

WET SYSTEM MECHANICAL LEGEND

HOT WATER SUPPLY ABOVE GRADE, HWS	---
HOT WATER SUPPLY BELOW GRADE, HWS	---
HOT WATER RETURN ABOVE GRADE, HWR	---
HOT WATER RETURN BELOW GRADE, HWR	---
DRAIN PIPING ABOVE GRADE	---
DRAIN PIPING BELOW GRADE	---
BALANCING VALVE	▽
GATE VALVE	◇
BALL VALVE	○
SWING CHECK VALVE	○
SILENT CHECK VALVE	◇
PRESSURE REDUCING VALVE	◇
MIXING VALVE	◇
CIRCULATING PUMP	○
TEE	┌
90 EL	└
45 EL	↙
90 DN, 90 OUT	└
90 UP, 90 OUT	└
TEE DOWN	└
TEE UP	┌

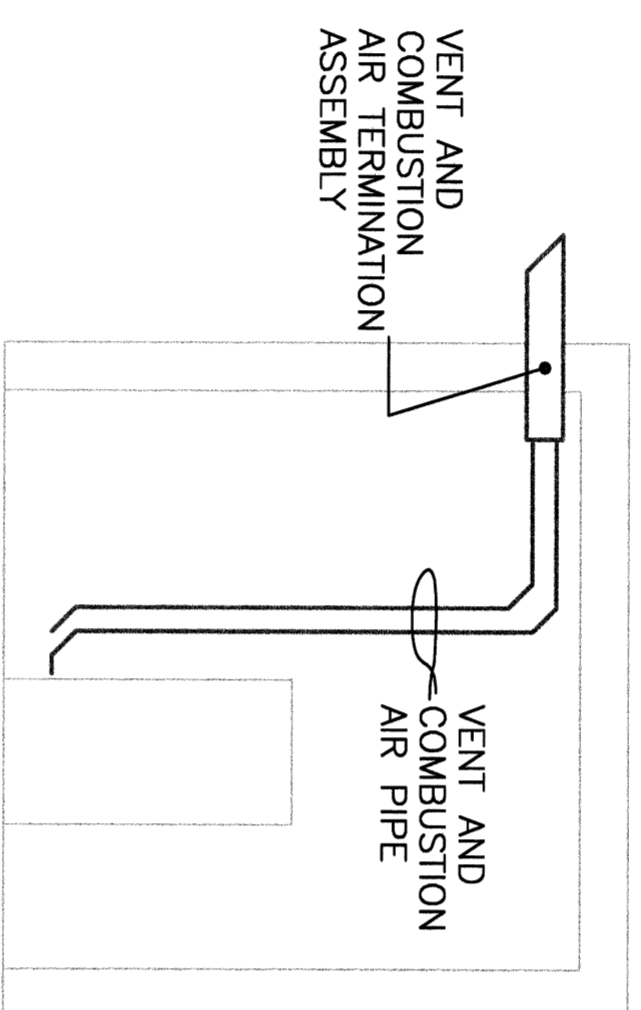
CCR TITLE 24 MANDATORY MEASURES

MINIMUM EFFICIENCY FOR OIL FIRED BOILERS, RATED AT 300,000 BTUH OR HIGHER, 83%.

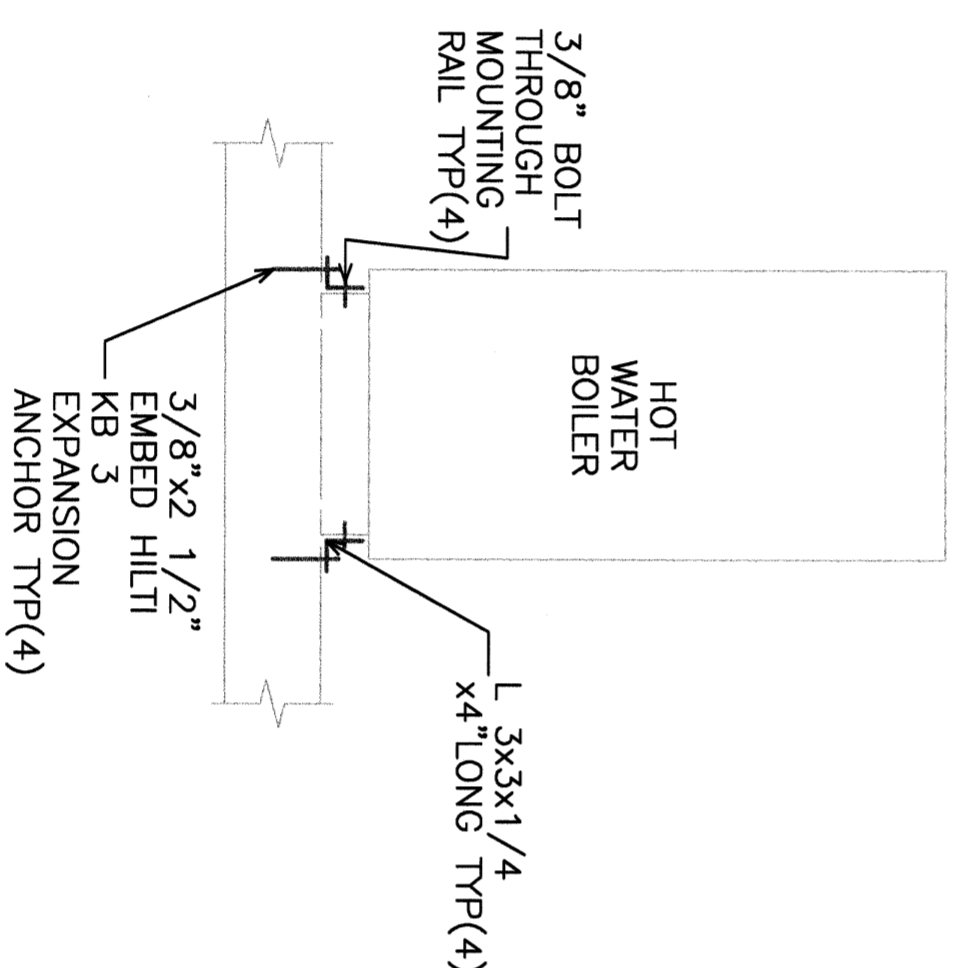
HOT WATER SUPPLY AND RETURN PIPING TO BE INSULATED WITH MINIMUM 1 1/2" THICK INSULATION RATED AT A CONDUCTANCE OF 0.25-0.29 BTUH-IN/HR-SF-F, AT A MEAN TEMPERATURE OF 125 F.

GENERAL MECHANICAL NOTES:

1. INSTALL MAIN BUILDING DUCTS IN SOFFITS OR CONCEALED SPACES.
2. INSTALL RESTROOM BUILDING EXHAUST DUCTS EXPOSED ALONG CEILING. STRAP TO CONCRETE ROOF WITH HILTI KB 3 EXPANSION ANCHORS.
3. INSTALL CW, HW, HWS AND HWR PIPING ALONG CEILING OF MECHANICAL ROOM. INSTALL WITH 3/8" ROD AND CLEVIS HANGERS ATTACHED TO THE CONCRETE ROOF WITH HILTI KB 3 EXPANSION ANCHORS, OR 3/8" ROD AND 1 5/8"x12GA FRAMING CHANNEL TRAPEZE HANGERS, ATTACHED TO THE CONCRETE ROOF WITH HILTI KB 3 EXPANSION ANCHORS.
4. ALL MECHANICAL PIPING TO BE INSULATED WITH 1 1/2" THICK SECTIONAL MOLDED FIBERGLASS INSULATION.



BOILER VENT AND COMBUSTION AIR DETAIL A



BOILER ANCHOR DETAIL B

HEAT LOSS CALCULATIONS:

SHELL LOSSES:
 SEMI-CIRCULAR SAND COVERED DOME:
 INSIDE RADIUS R1 = 16 FEET
 OUTSIDE RADIUS R2 = 16.5 FEET
 OUTSIDE INSULATION RADIUS R3 = 17 FEET
 DOME LENGTH L = 66 FEET
 CONCRETE K1 VALUE IN BTU/(HR-Ft-F) = 0.75
 INSULATION K2 VALUE IN BTU/(HR-Ft-F) = 0.02
 HEAT LOSS AT 20 F OUTSIDE AIR TEMPERATURE, Q IN BTUH/(HR-LF) NOTE THAT THE DOME IS SAND COVERED AND THE COLDEST LIKELY TEMPERATURE AT THE INSULATION FACE IS 30 F.
 $Q = 0.5 \times ((2 \times 3.1416) \times (70 - 30)) / (((LN 16.5/16)/0.75 + ((LN 17/16.5)/0.02))) = 82$
 DOME LOSS, BTU/HR = 82 x 66 = 5412

NEW SIDEWALL LOSS:
 AREA, A IN SF = 2 x 2 x 66 = 264
 INSULATION X1, R5, 1" THICK, FT = 0.083
 CONCRETE X2, 6" THICK, FT = 0.50
 DEEP SOIL TEMPERATURE, F = 50
 $Q \text{ IN BTU/HR} = A \times (T_i - T_o) / (((X1/K1) + (X2/K2)) = 264 \times (70 - 50) / (((0.5/0.75) + (0.083/0.02)) = 1096$

NEW FLOOR LOSS:
 AREA, A IN SF = 29.5 x 66 = 1,947
 CONCRETE AND INSULATION AREA SAME AS FLOOR AREA = 1,947
 $Q \text{ IN BTU/HR} = A \times (T_i - T_o) / (((X1/K1) + (X2/K2)) = 1,947 \times (70 - 50) / (((0.5/0.75) + (0.083/0.02)) = 8084$

NEW WINDOW LOSS:
 WINDOW U VALUE, BTU/(HR-SF-F) = 0.6
 AREA, A IN SF = 32'2 x 3.1416/4 = 804
 $Q \text{ IN BTU/HR} = A \times U \times (T_i - T_o) = 804 \times 0.6 \times (70 - 20) = 24120$

SHELL LOSS IN BTU/HR = 38712

VENTILATION LOSS:
 $Q \text{ IN BTU/HR} = CFM \times 1.08 \times (70 - 20) = 1200 \times 1.08 \times (70 - 20) = 64800$

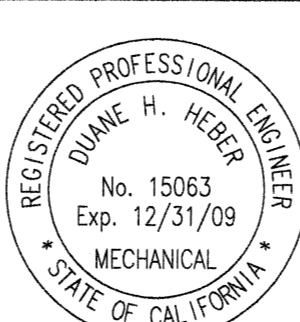
TOTAL HEAT LOSS IN BTU/HR = 103512

MECHANICAL LEGEND AND DETAILS

HUMBOLDT COASTAL NATURE CENTER
 OFFICES FOR FRIENDS OF THE DUNES
 200 STAMPS LANE
 MANILA, CALIFORNIA 95521

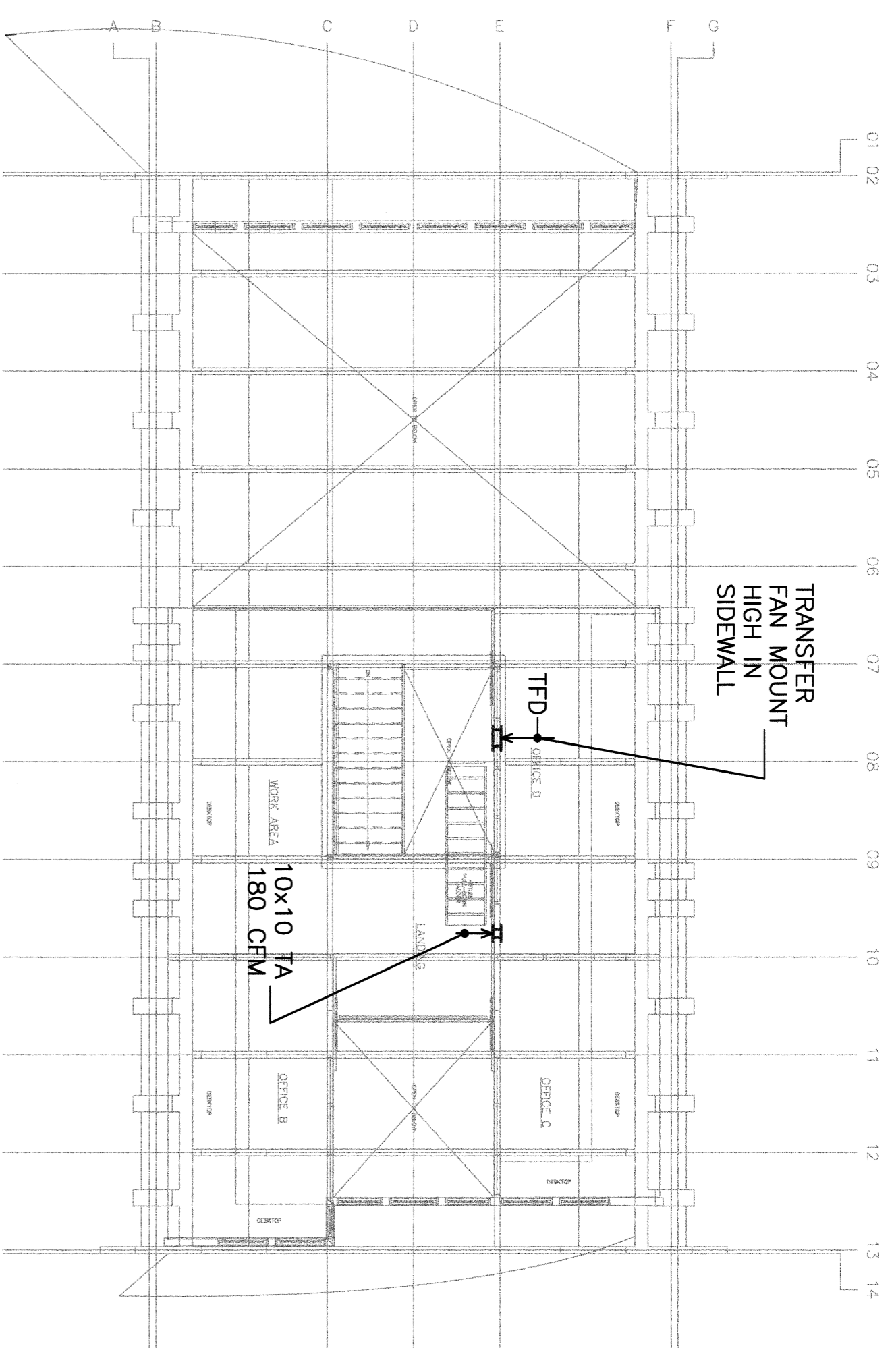
SCALE: NOTED

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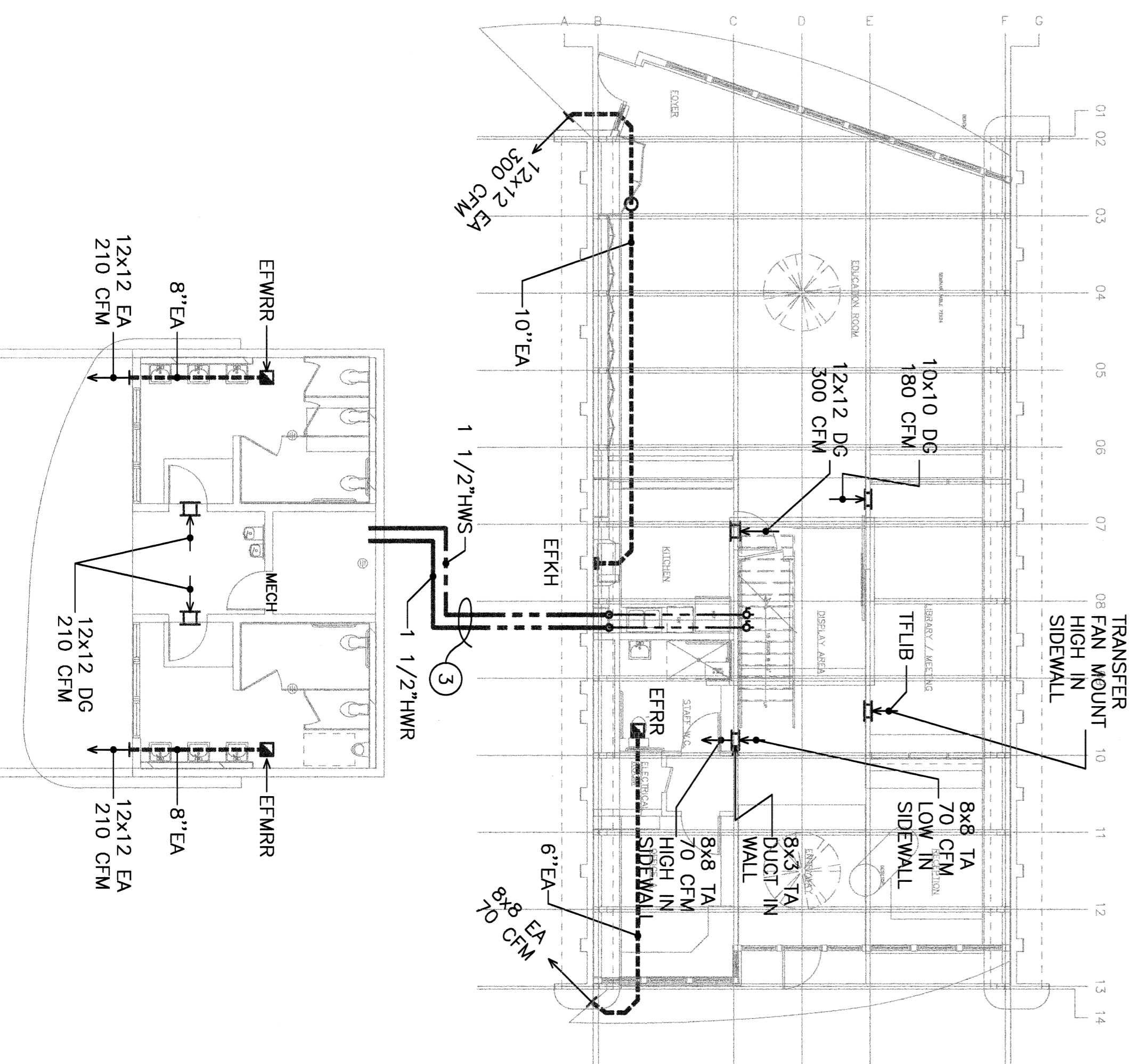


DUANE H. HEBER, P.E.
 180 FERN LANE
 EUREKA, CALIFORNIA 95503-9548
 TELEPHONE 707-444-3305
 CELL 707-599-4798

DATE: 9/4/09



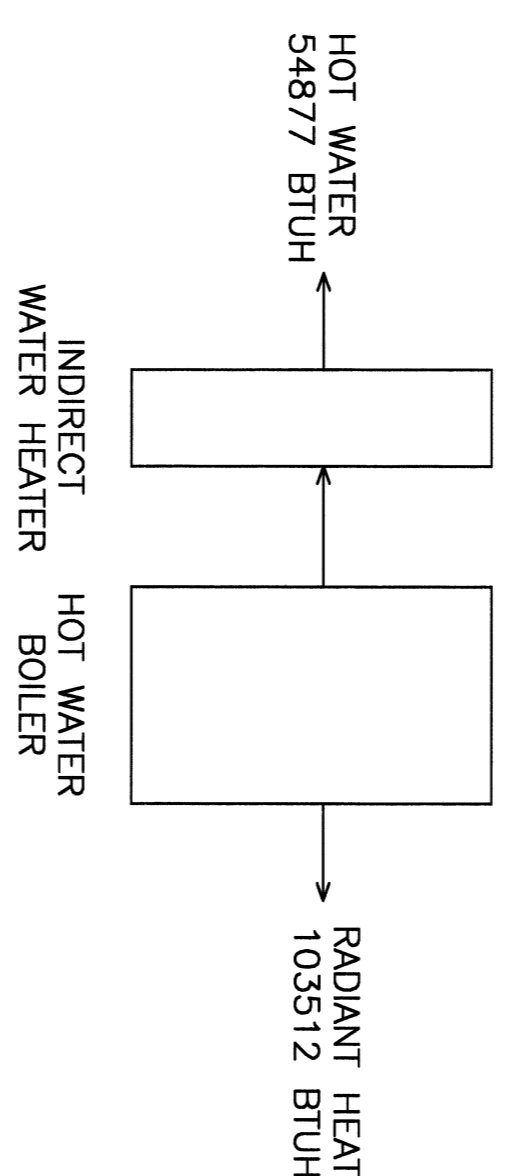
SECOND FLOOR MECHANICAL PLAN
SCALE 1/8" = 1'



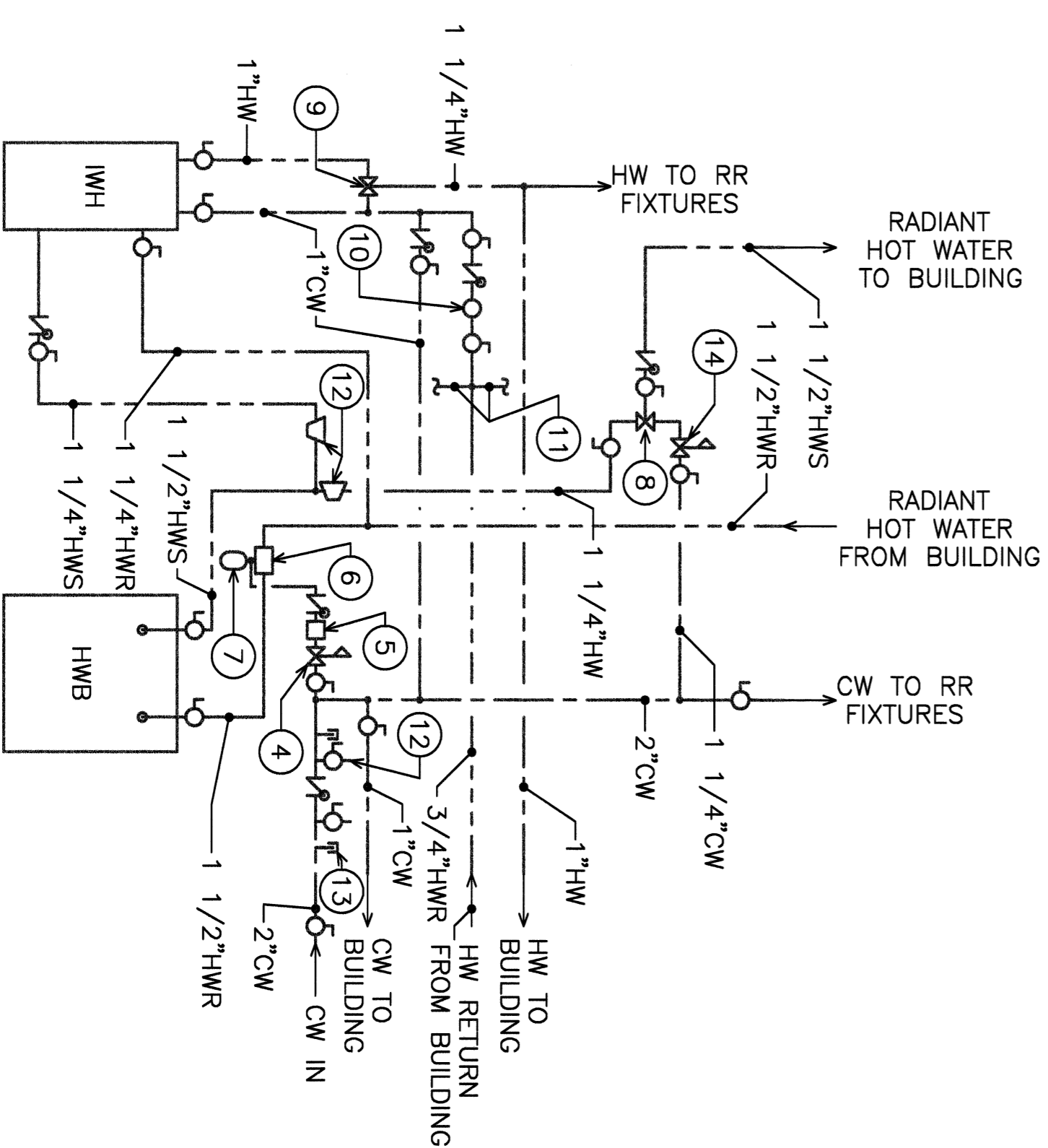
FIRST FLOOR MECHANICAL PLAN
NTS

MECHANICAL EQUIPMENT SCHEDULE

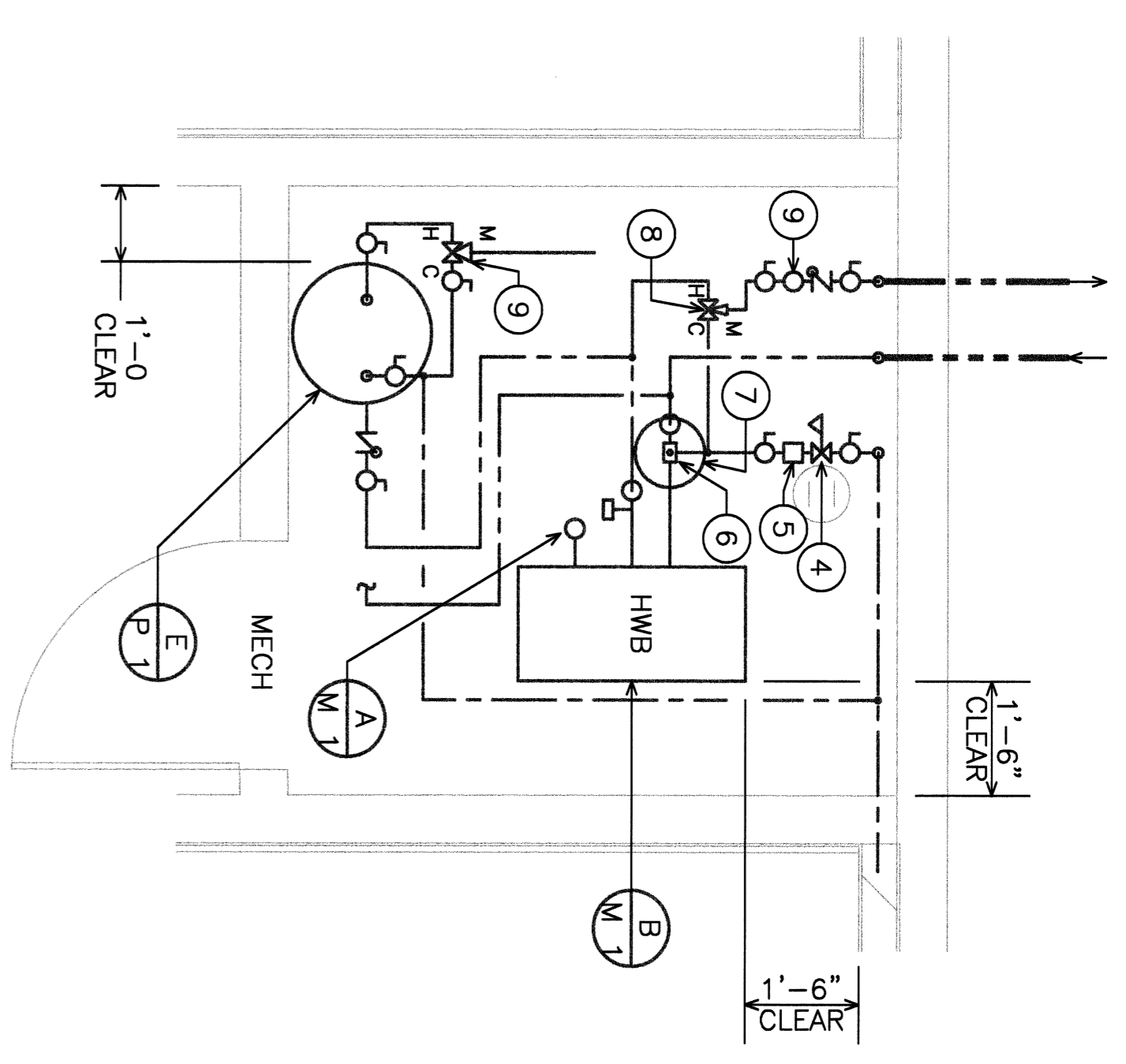
- TFLIB ROOM TO ROOM WALL MOUNTED TRANSFER FAN, ROOM # 511MG, AIR FLOW 180 CFM AT 0.1"S.P., 120V-60HZ-1PH, 1.5 FLA, NOISE LEVEL 4.5 SONES, LIGHT SWITCH CONTROL.
- EFRR CEILING MOUNTED EXHAUST FAN WITH BACK DRAFT DAMPER, GREENHECK SP-B110, AIR FLOW 95 CFM AT 0.375" S.P., NOISE LEVEL 2.0 SONES, 120V-60HZ-1PH, 1.14 FLA, 80 WATTS, WT. 10 LB. LIGHT SWITCH CONTROL, PROVIDE WITH ADJUSTABLE SPEED CONTROL, MOUNTED NEAR FAN.
- EFWRR CEILING MOUNTED EXHAUST FAN WITH BACK DRAFT DAMPER, GREENHECK SP-A250, AIR FLOW 210 CFM AT 0.375" S.P., NOISE LEVEL 2.9 SONES, 120V-60HZ-1PH, 0.77 FLA, 86 WATTS, WT. 23 LB. LIGHT SWITCH CONTROL.
- HMB LPG FIRED HOT WATER BOILER, WEIL-MCLAIN GV6, HEATING INPUT CAPACITY 175 MBH, OUTPUT CAPACITY 153 MBH, DIRECT VENT AND COMBUSTION AIR CAPABLE, COMPLETE WITH ALL STANDARD CONTROLS, WT. 410 LB.
- IWH INDIRECT HEATED DOMESTIC HOT WATER HEATER, WEIL-MCLAIN SIZE 80, 56 GALLON CAPACITY, WT. 667 LB.



HEATING LOAD DIAGRAM
NTS



MECHANICAL ROOM PIPING DIAGRAM
NTS



MECHANICAL ROOM PLAN
SCALE 1/2" = 1'

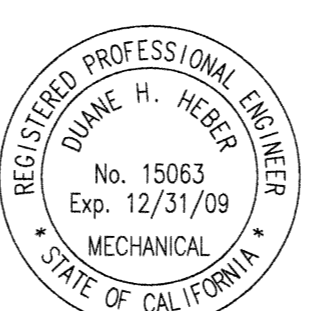
MECHANICAL ROOM PIPING NOTES:

1. PIPING TO BE TYPE L COPPER. ALL HOT WATER SUPPLY AND HOT WATER RETURN PIPING TO BE INSULATED WITH 3/4" THICK SECTIONAL MOLDED FIBERGLASS INSULATION.
2. PIPING TO BE SUPPORTED FROM THE ROOF STRUCTURE WITH 3/8" ROD AND CLEVIS HANGERS OR 3/8" ROD AND 1 5/8"x12GA FRAMING CHANNEL TRAPEZE HANGERS; 6 FEET ON CENTER FOR 1 1/2" AND SMALLER PIPING.
3. 1 1/2" UPONOR ECOFLEX THERMAL TWIN TUBING, OR EQUAL.
4. 3/4" PRESSURE REDUCING VALVE, SET TO 12 PSIG.
5. 3/4" DOUBLE CHECK VALVE ASSEMBLY, WILKINS # 950XLTUS, OR EQUAL.
6. 1 1/2" AIR SEPARATOR, BELL & GOSSETT # IAS-1 1/2 WITH ATF-12 AIRTRIL FITTING, OR EQUAL.
7. BLADDER TYPE EXPANSION TANK, AMTROL RX-30, OR EQUAL.
8. 1 1/2" MIXING VALVE, LEONARD TM-150-E, 1 1/4" INLET, OR EQUAL.
9. 1 1/4" MIXING VALVE, LEONARD TM-80-E, 1" INLET, OR EQUAL.
10. INLINE HOT WATER RETURN PUMP FROM BUILDING, BELL & GOSSETT # LR-20WR, 5 GPM @ 10' HEAD, 120V-60HZ-1PH, 1.10 FLA, WT. 10.4 LB. ADJUSTABLE CONTROL.
11. 1/2" HWR FROM RESTROOM LAVATORIES.
12. 1 1/2" STUB WITH BALL VALVE FOR FUTURE SOLAR CONNECTION, TYPICAL OF TWO.
13. 1/2" CAPPED STUB FOR FUTURE SOLAR CONNECTION CONTROLS.
14. 1 1/4" PRESSURE REDUCING VALVE, SET TO 12 PSIG.

MECHANICAL PLAN

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SCALE: NOTED



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