

PHRC LABORATORY 305 RENOVATION
COLUMBIA, SOUTH CAROLINA

JHS ARCHITECTURE :: INTEGRATED DESIGN, INC.
RMF ENGINEERING · MECHANICAL ENGINEER
RMF ENGINEERING · ELECTRICAL ENGINEER
RMF ENGINEERING · PLUMBING ENGINEER

CONSTRUCTION DOCUMENTS

INDEX OF DRAWINGS

ARCHITECTURAL DRAWINGS		MECHANICAL DRAWINGS		ELECTRICAL DRAWINGS		APPLICABLE CODES			
SHT. NO.	DESCRIPTION	SHT. NO.	DESCRIPTION	SHT. NO.	DESCRIPTION	CODES		DATE OF ISSUE ENFORCED	
A 0.0	COVER SHEET	M0.0	MECHANICAL LEGEND AND ABBREVIATIONS	E 0.0	ELECTRICAL LEGEND AND ABBREVIATIONS	INTERNATIONAL BUILDING CODE		2006	
A 0.1	LOCATION PLAN	MD1.0	PARTIAL THIRD FLOOR PLAN – MECHANICAL DEMOLITION	ED1.1	PARTIAL THIRD FLOOR PLAN – ELECTRICAL POWER DEMOLITION	INTERNATIONAL PLUMBING CODE		2006	
A 1.0	THIRD, FOURTH, FIFTH, & PENTHOUSE LEVEL DEMOLITION PLANS	M1.0	PARTIAL THIRD, FOURTH, FIFTH, & PENTHOUSE FLOOR PLANS – MECHANICAL NEW WORK	ED1.2	PARTIAL FIFTH AND PENTHOUSE FLOOR PLAN – ELECTRICAL POWER DEMOLITION	INTERNATIONAL MECHANICAL CODE		2006	
A 1.1	INTERIOR ELEVATIONS–DEMOLITION & RENOVATION	M2.0	PARTIAL THIRD FLOOR PLAN – HVAC AIR BALANCE SUMMARY	ED2.1	PARTIAL THIRD FLOOR PLAN – ELECTRICAL LIGHTING DEMOLITION	NATIONAL ELECTRIC CODE		2005	
A 2.0	THIRD, FOURTH, FIFTH, & PENTHOUSE LEVEL FLOOR PLANS	M3.0	MECHANICAL DETAILS	E1.1	PARTIAL THIRD FLOOR PLAN – ELECTRICAL POWER NEW WORK	LIFE SAFETY CODE		NOT APPLICABLE	
A 3.0	THIRD, FOURTH, & FIFTH LEVEL REFLECTED CEILING PLANS	M4.0	MECHANICAL SCHEMATICS	E1.2	PARTIAL THIRD FLOOR PLAN – ELECTRICAL POWER NEW WORK				
A 4.0	FINISH SCHEDULE, PARTITION TYPES, & DETAILS	M5.0	MECHANICAL SCHEDULES	E2.1	PARTIAL THIRD FLOOR PLAN – ELECTRICAL LIGHTING NEW WORK	TYPE OF CONSTRUCTION & OCCUPANCY			
A 7.0	OVERALL CASEWORK PLAN	M5.1	MECHANICAL SCHEDULES	E6.1	ELECTRICAL SCHEDULES	1. INTERNATIONAL BUILDING CODE: TABLE 503 & 601 TYPE I–B, SPRINKLERED			
A 7.1	CASEWORK PLANS & ELEVATIONS					2. INTERNATIONAL BUILDING CODE: SECTION 308.2 – BUSINESS			
A 7.2	CASEWORK PLANS & ELEVATIONS								
A 7.3	CASEWORK PLANS & ELEVATIONS					FLOOR AREA AND DISTANCE CHART			
A 7.4	CASEWORK PLANS & ELEVATIONS					AREA	AREA OF SUITE (SQUARE FEET)	MAX. DISTANCE REQUIRED	MAX. DISTANCE IN SUITE
A 7.5	CASEWORK SECTIONS					---	850 SF	75’	69’
A 7.6	CASEWORK SECTIONS								
A 7.7	CASEWORK SECTIONS					SUITE EGRESS CALCULATIONS			
A 7.8	CASEWORK UTILITIES SHAFT					TABLE 1004.1.1 – 100 SF/OCCUPANT GROSS			
PLUMBING DRAWINGS				FIRE PROTECTION PLANS					
SHT. NO.	DESCRIPTION	SHT. NO.	DESCRIPTION	SHT. NO.	DESCRIPTION				
P0.0	PLUMBING LEGEND, SYMBOLS AND GENERAL NOTES	P4.1	PLUMBING DETAILS	FP0.0	FIRE PROTECTION GENERAL NOTES AND ABBREVIATIONS	CONTRACTOR NOTE:			
P0.1	PLUMBING ABBREVIATIONS	P5.1	PLUMBING SCHEDULES	FP1.1	THIRD FLOOR FIRE PROTECTION	THIS BUILDING IS FULLY OCCUPIED. ALL WORK MUST BE COORDINATED WITH OWNER SO AS NOT TO DISRUPT BUILDING OPERATIONS. THIS MAY REQUIRE WORK OUTSIDE OF NORMAL WORKING HOURS.			
PD1.1	SECOND/THIRD FLOOR SANITARY/VENT DEMOLITION	P5.2	PLUMBING SCHEDULES						
PD1.2	THIRD FLOOR DOMESTIC WATER AND LABORATORY GAS DEMOLITION								
P1.1	SECOND & THIRD FLOOR LABORATORY WASTE/VENT NEW WORK								
P1.2	THIRD FLOOR LABORATORY WATER AND LABORATORY GAS NEW WORK								
P3.1	PLUMBING RISER DIAGRAMS								

Partner In Charge
DEF

Project Architect
DEF

Drawn By
MJW

Date Drawn
11-28-11

Revisions

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No. _____ Date _____

No. _____ Date _____

No. _____ Date _____

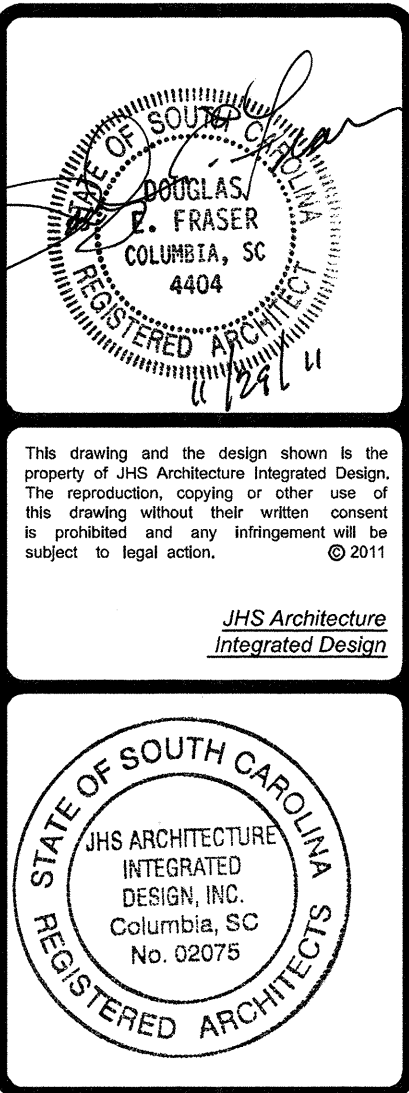
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Project
PHRC LABORATORY 305 RENOVATION

Sheet Title
COVER SHEET



Project Number
922x06

Sheet _____ Of _____
A 0.0

MECHANICAL LEGEND

PIPING SYMBOLS

SYMBOL	DESCRIPTION
---HR---	HEATING WATER RETURN
---HS---	HEATING WATER SUPPLY

DUCTWORK SYMBOLS

SYMBOL	DESCRIPTION
	THERMOSTAT
	AIR FLOW
	TRANSFER AIR FLOW (INDICATE CFM)
	SUPPLY AIR DIFFUSER
	EXHAUST AIR GRILLE
	FIRE DAMPER
	VOLUME DAMPER
	FLEXIBLE CONNECTION
	ELBOW WITH DOUBLE THICKNESS TURNING VANES
	RECTANGULAR BRANCH TAKE-OFF
	BELL MOUTH BRANCH TAKE-OFF
	ROUND BRANCH TAKE-OFF
	DUCT TRANSITION
	SQUARE TO ROUND TRANSITION
	DUCTWORK CHANGE IN ELEVATION (UP OR DOWN)
	SUPPLY/OUTSIDE AIR DUCT RISER
	EXHAUST/RELIEF AIR DUCT RISER
	ROUND DUCT RISER (SMALLER THAN 12")
	ROUND DUCT RISER (12" AND LARGER)
	TERMINAL UNIT
	TERMINAL UNIT WITH REHEAT COIL
	TERMINAL UNIT WITH ATTENUATOR AND REHEAT COIL
	EXHAUST TERMINAL UNIT
	LABORATORY AIR TERMINAL WITH ATTENUATOR
	LABORATORY AIR TERMINAL WITH ATTENUATOR
	SUPPLY AIR VOLUME TERMINAL UNIT IDENTIFIER
	EXHAUST AIR TERMINAL UNIT IDENTIFIER
	AIR DEVICE IDENTIFIER

GENERAL SYMBOLS

LINETYPE SYMBOLS

DESIGNATION	DESCRIPTION
	DEMOLITION WORK (SHOWN ON DEMOLITION PLANS)
	EXISTING WORK
	NEW WORK

REFERENCE SYMBOLS

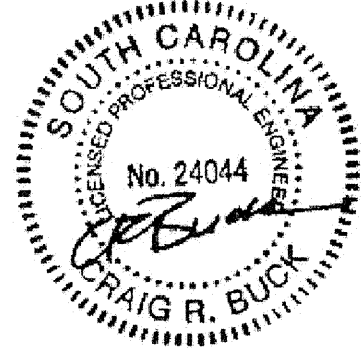
DESIGNATION	DESCRIPTION
	NORTH ARROW
	POINT OF CONNECTION TO EXISTING
	POINT OF DISCONNECTION

PIPING SYMBOLS

SYMBOL	DESCRIPTION
	PIPE DROP
	PIPE RISE
	PIPE CAP
	BRANCH TAKE OFF
	PIPE DROP TEE
	PIPE RISE TEE
	SHUTOFF VALVE (REFER TO SPECIFICATIONS FOR TYPE)
	AUTOMATIC CONTROL VALVE (TWO-WAY)
	AUTOMATIC CONTROL VALVE (THREE-WAY)
	BALANCING VALVE (WITH MEMORY STOP)
	UNION
	PIPE FLANGE
	CONCENTRIC REDUCER
	FLOWMETER FITTING
	PRESSURE SENSOR
	TEMPERATURE SENSOR
	PRESSURE/TEMPERATURE PLUG
	FLOW ARROW

GENERAL NOTES

1. NOTIFY THE OWNER, IN WRITING, AT LEAST SEVEN (7) DAYS IN ADVANCE OF ALL REQUIRED SHUTDOWNS OF WATER, FIRE, SEWER, GAS, ELECTRICAL SERVICE, OR OTHER UTILITIES. UPON WRITTEN RECEIPT OF APPROVAL FROM OWNER, SHUTDOWN SHALL BE PERFORMED BETWEEN THE HOURS OF SIX (6) P.M. AND SIX (6) A.M. OR AS DIRECTED OTHERWISE BY THE OWNER AND SHALL BE ACCOMPLISHED AT NO ADDITIONAL CONTRACT COST. AT THE END OF EACH SHUTDOWN ALL SERVICES SHALL BE RESTORED SO THAT NORMAL USE OF THE UTILITIES CAN CONTINUE.
2. WHEN WORKING IN AND AROUND THE EXISTING BUILDING, EXTREME CARE SHALL BE EXERCISED WITH REGARD TO PROTECTION OF THE EXISTING STRUCTURE AND MECHANICAL AND ELECTRICAL SERVICES WHICH WILL REMAIN. REPAIR, REPLACE, OR RESTORE TO THE SATISFACTION OF THE ARCHITECT, ENGINEER AND OWNER ALL EXISTING WORK DAMAGED IN THE PERFORMANCE OF DEMOLITION AND/OR NEW WORK.
3. ALL EXISTING PIPING, EQUIPMENT, DUCTWORK, AND MATERIALS NOT REQUIRED FOR RE-USE OR RE-INSTALLATION (SHOWN OR OTHERWISE) SHALL BE REMOVED. ALL EXISTING MATERIALS AND EQUIPMENT WHICH ARE REMOVED AND ARE DESIRED BY THE OWNER, OR ARE INDICATED TO REMAIN THE PROPERTY OF THE OWNER, SHALL BE DELIVERED TO HIM ON THE PREMISES BY THE CONTRACTOR. ALL OTHER MATERIALS AND EQUIPMENT WHICH ARE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED BY THE CONTRACTOR FROM THE PREMISES.
4. EXISTING CONDITIONS, I.E., PRESENCE AND LOCATION OF DUCTWORK, PIPING, EQUIPMENT AND MATERIALS, INDICATED ARE BASED ON INFORMATION OBTAINED FROM AVAILABLE RECORD DRAWINGS AND FIELD SURVEYS AND ARE NOT WARRANTED TO BE COMPLETE OR CORRECT. CONTRACTOR SHALL FIELD VERIFY EXACT LOCATION OF ALL DUCTWORK, PIPING, EQUIPMENT AND MATERIALS IN THE FIELD PRIOR TO STARTING ALL WORK.
5. EXISTING DUCT, PIPE, AND EQUIPMENT SIZES NOTED ARE FOR THE CONVENIENCE OF THE CONTRACTOR ONLY AND ARE NOT WARRANTED TO BE CORRECT. CONTRACTOR SHALL VERIFY ALL SIZES IN THE FIELD IF THEY EFFECT HIS WORK.
6. EXISTING PIPING NO LONGER REQUIRED TO REMAIN IN SERVICE (SHOWN OR OTHERWISE) SHALL BE DISCONNECTED AND REMOVED BACK TO SERVICE MAINS UNLESS OTHERWISE INDICATED OR NOTED ON THE PLANS. REMOVE EXISTING PIPE HANGERS, SUPPORTS, VALVES, ETC.. EXISTING PIPING INDICATED OR REQUIRED TO REMAIN IN SERVICE OR IN PLACE SHALL BE CAPPED, PLUGGED, OR OTHERWISE SEALED. NO EXISTING PIPING SHALL BE LEFT OPEN END.
7. EXISTING DUCTWORK INDICATED TO BE DISCONNECTED AND REMOVED SHALL INCLUDE ALL RELATED AIR DEVICES, HANGERS, SUPPORTS, ETC., UNLESS OTHERWISE INDICATED OR NOTED ON THE PLANS. EXISTING DUCTWORK WHERE INDICATED TO BE CAPPED OR REQUIRED TO REMAIN IN SERVICE SHALL BE CAPPED WITH 18 GAUGE SHEET METAL. SECURE CAP WITH SHEET METAL SCREWS AND SEAL PERIMETER OF OPENING AIR TIGHT WITH DUCT SEALER. NO EXISTING DUCTWORK SHALL BE LEFT OPEN FOR ANY EXTENDED PERIOD OF TIME. CAP EXISTING DUCTWORK IMMEDIATELY AS REQUIRED OR DIRECTED BY THE ENGINEER. CONTRACTOR SHALL RETURN ALL AIR DEVICES TO OWNER.
8. EXISTING MECHANICAL AND ELECTRICAL EQUIPMENT, PIPING, DUCTWORK, AND MATERIALS AFFECTED BY DEMOLITION OR NEW WORK INSTALLATION AND REQUIRED TO REMAIN IN SERVICE SHALL BE RE-INSTALLED OR SUPPORTED AS REQUIRED IN ACCORDANCE WITH NEW WORK SPECIFICATION. ALL WORK SHALL BE COMPLETED TO THE SATISFACTION OF THE ENGINEER AND OWNER AND AT NO ADDITIONAL CONTRACT COST.
9. PATCH ALL DISTURBED SURFACES, INCLUDING WALLS, CEILINGS, ROOF, AND FLOOR. PATCHING SHALL MATCH EXISTING ADJACENT SURFACES AS TO THICKNESS, TEXTURE, MATERIALS, AND COLOR. ALL PATCHING SHALL BE PERFORMED TO THE SATISFACTION OF THE ARCHITECT, ENGINEER AND OWNER AND AT NO ADDITIONAL CONTRACT COST.
10. IN GENERAL ALL PIPING, EQUIPMENT, DUCTWORK, AND MATERIALS SHOWN "LIGHT" IS EXISTING TO REMAIN. ALL PIPING, CONDUITS, EQUIPMENT, DUCTWORK, AND MATERIALS SHOWN "HEAVY AND DASHED" IS EXISTING TO BE DEMOLISHED.
11. ALL WORK SHALL BE PERFORMED IN A SEQUENCE AND DURING HOURS TO MINIMIZE DISRUPTION TO THE BUILDING WHICH WILL REMAIN OCCUPIED DURING CONSTRUCTION.
12. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE SOUTH CAROLINA CODES, CITY OF COLUMBIA, AND THE LOCAL FIRE MARSHALL'S REQUIREMENTS.
13. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH ALL OTHER TRADES/ SUBCONTRACTORS INCLUDING BUT NOT LIMITED TO AUTOMATIC TEMPERATURE CONTROLS, ELECTRICAL, AND GENERAL TRADES.
14. CONTRACTOR SHALL MAINTAIN ACCESS TO ALL STAIRWELLS AND EGRESS CORRIDORS DURING CONSTRUCTION.
15. CONCRETE CORING OR CUTTING MAY BE REQUIRED IN ORDER TO RUN MECHANICAL, ELECTRICAL, PLUMBING, CABLING OR OTHER SERVICES TO A SPECIFIC AREA. IT IS IMPERATIVE WHEN CONSIDERING EITHER CORING, CUTTING OR CHIPPING THAT REBAR, PLUMBING, ELECTRICAL SERVICES, ETC WITHIN THE CONCRETE SLAB, WALL OR FLOOR BE LOCATED PRIOR TO DISTURBING THE INTEGRITY OF THE EXISTING CONCRETE. OBTAIN STRUCTURAL DRAWINGS OF THE AREA IN QUESTION AND, USING THE BUILDING GRIDLINES, DETERMINE AND MARK THE EXACT LOCATIONS REQUIRED FOR NEW SERVICES.
16. ALL PENETRATIONS MUST BE SEALED WITH FIRE STOP MATERIAL AFTER SERVICES ARE RUN THROUGH. ALL PENETRATIONS THROUGH EXTERIOR WALLS ABOVE AND BELOW GRADE OR SLAB ON GRADE MUST BE WATERPROOFED.
17. FINAL CEILING HEIGHTS TO BE DETERMINED WITH ARCHITECT IN FIELD AFTER DEMOLITION OF EXISTING CEILINGS. NO FABRICATION OF DUCTWORK, HVAC PIPING OR PLUMBING PIPING SHALL BEGIN UNTIL AFTER THE CONTRACTOR HAS COMPLETED COORDINATION DRAWINGS AND COORDINATED THE CEILING HEIGHTS WITH THE ARCHITECT.
18. AUTOMATIC TEMPERATURE CONTROL CONTRACTOR SHALL DESIGNATE AND NUMBER ALL EQUIPMENT IN ACCORDANCE WITH UNIVERSITY OF SOUTH CAROLINA STANDARDS. NO DUPLICATE DESIGNATION NUMBERS SHALL BE PROVIDED. ALL NUMBERS SHALL BE THE NEXT SEQUENTIAL NUMBER FOR THAT SPECIFIC PIECE OF EQUIPMENT.
19. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT AND ENGINEER PRIOR TO CLOSING ANY CEILINGS FOR A COMPLETE CHECKOUT OF THE HVAC SYSTEM. THE SYSTEM MUST BE COMPLETE AND OPERATIONAL INCLUDING CONTROLS, REGISTERS, INSULATION, AND BALANCING WITH REPORT. THE SYSTEM SHALL BE RUN THROUGH ITS COMPLETE HEATING AND COOLING CYCLES. THE CONTRACTOR AND ALL APPROVED SUBCONTRACTORS SHALL BE PRESENT AT THE ARCHITECT-ENGINEER CHECKOUT. THE TESTING AND BALANCE AGENCY SHALL CERTIFY THAT THESE CONDITIONS ARE MET.



Partner In Charge	DSC
Project Engineer	CRB
Drawn By	BEK
Date Drawn	11-28-11
Revisions	
No.	Date
No.	Date
No.	Date
No.	Date
No.	Date
No.	Date
No.	Date
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Project

PHRC LABORATORY 305 RENOVATION

Sheet Title

MECHANICAL LEGEND AND ABBREVIATIONS

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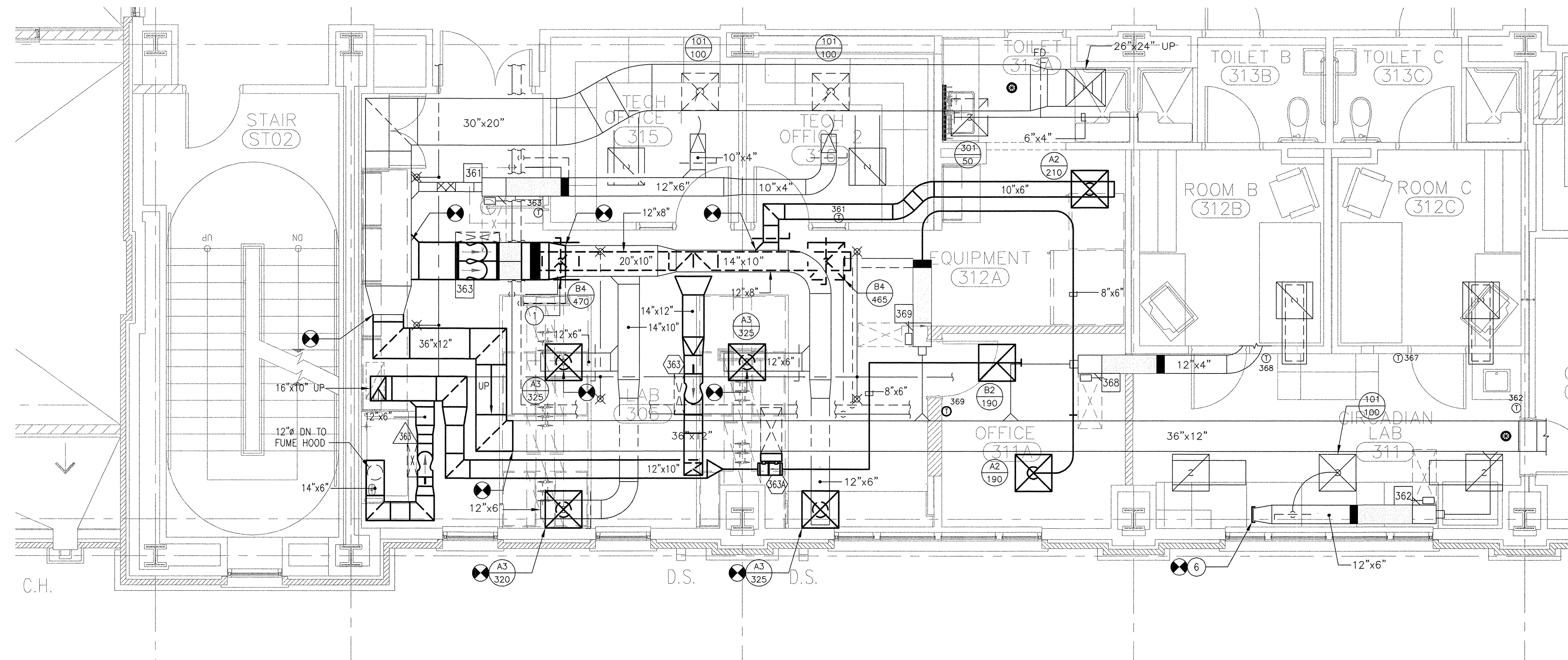
1812 LINCOLN STREET
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Project Number

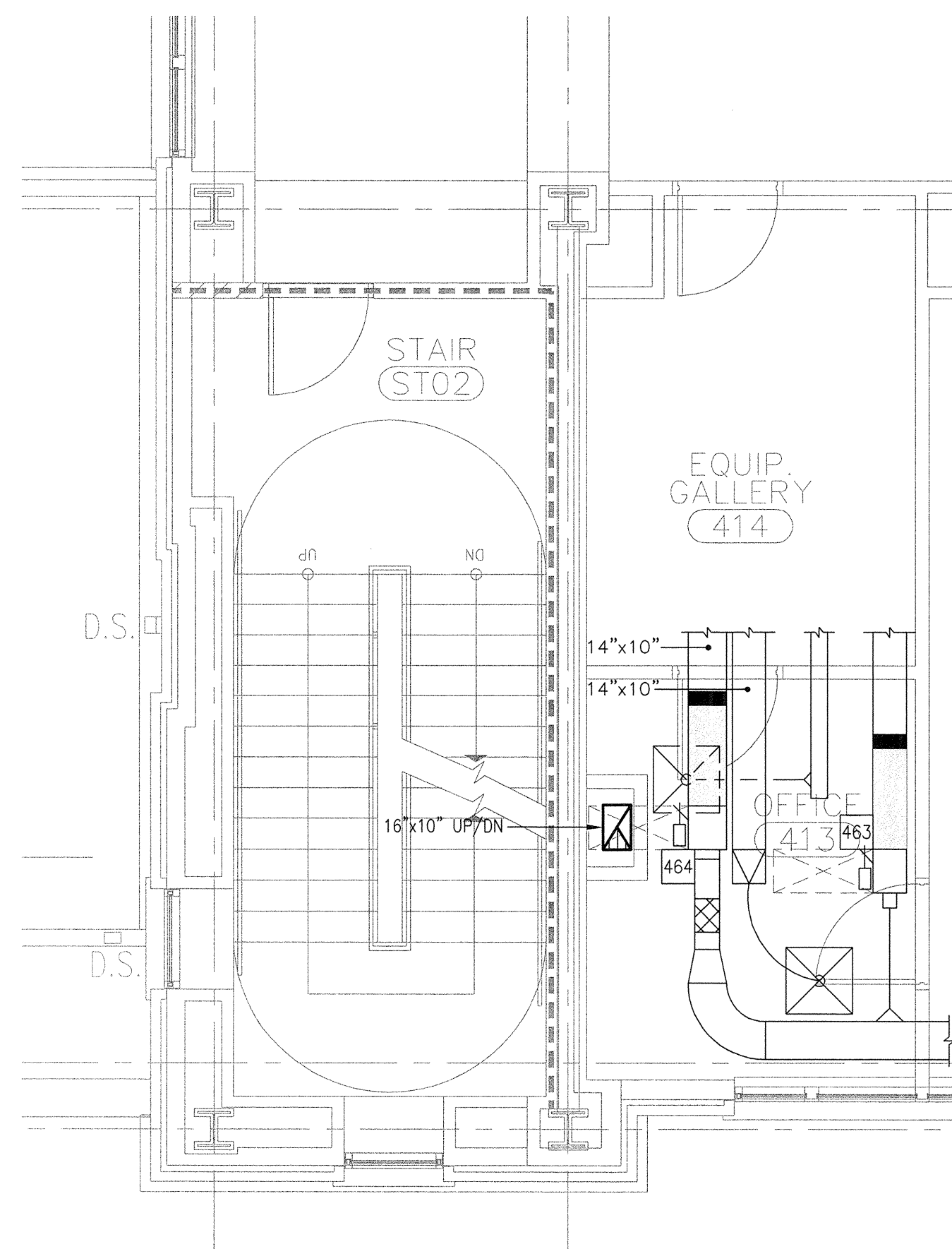
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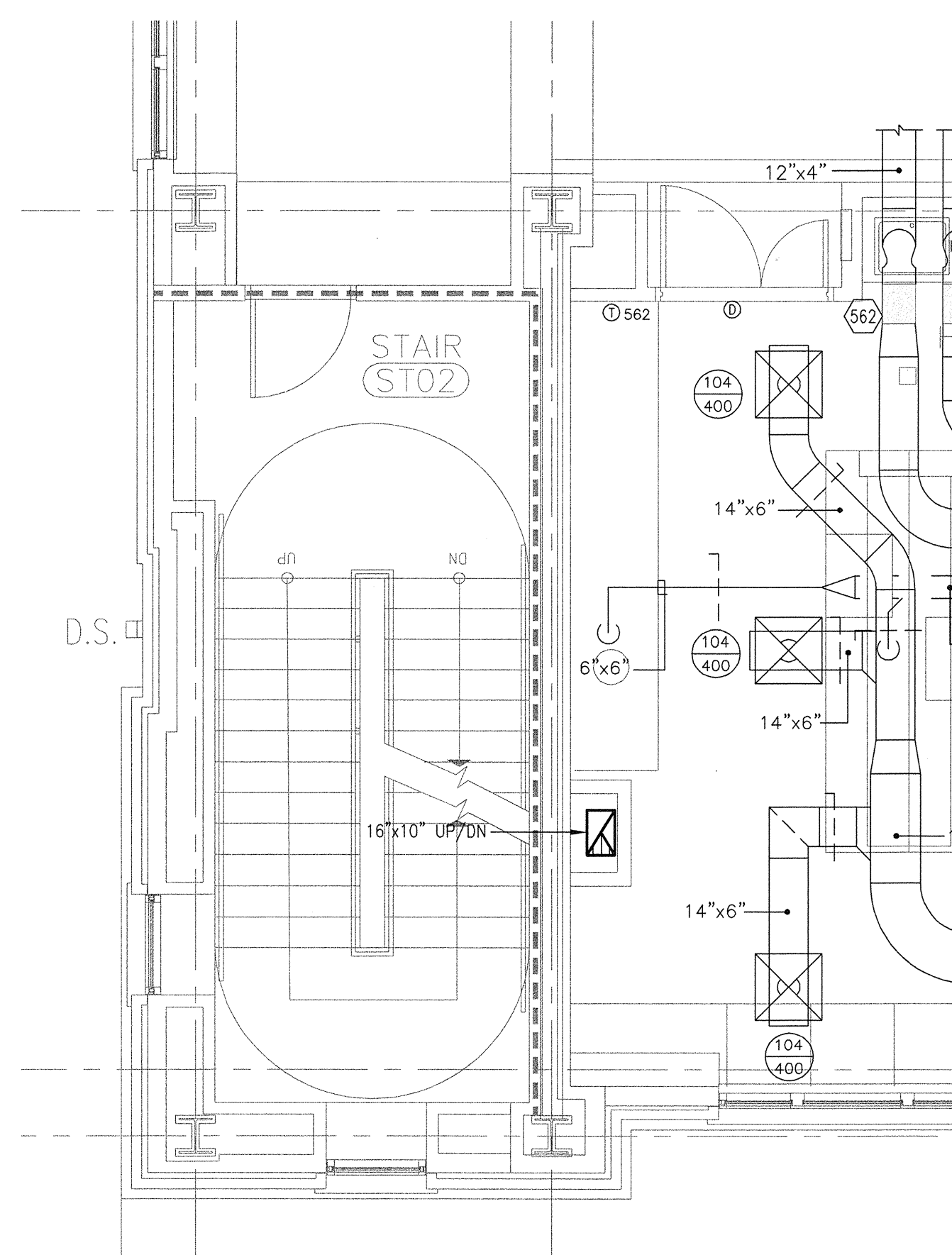
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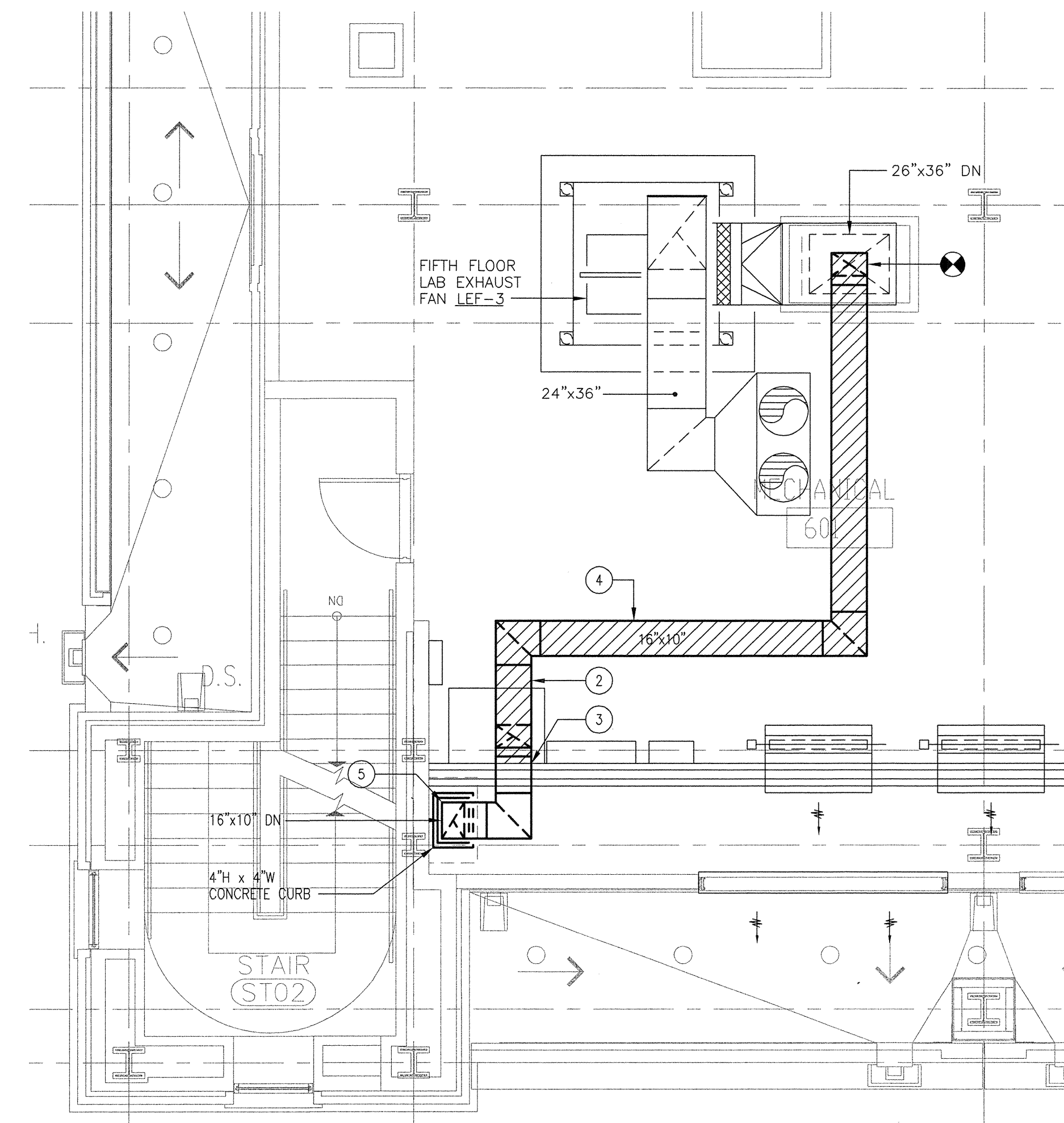
PARTIAL THIRD FLOOR - HVAC NEW WORK
SCALE: 1/4"=1'-0"



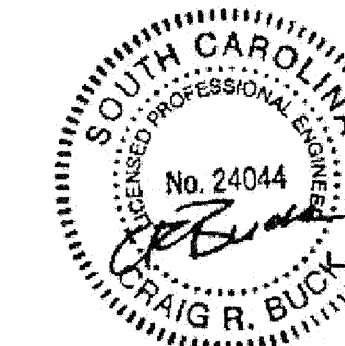
PARTIAL FOURTH FLOOR -
HVAC NEW WORK
SCALE: 1/4"=1'-0"



PARTIAL FIFTH FLOOR -
HVAC NEW WORK
SCALE: 1/4"=1'-0"



PENTHOUSE - HVAC NEW WORK
SCALE: 1/4"=1'-0"



GENERAL NOTES:

1. ALL DIFFUSERS SERVED BY VAV BOX 363 SHALL BE BALANCED TO THE CFM SHOWN.
2. THE CONTRACTOR SHALL FULLY COORDINATE THE VERTICAL EXHAUST DUCT FLOOR PENETRATION WITH THE EXISTING BUILDING COMPONENTS PRIOR TO PERFORMING ANY WORK.

DRAWING NOTES:

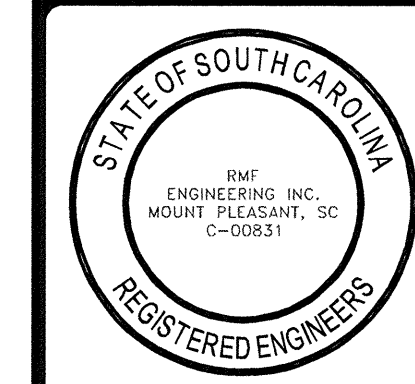
1. CONNECT EXISTING HS/HR PIPING TO NEW REHEAT COIL.
2. EXHAUST DUCTWORK SHOWN HATCHED SHALL BE PROVIDED WITH TYPE XI FIRE BARRIER INSULATION AS SPECIFIED.
3. INSULATED PLENUM WALL SECTION SHALL BE REMOVED AND REPLACED WITH A NEW SECTION TO ACCOMMODATE THE NEW DUCT PENETRATION. WALL SECTION SHALL BE OF THE SAME MATERIAL AS THE EXISTING SYSTEM. THE DUCT PENETRATION SHALL BE BY THE WALL MANUFACTURER AND SHALL NOT BE FIELD CUT BY THE CONTRACTOR. DUCT PENETRATION SHALL BE SEALED WEATHER AND AIRTIGHT PER THE WALL MANUFACTURER'S WRITTEN INSTRUCTIONS.
4. NEW DUCTWORK SHALL BE FULLY COORDINATED WITH THE EXISTING MECHANICAL, ELECTRICAL, PLUMBING, AND FIRE PROTECTION SYSTEMS.
5. DUCT AND CHASE PENETRATION SHALL BE SEALED AND FLASHED THE SAME AS AN EXTERIOR PENETRATION.
6. SUPPLY DUCT SHALL BE CAPPED AND SEALED AIR TIGHT.

Partner In Charge	DSC
Project Engineer	CRB
Drawn By	BEK
Date Drawn	11-28-11
Revisions	
No.	Date
No.	Date
No.	Date
No.	Date
No.	Date
No.	Date
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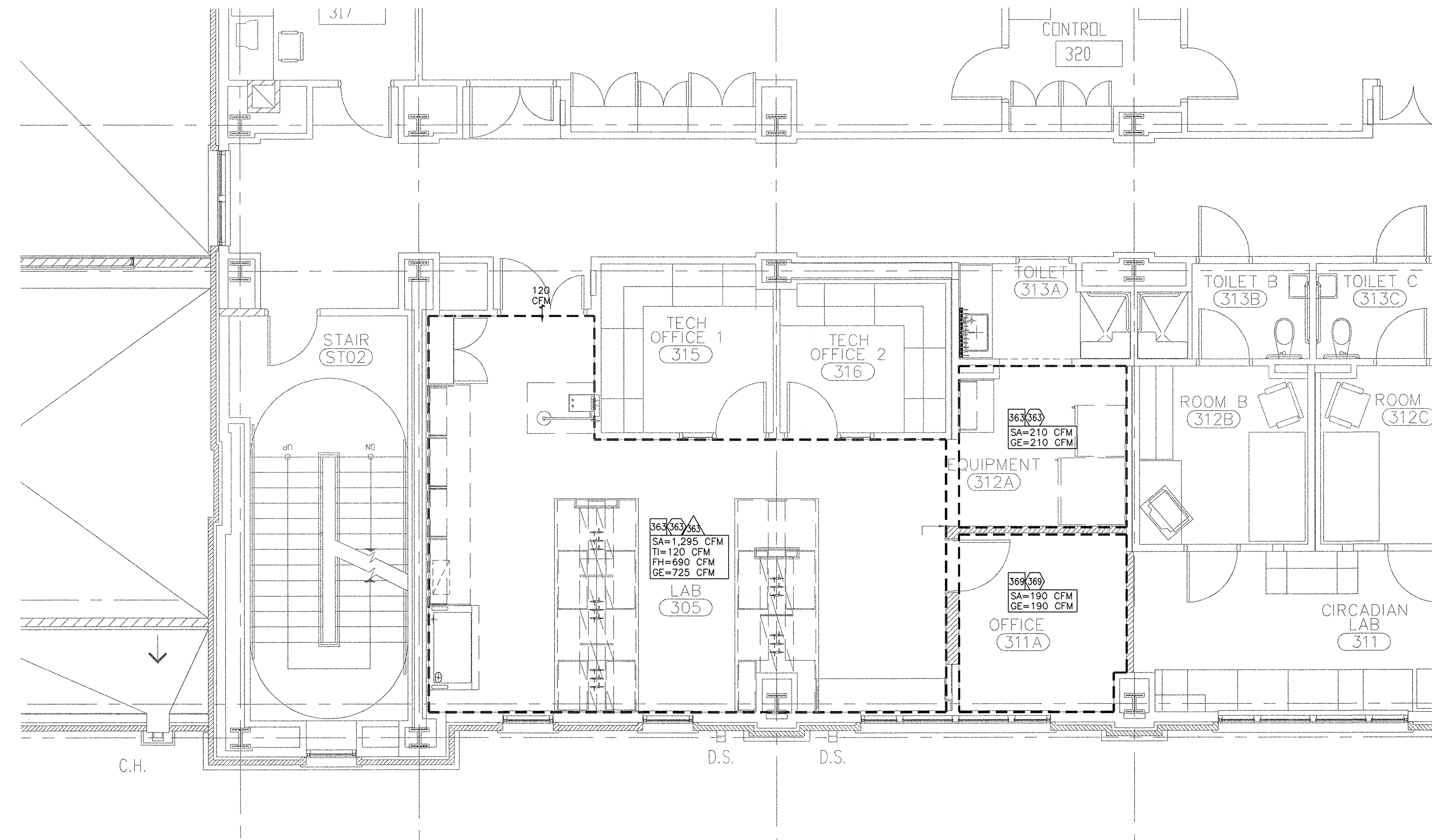
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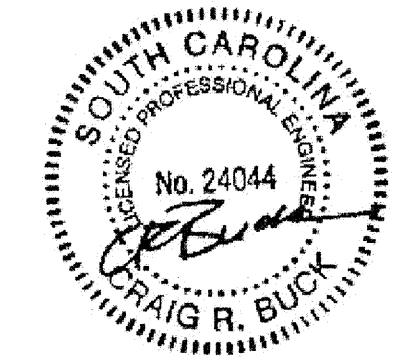
Project: PHRC LABORATORY 305 RENOVATION
Sheet Title: PARTIAL THIRD, FOURTH, FIFTH & PENTHOUSE FLOOR PLANS - MECHANICAL NEW WORK

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Sheet: M1.0



PARTIAL THIRD FLOOR — AIR BALANCE SUMMARY
SCALE: 1/4"=1'-0"

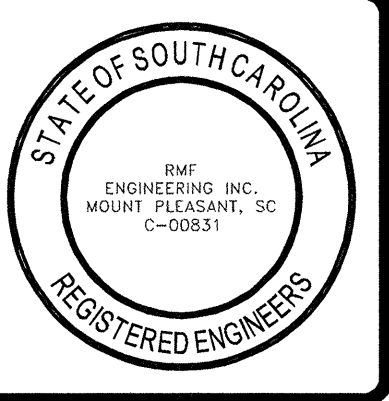


Partner In Charge	
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Project Engineer	
CRB	
Drawn By	
BEK	
Date Drawn	
11-28-11	
Revisions	
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Project	PHRC LABORATORY 305 RENOVATION
Sheet Title	PARTIAL THIRD FLOOR PLAN - HVAC AIR BALANCE SUMMARY


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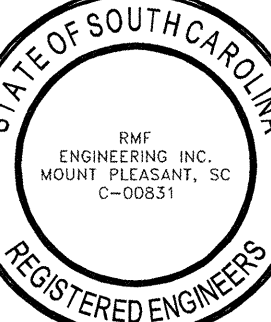
Partner In Charge	
DSC	
Project Engineer	
CRB	
Drawn By	
BEK	
Date Drawn	
11-28-11	
Revisions	
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Project
 PHRC LABORATORY 305 RENOVATION

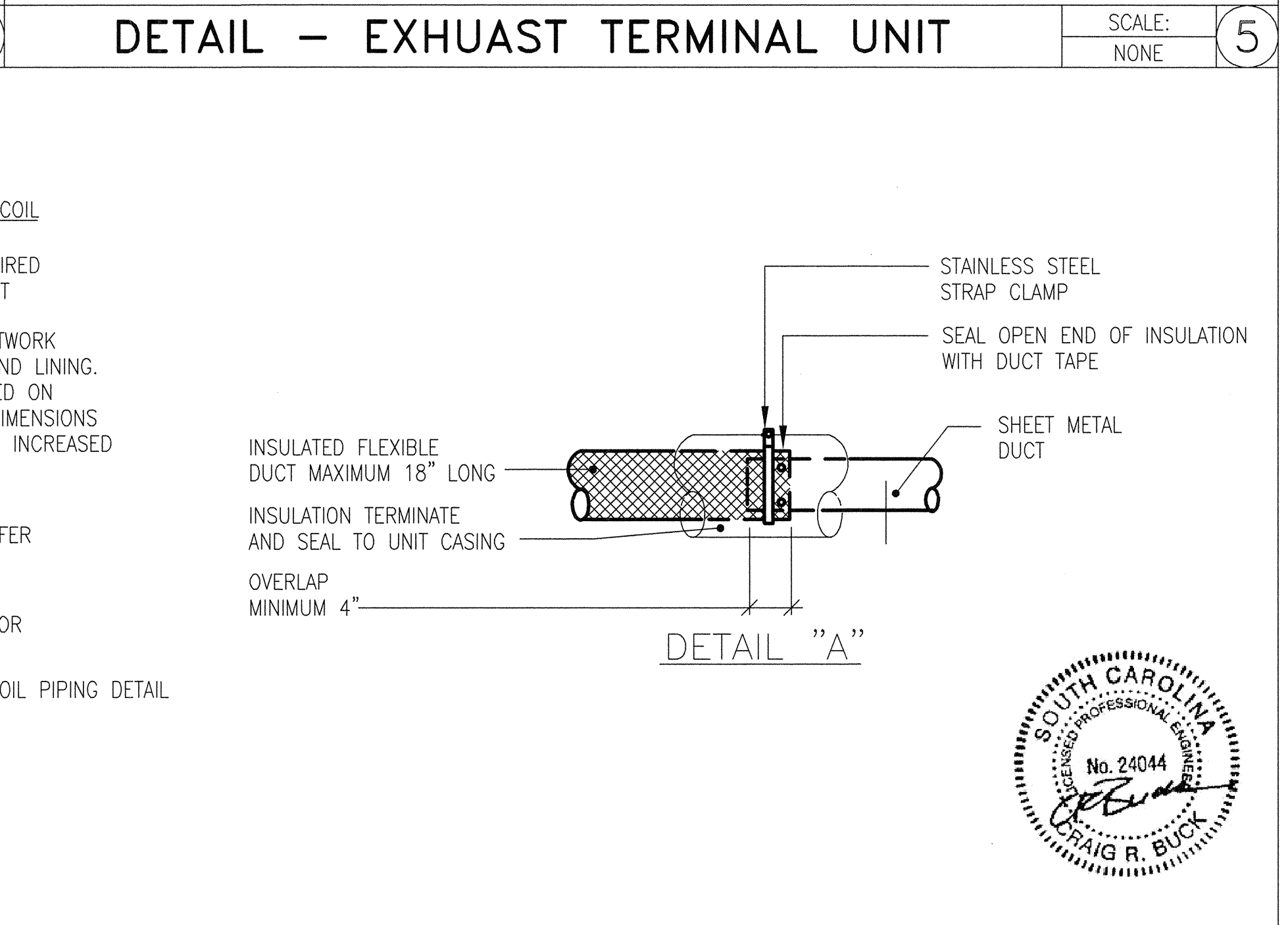
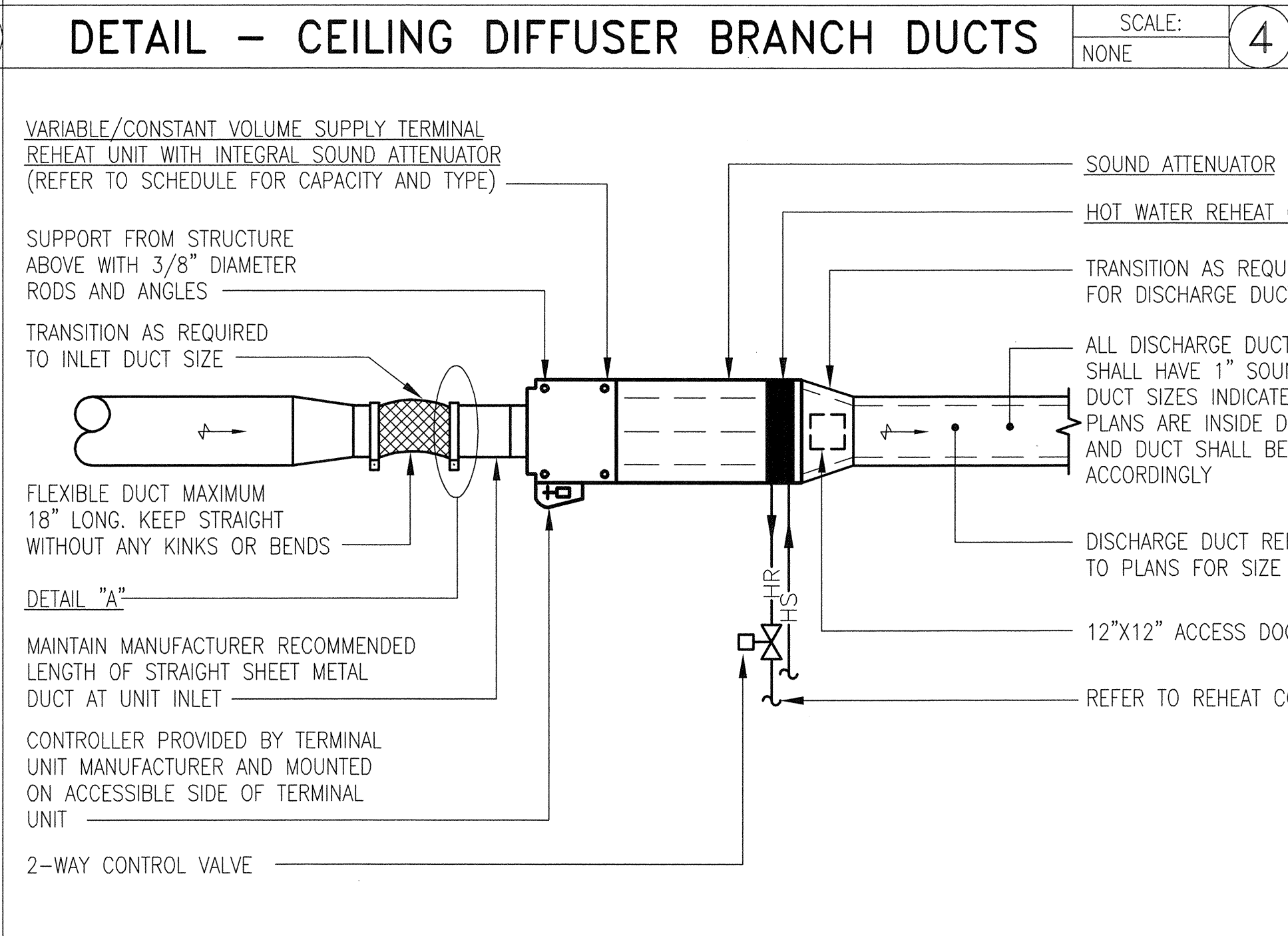
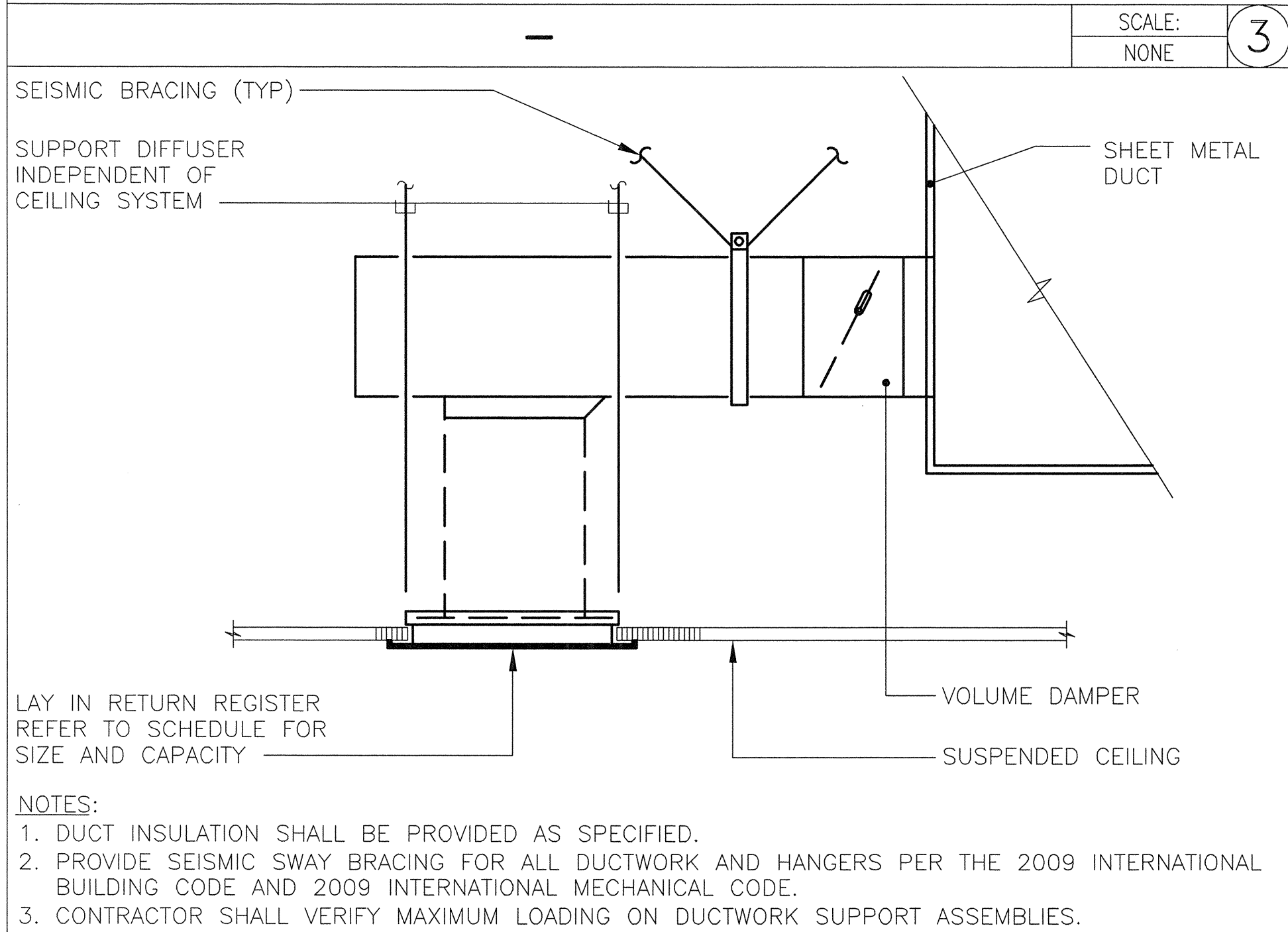
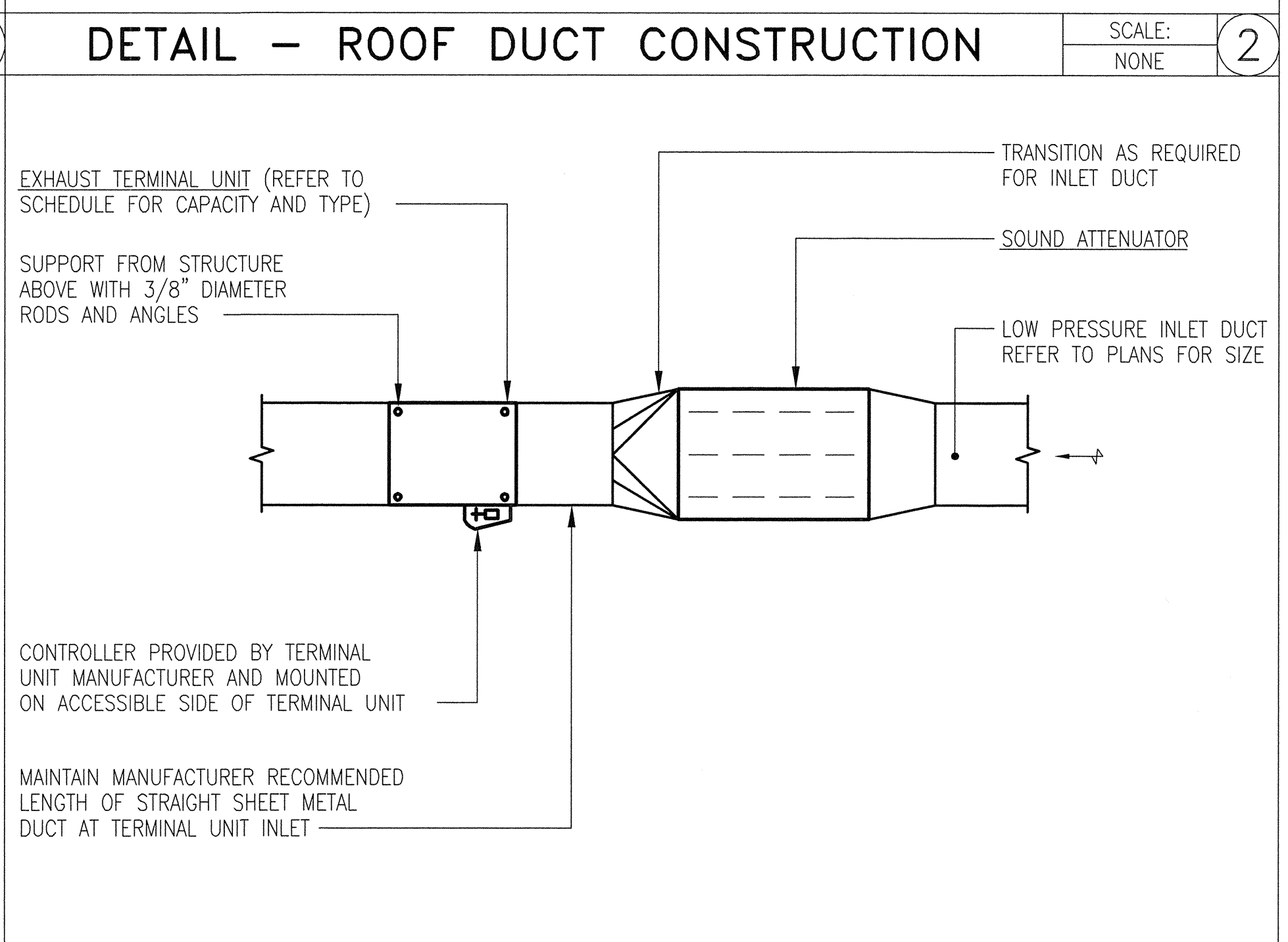
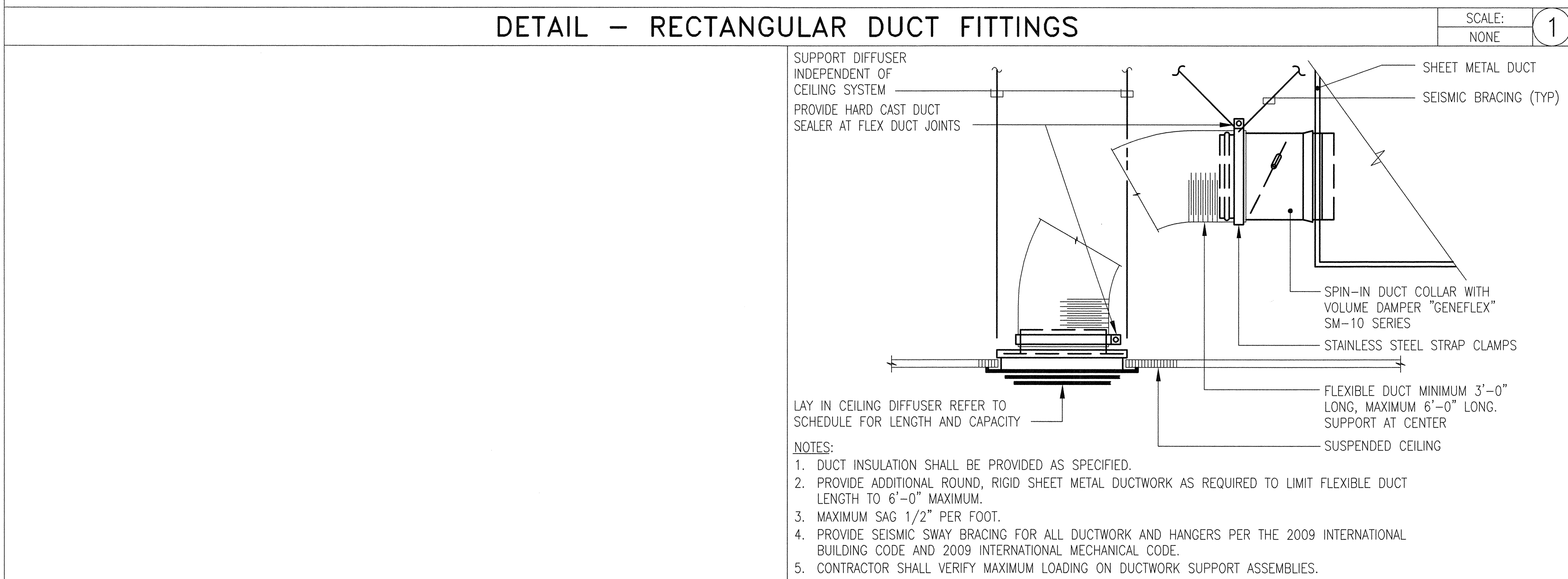
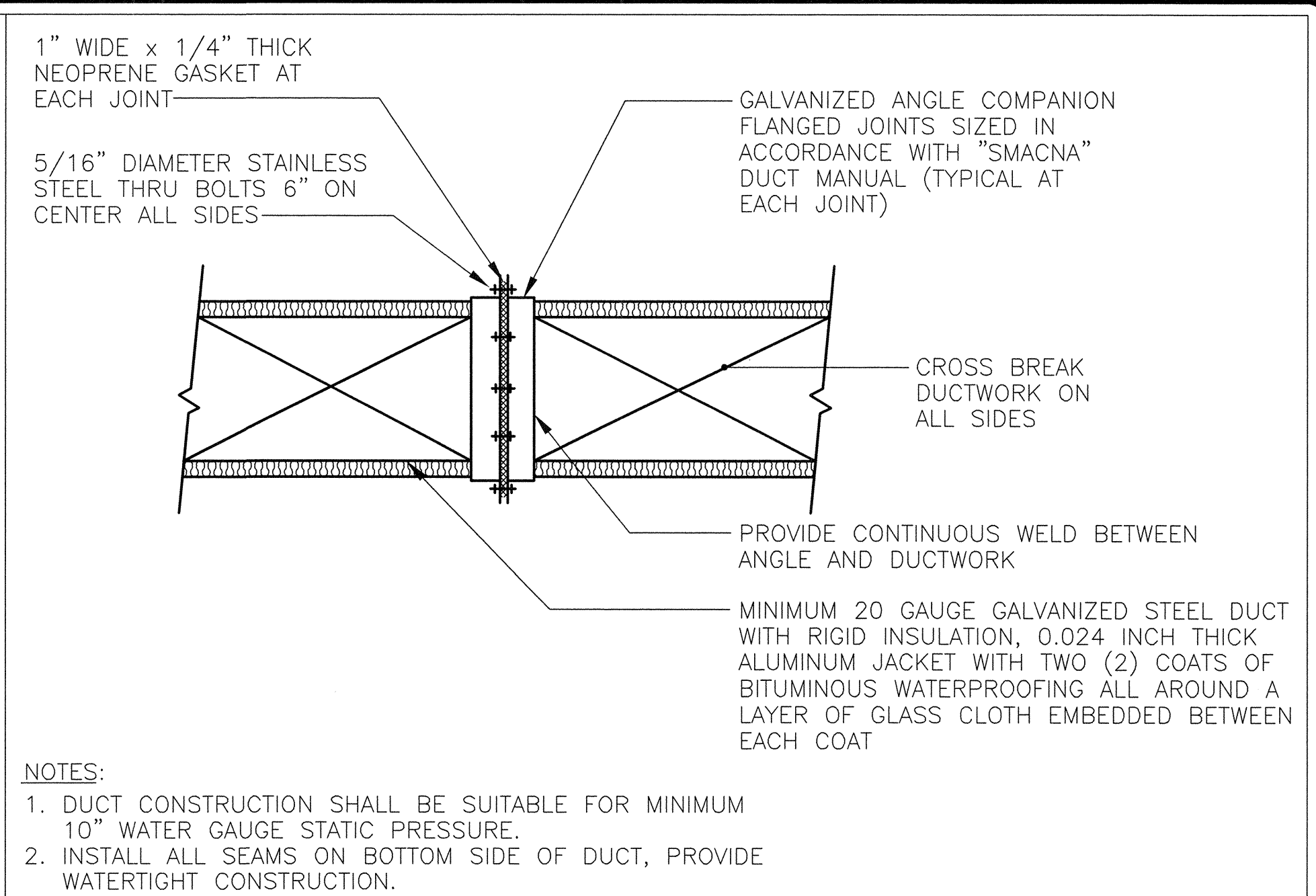
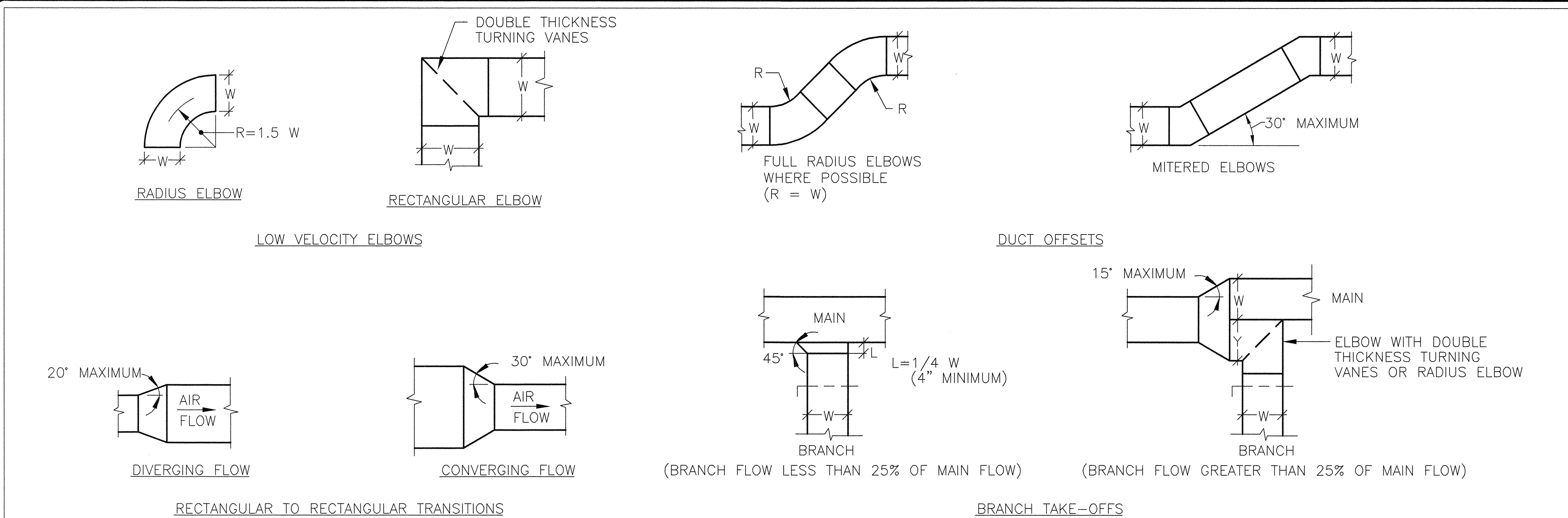
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 DETAILS

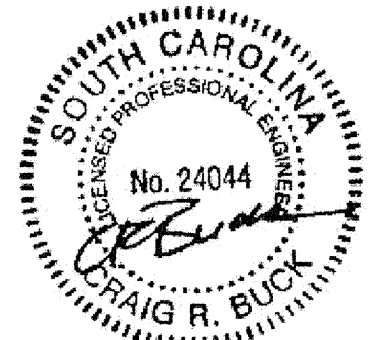


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 THIRD FLOOR
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Project Number
 922x06

Sheet
 M3.0



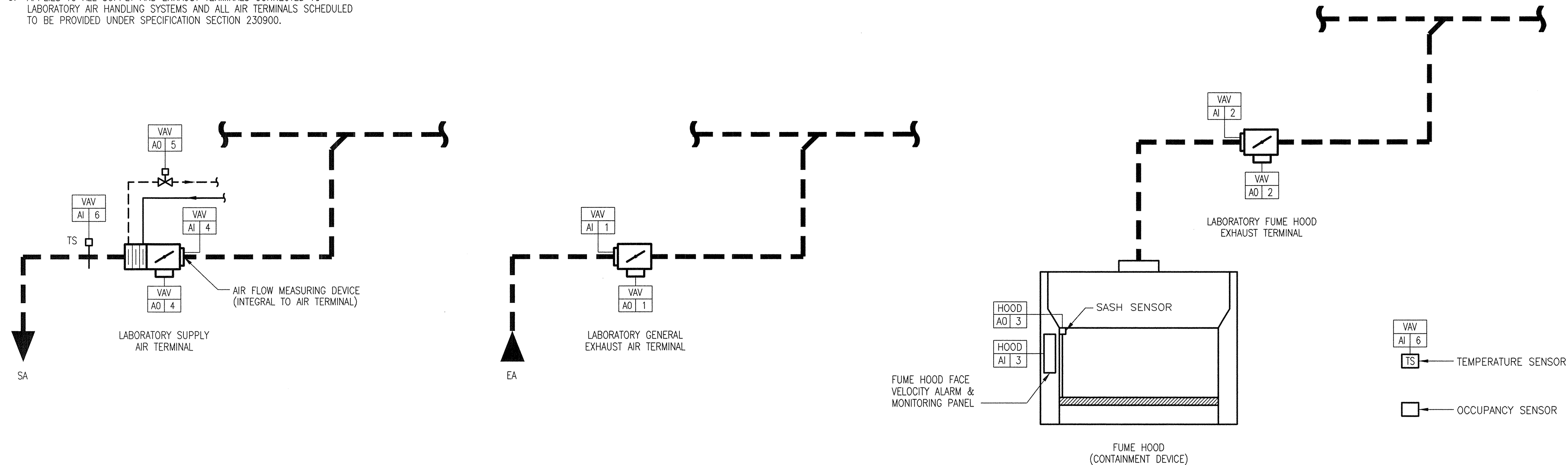


INPUT/OUTPUT SUMMARY

POINT NO.	SYSTEM APPARATUS OR AREA POINT DESCRIPTION	INPUTS												OUTPUTS				SYSTEM FEATURES										GENERAL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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		TEMPERATURE	VELOCITY PRESSURE	STATIC PRESSURE	DIFFERENTIAL PRESSURE	FACE VELOCITY			BTU/HR	RUN TIME	CFM	ENTHALPY		STATUS (OFF, PRESS)	SMOKE	FREEZE/STAT	HIGH HUM. LIMIT	STATUS (AMPS)	END SWITCH	VFD FAULT	HIGH STATIC LIMIT	HIGH REFRIGERANT		START - STOP	DAMPER POSITION	VALVE POSITION			DAMPER POSITION	VALVE POSITION	SASH POSITION		LOW VELOCITY/CFM	HIGH VELOCITY/CFM	FALL (VFD)	PROOF	HIGH PRESS LIMIT	SMOKE ALARM	LOW TEMP. LIMIT		TIME SCHEDULING	ALTERNATE	TIME DELAY START	OCCUPIED/UNOCCUPIED	TEMPERATURE RESET	MORNING WARM-UP	SMOKE CONTROL		COLOR GRAPHICS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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GENERAL NOTES:

1. CONTAINMENT TYPE EXHAUST TERMINALS SHALL BE CONSTRUCTED OF ALL NON-CORROSIVE MATERIALS.
2. THE FUME HOOD FACE VELOCITY ALARM & MONITORING PANEL SHALL BE FURNISHED BY BAS CONTRACTOR AND FACTORY INSTALLED.
3. APPLIES TO ALL SUPPLY AND EXHAUST TERMINALS CONNECTED TO LABORATORY AIR HANDLING SYSTEMS AND ALL AIR TERMINALS SCHEDULED TO BE PROVIDED UNDER SPECIFICATION SECTION 230900.

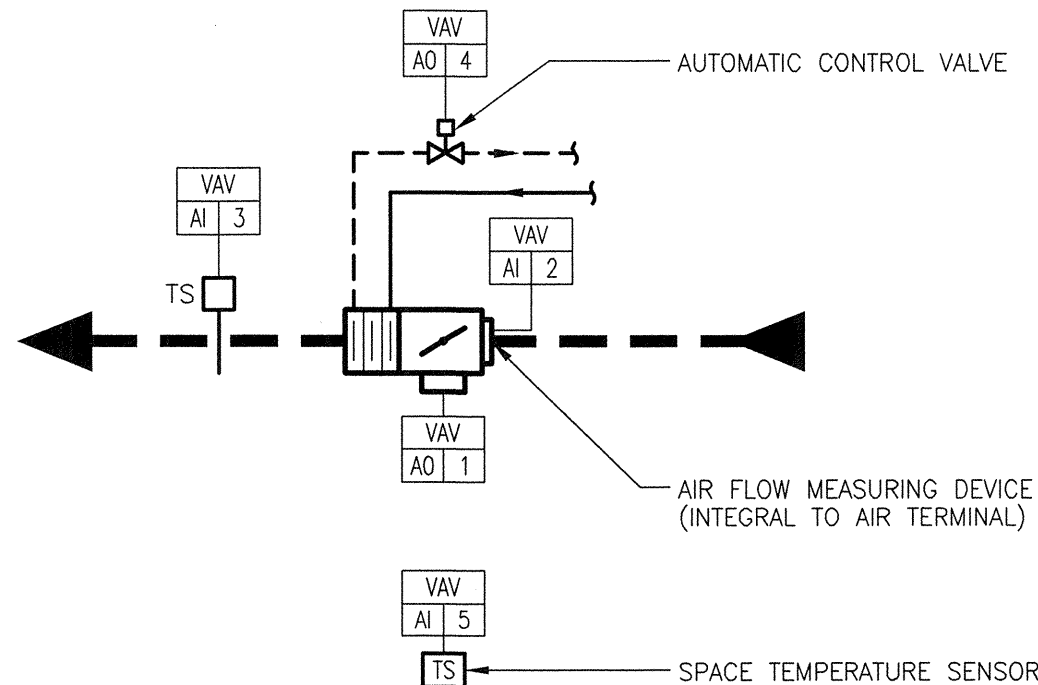


LABORATORY AIR VOLUME SCHEMATIC AND CONTROL DIAGRAM (TYPICAL)

SCALE: NONE 1

TERMINAL UNIT SEQUENCE OF OPERATION

- A. THE VARIABLE VOLUME AIR TERMINAL SHALL OPERATE ON AN OCCUPIED/UNOCCUPIED SCHEDULE. OCCUPIED/UNOCCUPIED MODES SHALL BE AS DETERMINED BY THE OCCUPIED/UNOCCUPIED PROGRAM OF THE BUILDING AUTOMATION SYSTEM (BAS).
- B. OCCUPIED MODE
 1. THE SUPPLY AIR TERMINAL AIR VOLUME REGULATOR SHALL MODULATE TO MAINTAIN THE OCCUPIED SPACE TEMPERATURE SET POINT. ON A DROP IN SPACE TEMPERATURE BELOW THE OCCUPIED SPACE TEMPERATURE SET POINT, THE AIR VOLUME REGULATOR SHALL MODULATE TOWARD ITS MINIMUM POSITION SET POINT.
 2. ON A FURTHER DROP IN SPACE TEMPERATURE BELOW THE OCCUPIED SET POINT WITH THE AIR VOLUME REGULATOR AT ITS MINIMUM SET POINT, THE REHEAT COIL VALVE SHALL MODULATE OPEN.
 3. ON A RISE IN TEMPERATURE ABOVE THE OCCUPIED SET POINT, THE REVERSE SHALL OCCUR.
- C. UNOCCUPIED MODE
 1. THE SUPPLY AIR TERMINAL UNIT AIR VOLUME REGULATOR SHALL CLOSE TO MINIMUM POSITION AND THE REHEAT VALVE SHALL BE FULLY CLOSED WHEN THE UNOCCUPIED MODE IS INITIATED.
 2. ON A DROP IN SPACE TEMPERATURE BELOW THE REDUCED UNOCCUPIED TEMPERATURE SET POINT OF 58° F, THE REHEAT COIL VALVE SHALL MODULATE OPEN TO MAINTAIN THE UNOCCUPIED SET POINT.
 3. ON A RISE IN TEMPERATURE ABOVE THE UNOCCUPIED SET POINT, THE REVERSE SHALL OCCUR.
- D. WARM-UP MODE
 1. THE SUPPLY AIR TERMINAL AIR VOLUME REGULATOR SHALL BE OPEN TO MINIMUM POSITION AND THE REHEAT VALVE SHALL BE MODULATED TO MAINTAIN THE OCCUPIED ROOM TEMPERATURE SET POINT.
- E. REFER TO AIR HANDLING UNIT SEQUENCE OF OPERATION FOR SYSTEM STATIC PRESSURE RESET REQUIREMENTS.
- G. UPON LOSS OF POWER, AIR VOLUME REGULATOR SHALL FAIL TO THE LAST POSITION HELD PRIOR TO LOSS OF POWER.



VARIABLE VOLUME SUPPLY AIR TERMINAL UNIT WITH REHEAT

SCALE: NONE 2

SEQUENCE OF OPERATION

PART 1 - PRESSURE & TEMPERATURE CONTROL SEQUENCES

- A. SEE PLANS FOR LOCATIONS OF ALL TEMPERATURE SENSORS, PANELS, DAMPERS, VALVES, AND EQUIPMENT. WHERE SUCH DEVICES ARE NOT INDICATED HOWEVER REQUIRED BY THE SEQUENCES, THEY SHALL BE PROVIDED BY THE CONTRACTOR AS PART OF THE CONTRACT AND LOCATED IN THE FIELD BY THE ARCHITECT.
- B. A FULL COMMUNICATION INTERFACE AND COMPLETE INTEROPERABILITY WITH THE EXISTING BUILDINGS DDC AUTOMATIC TEMPERATURE CONTROL SYSTEM SHALL BE PROVIDED TO PERFORM THE FUNCTIONS HEREIN DESCRIBED OR INDICATED IN THE CONTRACT DOCUMENTS. ALL TEMPERATURE, HUMIDITY, CARBON DIOXIDE, PRESSURE AND TIME SET POINTS SHALL BE FULLY ADJUSTABLE FROM THE BAS.
- C. LABORATORY CONTROL SYSTEM (LCS) SHALL MODULATE SUPPLY, GENERAL EXHAUST AND FUME HOOD EXHAUST TERMINAL UNITS TO MAINTAIN TEMPERATURE CONTROL AND PRESSURE INDEPENDENT VOLUME CONTROL. THE SET POINT VOLUMETRIC FLOW RATE OF SUPPLY AND EXHAUST INTO AND OUT OF EACH LABORATORY AREA AS DEFINED ON THE AIR BALANCE DRAWINGS SHALL BE AUTOMATICALLY MAINTAINED REGARDLESS OF FLUCTUATIONS IN STATIC PRESSURE; I.E. FLOW RATES SHALL BE DETERMINED BASED ON TERMINAL UNIT SENSOR READINGS AND THE POSITIONS OF AIR VOLUME REGULATORS IN THE SUPPLY AND EXHAUST TERMINAL UNIT ADJUSTED AUTOMATICALLY TO MAINTAIN THE SET POINT FLOW RATES. DURING OCCUPIED PERIODS OR PERIODS WHEN THE FUME HOOD IS NOT FULLY CLOSED, THE LABORATORY EXHAUST AIR CHANGE RATE SHALL BE A MINIMUM OF 12 ACH. DURING UNOCCUPIED PERIODS, THE LABORATORY EXHAUST AIR CHANGE RATE SHALL BE A MINIMUM OF 6 ACH.
- D. OCCUPIED/UNOCCUPIED MODES SHALL BE AS DETERMINED BY THE OCCUPIED/UNOCCUPIED PROGRAM OF THE BUILDING AUTOMATION SYSTEM (BAS). EACH LABORATORY/EQUIPMENT SPACE SHALL HAVE SEPARATE OCCUPIED/UNOCCUPIED PROGRAM SET POINTS TO BE ESTABLISHED DURING SYSTEM COMMISSIONING AND TEST AND BALANCE. INDIVIDUAL PROGRAM SET POINTS SHALL BE ADJUSTABLE THROUGH THE BAS.
- E. THE SYSTEM SHALL BE CALIBRATED AND THOROUGHLY LOOP TUNED TO PROVIDE STABLE SUPPLY AND EXTRACT AIR TERMINAL UNIT AIRFLOW AND SPACE TEMPERATURE CONTROL. AIRFLOW OFFSET SHALL BE CONSISTENT WITHOUT VARIATION AND SPACE TEMPERATURE SHALL BE STABLE WITHOUT FLUCTUATIONS BETWEEN THE DEAD BAND LIMITS. DAILY AUTOMATED TERMINAL UNIT CALIBRATION SHALL OCCUR WITH NO INTERRUPTION OF AIRFLOW OR LOSS OF PREDETERMINED AIRFLOW OFFSET. PROVIDE AUTO-ZERO MODULES FOR TERMINAL UNITS TO ACCOMMODATE THIS PROVISION.

PART 2 - LABORATORY AIR VOLUME CONTROL

- A. DURING OCCUPIED PERIODS, AS DETERMINED BY THE OCCUPIED/UNOCCUPIED SCHEDULE AND LABORATORY SPACE OCCUPANCY SENSOR, OR PERIODS WITH THE FUME HOOD SASH NOT FULLY CLOSED, AS DETERMINED BY THE FUME HOOD SASH SENSOR, THE FUME HOOD EXHAUST TERMINAL SHALL MAINTAIN ITS OCCUPIED AIRFLOW SET POINT, CORRESPONDING TO 100 FPM THROUGH THE FUME HOOD SASH AT 18" SASH HEIGHT.
- B. DURING UNOCCUPIED PERIODS WITH THE FUME HOOD SASH FULLY CLOSED, THE FUME HOOD EXHAUST TERMINAL SHALL MAINTAIN ITS UNOCCUPIED AIRFLOW SET POINT AND THE LABORATORY AIR CHANGE RATE SHALL BE A MINIMUM OF 6 ACH.
- C. WITH THE FUME HOOD CONTROLLER OPERATING AT ITS CONSTANT OCCUPIED SET POINT, TO CONTROL ROOM PRESSURIZATION, THE LABORATORY CONTROL SYSTEM (LCS) CONTROLLER SHALL MODULATE THE GENERAL EXHAUST AIR TERMINAL UNIT AND SUPPLY AIR TERMINAL UNIT IN SEQUENCE TO MAINTAIN THE REQUIRED AIRFLOW DIFFERENTIAL BETWEEN SUPPLY AND TOTAL EXHAUST (FUME HOOD EXHAUST AIRFLOW PLUS GENERAL EXHAUST AIRFLOW). ON A DROP IN DIFFERENTIAL CFM BELOW THE SET POINT, THE GENERAL EXHAUST TERMINAL UNIT SHALL MODULATE OPEN. ON A RISE IN DIFFERENTIAL CFM ABOVE THE SET POINT, THE GENERAL EXHAUST TERMINAL UNIT SHALL MODULATE CLOSED. ON A CONTINUED RISE IN DIFFERENTIAL CFM ABOVE THE SET POINT WITH THE GENERAL EXHAUST TERMINAL UNIT FULLY CLOSED, THE SUPPLY AIR TERMINAL AIR VOLUME REGULATOR SHALL SLOWLY MODULATE OPEN.
- D. EACH LABORATORY AREA SHALL BE EQUIPPED WITH A ROOM DIFFERENTIAL PRESSURE SENSOR (RDPS). THE RDPS SHALL MONITOR LABORATORY ROOM DIFFERENTIAL PRESSURE IN REFERENCE TO THE CORRIDOR. THE RDPS SHALL BE UTILIZED ON SYSTEM AIR BALANCE STARTUP TO ESTABLISH THE FINAL SUPPLY/TOTAL EXHAUST AIR FLOW OFFSET REQUIRED TO MAINTAIN THE DESIGN SET POINT OF 0.05 INCHES W.G. (ADJ). AN ALARM THROUGH THE DDC SHALL BE GENERATED IF THE DIFFERENTIAL UPSET IS NOT ADDRESSED IN AN OWNER SELECTED TIME PARAMETER (ADJ).
- E. ON A RISE IN SPACE TEMPERATURE ABOVE SET POINT, THE SUPPLY AIR TERMINAL REHEAT VALVE (NORMALLY OPEN) SHALL MODULATE CLOSED. ON A FURTHER RISE IN SPACE TEMPERATURE ABOVE SET POINT WITH THE TERMINAL REHEAT VALVE FULLY CLOSED, GENERAL EXHAUST AIR TERMINAL UNIT AIR VOLUME REGULATOR SHALL SLOWLY OPEN (SUPPLY AIR TERMINAL UNIT SHALL TRACK). ON A DROP IN SPACE TEMPERATURE, THE REVERSE SHALL OCCUR (THE MINIMUM ZONE EXHAUST FLOW SET POINT SHALL BE LIMITED TO THAT REQUIRED FOR OCCUPIED/UNOCCUPIED AIR EXCHANGE).
- F. OCCUPANCY CONTROL
 1. LABORATORY OCCUPANCY SENSORS PROVIDED FOR THE LIGHTING CONTROL SYSTEM SHALL BE INTERLOCKED TO ACTIVATE THE OCCUPIED MODE DURING PERIODS OF THE UNOCCUPIED MODE AS DEFINED BY THE BAS.
 2. LABORATORY OCCUPANCY SENSORS SHALL NOT CONTROL THE HVAC COMPONENTS DURING THE NORMALLY OCCUPIED MODE AS DEFINED BY THE BAS.
 3. LOCAL OCCUPIED/UNOCCUPIED OVERRIDE SWITCH SHALL BE ACTIVATED BY USERS TO ENABLE THE OCCUPIED MODE THROUGHOUT THE ENTIRE PROGRAMMED UNOCCUPIED PERIOD.
- G. EMERGENCY OPERATION & ALARMS
 1. ON A LOSS OF NORMAL ELECTRIC POWER TO THE BUILDING, EACH LABORATORY FUME HOOD EXHAUST TERMINAL UNITS SHALL CONTINUE TO OPERATE AND SHALL MAINTAIN ITS UNOCCUPIED AIRFLOW SET POINT. THE LABORATORY GENERAL EXHAUST TERMINAL UNITS SHALL CONTINUE TO OPERATE AND SHALL MAINTAIN A MINIMUM OF 6 ACH. THE LABORATORY SUPPLY AIR TERMINAL UNIT DAMPER FAIL POSITIONS SHALL BE SELECTED TO FAIL IN THE DIRECTION THAT WOULD MAINTAIN PRESSURIZATION. (NOTE: EXHAUST TERMINAL UNITS ARE CONNECTED TO THE BUILDING EMERGENCY ELECTRIC POWER SYSTEM).
 2. WHERE FEEDBACK OF THE SUPPLY AND EXHAUST FLOW IS PROVIDED BY A CORRELATION TO THE DAMPER POSITION (AS IN A VENTURI VALVE), AN INPUT TO THE BUILDING AUTOMATION SYSTEM SHALL INDICATE WHEN THE SUPPLY OR EXHAUST DUCT STATIC PRESSURE IS INSUFFICIENT TO VALIDATE THIS CORRELATION.

Partner In Charge

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Project Engineer
CRB
Drawn By
BEK
Date Drawn
11-28-11

Revisions

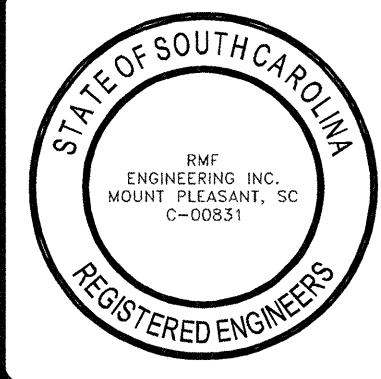
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Project
PHRC LABORATORY 305 RENOVATION

Sheet Title
MECHANICAL
SCHEMATICS



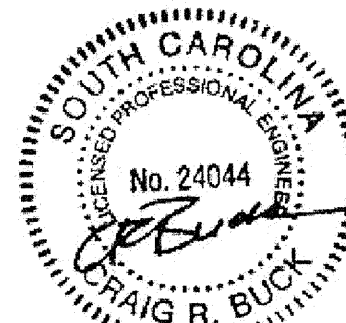
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SUPPLY TERMINAL UNIT SCHEDULE														
DESIG.	CFM		INLET SIZE DIA (IN)	OUTLET SIZE WxH (IN)	MIN INLET SP INCH WG	MAX DISCHARGE NC @1.5 INCH H ₂ O ΔP SP	HEATING COIL PERFORMANCE					HS & HR RUNOUT SIZE (IN)		REMARKS
	MAX	MIN					EAT °F	LAT °F	MBH @180°F EWT	MAX H ₂ O PD FT H ₂ O	ROWS	GPM @20°F ΔT		
362	190	95	—	—	—	—	—	—	—	—	—	—	—	②
363	1295	780	2-12	24"x12"	0.3	25	55	85	22.5	0.56	2	2.3	3/4"	①
369	100	50	—	—	—	—	—	—	—	—	—	—	—	②

- ① LABORATORY AIR TERMINAL VALVE
② EXISTING VAV BOX AND REHEAT COIL.

FUME HOOD EXHAUST TERMINAL UNIT SCHEDULE						
No. △	OCCUPIED CFM	UNOCCUPIED CFM	INLET SIZE	MAX STATIC PRESSURE DROP WG	MAX NC VALUE @1.0 IN. H ₂ O INLET S P	REMARKS
363	690	690	1-12	0.3	25	①

- ① LABORATORY AIR TERMINAL VALVE

GENERAL EXHAUST TERMINAL UNIT SCHEDULE						
No. ⬡	CFM		INLET SIZE	STATIC PRESSURE DROP WG	MAX NC VALUE @1.0 IN. H ₂ O INLET S P	REMARKS
	MAX	MIN				
363	935	90	1-12	0.3	25	①
363A	190	35	4"	0.4	25	

- ① LABORATORY AIR TERMINAL VALVE

DUCT CONSTRUCTION AND LEAK TEST SCHEDULE								
DUCT SYSTEM	MAXIMUM OPERATING PRESSURE (IN WG)	DUCT CONSTRUCTION			DUCT PRESSURE TEST			REMARKS
		PRESSURE CLASS (IN WG)	POSITIVE OR NEGATIVE	SMACNA DUCT SEAL CLASS	TEST REQUIRED (YES/NO)	TEST PRESSURE (IN WG)	DUCT LEAK CLASS	
SUPPLY AND OUTSIDE AIR (RECT)	6"	6"	POSITIVE	A	YES	4"	6	①②
SUPPLY AND OUTSIDE AIR (ROUND)	6"	6"	POSITIVE	A	YES	4"	3	①②
SUPPLY AND OUTSIDE AIR (RECT)	2"	2"	POSITIVE	B	NO	2"	12	③
SUPPLY AND OUTSIDE AIR (ROUND)	2"	2"	POSITIVE	B	NO	2"	6	③
LABORATORY EXHAUST AIR (RECT)	-6"	-6"	NEGATIVE	A	YES	4"	6	
LABORATORY EXHAUST AIR (ROUND)	-6"	-6"	NEGATIVE	A	YES	4"	3	

- ① TEST PER SMACNA HVAC AIR DUCT LEAKAGE TEST MANUAL, 1ST EDITION.
② UPSTREAM OF SUPPLY TERMINAL UNIT (FROM AIR HANDLING UNIT TO TERMINAL UNIT).
③ DOWNSTREAM OF SUPPLY TERMINAL UNIT (FROM TERMINAL UNIT TO AIR DEVICE).

BUILDING DESIGN COMMISSIONING DATA

1. OUTSIDE DESIGN CONDITIONS (PER ASHRAE FOR COLUMBIA, SC):

SUMMER (0.4%) :	94°F DB / 76°F WB
WINTER (99.6%):	24°F
DEHUMIDIFICATION (0.4%):	78°F DB
EVAPORATION (0.4%) :	80.5°F WB

2. GENERAL BUILDING CRITERIA:

WALL U-FACTOR :	0.07 BTUH*FT²*F
GLASS U-FACTOR :	0.28 BTUH*FT²*F
GLASS SHADING COEFFICIENT :	0.05 BTUH*FT²*F

3. GENERAL BUILDING DESIGN LOAD REQUIREMENTS :

LIGHTING :	1.0 - 2 W/SF
EQUIPMENT (LAB):	8 W/SF
PEOPLE (OFFICE):	250 BTUH/PER (SENSIBLE)
	200 BTUH/PER (LATENT)

4. COMFORT HEATING :

LABORATORIES	70°F ± 2°F
--------------	------------

5. COMFORT COOLING :

LABORATORIES	72°F ± 2°F/50% RH ±10%
--------------	------------------------

7. MINIMUM BUILDING POSITIVE PRESSURE :

0.05" WG

8. LABORATORY FUME HOOD CRITERIA:

5-0" CONSTANT VOLUME FUME HOOD AT 18" SASH HEIGHT	690 CFM
---	---------

9. DOOR TRANSFER CRITERIA: (P=Δ0.05 PSI)

3'-0" DOOR	120 CFM (BASED ON 1/8" CRACK)
6'-0" DOOR	160 CFM (BASED ON 1/8" CRACK)

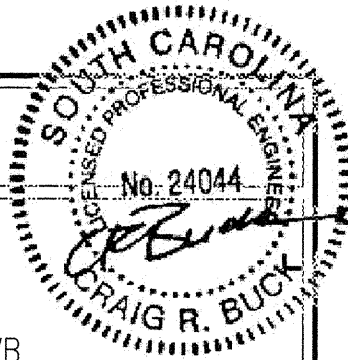
10. SPACE PRESSURIZATION CRITERIA

OFFICES	POSITIVE
LABORATORIES	NEGATIVE
CORRIDORS	POSITIVE

11. CODES:

2009 INTERNATIONAL BUILDING CODE
 2009 INTERNATIONAL MECHANICAL CODE
 2009 INTERNATIONAL PLUMBING CODE
 2009 INTERNATIONAL ENERGY CONSERVATION CODE
 2009 INTERNATIONAL FIRE CODE
 NATIONAL FIRE PROTECTION ASSOCIATION STANDARDS (LATEST EDITIONS)
 ASHRAE HANDBOOKS (LATEST EDITIONS)
 ASHRAE STANDARD 62.1-2007
 ASHRAE STANDARD 90.1-2007

AIR DEVICE SCHEDULE											
No.	DUTY	TYPE	CFM RANGE		FACE/MODULE SIZE (IN)	NOMINAL DUCT SIZE (IN)	BLOW	MAX TOTAL AIR PD (IN H ₂ O)	MAX NOISE CRITERIA VALUE	BASIS OF DESIGN	REMARKS
			LOW	HIGH							
A1	CEILING SUPPLY DIFFUSER	A	0	150	24x24	6ø	4-WAY	0.15	25	TITUS/TDCA-AA	
A2	CEILING SUPPLY DIFFUSER	A	151	250	24x24	8ø	4-WAY	0.15	25	TITUS/TDCA-AA	
A3	CEILING SUPPLY DIFFUSER	A	251	350	24x24	10ø	4-WAY	0.15	25	TITUS/TDCA-AA	
A4	CEILING SUPPLY DIFFUSER	A	351	500	24x24	12ø	4-WAY	0.15	25	TITUS/TDCA-AA	
A5	CEILING SUPPLY DIFFUSER	A	501	700	24x24	14ø	4-WAY	0.15	25	TITUS/TDCA-AA	
A6	CEILING SUPPLY DIFFUSER	A	251	300	24x24	10ø	2-WAY	0.15	25	TITUS/TDCA-AA	
B1	EXHAUST REGISTER	B	0	125	12x12	6x6	0" DEFL	0.10	20	TITUS/PAR-AA	
B2	EXHAUST REGISTER	B	126	225	24x24	8x8	0" DEFL	0.10	20	TITUS/PAR-AA	
B3	EXHAUST REGISTER	B	226	350	24x24	10x10	0" DEFL	0.10	20	TITUS/PAR-AA	
B4	EXHAUST REGISTER	B	351	500	24x24	12x12	0" DEFL	0.10	20	TITUS/PAR-AA	
B5	EXHAUST REGISTER	B	501	780	24x24	15x15	0" DEFL	0.10	20	TITUS/PAR-AA	



Partner In Charge	DSC
Project Engineer	CRB
Drawn By	BEK
Date Drawn	11-28-11
Revisions	
No.	Date
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No.	Date

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THROUGH PENETRATION FIRESTOP SCHEDULE



- A. THIS SCHEDULE IDENTIFIES REQUIREMENTS FOR ACCEPTABLE THROUGH PENETRATION FIRESTOPS BASED ON BARRIER TYPE, BASIS OF BARRIER CONSTRUCTION, AND PENETRANT TYPE. THIS IS A STANDARD THROUGH PENETRATION FIRESTOP SCHEDULE. SOME BARRIERS AND/OR PENETRANT TYPES MAY NOT APPEAR ON THE DRAWINGS.
- B. THROUGH PENETRATION FIRESTOPS ARE NOT REQUIRED FOR FLOOR PENETRATIONS CONTAINED TOTALLY WITHIN A RATED SHAFT ENCLOSURE.
- C. FOR EACH PENETRATION, SELECT A THROUGH PENETRATION FIRESTOP BASED ON ACTUAL FIELD CONDITIONS, WHICH INCLUDE BUT ARE NOT LIMITED TO PENETRATION SIZE, PENETRATION SHAPE, PENETRANT MATERIAL(S), QUANTITY OF PENETRANTS PER PENETRATION, AND LOCATION(S) OF PENETRANT(S) WITHIN PENETRATION.
- D. NOMENCLATURE OF UL CLASSIFIED FIRESTOP ASSEMBLIES USED IN THIS SCHEDULE IS IDENTICAL TO THAT USED IN CATALOGS OF APPROVED FIRESTOP MANUFACTURERS (SEE DIVISION 23) AND IN UNDERWRITERS LABORATORIES "FIRE RESISTANCE DIRECTORY."

RATED BARRIER		FIRESTOP ASSEMBLY REQUIREMENTS		PENETRANT TYPE						
TYPE	BASIS OF CONSTRUCTION			NO PENETRANTS	METALLIC, UNINSULATED PIPE OR TUBING (EX. COPPER, IRON, STEEL) (NOTE 14)	NONMETALLIC, UNINSULATED PIPE OR TUBING (EX. PVC, PP, CPVC, GLASS, FRPP)	INSULATED PIPES (EX. COPPER, IRON PLASTIC, STEEL) IN SYSTEMS OPERATING BETWEEN 32°F AND 122°F (NOTE 1)	INSULATED PIPES (EX. COPPER, IRON PLASTIC, STEEL) IN SYSTEMS OPERATING BELOW 32°F OR ABOVE 122°F (NOTE 2)	METAL DUCT (NOTE 3)	RECESSED DEVICES (NOTE 4)
WALL	WOOD STUDS & GYPSUM WALLBOARD (U300 SERIES)	UL CLASSIFIED SERIES	SINGLE PENETRANT	W-L-0000 SERIES OR NOTE 5	W-L-1000 SERIES	W-L-2000 SERIES	W-L-5000 SERIES	W-L-5000 SERIES	W-L-7000 SERIES	W-L-7000 SERIES NOTE 8
			MULTIPLE PENETRANTS		W-L-8000 SERIES (NOTE 6)		W-L-8000 SERIES (NOTE 6)	W-L-8000 SERIES (NOTE 6)	N/A	
		F RATING		EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING
		T RATING		NOTE 10	NOTE 10	NOTE 10	NOTE 10	NOTE 10	NOTE 10	NOTE 10
		EXCEPTIONS/ ADDED REQUIREMENTS		NONE	NOTE 13	NOTE 13	NONE	NOTE 7	NONE	NONE
WALL	METAL STUDS & GYPSUM WALLBOARD (U400 SERIES)	UL CLASSIFIED SERIES	SINGLE PENETRANT	W-L-0000 SERIES OR NOTE 5	W-L-1000 SERIES	W-L-2000 SERIES	W-L-5000 SERIES	W-L-5000 SERIES	W-L-7000 SERIES	W-L-7000 SERIES NOTE 8
			MULTIPLE PENETRANTS		W-L-8000 SERIES (NOTE 6)		W-L-8000 SERIES (NOTE 6)	W-L-8000 SERIES (NOTE 6)	N/A	
		F RATING		EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING
		T RATING		NOTE 10	NOTE 10	NOTE 10	NOTE 10	NOTE 10	NOTE 10	NOTE 10
		EXCEPTIONS/ ADDED REQUIREMENTS		NONE	NOTE 13	NOTE 13	NONE	NOTE 7	NONE	NONE
WALL	POURED CONCRETE, CONCRETE BLOCK OR MASONRY (BLOCK & U900 SERIES) (ANY THICKNESS)	UL CLASSIFIED SERIES	SINGLE PENETRANT	W-J-0000 SERIES OR NOTE 5	C-AJ-1000 OR W-J-1000 SERIES	C-AJ-2000 OR W-J-2000 SERIES	C-AJ-5000 OR W-J-5000 SERIES	C-AJ-5000 OR W-J-5000 SERIES	C-AJ-7000 OR W-J-7000 SERIES	NOTE 8
			MULTIPLE PENETRANTS		C-AJ-8000 OR W-J-8000 SERIES (NOTE 6)		C-AJ-8000 OR W-J-8000 (NOTE 6)	C-AJ-8000 OR W-J-8000 (NOTE 6)	N/A	
		F RATING		EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING
		T RATING		NOTE 10	NOTE 10	NOTE 10	NOTE 10	NOTE 10	NOTE 10	NOTE 10
		EXCEPTIONS/ ADDED REQUIREMENTS		NONE	NOTES 12 & 13	NOTE 13	NONE	NOTE 7	NONE	NONE
FLOOR	POURED CONCRETE (ANY THICKNESS)	UL CLASSIFIED SERIES	SINGLE PENETRANT	C-AJ-0000 SERIES F-A-0000 SERIES OR NOTE 5	C-AJ-1000 OR F-A-1000 SERIES	C-AJ-2000 OR F-A-2000 SERIES	C-AJ-5000 OR F-A-5000 SERIES	C-AJ-5000 OR F-A-5000 SERIES	C-AJ-7000 OR F-A-7000 SERIES	NOTE 8
			MULTIPLE PENETRANTS		C-AJ-8000 OR F-A-8000 SERIES (NOTE 6)		C-AJ-8000 OR F-A-8000 (NOTE 6)	C-AJ-8000 OR F-A-8000 (NOTE 6)	N/A	
		F RATING		EQUAL TO FLOOR RATING, BUT NOT LESS THAN 1 HR	EQUAL TO FLOOR RATING, BUT NOT LESS THAN 1 HR	EQUAL TO FLOOR RATING, BUT NOT LESS THAN 1 HR	EQUAL TO FLOOR RATING, BUT NOT LESS THAN 1 HR	EQUAL TO FLOOR RATING, BUT NOT LESS THAN 1 HR	EQUAL TO FLOOR RATING, BUT NOT LESS THAN 1 HR	EQUAL TO FLOOR RATING, BUT NOT LESS THAN 1 HR
		T RATING		NOTE 11	NOTE 11	NOTE 11	NOTE 11	NOTE 11	NOTE 11	NOTE 11
		EXCEPTIONS/ ADDED REQUIREMENTS		NONE	NOTE 12	NONE	NONE	NOTE 7	NONE	NONE

NOTES

1. EXAMPLES OF SYSTEMS THAT OPERATE BETWEEN 32 DEGF AND 122 DEGF:
- | | |
|----------------------------------|---|
| CHILLED WATER SUPPLY & RETURN | DOMESTIC HOT WATER LESS THAN 122 DEGF |
| HEAT PUMP WATER SUPPLY & RETURN | DOMESTIC HOT WATER RECIRCULATION LESS THAN 122 DEGF |
| DOMESTIC COLD AND TEMPERED WATER | |
2. EXAMPLES OF SYSTEMS OPERATING BELOW 32 DEGF OR ABOVE 122 DEGF:
- | | |
|---------------------------|---|
| STEAM SUPPLY & RETURN | HEATING HOT WATER SUPPLY & RETURN |
| STEAM VENT | HOT-CHILLED WATER SUPPLY & RETURN |
| CONDENSATE PUMP DISCHARGE | GLYCOL HEATING HOT WATER SUPPLY & RETURN |
| BOILER BLOWDOWN | DOMESTIC HOT WATER SUPPLY 140 DEGF |
| CRYOGENIC VENT | DOMESTIC HOT WATER RECIRCULATION 140 DEGF |
| ENGINE GENERATOR EXHAUST | |
3. THIS SCHEDULE'S DATA APPLY ONLY TO PENETRATIONS WITHOUT DAMPERS. FOR DAMPERED PENETRATIONS, REFER TO SPECIFICATIONS. AT DAMPERS, DO NOT APPLY MATERIAL THAT IS NOT INCLUDED IN THE DAMPER'S CLASSIFICATION.
4. EXAMPLES OF RECESSED DEVICES:
- | | |
|-------------------------|---------------------------|
| MEDICAL GAS ZONE VALVES | UNIT HEATERS |
| MEDICAL GAS OUTLETS | FIRE FIGHTERS' PHONE |
| FIRE VALVE CABINETS | FIRE EXTINGUISHER CABINET |
| FIRE HOSE CABINETS | CENTRAL VACUUM OUTLETS |
5. SEAL OPENING USING BARRIER'S ORIGINAL CONSTRUCTION.
6. WHERE A SERIES 8000 CLASSIFIED SYSTEM IS NOT AVAILABLE, INSTALL PENETRANTS SINGLY, AND PROVIDE SINGLE-PENETRANT SYSTEMS.
7. FOR SYSTEMS THAT OPERATE BELOW 32°F OR ABOVE 122°F, COMPLY WITH THE FOLLOWING ADDITIONAL REQUIREMENTS:
- A. PROVIDE TPFS SYSTEM USING INTUMESCENT ELASTOMERIC WRAP STRIP AS ITS FILL, VOID, OR CAVITY MATERIAL.
- B. DO NOT USE SERIES 8000 PENETRATIONS. PROVIDE ONLY SINGLE PENETRATIONS.
8. WHERE UL CLASSIFIED SYSTEMS ARE NOT AVAILABLE FOR OTHER RECESSED DEVICES, MAINTAIN CONTINUITY OF RATED BARRIER CONSTRUCTION AROUND RECESS.
9. REQUIREMENTS FOR MEMBRANE PENETRATIONS AND THROUGH PENETRATIONS ARE IDENTICAL.
10. TEMPERATURE (T) RATINGS OF ASSEMBLIES IN WALLS MAY EQUAL ZERO.
11. TEMPERATURE (T) RATINGS OF ASSEMBLIES IN FLOORS SHALL EQUAL THE GREATER OF EITHER THE BARRIER RATING OR ONE HOUR EXCEPT AS FOLLOWS:
- A. AN ASSEMBLY'S T RATING MAY EQUAL ZERO WHEN THE PENETRANT ABOVE THE FLOOR PENETRATION IS CONTAINED AND LOCATED WITHIN THE CAVITY OF A WALL.
12. CLASSIFIED TPFS ASSEMBLY IS NOT REQUIRED WHEN ALL THE FOLLOWING CONDITIONS ARE MET:
- A. PENETRANT HAS A MAXIMUM NOMINAL DIAMETER OF 6-INCHES.
- B. PENETRATION HAS A MAXIMUM AREA OF 144 SQUARE INCHES.
- C. ANNULAR SPACE IS COMPLETELY FILLED WITH CONCRETE, GROUT, OR MORTAR THE FULL THICKNESS OF THE BARRIER.
13. OPENINGS ACCOMMODATING NONCOMBUSTIBLE CONDUITS, PIPES AND TUBES THROUGH SINGLE MEMBRANES WHICH ARE PART OF A FIRE RESISTANCE RATED WALL ASSEMBLY ARE PERMITTED WHEN:
- A. AGGREGATE AREA OF THE MEMBRANE OPENINGS DO NOT EXCEED 100 SQUARE INCHES FOR ANY 100 SQUARE FEET OF WALL AREA.
14. THIS COLUMN ALSO INCLUDES WIRES AND CABLES WITH STEEL JACKETS.

Partner In Charge

DSC

Project Engineer

CRB

Drawn By

BEK

Date Drawn

11-28-11

Revisions

No.	Date
No.	Date
No.	Date
No.	Date
No.	Date
No.	Date
No.	Date
No.	Date
No.	Date
No.	Date

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RMF ENGINEERING, INC.
MOUNT PLEASANT, SC
C-60851

Project	PHRC LABORATORY 305 RENOVATION	Sheet Title
MECHANICAL SCHEDULES		

JHS
Architecture
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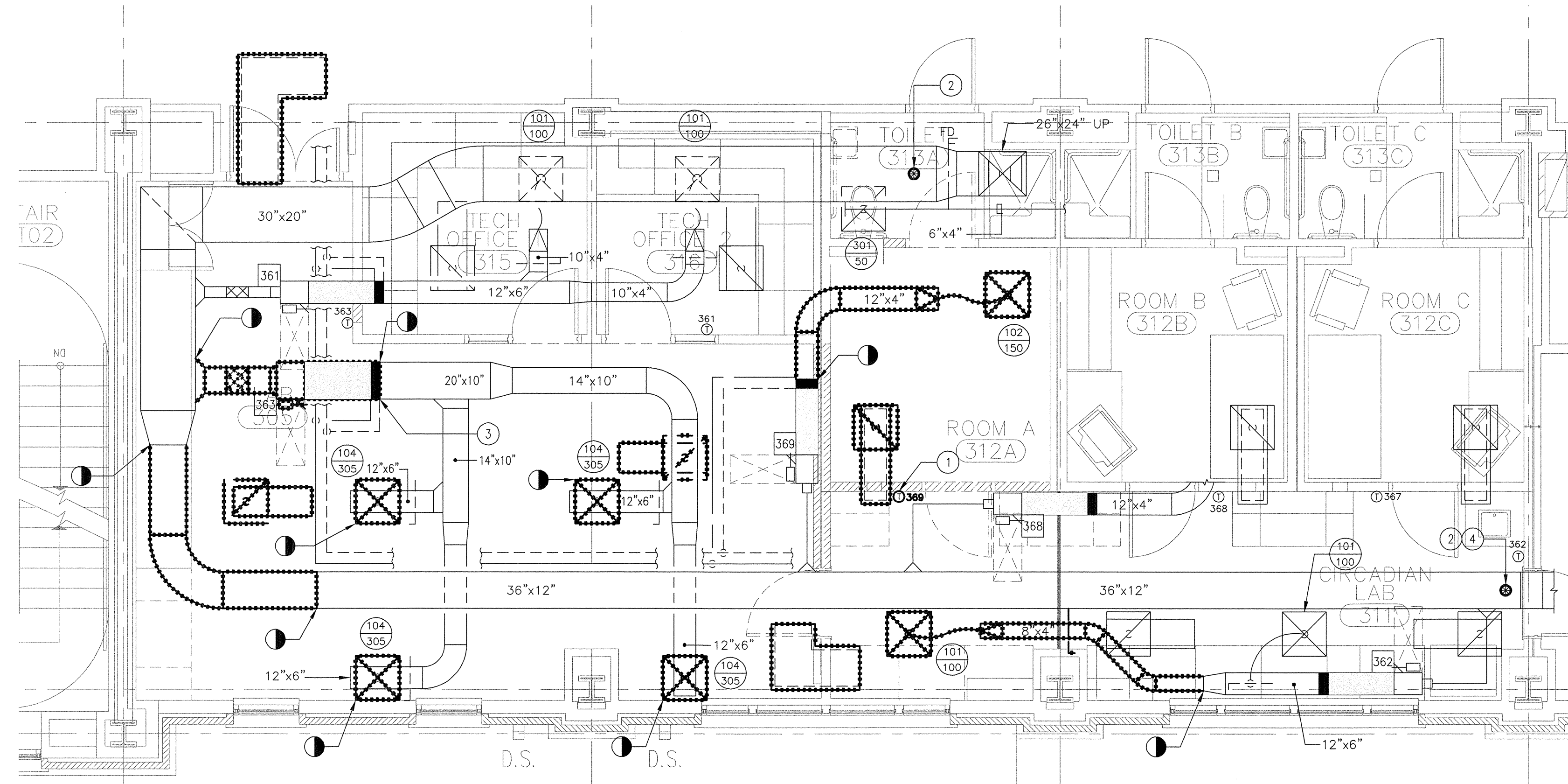
1812 LINCOLN STREET
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Project Number

922x06

Sheet Of

M5.1



PARTIAL THIRD FLOOR — MECHANICAL DEMOLITION
SCALE: 1/4"=1'-0"



GENERAL NOTES
1. REFER TO M0.0 FOR GENERAL DEMOLITION NOTES.

- DEMOLITION NOTES
- 1 RELOCATE THERMOSTAT SERVING VAV BOX 369. REFER TO NEW WORK DRAWINGS. LOCATION SHALL BE FULLY COORDINATED WITH NEW WALLS.
 - 2 PRIOR TO ANY WORK BEING PERFORMED THE CONTRACTOR SHALL PERFORM A BASELINE AIR AND PRESSURE READING AT THIS POINT. THE BASELINE AIR READINGS SHALL BE COMPILED INTO A REPORT AND SUBMITTED TO THE OWNER AND ENGINEER FOR REVIEW. ONE COPY OF THE REPORT SHALL REMAIN WITH THE CONTRACTOR ON SITE FOR THE DURATION OF THE PROJECT.
 - 3 HEATING WATER SUPPLY AND RETURN PIPING SHALL BE DISCONNECTED FROM REHEAT COIL BEING REMOVED UNDER THE DEMOLITION PHASE.
 - 4 DURING FINAL TESTING AND BALANCING THE CONTRACTOR SHALL REESTABLISH THE BASELINE AIR READINGS AT THIS POINT.

Partner In Charge	DSC
Project Engineer	CRB
Drawn By	BEK
Date Drawn	11-28-11
Revisions	
No.	Date
No.	Date
No.	Date
No.	Date
No.	Date
No.	Date
No.	Date
No.	Date

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Project
PHRC LABORATORY 305 RENOVATION

Sheet Title
PARTIAL THIRD FLOOR PLAN -
MECHANICAL DEMOLITION

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
Project Number
922x06

Sheet Of
MD1.0

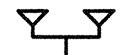





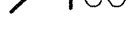
PLUMBING LEGEND

PIPING SYMBOLS	
SYMBOL	DESCRIPTION
----	DOMESTIC COLD WATER (POTABLE)
-----	DOMESTIC HOT WATER
-----	DOMESTIC HOT WATER RECIRCULATION
---ICW---	INDUSTRIAL/LABORATORY COLD WATER
---IHW---	INDUSTRIAL/LABORATORY HOT WATER
---IHWR---	INDUSTRIAL/LABORATORY HOT WATER RECIRCULATION
---LV---	LABORATORY VENT
---LW---	LABORATORY WASTE
---G---	NATURAL GAS
-----	SANITARY ABOVE FLOOR
---TWR---	TEMPERED WATER RETURN
---TWS---	TEMPERED WATER SUPPLY
-----	VENT

COMPONENTS AND SPECIALTIES

SYMBOL	DESCRIPTION
	FLOOR DRAIN WITH TRAP PRIMING LINE
	EMERGENCY EYEWASH (HANDHELD)

RISER DIAGRAM COMPONENTS AND SPECIALTIES



SYMBOL	DESCRIPTION
	EMERGENCY EYE WASH STATION
	EMERGENCY SHOWER
	SHOCK ARRESTER
	TRAP ARM
	URINAL/WATER CLOSET (WALL MOUNTED)
	FLOOR/ROOF DRAIN
	WALL/PIPE CLEANOUT

EQUIPMENT DESIGNATIONS


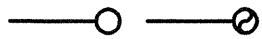
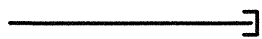






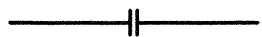

DESIGNATION	DESCRIPTION
FD-X	FLOOR DRAIN DESIGNATION
FH-X	FUME HOOD DESIGNATION
P-X	PLUMBING FIXTURE DESIGNATION

LABORATORY/MEDICAL GAS LEGEND

PIPING SYMBOLS	
SYMBOL	DESCRIPTION
---G---	NATURAL GAS
---A---	LABORATORY COMPRESSED AIR
---V---	LABORATORY VACUUM

COMPONENTS AND SPECIALTIES	
SYMBOL	DESCRIPTION
	BENCHTOP GAS OUTLET (NOTE GAS TYPE - G/A/V)
	EMERGENCY GAS SHUTOFF VALVE CABINET




GENERAL SYMBOLS

PIPING SYMBOLS	
SYMBOL	DESCRIPTION
	PIPE DROP
	PIPE RISE
	PIPE CAP
	BRANCH TAKE OFF
	PIPE DROP TEE
	PIPE RISE TEE
	SHUTOFF VALVE (REFER TO SPECIFICATIONS FOR TYPE)
	BALANCING VALVE (WITH MEMORY STOP)
	CHECK VALVE
	PIPE FLANGE
	FLOW ARROW

LINE/TYPE SYMBOLS

DESIGNATION	DESCRIPTION
=====	DEMOLITION WORK (SHOWN ON DEMOLITION PLANS)
=====	EXISTING WORK
=====	NEW WORK

REFERENCE SYMBOLS

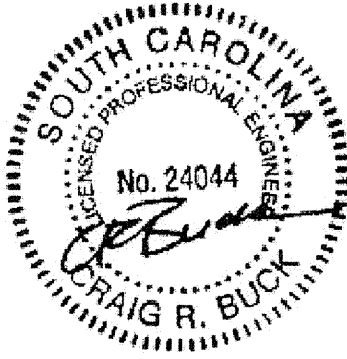
DESIGNATION	DESCRIPTION
	NORTH ARROW
	POINT OF CONNECTION TO EXISTING
	POINT OF DISCONNECTION

TEXT SYMBOLS


SYMBOL	DESCRIPTION
&	AND
@	AT
°F	DEGREE(S) FAHRENHEIT
°C	DEGREE(S) CELSIUS
Ø	DIAMETER, PHASE
/	DIVIDE BY, PER
\$	DOLLAR
=	EQUALS, EQUAL TO
x'	FEET, FOOT
>	GREATER THAN
≥	GREATER THAN OR EQUAL TO
x"	INCH(ES)
<	LESS THAN
≤	LESS THAN OR EQUAL TO
-	MINUS
x	MULTIPLY BY, BY
#	NUMBER, POUND
%	PERCENT
+	PLUS
±	PLUS OR MINUS

GENERAL NOTES

- NOTIFY THE OWNER, IN WRITING, AT LEAST SEVEN (7) DAYS IN ADVANCE OF ALL REQUIRED SHUTDOWNS OF WATER, FIRE, SEWER, GAS, ELECTRICAL SERVICE, OR OTHER UTILITIES. UPON WRITTEN RECEIPT OF APPROVAL FROM OWNER, SHUTDOWN SHALL BE PERFORMED BETWEEN THE HOURS OF SIX (6) P.M. AND SIX (6) A.M. OR AS DIRECTED OTHERWISE BY THE OWNER AND SHALL BE ACCOMPLISHED AT NO ADDITIONAL CONTRACT COST. AT THE END OF EACH SHUTDOWN ALL SERVICES SHALL BE RESTORED SO THAT NORMAL USE OF THE UTILITIES CAN CONTINUE.
- WHEN WORKING IN AND AROUND THE EXISTING BUILDING, EXTREME CARE SHALL BE EXERCISED WITH REGARD TO PROTECTION OF THE EXISTING STRUCTURE AND MECHANICAL AND ELECTRICAL SERVICES WHICH WILL REMAIN. REPAIR, REPLACE, OR RESTORE TO THE SATISFACTION OF THE ARCHITECT, ENGINEER AND OWNER ALL EXISTING WORK DAMAGED IN THE PERFORMANCE OF DEMOLITION AND/OR NEW WORK.
- ALL EXISTING PIPING, EQUIPMENT, DUCTWORK, AND MATERIALS NOT REQUIRED FOR RE-USE OR RE-INSTALLATION (SHOWN OR OTHERWISE) SHALL BE REMOVED. ALL EXISTING MATERIALS AND EQUIPMENT WHICH ARE REMOVED AND ARE DESIRED BY THE OWNER, OR ARE INDICATED TO REMAIN THE PROPERTY OF THE OWNER, SHALL BE DELIVERED TO HIM ON THE PREMISES BY THE CONTRACTOR. ALL OTHER MATERIALS AND EQUIPMENT WHICH ARE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED BY THE CONTRACTOR FROM THE PREMISES.
- EXISTING CONDITIONS, I.E., PRESENCE AND LOCATION OF DUCTWORK, PIPING, EQUIPMENT AND MATERIALS, INDICATED ARE BASED ON INFORMATION OBTAINED FROM AVAILABLE RECORD DRAWINGS AND FIELD SURVEYS AND ARE NOT WARRANTED TO BE COMPLETE OR CORRECT. CONTRACTOR SHALL FIELD VERIFY EXACT LOCATION OF ALL DUCTWORK, PIPING, EQUIPMENT AND MATERIALS IN THE FIELD PRIOR TO STARTING ALL WORK.
- EXISTING DUCT, PIPE, AND EQUIPMENT SIZES NOTED ARE FOR THE CONVENIENCE OF THE CONTRACTOR ONLY AND ARE NOT WARRANTED TO BE CORRECT. CONTRACTOR SHALL VERIFY ALL SIZES IN THE FIELD IF THEY EFFECT HIS WORK.
- EXISTING PIPING NO LONGER REQUIRED TO REMAIN IN SERVICE (SHOWN OR OTHERWISE) SHALL BE DISCONNECTED AND REMOVED BACK TO SERVICE MAINS UNLESS OTHERWISE INDICATED OR NOTED ON THE PLANS. REMOVE EXISTING PIPE HANGERS, SUPPORTS, VALVES, ETC.. EXISTING PIPING INDICATED OR REQUIRED TO REMAIN IN SERVICE OR IN PLACE SHALL BE CAPPED, PLUGGED, OR OTHERWISE SEALED. NO EXISTING PIPING SHALL BE LEFT OPEN END.
- EXISTING DUCTWORK INDICATED TO BE DISCONNECTED AND REMOVED SHALL INCLUDE ALL RELATED AIR DEVICES, HANGERS, SUPPORTS, ETC., UNLESS OTHERWISE INDICATED OR NOTED ON THE PLANS. EXISTING DUCTWORK WHERE INDICATED TO BE CAPPED OR REQUIRED TO REMAIN IN SERVICE SHALL BE CAPPED WITH 18 GAUGE SHEET METAL. SECURE CAP WITH SHEET METAL SCREWS AND SEAL PERIMETER OF OPENING AIR TIGHT WITH DUCT SEALER. NO EXISTING DUCTWORK SHALL BE LEFT OPEN FOR ANY EXTENDED PERIOD OF TIME. CAP EXISTING DUCTWORK IMMEDIATELY AS REQUIRED OR DIRECTED BY THE ENGINEER. CONTRACTOR SHALL RETURN ALL AIR DEVICES TO OWNER.
- EXISTING MECHANICAL AND ELECTRICAL EQUIPMENT, PIPING, DUCTWORK, AND MATERIALS AFFECTED BY DEMOLITION OR NEW WORK INSTALLATION AND REQUIRED TO REMAIN IN SERVICE SHALL BE RE-INSTALLED OR SUPPORTED AS REQUIRED IN ACCORDANCE WITH NEW WORK SPECIFICATION. ALL WORK SHALL BE COMPLETED TO THE SATISFACTION OF THE ENGINEER AND OWNER AND AT NO ADDITIONAL CONTRACT COST.
- PATCH ALL DISTURBED SURFACES, INCLUDING WALLS, CEILINGS, ROOF, AND FLOOR. PATCHING SHALL MATCH EXISTING ADJACENT SURFACES AS TO THICKNESS, TEXTURE, MATERIALS, AND COLOR. ALL PATCHING SHALL BE PERFORMED TO THE SATISFACTION OF THE ARCHITECT, ENGINEER AND OWNER AND AT NO ADDITIONAL CONTRACT COST.
- IN GENERAL ALL PIPING, EQUIPMENT, DUCTWORK, AND MATERIALS SHOWN "LIGHT" IS EXISTING TO REMAIN. ALL PIPING, CONDUITS, EQUIPMENT, DUCTWORK, AND MATERIALS SHOWN "HEAVY AND DASHED" IS EXISTING TO BE DEMOLISHED.
- ALL WORK SHALL BE PERFORMED IN A SEQUENCE AND DURING HOURS TO MINIMIZE DISRUPTION TO THE BUILDING WHICH WILL REMAIN OCCUPIED DURING CONSTRUCTION.
- ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE SOUTH CAROLINA CODES, CITY OF COLUMBIA, AND THE LOCAL FIRE MARSHALL'S REQUIREMENTS.
- THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH ALL OTHER TRADES/ SUBCONTRACTORS INCLUDING BUT NOT LIMITED TO AUTOMATIC TEMPERATURE CONTROLS, ELECTRICAL, AND GENERAL TRADES.
- CONTRACTOR SHALL MAINTAIN ACCESS TO ALL STAIRWELLS AND EGRESS CORRIDORS DURING CONSTRUCTION.
- CONCRETE CORING OR CUTTING MAY BE REQUIRED IN ORDER TO RUN MECHANICAL, ELECTRICAL, PLUMBING, CABLING OR OTHER SERVICES TO A SPECIFIC AREA. IT IS IMPERATIVE WHEN CONSIDERING EITHER CORING, CUTTING OR CHIPPING THAT REBAR, PLUMBING, ELECTRICAL SERVICES, ETC WITHIN THE CONCRETE SLAB, WALL OR FLOOR BE LOCATED PRIOR TO DISTURBING THE INTEGRITY OF THE EXISTING CONCRETE. OBTAIN STRUCTURAL DRAWINGS OF THE AREA IN QUESTION AND, USING THE BUILDING GRIDLINES, DETERMINE AND MARK THE EXACT LOCATIONS REQUIRED FOR NEW SERVICES.
- ALL PENETRATIONS MUST BE SEALED WITH FIRE STOP MATERIAL AFTER SERVICES ARE RUN THROUGH. ALL PENETRATIONS THROUGH EXTERIOR WALLS ABOVE AND BELOW GRADE OR SLAB ON GRADE MUST BE WATERPROOFED.
- FINAL CEILING HEIGHTS TO BE DETERMINED WITH ARCHITECT IN FIELD AFTER DEMOLITION OF EXISTING CEILINGS. NO FABRICATION OF DUCTWORK, HVAC PIPING OR PLUMBING PIPING SHALL BEGIN UNTIL AFTER THE CONTRACTOR HAS COMPLETED COORDINATION DRAWINGS AND COORDINATED THE CEILING HEIGHTS WITH THE ARCHITECT.
- AUTOMATIC TEMPERATURE CONTROL CONTRACTOR SHALL DESIGNATE AND NUMBER ALL EQUIPMENT IN ACCORDANCE WITH UNIVERSITY OF SOUTH CAROLINA STANDARDS. NO DUPLICATE DESIGNATION NUMBERS SHALL BE PROVIDED. ALL NUMBERS SHALL BE THE NEXT SEQUENTIAL NUMBER FOR THAT SPECIFIC PIECE OF EQUIPMENT.
- THE CONTRACTOR SHALL NOTIFY THE ARCHITECT AND ENGINEER PRIOR TO CLOSING ANY CEILINGS FOR A COMPLETE CHECKOUT OF THE HVAC SYSTEM. THE SYSTEM MUST BE COMPLETE AND OPERATIONAL INCLUDING CONTROLS, REGISTERS, INSULATION, AND BALANCING WITH REPORT. THE SYSTEM SHALL BE RUN THROUGH ITS COMPLETE HEATING AND COOLING CYCLES. THE CONTRACTOR AND ALL APPROVED SUBCONTRACTORS SHALL BE PRESENT AT THE ARCHITECT-ENGINEER CHECKOUT. THE TESTING AND BALANCE AGENCY SHALL CERTIFY THAT THESE CONDITIONS ARE MET.



Partner In Charge
DSC
Project Engineer
CRB
Drawn By
CSL
Date Drawn
11-28-11
Revisions
No. Date
No. Date
No. Date
No. Date
No. Date
No. Date
No. Date
No. Date
No. Date



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Project

PHRC LABORATORY 305 RENOVATION

Sheet Title

PLUMBING LEGEND, SYMBOLS
AND GENERAL NOTES



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ABBREVIATIONS

NOTE: THIS IS A STANDARD ABBREVIATION LIST.
SOME ABBREVIATIONS MAY NOT APPEAR ON THE
ACCOMPANYING DRAWINGS.

A COMPRESSED AIR
AAV AUTOMATIC AIR VENT
ACV AUTOMATIC CONTROL VALVE
AD ACCESS DOOR, AREA DRAIN
AF ANTIFREEZE
AFF ABOVE FINISHED FLOOR
AR ARGON GAS
ATC AUTOMATIC TEMPERATURE CONTROL

BAS BUILDING AUTOMATION SYSTEM
BBD BOILER BLOWDOWN
BCWR BEARING COOLING WATER RETURN
BCWS BEARING COOLING WATER SUPPLY
BDD BACKDRAFT DAMPER
BFP BACKFLOW PREVENTER
BHP BRAKE HORSEPOWER
BMS BUILDING MANAGEMENT SYSTEM
BO BLOW OFF
BTU BRITISH THERMAL UNIT
BTUH BRITISH THERMAL UNIT PER HOUR

°C DEGREE(S) CELSIUS
CA CONTROL AIR
CBD CONTINUOUS BLOWDOWN
CC CAMPUS CONDENSATE
CCMS CENTRAL CONTROL AND MONITORING SYSTEM
CD CONDENSATE DRAIN
CF CHEMICAL FEED
CFM CUBIC FEET PER MINUTE
CHR CHILLED WATER RETURN
CHS CHILLED WATER SUPPLY
CO CLEANOUT
CO2 CARBON DIOXIDE
CS CLEAN STEAM
CW COLD WATER, CITY WATER
CWR CONDENSER WATER RETURN
CWS CONDENSER WATER SUPPLY

D DEEP, DRAIN WATER
DB DECIBEL, DRY BULB
DDC DIRECT DIGITAL CONTROL
DHR DISTRIBUTION HEATING WATER RETURN
DHS DISTRIBUTION HEATING WATER SUPPLY
DIR DEIONIZED WATER RETURN
DIS DEIONIZED WATER SUPPLY
DL DOOR LOUVER
DN DOWN
DSP DRY SPRINKLER PIPE
DTR DUAL TEMPERATURE RETURN
DTS DUAL TEMPERATURE SUPPLY
DW DISTILLED WATER

EA EXHAUST AIR
EAT ENTERING AIR TEMPERATURE
EJ EXPANSION JOINT
EMS ENERGY MANAGEMENT SYSTEM
ESP EXTERNAL STATIC PRESSURE
ETC ETCETERA
EVAC GAS EVACUATION
EWT ENTERING WATER TEMPERATURE
EX EXISTING

°F DEGREE(S) FAHRENHEIT
F FIRE LINE
FC FLEXIBLE CONNECTION
FD FIRE DAMPER, FOUNDATION DRAIN
FDV FIRE DEPARTMENT VALVE
FF FINISHED FLOOR
FFE FINISHED FLOOR ELEVATION
FIN/FT FINS PER FEET
FIN/INCH FINS PER INCH
FM FLOWMETER
FMF FLOWMETER FITTING
FOF FUEL OIL FILL
FOO FUEL OIL OVERFLOW
FOR FUEL OIL RETURN
FOS FUEL OIL SUPPLY

FOT FUEL OIL TRANSFER
FOV FUEL OIL VENT
FPM FEET PER MINUTE
FPS FEET PER SECOND
FS FLOW SWITCH
FT FOOT, FEET
FWR FEED WATER RETURN
FWS FEED WATER SUPPLY

G NATURAL GAS
GHR GLYCOL HEATING RETURN
GHS GLYCOL HEATING SUPPLY
GPH GALLONS PER HOUR
GPM GALLONS PER MINUTE
GR AUTOMOTIVE LUBRICATION PIPING

H HIGH
HB HOSE BIBB
HED HOSE END DRAIN VALVE
HP HORSEPOWER
HPR HIGH PRESSURE STEAM RETURN
HPS HIGH PRESSURE STEAM SUPPLY
HR HEATING WATER RETURN
HRR HEAT RECOVERY RETURN
HRS HEAT RECOVERY SUPPLY
HS HEATING WATER SUPPLY
HT HEIGHT
HTHR HIGH TEMPERATURE HEATING WATER RETURN
HTHS HIGH TEMPERATURE HEATING WATER SUPPLY
HW HOT WATER
HWR HOT WATER RECIRCULATION
HZ HERTZ

IA INSTRUMENT AIR
ICW INDUSTRIAL COLD WATER
IHW INDUSTRIAL HOT WATER
IHR INDUSTRIAL HOT WATER RECIRCULATION
IN INCH, INCHES
INV EL INVERT ELEVATION

KW KILOWATTS

L LONG, LENGTH
LA LABORATORY AIR
LAT LEAVING AIR TEMPERATURE
LBS POUNDS
LBS/HR POUNDS PER HOUR
LN LIQUID NITROGEN
LP LIQUID PROPANE
LPG LIQUID PETROLEUM GAS
LPR LOW PRESSURE STEAM RETURN
LPS LOW PRESSURE STEAM SUPPLY
LV LABORATORY VENT, LABORATORY VACUUM
LW LABORATORY WASTE
LWT LEAVING WATER TEMPERATURE

MA MEDICAL AIR
MAV MANUAL AIR VENT
MBH THOUSAND BRITISH THERMAL UNITS PER HOUR
MCC MOTOR CONTROL CENTER
MO MOTOR OIL PIPING
MOD MOTOR OPERATED DAMPER
MPR MEDIUM PRESSURE STEAM RETURN
MPS MEDIUM PRESSURE STEAM SUPPLY
MV MEDICAL VACUUM

N NITROGEN
NA NOT APPLICABLE
NC NOISE CRITERIA, NORMALLY CLOSED
NFPA NATIONAL FIRE PROTECTION ASSOCIATION
NO NORMALLY OPEN, NITROUS OXIDE
NPSH NET POSITIVE SUCTION HEAD

O OXYGEN
OA OUTSIDE AIR
OD OVERFLOW DRAIN

OED OPEN ENDED DUCT
OS&Y OUTSIDE STEM AND YOKE

P&ID PROCESS AND INSTRUMENTATION DIAGRAM
PA PLANT AIR
PC PUMPED CONDENSATE
PCR PUMPED CONDENSATE RECIRCULATION
PCHR PRIMARY CHILLED WATER RETURN
PCHS PRIMARY CHILLED WATER SUPPLY
PCWR PROCESS COOLING WATER RETURN
PCWS PROCESS COOLING WATER SUPPLY
PD PRESSURE DROP, PUMP DISCHARGE
PGR PROCESS GLYCOL WATER RETURN
PGS PROCESS GLYCOL WATER SUPPLY
PH PHASE
PHR PRIMARY HEATING RETURN
PHS PRIMARY HEATING SUPPLY
PIV POST INDICATING VALVE
PPH POUNDS PER HOUR
PRV PRESSURE REDUCING VALVE, PRESSURE REGULATING VALVE
PSI POUNDS PER SQUARE INCH
PSIG POUNDS PER SQUARE INCH GAUGE

RA RETURN AIR, RELIEF AIR
RD REFRIGERANT DISCHARGE
RH RELATIVE HUMIDITY
RHR REHEAT WATER RETURN
RHS REHEAT WATER SUPPLY
RL REFRIGERANT LIQUID
ROR REVERSE OSMOSIS WATER RETURN
ROS REVERSE OSMOSIS WATER SUPPLY
RPM REVOLUTIONS PER MINUTE
RS REFRIGERANT SUCTION
RV RELIEF VENT, REFRIGERANT VENT
RX REMOVE EXISTING

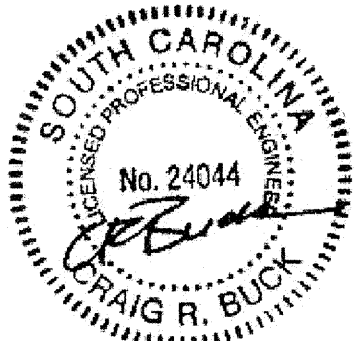
SA SUPPLY AIR
SAN SANITARY, SOIL, WASTE
SCHR SECONDARY CHILLED WATER RETURN
SCHS SECONDARY CHILLED WATER SUPPLY
SD STORM DRAIN, SMOKE DETECTOR
SF SQUARE FOOT
SHR SECONDARY HEATING WATER RETURN
SHS SECONDARY HEATING WATER SUPPLY
SL SOUND LINING
SP STATIC PRESSURE
SPR SPRINKLER LINE
SS STAINLESS STEEL
SQ FT SQUARE FOOT
SW SOFT WATER

ΔT TEMPERATURE DIFFERENCE
TS TAMPER SWITCH
TSP TOTAL STATIC PRESSURE
TWR TEMPERED WATER RETURN
TWS TEMPERED WATER SUPPLY
TW TREATED WATER
TYP TYPICAL

UCD UNDERCUT DOOR
UL UNDERWRITERS LABORATORIES

V VACUUM, VOLTS
VD VOLUME DAMPER
VFD VARIABLE FREQUENCY DRIVE
VPD VACUUM PUMP DISCHARGE
VSD VARIABLE SPEED DRIVE
VTR VENT THROUGH ROOF

W WATTS, WIDE
WB WET BULB
WC WATER COLUMN
WG WATER GAUGE
WH WALL HYDRANT
WWF WELDED WIRE FABRIC
WWM WELDED WIRE MESH



Partner In Charge
DSC
Project Engineer
CRB
Drawn By
CSL
Date Drawn
11-28-11

Revisions

No.	Date
No.	Date
No.	Date
No.	Date
No.	Date
No.	Date
No.	Date
No.	Date
No.	Date

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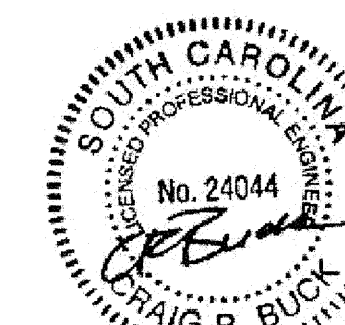
Project	PHRC LABORATORY 305 RENOVATION	Sheet Title	PLUMBING ABBREVIATIONS

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1812 LINCOLN STREET
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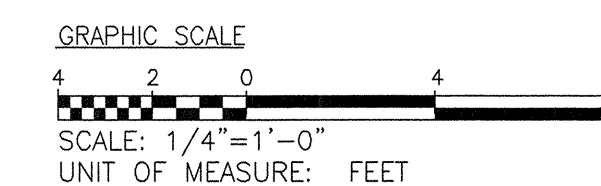
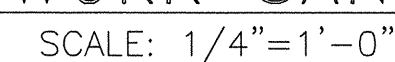
Project Number
922x06

Sheet Of
P0.1



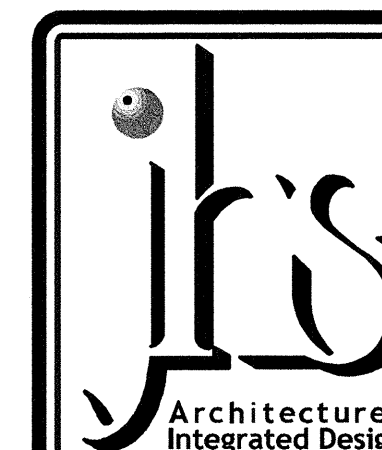
① REFER TO LABORATORY DRAWINGS AND MANUFACTURER'S INSTRUCTIONS FOR PIPING INSTALLATION TO EQUIPMENT.

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



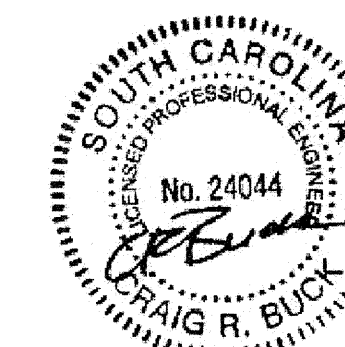
Sheet Title

SECOND & THIRD FLOOR
LABORATORY WASTE/VENT NEW WORK



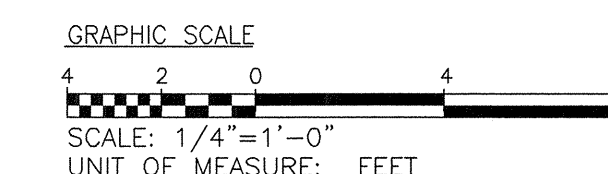
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P1.1




- ① LABORATORY GAS VALVE CABINET ON WALL.
- ② LABORATORY GAS SERVICES SHALL BE ROUTED THROUGH PIPE CHASE TO BELOW BENCHTOP IN CABINET CHASE FOR CONNECTION TO TURRETS. REFER TO LABORATORY DRAWINGS/SPECIFICATIONS FOR TURRET LOCATIONS, QUANTITY AND DETAILS.
- ③ REFER TO LABORATORY DRAWINGS AND MANUFACTURER'S INSTRUCTIONS FOR PIPING, INSTALLATION TO EQUIPMENT

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



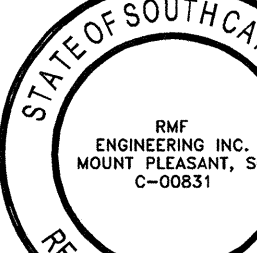
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Project	PHRC LABORATORY 305 RENOVATION
Sheet Title	THIRD FLOOR LABORATORY WATER AND LABORATORY GAS NEW WORK.



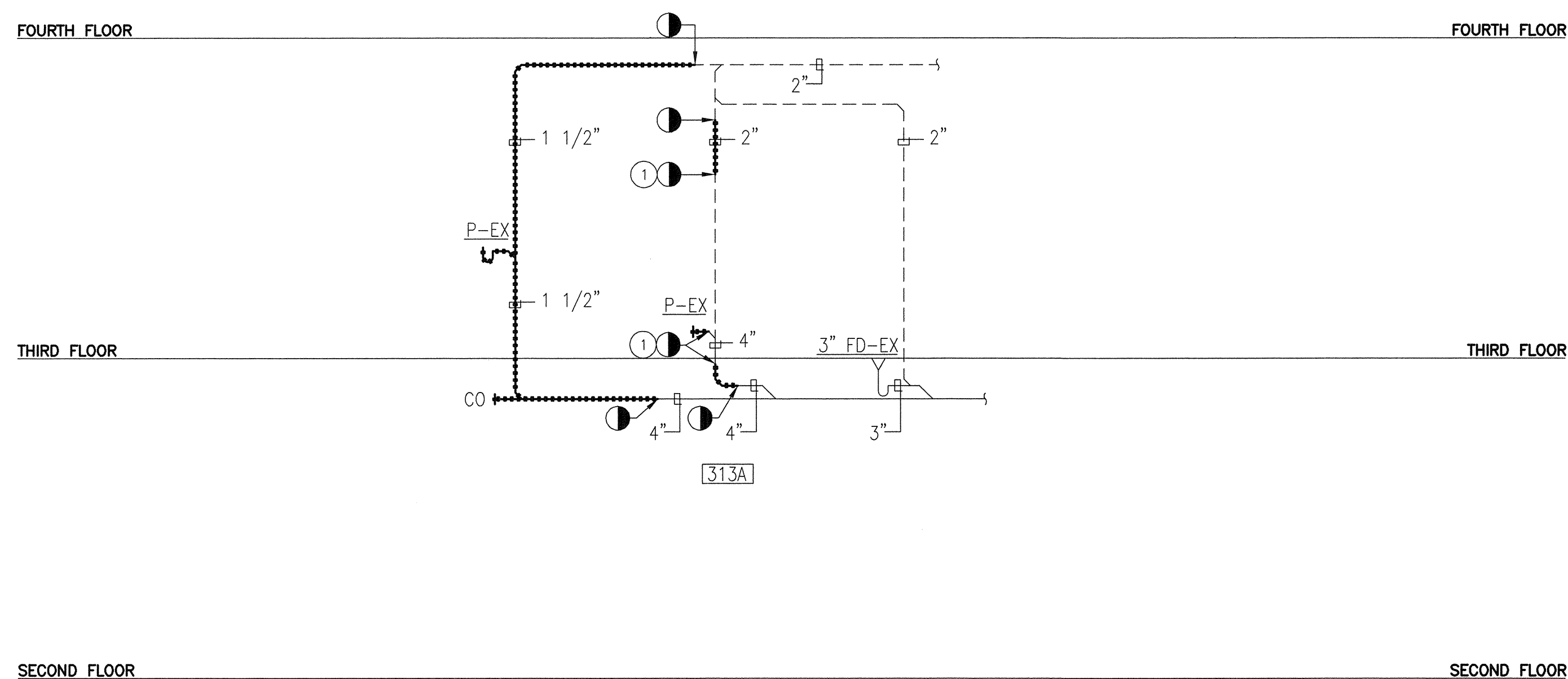
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922x06

Sheet Of
P1.2

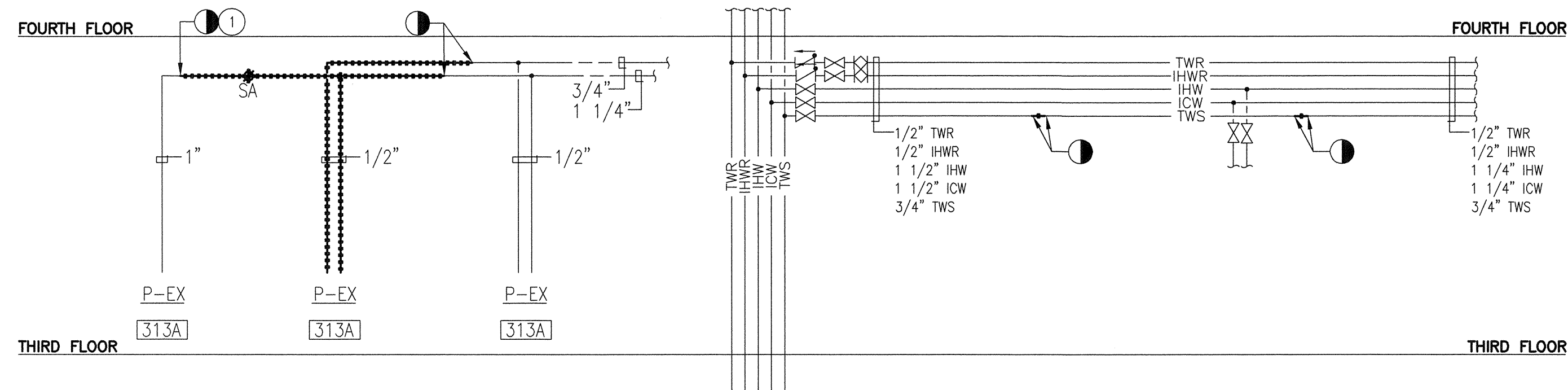
① ABANDON SANITARY AND VENT PIPING IN PLUMBING CHASE.
CAP ALL OPEN PIPING.



SANITARY WASTE AND VENT RISER DIAGRAM – DEMOLITION

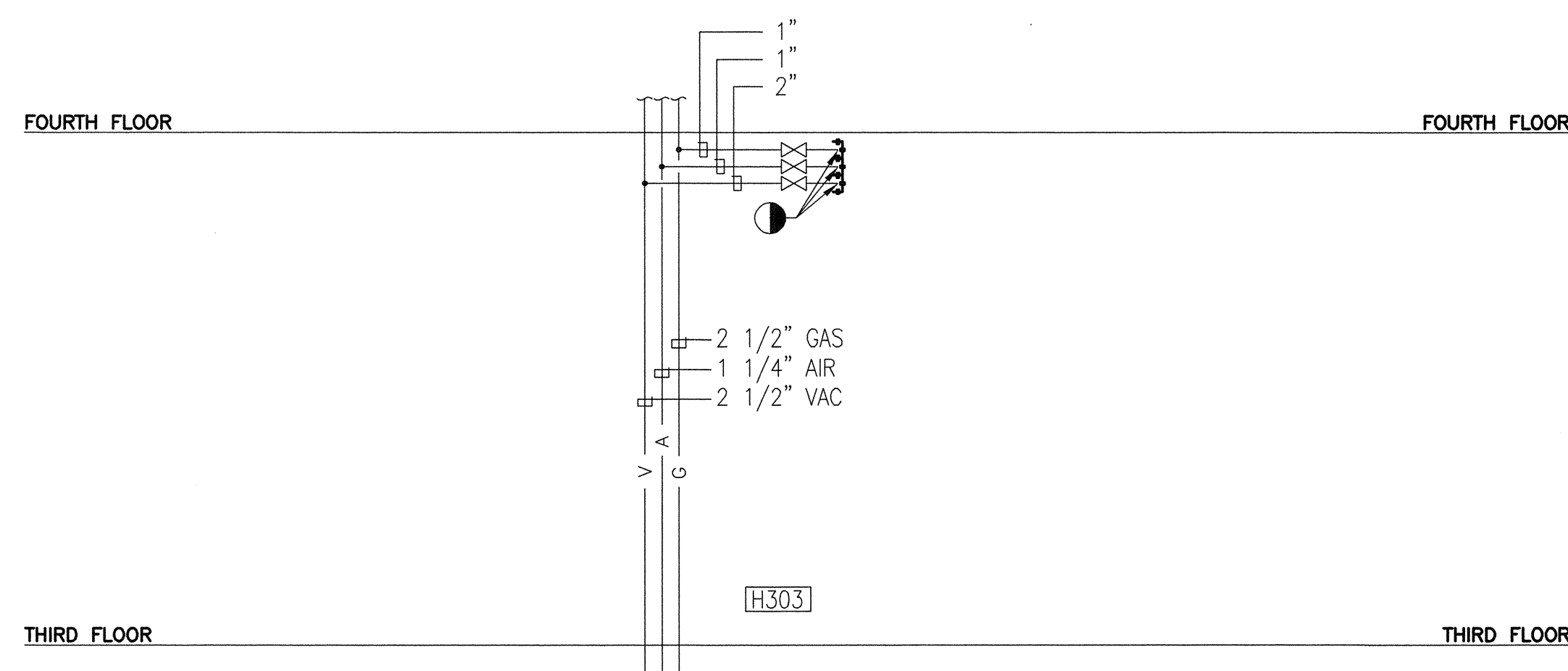
SCALE:
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① ABANDON DOMESTIC WATER PIPING IN PLUMBING CHASE.
CAP ALL OPEN PIPING.



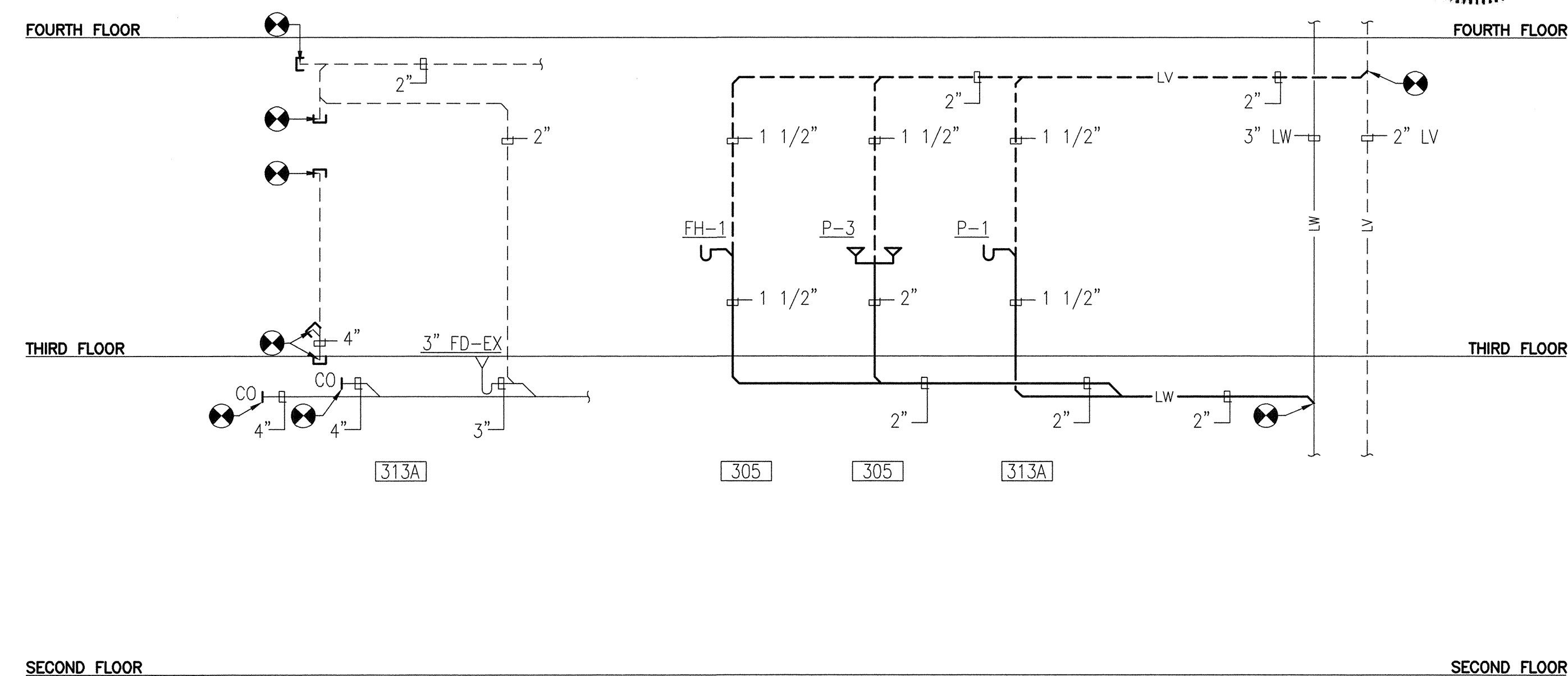
DOMESTIC/LABORATORY WATER RISER DIAGRAM – DEMOLITION

SCALE:
NONE



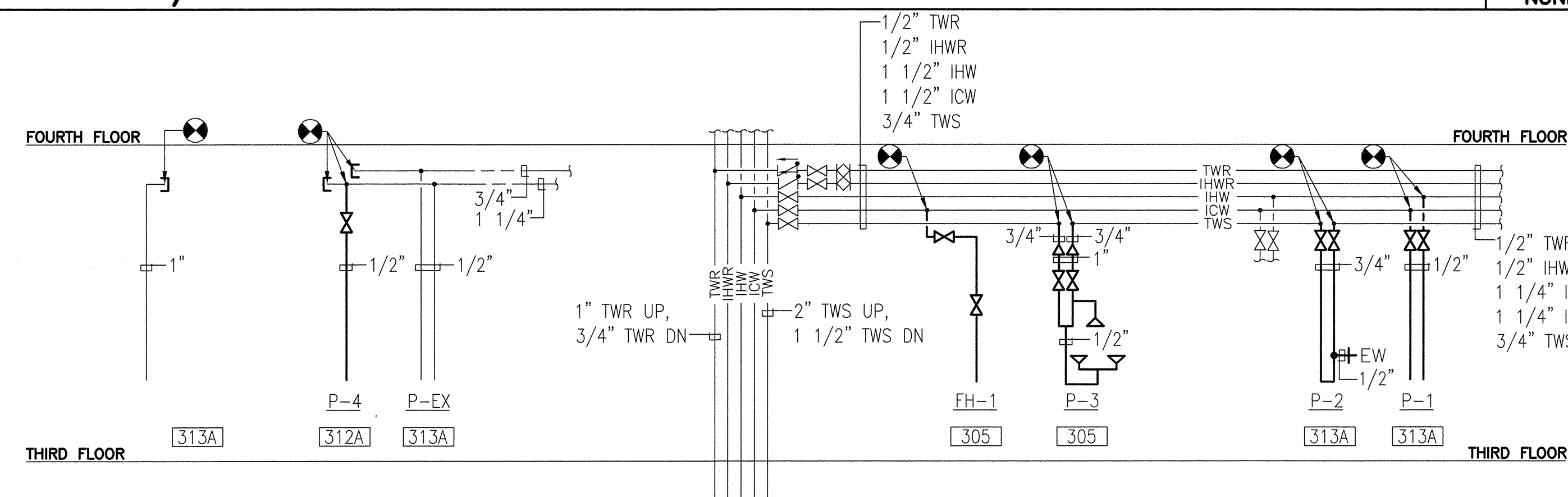
LABORATORY GAS RISER DIAGRAM – DEMOLITION

SCALE:
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SANITARY/LABORATORY WASTE AND VENT RISER DIAGRAM – NEW WORK

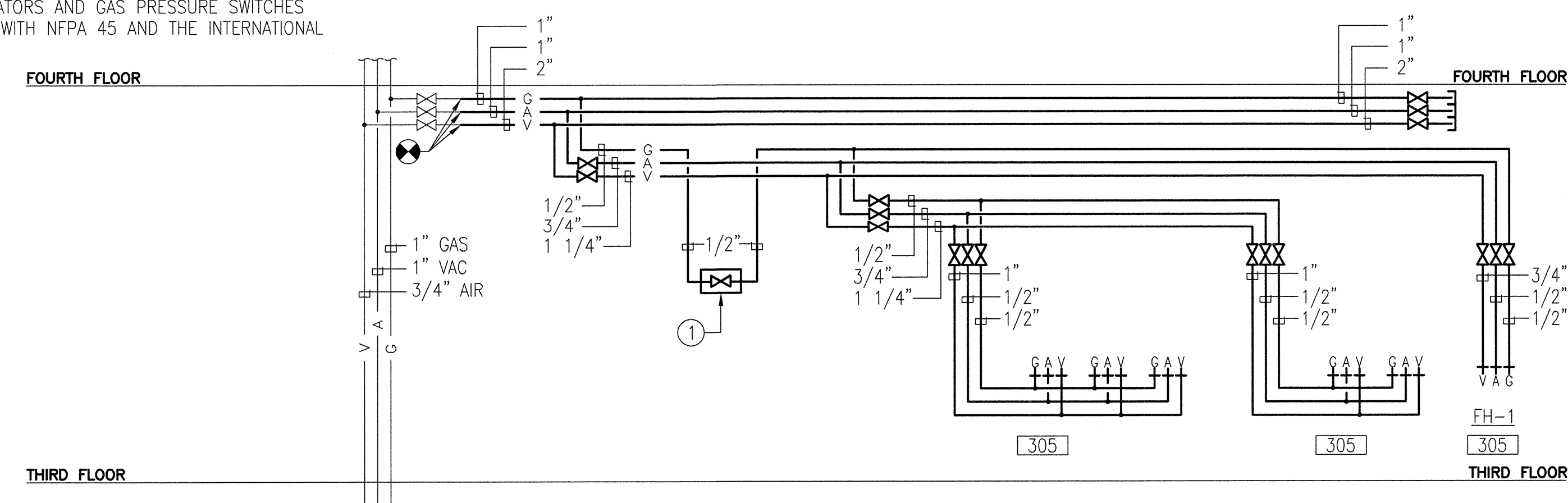
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DOMESTIC/LABORATORY WATER RISER DIAGRAM - NEW WORK

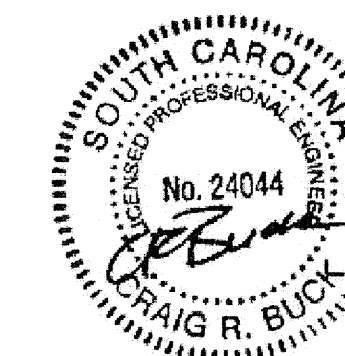
SCALE:
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① LABORATORY GAS SHUT-OFF VALVE CABINET.



LABORATORY GAS RISER DIAGRAM – NEW WORK

SCALE:
NONE



11-28-11

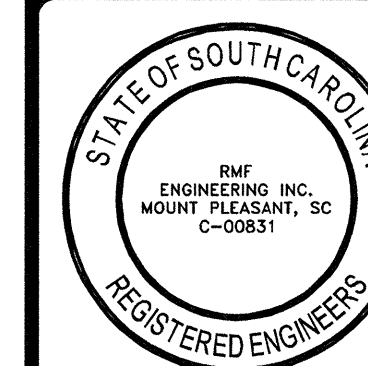
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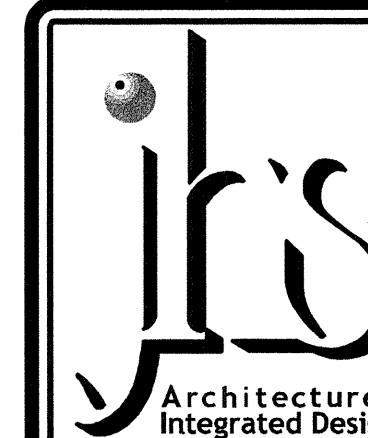
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Project
PHRC LABORATORY 305 RENOVATION

PLUMBING RISER DIAGRAMS



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Sheet C

P3.1