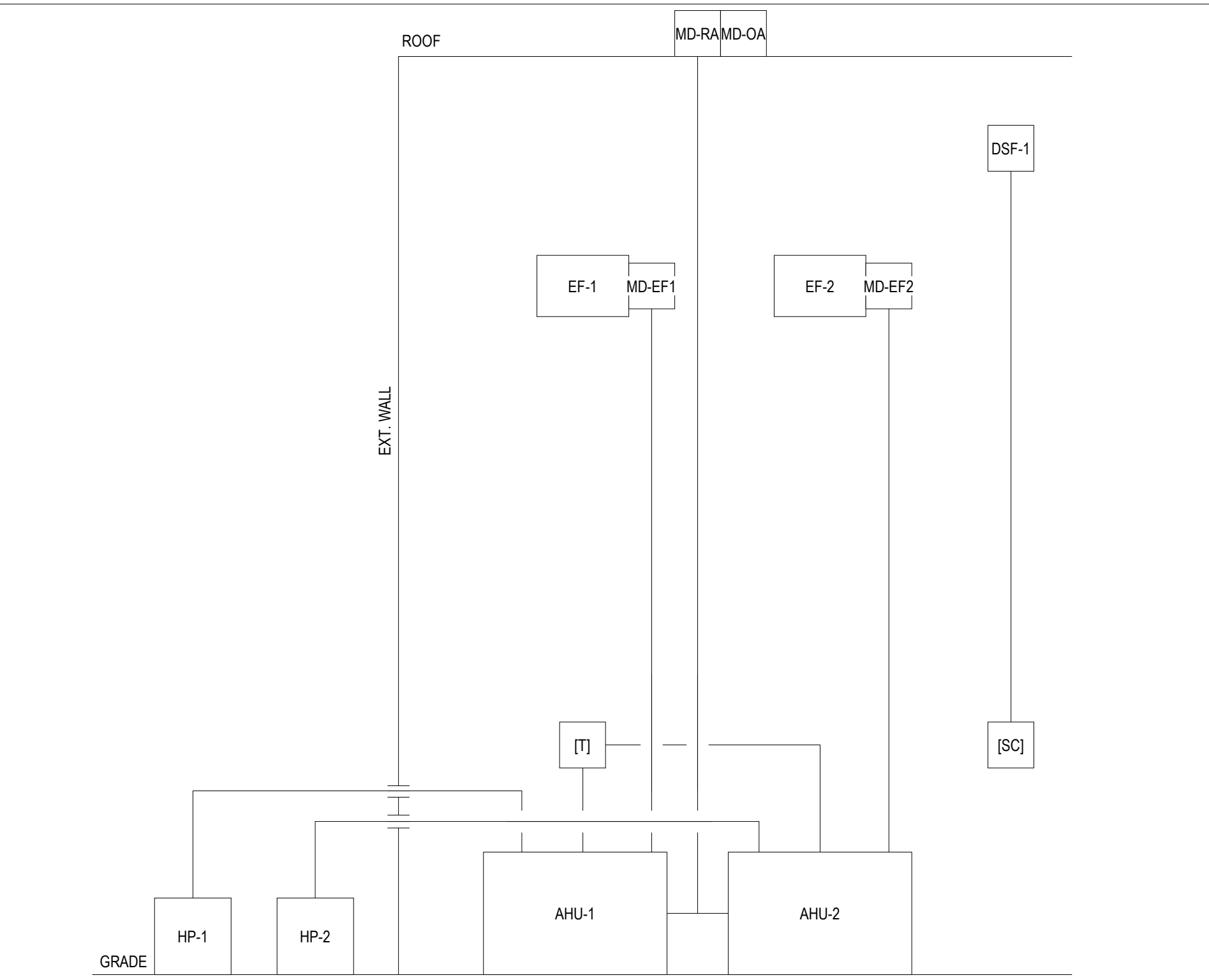


SYSTEM SCHEMATIC



HVAC CONTROL SEQUENCES

SYSTEM 1:

HP-1 / HP-2 (HEAT PUMP)
AHU-1 / AHU-2 (AIR HANDLING UNIT)
EF-1 / EF-2 (POWER EXHAUST FAN)

SPACE TEMPERATURE SETPOINTS:

OCCUPIED HEATING	68°F (ADJ)	UNOCCUPIED HEATING	63°F (ADJ)
OCCUPIED COOLING	75°F (ADJ)	UNOCCUPIED COOLING	80°F (ADJ)

- A LOCAL PROGRAMMABLE THERMOSTAT SHALL HAVE AN OCCUPANCY SCHEDULE CLOSELY MATCHING THE OWNER'S INTENDED FACILITY OPERATION.
 - OCCUPIED MODE SHALL BE PROGRAMMED TO INITIATE 2 HRS BEFORE OCCUPANCY (ADJ.)
 - UNOCCUPIED MODE SHALL BE PROGRAMMED TO INITIATE 2 HRS AFTER END OF OCCUPANCY (ADJ.)
- AHU-1+2HP-1+2 SHALL ENERGIZE AND STAGE HEATING/COOLING CAPACITY BASED ON CALLS FROM THE LOCAL THERMOSTAT FOR SPACE HEATING/COOLING.
- OCCUPIED MODE:**
 - OUTSIDE AIR DAMPER SHALL OPEN TO THE DCV MIN OA CFM SETTING.
 - SUPPLY FAN SHALL OPERATE CONTINUOUSLY.
 - HEAT PUMPS SHALL STAGE HEATING/COOLING AS REQUIRED TO MAINTAIN OCCUPIED SETPOINTS.
 - ECONOMIZER SHALL BE AVAILABLE.
 - DEMAND CONTROLLED VENTILATION SHALL BE AVAILABLE.
 - POWERED EXHAUST SHALL BE AVAILABLE.
 - SINGLE-ZONE VAV SHALL BE AVAILABLE.
- UNOCCUPIED MODE:**
 - OUTSIDE AIR SHALL BE REDUCED TO 0 DURING NORMAL OPERATION.
 - SUPPLY FANS AND HEAT PUMPS SHALL CYCLE AS REQUIRED TO MAINTAIN UNOCCUPIED SETPOINTS.
 - ECONOMIZER OPERATION SHALL BE AVAILABLE.
 - POWERED EXHAUST SHALL BE AVAILABLE.
 - SINGLE-ZONE VAV SHALL BE AVAILABLE.
- ECONOMIZER:**
 - AN OUTDOOR DRY BULB SENSOR SHALL DETERMINE OUTDOOR AIR SUITABILITY FOR COMPRESSOR-LESS COOLING, AND MODULATE THE OUTSIDE AIR DAMPER TO ADMIT ADDITIONAL OUTDOOR AIR.
 - ECONOMIZER CONTROLS SHALL LIMIT MIXED AIR TEMPERATURE TO MINIMUM 55°F DB.
 - AN ECONOMIZER FAULT DETECTION AND DIAGNOSTICS (FDD) SYSTEM SHALL PROVIDE WARNINGS/ALARMS FOR FAILURE TO INITIATE ECONOMIZER AND FALSE POSITIVE ECONOMIZER OPERATION.
- DEMAND CONTROL VENTILATION:**
 - SPACE SENSORS SHALL MONITOR INDOOR CO2 CONCENTRATION
 - WHEN THE SYSTEM IS OPERATING DURING HOURS OF EXPECTED OCCUPANCY, CONTROLS SHALL MAINTAIN SYSTEM VENTILATION RATES NO LESS THAN THE RATE LISTED IN THE VENTILATION SCHEDULE.
 - WHEN SPACE CO2 CONCENTRATION EXCEEDS 1000 PPM, THE OUTSIDE AIR MOTORIZED DAMPER SHALL MODULATE OPEN TO ADMIT ADDITIONAL OUTDOOR AIR.
 - DEMAND CONTROL VENTILATION SHALL NOT RESTRICT ECONOMIZER OPERATION.
- POWERED EXHAUST:**
 - A SPACE PRESSURE SENSOR SHALL BE PROVIDED WITHIN THE GYMNASIUM AT HALF BUILDING ELEVATION.
 - AN OUTDOOR PRESSURE SENSOR SHALL BE PROVIDED AT THE BUILDING EXTERIOR.
 - WHEN DIFFERENTIAL SPACE PRESSURE EXCEEDS 0.05 IN. WG, EXHAUST FAN DAMPERS SHALL FULLY OPEN.
 - ON DAMPER END SWITCH CONTACT, EF-1 AND EF-2 SHALL MODULATE FAN SPEED TO MAINTAIN SPACE PRESSURE, RELATIVE TO OUTDOORS.
- SINGLE-ZONE VAV:**
 - DURING PERIODS OF LOW COOLING LOAD, THE SUPPLY FAN SHALL STAGE/MODULATE TO A MINIMUM FAN SPEED.
 - SUPPLY FAN MODULATION SHALL NOT REDUCE AIRFLOW BELOW THE MINIMUM VENTILATION RATE.

SYSTEM 2:

- DSF-1 (DESTRATIFICATION FAN)
- FAN SHALL BE MANUALLY ENERGIZED AND CONTROLLED BY A LOCAL SPEED CONTROLLER.

VENTILATION SCHEDULE - CALIFORNIA ENERGY CODE 2019

SPACE DATA				OCCUPANCY LOAD		OUTDOOR AIR LOAD			DEMAND CONTROL VENTILATION		REMARKS
#	NAME	SPACE TYPE	AREA (A _z) [sqft]	# OF PEOPLE (P ₂)	AREA PER PERSON [sqft]	OUTDOOR AIR PER AREA (R _a) [CFM/SQFT]	OUTDOOR AIR PER PERSON (R _p) [CFM]	OUTDOOR AIRFLOW (V _{bz}) [CFM]	# CO2 Sensors 120.1(d)4A	MIN AIR RATE FOR DCV [CFM]	
100	GYMNASIUM	Gym, sports arena	4,804	160.1	30	0.5	15	2,402	1	721	ALL
101	STAGE	Stages, studios	780	26	30	0.5	15	390	1	117	ALL

REMARKS:

- DEMAND CONTROL VENTILATION REQUIRED (OCCUPANCY DENSITY EXCEEDS THRESHOLD, AIR ECONOMIZERS ARE INCLUDED IN SYSTEM DESIGN).

DESTRATIFICATION FAN SCHEDULE

TAG	#	MANUFACTURER	MODEL	WATTS	dB(A) 15 FT	ELECTRICAL DATA				WEIGHT [lbs]	REMARKS
						VOLT	PH	FLA	MOCP		
DSF	1	Arius	A-25-EC-STD-100-130	31	44	120 V	1	0.46 A	15 A	10	ALL
DSF	2	Arius	A-25-EC-STD-100-130	31	44	120 V	1	0.46 A	15 A	10	ALL
DSF	3	Arius	A-25-EC-STD-100-130	31	44	120 V	1	0.46 A	15 A	10	ALL

REMARKS:

- 1200 SQ. FT COVERAGE (25' CEILING REFERENCE)
- CORD AND PLUG CONNECTION.
- 0-10VDC EC MOTOR
- PROVIDE LOW-VOLTAGE WALL MOUNT SPEED CONTROLLER. LOW-VOLTAGE CONTROL WIRING DAISY CHAINED FROM FANS TO CONTROLLER.
- PROVIDE BLACK ABS HOUSING.
- THREADED ROD MECHANICAL ATTACHMENT TO STRUCTURE.

HVAC LEGEND

DUCT, ROUND OR RECTANGULAR (AS NOTED PER PLANS)

DUCT, ROUND OR RECTANGULAR (AS NOTED PER PLANS)

VOLUME DAMPER

DUCT, INTERNALLY INSULATED (ROUND OR RECTANGULAR)

DUCT, INTERNALLY INSULATED (ROUND OR RECTANGULAR)

FLEXIBLE DUCT/EQUIPMENT CONNECTION

FLEXIBLE DUCTWORK

TURNING VANES IN RECTANGULAR DUCTWORK

AIR OUTLET/INLET CALL-OUT (SEE AIR OUTLET SCHEDULE FOR TYPE)

DUCTWORK CROSS SECTION

SUPPLY DIFFUSER OUTLET (CEILING)

RETURN GRILLE INLET (CEILING)

EXHAUST GRILLE INLET (CEILING)

THERMOSTAT/HUMIDISTAT/SENSOR

DETAIL REFERENCE

EQUIPMENT TAG

AIR OUTLET TAG

U.S. GREEN BUILDING COUNCIL LOGO (PRODUCT APPROVED FOR LEEDS CREDIT)

RECYCLING LOGO (PRODUCT CONTAINS RECYCLED MATERIAL)

FIRE/SMOKE DAMPER (FD FIRE-ONLY, SD SMOKE-ONLY)

LOW LEAKAGE OPPOSED BLADE MOTORIZED DAMPER

SUPPLY DIFFUSER OUTLET (CEILING)

CFM INDICATES MINIMUM UNIT OA QUANTITY IN A FULL ECONOMIZER CAPABLE SYSTEM

POINT OF CONNECTION

DUCT SMOKE DETECTOR

HVAC SERVICE NOTES

PERFORM FULL SERVICE DIAGNOSTIC CHECK, INCLUDING BUT NOT LIMITED TO:

- TIGHTEN ELECTRICAL CONNECTIONS TO ORIGINAL EQUIPMENT MINIMUM REQUIREMENTS.
- CHECK AIRFLOW, REFRIGERANT LEVEL, CURRENT (AMP.) DRAW.
- CLEAN EVAPORATOR AND CONDENSER COILS.
- INSPECT INDOOR FAN COIL DRAIN PAN AND DRAIN LINES.
- CLEAN FAN BLADES AND CHECK FOR DUCT LEAKS.
- CHECK AND VERIFY ECONOMIZER OPERATION.
- PROGRAM THERMOSTATS TO OWNER SETPOINT AND TIME REQUIREMENTS.
- LUBRICATE ALL MOVING PARTS PER MANUFACTURER'S RECOMMENDATIONS.
- CHECK AND ENSURE REFRIGERANT LEVEL AND CHARGE ARE WITHIN THE MANUFACTURER'S OPERATIONAL GUIDELINES.
- DYNAMICALLY BALANCE BLOWER MOTOR.

REPORT ANY DEFICIENCIES TO OWNER. **SUBMIT TO MEOR.**

AIR HANDLING UNIT SCHEDULE

TAG	#	MANUFACTURER	MODEL	DCV MIN OA CFM	O/A CFM	SUPPLY FAN			COOLING		HEATING		EFFICIENCIES			ELECTRICAL DATA					WEIGHT [lbs]	REMARKS
						CFM	ESP	BHP	TOTAL [BTU/H]	SENSIBLE [BTU/H]	BTU/H	DEFROST KW	EER	IEER	COP 47F	VOLT	PH	FLA	MCA	MOCP		
AHU	1	Carrier	40RUQ12	335	1,120	4,000	1.00	2.64	116,800	94,600	104,000	4.6 kW	11	13.8	3.3	480 V	3	5.3 A	13.6 A	15 A	450	ALL
AHU	2	Carrier	40RUQ16	505	1,680	6,000	1.00	3.26	184,400	150,700	170,000	9.2 kW	10.6	12.5	3.4	460 V	3	4.9 A	21.2 A	25 A	750	ALL

REMARKS:

- SINGLE-CIRCUIT, TWO COMPRESSOR OPTION.
- HONEYWELL W7220 CONTROLLER FOR ECONOMIZER CONTROL, FAULT DETECTION, AND DIAGNOSTICS.
- 120V UV-C GERMICIDAL LIGHT
- GPS NEEDLE POINT BI-POLAR ION GENERATOR (24V, 4.3W), PROVIDE 1 GENERATOR FOR 1800 CFM SUPPLY AIR, PROVIDE STEPDOWN TRANSFORMER.
- 2" FILTER RACK AT RETURN CONNECTION WITH MERV13 FILTERS. PROVIDE ADDITIONAL 2 FILTER SETS TO OWNERS REPRESENTATIVE.
- DUCT SMOKE DETECTOR PER 2019 CMC 608.1.
- DISCONNECT SWITCH

HEAT PUMP UNIT SCHEDULE

TAG	#	MANUFACTURER	MODEL	COOLING PERFORMANCE			HEATING PERFORMANCE			ELECTRICAL					WEIGHT [lbs]	REMARKS
				TOTAL [BTUH]	SENSIBLE [BTUH]	EER	TOTAL @ 47 [BTUH]	INTEGRATED @ 17F [BTUH]	COP @ 47F	VOLT	PH	FLA	MCA	MOCP		
HP	1	Carrier	38AUQ012	116,800	94,600	11	104,000	59,700	3.3	480 V	3	0.8 A	19 A	25 A	600	ALL
HP	2	Carrier	38AUQ016	184,400	150,700	10.6	170,000	101,000	3.4	480 V	3	0.8 A	29.9 A	40 A	800	ALL

REMARKS:

- REFER TO MANUFACTURER'S IOM FOR LINESET SIZING AND INSTALLATION REQUIREMENTS.
- PROVIDE LOCKING-TYPE REFRIGERANT ACCESS CAPS FOR TAMPER RESISTANCE.
- DISCONNECT IN NEMA-4X HOUSING MOUNTED ADJACENT TO UNIT.
- R-410A REFRIGERANT (PURCH)

EXHAUST FAN SCHEDULE

TAG	#	MANUFACTURER	MODEL	MIN CFM	CFM	ESP [in.w.c.]	RPM	HP	SONES	ELECTRICAL DATA		WEIGHT [lbs]	REMARKS
										V	PH		
EF	1	GREENHECK	CUE-161-VG	1,600	4,750	0.15	1685	1.71 hp	28	460 V	3	75	ALL
EF	2	GREENHECK	CUE-161-VG	1,600	4,750	0.15	1685	1.71 hp	28	460 V	3	75	ALL

REMARKS:

- UL-705 LISTED
- VARI-GREEN CONTROL - CONSTANT PRESSURE - ROOM STATIC PROBES
- PROVIDE NEMA-3R ENCLOSURE FOR OUTDOOR CONTROL BOX
- SIDEWALL MOUNTING
- WD-330 MOTORIZED DAMPER ASSEMBLY WITH 24VAC ACTUATOR AND END SWITCH.
- DISCONNECT SWITCH

ABBREVIATIONS

NOT ALL ABBREVIATIONS LISTED HEREIN APPEAR ON THE DRAWINGS.

(N) NEW	IW INDIRECT WASTE
(E) EXISTING	K KILOGRAMS
AD ACCESS DOOR	LAT LEAVING AIR TEMPERATURE
AFC ABOVE FINISHED CEILING	LBS POUNDS
ATF ABOVE FINISHED FLOOR	LWT LEAVING WATER TEMPERATURE
AFG ABOVE FINISHED GRADE	MAT MIXED AIR TEMPERATURE
AHJ AUTHORITY HAVING JURISDICTION	MAX MAXIMUM MBH BTU/H, THOUSANDS
AL ACOUSTICALLY LINED	MCA MINIMUM CIRCUIT AMPERES
ALM ALUMINUM	MFR MANUFACTURER
AP ACCESS PANEL	MIN MINIMUM
APSI ABSOLUTE PRESSURE	MOCP MAXIMUM OVERCURRENT
ATR ALL THREAD ROD	NOP PROTECTION
BDD BACKDRAFT DAMPER	NA NOT APPLICABLE
BF BELOW FLOOR	NC NORMALLY CLOSED
BG BELOW GRADE	NIC NOT IN CONTRACT
BHP BRAKE HORSEPOWER	NO NORMALLY OPEN
BLKS BLOCKING	OA OUTSIDE AIR
BO BY OTHERS	OC ON CENTER
BTU BRITISH THERMAL UNITS	OD OVERFLOW DRAIN
BTUH BRITISH THERMAL UNITS PER HOUR	OP OWNER PROVIDED
BY BALL VALVE	PH PRE-HEAT
CD CONDENSATE DRAIN PIPING	PCO POINT OF CONNECTION
CF CAPPED FOR FUTURE	PRTY PRESSURE/TEMPERATURE RELIEF
CFH CUBIC FEET PER HOUR	VALVE
CFM CUBIC FEET PER MINUTE	PRV PRESSURE RELIEF VALVE
CHWR CHILLED WATER RETURN	PSI GAUGE PRESSURE (POUNDS PER SQUARE INCH)
CK CHECK VALVE	PTDF PRESSURE TREATED DOUGLAS FIR
COTG CLEANOUT TO GRADE	RA RETURN AIR RD ROOF DRAIN
CTE CONNECT TO EXISTING	RVD RELIEF VALVE DISCHARGE
CV CONSTANT VOLUME	RL REFRIGERANT LIQUID PIPING
CW DOMESTIC COLD WATER	RBP REDUCED PRESSURE BACKFLOW PREVENTER
CWB COMBINATION WASTE & VENT	RPM REVOLUTIONS PER MINUTE
DB DRY BULB TEMPERATURE	RS REFRIGERANT SUCTION PIPING
DH DUCT HEATER	RWL RAINWATER LEADER
DIA DIAMETER	S SENSOR
DN DOWN	SA SHOCK ABSORBER
DWV DRAIN, WASTE, AND VENT	SA SUPPLY AIR
EA EXHAUST AIR	SAD SEE ARCHITECTURAL DRAWINGS
EAT ENTERING AIR TEMPERATURE	SCD SEE CIVIL DRAWINGS
EC ELECTRICAL CONTRACTOR	SD STORM DRAIN
ECM ELECTRONIC COMMUTATED MOTOR	SD SMOKE DETECTOR
EDH ELECTRIC DUCT HEATER	SED SEE ELECTRICAL DRAWINGS
EFF EFFICIENCY	SEER SEASONAL ENERGY EFFICIENCY RATIO
ESP EXTERNAL STATIC PRESSURE	SHGF SOLAR HEAT GAIN FACTOR
EWT ENTERING WATER TEMPERATURE	SHR SENSIBLE HEAT RATIO
F DEGREES FAHRENHEIT	SHD SEE MECHANICAL DRAWINGS
FBO FURNISHED BY OTHERS	SMS SHEET METAL SCREW
FC FLEXIBLE CONNECTION	SOV SHUT OFF VALVE
FCO FLOOR CLEANOUT	SP SPRINKLER
FD FLOOR DRAIN	SP STATIC PRESSURE
FD FIRE DAMPER	SPD SEE PLUMBING DRAWINGS
FLA FULL LOAD AMPERES	SOFT SQUARE FEET
FS FLOOR SINK	SS SANITARY SEWER
FSD COMBINATION FIRE/SMOKE DAMPER	SSE SEE STRUCTURAL DRAWINGS
FFM FEET PER MINUTE	SS THERMOSTAT
FT FEET	TH THERMOMETER
FT2 SQUARE FEET	TPV TRAP PRIMER VALVE
G GAS PIPING	TSP TOTAL STATIC PRESSURE
GC GAS COOK	TYP TYPICAL
GC GENERAL CONTRACTOR	U UNION
GPF GALLONS PER FLUSH	UG UNDERGROUND
GPM GALLONS PER MINUTE	UN UNLESS OTHERWISE NOTED
GSMS GALVANIZED SHEET METAL SCREW	V VENT PIPING
GV GATE VALVE	VAV VARIABLE AIR VOLUME
GW GREASE WASTE	VD VOLUME DAMPER
HB HOSE BIBB	VFD VARIABLE FREQUENCY DRIVE
HHWR HEATING HOT WATER RETURN	VIF VERIFY IN FIELD
HR HEAT RECOVERY	VPH VOLTS/PHASE/HERTZ
HWS HEATING HOT WATER SUPPLY	VSD VARIABLE SPEED DRIVE
HP HORSEPOWER	VTR VENT THROUGH ROOF
HW DOMESTIC HOT WATER	W WITH
HX HEAT EXCHANGER	W/O WITHOUT
IFC IN FURRED CEILING	WA WATER HAMMER ARRESTOR
IN INCH	WB WET BULB TEMPERATURE
INS INCHES	WC WATER COLUMN
INS INSULATION	WCO WALL CLEANOUT
IS IN SOFFIT	WT WEIGHT
IS ISSUE	

CALGREEN NOTES

- HVAC SYSTEM INSTALLERS SHALL BE TRAINED AND CERTIFIED IN THE PROPER INSTALLATION OF HVAC SYSTEMS.
- PROVIDE DOCUMENTATION TO SHOW COMPLIANCE WITH CONSTRUCTION DOCUMENTS, PLANS, INSTALLER CERTIFICATIONS, INSPECTION REPORTS, TO DEMONSTRATE SUBSTANTIAL CONFORMANCE. WHEN SPECIFIC DOCUMENTATION OR SPECIAL INSPECTION IS NECESSARY TO VERIFY COMPLIANCE, THAT METHOD OF COMPLIANCE WILL BE SPECIFIED IN THE APPROPRIATE SECTION OR IDENTIFIED IN THE APPLICATION CHECKLIST.
- AABC COMPLIANCE: COMPLY WITH AABC'S MANUAL MN-1 "AABC NATIONAL STANDARDS", AS APPLICABLE TO MECHANICAL AIR DISTRIBUTION SYSTEMS AND ASSOCIATED EQUIPMENT AND APPARATUS, EXCEPT AS OTHERWISE SPECIFIED. DEVELOP A WRITTEN PLAN OF PROCEDURES TO BE INCLUDED FOR TESTING AND BALANCING. SUBMIT CERTIFIED TEST REPORTS SIGNED BY THE TEST AND BALANCE SUPERVISOR WHO PERFORMED TESTING AND BALANCING WORK. PROVIDE A COPY OF THE FINAL TEST REPORT TO THE ENFORCING AGENCY.
- PROVIDE VENTILATION DURING CONSTRUCTION THRU OPENINGS IN THE BUILDING SHELL USING TEMPORARY FANS TO PRODUCE A MINIMUM OF 3 AIR CHANGES PER HOUR. DO NOT USE THE PERMANENT HVAC EQUIPMENT FOR THIS PURPOSE.
- COVER ALL DUCT OPENINGS WITH SHEET METAL OR PLASTIC DURING CONSTRUCTION TO REDUCE DUST AND DEBRIS IN DUCTWORK.
- ALL AIR FILTERS SHALL BE MINIMUM MERV 13. A HIGHER MERV RATING MAY BE REQUIRED ON SCHEDULES OR SPECIFICATIONS.
- NO HVAC REFRIGERANT SYSTEMS USING HYDROCHLOROFLUOROCARBONS SHALL BE USED ON THE PROJECT.
- PROVIDE THE BUILDING OWNER WITH DETAILED OPERATION AND MAINTENANCE INSTRUCTIONS AND COPIES OF GUARANTEES/WARRANTIES FOR EACH SYSTEM PRIOR TO FINAL INSPECTION.

EQUIPMENT ANCHORAGE NOTES

MEP COMPONENT ANCHORAGE NOTE

ALL MECHANICAL, PLUMBING, AND ELECTRICAL COMPONENTS SHALL BE ANCHORED AND INSTALLED PER THE DETAILS ON THE APPROVED CONSTRUCTION DOCUMENTS. WHERE NO DETAIL IS INDICATED, THE FOLLOWING COMPONENTS SHALL BE ANCHORED OR BRACED TO MEET THE FORCE AND DISPLACEMENT REQUIREMENTS PRESCRIBED IN THE 2019 CBC, SECTIONS 1615A, 1.12 THROUGH 1.22 AND ASCE 7-10 CHAPTER 6 AND 13.

- ALL PERMANENT EQUIPMENT AND COMPONENTS
- TEMPORARY OR MOVABLE EQUIPMENT THAT IS PERMANENTLY ATTACHED (E.G. HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRICITY, GAS, OR WATER.
- MOVABLE EQUIPMENT WHICH IS STATIONED IN ONE PLACE FOR MORE THAN 8 HOURS AND HEAVIER THAN 400 POUNDS ARE REQUIRED TO BE ANCHORED WITH TEMPORARY ATTACHMENTS.

THE ATTACHMENT OF THE FOLLOWING MECHANICAL AND ELECTRICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE STRUCTURE, BUT NEED NOT BE DETAILED ON THE PLANS. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT.

- COMPONENTS WEIGHING LESS THAN 400 POUNDS AND HAVE A CENTER MASS LOCATED 4 FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT.
- COMPONENTS WEIGHING LESS THAN 20 POUNDS, OR IN THE CASE OF DISTRIBUTED SYSTEMS, LESS THAN 5 POUNDS PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR HUNG FROM A WALL.

FOR THOSE ELEMENTS THAT DO NOT REQUIRE DETAILS ON THE APPROVED DRAWINGS, THE INSTALLATION SHALL BE SUBJECT TO THE APPROVAL OF THE STRUCTURAL ENGINEER OF RECORD.

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEM BRACING NOTES

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO COMPLY WITH THE FORCES AND DISPLACEMENTS PRESCRIBED IN ASCE 7-10 SECTION 13.3 AS DEFINED IN ASCE 7-10 SECTION 13.6.8, 13.6.7, 13.6.5.6, AND 2019 CBC, SECTION 1616.

THE BRACING ATTACHMENTS TO THE STRUCTURE SHALL BE DETAILED ON THE APPROVED DRAWINGS OR THEY SHALL COMPLY WITH ONE OF THE PRE-APPROVALS (OPA #) AS MODIFIED TO SATISFY ANCHORAGE REQUIREMENTS OF ACI 318, APPENDIX D.

COPIES OF THE MANUAL SHALL BE AVAILABLE ON THE JOBSITE PRIOR TO THE START OF HANGING AND BRACINGS OF THE PIPE, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS.

THE STRUCTURAL ENGINEER OF RECORD SHALL VERIFY THE ADEQUACY OF THE STRUCTURE TO SUPPORT THE HANGER AND BRACE LOADS.

HVAC GENERAL NOTES

- DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO BE USED AS A GUIDE FOR THE INSTALLATION OF A COMPLETE MECHANICAL SYSTEM. CONTRACTOR SHALL AMEND ALL INFORMATION AS REQUIRED AS SITE CONDITIONS WARRANT.
- WHERE INDICATED BY **"SUBMIT TO MEOR"**, PROVIDE DETAILED SUBMITTALS FOR REVIEW BY MECHANICAL ENGINEER OF RECORD. ALL DRAWINGS SHALL BE IN 1/4"= 1'-0" SCALE AND ELECTRONIC. ALL SUBMITTALS SHALL BE ELECTRONIC.
- PROVIDE ALL EQUIPMENT AND LABOR NECESSARY FOR THE COMPLETE AND WORKABLE INSTALLATION OF ALL SPECIFIED AND OWNER SUPPLIED EQUIPMENT AND FIXTURES.
- ALL WORK SHALL BE PERFORMED IN FULL ACCORDANCE WITH ALL APPLICABLE CODES AND ORDINANCES.
- ALL DAMPERS INSTALLED OVER AREAS WITH HARD CEILINGS SHALL BE PROVIDED WITH EITHER REMOTE OPERATORS OR ACCESS PANELS.
- COORDINATE LOCATION OF ALL ACCESS PANELS WITH ARCHITECTURAL PLANS.
- DO NOT CUT ANY STRUCTURAL MEMBERS OR STUDS WITHOUT PROPER COORDINATION WITH GENERAL CONTRACTOR AND STRUCTURAL DRAWINGS.
- ALL DUCTWORK SHALL BE RUN PERPENDICULAR TO STRUCTURE UNLESS OTHERWISE NOTED.
- DUCTWORK SHALL AVOID ARCHITECTURAL OPENINGS AND SHALL BE RUN CONCEALED UNLESS OTHERWISE NOTED.
- ALL DUCT SIZES SHOWN REPRESENT CLEAR INSIDE DIMENSIONS UNLESS OTHERWISE NOTED. WHERE DUCT LINING OCCURS, INCREASE DUCT SIZE INDICATED TO SUIT.
- CONTRACTOR SHALL VISIT SITE, AND FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO BID. ANY DISCREPANCIES BETWEEN CONTRACT DOCUMENTS AND ACTUAL CONDITIONS SHALL BE SUBMITTED IN WRITING TO THE OWNER'S REPRESENTATIVE PRIOR TO BID.
- ROOF MOUNTED DUCTWORK SHALL BE SLOPED TO SHED WATER.
- ALL EQUIPMENT INSTALLED WITH SEISMIC VIBRATION ISOLATORS SHALL HAVE A MINIMUM 2" STATIC DEFLECTION.
- REFRIGERANT PIPING SHALL BE SIZED AS RECOMMENDED BY THE MANUFACTURER.
- PROVIDE COMBINATION FIRE/SMOKE DAMPERS AT ALL PENETRATIONS THROUGH FIRE RATED SHAFTS AND SEPARATIONS PER CALIFORNIA STATE FIRE MARSHAL REQUIREMENTS.
- THE DRAWINGS REPRESENT THE DIAGRAMMATIC GRAPHICAL REPRESENTATION OF THE SCOPE OF WORK AND SHOULD NOT BE USED SOLELY TO DETERMINE SCOPE. CONTRACTORS SHALL BID THE ENTIRE SET OF CONTRACT DOCUMENTS INCLUDING CROSS DISCIPLINE INFORMATION AND WRITTEN SPECIFICATIONS. ALL BIDS BASED UPON DRAWING INFORMATION ONLY CAN BE ASSUMED TO BE INCOMPLETE AND INCONCLUSIVE TO DETERMINE ENTIRE SCOPE OF WORK.
- CONTRACTOR SHALL VERIFY VOLTAGES AND ALL OTHER ELECTRICAL CHARACTERISTICS WITH ELECTRICAL PRIOR TO ORDERING EQUIPMENT.
- DESIGN AND EQUIPMENT PERFORMANCES ARE BASED ON THE EQUIPMENT SCHEDULED AND SPECIFIED HEREIN. ANY ALTERATIONS OR SUBSTITUTIONS OF ANY EQUIPMENT SHALL BE SUBMITTED, REVIEWED AND APPROVED BY THE ENGINEER OF RECORD PRIOR TO ORDERING OF EQUIPMENT.
- PROVIDE LINE OR LOW VOLTAGE POWER WIRING FOR ALL CONTROLS. COORDINATE CONTROL SYSTEM POWER REQUIREMENTS WITH ELECTRICAL CONTRACTOR INCLUDING DAMPER MOTORS, CONTROL PANELS AND ALL DEVICES REQUIRING POWER. ALL WIRING AND COMPONENTS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE CALIFORNIA ELECTRICAL CODE LATEST EDITION.
- COORDINATE FINAL ELECTRICAL AMPERAGES AND VOLTAGES WITH ELECTRICAL CONTRACTOR PRIOR TO ORDERING EQUIPMENT.
- FACTORY-MADE FLEXIBLE AIR DUCTS AND CONNECTORS SHALL BE NOT MORE THAN 5 FEET IN LENGTH AND SHALL NOT BE USED IN LIEU OF RIGID ELBOWS OR FITTINGS, PER 2019 CMC 603.4.1.
- CALIFORNIA ENERGY CODE ACCEPTANCE TESTING: THE CALIFORNIA ENERGY CODE REQUIRES ACCEPTANCE TESTING ON MECHANICAL SYSTEMS. THE REQUIRED TESTS ARE INDICATED ON THE TITLE 24 DOCUMENTATION FORMS. ACCEPTANCE TESTING SHALL BE PERFORMED BY A CALIFORNIA CERTIFIED ACCEPTANCE TEST TECHNICIAN. ANY TESTS THAT DO NOT PASS SHALL BE SUBMITTED TO THE ARCHITECT AND ENGINEER FOR REVIEW. ALL NOTED ACCEPTANCE TESTING MUST BE PERFORMED PRIOR TO BENEFICIAL OCCUPANCY. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ACCEPTANCE TESTING AND SUBMIT COMPLETED ACCEPTANCE TEST FORMS TO THE AUTHORITY HAVING JURISDICTION.
- DRAWINGS, SPECIFICATIONS, NOTES AND CALCULATIONS ARE FOR PERMIT SUBMITTAL ONLY TO THE AUTHORITY HAVING JURISDICTION. PLANS ARE NOT INTENDED FOR CONSTRUCTION, BIDDING AND/OR ESTIMATING UNTIL STAMPED AND SIGNED BY A LICENSED MECHANICAL ENGINEER AND THIS NOTE IS REMOVED FROM THE DRAWINGS.
- PROVIDE ALL CONTROL WIRING AND DEVICES AS REQUIRED FOR A COMPLETE AND WORKABLE SYSTEM. ALL WIRING AND DEVICES SHALL BE IN STRICT ACCORDANCE WITH THE CALIFORNIA ELECTRICAL CODE. COORDINATE POWER REQUIREMENTS WITH ELECTRICAL SUBCONTRACTOR.

DOCUMENT LIST

CONTRACTOR SHALL REVIEW ENTIRE CONSTRUCTION SET, INCLUDING, BUT NOT LIMITED TO ALL SPECIFICATIONS, DRAWINGS, PROJECT MANUAL, CALCULATIONS AND OUT-SHEETS. ADDITIONAL LIST OF DOCUMENTS AND DRAWINGS CONTAINED HEREIN, INCLUDE:

- M0.01 HVAC NOTES, LEGENDS, & ABBREVIATIONS
- M0.02 HVAC SPECIFICATIONS
- M0.03 HVAC SPECIFICATIONS
- M0.04 HVAC SPECIFICATIONS
- M1.01 DEMO FLOOR PLAN - HVAC
- M1.02 FLOOR PLAN - HVAC
- M3.01 HVAC DETAILS

15000 inc.

heating, ventilation, air conditioning • plumbing design and engineering

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MATTHEW J. TORRES

MECHANICAL

STATE OF CALIFORNIA

Exp 3/30/20

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CLIENT

PROJECT TITLE

APPROVALS

DRAWING TITLE

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WATERFORD UNIFIED SCHOOL DISTRICT

219 N. REINWAY AVE, #2 WATERFORD, CA 95386

WATERFORD JUNIOR HS GYMNASIUM MODERNIZATION

12916 BENTLY STREET WATERFORD, CA 95386

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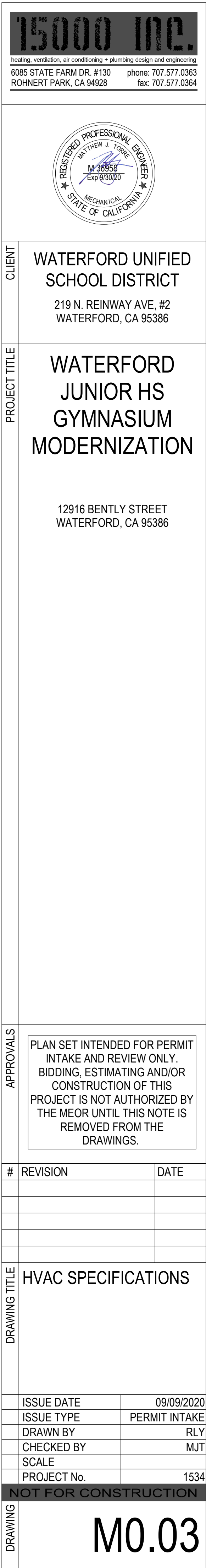
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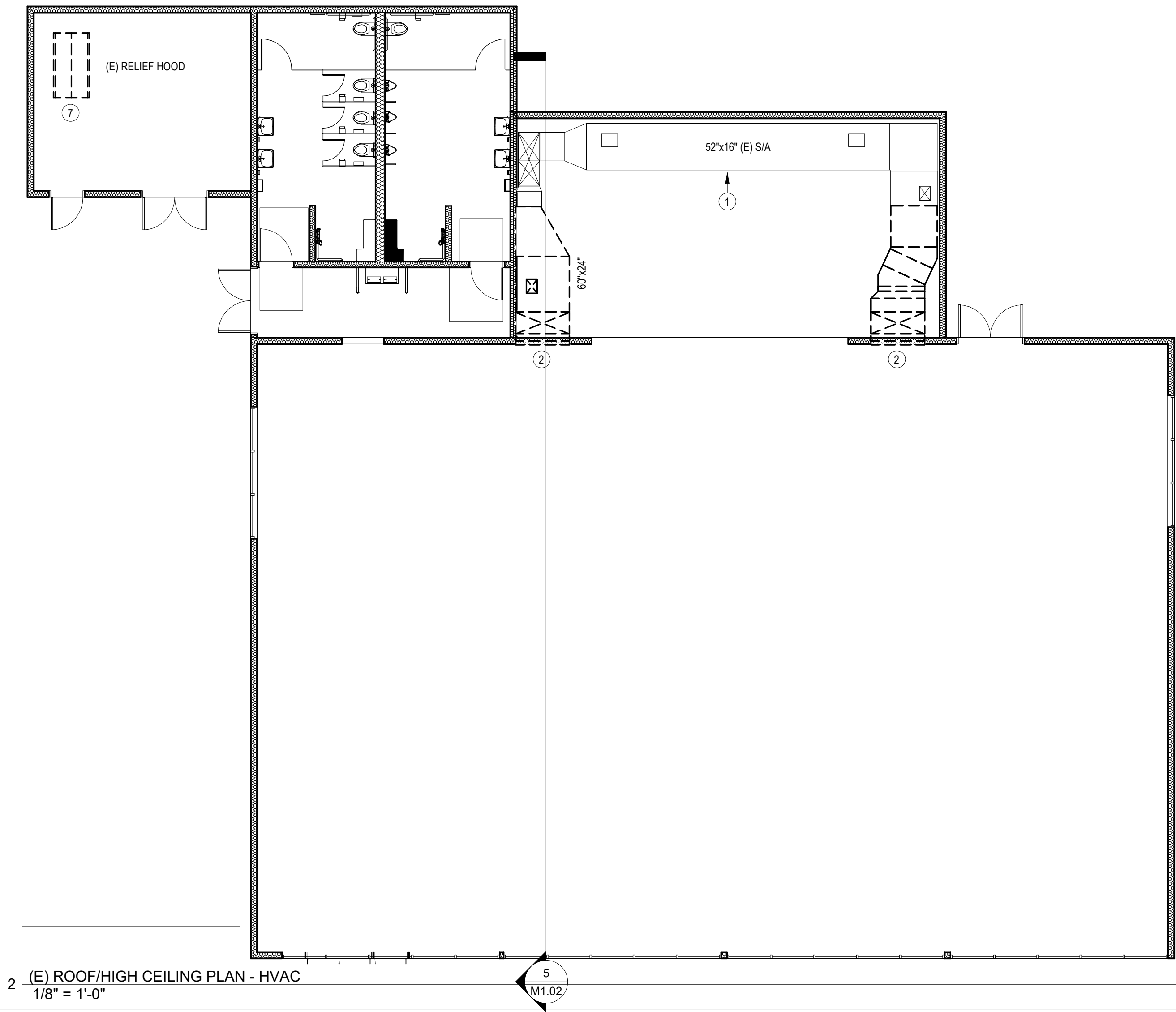
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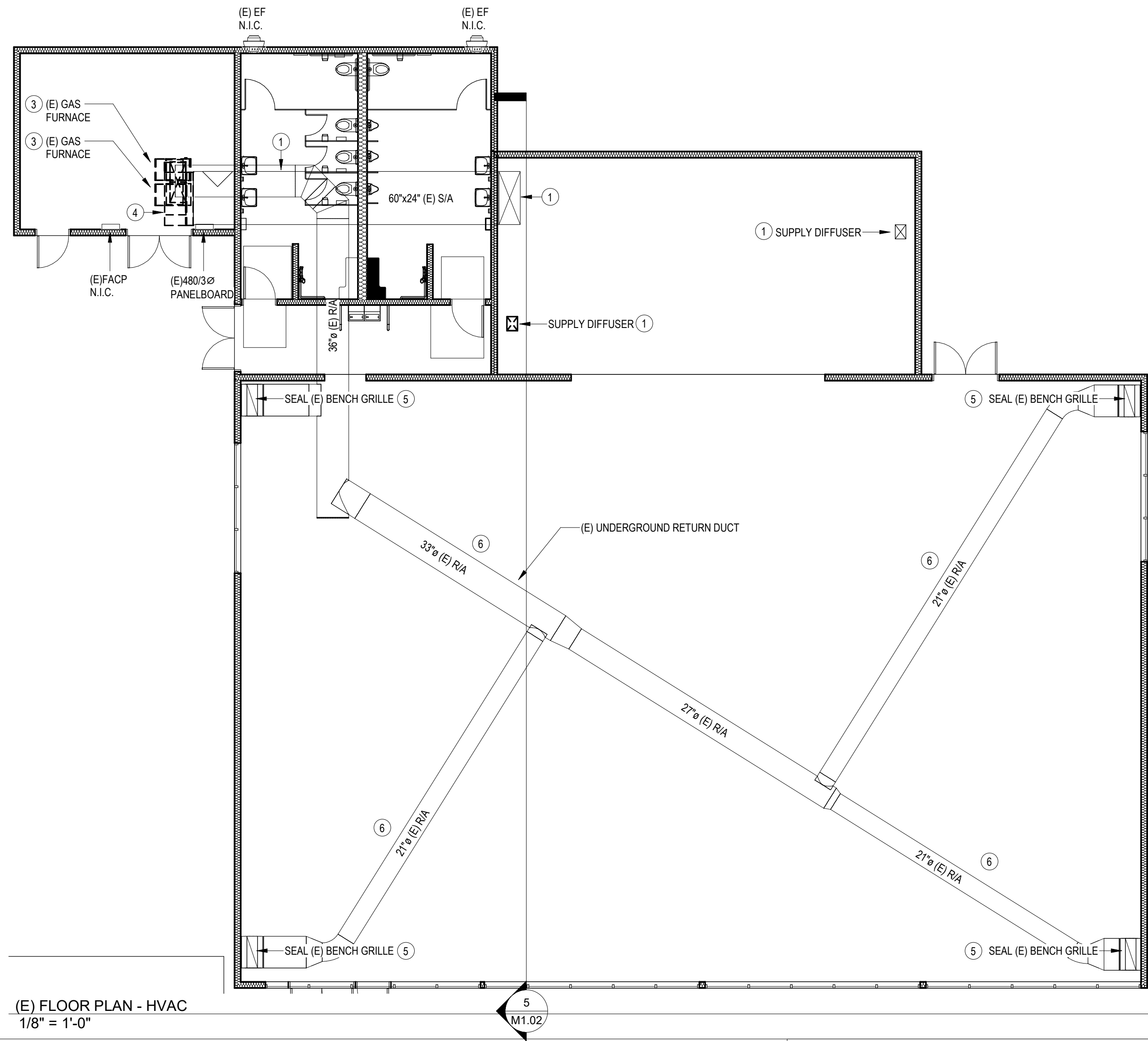
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	<div>238000 - HVAC EQUIPMENT</div> <div><div>PART 1 - GENERAL</div><div>1.01DESCRIPTION</div><div>AThis Section covers the furnishing and installation of Heating, Ventilating and Air Conditioning (HVAC) equipment as indicated on the contract drawings, schedules and as specified herein.</div><div>1.02SUBMITTALS</div><div>AManufacturer's literature and data:<div>1.Sufficient information, including capacities, pressure drops and piping connections clearly presented, shall be included to determine compliance with drawings and specifications for units noted below:<div>a.Unitary air conditioners.</div></div><div>2.Split systems</div><div>3.Unit Dimensions required clearances, operating weights accessories and start-up instructions.</div><div>4.Electrical requirements, wiring diagrams, interlocking and control wiring showing factory installed and portions to be field installed.</div><div>5.Mounting and flashing of the roof curb to the roofing structure with coordinating requirements for the roof membrane system.</div></div><div>BOperating and Maintenance Manual: Submit three copies of Operating and Maintenance manual to Resident Engineer three weeks prior to final inspection.</div><div>PART 2 - PRODUCTS</div><div>2.01EQUIPMENT - REFER TO SCHEDULES.</div><div>PART 3 - EXECUTION</div><div>3.01INSTALLATION</div><div>A.Roof Curb: Install where indicated on the Drawings, level and secure, according to ARI Guideline B. Secure rooftop units to upper curb rail, and secure curb base to roof framing or concrete base with anchor bolts.</div><div>B.Rooftop Unit Support: Install unit level on structural curbs, unless otherwise indicated on the Drawings. Coordinate wall penetrations and flashing with wall construction. Secure rooftop units to structural support with anchor bolts.</div><div>C.Install units level and plumb maintaining manufacturer's recommended clearances and tolerances.</div><div>D.Install ground-mounting, compressor-condenser components on 4-inch thick, reinforced concrete base; 4 inches larger on each side than unit.</div><div>E.Install seismic restraints.</div><div>F.Install and connect pre-charged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.</div><div>G.Install wall sleeves in finished wall assembly and weatherproof. Install and anchor wall sleeves to withstand, without damage seismic forces as required by code.</div><div>3.02CONNECTIONS</div><div>A.Verify condensate drainage requirements.</div><div>B.Install condensate drain, minimum connection size, with trap and indirect connection to nearest roof drain or area drain or as indicated on the Drawings.</div><div>C.Install ducts to termination at top of roof curb. Cut roof decking only as required for passage of ducts. Do not cut out decking under entire roof curb.</div><div>D.Connect refrigerant piping to coils with shutoff valves on the suction and liquid lines at the coil and a union or flange at each connection at the coil and condenser.</div><div>E.Install ducts to the units with flexible duct connections.</div><div>END OF SECTION</div></div>	<div>233716 - FABRIC AIR DISTRIBUTION</div> <div><div>PART 1- GENERAL</div><div>1.1DESCRIPTION OF WORK:<div>A.Extent of non-metal ductwork is indicated on drawings and by requirements of this section.</div><div>B.Types of non-metal ductwork required for this project include the following:<div>a.Textile Air Dispersion Products.</div></div></div><div>1.2QUALITY ASSURANCE:<div>A.Building Codes and Standards:</div><div>B.Product must be Classified by Underwriter's Laboratories in accordance with the 25/50 flame spread / smoke developed requirements of NFPA 90-A and UL 2518. Also Classified by UL-C (Canada) S102.2, BS 5867 Part 2, 1980, GB8624-2006.</div><div>C.All product sections must be labeled with the logo and classification marking of Underwriter's Laboratories.</div><div>D.Design & Quality Control</div><div>E.Manufacturer must have documented design support information including duct sizing; vent, orifice, and/or nozzle location; vent, orifice, and/or nozzle sizing; length; and suspension. Parameters for design, including maximum air temperature, velocity, pressure and textile permeability, shall be considered and documented.</div></div><div>1.3WARRANTY:<div>A.Manufacturer must provide a 15 Year Product Warranty for products supplied for the fabric portion of this system as well as a Design and Performance Warranty.</div></div><div>1.4DELIVERY, STORAGE AND HANDLING:<div>A.Protect textile air dispersion system and internal suspension components from damage during shipping, storage, and handling.</div><div>B.Where possible, store products inside and protect from weather. Where necessary to store outside, store above grade and enclose with a vented waterproof wrapping.</div></div><div>PART 2 - PRODUCTS</div><div>2.1TEXTILE AIR DISPERSION SYSTEM:<div>A.Air diffusers shall be constructed with internal tensioning frame.</div><div>B.System shall cylindrically tension textile along the entire length of textile duct, including all fittings(crosses, elbows, reducers and tees).</div><div>C.Tensioning system shall include full 360 degree tensioning and intermediate rings with quick connection spacer tubes concealed inside the fabric system.</div><div>D.Interior structure to include multiple mechanically adjustable tension devices. To provide proper textile tensioning, structural and textile system shall be configured in segments of no more than 45 feet.</div><div>E.Textile components supported solely by metal cylindrical rings.<div>a.Vertical supports are Galvanized steel with available lengths of 5'(standard), 10', 15', & 30'.</div></div><div>G.Available for diameters from 8" – 84".</div></div><div>H.TEXTILE<div>a.Textile Construction: Filament/filament twill polyester, fire retardant in accordance with UL 2518.</div><div>b.Air Permeability: 2 (+/-1) CFM/ft2 per ASTM D737, Frazier</div><div>c.Weight: 6.8 oz./yd2 per ASTM D3776</div><div>d.Warranty: 15 years with standard inlet velocity.</div></div><div>I.TEXTILE SYSTEM FABRICATION REQUIREMENTS:<div>a.Textile system to be constructed in modular lengths (zippered) with proper radial securing clips (inlets, endcaps, and mid-sections) and top access zippers for vertical cable safety attachment.</div><div>b.Integrated air dispersion shall be specified and approved by manufacturer.<div>1.Linear Vents<div>A.Air dispersion accomplished by linear vent and permeable fabric. Linear vents must be sized in 1 CFM per linear foot increments (based on .5" SP), starting a 1 CFM through 90 CFM per linear foot. Linear vent is to consist of an array of open orifices rather than a mesh style vent to reduce maintenance requirements of mesh style vents. Linear vents should also be designed to minimize dusting on fabric surface.</div></div><div>B.Size of vent openings and location of linear vents to be specified and approved by manufacturer.</div></div><div>c.Inlet connection to metal duct via fabric draw band with anchor patches as supplied by manufacturer. Anchor patches to be secured to metal duct via .zip screw fastener – supplied by contractor.</div><div>d.Inlet connection includes zipper for easy removal / maintenance.</div><div>e.Lengths to include required intermediate zippers as specified by manufacturer.</div><div>f.System to include Adjustable Flow Devices to balance turbulence, airflow and distribution as needed. Flow restriction device shall include ability to adjust the airflow resistance from 0.06 – 0.60 in w.g. static pressure.</div><div>g.End cap includes zipper for easy maintenance.</div><div>h.Each section of the textile shall include identification labels documenting order number, section diameter, section length, piece number, code certifications and other pertinent information.</div></div><div>J.DESIGN PARAMETERS:<div>1.Textile air diffusers shall be designed from 0.25" water gage minimum to 3.1" maximum, with 0.5" as the standard.</div><div>2.Textile air diffusers shall be limited to design temperatures between 0 degrees F and 180 degrees F (-17.8 degrees C and 82 degrees C).</div><div>3.System overall design; diameter, length, airflow, operating static pressure and dispersion shall be designed or approved by the manufacturer.</div><div>4.Do not use textile diffusers in concealed locations.</div><div>5.Use textile air dispersion systems only for positive pressure air distribution components of the mechanical ventilation system.</div></div></div> <div>PART 3 – INSTALLATION</div> <div>3.1INSTALLATION OF TEXTILE AIR DISPERSION SYSTEM:<div>A.Install chosen suspension system in accordance with the requirements of the manufacturer. Instructions for installation shall be provided by the manufacturer with product.</div></div> <div>3.2CLEANING AND PROTECTION:<div>A.Clean air handling unit and ductwork prior to the DuctSox system unit-by-unit as it is installed. Clean external surfaces of foreign substance which may cause corrosive deterioration of facing.</div><div>B.Temporary Closure: At ends of ducts which are not connected to equipment or distribution devices at time of ductwork installation, cover with polyethylene film or other covering which will keep the system clean until installation is completed.</div><div>C.If fabric duct systems become soiled during installation, they should be removed and cleaned following the manufacturers standard terms of laundry.</div></div> <div>***END OF SECTION***</div>
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2 (E) ROOF/HIGH CEILING PLAN - HVAC
1/8" = 1'-0"



1 (E) FLOOR PLAN - HVAC
1/8" = 1'-0"

NOTES BY SYMBOL - DEMO

- EXISTING SUPPLY DUCTWORK ABOVE RESTROOMS, WITHIN MECHANICAL CHASE, AND ABOVE STAGE TO BE RE-USED. EXISTING SUPPLY DIFFUSERS TO BE CLEANED AND RE-USED.
- DISCONNECT AND REMOVE EXISTING SIDEWALL DIFFUSER AND ASSOCIATED DUCTWORK, HANGERS, AND SUPPORTS. OPENING TO BE RE-USED.
- DISCONNECT AND REMOVE EXISTING GAS FURNACE SYSTEM, INCLUDING ASSOCIATED GAS PIPING, VENT TERMINAL, RETURN AIR PLENUM, CONTROLS, WIRING, AND SUPPORTS.
- DISCONNECT AND REMOVE EXISTING SUPPLY DUCTWORK TO POINT INDICATED ON PLANS. EXISTING SUPPLY DUCT DISTRIBUTION THROUGH MECHANICAL ROOM WALL TO REMAIN AND BE RE-USED IN NEW CONSTRUCTION.
- REMOVE EXISTING BENCH GRILLE. INSTALL INSULATED SHEETMETAL PANEL SPRAY PANEL FLAT BLACK. SEAL OPENING AIRTIGHT. REINSTALL BENCH GRILLE.
- EXISTING UNDERGROUND RETURN DUCT SYSTEM TO BE ABANDONED IN PLACE.
- DISCONNECT AND REMOVE EXISTING ROOFTOP RELIEF HOOD. EXISTING ROOF OPENING TO BE RE-USED IN NEW CONSTRUCTION. FIELD VERIFY EXISTING ROOF OPENING SIZE PRIOR TO PURCHASE OF NEW EXTERIOR DUCT SYSTEM.

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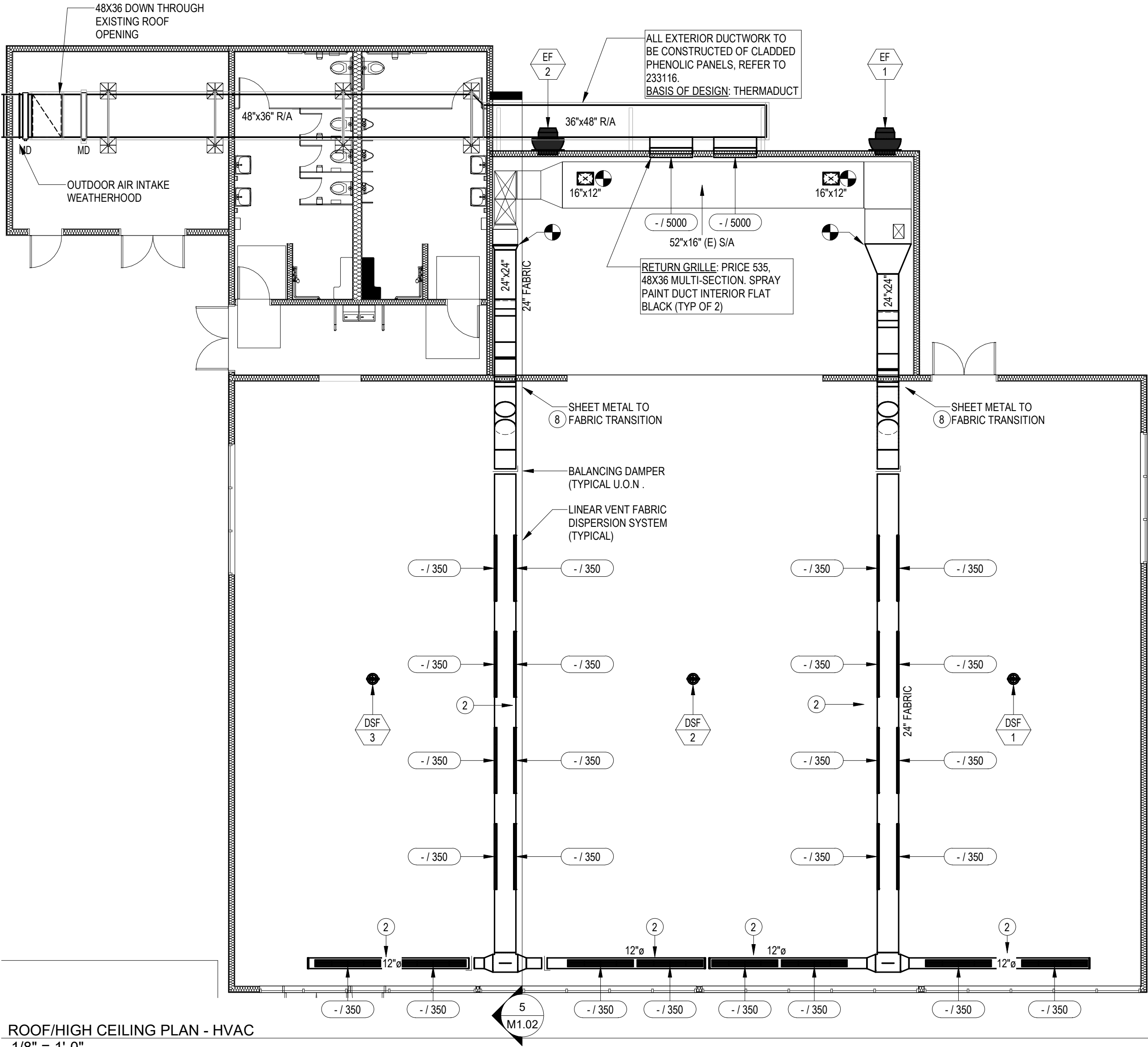
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ISSUE TYPE	PERMIT INTAKE
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CHECKED BY	MJT
SCALE	1/8" = 1'-0"
PROJECT No.	1534

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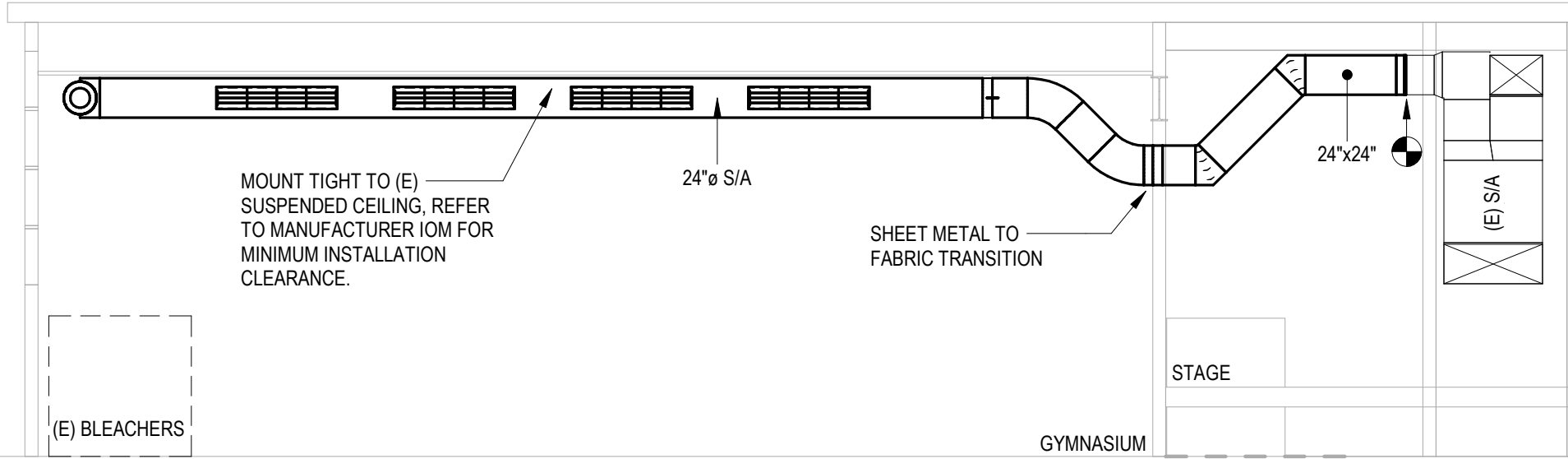
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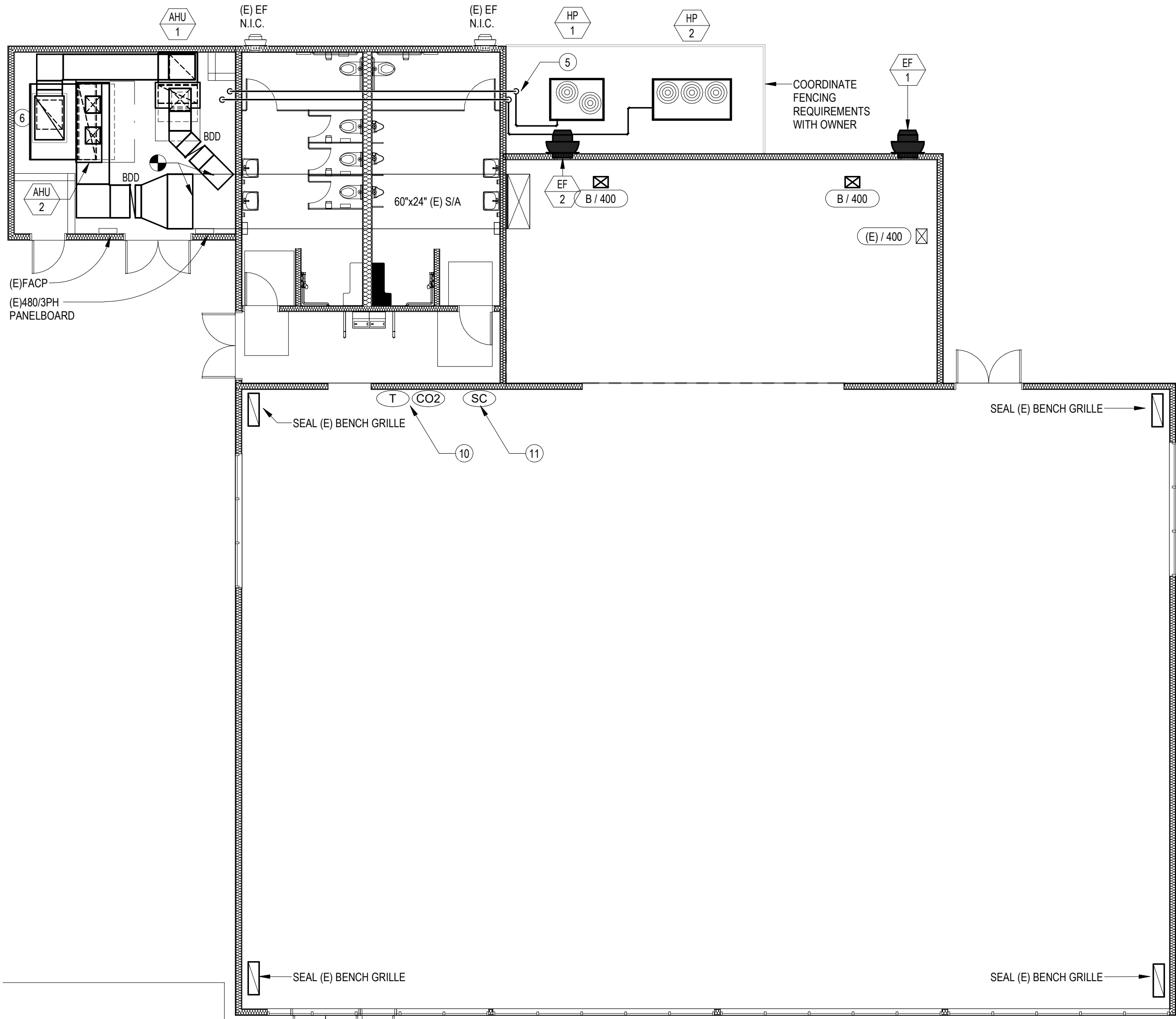
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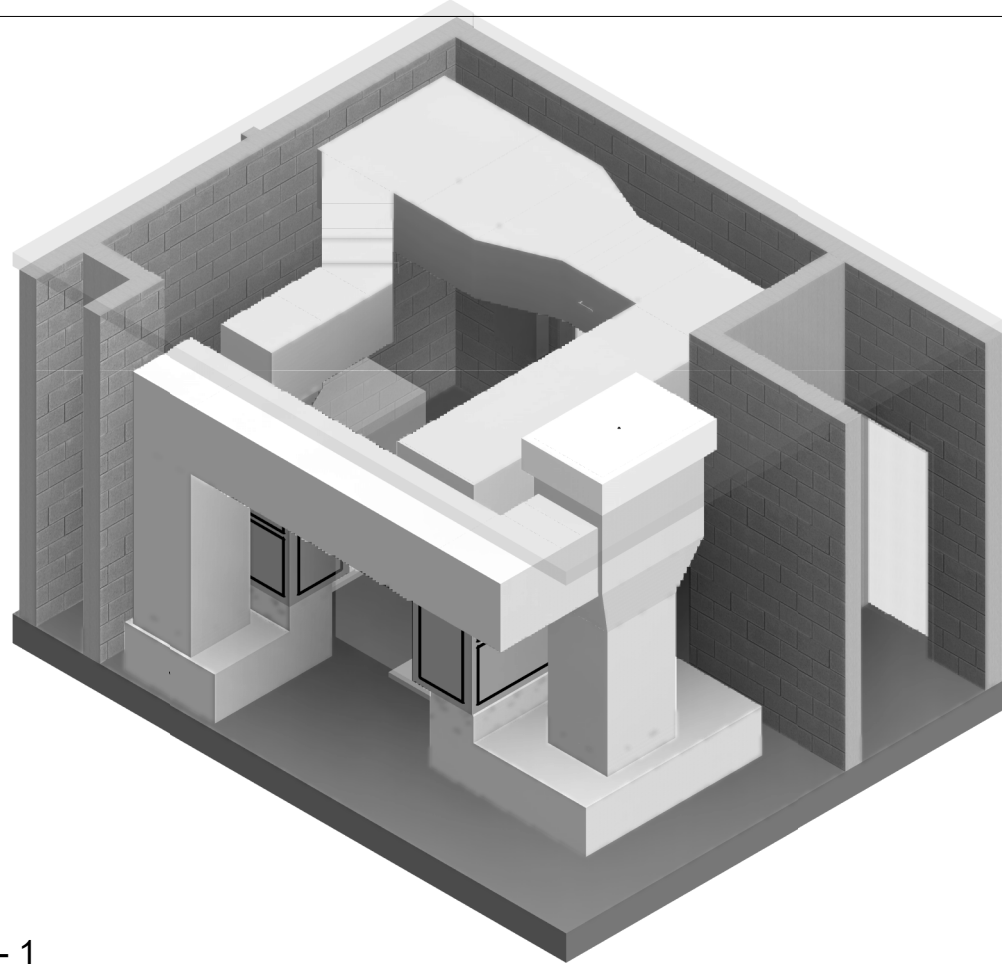
2 ROOF/HIGH CEILING PLAN - HVAC
1/8" = 1'-0"



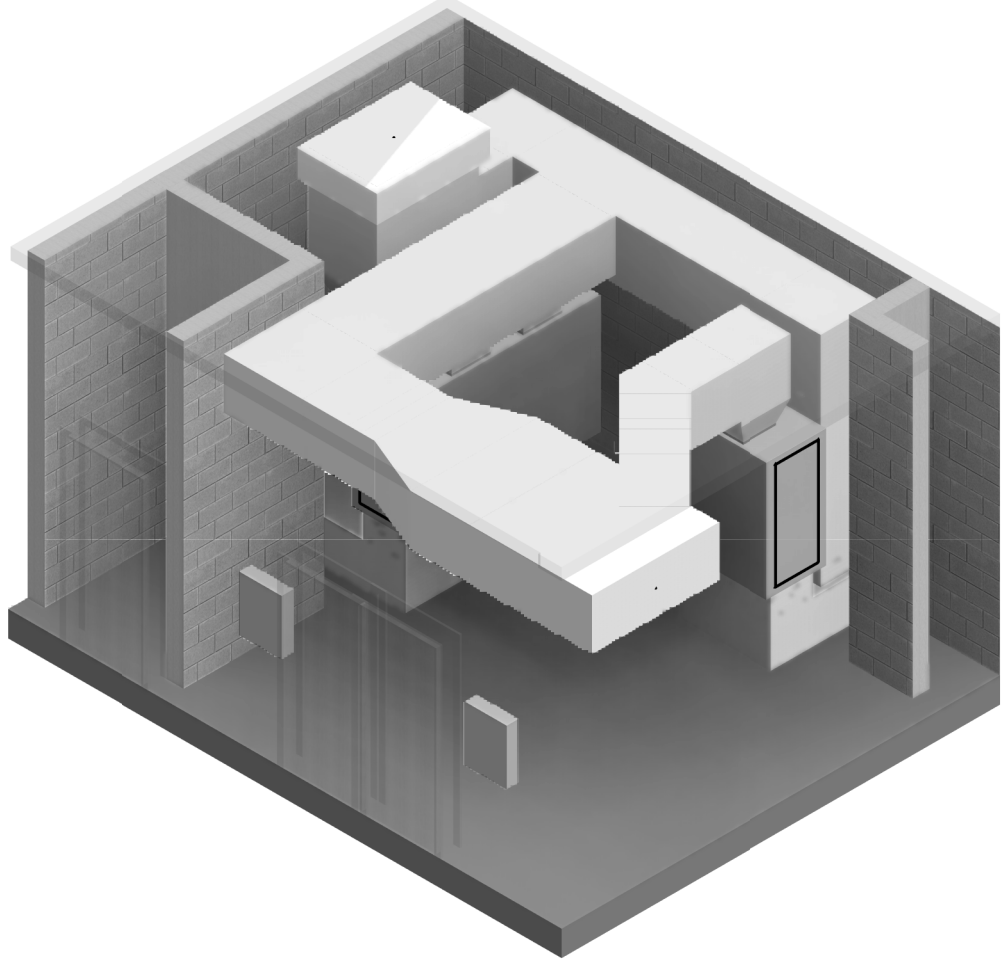
5 SECTION
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1 FLOOR PLAN - HVAC
1/8" = 1'-0"



3 ISO - MECH ROOM - 1
No Scale



4 ISO - MECH ROOM - 2
No Scale

NOTES BY SYMBOL - NEW

- 1 SPLIT AIR HANDLING UNIT ELEVATED WITH MOUNTING LEGS ABOVE COMMON RETURN DUCT PLENUM, REFER TO DETAIL.
- 2 SUSPEND FABRIC DUCT SYSTEM TIGHT TO UNDERSIDE OF EXISTING STRUCTURE.
- 3 PROVIDE 1/4" WIRE MESH SCREEN OVER EXHAUST OPENING. HEM ALL EXPOSED EDGES. PROVIDE MOTORIZED DAMPER WITH END SWITCH FOR DELAYED FAN START (POWERED OPEN, SPRING RETURN CLOSED)
- 4 INSTALL RETURN GRILLE LOW ON WALL, MAINTAIN DUCTWORK ABOVE RESTROOM CEILING.
- 5 CONCEAL EXTERIOR REFRIGERANT AND CONTROL WIRING WITHIN INSULATED METAL JACKETING, REFER TO DETAIL.
- 6 48X36 R/A THROUGH (E) ROOF OPENING. CONTRACTOR TO FIELD VERIFY OPENING DIMENSIONS PRIOR TO INSTALLATION. PROVIDE MANUAL BALANCING DAMPERS ON RETURN DUCT TAKEOFFS TO AHU PLENUM CONNECTIONS.
- 7 ENCLOSE THERMOSTAT/SENSOR CONTROL WIRING WITHIN WIRE RACEWAY, COORDINATE COLOR REQUIREMENTS WITH ARCH PRIOR TO INSTALLATION.
- 8 24X24 S/A THROUGH (E) WALL OPENING. PATCH AND REPAIR WALL TO MATCH EXISTING ADJACENT SURFACES.
- 9 SINGLE-PANEL RETURN DUCT THROUGH WALL OPENING. PATCH AND REPAIR WALL PENETRATION. SEAL WATERTIGHT.
- 10 COMBINATION CO2/THERMOSTAT CONTROLLER - MOUNT TOP OF CONTROL DEVICE MAXIMUM 48" A.F.F.
- 11 DESTRATIFICATION FAN SPEED CONTROLLER - MOUNT TOP OF CONTROL DEVICE MAXIMUM 48" A.F.F.

DESCRIPTION OF WORK

BASE BID:

- INSTALLATION OF NEW DX SPLIT HEAT PUMPS (10+15 TON UNITS) AND ASSOCIATED TOP DISCHARGE, BOTTOM RETURN AIR HANDLING UNITS.
- INSTALLATION OF NEW SHEETMETAL SUPPLY AND RETURN DUCT SYSTEMS IN MECHANICAL ROOM AND THEATRE.
- INSTALLATION OF NEW FABRIC SUPPLY DUCT SYSTEM IN MAIN GYMNASIUM SPACE.
- INSTALLATION OF NEW PHENOLIC PANEL DUCT SYSTEM ON BUILDING EXTERIOR/ROOF.
- INSTALLATION OF ECONOMIZER-CONTROLLED POWERED EXHAUST FANS INTERLOCKED TO AHU-1 AND AHU-2.
- INSTALLATION OF GYMNASIUM DESTRATIFICATION FANS.
- SEALING AND CLOSURE OF EXISTING SUBSLAB RETURN DUCT SYSTEM.

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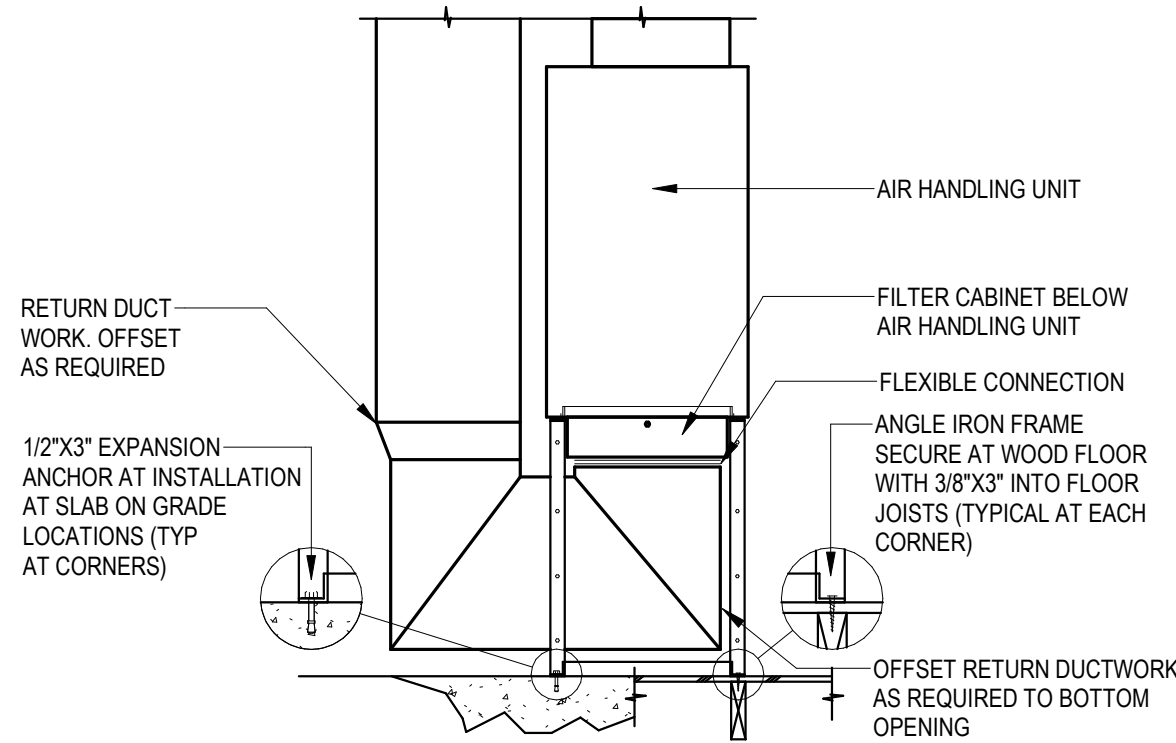
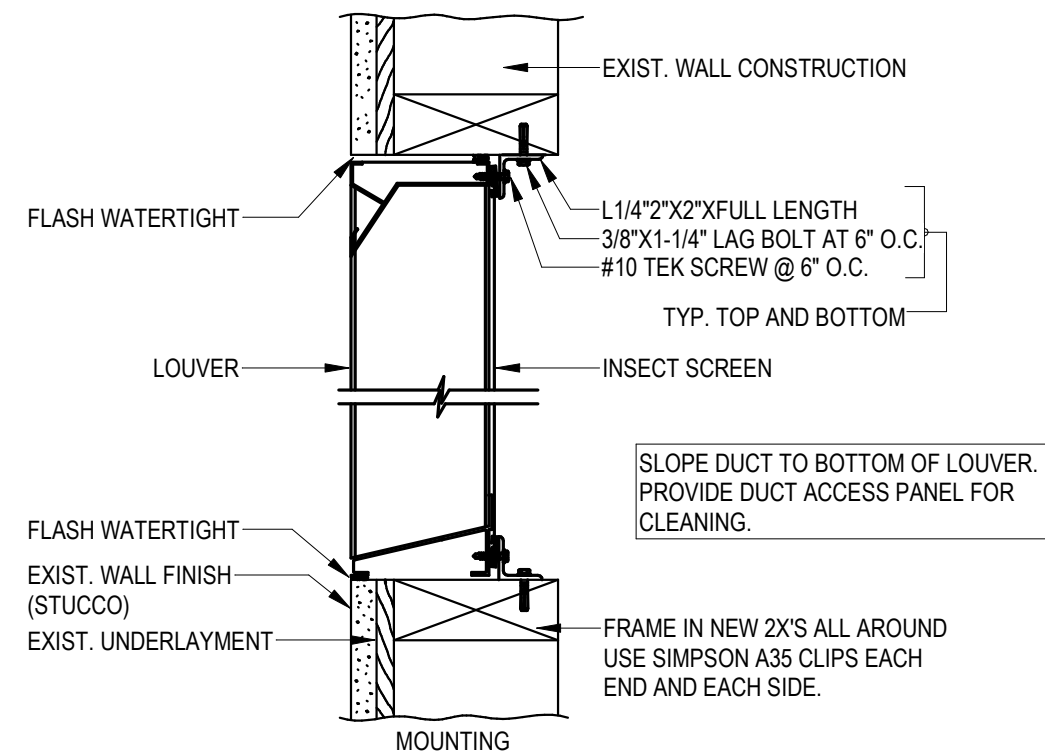
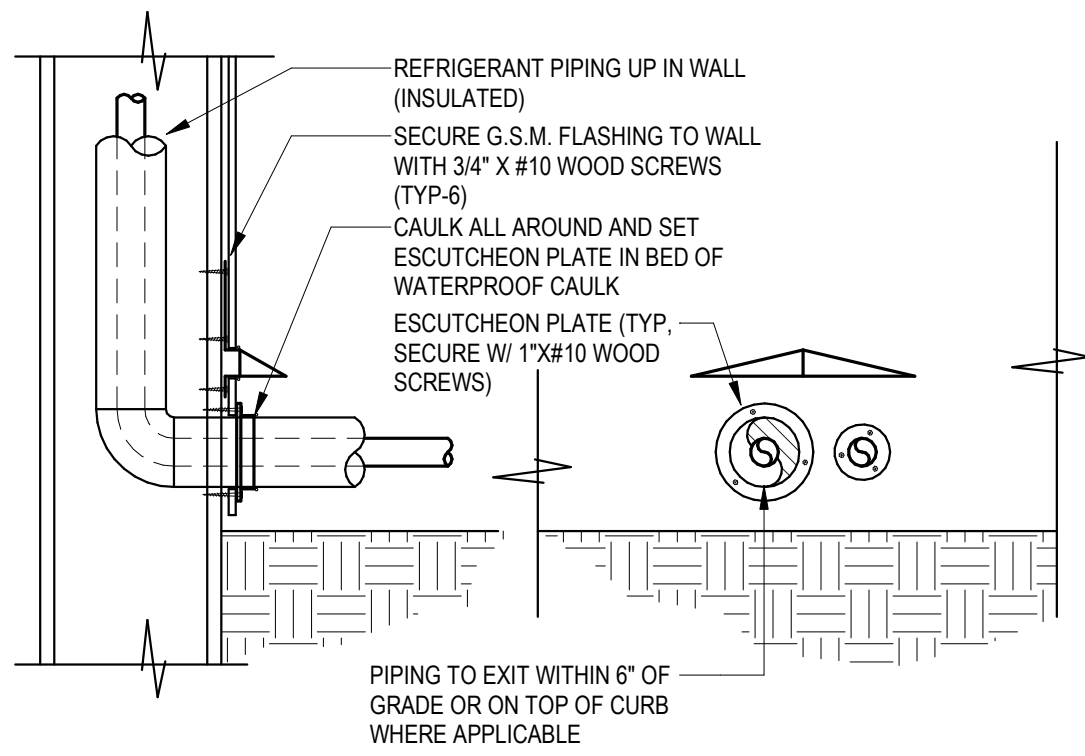
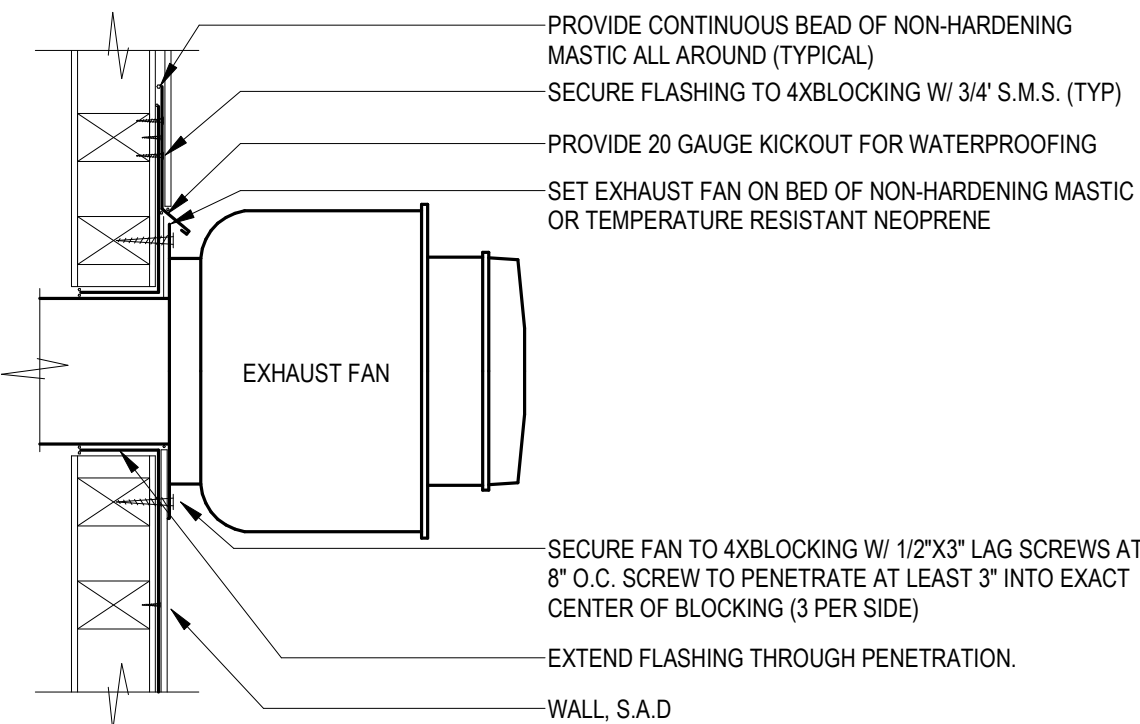
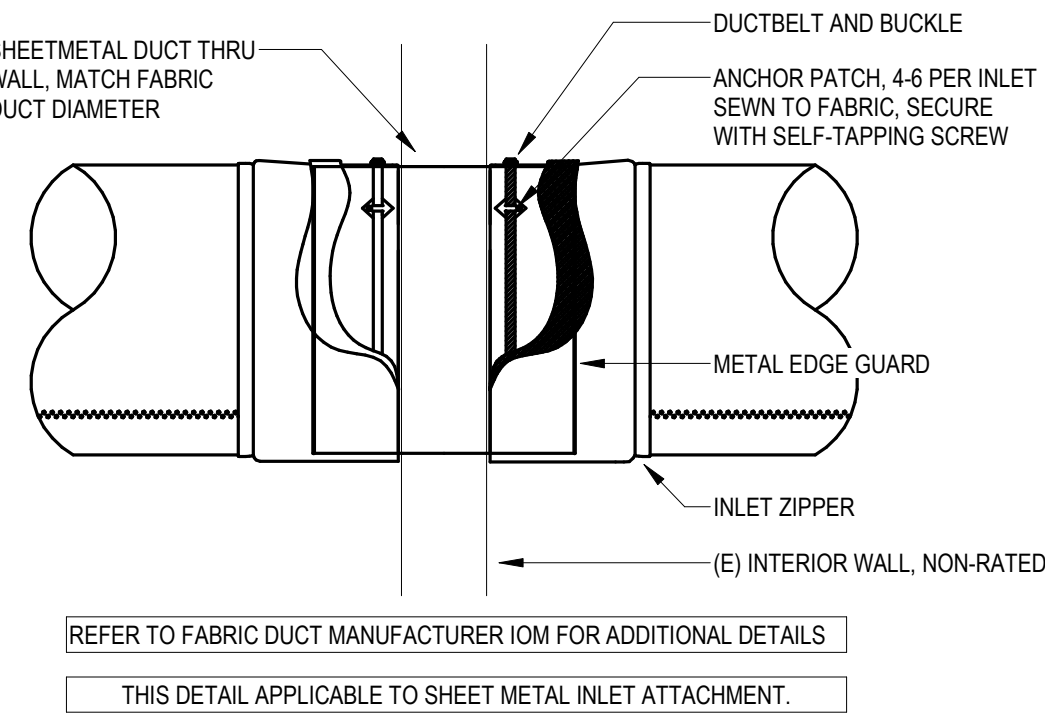
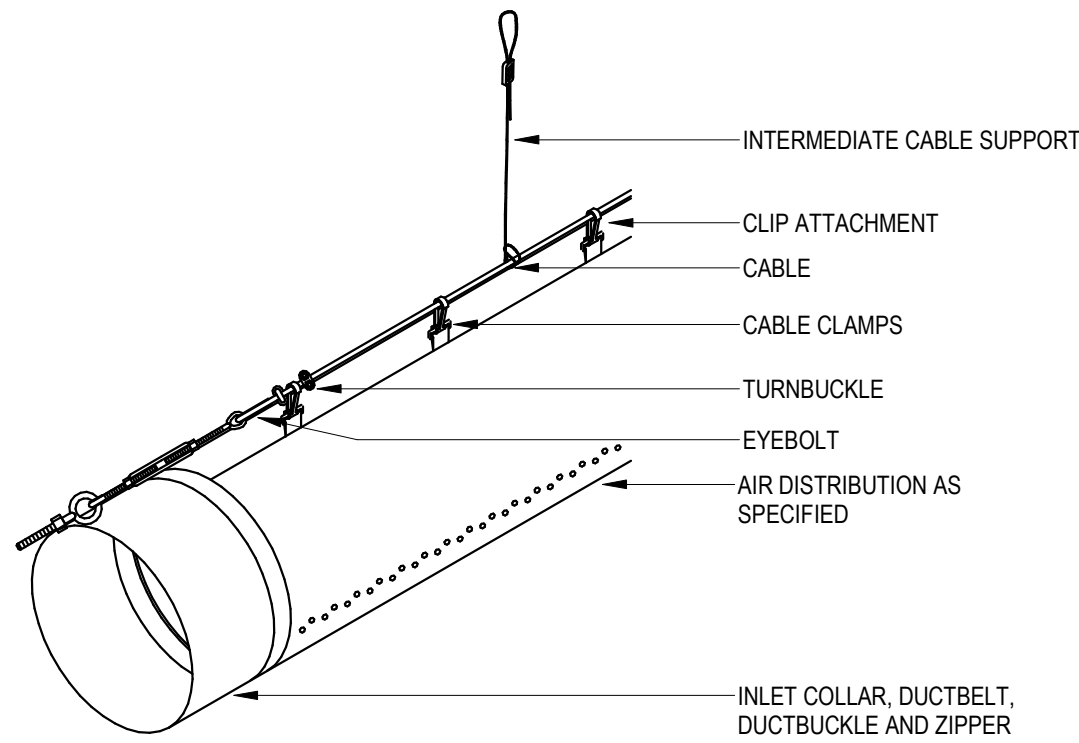
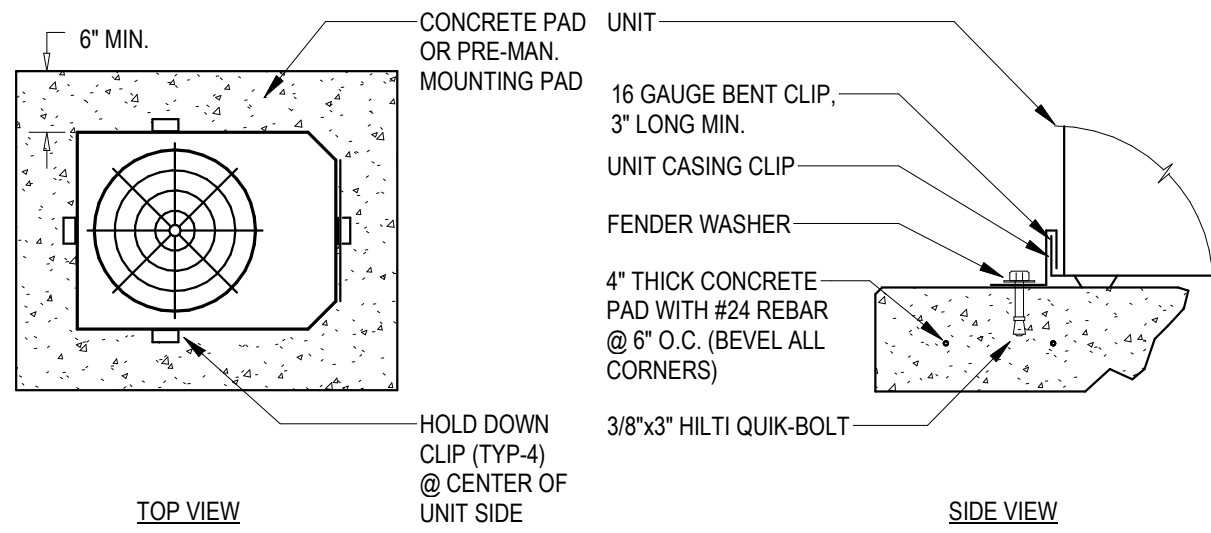
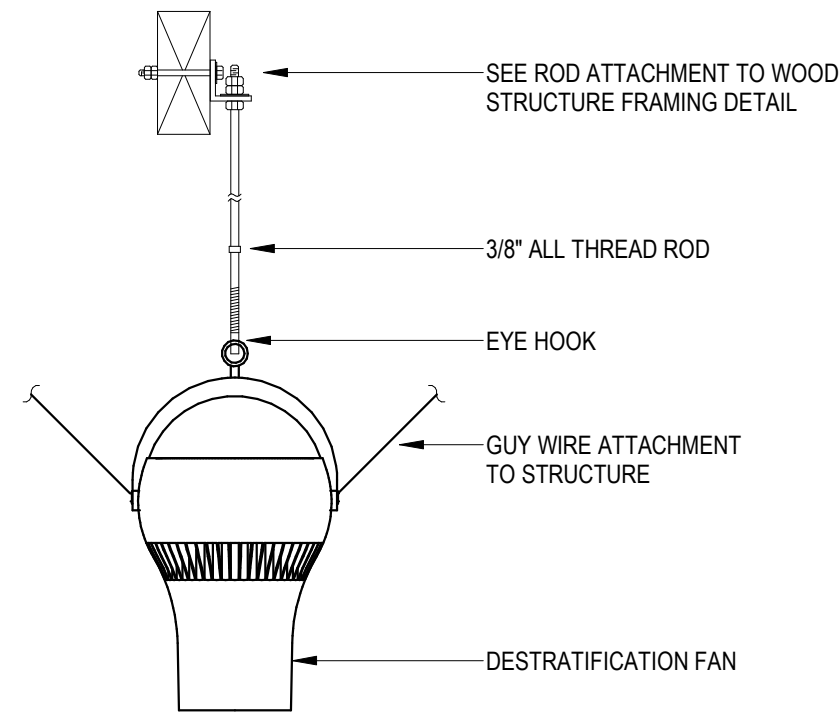
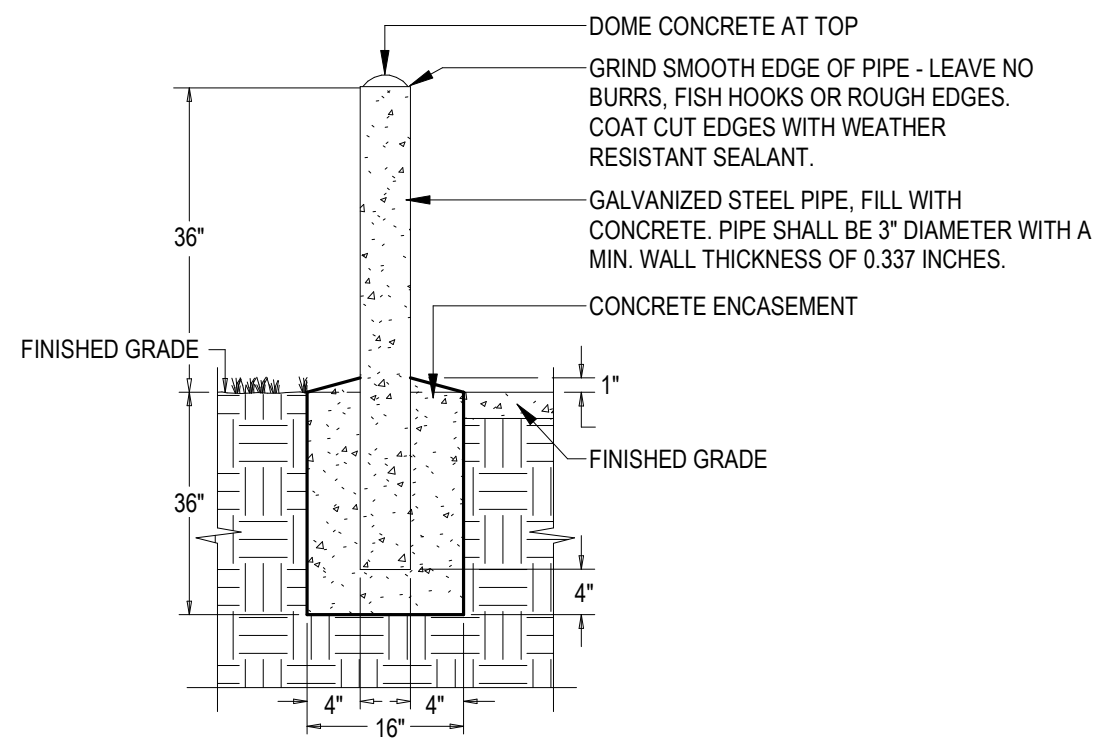
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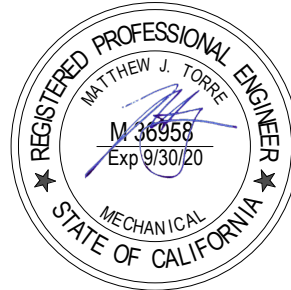
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