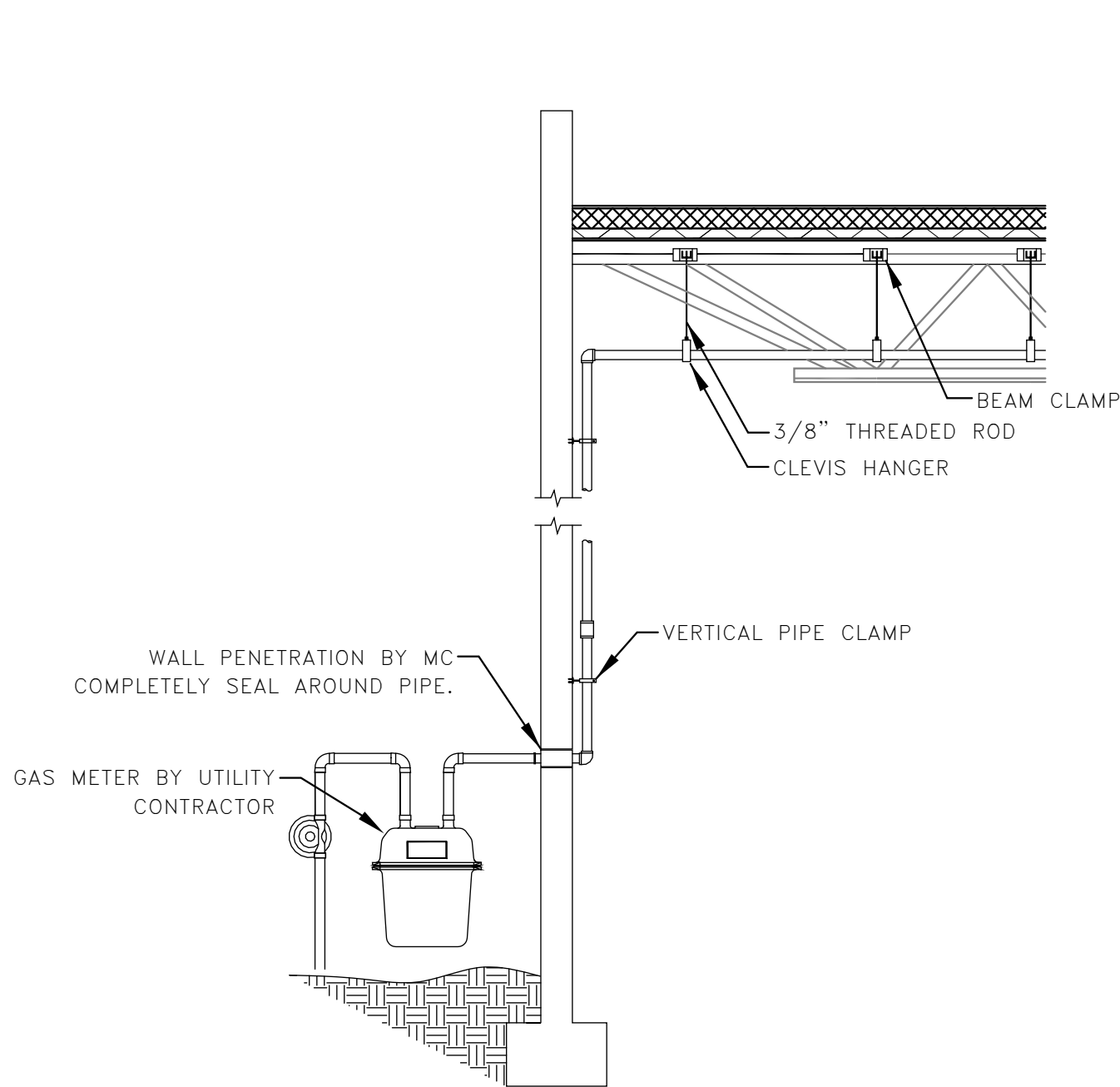
HVLS FAN DETAIL

NOT TO SCALE



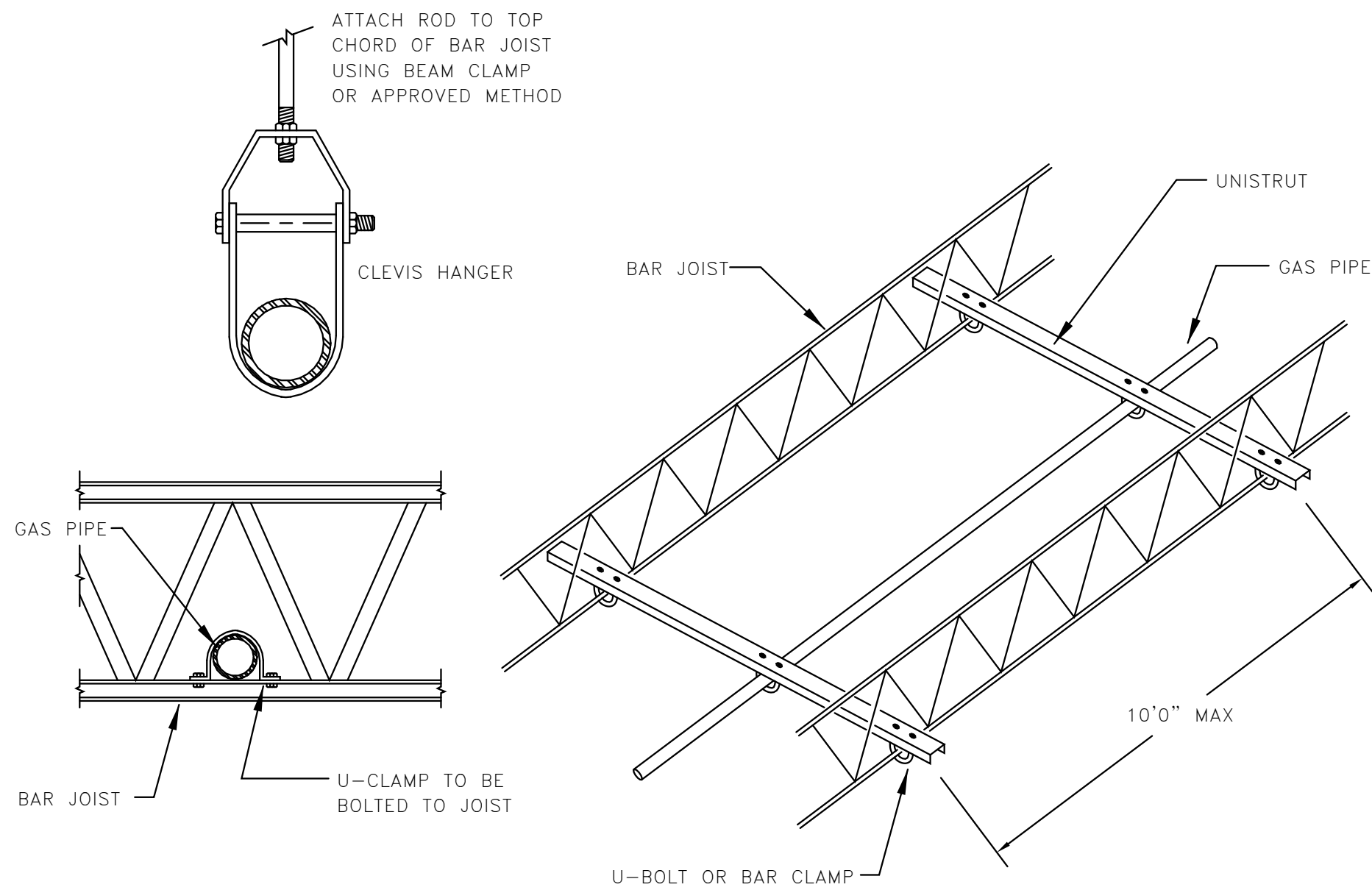
ROOF MOUNTED CENTRIFUGAL EXHAUST FAN

NOT TO SCALE



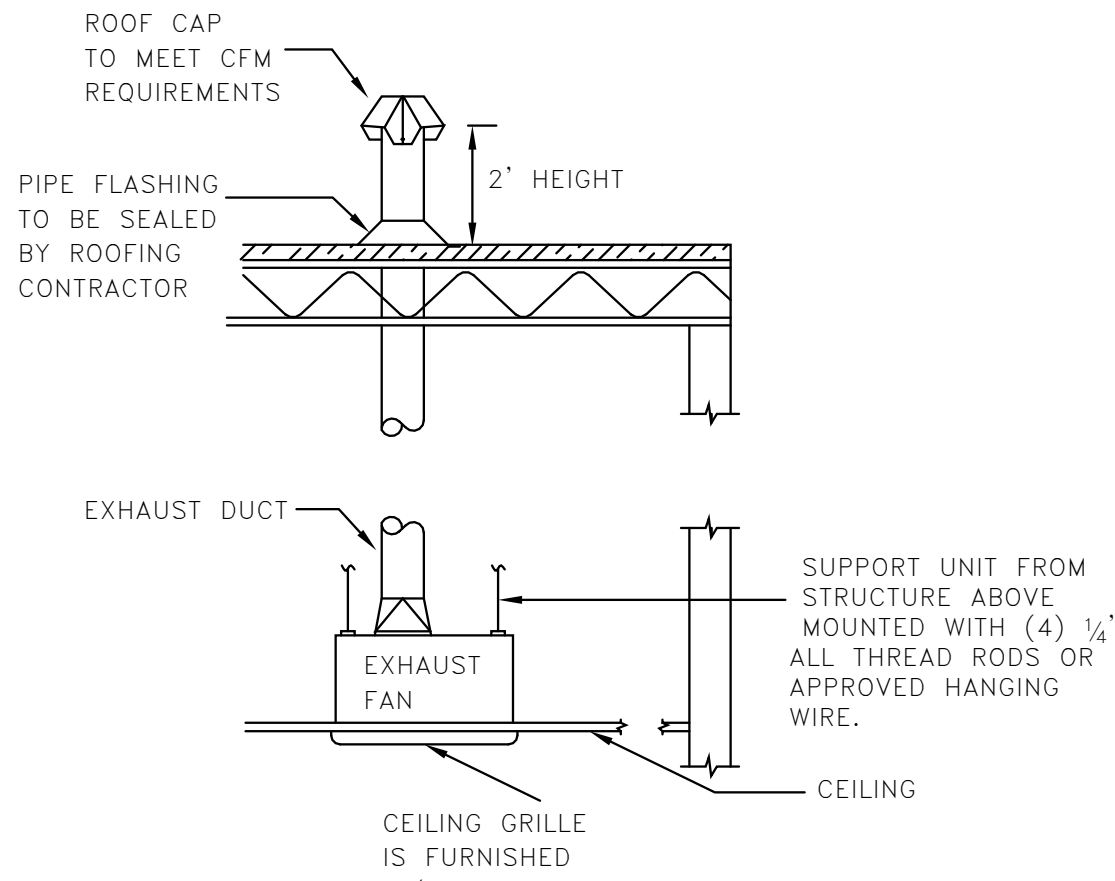
INTERIOR GAS PIPE RISER DETAIL

NOT TO SCALE



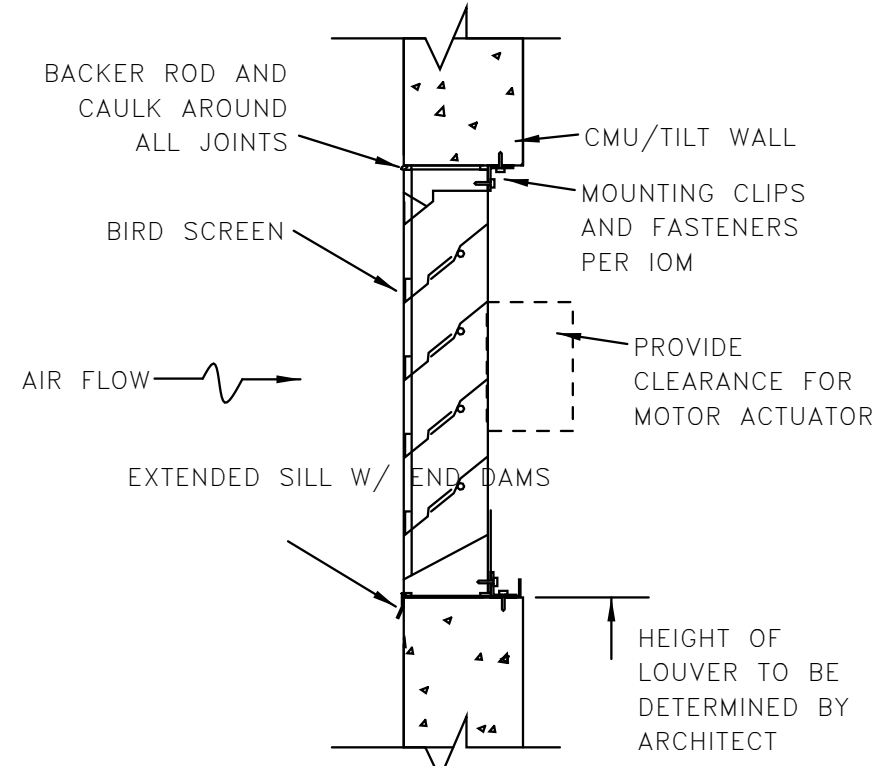
GAS PIPE SUPPORT AT JOISTS

NOT TO SCALE



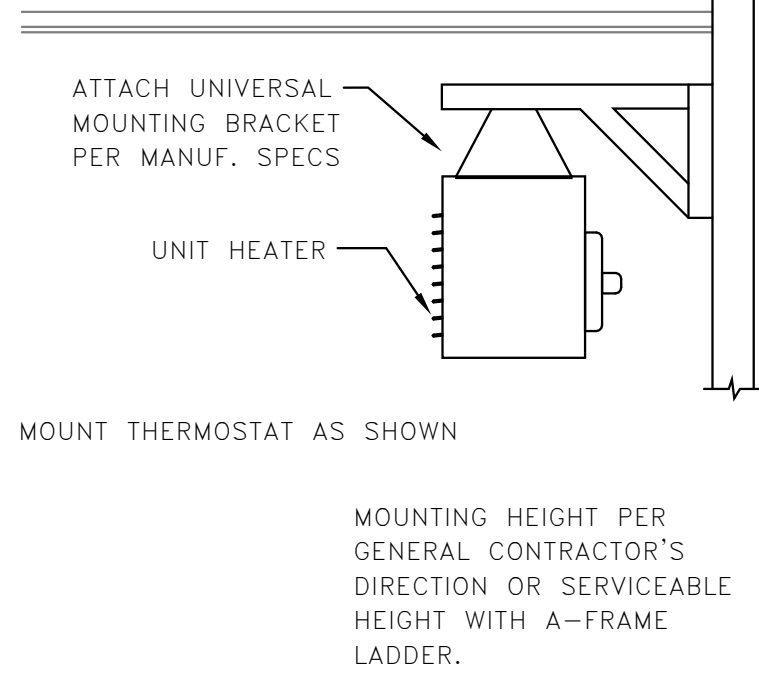
CEILING EXHAUST FAN DETAIL

NOT TO SCALE



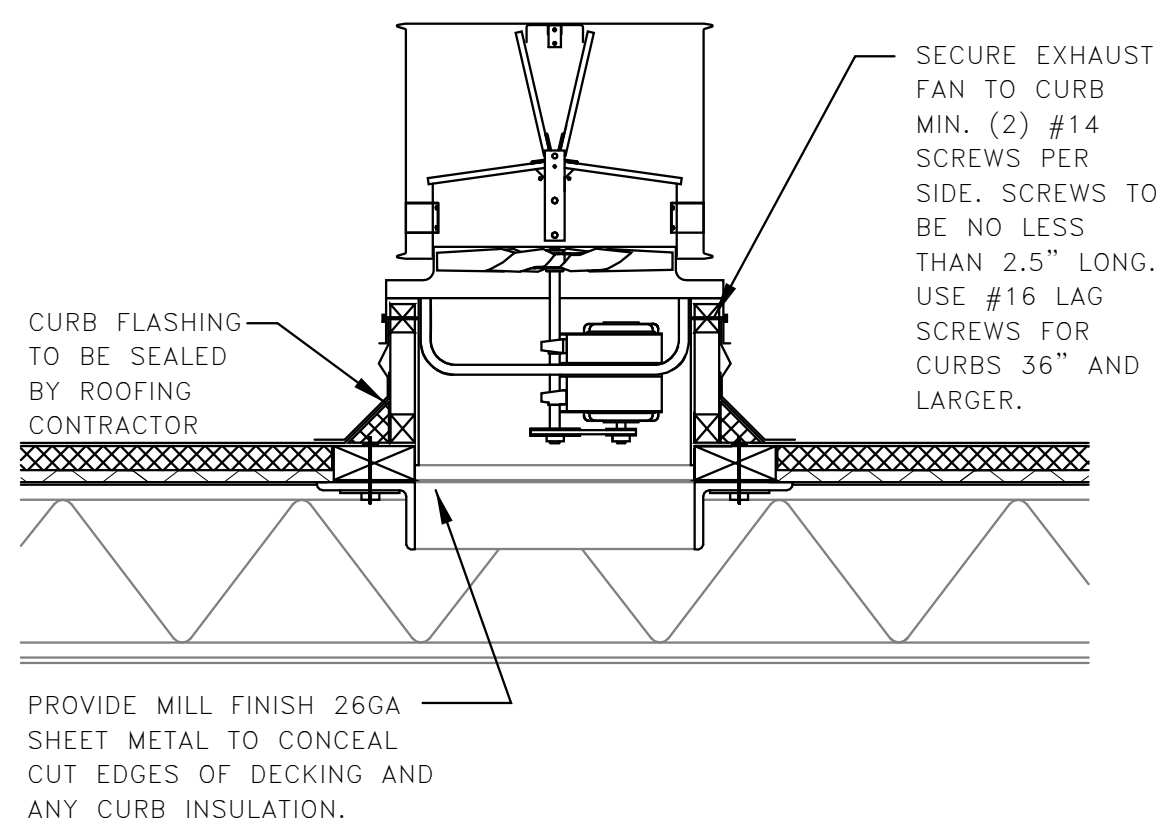
WALL LOUVER DETAIL

NOT TO SCALE



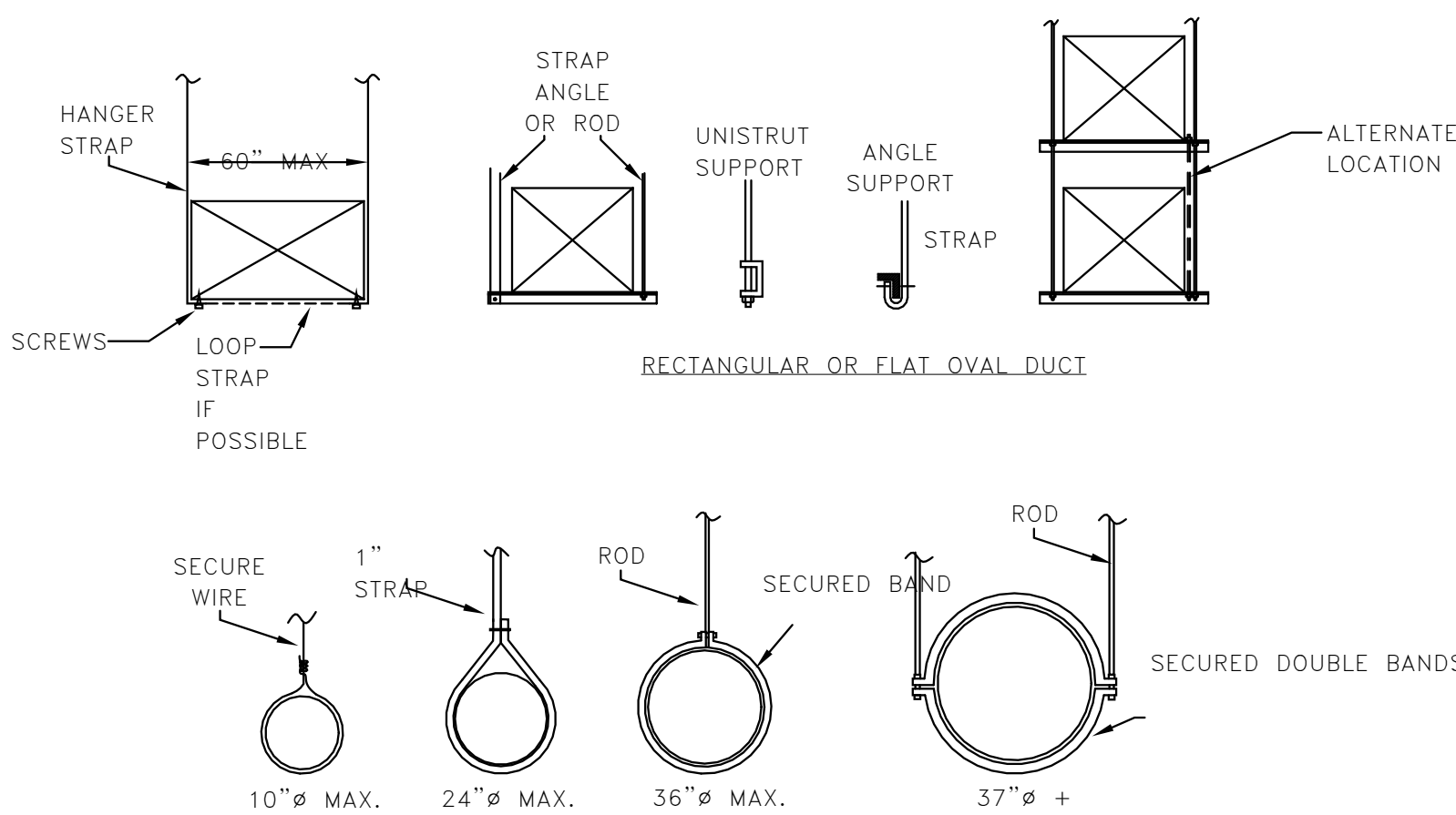
ELECTRIC UNIT HEATER DETAIL

NOT TO SCALE



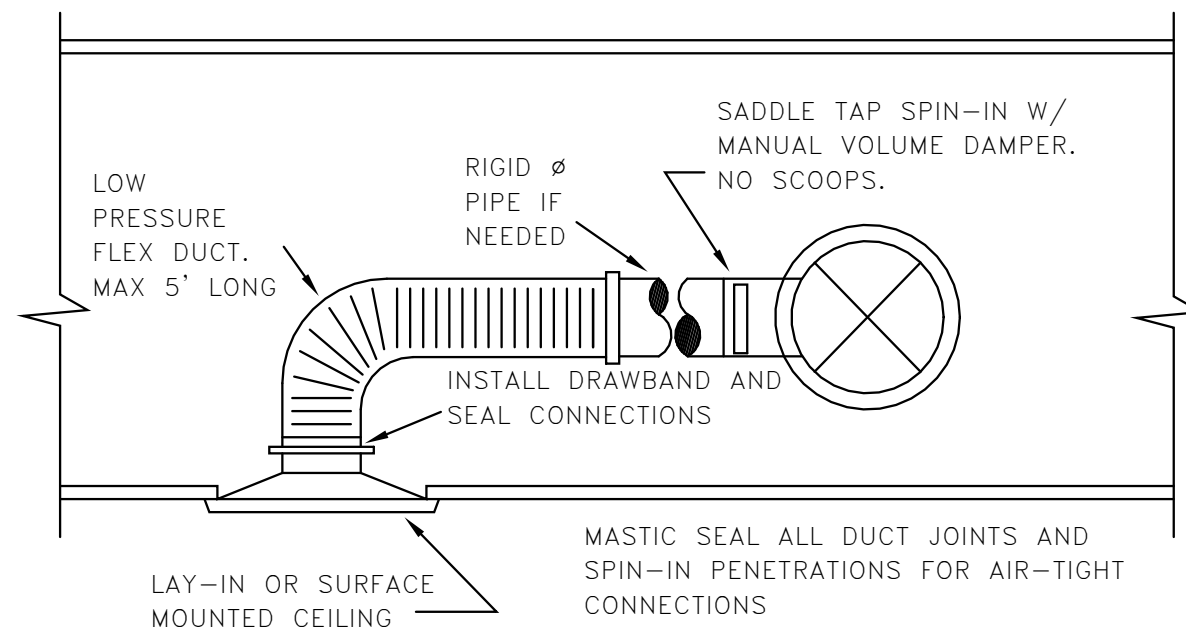
ROOF MOUNTED UPBLAST EXHAUST FAN

NOT TO SCALE



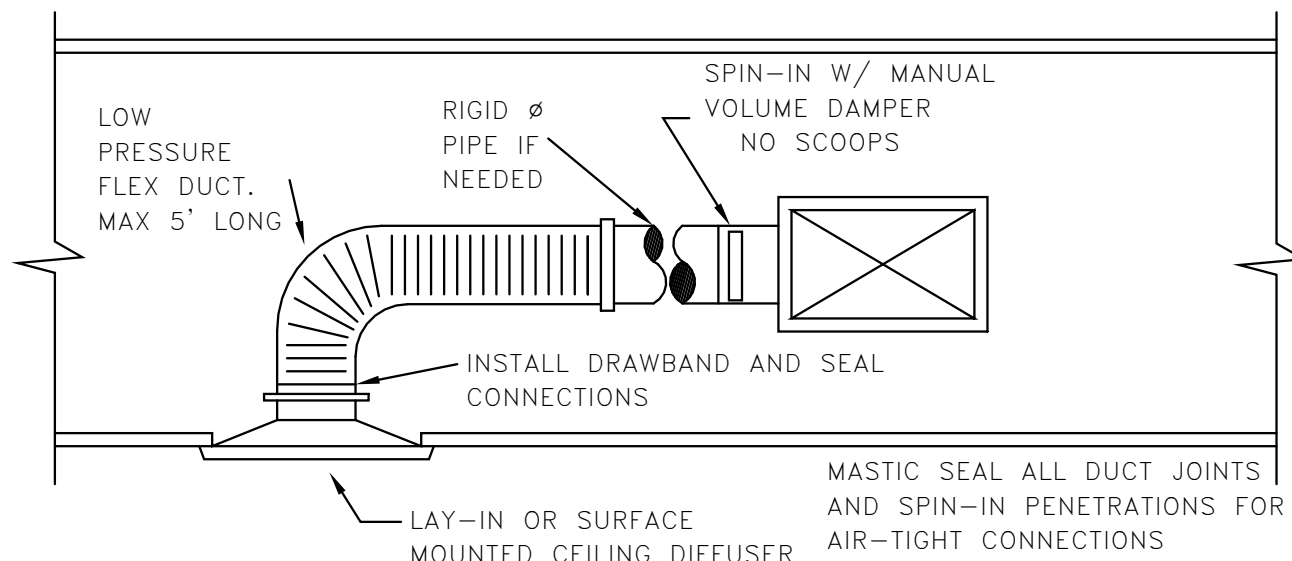
DUCTWORK SUPPORT DETAIL

NOT TO SCALE



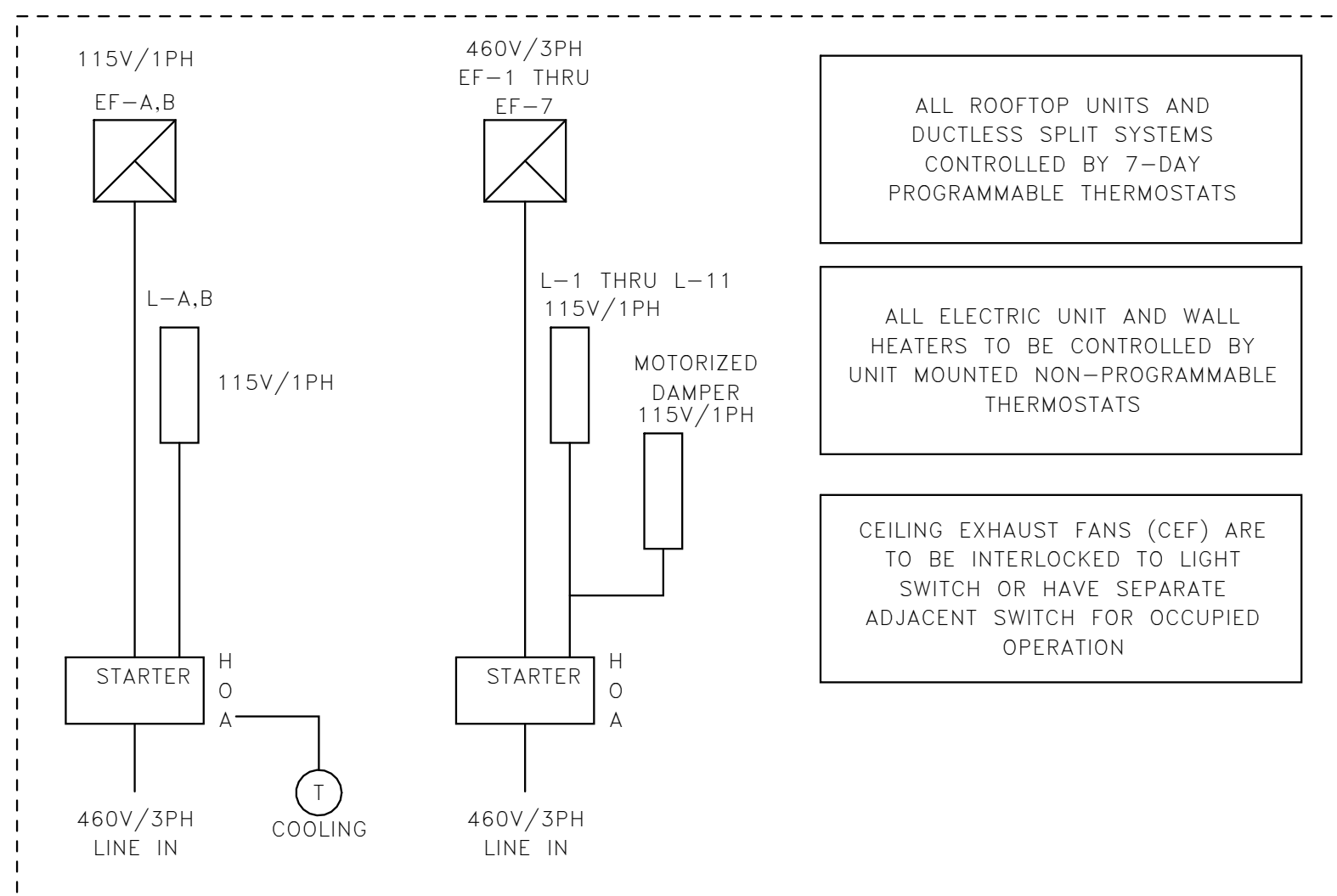
TYPICAL SIDE FLEX-DUCT CONNECTION

NOT TO SCALE



TYPICAL SIDE FLEX-DUCT CONNECTION

NOT TO SCALE



EQUIPMENT CONTROL DIAGRAMS

SHOWN FOR DIAGRAMMATIC PURPOSES ONLY

ROOF TOP UNIT SCHEDULE															
MARK	MAKE	MODEL	COOLING CAP. TONS	CLG. STAGES	INPUT/OUTPUT GAS HEATING CAP. (MBH)	ESP (in.WC)	CFM	SEER/EER	VOLT/PH	MCA	MOCP	O.A. REQ	SMOKE DETECTOR	WEIGHT LBS	NOTES
RTU-1	CARRIER	48FEDM12	10	2	1st STAGE 120/96 2nd STAGE 150/120	1.0"	4000	-/11.0	460/3	24	30	450	YES	878	1,2,3
RTU-2	CARRIER	48FEDM07	6	2	1st STAGE 120/96 2nd STAGE 150/120	1.0"	2400	-/15.0	460/3	18	25	250	YES	757	1,2
NOTES: 1. PROVIDE INSULATED 14" ROOF CURB, 2" FILTER RACK, DIRECT DRIVE ECM MOTOR, UNITS TO BE CONTROLLED BY 7-DAY PROGRAMMABLE TSTAT 2. PROVIDE ENTHALPHY ECONOMIZER WITH BAROMETRIC RELIEF. 3. PROVIDE CO2 DETECTOR AND CONTROL SYSTEM.															

EXHAUST FAN SCHEDULE													
MARK	MAKE	MODEL	CFM	EXT. SP	FAN RPM	TYPE	LOCATION	DRIVE	MAX BHP	MOTOR HP	VOLT/PH	WEIGHT (lbs)	NOTES
EF-A,B	GREENHECK	G-090-VG	800	0.125"	1,326	CENTRIFUGAL	FIRE/ELEC	ECM DIRECT	0.07	1/6 HP	115/1	79	1
EF-1 THRU EF-4	GREENHECK	RBU-3L60	50,000	0.125"	427	UPBLAST	STORAGE AREA	BELT	7.4	7-1/2 HP	460/3	857	2
EF-5 THRU EF-7	GREENHECK	RBU-3L60	50,000	0.125"	427	UPBLAST	CRANE AREA	BELT	7.4	7-1/2 HP	460/3	857	2
NOTES: 1. PROVIDE 14" ROOF CURB, DISCONNECT SWITCH, MOTORIZED BACKDRAFT DAMPER, HOA STARTER, LINE VOLTAGE COOLING THERMOSTAT 2. PROVIDE 14" ROOF CURB, DISCONNECT SWITCH, HOA STARTER, REFER TO FAN/LOUVER INTERLOCKING SCHEDULE FOR INTERLOCKING DETAILS.													

HVLS FAN SCHEDULE										
MARK	MAKE	MODEL	NUMBER OF AIR FOILS	DIAMETER	MAX SPEED (RPM)	LOCATION	POWER	VOLT/PH	WEIGHT(lbs)	NOTES
HVLS-1 THRU 4	MACROAIR	AIRVOLUTION D 780	6	24'	64	CRANE AREA	2.1 HP	460/3	239	1
NOTES: 1. VFD CONTROLLER MOUNTED ON CLOSEST COLUMN OR AS DESIRED BY OWNER . CONTACTS IN VFD CONTROLLER OR FAN TO PROVIDE FIRE ALARM SYSTEM SHUTDOWN										

CEILING EXHAUST FAN SCHEDULE												
MARK	MAKE	MODEL	CFM	POWER	ESP ("W.C)	SONES	TYPE	LOCATION	VOLT/PH	WEIGHT (lbs)	QTY.	NOTES
CEF-A	GREENHECK	SP-B110	75	80W	0.5"	2.0	CEILING	RESTROOMS/JANITORS	115/1	10	6	1
CEF-B	GREENHECK	SP-A390	225	1.42 FLA	0.5"	5.5	CEILING	IT	115/1	10	1	2
CEF-C	GREENHECK	SP-A390	225	1.42 FLA	0.5"	5.5	CEILING	RESTROOMS	115/1	24	2	1
CEF-D	GREENHECK	SP-A390	225	1.42 FLA	0.5"	5.5	CEILING	RESTROOMS	115/1	24	2	1
NOTES: 1. FAN TO BE INTERLOCKED TO LIGHT SWITCH OR ON SEPARATE SWITCH ADJACENT TO LIGHT SWITCH FOR OPERATION DURING OCCUPIED HOURS. 2. FAN TO BE INTERLOCKED TO THERMOSTAT, TEMPERATURE SET AT 85°F												

MAKE UP AIR UNIT SCHEDULE										
MARK	MAKE	MODEL	GAS INPUT (MBH)	GAS OUTPUT (MBH)	CFM	LAT °F	POWER	VOLT/PH	WEIGHT (lbs)	NOTES
MUA-1,2	GREENHECK	DGX-P122-H22-MF	880.4	810	6,000	140	3 HP	460/3	1,164	1,2
NOTES: 1. DIRECT FIRED UNIT TO BE CONTROLLED BY INDUSTRIAL ROOM CONTROLLER FOR ROOM TEMPERATURE. CONTROLLER TO BE ON ADJACENT COLUMN OR AS DESIRED BY OWNER. 2. UNIT TO INCLUDE ALL ROOF MOUNTING CURBS AND HARDWARE AND DISCONNECT SWITCH, 4-WAY DRUM LOUVER DIFFUSER.										

ELECTRIC UNIT HEATER SCHEDULE										
MARK	MAKE	MODEL	HEAT	VOLT/PH	MCA	MOCP	WEIGHT (lbs)	MOUNT	LOCATION	NOTES
EUH-A,B	TPI	UH SERIES	5 kW	460/3	6	15	44	HANGING	VARIES	1
NOTES: 1. 24V. CONTROL VOLTAGE. THERMOSTAT AS SHOW ON DETAILS										

ADJUSTABLE LOUVER SCHEDULE										
MARK	MAKE	MODEL	SIZE W"xH"	FREE AREA (FT²)	MOTOR OPERATED	VOLT/PH	MCA	LOCATION	NOTES	
L-1 THRU L-4	GREENHECK	EAD-635	72X72	20.9	YES	115/1	1	STORAGE AREA	1,2,3	
L-5 THRU L-14	GREENHECK	EAD-635	72X72	20.9	YES	115/1	1	CRANE AREA	1,2,3	
L-A,B	GREENHECK	EAD-635	24X24	1.9	YES	115/1	1	ELEC/PUMP RM	1,2,3	
NOTES: 1. SEE INTERLOCKING SCHEDULES AND DETAILS 2. INCLUDE BIRD SCREEN 3. FINISH: MILL										

ELECTRIC WALL HEATER SCHEDULE										
MARK	MAKE	MODEL	HEAT	VOLT/PH	FLA	MOCP	MOUNT	LOCATION	NOTES	
EWH-A	TPI	3320 SERIES	750 W	115/1	6.25	15	SURFACE	RESTROOMS/JAN	1	
EWH-B	TPI	3320 SERIES	2 kW	208/1	9.6	15	SURFACE	RESTROOMS	1	
NOTES: 1. INTEGRAL THERMOSTAT										

TYPICAL AIR DISTRIBUTION SCHEDULE				
SYMBOL	TYPE	MAKE	MODEL	ACCESSORIES
☒	24X24 SUPPLY LAY-IN	TITUS	TMS	1
☒	24X24, 24X12 EGG CRATE RETURN	TITUS	50F	5
☒	24X24 SUPPLY SURFACE MOUNT	TITUS	TMS	1,2
☒	24X24 RETURN SURFACE MOUNT	TITUS	50F	2
DG-A	DOOR GRILLE 16"x16"	TITUS	T-700L	6
ACCESSORIES: 1. INSULATED BACK 2. SHEETROCK FRAME 3. OPPOSABLE BLADE DAMPER 4. LAY-IN CEILING ADAPTER 5. INSULATED BOX, ROUND DUCT TRANSITION 6. SURFACE MOUNTED				

HVAC LEGEND	
SYMBOL	DESCRIPTION
AP	ACCESS PANEL
BDD	BACK DRAFT DAMPER
CD	CONDENSATE DRAIN
CO2	CARBON DIOXIDE SENSOR
DG	DOOR GRILLE
FD	FIRE DAMPER
G	GAS LINE
H	HUMIDISTAT OR HYDROGEN SENSOR
MOD	MOTOR OPERATED DAMPER
OA	OUTDOOR AIR
RA	RETURN AIR
RAG	RETURN AIR GRILLE
SA	SUPPLY AIR
SAG	SUPPLY AIR GRILLE
SD	SOME DETECTOR
T	THERMOSTAT
UC	UNDER CUT DOOR
VTR	VENT THROUGH ROOF
DASH LINE IN DUCT	
RTU-#	INTERNALLY LINED DUCT
RTU-#	
EQUIPMENT TAG	

EQUIPMENT NOTES	
NOTE: ALL APPROVED EQUALS MUST MEET BASIC MATERIALS AND COMPONENTS OF THE BASIS OF DESIGN MODEL IN THE SCHEDULES.	
1. EXHAUST FAN APPROVED EQUALS: GREENHECK, PENNBARRY, COOK, SOLAR AND PALAU 2. ROOFTOP UNIT APPROVED EQUALS: CARRIER, TRANE, LENNOX, DAIKIN 3. MINI SPLIT-SYSTEM UNIT APPROVED EQUALS: MITSUBISHI, LG, DAIKIN, SANYO, TRANE, CARRIER 4. OUTDOOR AIR UNIT APPROVED EQUALS: AAON RN, GREENHECK RV, DAIKIN REBEL 5. CEILING EXHAUST FAN APPROVED EQUALS: GREENHECK, BROAN, PENNBARRY 6. ELECTRIC WALL HEATER APPROVED EQUALS: TPI, MARKEL, RAYWALL 7. ELEC. UNIT HEATER APPROVED EQUALS: TPI, MODINE, REZNOR 8. HVLS FAN APPROVED EQUALS: MACRO AIR, BIG ASS FAN, RITE HITE 9. LOUVER APPROVED EQUALS: GREENHECK, NAILOR, RUSKIN, ARROW 10. AIR DISTRIBUTION APPROVED EQUALS: TITUS, NAILOR, KREUEGER, METAL-AIRE 11.THERMOSTAT TO BE EQUAL TO HONEYWELL 8000 SERIES WITH REMOTE SENSOR CAPABILITIES	

MECHANICAL PIPING NOTES	
GENERAL PIPING NOTES: 1. ALL PIPING SHOULD BE SUPPORTED FROM STRUCTURAL MEMBERS. DO NOT REST PIPING ON CEILING TILES OR SUSPENDED GRID. PIPING HUNG FROM ROOF JOISTS SHALL BE SECURED AT THE TOP CHORD OF THE JOIST UNLESS APPROVED OTHERWISE. PIPING SHOULD BE SUPPORTED IN INTERVALS AS LISTED IN THE MECHANICAL CODE TABLE IMC 305.4 AND AT EVERY CHANGE IN DIRECTION. PIPING SHALL BE NEAT AND STRAIGHT. 2. ALL PIPING SHALL BE CONNECTED TO EQUIPMENT PER MANUFACTURER'S INSTRUCTIONS. 3. DIELECTRIC UNIONS SHOULD BE USED TO CONNECT ALL DISSIMILAR METALS. 4. ALL VALVES TO BE 1/4 TURN BALL VALVES UNLESS OTHERWISE NOTED. 5. ROOF PENETRATIONS: 5.1. COPPER PIPE, REFRIGERANT PIPE OR ANY PIPE WITH INSULATION: PIPE FOR ALL ROOF PIPING PENETRATIONS SHOULD GO THROUGH A CURB WITH SHEET METAL HOOD. PIPE CURB SHOULD BE AT LEAST 8" HIGH ABOVE THE ROOF DECK. PIPE HOOD ASSEMBLY SHOULD BE EQUAL TO PATE CURBS PHA SERIES. SEAL ALL OPENINGS WATER TIGHT. 5.2. PIPE PENETRATIONS WITHOUT INSULATION: PIPING PENETRATIONS THROUGH ROOF SHOULD BE THROUGH PIPING BOOT EQUAL TO JOHN MANSVILLE EPDM PIPE BOOT. SEAL ALL OPENINGS WATER TIGHT. IDENTIFICATION 6. PROVIDE PLASTIC AND PERMANENT NAMEPLATES WITH THE UNIT NUMBER ON ALL MECHANICAL EQUIPMENT. PROVIDE PIPE IDENTIFICATION LABELS INCLUDING DIRECTION OF FLOW ARROW AND ALL LABELS SHALL HAVE BACKGROUND COLORS MATCHED WITH SPECIFIC SERVICE DESIGNATION. LABELS SHOULD BE PROVIDED BOTH INSIDE AND OUTSIDE OF BUILDING TO SHOW APPROPRIATE SERVICE TYPE AND FLOW DIRECTION. PROVIDE LABELS EVERY 50' AND CHANGE IN DIRECTION. LABELS WITHIN MECHANICAL ROOM SHALL CLEARLY IDENTIFY PIPE AND FLOW DIRECTION. PIPING SYSTEMS 7. ALL STAINLESS STEEL PIPING TO BE WELDED. 8. ALL SCH. 40 STEEL PIPING: 2.5" NOMINAL SIZE AND SMALLER MAY BE THREADED. PIPING 3" AND LARGER MUST BE FLANGED OR WELDED. ALL STEEL PIPING EXPOSED TO THE OUTDOORS SHALL BE PAINTED WITH NO LESS THAN 2 COATS OF RUST-O-LEUM TYPE PAINT. PIPE TESTING 9. PVC PIPE (NON-DRAIN): 100 PSIG HYDROSTATIC TEST. HOLD HYDROSTATIC TESTS FOR A MINIMUM OF EIGHT HOURS WITHOUT LOSS OF PRESSURE. HOLD AIR TESTS FOR A MINIMUM OF ONE HOUR WITHOUT SIGNIFICANT LOSS OF PRESSURE. WITH APPROVAL OF ARCHTTECT, AIR TESTING MAY BE SUBSTITUTED FOR HYDROSTATIC TESTING IN FREEZING WEATHER OR AS REQUESTED. 10. REFRIGERATION/GAS COPPER PIPE: 450 PSIG NITROGEN TEST. HOLD NITROGEN TESTS FOR A MINIMUM OF ONE HOUR WITHOUT LOSS OF PRESSURE. 11. RETESTING: RETEST PIPING FAILING INITIAL TESTS FOLLOWING CORRECTION OF DEFECTIVE WORK. REQUIREMENTS OF INITIAL TESTS SHALL APPLY. OUTDOOR PIPING SUPPORT 12. ROOF SUPPORT: PIPING SUPPORTS ON ROOF WITH GAS PIPE STANDS EQUAL TO COOPER B-LINE RUBBER BASE ROOFTOP SUPPORT. SUPPORT IN INTERVALS AS LISTED IN THE MECHANICAL CODE TABLE IMC 305.4 AND AT EVERY CHANGE IN DIRECTION. SECURE PIPE WITH PIPE CLAMPS. PRESSURE TREATED WOOD IS NOT ACCEPTABLE SUPPORT. INDOOR PIPING SUPPORT 13. PIPE RUN UNDER ROOF SHALL PENETRATE ROOF WITHIN 5' OF ROOFTOP UNITS. SUPPORT GAS PIPE ON JOISTS WITH U-CLAMP, TRAPPEZ OR CLEVIS HANGERS AS SHOWN ON DETAILS. SUPPORT IN INTERVALS AS LISTED IN THE MECHANICAL CODE TABLE IMC 305.4 AND AT EVERY CHANGE IN DIRECTION. 14. WALL ANCHORS: 14.1. ANCHORS IN CONCRETE OR MASONRY WALLS TO BE 3/4" SS ADHESIVE ANCHOR WITH NUT & LOCK WASHER. EXTERIOR ANCHORS ON METAL BUILDING WALLS SHALL BE STAINLESS STEEL AND MUST BE ATTACHED TO INTERIOR RIGID FRAMING (PURLINS OR WALL GIRTS). INTERIOR ANCHORS MAY BE GALVANIZED, APPROVED EQUALS ACCEPTED. NATURAL OR LP GAS PIPING NOTES 15. DESIGN PRESSURE: GAS PIPING SYSTEM IS DESIGNED FOR 5 PSIG. 16. REGULATORS: PROVIDE A GAS REGULATOR AT EACH PIECE OF GAS EQUIPMENT TO REDUCE GAS PRESSURE TO MANUFACTURER'S REQUIREMENTS. GAS PIPING HAS BEEN SIZED PER 2021 VFGC 402.4. REGULATORS ARE TO INCLUDE OVERPROTECTION DEVICE BUILT INTO OR ADJACENT TO THE REGULATOR AND MEET ALL APPLICABLE VFGC CODES WITHIN SECTION 416. ALL REGULATORS ON THIS PROJECT ARE TO BE INSTALLED OUTDOORS AND EQUAL TO MAXITROL 325L. 17. GAS PIPING AND FITTINGS: GAS PIPING TO BE SCH. 40 BLACK CARBON STEEL. FITTINGS MAY BE BUTT WELDED OR STANDARD WEIGHT MALLEABLE IRON SCREWED THAT ARE SCHEDULE 40 PIPE, MEETING REQUIREMENTS OF ASTM A234. 18. WELDING: GAS PIPING 3"Ø AND LARGER AND ANY CONCEALED PIPING SHALL BE BUTT WELDED. CONCEALED PIPING IS CONSIDERED PIPING IN A CHASE, SHAFT, SOFFIT OR RETURN AIR PLENUM. 19. TESTING: GAS PIPING SYSTEM SHALL BE TESTED AS FOLLOWS: TESTS SHOULD INCLUDE COMPRESSED AIR, CARBON DIOXIDE OR NITROGEN GAS. PRESSURE TESTS SHALL BE CONDUCTED ON THE DOWNSTREAM SIDE OF THE METER AFTER THE PIPING IS FULLY INSTALLED WITH TEST PORTS. THE PIPING SHALL BE PRESSURIZED TO A MINIMUM PRESSURE OF 20 PSIG AND HELD FOR A PERIOD OF NOT LESS THAN ONE(1) HOUR WITH THE COMPRESSOR DISCONNECTED. TEST EACH JOINT WITH A SOAPY WATER SOLUTION FOR LEAKS DURING PRESSURE TEST. IF ANY JOINT FAILS THE LEAK TEST THE JOINT SHALL BE CORRECTED, AND COMPLETE NEW TEST SHOULD BE MADE. 20. DRIP LEGS: PROVIDE DRIP LEGS WITH SCREW FIT BOTTOMS AT A MINIMUM 3" ABOVE FINISHED GRADE OR ROOF. INSTALL 8" LONG MINIMUM DRIP LEG WITH PIPE CAP, ON VERTICAL GAS DROP SERVING EACH GAS-FIRED EQUIPMENT UNIT. USE FITTING FOR ANY CHANGES OF DIRECTION IN PIPE AND FOR BRANCH RUNOUTS. 21. VALVES: ALL VALVES TO BE 1/4-TURN BALL VALVES. PROVIDE CUT-OFF VALVES IN GAS PIPING AT EACH GAS CONSUMING APPLIANCE OR EQUIPMENT AND AT EACH PRESSURE REGULATOR VALVE. INSTALL GAS VALVES ADJACENT TO EQUIPMENT CABINET AND EASILY ACCESSIBLE. 22. FITTINGS: UNIONS ARE NOT PERMITTED IN HIGH PRESSURE GAS PIPING EXCEPT AT THE FOLLOWING LOCATIONS: DOWNSTREAM OF APPLIANCE SHUT-OFF VALVES, METER LOCATIONS AND IMMEDIATELY DOWNSTREAM OF THE BUILDING SHUT-OFF VALVE. 23. LABELS: LABEL ALL GAS PIPE AT NO MORE THAN 50' INTERVALS WITH BLACK AND YELLOW LABELS STATING "NATURAL GAS" ALONG WITH THE PRESSURE, EXAMPLE: "NATURAL GAS 5 PSIG" 24. ROOF SUPPORT: GAS PIPING SUPPORTS ON ROOF WITH GAS PIPE STANDS EQUAL TO COOPER B-LINE RUBBER BASE ROOFTOP SUPPORT. SPACE ON 10 FOOT CENTERS OR AT CHANGE IN DIRECTION. SECURE PIPE WITH PIPE CLAMPS. PRESSURE TREATED WOOD IS NOT ACCEPTABLE SUPPORT. 25. PAINTING: ALL GAS PIPE OUTSIDE SHALL BE PAINTED WITH NO LESS THAN 2-COATS OF RUST-O-LEUM TYPE PAINT; COLOR AS APPROVED BY OWNER. 26. GAS PIPE RUN UNDER ROOF SHALL PENETRATE ROOF WITHIN 5' OF ROOFTOP UNITS. SUPPORT GAS PIPE ON JOISTS WITH U-CLAMP, TRAPPEZ OR CLEVIS HANGERS AS SHOWN ON DETAILS. PIPE SUPPORT ON 10 FOOT CENTERS AND EVERY CHANGE IN DIRECTION.	

DESIGN CONDITIONS	
1. DESIGN BASED ON OUTSIDE AMBIENT ASHRAE CONDITIONS FOR DALEVILLE, VA: 92.1°F DRY BULB, 72.6°F WET BULB – SUMMER (ASHRAE 0.4%) 15.5°F DRY BULB – WINTER (ASHRAE 99.6%) 2. INDOOR CONDITIONS ARE DESIGNED FOR: OFFICE – SUMMER (COOLING) – 72°F DRY BULB / 50% RELATIVE HUMIDITY OFFICE – WINTER (HEATING) – 70°F DRY BULB WAREHOUSE – SUMMER – AMBIENT TEMPERATURE VENTILATION WAREHOUSE – WINTER (HEATING) – 40°F DRY BULB 3. CALCULATIONS BASED ON CRITERIA FOUND IN ASHRAE HANDBOOK OF FUNDAMENTALS FOR NONRESIDENTIAL HEATING AND COOLING LOAD APPLICATIONS 4. SYSTEM DESIGN IS BASED ON BUILDING AS SHOWN IN THESE CONSTRUCTION DOCUMENTS. HVAC DESIGN DOES NOT INCLUDE EXTRA CAPACITY FOR FUTURE EXPANSION. ALL VENTILATION CODE REQUIREMENTS ARE TO BE MET UPON OCCUPANCY HVAC DESIGN. 5. HVAC DESIGN AND EQUIPMENT SELECTION IS BASED ON THE 2021 VIRGINIA ENERGY CODE, 2021 VIRGINIA MECHANICAL CODE AND 2021 VIRGINIA FUEL GAS CODE.	

THERMOSTATS	
PROVIDE THERMOSTATS MOUNTED AS SHOWN OR AS DIRECTED BY ARCHITECT OR GC. MOUNT THERMOSTATS 48" AFF. THERMOSTATS TO BE EQUAL TO HONEYWELL COMMERCIAL VISIONPRO 8000 PROGRAMMABLE THERMOSTAT WITH WI-FI CAPABILITIES. PROVIDE INSTRUCTION FOR SCHEDULING THERMOSTATS TO OWNER. TEMPERATURES ARE TO BE SET FOR 68°F HEAT AND 72°F COOLING WITH CONTINUOUS FAN.	

OUTDOOR AIR VENTILATION RATE CALCULATIONS								
USING VMC 2021 403.3								
FORMULA: $V_{bz}=R_p P_z+R_{oA} A_z$			UNIT	R_p (cfm/per)	P_z	R_o (cfm/sq.ft)	A_z (sq.ft.)	V_{bz} (CFM)
Vbz – Breathing Zone (Req'd air) in CFM			CRANE AREA	–	–	0.06	138,751	8,325
Rp – Outdoor Airflow Rate Per Person			STORAGE AREA	–	–	0.06	55,770	3,346
Pz – Zone Population			RTU-1	5	54	0.06	2,580	425
Ro – Outdoor Airflow Rate Per Unit Area			RTU-2	5	26	0.06	1,787	238
Az – Zone Floor Area (sq.ft.)								

HVAC SPECIFICATIONS AND NOTES

CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL PROVIDE A COMPLETE HVAC SYSTEM AS SHOWN SCHEMATICALLY TO INCLUDE ALL LABOR, MATERIALS, TOOLS AND EQUIPMENT FOR A COMPLETE AND FUNCTIONAL SYSTEM INCLUDING ALL NECESSARY COMPONENTS CUSTOMARILY INCLUDED IF NOT SPECIFICALLY CALLED OUT.
2. ALL WORK SHALL BE PERFORMED IN COMPLIANCE WITH ALL LOCAL, STATE AND FEDERAL CODES, LAWS AND ORDINANCES. PROVIDE ACCESS TO OWNER'S AUTHORIZED PERSONS AND THE POLICE, FIRE OR OTHER DEPARTMENTS HAVING LEGAL JURISDICTION TO THE SITE AT ALL TIMES AND PROVIDE COOPERATION IN THEIR WORK.
3. THE CONTRACTOR SHALL VERIFY ALL ELECTRICAL CHARACTERISTICS WITH ELECTRICAL DRAWINGS BEFORE PURCHASING EQUIPMENT. PRESENT ANY CONFLICTS TO THE GENERAL CONTRACTOR AND ENGINEER BEFORE PURCHASING EQUIPMENT.
4. INSTALL ALL EQUIPMENT AND MATERIALS PER MANUFACTURER'S RECOMMENDATIONS.
5. ASSUME FULL RESPONSIBILITY FOR PROTECTION AND SAFEKEEPING OF PRODUCTS AND EQUIPMENT STORED.
6. THE CONTRACTOR SHALL ACCEPT THE PROJECT SITE IN "AS IS" CONDITION. CONTRACTOR SHALL INCLUDE COSTS OF ALL REQUIRED MODIFICATIONS IN ACCORDANCE WITH APPLICABLE PLANS AND SPECIFICATION SECTIONS.
7. THE DIMENSIONS AND COUNTS PROVIDED ON THE DRAWINGS AND IN THE SPECIFICATIONS ARE FIELD MEASURED AND/OR TAKEN FROM EXISTING DRAWINGS AND MAY NOT BE EXACTLY AS SHOWN OR INDICATED. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO INSPECT THE SITE, TAKE NECESSARY MEASUREMENTS AND COUNTS PRIOR TO PROCEEDING WITH THE WORK.
8. THE CONTRACTOR SHALL VISIT THE JOB SITE AND THOROUGHLY FAMILIARIZE THEMSELVES WITH ALL DETAILS OF THE WORK AND THE EXISTING CONDITIONS AND SHALL VERIFY DIMENSIONS, CLEARANCES AND EXISTING CONDITIONS AND BE ASSURED THAT THE EQUIPMENT PURCHASED WILL FIT INTO THE AVAILABLE SPACE.
9. DISPOSE OF ALL WASTE MATERIALS IMMEDIATELY AND KEEP PREMISES CLEAN AT ALL TIMES.
10. ALL MATERIALS SHALL BE NEW, CLEAN, AND WITHOUT DEFECTS. ANY DEFECTIVE MATERIALS SHALL BE REMOVED FROM JOB SITE.
11. DO NOT LOAD STRUCTURES WITH WEIGHT THAT WILL ENDANGER STRUCTURE.
12. DO NOT UNREASONABLY ENCUMBER SURROUNDING PREMISES WITH MATERIALS OR EQUIPMENT.
13. CONFINE OPERATIONS AT THE SITE TO AREAS PERMITTED BY LAW ORDINANCES, PERMITS, CONTRACT DOCUMENTS AND THE OWNER.
14. THE CONTRACT OPERATIONS SHOULD NOT CAUSE ANY HINDRANCE, NUISANCE, LACK OF SAFETY, BLOCKED MEANS OF ENTRANCE AND EXIT, DAMAGE TO PROPERTY AND PERSON, DISRUPTION OF UTILITIES, EXCESSIVE AND OFFENSIVE NOISE AND DUST TO ANY OF THE ADJOINING PROPERTIES AND PERSONS. REMOVE SUCH CONDITION FORTHWITH, SHOULD THEY OCCUR AND REPAIR OR REPLACE THE DAMAGE AT OWN COST TO THE APPROVAL OF THE ENGINEER.

GENERAL HVAC NOTES

15. MAINTAIN A MINIMUM OF 10' CLEARANCE BETWEEN ANY OUTDOOR AIR INTAKES AND EXHAUST OUTLETS. EXHAUST OUTLETS SHOULD BE LOCATED A MIN. DISTANCE OF 3' FROM OPERABLE OPENINGS INTO THE BUILDING.
16. PROVIDE ACCESS PANELS IN NON-ACCESSIBLE CEILINGS AND IN WALL STRUCTURE TO ALLOW ADEQUATE ROOM FOR MAINTENANCE OF EQUIPMENT AND BALANCING OF SYSTEM. ACCESS DOORS IN CEILING/WALLS SHALL BE A MINIMUM OF 12X12, HINGED, AND FIRE RATED TO MATCH CEILING/WALL RATING. DUCT ACCESS DOORS SHALL BE DOUBLE WALL INSULATED IF INSTALLED ON SUPPLY DUCT, AND PROVIDED WITH THUMB LATCHES AND GASKET WITH AIR TIGHT FIT.
17. CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL EVAPORATOR AND CONDENSER COILS FROM DUST, DEBRIS AND USE THAT WOULD REQUIRE CLEANING PRIOR TO CO. USE OF THE SYSTEMS DURING THE CONSTRUCTION PROCESS OR BEFORE FINAL PAINTING WILL BE SUBJECT TO INSPECTION BY OWNER, ENGINEER AND GENERAL CONTRACTOR. IT IS THE MECHANICAL CONTRACTORS RESPONSIBILITY TO MAINTAIN THE CLEANLINESS OF THE HVAC SYSTEMS.
18. UNLESS NOTED OTHERWISE: STARTERS, DUCT, NON-ADDRESSABLE SMOKE DETECTORS, TRANSFORMERS, LOW-VOLTAGE CONTROLS LOW-VOLTAGE CONTROL WIRING FOR ALL MECHANICAL SYSTEMS SHALL BE FURNISHED AND INSTALLED BY MECHANICAL CONTRACTORS.
19. ALL REQUIRED HVAC CONTROL WIRING NOT SHOWN ON THE ELECTRICAL DRAWINGS SHALL BE INCLUDED AS PART OF MECHANICAL WORK.
20. ALL EXPOSED CONTROL WIRING RUNNING VERTICALLY TO CONTROL DEVICES SHOULD BE PROVIDED WITHIN CONDUIT.

DUCTWORK

21. ALL DUCT DIMENSIONS SHOWN ARE INSIDE CLEAR (UNLESS OTHERWISE NOTED).
22. THE CONTRACTOR SHALL REVIEW ARCHITECTURAL, STRUCTURAL, PLUMBING AND FIRE PROTECTION DRAWINGS BEFORE FABRICATING OR INSTALLING DUCTWORK OR EQUIPMENT TO AVOID ANY CONFLICTS. FIELD FABRICATE DUCTWORK TO JOB CONDITIONS.
23. ALL DUCTWORK SHALL BE FABRICATED OF GALVANIZED STEEL OF THICKNESS AND GAUGES TO CONFORM TO SMACNA DUCT CONSTRUCTION STANDARDS. OTHER DUCT MATERIAL TYPES WILL BE NOTED ON THE PLANS. FIBERGLASS DUCTBOARD IS PROHIBITED.
24. ALL JOINTS AND SEAMS IN ALL SHEETMETAL DUCT WORK SHALL BE SEALED WITH DUCT SEALER, UL LISTED 181A OR 181B FOR TAPES AND MASTICS. DO NOT USE DUCT TAPE.
25. ALL RECTANGULAR 90° ELBOWS SHALL BE PROVIDED WITH SINGLE WALL TURNING VANES.
26. SPIN-IN FITTINGS OR STICK ON FITTINGS WITH MANUAL LOCKABLE DAMPERS SHALL BE APPLIED TO ALL SUPPLY DUCTWORK. NO SCOPES ARE ALLOWED IN FITTINGS. PROVIDE AIR EXTRACTORS AS REQUIRED FOR AIR BALANCING FOR ALL TAKEOFFS.
27. LOW PRESSURE FLEX DUCT SHALL BE A MAXIMUM OF 5 FEET LONG AND SHALL BE SIZED AS FOLLOWS:

CFM	FLEXDUCT DIAMETER
000 – 100	6"
101 – 200	8"
201 – 300	10"
301 – 500	12"

INDOOR CONCEALED DUCT:

- 28.1.SUPPLY & RETURN DUCTWORK SHALL BE EXTERNALLY INSULATED WITH 2" THICK R-6 FIBERGLASS DUCT INSULATION WITH ALUMINUM FOIL BACKING. TAPE ALL SEAMS AND SECURE INSULATION TO DUCTWORK.

DUCT IN ATTICS/UNINSULATED AREAS:

- 29.1.SUPPLY & RETURN DUCTWORK SHALL BE EXTERNALLY INSULATED WITH 3" THICK R-8 FIBERGLASS DUCT INSULATION WITH ALUMINUM FOIL BACKING. TAPE ALL SEAMS AND SECURE INSULATION TO DUCTWORK.

EXHAUST DUCT

- 30.1.EXHAUST DUCT THROUGH A CONDITIONED SPACE DOES NOT NEED TO BE INSULATED. USE WYE FITTINGS WHERE POSSIBLE TO CONNECT EXHAUST RUNOUTS.

THERMOSTATS

31. INSTALL ALL ROOM THERMOSTATS/CONTROLLERS 48" AFF IN OFFICE AREAS, WAREHOUSE THERMOSTATS FOR HVAC EQUIPMENT MAY BE INSTALLED ON CLOSEST COLUMN OR WALL AT HEIGHT PREFERRED BY OWNER OR GC. THERMOSTATS CONTROLLING TEMPERATURES 53°F AND ABOVE SHALL BE 7-DAY PROGRAMMABLE TYPE. THERMOSTATS CONTROLLING HEATING FREEZE PROTECTION SYSTEMS (40°F) OR VENTILATION-ONLY MAY BE NON-PROGRAMMABLE TYPE.

DUCT SMOKE DETECTORS

32. REQUIRED FOR SYSTEMS RECIRCULATING GREATER THAN 2,000 CFM.
33. ADDRESSABLE DUCT-MOUNTED SMOKE DETECTORS SHALL BE PROVIDED BY THE FIRE ALARM CONTRACTOR. THE SMOKE DETECTOR SHALL BE MOUNTED IN THE DUCT BY THE MECHANICAL CONTRACTOR, AND WIRED BY THE FIRE ALARM CONTRACTOR. EACH SMOKE DETECTOR SHALL BE WIRED TO STOP THE FAN UPON DETECTION OF SMOKE, AND SIGNAL THE BUILDING FIRE ALARM CONTROL PANEL.
34. PROVIDE A REMOTE TEST SWITCH AT THE UNIT THERMOSTAT FOR UNITS WITH DUCT SMOKE DETECTORS WHEN A FIRE ALARM SYSTEM IS NOT PRESENT.

FILTERS

35. MECHANICAL CONTRACTOR TO PROVIDE (1) SET OF CLEAN NEW FILTERS FOR ALL HVAC SYSTEMS AT TIME OF OWNER TRAINING OR FILTERS TO BE MERV 8 UNLESS OTHERWISE NOTED.

FIRE STOPPING

36. ALL PIPE AND DUCT PENETRATIONS OF FIRE AND SMOKE RATED ASSEMBLIES SHALL BE FIRE-STOPPED AS REQUIRED TO MAINTAIN THE ORIGINAL INTEGRITY. FIRE BARRIER PRODUCTS SHALL BE MANUFACTURED BY 3M CO.GP 25 CAULK, CS195 COMPOSITE PANEL, FS 195 WRAP/STRIP, OR PSS 7900 SERIES SYSTEM AS RECOMMENDED BY MFG. FOR PARTICULAR APPLICATION, OR EQUIVALENT SYSTEM AS APPROVED BY LOCAL CODE OFFICIALS.
37. RECTANGULAR DAMPERS IN ALL DUCTS PASSING THROUGH FIRE RATED WALLS REFER TO ARCHITECTURAL DRAWINGS FOR ALL FIRE WALLS. INSTALL ALL REQUIRED FIRE / SMOKE DAMPERS IN RATED WALLS OR CEILINGS. DAMPERS SHALL MATCH THE RATING OF THE ASSEMBLY PENETRATED. ALL FIRE DAMPERS SHALL BE U.L. LABELED, TYPE-B (WITH BLADES OUT OF THE AIR STREAM) UNLESS OTHERWISE NOTED AND SHALL BE DYNAMIC RATED FOR ALL DUCTED APPLICATIONS.

IDENTIFICATION

38. PROVIDE PLASTIC AND PERMANENT NAMEPLATES WITH THE UNIT/TAG NUMBER ON ALL MECHANICAL EQUIPMENT. TAG SHOULD BE IN CONTRAST TO THE BACKGROUND AND SHOULD BE MECHANICALLY FASTENED TO THE EQUIPMENT, NOT VIA ADHESIVE ONLY.

AIR BALANCE

39. BALANCE ALL AIR SYSTEMS TO PRODUCE THE VOLUMES AND QUANTITIES SHOWN ON DRAWINGS OR SPECIFIED USING NEBB OR AABC CERTIFIED TEST AND BALANCE CONTRACTOR.