



100 NORTH MARKET STREET  
 FREDERICK, MARYLAND 21701  
 (301) 662-8532  
 FAX (301) 662-4192  
 info@proffittandassociates.com

RHL ENGINEERING  
 COMPANY, INC.  
 3 West Second Street  
 Frederick, Md. 21701  
 OFFICE: (301) 695-9424  
 FAX: (301) 293-6338  
 E-mail: rhlengr@rhlengr.com

Professional Certification. I  
 hereby certify that these  
 documents were prepared or  
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 am a duly licensed  
 professional engineer under  
 the laws of the State of  
 Maryland. License No: 13954  
 Expiration Date: 05/18/2014

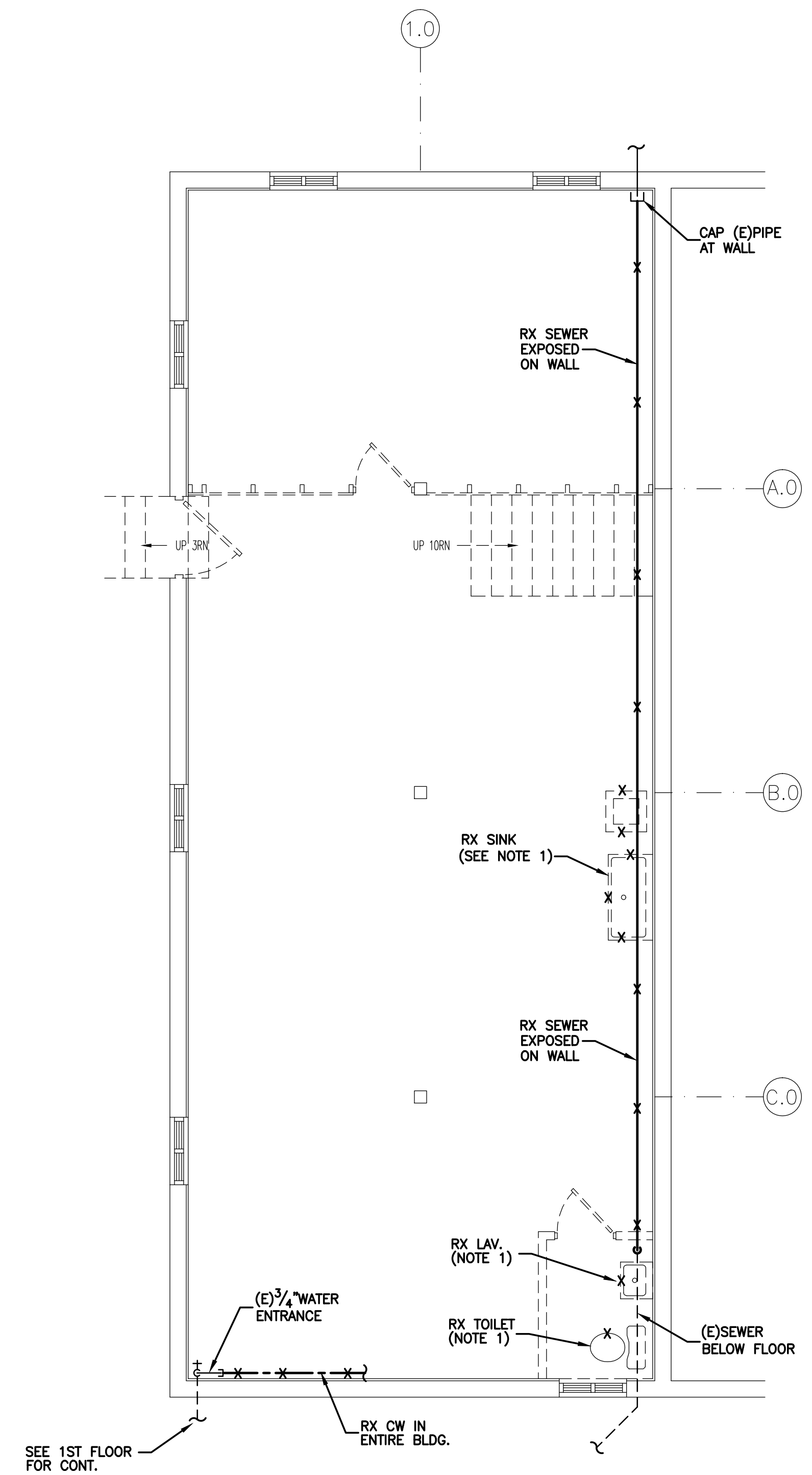
RENOVATIONS TO  
 10 SOUTH BENTZ STREET  
 FOR CAS ENGINEERING  
 10 SOUTH BENTZ STREET  
 FREDERICK, MD. 21701  
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ISSUE		
REV	DATE	DESCRIPTION
1	04/08/14	FRICING

PROJECT NO.: 11121  
 DATE: 03-07-14

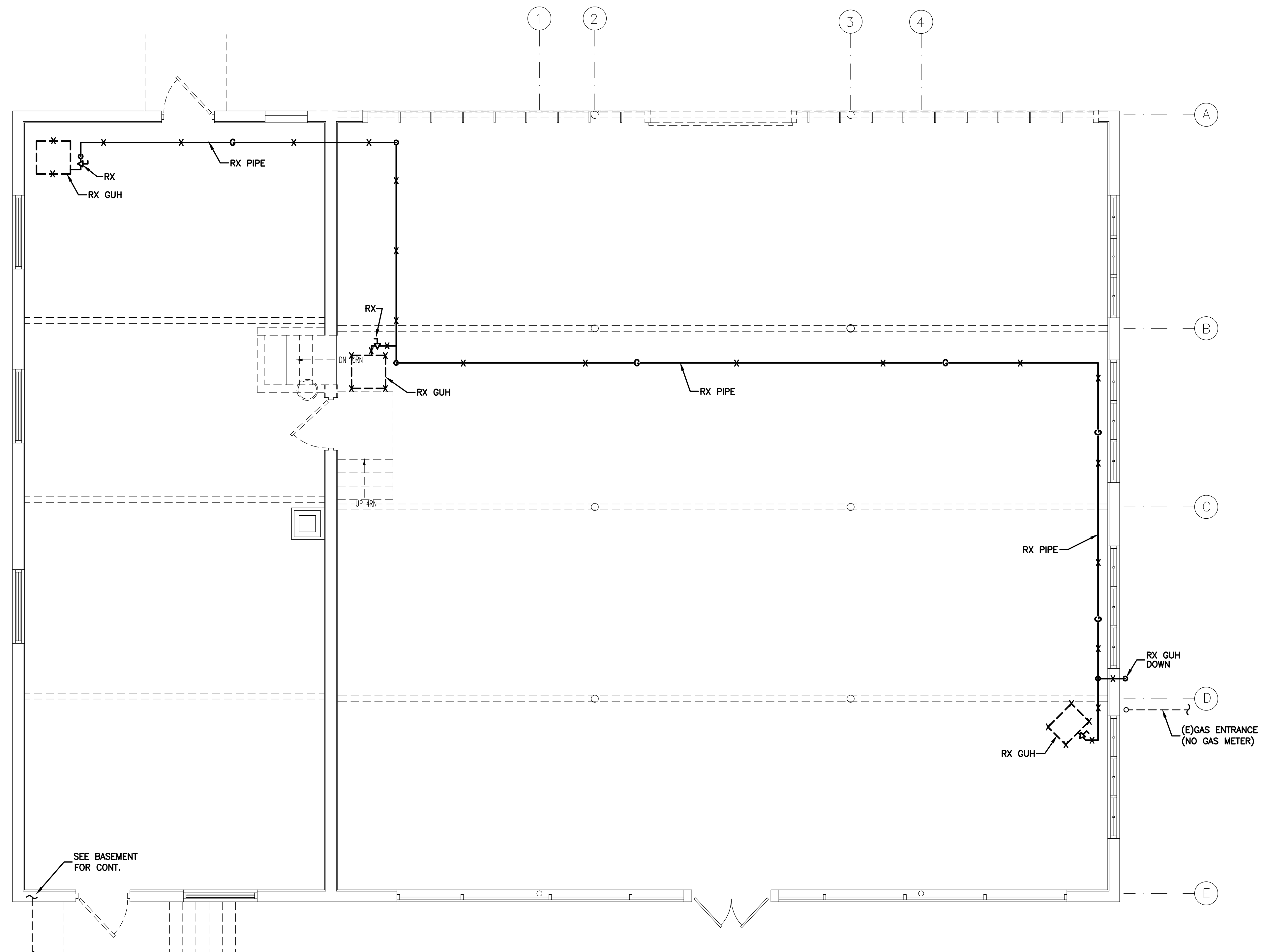
BASEMENT & FIRST FLOOR PLAN  
 PLUMBING - DEMO

**P0.1**  
 1 OF 3

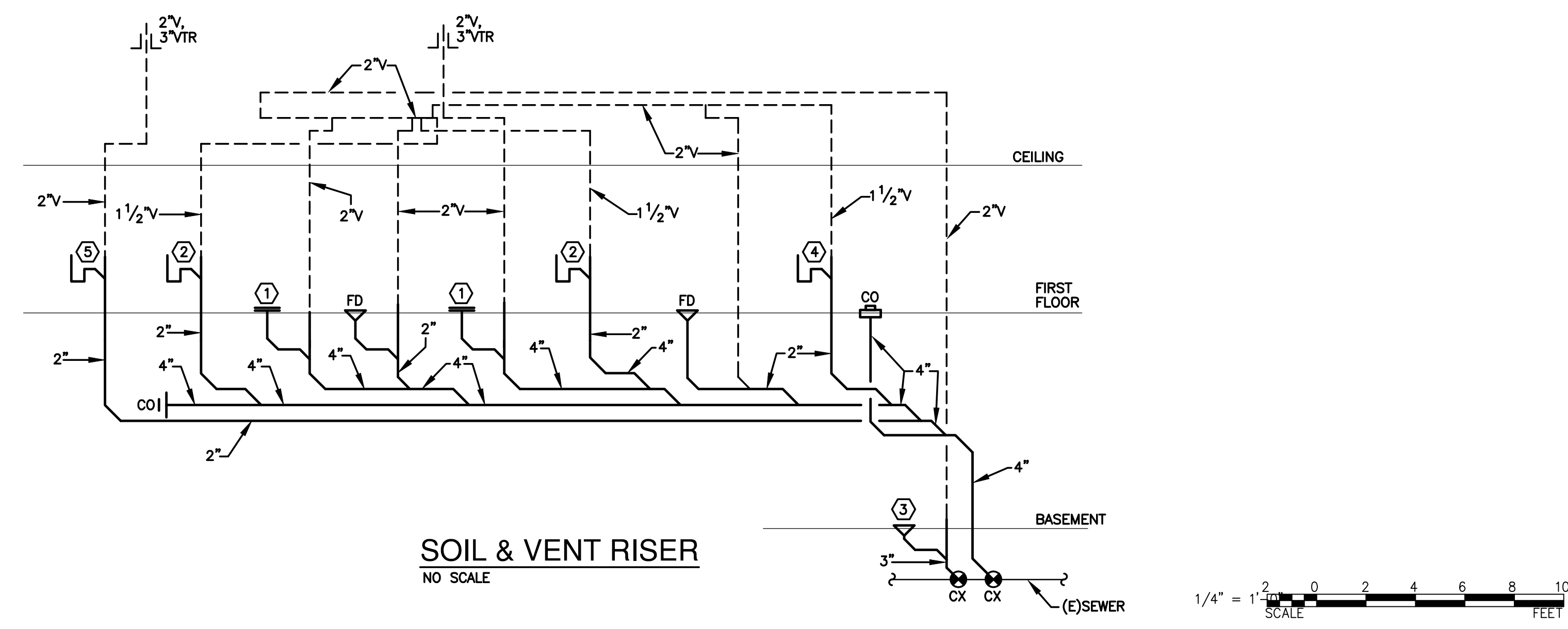


**BASEMENT FLOOR PLAN - PLUMBING DEMO**  
 SCALE: 1/4"=1'-0"

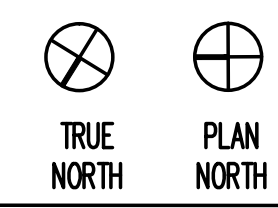
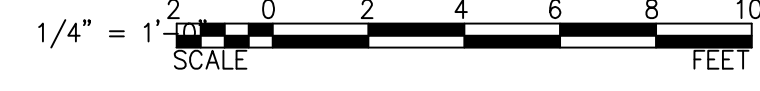
NOTE 1: RX PLUMBING FIXTURES AND ALL ASSOCIATED PIPING. CAP SEWER PIPE BELOW EXISTING FLOOR. CAP EXISTING VENT PIPE AT EXISTING ROOF.



**FIRST FLOOR PLAN - PLUMBING DEMO**  
 SCALE: 1/4"=1'-0"

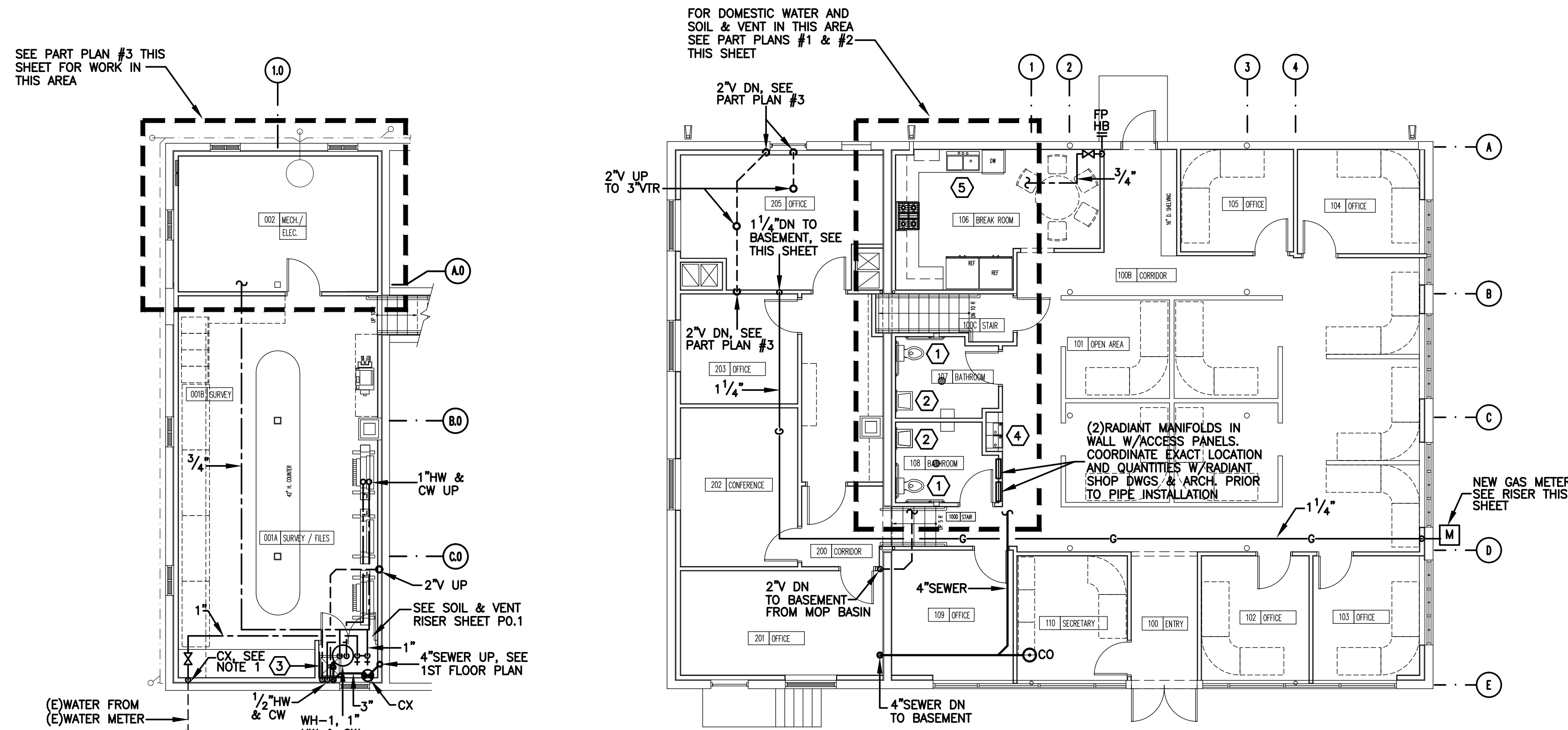


**SOIL & VENT RISER**  
 NO SCALE

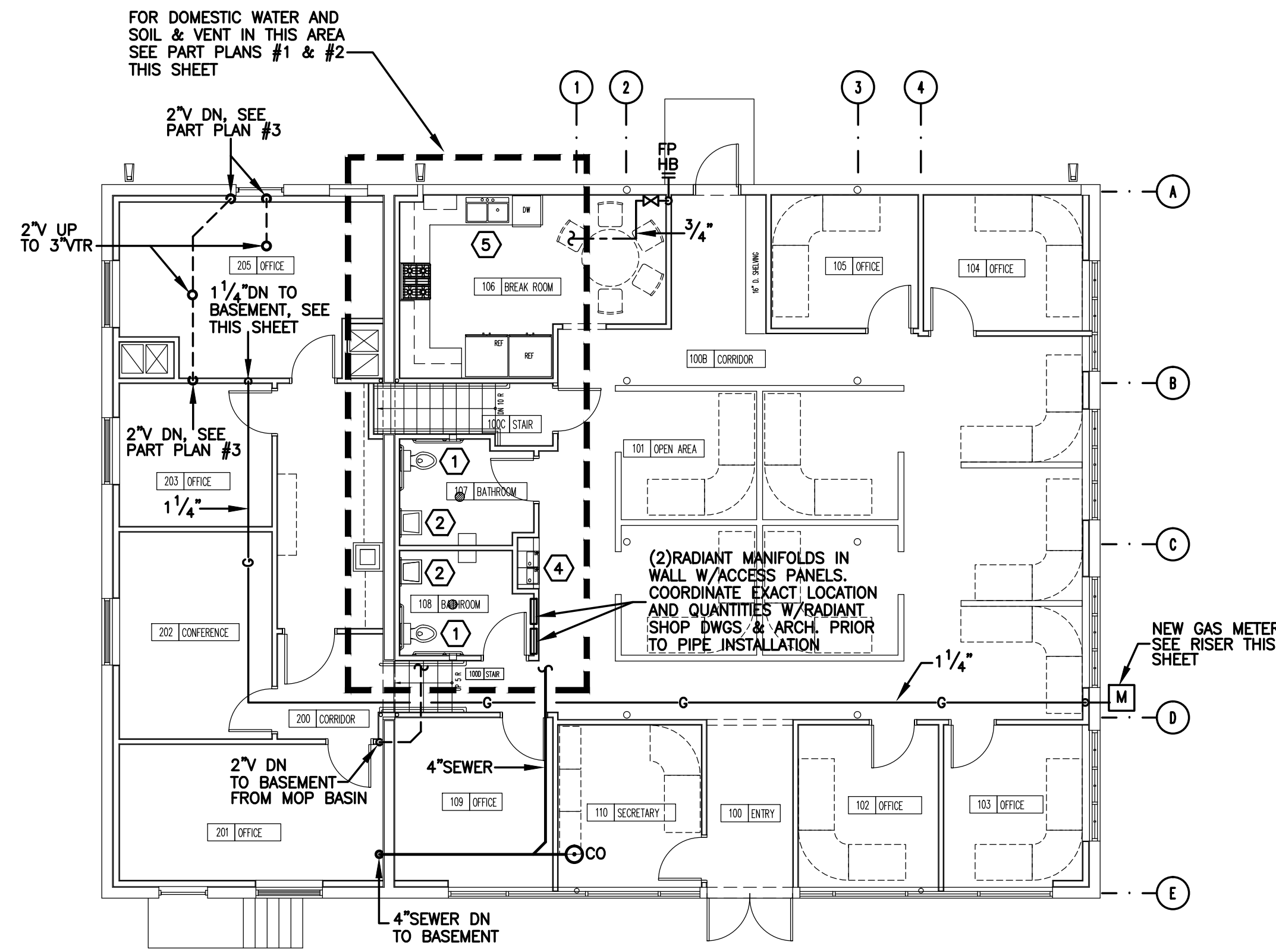


ISSUE	
REV	DESCRIPTION
1	04/08/14 PRICING

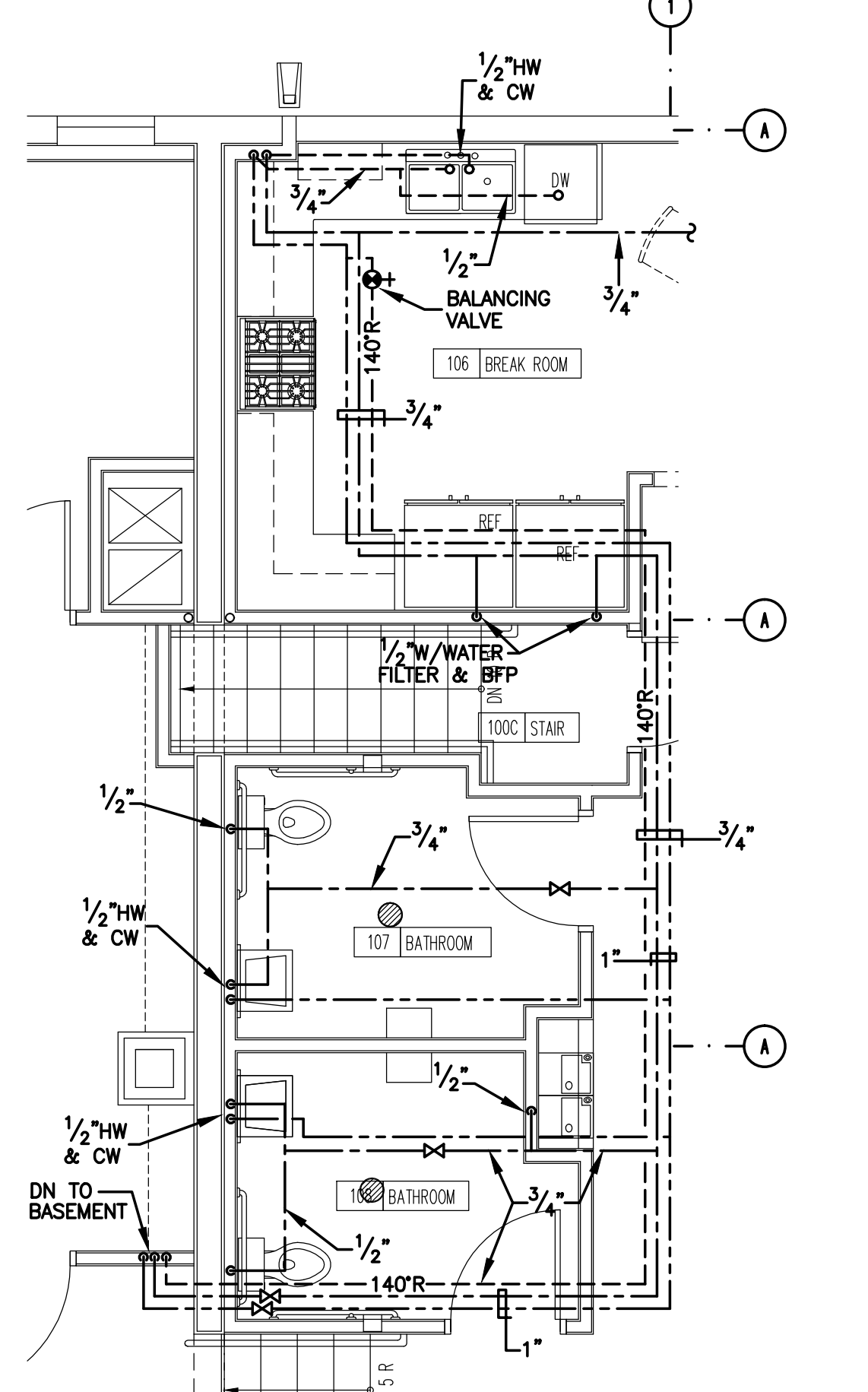
REV	DATE	DESCRIPTION



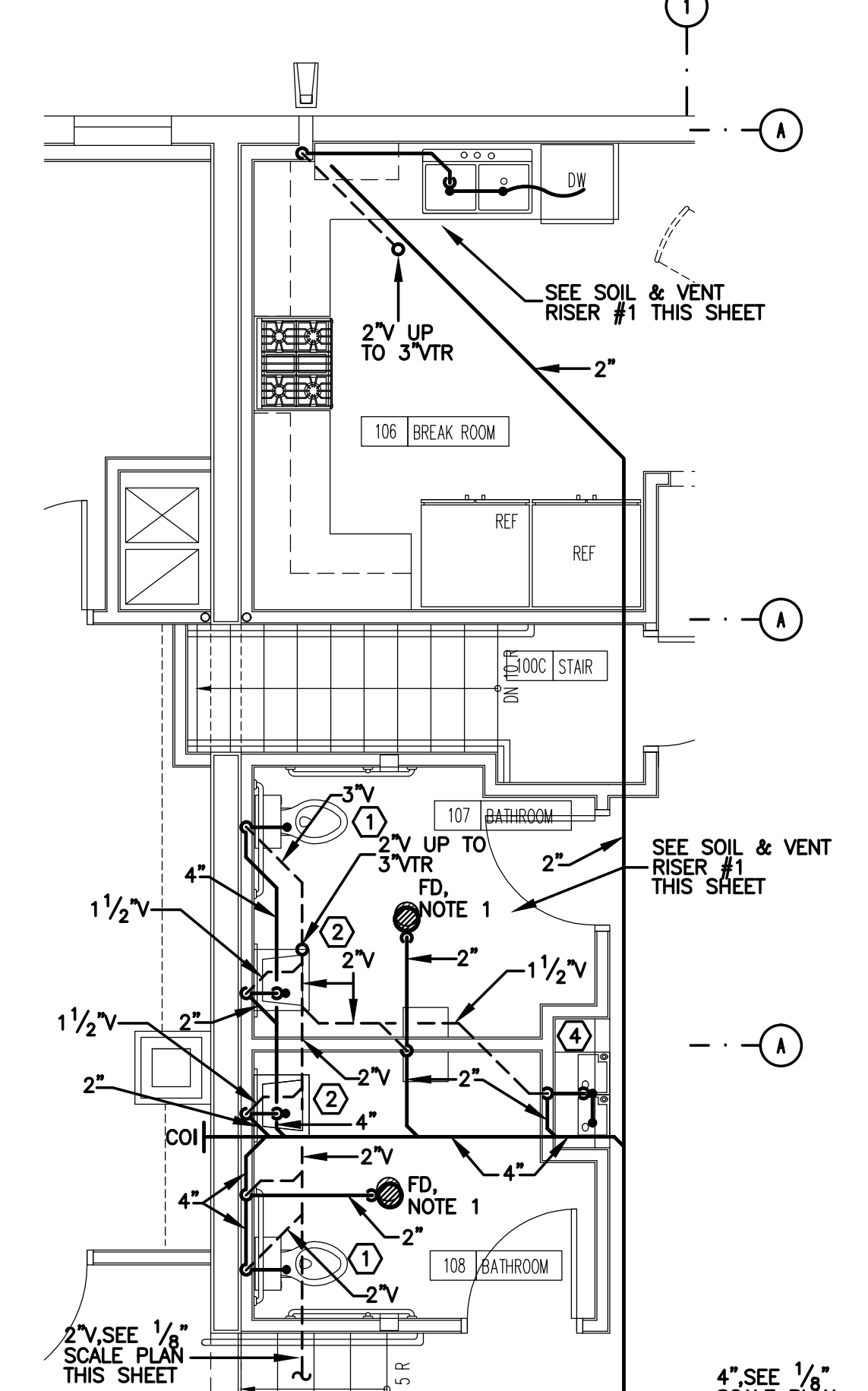
**BASEMENT FLOOR PLAN - PLUMBING**  
SCALE: 1/8"=1'-0"  
NOTE 1: SEE WATER ENTRANCE RISER ON SHT. P2.1 FOR ADDITIONAL PIPING DETAIL.



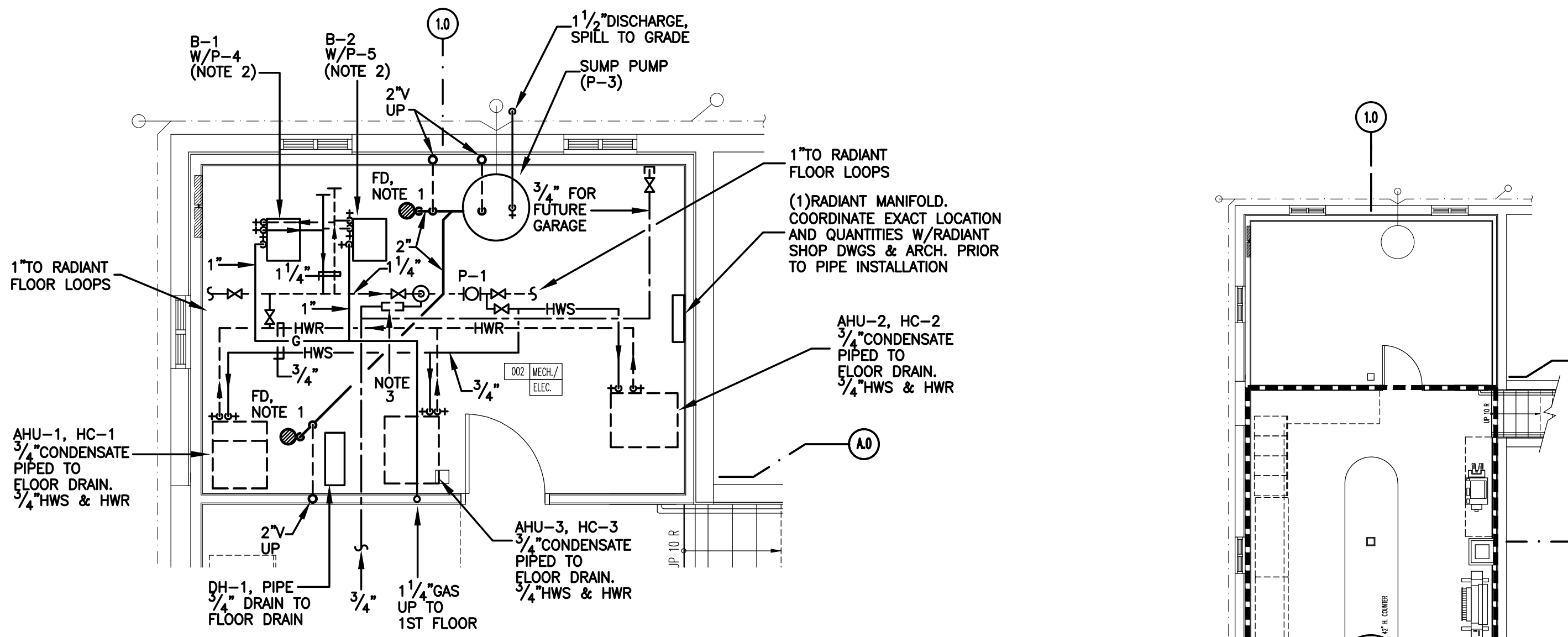
**FIRST FLOOR PLAN - PLUMBING**  
SCALE: 1/8"=1'-0"



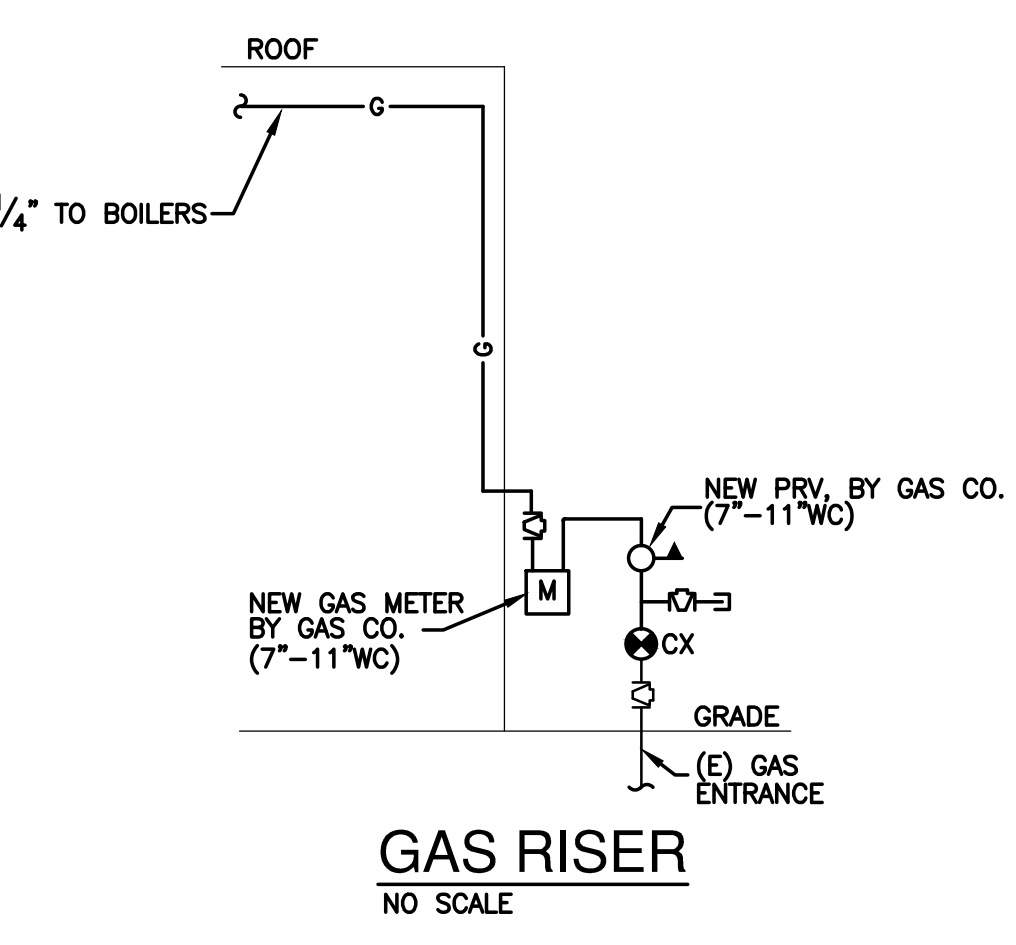
**PART PLAN #1 - DOMESTIC WATER**  
SCALE: 1/4"=1'-0" (FIRST FLOOR)



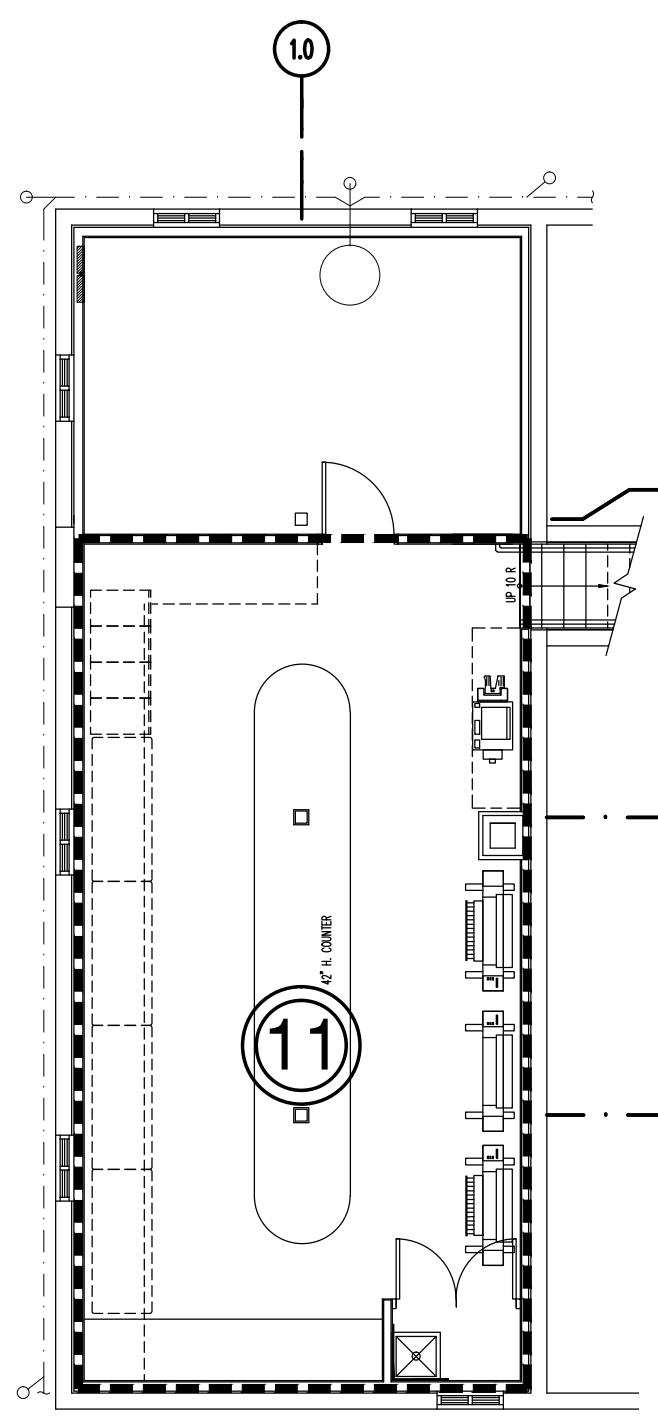
**PART PLAN #2 - SOIL AND VENT**  
SCALE: 1/4"=1'-0" (FIRST FLOOR)  
NOTE 1: PROVIDE "PRO VENT" SYSTEM TRAP SEAL GUARD.  
NOTE 2: SEE SOIL AND VENT RISER ON SHEET P0.1



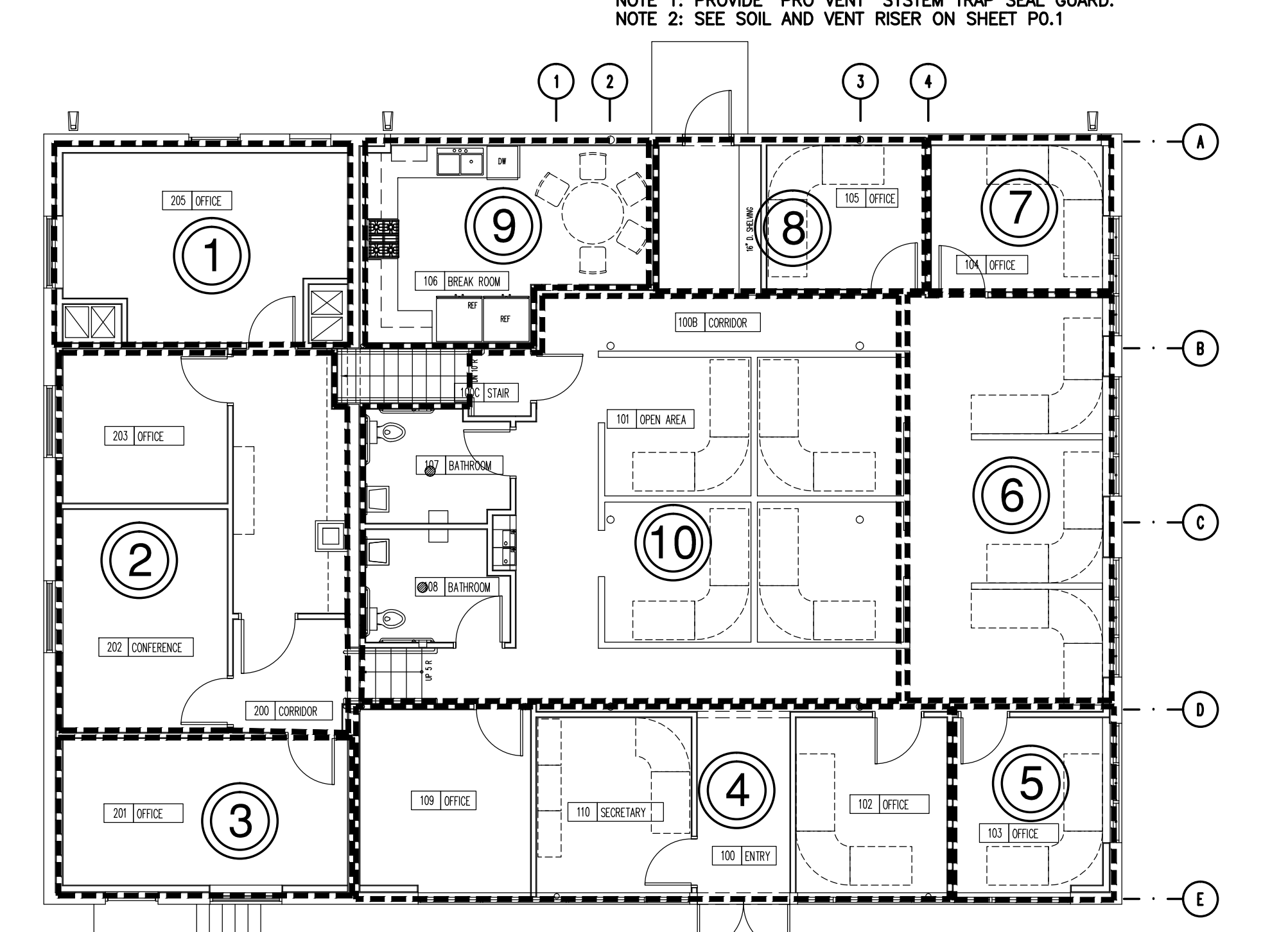
**PART PLAN #3 - PLUMBING**  
SCALE: 1/4"=1'-0" (BASEMENT)  
NOTE 1: PROVIDE "PRO VENT" SYSTEM TRAP SEAL GUARD.  
NOTE 2: SEE SHEET P2.1 "GAS BOILER SCHEMATIC" FOR ADDITIONAL PIPING DETAIL.  
NOTE 3: SEE "COLD WATER MAKEUP CONNECTION DETAIL" ON SHEET P2.1.



**GAS RISER**  
NO SCALE

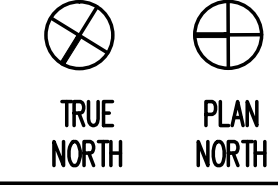
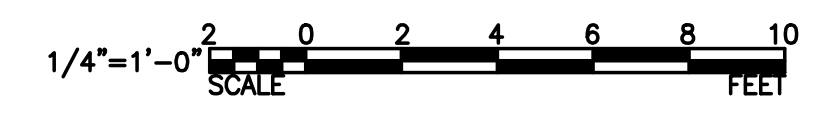


**BASEMENT FLOOR PLAN - RADIANT HEATING SLAB ZONES**  
SCALE: 1/8"=1'-0"



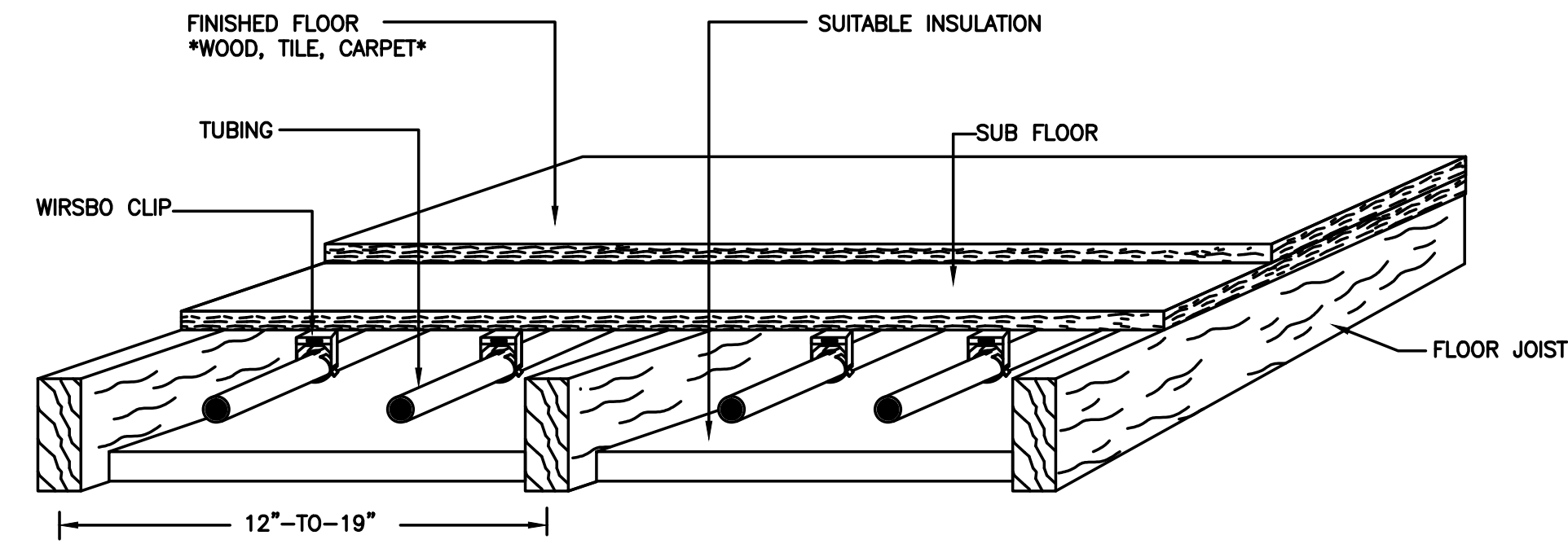
**1ST FLOOR PLAN - RADIANT HEATING SLAB ZONES**  
SCALE: 1/8"=1'-0"

ZONE #	MINIMUM ZONE HEATING REQUIREMENT @ 68°F ID & 8°F OD
1	4.2 MBH
2	6.8 MBH
3	4.0 MBH
4	14.9 MBH
5	4.5 MBH
6	6.4 MBH
7	2.6 MBH
8	2.1 MBH
9	2.2 MBH
10	4.9 MBH
11	10.7 MBH

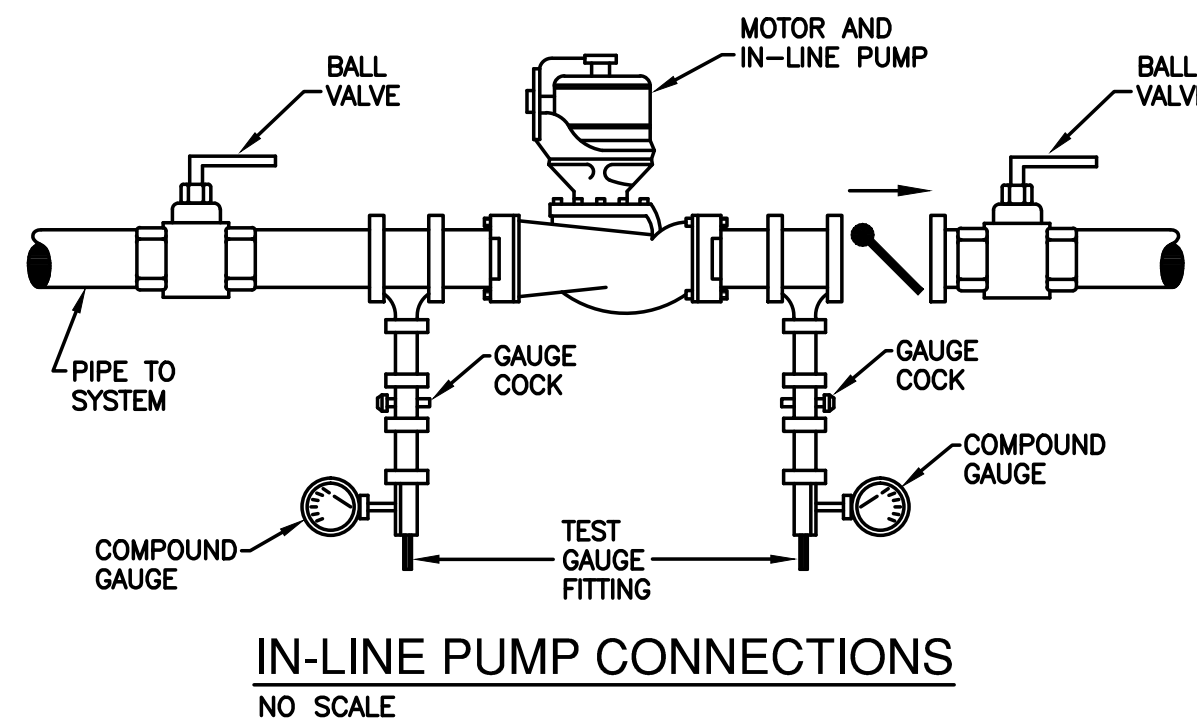


### PLUMBING/PIPING LEGEND/ABBREVIATIONS

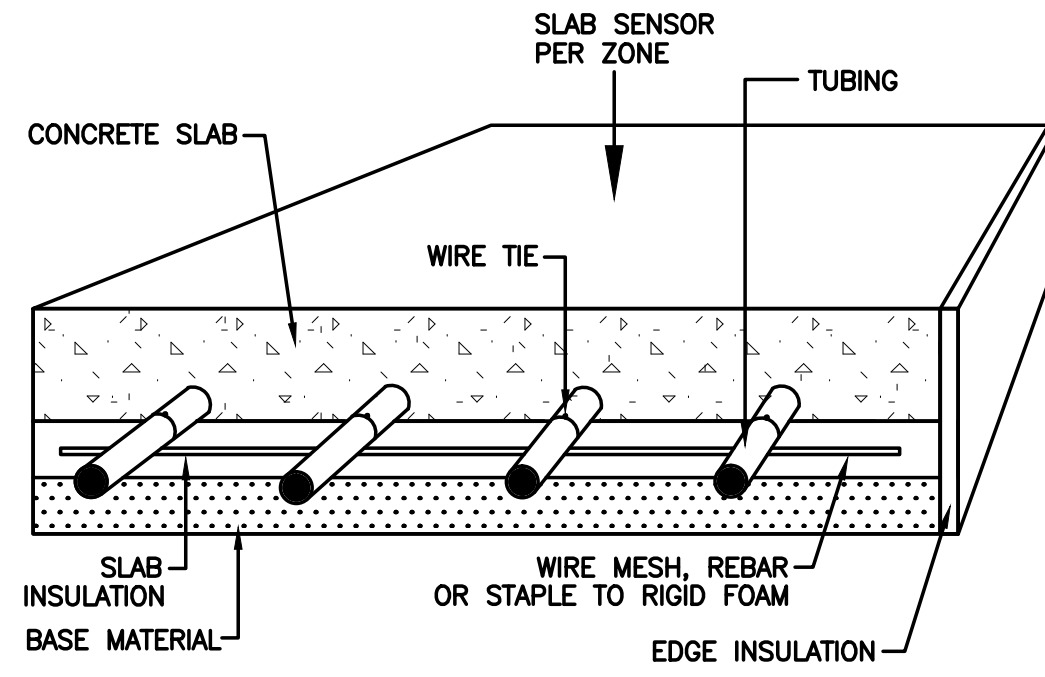
- DOMESTIC COLD WATER
- DOMESTIC HOT WATER
- 140°- 140° DOMESTIC HOT WATER
- VENT PIPE
- SOIL PIPE
- VTR VENT THRU ROOF
- v VENT
- INDICATES FIXTURE NUMBER
- ⊕ VALVE IN RISER
- PIPE UP
- PIPE DOWN
- H-O- CLEANOUT
- |/|- UNION
- |/|- PRESSURE RELIEF VALVE
- |/|- BALL VALVE
- |/|- CHECK VALVE
- |/|- THERMOSTATIC MIXING VALVE
- CX- CONNECT TO EXISTING
- G- NATURAL GAS LINE
- BFP- BACKFLOW PREVENTER
- GAS STOP
- 140°R- 140° RECIRCULATED
- HWS HEATING WATER SUPPLY PIPING
- HWR HEATING WATER RETURN PIPING



### RADIANT PIPING WOOD JOIST DETAIL



### IN-LINE PUMP CONNECTIONS



### RADIANT PIPING CONCRETE SLAB DETAIL

MARK	FIXTURE	TRAP	WASTE	CW	HW	MOUNT	MANUF	MODEL	TRIM
①	WATER CLOSET HANDICAPPED	INTEGRAL	4"	1/2"	-	FLOOR	AMERICAN STANDARD	2467.100	CHURCH SEAT, SUPPLIES AND STOPS (1.1 GPF) ◇
②	LAVATORY HANDICAPPED	1 1/4" x 1 1/2"	1 1/2"	1/2"	1/2"	WALL	AMERICAN STANDARD	0124.024	ZURN ZB6500-XL-3M FAUCET (0.5GPM), OFFSET TRAP SUPPLIES AND STOPS. POWERS MIXING VALVE #FLM495 ◇*
③	MOP BASIN	3"	3"	1/2"	1/2"	FLOOR	FIAT	MSB 2424	FAUCET FIAT #B30AA
④	HI/LO EWC HANDICAPPED	1 1/4" x 1 1/2"	1 1/2"	1/2"	-	WALL	ELKAY	EZSTL8C	SUPPLIES AND STOPS
⑤	ADA 2-COMP. SINK	1 1/2"	1 1/2"	1/2"	1/2"	COUNTER	ELKAY	LRAD3319-3	DELTA 100LF-HOF FAUCET (1.5 GPM), CUP STRAINER, TRAP, SUPPLIES & STOPS. POWERS MIXING VALVE #FLM495 ◇◇

\* PROVIDE INSULATION KIT, ON SUPPLIES & TRAP FOR ADA SINKS. (ASTM E84-01)  
△ GRID STRAINER  
◇ COORDINATE LH/RH LEVER LOCATION WITH HANDICAPPED TOILET  
◇◇ PROVIDE LEAD FREE PIPING, FITTINGS AND FIXTURES INTENDED TO DISPENSE WATER FOR HUMAN CONSUMPTION.

### PUMP SCHEDULE

MARK	SYSTEM	GPM	FT. HD	HP	RPM	VOLTAGE	REMARKS	MANUF	MODEL
P-1	RADIANT FLOOR LOOP	12	6'	FRAC	1750	115V/1ϕ	U.L., IN-LINE SINGLE PHASE (VDF)	WILO	STAR S 33 FC
P-2	RECIRC. PUMP 140°	8	15'	FRAC	1750	120V/1ϕ	ALL BRONZE - "IN-LINE"	B & G	PR SERIES
P-3	SUMP PUMP	85	15'	1/2	3450	120V/1ϕ	U.L., BASIN 30"x60"	ZOELLER	4161
P-4	B-1 PUMP	6	10'	FRAC	1750	115V/1ϕ	U.L., IN-LINE SINGLE PHASE (VDF)	WILO	STAR S 21 FX
P-5	B-2 PUMP	6	10'	FRAC	1750	115V/1ϕ	U.L., IN-LINE SINGLE PHASE (VDF)	WILO	STAR S 21 FX

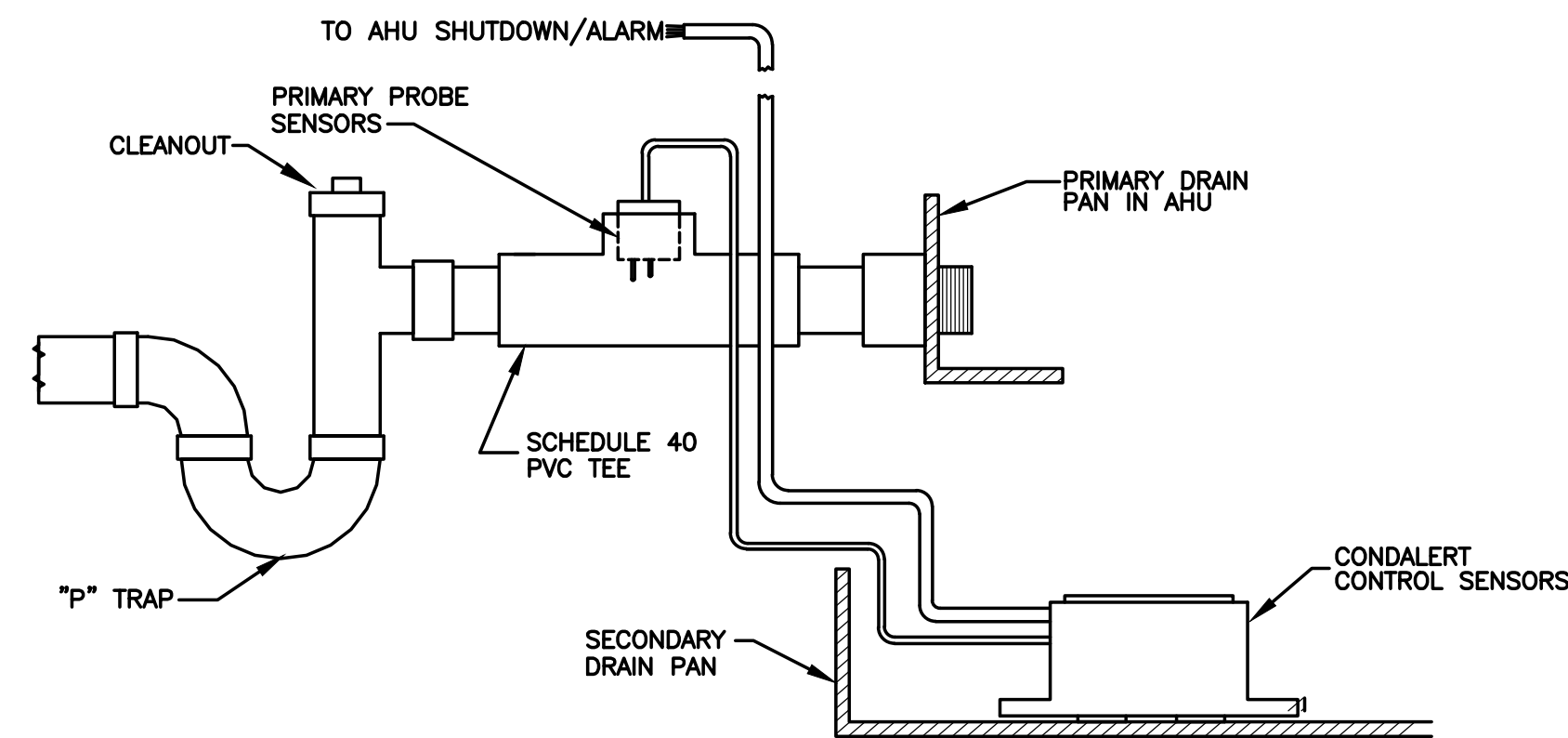
### ELECTRIC WATER HEATER SCHEDULE

MARK	GALLONS	KW	VOLTAGE	REMARKS	MANUF	MODEL
WH-1	50	4.5	240V/1ϕ	U.L., ASHRAE 90-80 W/ DRAIN PAN	A.O. SMITH	ECL-50

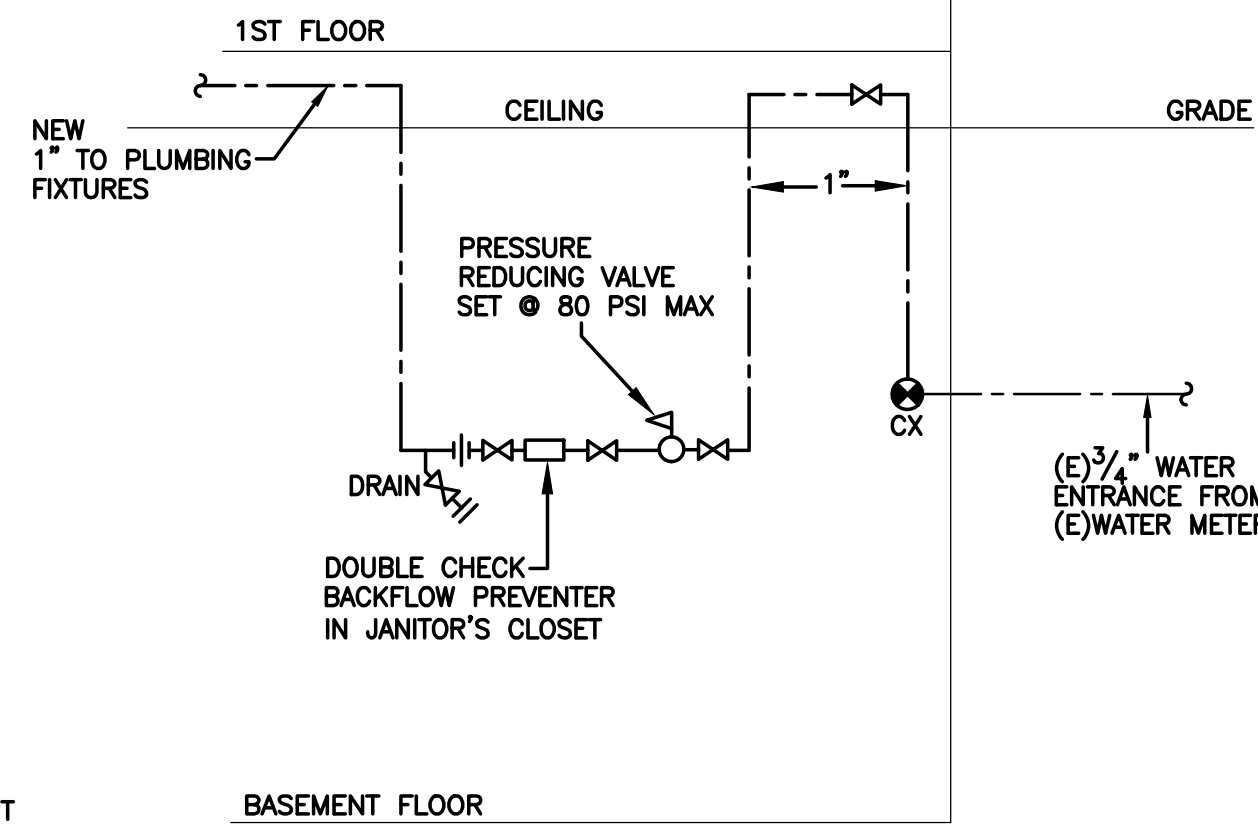
### NATURAL GAS BOILER BURNER SCHEDULE

MARK	GROSS OUTPUT MBH	BURNER CAP. GAS MBH	VOLTAGE	MANUF	MODEL	
B-1	74	80	120V/1ϕ	HEAT TRANSFER PRODUCTS "ELITE"	○△*	EL-80
B-2	74	80	120V/1ϕ	HEAT TRANSFER PRODUCTS "ELITE"	○△*	EL-80

\* PROVIDE CONDENSATE NEUTRALIZATION KIT  
△ 96% EFFICIENCY  
○ 3" PVC CONCENTRIC VENT KIT (KGAVT0601CVT)

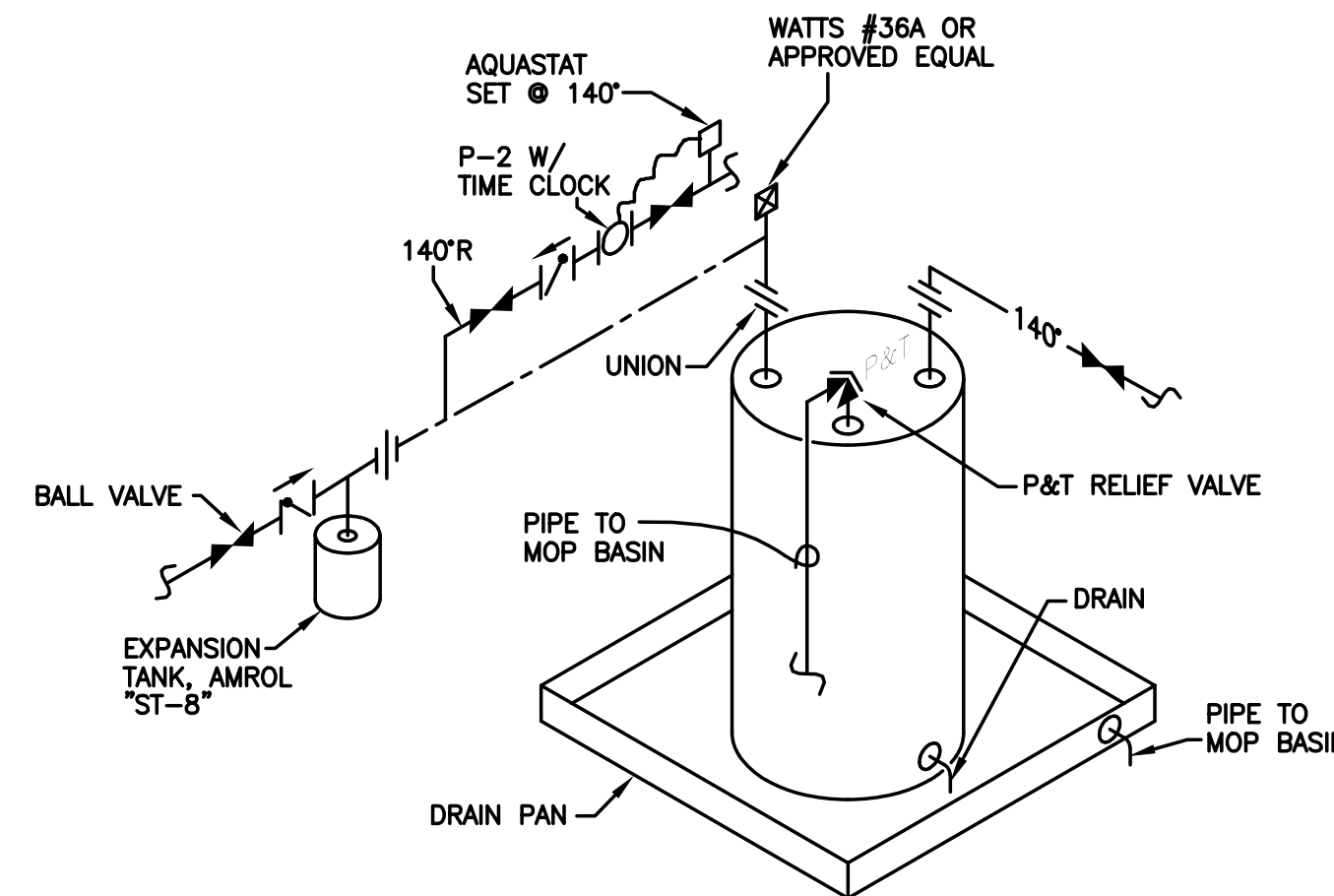


### CONDENSATE ALARM/DETECTION DETAIL



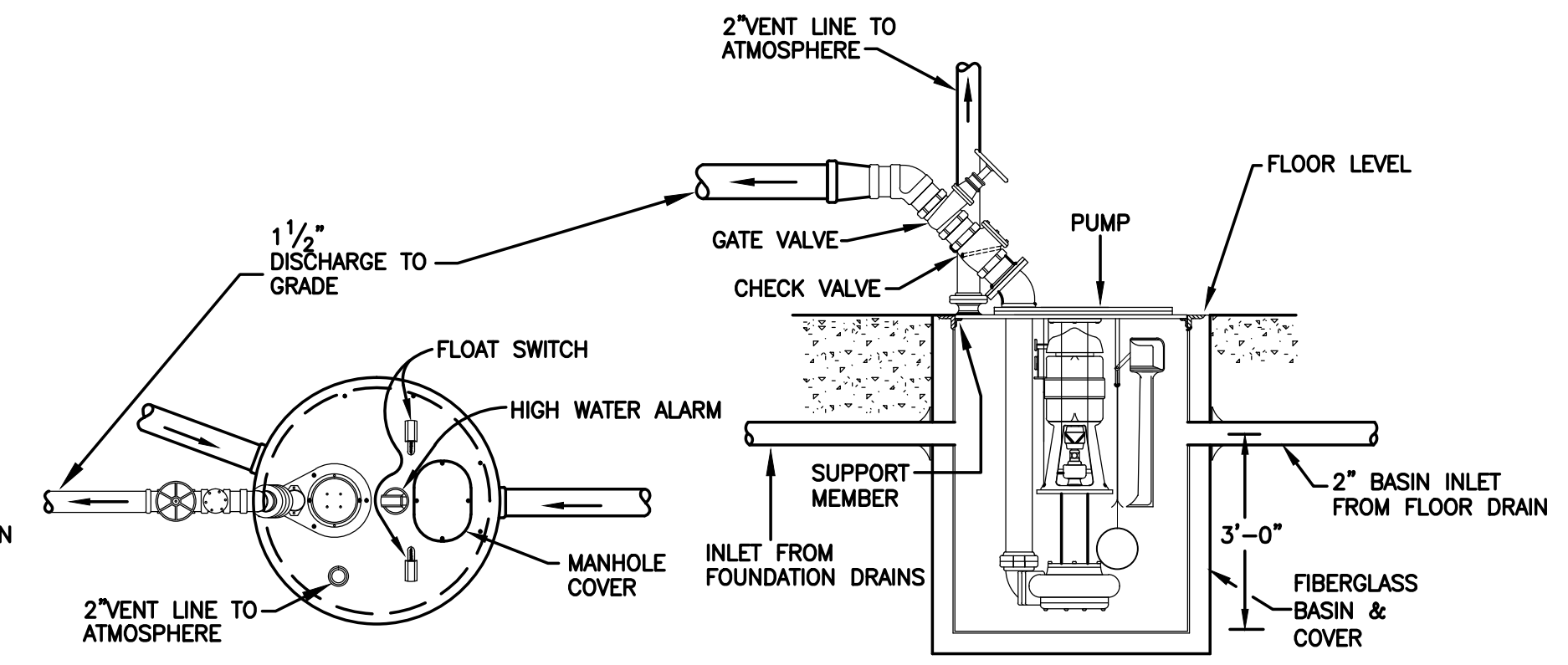
### WATER ENTRANCE RISER

NOTE 1: DOUBLE CHECK BFP'S TO BE INSTALLED MIN. +12" AFF, MAX 60" AFF.  
NOTE 2: ALL PIPING, VALVES, FITTINGS, BFP'S ETC. TO BE USED FOR POTABLE WATER SHALL BE LEAD FREE TYPE.



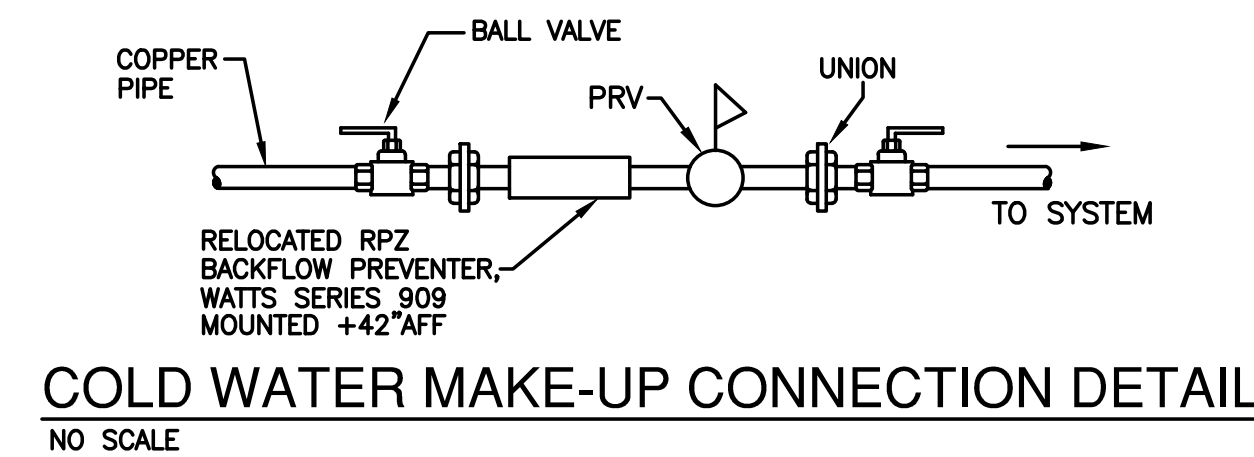
### ELECTRIC WATER HEATER SCHEMATIC

(MTD. ABOVE MOP BASIN ON PLATFORM)

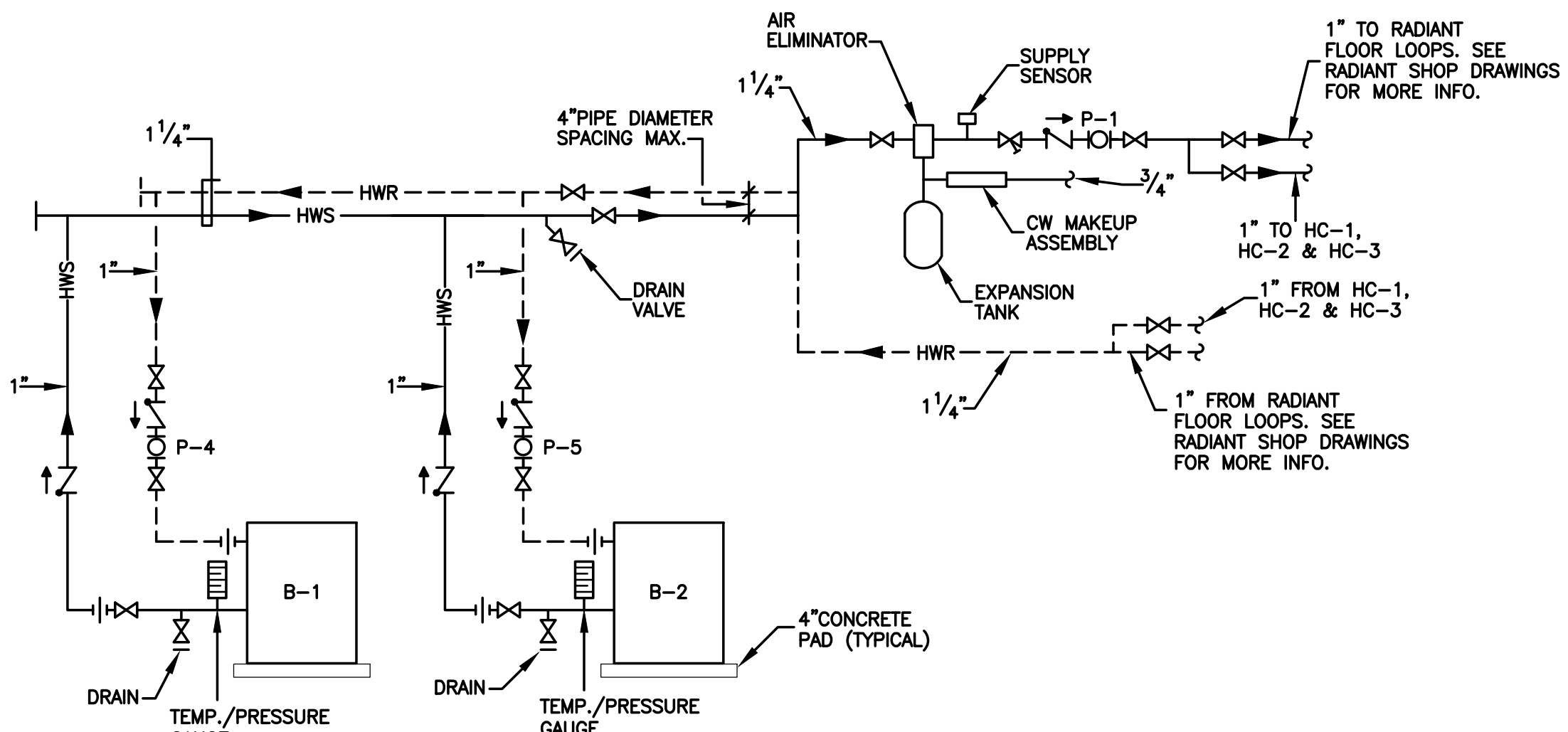


### SIMPLEX SUMP PUMP

(P-3)

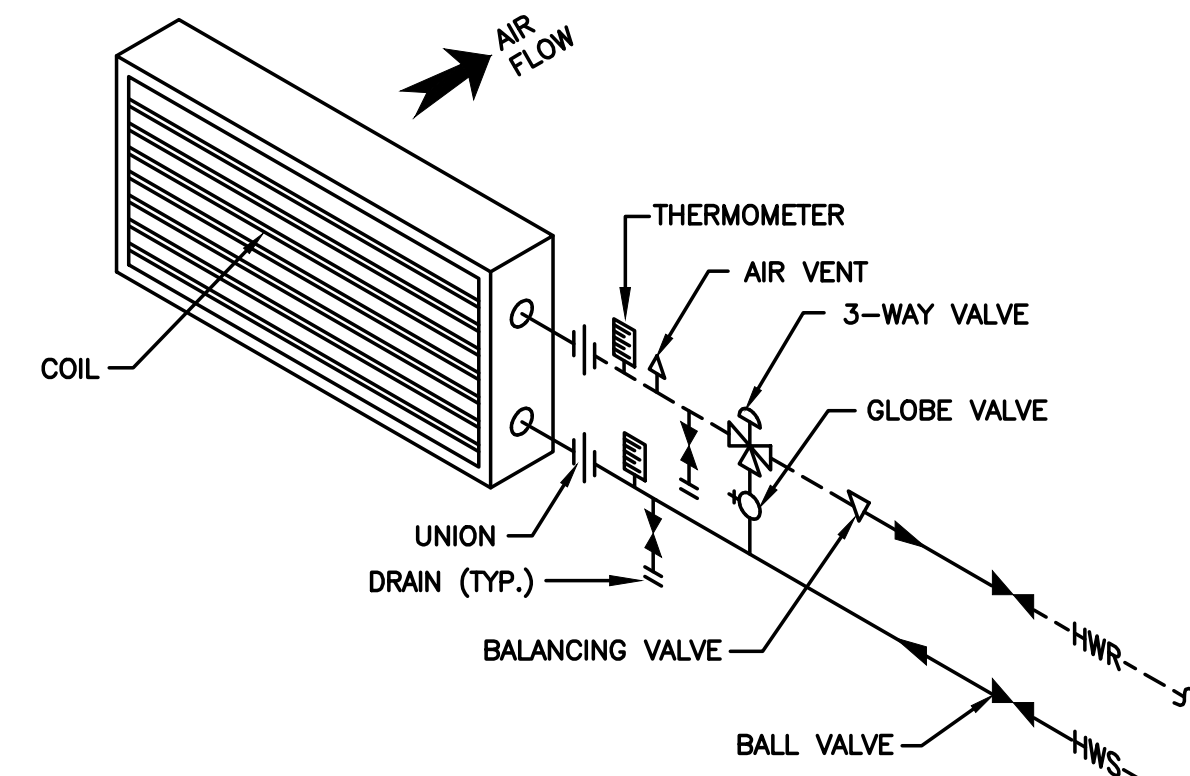


### COLD WATER MAKE-UP CONNECTION DETAIL



### GAS BOILER SCHEMATIC

NO SCALE



### HEATING COIL PIPING SCHEMATIC

(HC-1, HC-2 & HC-3)



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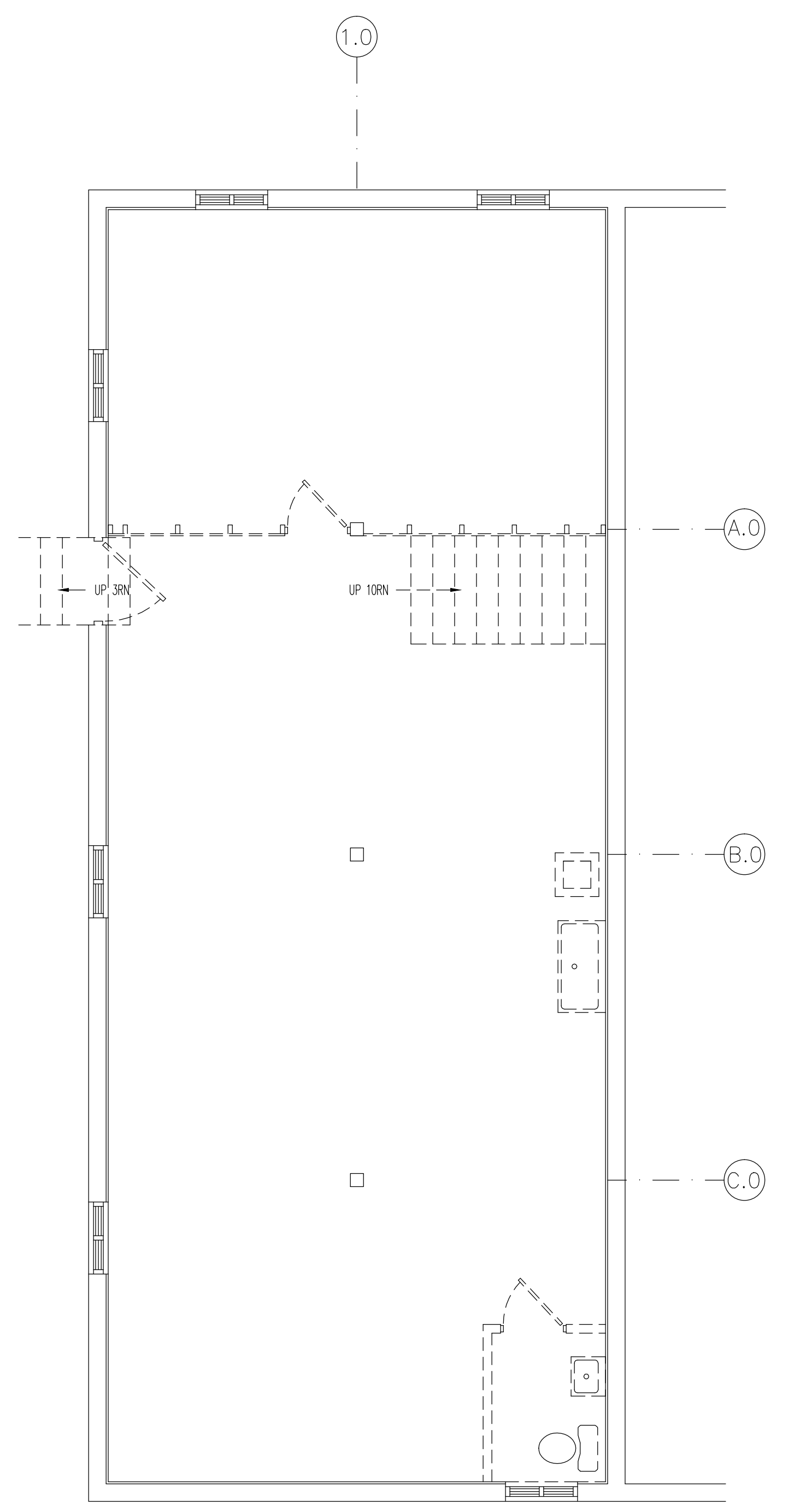
PLUMBING/PIPING  
SCHEDULES & DETAILS

P2.1

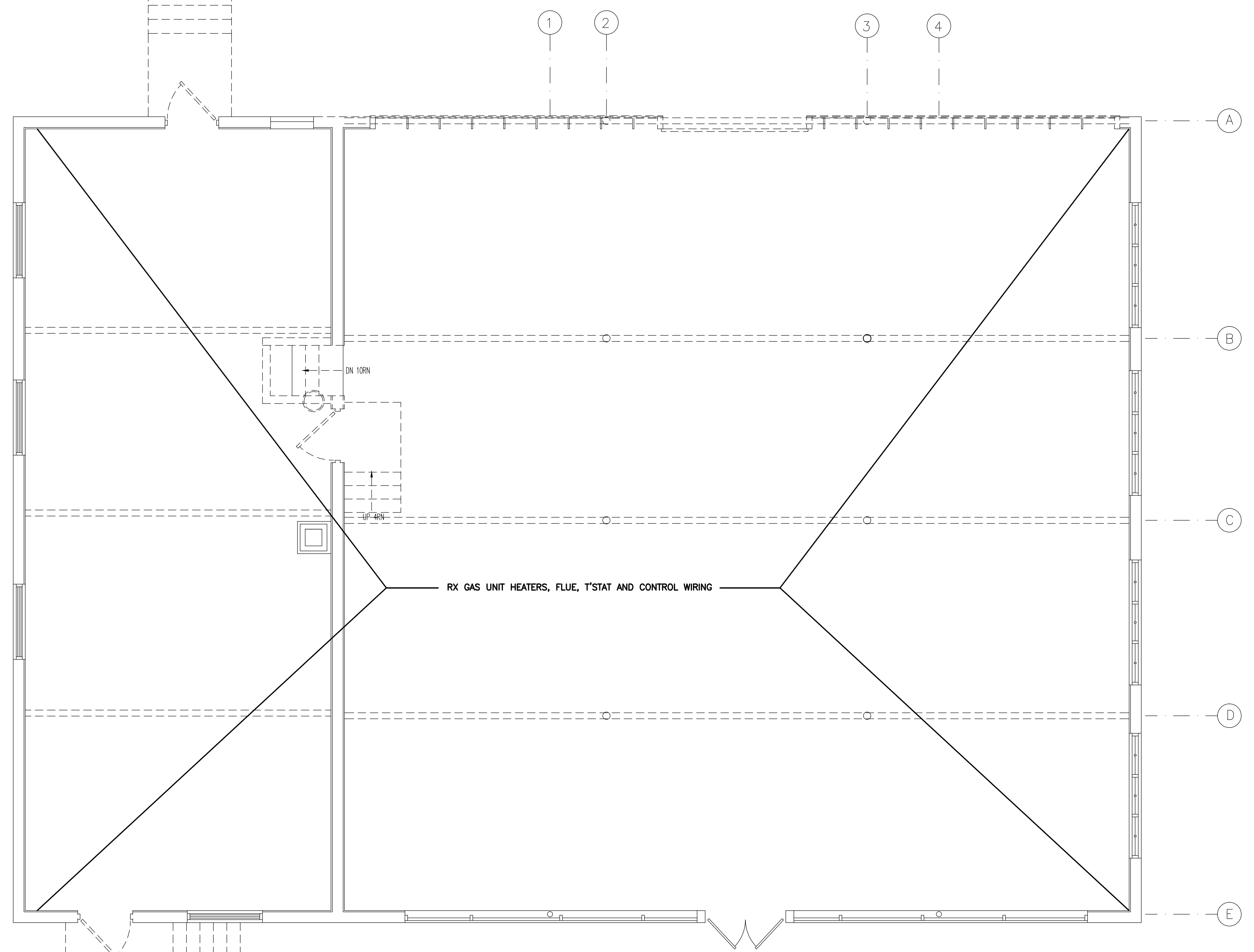
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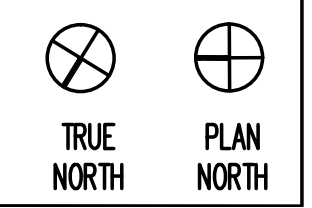
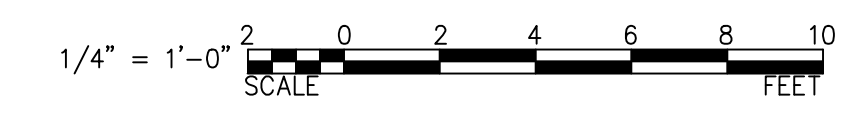
BASEMENT & FIRST FLOOR PLAN  
 HVAC - DEMO



**BASEMENT FLOOR PLAN - HVAC DEMO**  
 SCALE: 1/4"=1'-0"



**FIRST FLOOR PLAN - HVAC DEMO**  
 SCALE: 1/4"=1'-0"

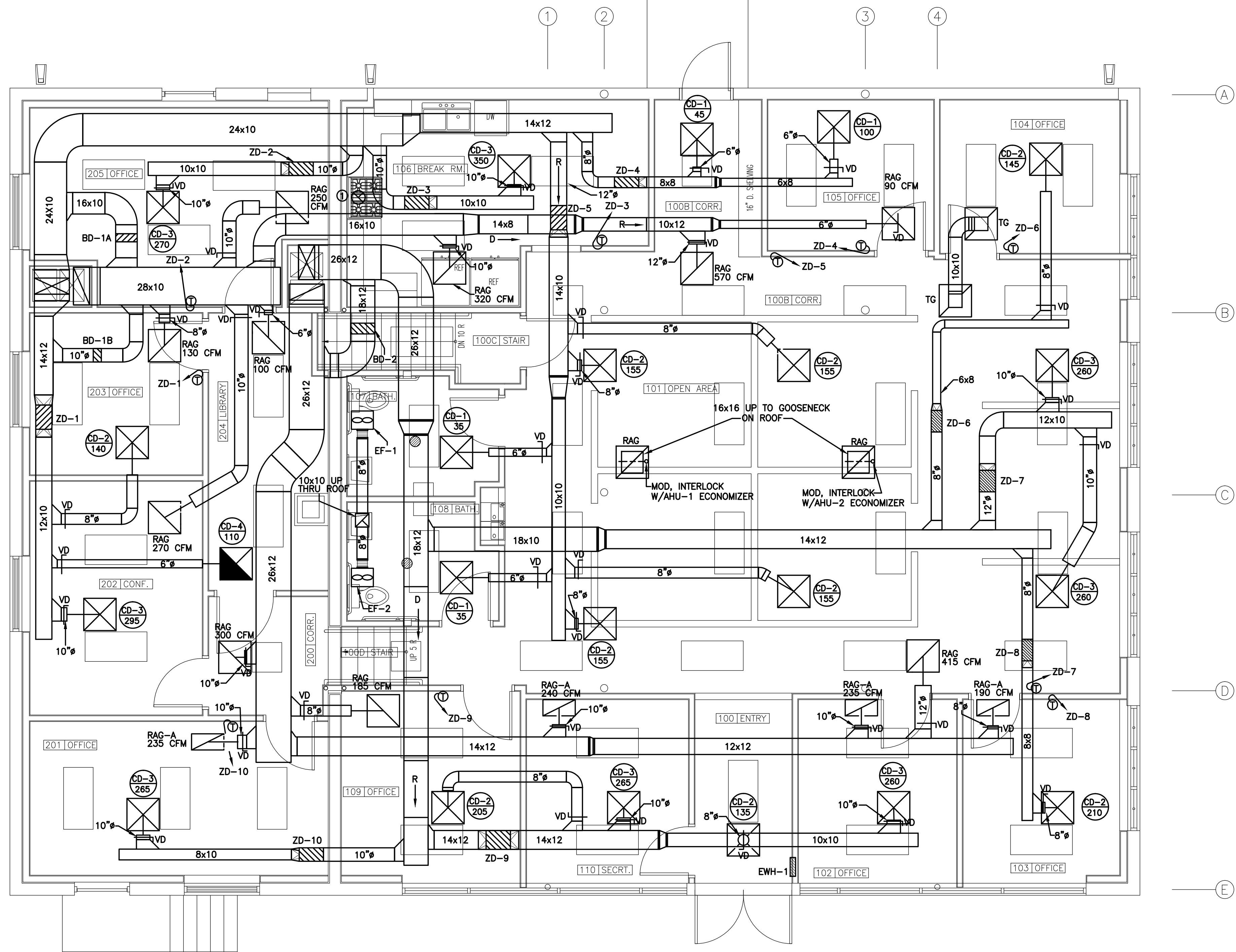
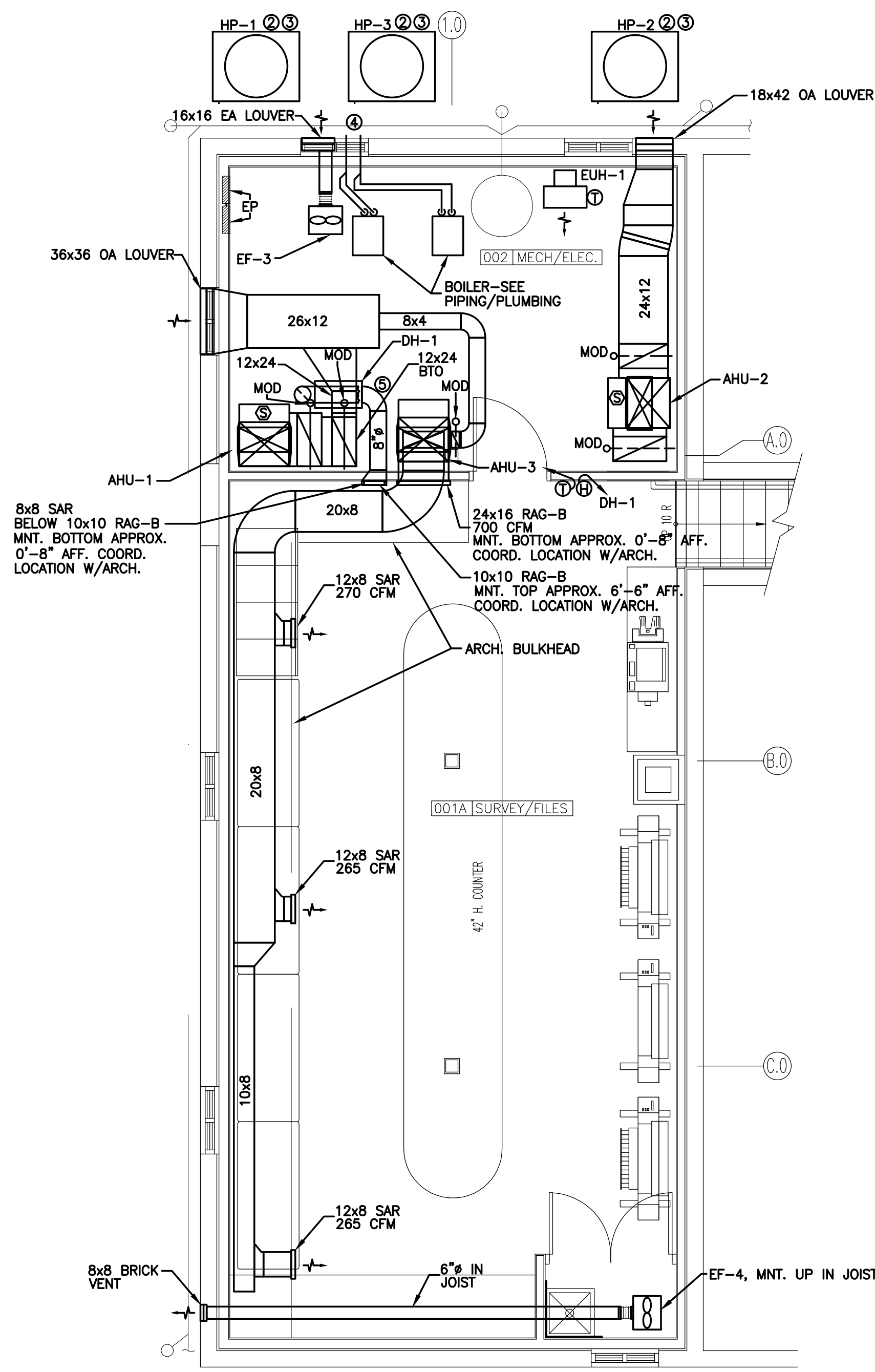


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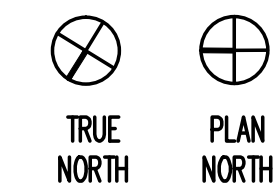
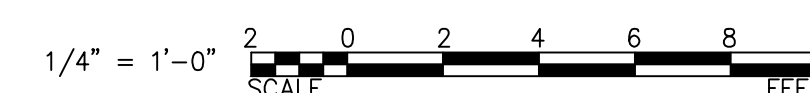
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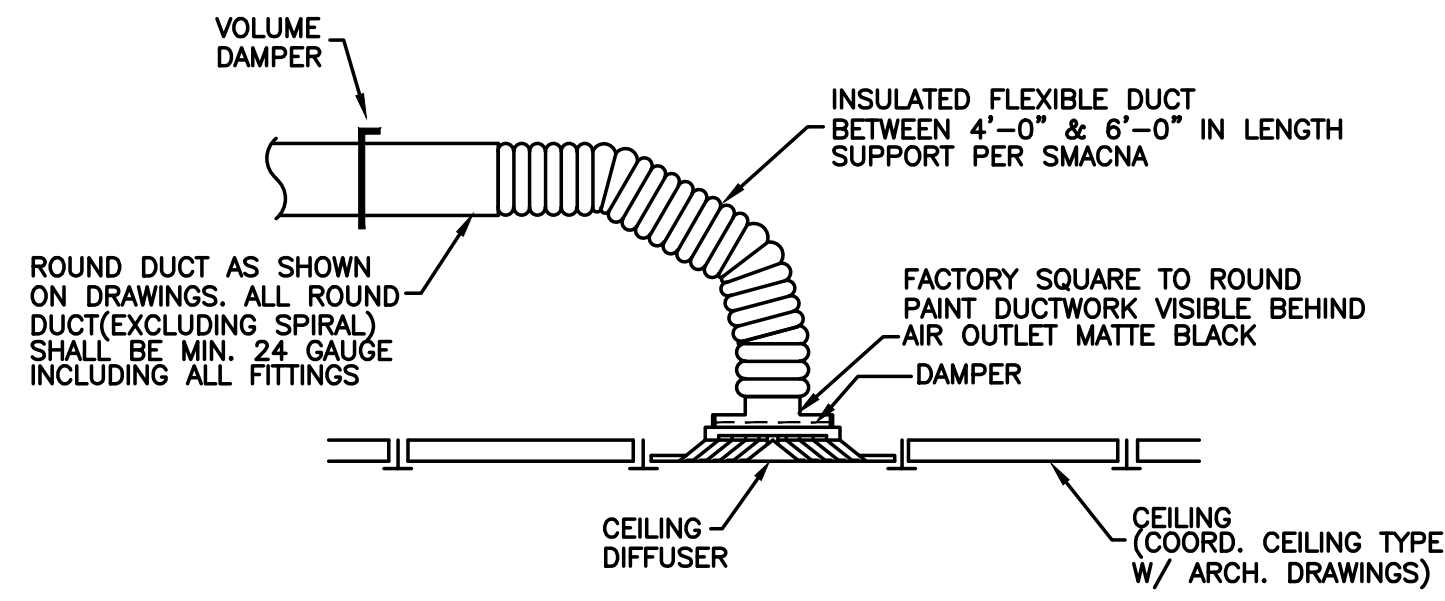
BASEMENT & FIRST FLOOR PLAN  
- HVAC

**M1.1**  
2 OF 4

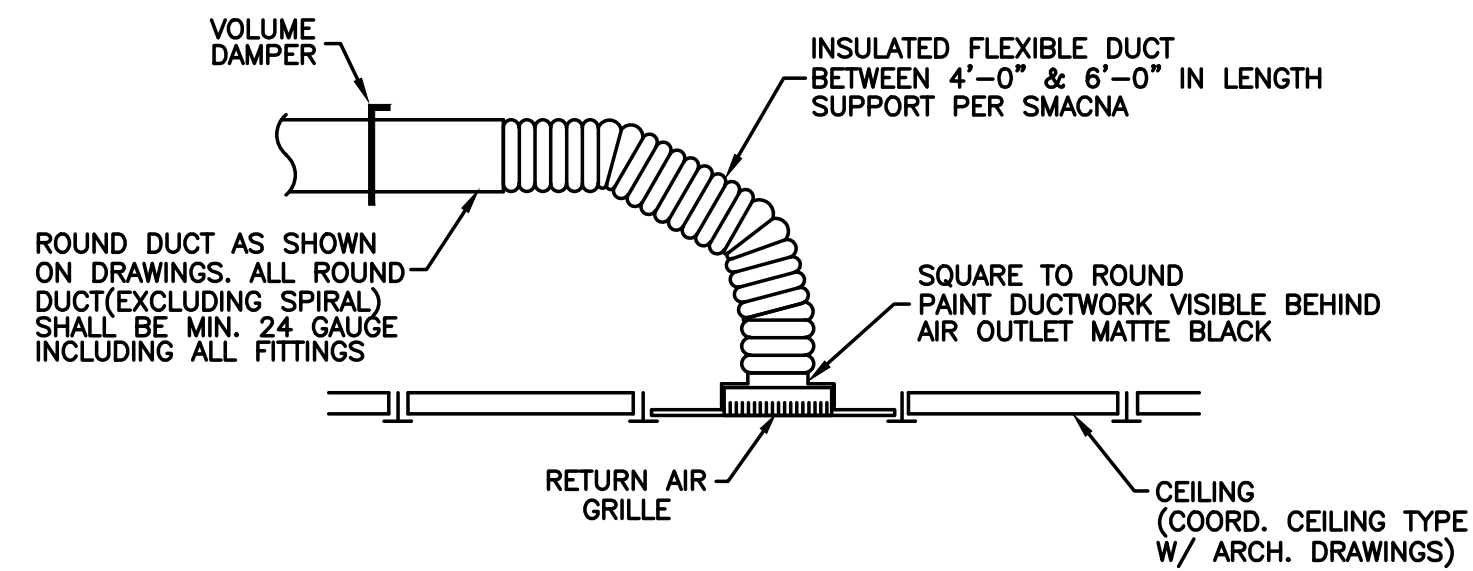


- DRAWING NOTES:**
- ① KITCHEN HOOD EXHAUST VENT UP THRU ROOF. TERMINATE PER MANUFACTURER'S RECOMMENDATIONS. COORDINATE EXHAUST VENT SIZE WITH KITCHEN HOOD SUPPLIER.
  - ② RS & RL PIPING FROM HP TO ASSOCIATED AHU IN MECHANICAL ROOM.
  - ③ HP ON CONCRETE PAD. SEE ARCH. DRAWINGS.
  - ④ 3" CONCENTRIC VENTS FROM BOILERS.
  - ⑤ 8" RA DUCT ABOVE SA DUCT.

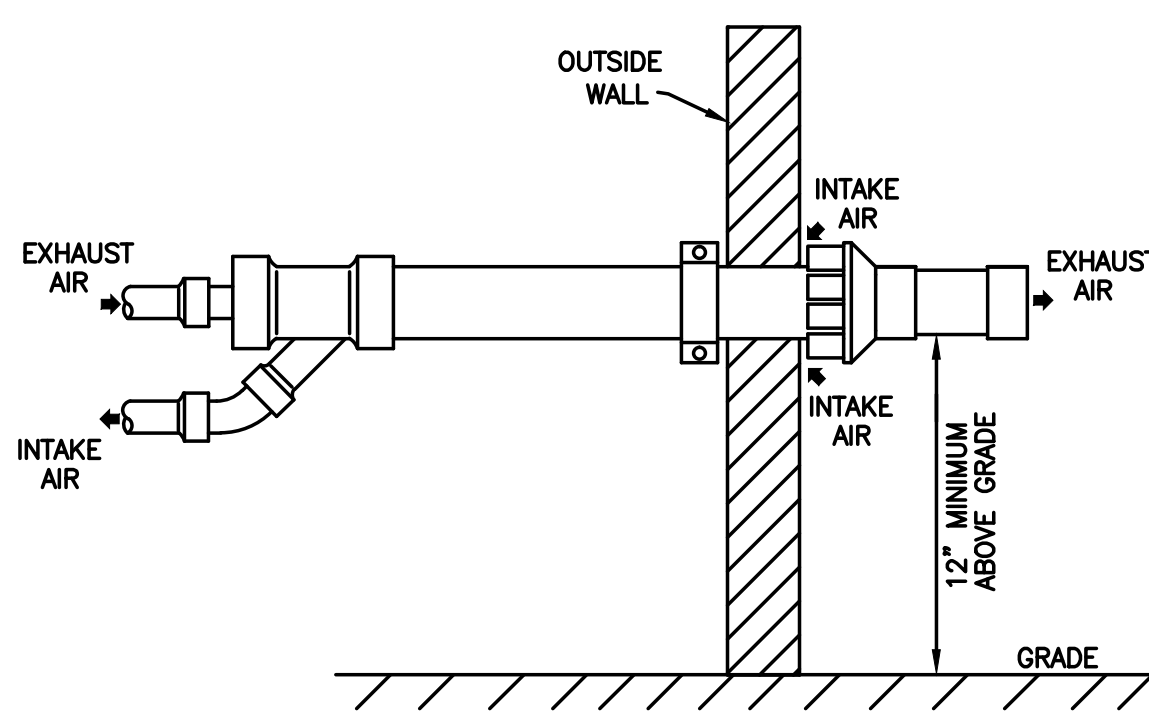




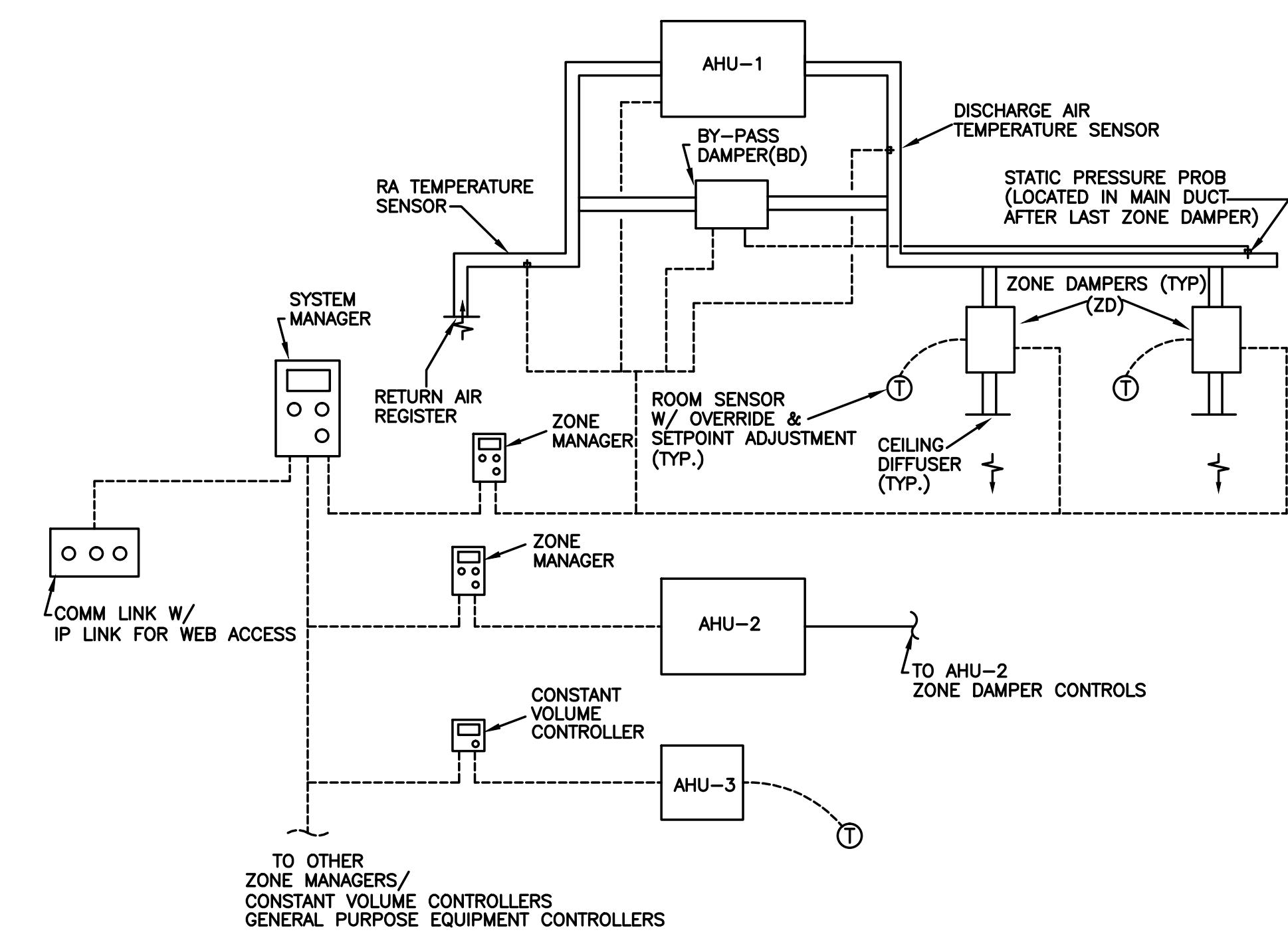
1 FLEXIBLE DUCT DETAIL - SUPPLY  
M2.1 NO SCALE



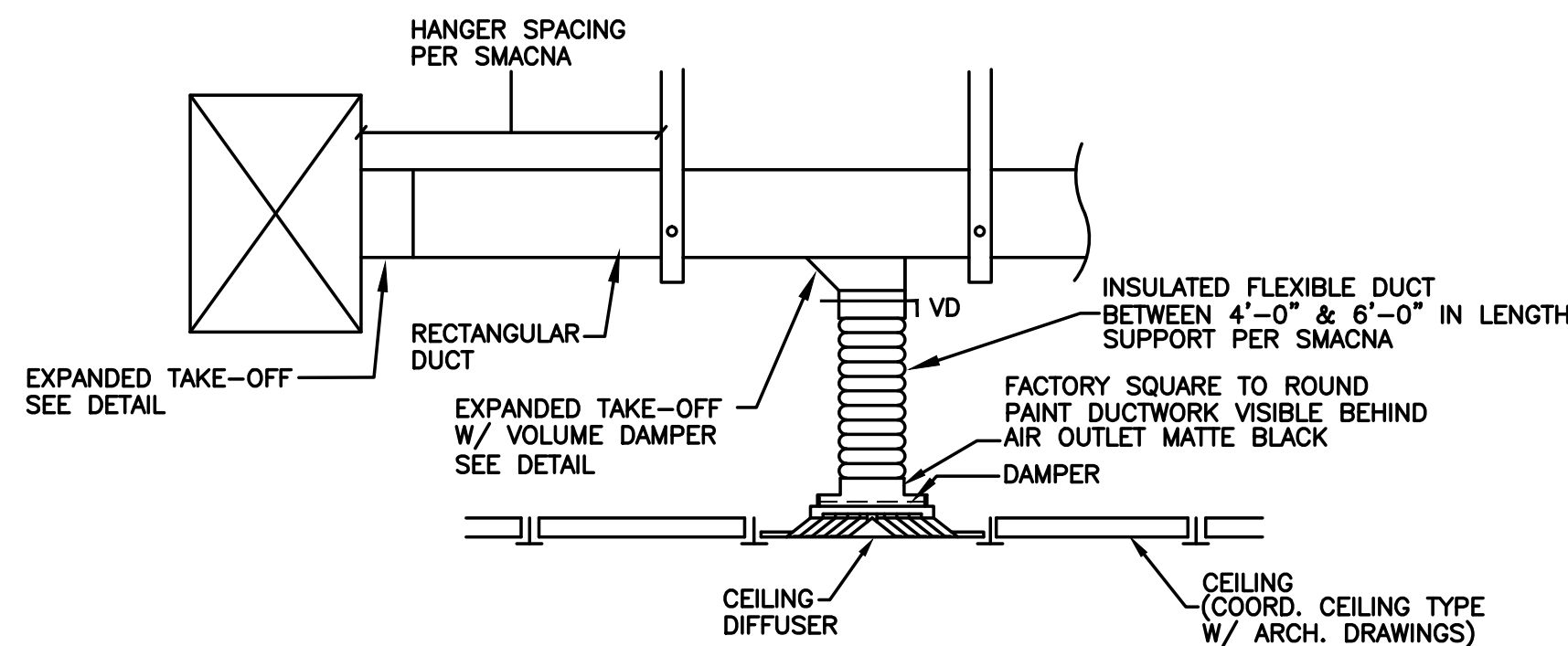
3 FLEXIBLE DUCT DETAIL - RETURN  
M2.1 NO SCALE



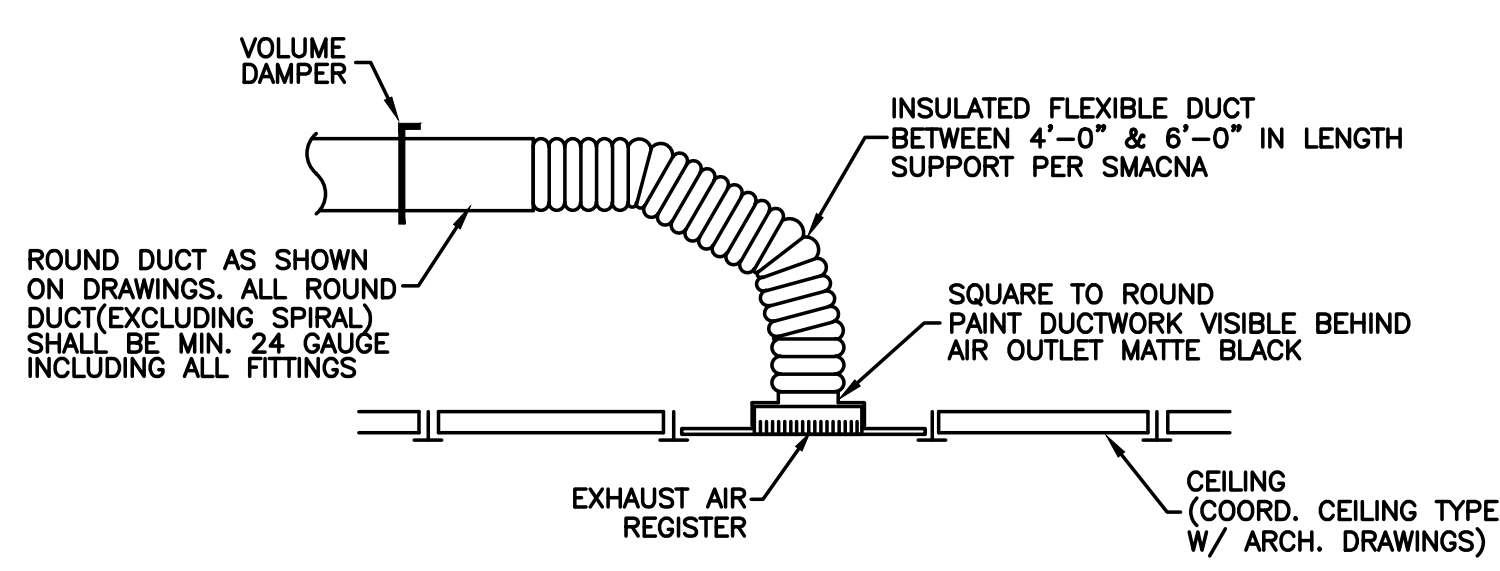
5 CONCENTRIC WALL VENT  
M2.1 NO SCALE



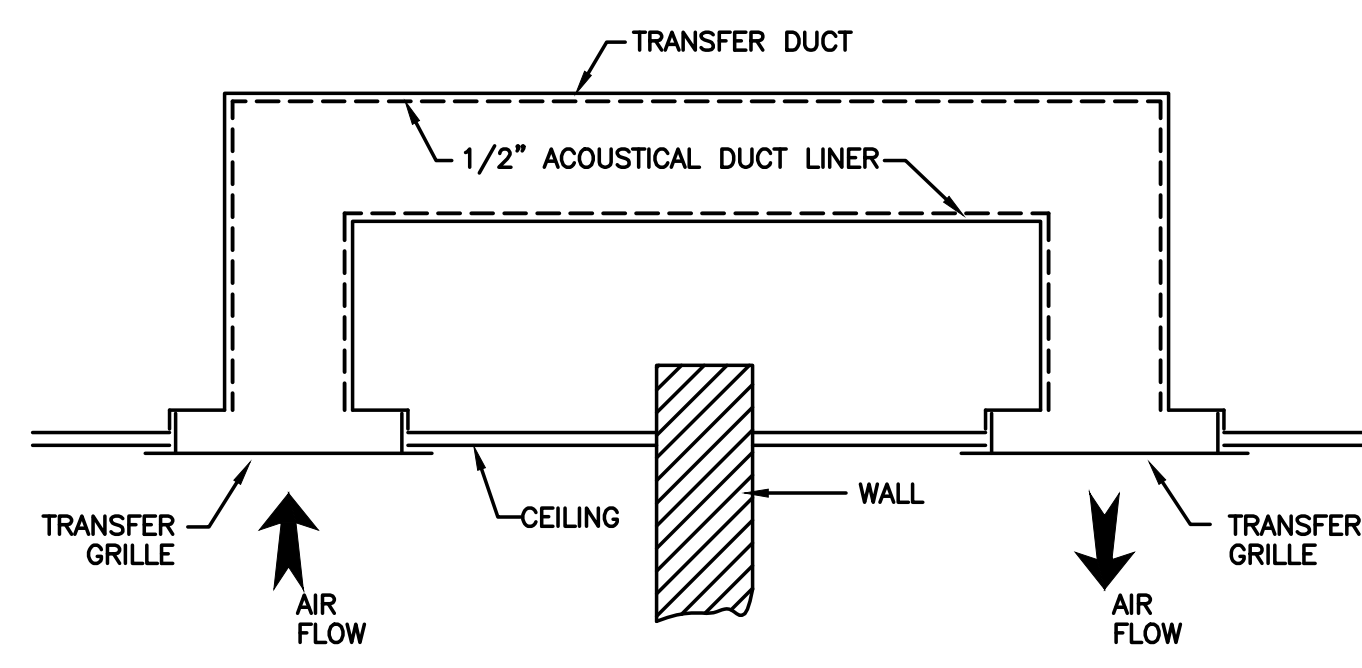
9 ZONE DAMPER SYSTEM SCHEMATIC  
(WATTMASTER AUTO-ZONE PLUS SYSTEM)  
M2.1 NO SCALE



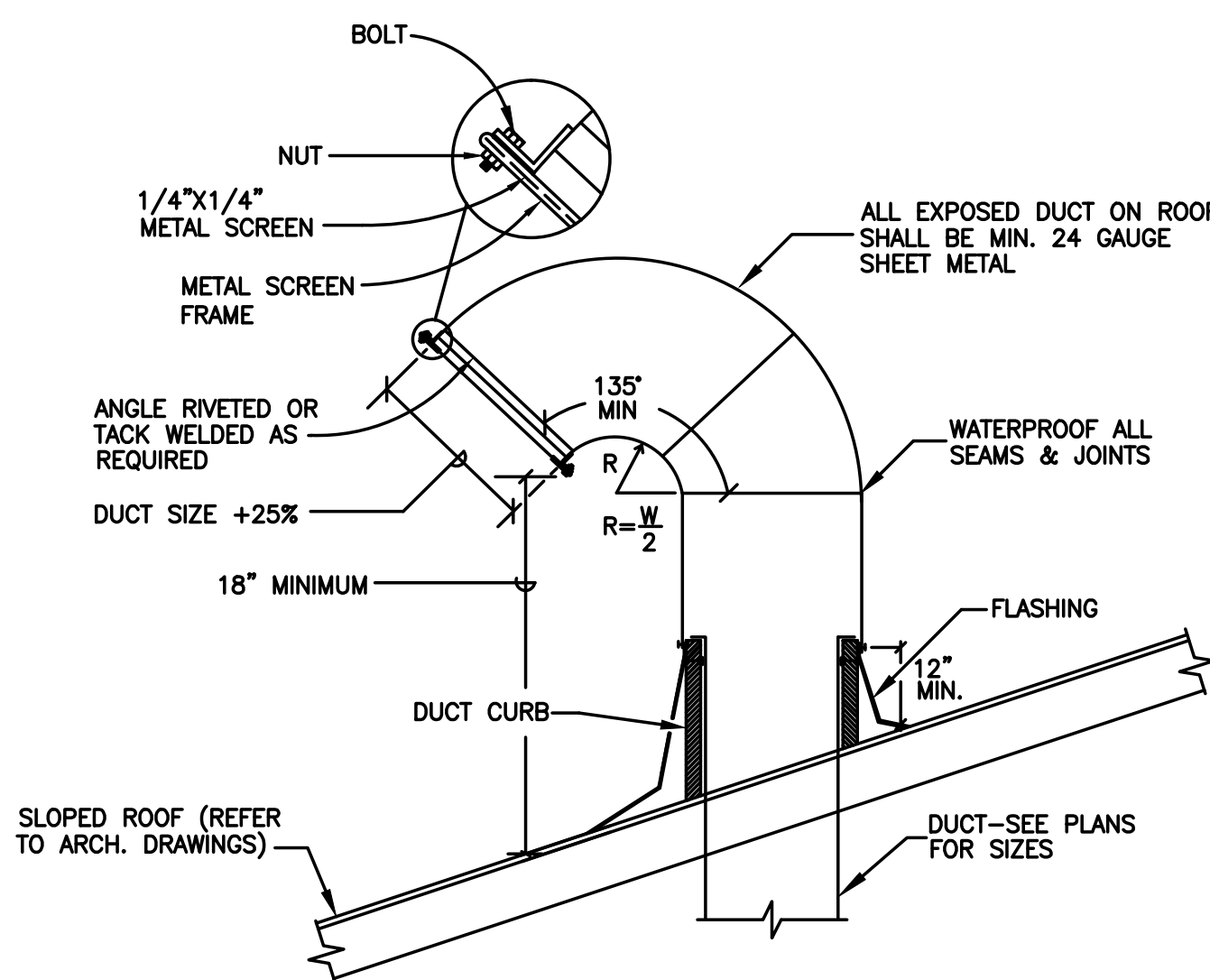
2 FLEXIBLE DUCT DETAIL - SUPPLY  
M2.1 NO SCALE



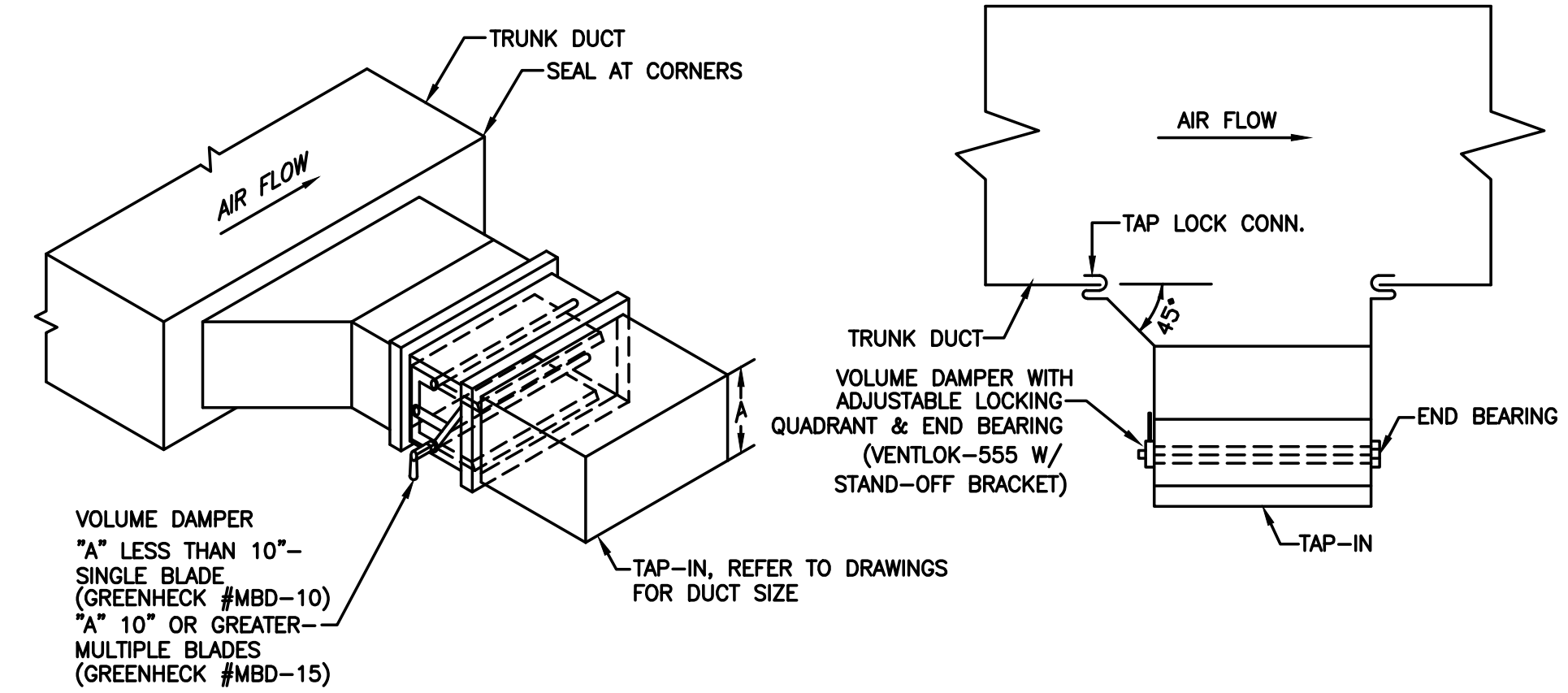
4 FLEXIBLE DUCT DETAIL - EXHAUST  
M2.1 NO SCALE



6 TRANSFER DUCT  
M2.1 NO SCALE  
NOTE: 1. PAINT ALL DUCTWORK VISIBLE BEHIND DEVICE MATTE BLACK

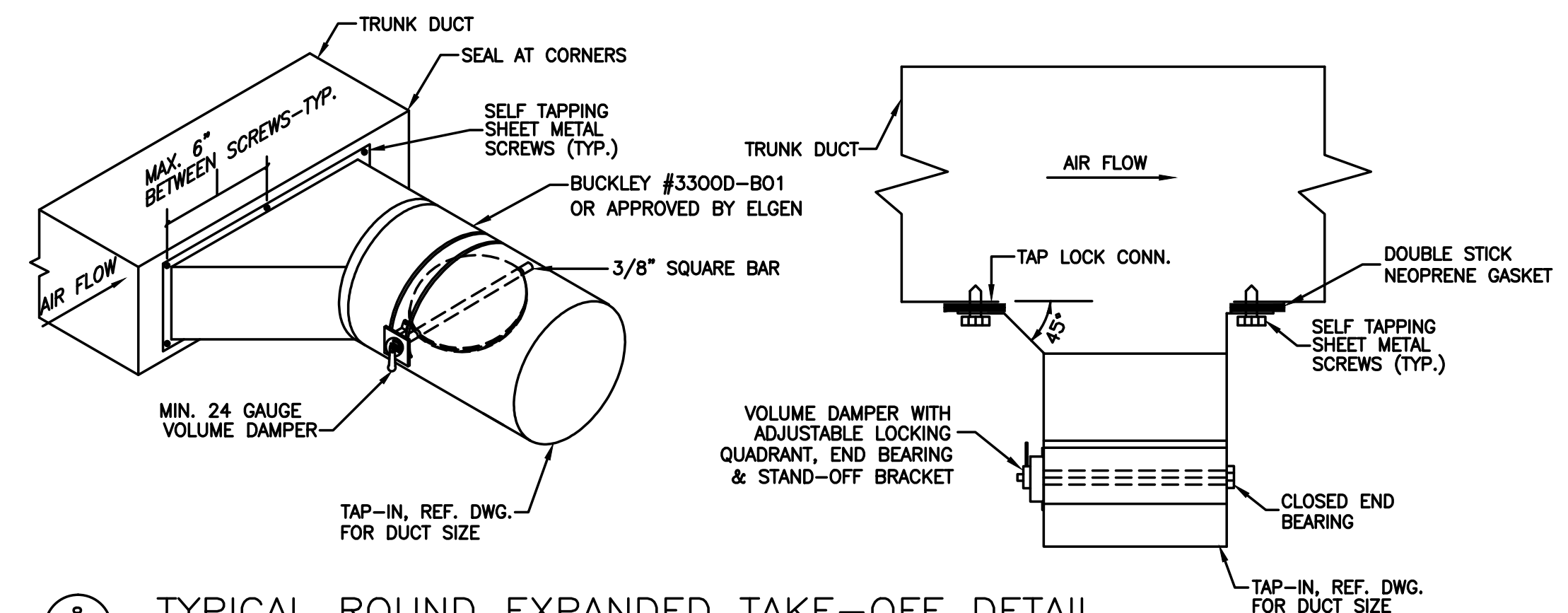


10 GOOSENECK THRU ROOF DETAIL  
M2.1 NO SCALE



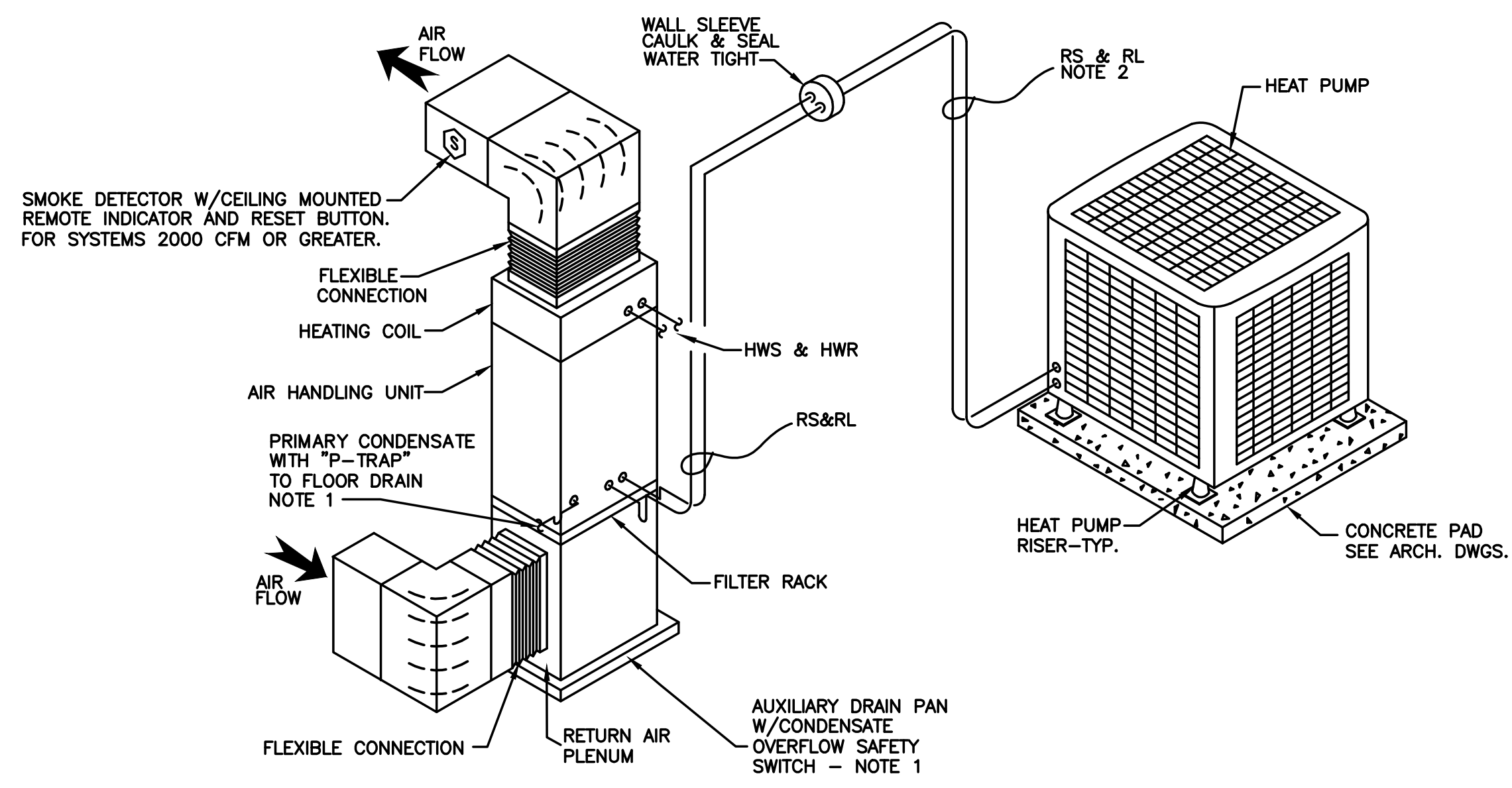
7 TYPICAL RECTANGULAR EXPANDED TAKE-OFF DETAIL  
M2.1 NO SCALE

GENERAL NOTE: A. ALL TAKE-OFFS SHALL BE THE EXPANDED TYPE AS DETAILED. SEE DRAWINGS FOR VOLUME DAMPER LOCATIONS.



8 TYPICAL ROUND EXPANDED TAKE-OFF DETAIL  
M2.1 NO SCALE

GENERAL NOTE: ALL TAKE-OFFS SHALL BE THE EXPANDED TYPE AS DETAILED. SEE DRAWINGS FOR VOLUME DAMPER LOCATIONS. ALL ROUND TAKE-OFFS SHALL BE BUCKLEY 3300D-B01 OR APPROVED EQUAL BY ELGEN.



11 SPLIT SYSTEM HEAT PUMP UNIT SCHEMATIC  
M2.1 NO SCALE

NOTE 1: PROVIDE LITTLE GIANT MODEL #ACS-4 & ACS-2 THAT SHALL SHUT-OFF UNIT AND SIGNAL AUDIBLE/VISUAL ALARM.  
NOTE 2: ALL EXTERIOR RS & RL PIPING SHALL BE COVERED WITH VENTURE CLAD 1577CW JACKETING SYSTEM BY VENTURE TAPE OR APPROVED EQUAL.



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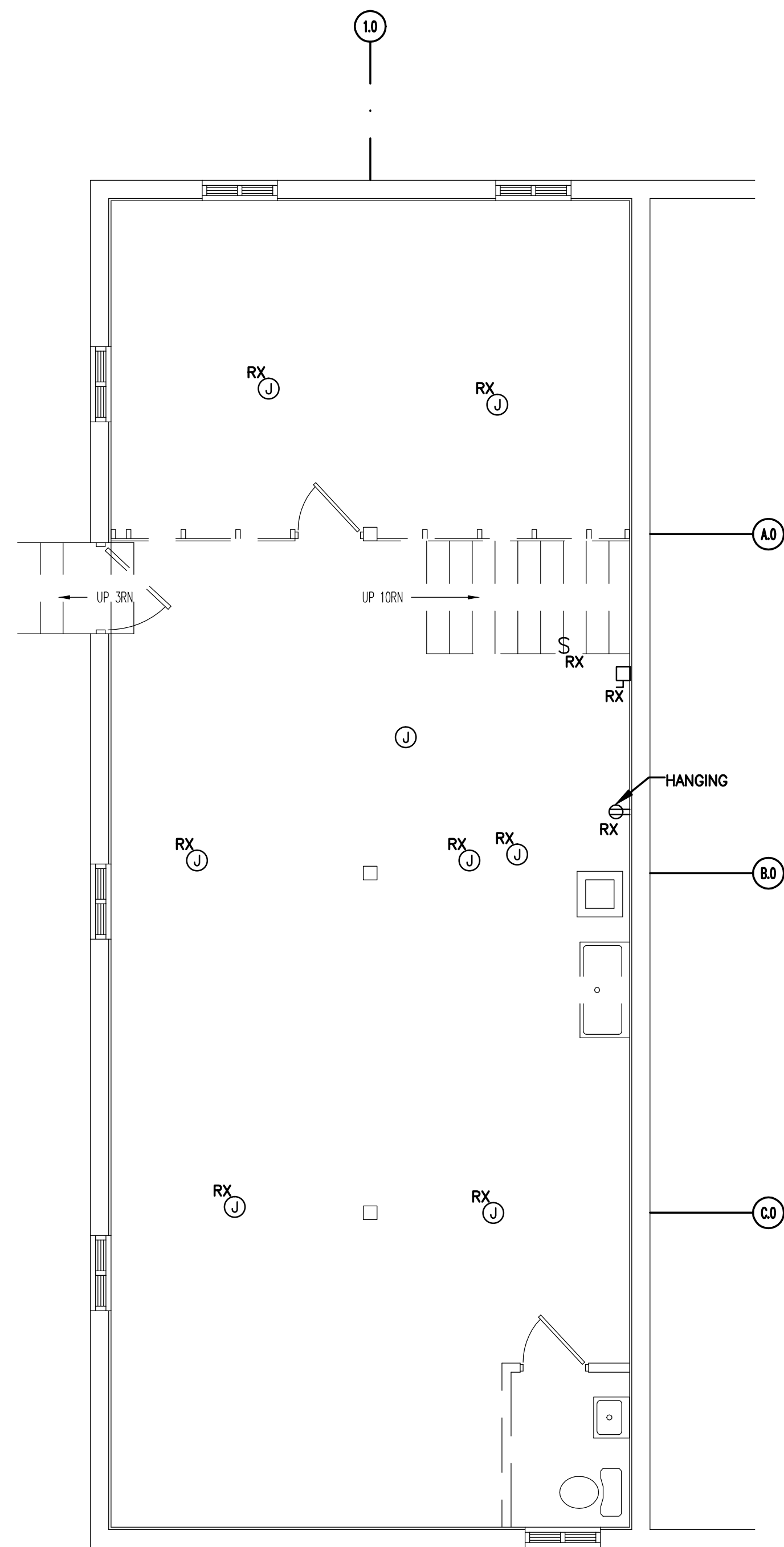
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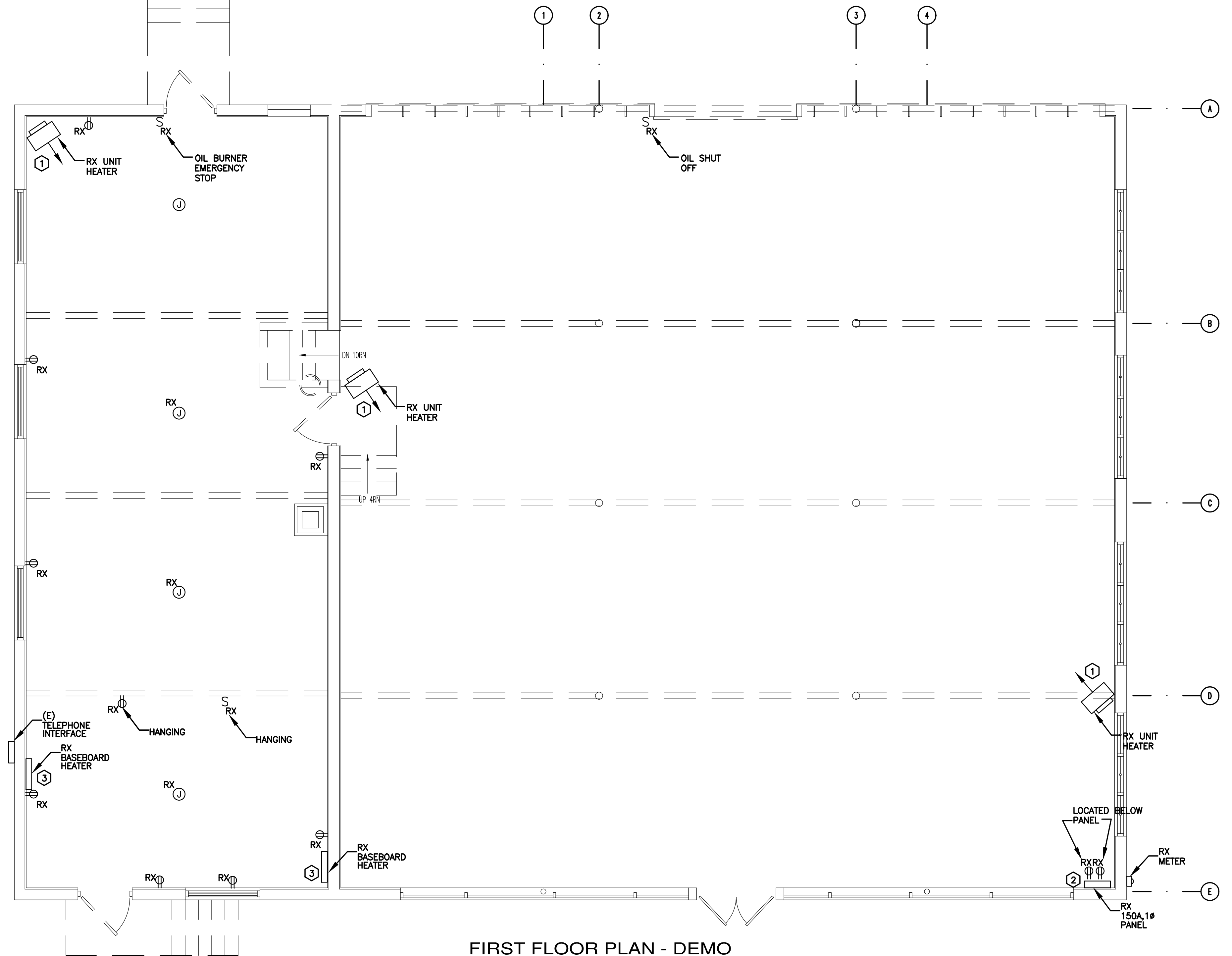
DETAILS - HVAC

M2.1  
3 OF 4





**BASEMENT FLOOR PLAN - DEMO**  
SCALE: 1/4"=1'-0"



**FIRST FLOOR PLAN - DEMO**  
SCALE: 1/4"=1'-0"

**ELECTRICAL LEGEND**

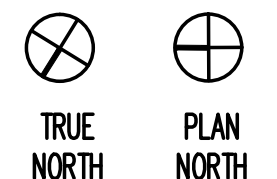
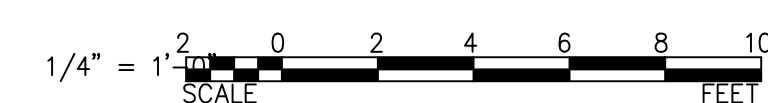
- COORDINATE LOCATIONS AND SIZES WITH ARCHITECTURAL AND MECHANICAL DRAWINGS.
  - UNLESS OTHERWISE NOTED, MOUNTING HEIGHTS ARE TO CENTER LINE OF EQUIPMENT.
  - WHERE APPLICABLE, MOUNTING HEIGHTS SHALL CONFORM TO HANDICAPPED CODE.
- FLEXIBLE LIQUIDTIGHT METAL RACEWAY (SEALTITE) WITH REQUIRED WIRING.
  - DUPLEX RECEPTACLE, SPEC GRADE, 1PH, 125V, 20A, NEMA 5-20, GROUNDING TYPE, MTD 18 INCHES AFF UNLESS OTHERWISE NOTED.
  - DUPLEX RECEPTACLE, COUNTER HIGH, MOUNTED 8 INCHES ABOVE COUNTER HEIGHT AND SHALL CLEAR BACKSPASH.
  - DUPLEX RECEPTACLE, GROUND FAULT INTERRUPTING, SPEC GRADE, 125V, 20A, FEED THRU TYPE, MOUNTED 48 INCHES AFF UNLESS OTHERWISE NOTED. (18" OUTDOORS)
  - DOUBLE DUPLEX RECEPTACLE, SPEC GRADE, 1PH, 125V, 20A, NEMA 5-20, GROUNDING TYPE, MTD. 18 INCHES AFF UNLESS OTHERWISE NOTED.
  - RECEPTACLE, SPECIAL PURPOSE, GROUNDING TYPE, NEMA CONFIGURATION TO SUIT EQUIPMENT.
  - FLEXIBLE EQUIPMENT CONNECTION, HARD WIRED.
  - JUNCTION BOX, OUTLET BOX, OR PULL BOX, SIZE AS REQUIRED.
  - MOTOR CONNECTION; NUMBER INDICATES H.P.
  - DISCONNECT SWITCH; FUSED, SIZE PER NEC. MOUNT ADJACENT TO EQUIPMENT. INSTALL AND FUSE PER EQUIPMENT INSTALLATION RECOMMENDATION AND NEC.
  - RJ-45 JACK, PROVIDE 3/4" CONDUIT TO ABOVE CEILING, 4" SQUARE SPACE, W/4" SQ BOX & PLASTER RING MOUNTED AT 18" AFF. NEW TELEPHONE/DATA COMBINATION OUTLET; PROVIDE STRING TO CEILING. PROVIDE TWO (2) 4 PAIR CAT 5e CABLES TO MAIN TELEPHONE BACKBOARD/ OR DATA WIRING PATCH PANEL AS DIRECTED.
  - AFF ABOVE FINISHED FLOOR
  - (E) EXISTING TO REMAIN
  - EF EXHAUST FAN, COORDINATE OVERCURRENT DEVICE AND WIRE SIZES WITH MECHANICAL EQUIPMENT NAMEPLATE DATA.
  - EMT ELECTRICAL METALIC TUBING
  - EWC ELECTRIC WATER COOLER
  - FLA FULL LOAD AMPERAGE
  - ER EXISTING, RELOCATED.
  - H.P. HORSEPOWER
  - MCA MINIMUM CIRCUIT AMPACITY.
  - MDP MAIN DISTRIBUTION PANEL
  - MOCPP MAXIMUM OVERCURRENT PROTECTION
  - NEC NATIONAL ELECTRIC CODE
  - RX REMOVE EXISTING
  - RLX RELOCATE EXISTING
  - WH WATER HEATER, COORDINATE OVERCURRENT DEVICE AND WIRE SIZES WITH MECHANICAL EQUIPMENT NAMEPLATE DATA.
  - WP WEATHERPROOF, TO SUIT INTENDED USAGE.
  - M MANUAL MOTOR STARTER (D.S.) 20A

**DEMOLITION SHEET NOTES**

- REMOVE HEATERS IN ENTIRETY. ALL WIRING, BOXES, AND CONDUIT SHALL BE REMOVED BACK TO PANEL.
- EXISTING PANEL SHALL BE REMOVED IN ENTIRETY. ALL WIRING, BOXES, AND CONDUIT SHALL BE REMOVED BACK TO PANEL.
- EXISTING BASEBOARD HEATER TO BE REMOVED IN IT'S ENTIRETY. ALL WIRING, BOXES, AND CONDUIT SHALL BE REMOVED BACK TO PANEL.

**GENERAL DEMOLITION NOTES**

- REMOVE ALL LIGHT FIXTURES, WIRING DEVICES, TELEPHONE OUTLETS, AND INDICATED ITEMS NOTED ON THE DEMOLITION PLANS. REMOVE ALL ASSOCIATED UNUSED CABLES AND WIRING.
- THE OWNER SHALL HAVE FIRST CLAIM ON ANY REMOVED MATERIALS. IF THE OWNER DOES NOT WANT DEMOLISHED MATERIALS, THE CONTRACTOR SHALL DISPOSE OF THE MATERIALS APPROPRIATELY.
- ALL PCB BALLASTS SHALL BE DISPOSED OF APPROPRIATELY AND INCINERATED.



ISSUE		
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DATE: 03-07-14

BASEMENT & FIRST FLOOR PLAN - DEMO

**E0.1**  
1 OF 7

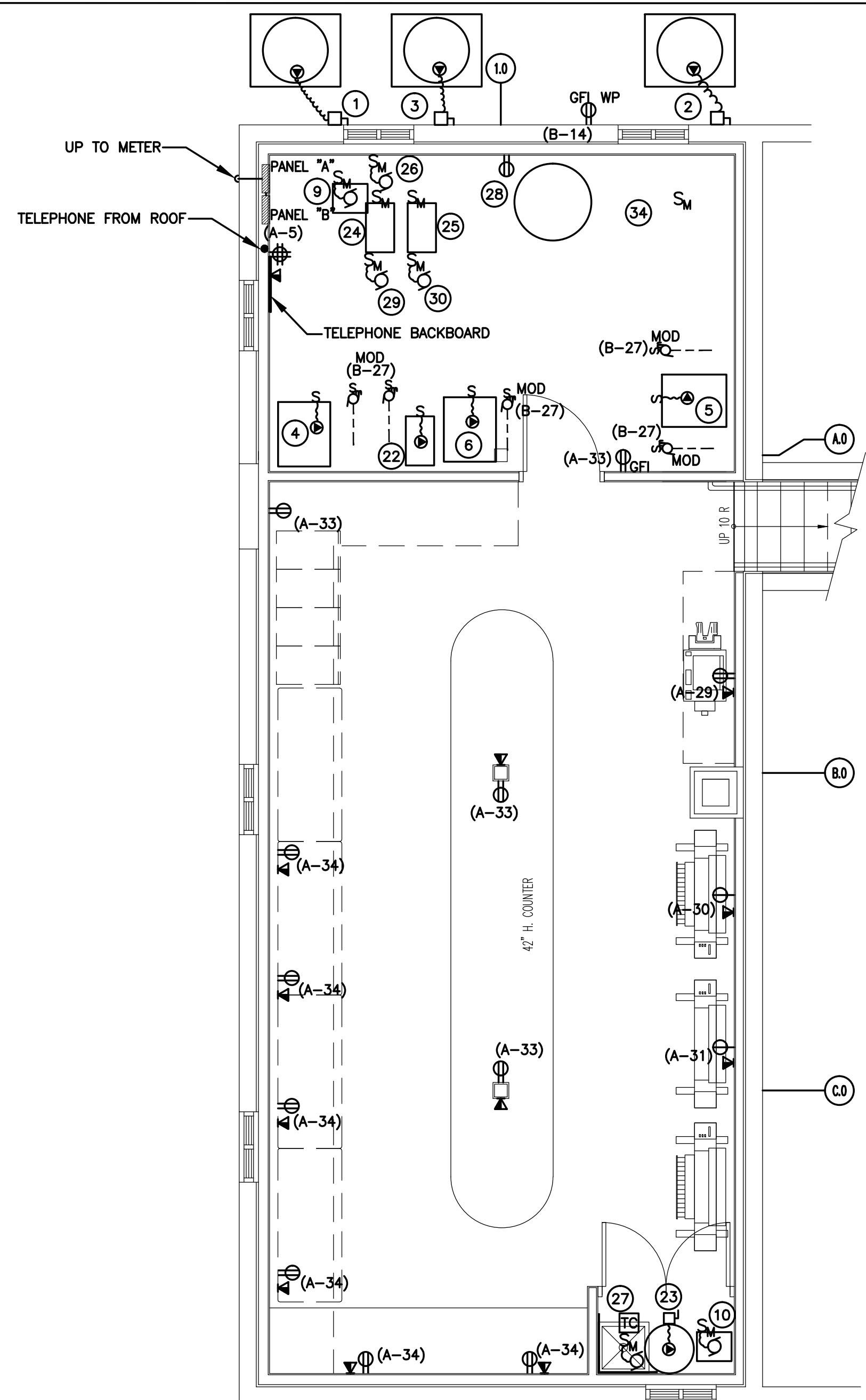


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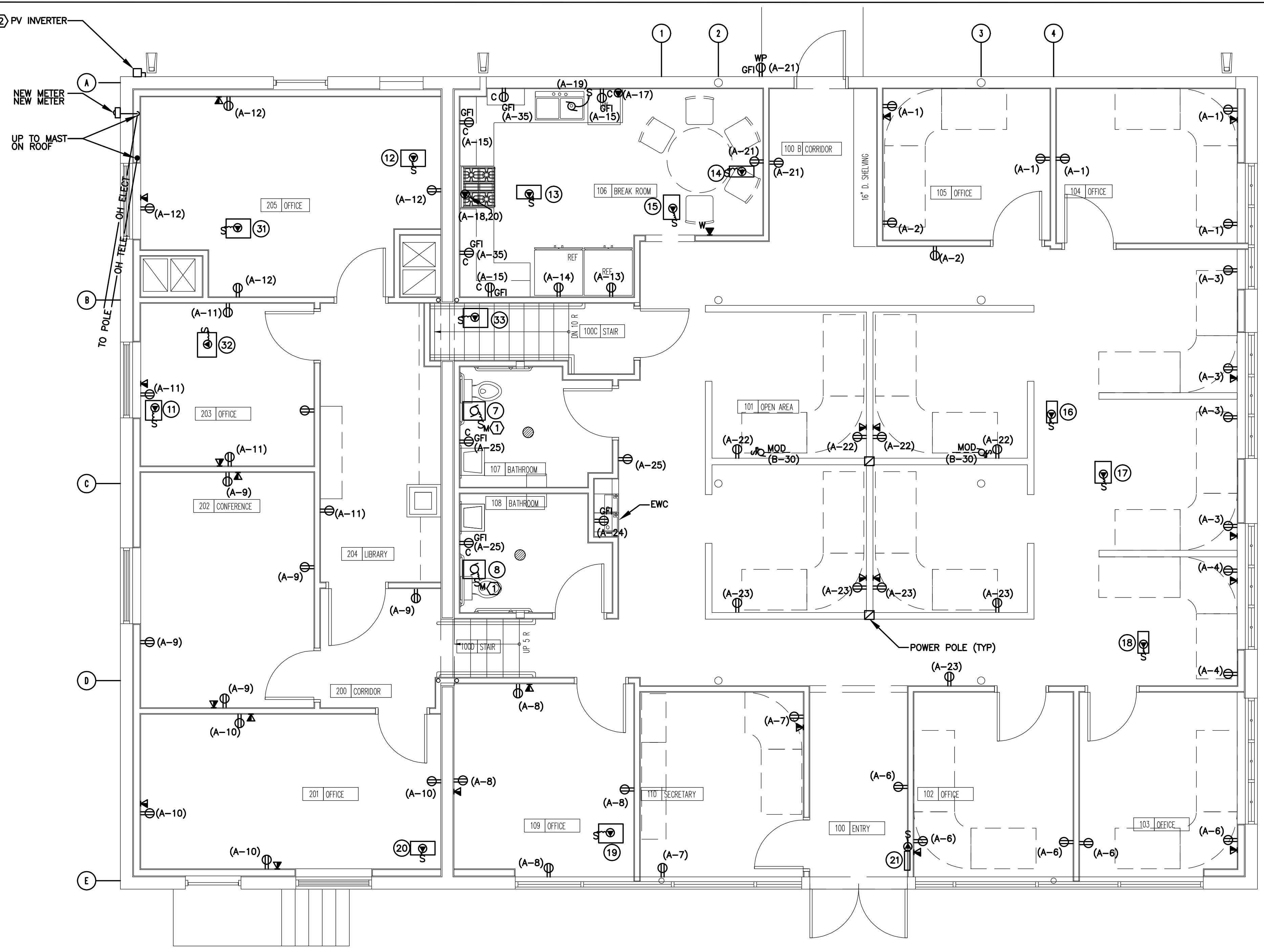
REV	DATE	DESCRIPTION
1	04/06/14	ISSUE

PROJECT NO.: 11121  
DATE: 03-07-14  
BASEMENT & FIRST FLOOR PLAN  
- POWER

**E1.1**



**BASEMENT FLOOR PLAN - POWER**  
SCALE: 1/4"=1'-0"



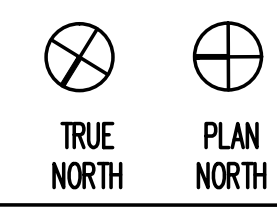
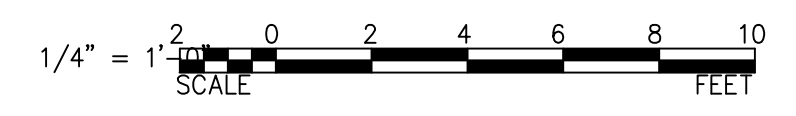
**FIRST FLOOR PLAN - POWER**  
SCALE: 1/4"=1'-0"

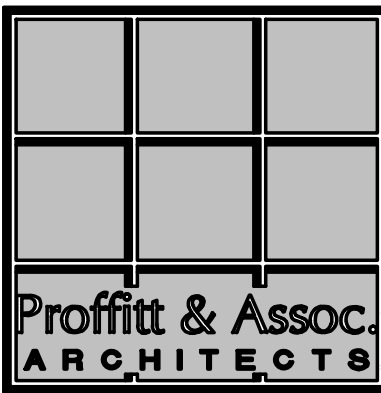
EQUIPMENT SCHEDULE

NO.	ITEM	QTY.	VOLTS	PHASE	AMPS	CIRCUIT	CABLE/CONDUIT	RECEP/HARD WIRE	REMARKS
1	HP-1	1	240	1	35	B-1	(2) #6, (1) #10 GRD - 1"	HW	60A HD NEMA 3R DISC. FUSED AT 35A
2	HP-2	1	240	1	19	B-5	(2) #10, (1) #10 GRD - 3/4"	HW	30A HD NEMA 3R DISC. FUSED AT 30A
3	HP-3	1	240	1	19	B-9	(2) #10, (1) #10 GRD - 3/4"	HW	30A HD NEMA 3R DISC. FUSED AT 30A
4	AHU-1	1	240	1	9	B-2	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
5	AHU-2	1	240	1	9	B-6	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
6	AHU-3	1	240	1	6	B-10	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
7	EF-1	1	120	1	1	B-16	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
8	EF-2	1	120	1	1	B-16	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
9	EF-3	1	120	1	1	B-16	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
10	EF-4	1	120	1	1	B-16	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
11	ZD-1	1	120	1	1	B-17	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
12	ZD-2	1	120	1	1	B-17	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
13	ZD-3	1	120	1	1	B-17	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
14	ZD-4	1	120	1	1	B-17	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
15	ZD-5	1	120	1	1	B-18	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
16	ZD-6	1	120	1	1	B-18	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
17	ZD-7	1	120	1	1	B-18	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
18	ZD-8	1	120	1	1	B-18	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
19	ZD-9	1	120	1	1	B-19	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
20	ZD-10	1	120	1	1	B-19	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
21	EW-1	1	240	1	6.3	B-13	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
22	DH-1	1	115	1	8	B-20	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
23	WH-1	1	240	1	23	B-21	(2) #10, (1) #10 GRD - 3/4"	HW	30A HD NEMA 3R DISC.
24	B-1/P-4	1	120	1	5	B-22	(2) #12, (1) #12 GRD - 3/4"	HW	(2) 20A MOTOR SNAP SWITCH
25	B-2/P-5	1	120	1	5	B-28	(2) #12, (1) #12 GRD - 3/4"	HW	(2) 20A MOTOR SNAP SWITCH
26	P-1	1	115	1	10	B-24	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
27	P-2	1	120	1	1	B-26	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH AND TIME CLOCK
28	P-3	1	120	1	9.8	B-25	(2) #12, (1) #12 GRD - 3/4"	HW	5-20R
29	P-4	1	120	1	1	B-29	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
30	P-5	1	120	1	1	B-29	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
31	BD-1A	1	120	1	1	B-18	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
32	BD-1B	1	120	1	1	B-18	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
33	BD-2	1	120	1	1	B-18	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH
34	EUH-1	1	240	1	12.5	B-31	(2) #12, (1) #12 GRD - 3/4"	HW	20A MOTOR SNAP SWITCH

**ELECTRICAL NOTES - POWER**

- ① CONNECT EXHAUST FANS TO BATHROOM LIGHTING CIRCUIT.
- ② CONTRACTOR SHALL PROVIDE CONDUIT THRU WALL AND WITHIN WALL CAVITY TO PANEL "A"





100 NORTH MARKET STREET  
 FREDERICK, MARYLAND 21701  
 (301) 662-8532  
 FAX (301) 662-4192  
 info@proffittandassociates.com

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 COMPANY, INC.  
 3 West Second Street  
 Frederick, Md. 21701  
 OFFICE: (301) 695-9424  
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 E-mail: rhlengr@rhlengr.com

Professional Certification. I  
 hereby certify that these  
 documents were prepared or  
 approved by me, and that I  
 am a duly licensed  
 professional engineer under  
 the laws of the State of  
 Maryland. License No: 13954  
 Expiration Date: 05/18/2014

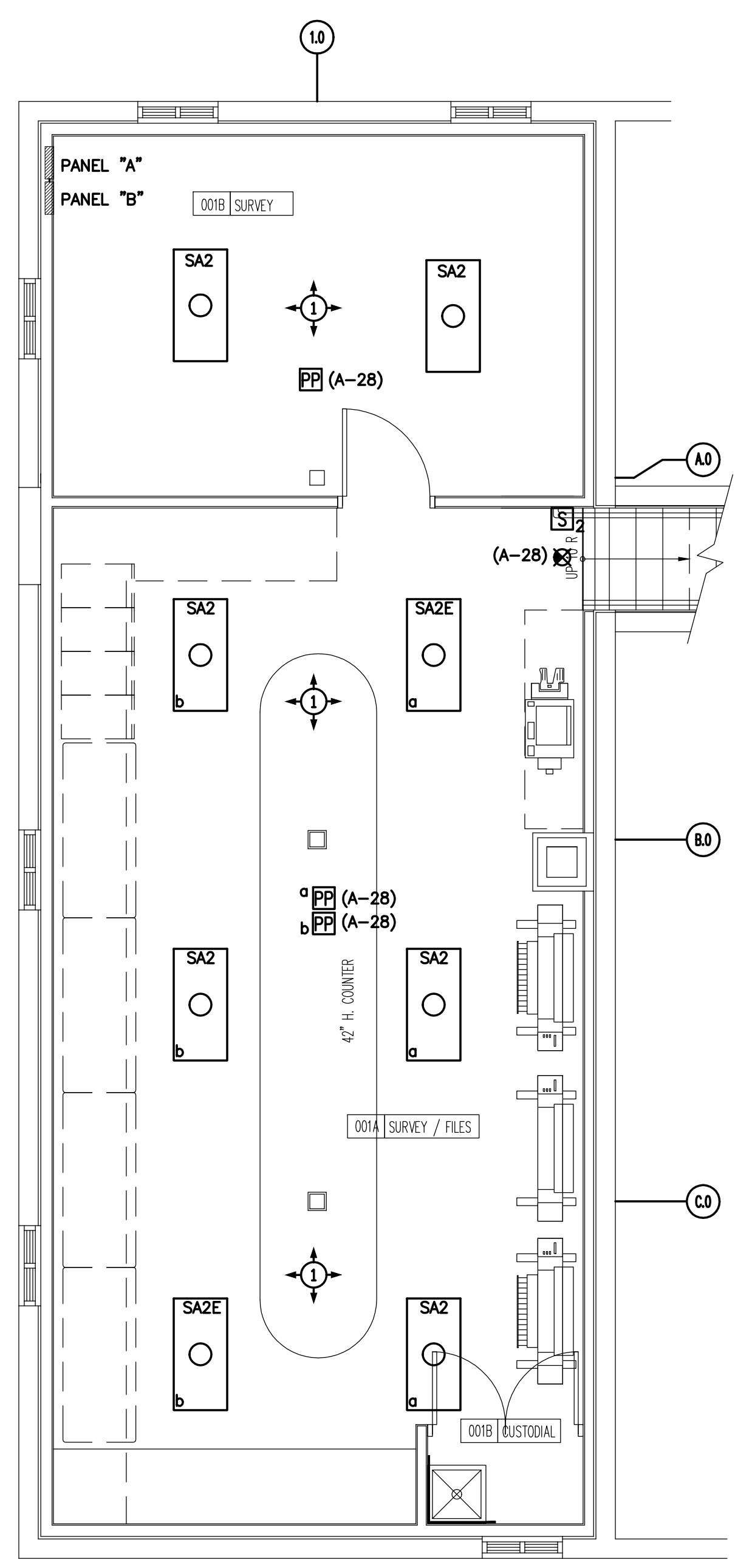
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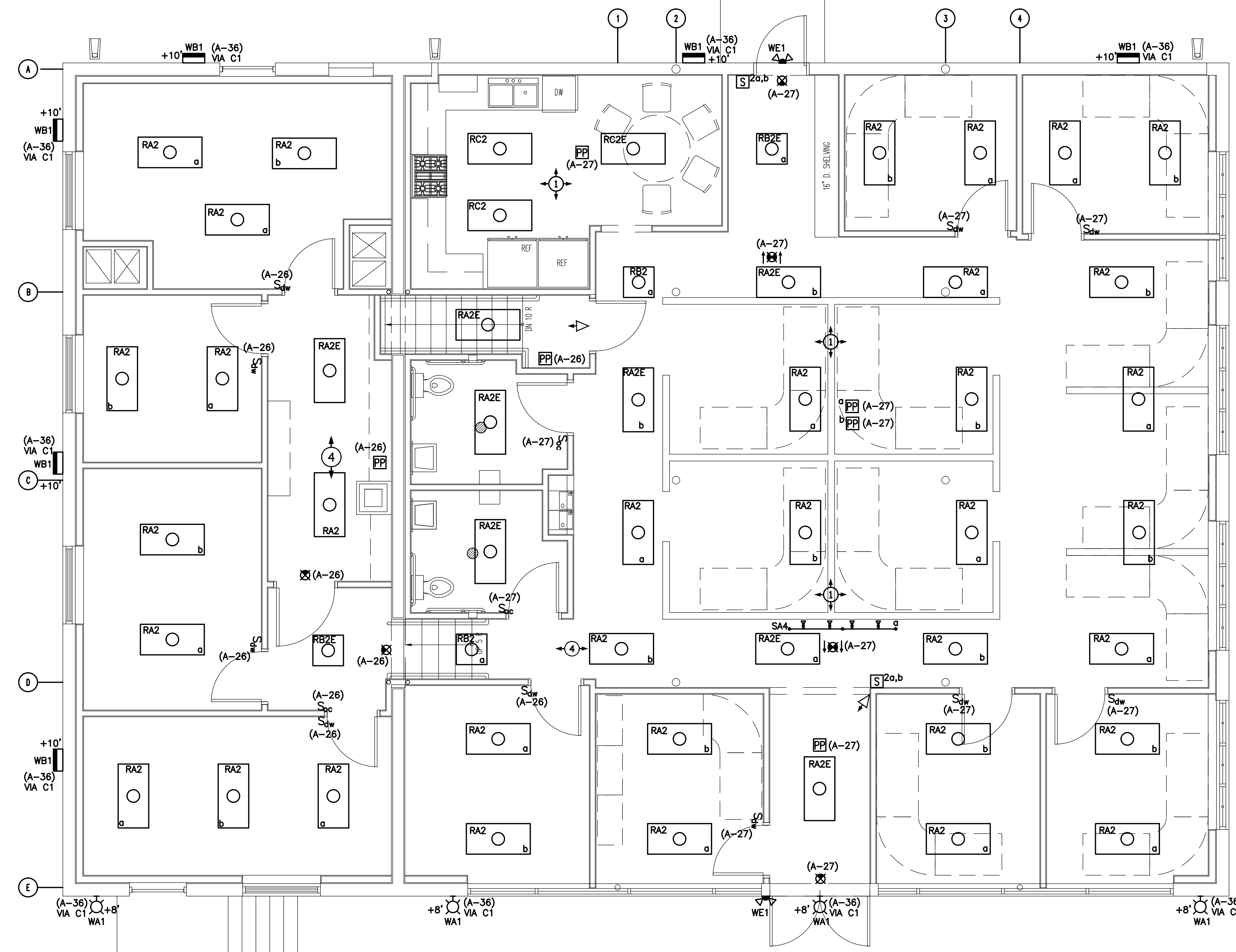
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PROJECT NO.: 11121  
 DATE: 03-07-14  
 BASEMENT & FIRST FLOOR PLAN  
 - LIGHTING

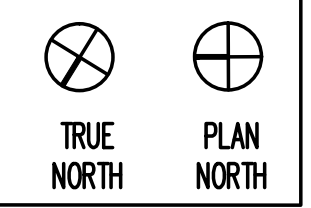
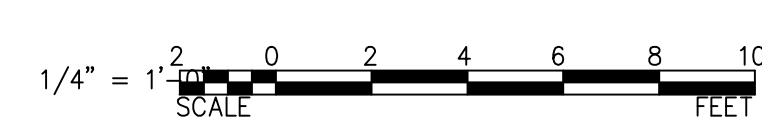
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 3 OF 7

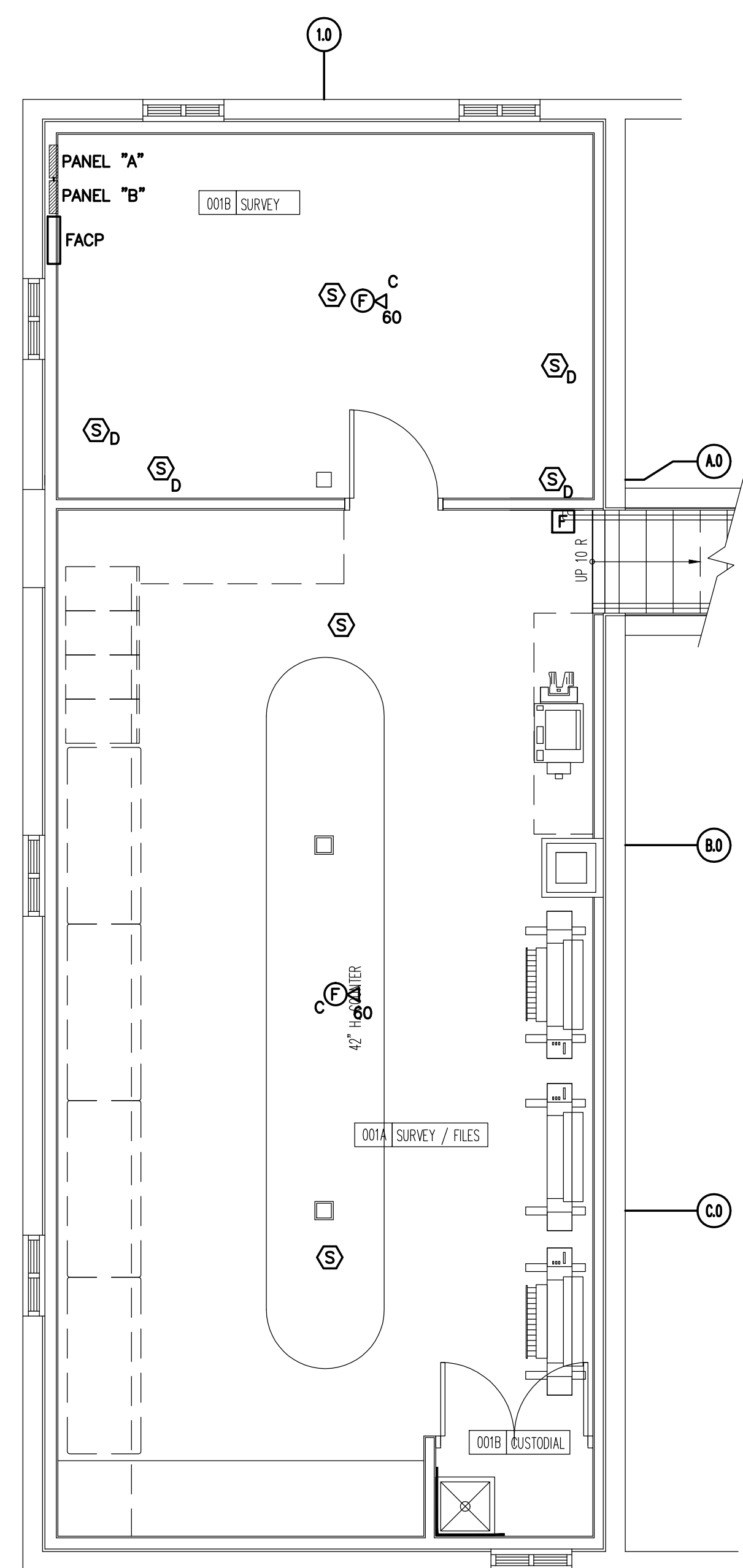


**BASEMENT FLOOR PLAN - LIGHTING**  
 SCALE: 1/4"=1'-0"

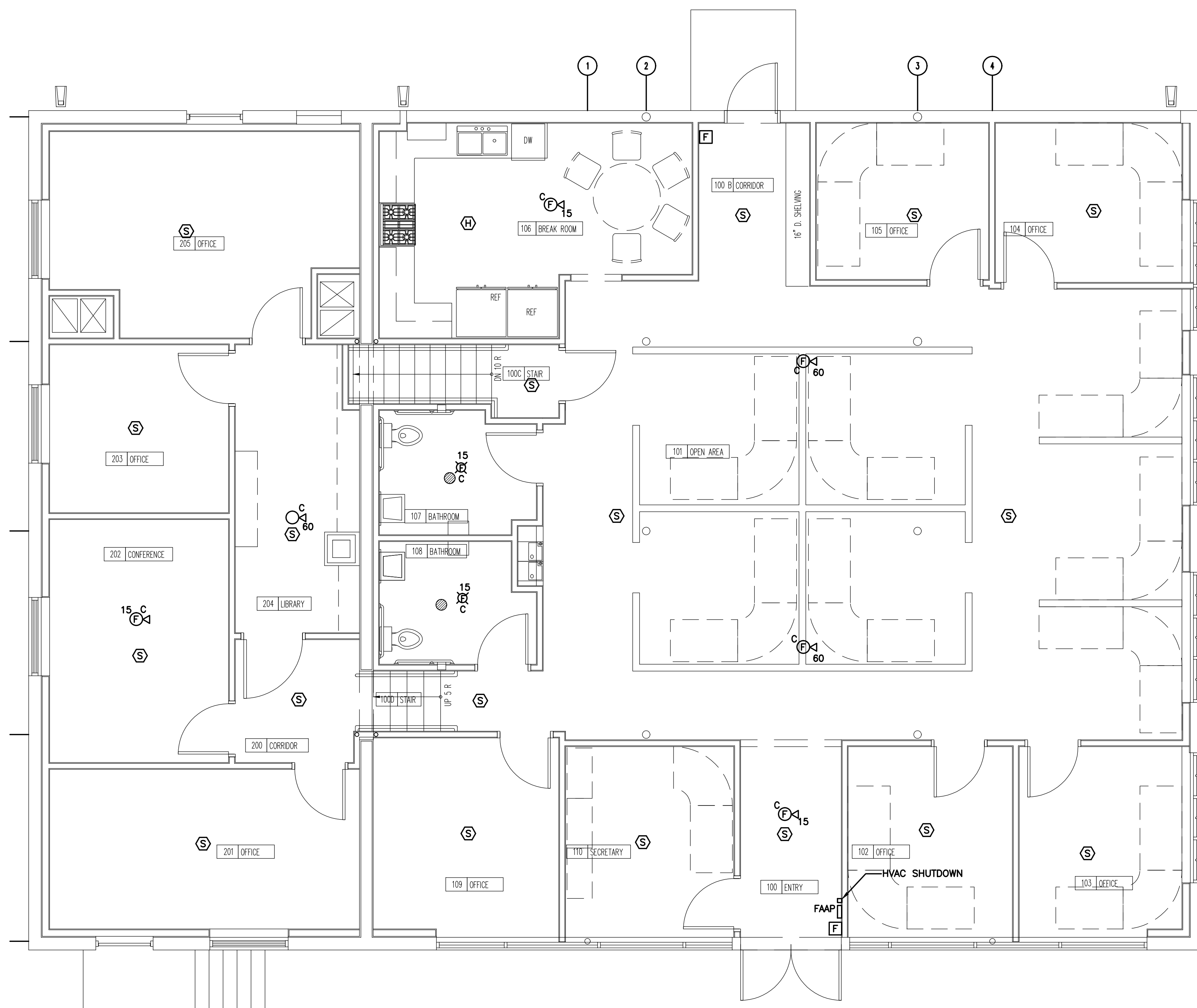


**FIRST FLOOR PLAN - LIGHTING**  
 SCALE: 1/4"=1'-0"





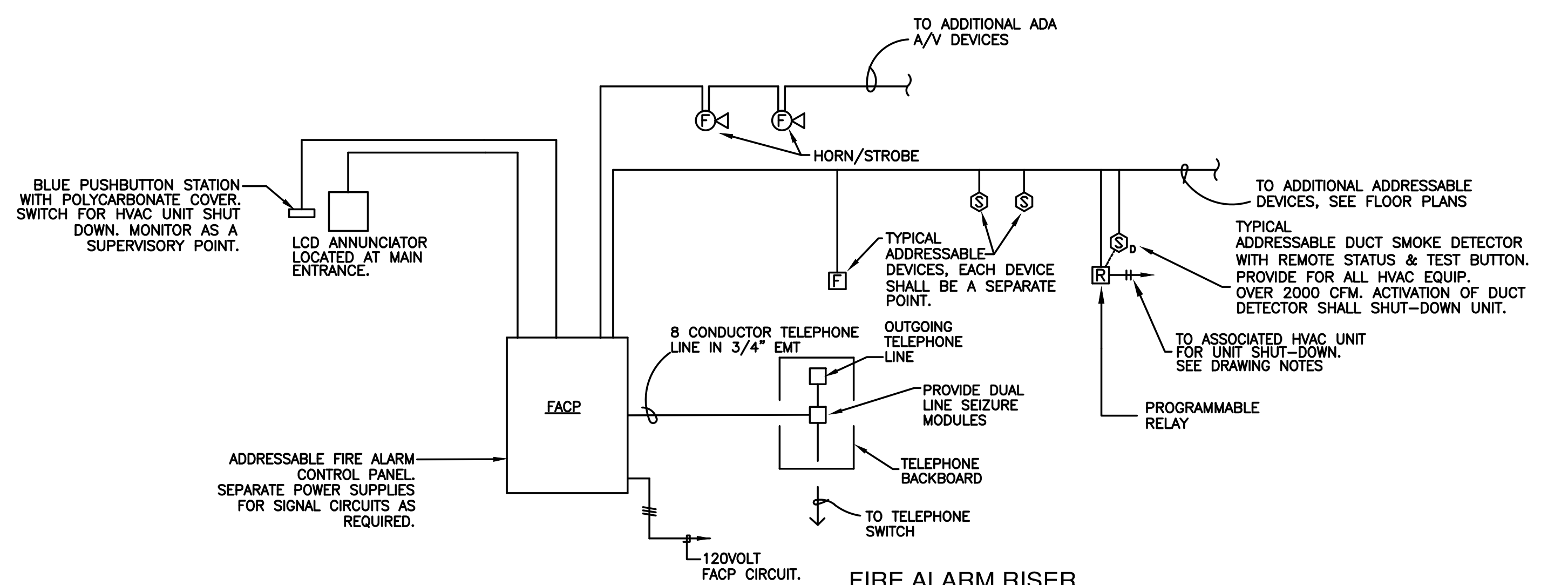
**BASEMENT FLOOR PLAN - FIRE ALARM**  
SCALE: 1/4"=1'-0"



**FIRST FLOOR PLAN - FIRE ALARM**  
SCALE: 1/4"=1'-0"

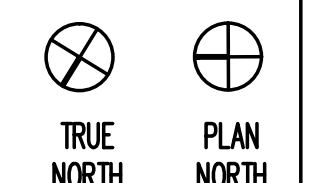
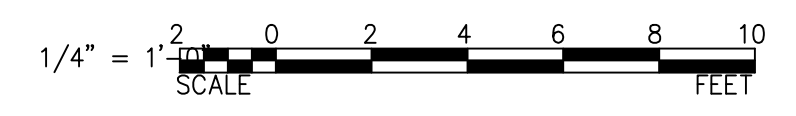
**FIRE ALARM SYSTEM LEGEND:**

- [F] MANUAL PULL STATION, ADDRESSABLE, MOUNTED AT +48" AFF. (FIRE ALARM SYSTEM). PROVIDE POLYCARBONATE GUARD WITH LOCAL ALARM.
- [C] COMBINATION AUDIBLE ALARM AND ADA STROBE CEILING MOUNT, ADJACENT NUMBER INDICATES MINIMUM STROBE INTENSITY (FIRE ALARM SYSTEM).
- [15] VISUAL ADA STROBE, CEILING MOUNT, ADJACENT NUMBER INDICATES MINIMUM STROBE INTENSITY (FIRE ALARM SYSTEM).
- [H] HEAT DETECTOR, ADDRESSABLE.
- [S] SMOKE DETECTOR, ADDRESSABLE MOUNTED PER NFPA 72E (FIRE ALARM SYSTEM).
- [S<sub>D</sub>] DUCT SMOKE DETECTOR, PHOTOELECTRIC, ADDRESSABLE FURNISHED BY ELECTRICAL CONTRACTOR. (FIRE ALARM SYSTEM.)
- [I] ADDRESSABLE MONITORING POINT (FIRE ALARM SYSTEM).
- [R] PROGRAMMABLE CONTROL RELAY (FIRE ALARM SYSTEM).



**FIRE ALARM RISER**  
NO SCALE

NOTE:  
1. ALL STROBES SHALL BE SYNCHRONIZED



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(301) 662-8532  
FAX (301) 662-4192  
Info@proffittandassociates.com

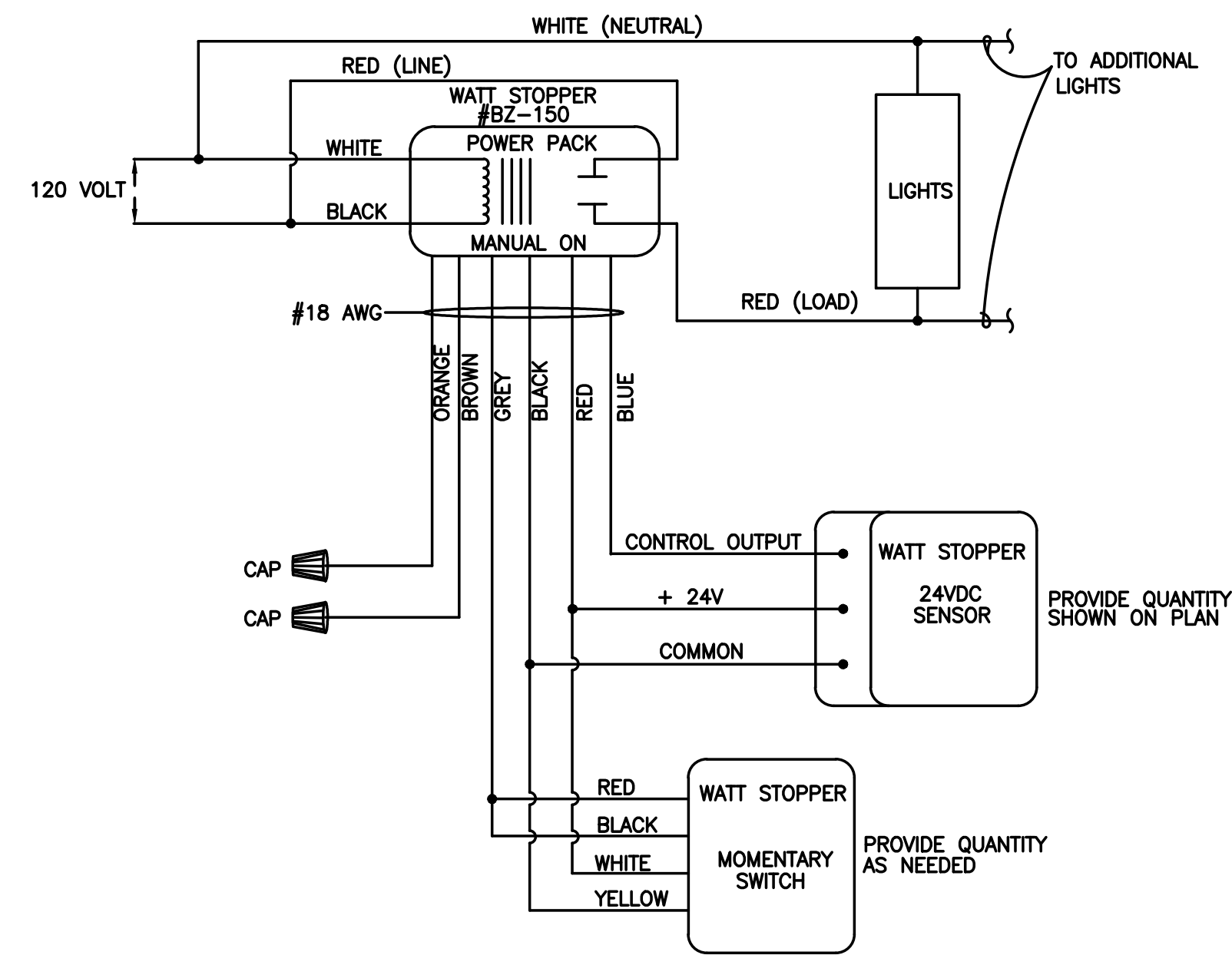
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FAX: (301) 293-6338  
E-mail: rhlengr@rhlengr.com

Professional Certification. I  
hereby certify that these  
documents were prepared or  
approved by me, and that I  
am a duly licensed  
professional engineer under  
the laws of the State of  
Maryland. License No: 13954  
Expiration Date: 05/18/2014

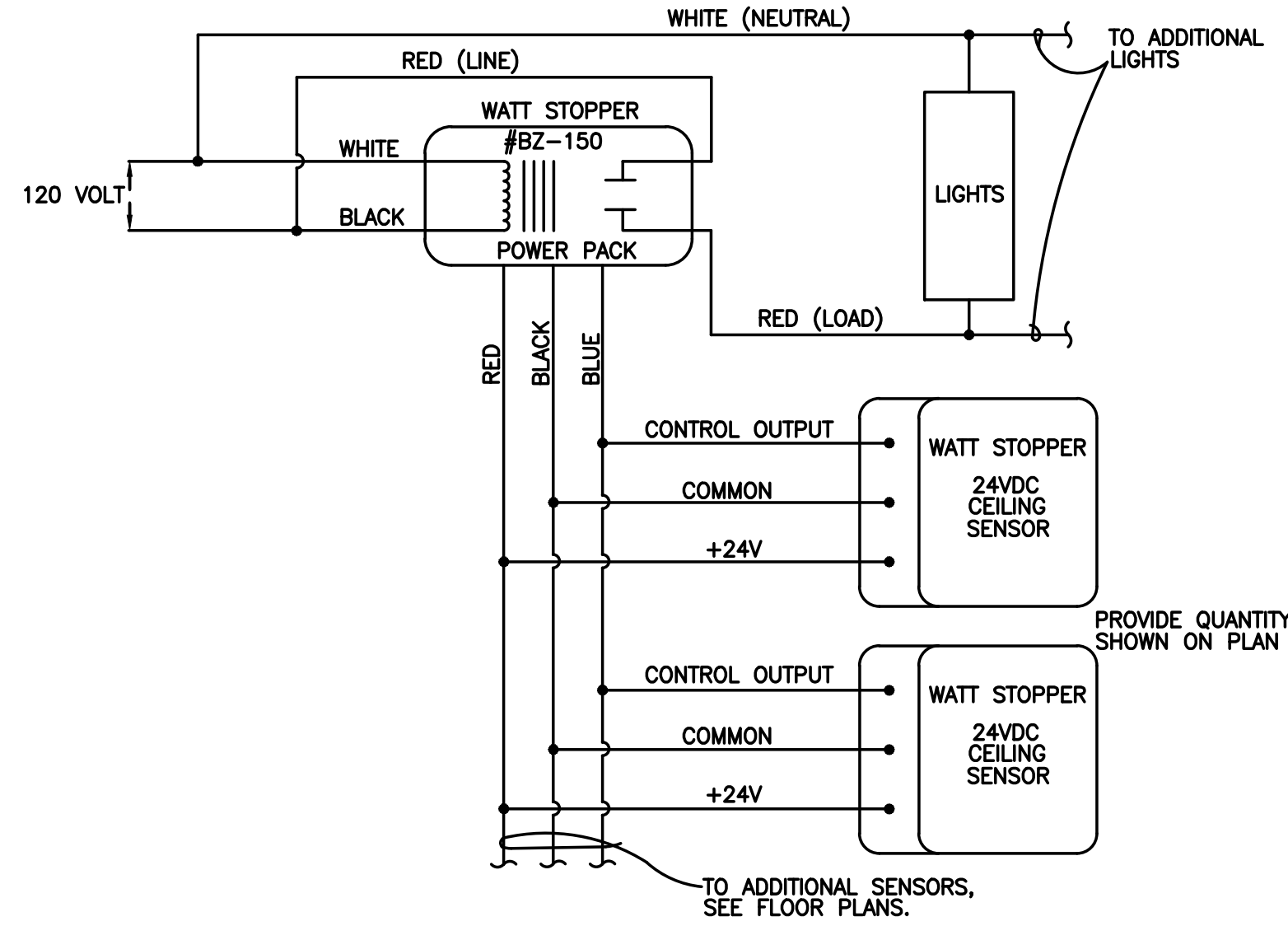
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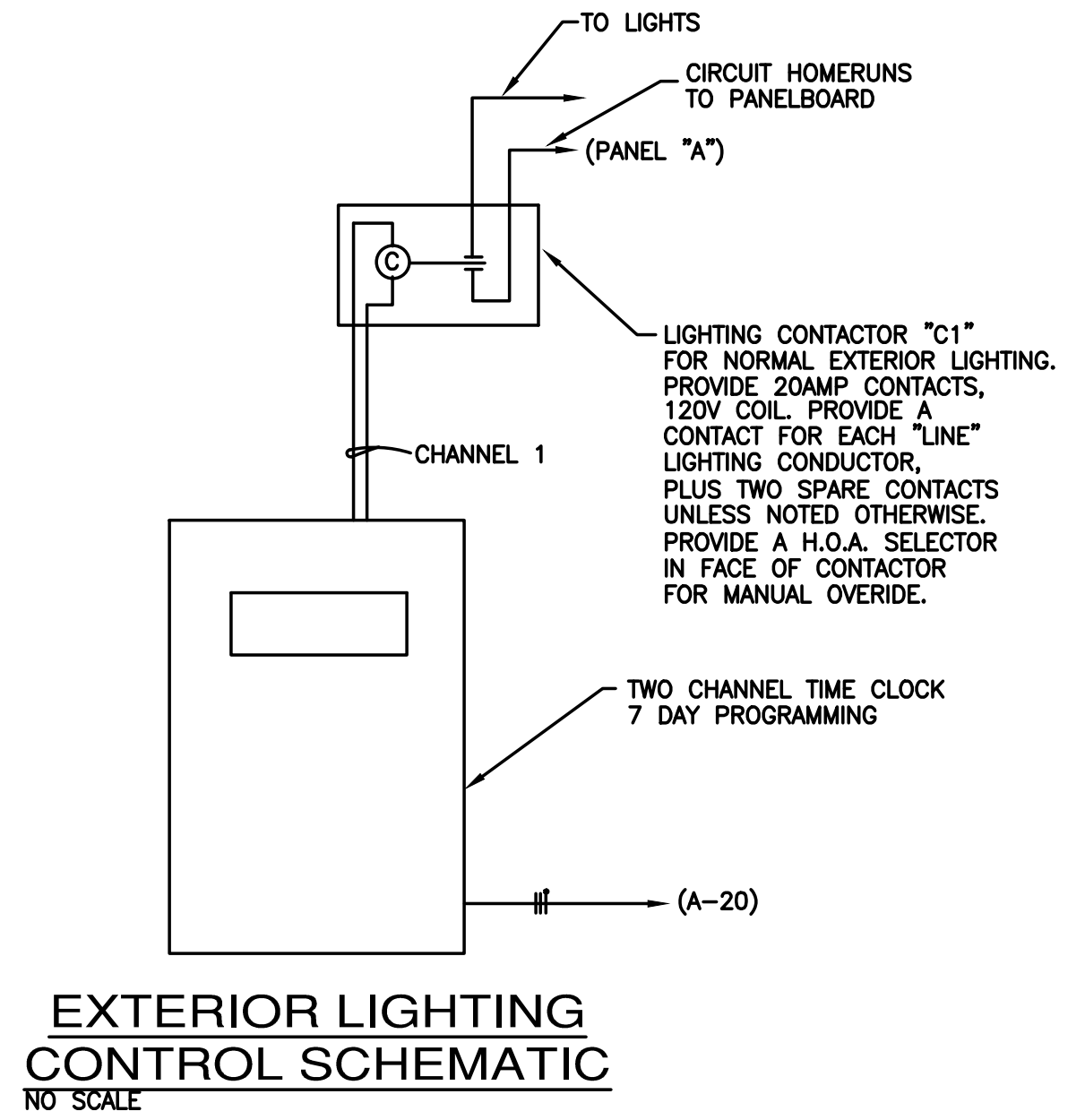
PROJECT NO.: 11121  
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BASEMENT & FIRST FLOOR PLAN  
- FIRE ALARM



**TYPICAL VACANCY SENSOR WIRING DIAGRAM**  
NO SCALE



**TYPICAL OCCUPANCY SENSOR DIAGRAM**  
NO SCALE



**EXTERIOR LIGHTING CONTROL SCHEMATIC**  
NO SCALE

**LIGHTING FIXTURE SCHEDULE**

TYPE	DESCRIPTION	MANUFACTURER	NAMED EQUAL
RA2	2'x4' LUCEN VOLUMETRIC	PINNACLE LU24X-2TB-G1-UNV 1C-W	HE WILLIAMS COLUMBIA
RA2D	2'x4' LUCEN VOLUMETRIC W/ DIMMABLE BALLAST	PINNACLE LU24X-2TB-G1-UNV 1D-W	HE WILLIAMS COLUMBIA
RA2E	2'x4' VOLUMETRIC W/ EMERGENCY BATTERY	PINNACLE LU24X-2TB-G1-UNV 1B-W	HE WILLIAMS COLUMBIA
RB2	2'x2' VOLUMETRIC	PINNACLE LU22X-2TB-G1-UNV 1C-W	HE WILLIAMS COLUMBIA
RB2E	2'x2' VOLUMETRIC W/ EMERGENCY BATTERY	PINNACLE LU22X-2TB-G1-UNV 1B-W	HE WILLIAMS COLUMBIA
SA2	2'x4' SURFACE MOUNTED	PINNACLE LU24X-2TB-S-UNV 1C-W	HE WILLIAMS COLUMBIA
SA2E	2'x4' SURFACE MOUNTED W/EMERGENCY BATTERY	PINNACLE LU24X-2TB-S-UNV 1B-W	HE WILLIAMS COLUMBIA
SA4	SURFACE MOUNTED TRACK LIGHTS W/4 HEADS	TECH LIGHTING 700TTENVLLS2085 700MOKTSM30ES TRACK	JESCO JUNO
WA1	OUTDOOR WALL MOUNT	BASELIGHT L112-XX-WM15-21W LED	LSI INDUSTRIES BARN LIGHT ELECT.
WB1	OUTDOOR WALL MOUNT	LITHONIA CSXW LED-30C-700-40K T2M-VG-XX	HE WILLIAMS COLUMBIA
WE1	OUTDOOR EMERGENCY WALL MOUNT	LITHONIA AFN-DB-EXT	HE WILLIAMS COLUMBIA
⊗	UNIVERSAL MOUNT EXIT SIGN	LITHONIA EDGR-1/2-R/RMR-EL-SD	HE WILLIAMS COLUMBIA

**LIGHTING CONTROL SCHEDULE**

SYMBOL	MOUNTING	COVERAGE	SENSOR TYPE	VOLTAGE	MODEL NUMBER	TIME DELAY	REMARKS
⊕	CEILING	40'x40'	DUAL PIR/ ULTRASONIC	24	WATT STOPPER DT-305	20 MIN.	WALK TEST AND FIELD SET SENSITIVITY REQUIRES POWER PACK BZ-150
⊕	CEILING	60'x10'	ULTRASONIC	24	WATT STOPPER W-2000H	10 MIN.	WALK TEST AND FIELD SET SENSITIVITY REQUIRES POWER PACK BZ-150
⊕	CEILING/WALL	CORNER, 50' RADIUS	PIR	24	WATT STOPPER CX-100	10 MIN.	WALK TEST AND FIELD SET SENSITIVITY REQUIRES POWER PACK BZ-150
S <sub>c</sub>	WALL SWITCH	18'Dx15'W MINOR MOTION 30'Dx30'W MAJOR MOTION	DUAL PIR/ ULTRASONIC	120V or 277V	WATT STOPPER DSW-100	20 MIN.	WALK TEST AND FIELD SET SENSITIVITY
S <sub>w</sub>	WALL SWITCH	18'Dx15'W MINOR MOTION 30'Dx30'W MAJOR MOTION	DUAL PIR/ ULTRASONIC	120V or 277V	WATT STOPPER DW-200	20 MIN.	WALK TEST AND FIELD SET SENSITIVITY
PP	JUNCTION BOX	N/A	N/A	120V or 277V	WATT STOPPER BZ-150	N/A	SET TO MANUAL ON FOR VACANCY 10 UNITS MAX CONNECTED
S <sup>2</sup>	WALL SWITCH	N/A	N/A	24	WATT STOPPER DCC2	N/A	COORDINATE COLOR WITH ARCHITECT NUMBER INDICATES QUANTITY OF SWITCHES REQUIRED

NOTES:  
1. OCCUPANCY SETTING FOR: ENTRY 100, CORRIDOR 200, LIBRARY 204, BATHROOMS, STAIR 100C, BREAK RM, MECH/ELECT RM.  
2. VACANCY SETTING FOR ALL OTHER ROOMS AS SHOWN.



100 NORTH MARKET STREET  
FREDERICK, MARYLAND 21701  
(301) 662-8532  
FAX (301) 662-4192  
Info@proffittandassociates.com

RHL ENGINEERING  
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Expiration Date: 05/18/2014

RENOVATIONS TO  
10 SOUTH BENTZ STREET  
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FREDERICK, MD. 21701

**ISSUE**

REV	DATE	DESCRIPTION
1	04/06/14	ISSUE

PROJECT NO.: 11121  
DATE: 03-07-14

LIGHTING  
SCHEDULES AND DETAILS

**E4.1**

PANELBOARD: "A"  
 BUS AMPACITY: 400A  
 BRANCH BRKR. MTG. SPACE: 42 SPACE  
 MLO: MAIN BREAKER: 400A  
 PANEL MANUFACTURER: SQUARE-D  
 ISOLATED GROUND BAR: \_\_\_\_\_

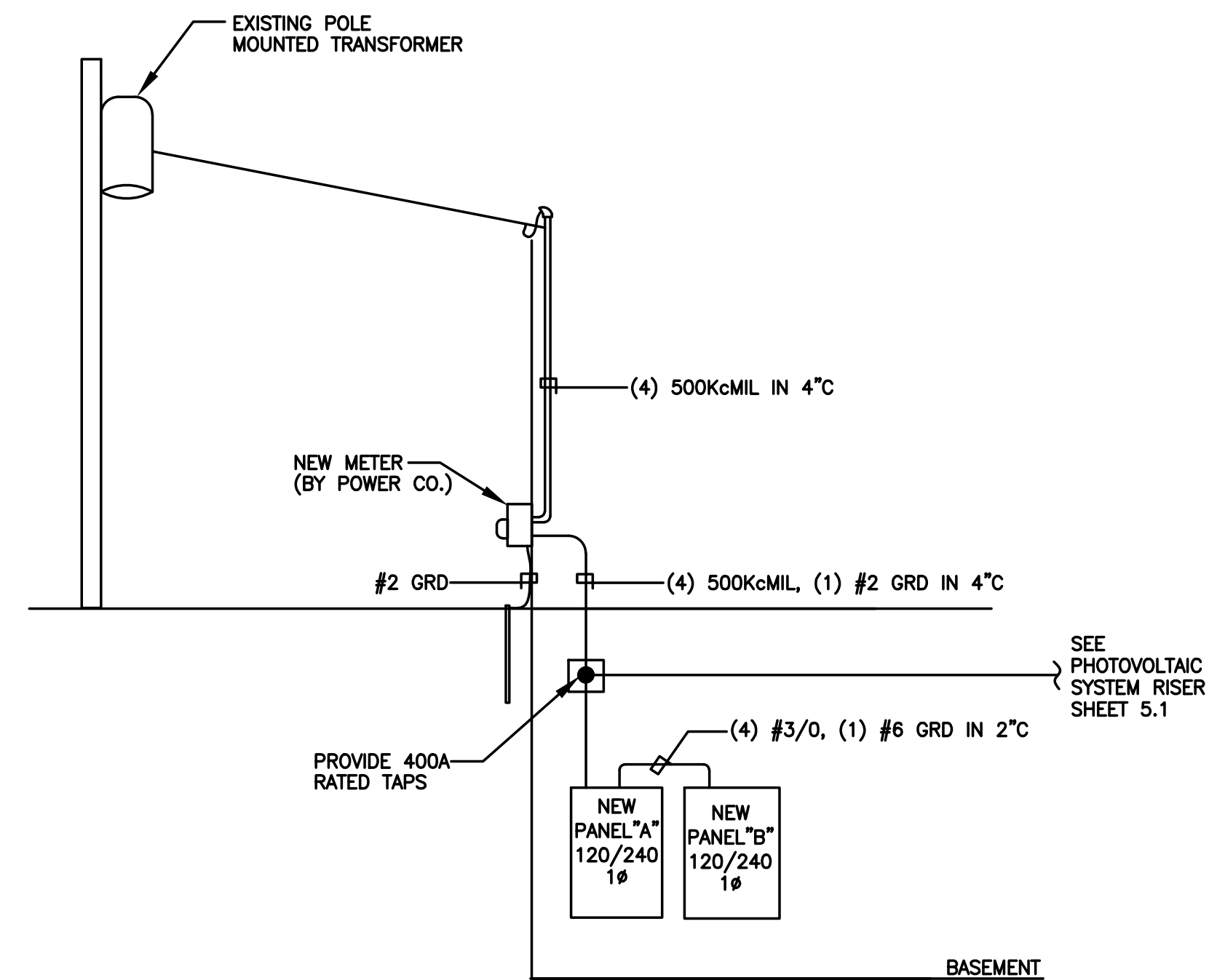
VOLTAGE/PHASE: 120/240V, 1 $\phi$ -3W  
 EQUIPMENT GROUND BAR: X  
 SURFACE MOUNTED: X RECESSED:  
 INTERRUPT CAPACITY: 10,000 AIC  
 FEEDER BREAKER SIZE: 400A  
 ACCESSORIES: \_\_\_\_\_

LOAD	CKT NO.	BKR A/P	WIRE SIZE	KW/PHASE		KW/PHASE		WIRE SIZE	BKR A/P	CKT NO.	LOAD
				A	B	A	B				
RECEPT: RM#: 104,105	1	20/1	12	1.2	—	0.5	—	12	20/1	2	RECEPT: RM#: 105
RECEPT: RM#: A/B	3	20/1	12	—	0.9	—	0.7	12	20/1	4	RECEPT: RM#: C/100A
RECEPT: IT RM#: ELEC	5	20/1	12	0.9	—	0.9	—	12	20/1	6	RECEPT: RM#: 102/ENTRY,103
RECEPT: RM#: 110	7	20/1	12	—	0.9	—	0.7	12	20/1	8	RECEPT: RM#: 109
RECEPT: RM#: 202	9	20/1	12	0.9	—	0.7	—	12	20/1	10	RECEPT: RM#: 201
RECEPT: RM#: 203,209	11	20/1	12	—	0.9	—	0.7	12	20/1	12	RECEPT: RM#: 205
RECEPT:FRIDGE RM#: 106	13	20/1	12	0.9	—	1.0	—	12	20/1	14	RECEPT:FRIDGE RM#: 106
RECEPT: RM#: 106	15	20/1	12	—	0.9	—	1.0	12	20/1	16	RECEPT:DISPOSAL RM#: 106
DISHWASHER	17	20/1	12	0.5	—	1.0	—	12	20/1	18	RECEPT: RANGE RM#: 106
GARBAGE DISPOSAL	19	20/1	12	—	0.5	—	0.9	12	20/1	20	OUTDOOR LIGHTING PANEL
RECEPT:CORR./OUTDOOR	21	20/1	12	0.9	—	1.1	—	12	20/1	22	RECEPT: RM#:OPEN AREA
RECEPT: RM#: OPEN AREA	23	20/1	12	—	0.9	—	1.0	12	20/1	24	RECEPT: EWC
RECEPT: RM#: 107,108	25	20/1	12	0.9	—	0.9	—	12	20/1	26	LTG: 2ND FLOOR
LTG: FIRST FLOOR	27	20/1	12	—	1.1	—	0.9	12	20/1	28	LTG: BASEMENT
RECEPT:COPIER RM#:1A	29	20/1	12	0.5	—	1.0	—	12	20/1	30	RECEPT: PRINTER A
RECEPT:PRINTER B RM 1A	31	20/1	12	—	0.9	—	.	12	20/1	32	RECEPT: .
RECEPT: N. 1A	33	20/1	12	1.0	—	1.0	—	12	20/1	34	RECEPT: SW. 1A
.	35	20/1	12	—	1.1	—	.	12	20/1	36	LTG: EXTERIOR
.	37	20/1	12	.	—	.	—	12	20/1	38	.
.	39	.	.	.	—	15.7	—	12	20/1	40	PANEL "B"
.	41	.	.	.	—	15.7	—	12	20/1	42	.
SUBTOTAL / PHASE				7.7	8.1	23.8	21.6				
TOTAL / PHASE				31.5	29.7						

PANELBOARD: "B"  
 BUS AMPACITY: 200A  
 BRANCH BRKR. MTG. SPACE: 42 SPACE  
 MLO: MAIN BREAKER: 200A  
 PANEL MANUFACTURER: SQUARE-D  
 ISOLATED GROUND BAR: \_\_\_\_\_

VOLTAGE/PHASE: 120/240V, 1 $\phi$ -3W  
 EQUIPMENT GROUND BAR: X  
 SURFACE MOUNTED: X RECESSED:  
 INTERRUPT CAPACITY: 10,000 AIC  
 FEEDER BREAKER SIZE: 200A  
 ACCESSORIES: X

LOAD	CKT NO.	BKR A/P	WIRE SIZE	KW/PHASE		KW/PHASE		WIRE SIZE	BKR A/P	CKT NO.	LOAD
				A	B	A	B				
HP-1	1	60/2	6	3.3	—	0.8	—	12	20/2	2	AHU-1
	3			—	3.3	—	0.8			4	
HP-2	5	30/2	10	1.8	—	0.8	—	12	20/2	6	AHU-2
	7			—	1.8	—	0.8			8	
HP-3	9	30/2	10	1.8	—	0.5	—	12	20/2	10	AHU-3
	11			—	1.8	—	0.5			12	
EWH-1	13	20/2	12	0.6	—	0.9	—	12	20/1	14	RECEPT: OUTDOOR
	15			—	0.6	—	0.3	12	20/1	16	EF-1, 2, 3, 4
ZD 1-4	17	20/1	12	0.8	—	0.8	—	12	20/1	18	ZD 5-8
ZD 8-10	19	20/1	12	—	0.4	—	0.8	12	20/1	20	DH-1
	21			2.2	—	0.5	—	12	20/1	22	B-1/P-4
WH-1	23	30/2	10	—	2.2	—	1.0	12	20/1	24	P-1
P-3	25	20/1	12	0.9	—	0.2	—	12	20/1	26	P-2
MOD'S BASEMENT	27	20/1	12	—	0.5	—	0.5	12	20/1	28	B-2/P-5
P-4/P-5	29	20/1	12	0.2	—	0.2	—	12	20/1	30	MOD'S ROOM 101
EUH-1	31	20/2	12	—	1.5	—	.	.	.	32	.
	33			1.5	—	.	.	.	.	34	.
.	35	.	.	.	.	.	.	.	.	36	.
.	37	.	.	.	.	.	.	.	.	38	.
.	39	.	.	.	.	.	.	.	.	40	.
.	41	.	.	.	.	.	.	.	.	42	.
SUBTOTAL / PHASE				13.1	12.1	4.7	4.7				
TOTAL / PHASE				17.8	16.8						



POWER RISER-ELECTRICAL  
 NO SCALE:



100 NORTH MARKET STREET  
 FREDERICK, MARYLAND 21701  
 (301) 662-8532  
 FAX (301) 662-4192  
 info@proffittandassociates.com

RHL ENGINEERING  
 COMPANY, INC.  
 3 West Second Street  
 Frederick, Md. 21701  
 OFFICE: (301) 895-9424  
 FAX: (301) 293-6338  
 E-mail: rhlengr@rhlengr.com

Professional Certification. I  
 hereby certify that these  
 documents were prepared or  
 approved by me, and that I  
 am a duly licensed  
 professional engineer under  
 the laws of the State of  
 Maryland. License No: 13954  
 Expiration Date: 05/18/2014

RENOVATIONS TO  
 10 SOUTH BENTZ STREET  
 FOR CAS ENGINEERING  
 10 SOUTH BENTZ STREET  
 FREDERICK, MD. 21701

ISSUE

REV	DATE	DESCRIPTION
1	04/06/14	PROJING

PROJECT NO.: 11121  
 DATE: 03-07-14

POWER  
 SCHEDULES AND DETAILS

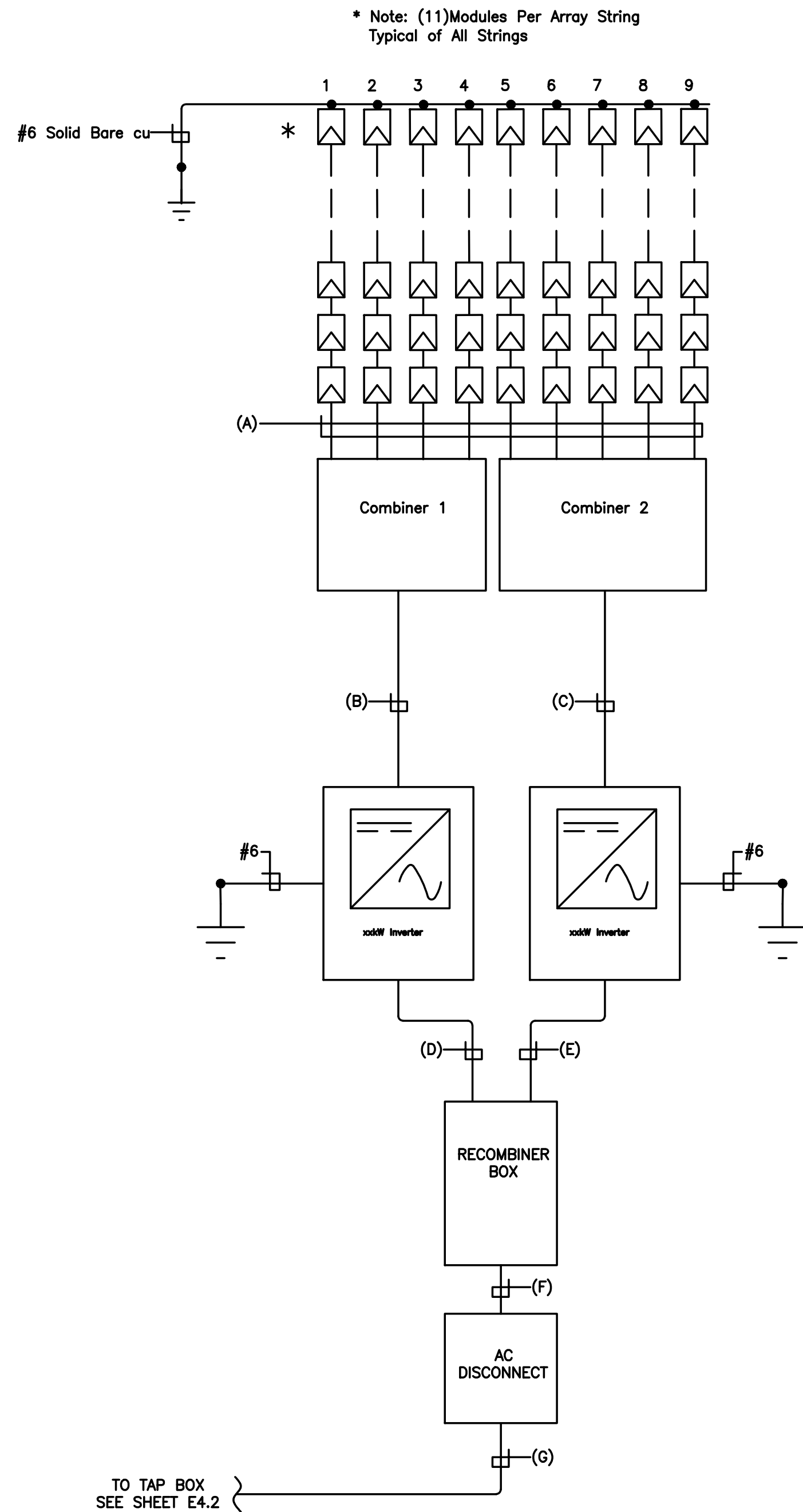
E4.2

ISSUE	
REV	DESCRIPTION
1	04/08/14 PROLOG

PROJECT NO.: 11121  
DATE: 03-07-14

ROOF PLAN - POWER  
SOLAR PANELS

**E5.1**

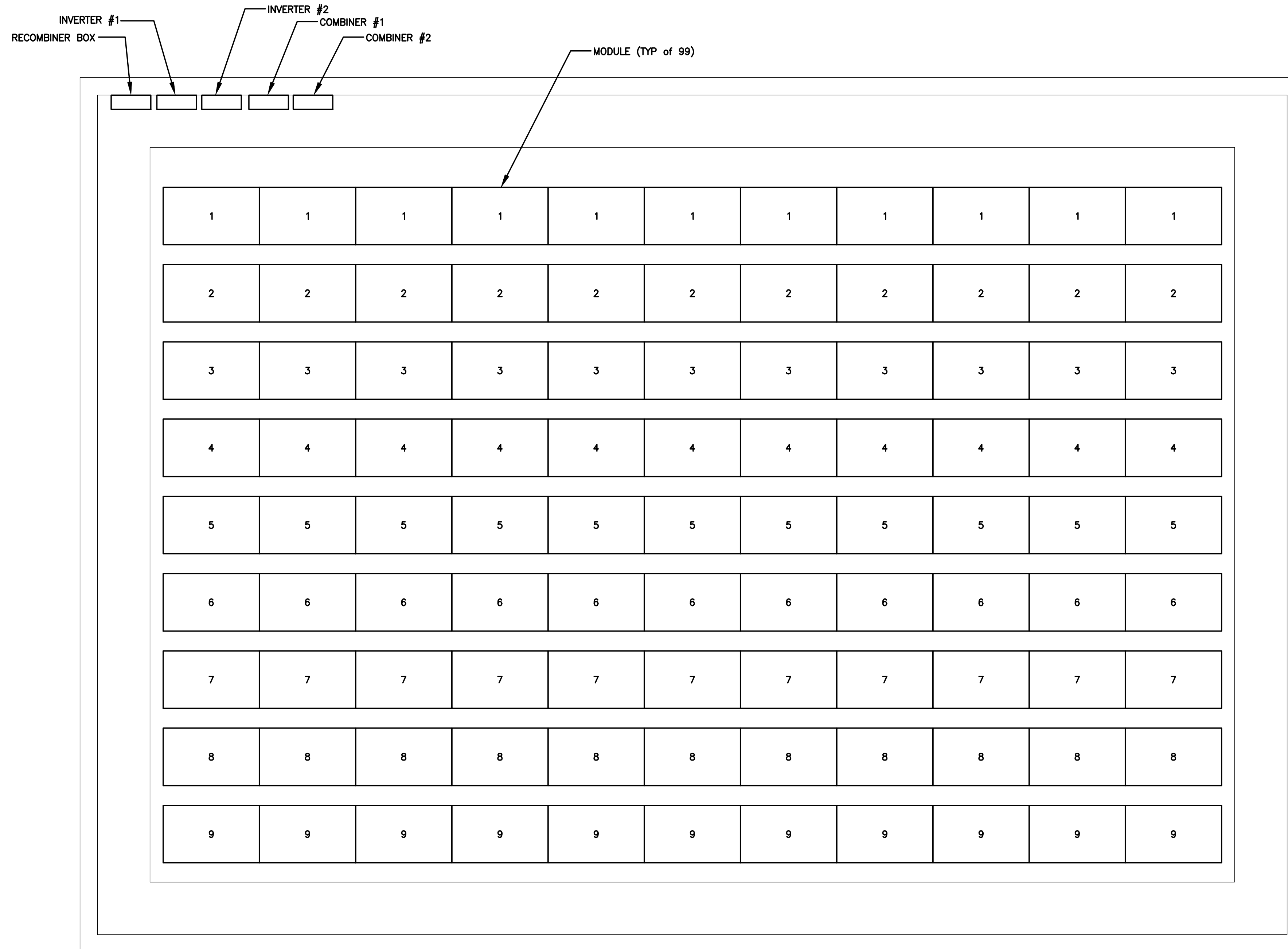


**PHOTOVOLTAIC SYSTEM RISER**  
NO SCALE:

DC Conduit & Wire Schedule				
From	To	Conduit	Wire	Ground
A	Array	Combiner 1	None EMT PV WIRE	-
A	Array	Combiner 2	None EMT PV WIRE	(1) #4 THHN cu
B	Combiner 1	9kW Inverter	1.25" PVC (2) #4 THHN cu	(1) #8 THHN cu
C	Combiner 2	11kW Inverter	1.25" PVC (2) #3 THHN cu	(1) #8 THHN cu

AC Conduit & Wire Schedule				
From	To	Conduit	Wire	Ground
D	9kW Inverter	ReCombiner Box	3/4" PVC (2) #8 THHN cu	(1) #10 THHN cu
E	11kW Inverter	ReCombiner Box	1" PVC (2) #6 THHN cu	(1) #10 THHN cu
F	ReCombiner Box	AC Disconnect	2" PVC (2) #1/0 THHN cu	(1) #6 THHN cu
G	AC Disconnect	Tap Box	2" PVC (2) #1/0 THHN cu	(1) #6 THHN cu

EQUIPMENT SCHEDULE	
QTY	DESCRIPTION
1	INVERTER SMA- SB 9000TL-US
1	INVERTER SMA- SB 11000TL-US
2	COMBINER SMA- SUNNY BOY SBCBTL6
99	MODULES HANWHA- HSL60P6-PB-0-250T
1	RECOMBINER BOX COOPER- CRBS-02-F125-SP-DCM



**ROOF SOLAR PANEL LAYOUT - POWER**  
SCALE: 1/4"=1'-0"



**WARNING**  
ELECTRICAL SHOCK HAZARD  
IF A GROUND FAULT IS INDICATED  
NORMALLY GROUNDED CONDUCTORS  
MAY BE UNGROUNDED AND ENERGIZED

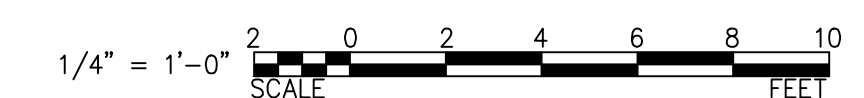
600 Volts DC

Warning  
Conductors in this  
conduit may still be  
energized even when the  
PV inverter is shutdown.

Photovoltaic DC Supply Circuit

**GENERAL NOTES:**

- ALL CONDUIT SHALL BE EMT WITH RAIN-TITE COMPRESSION FITTINGS UNLESS OTHERWISE NOTED. USE "MYERS-HUB" FITTINGS FOR ALL OUTDOOR CONNECTIONS.
- FLEX CONNECTIONS SHALL BE LFMC.
- TERMINATE #10 USE-2 STRING CONDUCTORS TO COMBINER BOXES USING 1/2" HOLE STRAIN RELIEF CONNECTORS.
- MAINTAIN A MINIMUM 3 1/2" CLEARANCE FROM ROOF SURFACE TO THE BOTTOM OF CONDUITS FOR ALL ROOF MOUNTED CONDUITS.
- INSTALL WARNING SIGN, AS DETAILED THIS PAGE ON INVERTER AT GROUND FAULT INDICATOR.
- ARRAY MODULE INTERCONNECTION WIRING SHALL BE SUPPORTED TO MODULES WITH ARLINGTON SC-100 CABLE CLIPS.
- INSTALL DC VOLTAGE WARNING LABELS ON ALL DC SUPPLY CIRCUIT CONDUITS AT 10' INTERVALS.



INVERTER 1 TECHNICAL DATA - OUTPUT (AC)	
Rated power/max. apparent AC power	9000W/9000VA
Nominal AC voltage/nominal AC voltage range	240V/211V-264V
AC power frequency/range	60Hz/59.3Hz...60.5Hz
Max. output current	37.5A
Power factor at rated power	1
Feed-in phases/connection phases	1/2

INVERTER 2 TECHNICAL DATA - OUTPUT (AC)	
Rated power/max. apparent AC power	11000W/11000VA
Nominal AC voltage/nominal AC voltage range	240V/211V-264V
AC power frequency/range	60Hz/59.3Hz...60.5Hz
Max. output current	45.8A
Power factor at rated power	1
Feed-in phases/connection phases	1/2

MODULE TECHNICAL DATA - POWER CLASS	
Max. Power	250W
Open Circuit Voltage	37.4V
Short Circuit Current	8.89A
Voltage at Max Power	30.0V
Current at Max Power	8.34A
Efficiency	15.5%