

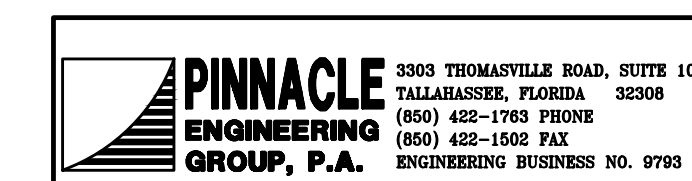
LEON COUNTY COURTHOUSE AHU-11 AND AHU-12 REPLACEMENT

100% CONSTRUCTION DOCUMENTS – FINAL

for

LEON COUNTY
TALLAHASSEE, FLORIDA

JANUARY 9, 2012



DRAWING LIST

M001 ABBREVIATIONS, LEGENDS, AND GENERAL NOTES
M002 MECHANICAL SCHEDULES
M101 AHU-11 AND AHU-12 MECHANICAL ROOM FLOOR PLAN
M201 LEVEL 3 PARTIAL FLOOR PLAN-MECH. EQUIP. ROOM-NEW WORK
M202 AHU-12 MECH. ROOM-NEW WORK PLAN AND ELEVATION
M203 LEVEL 3 PARTIAL FLOOR PLAN-MECH. EQUIP. ROOM
M301 MECHANICAL DETAILS
M401 MECHANICAL CONTROLS

E001 ABBREVIATIONS, LEGEND, GENERAL NOTES, AND SPECIFICATIONS-ELECTRICAL
E101 AHU-11 AND AHU-12 MECH. RM.-EXISTING COND/DEMO-ELECTRICAL
E201 LEVEL 3 PARTIAL FLOOR PLAN-MECHANICAL EQUIPMENT ROOM-NEW WORK-ELECTRICAL
E202 AHU-12 MECHANICAL ROOM-NEW WORK PLAN-ELECTRICAL

ABBREVIATIONS, LEGENDS, GENERAL NOTES AND SPECIFICATIONS

SPECIFICATIONS

SECTION 16000
PART 1 - GENERAL

1.1 SUMMARY

A. PROVIDE ALL LABOR AND MATERIAL NECESSARY TO COMPLETE THE CONSTRUCTION OF THE ELECTRICAL SYSTEM.

1.2 WORK INCLUDED

A. THE WORK REQUIRED UNDER THIS DIVISION SHALL INCLUDE ALL MATERIALS, LABOR AND AUXILIARIES REQUIRED TO INSTALL A COMPLETE AND PROPERLY OPERATING ELECTRICAL SYSTEM. THE ELECTRICAL SYSTEM WORK REQUIRED UNDER THIS DIVISION SHALL BE AS SPECIFIED HEREIN AND AS SHOWN ON PLANS.

B. DRAWINGS FOR THE WORK ARE DIAGRAMMATIC, INTENDED TO CONVEY THE EXTENT, GENERAL ARRANGEMENT, AND LOCATIONS OF THE WORK. BECAUSE OF THE SCALE OF THE DRAWINGS, CERTAIN BASIC ITEMS SUCH AS CONDUIT FITTINGS, ACCESS PANELS, SLEEVES, PULL AND JUNCTION BOXES MAY NOT BE SHOWN. INCLUDE SUCH ITEMS WHERE REQUIRED BY CODE, OTHER SECTIONS, OR FOR PROPER INSTALLATION OF THE WORK.

C. EQUIPMENT SPECIFICATIONS MAY NOT DEAL INDIVIDUALLY WITH EVERY PART, CONTROL, OR DEVICE, WHICH MAY BE REQUIRED TO PRODUCE THE EQUIPMENT PERFORMANCE SPECIFIED OR AS REQUIRED TO MEET THE EQUIPMENT WARRANTIES. INCLUDE SUCH ITEMS AS REQUIRED, WHETHER OR NOT SPECIFICALLY INDICATED.

D. COORDINATE WITH ALL TRADES IN SUBMITTAL OF SHOP DRAWINGS. SHOP DRAWINGS SHALL DETAIL SPACE CONDITIONS TO THE SATISFACTION OF ALL CONCERNED TRADES, SUBJECT TO FINAL REVIEW OF THE ENGINEER. IF ELECTRICAL WORK IS INSTALLED, BEFORE COORDINATING WITH OTHER TRADES, WHICH INTERFERES WITH WORK OF OTHER TRADES, MAKE ALL NECESSARY CHANGES TO CORRECT THE CONDITION AT NO ADDITIONAL COST TO THE OWNER.

1.3 CODES AND STANDARDS

- INSTALL ALL WORK IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF THE FOLLOWING:
 - (NEC) NFPA 70, 2008 NATIONAL ELECTRICAL CODE
 - (NFPA) NFPA 101, 2006 LIFE SAFETY CODE
 - (FBC) FLORIDA BUILDING CODE, 2007 (with 2009 revisions)

B. STANDARDS OF THE FOLLOWING ASSOCIATIONS OR ORGANIZATIONS SHALL BE FOLLOWED AND APPLIED WHERE APPLICABLE.

- (UL) UNDERWRITERS LABORATORIES
- (IEEE) INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS
- (NEMA) NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
- (FM) FACTORY MUTUAL

C. IT IS THE INTENT OF THE CONTRACT DOCUMENTS TO COMPLY WITH THE APPLICABLE CODES, ORDINANCES, REGULATIONS, AND STANDARDS. WHERE DISCREPANCIES OCCUR, NOTIFY THE ENGINEER, IN WRITING, AND ASK FOR INTERPRETATION. CORRECT ANY INSTALLATION THAT FAILS TO COMPLY WITH THE APPLICABLE CODES AND STANDARDS AT NO ADDITIONAL COST TO THE OWNER.

1.4 PERMITS AND INSPECTIONS

A. OBTAIN AND MAKE ALL PAYMENT FOR PERMITS AND INSPECTIONS REQUIRED. AT THE COMPLETION OF THE PROJECT AND BEFORE FINAL ACCEPTANCE OF THE ELECTRICAL WORK, PROVIDE EVIDENCE OF FINAL INSPECTION AND APPROVAL BY THE AUTHORITIES HAVING JURISDICTION.

1.5 ACTIVE SERVICES

A. PROTECT EXISTING ACTIVE SERVICES, WATER, GAS, SEWER, ELECTRIC, WHEN ENCOUNTERED, AGAINST DAMAGE. DO NOT PREVENT OR DISTURB OPERATION OF ACTIVE SERVICES WHICH ARE TO REMAIN. IF ACTIVE SERVICES ARE ENCOUNTERED WHICH REQUIRE RELOCATION, MAKE REQUEST TO AUTHORITIES WITH JURISDICTION FOR DETERMINATION OF PROCEDURES. WHERE EXISTING SERVICES ARE TO BE ABANDONED, TERMINATE THEM IN CONFORMANCE WITH REQUIREMENTS OF THE UTILITY OF MUNICIPALITY HAVING JURISDICTION.

1.6 TESTS AND DEMONSTRATIONS

A. TEST ALL SYSTEMS AND PLACE IN PROPER WORKING ORDER PRIOR TO DEMONSTRATING SYSTEMS TO THE OWNER.

B. PERFORM SUCH TESTS AS REQUIRED BY AUTHORITIES HAVING JURISDICTION OVER THE SITE.

C. PRIOR TO ACCEPTANCE OF THE WORK, DEMONSTRATE TO THE OWNER ALL FEATURES AND FUNCTIONS OF ALL SYSTEMS, AND INSTRUCT THE OWNER IN THE PROPER OPERATION, CARE AND MAINTENANCE OF THE SYSTEMS AND EQUIPMENT.

D. ARRANGE WITH THE OWNER THE DATES AND TIMES FOR EACH DEMONSTRATION.

1.7 IDENTIFICATION

A. PROVIDE ENGRAVED LAMINATED NAMEPLATES ON THE FOLLOWING, LISTING THE DESIGNATED INFORMATION:

1. SAFTEY SWITCHES WITH EQUIPMENT SERVED IDENTIFICATION

2. NAMEPLATES SHALL BE WHITE LETTERS ON BLACK BACKGROUND FOR NORMAL SYSTEM

B. POWER WIRING SHALL HAVE CONDUCTORS COLOR BANNED IN EACH JUNCTION AND PULL BOX.

C. CONTROL CIRCUIT WIRING SHALL BE IDENTIFIED WITH WIRE NUMBERS AT EACH TERMINATION.

D. PANELBOARDS

1.8 DELIVERY AND STORAGE

A. HANDLE, STORE AND PROTECT EQUIPMENT AND MATERIALS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND WITH THE REQUIREMENTS OF NFPA B, APPENDIX I, TITLED "EQUIPMENT STORAGE AND MAINTENANCE DURING CONSTRUCTION". REPLACE DAMAGED OR DEFECTIVE ITEMS WITH NEW ITEMS.

1.9 ELECTRICAL CONNECTIONS TO EQUIPMENT

A. PROVIDE POWER CIRCUIT AND CONTROL WIRING FOR ALL ELECTRICAL EQUIPMENT AND CONNECT COMPLETE UNLESS OTHERWISE INDICATED IN THE CONTRACT DOCUMENTS.

B. ALL CONNECTIONS SHALL BE TIGHTENED TO THE TORQUE VALUES RECOMMENDED BY THAT DEVICE MANUFACTURERS INSTRUCTIONS. IF THESE VALUES ARE NOT LISTED, TIGHTEN TO FOUR INCH OR POUND-FOOT VALUES RECOMMENDED BY UL STANDARD 486B, A SUMMARY OF WHICH MAY BE FOUND IN SECTION 110-14 OF THE NATIONAL ELECTRIC CODE HANDBOOK.

1.10 SUBMITTALS

A. SUBMIT DATA CONSISTING OF SHOP DRAWINGS AND/OR CATALOGUE CUTS COMPLETE WITH TECHNICAL DATA NECESSARY TO EVALUATE THE MATERIAL OR EQUIPMENT. INCLUDE DIMENSIONS, WIRING DIAGRAMS, PERFORMANCE CURVES, RATINGS, CONTROL SEQUENCE, AND OTHER DESCRIPTIVE DATA NECESSARY TO DESCRIBE FULLY THE ITEM PROPOSED AND ITS OPERATING CHARACTERISTICS.

B. DO NOT PURCHASE OR INSTALL EQUIPMENT REQUIRING SUBMITTAL UNTIL THE REVIEW PROCESS IS COMPLETE.

1.11 ACCEPTABLE PRODUCTS

A. USE ONLY NEW PRODUCTS MADE BY COMPANIES REGULARLY ENGAGED IN THE MANUFACTURE OF THE TYPE EQUIPMENT SPECIFIED. USE THE PRODUCTS OF A SINGLE MANUFACTURER FOR SIMILAR TYPE EQUIPMENT, I.E. SAFETY SWITCHES, PANELBOARDS, RECEPTABLES, SWITCHES.

1.12 RECORD DRAWINGS

A. AT THE JOB SITE, MAINTAIN A SET OF PRINTS ON WHICH ARE RECORDED ALL FORMAL FIELD CHANGES AND OTHER PORTIONS OF THE WORK THAT VARY SIGNIFICANTLY FROM THE CONTRACT DOCUMENTS. INDICATE ACTUAL ROUTING OF ELECTRICAL FEEDERS.

B. DELIVER RECORD DRAWINGS TO THE OWNER IN THE QUANTITY AND MANNER REQUESTED.

C. FINAL ACCEPTANCE AND PAYMENT FOR THE PROJECT WILL NOT BE GIVEN UNTIL THESE DRAWINGS HAVE BEEN RECEIVED.

1.13 GUARANTEES

ALL MATERIALS AND LABOR SHALL BE UNCONDITIONALLY WARRANTED FOR A PERIOD OF ONE (1) YEAR FROM DATE OF SUBSTANTIAL COMPLETION. SPECIFIC MANUFACTURER'S EQUIPMENT WARRANTIES IN EXCESS OF ONE (1) YEAR SHALL TAKE PRECEDENCE. MANUFACTURER'S WARRANTIES SHALL BE PROVIDED WHENEVER AVAILABLE AND POSSIBLE. ALL EQUIPMENT SHALL BE NEW AND UNUSED FROM THE FACTORY AND SHALL NOT BE MODIFIED OR REBUILT.

PART 2 - PRODUCTS

2.1 OUTLET BOXES

GENERAL USE BOXES: GALVANIZED, PRESSED STEEL UNITS OF PROPER DEPTH AND GAUGE REQUIRED BY THE OUTLET LOCATION. EQUIP WITH PLASTER RING OR COVER AS NECESSARY.

ACCEPTABLE MANUFACTURERS: RACO OR STEEL CITY.

SPECIAL BOXES: GALVANIZED SHEET METAL OR CAST CONSTRUCTION AND SIZED IN ACCORDANCE WITH THE NEC BASED ON THE NUMBER OF CONDUCTORS AND SPLICES TO BE HOUSED. FOR SPECIAL SYSTEMS, USE BOXES AS RECOMMENDED BY THE EQUIPMENT MANUFACTURER.

PVC OUTLET AND JUNCTION BOXES ARE ALSO ACCEPTABLE. OUTLET AND JUNCTION BOXES IN OUTDOOR LOCATIONS SHALL BE NEMA 3R.

2.2 CONDUIT

RIGID METALLIC CONDUIT (RMC): HOT DIPPED GALVANIZED STEEL CONFORMING TO FS WW-C581E AND UL 6.

ELECTRICAL METALLIC TUBING (EMT/THINWALL): GALVANIZED STEEL CONFORMING TO ASA C80.3, FS WW-C563 AND UL 797.

INTERMEDIATE METAL CONDUIT (IMC): HOT DIPPED GALVANIZED STEEL CONFORMING TO UL 1.

FLEXIBLE METAL CONDUIT: SPIRAL WOUND, SQUARE- LOCKED, HOT-DIPPED GALVANIZED STEEL CONFORMING TO UL 1.

PVC CONDUIT IS ALSO ACCEPTABLE.

2.3 CONDUIT FITTINGS

RMC: THREADED, MALLEABLE IRON, HOT-DIPPED GALVANIZED OR CADMIUM PLATED. FITTINGS USED WITH COATED RMC SHALL HAVE A SIMILAR COATING.

EMT: COMPRESSION TYPE, MADE OF CADMIUM PLATED STEEL OR HOT-DIPPED GALVANIZED MALLEABLE IRON.

FLEXIBLE METAL: TWO SCREW, DOUBLE CLAMP MALLEABLE IRON, HOT- DIPPED GALVANIZED OR CADMIUM PLATED.

PVC FITTINGS FOR PVC CONDUIT ARE ALSO ACCEPTABLE.

2.4 WIRE AND CABLE - 600 VOLT

ALL CONDUCTORS SHALL BE COPPER.

ALL CONDUCTORS SHALL BE INSTALLED WITHIN A CONDUIT RACEWAY SYSTEM.

INSULATION: HEAT AND MOISTURE RESISTANT WITH A TEMPERATURE RATING OF AT LEAST 75 DEGREES (.THIN, THIN) AND A 600 VOLT RATING UNLESS OTHERWISE INDICATED.

USE STRANDED CONDUCTOR ON ALL WIRING #10 AWG AND LARGER. ALL OTHER WIRING MAY BE SOLID.

COLOR CODE WIRING AS FOLLOWS:

120/208 VOLT, 3 PHASE, 4 WIRE

NEUTRAL - WHITE

PHASE A - BLACK

PHASE B - RED

PHASE C - BLUE

GROUND --- GREEN

277/480 VOLT, 3 PHASE, 4 WIRE

NEUTRAL - NATURAL GRAY

PHASE A - YELLOW

PHASE B - BROWN

PHASE C - ORANGE

GROUND --- GREEN

ALL OTHER COLORS SHALL BE RESERVED FOR AND ONLY USED FOR SWITCH LEGS, CONTROL CIRCUITS, COMMUNICATIONS WIRING, FIRE ALARM, ETC. USE DIFFERENT COLOR FOR DIFFERENT CIRCUIT TYPES.

2.5 GROUNDING

A. PROVIDE AN EQUIPMENT CONDUCTOR IN ALL RACEWAYS SIZED IN ACCORDANCE WITH THE REQUIREMENTS OF THE NATIONAL ELECTRIC CODE (NEC).

B. BOND ALL BRANCH CIRCUIT DEVICES TO THE BUILDING GROUND SYSTEM BY MEANS OF THE GROUNDING CONDUCTOR INSTALLED IN EACH RACEWAY.

2.6 ANCHORS AND FASTENERS

A. USE ANCHORS AND FASTENERS OF A TYPE DESIGNED AND INTENDED FOR USE IN THE BASE MATERIAL TO WHICH THE MATERIAL OR SUPPORT IS TO BE ATTACHED, AND CAPABLE OF SUPPORTING THE INTENDED LOAD AND WITHSTANDING ANY ASSOCIATED STRESSES AND VIBRATIONS. DO NOT USE WOODEN PLUGS FOR FASTENING.

2.7 FIRE ALARM

1. ALL FIRE ALARM WORK SHALL BE COMPLETELY IN STRICT COMPLIANCE WITH APPLICABLE CODES AND STANDARDS INCLUDING NFPA 72, NATIONAL FIRE ALARM CODE.

2. THIS PROJECT CONSISTS OF MODIFICATIONS TO THE EXISTING SIMPLEX ZONED FIRE ALARM SYSTEM.

3. PROVIDE ALL REQUIRED PROGRAMMING, COMPONENTS, CAPACITIES, CERTIFICATION & TESTING TO MEET CODE AND PROVIDE A COMPLETE AND OPERATIONAL SYSTEM.

4. PROVIDE COMPLETE SHOP DRAWINGS OF FIRE ALARM MODIFICATIONS, 6 COPIES.

5. SUBMIT TO THE AUTHORITY OF JURISDICTION FOR REVIEW/APPROVAL.

6. BEFORE THE EXISTING FIRE ALARM SYSTEM IS MODIFIED, THIS CONTRACTOR SHALL COMPLETE A SYSTEM SURVEY TO DOCUMENT ANY EXISTING CONDITIONS/PROBLEMS/TROUBLES OF THIS SYSTEM. PROVIDE A WRITTEN REPORT TO PROJECT ENGINEER.

7. THE EXISTING SIMPLEX FIRE ALARM CONTROL PANEL(S) ARE LOCATED ON SOUTH END OF THE PLAZA LEVEL.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

1. USE GOOD WORKMANSHIP IN THE INSTALLATION OF ALL ELECTRICAL MATERIALS AND EQUIPMENT. INSTALL EQUIPMENT LEVEL, PLUMB, AND TRUE WITH THE STRUCTURE AND OTHER EQUIPMENT. FIRMLY SECURE ALL MATERIALS IN PLACE, ADEQUATELY SUPPORTED, AND PERMANENT. MATERIALS EMBEDDED IN CONCRETE OR MASONRY OR OTHERWISE PART OF THE STRUCTURE ARE CONSIDERED SUFFICIENTLY SUPPORTED. USE HARDWARE AND ACCESSORY FITTINGS OF A TYPE DESIGNED, INTENDED AND APPROPRIATE FOR THE USE AND TO COMPLEMENT THE ITEMS WITH WHICH THEY ARE USED.

3.2 MINIMUM SIZES

1. CONDUIT: 1/2" FOR RUNS TO SWITCH, & 1/2" FOR ALL OTHER INSTALLATIONS UNLESS OTHERWISE NOTED.

2. WIRE: #12 AWG FOR ALL POWER AND LIGHTING CIRCUITS.

3.3 LOCATIONS AND DIMENSIONS

1. LOCATE ALL DEVICES AND EQUIPMENT WHERE SHOWN ON THE DRAWINGS. ALL DIMENSIONS SHOWN ON THE DRAWINGS ARE FROM FINISHED FLOOR TO THE CENTER OF THE DEVICE UNLESS OTHERWISE INDICATED.

3.4 WIRING METHODS

1. INSTALL ALL WIRING IN CONDUIT OR APPROVED RACEWAYS. PROVIDE NYLON PULL CORD IN EMPTY CONDUITS.

2. SET OUTLET BOXES SQUARE, LEVEL, AND FLUSH WITH FINISHED SURFACES. SECURE AND BRACE WORK IN SUCH A MANNER AS TO INSURE THAT OUTLET BOXES AND CONDUIT DO NOT BECOME DISLOCATED DURING THE CONCRETE PLACING OPERATIONS OR WHILE OTHER CONSTRUCTION WORK IS BEING DONE.

3. UNLESS OTHERWISE INDICATED, PROVIDE CONDUIT IN ACCORDANCE WITH THE FOLLOWING:

1. RIGID METAL CONDUIT (RMC): USE ANYWHERE. FOR SERVICE ENTRANCE OR WHERE RUN EXPOSED.

2. PVC: USE WHERE SHOWN ON THE DRAWINGS OR BELOW GRADE. WHERE CONDUITS EMERGE FROM SLAB, TRANSITION TO METALLIC RACEWAY BELOW SLAB.

3. THIN WALL METAL (EMT): USE ANYWHERE EXCEPT:

- UNDERGROUND
- IN SLABS ON GROUND

4. USE FLEXIBLE STEEL CONDUIT WITH GROUND WIRE FOR FINAL 24" OF CONNECTION TO MOTORS OR EQUIPMENT SUBJECT TO VIBRATION.

5. FIRMLY AND SECURELY FASTEN CONDUITS TO OR SUPPORT FROM THE BUILDING OR STRUCTURAL MEMBER OR EMBEDDED IN CONCRETE OR MASONRY. USE HANGERS AND SUPPORTS THAT ARE STANDARD CATALOG ITEMS OF A TYPE COMPATIBLE WITH AND SUITABLE FOR THE INTENDED USE. TWISTED WIRE HANGERS AND SUPPORTS ARE NOT ACCEPTABLE.

6. DO NOT PULL CONDUCTORS INTO CONDUITS UNTIL ALL WORK WHICH MAY CAUSE DAMAGE TO THE WIRES IS COMPLETED. INSTALL WIRE AND CABLES SO AS NOT TO DAMAGE THE INSULATION OR CABLE SHEATH. PULL ALL CONDUCTORS TO BE INSTALLED IN A RACEWAY TOGETHER.

7. KEEP CONDUCTOR SPLICES TO A MINIMUM. PROVIDE SPLICES AND TAPS WITH AT LEAST THE EQUIVALENT MECHANICAL STRENGTH AND INSULATION AS THE CONDUCTORS. PROVIDE SPLICE AND TAP DEVICE OF THE PROPER SIZE AND TYPE FOR THE USE AND COMPATIBLE WITH THE CONDUCTOR MATERIAL.

8. PROVIDE SUFFICIENT LENGTH OF CONDUCTORS WITHIN CABINETS AND CUTOUT BOXES TO NEATLY TRAIN THE CONDUCTOR TO THE TERMINAL POINT WITH NO EXCESS. FASTEN THE CABLES TOGETHER IN NEAT BUNDLES WHEN THERE ARE MANY CONDUCTORS.

9. PROVIDE FIRE RESISTANT COMPOUND TO RESTORE FIRE AND SMOKE RATING WHEN PENETRATING A RATED WALL OR CEILING

3.5 EQUIPMENT MOUNTING

1. INSTALL EQUIPMENT AS INDICATED OR AS APPROPRIATE. PROVIDE FASTENERS OR SUPPORTS SUFFICIENT IN SIZE AND QUANTITY TO SUBSTANTIALLY SECURE THE EQUIPMENT IN PLACE TO THE BUILDING STRUCTURE OR STRUCTURAL ELEMENT.

2. INSTALL THE EQUIPMENT PLUMB AND TRUE AS INTENDED AND SECURE. WHEN SEVERAL ITEMS OF EQUIPMENT ARE WALL OR RACK MOUNTED IN THE SAME AREA, LINE THEM UP VERTICALLY AND HORIZONTALLY ALONG WITH ANY ASSOCIATED RACEWAYS.

3.6 SLEEVES

1. WHERE ELECTRICAL CONDUITS PASS THROUGH WALLS, ROOFS, CEILING, OR FLOORS, SET SLEEVES FOR THEM WHEN THE FLOORS, WALLS, CEILING OR ROOFS ARE CONSTRUCTED. IF ANY HOLES ARE CUT IN FINISHED WORK WHERE SLEEVES HAVE BEEN OMITTED, USE A CONCRETE CORING MACHINE OR OTHER APPROVED METHOD AND ONLY WITH WRITTEN CONSENT OF THE ARCHITECT. CUT ALL SUCH HOLES CAREFULLY, NO LARGER THAN NECESSARY. COVER THESE HOLES ENTIRELY BY ESCUTCHEON PLATES WHEN WORK IS COMPLETED. PROVIDE SLEEVES MADE OF STEEL NO LIGHTER THAN 18 GAUGE.

2. WHERE CONDUITS PASS THROUGH SLEEVES IN EXTERIOR WALLS, CAULK THE ANNULAR SPACE WITH OAKUM AND FILL INSIDE AND OUT WITH A NON- HARDENING, WATERPROOF SEALANT FINISHED OFF FLUSH WITH BOTH FACES OF THE WALL.

3. PRIOR TO ANY WORK ON ROOF, VERIFY EXTENT OF ROOFING WARRANTIES WITH OWNER AND ARCHITECT. OBTAIN OWNER'S WRITTEN APPROVAL OF ROOFING WORK. WHERE CONDUITS PASS THROUGH SLEEVES IN THE ROOF, FLASH THE PENETRATION IN ACCORDANCE WITH PLATE 59, FIGURE C OF THE "ARCHITECTURAL SHEET METAL MANUAL" OF THE SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION, INC., AND THE ROOFING MANUFACTURER'S RECOMMENDED PROCEDURES AND MATERIALS.

3.7 CUTTING AND PATCHING

1. CUT WALLS, FLOORS, PAVEMENT, ETC. AS REQUIRED FOR THE ELECTRICAL INSTALLATIONS. UNLESS OTHERWISE INDICATED, PATCH AND REFINISH TO MATCH ADJACENT SURFACES AND IN ACCORDANCE WITH THE OTHER DIVISIONS OF THESE SPECIFICATIONS.

3.8 PROTECTION OF EQUIPMENT

1. DURING CONSTRUCTION, PROTECT ALL EQUIPMENT FROM INSULATION MOISTURE ABSORPTION AND METALLIC COMPONENT CORROSION BY APPROPRIATE USE OF STRIP HEATERS, LAMPS, COVERINGS, OR OTHER SUITABLE MEANS. APPLY PROTECTION IMMEDIATELY UPON RECEIVING THE PRODUCTS AND MAINTAIN CONTINUALLY.

2. KEEP PRODUCTS CLEAN BY ELEVATING ABOVE GROUND OR FLOOR AND BY USING SUITABLE COVERINGS. TAKE SUCH PRECAUTIONS AS ARE NECESSARY TO PROTECT APPARATUS AND MATERIALS FROM DAMAGE. FAILURE TO PROTECT MATERIALS IS SUFFICIENT CAUSE FOR REJECTION OF THE APPARATUS OR MATERIAL IN QUESTION.

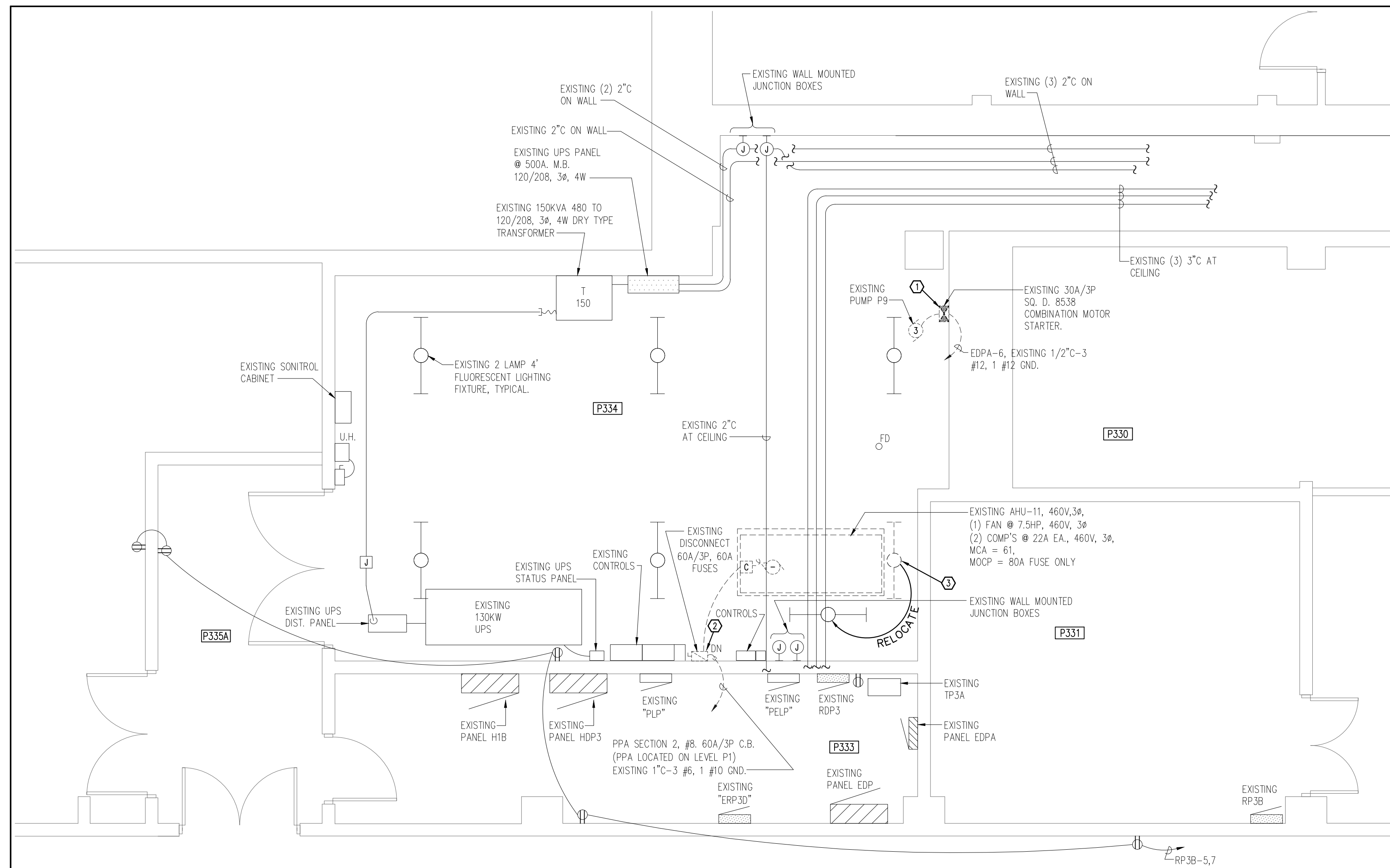
3. PROTECT FACTORY FINISH FROM DAMAGE DURING CONSTRUCTION OPERATIONS AND UNTIL ACCEPTANCE OF THE PROJECT. SATISFACTORILY RESTORE ANY FINISHES THAT BECOME STAINED OR DAMAGED.

ABBREVIATIONS

A	AMPERE
AC	AIR CONDITIONING OR ALTERNATING CURRENT
ACC	ACCESS
AF	AMPERE FRAME
AFF	ABOVE FINISHED FLOOR
AG	ABOVE GRADE
AHU	AIR HANDLING UNIT
AL	ALUMINUM
AM	AMMETER
AT	AMPERE TRIP
ATC	AUTOMATIC TEMPERATURE CONTROL
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
C	CONDUIT
CB	CIRCUIT BREAKER
CH	CHILLER
CKT	CIRCUIT
CL	CENTER LINE
CLF	CURRENT-LIMITING FUSE
CM	CEILING MOUNTED
CNTL	CONTROL
COU	COPPER
DWG	DRAWING
ED	ELECTRIC CONTRACTOR
EF	EXHAUST FAN
EM	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
ENCL	ELECTRICAL METALLIC TUBING
EPD	EMERGENCY POWER OFF
ENCL	ENCLOSURE
EWH	ELECTRIC WATER HEATER
EXIST	EXISTING
FLR	FLOOR
FMC	FURNISHED BY MECHANICAL CONTRACTOR
FWE	FURNISHED WITH EQUIPMENT
GF	GROUND FAULT INTERRUPTER
GND,G	GROUND
HADR	HEATING/AIR CONDITIONING-RATED
HID	HIGH INTENSITY DISCHARGE
HPP	HIGH POWER FACTOR
HPS	HIGH PRESSURE SODIUM
HEZT	HEATZ
HP	HORSEPOWER
IG	ISOLATED GROUND
IMC	INTERMEDIATE METALLIC CONDUIT
JB	JUNCTION BOX
KQML	THOUSAND CIRCULAR MILS
KVA	KILOVOLT AMPERE
KW	KILOWATT
MC	MECHANICAL CONTRACTOR
MCC	MOTOR CONTROL CENTER
M-G	MOTOR GENERATOR
MDP	MAIN DISTRIBUTION PANEL
MH	METAL HALIDE
MOD	MOTOR OPERATED DAMPER OR DOOR
MTD	MOUNTED
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOC.
NF	NON-FUSED
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
NO	NORMALLY OPEN
PNL	PANEL
#	PHASE
OFCl	OWNER FURNISHED CONTRACTOR INSTALLED
PB	PUSHBUTTON
PE	PHOTOELECTRIC
PP	PATCH PANEL
PVC	POLYVINYL CHLORIDE CONDUIT
RSC	RIGID STEEL CONDUIT
SCH	SCHEDULE
SEC	SECURITY
SW	SWITCH
SWGR	SWITCHGEAR
TLT	TELEPHONE
TBB	TELEPHONE BACKBOARD
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
TS	TIME SWITCH
XFR	TRANSFORMER
XFR	TRANSFER
TIP	TYPICAL
UG	UNDERGROUND
UH	UNIT HEATER
UPS	UNINTERRUPTIBLE POWER SUPPLY
UON	UNLESS OTHERWISE NOTED
VT	VAPORIGHT
VAV	VARIABLE AIR VOLUME
VFD	VARIABLE FREQUENCY DRIVE
V	VOLT
WM	WATTMETER
W	WATT
WM	WATTHOUR METER
WP	WATMETER
WP	WEATHER PROOF

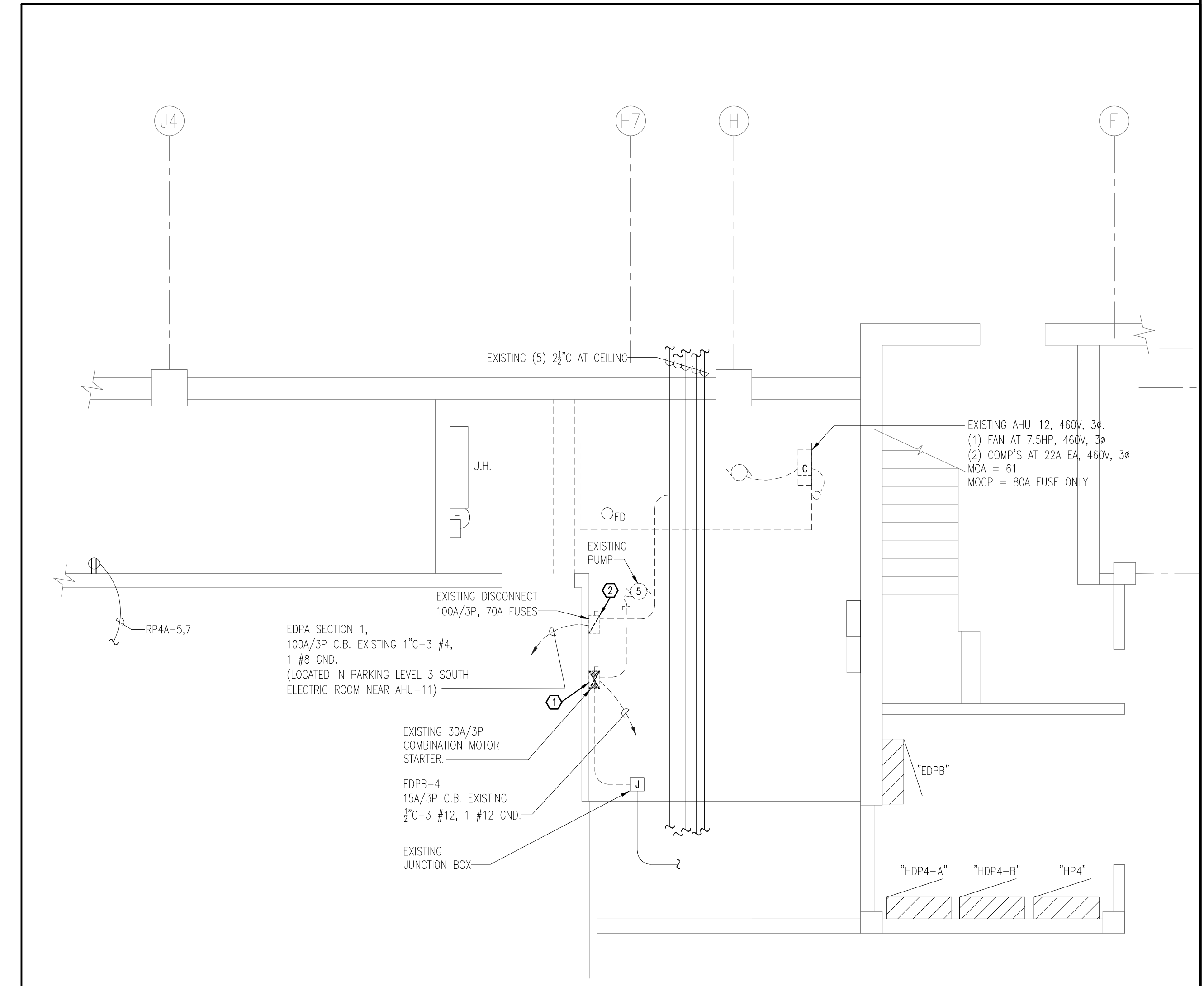
SYMBOL LEGEND

	WALL MOUNTED LIGHT FIXTURE (MOUNT 6"-8" TO BOTTOM OF FIXTURE)
	CEILING SURFACE MOUNTED LIGHT FIXTURE
	CEILING MOUNTED DOWNLIGHT
	SINGLE FACED EXIT LIGHT, PROVIDE UNSWITCHED PHASE CONDUCTOR.
	BATTERY POWERED EMERGENCY LIGHT FIXTURE. PROVIDE UNSWITCHED PHASE CONDUCTOR.
	SINGLE POLE WALL MOUNTED SWITCH - UON CENTERLINE MOUNTED 48" AFF K: KEY TYPE M: MOTOR RATED
	THREE WAY WALL MOUNTED SWITCH - UON CENTERLINE MOUNTED 48" AFF
	HOMERUN TO PANEL INDICATED. (CONCEALED). 1 BRANCH CIRCUIT WITH NEUTRAL IN A SINGLE CONDUIT. 1/2" MINIMUM. UON PROVIDE #12 CONDUCTORS AS REQUIRED BY NUMBER OF CIRCUITS SHOWN. INCLUDE SEPARATE #12 EQUIPMENT GROUND AND #12 NEUTRAL FOR HOMERUNS EXCEEDING 100' IN LENGTH PROVIDE #10 CONDUCTORS IN LEU OF #12 AS INDICATED ABOVE. TEXT INDICATES PANELBOARD AND CIRCUIT NUMBERS.
	CONDUIT CONCEALED IN WALL OR ABOVE CEILING (1/2" MINIMUM) UON PROVIDE #12 CONDUCTORS AS REQUIRED BY NUMBER OF CIRCUITS SHOWN. INCLUDE SEPARATE #12 EQUIPMENT GROUND AND #12 NEUTRAL FOR EACH CIRCUIT.
	CEILING OR WALL MOUNTED JUNCTION BOX. UON SIZE AS REQUIRED BY N.E.C.
	MOTOR, NUMERAL INDICATES HP.
	480/277V, 3φ, 4W PANELBOARD.
	208/120V, 3φ, 4W PANELBOARD.
	NON-FUSED SAFETY SWITCH, TEXT INDICATES SIZE & NEMA REQUIREMENTS. THIS EXAMPLE INDICATES 30 AMP, 2 POLE SAFETY SWITCH IN NEMA 1 ENCLOSURE.
	DUPLEX RECEPTACLE. UON CENTERLINE MOUNTED 18" AFF
	DUPLEX RECEPTACLE. UON CENTERLINE MOUNTED 42" AFF
	GROUND
	METER SOCKET
	DUCT SMOKE DETECTOR DUCT MOUNTED
	REMOTE ALARM IND



AHU-11 MECH. ROOM - EXISTING CONDITIONS/DEMO. - ELECTRICAL

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



AHU-12 MECHANICAL ROOM

EXISTING CONDITIONS/DEMO. - ELECTRICAL

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



ELECTRICAL WORK NOTES: (DWG E101)

- ① REMOVE EXISTING COMBINATION MOTOR STARTER & ASSOCIATED CONDUITS/CONDUCTORS TO MOTOR AND TO POWER SOURCE PANEL. MOTOR REMOVED BY MECHANICAL DIVISION.
- ② REMOVE EXISTING FUSED DISCONNECT SWITCH AND ASSOCIATED CONDUITS/CONDUCTORS TO MOTOR AND TO POWER SOURCE PANEL. AHU REMOVED BY MECHANICAL DIVISION.
- ③ REMOVE AND REPLACE EXISTING LIGHTING FIXTURE FOR INSTALLATION OF NEW PIPING. EXTEND EXISTING CONDUIT/CONDUCTORS.

LINE TYPE LEGEND

- EXISTING TO BE REMOVED
- EXISTING TO REMAIN (LIGHT)
- NEW TO BE PROVIDED (BOLD)

DRAWING TITLE:

**AHU-11 MECH. RM-EXISTING
COND./DEMO.-ELECTRICAL
AHU-12 MECH. RM-EXISTING
COND./DEMO.-ELECTRICAL**

FILE: E101
JOB NO.: 211-124
DATE: 1-9-12
PLOT SIZE: 1=1
DRAWN BY: D. GOODMAN
CHECKED BY: K. FOLLMAR
SHEET No.:

E101

**AHU-11 & AHU-12 REPLACEMENT
LEON COUNTY COURTHOUSE**

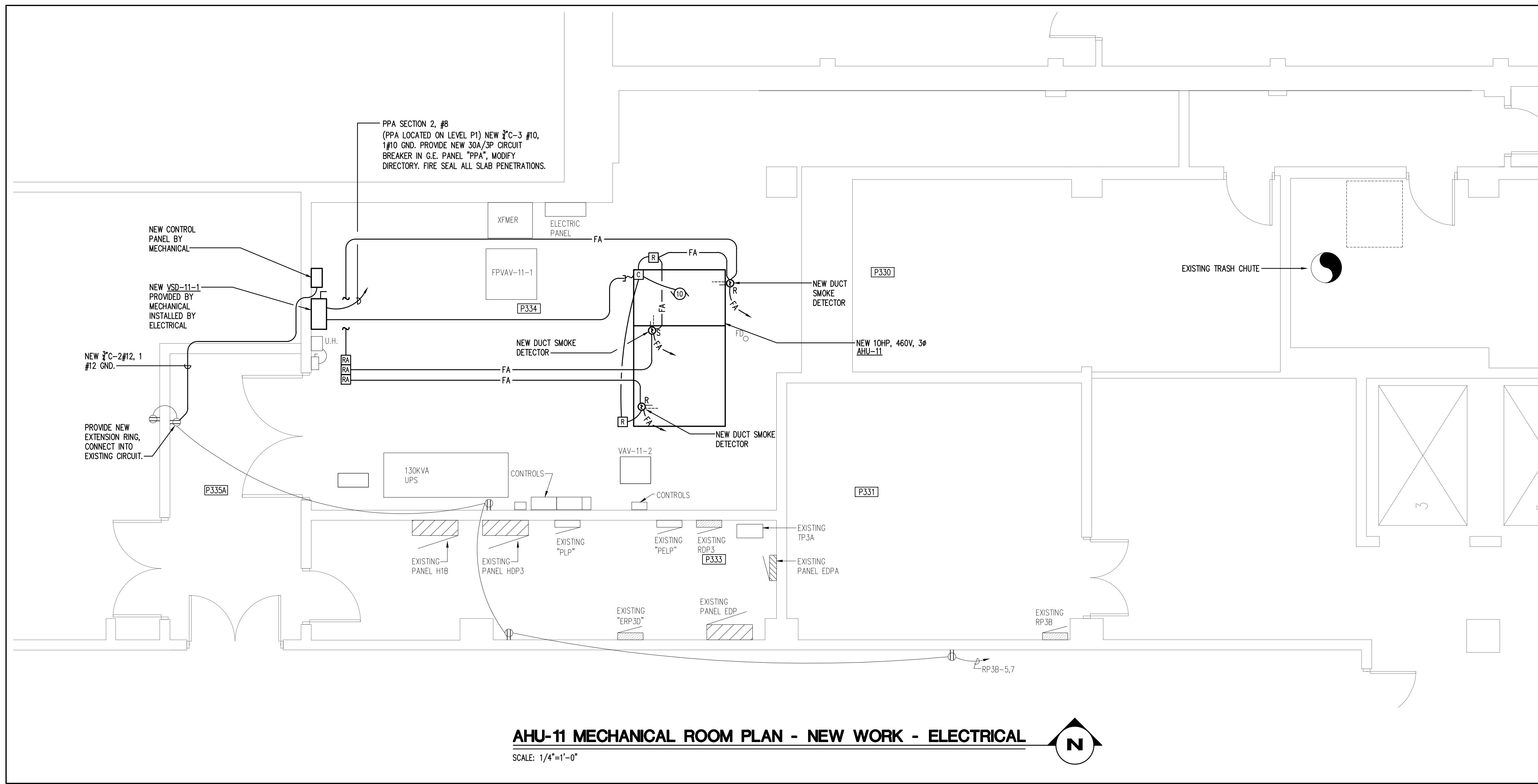
LEON COUNTY
TALLAHASSEE, FLORIDA

REV. DESCRIPTION

DATE

SCALE

Pinnacle Engineering Group, P.A.
330 THOMASVILLE ROAD, SUITE 102
TALLAHASSEE, FLORIDA 32301
OFFICE: (904) 422-1733 FAX: (904) 422-1522
Engineering Business #9793



NOTE: MECHANICAL ROOM IS A PLENUM. ALL MATERIALS
MUST BE PLENUM-RATED.

LINE TYPE LEGEND	
---	EXISTING TO BE REMOVED
---	EXISTING TO REMAIN (LIGHT)
---	NEW TO BE PROVIDED (BOLD)

REV#	DESCRIPTION	DATE

**AHU-11 & AHU-12 REPLACEMENT
LEON COUNTY COURTHOUSE
LEON COUNTY
TALLAHASSEE, FLORIDA**

DRAWING TITLE: LEVEL 3 PARTIAL FLOOR PLAN MECHANICAL EQUIPMENT ROOM - NEW WORK ELECTRICAL	
FILE:	E201
JOB NO.:	211-124
DATE :	1-9-12
PLOT SIZE:	1=1
DRAWN BY:	D. GOODMAN
CHECKED BY:	K. FOLLMAR
SHEET No.:	E201

AIR HANDLING UNIT SCHEDULE

MARK	AHU-11	AHU-12			
LOCATION	MER 3 SOUTH	MER 4 NORTH			
SERVICE	---	---			
TOTAL AIR (CFM)	7500	7900			
RETURN AIR (CFM)	6800	5800			
OUTSIDE AIR (CFM)	700	2100			
FAN SPEED (RPM)	1692	1740			
ESP/TSP (IN. WATER)	2.0/4.3	2.20/4.4			
FAN MOTOR (BHP/HP)	7.8/10	8.6/10			
FAN TYPE	20" AFF	20" AFF			
ELECTRIC (V/PH/Hz)	480/3/60	480/3/60			
COOLING COIL SECTION					
FACE VELOCITY (FPM)	446	470			
ENT. AIR (DB)(°F)	77.7/64.6	80.8/67.2			
LV. AIR (DB)(°F)	55.0/54.5	55.0/54.5			
CAPACITY (MBH)(TOTAL)	230.3	312.9			
CAPACITY (MBH)(SENS.)	183.9	220.1			
CAPACITY (MBH)(LAT.)	46.4	92.8			
WATER TEMP. (ENT./LV.)(°F)	44/58	44/58			
WATER QUANTITY (GPM)	33	45			
AIR FRICTION (IN. WTR.)	0.59	0.74			
WATER FRICTION (FT. WTR.)	4.3	3.8			
ROWS DEEP	6	6			
FIN SPACING (FIN/FT)	130	146			
HEATING COIL SECTION (REHEAT)					
FACE VELOCITY (FPM)	446	470			
ENT. AIR (DB)(°F)	61	56			
LV. AIR (DB)(°F)	80	80			
CAPACITY (MBH)(TOTAL)	155	202			
WATER TEMP. (ENT./LV.)(°F)	140/90	140/90			
WATER QUANTITY (GPM)	6.2	8.1			
AIR FRICTION (IN. WTR.)	0.20	0.13			
WATER FRICTION (FT. WTR.)	0.62	0.52			
ROWS DEEP	2	2			
FIN SPACING (FIN/FT)	167	90			
FILTER SECTION					
TYPE	MERV8	MERV8			
FILTER BOX (TYPE)	FLAT	FLAT			
DEPTH (IN.)	2"	2"			
MAX S.P. (DIRTY)	1.0"	1.0"			
BASIS OF DESIGN	TRANE	TRANE			
MODEL NO.	PCC SIZE 17	PCC SIZE 17			

- GENERAL NOTES:**
- AHU MOTORS SHALL BE HIGH EFFICIENCY, INVERTER DUTY.
 - AHU FAN AND MOTOR SHALL BE EQUIPPED WITH DUAL BELT DRIVE ARRANGEMENT.
 - AHU UNIT CASING SHALL BE DOUBLE WALL WITH 2" INSULATION. (R-13 MINIMUM) WITH CLASS "A" THERMAL BREAKS. REFER TO SPEC FOR ADDITIONAL REQUIREMENTS.
 - AHU SHALL BE COMPLETELY DISASSEMBLED AND REASSEMBLED IN THE BUILDING AS NECESSARY FOR INSTALLATION. DISASSEMBLE AND REASSEMBLE FAN SECTION AS NECESSARY FOR INSTALLATION IN BUILDING.
 - AT CONCLUSION OF PROJECT, INSTALL NEW FILTERS IN ALL AHU'S.
 - MAX. NC RATING IN ROOMS SERVED BY AHU IS NC=35. MFR. SHALL SUBMIT SOUND DATA FOR SPECIFIC INSTALLATION. IF MAX. NC RATING IS EXCEEDED, PROVIDE SA & RA SILENCERS, INCREASE E.S.P. & SIZE MOTOR ACCORDINGLY.
 - AHU-11: PROVIDE DISCHARGE PLENUM SECTION AND FILTER MIXING BOX WITH AIR FOIL, MODULATING OPPOSED BLADE CONTROL DAMPERS. PROVIDE WITH MOTORIZED OPERATORS. COORDINATE WITH CONTROLS SUB AND PROVIDE COMPATIBLE OPERATORS FOR SEAMLESS CONTROL INTERFACE. PROVIDE ACCESS DOORS ON BOTH SIDES OF AHU. ALL SECTIONS.
 - PROVIDE BASERAILS. SEE DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.

VARIABLE SPEED DRIVE SCHEDULE

MARK	VSD-11-1	VSD-12-1			
LOCATION	MER	MER			
SERVICE	AHU-11	AHU-12			
HP	10	10			
ELECTRIC	480/3/60	480/3/60			
MANUFACTURER	DAN FOSS	DAN FOSS			
MODEL	VLT-HVAC	VLT-HVAC			
NOTES	1,2,3,5,6,7,8	1,2,3,5,6,7,8			

- NOTES:**
- PROVIDE W/ MANUAL BYPASS TRANSFER SWITCH. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
 - OUTPUT CONTACTOR SHALL DISCONNECT MOTOR FROM DRIVE WHEN DRIVE IS STOPPED.
 - VSD FURNISHED BY DIVISION 15 AND INSTALLED BY DIVISION 16. COORDINATE WITH CONTROLS CONTRACTOR FOR CONTROL INTERFACE.
 - REDUCED VOLTAGE BYPASS REQUIRED (15 HP OR GREATER) FOR COMPLIANCE W/CITY OF TALLAHASSEE REQUIREMENTS.
 - FIELD VERIFY VOLTAGE AND HORSEPOWER PRIOR TO ORDERING.
 - COORDINATE WITH CONTROLS CONTRACTOR FOR CONTROL INTERFACE.
 - UNIT SHALL BE SUPPLIED WITH INTEGRAL FEEDER DISCONNECTING MEANS AND EXTERNAL OPERATOR & OVER CURRENT DEVICE.
 - V.S.D SHALL HAVE CONTACTS FOR CONNECTION TO REMOTE SAFETY SWITCH EARLY BREAK CONTACTS.

FAN SCHEDULE - EXISTING

ITEM NO.	---	EF-71	
SERVICE	---	-	
AIR QUANTITY	CFM	2,100	
EXT. STATIC PRESSURE	IN. WTR.	-	
FAN TYPE	---	ROOF CENT.	
DRIVE	---	-	
SONES	---	-	
MOTOR	HP	1/4	
FAN SPEED	RPM	-	
ELECTRICAL	V/PH/Hz.	-	
CONTROLS	---	⑩	
LOCATION	---	ROOF	
MANUFACTURER	---	-	
MODEL NO.	---	-	
NOTES	---	⑩	

- NOTE:**
- PROVIDE VARIABLE SPEED CONTROLLER FOR ALL DIRECT DRIVE FANS. T & B CONTRACTOR SHALL MARK BALANCED POSITION ON CONTROLLER.
 - PROVIDE NEW ADJUSTABLE SHEAVE AND BELTS.
 - DISCONNECT SWITCH.
 - ALUMINUM CEILING GRILLE, WHITE, DELUXE; PROVIDE WALLCAP OR ROOFJACK AS SHOWN.
 - BACK DRAFT DAMPER
 - INLET/OUTLET FLEX DUCT CONNECTORS, ISOLATORS & SUPPORT HARDWARE.
 - SPRING ISOLATORS & SUPPORT HARDWARE.
 - ROOF CURB, BACKDRAFT DAMPER AND BIRDSCREEN.
 - CONNECT WITH AHU-12; SEE CONTROL SCHEMATIC & SEQUENCE.
 - EXISTING FAN TO REMAIN. TEST AND BALANCE PRIOR TO CONSTRUCTION AND SUBMIT REPORT TO ENGINEER. UPON COMPLETION OF WORK, TEST AND BALANCE TO NEW CONDITIONS NOTED. PROVIDE NEW SHEAVE AND BELTS AS REQUIRED. SUBMIT REPORT.

VARIABLE AIR VOLUME BOX SCHEDULE - EXISTING

ITEM NO.	---	TP-1	TP-2	TP-3	TP-4	TP-5	FPVAV-11-1	VAV-11-2						
BOX CAPACITY	CFM	2125	2490	3325	3135	2870	900	600						
CONTROL CFM VOLUME	MAX./MIN.	-/425	-/500	-/665	-/0	-/0	-/450	-/0						
FAN AIR FLOW	CFM/HP	1500/1	1500/1	2000/1	2000/1	2000/1	-/-	N/A						
ELECTRICAL KW	KW	14	12	12	8	5	2	N/A						
CAPACITY/# OF STEPS	MBTU/# STEPS	48/3	41/2	41/2	27/2	17/1	7/1	N/A						
SERVICE	---	AHU-12	AHU-12	AHU-12	AHU-11	AHU-11	AHU-11	AHU-11						
MANUFACTURER	---	-	-	-	-	-	CARRIER	MODUBOX						
MODEL NO.	---	-	-	-	-	-	45CAB22	-						
NOTES	---	①②	①②	①②	①②	①②	①②	①②③						

- NOTES:**
- T & B PARALLEL FAN POWERED VAV BOX PRIOR TO CONSTRUCTION; SUBMIT REPORT.
 - T & B PARALLEL FAN POWERED VAV BOX POST CONSTRUCTION; SUBMIT REPORT.
 - BID ALTERNATE #1: FURNISH AND INSTALL NEW BOX ACTUATOR AND CONTROLLER. COORDINATE WITH CONTROLS SUBCONTRACTOR PRIOR TO BID AND INCLUDE ALL COSTS FOR FULLY OPERATIONAL VAV BOX.

DESIGN CONDITIONS

OUTDOOR (SUMMER) = 94.0° F DB / 77.0° F WB
 OUTDOOR (WINTER) = 25.0° F DB
 INDOOR (SUMMER) = 75.0° F DB / 50% RH.
 INDOOR (WINTER) = 70.0° F DB

DRAWING TITLE:

MECHANICAL SCHEDULES

FILE: M002
 JOB NO.: 211-124
 DATE: 1-9-12
 PLOT SIZE: 1=1
 DRAWN BY: D. GOODMAN
 CHECKED BY: C. ALLEN
 SHEET No.:

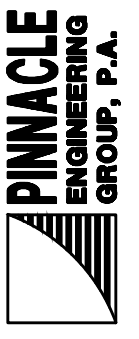
M002

**AHU-11 & AHU-12 REPLACEMENT
 LEON COUNTY COURTHOUSE
 LEON COUNTY
 TALLAHASSEE, FLORIDA**

REV# DESCRIPTION

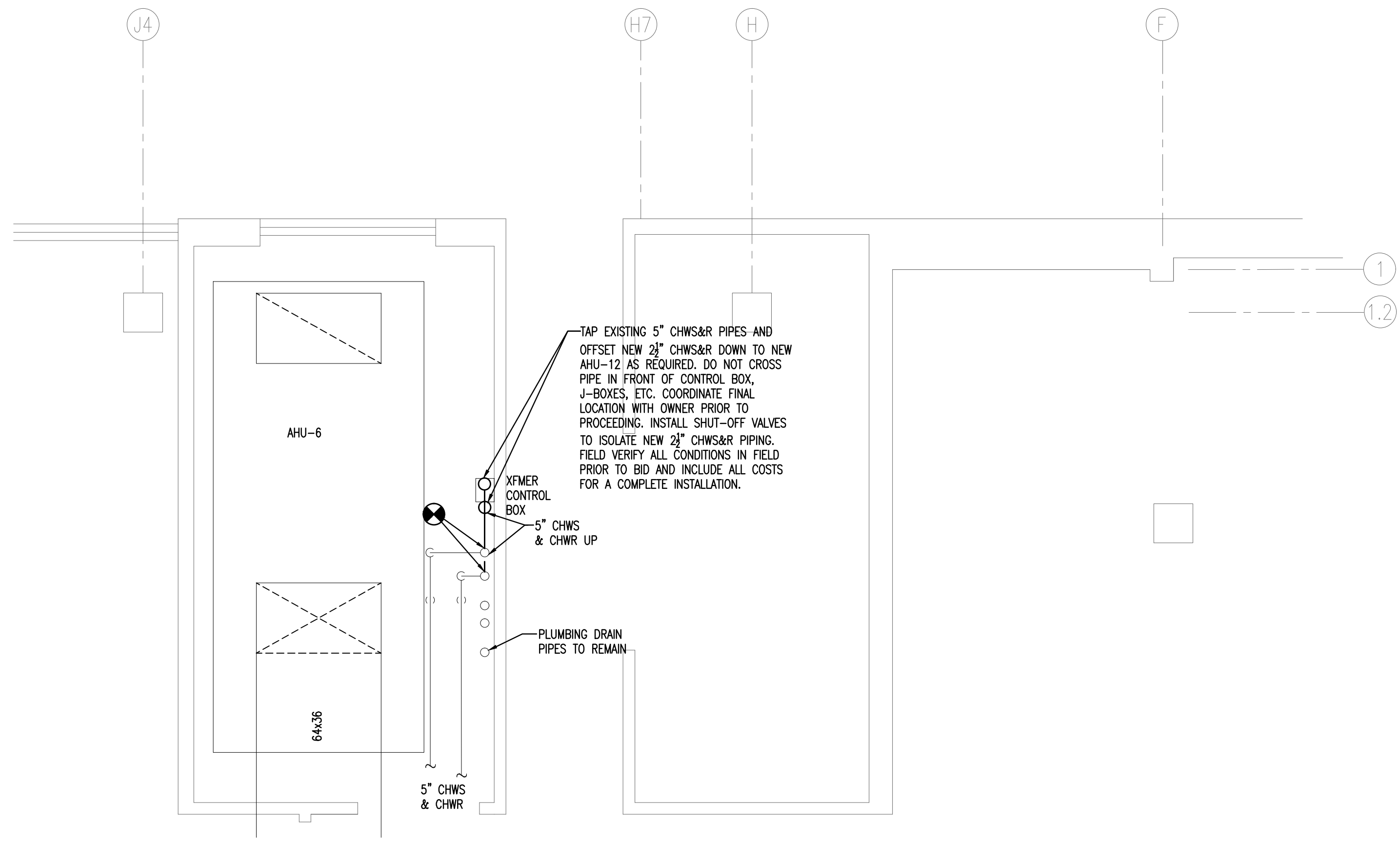
DATE

SEAL



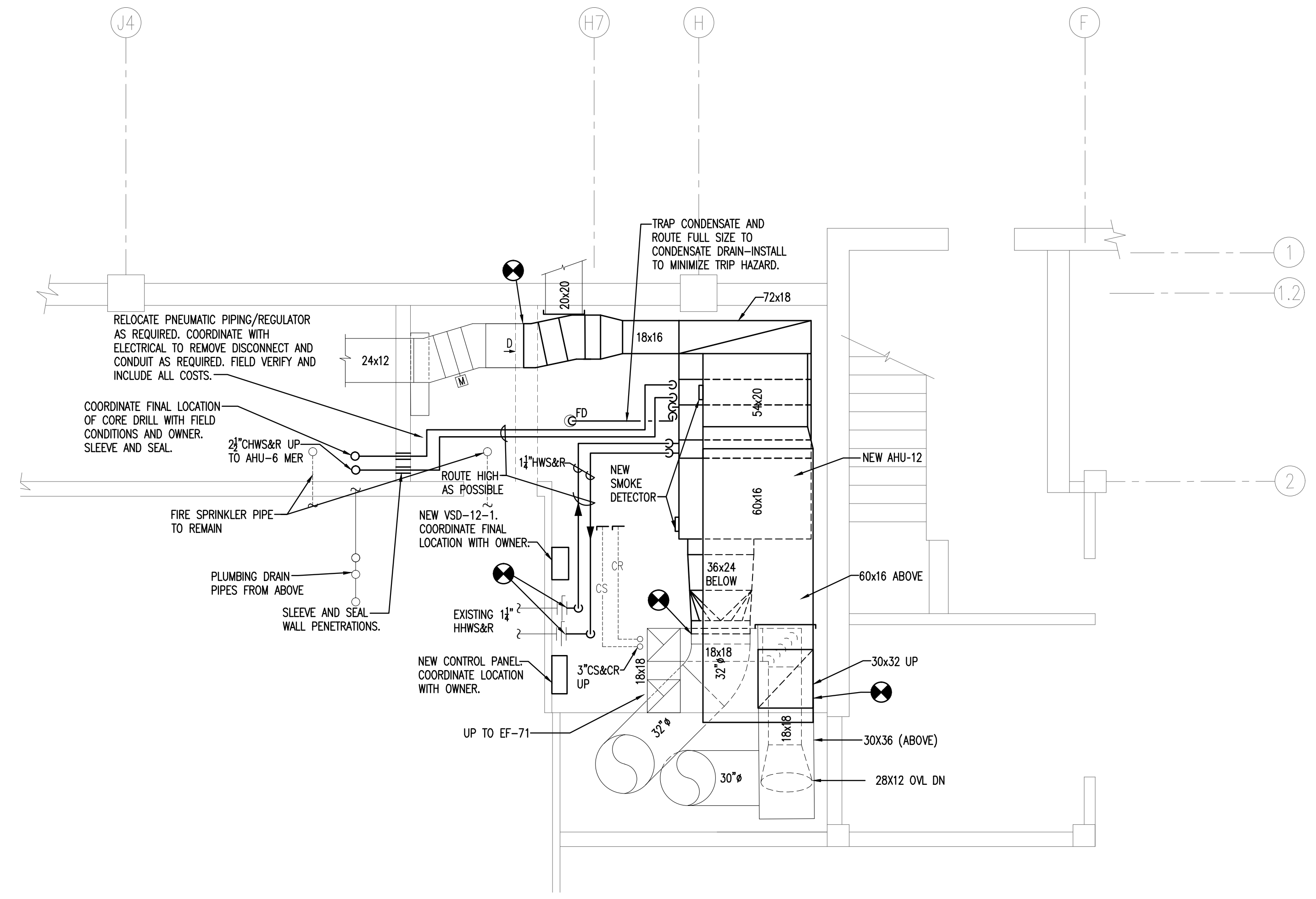
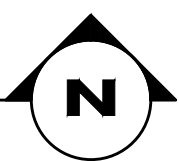
Pinnacle Engineering Group, P.A.

3300 THOMASVILLE ROAD, SUITE 102
 TALLAHASSEE, FLORIDA 32309
 OFFICE: (904) 422-1783 FAX: (904) 422-1922
 Engineering Business #9793



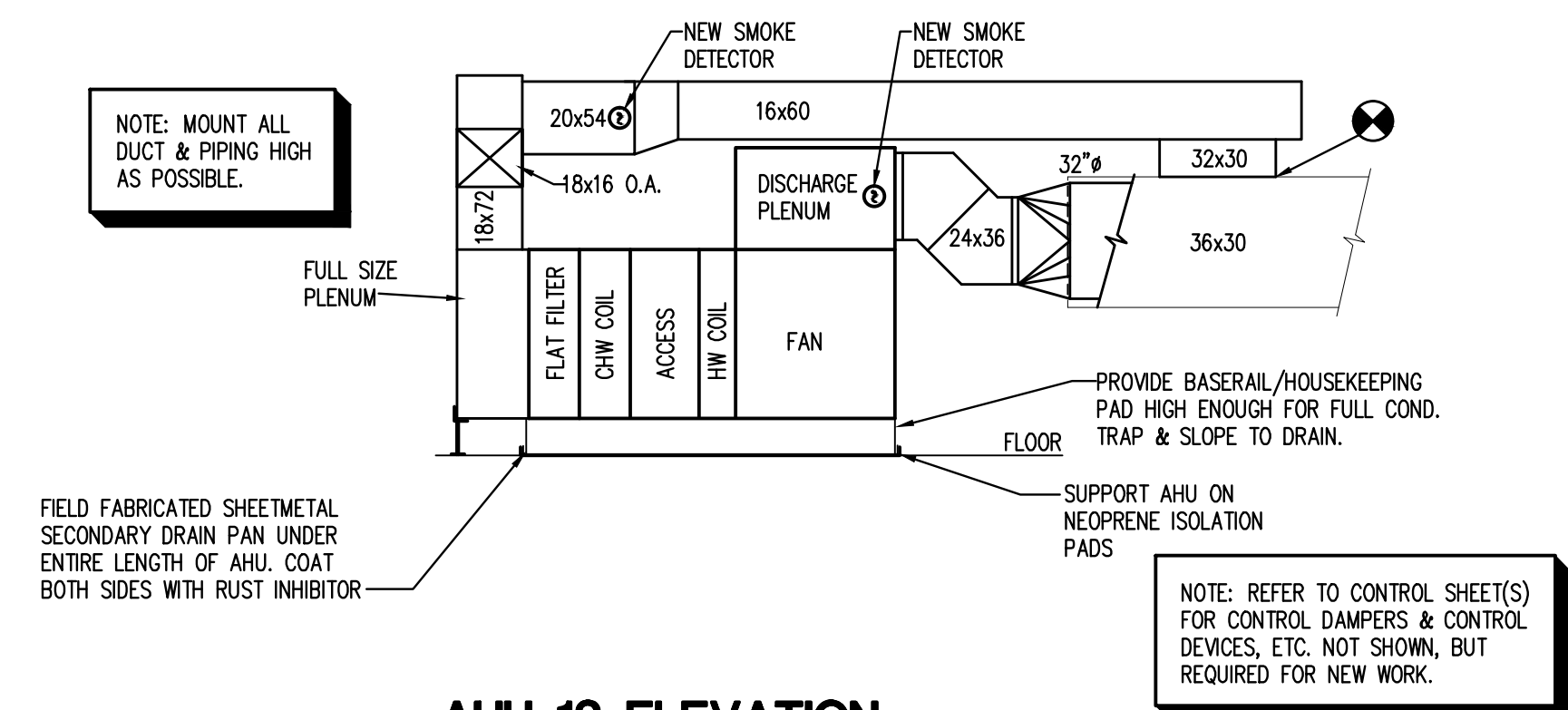
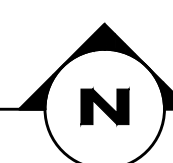
PARTIAL PLAZA LEVEL NORTH FLOOR PLAN

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



AHU-12 MECHANICAL ROOM - NEW WORK

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



AHU-12 ELEVATION

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

REV	DESCRIPTION	DATE

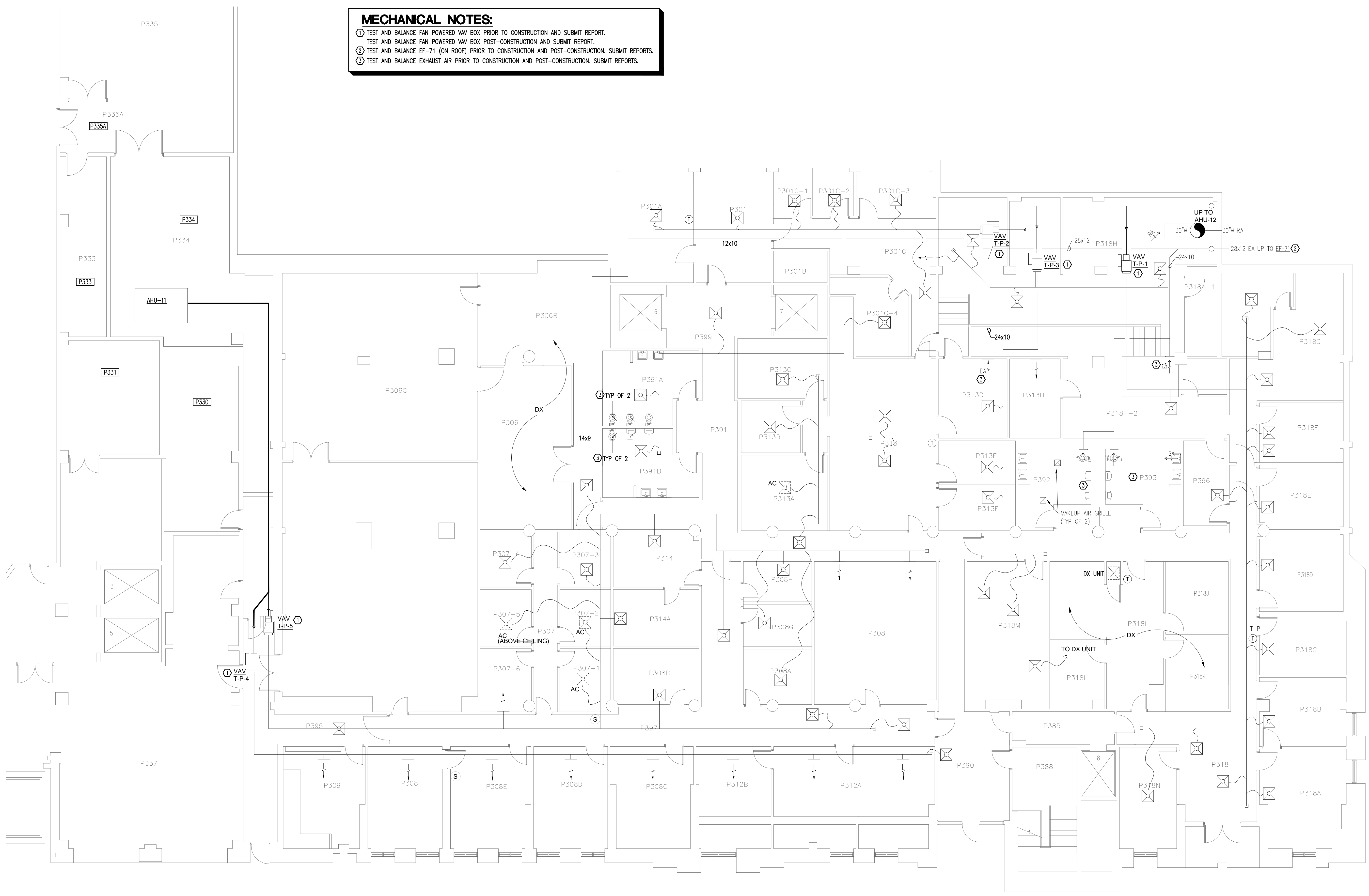
**AHU-11 & AHU-12 REPLACEMENT
 LEON COUNTY COURTHOUSE
 LEON COUNTY
 TALLAHASSEE, FLORIDA**

DRAWING TITLE: **AHU-12 - MECHANICAL ROOM NEW WORK PLAN & ELEVATION**

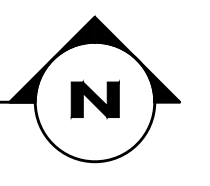
FILE:	M202
JOB NO.:	211-124
DATE :	1-9-12
PLOT SIZE:	1=1
DRAWN BY:	D. GOODMAN
CHECKED BY:	C. ALLEN
SHEET No.:	

MECHANICAL NOTES:

- ① TEST AND BALANCE FAN POWERED VAV BOX PRIOR TO CONSTRUCTION AND SUBMIT REPORT.
- ② TEST AND BALANCE FAN POWERED VAV BOX POST-CONSTRUCTION AND SUBMIT REPORT.
- ③ TEST AND BALANCE EF-71 (ON ROOF) PRIOR TO CONSTRUCTION AND POST-CONSTRUCTION, SUBMIT REPORTS.
- ④ TEST AND BALANCE EXHAUST AIR PRIOR TO CONSTRUCTION AND POST-CONSTRUCTION, SUBMIT REPORTS.



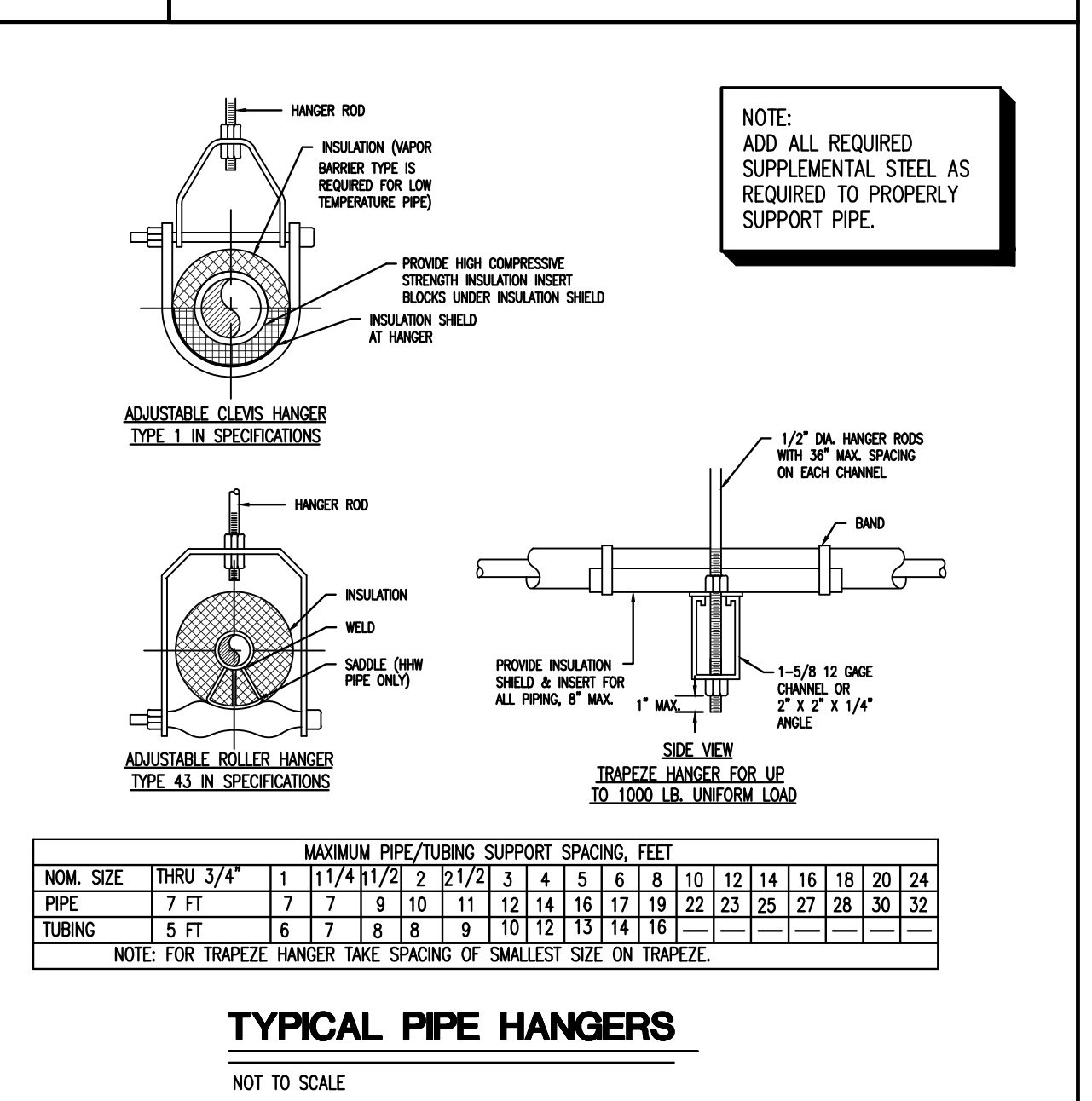
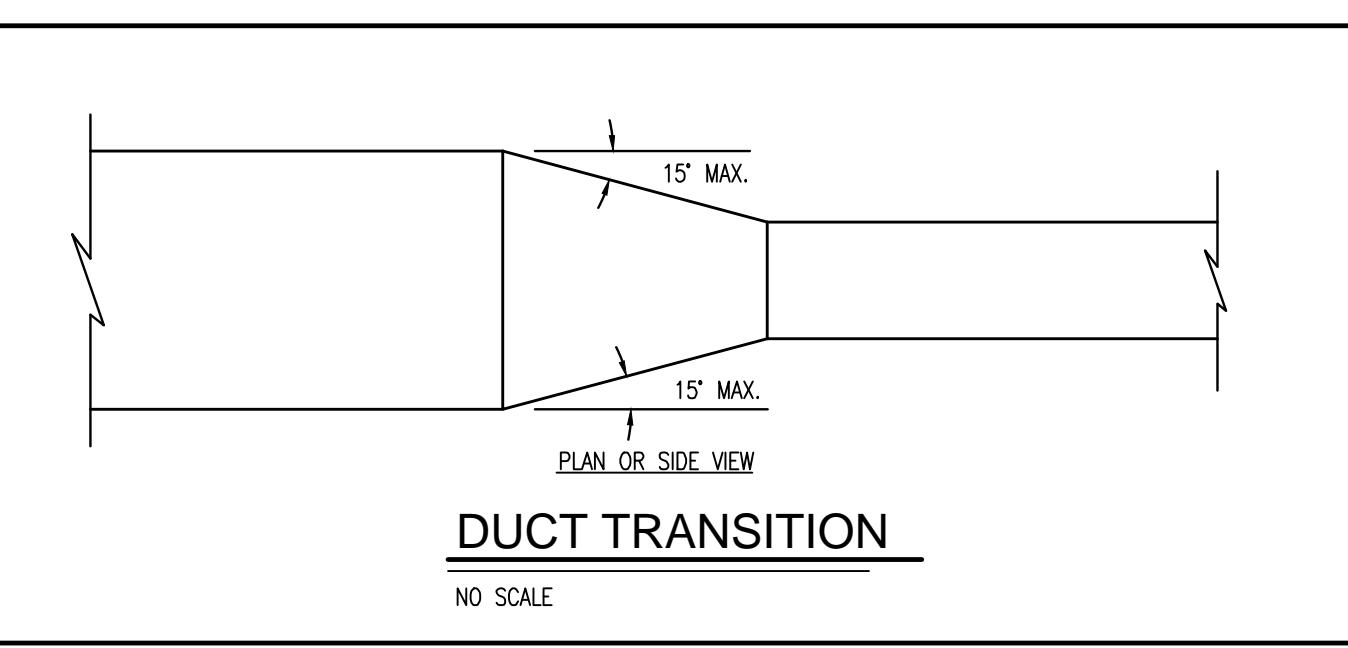
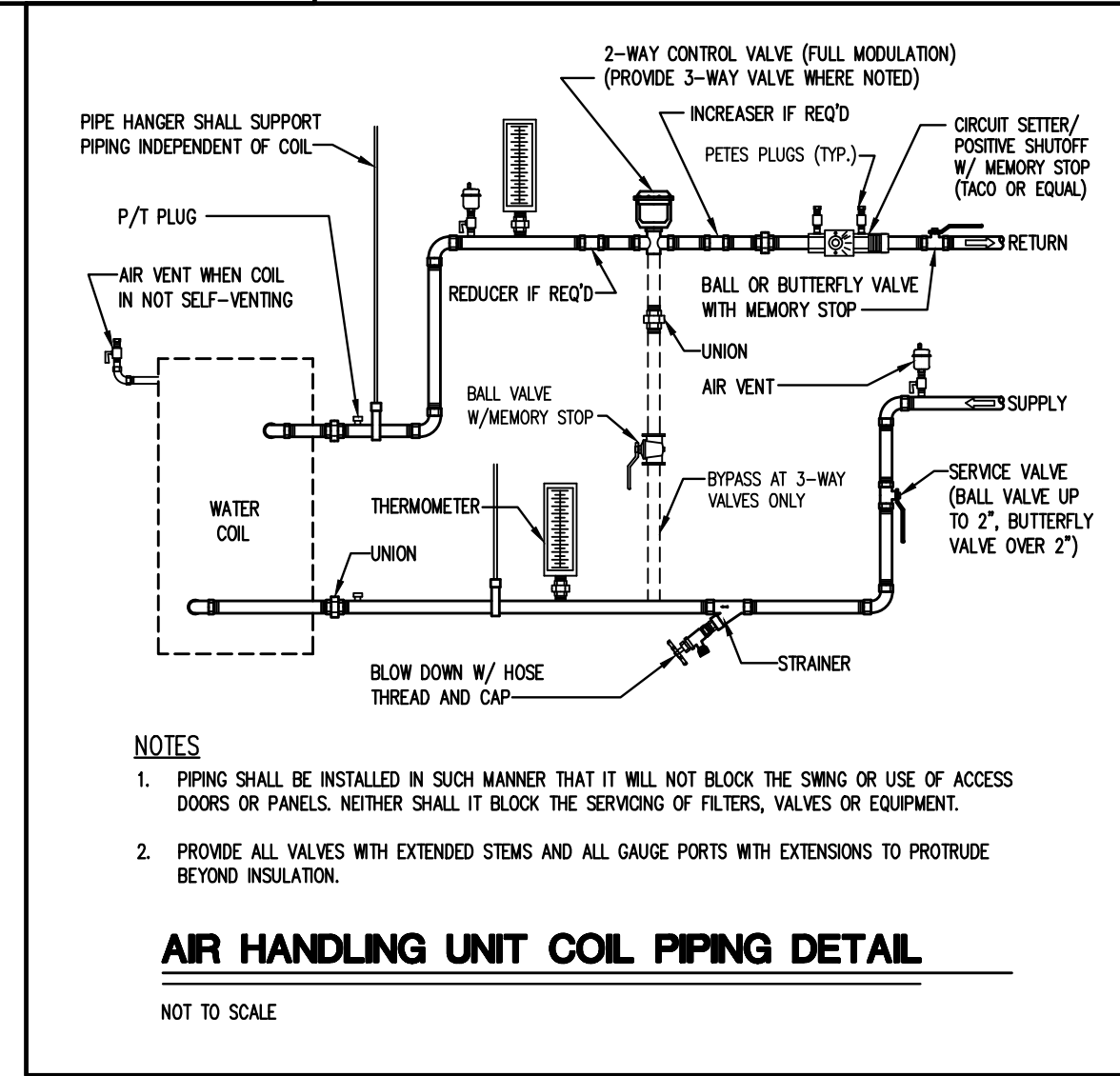
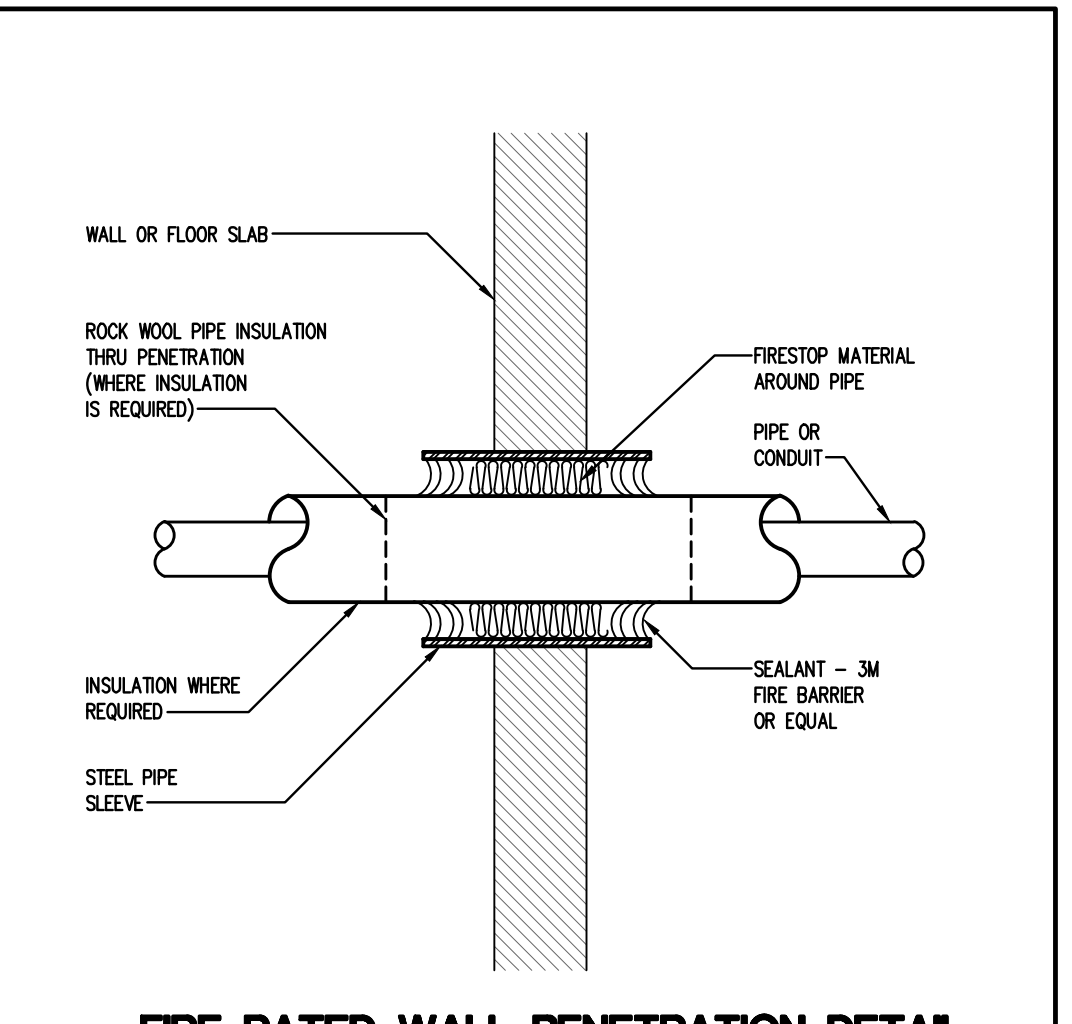
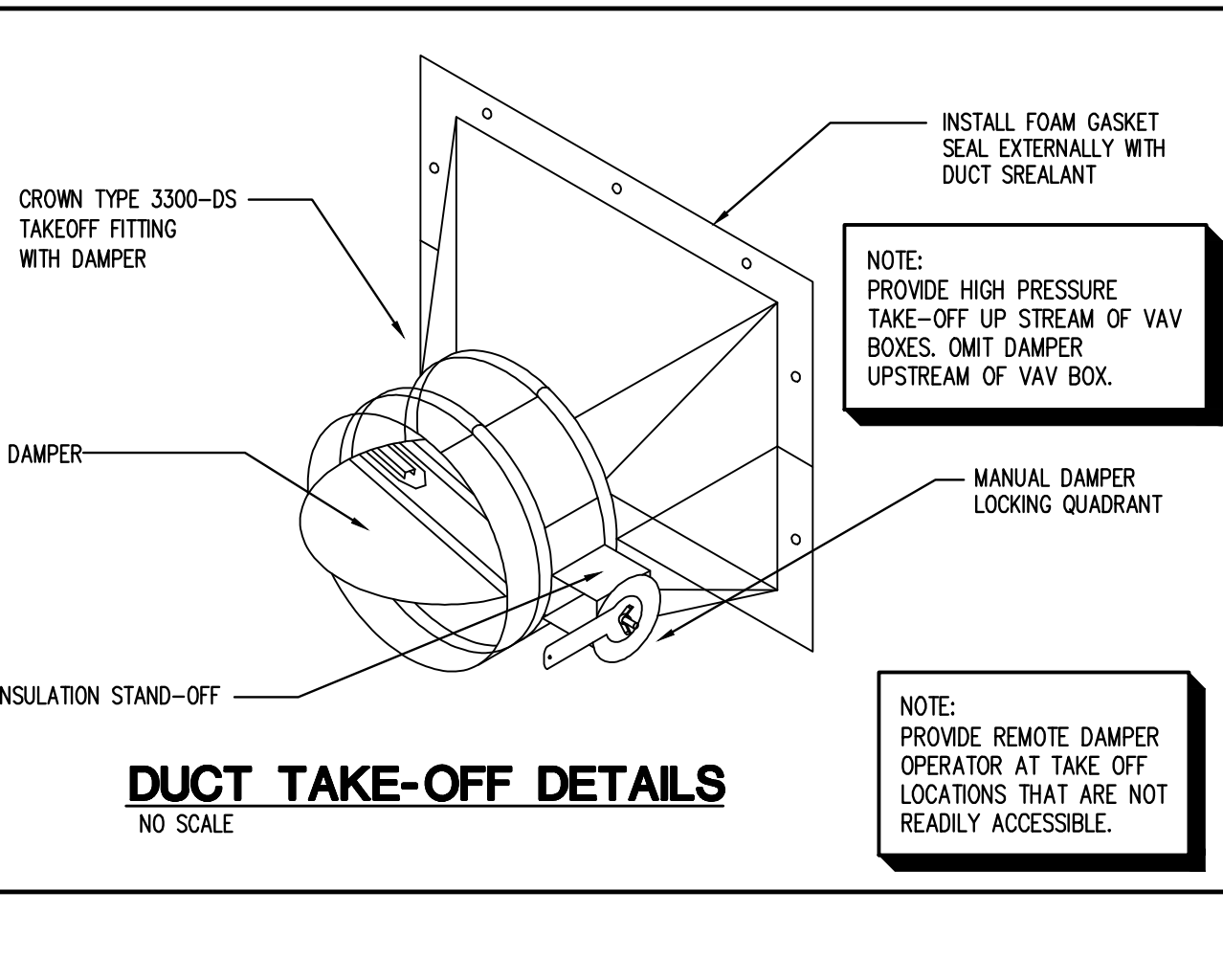
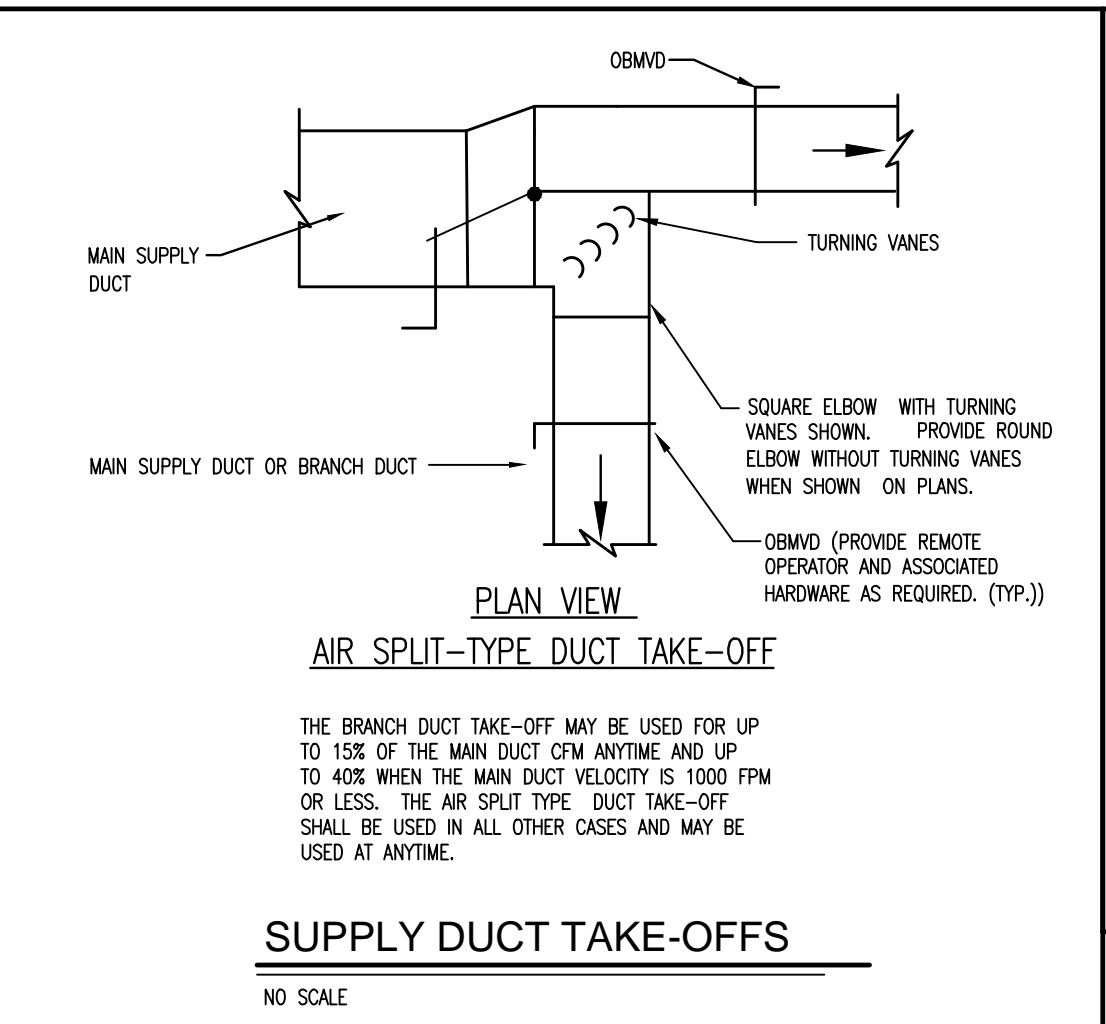
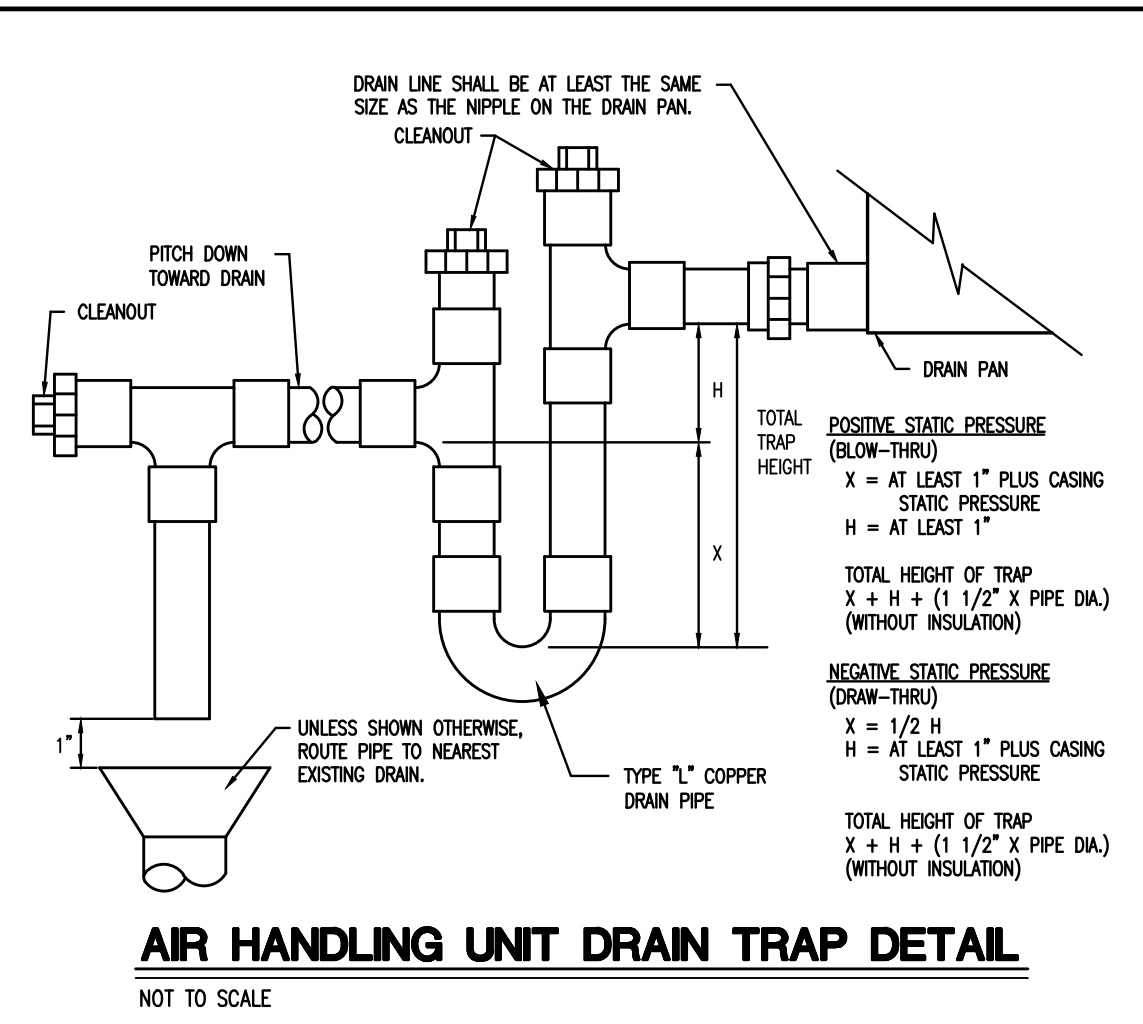
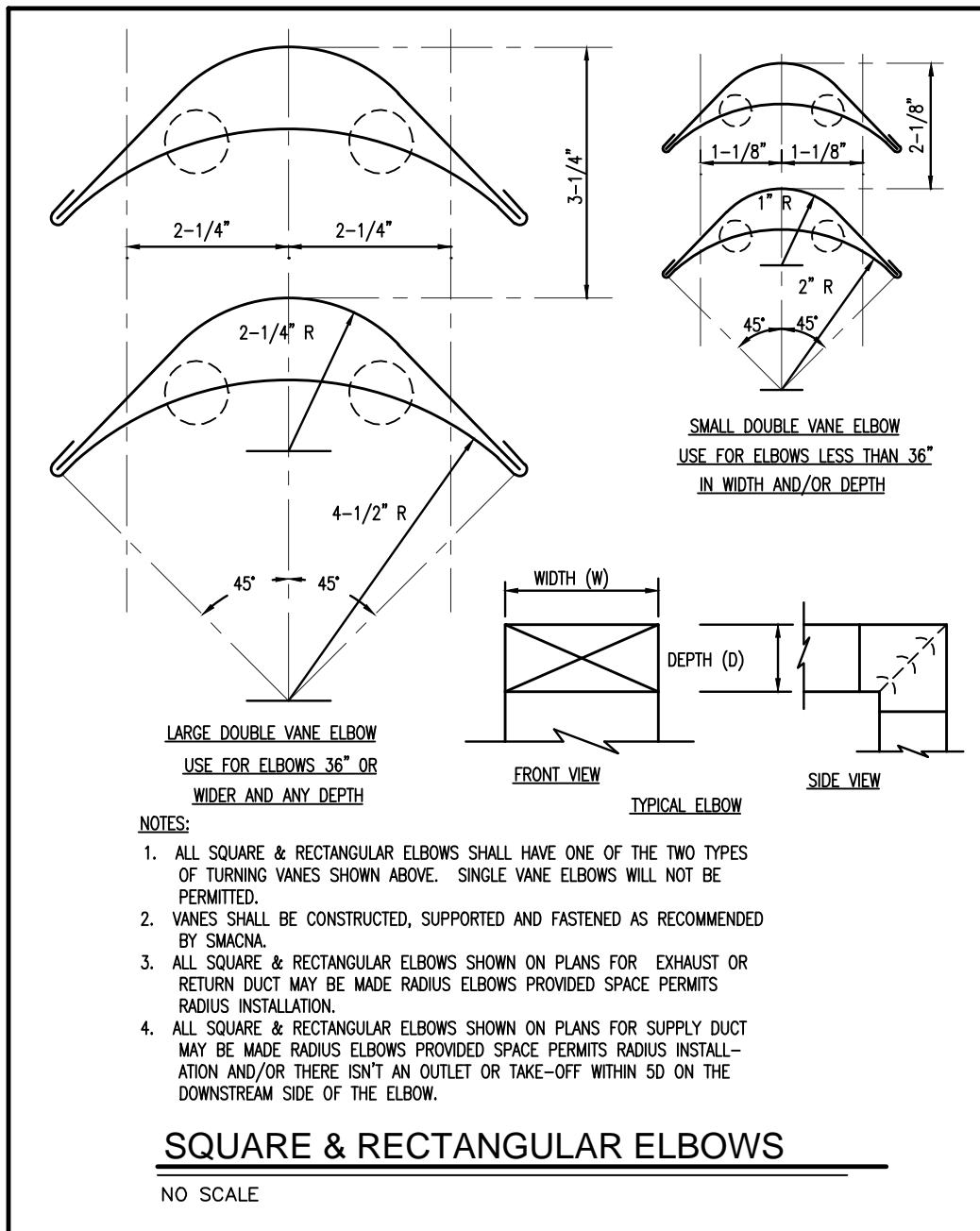
EXISTING CONDITIONS - PARKING LEVEL P3 - HVAC
 SCALE: 1/8"=1'-0"

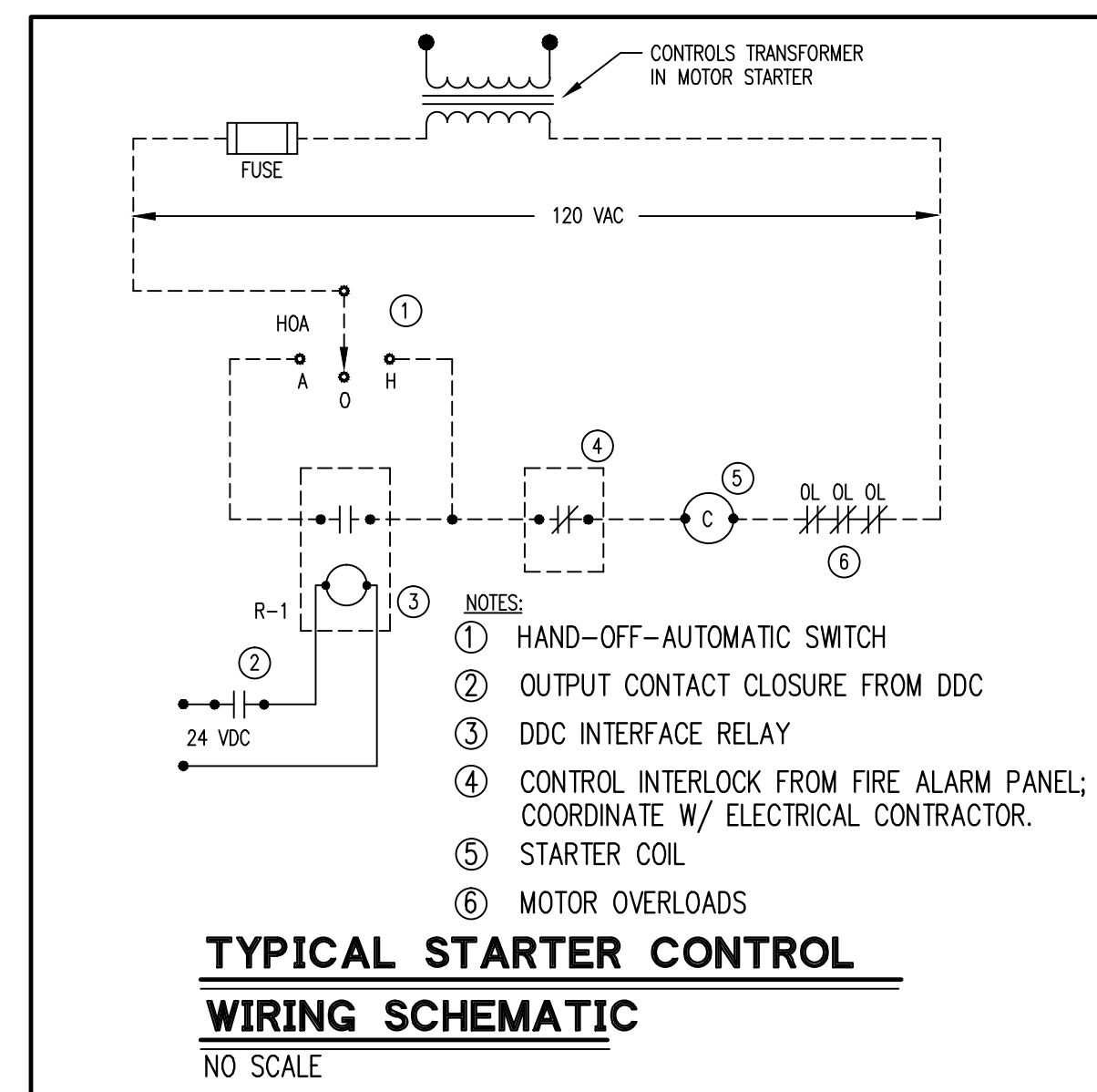
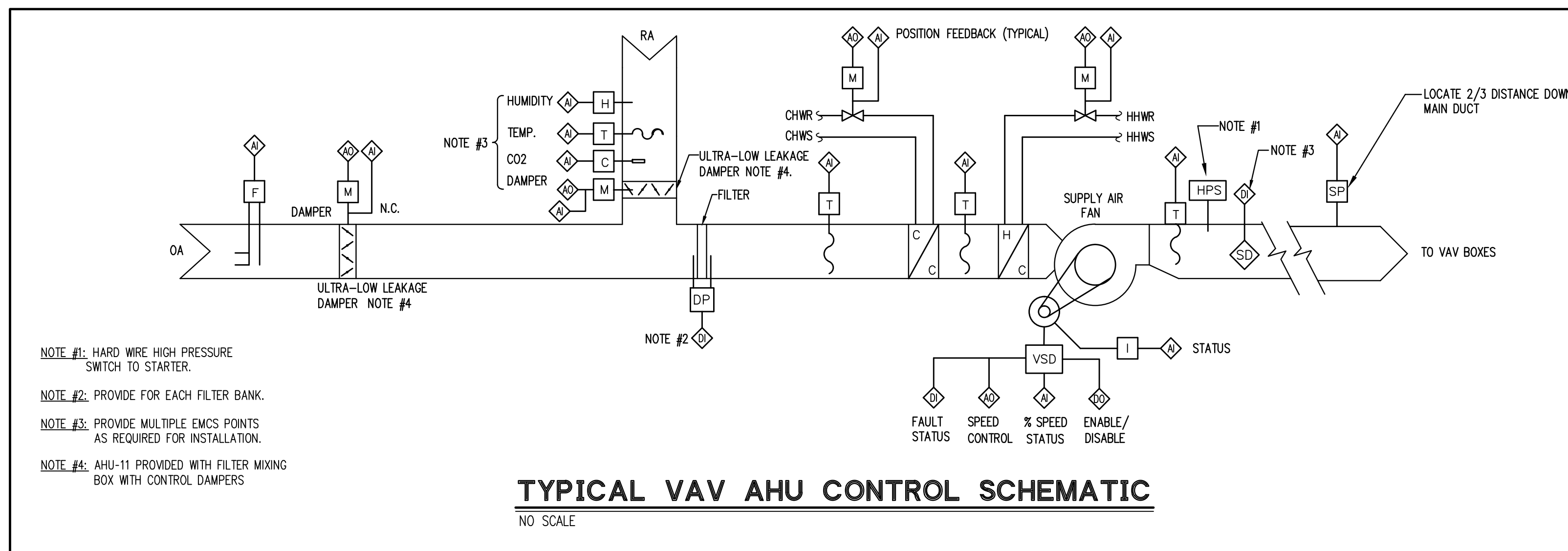


REV#	DESCRIPTION	DATE

AHU-11 & AHU-12 REPLACEMENT
LEON COUNTY COURTHOUSE
 LEON COUNTY
 TALLAHASSEE, FLORIDA

DRAWING TITLE:	LEVEL 3 PARTIAL FLOOR PLAN MECHANICAL EQUIPMENT ROOM
FILE:	M-5
JOB NO.:	211-124
DATE :	1-9-12
PLOT SIZE:	1=1
DRAWN BY:	D. GOODMAN
CHECKED BY:	C. ALLEN
SHEET No.:	M-203





EMCS GENERAL NOTES

- CONTRACTOR SHALL COORDINATE ALL CONTROLS INTERFACE WORK OF HVAC EQUIPMENT WITH EQUIPMENT MANUFACTURERS SO THAT: A) WARRANTIES WILL REMAIN VALID, B) INTERFACE METHOD IS APPROPRIATE FOR PROPER OPERATION OF EQUIPMENT, C) PROPER EMCS PERFORMANCE.
- CONTRACTOR SHALL PROVIDE POWER (AND CONTROL POWER) TO ALL CONTROL PANELS, CONTROL DEVICES, ACTUATORS AND ACCESSORIES AS REQUIRED. COORDINATE WITH OWNER FOR ELECTRICAL SERVICE CONNECTION FOR NEW CONTROLS.
- LOCATION OF EMCS CONTROL PANELS SHALL BE COORDINATED WITH OWNER.
- MOUNT ZONE SENSORS 48" ABOVE FINISHED FLOOR. COORDINATE FINAL LOCATIONS W/OWNER.
- CONTRACT W/BUILDING FIRE ALARM SYSTEM CONTRACTOR TO COMPLETE ALL REQUIRED FIRE ALARM INTERLOCK/INTERFACE WORK REQUIRED BY THIS PROJECT. MAINTAIN FIRE ALARM SYSTEM WARRANTY.
- NO EXPOSED CONDUIT WILL BE ACCEPTABLE FOR ZONE SENSORS.
- EMCS CONTRACTOR SHALL UPDATE EXISTING EMCS, GRAPHICS, SEQUENCES, ETC. FOR ALL NEW WORK & MODIFIED EXISTING WORK ASSOCIATED W/THIS PROJECT. EMCS CONTRACTOR SHALL INCLUDE ALL COSTS TO INTERFACE WITH EXISTING CONTROLS AS REQUIRED TO FULLY ACCOMPLISH SCOPE OF WORK.
- CONTROLS SHALL FULLY INTEGRATE/INTERFACE WITH VSD CONTROLLERS. PROVIDE ALL REQUIRED INTERFACE COMMUNICATIONS, HARDWARE, FIRMWARE & SOFTWARE AS REQUIRED TO MONITOR & CONTROL VSD'S AT LOCAL EMCS CONTROLLERS & ON-SITE/OFF-SITE WORKSTATIONS. ALL AVAILABLE VSD DATA & CONTROL AT LOCAL CONTROL PANELS SHALL BE INTERFACED, DISPLAYED & ADJUSTABLE AT EMCS WORKSTATION(S).
- COORDINATE CLOSELY W/T&B SUBCONTRACTOR TO FULLY ACCOMPLISH EMCS AND T&B SCOPE OF WORK.

CONTROL SYMBOL LEGEND

C	CARBON DIOXIDE SENSOR
I	CURRENT SENSOR
F	FLOW SENSOR
T	TEMPERATURE SENSOR
H	HUMIDITY SENSOR
M	MOTOR ACTUATOR
R	RELAY OR CONTACTOR
DP	DIFFERENTIAL PRESSURE
SP	STATIC PRESSURE SENSOR
HSP	HIGH PRESSURE SWITCH
DO	DIGITAL OUTPUT
DI	DIGITAL INPUT
AO	ANALOG OUTPUT
AI	ANALOG INPUT
SD	SMOKE DETECTOR
N.C.	NORMALLY CLOSED
N.O.	NORMALLY OPEN
H.C.	HEATING COIL
C.C.	COOLING COIL
D.X.C.	DIRECT EXPANSION COIL
S/S	START/STOP
D.D.C.	DIRECT DIGITAL CONTROLS
EMCS	ENERGY MANAGEMENT CONTROL SYSTEM
VSD	VARIABLE SPEED DRIVE

NOTE: EMCS CONTRACTOR SHALL VERIFY ALL EXISTING CONTROL SEQUENCES, EXISTING CONTROL POINTS, GRAPHICS, ETC. EXIST, ARE OPERATIONAL & PROVIDE REPORT ON ALL TESTS/FINDINGS. NEW AHUS SHALL HAVE COMMUNICATIONS WITH VAV BOXES, CENTRAL CHILLER PLANT AND CENTRAL BOILER PLANT - PROVIDE INNER CONNECTION COMMUNICATIONS AS REQUIRED; MAKE SOFTWARE/FIRMWARE/HARDWARE CHANGES AS REQUIRED; REFER TO SEQUENCE OF OPERATION.

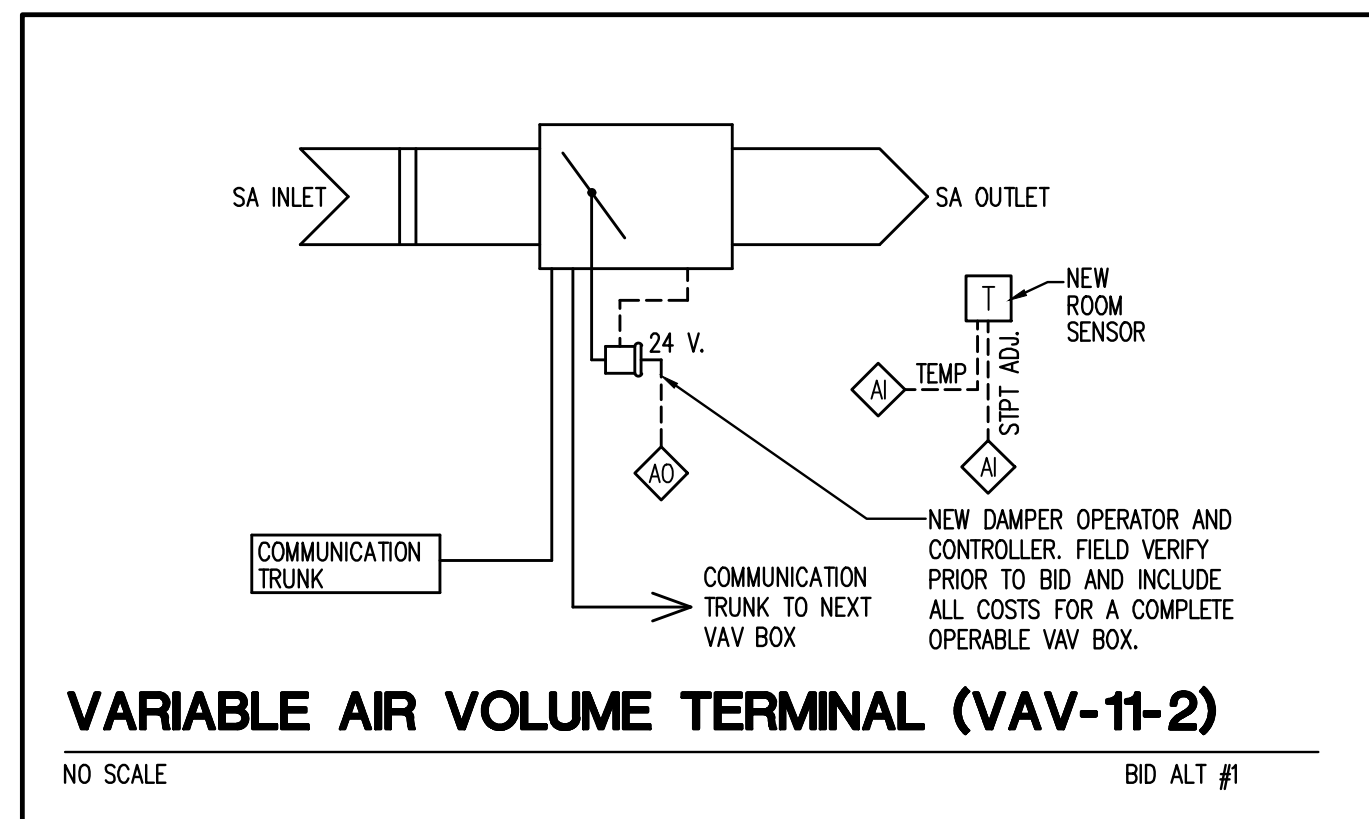
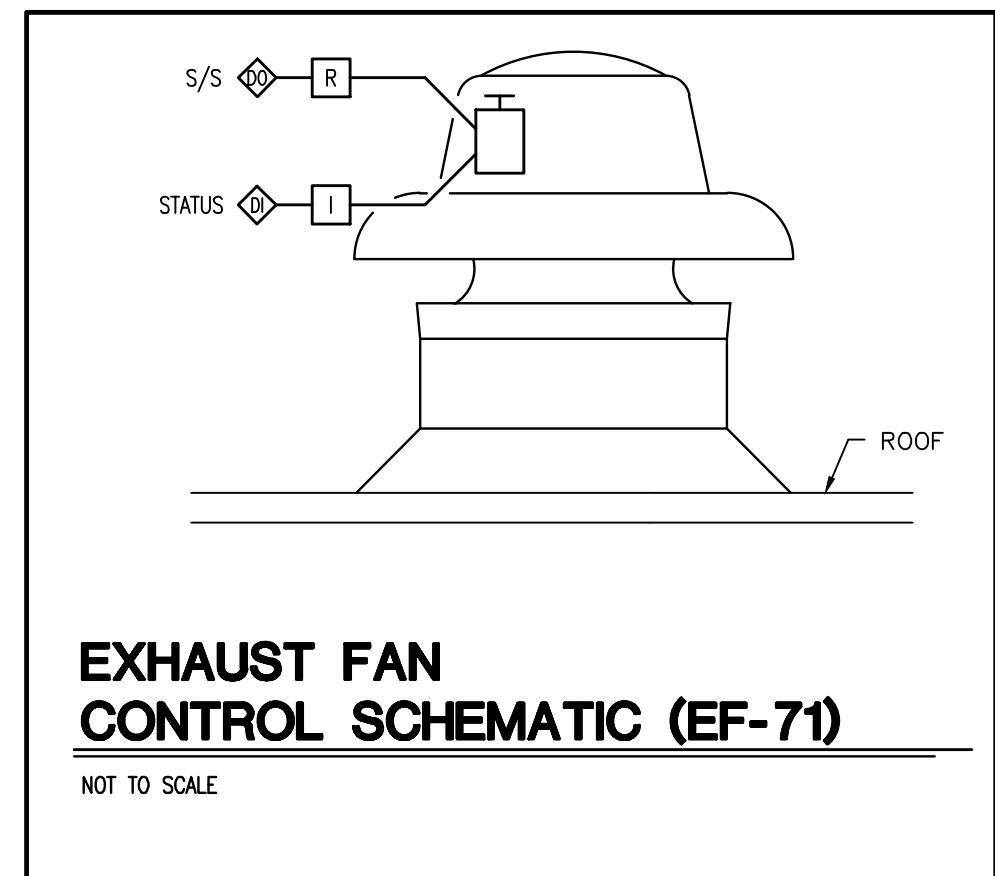
SPECIFIC SEQUENCE OF OPERATION:

- AHU (Typical):**
 - Space Temperature Setpoints:
 - Maximum Space Temperature (Summer Mode) = 75.0°F (ADJ)
 - Minimum Space Temperature (Winter Mode) = 70.0°F (ADJ)
 - Unoccupied Space Temperature (Summer Mode) = 82.0°F (ADJ)
 - Unoccupied Space Temperature (Winter Mode) = 60.0°F (ADJ)
 - Hours of Operation:
 - Hour of Operation = Coordinate with owner for daily and weekly hours of operation required.
- EXHAUST FAN CONTROL:**
 - Exhaust fans shall be controlled w/start/stop (DO) & status (DI) with AHU's as follows:

AHU	EF
AHU-11	N/A
AHU-12	EF-71

VARIABLE AIR VOLUME BOXES (VAV-11-2): (BID ALT #1)

Each variable air volume (VAV) box will be controlled by a stand-alone DDC controller. The EMCS shall monitor the space temperature. The EMCS shall position the VAV damper to maintain a constant space temperature setpoint. On a drop in space temperature below setpoint, the VAV damper will be modulated closed. On a further drop in space temperature, the VAV damper will go to the minimum position. The reverse shall occur on a rise in space temperature above setpoint.



SEQUENCE OF OPERATION

GENERAL
Sequence of operation is hereby defined as the manner and method by which controls function. Requirements for each type of control system operation are specified in this section. All setpoints shall be user adjustable. Programming shall have sufficient ranges, deadbands, etc., to prevent excessive cycling and/or unstable control.

All motors shall be monitored by the EMCS. The status of each motor shall be reported to the EMCS which shall track the runtime of each motor. Each motor shall be assigned a runtime setpoint. When the accumulated runtime setpoint has been exceeded, a maintenance work order message shall be sent to the building EMCS workstations.

Each analog sensor (temperature, humidity, pressure, flow, etc.) shall have adjustable high and low limit alarm setpoints. Whenever a setpoint is exceeded, the DDC shall send an alarm message to the building EMCS workstations (and applicable off-site notifiers: pager, cell phone, workstation, etc.). The alarm shall remain active until the sensor reports to the DDC that the reading is in the normal range.

All alarms shall be interlocked with the associated equipment so that alarms shall be suppressed when the equipment or system is inactive. Status alarms shall have an adjustable time delay set long enough to allow the equipment status to be sensed to help prevent nuisance alarms. Analog sensor alarms shall have a time delay as well as an adjustable deadband to prevent toggling between normal and alarm states. Means shall be provided to the operator to manually suppress each alarm and to adjust alarm limits.

All Setpoints are user adjustable.

AIR-SIDE CONTROL SEQUENCES

TYPICAL VAV AHU'S

Each AHU will be controlled by a stand-alone DDC controller. The EMCS shall start/stop the AHU through the automatic circuit of the AHU starter. The EMCS shall start/stop the AHU based on time schedules, commands generated by the DDC controller, the EMCS, zone "occupied" overrides, or by remote commands from Building (and off-site maintenance) EMCS workstation(s). AHU positive run status shall be reported to the EMCS via current sensor relays or differential pressure switch as shown. When the AHU is "off", the EMCS shall position the AHU control valves and dampers to the static or default setting.

A. Supply Air Fan

When the AHU is called to run, the EMCS shall modulate the variable speed drive (via PID algorithms) to maintain a constant duct static pressure setpoint. If multiple static pressure sensors are shown, the EMCS shall poll the sensors and modulate the variable speed drive to satisfy the worst case condition.

If the fan fails to start, an alarm signal will be sent to the building & off-site EMCS workstation(s); the supply fan motor will start/stop manually via the VSD bypass; Fan speed will be manually adjustable.

The high pressure sensor (HPS) located at the supply fan discharge shall be set to prevent the supply fan from developing excessive pressure in the supply duct. In the event that static pressure rises above the upper setpoint, the AHU shall shut down and an alarm shall be sent to the building (and off-site maintenance) EMCS workstation(s).

When the AHU is started in the optimum start mode, unoccupied mode, or safety mode, the SA fan maximum cfm will be limited to the RA cfm indicated on the AHU Schedule. At the scheduled occupied time, the system will return to normal operation and modulate the fan to maintain maximum duct static pressure setpoint as required.

B. Outside Air Flow

When the AHU is started in the optimum start mode or unoccupied mode, the return air damper(s) will be positioned fully open and the outside air damper will remain closed. At the scheduled occupied time, the outside air damper will open and modulate in conjunction with return air damper(s) to maintain a constant outside air flow. The EMCS shall trend the outside air flow (cfm).

When in unoccupied mode, if CO2 level rises above 800 ppm (adjustable), the system shall operate in the occupied mode until the CO2 level has dropped 10% below the CO2 setpoint.

The EMCS shall continually trend the CO2 ppm level. If the ppm level exceeds 800 (adjustable), an alarm signal will be sent to the building (and off-site maintenance) EMCS workstation(s).

C. Cooling Coil

When the AHU is running, the cooling coil valves shall modulate to maintain a maximum supply air temperature setpoint. The cooling coil valve shall shut whenever the actual supply air temperature is below the maximum supply air temperature setpoint. When the AHU is off, the cooling coil valve shall shut.

The maximum supply air temperature setpoint shall be reset up whenever all actual space temperatures are below the maximum space temperature setpoint.

The EMCS shall maintain an "unoccupied" maximum space temperature setpoint. If the unoccupied maximum space temperature setpoint (of any sensor if multiple sensors installed) is exceeded, the EMCS shall cycle the unit ON and modulate the cooling coil valve to maintain the unoccupied maximum space temperature setpoint.

D. Heating Coil

When the AHU is running, the heating coil valve shall modulate to maintain a minimum supply air temperature setpoint. The heating coil valve shall shut whenever the actual supply air temperature is above the minimum supply air temperature setpoint. When the AHU is off, the heating coil valve shall shut.

The minimum supply air temperature setpoint shall be reset down whenever all actual space temperatures are above the minimum space temperature setpoint.

The EMCS shall maintain an "unoccupied" minimum space temperature setpoint. If space temperature drops below the unoccupied minimum space temperature setpoint (of any sensor if multiple sensors installed), the EMCS shall cycle the unit ON, start heating plant and modulate the heating coil valve to maintain the unoccupied minimum space temperature setpoint.

E. Humidity Control

The EMCS shall continuously monitor return air relative humidity. If the return air relative humidity rises above 60%, the EMCS shall:

- Adjust the supply air temperature leaving the cooling coil downward; and
- Cycle the Building Heating System ON and modulate the AHU heating coil valve and modulate/stage the terminal unit heating if required to maintain supply air temperature setpoint;

If the return air humidity decreases below setpoint (include deadbands to avoid cycling), the Building Heating System will cycle OFF line (if not required elsewhere), and the AHU will resume normal operation.

F. Filter

Filters shall be monitored by the EMCS via differential pressure sensors. Each filter shall have a software adjustable setpoint. Whenever the differential pressure rises above the setpoint, the DDC shall send an alarm message to the building (and off-site maintenance) EMCS workstation(s).

G. Safeties

On detection of smoke, the AHU duct smoke detectors will signal the fire alarm panel and stop the supply air fans. An alarm signal will be sent to the building (and off-site maintenance) EMCS workstation(s). Fans will be restarted when the fire alarm circuit is reset.

When the outside air temperature drops below 37°F (adjustable), the air handler unit will be cycled on, the cooling coil valve shall shut, the heating system will be cycled on and the AHU and terminal unit hot water valves will modulate to maintain space temperature setpoint. If mixed air temperature drops below 37°F, the outside air damper will position full closed and the return air damper will position full open.

H. Miscellaneous Control Sequences

Reference Miscellaneous Control Sequences for other required sequences of operation. These sequences shall be programmed in the software; however, the Owner must be able to "toggle" sequences on or off. Required miscellaneous control sequences are:

- Scheduled Start/Stop -Morning Cool-down Cycle
- Alarms -Supply Air Temperature Reset w/ Humidity Override
- Morning Warm-up Cycle -Space Temperature Control

MISCELLANEOUS CONTROL SEQUENCES

The following control strategies are defined as required for the initial implementation of this project, but are not to be construed as defining all available strategies of the EMCS. The new EMCS shall accomplish the defined strategies.

- SCHEDULED START/STOP**
The scheduled start/stop program shall start and stop equipment based on the time-of-day and day-of-week. A feedback signal shall verify that the command has been carried out and provide the EMCS operator with an alarm when the equipment fails or is locally started or stopped.
- ALARMS**
All critical alarm points are sent to the Building Controls Operator Workstation and to the pager, email and telephone alarm notification software system (as applicable).
- MORNING WARM-UP CYCLE:**
When the AHU is started, if the return air temperature is less than 65°F, the EMCS shall activate the morning warm-up cycle as follows: The outside air damper shall remain closed, the return air dampers will open fully, the supply air temperature setpoint shall be raised to a maximum, the VSD will modulate to a minimum position and the heating coil valves shall modulate open.
When the return air temperature rises to 72°F, the EMCS shall revert to normal AHU sequence of operation as indicated. During this mode, the cooling coil valve will be closed.
- MORNING COOL-DOWN CYCLE:**
When the AHU is started, if the return air temperature is more than 82°F, the EMCS shall activate the morning cool-down cycle as follows: The outside air damper shall remain closed, the return air dampers will open fully, the supply air temperature setpoint shall be lowered to 52°F (adjustable), and the VSD will be modulated for full design flow. When the room air temperature lowers to 76°F, the EMCS shall revert to the normal AHU sequence of operation as indicated. During this mode, the heating coil valves will be closed.
- SUPPLY AIR TEMPERATURE RESET WITH HUMIDITY OVERRIDE**
In the cooling mode, the supply air temperature setpoint shall be adjusted based on a linear reset schedule. The EMCS shall monitor the space temperature sensor(s). Whenever all space temperature sensor(s) are at or below the space temperature setpoint(s), and the fan speed is at a minimum, the supply air temperature shall be reset up one degree for each degree that the highest space temperature is below setpoint. User defined limits on reset variance is required.
The supply air temperature reset algorithm shall be interrupted if the humidity in the zone (or return air duct) reaches an upper adjustable limit. If the humidity exceeds the upper allowable limit, the EMCS shall adjust the supply air temperature leaving the cooling coil downward until the space humidity level falls below the upper limit. The EMCS shall cycle the building heating system ON, and modulate the AHU or terminal hot water coil valve to maintain space temperature setpoint. If the humidity drops further in the space, the supply air temperature reset sequence of operation shall be reactivated.
- SPACE TEMPERATURE CONTROL:**
The control system shall maintain space temperature setpoints as indicated in the "Specific Sequence of Operation" below.

SEAL

Pinnacle Engineering Group, P.A.
3300 THOMASVILLE ROAD, SUITE 102
TALLAHASSEE, FLORIDA 32309
OFFICE: (850) 422-1703 FAX: (850) 422-1502
Engineering Business #793

DATE

REV. DESCRIPTION

AHU-11 & AHU-12 REPLACEMENT
LEON COUNTY COURTHOUSE
LEON COUNTY
TALLAHASSEE, FLORIDA

DRAWING TITLE: **MECHANICAL CONTROLS**

FILE: M401

JOB NO.: 211-124

DATE: 1-9-12

PLOT SIZE: 1=1

DRAWN BY: D. GOODMAN

CHECKED BY: C. ALLEN

SHEET NO.: **M401**