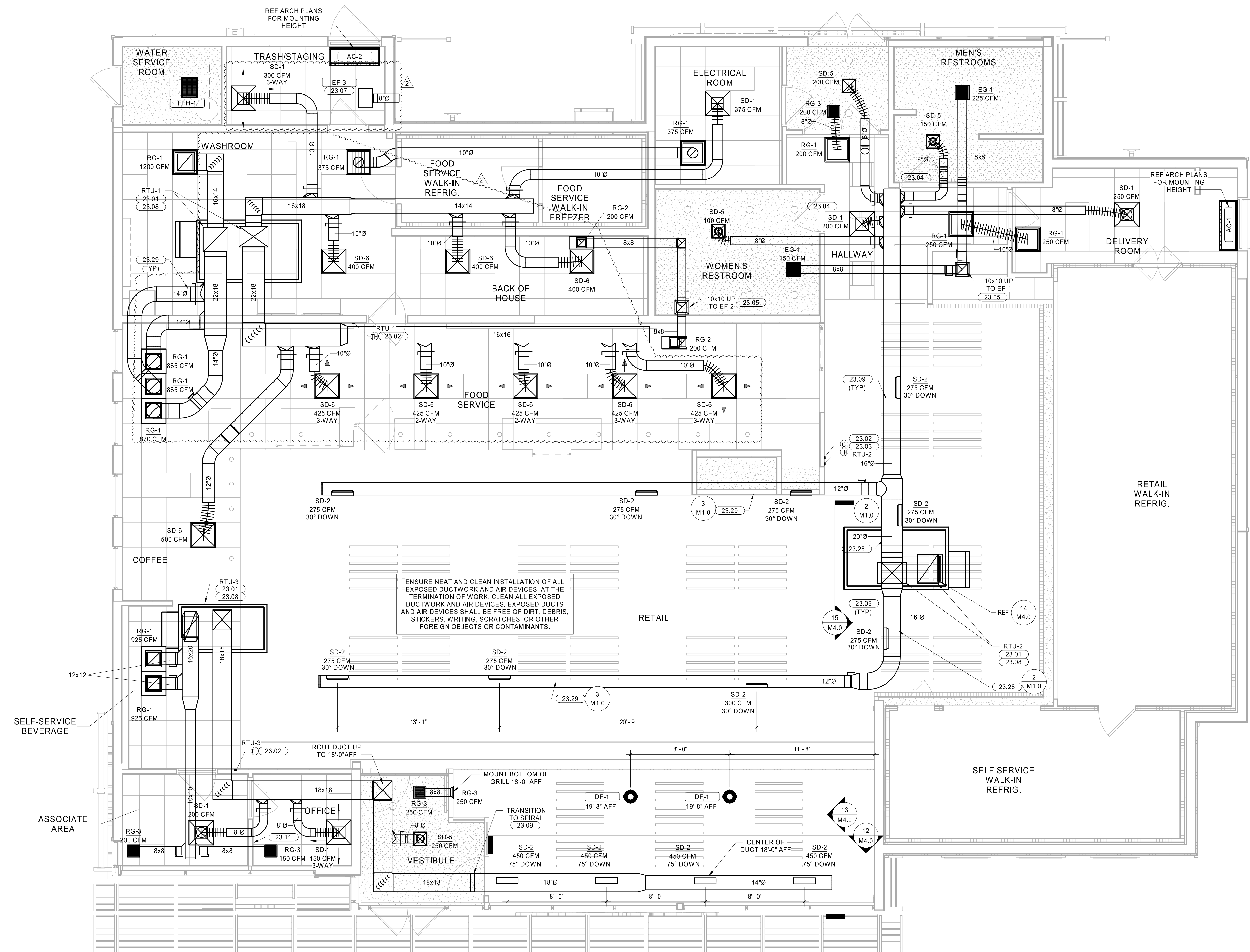


2 EXPOSED DUCT SUPPORT AND GRILLE  
M1.0 NTS

3 EXPOSED DUCT SUPPORT AND GRILLE  
M1.0 NTS



ENSURE NEAT AND CLEAN INSTALLATION OF ALL EXPOSED DUCTWORK AND AIR DEVICES. AT THE TERMINATION OF WORK, CLEAN ALL EXPOSED DUCTWORK AND AIR DEVICES. EXPOSED DUCTS AND AIR DEVICES SHALL BE FREE OF DIRT, DEBRIS, STICKERS, WRITING, SCRATCHES, OR OTHER FOREIGN OBJECTS OR CONTAMINANTS.

KEYNOTES	
23.01	SUPPLY AND RETURN DUCT UP TO RTU ON ROOF. TRANSITION AS REQUIRED. FIELD VERIFY DUCT ROUTING PRIOR TO FABRICATION. PROVIDE FLEX CONNECTION FOR VIBRATION ISOLATION.
23.02	MOUNT REMOTE TEMPERATURE/HUMIDITY SENSOR IN AREA SHOWN AT 6\"/>
23.03	WALL MOUNTED CO2 SENSOR TO RTU-2. SENSOR TO MONITOR CO2 LEVELS THROUGH REMOTE BAS. SENSOR BY WAWA BAS VENDOR.
23.04	UNDERCUT DOOR 1\"/>
23.05	EXHAUST DUCT ROUTED TO FAN ON ROOF. COORDINATE ROUTING OF DUCT WITH ALL DISCIPLINES. PROVIDE TRANSITIONS AND FITTINGS AS REQUIRED.
23.07	PROVIDE A CABINET STYLE EXHAUST FAN. EXHAUST DUCT SHALL BE GALVANIZED STEEL. PROVIDE SIDEWALL VENT WITH SCREEN AND FLAPPER DAMPER. CROWN MODEL 349 OR EQUAL. EXHAUST FAN SHALL MAINTAIN 10\"/>
23.08	HVAC UNIT MANUFACTURER TO PROVIDE 120V SMOKE DETECTORS FOR SUPPLY AND RETURN WITH AUXILIARY CONTACTS AS SHOWN. UPON ACTIVATION, THE SMOKE DETECTORS SHALL SHUT DOWN THE AIR DISTRIBUTION SYSTEM TO WHICH IT IS CONNECTED AND ACTIVATE A VISIBLE AND AUDIBLE SUPERVISORY SIGNAL AT A CONSTANTLY ATTENDED LOCATION VIA THE SPRINKLER/FIRE ALARM PANEL. SMOKE DETECTORS SHALL ALSO BE FURNISHED WITH WALL MOUNTED REMOTE TEST STATION WITH KEYS RESET. REMOTE SD TEST SUPERVISORY SIGNAL SHALL BE LED TYPE WITH AUDIBLE BEEPING ALERT.
23.09	PROVIDE MCGILL AIRFLOW'S DOUBLE-WALL INSULATED SPIRAL DUCT OR EQUAL (MCGILL 614/829-1200). REFERENCE DRAWINGS FOR MOUNTING HEIGHT. PROVIDE DUCT AND FITTINGS WITH SLIP JOINT CONNECTION TYPE. FLANGE-TO-FLANGE CONNECTION TYPES ARE NOT ALLOWED.
23.11	PROVIDE REMOTE TEST STATION FOR SMOKE DETECTORS WITH AUDIBLE AND VISUAL ALARM WITH KEYS RESET. MOUNT TEST STATION 48 INCHES AFF. MOUNT AUDIBLE AND VISUAL ALARM IN CONSTANTLY ATTENDED LOCATION. CONSTANTLY ATTENDED LOCATION IS NOT REQUIRED WHERE DUCT SMOKE DETECTOR ACTIVATES THE BUILDING'S ALARM SYSTEM.
23.28	ROUTE DUCTWORK AS HIGH AS POSSIBLE PARALLEL TO STRUCTURE. REF 2-M1.0 TYP.
23.29	ROUTE DUCTWORK WITHIN THE JOIST SPACE. COORDINATE THRU WEBBING. REF 3-M1.0 TYP.

HVAC LEGEND	
SYMBOL	DESCRIPTION
	NEW RECTANGULAR OR ROUND DUCT
	FLEXIBLE DUCT
	SUPPLY AIR DUCTWORK UP THROUGH PLAN
	RETURN AIR DUCTWORK UP THROUGH PLAN
	EXHAUST AIR DUCTWORK UP THROUGH PLAN
	90° ELBOW WITH TURNING VANES
	MANUAL AIR VOLUME CONTROL DAMPER
	4 WAY SUPPLY DIFFUSER
	3 WAY SUPPLY DIFFUSER
	2 WAY OPPOSED SUPPLY DIFFUSER
	2 WAY CORNER SUPPLY DIFFUSER
	RETURN AIR DEVICE
	EXHAUST AIR DEVICE
	AIR CURTAIN
	LINEAR SLOT DIFFUSER WITH PLENUM
	COMBINATION TEMPERATURE/HUMIDITY SENSOR
	TEMPERATURE SENSOR
	CO2 SENSOR
	TYPE MARK
	CFM
	MECHANICAL EQUIPMENT TAG
	CONDENSATE PIPING
	ROOF MOUNTED EXHAUST FAN
	INLINE EXHAUST FAN
	PACKAGED ROOFTOP AIR CONDITIONER

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

STIPULATION FOR REUSE:  
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**WAWA**  
STORE NUMBER: 6801  
1000 OLD RUTHER GLEN, VA 22546  
JOB NUMBER: 42-2345-058

ISSUE BLOCK		
2	REV 2	04/05/24

CHECKED BY: MJS  
DRAWN BY: SGB  
DOCUMENT DATE: 04/05/24  
PROTO: U59FB-R  
PROTO CYCLE: 2023.Q4.G3  
PLAN ISSUE: CONSTRUCTION SET



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HVAC FLOOR PLAN

SHEET: M1.0

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KEYNOTES	
#	NOTE
23.20	CONTRACTOR SHALL REVIEW ELECTRICAL POWER REQUIREMENTS FOR MECHANICAL EQUIPMENT THAT ARE SCHEDULED ON THE ELECTRICAL DRAWINGS AND VERIFY THAT THEY MATCH PRIOR TO ORDERING EQUIPMENT. DO NOT PURCHASE MOTORS OR ELECTRICAL EQUIPMENT UNTIL POWER CHARACTERISTICS AVAILABLE AT BUILDING HAVE BEEN CONFIRMED BY CONTRACTOR.
23.21	PROVIDE NEW ROOFTOP UNIT WITH PRE-FABRICATED MINIMUM 14 INCH HIGH INSULATED ROOF CURB. MAINTAIN MINIMUM HEIGHT OF 8" FROM ROOF SURFACE, TIE DOWN TO CURB USING LENNOX ROOF CLIPS APPROVED FOR LOCAL WIND ZONE. FIELD COORDINATE SIZE WITH MANUFACTURER REQUIREMENTS PRIOR TO BID.
23.22	MECHANICAL TO ENSURE RTU HAS PAN SENSOR (OVERFLOW SWITCH) INSIDE ROOFTOP UNIT DRAIN PAN. THIS DEVICE SHALL SHUT OFF THE EQUIPMENT SERVED IN THE EVENT THAT THE PRIMARY DRAIN BECOMES RESTRICTED.
23.23	COORDINATE ROOFTOP EQUIPMENT LOCATION AND OPENING IN THE ROOF WITH THE STRUCTURAL MEMBERS PRIOR TO CUTTING DECK.
23.24	INSTALLATION OF EQUIPMENT SHALL COMPLY WITH EQUIPMENT MANUFACTURER'S INSTALLATION AND CLEARANCE REQUIREMENTS TO ALLOW FOR INSPECTION, SERVICE, REPAIR OR REPLACEMENT.
23.25	CONDENSATE PIPING IS LOCATED ON ROOF, PROVIDED BY MECHANICAL CONTRACTOR. PROVIDE SUPPORTS EVERY 4'. ROUTE TO NEAREST ROOF DRAIN/SCUPPER.
23.26	REFRIGERATION EQUIPMENT SHALL BE PROVIDED BY OTHERS.
23.27	AIR-COOLED CONDENSING UNITS ON PRE-ENGINEERED EQUIPMENT RACK, REF 344.0.

**HFA**  
HFA-AE, L T D.  
t 479.273.7780  
1705 S. Walton Blvd., Suite 3  
Bentonville, Arkansas 72712  
www.hfa-ac.com

STIPULATION FOR REUSE  
THIS DRAWING WAS PREPARED FOR USE IN THE PROJECT IDENTIFIED HEREIN. IT IS THE USER'S RESPONSIBILITY TO OBTAIN PERMISSION FROM THE ORIGINAL DESIGNER BEFORE REUSE OF THIS DRAWING FOR ANY OTHER PROJECT. THE USER ASSUMES ALL LIABILITY FOR ANY REUSE OF THIS DRAWING. THE ORIGINAL DESIGNER AND ENGINEER SHALL NOT BE RESPONSIBLE FOR ANY REUSE OF THIS DRAWING FOR ANY OTHER PROJECT OR FOR REUSE OF ANY PART OF THIS DRAWING FOR ANY OTHER PROJECT.

**WAWA**  
STORE NUMBER: 6601  
1100 W. STATE STREET  
RUTHER GLEN, VA 22546  
JOB NUMBER: 42-23-01-088

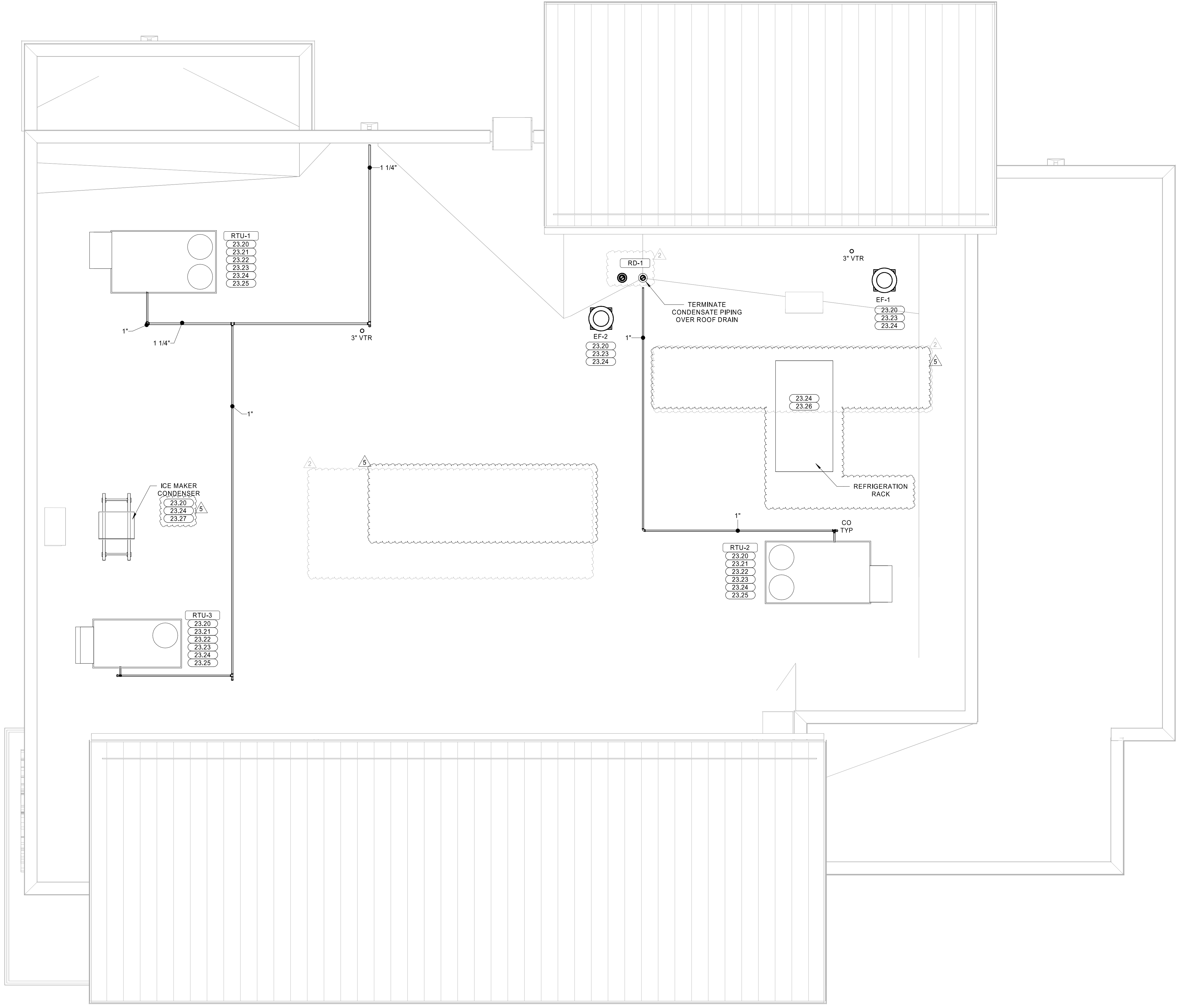
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2	REV 2	04/05/24
5	REV 5	06/14/24

CHECKED BY: MJS  
DRAWN BY: SGB  
DOCUMENT DATE: 04/25/24  
PROTO: U59FB-R  
PROTO CYCLE: 2023.Q4.G3  
PLAN ISSUE: CONSTRUCTION SET

COMMONWEALTH OF VIRGINIA  
GREG J. SCHLUTERMAN  
Lic. No. 48785  
2024.06.13 12:59:04-0500'

HVAC ROOF PLAN

SHEET: M2.0



**1 ROOF PLAN MECHANICAL**  
1/4" = 1'-0"

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**PACKAGED ROOFTOP UNIT SCHEDULE**

MARK	AREA SERVED	BASIS OF DESIGN		NOMINAL CAPACITY (TONS)	FAN			DIRECT EXPANSION COOLING				ELECTRICAL HEATING			ELECTRICAL DATA			NOTES						
		MANUFACTURE	MODEL		SUPPLY AIRFLOW (CFM)	OUTSIDE AIRFLOW (CFM)	EXT. SP (IN. WG)	NOM. MOTOR HP	ENTERING AIR DB (°F)	WB (°F)	DB (°F)	WB (°F)	TOT. CAPACITY (Btu/h)	SENS. CAPACITY (Btu/h)	EER	ENT. AIR DB (°F)	LVG. AIR DB (°F)		INPUT (KW)	VOLTS	PHASE	MCA (AMPS)	MCCP (AMPS)	WEIGHT (LBS)
RTU-1	BACK OF HOUSE	LENNOX	LCT1102H4E	12.5	4500	700	0.70	3.75	80.0	67.0	58.2	56.4	134100	91900	11	0.0	0.0	0.0	208	3	63	80	1644	1-12
RTU-2	SALES	LENNOX	LCT1102H4E	8.5	3400	380	1.00	3.75	80.0	67.0	58.4	57.2	96200	71000	12.1	62.0	90.3	22.5	208	3	73	80	1495	1-12
RTU-3	FRONT OF HOUSE	LENNOX	LCT072H4E	6.0	2400	200	0.50	1	80.0	67.0	57.0	56.8	70100	53100	12.2	62.0	95.2	22.5	208	3	68	70	865	1-12

**NOTES:**

- PROVIDE CO2 SENSOR FOR RTU2 ONLY. SENSOR TO BE INTERLOCKED WITH BAS.
- PROVIDE HUMIDITROL HOT GAS REHEAT.
- PROVIDE REMOTE WALL MOUNTED COMBINATION TEMPERATURE/HUMIDITY SENSOR.
- PROVIDE WITH 2" FACTORY PLEATED MERV 8 FILTERS.
- PROVIDE WITH 18" ROOF CURB.
- PROVIDE WITH FACTORY INSTALLED HACR CIRCUIT BREAKERS AND DISCONNECT.
- PROVIDE WITH FACTORY INSTALLED 15A GFCI SERVICE OUTLET. EC TO PROVIDE FIELD WIRING.
- PROVIDE WITH FACTORY INSTALLED DISCONNECT.
- PROVIDE WITH FACTORY INSTALLED SINGLE ENTHALPHY CONTROLLED ECONOMIZER AND UNIT POWERED EXHAUST FAN.
- PROVIDE WITH FACTORY INSTALLED DIRTY FILTER SWITCH.
- PROVIDE WITH FACTORY INSTALLED DRAIN PAN OVERFLOW SWITCH.
- PROVIDE WITH FACTORY INSTALLED SUPPLY AND RETURN SMOKE DETECTORS.

**AIR CURTAIN SCHEDULE**

MARK	MANUFACTURER	MODEL	AREA SERVED	FAN MOTORS			FLA	HEAT INPUT (KW)	WEIGHT (LB)	NOTES
				HP	V	PH				
AC-1	POWERED AIRE	BCE-148	DELIVERY ROOM	0.5 hp	120	1	7.3	0	99	1,2,3
AC-2	POWERED AIRE	BCE-148	TRASH STAGING	0.5 hp	120	1	7.3	0	99	1,2,3

**NOTES:**

- MOUNT INSIDE BUILDING ABOVE DOOR.
- PROVIDE ALL NECESSARY MOUNTING BRACKETS AND ACCESSORIES.
- PROVIDE WITH MODEL SM-300 COMMERCIAL MAGNETIC REED DOOR SWITCH. ENERGIZE EXHAUST FAN ON WHEN DOOR IS OPEN.

**EXHAUST FAN SCHEDULE**

MARK	AREA SERVED	MANUFACTURER	MODEL	DESIGN AIRFLOW (CFM)	EXT. S.P. (IN. WG)	VOLTS	PHASE	HP	WEIGHT (LB)	NOTES
EF-1	RESTROOMS	GREENHECK	GB-098-6	375	0.38	120	1	0.167	59	1,2,3,4
EF-2	BACK OF HOUSE	GREENHECK	GB-098-6	400	0.38	120	1	0.167	59	1,2,3,4
EF-3	TRASH ROOM	GREENHECK	SP-6200	290	0.50	120	1	0.167	14	1,3,4

**NOTES:**

- PROVIDE DISCONNECT SWITCH.
- PROVIDE 12" HIGH PREFABRICATED INSULATED ROOF CURB.
- MECHANICAL CONTRACTOR TO PROVIDE EXHAUST FAN, & WIRED SPEED CONTROLLER.
- WIRE FOR CONTINUOUS OPERATION.

**AIR DEVICE SCHEDULE**

TYPE	SERVICE	MFG	MODEL	STYLE	MOUNTING	FACE SIZE	NOTES
EG-1	EXHAUST	PRICE	630FF	LOUVERED GRILLE	SURFACE	12x12	4
RG-1	RETURN	PRICE	630FF	LOUVERED GRILLE	LAY-IN	24x24	4
RG-2	RETURN	PRICE	630FF	LOUVERED GRILLE	LAY-IN	24x12	4
RG-3	RETURN	PRICE	630FF	LOUVERED GRILLE	REF. PLANS	12x12	4
SD-1	SUPPLY	PRICE	AMD	MODULAR LOUVERED FACE DIFFUSER	LAY-IN	24x24	1.8
SD-2	SUPPLY	PRICE	SDGE	SPIRAL DUCT MOUNTED GRILLE	DUCT	20x4	7.8,9
SD-5	SUPPLY	PRICE	AMD	MODULAR LOUVERED FACE DIFFUSER	SURFACE	12x12	5.6
SD-6	SUPPLY	PRICE	AMDA	MODULAR LOUVERED FACE DIFFUSER	LAY-IN	24x24	1.6,10

**NOTES:**

- FOR LAY-IN CEILINGS PROVIDE WITH 18"x18" FULL FACE APPEARANCE DIFFUSER NECK. PROVIDE WITH FACTORY SQUARE TO ROUND NECK ADAPTER MODEL "SR". ROUND NECK SIZE SHALL BE EQUAL TO FLEX SIZE SERVING DIFFUSER.
- PROVIDE WITH PLENUM INTERNALLY LINED WITH COATED FIBERBOARD. EXTERNALLY INSULATE PLENUM UPON INSTALLATION WITH DUCT WRAP INSULATION.
- PROVIDE WITH CENTER NOTCH OPTION (CN) AS REQUIRED WHEN USED IN 24" T-BAR CEILING.
- HINGE PREFERRED - "OR" STYLE (1/4 TURN FASTENERS) NOT ACCEPTABLE. FILTER TYPE RETURN GRILLS PROVIDED SOLELY FOR MAINTENANCE PURPOSES. OMT FILTER UPON INSTALLATION.
- PROVIDE WITH TYPE 6 BEVEL SURFACE MOUNT FRAME AND FACTORY SQUARE TO ROUND NECK ADAPTER MODEL "SR".
- PROVIDE WITH BACKPAN INSTALLATION.
- PROVIDE WITH DOUBLE DEFLECTION TURNING VANES.
- PROVIDE WITH INTEGRAL OPPOSED BLADE DAMPER.
- COLOR: SILVER.
- PROVIDE WITH ADJUSTABLE PATTERN DEFLECTOR. PROVIDE WITH 12"x12" DIFFUSER NECK. PROVIDE WITH FACTORY SQUARE TO ROUND NECK ADAPTER MODEL "SR". ROUND NECK SIZE SHALL BE EQUAL TO FLEX SIZE SERVING DIFFUSER.

**DESTRATIFICATION FAN SCHEDULE**

MARK	MANUFACTURER	MODEL	AREA SERVED	VOLTS (V)	PHASE	FLA (A)	WEIGHT (LBS)	NOTES
DF-1	AIRIURS	A-10-SP-SH-120-X	RETAIL	120	1	0.14	7	1,2,3

**NOTES:**

- PROVIDE ALL NECESSARY MOUNTING BRACKETS AND ACCESSORIES.
- PROVIDE WALL MOUNTED SPEED CONTROL, 4 STEP SPEED CONTROL ON/OFF MODEL TRIAC-120-1.5.
- COLOR: WHITE.

**ELECTRICAL UNIT HEATER SCHEDULE**

MARK	MANUFACTURER	MODEL	AREA SERVED	FLA	V	PH	HEATING INPUT (KW)	NOTES
FFH-1	QMARK	EFF-1500	WATER SERVICE	12.5 A	120	1	1.5	1,2,3

**NOTES:**

- COORDINATE MOUNTING FRAME TYPE WITH ARCHITECTURAL DRAWINGS.
- PROVIDE FACTORY ACCESSORIES AS REQUIRED FOR CORRECT CEILING-TYPE INSTALLATION.
- PROVIDE WITH INTERNAL DISCONNECT SWITCH, FACTORY FAN DELAY SWITCH, FACTORY HIGH TEMPERATURE CUTOUT SWITCH, AND INTEGRAL THERMOSTAT.

**CONTROL SEQUENCE OF OPERATIONS: RTU (ELECTRIC HEAT)**

**RTU SEQUENCE OF OPERATION**

**24 HOUR CYCLE - COOLING**

- SUPPLY AIR FAN SHALL RUN CONTINUOUSLY.
- OUTSIDE AIR DAMPER SHALL BE IN MINIMUM POSITION.
- RESTROOM EXHAUST FANS SHALL BE ENERGIZED (24/7).
- THERMOSTAT SHALL CYCLE COMPRESSOR(S) TO MAINTAIN ROOM SET TEMPERATURE.

**24 HOUR CYCLE - HEATING**

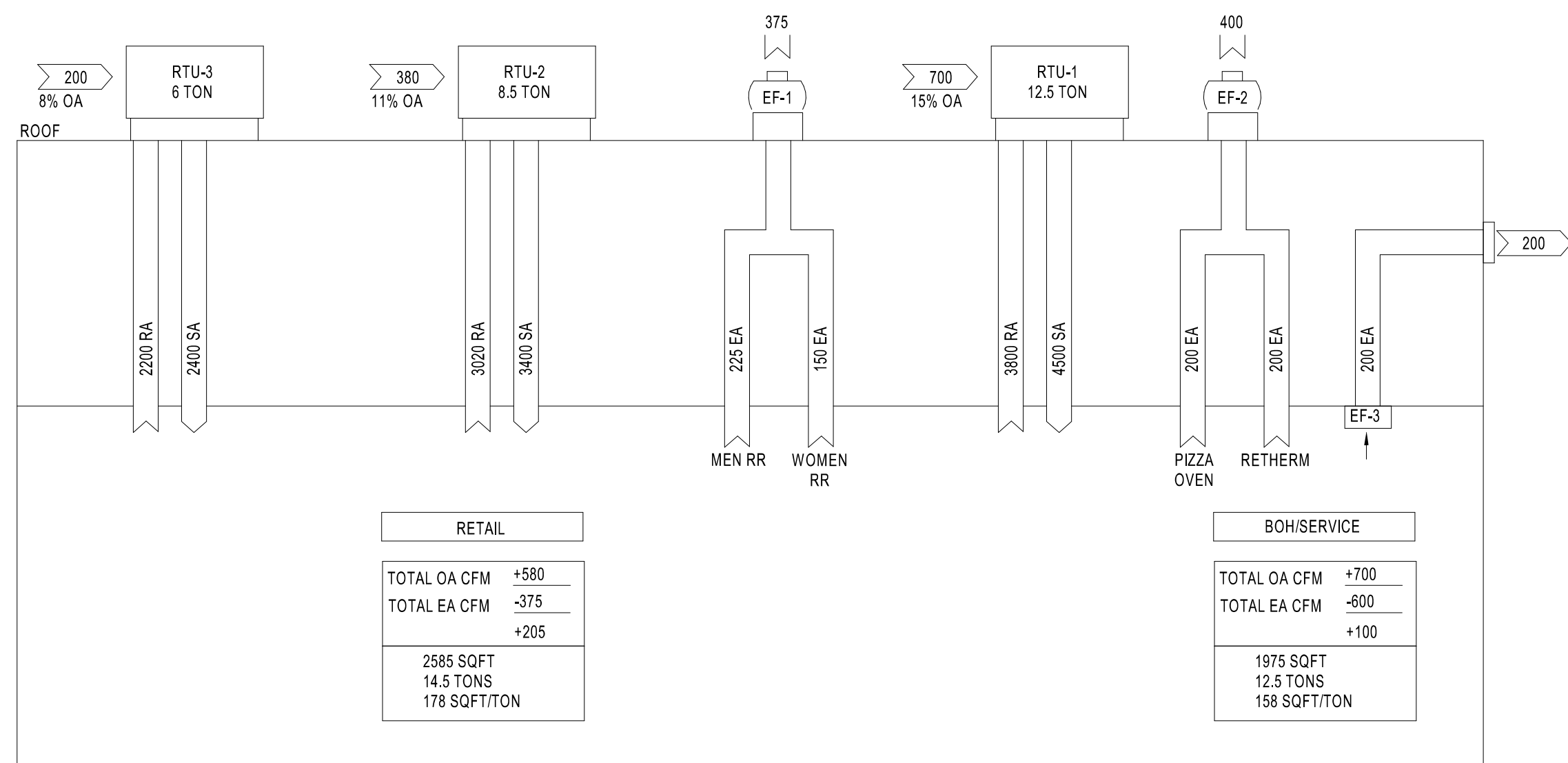
- SUPPLY AIR FAN SHALL RUN CONTINUOUSLY.
- OUTSIDE AIR DAMPER SHALL BE IN MINIMUM POSITION.
- RESTROOM EXHAUST FANS SHALL BE ENERGIZED (24/7).
- THERMOSTAT SHALL MODULATE HEATING ELEMENTS TO ACHIEVE ROOM SET TEMPERATURE.

**24 HOUR CYCLE - DEHUMIDIFICATION**

- SUPPLY AIR FANS SHALL RUN CONTINUOUSLY.
- MECHANICAL OUTSIDE AIR DAMPERS SHALL BE IN MINIMUM POSITION.
- RESTROOM EXHAUST FANS SHALL BE ENERGIZED (24/7).
- HUMIDISTAT SHALL CYCLE COOLING COIL STAGES TO MAINTAIN SET POINT HUMIDITY (SET AT 50%).

**SMOKE DETECTOR**

- WHEN SMOKE DETECTOR IS ACTIVATED SUPPLY AIR FAN SHALL SHUTDOWN.
- FIRE ALARM SHALL BE SIGNALLED.
- SUPPLY AIR FAN SHALL BE MANUALLY RESET. KEYPAD SET IN MANAGER'S OFFICE.



**AIR BALANCE SCHEMATIC**

MARK	OUTSIDE AIRFLOW (CFM)	EXHAUST AIRFLOW (CFM)	TOTAL AIRFLOW
EF-1		375	-375 CFM
EF-2		400	-400 CFM
EF-3		290	-290 CFM
RTU-1	700		700 CFM
RTU-2	380		380 CFM
RTU-3	200		200 CFM
TOTAL POSITIVE =			305 CFM

**VENTILATION SCHEDULE**

ROOM NAME	OCCUPANCY CATEGORY	AREA (SF)	SF PER PERSON	# OF PEOPLE	OA PER AREA (CFM/SF)	OA PER PERSON (CFM/PPERS ON)	Outdoor Airflow	ZONE EFF. (E <sub>z</sub> )	TOTAL OA (CFM)
VESTIBULE	Corridor/Transition	92	0 SF	0.0	0.0	0.0	8 CFM	0.8	7
OFFICE	Office - Enclosed	59	215 SF	0.3	0.06	5.0	5 CFM	0.8	6
ASSOCIATE AREA	Office - Enclosed	75	215 SF	0.3	0.06	5.0	6 CFM	0.8	8
RETAIL	Merchandising Sales Area - Retail	2192	72 SF	30.5	0.12	7.5	492 CFM	0.8	615
TRASH/STAGING	Active Storage	80	359 SF	0.2	0.12	0.0	10 CFM	0.8	12
WOMEN'S RESTROOM	Restrooms	134	108 SF	1.2	0.00	0.0	0 CFM	0.8	0
FOOD SERVICE	Food Preparation	389	54 SF	7.2	0.18	7.5	124 CFM	0.8	155
ELECTRICAL ROOM	Equipment Room	113	0 SF	0.0	0.00	5.0	0 CFM	0.8	0
MEN'S RESTROOM	Restrooms	128	108 SF	1.2	0.00	0.0	0 CFM	0.8	0
REAR VESTIBULE	Corridor/Transition	55	0 SF	0.0	0.06	0.0	3 CFM	0.8	4
DELIVERY ROOM	Active Storage	136	359 SF	0.4	0.12	0.0	16 CFM	0.8	20
SPECIALTY BEVERAGE	Food Preparation	210	54 SF	3.9	0.18	7.5	67 CFM	0.8	84
COFFEE	Food Preparation	112	54 SF	2.1	0.18	7.5	36 CFM	0.8	45
HALLWAY	Corridor/Transition	138	0 SF	0.0	0.06	0.0	0 CFM	0.8	10
WATER SERVICE ROOM	Equipment Room	50	0 SF	0.0	0.00	5.0	0 CFM	0.8	0
BACK OF HOUSE	Food Preparation	136	54 SF	2.5	0.18	7.5	43 CFM	0.8	54
WASHROOM	Food Preparation	325	54 SF	6.0	0.18	7.5	104 CFM	0.8	130
SELF-SERVICE BEVERAGE	Personal Services Sales Area - Retail	121	72 SF	1.7	0.12	7.5	27 CFM	0.8	34

TOTAL = 1184 CFM

E<sub>z</sub> = 0.8 (WARM AIR CEILING SUPPLY & CEILING RETURN)

TOTAL OSA PROVIDED 1,280 CFM > TOTAL REQUIRED OSA 1,184 CFM

**HVAC GENERAL NOTES:**

- REFER TO WRITTEN BOOK SPECIFICATIONS FOR ADDITIONAL INFORMATION.
- THE WORK TO BE DONE UNDER THESE SPECIFICATIONS AND THE DRAWINGS CONSISTS OF FURNISHING ALL EQUIPMENT, MATERIALS, LABOR AND SERVICES, AND PERFORMING ALL OPERATIONS TO COMPLETE THE MECHANICAL CONSTRUCTION WORK FOR THIS PROJECT. ANY WORK NOT SPECIFICALLY COVERED BY THESE SPECIFICATIONS OR INDICATED ON THE MECHANICAL/ELECTRICAL/PLUMBING PLANS, BUT NECESSARY TO COMPLETE OR PERFECT ANY PART OF THIS INSTALLATION IN A SUBSTANTIAL MANNER, SHALL BE PROVIDED WITHOUT EXTRA COST TO OWNER.
- THE TERM "FURNISH" SHALL MEAN TO OBTAIN AND SUPPLY TO THE JOB SITE. THE TERM "INSTALL" SHALL MEAN TO FIX IN POSITION AND CONNECT FOR USE. THE TERM "PROVIDE" SHALL MEAN TO FURNISH AND INSTALL. THE TERM "MECHANICAL WORK" OR "WORK" SHALL MEAN ALL LABOR, MATERIAL, EQUIPMENT, SCAFFOLDING, RIGGING, TOOLS, SUPERVISION, SERVICES AND OTHER INCIDENTALS NECESSARY FOR COMPLETE AND OPERABLE INSTALLATION.
- THE CONTRACTOR SHALL FURNISH AND INSTALL ALL EQUIPMENT, MATERIALS AND LABOR TO PROVIDE A COMPLETE AND OPERATIONAL SYSTEM AS INDICATED ON THE DESIGN DOCUMENTS.
- CONTRACTOR SHALL PROVIDE ALL ROOFING OPENINGS, FLASHINGS, AUXILIARY STEEL, THREADED RODS, VIBRATION ISOLATORS, TURNBUCKLES, ETC. TO SUPPORT HIS EQUIPMENT ON OR FROM THE STRUCTURE.
- ANY CHANGES AND/OR MODIFICATIONS MUST BE REVIEWED AND APPROVED BY THE ENGINEER OR OWNER'S REPRESENTATIVE PRIOR TO CONSTRUCTION.
- REMOVE ALL TRASH, DEBRIS AND DEMOLITION MATERIAL FROM PREMISES AT THE END OF EACH WORK DAY.
- SCHEDULE ALL WORK, CUTTING AND BUILDING SERVICE INTERRUPTIONS WITH BUILDING OWNER AND CONSTRUCTION MANAGER, PRIOR TO COMPLETING WORK.
- FIELD ADJUST THE DIRECTION OF BLOW FOR ALL SUPPLY AIR DEVICES SO THAT THE DEVICES DO NOT BLOW DIRECTLY INTO SOFFITS, CURTAIN WALLS, REFRIGERATED CASES OR EXHAUST HOODS.
- COORDINATE LOCATION OF NEW DUCTWORK, AIR DEVICES AND EQUIPMENT WITH LIGHT FIXTURES, SPRINKLER PIPING AND HYDRONIC PIPING.
- ALL TEMPERATURE AND HUMIDITY SENSORS SHALL BE INSTALLED 5' ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE ON PLAN. COORDINATE FINAL LOCATIONS WITH EQUIPMENT, FURNITURE, TENANT AND ARCHITECT PRIOR TO INSTALLATION.
- VERIFY ALL EQUIPMENT VOLTAGES, WIRING REQUIREMENTS, AND REQUIRED BREAKER SIZES WITH THE ELECTRICAL CONTRACTOR PRIOR TO ORDERING EQUIPMENT.
- THE MECHANICAL CONTRACTOR SHALL HAVE A QUALIFIED HVAC TECHNICIAN FROM THE UNIT MANUFACTURER PROVIDE AN EQUIPMENT OPERATION CHECK AFTER UNIT START-UP AND PRIOR TO CERTIFIED AIR BALANCING. THE CERTIFICATION, SIGNED BY THE TECHNICIAN, MUST BE INCLUDED IN THE GENERAL CONTRACTOR CLOSING DOCUMENTS FOR THE STORE.
- ALL DRAWINGS ARE CONCEPTUAL AND SCHEMATIC AND ARE INTENDED FOR USE AS A DESIGN/BUILD GUIDELINE. THE CONTRACTORS ARE RESPONSIBLE FOR VERIFYING ALL FIELD CONDITIONS AND ADJUSTING OR MODIFYING THE SPECIFIC ELEMENTS OF THEIR WORK AS REQUIRED TO MEET THE DESIGN INTENT. THE CONTRACTORS ARE RESPONSIBLE FOR THE FOLLOWING:
  - COORDINATION WITH OTHER TRADES.
  - PROVIDING ADDITIONAL DRAWINGS, CALCULATIONS AND OTHER DOCUMENTATION REQUIRED FOR THE BUILDING DEPARTMENT. THE MECHANICAL CONTRACTOR SHALL DOCUMENT THE INSTALLATION AND PROVIDE ALL TESTS REQUIRED TO SUBSTANTIATE CODE COMPLIANCE AS REQUIRED BY THE BUILDING DEPARTMENT AND LOCAL INSPECTOR. CONTRACTOR SHALL SUBMIT FINAL AS-BUILT DRAWINGS TO BUILDING DEPARTMENT FOR RECORD AT COMPLETION.
- MECHANICAL PLANS ARE DIAGRAMMATIC IN NATURE, NOT SHOWING EVERY ITEM IN EXACT LOCATION OR DETAIL. MEASUREMENTS AND LOCATIONS MUST BE FIELD VERIFIED AND COORDINATED WITH ARCHITECTURAL, HVAC, FIRE PROTECTION, STRUCTURAL, ELECTRICAL AND OTHER BUILDING DRAWINGS.
- CONTRACTOR TO INCLUDE IN BID ALL COSTS TO MAKE FIELD COORDINATION AND ADJUSTMENT TO DUCTWORK FOR FIT INTO EXISTING STRUCTURE. CONTRACTOR SHALL VERIFY AND FIELD COORDINATE FINAL LOCATION OF MECHANICAL EQUIPMENT.
- CONTRACTOR SHALL SECURE AND PAY FOR ALL REQUIRED PERMITS AND INSPECTIONS AND PERFORM ALL TESTS CALLED FOR OR REQUIRED AS A PART OF HIS WORK. FURNISHED APPROVED CERTIFICATE OF FINAL INSPECTION, AND TURN OVER TO OWNER AT COMPLETION OF PROJECT.
- CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF ALL TRADES, LANDLORD REQUIREMENTS, CEILING HEIGHTS AND EXISTING STRUCTURAL CONDITIONS PRIOR TO FABRICATION OF ANY DUCTWORK OR ORDERING OF ANY EQUIPMENT.
- ALL INSTALLATION OF THE MECHANICAL EQUIPMENT SHALL COMPLY WITH THE MANUFACTURER'S SPECIFICATION AND CLEARANCE REQUIREMENTS.
- ALL HVAC WORK SHALL BE IN ACCORDANCE WITH NFPA 90A, 90B, 96, 54 AND NFC 101, LIFE SAFETY CODE.
- INSTALLATION SHALL COMPLY WITH ALL LOCAL, STATE AND NATIONAL CODES, AND WITH LATEST ASHRAE PUBLICATIONS. WORK SHALL BE NEAT AND WORKMANSHIP SHALL BE ACCEPTABLE TO BUILDING STANDARDS.
- CONTRACTOR SHALL FURNISH AND INSTALL A COMPLETE TEMPERATURE CONTROL SYSTEM TO INCLUDE: PANELS, MODULES, RELAYS, WIRING, THERMOSTATS, SENSORS, DAMPERS, ACTUATORS AND ALL MISCELLANEOUS ITEMS AS REQUIRED TO FULFILL THE DESIGN INTENT AS INDICATED ON THE PLANS AND IN THE CODED NOTES. THERMOSTATS AND SENSORS SHALL BE LOCATED GENERALLY AS SHOWN BUT THEIR EXACT LOCATION SHALL BE FIELD COORDINATED TO AVOID INTERFERENCE WITH WALL MOUNTED WORK.
- DURING THE BIDDING PERIOD, EACH CONTRACTOR SHALL VISIT THE SITE TO DETERMINE CONDITIONS AFFECTING THE WORK. BIDS SHALL SERVE AS EVIDENCE OF KNOWLEDGE OF EXISTING CONDITIONS AND ANY MODIFICATIONS WHICH ARE REQUIRED TO MEET THE INTENT OF THE DRAWINGS AND SPECIFICATIONS. FAILURE TO VISIT THE SITE DOES NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY IN PERFORMANCE OF WORK REQUIRED CONDITIONS IN EVIDENCE THEREBY SHALL NOT BE JUSTIFICATION FOR ADDITIONAL COMPENSATION.
- THE EQUIPMENT SHALL BE LOCATED TO ALLOW FOR EASY ACCESS FOR SERVICING, ADJUSTING OR MAINTENANCE AND SPACE FOR REMOVAL OF INTERNAL ASSEMBLIES. PROVIDE MINIMUM CLEARANCES FOR ALL EQUIPMENT PER THE MANUFACTURER'S RECOMMENDATIONS.
- PROVIDE ALL CONTROL EQUIPMENT, MOTOR STARTERS, RELAYS, LINE VOLTAGE CONTROLS, TRANSFORMERS, LOW VOLTAGE CONTROLS, AND DEVICES NECESSARY FOR THE COMPLETE OPERATION OF THE HEATING AND AIR CONDITIONING AND VENTILATING SYSTEM.
- ALL LOW VOLTAGE WIRING AND CONDUIT REQUIRED FOR MECHANICAL EQUIPMENT SHALL BE FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR.
- PROVIDE ALL FANS AND ROOFTOP UNITS WITH RELAYS TO SHUT DOWN WHEN FIRE ALARM IS INITIATED. COORDINATE LOCATION WITH THE ELECTRICAL CONTRACTOR FOR THE FIRE ALARM WIRING.
- IN THE EVENT OF FAN SHUT DOWN, ALL DUCT MOUNTED DETECTORS SHALL REMAIN IN OPERATION.
- CONTRACTOR TO PROVIDE TENANT WITH AS-BUILT DRAWINGS OF ALL CHANGES OR MODIFICATIONS MADE IN THE FIELD, TO THE ORIGINAL SET OF CONSTRUCTION DOCUMENTS, FOR TURN-OVER TO THE ARCHITECT/ENGINEER UPON COMPLETION OF THE PROJECT. PROVIDE ALL EQUIPMENT SHOP DRAWINGS, INFORMATION ON CONTROL DEVICES, CONTROL WIRING DIAGRAMS AND OTHER PERTINENT INFORMATION AT COMPLETION OF PROJECT.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE MECHANICAL EQUIPMENT COMPONENTS ARE INSTALLED AT LOCATIONS AND ELEVATIONS WHICH MAKE THEM READILY ACCESSIBLE FOR ROUTINE MAINTENANCE WITHOUT REQUIRING ANY EXTRAORDINARY MEASURES.
- THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ADMINISTERING ALL WARRANTIES ON EQUIPMENT WHICH HE INSTALLS. THIS INCLUDES ALL CONDENSERS, REFRIGERANT PIPES, AND OTHER ITEMS FURNISHED BY OTHERS AS WELL AS THOSE FURNISHED BY HIM.
- FIELD VERIFY THE EXACT LOCATION OF ALL EQUIPMENT WITH ARCHITECT/OWNER PRIOR TO INSTALLATION. INFORM OWNER OF ANY EQUIPMENT ITEMS THAT REQUIRE RELOCATION.
- PROVIDE VIBRATION ISOLATION DEVICES AND FLEXIBLE CONNECTIONS TO ALL MOVING MACHINERY.
- DUCT DIMENSIONS SHOWN ARE INSIDE NET DIMENSIONS, ADD TO SHEET METAL SIZE FOR INSULATION THICKNESS. HOLD DUCTWORK TIGHT TO UNDERSIDE OF STRUCTURE UNLESS OTHERWISE NOTED OR REQUIRED BY FIELD CONDITIONS. IT IS REQUIRED TO COORDINATE EXACT MOUNTING HEIGHT IN FIELD WITH SITE INVESTIGATION. SUPPLY, RETURN, OUTSIDE AIR AND RELIEF AIR DUCTS SHALL BE SHEET METAL AND BE EXTERNALLY INSULATED WITH OWENS CORNING TYPE 150 2" THICK, FOIL FACED FLEXIBLE FIBROUS GLASS BLANKET INSULATION WITH A MIN R-6.4 VALUE. EQUAL IS APPROVED. INSULATION WRAP SHALL BE SEALED WITH FAB AND MASTIC.
- ALL DUCTWORK SHALL MAINTAIN SYSTEM PRESSURE. THE AIR DISTRIBUTION COMPONENTS SHALL BE SEALED IN ACCORDANCE WITH SMACNA REQUIREMENTS. TWO INCH PRESSURE CLASS.
- DUCT INSULATION CLOSURE SYSTEM SHALL CONSIST OF GLASS FABRIC AND NON MIGRATING MASTIC. SEAL AIR TIGHT.
- ALL FLEXIBLE DUCTS SHALL BE SUPPORTED EVERY 4'-0" WITH 2" WIDE GALVANIZED STEEL BANDS. MINIMUM ONE PER EACH SECTION OF FLEXIBLE DUCT. MAXIMUM LENGTH OF FLEX DUCT SHALL BE 8'-0" LONG AND SHALL MEET INSTALLATION AND MATERIAL REQUIREMENTS OF LOCAL CODES.
- ALL BRANCH TAKE-OFFS SHALL BE PROVIDED WITH MANUAL BALANCING DAMPERS LOCATED ABOVE ACCESSIBLE CEILINGS AS CLOSE TO MAIN TRUNK AS POSSIBLE. WHEN AIR DEVICE IS NOT ACCESSIBLE PROVIDE DAMPER AT AIR DEVICE.
- CONTRACTOR IS RESPONSIBLE FOR COORDINATING BOX-OUT LOCATIONS FOR ALL DRYWALL MOUNTED AIR DEVICES WITH GENERAL CONTRACTOR AND CEILING FRAMING. CONTRACTOR SHALL COORDINATE ALL DUCT AND DIFFUSER LOCATIONS WITH LIGHTING LAYOUTS AS REQUIRED.
- ALL SUPPLY DUCT BENDS FROM THE VERTICAL TO HORIZONTAL AND ANGLED TURNS OF DUCTWORK SHALL HAVE TURNING VANES INSTALLED.
- PROVIDE SMOOTH TRANSITIONS AT EQUIPMENT AND AIR DEVICES TO MATCH CONNECTION SIZES. ALL DUCTWORK SHALL BE SHEET METAL FABRICATED IN ACCORDANCE WITH ASHRAE GUIDE AND SMACNA MANUAL LATEST EDITIONS.
- THE CONTRACTOR SHALL ENGAGE AN INDEPENDENT AIR BALANCING AGENCY SUBSEQUENT TO THE APPROVAL OF THE OWNERS REPRESENTATIVE. THE T&B AGENCY CAN ONLY ACT AS HIS OWN REPORTING AGENCY IF SUITABLE INSTRUMENTS HERINAFTER REQUIRED ARE DEMONSTRATED TO BE PART OF HIS NORMAL PROCEDURE TO THE SATISFACTION OF THE OWNERS REPRESENTATIVE. THE T&B AGENCY SHALL BE ABC OR NEBB CERTIFIED. CONTRACTOR SHALL PROVIDE LANDLORD WITH WATER AND AIR BALANCE REPORT.
- IT SHALL BE THE RESPONSIBILITY OF THIS T&B AGENCY TO PROVIDE THE LOCAL BUILDING DEPARTMENT AND OWNER WITH PROPER TEST & BALANCE DATA ON ABC OR NEBB FORMS.
- BUILDING AIR SYSTEMS SHALL BE BALANCED PER DATA INCLUDED ON THE DRAWINGS TO ACHIEVE RELATIVE AIR VOLUMES AS INDICATED ON THE DRAWINGS AND SCHEDULED HEREIN. REFER TO AIR FLOW DIAGRAM DETAIL.
- ALL NEW SUPPLY AND RETURN DUCTWORK SHALL BE GALVANIZED STEEL, EXTERNALLY INSULATED WITH 1.5" FIBERGLASS DUCTWRAP. INSTALLED R VALUE SHALL BE A MINIMUM OF 6. SEAL ALL JOINTS AND SEAMS PRIOR TO ADDING DUCTWRAP. SEAL WRAP WITH GLASS FABRIC AND MASTIC MEETING UL 181.
- PROVIDE VOLUME BALANCING DAMPER AT ALL NINETY-DEGREE DUCT TAKE-OFFS. THIS ALSO APPLIES TO TAKE-OFFS TO DIFFUSERS OR REGISTERS LOCATED DIRECTLY UNDER DUCTS.
- ALL RESTROOM MAKE-UP AIR SHALL BE GALVANIZED STEEL TRANSFER DUCTS WITH ZERO LEAKAGE BACKDRAFT DAMPERS AND DOOR UNDERCUTS.
- REFRIGERANT PIPE SIZING AND ROUTING DESIGN SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. CONTRACTOR SHALL TAKE INTO ACCOUNT LENGTH OF RUN AND FIELD CONDITIONS WHEN SIZING THE PIPING TO ENSURE ALL LOSSES ARE ACCOUNTED FOR.
- MECHANICAL CONTRACTOR TO FIELD VERIFY WITH STRUCTURE ALL DUCT ROUTING PRIOR TO FABRICATION.
- PROVIDE ACCESS TO ALL COMPONENTS REQUIRING PERIODIC INSPECTION AND SERVICE THAT ARE LOCATED WITHIN THE SPACE OR REQUIRE ACCESS THROUGH THE SPACE. LABEL ACCESS DOORS AND PANELS OR CEILING TILES UTILIZED FOR ACCESS WITH THE NAME OF THE HIDDEN COMPONENT(S). DEMONSTRATE ACCESS TO ALL HIDDEN COMPONENTS FOR THE FIELD REPRESENTATIVE PRIOR TO OCCUPANCY.
- ALL ROOF TOP UNITS AND ROOF TOP EXHAUST FANS SHALL BE LABELED TO INDICATE MARK NUMBERS, PANEL OF CIRCUIT ORIGIN, AND CIRCUIT NUMBER. LABELS SHALL BE SUNLIGHT RESISTANT AND SHALL BE IN PLACE PRIOR TO INSPECTION.
- PROVIDE ALL NECESSARY TRANSITIONS AND OFFSETS IN SUPPLY AND RETURN AIR DUCTWORK TO AVOID STRUCTURE, WATER, GAS, SPRINKLER PIPING, OTHER DUCTWORK, OTHER TRADES, ETC. DUCTWORK SHALL BE INSTALLED AS HIGH AS CONDITIONS WILL ALLOW.
- ENSURE NEAT AND CLEAN INSTALLATION OF ALL EXPOSED DUCTWORK AND AIR DEVICES. AT THE TERMINATION OF WORK, CLEAN ALL EXPOSED DUCTWORK AND AIR DEVICES. EXPOSED DUCTS AND AIR DEVICES SHALL BE FREE OF DIRT, DEBRIS, STICKERS, WRITING, SCRATCHES, OR OTHER FOREIGN OBJECTS OR CONTAMINANTS.



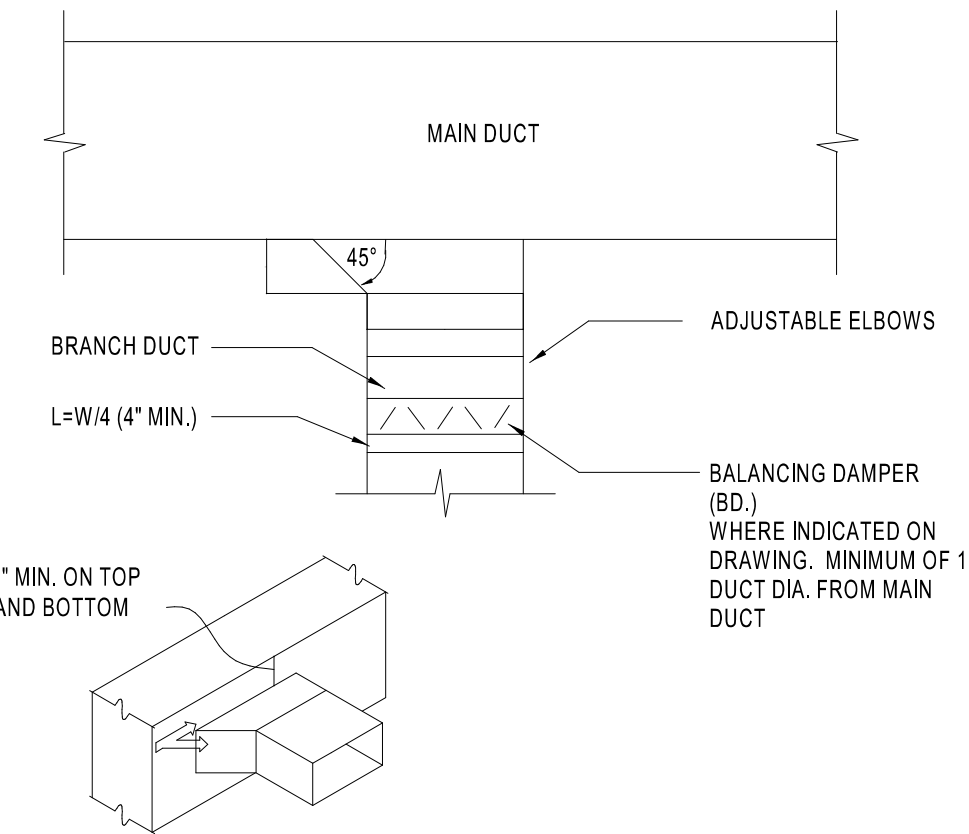
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t 479.273.7780  
1705 S. Walton Blvd., Suite 3  
Bentonville, Arkansas 72712  
www.hfa-ac.com

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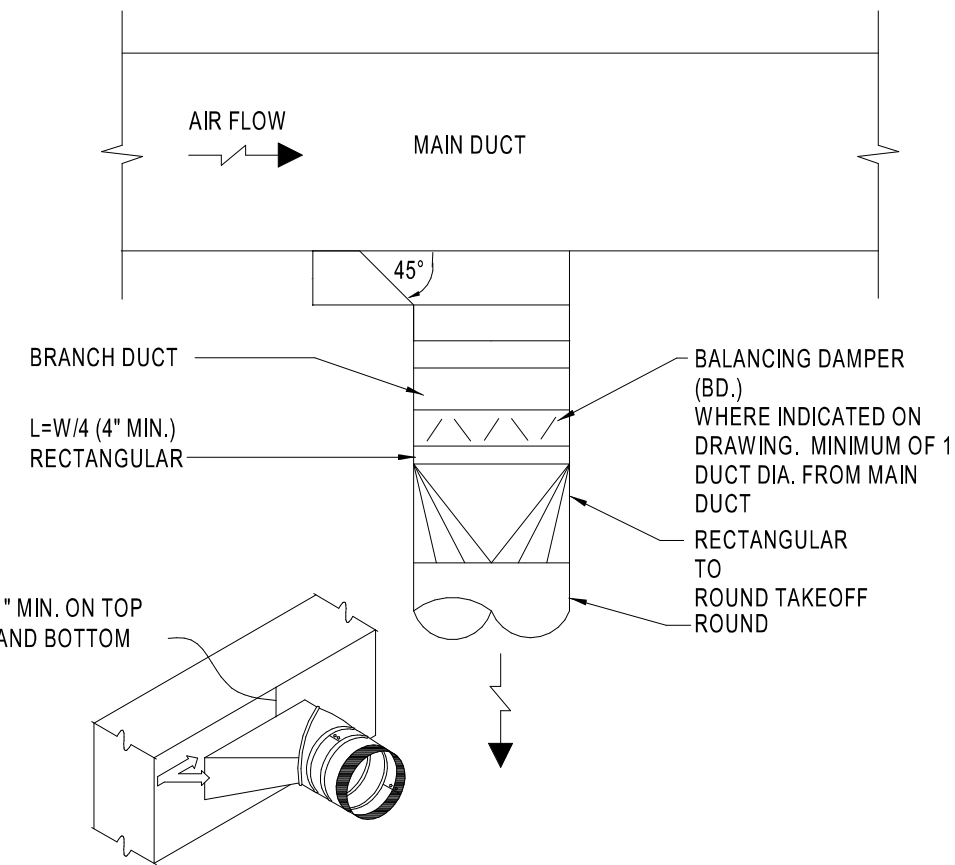
WAWA  
STORE NUMBER: 6601  
1000 W. WAWA BLVD.  
RUTHER GLEN, VA 22846  
JOB NUMBER: 42-234-068

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2	REV 2	04/05/24

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DOCUMENT DATE: 04/05/24  
PROTO: U59FB-R  
PROTO CYCLE: 2023.Q4.G3  
PLAN ISSUE: CONSTRUCTION SET



1 RECTANGULAR BRANCH CONNECTION  
M4.0 NTS

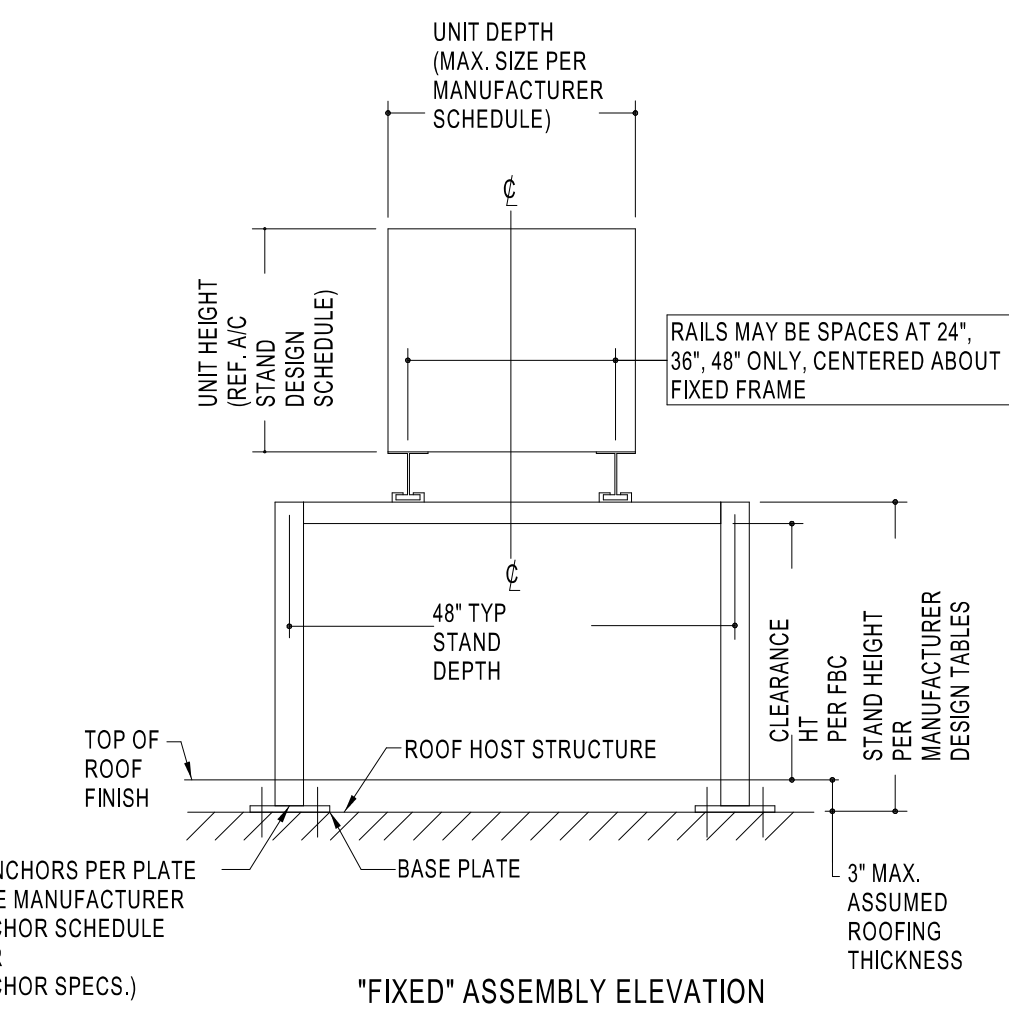


2 ROUND BRANCH CONNECTION  
M4.0 NTS

2 STAND TO BE MANUFACTURED BY PRECISION ALUMINUM PRODUCTS 1339 SW 1ST WAY DEERFIELD BEACH, FL 33441

2 CONDENSER STAND BY PRECISION ALUMINUM PRODUCTS. INSTALL PER MANUFACTURER RECOMMENDATION.

2 VERIFY THE SIZE OF EQUIPMENT FURNISHED WITH THE APPROVED SHOP DRAWINGS.

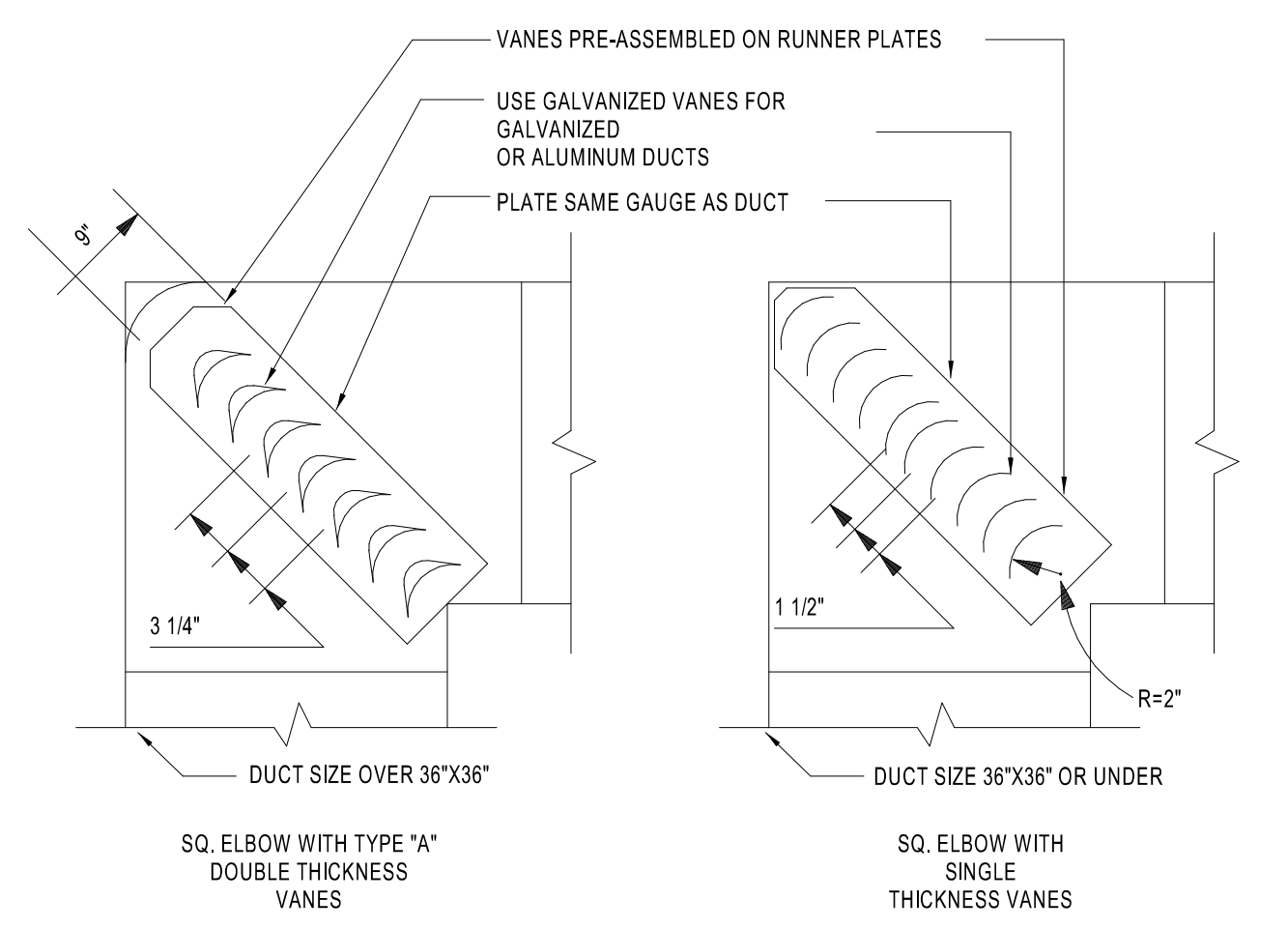


3 CONDENSING UNIT FRAMING SUPPORT  
M4.0 NTS

GENERAL NOTES:

- THIS SYSTEM HAS BEEN DESIGNED AND SHALL BE FABRICATED IN ACCORDANCE WITH THE STRUCTURAL PROVISIONS OF THE INTERNATIONAL BUILDING CODE FOR USE WITHIN AND OUTSIDE OF THE HIGH VELOCITY HURRICANE ZONE.
- CONTRACTOR SHALL ENSURE THAT EACH INSTALLATION ASSEMBLY MEET MINIMUM CLEARANCE HEIGHT PER BC.
- ALL FASTENERS TO BE #10 OR GREATER SAE GRADE 5, UNLESS NOTED OTHERWISE, CADMIUM PLATED OR OTHERWISE CORROSION RESISTANT MATERIAL AND SHALL COMPLY WITH ANY APPLICABLE FEDERAL, STATE, AND LOCAL CODES. PROVIDE (S) PITCHES MIN PAST THREAD PLANE.
- ALL EXTRUDED MEMBERS SHALL BE ALUMINUM ALLOY TYPED 6061-T6 OR 6063-T5.
- ALUMINUM WELDING SHALL BE PERFORMED IN ACCORDANCE WITH BC WITH WELD FILLER ALLOY MEETING ASHRAE AS 10 STANDARDS TO ACHIEVE ULTIMATE DESIGN STRENGTH IN ACCORDANCE WITH THE ALUMINUM DESIGN MANUAL, TABLE 3.6 WELD FILLER: 5383 ELECTRODES. ALL ALUMINUM CONSTRUCTION SHALL BE IN CONFORMANCE WITH THE TOLERANCE, QUALITY AND METHODS OF THE AMERICAN WELDING SOCIETY'S STRUCTURAL WELDING CODE-ALUMINUM. MINIMUM WELD IS 1/8\"/>

REFER TO MANUFACTURER DRAWINGS FOR COMPLETE SPECIFICATIONS AND REQUIREMENTS.



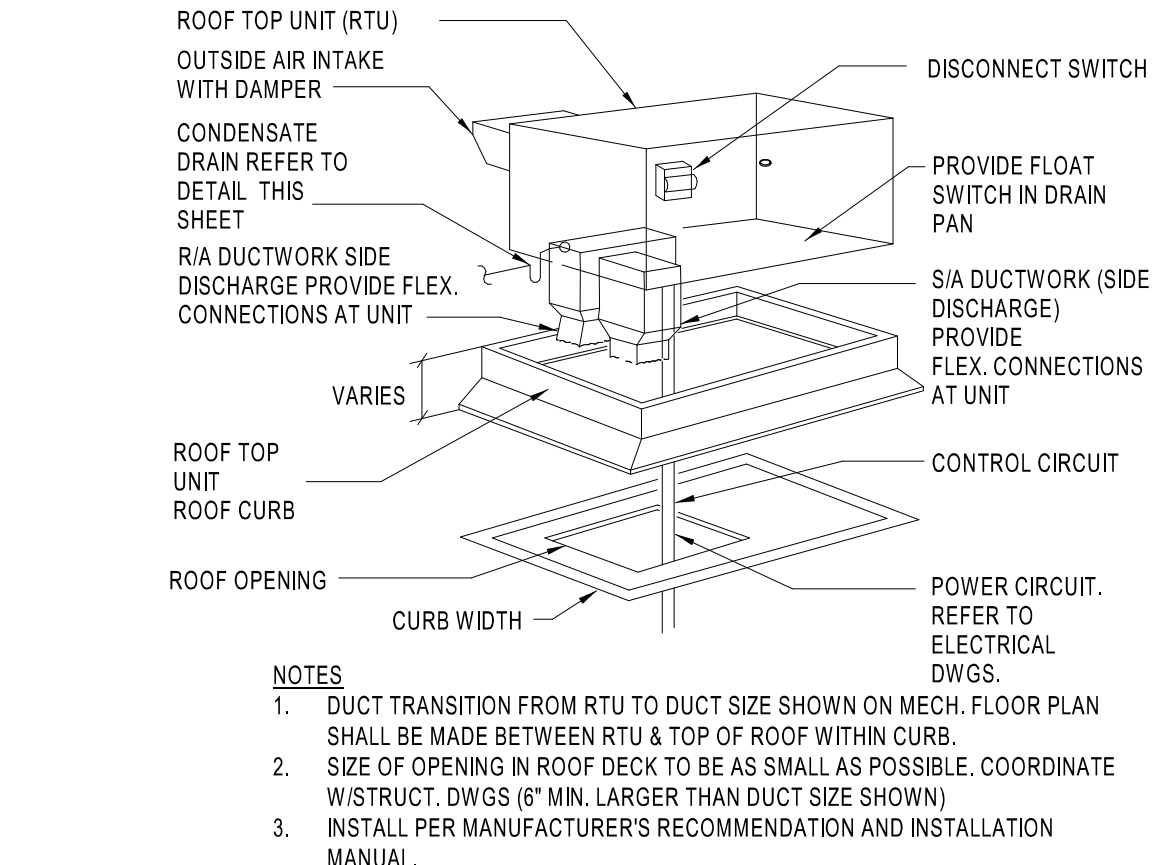
4 TURNING VANE DETAIL  
M4.0 NTS

DUCT SHALL BE SECURELY FASTENED TO RUNNERS. ALL VANES SHALL BE SECURE AND STABLE IN INSTALLED OPERATION POSITION. IF NECESSARY AT CERTAIN VELOCITIES OR PRESSURES WELD VANES TO RUNNERS ON APPROPRIATE INTERVALS ALONG RUNNERS. TO PREVENT LINER DAMAGE CARE MUST BE EXERCISED WHEN INSTALLING VANES IN LINED OR FIBROUS GLASS DUCT.

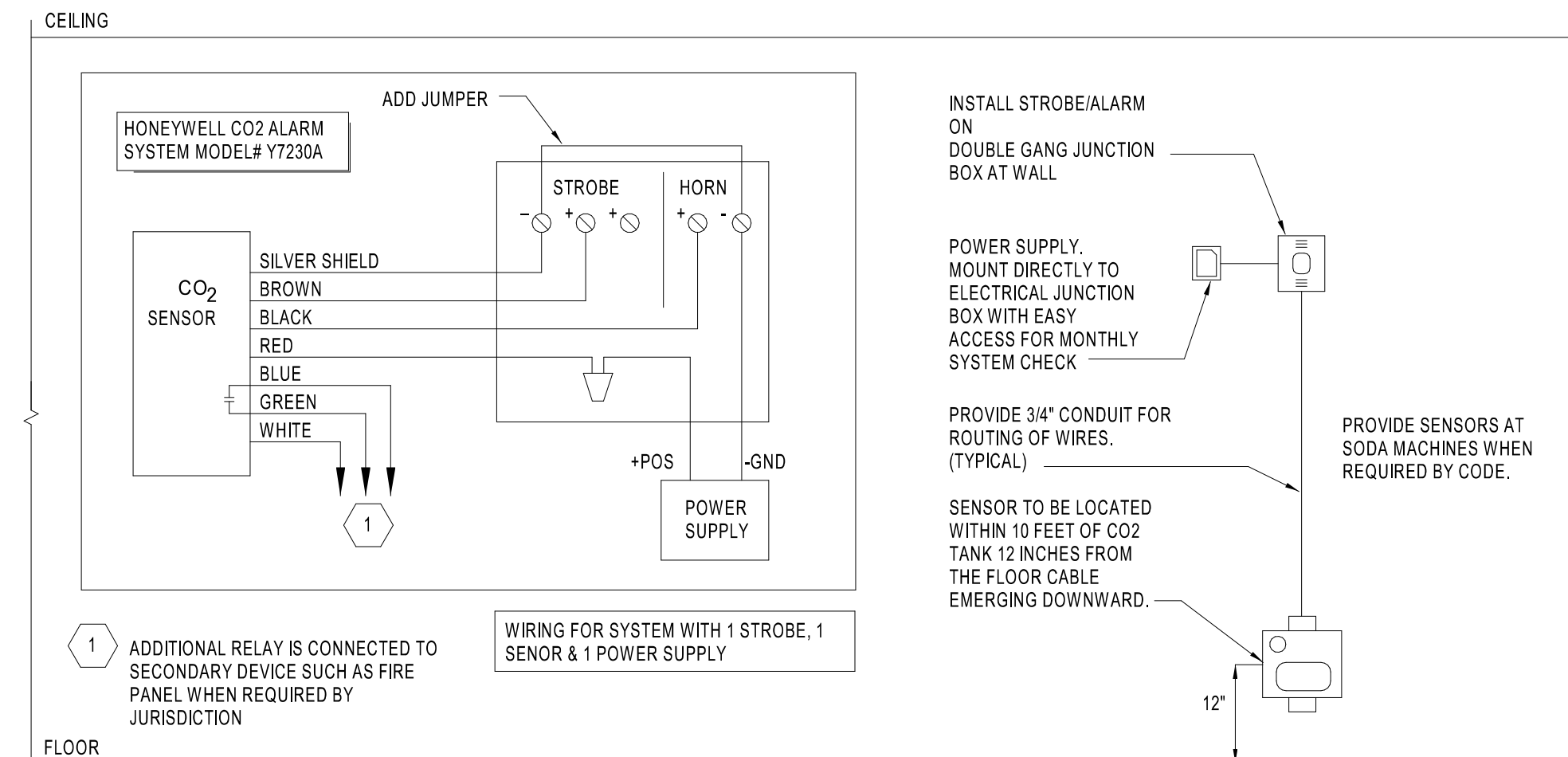
	R	SP	GA
SMALL	2"	1 1/2"	24
LARGE	4 1/2"	3 1/4"	22

\* MAXIMUM UNSUPPORTED VANE LENGTH  
SMALL SINGLE VANE 36"  
LARGE SINGLE VANE 36"  
SMALL DOUBLE VANE 60"  
LARGE DOUBLE VANE 72"

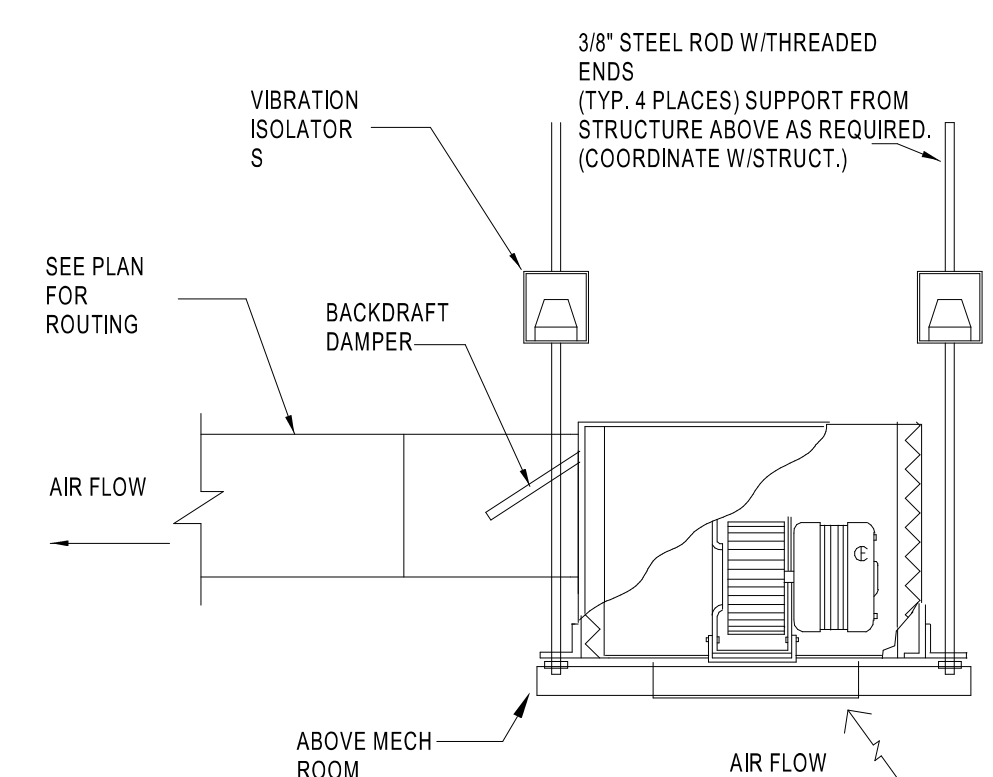
NOTE: FOLLOW PER SMACNA STANDARDS.



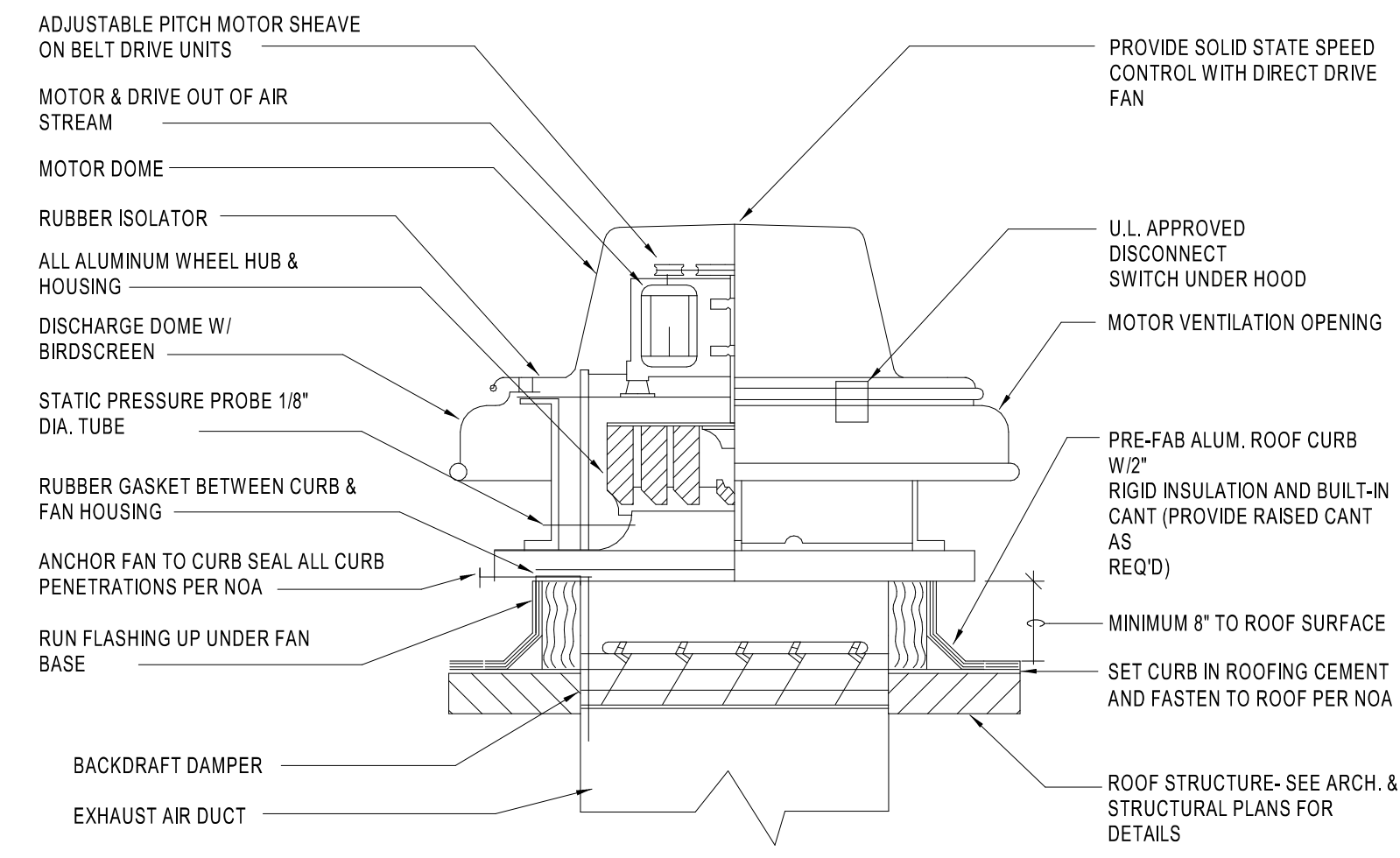
5 ROOF TOP UNIT MOUNTING DETAIL  
M4.0 NTS



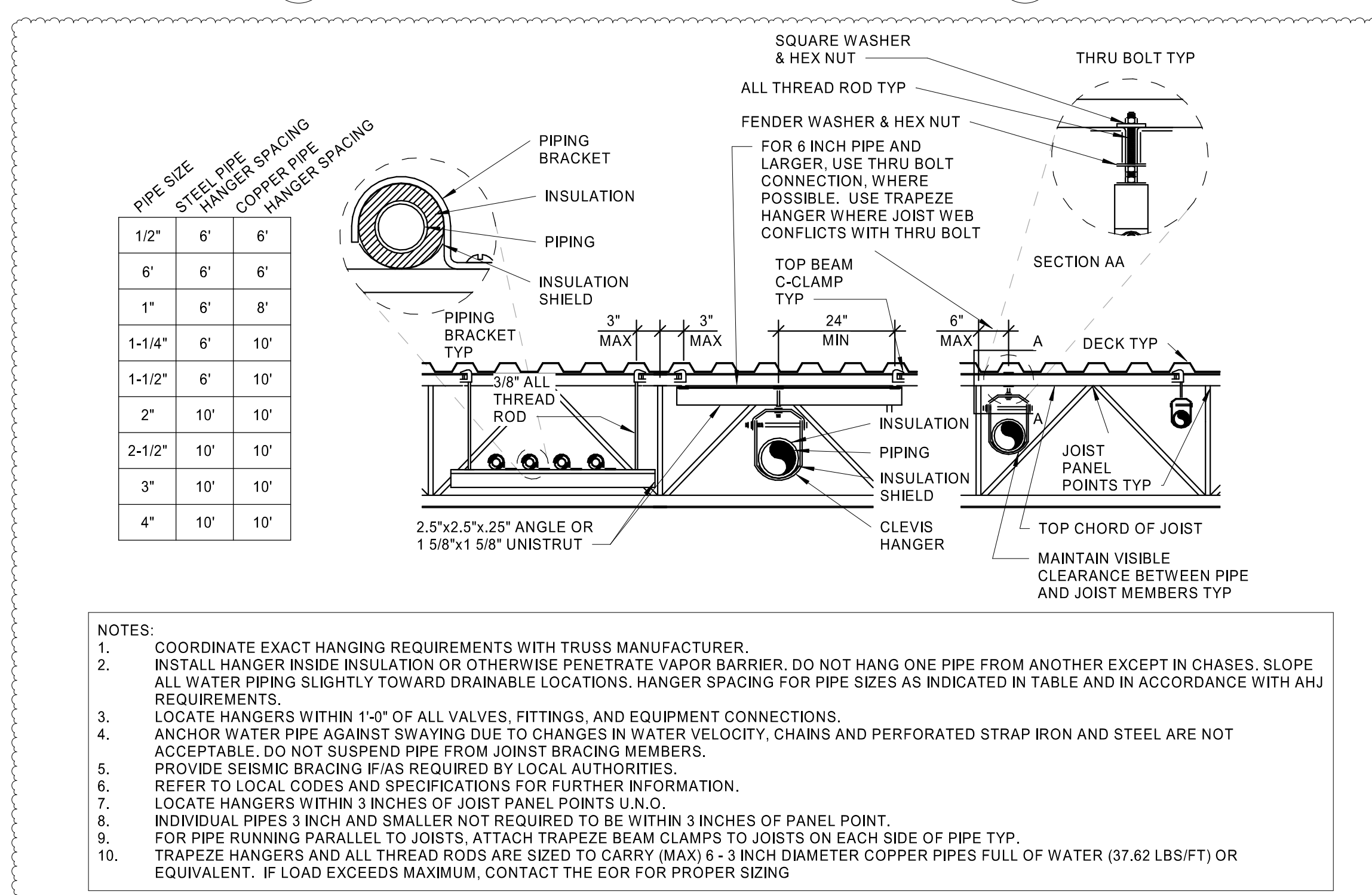
6 CO2 ALARM SYSTEM DETAIL  
M4.0 NTS



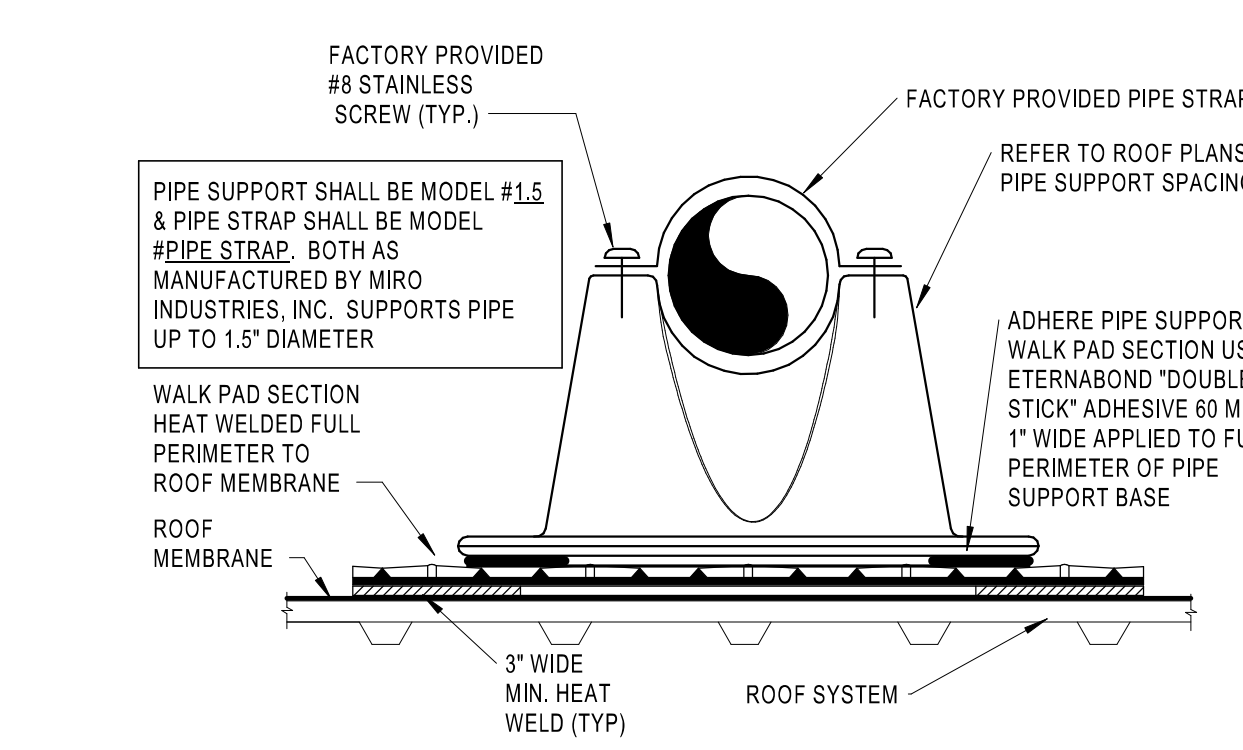
7 CEILING EXHAUST FAN DETAIL  
M4.0 NTS



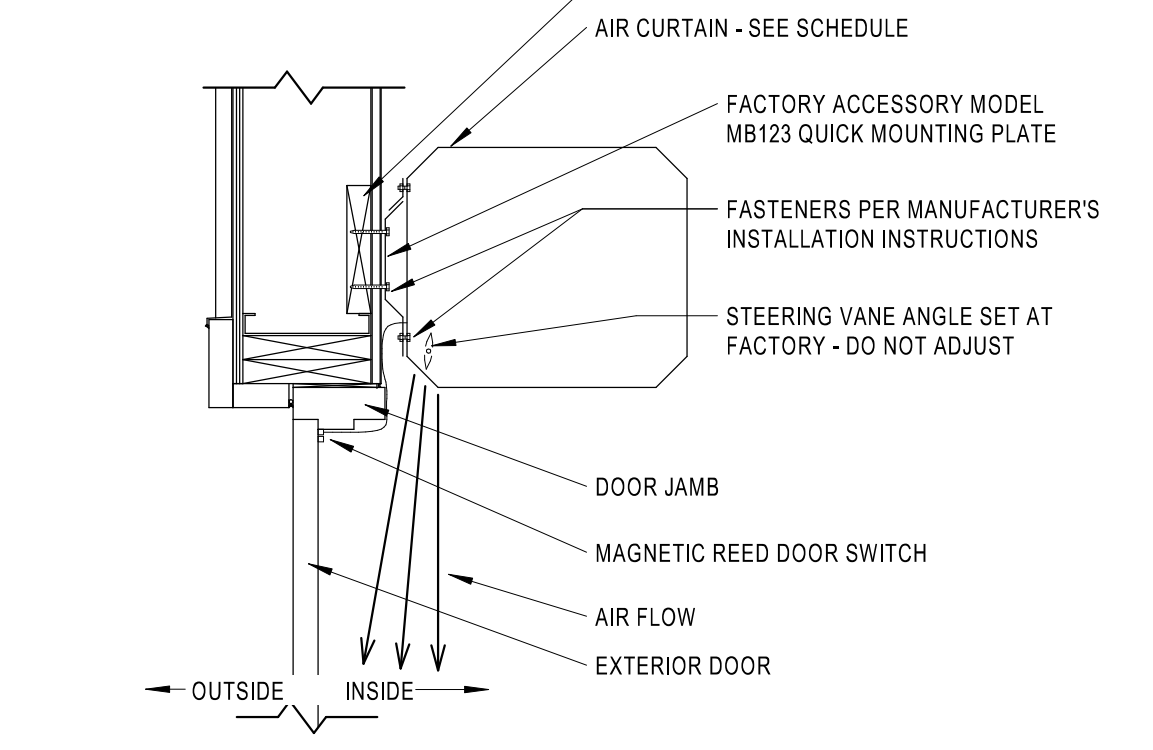
8 TYPICAL EXHAUST FAN DETAIL  
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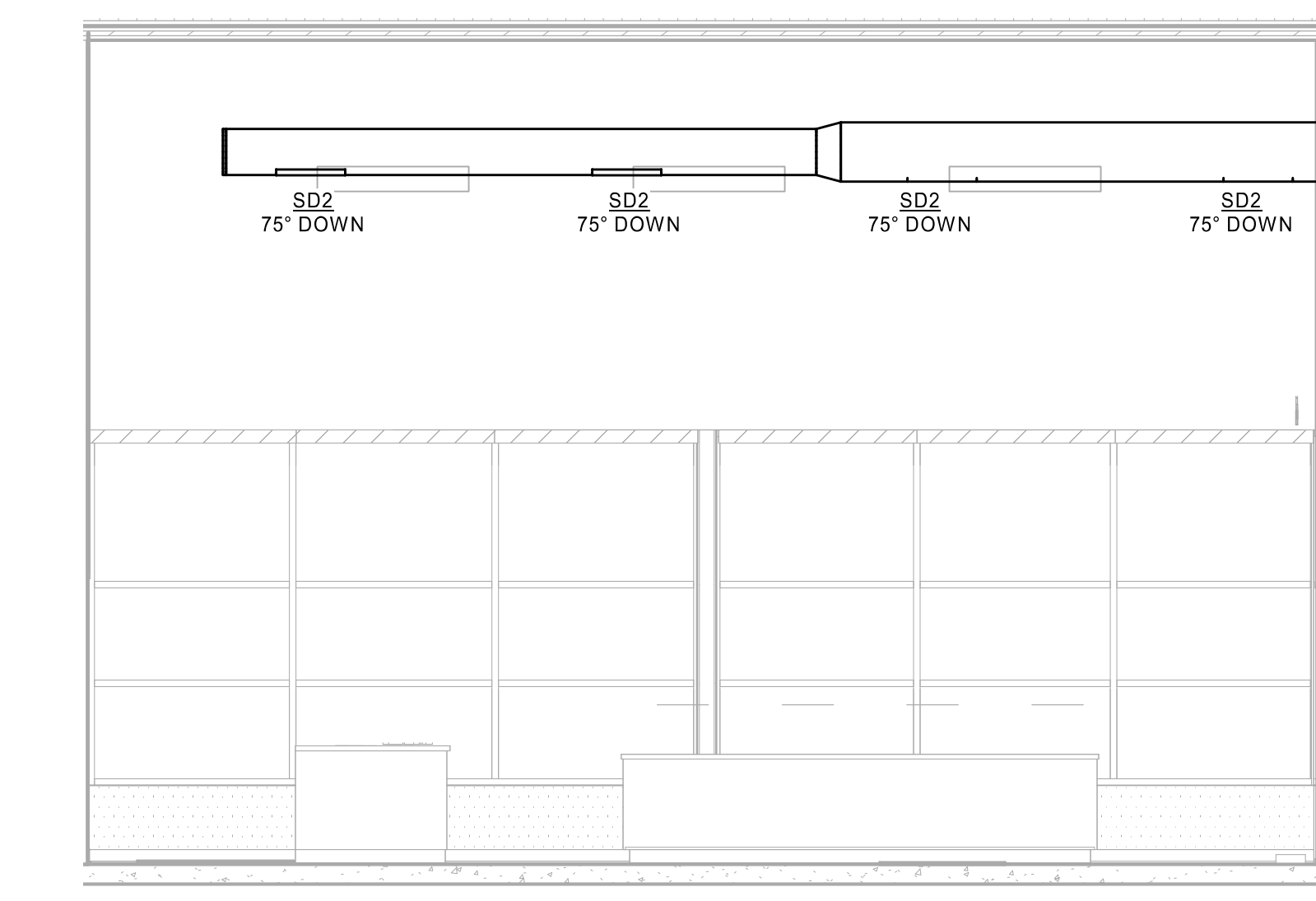
9 PIPE HANGER FOR STEEL JOIST DETAIL  
M4.0 NOT TO SCALE



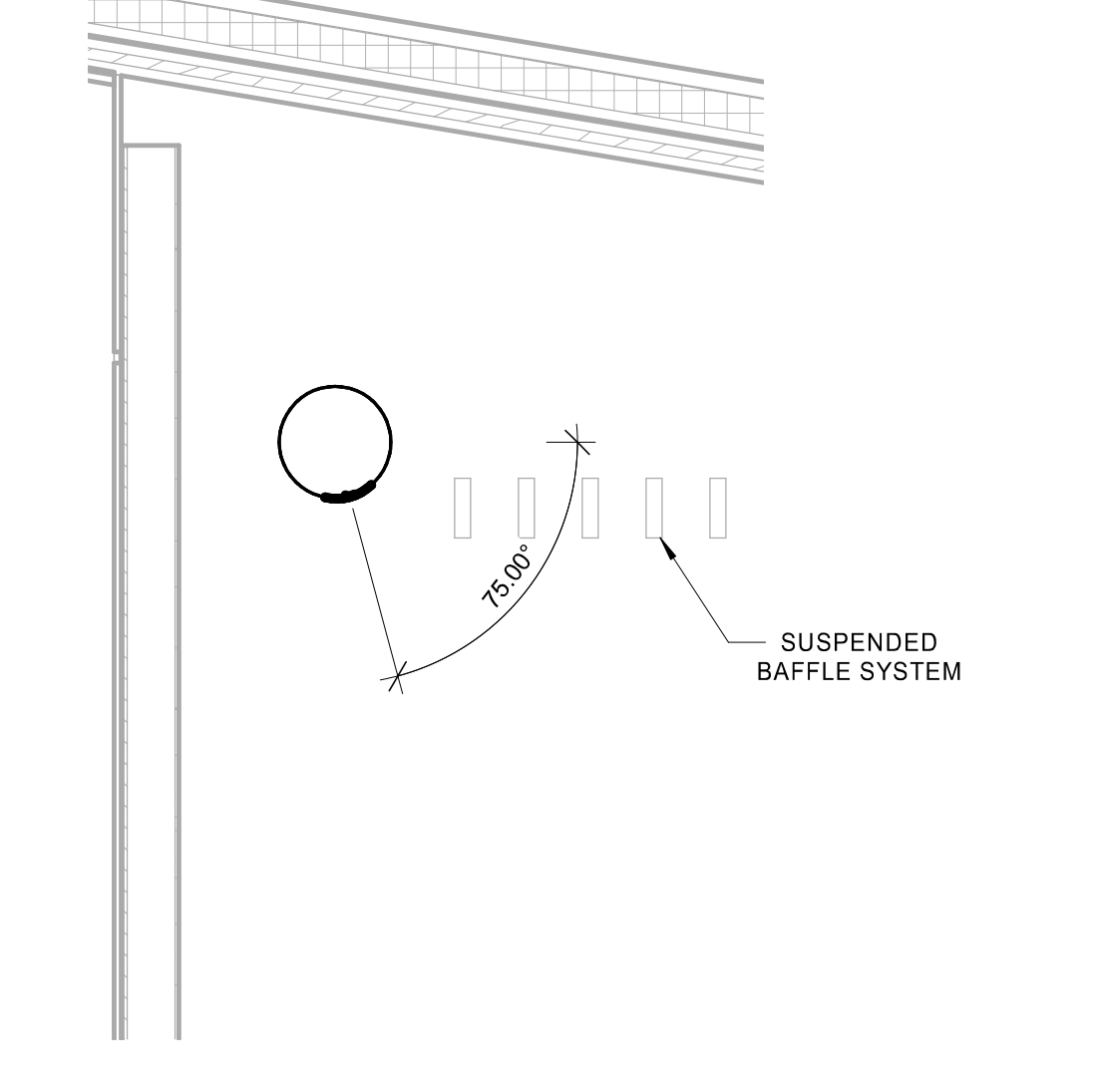
10 HVAC CONDENSATE PIPE ROOF SUPPORT DETAIL  
M4.0 NTS



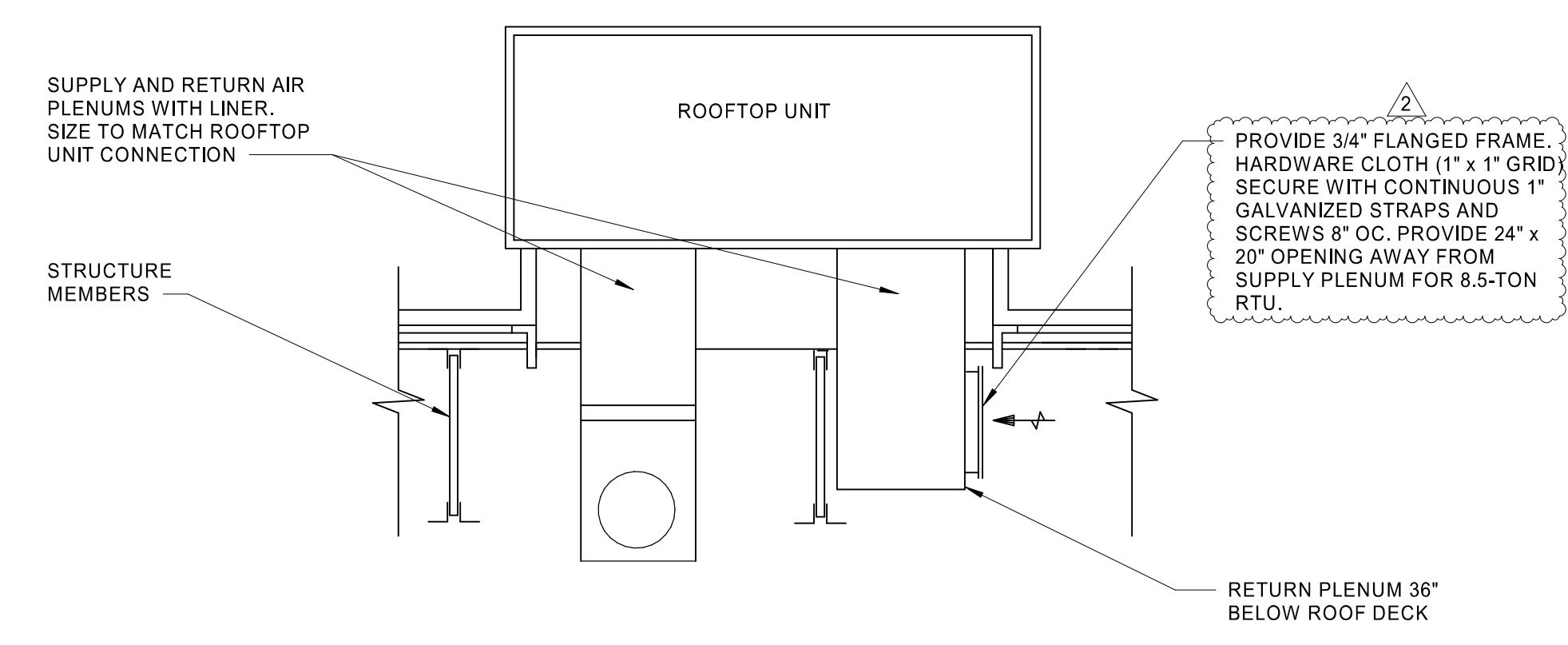
11 HVAC AIR CURTAIN INSTALLATION DETAIL  
M4.0 NTS



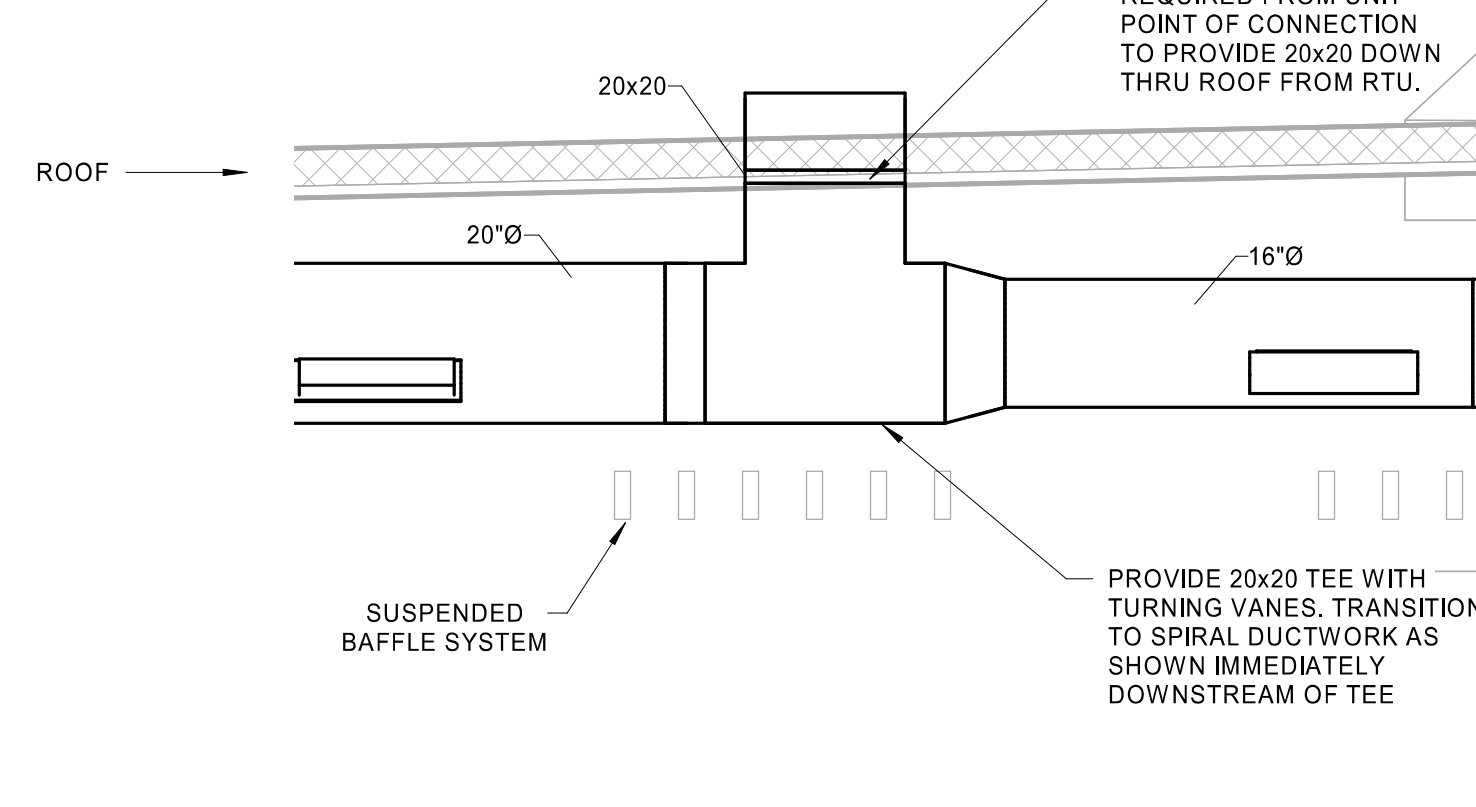
12 FRONT RETAIL DIFFUSER LAYOUT  
M4.0 114\"/>



13 FRONT RETAIL DIFFUSER ANGLE DETAIL  
M4.0 12\"/>



14 RTU DUCTWORK DROP DETAIL  
M4.0 NOT TO SCALE



15 RTU-2 SUPPLY DUCTWORK DROP  
M4.0 12\"/>

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PLAN ISSUE: CONSTRUCTION SET

REG. PROFESSIONAL ENGINEER  
GREG J. SCHLUTERMAN  
Lic. No. 48785

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MECHANICAL DETAILS