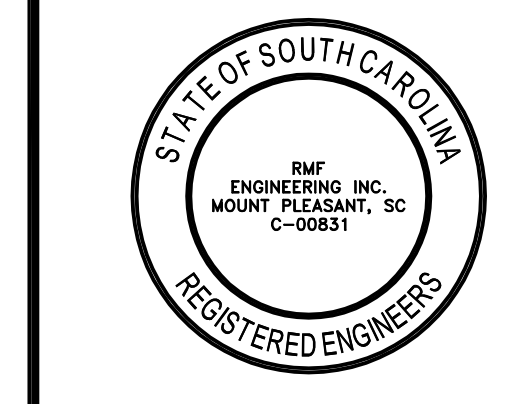


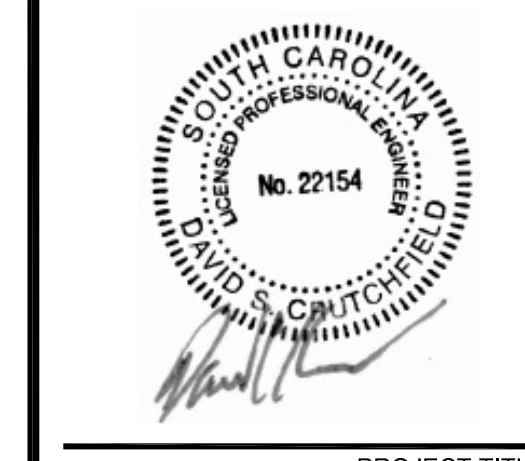


RMF ENGINEERING, INC.
194 SEVEN FARMS DR.
SUITE G
CHARLESTON, SC 29492
RMF JOB #: 31252.A0

CORPORATE SEAL



A/E SEAL



PROJECT TITLE

**University of
South Carolina**

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BID SET

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REVISIONS	
NO.	DATE

SHEET INFORMATION	
Date	04.08.13
Project No.	12.130.03
Scale	NONE
Drawn By	BMW
Checked By	DWZ

TITLE

**MECHANICAL
LEGEND
AND
ABBREVIATIONS**

SHEET NO.

M0.0

ABBREVIATIONS

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

AFF ABOVE FINISHED FLOOR	EX EXISTING	LAT LEAVING AIR TEMPERATURE	SA SUPPLY AIR
AHU AIR HANDLING UNIT	'F DEGREE(S) FAHRENHEIT	LBS POUNDS	SAN SANITARY, SOIL, WASTE
BHP BRAKE HORSEPOWER	FD FIRE DAMPER, FOUNDATION DRAIN	LBS/HR POUNDS PER HOUR	SF SQUARE FOOT
BTU BRITISH THERMAL UNIT	FF FINISHED FLOOR	LPS LOW PRESSURE SUPPLY	SP STATIC PRESSURE
BTUH BRITISH THERMAL UNIT PER HOUR	FFE FINISHED FLOOR ELEVATION	LPR LOW PRESSURE RETURN	SQ FT SQUARE FOOT
'C DEGREE(S) CELSIUS	FFE FINS PER FEET	MBH THOUSAND BRITISH THERMAL UNITS PER HOUR	ST TEMPERATURE DIFFERENCE
CD CONDENSATE DRAIN	FIN/INCH FINS PER INCH	MOD MOTOR OPERATED DAMPER	TSP TOTAL STATIC PRESSURE
CFM CUBIC FEET PER MINUTE	FPM FEET PER MINUTE	NC NOISE CRITERIA, NORMALLY CLOSED	TYP TYPICAL
CHR CHILLED WATER RETURN	FPS FEET PER SECOND	NFPA NATIONAL FIRE PROTECTION ASSOCIATION	UL UNDERWRITERS LABORATORIES
CHS CHILLED WATER SUPPLY	FT FOOT, FEET	OA OUTSIDE AIR	V VACUUM, VOLTS
CO CLEANOUT	GPH GALLONS PER HOUR	PV POST INDICATING VALVE	VD VOLUME DAMPER
CONT CONTINUOUS	GPM GALLONS PER MINUTE	PPH POUNDS PER HOUR	VFD VARIABLE FREQUENCY DRIVE
CO2 CARBON DIOXIDE	HB HOSE BIBB	PRV PRESSURE REDUCING/REGULATING VALVE	VPD VACUUM PUMP DISCHARGE
CW COLD WATER, CITY WATER	HP HORSEPOWER, HIGH POINT	PSI POUNDS PER SQUARE INCH	VSD VARIABLE SPEED DRIVE
DDC DIRECT DIGITAL CONTROL	HT HEIGHT	PSIG POUNDS PER SQUARE INCH GAUGE	VTR VENT THROUGH ROOF
DL DOOR LOUVER	HW HOT WATER	RA RETURN AIR, RELIEF AIR	W WATTS, WIDE
DN DOWN	IN INCH, INCHES	RH RELATIVE HUMIDITY	WB WET BULB
EA EXHAUST AIR	INV EL INVERT ELEVATION	RL REFRIGERANT LIQUID	WC WATER COLUMN
EAT ENTERING AIR TEMPERATURE	KW KILOWATTS	RPM REVOLUTIONS PER MINUTE	WG WATER GAUGE
ESP EXTERNAL STATIC PRESSURE	L LONG, LENGTH		
EWT ENTERING WATER TEMPERATURE			

MECHANICAL LEGEND AND GENERAL SYMBOLS

DUCTWORK SYMBOLS		PIPING SYMBOLS		TEXT SYMBOLS	
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	THERMOSTAT		PIPE DROP	&	AND
	AIR FLOW		PIPE RISE	'F	DEGREE(S) FAHRENHEIT
	SUPPLY AIR DIFFUSER		PIPE CAP	'C	DEGREE(S) CELSIUS
	RETURN AIR GRILLE		BRANCH TAKE OFF	/	DIVIDE BY, PER
	EXHAUST AIR GRILLE		PIPE DROP TEE	\$	DOLLAR
	FIRE DAMPER		PIPE RISE TEE	=	EQUALS, EQUAL TO
	COMBINATION FIRE/SMOKE DAMPER		SHUTOFF VALVE (REFER TO SPECIFICATIONS FOR TYPE)	>	GREATER THAN
	VOLUME DAMPER		SHUTOFF VALVE (REFER TO SPECIFICATIONS FOR TYPE)	>=	GREATER THAN OR EQUAL TO
	ELBOW WITH DOUBLE THICKNESS TURNING VANES		SHUTOFF VALVE (REFER TO SPECIFICATIONS FOR TYPE)	<	LESS THAN
	RECTANGULAR BRANCH TAKE-OFF		SHUTOFF VALVE (REFER TO SPECIFICATIONS FOR TYPE)	<=	LESS THAN OR EQUAL TO
	BELL MOUTH BRANCH TAKE-OFF		SHUTOFF VALVE (REFER TO SPECIFICATIONS FOR TYPE)	-	MINUS
	ROUND BRANCH TAKE-OFF		SHUTOFF VALVE (REFER TO SPECIFICATIONS FOR TYPE)	x	MULTIPLY BY, BY
	ROUND DUCT DROP OFF BOTTOM		SHUTOFF VALVE (REFER TO SPECIFICATIONS FOR TYPE)	#	NUMBER, POUND
	DUCT TRANSITION		SHUTOFF VALVE (REFER TO SPECIFICATIONS FOR TYPE)	%	PERCENT
	SQUARE TO ROUND TRANSITION		SHUTOFF VALVE (REFER TO SPECIFICATIONS FOR TYPE)	+	PLUS
	DUCTWORK CHANGE IN ELEVATION (UP OR DOWN)		SHUTOFF VALVE (REFER TO SPECIFICATIONS FOR TYPE)	±	PLUS OR MINUS
	SUPPLY/OUTSIDE AIR DUCT RISER		SHUTOFF VALVE (REFER TO SPECIFICATIONS FOR TYPE)		
	RETURN AIR DUCT RISER		SHUTOFF VALVE (REFER TO SPECIFICATIONS FOR TYPE)		
	EXHAUST/RELIEF AIR DUCT RISER		SHUTOFF VALVE (REFER TO SPECIFICATIONS FOR TYPE)		
	ROUND DUCT RISER (SMALLER THAN 12")		SHUTOFF VALVE (REFER TO SPECIFICATIONS FOR TYPE)		

ELECTRIC BASEBOARD HEATER SCHEDULE						
DESIGNATION	SERVICE	REQUIRED MBH	CONNECTED KW	ELECTRICAL V/ø/HZ	BASIS OF DESIGN	REMARKS
EBH-01	OFFICES	5.1	1.5	208/1/60	CADET MODEL 6F1500-8	ALTERNATE #2
EBH-02	OFFICES	6.8	2.0	208/1/60	CADET MODEL 8F2000-8	ALTERNATE #2
EBH-03	OFFICES	8.5	2.5	208/1/60	CADET MODEL 8F2500-8	ALTERNATE #2

← ELECTRIC BASEBOARD HEATER WORK PROVIDED UNDER ALTERNATE #2

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	BASIS OF DESIGN	REMARKS
			LOW	HIGH							
A1	SUPPLY	A	0	150	24x24	6ø	4-WAY	0.15	25	TITUS/TDCA-AA	① ② ③
A2	SUPPLY	A	151	250	24x24	8ø	4-WAY	0.15	25	TITUS/TDCA-AA	① ② ③
A3	SUPPLY	A	251	350	24x24	10ø	4-WAY	0.15	25	TITUS/TDCA-AA	① ② ③
B1	RETURN	B	0	250	24x24	8x8	0° DEFL	0.10	20	TITUS/TDCA-AA	② ③
B2	RETURN	B	251	400	24x24	10x10	0° DEFL	0.10	20	TITUS/TDCA-AA	② ③
B3	RETURN	B	401	600	24x24	12x12	0° DEFL	0.10	20	TITUS/TDCA-AA	② ③

- ① 18"x18" BACKPAN SIZE
- ② SCHEDULED MODULE SIZE IS NOMINAL, AND WHERE REQUIRED SHALL BE WITHIN 24"x48" OR 24"x24" ARCHITECTURAL CEILING GRID.
- ③ MAX NC VALUE SHALL BE BASED ON OCTAVE BAND 2-7 SOUND POWER LEVELS MINUS ROOM ABSORPTION OF 10db.

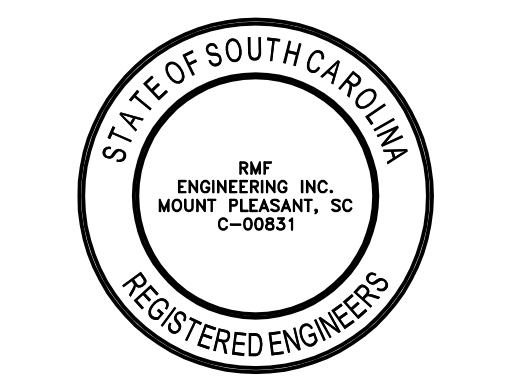
GENERAL NOTES:

- 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.
- BEFORE BEGINNING DEMOLITION WORK, CONTRACTOR SHALL PROVIDE THE ENGINEER A BASELINE AIRFLOW MEASUREMENT ON ALL SUPPLY DIFFUSERS FOR THE DUCT SYSTEMS CONNECTED TO AHU-04 AND AHU-08. AIRFLOW MEASUREMENTS SHALL BE TAKEN WITH ALL AHU'S OPERATING AT 100% AIRFLOW. CONTRACTOR SHALL ALSO PROVIDE THE AHU'S EXTERNAL STATIC PRESSURE.

DRAWING NOTES:

- DUCTWORK SHALL BE REMOVED BY THE OWNER UNDER A SEPARATE CONTRACT
- PROVIDE SHUT-OFF VALVE AND CAP WHERE STEAM AND CONDENSATE RETURN PIPING IS BEING DEMOLISHED.
- REMOVAL OF STEAM AND CONDENSATE PIPING AND CAPPING OF LINES SHALL BE WORK PROVIDED UNDER ALTERNATE #1.

CORPORATE SEAL



A/E SEAL



Apr 8 2013

PROJECT TITLE

University of South Carolina

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COLUMBIA, SC 29201

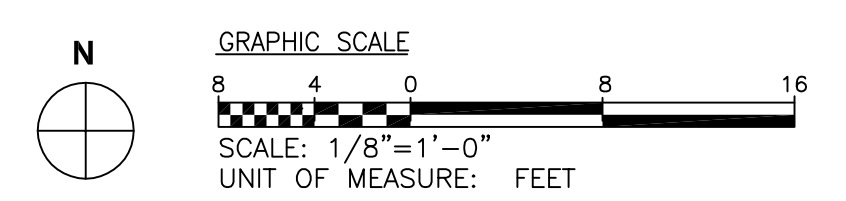
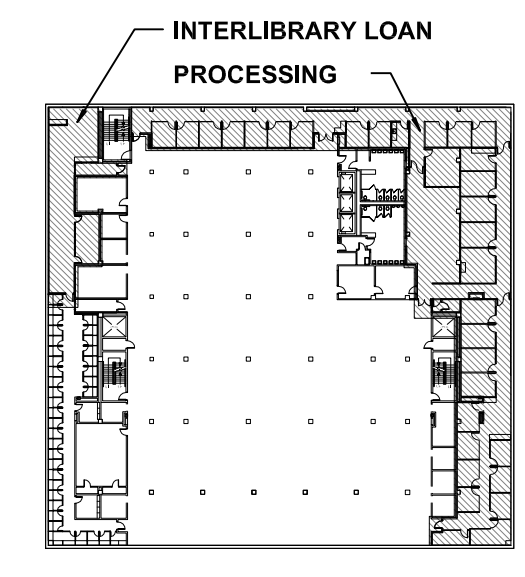
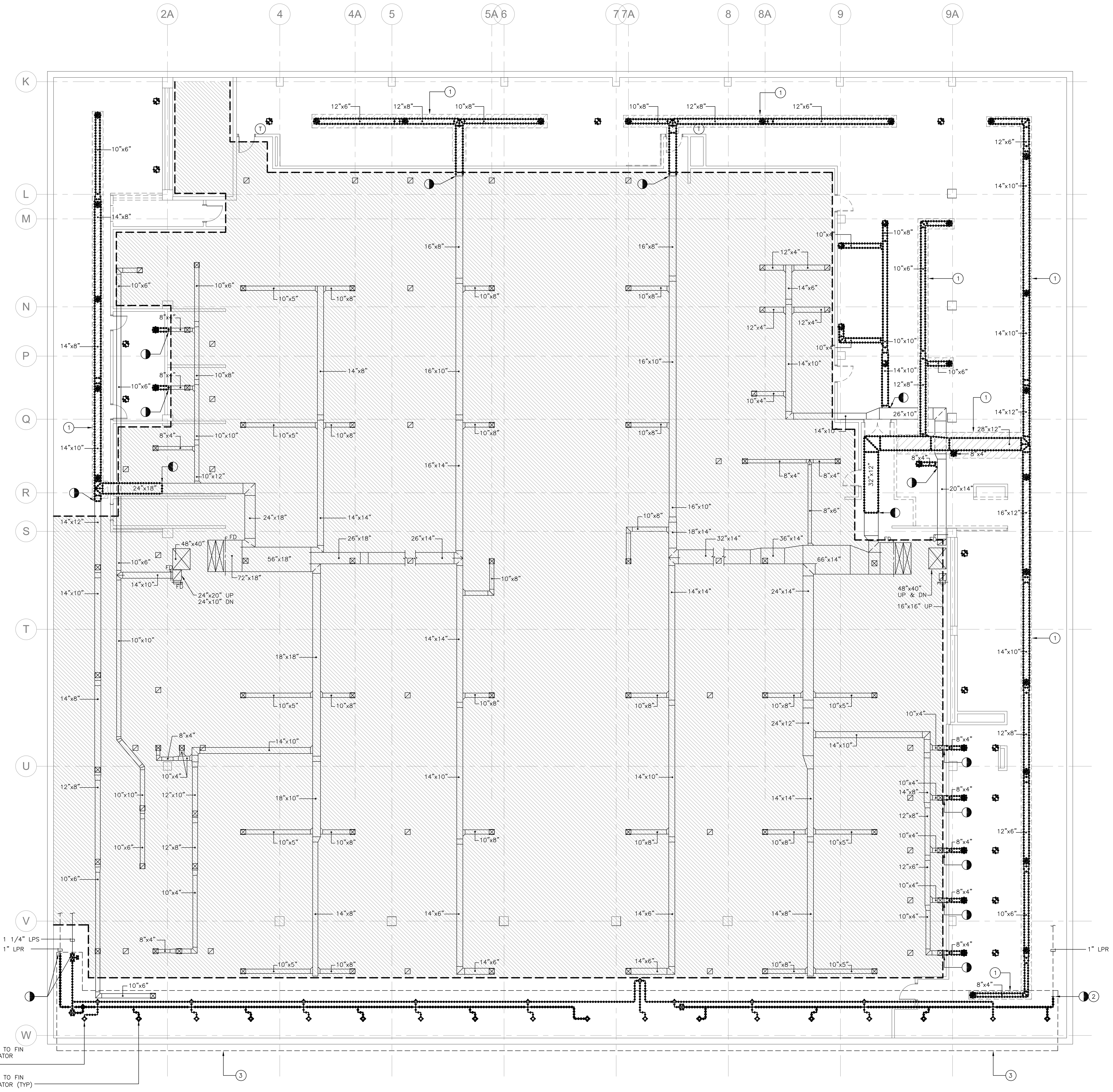
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REVISIONS		
NO	REVISION	DATE

SHEET INFORMATION	
Date	04.08.13
Project No.	12.130.03
Scale	1/8" = 1'-0"
Drawn By	BMW
Checked By	DWZ

LEVEL 4 - OVERALL - MECHANICAL DEMOLITION





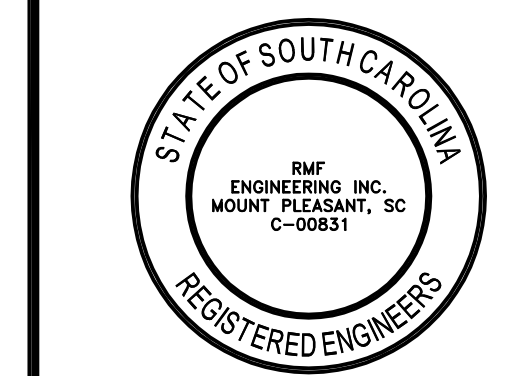
QUACKENBUSH
ARCHITECTS + PLANNERS

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Columbia, SC 29201 F: 803.771.2958

RFM ENGINEERING, INC.
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CHARLESTON, SC 29402
RFM JOB #: 31292.A0



CORPORATE SEAL



A/E SEAL



PROJECT TITLE

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REVISIONS		
NO.	REVISION	DATE

SHEET INFORMATION	
Date	04.08.13
Project No.	12.130.03
Scale	1/8" = 1'-0"
Drawn By	BMW
Checked By	DWZ

TITLE

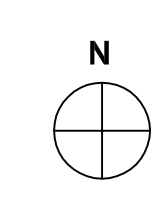
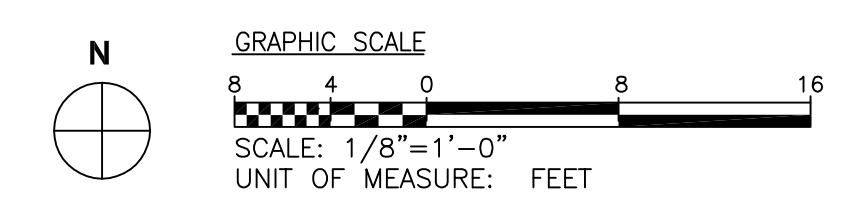
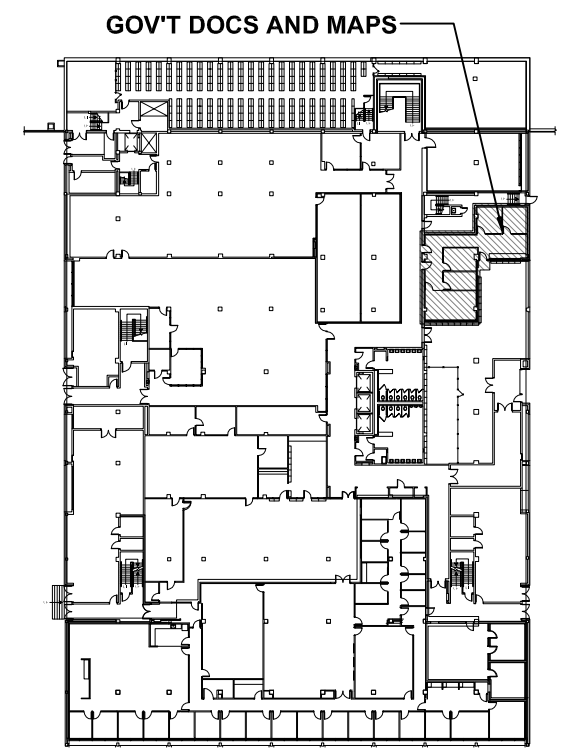
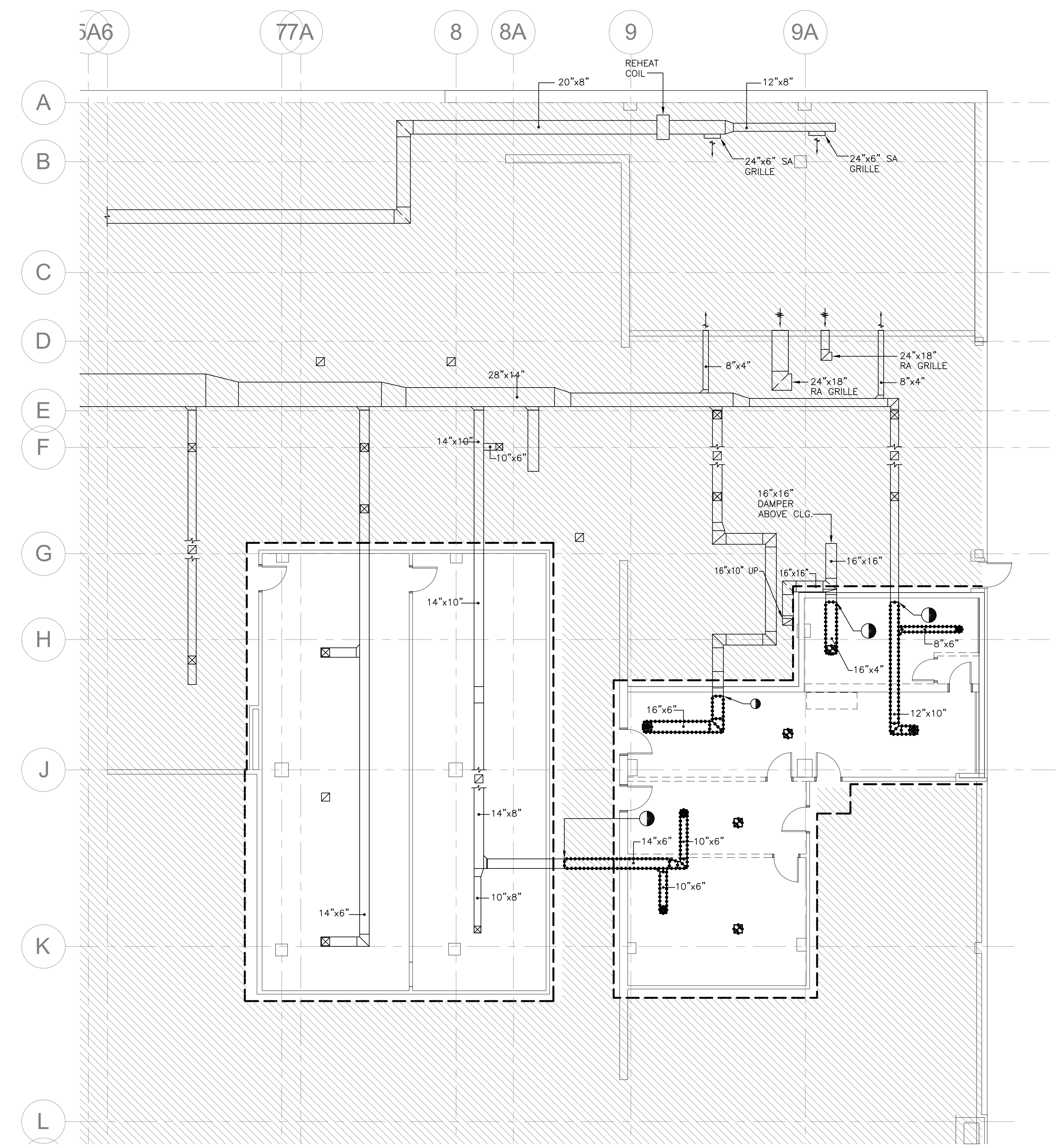
**LEVEL 5 -
GOV'T DOCS
AND MAPS -
MECHANICAL
DEMOLITION**

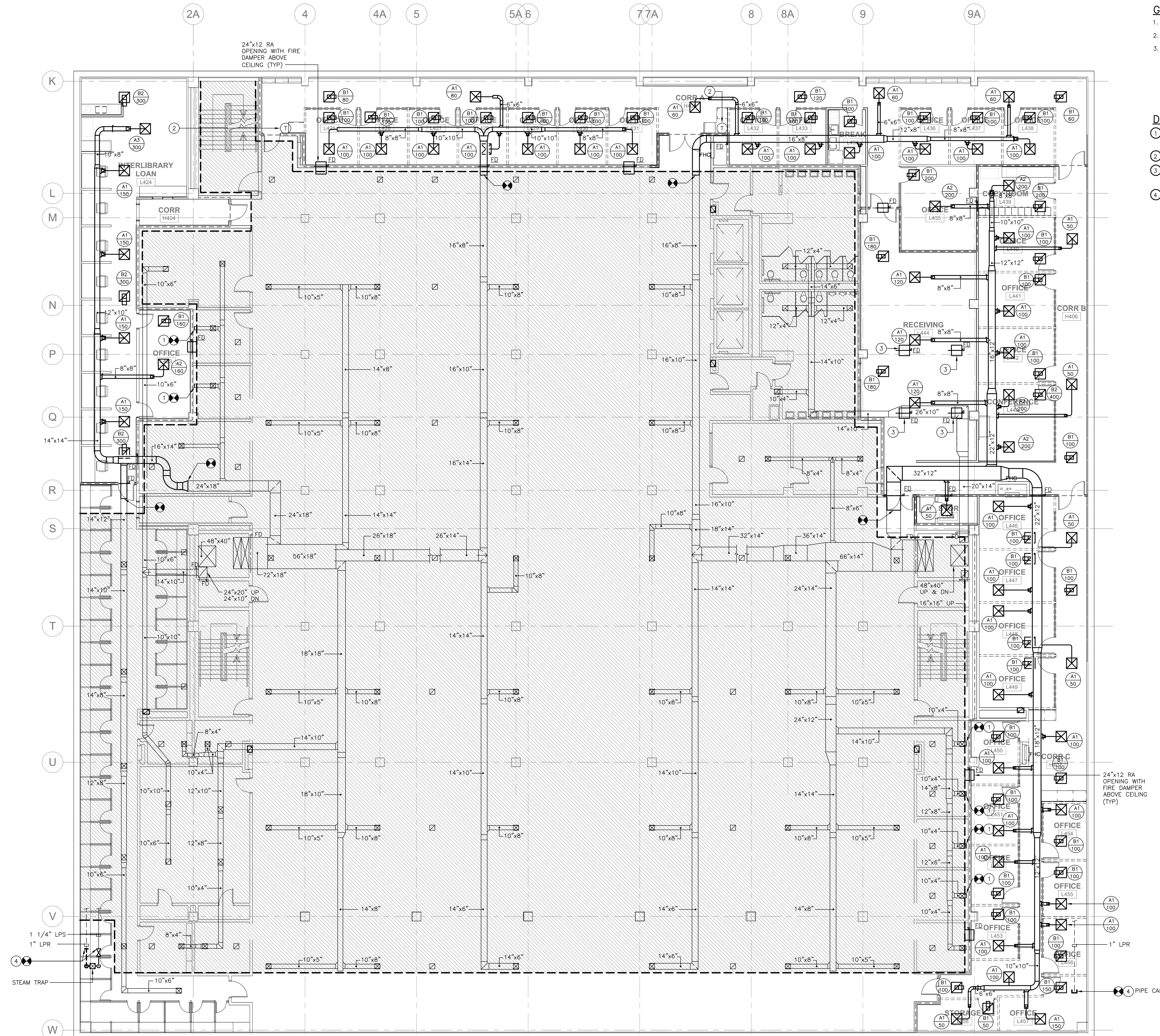
SHEET NO.

M1.5B

GENERAL NOTES:

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- BEFORE BEGINNING DEMOLITION WORK, CONTRACTOR SHALL PROVIDE THE ENGINEER A BASELINE AIRFLOW MEASUREMENT ON ALL SUPPLY DIFFUSERS FOR THE DUCT SYSTEMS CONNECTED TO AHU-09. AIRFLOW MEASUREMENTS SHALL BE TAKEN WITH ALL AHU'S OPERATING AT 100% AIRFLOW. CONTRACTOR SHALL ALSO PROVIDE THE AHU'S EXTERNAL STATIC PRESSURE.





GENERAL NOTES:

1. ALL MATERIALS USED IN THE CEILING MUST BE PLENUM RATED.
2. EXISTING THERMOSTATS TO REMAIN IN PLACE.
3. PRIOR TO PREPARING THE BID THE CONTRACTOR SHALL VISIT THE SITE TO FAMILIARIZE THEMSELVES WITH ALL THE EXISTING CONDITIONS AND MAKE ALL NECESSARY INVESTIGATIONS AS TO MATTERS THAT AFFECT THE WORK. PROVIDE A COST TO REPAIR/REPLACE ALL EXISTING SYSTEMS IN THE AREA OF WORK PLENUM THAT ARE NOT PLENUM RATED CONSTRUCTION. NO ADDITIONAL COMPENSATION WILL BE MADE TO THE CONTRACTOR AS A RESULT OF HIS FAILURE TO FAMILIARIZE HIMSELF WITH THE EXISTING CONDITIONS UNDER WHICH THE WORK MUST BE PERFORMED.

DRAWING NOTES:

- 1 CAP DUCT WITH 18 GAUGE SHEET METAL AND SECURE CAP WITH SHEET METAL SCREWS. SEAL PERIMETER OF OPENING AIR TIGHT WITH DUCT SEALER AND INSULATE.
- 2 EXISTING THERMOSTAT TO REMAIN.
- 3 PROVIDE FIRE DAMPER ABOVE FLOOR SLAB AT EXISTING PLENUM RETURN PENETRATION. REFER TO ARCHITECTURAL DRAWINGS FOR INSTALLATION DETAILS.
- 4 NEW STEAM PIPING SHALL BE WORK PROVIDED UNDER ALTERNATE #1.

QUACKENBUSH
ARCHITECTS + PLANNERS

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RFM ENGINEERING, INC.
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SUITE G
CHARLESTON, SC 29492
RFM JOB #: 312922A0

CORPORATE SEAL

STATE OF SOUTH CAROLINA
RFM ENGINEERING, INC.
MOUNT PLEASANT, SC
C-10811
REGISTERED ENGINEERS

A/E SEAL

STATE OF SOUTH CAROLINA
No. 22154
REGISTERED PROFESSIONAL ENGINEER

Apr 8 2013

PROJECT TITLE

University of South Carolina

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REVISIONS	
NO	REVISION

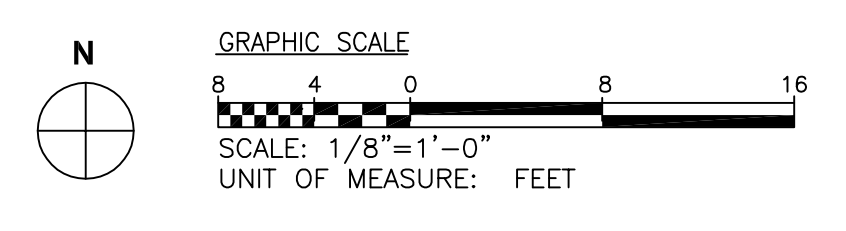
SHEET INFORMATION

Date: 04.08.13
Project No.: 12.130.03
Scale: 1/8" = 1'-0"
Drawn By: BMW
Checked By: DWZ

LEVEL 4 - OVERALL - MECHANICAL NEW WORK

M2.4

SHEET NO.

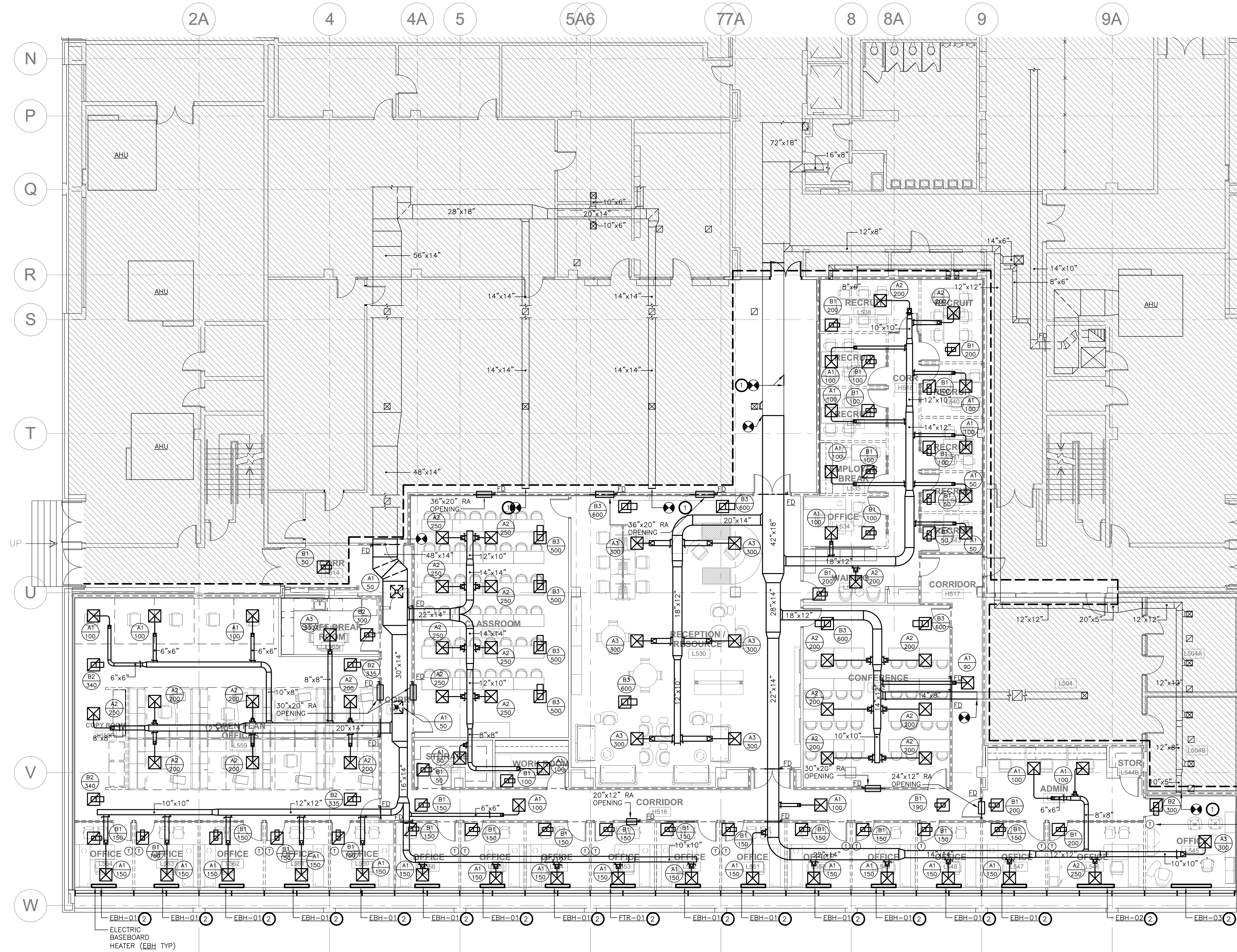


GENERAL NOTES:

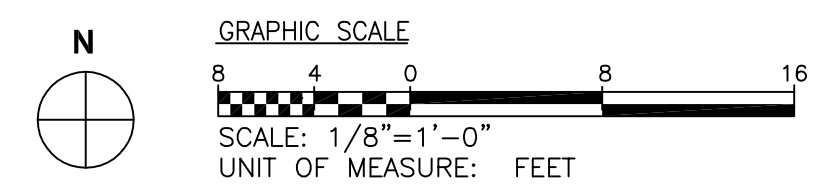
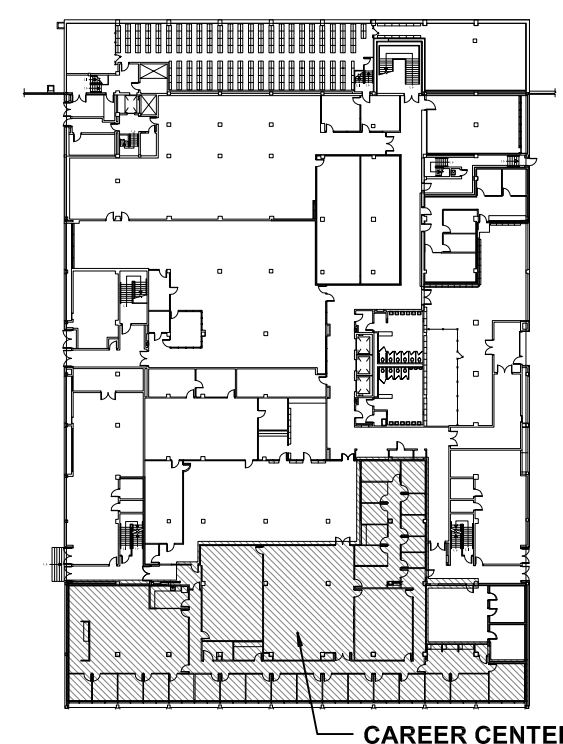
1. ALL MATERIALS USED IN THE CEILING MUST BE PLENUM RATED.
2. EXISTING THERMOSTATS TO REMAIN IN PLACE.
3. PRIOR TO PREPARING THE BID THE CONTRACTOR SHALL VISIT THE SITE TO FAMILIARIZE THEMSELVES WITH ALL THE EXISTING CONDITIONS AND MAKE ALL NECESSARY INVESTIGATIONS AS TO MATTERS THAT AFFECT THE WORK. PROVIDE A COST TO REPAIR/REPLACE ALL EXISTING SYSTEMS IN THE AREA OF WORK PLENUM THAT ARE NOT PLENUM RATED CONSTRUCTION. NO ADDITIONAL COMPENSATION WILL BE MADE TO THE CONTRACTOR AS A RESULT OF HIS FAILURE TO FAMILIARIZE HIMSELF WITH THE EXISTING CONDITIONS UNDER WHICH THE WORK MUST BE PERFORMED.
4. REFER TO ARCHITECTURAL DRAWINGS FOR FLOOR PATCHING DETAILS WHERE PIPE PENETRATIONS ARE REQUIRED.

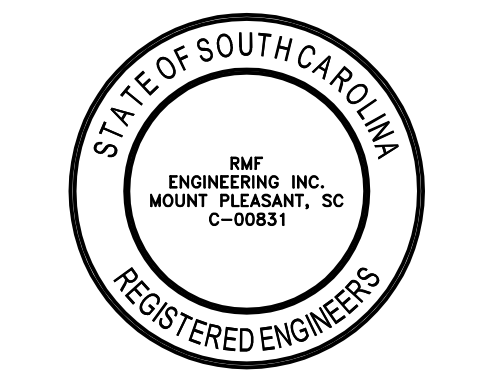
DRAWING NOTES:

1. CAP DUCT WITH 18 GAUGE SHEET METAL AND SECURE CAP WITH SHEET METAL SCREWS. SEAL PERIMETER OF OPENING AIR TIGHT WITH DUCT SEALER AND INSULATE.
2. INSTALLATION OF ELECTRIC BASEBOARD HEATERS AND ALL ASSOCIATED WIRING AND CONTROLS SHALL BE WORK PROVIDED UNDER ALTERNATE #2.



THERMOSTAT CONTROLLING ROOM ELECTRIC BASEBOARD HEATER (TYP)





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REVISIONS	
NO.	DATE

SHEET INFORMATION

Date	04.08.13
Project No.	12.130.03
Scale	1/8" = 1'-0"
Drawn By	BMW
Checked By	DWZ

TITLE

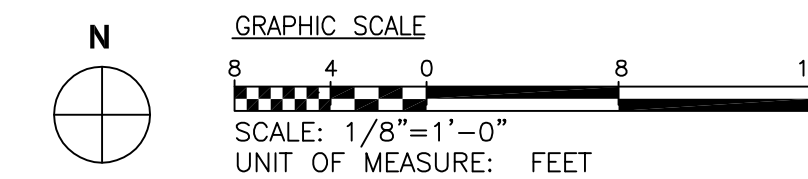
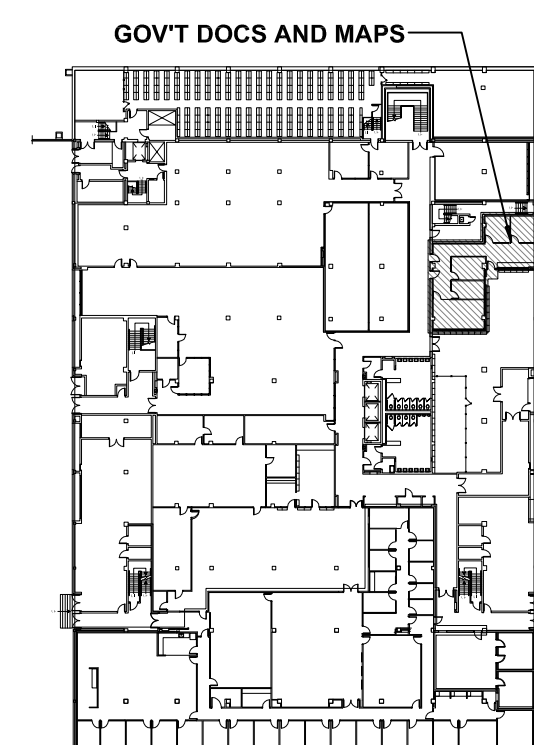
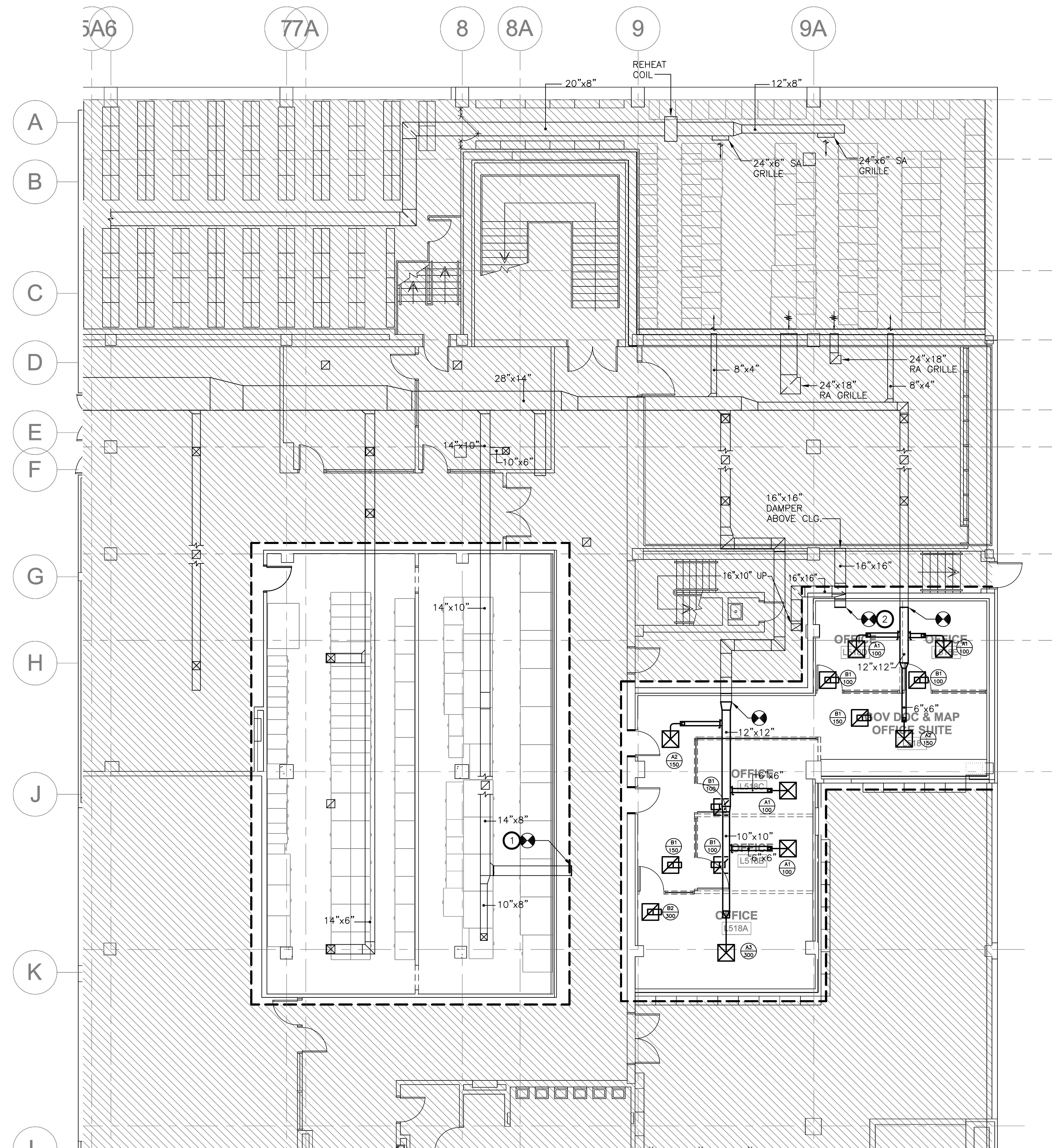
LEVEL 5 - GOV'T DOCS AND MAPS - MECHANICAL NEW WORK

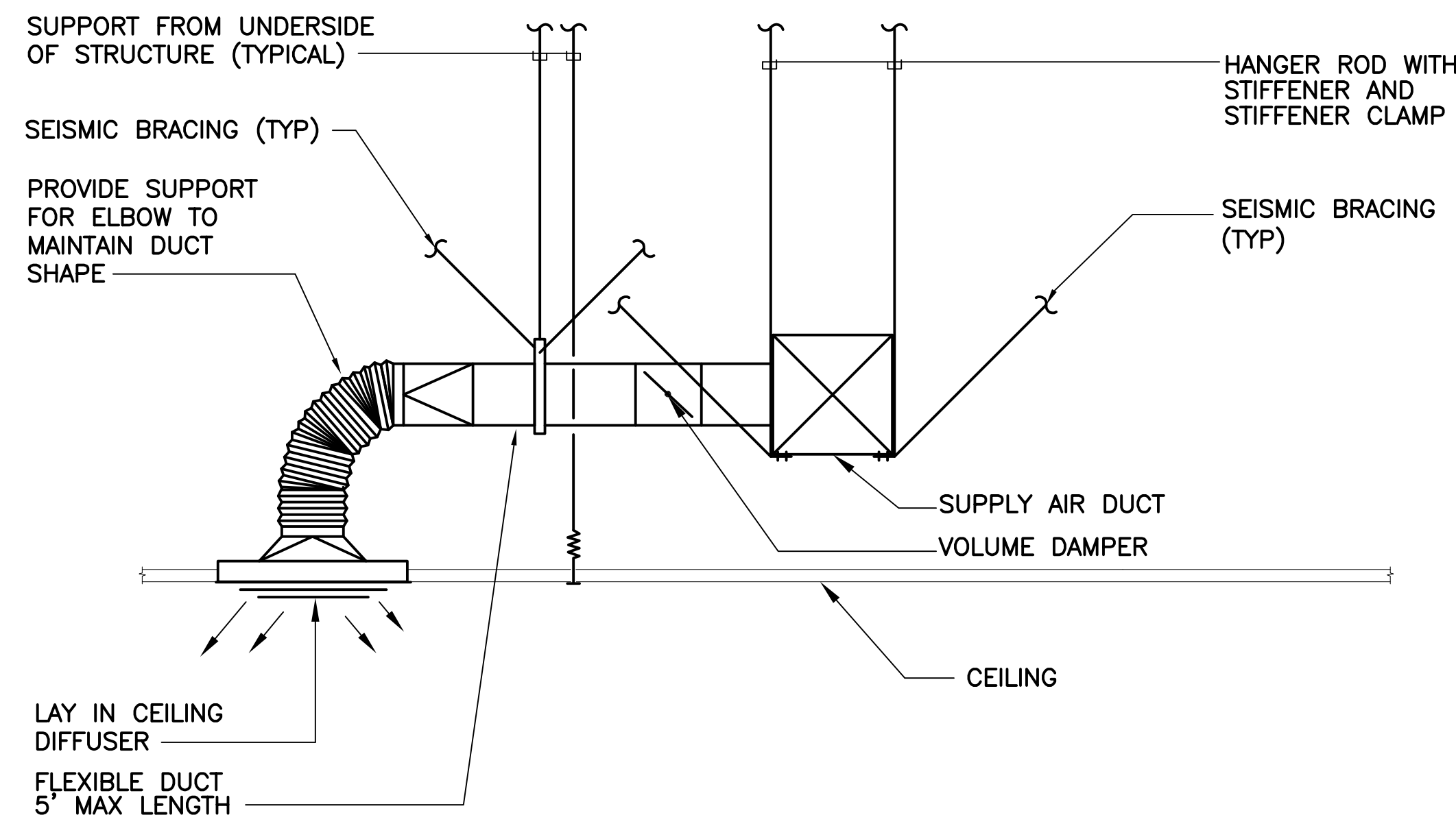
GENERAL NOTES:

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2. EXISTING THERMOSTATS TO REMAIN IN PLACE.
3. PRIOR TO PREPARING THE BID THE CONTRACTOR SHALL VISIT THE SITE TO FAMILIARIZE THEMSELVES WITH ALL THE EXISTING CONDITIONS AND MAKE ALL NECESSARY INVESTIGATIONS AS TO MATTERS THAT AFFECT THE WORK. PROVIDE A COST TO REPAIR/REPLACE ALL EXISTING SYSTEMS IN THE AREA OF WORK PLENUM THAT ARE NOT PLENUM RATED CONSTRUCTION. NO ADDITIONAL COMPENSATION WILL BE MADE TO THE CONTRACTOR AS A RESULT OF HIS FAILURE TO FAMILIARIZE HIMSELF WITH THE EXISTING CONDITIONS UNDER WHICH THE WORK MUST BE PERFORMED.

DRAWING NOTES:

- 1 CAP DUCT WITH 18 GAUGE SHEET METAL AND SECURE CAP WITH SHEET METAL SCREWS. SEAL PERIMETER OF OPENING AIR TIGHT WITH DUCT SEALER AND INSULATE.
- 2 PROVIDE INSECT SCREEN AT DUCT OPENING.



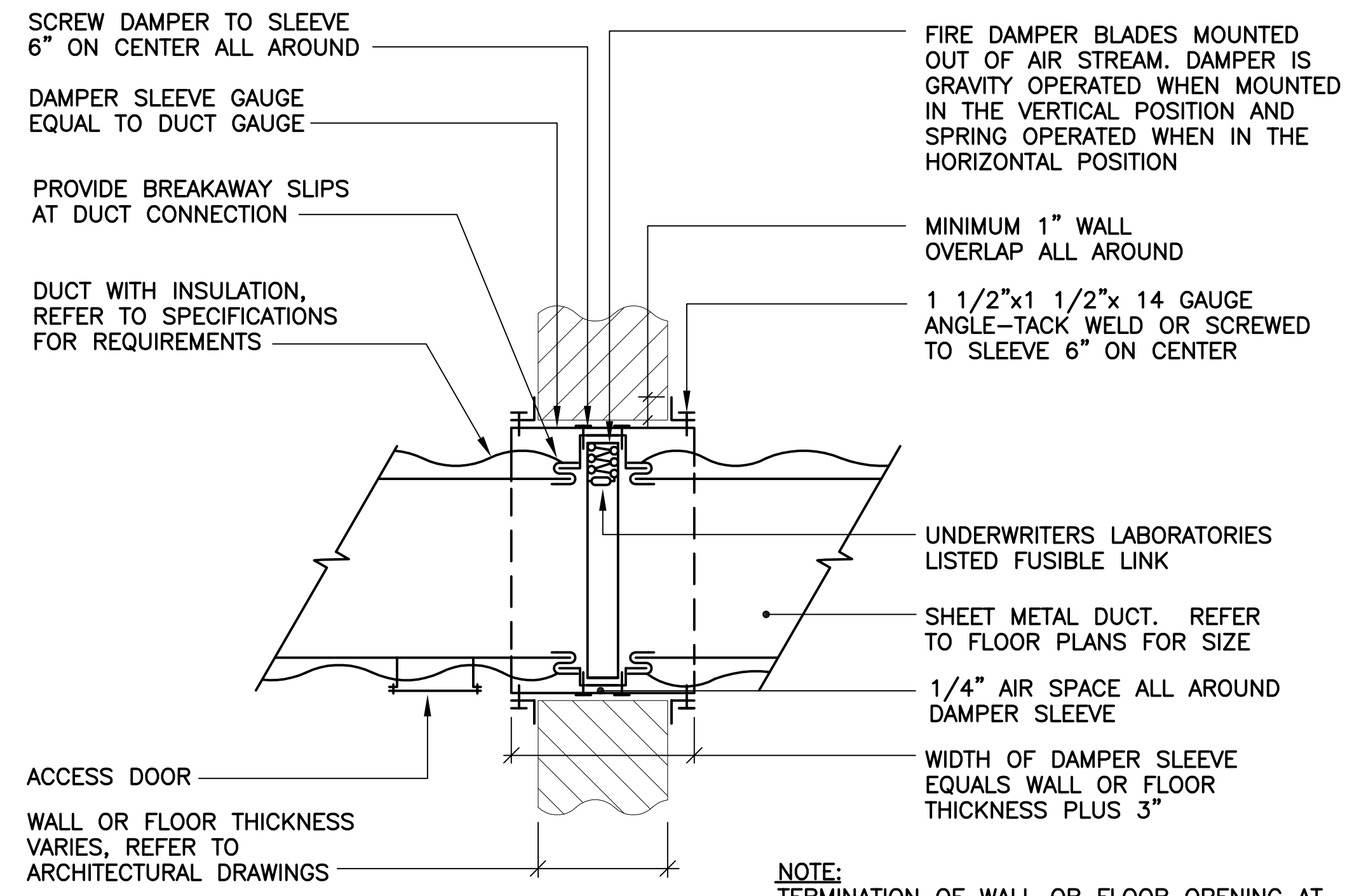


NOTES:

1. MAXIMUM SAG 1/2" PER FOOT.
2. MAXIMUM LENGTH OF FLEX DUCT IS 5'-0"
3. PROVIDE SEISMIC SWAY BRACING FOR ALL DUCTWORK HANGERS PER THE 2009 INTERNATIONAL BUILDING CODE AND THE 2009 INTERNATIONAL MECHANICAL CODE.
4. CONTRACTOR SHALL VERIFY MAXIMUM LOADING ON DUCTWORK SUPPORT ASSEMBLIES

DETAIL - CEILING DIFFUSER BRANCH DUCT

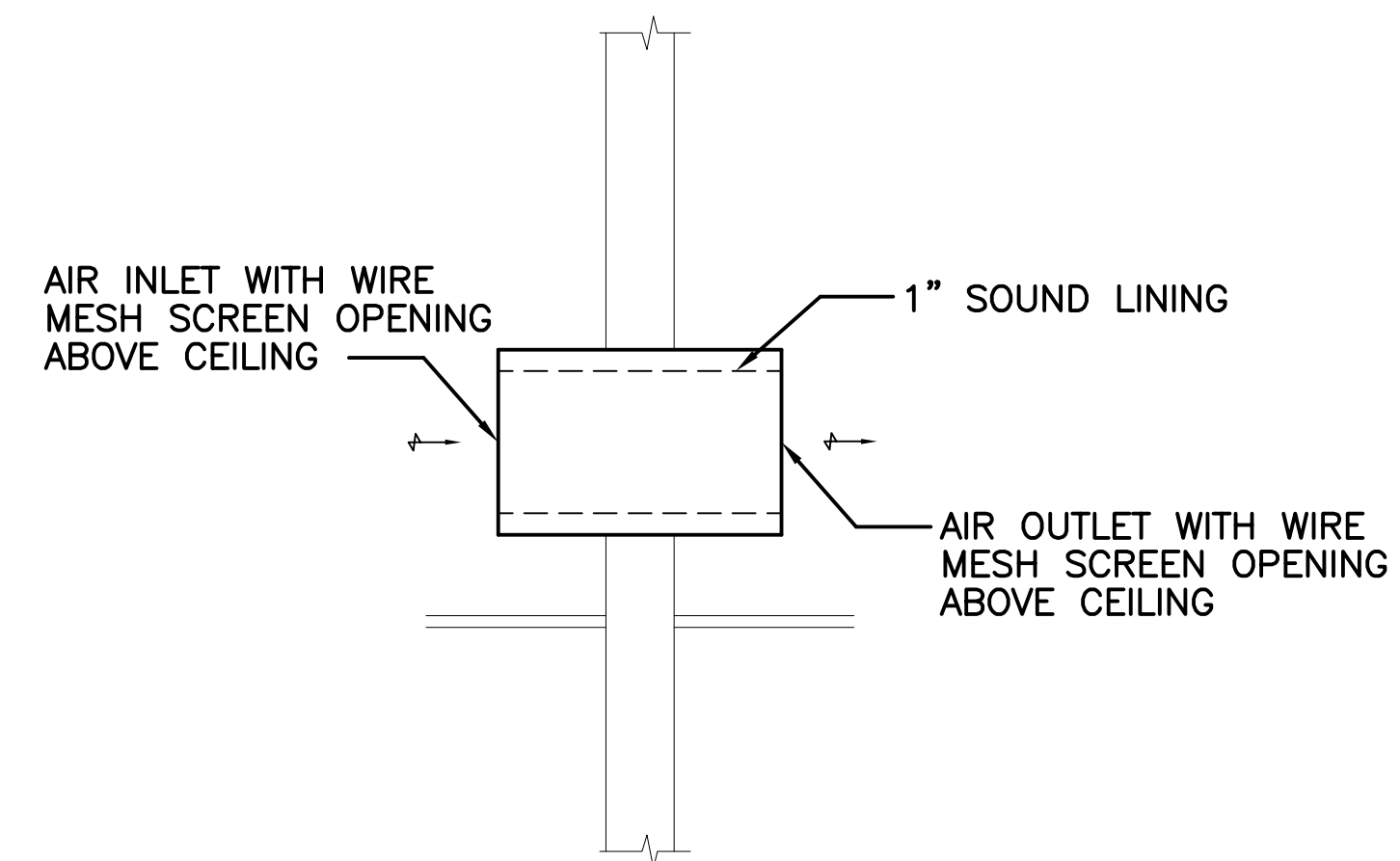
SCALE: NONE 1



NOTE:
TERMINATION OF WALL OR FLOOR OPENING AT DAMPER SLEEVE SHALL BE AS REQUIRED BY UNDERWRITER'S LABORATORIES AND AS DEFINED UNDER ANOTHER DIVISION OF THE SPECIFICATIONS

DETAIL - FIRE DAMPER INSTALLATION

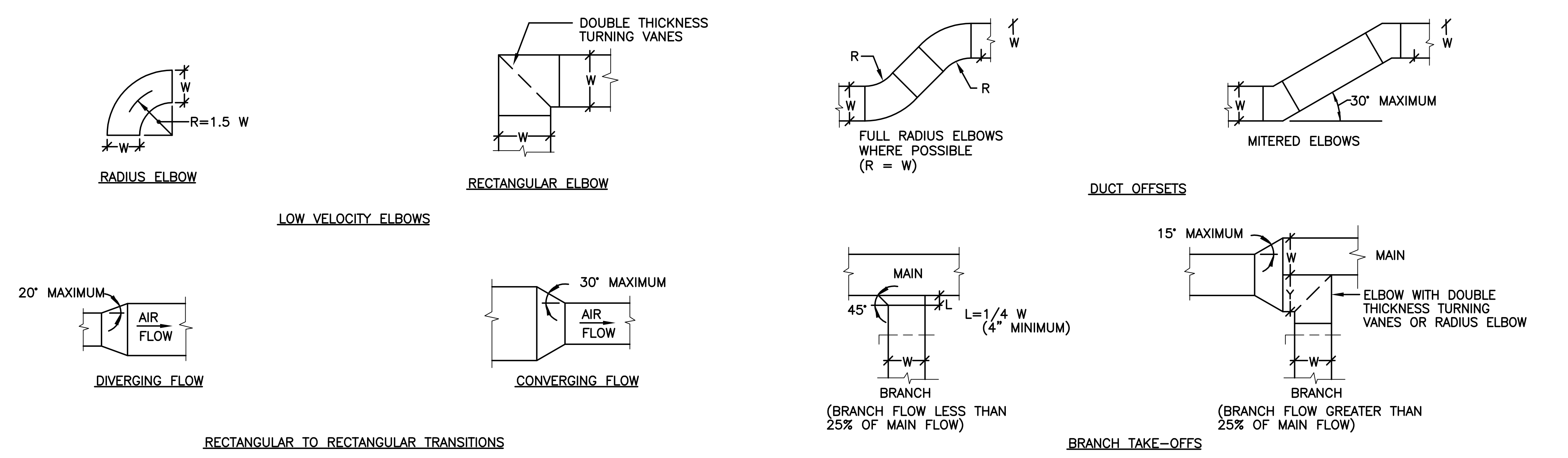
SCALE: NONE 2



NOTE:
PROVIDE FIRE DAMPER AT WALL PENETRATION WHEN REQUIRED. REFER TO PLANS FOR LOCATION OF FIRE DAMPERS.

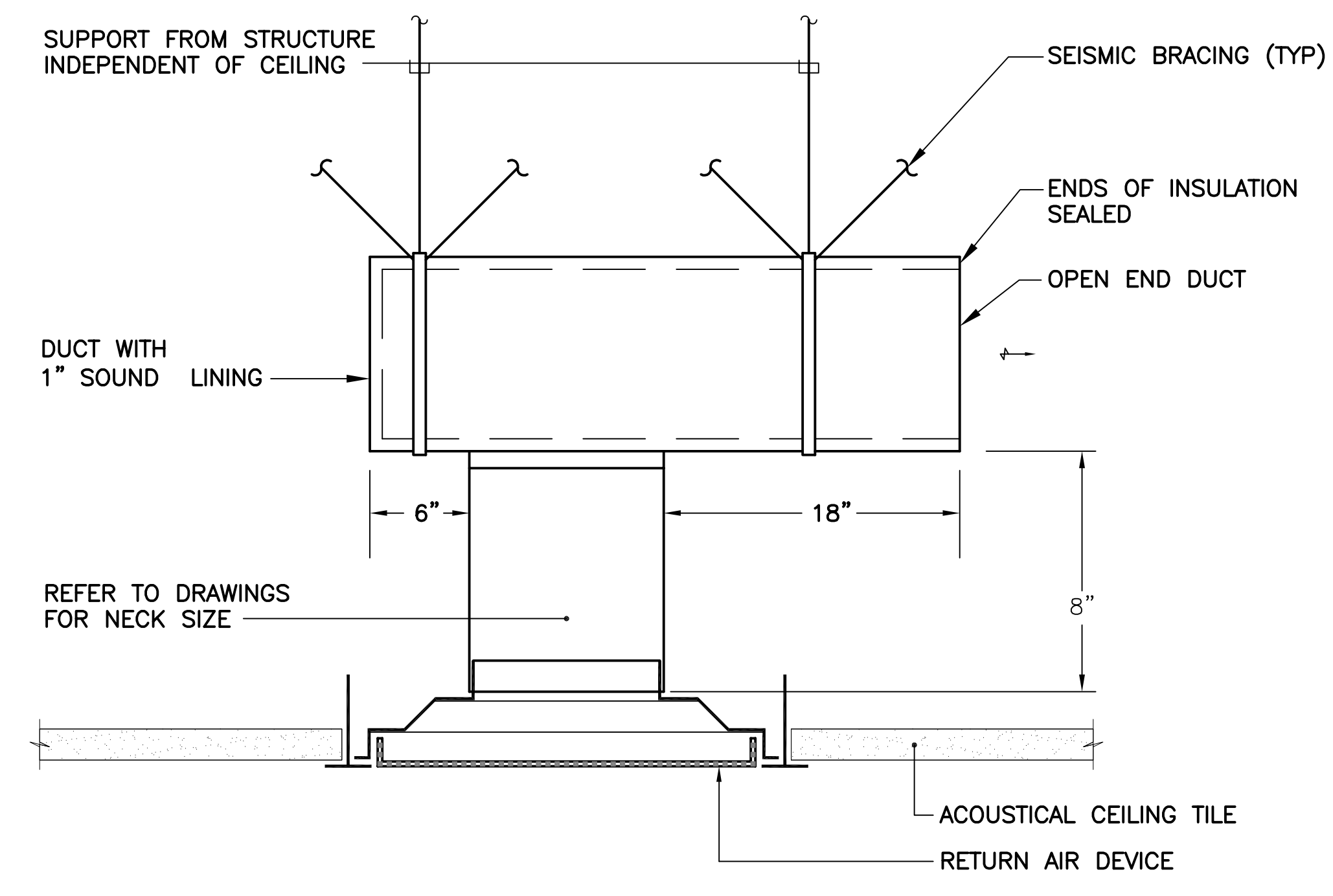
DETAIL - TRANSFER DUCT

SCALE: NONE 3



DETAIL - RECTANGULAR DUCT FITTINGS

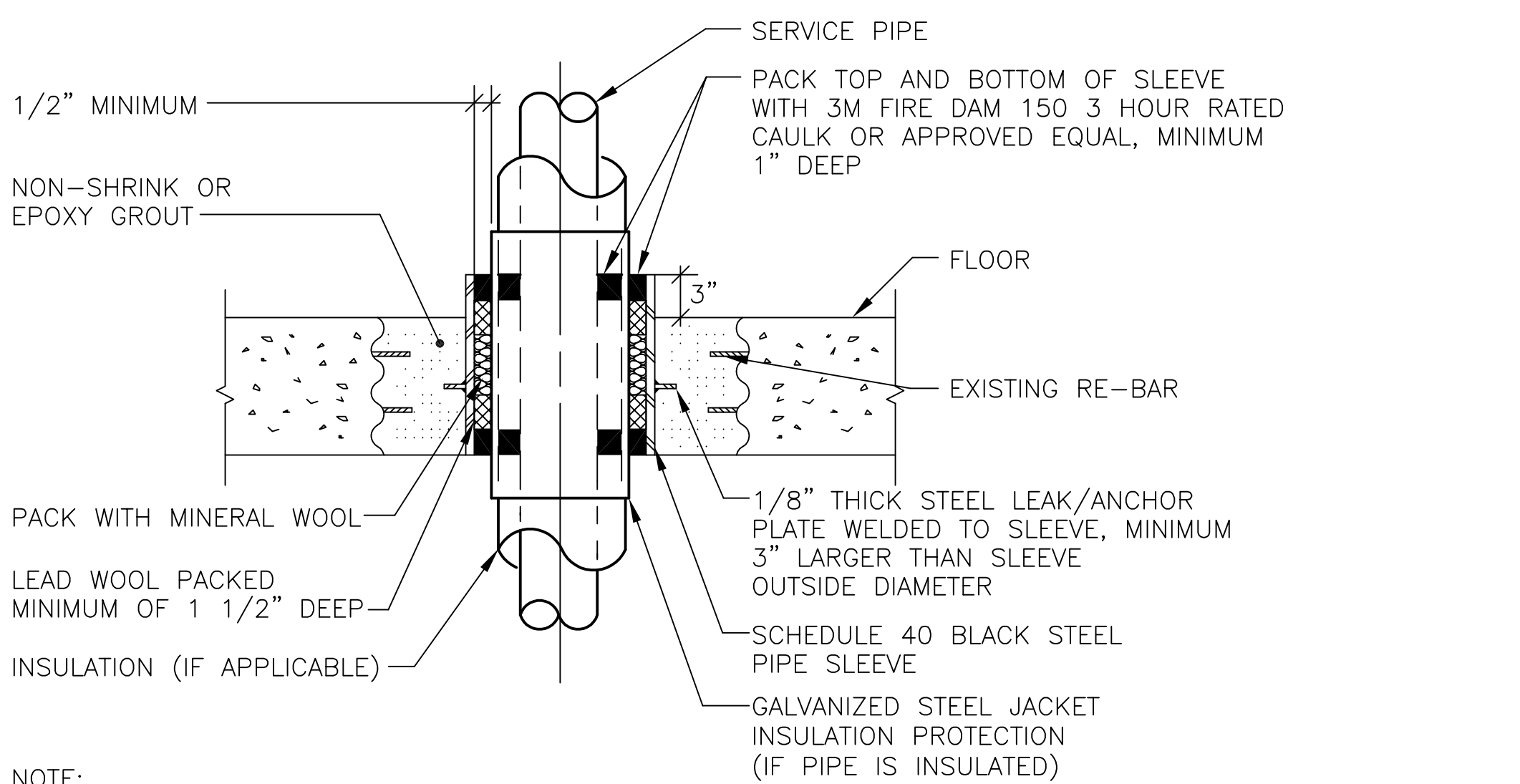
SCALE: NONE 4



NOTES:
1. PROVIDE SEISMIC SWAY BRACING FOR ALL DUCTWORK AND HANGERS PER THE 2009 INTERNATIONAL BUILDING CODE AND 2009 INTERNATIONAL MECHANICAL CODE.
2. CONTRACTOR SHALL VERIFY MAXIMUM LOADING ON DUCTWORK SUPPORT ASSEMBLIES.

DETAIL - WALL/CEILING TRANSFER GRILLE

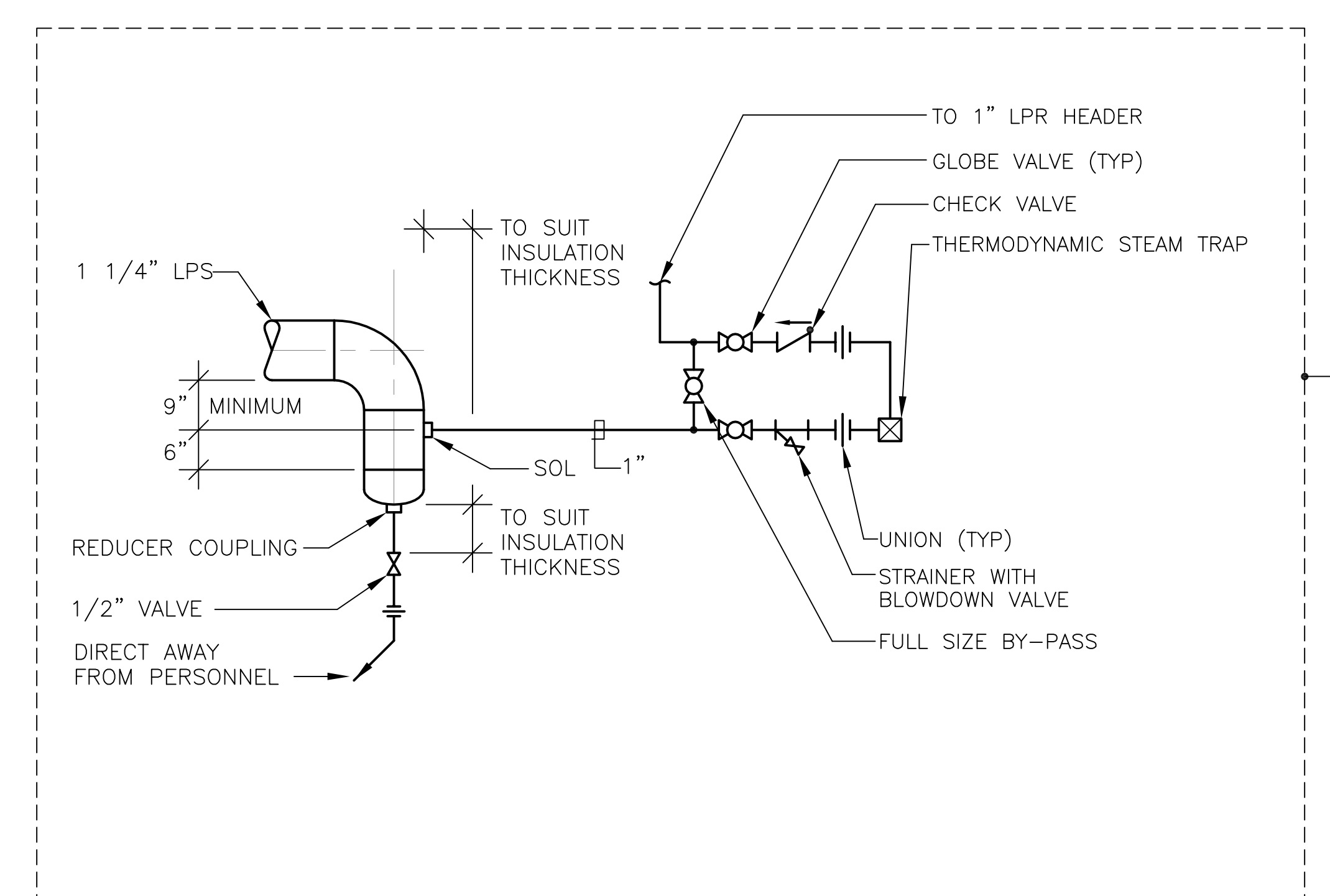
SCALE: NONE 5



NOTE:
1. PIPE SHALL BE SUPPORTED BY RISER CLAMPS ABOVE OR BELOW WITH PIPE HANGERS.

DETAIL - PIPE PENETRATION AT FLOOR

SCALE: NONE 6



STEAM TRAP WORK SHALL BE PROVIDED UNDER ALTERNATE #1

DETAIL - STEAM TRAP INSTALLATION

SCALE: NONE 7

REVISIONS		
NO	REVISION	DATE

SHEET INFORMATION		
Date	04.08.13	
Project No.	12.130.03	
Scale	NONE	
Drawn By	BMW	
Checked By	DWZ	