



**ARNOLD AND
O'SHERIDAN INC.**
MECHANICAL ■ CIVIL ■ HVAC ■ PLUMBING
ELECTRICAL ■ TECHNOLOGY

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Consultant:

RETRO-COMMISSIONING PROJECT

AIR HANDLING UNIT RETROFIT

CITY-COUNTY BUILDING

MADISON, WISCONSIN

OWNER: DANE COUNTY, WISCONSIN

Sheet Title:
**SYMBOLS,
ABBREVIATIONS, AND
SHEET INDEX**

Revisions:		No.	Date	Description	By:
Δ	00-00-00	-			ABC

Project Number:	101121A	Designed By:	A&O
Date Issued:	11-30-10	Reviewed By:	MAH

Sheet Number:
H0.0

ABBREVIATIONS

A	COMPRESSED AIR	FA	FRESH AIR	KA	NOISE CRITERIA
ACC	AIR COOLED COMPRESSOR	FAB	FRESH AIR BLOWER	KB	NOMINALLY CLOSED
ACT	AIR CONDITIONING UNIT	FAC	FRESH AIR CONTROL	KC	NOMINALLY OPEN
ADU	AIR DISTRIBUTION UNIT	FAD	FRESH AIR DAMPER	ND	NOMINAL PANEL LOAD VALUE
ADJ	ADJUSTABLE	FAN	FAN	OE	OVERHEAD
AE	AIR EXHAUST	FAN COU	FAN COUPLER	OC	OUTDOOR AIR
AF	AIR FILTER	FAN DAMP	FAN DAMPER	OD	OUTDOOR AIR
AFI	AIR FILTER INLET	FAN DIS	FAN DISCONNECT	OC	OUTDOOR AIR
AFR	AIR FILTER RETURN	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AFS	AIR FILTER SPLIT	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AHJ	AIR HANDLING UNIT	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AHU	AIR HANDLING UNIT	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AIP	AIR INLET	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP	ACCESS PANEL	FAN FAN	FAN FAN	OC	OUTDOOR AIR
APB	ACCESS PANEL BLOWER	FAN FAN	FAN FAN	OC	OUTDOOR AIR
APC	AIR PRESSURE CONTROL	FAN FAN	FAN FAN	OC	OUTDOOR AIR
APR	AIR PRESSURE RETURN	FAN FAN	FAN FAN	OC	OUTDOOR AIR
APV	AIR PRESSURE VALVE	FAN FAN	FAN FAN	OC	OUTDOOR AIR
APW	AIR PRESSURE WINDSTOPPER	FAN FAN	FAN FAN	OC	OUTDOOR AIR
APX	AIR PRESSURE EXHAUST	FAN FAN	FAN FAN	OC	OUTDOOR AIR
APY	AIR PRESSURE YIELD	FAN FAN	FAN FAN	OC	OUTDOOR AIR
APZ	AIR PRESSURE ZONE	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP1	AIR PRESSURE POINT 1	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP2	AIR PRESSURE POINT 2	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP3	AIR PRESSURE POINT 3	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP4	AIR PRESSURE POINT 4	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP5	AIR PRESSURE POINT 5	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP6	AIR PRESSURE POINT 6	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP7	AIR PRESSURE POINT 7	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP8	AIR PRESSURE POINT 8	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP9	AIR PRESSURE POINT 9	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP10	AIR PRESSURE POINT 10	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP11	AIR PRESSURE POINT 11	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP12	AIR PRESSURE POINT 12	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP13	AIR PRESSURE POINT 13	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP14	AIR PRESSURE POINT 14	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP15	AIR PRESSURE POINT 15	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP16	AIR PRESSURE POINT 16	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP17	AIR PRESSURE POINT 17	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP18	AIR PRESSURE POINT 18	FAN FAN	FAN FAN	OC	OUTDOOR AIR
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AP36	AIR PRESSURE POINT 36	FAN FAN	FAN FAN	OC	OUTDOOR AIR
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AP60	AIR PRESSURE POINT 60	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP61	AIR PRESSURE POINT 61	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP62	AIR PRESSURE POINT 62	FAN FAN	FAN FAN	OC	OUTDOOR AIR
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AP87	AIR PRESSURE POINT 87	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP88	AIR PRESSURE POINT 88	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP89	AIR PRESSURE POINT 89	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP90	AIR PRESSURE POINT 90	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP91	AIR PRESSURE POINT 91	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP92	AIR PRESSURE POINT 92	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP93	AIR PRESSURE POINT 93	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP94	AIR PRESSURE POINT 94	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP95	AIR PRESSURE POINT 95	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP96	AIR PRESSURE POINT 96	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP97	AIR PRESSURE POINT 97	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP98	AIR PRESSURE POINT 98	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP99	AIR PRESSURE POINT 99	FAN FAN	FAN FAN	OC	OUTDOOR AIR
AP100	AIR PRESSURE POINT 100	FAN FAN	FAN FAN	OC	OUTDOOR AIR

GENERAL SYMBOLS

①	TEMPERATURE OR TEMPERATURE SENSOR	①	TEMPERATURE SENSOR
②	TEMPERATURE OR TEMPERATURE SENSOR WITH SECURITY COVER	②	TEMPERATURE SENSOR
③	HANDHOLD OR HANDY SENSOR	③	TEMPERATURE SENSOR
④	HANDHOLD OR HANDY SENSOR WITH SECURITY COVER	④	TEMPERATURE SENSOR
⑤	WORK STARTER	⑤	TEMPERATURE SENSOR
⑥	SPEED CONTROLLER	⑥	TEMPERATURE SENSOR
⑦	START/STOP SWITCH	⑦	TEMPERATURE SENSOR
⑧	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	⑧	TEMPERATURE SENSOR
⑨	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	⑨	TEMPERATURE SENSOR
⑩	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	⑩	TEMPERATURE SENSOR
⑪	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	⑪	TEMPERATURE SENSOR
⑫	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	⑫	TEMPERATURE SENSOR
⑬	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	⑬	TEMPERATURE SENSOR
⑭	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	⑭	TEMPERATURE SENSOR
⑮	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	⑮	TEMPERATURE SENSOR
⑯	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	⑯	TEMPERATURE SENSOR
⑰	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	⑰	TEMPERATURE SENSOR
⑱	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	⑱	TEMPERATURE SENSOR
⑲	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	⑲	TEMPERATURE SENSOR
⑳	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	⑳	TEMPERATURE SENSOR
㉑	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㉑	TEMPERATURE SENSOR
㉒	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㉒	TEMPERATURE SENSOR
㉓	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㉓	TEMPERATURE SENSOR
㉔	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㉔	TEMPERATURE SENSOR
㉕	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㉕	TEMPERATURE SENSOR
㉖	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㉖	TEMPERATURE SENSOR
㉗	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㉗	TEMPERATURE SENSOR
㉘	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㉘	TEMPERATURE SENSOR
㉙	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㉙	TEMPERATURE SENSOR
㉚	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㉚	TEMPERATURE SENSOR
㉛	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㉛	TEMPERATURE SENSOR
㉜	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㉜	TEMPERATURE SENSOR
㉝	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㉝	TEMPERATURE SENSOR
㉞	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㉞	TEMPERATURE SENSOR
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㊳	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㊳	TEMPERATURE SENSOR
㊴	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㊴	TEMPERATURE SENSOR
㊵	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㊵	TEMPERATURE SENSOR
㊶	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㊶	TEMPERATURE SENSOR
㊷	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㊷	TEMPERATURE SENSOR
㊸	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㊸	TEMPERATURE SENSOR
㊹	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㊹	TEMPERATURE SENSOR
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㊼	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㊼	TEMPERATURE SENSOR
㊽	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㊽	TEMPERATURE SENSOR
㊾	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㊾	TEMPERATURE SENSOR
㊿	EXISTING TO BE REMOVED EQUIPMENT (REMOVE TO NEW EQUIPMENT)	㊿	TEMPERATURE SENSOR

DUCTWORK SYSTEMS

	AXIAL FLOW FAN
	DUCT SIZE (FIRST FIGURE IS SIZE SHOWN)
	ROUND DUCT
	OVAL DUCT
	CHANGE OF ELEVATION IN DIRECTION OF AIR FLOW
	ACCESS DOOR, VERTICAL OR HORIZONTAL
	ACOUSTICAL DUCT LINER
	DUCT LAGGING
	FLEXIBLE CONNECTION
	DUCT SOUND ATTENUATOR
	DUCT TRANSITION (DOUBLE LINE)
	DUCT TRANSITION (RECT. TO ROUND)
	DUCT TRANSITION (SINGLE LINE)
	HOOD DAMPER
	BACK DRAFT DAMPER
	DIFFERENTIAL PRESSURE SENSOR
	MOTOR OPERATED DAMPER
	MANUAL VOLUME DAMPER
	SMOKE REFLECTOR
	SMOKE DAMPER
	FIRE DAMPER
	COMBINATION FIRE/SMOKE DAMPER



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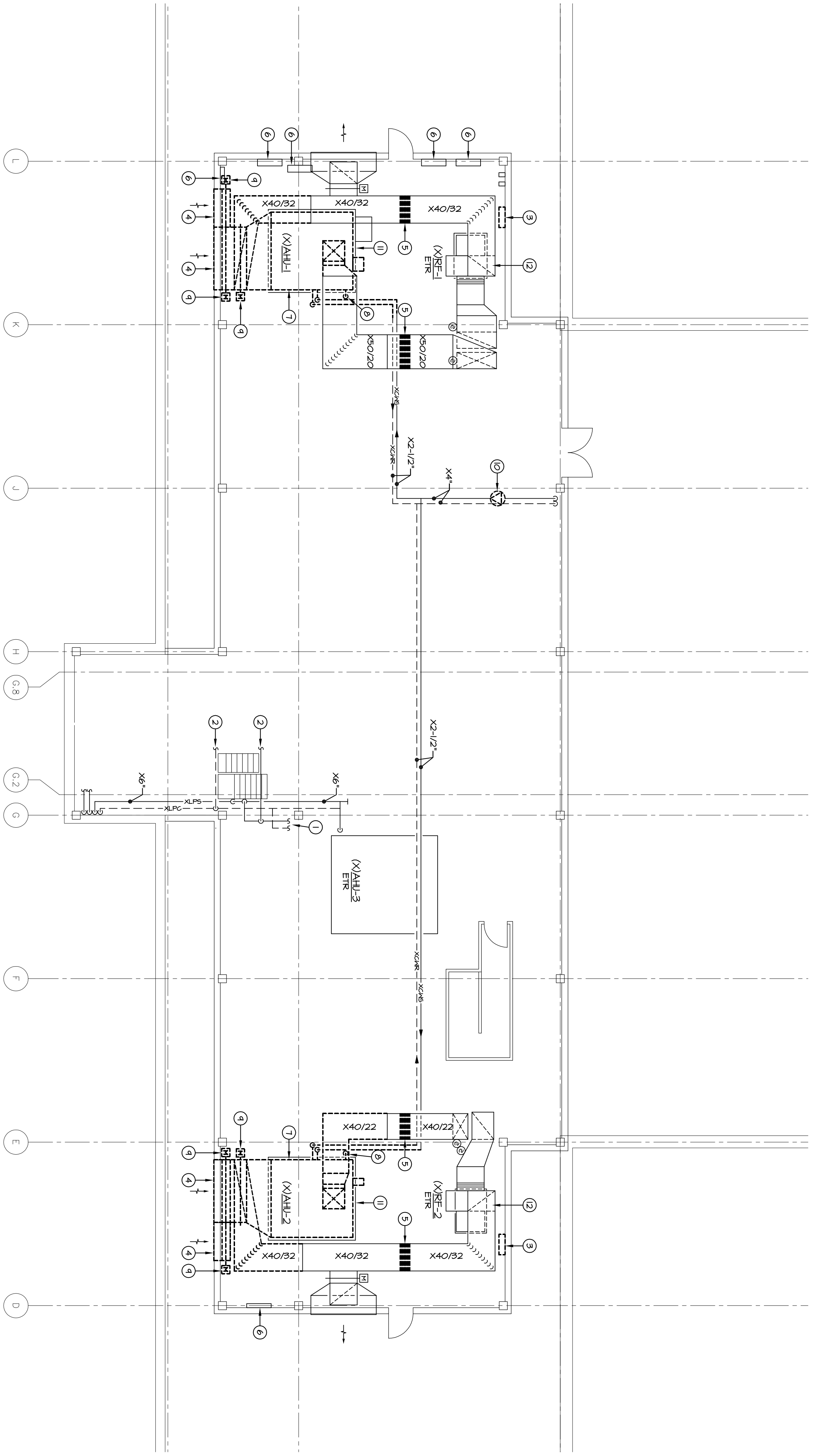
Sheet Title:
**PENTHOUSE
DEMOLITION
PLAN**

Revisions:	No.	Date	Description	By:
	1	00-00-00	-	AJC

Project Number:	101121A	Designed By:	A&O
Date Issued:	11-30-10	Reviewed By:	MAH

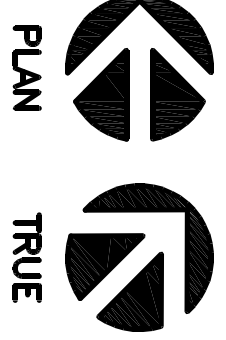
Sheet Number:

H1.8



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H1.8
PENTHOUSE DEMOLITION PLAN

SCALE: 1/8"=1'-0"



PLAN TRUE

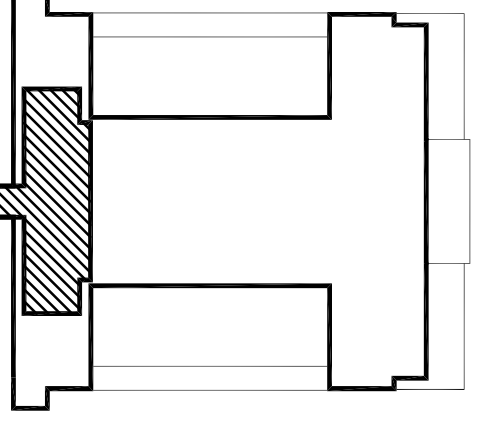
KEYED NOTES:

- 1 EXISTING UPS/RP PIPING TO AIR HANDLING UNIT AM-3 TO REMAIN
- 2 EXISTING UPS PIPING TO HEAT EXCHANGER HX-1 TO REMAIN
- 3 EXISTING RETURN FAN VFD TO BE REMOVED
- 4 REMOVE EXISTING LOWER TO ALLOW FOR REMOVAL OF EXISTING AHU AND INSTALLATION OF NEW AHU. REPLACE LOWER AFTER NEW AIR HANDLING UNIT IS IN PLACE.
- 5 EXISTING AIR FLOW MEASURING STATIONS TO BE REMOVED
- 6 EXISTING TEMPERATURE CONTROL/ELECTRICAL PANELS TO REMAIN
- 7 REMOVE EXISTING AIR HANDLING UNIT, ASSOCIATED DUCTWORK, PIPING AND CONTROLS AS SHOWN. DISCONNECT, CAP OFF DUCTWORK AND PIPING OPEN TO AIR.
- 8 EXISTING AIR HANDLING UNIT COOLING COIL, CONDENSATE DRAIN LOCATION TO REMAIN
- 9 EXISTING VFD FOR ACTIVATED DAMPER/ASSOCIATED CONTROLS AND WIRING TO BE REMOVED
- 10 REMOVE EXISTING DAMPER/ASSOCIATED CONTROLS AND WIRING TO BE REMOVED FOR NEW PUMP INSTALLATION
- 11 EXISTING CONCRETE HOVERDECKING PAD TO REMAIN
- 12 EXISTING FAN MOTOR AND PULLEY SHALL BE REMOVED AND REPLACED WITH NEW

GENERAL NOTE:

- 1 CONTRACTOR SHALL TAKE RESPONSIBILITY FOR REMOVAL OF EXISTING AIR HANDLING UNITS FROM TO DEMOLITION. DATA SHALL BE SENT TO THE ENGINEER FOR REVIEW PRIOR TO WORK COMMENCING.

EXISTING PROJECT CONDITIONS:
INSPECTION PERTAINING TO EXISTING PROJECT CONDITIONS, SHALL BE PRESENT FOR CONSTRUCTION, DEMOLITION, AND ELECTRICAL EQUIPMENT, PIPING, DUCTWORK, ROOFING, AND REPAIRS. WHILE SUCH INFORMATION HAS BEEN BASED ON AVAILABLE RECORDS AND COLLECTED WITH REASONABLE CARE, IT IS NOT GUARANTEED THAT CONDITIONS SO INDICATED ARE OR WILL BE ACTUALLY EXISTING. ALL CONTRACTORS SHALL VERIFY THESE AS TO ALL EXISTING JOB CONDITIONS PRIOR TO BEGINNING WORK. VERIFY ALL DIMENSIONS AT THE SITE.





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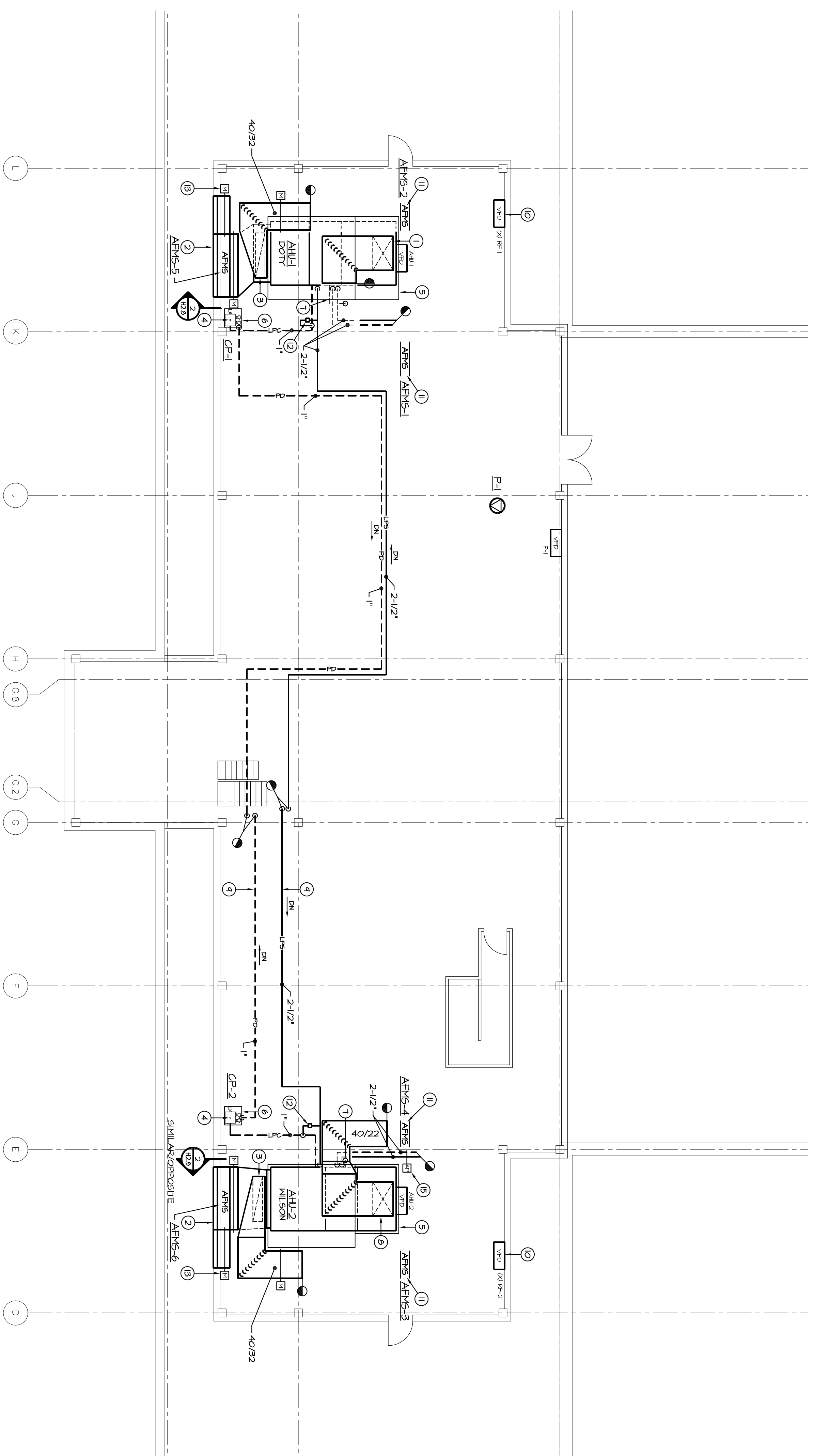
Sheet Title:
PENTHOUSE NEW CONSTRUCTION PLAN

Revisions:	No.	Date	Description	By:	App:
△	00-00-00	-		AJC	

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11-30-10	MAH

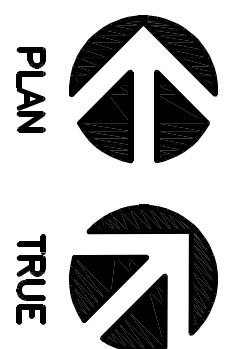
Sheet Number:

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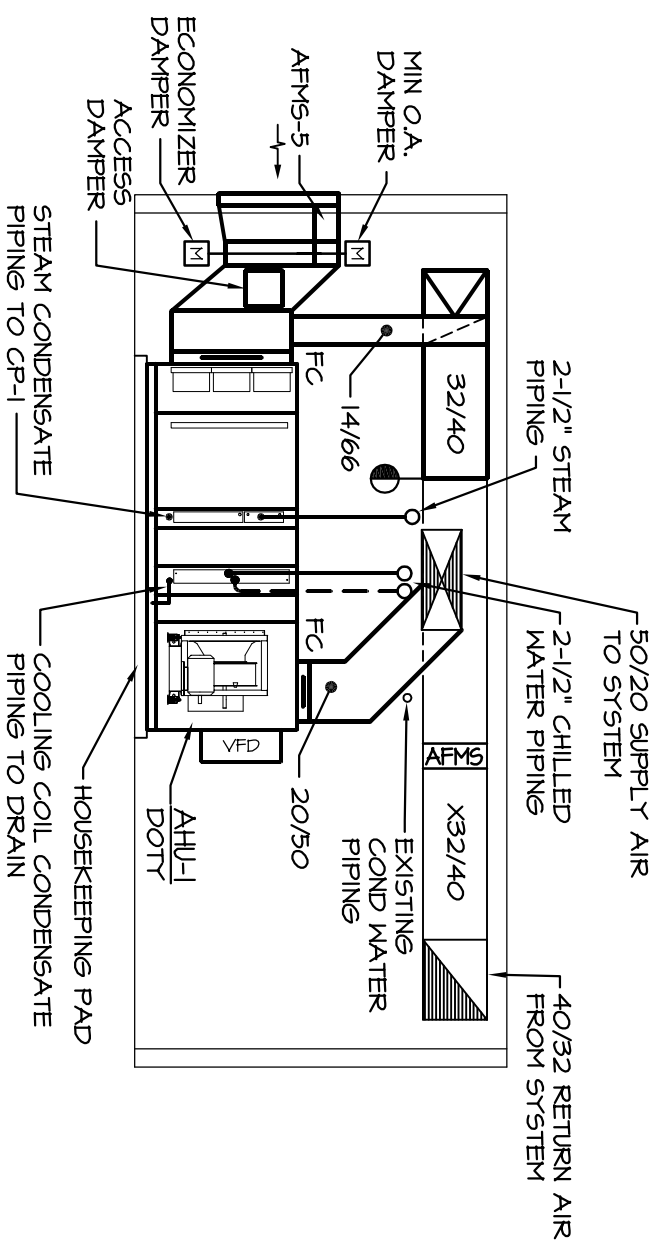
1 PENTHOUSE NEW CONSTRUCTION PLAN

SCALE: 1/8" = 1'-0"



REFER NOTES:

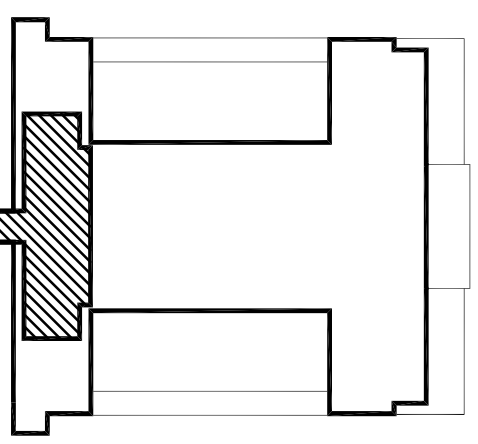
- 1) 50/20 CONNECTION TO AIR TRANSITION TO 50/20 TO MATCH CONNECTION TO EXISTING DUCT
- 2) REINSTALL EXISTING LOWER AND PROVIDE NEW MOTOR ACTIVATED DAMPERS
- 3) 6614 RETURN AIR CONNECTION TO TOP OF OUTSIDE AIR DUCT
- 4) SEE DETAIL 5100 FOR CONCRETE PUMP PIPING/VALVE REQUIREMENTS
- 5) EXISTING CONCRETE PAD A MINIMUM 4" THICK BID OF NEW PAVEMENT TO MATCH EXISTING PAD
- 6) PROVIDE A 2" HIGH CONCRETE HOVERBEARING PAD UNDER CONCRETE PUMP
- 7) EXTEND 1/2" COOLING COIL CONDENSATE PIPING FROM AIR TO EXISTING DRAIN
- 8) 50/20 CONNECTION TO AIR TRANSITION TO 40/22 AS SHOWN TO MATCH CONNECTION TO EXISTING DUCT
- 9) NEW PIPING SHALL BE INSTALLED NEAR OVER EXISTING DUCTWORK IN THIS AREA
- 10) NEW VFD FOR RETURN FAN. COORDINATE INSTALLATION WITH THE ELECTRICAL CONTRACTOR
- 11) CONTRACTOR SHALL MAKE NECESSARY MODIFICATIONS TO EXISTING DUCTWORK TO INSTALL AIR FLOW MEASURING STATION
- 12) PROVIDE AID OF MAIN STAIR TRAP. REFER TO DETAIL 10810
- 13) CONNECT NEW DAMPER ACTUATOR TO EXISTING MECHANICAL ROOM VENTILATION CONTROLS
- 14) OWNER TO PROVIDE PERMANENT MAINTENANCE DURING WORKER INSTALLATION. COORDINATE WITH OWNER
- 15) LOCATION OF PUMP P1 DIFFERENTIAL PRESSURE SENSOR



2 SECTION AT AIR HANDLING UNIT AHU-1

SCALE: 1/8" = 1'-0"

AHU-2 IS SIMILAR/OPPPOSITE





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Consultant:

RETRO-COMMISSIONING PROJECT

AIR HANDLING UNIT RETROFIT

CITY-COUNTY BUILDING

MADISON, WISCONSIN

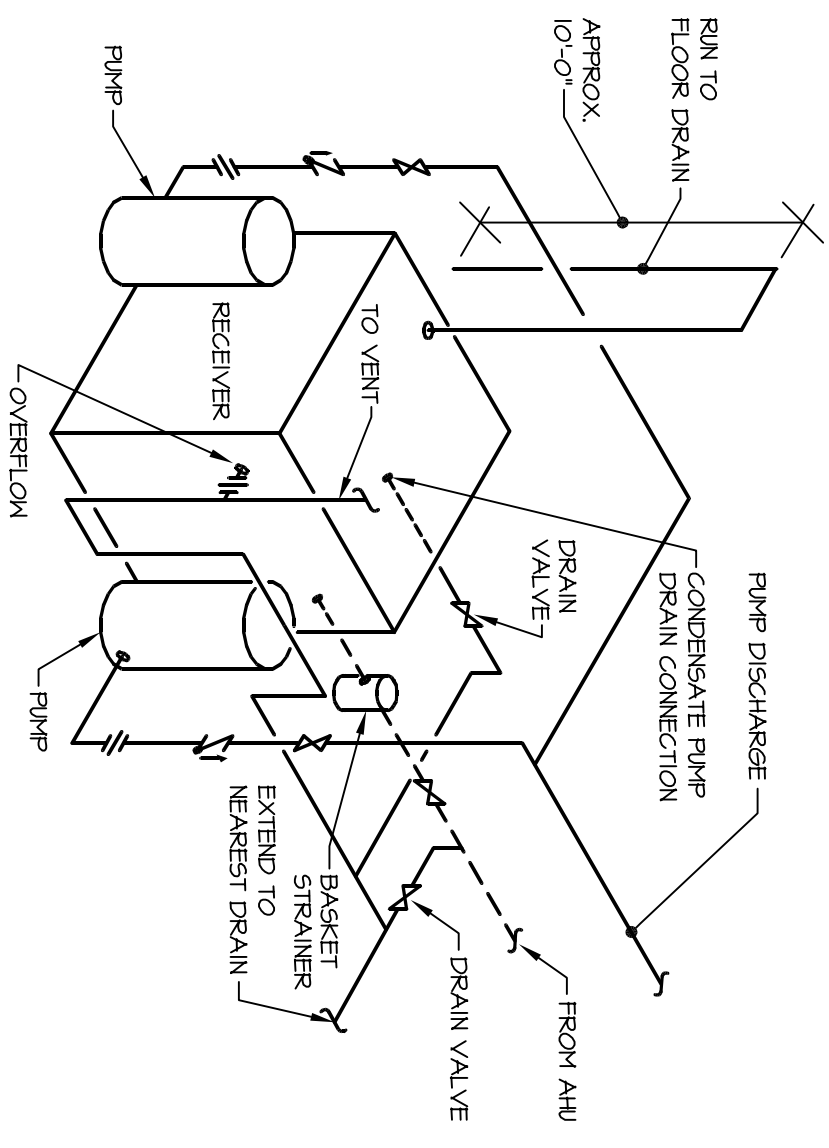
OWNER: DANE COUNTY, WISCONSIN

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DETAILS

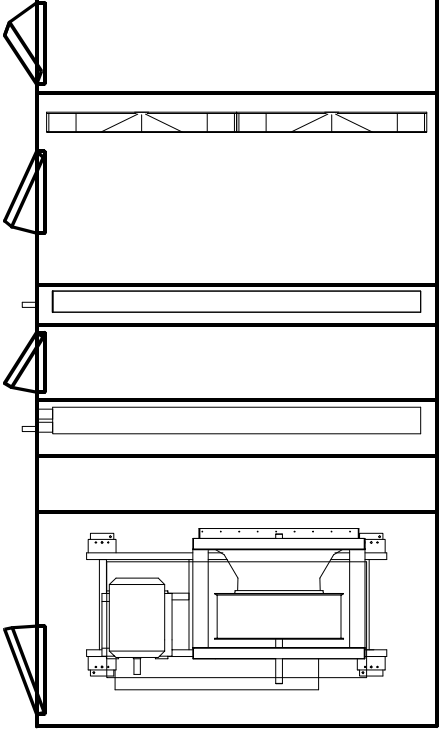
Revisions:		No.	Date	Description	By:
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Project Number:	Designed By:
101121A	AKO
Date Issued:	Reviewed By:
11-30-10	MAH

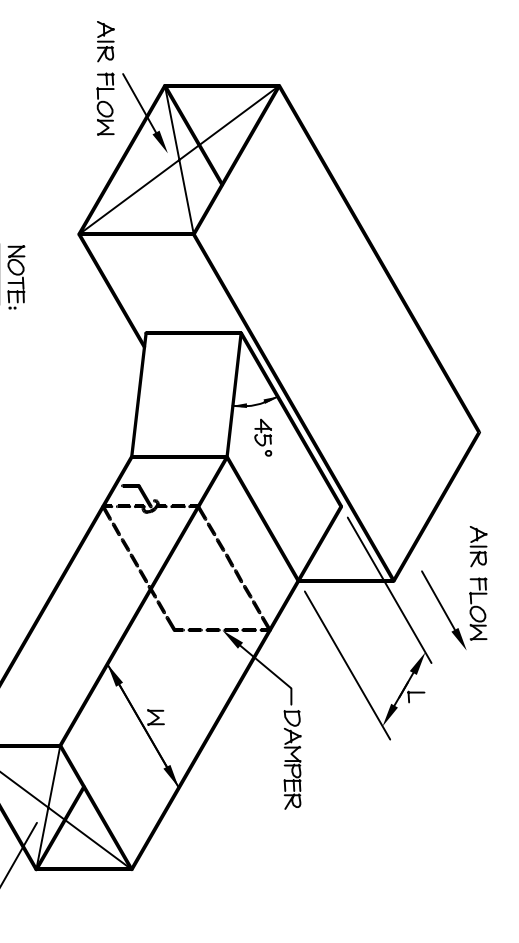
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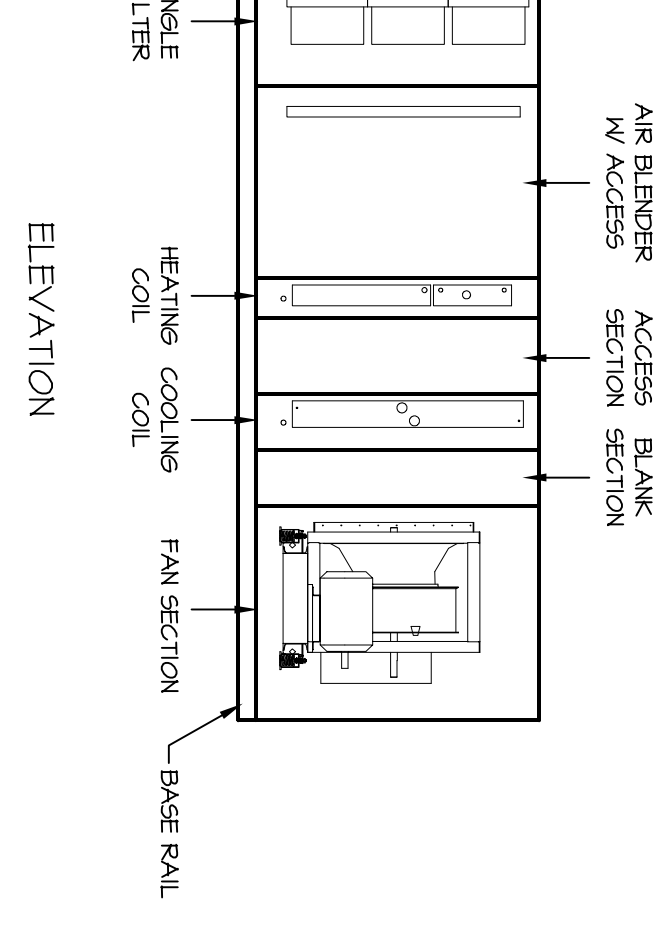
1 DUPLEX CONDENSATE PUMP
SCALE: NONE



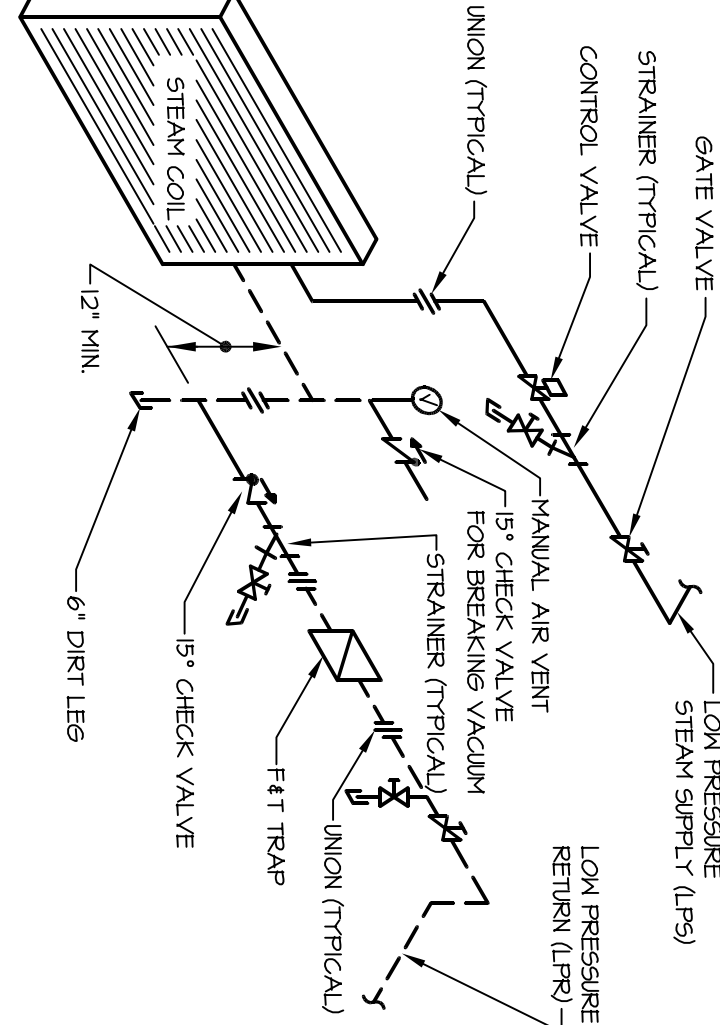
PLAN VIEW



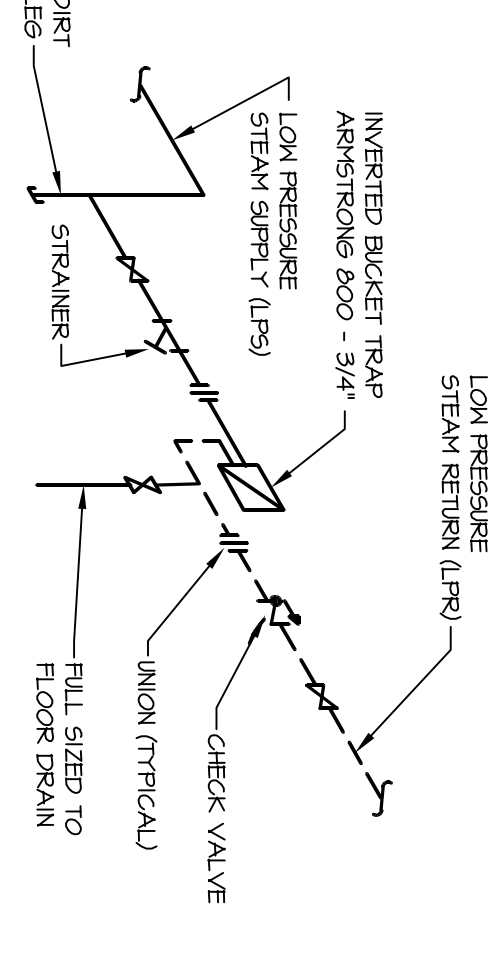
2 BRANCH DUCT TAKEOFF
SCALE: NONE
REVERSE FLOW AIRBOX (FOR EXHAUST AND RETURN)



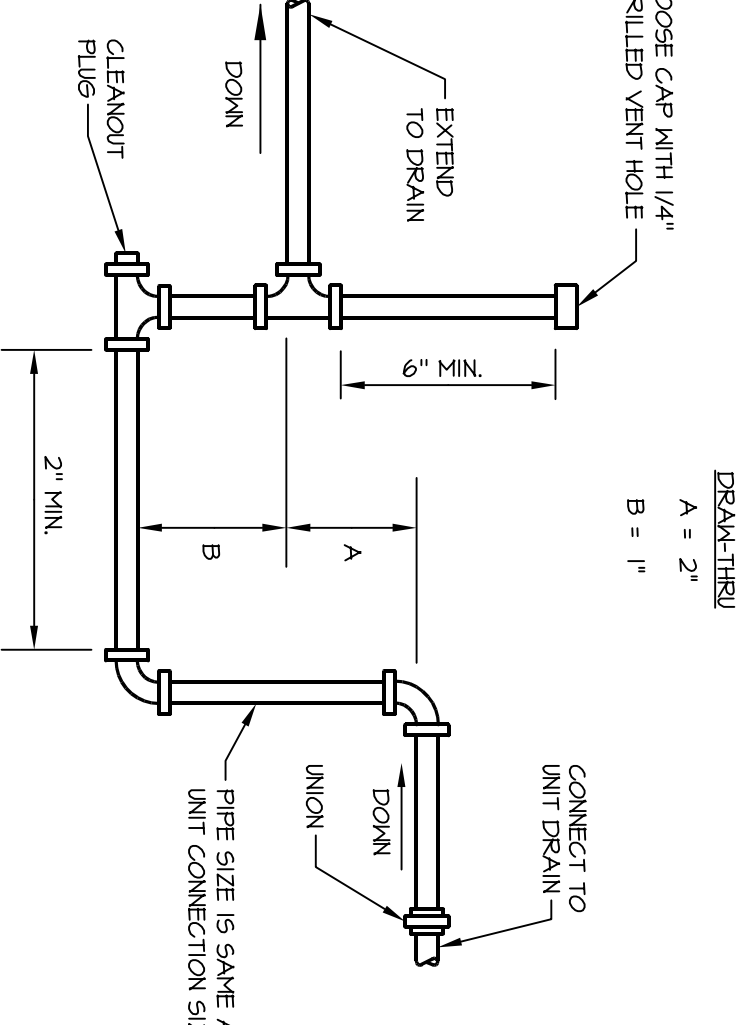
5 AIR HANDLING UNIT DETAILS
SCALE: NONE



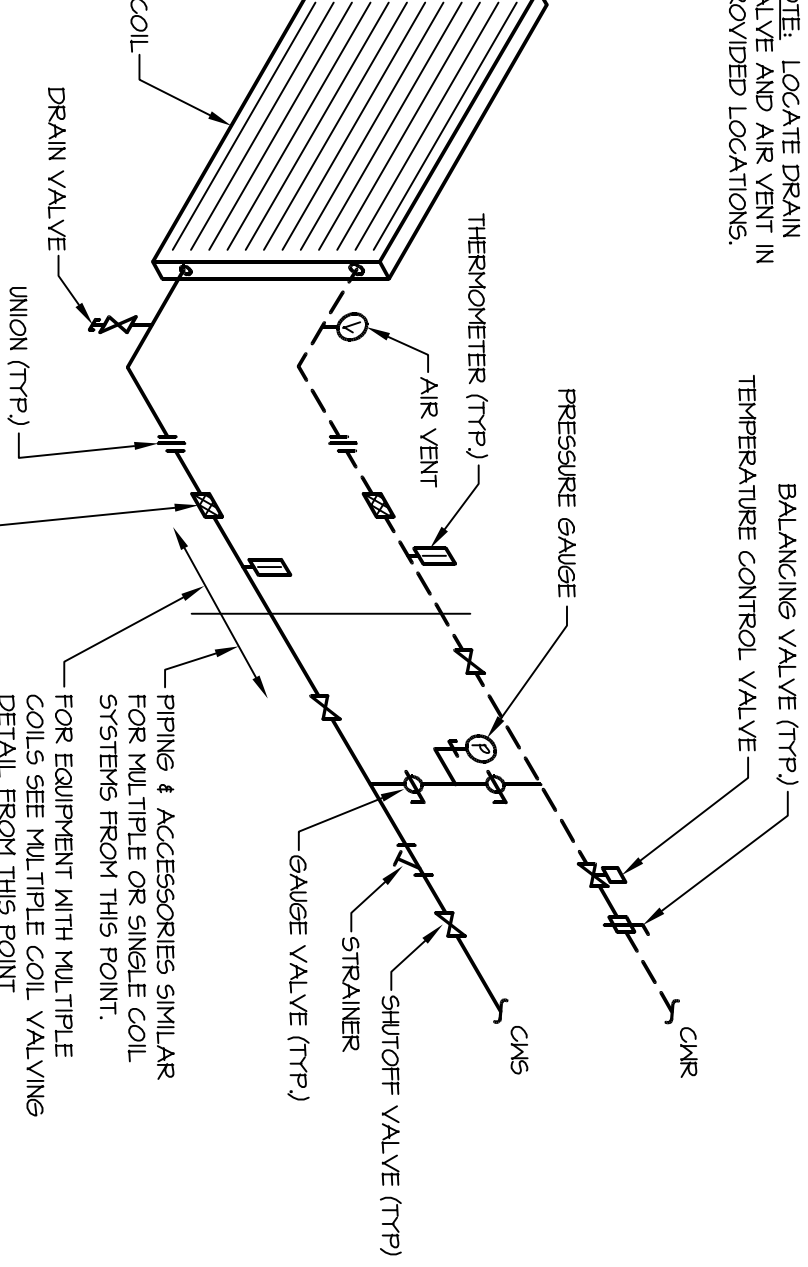
3 STEAM COIL PIPING DETAIL
SCALE: NONE



6 DRIP AT END OF STEAM MAIN
SCALE: NONE



4 LOOP SEAL FOR COOLING COIL CONDENSATE DRAIN
SCALE: NONE



7 CHILLED WATER COIL PIPING DETAIL
SCALE: NONE
(MINI-SHAW-TV)

NOTE: LOCATE DRAIN VALVE AND AIR VENT IN POSITIVE LOCATIONS.

NOTE: LOCATE DRAIN AND CHECK VALVE REQUIRED FOR CONDENSATE LIFT ONLY.

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AIR HANDLING UNIT RETROFIT
CITY-COUNTY BUILDING
MADISON, WISCONSIN
OWNER: DANE COUNTY, WISCONSIN

Sheet Title:
**PENTHOUSE NEW
CONSTRUCTION
PLAN**

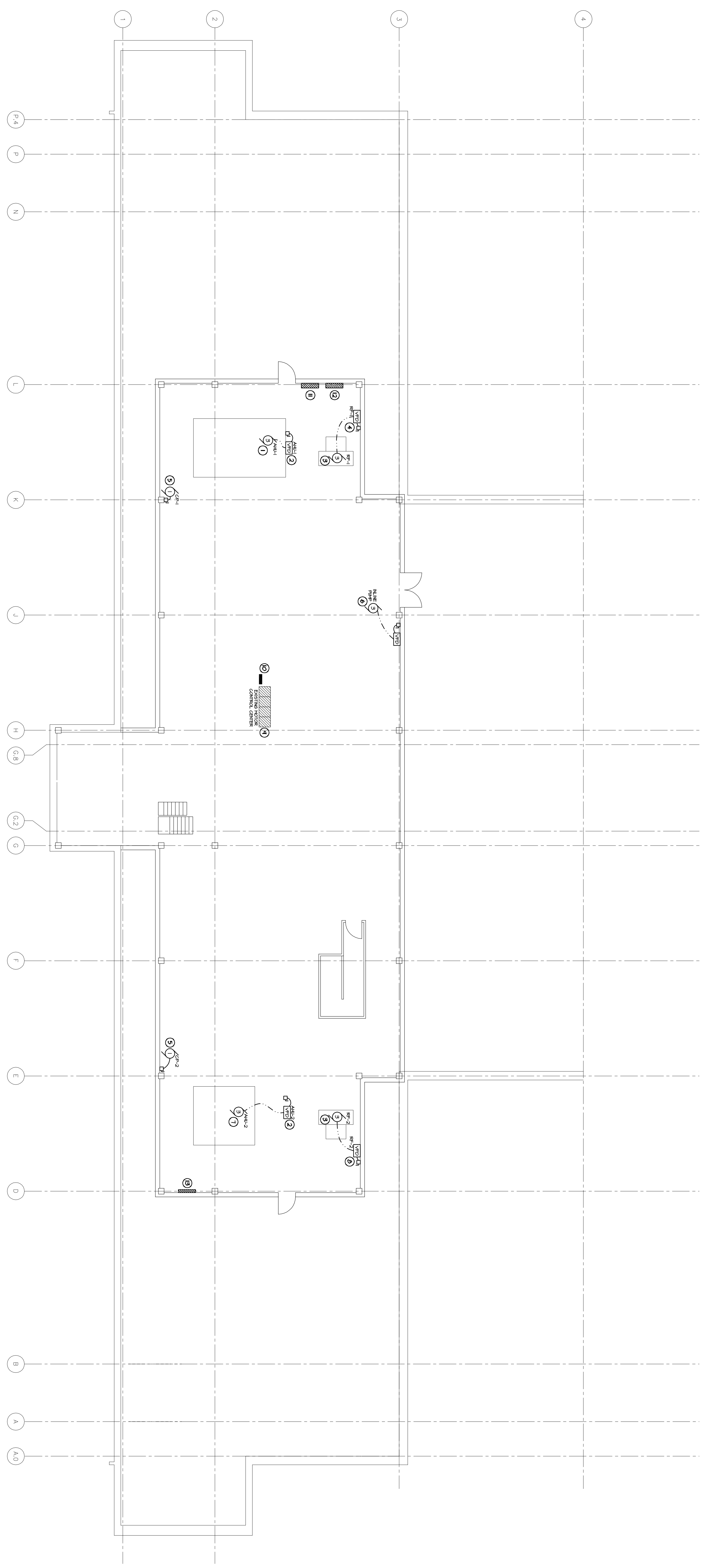
Revisions:		No.	Date	Description	By
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Project Number:	Designed By:
101121A	A&O
Date Issued:	Reviewed By:
11-30-10	AES
Sheet Number:	

E2.8

- GENERAL NOTES:**
1. NEW AHU 2, 3HP, 400V, 3P REPLACES EXISTING SHIP FROM THE REMOVAL OF EXISTING EQUIPMENT. EXISTING MOTOR CONTROL CENTER, EXISTING CONTROL PANEL AND EQUIPMENT NOT BEING REPLICATED. EXISTING SWAMP TRAYS WITH DAMP TRAYS SHALL BE REMOVED.
 2. VERIFY ALL EXISTING CONNECTIONS ON-SITE. EXISTING EQUIPMENT BEING REPLICATED SHALL BE REPLICATED AS SHOWN ON THIS DRAWING UNLESS OTHERWISE NOTED. VERIFY ON-SITE.

- SHEET NOTES:**
1. NEW AHU 2, 3HP, 400V, 3P REPLACES EXISTING SHIP. EXISTING MOTOR CONTROL CENTER, EXISTING CONTROL PANEL AND EQUIPMENT NOT BEING REPLICATED. EXISTING SWAMP TRAYS WITH DAMP TRAYS, VERIFY RECONNECTIONS WITH EQUIPMENT SUPPLIER.
 2. NEW VFD BEING PROVIDED BY HVAC. INCLUDE ALL CONNECTIONS AND WIRING TO BE PROVIDED BY HVAC. VERIFY ON-SITE.
 3. EXISTING SWAMP TRAYS WITH DAMP TRAYS TO BE REMOVED. VERIFY ON-SITE.
 4. NEW VFD AND DISCONNECT SWITCH. SEE NOTE 3.
 5. EXISTING MOTOR CONTROL CENTER. REMOVE NEW TRAYS TO ACCOMMODATE NEW MOTOR AND REPLICAS EXISTING CONTROL CENTER.
 6. EXISTING PANEL PA.
 7. EXISTING PANEL MP.
 8. EXISTING PANEL MPA.
 9. EXISTING PANEL P2.



E2.8 SCALE: 1/8"=1'-0"
PENTHOUSE NEW CONSTRUCTION PLAN

