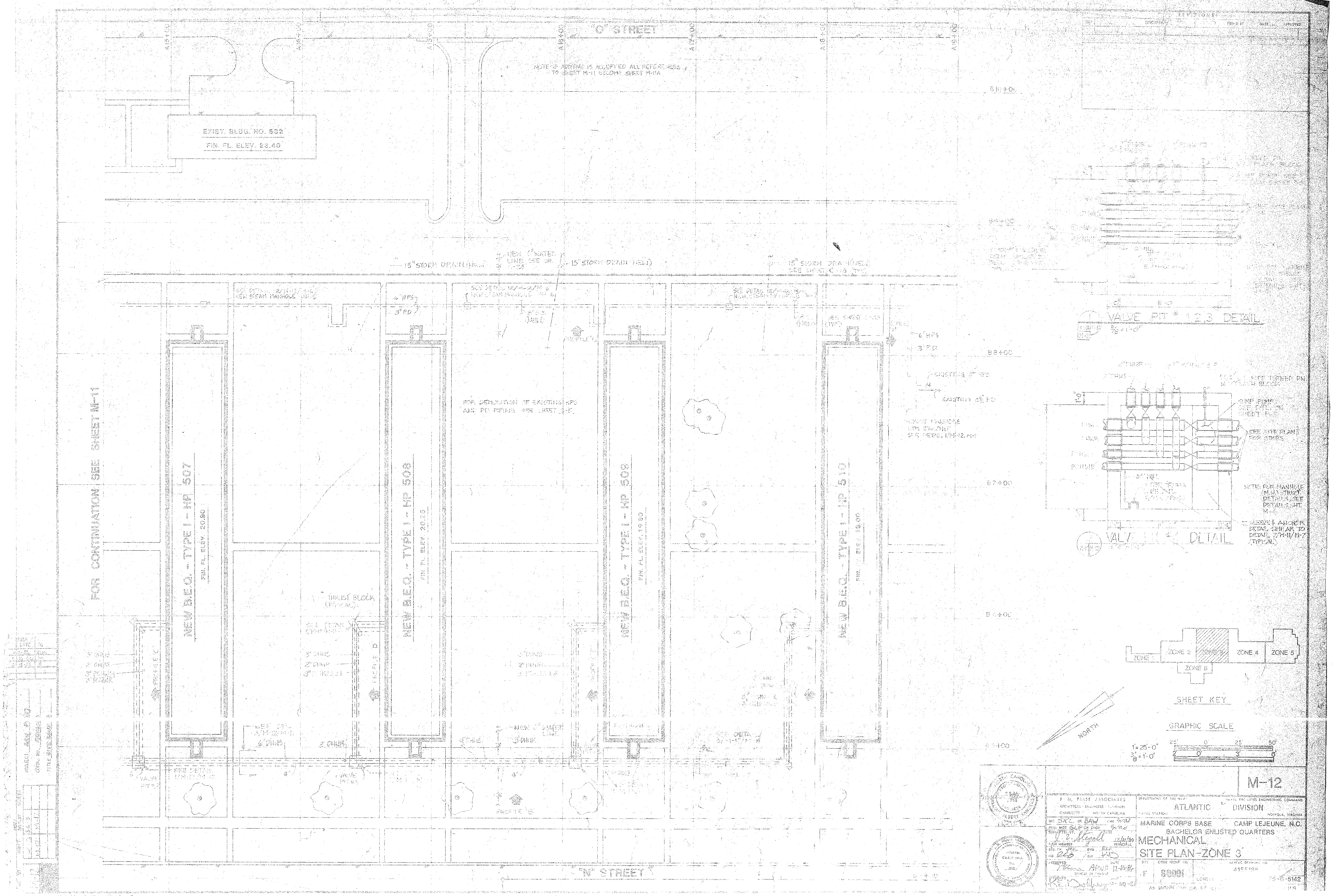
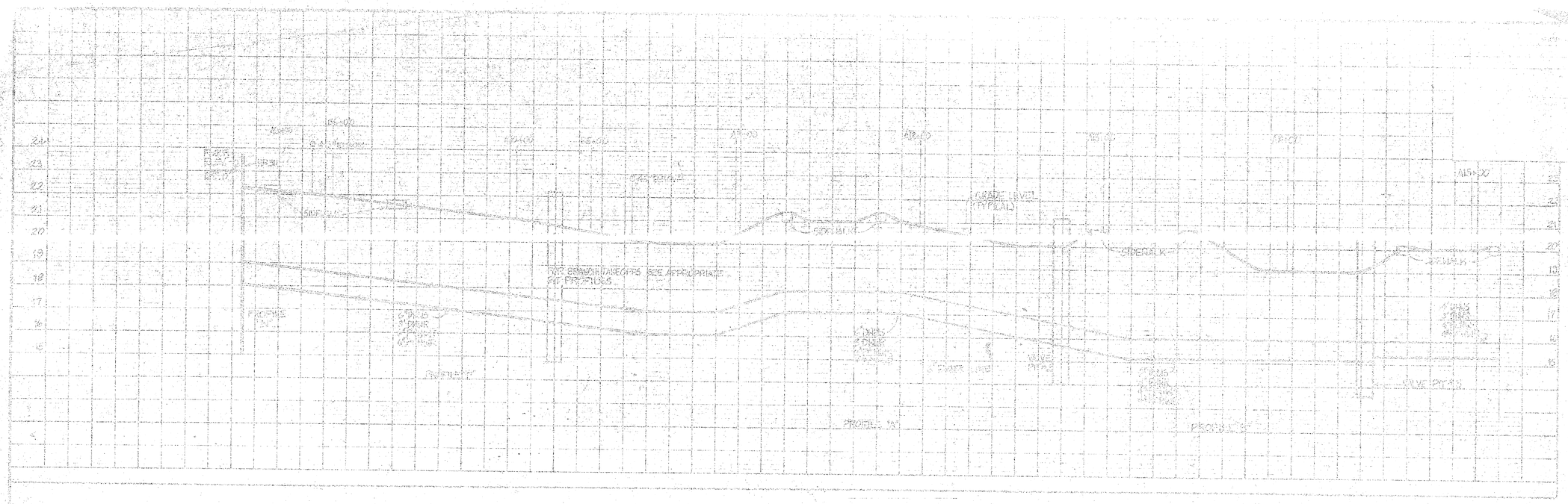

"C" STREET
NOTE: IF ADDITIVE IS ACCEPTED ALL REFERENCES TO SHEET M-11 BECOME SHEET M-11A
A13+00
A14+00
A15+00
A16+00
A17+00
A18+00
A19+00
EXIST. BLDG. NO. 532
FIN. FL. ELEV. 23.40
15" STORM DRAIN (NEW)
15" STORM DRAIN (NEW)
15" STORM DRAIN (NEW) SEE SHEET C-18 (TYP)
NEW 6" WATER LINE SEE SH. C-23
NEW STEAM MANHOLE
6" HPS
3" PD
FOR DEMOLITION OF EXISTING HPS AND PD PIPING SEE SHEET
EXISTING 6" HPS
EXISTING 2½" PD
B10+00
B9+00
B8+00
B7+00
B6+00
B5+00
FOR CONTINUATION SEE SHEET M-11
NEW B.E.Q. - TYPE I - HP 507
FIN. FL. ELEV. 20.90
NEW B.E.Q. - TYPE I - HP 508
FIN. FL. ELEV. 20.25
NEW B.E.Q. - TYPE I - HP 509
FIN. FL. ELEV. 19.80
NEW B.E.Q. - TYPE I - HP 510
FIN. FL. ELEV. 19.00
THRUST BLOCK (TYPICAL)
3" DHWS
2" DHWR
3" PCHWS
3" PCHWR
PROFILE C
PROFILE D
PROFILE B
6" DHWS
2" DHWR
NEW 3" WATER LINE
VALVE PIT #2
VALVE PIT #3
"N" STREET
VALVE PIT # 1,2,3 DETAIL
3/8" = 1'-0"
SUMP PUMP SEE DETAIL ON SHEET
SEE SITE PLAN FOR SIZES
PIPE TURNED DN. W/ THRUST BLOCK
VALVE PIT DETAIL
NOTE: FOR MANHOLE (M.H.) STRUCT. DETAILS SEE DETAIL SHT. M-6
SLEEVE & ANCHOR DETAIL SIMILAR TO DETAIL 7/M-11/M-7 (TYPICAL)
ZONE 1
ZONE 2
ZONE 3
ZONE 4
ZONE 5
ZONE 6
SHEET KEY
NORTH
GRAPHIC SCALE
1" = 25'-0"
3/8" = 1'-0"
REVISIONS
SYM
DESCRIPTION
PREP'D BY
DATE
APPROVED
M-12
J. N. PEASE ASSOCIATES
ARCHITECTS - ENGINEERS - PLANNERS
CHARLOTTE NORTH CAROLINA
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NORFOLK, VIRGINIA
MARINE CORPS BASE CAMP LEJEUNE, N.C.
BACHELOR ENLISTED QUARTERS
MECHANICAL
SITE PLAN-ZONE 3
SIZE F
CODE IDENT NO. 80091
NAVFAC DRAWING NO. 4155186
05-B-5142



GRAPHIC SCALE

VERTICAL

HORIZONTAL

M-14

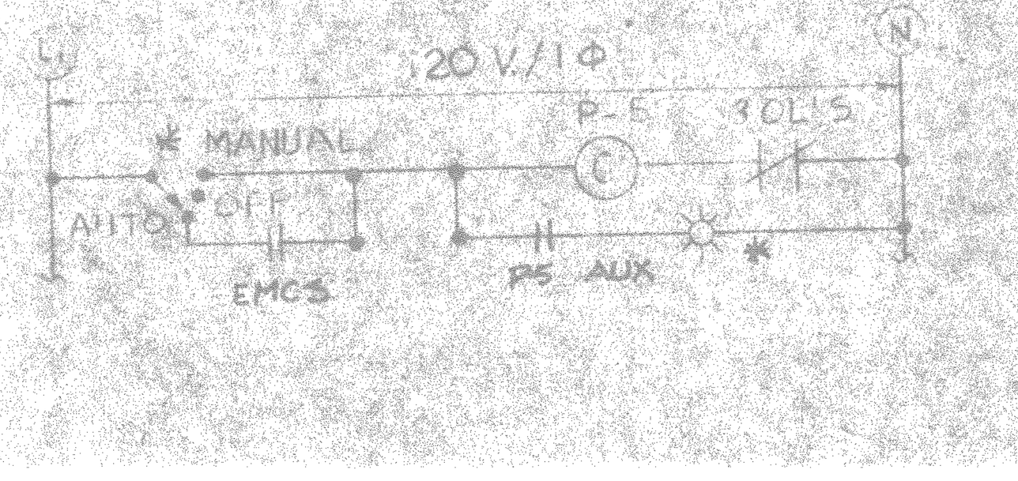
ATLANTIC DIVISION

MARINE CORPS BASE CAMP LEJEUNE, N.C.

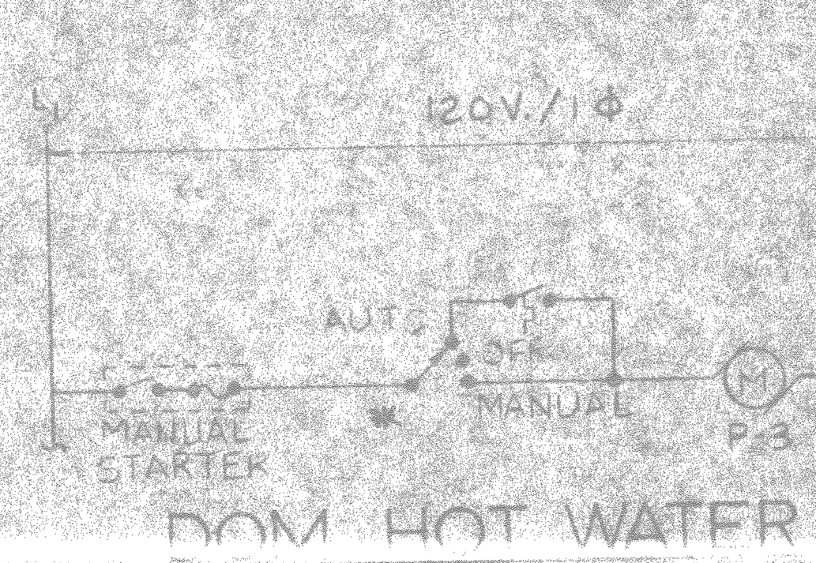
FACILITIES ENGINEERING & PLANNING

PROFILES-POHWS/R & DHWS/R DISTRIBUTION

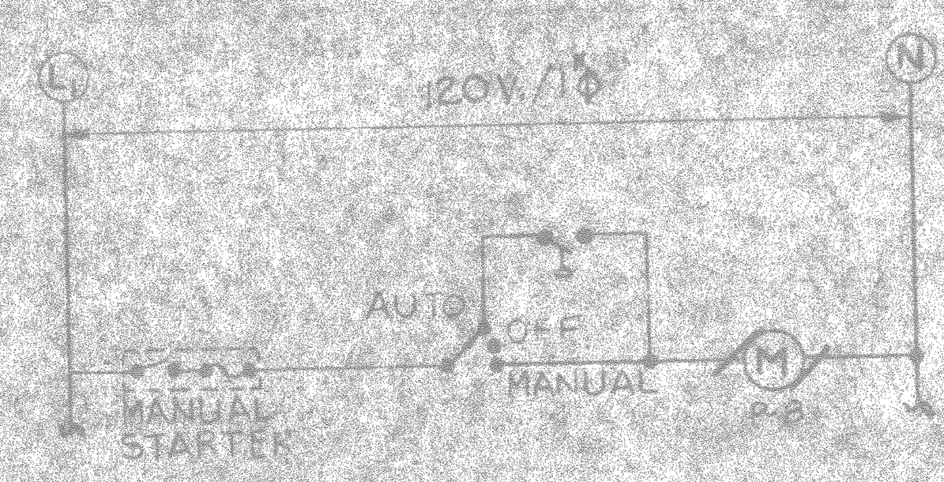
4153186



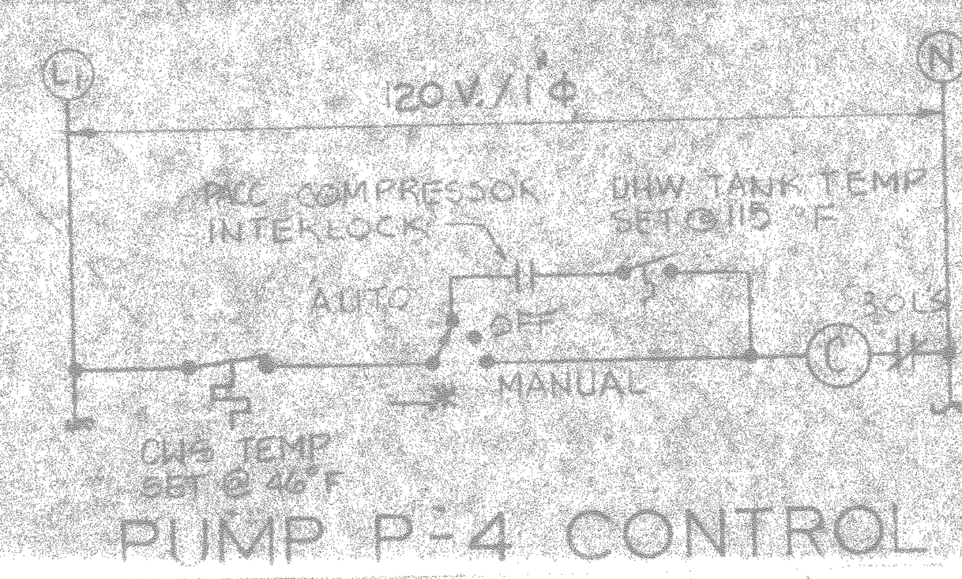
PUMP CONTROLS P-5
NO SCALE



DOM. HOT WATER PUMP CONTROLS
NO SCALE



SUMP PUMP CONTROLS
NO SCALE

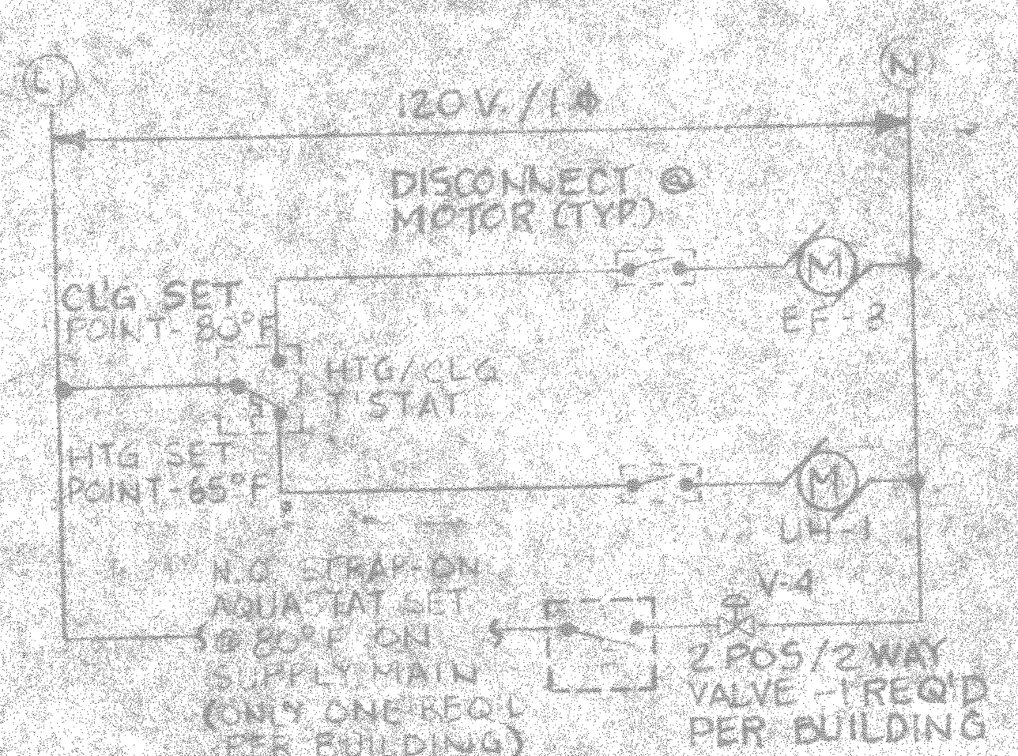


PUMP P-4 CONTROL
NO SCALE (TYP. FOR 4 PUMPS)

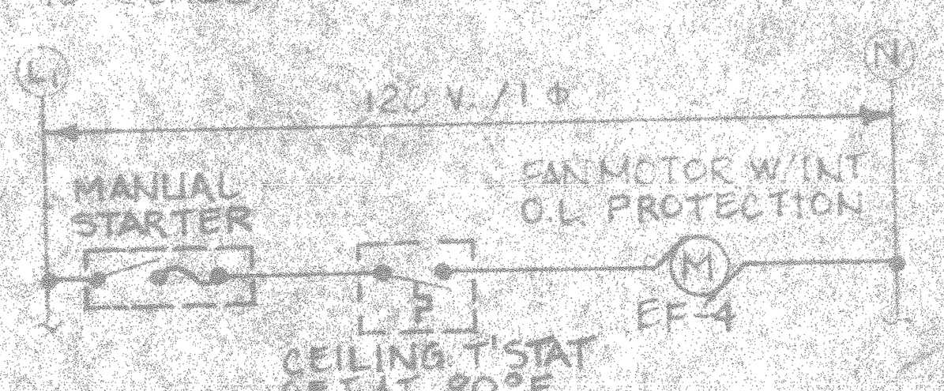
CONTROL LEGEND

- AQUASTAT
- CONTROL RELAY
- TEMPERATURE SENSOR
- MANUAL SWITCH
- DATA TERMINAL CABINET
- SENSOR
- NORMALLY CLOSED
- NORMALLY OPEN
- COMMON
- FLOW SWITCH
- LOW LIMIT THERMOSTAT
- HIGH LIMIT THERMOSTAT
- RETURN AIR TEMP TRANSMITTER
- DISCHARGE AIR TEMP TRANSMITTER
- TEMP INDICATOR
- RESET CONTROLLER
- THERMAL OVERLOADS
- DAMPER MOTOR
- ELECTRIC-PNEUMATIC SWITCH
- NORMALLY OPEN CONTACT
- NORMALLY CLOSED CONTACT
- PILOT LIGHT
- FUSE
- SWITCH
- TEMPERATURE SENSING SWITCH
- FLOAT SWITCH
- DMSD DUCT MOUNTED SMOKE DETECTOR
- * COMPONENT MOUNTED TO PANEL
- STR STARTER
- (M) MOTOR
- (C) MOTOR CONTACTOR
- CONTROL RELAY W/ N.C. CONTACT
- WPD WATER PRESSURE DROP, FEET H.G.

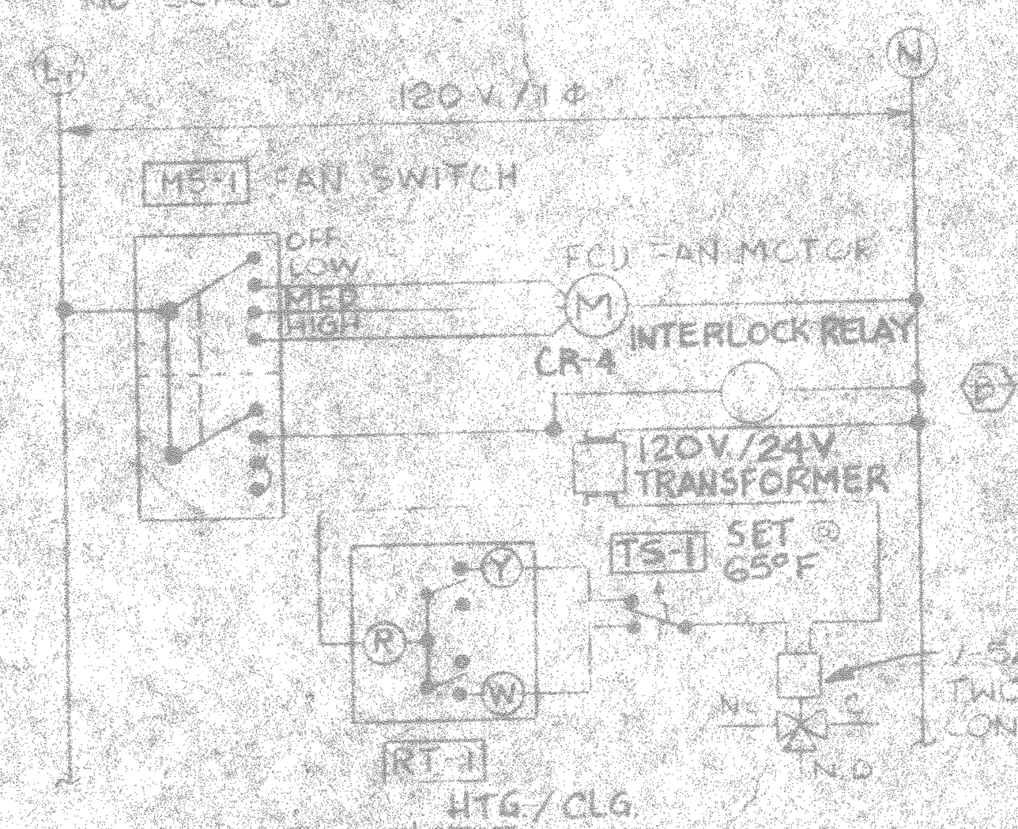
DESIGN CONDITIONS		
MODE	OUTSIDE	INSIDE
SUMMER	90°F DB/79°F WB	78°F DB/50% RH
[illegible]	[illegible]	68°F DB



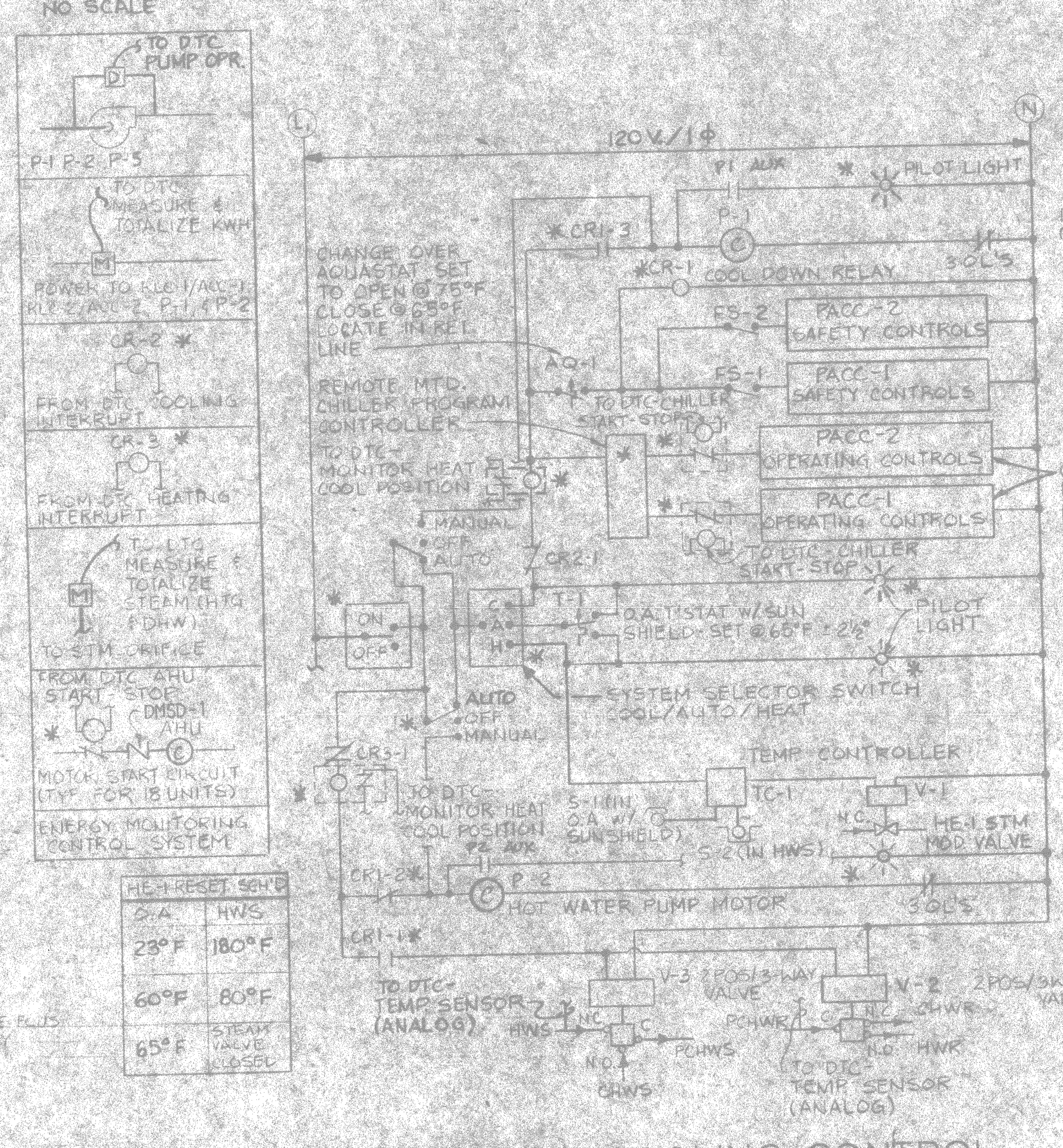
LAUNDRY ROOM CONTROL
NO SCALE



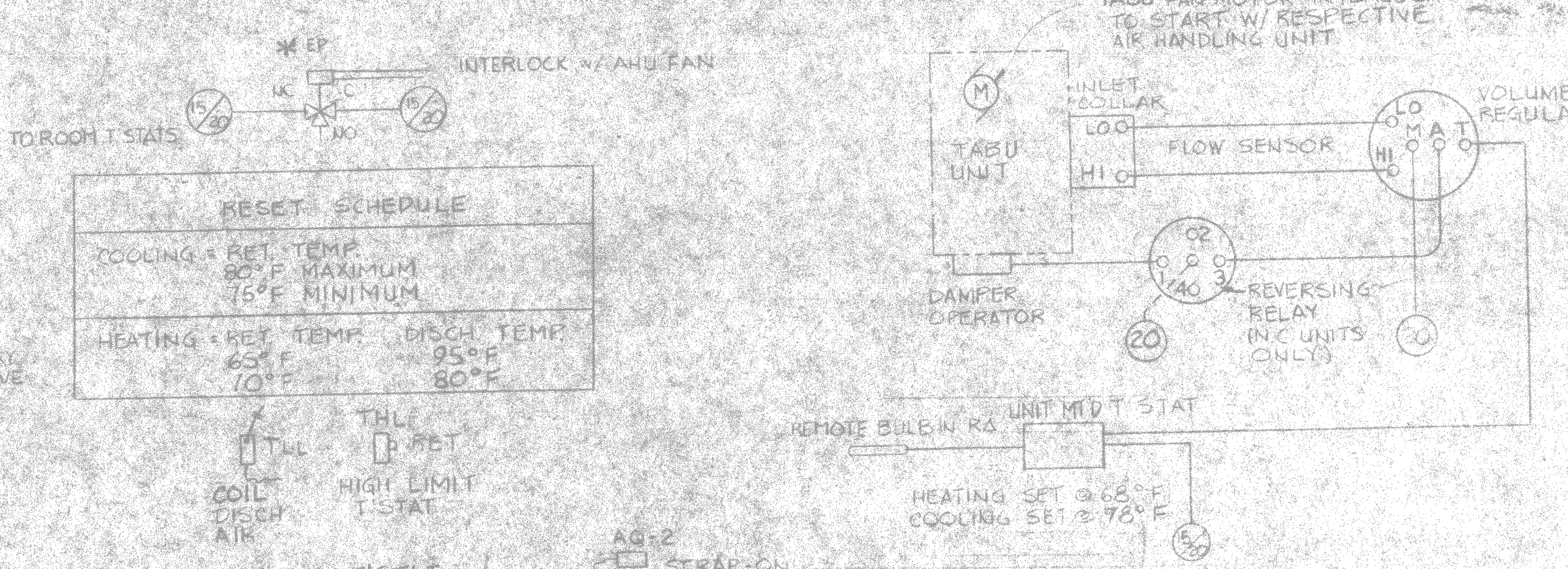
MECHANICAL BUILDING EXHAUST FAN CONTROL
NO SCALE



FAN COIL UNIT CONTROL
NO SCALE



HEATING/COOLING CONTROL
NO SCALE



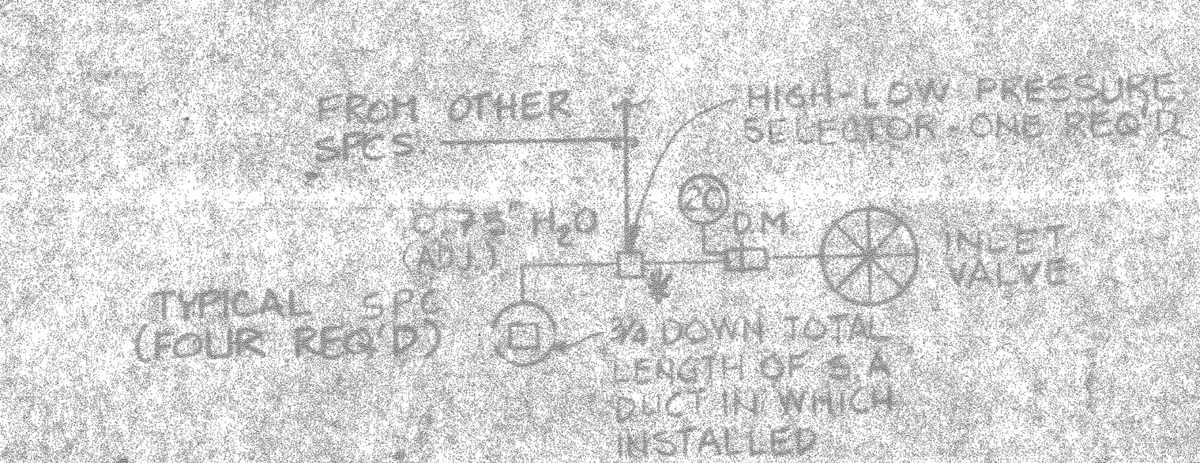
ROOM CONTROL
NO SCALE

STEAM/HOT WATER HEAT EXCHANGER		
UNIT DESIGNATION	HE-1	
TYPE SERVICE	HEATING	
BLDG SERVED	HP-506-510	
TEMP IN °F	160°	
TEMP OUT °F	180°	
STEAM PRESS., PSIG	15	
STEAM FLOW, LB/HR	4557	
WATER FLOW, GPM	426	
EXCHANGE TYPE	SHELL&TUBE	
NOTES	(1)(2)(3)	

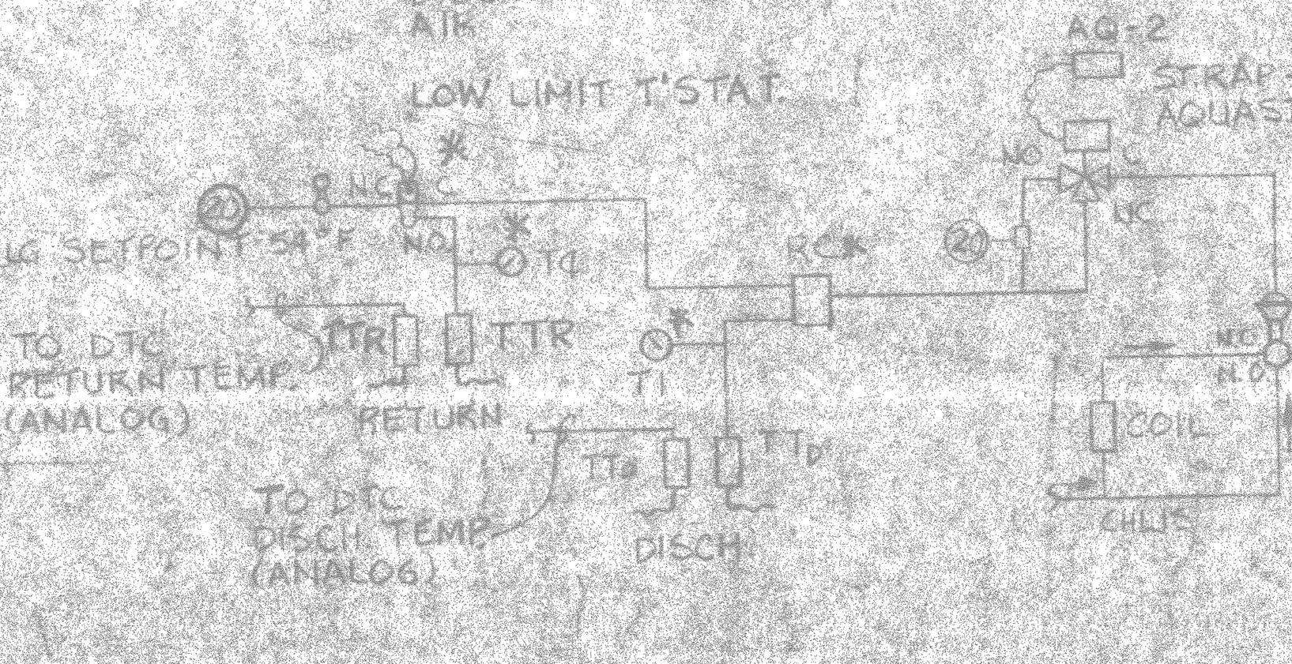
(1) MAX TUBE VEL. - 7 FEET PER SECOND
(2) MAX PRESS DROP - 5 FT WATER GAUGE
(3) SCALE FACTOR = 0.0005
(4) 14" ϕ × 48" LONG

UNIT HEATER SCHEDULE	
UNIT DESIGNATION	UH-1
AREA SERVED	LAUNDRY
MIN CAP, BTUH	8295
ENT. AIR TEMP °F	60
WATER TEMP °F	180°
WATER TEMP DROP °F	20°
MAX MOTOR HP	1/20
VOLTS/PHASE/HERTZ	120/1/60
HEATER TYPE	HORIZONTAL
G.P.M./WPD	1/2

(1) DIRECTIONAL DISCHARGE LOUVER
(2) 500 CFM NOMINAL
(3) FOULING FACTOR = 0.0005



PLENUM STATIC PRESSURE CONTROLS
NO SCALE (1 EACH REQ'D PER AHU)



AIR HANDLING UNIT CONTROL
NO SCALE

NOTE: AHU FANS SHALL BE PROVIDED W/ PUSH BUTTON START/STOP STATIONS. EACH AHU SHALL BE PROVIDED WITH A DUCT SMOKE DETECTOR WHICH UPON ACTUATION SHALL CAUSE SHUT OFF OF THE ASSOCIATED FAN AND "TABU" UNITS.

FAN COIL UNIT SCHEDULE			
UNIT DESIGNATION		(B)	(C)
NOTES		(1)(6)	(2)(7)
NOMINAL CFM		600	200
COIL SELECTION, CFM		600	200
MAXIMUM CHILLED WATER FLOW GPM		6	1
COOLING	MINIMUM COIL CAPACITY SENSIBLE BTUH	17,302	3780
	MINIMUM COIL CAPACITY TOTAL BTUH	34,020	5130
	ENTERING AIR TEMP, DB °F	83.0	78
	ENTERING AIR TEMP, WB °F	70.8	65
	ENTERING WATER TEMP, °F	42°	42°
HEATING	MINIMUM COIL CAPACITY TOTAL BTUH	19,894	5832
	ENTERING AIR TEMP, DB °F	49.3	68
	ENTERING WATER TEMP °F	180°	180°
CFM OUTSIDE AIR		250	0
PIPING RUNOUT SIZE, SUPPLY & RETURN		1"	1/2"
MAXIMUM MOTOR WATTAGE		135	95
MAXIMUM HOT WATER FLOW, GPM		6	1

(1) HORIZONTAL TYPE W/ OUTSIDE AIR INTAKE
(2) VERTICAL TYPE W/OUT OUTSIDE AIR
(3) SELECT UNITS TO MEET SENSIBLE CAPACITY @ HIGH FAN SPEED
(4) 0.0005 FOULING FACTOR
(5) UNITS ARE 120 V/1ϕ
(6) MAXIMUM COIL WATER PRESSURE DROP = 15.0 FT.
(7) MAXIMUM COIL WATER PRESSURE DROP = 5.0 FT.

PACKAGED AIR COOLED CHILLER		
UNIT DESIGNATION	PACC-1	PACC-2
BUILDING SERVED	HP-506 THRU HP-510	
MINIMUM TOTAL CAPACITY TONS	107.8	107.8
ENTERING WATER TEMP °F	52°	52°
LEAVING WATER TEMP °F	42°	42°
WATER FLOW GPM	259	259
AMBIENT AIR TEMP., DB °F	95°	95°
MAXIMUM WATER PRESSURE DROP FT WG	12'	12'
MAXIMUM UNIT KW	197	197
VOLTS/PHASE/HERTZ	460/3/60	460/3/60

CHILLER SHALL HAVE MINIMUM OF 4 STEPS OF CAPACITY REDUCTION, FOULING FACTOR 0.0005, STARTERS SUPPLIED BY UNIT MANUFACTURER, REFRIGERANT R-22

PUMP SCHEDULE								
UNIT DESIGNATION	P-1	P-2	P-3	P-4 **	P-5 ***	P-6	P-7 *	P-8
TYPE SERVICE	CHILLED WATER	HOT WATER	DOM. HW	HEAT RECLAIM	SECONDARY	NOT USED	STEAM COND.	SUMP
BLDG SERVED	HP-506-510	HP-506-510	HP-506-510	HP-506-510	HP-506-510		HP-511	HP-511
WATER FLOW GPM	518	426	80	18	120		39	30
TOTAL HEAD FT. W.G.	130'	80'	25	30	55'		50 PSI DISCH	20
R.P.M./NEMA STR	1750/3	1750/2	1750/00	1750/00	1750/0		3500/0	1750/00
MAX MOTOR H.P.	30	20	1½	½	5		3	⅓
VOLTS/PHASE/HERTZ	460/3/60	460/3/60	460/3/60	120/1/60	208/3/60		460/3/60	120/1/60
PUMP TYPE	BASE MTD.	BASE MTD.	IN-LINE	IN-LINE	IN-LINE		CENT. IMPELLER	SUB.

EXHAUST FAN SCHEDULE						
UNIT DESIGNATION	EF-1	EF-2	EF-3	EF-4	EF-5	EF-6
NOTES	(1)	(1)	(2)(4)	(1)(3)	(1)(5)(6)	(4)
AIR FLOW, CFM	120	440	500	2160	109	290
TOTAL STATIC PRESSURE IN WG	.125	.125	.125	.25	.125	0.25
LOCATION	ROOF	ROOF	WALL	ROOF	CEILING	LOUNGE STG.
AREA SERVED	JAN. CLOSET	ELECT. ROOM	LAUNDRY	MECH. BLDG.	TOILETS	LOUNGE
MAX MOTOR H.P.	35 MHP	1/20	1/20	1/2	0.7 AMPS	1/4
VOLTS/PHASE/HERTZ	120/1/60	120/1/60	120/1/60	120/1/60	120/1/60	120/1/60
FAN TYPE	CENTRIFUGAL	CENTRIFUGAL	PROP.	CENTRIFUGAL	CENTRIFUGAL	IN-LINE CENT.

(1) PROVIDE MOTOR OPERATED DAMPER, DISCONNECT SWITCH & BIRD SCREEN
(2) PROVIDE FAN GUARD, GRAVITY BACKDRAFT DAMPER & DISCONNECT SWITCH
(3) PROVIDE ALUMINUM, SELF-FLASHING CURB SEE DETAIL 3/A-2 /A-2
(4) MAX. SOUND LEVEL TO BE 4 SONES
(5) INTERLOCK W/ LIGHT SWITCH
(6) BIRDSCREEN NOT REQUIRED ON EF-5

PUMP SCHEDULE NOTES:
*(1) EDR=26,100 SQUARE FEET
(2) 45 GAL RECEIVER CAPACITY
(3) DUPLEX W/CAST IRON RECEIVER
(4) MECH. ALTERNATOR

** FOUR REQ'D *** FIVE REQ'D

M-10

J. N. PEASE ASSOCIATES
ARCHITECTS · ENGINEERS · PLANNERS
CHARLOTTE NORTH CAROLINA

DES. SKL DR. BAW CHK
PROJ. MGR. GLP CH. ENGR.
SUBMITTED BY J. T. Stegall DATE 12/11/86
FIRM MEMBER PRINCIPAL
EFD: FP JOTL RVD RLA
HD RCB DIR
APPROVED DATE 12-15-86
OFFICER IN CHARGE
APPROVED DATE 3-30-87
FOR EFD FOR COMMANDER NAVFAC

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VIRGINIA
MARINE CORPS BASE CAMP LEJEUNE, N.C.
BACHELOR ENLISTED QUARTERS

CONTROLS & SCHEDULES

SIZE F | CODE IDENT NO. 80091 | NAVFAC DRAWING NO. 4155164
CONSTR CONTR NO N62470-85-B-5142
SCALE AS SHOWN | SPEC 05-85-5142
EFD DWG 255180

REVISIONS				
SYM	DESCRIPTION	REF'D BY	DATE	APPROVED

AIR HANDLING UNIT SCHEDULE

*NEMA STARTER SIZE 1, 208/3/60

DUAL TEMPERATURE COIL

UNIT NO.	LOCATION	FAN DATA: TOTAL CFM	MIN. O.A. CFM	MIN O.V. FPM	T.E.S.P. ("W.G.)	APPROX. T.S.P. ("W.G.)	MIN. HP *	COOLING PERFORMANCE DATA: COIL CFM	TOTAL LOAD BTUH	TOTAL SENS BTUH	MAX FACE VEL FPM	E.A.T. °F D.B.	E.A.T. °F W.B.	L.A.T. °F D.B.	L.A.T. °F W.B.	COIL GPM	E.W.T. °F	WAT. P.D. MAX	AIR P.D. MAX	MIN ROW	HEATING PERFORMANCE: COIL CFM	TOTAL LOAD BTUH	MAX FACE VEL FPM	E.A.T. °F D.B.	L.A.T. °F D.B.	COIL GPM	E.W.T. °F	REMARKS
AHU-1	HP-506-510	4850	200	1700	1.08	2.5"	5	4850	139680	109998	500	78.5	65.5	57.5	56.3	23.3	45	8'	0.7"	4	4850	130479	500	66.2	91.1	13.0	180	1ST FLOOR, UNIT H
AHU-2					1.04																							1ST FLOOR, UNIT H
AHU-3					1.08																							2ND FLOOR, UNIT H
AHU-4		4850		1700	1.08			4850	139680	109998				57.5	56.3	23.3					4850	130479		66.2	91.1			2ND FLOOR, UNIT H
AHU-5		5200		1880	1.13			5200	142740	116813				57.7	56.6	23.8					5200	130067		66.3	89.4			3RD FLOOR, UNIT H
AHU-6	HP-506-510	5200	200	1880	1.10	2.5"	5	5200	142740	116813	500	78.5	65.5	57.7	56.6	23.8	45	8'	0.7"	4	5200	130067	500	66.3	89.4	13.0	180	3RD FLOOR, UNIT H

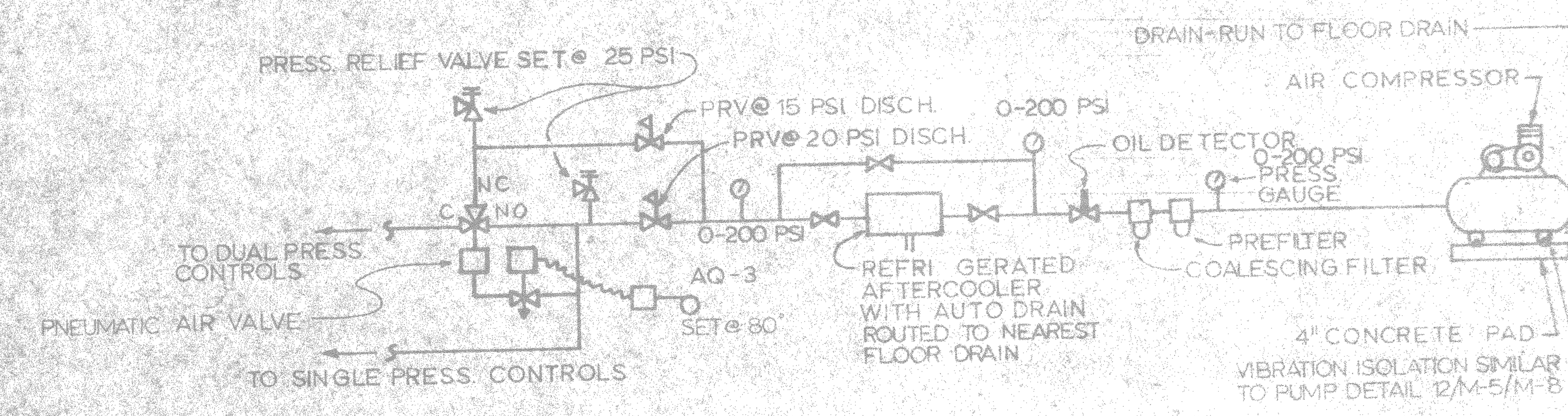
HOT WATER STORAGE GENERATOR

UNIT NO	SERVICE	LOCATION	STEAM PRESS	#/HR STEAM	RECOV. GPH	ENT WATER	LEAVE WATER	GAL	TANK SIZE	ELECT. (1) VOLT	PHASE	REMARKS
DHWH-1	HP-506-510	HP-511	15 PSIG	1964	2765	40°F	120°F	4600	89Ø/210	120	1	

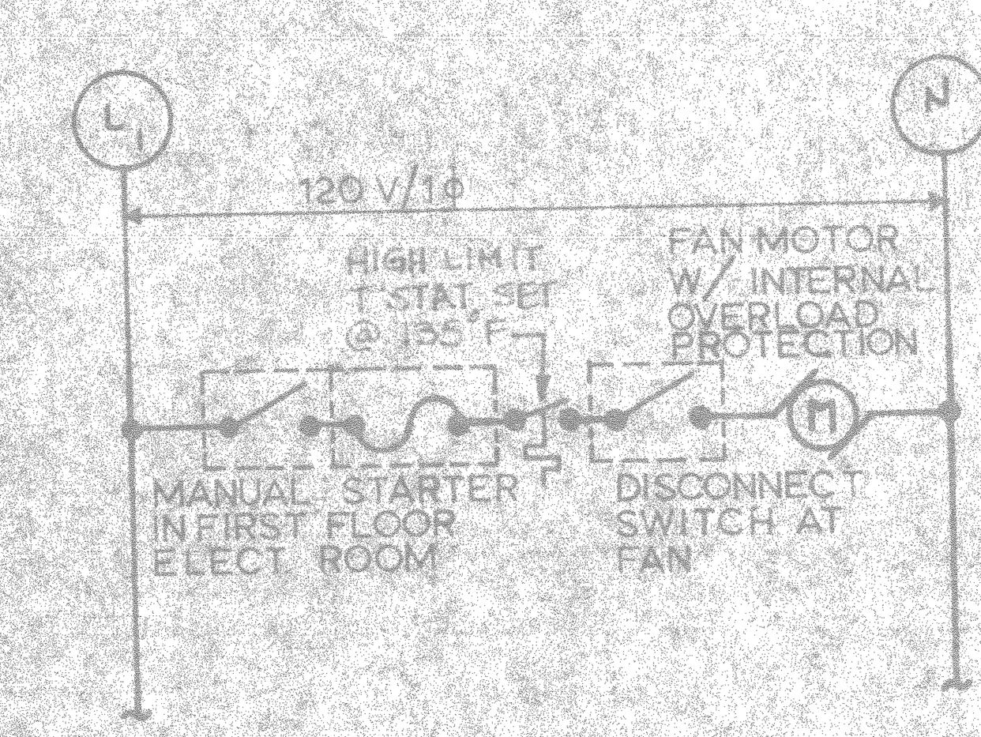
(1) FOR CONTROLS & INTEGRAL PUMP

CONTROL VALVE SCHEDULE

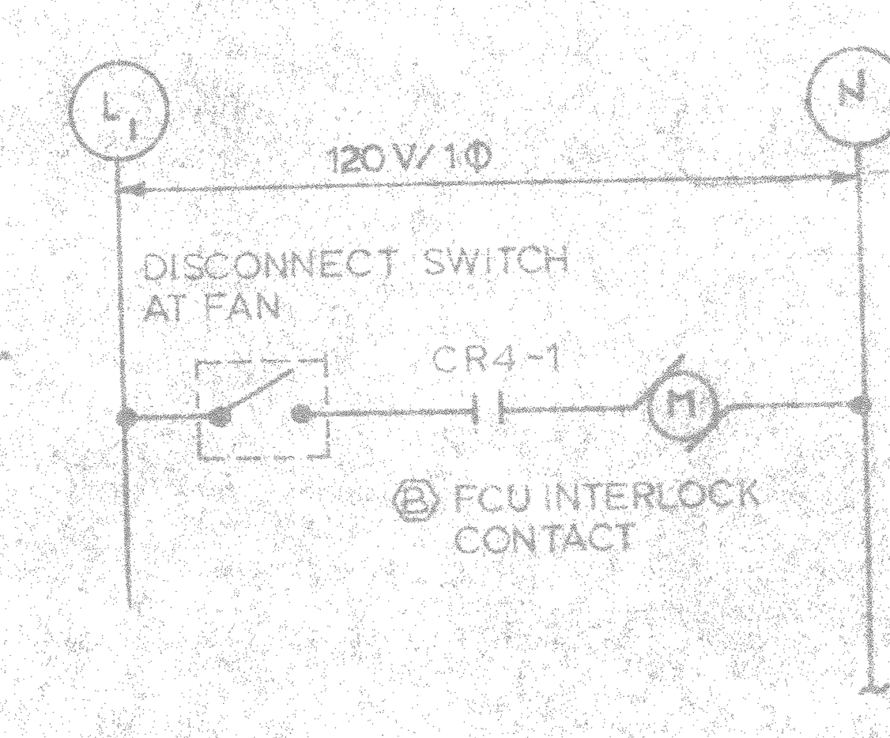
MARK	UNIT SERVED	SERVICE	TYPE	ACTION	CAPACITY LBS/HR	CAPACITY GPM	STEAM PRESS. INLET	STEAM PRESS. OUTLET	C_v	MAX. WPD FT. H_2O	NORMAL SIZE	LOCATION
PRV-1	—	STEAM	2-WAY	MODULATING	1964	—	150	25	50	—	1"	MECHANICAL BUILDING
PRV-2	—	STEAM	2-WAY		4557	—	150	25	11.5	—	1½"	MECHANICAL BUILDING
PRV-3	EJECTOR PUMPS	STEAM	2-WAY		800	—	150	75	3.4	—	1"	STEAM PITS
V-1	HE 1	STEAM	2-WAY	MODULATING	4557	—	26	15	85	—	3"	MECHANICAL BUILDING
V-2	CHANGE OVER	CHWR	3-WAY	2-POSITION	—	345	—	—	190	7	6"	MECHANICAL BUILDING
V-3	CHANGE OVER	CHWR	3-WAY		—	345	—	—	190	7	6"	MECHANICAL BUILDING
V-4	UNIT HEATER	HWR	2-WAY		—	3	—	—	6.3	5	¾"	BEQ LOUNGES
V-5	FCU (B)	CHWR	3-WAY		—	6	—	—	3.5	7	½"	BEQ LOUNGES
V-5A	FCU (C)	CHWR	3-WAY	2-POSITION	—	1	—	—	0.6	7	½"	BEQ OFFICES
V-6	AHU 5 & 6	CHWR	3-WAY	MODULATING	—	23.8	—	—	13.5	7	1½"	BEQ TOP FLOOR
V-6A	AHU 1-4	CHWR	3-WAY		—	23.3	—	—	13.3	7	1½"	BEQ 1ST & 2ND FLOOR
V-7	DHWH-1	STEAM	2-WAY		1964	—	26	15	35	—	2"	MECHANICAL BUILDING
V-8	DHWH-1	DHWS	3-WAY	MODULATING	—	575			330	7	6"	MECHANICAL BUILDING



8 M-9 DETAIL CONTROL AIR COMPRESSOR
NO SCALE



FAN EF-1 CONTROL (TYP FOR EF-2)
NO SCALE



FAN EF-6 CONTROL
NO SCALE

SEQUENCE OF OPERATION:

1. HEATING/COOLING CONTROL: SYSTEM SHALL BE ENERGIZED WHENEVER MANUAL "ON-OFF" SWITCH IS IN "ON" POSITION, AND SYSTEM MODE SHALL BE CONTROLLED BY "COOL-AUTO-HEAT" SELECTOR SWITCH. WITH THE SELECTOR SWITCH IN THE AUTO POSITION, A NORMALLY OPEN THERMOSTAT (T-1), LOCATED IN THE OUTSIDE AIR, SHALL CONTROL THE SYSTEM CHANGEOVER. ABOVE 65 DEGREES F OUTSIDE TEMPERATURE THE SYSTEM SHALL BE IN THE COOLING MODE, AND BELOW 65 DEGREES F THE SYSTEM SHALL BE IN THE HEATING MODE. WHEN SYSTEM IS IN THE HEATING MODE THE HEATING HOT WATER PUMP SHALL BE ENERGIZED AND THE SWITCHOVER 3-WAY VALVES (V-2 AND V-3) SHALL BE IN THE HEATING (NORMALLY OPEN) POSITIONS. WHEN SYSTEM IS IN THE COOLING MODE A REMOTE BULB THERMOSTAT (AQ-1), ACTING AS HIGH LIMIT SAFETY, WITH ELEMENT LOCATED IN THE RETURN WATER LINE SHALL PREVENT SYSTEM CHANGEOVER UNTIL WATER TEMPERATURE IS BELOW A PREDETERMINED SETTING (85 DEGREES F ADJ.). UNTIL CHANGEOVER TEMPERATURE IS MAINTAINED, HOT WATER PUMP SHALL CONTINUE TO OPERATE WITHOUT SHORT CYCLING, CIRCULATING WATER FOR COOL DOWN, AND THE CONVERTER STEAM VALVE V-1 SHALL BE MAINTAINED IN THE CLOSED POSITION DURING COOLING MODE. RELAY (CR1) SHALL BE ENERGIZED WHEN (AQ-1) CLOSES, TO START CHILLED WATER PUMP, STOP HOT WATER PUMP, AND POSITION 3-WAY VALVES (V-2 AND V-3), TO COOLING MODE.

2. CHILLER CONTROL: THE AIR COOLED WATER CHILLER SHALL HAVE SELF-CONTAINED CONTROLS WHICH WILL START ON A DEMAND FOR COOLING, AND FLOW SWITCHES (FS-1 AND FS-2) SHALL BE INTERLOCKED TO PREVENT CHILLERS FROM STARTING UNLESS THERE IS PROOF OF FLOW IN THE CHILLED WATER LINE. AN ELECTRICAL INTERLOCK BETWEEN CHILLED WATER PUMP AND CHILLER SHALL PREVENT CHILLER FROM STARTING UNLESS PUMP IS ENERGIZED. THE TEMPERATURE CONTROLLER SHALL ARRANGE THE UNLOADING STAGES TO PREVENT SHORT CYCLING OF EITHER MACHINE AND MAINTAIN SYSTEM CHILLED WATER TEMPERATURE WITHIN PLUS OR MINUS 2 DEGREES F OF THE SYSTEM DESIGN. CHILLER CONTROL SEQUENCER SHALL ALLOW LEAD MACHINE TO OPERATE UP TO GREATER THAN 50 PERCENT (ADJUSTABLE) OF THE SYSTEM LOAD BEFORE ENERGIZING THE SECOND MACHINE. AS THE TOTAL LOAD DECREASES, THE LAG MACHINE SHALL REMAIN IN OPERATION UNTIL LESS THAN 50 PERCENT (ADJUSTABLE) OF THE SYSTEM LOAD IS REACHED. MACHINE SHALL HAVE A LEAD-LAG SELECTOR SWITCH. THE LEAVING WATER TEMPERATURE FROM EITHER MACHINE SHALL NOT FALL BELOW 38 DEGREES F OR MANUFACTURER'S RECOMMENDATIONS, WHICHEVER IS HIGHER.

3. HOT WATER CONTROL: AN ADJUSTABLE OUTDOOR RESET THERMOSTAT (TC-1) MODULATES, THROUGH A TEMPERATURE CONTROLLER, STEAM REGULATING VALVE (V-1) ON A PREDETERMINED RESET SCHEDULE TO MAINTAIN LEAVING WATER TEMPERATURE.

4. FAN COIL UNITS: A LOW VOLTAGE CHANGEOVER THERMOSTAT (TS-1) FOR USE WITH COMBINATION HEATING-COOLING THERMOSTAT (RT-1) SHALL CONTROL THE WATER FLOW THROUGH EACH FAN COIL UNIT BY CONTROLLING THE POSITION OF A TWO-POSITION THREE-WAY VALVE (V-5). THE MODE OF THE CHANGEOVER THERMOSTAT SHALL BE CONTROLLED BY A STRAP-ON THERMOSTAT ELEMENT ON THE WATER SUPPLY TO THE TWO-POSITION THREE-WAY VALVE (V-5). WHEN WATER SUPPLY IS ABOVE 65 DEGREES F, THE CHANGEOVER THERMOSTAT (TS-1) SHALL BE POSITIONED TO THE HEATING MODE. WHEN WATER SUPPLY IS BELOW 65 DEGREES F, THE CHANGEOVER THERMOSTAT (TS-1) SHALL BE POSITIONED TO THE COOLING MODE. FAN OPERATION SHALL BE CONTROLLED BY OFF-HIGH-MEDIUM-LOW FAN SPEED SWITCH (MS-1). THERMOSTAT AND SWITCH SHALL BE MOUNTED FIVE FEET ABOVE THE FLOOR.

5. LAUNDRY ROOM CONTROL: A TWO-STAGE HEATING/COOLING THERMOSTAT SHALL ENERGIZE THE EXHAUST FAN ANY TIME SPACE TEMPERATURE EXCEEDS 80 DEGREES F AND ENERGIZE THE UNIT HEATER FAN WHENEVER THE SPACE TEMPERATURE FALLS BELOW 65 DEGREES F. WHEN THE ROOM TEMPERATURE FALLS BELOW 80 DEGREES F THE EXHAUST FAN SHALL BE DE-ENERGIZED. A STRAP-ON AQUASTAT SHALL PREVENT THE UNIT HEATER FROM OPERATING IF THE WATER TEMPERATURE IS BELOW 80 DEGREES F AND CLOSE TWO-POSITION VALVE. V-4

6. MECHANICAL EQUIPMENT BUILDING EXHAUST FAN EF-4: FAN SHALL BE CONTROLLED BY A THERMOSTAT. ON A RISE IN ROOM TEMPERATURE, THERMOSTAT SET FOR 85 DEGREES F, THE FAN SHALL ENERGIZE AND OPEN OUTSIDE AIR INTAKE DAMPER, AND ON A DROP IN TEMPERATURE THE REVERSE SHALL OCCUR.

7. AIR HANDLER UNIT CONTROL (FOR EACH A.H. UNIT): UNITS SHALL BE STARTED AND STOPPED MANUALLY.

7.1 THE AH UNIT AND ROOM CONTROLS SHALL BE INDEXED FOR HEATING OR COOLING FROM A SENSOR (AQ-2) IN THE CW/HW SUPPLY PIPING FROM CENTRAL SYSTEM. WHEN 75 DEGREES F OR ABOVE WATER TEMPERATURE IS SENSED, THE SYSTEM SHALL BE INDEXED FOR HEATING. WHEN 65 DEGREES F OR BELOW WATER IS SENSED, THE SYSTEM SHALL BE INDEXED FOR COOLING.

7.2 WITH AH UNITS OPERATING AND SYSTEM INDEXED FOR HEATING, THE RETURN AIR SENSOR SHALL RESET THE DISCHARGE AIR TEMPERATURE OVER A PREDETERMINED SCHEDULE. ON A FALL IN DISCHARGE TEMPERATURE, CONTROLLER (RC) SHALL REPOSITION THREE-WAY VALVE (V-6) SUPPLYING HOT WATER TO THE UNIT COIL.

7.3 WITH THE AH UNIT OPERATING AND SYSTEM INDEXED FOR COOLING, THE DISCHARGE AIR CONTROLLER (TTD) SHALL BE AUTOMATICALLY SET TO MAINTAIN 59 DEGREE F CONSTANT DISCHARGE AIR TEMPERATURE. THE RETURN AIR SENSOR SHALL BE LOCKED OUT.

7.4 PROVIDE A TEMPERATURE LOW LIMIT THERMOSTAT (TLL) TO SHUT THE AH UNIT DOWN AT 38 DEGREES F.

7.5 PROVIDE A TEMPERATURE HIGH LIMIT THERMOSTAT (THL) TO SHUT THE AH UNIT DOWN AT 135 DEGREES F.

8. ROOM CONTROL: WITH THE ROOM THERMOSTAT INDEXED FOR HEATING, THE ROOM THERMOSTAT SHALL ON A FALL IN TEMPERATURE MODULATE THE TAB SUPPLY AIR DAMPER OPEN SIMULTANEOUSLY CLOSING THE ROOM RETURN AIR DAMPER. WITH THE THERMOSTAT INDEXED FOR COOLING THE THERMOSTAT SHALL ON A RISE IN TEMPERATURE MODULATE TO OPEN THE TAB SUPPLY AIR SIMULTANEOUSLY CLOSING THE ROOM RETURN. INDEXING FOR HEATING AND COOLING SHALL BE AUTOMATIC BY CENTRAL SOURCE.

9. AH UNIT STATIC PRESSURE CONTROL: A STATIC PRESSURE CONTROL (SPC) SHALL BE PROVIDED FOR EACH SUPPLY PLENUM (FOUR PER AH UNIT) WITH THE SENSING TIPS LOCATED IN THE SUPPLY PLENUM 3/4 DOWN TOTAL LENGTH OF SUPPLY AIR DUCT IN WHICH INSTALLED AND IN THE AH EQUIPMENT ROOM. ON A RISE IN STATIC ABOVE THE CONTROLLER SETPOINT (.75 INCH ADJ.) THE CONTROLLER SHALL MODULATE THE INLET VALVE ON THE AH UNIT FAN. THROUGH A HIGH-LOW PRESSURE SELECTOR (ONE PER AH UNIT). THE CONTROLLER SET POINT IS ADJUSTABLE.

10. HOT WATER STORAGE HEATERS: A SELF-CONTAINED CONTROL VALVE WITH A CAPILLARY BULB IN THE DOMESTIC HOT WATER TANK SHALL MODULATE THE NORMALLY CLOSED STEAM VALVE TO CONTROL THE WATER TEMPERATURE SET AT 110 DEGREES F. DOMESTIC WATER CIRCULATION PUMP P-3 SHALL BE CONTROLLED AUTOMATICALLY BY AQUASTAT LOCATED IN DOMESTIC HOT WATER RETURN SET AT 110 DEGREES F AND WHEN TEMPERATURE DROPS BELOW 110 DEGREES F WILL START PUMP P-3. A SELF-CONTAINED TEMPERING VALVE V-8 SET AT 110 DEGREES F. WITH BULB LOCATION IN THE DOMESTIC HOT WATER SUPPLY LINE SHALL MAINTAIN THE DESIRED DOMESTIC HOT WATER TEMPERATURE TO THE BUILDINGS.

11. EF-1 AND EF-2 EXHAUST FAN CONTROL: WITH HIGH LIMIT THERMOSTAT AND DISCONNECT SWITCH CLOSED, EXHAUST FAN RUNS CONTINUOUSLY.

12. ENERGY MONITORING CONTROL SYSTEM (EMCS): A CENTRAL ENERGY MANAGEMENT AND CONTROL SYSTEM WILL BE INSTALLED IN THE FUTURE WHICH WILL CONNECT BUILDINGS HP-506, HP-507, HP-508, HP-509, & HP-510 AND THE MECHANICAL BUILDING HP-511. DATA TERMINAL CABINETS (DTC) SHALL BE FURNISHED THAT WILL INCORPORATE THE FOLLOWING POINTS INTO THE EMCS. ALL EQUIPMENT SHALL BE COMPATIBLE FOR CONNECTING TO THE FUTURE FIELD INTERFACE DEVICES AND TO THE CENTRAL SYSTEM.

12.1 MECHANICAL BUILDING:

- CHILLED/HOT WATER SUPPLY AND RETURN -- TEMPERATURE SENSOR (DEGREE F) AND FLOW (GPM)
- CHILLER PACC-1 -- START-STOP, ALARMS STATUS, CHILLED WATER RESET AND CHILLER PROFILE AND SELECT
- CHILLER PACC-2 -- START-STOP, ALARMS STATUS, CHILLED WATER RESET AND CHILLER PROFILE AND SELECT.
- STEAM LINE -- MEASURE STEAM FLOW LBS./HOUR (ORIFICE)
- STEAM LINE -- TOTALIZE STEAM FLOW
- ELECTRICAL ENERGY -- MEASURE AND TOTALIZE KWH, KWD, CHILLER PACC-1 AND 2, P1 AND P2.
- MONITOR HEAT OR COOL CONTROL POSITION
- PUMPS NO. 1 AND 2 -- MONITOR OPERATION, START-STOP (FOR DEMAND LIMITING)

12.2 UEPH BUILDINGS:

- POINTS LISTED ARE REQUIRED IN EACH BUILDING:
- MEASURE TEMPERATURE OF SUPPLY AND RETURN AIR TEMPERATURE OF EACH AIR HANDLER (6 PER BUILDING)
- BUILDING AIR HANDLERS (6 PER BUILDING) START-STOP FOR DEMAND LIMITING AND DUTY CYCLING, FAN STATUS
- HUMIDITY MONITORING, EACH BUILDING AIR HANDLERS, (6 PER BUILDING)
- TERMINAL AIR BLENDER CONTROL (ONE PER AIR HANDLING UNIT) -- HIGH AND LOW TEMPERATURE

13. PUMP P-4 CONTROL (TYPICAL FOR FOUR PUMPS): PUMP P-4 SHALL BE ENERGIZED WHEN THE TEMPERATURE OF THE WATER IN THE DOMESTIC HOT WATER STORAGE GENERATOR FALLS BELOW 115 DEGREES F. HOWEVER, THE PUMP SHALL BE INTERLOCKED WITH THE RECIPROCATING LIQUID CHILLER SO THAT THE PUMP WILL NOT OPERATE UNLESS THE CHILLER IS IN OPERATION. ALSO, A SENSOR IN THE CHILLER'S LEAVING CHILLED WATER LINE SHALL DE-ENERGIZE THE PUMP IF THE LEAVING CHILLED WATER TEMPERATURE EXCEEDS 46 DEGREES F.

M-9

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 8352 WILLIAM ALBERT SANDERS 12-11-86

J. N. PEASE ASSOCIATES NORTH CAROLINA No. 83 CHARLOTTE, N.C.

J. N. PEASE ASSOCIATES
ARCHITECTS · ENGINEERS · PLANNERS
CHARLOTTE NORTH CAROLINA

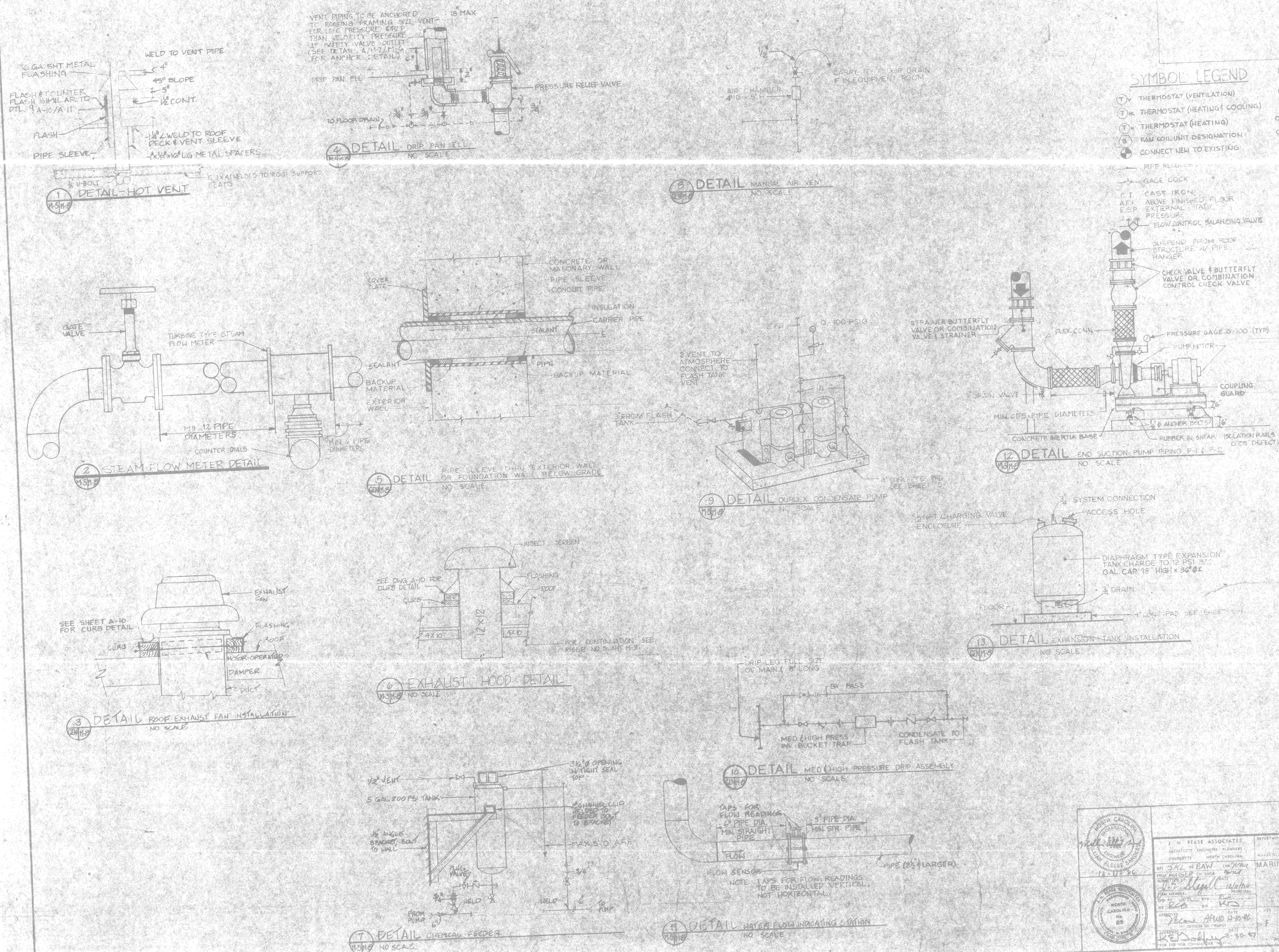
DES SKL DR BAW CHK
PROJ MGR GLF CH ENGR
SUBMITTED BY DATE 12/11/86
FIRM MEMBER PRINCIPAL
EFD RCA
APPROVED DATE ARIBO 12-15-86
OFFICER IN CHARGE
APPROVED DATE 3-30-87
FOR EFD FOR COMMANDER NAVFAC

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VIRGINIA

MARINE CORPS BASE CAMP LEJEUNE, N.C.
BACHELOR ENLISTED QUARTERS

CONTROLS & SCHEDULES

SIZE F | CODE IDENT NO 80091 | NAVFAC DRAWING NO 4155183
CONSTR. CONTR. NO N62470-85-B-5142
SCALE AS SHOWN | SPEC 05-85-5142 | SHEET 84 OF 118
EFD DWG NO. 255183



SYMBOL LEGEND

Symbol	Description
(T)V	THERMOSTAT (VENTILATION)
(T)HC	THERMOSTAT (HEATING & COOLING)
(T)H	THERMOSTAT (HEATING)
(B)	FAN COIL UNIT DESIGNATION
	CONNECT NEW TO EXISTING
	PIPE REDUCER
	GAGE COCK
C.I.	CAST IRON
A.F.F.	ABOVE FINISHED FLOOR
E.S.P.	EXTERNAL STATIC PRESSURE
	FLOW CONTROL BALANCING VALVE
DMSD	DUCT MOUNTED SMOKE DETECTOR
O.V.	OUTLET VELOCITY
CHWS	CHILLED HOT WATER SUPPLY
CHWR	CHILLED HOT WATER RETURN
CWS	CHILLED WATER SUPPLY
CWR	CHILLED WATER RETURN
	GATE VALVE
	HOSE END GATE VALVE
	BUTTERFLY VALVE
	GLOBE VALVE
	STRAINER
	2-WAY CONTROL VALVE
	3-WAY CONTROL VALVE
	UNION
	PIPE REDUCTION CONCENTRIC
	PRESS. GAUGE W/ GAUGE COCK
	THERMOMETER
	CHECK VALVE
MAV	MANUAL AIR VENT
MVD	MANUAL VOLUME DAMPER
PRV	PRESS. RED. VALVE
FCU	FAN COIL UNIT
UH	UNIT HEATER
TABU	TERMINAL AIR BLENDER
DS	DESUPER HEATER
FL. DR.	FLOOR DRAIN
	OPPOSED BLADE DAMPER
EMCS	ENERGY MONITORING CONTROL SYSTEM
MOD	MOTOR OPERATED DAMPER
AD	ACCESS DOOR
FD	FIRE DAMPER
BFF	BELOW FINISHED FLOOR
(T)	THERMOSTAT
(H)	HUMIDITY SENSOR
HWS	HOT WATER SUPPLY
HWR	HOT WATER RETURN
MPS	MEDIUM PRESSURE STEAM
	FLOW DIRECTION
HPS	HIGH PRESSURE STEAM
DG	DOOR GRILLE
	PIPE ANCHOR
PCHWS	PRIMARY CHILLED HOT WATER SUPPLY
PCHWR	PRIMARY CHILLED HOT WATER RETURN
DHWS	DOMESTIC HWS
DHWR	DOMESTIC HWR
RHW	RECLAIM HOT WATER
PD	PUMP DISCHARGE
VTR	VENT TO ROOF
MPD	MED PRESS. DRIP ASSEMBLY
HPD	HIGH PRESS DRIP ASSEMBLY
HG	HOT GAS LINE
L	LIQUID LINE
CVA	CONTROL VALVE ASSEMBLY
PACC	PACKAGE AIR COOLED CHILLER
E	EXPANSION LINE
CTE	CONNECT TO EXISTING

M-8

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — WILLIAM ALBERT SANDERS — 12-11-86

J. N. PEASE ASSOCIATES, ARCHITECTS · ENGINEERS · PLANNERS, CHARLOTTE, NORTH CAROLINA

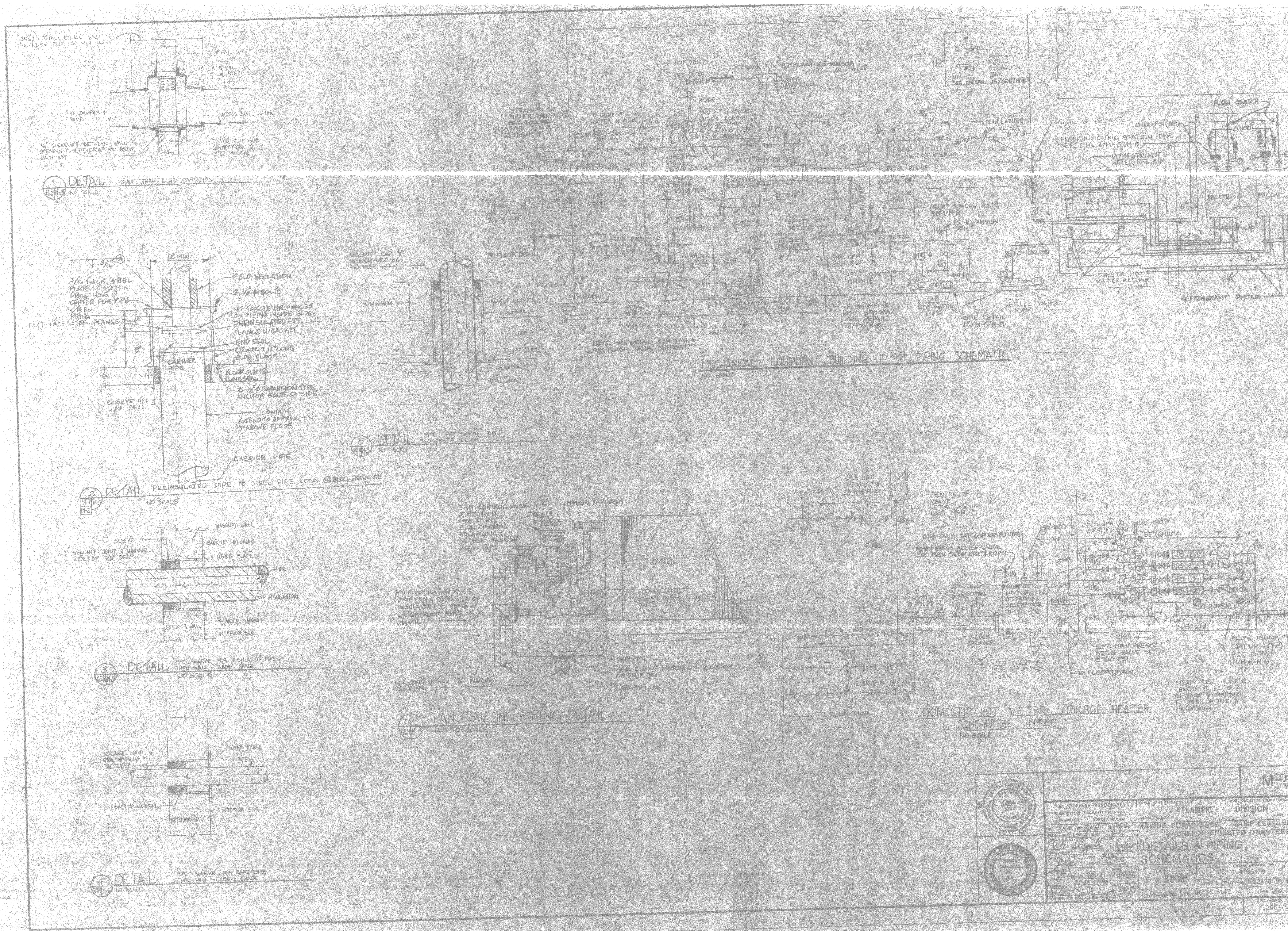
DES SKL DR BAW CHK
PROJ MGR GLP CH ENGR
SUBMITTED AT 12/11/86 PRINCIPAL
EFD RD JCR RVD RLA
HD RCB DIR
APPROVED APWO 12-15-86 OFFICER IN CHARGE
APPROVED 3-30-87 FOR EFD FOR COMMANDER NAVFAC

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND — ATLANTIC DIVISION — NORFOLK, VIRGINIA

MARINE CORPS BASE CAMP LEJEUNE, N.C.
BACHELOR ENLISTED QUARTERS

HVAC DETAILS

SIZE F — CODE IDENT NO 80091 — NAVFAC DRAWING NO 4155182
CONSTR. CONTR. NO N62470-85-B-5142
SPEC. 05-85-5142 — SHEET 83 OF 118
EFD DWG NO 255182


DETAIL DUCT THRU 1 HR PARTITION
NO SCALE
DETAIL PREINSULATED PIPE TO STEEL PIPE CONN @ BLDG. ENTRANCE
NO SCALE
DETAIL PIPE SLEEVE FOR INSULATED PIPE THRU WALL - ABOVE GRADE
NO SCALE
DETAIL PIPE SLEEVE FOR BARE PIPE THRU WALL - ABOVE GRADE
NO SCALE
DETAIL PIPE PENETRATION THRU CONCRETE FLOOR
NO SCALE
MECHANICAL EQUIPMENT BUILDING HP-511 PIPING SCHEMATIC
NO SCALE
FAN COIL UNIT PIPING DETAIL
NOT TO SCALE
DOMESTIC HOT WATER STORAGE HEATER SCHEMATIC PIPING
NO SCALE
M-5
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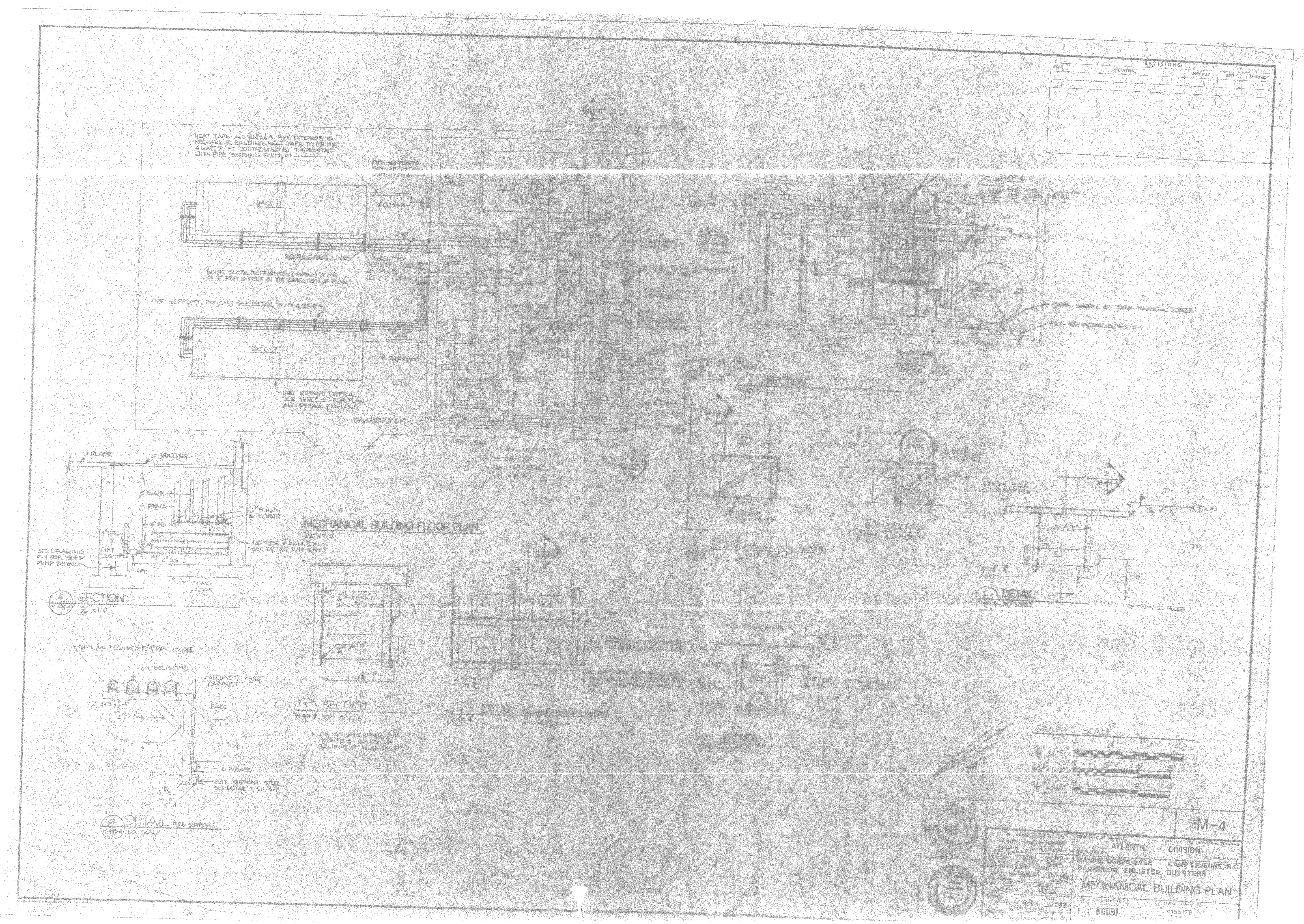
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NORFOLK, VIRGINIA
MARINE CORPS BASE CAMP LEJEUNE, N.C.
BACHELOR ENLISTED QUARTERS
DETAILS & PIPING SCHEMATICS
SIZE F
CODE IDENT. NO. 80091
NAVFAC DRAWING NO. 4155179
CONSTR. CONTR. NO. N62470-85-B-5142
SPEC 05-85-5142
EFD DWG. NO. 255179



HEAT TAPE ALL CWS&R PIPE EXTERIOR TO MECHANICAL BUILDING. HEAT TAPE TO BE MIN. 4 WATTS / FT CONTROLLED BY THERMOSTAT WITH PIPE SENSING ELEMENT
PACC-1
PACC-2
REFRIGERANT LINES
NOTE: SLOPE REFRIGERANT PIPING A MIN. OF 1/4" PER 10 FEET IN THE DIRECTION OF FLOW
PIPE SUPPORT (TYPICAL) SEE DETAIL D/M-4/M-4
UNIT SUPPORT (TYPICAL) SEE SHEET S-1 FOR PLAN AND DETAIL 7/S-1/S-1
AIR SEPARATOR
AIR VENT
MECHANICAL BUILDING FLOOR PLAN
1/4" = 1'-0"
SECTION
DETAIL
FLOOR
GRATING
3" DHWR
6" DHWS
6" PCHWS
6" PCHWR
3" PD
FIN TUBE RADIATION SEE DETAIL 11/M-4/M-7
SEE DRAWING P-4 FOR SUMP PUMP DETAIL
12" CONC FLOOR
SECTION
3/8" = 1'-0"
SHIM AS REQUIRED FOR PIPE SLOPE
U BOLTS (TYP)
SECURE TO PACC CABINET
PACC
UNIT BASE
UNIT SUPPORT STEEL SEE DETAIL 7/S-1/S-1
DETAIL PIPE SUPPORT
NO SCALE
SECTION
NO SCALE
* OR AS REQUIRED FOR MOUNTING HOLES ON EQUIPMENT FURNISHED
DETAIL
NO SCALE
GRAPHIC SCALE
3/8" = 1'-0"
1/4" = 1'-0"
1/8" = 1'-0"
M-4
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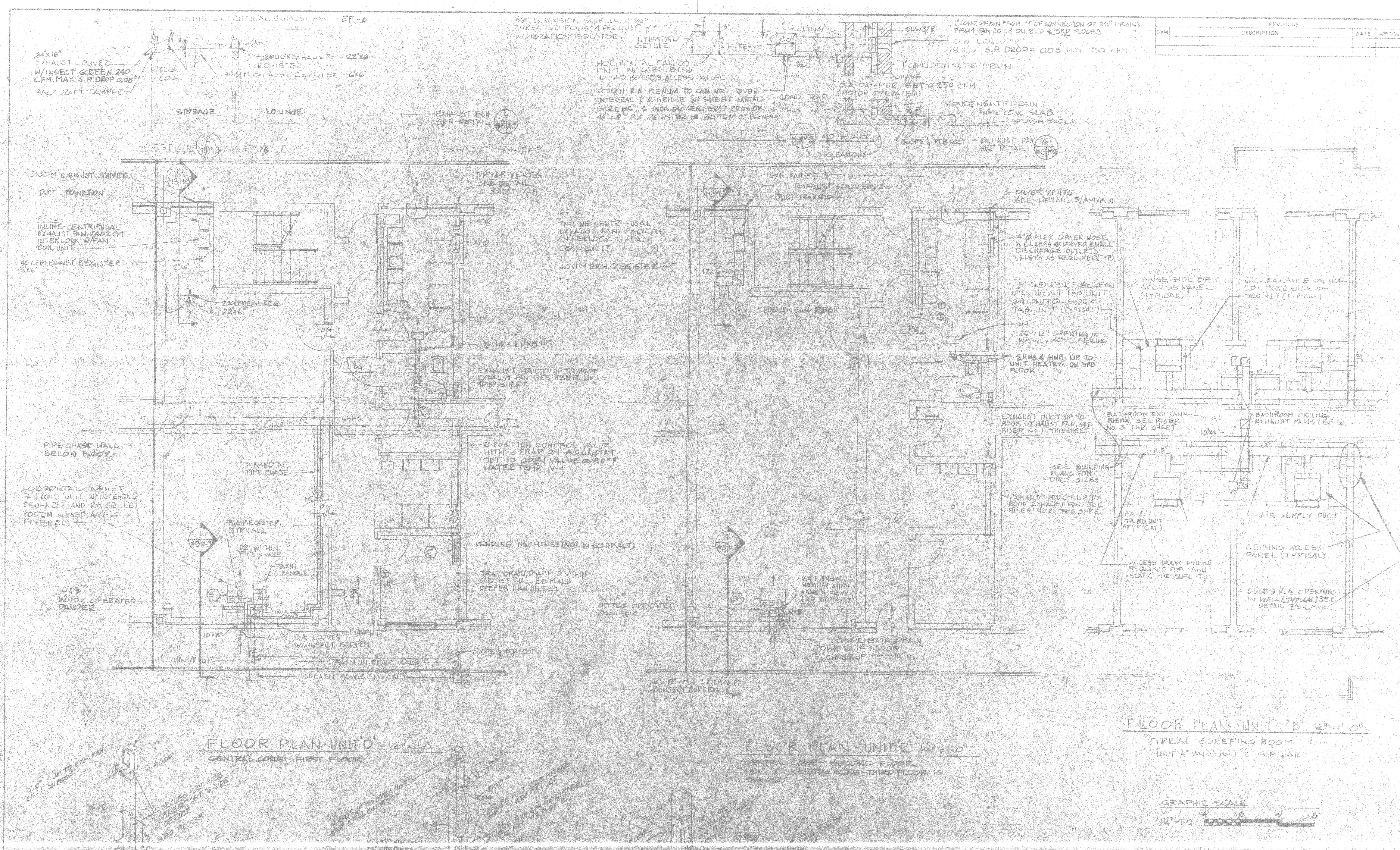
CHARLOTTE NORTH CAROLINA
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NORFOLK, VIRGINIA
MARINE CORPS BASE CAMP LEJEUNE, N.C.
BACHELOR ENLISTED QUARTERS
MECHANICAL BUILDING PLAN
SIZE F
CODE IDENT NO 80091
NAVFAC DRAWING NO 4155178



M-3

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CHARLOTTE NORTH CAROLINA

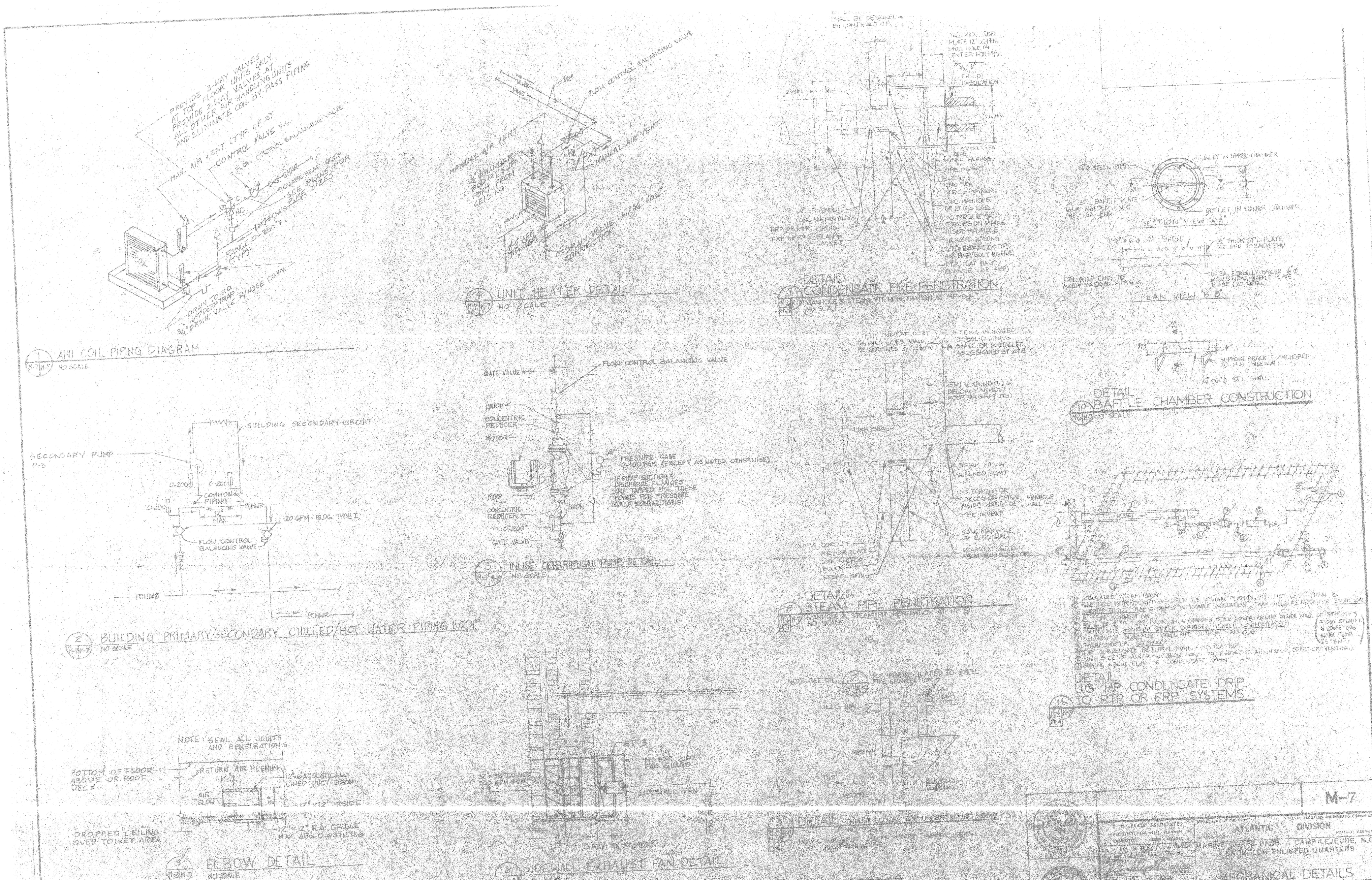
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VIRGINIA

MARINE CORPS BASE CAMP LEJEUNE, N.C.
BACHELOR ENLISTED QUARTERS

TYPICAL HVAC PLANS -
UNIT "B", "D", "E", & "F"

SIZE	F
CODE IDENT. NO.	80091
NAVFAC DRAWING NO.	4155177
CONSTR. CONTR. N.	N62470-85-B-5142
SCALE	AS SHOWN
SPEC.	05-85-5142
SHEET	78 OF 118
EFD DWG. NO.	255177

DES. SKL DR. BAW CHK.
PROJ. MGR. SLP CH. ENGR.
SUBMITTED BY DATE 12/11/86
FIRM MEMBER PRINCIPAL
APPROVED DATE 12-15-86
OFFICER IN CHARGE
APPROVED DATE 3-30-87
FOR EFD FOR COMMANDER, NAVFAC



NOTE:
IF ADDITIVE IS ACCEPTED ALL REFERENCES TO M-11 WILL BECOME M-11A

M-7

J. N. PEASE ASSOCIATES
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CHARLOTTE NORTH CAROLINA

DES. SKL DR. BAW CHK. WA

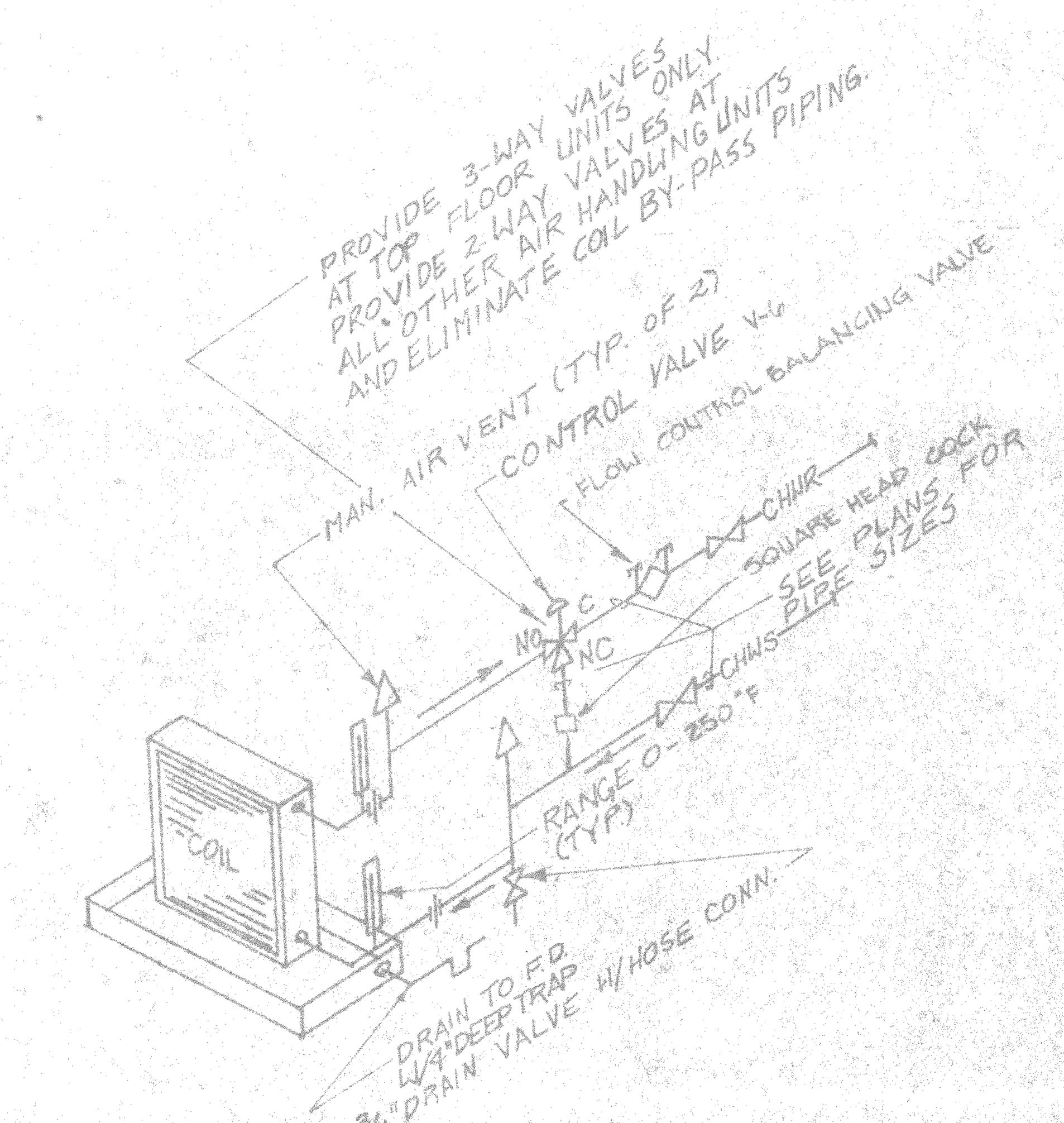
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NORFOLK, VIRGINIA

MARINE CORPS BASE CAMP LEJEUNE, N.C.
BACHELOR ENLISTED QUARTERS

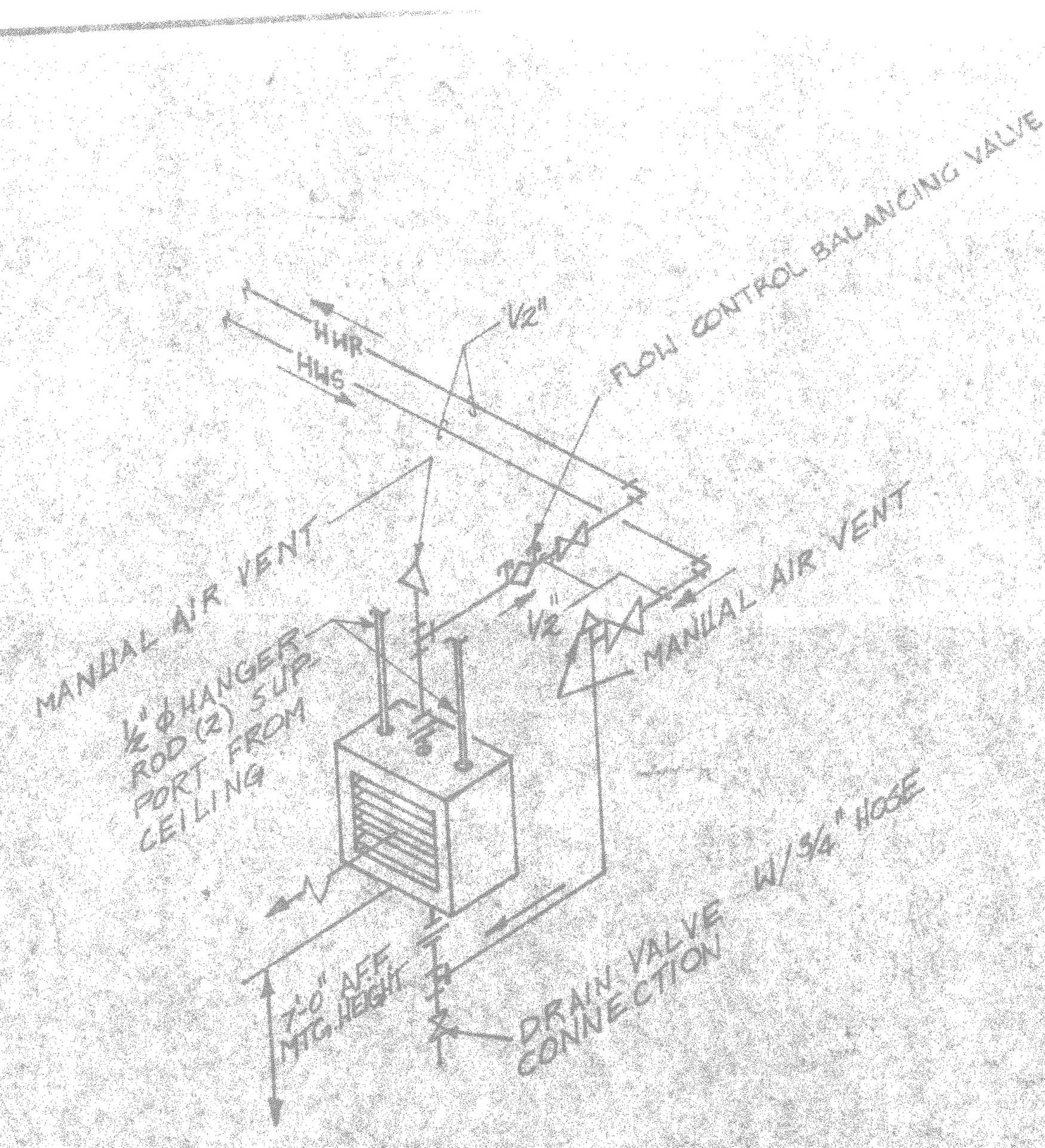
MECHANICAL DETAILS

SIZE F | CODE IDENT. NO. 80091 | NAVFAC DRAWING NO. 4155181
CONSTR. CONTR. NO. N62470-85-B-5142
SCALE 1"=25' | SPEC. 05-85-5142 | SHEET 82 of 118

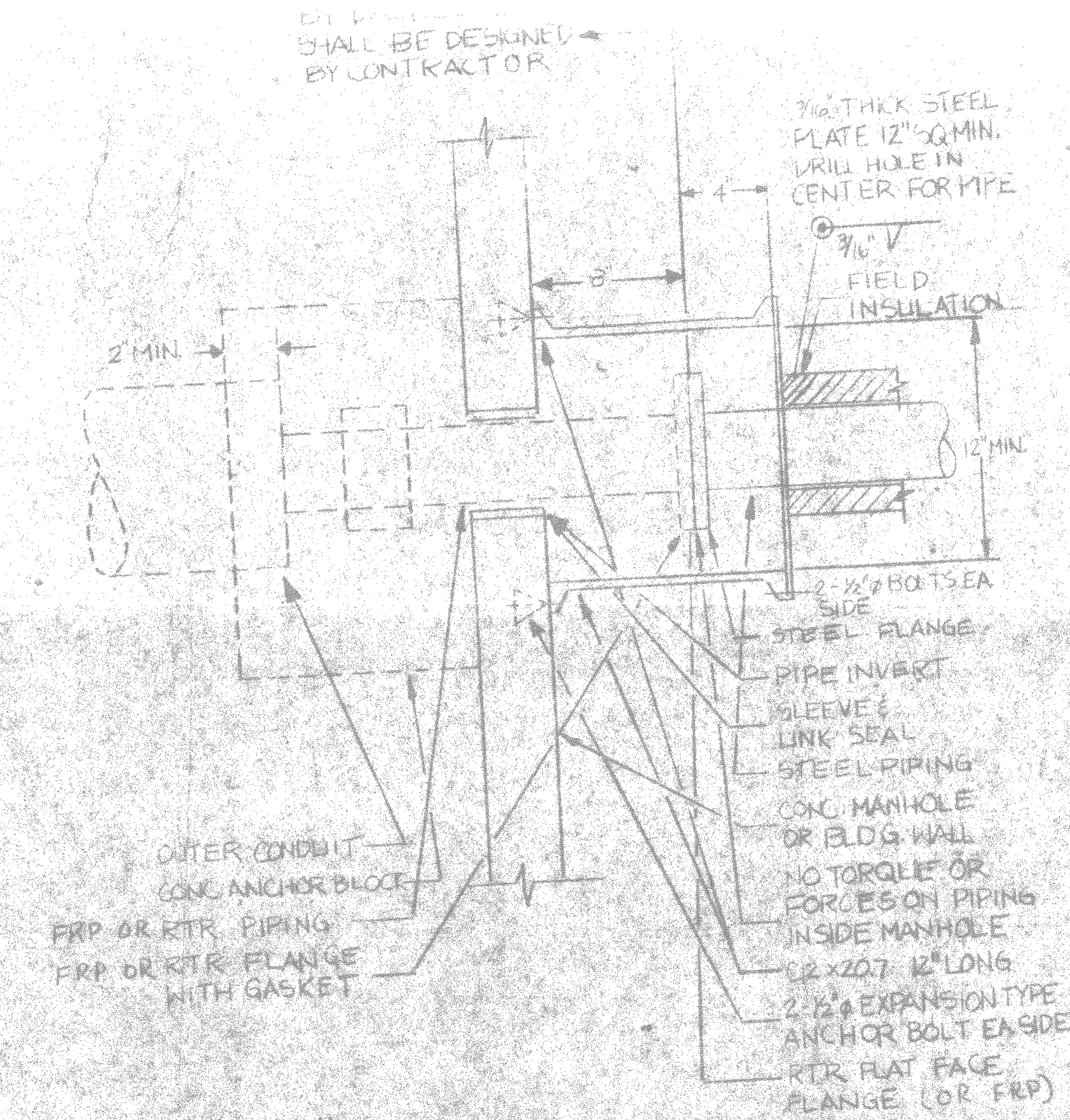
EFD DWG. NO. 255181



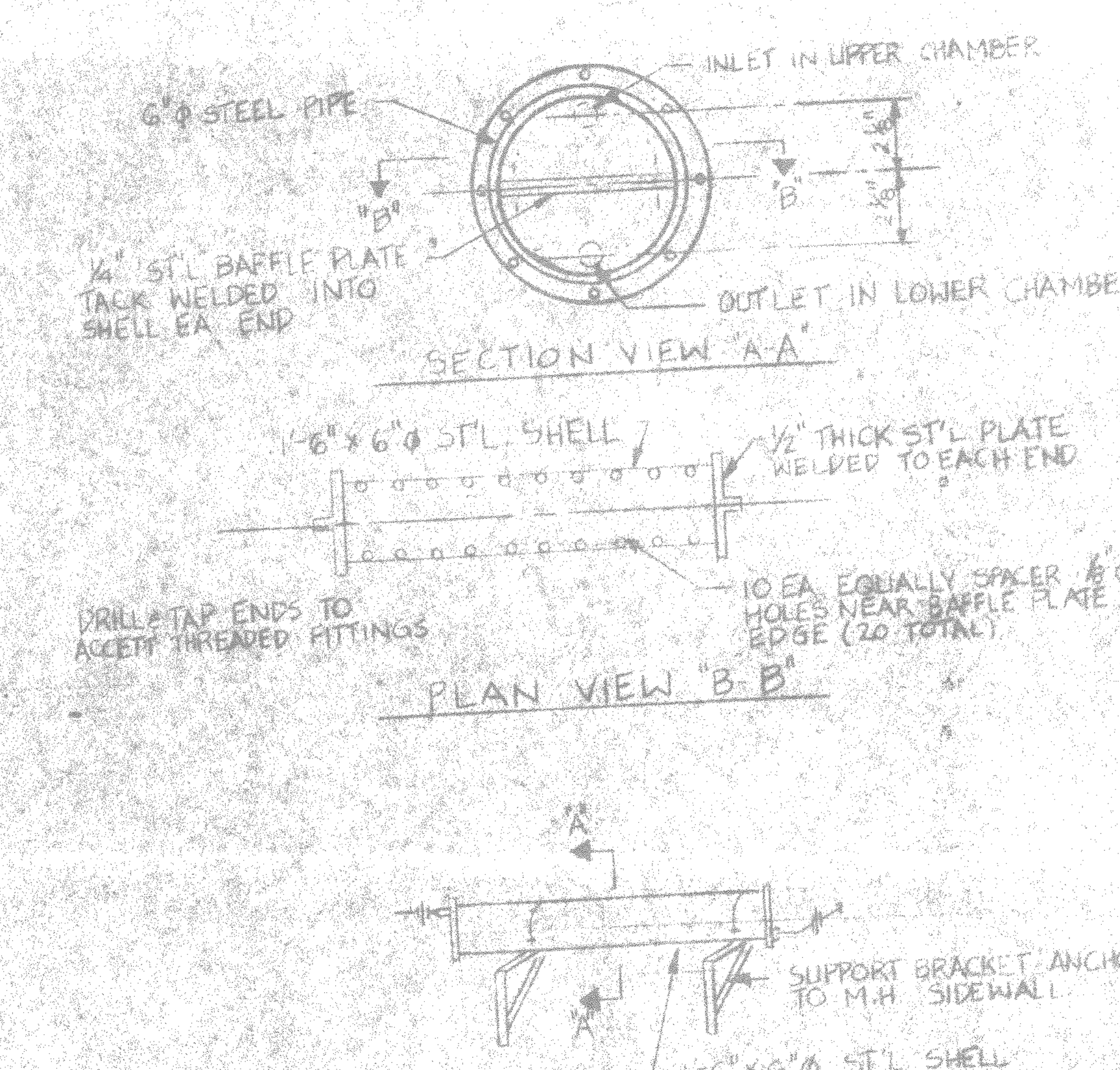
1 M-7 M-7 AHU COIL PIPING DIAGRAM
NO SCALE



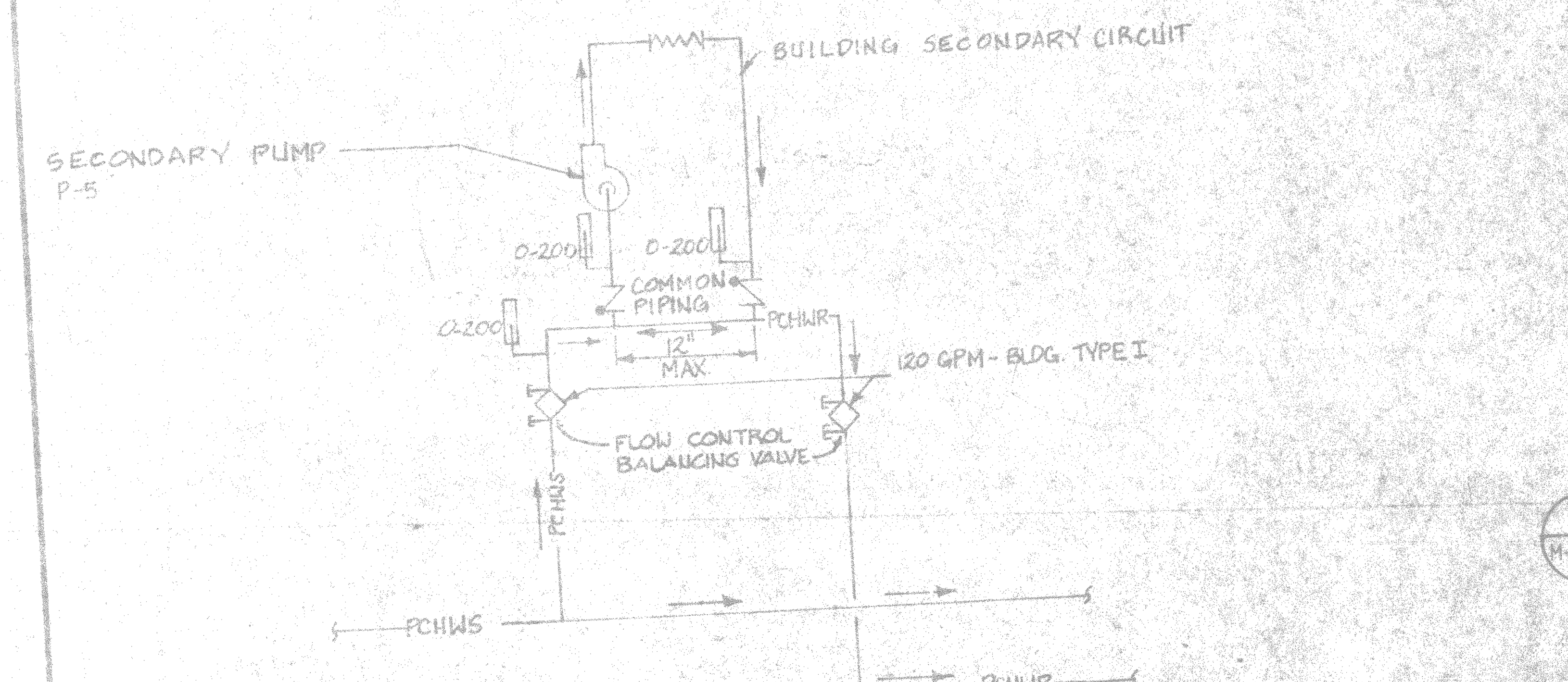
4 M-7 M-7 UNIT HEATER DETAIL
NO SCALE



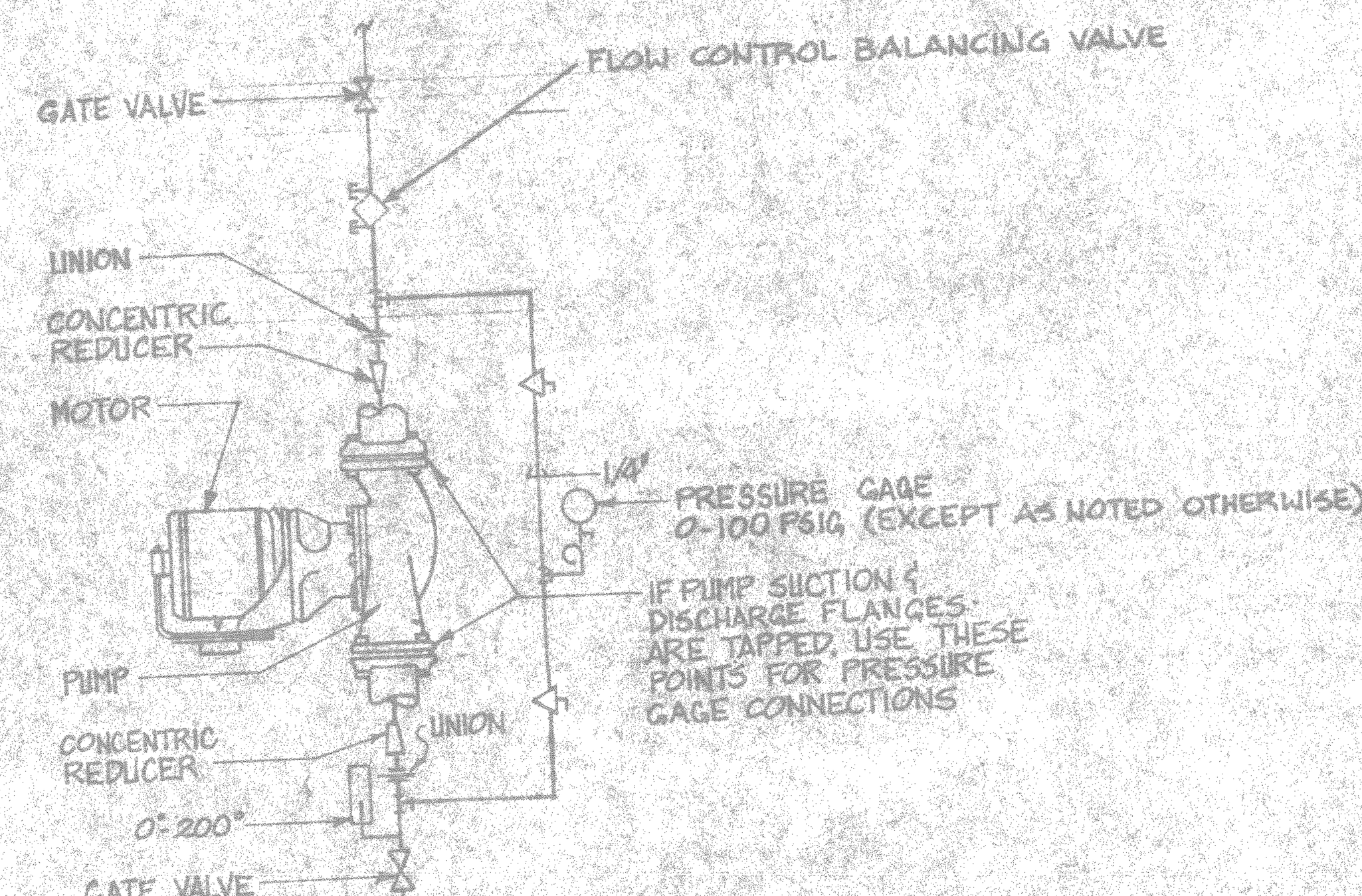
7 M-6 M-7 M-11 DETAIL: CONDENSATE PIPE PENETRATION
MANHOLE & STEAM PIT PENETRATION AT HP-511
NO SCALE



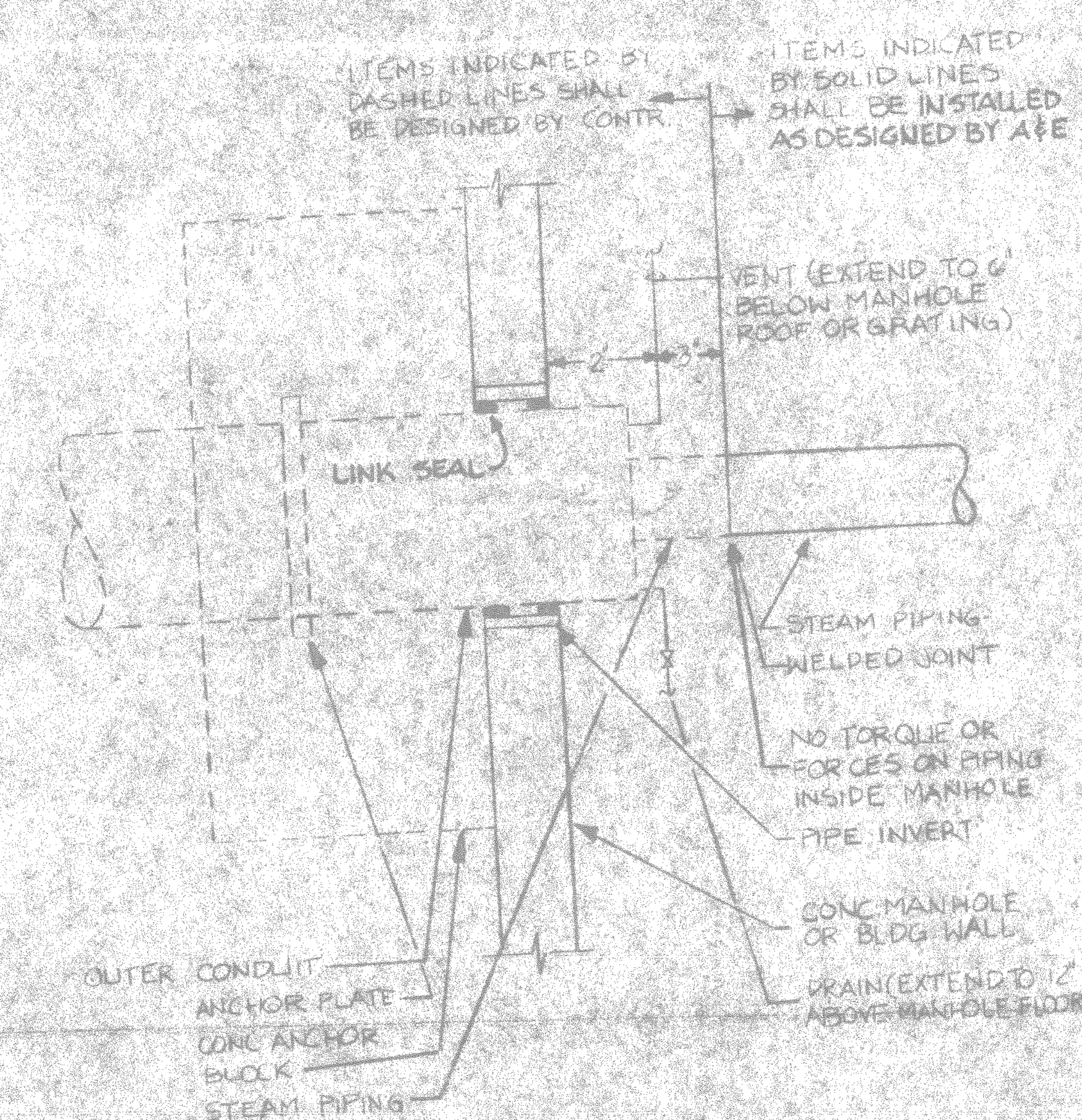
10 M-6 M-7 DETAIL: BAFFLE CHAMBER CONSTRUCTION
NO SCALE



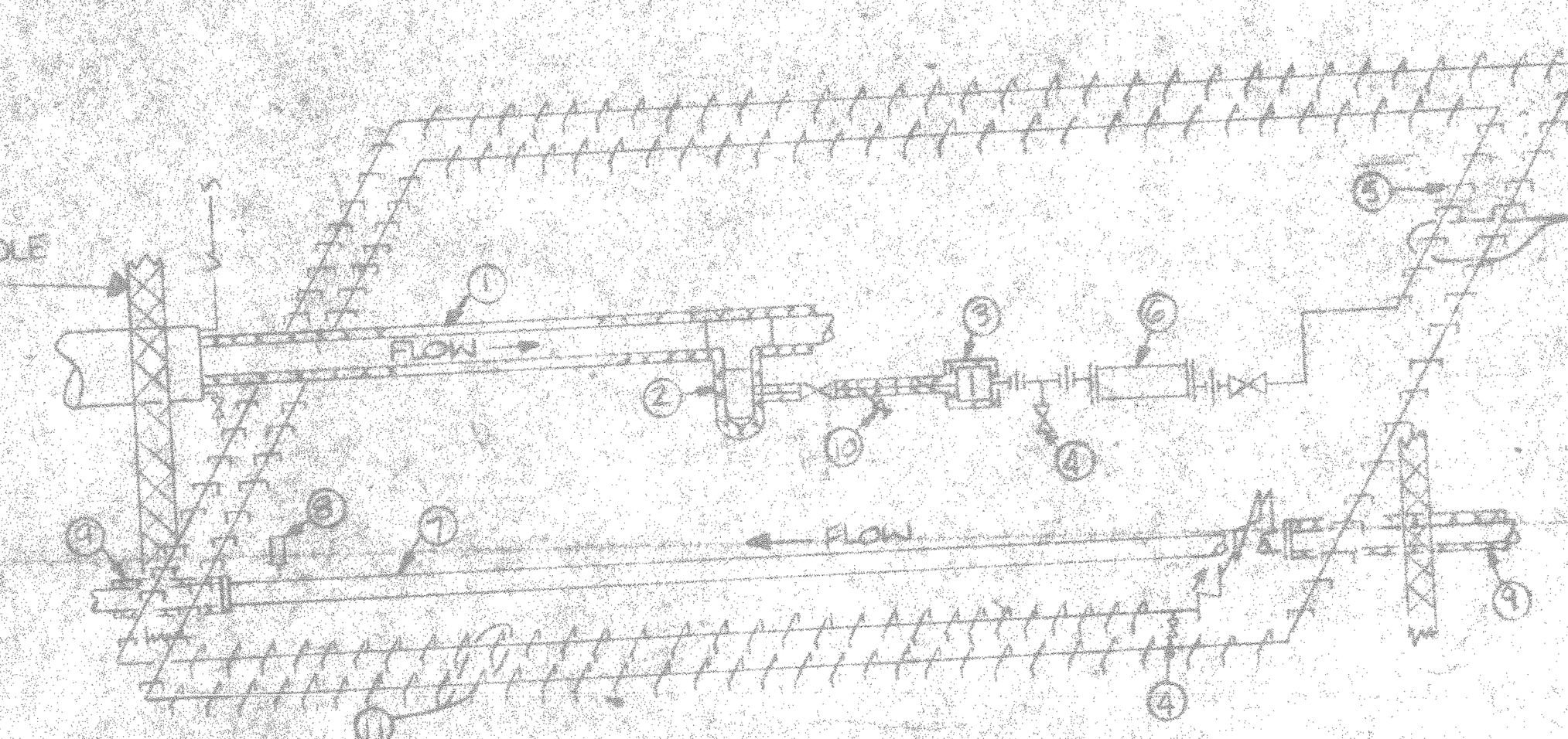
2 M-7 M-7 BUILDING PRIMARY/SECONDARY CHILLED/HOT WATER PIPING LOOP
NO SCALE



5 M-3 M-7 INLINE CENTRIFUGAL PUMP DETAIL
NO SCALE



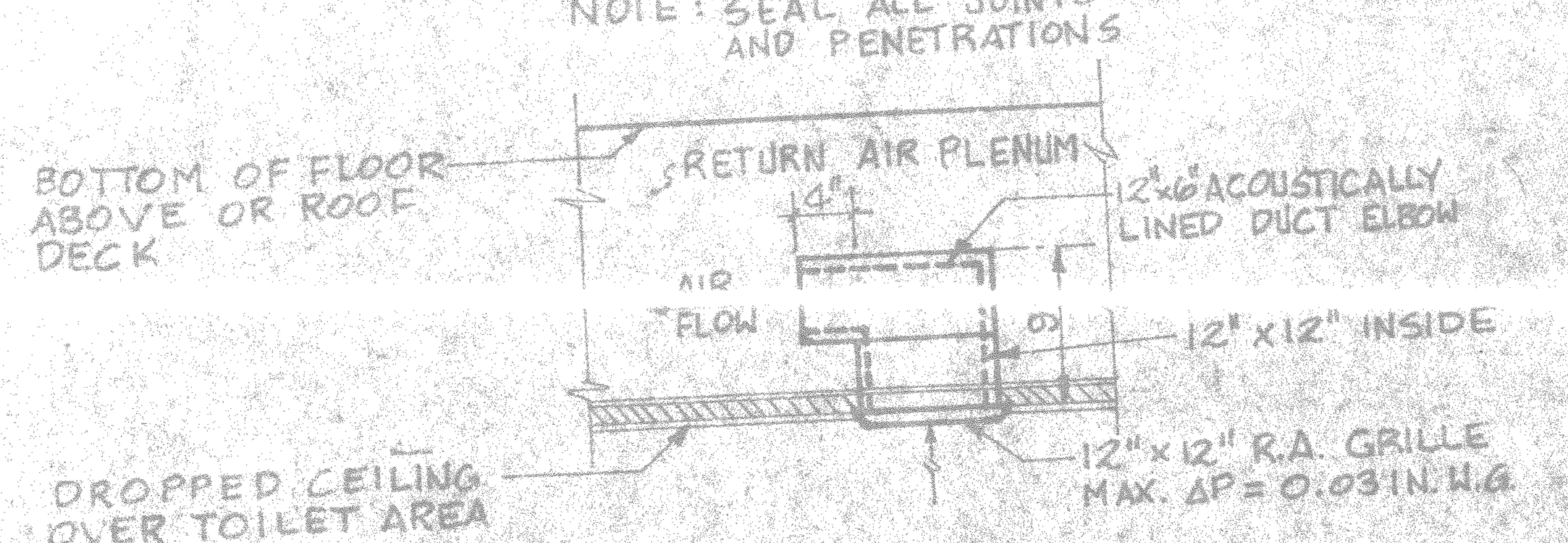
8 M-6 M-7 M-11 DETAIL: STEAM PIPE PENETRATION
MANHOLE & STEAM PIT PENTRATION AT HP 511
NO SCALE



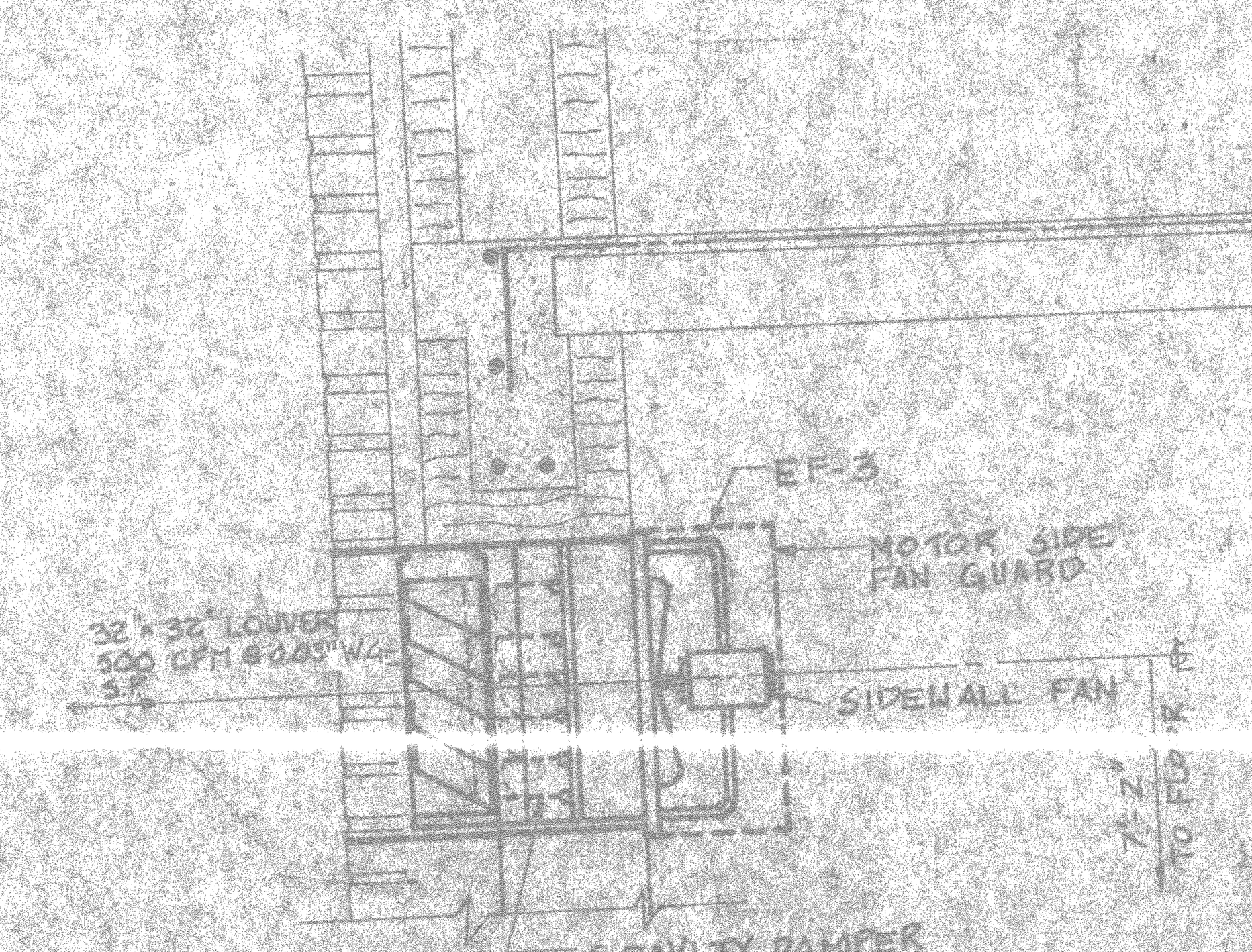
1. INSULATED STEAM MAIN
2. FULL SIZE DRIP POCKET AS DEEP AS DESIGN PERMITS BUT NOT LESS THAN 8"
3. INVERTED BUCKET TRAP W/FORMED REMOVABLE INSULATION. TRAP SIZED AS REQ'D FOR 3x STM LOAD
4. 1/2" TEST CONNECTION
5. 50 L.F. OF 2" FIN TUBE RADIATION W/EXPANDED STEEL COVER AROUND INSIDE WALL OF STM. M.H'S (±1000 BTUH/FT @ 200°F AVG WARR TEMP 65° ENT.)
6. CONDENSATE EXPANSION BAFFLE CHAMBER VESSEL (UNINSULATED)
7. SECTION OF INSULATED STEEL PIPE WITHIN MANHOLE
8. THERMOMETER 50°-300°F
9. FRP CONDENSATE RETURN MAIN - INSULATED
10. FULL SIZE STRAINER W/BLOW DOWN VALVE (USED TO AID IN COLD START-UP VENTING)
11. ROUTE ABOVE ELEV OF CONDENSATE MAIN

11 M-6 M-7 M-4 DETAIL: U.G. HP CONDENSATE DRIP TO RTR OR FRP SYSTEMS

NOTE: SEAL ALL JOINTS AND PENETRATIONS

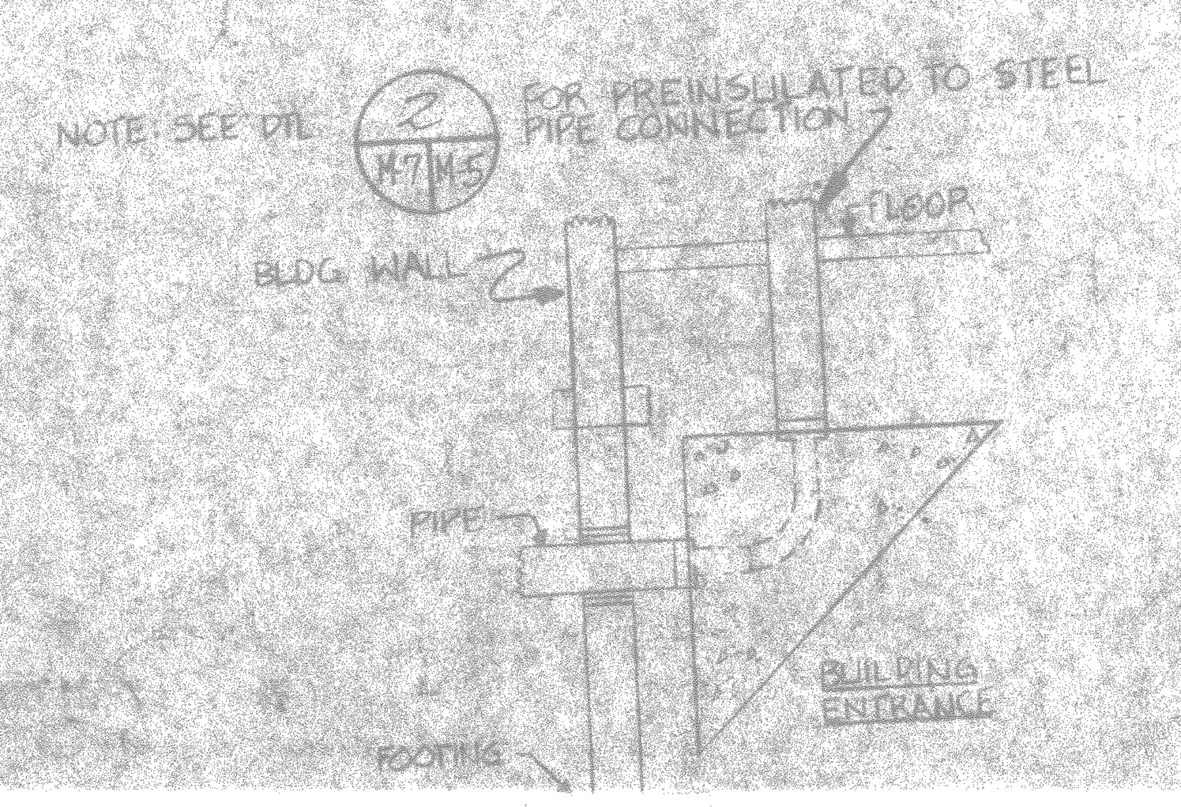


3 M-2 M-7 ELBOW DETAIL
NO SCALE



6 M-3 M-7 SIDEWALL EXHAUST FAN DETAIL
NO SCALE

NOTE SEE DTL 2 M-7 M-5 FOR PREINSULATED TO STEEL PIPE CONNECTION



9 M-9 M-10 M-2 M-7 DETAIL: THRUST BLOCKS FOR UNDERGROUND PIPING
NO SCALE
NOTE: SIZE THRUST BLOCKS PER PIPE MANUFACTURER'S RECOMMENDATIONS

NOTE:
IF ADDITIVE IS ACCEPTED ALL REFERENCES TO M-11 WILL BECOME M-11A

M-7

J. N. PEASE ASSOCIATES
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CHARLOTTE NORTH CAROLINA

DES. SKL DR. BAW CHK.
PROJ. MGR. GEP
SUBMITTED BY
PRINCIPAL
APPROVED
OFFICER IN CHARGE
FOR EFD FOR COMMANDER NAVFAC

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NORFOLK, VIRGINIA
MARINE CORPS BASE CAMP LEJEUNE, N.C.
BACHELOR ENLISTED QUARTERS

MECHANICAL DETAILS

SIZE	CODE IDENT NO	NAVFAC DRAWING NO
F	80091	4155181
SCALE	SPEC. 05-85-5142	CONSTR CONTR NO N62470-85-B-5142
		SHEET 82 of 118

EFD DWG. NO. 255181

AIR HANDLING UNIT SCHEDULE

*NEMA STARTER SIZE 1, 208/3/60

UNIT NO.	LOCATION	FAN DATA						DUAL TEMPERATURE COIL																		REMARKS
								COOLING PERFORANCE DATA												HEATING PERFORMANCE						
		TOTAL CFM	MIN. O.A. C.F.M.	MAX. O.A. F.P.M.	T.E.S.P.	APPROX. T.S.P.	MAX. HP *	COIL C.F.M.	TOTAL LOAD B.T.U.H.	TOTAL SENS. B.T.U.H.	MAX. FACE VEL. FPM	E.A.T. °F D.B.	E.A.T. °F W.B.	L.A.T. °F D.B.	L.A.T. °F W.B.	COIL G.P.M.	E.W.T. °F	WAT. P.D. MAX	AIR P.D. MAX	MIN ROW	COIL C.F.M.	TOTAL LOAD B.T.U.H.	MAX. FACE VEL. FPM	E.A.T. °F D.B.	L.A.T. °F D.B.	COIL G.P.M.	E.W.T. °F	
AHU-1	TYPE I BLDG	4500	200	2100	1.22	3"	5	4500	136,688	104,004	500	78.2	65.4	57.1	55.2	22.8	45	8'	0.7"	4	4500	140,940	500	66.0	95.0	14.1	180	1ST FLOOR, UNIT H
AHU-2					1.30																						1ST FLOOR, UNIT H
AHU-3					1.22																						2ND FLOOR, UNIT H
AHU-4		4500		2100	1.30																						2ND FLOOR, UNIT H
AHU-5		4800		2200	1.28			4500	136,688	104,004				57.1	55.9	22.8					4500	140,940		66.0		14.1		2ND FLOOR, UNIT H
AHU-6	TYPE I BLDG	4800	200	2200	1.59			4800	141,696	109,901				57.3	56.2	23.6					4800	149,299		66.2		14.9		3RD FLOOR, UNIT H
AHU-7	TYPE II BLDG	5300	240	2100	1.27			4800	141,696	109,901		78.2	65.6	57.3	56.2	23.6					4800	149,299	500	66.2		14.9		3RD FLOOR, UNIT H
AHU-8					1.28			5300	162,896	123,066		78.6	65.7	57.1	55.9	27.2					5300	166,568		65.9		16.7		1ST FLOOR, UNIT H
AHU-9					1.27																						1ST FLOOR, UNIT H
AHU-10		5300		2100	1.30																						2ND FLOOR, UNIT H
AHU-11		5600		2200	1.27			5300	162,896	123,066			65.7	57.1	55.9	27.2					5300	166,568		65.9		16.7		2ND FLOOR, UNIT H
AHU-12	TYPE II BLDG	5600	240	2200	1.30	3"	5	5600	165,312	128,822	500	78.6	65.6	57.3	56.2	27.6	45	8'	0.7"	4	5600	174,787	500	66.1	95.0	17.5	180	3RD FLOOR, UNIT H

HOT WATER STORAGE GENERATOR

UNIT NO	SERVICE	LOCATION	STEAM PRESS	#/ HR STEAM	RECOV. GPH	ENT WATER	LEAVE WATER	GAL	TANK SIZE	ELECT. VOLT	ELECT. PHASE	REMARKS
DHWH-1	HP-512-513-514	HP-515	15 PSIG	1239	1859	40°F	120°F	2800	1150	120	1	

CONTROL VALVE SCHEDULE

MARK	UNIT SERVED	SERVICE	TYPE	ACTION	CAPACITY LBS/HR	CAPACITY GPM	STEAM PRESS. INLET	STEAM PRESS. OUTLET	Cv	MAX WPD FT. H2O	NOMINAL SIZE	LOCATION
PRV-1		STEAM	2-WAY	MODULATING	2441	——	150	25	8.4	——	1"	MECHANICAL BUILDING
PRV-2		STEAM	2-WAY		1239	——	150	25	4.3	——	3/4"	MECHANICAL BUILDING
PRV-3	EJECTOR PUMPS	STEAM	2-WAY		800	——	150	75	3.4	——	1"	STEAM PITS
V-1	HE-1	STEAM	2-WAY	MODULATING	2441	——	25	15	19.7	——	2½"	MECHANICAL BUILDING
V-2	CHANGEOVER	CHWR	3-WAY	2-POSITION	——	325	——	——	180	7	6"	MECHANICAL BUILDING
V-3	CHANGE OVER	CHWR	3-WAY		——	325	——	——	180	7	6"	MECHANICAL BUILDING
V-4	UNIT HEATER	HWR	2-WAY		——	1	——	——	2.2	5	1/4"	MECHANICAL BUILDING
V-5	FCU (B)	CHWR	3-WAY		——	3	——	——	1.7	7	½"	BEQ LOUNGES
V-5A	FCU (C)	CHWR	3-WAY	2-POSITION	——	1	——	——	0.6	7	½"	BEQ OFFICES
V-6	AHU 5 & 6	CHWR	3-WAY	MODULATING	——	23.6**	——	——	13.4	7	1½"	BEQ TOP FLOOR
V-6A	AHU 1-4	CHWR	3-WAY		——	23.6**	——	——	13.5	7	1½"	BEQ 1ST & 2ND FLOOR
V-7	DHWH-1	STEAM	2-WAY		1239	——	25	15	22.2	——	1¼"	MECHANICAL BUILDING
V-8	DHWH-1	DHWS	3-WAY	MODULATING	——	354	55	15	202	7	6"	MECHANICAL BUILDING

** 27.2 GPM FOR AHU-7 THRU 10
* 27.6 GPM FOR AHU-11 AND 12

SEQUENCE OF OPERATION:

1. HEATING/COOLING CONTROL: SYSTEM SHALL BE ENERGIZED WHENEVER MANUAL "ON-OFF" SWITCH IS IN "ON" POSITION, AND SYSTEM MODE SHALL BE CONTROLLED BY "COOL-AUTO-HEAT" SELECTOR SWITCH. WITH THE SELECTOR SWITCH IN THE AUTO POSITION, A NORMALLY OPEN THERMOSTAT (T-1), LOCATED IN THE OUTSIDE AIR, SHALL CONTROL THE SYSTEM CHANGEOVER. ABOVE 65 DEGREES F OUTSIDE TEMPERATURE THE SYSTEM SHALL BE IN THE COOLING MODE, AND BELOW 65 DEGREES F THE SYSTEM SHALL BE IN THE HEATING MODE. WHEN SYSTEM IS IN THE HEATING MODE THE HEATING HOT WATER PUMP SHALL BE ENERGIZED AND THE SWITCHOVER 3-WAY VALVES (V-2 AND V-3) SHALL BE IN THE HEATING (NORMALLY OPEN) POSITIONS. WHEN SYSTEM IS IN THE COOLING MODE A REMOTE BULB THERMOSTAT (AQ-1), ACTING AS HIGH LIMIT SAFETY, WITH ELEMENT LOCATED IN THE RETURN WATER LINE SHALL PREVENT SYSTEM CHANGEOVER UNTIL WATER TEMPERATURE IS BELOW A PREDETERMINED SETTING (85 DEGREES F ADJ.). UNTIL CHANGEOVER TEMPERATURE IS MAINTAINED, HOT WATER PUMP SHALL CONTINUE TO OPERATE WITHOUT SHORT CYCLING, CIRCULATING WATER FOR COOL DOWN, AND THE CONVERTER STEAM VALVE V-1 SHALL BE MAINTAINED IN THE CLOSED POSITION DURING COOLING MODE. RELAY (CR1) SHALL BE ENERGIZED WHEN (AQ-1) CLOSES, TO START CHILLED WATER PUMP, STOP HOT WATER PUMP, AND POSITION 3-WAY VALVES (V-2 AND V-3), TO COOLING MODE.

2. CHILLER CONTROL: THE AIR COOLED WATER CHILLER SHALL HAVE SELF-CONTAINED CONTROLS WHICH WILL START ON A DEMAND FOR COOLING, AND FLOW SWITCHES (FS-1 AND FS-2) SHALL BE INTERLOCKED TO PREVENT CHILLERS FROM STARTING UNLESS THERE IS PROOF OF FLOW IN THE CHILLED WATER LINE. AN ELECTRICAL INTERLOCK BETWEEN CHILLED WATER PUMP AND CHILLER SHALL PREVENT CHILLER FROM STARTING UNLESS PUMP IS ENERGIZED. THE TEMPERATURE CONTROLLER SHALL ARRANGE THE UNLOADING STAGES TO PREVENT SHORT CYCLING OF EITHER MACHINE AND MAINTAIN SYSTEM CHILLED WATER TEMPERATURE WITHIN PLUS OR MINUS 2 DEGREES F OF THE SYSTEM DESIGN. CHILLER CONTROL SEQUENCER SHALL ALLOW LEAD MACHINE TO OPERATE UP TO GREATER THAN 50 PERCENT (ADJUSTABLE) OF THE SYSTEM LOAD BEFORE ENERGIZING THE SECOND MACHINE. AS THE TOTAL LOAD DECREASES, THE LAG MACHINE SHALL REMAIN IN OPERATION UNTIL LESS THAN 50 PERCENT (ADJUSTABLE) OF THE SYSTEM LOAD IS REACHED. MACHINE SHALL HAVE A LEAD-LAG SELECTOR SWITCH. THE LEAVING WATER TEMPERATURE FROM EITHER MACHINE SHALL NOT FALL BELOW 38 DEGREES F OR MANUFACTURER'S RECOMMENDATIONS, WHICHEVER IS HIGHER.

3. HOT WATER CONTROL: AN ADJUSTABLE OUTDOOR RESET THERMOSTAT (TC-1) MODULATES, THROUGH A TEMPERATURE CONTROLLER, STEAM REGULATING VALVE (V-1) ON A PREDETERMINED RESET SCHEDULE TO MAINTAIN LEAVING WATER TEMPERATURE.

4. FAN COIL UNITS: A LOW VOLTAGE CHANGEOVER THERMOSTAT (TS-1) FOR USE WITH COMBINATION HEATING-COOLING THERMOSTAT (RT-1) SHALL CONTROL THE WATER FLOW THROUGH EACH FAN COIL UNIT BY CONTROLLING THE POSITION OF A TWO-POSITION THREE-WAY VALVE (V-5). THE MODE OF THE CHANGEOVER THERMOSTAT SHALL BE CONTROLLED BY A STRAP-ON THERMOSTAT ELEMENT ON THE WATER SUPPLY TO THE TWO-POSITION THREE-WAY VALVE (V-5). WHEN WATER SUPPLY IS ABOVE 65 DEGREES F, THE CHANGEOVER THERMOSTAT (TS-1) SHALL BE POSITIONED TO THE HEATING MODE. WHEN WATER SUPPLY IS BELOW 65 DEGREES F, THE CHANGEOVER THERMOSTAT (TS-1) SHALL BE POSITIONED TO THE COOLING MODE. FAN OPERATION SHALL BE CONTROLLED BY OFF-HIGH-MEDIUM-LOW FAN SPEED SWITCH (MS-1). THERMOSTAT AND SWITCH SHALL BE MOUNTED FIVE FEET ABOVE THE FLOOR.

5. LAUNDRY ROOM CONTROL: A TWO-STAGE HEATING/COOLING THERMOSTAT SHALL ENERGIZE THE EXHAUST FAN ANY TIME SPACE TEMPERATURE EXCEEDS 80 DEGREES F AND ENERGIZE THE UNIT HEATER FAN WHENEVER THE SPACE TEMPERATURE FALLS BELOW 65 DEGREES F. WHEN THE ROOM TEMPERATURE FALLS BELOW 80 DEGREES F THE EXHAUST FAN SHALL BE DE-ENERGIZED. A STRAP-ON AQUASTAT SHALL PREVENT THE UNIT HEATER FROM OPERATING IF THE WATER TEMPERATURE IS BELOW 80 DEGREES F AND CLOSE TWO-POSITION VALVE. V-4

6. MECHANICAL EQUIPMENT BUILDING EXHAUST FAN EF-4: FAN SHALL BE CONTROLLED BY A THERMOSTAT. ON A RISE IN ROOM TEMPERATURE, THERMOSTAT SET FOR 85 DEGREES F, THE FAN SHALL ENERGIZE AND OPEN OUTSIDE AIR INTAKE DAMPER, AND ON A DROP IN TEMPERATURE THE REVERSE SHALL OCCUR.

7. AIR HANDLER UNIT CONTROL (FOR EACH A.H. UNIT): UNITS SHALL BE STARTED AND STOPPED MANUALLY.

7.1 THE AH UNIT AND ROOM CONTROLS SHALL BE INDEXED FOR HEATING OR COOLING FROM A SENSOR (AQ-2) IN THE CW/HW SUPPLY PIPING FROM CENTRAL SYSTEM. WHEN 75 DEGREES F OR ABOVE WATER TEMPERATURE IS SENSED, THE SYSTEM SHALL BE INDEXED FOR HEATING. WHEN 65 DEGREES F OR BELOW WATER IS SENSED, THE SYSTEM SHALL BE INDEXED FOR COOLING.

7.2 WITH AH UNITS OPERATING AND SYSTEM INDEXED FOR HEATING, THE RETURN AIR SENSOR SHALL RESET THE DISCHARGE AIR TEMPERATURE OVER A PREDETERMINED SCHEDULE. ON A FALL IN DISCHARGE TEMPERATURE, CONTROLLER (RC) SHALL REPOSITION THREE-WAY VALVE (V-6) SUPPLYING HOT WATER TO THE UNIT COIL.

7.3 WITH THE AH UNIT OPERATING AND SYSTEM INDEXED FOR COOLING, THE DISCHARGE AIR CONTROLLER (TTD) SHALL BE AUTOMATICALLY SET TO MAINTAIN 59 DEGREE F CONSTANT DISCHARGE AIR TEMPERATURE. THE RETURN AIR SENSOR SHALL BE LOCKED OUT.

7.4 PROVIDE A TEMPERATURE LOW LIMIT THERMOSTAT (TLL) TO SHUT THE AH UNIT DOWN AT 38 DEGREES F.

7.5 PROVIDE A TEMPERATURE HIGH LIMIT THERMOSTAT (THL) TO SHUT THE AH UNIT DOWN AT 135 DEGREES F.

7.6 AHU SHALL SHUT DOWN VIA ALARM OPERATED CONTACTS IN FIRE ALARM CONTROL PANEL.

8. ROOM CONTROL: WITH THE ROOM THERMOSTAT INDEXED FOR HEATING, THE ROOM THERMOSTAT SHALL ON A FALL IN TEMPERATURE MODULATE THE TAB SUPPLY AIR DAMPER OPEN SIMULTANEOUSLY CLOSING THE ROOM RETURN AIR DAMPER. WITH THE THERMOSTAT INDEXED FOR COOLING THE THERMOSTAT SHALL ON A RISE IN TEMPERATURE MODULATE TO OPEN THE TAB SUPPLY AIR SIMULTANEOUSLY CLOSING THE ROOM RETURN. INDEXING FOR HEATING AND COOLING SHALL BE AUTOMATIC BY CENTRAL SOURCE.

9. AH UNIT STATIC PRESSURE CONTROL: A STATIC PRESSURE CONTROL (SPC) SHALL BE PROVIDED FOR EACH SUPPLY PLENUM (FOUR PER AH UNIT) WITH THE SENSING TIPS LOCATED IN THE SUPPLY PLENUM 3/4 DOWN TOTAL LENGTH OF SUPPLY AIR DUCT IN WHICH INSTALLED AND IN THE AH EQUIPMENT ROOM. ON A RISE IN STATIC ABOVE THE CONTROLLER SETPOINT (.75 INCH ADJ.) THE CONTROLLER SHALL MODULATE THE INLET VALVE ON THE AH UNIT FAN, THROUGH A HIGH-LOW PRESSURE SELECTOR (ONE PER AH UNIT). THE CONTROLLER SET POINT IS ADJUSTABLE.

10. HOT WATER STORAGE HEATERS: A SELF-CONTAINED CONTROL VALVE WITH A CAPILLARY BULB IN THE DOMESTIC HOT WATER TANK SHALL MODULATE THE NORMALLY CLOSED STEAM VALVE TO CONTROL THE WATER TEMPERATURE SET AT 110 DEGREES F. DOMESTIC WATER CIRCULATION PUMP P-5 SHALL BE CONTROLLED AUTOMATICALLY BY AQUASTAT LOCATED IN DOMESTIC HOT WATER RETURN SET AT 110 DEGREES F AND WHEN TEMPERATURE DROPS BELOW 110 DEGREES F WILL START PUMP P-3. A SELF-CONTAINED TEMPERING VALVE V-8 SET AT 110 DEGREES F. WITH BULB LOCATION IN THE DOMESTIC HOT WATER SUPPLY LINE SHALL MAINTAIN THE DESIRED DOMESTIC HOT WATER TEMPERATURE TO THE BUILDINGS.

11. EF-1 AND EF-2 EXHAUST FAN CONTROL: WITH HIGH LIMIT THERMOSTAT AND DISCONNECT SWITCH CLOSED, EXHAUST FAN RUNS CONTINUOUSLY.

12. ENERGY MONITORING CONTROL SYSTEM (EMCS): A CENTRAL ENERGY MANAGEMENT AND CONTROL SYSTEM WILL BE INSTALLED IN THE FUTURE WHICH WILL CONNECT BUILDINGS HP-506, HP-507, HP-508, HP-509, & HP-510 AND THE MECHANICAL BUILDING HP-511. DATA TERMINAL CABINETS (DTC) SHALL BE FURNISHED THAT WILL INCORPORATE THE FOLLOWING POINTS INTO THE EMCS. ALL EQUIPMENT SHALL BE COMPATIBLE FOR CONNECTING TO THE FUTURE FIELD INTERFACE DEVICES AND TO THE CENTRAL SYSTEM.

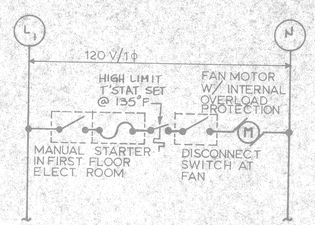
12.1 MECHANICAL BUILDING:

CHILLED/HOT WATER SUPPLY AND RETURN -- TEMPERATURE SENSOR (DEGREE F) AND FLOW (GPM)
CHILLER PACC-1 -- START-STOP, ALARMS STATUS, CHILLED WATER RESET AND CHILLER PROFILE AND SELECT
CHILLER PACC-2 -- START-STOP, ALARMS STATUS, CHILLED WATER RESET AND CHILLER PROFILE AND SELECT.
STEAM LINE -- MEASURE STEAM FLOW LBS./HOUR (ORIFICE)
STEAM LINE -- TOTALIZE STEAM FLOW
ELECTRICAL ENERGY -- MEASURE AND TOTALIZE KWH, KWD, CHILLER PACC-1 AND 2, P1 AND P2.
MONITOR HEAT OR COOL CONTROL POSITION
PUMPS NO. 1 AND 2 -- MONITOR OPERATION, START-STOP (FOR DEMAND LIMITING)

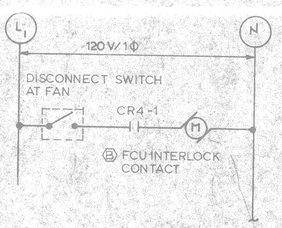
12.2 UEPH BUILDINGS:

POINTS LISTED ARE REQUIRED IN EACH BUILDING:
MEASURE TEMPERATURE OF SUPPLY AND RETURN AIR TEMPERATURE OF EACH AIR HANDLER (6 PER BUILDING)
BUILDING AIR HANDLERS (6 PER BUILDING) START-STOP FOR DEMAND LIMITING AND DUTY CYCLING, FAN STATUS
HUMIDITY MONITORING, EACH BUILDING AIR HANDLERS, (6 PER BUILDING)
TERMINAL AIR BLENDER CONTROL (ONE PER AIR HANDLING UNIT) -- HIGH AND LOW TEMPERATURE

13. PUMP P-4 CONTROL (TYPICAL FOR FOUR PUMPS): PUMP P-4 SHALL BE ENERGIZED WHEN THE TEMPERATURE OF THE WATER IN THE DOMESTIC HOT WATER STORAGE GENERATOR FALLS BELOW 115 DEGREES F. HOWEVER, THE PUMP SHALL BE INTERLOCKED WITH THE RECIPROCATING LIQUID CHILLER SO THAT THE PUMP WILL NOT OPERATE UNLESS THE CHILLER IS IN OPERATION. ALSO, A SENSOR IN THE CHILLER'S LEAVING CHILLED WATER LINE SHALL DE-ENERGIZE THE PUMP IF THE LEAVING CHILLED WATER TEMPERATURE EXCEEDS 46 DEGREES F.



FAN EF-1 CONTROL (TYP FOR EF-2)
NO SCALE



FAN EF-6 CONTROL
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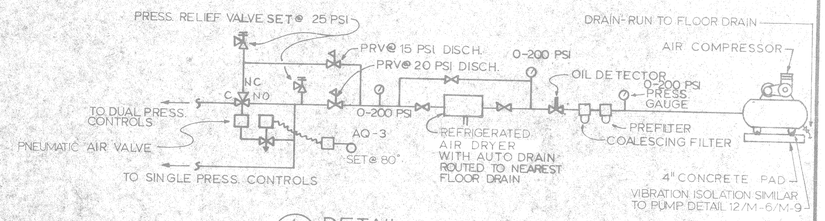


1 H-5 | H-11 DETAIL CONTROL AIR COMPRESSOR
NO SCALE

REVISIONS				
SYM	DESCRIPTION	PREP'D BY	DATE	APPROVED
A	REVISED AS-BUILT	GLB		GE

10-12-87

NORTH CAROLINA SEAL 3858 REGISTERED PROFESSIONAL ENGINEERS WILLIAM ALBERT

NORTH CAROLINA No. 23 REGISTERED LANDSCAPE ARCHITECT

RECORD DRAWING LETTER DATED 14 FEB 1991

M – 11

J. N. PEASE ASSOCIATES
ARCHITECTS · ENGINEERS · PLANNERS
CHARLOTTE NORTH CAROLINA

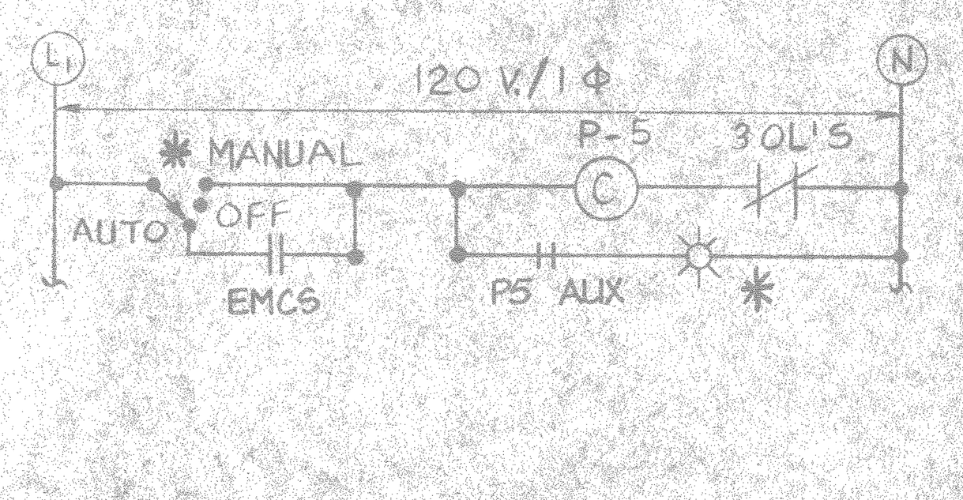
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
NAVAL STATION ATLANTIC DIVISION NORFOLK, VIRGINIA

DES. GKL DR. LRB/RCL CHK. WAS
PROJ. MGR. GLP CH. ENGR. WAS
SUBMITTED BY: [signature] DATE 10-14-87
FIRM MEMBER PRINCIPAL
EFD. OIC RAS RVD
HD DIR
APPROVED DATE
OFFICER IN CHARGE
APPROVED DATE
FOR EFD, FOR COMMANDER, NAVFAC

MARINE CORPS BASE CAMP LEJEUNE, N.C.
BACHELOR ENLISTED QUARTERS

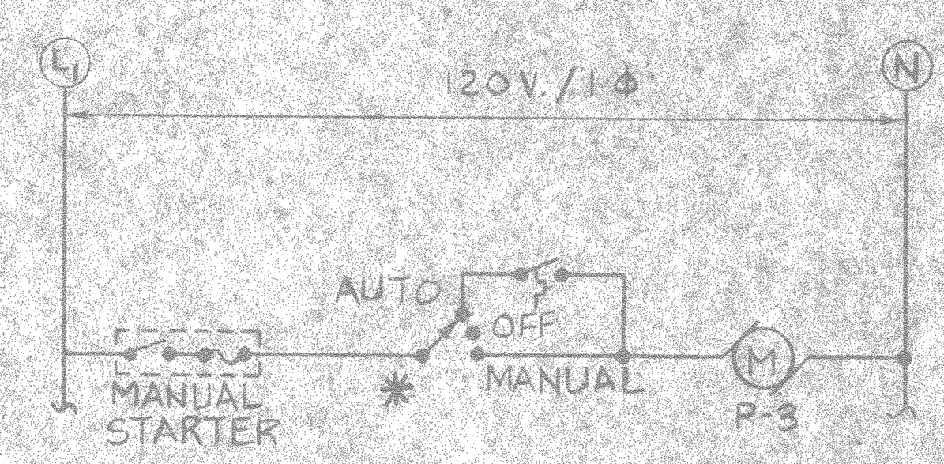
CONTROLS AND SCHEDULES

SIZE F | CODE IDENT. NO 80091 | NAVFAC DRAWING NO 4168711
CONSTR CONTR NO N62470-85-B-5428
SCALE 1/2"=1'-0" | SPEC 05-85-5428 | SHEET 107 OF 166
EFD DWG. NO.



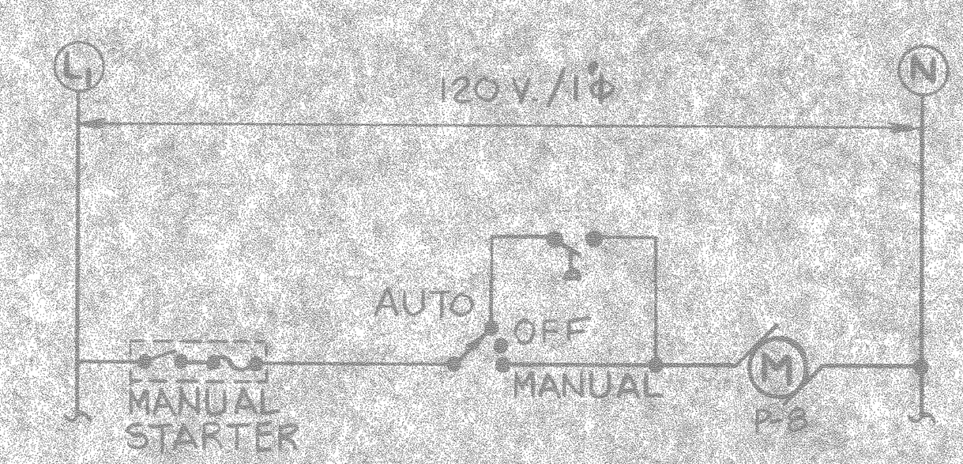
PUMP CONTROLS P-5

NO SCALE
TYPICAL FOR PUMPS P-6



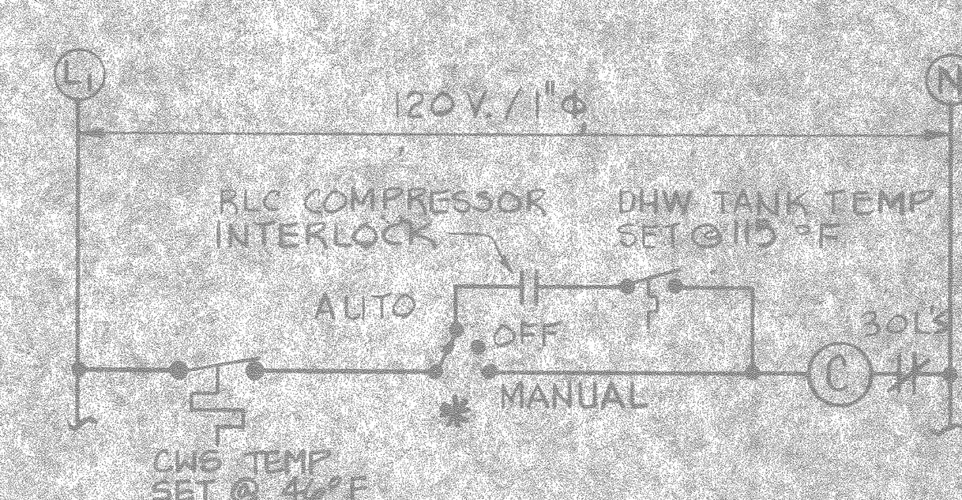
DOM. HOT WATER PUMP CONTROLS

NO SCALE



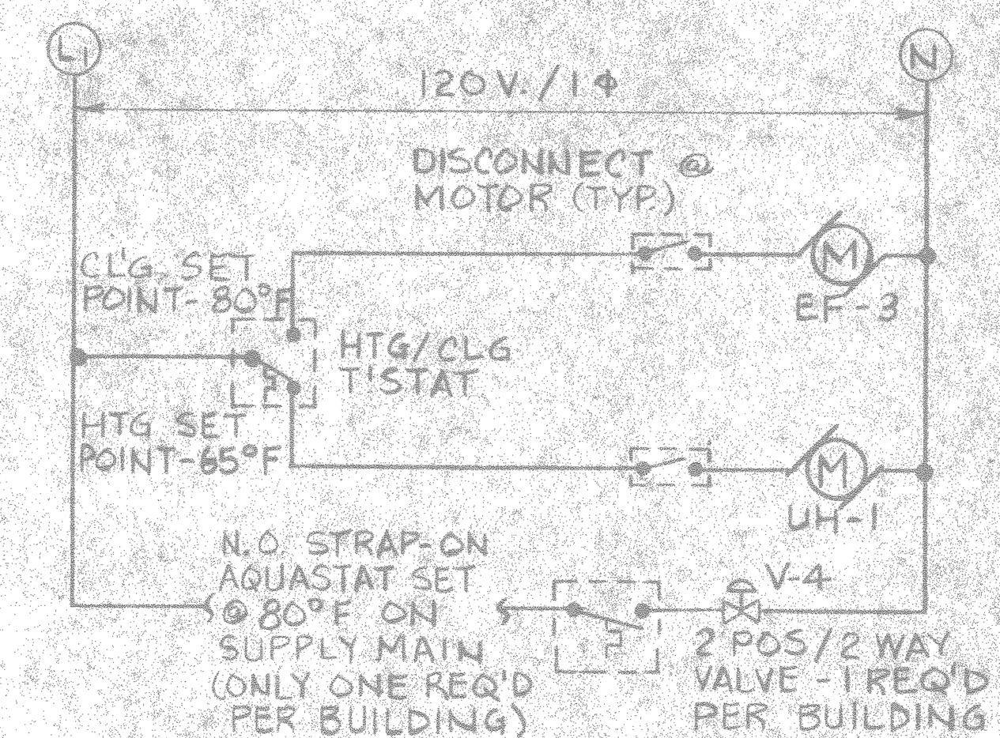
SUMP PUMP CONTROLS

NO SCALE



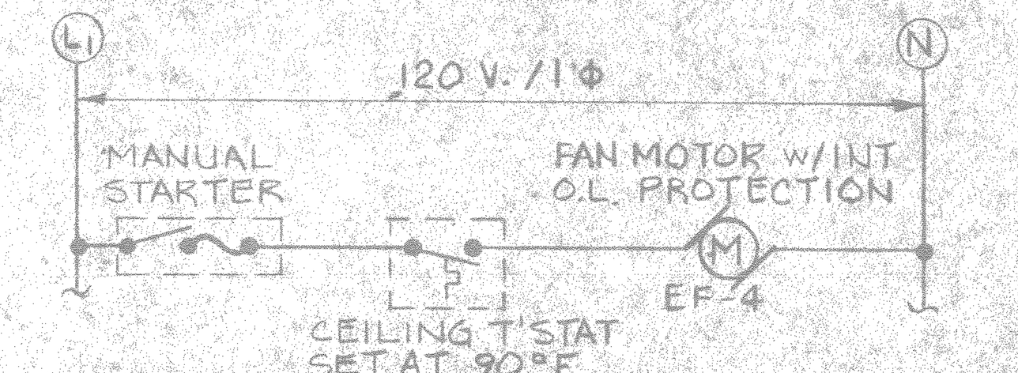
PUMP P-4 CONTROL

NO SCALE



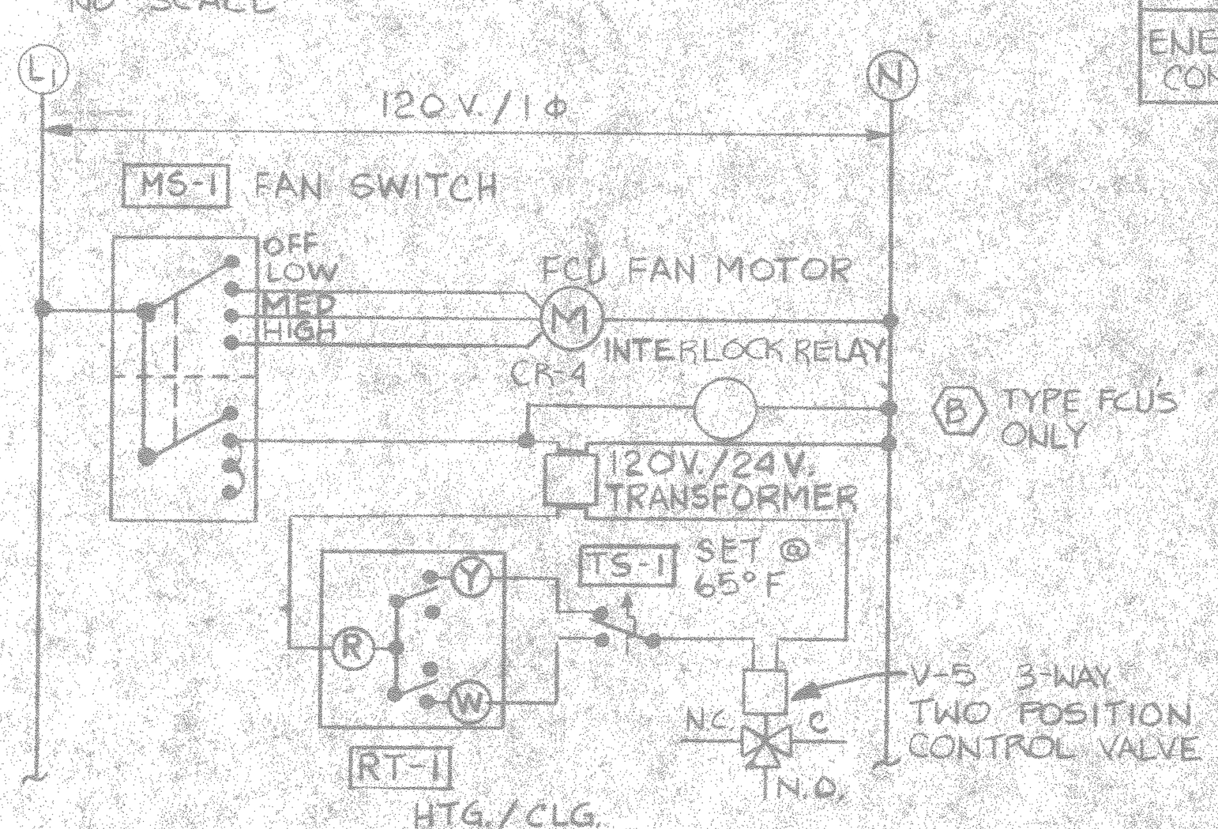
LAUNDRY ROOM CONTROL

NO SCALE



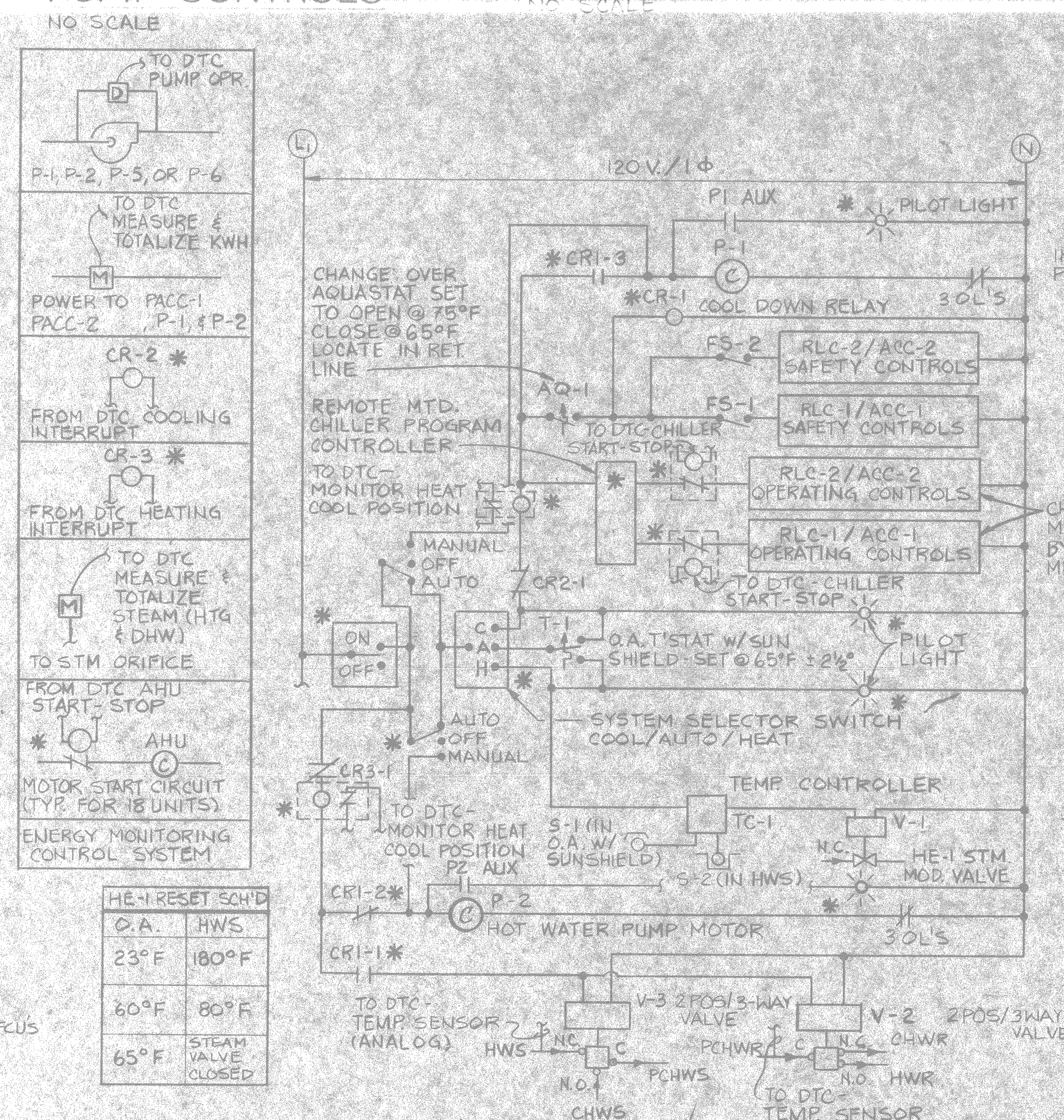
MECHANICAL BUILDING EXHAUST FAN CONTROL

NO SCALE



FAN COIL UNIT CONTROL

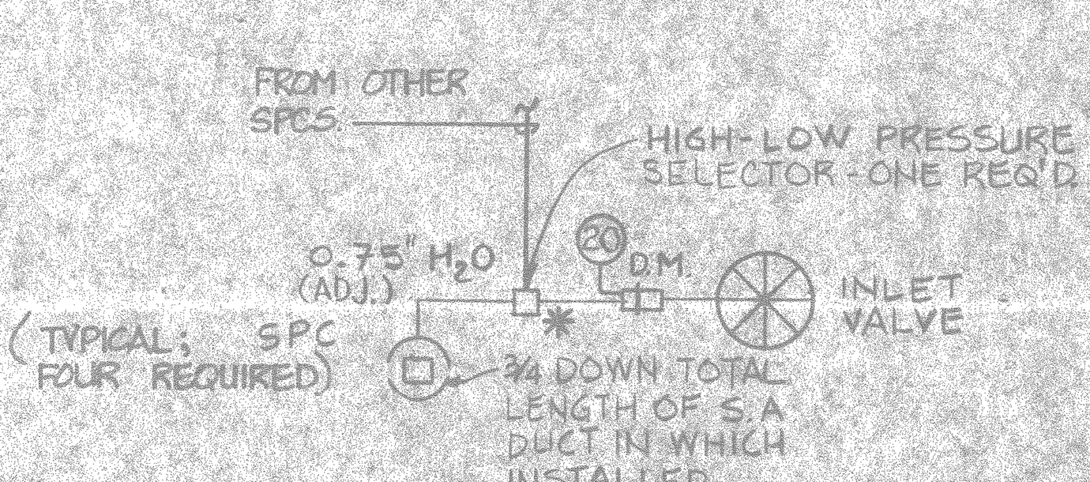
NO SCALE



HE-1 RESET SCH'D	
O.A.	HWS
23°F	180°F
60°F	80°F
65°F	STEAM VALVE CLOSED

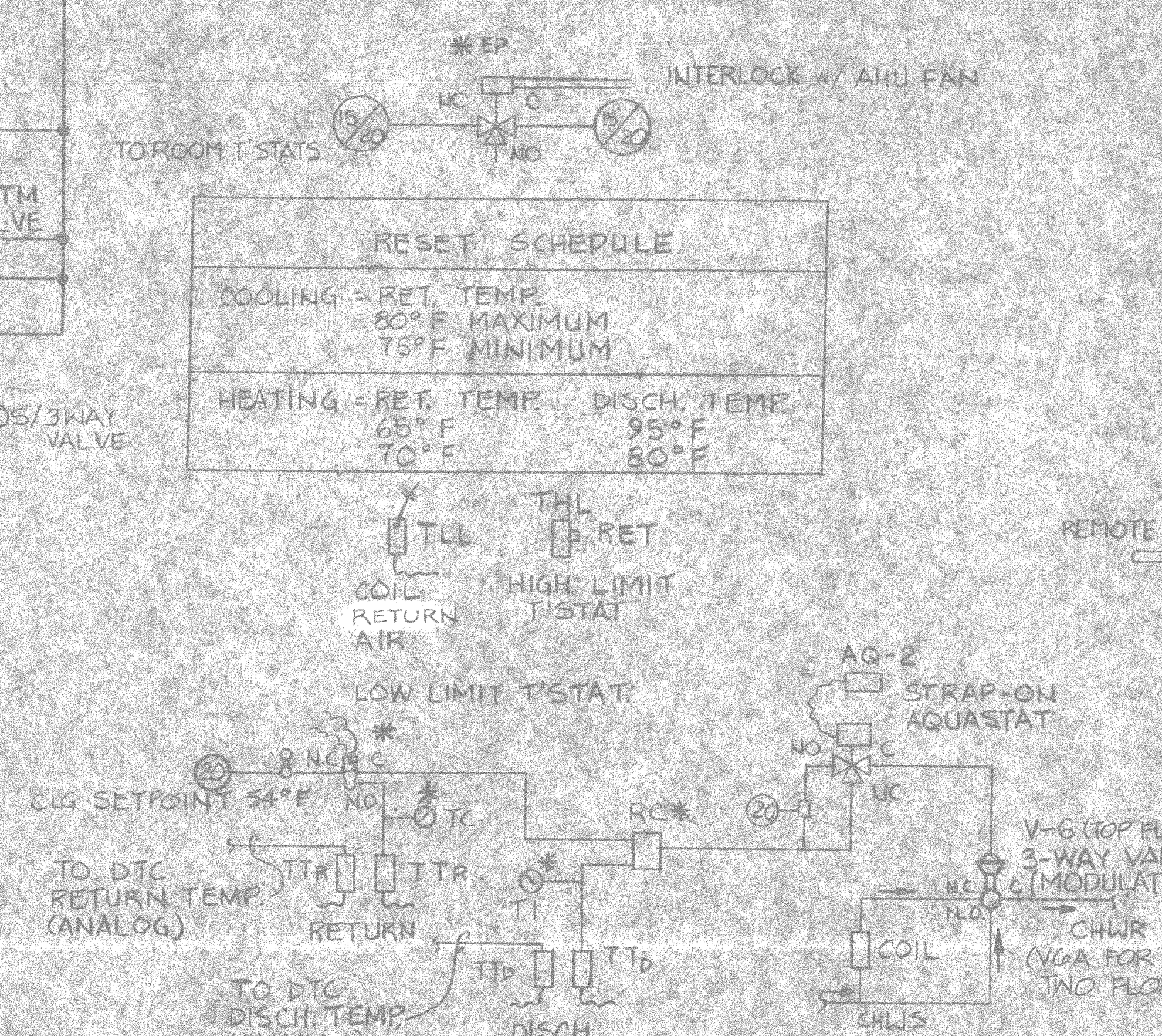
HEATING / COOLING CONTROL

NO SCALE



PLENUM STATIC PRESSURE CONTROLS

NO SCALE (1 EACH REQ'D PER AHU)



AIR HANDLING UNIT CONTROL

NO SCALE

NOTE: AHU FANS SHALL BE PROVIDED W/ PUSH BUTTON START/STOP STATIONS AND SHALL BE INTERLOCKED W/ FIRE ALARM PANEL TO SHUT OFF FANS WHEN FIRE ALARM IS ACTIVATED.

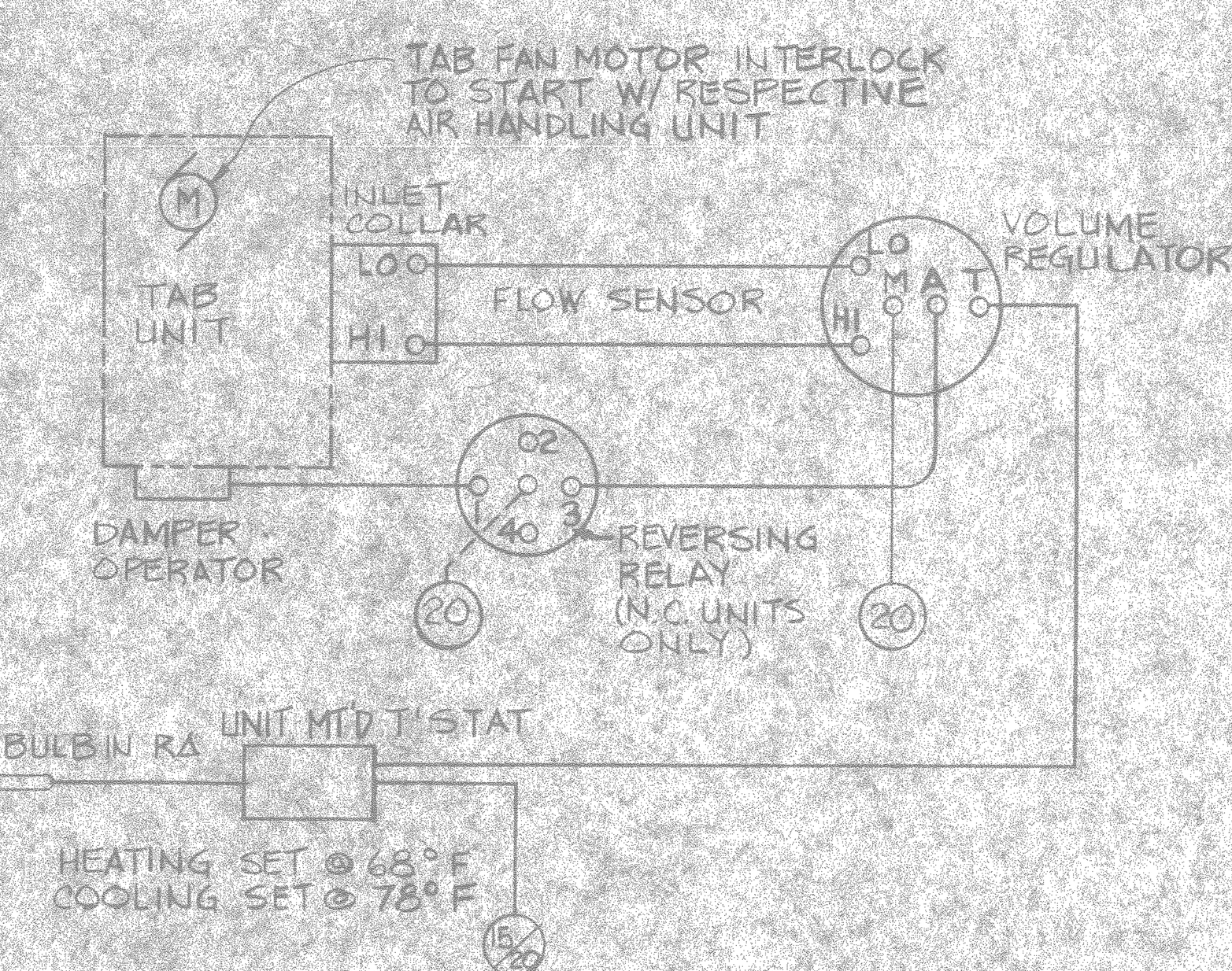
CONTROL LEGEND

AQ	AQUASTAT
CR	CONTROL RELAY
TS	TEMPERATURE SENSOR
MS	MANUAL SWITCH
DTC	DATA TERMINAL CABINET
S	SENSOR
N.C.	NORMALLY CLOSED
N.O.	NORMALLY OPEN
C	COMMON
SPC	STATIC PRESSURE CONTROLLER
FS	FLOW SWITCH
TLL	LOW LIMIT THERMOSTAT
THL	HIGH LIMIT THERMOSTAT
TTR	RETURN AIR TEMP TRANSMITTER
TTD	DISCHARGE AIR TEMP TRANSMITTER
TI	TEMP INDICATOR
RC	RESET CONTROLER
OL'S	THERMAL OVERLOADS
DM	DAMPER MOTOR
EP	ELECTRIC-PNEUMATIC SWITCH
(symbol)	NORMALLY OPEN CONTACT
(symbol)	NORMALLY CLOSED CONTACT
(symbol)	PILOT LIGHT
(symbol)	FUSE
(symbol)	SWITCH
(symbol)	TEMPERATURE SENSING SWITCH
(symbol)	FLOAT SWITCH

DMSD	DUCT MOUNTED SMOKE DETECTOR
*	COMPONENT MOUNTED TO PANEL
STR	STARTER
(M)	MOTOR
(C)	MOTOR CONTACTOR
(symbol)	CONTROL RELAY W/ N.C. CONTACT
WPD	WATER PRESSURE DROP, FEET WATER GAUGE

REVISIONS				
SYM	DESCRIPTION	PREP'D BY	DATE	APPROVED
(A)	REVISED AS-BUILT	GB		GB

DESIGN CONDITIONS		
MODE	OUTSIDE	INSIDE
SUMMER	90°FDB/79°FWB	78°FDB/50%RH
WINTER	23°FDB	68°FDB



ROOM CONTROL

NO SCALE

STEAM/HOT WATER HEAT EXCHANGER		
UNIT DESIGNATION	HE-1	
TYPE SERVICE	HEATING	
BLDG SERVED	HP-512-513-514	
TEMP. IN °F	160°	
TEMP. OUT °F	180°	
STEAM PRESS., PSIG	15	
STEAM FLOW, LB/HR	2441	
WATER FLOW, GPM	230	
EXCHANGE TYPE	SHELL & TUBE	
NOTES	①②③④	

1. MAX TUBE VEL. - 7 FEET PER SECOND
2. MAX PRESS DROP - 5 FT WATER GAUGE
3. SCALE FACTOR = 0.0005
4. 14"Φ × 36" LONG

UNIT HEATER SCHEDULE	
UNIT DESIGNATION	UH-1
AREA SERVED	LAUNDRY
MIN CAP., BTUH	10,348
ENT. AIR TEMP °F	60
WATER TEMP. °F	180°
WATER TEMP. DROP °F	20°
MAX. MOTOR H.P.	1/20
VOLTS/PHASE/HERTZ	120/1/60
HEATER TYPE	HORIZONTAL
G.P.M.	0.5

1. DIRECTIONAL DISCHARGE LOUVER
2. 500 CFM NOMINAL
3. FOULING FACTOR = 0.0005

FAN COIL UNIT SCHEDULE			
UNIT DESIGNATION		(B)	(C)
NOTES		①	②
NOMINAL CFM		600	200
COIL SELECTION, CFM		600	200
MAXIMUM CHILLED WATER FLOW GPM		3	1
COOLING	MINIMUM COIL CAPACITY SENSIBLE BTUH	10,822	3866
	MINIMUM COIL CAPACITY TOTAL BTUH	16,740	5400
	ENTERING AIR TEMP, DB °F	83.0	78
	ENTERING AIR TEMP, WB °F	70.8	65
	ENTERING WATER TEMP, °F	44°	44°
HEATING	MINIMUM COIL CAPACITY TOTAL BTUH	19,894	5832
	ENTERING AIR TEMP, D.B. °F	49.3	68
	ENTERING WATER TEMP. °F	180°	180°
CFM OUTSIDE AIR		250	0
PIPING RUNOUT SIZE, SUPPLY & RETURN		1"	1/2"
MAXIMUM MOTOR WATTAGE		136	95
MAXIMUM HOT WATER FLOW, GPM		3	1.2

① HORIZONTAL TYPE W/ OUTSIDE AIR INTAKE
② VERTICAL TYPE W/OUT OUTSIDE AIR
③ SELECT UNITS TO MEET SENSIBLE CAPACITY @ HIGH FAN SPEED.
④ 0.0005 FOULING FACTOR
⑤ UNITS ARE 120 V/1Φ
⑥ MAXIMUM COIL WATER PRESSURE DROP = 150 FT.
⑦ MAXIMUM COIL WATER PRESSURE DROP = 50 FT.

PACKAGED AIR COOLED CHILLER		
UNIT DESIGNATION	PACC-1	PACC-2
BUILDING SERVED	HP-512-513-514	
MINIMUM TOTAL CAPACITY TONS	80.9	80.9
ENTERING WATER TEMP °F	56°	56°
LEAVING WATER TEMP °F	44°	44°
WATER FLOW GPM	162	162
AMBIENT AIR TEMP, DB °F	92°	92°
MAXIMUM WATER PRESSURE DROP FT WG	12'	12'
MAXIMUM UNIT KW	130	130
VOLTS/PHASE/HERTZ	460/3/60	460/3/60

CHILLER SHALL HAVE MINIMUM OF 4 STEPS OF CAPACITY REDUCTION
FOULING FACTOR = 0.0005

PUMP SCHEDULE								
UNIT DESIGNATION	P-1	P-2	P-3	P-4 **	P-5 ***	P-6 ***	P-7 *	P-8
TYPE SERVICE	CHILLED WATER	HOT WATER	DORM HW	HEAT RECLAIM	SECONDARY	SECONDARY	STEAM COND.	SUMP
BLDG SERVED	HP-512-513-514	HP-512-513-514	HP-515	HP-515	HP-516 & 514	HP-512 & 518	HP-515	HP-515
WATER FLOW GPM	325	230	60	16	120	135	39	30
TOTAL HEAD FT. W.G.	90	40	25	25	55'	50'	50 PSI DISCH	20
R.P.M./NEMA STR	1750/2	1750/0	1750/00	1750/00	1750/1	1750/	3500/0	1750/00
MAX MOTOR H.P.	15	5	1	1/2	5	5	3	1/3
VOLTS/PHASE/HERTZ	460/3/60	460/3/60	460/3/60	120/1/60	208/3/60	208/3/60	460/3/60	120/1/60
PUMP TYPE	BASE MTD.	BASE MTD.	IN-LINE	IN-LINE	IN-LINE	IN-LINE	CENT. IMPELLER	SUB.

EXHAUST FAN SCHEDULE						
UNIT DESIGNATION	EF-1	EF-2	EF-3	EF-4	EF-5	EF-6
NOTES	①	①	②④	①③	①⑤⑥	④
AIR FLOW, CFM	120	440	500	2160	109	240
TOTAL STATIC PRESSURE IN WG	.125	.125	.125	.25	.125	0.25
LOCATION	ROOF	ROOF	WALL	ROOF	CEILING	LOUNGE STS
AREA SERVED	JAN. CLOSET	ELECT. ROOM	LAUNDRY	HP-502	TOILETS	LOUNGE
MAX. MOTOR H.P.	35 MHP	1/20	1/20	1/2	0.7 AMPS	1/4
VOLTS/PHASE/HERTZ	120/1/60	120/1/60	120/1/60	120/1/60	120/1/60	120/1/60
FAN TYPE	CENTRIFUGAL	CENTRIFUGAL	PROP.	CENTRIFUGAL	CENTRIFUGAL	IN-LINE CENT.

① PROVIDE MOTOR OPERATED DAMPER, DISCONNECT SWITCH & BIRD SCREEN
② PROVIDE ALUMINUM WALL GRILLE, FAN GUARD, GRAVITY BACKDRAFT DAMPER & DISCONNECT SWITCH
③ PROVIDE ALUMINUM, SELF-FLASHING CURB SEE DETAIL 4/A-14/A-14
④ MAX. SOUND LEVEL TO BE 4 SONES
⑤ INTERLOCK W/ LIGHT SWITCH
⑥ BIRDSCREEN NOT REQUIRED ON EF-5

PUMP SCHEDULE NOTES:

*① EDR = 15,134 SQUARE FEET
* ② 45 GAL. RECEIVER CAPACITY
* ③ DUPLEX W/CAST IRON RECEIVER
* ④ MECH. ALTERNATOR
*** TWO REQ'D ** FOUR REQ'D

10-12-87
NORTH CAROLINA PROFESSIONAL ENGINEER 3858 WILLIAM ALBERT SANDERS

J.N. PEASE ASSOCIATES REGISTERED NORTH CAROLINA No. 23 ARCHITECTURAL & ENGINEERING CHARLOTTE, N.C.

RECORD DRAWING LETTER DATED 14 FEB 1991

M - 10

J. N. PEASE ASSOCIATES
ARCHITECTS · ENGINEERS · PLANNERS
CHARLOTTE NORTH CAROLINA

DES. SKL | DR. WRB/RCL | CHK. WAS
PROJ. MGR. GLP | CH. ENGR. WAS
SUBMITTED BY: J.E. Stegall DATE: 10-14-87
FIRM MEMBER PRINCIPAL
EFD: FP RAS RVD
HD [signature] DIR [signature]
APPROVED DATE
OFFICER IN CHARGE
APPROVED [signature] DATE 3/1/88
FOR EFD FOR COMMANDER, NAVFAC

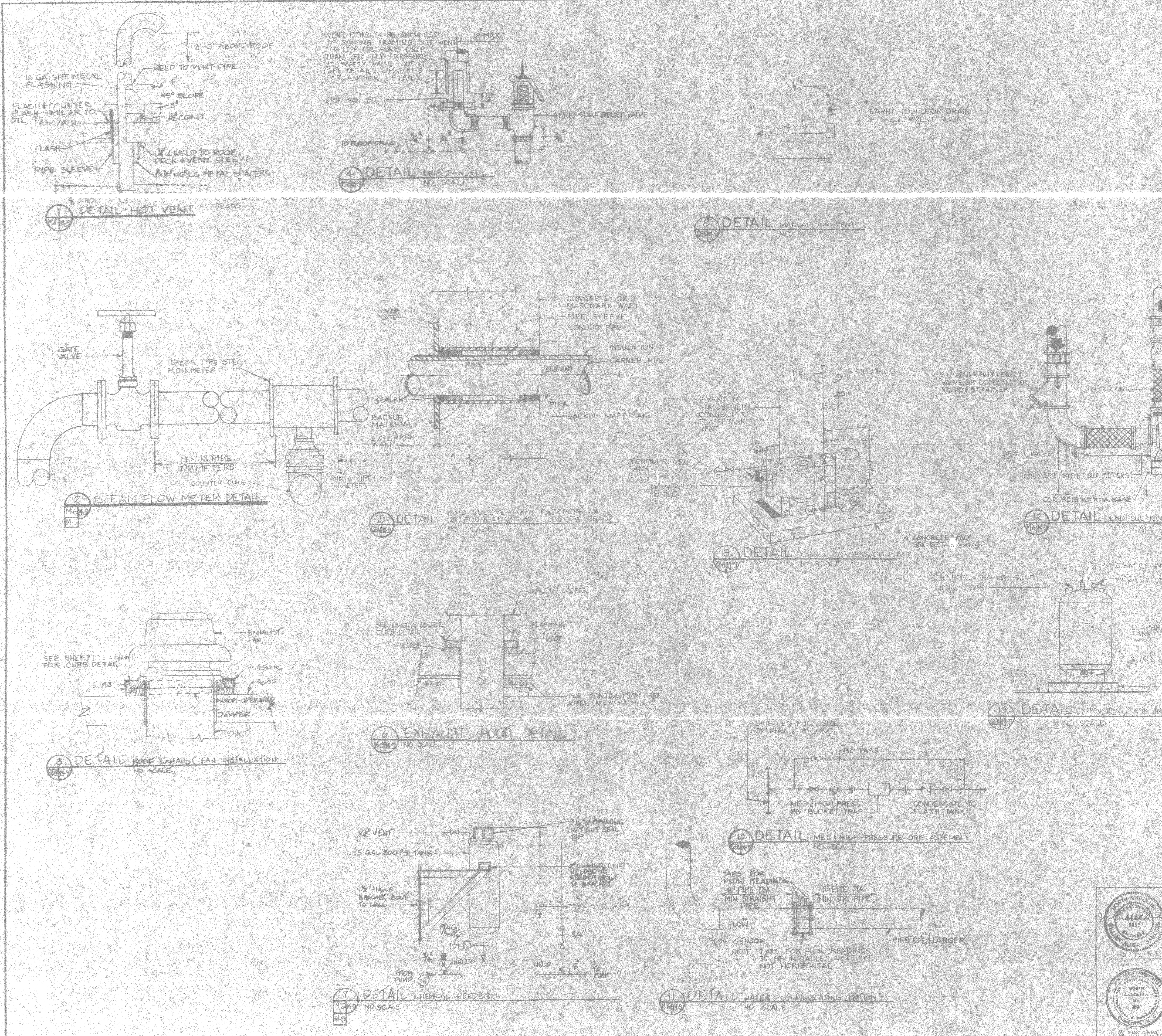
DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VIRGINIA

MARINE CORPS BASE CAMP LEJEUNE, N.C.
BACHELOR ENLISTED QUARTERS

CONTROLS & SCHEDULES

SIZE F | CODE IDENT NO 80091 | NAVFAC DRAWING NO 4168710
CONSTR. CONTR. NO. N62470-85-B-5428
SCALE NONE | SPEC. 05-85-5428 | SHEET 106 OF 166

EFD DWG. NO. 26810



REVISIONS

SYM	DESCRIPTION		DATE	APPROVED
A	REVISED AS BUILT	GB		GB

SYMBOL LEGEND

T V	THERMOSTAT (VENTILATION)
T HC	THERMOSTAT (HEATING & COOLING)
T H	THERMOSTAT (HEATING)
	FAN COIL UNIT DESIGNATION
	CONNECT NEW TO EXISTING
	PIPE REDUCER ECCENTRIC
	GAGE COCK
C.I.	CAST IRON
AFF	ABOVE FINISHED FLOOR
ESP	EXTERNAL STATIC PRESSURE
	FLOW CONTROL BALANCING VALVE
DMSD	DUCT MOUNTED SMOKE DETECTOR
O.V.	OUTLET VELOCITY
CHWS	CHILLED HOT WATER SUPPLY
CHWR	CHILLED HOT WATER RETURN
CWS	CHILLED WATER SUPPLY
CWR	CHILLED WATER RETURN
	GATE VALVE
	HOSE END GATE VALVE
	BUTTERFLY VALVE
	GLOBE VALVE
	STRAINER
	2 WAY CONTROL VALVE
	3-WAY CONTROL VALVE
	UNION
	PIPE REDUCTION CONCENTRIC
	PRESS GAUGE W/GAUGE COCK
	THERMOMETER
	CHECK VALVE
MAV	MANUAL AIR VENT
MVD	MANUAL VOLUME DAMPER
PRV	PRESS. RED VALVE
FCU	FAN COIL UNIT
UH	UNIT HEATER
TABU	TERMINAL AIR BLENDER
DS	DESUPER HEATER
FL.DR.	FLOOR DRAIN
	OPPOSED BLADE DAMPER
EMCS	ENERGY MONITORING CONTROL SYSTEM
MOD	MOTOR OPERATED DAMPER
AD	ACCESS DOOR
FD	FIRE DAMPER
BFF	BELOW FINISHED FLOOR
T	THERMOSTAT
H	HUMIDITY SENSOR
HWS	HOT WATER SUPPLY
HWR	HOT WATER RETURN
MPS	MEDIUM PRESSURE STEAM
	FLOW DIRECTION
HPS	HIGH PRESSURE STEAM
DG	DOOR GRILLE
	PIPE ANCHOR
PCHWS	PRIMARY CHILLED HOT WATER SUPPLY
PCHWR	PRIMARY CHILLED HOT WATER RETURN
DHWS	DOMESTIC HWS
DHWR	DOMESTIC HWR
RHW	RECLAIM HOT WATER
PD	PUMP DISCHARGE
VTR	VENT TO ROOF
MPD	MED PRESS. DRIP ASSEMBLY
HPD	HIGH PRESS. DRIP ASSEMBLY
HG	HOT GAS LINE
L	LIQUID LINE
CVA	CONTROL VALVE ASSEMBLY
PACC	PACKAGE AIR COOLED CHILLER
E	EXPANSION LINE
CTE	CONNECT TO EXISTING

RECORD DRAWING
LETTER DATED 14 FEB 1991

M – 9

NORTH CAROLINA PROFESSIONAL ENGINEER 3858 WILLIAM ALBERT SANDERS
10-12-87

J. N. PEASE ASSOCIATES
ARCHITECTS ENGINEERS PLANNERS
CHARLOTTE NORTH CAROLINA

DES SKL DR WRB/RCL CHK WAS
PROJ MGR GLP CH ENGR WAS
SUBMITTED BY DATE 10-14-87
FIRM MEMBER PRINCIPAL
EFD FP RAS RVD
HD DIR
APPROVED DATE
OFFICER IN CHARGE
APPROVED DATE 3/11/88
FOR EFD FOR COMMANDER NAVFAC

J. N. PEASE ASSOCIATES REGISTERED NORTH CAROLINA No. 23 ARCHITECTURAL & ENGINEERING CORP. CHARLOTTE, N. C.

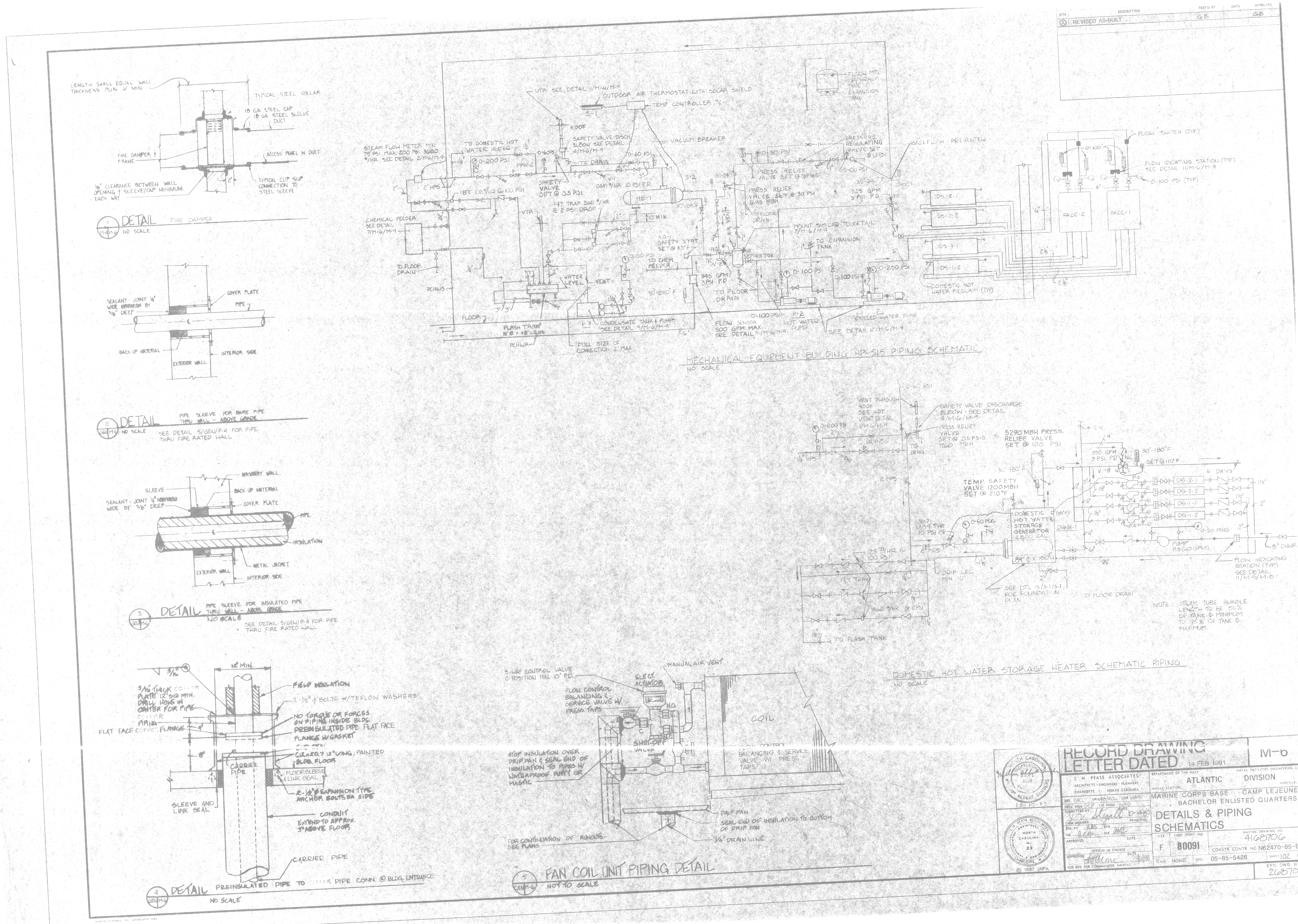
NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
MARINE CORPS BASE CAMP LEJEUNE, N.C.
BACHELOR ENLISTED QUARTERS

HVAC DETAILS

SIZE	CODE IDENT NO.	NAVFAC DRAWING NO.
F	80091	4168709
		CONSTR. CONTR. NO. N62470-85-B-5428

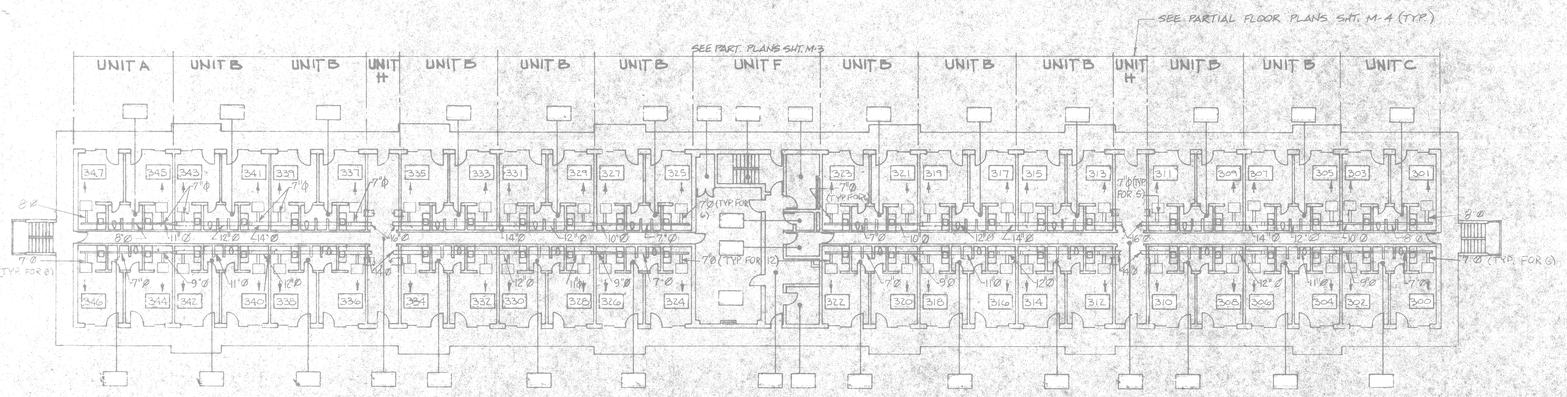
SCALE AS SHOWN 05-85-5428 SHEET 105 OF 166

EFD DWG NO. 768709



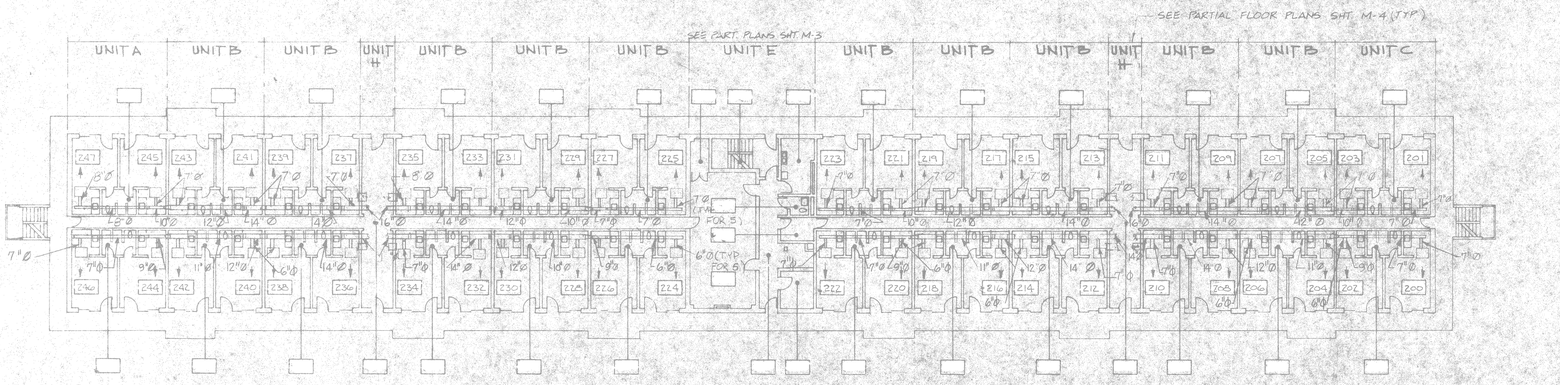
REVISED AS-BUILT
DETAIL FIRE DAMPER
NO SCALE
DETAIL PIPE SLEEVE FOR BARE PIPE THRU WALL - ABOVE GRADE
NO SCALE
SEE DETAIL 5/GEN/P-4 FOR PIPE THRU FIRE RATED WALL
DETAIL PIPE SLEEVE FOR INSULATED PIPE THRU WALL - ABOVE GRADE
NO SCALE
SEE DETAIL 5/GEN/P-4 FOR PIPE THRU FIRE RATED WALL
DETAIL PREINSULATED PIPE TO COPPER PIPE CONN @ BLDG. ENTRANCE
NO SCALE
MECHANICAL EQUIPMENT BUILDING HP-515 PIPING SCHEMATIC
NO SCALE
DOMESTIC HOT WATER STORAGE HEATER SCHEMATIC PIPING
NO SCALE
NOTE: STEAM TUBE BUNDLE LENGTH TO BE 80% OF TANK ⌀ MINIMUM TO 95% OF TANK ⌀ MAXIMUM.
FAN COIL UNIT PIPING DETAIL
NOT TO SCALE
RECORD DRAWING
LETTER DATED 14 FEB 1991
M-6
J. N. PEASE ASSOCIATES
ARCHITECTS · ENGINEERS · PLANNERS
CHARLOTTE NORTH CAROLINA
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NORFOLK
NAVAL STATION
MARINE CORPS BASE CAMP LEJEUNE
BACHELOR ENLISTED QUARTERS
DETAILS & PIPING SCHEMATICS
DES SKL DR WRB/RCL CHK WAS
PROJ MGR GLP CH ENGR WAS
SUBMITTED BY DATE 10-14-87
PRINCIPAL
SIZE F
CODE IDENT NO 80091
NAVFAC DRAWING NO 4168706
CONSTR CONTR NO N62470-85-5
SCALE NONE
SPEC 05-85-5428
SHEET 102
APPROVED DATE 3/4/88
FOR EFD FOR COMMANDER, NAVFAC
EFD DWG NO 26870
© 1987 JNPA

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVED
A	REVISED AS-BUILT		GB



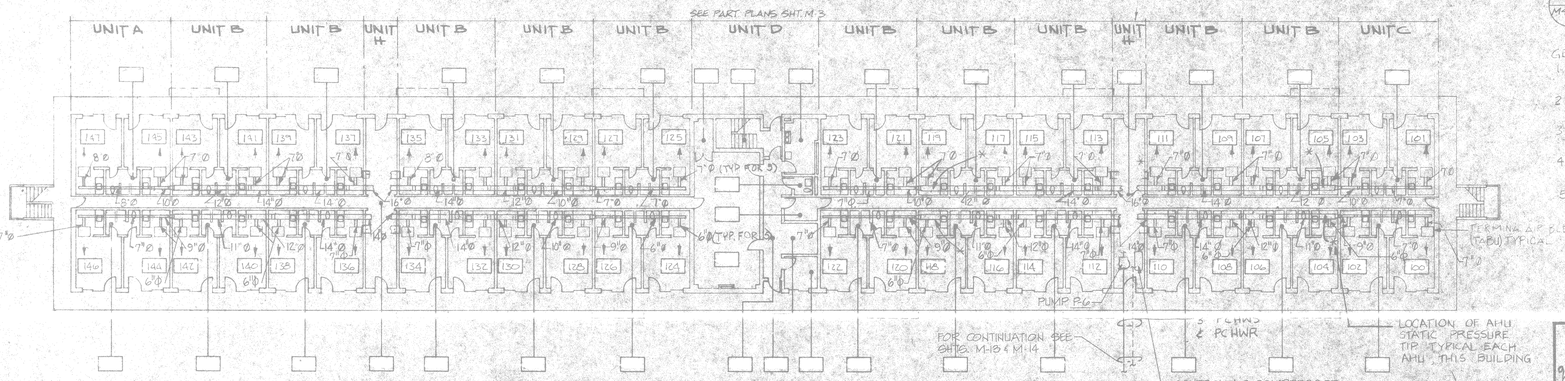
THIRD FLOOR PLAN - TYPE II 1/16" = 1-0

TYPICAL FOR BUILDING HP-512 & HP-513



SECOND FLOOR PLAN - TYPE II 1/16" = 1-0

TYPICAL FOR BUILDING HP-512 & HP-513



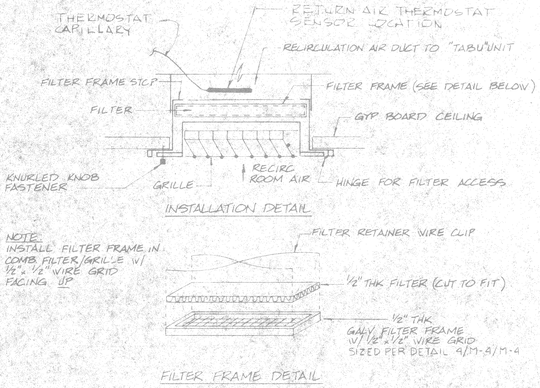
FIRST FLOOR PLAN - TYPE II 1/16" = 1-0

TYPICAL FOR BUILDINGS HP-512 AND HP-513

NOTE:
TOILETS WERE BUILT WITH THE SHOWERS & WATER CLOSETS BACK TO BACK. THE WATER CLOSET IS ON SIDE TOWARD THE LOUNGE.

NOTE:
WHERE ROUND DUCT WILL NOT FIT DUE TO SPACE LIMITATIONS OR INTERFERENES OVAL DUCT OF EQUIVALENT DIAMETER MAY BE SUBSTITUTED.

NOTE: ROOM NUMBERS 344 AND 244 ARE NOT USED FOR THIRD FLOOR AND SECOND FLOOR PLANS RESPECTIVELY FOR CONTINUANCE OF SLEEPING ROOM NUMBERS ON ALL FLOORS.



INSTALLATION DETAIL

NOTE:
INSTALL FILTER FRAME IN COMB. FILTER/GRILLE W/ 1/2" x 1/2" WIRE GRID FACING UP

FILTER FRAME DETAIL

1 / M4/M2 TYPICAL COMBINATION FILTER/GRILLE DETAIL @ TAB

NOT TO SCALE

GENERAL NOTES:
1. PROVIDE MANUAL AIR VENTS AT ALL HIGH POINTS OF PIPING SYSTEM & WHERE INDICATED.
2. PROVIDE PIPING SYSTEM DRAINS WITH HOSE CONNECTIONS AT ALL LOW POINTS & WHERE INDICATED.
3. ALL BALANCING VALVES, THERMOMETER WELLS, STRAINERS, AIR VENTS SHALL BE PROVIDED WITH REMOVABLE INSULATION CAPS.
4. ALL CONTROL VALVES SHALL BE CAPABLE OF SHUTTING TIGHT AGAINST PUMP SHUT-OFF HEAD.
5. DUCT STATIC PRESSURE CLASSIFICATIONS ARE: SUPPLY AIR = 2.0" S.P. AND RETURN, OUTSIDE & EXHAUST AIR = 0.5" S.P.

TERMINAL BLENDER UNIT (TABU) TYPICAL

GRAPHIC SCALE

1/16" = 1-0 — 16' 0 16' 32'

RECORD DRAWING LETTER DATED 14 FEB 1991

M-2

J. N. PEASE ASSOCIATES
ARCHITECTS · ENGINEERS · PLANNERS
CHARLOTTE NORTH CAROLINA

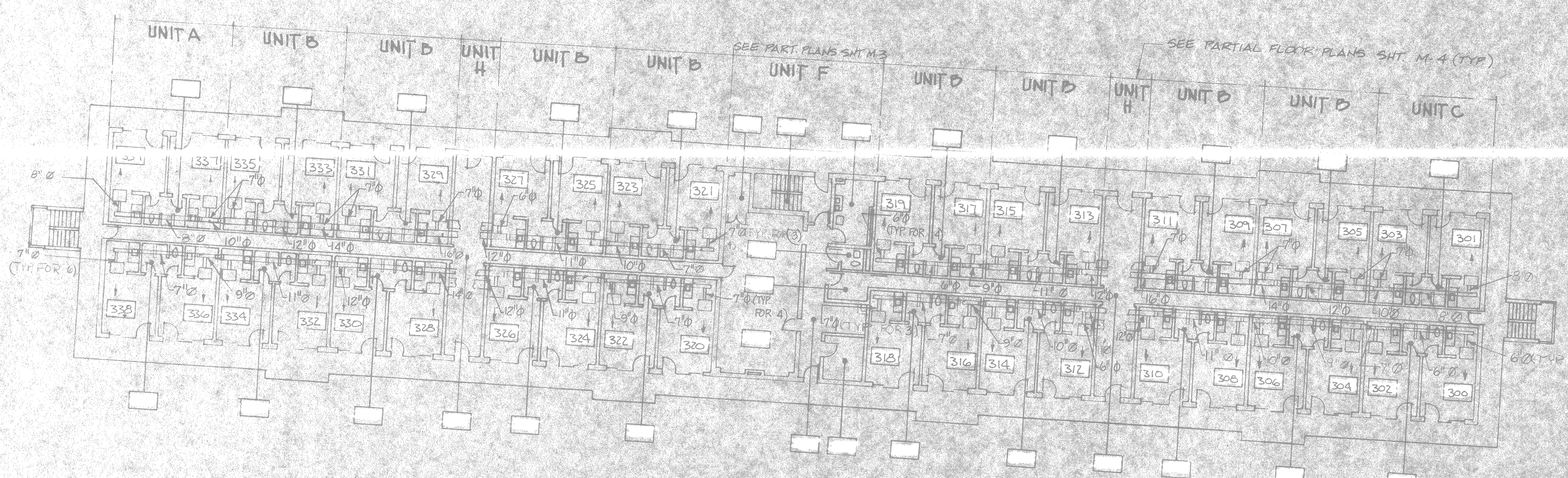
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VIRGINIA

MARINE CORPS BASE CAMP LEJEUNE, N.C.
UNACCOMPANIED ENLISTED PERSONNEL HOUSING

HVAC FLOOR PLANS -TYPE 2

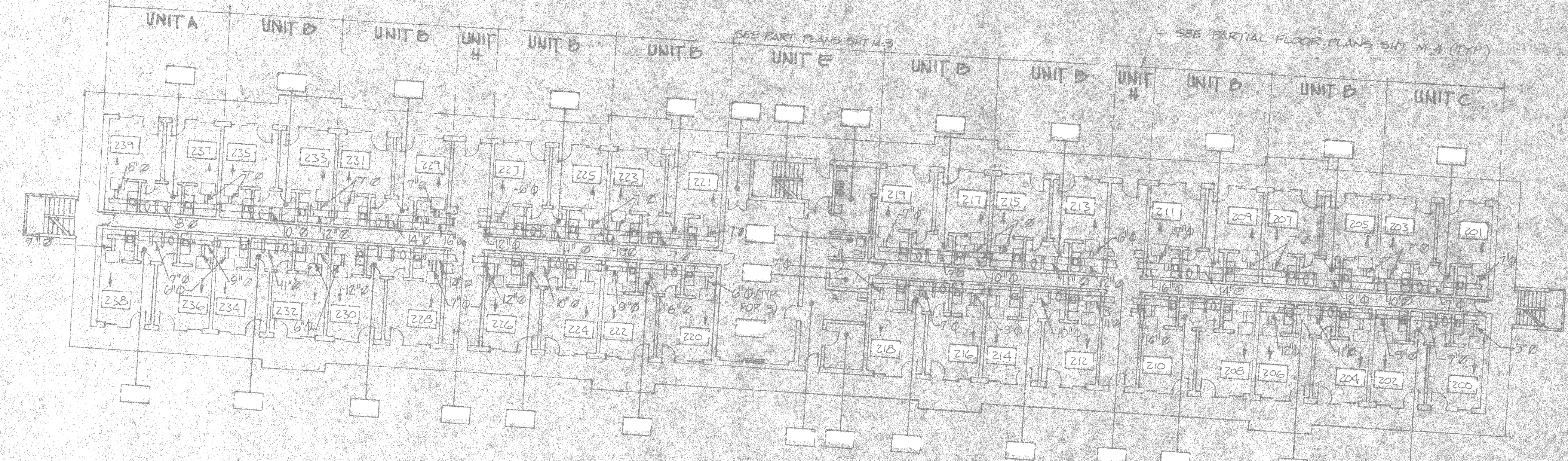
SIZE F	CODE IDENT. NO. 80091	NAVFAC DRAWING NO. 4108702	
		CONSTR. CONTR. NO. N62470-85-B-5428	
SCALE: AS SHOWN	SPEC. 05-85-5428	SHEET 98 OF 1406	

EFD. DWG. NO. 2085702



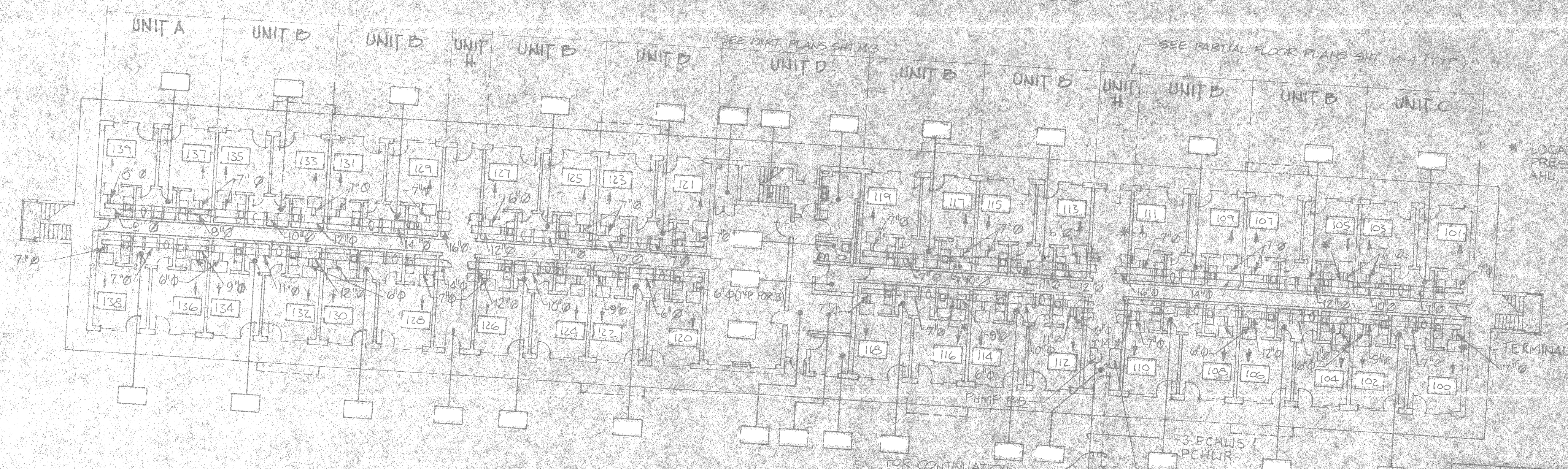
THIRD FLOOR PLAN - TYPE I 1/16" = 1'-0

TYPICAL FOR BUILDING HP-514 AND ADDITIVE NO. 1 - BUILDING HP-506



SECOND FLOOR PLAN - TYPE I 1/16" = 1'-0

TYPICAL FOR BUILDING HP-514 AND ADDITIVE NO. 1 - BUILDING HP-506



FIRST FLOOR PLAN TYPE I 1/16" = 1'-0

TYPICAL FOR BUILDING HP-514 AND ADDITIVE NO. 1 - BUILDING HP-506

NOTE: ROOM NUMBERS 338 AND 238 ARE NOT USED FOR THIRD FLOOR AND SECOND FLOOR PLANS RESPECTIVELY FOR CONTINUANCE OF SLEEPING ROOM NUMBERS ON ALL FLOORS.

NOTE:
WHERE ROUND DUCT WILL NOT FIT DUE TO SPACE LIMITATIONS OR INTERFERENCES, OVAL DUCT OF EQUIVALENT DIAMETER MAY BE SUBSTITUTED.

NOTE:
TOILETS WERE BUILT WITH THE SHOWERS & WATER CLOSETS BACK TO BACK. THE WATER CLOSET IS ON SIDE TOWARD THE LOUNGE.

SYM	REVISIONS DESCRIPTION	DATE	APPROVED
A	REVISED AS-BUILT		G.B.

(2) MAXIMUM SUPPLY CFM TO TERMINAL AIR BLENDER UNITS

(1)(3) TYPE I BLD'G ROOM NO.	FLOOR 1ST	FLOOR 2ND	FLOOR 3RD	FLOOR 1ST	FLOOR 2ND	FLOOR 3RD		(1)(3) TYPE II BLD'G ROOM NO.	FLOOR 1ST	FLOOR 2ND	FLOOR 3RD
*39	350	350	365					*47	350	350	365
*37	310	310	325					*45	310	310	325
38	270	270	285					46	270	270	285
36	245	245	255					44	245	245	255
*35	310	310	325					*43	310	310	325
*33	310	310	325					*41	310	310	325
34	245	245	255					42	245	246	255
32	245	245	255					40	245	245	255
*31	310	310	325					*39	310	310	325
*29	325	325	345					*37	325	325	345
30	245	245	255					38	245	245	255
28	265	265	275					36	265	265	275
*27	325	325	345					*35	325	325	345
*25	310	310	325					*33	310	310	325
26	265	265	275					34	265	265	275
24	245	245	255					32	245	245	255
*23	310	310	325					*31	310	310	325
*21	300	300	320					*29	310	310	325
22	245	245	255					30	245	245	255
20	245	245	255					28	245	245	255
*19	325	325	345					*27	310	310	325
*17	310	310	325					*25	300	300	320
18	270	265	275					26	245	245	255
16	245	245	255					24	245	245	255
*15	310	310	325					*23	325	325	345
*13	325	325	345					*21	310	310	325
14	245	245	255					22	270	265	275
12	265	265	275					20	245	245	255
*11	325	325	345					*19	310	310	325
*09	310	310	325					*17	310	310	325
10	265	265	275					18	245	245	255
08	245	245	255					16	245	245	255
*07	310	310	325					*15	310	310	325
*05	310	310	325					*13	325	325	345
06	245	245	255					14	245	245	255
04	245	245	255					12	265	265	275
*03	310	310	325					*11	325	325	345
*01	335	335	350					*09	310	310	325
02	245	245	255					10	265	265	275
00	260	260	275					08	245	245	255
								*07	310	310	325
								*05	310	310	325
								06	245	245	255
								04	245	245	255
								*03	310	310	325
								*01	335	355	350
								02	245	245	255
								00	260	260	275

(1) TABULATED ROOM NUMBERS ARE INDICATED BY THE LAST TWO DIGITS OF ACTUAL ASSIGNED ROOM NUMBERS.
(2) MAXIMUM CFMS TO TABU UNITS BASED ON INDIVIDUAL ROOM PEAK COOLING LOADS.
(3) ROOMS WITH AN ASTERISK (*), ADJACENT TO THE ROOM NO. REQUIRE A TABU W/ 400 CFM CAPACITY, 1/6 H.P., 120 V/1Ø, AND 0.13" E.S.P. ALL OTHERS REQUIRE A TABU W/ 300 CFM CAPACITY, 1/8 H.P., 120 V/1Ø, AND 0.13" E.S.P. MINIMUM PRIMARY AIR INLET STATIC PRESSURE = 0.75" W.G.

GRAPHIC SCALE
1/16" = 1'-0   16'   0   16'   32'

RECORD DRAWING
LETTER DATED 14 FEB 1991

M - 1

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 3858 WILLIAM ALBERT SANDERS
10-14-87

J. N. PEASE ASSOCIATES
ARCHITECTS · ENGINEERS · PLANNERS
CHARLOTTE NORTH CAROLINA

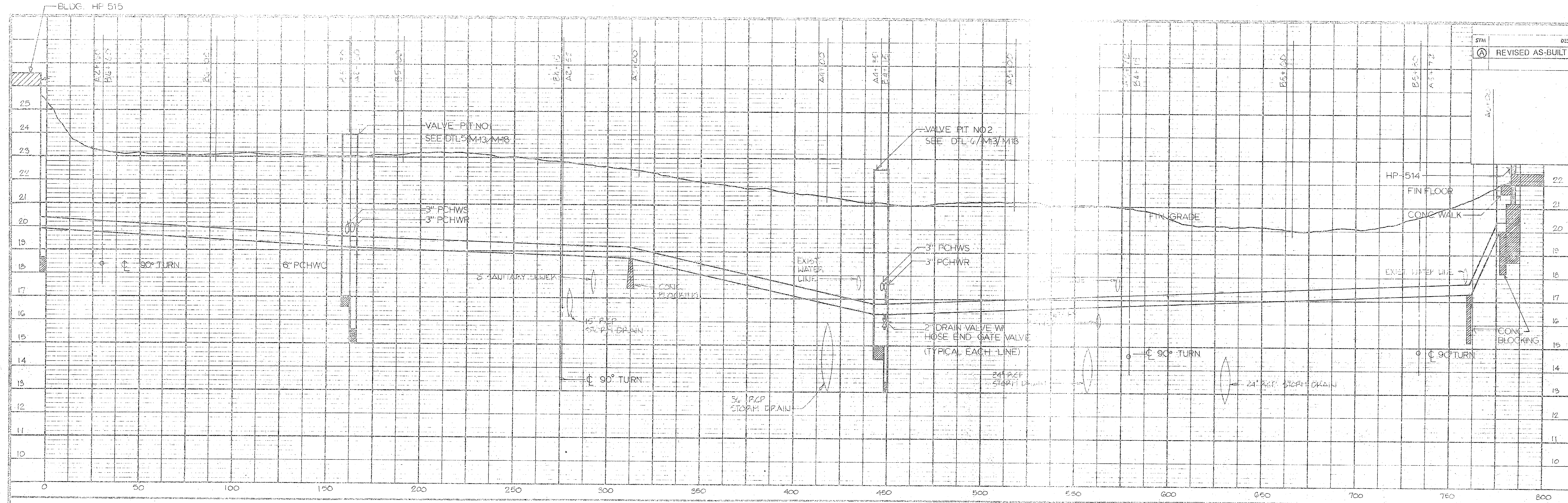
J. N. PEASE ASSOCIATES REGISTERED NORTH CAROLINA No. 23 ARCHITECTURAL & ENGINEERING

DES. SKL | DR WRB/RCL | CHK WAS
PROJ. MGR GLP | CH. ENGR WAS
SUBMITTED BY [signature] DATE 10-14-87
FIRM MEMBER PRINCIPAL
EFD F.P. RAS RVD.
HD. RCB DIR. UHE
APPROVED DATE
OFFICER IN CHARGE

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VIRGINIA
MARINE CORPS BASE CAMP LEJEUNE, N.C.
BACHELOR ENLISTED QUARTERS

HVAC FLOOR PLANS - TYPE I

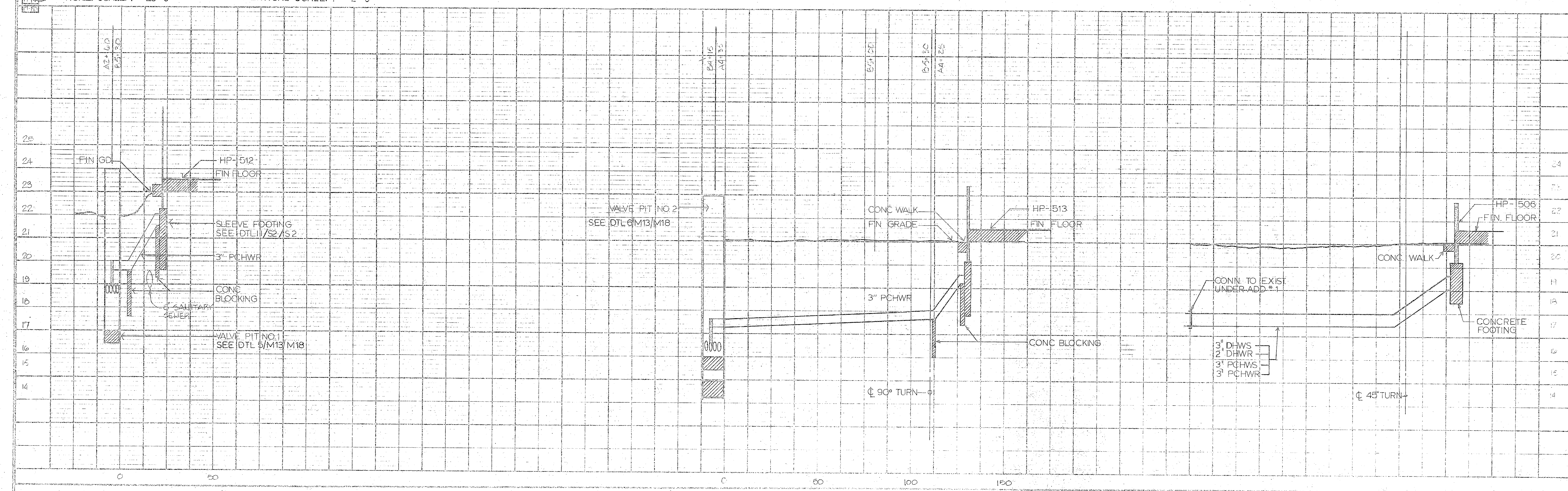
SIZE | CODE | NAVFAC DRAWING NO.



PROFILE NO. 1 PRIMARY CHILLED WATER RETURN PIPING

HORIZ. SCALE: 1" = 25'-0" VERTICAL SCALE: 1" = 2'-0"

NOTE: PCHWS, DHWS, AND DHWR PIPING SHALL BE RUN AT SAME ELEVATION AS PCHWR PIPING.



PROFILE NO. 2 PRIMARY CHILLED WATER RETURN

HORIZ. SCALE: 1" = 25'-0" VERTICAL SCALE: 1" = 2'-0"

PROFILE NO. 3 PRIMARY CHILLED WATER RETURN

HORIZ. SCALE: 1" = 25'-0" VERTICAL SCALE: 1" = 2'-0"

PROFILE NO. 4

HORIZ. SCALE: 1" = 25'-0" VERT. SCALE: 1"=1'-0"

GRAPHIC SCALES

RECORD DRAWING LETTER DATED 14 FEB 1991

M-17

NORTH CAROLINA PROFESSIONAL ENGINEER 9853 ALBERT SANDERS 10-12-87

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PROJ MGR GLP CH ENGR WAS
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