

Department of Veterans Affairs

Project 614-12-102

Replace Mech Equipment and Motors - Energy

VA Medical Center
1030 Jefferson Avenue
Memphis TN 38104

INDEX OF DRAWINGS

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NOTES:

1. PROVIDE NEMA 1 ENCLOSURE FOR VFDS.
2. PROVIDE FACTORY STARTUP PROVIDED BY FACTORY TRAINED TECHNICIAN.
3. ALL NEW MOTORS TO BE NEMA PREMIUM EFFICIENCY MOTORS.
4. ALL WORK TO BE DONE IN ACCORDANCE WITH NATIONAL ELECTRIC CODE.
5. DEMO OF PUMPS AND AIR HANDLING UNITS INCLUDES DEMO OF ALL SHUTOFF VALVES, STRAINERS, FILTERS, CONTROL VALVES, AND OTHER APPURTENANCES.
6. PIPING TO PUMPS TO BE INSTALLED WITH VALVES AND OTHER APPURTENANCES AS SHOWN ON DETAIL 1.
7. PROVIDE POWER TO ALL CONTROL DEVICES.

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MEMPHIS, TN. 38104

AMENDMENTS

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TITLE SHEET

REPLACE MECH
EQUIPMENT AND
MOTORS

SCALE:- NO SCALE

DATE
DEC 2011

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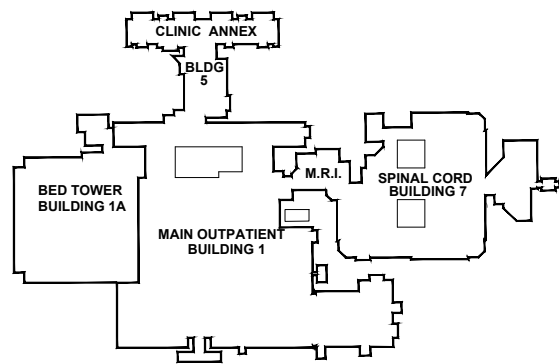
AIR HANDLING UNIT																														
FAN DATA									COOLING COIL DATA												STEAM HEATING COIL									
UNIT NUMBER	LOCATION	SUPPLY CFM	OA CFM	FAN TYPE	EXT SP INCHES WC	DRIVE	MOTOR		CFM	MAX FACE VELOCITY (FPM)	MAX SP LOSS	ENT AIR °F		LVG AIR °F		CIRCULATING FLUID					MIN BTUH	TYPE	CFM	MAX FACE VELOCITY	MAX SP LOSS (IN WC)	TEMP AIR °F		MIN BTUH	STEAM PRESSURE	LBS/HR
							HP	VOLTS PHASE				DB	WB	DB	WB	FLUID	GPM	TEMP IN °F	TEMP OUT °F	MAX LOSS FT FLUID						ENT	LVG			
AH-51	AEG-33	4300	700	DWDI	3	VFD	5	460/3Φ	4300	500	.8	81	67.3	55	54.3	CHILLED WATER	29	45	57	10'	175,085	STEAM NON FREEZE	4300	500	.8"	72	103	165,000	5	200
LAUNDRY AHU	CWG-39	4060	480	DWDI	2	VFD			4060	500	.8	76	63	55	52	CHILLED WATER	23.1	45	57	10'	139,000	STEAM NON FREEZE	4060	500	.1"	69	87	111,000	5	115

NEW PUMPS										
PUMP #	BLDG	LOCATION	SERVICE	GPM	HEAD	HP	TYPE	VOLT/PHASE	RPM	DRIVE
P-3	1	BWG1	CHILLED WATER	520	80	15	INLINE	460/3	1750	VFD
P-45	1	6017	HEATING HOT WATER	188	89	7.5	END SUCTION	460/3	1750	VFD
P-46	1	6017	HEATING HOT WATER	188	89	7.5	END SUCTION	460/3	1750	VFD
P-62	1	KITCHEN MECH ROOM	30% PROPYLENE GLYCOL	120	115	7.5	END SUCTION	460/3	1750	VFD

NEW FANS									
FAN #	BLDG	LOCATION	TYPE	CFM	SP (IN WC)	RPM	MOTOR HP	MOTOR	REMARKS
EF-7	5	TRANSFORMER VAULT	ROOF VENTILATOR	11800	.25	475	2	460/3	FAN CONTROLLED BY ROOM THERMOSTAT
EF-1	5	PENTHOUSE	CENTRIFIGUL FAN	5650	1.5	1125	3	460/3	INTERLOCKED WITH AHU-1 AND AHU-2

NEW MOTORS						
UNIT #	BLDG	LOCATION	SERVICE	HP	VOLT/PHASE	REBALANCE FAN CFM
H&V 25	1	PIPE BASEMENT	VENTILATION	10	460/3	20790
H&V 26	1	PIPE BASEMENT	VENTILATION	3	460/3	6460
H&V 35	1	WAREHOUSE	VENTILATION	3	460/3	6130
H&V 36	1	WAREHOUSE	VENTILATION	3	460/3	7500

LEGEND:
GPM – GALLONS PER MINUTE
HP – HORSE POWER
RF – RETURN FAN
SF – SUPPLY FAN
VFD – VARIABLE FREQUENCY DRIVE



SITE PLAN
NOT TO SCALE

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EQUIPMENT SCHEDULE AND NOTES

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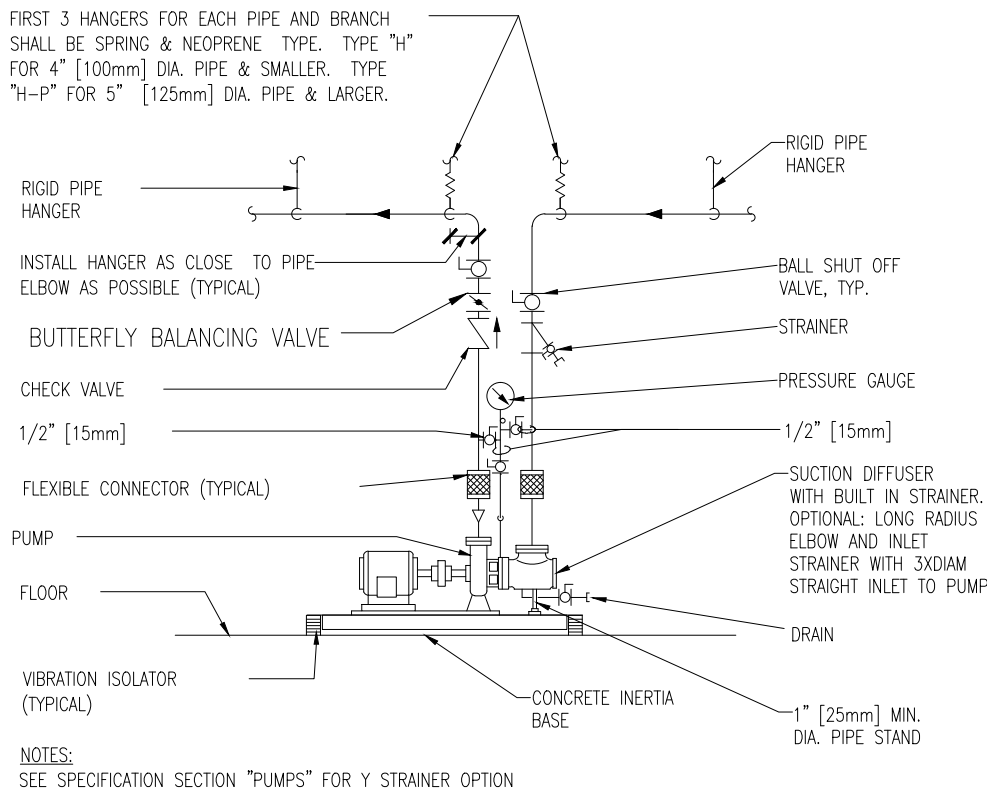
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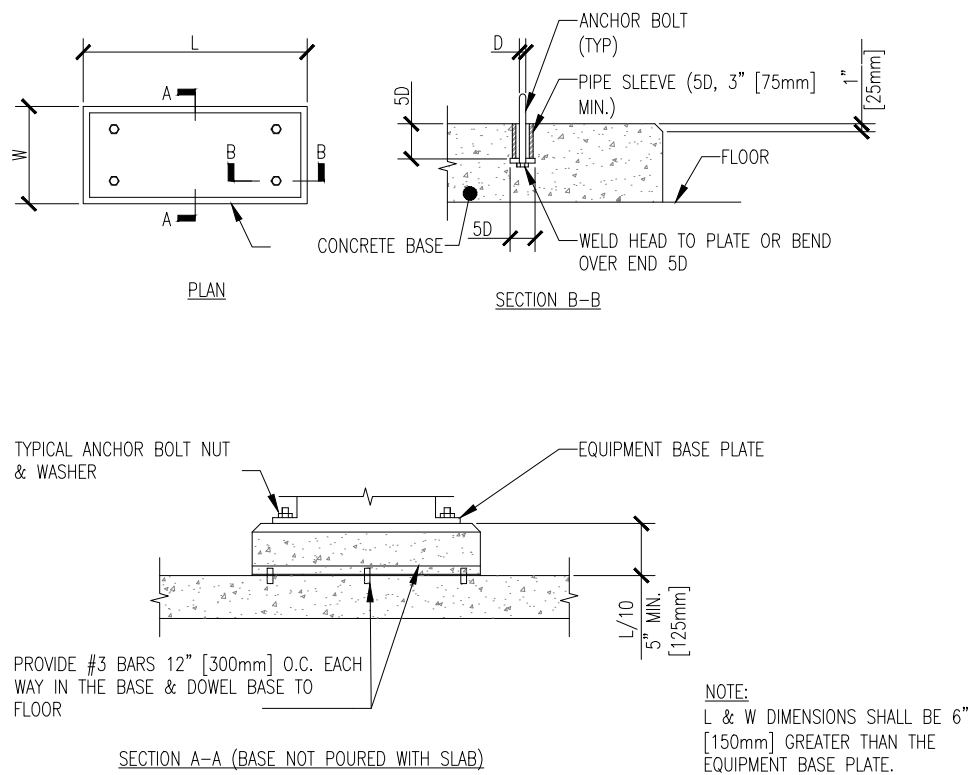
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FLOOR-MOUNTED PUMPS - CONNECTIONS WITH FLEXIBLE CONNECTORS

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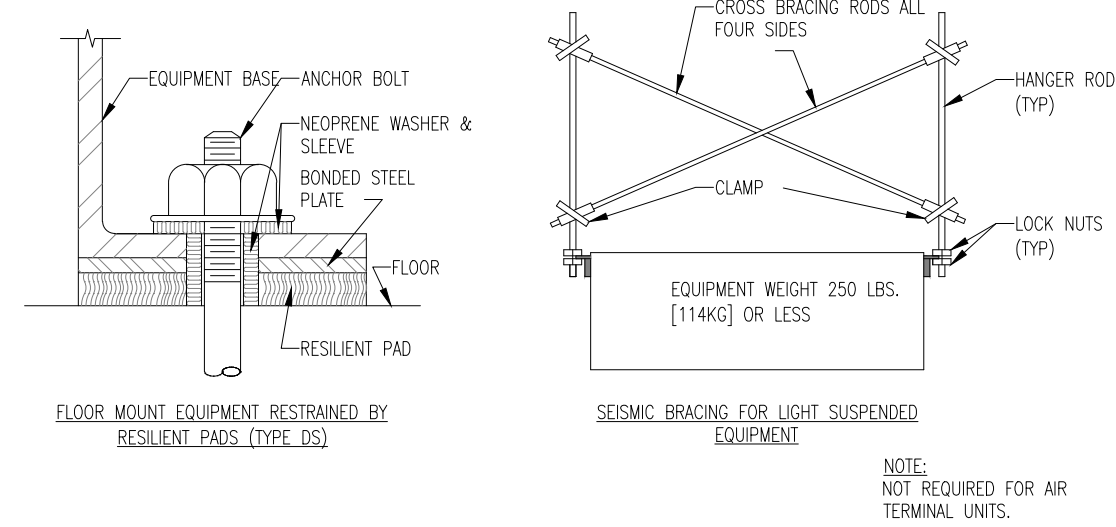
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CONCRETE EQUIPMENT BASES

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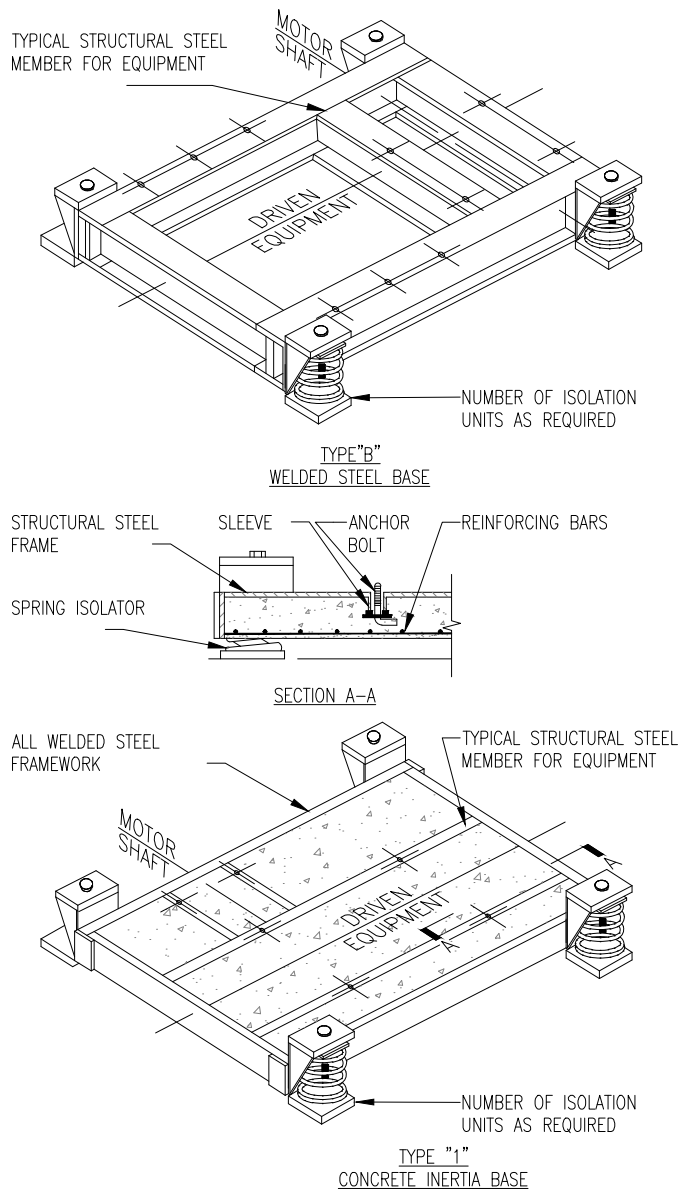
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SEISMIC BRACING FOR EQUIPMENT

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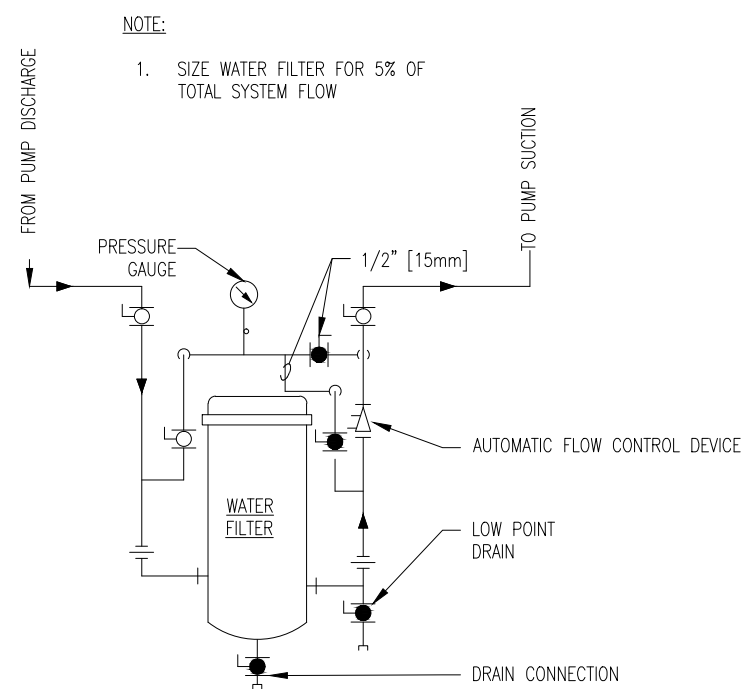
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VIBRATION ISOLATION BASES

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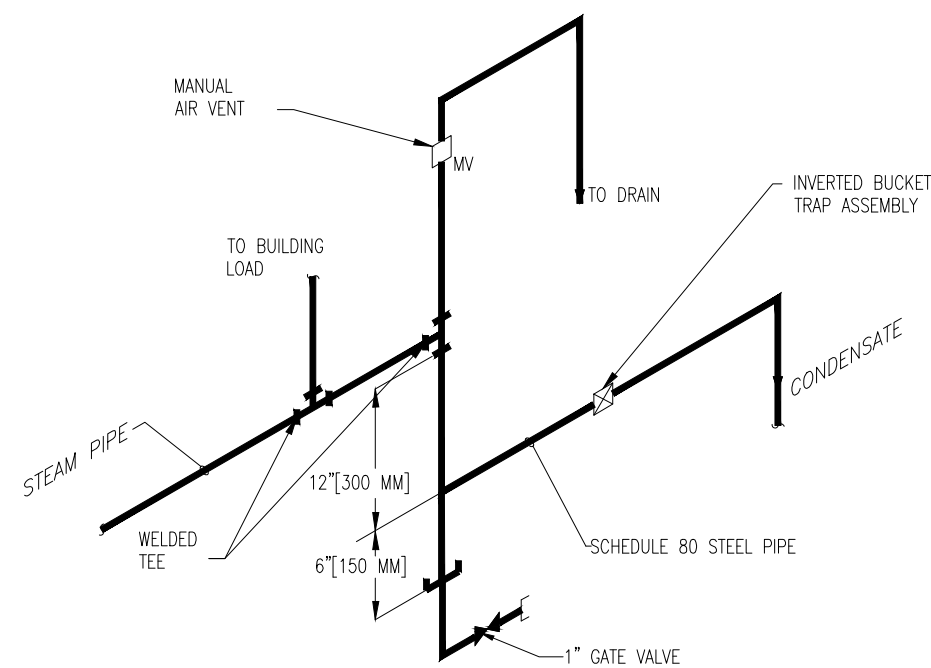
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WATER FILTERS - HEATING HOT WATER HYDRONIC SYSTEMS

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END OF STEAM LINE DRIP TRAP

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DETAILS

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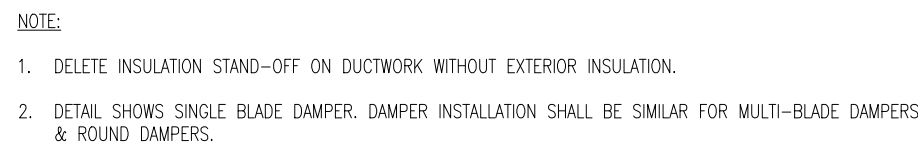
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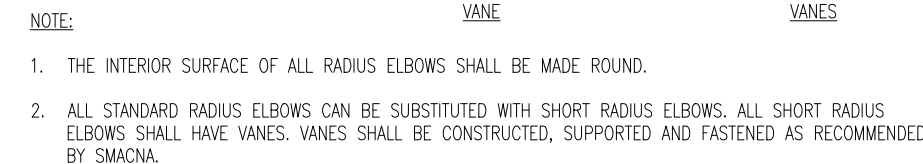
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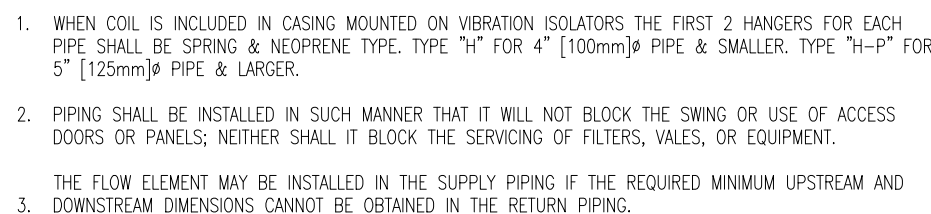
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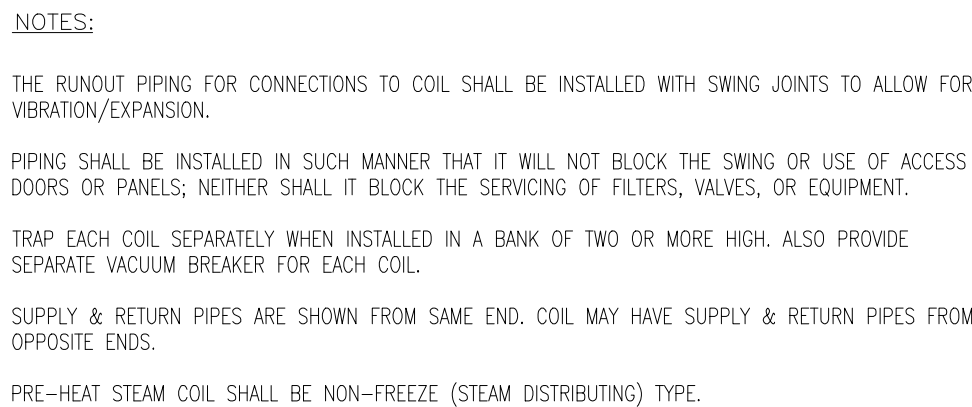
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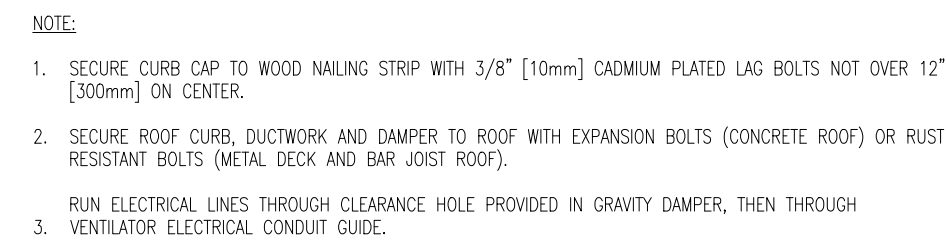
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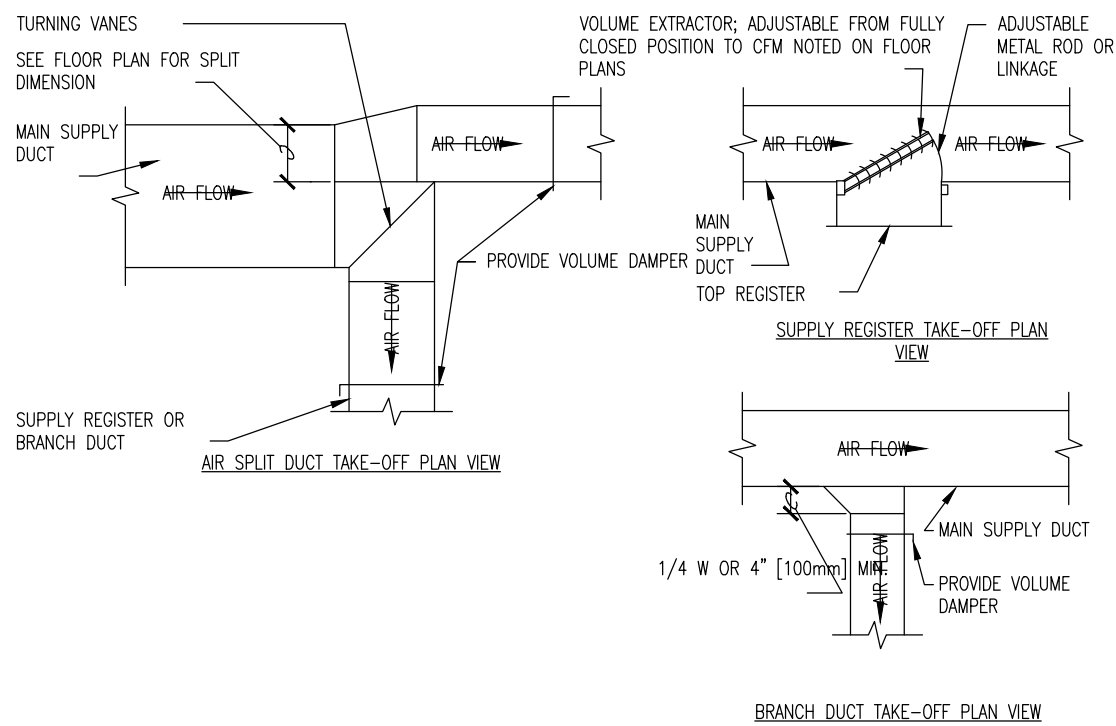


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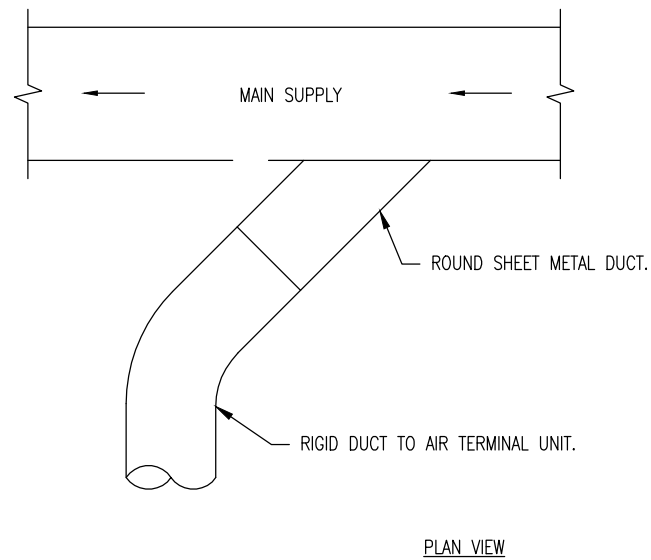
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13 SUPPLY DUCTWORK TAKE-OFFS

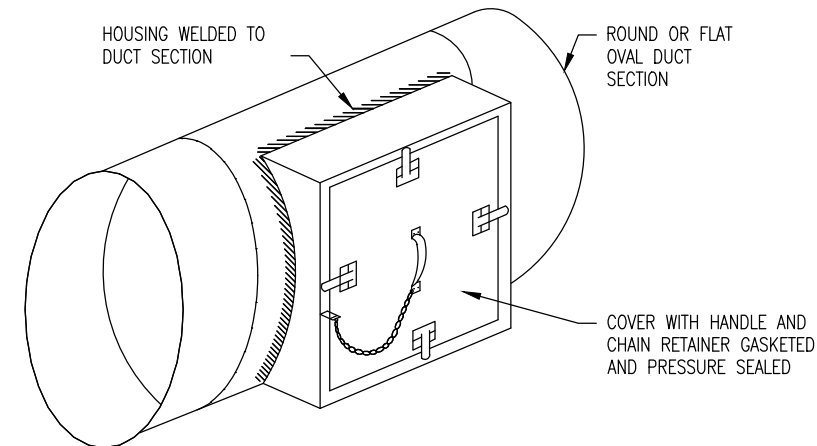
NTS DESIGNER'S NOTES:

1. THE SUPPLY REGISTER TAKE-OFF MAY BE USED FOR UP TO 25% OF THE MAIN DUCT CFM. THE BRANCH DUCT TAKE-OFF MAY BE USED FOR UP TO 15% OF THE MAIN DUCT CFM ANYTIME AND UP TO 40% WHEN THE MAIN DUCT VELOCITY IS 1000 FPM [5.1 M/S] OR LESS. THE AIR SPLIT DUCT TAKE-OFF SHALL BE USED IN ALL OTHER CASES AND MAY BE USED AT ANYTIME.
2. SHOW ALL VOLUME DAMPERS ON FLOOR PLANS.



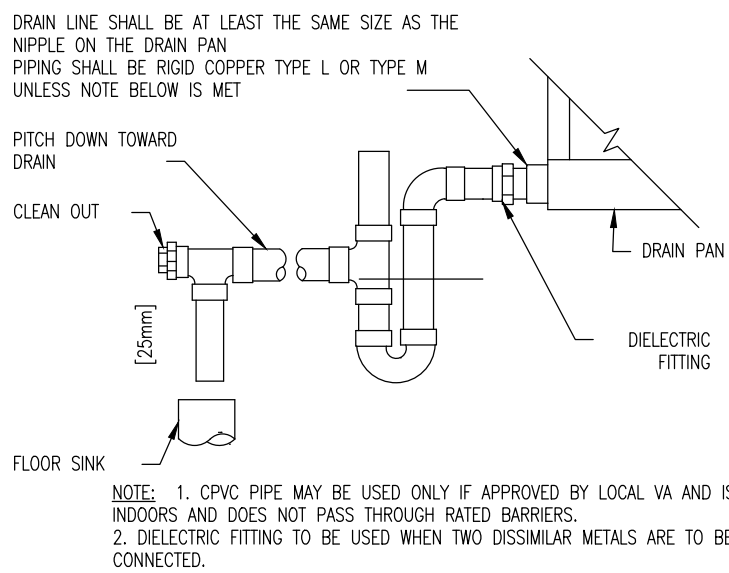
14 SUPPLY DUCT TAKEOFF - AIR TERMINAL UNIT

NTS



15 ACCESS SECTION FOR ROUND/OVAL DUCT

NTS

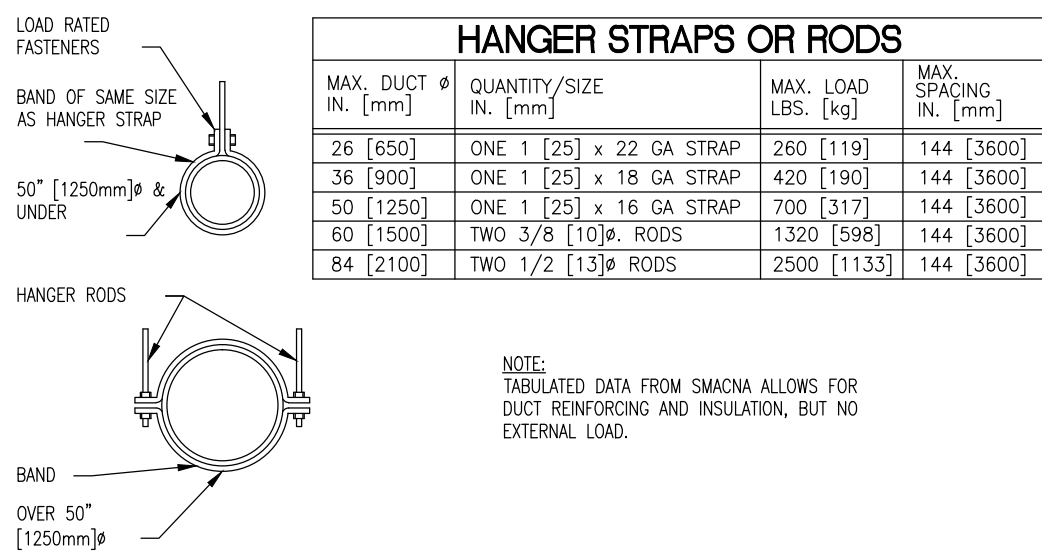


UNIT TYPE	A	B
DRAW THRU	2" [50mm] PLUS X	X
BLOW THRU	1" [25mm] MINIMUM	2X

WHERE X = STATIC PRESSURE IN PAN

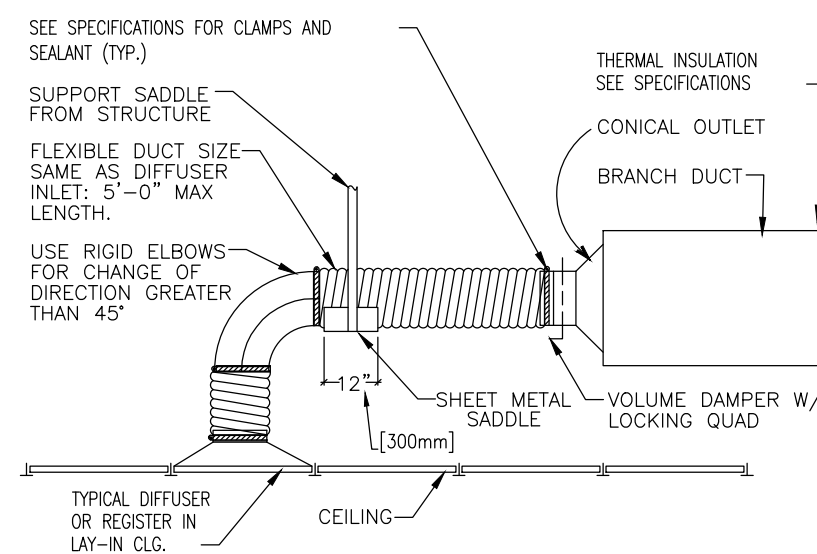
16 AIR HANDLING UNIT DRAIN TRAP DETAIL

NTS



17 ROUND DUCT HANGERS

NTS



NOTE: THE USE OF FLEXIBLE AIR DUCT CONNECTORS ARE NOT PERMITTED FOR THE DEDICATED AHU SERVING THE SURGICAL SUITE.

18 FLEXIBLE AIR DUCT CONNECTOR

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AMENDMENTS

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DETAILS

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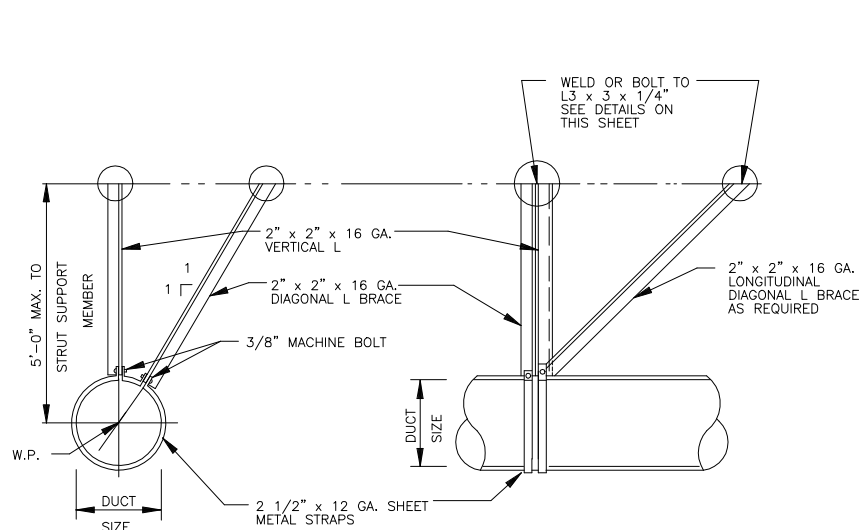
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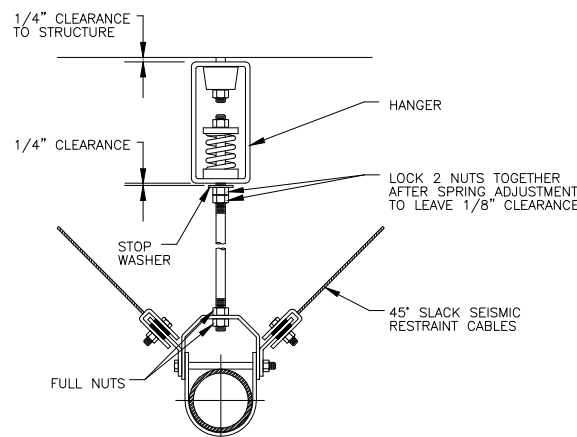
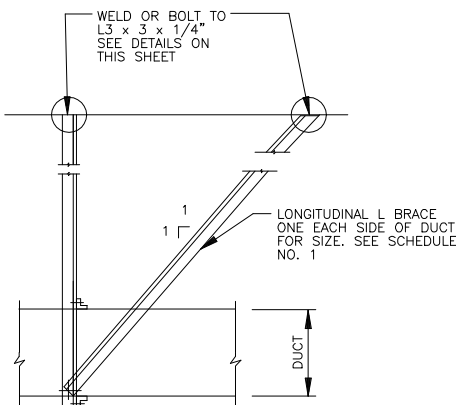
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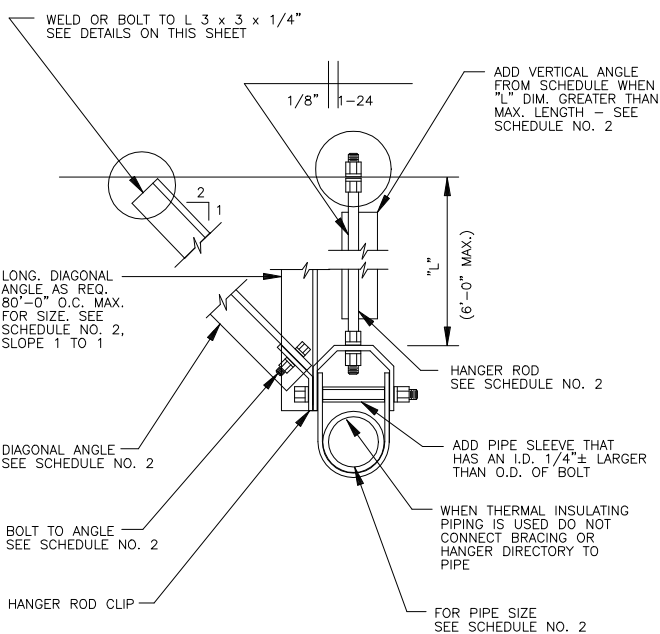


NOTE:
DETAILS FOR DUCTWORK 28" IN DIAMETER AND LARGER.

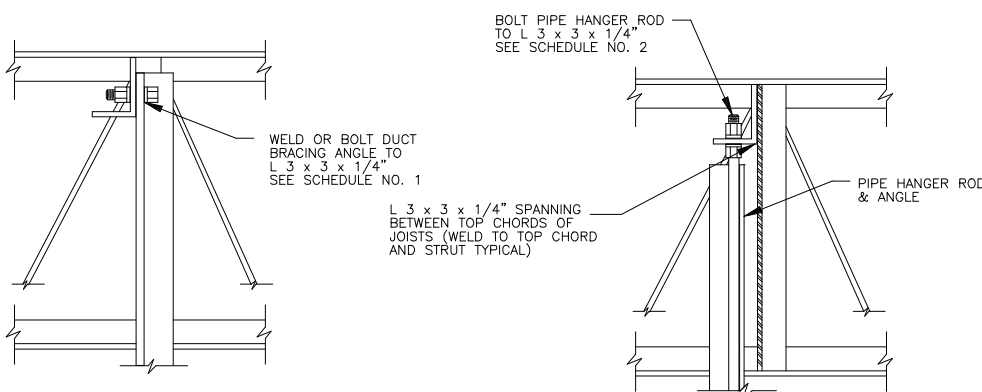
ROUND DUCT SUPPORT DETAILS



SEISMIC PIPE SUSPENSION DETAIL/SPRING HANGER



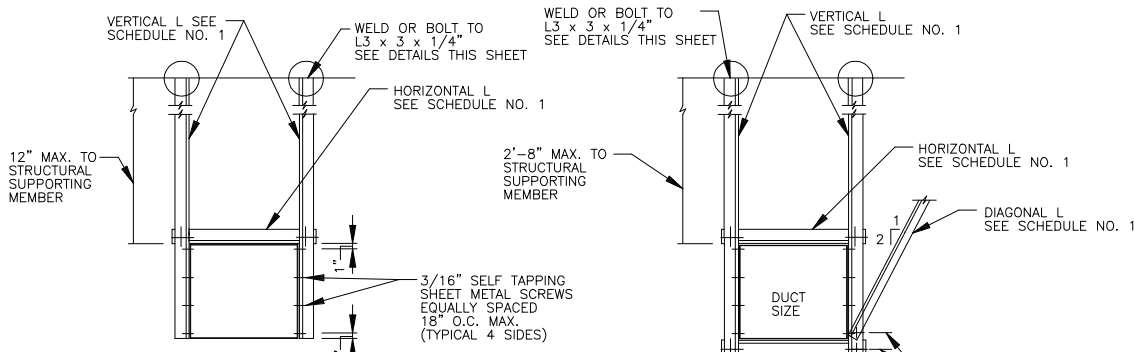
TYPICAL PIPE BRACING



DUCT SUPPORT

PIPE SUPPORT

TYP. ANGLE & JOINT CONNECTION



NOTE:
DETAILS FOR DUCT OVER 6 SQ. FT. CROSS SECTIONAL AREA.

RECTANGULAR DUCT SUPPORT DETAILS

TYPICAL NOTES FOR BRACING OF PIPES

- DETAILS SHOWN PROVIDE A LATERAL BRACING SYSTEM. A TYPICAL VERTICAL SUPPORT SYSTEM MUST ALSO BE USED. HOWEVER, WHERE BRACE OCCURS, THE VERTICAL ANGLE SHOWN MAY BE REPLACE A TYPICAL VERTICAL SUPPORT.
- TRANSVERSE BRACING AT 40'-0" O.C. MAXIMUM.
- LONGITUDINAL BRACING AT 80'-0" O.C. MAXIMUM.
- TRANSVERSE BRACING FOR ONE PIPE SECTION MAY ALSO ACT AS LONGITUDINAL BRACING FOR THE PIPE SECTION CONNECTED PERPENDICULAR TO IT. IF THE BRACING IS INSTALLED WITHIN 24" OF THE ELBOW OR TEE AND SIMILAR SIZE.
DO NOT USE BRANCH LINES TO BRACE MAIN LINES.
- PROVIDE FLEXIBILITY IN JOINTS WHERE PIPES PASS THROUGH BUILDING SEISMIC OR EXPANSION JOINTS, OR WHERE RIGIDLY SUPPORTED PIPES CONNECT TO EQUIPMENT WITH VIBRATION ISOLATORS.
- DO NOT FASTEN ONE RIGID PIPING SYSTEM TO TWO DISSIMILAR PARTS OF A BUILDING THAT MAY RESPOND IN A DIFFERENT MODE DURING AN EARTHQUAKE, FOR EXAMPLE, A WALL AND A ROOF.
- BRACING DETAILS, SCHEDULE, AND NOTES ARE TO BE USED WITH THE FOLLOWING TYPES OF PIPE: STEEL PIPE SCHEDULE 40, AND COPPER PIPE TYPE "L" (ONLY SILVER SOLDERED BRACED JOINTS TO BE USED WITH COPPER PIPE).
-

SCHEDULE NO. 2 BRACING FOR PIPING

PIPE SIZE IN.	HANGER TYPE	BOLT TO ANGLE	VERTICAL ANGLE	DIAGONAL ANGLE	LONGITUDINAL ANGLE	ROD SIZE	MAX. LENGTH FOR RODS
2 1/2	CLEVIS TYPE	3/8"	2x2x16GA.	2x2x16GA.	2 1/2x2 1/2x16GA.	1/2"	25"
3	CLEVIS TYPE	3/8"	2x2x16GA.	2x2x16GA.	2 1/2x2 1/2x16GA.	1/2"	25"
4	CLEVIS TYPE	3/8"	2x2x16GA.	2x2x16GA.	2 1/2x2 1/2x16GA.	5/8"	31"
5	CLEVIS TYPE	1/2"	2x2x16GA.	3x3x16GA.	2 1/2x2 1/2x16GA.	5/8"	31"
6	CLEVIS TYPE	1/2"	2 1/2x2 1/2x16GA.	2 1/2x2 1/2x16GA.	2 1/2x2 1/2x16GA.	3/4"	37"
8	CLEVIS TYPE	5/8"	2 1/2x2 1/2x12GA.	2 1/2x2 1/2x12GA.	2 1/2x2 1/2x12GA.	7/8"	43"

ALL HOLES IN ANGLES 1/16" OVERSIZE MAX. PLACE STANDARD CUT WASHERS BETWEEN SHEETMETAL ANGLES AND NUTS.

MIN. EDGE DISTANCE FOR BOLTS
1/4" - 1" 5/8" - 1 1/8"
3/8" - 1" 3/4" - 1 1/4"
1/2" - 1" 7/8" - 1 1/2"

TYPICAL NOTES FOR BRACING OF DUCTS

- DETAILS SHOWN PROVIDE A LATERAL BRACING SYSTEM. A TYPICAL VERTICAL SUPPORT SYSTEM MUST ALSO BE USED. HOWEVER, WHERE BRACING OCCURS, THE VERTICAL ANGLE SHOWN MAY REPLACE A TYPICAL SUPPORT. THIS INCLUDES A TRAPEZOIDAL VERTICAL SUPPORTING SYSTEM.
- TRANSVERSE BRACING TO OCCUR 30'-0" O.C. MAXIMUM. TRANSVERSE BRACING SHALL BE INSTALLED AT EACH DUCT TURN AND AT EACH END OF A DUCT RUN.
- LONGITUDINAL BRACING SHALL OCCUR 60'-0" MAXIMUM. TRANSVERSE BRACING FOR ONE DUCT SECTION MAY ALSO ACT AS LONGITUDINAL BRACING FOR A DUCT SECTION CONNECTED PERPENDICULAR TO IT. IF THE BRACING IS INSTALLED WITHIN FOUR FEET OF THE INTERSECTION OF BOTH DUCTS AND THE BRACING IS USED FOR THE LARGER DUCT.
NO BRACING IS REQUIRED IF THE TOP OF DUCT IS SUSPENDED 12" OR LESS FROM THE SUPPORTING STRUCTURAL MEMBER AND ATTACHED TO TOP OF DUCT.
- A GROUP OF DUCTS MAY BE COMBINED IN A LARGER SIZE FRAME USING THE OVERALL DIMENSIONS WITH MAXIMUM WEIGHT FOR SELECTION OF THE MEMBERS FROM THE SCHEDULE NO. 1 THIS SHEET.
- WALLS (INCLUDING OFFBOARD NON-BEARING PARTITIONS) WHICH HAVE DUCTS RUNNING THRU THEM MAY REPLACE A TYPICAL TRANSVERSE BRACE.
- WHERE IT IS PRACTICAL TO DO SO, DUCTS AND PIPES NOT BRACED SHALL BE INSTALLED WITH A 6" MINIMUM CLEARANCE TO VERTICAL CEILING HANGER WIRES.
-

SCHEDULE NO.1 SIDE BRACING FOR RECTANGULAR DUCTS

DUCT SIZE SQ. FT.	VERTICAL & LONGITUDINAL ANGLES	DIAGONAL ANGLE	HORIZONTAL ANGLE	BOLT SIZE DIA.	WT. PER LINEAR FEET*
30"	2x2x16GA.	2x2x16GA.	2x2x16GA.	1/4"	13
42"	2 1/2x2 1/2x16GA.	2 1/2x2 1/2x16GA.	2 1/2x2 1/2x16GA.	1/4"	20
54"	2 1/2x2 1/2x16GA.	2 1/2x2 1/2x16GA.	2 1/2x2 1/2x16GA.	3/8"	27
60"	3x3x16GA.	3x3x16GA.	3x3x16GA.	3/8"	36
84"	4x4x14GA.	4x4x14GA.	4x4x14GA.	3/8"	53
96"	4x4x12GA.	4x4x12GA.	4x4x12GA.	1/2"	80

* MAX. WEIGHTS OF DUCT OR COMBINATIONS OF DUCTS PER LINEAR FOOT.
** THE DUCTS MAX. DIMENSION SHALL GOVERN WHAT BRACING IS REQUIRED.
EXAMPLE: A 36" x 60" DUCT SHALL BE BRACED AS A 60" SQUARE DUCT.

SEISMIC REQUIREMENTS APPLY ONLY TO NEWLY-INSTALLED SYSTEMS.

NOTE: CONTRACTOR SHALL SECURE THE SERVICES OF AN ENGINEER REGISTERED WITH THE APPLICABLE STATE TO PROVIDE SEALED AND SIGNED SHOP DRAWINGS OF ALL SUBMITTED SEISMIC SUPPORT SYSTEMS. THE DRAWINGS SHALL SHOW DETAILS OF THE SUBMITTED SYSTEM, LOCATION OF EACH SUPPORT, AND IDENTIFICATION OF SUPPORT TYPE (LONGITUDINAL AND/OR TRANSVERSE). SHOP DRAWINGS SHALL BE SUBMITTED TO THE CODE ENFORCEMENT OFFICE FOR APPROVAL. SMACNA SEISMIC RESTRAINT MANUAL, SECOND EDITION, OR LATEST REVISION MAY BE USED AS A GUIDE FOR GENERAL SEISMIC SUPPORT DETAIL AND SUPPORT SPACING RECOMMENDATIONS.

DETAILS

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DRAWING 6 OF 12

- NOTES:
1. PROVIDE NEW SUPPLY AND RETURN DUCTWORK. PROVIDE BALANCEING DAMPERS ON ALL BRANCH DUCTS. SEE DETAILS 3, 7, 8, 9, 13, 14, 15, 17, 18, AND 19 FOR DUCT CONSTRUCTION STANDARDS.
 2. PROVIDE NEW PIPING TO COILS. SEE DETAILS 10 AND 11 FOR COIL CONNECTIONS.
 3. PROVIDE CONDENSATE DRAIN FOR COOLING COIL SEE DETAIL 16. PIPE TO SAME DRAIN THAT H&V 34 WAS CONNECTED TO.
 3. OUTSIDE AIR DUCT TO BE CONNECTED TO EXISTING H&V 34 OUTSIDE AIR DUCT.
 4. PROVIDE VFD FOR FAN. CONNECT TO EXISTING DISCONNECT FOR H&V UNIT 34.

PROVIDE NEW AIR LAUNDRY AIR HANDLING UNIT CONNECT TO EXISTING PIPING. HANG EQUIPMENT FROM CEILING ABOVE.

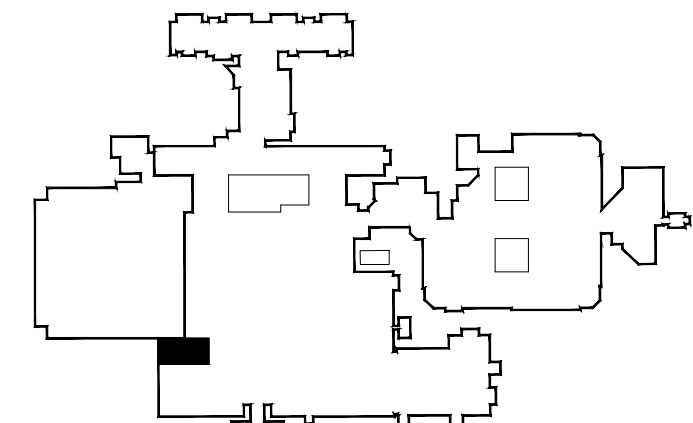
PROVIDE RELIEF AIR LOUVER AND BACKDRAFT DAMPER ABOVE DOOR.

NEW WORK 1/8" = 1'

DEMO EXISTING H&V UNITS 34 AND 35. OUTSIDE AIR INTAKE FOR H&V 34 TO USED FOR NEW AHU. OUTSIDE AIR INTAKE FOR H&V 35 TO BE CAPPED OFF. ALL SUPPLY DUCTWORK TO BE DEMOED. ALL PIPING VALVES AND APPURTENANCES TO BE DEMOED. REPAIR DROP CEILING AFTER DEMO.

DEMO EXISTING FAN COIL UNIT AND FLEX DUCT ABOVE CEILING. REMOVE EXISTING GRILLES AND REPLACE WITH CEILING TILE.

DEMO WORK 1/8" = 1'



KEY PLAN

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BUILDING 1 GROUND FLOOR LAUNDRY

REPLACE MECH
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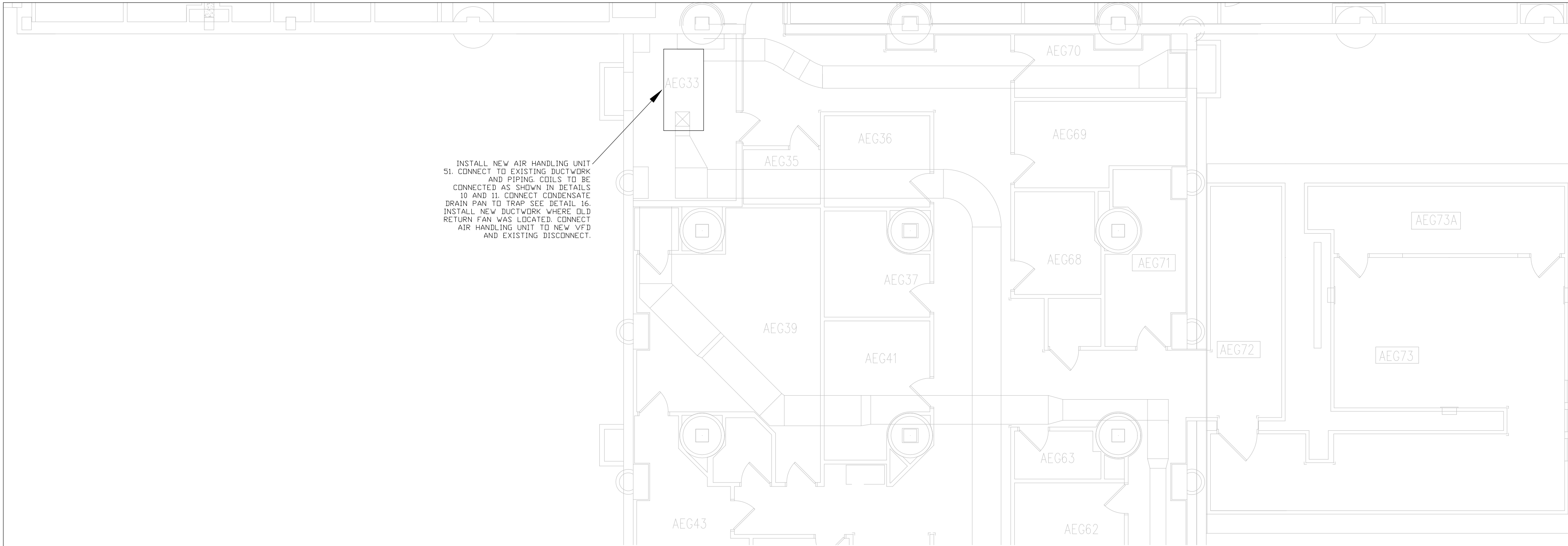
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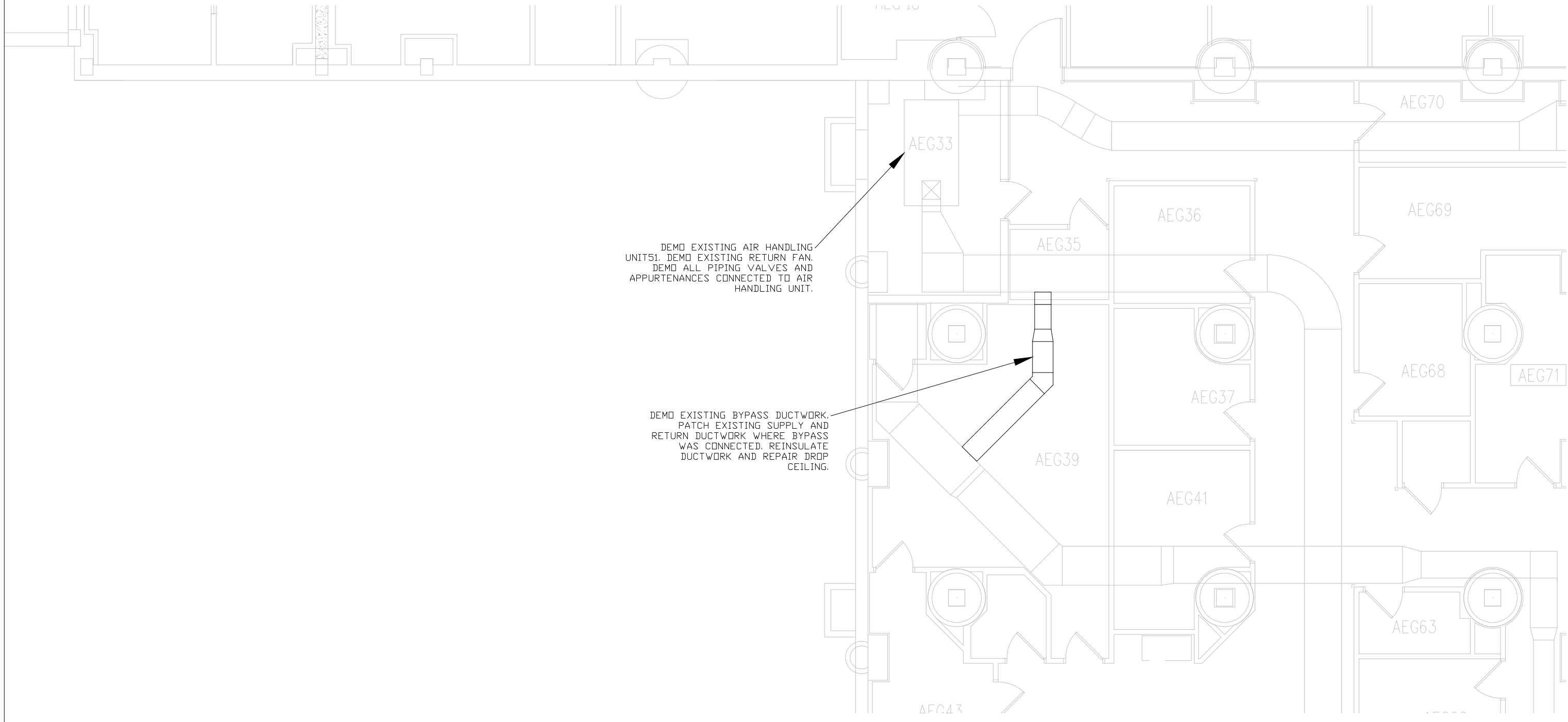
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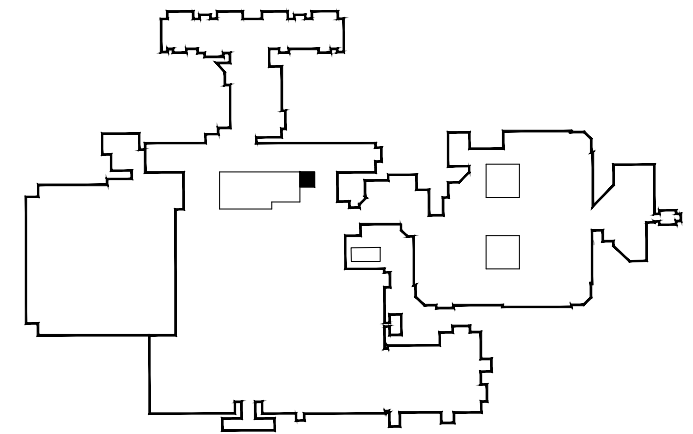
DRAWING 7 OF 12



NEW WORK 1/8" = 1'



DEMO WORK 1/8" = 1'



KEY PLAN

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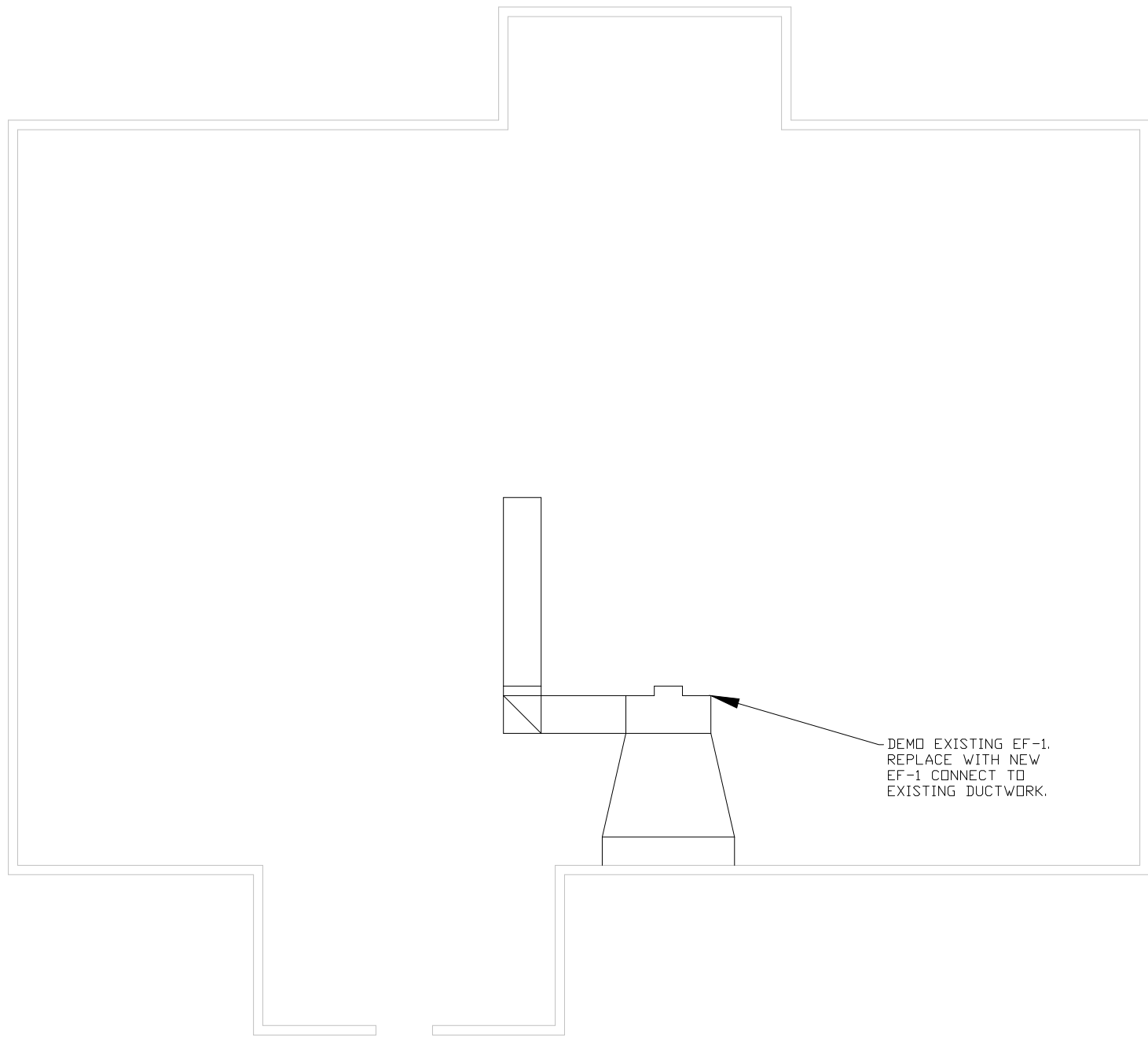
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BUILDING 1 GROUND FLOOR RADIATION ONCOLOGY

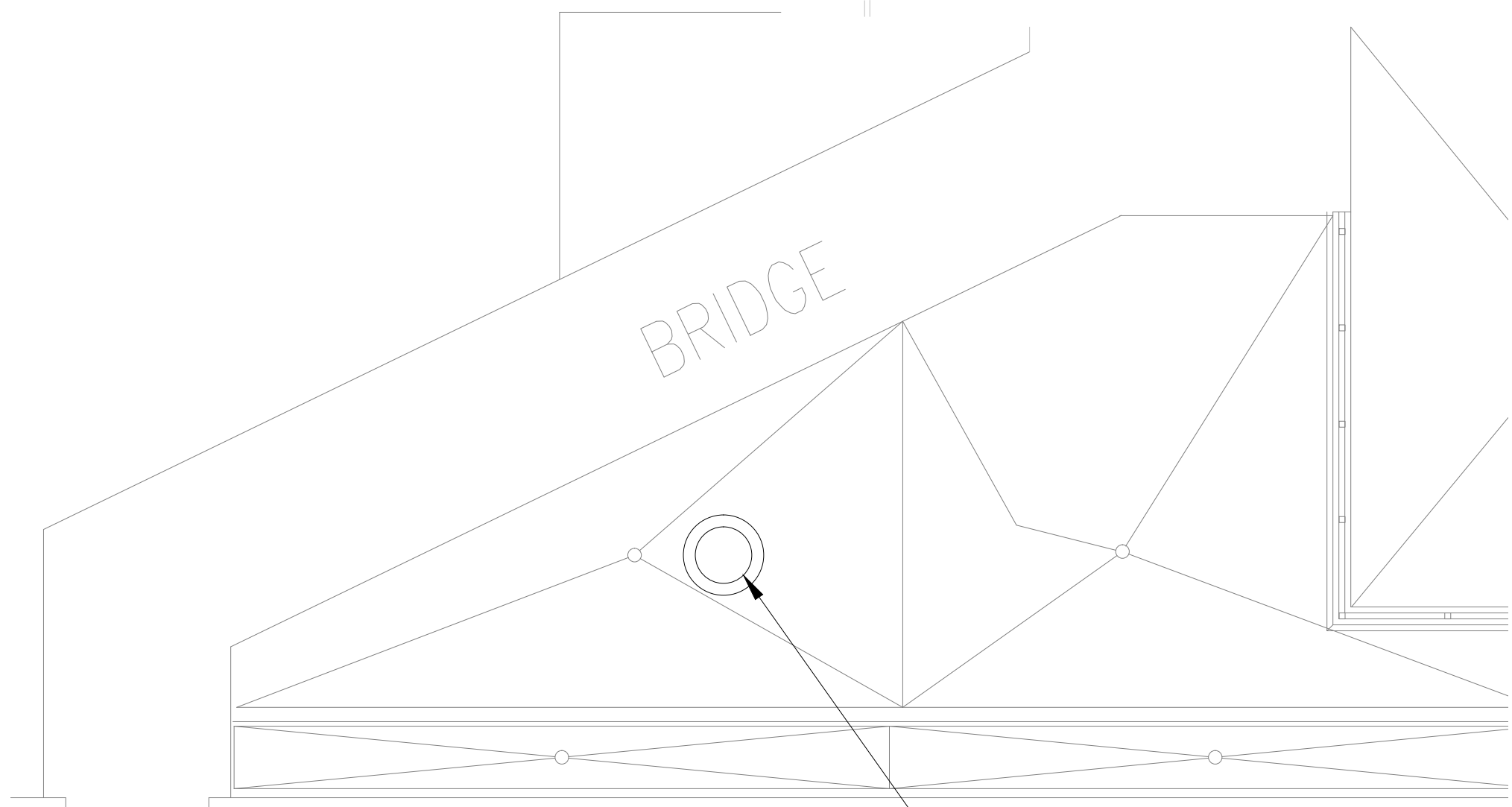
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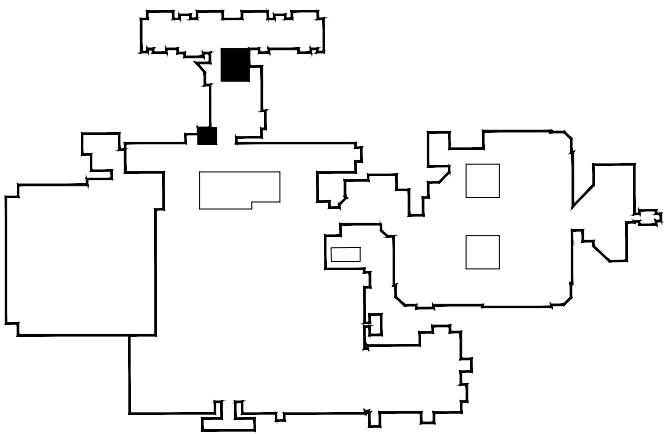
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DRAWING 8 OF 11



PENTHOUSE 1/8" = 1'



TRANSFORMER ROOM ROOF NOT TO SCALE



KEY PLAN

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BUILDING 5 EXHAUST FANS

REPLACE MECH
EQUIPMENT AND
MOTORS

SCALE: 1/8" = 1'

DATE DEC 2011

DRAWN BY S. NEYHART

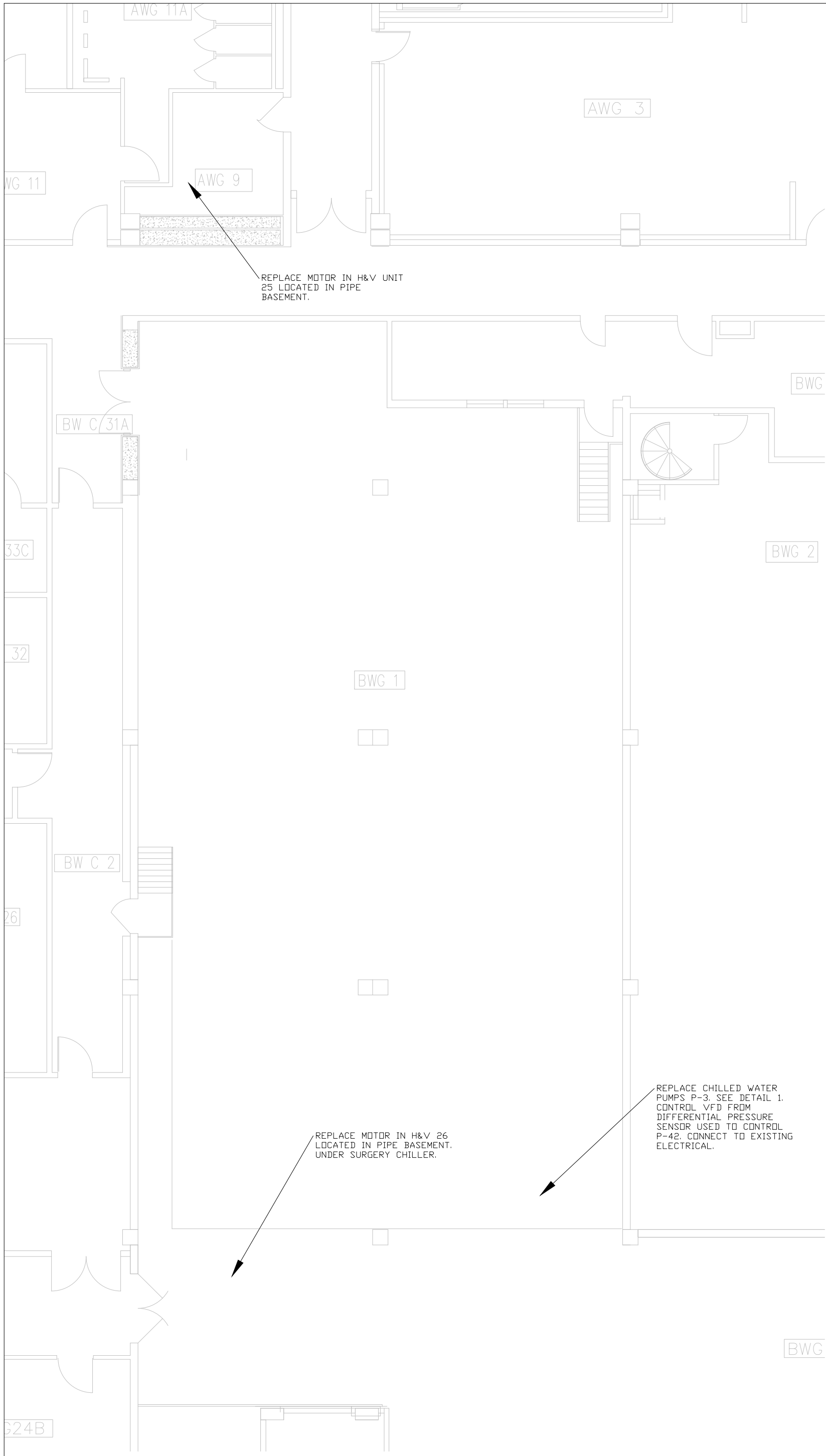
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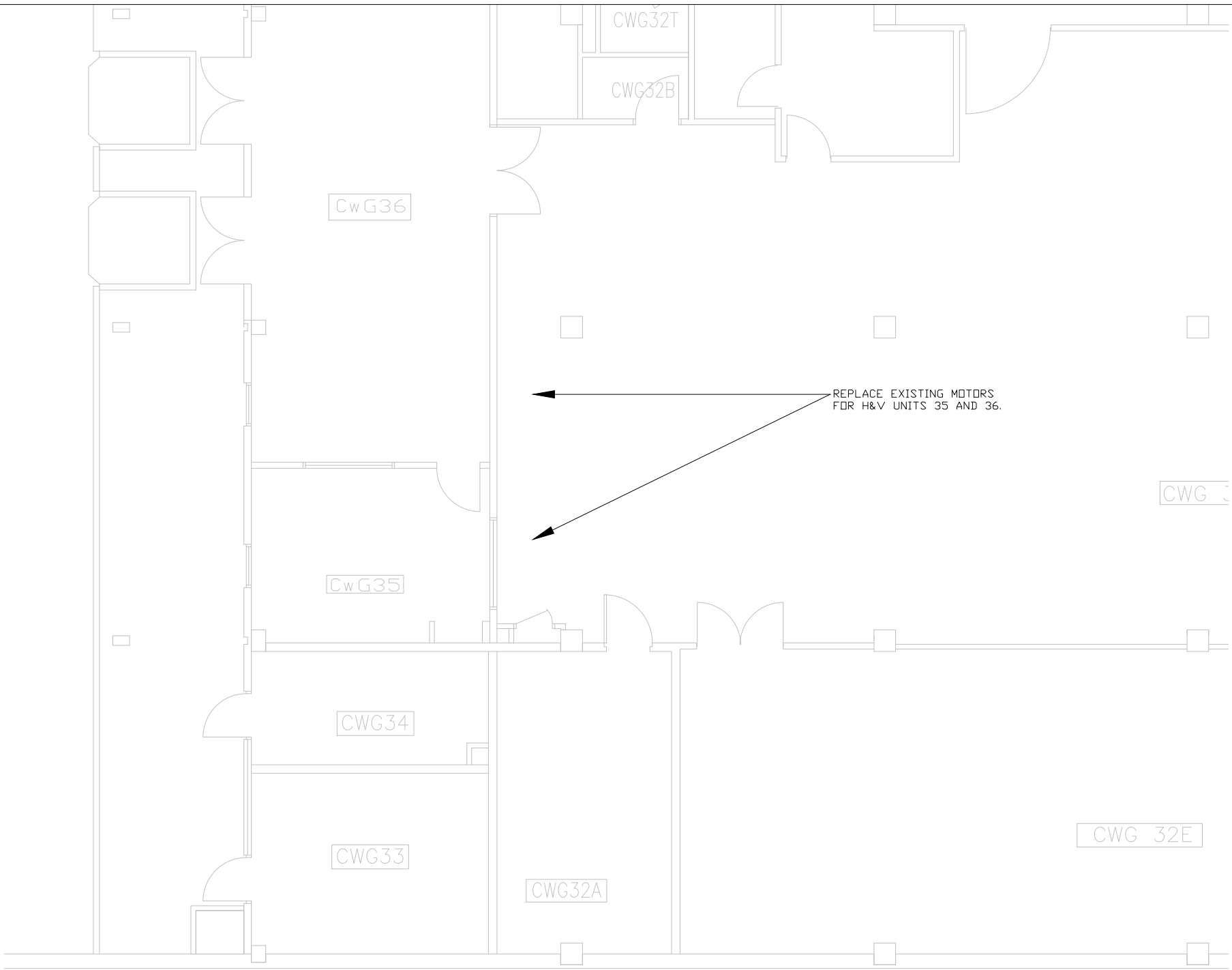
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9

DRAWING 9 OF 12

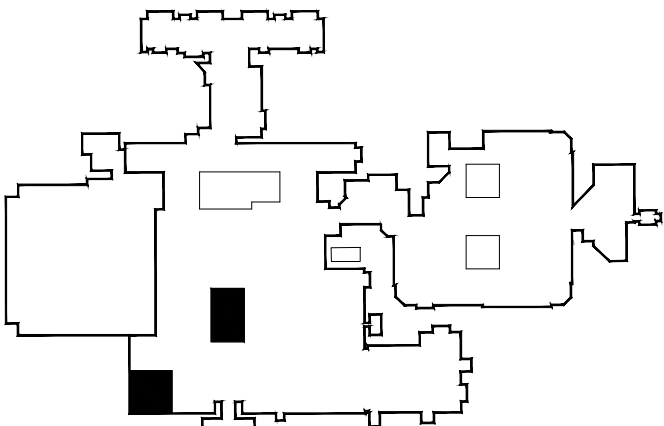


PIPE BASEMENT OLD CHILLER PLANT PUMP AND
MOTOR REPLACEMENTS 1/8" = 1'



WAREHOUSE H&V UNITS MOTOR REPLACEMENT

1/8" = 1'



KEY PLAN

V A M C
1030 JEFFERSON AV.
MEMPHIS, TN. 38104

AMENDMENTS

1	
2	
3	
4	
5	
6	
7	
8	

BUILDING 1 MOTOR REPLACEMENT

REPLACE MECH
EQUIPMENT AND
MOTORS

SCALE: 1/8" = 1'

DATE DEC 2011

DRAWN BY S. NEYHART

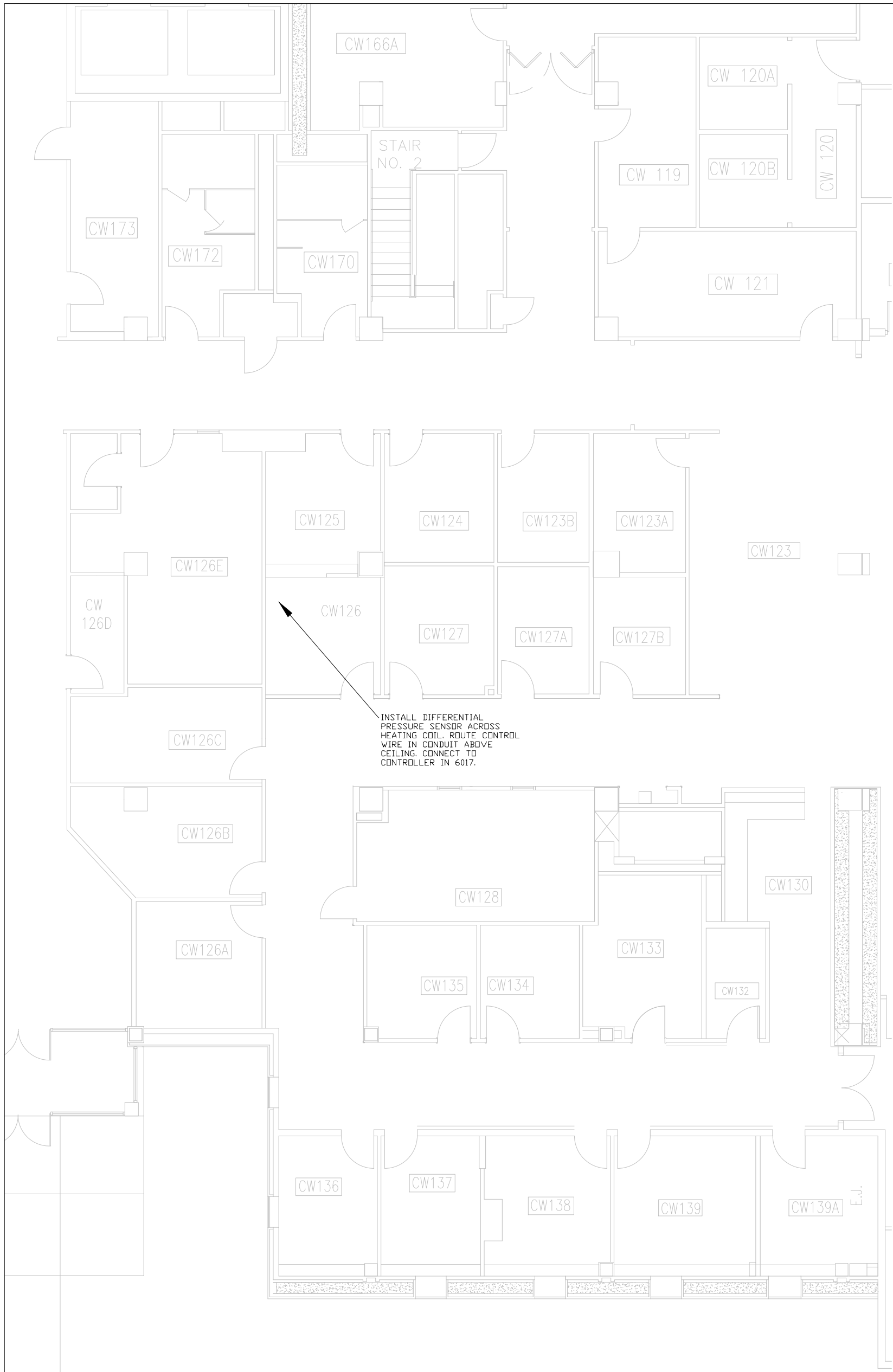
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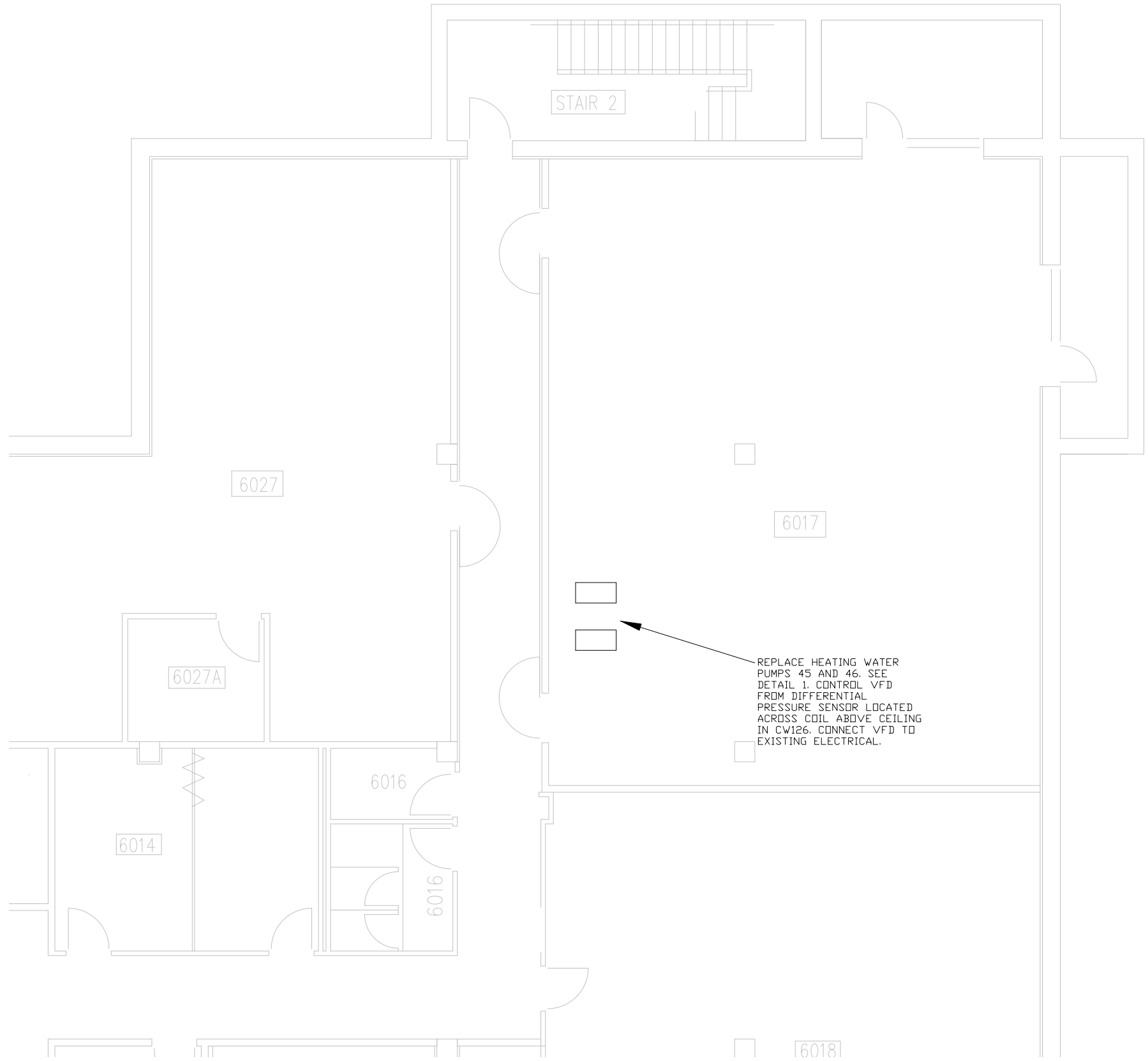
DRAWING NO.

10

DRAWING 10 OF 12

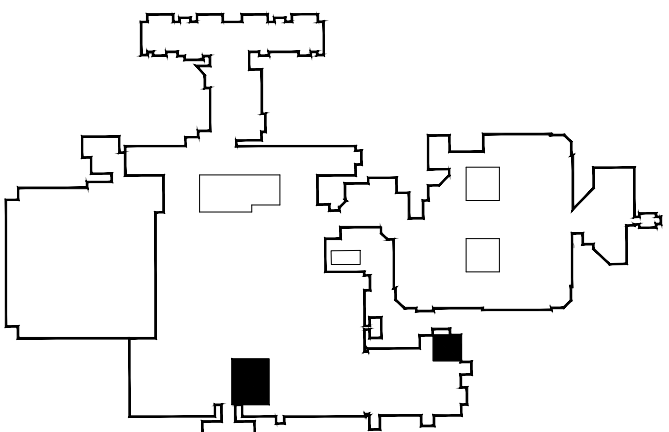


BUIDLING 1 FIRST FLOOR 1/8" = 1'



AMBULATORY CARE PUMP REPLACEMENT

1/8" = 1'



KEY PLAN

VAMC
1030 JEFFERSON AV.
MEMPHIS, TN. 38104

AMENDMENTS

1	
2	
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5	
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7	
8	

AMBULATORY CARE PUMP REPLACEMENT

REPLACE MECH
EQUIPMENT AND
MOTORS

SCALE: 1/8" = 1'

DATE DEC 2011

DRAWN BY S. NEYHART

CHECKED BY

ACAD FILE NAME XXXXX

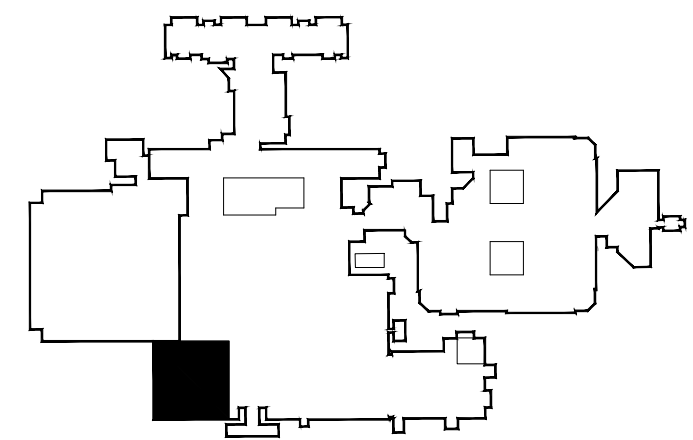
DRAWING NO.

11

DRAWING 11 OF 12



BUIDLING 1 SECOND FLOOR 1/8" = 1'



KEY PLAN

V A M C
1030 JEFFERSON AV.
MEMPHIS, TN. 38104

AMENDMENTS

1	
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3	
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BUILDING 1 2ND FLOOR PUMP REPLACEMENT

REPLACE MECH
EQUIPMENT AND
MOTORS

SCALE:- 1/8" = 1'

DATE DEC 2011

DRAWN BY S. NEYHART

CHECKED BY

ACAD FILE NAME
XXXXX

DRAWING NO.

12

DRAWING 12 OF 12