

HVAC SPECIFICATIONS

DIVISION 23 HVAC

23 05 00 BASIC HVAC REQUIREMENTS

- SEE DIVISION 00 PROCUREMENT AND CONTRACTING AND DIVISION 01 GENERAL REQUIREMENT FOR ADDITIONAL REQUIREMENTS.
- HVAC CONTRACTOR SHALL VERIFY REQUIREMENTS FOR TEMPORARY HEATING WITH GENERAL CONTRACTOR AND INCLUDE IN HIS SCOPE OF WORK WHEN DIRECTED BY G.C. INSTALL IN ACCORDANCE WITH ALL CODE AND OSHA REQUIREMENTS FOR CONSTRUCTION PROJECTS.
- SUBSTITUTIONS
 - SEE DIVISION 01 23 00 PRODUCT SUBSTITUTION PROCEDURES FOR ADDITIONAL REQUIREMENTS.
 - CONTRACTOR SHALL PROVIDE ALL SUPPORTING DATA AND ASSUME THE BURDEN OF PROOF THAT ANY SUBSTITUTE IS EQUIVALENT AS TO APPEARANCE, CONSTRUCTION, CAPACITY, AND PERFORMANCE. THE JUDGMENT OF EQUIVALENT SHALL BE MADE BY THE ENGINEER AT THE TIME OF SHOP DRAWING REVIEW, NOT DURING BIDDING.
 - WHERE SUBSTITUTE EQUIPMENT REQUIRES REDESIGN OF ANY PART OF THE PROJECT, THE COST OF REDESIGN AND ADDITIONAL COSTS OF THE WORK SHALL BE PAID BY THE CONTRACTOR. REDESIGN SHALL BE SUBJECT TO THE APPROVAL OF ALL AUTHORITIES HAVING JURISDICTION OVER THE WORK INCLUDING THE ARCHITECT/ENGINEER.
 - CONTRACTOR SHALL ASSUME ALL COORDINATION RESPONSIBILITIES FOR SUBSTITUTE EQUIPMENT INCLUDING COORDINATION ACROSS TRADES AND COORDINATION OF PREVIOUSLY REVIEWED AND APPROVED SHOP DRAWING SUBMITTALS, SHOULD THESE SHOP DRAWINGS BE AFFECTED BY THE SUBSTITUTED EQUIPMENT.
- SHOP DRAWINGS, PRODUCT DATA, TEST RESULTS, PROJECT CLOSEOUT DOCUMENTS.
 - SEE DIVISION 01 33 23 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES FOR ADDITIONAL REQUIREMENTS
 - CONSTRUCTION ADMINISTRATION SUBMITTAL LIST:
 - DUCTWORK
 - DUCTWORK ACCESSORIES
 - INSULATION
 - KITCHEN DUCTWORK
 - PIPING
 - PIPE HANGERS
 - VALVES
 - GRILLES
 - FANS
 - ELECTRIC WALL HEATERS
 - TEST AND BALANCE REPORT
 - PROJECT CLOSEOUT
 - PROVIDE HVAC EQUIPMENT OPERATING AND MAINTENANCE MANUALS TO THE OWNER PER IECC C303.3 AND C408.2.5.1.
 - AS-BUILT DRAWINGS SHALL BE MARKED ON A FINAL SET OF DRAWINGS WHICH INCLUDES ALL REVISIONS. DETAILS AND SCHEDULES ARE SHOWN TO AID THE CONTRACTOR AND ARE NOT MEANT TO BE INCLUSIVE OF ALL DEVICES. PROVIDE REQUIRED EQUIPMENT AND ACCESSORIES FOR A COMPLETE INSTALLATION.
- INSTALL ALL EQUIPMENT PER MANUFACTURER'S INSTALLATION INSTRUCTIONS AND REQUIREMENTS. PROVIDE ADDITIONAL WORK AND MATERIALS AS REQUIRED.
- COORDINATE INSTALLATION OF HVAC WORK WITH THE OTHER CONTRACTORS TO AVOID CONFLICTS WITH OTHER WORK.
- VERIFY CONNECTION REQUIREMENTS FOR EQUIPMENT FURNISHED BY OTHERS WITH FINAL SHOP DRAWINGS.
- PROVIDE ALL CUTTING AND PATCHING NECESSARY FOR HVAC WORK INSTALLATION UNLESS THIS WORK IS IDENTIFIED TO BE THE WORK OF OTHER CONTRACTORS. PATCHING SHALL MATCH ADJACENT SURFACES.
- REMOVE HVAC DUCTWORK, PIPING, EQUIPMENT, ETC. INDICATED BY THE DRAWINGS TO BE DEMOLISHED FROM THE JOB SITE, UNLESS INDICATED TO BE TURNED OVER TO THE OWNER.
- PROJECT COMPLETION
 - INSTALL CLEAN SET OF FILTERS IN ALL UNITS AT TIME OF TESTING AND BALANCING.
 - CLEAN GRILLES AND EQUIPMENT AND LEAVE IN PROPER WORKING CONDITION AT THE TIME OF FINAL CLEAN-UP.
 - PROVIDE OPERATING INSTRUCTIONS FOR A TOTAL OF FOUR (4) HOURS. MAINTAIN A RECORD OF OPERATING INSTRUCTION PERIODS AND OBTAIN OWNER SIGNOFF THAT INSTRUCTIONS HAVE BEEN COMPLETED.
- ACCESS
 - FURNISH ACCESS PANELS OF ADEQUATE SIZE TO PERMIT SERVICE OF EQUIPMENT, VALVES, OR OTHER SPECIALTIES WHICH REQUIRE MAINTENANCE OR ADJUSTMENT WHICH ARE INSTALLED BEHIND WALLS OR ABOVE CEILING SURFACES.
 - PANELS SHALL BE SUITABLE FOR INSTALLATION IN THE MATERIAL FORMING THE FINISHED SURFACE, WITH FLANGED FLUSH METAL FRAME, FLUSH HINGED STEEL DOOR, FLUSH SCREWDRIVER OPERATED LATCH.
 - PANELS UL LISTED TO CONFORM TO THE FIRE RATING OF THE SURFACE INSTALLED IN.
 - TURN ACCESS PANEL OVER TO CONTRACTOR SKILLED IN THE CONSTRUCTION OF THE SURFACES INVOLVED FOR INSTALLATION.
 - ARCHITECT TO APPROVE ACCESS PANEL LOCATION PRIOR TO INSTALLATION OF EQUIPMENT REQUIRING ACCESS.
 - COORDINATE WITH THE OTHER CONTRACTORS AND WHEREVER PRACTICAL, GROUP DEVICES IN SUCH A MANNER SO AS TO MINIMIZE PANELS.

23 05 13 MOTORS AND ELECTRICAL WORK

- MOTORS
 - MANUFACTURERS: GENERAL ELECTRIC, LOUIS ALLIS, MARATHON, AND BALDOR.
 - MOTORS LESS THAN 250 WATTS: EQUIPMENT MANUFACTURER'S STANDARD AND NEED NOT CONFORM TO THESE SPECIFICATIONS.
 - OPEN DRIP-PROOF TYPE EXCEPT TOTALLY ENCLOSED FAN COOLED FOR THE FOLLOWING MOTORS:
 - EXTERIOR LOCATIONS
 - WHERE NOTED ON EQUIPMENT SCHEDULES
 - DESIGN FOR CONTINUOUS OPERATION IN 40 DEGREES C ENVIRONMENT AND FOR TEMPERATURE RISE IN ACCORDANCE WITH NEMA MG 1 LIMITS.
 - SINGLE PHASE POWER (PERMANENT SPLIT CAPACITOR MOTORS) WITH STARTING TORQUE EXCEEDING ONE FOURTH OF FULL LOAD TORQUE AND STARTING CURRENT UP TO SIX TIMES FULL LOAD CURRENT. CLASS A (50 DEGREES C TEMPERATURE RISE) INSULATION, MINIMUM 1.0 SERVICE FACTOR, PRELUBRICATED SLEEVE OR BALL BEARINGS, AUTOMATIC RESET OVERLOAD PROTECTOR.
 - THREE PHASE POWER (SQUIRREL CAGE MOTORS) WITH STARTING TORQUE BETWEEN 1 AND 1-1/2 TIMES FULL LOAD TORQUE AND STARTING CURRENT SIX TIMES FULL LOAD CURRENT. NEMA DESIGN B MOTOR AND INSULATION SYSTEM. MINIMUM 1.15 SERVICE FACTOR FOR OPEN DRIP-PROOF MOTORS, 1.0 (MINIMUM) FOR OTHER TYPES. MINIMUM 85% NOMINAL POWER FACTOR UNDER RATED LOAD CONDITIONS. GREASE LUBRICATED ANTI-FRICTION BALL BEARINGS, RATED FOR MINIMUM AFMA 9, L-10 LIFE OF 200,000 HOURS.
- STARTERS
 - SEE ELECTRICAL STARTER DISCONNECT SCHEDULE ON PLANS.

23 05 29 PIPE AND EQUIPMENT HANGERS AND SUPPORTS

- MANUFACTURERS: B-LINE, EMPIRE INDUSTRIES, GLOBAL PIPE HANGER PRODUCTS, GRINNELL, NATIONAL PIPE HANGER, UNI STRUT.
- HOT DIP GALVANIZED HANGERS, RODS, AND ACCESSORIES AFTER FABRICATION WHICH ARE EXPOSED TO WEATHER.
- ANGLES, CHANNELS, AND BEAMS: ASTM A36 AND A572 AS REQUIRED.
- HANGERS SHALL NOT BE ATTACHED TO JOIST BRIDGING.
- PIPE HANGERS AND SUPPORTS
 - SEE DETAILS ON PLANS FOR ADDITIONAL PIPE HANGER SPECIFICATIONS.
 - SEE SCHEDULE ON PLANS FOR HANGER SPACING.
 - CONFORM TO ASME B31.9 AND MANUFACTURER'S STANDARDIZATION SOCIETY (MSS) SP-58-2009.
 - MATERIALS
 - INSTALL HANGERS AND SUPPORTS SO PIPING LIVE AND DEAD LOADS AND STRESSES FROM MOVEMENT WILL NOT BE TRANSMITTED TO CONNECTED EQUIPMENT. ADJUST HANGERS TO DISTRIBUTE LOADS EQUALLY ON ATTACHMENTS AND TO PROVIDE INDICATED PIPE SLOPES.

23 07 00 INSULATION

- GENERAL
 - SEE INSULATION SCHEDULES ON PLANS FOR ADDITIONAL INFORMATION.
 - INSULATION, INSULATION SYSTEM AND JACKETS SHALL MEET UL-723/ASTM E84 REQUIREMENTS OF MAX. FIRE HAZARD CLASSIFICATIONS OF 25 AND MAX. FLAME SPREAD, FUEL CONTRIBUTED, AND SMOKE DEVELOPED OF 50 WHEN INSTALLED IN A RETURN AIR PLENUM.
 - INSTALL MATERIALS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND MICA PUBLICATION "NATIONAL COMMERCIAL AND INDUSTRIAL STANDARDS", 2011 SEVENTH EDITION.
 - CONTINUE INSULATION WITHOUT INTERRUPTIONS THROUGH WALLS AND FLOOR PENETRATIONS AND HANGERS.
- FIBERGLASS (F.G.) INSULATION
 - FLEX. F.G.
 - O.C. SOFTDR DUCT WRAP, KNAUF FRIENDLY FEEL DUCT WRAP, CERTAINTED SOFTTOUCH, JOHNS MANVILLE MICROLITE EQ FSK DUCT WRAP.
 - GLASS FIBER INSULATION FACTORY LAMINATED TO FRK/FSK VAPOR RETARDER. LISTED THICKNESS IS NOMINAL.
 - 0.75 LB./CU. FT. R=3.3 / NOMINAL INCH AT 75 DEG F.
 - MAX 250 DEG F. JACKET MAX 150 DEG F. 0.02 PERM.
 - ACOUSTICAL DUCT LINING
 - O.C. QUIETR ROTARY DUCT LINER, KNAUF EQUIPMENT LINER M, CERTAINTED TOUGHGARD 2, JOHNS MANVILLE LINATEX.
 - DUCT LINER COMPLYING WITH ASTM C1071, NFPA 90A AND 90B.
 - LININGS MUST MEET ASTM C1338, ASTM G21 FUNGI TEST AND ASTM G22 BACTERIA TEST.

- AIR STREAM SURFACES SHALL BE EVALUATED IN ACCORDANCE WITH THE "EROSION TEST" IN UL 181 AND SHALL NOT BREAK AWAY, CRACK, PEEL, FLAKE OFF, OR SHOW EVIDENCE OF DELAMINATION OR CONTINUED EROSION UNDER TEST CONDITIONS.
- EDGE COAT ALL TRANSVERSE JOINTS AND EXPOSED EDGES.
- R= 4.2 /INCH AT 75 DEG F.
- MAX 250 DEG F.
- ELASTOMERIC FOAM INSULATION
 - SEAL BUTT JOINTS WITH ADHESIVE. INSTALL PER MANUFACTURER INSTRUCTIONS.
 - PIPE
 - MANUFACTURERS: AEROFLEX AEROCEL SSPT, K-FLEX/INSUL-LOCK DS, ARMACELL AP/ARMAFLEX BLACK LAPSEAL.
 - EPDM/PVC BASE ELASTOMERIC FOAM MATERIAL.
 - DUAL TAPE CLOSURE
 - MAX. K' VALUE 0.245 AT 75 DEG F.
 - MAX. CONTINUOUS TEMPERATURE 220 DEG F.
 - MAX. 0.05 PERM PER ASTM E96
 - MAX. FIRE/SMOKE DEVELOPED OF 25/50 PER ASTM E84 FOR UP TO 2" THICK.
 - PROVIDE MANUFACTURER PREFERRED INSULATION OVER VALVES AND FITTINGS
- FIRE RATED: THERMAL CERAMICS FASTWRAP XL COMMERCIAL KITCHEN GREASE DUCT WRAP OR EQUIVALENT GREASE DUCT ENCLOSURE COMPLYING WITH ASTM E2336. INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- JACKETS
 - PVC
 - ZESTON, CEELCO, PROTO LOSMOKE PVC JACKET
 - 30 MIL WHITE PVC. MAX TEMP 150 DEG F.
 - FULLY ADHERE JOINT WITH SOLVENT WELDED ADHESIVE. CIRCUMFERENTIAL SEAMS MINIMUM 1" OVERLAP. LONGITUDINAL SEAMS MINIMUM 1.5" OVERLAP. LOCATE JOINT AT LEAST VISIBLE SIDE OF PIPE.
 - PROVIDE SLIP JOINTS PERIODICALLY ON LONG RUNS OF STRAIGHT PIPE BY INCREASING CIRCUMFERENTIAL OVERLAP TO MINIMUM 8" AND APPLYING A FLEXIBLE WHITE CAULKING IN THE OVERLAP AREA.
- DUCT INSULATION REQUIREMENTS
 - INSULATE FITTINGS, JOINTS, FLANGES, FLEXIBLE CONNECTIONS, DAMPERS, AND IN-LINE ACCESSORIES WITHOUT INTERNAL LINING/INSULATION WITH SAME MATERIAL AND THICKNESS AS SPECIFIED FOR THE DUCT SYSTEM. STOP AND POINT INSULATION AROUND ACCESS DOORS AND DAMPER OPERATORS TO ALLOW OPERATION WITHOUT DISTURBING WRAPPING.
- PIPE INSULATION REQUIREMENTS
 - INSULATE ENTIRE PIPING SYSTEM INCLUDING VALVES AND FITTINGS PER MICA INSULATION STANDARDS PLATES 10 THRU 18.
 - SEAL ALL INSULATION ENDS.

23 31 13 DUCTWORK

- PERFORM WORK IN ACCORDANCE WITH THE LATEST EDITIONS OF SMACNA - HVAC DUCT CONSTRUCTION STANDARDS, NFPA 90A.
- GENERAL
 - SEAL ALL OUTSIDE AIR DUCT JOINTS WATERTIGHT WITH SILICONE SEALANT.
 - PAINT THE INSIDE OF ALL DUCTS VISIBLE THROUGH GRILLES IN ROOMS WITH CEILINGS WITH DULL BLACK PAINT. CERTAIN VERTICAL AND HORIZONTAL OFFSETS ARE INDICATED IN DUCTS TO INDICATE THE GENERAL POSITION RELATIONSHIP OF THE DUCTWORK SYSTEMS; PROVIDE ADDITIONAL OFFSETS AS REQUIRED TO COORDINATE WITH THE INSTALLATION OF OTHER SYSTEMS, CEILINGS AND STRUCTURE. THE DRAWINGS SHALL NOT BE SCALED TO DETERMINE EXACT LOCATION OF DUCTWORK.
 - PROVIDE TEMPORARY CLOSURES OF METAL OR TAPED POLYETHYLENE ON OPEN DUCTWORK TO PREVENT CONSTRUCTION DUST FROM ENTERING DUCTWORK SYSTEM.
 - LOCATE DUCTS WITH SUFFICIENT SPACE AROUND EQUIPMENT TO ALLOW NORMAL OPERATING AND MAINTENANCE ACTIVITIES.
 - INCREASE DUCT SIZES GRADUALLY, NOT EXCEEDING 15 DEGREES WHENEVER POSSIBLE. 30 DEGREE MAXIMUM.
 - ROUND DUCTS MAY BE SUBSTITUTED FOR RECTANGULAR IF SIZED IN ACCORDANCE WITH ASHRAE TABLES OF EQUIVALENT RECTANGULAR AND ROUND DUCTS.
- ROUND DUCTWORK
 - CONCEALED BRANCH DUCTWORK TO GRILLES AND DIFFUSERS MAY BE LONGITUDINAL LOCKSEAM. ALL OTHER ROUND DUCTWORK SHALL BE SPIRAL LOCKSEAM WITH FITTINGS AND COUPLINGS MINIMUM 2 GAUGES HEAVIER THAN DUCT.
- FLEXIBLE DUCTWORK
 - MANUFACTURERS: THERMAFLEX, FLEXMASTER, CLEVAFLX.
 - UL 181 LISTED CLASS 1 FACTORY FABRICATED FLEXIBLE AIR DUCT, COMPLY WITH NFPA 90A, FLAME SPREAD OF 25 OR LESS, SMOKE DEVELOPED RATING OF 50 OR LESS.
 - MINIMUM PRESSURE RANGE -1/2" TO 4" W.C., TEMPERATURE RANGE 0-200 DEG F.
 - ACOUSTIC: THERMAFLEX M-KE OR G-KM, FLEXMASTER TYPE 1 OR 6
 - POLYETHYLENE, SPUNBOUND NYLON OR CHLORINATED POLYETHYLENE LINER.
 - DUCTWORK TO HAVE TESTED ACOUSTICAL PERFORMANCE NOT LESS THAN 2 DB LESS THAN THE TYPES SPECIFIED.
 - SEMI-RIGID FLEXIBLE ALUMINUM DUCTWORK NOT PERMITTED.
 - SUPPLY DUCTWORK SHALL BE INSULATED WITH FIBERGLASS INSULATION, MINIMUM R VALUE 4, WITH VAPOR BARRIER JACKET WITH MAXIMUM 0.10 PERM RATING.
 - CONNECT TO SUPPLY DUCTWORK BY SLIDING CORE OVER COLLAR, TAPE JOINT WITH MINIMUM 3 WRAPS OF TAPE, AND APPLY METAL BAND CLAMP OR PANDUIT. FOR INSULATED DUCTWORK, PULL INSULATION AND OUTER JACKET BACK INTO POSITION, AND TAPE WITH MINIMUM 3 WRAPS OF TAPE BETWEEN FLEX DUCT AND DUCT INSULATION.
 - CONNECT TO GRILLES AND RETURN AND TRANSFER DUCTWORK WITH METAL BAND CLAMP OR PANDUIT.
 - MAXIMUM LENGTH FROM DUCTWORK TO GRILLES OR SLOTS 8'-0" WITH ONE 90 DEG ELBOW.
 - DO NOT RUN THROUGH WALLS OR PARTITIONS.
- DUCTWORK SEALANTS
 - MANUFACTURERS: HARDCAST SURE-GRIP 404 SOLVENT BASED DUCT SEALANT OR EQUIVALENT.
 - SYNTHETIC RUBBER RESIN BASE.
 - 20 TO 200 DEG F.
 - PRESSURE CLASSES UP TO 10" W.C., MEETING SEAL CLASS A.
 - MAXIMUM FLAME SPREAD OF 25, SMOKE DEVELOPED OF 50.
 - APPLY MINIMUM 20-MIL THICK WET FILM AT TEMPERATURES BETWEEN 35-100 DEG F.
 - HARDCAST ALUMA-GRIP 701 OR EQUIVALENT PRESSURE SENSITIVE DUCT JOINT ROLLED SEALANT MAY BE USED IN PLACE OF MASTIC. SEALANT SHALL COMPLY WITH THE FOLLOWING:
 - MIL FINISH ALUMINUM SUBSTRATE WITH GRAY ADHESIVE.
 - MINIMUM 30 MIL THICK.
 - MIL 17 LB PER LINEAR INCH PEEL STRENGTH.
 - MAX FLAME SPREAD OF 25, MAX SMOKE DEVELOPED OF 50 WHEN TESTED IN ACCORDANCE WITH ASTM G-53.
 - VOC: 0 G/L, COMPLIANT WITH LEED SQAQMD RULE 1168.
 - PRESSURE CLASSES UP TO 10" W.C.
- TYPE I KITCHEN HOOD EXHAUST DUCTWORK
 - LIQUID TIGHT, CONTINUOUS EXTERNAL WELDED SEAMS, JOINTS AND PENETRATIONS.
 - PROVIDE LISTED ACCESS PANELS IN THE DUCTWORK PER NFPA 96 AT MAXIMUM 12'-0" INTERVALS AND AT ALL CHANGES IN DIRECTION. PLACE A SIGN ON ALL ACCESS PANELS STATING THE FOLLOWING: "ACCESS PANEL - DO NOT OBSTRUCT".
 - PITCH HORIZONTAL DUCTS DOWN IN THE DIRECTION OF AIR FLOW MINIMUM 2% FOR HORIZONTAL RUNS UP TO 75 FEET AND 8% IN RUNS GREATER THAN 75 FEET. PROVIDE RESIDUE TRAP AT THE BASE OF EACH VERTICAL RISE WITH PROVISIONS FOR CLEANOUT NEAR THE BOTTOM OF THE TRAP.
- TYPE II KITCHEN HOOD EXHAUST DUCTWORK
 - LIQUID TIGHT, CONTINUOUS EXTERNAL SEALED SEAMS, JOINTS AND PENETRATIONS.
 - PITCH DUCTWORK DOWN TO CONNECTION AT HOOD.
- DUCT CLEANING
 - PROTECT DUCTWORK AGAINST ENTRY OF FOREIGN MATTER DURING CONSTRUCTION. PROVIDE TEMPORARY END CAPS AND SEALS. PROVIDE TEMPORARY FILTERS OVER RETURN OR EXHAUST AIR INLETS IF DUCTWORK IS USED DURING CONSTRUCTION.
 - REMOVE ALL DIRT AND FOREIGN MATTER AND CLEAN DIFFUSERS, REGISTERS, AND GRILLES BEFORE OPERATING FANS.
- SEALING DUCT PENETRATIONS
 - THRU NON-RATED WALLS WHERE DRYWALL, CONCRETE, OR MASONRY EXTENDS TO STRUCTURE, FILL VOID BETWEEN DUCT AND WALL WITH MINERAL WOOL AND CAULK BOTH SIDES WITH NON-HARDENING CAULK.

23 33 00 DUCTWORK ACCESSORIES

- GENERAL - ALL DUCT ACCESSORIES SHALL BE CONSTRUCTED OF SAME MATERIAL AS DUCTWORK BEING INSTALLED IN.
- TURNING VANES
 - MANUFACTURERS: AERO/DYNE CO. H.E.P., HART & COOLEY, UNITED MCGILL SEMCO.
 - RECTANGULAR DUCTWORK: AIRFOIL TURNING VANES IN ACCORDANCE WITH SMACNA FIG. 2-3 AND 2-4. VANE RADIUS AS PROVIDED BY AERO/DYNE H.E.P. OR 4-1/2 INCHES WITH A 3-1/2 INCH SPACING.
 - ROUND DUCTWORK: TWO-PIECE MITERED, MINIMUM 20 GAUGE.
- MANUAL VOLUME DAMPERS
 - MANUFACTURERS: RUSKEN, VENT PRODUCTS, UNITED MCGILL.
 - DAMPERS WITH EXTENDED SHAFTS AND QUADRANTS, OPERATOR WITH LOCKING DEVICE, POSITION INDICATOR, AND ELEVATED PLATFORM FOR EXTERNALLY INSULATED DUCTWORK.
 - EVERY SUPPLY, RETURN AND EXHAUST GRILLE SHALL HAVE EITHER A VOLUME DAMPER IN THE BRANCH DUCT OR AT THE GRILLE WHERE SHOWN. IF ONE IS NOT SHOWN, CONTRACTOR SHALL PROVIDE VOLUME DAMPER IN DUCT IF DUCT IS ACCESSIBLE, OTHERWISE AT THE GRILLE.
 - RECTANGULAR DAMPERS WHICH DO NOT EXCEED 12" HIGH OR 36" WIDE. BUTTERFLY DAMPER, MINIMUM 22 GAUGE. SHAFT ALONG ENTIRE LENGTH OF DAMPER FOR DAMPERS EXCEEDING 18" IN WIDTH.

LEGEND

NOTE: ALL SYMBOLS SHOWN MAY NOT APPEAR ON DRAWINGS.

SYM.	ABBR.	IDENTIFICATION	SYM.	ABBR.	IDENTIFICATION
DUCTWORK					
		DUCT (RISE/D)ROP			SA OR OA DUCT DOWN OR AWAY
		RADIUS ELBOW			EA DUCT DOWN OR AWAY
		SQUARE ELBOW WITH TURNING VANES			RA DUCT DOWN OR AWAY
		SQUARE ELBOW WITHOUT TURNING VANES			VD VOLUME DAMPER
		SQUARE OR RECTANGULAR BRANCH TAKEOFF			BDD BACKDRAFT DAMPER
		RECTANGULAR TO ROUND TAKEOFF			MOD MOTOR OPERATED DAMPER
		TEE WITH TURNING VANES			DSD DUCT SMOKE DETECTOR
		ROUND TO ROUND CONICAL TAKEOFF			FD FIRE DAMPER
		ECCENTRIC TRANSITION			SD SMOKE DAMPER
		CONCENTRIC TRANSITION			FSD FIRE/SMOKE DAMPER
		SQUARE TO ROUND TRANS.			SG SUPPLY GRILLE
		DUCT CAP			EG, RG, TG (EXHAUST / (RETURN / (TRANSFER) GRILLE
		ALD ACOUSTICALLY LINED DUCT			UCD UNDERCUT DOOR (BY GC)
		SA SUPPLY AIR DUCT UP			DTG DOOR TRANSFER GRILLE
		OA OUTSIDE AIR DUCT UP			FC FLEXIBLE CONNECTION
		RA RETURN AIR DUCT UP			AD ACCESS DOOR
		EA EXHAUST AIR DUCT UP			

MISCELLANEOUS AND CONTROLS			
	DETAIL OR SECTION NUMBER SHEET		STATIC PRESS. SENSOR
	HUMIDISTAT / HUMID. SENSOR		SLAB TEMPERATURE SENSOR
	THERMOSTAT / TEMP. SENSOR		COMBINATION STARTER
	VFD VARIABLE FREQUENCY DRIVE		MANUAL STARTER
	AFF ABOVE FINISHED FLOOR		OC ON CENTER
	AFG ABOVE FINISHED GRADE		PC PLUMBING CONTRACTOR
	AP ACCESS PANEL		RAO RETURN AIR OPENING
	BJ BETWEEN JOISTS		TAO TRANSFER AIR OPENING
	BOD BOTTOM OF DUCT		EAO EXHAUST AIR OPENING
	BOG BOTTOM OF GRILLE		TCC TEMPERATURE CONTROL CONTRACTOR
	EC ELECTRICAL CONTRACTOR		TCP TEMPERATURE CONTROL PANEL
	GC GENERAL CONTRACTOR / CONSTRUCTION MANAGER		TJ THRU JOISTS
	HC HVAC CONTRACTOR		TYP. TYPICAL
	IMP INSULATED METAL PANEL		TTS TIGHT TO STRUCTURE
	NIC NOT IN CONTRACT		TV TURNING VANES
	NTS NOT TO SCALE		WWM WELDED WIRE MESH

PIPING			
	SHUTOFF VALVE		PRV PRESS. REDUCING VALVE
	BALANCE VALVE		SRV SAFETY RELIEF VALVE
	CHECK VALVE		STEAM TRAP
	COMBINATION VALVE		ANCHOR
	STRAINER		GUIDE
	DRAIN VALVE		PIPING BOTTOM TAKE-OFF
	GLOBE VALVE		PIPING TOP TAKE-OFF
	THERMOMETER		PIPE DOWN OR AWAY
	PG PRESSURE GAUGE		PIPE UP
	GAUGE COCK		PIPING CAP
	TCV TEMP. CONTROL VALVE		UNION/FLANGE
	TEST CONNECTION		PIPE PITCH DOWN
	MAV MANUAL AIR VENT		CONCENTRIC REDUCER
	FM FLOW METER		ECCENTRIC REDUCER
	FLOW CONTROL / SHUTOFF VALVE		FC FLEXIBLE CONNECTION
	FLOW CONTROL VALVE		BF BLIND FLANGE
	GEO-S/GEO-R GEOTHERMAL SUPPLY/RETURN		HWS/HWR HOT WATER SUPPLY/RETURN
	CTS/CTR COOLING TOWER WATER SUPPLY/RETURN		GS/GR GLYCOL SUPPLY/RETURN
	MU MAKEUP WATER		RWS/RWR RADIANT WATER SUPPLY/RETURN
	LPS/LPC LOW PRESSURE STEAM/CONDENSATE		SMS/SMR SNOW MELT SUPPLY/RETURN
	HPS/HPC HIGH PRESSURE STEAM/CONDENSATE		FOS/FOR FUEL OIL SUPPLY/RETURN
	PC PUMPED CONDENSATE		BF BOILER FEED
	G/LP NATURAL GAS/LP GAS		CF CHEMICAL FEED
	D DRAIN		A COMPRESSED AIR
	CHWS/CHWR CHILLED WATER SUPPLY/RETURN		V VENT
FIRE RATED WALLS			
	FIRE - 1 HOUR		FIRE - 3 HOUR
	FIRE - 2 HOUR		FIRE - 4 HOUR

PROJECT DESIGN CRITERIA

MECHANICAL CODE **IMC 2015**
ENERGY CODE **IECC 2015**
SEISMIC DESIGN CATEGORY **D**
NEAREST ASHRAE CITY **ST LOUIS LAMBERT**
ELEVATION **709**

	OUTSIDE	
	DB	WB
WINTER:	6.6	N/A
SUMMER:	95.5	79.4

HVAC LEGEND AND SPECIFICATIONS



PROJECT INFORMATION

PROPOSED BUILDING RENOVATION
HAWAIIAN BROS - STR: 45
13963 STATE HWY AC • FLORISSANT, MO. 63033

PROFESSIONAL SEAL

SHEET DATES

SHEET ISSUE NOV. 16, 2021

REVISIONS

AD1	FEB. 25, 2022
CB1	APR. 26, 2022
CB2	MAY 11, 2022

JOB NUMBER

2164180

SHEET NUMBER

H0.1

HVAC SPECIFICATIONS (CONT.)

5. RECTANGULAR DAMPERS GREATER THAN 12" HIGH OR 36" WIDE. MULTI-BLADE DAMPER WITH CONNECTING LINKAGE TO CONTROL FROM A SINGLE POINT. BLADES MINIMUM 16 GAUGE WITH OPPOSED BLADE ACTION.
6. ROUND DAMPERS: MINIMUM 20 GAUGE BUTTERFLY DAMPER.
- D. TAKE-OFF FITTINGS
 1. MANUFACTURERS: FLEXMASTER, UNITED MCGILL.
 2. ROUND BRANCH TAKE-OFFS TO MULTIPLE GRILLES SHALL BE CONICAL.
 3. RECTANGULAR BRANCH TAKE-OFFS TO MULTIPLE GRILLES SHALL BE PER DUCT FITTING DETAIL ON PLANS.
 4. ROUND TAKE-OFFS TO INDIVIDUAL GRILLES AND SLOT DIFFUSERS: ONE PIECE SPIN-IN WITH INTEGRAL FACTORY INSTALLED LOCKING TYPE BALANCING DAMPERS.
- E. DUCT ACCESS DOORS
 1. MANUFACTURERS: CESCO, FLEXMASTER, VENT PRODUCTS, KEES, UNITED MCGILL, SEMCO, DUCTMATE.
 2. HINGE, LATCHES, HANDLES, AND RUBBER GASKET IN FRAME. 1" INSULATED DOUBLE WALL CONSTRUCTION FOR DOORS IN LINED OR EXTERNALLY INSULATED DUCTWORK. ATTACHMENT CABLES FOR SPIN-IN UNITS. DOOR SUITABLE FOR DUCT STATIC PRESSURE CLASS.
 3. DOOR SIZE 2" LESS THAN THE WIDTH OF THE DUCT (MAX. DOOR SIZE 24"X 24" (24" DIA.).
 4. ROUND DUCTWORK: 16 GAUGE ROLLED SHEET METAL HINGED ACCESS DOOR WITH BUCKLE LOCKS.
5. PROVIDE AT:
 - a. UPSTREAM SIDE OF TURNING VANES IN RETURN AND EXHAUST DUCTWORK
 - b. DRAIN PANS
 - c. DUCT MOUNTED SMOKE DETECTORS
 - d. AT ANY DEVICE IN THE DUCT WHICH REQUIRES MAINTENANCE, SERVICE OR CLEANING.
6. USE HINGED ACCESS DOORS WHERE POSSIBLE. USE CAM OPERATED REMOVABLE DOORS WHERE SPACE PREVENTS THE OPENING OF A HINGED MODEL.
- F. FLEXIBLE CONNECTIONS
 1. MANUFACTURERS: VENTFABRICS, DURO-DYNE.
 2. MATERIAL BOLTED SECURELY TO THE EQUIPMENT AND CONNECTING DUCTWORK WITH #16 GAUGE GALVANIZED IRON BAND (LOOP) CLAMPS BOLTED TIGHT TO MAKE AN AIRTIGHT CONNECTION, MINIMUM 6" WIDE.
 3. PROVIDE AT INLET AND OUTLET OF ALL AIR HANDLING UNITS AND FANS IN ACCORDANCE WITH SMACNA FIGURE 2-19.
 4. CONVENTIONAL INTERIOR: VENTGLAS, -20 TO 200 DEG F, .30 OZ. PER SQUARE YARD GLASS FABRIC DOUBLE COATED WITH NEOPRENE, UL 214 APPROVED.
- G. DUCTWORK ROOF CURBS
 1. MANUFACTURERS: PATE, THYCURB, RPS.
 2. 18 GAUGE GALVANIZED STEEL, UNITIZER, FULL MITERED CORNERS, ALL SEAMS WELDED, 1-1/2" THICK RIGID FIBERGLASS INSULATION, WOOD NAILER STRIP, WITHOUT RAISED CANT. COMPENSATE FOR ROOF INSULATION AND ROOF PITCH FOR LEVEL INSTALLATION. MINIMUM HEIGHT 18" ABOVE ROOF INSULATION.
 3. CONTRACTOR SHALL INSTALL (SET AND SECURE) ROOF CURBS.

23 90 00 TEMPERATURE CONTROLS

- A. INSTALLER QUALIFICATIONS: AUTOMATIC CONTROL SYSTEM MANUFACTURER'S AUTHORIZED REPRESENTATIVE WHO IS TRAINED AND APPROVED FOR INSTALLATION OF SYSTEM COMPONENTS REQUIRED FOR THIS PROJECT.
- B. ALL PRODUCTS USED IN THIS INSTALLATION SHALL BE NEW, CURRENTLY UNDER MANUFACTURE, AND SHALL BE APPLIED IN STANDARD OFF THE SHELF PRODUCTS. THIS INSTALLATION SHALL NOT BE USED AS A TEST SITE FOR ANY NEW PRODUCTS UNLESS EXPLICITLY APPROVED BY THE ENGINEER IN WRITING. SPARE PARTS SHALL BE AVAILABLE FOR AT LEAST 5 YEARS AFTER COMPLETION OF THIS CONTRACT.
- C. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, ARTICLE 100, BY A TESTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, AND MARKED FOR INTENDED USE.
- D. LABOR AND MATERIALS FOR THE CONTROL SYSTEM SPECIFIED SHALL BE WARRANTED FREE FROM DEFECTS FOR A PERIOD OF 12 MONTHS AFTER FINAL COMPLETION AND ACCEPTANCE. CONTROL SYSTEM FAILURES DURING THE WARRANTY PERIOD SHALL BE ADJUSTED, REPAIRED, OR REPLACED AT NO ADDITIONAL COST OR REDUCTION IN SERVICE TO THE OWNER.
- E. CONNECT AND CONFIGURE EQUIPMENT AND SOFTWARE TO ACHIEVE SEQUENCE OF OPERATION SPECIFIED.
- F. CONTROLLER HARDWARE USED OUTDOORS AND/OR IN WET AMBIENT CONDITIONS SHALL BE MOUNTED WITHIN NEMA 3R ENCLOSURES, AND RATED FOR OPERATION AT -40 DEG F TO 150 DEG F AND 10 TO 90% RH. HARDWARE USED IN CONDITIONED SPACE SHALL BE MOUNTED IN AN ENCLOSURE AND BE RATED FOR OPERATION AT 32 DEG F TO 120 DEG F.
- G. POWER SUPPLIES: UL LISTED TRANSFORMERS WITH CLASS 2 CURRENT-LIMITING TYPE OR OVERCURRENT PROTECTION; LIMIT CONNECTED LOADS TO 80 PERCENT OF RATED CAPACITY. DC POWER SUPPLY SHALL MATCH OUTPUT CURRENT AND VOLTAGE REQUIREMENTS AND BE FULL-WAVE RECTIFIER TYPE.
- H. POWER LINE FILTERING: INTERNAL OR EXTERNAL TRANSIENT VOLTAGE AND SURGE SUPPRESSION.
- I. ELECTRONIC SENSORS/TRANSMITTERS
 1. INSTALLATION
 - a. INSTALL ALL SENSORS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
 - b. ROOM TEMPERATURE SENSORS SHALL BE INSTALLED ON CONCEALED JUNCTION BOXES PROPERLY SUPPORTED BY THE WALL FRAMING WITH CONDUIT STUB TO ABOVE THE CEILING.
 - c. INSTALL DEVICES WHICH HAVE ADJUSTMENT 48 INCHES ABOVE THE FLOOR OR COMPLY WITH CURRENT ADA REQUIREMENTS. INSTALL NON-ADJUSTABLE CONTROL SENSORS AT 60 INCHES ABOVE THE FLOOR.
 - d. COORDINATE LOCATION OF THERMOSTATS, HUMIDISTATS, AND OTHER EXPOSED CONTROL SENSORS WITH PLANS AND ROOM DETAILS BEFORE INSTALLATION.
 - e. ALL WIRES ATTACHED TO SENSORS SHALL BE AIR SEALED IN THEIR RACEWAYS OR IN THE WALL TO STOP AIR TRANSMITTED FROM OTHER AREAS AFFECTING SENSOR READINGS.
- J. ELECTRICAL WIRING AND CONNECTION INSTALLATION
 1. PROVIDE 120 VAC POWER TO ANY CONTROL PANELS RELATED TO THIS SECTION NOT SHOWN ON THE DRAWINGS.
 2. ALL CONTROL AND INTERLOCK WIRING SHALL COMPLY WITH NATIONAL AND LOCAL ELECTRICAL CODES AND ELECTRICAL SPECIFICATION. WHERE THE REQUIREMENTS OF THIS SECTION DIFFER WITH THOSE IN THE ELECTRICAL SPECIFICATIONS, THE MORE STRINGENT REQUIREMENTS SHALL TAKE PRECEDENCE.
 3. ALL NEC CLASS 1 (LINE VOLTAGE) WIRING SHALL BE UL LISTED IN APPROVED RACEWAY PER NEC AND ELECTRICAL SPECIFICATIONS.
 4. SEE ELECTRICAL SPECIFICATIONS FOR CONDUIT REQUIREMENTS.
 5. ALL LOW-VOLTAGE WIRING SHALL MEET NEC CLASS 2 REQUIREMENTS. (LOW-VOLTAGE POWER CIRCUITS SHALL BE SUB-FUSED WHEN REQUIRED TO MEET CLASS 2 CURRENT-LIMIT).
 6. ALL WIRING IN MECHANICAL, ELECTRICAL, OR SERVICE ROOMS AND WHERE SUBJECT TO DAMAGE SHALL BE INSTALLED IN RACEWAY.
 7. WHERE NEC CLASS 2 (CURRENT-LIMITED) WIRES ARE IN CONCEALED AND ACCESSIBLE LOCATIONS, APPROVED CABLES NOT IN RACEWAY MAY BE USED PROVIDED THAT CABLES ARE UL LISTED FOR THE INTENDED APPLICATION.
 8. DO NOT INSTALL CLASS 2 WIRING IN RACEWAY, BOXES AND PANELS CONTAINING CLASS 1 WIRING.
 9. SUPPORT CABLES AND RACEWAYS FROM STRUCTURAL MEMBERS. CABLES AND RACEWAYS SHALL NOT BE SUPPORTED BY DUCTWORK, ELECTRICAL RACEWAYS, PIPING, OR CEILING SUSPENSION SYSTEMS. SECURE AND SUPPORT CABLE AT INTERVALS NOT EXCEEDING 30 INCHES AND NOT MORE THAN 6 INCHES FROM CABINETS, BOXES, FITTINGS, OUTLETS, RACKS, FRAMES, AND TERMINALS.
 10. INSTALL WIRING IN SLEEVES WHERE IT PASSES THROUGH WALLS AND FLOORS. MAINTAIN FIRE RATING AT ALL PENETRATIONS.
 11. SIZE OF WIRE AND RACEWAY SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR, AND BE PER THE MANUFACTURER'S RECOMMENDATION AND NEC REQUIREMENTS.
 12. INCLUDE ONE PULL STRING IN EACH RACEWAY 1" OR LARGER.
 13. LOCATE CONTROL AND STATUS RELAYS IN DESIGNATED ENCLOSURES ONLY.
 14. FLEXIBLE METAL RACEWAYS ARE NOT PERMITTED OVER 6 FEET.
 15. MAINTAIN UPDATED (AS-BUILT) WIRING DIAGRAMS WITH TERMINATIONS IDENTIFIED AT THE JOB SITE.
 16. IDENTIFICATION OF HARDWARE AND WIRING
 - a. LABEL ALL WIRING AND CABLING, INCLUDING THAT WITHIN FACTORY-FABRICATED PANELS, AT EACH END WITHIN 2" OF TERMINATION WITH THE DDC ADDRESS OR TERMINATION NUMBER.
 - b. PERMANENTLY LABEL OR CODE EACH POINT/OBJECT OF FIELD TERMINAL STRIPS TO SHOW THE INSTRUMENT OR ITEM SERVED.
- K. DUCT SMOKE DETECTORS AND THE INTERLOCK REQUIRED FOR ROOFTOP UNIT SHUTDOWN ARE FURNISHED BY THE EQUIPMENT MANUFACTURER.
- L. INSTALLATION
 1. INSTALL EQUIPMENT, PIPING, AND WIRING/RACEWAY PARALLEL TO BUILDING LINES (I.E., HORIZONTAL, VERTICAL, AND PARALLEL TO WALLS) WHEREVER POSSIBLE.
 2. INSTALL ALL EQUIPMENT IN READILY ACCESSIBLE LOCATIONS AS DEFINED BY CHAPTER 1, ARTICLE 100, PART A OF THE NATIONAL ELECTRICAL CODE (NEC).
 3. THE CONTRACTOR SHALL PROTECT ALL WORK AND MATERIAL FROM DAMAGE BY HIS WORK OR EMPLOYEES, AND SHALL BE LIABLE FOR ALL DAMAGE THUS CAUSED.
 4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIS WORK AND EQUIPMENT UNTIL FINALLY INSPECTED, TESTED, AND ACCEPTED. THE CONTRACTOR SHALL PROTECT ANY MATERIAL THAT IS NOT IMMEDIATELY INSTALLED.
 5. TEST AND BALANCE: FURNISH ALL TOOLS NECESSARY TO INTERFACE TO THE CONTROL SYSTEM FOR TEST AND BALANCE PURPOSES. PROVIDE A QUALIFIED TECHNICIAN TO ASSIST IN THE TEST AND BALANCE PROCESS.
- M. FIELD QUALITY CONTROL
 1. INSPECT, TEST, AND ADJUST FIELD-ASSEMBLED COMPONENTS AND EQUIPMENT INSTALLATION, AND TO ASSIST IN FIELD TESTING.
 2. PERFORM THE FOLLOWING FIELD TESTS AND INSPECTIONS AND PREPARE TEST REPORTS:
 - a. OPERATIONAL TEST: AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, START UNITS TO CONFIRM PROPER UNIT OPERATION. REMOVE AND REPLACE MALFUNCTIONING UNITS AND RETEST.
 - b. TEST AND ADJUST CONTROLS AND SAFETIES.
 - c. TEST CALIBRATION OF ELECTRONIC CONTROLLERS BY DISCONNECTING INPUT SENSORS AND SIMULATING OPERATION WITH COMPATIBLE SIGNAL GENERATOR.
 - d. TEST EACH POINT THROUGH ITS FULL OPERATING RANGE TO VERIFY THAT SAFETY AND OPERATING CONTROL SET POINTS ARE AS REQUIRED.
 - e. TEST EACH CONTROL LOOP TO VERIFY STABLE MODE OF OPERATION AND COMPLIANCE WITH SEQUENCE OF OPERATION. ADJUST PID ACTIONS.
 - f. TEST EACH SYSTEM FOR COMPLIANCE WITH SEQUENCE OF OPERATION.
 - g. TEST SOFTWARE AND HARDWARE INTERLOCKS.

23 90 10 SEQUENCE OF OPERATION

- A. ROOFTOP UNITS
 1. MOUNT REMOTE CONTROL PANEL IN MANAGERS OFFICE AND REMOTE TEMPERATURE / HUMIDITY SENSORS WHERE INDICATED ON PLAN AND PROVIDE ALL CONTROL WIRING ASSOCIATED WITH THESE DEVICES BACK TO ROOFTOP UNITS.
 2. PROVIDE SMOKE DETECTOR SIGNALING AND TESTING DEVICE, COMPATIBLE WITH SMOKE DETECTOR PROVIDED BY ROOFTOP UNIT MANUFACTURER, WITH ADD ON "SMOKE" STROBE AND WIRE TO SMOKE DETECTOR AT ROOFTOP UNIT. INSTALL SIGNALING AND TESTING DEVICES IN AN AHI APPROVED LOCATION.
 3. MOUNT AND WIRE ALL CONTROL WIRING ASSOCIATED WITH THE ROOFTOP UNITS AND PROVIDE ANY ADDITIONAL DEVICES NECESSARY FOR A COMPLETE OPERATIONAL SYSTEM.
- B. EXHAUST FANS (EFS)
 1. CONTROL OF KITCHEN HOOD EXHAUST FANS BY KITCHEN EQUIPMENT SUPPLIER.
 2. TOILET ROOM EXHAUST FAN TO OPERATE CONTINUOUSLY DURING OCCUPIED CYCLE OF ROOFTOP UNITS.
 3. CO2 EXHAUST FAN TO OPERATE UPON ALARM FROM CO2 DETECTOR.

23 95 00 TESTING, ADJUSTING AND BALANCING

- A. QUALITY ASSURANCE
 1. PERFORM TOTAL SYSTEM BALANCE IN ACCORDANCE WITH AABC NATIONAL STANDARDS FOR FIELD MEASUREMENT AND INSTRUMENTATION, TOTAL SYSTEM BALANCE OR NEBB PROCEDURAL STANDARDS FOR TESTING, BALANCING AND ADJUSTING OF ENVIRONMENTAL SYSTEMS, AND ASHRAE STANDARD 111.
 2. THE TESTING, ADJUSTING AND BALANCING (TAB) CONTRACTOR SHALL BE AN INDEPENDENT COMPANY SPECIALIZING IN THE TESTING, ADJUSTING, AND BALANCING OF SYSTEMS WITH MINIMUM THREE YEARS EXPERIENCE AND NOT ASSOCIATED WITH THE SUPPLIERS OF EQUIPMENT OR THE INSTALLING CONTRACTOR.
 3. PERFORM WORK UNDER SUPERVISION OF AABC CERTIFIED TEST AND BALANCE ENGINEER OR NEBB CERTIFIED TESTING, BALANCING AND ADJUSTING SUPERVISOR.
- B. SUBMITTALS
 1. CONTRACTOR SHALL SUBMIT THE FINAL TESTING AND BALANCING REPORT TO LOCAL AHI PRIOR TO PROJECT COMPLETION AND IN ADVANCE OF DATE OF OCCUPANCY. SUBMIT REPORTS ON AABC NATIONAL STANDARDS FOR TOTAL SYSTEM BALANCE OR NEBB FORMS.
 2. SUBMIT THE DESIGN AND ACTUAL DATA FOR EACH SCHEDULED PIECE OF EQUIPMENT: MODEL; SUPPLY, RETURN, AND OUTSIDE AIR FLOWS; STATIC PRESSURE PROFILES OF AIR HANDLING UNIT COMPONENTS AND ALL FANS; FAN RPM, BHP, AMPERAGE; FAN AND MOTOR SHEAVE, DIAMETER, BORE AND MAKE; BELT SIZE AND QUANTITY; MOTOR SHEAVE CENTER LINE AND OPERATOR DISTANCE; ROOM AIR FLOW; EQUIPMENT FLOW RATES AND PRESSURE DROPS.
- C. INSTALLATION TOLERANCES
 1. AIR HANDLING SYSTEMS: ADJUST SUPPLY SYSTEMS TO WITHIN PLUS OR MINUS 5 PERCENT OF DESIGN AND RETURN AND EXHAUST SYSTEMS TO PLUS OR MINUS 10 PERCENT OF DESIGN.
 2. AIR OUTLETS AND INLETS: ADJUST TOTAL AIR FLOW TO SPACE TO WITHIN PLUS 10 PERCENT AND MINUS 5 PERCENT OF DESIGN.
 3. ADJUST OUTLETS AND INLETS IN SPACE TO WITHIN PLUS OR MINUS 10 PERCENT OF DESIGN.
- D. AIR SYSTEM BALANCE
 1. VARY TOTAL SYSTEM AIR QUANTITIES BY ADJUSTING FAN SPEEDS. VARY BRANCH AIR QUANTITIES BY DAMPER REGULATION.
 2. ADJUST SETTINGS ON DIRECT DRIVE FANS WITH ECM MOTORS AS REQUIRED TO ACHIEVE DESIGN AIRFLOW.
 3. ADJUST OUTSIDE AIR, RETURN AIR, AND EXHAUST AIR AUTOMATIC DAMPERS FOR DESIGN CONDITIONS.
 4. TEST AIR HANDLING UNITS AT MINIMUM AND 100% OUTSIDE AIR.
 5. FOR BELT DRIVE FANS WITH A VFD, ADJUST BELT AND SHEAVES TO ACHIEVE DESIGN AIRFLOW WITH VFD AT 60 HERTZ. VFD IS NOT TO BE USED FOR INITIAL BALANCING.
- E. FANS WITH FIXED MOTOR SHEAVES - TEST THE FAN EQUIPMENT. IF THE DESIGN CONDITIONS ARE NOT OBTAINED, CALCULATE THE FINAL FIXED MOTOR SHEAVE AND/OR BELTS REQUIRED TO OBTAIN DESIGN CONDITIONS. HEATING CONTRACTOR SHALL OBTAIN THE FINAL FIXED MOTOR SHEAVE AND BELT(S) FROM THE FAN MANUFACTURER AND TURN THEM OVER TO THE TAB CONTRACTOR FOR INSTALLATION.

CB1



PROJECT INFORMATION

PROPOSED BUILDING RENOVATION
HAWAIIAN BROS - STR: 45
 13963 STATE HWY AC • FLORISSANT, MO. 63033

PROFESSIONAL SEAL

SHEET DATAS

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PROJECT INFORMATION

PROPOSED BUILDING RENOVATION
HAWAIIAN BROS - STR: 45
 13963 STATE HWY AC • FLOISSANT, MO. 63033

PROFESSIONAL SEAL

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GENERAL NOTES

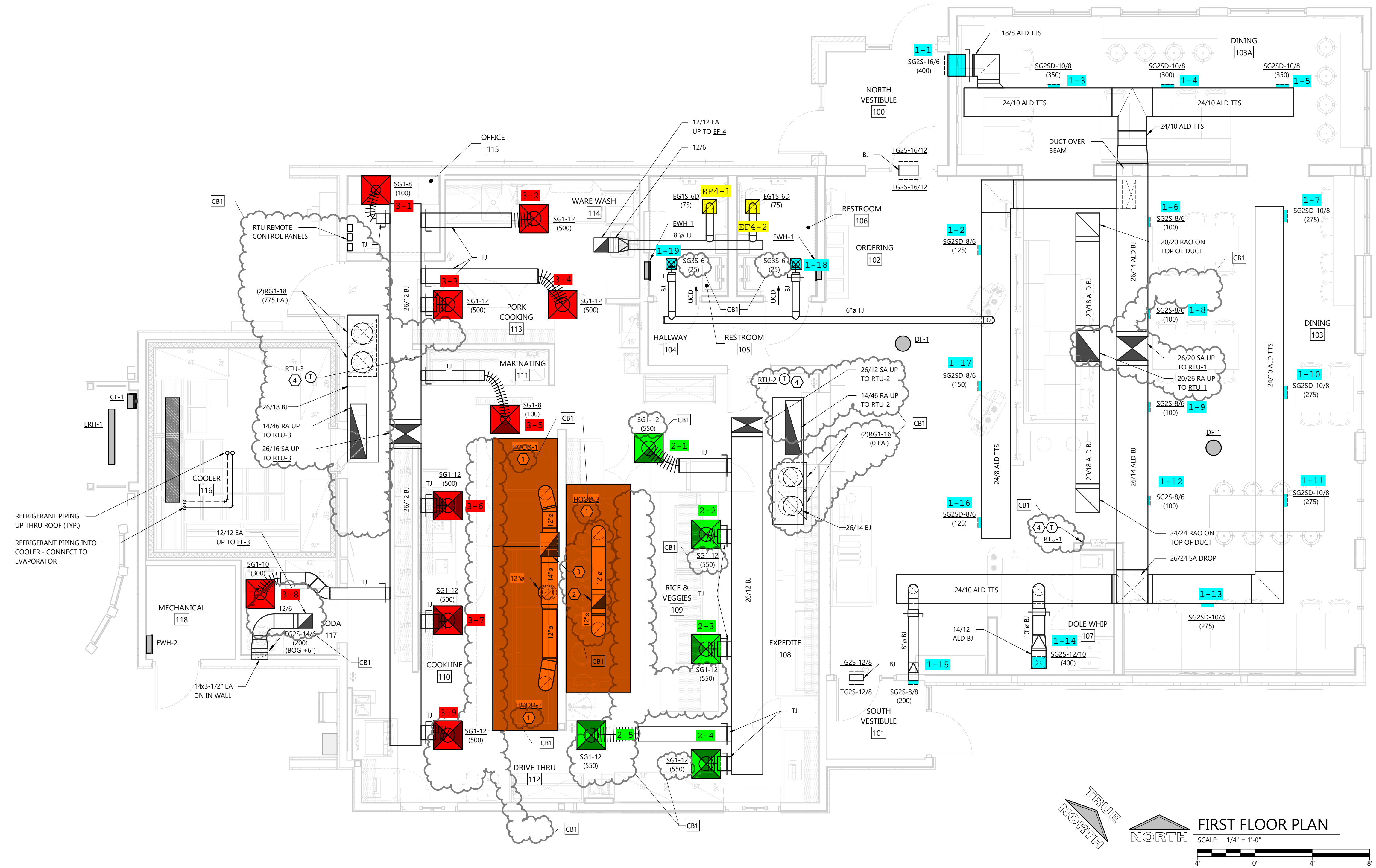
- VERIFY BUILDING OPENING AND CURB SIZES LISTED ON PLANS WITH ACTUAL EQUIPMENT SCHEDULED AND SUPPLIED. COORDINATE REQUIRED OPENING SIZES AND LOCATIONS WITH CONTRACTORS PROVIDING OPENING SCHEDULES AND ACTUAL EQUIPMENT SIZES SHALL TAKE PRECEDENCE OVER SIZES SHOWN ON PLANS.
- DETAIL REFERENCES ON PLANS ARE TO AID THE CONTRACTOR IN IDENTIFYING THE APPLICABLE DETAIL. NOT ALL DETAILS, OR INSTANCES OF DETAILS, ARE REFERENCED ON PLANS. CONTRACTOR IS RESPONSIBLE TO REVIEW AND COMPLY WITH ALL APPLICABLE DETAILS WHETHER OR NOT REFERENCED ON PLANS.
- COORDINATE LOCATION OF ALL EXPOSED PIPING AND DUCTWORK WITH OWNER PRIOR TO INSTALLATION.
- IF DUCT SYSTEMS ARE USED FOR TEMPORARY HEAT, PROVIDE TEMPORARY FILTERS AT RETURN AIR OPENINGS AND INSTALL FILTERS IN THE UNITS. EQUIVALENT TO THE EFFICIENCY OF THE SPECIFIED FILTERS FOR THE UNIT. IF PROPER EFFICIENCY FILTERS ARE NOT INSTALLED IN UNIT, UNIT AND ALL DUCTWORK DOWNSTREAM OF UNIT SHALL BE CLEANED BEFORE TEST AND BALANCE.

KEYNOTES

- 1 KITCHEN HOOD - FURNISHED BY KITCHEN EQUIPMENT SUPPLIER, INSTALLED BY H.C.
- 2 12/12 EA UP - TRANSITION IN CURB TO EXHAUST FAN CONNECTION SIZE.
- 3 16/20 EA UP - TRANSITION IN CURB TO EXHAUST FAN CONNECTION SIZE.
- 4 NON-ADJUSTABLE TEMPERATURE / HUMIDITY SENSOR. INSTALL AT 60" A.F.F.

SEISMIC NOTE

NOTE:
 PROJECT IS SEISMIC DESIGN CATEGORY "D" - INSTALL ALL EQUIPMENT PER ASCE STANDARD CHAPTER 13



TRUE NORTH
 NORTH
FIRST FLOOR PLAN
 SCALE: 1/4" = 1'-0"
 4' 0' 4' 0'

HVAC FIRST FLOOR PLAN

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GAS SPECIFICATIONS

DIVISION 23 HVAC

23 05 00 BASIC HVAC REQUIREMENTS

- A. SEE DIVISION 00 PROCUREMENT AND CONTRACTING AND DIVISION 01 GENERAL REQUIREMENT FOR ADDITIONAL REQUIREMENTS.
- B. HVAC CONTRACTOR SHALL VERIFY REQUIREMENTS FOR TEMPORARY HEATING WITH GENERAL CONTRACTOR AND INCLUDE IN HIS SCOPE OF WORK WHEN DIRECTED BY G.C. INSTALL IN ACCORDANCE WITH ALL CODE AND OSHA REQUIREMENTS FOR CONSTRUCTION PROJECTS.
- C. SHOP DRAWINGS, PRODUCT DATA, TEST RESULTS, PROJECT CLOSEOUT DOCUMENTS:
 - 1. SEE DIVISION 01 33 23 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES FOR ADDITIONAL REQUIREMENTS
 - 2. CONSTRUCTION ADMINISTRATION SUBMITTAL LIST:
 - a. PIPING
 - b. PIPE HANGERS
 - c. VALVES
 - d. GAS PRESSURE REGULATORS
- D. FINISHING AND PAINTING
 - 1. SEE DIVISION 09 91 00 FINISH AND PAINTING FOR ADDITIONAL REQUIREMENTS.
 - 2. PREPARE EXPOSED PIPE, FITTINGS, SUPPORTS, AND ACCESSORIES FOR FINISH PAINTING IN ROOMS THAT WILL HAVE CEILING AND STRUCTURE PAINTED.
 - 3. COORDINATE WORK WITH THE PAINTERS SO THAT ALL EQUIPMENT IS INSTALLED PRIOR TO PAINTING. H.C. SHALL PAINT ITEMS IF NOT IN PLACE PRIOR TO NORMAL ROUTINE PAINTING.
 - 4. IF FINISH BECOMES RUSTED, CORRODED, SCRATCHED, OR FLAKED DURING STORAGE OR INSTALLATION, REFINISH THE EQUIPMENT TO THE SATISFACTION OF THE OWNER.
 - 5. WHERE THE HEATING CONTRACTOR IS REQUIRED TO PAINT, THE PAINTING SHALL BE DONE IN ACCORDANCE WITH THE PAINTING PORTION OF THE ARCHITECTURAL SPECIFICATION.
- E. DETAILS AND SCHEDULES ARE SHOWN TO AID THE CONTRACTOR AND ARE NOT MEANT TO BE INCLUSIVE OF ALL DEVICES. PROVIDE REQUIRED EQUIPMENT AND ACCESSORIES FOR A COMPLETE INSTALLATION.
- F. INSTALL ALL EQUIPMENT PER MANUFACTURER'S INSTALLATION INSTRUCTIONS AND REQUIREMENTS. PROVIDE ADDITIONAL WORK AND MATERIALS AS REQUIRED.
- G. COORDINATE INSTALLATION OF WORK WITH THE OTHER CONTRACTORS TO AVOID CONFLICTS WITH OTHER WORK.

- H. VERIFY CONNECTION REQUIREMENTS FOR EQUIPMENT FURNISHED BY OTHERS WITH FINAL SHOP DRAWINGS.
- I. PROVIDE ALL CUTTING AND PATCHING NECESSARY FOR INSTALLATION UNLESS THIS WORK IS IDENTIFIED TO BE THE WORK OF OTHER CONTRACTORS. PATCHING SHALL MATCH ADJACENT SURFACES.
- J. GAS SERVICE
 - 1. CONNECTED GAS LOAD TO EXISTING METER IS BEING INCREASED AND METER MAY NEED TO BE REPLACED BY GAS COMPANY. CONTACT GAS UTILITY TO COORDINATE METER REPLACEMENT AND ASSIST OWNER IN APPLYING FOR LARGER SERVICE. PROVIDE RESTART OF ALL EXISTING GAS APPLIANCES IF REQUIRED AFTER METER REPLACEMENT.
 - 2. GAS SERVICE COST BY OWNER.

23 05 29 PIPE AND EQUIPMENT HANGERS AND SUPPORTS

- A. MANUFACTURERS: B-LINE, EMPIRE INDUSTRIES, GLOBAL PIPE HANGER PRODUCTS, GRINNELL NATIONAL PIPE HANGER, LINT STRUT
- B. HOT DIP GALVANIZING HANGERS, RODS, AND ACCESSORIES AFTER FABRICATION WHICH ARE EXPOSED TO WEATHER. ANGLES, CHANNELS, AND BEAMS: ASTM A36 AND A572 AS REQUIRED.
- C. HANGERS SHALL NOT BE ATTACHED TO JOIST BRIDGING.
- D. PIPE HANGERS AND SUPPORTS
 - 1. SEE DETAILS ON PLANS FOR ADDITIONAL PIPE HANGER SPECIFICATIONS.
 - 2. SEE SCHEDULE ON PLANS FOR HANGER SPACING.
 - 3. CONFORM TO ASME B31.9 AND MANUFACTURER'S STANDARDIZATION SOCIETY (MSS) SP-58-2009.
 - 4. MATERIALS
 - 5. INSTALL HANGERS AND SUPPORTS SO PIPING LIVE AND DEAD LOADS AND STRESSES FROM MOVEMENT WILL NOT BE TRANSMITTED TO CONNECTED EQUIPMENT. ADJUST HANGERS TO DISTRIBUTE LOADS EQUALLY ON ATTACHMENTS AND TO PROVIDE INDICATED PIPE SLOPES.

23 11 23 NATURAL GAS PIPING AND ACCESSORIES

- A. PIPING
 - 1. INSTALL, INSPECT, TEST, AND PURGE GAS PIPING IN CONFORMANCE WITH NFPA 54, UTILITY COMPANY AND ALL OTHER GOVERNING CODES.
 - 2. MAKE BRANCH CONNECTIONS TO THE MAIN FROM THE TOP OR SIDE.
 - 3. PAINTING GAS PIPING IS NOT BY HEATING CONTRACTOR. PAINTING PER SPECIFICATION 09 91 00 PAINTING.
- B. GAS VALVES

- 1. UL LISTED FOR USE AS NATURAL GAS SHUTOFF.
- 2. BALL VALVES (MANUFACTURERS: NIBCO 585/580-70UL, WATTS B6000UL); BRONZE BODY, THREADED ENDS, CHROME PLATED BRONZE BALL, FULL/CONVENTIONAL PORT, TEFLON SEAT, BLOWOUT-PROOF STEM, TWO-PIECE CONSTRUCTION, 150 PSIG WORKING PRESSURE.
- 3. PLUG VALVES (MANUFACTURERS: DEZURK PEC, HOMESTEAD SERIES 612); CAST IRON BODY, FLANGED ENDS, BRONZE BEARINGS, ELECTROLESS NICKEL PLATED CAST IRON PLUG WITH HYCAR RESILIENT PLUG SEAL, BUNA-N STEM SEAL PACKING, LEVER ACTUATOR, 175 PSIG WOG.
- C. GAS PRESSURE REGULATORS
 - 1. CAST IRON BODY, ALUMINUM SPRING CASE, ALUMINUM ORIFICE, BUNA-N DIAPHRAGM, INTERNAL RELIEF VALVE SET TO RELIEVE AT 7-10" W.C. ABOVE NORMAL OUTLET PRESSURE SETTING OF 7" W.C., TOPCOAT ENAMEL.
 - 2. SENSUS MODELS 496, 619Z, 143-90, 243
 - 3. FOR REGULATORS INSTALLED INDOORS, PIPE THE RELIEF VALVE VENT FULL SIZE TO THE OUTSIDE OF THE BUILDING AT A NON-HAZARDOUS LOCATION. INCREASE VENT SIZE ONE PIPE SIZE IF VENT LENGTH EXCEEDS 10 FEET. TERMINATE WITH AN ELBOW DOWN WITH A SCREEN OVER THE OPENING. DO NOT COMBINE VENTS.
 - 4. MAXITROL 325 SERIES WITH VENT LIMITER ARE PERMITTED FOR INDOOR APPLICATIONS WHERE SUPPLYING LESS THAN 300,000 BTUH.
 - 5. FOR REGULATORS INSTALLED OUTDOORS, POSITION THE REGULATOR SO THE RELIEF VALVE VENT IS FACING DOWN OR INSTALL ELBOW FACING DOWN A MINIMUM 10 FEET FROM AN OUTSIDE AIR INTAKE AND 5 FEET FROM A GAS FLUE DISCHARGE.

GENERAL NOTES

- DETAIL REFERENCES ON PLANS ARE TO AID THE CONTRACTOR IN IDENTIFYING THE APPLICABLE DETAIL. NOT ALL DETAILS, OR INSTANCES OF DETAILS, ARE REFERENCED ON PLANS. CONTRACTOR IS RESPONSIBLE TO REVIEW AND COMPLY WITH ALL APPLICABLE DETAILS WHETHER OR NOT REFERENCED ON PLANS.

KEYNOTES

- 1 CONNECT TO EXISTING.
- 2 1 1/4" GAS DOWN ALONG WALL. SEE DETAIL 1 ON SHEET H3.0G.
- 3 1 1/4" GAS DOWN ALONG WALL. SEE DETAIL 2 ON SHEET H3.0G.
- 4 SEE 4/H3.0G FOR GAS PIPE SUPPORT. SEE 5/H3.0G FOR SPACING.

CB2

PIPE SCHEDULE

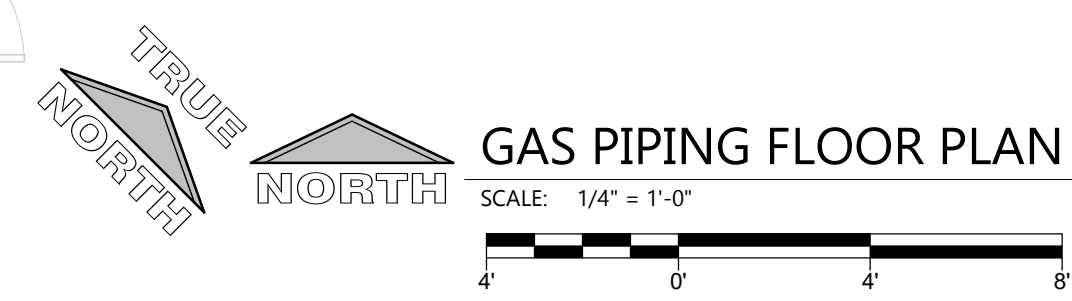
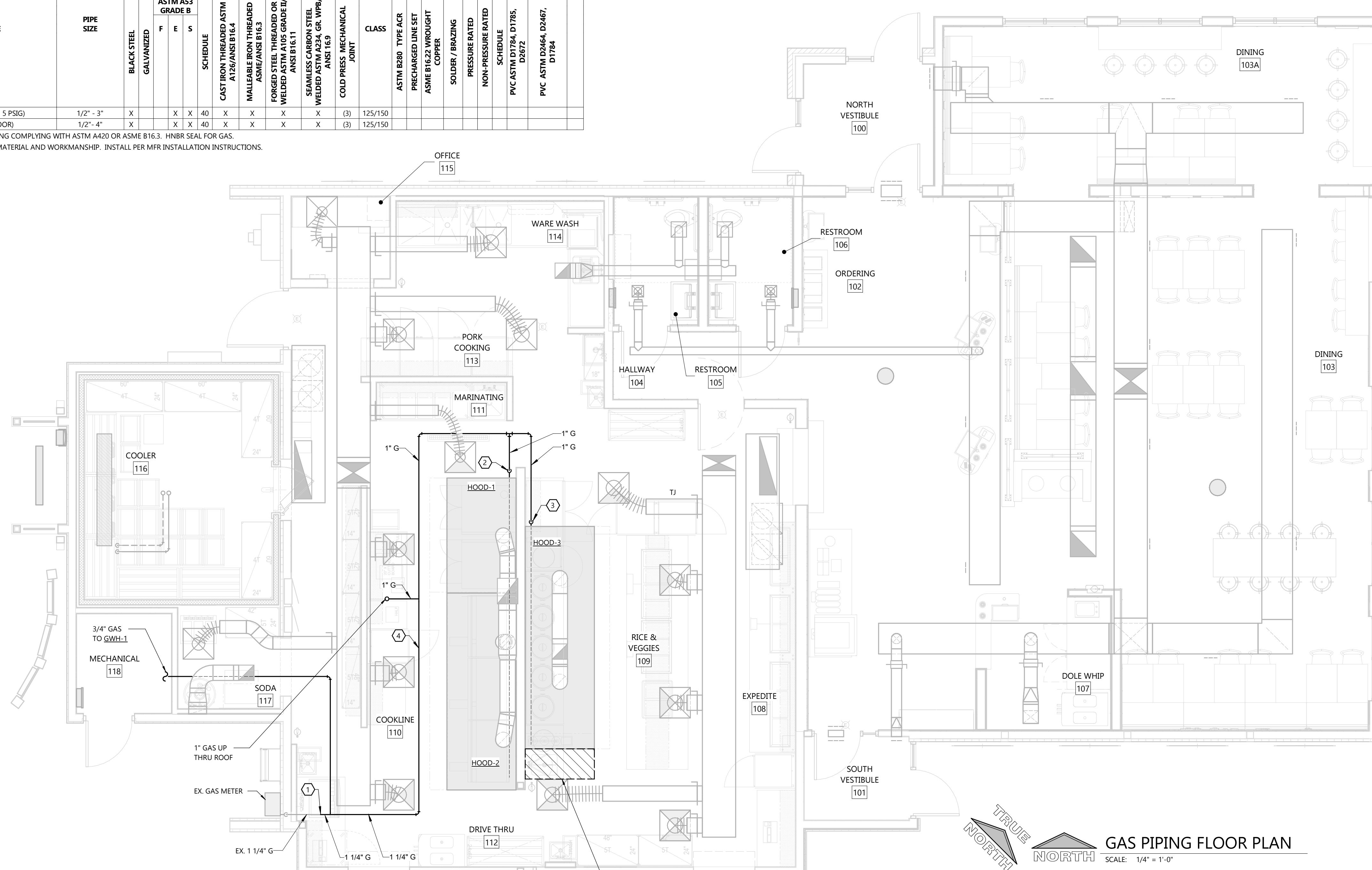
SERVICE	PIPE SIZE	STEEL			FITTINGS			COPPER			PLASTIC			PEX
		BLACK STEEL	ASTM A53 GRADE B	SCHEDULE	CAST IRON THREADED	MALLEABLE IRON THREADED	FORGED STEEL THREADED OR WELDED	SEAMLESS CARBON STEEL WELDED	COLD PRESS. MECHANICAL JOINT	CLASS	PIPE	FITTINGS	PIPE	
GAS (INDOOR ≤ 5 PSIG)	1/2" - 3"	X	X	X	X	X	X	X	(3)	125/150				
GAS (OUTDOOR)	1/2" - 4"	X	X	X	X	X	X	X	(3)	125/150				

- (3) VIEGA MEGAPRESS FITTING COMPLYING WITH ASTM A420 OR ASME B16.3. HNBR SEAL FOR GAS.
- 10 YEAR WARRANTY IN MATERIAL AND WORKMANSHIP. INSTALL PER MFR INSTALLATION INSTRUCTIONS.

GAS LOAD SUMMARY

ITEM	MBH INPUT	REQUIRED PRESSURE (1)
RTAC-1	264	7" W.C.
RTAC-2	302	7" W.C.
RTAC-3	211	7" W.C.
GWH-1	499	7" W.C.
RICE COOKER	35	7" W.C.
RICE COOKER	35	7" W.C.
RICE COOKER	35	7" W.C.
RICE COOKER	35	7" W.C.
RICE COOKER	35	7" W.C.
CONVECTION OVEN	45	7" W.C.
CONVECTION OVEN	45	7" W.C.
GRIDDLE	120	7" W.C.
GRIDDLE	120	7" W.C.
GRIDDLE	120	7" W.C.
TOTAL	1,901	

- GAS PRESSURE AT METER = 2 PSIG
- PROVIDE GAS PRESSURE REGULATOR AT EACH PIECE OF EQUIPMENT LISTED ABOVE
- (1) VERIFY PRESSURE REQUIRED WITH ACTUAL EQUIPMENT INSTALLED ON PROJECT BEFORE SIZING REGULATOR.



GAS PIPE SHALL NOT BE INSTALLED IN AREA IN FRONT OF CABINET

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PROFESSIONAL SEAL

SHEET DATAS

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SHEET DATES

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REVISIONS

AD1	FEB. 25, 2022
CB1	APR. 26, 2022

JOB NUMBER

2164180

SHEET NUMBER

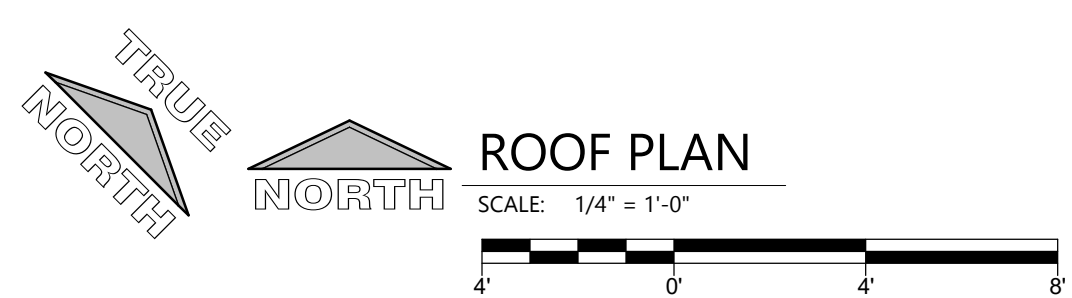
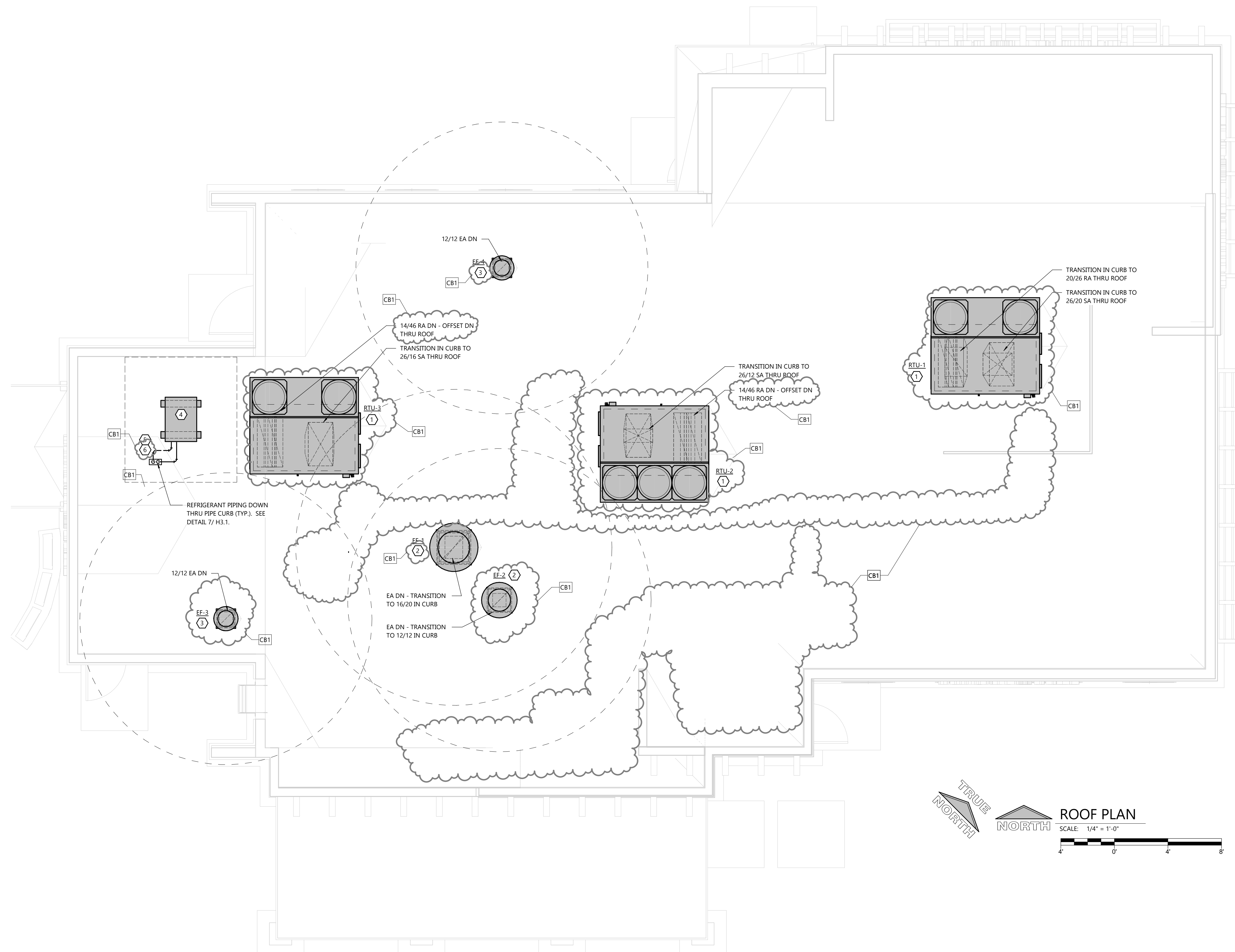
H1.2

GENERAL NOTES

- VERIFY BUILDING OPENING AND CURB SIZES LISTED ON PLANS WITH ACTUAL EQUIPMENT SCHEDULED AND SUPPLIED. COORDINATE REQUIRED OPENING SIZES AND LOCATIONS WITH CONTRACTORS PROVIDING OPENING SCHEDULES AND ACTUAL EQUIPMENT SIZES SHALL TAKE PRECEDENCE OVER SIZES SHOWN ON PLANS.
- DETAIL REFERENCES ON PLANS ARE TO AID THE CONTRACTOR IN IDENTIFYING THE APPLICABLE DETAIL. NOT ALL DETAILS OR INSTANCES OF DETAILS, ARE REFERENCED ON PLANS. CONTRACTOR IS RESPONSIBLE TO REVIEW AND COMPLY WITH ALL APPLICABLE DETAILS WHETHER OR NOT REFERENCED ON PLANS.
- TERMINATE ALL UNIT HEATER INTAKES/FLUES MINIMUM 10'-0" FROM EDGE OF ROOF.
- TERMINATE ALL GAS REGULATOR VENTS MINIMUM 10'-0" FROM EDGE OF ROOF. VENTS SHALL NOT BE TERMINATED OUT EXTERIOR WALLS
- DASHED LINES AROUND EXHAUST TERMINATIONS INDICATE 10'-0" REQUIRED CLEARANCE TO OUTSIDE AIR INTAKES.

KEYNOTES

- ① DEDICATED OUTDOOR AIR ROOFTOP UNIT - FURNISHED BY KITCHEN EQUIPMENT SUPPLIER, INSTALLED BY H.C.
- ② KITCHEN HOOD EXHAUST FAN - FURNISHED BY KITCHEN EQUIPMENT SUPPLIER, INSTALLED BY H.C.
- ③ EXHAUST FAN - FURNISHED BY KITCHEN EQUIPMENT SUPPLIER, INSTALLED BY H.C.
- ④ CONDENSING UNITS FURNISHED BY KITCHEN EQUIPMENT SUPPLIER, INSTALLED BY H.C. SET CONDENSING UNITS ON EQUIPMENT SUPPORT RAILS. SEE DETAIL 6/H3.1. FASTEN PER MANUFACTURER'S REQUIREMENTS.
- ⑤ REFRIGERANT PIPING BY H.C. PIPE SIZING BY CONDENSING UNIT MANUFACTURER. INSTALL ANY MANUFACTURER FURNISHED REFRIGERANT SPECIALTIES PER MANUFACTURER'S REQUIREMENTS. SEE AIRDYNE REFRIGERATION PLANS. LEAK TEST AND CHARGE REFRIGERANT CIRCUITS PER MANUFACTURER'S REQUIREMENTS.
- ⑥ SEE 9/H3.1 FOR REFRIGERANT PIPING SUPPORTS. SEE 3/H3.0 FOR SPACING.



PROJECT INFORMATION

PROPOSED BUILDING RENOVATION
HAWAIIAN BROS - STR: 45
13963 STATE HWY AC • FLORISSANT, MO. 63033

PROFESSIONAL SEAL

SHEET DATES

SHEET ISSUE APR. 26, 2022

REVISIONS

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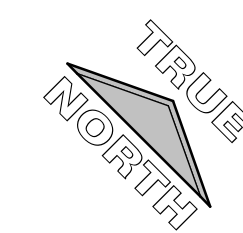
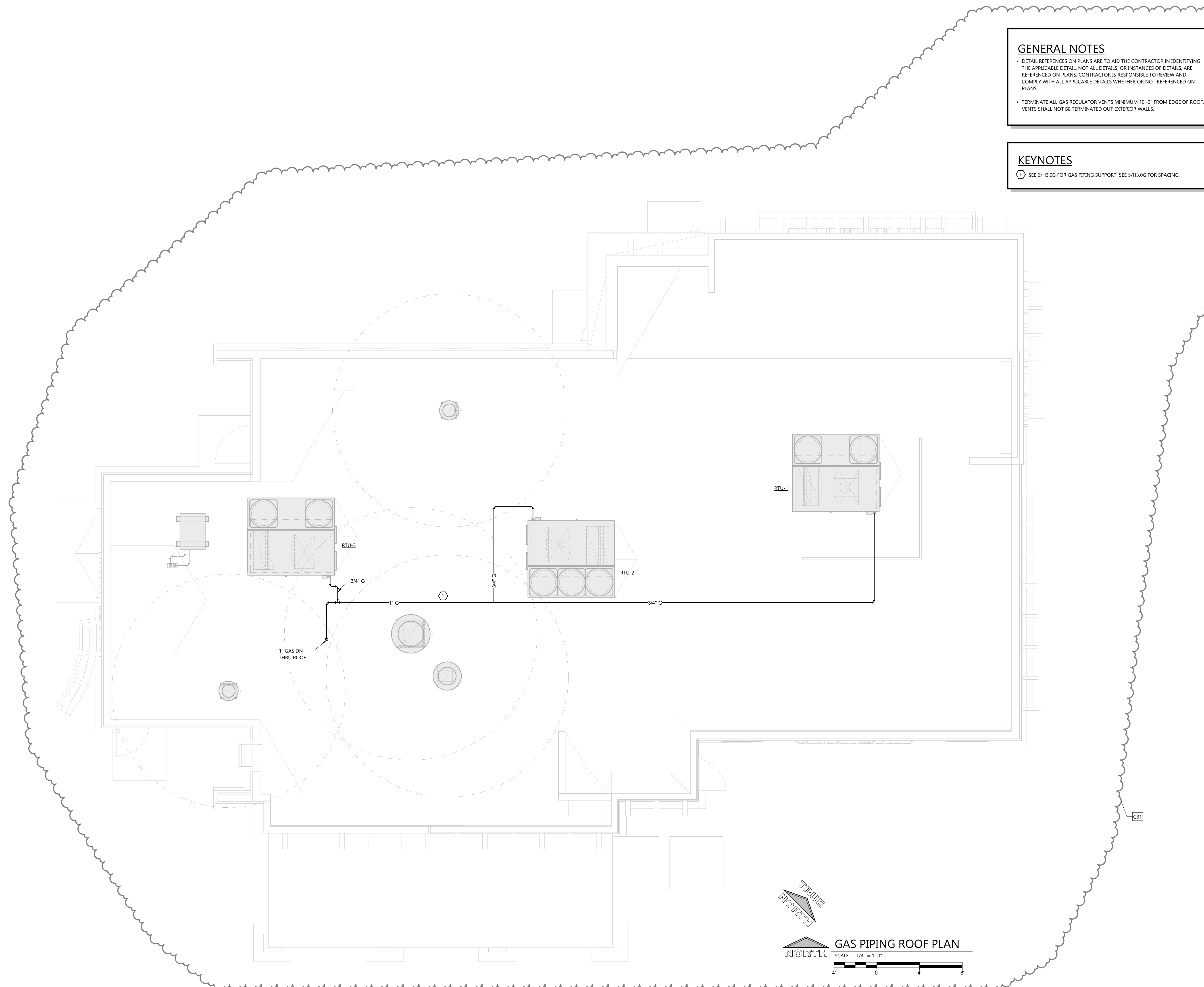
H1.2G

GENERAL NOTES

- DETAIL REFERENCES ON PLANS ARE TO AID THE CONTRACTOR IN IDENTIFYING THE APPLICABLE DETAIL. NOT ALL DETAILS, OR INSTANCES OF DETAILS, ARE REFERENCED ON PLANS. CONTRACTOR IS RESPONSIBLE TO REVIEW AND COMPLY WITH ALL APPLICABLE DETAILS WHETHER OR NOT REFERENCED ON PLANS.
- TERMINATE ALL GAS REGULATOR VENTS MINIMUM 10'-0" FROM EDGE OF ROOF. VENTS SHALL NOT BE TERMINATED OUT EXTERIOR WALLS.

KEYNOTES

- ① SEE 6/H3.0G FOR GAS PIPING SUPPORT. SEE 5/H3.0G FOR SPACING.



GAS PIPING ROOF PLAN
SCALE: 1/4" = 1'-0"



HVAC GAS PIPING ROOF PLAN

PROJECT INFORMATION

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 13963 STATE HWY AC • FLORISSANT, MO. 63033

PROFESSIONAL SEAL

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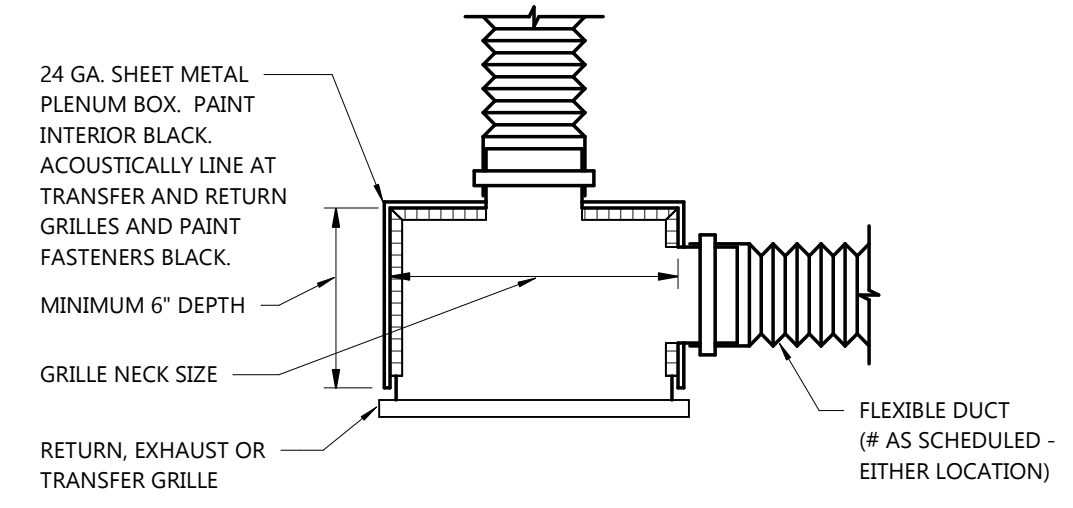
H3.0

MAX. SPACING BETWEEN PIPE SUPPORTS AND MIN. HANGER ROD SIZES

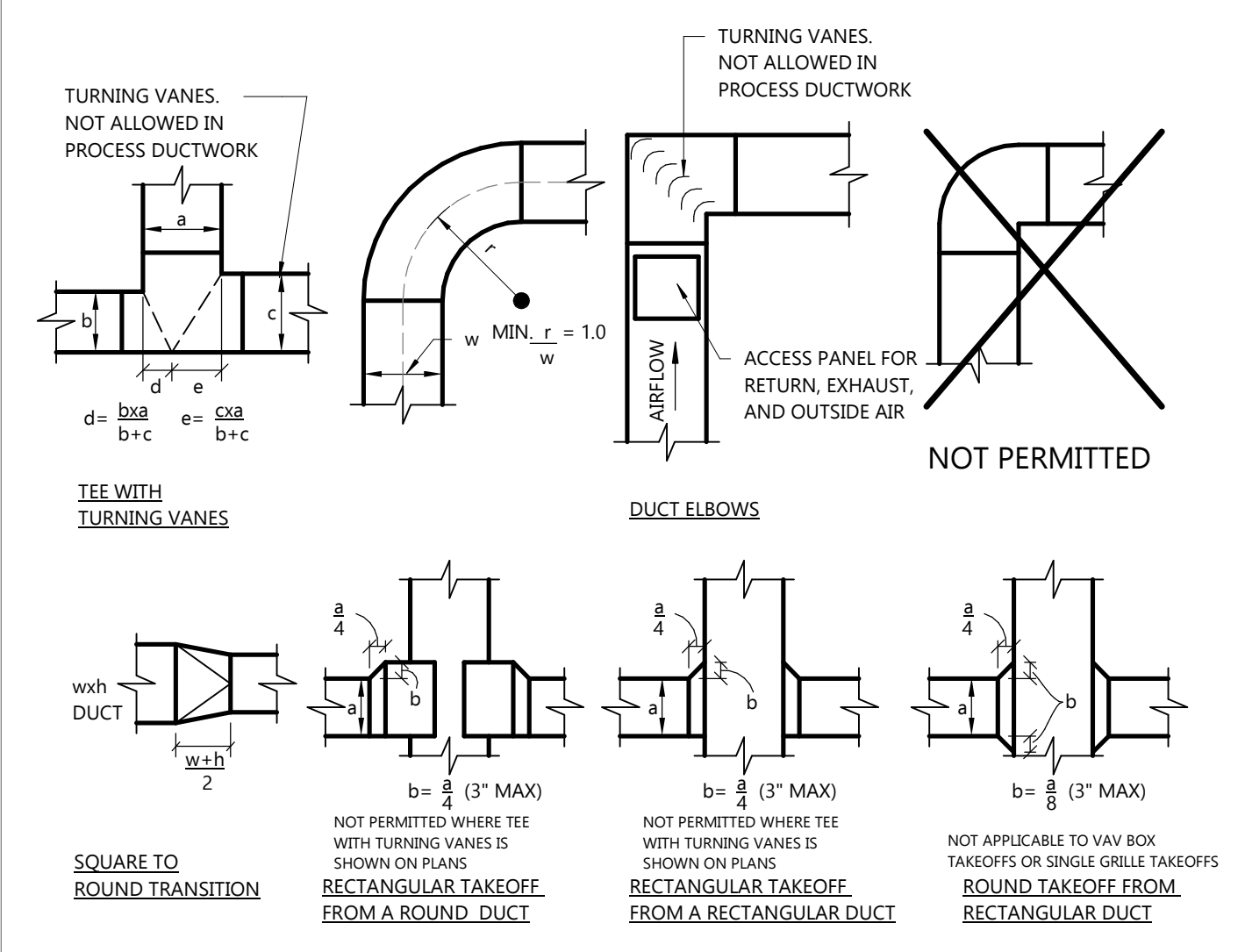
PIPE SIZE	STEEL			COPPER			PEX	MIN. ROD	
	WATER	VAPOR	NAT. GAS	WATER	VAPOR	CPVC		METAL PIPE	PLASTIC PIPE
1/4"-1/2"	7'	8'	6'	5'	6'	4'	32"	3/8"	3/8"
3/4"	7'	9'	8'	5'	7'	4'	32"	3/8"	3/8"
1"	7'	9'	8'	6'	8'	4'	32"	3/8"	3/8"
1 1/4"	7'	9'	10'	7'	9'	4'	32"	3/8"	3/8"
1 1/2"	9'	12'	10'	8'	10'	4'	32"	3/8"	3/8"
2"	10'	12'	10'	8'	11'	4'	-	3/8"	3/8"
2 1/2"	11'	12'	10'	9'	12'	4'	-	3/8"	3/8"
3"	12'	12'	10'	10'	12'	4'	-	3/8"	3/8"
4"	12'	12'	10'	12'	12'	4'	-	3/8"	3/8"
6"	12'	12'	10'	12'	12'	4'	-	3/8"	3/8"
8"	12'	12'	-	-	-	4'	-	1/2"	3/8"
10"	12'	12'	-	-	-	4'	-	1/2"	3/8"
12"	12'	12'	-	-	-	4'	-	5/8"	3/8"
14"	12'	12'	-	-	-	4'	-	5/8"	3/8"
16"	12'	12'	-	-	-	4'	-	3/4"	3/8"
MAX VERT. (1)	15'	15'	-	10'	10'	10'	-	-	-

(1) SUPPORT AT MINIMUM EVERY FLOOR LEVEL OR SPACING LISTED.
 MSS = MANUFACTURER'S STANDARDIZATION SOCIETY
 *INSTALL ADDITIONAL HANGERS WITHIN 12" OF ELBOWS AND TEES AND AT CONCENTRATED LOADS, INCLUDING VALVES, FLANGES AND STRAINERS 2 1/2" AND LARGER.

3 PIPE SUPPORT SCHEDULE
 H3.0 NOT TO SCALE

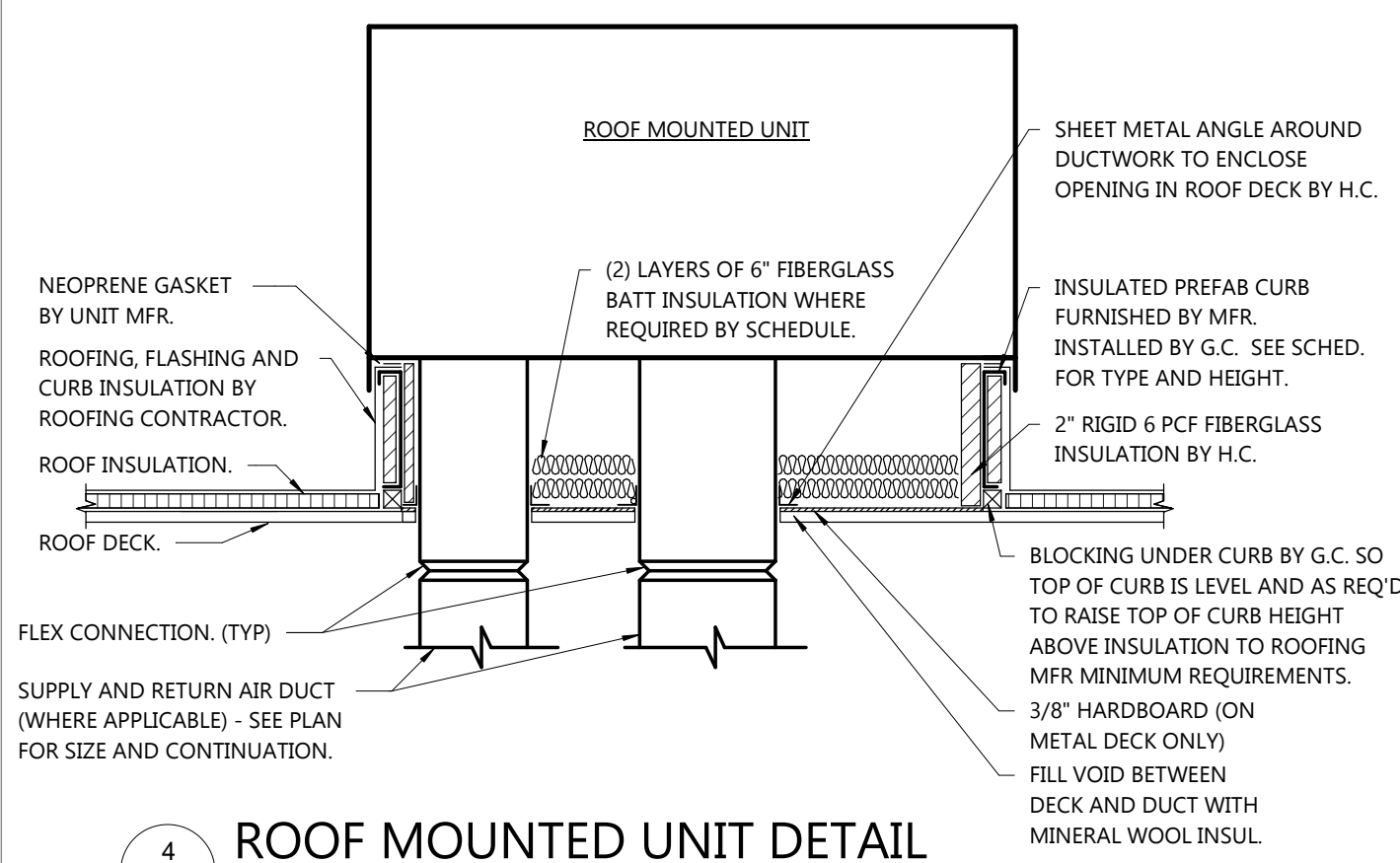


2 GRILLE PLENUM BOX DETAIL
 H3.0 NOT TO SCALE

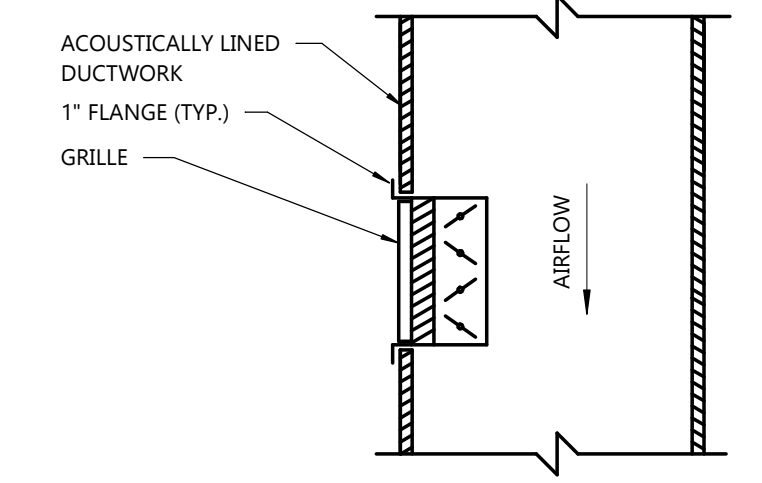


1 DUCT FITTING DETAILS
 H3.0 NOT TO SCALE

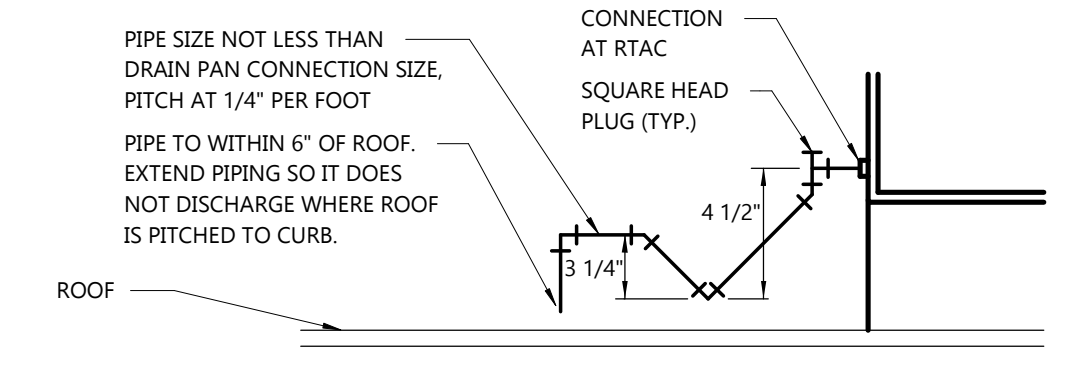
UNIT	INSULATION	BALLAST
RTU-1	YES	NO
RTU-2	YES	NO
RTU-3	YES	NO



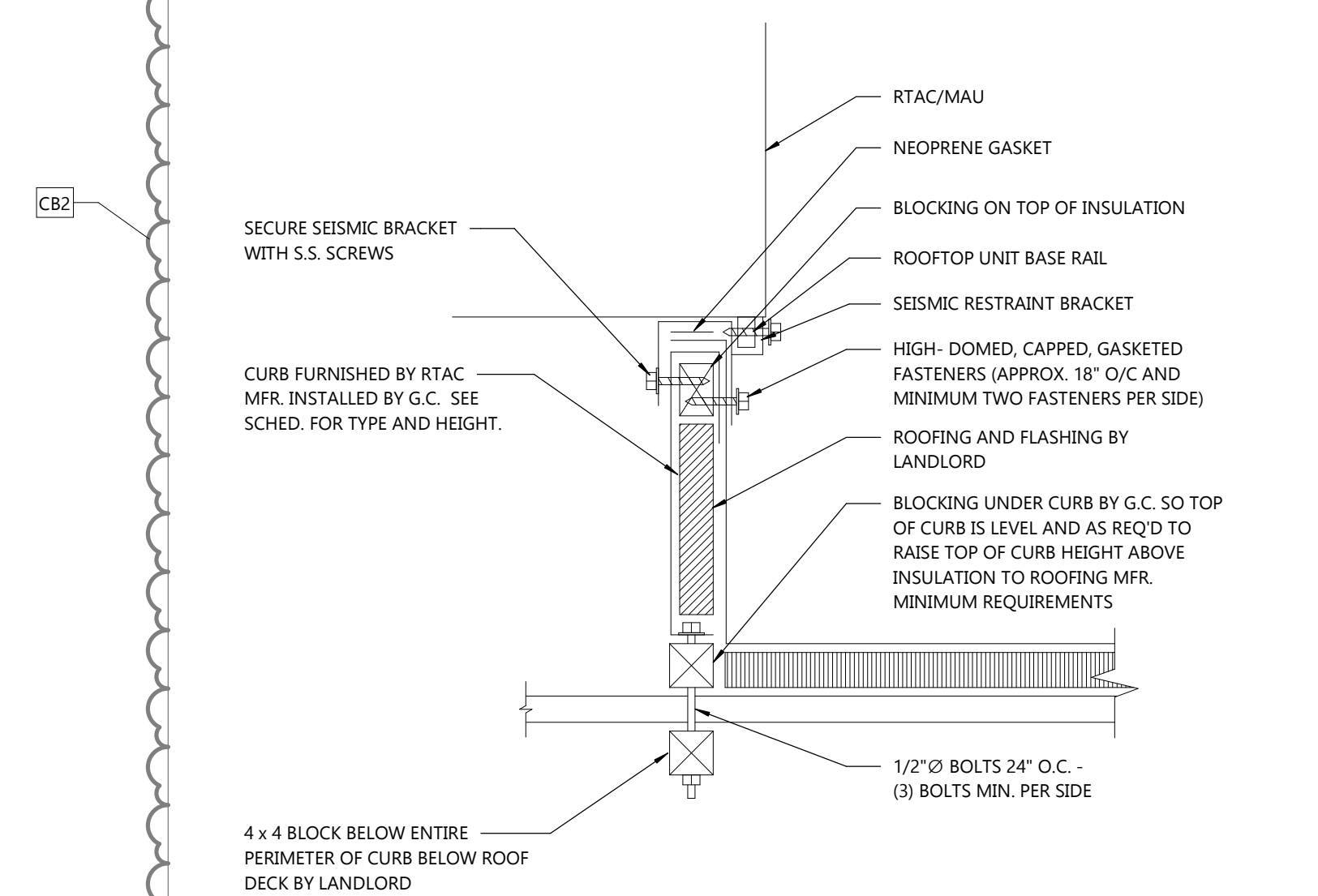
4 ROOF MOUNTED UNIT DETAIL
 H3.0 NOT TO SCALE



6 DUCT/PLENUM MOUNTED GRILLE DETAIL
 H3.0 NOT TO SCALE



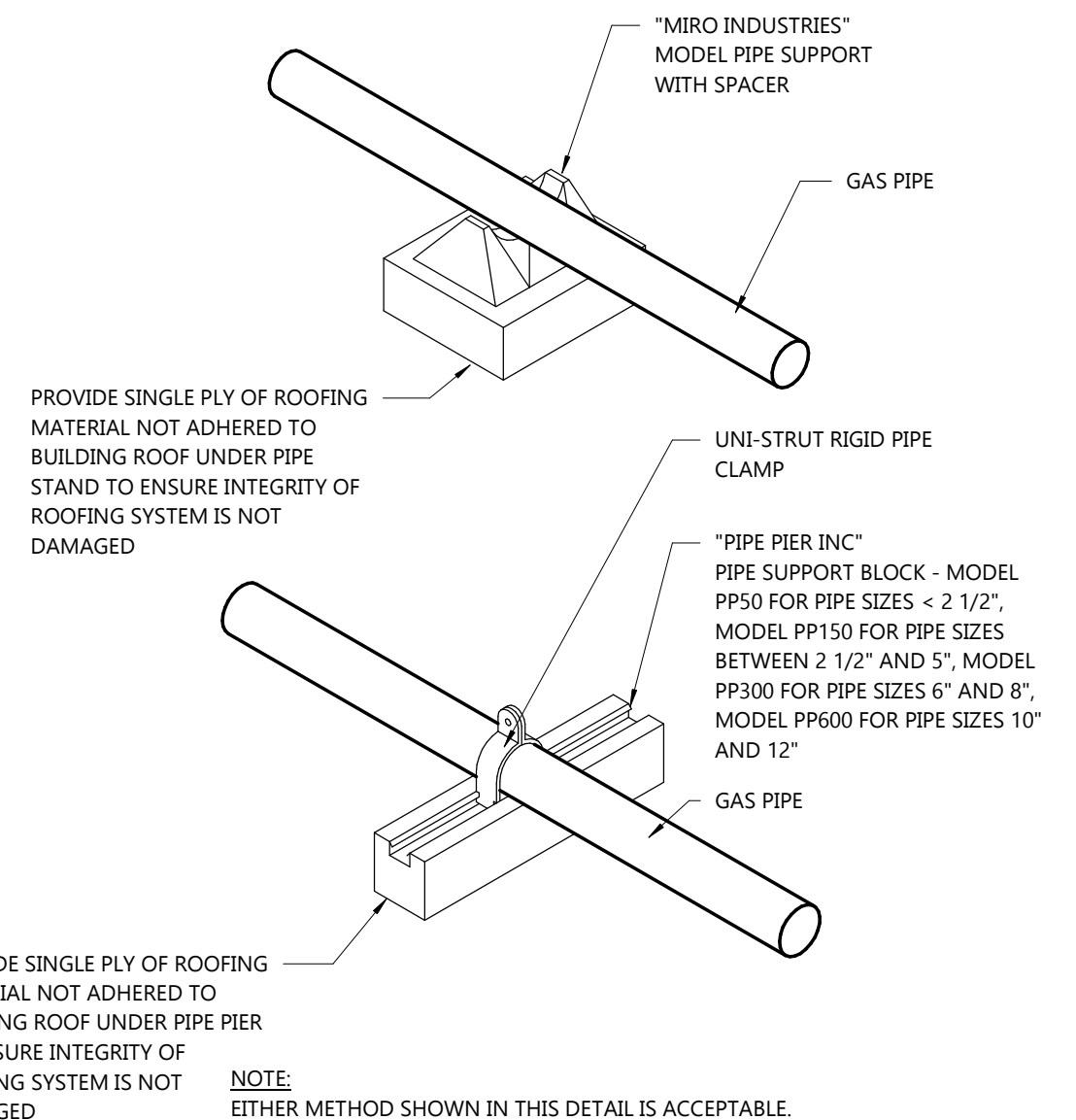
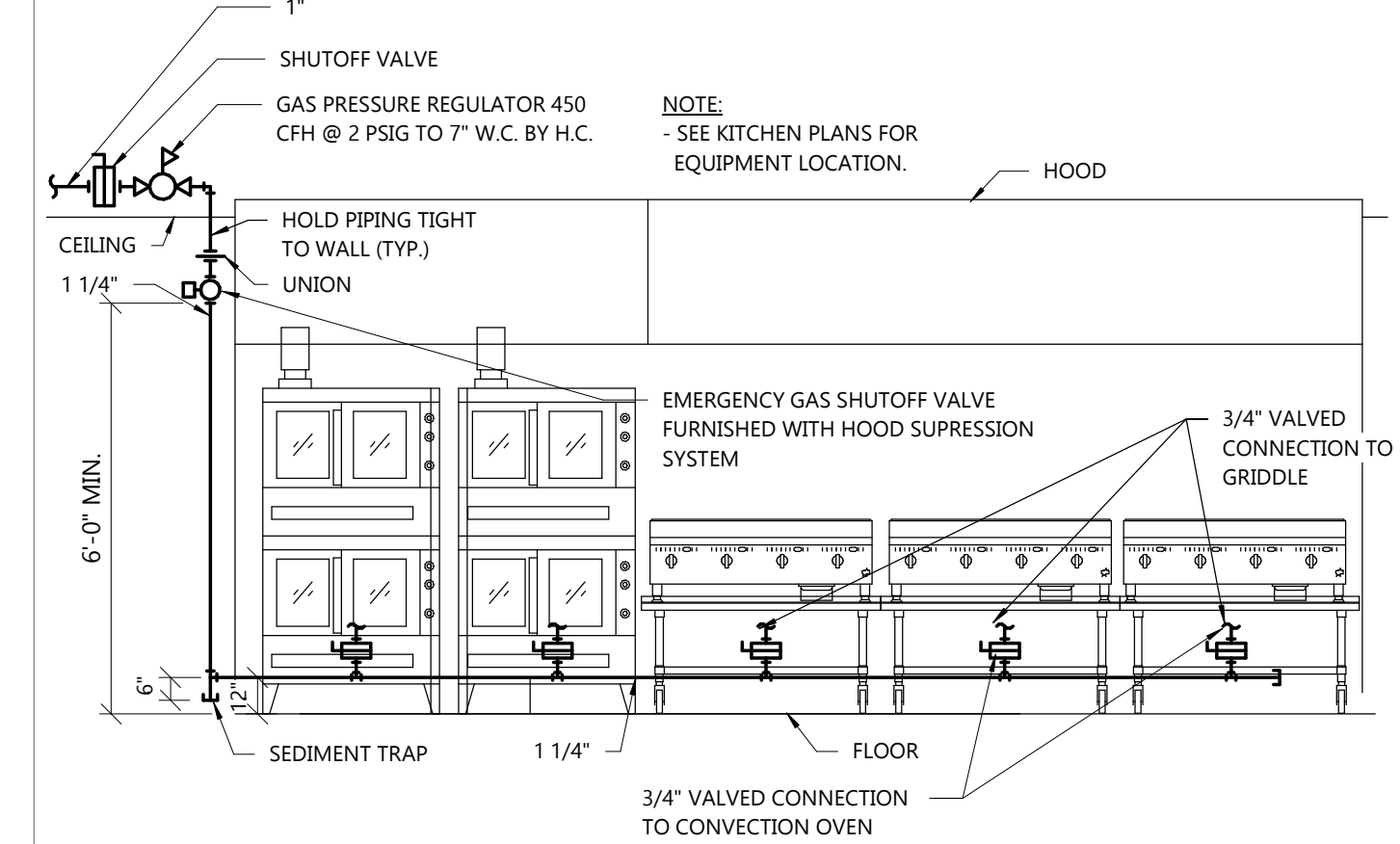
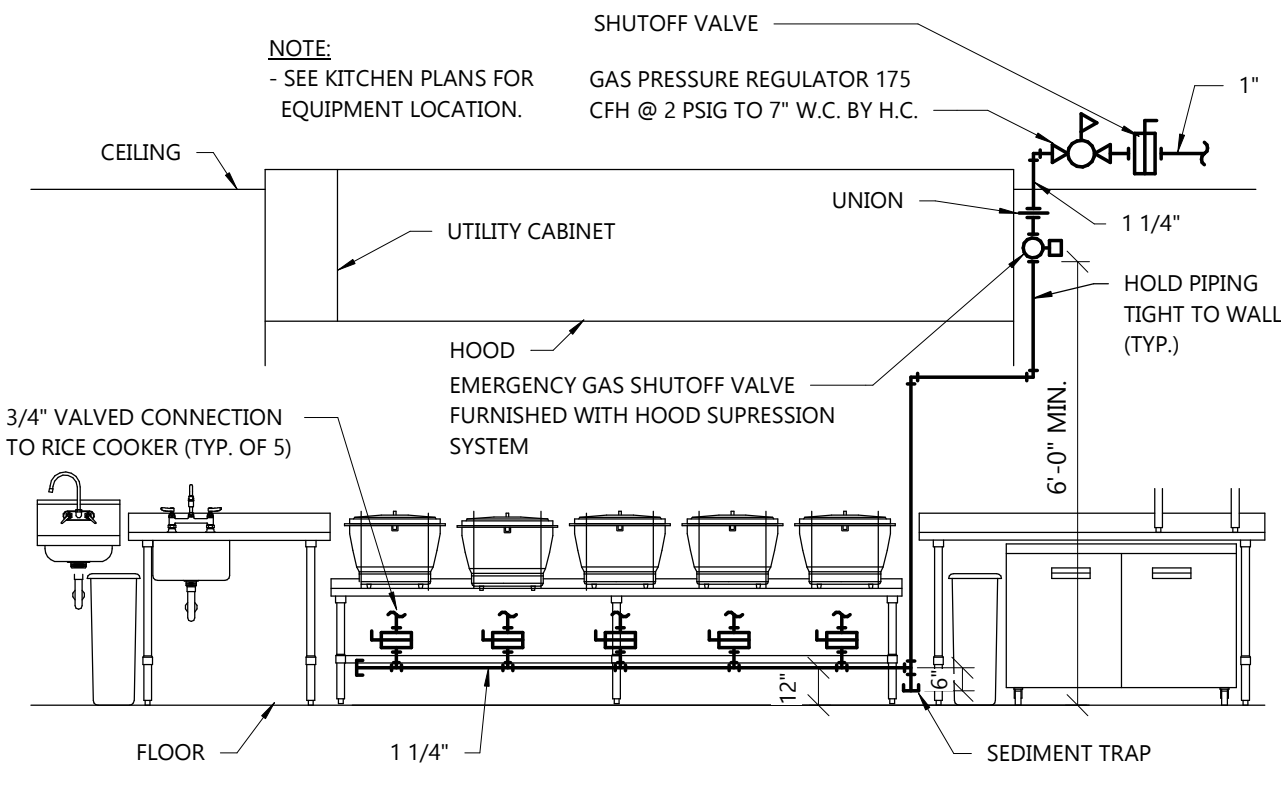
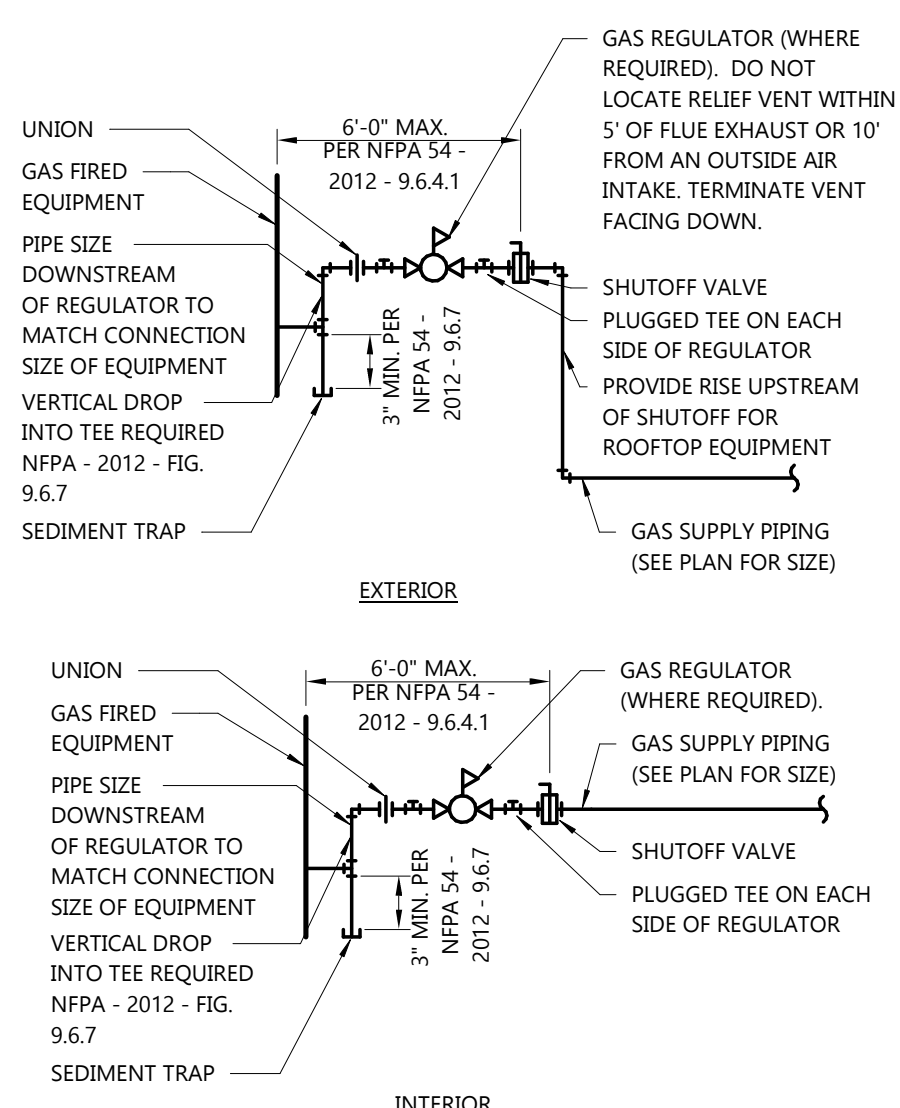
5 RTAC CONDENSATE DRAIN TRAP PIPING DETAIL
 H3.0 NOT TO SCALE



7 SEISMIC ROOF CURB DETAIL
 H3.0 NOT TO SCALE

PROJECT INFORMATION

PROPOSED BUILDING RENOVATION
HAWAIIAN BROS - STR: 45
 13963 STATE HWY AC • FLOISSANT, MO. 63033

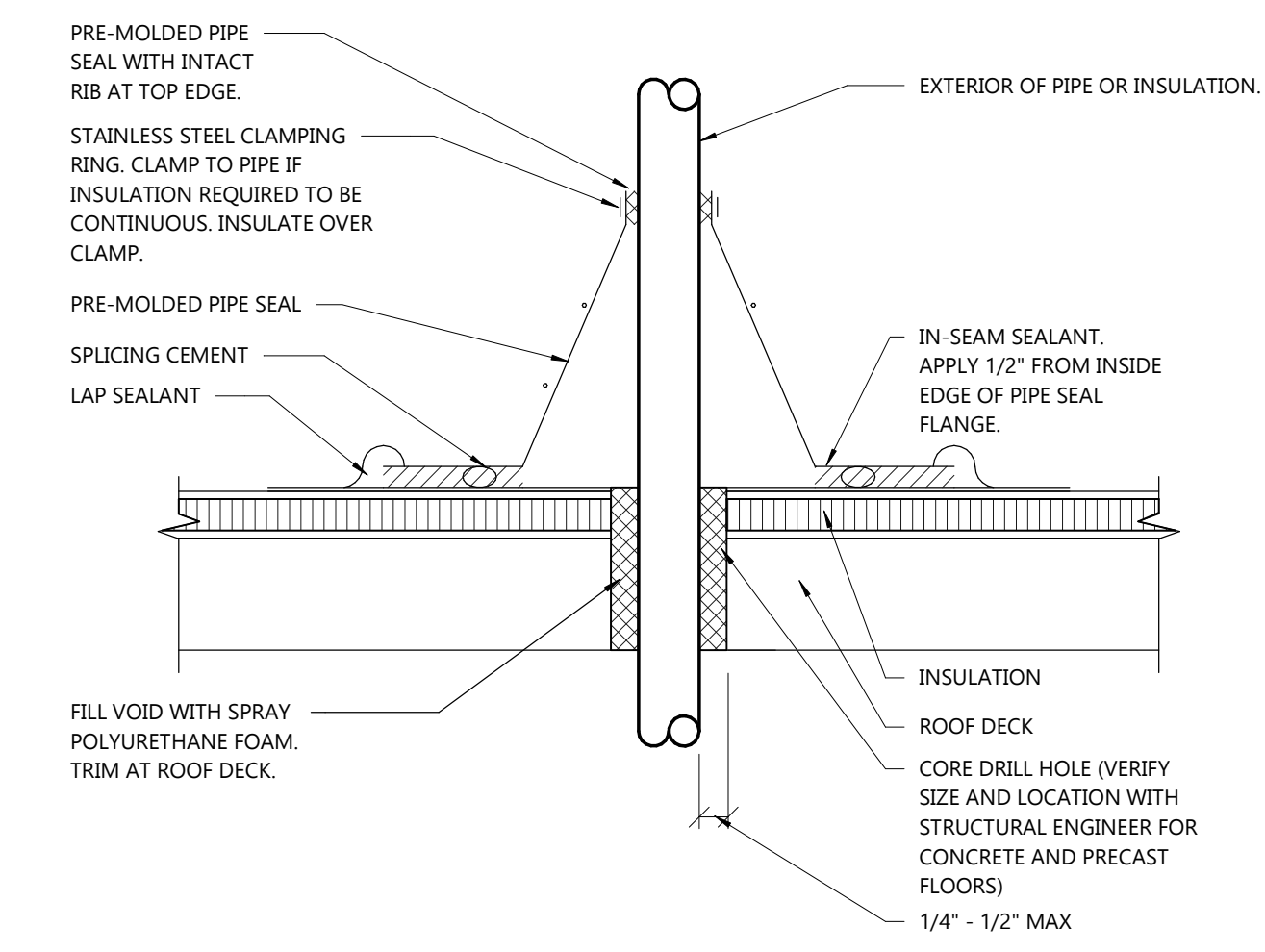
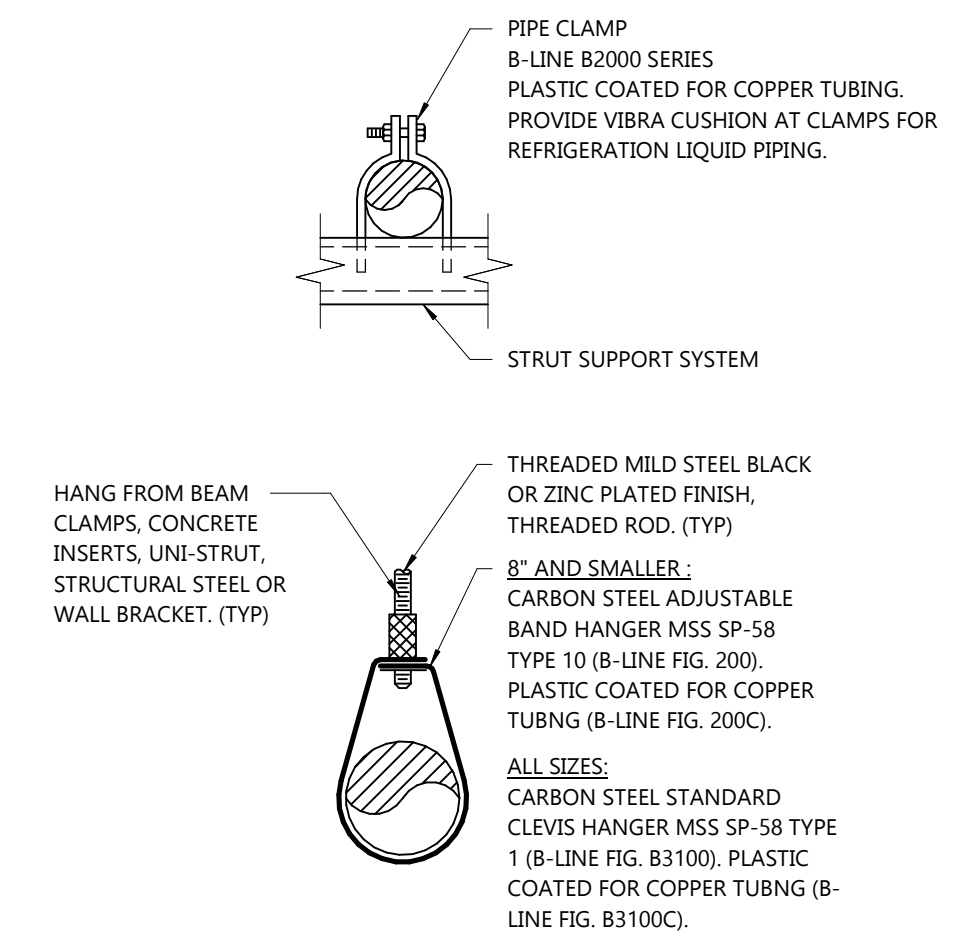


MAX. SPACING BETWEEN PIPE SUPPORTS AND MIN. HANGER ROD SIZES

PIPE SIZE	STEEL			COPPER			PVC CPVC	PEX	MIN. ROD	
	WATER	VAPOR	NAT. GAS	WATER	VAPOR	METAL PIPE			PLASTIC PIPE	
1/4" - 1/2"	7'	8'	6'	5'	6'	4'	32"	3/8"	3/8"	
3/4"	7'	9'	8'	5'	7'	4'	32"	3/8"	3/8"	
1"	7'	9'	8'	6'	8'	4'	32"	3/8"	3/8"	
1 1/4"	7'	9'	10'	7'	9'	4'	32"	3/8"	3/8"	
1 1/2"	9'	12'	10'	8'	10'	4'	32"	3/8"	3/8"	
2"	10'	12'	10'	8'	11'	4'	-	3/8"	3/8"	
2 1/2"	11'	12'	10'	9'	12'	4'	-	3/8"	3/8"	
3"	12'	12'	10'	10'	12'	4'	-	3/8"	3/8"	
4"	12'	12'	10'	12'	12'	4'	-	3/8"	3/8"	
6"	12'	12'	10'	12'	12'	4'	-	3/8"	3/8"	
8"	12'	12'	-	-	4'	-	-	1/2"	3/8"	
10"	12'	12'	-	-	4'	-	-	1/2"	3/8"	
12"	12'	12'	-	-	4'	-	-	5/8"	3/8"	
14"	12'	12'	-	-	4'	-	-	5/8"	3/8"	
16"	12'	12'	-	-	4'	-	-	3/4"	3/8"	
MAX VERT. (1)	15'	15'	-	-	10'	10'	10'	-	-	

(1) SUPPORT AT MINIMUM EVERY FLOOR LEVEL OR SPACING LISTED.
 MSS = MANUFACTURER'S STANDARDIZATION SOCIETY
 *INSTALL ADDITIONAL HANGERS WITHIN 12" OF ELBOWS AND TEES AND AT CONCENTRATED LOADS, INCLUDING VALVES, FLANGES AND STRAINERS 2 1/2" AND LARGER.

5 PIPE SUPPORT SCHEDULE
 H3.0G NOT TO SCALE



PROFESSIONAL SEAL

SHEET DATES

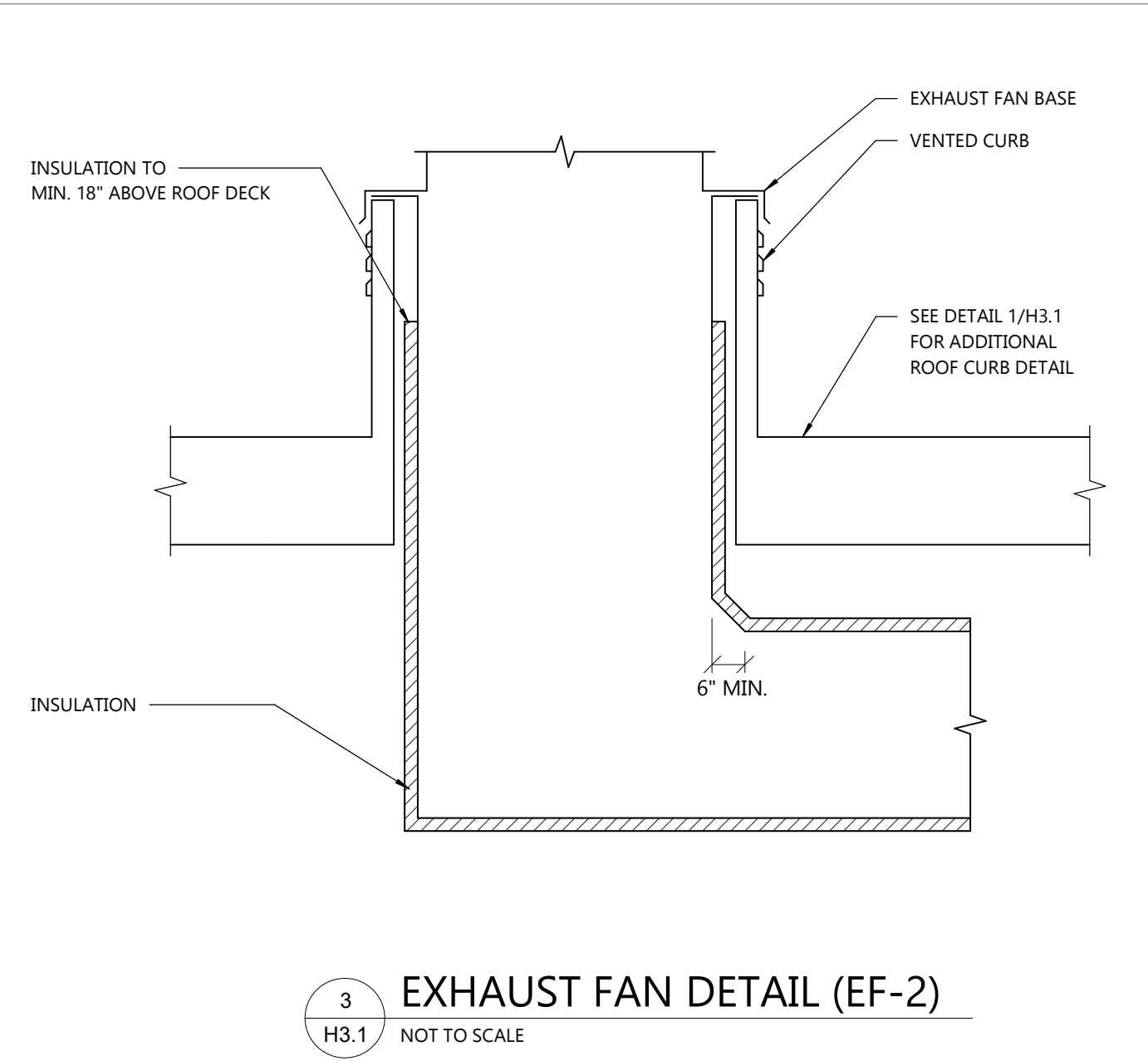
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JOB NUMBER
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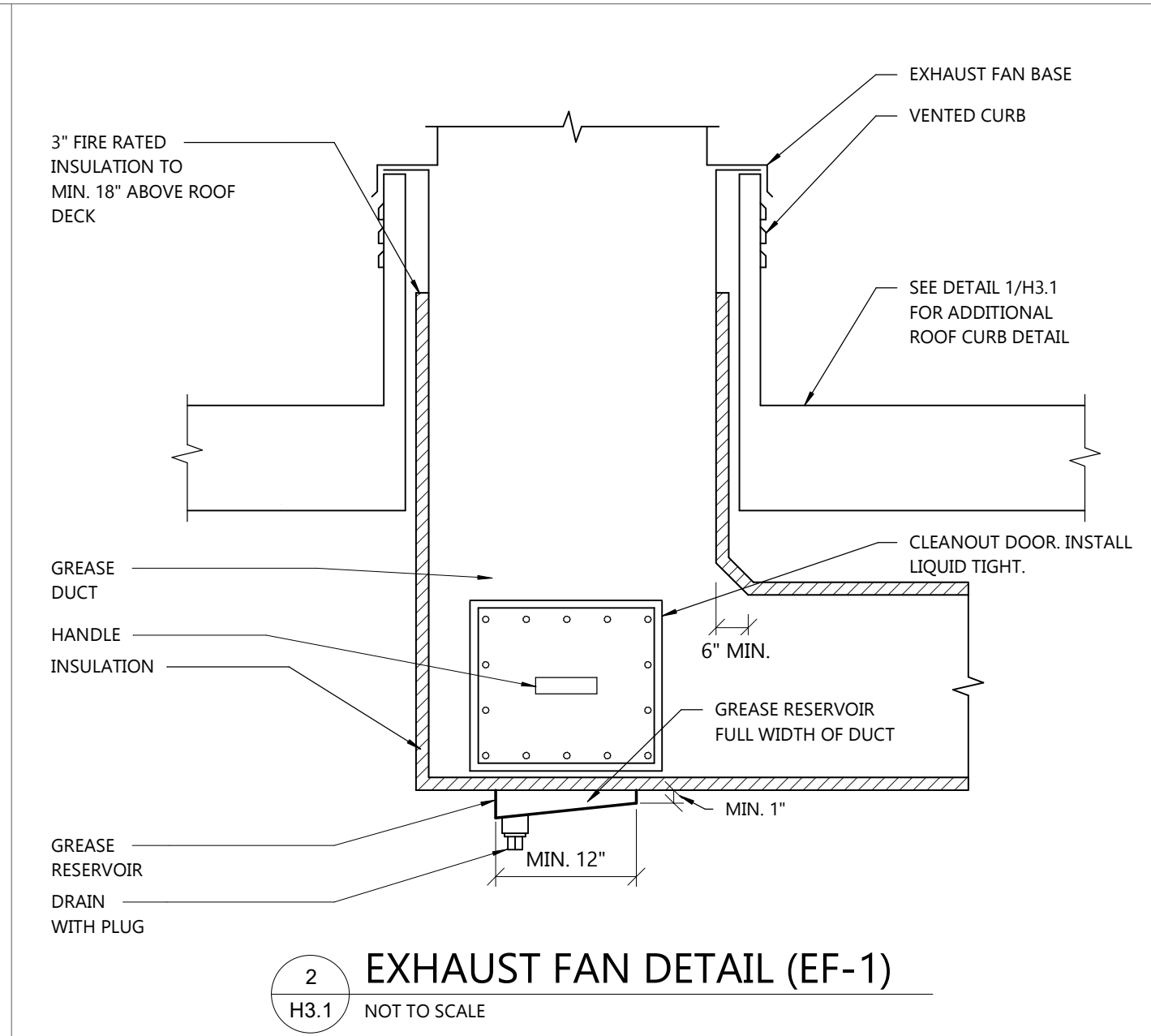
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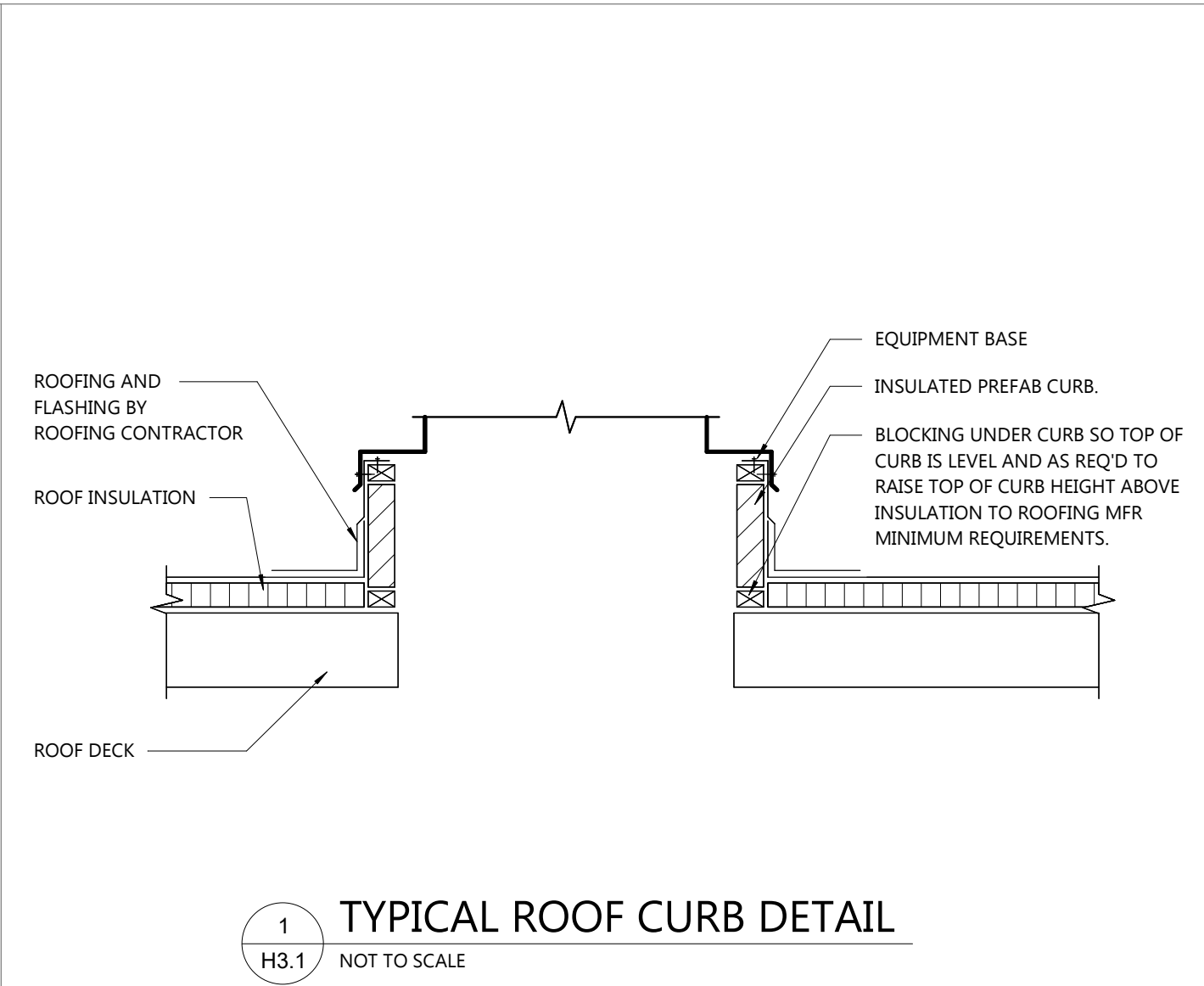
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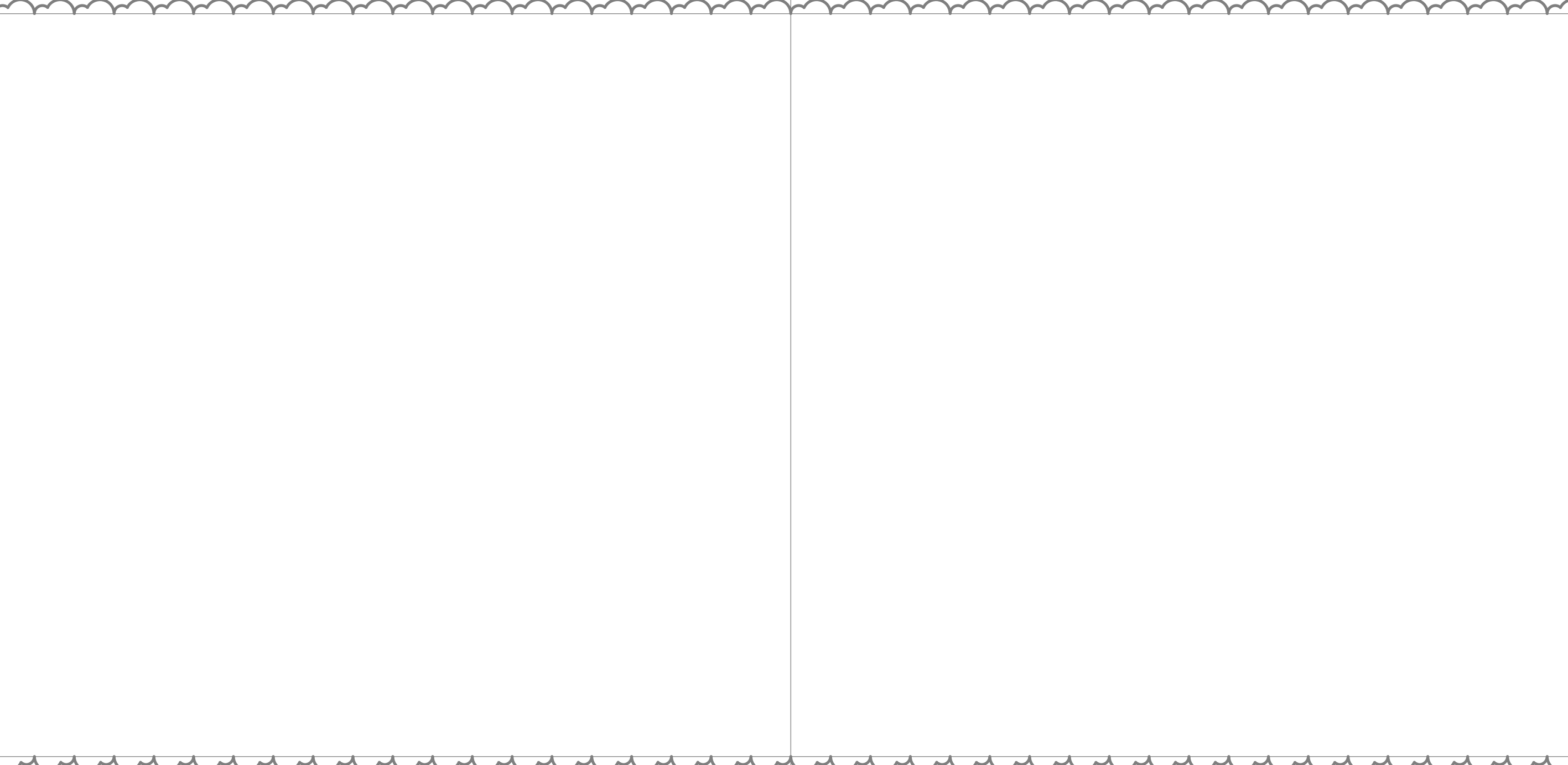
3 EXHAUST FAN DETAIL (EF-2)
H3.1 NOT TO SCALE



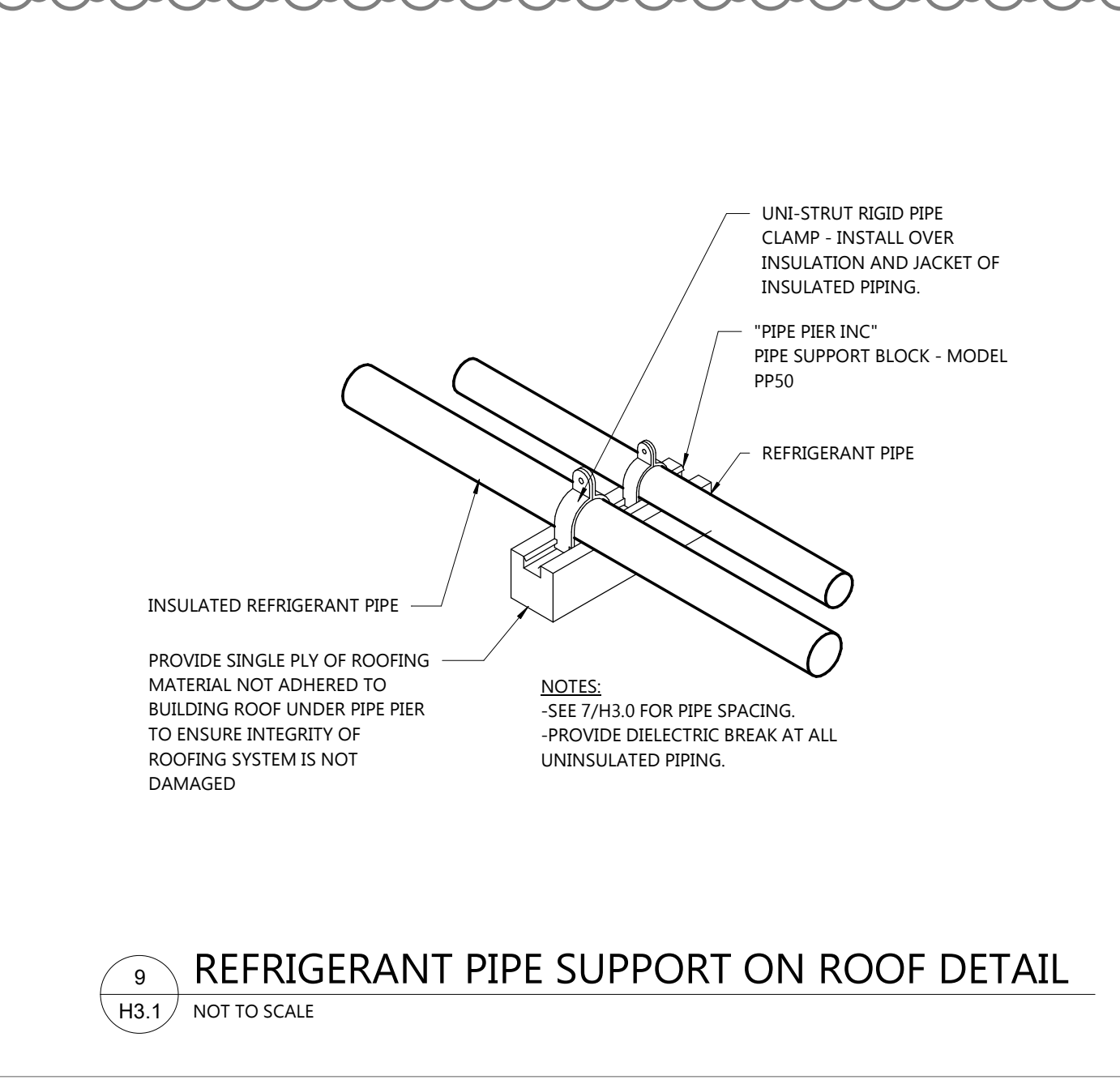
2 EXHAUST FAN DETAIL (EF-1)
H3.1 NOT TO SCALE



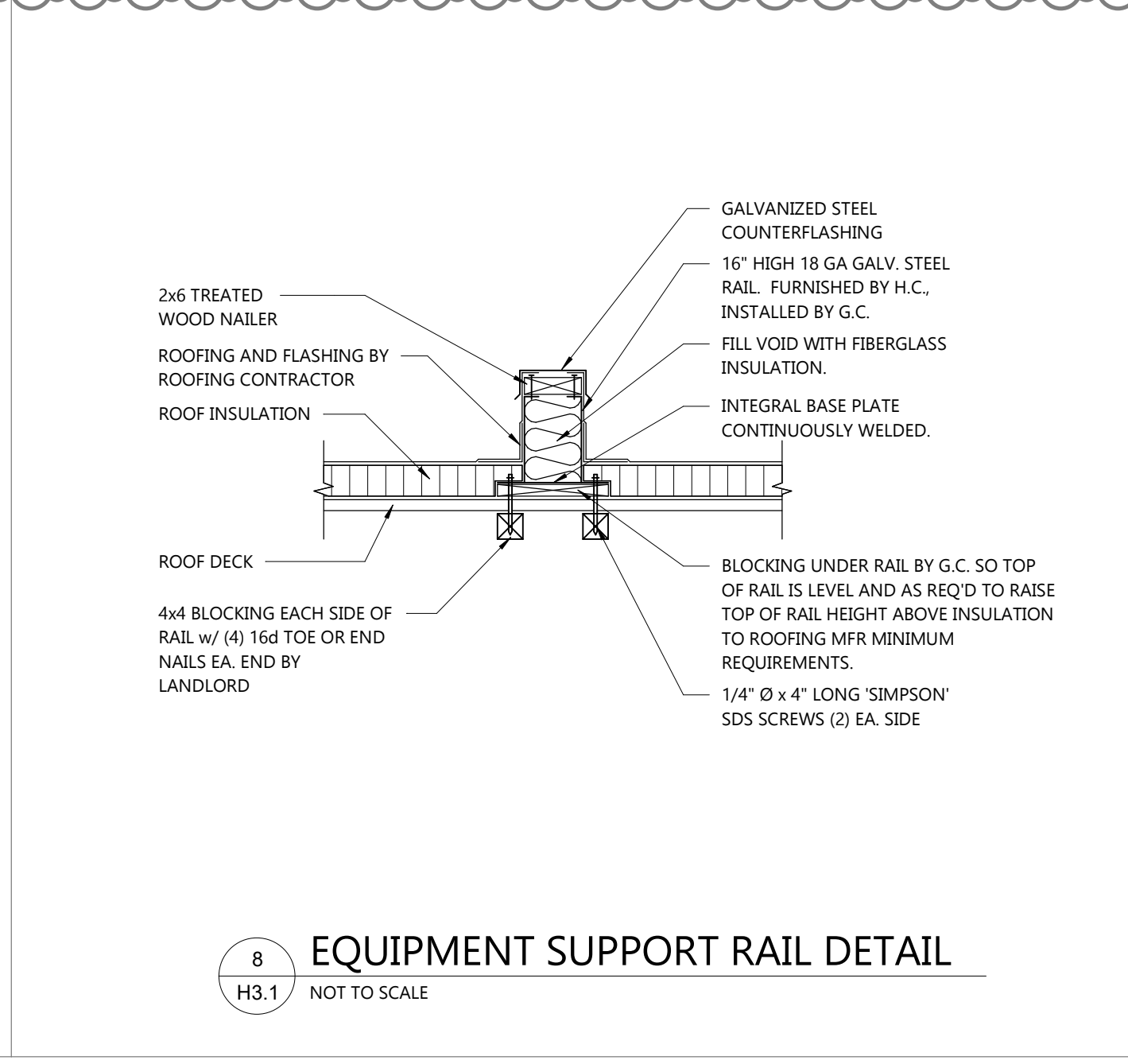
1 TYPICAL ROOF CURB DETAIL
H3.1 NOT TO SCALE



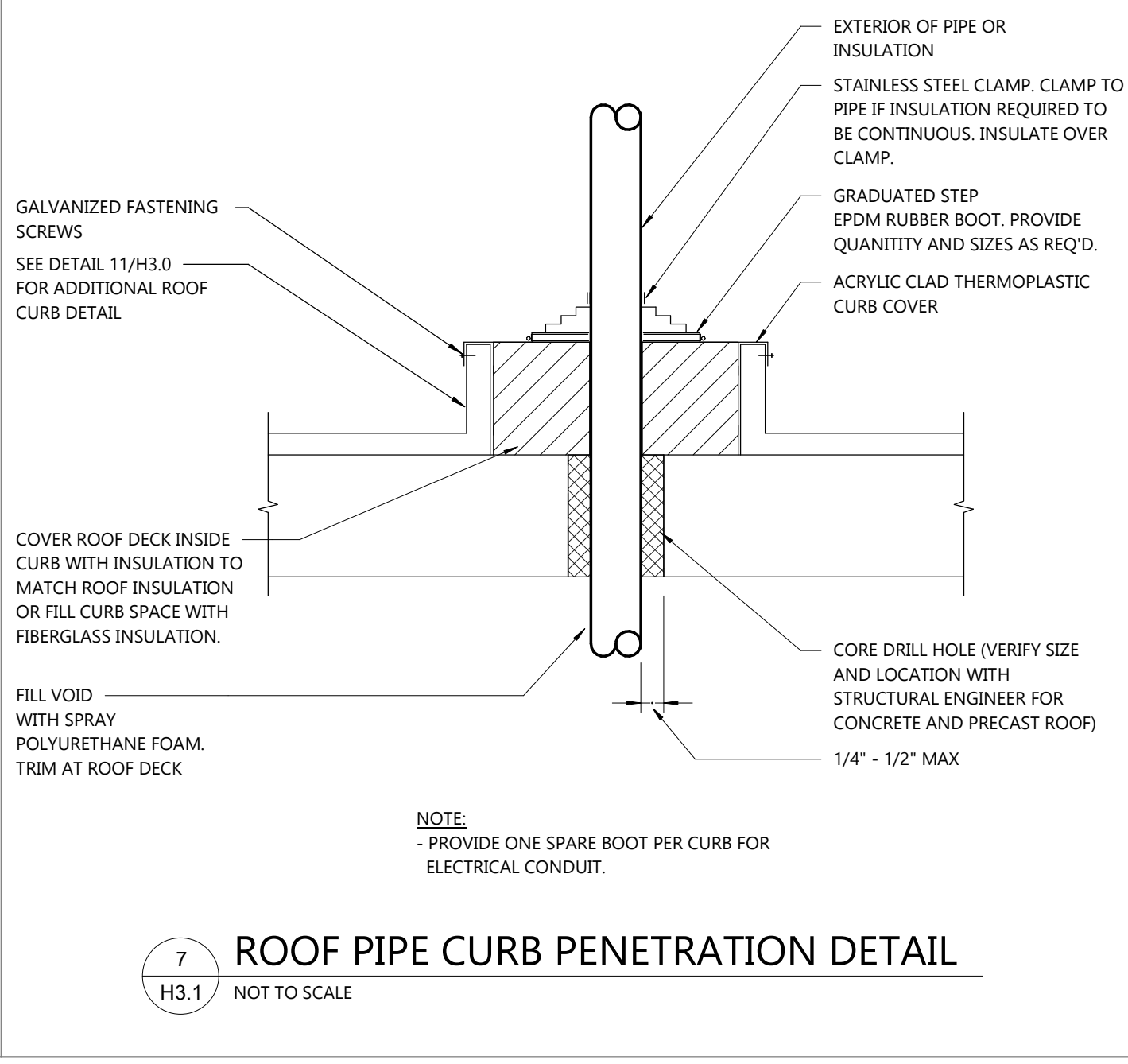
4 EXHAUST FAN DETAIL (EF-3 & EF-4)
H3.1 NOT TO SCALE



9 REFRIGERANT PIPE SUPPORT ON ROOF DETAIL
H3.1 NOT TO SCALE



8 EQUIPMENT SUPPORT RAIL DETAIL
H3.1 NOT TO SCALE



7 ROOF PIPE CURB PENETRATION DETAIL
H3.1 NOT TO SCALE

PROFESSIONAL SEAL

SHEET DATES

SHEET ISSUE	NOV. 16, 2021
REVISIONS	
AD1	FEB. 25, 2022
CB1	APR. 26, 2022

JOB NUMBER
2164180

SHEET NUMBER
H3.1

PROJECT INFORMATION

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HAWAIIAN BROS - STR: 45
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PROFESSIONAL SEAL

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SHEET NUMBER

H4.0

DUCTWORK AND DUCTWORK INSULATION SCHEDULE

SERVICE	LOCATION	DUCT MAT'L	SMACNA PRESS. CLASS	INSULATION		INSUL JACKET
				RECTANGULAR DUCT	ROUND DUCT	
SUPPLY SINGLE ZONE SYSTEMS	CONCEALED	GALV. ST.	+1"	1.5" FLEX. F.G.	1.5" FLEX. F.G.	N.R.
SUPPLY SINGLE ZONE SYSTEMS	EXPOSED IN ROOMS SERVED BY UNIT	GALV. ST.	+1"	1" ALD (1)	N.R.	N.R.
SUPPLY SINGLE ZONE SYSTEMS	OUTDOORS	GALV. ST.	+1"	1.5" POLYISOCYANURATE BOARD	2" ELAST. FOAM LAM. (3)	(3)
RETURN UPSTREAM OF FAN	CONCEALED AND EXPOSED	GALV. ST.	-1"	1" ALD (1)	N.R.	N.R.
EXHAUST UPSTREAM OF FAN, RE	CONCEALED	GALV. ST.	-1"	1.5" FLEX. F.G. (2)	1.5" FLEX. F.G. (2)	N.R.
EXHAUST TYPE I KITCHEN HOOD	CONCEALED	(5)	-3"	(4)	(4)	N.R.
EXHAUST TYPE II KITCHEN HOOD	CONCEALED	GALV. ST.	-3"	1.5" FLEX. F.G.	1.5" FLEX. F.G.	N.R.

N.R. = NOT REQUIRED

CONCEALED = HIDDEN FROM VIEW BY WALLS AND CEILINGS.

EXPOSED = VISIBLE FROM OCCUPIED SPACE.

MATERIALS:

GALV. STEEL: ASTM A653, LOCK FORMING QUALITY, 1.25 OUNCES/ S.F. ZINC COATING (G90 IN ACCORDANCE WITH ASTM A90 BOTH SIDES).

- ALL JOINTS, LONGITUDINAL AND TRANSVERSE SEAMS AND CONNECTIONS IN DUCTWORK SHALL BE SEALED PER 2015 IECC 403.2.9.

(1) PROVIDE 1" ACOUSTICAL DUCT LINING IN DUCTS NOTED AS "ALD" DUCT DIMENSIONS ARE SHEET METAL DIMENSIONS AND INCLUDE LINING.

(2) INSULATE FROM 18" UPSTREAM OF THE BACKDRAFT OR MOTOR OPERATED DAMPER TO THE POINT WHERE THE DUCT EXITS THE BUILDING.

(3) LAMINATED JACKET FOR RECTANGULAR DUCTWORK. JACKET PART OF INSULATION FOR ROUND DUCTWORK, SEE SPEC.

(4) INSULATE CONCEALED DUCTWORK AND SURFACES OF TYPE I KITCHEN HOODS WITH (2) LAYERS OF 1 1/2" FIRE RATED INSULATION.

(5) DUCTWORK AND SUPPORT MINIMUM 18 GA NO. 28 MILL ROLLED FINISH S.S. OR 16 GA. STEEL. WELD FINISH SHALL BE AS WELDED.

PIPE SCHEDULE

SERVICE	PIPE SIZE	STEEL										COPPER			PLASTIC		PEX					
		BLACK STEEL	ASTM A53 GRADE B	F	E	S	SCHEDULE	CAST IRON THREADED ASTM A126/ANSI B16.4	MALLEABLE IRON THREADED ASME/ANSI B16.3	FORGED STEEL THREADED OR WELDED ASTM A105 GRADE B W/ANSI B16.11	SEAMLESS CARBON STEEL WELDED ASTM A234, GR. WPRB ANST 16.9	COLD PRESS. MECHANICAL JOINT	CLASS	PIPE	FITTINGS	PIPE		FITTINGS				
REFR. SUCTION AND LIQUID	ALL														X	X	(1)					
COND. DRAIN	ALL																	X	40	X	(2)	

(1) AWS A5.8 B CUP SILVER/PHOSPHOROUS COPPER ALLOY BRAZING WITH MELTING RANGE OF 1190 TO 1480 DEG F.

(2) ASTM F656 SOLVENT WELD WITH ASTM D2564 CLEAR SOLVENT CEMENT

PIPE INSULATION SCHEDULE

SERVICE	LOCATION	INSULATION TYPE	JACKET	PIPE SIZE				
				< 1"	1" - 1.25"	1.5" - 3"	4" - 6"	> 6"
REFRIGERATION SUCTION	OUTDOORS (1)	ELASTOMERIC FOAM	PVC	1/2"	1"	1"	1"	1"
REFRIGERATION SUCTION	INDOORS	ELASTOMERIC FOAM	N.R.	1/2"	1"	1"	1"	1"
REFRIGERATION LIQUID	ALL	N.R.	N.R.	-	-	-	-	-

(1) CONTINUE INSULATION INTO THE COIL MODULE TO THE COOLING COIL.

ELECTRICAL/STARTER/DISCONNECT SCHEDULE

SYM.	ELECTRICAL DATA					STARTER			SMOKE DETECTOR	DISCONNECT	FURN.	REMARKS				
	HP	KW	FLA	MCA	MOP	VOLT	PH.	TYPE					LOCATION	FURN. BY	AUX. CONTACT	ACCESSORIES
RTU-1	-	-	-	78.5	90	208	3	INTEG.	INTEGRAL	EM	-	-	(6)	R	EM (2)	-
RTU-2	-	-	-	80.6	90	208	3	INTEG.	INTEGRAL	EM	-	-	(6)	R	EM (2)	-
RTU-3	-	-	-	64.9	70	208	3	INTEG.	INTEGRAL	EM	-	-	(6)	R	EM (2)	-
EF-1	5	-	-	-	-	208	3	VFD	INTEGRAL	HC	-	-	-	R	EM (2)	(3)
EF-2	1	-	-	-	-	208	1	INTEG.	INTEGRAL	HC	-	-	-	R	EM (2)	(3)
EF-3	1/4	-	-	-	-	120	1	RELAY	(28)	HC	-	-	-	R	EM (2)	(4)
EF-4	1/4	-	-	-	-	120	1	RELAY	(28)	HC	-	-	-	R	EM (2)	-
EWH-1	-	2	-	-	-	208	1	INTEG.	INTEGRAL	EM	-	-	-	R	EM	-
DF-1'S	-	-	-	-	-	120	1	INTEG.	INTEGRAL	EM	-	-	-	R	EC	REC.
ERH-1	-	1.5	-	-	-	120	1	INTEG.	INTEGRAL	EM	-	-	-	R	EC	H.W. (8)
CF-1	1/15	-	-	-	-	120	1	INTEG.	INTEGRAL	EM	-	-	-	R	EC	H.W. (8)

STARTER TYPE:

INTEG = INTEGRAL; PROVIDED INTEGRAL WITH EQUIPMENT.

RELAY = UL LISTED MOTOR RATED RELAY WITH SEPARATE ENTRANCES FOR INPUT AND OUTPUT CONTACTS (RBT SERIES); OVERRIDE SWITCH AND LED STATUS INDICATOR.

CONTACT RATINGS, CONFIGURATION AND COIL VOLTAGE SUITABLE FOR APPLICATION.

MAN = MANUAL; NEMA ICS 2, AC GENERAL PURPOSE CLASS A MANUALLY OPERATED, FULL-VOLTAGE CONTROLLER WITH QUICK MAKE AND BREAK TOGGLE ACTION AND DOUBLE BREAK SILVER ALLOY CONTACTS. BIMETALLIC OR MELTING ALLOY TYPE THERMAL OVERLOAD UNITS. NEMA ICS 6 GENERAL PURPOSE FLUSH MOUNTED ENCLOSURE WITH STAINLESS STEEL COVER PLATE IN FINISHED AREAS AND TYPE 1 SURFACE MOUNTED IN UNFINISHED AREAS.

MAG = MAGNETIC; NEMA ICS 2, AC GENERAL PURPOSE CLASS A MAGNETIC ACROSS-THE-LINE CONTROLLER. DOUBLE BREAK SILVER ALLOY CONTACTS. NEMA SOLID STATE OVERLOAD RELAY WITH USER SELECTABLE SETTINGS, CLASS 10, 20, AND 30; BUILT-IN MEMORY TO PREVENT HOT MOTOR RESTART. OPERATING TEMPERATURE -20 DEGREE C TO +70 DEGREE C. PHASE CURRENT LOSS PROTECTION. PHASE CURRENT UNBALANCE PROTECTION (ADJUSTABLE 20-50%).

PROVIDE NEMA ICS 6, TYPE 1 ENCLOSURE AUXILIARY CONTACT(S) AS REQUIRED FOR CONTROL. PROVIDE 120V, 60 HZ, SECONDARY, 100VA FUSED MINIMUM, TRANSFORMER IN EACH STARTER. FUSED PRIMARY AND SECONDARY, BOND UNFUSED LEG OF SECONDARY TO ENCLOSURE.

COMB = COMBINATION; COMBINE MAGNETIC STARTER AND NON-FUSED DISCONNECT SWITCH IN COMMON ENCLOSURE. LOCKABLE IN OPEN POSITION, MOLDED CAST TYPE MOTOR CIRCUIT PROTECTOR (MAGNETIC PROTECTION ONLY).

VFD = VARIABLE FREQUENCY DRIVE- SEE SPECS.

FURNISHED BY:

EM = EQUIPMENT MANUFACTURER

HC = HEATING CONTRACTOR

EC = ELECTRICAL CONTRACTOR

- ACCEPTABLE MANUFACTURERS: ALLEN BRADLEY, CUTLER HAMMER, SQUARE D, GENERAL ELECTRIC.

- VERIFY VOLTAGE AND PHASE WITH ELECTRICAL CONTRACTOR BEFORE ORDERING EQUIPMENT.

- FURNISH MOTOR STARTERS TO E.C. FOR INSTALLATION AND WIRING WHEN THE STARTER SCHEDULE CALLS FOR H.C. TO FURNISH.

(2) DISCONNECT FACTORY MOUNTED AND PREWIRED BY EQUIPMENT MANUFACTURER.

(3) HOOD EXHAUST FANS CONTROLLED THRU HOOD CONTROL PANEL MOUNTED ON HOOD-3. EC SHALL INSTALL CONTROL WIRING FURNISHED BY FAN MANUFACTURER FROM HOOD CONTROL PANEL TO FANS. COORDINATE INSTALLATION WITH KITCHEN EQUIPMENT SUPPLIER.

(4) EC SHALL WIRE 24V FROM CO2 DETECTOR ALARM OUTPUT TO RELAY. TURN ON EF-3 UPON CO2 ALARM FROM DETECTOR.

(6) SMOKE DETECTOR PROVIDED WITH RTU TO SHUT DOWN UNIT ON SMOKE DETECTION. EC SHALL POWER AND MONITOR SMOKE DETECTOR THRU FIRE ALARM PANEL.

(8) EC SHALL PROVIDE WALL SWITCH.

(28) MOUNT RELAY ON WALL NEAR ELECTRICAL PANEL THAT SERVES FAN. COORDINATE LOCATION WITH ELECTRICAL CONTRACTOR.

ELECTRIC WALL HEATER SCHEDULE - (E.W.H.)

NO.	CFM	EAT F	LAT F	MBH	HTG KW	THERMOSTAT	CABINET RECESS DEPTH	HGT. AFF.	MODEL	COLOR	REMARKS
1	100	60	122	6.8	2	INTEG., PREWIRED, TAMPER-RESISTANT	3-3/4"	12"	FRC-4020	WHITE	"BERKO"
2	100	60	122	6.8	2	INTEG., PREWIRED, TAMPER-RESISTANT	-	36"	FRC-4020	WHITE	"BERKO"

- ACCEPTABLE MANUFACTURERS: BERKO, RAYWALL, Q-MARK, MARKEL.

- PROVIDE ALL EWH'S WITH PREWIRED DISCONNECT SWITCH, PREWIRED AUTOMATIC RESET THERMAL OVERLOAD PROTECTION, BUILT-IN FAN DELAY CONTROLS, 16 GAUGE FRONT BAR GRILLE.

DESTRATIFICATION FAN SCHEDULE (D.F.)

NO.	LOC.	CFM	FAN DIA.	INSTALLATION HEIGHT	RPM	MAX. AMPS	HP	WATTS	PROTECTIVE CAGE	SECONDARY SUPPORT CABLE	COLOR	WEIGHT	MODEL	REMARKS
1	SEE DWG.	620	-	BETWEEN TRUSSES	1,640	0.46	-	31	NO	NO	WHITE	15 LBS	D-25-EC	"AIRUS"

- ACCEPTABLE MANUFACTURERS: ENVIRO, FAN LEADING EDGE, AIRUS

SUPPLY GRILLE SCHEDULE (S.G.)

NO.	TYPE	CFM RANGE	NECK/FACE SIZE	INLET DUCT DIA.	MAT'L	VOL. DMPR	FINISH	FRAME	THROW	MODEL	REMARKS
1-6	PERF.	0-75	6"	6"	STEEL	(1)	WHITE	LAY-IN	(3)	PAS	"TITUS" (5)
1-8	PERF.	76-250	8"	8"	STEEL	(1)	WHITE	LAY-IN	(3)	PAS	"TITUS" (5)
1-10	PERF.	251-325	10"	10"	STEEL	(1)	WHITE	LAY-IN	(3)	PAS	"TITUS" (5)
1-12	PERF.	326-425	12"	12"	STEEL	(1)	WHITE	LAY-IN	(3)	PAS	"TITUS" (5)
1-14	PERF.	426-525	14"	14"	STEEL	(1)	WHITE	LAY-IN	(3)	PAS	"TITUS" (5)
1-16	PERF.	526-650	16"	16"	STEEL	(1)	WHITE	LAY-IN	(3)	PAS	"TITUS" (5)
25	DLR DEF.	SEE DWG.	(2)	-	STEEL	(1)	WHITE	SURFACE MOUNT	330R (4)	OMNI	"TITUS" (5)
35-6	PLAQUE	0-75	12 X 12	8"	STEEL	(1)	WHITE	(6)	(3)	OMNI	"TITUS" (5)
35-8	PLAQUE	76-275	12 X 12	8"	STEEL	(1)	WHITE	(6)	(3)	OMNI	"TITUS" (5)

- ACCEPTABLE MANUFACTURERS: TITUS, PRICE, CARNES, METALAIR, ANEMOSTAT, KRUEGER, NAILOR.

- NOT ALL SUPPLY GRILLES SCHEDULED ARE USED ON THE PROJECT.

(1) VOLUME DAMPER AT THE GRILLE INDICATED BY A "D" AFTER THE GRILLE DESIGNATION. EXAMPLE: SG15-8D IS SG15-8 WITH A DAMPER.

(2) NECK SIZE INDICATED ON PLAN AT GRILLE IDENTIFICATION.

(3) NUMBER OF THROW DIRECTION INDICATED ON PLAN BY GRILLE SHADING. SHADED QUADRANT DOES NOT HAVE AIRFLOW.

(4) FRONT BLADES IN THE HORIZONTAL DIRECTION.

(5) PROVIDE MOLDED FIBERGLASS INSULATION BLANKET ON BACK SIDE OF GRILLE.

(6) PROVIDE GRILLE WITH LAY-IN FRAME AND MODEL TRM-5 MOUNTING FRAME TO INSTALL GRILLE.

RETURN GRILLE SCHEDULE (RG)

NO.	TYPE	MAX. CFM	NECK/FACE SIZE	FLEX. DUCT DIA.	MAT'L	VOL. DMPR	FINISH	FRAME	MODEL	REMARKS
1-6	PERF.	75	24 X 24	6"	STEEL	(1)	WHITE	LAY-IN	PAR	"TITUS"
1-8	PERF.	250	24 X 24	8"	STEEL	(1)	WHITE	LAY-IN	PAR	"TITUS"
1-10	PERF.	450	24 X 24	10"	STEEL	(1)	WHITE	LAY-IN	PAR	"TITUS"
1-12	PERF.	750	24 X 24	12"	STEEL	(1)	WHITE	LAY-IN	PAR	"TITUS"
1-14	PERF.	1,100	24 X 24	14"	STEEL	(1)	WHITE	LAY-IN	PAR	"TITUS"
1-16	PERF.	1,600	24 X 24	16"	STEEL	(1)	WHITE	LAY-IN	PAR	"TITUS"
1-18	PERF.	2,000	24 X 24	18"	STEEL	(1)	WHITE	LAY-IN	PAR	"TITUS"
25	LOUVERED	SEE DWG.	(2)	-	STEEL	(1)	WHITE	SURFACE MOUNT	330R (4)	"TITUS"
35	LOUVERED	SEE DWG.	(2)	-	STEEL	(1)	WHITE	SURFACE MOUNT	33R (4)	"TITUS"

- ACCEPTABLE MANUFACTURERS: TITUS, PRICE, CARNES, METALAIR, ANEMOSTAT, KRUEGER, NAILOR.

- NOT ALL RETURN GRILLES SCHEDULED ARE USED ON THE PROJECT.

(1) VOLUME DAMPER AT THE GRILLE INDICATED BY A "D" AFTER THE GRILLE DESIGNATION. EXAMPLE: RG15-8D IS RG15-8 WITH A DAMPER.

(2) NECK SIZE INDICATED ON PLAN AT GRILLE IDENTIFICATION.

(4) BLADES IN HORIZONTAL DIRECTION.

TRANSFER GRILLE SCHEDULE (TG)

NO.	TYPE	MAX CFM	NECK/FACE SIZE	FLEX. DUCT DIA.	MAT'L	FINISH	FRAME	MODEL	REMARKS
25	LOUVERED	SEE DWG.	(2)	-	STEEL	WHITE	SURFACE MOUNT	350R (4)	"TITUS"

- ACCEPTABLE MANUFACTURERS: TITUS, PRICE, CARNES, METALAIR, ANEMOSTAT, KRUEGER, NAILOR.

(2) NECK SIZE INDICATED ON PLAN AT GRILLE IDENTIFICATION.

(4) BLADES IN HORIZONTAL DIRECTION.

EXHAUST GRILLE SCHEDULE (EG)

NO.	TYPE	CFM RANGE	NECK/FACE SIZE	FLEX. DUCT DIA.	MAT'L	VOL. DMPR	FINISH	FRAME	MODEL	REMARKS
15-6	LOUVERED	0-75	8 X 8	6"	STEEL	(1)	WHITE	SURFACE MOUNT	350RL	"TITUS"
25	LOUVERED	SEE DWG.	(2)	-	STEEL	(1)	WHITE	SURFACE MOUNT	350R (4)	"TITUS"

- ACCEPTABLE MANUFACTURERS: TITUS, PRICE, CARNES, METALAIR, ANEMOSTAT, KRUEGER, NAILOR.

(1) VOLUME DAMPER AT THE GRILLE INDICATED BY A "D" AFTER THE GRILLE DESIGNATION. EXAMPLE: EG15-8D IS EG15-8 WITH A DAMPER.

(2) NECK SIZE INDICATED ON PLAN AT GRILLE IDENTIFICATION.

(4) BLADES IN HORIZONTAL DIRECTION.

ELECTRIC RADIANT HEATER SCHEDULE (E.R.H.)

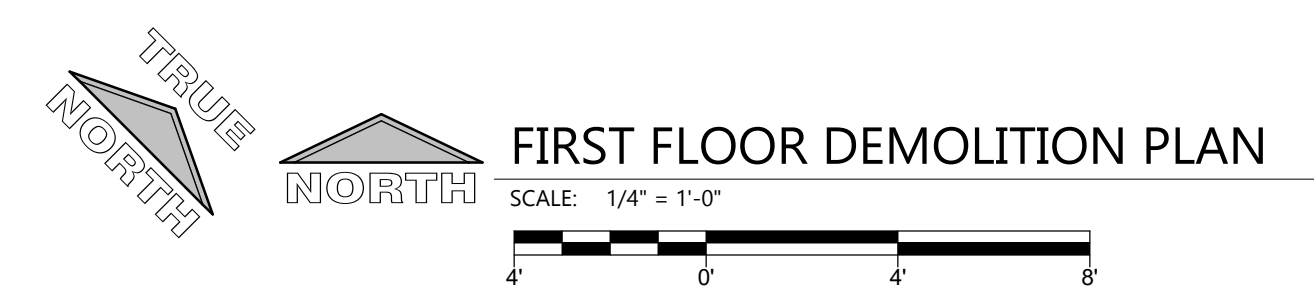
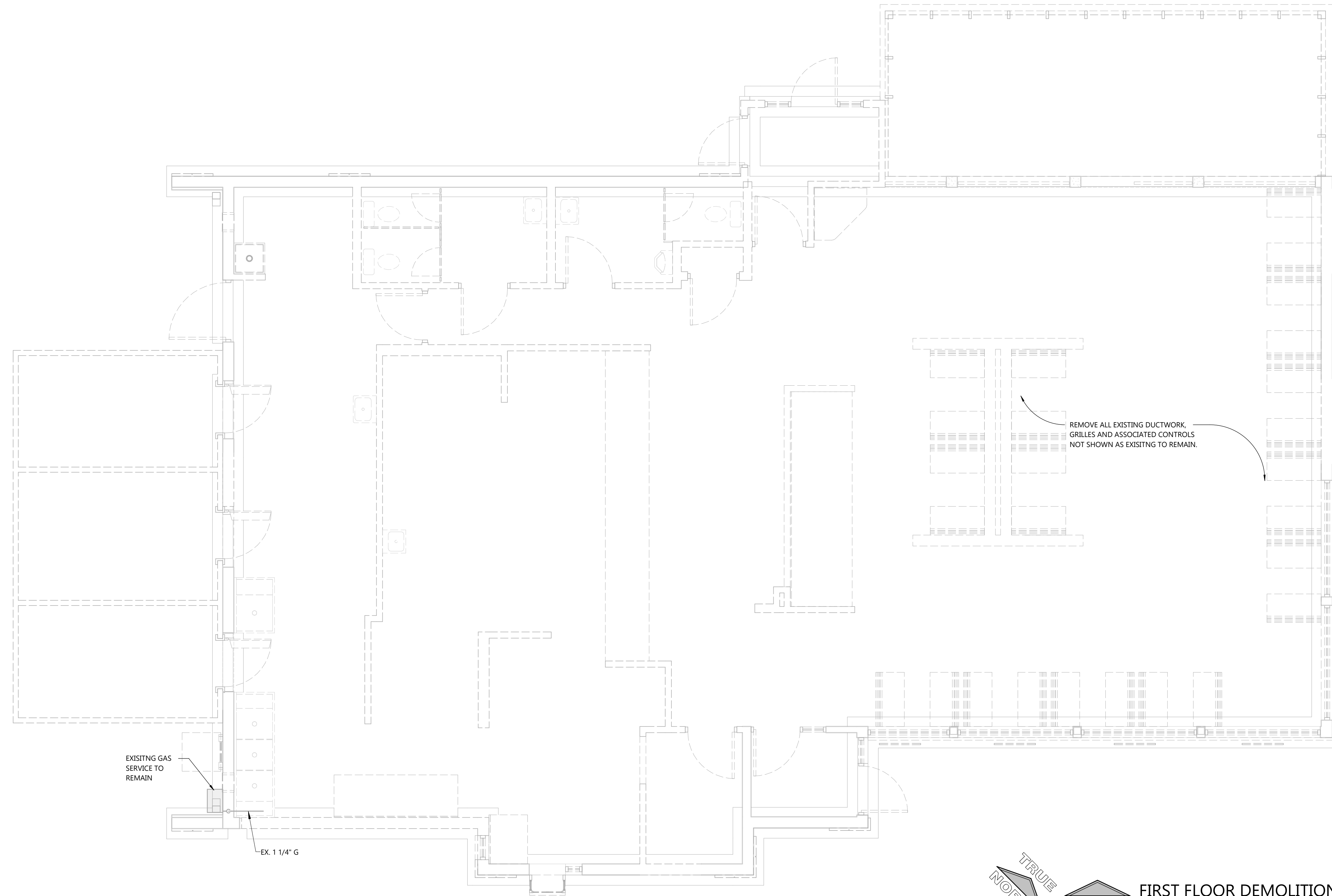
NO.	BTU	WATT	HEIGHT	DEPTH	LENGTH	HEIGHT A.F.F. (1)	VOLTS	CONTROL	MODEL	REMARKS
1	5,100	1,500	3.375"	5.5"	4					

DEMOLITION PLAN NOTES

- ALL EQUIPMENT, DUCTWORK AND PIPING SHOWN "HEAVY DASHED" ARE TO BE DEMOLISHED.
- ALL EQUIPMENT, DUCTWORK AND PIPING SHOWN "LIGHTER" ARE EXISTING TO REMAIN.
- WHERE GRILLES ARE SHOWN TO BE REMOVED, REMOVE BRANCH DUCT, CAP AT MAIN IF MAIN REMAINS AND TAKEOFF IS NOT BEING USED FOR NEW GRILLE.

PROJECT INFORMATION

PROPOSED BUILDING RENOVATION
HAWAIIAN BROS - STR: 45
13963 STATE HWY AC • FLOISSANT, MO. 63033



FIRST FLOOR DEMOLITION PLAN

PROFESSIONAL SEAL

SHEET DATES

SHEET ISSUE NOV. 16, 2021

REVISIONS

NO.	DESCRIPTION

JOB NUMBER

2164180

SHEET NUMBER

HD1.1

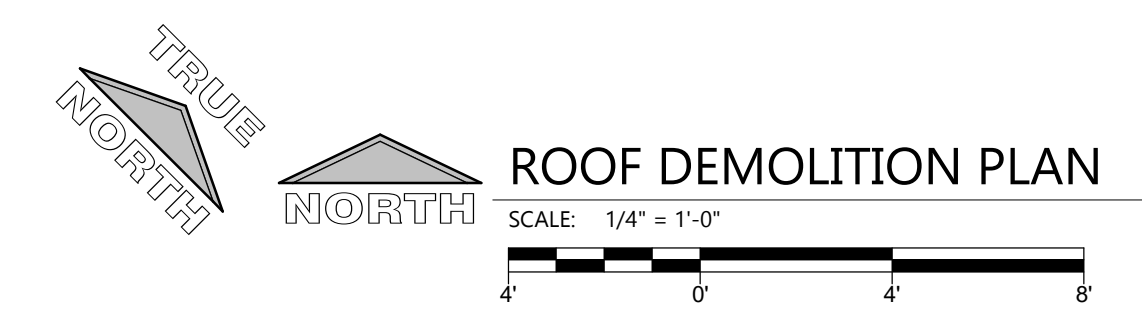
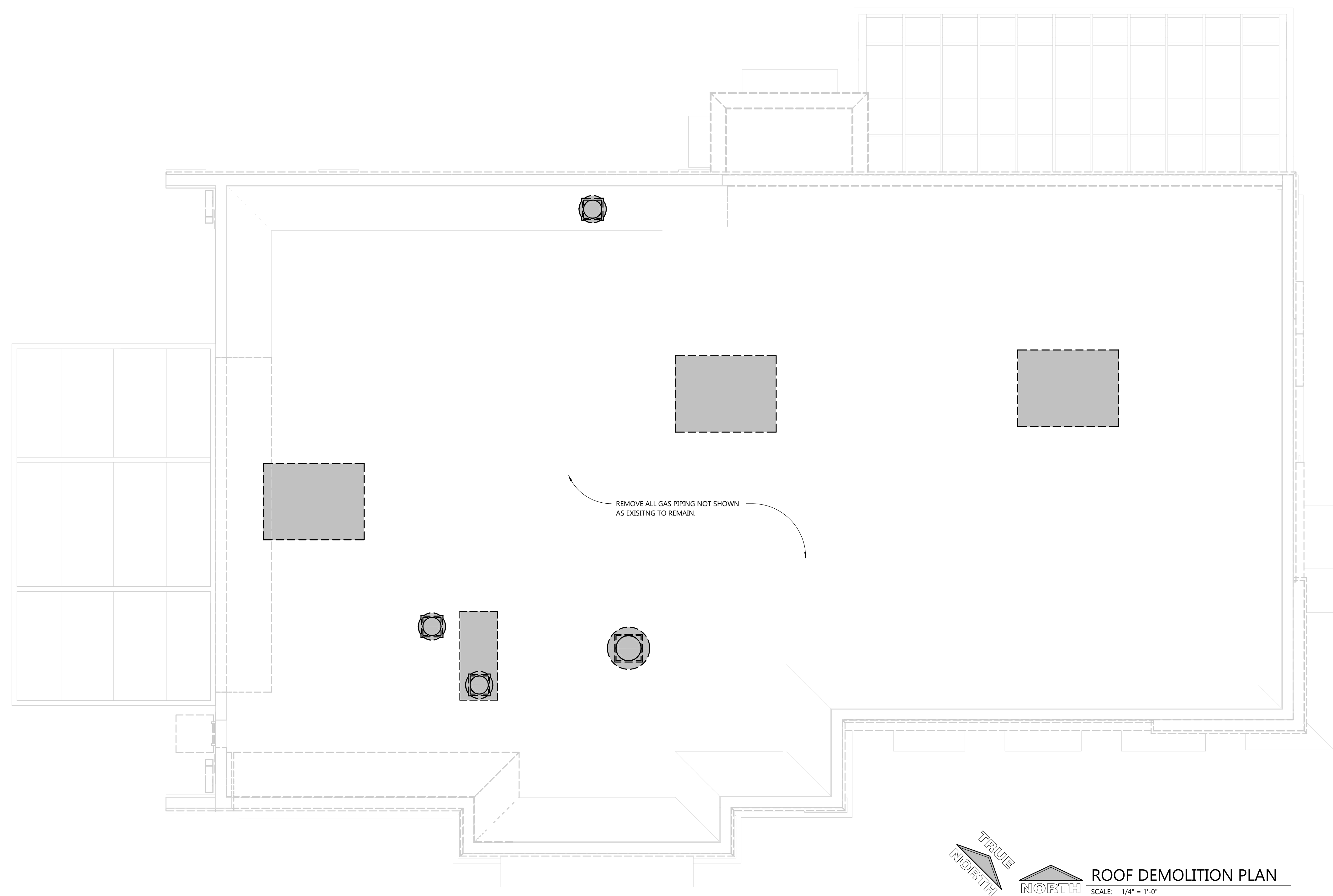
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DEMOLITION PLAN NOTES

- ALL EQUIPMENT, DUCTWORK AND PIPING SHOWN "HEAVY DASHED" ARE TO BE DEMOLISHED.
- ALL EQUIPMENT, DUCTWORK AND PIPING SHOWN "LIGHTER" ARE EXISTING TO REMAIN.

PROJECT INFORMATION

PROPOSED BUILDING RENOVATION
HAWAIIAN BROS - STR: 45
13963 STATE HWY AC • FLORISSANT, MO. 63033



ROOF DEMOLITION PLAN

PROFESSIONAL SEAL

SHEET DATES

SHEET ISSUE NOV. 16, 2021

REVISIONS

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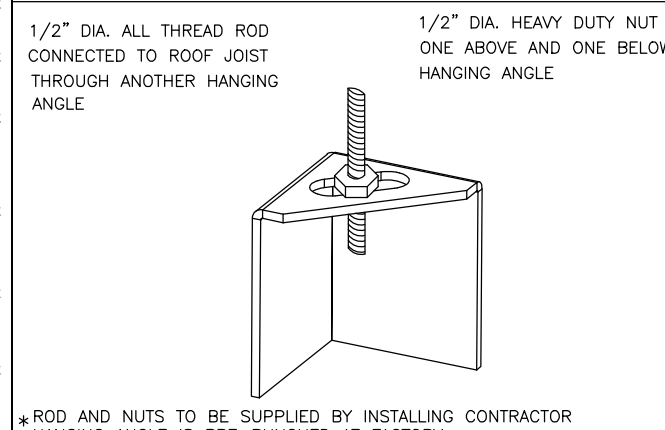
JOB NUMBER

2164180

SHEET NUMBER

HD1.2

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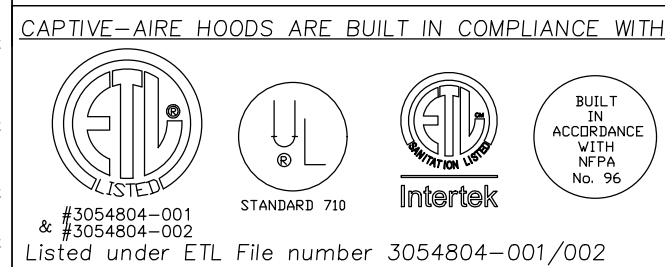


ROD AND NUTS TO BE SUPPLIED BY INSTALLING CONTRACTOR HANGING ANGLE IS PRE-FINISHED AT FACTORY

HOOD STYLE	DIM FROM REAR	DIM FROM FRONT (24" H)	DIM FROM FRONT (30" H)
CANOPY ND2	4.166"	2.246"	2.246"
ND2-PSP-F	4.166"	2.246"	2.246"
BACKSHELF BD-2	4.166"	2.246"	-
VHB/VHB-G	36"X36"	42"X42"	48"X48"
FRONT/BACK DIMS BY SIZE	2.246"	2.246"	2.246"

EXHAUST CFM=LENGTH OF HOOD X CFM/LIN.FT. (LOAD)
 SUPPLY CFM=EXHAUST CFM X PERCENTAGE REQUIRED
 TOTAL DUCT AREA=144 X $\frac{CFM}{FPM}$
 DUCT LENGTH= $\frac{TOTAL DUCT AREA}{DUCT DEPTH}$

*CAPTIVE-AIRE DUCT CONNECTION SIZES ARE CALCULATED USING AN EXHAUST VELOCITY OF 1500-1800 FPM AND A SUPPLY VELOCITY OF 300-400 FPM.



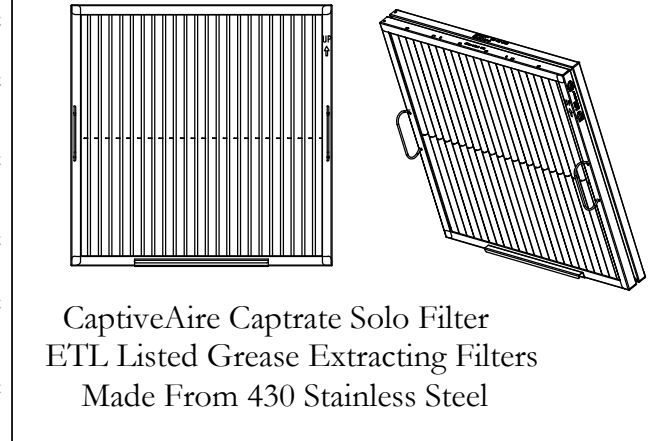
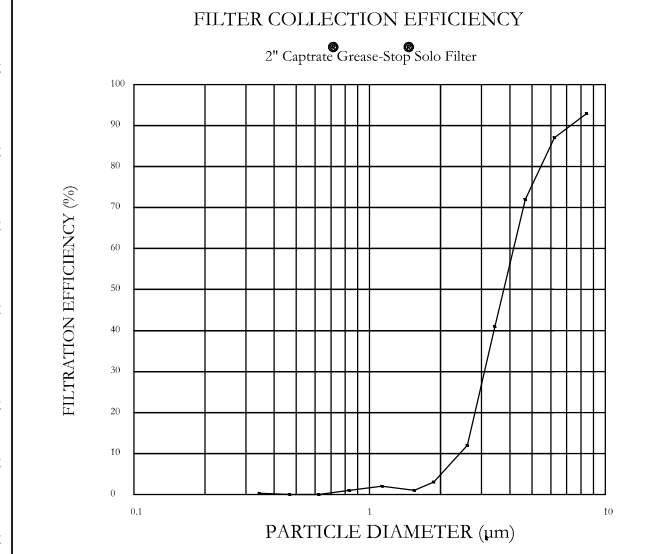
CAPTIVE-AIRE HOODS HAVE OPTIONAL CLEARANCE REDUCTION SYSTEMS AVAILABLE AS FOLLOWS:

MATERIAL	CLEARANCE REDUCTION SYSTEM
NON-COMBUSTIBLE	NONE REQUIRED
LIMITED-COMBUSTIBLE	3" UNINSULATED STANDOFF
COMBUSTIBLE	1" UNINSULATED STANDOFF

- INSTALLATION**
- ALL ELECTRICAL "FIELD" CONNECTIONS AND RELATED INTERCONNECTIONS BY ELECTRICAL CONTRACTORS.
 - ALL PLUMBING "FIELD" CONNECTIONS AND RELATED INTERCONNECTIONS BY PLUMBING CONTRACTORS.
 - HANGING BRACKETS LOCATED AND WELDED AS SHOWN ON PLANS. ALL OTHER HANGER MATERIALS PROVIDED BY INSTALLING CONTRACTORS.
 - ALL CONNECTIONS FROM CAPTIVE-AIRE DUCT PER MECHANICAL CONTRACTOR'S PLANS.
 - COOKING EQUIPMENT TO SHUTOFF IN EVENT OF FIRE.
 - EXHAUST FANS TO TURN ON IN EVENT OF FIRE.
 - ALL LIGHTS FIXTURE SHOWN INSTALLED BY CAPTIVE-AIRE ARE FACTORY PREWIRED. INTERCONNECTIONS BETWEEN HOODS AND TO SWITCHES BY ELECTRICAL CONTRACTORS.
 - LAMPS FOR LIGHT FIXTURES BY INSTALLING CONTRACTORS.
 - SEMI-RESISTANTS ARE RESPONSIBILITY OF INSTALLING CONTRACTOR.
 - INSTALLING CONTRACTORS ASSUME ALL RELATED RESPONSIBILITY FOR VERIFICATION OF DIMENSIONAL DATA CONTAINED ON THESE DOCUMENTS FOR ACCURACY, INTEGRATION AND ADMINISTRATION OF CODE REQUIREMENTS IN EFFECT PRIOR TO ANY RELEASE FOR PRODUCTION OF EQUIPMENT SHOWN.

- BALANCE**
- KITCHEN HOODS MUST BE BALANCED WITH KITCHEN.
 - KITCHEN SHALL BE NEGATIVE WITH RESPECT TO DINING AREA.
 - RESTAURANT SHALL BE POSITIVE WITH RESPECT TO AMBIENT PRESSURE.

- ADDITIONAL**
- WRITTEN HOOD DIMENSIONS HAVE PRECEDENCE OVER SCALE.
 - SIGNED AND "APPROVED" COPIES OF THIS DOCUMENT MUST BE RECEIVED BY THE FACTORY PRIOR TO COMMENCEMENT OF FABRICATION.



CaptiveAire Captrate Solo Filter ETL Listed Grease Extracting Filters Made From 430 Stainless Steel

HOOD INFORMATION - JOB#5448875

HOOD NO	TAG	MODEL	MANUFACTURER	LENGTH	MAX COOKING TEMP	TYPE	APPLIANCE DUTY	DESIGN CFM/FT	TOTAL EXH CFM	EXHAUST PLENUM RISER(S)				HOOD CONSTRUCTION	HOOD CONFIG		
										WIDTH	LENG	HEIGHT	DIA		CFM	VEL	SP
1	Item 52	5424 ND-2	CAPTIVEAIRE	12' 11"	450 DEG	I	MEDIUM	225	2910	4"	12"	1455	1853	-0.988"	430 SS WHERE EXPOSED	RIGHT	BACK
2	Item 53	5424 ND-2	CAPTIVEAIRE	7' 5"	450 DEG	I	MEDIUM	150	1115	4"	10"	1115	2044	-0.860"	430 SS WHERE EXPOSED	LEFT	BACK
3	Item 75	5424 VHB-ND	CAPTIVEAIRE	13' 6"	700 DEG	II	N/A	150	2025	4"	12"	1012	1289	-0.133"	430 SS 100%	ALONE	FRONT

PATENT NUMBERS
 EXHAUST HOODS ND-2/BD-2/SND-2 (CANADA) - CA PATENT 2520435 C.

HOOD INFORMATION

HOOD NO	TAG	TYPE	FILTER(S)		EFFICIENCY @ 7 MICRONS	QTY	LIGHTS(S)		WIRE GUARD	LOCATION	SIZE	UTILITY CABINET(S)		FIRE SYSTEM PIPING	HOOD HANGING WEIGHT	
			QTY	HEIGHT			LENGTH	TYPE				SIZE	ELECTRICAL			SWITCHES
1	Item 52	CAPTRATE SOLO FILTER	9	16"	16"	85% SEE FILTER SPEC	4	RECESSED ROUND	NO					NO	614 LBS	
2	Item 53	CAPTRATE SOLO FILTER	5	16"	16"	85% SEE FILTER SPEC	2	RECESSED ROUND	NO					NO	432 LBS	
3	Item 75						4	RECESSED ROUND	NO	LEFT	12"x54"x24"		DCV-2011_MA4	1 LIGHT 1 FAN	NO	574 LBS

HOOD OPTIONS

HOOD NO	TAG	OPTION
1	Item 52	FIELD WRAPPER 18.00' HIGH FRONT, RIGHT. BALANCE DAMPERS. RISER SENSOR INSTALL 6IN PLEN. RIGHT VERTICAL END PANEL 27' TOP WIDTH, 21' BOTTOM WIDTH, 80" HIGH INSULATED 430 SS.
2	Item 53	FIELD WRAPPER 18.00' HIGH FRONT, LEFT. BALANCE DAMPERS. RISER SENSOR INSTALL 6IN PLEN. LEFT WIDE VERTICAL END PANEL 42' TOP WIDTH, 36' BOTTOM WIDTH, 80" HIGH INSULATED 430 SS.
3	Item 75	FIELD WRAPPER 18.00' HIGH FRONT, LEFT, RIGHT. RIGHT QUARTER END PANEL 23' TOP WIDTH, 0' BOTTOM WIDTH, 23' HIGH 430 SS. LEFT QUARTER END PANEL 23' TOP WIDTH, 0' BOTTOM WIDTH, 23' HIGH 430 SS. RISER SENSOR INSTALL 3IN DBL.

SPECIFICATION: CAPTRATE GREASE-STOP SOLO FILTER

THE CAPTRATE GREASE-STOP SOLO FILTER IS A SINGLE-STAGE FILTER FEATURING A UNIQUE S-Baffle DESIGN IN CONJUNCTION WITH A SLOTTED REAR Baffle DESIGN, TO DELIVER EXCEPTIONAL FILTRATION EFFICIENCY.

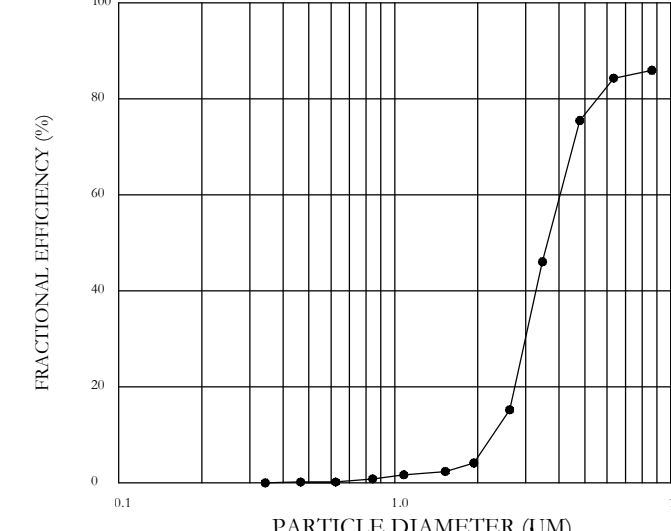
FILTER IS STAINLESS STEEL CONSTRUCTION, AND SIZED TO FIT INTO STANDARD 2-INCH DEEP HOOD CHANNEL(S).

UNITS SHALL INCLUDE STAINLESS STEEL HANDLES AND A FASTENING DEVICE TO SECURE THE TWO COMPONENTS WHEN ASSEMBLED.

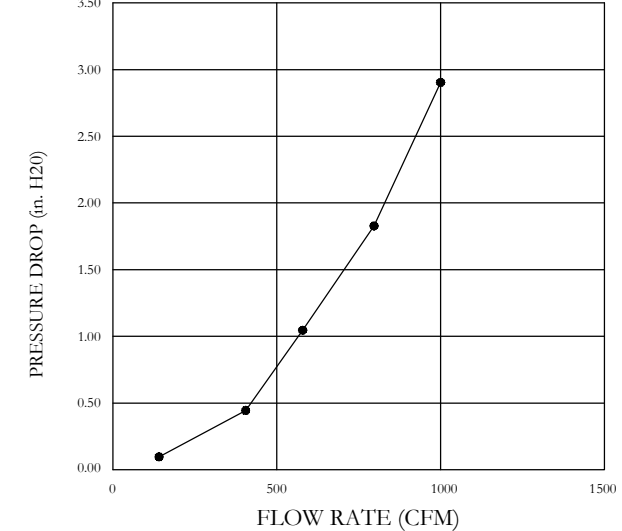
GREASE EXTRACTION EFFICIENCY PERFORMANCE SHALL REMOVE AT LEAST 75% OF GREASE PARTICLES FIVE MICRONS IN SIZE, AND 85% GREASE PARTICLES SEVEN MICRONS IN SIZE AND LARGER, WITH A CORRESPONDING PRESSURE DROP NOT TO EXCEED 1.0 INCHES OF WATER GAUGE.

THE CAPTRATE GREASE-STOP SOLO WAS TESTED TO ASTM STANDARD ASTM F2519-05, MANUFACTURER APPROVED FOR USE IN SOLID FUEL APPLICATIONS AS A SPARK ARRESTER.

EFFICIENCY VS. PARTICLE DIAMETER



PRESSURE DROP VS. FLOW RATE



CAPTRATE FILTERS ARE BUILT IN COMPLIANCE WITH:



FOR QUESTIONS, CALL THE KANSAS CITY REGIONAL OFFICE
 1126 SWIFT STREET, KANSAS CITY, MO 64116
 PHONE: (816) 221-8575
 FAX: (816) 221-8311

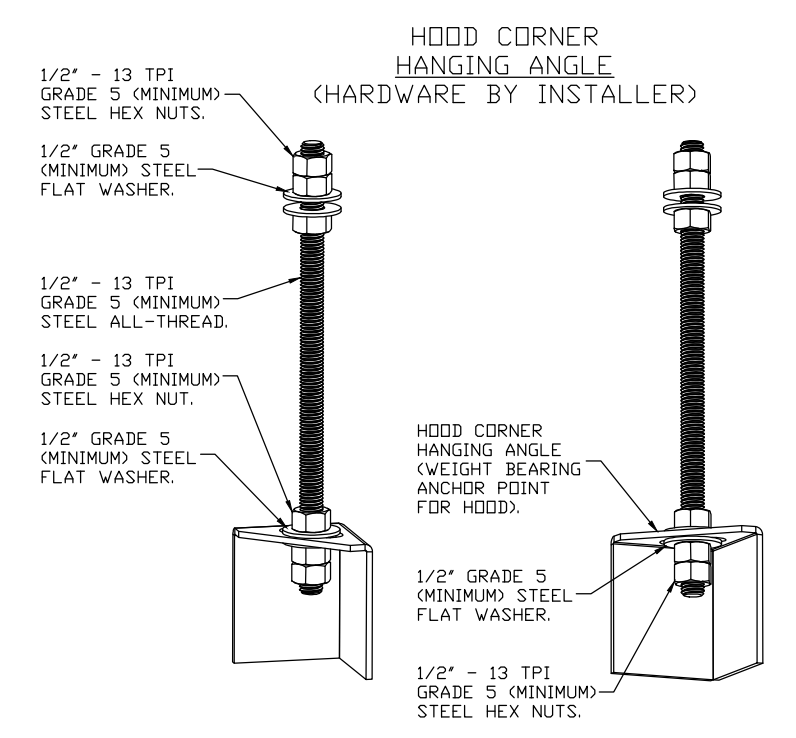
CUSTOMER APPROVAL TO MANUFACTURE:

Approved as Noted
 Approved with NO Exception Taken
 Revise and Resubmit
 SIGNATURE _____ Date _____

***** NOTE *****
 ALL WALLS AND STRUCTURES THAT COME WITHIN 18" OF HOOD MUST BE METAL STUDS AND SHEETROCK. WOOD STUDS OR ANY OTHER COMBUSTIBLE MATERIAL WITHIN 18" OF HOOD NOT ALLOWED.

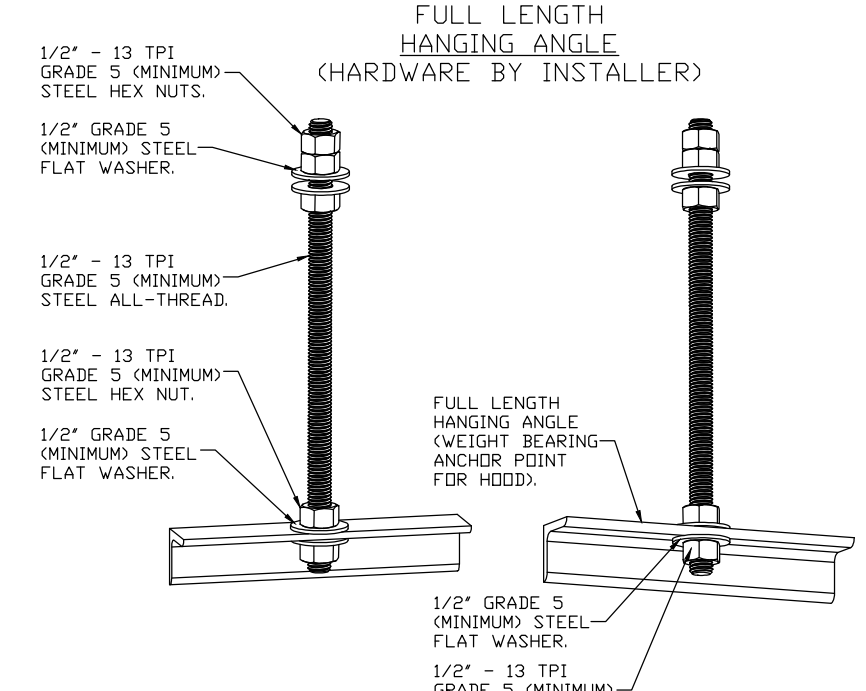
***** NOTE *****
 HOOD MANUFACTURER RECOMMENDS NO RETURNS OR 4-WAY DIFFUSERS WITHIN 10 FEET OF HOOD IN ALL DIRECTION.

***** NOTE *****
 MAKEUP AIR SHALL BE DELIVERED INTO SPACE IN MANNER THAT WILL NOT DISRUPT HOODS ABILITY TO CAPTURE AND CONTAIN.



ASSEMBLY INSTRUCTIONS

HANGING ANGLE MUST BE SUPPORTED WITH 1/2" - 13 TPI GRADE 5 (MINIMUM) ALL-THREAD. SANDWICH HANGING ANGLES AND CEILING ANCHOR POINTS WITH 1/2" GRADE 5 (MINIMUM) STEEL FLAT WASHERS AND 1/2" - 13 TPI GRADE 5 (MINIMUM) HEX NUTS AS SHOWN. MUST USE DOUBLED HEX NUT CONFIGURATION BENEATH HOOD HANGING ANGLES AND ABOVE CEILING ANCHORS. MAINTAIN 1/4" OF EXPOSED THREADS BENEATH BOTTOM HEX NUT. TORQUE ALL HEX NUTS TO 57 FT-LBS.



ASSEMBLY INSTRUCTIONS

HANGING ANGLE MUST BE SUPPORTED WITH 1/2" - 13 TPI GRADE 5 (MINIMUM) ALL-THREAD. SANDWICH HANGING ANGLES AND CEILING ANCHOR POINTS WITH 1/2" GRADE 5 (MINIMUM) STEEL FLAT WASHERS AND 1/2" - 13 TPI GRADE 5 (MINIMUM) HEX NUTS AS SHOWN. MUST USE DOUBLED HEX NUT CONFIGURATION ABOVE CEILING ANCHORS. SINGLE HEX NUT BENEATH HANGING ANGLE IS ACCEPTABLE FOR FULL LENGTH HANGING ANGLES. MAINTAIN 1/4" OF EXPOSED THREADS BENEATH BOTTOM HEX NUT. TORQUE ALL HEX NUTS TO 57 FT-LBS.

REVISIONS	
DESCRIPTION	DATE



Hawaiian Bros - Florissant, MO (DIAS)
 13963 State Hwy AC,
 Florissant, MO, 63033

DATE: 5/6/2022
 DWG.#: 5448875
 DRAWN BY: michael.co
 SCALE: 3/4" = 1'-0"
 MASTER DRAWING

SHEET NO. 1



PROJECT INFORMATION

PROPOSED BUILDING RENOVATION
HAWAIIAN BROS - STR: 45
 13963 NEW HALLS FERRY ROAD • FLORISSANT, MO. 63033

PROFESSIONAL SEAL

SHEET DATES

ISSUE DATE APR. 26, 2022

REVISIONS

CB1 APR. 26, 2022
 CB2 MAY 11, 2022

JOB NUMBER

2164180

SHEET NUMBER

H5.1

PROJECT INFORMATION

PROPOSED BUILDING RENOVATION
HAWAIIAN BROS - STR: 45
13963 NEW HALLS FERRY ROAD • FLORISSANT, MO. 63033

PROFESSIONAL SEAL

SHEET DATES

ISSUE DATE APR. 26, 2022

REVISIONS

CB1 APR. 26, 2022
CB2 MAY 11, 2022

JOB NUMBER

2164180

SHEET NUMBER

H5.2

REVISIONS	DESCRIPTION	DATE
△		
△		
△		
△		



Hawaiian Bros - Florissant, MO (DDAS)
13963 State Hwy AC,
Florissant, MO, 63033

DATE: 5/6/2022

DWG.#: 5448875

DRAWN BY: michael.co

SCALE: 3/4" = 1'-0"

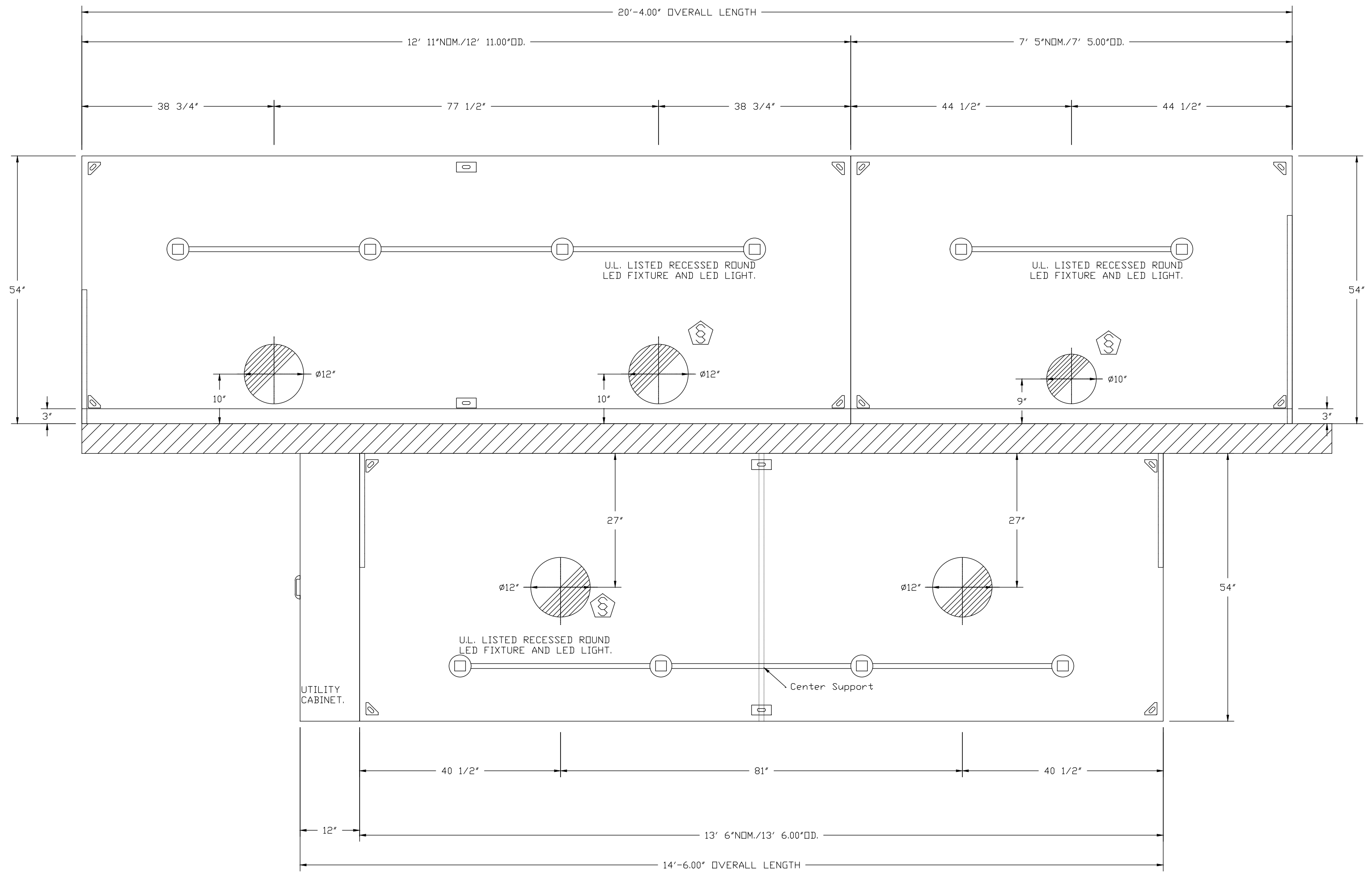
MASTER DRAWING

SHEET NO.
2

NOTE: ADDITIONAL HANGING ANGLES PROVIDED FOR HOODS 12" AND LONGER.

PLAN VIEW - HOOD #1 (Item 52)
12' 11.00" LONG 5424ND-2

PLAN VIEW - HOOD #2 (Item 53)
7' 5.00" LONG 5424ND-2



PLAN VIEW - HOOD #3 (Item 75)
13' 6.00" LONG 5424VHB-ND

NOTE: ADDITIONAL HANGING ANGLES PROVIDED FOR HOODS 12" AND LONGER.

CB2

PROJECT INFORMATION

PROPOSED BUILDING RENOVATION
HAWAIIAN BROS - STR: 45
13963 NEW HALLS FERRY ROAD • FLORISSANT, MO. 63033

PROFESSIONAL SEAL

SHEET DATES
ISSUE DATE APR. 26, 2022

REVISIONS
CB1 APR. 26, 2022
CB2 MAY 11, 2022

DATE: 5/6/2022
DWG.#: 5448875
DRAWN BY: michael.co
SCALE: 3/4" = 1'-0"
MASTER DRAWING

JOB NUMBER
2164180

SHEET NUMBER

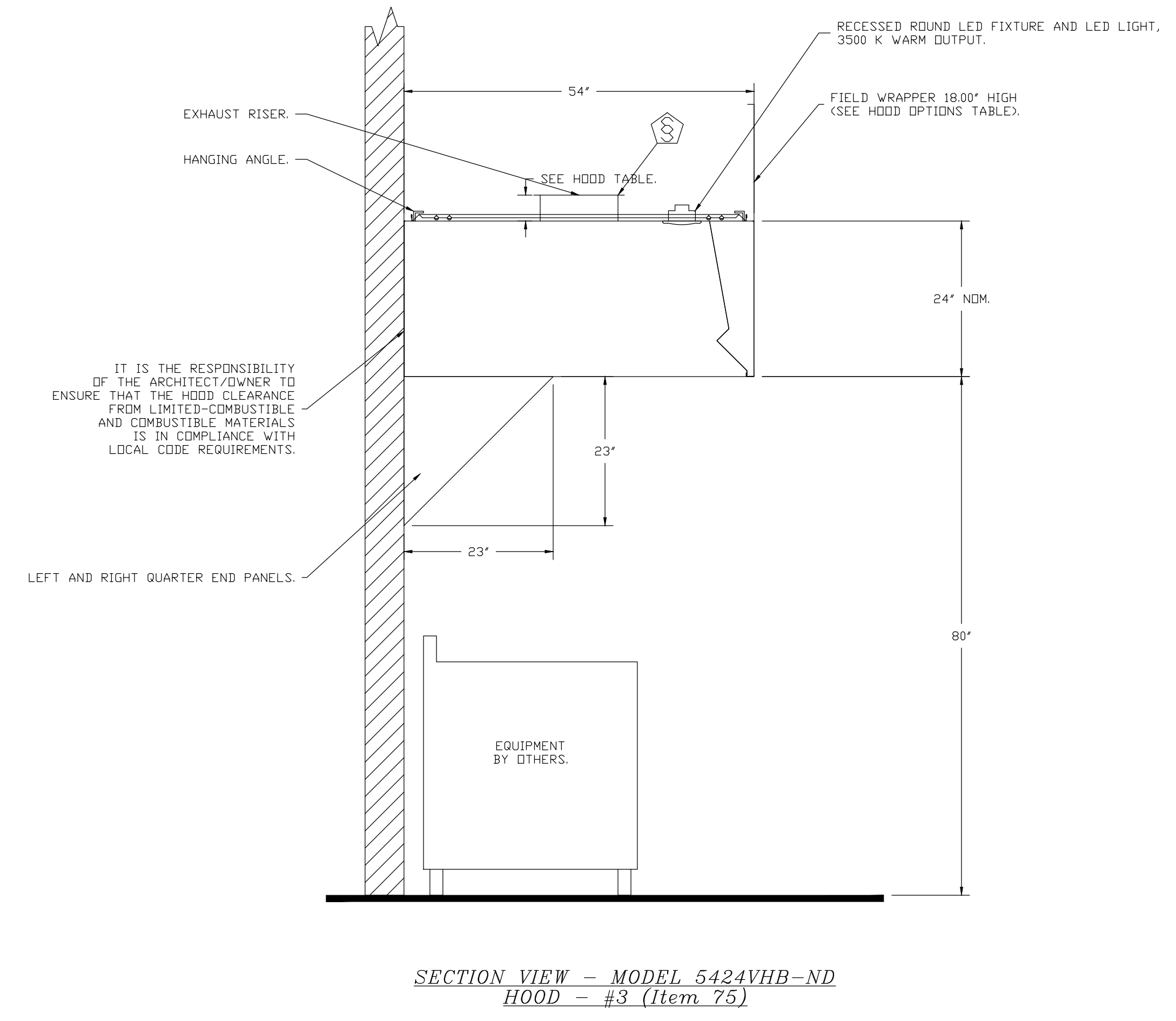
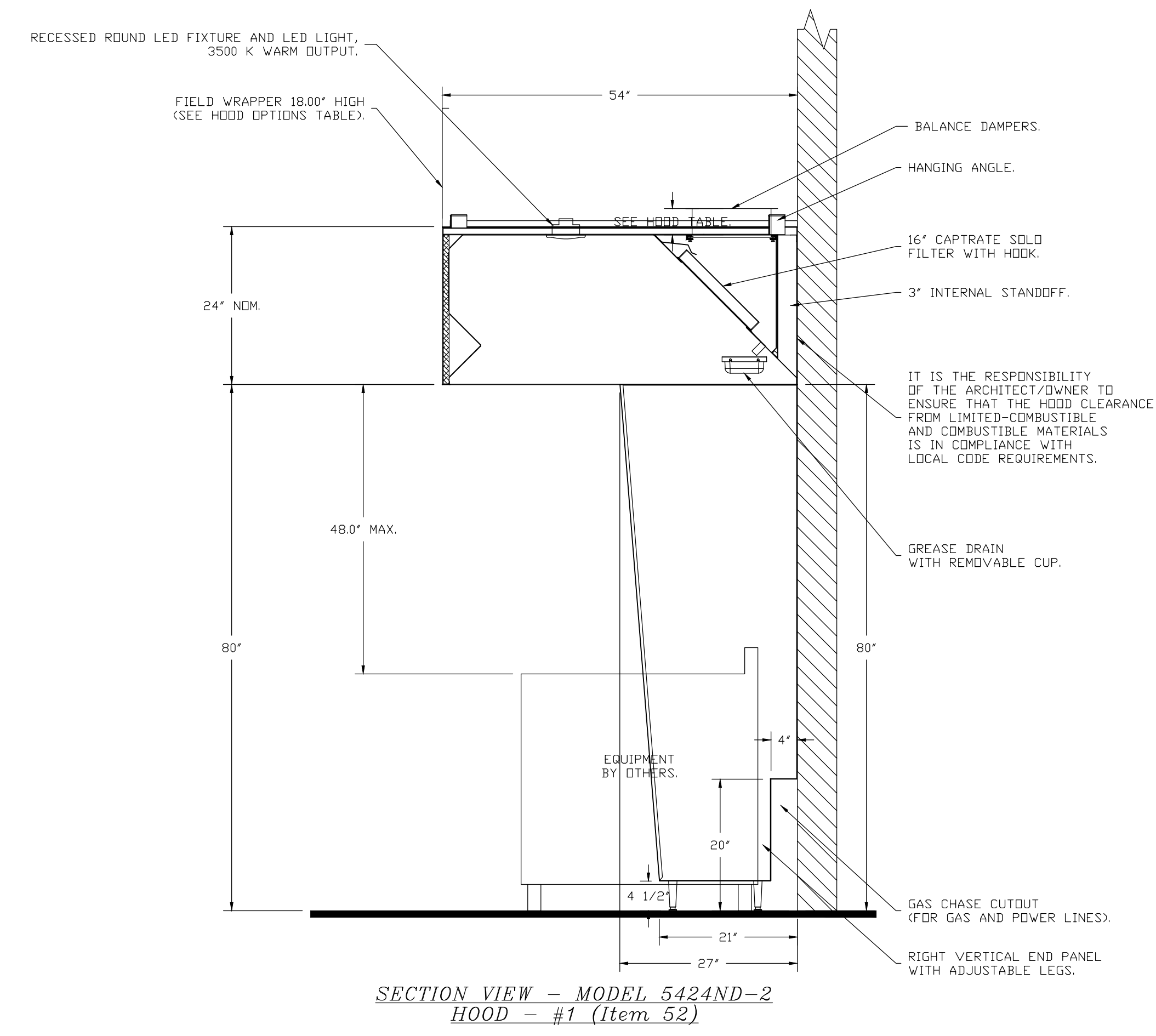
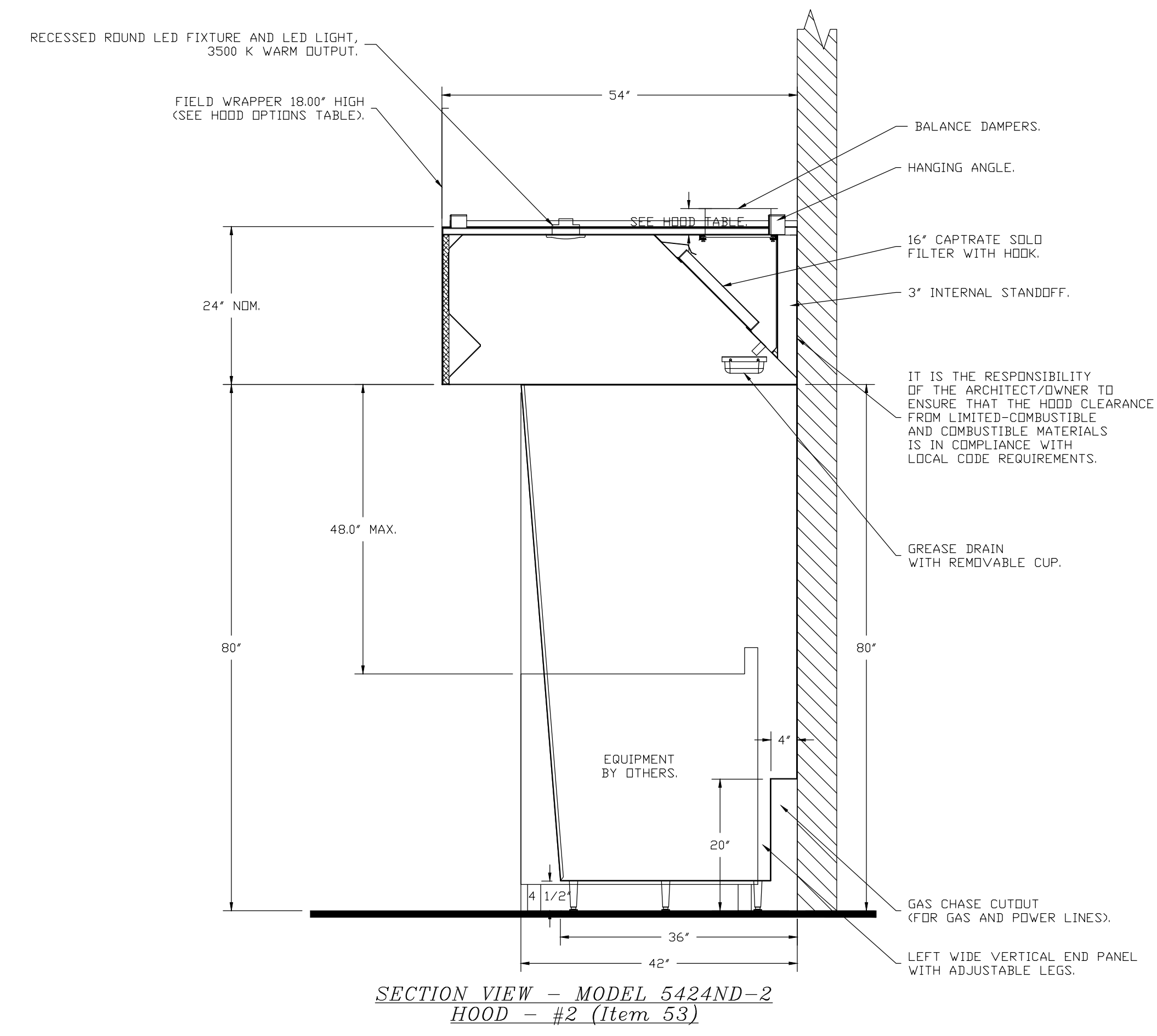
H5.3

REVISIONS	
DESCRIPTION	DATE

CAPTIVE
HBT Foodservice
1126 Swift Street, North Kansas City, MO, 64116 PHONE: (816) 221-8575 FAX: (816) 221-8311 EMAIL: reg98@captiveaire.com

Hawaiian Bros - Florissant, MO (DDAS)
13963 State Hwy AC,
Florissant, MO, 63033

DATE: 5/6/2022
DWG.#: 5448875
DRAWN BY: michael.co
SCALE: 3/4" = 1'-0"
MASTER DRAWING
SHEET NO.
3



SECTION 23 38 13 13

SPECIFICATIONS
TAG: Commercial Kitchen Ventilation Hoods, Listed Commercial Kitchen Hoods

PART 1 - GENERAL

1.1 SUMMARY

- A. The ND2 series is a Type I, wall canopy hood for use over 450°F, 700°F cooking surface temperatures. The aerodynamic design includes a mechanical baffle and performance enhancing lip for exceptional capture and containment.
- B. The VHB Series is a Premier Type II, exhaust only hood used over equipment not producing grease laden vapors. Type II hoods are used for condensation or heat removal applications.
- C. The hood shall have the size, shape, and performance specified on drawings.

1.2 SUBMITTALS

- A. The manufacturer assumes no liability for the use or results of use from this document. Specifications are to be reviewed by the engineer to confirm the project's requirements and meet Federal, State, and Local codes and regulations.
- B. As the manufacturer continues product development, it reserves the right to change design and specifications without notice.
- C. The manufacturer shall supply complete computer generated submittal drawings, including hood section view(s) and hood plan view(s). These drawings must be available to the engineer, architect, and owner for their use in construction, operation, and maintenance.

1.3 QUALITY ASSURANCE

- A. This hood is ETL-listed to standard UL710, ULC710, and ULC-S646 when installed in accordance with these installation instructions and National Fire Protection Association Standard NFPA 96, Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations.*
- B. Built-in compliance with NSF/ANSI Standard 2.
- C. The hood shall be ETL Listed as:
 1. "Exhaust Hood Without Exhaust Damper."
 2. ETL Sanitation Listed and built in accordance with NFPA 96.
 3. The ETL label shall list temperature rating(s) and minimum CFM/ft rating(s).

1.4 WARRANTY

- A. All units shall be provided with the following standard warranty:
 1. This equipment is warranted to be free from defects in materials and workmanship, under normal use and service, for a period of 2-years from date of shipment.
- B. The manufacturer shall not be liable for incidental and consequential losses and damages potentially attributable to malfunctioning equipment. Should any part of the equipment prove to be defective in material or workmanship within the 2-year warranty period, upon examination by the manufacturer, such part will be repaired or replaced by manufacturer at no charge. The buyer shall pay all labor costs incurred in connection with such repair or replacement. Equipment shall not be returned without manufacturer's prior authorization, and all returned equipment shall be shipped by the buyer, freight prepaid to a destination determined by the manufacturer.
- C. Refer to Manufacturer's Operation, Installation, and Maintenance (OIM) Manual for detailed descriptions of what is/is not covered and contact information for warranty claims.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Construction shall be dependent on the structural application to minimize distortion and other defects. All seams, joints, and penetrations of the hood enclosure to the lower outermost

perimeter, which directs and captures grease-laden vapor and exhaust gases, shall have a liquid-tight continuous external weld in accordance with NFPA 96.

- B. Duct sizes, CFM, and static pressure requirements shall be as shown on drawings. Static pressure requirements shall be precise and accurate; air velocity and volume information shall be accurate within 1-ft increments along the length of the ventilator.

2.2 CONSTRUCTION

- A. Construction shall be type 430 stainless steel.
- B. Double wall insulated front to eliminate condensation and increase rigidity on wide sizes. The insulation shall have a flexural modulus of 475 EI, meet UL 181 requirements and be in accordance with NFPA 90A and 90B.
- C. Hood shall be equipped with a minimum of four connections for hanger rods. Hood lengths greater than 12' will have added hangers.
- D. Exhaust duct collar to be 4" high with flange.
- E. The grease drain system shall be an enclosed integral part of the hood back and have slopes with an exposed, removable 1/2 grease cup to facilitate cleaning.
- F. An integral baffle to direct grease laden vapors toward the exhaust filter bank.
- G. Hood shall be furnished with UL classified filters, supplied in size and quantity as required by ventilator.
- H. All seams shall be welded and have stainless steel on exposed surfaces.

2.3 LIGHTING

- A. Recessed round LED fixture and LED light, 3500K Warm output.

2.4 FILTERS

- A. Stainless Steel Captrate Solo filter with hook, ETL Listed. Particulate capture efficiency: 85% efficient at 9 microns, 76% efficient at 5 microns.

2.5 OPTIONS

- A. Hood Mounted Utility Cabinet - Cabinet can store listed fire suppression system, listed components, pre-wired electrical controls.

2.6 ACCESSORIES

- A. Balance Damper - Used to manually balance exhaust flow rate. Installed in hood plenum.
- B. End Panel(s) maximize hood performance and eliminate the effects of cross drafts in the kitchen. Units constructed of stainless steel and sized according to hood width and cooking equipment. Exposed edges hemmed for safety and rigidity. Selected panels:
 1. Quarter End Panel
 2. Vertical End Panel
 3. Wide Vertical End Panel
- C. Wrapper(s) may be installed from the factory or field installed. Wrapper(s) selected:
 1. Wrapper
- D. Miscellaneous option(s) selected:
 1. Riser Sensor Install -Sensor set-up for 3" thick double wall duct.
 2. Riser Sensor Install -Sensor set-up for 6" plenum.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions under which the system is installed. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to installer.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions, drawings, written specifications, manufacturer's installation manual, and all applicable building codes.

REVISIONS

DESCRIPTION	DATE

HBT Foodservice

www.captiveair.com

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PROJECT INFORMATION

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PROFESSIONAL SEAL

SHEET DATES	
ISSUE DATE	APR. 26, 2022
REVISIONS	
CB1	APR. 26, 2022
CB2	MAY 11, 2022

JOB NUMBER

2164180

SHEET NUMBER

H5.4

CB2

EXHAUST FAN INFORMATION - JOB#5448875

FAN UNIT NO	TAG	QTY	FAN UNIT MODEL #	MANUFACTURER	CFM	ESP	RPM	MOTOR ENCL	HP	BHP	PHASE	VOLT	FLA	DISCHARGE VELOCITY	WEIGHT (LBS)	SONES
1	ITEM 52/53	1	DU240HFA	CAPTIVEAIRE	4025	1.500	894	DDP,PREMIUM	5.000	1.9990	3	208	15.8	915 FPM	319	17
2	ITEM 75	1	DUB5HFA	CAPTIVEAIRE	2025	0.650	1308	TEAD-ECM	1.000	0.3980	1	208	6.9	641 FPM	92	13.1
3	CO2 EXHAUST	1	DR12HFA	CAPTIVEAIRE	200	0.380	1070	TEAD-ECM	0.250	0.0530	1	115	2.9		61	4.7
4	BATHROOM EXHAUST	1	DR12HFA	CAPTIVEAIRE	150	0.500	1190	TEAD-ECM	0.250	0.0730	1	115	2.9		61	6

DOAS/RTU FAN SCHEDULE - JOB#5448875

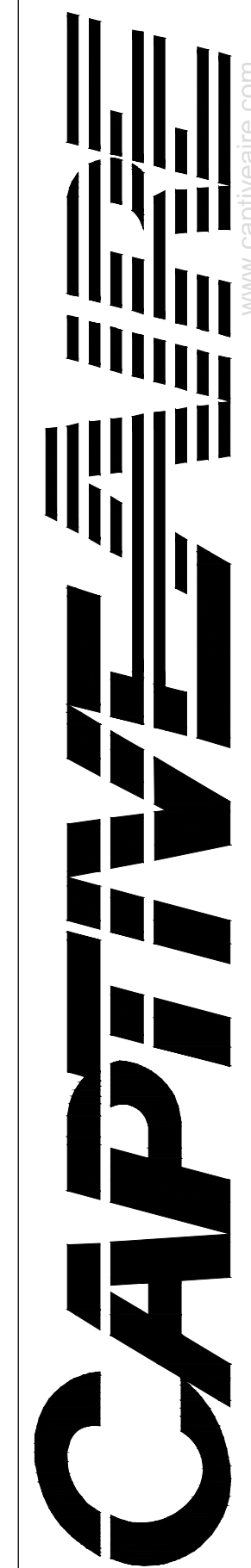
FAN UNIT NO	TAG	QTY	DOAS/RTU MODEL #	MANUFACTURER	ELECTRICAL INFORMATION										COOLING INFORMATION						REHEAT INFORMATION				GAS HEAT INFORMATION			NOTES								
					BLOWER	RETURN AIR CFM	MAX OUTSIDE AIR CFM	TOTAL CFM	WEIGHT (LBS)	ESP	HP	Ø	VOLT	MCA	MCCP	OUTSIDE AIR		MIXED AIR		LEAVING AIR		CAPACITY		IEER	ISMRE	DISCHARGE			CAPACITY		MOISTURE REMOVAL RATE	GAS TYPE	INPUT BTUs	OUTPUT BTUs	TEMP RISE	
																DB	WB	DB	WB	DB	WB	DP	TOTAL			SENS.	DB		WB	DESIRED						MAX
5	RTU1 DINING	1	CASRTU3-1.300-20-15T-DOAS	CAPTIVEAIRE	20P-3	2350	1650	4000	2546	1.000	7.50	3	208	78.5A	90A	95.5°F	79.4°F	83.4°F	70.0°F	55.4°F	54.9°F	54.6°F	186.0 MBH	117.4 MBH	18.8	5.7	70.0°F	60.6°F	64.2 MBH	129.6 MBH	62.5 LBS/HR	NATURAL	264511	211609	44°F	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18
6	RTU2 KITCHEN	1	CASRTU3-1.300-18-20T-DOAS	CAPTIVEAIRE	18P-3	150	2600	2750	2566	1.000	3.00	3	208	80.6A	90A	95.5°F	79.4°F	94.5°F	78.7°F	51.3°F	48.3°F	45.8°F	264.0 MBH	122.6 MBH	18.2	6.0	70.0°F	56.7°F	56.8 MBH	129.6 MBH	127.8 LBS/HR	NATURAL	301709	241367	73°F	1,2,3,4,5,6,7,8,9,10,11,12,13,15,18
7	RTU3	1	CASRTU3-1.250-20-15T-DOAS	CAPTIVEAIRE	20P-3	1550	1950	3500	2593	1.000	3.00	3	208	64.9A	70A	95.5°F	79.4°F	86.5°F	72.6°F	57.3°F	55.9°F	55.1°F	186.0 MBH	106.0 MBH	18.8	5.7	70.0°F	60.7°F	48.5 MBH	129.6 MBH	72.7 LBS/HR	NATURAL	210881	168705	40°F	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18

NOTES:
 1. INVERTER SCROLL COMPRESSOR WITH INTEGRATED OIL SENSOR. DIGITAL OR STAGED SCROLL NOT AN APPROVED EQUAL
 2. DIRECT DRIVE PLENUM BLOWER. BELT DRIVEN BLOWERS ARE NOT ACCEPTABLE
 3. INTEGRATED MONITORING VIA CELLULAR CONNECTION BY MANUFACTURER
 4. REFRIGERATION PRESSURE MONITORING ON HIGH AND LOW PRESSURE SIDE OF SYSTEM INCLUDED THROUGH DIGITAL INTERFACE
 5. ECM MOTOR CONDENSING FANS
 6. ELECTRONIC EXPANSION VALVE. TXV NOT ACCEPTABLE
 7. SUCTION LINE ACCUMULATOR
 8. FACTORY COMMISSIONING WITH 5 YEAR PARTS WARRANTY, 25 YEAR WARRANTY ON STAINLESS STEEL HEAT EXCHANGER
 9. AVERAGING INTAKE, EVAP AND DISCHARGE TEMPERATURE SENSORS (DISCHARGE SENSOR TO BE FACTORY MOUNTED WITHIN UNIT)
 10. 2" EXTERIOR DUAL-WALL CONSTRUCTION W/ R-13 INSULATION-MINIMUM 20GA EXTERIOR W/ 14GA BASE
 11. 80% EFFICIENT FURNACE. WITH MODULATING INDUCER TO MAINTAIN CONSTANT COMBUSTION EFFICIENCY ACROSS FIRING RANGE. 6:1 TURNDOWN WITH NG AND 5:1 TURNDOWN WITH LP
 12. SUPPLY CFM MONITORING INTEGRAL TO UNIT WITH CFM MEASUREMENT INCLUDED THROUGH DIGITAL INTERFACE
 13. FULLY MODULATING HOT GAS REHEAT
 14. 15 DEGREE LOW AMBIENT OPERATION
 15. HAIL GUARD FOR CONDENSING COIL
 16. RTU ECONOMIZER WITH DIFFERENTIAL ENTHALPY CONTROL
 17. BAROMETRIC RELIEF DAMPER
 18. DOWN DISCHARGE/DOWN RETURN

FAN OPTIONS

FAN UNIT NO	TAG	QTY	DESCRIPTION	FAN UNIT NO	TAG	QTY	DESCRIPTION				
1	ITEM 52/53	1	GREASE BOX	7	RTU3	1	CASLINK BUILDING MONITORING SYSTEM - INTERNET OR CELLULAR CONNECTION REQUIRED				
		1	EXHAUST FAN HEAT BAFFLE			1	RTU3 DOWN DISCHARGE				
		1	UNIT MOUNTED VFD FOR USE WITH ECPM03			1	2" MERV 13 FILTERS FOR RTU3 (QTY. 4)				
		1	VFD MOUNTING BRACKET FOR DU/DR 240			1	2" MERV 8 FILTERS FOR RTU3 (QTY. 4)				
		1	2 YEAR PARTS WARRANTY			1	OVERHEAT STAT				
		2	ITEM 75			1	GREASE BOX	1	VFD FACTORY MOUNTED AND WIRED IN RTU COMMERCIAL CONTROL VESTIBULE		
						1	ECM WIRING PACKAGE - PWM SIGNAL FROM ECPM03 PREWIRE (TELCO MOTOR), CCW ROTATION	1	REMOTE TEMPERATURE AND HUMIDITY SPACE SENSOR		
						1	2 YEAR PARTS WARRANTY	1	RTU3 CURB DUCT HANGER		
						3	CO2 EXHAUST	1	ECM WIRING PACKAGE - MANUAL OR 0-10VDC REFERENCE SPEED CONTROL (TELCO MOTOR), CCW ROTATION	1	OCCUPIED SCHEDULING
								1	MOTORIZED I 12 BDD 120/240V	1	CLOGGED FILTER SWITCH - NOTIFICATION ON HMI
1	2 YEAR PARTS WARRANTY			1	20 TON MODULATING COOLING OPTION, 208/230V. R410A REFRIGERANT, VARIABLE SPEED COMPRESSOR, ECM CONDENSING FANS						
4	BATHROOM EXHAUST			1	ECM WIRING PACKAGE - MANUAL OR 0-10VDC REFERENCE SPEED CONTROL (TELCO MOTOR), CCW ROTATION			1	20 TON MODULATING REHEAT OPTION - SPACE DEWPOINT CONTROL		
				1	MOTORIZED I 12 BDD 120/240V			1	RTU INTAKE/RETURN DAMPER - MANUAL CONTROL VIA HMI		
				1	2 YEAR PARTS WARRANTY			1	RTU3 DOWN RETURN		
				1	INLET PRESSURE GAUGE, 0-35"			1	FREEZESTAT		
		1	MANIFOLD PRESSURE GAUGE, 0 TO 10" WC, 1 FURNACE	1	VAV PACKAGE W/ 0-10VDC INPUT CONTROL (S71 VFD INCLUDED)						
		1	RTU TOTAL CFM MONITORING	1	RTU RETURN MOUNTED SMOKE DETECTOR AND SAMPLING TUBE - FACTORY INSTALLED						
		1	SHIP LOOSE GAS STRAINER 3/4"	1	RTU3 HAIL GUARD						
		1	SINGLE POINT ELECTRICAL CONNECTION FOR RTU. 750VA TRANSFORMER USED. IF A NON-DCV PREWIRE CONTROLS THIS UNIT, THE #28, #47, "MA", OR "E2" PREWIRE OPTION MUST BE SELECTED. DOES NOT PROVIDE SUPPLY STARTER IN PREWIRE	1	5 YEAR ENTIRE UNIT PARTS WARRANTY, 10 YEAR ENTIRE UNIT PARTS WARRANTY WITH REMOTE MONITORING AND CAPTIVEAIRE SERVICE CONTRACT, 25 YEAR STAINLESS STEEL FURNACE PARTS WARRANTY (SEE ADDITIONAL DETAILS)						
		1	CASLINK BUILDING MONITORING SYSTEM - INTERNET OR CELLULAR CONNECTION REQUIRED	1	INLET PRESSURE GAUGE, 0-35"						
		1	LOW AMBIENT COOLING OPERATION - DOWN TO 15F AMBIENT	1	MANIFOLD PRESSURE GAUGE, 0 TO 10" WC, 1 FURNACE						
5	RTU1 DINING	1	RTU3 DOWN DISCHARGE	1	RTU TOTAL CFM MONITORING						
		1	2" MERV 13 FILTERS FOR RTU3 (QTY. 4)	1	SHIP LOOSE GAS STRAINER 3/4"						
		1	OVERHEAT STAT	1	SINGLE POINT ELECTRICAL CONNECTION FOR RTU. 750VA TRANSFORMER USED. IF A NON-DCV PREWIRE CONTROLS THIS UNIT, THE #28, #47, "MA", OR "E2" PREWIRE OPTION MUST BE SELECTED. DOES NOT PROVIDE SUPPLY STARTER IN PREWIRE						
		1	VFD FACTORY MOUNTED AND WIRED IN RTU COMMERCIAL CONTROL VESTIBULE	1	CASLINK BUILDING MONITORING SYSTEM - INTERNET OR CELLULAR CONNECTION REQUIRED						
		1	15 TON MODULATING COOLING OPTION, 208/230V. R410A REFRIGERANT, VARIABLE SPEED COMPRESSOR, ECM CONDENSING FANS	1	LOW AMBIENT COOLING OPERATION - DOWN TO 15F AMBIENT						
		1	15 TON MODULATING REHEAT OPTION - SPACE DEWPOINT CONTROL	1	RTU3 DOWN DISCHARGE						
		1	REMOTE TEMPERATURE AND HUMIDITY SPACE SENSOR	1	2" MERV 13 FILTERS FOR RTU3 (QTY. 4)						
		1	RTU3 CURB DUCT HANGER	1	2" MERV 8 FILTERS FOR RTU3 (QTY. 4)						
		1	RTU RETURN MOUNTED SMOKE DETECTOR AND SAMPLING TUBE - FACTORY INSTALLED	1	OVERHEAT STAT						
		1	OCCUPIED SCHEDULING	1	VFD FACTORY MOUNTED AND WIRED IN RTU COMMERCIAL CONTROL VESTIBULE						
6	RTU2 KITCHEN	1	CLOGGED FILTER SWITCH - NOTIFICATION ON HMI	1	REMOTE TEMPERATURE AND HUMIDITY SPACE SENSOR						
		1	RTU ECONOMIZER - DIFFERENTIAL ENTHALPY CONTROL	1	RTU3 CURB DUCT HANGER						
		1	RTU3 ECONOMIZER BAROMETRIC RELIEF	1	RTU RETURN MOUNTED SMOKE DETECTOR AND SAMPLING TUBE - FACTORY INSTALLED						
		1	RTU INTAKE/RETURN DAMPER - MANUAL CONTROL VIA HMI	1	OCCUPIED SCHEDULING						
		1	RTU3 HAIL GUARD	1	CLOGGED FILTER SWITCH - NOTIFICATION ON HMI						
		1	RTU3 DOWN RETURN	1	RTU ECONOMIZER - DIFFERENTIAL ENTHALPY CONTROL						
		1	FREEZESTAT	1	RTU3 ECONOMIZER BAROMETRIC RELIEF						
		1	VAV PACKAGE W/ MANUAL/DDC CONTROL (S71 VFD INCLUDED)	1	RTU INTAKE/RETURN DAMPER - MANUAL CONTROL VIA HMI						
		1	5 YEAR ENTIRE UNIT PARTS WARRANTY, 10 YEAR ENTIRE UNIT PARTS WARRANTY WITH REMOTE MONITORING AND CAPTIVEAIRE SERVICE CONTRACT, 25 YEAR STAINLESS STEEL FURNACE PARTS WARRANTY (SEE ADDITIONAL DETAILS)	1	RTU3 DOWN RETURN						
		1	INLET PRESSURE GAUGE, 0-35"	1	FREEZESTAT						

REVISIONS	
DESCRIPTION	DATE



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PROJECT INFORMATION

PROPOSED BUILDING RENOVATION
HAWAIIAN BROS - STR: 45
 13963 NEW HALLS FERRY ROAD • FLORISSANT, MO. 63033

PROFESSIONAL SEAL

SHEET DATES

ISSUE DATE APR. 26, 2022

REVISIONS

CB1 APR. 26, 2022
 CB2 MAY 11, 2022

JOB NUMBER

2164180

SHEET NUMBER

H5.5

FAN ACCESSORIES

FAN UNIT NO	TAG	EXHAUST			SUPPLY		
		GREASE CUP	GRAVITY DAMPER	WALL MOUNT	SIDE DISCHARGE	GRAVITY DAMPER	MOTORIZED DAMPER
1	ITEM 52/53	YES					
2	ITEM 75	YES					
3	CD2 EXHAUST						
4	BATHROOM EXHAUST						

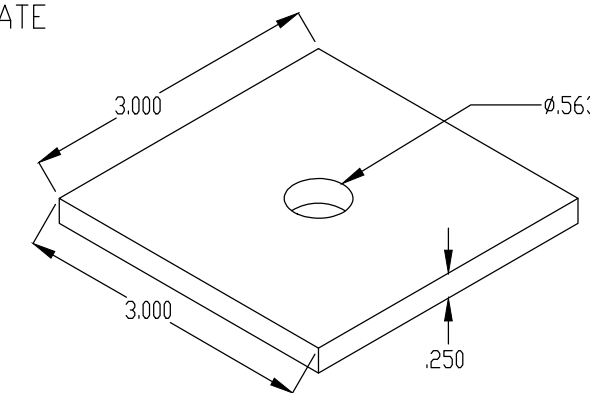
CURB ASSEMBLIES

NO	ON FAN	TAG	WEIGHT	ITEM	SIZE
1	# 1	ITEM 52/53	75 LBS	CURB	31.500"W X 31.500"L X 20.000"H ALONG LENGTH, RIGHT INSULATED VENTED HINGED 16 GAUGE.
2	# 2	ITEM 75	57 LBS	CURB	23.000"W X 23.000"L X 20.000"H ALONG LENGTH, RIGHT INSULATED VENTED HINGED 16 GAUGE.
3	# 3	CD2 EXHAUST	73 LBS	CURB	17.500"W X 17.500"L X 18.000"H ALONG LENGTH, RIGHT INSULATED 16 GAUGE.
4	# 4	BATHROOM EXHAUST	73 LBS	CURB	17.500"W X 17.500"L X 18.000"H ALONG LENGTH, RIGHT INSULATED 16 GAUGE.
5	# 5	RTU1 DINING	281 LBS	CURB	59.500"W X 91.000"L X 24.000"H ALONG WIDTH, RIGHT INSULATED 16 GAUGE.
6	# 6	RTU2 KITCHEN	281 LBS	CURB	59.500"W X 91.000"L X 24.000"H ALONG WIDTH, RIGHT INSULATED 16 GAUGE.
7	# 7	RTU3	281 LBS	CURB	59.500"W X 91.000"L X 24.000"H ALONG WIDTH, RIGHT INSULATED 16 GAUGE.

SEISMIC HARDWARE

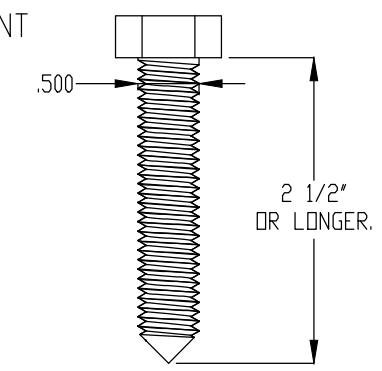
ROOFTOP CURB ATTACHMENT PLATE

STEEL SUPPORT BLOCK, 3" X 3" BY .250" THICK STEEL PLATE AND GALVANIZED FOR WEATHER RESISTANCE.
PART NUMBER FOR THE PLATE IS 91530440 (MACOL# 40017326).

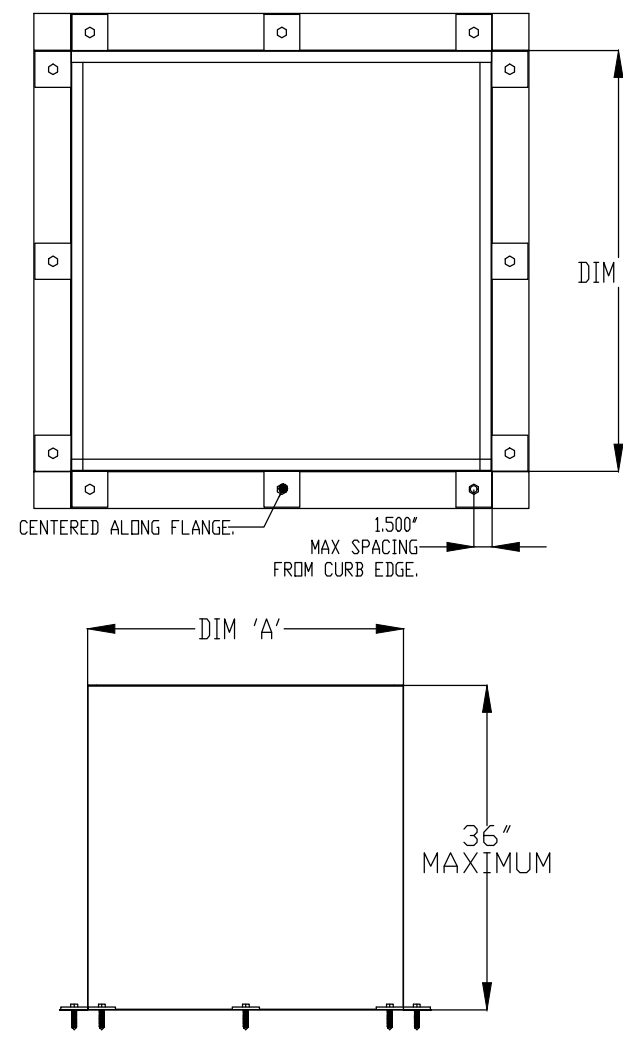


LAG BOLT FOR ROOFTOP CURB ATTACHMENT

STEEL LAG BOLT, .500" DIAMETER, 1 1/2" OF BOLT MUST BE INSTALLED INTO THE WOODEN SUPPORT STRUCTURE.
LAG BOLT MUST NOT BE INSTALLED IN THE END GRAIN.
PART NUMBER FOR THE BOLT IS 91478A722 (MACOL# 40017360).



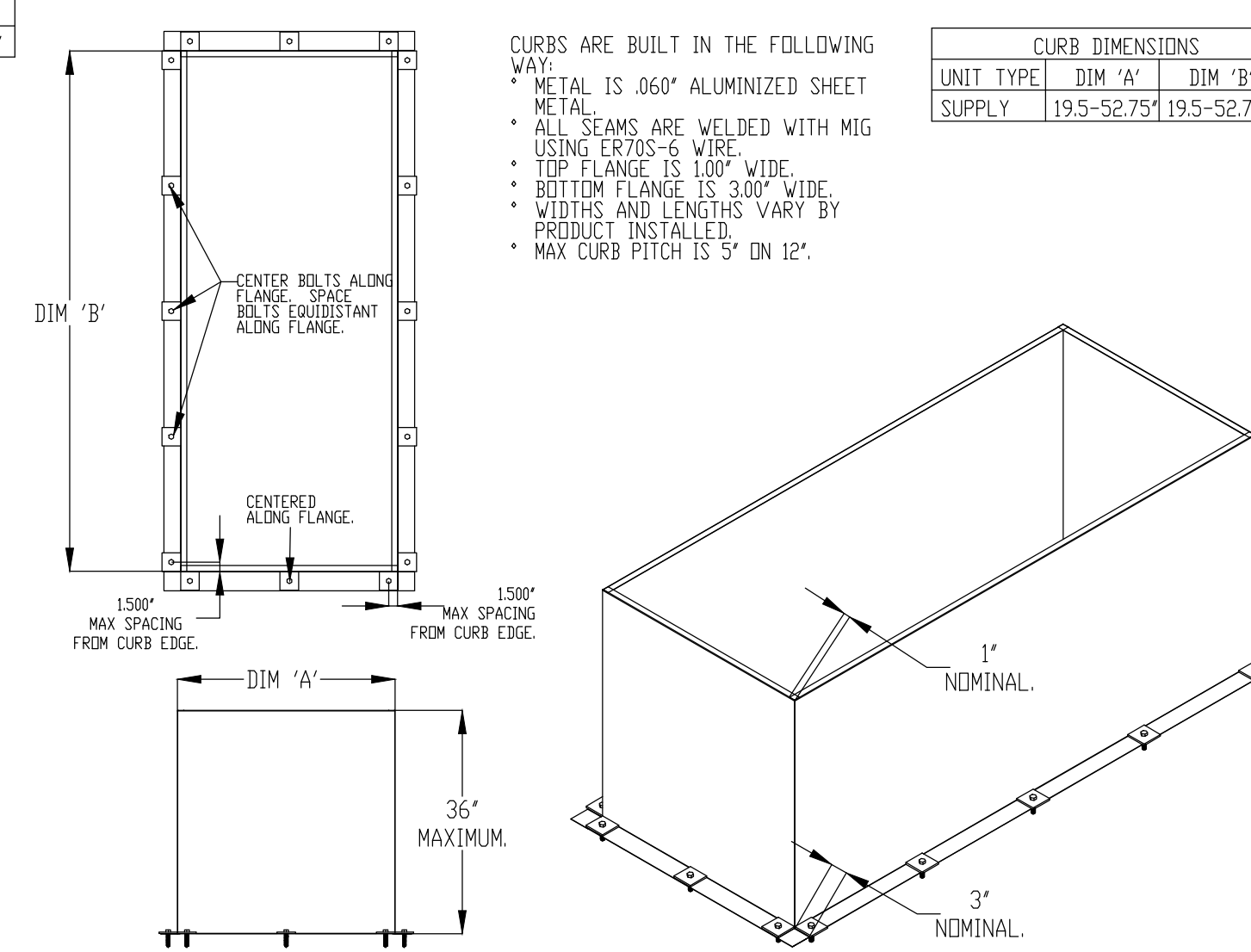
SEISMIC EXHAUST CURB



- CURBS ARE BUILT IN THE FOLLOWING WAY:
- METAL IS .060" ALUMINIZED SHEET METAL.
 - ALL SEAMS ARE WELDED WITH MIG USING ER70S-6 WIRE.
 - TOP FLANGE IS 1.00" WIDE.
 - BOTTOM FLANGE IS 3.00" WIDE.
 - WIDTHS AND LENGTHS VARY BY PRODUCT INSTALLED.
 - MAX CURB PITCH IS 5" ON 12".

CURB DIMENSIONS		
UNIT TYPE	DIM 'A'	DIM 'B'
EXHAUST	19.5-42.5'	19.5-42.5'

SEISMIC SUPPLY CURB



- CURBS ARE BUILT IN THE FOLLOWING WAY:
- METAL IS .060" ALUMINIZED SHEET METAL.
 - ALL SEAMS ARE WELDED WITH MIG USING ER70S-6 WIRE.
 - TOP FLANGE IS 1.00" WIDE.
 - BOTTOM FLANGE IS 3.00" WIDE.
 - WIDTHS AND LENGTHS VARY BY PRODUCT INSTALLED.
 - MAX CURB PITCH IS 5" ON 12".

CURB DIMENSIONS		
UNIT TYPE	DIM 'A'	DIM 'B'
SUPPLY	19.5-52.75'	19.5-52.75'

REVISIONS

NO	DESCRIPTION	DATE

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PROFESSIONAL SEAL

SHEET DATES	
ISSUE DATE	APR. 26, 2022
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CB1	APR. 26, 2022
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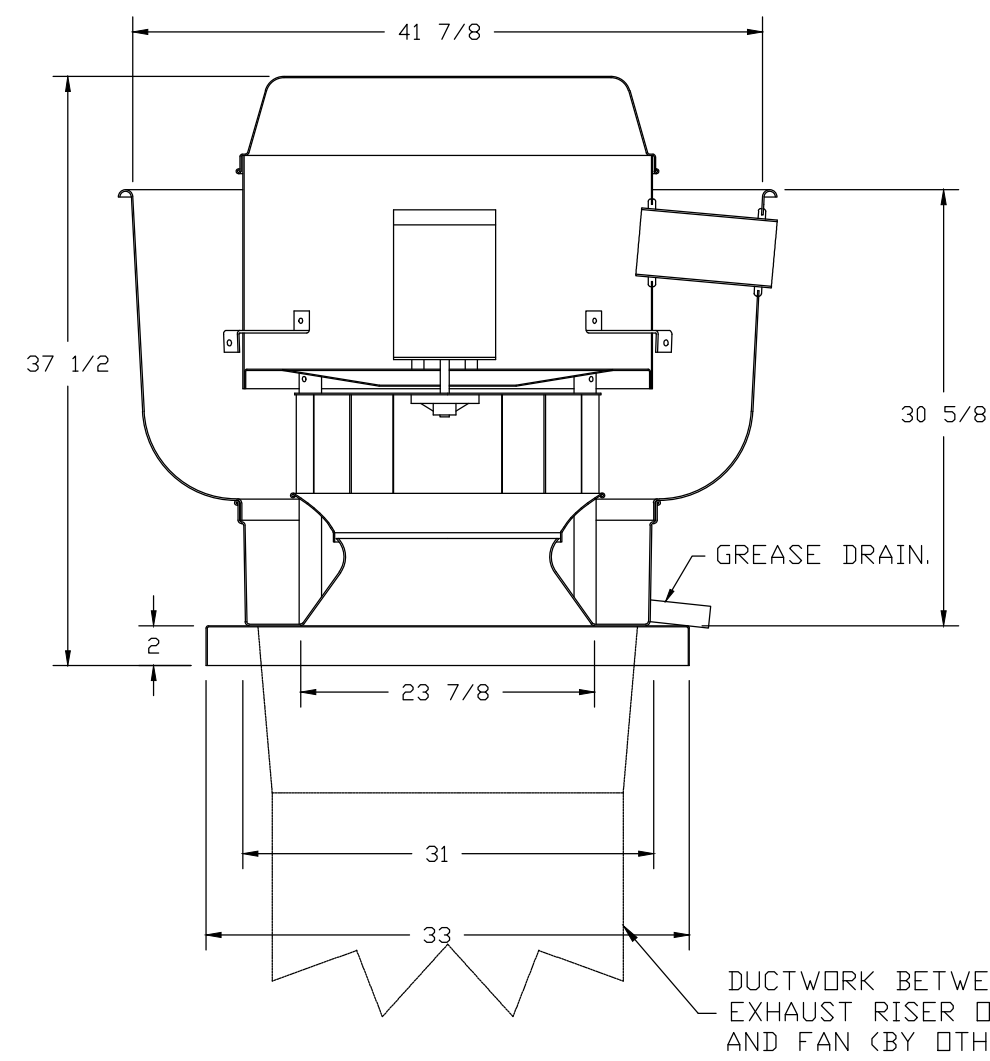
JOB NUMBER
 2164180

SHEET NUMBER

H5.6

CB2

FAN #1 DU240HFA - EXHAUST FAN (ITEM 52/53)



FEATURES:

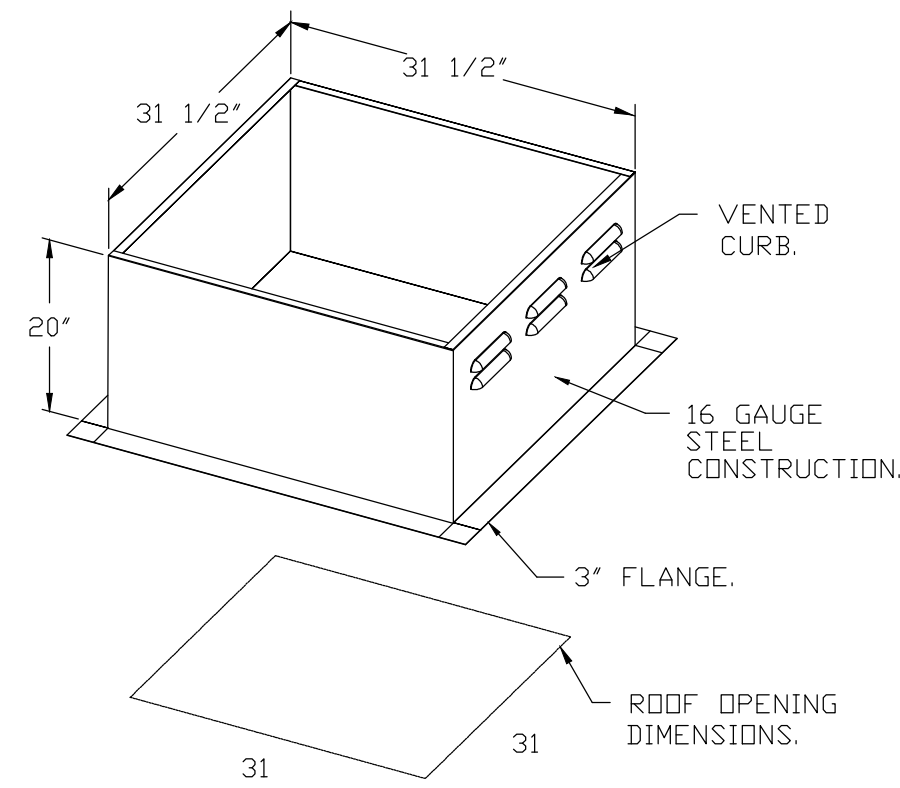
- DIRECT DRIVE CONSTRUCTION (NO BELTS/PULLEYS).
- ROOF MOUNTED FANS.
- RESTAURANT MODEL.
- UL705 AND UL762 AND ULC-S645
- VARIABLE SPEED CONTROL.
- INTERNAL WIRING.
- THERMAL OVERLOAD PROTECTION (SINGLE PHASE).
- HIGH HEAT OPERATION 300°F (149°C).
- GREASE CLASSIFICATION TESTING.
- NEMA 3R SAFETY DISCONNECT SWITCH.

NORMAL TEMPERATURE TEST
EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING AIR AT 300°F (149°C) UNTIL ALL FAN PARTS HAVE REACHED THERMAL EQUILIBRIUM, AND WITHOUT ANY DETERIORATING EFFECTS TO THE FAN WHICH WOULD CAUSE UNSAFE OPERATION.

ABNORMAL FLARE-UP TEST
EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING BURNING GREASE VAPORS AT 600°F (316°C) FOR A PERIOD OF 15 MINUTES WITHOUT THE FAN BECOMING DAMAGED TO ANY EXTENT THAT COULD CAUSE AN UNSAFE CONDITION.

OPTIONS

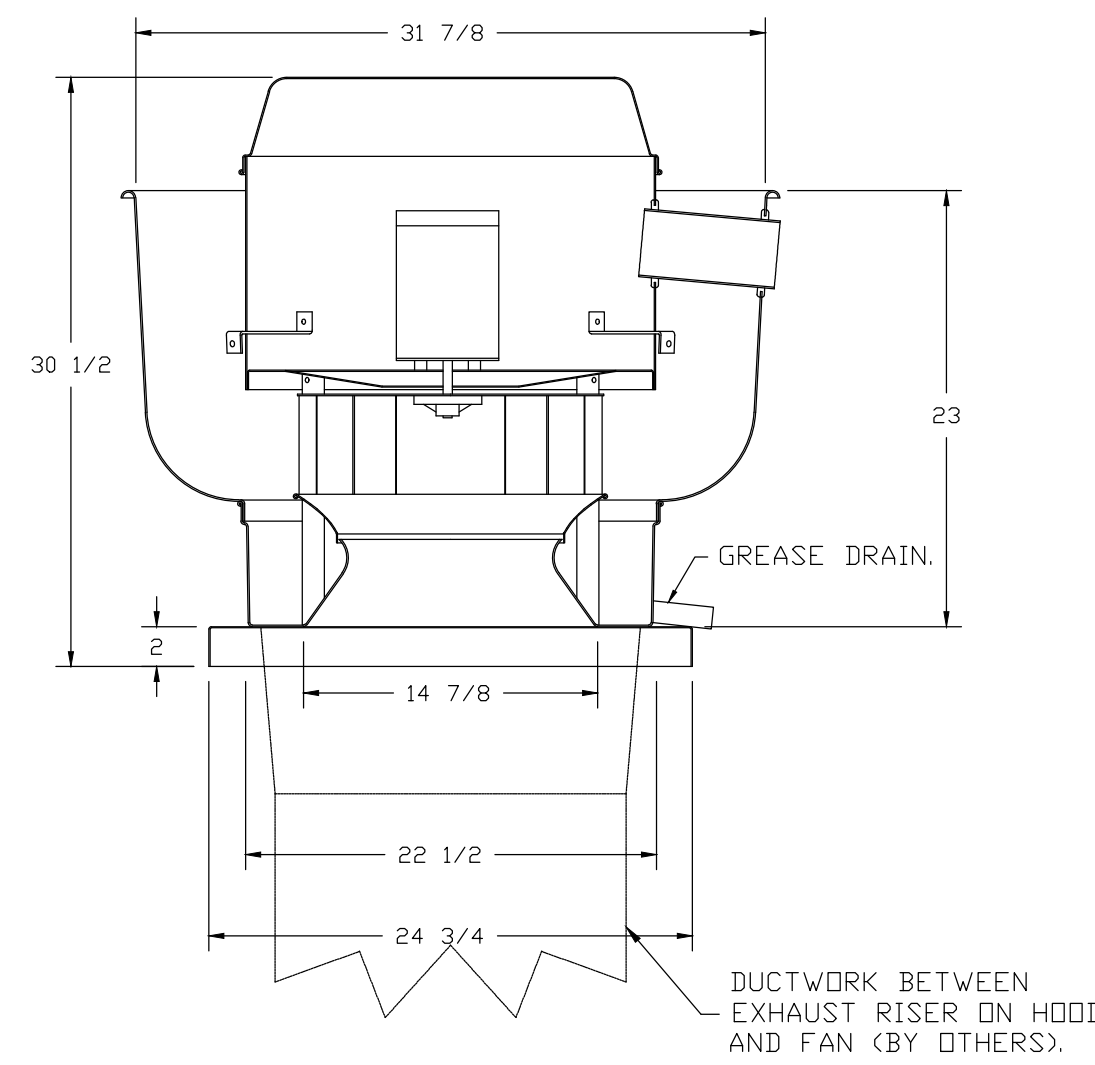
- GREASE BOX.
- EXHAUST FAN HEAT BAFFLE.
- UNIT MOUNTED VFD FOR USE WITH ECPM03.
- VFD MOUNTING BRACKET FOR DU/DR 240.
- 2 YEAR PARTS WARRANTY.



PITCHED CURBS ARE AVAILABLE FOR PITCHED ROOFS.

EXAMPLE: 7/12 PITCH = 30° SLOPE.

FAN #2 DU85HFA - EXHAUST FAN (ITEM 75)



FEATURES:

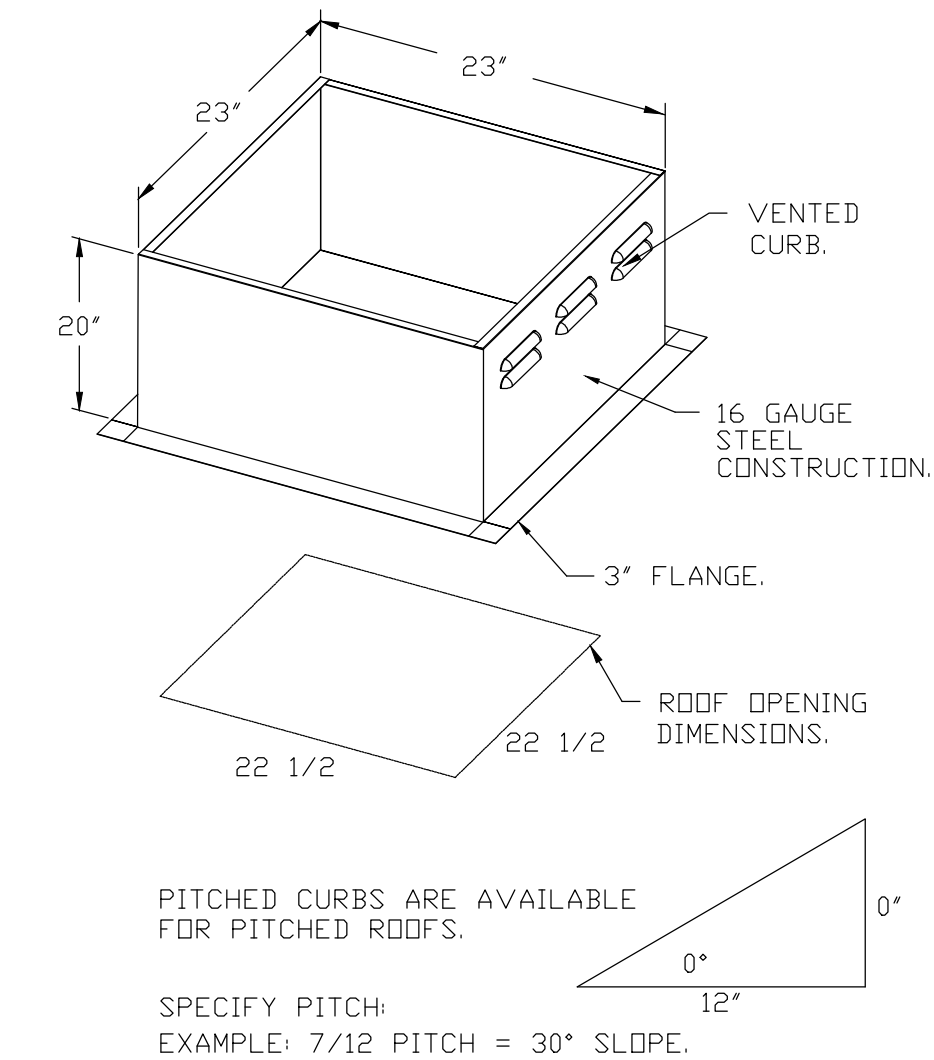
- DIRECT DRIVE CONSTRUCTION (NO BELTS/PULLEYS).
- ROOF MOUNTED FANS.
- RESTAURANT MODEL.
- UL705 AND UL762 AND ULC-S645
- VARIABLE SPEED CONTROL.
- INTERNAL WIRING.
- THERMAL OVERLOAD PROTECTION (SINGLE PHASE).
- HIGH HEAT OPERATION 300°F (149°C).
- GREASE CLASSIFICATION TESTING.
- NEMA 3R SAFETY DISCONNECT SWITCH.

NORMAL TEMPERATURE TEST
EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING AIR AT 300°F (149°C) UNTIL ALL FAN PARTS HAVE REACHED THERMAL EQUILIBRIUM, AND WITHOUT ANY DETERIORATING EFFECTS TO THE FAN WHICH WOULD CAUSE UNSAFE OPERATION.

ABNORMAL FLARE-UP TEST
EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING BURNING GREASE VAPORS AT 600°F (316°C) FOR A PERIOD OF 15 MINUTES WITHOUT THE FAN BECOMING DAMAGED TO ANY EXTENT THAT COULD CAUSE AN UNSAFE CONDITION.

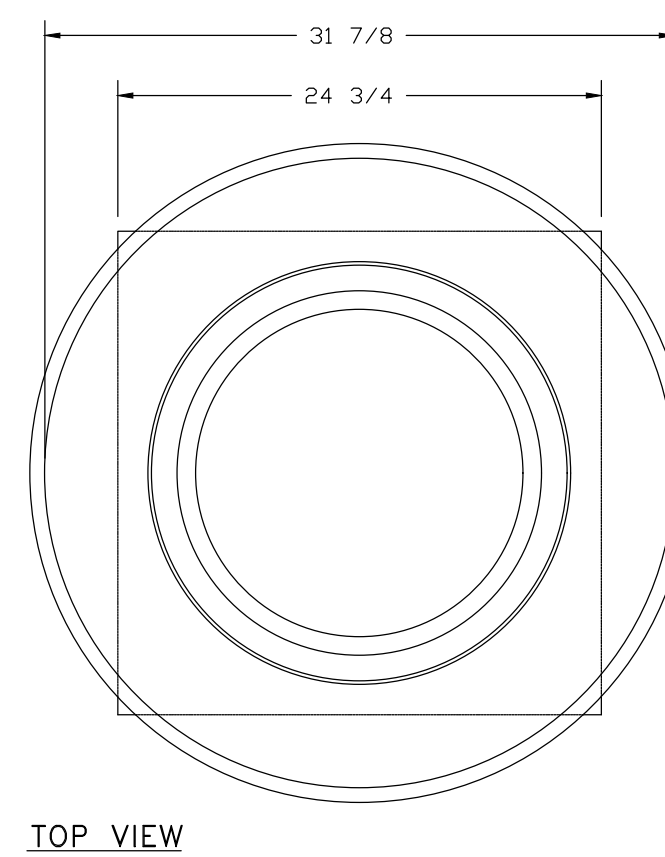
OPTIONS

- GREASE BOX.
- ECH WIRING PACKAGE - PWM SIGNAL FROM ECPM03 PREWIRE (TELCO MOTOR), CCW ROTATION.
- 2 YEAR PARTS WARRANTY.



PITCHED CURBS ARE AVAILABLE FOR PITCHED ROOFS.

EXAMPLE: 7/12 PITCH = 30° SLOPE.



TOP VIEW

REVISIONS	
DESCRIPTION	DATE

CAPTIVE
HBT Foodservice

Hawaiian Bros - Florissant, MO (DDAS)
13963 State Hwy AC,
Florissant, MO, 63033

DATE: 5/6/2022
DWG.#: 5448875
DRAWN BY: michael.co
SCALE: 3/4" = 1'-0"
MASTER DRAWING

SHEET NO. 7

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PROJECT INFORMATION

PROPOSED BUILDING RENOVATION
HAWAIIAN BROS - STR: 45
13963 NEW HALLS FERRY ROAD • FLORISSANT, MO. 63033

PROFESSIONAL SEAL

SHEET DATES

ISSUE DATE	APR. 26, 2022
REVISIONS	
CB1	APR. 26, 2022
CB2	MAY 11, 2022

JOB NUMBER

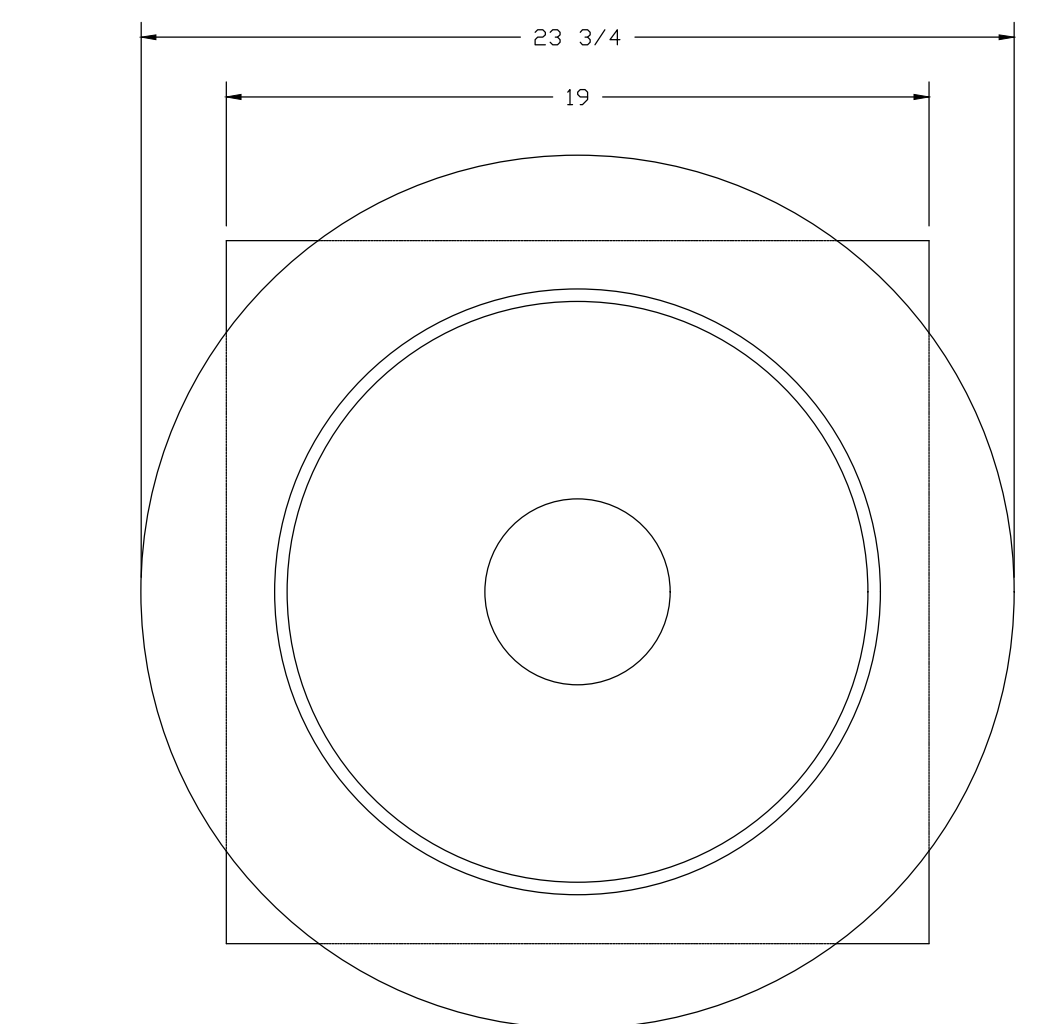
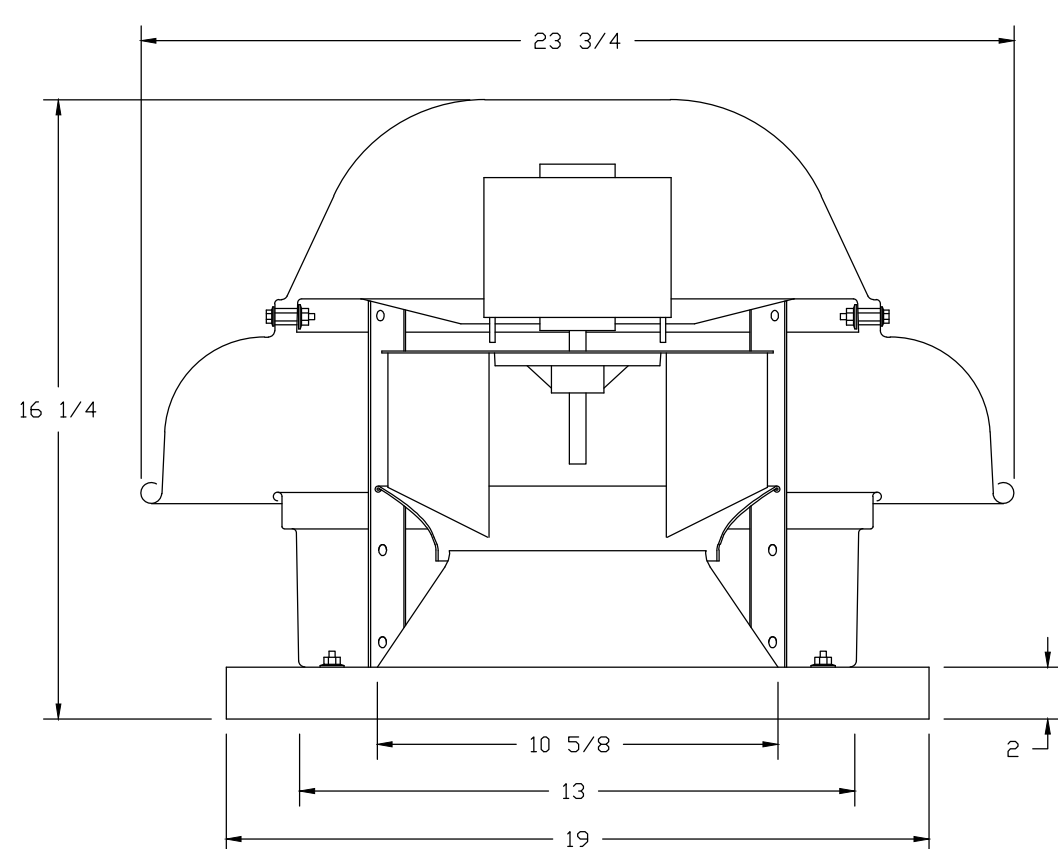
2164180

SHEET NUMBER

H5.7

CB2

FANS #3 (COR. EXHAUST), #4 (BATHROOM EXHAUST) - DR12HFA EXHAUST FAN



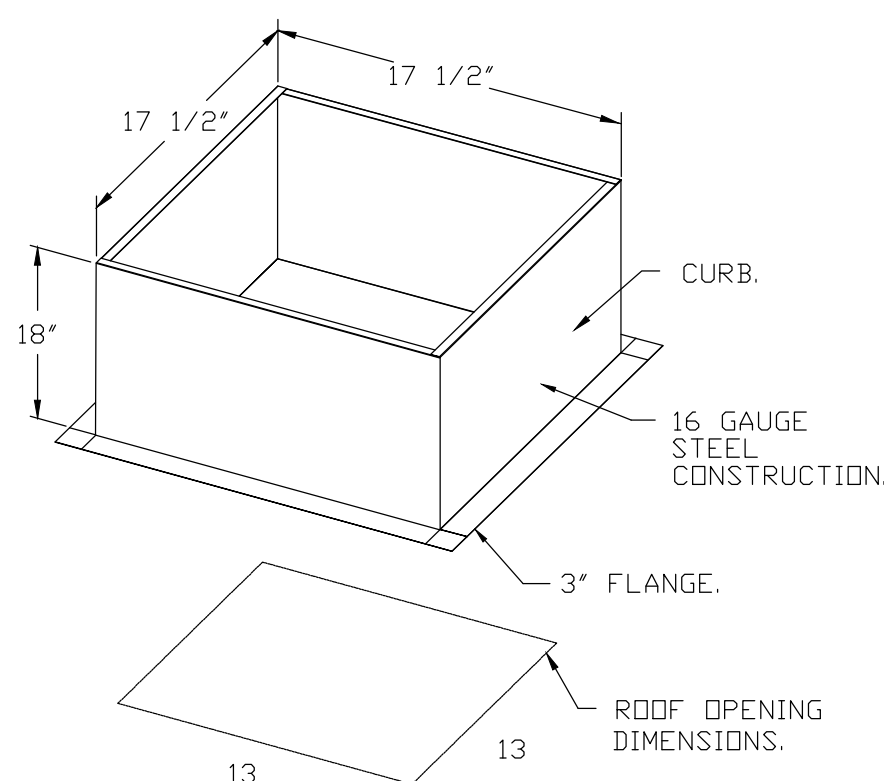
TOP VIEW

FEATURES:

- DIRECT DRIVE CONSTRUCTION (NO BELTS/PULLEYS).
- ROOF MOUNTED FANS.
- UL705.
- SAFETY DISCONNECT.
- STANDARD BIRD SCREEN.
- SPEED CONTROL.

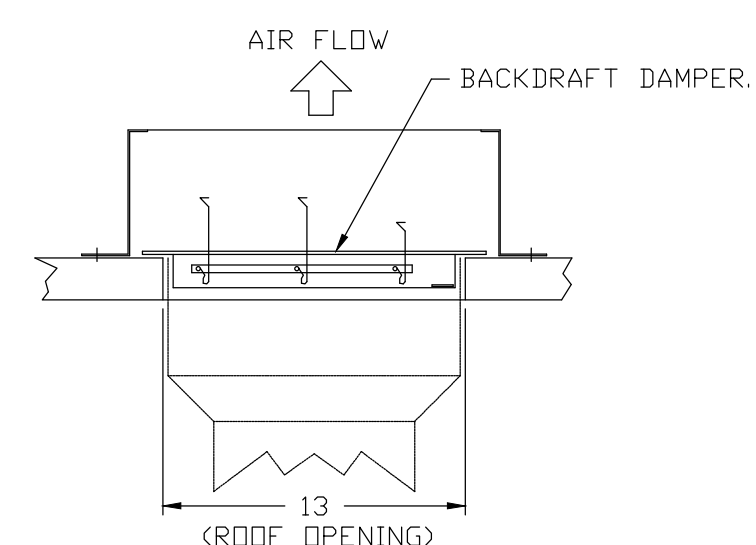
OPTIONS

ECM WIRING PACKAGE - MANUAL OR 0-10VDC REFERENCE SPEED CONTROL (TELCO MOTOR), CCW ROTATION. MOTORIZED I 12 BDD 120/240V. 2 YEAR PARTS WARRANTY.

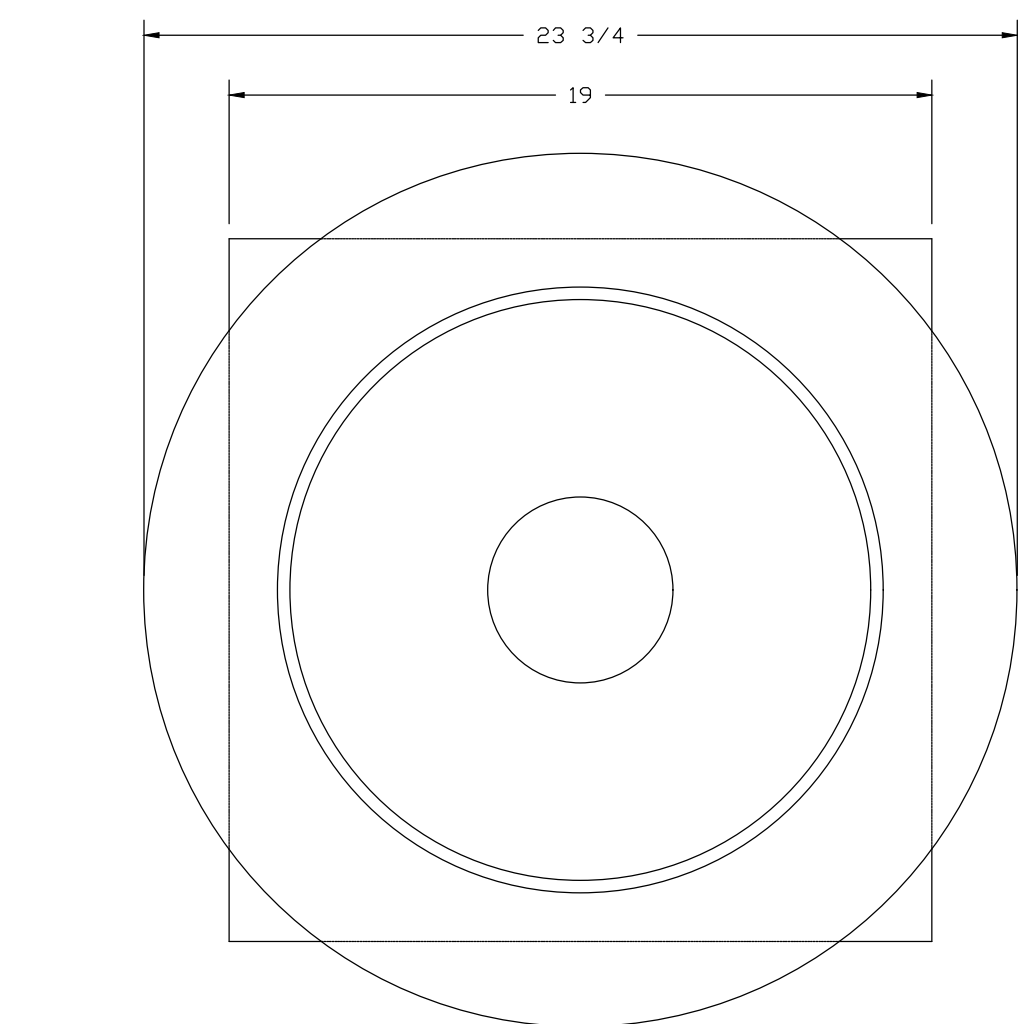
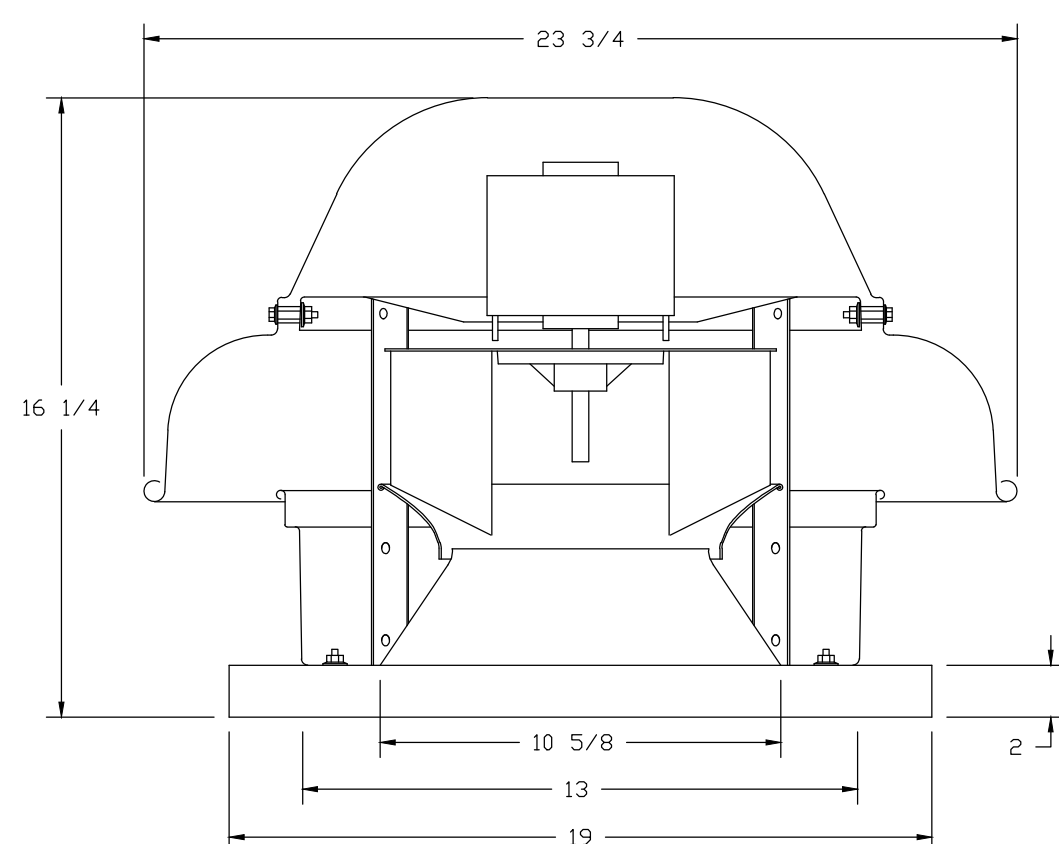


PITCHED CURBS ARE AVAILABLE FOR PITCHED ROOFS.
SPECIFY PITCH:
EXAMPLE: 7/12 PITCH = 30° SLOPE.

BACKDRAFT DAMPER INSTALLATION



FANS #3 (COR. EXHAUST), #4 (BATHROOM EXHAUST) - DR12HFA EXHAUST FAN



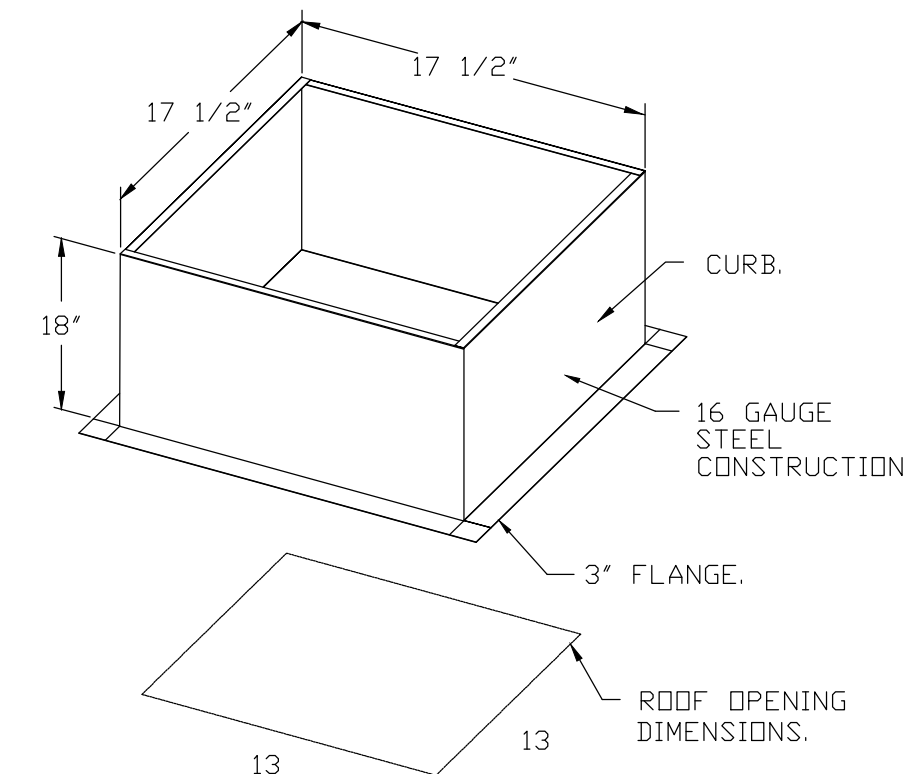
TOP VIEW

FEATURES:

- DIRECT DRIVE CONSTRUCTION (NO BELTS/PULLEYS).
- ROOF MOUNTED FANS.
- UL705.
- SAFETY DISCONNECT.
- STANDARD BIRD SCREEN.
- SPEED CONTROL.

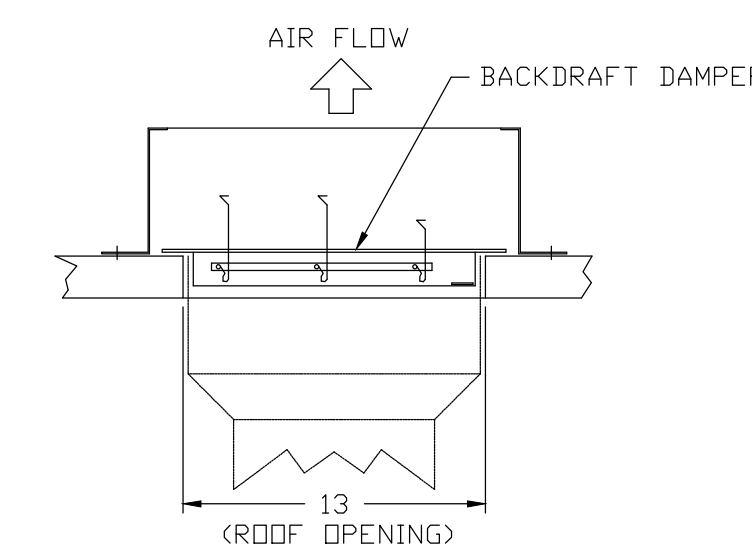
OPTIONS

ECM WIRING PACKAGE - MANUAL OR 0-10VDC REFERENCE SPEED CONTROL (TELCO MOTOR), CCW ROTATION. MOTORIZED I 12 BDD 120/240V. 2 YEAR PARTS WARRANTY.



PITCHED CURBS ARE AVAILABLE FOR PITCHED ROOFS.
SPECIFY PITCH:
EXAMPLE: 7/12 PITCH = 30° SLOPE.

BACKDRAFT DAMPER INSTALLATION



REVISIONS

DESCRIPTION	DATE

CAPTIVE
HBT Foodservice
www.captiveaire.com
1126 Swift Street, North Kansas City, MO, 64116 PHONE: (816) 221-8575 FAX: (816) 221-8311 EMAIL: reg98@captiveaire.com

Hawaiian Bros - Florissant, MO (DDAS)
13963 State Hwy AC,
Florissant, MO, 63033

DATE: 5/6/2022

DWG.#: 5448875

DRAWN BY: michael.co

SCALE: 3/4" = 1'-0"

MASTER DRAWING

SHEET NO. 8

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13963 NEW HALLS FERRY ROAD • FLORISSANT, MO. 63033

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SHEET DATES

ISSUE DATE APR. 26, 2022

REVISIONS

CB1 APR. 26, 2022
CB2 MAY 11, 2022

JOB NUMBER

2164180

SHEET NUMBER

H5.8

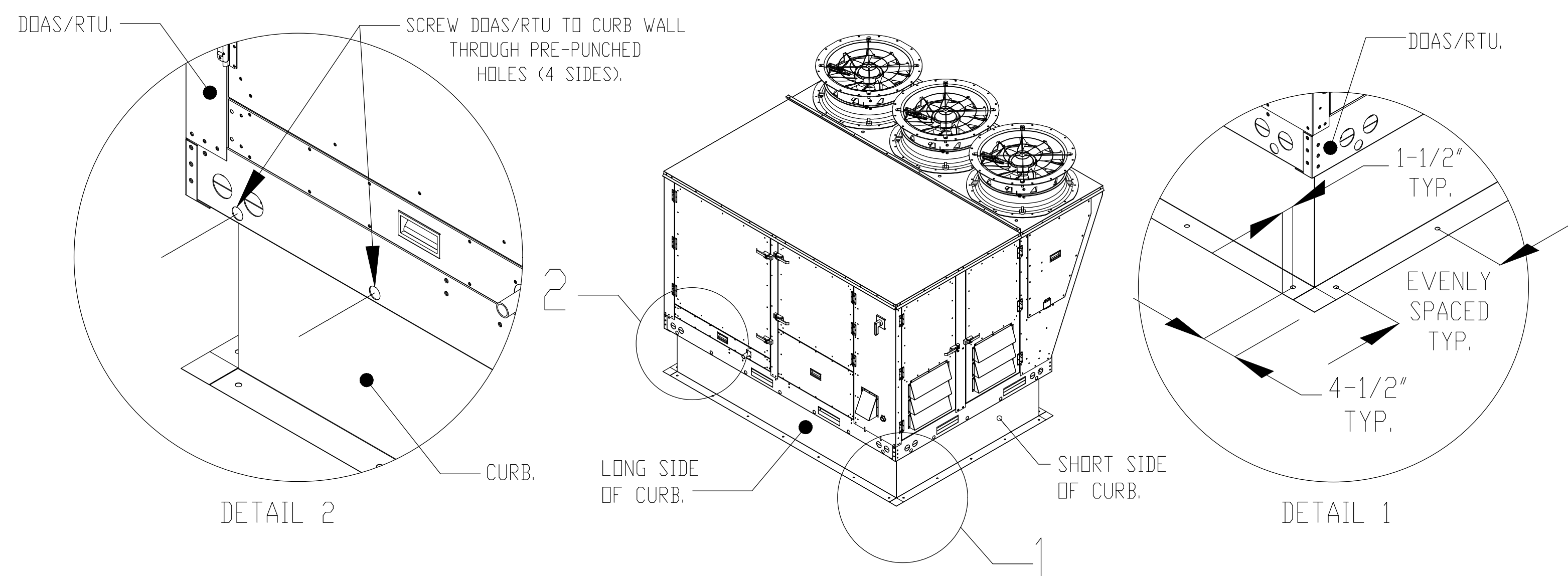
AIR DIFFUSION SUPPLY DUCT SPECIFICATIONS:
 PROVIDE AIR DIFFUSION SUPPLY DUCT EQUAL TO CAPTIVEAIRE SYSTEMS MODEL DW-S0(HC), DW-S90(HC), & DW-S180(HC).
 THREE DISTINCT HOLE PATTERN OPTIONS TO COVER A VARIETY OF CEILING HEIGHTS.
 NO ADDITIONAL DIFFUSERS REQUIRED, AS THE DUCT ITSELF PROVIDES AIR DIFFUSION.
 MADE OF HIGH QUALITY STAINLESS STEEL DESIGNED TO LAST 20+ YEARS.
 HIGH INDUCTION SUPPLY DUCT IS CONSTRUCTED USING 24 GAUGE, 430 SS - 5" THRU 24".
 HIGH INDUCTION SUPPLY DUCT IS CONSTRUCTED USING 20 GAUGE, 430 SS - 26" THRU 36".
 QUICK ONSITE ASSEMBLY USING EPDM GASKETS & UNIVERSAL V-BANDS.
 DOUBLE WALL SUPPLY DUCT AVAILABLE FOR INTERIOR AND EXTERIOR SPACES, EITHER CONDITIONED OR UNCONDITIONED.
 DOUBLE WALL SUPPLY DUCT AVAILABLE IN DW-1S, DW-2S, & DW-3S TO MEET SPECIFIC REGIONAL "R" VALUE REQUIREMENTS.

Insulation R-Value Recommendations		
Supply Duct Type	Minimum R-value	Space Type
Single Wall - S & -HC	N/A	Conditioned Space Only
Double Wall - 1S	R-4	Unconditioned Interior Space Only
Double Wall - 2S	R-8	Unconditioned Space Climate Zones 1-4
Double Wall - 3S	R-12	Unconditioned Space Climate Zones 5-8

DOUBLE WALL SUPPLY DUCT IS INSULATED WITH A 24 GAUGE 430 STAINLESS OUTER SHELL.
 AIR DIFFUSION SUPPLY DUCT COMPLIES WITH SMACNA (SHEET METAL AND AIR CONDITIONING CONTRACTORS) BEST PRACTICES.
 POSITIONING OF SPRINKLERS TO AVOID OBSTRUCTION TO DISCHARGE, SEE NFPA 13, TABLE 8.12.5.1.1.

TYPICAL DOAS/RTU ROOF MOUNTING INSTALLATION INSTRUCTIONS

- SECURE THE CURB TO THE ROOF FRAMING MEMBERS BY DRILLING 1/4" PILOT HOLES IN THE CURB FLANGES AT LOCATIONS SHOWN IN THE DIAGRAM BELOW. USING 3/8" X 2" ZINC PLATED STEEL LAG BOLTS, AND ZINC PLATED WASHERS, SCREW THROUGH THE CURB FLANGES AND INTO THE ROOF FRAMING MEMBERS. A MINIMUM OF (5) LAG BOLTS ON EACH SHORT SIDE, AND (7) LAG BOLTS ON EACH LONG SIDE IS REQUIRED.
- SECURE THE UNIT BASE TO THE SIDE WALLS OF THE CURB USING (24) 1/4"-14 X 2" SELF-DRILLING, STEEL ZINC PLATED SCREWS. PRE-PUNCHED HOLES HAVE BEEN PROVIDED FOR EACH SCREW LOCATION.



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CAPTIVEAIRE
 HBT Foodservice
 1126 Swift Street, North Kansas City, MO, 64116 PHONE: (816) 221-8575 FAX: (816) 221-8311 EMAIL: reg88@captiveaire.com

Hawaiian Bros - Florissant, MO (DOAS)
 13963 State Hwy AC,
 Florissant, MO, 63033

DATE: 5/6/2022
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SCALE: 3/4" = 1'-0"
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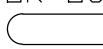
SHEET NUMBER

H5.9

FAN #5 CASRTU3-I.300-20-15T-DDAS - HEATER (RTU1 DINING)

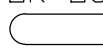
FAN #6 CASRTU3-I.300-18-20T-DDAS - HEATER (RTU2 KITCHEN)

NOTES:

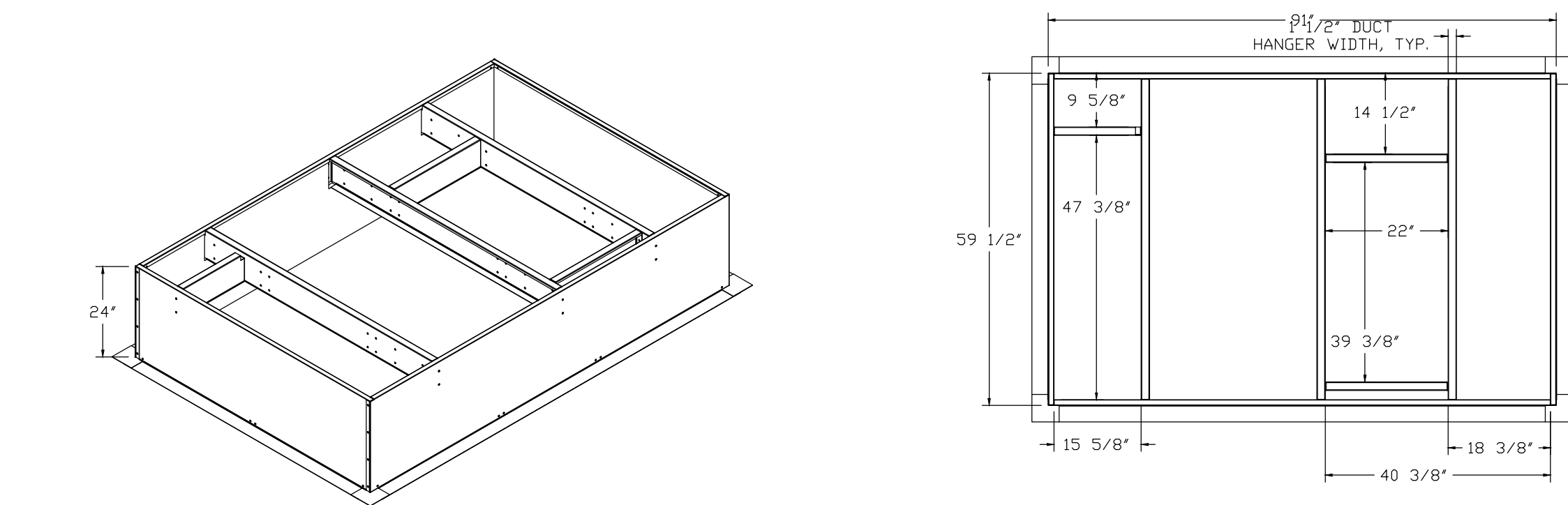
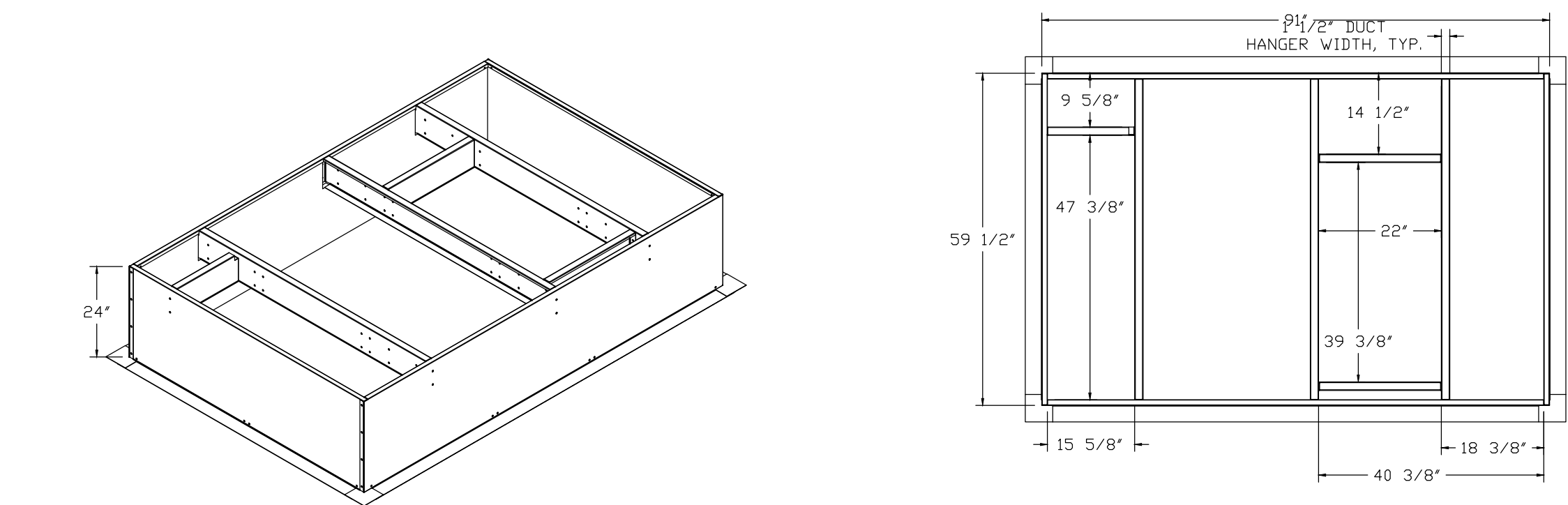
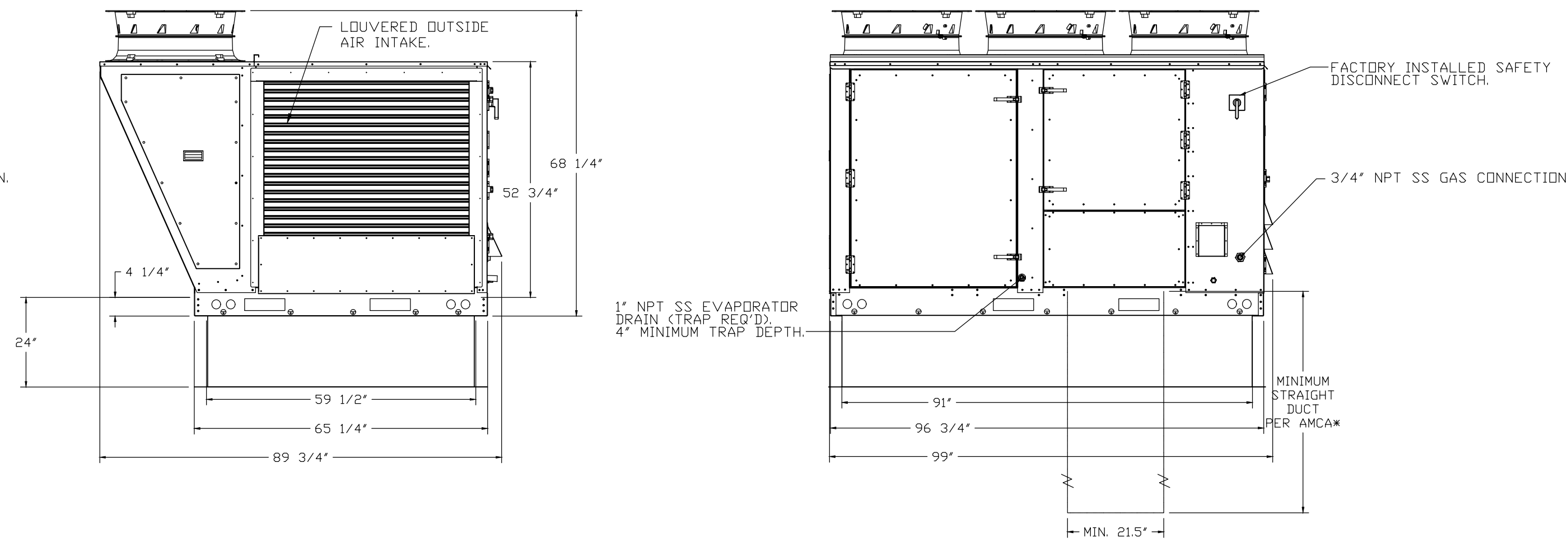
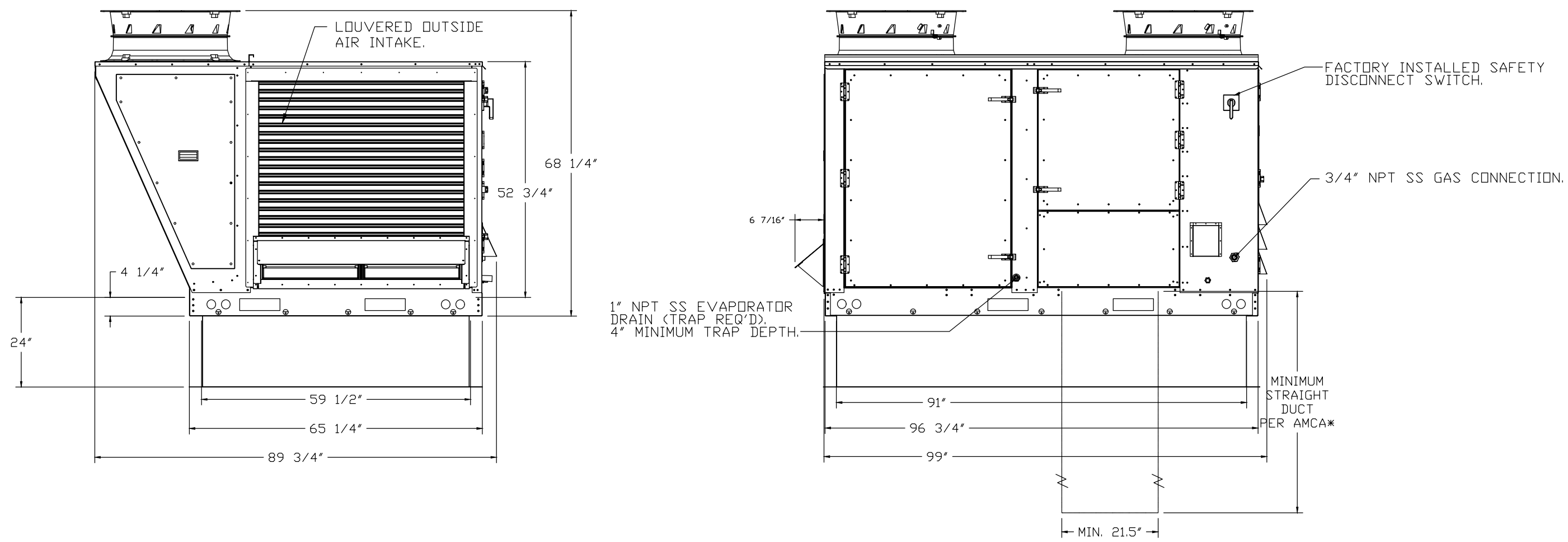
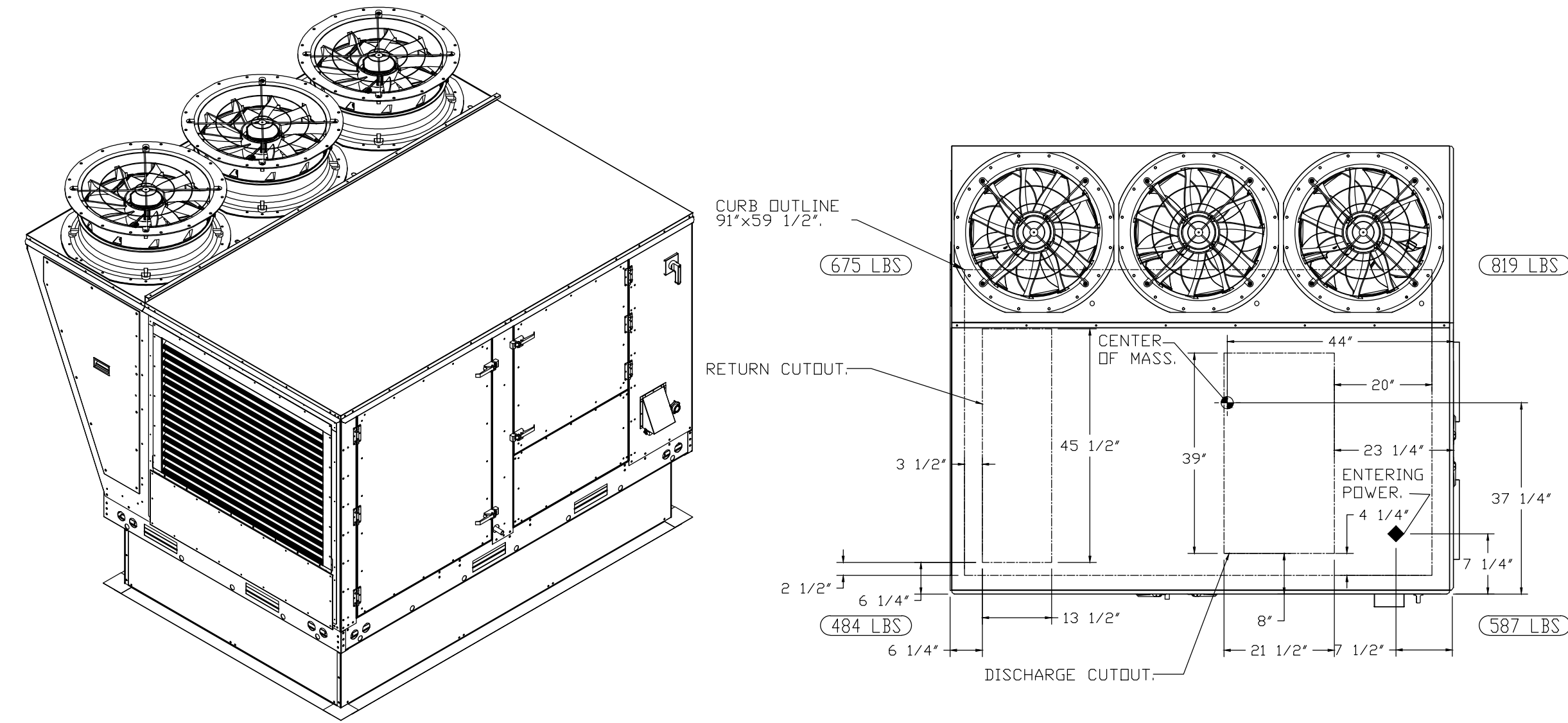
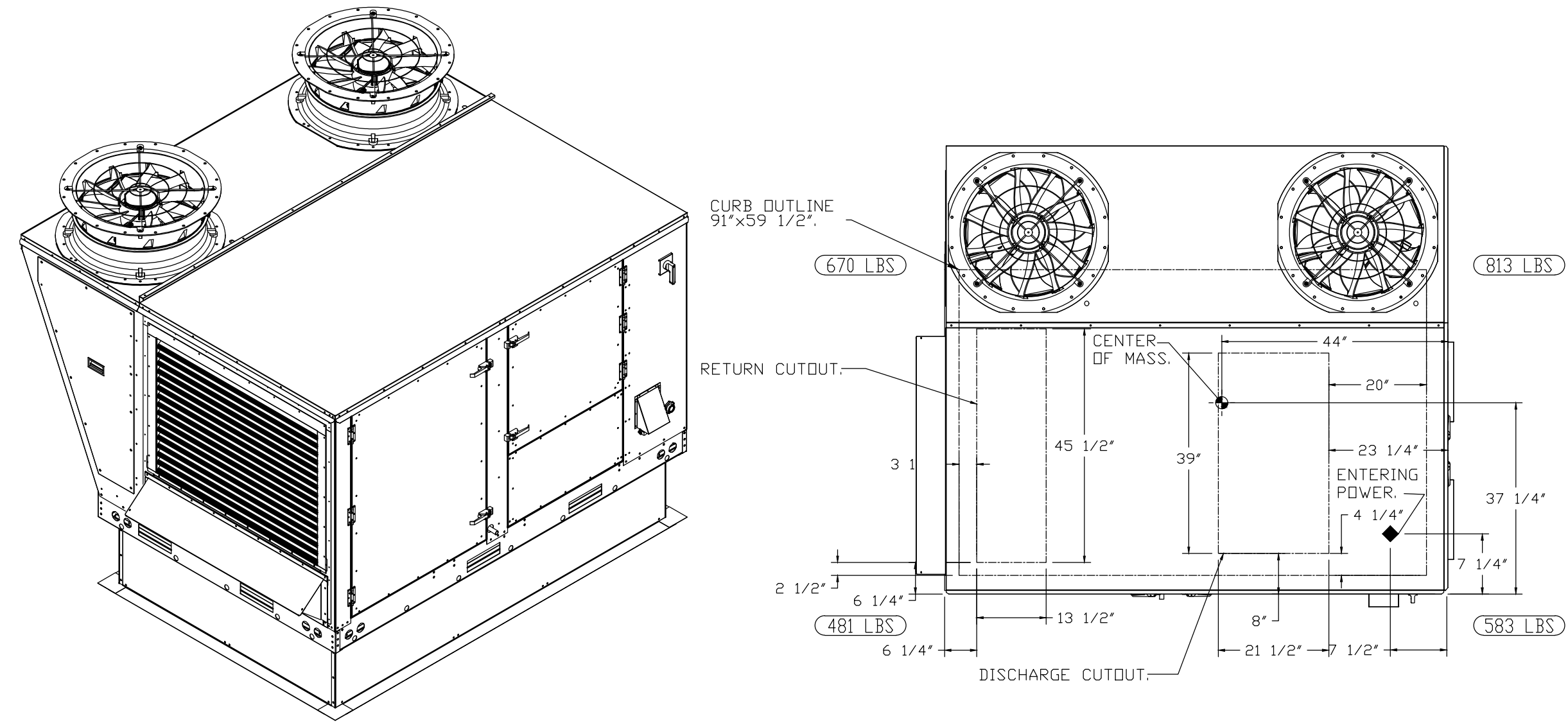
- DO NOT OBSTRUCT OUTSIDE AIR INLET, OUTSIDE AIR COIL OR OUTSIDE AIR FAN.
-  DENOTES CORNER WEIGHT.
- ROOF OPENING MUST BE 2" SMALLER THAN CURB DIMENSIONS IN BOTH DIRECTIONS.

*NOTE: SUPPLY DUCT MUST BE INSTALLED TO MEET SMACNA STANDARDS. A MINIMUM STRAIGHT DUCT LENGTH MUST BE MAINTAINED DOWNSTREAM OF UNIT DISCHARGE AS OUTLINED IN AMCA PUBLICATION 201. WHEN USING RECTANGULAR DUCTWORK, ELBOWS MUST BE RADIUS THROAT, RADIUS BACK WITH TURNING VANES. FLEXIBLE DUCTWORK AND SQUARE THROAT/SQUARE BACK ELBOWS SHOULD NOT BE USED. ANY TRANSITION AND/OR TURNS IN THE DUCTWORK WILL CAUSE SYSTEM EFFECT. SYSTEM EFFECT WILL DRASTICALLY INCREASE STATIC PRESSURE AND REDUCE AIRFLOW. DO NOT RELY ON UNIT TO SUPPORT DUCT IN ANY WAY. FAILURE TO PROPERLY SIZE DUCTWORK MAY CAUSE SYSTEM EFFECTS AND REDUCE PERFORMANCE OF THE EQUIPMENT. SUGGESTED STRAIGHT DUCT SIZE IS 21.5" x 39".

NOTES:

- DO NOT OBSTRUCT OUTSIDE AIR INLET, OUTSIDE AIR COIL OR OUTSIDE AIR FAN.
-  DENOTES CORNER WEIGHT.
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DESCRIPTION	DATE



Hawaiian Bros - Florissant, MO (DDAS)
13963 State Hwy AC,
Florissant, MO, 63033

DATE: 5/6/2022
DWG.#: 5448875
DRAWN BY: michael.co
SCALE: 1/2" = 1'-0"
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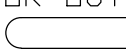
SHEET DATES	
ISSUE DATE	APR. 26, 2022
REVISIONS	
CB1	APR. 26, 2022
CB2	MAY 11, 2022

JOB NUMBER
2164180

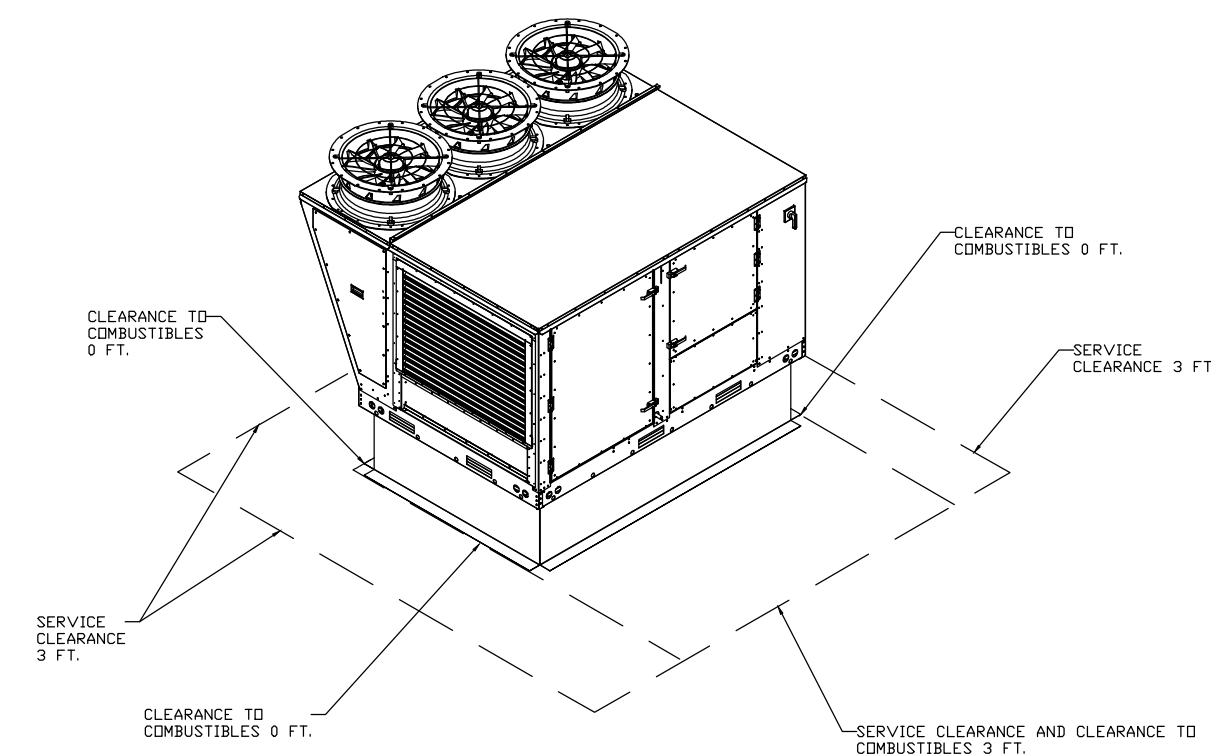
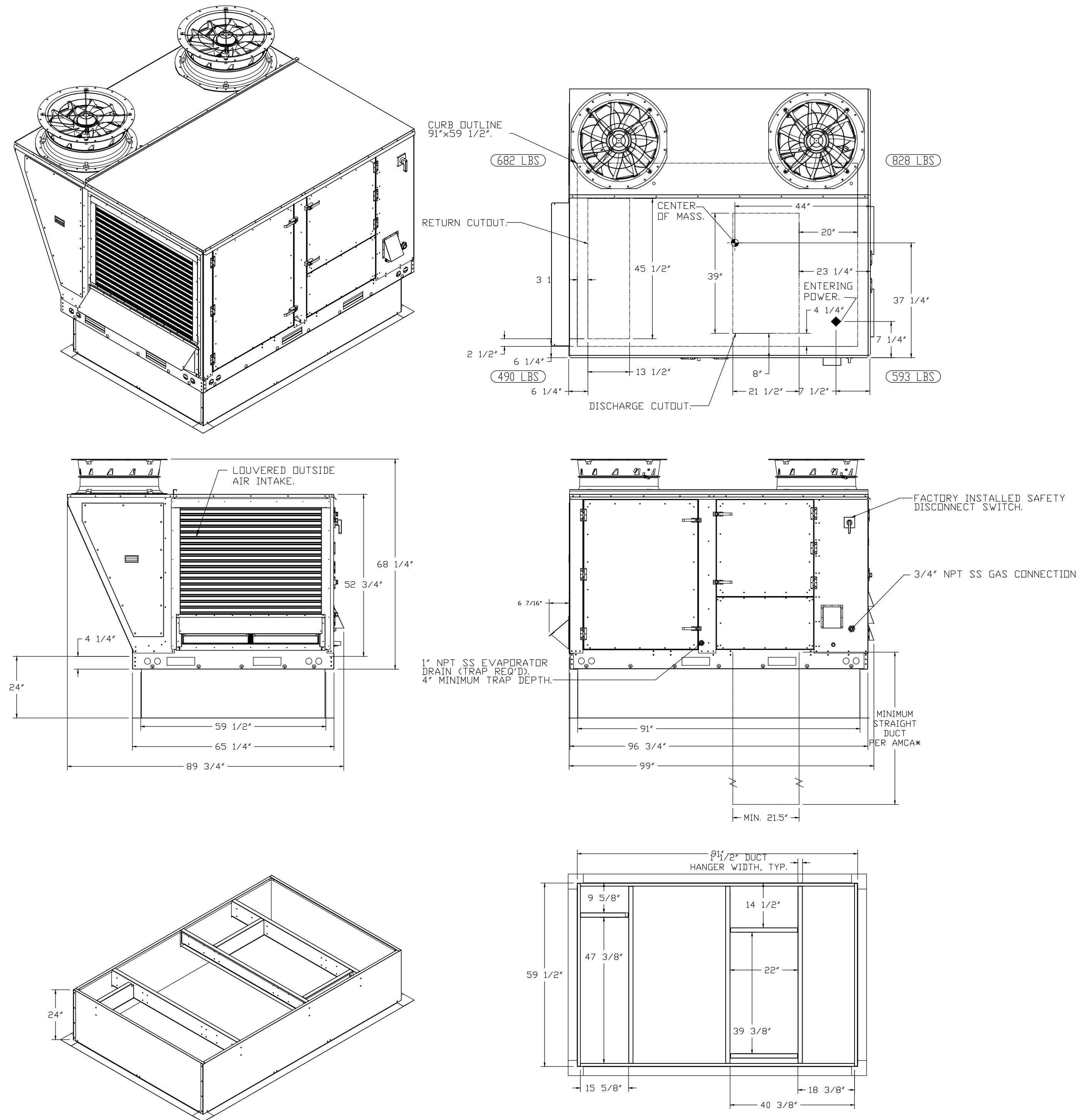
SHEET NUMBER

H5.10

NOTES:

- DO NOT OBSTRUCT OUTSIDE AIR INLET, OUTSIDE AIR COIL OR OUTSIDE AIR FAN.
-  DENOTES CORNER WEIGHT.
- ROOF OPENING MUST BE 2" SMALLER THAN CURB DIMENSIONS IN BOTH DIRECTIONS.

*NOTE: SUPPLY DUCT MUST BE INSTALLED TO MEET SMACNA STANDARDS. A MINIMUM STRAIGHT DUCT LENGTH MUST BE MAINTAINED DOWNSTREAM OF UNIT DISCHARGE AS OUTLINED IN AMCA PUBLICATION 201. WHEN USING RECTANGULAR DUCTWORK, ELBOWS MUST BE RADIUS THROAT, RADIUS BACK WITH TURNING VANES. FLEXIBLE DUCTWORK AND SQUARE THROAT/SQUARE BACK ELBOWS SHOULD NOT BE USED. ANY TRANSITION AND/OR TURNS IN THE DUCTWORK WILL CAUSE SYSTEM EFFECT. SYSTEM EFFECT WILL DRASTICALLY INCREASE STATIC PRESSURE AND REDUCE AIRFLOW. DO NOT RELY ON UNIT TO SUPPORT DUCT IN ANY WAY. FAILURE TO PROPERLY SIZE DUCTWORK MAY CAUSE SYSTEM EFFECTS AND REDUCE PERFORMANCE OF THE EQUIPMENT. SUGGESTED STRAIGHT DUCT SIZE IS 21.5" x 39".



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CAPTIVE
 HBT Foodservice
 1126 Swift Street, North Kansas City, MO, 64116 PHONE: (816) 221-8576 FAX: (816) 221-8311 EMAIL: reg@captivaire.com

Hawaiian Bros - Florissant, MO (DDAS)
 13963 State Hwy AC,
 Florissant, MO, 63033

DATE: 5/6/2022
 DWG.#: 5448875
 DRAWN BY: michael.co
 SCALE: 1/2" = 1'-0"
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PROJECT INFORMATION

PROPOSED BUILDING RENOVATION
HAWAIIAN BROS - STR: 45
 13963 NEW HALLS FERRY ROAD • FLORISSANT, MO. 63033

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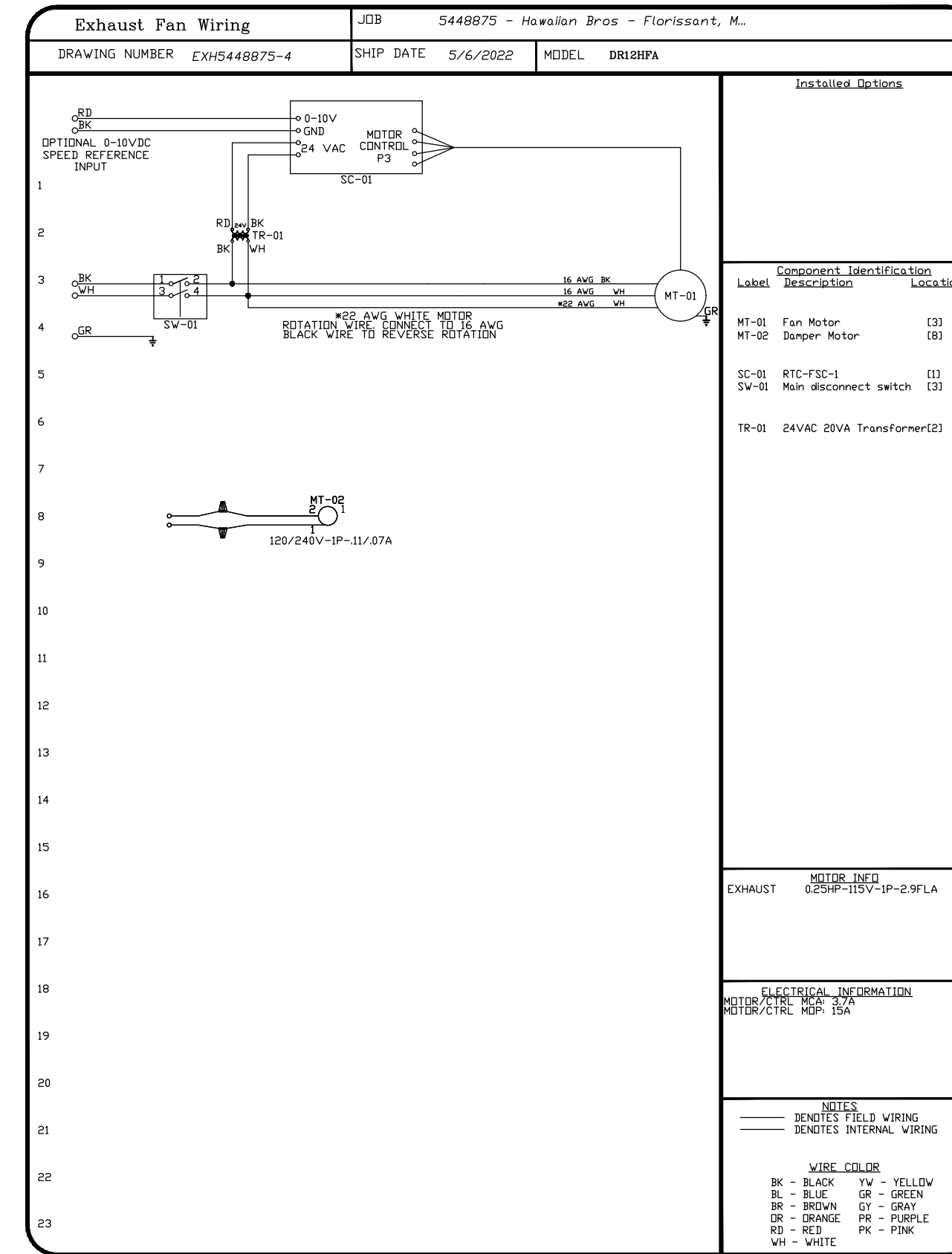
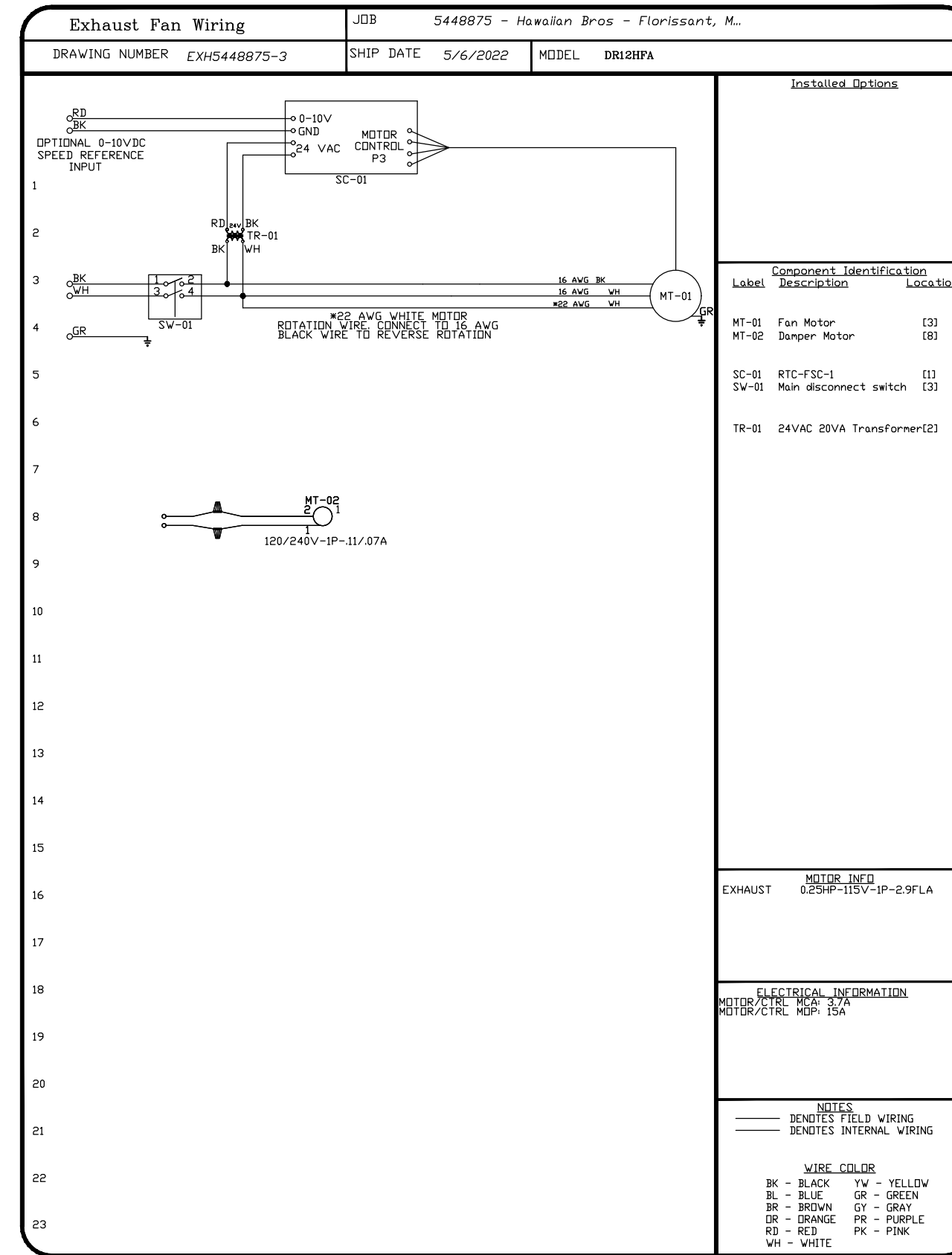
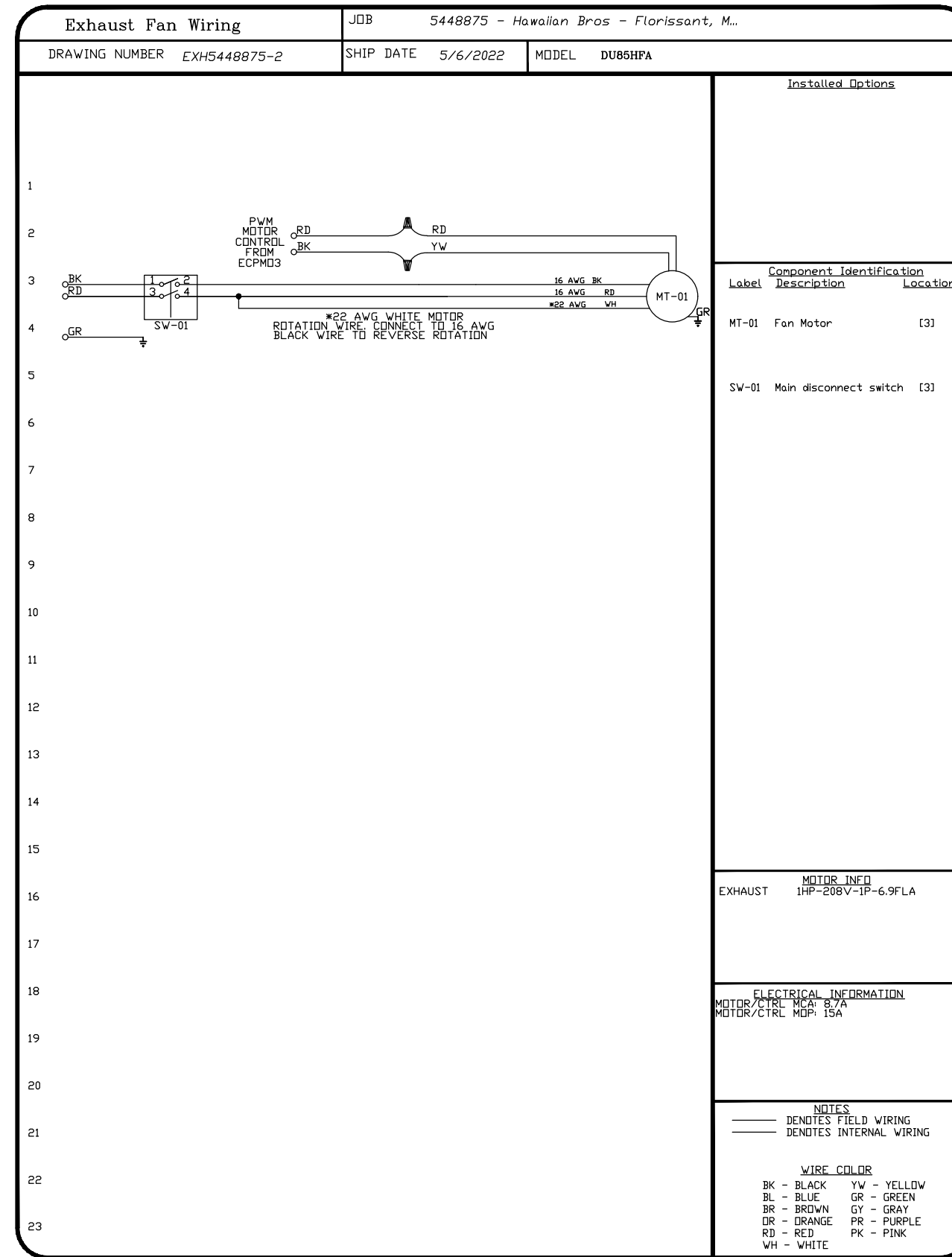
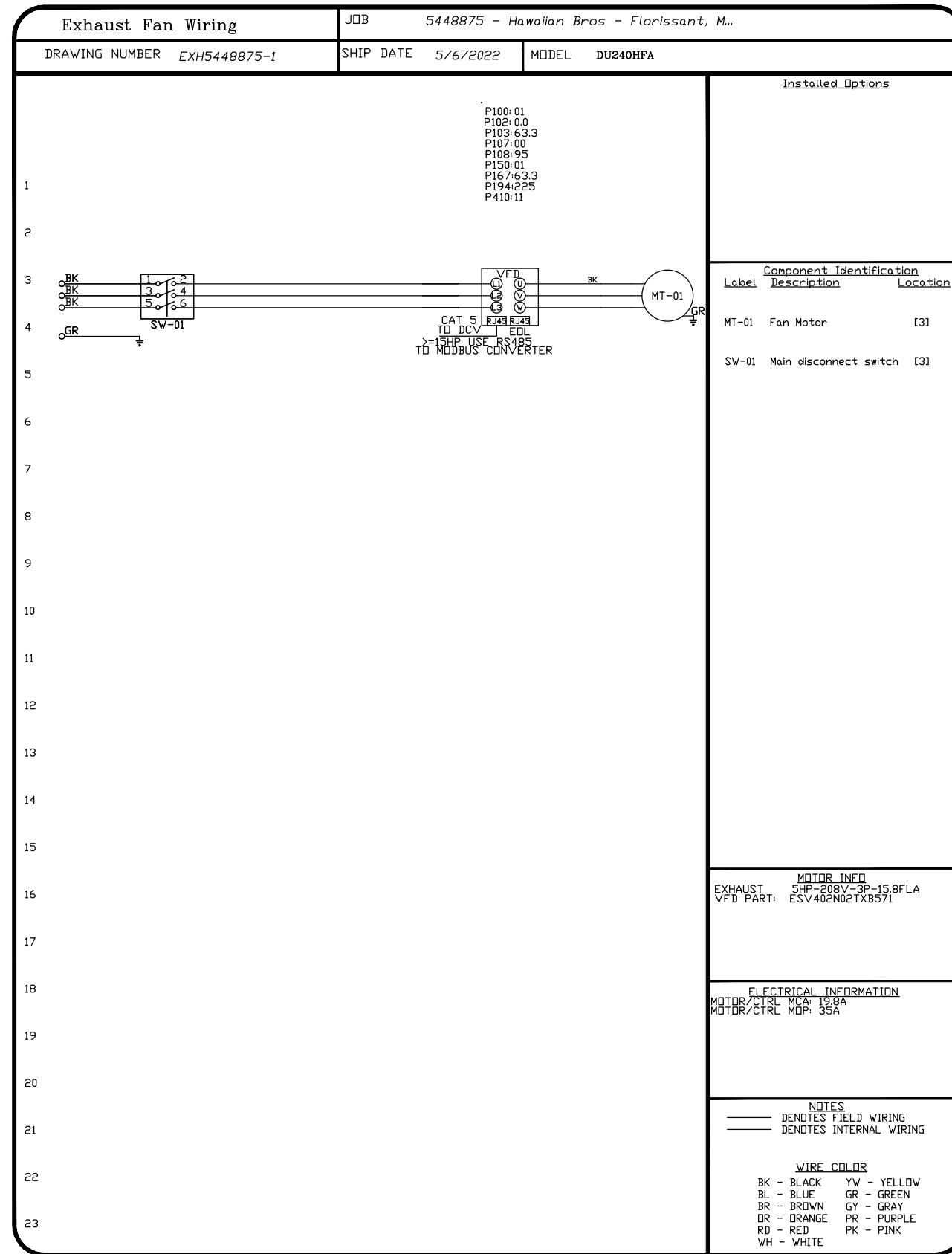
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ISSUE DATE	APR. 26, 2022
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JOB NUMBER
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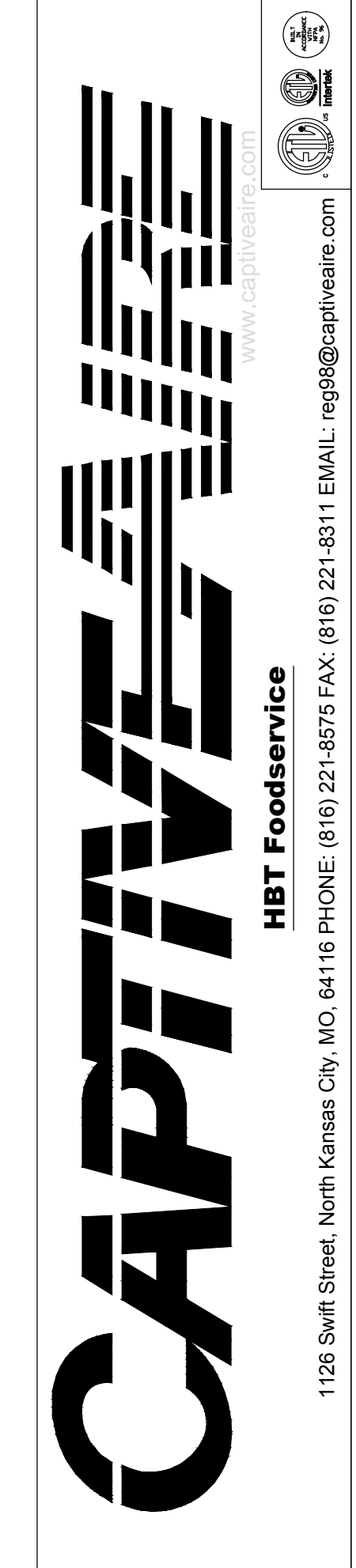
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REVISIONS

DESCRIPTION	DATE



Hawaiian Bros - Florissant, MO (DDAS)
13963 State Hwy AC,
Florissant, MO, 63033

DATE: 5/6/2022

DWG.#: 5448875

DRAWN BY: michael.co

SCALE: 3/4" = 1'-0"

MASTER DRAWING

SHEET NO. 12



PROJECT INFORMATION

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HAWAIIAN BROS - STR: 45
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PROFESSIONAL SEAL

SHEET DATES

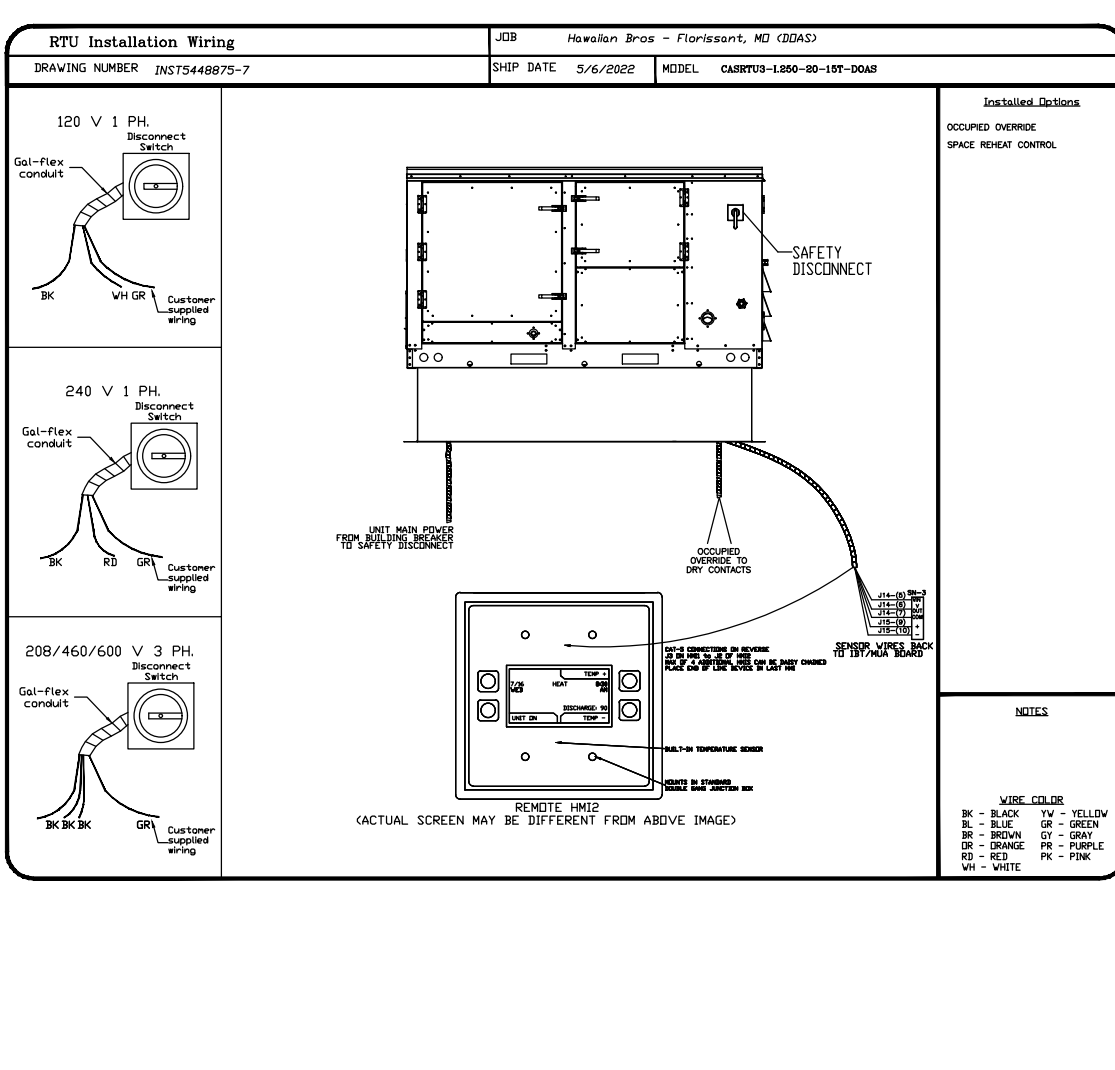
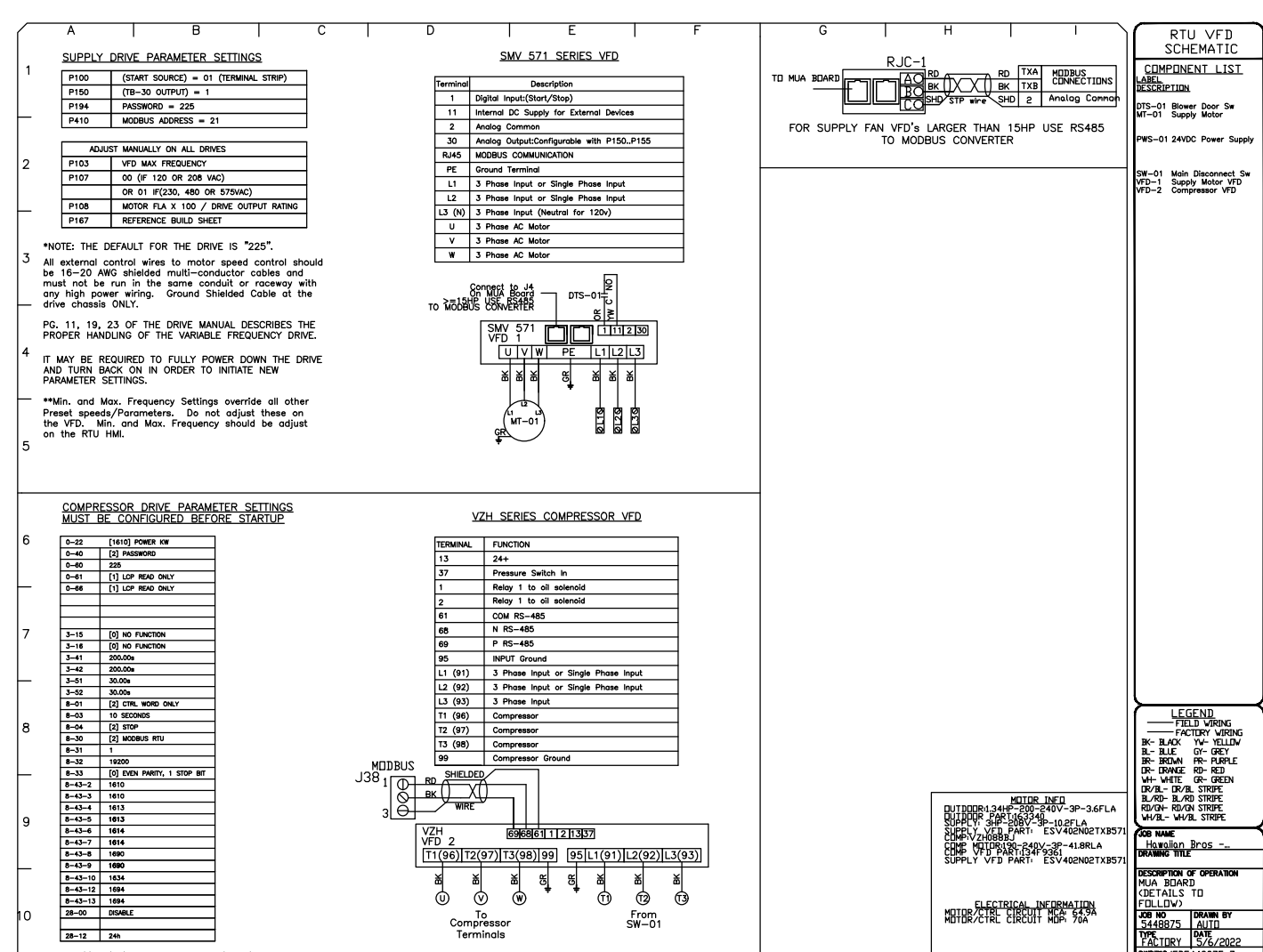
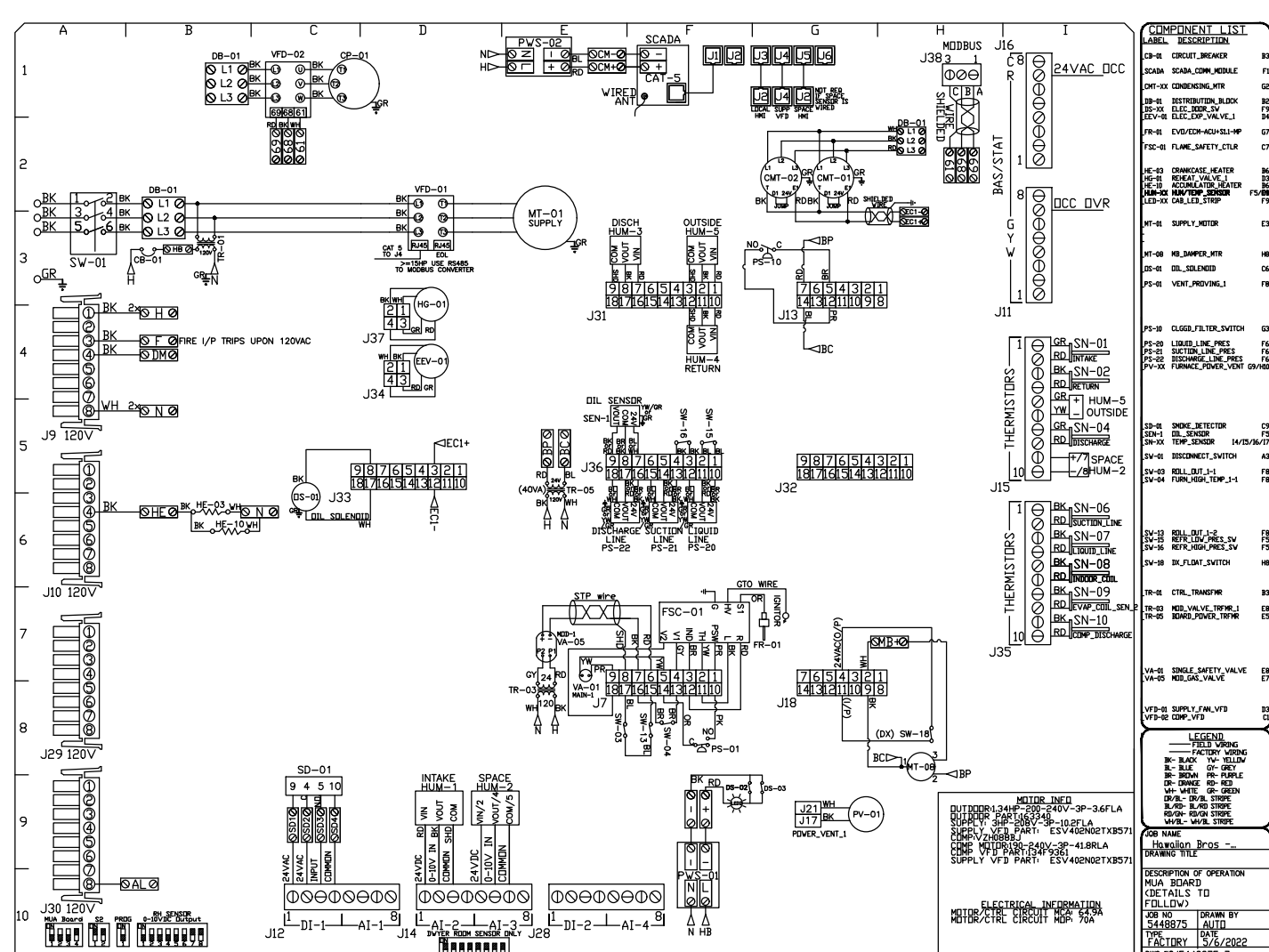
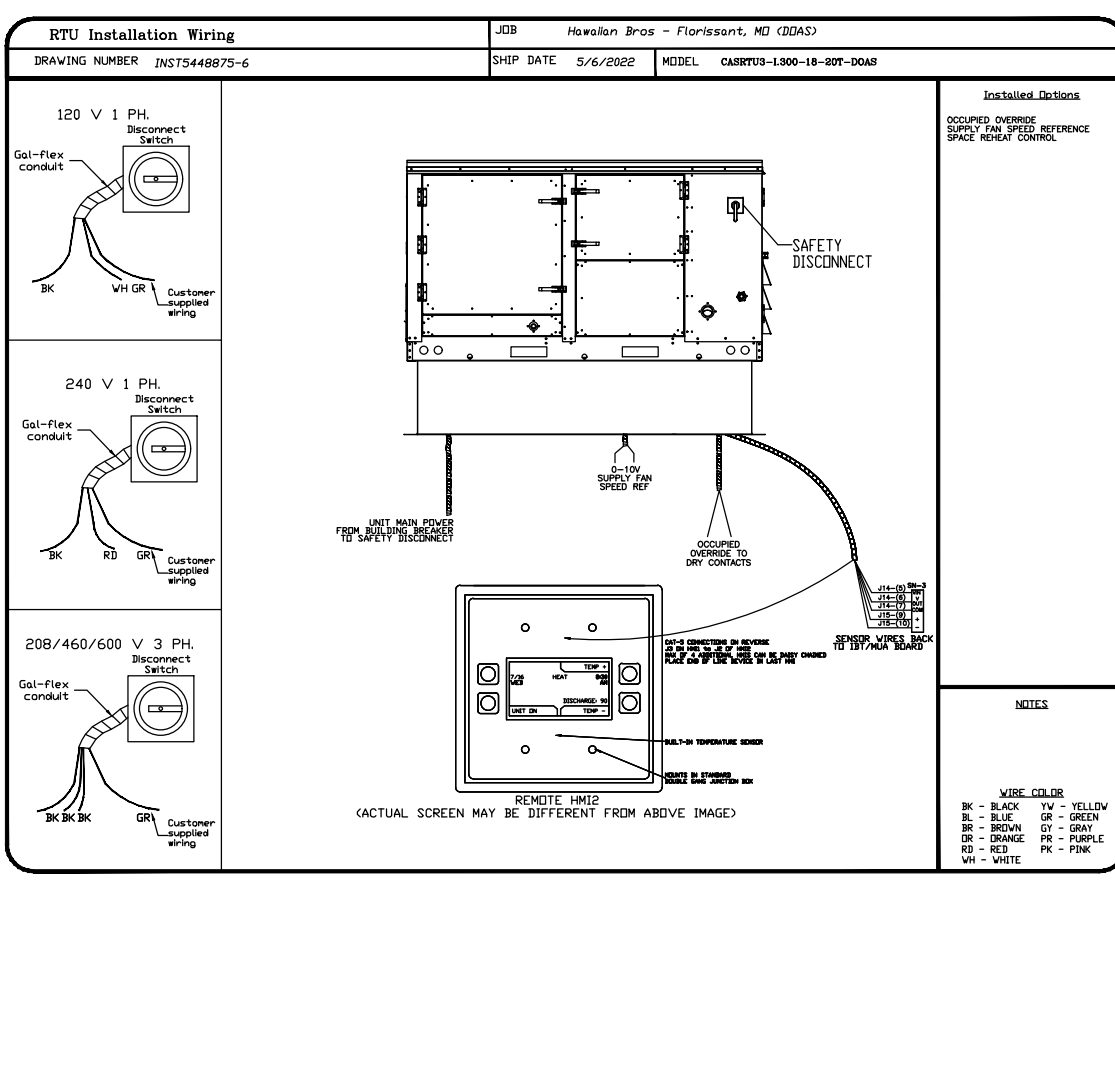
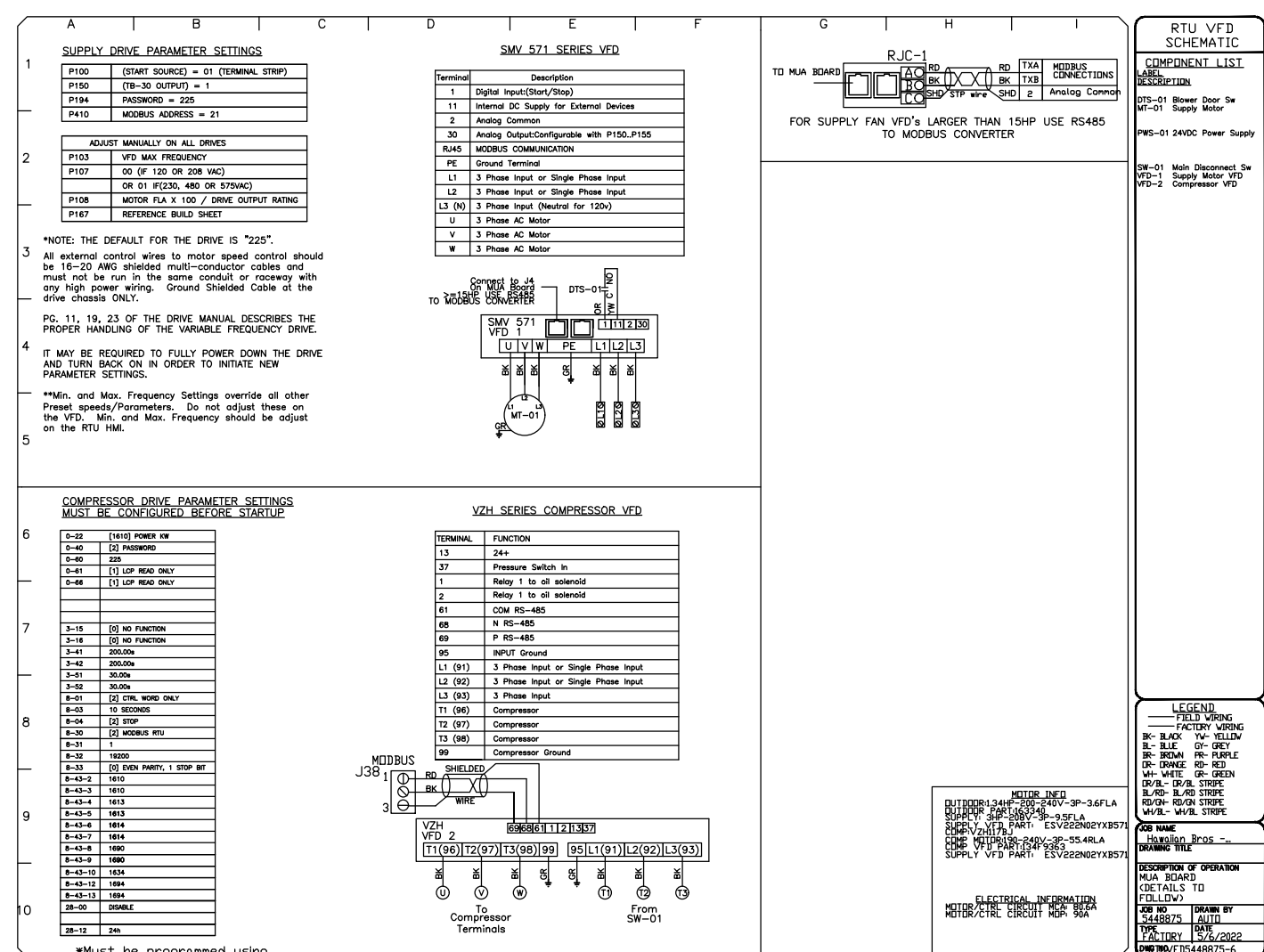
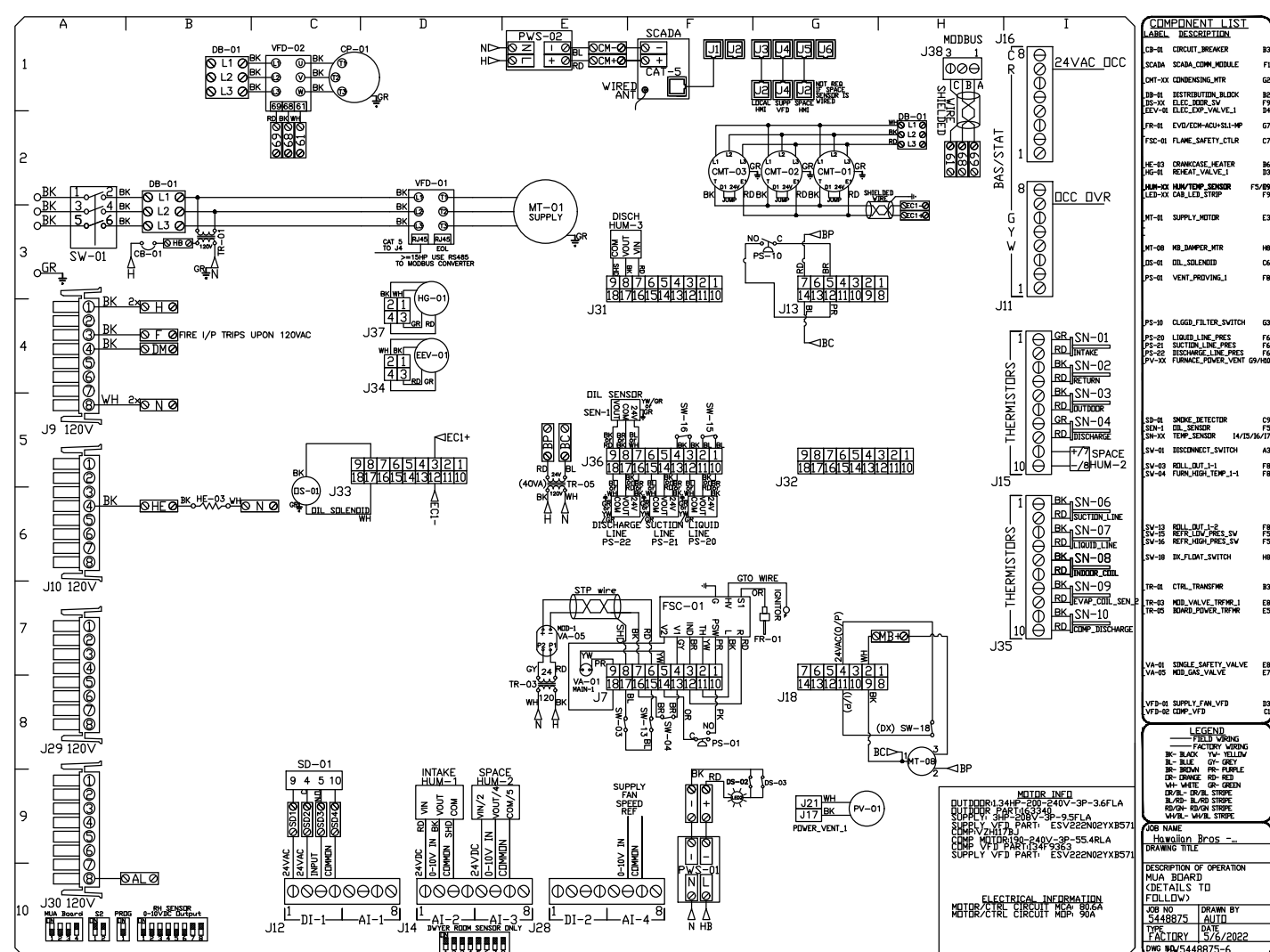
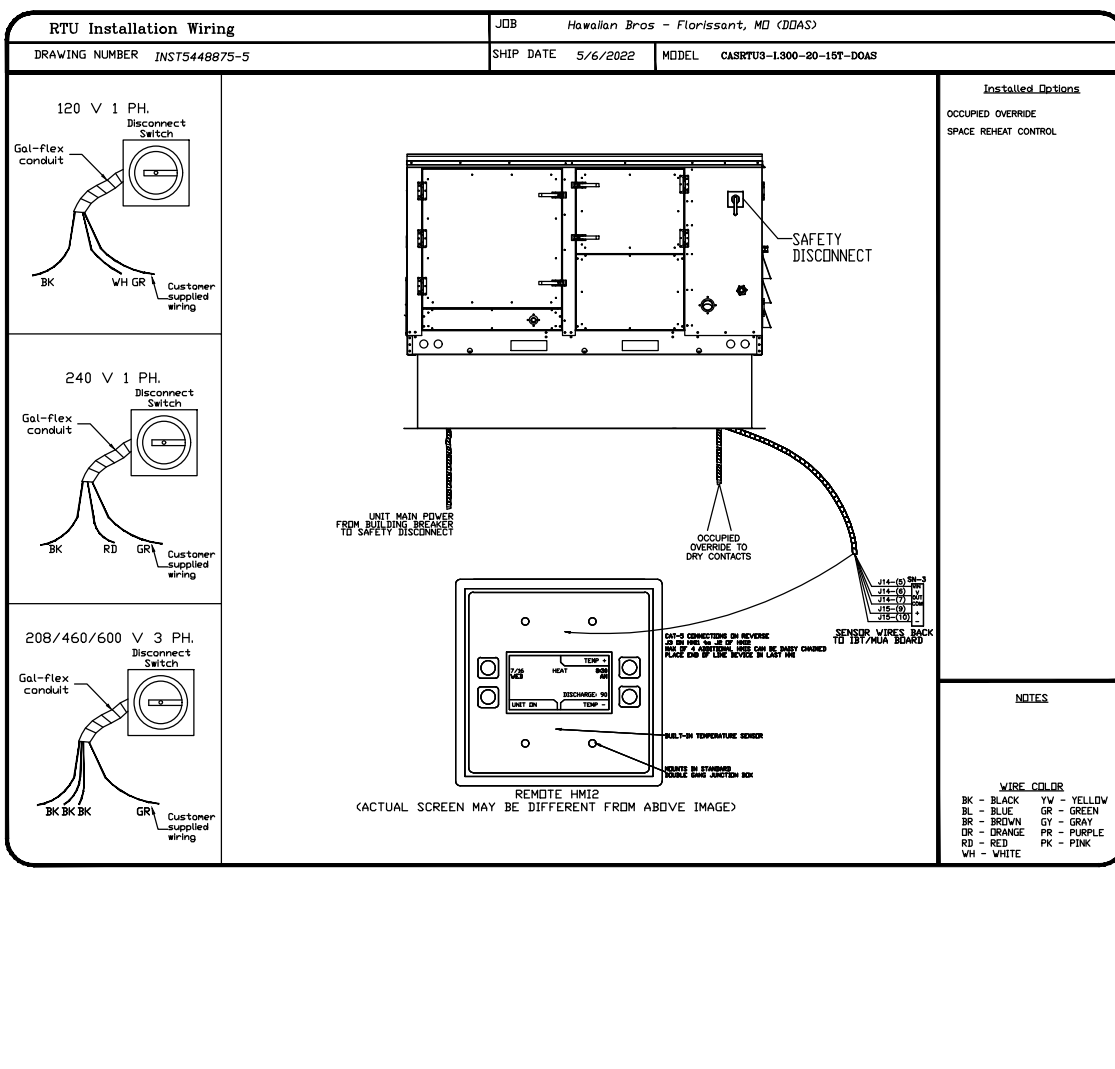
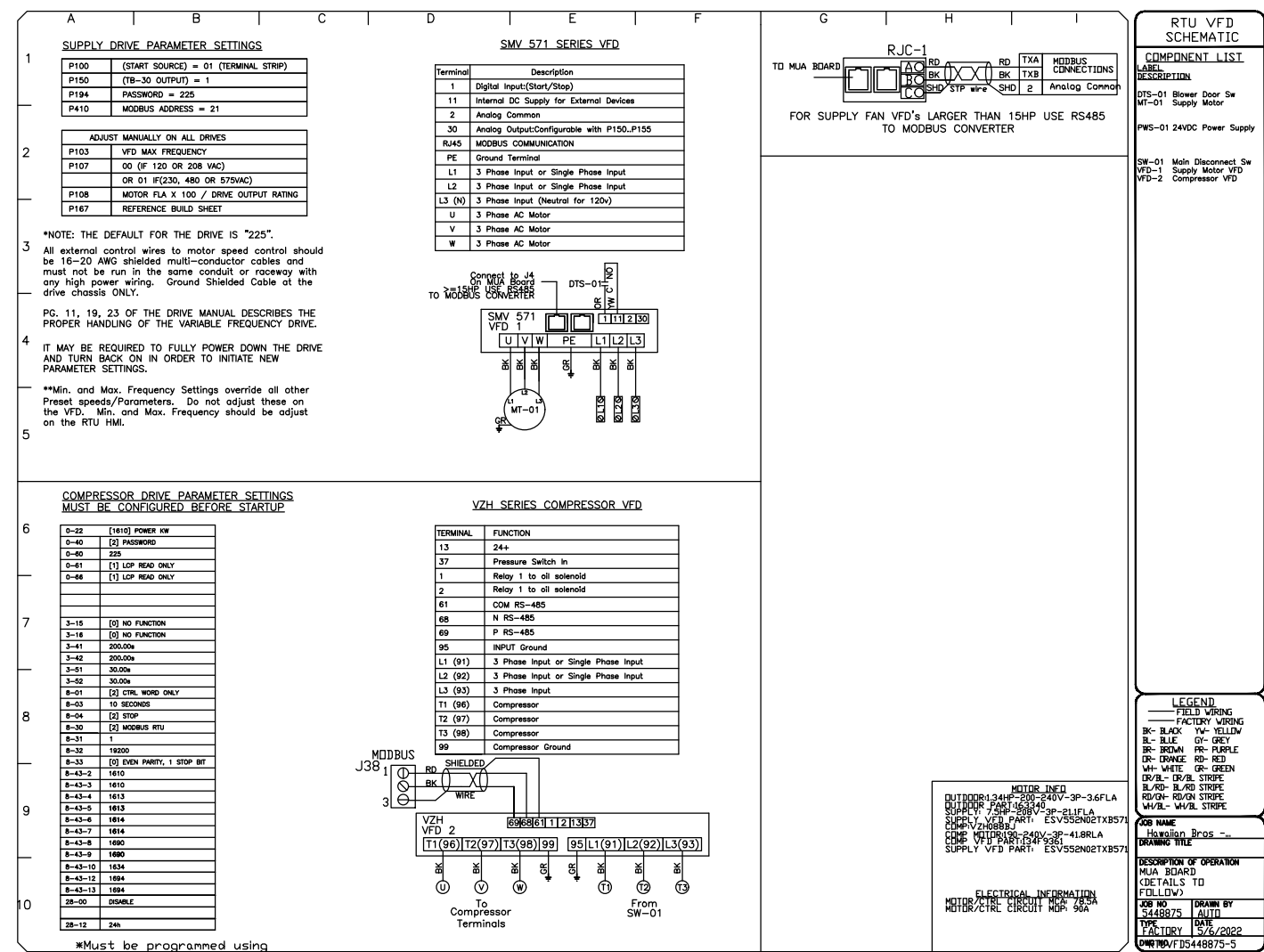
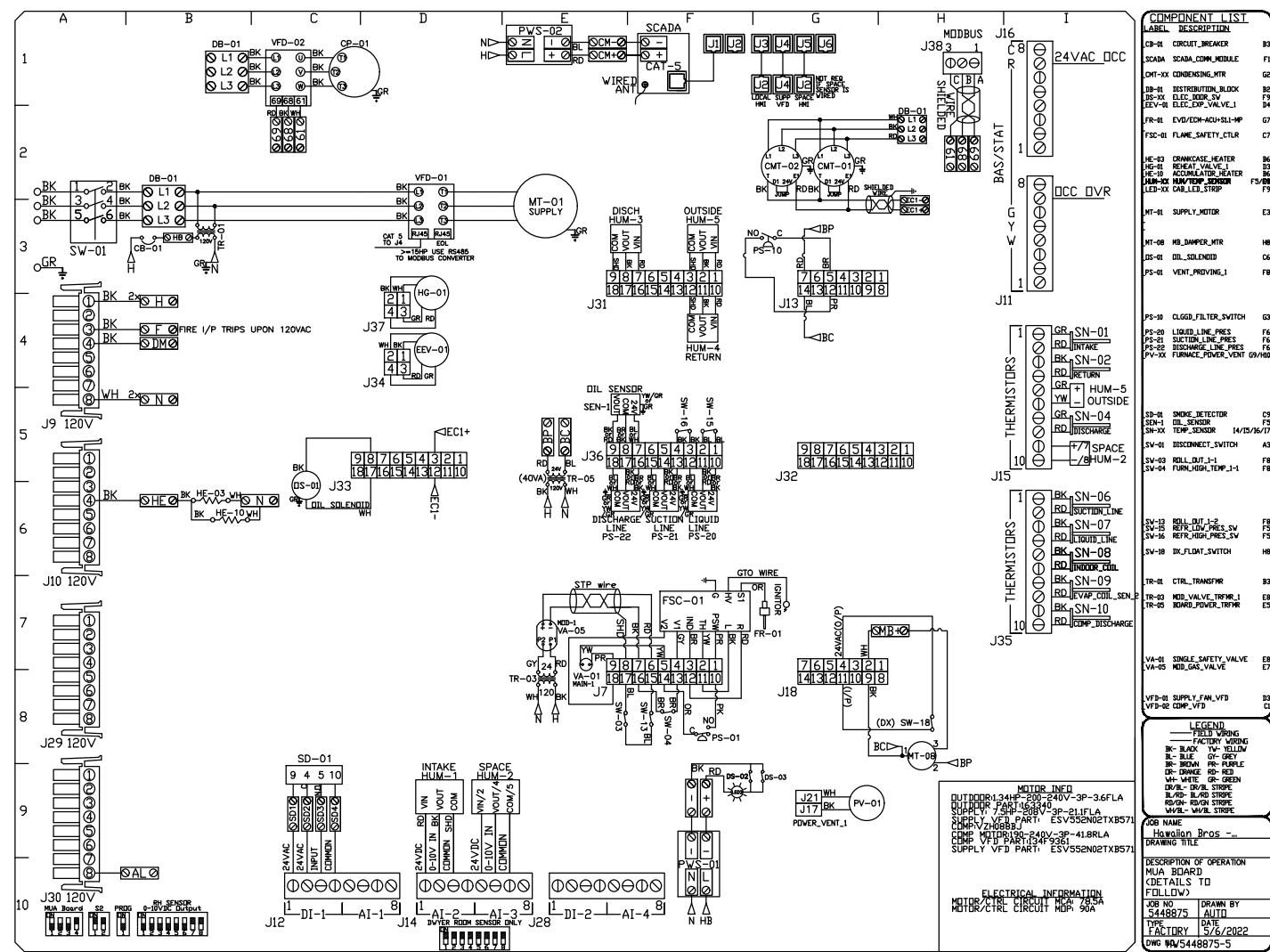
ISSUE DATE	DATE

REVISIONS

CB1	APR. 26, 2022	
CB2	MAY 11, 2022	

JOB NUMBER
2164180

SHEET NUMBER
H5.12



CAPTIVEAIRE

Hawaiian Bros - Florissant, MD (DDAS)
 13963 State Hwy AC,
 Florissant, MD, 63033

DATE: 5/6/2022
DWG.#: 5448875
DRAWN BY: michael.co
SCALE: 1/2" = 1'-0"
MASTER DRAWING

SHEET NO.
 13

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PROJECT INFORMATION

PROPOSED BUILDING RENOVATION
HAWAIIAN BROS - STR: 45
 13963 NEW HALLS FERRY ROAD • FLOISSANT, MO. 63033

PROFESSIONAL SEAL

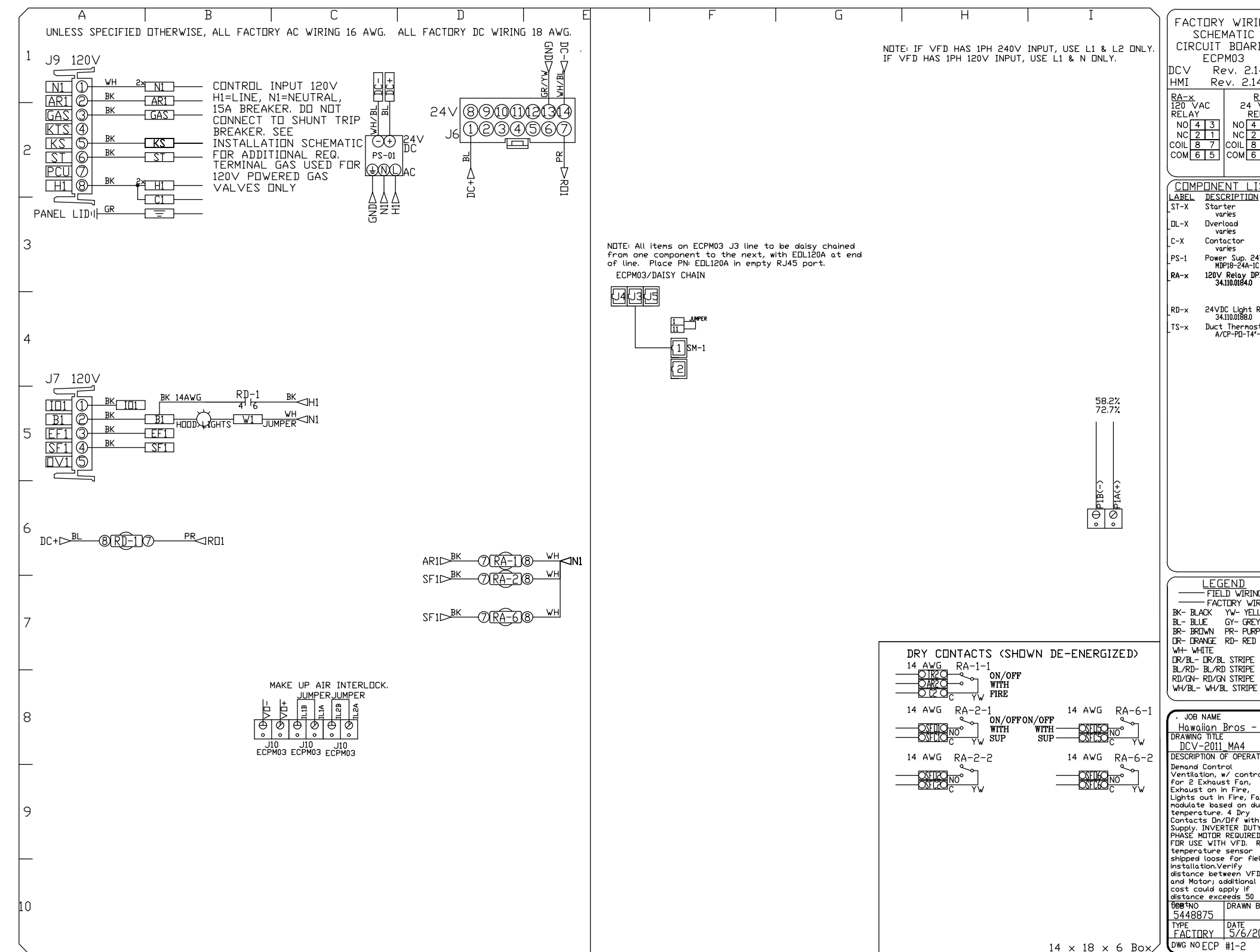
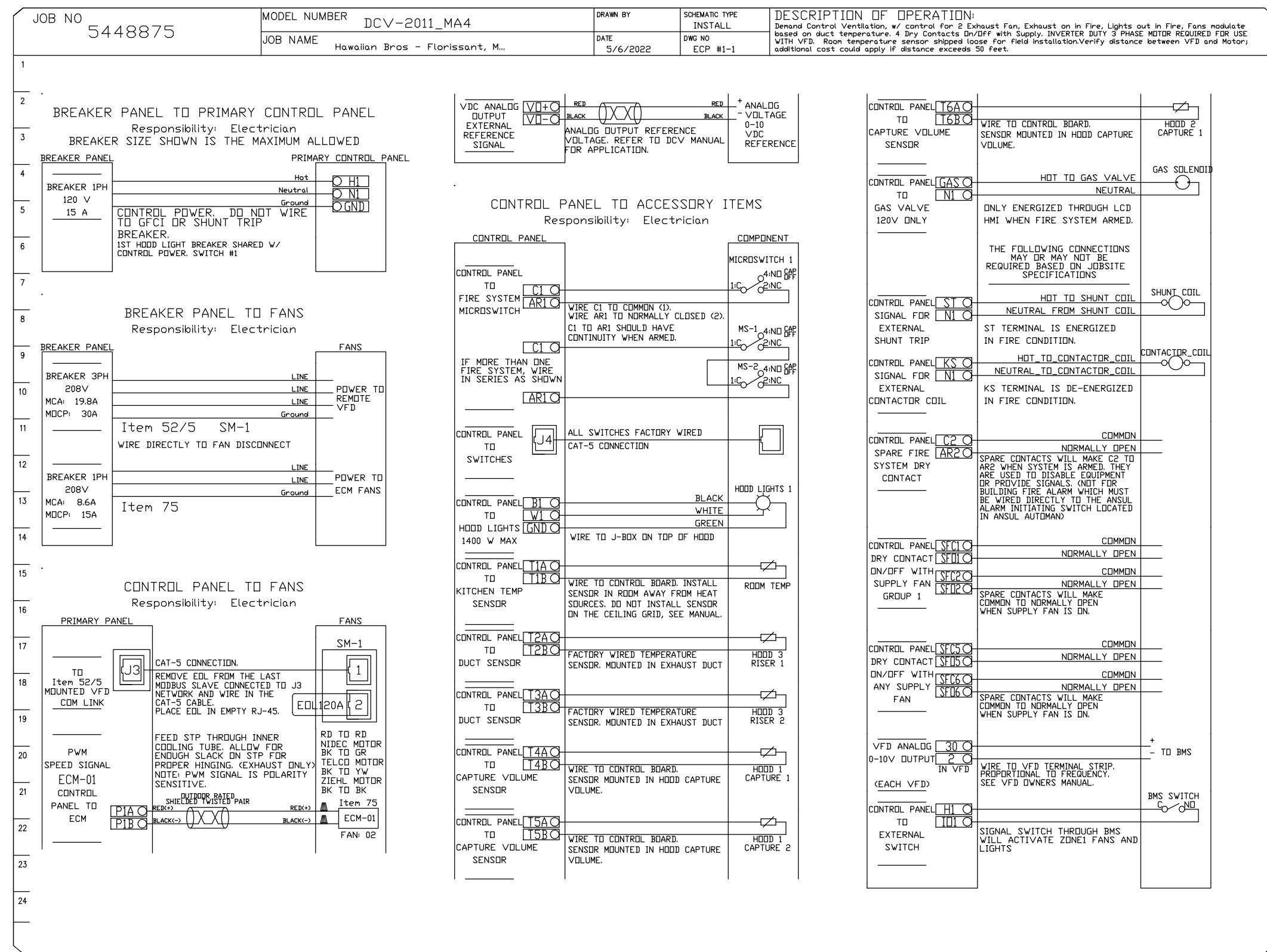
SHEET DATES	
ISSUE DATE	APR. 26, 2022
REVISIONS	
CB1	APR. 26, 2022
CB2	MAY 11, 2022

JOB NUMBER
 2164180

SHEET NUMBER
H5.13

ELECTRICAL PACKAGE - JOB#5448875

NO	TAG	PACKAGE #	LOCATION	SWITCHES		OPTION	FANS CONTROLLED					
				LOCATION	QUANTITY		FAN TAG	TYPE	Ø	HP	VOLT	FLA
1		DCV-2011_MA4	UTILITY CABINET LEFT	DCV - UTILITY CABINET LEFT	1 LIGHT	SMART CONTROLS DCV	Item 52/53	EXHAUST	3	5,000	208	15.8
				HOOD # 3	1 FAN		Item 75	EXHAUST	1	1,000	208	6.9



REVISIONS

NO.	DESCRIPTION	DATE

CAPTIVE

HBT Foodservice

1126 Swift Street, North Kansas City, MO, 64116 PHONE: (816) 221-8575 FAX: (816) 221-8311 EMAIL: reg@captivair.com

Hawaiian Bros - Florissant, MO (D0AS)
 13963 State Hwy AC,
 Florissant, MO, 63033

DATE: 5/6/2022
DWG.#: 5448875
DRAWN BY: michael.co
SCALE: 3/4" = 1'-0"
MASTER DRAWING

SHEET NO.
 14

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PROJECT INFORMATION

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HAWAIIAN BROS - STR: 45
 13963 NEW HALLS FERRY ROAD • FLORISSANT, MO. 63033

PROFESSIONAL SEAL

SHEET DATES

ISSUE DATE	DATE

REVISIONS

NO.	DESCRIPTION	DATE

JOB NUMBER
 2164180

SHEET NUMBER

H5.14