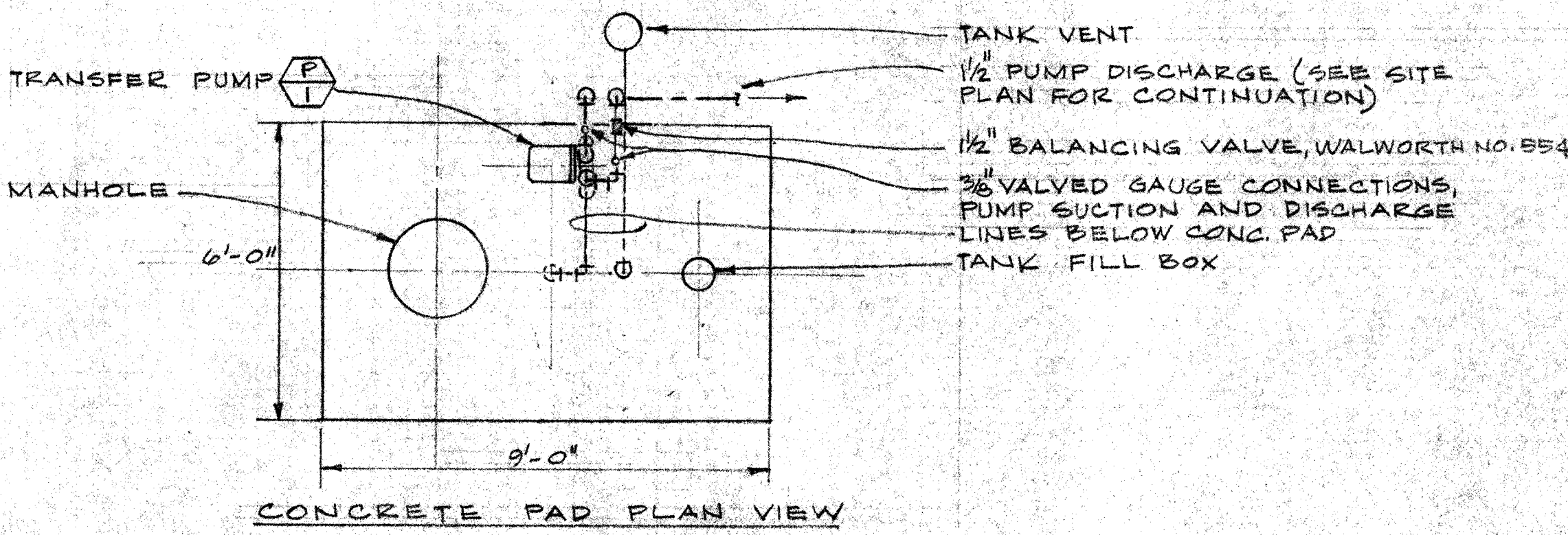
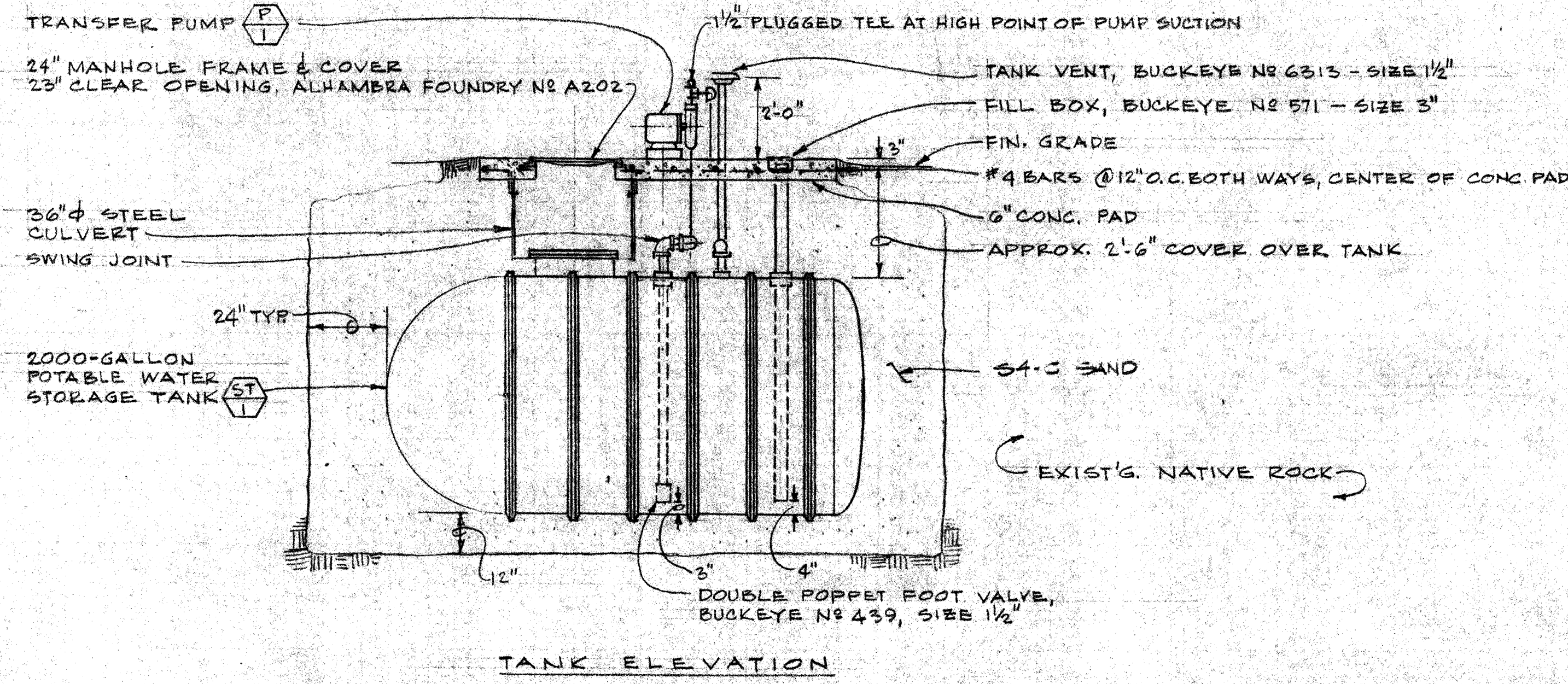
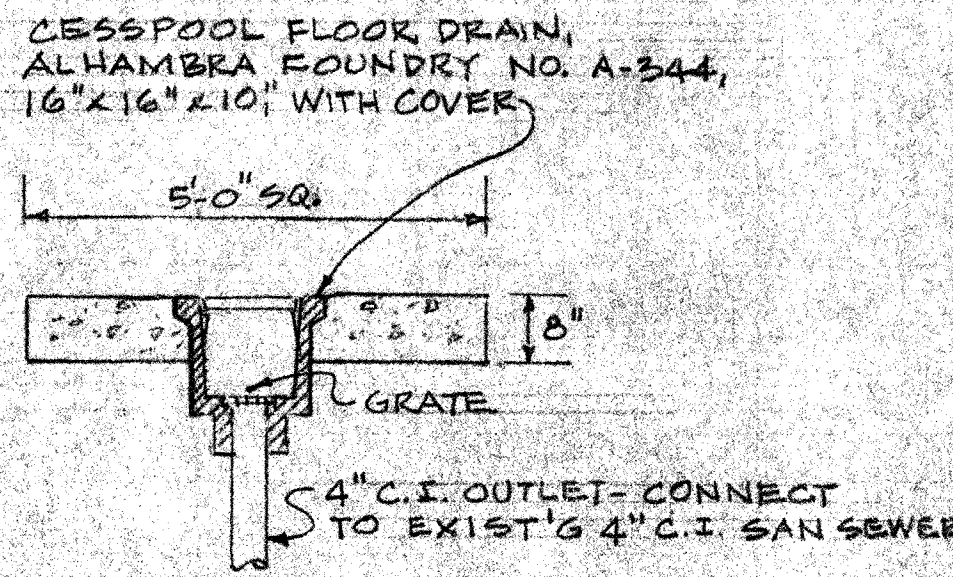


LIST OF MATERIALS			
ITEM	QTY	DESCRIPTION	UNIT WT



(A) POTABLE WATER STORAGE TANK
NOT TO SCALE



(C) CESSPOOL DRAIN
NOT TO SCALE

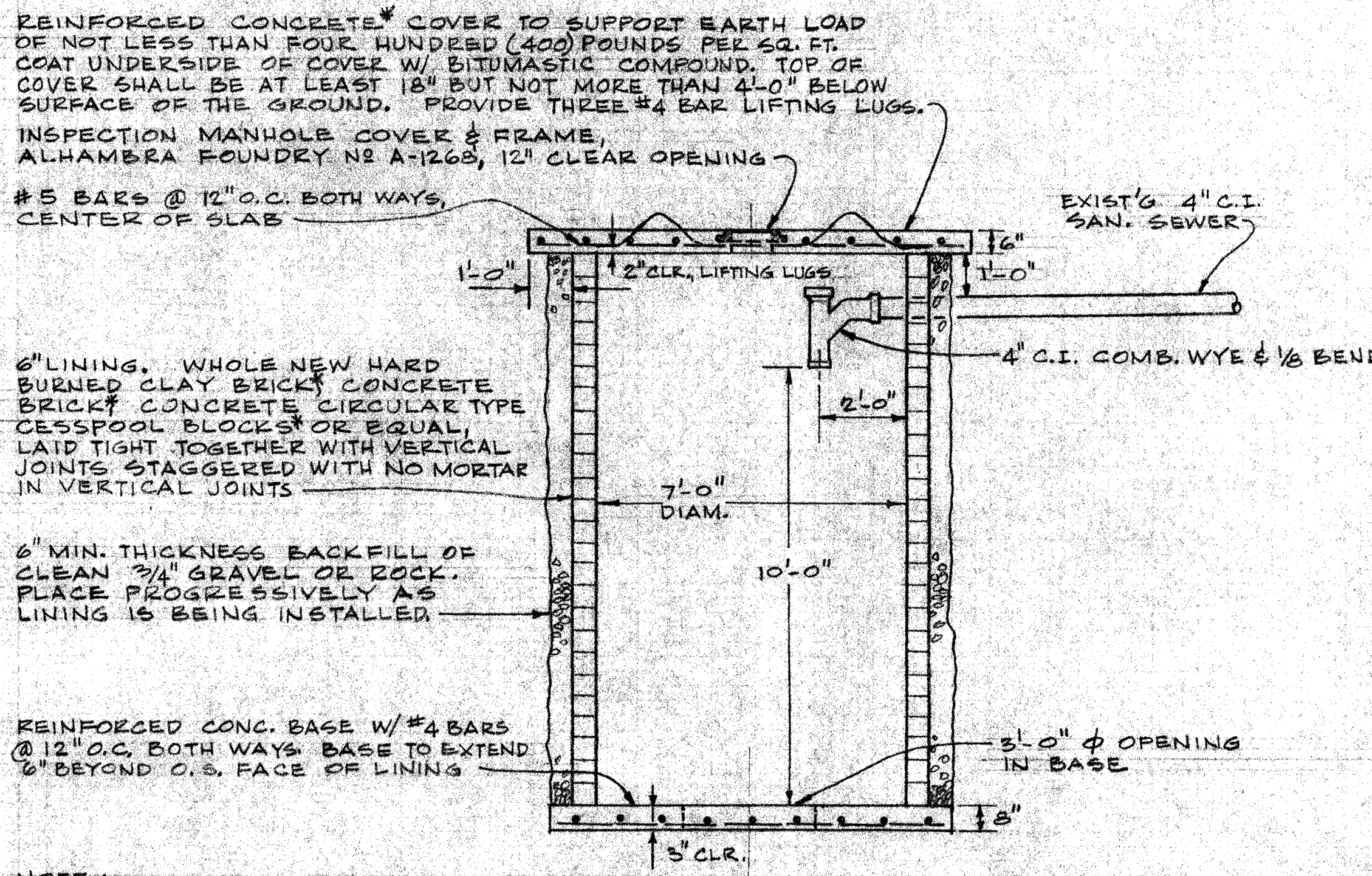
MECHANICAL SYMBOLS

PLUMBING

- COLD WATER
- SANITARY SEWER OR WASTE
- VENT
- CONDENSATE OR HUMIDIFIER DRAIN
- POINT OF CONNECTION (P.O.C.)
- DETAIL DESIGNATION
- SHEET OR DRAWING NUMBER
- EQUIPMENT DESIGNATION MARK NO.
- CLEANOUT TO GRADE

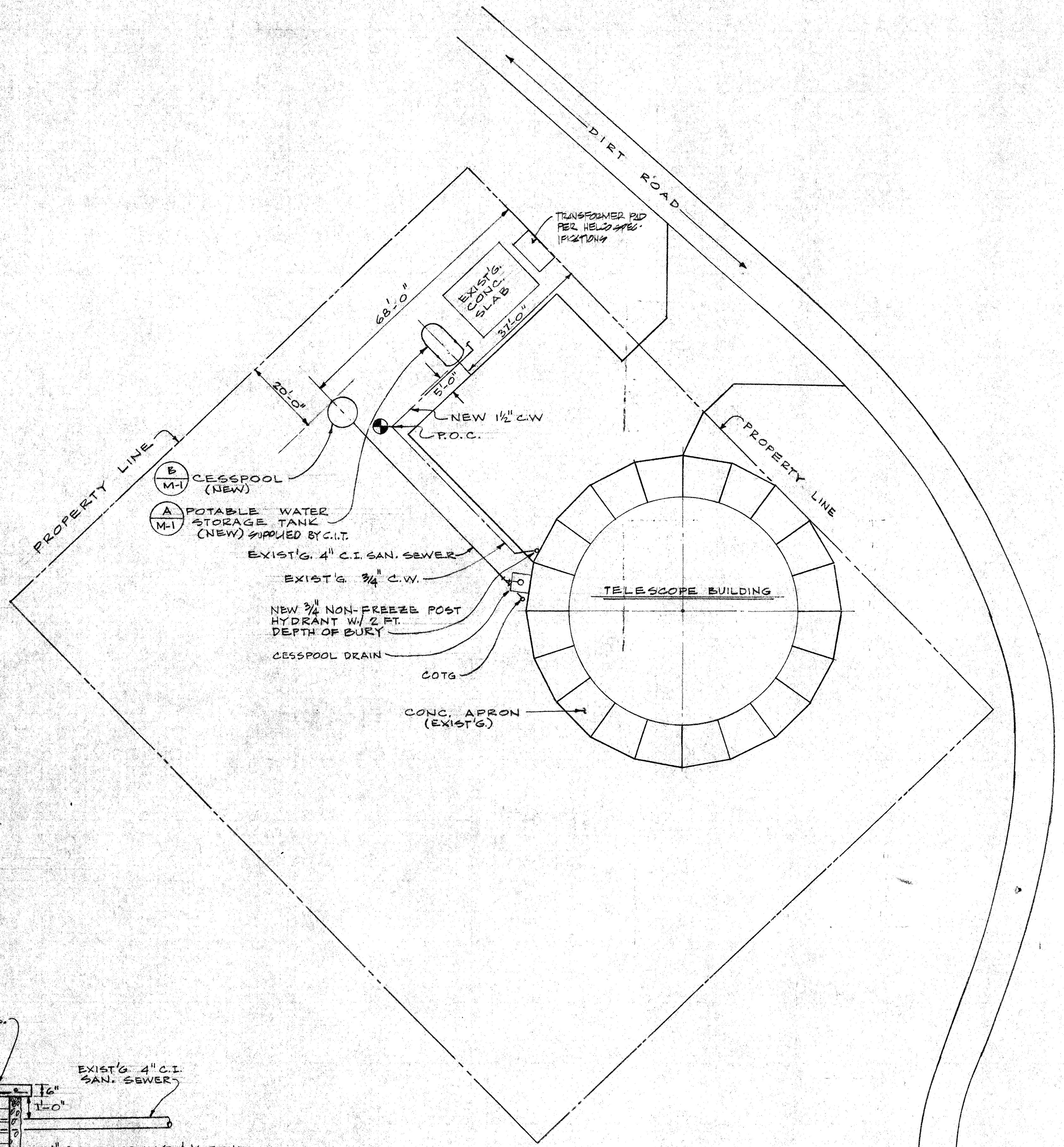
HEATING, VENTILATING AND AIR CONDITIONING (HVAC)

- SUPPLY AIR DUCT OR DIFFUSER
- RETURN AIR DUCT OR GRILLE/REGISTER
- DUCT LINED WITH THERMAL/ACOUSTICAL LINING MATERIAL
- TURNING VANES IN SQUARE MITER ELBOW
- THERMOSTAT
- DETAIL DESIGNATION
- SHEET OR DRAWING NUMBER
- EQUIPMENT DESIGNATION MARK NO.
- UNDER HEATING AND AIR CONDITIONING WORK SECTIONS
- UNDER ELECTRICAL WORK SECTIONS
- SUPPLY AIR
- RETURN AIR
- CEILING DIFFUSER
- FIRE DAMPER
- FLEXIBLE DUCT CONNECTION

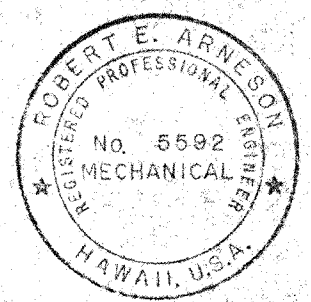


NOTE:
ALL REINFORCED CONCRETE, CONCRETE BLOCK OR BRICK SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF TWENTY-FIVE HUNDRED (2500) POUNDS PER SQ. INCH.

(B) CESSPOOL - TYPICAL SECTION
NOT TO SCALE



SITE PLAN
SCALE: 1/16" = 1'-0"



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

2. PROTECTIVE FINISH:
NOTES: 1. REMOVE ALL BURRS AND SHARP EDGES.

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES
TOLERANCE ON DECIMALS
XX = ± .03 ANGULAR = ± 1/2°
XXX = ± .005
TOLERANCE ON FRACTIONS = 1/16
MACHINE FINISH 12/

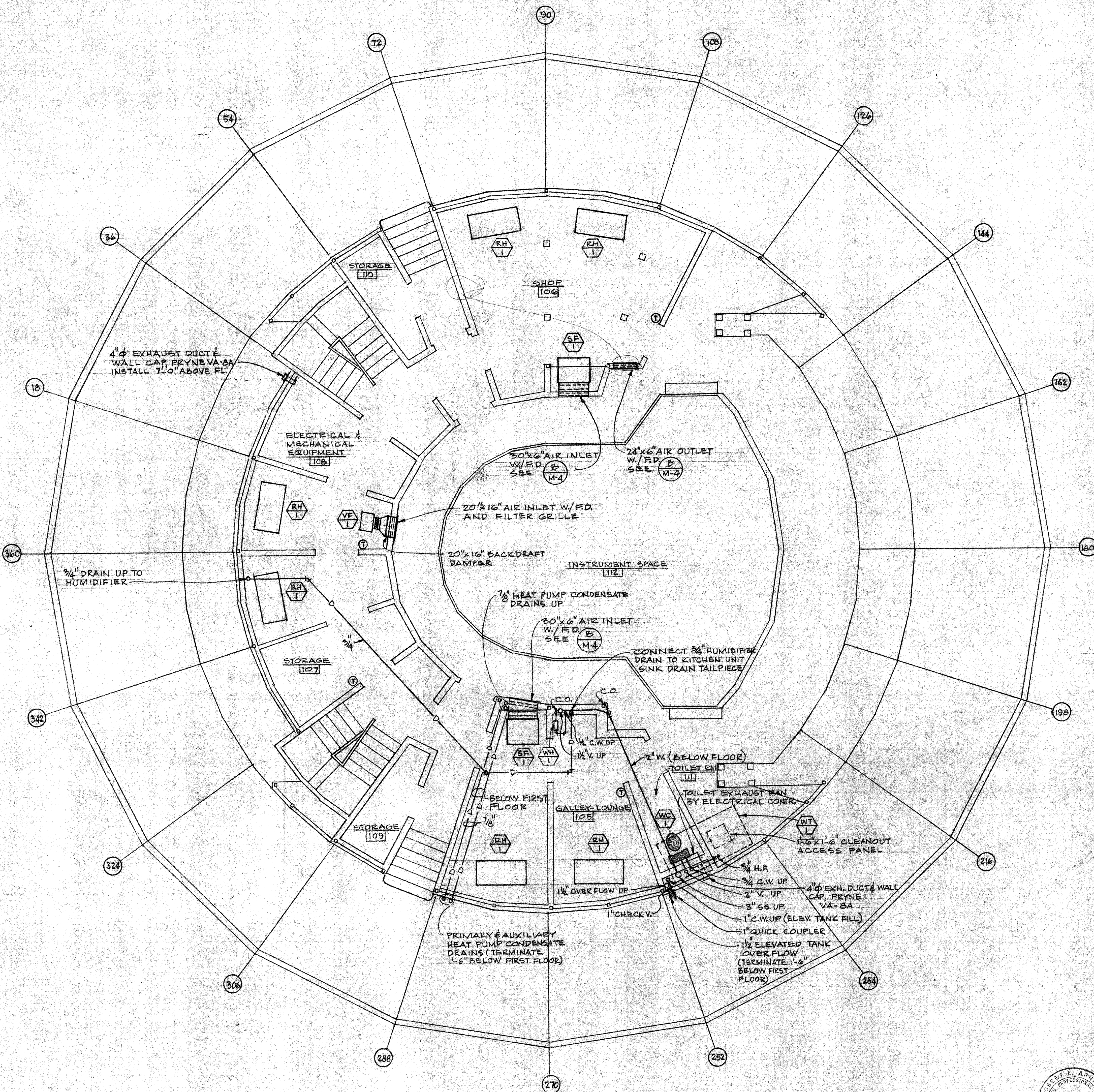
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CHECKED: [Signature]
APPROVED: [Signature]
DATE: 11/24/08

TITLE: MECHANICAL-SITE PLAN, DETAILS & SYMBOLS
SUBMILLIMETER OBSERVATORY
MAUNA KEA, HAWAII

DWG. NO.: E
SCALE: AS NOTED
DEPT.: EIOMD SHM1

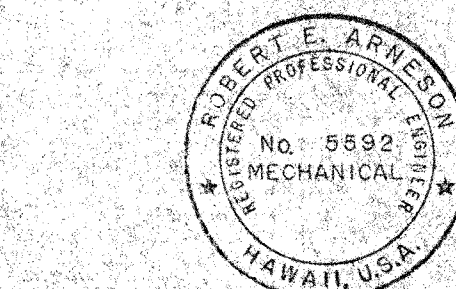
HAWAII ELECTION BID SET
LTR: []
DESCRIPTION: []
DATE: 12-2-08
APPRO: []
REVISION: []

DRAWING NO.: []
ITEM: []
QTY: []
WEIGHT: []
APPLICABLE DOC: []



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

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION



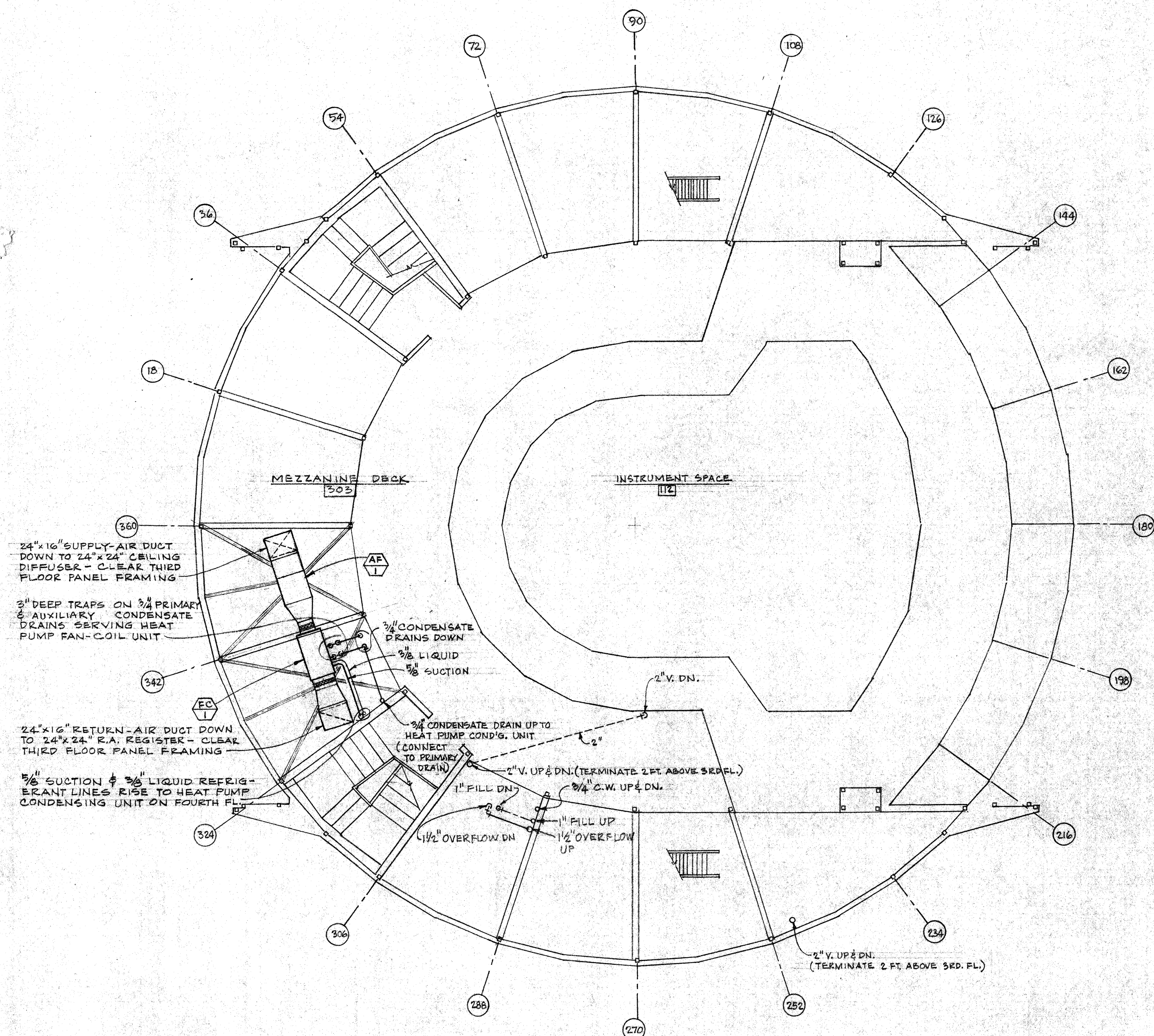
HVAC EQUIPMENT SCHEDULE					
MARK NUMBER	DESCRIPTION	AREA SERVED	CAPACITY	ELECTRICAL	OPERATING WEIGHT, LBS.
EH 1	DUAL ELECTRIC HEAT SUPPLY FAN UNIT, HORIZONTAL CABINET, INTEGRAL FRONT GRILLE OUTLET, BACK DUCT COLLAR INLET, OFF-VENT-HI-LO WALL-MOUNTED SWITCH, TAP-WOUND PERMANENT SPLIT CAPACITOR, HIGH EFFICIENCY MOTOR, 1-INCH REPLACEMENT MEDIA AIR FILTER, TRANS. CO. FORCE-FLOI, MODEL D, TYPE E-2 ELECTRIC COIL, SIZE 02, WITH TRANSFORMER, SUSPEND EA. UNIT WITH FOUR (4) VIBRATION ISO. HANGERS, MASON NO. DNH5-A	GALLEY-LOUNGE 105, SHOP 108, BUNK ROOM 203, ELECTRONICS RECEIVER LAB CRYO-GENICS 204, CONTROL COMP. DATA FACIL. 205	220 CFM, 1.25 KW. LO HEAT, 3.75 KW. HI HEAT - FOR OPERATION AT 13,400 FT. ABOVE MEAN SEA LEVEL	ELECTRIC COIL - 208 VOLT, 3 PHASE, 3 WIRE 3 ELEMENT, DUAL HEAT, 3 ELEMENT LO HEAT, 3 ELEMENT HI HEAT, MOTOR - 115 VOLT, 1 PHASE, 1/30 HP, TRANSFORMER - TOTALLY ENCLOSED, CLASS A, 115 VOLTS.	65
EH 2	LOW TEMPERATURE ELECTRIC RADIANT CEILING HEATING PANEL, T-BAR INSTALLATION, ARTEC CAT. NO. ATL-66-4, 2'x4' FT.	GALLEY-LOUNGE 105, SHOP 108, BUNK ROOM 203, ELECTRONICS RECEIVER LAB CRYO-GENICS 204, STORAGE 107, MECH/ELEC EQUIP. 108	N.A.	120 VOLTS, 500 WATTS	24
EH 3	LOW TEMPERATURE ELECTRIC RADIANT CEILING HEATING PANEL, T-BAR INSTALLATION, ARTEC CAT. NO. ATL-66-3, 2'x3' FT.	CONTROL COMP. DATA FACIL. 205	N.A.	120 VOLTS, 375 WATTS	19
HRC 1	AIR-TO-AIR HEAT PUMP CONDENSING UNIT, CARRIER 38RQ020, WITH MAX. SOUND RATING NO. 19, U.L. APPROVED, AUTOMATIC CHANGEOVER INDOOR THERMOSTAT W/ SERVICE SENTRY CONTROL WARNING LIGHT, SOLID STATE TIME GUARDED TIME DELAY DEVICE, BLOW LIQUID LINE FILTER, DEFER. START CAPACITOR AND RELAY, FLARE TO COMPATIBLE COUPLER, 20-FT. LENGTH PRECHARGED TUBING PACKAGE, SERIES 32 MOTOR MASTER SOLID STATE HEAD PRESSURE CONTROL.	COMPUTER ROOM 206	18,700 BTUH TOTAL NET COOLING CAPACITY, 19,100 BTUH TOTAL NET HI-TEMP HEAT'G. AND 10,000 BTUH TOTAL NET LO-TEMP HEAT'G. CAPACITY @ A.E.T. STAND. RATING, USING CARRIER 40AQ024 INDOOR UNIT DELIVERING 690 CFM.	60 HZ., 208-230V/1Ø, 11.7 COMPRESSION RATED LOAD AMPS, 1.3 FAN FULL-LOAD AMPS.	180
EC 1	DIRECT-EXPANSION HORIZONTAL FAN-COIL UNIT, CARRIER 40AQ024, PERMANENT 1-INCH THICK FILTER, 2 CONDENSATE PANS W/ PRIMARY & AUXILIARY DRAIN CONNECTIONS, 24-V. CONTROL CIRCUIT TRANSFORMER AND INDOOR FAN RELAY (USED AS PRE-FILTER FOR AF-1)	COMPUTER ROOM 206	600-1000 CFM RANGE.	1/4 HP 115 VOLT, 1 PHASE PERMANENT SPLIT CAPACITOR MOTOR	78
AF 1	DISPOSABLE MEDIA AIR FILTER, SIZE 24" x 24" x 12" DEEP, 60-65% ASHRAE 52-76 TEST STANDARD EFFICIENCY AT 97% ARRESTANCE, FARE CO. RIGA-FLOW 15, INSTALLED IN A FARE CO. 3P UNIVERSAL GLIDE/PACK SIDE ACCESS FILTER HOUSING	COMPUTER ROOM 206	0.15 INCHES W.G. RESISTANCE @ 1000 CFM CAPACITY	N.A.	119
H 1	SELF-CONTAINED HUMIDIFIER, DEI-STEEM HUMIDIFIER CO. VAPOR FAN MODEL VF20, FOR WALL MOUNTING	COMPUTER ROOM 206	6 POUNDS WATER PER HOUR	208 VOLT/1 PHASE, 9.6 AMPS	130
EH 3	LOW TEMPERATURE ELECTRIC RADIANT CEILING HEATING PANEL, T-BAR INSTALLATION, ARTEC CAT. NO. ATL-66-2, 2'x2' FT.	CONTROL COMP. DATA FACIL. 205	N.A.	120 VOLTS, 250 WATTS	14
VP 1	IN-LINE DIRECT-DRIVE CENTRIFUGAL VENTILATING FAN, ILL. NO. CCH500, 162 CFM @ 1/8" S.P., 670 RPM, 1/25 HP, 120V, 1Ø, 60 HZ MOTOR, WITH ETS 56 SOLID STATE SPEED CONTROL	MECHANICAL & ELECTRICAL EQUIPMENT 108	91-417 CFM RANGE	120 VOLTS, 1/25 HP	45


PLUMBING EQUIPMENT SCHEDULE							
MARK NUMBER	ITEM	CONNECTIONS				DESCRIPTION	OPERATING WEIGHT, LBS.
		S/W	V	CW	HW		
WC 1	WATER CLOSET	3"	2"	1/2"	—	WATER SAVING TOILET, (ONE GALLON OF WATER PER FLUSH), VITREOUS CHINA BOWL AND TANK, ANTI-SIPHON FILL VALVE AND CONVENTIONAL FLUSH VALVE, TWELVE-INCH ROUGH-IN, 3" CLOSET FLANGE, THETFOR CORP "SUPERINSE" MODEL N215502, ELONGATED BOWL, W/ TANK ASSEMBLY, SEAT W/ CLOSED FRONT, LID COLOR: PRESIDENTIAL WHITE	150
L 1	LAVATORY	2"	1 1/2"	1/2"	1/2"	VITREOUS CHINA COUNTERTOP LAVATORY, AMERICAN STANDARD "OVALYN" N2 0470, 021, 19" x 15" W/ METAL MOUNTING FRAME, HOT AND COLD N2 2285, 062 SELF-CLOSING FAUCETS, N2 2411, 015 GRID DRAIN W/ 1/2" TAILPIECE, 1/2" x 1/2" L.A. PATTERN CHROME PLATED TRAP, 3/8" FLANGE-TYPE STOP VALVES, COLOR: WHITE	25
WH 1	WATER HEATER	—	—	1/2"	1/2"	INSTANTANEOUS TYPE ELECTRIC HEATER, CHROMOMITE LABS, INC. MODEL N2 5-23, 2300 WATTS, 120 VOLTS, 32.0F RISE @ 0.5 GPM FLOW	6
ST 1	POTABLE WATER STORAGE TANK	—	2"	—	—	2000 GALLONS NOM. CAP (2,200 GALLONS ACTUAL CAP) FIBER GLASS REINFORCED PLASTIC, NATIONAL SANITATION FOUNDATION, STANDARD 14, LABELED, UNDERGROUND POTABLE WATER STORAGE TANK, XERXES CORP. CASTURY CAST, W/ 22" I.D. FLANGED MANWAY & 4" FILL TUBES.	19,370 (1000 LBS. EMPTY)
ST 2	POTABLE WATER ELEVATED TANK	—	1 1/2"	1 1/2"	—	300 GALLONS NOM. CAP, FIBER GLASS REINFORCED PLASTIC, PREMIUM RESIN, NATIONAL SANITATION FOUNDATION, APPROVED FOR POTABLE WATER STORAGE, RYAN HERCO PRODUCTS CORP N2 060, W/ SUPPORT SADDLE, TOP 1/2" FILL, OVERFLOW & VENT, BOTTOM 1/2" DRAIN FITTINGS.	2,650 (120 LBS. EMPTY)
WT 1	WASTE WATER HOLDING TANK	3"	2"	—	—	300 GALLONS NOM. CAP, INDUSTRIAL HEAVY-DUTY, CONVENTIONAL POLYETHYLENE, 3/8" WALL THICKNESS, 3/8" x 7-0" x 11-5" TO 10" HEIGHT VARIATION END-TO-END, SUMP WITH 3" TANK COLLAR AND DUMP VALVE AT LOW END, RYAN HERCO PRODUCTS CORP. 1 1/2" x 6" CLEANOUT ACCESS PANEL IN TOP OF TANK.	2,700
P 1	POTABLE WATER TRANSFER PUMP	—	1 1/2"	—	—	LIQUID RING TYPE CLOSE-COUPLED CENTRIFUGAL PUMP FOR SANITARY DRINKING WATER SERVICE, CASING, CASING COVER AND IMPELLER ALL BRONZE CONSTRUCTION, WITH MECHANICAL SHAFT SEAL, WEINMAN NO. 6715P, 12 GPM @ 100 FT. TDH, 5.5 FT. NET POSITIVE SUCTION HEAD, WITH 2HP, 1750 RPM, 208V, 3Ø 60 HZ. TOTALLY ENCLOSED MOTOR	

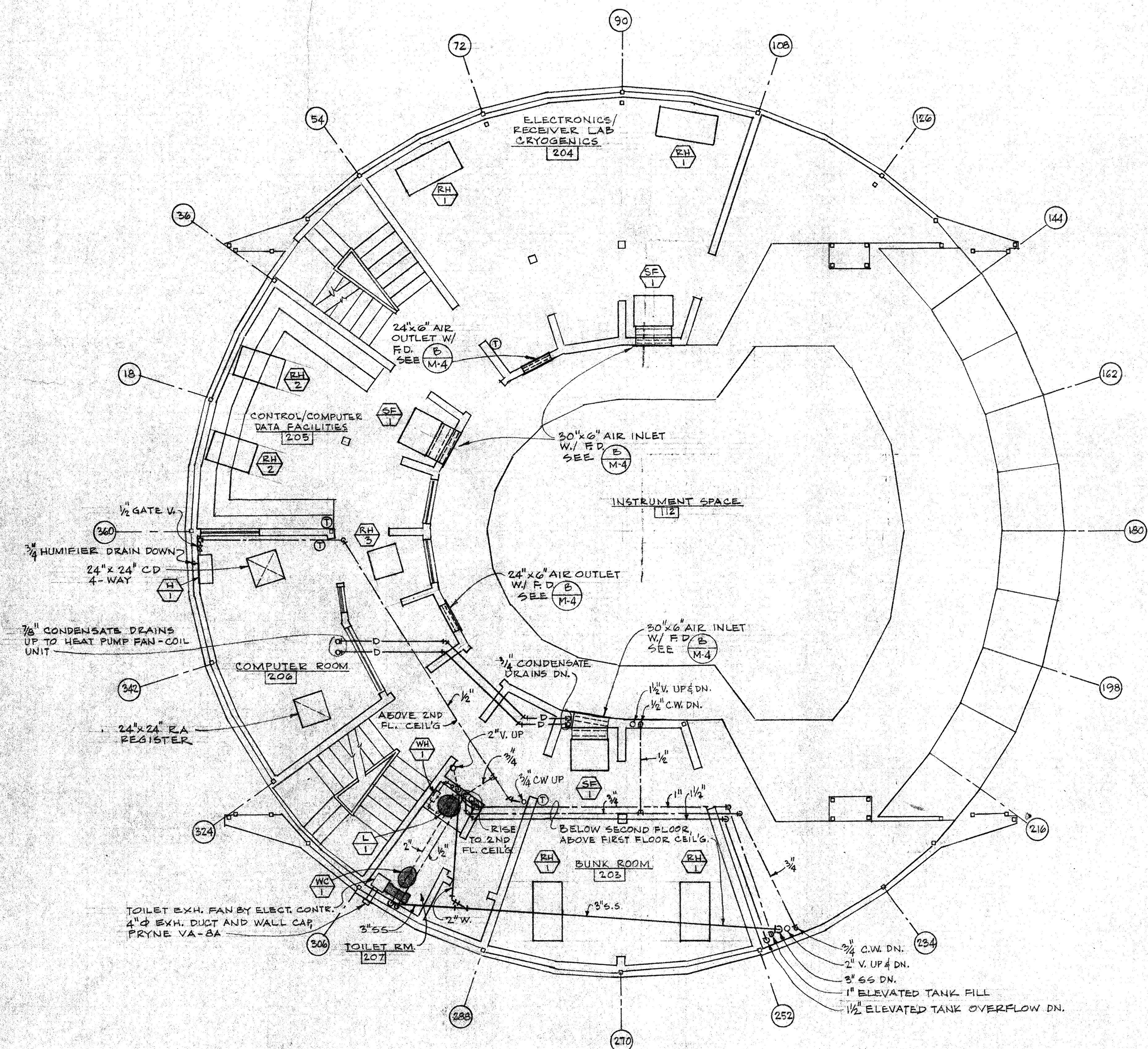
2. PROTECTIVE FINISH:
NOTES: 1. REMOVE ALL BURRS AND SHARP EDGES.


UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES TOLERANCE ON DECIMALS XX ± .03 ANGULAR ± 1/2° XXX ± .005 TOLERANCE ON FRACTIONS ± 1/16 MACHINE FINISH 12/1		DRAWN: REA CHECKED: [Signature] APPROVED: [Signature]		DATE: 11/20/84 DATE: 11/20/84 DATE: 11/20/84		CALIFORNIA INSTITUTE OF TECHNOLOGY PASADENA, CALIF.	
NEXT ASSEMBLY		DWG. NO. E		SCALE: AS NOTED		DWG. NO. E10MD SH M2	
LTR		DESCRIPTION		DATE		APPD	
REVISION		DATE		APPD		SHEET M2 OF 2	

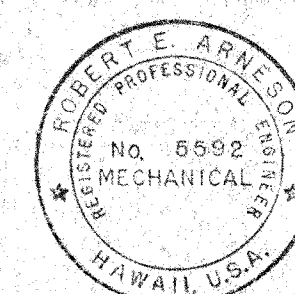
LIST OF MATERIALS			
ITEM	QTY	DESCRIPTION	UNIT WT



N  **THIRD FLOOR PLAN**
SCALE: 1/4" = 1'-0"



N  **SECOND FLOOR PLAN**
SCALE: 1/4" = 1'-0"



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

2. PROTECTIVE FINISH:

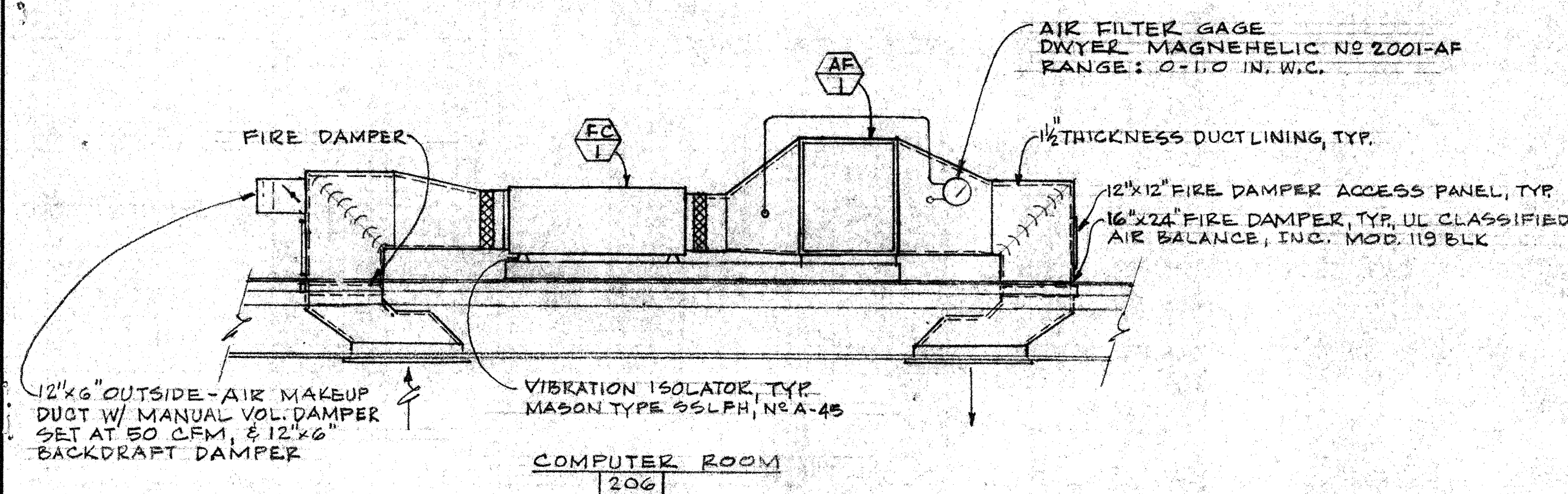
NOTES: 1. REMOVE ALL BURRS AND SHARP EDGES.

HAWAII ERECTION BID SET		12-20-84	W. H. H. H.
LTR	DESCRIPTION	DATE	APPRO
REVISION			
NEXT ASSEMBLY		DATE	APPRO
DRAWING NO.	ITEM	QTY	WEIGHT
APPLICABLE DOC		FILE NO.	W.O.
DWG. NO.		SCALE	DWG. NO.
E		AS NOTED	E10MD SHM3
SHEET M-1		DEPT	SHEET M-1

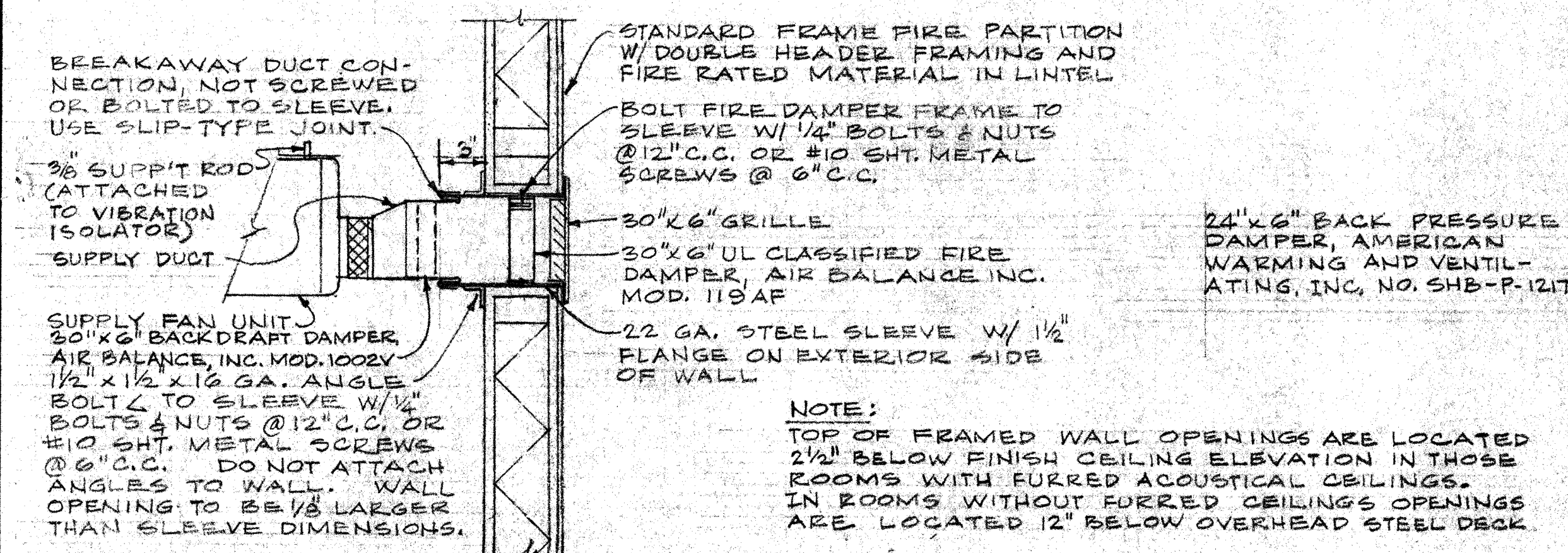
UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES TOLERANCE ON DECIMALS XX = ± .03 ANGULAR ± 1/2° XXX = ± .005 TOLERANCE ON FRACTIONS ± 1/16 MACHINE FINISH 12/		DRAWN R. E. A.	DATE 11/1/84
CHECKED R. E. A.		DATE 11/1/84	APPROVED R. E. A.
TITLE MECHANICAL-SECOND & THIRD FLOOR PLANS SUBMILLIMETER OBSERVATORY MAUNA KEA, HAWAII		FILE NO.	W.O.

CALIFORNIA INSTITUTE OF TECHNOLOGY
PASADENA, CALIF.

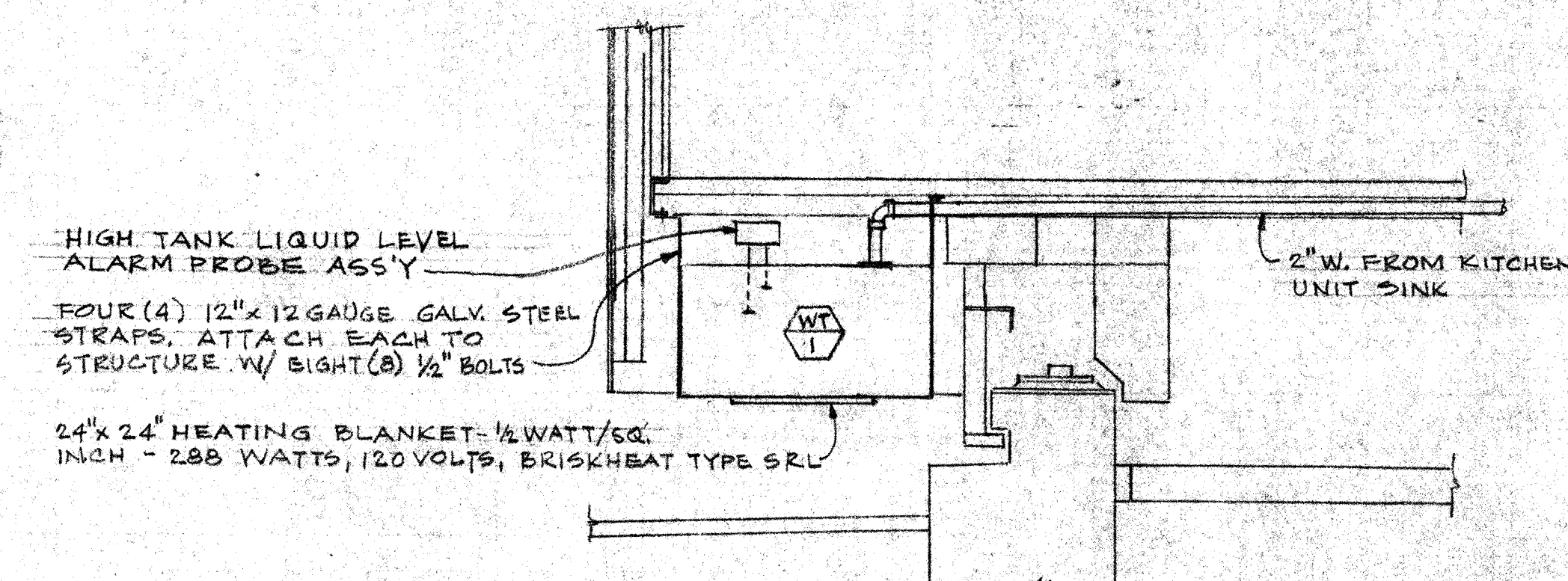
LIST OF MATERIALS		
ITEM	QTY	DESCRIPTION
		MATERIAL OR SOURCE OF SUPPLY



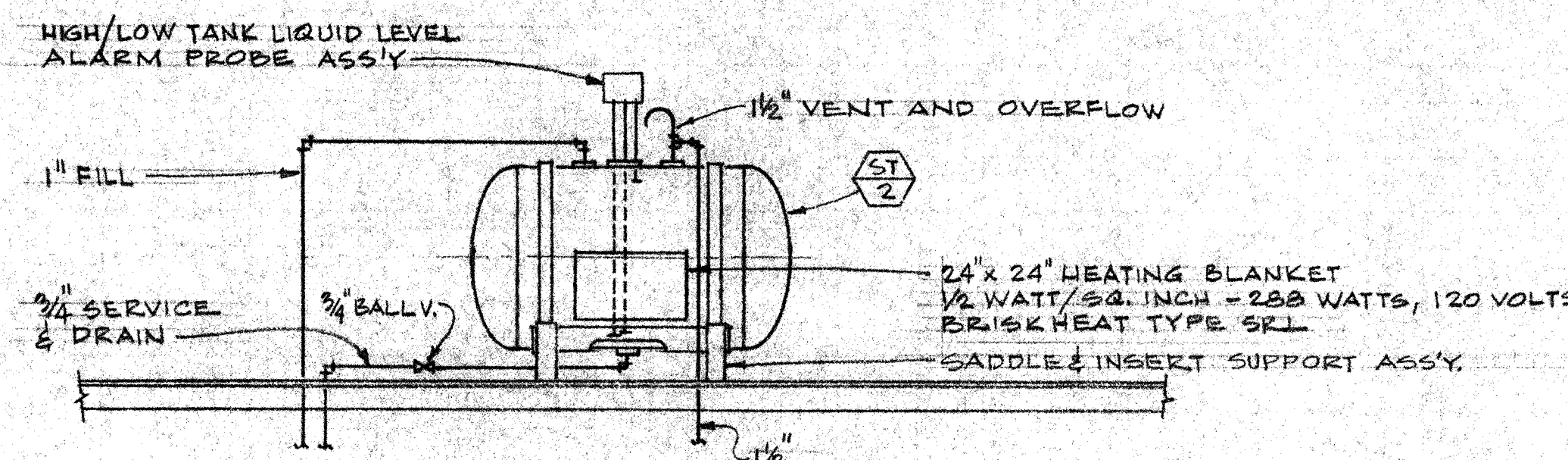
A COMPUTER RM. HEAT PUMP FAN-COIL UNIT & AIR FILTER ASSEMBLY
NOT TO SCALE



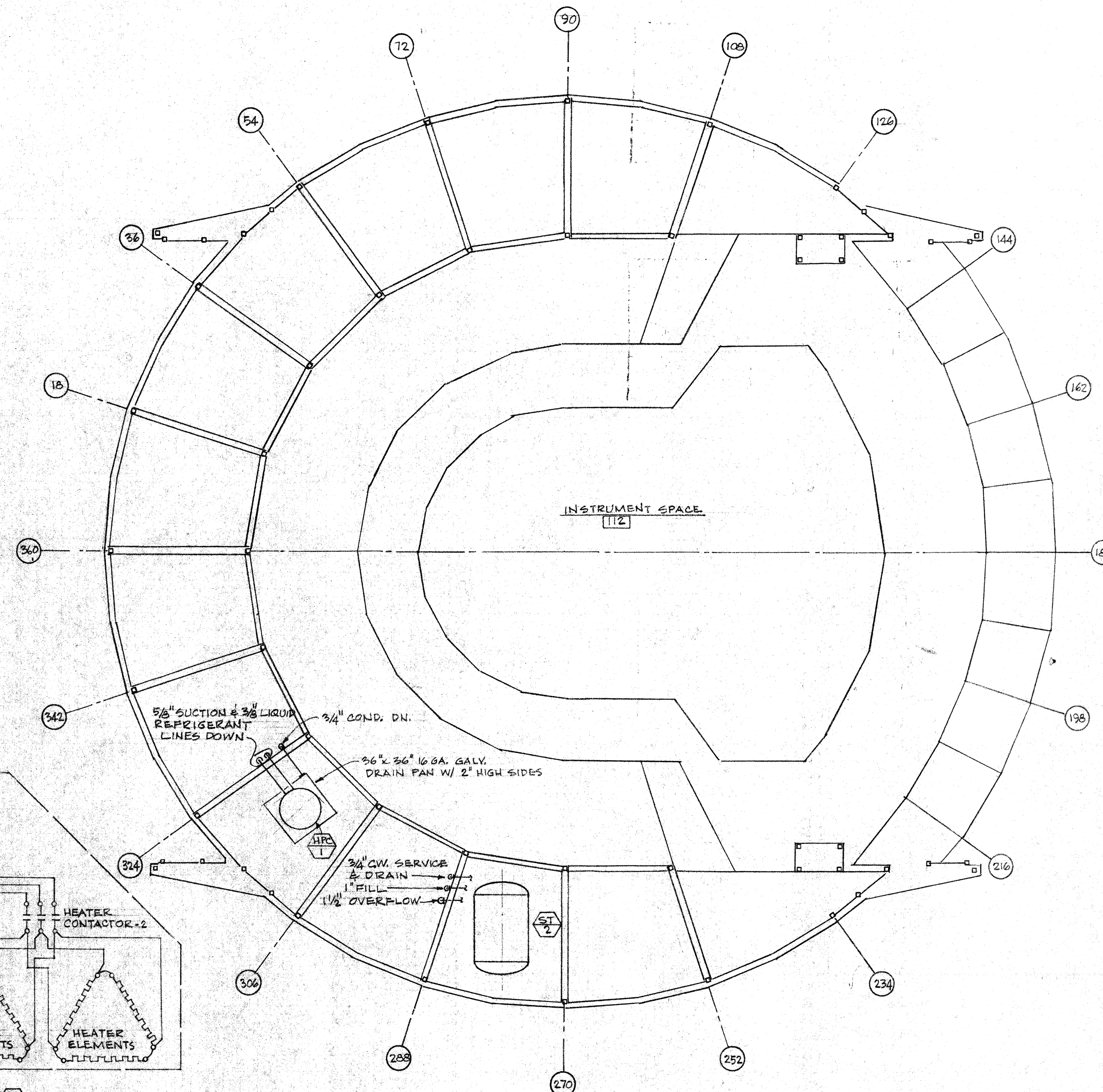
B TYPICAL WALL PENETRATION FIRE DAMPER DETAILS
NOT TO SCALE



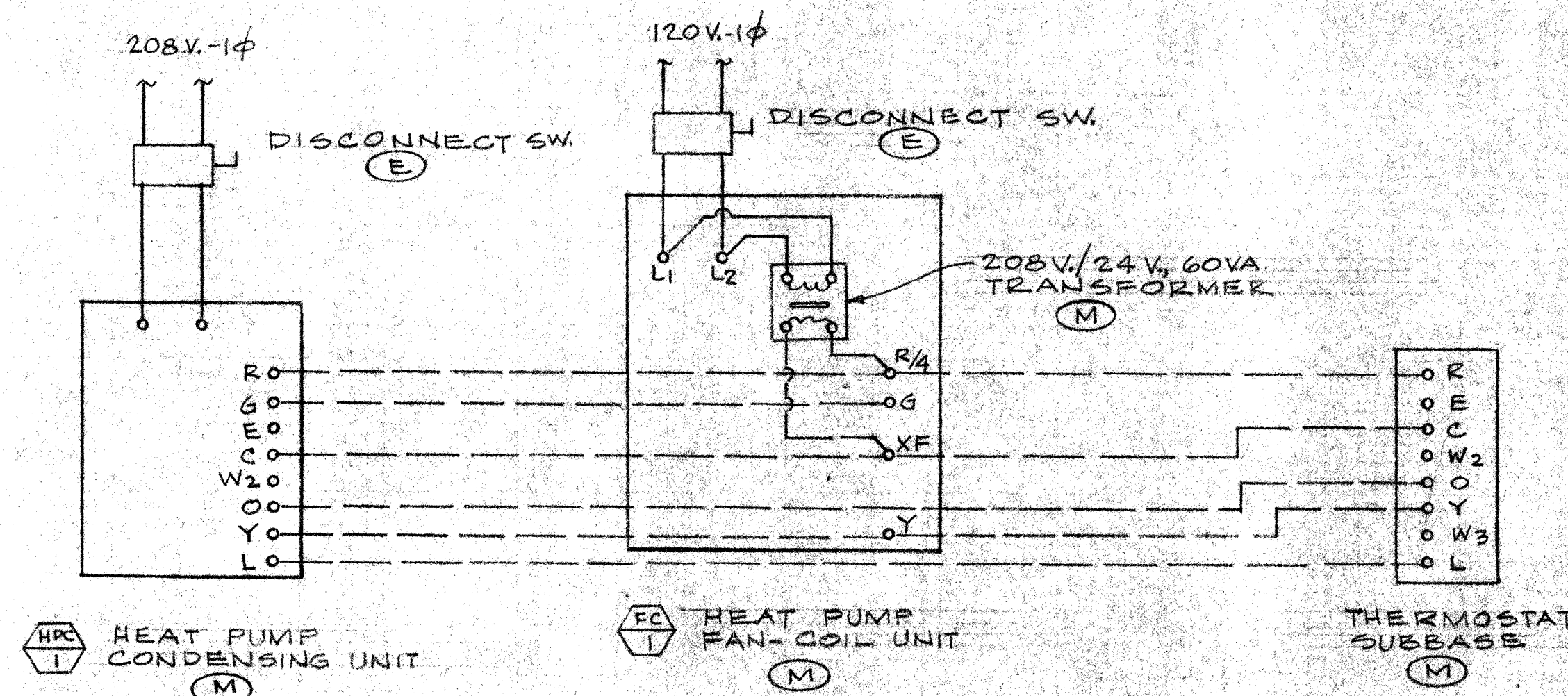
C WASTE WATER HOLDING TANK
NOT TO SCALE



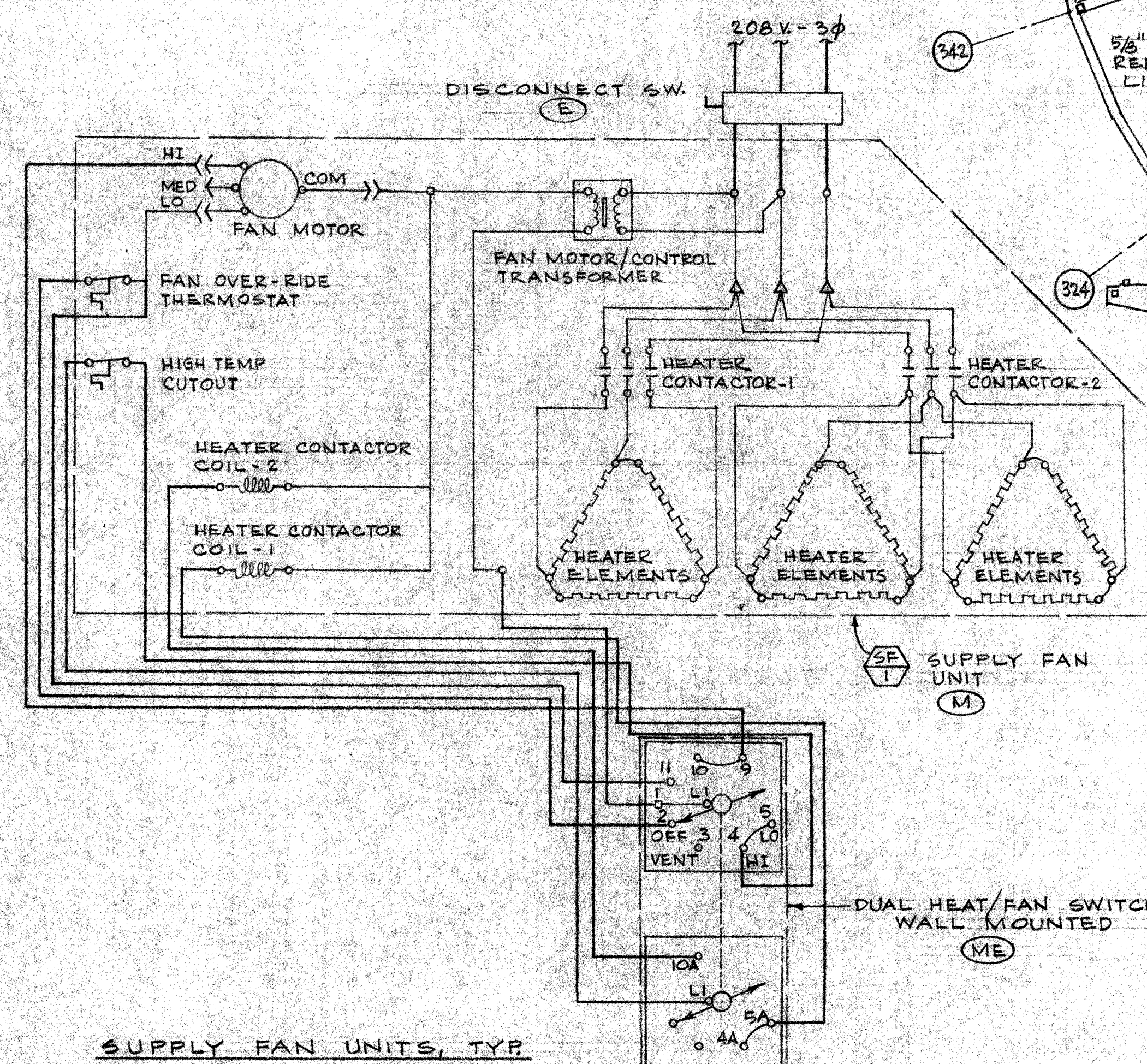
D POTABLE WATER ELEVATED TANK
NOT TO SCALE



E FOURTH FLOOR PLAN
SCALE: 1/4" = 1'-0"



F HEAT PUMP SYSTEM
NOT TO SCALE



G SUPPLY FAN UNITS, TYP.
NOT TO SCALE

H CONTROL WIRING DIAGRAMS
NOT TO SCALE

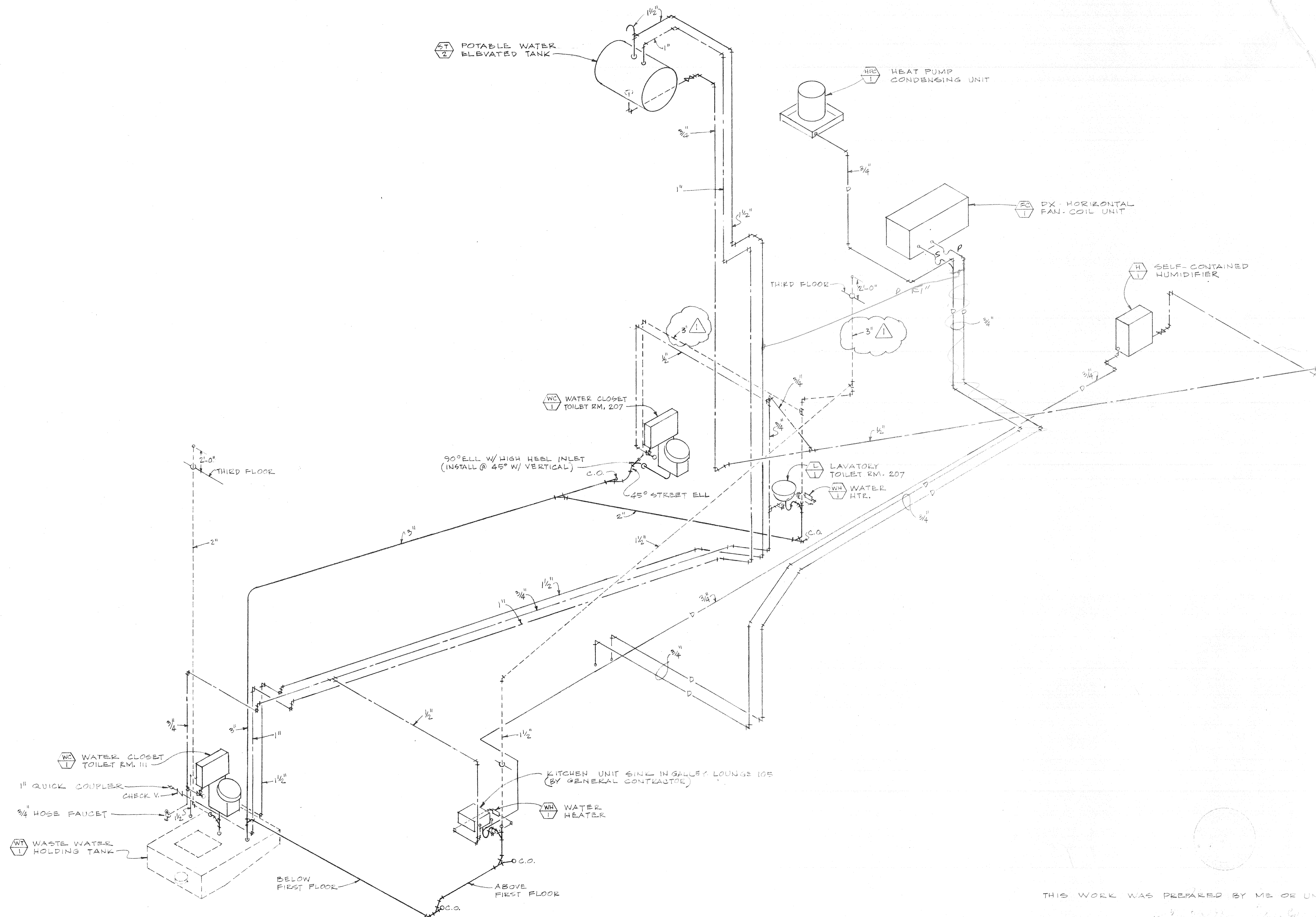
LOW VOLTAGE WIRE BY MECHANICAL CONTRACTOR, CONDUIT BY ELECTRICAL CONTRACTOR
LINE VOLTAGE WIRE AND CONDUIT BY ELECTRICAL CONTRACTOR
FACTORY-WIRED EQUIPMENT
ITEM FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR
ITEM FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR
ITEM FURNISHED BY MECHANICAL CONTRACTOR, INSTALLED AND WIRED BY ELECTRICAL CONTRACTOR

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

2. PROTECTIVE FINISH:
NOTES: 1. REMOVE ALL BURRS AND SHARP EDGES.

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES TOLERANCE ON DECIMALS X/100 = ±.001 TOLERANCE ON FRACTIONS ± 1/16 MACHINE FINISH 12/1			DRAWN 12/EA DATE 11/20/04 CHECKED 11/20/04 DATE 11/20/04 APPROVED 11/20/04 DATE 11/20/04			CALIFORNIA INSTITUTE OF TECHNOLOGY PASADENA, CALIF. TITLE MECHANICAL-FOURTH FLOOR PLAN & DETAIL SUBMILLIMETER OBSERVATORY MAUNA KEA, HAWAII		
FILE NO.	W.O.	DEPT.	DWG. NO.	SCALE	DWG. NO.	AS NOTED	E10MD SHM2	
REVISION	DESCRIPTION	DATE	APPRO	WEIGHT	APPLICABLE DOC			

LIST OF MATERIALS			
ITEM	QTY	DESCRIPTION	MATERIAL OR SOURCE OF SUPPLY



PLUMBING SCHEMATIC NOT TO SCALE

THIS WORK WAS PREPARED BY ME OR UNDER MY CLOSE PERSONAL SUPERVISION

2. PROTECTIVE FINISH

NOTES: 1. REMOVE ALL PROTECTIVE FINISH

UNLESS OTHERWISE NOTED
DIMENSIONS ARE IN INCHES
TOLERANCE ON DECIMALS
XX = ± .03 ANGULAR = ± 1/2°
XXX = ± .005
TOLERANCE ON FRACTIONS ± 1/16
MACHINE FINISH 12"

DRAWN
CHECKED
APPROVED
DATE
DATE
DATE

BUILDING DEPARTMENT CORRECTIONS			
LT	DESCRIPTION	DATE	APPD

NEXT ASSEMBLY			
DRAWING NO.	ITEM	QTY	WEIGHT

APPLICABLE DOP