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ABBREVIATIONS

ABV.

ABOVE

AC

AIR CONDITIONER

ACT

AIR CURTAIN

AD

ACCESS DOOR

AFF

ABOVE FINISHED FLOOR

AHU

AIR HANDLING UNIT

AL

ACOUSTICAL LINING

ALD

AUTOMATIC LOUVER DAMPER (MOTORIZED)

ATC

AUTOMATIC TEMPERATURE CONTROL

B.D.D.

BACK DRAFT DAMPER

BMS

BUILDING MANAGEMENT SYSTEM

BOD

BOTTOM OF DUCT

BOIL

BOILER

BHP

BRAKE HORSE POWER

BRD

BAROMETRIC RELIEF DAMPER

BTU

BRITISH THERMAL UNIT

CC

COOLING COIL

CD

CEILING DIFFUSER

CFM

CUBIC FEET PER MINUTE

CG

CEILING GRILLE

CO2

CARBON DIOXIDE

CHW

CHILLED WATER

CHWLG

CHILLED WATER LOW GRADE (RADIANT SYSTEM)

CO

CLEAN OUT

COD

CABLE OPERATED VOLUME DAMPER

CDP

CONDENSATE DRAIN PIPING

CWP

CONDENSER WATER

CP

CONDENSATE PUMP RETURN

CAV

CONSTANT AIR VOLUME TERMINAL

DN

DOWN

EAT

ENTERING AIR TEMPERATURE

EF

EXHAUST FAN

EHC

ELECTRIC HEATING COIL

ET

EXPANSION VESSEL/EXPANSION TANK

EWT

ENTERING WATER TEMPERATURE

EXTK

EXPANSION TANK

FC

FLEXIBLE CONNECTION

FC

FAN COIL UNIT

FD/AD

FIRE DAMPER/ACCESS DOOR

FD/GA

FIRE DAMPER/GRILLE ACCESS

FTR

FIN TUBE RADIATOR

GENERAL MECHANICAL NOTES

1. SHOULD THERE BE ANY DISCREPANCIES BETWEEN CONTRACT DOCUMENTS AND SPECIFICATIONS THE GREATER QUALITY OR QUANTITY OF WORK SHALL BE PERFORMED. THIS WORK MUST BE SUBMITTED IN WRITING TO ENGINEER PRIOR TO FINAL BID APPROVAL. NO EXTRAS SHALL BE ALLOWED AFTER THAT TIME. THIS SHALL ALSO PERTAIN TO ANY DISCREPANCIES IN THE CONTRACT DOCUMENTS OR BETWEEN TRADES.

2. NO MODIFICATIONS TO THE SPECIFICATIONS, CONSTRUCTION DOCUMENTS, OR INTENT OF THE SCOPE OF WORK SHALL BE ALLOWED WITHOUT PRIOR WRITTEN AUTHORIZATION FROM THE ENGINEER. ALL MODIFICATIONS, CHANGE ORDERS, ALTERNATES AND VALUE ENGINEERING SHALL BE SUBMITTED IN WRITING TO THE ARCHITECT AND ENGINEER FOR REVIEW.

3. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF ALL TRADES RESPONSIBLE FOR FINAL CONNECTION OR ALL EQUIPMENT.

4. CONTRACTORS ARE RESPONSIBLE UNDERSTANDING AND BEING EDUCATED ON THE REQUIREMENTS TO OBTAIN NGBS NET ZERO CERTIFICATION AND PHIUS CERTIFICATION, AS WELL AS ALL PREREQUISITE CERTIFICATIONS NEEDED TO OBTAIN PHIUS. RESPONSIBILITY OF THE GENERAL CONTRACTOR AND TRADES TO PROVIDE REQUIRED FIELD TESTING REQUIRED TO OBTAIN CERTIFICATIONS. ALSO, ANY MODIFICATIONS NEEDED TO SYSTEMS AFTER INITIAL TESTING TO PASS RETESTING IF REQUIRED.

5. IECC 2021 MECHANICAL COMCHECK PERFORMED AND IS IN COMPLIANCE. REFERENCE JOB NAME JOHN GRACE ARMS IN COMCHECK DATABASE FOR REFERENCE

HVAC GENERAL NOTES

1. COORDINATE DUCTWORK WITH EXISTING AND NEW SITE CONDITIONS, EQUIPMENT MANUFACTURE AND ALL OTHER TRADES TO PREVENT INTERFERENCES. RESIZE AND FIELD ROUT AS REQUIRED, USE EQUIVALENT DUCT SIZING.

2. PROVIDE ACCESS AROUND ALL NEW EQUIPMENT PER MANUFACTURER RECOMMENDATIONS AND CODE REQUIREMENTS.

3. ALL CORING THROUGH FLOORS SHALL BE DONE BY MECHANICAL CONTRACTOR.

4. ALL DUCTWORK SHALL BE ROUTED AS HIGH AS POSSIBLE, UNLESS OTHERWISE NOTED ON THE DRAWINGS. COORDINATE ROUTING WITH OTHER TRADES TO PREVENT INTERFERENCES.

5. BALANCE HVAC SYSTEMS AND DISTRIBUTION INCLUDING SUPPLY, RETURN AND OUTDOOR AIR TO INDICATED FLOW RATES, REFER TO VENTILATION SCHEDULE AND HVAC PLAN. IF NOT INDICATED ON DRAWING OR DETAIL, PROVIDE PROPER EQUIPMENT ON THE FIELD TO PROPERLY BALANCE SYSTEMS.

6. DUCT SIZES TO DIFFUSERS SHALL MATCH NECK OR DIMENSIONS REQUIRED, REFER TO SCHEDULES.

7. ALL CONCEALED SUPPLY AIR DUCTWORK SHALL BE INSULATED PER SPECIFICATIONS.

8. SEAL ALL PENETRATIONS THROUGH WALLS PER SPECIFICATION.

9. COORDINATE EXACT LOCATION OR DIFFUSERS AND RETURN GRILLS WITH ARCHITECTURAL AND ELECTRICAL REFLECTED CEILING PLANS.

10. COORDINATE THERMOSTAT LOCATIONS WITH ARCHITECT.

11. PROVIDE SPIN-IN DAMPERS AT ALL ROUND BRANCH DUCT CONNECTIONS TO DIFFUSERS. PROVIDE MANUAL VOLUME DAMPERS AS EACH BRANCH DUCT AT CONNECTION TO MAIN AS WELL AS IN EACH DUCT AFTER BRANCH DUCT SPLITS. THESE ARE NOT INDICATED ON PLANS BUT ARE REQUIRED. CONTRACTOR TO DETERMINE PROPER LOCATIONS TO PROPERLY BALANCE THE SYSTEM.

GENERAL PIPING NOTES:

1. COORDINATE NEW PIPING WITH EXISTING SITE CONDITIONS, EQUIPMENT, MANUFACTURER, AND ALL OTHER TRADES TO PREVENT INTERFERENCES.

2. PROVIDE ACCESS AROUND ALL NEW EQUIPMENT PER MANUFACTURER RECOMMENDATIONS AND CODE REQUIREMENTS.

3. ALL CORING THROUGH FLOORS AND FLOOR TRENCHING SHALL BE BY MECHANICAL CONTRACTOR.

4. ALL PIPING SHALL BE ROUTED AS HIGH AS POSSIBLE, COORDINATE ALL ROUTING WITH OTHER TRADES TO PREVENT INTERFERENCES.

5. BALANCE WATER SYSTEMS TO INDICATED FLOW RATES REQUIRED BY MANUFACTURER OF EQUIPMENT IN EQUIPMENT SCHEDULES.

6. ALL PIPING SHALL BE INSULATED PER SPECIFICATIONS.

7. ALL PIPING SHALL BE CONCEALED IN WALLS OR CEILINGS SPACE.

8. SEAL ALL PENETRATIONS THROUGH WALLS, REFER TO SPECIFICATIONS.

9. EXPANSION LOOPS (JOINTS) AND GUIDES ARE TO BE USED ON ALL HOT WATER AND HOT WATER RETURN PIPING.

GENERAL SHEET MECHANICAL NOTES

1. SEE M-001 FOR ADDITIONAL NOTES

2. THE DRAWINGS ARE DIAGRAMMATIC AND REPRESENT THE GENERAL INTENT AND ARRANGEMENT OF SYSTEMS. THEY ARE NOT TO BE CONSIDERED FABRICATION/COORDINATION/SHOP DRAWINGS AND COORDINATION WITH OTHER TRADES WILL BE REQUIRED. PROVIDE ADDITIONAL FITTINGS AND OFFSETS THAT MAY BE REQUIRED TO COMPLETE EACH SYSTEM AND TO AVOID INTERFERENCES WITH ALL OTHER SYSTEMS AND ANY OTHER EXISTING SPACE CONSTRAINTS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE WITH ALL TRADES FOR UTILIZATION OF SPACE CONSTRAINTS.

3. REFER TO ARCHITECT CEILING REFLECTED CEILING PLANS FOR LOCATION OF LIGHTS, CEILING DROPS AND ELEVATIONS.

4. THE CONTRACTOR SHALL VERIFY EXACT LOCATION OF ALL EXISTING ABOVE CEILING EQUIPMENT INCLUDING STRUCTURAL TO AVOID INTERFERENCES.

5. ALL SUPPLY DUCT WORK SHALL BE INSULATED PER SPECIFICATIONS.

6. ROUND DUCT BRANCH CONNECTIONS TO DIFFUSERS TO BE SAME SIZE AS DIFFUSER NECK.

7. PROVIDE DUCT TAP WITH VOLUME DAMPER AT EACH BRANCH TO DIFFUSER DUCT CONNECTION, SPIN -IN FITTINGS MAY BE USED WHERE ROUND DUCTS ARE CONNECTING TO RECTANGULAR DUCTS.

8. BALANCING THE AIR SYSTEM IS REQUIRED REFER TO HVAC SPECIFICATIONS, NOTES AND DRAWINGS.

MECHANICAL KEYED SHEET NOTES

1. KITCHEN EXHAUST HOODS PROVIDED BY ARCHITECT, TRADES TO COORDINATE EXHAUST CONNECTIONS SIZE AND CFM WITH HOOD MANUFACTURER. INSTALL EXHAUST DUCT PER MANUFACTURERS RECOMMENDATIONS, INSTALL CEILING RADIATION DAMPER PER CODE. EXHAUST ROUTING CAN NOT Tie INTO ERV EXHAUST SYSTEM, ROUTE IN MANNER THAT IT DOES NOT INTERFERE WITH ERV DUCT WORK.

2. TRANSITION TO SUPPLY/RETURN GRILL FOR INLAY OF WINDOW GRILL HEIGHT WILL BE 12" x WIDTH OF EXISTING WINDOW OPENING.

3. ALL REFRIGERATION LINE SETS RUNNING ALONG EXPOSED EXTERIOR BRICK MUST HAVE UV RESISTANT PLASTIC COVERS. COLOR TO MATCH BRICK AS APPROVED BY ARCHITECT.

4. ERV EXHAUST DUCT TO SIDE WALL, TERMINATE WITH VENT CAP, BUILT IN BACKDRAFT DAMPER AND BIRD SCREEN. INSTALL DUCT IN TRUSS SPACE WHICH IS NOT KNOWN AT THIS TIME AND NEEDS TO COORDINATE WITH TRUSS MANUFACTURER.

5. ERV OUTSIDE AIR DUCT TO SIDEWALL TERMINATE WITH OA LOUVER, INSULATE DUCT FROM LOUVER TO ERV UNIT. COORDINATE DUCT ROUTING WITH TRUSS MANUFACTURER AND ARCHITECTURAL DRAWINGS, ALSO INCLUDE RADIATION DAMPER.

6. REFRIGERANT PIPING UP TO ROOF THROUGH PITCH BOX TO ASSOCIATED CONDENSER. ADHERE TO MANUFACTURER REQUIREMENTS FOR TOTAL LENGTH OF PIPING FOR HEAT PUMP SYSTEM, DO NOT EXCEED LENGTH. ROUTE NEEDED POWER AND CONTROL WIRING FROM HEAT PUMP CONDENSER IN SAME LOCATION WITH REFRIGERANT PIPING.

7. PROVIDE RETURN AIR FILTER AND RETURN GRILL COMBINATION AND PROVIDE FILTER (MERV 8) AT REQUIRED SIZE

8. 4" DRYER EXHAUST TO ROOF OR SIDE WALL, TERMINATE WITH VENT CAP WITH INTEGRAL BACKDRAFT DAMPER. COORDINATE LOCATION WITH OTHER TRADES AND EQUIPMENT TO AVOID INTERFERENCE.

9. FAN COIL UNIT TO BE HANG ABOVE CEILING WITH PROPER ACCESS PANEL AND CLEARANCE PROVIDED. COORDINATE CONDENSATE DRAIN ROUTING TO NEAREST MECHANICAL FLOOR DRAIN.

10. THERMOSTAT LOCATION, PROVIDE PROPER CONTROL WIRING BACK TO FAN COIL UNIT.

11. ERV UNIT, TO BE INTERLOCKED WITH FAN COIL UNIT, SEE MANUFACTURER REQUIREMENTS FOR WIRING.

12. EXHAUST FAN AND LIGHT COMBO UNIT, ROUTE 6 IN DUCT WORK TO EXHAUST PORT OF THE ERV UNIT. UNIT TO BE CONTROLLED OCCUPANCY, REFER TO ELECTRICAL.

ABBREVIATIONS

FL

FLOOR

FLA

FULL LOAD AMPS

FSD

FIRE SMOKE DAMPER

FSD/AD

FIRE SMOKE DAMPER/ACCESS DOOR

FSD/GA

FIRE SMOKE DAMPER/GRILLE ACCESS

FFSD/AD

FLOOR FIRE SMOKE DAMPER/ACCESS DOOR

GPM

GALLONS PER MINUTE

GX

GENERAL EXHAUST

SPF

STAIR PRESSURIZATION FAN

HC

HEATING COIL

HHW

HEATING HOT WATER

HP

HORSE POWER

HTEX

HEAT EXCHANGER

ID

INSIDE DIMENSION

KW

KILOWATT

KX

KITCHEN EXHAUST

LAT

LEAVING AIR TEMPERATURE

LED

LINEAR EXHAUST DIFFUSER

LRD

LINEAR RETURN DIFFUSER (CEILING, WALL, SILL, OR FLOOR)

LSD

LINEAR SUPPLY DIFFUSER (CEILING, WALL, SILL, OR FLOOR)

LTHW

LOW TEMPERATURE HOT WATER

LVL

LEVEL

LWS

LOUVER WITH WIRE SCREEN

LWT

LEAVING WATER TEMPERATURE

MAT

MIXED AIR TEMPERATURE

MAX

MAXIMUM

MBH

THOUSAND BTU PER HOUR

MBTU

BRITISH THERMAL UNIT (1000 BTU)

MIN

MINIMUM

MD

MOTORIZED DAMPER

NC

NORMALLY CLOSED

NFA

NET FREE AREA

NIC

NOT IN THIS CONTRACT

NO

NORMALLY OPEN

NTS

NOT TO SCALE

OA

OUTSIDE AIR

OAT

OUTSIDE AIR TEMPERATURE

OBD

OPPOSED BLADE DAMPER

OED

OPEN ENDED DUCT

P

PUMP

PHC

PRE-HEAT COIL

ABBREVIATIONS

PHX

PLATE & FRAME HEAT EXCHANGE

PSI

POUNDS PER SQUARE INCH (GAUGE)

RA

RETURN AIR

RF

RETURN FAN

RHC

REHEAT COIL

RPM

REVOLUTIONS PER MINUTE

RR

RETURN REGISTER

SA

SUPPLY AIR

SCHW

SECONDARY CHILLED WATER

SD

SMOKE DAMPER

SD/ALD

SMOKE DAMPER AND AUTOMATIC LOUVER COMBINATION

SF

SUPPLY FAN

SG

SUPPLY GRILLE

ST

SOUND TRAP

SEF

SMOKE EXHAUST FAN

TOD

TOP OF DUCT

TF

TRANSFER FAN

TG

TOP GRILLE

TR

TOP REGISTER

TD

TRANSFER DUCT

TRX

TRASH EXHAUST

TX

TOILET EXHAUST

UH

UNIT HEATER

VAV

VARIABLE AIR VOLUME

VD

VOLUME DAMPER

VFD

VARIABLE FREQUENCY DRIVE

VRV

VARIABLE REFRIGERANT VOLUME

WMS

WIRE MESH SCREEN

(300)

CUBIC FEET OF AIR PER MINUTE OR GALLONS PER MINUTE

HVAC SYMBOLS (DUCTWORK)

RECTANGULAR DUCT SUPPLY

RECTANGULAR DUCT RETURN

RECTANGULAR DUCT EXHAUST

ROUND DUCT SUPPLY

ROUND DUCT RETURN

ROUND DUCT EXHAUST

DUCT WITH ACOUSTIC LINING

DUCT WRAPPED WITH FIRE RATED INSULATION

BRANCH DUCT WITH RADIUSUED SIDE SPLIT - RECTANGULAR DUCT

BRANCH DUCT TAP, SINGLE BOOT - RECTANGULAR DUCT

BRANCH DUCT TAP, DOUBLE BOOT - RECTANGULAR DUCT

BRANCH DUCT TAP, SINGLE BOOT - ROUND & FLAT OVAL DUCT

BRANCH DUCT TAP, DOUBLE BOOT - ROUND & FLAT OVAL DUCT

FLEXIBLE DUCT

FLEXIBLE CONNECTION

ACCESS DOOR

CLEAN OUT

DUCT THROUGH BEAM PENETRATION

AUTOMATIC DAMPER - OPPOSED BLADE

AUTOMATIC DAMPER - PARALLEL BLADE

FIRE SMOKE DAMPER

FIRE DAMPER

BACKDRAFT DAMPER

BAROMETRIC DAMPER

SQUARE CEILING DIFFUSER (SHADED SECTORS INDICATE BLANK OFFS)

ROUND CEILING DIFFUSER (SHADED SECTORS INDICATE BLANK OFFS)

ROUND FLOOR DIFFUSER (UFAD)

REGISTER - SIDEWALL/CEILING/FLOOR - SUPPLY

REGISTER/GRILLE - SIDEWALL/CEILING/FLOOR - RETURN/EXHAUST

WALL TRANSFER GRILLES

LINEAR DIFFUSER/GRILLE - SUPPLY/RETUN/EXHAUST

PLENUM FOR LINEAR DIFFUSER/GRILLE

DUCT SMOKE DETECTOR

DUCT FIRESTAT

AIRFLOW STATION

ACOUSTIC TRANSFER DUCT

TERMINAL UNIT - VAV BOX - WITH/WITHOUT HEATING COIL

TERMINAL UNIT - FAN COIL UNIT

UNIT HEATER

DUCT MOUNTED COIL

DUCT MOUNTED HUMIDIFIER

HVAC SYMBOLS (PIPING)

PIPE TURNING UP

PIPE TURNING DOWN

SLOPE RISE IN DIRECTION OF FLOW

SLOPE DROP IN DIRECTION OF FLOW

PIPE THROUGH BEAM PENETRATION

WALL SLEEVE WITH WATER STOP

ELBOW

TEE

BRANCH PIPE TOP CONNECTION

BRANCH PIPE BOTTOM CONNECTION

REDUCER/INCREASER CONCENTRIC

REDUCER/DECREASER ECCENTRIC

UNION (SCREWED)

UNION (FLANGED)

BLIND FLANGE

END CAP

BUTTERFLY VALVE

PIPE ANCHOR

BALL VALVE - MANUAL (LEVER HANDLE)

BALL VALVE - MANUAL (TEE HANDLE)

BALL VALVE - MOTORIZED

ISOLATION VALVE (SEE SPEC FOR TYPE)

BALANCING VALVE

GLOBE VALVE

TRIPLE DUTY VALVE

PIPE GUIDE

FLOWSETTER VALVE (BALANCING)

CARTRIDGE FLOW BALANCER

PRESSURE REDUCING VALVE

PLUG VALVE

CHECK VALVE (SWING TYPE)

CHECK VALVE (SILENT TYPE, CENTER GUIDED)

PRESSURE INDEPENDENT CONTROL VALVE (PICV)

2 WAY CONTROL VALVE

3 WAY CONTROL VALVE (MIXING TYPE)

3 WAY CONTROL VALVE (DIVERTING TYPE)

SOLENOID VALVE

RELIEF VALVE

BACKFLOW PREVENTOR

BACKFLOW PREVENTER (RPZ TYPE)

AIR VENT (AUTOMATIC)

TEMPERATURE GAUGE (DUCT MOUNTED)

PRESSURE GAUGE W/ PIGTAIL AND PETCOCK

HVAC SYMBOLS (PIPING)

SIGHTGLASS

FILTER-DRYER

LEAK DETECTOR, PROBE TYPE

LEAK DETECTOR, CABLE TYPE

METER

AIR VENT (MANUAL)

STRAINER WITH BLOW OFF

FLOW SWITCH

Y-STRAINER

DRAIN VALVE WITH CAPPED HOSE END

DUPLEX BASKET STRAINER

TEMPERATURE GAUGE

PRESSURE GAUGE W/ PIGTAIL AND PETCOCK

FLEXIBLE COUPLING

PIPE IN PIPE (FUEL OIL)

HEAT TRACED PIPE

AIR SEPARATOR

EXPANSION TANK

CHEM SHOT FEEDER

PLATE AND FRAME HEAT EXCHANGER

PUMP

FLEX CONNECTORS

John Grace Arms

21030 Indian St, Southfield MI 48033

Developed by

John Grace Arms LDHA LLC

SDG

Architects + Planners

607 Shelby Street
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Detroit, MI 48226

Tel: 313-961-9000
Fax: 313-964-3233

A & A Engineering & Consulting

28063 Vista Way, South Lyon, MI 48178

REGISTRATION SEAL

KEY PLANS

SHEET TITLE

MECHANICAL SYMBOLS AND ABBREVIATIONS

SCALE: AS NOTED

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DATE

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10.20.24

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5.19.25

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M-001



REGISTRATION SEAL



KEY PLANS

SHEET TITLE

FIRST FLOOR
MECHANICAL HVAC
PLAN

SCALE: AS NOTED

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PERMIT	10.20.24
<u>Δ BULLETIN 2</u>	<u>3.05.25</u>
<u>Δ BULLETIN 3</u>	<u>5.19.25</u>
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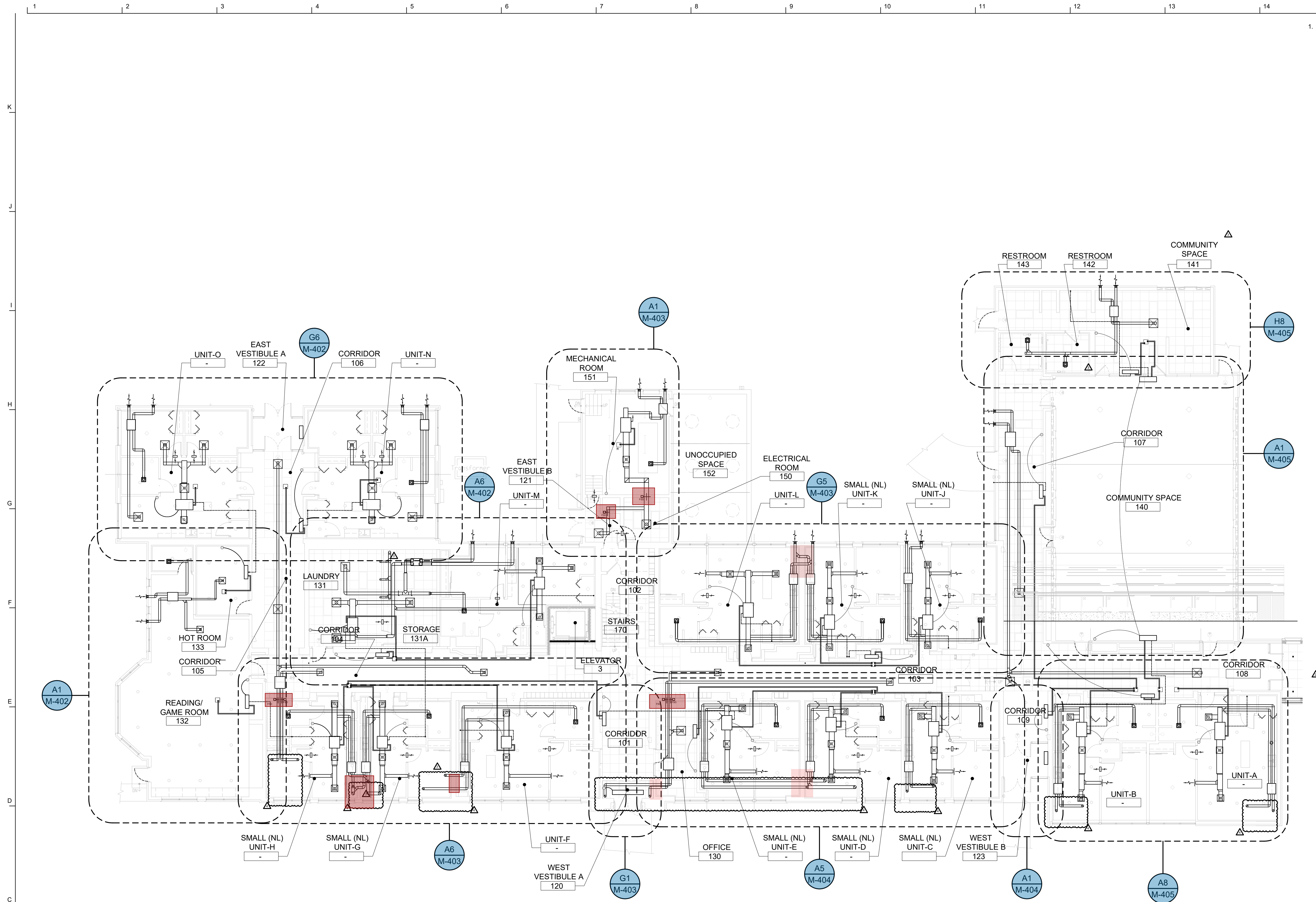
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M-101

SHEET NO.



A1

FIRST FLOOR MECHANICAL HVAC PLAN

M-101

SCALE: 3/32" = 1'-0"



A & A Engineering & Consulting
28862 Vista Way, South Lyon, MI 48178

REGISTRATION SEAL



KEY PLANS

SHEET TITLE

SECOND FLOOR -
MECHANICAL HVAC
PLAN

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△ BULLETIN 6	12.03.25

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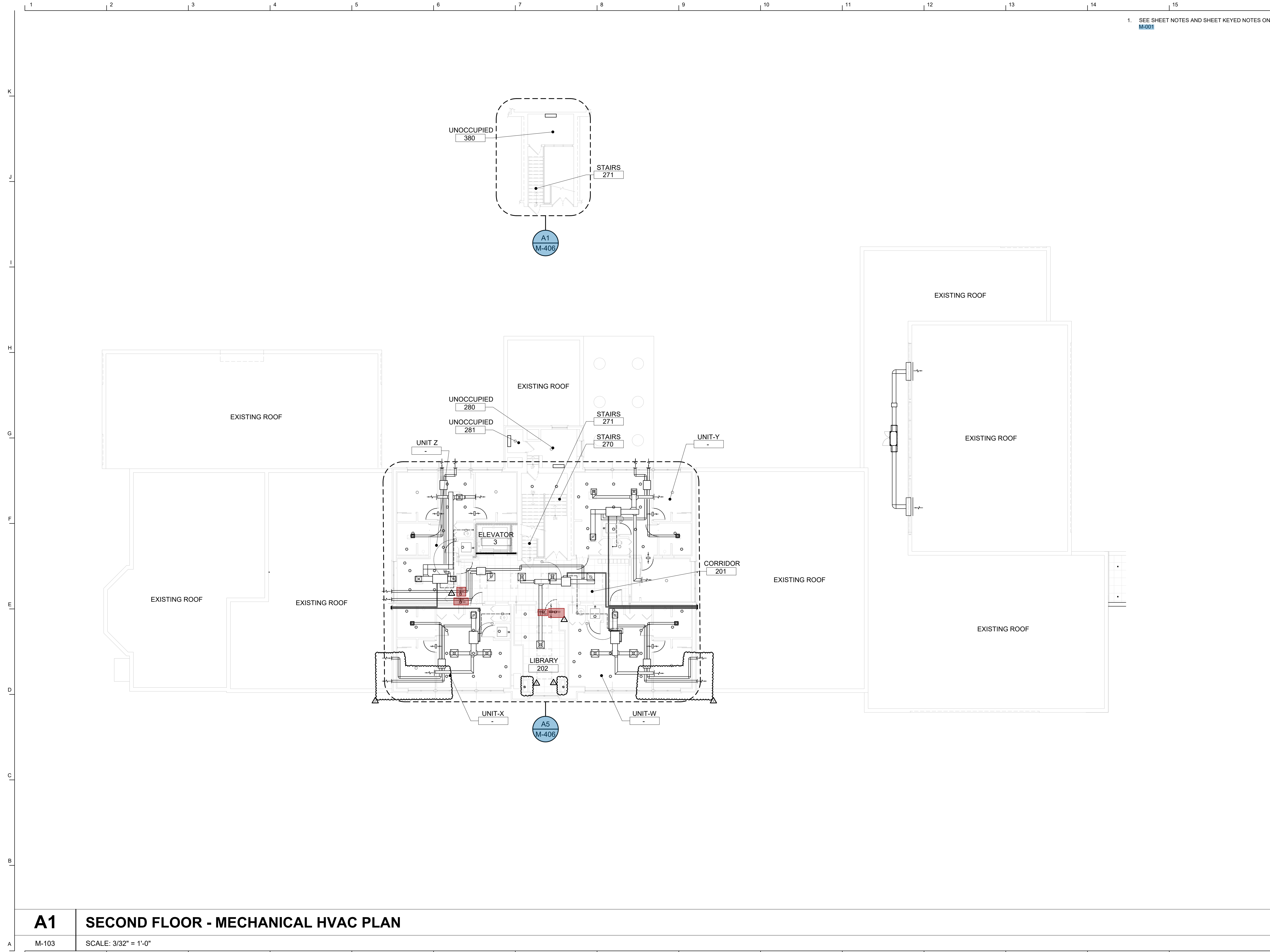
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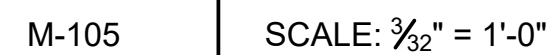
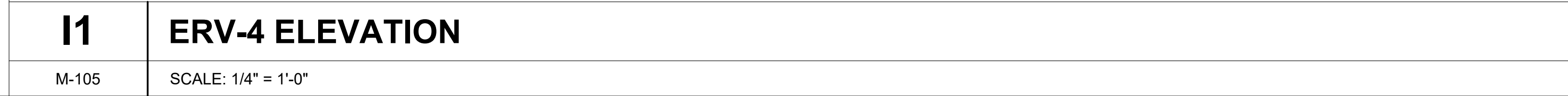
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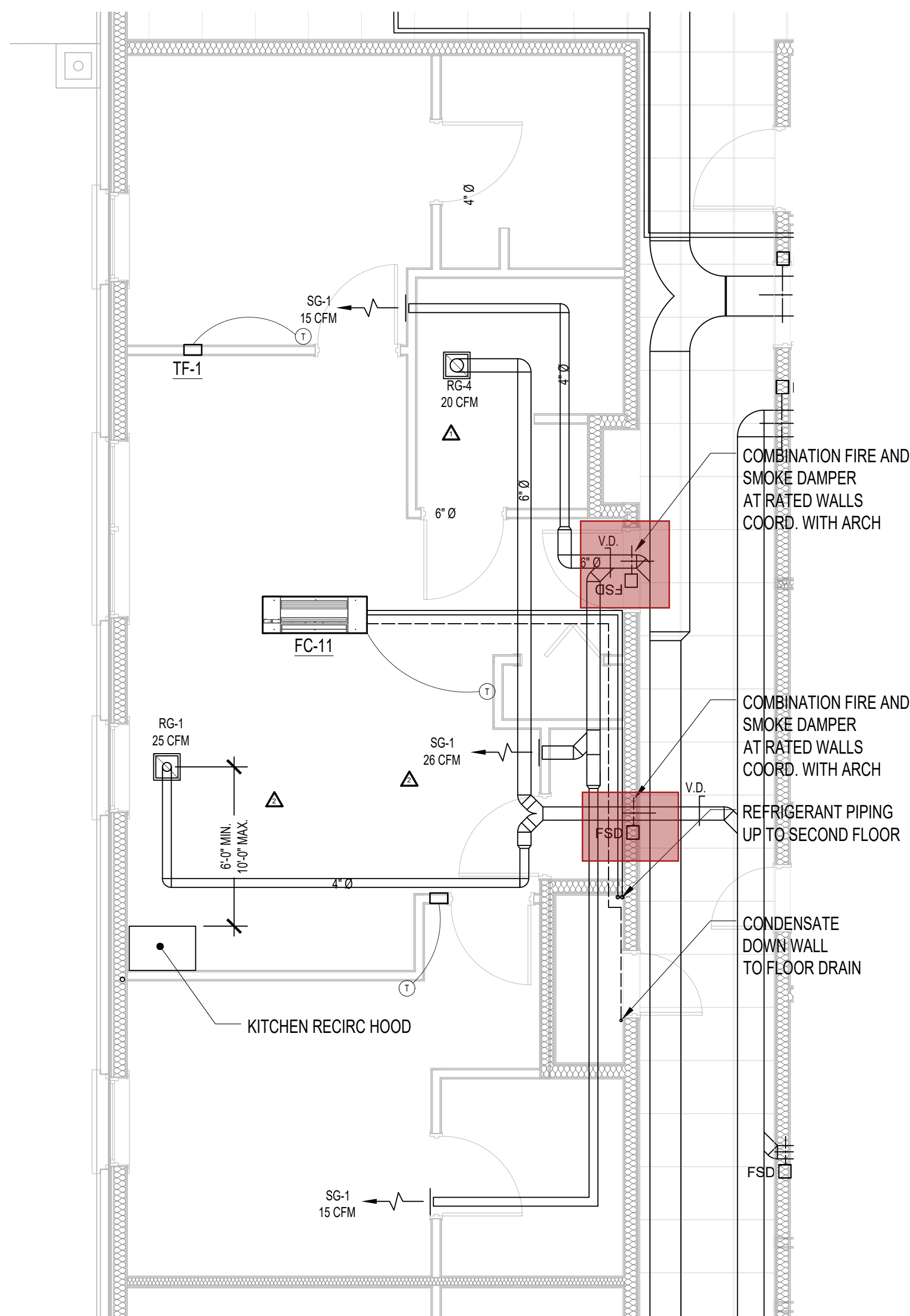
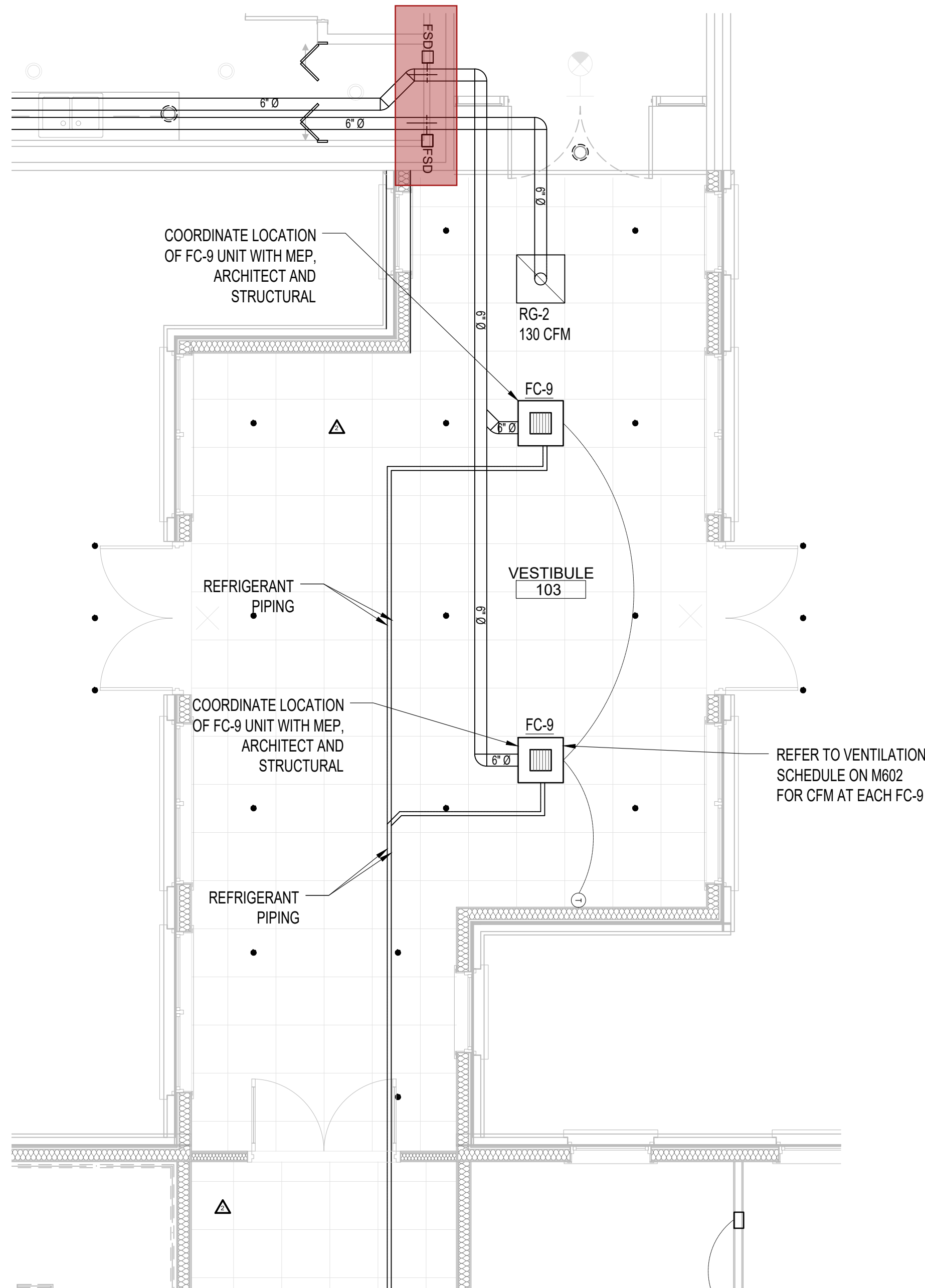
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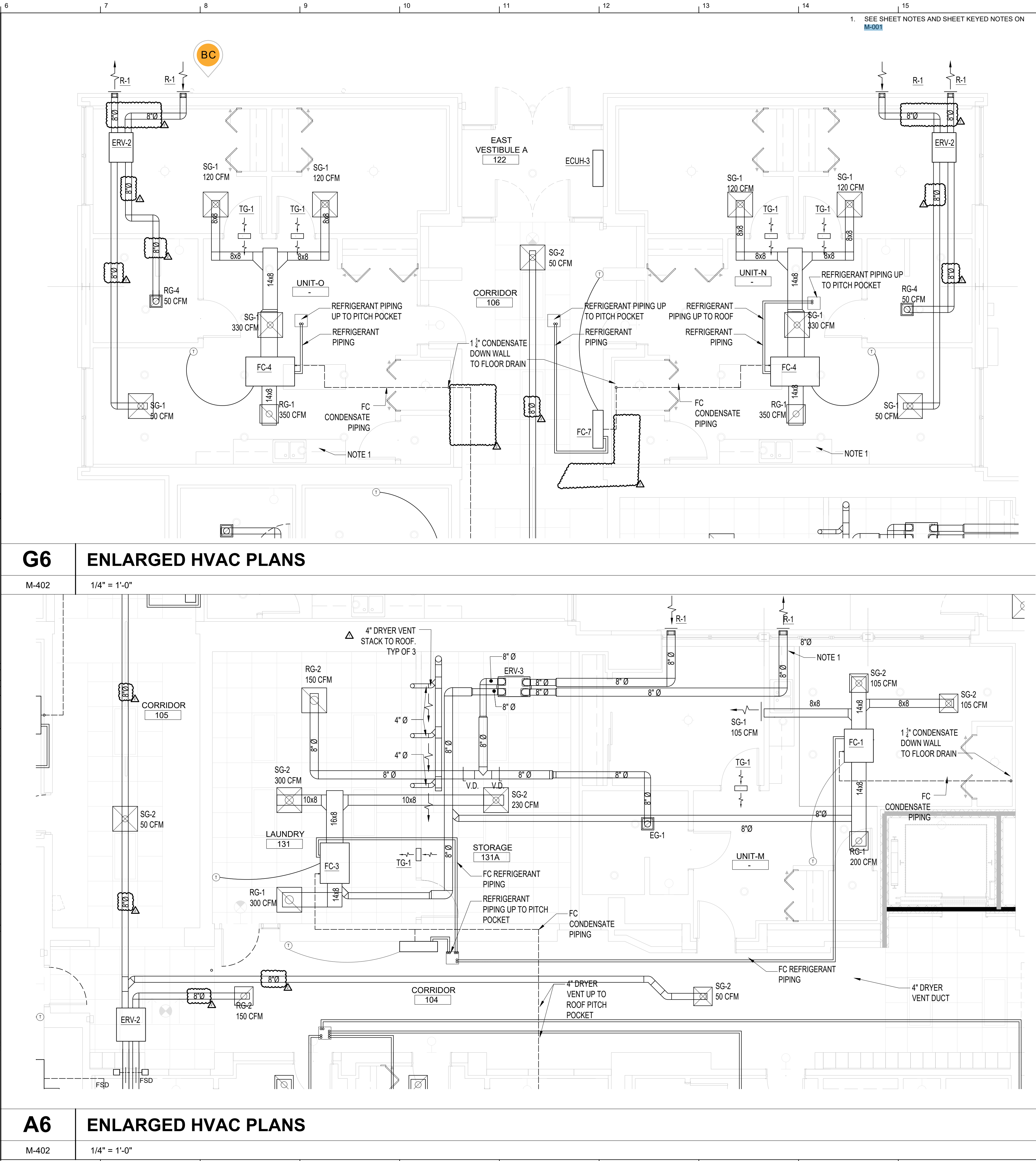
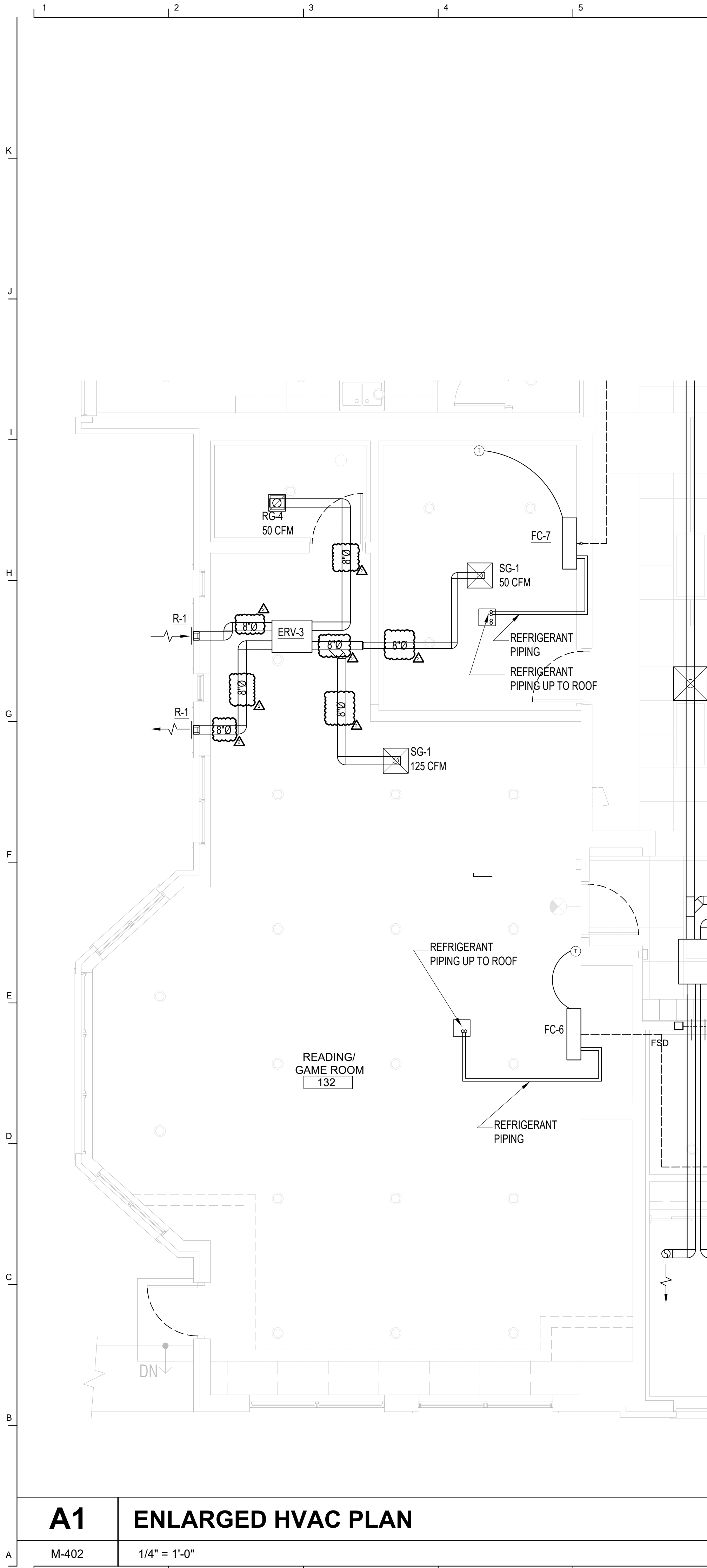




A6 ENLARGED HVAC PLAN

A11 | **2B UNIT B (A SIM) - HVAC PLAN**

12/2/2025 7:06:27 PM



1. SEE SHEET NOTES AND SHEET KEYED NOTES ON [M-001](#)

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REGISTRATION SEAL

KEY PLANS

SHEET TITLE

**MECHANICAL HVAC
ENLARGED PLANS**

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FILE NO.

SHEET NO.



MECHANICAL HVAC ENLARGED PLANS

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Δ BULLETIN 6	12.03.25

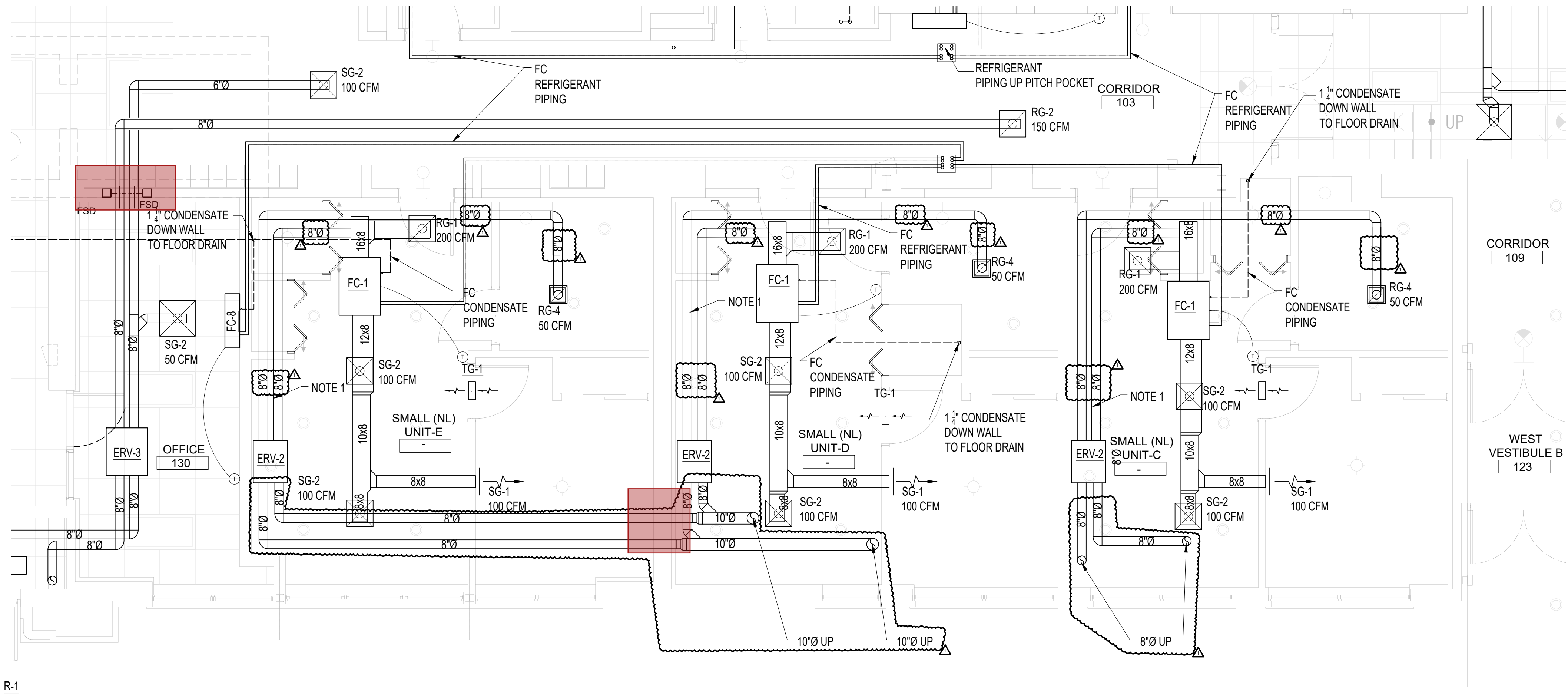
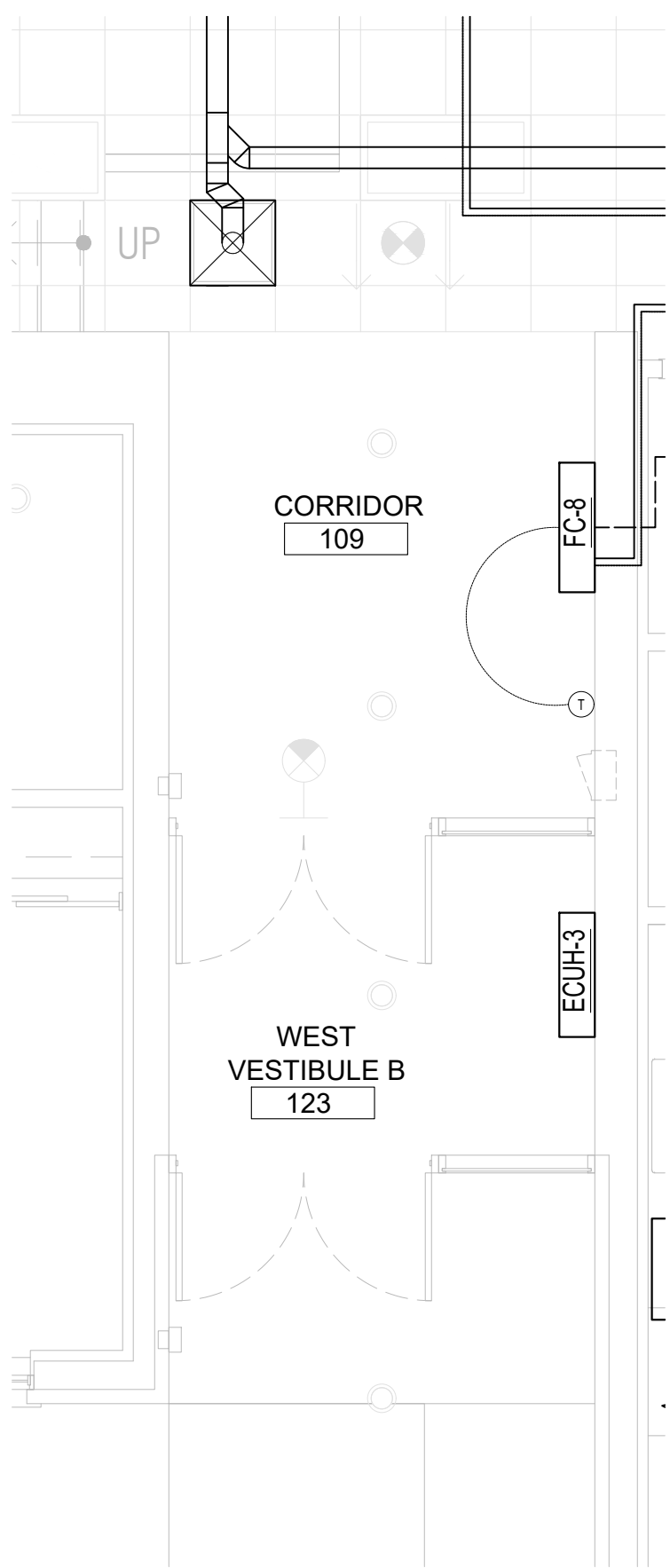
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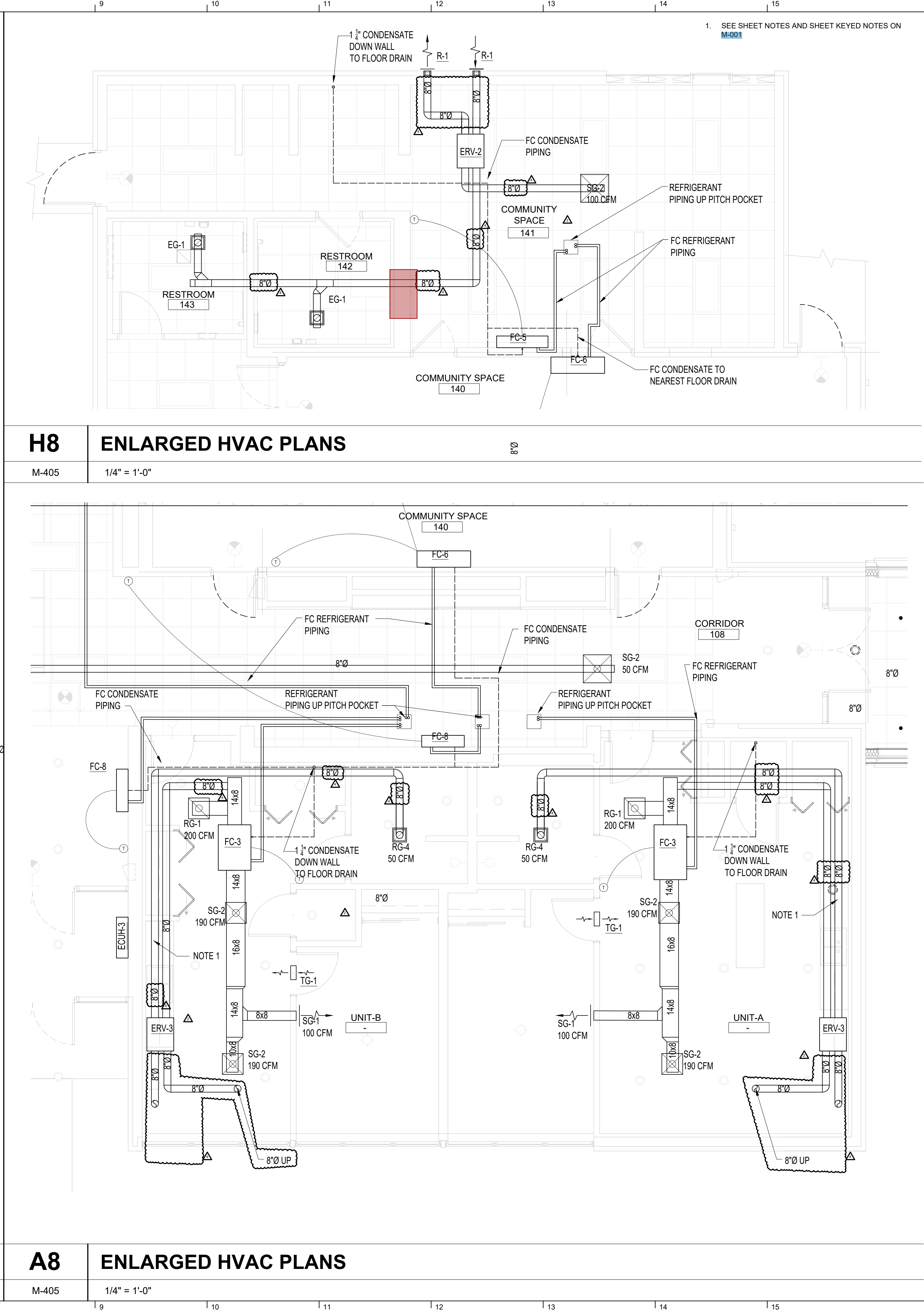
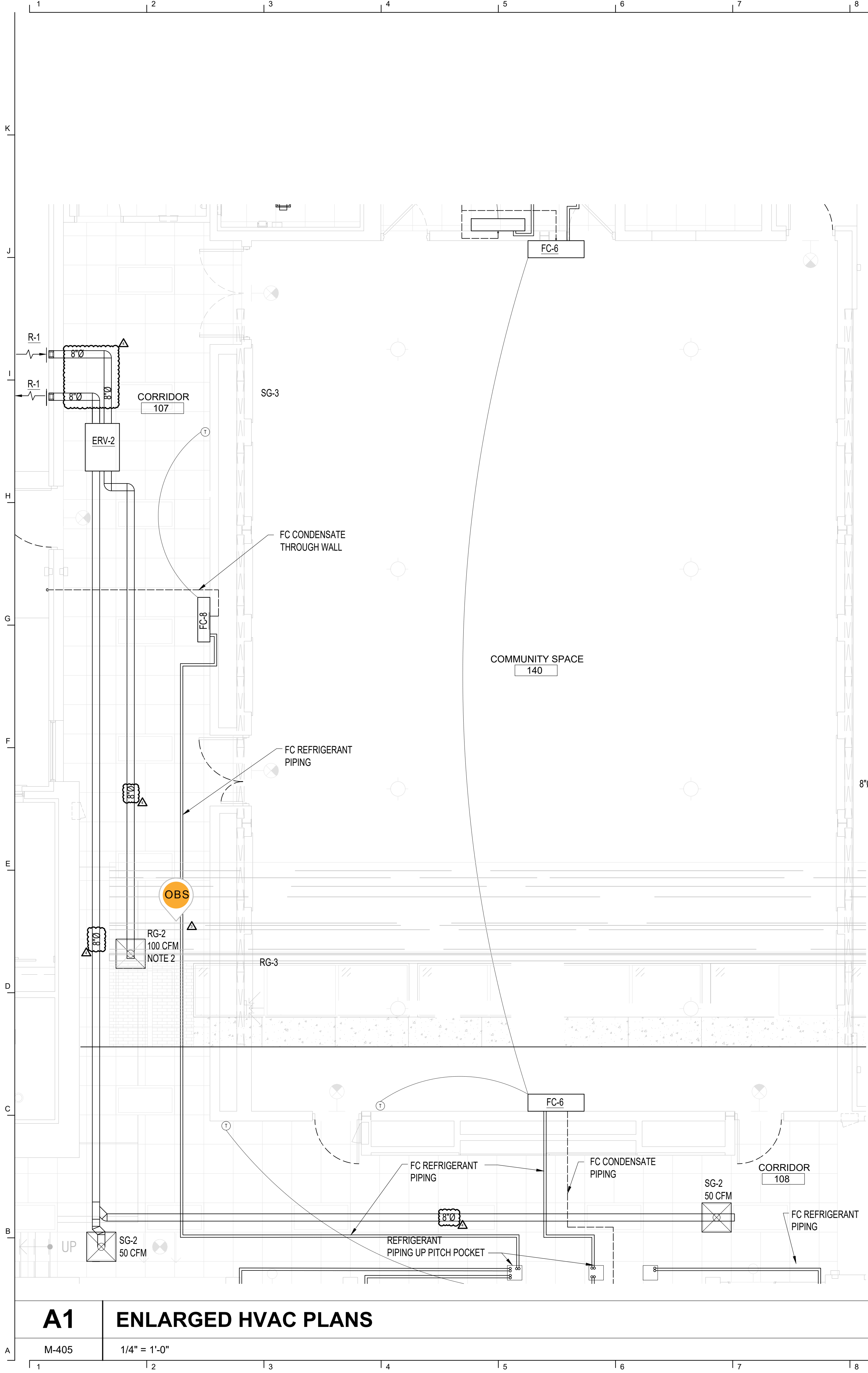
A1 | **ENLARGED HVAC PLAN**

A5 ENLARGED HVAC PLANS

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M-404

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REGISTRATION SEAL

KEY PLANS

SHEET TITLE

MECHANICAL HVAC
ENLARGED PLANS

SCALE: AS NOTED

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5.19.25

▲ BULLETIN 6

12.03.25

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M-405

FILE NO.

SHEET NO.



SHEET TITLE

MECHANICAL HVAC
ENLARGED PLANS

SCALE: AS NOTED

ISSUED FOR	DATE
PERMIT	10.20.24
△ BULLETIN 3	5.19.25
△ BULLETIN 5	10.13.25
△ BULLETIN 6	12.03.25

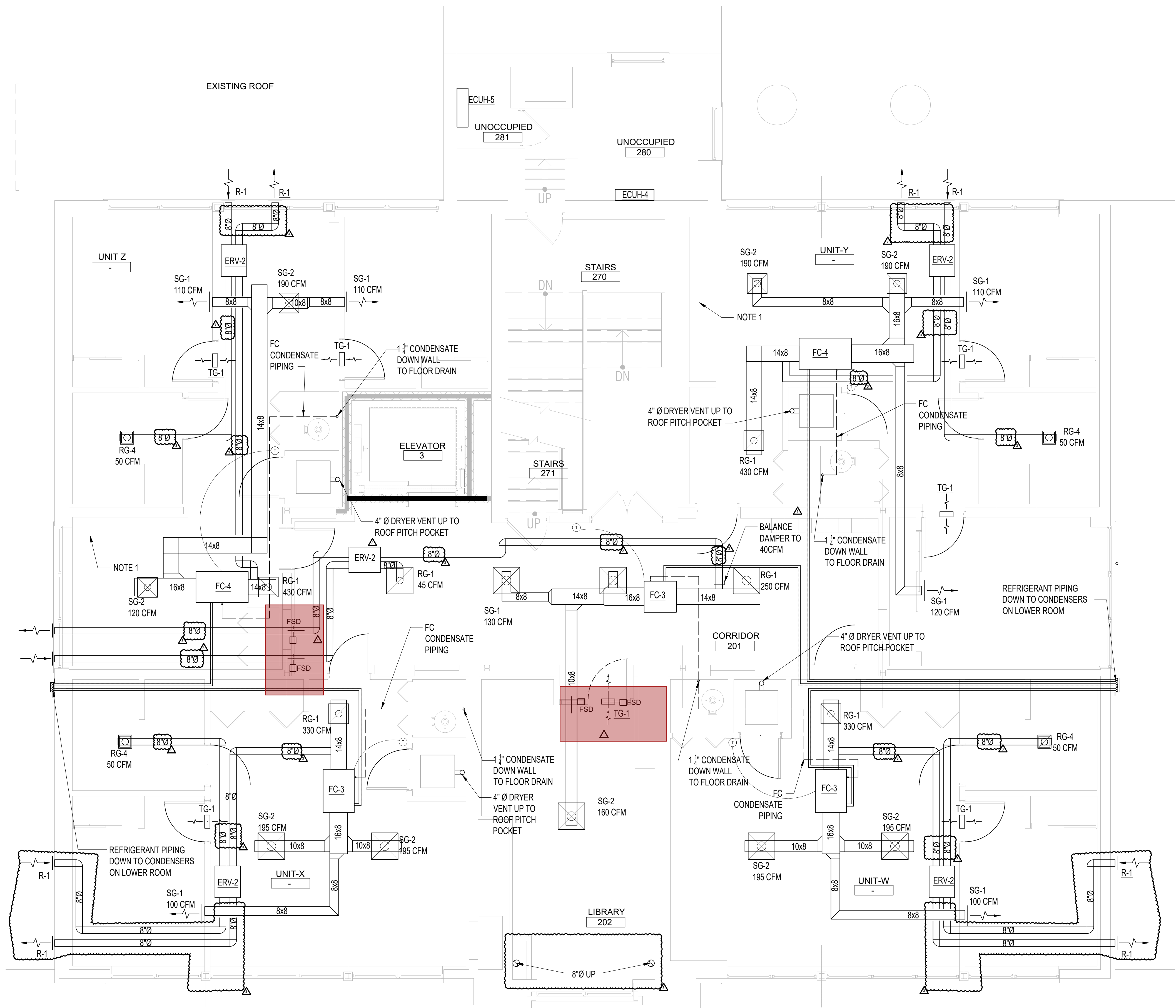
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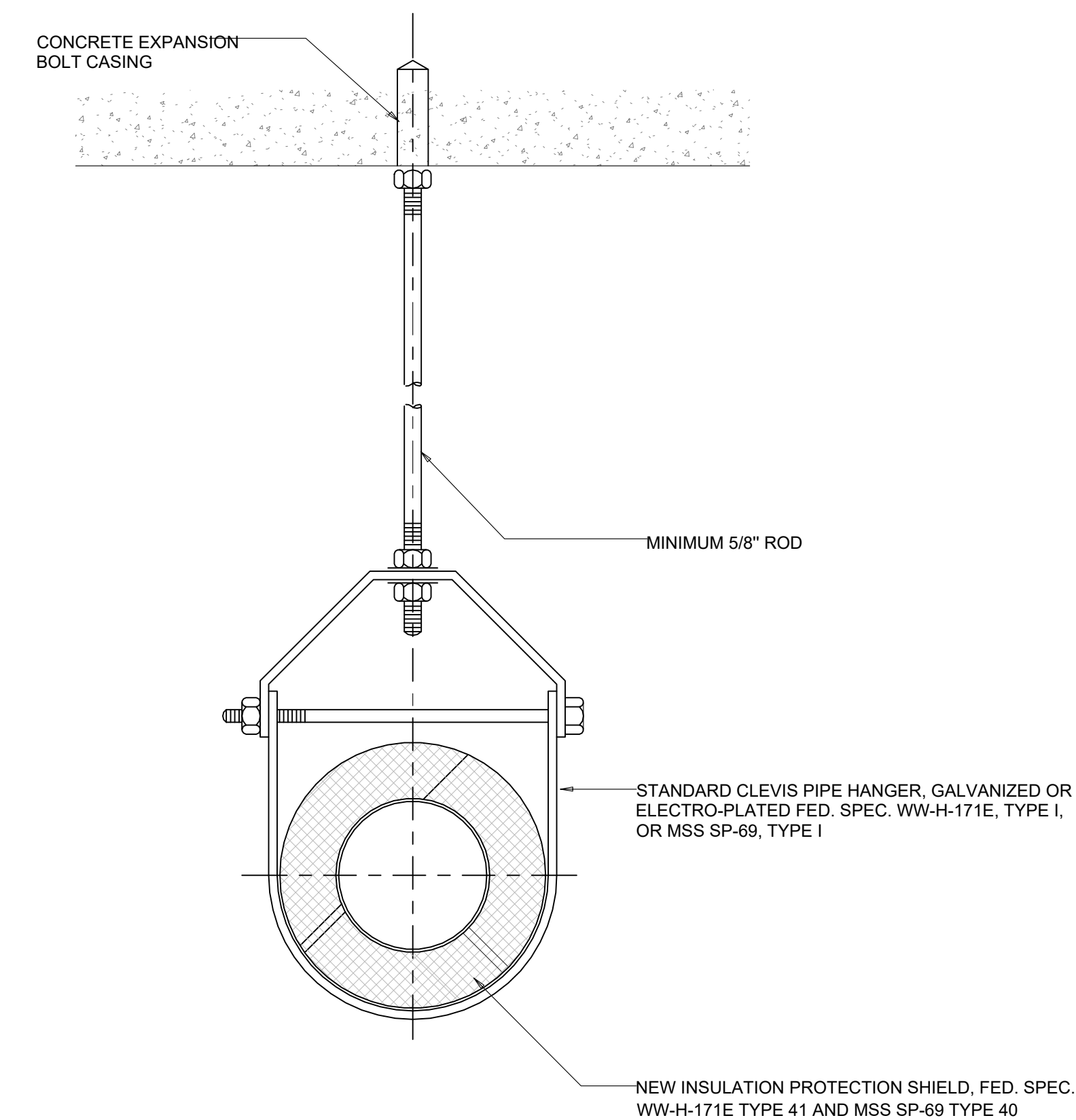
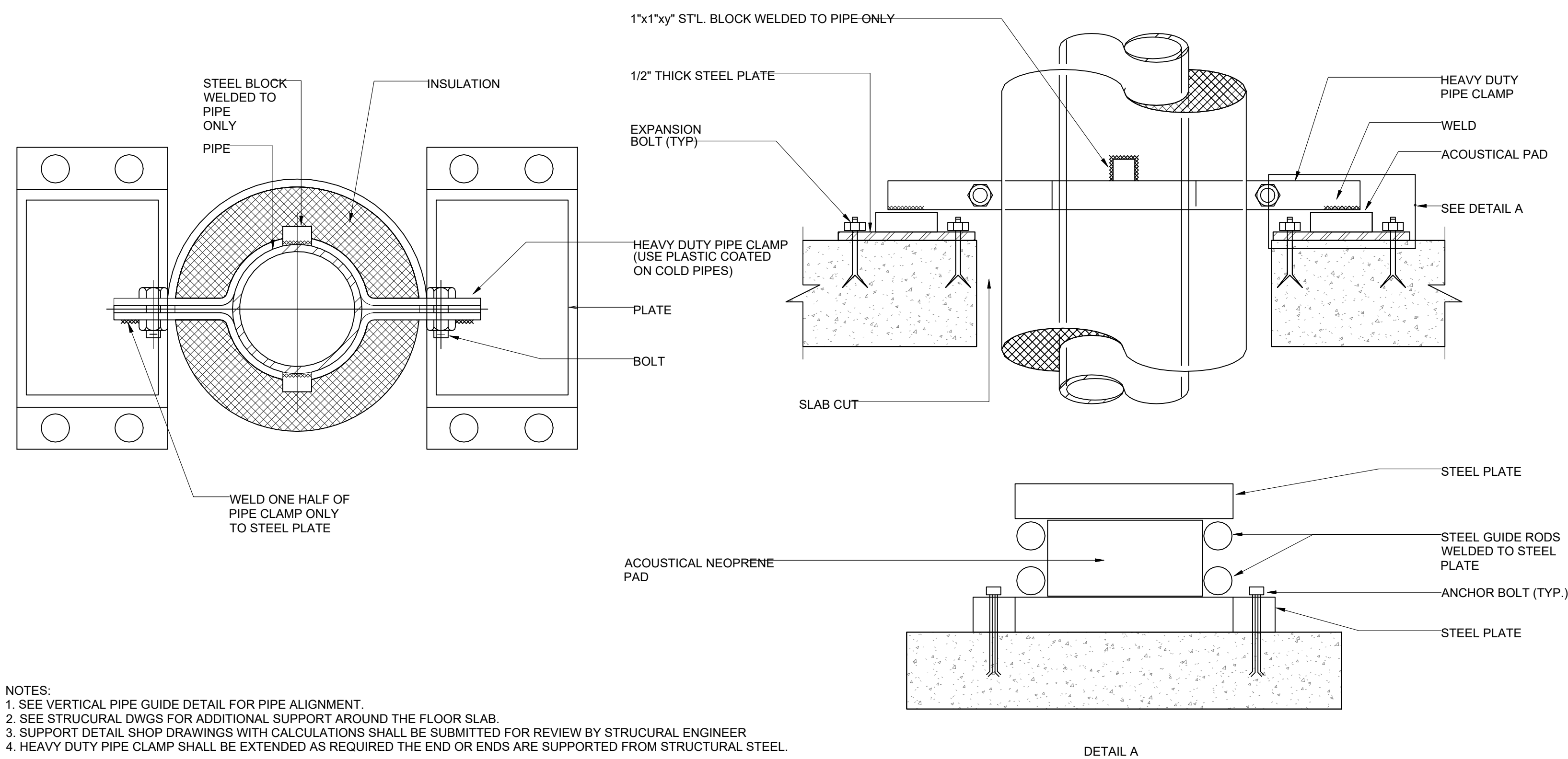


A1 ENLARGED HVAC PLANS

A5 ENLARGED HVAC PLANS

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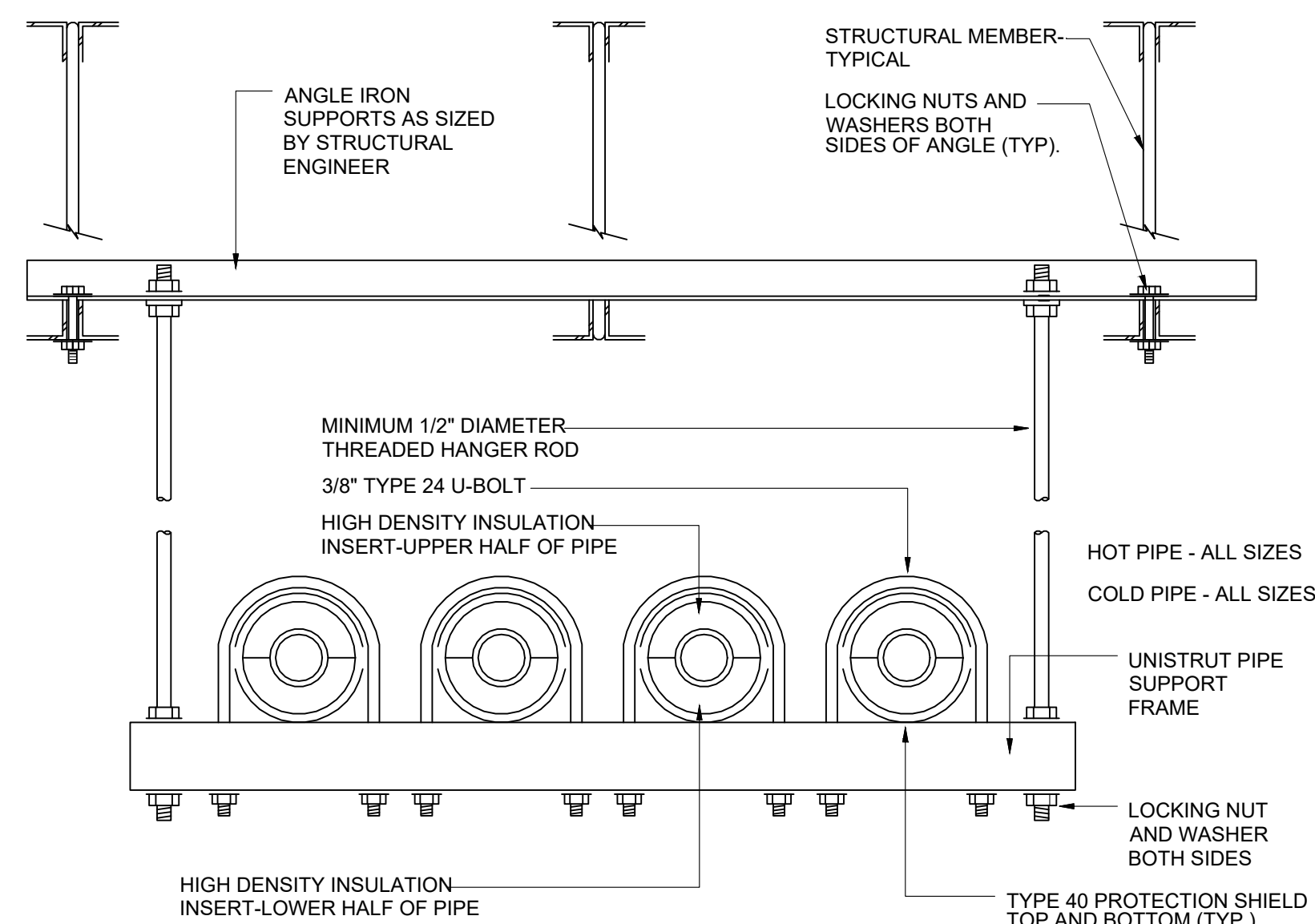
M-406



G1	VERTICAL PIPE SUPPORT
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M-502

NTS



INDIVIDUAL PIPE HANGER ROD & SPACING SCHEDULE											
NOMINAL PIPE OR TUBE SIZE- INCHES	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	--
HANGER ROD SIZE-INCHES	3/8	3/8	3/8	3/8	1/2	1/2	5/8	5/8	7/8	7/8	--
MAXIMUM SPACING BETWEEN INCHES	6	7	9	10	11	12	14	16	17	19	--
MAXIMUM SPACING BETWEEN CU, TUBE SUPPORT IN FEET	6	6	8	9	10	10	12	14	14	16	--

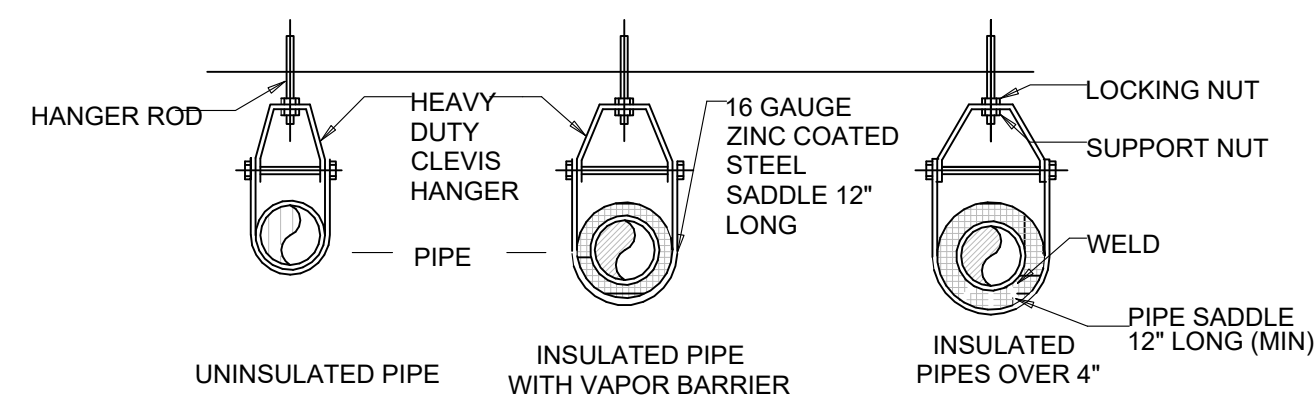
NOTES:

1. TRAPEZE SPACING SHALL BE BASED ON SPACING OF SMALLEST PIPE ON TRAPEZE.
2. TRAPEZE SHALL BE DESIGNED WITH A FACTOR OF SAFETY 5 FOR CENTER OF SPAN CONCENTRATED LOAD.
3. METHOD OF HANGING, TYPE OF INSERT, BEAM CLAMP, ROD, ETC. MUST BE APPROVED BY STRUCTURAL ENGINEER PER APPROVED DRAWING.
4. FOR ALL UNINSULATED COPPER PIPING, HANGERS SHALL MATCH IN MATERIAL TYPE SO AS TO AVOID DISSIMILAR METAL CORROSION. THE USE OF NEOPRENE OR PVC SADDLES IS UNACCEPTABLE.

A1 TRAPEZE PIPE HANGERS

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INDIVIDUAL PIPE HANGER ROD & SPACING SCHEDULE											
NOMINAL PIPE OR TUBE SIZE-INCHES	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	--
HANGER ROD SIZE-INCHES	3/8	3/8	3/8	3/8	1/2	1/2	5/8	5/8	7/8	7/8	--
MAXIMUM SPACING BETWEEN PIPE SUPPORT-FEET	6	7	9	10	11	12	14	16	17	19	--
MAXIMUM SPACING BETWEEN CU. TUBE SUPPORT-FEET	6	6	8	9	10	10	12	14	14	16	--

NOTES:

1. TRAPEZE SPACING SHALL BE BASED ON SPACING OF SMALLEST PIPE ON TRAPEZE.
2. TRAPEZE SHALL BE DESIGNED WITH A FACTOR OF SAFETY 5.0 FOR CENTER OF SPAN CONCENTRATED LOAD.
3. METHOD OF CHANGING, TYPE OF INSERT, BEAM CLAMP, ROD, ETC. MUST BE APPROVED BY STRUCTURAL ENGINEER PER SHOP DRAWINGS.
4. FOR ALL UNSULPHATED COPPER PIPING, HANGERS SHALL MATCH IN MATERIAL TYPE SO AS TO AVOID DISSIMILAR METAL CORROSION. THE USE OF NEOPRENE OR PVC SADDLES IS UNACCEPTABLE.

A6 TYPICAL CLEVIS HANGER SUPPORTS

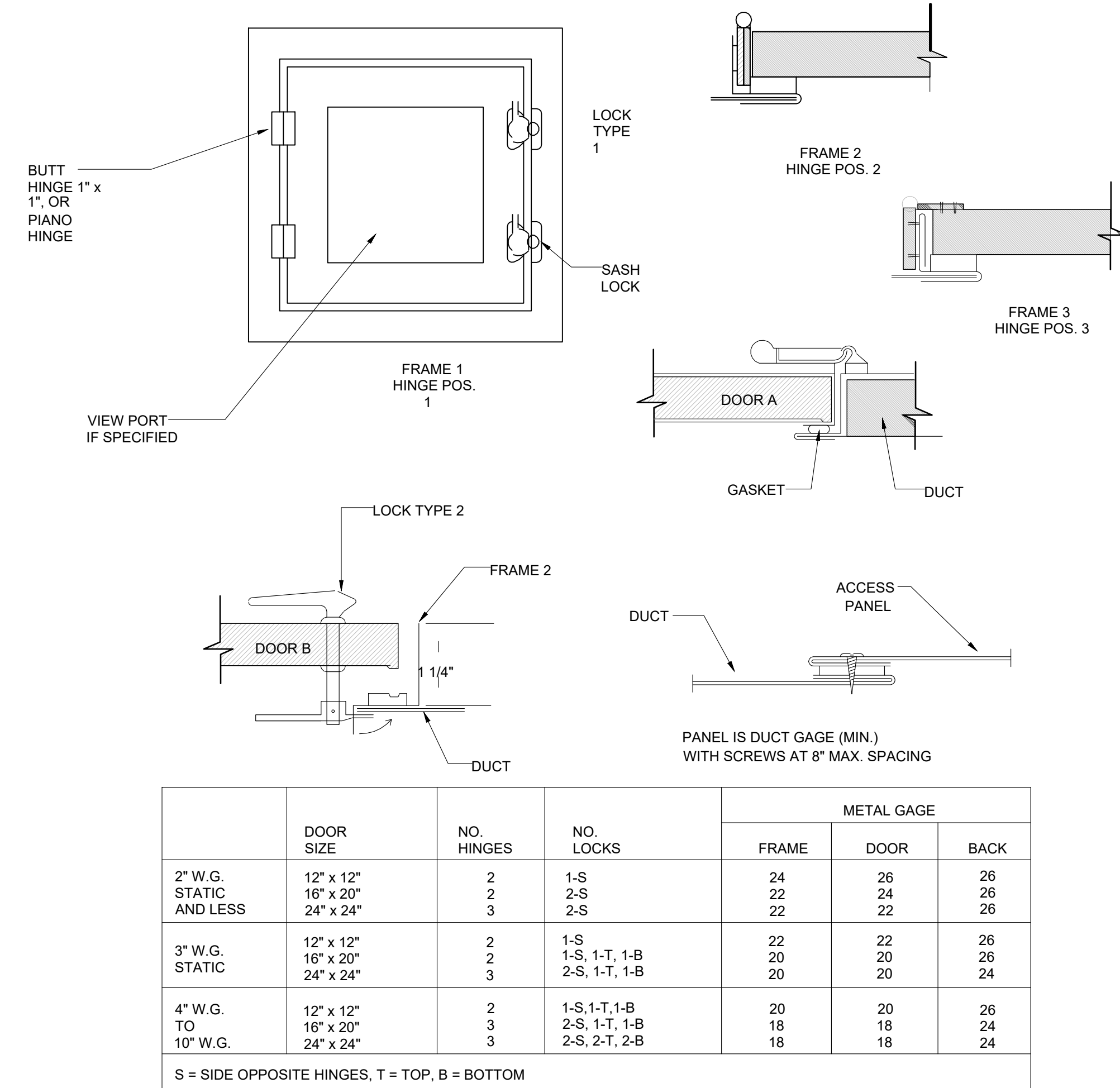
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G11 SUPPORT SYSTEM FOR INSULATED PIPES

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A11 DUCT ACCESS DOORS

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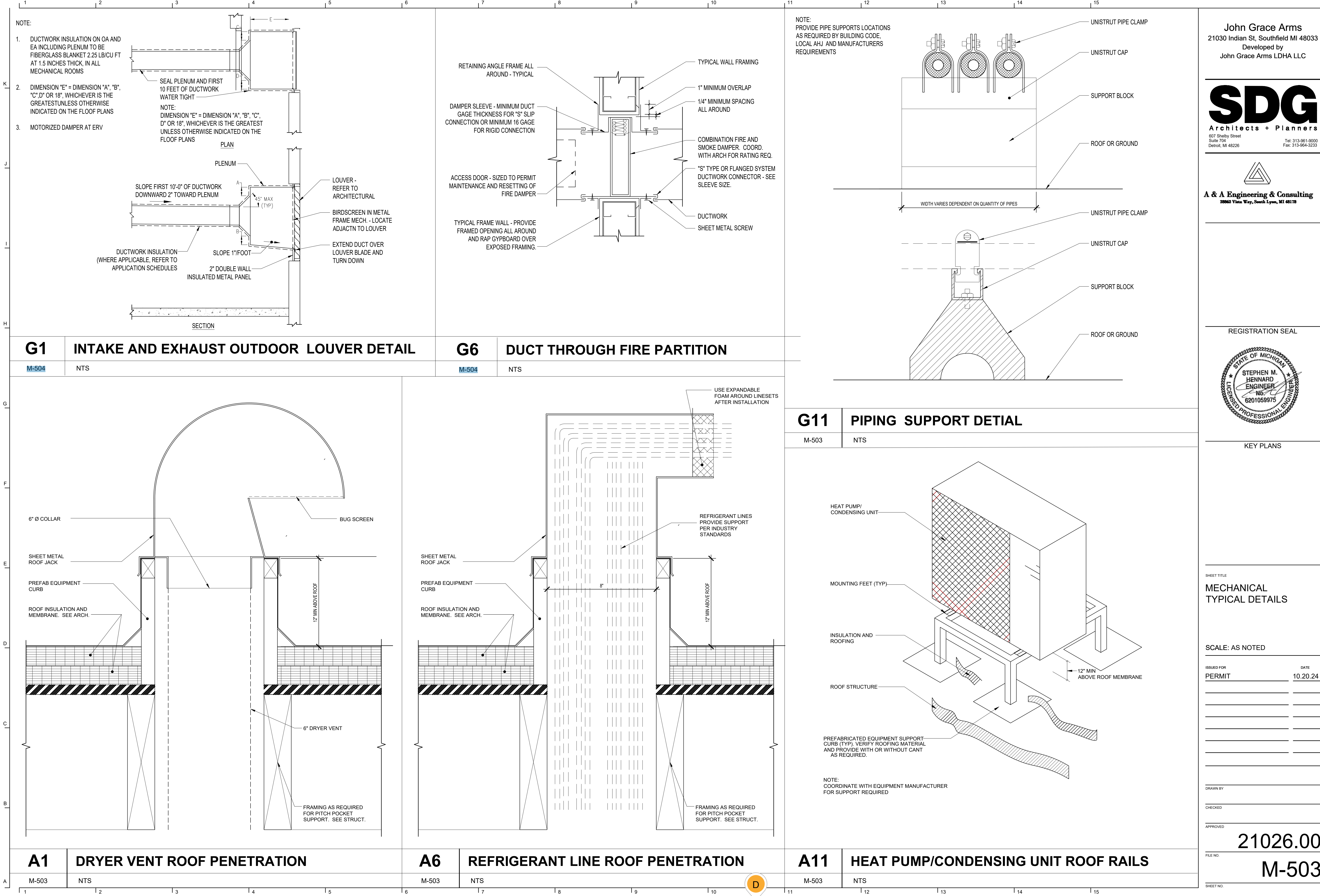
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RETAINING ANGLE FRAME ALL AROUND - TYPICAL NORMALLY CLOSED ELECTRIC ACTUATOR MOUNTED ON OUTSIDE OF DUCTWORK ACCESS DOOR - SIZED TO PERMIT MAINTENANCE AND RESETTING OF FIRE DAMPER DAMPER SLEEVE - MINIMUM DUCT GAGE THICKNESS FOR "S" SLIP CONNECTION OR MINIMUM 16 GA FOR RIGID CONNECTION TYPICAL FRAME WALL - PROVIDE FRAMED OPENING ALL AROUND AND WRAP GYP BD. OVER EXPOSED FRAMING TYPICAL WALL 1" MIN. OVERLAP 1/4" MIN. SPACING ALL AROUND 1-1/2" HR. UL 555-S COMBINATION FIRE AND SMOKE DAMPER "S" TYPE OR FLANGED SYSTEM DUCTWORK CONNECTOR - SEE SLEEVE SIZE. DUCTWORK SHEET METAL SCREW NOTES: 1. PROVIDE FIRESTAT OPTION FOR DAMPER RESET 2. ELECTRICA ACTUATOR TO BE SPRING LOADED TO CLOSE DAMPER UPON LOSS OF POWER 3. PROVIDED AND INSTALLED BY MECHANICAL CONTRACTOR , WIRED BY CONTROLS/FIRE ALARM CONTRACTOR		ACCU-9 36 MBH 2 PIPE REFRIGERANT LINE SET SYSTEM FIELD WIRING AND COMMUNICATION FC-9 15 MBH FC-9 15 MBH ROOF LEVEL FIRST FLOOR SECOND FLOOR MULTI-ZONE HEAT PUMP SYSTEM		EA EXHAUST AIR GRAVITY BACKDRAFT DAMPER 100% OA OUTDOOR AIR DAMPER ERV-X WITH PACKAGED CONTROLS ISOLATION SMOKE DAMPER ISOLATION SMOKE DAMPER GENERAL EXHAUST AIR NEUTRAL VENTILATION SUPPLY AIR 208V POWER SUPPLY SAFETY INTERLOCK FROM FIRE ALARM SYSTEM BACnet COMMUNICATIONS TO BAS 1. ERV SHALL BE SUPPLIED TO INCLUDE DAMPERS, FIRE ALARM INTERFACE CONTROLS AND ELECTRIC DUCT HEATER CONTROLS. UNIT SUPPLIED WITH 208V AND SEPARATE 120V FOR CONTROL PANEL. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FIELD WIRING REQUIRED FOR OPERATION AND CONTROL OF ERV. 2. CONTRACTOR SHALL PROVIDE ALL FIRE ALARM COMPONENTS AND WIRING TO TIE ERV INTO FIRE ALARM PANEL. COORDINATE WITH FIRE ALARM CONTRACTOR FOR SEQUENCE AND FINAL TIE INTO FIRE ALARM SYSTEM. SEQUENCE OF OPERATION: 1. ERV SHALL MAINTAIN A NEUTRAL AND CONSTANT DISCHARGE AIR TEMPERATURE AND CFM FOR BUILDING VENTILATION REQUIREMENTS. 2. SUPPLY FAN AND EXHAUST FAN SPEEDS TO BE SET AT CONSTANT SPEED TO ACHIEVE CFM RATING REQUIRED, SEE DRAWING AND VENTILATION SCHEDULE FOR SETPOINTS. 3. DUCT ELECTRIC COIL SCR SHALL BE MODULATED BY A DUCT MOUNTED TEMPERATURE SENSOR TO MAINTAIN A DISCHARGE AIR TEMPERATURE OF 60 DEGREES F, TEMPERATURE TO BE ADJUSTABLE. 4. DUCT SMOKE DETECTORS SHALL DEACTIVATE ERV UNIT THRU FIRE ALARM SYSTEM CONTROL MODULE.
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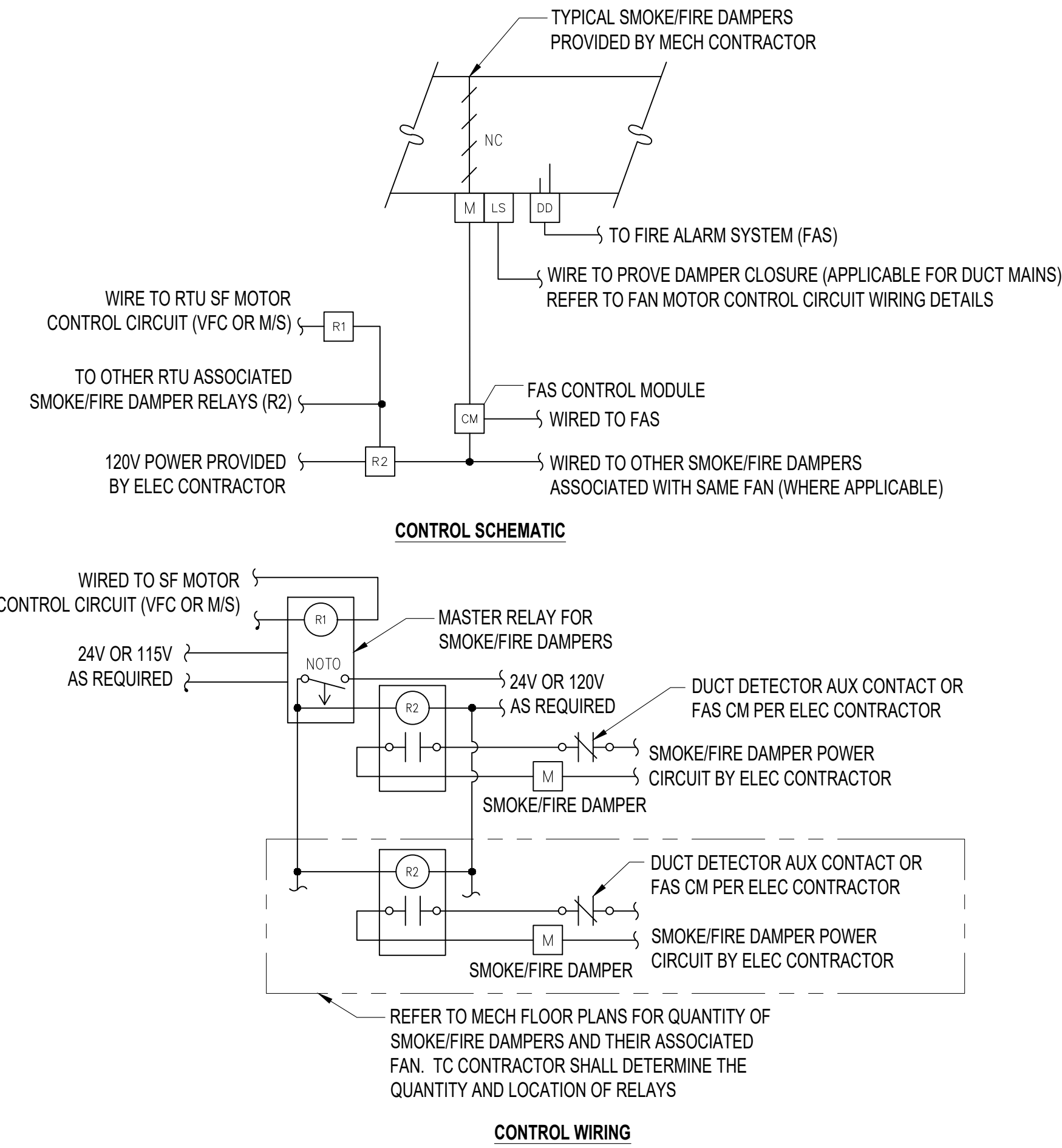
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- NOTES:
- REFER TO FLOOR PLANS FOR QUANTITY 7 LOCATION OF THE SMOKE/FIRE DAMPERS AND ASSOCIATED HEAT PUMP UNIT
 - ELECTRICAL CONTRACT SHALL PROVIDE 120V POWER REQUIREMENT FOR SMOKE/FIRE DAMPER ACTUATOR(S)
 - TC CONTRACTOR SHALL PROVIDE CONTROL RELAY IN ENCLOSURE FOR SMOKE/FIRE DAMPER CONTROL. IF MULTIPLE POWER CIRCUITS ARE USED FOR SMOKE/FIRE DAMPERS ASSOCIATED WITH COMMON FAN, MULTIPLE CONTROL RELAYS SHALL BE USED AND WIRED IN PARALLEL.
 - SMOKE/FIRE DAMPERS SHALL BE SHIPPED AS AN ASSEMBLY FOR INSTALLATION ON SITE AND BEAR THE UL LISTING LABEL
- SEQUENCE OF OPERATION**
- SMOKE/FIRE DAMPERS SHALL BE HARDWIRE INTERLOCKED TO ASSOCIATE FAN CONTROLS AND SHALL OPEN WHEN FAN IS ACTIVATED AND CLOSE WHEN FAN IS DEACTIVATED.
 - WHEN PRODUCTS OF COMBUSTION ARE DETECTED AT DUCT SMOKE/FIRE DETECTOR, FIRE ALARM SYSTEM SHALL CLOSE RESPECTIVE SMOKE/FIRE DAMPERS AND DEACTIVATE ASSOCIATED FAN
 - WHERE APPLICABLE, FIRE/SMOKE/FIRE DAMPER LIMIT (ES) SWITCH SHALL BE HARDWIRE INTERLOCKED TO RESPECTIVE FAN CONTROL CIRCUIT TO PREVENT FAN FROM OPERATING UNTIL DAMPER(S) ARE PROVEN OPEN.

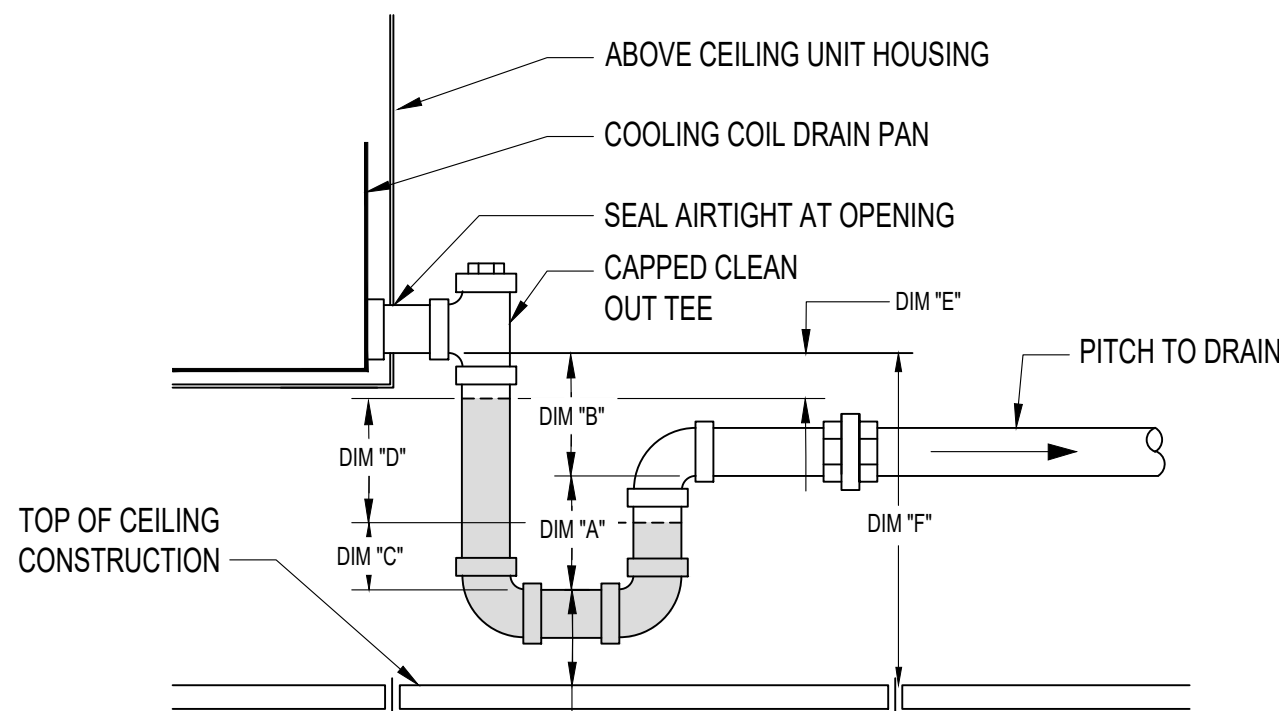
A1 DOAS 1 SMOKE/FIRE CONTROL WIRING

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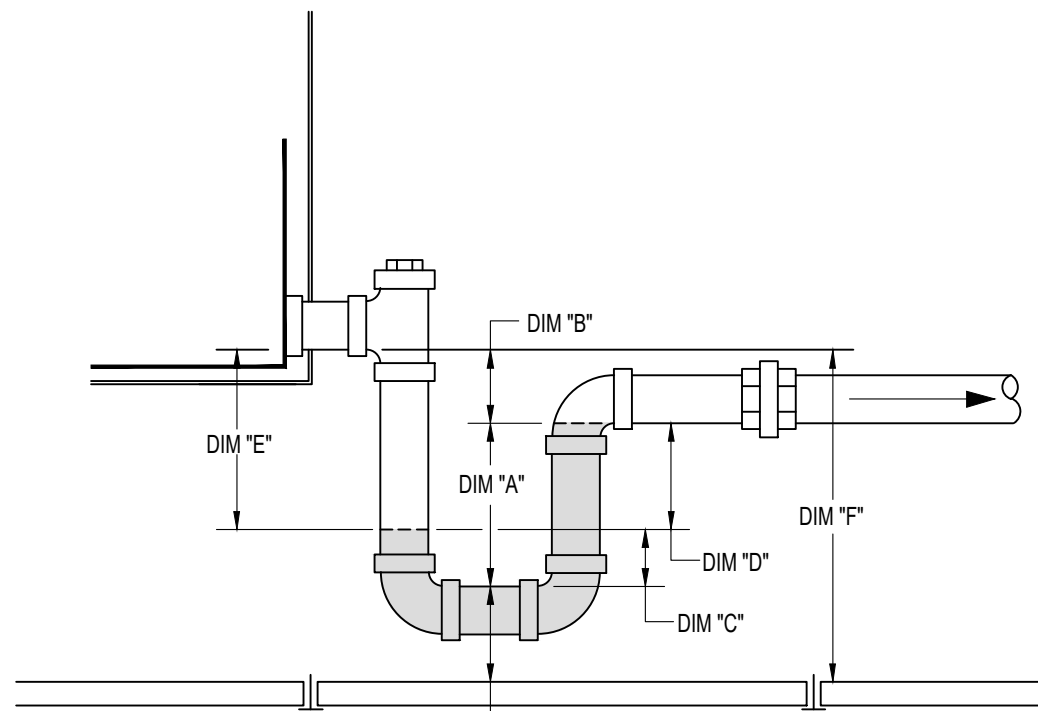
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TRAP DIMENSION TABLE										
TYPE OF SYSTEM		DIMENSIONS "A" (INCHES) MIN.	DIMENSIONS "B" (INCHES)	DIMENSIONS "C" (INCHES) (TRAP SEAL)	DIMENSIONS "D" (INCHES)	DIMENSIONS "E" (INCHES)	DIMENSIONS "F" (INCHES)			
							DRAIN PIPE SIZE (INCHES)			
DRAW THROUGH	-2.1 TO -3	3.5	3.5	2	3	2	1 1/2"	2"	2 1/2", 3"	4"
	UP TO -2	3.0	3.0	2	2	2	9.0	10.0	11.0	12.0
BLOW THROUGH	UP TO +2	4.0	2.0	2	2	4	9.0	10.0	11.0	12.0
	+2.1 TO +3	5.0	2.0	2	3	5	10.0	11.0	12.0	13.0

- NOTES:
- REFER TO TERMINAL DEVICES USED FOR COOLING, COMPUTER ROOM AIR CONDITIONING UNITS, FAN COIL UNITS SPLIT SYSTEM AIR CONDITIONING UNIT ETC. FOR (-) OR (+) STATIC PRESSURE AT COIL DRAIN PAN
 - DIMENSION "G" IS MIN: 3" FOR UP TO 1 1/2" DRAIN PIPE
4" FOR 2" DRAIN PIPE
5" FOR 2 1/2" OR 3" DRAIN PIPE
6" FOR 4" DRAIN PIPE



DRAW THROUGH

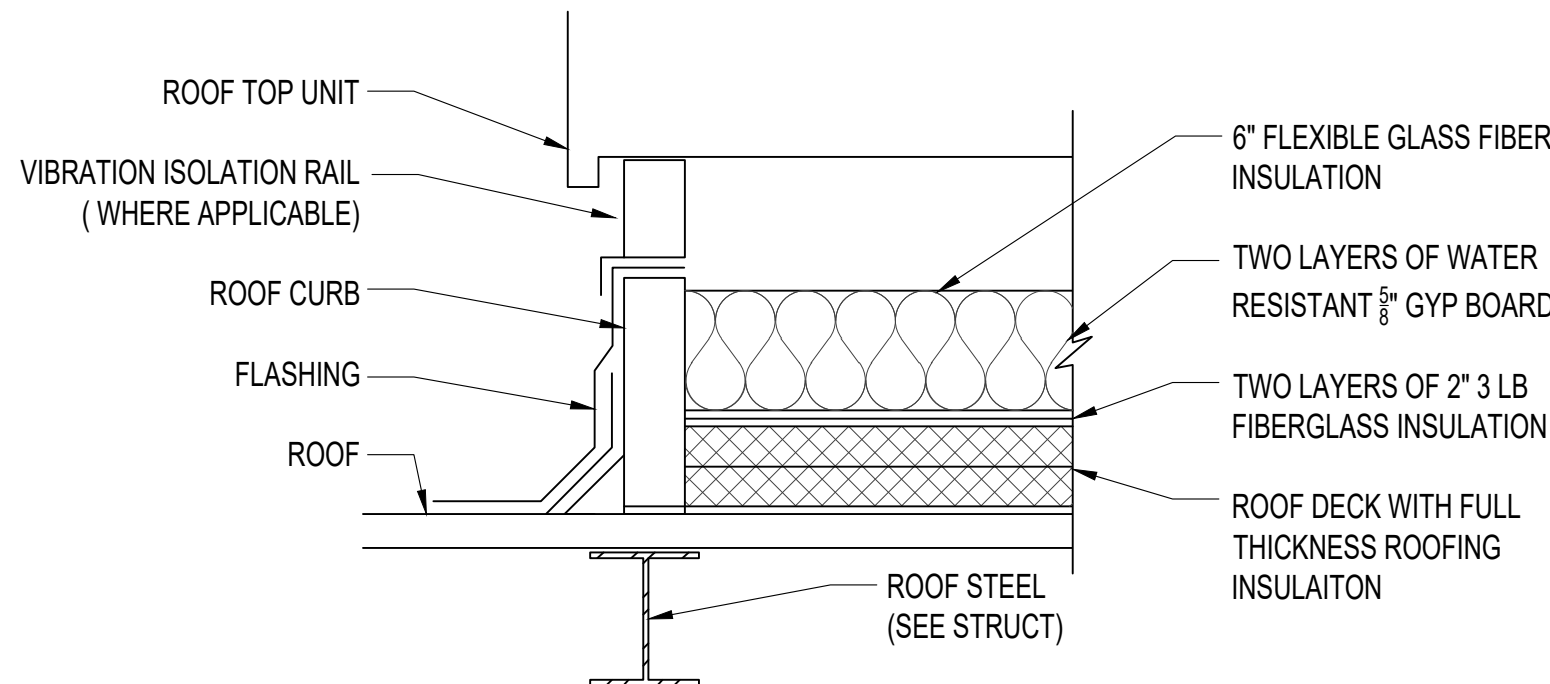


BLOW THROUGH

E6 CONDENSATE DRAIN PAN TRAP DETAIL (ABOVE CEILING UNITS)

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NOTE: ALL DUCT, PIPING, OR ELECTRICAL CONNECTIONS TO UNIT BELOW CURB SHALL HAVE FLEXIBLE CONNECTIONS. CUT INSULATION, GYP BOARD, ROOFING INSULATION, AND METAL DECKING PENETRATIONS TIGHT TO ITEM PENETRATING ROOF. PACK ALL PENETRATION OPENINGS WITH FLEXIBLE GLASS FIBER

A6 ROOF TOP UNIT CURB DETAIL

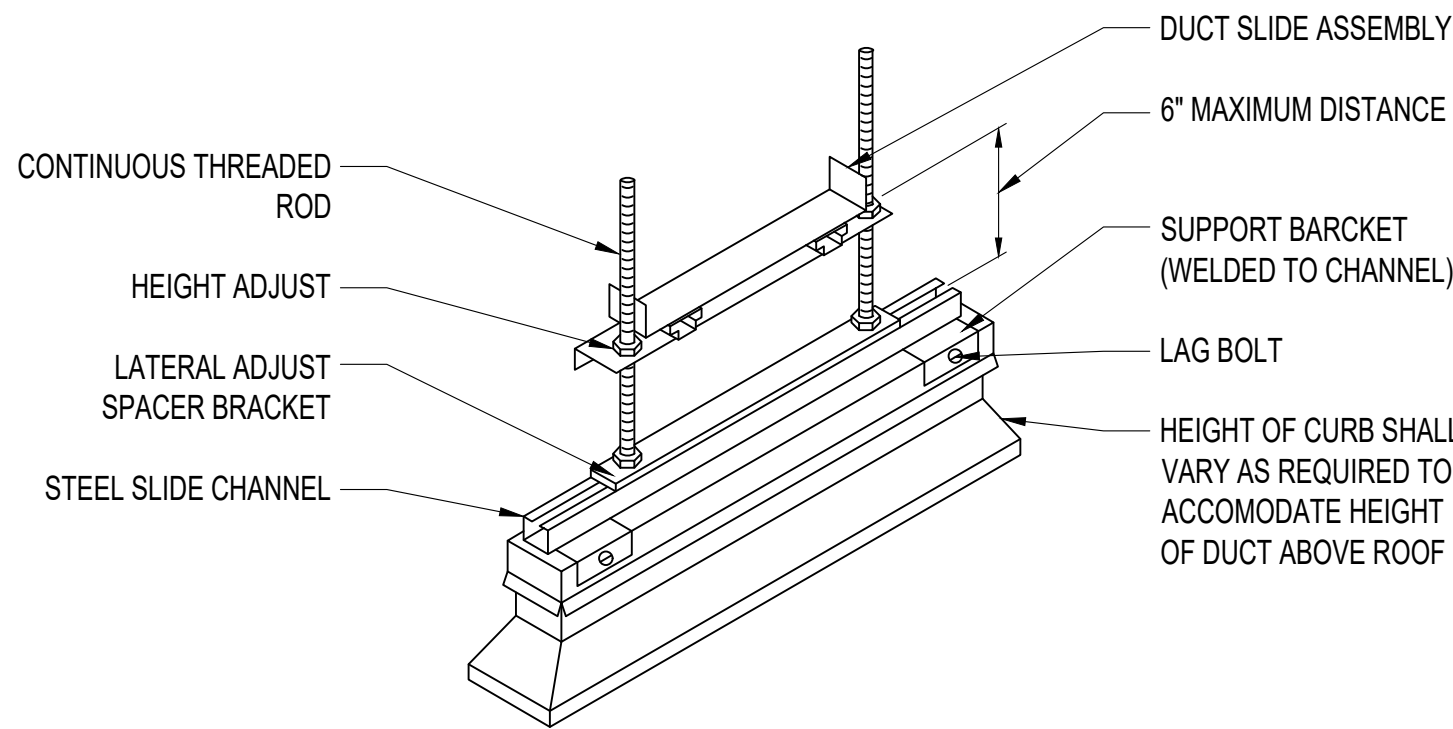
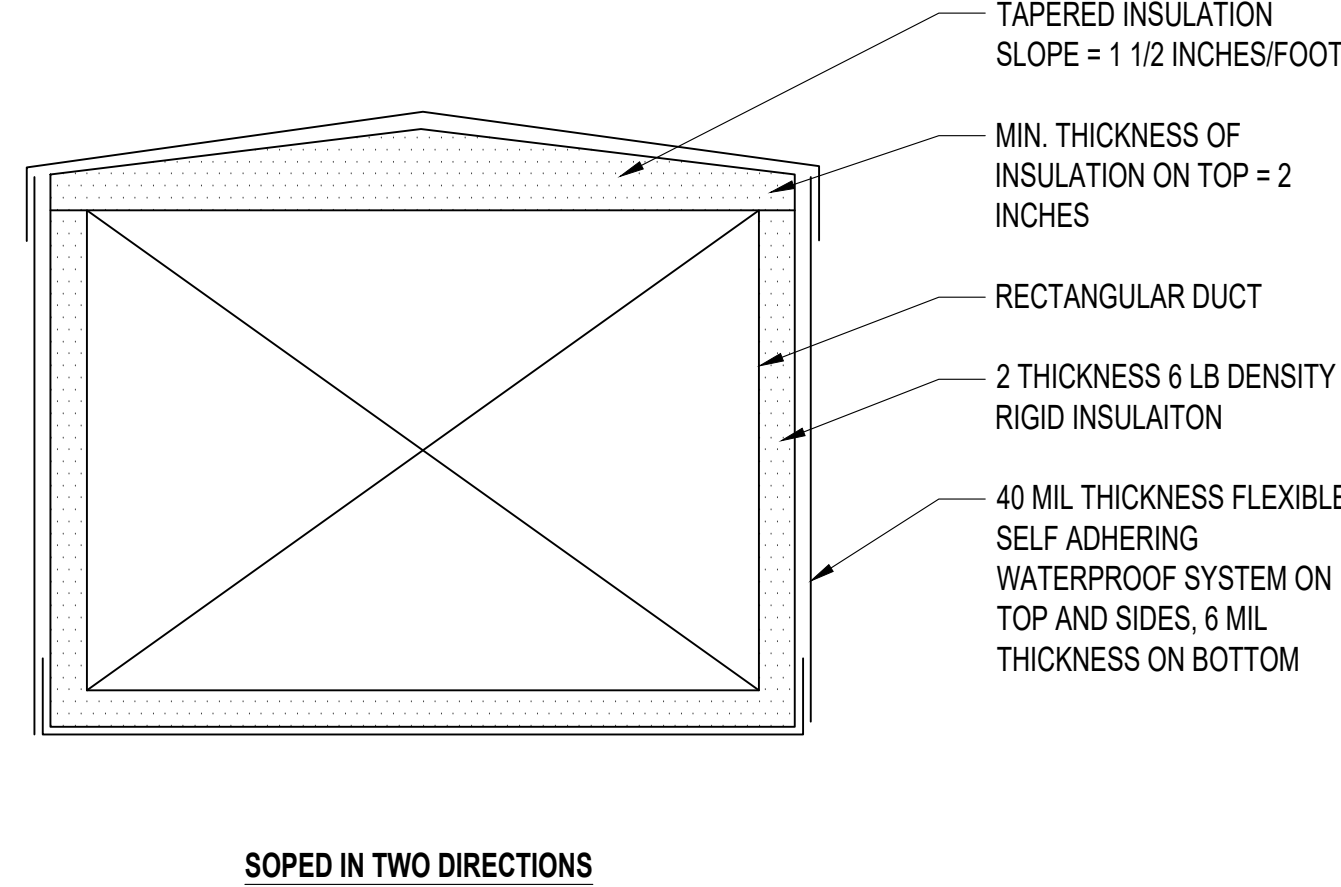
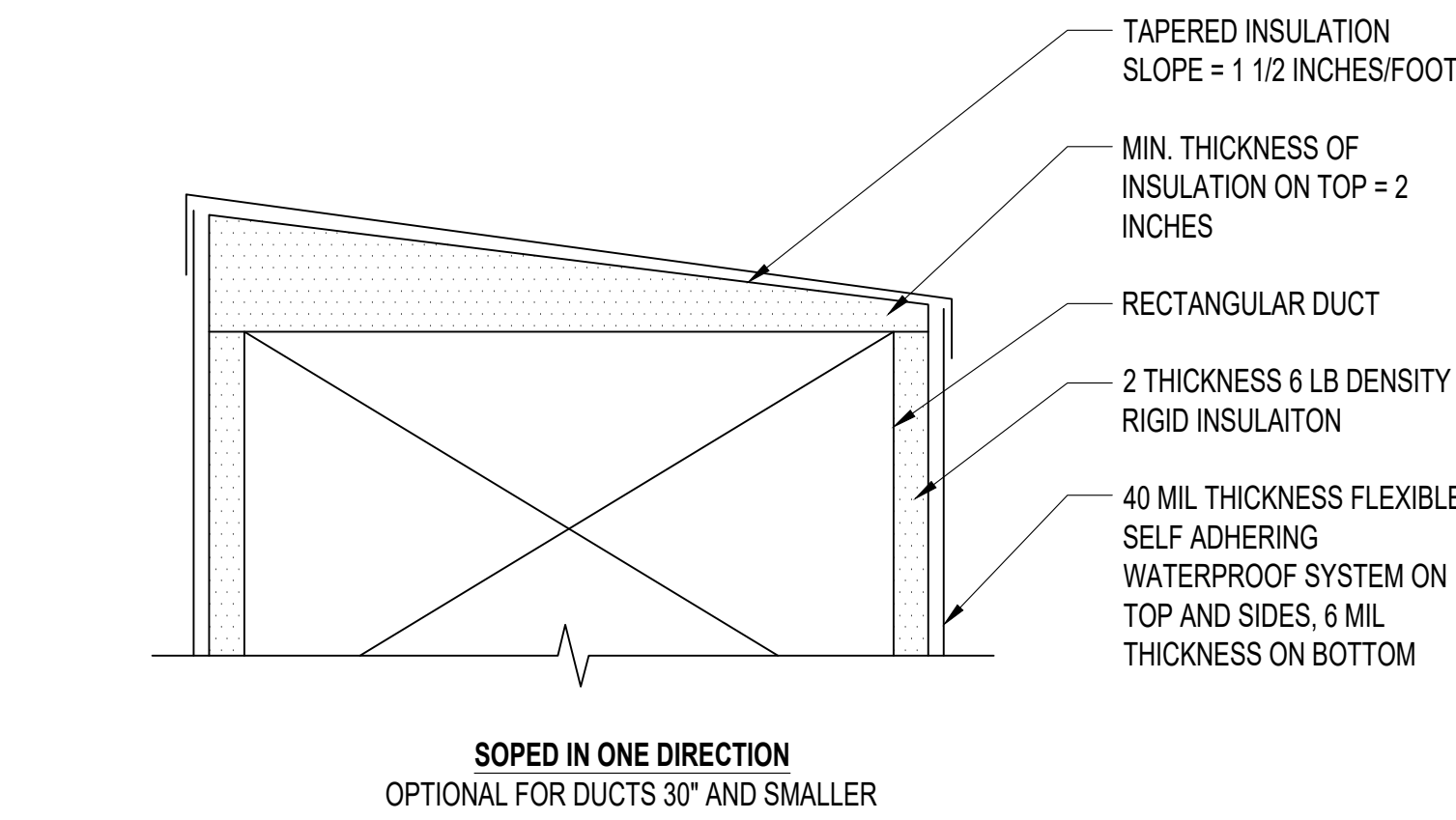
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E11 OUTDOOR DUCT INSULATION DETAIL

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A11 DUCT MOUNTING PEDESTAL DETAIL

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ENERGY RECOVERY VENTILATOR & FAN SCHEDULE

IDENTIFIER	SERVICE	LOCATION	DESIGN AIR FLOW (CFM)		QTY	EXHAUST FAN		QTY	SUPPLY FAN		QTY	HEAT EXCHANGER		QTY	ELECTRICAL DATA		DIMENSIONS (IN)			WEIGHT (LBS)	BASIS OF DESIGN		NOTES											
			OUTDOOR AIR	EXHAUST AIR		ESP (IN. WC)	MOTOR R (HP)		ESP (IN. WC)	MOTOR (HP)		EAT DB (°F)	LAT DB (°F)		RAT (°F)	SENSIBLE EFFECTIVENESS %	LATENT EFFECTIVENESS %	EAT DB (°F)	LAT DB (°F)		RAT (°F)	SENSIBLE EFFECTIVENESS %		LATENT EFFECTIVENESS %	MCA	MOCP	VOLTS/PH/Hz	L	W	H	MANUFACTURER	MODEL		
ERV -1	Addition – Floor 1 & 2	Roof	2180	1890	1	1.4	1.7	1	1.3	1.9	90	75	75	73.4%	44.4	0	46.3	51.3	66.2	66.0	11.3	15	208-230/160	81 7/8"	22"	58 1/2"	261-415	YmJmJm	AS1	5				
ERV -2	Residential units	Residential units	50-100	50-100	1	1.4		1	1-4		95			60%			32		84%				120/160	28 1/2"	23"	9 7/8"		Panasonic	Imesh-Balance FY-10VCL3	1, 3				
ERV -3	Hallways & Library Room	Various	60-200	60-200	1	0.4		1	0.4		95			61%			32		86%				120/160	27 1/2"	30 1/2"	19 1/2"		Panasonic	Imesh-Balance FY-10VCL3	1, 3				
ERV -4	Community Room (Gym)	Existing Roof	692	720	1	0.85	0.77	2	0.65	0.70	90.7	73.4	80.3	68.8	75.0	62.5	66.2%		44.4	0	46.3	51.3	66.2	66.0	11.3	15	208-230/160	81 7/8"	22"	58 1/2"	261-415	RenewAir	HE10-WITH-SS5AH-DG17-L	1, 2, 3
TF -1	Addition	Residential Units	60	0	1	0.03												120/160	3	18 3/4	7 3/4		YmJmJm	AS1	1									

- NOTES:
- Refer to manufacturer cut sheets for effectiveness for various cfm and temperature ranges.
 - Refer to manufacturer cut sheet for roof mounting detail and curb dimensions.
 - Provide access panel in location to access filters and units for proper maintenance and service.
 - Coordinate with architectural and electrical for placement in ceiling and routing of duct work. Refer to additional details and control sequence..
 - Provide 24v relay/transformer FC24 and provide necessary wiring to a 24v adjustable thermostat that meets PHILUS requirements. Coordinate location and finish with other trades and architectural plans.
 - Provide and install roof as required refer to architectural and structural drawings.
 - Unit comes pre packaged with electric pre heater at 480V 3P, MOP, 30A, MCA 32.7A. Requires separate circuit

HEAT PUMP - FCU SCHEDULE

IDENTIFIER	SERVICE	TYPE	CONDENSING UNIT	SUPPLY FAN				SOUND PRESSURE LEVEL (DB)	COOLING		HEATING TOTAL MBH	ELECTRICAL DATA				DIMENSIONS (IN)		WEIGHT (LBS)	BASIS OF DESIGN		NOTES	
				SPEED	AIR FLOW (CFM)	OUTSIDE AIR (CFM)	ESP (IN. WC)		TOTAL MBH	SENSIBLE MBH		VOLTAGE	PHASE	MCA	MOCP	W	H		D	MANUFACTURER		MODEL
FC-1	Residential units, library, offices.	Ducted	ACCU-1		317		0.2	30	0.75	9	12.5	208	1	0.74	15	31 1/8	7 7/8	27 9/16	42	Mitsubishi	SEZ-KD09NAMRT1 TH	1, 2
FC-2	Residential units, Corridors, Mechanical	Ducted	ACCU-2		388		0.2	33	1	12	15	208	1	0.80	15	39	7 7/8	27 9/16	50	Mitsubishi	SEZ-KD12NAMRT1 TH	1, 2
FC-3	Residential units, Laundry	Ducted	ACCU-3		429		0.2	33	1.25	15	18	208	1	1.1	20	39	7 7/8	27 9/16	54	Mitsubishi	SEZ-KD15NAMRT1 TH	1, 2
FC-4	Residential units, Custodial	Ducted	ACCU-4		635		0.2	38	1.5	18	21.8	208	1	1.13	20	46 7/8	7 7/8	27 9/16	62	Mitsubishi	SEZ-KD18NAMRT1 TH	1, 2
FC-5	Prep Space	Wall Mounted	ACCU-5		701		34	1.87	22.4	21.2	208	1	1	20	43 5/16	12 13/16	9 3/8	37	Mitsubishi	MSZ-GS24NA	1, 2	
FC-6	Community Gym, Reading Room	Wall Mounted	ACCU-6		775		39	2.5	30	32	208	1	1	35	48 1/16	14 3/8	11 5/8	46	Mitsubishi	PXA-A30K4B	1, 2, 3	
FC-7	Offices, Hot Room	Wall Mounted	ACCU-7		437		36	0.75	9	9.6	208	1	1	15	36 7/16	12 11/16	9 3/16	29	Mitsubishi	MUZ-FS09NA	1, 2	
FC-8	Corridors - Existing	Wall Mounted	ACCU-8		514		46	1.5	19	24	208	1	1	20	36 7/16	12 11/16	9 3/16	29	Mitsubishi	MUZ-FS19NA	1, 2	
FC-9	Addition - Lobby	Ceiling Mount	ACCU-9		570-580		38	2.5	30	34	208	1	1	40	33 1/16	11 3/4	33 1/16	67	Mitsubishi	FLA-AS3EAB	1, 2, 3	
FC-10	Residential Units - Living Area	Ceiling Mount	ACCU-10		325		38	0.75	9	12	208	1	1	15	43 3/8	7 5/16	14 3/16	34	Mitsubishi	MLZ-KP09NA2	1, 3, 4, 5, 6	
FC-11	Residential Units - Living Area	Ceiling Mount	ACCU-11		350		40	0.5	6	7.2	208	1	1	15	43 3/8	7 5/16	14 3/16	34	Mitsubishi	MLZ-KP12NA2	1, 3, 4, 5, 6	
FC-12	Corridor - Addition	Ceiling Mount	ACCU-12		530-670		28	2.0	24	28	208	1	1	27	60 3/8	9 11/16	26 3/4	31	Mitsubishi	PCA-A24K4B	1, 2, 3	
FC-13	Mechanical & Storage Rooms	Wall Mount	Various		117-437		40	0.5	9	14	208	1	1	15	36 7/16	12	9 3/16	29	Mitsubishi	MSZ-FS09NA	1, 2, 3, 4, 5	

- NOTES:
- Utilize Mitsubishi Touch MA Controller PAR-CT01MAU-SB, provide routing to location on mechanical drawings and associated wiring per manufacturer specifications.
 - Receive power and control ACCU on roof. Mechanical contractor to coordinate install and routing.
 - PROVIDE CONDENSATE PUMP IF REQUIRED FOR ROUTING OF CONDENSATE DRAIN TO NEAREST AVAILABLE FLOOR DRAIN, REFER TO MANUFACTURER SPECIFICATIONS.
 - INCLUDE SYSTEM CONTROL INTERFERENCE, TEMPERATURE SENSOR AND ALL CONTROLS TO ALLOW OPERATION IN MULTI-ZONE SETUP.
 - PROVIDE ALL WIRING AND PIPING NEEDED TO CONNECT TO BRANCH BOX AS SHOWN ON DRAWINGS.
 - INCLUDE GRILLE MLP-448WU AS REQUIRED.

ELECTRIC DUCT HEATER SCHEDULE+B33:AR58B33:A33:CM62

IDENTIFIER	MANUFACTURER	MODEL	QUANTITY	DESCRIPTION	NOTES
DH-1	RenewAir	EK-121208SCCHR-21-15V-N	1	Ducted electric heater	1,2,3,4
DH-2	RenewAir	EK-XXXX10SCCHL-21-15-N	1	Ducted electric heater	1,2,3,5

- NOTES:
- Voltage for heater is 208/230/160, coordinate with electrical contractor.
 - Provide duct thermostat sensor kit for SCR control. Install per manufacturer specifications for location and wiring. Duct temperature sensor to be in supply side of duct work.
 - Interlock duct heater with fan proof from ERV, do not run duct heater without supply fan running.
 - Protect heater and heater control panel from elements, Refer to mechanical details.
 - Match duct size on drawing to duct heater size to fit properly in duct layout, model number with xxxx designates duct work dimensions.

OUTDOOR HEAT PUMP UNIT SCHEDULE

IDENTIFIER	TYPE	LOCATION	SERVICE	COOLING		HEATING		Refrigerant Type	ELECTRICAL DATA		DIMENSIONS (IN.)			WEIGHT (LBS)	BASIS OF DESIGN		NOTES	
				TOTAL MBH	EER	TOTAL MBH	COP @ 47° F		MOCP	RLA	VOLTS/PH/Hz	H	W		D	MFG'R		MODEL
ACCU-1	Heat Pump Air Cooled Condenser	Roof	FC-1	9	13	12	4.03	R410A	24	13	208/230/160	34 5/8	38 9/16	13	129	Mitsubishi	SUZ-KA09NAHZ	1, 2, 3, 4
ACCU-2	Heat Pump Air Cooled Condenser	Roof	FC-2	12	13	15	3.90	R410A	24	13	208/230/160	34 5/8	38 9/16	13	129	Mitsubishi	SUZ-KA12NAHZ	1, 2, 3, 4
ACCU-3	Heat Pump Air Cooled Condenser	Roof	FC-3	15	12.5	18	2.70	R410A	31	16	208/230/160	34 5/8	38 9/16	13	131	Mitsubishi	SUZ-KA15NAHZ	1, 2, 3, 4
ACCU-4	Heat Pump Air Cooled Condenser	Roof	FC-4	18	13.1	21.6	3.40	R410A	31	16	208/230/160	34 5/8	38 9/16	13	131	Mitsubishi	SUZ-KA18NAHZ	1, 2, 3, 4
ACCU-5	Heat Pump Air Cooled Condenser	Roof	FC-5	22.4	12.6	21.2	4.03	R410A	20	13.6	208/230/160	34 5/8	33 1/16	13	120	Mitsubishi	MUZ-GS24NAHZ	1, 2, 3, 4
ACCU-6	Heat Pump Air Cooled Condenser	Roof	FC-6	30	12.8	32	3.38	R410A	40	18	208/230/160	52 11/16	41 5/16	14 3/16	261	Mitsubishi	PUZ-HA30NKA	1, 2, 3, 4
ACCU-7	Heat Pump Air Cooled Condenser	Roof	FC-7	09	16	9.6	4.54	R410A	15	10	208/230/160	21 5/8	31 1/2	11 1/4	82	Mitsubishi	MUZ-FS09NA	1, 2, 3, 4
ACCU-8	Heat Pump Air Cooled Condenser	Roof	FC-8	15	14	16	4.06	R410A	20	17	208/230/160	34 5/8	33 1/16	13	117	Mitsubishi	MUZ-FS19NA	1, 2, 3, 4
ACCU-9	Heat Pump Air Cooled Condenser	Roof	FC-9	30	14.1	24	4.1	R410A	40	18	208/230/160	52 43/64	41 11/32	12 63/64	261	Mitsubishi	PUZ-HA30NKA	1, 2, 4, 5
ACCU-10	Heat Pump Air Cooled Condenser	Roof	FC-10	9	12.5	14	4.1	R410A	24	10	208/230/160	34 5/8	38 1/16	13	129	Mitsubishi	SUZ-KA09NAHZ	1, 2, 4, 5
ACCU-11	Heat Pump Air Cooled Condenser	Roof	FC-11	12	12.7	18	3.8	R410A	24	10	208/230/160	34 5/8	33 1/16	13	129	Mitsubishi	SUZ-KA12NAHZ	1, 2, 4, 5
ACCU-12	Heat Pump Air Cooled Condenser	Roof	FC-12	24	12.5	28	3.71	R410A	27	9	208/230/160	37 1/8	37 13/32	13	190	Mitsubishi	PUZ-HA24NHAT-R1	1, 2, 4, 5
ACCU-13	Heat Pump Air Cooled Condenser	Roof	FC-13	9	19	14	4.68	R410A	15	9.2	208/230/160	21 5/8	31 1/2	11 1/4	82	Mitsubishi	MUZ-FS06NA	1, 2, 4, 5
ACCU-14	Heat Pump Air Cooled Condenser	Roof	FC-13	36	15	42	4.0	R410A	86		208/230/160	52 11/16	41 11/32	13	278	Mitsubishi	MXZ-SM36NAMHZ2	1, 2, 4, 5, 6

- NOTES:
- 12 IN CONDENSER STAND TO BE SUPPLIED QSMS1201M
 - UTILIZE MICROPARTICULATE FILTER PM2.5 (part number MAC-EMF615FT-E)
 - INSTALL 2-PIECE WIND BAFFLE WB-PA3
 - PROVIDE ALL NECESSARY LINE SETS AT CORRECT SIZE TO CONNECT TO INDOOR UNIT.
 - INSTALL WIND BAFFLE LOW AMBIENT KIT
 - PIPE TO BRANCH BOX (BB-1) PART NUMBER PAK-MAS2BC. SUPPORT BRANCH BOX VIA ALL THREAD AND MOUNTING APPROVED BY STRUCTURAL. POWER FOR BRANCH BOX FROM OUTDOOR UNIT. REFER TO MANUFACTURER SPECIFICATIONS FOR WIRING, PIPING PRACTICES AND MOUNTING.

DIFFUSER AND GRILLE SCHEDULE

IDENTIFIER	TYPE	SYSTEM	LOCATION	FRAME	DAMPER	MAX NO	MANUF	MODEL #	REMARKS
FO-1	Wall mounted transfer grill	Wall Transfer Return	Apartments	N			Price	2202	Baked White Enamel, 2, 3
SG-1	Soffit supply air register	Supply Air	Various	Y			Price	840 Series	White Finish, 2, 3.
SG-2	Ceiling supply air 24x24 face	Supply Air	Various	Y			Price	ASCO	Baked White Enamel, 1, 2, 3
SG-3	Supply air register	Supply Air	Community Space	Y			Price	89-LA-B12	2, 3
RG-1	Pillar housed return grille	Return Air	Apartments	N			Price	835FF-LH	White B12, 2, 3, 4, 6
RG-2	Ceiling return air 24x24 face	Return Air	Various	N			Price	FDOR Series	White finish, 2, 3.
RG-3	Return air register	Return Air	Community Space	N			Price	97-LA-B12	2, 3
RG-4	Exhaust return grille	Return Air	Apartments	N			Price	830-535	White B12, 2, 3, 4
R-1	Intake & Exhaust Register	OA & Exhaust	Exterior	Y			Price	Primax	WCX 2, 3, 5, 6
R-1	Intake & Exhaust Register	OA & Exhaust	Exterior	N			Price	Accl Series	2, 3, 5, 7

- FRONT BLADES PARALLEL TO SHORT DIMENSION
- COORDINATE INSTALL LOCATION WITH ARCHITECTURAL PLANS. FOR LAYIN DIFFUSERS COORDINATE WITH REFLECTED CEILING PLAN FOR PROPER MOUNTING.
- COORDINATE NECK SIZE WITH MECHANICAL DRAWING DUCT SIZING.
- SURFACE MOUNTING (SM) FOR SOFFIT OR CEILING INSTALLATION
- PAIN'T TO MATCH EXTERIOR BRICK
- IF USED AS INTAKE REMOVE DAMPER
- INTERGRATE BIRD SCREEN OPTION FROM MANUFACTURER
- WHEN LOCATED IN KITCHEN PROVIDE MERV3 1 IN FILTER TO FIT. SIZE TO BE 10IN X 10IN IN KITCHEN AREA AND LOCATED WITH 6FT FROM HOOD SYSTEM.

ELECTRIC UNIT HEATER SCHEDULE

Tag	Location	Type	CFM	Power	Voltage	Phase	Mounting Height	Length	Width	Height	Weight (lbs)	Manufacturer	Model	Remarks
ECUH-1	Addition Stairwells	Wall Mounted	500	6.0 KW	208 V	1	6" ABOVE FF	45"	9 3/4"	26 3/8"	160	Qmark	CU945	CU945-06-20-1-B-F-2B-2-C-S-S-P-K-O-W, 1, 2
ECUH-2	106 and Corridor 212	Wall Mounted	250	5.0 KW	208 V	1	6" ABOVE FF	35"	9 3/4"	26 3/8"	120	Qmark	CU936	CU936-06-20-1-B-F-2B-2-C-S-S-P-K-O-W, 1, 2
ECUH-3	Vestibules - West B & East A	Wall Mounted	250	6.0 KW	208 V	1	6" ABOVE FF	35"	9 3/4"	26 3/8"	120	Qmark	CU935	CU935-06-20-1-B-F-2B-2-C-S-S-P-K-O-W, 1, 2
ECUH-4	Unoccupied rooms 280 & 380	Wall Mounted	250	7.0 KW	208 V	1	6" ABOVE FF	35"	9 3/4"	26 3/8"	120	Qmark	CU935	CU935-07-20-1-B-F-2B-2-C-S-S-P-K-O-W, 1, 2
ECUH-5	Existing room 281 & Addition Entrance	Wall Mounted	250	3.0 KW	208 V	1	6" ABOVE FF	35"	9 3/4"	26 3/8"	120	Qmark	CU935	CU935-03-20-1-B-F-2B-2-C-S-S-P-K-O-W, 1, 2
CCU-1	West Vestibule A - 120	Ceiling Mounted	3003	20 KW	208 V	1	Ceiling Height	20 1/4"	75"	16 1/2"	364	Powered Aire	CHD-E-2-72	3, 4, 5, 6

-
- SURFACE MOUNT ELECTRIC CABINET HEATERS TO BLOCK OR BRICK WALL WITH PROPER CLEARANCE PER MANUFACTURER SPECIFICATIONS.
- INTERNAL MOUNTED THERMOSTAT, VERIFY FIELD DETTING TO 60 DEGREES.
- SUPPLY 24V LINE THERMOST

Apartment/Room Notation	Occupancy Classification	Floor Area (SF)	Quantity	Code Occupent Density / 1000SF	Calculated Occupancy	Number of Plumbing Fixtures	TABLE 403.3 2015 Michigan Mech Code & ASHRE 62.2 Requirements					Design Air Balance					
							Outdoor Air			Calculated Min outdoor air required (cfm)	Zone Air Dist. Eff.	Calculated Min Exhaust Air (cfm)	Minimum room supply air (cfm)	Minimum exhaust air (cfm)	Minimum unit %OA	Outdoor ventilation air (cfm) delivered to space	Supply Air Units
							CFM/ SF	CFM/ PERSON	CFM/ FIXTURE OF SF								
H	Private Dwelling - 1 bedroom, 1 bathroom, living areas	462	1		2			15		38	0.8	0	see plan	50		50	FC 1
G	Private Dwelling - 1 bedroom, 1 bathroom, living areas	469	1		2			15		38	0.8	0	see plan	50		50	FC 1
F	Private Dwelling - 1 bedroom, 1 bathroom, living areas	682	1		2			15		56	0.8	0	see plan	50		60	FC 3
M	Private Dwelling - 1 bedroom, 1 bathroom, living areas	678	1		2			15		56	0.8	0	see plan	50		60	FC 3
C	Private Dwelling - 1 bedroom, 1 bathroom, living areas	484	1		2			15		38	0.8	0	see plan	50		50	FC 1
D	Private Dwelling - 1 bedroom, 1 bathroom, living areas	487	1		2			15		38	0.8	0	see plan	50		50	FC 1
E	Private Dwelling - 1 bedroom, 1 bathroom, living areas	500	1		2			15		38	0.8	0	see plan	50		50	FC 2
B	Private Dwelling - 1 bedroom, 1 bathroom, living areas	607	1		2			15		56	0.8	0	see plan	50		60	FC 3
A	Private Dwelling - 1 bedroom, 1 bathroom, living areas	800	1		2			15		56	0.8	0	see plan	50		60	FC 4
J	Private Dwelling - 1 bedroom, 1 bathroom, living areas	495	1		2			15		38	0.8	0	see plan	50		50	FC 1
K	Private Dwelling - 1 bedroom, 1 bathroom, living areas	513	1		2			15		38	0.8	0	see plan	50		50	FC 1
L	Private Dwelling - 1 bedroom, 1 bathroom, living areas	714	1		2			15		56	0.8	0	see plan	50		60	FC 3
X	Private Dwelling - 1 bedroom, 1 bathroom, living areas	660	1		2			15		56	0.8	0	see plan	50		60	FC 3
W	Private Dwelling - 1 bedroom, 1 bathroom, living areas	713	1		2			15		56	0.8	0	see plan	50		60	FC 3
N, O	Private Dwelling - 2 bedroom, 1 bathroom, living areas	812	1		3			15		56	0.8	0	see plan	50		60	FC 4
Y	Private Dwelling - 2 bedroom, 1 bathroom, living areas	876	1		3			15		56	0.8	0	see plan	50		60	FC 4
Z	Private Dwelling - 2 bedroom, 1 bathroom, living areas	795	1		3			15		56	0.8	0	see plan	50		60	FC 4
141	Breakroom	487	1	25	13	1		0.06	5	110	0.8		701			100	FC 5
131 / 131A	Laundry	628	1	20	13	1		0.06	7.5	160			529	150		150	FC 3
133	Storage	178	1					0.06					437			50	FC 7
132	Breakroom	1096	1	25	28			0.06	5	241			775	175		250	FC 6
140	Conference/meeting	2377	1	50	119			0.06	5	886			1550		100	900	ERV 3, FC 6 (2)
130	Office	212	1	5	1			0.06	5	19			437			50	FC 7
150	Electrical Room	121	1		0												FC 3
151	Storage	414	1		0												FC 3
142, 143	Toilet	78	1		0	1				70		70	0				
101 - 110	Cooridor	3831	1					0.06		230	0.8	0	257	400		350	FC 8
202	Office	274	1	5	2			0.06	5	29			160		16	40	FC 3
201	Cooridor	528	1					0.06		32	0.8	0	260	45	18	40	FC 3
103	Lobby	1040	1	10	11			0.06	7.5	166			1040		18	175	FC 9
1B Unit A & C	Private Dwelling - 1 bedroom, 1 bathroom, living areas		19		2				15	38	0.8	0	See plan	45		48	FC 10 & FC 11
2B Unit A,B & C	Private Dwelling - 2 bedroom, 1 bathroom, living areas		2		3				15	56	0.8	0	See plan	45		△56	FC 10 & FC 11
Various	Cooridor	3156	1					0.06		189	0.8	0	900	200		190	FC 12
105	Electrical room		1														FC 13
113	Electrical room		1												△		FC 13
109	Storage		1														FC 13
115	Mechanical room		1														FC 13
108	Storage		1														FC 13
	Total For Floor 1													1145		1214	
1B Unit A & C	Private Dwelling - 1 bedroom, 1 bathroom, living areas		18		2				15	38	△ 0.8	0	See plan	45△		48	FC 10 & FC 11
2B Unit A,B & C	Private Dwelling - 2 bedroom, 1 bathroom, living areas		3		3				15	56	0.8	0	See plan	45		△56	FC 10 & FC 11
Various	Cooridor	2610	1		0			0.06		157	0.8	0	900	175		162	FC 12
203	Storage		1		0												FC 13
208	Storage		1		0									△			FC 13
211	Mechanical room		1		0												FC 13
207	Storage		1		0												FC 13
	Total For Floor 2										△			1120△		1194	

VIBRATION ISOLATOR APPLICATION SCHEDULE										
EQUIPMENT TYPE	EQUIPMENT CATEGORY	HORESPOWER AND OTHER	RPM	EQUIPMENT LOCATION						KEYED NOTES
				SLAB ON GRADE			UP TO 40 FT (12M) FLOOR SPAN			
				BASE TYPE	ISOLATOR TYPE	MIN. DEF., IN. (MM)	BASE TYPE	ISOLATOR TYPE	MIN. DEF., IN. (MM)	
SUSPEND HEAT PUMPS, FAN COILS, LOCATED INDOORS	ALL	ALL	ALL				A OR B	8a or 8b	1.50 (38)	NOTES 1, 3, 4
BASE MOUNTED CONDENSING UNITS	ALL ALL	≤1HP >1HP	ALL ALL	A OR B A OR B	2 2	0.25 (6) 0.25 (6)	A OR B A OR B	2 4	.25 (64) 2.50 (64)	NOTES 3
SUSPEND DUCTED ROTATING EQUIP.	SMALL FANS, FAN-POWERED BOXES	≤600 CFM >600 CFM	ALL ALL				A A	8a or 8b 8a or 8b	0.50 (13) 0.75 (19)	NOTES 3, 4

NOTES:

1. THRUST RESTRAINTS: PROVIDE THRUST RESTRAINTS BETWEEN FAN DISCHARGE AND DUCT (IN PAIRS, LOCATED ON THE CENTER LINE OF THE DISCHARGE OUTLET OF THE FAN, BRIDGING THE FLEXIBLE DUCT CONNECTOR) FOR ALL FAN HEADS, FOR AXIAL AND CENTRIFUGAL FANS UNITS OPERATING AT 2 INCH OR GREATER TOTAL STATIC PRESSURE AND AS SHOWN ON DRAWINGS. SPRING DEFLECTION SHALL BE LIMITED TO THE FOLLOWING TABLES:
2. PIPING RISER ISOLATION: PROVIDE PIPE RISER RESILIENT ANCHORS, SPRING MOUNTS AND RESILIENT PIPE GUIDES CAPABLE OF DISTRIBUTING THE LOADS WITHIN THE BUILDING DESIGN LIMITS AT THE SUPPORT POINTS.
3. HORIZONTAL PIPING VIBRATION ISOLATION: PROVIDE TYPE 8a OR 8b SPRING HANGERS AND SPRING MOUNTS FOR PIPING CONNECTED TO VIBRATION ISOLATED EQUIPMENT. FOR 2" TO 4" EQUIPMENT, PROVIDE SPRING MOUNTS AND HANGERS WITH MINIMUM HORIZONTAL DISTANCES FROM THE ISOLATED EQUIPMENT: UP TO 6" - 50 FEET (1 1/2" MINIMUM DEFLECTION), 8" AND LARGER - 100 FEET (2 1/2" MINIMUM DEFLECTION), WHICHEVER IS GREATER; AND AS SHOWN ON DRAWINGS. THE FIRST 4 HANGERS FROM THE ISOLATED EQUIPMENT SHALL BE TYPE 8b.
4. DUCTWORK VIBRATION ISOLATION: PROVIDE TYPE 8a OR 8b SPRING HANGERS FOR DUCTWORK WITH A CROSS SECTION OF 2 SQUARE FEET OR GREATER. PROVIDE AIR HANDLING UNIT HANGERS AND SPRING MOUNTS FOR RELIEF FANS, AND VIBRATION ISOLATED EQUIPMENT, WHICHEVER IS GREATER; AND AS SHOWN ON DRAWINGS (3/4" MINIMUM DEFLECTION).

BASE TYPES:

BASE TYPE A - NO BASE, ISOLATORS ATTACHED DIRECTLY TO EQUIPMENT
 BASE TYPE B - STRUCTURAL, STEEL RAILS OR BASE
 BASE TYPE C - CONCRETE INERTIA BASE
 BASE TYPE D - CURB - MOUNTED ALUMINUM BASE WITH 1" DEFL. SPRING ISOLATORS
 BASE TYPE E - CURB - MOUNTED STEEL BASE WITH ADJUSTABLE 1", 2" OR 3" DEFL. SPRING ISOLATORS

ISOLATOR TYPES:

ISOLATOR TYPE 1a -	ELASTOMERIC ISOLATION PAD
ISOLATOR TYPE 1b -	ELASTOMERIC ISOLATION PAD WITH STEEL LOAD BEARING PLATE
ISOLATOR TYPE 2 -	ELASTOMERIC FLOOR ISOLATOR
ISOLATOR TYPE 3 -	FREE STANDING SPRING FLOOR ISOLATOR
ISOLATOR TYPE 4 -	RESTRAINED SPRING ISOLATOR
ISOLATOR TYPE 5 -	THRUST RESTRAINT
ISOLATOR TYPE 6 -	AIR SPRING
ISOLATOR TYPE 7 -	ELASTOMERIC HANGERS
ISOLATOR TYPE 8a -	SPRING HANGERS
ISOLATOR TYPE 8b -	SPRING HANGERS WITH VERTICAL - LIMIT STOP

[illegible]

GENERAL NOTES:

1. THE FOLLOWING PLENUMS, DUCTS AND DUCT ACCESSORIES NOT REQUIRING INSULATION

- a. DOUBLE WALL METAL DUCTS WITH SUFFICIENT INSULATION TO MEET ASHRAE 62.2
- b. EXPOSED SUPPLY DUCT IN CONDITIONED SPACE SERVED BY THAT SYSTEM
- c. FACTORY-INSULATED FLEXIBLE DUCTS
- d. FLEXIBLE CONNECTORS
- e. VIBRATION - CONTROL DEVICES
- f. FACTORY - INSULATED ACCESS PANELS AND DOORS.

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REGISTRATION SEAL



KEY PLANS

SHEET TITLE

MECHANICAL VENTILATION SCHEDULE

SCALE: AS NOTED

ISSUED FOR

PERMI

DATE _____

10.20.24

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BULLETIN 2

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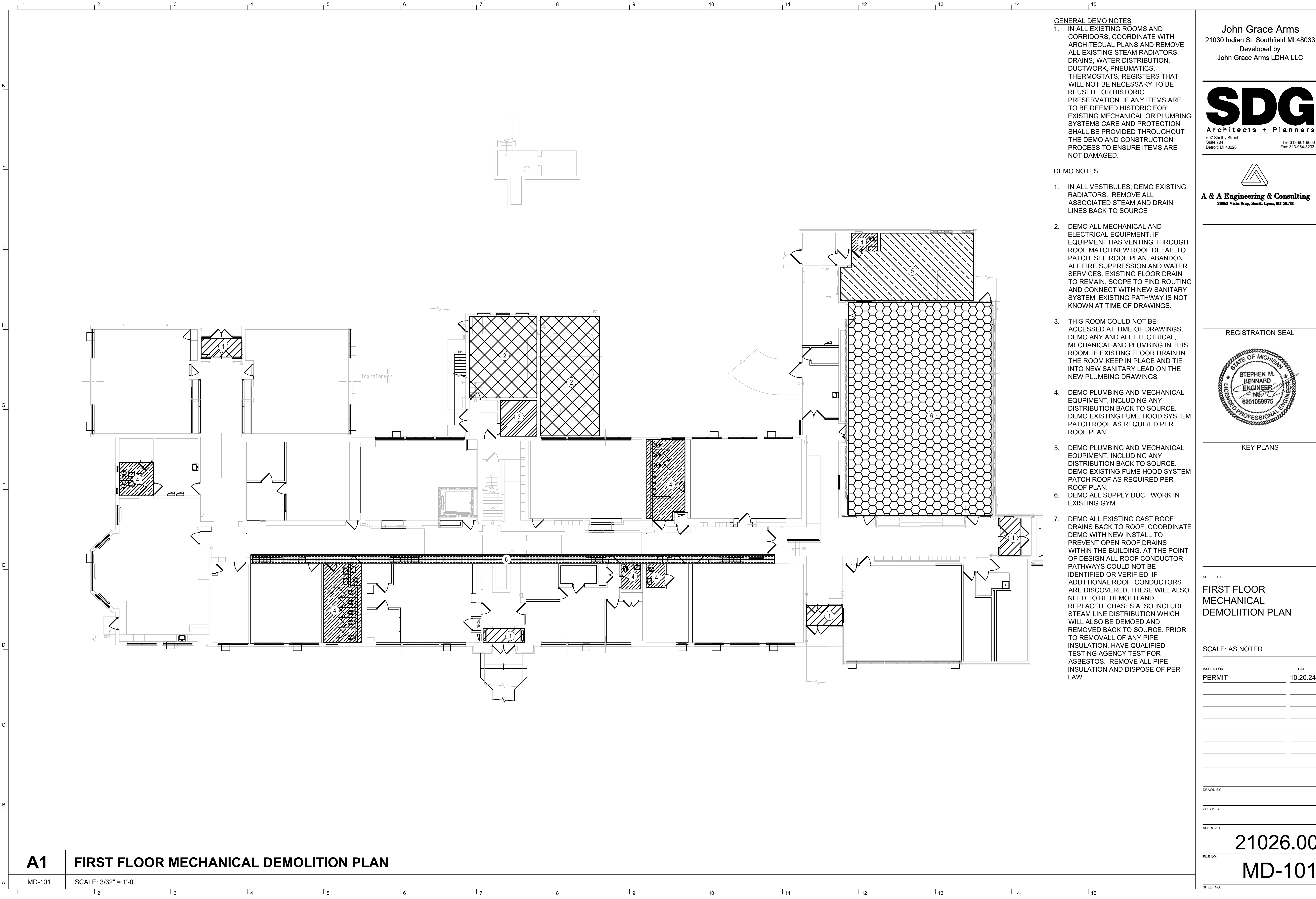
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GENERAL DEMO NOTES

1. IN ALL EXISTING ROOMS AND CORRIDORS, COORDINATE WITH ARCHITECUAL PLANS AND REMOVE ALL EXISTING STEAM RADIATORS, DRAINS, WATER DISTRIBUTION, DUCTWORK, PNEUMATICS, THERMOSTATS, REGISTERS THAT WILL NOT BE NECESSARY TO BE REUSED FOR HISTORIC PRESERVATION. IF ANY ITEMS ARE TO BE DEEMED HISTORIC FOR EXISTING MECHANICAL OR PLUMBING SYSTEMS CARE AND PROTECTION SHALL BE PROVIDED THROUGHOUT THE DEMO AND CONSTRUCTION PROCESS TO ENSURE ITEMS ARE NOT DAMAGED.

- DEMO NOTES
1. IN ALL VESTIBULES, DEMO EXISTING RADIATORS. REMOVE ALL ASSOCIATED STEAM AND DRAIN LINES BACK TO SOURCE
2. DEMO ALL MECHANICAL AND ELECTRICAL EQUIPMENT. IF EQUIPMENT HAS VENTING THROUGH ROOF MATCH NEW ROOF DETAIL TO PATCH. SEE ROOF PLAN. ABANDON ALL FIRE SUPPRESSION AND WATER SERVICES. EXISTING FLOOR DRAIN TO REMAIN. SCOPE TO FIND ROUTING AND CONNECT WITH NEW SANITARY SYSTEM. EXISTING PATHWAY IS NOT KNOWN AT TIME OF DRAWINGS.
3. THIS ROOM COULD NOT BE ACCESSED AT TIME OF DRAWINGS, DEMO ANY AND ALL ELECTRICAL, MECHANICAL AND PLUMBING IN THIS ROOM. IF EXISTING FLOOR DRAIN IN THE ROOM KEEP IN PLACE AND TIE INTO NEW SANITARY LEAD ON THE NEW PLUMBING DRAWINGS
4. DEMO PLUMBING AND MECHANICAL EQUIPMENT, INCLUDING ANY DISTRIBUTION BACK TO SOURCE. DEMO EXISTING FUME HOOD SYSTEM PATCH ROOF AS REQUIRED PER ROOF PLAN.
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6. DEMO ALL SUPPLY DUCT WORK IN EXISTING GYM.
7. DEMO ALL EXISTING CAST ROOF DRAINS BACK TO ROOF. COORDINATE DEMO WITH NEW INSTALL TO PREVENT OPEN ROOF DRAINS WITHIN THE BUILDING. AT THE POINT OF DESIGN ALL ROOF CONDUCTOR PATHWAYS COULD NOT BE IDENTIFIED OR VERIFIED. IF ADDTTIONAL ROOF CONDUCTORS ARE DISCOVERED, THESE WILL ALSO NEED TO BE DEMOED AND REPLACED. CHASES ALSO INCLUDE STEAM LINE DISTRIBUTION WHICH WILL ALSO BE DEMOED AND REMOVED BACK TO SOURCE. PRIOR TO REMOVAL OF ANY PIPE INSULATION, HAVE QUALIFIED TESTING AGENCY TEST FOR ASBESTOS. REMOVE ALL PIPE INSULATION AND DISPOSE OF PER LAW.

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KEY PLANS

SHEET TITLE

**FIRST FLOOR
MECHANICAL
DEMOLITION PLAN**

SCALE: AS NOTED

ISSUED FOR	DATE
PERMIT	10.20.24

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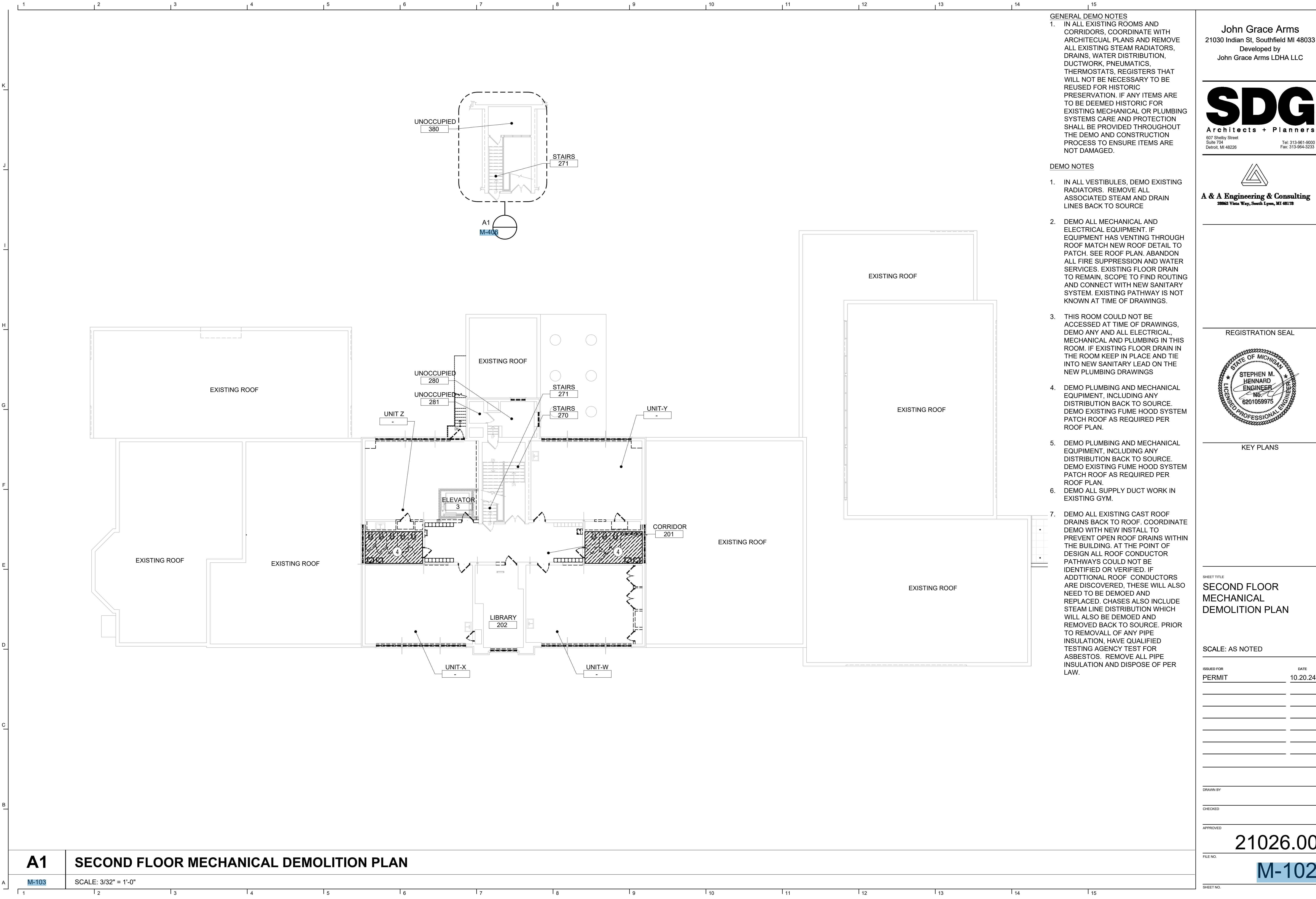
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GENERAL DEMO NOTES

1. IN ALL EXISTING ROOMS AND CORRIDORS, COORDINATE WITH ARCHITECTUAL PLANS AND REMOVE ALL EXISTING STEAM RADIATORS, DRAINS, WATER DISTRIBUTION, DUCTWORK, PNEUMATICS, THERMOSTATS, REGISTERS THAT WILL NOT BE NECESSARY TO BE REUSED FOR HISTORIC PRESERVATION. IF ANY ITEMS ARE TO BE DEEMED HISTORIC FOR EXISTING MECHANICAL OR PLUMBING SYSTEMS CARE AND PROTECTION SHALL BE PROVIDED THROUGHOUT THE DEMO AND CONSTRUCTION PROCESS TO ENSURE ITEMS ARE NOT DAMAGED.

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KEY PLANS

SHEET TITLE

**SECOND FLOOR
MECHANICAL
DEMOLITION PLAN**

SCALE: AS NOTED

ISSUED FOR	DATE
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