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**AIR DISTRIBUTION**

**3.01 DUCTWORK:**

- A. MATERIALS:**
1. SHEET METAL DUCTS: TRADEMARKED GALVANIZED STEEL, LOCK FORMING QUALITY, HAVING ZINC COATING OF 0.90 OUNCES PER SQUARE FOOT FOR EACH SIDE (90, ASTM A 525 AND A 527).
  2. FASTENERS: USE RIVETS AND BOLTS THROUGHOUT; SHEET METAL SCREWS MAY BE USED ON LOW PRESSURE DUCTS.
  3. SEALANTS: WATER AND FIRE RESISTANT WHEN DRY, COMPATIBLE WITH MATING MATERIALS. WHERE SEALANTS ARE USED ON EXPOSED DUCTWORK, COMPOSITION SHALL BE DESIGNED TO PREVENT BLEED-THROUGH OF FINISH PAINT, OR SEALANT SHALL BE PRE-PAINTED WITH A COATING IMPERVIOUS TO BLEED-THROUGH. ALL SEAMS AND JOINTS SHALL BE SEALED.
  4. ALL DUCT AND ACCESSORY MATERIALS SHALL HAVE A COMPOSITE FLAME SPREAD RATING NOT EXCEEDING 25, AND A SMOKE DEVELOPED RATING NOT EXCEEDING 50 AS TESTED UNDER PROCEDURE ASTM E-84-75, NFPA 255 AND UL 723. DUCT COVERINGS AND LININGS SHALL NOT FLAME, GLOW, SMOLDER OR SMOKE WHEN TESTED IN ACCORDANCE WITH ASTM C411.
- B. CONSTRUCTION:**
1. LOW PRESSURE DUCTWORK (ALL DUCTWORK LOCATED DOWNSTREAM OF VAV BOXES, EXHAUST DUCTS, AND TRANSFER DUCTS) SHALL BE RECTANGULAR. TEES AND LATERALS SHALL BE LOW LOSS TYPE. DUCTS SHALL BE CONSTRUCTED TO COMPLY WITH SMACNA DUCT STANDARDS: PRESSURE CLASS 2" W.G.; SEAL CLASS A; LEAKAGE CLASS 12.

**3.02 FLEXIBLE DUCTS [S]:**

- A. INSULATED, FLEXIBLE DUCT SHALL BE UL 181, CLASS 1, 2-PLY VINYL FILM SUPPORTED BY HELICALLY WOUND, SPRING-STEEL WIRE; FIBROUS-GLASS INSULATION; POLYETHYLENE OR ALUMINIZED VAPOR-BARRIER FILM. INSULATION SHALL BE 1" THICK FIBERGLASS WITH MINIMUM 4 MIL SEAMLESS VAPOR BARRIER JACKET. FLEX DUCT SHALL BE RATED FOR 10-INCH WG POSITIVE, 1.0-INCH WG NEGATIVE PRESSURE, AND VELOCITY OF 4,000 FPM.**
- 3.03 DUCTWORK INSULATION [S]:**
- A. EXPOSED RECTANGULAR DUCTS:** 1-1/2" THICK RIGID FIBROUS GLASS INSULATION, 3.0 LB. DENSITY, 0.24 BTUIN./SQ.FT./"F/HR. MAXIMUM "K" VALUE AT 75°F, WITH FACTORY APPLIED REINFORCED ALUMINUM FOIL VAPOR BARRIER. INSULATION TO BE EXPOSED IN PUBLIC, FINISHED AREAS SHALL HAVE FACTORY APPLIED REINFORCED WHITE KRAFT ALL SERVICE JACKET FOR PAINTING.
- B. ROUND DUCTS, FLAT OVAL DUCTS AND CONGEALED RECTANGULAR DUCTS:** 1-1/2" THICK FLEXIBLE FIBROUS GLASS INSULATION, 1.0 LB. DENSITY, 0.27 BTUIN./SQ.FT./F/HR. MAXIMUM "K" VALUE AT 75°F, WITH FACTORY APPLIED REINFORCED ALUMINUM FOIL VAPOR BARRIER.
- C. FLEXIBLE DUCT INSULATION SHALL BE PROVIDED WITH A MINIMUM 2" FACING FLAP OVERLAPPING ADJACENT AND CONNECTING INSULATION. SEAMS SHALL BE STAPLED APPROXIMATELY 6" ON CENTER WITH 1/2" OUTWARD CLINCHING STAPLES. WHERE RECTANGULAR DUCTS ARE 24" IN WIDTH OR GREATER, INSULATION SHALL BE SECURED TO THE BOTTOM OF THE DUCT WITH MECHANICAL FASTENERS TO PREVENT SAGGING. ALL INSULATION JOINTS SHALL BE TIGHTLY BUTTED. ALL JOINTS, VOIDS AND PUNCTURES IN FACING SHALL BE SEALED VAPOR TIGHT WITH MASTIC.**
- D. INTERNAL:** THE LINING SHALL BE APPLIED TO CUT-TO-SIZE PIECES FASTENED TO THE ENTIRE INTERIOR OF THE DUCT WITH MASTIC, STICK CLIPS AND SPEED WASHERS. EDGES AND JOINTS SHALL BE COATED WITH FIRE RESISTANT MASTIC. EXTERNAL DUCT INSULATION IS NOT REQUIRED ON DUCTS WITH INTERNAL LINING UNLESS NOTED OTHERWISE.
- E. WHERE DUCT MOUNTED HEATING COILS ARE LOCATED DOWNSTREAM FROM COOLING COILS AND AT VARIABLE AIR VOLUME TERMINAL UNITS THE COIL SHALL BE PROVIDED WITH VAPOR-SEALED EXTERNAL DUCT INSULATION ON SIDES, TOP AND BOTTOM.**
- F. WHERE DUCTWORK IS INDICATED TO HAVE INTERNAL ACOUSTIC LINING, SHEET METAL DROPS TO DIFFUSER AND REGISTER NECKS SHALL ALSO BE LINED.**
- G. DAMAGED INSULATION:** ALL EXISTING THERMAL COVERINGS THAT ARE REMOVED OR DAMAGED DURING CONSTRUCTION SHALL BE REPLACED OR REPAIRED TO NOT LESS THAN ORIGINAL CONDITION. REPAIRED SECTIONS SHALL PROVIDE EQUAL OR BETTER THERMAL PERFORMANCE AND VAPOR PROTECTION.
- H. PATCHING:** WHERE EXISTING CONTROL, MONITORING OR OTHER PENETRATING DEVICES ARE REMOVED FROM DUCTWORK OR PIPING, THE INSULATION SHALL BE PATCHED TO MATCH THICKNESS, TYPE AND FINISH OF EXISTING INSULATION.

**3.04 DIFFUSERS, REGISTERS AND GRILLES [S]:**

- A. GENERAL:**
1. ALL DEVICES SHALL BE COMMERCIAL GRADE AND SHALL BE CONSTRUCTED OF ALUMINUM.
  2. MANUFACTURER SHALL CERTIFY CATALOGED PERFORMANCE AND ENSURE CORRECT APPLICATION OF EACH AIR DEVICE TO PROVIDE AIR PATTERN, VELOCITY, PRESSURE DROP AND SOUND CHARACTERISTICS NC SUITABLE FOR SPACE INSTALLED. SHOP DRAWINGS SHALL INCLUDE AIR QUANTITY, SIZE, PRESSURE DROP, THROW FT, AND SOUND LEVEL NC.
  3. ALL DEVICES LOCATED IN CEILINGS SHALL HAVE WHITE BAKED ENAMEL FINISH. DEVICES AT OTHER LOCATIONS SHALL HAVE PRIME FINISH SUITABLE FOR PAINTING OR ANODIZED ALUMINUM UNLESS NOTED OTHERWISE.
  4. MAXIMUM AIR OUTLET NOISE LEVEL SHALL NOT EXCEED NC35.
  5. PROVIDE SPONGE RUBBER SEAL AROUND EDGES OF ALL SUPPLY REGISTERS AND GRILLES.
- B. SQUARE CEILING DIFFUSERS FOR LAY IN SERVICE SHALL BE ALUMINUM, REMOVABLE CORE, LOUVER FACE, SQUARE LAY-IN MOUNTED TYPE WITH 1/4" HORIZONTAL LEGS ON ALL SIDES OF INNER CORE, COMPLETE WITH VOLUME CONTROL UNIT.**
- C. RETURN AND EXHAUST REGISTERS SHALL BE ALUMINUM, UNLESS NOTED OTHERWISE, COMPLETE WITH FIXED HORIZONTAL OR LONGITUDINAL DEFLECTING VANES AT NOT MORE THAN 1/2 INCH CENTERS, PROVIDE 1 INCH MARGIN FRAME WITH COUNTERSUNK SCREW HOLES. DAMPER SHALL BE OPPOSED BLADE FACE OPERATED TYPE WITH REMOVABLE KEY.**
- D. GRILLES SHALL BE AS SPECIFIED FOR REGISTERS EXCEPT WITHOUT OPPOSED BLADE DAMPERS.**

**3.05 DUCT ACCESS DOORS [S]:**

- A. DOORS FOR LOW PRESSURE RECTANGULAR DUCTWORK SHALL BE GALVANIZED STEEL, 20 GAUGE RIGID TYPE, 12" X 16" MINIMUM SIZE UNLESS NOTED OTHERWISE, EXCEPT WHERE SIZE OF DUCT WILL NOT ACCOMMODATE THIS SIZE, THEY SHALL BE AS LARGE AS POSSIBLE. DOOR SHALL HAVE GASKET, TWO HINGES, AND TWO COMPRESSION LATCHES WITH OUTSIDE AND INSIDE HANDLES. PROVIDE INSULATED DOORS WHERE INSTALLED IN INSULATED DUCTWORK.**
- B. DOORS FOR ROUND OR FLAT-OVAL LOW, MEDIUM OR HIGH PRESSURE DUCTWORK SHALL BE A COMPLETE FACTORY MOUNTED, DUCT SECTION/ACCESS DOOR ASSEMBLY CONSTRUCTED OF MINIMUM 20 GAUGE GALVANIZED STEEL. ACCESS DOOR SHALL MATCH WITHIN TWO INCHES THE DIAMETER OF DUCT AND SHALL BE COMPLETE WITH GASKET, INSULATED DOOR WITH HANDLE, COMPRESSION CLIPS AND CHAIN RETAINER.**

**CLEANING, BALANCING, AND TESTING**

**4.01 GENERAL**

- A. THE TAB CONTRACTOR SHALL PROVIDE A COMPLETE MEASUREMENT OF AIR FLOW FOR ALL SYSTEMS.**

**4.02 TESTING PROCEDURES**

- A. DUCTWORK:**
1. LOW VELOCITY DUCTWORK: DUCTS, PLENUMS AND CASINGS SHALL BE TESTED AND MADE SUBSTANTIALLY AIR TIGHT AT STATIC PRESSURE INDICATED FOR THE SYSTEM. SUBSTANTIALLY AIR TIGHT SHALL BE CONSTRUED TO MEAN THAT NO AIR LEAKAGE IS NOTICEABLE THROUGH THE SENSE OF FEELING OR HEARING.

**4.03 ADJUSTING AND BALANCING**

- A. EQUIPMENT:** BEFORE ATTEMPTING TO ADJUST AND BALANCE THE AIR SYSTEMS, THE CONTRACTOR SHALL VERIFY THAT THE FOLLOWING ITEMS HAVE BEEN COMPLETED AND ARE CORRECT.
1. ELECTRIC CURRENT FLOW IN EACH PHASE OF MOTORS AND ELECTRIC HEATING ELEMENTS.
  2. MOTOR PROTECTIVE DEVICES ARE SIZED TO PROPERLY PROTECT INSTALLED MOTORS.
  3. THERMOSTATS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRING SETTING OR ADJUSTMENT SHALL BE SET AS INDICATED.
- B. COMPENSATING FOR DIVERSITY:** WHEN THE TOTAL AIRFLOW OF ALL TERMINAL UNITS IS MORE THAN THE INDICATED AIRFLOW OF THE FAN, PLACE A SELECTED NUMBER OF TERMINAL UNITS AT A MINIMUM SET-POINT AIRFLOW WITH THE REMAINDER AT MAXIMUM-AIRFLOW CONDITION UNTIL THE TOTAL AIRFLOW OF THE TERMINAL UNITS EQUALS THE INDICATED AIRFLOW OF THE FAN. SELECT THE REDUCED-AIRFLOW TERMINAL UNITS SO THEY ARE DISTRIBUTED EVENLY AMONG THE BRANCH DUCTS.
- C. PRESSURE-INDEPENDENT, VARIABLE-AIR-VOLUME SYSTEMS:** AFTER THE FAN SYSTEMS HAVE BEEN ADJUSTED, ADJUST THE VARIABLE-AIR-VOLUME SYSTEMS AS FOLLOWS:
1. SET OUTDOOR-AIR DAMPERS AT MINIMUM, AND SET RETURN- AND EXHAUST-AIR DAMPERS AT A POSITION THAT SIMULATES FULL-COOLING LOAD.
  2. SELECT THE TERMINAL UNIT THAT IS MOST CRITICAL TO THE SUPPLY-FAN AIRFLOW AND STATIC PRESSURE. MEASURE STATIC PRESSURE. ADJUST SYSTEM STATIC PRESSURE SO THE ENTERING STATIC PRESSURE FOR THE CRITICAL TERMINAL UNIT IS NOT LESS THAN THE SUM OF THE TERMINAL-UNIT MANUFACTURER'S RECOMMENDED MINIMUM INLET STATIC PRESSURE PLUS THE STATIC PRESSURE NEEDED TO OVERCOME TERMINAL-UNIT DISCHARGE SYSTEM LOSSES.
  3. MEASURE TOTAL SYSTEM AIRFLOW. ADJUST TO WITHIN INDICATED AIRFLOW.
  4. SET TERMINAL UNITS AT MAXIMUM AIRFLOW AND ADJUST CONTROLLER OR REGULATOR TO DELIVER THE DESIGNED MAXIMUM AIRFLOW. USE TERMINAL-UNIT MANUFACTURER'S WRITTEN INSTRUCTIONS TO MAKE THIS ADJUSTMENT. WHEN TOTAL AIRFLOW IS CORRECT, BALANCE THE AIR OUTLETS DOWNSTREAM FROM TERMINAL UNITS THE SAME AS DESCRIBED FOR CONSTANT-VOLUME AIR SYSTEMS.
  5. SET TERMINAL UNITS AT MINIMUM AIRFLOW AND ADJUST CONTROLLER OR REGULATOR TO DELIVER THE DESIGNED MINIMUM AIRFLOW. CHECK AIR OUTLETS FOR A PROPORTIONAL REDUCTION IN AIRFLOW THE SAME AS DESCRIBED FOR CONSTANT-VOLUME AIR SYSTEMS.
    - a. IF AIR OUTLETS ARE OUT OF BALANCE AT MINIMUM AIRFLOW, REPORT THE CONDITION BUT LEAVE OUTLETS BALANCED FOR MAXIMUM AIRFLOW.
  6. REMEASURE THE RETURN AIRFLOW TO THE FAN WHILE OPERATING AT MAXIMUM RETURN AIRFLOW AND MINIMUM OUTDOOR AIRFLOW.
    - a. ADJUST THE FAN AND BALANCE THE RETURN-AIR DUCTS AND INLETS THE SAME AS DESCRIBED FOR CONSTANT-VOLUME AIR SYSTEMS.
  7. MEASURE STATIC PRESSURE AT THE MOST CRITICAL TERMINAL UNIT AND ADJUST THE STATIC-PRESSURE CONTROLLER AT THE MAIN SUPPLY-AIR SENSING STATION TO ENSURE THAT ADEQUATE STATIC PRESSURE IS MAINTAINED AT THE MOST CRITICAL UNIT.
  8. RECORD FINAL FAN-PERFORMANCE DATA.

**4.04 BALANCE AND PERFORMANCE DATA REPORT:**

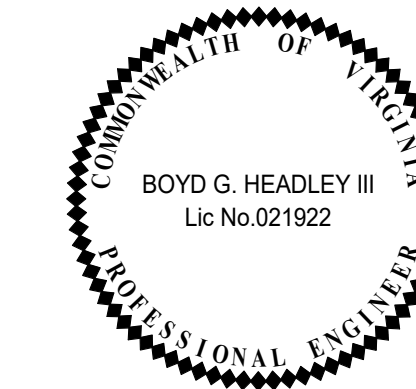
- A. GENERAL:** EACH HEATING, VENTILATING AND AIR CONDITIONING SYSTEM SHALL BE OPERATED AND TESTED CONTINUOUSLY FOR AT LEAST TWO CONSECUTIVE DAYS TO VERIFY THAT THE SYSTEM IS OPERATING SATISFACTORILY AND SAFELY AND THAT ALL EQUIPMENT IS PRODUCING THE REQUIRED CAPACITY. TO BE SUCCESSFUL, THIS TEST MUST BE CONDUCTED WITH ALL CONTROLS IN AUTOMATIC POSITION AND ALL LIGHTS ON OR OFF TO SIMULATE DAY TIME OR NIGHT TIME USE OF THE BUILDING. SUBMIT TWO TYPEWRITTEN COPIES OF REPORTS COVERING AIR SYSTEM BALANCE AND PERFORMANCE. REPORTS MUST BE RECEIVED BY THE ARCHITECT-ENGINEER AT LEAST ONE WEEK PRIOR TO THE CONTRACTOR'S REQUEST FOR A SUBSTANTIAL COMPLETION INSPECTION. REPORTS THAT CONTAIN DEFICIENCIES RELATED TO INCOMPLETE OR IMPROPER SYSTEM INSTALLATION WILL BE REJECTED BY THE ENGINEER WITHOUT FURTHER REVIEW.
- B. CALIBRATION DATA:** THE REPORT SHALL INCLUDE A LIST OF ALL INSTRUMENTATION USED AND THE DATE OF THE MOST RECENT CALIBRATION FOR EACH INSTRUMENT.
- C. BALANCE DATA:** THE FOLLOWING BALANCE DATA SHALL BE PROVIDED. DESIGN AND ACTUAL AIR FLOWS SHALL BE PROVIDED IN TABULAR FORM.
1. ALL AIR HANDLING EQUIPMENT USED FOR HEATING, COOLING AND VENTILATING:
    - a. SYSTEM NOMENCLATURE AND IDENTIFICATION.
    - b. NAMEPLATE INFORMATION: MANUFACTURER, MODEL AND SERIAL NUMBER, HORSEPOWER, RPM, VOLTAGE, PHASE, MAXIMUM AMPERAGE.
    - c. FAN SPEED.
    - d. STATIC PRESSURE PROFILE - READING BETWEEN ALL COMPONENTS AND TOTAL EXTERNAL STATIC PRESSURE.
    - e. OUTSIDE, RETURN, AND SUPPLY AIR QUANTITIES.
    - f. ACTUAL RUNNING MOTOR AMPERAGE.
    - g. COOLING AND HEATING AIRFLOW.
    - h. MINIMUM AIRFLOW.
  2. AIR OUTLET AND INLET:
    - a. ROOM IDENTIFICATION.
    - b. MANUFACTURER.
    - c. SIZE.
    - d. FREE AREA FACTOR.
    - e. AIR QUANTITY.
    - f. VELOCITY.
  3. FANS
    - a. SYSTEM NOMENCLATURE AND IDENTIFICATION.
    - b. NAMEPLATE INFORMATION: MANUFACTURER, MODEL AND SERIAL NUMBER, HORSEPOWER, RPM, VOLTAGE, PHASE, MAXIMUM AMPERAGE.
    - c. FAN SPEED.
    - d. TOTAL EXTERNAL STATIC PRESSURE.
    - e. AIR QUANTITY.
    - f. ACTUAL RUNNING MOTOR AMPERAGE.
- D. PERFORMANCE DATA:** THE FOLLOWING INFORMATION SHALL BE RECORDED TWICE EACH DAY AND TWICE EACH NIGHT DURING THE PERFORMANCE TEST. READING SHALL BE TAKEN FOR EACH ITEM AT A DIFFERENT TIME EACH SUCCEEDING DAY AT LEAST TWO HOURS LATER THAN THE TIME THE READING WAS TAKEN ON THE PRECEDING DAY.
1. ALL AIR HANDLING AND AIR CONDITIONING EQUIPMENT USED FOR HEATING, COOLING AND VENTILATING:
    - a. SYSTEM NOMENCLATURE AND IDENTIFICATION
    - b. DRY BULB AND WET BULB TEMPERATURES ENTERING AND LEAVING ALL COILS
    - c. TEST ALL ELECTRIC HEATING COILS FOR OPERATION OF LOW AIRFLOW INTERLOCK
  2. ELECTRIC HEATING COILS:
    - a. SYSTEM NOMENCLATURE AND IDENTIFICATION
    - b. NAMEPLATE INFORMATION: MANUFACTURER, MODEL AND SERIAL NUMBER.
    - c. DRY BULB TEMPERATURES ENTERING AND LEAVING COILS.
  3. TEMPERATURE:
    - a. EACH ROOM IN BUILDING.
- E. HEATED AND CHILLED WATER LINES:** PIPE 4" AND SMALLER SHALL BE TYPE L HARD DRAWN COPPER TUBING OR STANDARD WEIGHT SCHEDULE 40 BLACK STEEL PIPE OVER 4" SHALL BE STANDARD WEIGHT BLACK STEEL. FITTINGS FOR COPPER PIPE SHALL BE ASME B16.18 OR ASME B16.22 SOLDER TYPE. VIEGA PROGRESS (NO SUBSTITUTE) MAY BE USED FOR PIPE 2" AND SMALLER. FITTINGS FOR STEEL PIPE SHALL BE STANDARD WEIGHT, THREADED (OR GROOVED), BLACK, MALLEABLE IN ACCORDANCE WITH ASME B16.3 OR CAST IRON IN ACCORDANCE WITH ASME B16.4 EXCEPT FITTINGS OVER 2" SIZE MAY BE WELDING TYPE. FLANGES SHALL BE WELD NECK TYPE. ALL FITTINGS SHALL BE SUITABLE FOR 125 PSI WATER SERVICE.

**THE HAYNES**

2221 CRYSTAL SPRING AVE SW  
ROANOKE, VA 24014

FOR

**VAN THIEL**



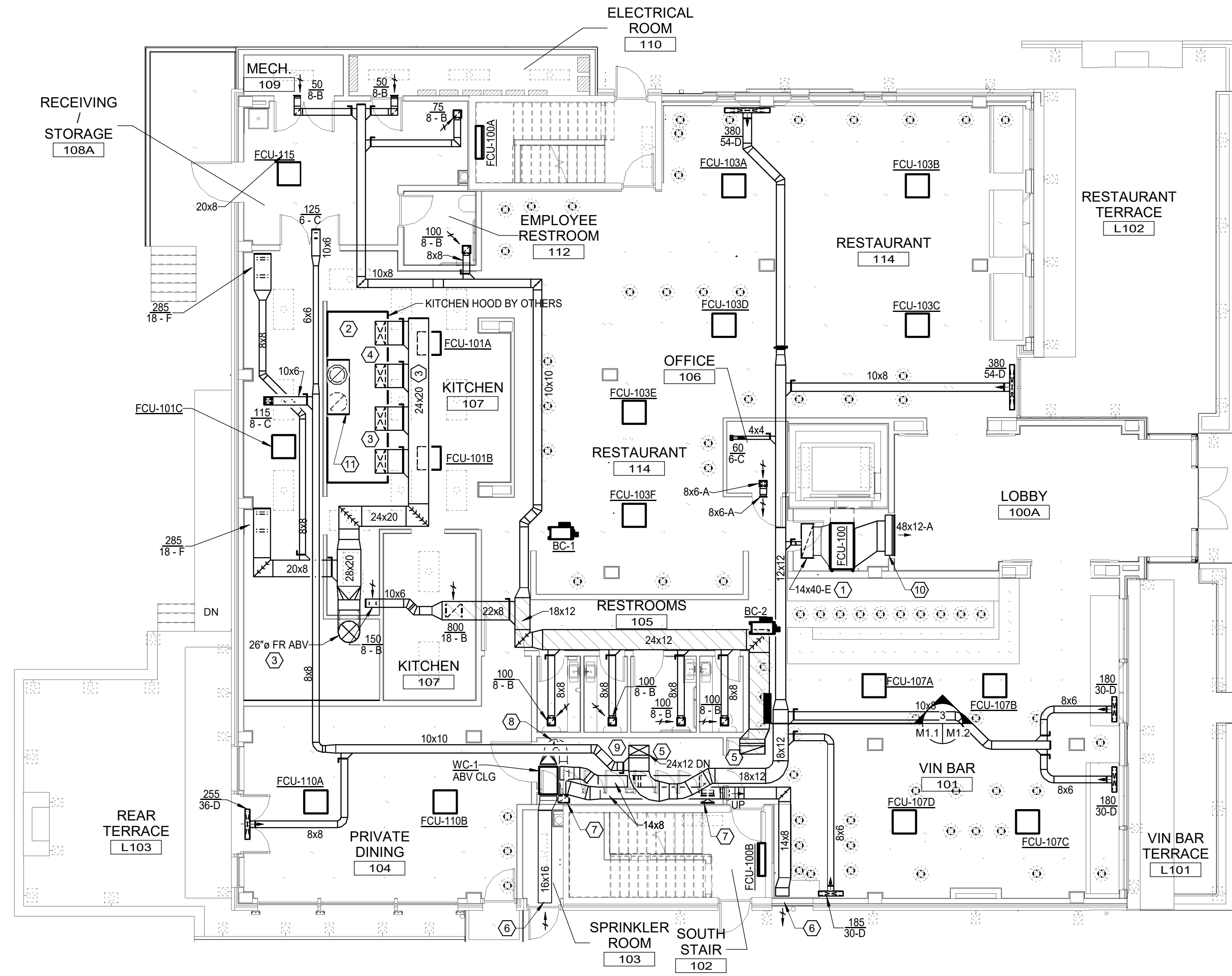
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DATE	08/30/24
DRAWN BY	Author
APPROVED BY	Approver
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**CONSTRUCTION SET**

REVISIONS	

**M0.3**

**MECHANICAL SPECIFICATIONS**



**1** MECHANICAL DUCTWORK FLOOR PLAN - FIRST FLOOR  
SCALE: 1/8" = 1'-0"

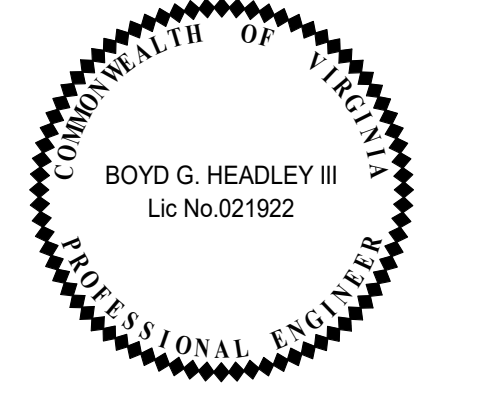
- GENERAL DUCTWORK NOTES**
1. ALL FLEX DUCT RUNOUTS TO DIFFUSERS SHALL BE SAME SIZE AS DIFFUSER ROUND NECK ADAPTER.
  2. FLEXIBLE DUCTWORK SHALL NOT EXCEED 5 FT. IN LENGTH. FLEXIBLE DUCTWORK SHALL BE SUPPORTED AS SPECIFIED AND CONNECTED TO DIFFUSER ACCORDING TO THE DETAILS. CONTRACTOR SHALL USE MINIMUM NUMBER OF TURNS IN FLEXIBLE DUCTWORK TO MAKE REQUIRED CONNECTION. ALL RETURN AND EXHAUST DUCT SHALL BE HARD DUCTED TO GRILLES AND REGISTERS. FLEXIBLE DUCTWORK IS PROHIBITED ON RETURN AND EXHAUST.
  3. WHERE DUCT SIZES TO AIR HANDLING UNITS ARE NOT INDICATED, DUCT SHALL BE FULL SIZE OF UNIT OPENING.
  4. PROVIDE MANUAL VOLUME DAMPERS AT BRANCH CONNECTIONS TO ALL LOW-PRESSURE SUPPLY, RETURN, AND EXHAUST DUCTWORK. PROVIDE A MANUAL VOLUME DAMPER DOWNSTREAM OF THE FINAL BRANCH TAKEOFF. ALL MANUAL VOLUME DAMPERS SHALL BE INSTALLED WITHIN 3' OF THE CONNECTION.
  5. ALL PENETRATIONS THROUGH WALLS SHALL BE SEALED.
  6. ALL DUCT PENETRATIONS THROUGH FLOORS SHALL BE PROTECTED TO PREVENT THE PASSAGE OF FLAME AND PRODUCTS OF COMBUSTION.
  7. ALL ROUND OR FLAT OVAL DUCT INDICATED TO BE LINED SHALL BE DOUBLE WALL.
  8. ALL EXPOSED DUCT SHALL BE SUITABLE FOR PAINTING.
  9. ALL OPEN-END DUCTS SHALL BE COVERED WITH 1/2" WIRE MESH.
  10. REFER TO DIVISION 23 SPECIFICATIONS FOR TEMPORARY HEATING AND COOLING REQUIREMENTS.
  11. ALL OUTSIDE AIRFLOW TO EACH SUITE SHALL BE BALANCED TO 30 CFM.
  12. OUTSIDE AIRFLOW TO LOBBY CASSETTES SHALL BE BALANCED TO 60 CFM.
  13. COORDINATE ALL FAN COIL UNITS AND CEILING AIR DEVICES WITH ARCHITECTURAL CEILING PLANS.
  14. PROVIDE STRICT COORDINATION BETWEEN DUCTWORK AND PIPING IN ALL AREAS.

- SHEET NOTES**
1. PROVIDE PLENUM BOX OFF TOP OF GRILLE FULL SIZE OF GRILLE NECK. GRILLE SHALL BE FILTER TYPE SUITABLE FOR 2 STANDARD 20"x14"x1" FILTERS. OUTSIDE AIR SUPPLY DUCT AND RETURN DUCT FROM UNIT SHALL TAP INTO THE SIDE OF THE PLENUM BOX. PLENUM BOX SHALL BE SUFFICIENT HEIGHT FOR RETURN AND OUTSIDE AIR TAPS AND CAPPED AT TOP.
  2. KITCHEN HOOD, EXHAUST DUCTWORK, AND CONNECTION TO HOOD OUTLET BY KITCHEN INSTALLER.
  3. ALL HOOD SUPPLY DUCTWORK AND CONNECTION TO HOOD PLENUM COLLARS BY MECHANICAL CONTRACTOR.
  4. BALANCE HOOD SUPPLY AIR DAMPERS FOR 3190 CFM EQUALLY DISTRIBUTED TO EACH DAMPER.
  5. HORIZONTAL FIRE DAMPER THROUGH SECOND FLOOR LOCATED AT DUCT PENETRATION OUT OF RATED CHASE.
  6. CONNECT DUCT TO WALL LOUVERS. SEE ARCH DRAWINGS. PROVIDE 2" INSULATION ON COOLER CONDENSING SECTION DUCTWORK. PROVIDE 1" INSULATION ON COOLER SUPPLY AND RETURN DUCTWORK.
  7. 14x8 CEILING GRILLE IN 8 FOOT CEILING IN WINE CLOSET, SUPPLY AND RETURN.
  8. 10" DIAMETER RIGID DUCT WITH ELBOWS ROTATED DOWN TO PASS UNDER OTHER DUCTWORK. TRANSITION TO 14x8 AND EXTEND TO RETURN GRILLE.
  9. PROVIDE STRICT COORDINATION BETWEEN DUCTWORK AND PIPING IN THIS AREA.
  10. PLENUM FULL SIZE OF SUPPLY REGISTER.
  11. 26x26 HOOD EXHAUST PLENUM. CONNECT TO HOOD COLLAR AND OFFSET DUCT FROM ABOVE. PROVIDE CLEANOUT ACCESS DOOR. PROVIDE 2-HOUR UL LISTED DUCT WRAP ON ALL SIDES.

**THE HAYNES**

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FOR  
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APPROVED BY	BH
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**CONSTRUCTION SET**

**REVISIONS**

NO.	DESCRIPTION

**M1.1**

**GRAPHIC SCALE**

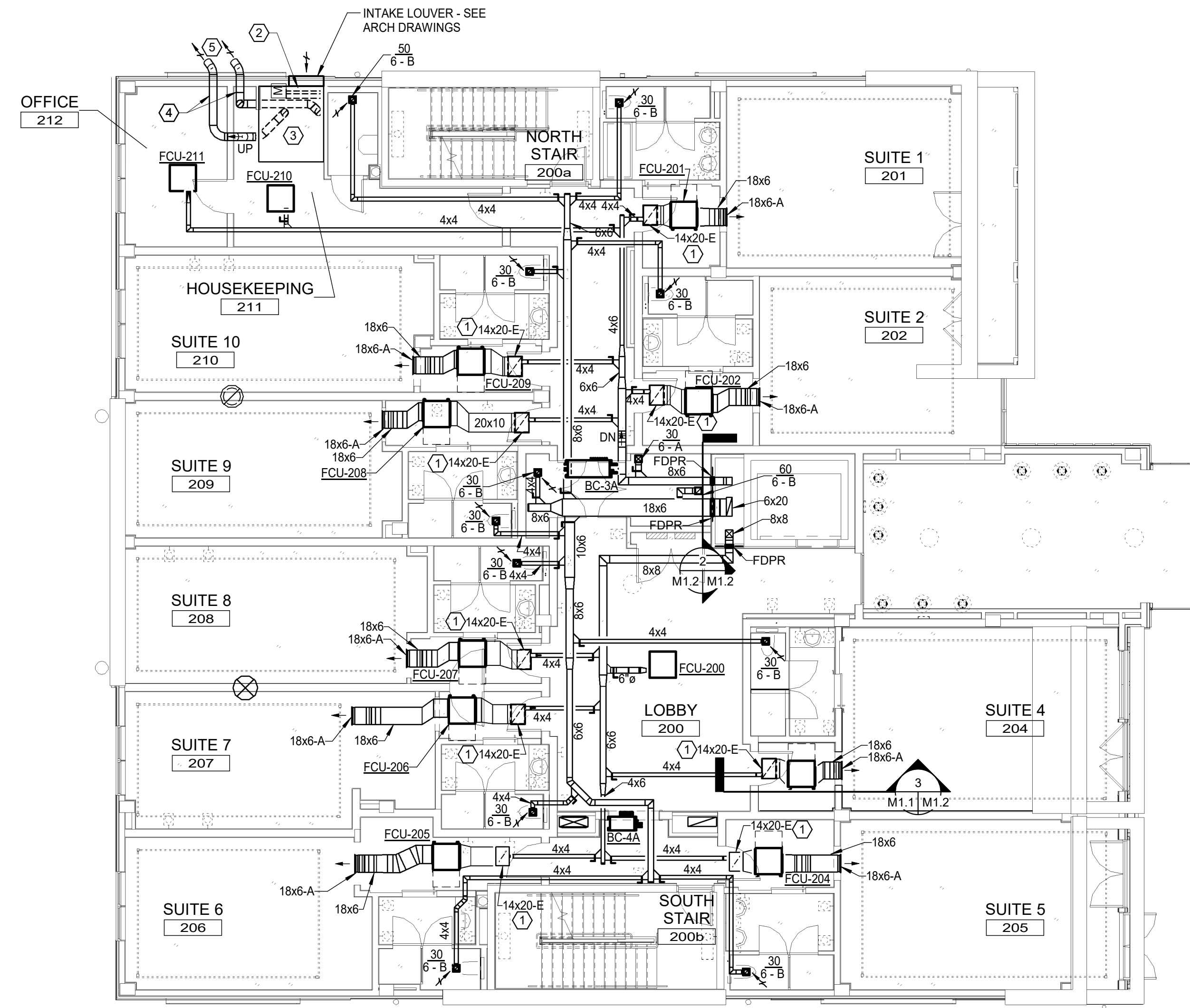


**MECHANICAL 1ST FLOOR PLAN - DUCTWORK**

**THE HAYNES**

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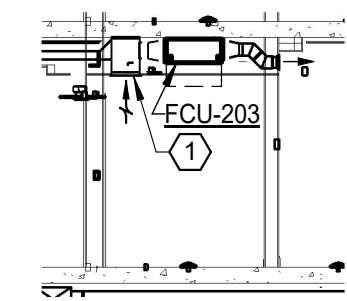
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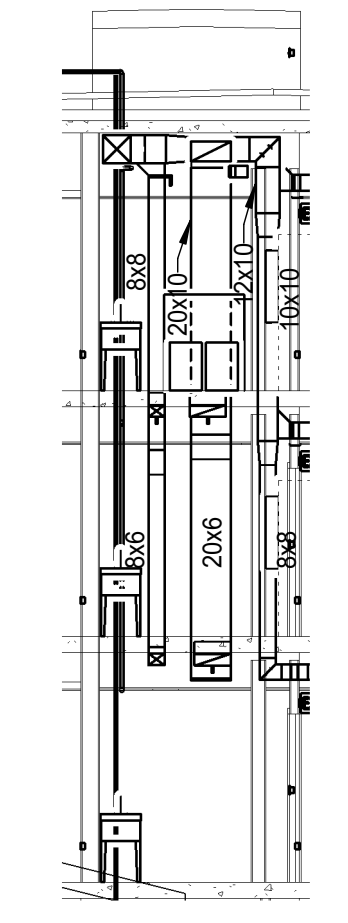
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  3. WHERE DUCT SIZES TO AIR HANDLING UNITS ARE NOT INDICATED, DUCT SHALL BE FULL SIZE OF UNIT OPENING.
  4. PROVIDE MANUAL VOLUME DAMPERS AT BRANCH CONNECTIONS TO ALL LOW-PRESSURE SUPPLY, RETURN, AND EXHAUST DUCTWORK. PROVIDE A MANUAL VOLUME DAMPER DOWNSTREAM OF THE FINAL BRANCH TAKEOFF. ALL MANUAL VOLUME DAMPERS SHALL BE INSTALLED WITHIN 3' OF THE CONNECTION.
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  13. COORDINATE ALL FAN COIL UNITS AND CEILING AIR DEVICES WITH ARCHITECTURAL CEILING PLANS.
  14. PROVIDE STRICT COORDINATION BETWEEN DUCTWORK AND PIPING IN ALL AREAS.

- # SHEET NOTES**
1. PROVIDE PLENUM BOX OFF TOP OF GRILLE FULL SIZE OF GRILLE NECK. GRILLE SHALL BE FILTER TYPE SUITABLE FOR STANDARD 20"x14"x1" FILTER. OUTSIDE AIR SUPPLY DUCT AND RETURN DUCT FROM UNIT SHALL TAP INTO THE SIDE OF THE PLENUM BOX. PLENUM BOX SHALL BE SUFFICIENT HEIGHT FOR RETURN AND OUTSIDE AIR TAPS AND CAPPED AT TOP.
  2. MOTOR OPERATED DAMPER INSIDE DRYER PLENUM, OVER FULL PORTION OF EXPOSED FACE OF LOUVER. INTERLOCK WITH BOTH DRYERS.
  3. INSULATED DRYER PLENUM AROUND BOTH DRYERS. SEE STACKED DRYER PLENUM DETAIL.
  4. DRYER EXHAUST DUCTS ABOVE CEILING, FULL SIZE OF DRYER OUTLET.
  5. DRYER EXHAUST TO OUTSIDE. TURN DOWN 45 DEGREES AND TURN AWAY 45 DEGREES AWAY FROM INTAKE LOUVER.

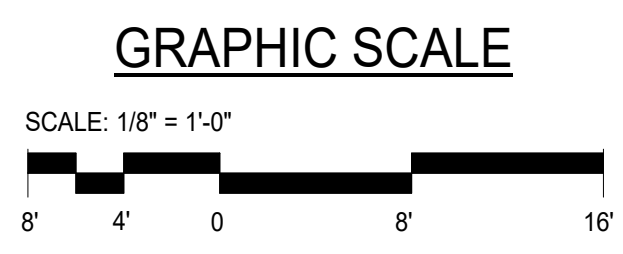
**1** MECHANICAL DUCTWORK FLOOR PLAN - SECOND FLOOR  
SCALE: 1/8" = 1'-0"



**3** TYPICAL SUITE FAN COIL UNIT SECTION  
1/8" = 1'-0"



**2** DUCT SHAFT  
1/8" = 1'-0"



**CONSTRUCTION SET**

**REVISIONS**

NO.	DATE	DESCRIPTION

**M1.2**

**MECHANICAL 2ND FLOOR PLAN - DUCTWORK**

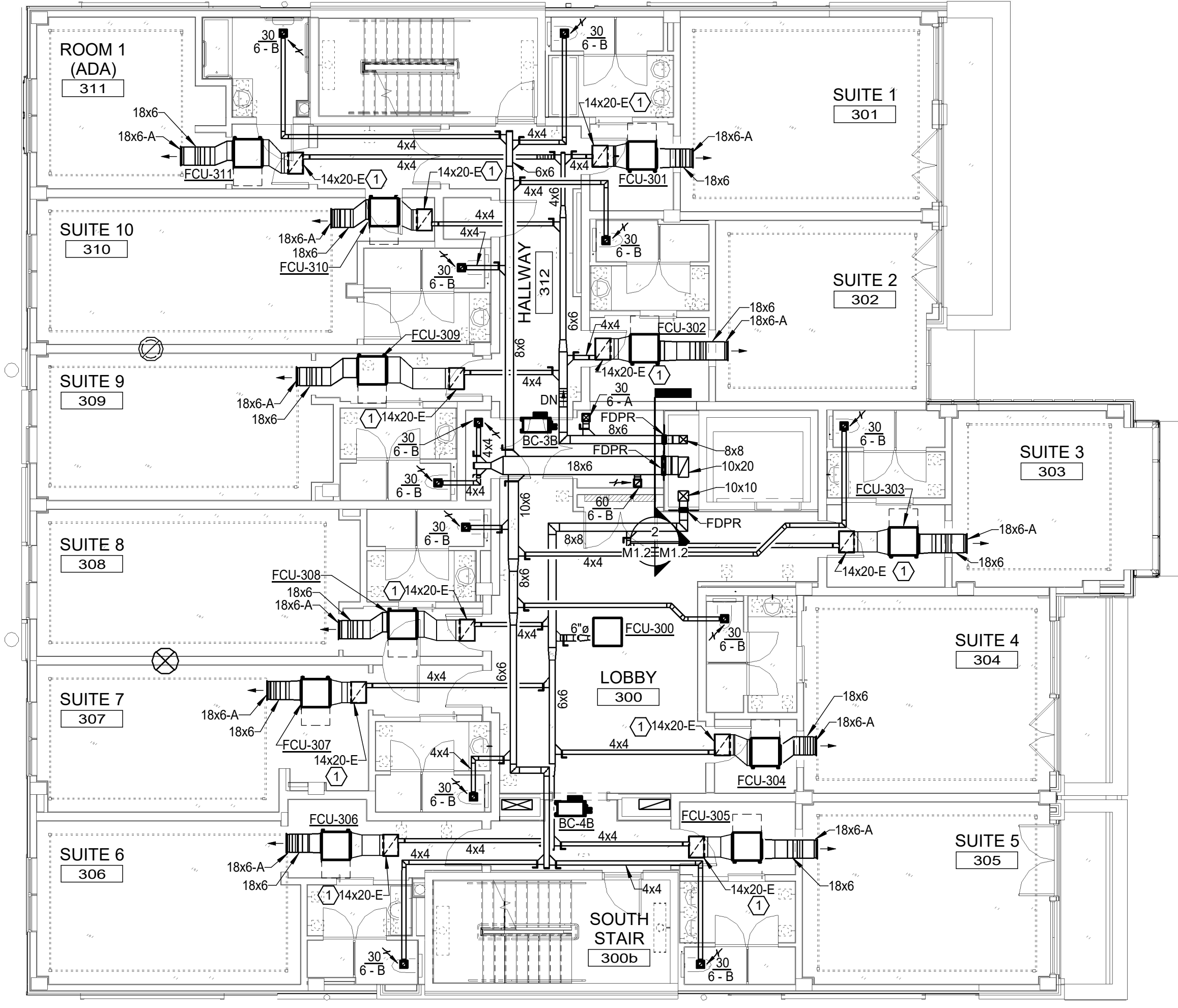


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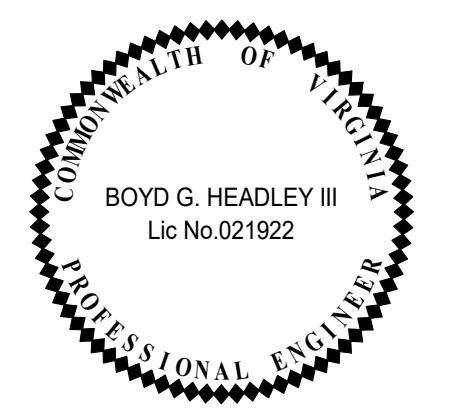
FOR  
**VAN THIEL**



- GENERAL DUCTWORK NOTES**
1. ALL FLEX DUCT RUNOUTS TO DIFFUSERS SHALL BE SAME SIZE AS DIFFUSER ROUND NECK ADAPTER.
  2. FLEXIBLE DUCTWORK SHALL NOT EXCEED 5 FT. IN LENGTH. FLEXIBLE DUCTWORK SHALL BE SUPPORTED AS SPECIFIED AND CONNECTED TO DIFFUSER ACCORDING TO THE DETAILS. CONTRACTOR SHALL USE MINIMUM NUMBER OF TURNS IN FLEXIBLE DUCTWORK TO MAKE REQUIRED CONNECTION. ALL RETURN AND EXHAUST DUCT SHALL BE HARD DUCTED TO GRILLES AND REGISTERS. FLEXIBLE DUCTWORK IS PROHIBITED ON RETURN AND EXHAUST.
  3. WHERE DUCT SIZES TO AIR HANDLING UNITS ARE NOT INDICATED, DUCT SHALL BE FULL SIZE OF UNIT OPENING.
  4. PROVIDE MANUAL VOLUME DAMPERS AT BRANCH CONNECTIONS TO ALL LOW-PRESSURE SUPPLY, RETURN, AND EXHAUST DUCTWORK. PROVIDE A MANUAL VOLUME DAMPER DOWNSTREAM OF THE FINAL BRANCH TAKEOFF. ALL MANUAL VOLUME DAMPERS SHALL BE INSTALLED WITHIN 3' OF THE CONNECTION.
  5. ALL PENETRATIONS THROUGH WALLS SHALL BE SEALED.
  6. ALL DUCT PENETRATIONS THROUGH FLOORS SHALL BE PROTECTED TO PREVENT THE PASSAGE OF FLAME AND PRODUCTS OF COMBUSTION.
  7. ALL ROUND OR FLAT OVAL DUCT INDICATED TO BE LINED SHALL BE DOUBLE WALL.
  8. ALL EXPOSED DUCT SHALL BE SUITABLE FOR PAINTING.
  9. ALL OPEN-END DUCTS SHALL BE COVERED WITH 1/2" WIRE MESH.
  10. REFER TO DIVISION 23 SPECIFICATIONS FOR TEMPORARY HEATING AND COOLING REQUIREMENTS.
  11. ALL OUTSIDE AIRFLOW TO EACH SUITE SHALL BE BALANCED TO 30 CFM.
  12. OUTSIDE AIRFLOW TO LOBBY CASSETTES SHALL BE BALANCED TO 60 CFM.
  13. COORDINATE ALL FAN COIL UNITS AND CEILING AIR DEVICES WITH ARCHITECTURAL CEILING PLANS.
  14. PROVIDE STRICT COORDINATION BETWEEN DUCTWORK AND PIPING IN ALL AREAS.

- (#) SHEET NOTES**
1. PROVIDE PLENUM BOX OFF TOP OF GRILLE FULL SIZE OF GRILLE NECK. GRILLE SHALL BE FILTER TYPE SUITABLE FOR STANDARD 20"x14"x1" FILTER. OUTSIDE AIR SUPPLY DUCT AND RETURN DUCT FROM UNIT SHALL TAP INTO THE SIDE OF THE PLENUM BOX. PLENUM BOX SHALL BE SUFFICIENT HEIGHT FOR RETURN AND OUTSIDE AIR TAPS AND CAPPED AT TOP.

**MECHANICAL DUCTWORK FLOOR PLAN - THIRD FLOOR**  
SCALE: 1/8" = 1'-0"



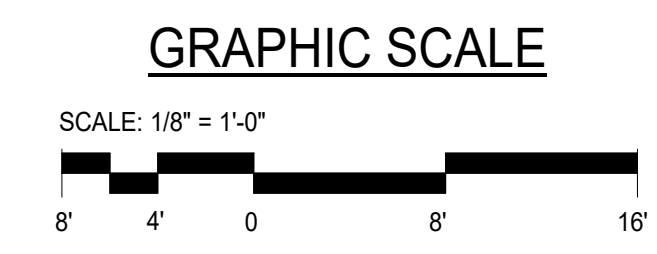
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**CONSTRUCTION SET**

**REVISIONS**

NO.	DESCRIPTION

**M1.3**

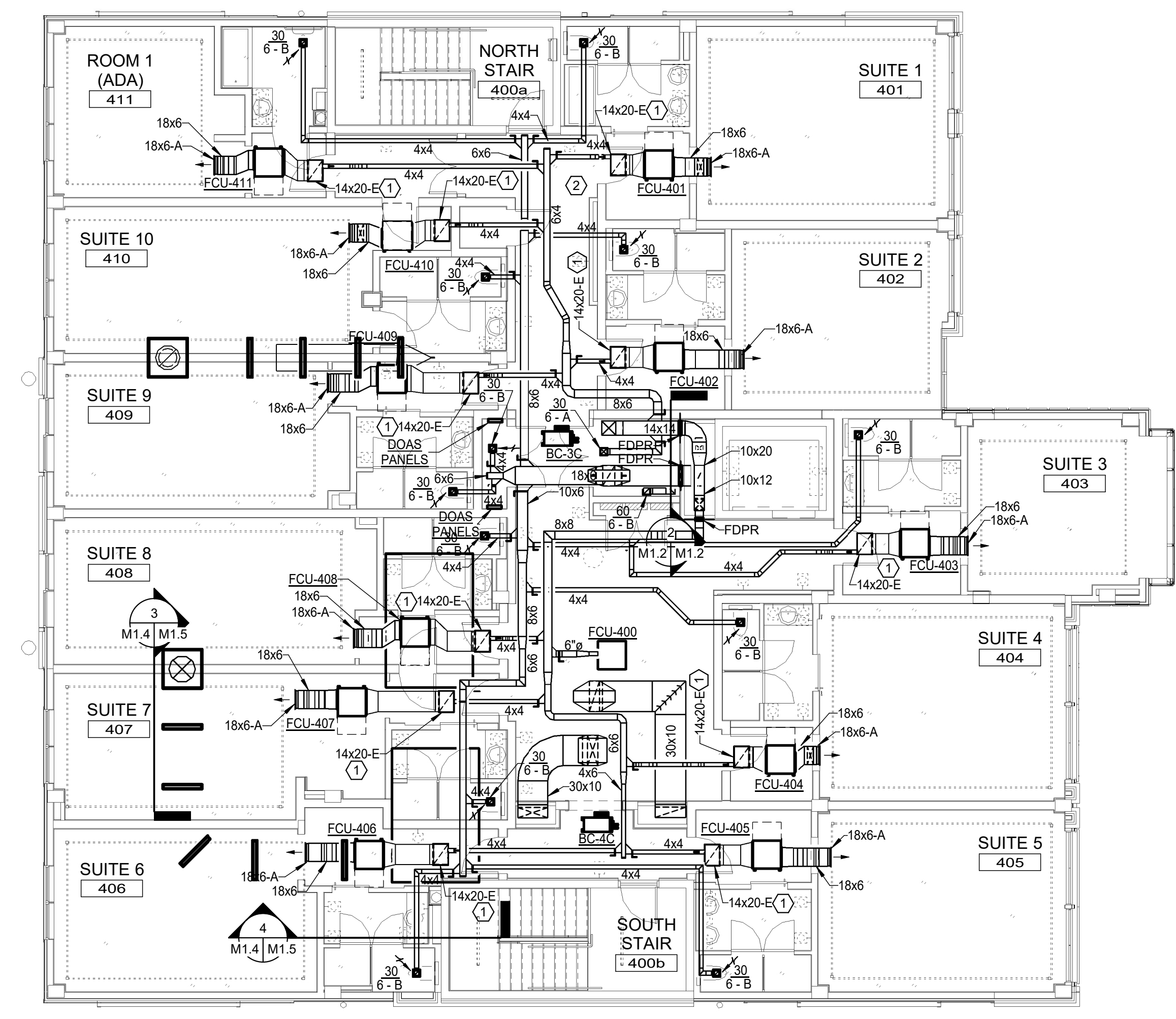


**MECHANICAL 3RD FLOOR PLAN - DUCTWORK**

**THE HAYNES**

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**VAN THIEL**



- GENERAL DUCTWORK NOTES**
1. ALL FLEX DUCT RUNOUTS TO DIFFUSERS SHALL BE SAME SIZE AS DIFFUSER ROUND NECK ADAPTER.
  2. FLEXIBLE DUCTWORK SHALL NOT EXCEED 5 FT. IN LENGTH. FLEXIBLE DUCTWORK SHALL BE SUPPORTED AS SPECIFIED AND CONNECTED TO DIFFUSER ACCORDING TO THE DETAILS. CONTRACTOR SHALL USE MINIMUM NUMBER OF TURNS IN FLEXIBLE DUCTWORK TO MAKE REQUIRED CONNECTION. ALL RETURN AND EXHAUST DUCT SHALL BE HARD DUCTED TO GRILLES AND REGISTERS. FLEXIBLE DUCTWORK IS PROHIBITED ON RETURN AND EXHAUST.
  3. WHERE DUCT SIZES TO AIR HANDLING UNITS ARE NOT INDICATED, DUCT SHALL BE FULL SIZE OF UNIT OPENING.
  4. PROVIDE MANUAL VOLUME DAMPERS AT BRANCH CONNECTIONS TO ALL LOW-PRESSURE SUPPLY, RETURN, AND EXHAUST DUCTWORK. PROVIDE A MANUAL VOLUME DAMPER DOWNSTREAM OF THE FINAL BRANCH TAKEOFF. ALL MANUAL VOLUME DAMPERS SHALL BE INSTALLED WITHIN 3' OF THE CONNECTION.
  5. ALL PENETRATIONS THROUGH WALLS SHALL BE SEALED.
  6. ALL DUCT PENETRATIONS THROUGH FLOORS SHALL BE PROTECTED TO PREVENT THE PASSAGE OF FLAME AND PRODUCTS OF COMBUSTION.
  7. ALL ROUND OR FLAT OVAL DUCT INDICATED TO BE LINED SHALL BE DOUBLE WALL.
  8. ALL EXPOSED DUCT SHALL BE SUITABLE FOR PAINTING.
  9. ALL OPEN-END DUCTS SHALL BE COVERED WITH 1/2" WIRE MESH.
  10. REFER TO DIVISION 23 SPECIFICATIONS FOR TEMPORARY HEATING AND COOLING REQUIREMENTS.
  11. ALL OUTSIDE AIRFLOW TO EACH SUITE SHALL BE BALANCED TO 30 CFM.
  12. OUTSIDE AIRFLOW TO LOBBY CASSETTES SHALL BE BALANCED TO 60 CFM.
  13. COORDINATE ALL FAN COIL UNITS AND CEILING AIR DEVICES WITH ARCHITECTURAL CEILING PLANS.
  14. PROVIDE STRICT COORDINATION BETWEEN DUCTWORK AND PIPING IN ALL AREAS.

- # SHEET NOTES**
1. PROVIDE PLENUM BOX OFF TOP OF GRILLE FULL SIZE OF GRILLE NECK. GRILLE SHALL BE FILTER TYPE SUITABLE FOR STANDARD 20"x14"x1" FILTER. OUTSIDE AIR SUPPLY DUCT AND RETURN DUCT FROM UNIT SHALL TAP INTO THE SIDE OF THE PLENUM BOX. PLENUM BOX SHALL BE SUFFICIENT HEIGHT FOR RETURN AND OUTSIDE AIR TAPS AND CAPPED AT TOP.
  2. MAINTAIN CLEAR AREA BETWEEN GENERATOR ROOF PENETRATION AND CONDUIT RISERS IN CHASE.

**MECHANICAL DUCTWORK FLOOR PLAN - FOURTH FLOOR**  
SCALE: 1/8" = 1'-0"

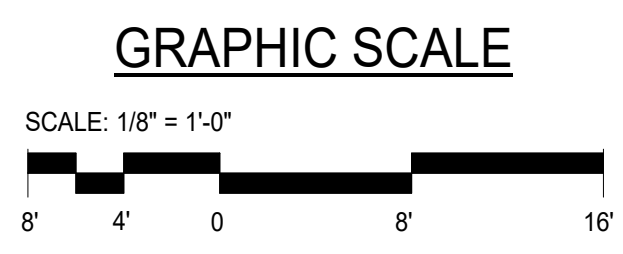


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**CONSTRUCTION SET**

**REVISIONS**


**M1.4**

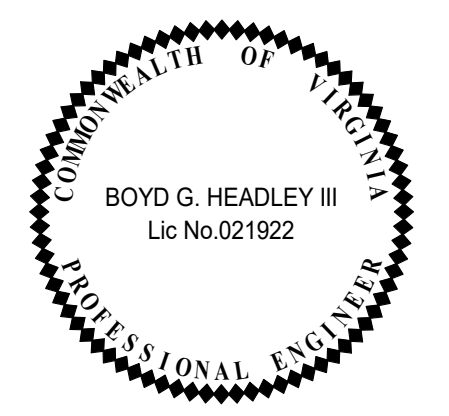


**MECHANICAL 4TH FLOOR PLAN - DUCTWORK**

**THE HAYNES**

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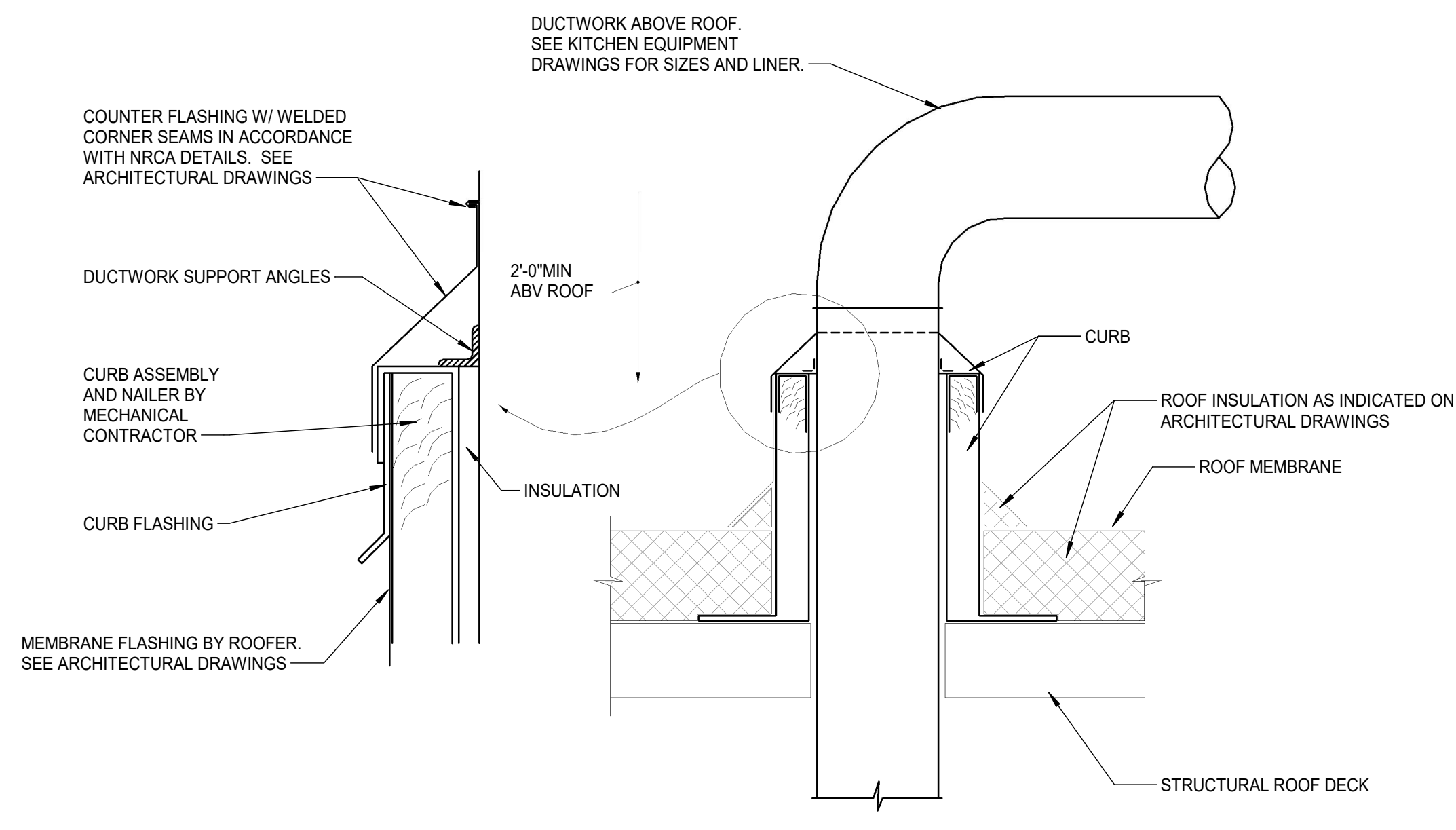
REVISIONS

NO.	DESCRIPTION

**M1.5**

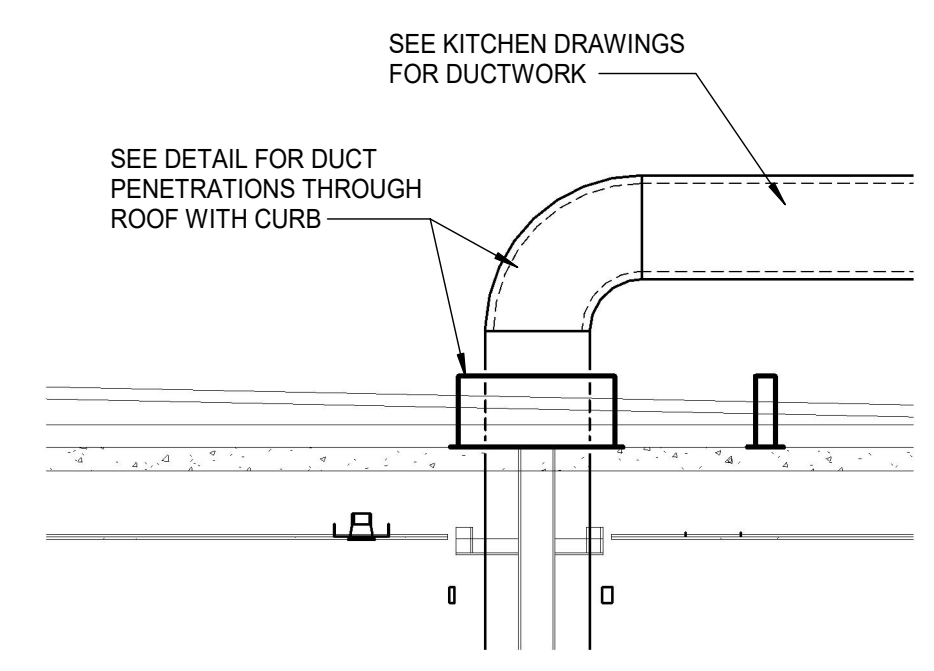
MECHANICAL ROOF PLAN

- SHEET NOTES**
- ① REFER TO DETAIL ON SHEET M3.1 FOR INSTALLATION.
  - ② SET ROOFTOP VRV OUTDOOR UNITS ON EQUIPMENT SUPPORTS AS INDICATED ON STRUCTURAL DRAWINGS WITH VIBRATION ISOLATION AS SPECIFIED.
  - ③ LOCATE KITCHEN EXHAUST FAN A MINIMUM OF 20 FEET FROM THE NEAREST DOAS INTAKE. VERIFY FAN UPWARD EXHAUST IS A MINIMUM OF 7 FEET ABOVE THE ROOF. COORDINATE WITH KITCHEN EQUIPMENT INSTALLER.
  - ④ LOCATE GENERATOR EXHAUST OUTLET A MINIMUM OF 20 FEET FROM THE NEAREST DOAS INTAKE. COORDINATE WITH ELECTRICAL TO HAVE OUTLET TURNED AWAY FROM THE DOAS UNITS.
  - ⑤ LOCATE KITCHEN MAU GAS EXHAUST OUTLET A MINIMUM OF 10 FEET FROM THE NEAREST DOAS INTAKE. COORDINATE WITH KITCHEN EQUIPMENT INSTALLER TO HAVE GAS EXHAUST OUTLET TURNED AWAY FROM THE DOAS UNITS.
  - ⑥ ROOFTOP DUCT SUPPORTS BY MECHANICAL CONTRACTOR. MINIMUM SPACING SHALL BE AS INDICATED ON KITCHEN DRAWINGS.

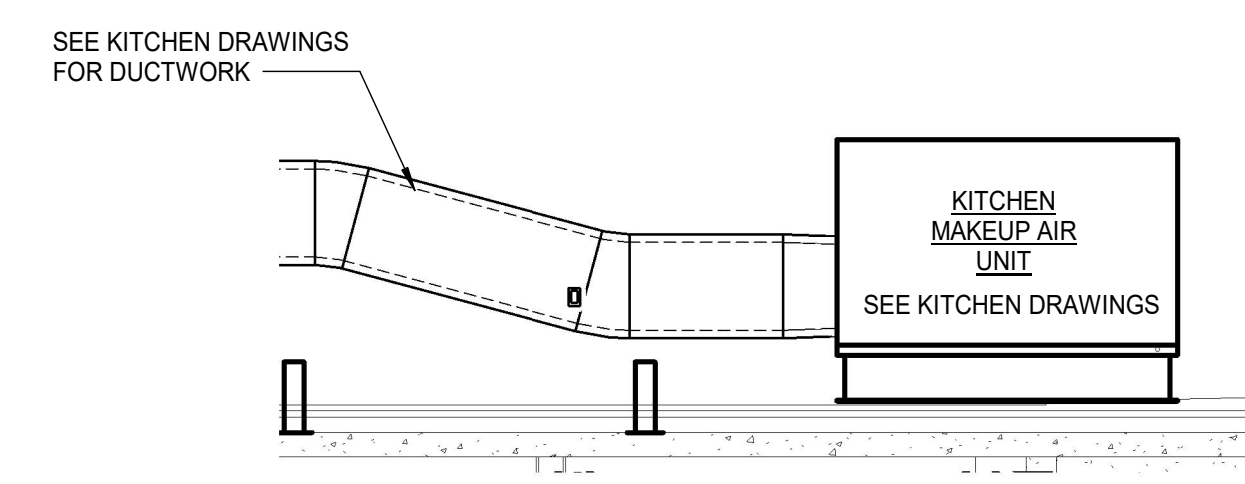


NOTE:  
CURB HEIGHT SHALL BE AS REQUIRED TO PROVIDE ROOFING CONTRACTOR'S MINIMUM FLASHING HEIGHT ACCOUNTING FOR THE THICKNESS OF TAPERED INSULATION WHERE INSTALLED.

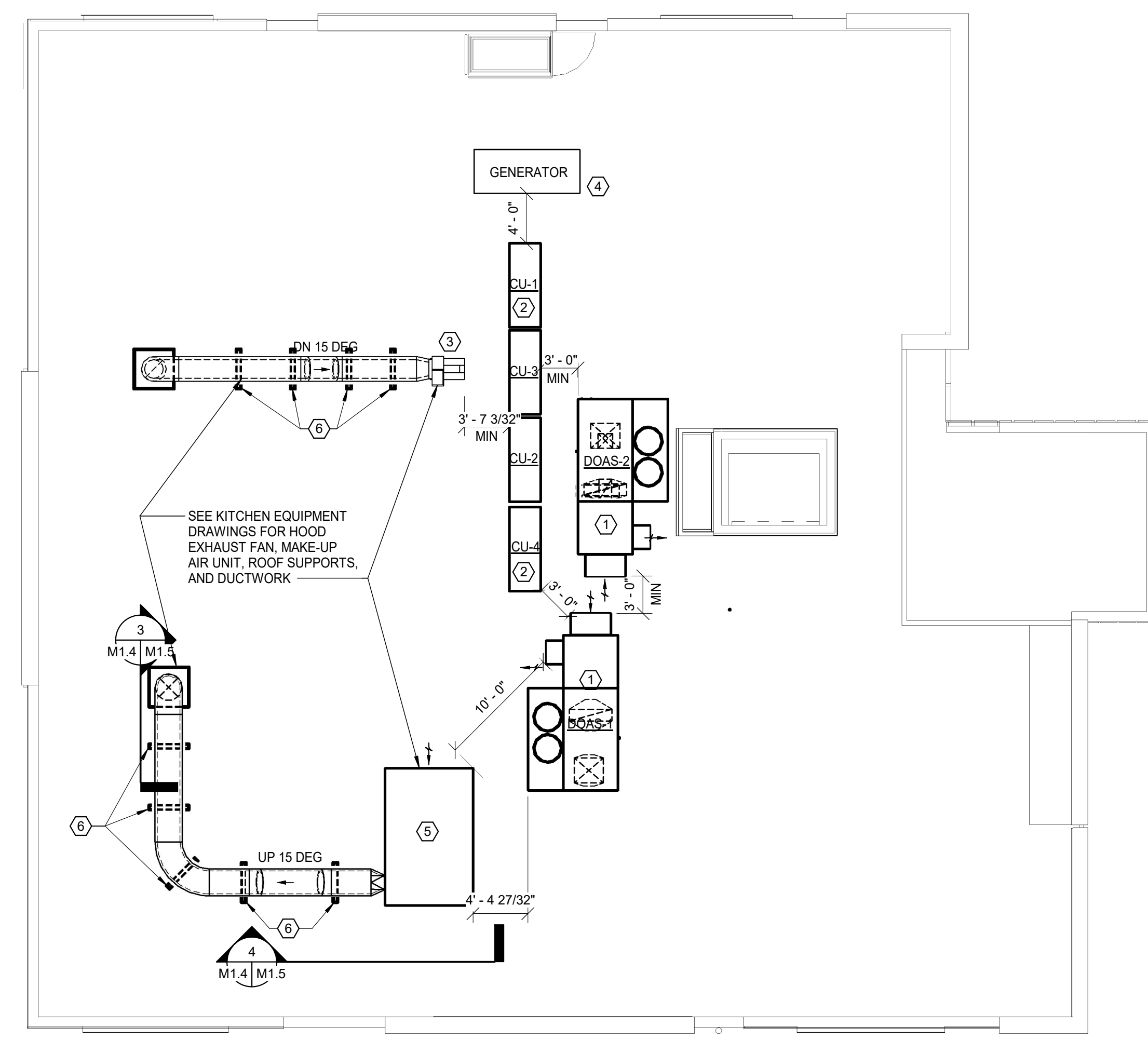
**DUCT ROOF PENETRATION DETAIL**  
NO SCALE



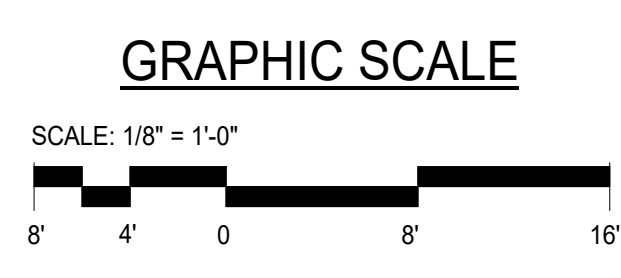
③ SECTION - ROOF PENETRATIONS  
1/4" = 1'-0"



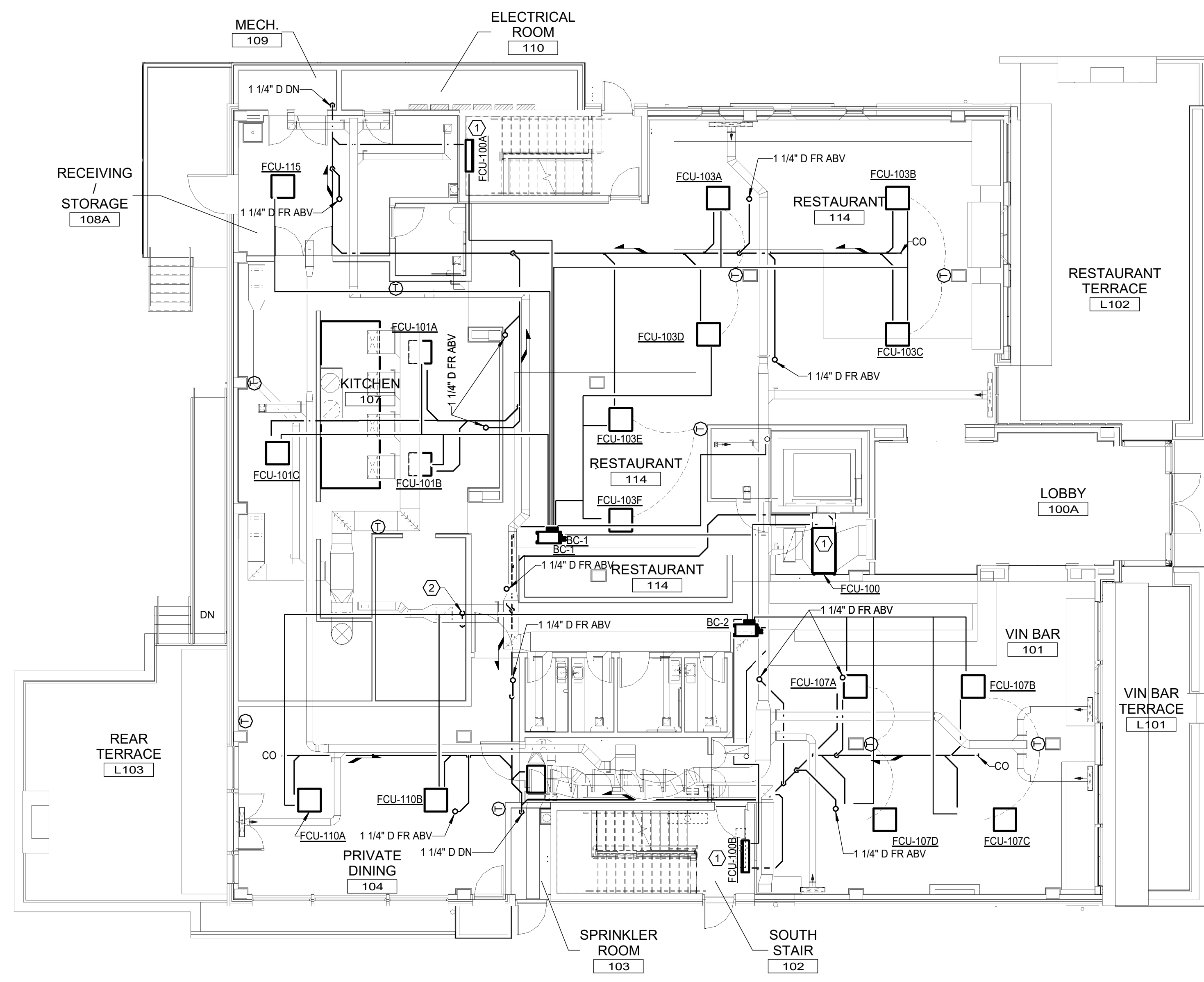
④ SECTION - MAKEUP AIR DUCT  
1/4" = 1'-0"



① MECHANICAL DUCTWORK FLOOR PLAN - ROOF  
SCALE: 1/8" = 1'-0"







**MECHANICAL PIPING FLOOR PLAN - FIRST FLOOR**  
SCALE: 1/8" = 1'-0"

- GENERAL PIPING NOTES**
1. ALL PENETRATIONS THROUGH WALLS SHALL BE SEALED.
  2. WHERE A SINGLE SENSOR IS SHOWN FOR A SPACE SERVED BY MULTIPLE TERMINAL UNITS OR AIR HANDLERS, THE SINGLE SENSOR SHALL CONTROL ALL UNITS SERVING THE SPACE.
  3. WHERE MULTIPLE SENSORS ARE SHOWN FOR SINGLE TERMINAL UNITS OR AIR HANDLERS, THE SENSORS SHALL PROVIDE AVERAGING CONTROL OF THE UNIT.
  4. REFER TO DIVISION 23 SPECIFICATIONS FOR TEMPORARY HEATING AND COOLING REQUIREMENTS.
  5. REFER TO PHASING PLANS FOR PHASING REQUIREMENTS.
  6. SINGLE REFRIGERANT LINES INDICATE MULTIPLE LINES AS REQUIRED FOR ENERGY RECOVERY VRV HEAT PUMP SYSTEMS.
  7. ALL COOLING CONDENSATE DRAIN LINES SHALL BE 1-1/4".
  8. ALL PIPING SHALL BE CONCEALED ABOVE CEILINGS.

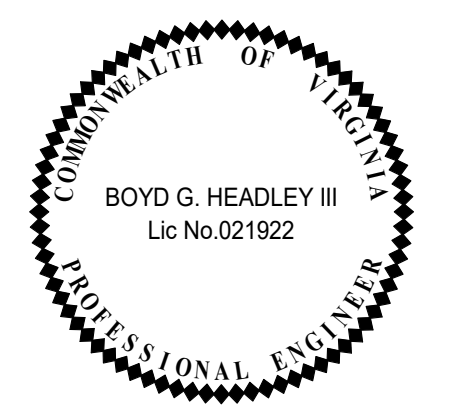
- SHEET NOTES**
1. UTILIZE INTERNAL THERMOSTAT WHERE INDICATED.
  2. EXTEND 3/4" DRAIN FROM BOTTOM OF WATERTIGHT DUCT TO FLOOR DRAIN BELOW DISHWASHER.

**RADIANT FLOORS IN BATHROOMS**  
ALL RADIANT FLOORS IN BATHROOMS ARE AN ADD ALTERNATE. IF THE ALTERNATE IS NOT ACCEPTED, DO NOT ROUGH IN FOR BATHROOM THERMOSTATS.

**THE HAYNES**

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FOR  
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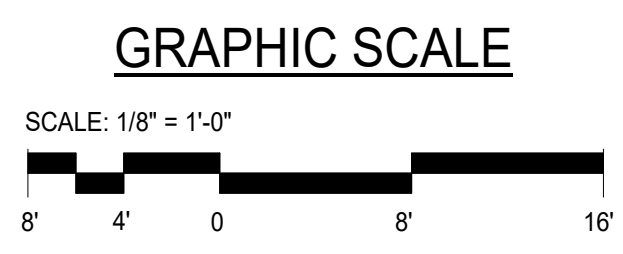
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**CONSTRUCTION SET**

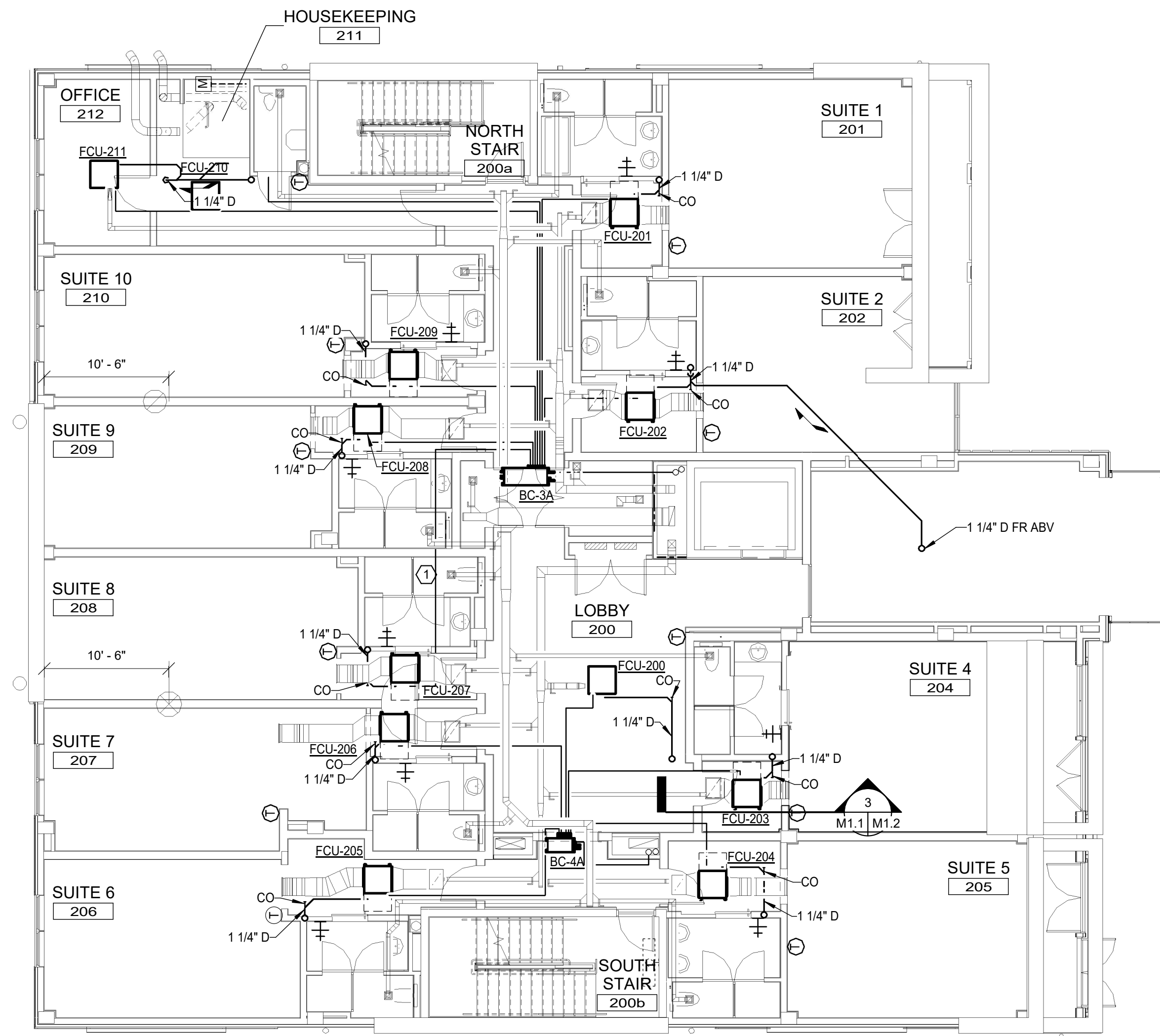
**REVISIONS**

NO.	DESCRIPTION

**M2.1**



**MECHANICAL 1ST FLOOR PLAN - PIPING**



- GENERAL PIPING NOTES**
1. ALL PENETRATIONS THROUGH WALLS SHALL BE SEALED.
  2. WHERE A SINGLE SENSOR IS SHOWN FOR A SPACE SERVED BY MULTIPLE TERMINAL UNITS OR AIR HANDLERS, THE SINGLE SENSOR SHALL CONTROL ALL UNITS SERVING THE SPACE.
  3. WHERE MULTIPLE SENSORS ARE SHOWN FOR SINGLE TERMINAL UNITS OR AIR HANDLERS, THE SENSORS SHALL PROVIDE AVERAGING CONTROL OF THE UNIT.
  4. REFER TO DIVISION 23 SPECIFICATIONS FOR TEMPORARY HEATING AND COOLING REQUIREMENTS.
  5. REFER TO PHASING PLANS FOR PHASING REQUIREMENTS.
  6. SINGLE REFRIGERANT LINES INDICATE MULTIPLE LINES AS REQUIRED FOR ENERGY RECOVERY VRV HEAT PUMP SYSTEMS.
  7. ALL COOLING CONDENSATE DRAIN LINES SHALL BE 1-1/4\".
  8. ALL PIPING SHALL BE CONCEALED ABOVE CEILINGS.

- # SHEET NOTES**
- 1 REFRIGERANT PIPING SHALL HAVE NO FITTINGS ABOVE BATHROOMS OR ANY OTHER ROOM SMALLER THAN 124 SQUARE FEET.

**RADIANT FLOORS IN BATHROOMS**  
ALL RADIANT FLOORS IN BATHROOMS ARE AN ADD ALTERNATE. IF THE ALTERNATE IS NOT ACCEPTED, DO NOT ROUGH IN FOR BATHROOM THERMOSTATS.

**MECHANICAL PIPING FLOOR PLAN - SECOND FLOOR**  
SCALE: 1/8" = 1'-0"

**THE HAYNES**

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FOR  
**VAN THIEL**

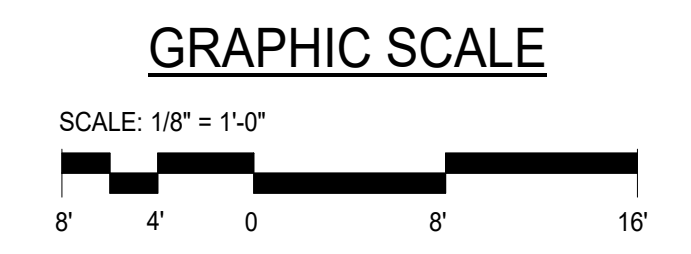


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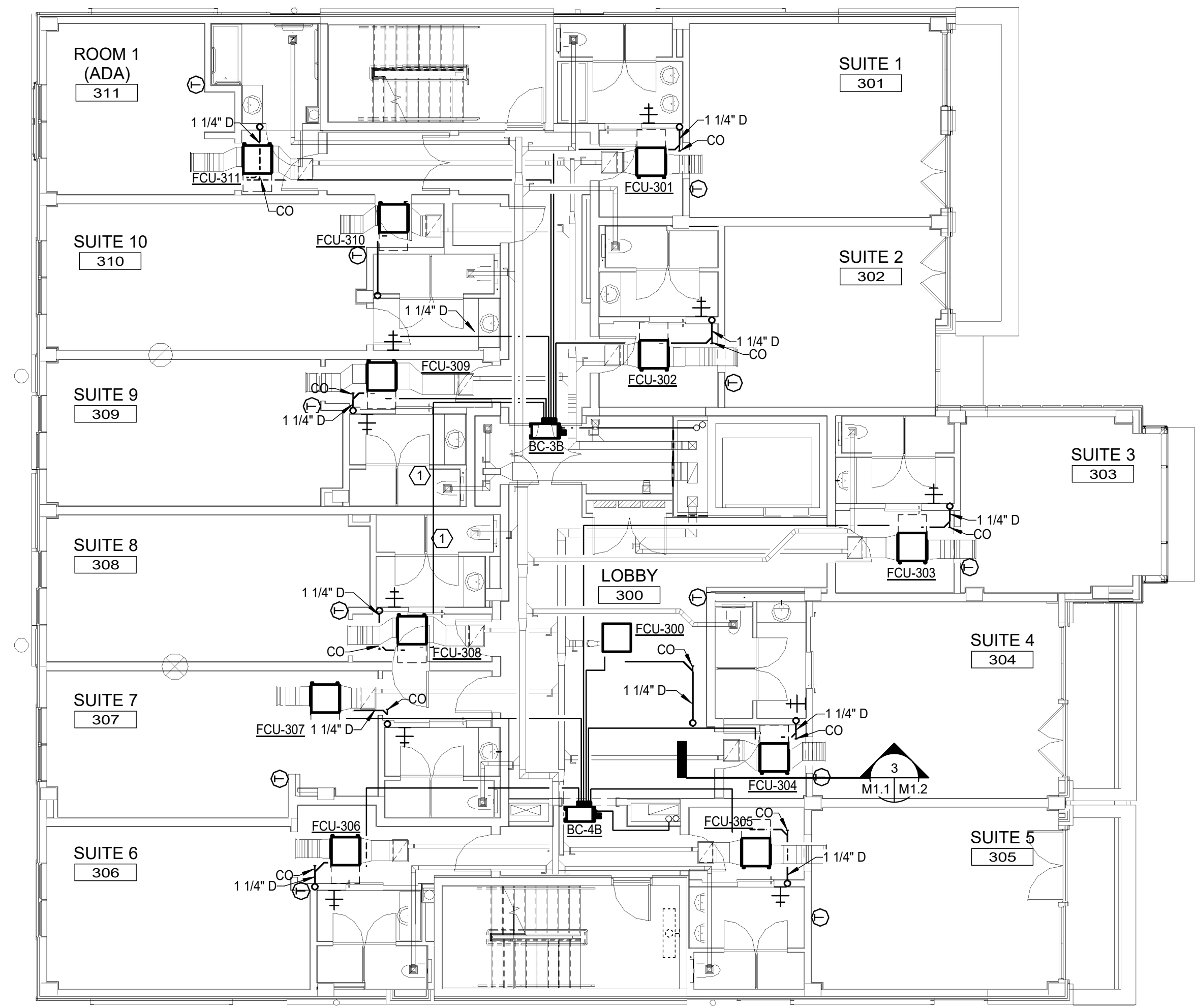
**CONSTRUCTION SET**

**REVISIONS**


**M2.2**



**MECHANICAL 2ND FLOOR PLAN - PIPING**



- GENERAL PIPING NOTES**
1. ALL PENETRATIONS THROUGH WALLS SHALL BE SEALED.
  2. WHERE A SINGLE SENSOR IS SHOWN FOR A SPACE SERVED BY MULTIPLE TERMINAL UNITS OR AIR HANDLERS, THE SINGLE SENSOR SHALL CONTROL ALL UNITS SERVING THE SPACE.
  3. WHERE MULTIPLE SENSORS ARE SHOWN FOR SINGLE TERMINAL UNITS OR AIR HANDLERS, THE SENSORS SHALL PROVIDE AVERAGING CONTROL OF THE UNIT.
  4. REFER TO DIVISION 23 SPECIFICATIONS FOR TEMPORARY HEATING AND COOLING REQUIREMENTS.
  5. REFER TO PHASING PLANS FOR PHASING REQUIREMENTS.
  6. SINGLE REFRIGERANT LINES INDICATE MULTIPLE LINES AS REQUIRED FOR ENERGY RECOVERY VRV HEAT PUMP SYSTEMS.
  7. ALL COOLING CONDENSATE DRAIN LINES SHALL BE 1-1/4\".
  8. ALL PIPING SHALL BE CONCEALED ABOVE CEILINGS.

- (#) SHEET NOTES**
- 1 REFRIGERANT PIPING SHALL HAVE NO FITTINGS ABOVE BATHROOMS OR ANY OTHER ROOM SMALLER THAN 124 SQUARE FEET.

**RADIANT FLOORS IN BATHROOMS**  
ALL RADIANT FLOORS IN BATHROOMS ARE AN ADD ALTERNATE. IF THE ALTERNATE IS NOT ACCEPTED, DO NOT ROUGH IN FOR BATHROOM THERMOSTATS.

**MECHANICAL PIPING FLOOR PLAN - THIRD FLOOR**  
SCALE: 1/8" = 1'-0"

**THE HAYNES**

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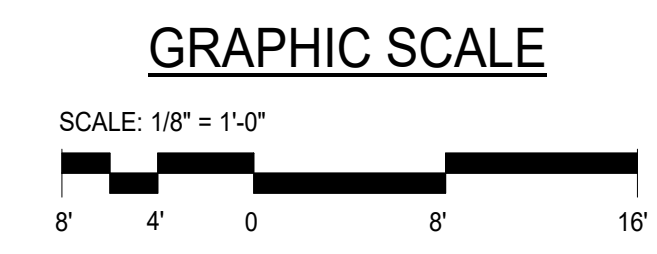
**CONSTRUCTION SET**

**REVISIONS**

NO.	DESCRIPTION

**M2.3**

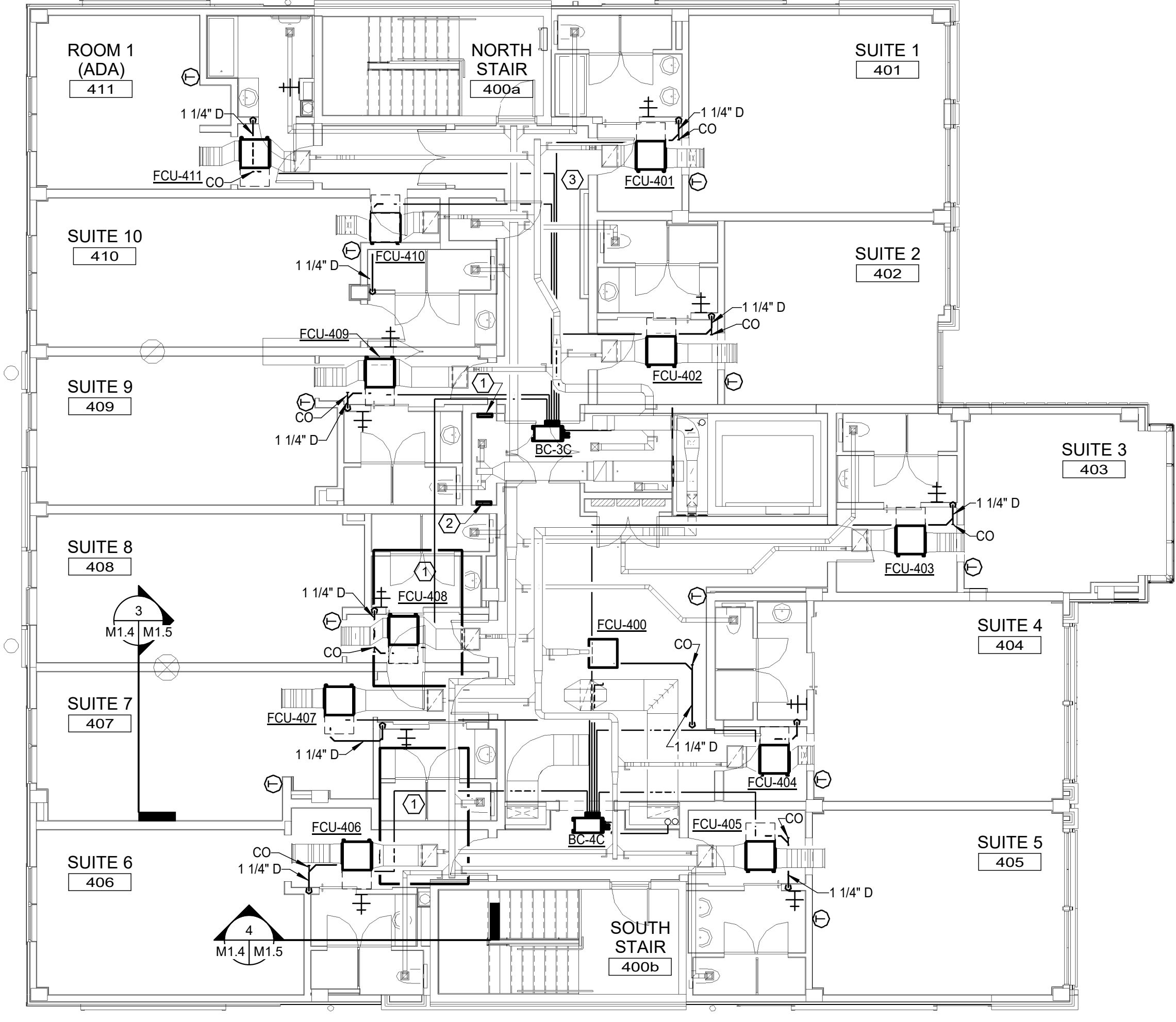
**MECHANICAL 3RD FLOOR PLAN - PIPING**



**THE HAYNES**

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  3. WHERE MULTIPLE SENSORS ARE SHOWN FOR SINGLE TERMINAL UNITS OR AIR HANDLERS, THE SENSORS SHALL PROVIDE AVERAGING CONTROL OF THE UNIT.
  4. REFER TO DIVISION 23 SPECIFICATIONS FOR TEMPORARY HEATING AND COOLING REQUIREMENTS.
  5. REFER TO PHASING PLANS FOR PHASING REQUIREMENTS.
  6. SINGLE REFRIGERANT LINES INDICATE MULTIPLE LINES AS REQUIRED FOR ENERGY RECOVERY VRV HEAT PUMP SYSTEMS.
  7. ALL COOLING CONDENSATE DRAIN LINES SHALL BE 1-1/4\".
  8. ALL PIPING SHALL BE CONCEALED ABOVE CEILINGS.

- SHEET NOTES**
- 1 REFRIGERANT PIPING SHALL HAVE NO FITTINGS ABOVE BATHROOMS OR ANY OTHER ROOM SMALLER THAN 124 SQUARE FEET.
  - 2 DOAS CONTROL AND MONITORING PANEL.
  - 3 MAINTAIN CLEAR AREA BETWEEN GENERATOR ROOF PENETRATION AND CONDUIT RISERS IN CHASE.

**RADIANT FLOORS IN BATHROOMS**  
ALL RADIANT FLOORS IN BATHROOMS ARE AN ADD ALTERNATE. IF THE ALTERNATE IS NOT ACCEPTED, DO NOT ROUGH IN FOR BATHROOM THERMOSTATS.

**MECHANICAL PIPING FLOOR PLAN - FOURTH FLOOR**  
SCALE: 1/8" = 1'-0"



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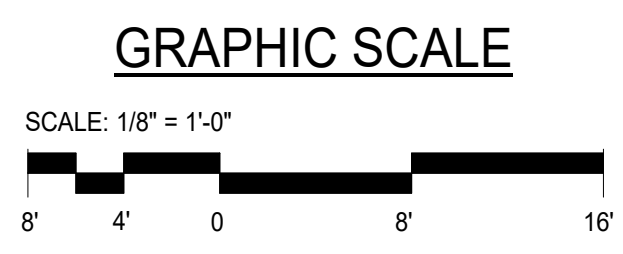
**CONSTRUCTION SET**

**REVISIONS**

NO.	DESCRIPTION

**M2.4**

**MECHANICAL 4TH FLOOR PLAN - PIPING**



**THE HAYNES**

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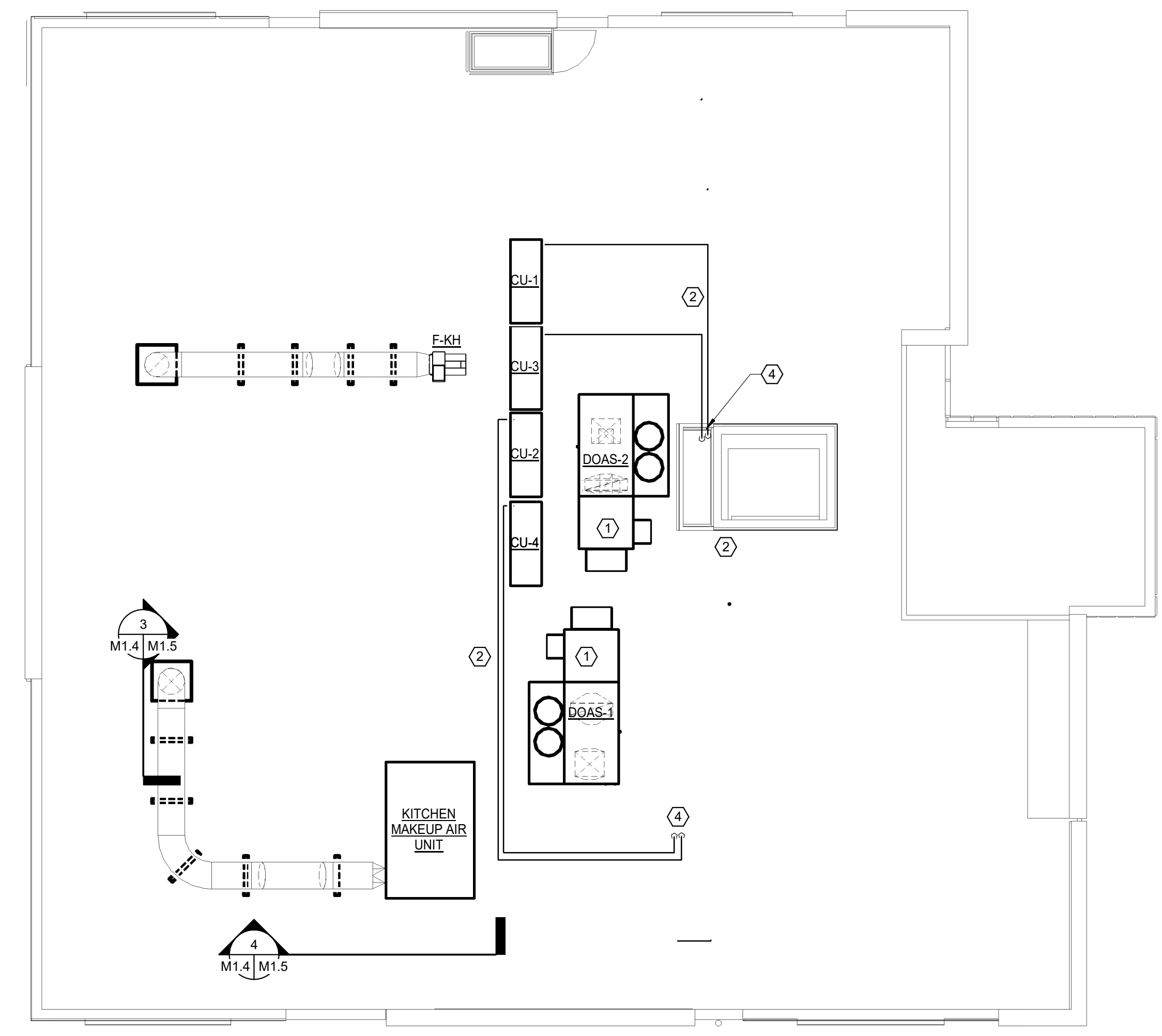
REVISIONS	

**M2.5**

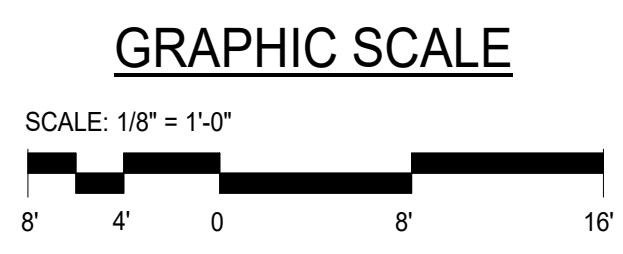
**MECHANICAL ROOF PIPING PLAN**

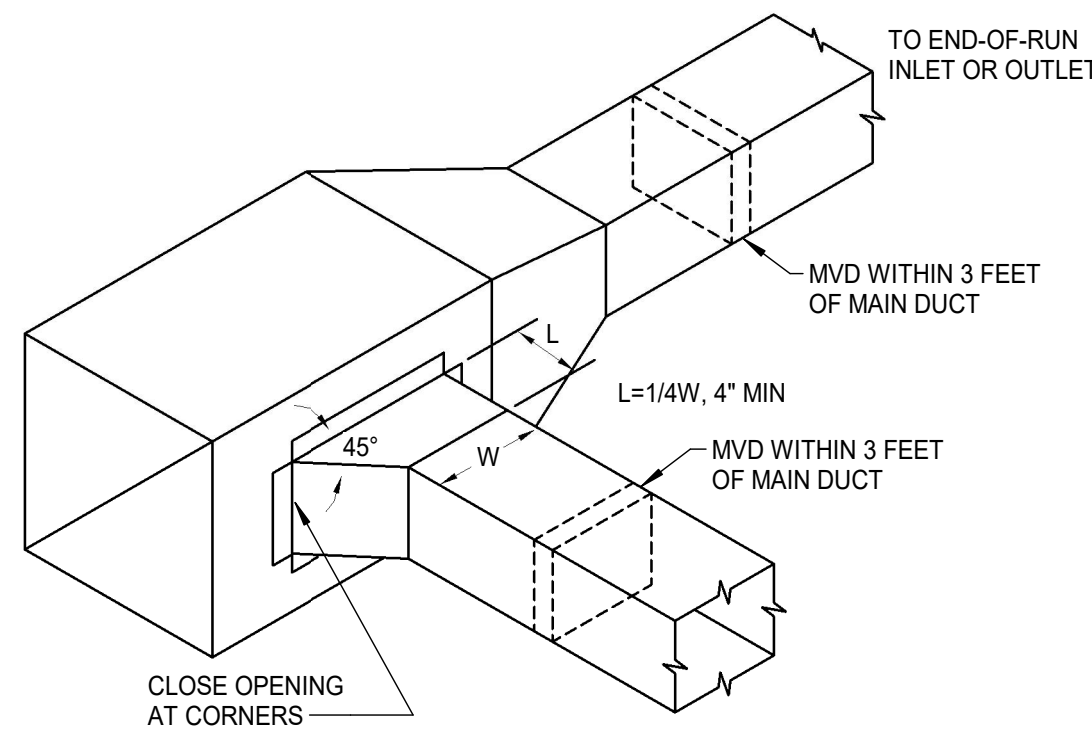
- GENERAL PIPING NOTES**
1. ALL PENETRATIONS THROUGH WALLS SHALL BE SEALED.
  2. WHERE A SINGLE SENSOR IS SHOWN FOR A SPACE SERVED BY MULTIPLE TERMINAL UNITS OR AIR HANDLERS, THE SINGLE SENSOR SHALL CONTROL ALL UNITS SERVING THE SPACE.
  3. WHERE MULTIPLE SENSORS ARE SHOWN FOR SINGLE TERMINAL UNITS OR AIR HANDLERS, THE SENSORS SHALL PROVIDE AVERAGING CONTROL OF THE UNIT.
  4. REFER TO DIVISION 23 SPECIFICATIONS FOR TEMPORARY HEATING AND COOLING REQUIREMENTS.
  5. REFER TO PHASING PLANS FOR PHASING REQUIREMENTS.
  6. SINGLE REFRIGERANT LINES INDICATE MULTIPLE LINES AS REQUIRED FOR ENERGY RECOVERY VRV HEAT PUMP SYSTEMS.
  7. ALL COOLING CONDENSATE DRAIN LINES SHALL BE 1-1/4".
  8. ALL PIPING SHALL BE CONCEALED ABOVE CEILINGS.

- SHEET NOTES**
- ① ROUTE UNIT CONDENSATE DRAIN TO NEAREST ROOF DRAIN, TURN CONDENSATE DOWN INTO DRAIN.
  - ② REFRIGERANT PIPING SHALL BE SUPPORTED PER DETAIL ON SHEET M3.2.
  - ③ REFRIGERANT PIPING SHALL BE SIZED AND ROUTED IN STRICT ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS.
  - ④ REFRIGERANT PIPING DOWN INTO BUILDING. PROVIDE ROOF PENETRATION AS DETAILED.

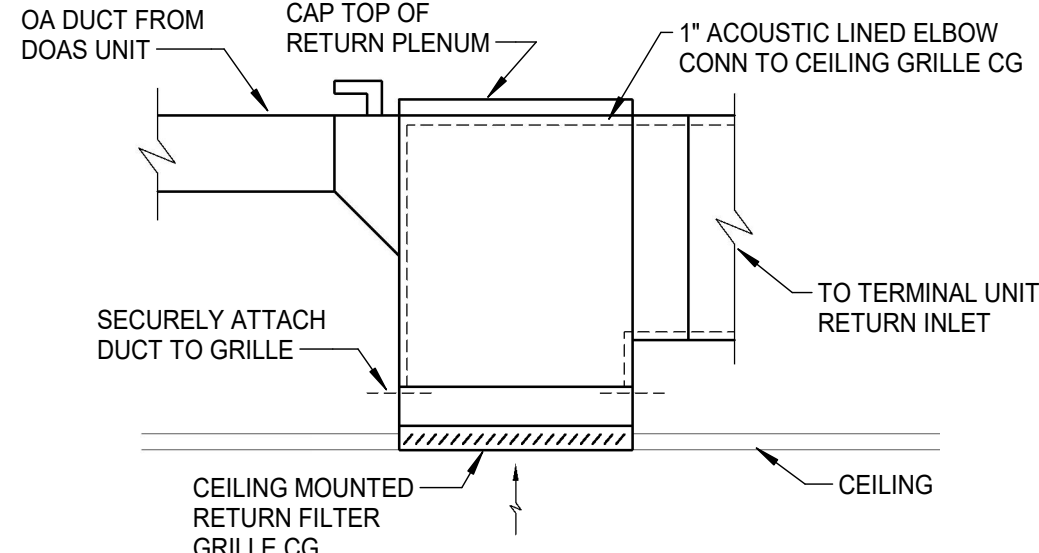


1  
M2.5 **MECHANICAL PIPING FLOOR PLAN - ROOF**  
SCALE: 1/8" = 1'-0"

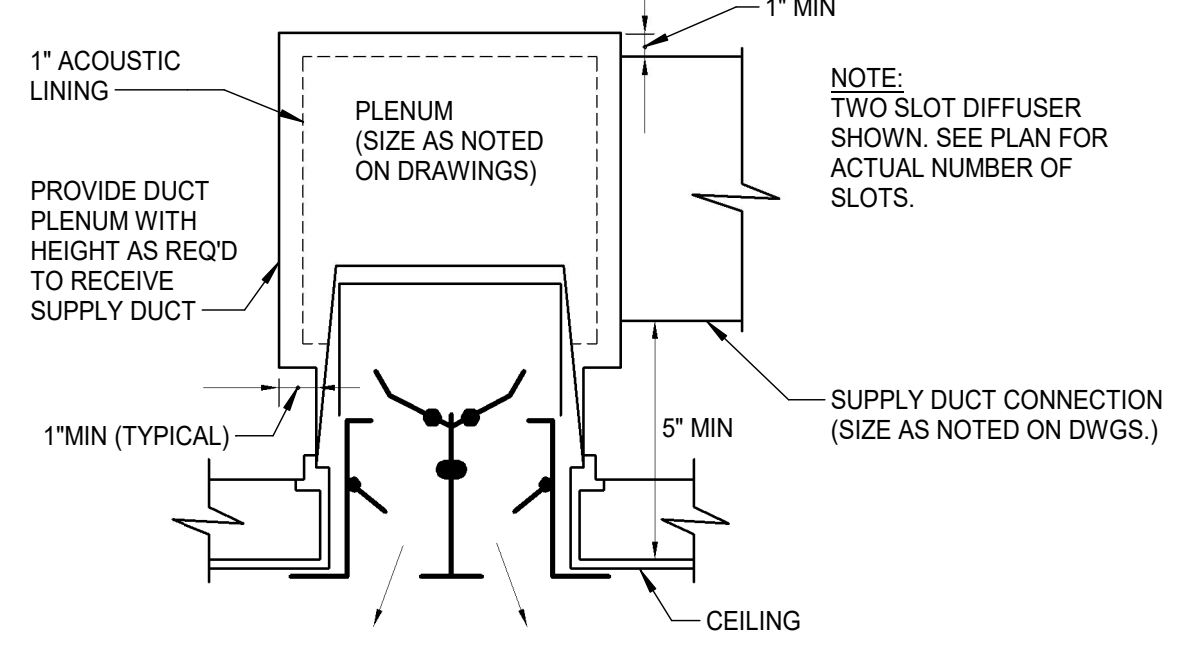




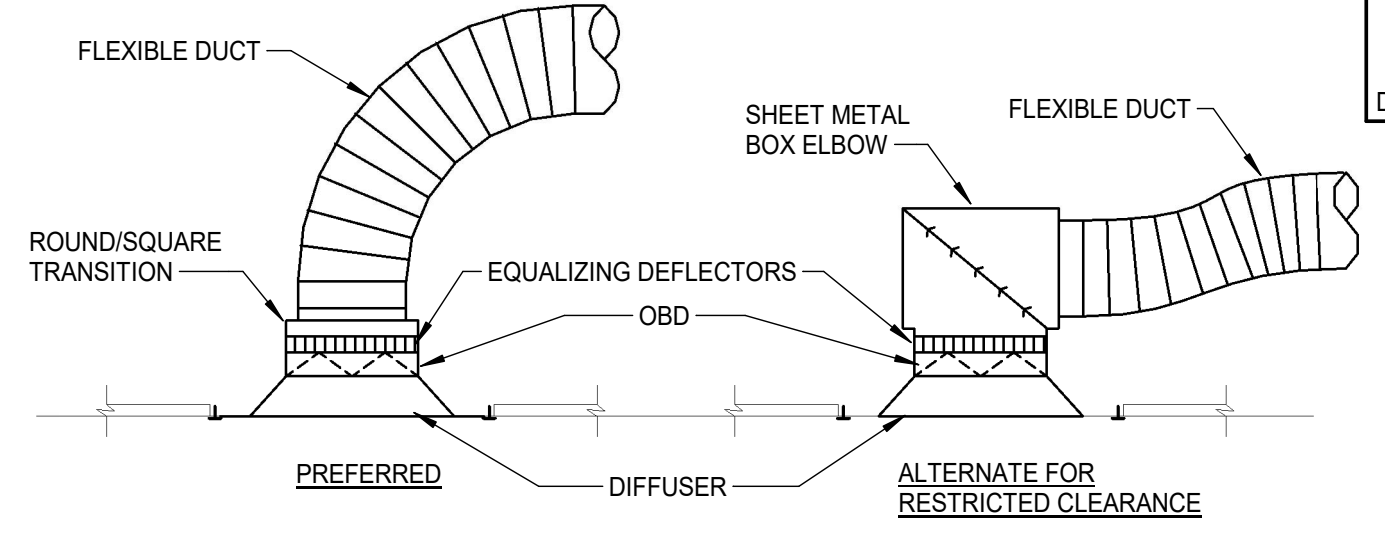
**BRANCH CONNECTIONS DETAIL FOR SUPPLY, RETURN & EXHAUST DUCT (TYP)**  
SCHEMATIC



**RETURN GRILLE DETAIL**  
NO SCALE



**MOUNTING DETAIL FOR LINEAR DIFFUSERS**  
NO SCALE



**DIFFUSER CONNECTION DETAIL**  
NO SCALE

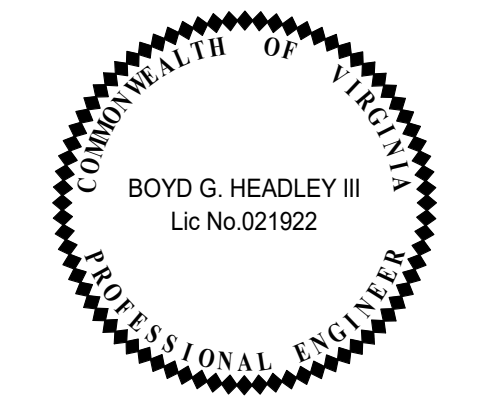
**ASCENT**  
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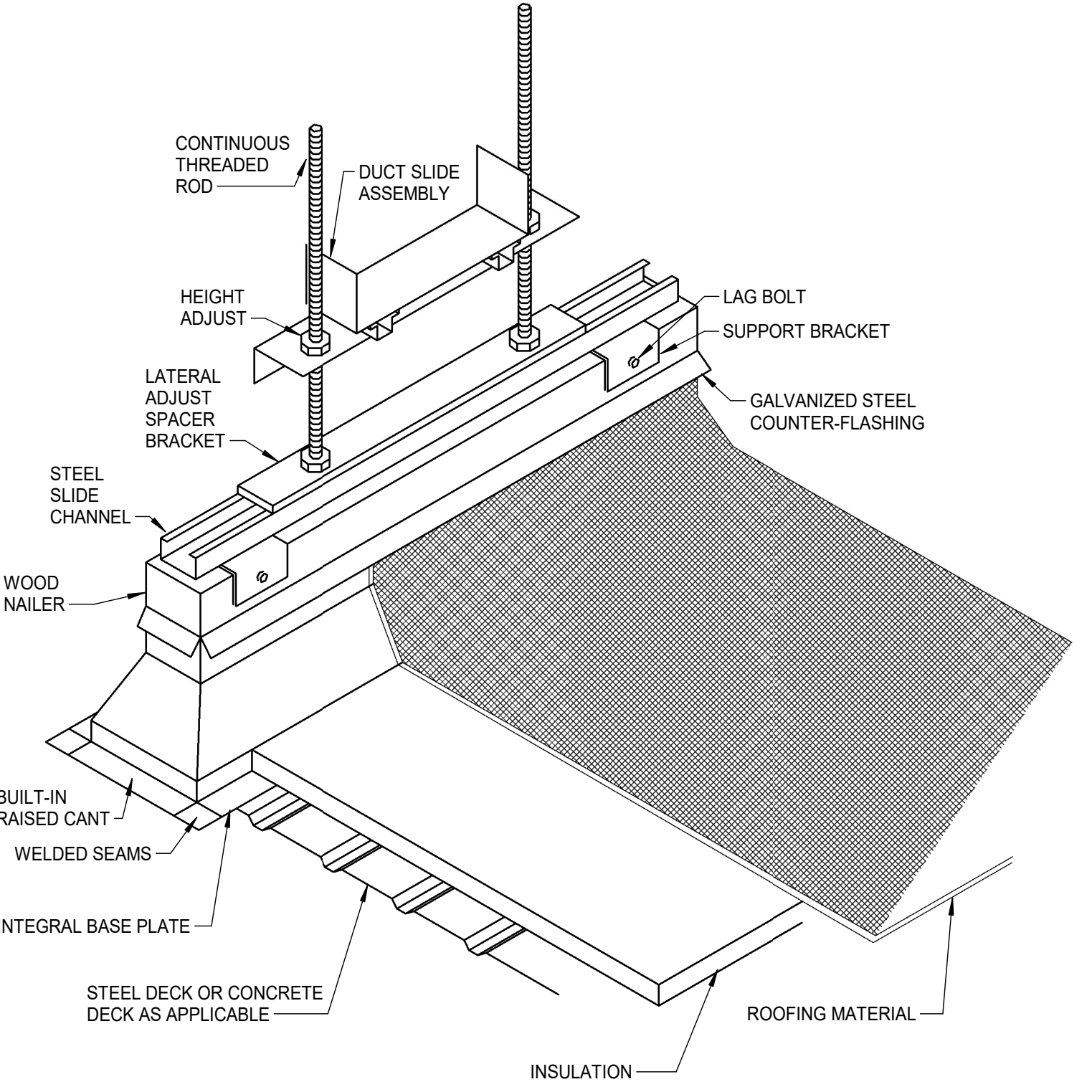
**THE HAYNES**

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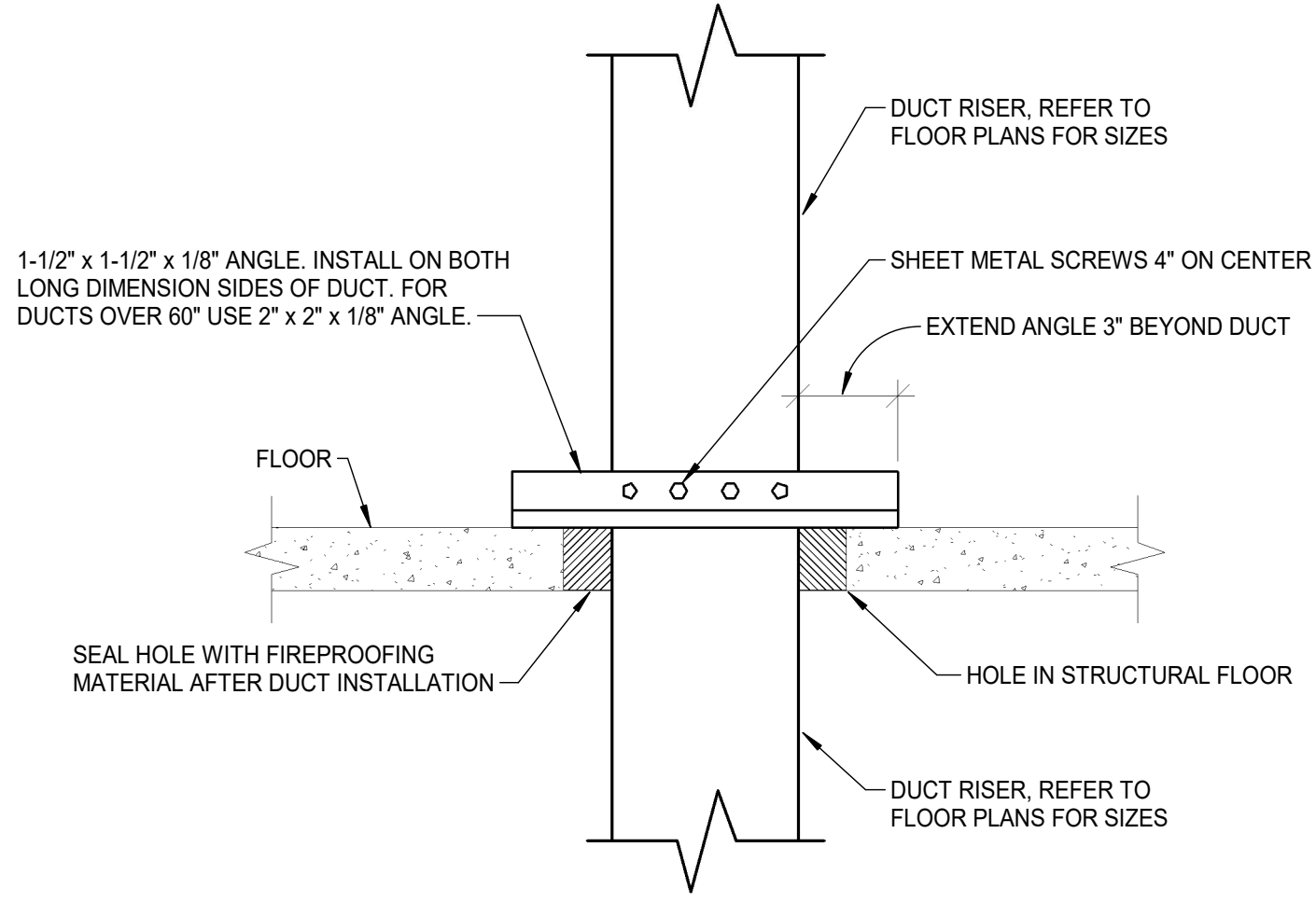
FOR  
**VAN THIEL**



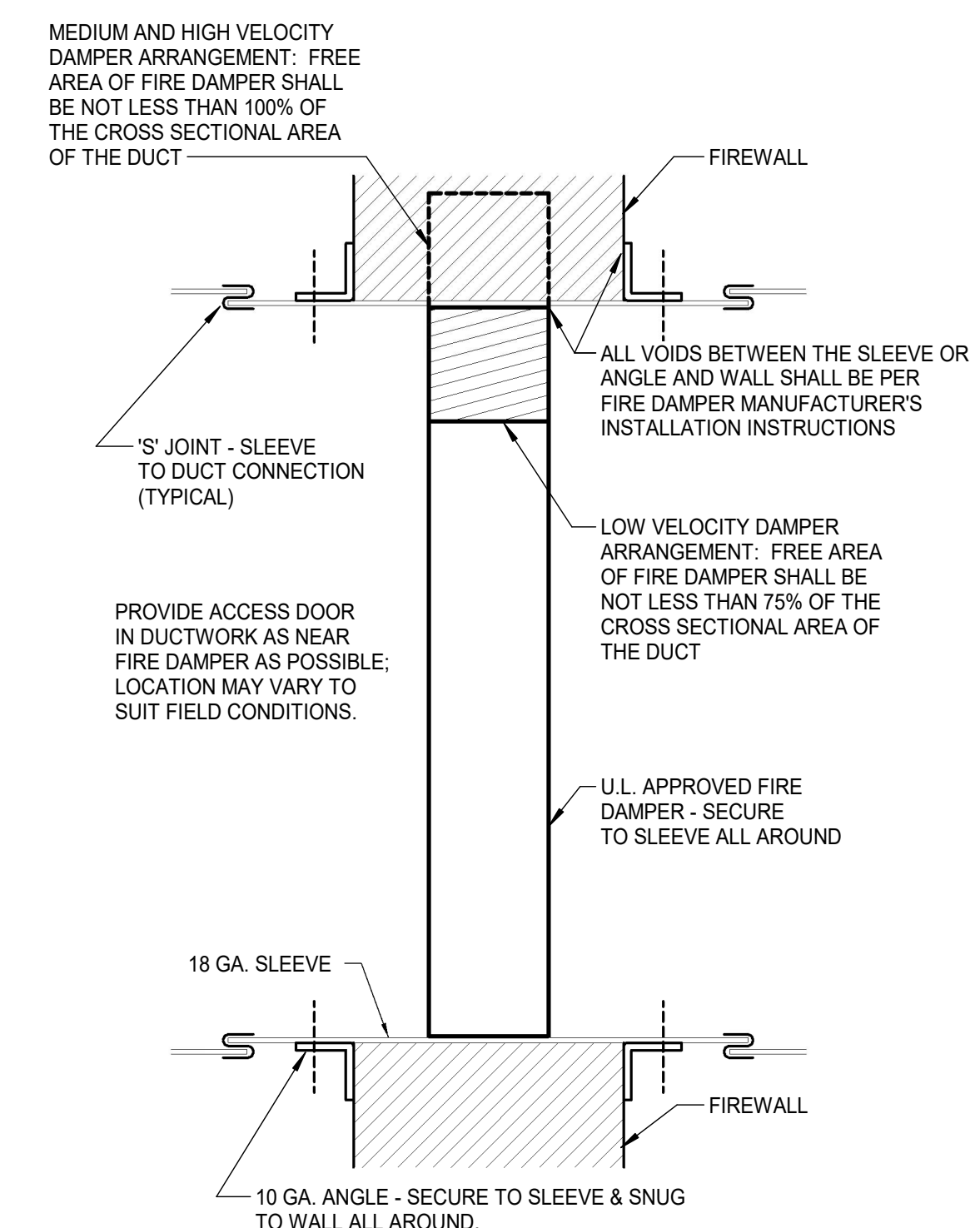
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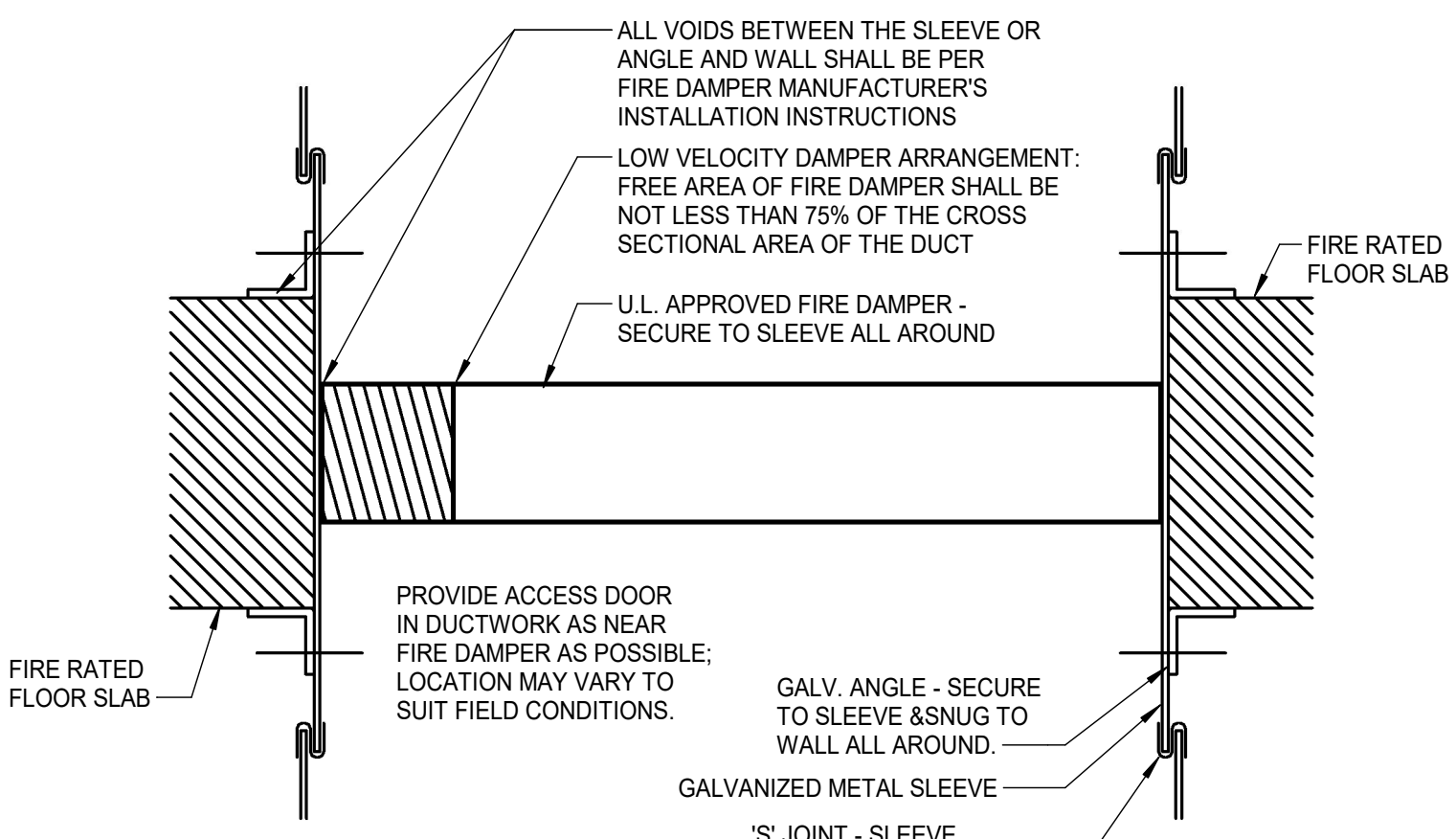
**TYPICAL ROOF DUCT SUPPORT**  
NO SCALE



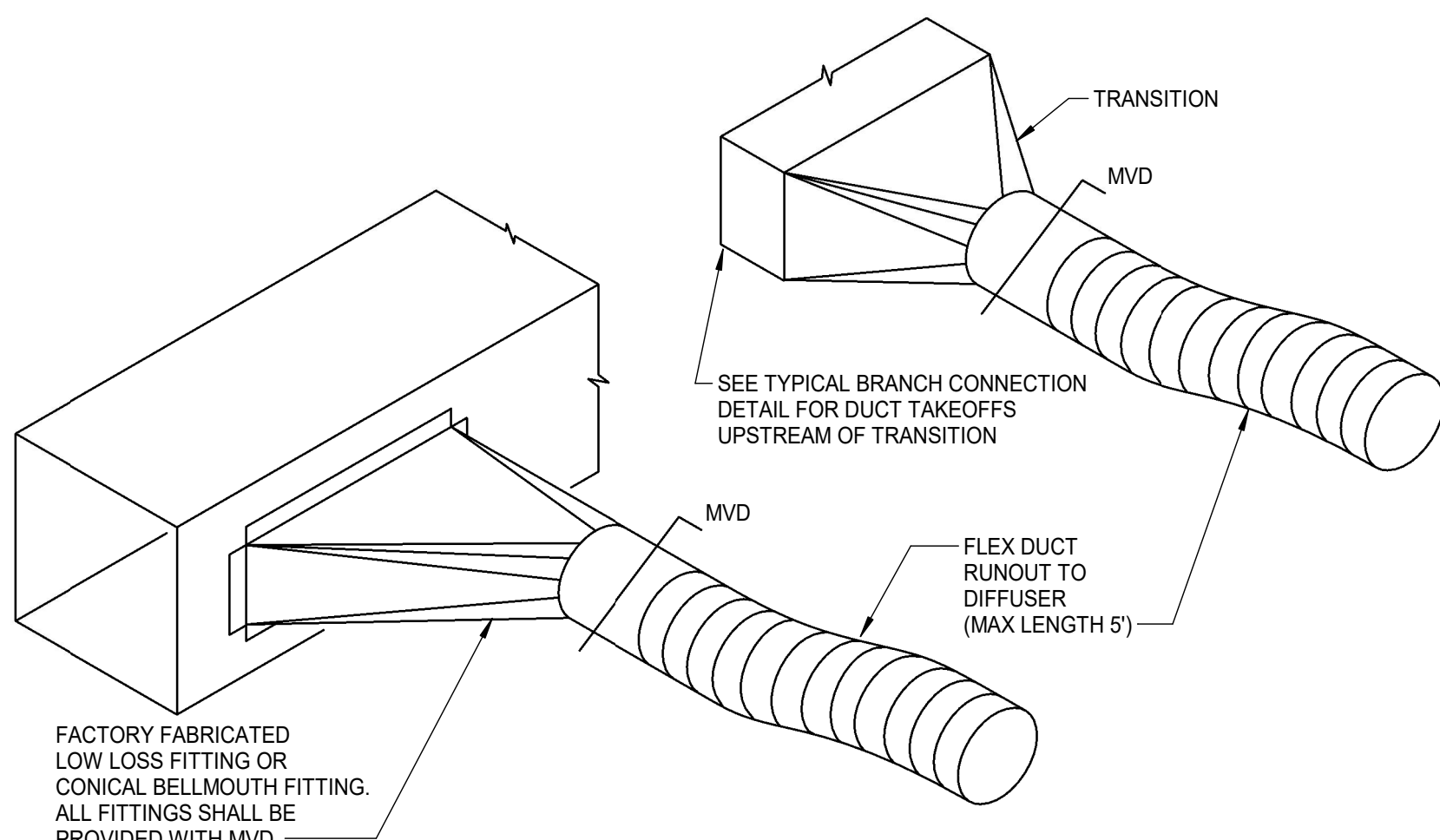
**DUCT RISER SUPPORTS**  
NO SCALE



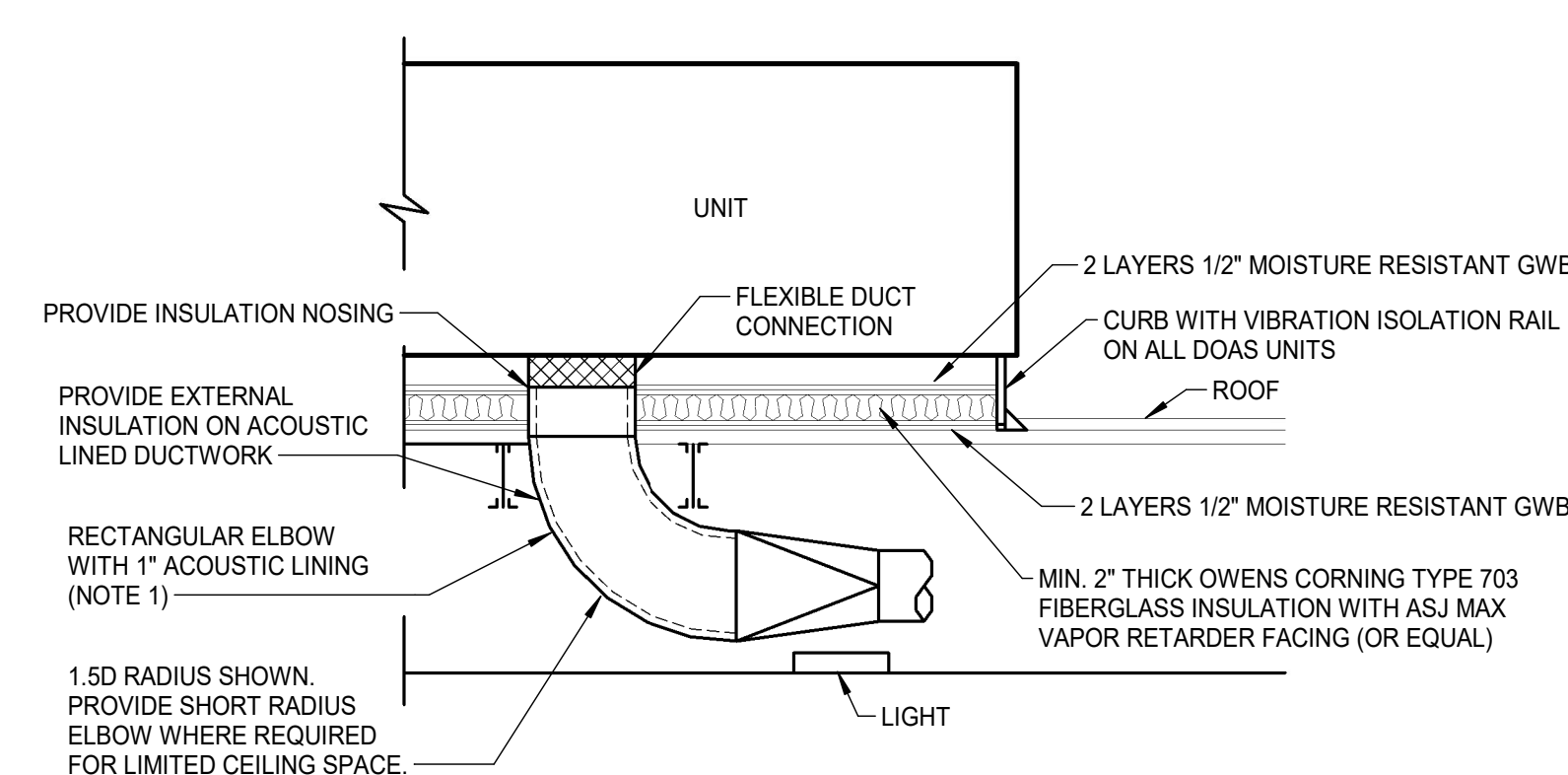
**FIRE DAMPER INSTALLATION**  
SCHEMATIC



**FIRE DAMPER INSTALLATION**  
SCHEMATIC



**CONNECTIONS FOR FLEX DUCT (TYP)**  
SCHEMATIC



**DOAS UNIT INSTALLATION DETAIL**  
SCHEMATIC

**CONSTRUCTION SET**

REVISIONS

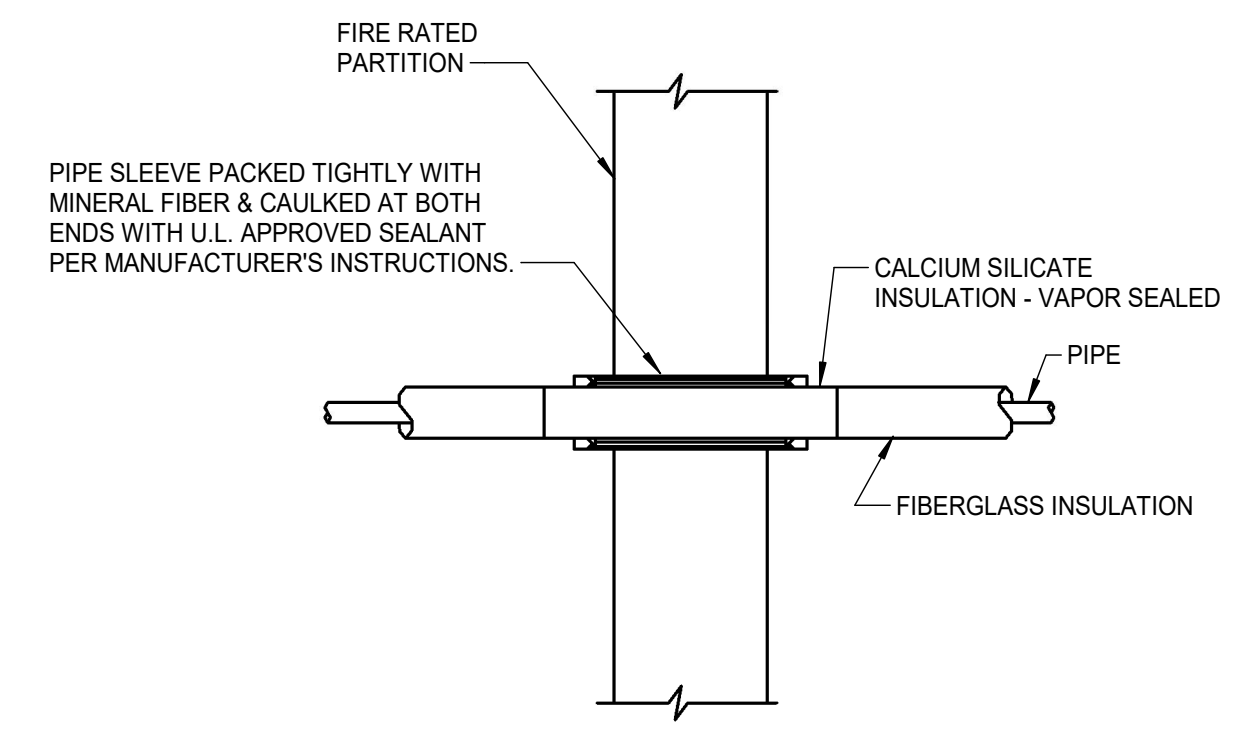

**M3.1**

**MECHANICAL DETAILS**

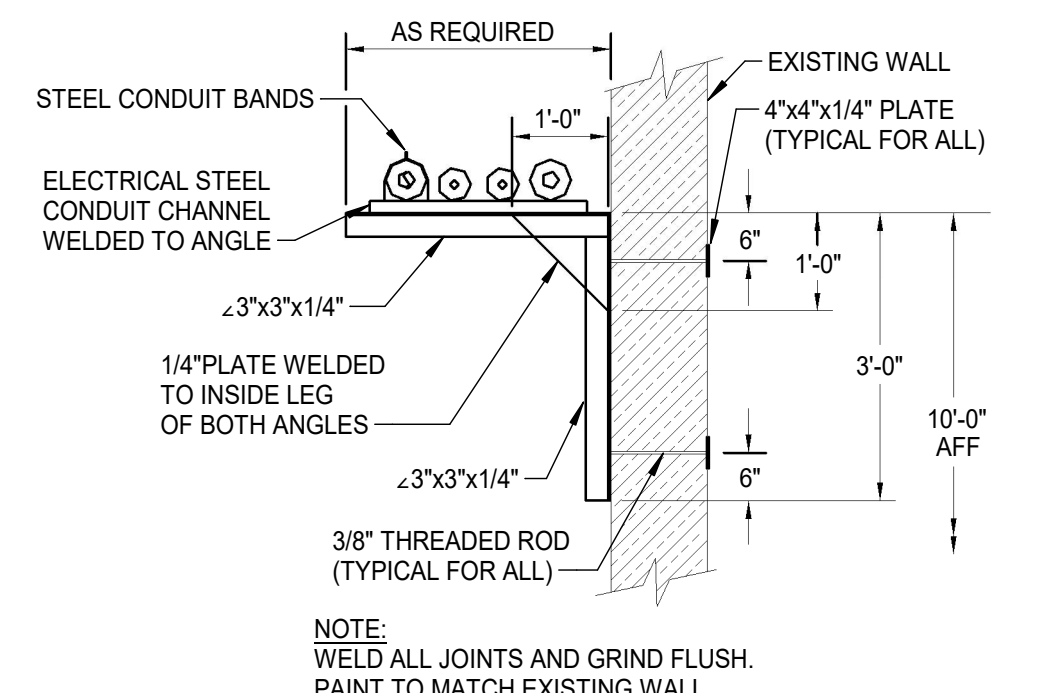
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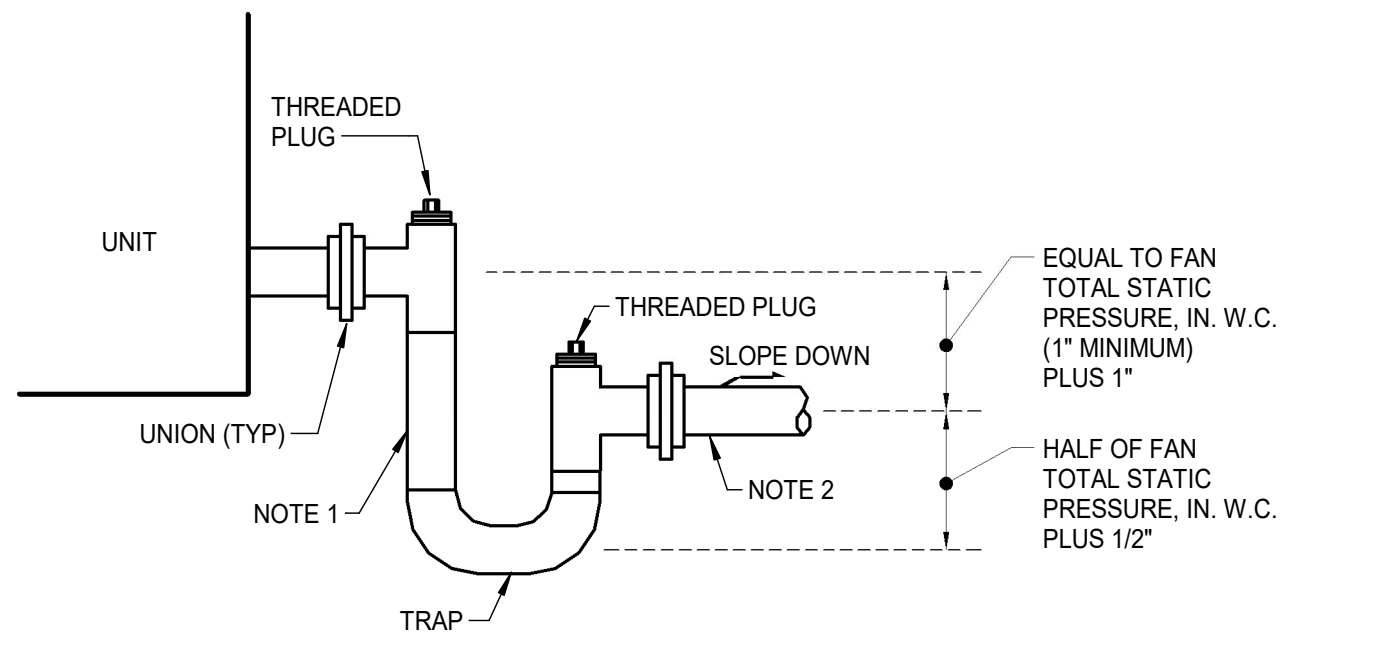
JC, BH



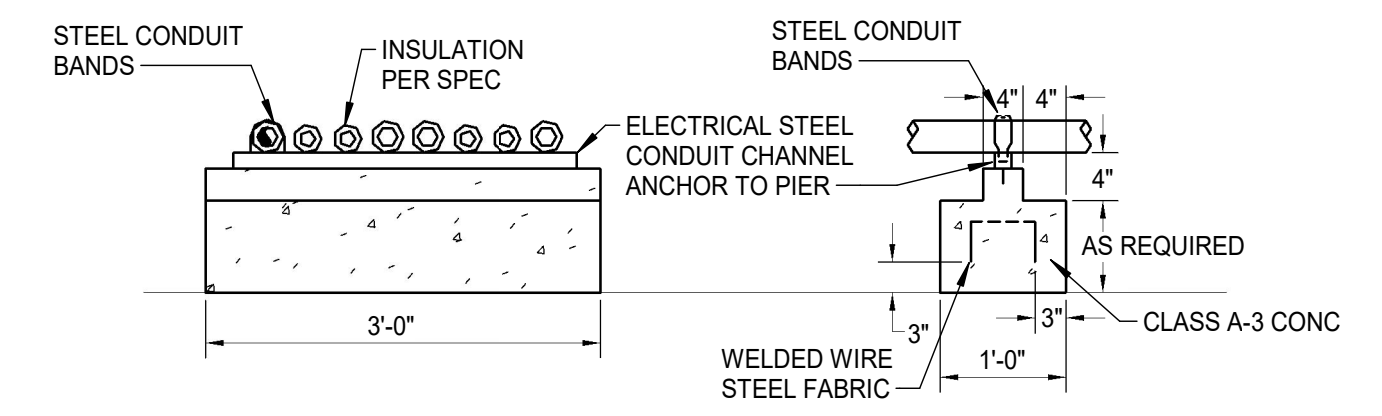
**PIPING PENETRATION THROUGH FIRE RATED PARTITION**  
SCHEMATIC (UNINSULATED PIPE SIMILAR)



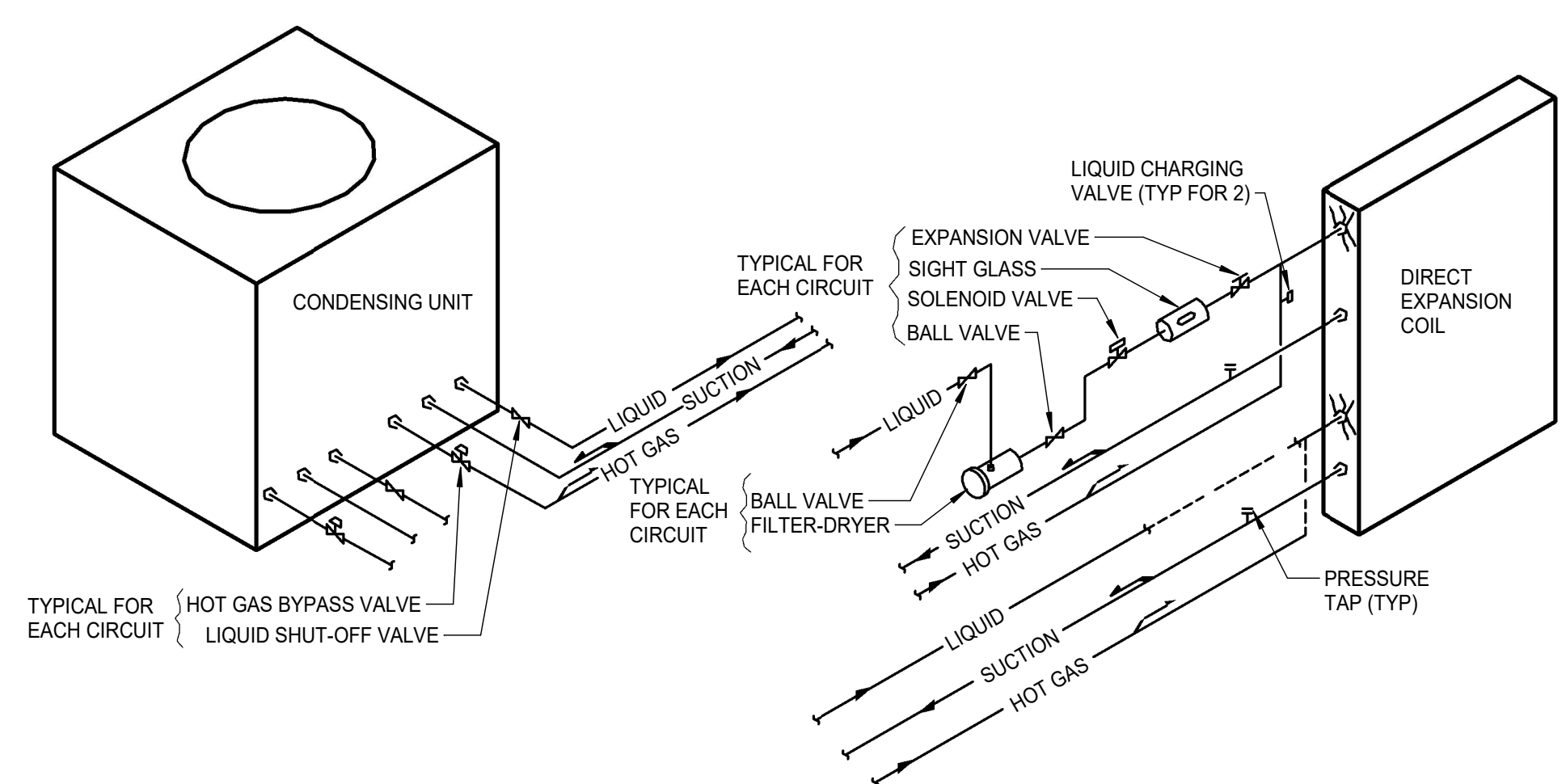
**REFRIGERANT PIPING INSIDE SUPPORT**  
NO SCALE



**COOLING COIL CONDENSATE DRAIN**  
NO SCALE

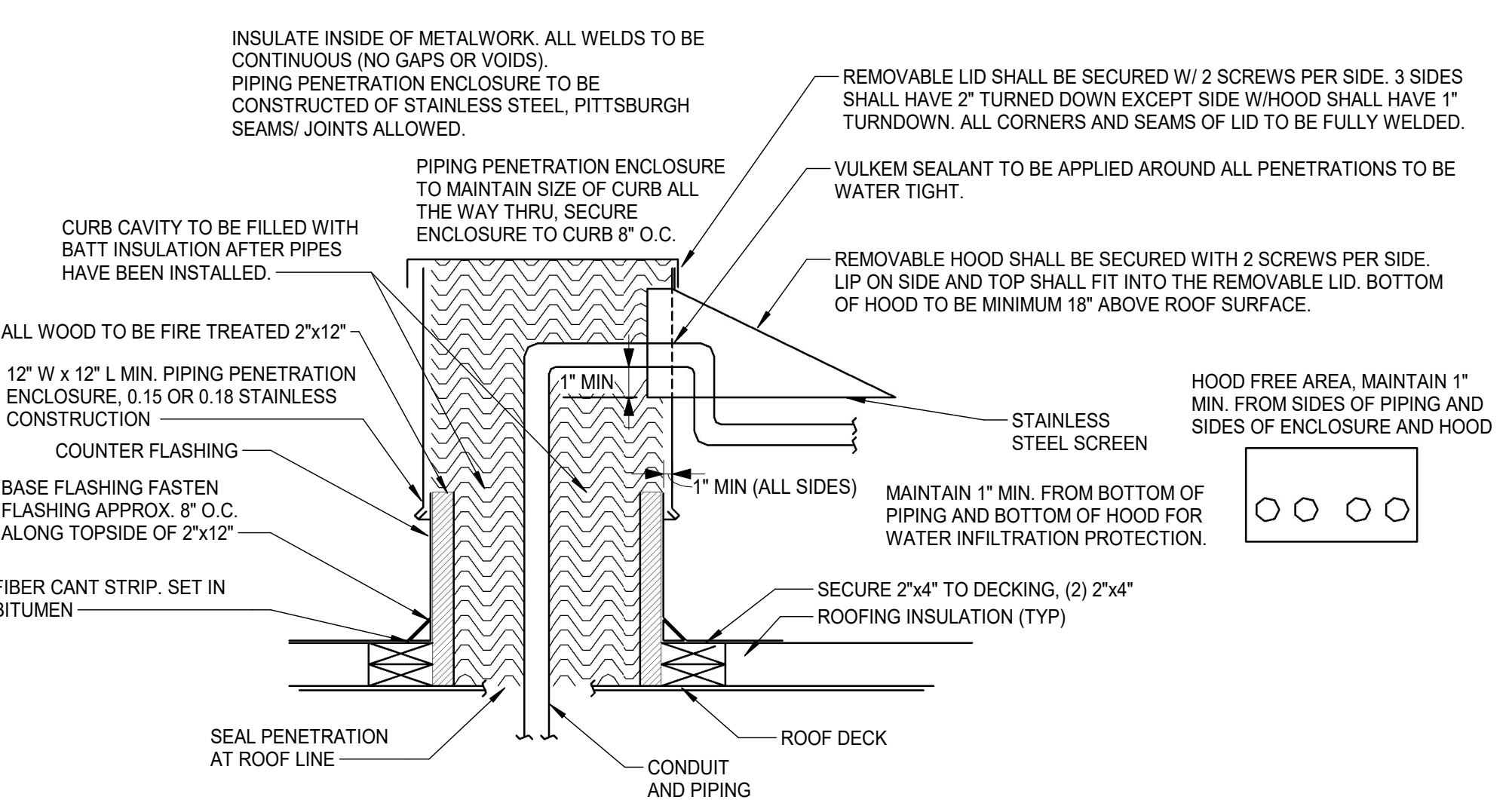


**REFRIGERANT PIPING PIER SUPPORT**  
NO SCALE

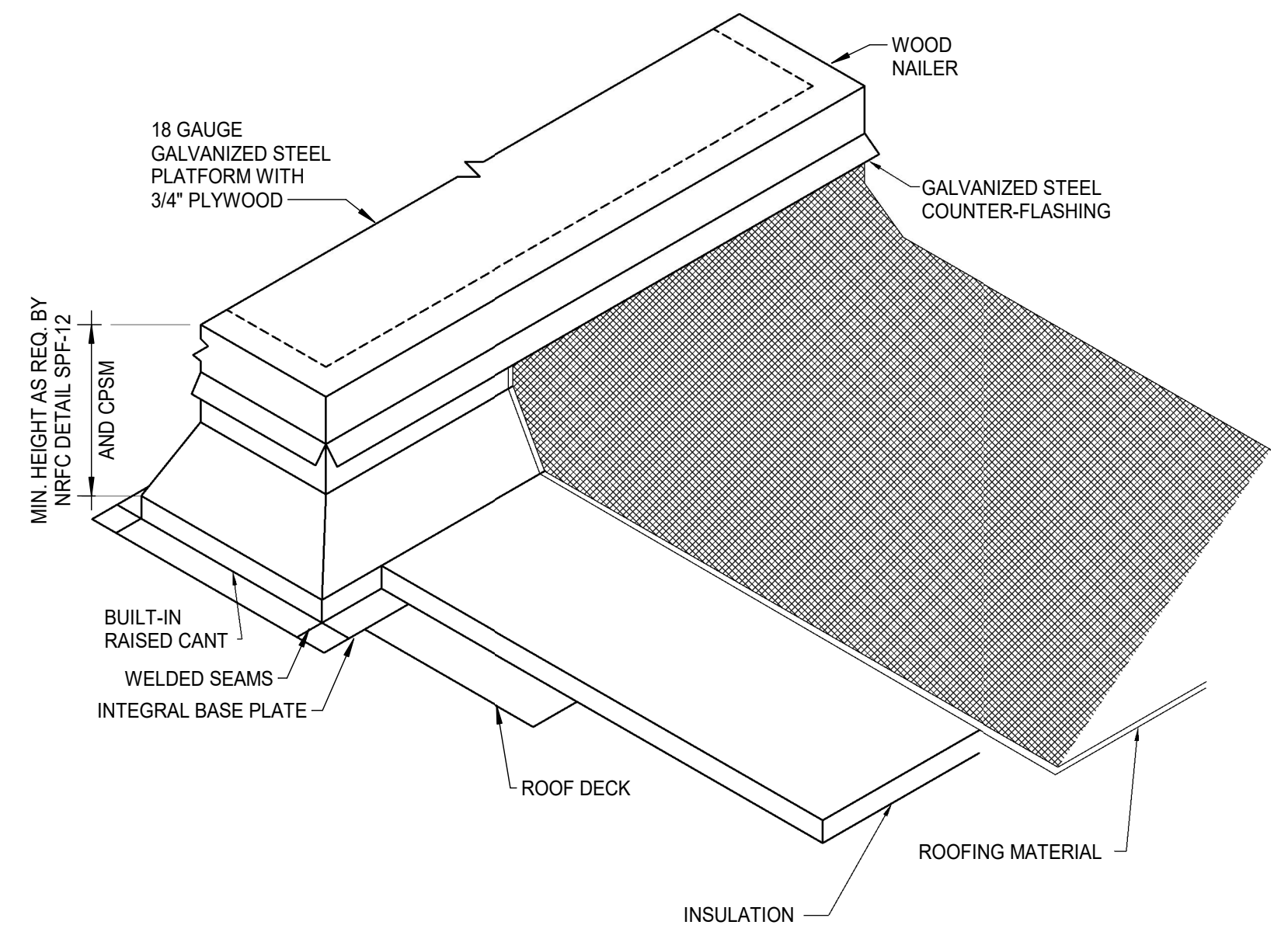


NOTE: DIAGRAM SHOWN FOR GENERAL PIPING ARRANGEMENT AND FOR REQUIRED REFRIGERATION SPECIALTIES. ACTUAL PIPING AND SIZING SHALL BE AS RECOMMENDED BY EQUIPMENT SUPPLIER FOR ACTUAL CIRCUITING PROVIDED.

**REFRIGERATION LINE CONNECTIONS**  
NO SCALE

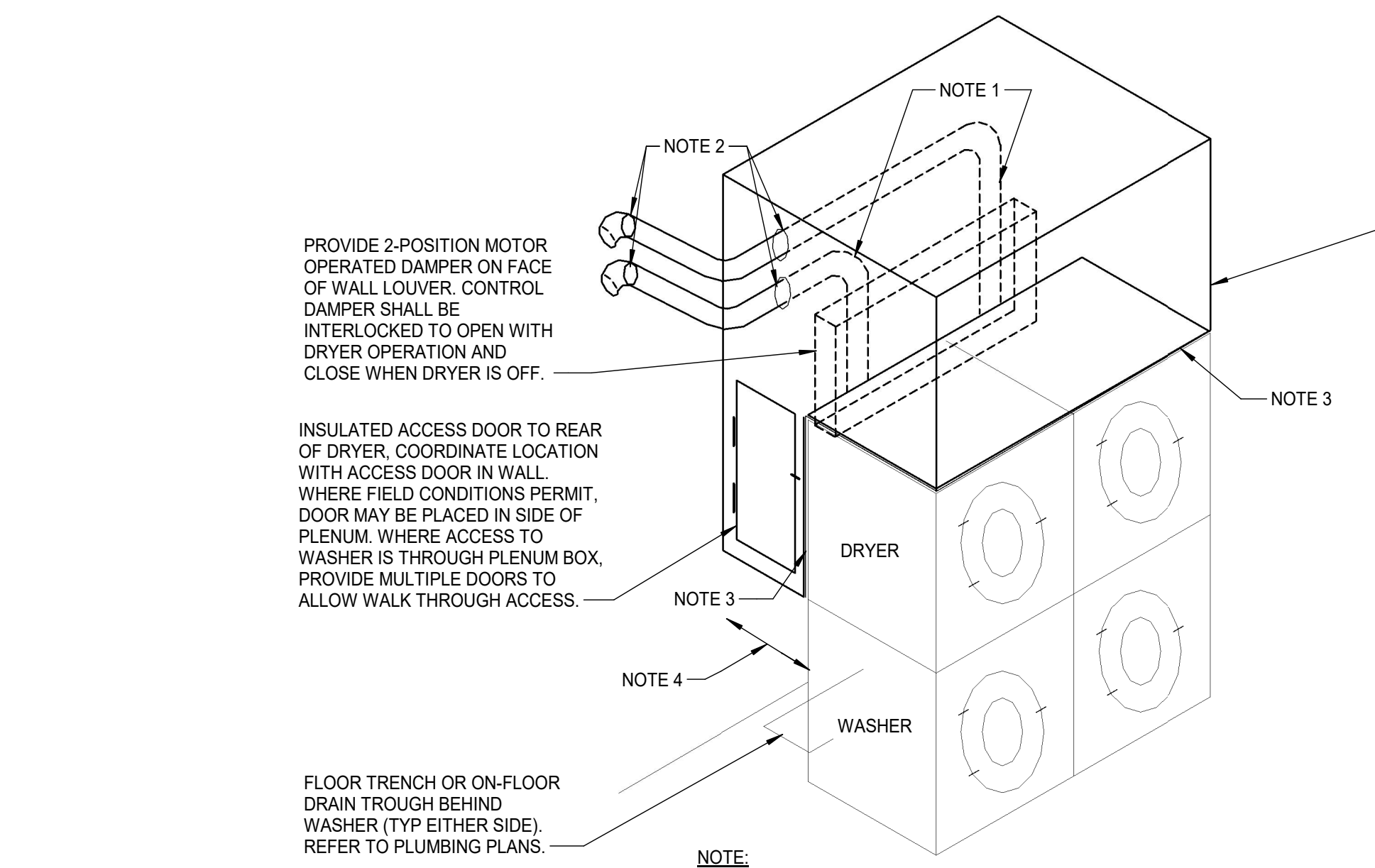


**PIPING CURB DETAIL**  
NO SCALE



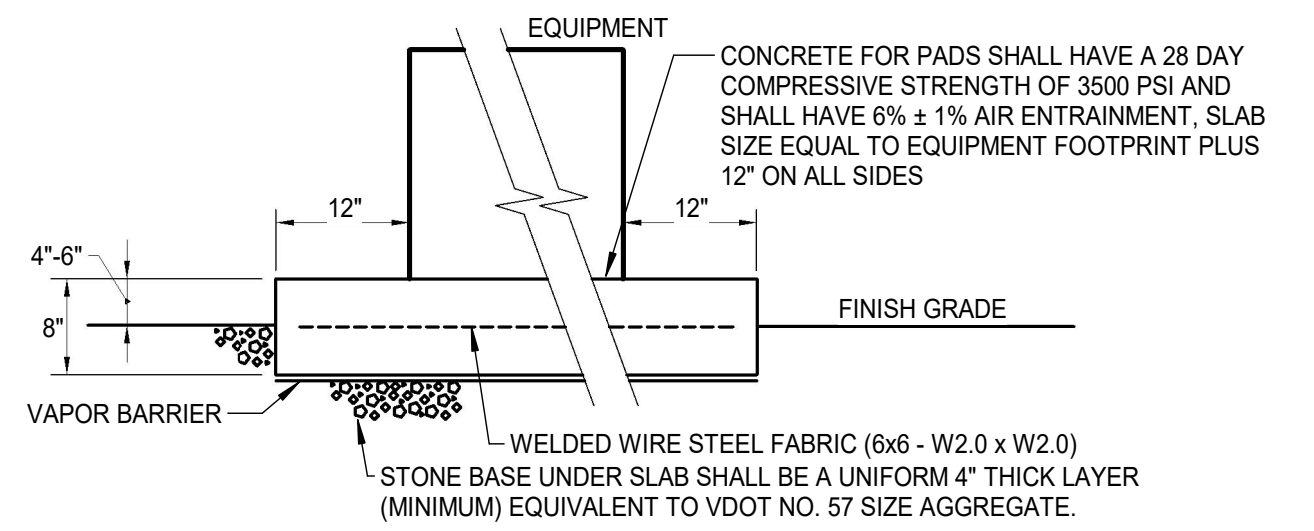
**TYPICAL ROOF EQUIPMENT RAIL SUPPORT**  
NO SCALE

NOTES:  
1. ATTACH INTEGRAL BASE PLATE TO CONCRETE DECK WITH DROP-IN ANCHORS AND THROUGH BOLTS, SPACING AS RECOMMENDED BY MANUFACTURER, BUT NO LESS THAN 4 ANCHORS PER SUPPORT.

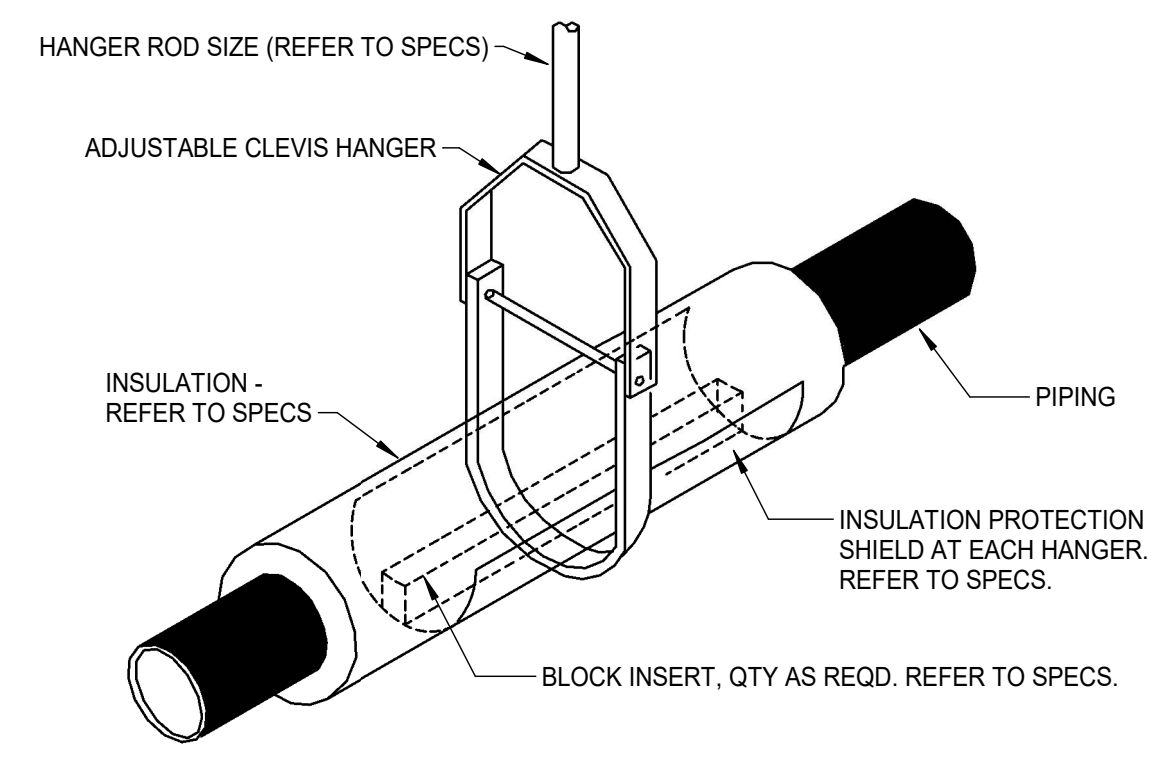


NOTE:  
1. DRYER VENT DUCT FULL SIZE OF DRYER OUTLET.  
2. SEAL EXHAUST DUCT PENETRATIONS THROUGH DRYER PLENUM AND THROUGH EXTERIOR WALL.  
3. PROVIDE RUBBER GASKETING AT ALL JUNCTIONS.  
4. MAINTAIN MAXIMUM SERVICE AREA FROM WALL TO OBTAIN ACCESS TO THE FAR SIDE WASHER AND DRYER.

**STACKED DRYER PLENUM DETAIL**  
NO SCALE



**TYPICAL OUTDOOR EQUIPMENT PAD**  
NO SCALE

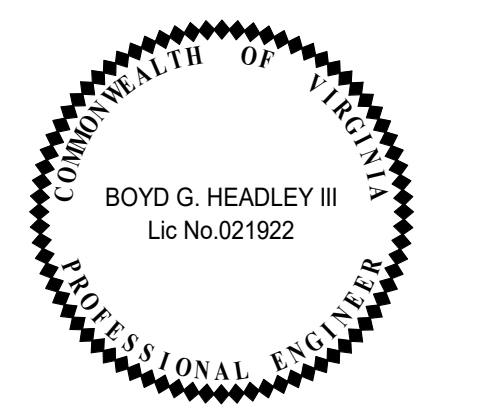


**PIPE HANGER AND INSULATION DETAIL**  
NO SCALE

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FOR  
**VAN THIEL**



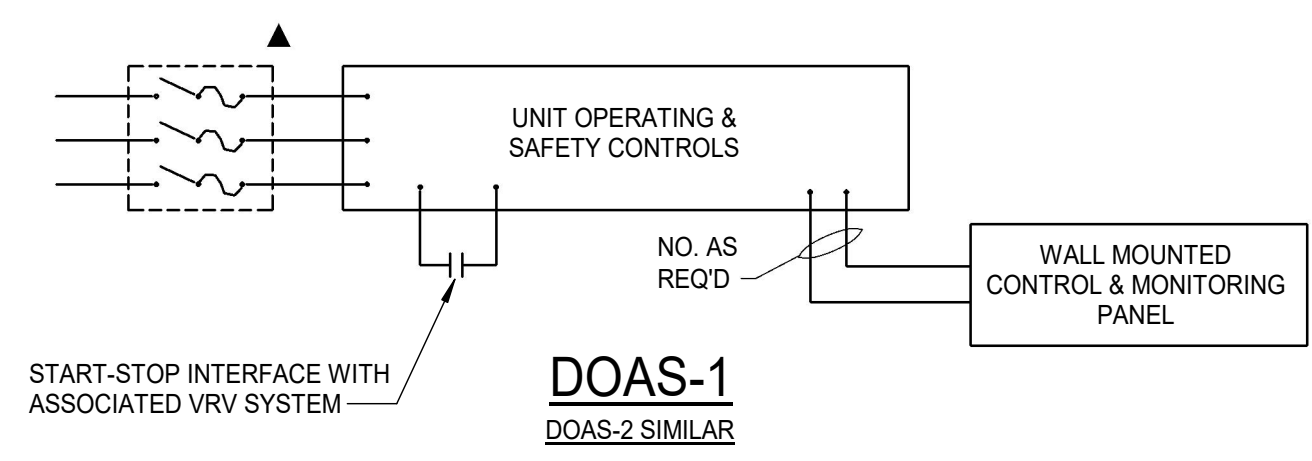
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**CONSTRUCTION SET**

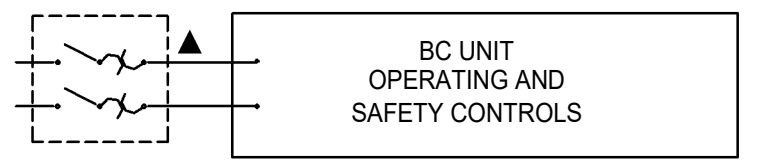
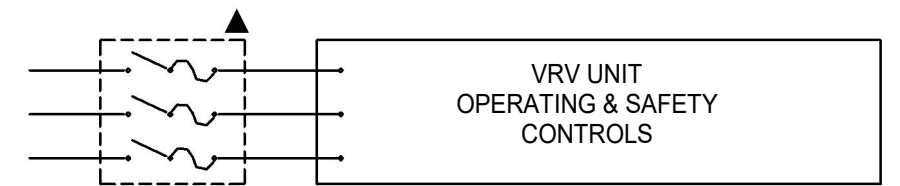
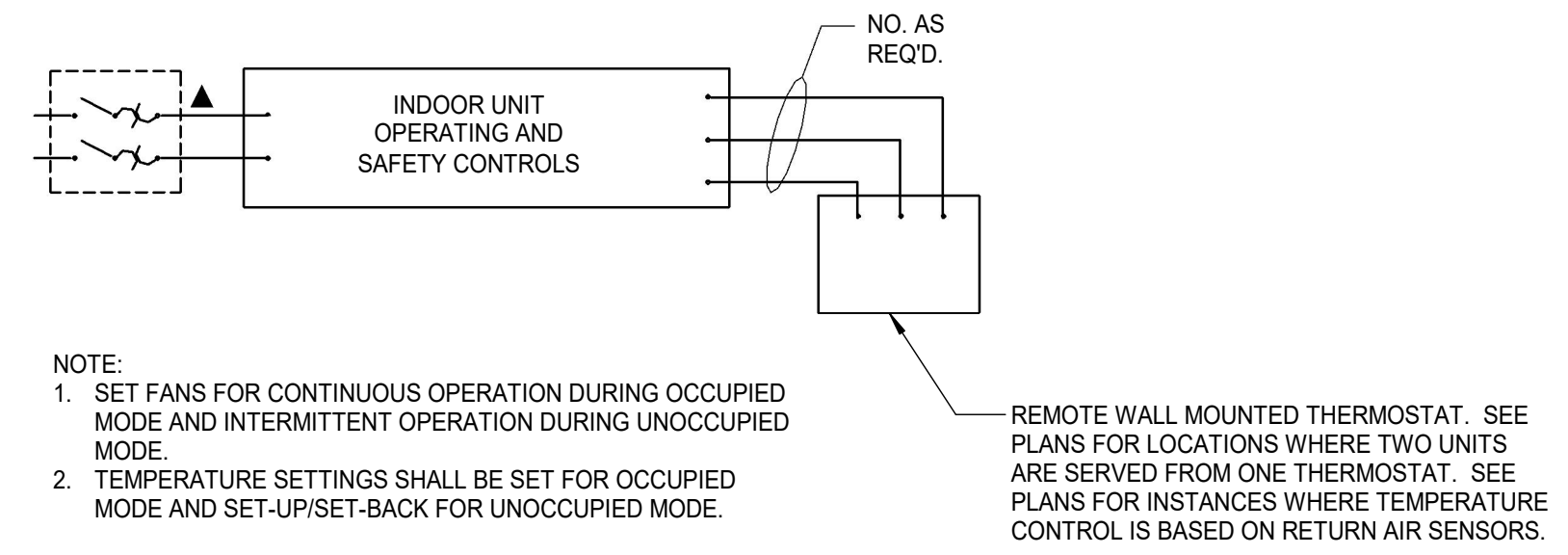
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**M3.2**

**MECHANICAL DETAILS**



**DEDICATED OUTDOOR AIR SYSTEMS**



**CONTROL LEGEND**

HOLDING COILS	COMBINATION FUSIBLE MOTOR STARTER RELAY	
MOTOR		
MOTOR PROTECTIVE SWITCH		
DISCONNECT SWITCH (FUSED)		
DISCONNECT		
PILOT LIGHT		
T'STAT OR RELAY		
SET POINT-CLOSE BELOW 65°F		
SET POINT-CLOSE ABOVE 65°F		
ELECTRICAL WIRING, ABOVE 100 VOLT		
TWIST SHIELDED PAIR, 24 VOLT		

AIRFLOW MEASURING STATION	AF	FREEZE PROTECTION	FP
ANALOG INPUT	AI	FIRESTAT	FS
ANALOG OUTPUT	AO	FIRE ALARM SYSTEM	F.A.
CARBON DIOXIDE SENSOR	CO2	GAS HEATER	GH
CONTROL RELAY	CR	HEATING COIL	HC
COOLING COIL	CC	HOT GAS REHEAT COIL	HG
CURRENT RELAY	CTR	HUMIDITY SENSOR	HE
DIGITAL INPUT	DI	PNEUMATIC ELECTRIC	PE
DIGITAL OUTPUT	DO	PHASE LOSS PROTECTION	PLP
DIRECT DIGITAL CONTROL PANEL	DDC	START-STOP	S/S
DIRECT EXPANSION COIL	DX	SMOKE DETECTOR	SD
ELECTRIC COIL	EHC	TEMP SENSOR	TE
ELECTRIC PNEUMATIC FAN RELAY	EP FR		

ALL ITEMS SHOWN ON CONTROL DIAGRAMS AND WIRING 100 VOLTS OR LESS SHALL BE INCLUDED AS A PART OF DIVISION 23 EXCEPT POWER WIRING OVER 100 VOLTS. ITEMS MARKED ▲ OR ITEMS SPECIFIED TO BE FURNISHED WITH EQUIPMENT. WIRING OVER 100 VOLTS AND ITEMS MARKED ▲ SHALL BE FURNISHED AS A PART OF DIVISION 26. ALL OVERLOADS, HOA SWITCHES, AUXILIARY CONTACTS AND PILOT LIGHTS SHALL BE INTEGRAL WITH THE MOTOR STARTERS UNLESS SHOWN OTHERWISE.

ALL WIRING SHOWN ON ELECTRIC SEQUENCE CONTROLS SHALL BE OVER 100 VOLTS UNLESS NOTED OTHERWISE. RELAYS FROM THE CONTROL SYSTEM SHALL BE LOCATED ADJACENT TO THE CONTROLLED DEVICE (MOTOR OR MOTOR STARTER), AND MAY BE LOCATED WITHIN STARTER HOUSINGS WHERE SPACE IS AVAILABLE AND WHERE APPROVED BY NEC.

ALL SEQUENCES OF OPERATION, FLOW DIAGRAMS, AND POINTS LIST ARE COMPLEMENTARY. ALL CONTROL STRATEGIES SHALL BE SATISFIED EVEN IF SOME OF THE REQUIRED CONTROL POINTS, ALARM, OR SOFTWARE HAVE BEEN INADVERTENTLY LEFT OFF OF THE POINTS LIST OR FLOW DIAGRAM. SIMILARLY, CONTROL POINTS, ALARM, AND SOFTWARE STRATEGIES INDICATED ON THE POINTS LIST SHALL BE PROVIDED EVEN IF A WRITTEN SEQUENCE OR FLOW DIAGRAM DEVICE HAS BEEN INADVERTENTLY OMITTED.

CONTROL ITEMS MARKED THUS "VENTILATION-ON-OFF" SHALL HAVE PLATE ENGRAVED WITH THE WORDING CONTAINED WITHIN THE QUOTE "...". MARKS PLUS EQUIPMENT IDENTIFICATION.

\*QTY AS REQUIRED/INDICATED ON PLANS.

**THE HAYNES**

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FOR  
**VAN THIEL**



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**CONSTRUCTION SET**

**REVISIONS**

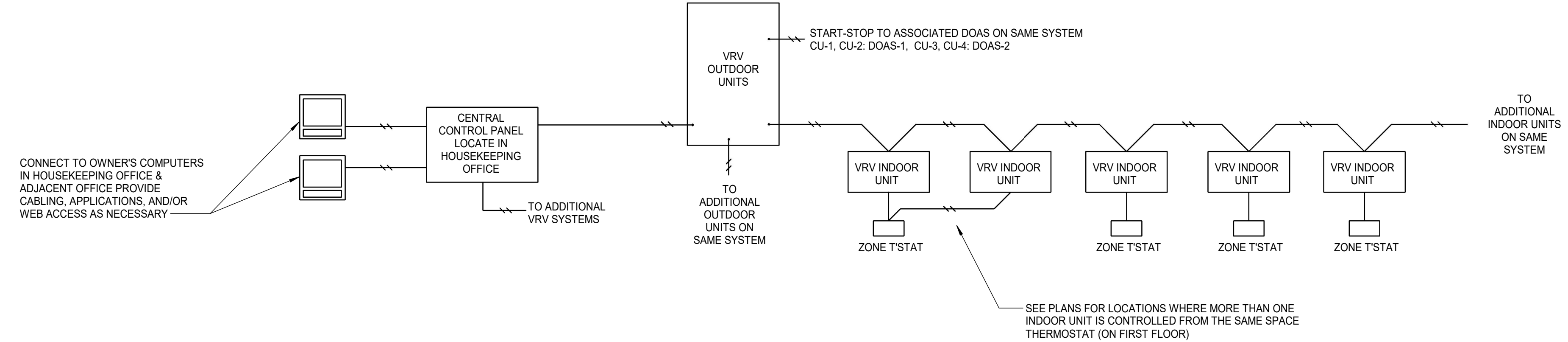

**M4.1**

**MECHANICAL CONTROLS**

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- NOTES:**
- THERE SHALL BE TWO SEPARATE VRV SYSTEMS, ONE TO SERVE ALL INDOOR UNITS ON THE FIRST FLOOR AND ONE TO SERVE ALL INDOOR UNITS ON 2ND, 3RD AND 4TH FLOORS. SEE PLANS FOR NUMBER OF OUTDOOR UNITS AND ASSOCIATED INDOOR UNITS.
  - EACH SYSTEM SHALL BE INTERLOCKED WITH ITS ASSOCIATED DOAS UNIT AS INDICATED.

**VRV SYSTEM CONTROL ARCHITECTURE**