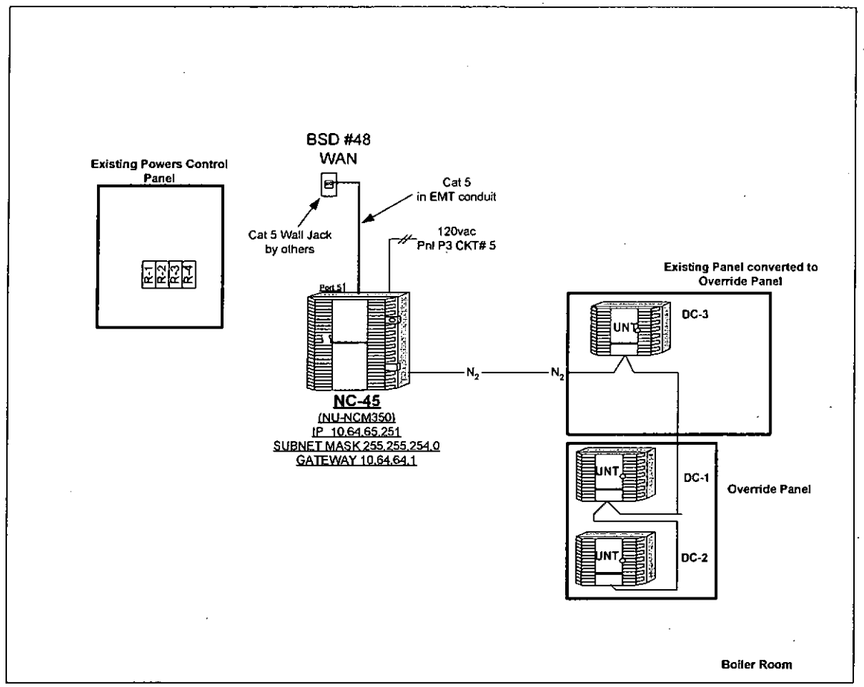
Supporting Documentation

BILL OF MATERIALS

Designation	Qty	Part Number	Description
Field Devices:			
NC-34	1	EN-EWC25-0	DUAL ENCLOSURE WITH 50VA POWER
	1	NU-NCM350-8	NETWORK CNTRL MOD 350,8MB,ARC/ETHERNET
	1	NU-NET301-0	NCU,N1 CARD F/ NCM350,ETHERNET,PRECONFIG

Hiteon Elementary School



Wire Type Legend		
Fibre Optic — N1 Trunk - Fiber Optic	General Instrument R-002-ZC-6F-00	
Coax — N1 Arcnet Trunk - Coax	RG62A/U Coax, shielded, plenum	
Coax — N1 Ethernet Trunk - Coax	RG58A/U Coax, shielded, plenum	
UTP — N1 Ethernet Trunk - UTP	CAT5, unshielded, 4 pair, 24 AWG, plenum	
N_2 — N2 Trunk -RS485	18/3 twisted, shielded, plenum, blue jacket	
XT Bus — XT Bus	18/3 twisted, shielded, plenum, blue jacket	

REVISION INFORMATION
NUMBER 0
DATE 04/01/04
TIME 11:35 AM
SLW 0
FILE NAME NR-21C-1.vsd

Drawing Title
Network Riser NC-45

Hetion Elementary School

Project Title
Beaverton SD Retrofit Projects

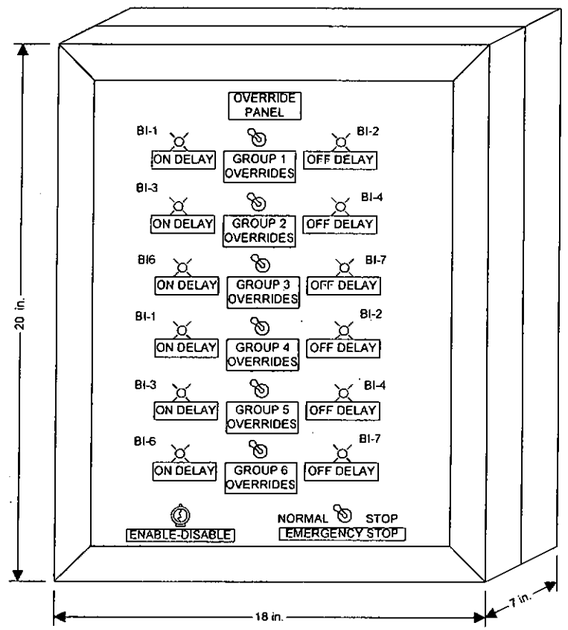
		ASBUILTS		3/9/04	MKH
REFERENCE DRAWING		NO.	REVISION-LOCATION	ECN	DATE BY
Sales Engineer	Project Manager Kim McKay	Application Engineer Mark Harris	DRAWN BY DATE 01/01/2000		APPROVED BY DATE 01/01/2000

JOHNSON CONTROLS
Systems & Services Division

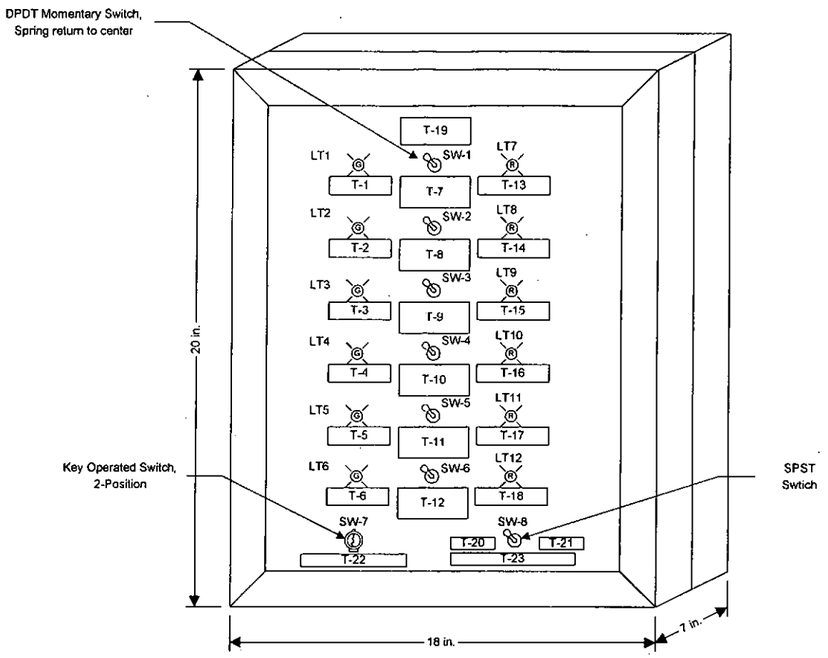
Branch Information
4011 S.E. International Way
Suite 605
Milwaukie
OR 97222
Phone: 503-305-2000
Fax: 503-305-1158

CONTRACT NUMBER **3084-0070**

DRAWING NUMBER **NR-21C-1**



PANEL FACE DETAIL



PANEL FACE DEVICE LAYOUT

SEQUENCE OF OPERATION

All Air Handlers, RTU's and Unit Ventilators can be assigned to a group. The group number is the same as the group as labeled on the panel. When the switch is toggled to "ON", the assigned units in that group will start. The units will keep running until an adjustable time delay is completed, after which the units revert back to the normal automatic mode. When the switch is toggled to "OFF", the assigned units in that group will stop. The units will stop running until an adjustable time delay is completed, after which the units revert back to the normal automatic mode. There is a separate adjustable time delay for each group that is used for both the ON and OFF delays. Green and red pilot lights indicate the ON or OFF status of each group.

The lights can be switched to "ON" or "OFF" and respected pilot light indicates the ON or OFF Status of the group.

When a unit is started, heating or cooling systems will start as required. VAV's, EF's, UH's and other miscellaneous items are not assignable to a group number.

The key operated **ENABLE-DISABLE** switch allows panel to function.

The **EMERGENCY STOP** switch shuts down all HVAC systems controlled by Metasys.

BILL OF MATERIALS

Panel Devices:

Designation	Qty	Part Number	Description
T-1-23	23	TAGS	PNEOLIC TAGS, KELE

Panel Tag Schedule

Tag #	Tag Description	Tag Size	Color
T-1 thru T-6	ON DELAY	3"W x 1"H	Black Tag, White Letters
T-7	GROUP 1 OVERRIDES	3"W x 1"H	Black Tag, White Letters
T-8	GROUP 2 OVERRIDES	3"W x 1"H	Black Tag, White Letters
T-9	GROUP 3 OVERRIDES	3"W x 1"H	Black Tag, White Letters
T-10	GROUP 4 OVERRIDES	3"W x 1"H	Black Tag, White Letters
T-11	GROUP 5 OVERRIDES	3"W x 1"H	Black Tag, White Letters
T-12	GROUP 6 OVERRIDES	3"W x 1"H	Black Tag, White Letters
T-13 thru T-18	OFF DELAY	3"W x 1"H	Black Tag, White Letters
T-19	OVERRIDE PANEL	3"W x 1"H	Black Tag, White Letters
T-20	NORMAL	3"W x 1"H	Black Tag, White Letters
T-21	STOP	3"W x 1"H	Black Tag, White Letters
T-22	EMERGENCY STOP	3"W x 1"H	Red Tag, White Letters
T-23	ENABLE -DISABLE	3"W x 1"H	Black Tag, White Letters

REVISION INFORMATION
NUMBER 0
DATE 04/01/04
TIME 11:36 AM
SLW 0
FILE NAME OP-21C-1.vsd

Drawing Title: **Override Panel Layout**

Hiteon Elementary School

Project Title: **Beaverton SD Retrofit Projects**

REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY
		ASBUILTS		3/9/04	MKH

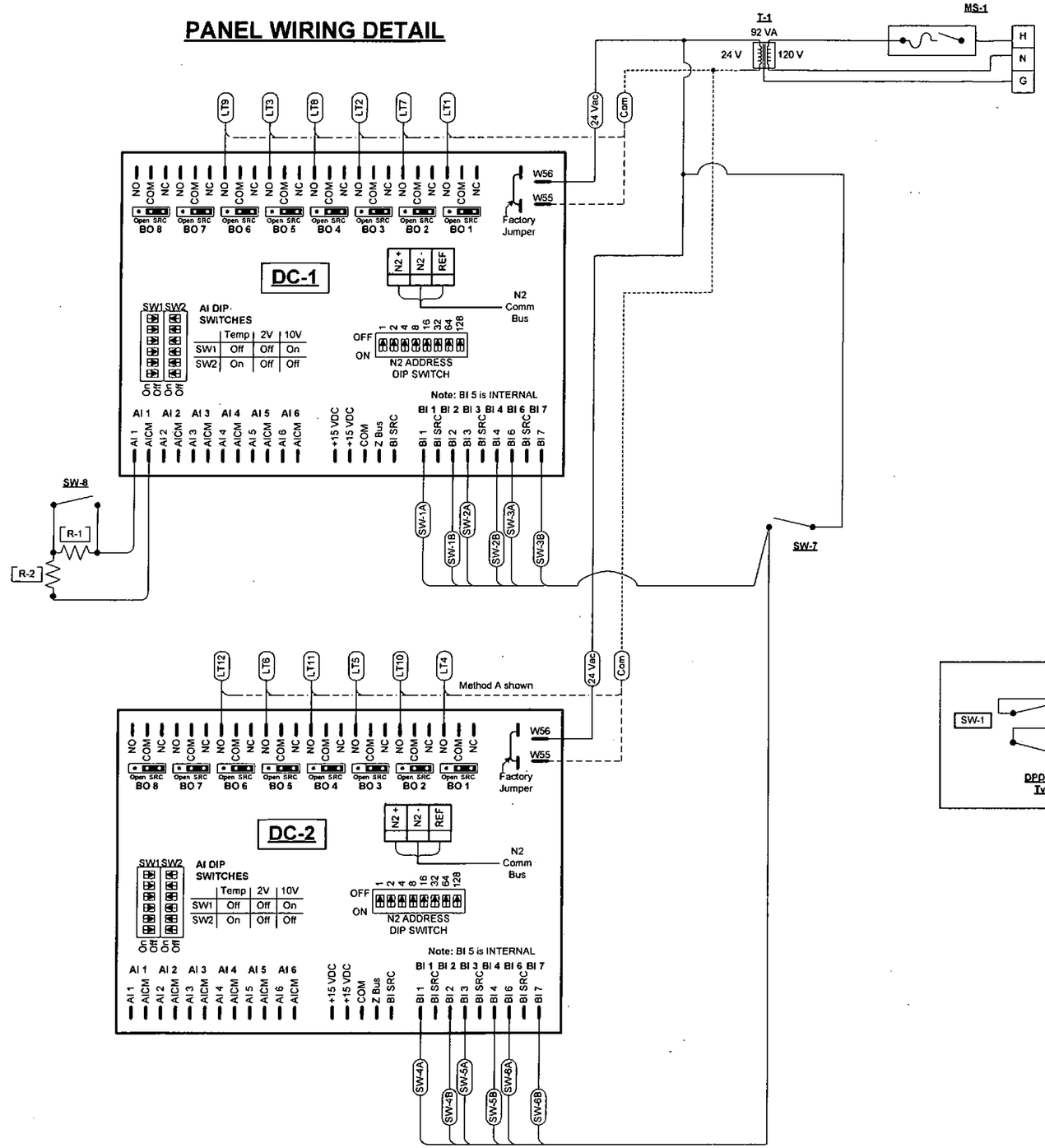
Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
	Kim McKay	Mark Harris	BY MWB DATE 05/30/2003	BY MWB DATE 05/30/2003

JOHNSON CONTROLS
Systems & Services Division
Branch Information
4011 S.E. International Way
Suite 805
Milwaukie
OR 97222
Phone: 503-305-2000
Fax: 503-305-1158

CONTRACT NUMBER **3084-0070**

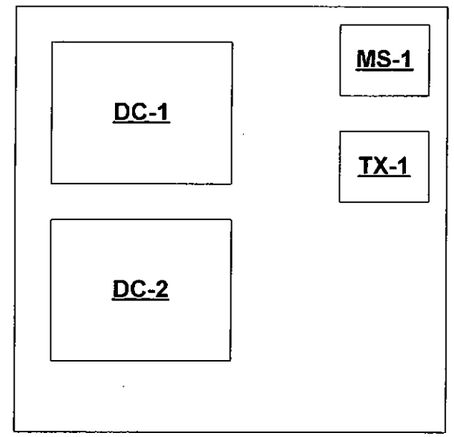
DRAWING NUMBER **OP-21C-1**

PANEL WIRING DETAIL

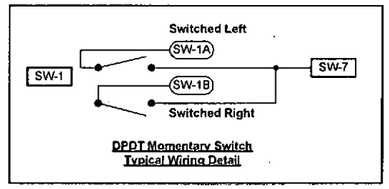


BILL OF MATERIALS

Designation	Qty	Part Number	Description
Panel Devices:			
DC-1,2	2	AS-UNT1108-0	CNTRLR,DIG,UNT,6AI,6BI,0AO,8BO
LT1-LT-12	12	24PSB5	LAMP 24VAC – KELE
	12	L4017	LAMP SOCKET, 11/16" DIA.–KELE
LT1-LT6	6	L4029	FLAT LENS GREEN – KELE
LT7-LT12	6	L4025	FLAT LENS RED --- KELE
MS-1	1	PRK-S	PANEL RECEPTACLE & DISCONNECT SW –KELE
PANEL	1	RET2018-PB	20x18x7 NEMA 1/Subpanel,pwdr blue–KELE
R-1	1	R100	100 OHM RESISTOR, 1/4 W
R-2	1	R1000	1000 OHM RESISTOR 1/4W
SW-1-7	6	4X203	TOGL,SW,3-POS,DPDT,MOM- GRANGER
SW-7	1	HWIK-2AF10	KEY SW, 2-POS,1-NO, – IDEC
SW-8	1	23F341	SPST, TOGGLE SW –KELE
TX-1	1	691-U100	XFMR, 120/24V,92VA,—KELE



PANEL INTERNAL DEVICE LAYOUT

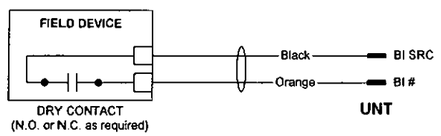


DPDT Momentary Switch Typical Wiring Detail

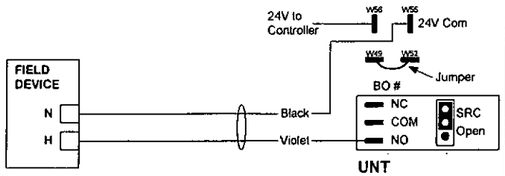
REVISION INFORMATION	Drawing Title: Override Panel Wiring Details						
NUMBER 0				ASBUILTS		3/9/04	MKH
DATE 04/01/04	Hiteon Elementary School	REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY
TIME 11:36 AM	Project Title: Beaverton SD Retrofit Projects	Sales Engineer / Project Manager: Kim McKey / Application Engineer: Mark Harris	DRAWN BY MWB DATE 05/30/2003	APPROVED BY MWB DATE 05/30/2003			
SLW 0	JOHNSON CONTROLS Systems & Services Division	Branch Information: 4011 S.E. International Way, Suite 605, Milwaukie, OR 97222, Phone: 503-305-2000, Fax: 503-305-1158	CONTRACT NUMBER 3084-0070				
FILE NAME OP-21C-2.vsd			DRAWING NUMBER OP-21C-2				

		Point Information			Controller Information						Panel Information			Intermediate Device				Field Device				
Tag	Point Type	System Name	Object Name	Expanded ID	Controller Details	Controller Tag	NCM Addr	Trunk Addr.	Cable Destination Bay/Terminal	Termination Out	Panel	Panel Location	Cable Number	Wiring /Tubing	Termination In	Device	Termination Out	Wiring /Tubing	Termination In	Device	Ref Detail	Comment
					UNT 1108						EN-1	Boiler Rm										Power to Controller
					UNT 1108	DC-1	45	1			EN-1	Boiler Rm										N2 Trunk
	AI-1	HIT-OVR PNL	Emergenc	Emergency Stop Switch	UNT 1108	DC-1	45	1	AI-1		EN-1	Boiler Rm	45-1-AI-1									
	AI-2				UNT 1108	DC-1	45	1	AI-2		EN-1	Boiler Rm	45-1-AI-2									
	AI-3				UNT 1108	DC-1	45	1	AI-3		EN-1	Boiler Rm	45-1-AI-3									
	AI-4				UNT 1108	DC-1	45	1	AI-4		EN-1	Boiler Rm	45-1-AI-4									
	AI-5				UNT 1108	DC-1	45	1	AI-5		EN-1	Boiler Rm	45-1-AI-5									
	AI-6				UNT 1108	DC-1	45	1	AI-6		EN-1	Boiler Rm	45-1-AI-6									
	BI-1	HIT-OVR PNL	Group 1	Group 1 On Switch Sts	UNT 1108	DC-1	45	1	BI-1		EN-1	Boiler Rm	45-1-BI-1									
	BI-2	HIT-OVR PNL	Group 1	Group 1 Off Switch Sts	UNT 1108	DC-1	45	1	BI-2		EN-1	Boiler Rm	45-1-BI-2									
	BI-3	HIT-OVR PNL	Group 2	Group 2 On Switch Sts	UNT 1108	DC-1	45	1	BI-3		EN-1	Boiler Rm	45-1-BI-3									
	BI-4	HIT-OVR PNL	Group 2	Group 2 Off Switch Sts	UNT 1108	DC-1	45	1	BI-4		EN-1	Boiler Rm	45-1-BI-4									
	BI-6	HIT-OVR PNL	Group 3	Group 3 On Switch Sts	UNT 1108	DC-1	45	1	BI-6		EN-1	Boiler Rm	45-1-BI-6									
	BI-7	HIT-OVR PNL	Group 3	Group 3 Off Switch Sts	UNT 1108	DC-1	45	1	BI-7		EN-1	Boiler Rm	45-1-BI-7									
	BO-1	HIT-OVR PNL	Group 1	Group 1 On Lite Cntrl	UNT 1108	DC-1	45	1	BO-1		EN-1	Boiler Rm	45-1-BO-1									
	BO-2	HIT-OVR PNL	Group 1	Group 1 Off Lite Cntrl	UNT 1108	DC-1	45	1	BO-2		EN-1	Boiler Rm	45-1-BO-2									
	BO-3	HIT-OVR PNL	Group 2	Group 2 On Lite Cntrl	UNT 1108	DC-1	45	1	BO-3		EN-1	Boiler Rm	45-1-BO-3									
	BO-4	HIT-OVR PNL	Group 2	Group 2 Off Lite Cntrl	UNT 1108	DC-1	45	1	BO-4		EN-1	Boiler Rm	45-1-BO-4									
	BO-5	HIT-OVR PNL	Group 3	Group 3 On Lite Cntrl	UNT 1108	DC-1	45	1	BO-5		EN-1	Boiler Rm	45-1-BO-5									
	BO-6	HIT-OVR PNL	Group 3	Group 3 Off Lite Cntrl	UNT 1108	DC-1	45	1	BO-6		EN-1	Boiler Rm	45-1-BO-6									
	BO-7				UNT 1108	DC-1	45	1	BO-7		EN-1	Boiler Rm	45-1-BO-7									
	BO-8				UNT 1108	DC-1	45	1	BO-8		EN-1	Boiler Rm	45-1-BO-8									
					UNT 1108						EN-1	Boiler Rm										Power to Controller
					UNT 1108	DC-2	45	2			EN-1	Boiler Rm										N2 Trunk
	AI-1				UNT 1108	DC-2	45	2	AI-1		EN-1	Boiler Rm	45-2-AI-1									
	AI-2				UNT 1108	DC-2	45	2	AI-2		EN-1	Boiler Rm	45-2-AI-2									
	AI-3				UNT 1108	DC-2	45	2	AI-3		EN-1	Boiler Rm	45-2-AI-3									
	AI-4				UNT 1108	DC-2	45	2	AI-4		EN-1	Boiler Rm	45-2-AI-4									
	AI-5				UNT 1108	DC-2	45	2	AI-5		EN-1	Boiler Rm	45-2-AI-5									
	AI-6				UNT 1108	DC-2	45	2	AI-6		EN-1	Boiler Rm	45-2-AI-6									
	BI-1	HIT-OVR PNL	Group 4	Group 4 On Switch Sts	UNT 1108	DC-2	45	2	BI-1		EN-1	Boiler Rm	45-2-BI-1									
	BI-2	HIT-OVR PNL	Group 4	Group 4 Off Switch Sts	UNT 1108	DC-2	45	2	BI-2		EN-1	Boiler Rm	45-2-BI-2									
	BI-3	HIT-OVR PNL	Group 5	Group 5 On Switch Sts	UNT 1108	DC-2	45	2	BI-3		EN-1	Boiler Rm	45-2-BI-3									
	BI-4	HIT-OVR PNL	Group 5	Group 5 Off Switch Sts	UNT 1108	DC-2	45	2	BI-4		EN-1	Boiler Rm	45-2-BI-4									
	BI-6	HIT-OVR PNL	Group 6	Group 6 On Switch Sts	UNT 1108	DC-2	45	2	BI-6		EN-1	Boiler Rm	45-2-BI-6									
	BI-7	HIT-OVR PNL	Group 6	Group 6 Off Switch Sts	UNT 1108	DC-2	45	2	BI-7		EN-1	Boiler Rm	45-2-BI-7									
	BO-1	HIT-OVR PNL	Group 4	Group 4 On Lite Cntrl	UNT 1108	DC-2	45	2	BO-1		EN-1	Boiler Rm	45-2-BO-1									
	BO-2	HIT-OVR PNL	Group 4	Group 4 Off Lite Cntrl	UNT 1108	DC-2	45	2	BO-2		EN-1	Boiler Rm	45-2-BO-2									
	BO-3	HIT-OVR PNL	Group 5	Group 5 On Lite Cntrl	UNT 1108	DC-2	45	2	BO-3		EN-1	Boiler Rm	45-2-BO-3									
	BO-4	HIT-OVR PNL	Group 5	Group 5 Off Lite Cntrl	UNT 1108	DC-2	45	2	BO-4		EN-1	Boiler Rm	45-2-BO-4									
	BO-5	HIT-OVR PNL	Group 6	Group 6 On Lite Cntrl	UNT 1108	DC-2	45	2	BO-5		EN-1	Boiler Rm	45-2-BO-5									
	BO-6	HIT-OVR PNL	Group 6	Group 6 Off Lite Cntrl	UNT 1108	DC-2	45	2	BO-6		EN-1	Boiler Rm	45-2-BO-6									
	BO-7				UNT 1108	DC-2	45	2	BO-7		EN-1	Boiler Rm	45-2-BO-7									
	BO-8				UNT 1108	DC-2	45	2	BO-8		EN-1	Boiler Rm	45-2-BO-8									

DETAIL UC301 BINARY INPUT (DRY CONTACT)



DETAIL UC404 24 VAC BINARY OUTPUT

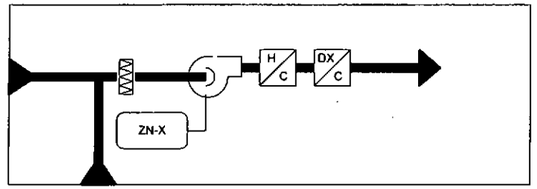


NOTE: 24V Sourced from Controller Power

REVISION INFORMATION	Drawing Title				
NUMBER 0	Override Panel Points List				
DATE 04/01/04	Hiteon Elementary School		ASBUILTS	3/9/04	MKH
TIME 11:36 AM	Project Title	REFERENCE DRAWING	NO. REVISION-LOCATION	ECN DATE	BY
SLW 0	Beaverton SD Retrofit Projects	Sales Engineer / Project Manager: Kim McKay; Application Engineer: Mark Harris	DRAWN BY / DATE: 01/01/2000	APPROVED BY / DATE: 01/01/2000	
FILE NAME OP-21C-3.vsd		JOHNSON CONTROLS Systems & Services Division	Branch Information: 4011 S.E. International Way, Suite 605, Milwaukie, OR 97222, Phone: 503-305-2000, Fax: 503-305-1158	CONTRACT NUMBER 3084-0070	DRAWING NUMBER OP-21C-3

OA-T

OUTSIDE AIR TEMPERATURE SENSOR
LOCATED ON THE NORTH WEST
CORNER OF THE BOILER RM



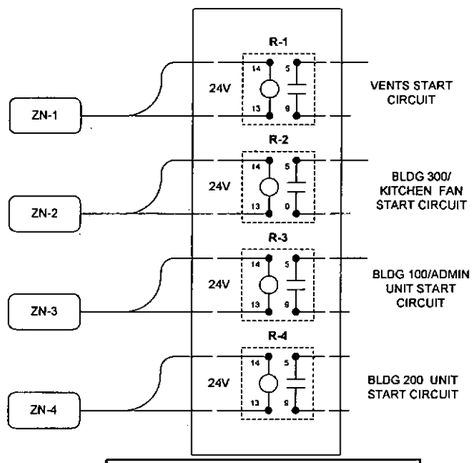
THIS DRAWING IS TYPICAL FOR ALL 4 ZONE FAN UNITS

THEY SERVE THE VENTS, BLDG 300/KITCHEN, BLDG 100/ADMIN, BLDG 200

BILL OF MATERIALS

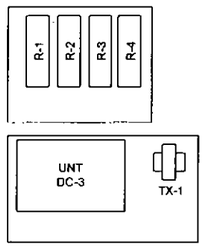
Designation	Qty	Part Number	Description
Field Devices:			
DC-3	1	AS-UNT141-1	CNTRLR,DIG,UNT,6AI,4BI,6BO,2AO,SCR
OA-T	1	TE-6313P-1	SENSOR,T-NI,0.1%,3IN OAT
R-1-4	4	VBD1B-F	SPDT RELAY SOCKET BASE
	4	VMD1B-F24A	SPDT RELAY, 24VAC,15A, LED, PUSH TO TEST- VERIS
TX-1	1	Y65T31-0	XFMR,120-208-240/24,40VA,FOOT [Y65AR+]

RELAYS MOUNTED IN SAME PANEL AS THE CONTROLLER, LOCATED IN CEILING ABOVE THE ROOM SENSOR



CONTROLLER POINT LIST IN ON DWG. MS-21C-2

Existing Power Control Panel
Located in the Boiler Rm



Digital Device Legend:

xxxx: System
nnnn: Point
xxxx nnnn

Note:
1. Points associated with each System are connected to the Digital Controller as identified in the associated System's Point Schedule.
2. System Point Schedule rows which are shaded are for information only.
3. All devices shown as **shaded** are existing, and are to be re-used.
4. All panel devices are located in the noted Enclosure.

REVISION INFORMATION	
NUMBER	0
DATE	04/01/04
TIME	11:37 AM
SLW	0
FILE NAME	MS-21C-1.vsd

Drawing Title
Zone Fan Control

Hiteon Elementary School

Project Title
Beaverton SD Retrofit Projects

		ASBUILTS		3/9/04	MKH
REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY
Sales Engineer / Project Manager (Kim McKay) / Application Engineer (Mark Harris)		DRAWN BY / DATE 01/01/2000		APPROVED BY / DATE 01/01/2000	

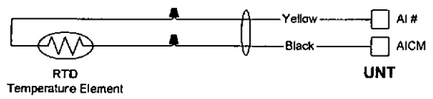
JOHNSON CONTROLS
Systems & Services Division
Branch Information
4011 S.E. International Way
Suite 605
Milwaukie
OR 97222
Phone: 503-305-2000
Fax: 503-305-1158

CONTRACT NUMBER
3084-0070

DRAWING NUMBER
MS-21C-1

		Point Information			Controller Information						Panel Information			Intermediate Device				Field Device				
Tag	Point Type	System Name	Object Name	Expanded ID	Controller Details	Controller Tag	NCM Addr	Trunk Addr.	Cable Destination Bay/Terminal	Termination Out	Panel	Panel Location	Cable Number	Wiring /Tubing	Termination In	Device	Termination Out	Wiring /Tubing	Termination In	Device	Ref Detail	Comment
					UNT 141						EN-3	Boiler Rm										Power to Controller
					UNT 141	DC-3	45	3			EN-3	Boiler Rm										N2 Trunk
	AI-1	HIT-ZONE	Outside	Outside Air Temp	UNT 141	DC-3	45	3	AI-1	AI1,A COM	EN-3	Boiler Rm	45-3-AI-1					2/18 YEL	2-Wire	TE	UT131	
	AI-2				UNT 141	DC-3	45	3	AI-2		EN-3	Boiler Rm	45-3-AI-2									
	AI-3				UNT 141	DC-3	45	3	AI-3		EN-3	Boiler Rm	45-3-AI-3									
	AI-4				UNT 141	DC-3	45	3	AI-4		EN-3	Boiler Rm	45-3-AI-4									
	AI-5				UNT 141	DC-3	45	3	AI-5		EN-3	Boiler Rm	45-3-AI-5									
	AI-6				UNT 141	DC-3	45	3	AI-6		EN-3	Boiler Rm	45-3-AI-6									
	BI-1				UNT 141	DC-3	45	3	BI-1		EN-3	Boiler Rm	45-3-BI-1									
	BI-2				UNT 141	DC-3	45	3	BI-2		EN-3	Boiler Rm	45-3-BI-2									
	BI-3				UNT 141	DC-3	45	3	BI-3		EN-3	Boiler Rm	45-3-BI-3									
	BI-4				UNT 141	DC-3	45	3	BI-4		EN-3	Boiler Rm	45-3-BI-4									
	BO-1	HIT-ZONE	ZN-1	Vents	UNT 141	DC-3	45	3	BO-1	BO1,RTN	EN-3	Boiler Rm	45-3-BO-1	2/18 VIO	COIL (24V, Com)	Veris Command Relay	COM, NO	2/14	See wiring detail	Starter (NO) (Sw Hi)	UT502	
	BO-2	HIT-ZONE	ZN-2	Building 300/Kitchen	UNT 141	DC-3	45	3	BO-2	BO2,RTN	EN-3	Boiler Rm	45-3-BO-2	2/18 VIO	COIL (24V, Com)	Veris Command Relay	COM, NO	2/14	See wiring detail	Starter (NO) (Sw Hi)	UT502	
	BO-3	HIT-ZONE	ZN-3	Building 100/Admin	UNT 141	DC-3	45	3	BO-3	BO3,RTN	EN-3	Boiler Rm	45-3-BO-3	2/18 VIO	COIL (24V, Com)	Veris Command Relay	COM, NO	2/14	See wiring detail	Starter (NO) (Sw Hi)	UT502	
	BO-4	HIT-ZONE	ZN-4	Building 200	UNT 141	DC-3	45	3	BO-4	BO4,RTN	EN-3	Boiler Rm	45-3-BO-4	2/18 VIO	COIL (24V, Com)	Veris Command Relay	COM, NO	2/14	See wiring detail	Starter (NO) (Sw Hi)	UT502	
	BO-5				UNT 141	DC-3	45	3	BO-5		EN-3	Boiler Rm	45-3-BO-5									
	BO-6				UNT 141	DC-3	45	3	BO-6		EN-3	Boiler Rm	45-3-BO-6									
	AO-1				UNT 141	DC-3	45	3	AO-1		EN-3	Boiler Rm	45-3-AO-1									
	AO-2				UNT 141	DC-3	45	3	AO-2		EN-3	Boiler Rm	45-3-AO-2									

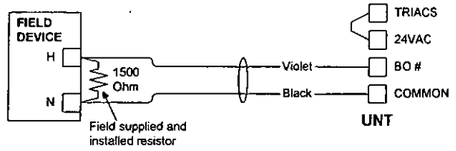
DETAIL U131 TEMPERATURE SENSOR INPUT



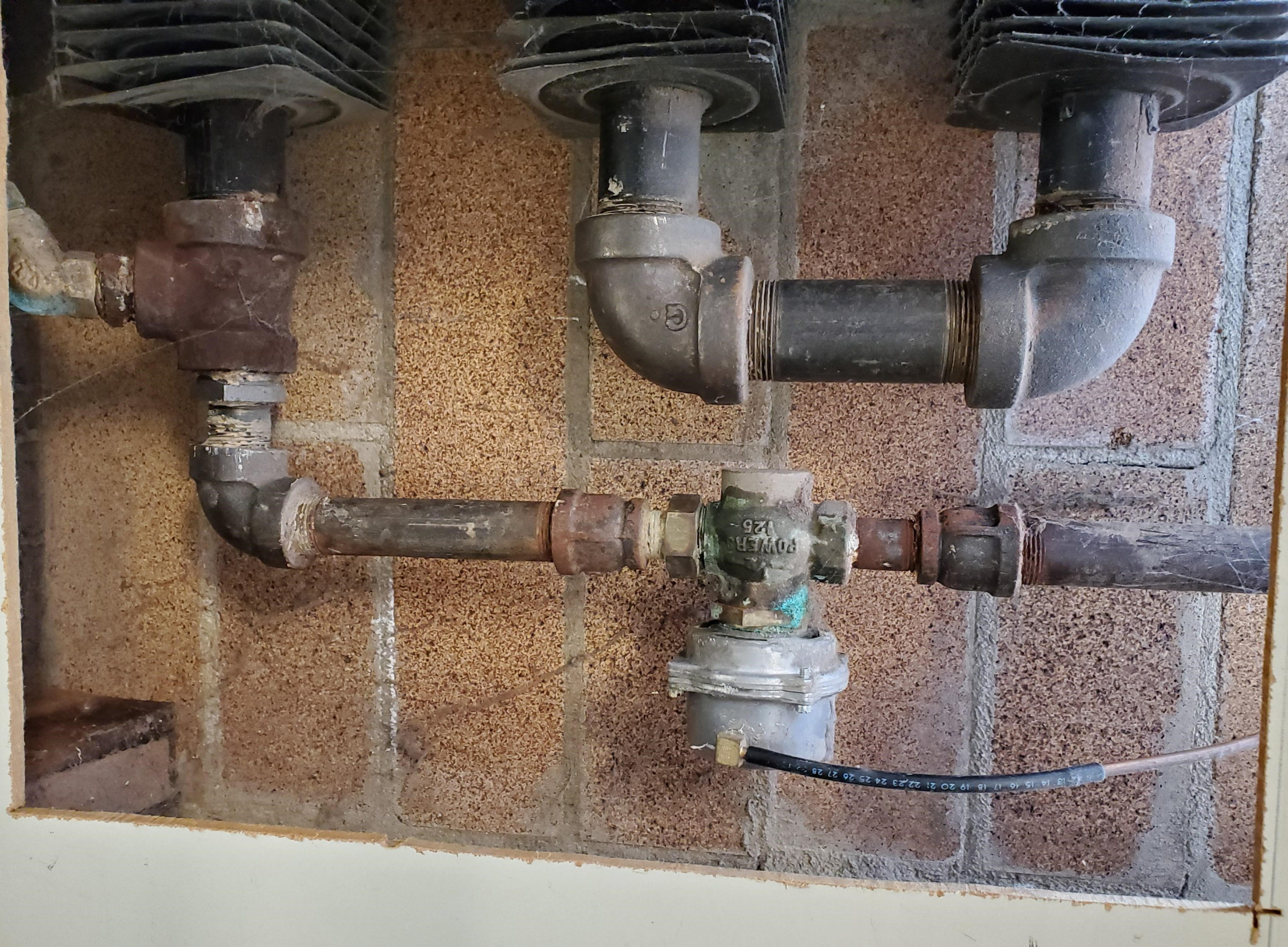
Set SW1 to Position "T" and SW2 to Position "2V"

DETAIL U502 24 VAC BINARY OUTPUT to LOW CURRENT DRAW DEVICE (Switch High)

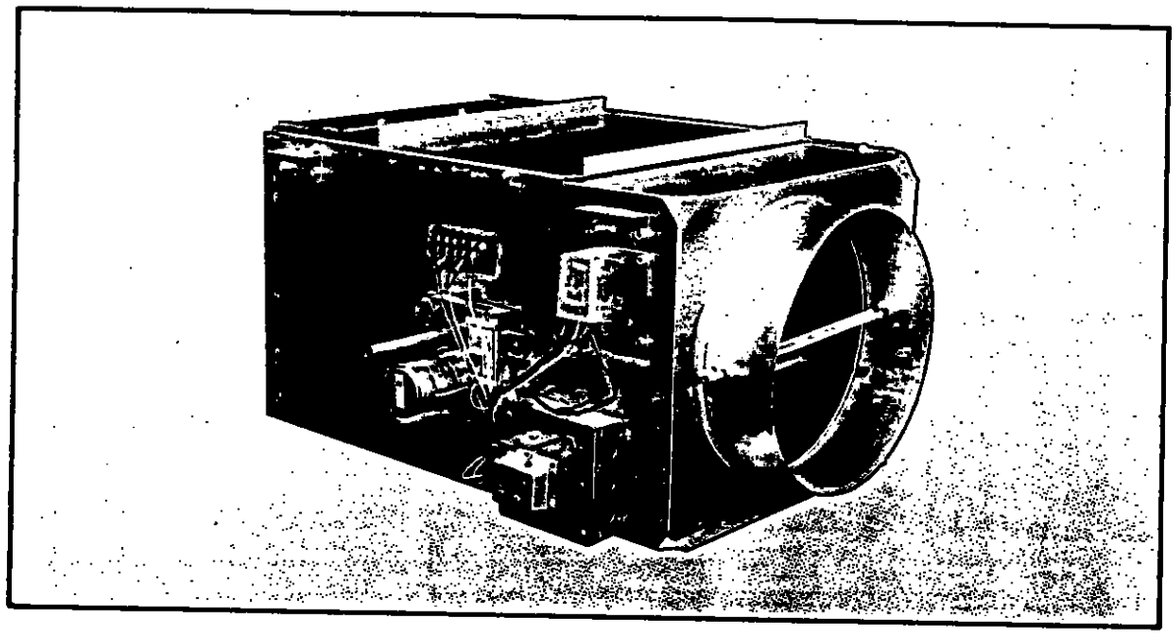
(Use when current draw of the Field Device is less than 50 mA)



REVISION INFORMATION	Drawing Title				
NUMBER 0	Zone Fans Point List				
DATE 04/01/04	Hiteon Elementary School		ASBUILTS	3/19/04	MKH
TIME 11:37 AM	Project Title	REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN / DATE / BY
SLW 0	Beaverton SD Retrofit Projects	Sales Engineer / Project Manager: Kim McKay / Application Engineer: Mark Harris	DRAWN BY / DATE 01/01/2000	APPROVED BY / DATE 01/01/2000	
FILE NAME MS-21C-2.vsd	JOHNSON CONTROLS Systems & Services Division	Branch Information: 4011 S.E. International Way, Suite 605, Milwaukie, OR 97222, Phone: 503-305-2000, Fax: 503-305-1158	CONTRACT NUMBER 3084-0070	DRAWING NUMBER MS-21C-2	


POWER
125

2 By-Pass Control Unit—Model ABBB



The Carnes Model ABBB, by-pass unit, provides pressure dependent variable air volume to individual zones while by-passing the unneeded air to the ceiling plenum for recirculation.

Although zone air volumes in small buildings may vary greatly, the cost of fan controls many times cannot be justified. Zone variable air volumes are realized with the by-pass unit while the supply fan delivers a constant CFM.

The ABBB is compatible with reverse or direct acting pneumatic thermostats or electric thermostats. Zone thermostats directly controlling the by-pass damper assures that only the air that is needed is delivered to the zone.

Downstream duct work pressure losses can be matched by adjusting an integral by-pass balancing damper.

Other Features Include:

- Air flow capacities from full shut-off to zone to 3,200 CFM.
- Pneumatic, electric or manual damper control.
- Low pressure drop.
- Low sound levels.
- Thermally and acoustically insulated casing.
- Open-end discharge provided with S and drive connection for easy installation.
- Optional multi-discharge adaptors have round outlet connections with integral balancing dampers.
- Balancing damper in by-pass is standard.
- Air flow sensor at inlet is standard.
- Optional hanger brackets.
- Optional controls enclosure for electric controls.
- Optional foil coated insulation (hospital, laboratory, etc. applications).

Available Modules:

- Basic control unit—Model ABBB.
- Multi-discharge adaptor—Model AXMA (See Section 5—Accessories).

SOUND DATA

CFM	ΔPs	Sound Power db Octave Band 2	3	4	5	6	7	Max. Disc. NC	Radiated NC
SIZE 02									
80	0.07	—	31	23	—	—	—	—	—
120	0.14	—	41	35	29	—	—	—	—
160	0.23	51	49	42	36	30	—	26	—
200	0.36	56	54	47	42	36	31	33	24
SIZE 04									
160	0.05	—	—	21	—	—	—	—	—
240	0.12	—	41	34	28	21	—	—	—
320	0.21	51	48	41	36	31	26	25	24
400	0.32	56	53	47	42	37	33	32	30
SIZE 06									
240	0.04	—	32	22	—	—	—	—	—
360	0.10	—	40	32	27	—	—	—	—
480	0.16	49	47	40	34	29	—	24	21
600	0.25	54	52	46	40	36	31	31	26
SIZE 08									
320	0.03	—	—	—	—	—	—	—	—
480	0.07	—	37	29	22	—	—	—	—
640	0.13	47	45	37	31	27	—	22	21
800	0.19	54	51	44	37	33	28	29	28

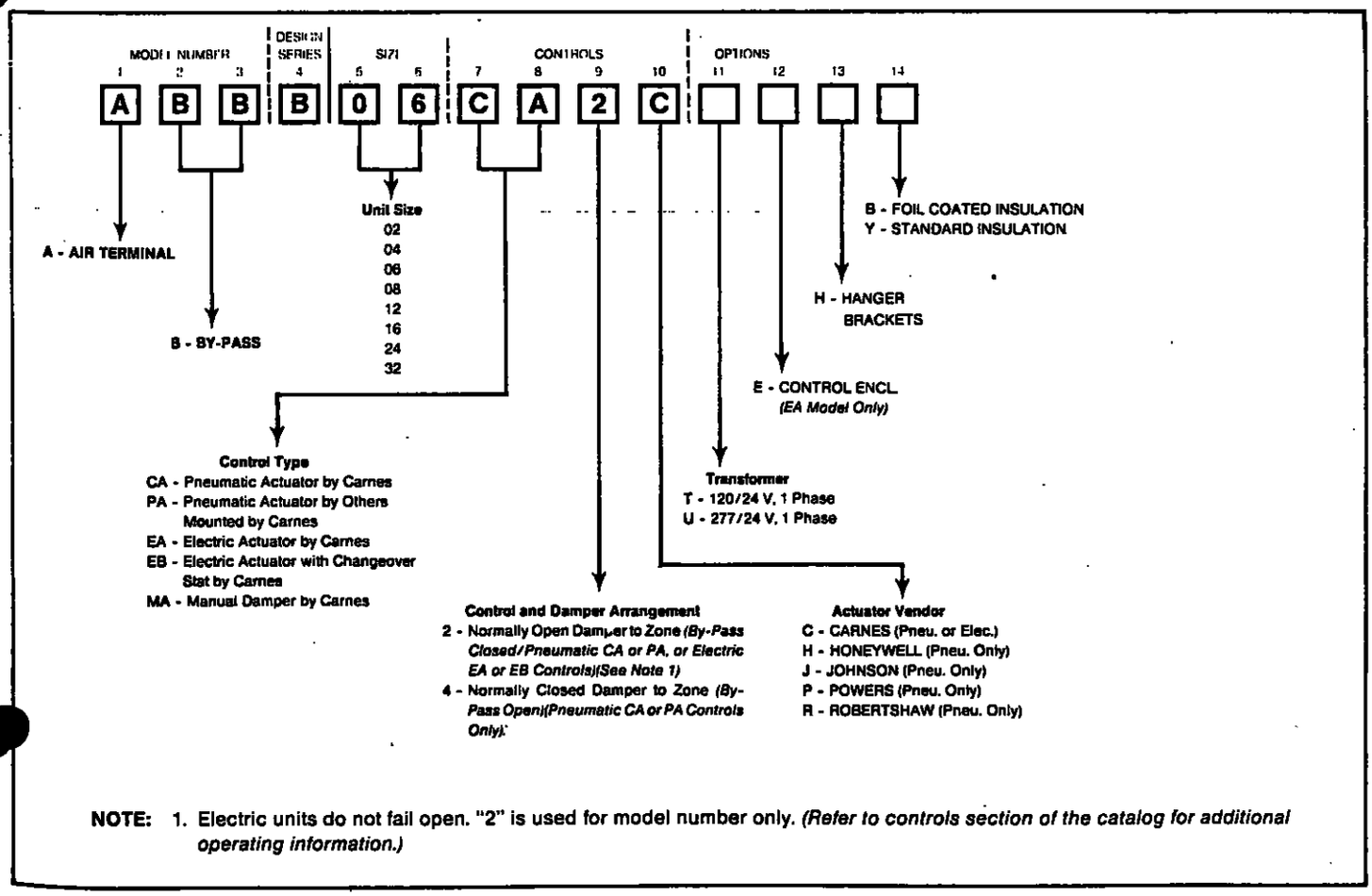
SOUND DATA

CFM	ΔPs	Sound Power db Octave Band 2	3	4	5	6	7	Max. Disc. NC	Radiated NC
SIZE 12									
480	0.03	—	31	21	—	—	—	—	—
720	0.06	—	38	31	29	22	—	—	—
960	0.11	48	45	38	34	29	—	22	23
1200	0.17	55	52	45	39	35	30	31	29
SIZE 16									
640	0.03	—	30	23	20	—	—	—	—
960	0.06	—	39	32	27	21	—	—	—
1280	0.12	52	47	40	35	30	—	24	22
1600	0.18	56	53	47	41	36	31	32	29
SIZE 24									
960	0.04	—	35	31	21	—	—	—	—
1440	0.10	48	45	41	33	30	28	25	20
1920	0.18	54	51	47	41	36	32	32	28
2400	0.28	60	58	54	47	44	42	39	35
SIZE 32									
1280	0.04	—	37	33	27	24	—	—	—
1920	0.09	51	46	41	36	31	27	25	21
2560	0.15	57	54	48	44	39	34	33	29
3200	0.22	61	59	53	47	44	38	38	36

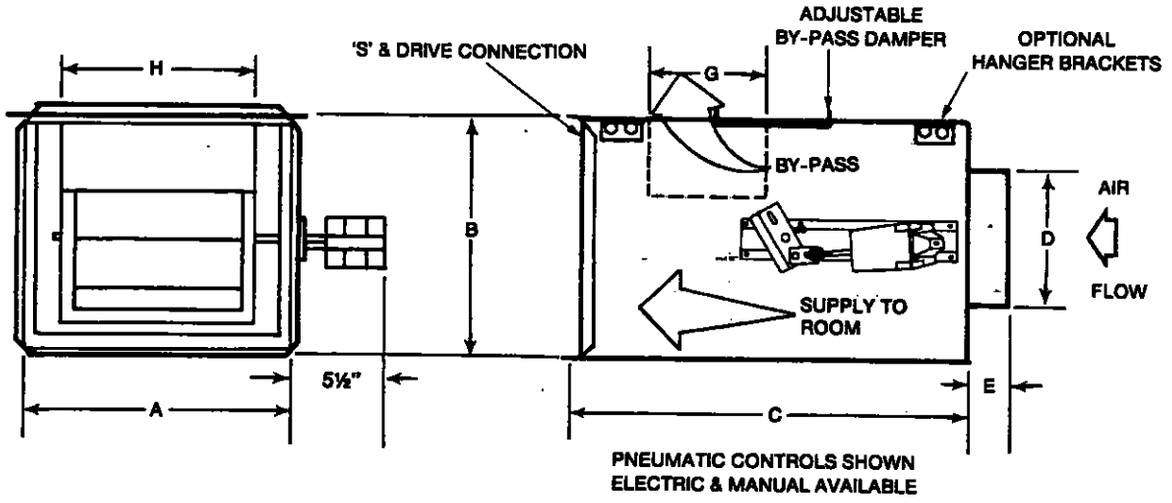
OPEN END NOTES

1. *ΔPs Static pressure difference from inlet to discharge.*
2. *Radiated NC is based on sound emanating from the casing with room absorption (10db) and ceiling plenum absorption and transmission loss (10db).*
3. *Dash (—) indicates sound power db or NC level less than 20.*
4. *All values of NC include 10 db room absorption.*

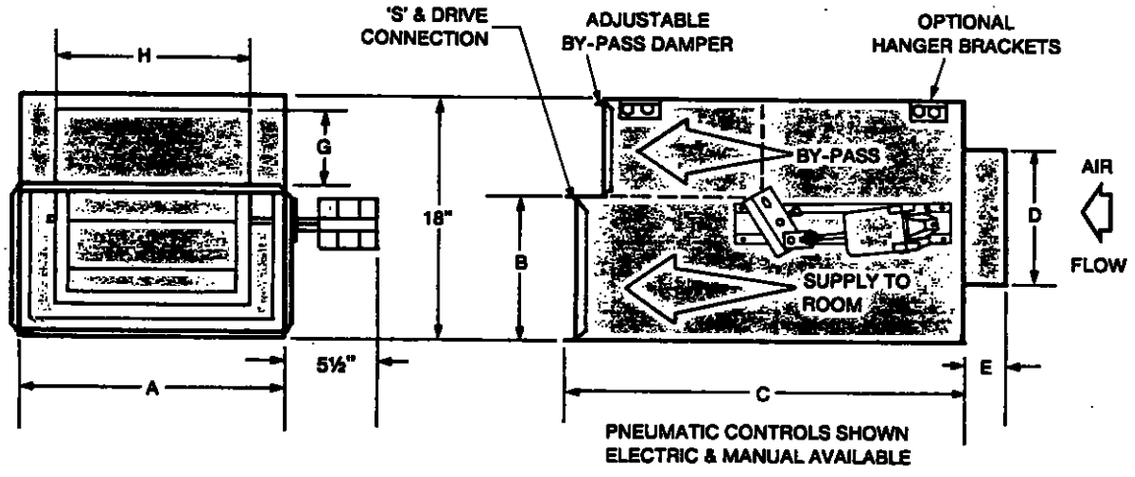
MODEL NUMBERING SYSTEM—Model ABBB Control Unit



NOTE: 1. Electric units do not fail open. "2" is used for model number only. *(Refer to controls section of the catalog for additional operating information.)*



DIMENSIONS LISTED IN INCHES BASIC ASSEMBLY								
UNIT SIZE	DISCHARGE A	DISCHARGE B	C	D	E	BY-PASS OPENING G	BY-PASS OPENING H	WEIGHT (lbs.) Less Controls
02	10	8	15 3/4	5	2 3/8	4 3/16	7	11
04	12	10	15 3/4	8	2 3/8	5 7/8	9	14
06	14	12	21 3/4	10	2 3/8	9 3/4	11	19
08	16	14	21 3/4	12	2 3/8	9 5/8	13	27
12	18	16	23 3/4	14	2 5/8	10 3/8	15	31



DIMENSIONS LISTED IN INCHES BASIC ASSEMBLY								
UNIT SIZE	DISCHARGE A	DISCHARGE B	C	D	E	BY-PASS OPENING G	BY-PASS OPENING H	WEIGHT (lbs.) Less Controls
16	20	10	24 1/8	16	2 5/8	6 1/2	17	36
24	24	10	24 1/8	16 x 18	3 3/8	6 1/2	21	40
32	32	10	24 1/8	16 x 24	3 3/8	6 1/2	29	50

Table 2 — Electrical Data (3-Phase, 60-Hz)

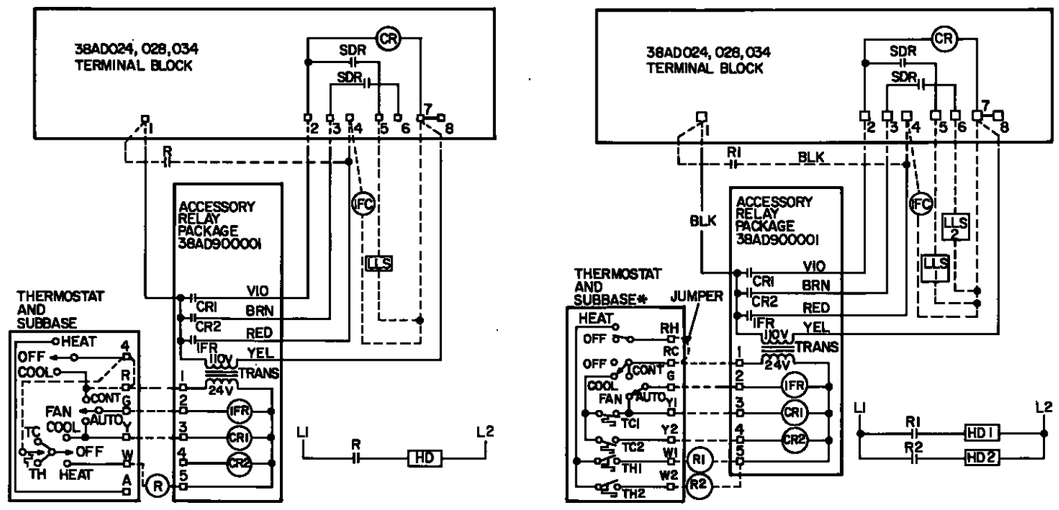
38AD	Model	UNIT Volts Nameplate	Volts Supplied* Min	Volts Supplied* Max	MCA	Max Fuse Amps	COMPRESSOR RLA	COMPRESSOR LRA	COMPRESSOR MTA	FANS Total	FANS FLA (ea) No. 1	FANS FLA (ea) No. 2,3	KW (Total)
024	520	208/230	187	253	103	175	76.0	345	53		4.5	4.6	3.36
	620	460	414	508	51	80	36.0	173	50	3	1.9	1.9	3.36
	120	575	518	632	41	60	28.6	120	40		1.6	1.6	3.36
028	530	208/230	187	253	145	225	100.0	446	70		6.2	6.6	4.05
	630	460	414	508	69	110	48.0	223	33	3	3.0	3.0	4.05
	130	575	518	632	62	100	43.4	164	61		2.5	2.5	4.05
034	520	208/230	187	253	170	275	120.0	506	83		6.2	6.6	4.05
	620	460	414	508	72	110	50.0	253	35	3	3.0	3.0	4.05
	120	575	518	632	64	100	45.0	176	63		2.4	2.4	4.05

FLA — Full Load Amps (fan motors)
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps. Complies with National Electrical Code (NEC) 430-24.
MTA — Must Trip Amps (circuit breaker)
RLA — Rated Load Amps (compressor)
*Units are suitable for use on electrical systems where voltage supplied to the unit terminals is not below or above the listed limits.

Table 3 — Maximum Allowable Field Wire Sizes

UNIT	SIZE	VOLTS (60-Hz)	WIRE SIZE	CONN.
38AD	024,028,034	208/230	6 AWG to 350 MCM	TB
		460, 575	14 AWG to 2/0	

TB — Terminal Block (with integral compression terminal).



(A) ONE-STEP COOLING/ONE-STEP HEATING

(B) TWO-STEP COOLING/TWO-STEP HEATING

*Manual changeover type shown.

Fig. 7 — Control Circuit Wiring with 24-Volt Accessories

NOTE: Do not use circuit breaker to start or stop compressor, except in an emergency.

Depending on the position of the Time Guard® timer, start-up of the compressor will be delayed from 12 seconds to 8 minutes from the time the control circuit is energized.

Charge System

1. Block condenser coils to maintain 125 F condensing temperature at 280 psig, then add additional charge to clear sight glass. *(If long liquid lines or vertical lifts greater than 25 ft are used, a liquid line sight glass should be installed at condensing unit and used for charging purposes.)*
2. After sight glass has cleared, additional charge must be added per Table 4 to flood subcooler circuits in condensers.

Table 4 — Charging Data (R-22)

UNIT 38AD	REFRIG CHG (lb) Subcooler Coil*	REFRIG STORAGE CAP. (lb)†
024	8	70
028	8	77
034	7	99

*For maximum system capacity without receiver.
†At 120 F condensing temperature with condenser 80% full of liquid.
NOTE: Values shown do not include charging requirements for cooling coils and piping.

Oil Charge (Table 5) — Allow unit to run for about 20 minutes. Stop unit and check compressor oil level. Add oil only if necessary to bring oil into view in sight glass. *Use only Carrier-approved compressor oil.* Approved oils are:

Sun Oil Company ..... Suniso 3GS
Texaco, Inc. ..... Capella BI
E.I. DuPont Company ..... DuPont Synthetic Refrigeration Oil (150 SSU only)

Do not reuse drained oil or use any oil that has been exposed to atmosphere. Procedures for adding or removing oil are given in Carrier Standard Service Techniques Manual, Chapter 1, Refrigerants.

If oil is added, run unit for additional 10 minutes. Stop unit and check oil level. If level is again low, add oil *only after* determining that piping system is designed for proper oil return and that the system is not leaking oil.

Table 5 — Physical Data

UNIT 38AD	024	028	034
OPER WT (lb)	1750	1900	2300
REFRIGERANT	R-22		
Oper Charge (lb)*	28.0	30.5	35.5
COMPRESSOR	Recip Hermetic — 1750 Rpm		
Number	1	1	1
Model 06E	4250	5265	5275
Cylinders	4	6	6
Oil (pt)†	14	19	19
Crankcase Heater (watts)	125		
Protection	See Note		
Capacity Control	Suction Pressure Unloader(s)		
No. 1	Unloader Settings (psig)		
Load	76	76	76
Unload	58	58	58
No. 2	Unloader Settings (psig)		
Load	—	78	78
Unload	—	60	60
CONDENSER FANS	Axial Flow, Direct Drive		
Number...Rpm	3...1140		
Diameter (in.)	26	30	30
Motor Hp (ea)	3/4	1	1
Total Airflow (cfm)	18,200	25,200	28,200
CONDENSER COIL	Plate Fins, 3 Rows		
Sections	1	1	1
Total Face Area (sq ft)	35.4	39.0	49.6
Capacity (lb)‡	70	77	99
ELECTRIC CONTROLS	Time Guard® Circuit**		
Pressurestat, Dual			
High Cutout (psig)	364	364	364
High Cut-in (psig)	264	264	264
Low Cutout (psig)	29	29	29
Low Cut-in (psig)	44	44	44
Oil Pressure Switch Cutout	5 psi above suction pressure		
Fan Cycling Controls			
No. 2 Fan: Press. (±5 psig)	Opens 160, Closes 260		
No. 3 Fan: Temp (±3 F)	Opens 70, Closes 80		
PRESSURE RELIEF	Fusible Plug		
DISCHARGE LINE CHECK VALVE	1	1	1

*Approximate charge for maximum system capacity. All units shipped with holding charge.
†Refer to Oil Charge for Carrier-approved compressor oil.
‡Storage capacity at 120 F condensing temperature with condenser 80% full of liquid.
**Protection against compressor short cycling.

NOTE: Circuit Breaker in main power circuit and Discharge Gas Thermostat in control circuit.

Check Operation of all safety controls. Replace all service panels. *Be sure that control panel door is closed tightly.*

SERVICE

Capacity Control is by either one or 2 suction pressure actuated unloaders. Each controls 2 cylinders. Unloaders are factory set (see Table 4) but may be field adjusted. Number 1 unloader is on cylinder bank on same side of compressor as terminal box.

CONTROL SET POINT

The control set point (cylinder load point) is adjustable from 0 to 85 psig. To adjust, turn control set point adjustment nut (Fig. 8) clockwise to its bottom stop. In this position, set point is 85 psig. Then, turn adjustment counterclockwise to desired control set point. Every full turn counterclockwise decreases set point by 7.5 psig.

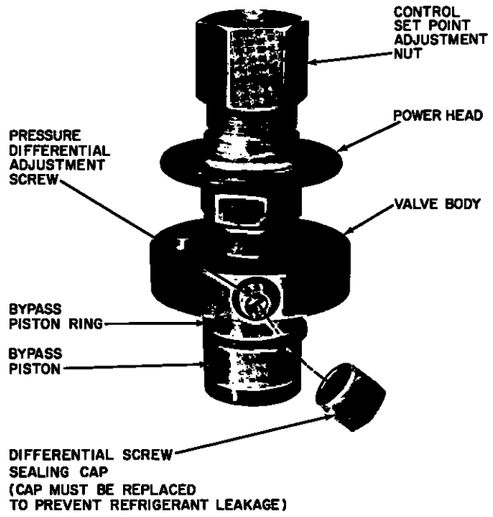


Fig. 8 — Capacity Control Valve

PRESSURE DIFFERENTIAL

The pressure differential (difference between cylinder load and unload points) is adjustable from 6 to 22 psig. To adjust, turn pressure differential adjustment screw (Fig. 8) counterclockwise to its backstop position. In this position, differential is 6 psig. Then, turn adjustment clockwise to desired pressure differential. Every full turn clockwise increases differential by 1.5 psig.

Oil Pressure Safety Switch (OPS) in the control circuit stops the compressor, and unit, if proper oil pressure differential is not established at start-up or maintained during operation. If OPS stops the unit, determine the cause and correct before restarting unit. Failure to do so will constitute abuse. *Equipment failure due to abuse may void the Warranty.*

Compressor Motor Protection

CIRCUIT BREAKER

A manual reset calibrated-trip magnetic circuit breaker protects the compressor against overcurrent. Do not bypass connections to increase size of breaker for any reason. If trouble occurs, determine cause and correct before resetting the breaker. Circuit breaker Must Trip Amps (MTA) are listed in Table 2, Electrical Data.

DISCHARGE GAS THERMOSTAT

A sensor in the discharge gas of the compressor reacts to excessively high discharge gas temperature and shuts off the compressor. The high temperature of the discharge gas is a direct indication of an overtemperature condition in compressor motor.

CRANKCASE HEATER

The compressor has an electric heater located in the bottom cover, held in place by a clip and bracket. Heater must be tight to prevent backing out (heater will burn out if exposed to air). The heater is wired into the compressor control circuit thru a relay to energize only when the compressor shuts off. This keeps the oil at a temperature that will prevent excessive absorption of refrigerant during shutdown periods.

Crankcase heater should be energized at all times when unit is not running except during prolonged shutdown or during servicing. In these cases, the heater should be energized for 24 hours before unit is restarted.

TIME GUARD® DEVICE

Time Guard function prevents compressor from short cycling.

Fan Motor Protection — Fan motors are inherently protected, grouped on a single circuit breaker.

Fan Adjustment — When replacing a fan, adjust fan until top surface of hub plate is below the top of the orifice ring as indicated in Fig. 9. Then, tighten both setscrews, located over the keyway of the fan hub of the motor shaft. Seal recessed area of fan hub bore with Permagum to prevent rusting.

Head Pressure Control reduces condensing capacity under low ambient temperature conditions. For intermediate season operation, fan cycling is employed. Fan no. 2 is cycled by pressure control, with the pressure sensor located in the liquid line. Fan no. 3 is cycled by an air temperature thermostat (see Table 5). For operation under colder ambient conditions, refer to 32LT service publication for use of Motormaster® control to supplement fan cycling.

Winter Start Control — Contacts D-D1 in the 4-function timer bypass the low-pressure switch (LPS) for 2-1/2 minutes at unit start-up to prevent nuisance LPS trips at low ambient temperature.

DEFROST THERMOSTAT (optional, field supplied)

If an oil return connection at the bottom of this suction header is supplied with an evaporator, this connection must be teed in ahead of first mixing elbow. When the compressor is below the evaporator, the riser at the evaporator does not have to extend as high as the top level. After a 15 diameter riser has been provided, the suction line may elbow down immediately.

SAFETY RELIEF

A fusible plug is located on unit liquid line before the liquid valve.

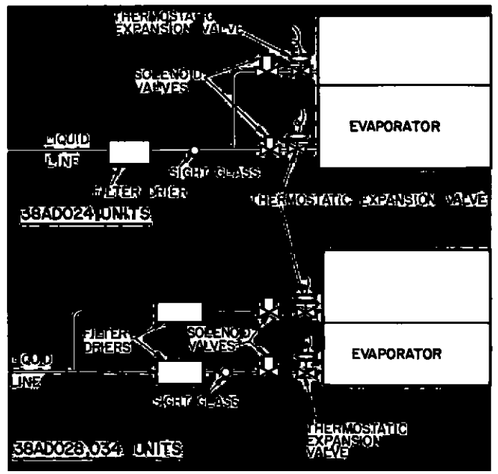


Fig. 6 — Recommended Filter Drier(s) and Sight Glass Locations

Step 4 — Make Electrical Connections

POWER SUPPLY

Electrical characteristics of available power supply must agree with unit nameplate rating. Supply voltage must be within tolerances shown in Table 2. Phase unbalance must not exceed 2%. *Operation of unit on improper supply voltage or with excessive phase unbalance constitutes abuse and is not covered by Carrier Warranty.*

POWER WIRING

All power wiring must comply with applicable local and national codes. Install a field-supplied branch circuit disconnect switch of a type that can be locked "Off" or "Open." Run power wires from the disconnect switch thru the power opening (H on Fig. 2) on unit and connect to terminal block just inside the opening. Refer to Table 3 for maximum wire size at terminal block.

The power terminal block is in the control box. Remove the outer panel and remove the no. 10 screw on the door. Swing open door, remove screws on barrier panel and remove barrier panel.

Condenser fans must rotate clockwise when viewed from above. If necessary, correct direction of fan rotation by interchanging any 2 power input wires at disconnect switch.

Affix crankcase heater decal to unit disconnect switch.

CONTROL CIRCUIT WIRING

Internal control voltage on 38AD units is 115 volts. All control circuit wiring must comply with applicable local and national codes. Remote control wiring must enter unit control box thru control opening (G on Fig. 1) and connect to terminal block inside the control box.

LOW-VOLTAGE REMOTE CONTROL

Install field-supplied accessories as shown in Fig. 7 for either one-step cooling, one-step heating or 2-step cooling, 2-step heating. Wire liquid line solenoids as shown.

START-UP

Preliminary Checks

1. Compressor oil level must be visible at sight glass in compressor crankcase. Add oil if necessary. (See Oil Charge.)
2. Compressor must float freely on its mounting springs.
3. All internal wiring connections must be tight, and all barriers and covers must be in place.
4. Electrical power source must agree with unit nameplate rating.
5. All service valves must be open.
6. Crankcase heater must be firmly locked in place.

Leak Test the entire refrigerant system by the Pressure Method described in the Carrier Standard Service Techniques Manual, Chapter 1, Section 1-6. Use R-22 at approximately 25 psig backed up with an inert gas to a total pressure not to exceed 245 psig.

Evacuate and Dehydrate the entire refrigerant system by either of the methods described in the Carrier Standard Service Techniques Manual, Chapter 1, Section 1-7.

Preliminary Charge — Refer to Carrier Standard Service Techniques Manual, Chapter 1, Section 1-8, for charging methods and procedures mentioned below.

Charge system with approximately 25 lb of R-22 by the Liquid Charging Method and Charging by Weight Procedure.

Start the Unit — The field disconnect is closed, the fan circuit breaker is closed and the space thermostat is set above ambient temperature so that there is no demand for cooling. Only the crankcase heater is energized. After the heater has been on for 24 hours, the unit can be started.

Close the compressor circuit breaker and then reset the space thermostat *below* ambient temperature, so that a call for cooling is ensured.

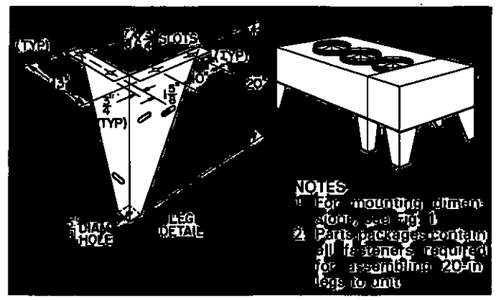


Fig. 3 — Mounting Leg for 38AD Units

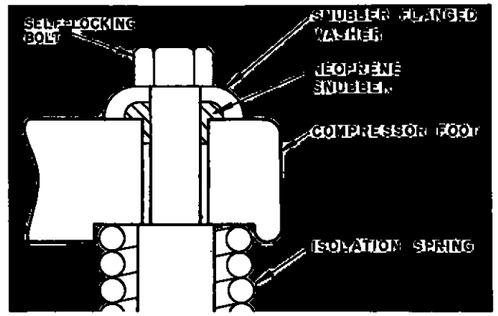
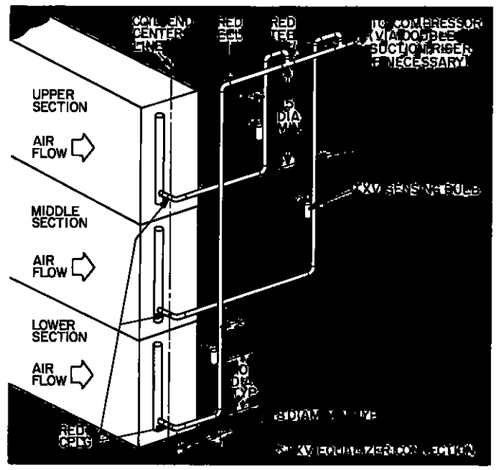


Fig. 4 — Compressor Mounting



NOTES:
1. Suction line is connected to coil on same side as the entering air.
2. For coils having only one section, use upper section piping; for coils having 2 sections, use upper and middle section piping.
3. Lower section is first on and last off.
→ 4. For more complete piping information, refer to Carrier System Design Manual, Part 3.

Fig. 5 — Suction Line Piping to Unit with 3 Section Coil Split

SINGLE PUMPOUT CONTROL

All units are factory wired to operate on single pumpout control. A field-supplied liquid line solenoid valve is required, sized for minimum pressure drop, to be installed immediately ahead of each expansion valve. If unit is to be used with a chiller, wiring modifications may be necessary.

FILTER DRIER AND MOISTURE INDICATOR

Every unit should have a filter drier and a sight glass (moisture indicator) field installed. Select the filter drier for maximum unit capacity and minimum pressure drop. Figure 6 shows recommended locations of filter drier(s) and sight glass. Complete the refrigerant piping from the evaporator to the condenser before opening the liquid and suction lines at the condensing unit.

RECEIVER

No receiver is provided with the unit; it is recommended that one *not* be used.

PIPING PROCEDURE

Do not remove plastic dust bags from suction and liquid line stubs in compressor compartment until piping connections are ready to be made. Pass nitrogen or other inert gas thru piping while brazing, to prevent formation of copper oxide.

Install field-supplied thermostatic expansion valve in liquid line ahead of each evaporator section. For 2-step cooling, *the solenoids used must be wired to be opened by control from a 2-step thermostat.*

For example: 2 solenoids may be used with 3 TXVs — one of the solenoids serving a liquid line feeding 2 of the TXVs. When 3 solenoids are used with 3 TXVs, 2 of the solenoids must be tied in parallel with the thermostat to serve the one liquid line feeding the 2 TXVs. The third solenoid operates independently for the other step of cooling.

SUCTION PIPING AT EVAPORATOR AND TXV BULB LOCATION (ref. Fig. 5)

The purpose of these recommendations is to achieve good mixing of the refrigerant leaving the evaporator suction header for proper sensing by the TXV bulb.

1. A minimum of two 90° elbows must be installed upstream of the expansion valve bulb location.
2. The TXV sensing bulb should be located on a vertical riser where possible. If a horizontal location is necessary, secure the bulb at approximately the 4 o'clock position.
3. Size the suction line from the evaporator thru the riser for high velocity. Enter the suction pipe sizing charts in the Carrier System Design Manual at design tons and equivalent length (for 2 F loss). If reading falls between 2 sizes on chart, choose the smaller pipe size.

   Suction piping for the high velocity section should be selected for about 0.5 F friction loss. If a 2 F loss is allowed for the entire suction line, 1.5 F is left for the balance of the suction line and it should be sized on that basis. Check that the high-velocity sizing is adequate for oil return up the riser.

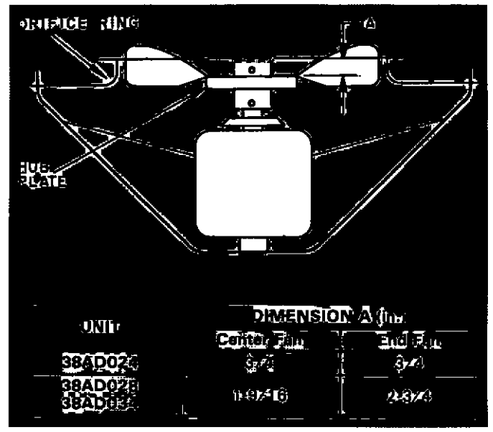


Fig. 9 — Fan Adjustment

NOTE: A defrost thermostat should be used on systems operating with outdoor temperatures below 45 F.

Position switch so that moisture cannot enter switch insulator. Install control with approximately 2 in. of top of thermostat capillary passing thru lower part of evaporator coil and with remainder of capillary inserted between fins on entering air side of coil. Connect thermostat electrical contacts into indoor cooling thermostat circuit or in series with compressor holding coil.

Thermostat is set to cut out at 25 F and cut in at 55 F. Contact rating is 16 amps and 230 volts. As evaporator coil frosts, coil fin temperature drops to thermostat cutout setting, and stops compressor. Evaporator fans keep running to defrost coil with room air. As indoor coil defrosts, fin temperature will rise to thermostat cut-in setting. Compressor starts when cooling is required.

Lubrication

FAN MOTORS

Fan motors have permanently lubricated bearings. No provisions for lubrication are made.

COMPRESSOR

The compressor has its own oil supply. Loss of oil due to a leak in the system should be the only reason for adding oil after the system has been in operation.

Coil Cleaning — Clean coils with a vacuum cleaner, fresh water, compressed air or a bristle brush (not wire). Set up coil cleaning as part of a planned maintenance schedule when units are installed in corrosive environments. Wash all accumulations of dirt from coil in these applications. Keep condenser coil drain holes free of dirt and debris to ensure adequate coil drainage.

SEQUENCE OF OPERATION

The first stage of the cooling thermostat (TC1) closes, calling for cooling, and the indoor fan contactor is immediately energized, starting the indoor fan. The control relay (CR) is energized and the no. 1 outdoor fan contactor (OFC1) is energized, starting the no. 1 outdoor fan immediately. Fan no. 2 will start when the pressure sensor closes on rise at approximately 260 psig (opens at 160 psig). Fan no. 3 will start when the air temperature switch (ATS) closes on rise at approximately 80 F (opens at 70 F).

Refer to Fig. 10, Timer Chart: The timer motor (TM) is energized thru the low-pressure switch (LPS) or thru the D-D1 timer contacts, which bypass LPS for 2-1/2 minutes at start-up to avoid nuisance trips on cold starts. Approximately 12 seconds after timer starts, normally open B-B1 contacts close for 1 second. Compressor contactor (C) is energized and the compressor starts. At the same time the solenoid drop relay (SDR) closes; no. 1 liquid line solenoid valve (LLS1) opens and the timer relay (TR) is energized; the normally open TR contacts close to maintain the circuit thru the compressor contactor to keep the compressor running when the B-B1 timer contacts open. Timer contacts E-E1 remain closed for approximately 35 seconds after compressor starts, bypassing the oil pressure switch (OPS). If sufficient oil pressure to close OPS does not come up before the E-E1 contacts open, the compressor stops, the timer cycles off and the control circuit locks out.

On across-the-line (XL) start, the compressor start sequence is completed when the compressor contactor (C) is energized thru the B-B1 timer contacts. On part-winding (PW) start, the B-B1 contacts close for one second, to energize the first-stage contactor (C1); after one second, the timer contacts switch back to B-B2 position and the second-stage compressor contactor (C2) is energized to complete the start sequence.

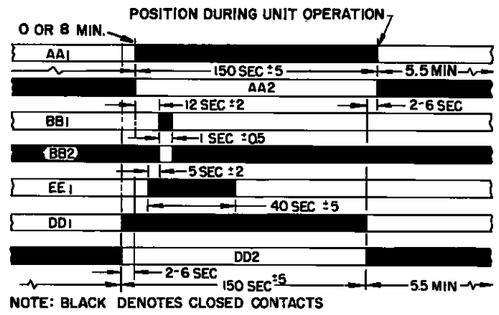


Fig. 10 — Timer Chart

The D-D1 timer contacts, which bypass the low-pressure switch for 2-1/2 minutes at start-up, open approximately 4 seconds before the "A" contacts switch to the run position. If the LPS has not closed by this time, the compressor stops and the control circuit locks out. If, any time after 2-1/2 minutes from starting, the low-pressure switch opens, the compressor stops and the timer continues to run for 5-1/2 minutes and automatically switches to the start sequence, bypassing the LPS. After 2-1/2 minutes, if the LPS has not closed, the compressor stops, and the control circuit locks out. In both of the above cases, the LPS must be closed before the compressor can start.

Whenever the compressor is off because the thermostat is satisfied or because of safety device action, the crankcase heater remains energized. The timer provides a delay of approximately 5-1/2 minutes before the compressor can restart to ensure against short cycling.

If LPS or HPS open or RB is pressed during unit operation, the compressor will stop and the timer motor will start. The compressor, however, cannot restart until the timer completes its cycle (approximately 5-1/2 minutes) and all the switches on the safety devices have closed.

If the compressor stops because of open oil pressure switch (OPS) or open discharge gas thermostat (DGT), the reset button (RB) must be pressed to restart the timer motor. Compressor restart is thru Time Guard® control.

When the second stage of the thermostat (TC2) calls for cooling, LLS2 is energized and the valve opens. This increases the suction pressure and causes the compressor to operate at full capacity, if required.

Book 1 Tab 3a

Form 38AD-15SI Supersedes 38AD-14SI Printed in U.S.A. 12-82 PC111 Catalog No. 533-875

Number One Air Conditioning Maker

Carrier

Division of Carrier Corporation

Carrier Parkway • Syracuse, N.Y. 13221

Installation, Start-Up and Service Instructions

38AD
024,028,034

Air-Cooled Condensing Units

INSTALLATION

Step 1 — Rig and Locate the Unit

RIGGING

Lift units at points 3, 4, 7, 8 (Fig. 1). Use eyebolts and washers supplied in parts package. *Do not sling unskidded unit.* Skidded unit may be slung provided sling does not contact sides of unit. While unit is on skid, it can be rolled or dragged.

PLACING UNIT

Place unit so that airflow is unrestricted above. Provide clearance around the unit as shown in Fig. 2. Remove 6 holddown bolts, releasing the skid. The legs are attached to the base skid.

Block up or suspend the unit. With the bolts supplied, secure the legs (see Fig. 3) to unit (1, 2, 3, 4, 5 and 6 in Fig. 1).

The unit may be mounted on a full pad or on raised supports at each leg. The weight distribution shown in Fig. 1 will determine the type of support required. Bolt unit securely to pad or supports when positioned and leveled.

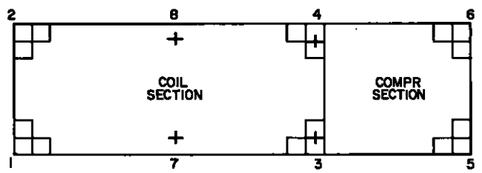
If vibration isolators are required, the weight distribution shown in Fig. 1 will aid in making the proper selection.

Step 2 — Mount Compressor

COMPRESSOR MOUNTING

As shipped, the compressor is held down by special self-locking bolts and lockwashers. After unit is installed, remove the self-locking bolts one at a time and reassemble with flanged washers and neoprene snubbers as shown in Fig. 4. The flanged washers and neoprene snubbers are shipped in a cloth bag tied to one of the compressor feet. Tighten all 4 bolts, then loosen each until the flanged washer can be moved sideways with finger pressure.

IMPORTANT: SPREADER BARS MUST BE USED BETWEEN POINTS 3-4 AND 7-8



UNIT	TOTAL	WEIGHT (lb) Leg Location					
		1	2	3	4	5	6
38AD024	1750	175	175	575	575	125	125
38AD028	1900	178	178	521	565	207	251
38AD034	2300	263	263	767	767	120	120

Fig. 1 — Weight Distribution

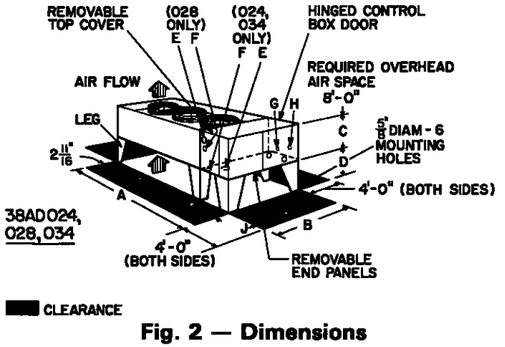


Fig. 2 — Dimensions

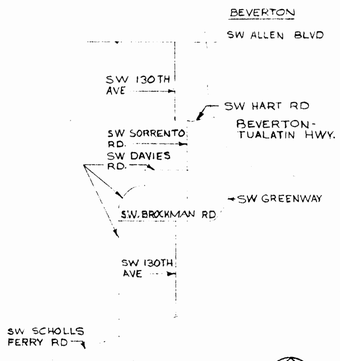
Table 1 — Dimensions

UNIT		38AD024	38AD028	38AD034
DIMENSIONS (ft-in.)				
Length	A	12'-10-3/4		
Width	B	3-11-1/2		4-10
Height w/o Legs	C	2- 4-1/8		3-1-7/8
Leg Height	D	1-8		
Mtg Holes				
Legs	J	0-2-5/8		
	K	3-6-1/4		4-4-3/4
	L	3-7-3/8		
	M	8-10		
CONNECTIONS (in.)				
Suction (ODM)		1-5/8		
Liquid (ODM)		7/8		
Hot Gas Bypass		5/8		
OPENINGS (in.)				
Suction	E		2-1/2	
Liquid	F	1-3/4	1-1/2	1-3/4
Control	G		7/8	
Power	H		3-5/8	

Step 3—Make Refrigerant Piping Connections

Line sizes will depend on length of piping required between condensing unit and evaporator; also, liquid lift and compressor oil return are factors to consider. Refer to Part 3 of Carrier System Design Manual for line sizing information and Fig. 5 for recommended piping details.

Supporting Documentation



VICINITY MAP

SITE PLAN
SCALE: 1"=50'

REVISIONS	
DRWN	PP
CHKD	
DATE	1-30-14
COMM	13-07

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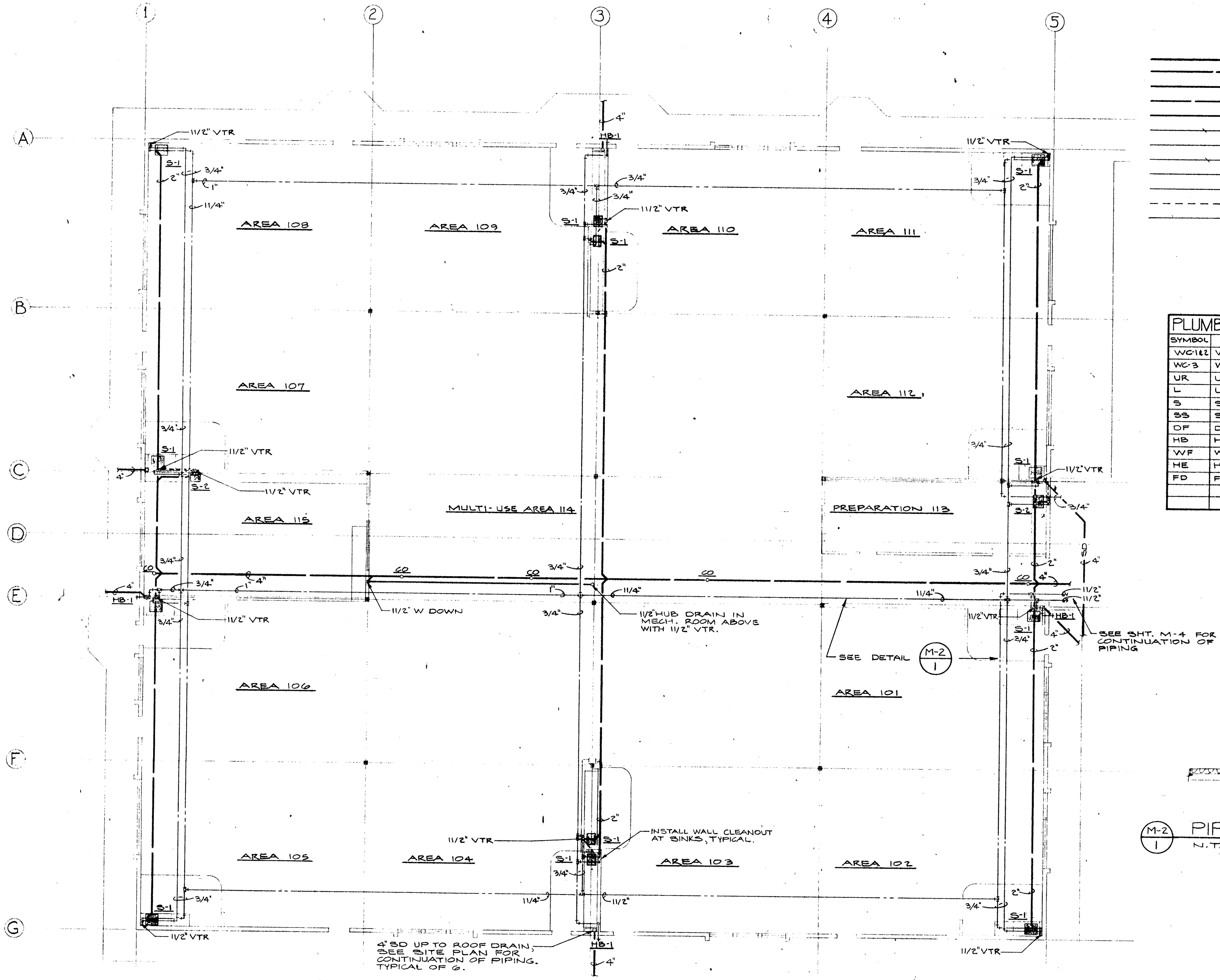
ARCHITECTS - PLANNERS
3777 S.E. MILWAUKIE AVENUE
PORTLAND, ORE. 97202 503-232-1195

SITE PLAN
S.W. BROCKMAN ROAD AND S.W. DAVIES ROAD
BEAVERTON, OREGON
WASHINGTON COUNTY

SHEET M1
OF 11



M-2 / A BUILDING 100 FLOOR PLAN - PLUMBING

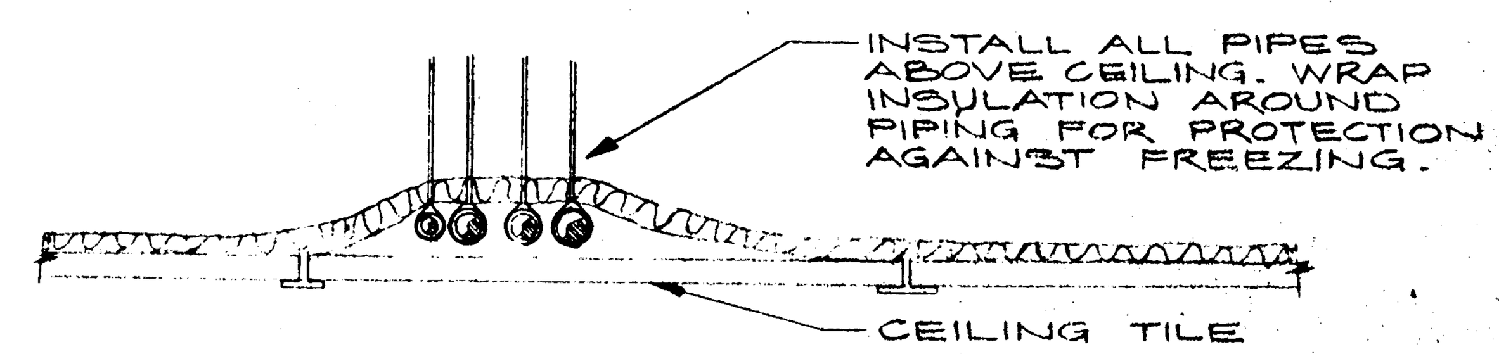
SCALE: 1/8" = 1'-0"

PIPING LEGEND

——	WASTE BELOW GRADE
——	WASTE ABOVE GRADE
—— SD ——	STORM DRAIN BELOW GRADE
—— SD ——	STORM DRAIN ABOVE GRADE
	COLD WATER BELOW GRADE
	COLD WATER ABOVE GRADE
	HOT WATER BELOW GRADE
	HOT WATER ABOVE GRADE
	HOT WATER RETURN
- - - -	VENT
—— G ——	GAS
CB	CATCH BASIN
CO	CLEAN-OUT
FH	FIRE HYDRANT
VTR	VENT THRU ROOF

PLUMBING FIXTURE CONNECTION SCHEDULE

SYMBOL	FIXTURE	W	V	CW	HW	REMARKS
WC-1&2	WATER CLOSET	4"	2"	11/2"	---	
WC-3	WATER CLOSET	4	2	3/4	---	
UR	URINAL	2	2	3/4	---	
L	LAVATORY	11/2	11/4	3/4	3/4"	
S	SINK	2	11/2	3/4	3/4	
SS	SERVICE SINK	3	2	3/4	3/4	
DF	DRINKING FOUNTAIN	11/4	11/4	3/4	---	
HB	HOSE BIBB	---	---	3/4	---	
WF	WASH FOUNTAIN	2	11/2	3/4	3/4	
HE	HEAT EXCHANGER	---	---	2	2	
FD	FLOOR DRAIN	---	---	---	---	PRIME



M-2 / 1 PIPE INSTALLATION DETAIL

N.T.S.

PLUMBING PLAN - BUILDING 100

SW. BROCKMAN ROAD AND SW. DAVIES ROAD
BEAVERTON OREGON

ELEMENTARY SCHOOL - SCHOOL DISTRICT 48
BEAVERTON WASHINGTON COUNTY OREGON

WILLIAMS & EHMANN AIA
ARCHITECTS-PLANNERS
3777 S.E. MILWAUKIE AVENUE
PORTLAND, ORE. 97202 503-232-8795

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CHKD
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COMM 73-01
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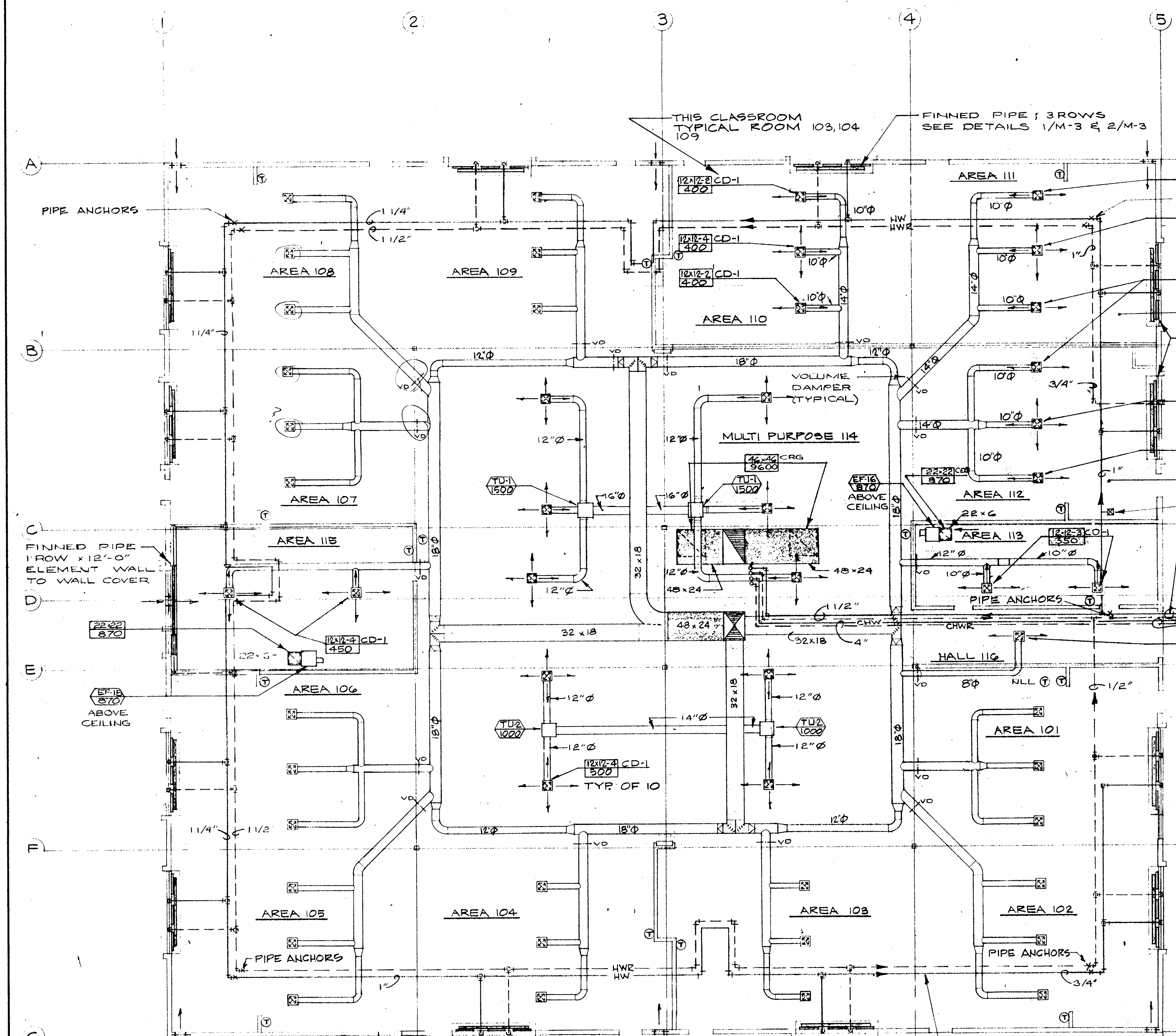
SHEET M 2

REGISTERED PROFESSIONAL ENGINEER 6436 OREGON LARRY R. McGINNIS

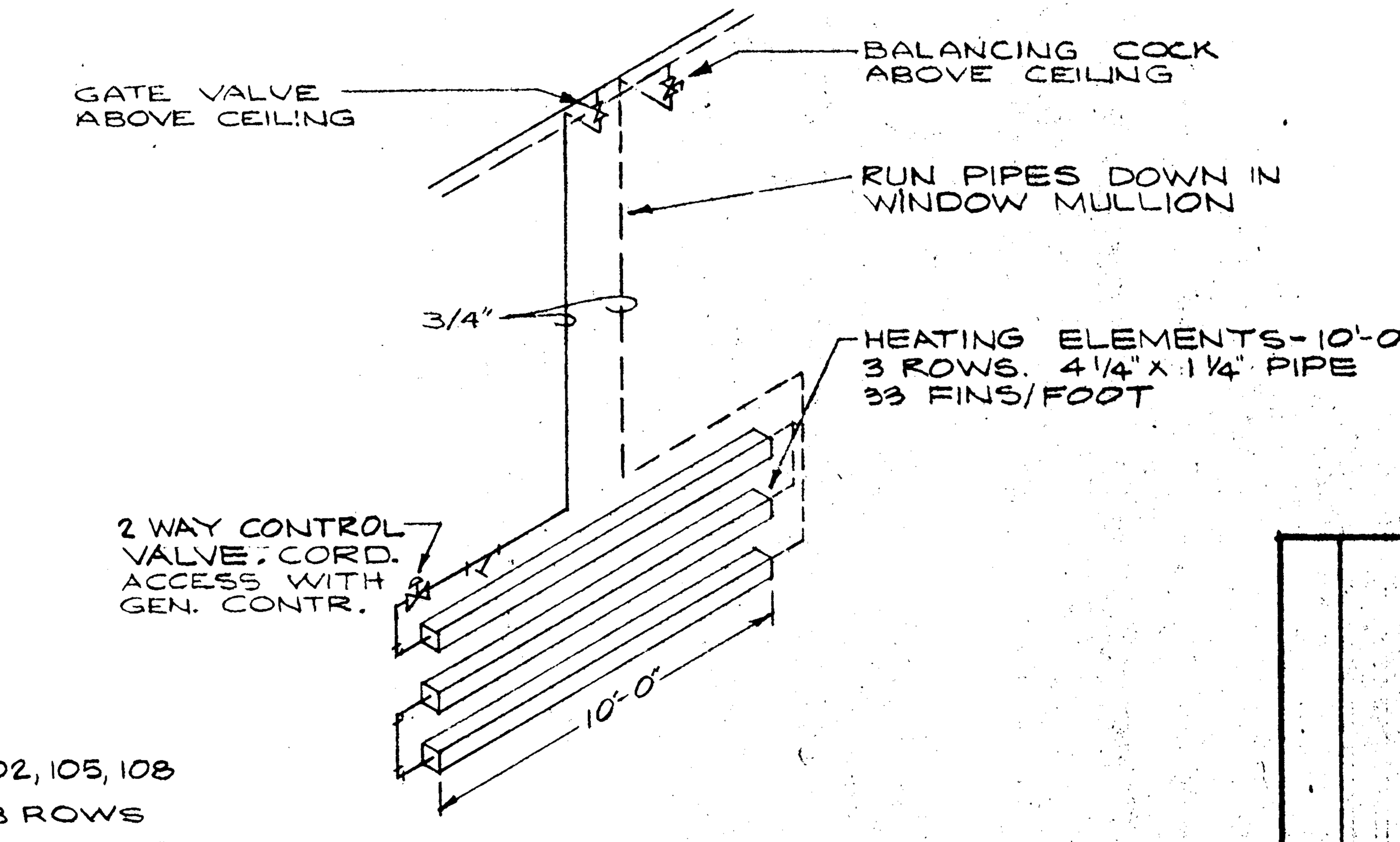


NOTES

1. COORDINATE LOCATION OF ALL CEILING DIFFUSERS & GRILLS WITH LIGHT FIXTURES & T-BAR
2. INSTALL FIRE DAMPERS IN ALL CEILING PENETRATIONS
3. INSTALL VOLUME DAMPERS IN ALL BRANCH DUCTS

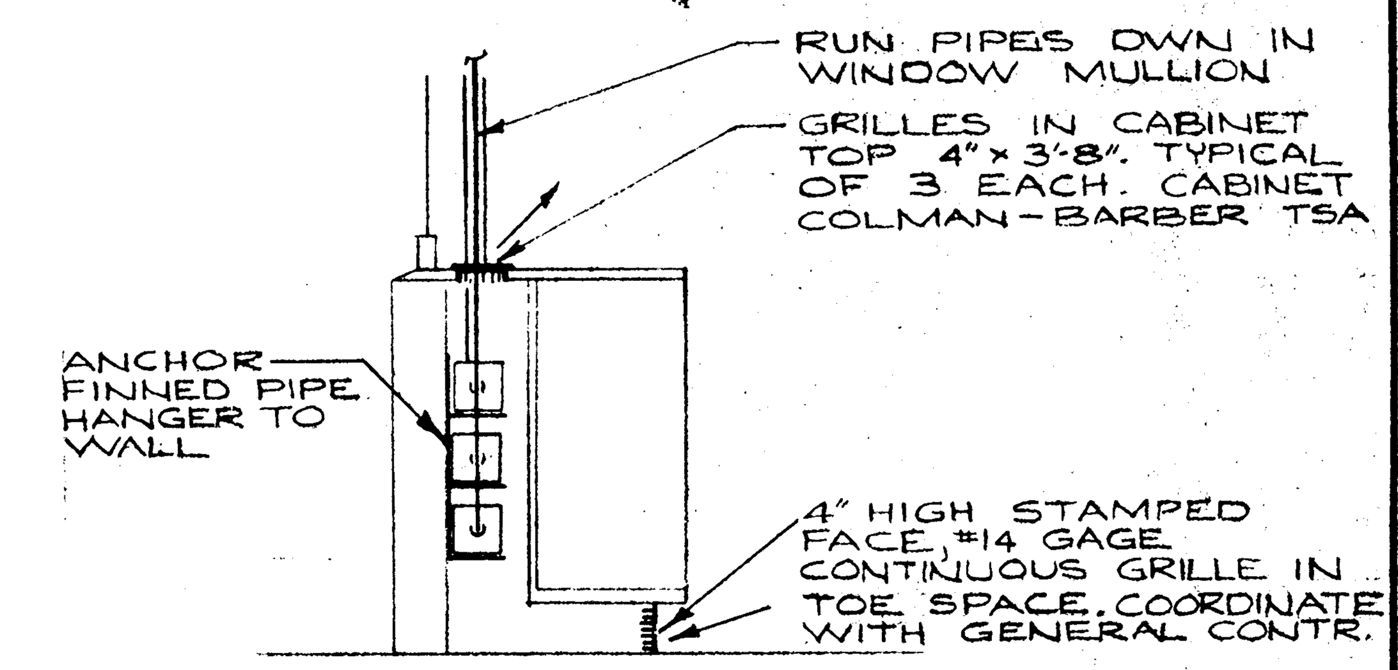
M-3 A BUILDING 100 FLOOR PLAN - AIR CONDITIONING

SCALE: 1/8" = 1'-0"



M-3 1 TYPICAL CLASSROOM FINNED PIPE PIPING DIAGRAM

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



M-3 2 TYPICAL CLASSROOM FINNED PIPE DETAIL

SCALE: 3/4" = 1'-0"

DUCT LEGEND

SUPPLY · EXHAUST · OUTSIDE AIR · RETURN

LOW VELOCITY DUCTS

AP ACCESS PANEL — FLEXIBLE DUCT

T ROOM THERMOSTAT

NECK SIZE — 14x14-2 CD 300 — DIRECTION OF THROW — CFM — TYPE (SEE SPECS)

SUPPLY DIFFUSER

GRILLE SIZE — 8x8 CRG 200 — TYPE (SEE SPECS) — CFM

EXHAUST OR RETURN AIR GRILLES

- VOLUME DAMPER
- MOTORIZED DAMPER
- SPLITTER DAMPER
- FIRE DAMPER
- TURNING VANES
- ACOUSTICALLY LINED DUCT (SIZES SHOWN ARE NET INSIDE)
- TRANSITION FROM RECT. TO ROUND
- ADJUSTABLE EXTRACTOR

FLEX CONNECTION

P-1 / 20 — EQUIP NO. / CAPACITY

PIPING LEGEND

HW	HEATING WATER SUPPLY
HWR	HEATING WATER RETURN
CHW	CHILLED WATER
CHWR	CHILLED WATER RETURN
C	CONDENSER WATER
CR	CONDENSER WATER RETURN
FOS	FUEL OIL SUCTION
FOR	FUEL OIL RETURN
D	DRAIN

AIR CONDITIONING PLAN - BUILDING 100

SW. BROCKMAN ROAD AND SW. DAVIES ROAD BEAVERTON, OREGON

ELEMENTARY SCHOOL - SCHOOL DISTRICT 4E

BEAVERTON WASHINGTON COUNTY OREGON

WILLIAMS & EHMANN AIA
ARCHITECTS - PLANNERS
3777 S.E. MILWAUKIE AVENUE
PORTLAND, ORE. 97202 503-232-1395

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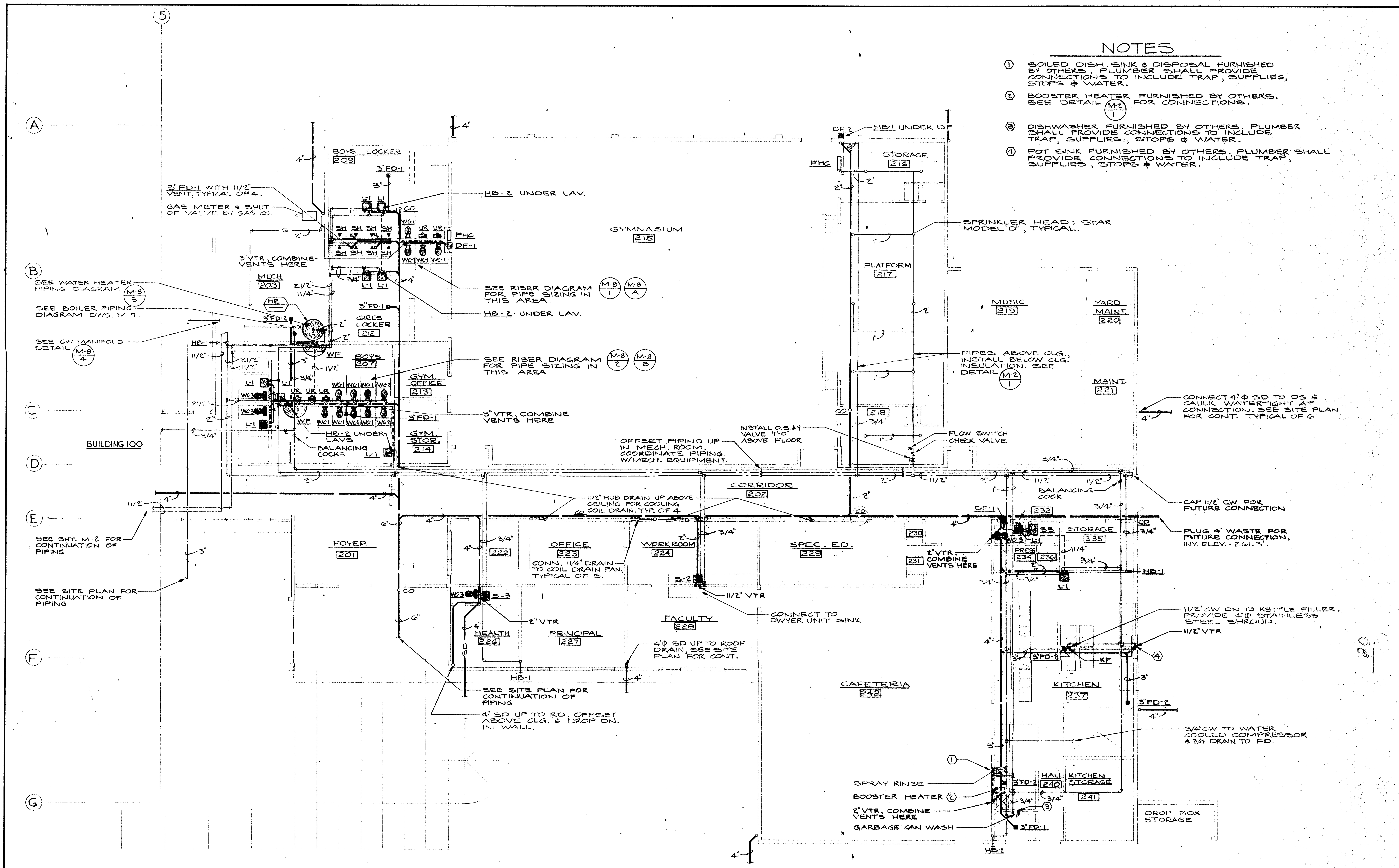
SHEET M 3 OF 11



BOYS LOCKER 209
GYMNASIUM 215
MECH 203
GIRLS LOCKER 212
BOYS 207
GYM OFFICE 213
GYM STOR. 214
BUILDING 100
FOYER 201
CORRIDOR 202
OFFICE 223
WORKROOM 224
SPEC. ED. 229
HEALTH 226
PRINCIPAL 227
FACULTY 228
CAFETERIA 242
STORAGE 216
PLATFORM 217
MUSIC 219
YARD MAINT. 220
MAINT. 221
STORAGE 235
KITCHEN 237
HALL 240
KITCHEN STORAGE 241
DROP BOX STORAGE
3" FD-1 WITH 1 1/2" VENT, TYPICAL OF 4.
GAS METER & SHUT OF VALVE BY GAS CO.
3" VTR, COMBINE VENTS HERE
SEE WATER HEATER PIPING DIAGRAM M-8 3
SEE BOILER PIPING DIAGRAM DWG. M-7.
SEE CW MANIFOLD DETAIL M-8 4
HB-2 UNDER LAV.
SEE RISER DIAGRAM M-8 1 M-8 A FOR PIPE SIZING IN THIS AREA.
SEE RISER DIAGRAM M-8 2 M-8 B FOR PIPE SIZING IN THIS AREA
3" VTR, COMBINE VENTS HERE
HB-2 UNDER LAVS
BALANCING COCKS
HB-1 UNDER DF
SPRINKLER HEAD: STAR MODEL 'D', TYPICAL.
PIPES ABOVE CLG. INSTALL BELOW CLG. INSULATION. SEE DETAIL M-2 1
INSTALL O.S.& Y VALVE 7'-0" ABOVE FLOOR
FLOW SWITCH
CHECK VALVE
OFFSET PIPING UP IN MECH. ROOM. COORDINATE PIPING W/MECH. EQUIPMENT.
CONNECT 4" Φ SD TO DS & CAULK WATERTIGHT AT CONNECTION. SEE SITE PLAN FOR CONT. TYPICAL OF 6
1 1/2" HUB DRAIN UP ABOVE CEILING FOR COOLING COIL DRAIN. TYP. OF 4
BALANCING COCK
CAP 1 1/2" CW FOR FUTURE CONNECTION
PLUG 4" WASTE FOR FUTURE CONNECTION, INV. ELEV. - 261.3'.
SEE SHT. M-2 FOR CONTINUATION OF PIPING
SEE SITE PLAN FOR CONTINUATION OF PIPING
CONN. 1 1/4" DRAIN TO COIL DRAIN PAN, TYPICAL OF 5.
2" VTR COMBINE VENTS HERE
1 1/2" VTR
CONNECT TO DWYER UNIT SINK
2" VTR
4" Φ SD UP TO ROOF DRAIN, SEE SITE PLAN FOR CONT.
1 1/2" CW ON TO KETTLE FILLER. PROVIDE 4" Φ STAINLESS STEEL SHROUD.
1 1/2" VTR
SEE SITE PLAN FOR CONTINUATION OF PIPING
4" SD UP TO RD. OFFSET ABOVE CLG. & DROP DN. IN WALL.
3/4" CW TO WATER COOLED COMPRESSOR & 3/4 DRAIN TO FD.
SPRAY RINSE
BOOSTER HEATER ②
2" VTR, COMBINE VENTS HERE
GARBAGE CAN WASH

NOTES

① BOILED DISH SINK & DISPOSAL FURNISHED BY OTHERS. PLUMBER SHALL PROVIDE CONNECTIONS TO INCLUDE TRAP, SUPPLIES, STOPS & WATER.

② BOOSTER HEATER FURNISHED BY OTHERS. SEE DETAIL (M-2 / 1) FOR CONNECTIONS.

③ DISHWASHER FURNISHED BY OTHERS. PLUMBER SHALL PROVIDE CONNECTIONS TO INCLUDE TRAP, SUPPLIES, STOPS & WATER.

④ POT SINK FURNISHED BY OTHERS. PLUMBER SHALL PROVIDE CONNECTIONS TO INCLUDE TRAP, SUPPLIES, STOPS & WATER.

(M-4 / A) BUILDING 200 FLOOR PLAN - PLUMBING

SCALE: 1/8" = 1'-0"

PLUMBING PLAN - BUILDING 200

SW. BROCKMAN ROAD AND SW. DAVIES ROAD
BEAVERTON, OREGON

ELEMENTARY SCHOOL - SCHOOL DISTRICT 48
BEAVERTON, WASHINGTON COUNTY, OREGON

WILLIAMS & EHMANN AIA
ARCHITECTS · PLANNERS
2775 S.E. MILWAUKIE AVENUE
PORTLAND, ORE. 97202 · 503-233-1193

REVISIONS

SHEET M-4

REGISTERED PROFESSIONAL ENGINEER
OREGON
LARRY R. McGINNIS

NOTES THIS SHEET

1. COMBINE EXH. DUCTS TO 16"ϕ. RUN UP EF ON ROOF
2. COORDINATE CEILING DIFFUSER LAYOUT W/ LIGHTS & T-BAR GRID
3. RAISE SA DUCT TO RUN ABOVE RA DUCT
4. INSTALL FIRE DAMPERS IN ALL GRILLES + DIFFUSERS PENETRATING CEILINGS.
6. INSTALL GRAVITY ROOF VENTILATOR, 24x24 NECK SIZE. PACE SKY-CAP WITH BIRD SCREEN.
7. INSTALL VOLUME DAMPERS IN ALL BRANCH DUCTS.
8. INSTALL 24x24 ACCESS PANEL TO EQUIP. ABOVE CEIL. COORDINATE WITH CEIL. PATTERN + LIGHT FIXTURES AND FOR CLEAR ACCESS.
9. INSTALL GALVANIZED STEEL DRAIN PANS UNDER COILS WITH 1¼" DRAIN CONNECTIONS
10. PROVIDE 2-SPEED SWITCH FOR EXHAUST FANS FOR ELECTRICAL CONTRACTOR TO INSTALL

(M-5 A) BUILDING 200 FLOOR PLAN - AIR CONDITIONING
SCALE 1/8"=1'-0"

AIR CONDITIONING PLAN - BUILDING 200
SW. BROCKMAN ROAD AND SW. PAYNE ROAD
BEAVERTON OREGON

ELEMENTARY SCHOOL - SCHOOL DISTRICT 48
BEAVERTON WASHINGTON COUNTY OREGON

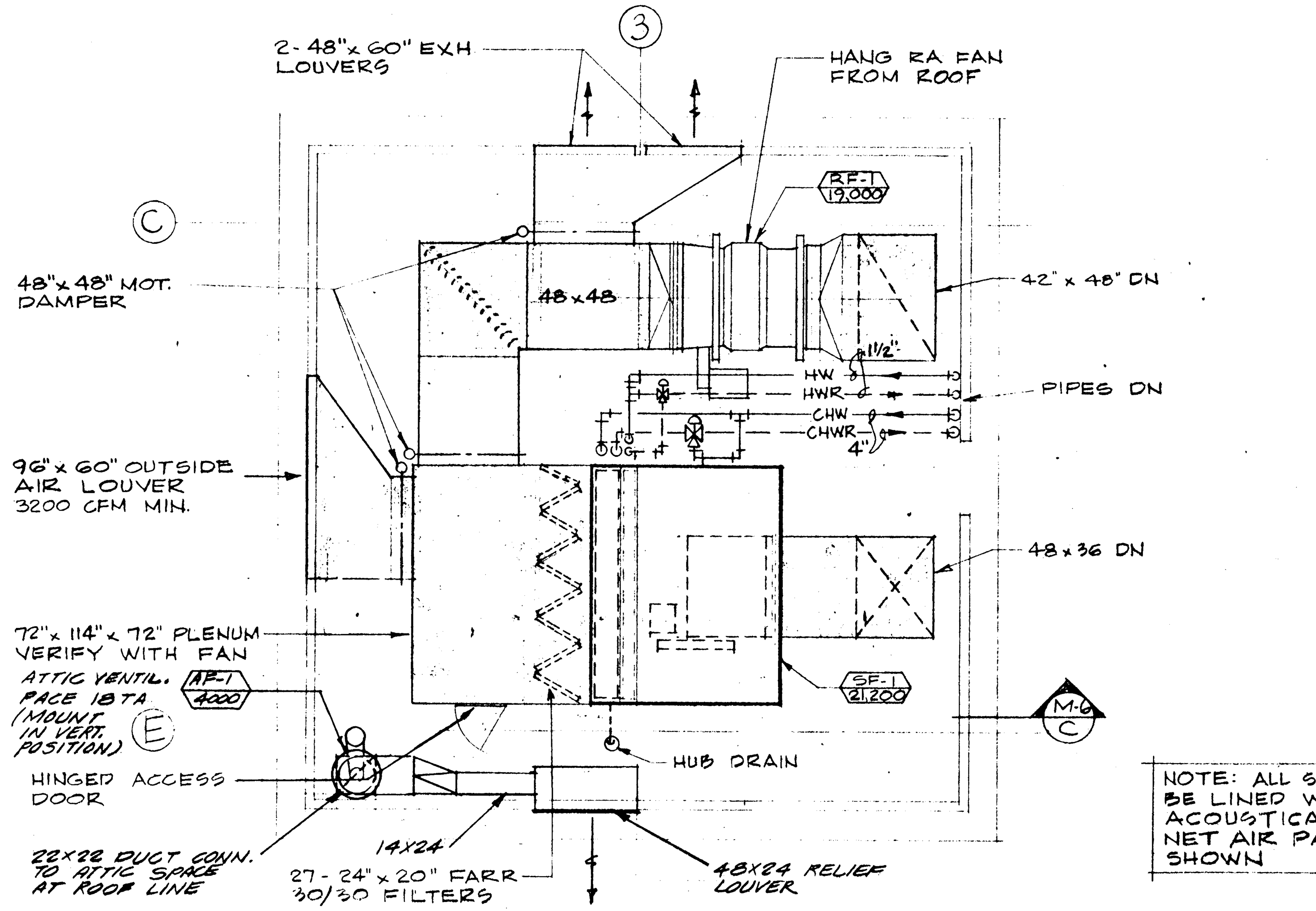
WILLIAMS & EHMANN AIA
ARCHITECTS - PLANNERS
3727 S.E. MILWAUKIE AVENUE
PORTLAND, ORE. 97202 503-232-1195

REVISIONS
DRWN DP
CHKD
DATE 1-30-74
CORR 7-8-74
FILE

REGISTERED PROFESSIONAL ENGINEER 6436 OREGON JAMES R. McGINNIS MAY 7, 1969

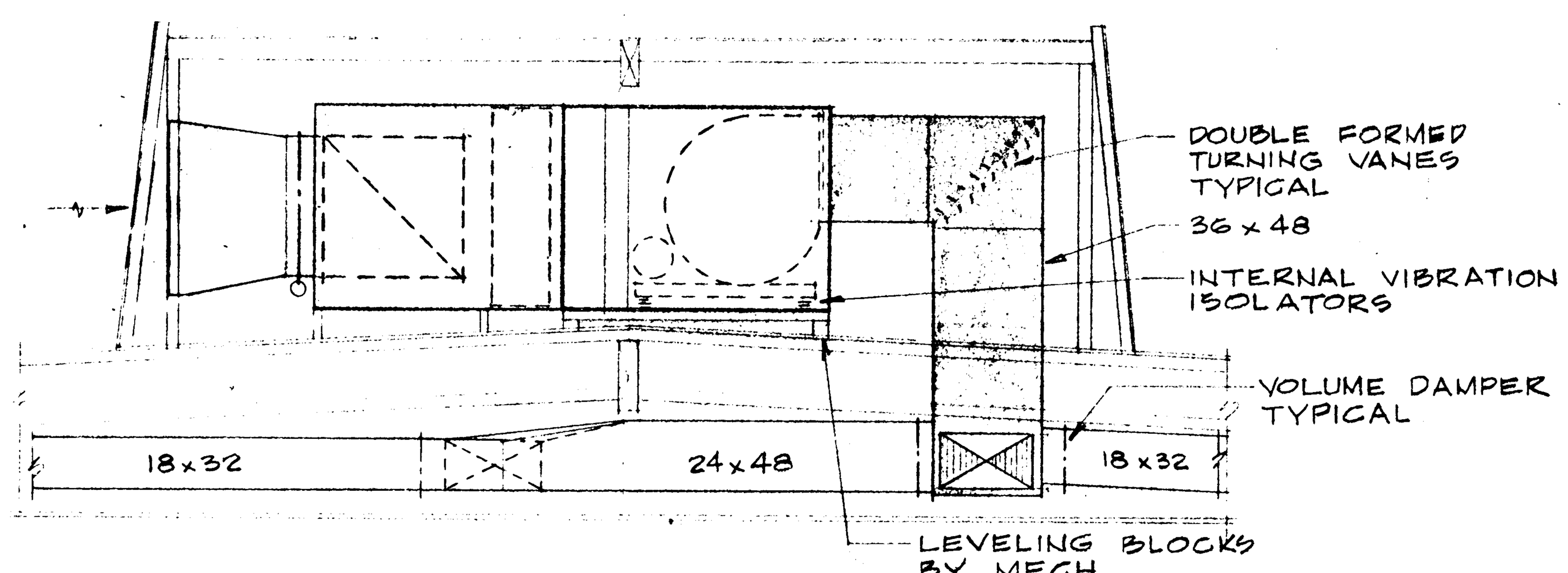
SHEET M 5 OF 11

DATAPRINT STOCKDRAFTING FORM NO. 101-84

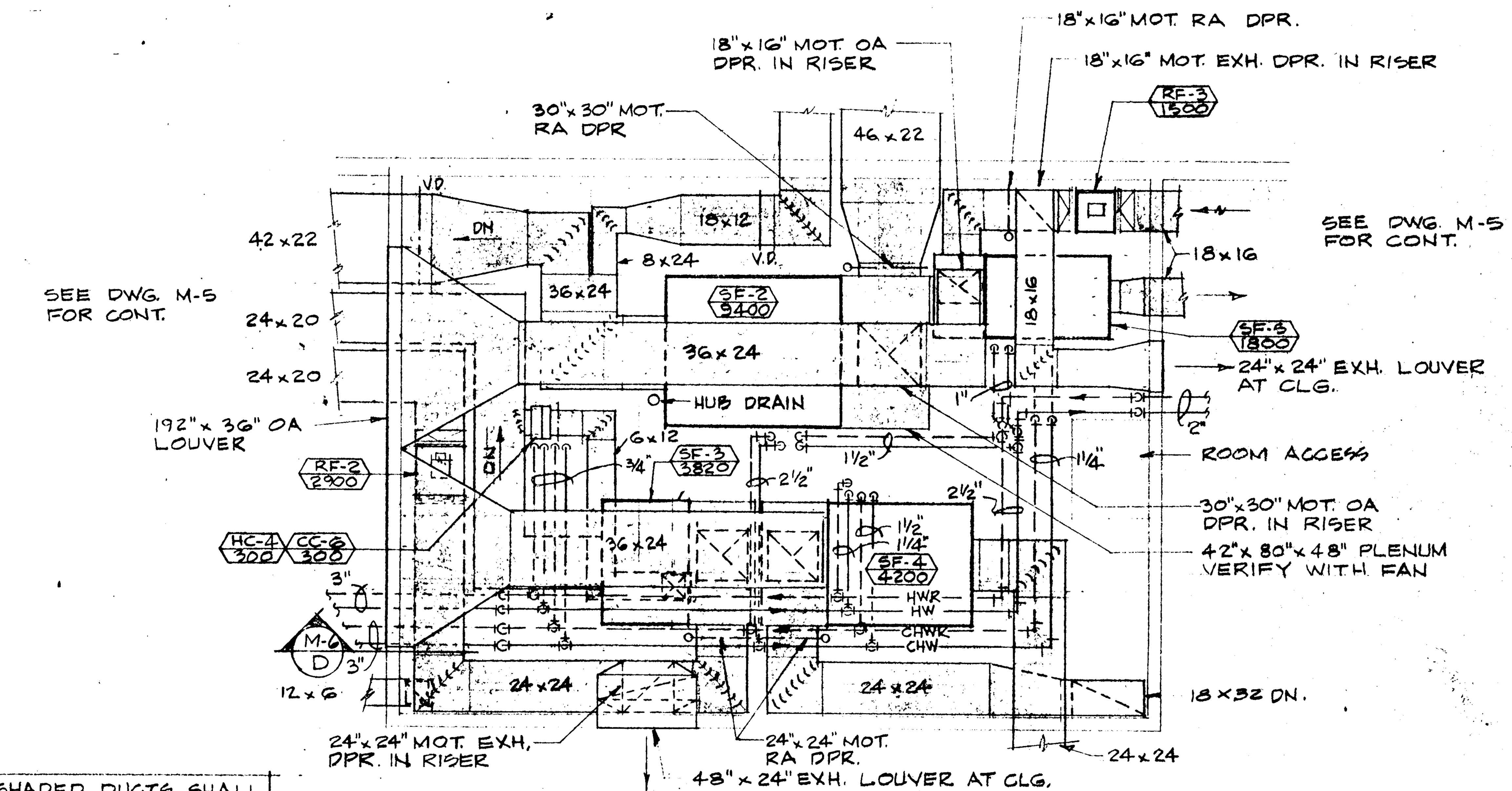


M-6 A BUILDING 100 MECH. ROOM PLAN
SCALE 1/4" = 1'-0"

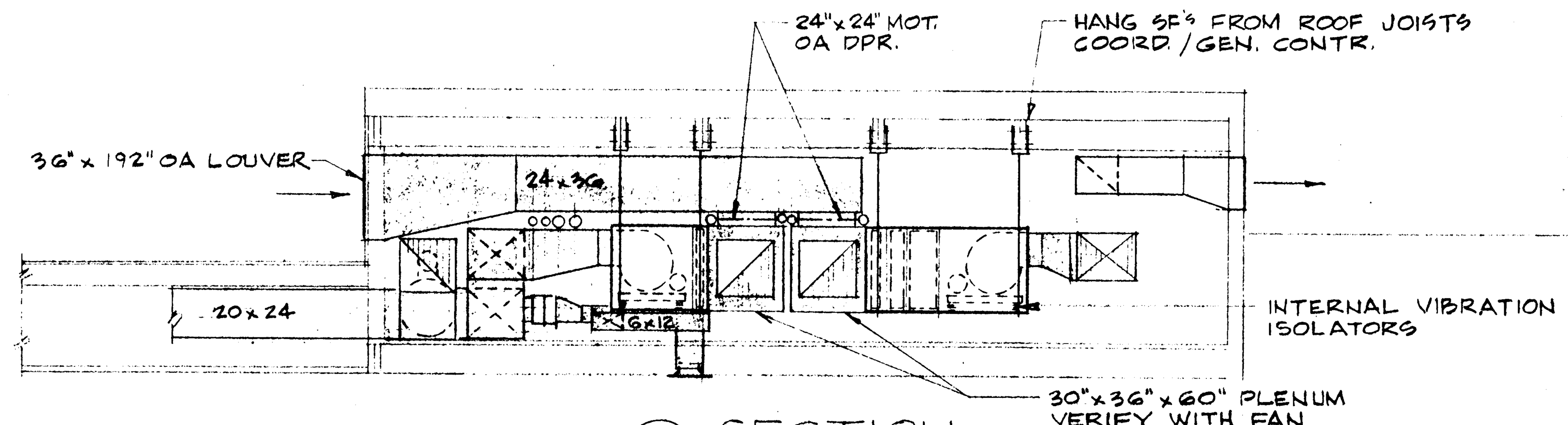
NOTE: ALL SHADED DUCTS SHALL BE LINED WITH 1" THICK ACOUSTICAL DUCT LINING NET AIR PASSAGE SIZES SHOWN



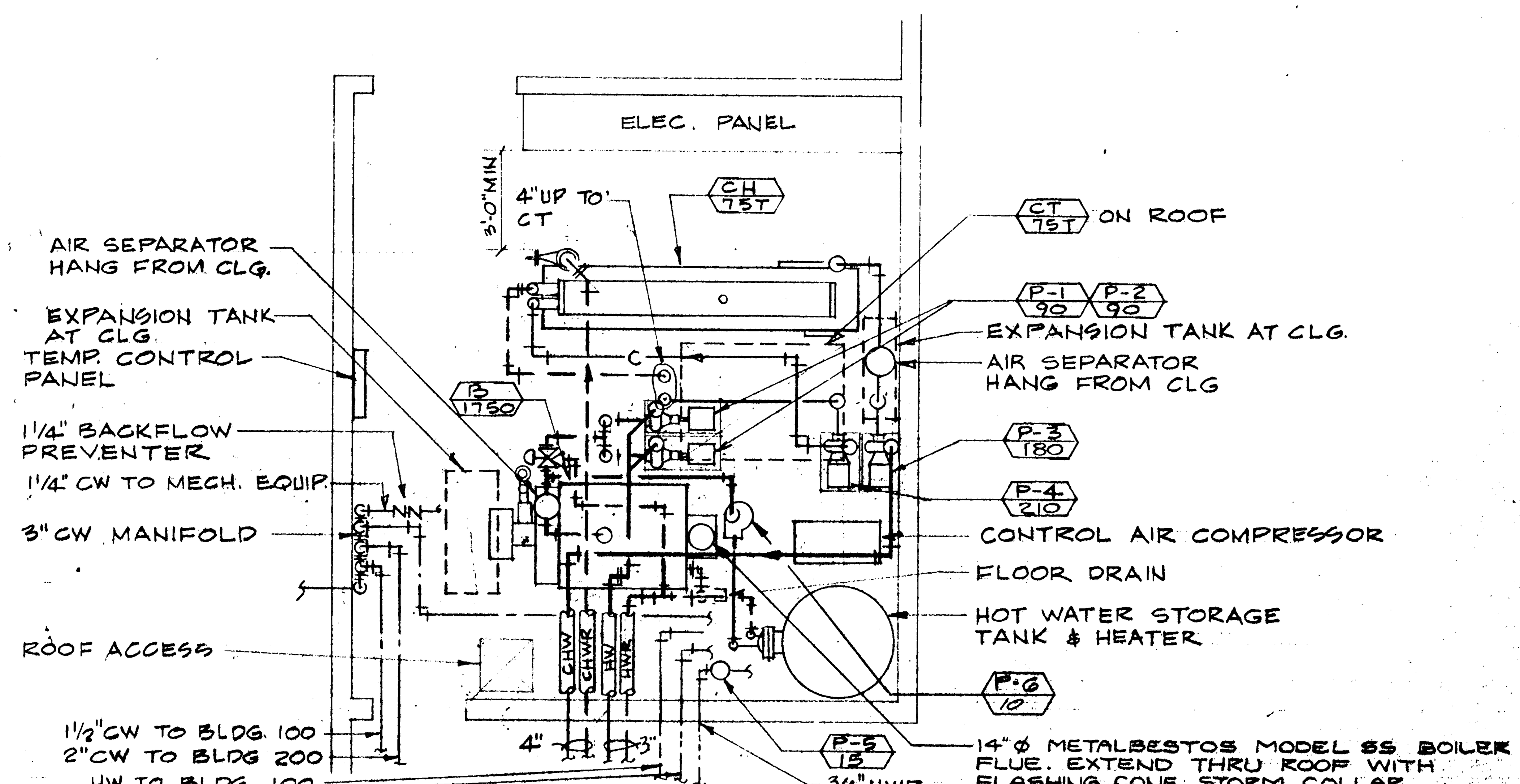
M-6 A SECTION
SCALE 1/4" = 1'-0"



M-6 B BUILDING 200 MECH. ROOM PLAN
SCALE 1/4" = 1'-0"



M-6 D SECTION
SCALE 1/4" = 1'-0"



M-6 E BOILER ROOM
SCALE 1/4" = 1'-0"

MECHANICAL ROOM PLANS

ELEMENTARY SCHOOL - SCHOOL DISTRICT 48
S.W. BROCKMAN ROAD AND S.W. DAVIES ROAD
BEAVERTON, OREGON
BEAVERTON
WASHINGTON COUNTY OREGON

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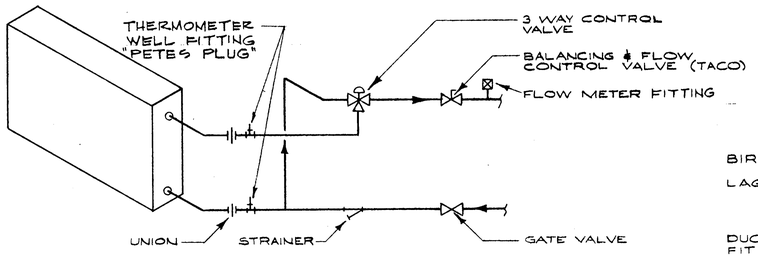
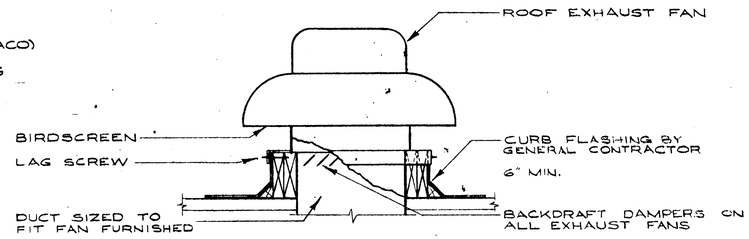
SHEET M 6 of 11

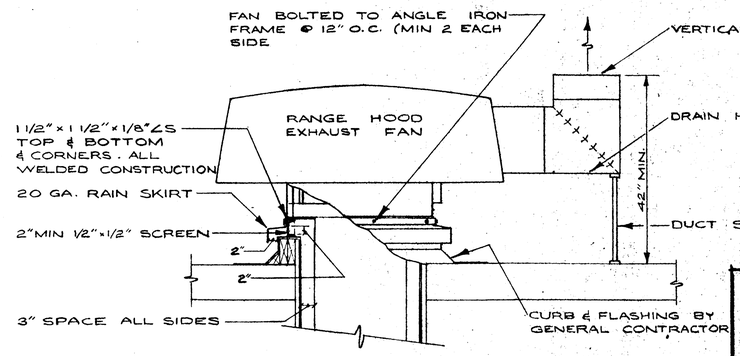
DATAPRINT STOCKDRAFTING FORM NO. 101-84



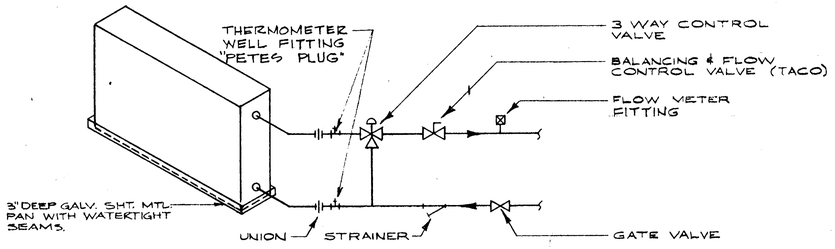
M-7/1 HEATING COIL DIAGRAM



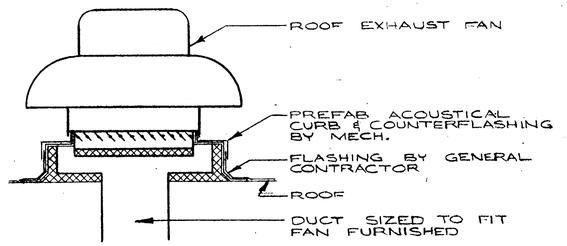
M-7/3 ROOF EXHAUST FAN DETAIL
NTS.



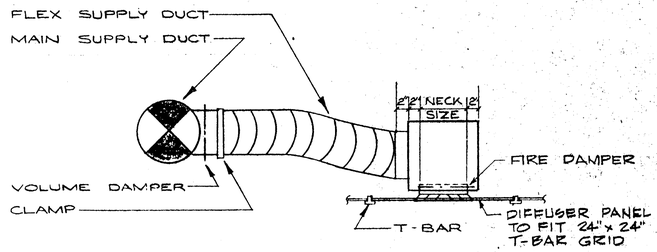
M-7/5 RANGE HOOD EXHAUST FAN DETAIL SCALE: 3/4"=1'-0"



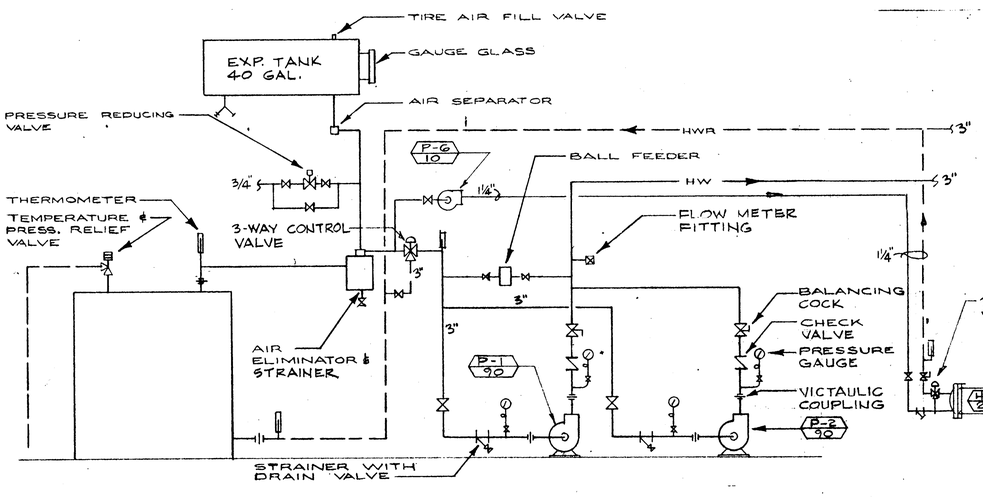
M-7/2 CHILLED WATER COIL DIAGRAM



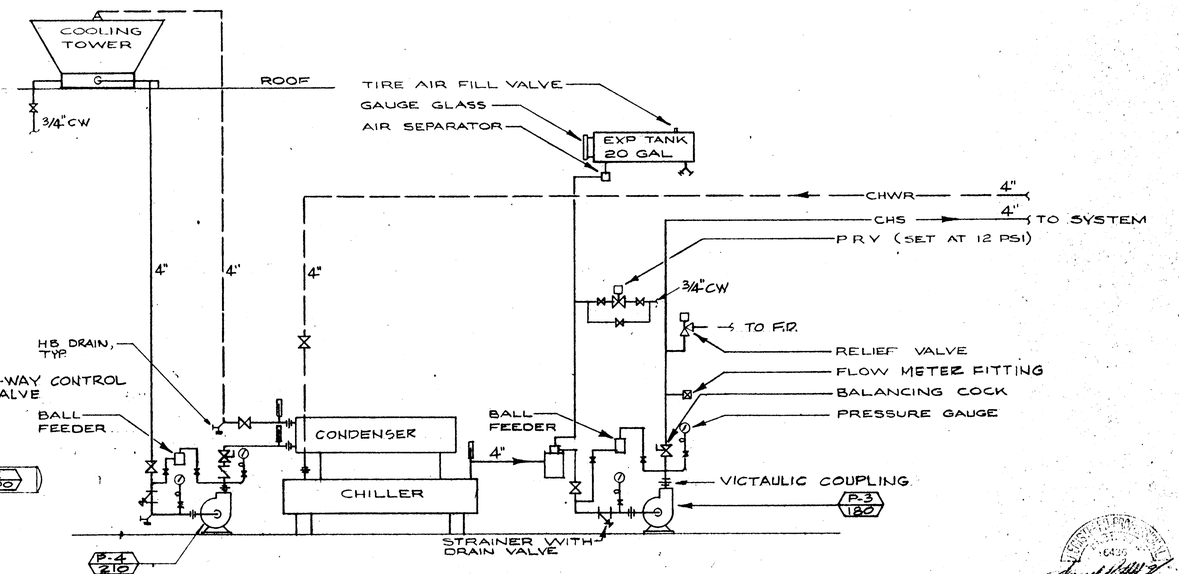
M-7/4 EXHAUST FAN DETAIL SOUND CURB N.T.S.



M-7/6 DIFFUSER NO. 1
N.T.S.



M-7/7 BOILER PIPING DIAGRAM



M-7/8 CHILLER PIPING DIAGRAM

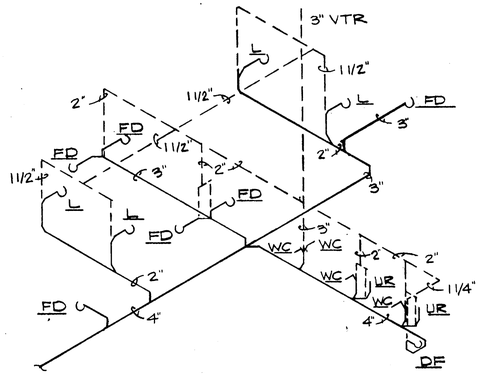
DETAILS & FLOW DIAGRAMS

ELEMENTARY SCHOOL - SCHOOL DISTRICT 48
SW. BROCKMAN ROAD AND SW. DAVIES ROAD
BEAVERTON, OREGON
WASHINGTON COUNTY, OREGON

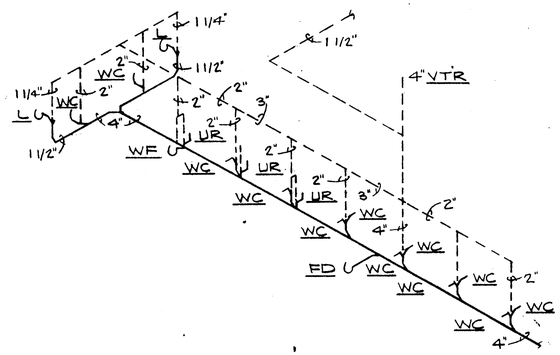
WILLIAMS & EHMANN AIA
ARCHITECTS - PLANNERS
3777 S.E. MILWAUKIE AVENUE
PORTLAND, ORE. 97202 503-232-1199

REVISIONS:
DRWN DP
CHKD
DATE 1-30-74
COMM 73-61
FILE

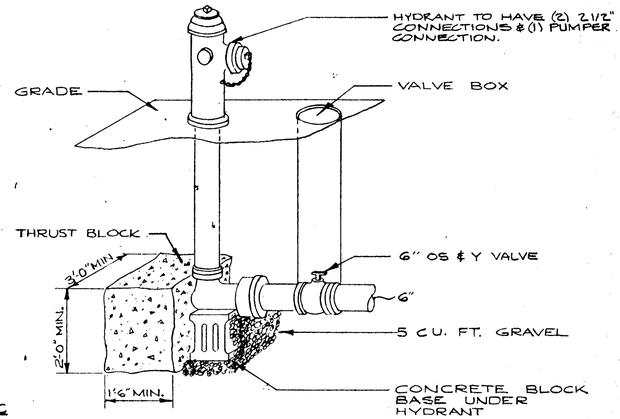
SHEET M 7
OF 11



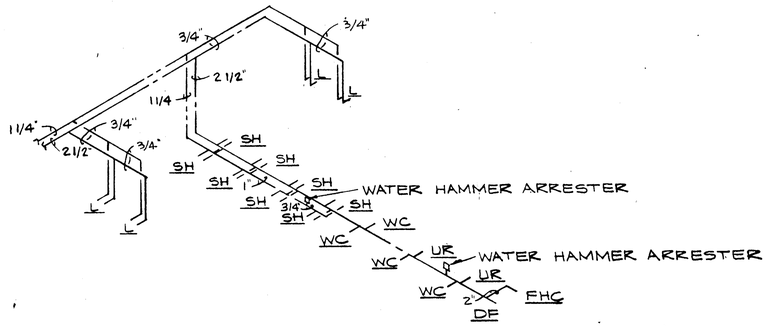
M-8 / 1 WASTE & VENT RISER



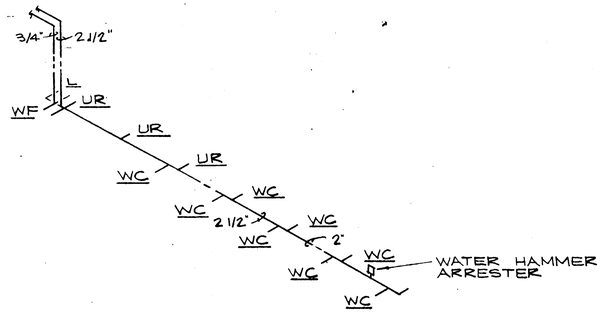
M-8 / 2 WASTE & VENT RISER



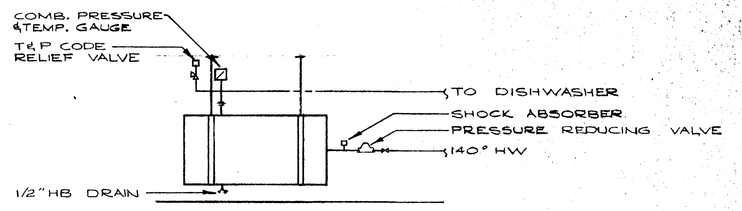
M-8 / 6 FIRE HYDRANT DETAIL



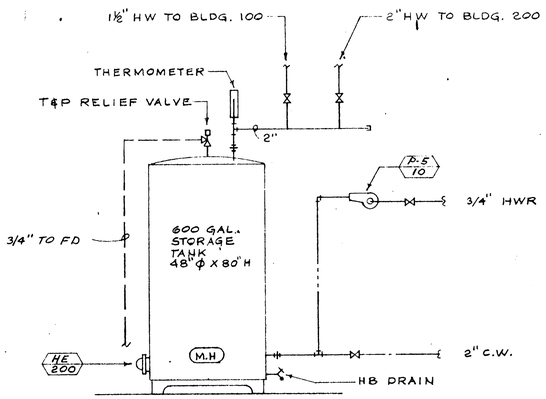
M-8 / A HOT & COLD WATER RISER



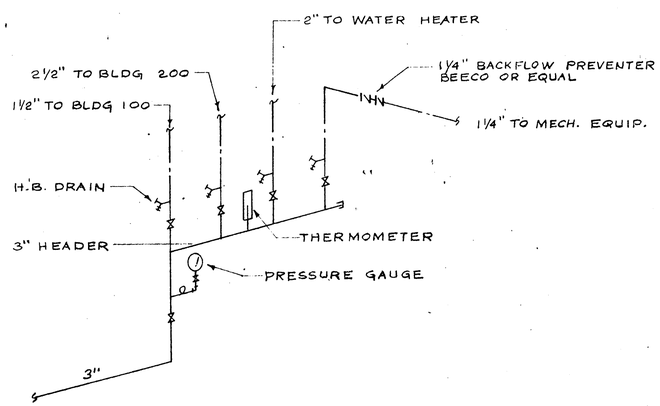
M-8 / B HOT & COLD WATER RISER



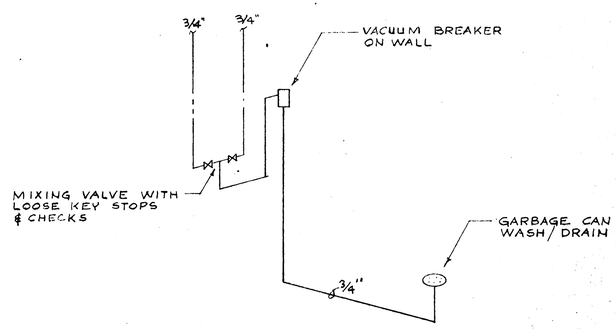
M-8 / 7 DISHWASHER BOOSTER HEATER DETAIL



M-8 / 3 WATER HEATER PIPING DIAGRAM



M-8 / 4 CW MANIFOLD



M-8 / 5 GARBAGE CAN WASH PIPING DIAGRAM

SCHOOL - SCHOOL DISTRICT 48
ELEMENTARY
BEAVERTON
OREGON
WASHINGTON COUNTY
ROAD AND SW DAVIES ROAD
BEAVERTON OREGON
PLUMBING DETAILS

WILLIAMS & EHMANN AIA
ARCHITECTS-PLANNERS
3777 S.E. MILWAUKIE AVENUE
PORTLAND, ORE. 97202 503-232-1195

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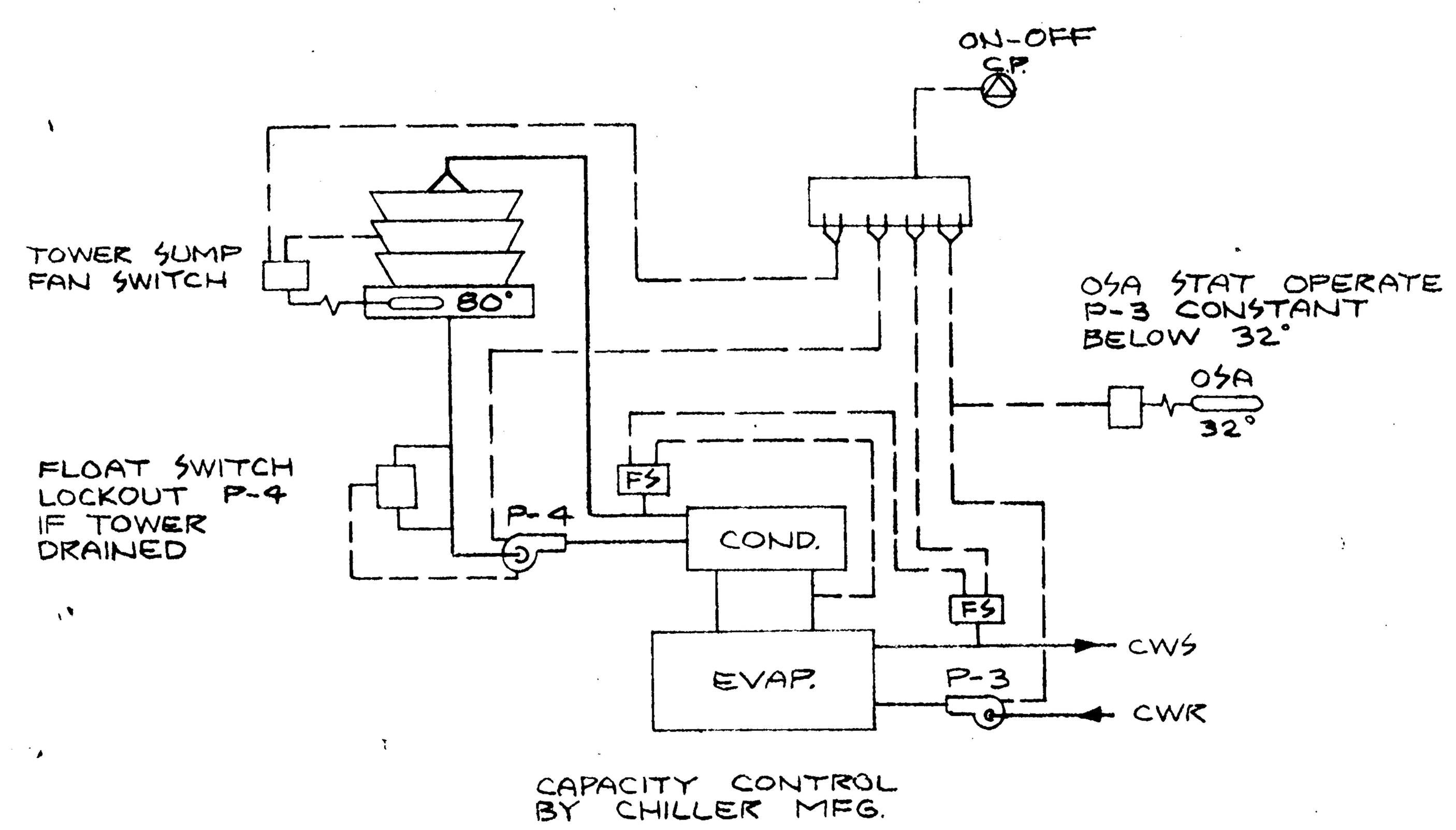
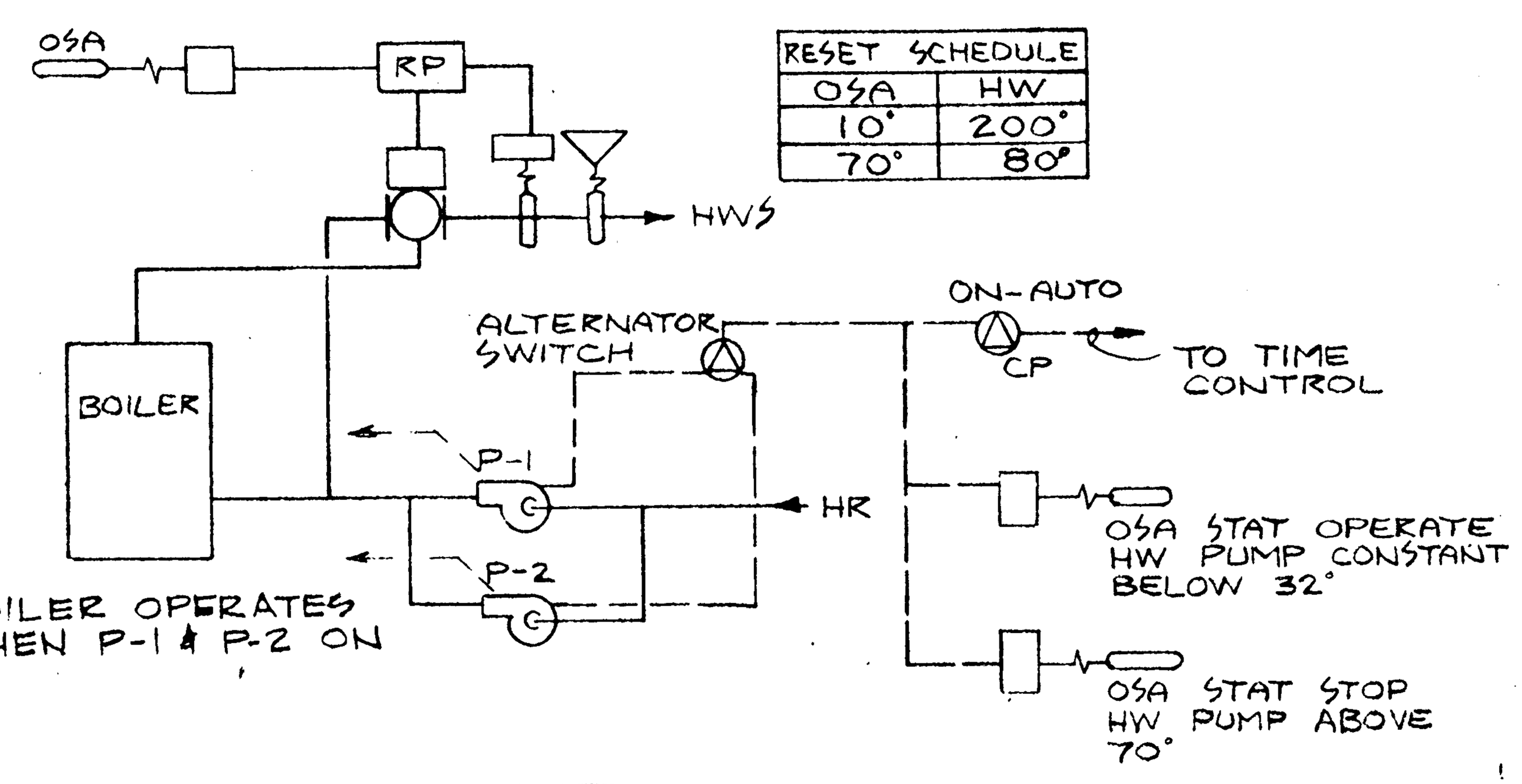
FILE

SHEET M 8
OF 11

DATAPRINT CORP. 2011 LITTLEFIELD AVE. SO. SAN FRANCISCO, CA. 94080
DATAPRINT STOCKDRAFTING FORM NO. 101-84

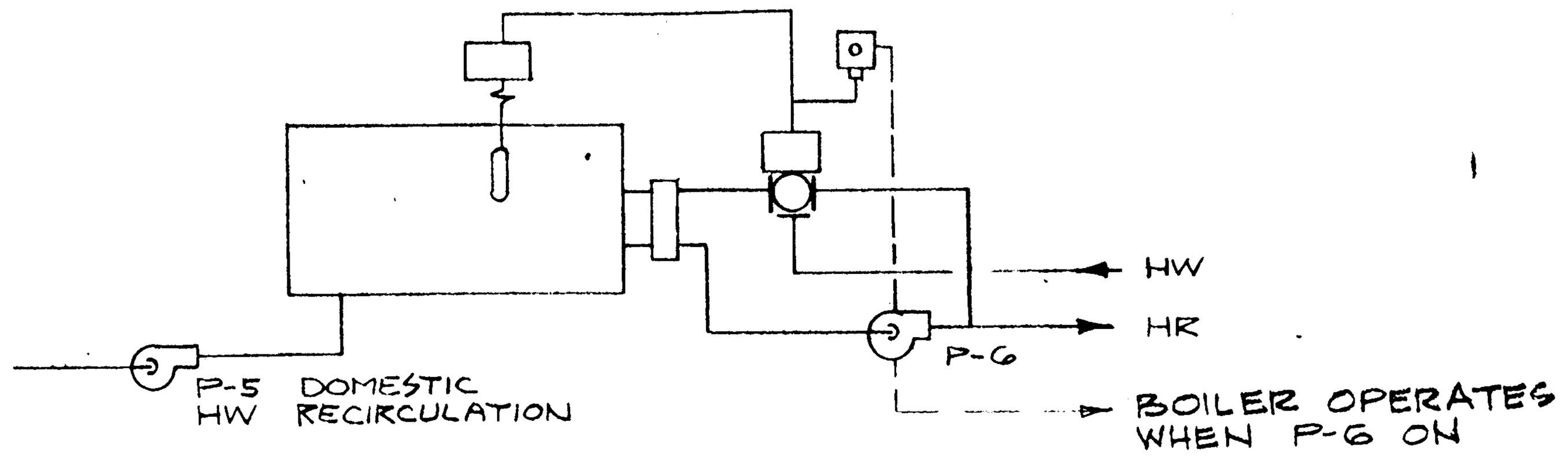


M-9 / 1 CHILLER

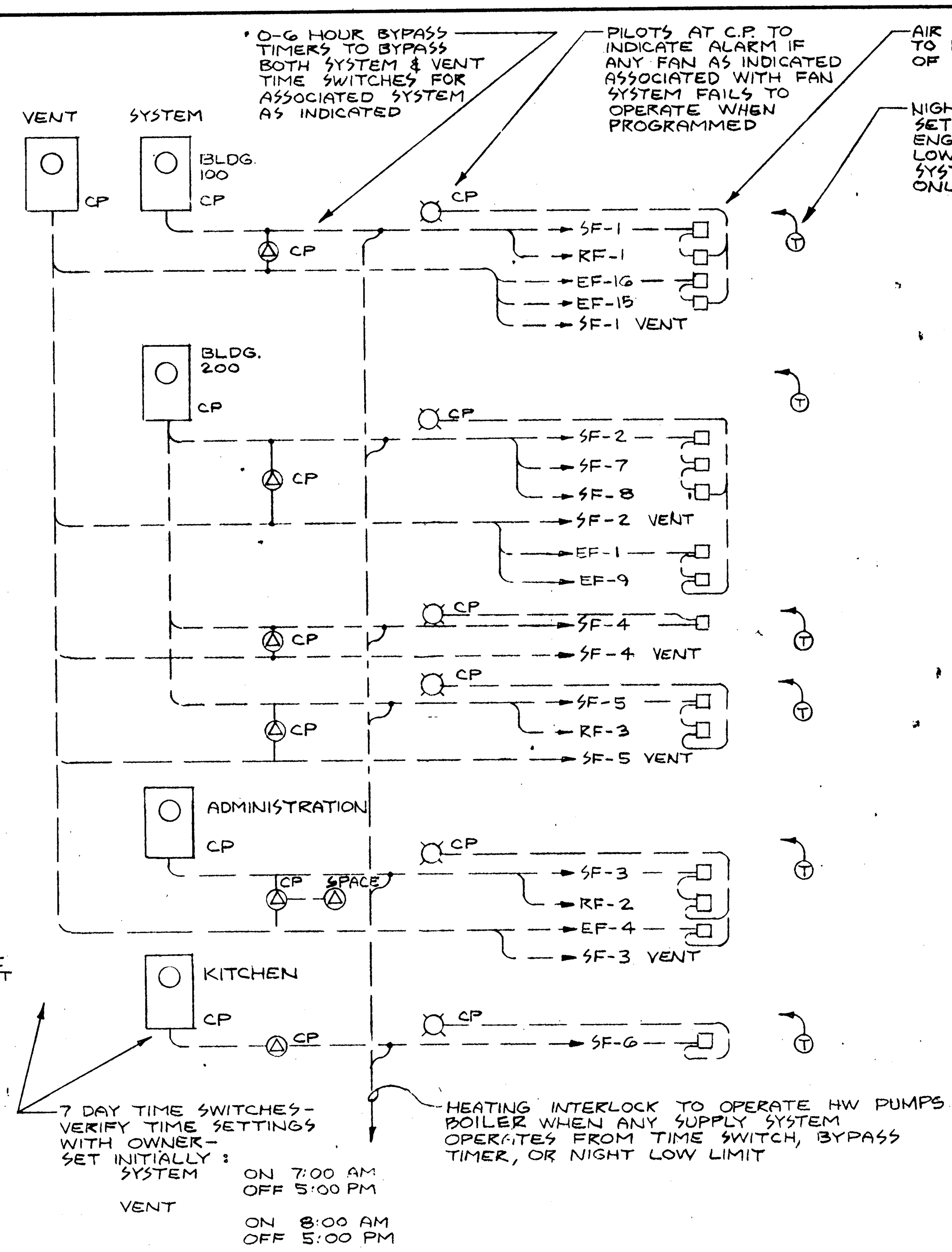


RESET SCHEDULE	
OSA	HW
10°	200°
70°	80°

BOILER



M-9 / 2 DOMESTIC HOT WATER



M-9 / 3 TIME CONTROL

TEMPERATURE CONTROL LEGEND

CP	CENTRAL PANEL
EA	EXHAUST AIR
RA	RETURN AIR
OSA	OUTSIDE AIR
-----	WIRING
	CONTROL TUBING
	PNEUMATIC RELAY
EP	(ELECTRIC OPERATED)
KP	RESET PANEL (SUBMASTER INSTRUMENT
	PILOT LIGHT
	ON-OFF SWITCH (ELECTRIC)
	ANY RELAY OR MISCELLANEOUS DEVICE AS NOTED
DP	DIFFERENTIAL PRESSURE INDICATOR OR CONTROLLER
NC	NORMALLY CLOSED
FU	NON-FREEZE
LSFS	CONNECT TO LOAD SIDE OF FAN STARTER
	DAMPER MOTOR
	2-WAY CONTROL VALVE
	3-WAY CONTROL VALVE
FS	FLOW SWITCH
NO	NORMALLY OPEN
	DUCT THERMOSTAT - 15" AVERAGING TYPE SENSING ELEMENT
R	CONTROL POINT W/ MANUAL REMOTE READJUSTMENT

THERMOSTAT * — HC: HEATING COOLING TYPE; HG: HEAVY DUTY GUARD; DN: 2 TEMPERATURE DAY-NIGHT TYPE; G: GUARD; NLL: NIGHT LOW LIMIT; AS: ACCESSIBLE SETTING W/LIMIT STOPS

IMMERSION THERMOSTAT * — R = AUTOMATIC RESET W/RESET CUT-OUT; RC: RECORDING CONTROLLER

INDICATION POINT ELEMENTS AS SHOWN FOR THERMOSTAT + — T: TEMPERATURE; P: PRESSURE; D: DEW POINT; H: HUMIDITY — CP, LP, PM INDICATES LOCATION OF READ-OUT(S)

PNEUMATIC SWITCH * — G: GRADUAL; T: 2 POSITION

CONTROL DIAGRAMS

SW. BROCKMAN ROAD AND SW. DAVIES ROAD BEAVERTON OREGON

ELEMENTARY SCHOOL - SCHOOL DISTRICT 48

BEAVERTON WASHINGTON COUNTY OREGON

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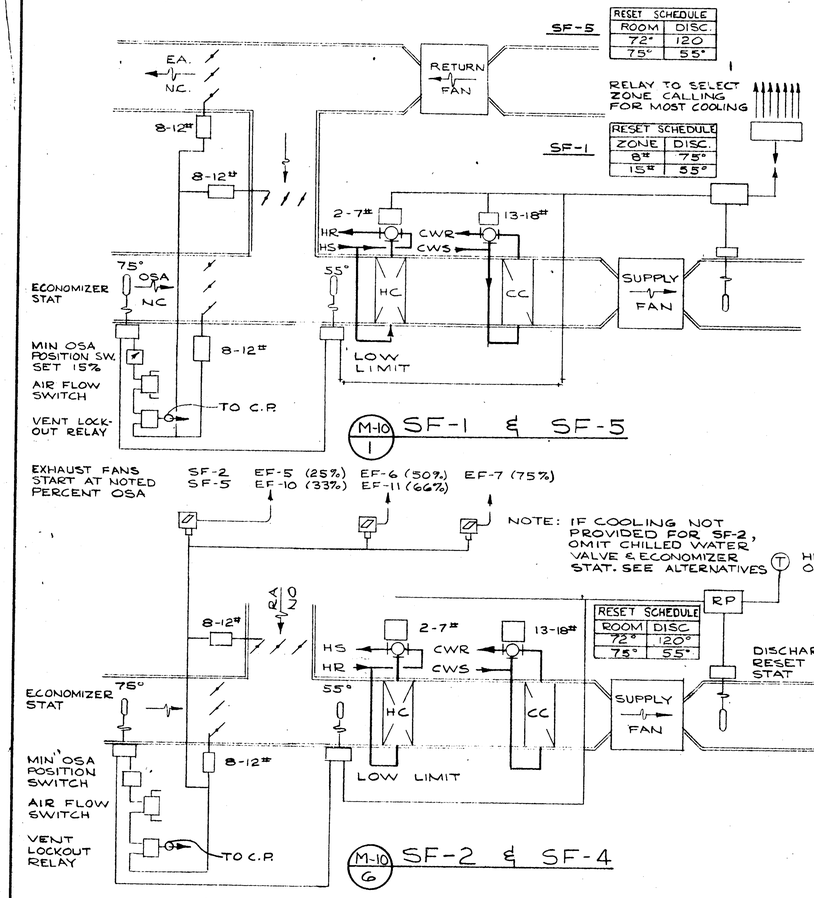
REVISIONS
DRAWN PP
CHKD
DATE 1-30-74

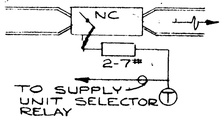
LARRY R. McGINNIS

SHEET M 9 OF 11

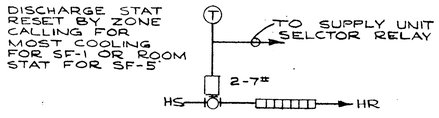


M-10 / 1 SF-1 & SF-5

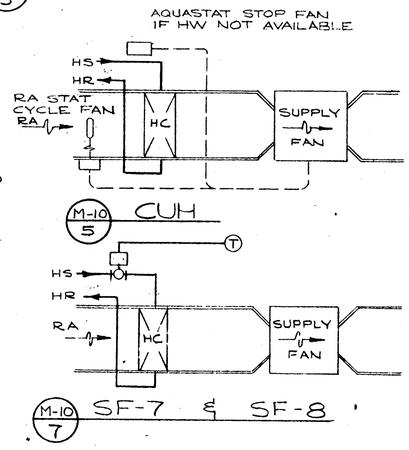
M-10 / 6 SF-2 & SF-4



M-10 / 2 VARIABLE VOLUME BOX

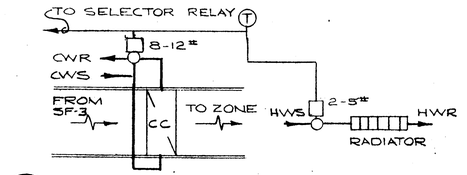


M-10 / 3 RADIATION

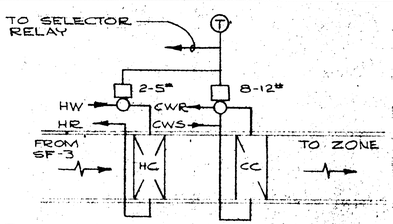


M-10 / 5 CUH

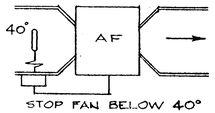
M-10 / 7 SF-7 & SF-8



M-10 / 4 PERIMETER ZONES



M-10 / 11 INTERIOR ZONES



M-10 / 10 ATTIC FAN

CONTROL SEQUENCE

SF-1: SUPPLY RETURN FANS START FROM CENTRAL TIME CONTROL SYSTEM. ROOM STAT OPERATES VARIABLE VOLUME BOX OR RADIATION CONTROL VALVE THROUGH LOWER HALF OF CONTROL RANGE. UPPER HALF OF CONTROL RANGE OF STAT CALLING FOR MOST COOLING RESETS UNIT DISCHARGE STAT. DISCHARGE STAT OPERATES UNIT HEATING VALE, DAMPERS, & UNIT COOLING VALVE IN SEQUENCE. OUTSIDE AIR CLOSES TO MINIMUM ABOVE 75° OUTSIDE. OUTSIDE AIR CLOSED ON FAN STOP & UNIT VENTILATION ALLOWED BY CENTRAL TIME CONTROL SYSTEM.

SF-2: SUPPLY FAN STARTS FROM CENTRAL TIME CONTROL SYSTEM. ROOM STAT RESETS CONTROL POINT OF DISCHARGE STAT. DISCHARGE STAT OPERATES UNIT HEATING VALVE, DAMPERS, & UNIT COOLING VALVE IN SEQUENCE, OUTSIDE AIR CLOSES TO MINIMUM ABOVE 75° OUTSIDE. OUTSIDE AIR CLOSED ON FAN STOP & UNTIL VENTILATION ALLOWED BY CENTRAL TIME CONTROL SYSTEM. SF-5,6,&7 INTERLOCKED TO OPERATED WHEN OSA DAMPER 25%, 50% & 75% OPEN RESPECTIVELY.

SF-3: SUPPLY AND RETURN FANS START FROM CENTRAL TIME CONTROL SYSTEM. PERIMETER ZONE ROOM STATS OPERATE RADIATION VALVES THROUGH LOWER THIRD OF RANGE, RESET UNIT THROUGH MIDDLE THIRD OF RANGE, & OPERATE ZONE COOLING COIL THROUGH UPPER THIRD OF RANGE. INTERIOR ZONE ROOM STATS OPERATE ZONE HEATING COIL THROUGH LOWER THIRD OF RANGE, RESET UNIT THROUGH MIDDLE THIRD OF RANGE, & OPERATE ZONE COOLING COIL THROUGH UPPER THIRD OF RANGE. RELAX SELECTS ZONE CALLING FOR GREATEST COOLING WHICH RESETS UNIT DISCHARGE STAT THROUGH MIDDLE THIRD OF RANGE. DISCHARGE STAT OPERATES DAMPERS. OUTSIDE AIR CLOSES TO MINIMUM ABOVE 75° OUTSIDE. OUTSIDE AIR CLOSES ON FAN STOP & UNTIL VENTILATION ALLOWED BY CENTRAL TIME CONTROL SYSTEM.

SF-4: OPERATES AS NOTED FOR SR-2 EXCEPT EF-10 AT 33% & EF-11 AT 66% ARE INTERLOCKED EXHAUST FANS.

SF-5: OPERATES AS NOTED FOR SF-1 EXCEPT DISCHARGE STAT RESET BY SINGLE UNIT ROOM STAT.

SF-6: SUPPLY FAN STARTS FROM CENTRAL TIME CONTROL SYSTEM ROOM STAT & DISCHARGE, LOW LIMIT OPERATE UNIT HEATING VALVE. ANTIFREEZE STAT STOPS FAN. OUTSIDE AIR OPEN 50% IF EF-13 ON LOW SPEED & TO 100% IF EF-13 ON HIGH SPEED. OUTSIDE AIR SUBJECT TO MIXED AIR LOW LIMIT. OUTSIDE AIR CLOSED ON FAN STOP.

SF-7: SUPPLY FAN STARTS FROM CENTRAL TIME CONTROL SYSTEM. ROOM STAT OPERATES HEATING COIL VALVE.

SF-8: OPERATES AS NOTED FOR SF-7.

CUH: RETURN AIR THERMOSTAT CYCLES FAN SUBJECT TO AQUASTAT WHICH KEEPS FAN OFF UNLESS HEATING AVAILABLE.

AF: ATTIC STAT CYCLES FAN WITH OPERATION ABOVE 50°.

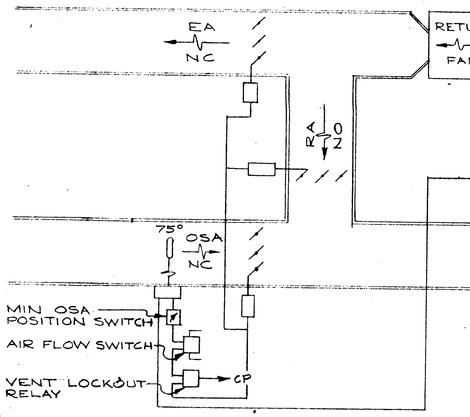
DOMESTIC HOT WATER: TANK STAT OPERATES HEATING VALVE. P-6 ON IF VALVE OPEN. RETURN LINE AQUASTAT CYCLES RECIRCULATION PUMP P-5.

BOILER: P-1 OR P-2 OPERATE FROM CENTRAL TIME CONTROL SYSTEM SUBJECT TO ON-AUTO SWITCH. PROVIDE ALTERNATOR SWITCH. SELECTED PUMP OFF ABOVE 75° OUTSIDE & OPERATES CONSTANT BELOW 32° OUTSIDE REGARDLESS OF OTHER CONTROL. MAIN HEATING 3-WAY VALVES CONTROLLED BY DISCHARGE STAT RESET BY OUTSIDE STAT. BOILER OPERATES WHEN P-1, P-2 OR P-6 ON

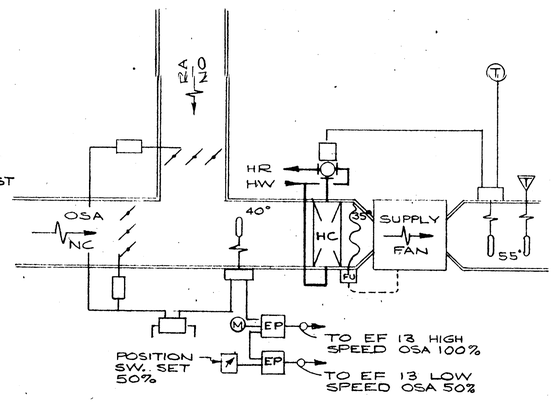
CHILLER: SYSTEM OPERATES FROM CENTRAL TIME CONTROL SYSTEM SUBJECT TO AUTO-OFF SWITCH. IF OPERATION PROGRAMMED & OSA ABOVE 60°; P-3 STARTS: P-4 STARTS IF TOWER FILLED AS SENSED BY FLOAT SWITCH: COOLING TOWER FAN ALLOWED TO OPERATE: & CHILLER ALLOWED TO OPERATE IF FLOW IS PROVEN IN CONDENSER & CHILLER CIRCUITS. COOLING TOWER FAN CYCLED BY SUMP STAT. P-3 OPERATES CONSTANT BELOW 32° OUTSIDE.

CENTRAL TIME CONTROL SYSTEM: SYSTEM TIME SWITCHED (3REG'D) START ASSOCIATED SUPPLY SYSTEMS. VENTILATION TIME SWITCH STARTS ASSOCIATED EXHAUST FANS & ALLOWS OUTSIDE DAMPERS TO OPEN. BY PASS TIMERS RESTORE INDIVIDUAL SUPPLY SYSTEM OPERATIONS & BY PASS BOTH VENTILATION & SYSTEM TIME SWITCHES. NIGHT LOW LIMIT STATS BY PASS SYSTEM TIME SWITCH FOR ASSOCIATED SYSTEM ONLY. PILOTS AT CENTRAL PANEL SHALL INDICATE IF ASSOCIATED SYSTEM FANS FAIL TO OPERATE. SEE DRAWINGS FOR FANS ASSIGNED TO EACH TIME SWITCH, BY PASS TIMER ALARM PILOT, & NIGHT LOW LIMIT STAT.

BOILER INTERLOCK PROVIDED TO START P-1 OR P-2 IF ANY SUPPLY SYSTEM OPERATES FROM TIME SWITCH, BY PASS, OR NIGHT LOW LIMIT STAT.



M-10 / 8 SF-3



M-10 / 9 SF-6

CONTROL DIAGRAMS
SW. BROCKMAN ROAD AND SW. DAVIES ROAD
BEAVERTON, OREGON

SCHOOL - DISTRICT 48
ELEMENTARY SCHOOL
BEAVERTON
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OREGON

WILLIAMS & EHMANN AIA
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3777 S.E. MILWAUKIE AVENUE
PORTLAND, ORE. 97202
503-232-1193

REVISIONS
DRWN DP
CHKD
DATE 1-30-74
FORM 73-07
FILE

SHEET M 10
OF 11

DATAPRINT CORP. 800 LITTLEFIELD AVE. SO. SAN FRANCISCO CA 94080

DATAPRINT STOCKDRAFTING FORM NO. 101-84

SUPPLY FAN SCHEDULE

SYMBOL	SERVING	TOTAL CFM	WHEEL SIZE INCH	SP IN	MOTOR HP	MOTOR VOLT	MOTOR PHASE	CLASS	MAX COIL FACE FPM	HEATING COIL EWT 190° EAT °F	HEATING COIL EWT 190° LAT °F	HEATING COIL MBH	HEATING COIL MAX GPM	HEATING COIL LWT 150° MAX AIR PD IN H_2O	HEATING COIL LWT 150° MAX H_2O PD FT H_2O	COOLING COIL AIR TEMP °F ENT DB	ENT WB	LVG DB	LVG WB	COOLING COIL MBH	SEC. TEMP.	AIR P.D. IN H_2O	MIN NO. ROWS	GPM	FINS PER INCH	REMARKS
SF-1	CLASSROOMS	21,200	33"	2 1/4"	15	208	3	1	500	63.8°	73.8°	228	11.5	.25	5.0	77	63.5	55	54.5	575	45°	.75	6	115	9	PACE "S1" A 33-AF
SF-2	GYM	9,400	22 1/4"	1 1/4"	5	208	3	1	500	61°	95°	313	16	.25	5.0	77	63.5	55	54.5	225	45°	.75	6	51	9	PACE "S1" A 22
SF-3	ADMINISTRATION	3,820	13 1/2"	1 3/4"	3	208	3	1	—	62.7°	85.0°	92	4.6	—	—	—	—	—	—	—	—	—	—	20.8	—	PACE "S1" A 22
SF-4	CAFETERIA	4,200	15"	2"	3	208	3	1	500	55°	85°	136	8.1	.25	5.0	77	63.5	55	54.5	114	45°	.75	6	22.8	9	PACE "S1" A 14
SF-5	MUSIC ROOM	1,800	9 3/4"	1 3/4"	1 1/2	208	3	1	500	62.7°	85.0°	43	2.2	.25	5.0	77	63.5	55	54.5	49	45°	.75	6	9.8	9	PACE "S1" A 9
SF-6	KITCHEN	3,750	15"	1"	1 1/2	208	3	1	500	40°	100°	202	10.	.25	5.0	—	—	—	—	—	—	—	—	—	—	PACE "S1" A 15
SF-7&8	LOCKER ROOMS	600	6 1/2"	3/4"	1/12	120	1	1	500	62.7°	82.7°	13	.65	.25	5.0	—	—	—	—	—	—	—	—	—	—	PACE CUH 61-1

COOLING COIL SCHEDULE

SYMBOL	SERVING	CFM	SIZE NO	SIZE HDR	SIZE TUBES	MAX FACE VEL FPM	AIR TEMP ENT DB	AIR TEMP ENT WB	AIR TEMP LVG DB	AIR TEMP LVG WB	ENT H_2O TEMP	MAX GPM	MAX AIR P.D. IN H_2O	MAX H_2O P.D. IN H_2O	MAX FINS/INCH	MBH	REMARKS
CC-1	FOYER	1250	1	18	24"	415	77.4	64	55	54.5	45	7	.75"	5'	8	36	
CC-2	GYM OFFICE	620	1	12	18	415	77.4	64	55	54.5	45	3.5	.75"	5'	8	18.0	
CC-3	PRINCIPAL	600	1	12	18	400	77.4	64	55	54.5	45	3.5	.75"	5'	8	18.0	
CC-4	OFFICE	550	1	12	18'	366	77.4	64	55	54.5	45	3.2	.75"	5'	8	16	
CC-5	FACULTY	500	1	12	12	500	77.4	64	55	54.5	45	2.9	.75"	5'	8	14	
CC-6	SPECIAL ED	300	1	9	12	400	77.4	64	55	54.5	45	1.7	.75"	5'	8	9	

HEATING COIL SCHEDULE

SYMBOL	SERVING	CFM	SIZE NO.	SIZE HDR	SIZE TUBE	MAX FACE VEL FPM	MAX AIR PD IN H_2O	AIR TEMP ENT	AIR TEMP LVG	WTR. TEMP ENT	WTR. TEMP LVG	MAX GPM	MAX FINS INCH	MBH	MAX WTR PD.	PIPE SIZE
HC-1	FOYER	1250		18	24	416	.75"	62.7	82.7	180	140	1.4	8	27	5'	1/2"
HC-2	GYM OFFICE	620		12	18	413	.75"	62.7	82.7	180	140	.7	8	14	5'	1/2"
HC-3	OFFICE	550		12	18	366	.75"	62.7	82.7	180	140	.6	8	12	5'	1/2"
HC-4	SPECIAL ED.	300		4	12	400	.75"	62.7	82.7	180	140	.4	8	7	5'	1/2"

EXHAUST & RETURN FAN SCHEDULE

SYMBOL	SERVING	CFM	TOTAL S.P. WATER	MOTOR HP	MOTOR VOLT	MOTOR PHASE	MAX SONES AT 5 FT	TYPE	REMARKS
EF-1	BOYS & GIRLS LAV	1200	3/8"	1/3	120	1	5.0	ROOF	PACE CRE-11
EF-2&3	TOILET	100	1/4	—	120	1	5.0	ROOF	PACE DD-200 R
EF-4	FACULTY	500	3/8	1/8	120	1	3.0	ROOF	PACE DD-650 R, SOUND CURB
EF-5,6,7,8	GYM	1800	3/8	1/2	208	3	3.0	ROOF	PACE CRE-15, SOUND CURB
EF-9	LOCKER ROOMS	1500	3/8	1/3	120	1	5.0	ROOF	PACE CRE-15,
EF-10,11	CAFETERIA	2000	3/8	1/2	208	3	3.0	ROOF	PACE CRE-16, SOUND CURB
EF-12	MAINTENENCE	200	1/4	—	120	1	5.0	ROOF	PACE DD-350 R
EF-13	RANGE HOOD	3800	1	1 1/2	208	3	7.5	ROOF	PACE CRE-20, 2 SPEED
EF-14	DISHWASHER HOOD	1200	1/2	1/2	208	3	7.5	ROOF	PACE CRE-11, 2 SPEED
EF-15,16	BLDG. 100	870	1/4	1/6	120	1	5.0	CEILING	PACE DD 850
RF-1	BLDG. 100	19,000	1/2	5	208	3	—	AXIAL	TRANE MODEL Q SIZE 44
RF-2	ADMINISTRATION	2800	3/4	3/4	208	3	—	AXIAL	TRANE MODEL Q SIZE 19
RF-3	MUSIC ROOM	1500	5/8	1/2	208	3	—	AXIAL	TRANE MODEL Q SIZE 16

PUMP SCHEDULE

SYMBOL	SERVING	GPM	HEAD WATER	WATER TEMP °F	MOTOR HP	MOTOR VOLT	MOTOR PHASE	TYPE PUMP	RPM	REMARKS
P-1&2	HEATING PUMPS	90	105	210	7 1/2	208	3	BASE MOUNT	1750	B&G NO U2-G
P-3	CHILLED WATER PUMP	180	52	45	5	208	3	CLOSE CPLD	1750	B&G NO 1531 2 1/2" B
P-4	CONDENSER WTR PUMP	210	40	95	5	208	3	CLOSE CPLD	1750	B&G NO 1531 4" AB
P-5	DOMESTIC WTR RECIRC. PUMP	10	15	140	1/6	120	1	IN LINE	1750	B&G 1" PR ALL BRONZE
P-6	HEAT EXCHANGER	10	15	210	1/6	120	1	IN LINE	1750	B&G 1" PR

MISCELLANEOUS EQUIPMENT

SYMBOL	DESCRIPTION	ELECTRICAL
B	BOILER: GAS FIRED, 1750 MBH, 52.3 HP, 2,188 MBH INPUT, 239 SQ FT. TOTAL HEATING SURFACE. KEWANEE M-175	3/4 HP BOILER MOTOR 230V, 1Ø
CH	CHILLER: 70 TONS, 45° L.W.T., 179 GPM COND. WATER, 85° ENT, 95° L.W.T., 10 FT. HD. COND. P.D., 15 FT. HD. CHILLER P.D. MAX. TRANE CG 75D	224 FLA 208 V 3 Ø
CT	COOLING TOWER: CAPACITY TO 210 GPM AT 70° WB, 95° EWT / 85° LWT. BAC-VNT 50 B	7 1/2 HP FAN MOTOR
FP	FINNED PIPE: 4 1/4" x 1 1/4", 850 BTUH/FT., 33 FINS/FOOT, 180° AVERAGE WATER TEMP	
HE	HEAT EXCHANGER: (WATER HEATER) CAPACITY TO HEAT 4.2 GPM FROM 45° TO 140° WITH 10 GPM, 200° E.W.T., .0005 FOULING FACTOR	
CUH	CABINET UNIT HEATER: 600 CFM, 24 MBH, 190° E.W.T., PACE #61-2	1/12 HP 120V, 1Ø
AF	ATTIC FAN: 4,000 CFM AT 1/4" S.P., 18" S.P., BELT DRIVE, TUBE AXIAL FAN, PACE TYPE TA	3/4 HP 208V, 3Ø

REGISTERED PROFESSIONAL ENGINEER 6406 OREGON

SCHEDULES

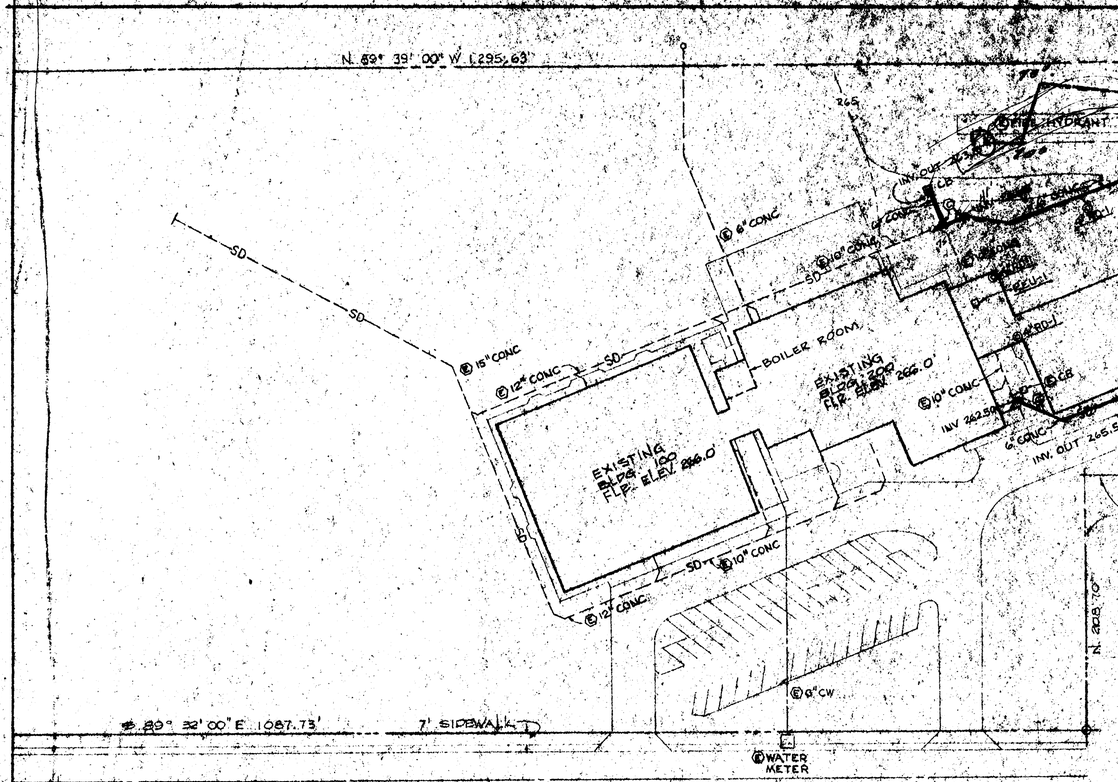
SW. BROCKMAN ROAD AND SW. DAVIES ROAD
BEAVERTON, OREGON

ELEMENTARY SCHOOL - SCHOOL DISTRICT 48
BEAVERTON WASHINGTON COUNTY OREGON

WILLIAMS & EHMANN AIA
ARCHITECTS - PLANNERS
3777 S.E. MILWAUKIE AVENUE
PORTLAND, ORE. 97202 503-232-1195

REVISIONS
DRWN. DP
CHKD
DATE 1-30-74
COMM 73-61
FILE

SHEET M 11 OF 11



SITE PLAN

(1/M-1)

SCALE: 1" = 50'-0"

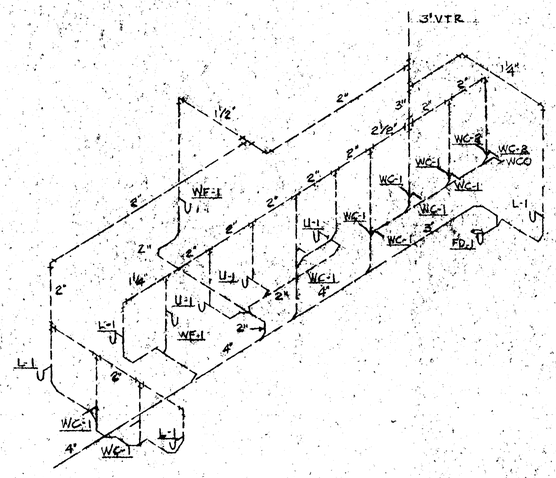
NOTE:
1. FOR ADDITIONAL GRADES SEE ARCHITECTURAL SITE PLAN.

PLUMBING FIXTURE SCHEDULE

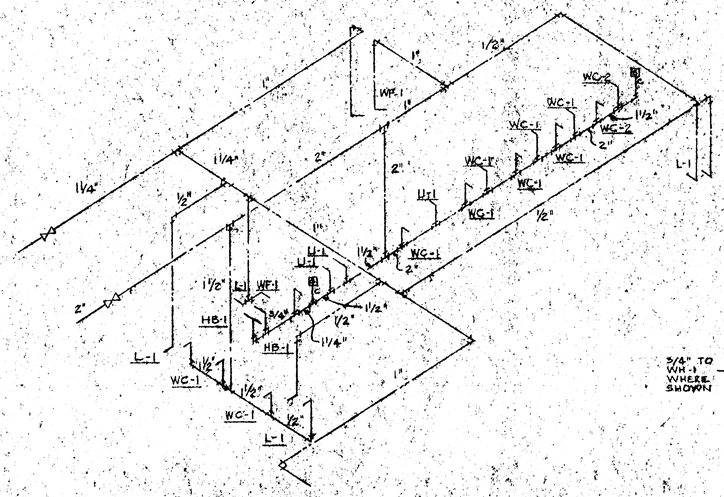
SYMBOL	DESCRIPTION	ROUGH-IN W	ROUGH-IN V	SIZE-INCHES CW	SIZE-INCHES HW	REMARKS
WC-1	WATER CLOSET	4'	2'	1 1/4	—	WALL HUNG
WC-2	WATER CLOSET	4'	2'	1 1/4	—	HANDICAPPED HEIGHT
L-1	LAVATORY	1 1/2	1 1/4	1/2	1/2	HANDICAPPED TYPE
U-1	URINAL	2	2	1	—	
WF-1	WASH FOUNTAIN	2'	4	1	1	SEMI-CIRCULAR
S-1	SINK	2	1 1/2	1/2	1/2	CLASSROOM SINK

LEGEND

CD	CD	CONDENSATE DRAIN.
W	W	SANITARY WASTE ABOVE GRADE.
W	W	SANITARY WASTE BELOW GRADE.
SD	SD	STORM DRAIN ABOVE GRADE.
SD	SD	STORM DRAIN BELOW GRADE.
V	V	VENT.
CW	CW	COLD WATER.
HW	HW	HOT WATER.
RHW	RHW	RECIRCULATED HOT WATER.
		GATE VALVE.
		GLOBE VALVE.
		CHECK VALVE.
		BUTTERFLY VALVE.
		BALANCING FITTING.
WH	WH	WALL HYDRANT.
DV	DV	HOSE END DRAIN VALVE.
SA		SHOCK ABSORBER, SIZE C (R.D.I. STANDARD 201)
		PITCHED DOWN.
		AIR FLOW DIRECTION.
		SUPPLY-OSA DUCT SECTION, ROUND, RECTANGULAR.
		RETURN-EXHAUST DUCT SECTION ROUND, RECTANGULAR.
		LINED, INSULATED DUCT DOUBLE LINE, SINGLE LINE.
		FLEXIBLE DUCT CONNECTION.
FLD	FLD	FUSIBLE LINK DAMPER DOUBLE LINE, SINGLE LINE.
		BUTTERFLY VOLUME DAMPER DOUBLE LINE, SINGLE LINE.
①		ROOM THERMOSTAT, WALL MOUNTED
T		ROOM THERMOSTAT, SURFACE MOUNTED
⌀10		ROUND DUCT DIAMETER, INCHES
32x14		RECTANGULAR DUCT, INCHES
ASU		AIR SUPPLY UNIT.
SF		SUPPLY FAN.
REU		ROOF EXHAUST UNIT
UH		UNIT HEATER.
CC		COOLING COIL.
OSA		OUTSIDE AIR.
AUD		AUTOMATIC DAMPER.
OAD		OUTSIDE AIR DAMPER.
RAD		RETURN AIR DAMPER.
EAD		EXHAUST AIR DAMPER.
CS		CEILING SUPPLY DIFFUSER.
CE		CEILING EXHAUST GRILLE.
LCS		LINEAR CEILING SUPPLY.
FD		FLOOR DRAIN.
RD		ROOF DRAIN.
VTR		VENT THROUGH ROOF.
CTG		CLEANOUT TO GRADE.
FCO		FLOOR CLEANOUT.
WCO		WALL CLEANOUT.
CO		CLEANOUT.
INV		INVERT ELEVATION.
CI		CAST IRON PIPE.
CONC		CONCRETE PIPE.
NIM		NOT IN MECHANICAL - FURNISHED UNDER ANOTHER DIVISION.
EH		ELECTRIC HEATER, NIM
EBB		ELECTRIC BASEBOARD, NIM.
Ⓐ		ACCESS DOOR.
Ⓒ		CONNECT TO EXISTING.
Ⓔ		EXISTING TO REMAIN.
Ⓕ		BELOW FLOOR.
Ⓚ		CAP
Ⓡ		RELOCATE EXISTING.
Ⓧ		REMOVE EXISTING.



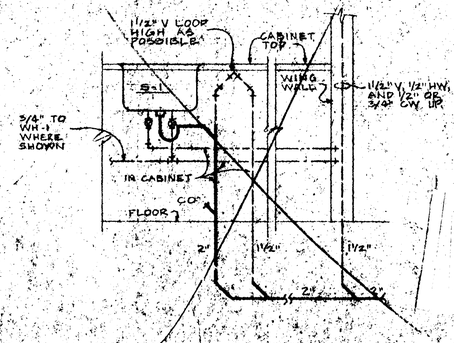
WASTE AND VENT



HOT AND COLD WATER

TOILET ROOM PLUMBING PIPING DIAGRAM

(2/M-1) NO SCALE



SINK WASTE AND VENT DIAGRAM

(3/M-1) NO SCALE

SIX CLASSROOM ADDITION
HITEON ELEMENTARY SCHOOL
SCHOOL DISTRICT No 48
3800 S.W. BROCKMAN RD. - BEAVERTON, OREGON

59712

1 FLOOR PLAN

1/8"=1'-0"

NOTES:

① ALL FLEXIBLE CONNECTORS AND RIGID ROUND DUCTS ARE 8Φ, EXCEPT AS SCHEDULED FOR THE TERMINAL UNITS.

② 12×18 FLD AT GYPSUM BOARD ON BOTTOM OF T.J.S. FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR.

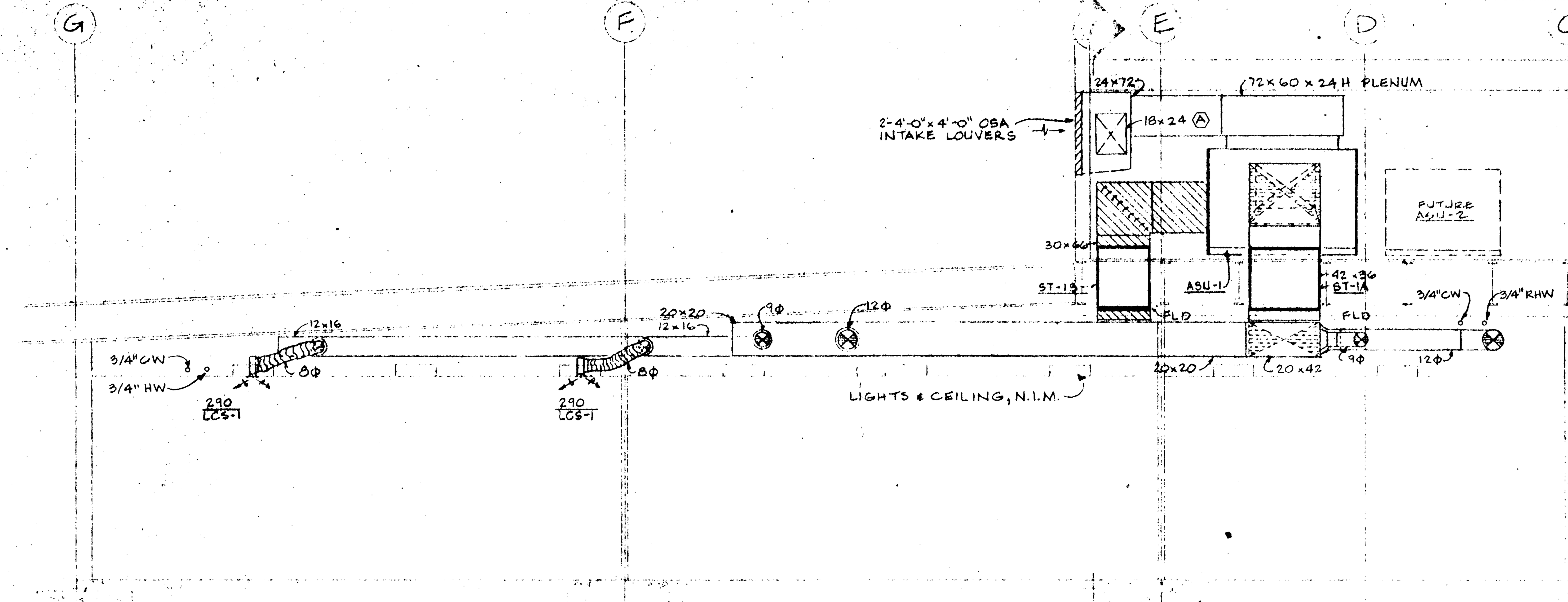
2 PARTIAL PLAN

1/8"=1'-0"

NOTE: SAME AS NOTE 1 FOR 1/M-2.

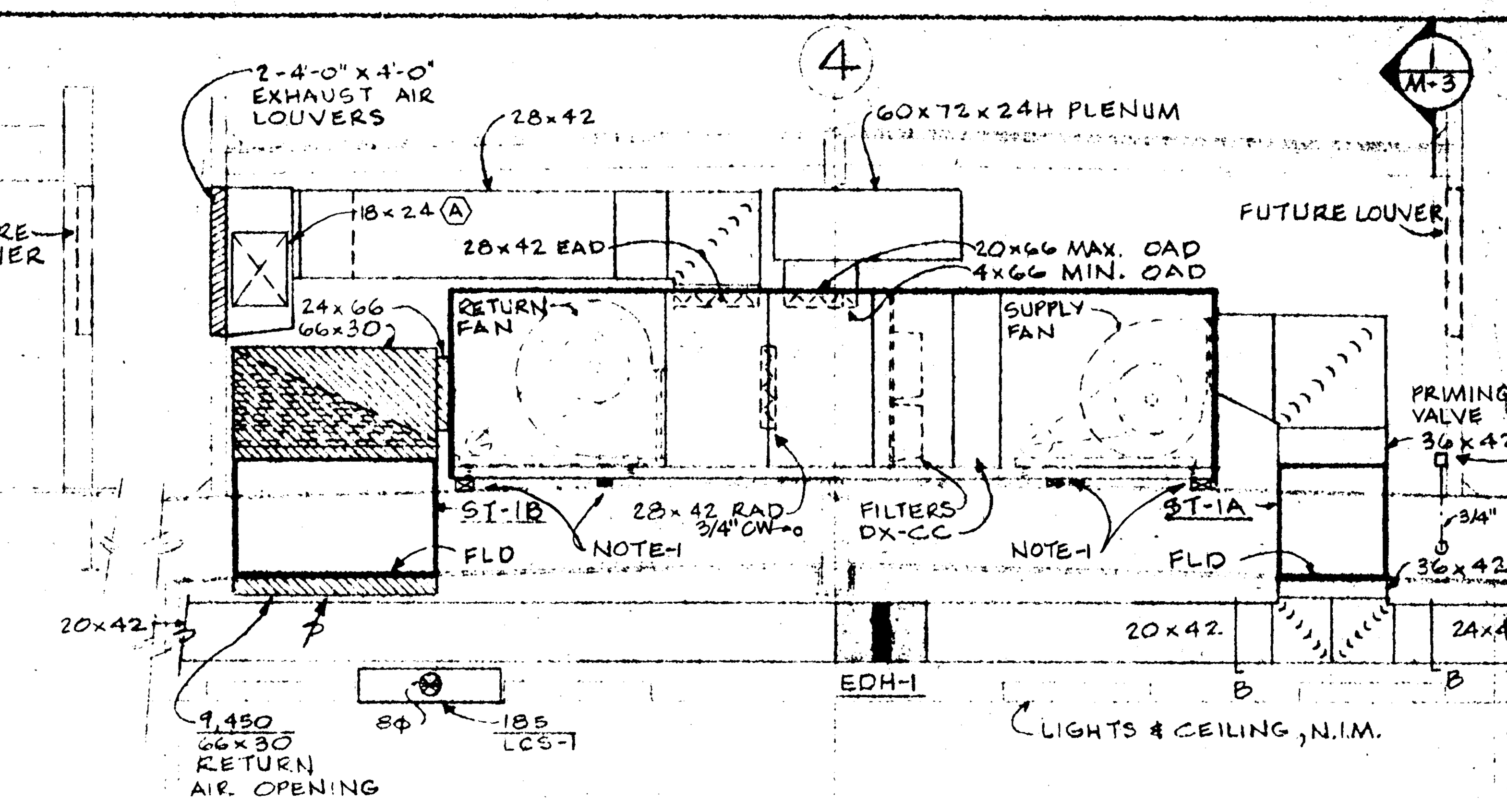
SIX CLASSROOM ADDITION
HILTON ELEMENTARY SCHOOL
SCHOOL DISTRICT NO 48
3500 S.W. BROCKMAN RD - BEAVERTON, OREGON

59713



(1/M-3) SECTION

1/4" = 1'-0"



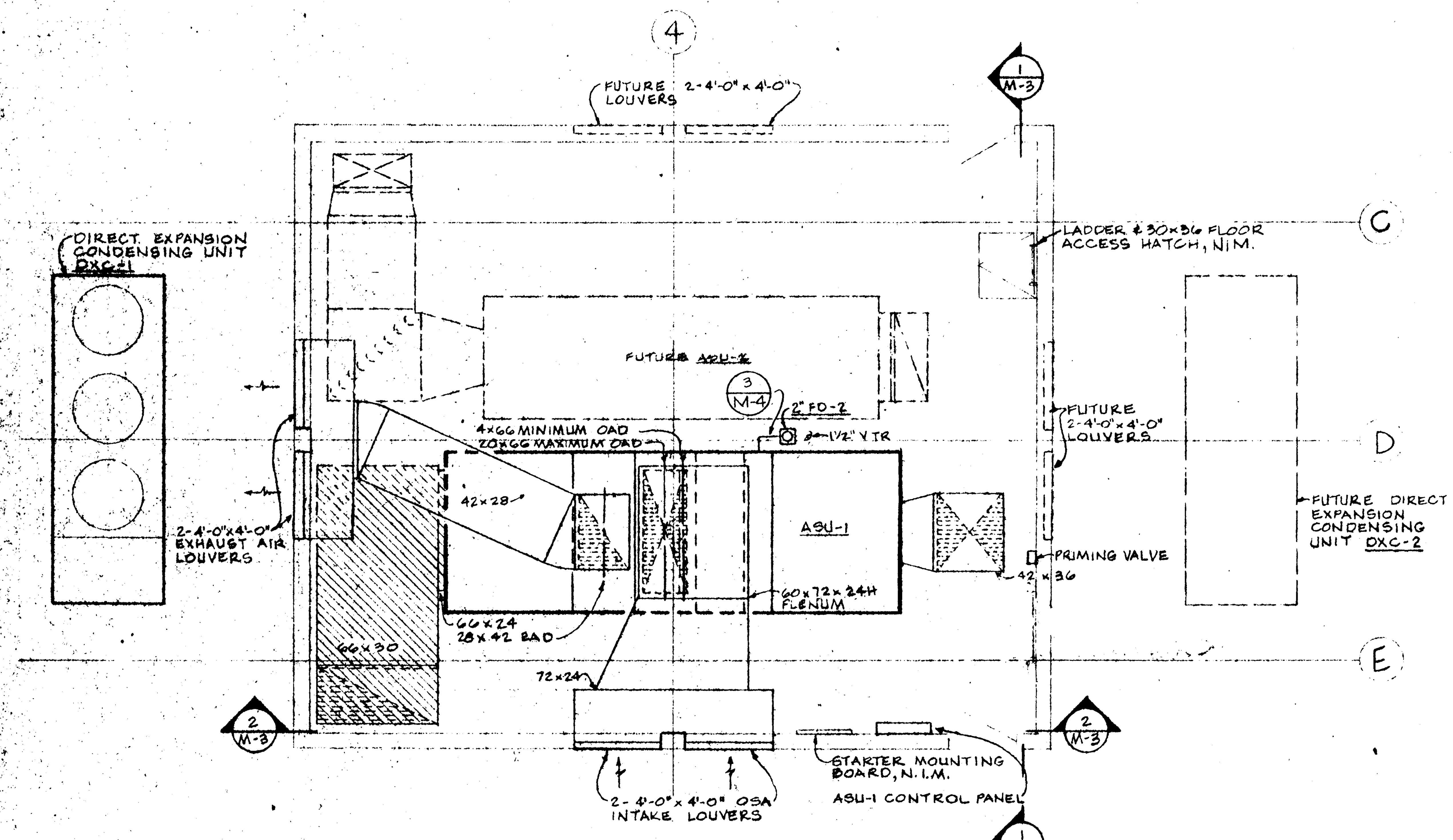
(2/M-3) SECTION

1/4" = 1'-0"

NOTE:

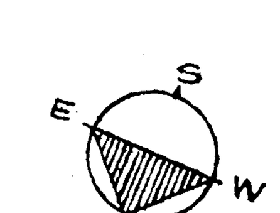
~~SHIM UNDER ASU TO PROVIDE LEVEL SUPPORT~~

1. Provide Treated wood Supports to give a level ASU installation.



(3/M-3) PLAN - MECHANICAL ROOM

1/4" = 1'-0"



PARTIAL MECH. PLAN & SECTIONS

WILLIAMS & GILHAM ARCHITECTS & PLANNERS

SIX CLASSROOM ADDITION

HITEON ELEMENTARY SCHOOL

SCHOOL DISTRICT No 48

13800 S.W. BROCKMAN RD. - BEAVERTON, OREGON

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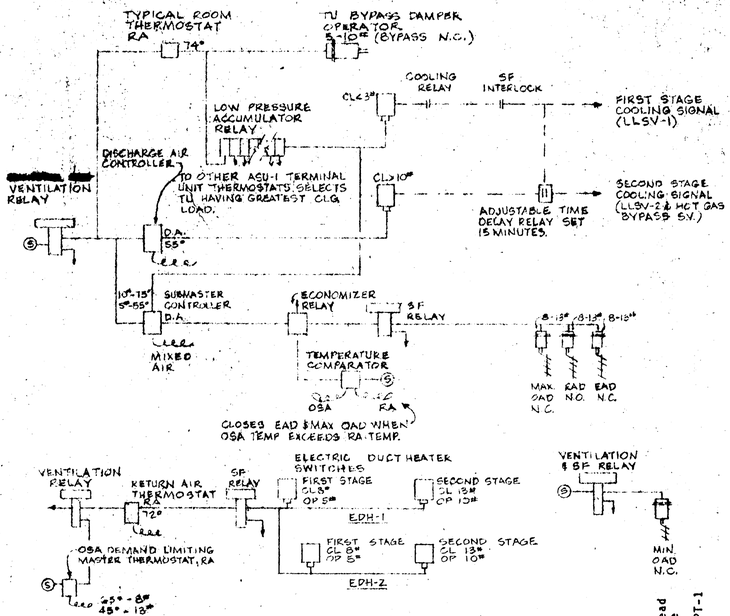
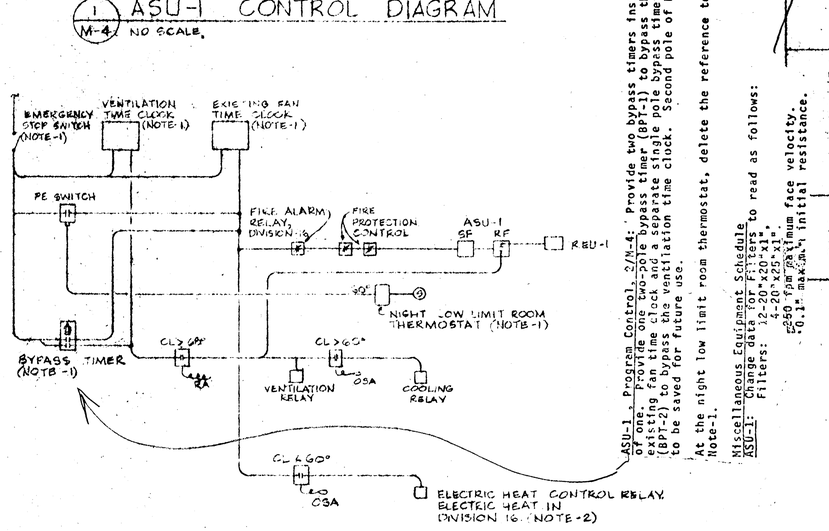


1/M-4 ASU-1 CONTROL DIAGRAM
NO SCALE.



2/M-4 ASU-1 PROGRAM CONTROL
NO SCALE
NOTES:
1. LOCATED IN EXISTING BOILER ROOM.
2. LOCATED IN FAN CONTROL PANEL.

ASU-1 - Program Control, 2/M-4: Provide two bypass timers instead of existing fan time clock and a separate single pole bypass timer (BPT-2) to bypass the ventilation time clock. Second pole of BPT-1 to be saved for future use.

At the night low limit room thermostat, delete the reference to Note-1.

Miscellaneous Equipment Schedule
ASU-1: Change data to read as follows:
Filters: 2-20"x20"x2".
4-20"x25"x2".
≤250 fpm maximum face velocity.
0.1" maximum initial resistance.

SOUND TRAP SCHEDULE

SYMBOL	APPLICATION	AIR VOLUME CFM	DYN INSERT LOSS ① OCT BAND CENTER FREQ 250	500	BASIS OF SELECTION	MAX PRESS LOSS IN. WG	OVERALL SIZE W X H
ST-1A	SUPPLY AIR	10,650	14	33	IAC-3S	0.35	36"X42"
ST-1B	RETURN AIR	9,450	14	20	IAC-3MS	.2	30"X66"

① D.I.L. IN DB. RE 10^-12 WATTS.
② MAX FACE VELOCITY 1018 FPM.

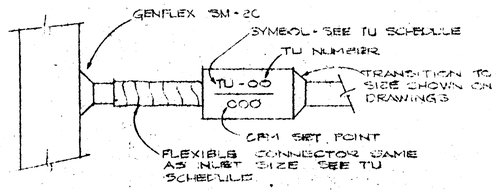
MISCELLANEOUS EQUIPMENT SCHEDULE

ITEM	DESCRIPTION
ASU-1 Air Supply Unit (Approx. total operating weight, 5,000 lbs.)	Supply Fan: Single-zone 10,650 cfm @ 2-1/2" static pressure, approximately 1190 rpm, 24-1/2" air foil wheel, 7-1/2 HP, 208 volt, 3 phase motor. Vibration isolation: type B, 1-1/2" deflection. Design basis: Pace A-24 fan in A-27 casing; internal spring isolated. D-X Cooling Coil: 10,650 cfm, 350 MBH total at 80.5°F EDB, 64.5°F. EWB, 55°F LDB and approximately 54°F LWB. Maximum face velocity 500 FPM. Performance based on 40°F saturated suction temperature. Maximum air P = 0.4". Filters: (4) 20"x25"x9", (4) 16"x25"x9". 500 fpm maximum face velocity. Design basis: Cambridge Hi-Cap. Outside Air Dampers: Maximum - 20"x66" at 9,450 cfm. Minimum - 4"x66" at 1,200 cfm. Return Air Damper: 28"x42" at 9,450 cfm. Exhaust Air Damper: 28"x42" at 9,450 cfm. Return Fan: 9,450 cfm 9 3/4" static pressure, approximately 640 rpm, 27" air foil wheel, 3 HP, 208 volt, 3 phase motor. Vibration isolation: type B, 1-1/2" deflection. Design Basis: Pace A-27 in A-27 casing; internal spring isolated.
DXC-1 DIRECT EXPANSION CONDENSING UNIT	Nominal 30 ton compressor-condensing unit; refrigerant 22, 1750 rpm reciprocating, hermetic compressor with 208 volt, 3 phase motor, 133 FLA, 551 LRA 35.6 KW input. 350 Mbh total load at 90°F outside with 39°F saturated suction temperature. Condensing fans, 4 - 1 HP motors, 0.90 KW input, 208 volt, 3 phase; approximate operating weight 2,750 lbs. Vibration isolation; type B, 1-1/2" deflection for compressor. Design Basis: Trane RAUA 300.
REU-1 Roof Exhaust UNIT	700 cfm at 3/8" static pressure, approximately 775 rpm, 1/4 HP, 120 volt, single phase motor. Vibration isolation: type B, 1" deflection. Design Basis: Pace CRE-9F.

TERMINAL UNIT SCHEDULE

SYMBOL	CFM RANGE	INLET SIZE	DESIGN BASIS ①
TU-A	240 - 360	6Ø	MODEL 300
TU-B	400 - 600	9Ø	MODEL 500
TU-C	601 - 900	10 OVAL	MODEL 750
TU-D	901 - 1200	12 OVAL	MODEL 1000
TU-E	1201 - 1800	14 OVAL	MODEL 1500

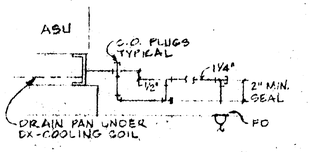
①TEMPMASTER TYPE MSR.



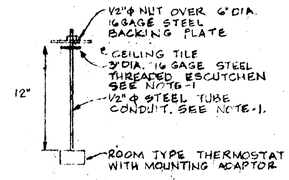
5/M-4 DETAIL - TERMINAL UNIT
NO SCALE

ELECTRIC DUCT HEATER SCHEDULE

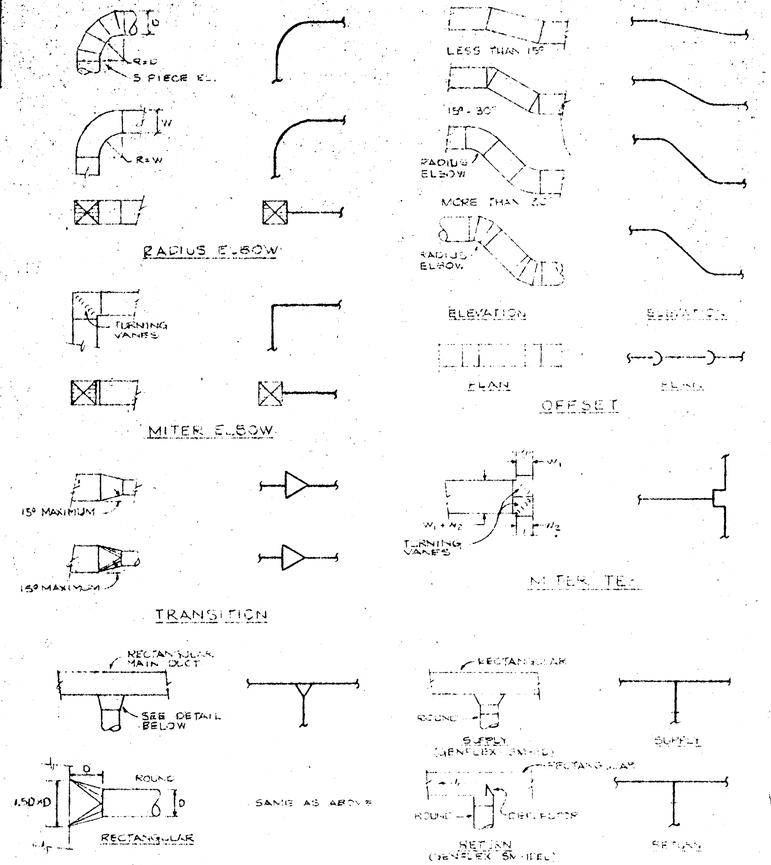
SYMBOL	MAX. CFM	DUCT SIZE	KW	STEPS
EDH-1	6000	42 X 20	17.5	2
EDH-2	6000	42 X 20	17.5	2



3/M-4 DETAIL-CONDENSATE TRAP
NO SCALE

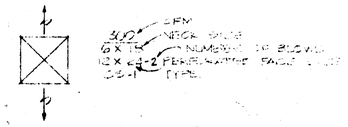


4/M-4 DETAIL-SUSPENDED THERMOSTAT
NO SCALE
NOTE:
1. PAINT WITH 2 COATS OF ENAMEL; COLOR AS APPROVED.

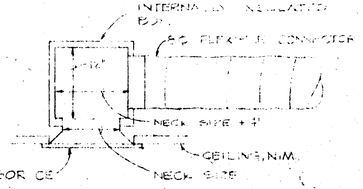


6/M-4 DETAILS - DUCT FITTINGS
NO SCALE

NOTES:
1. FITTING USED ON LOW PRESSURE SYSTEMS ONLY.
2. 32 x 14 FIRST DIMENSION IS THE SIDE SEEN IN ONE THE FIRST DIMENSION IS THE HORIZONTAL SIDE.
3. THE SUPPLY FITTING TO BE USED DOWN STREAM OF TERMINAL UNIT ONLY.



7/M-4 DETAIL - CEILING OUTLET SYMBOL
NO SCALE
NOTE:
1 SUPPLY SYMBOL SHOWN, EXHAUST SIMILAR.



8/M-4 DETAIL - CEILING CONNECTION SYMBOL
NO SCALE

WILLIAMS & GILHAM
ARCHITECTS - PLANNERS
3777 S.E. MILWAUKIE AVE. 238-1196
PORTLAND, OREGON 97202

REGISTERED ARCHITECT MAX P. WILLIAMS PORTLAND, OREGON STATE OF OREGON

REGISTERED PROFESSIONAL ENGINEER ROBERT G. MANN OREGON JULY 9, 1971

C.W. Tramer Associates Inc. Consulting Engineers

DETAILS & SCHEDULES

SIX CLASSROOM ADDITION
HITEON ELEMENTARY SCHOOL
SCHOOL DISTRICT Nº 48
13800 S.W. BROCKMAN RD. - BEAVERTON, OREGON

REVISION
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FILE 27
DATE 8-15-77
SHEET NO. M4
OF 4

59715

PLUMBING FIXTURE SCHEDULE

MARK	FIXTURE	CONNECTION SIZES IN INCHES				REMARKS
		W	V	CW	HW	
WC-1	WATER CLOSET	3	2	3/4	–	
S-1	CLASSROOM SINK	2	2	1/2	1/2	FAUCET LEDGE ON RIGHT SIDE
S-2	SINK	2	2	1/2	1/2	DOUBLE COMPARTMENT
SS-1	SERVICE SUMP	3	2	1/2	1/2	
HB-1	HOSE BIBB	–	–	3/4	–	NON-FREEZE

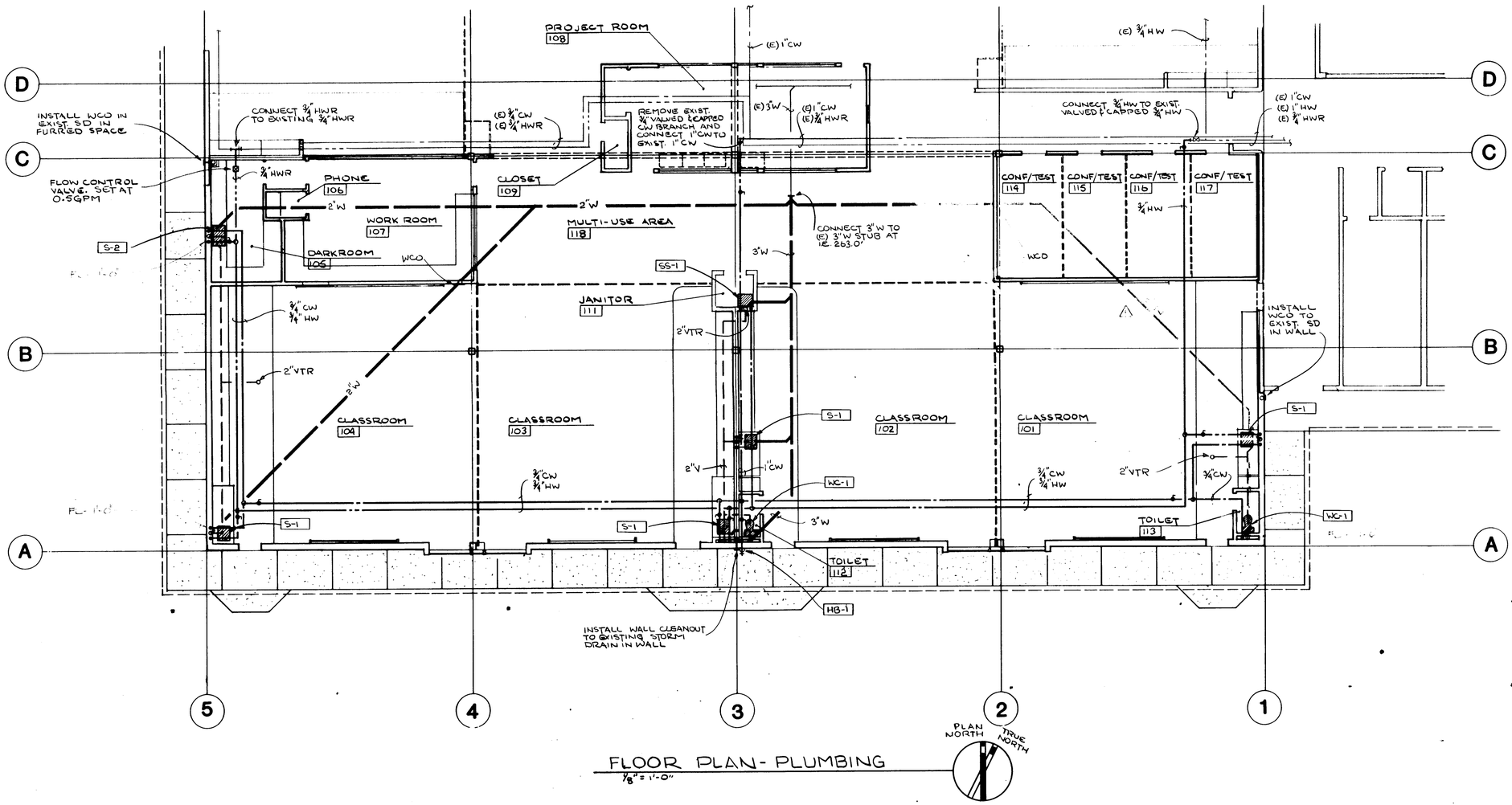
GENERAL NOTES

1. PIPE SIZES SHOWN ON CONNECTION SCHEDULES ARE INDIVIDUAL FIXTURE REQUIREMENTS. SIZE BRANCH WASTE & VENT PIPING ON ACCUMULATED FIXTURE WEIGHTS PER APPLICABLE PLUMBING CODE.
2. PLUMBING DRAWINGS ARE GENERALLY DIAGRAMMATIC. VERIFY FIXTURE LOCATIONS & MOUNTING HEIGHTS W/ARCHITECTURAL DRAWINGS. VERIFY ROUGH-IN REQUIREMENTS PRIOR TO INSTALLING ANY FIXTURE OR EQUIPMENT FURNISHED BY OWNER.
3. EXISTING UNDERGROUND PIPING LOCATIONS & FLOW LINES, GRADES, & DATUM ELEVATIONS ARE TAKEN FROM AVAILABLE RECORDS. CONTRACTOR TO VERIFY ALL CONDITIONS FOR CONNECTING TO EXISTING PIPING PRIOR TO CONSTRUCTION.

PLUMBING LEGEND

(E)W	EXISTING WASTE
(E)CW	EXISTING COLD WATER
(E)HW	EXISTING HOT WATER
(E)HWR	EXISTING HOT WATER RETURN
W	WASTE
V	VENT
CW	COLD WATER
HW	HOT WATER
HWR	HOT WATER RETURN
	POINT OF CONNECTION, NEW TO EXISTING
	BALL VALVE

(E) EXISTING
I.E. INVERT ELEVATION
SD STORM DRAIN
VTR VENT THROUGH ROOF
WCO WALL CLEAN OUT



FLOOR PLAN - PLUMBING

1/8" = 1'-0"

△ 3-16-12 CONTRACTOR ADDENDUM #2

Carson, Bekooy, Gulick & Associates, Inc.
Consulting Engineers
3220 S.W. First Avenue, Portland, Oregon 97201
(503) 227-4405

FLOOR PLAN - PLUMBING

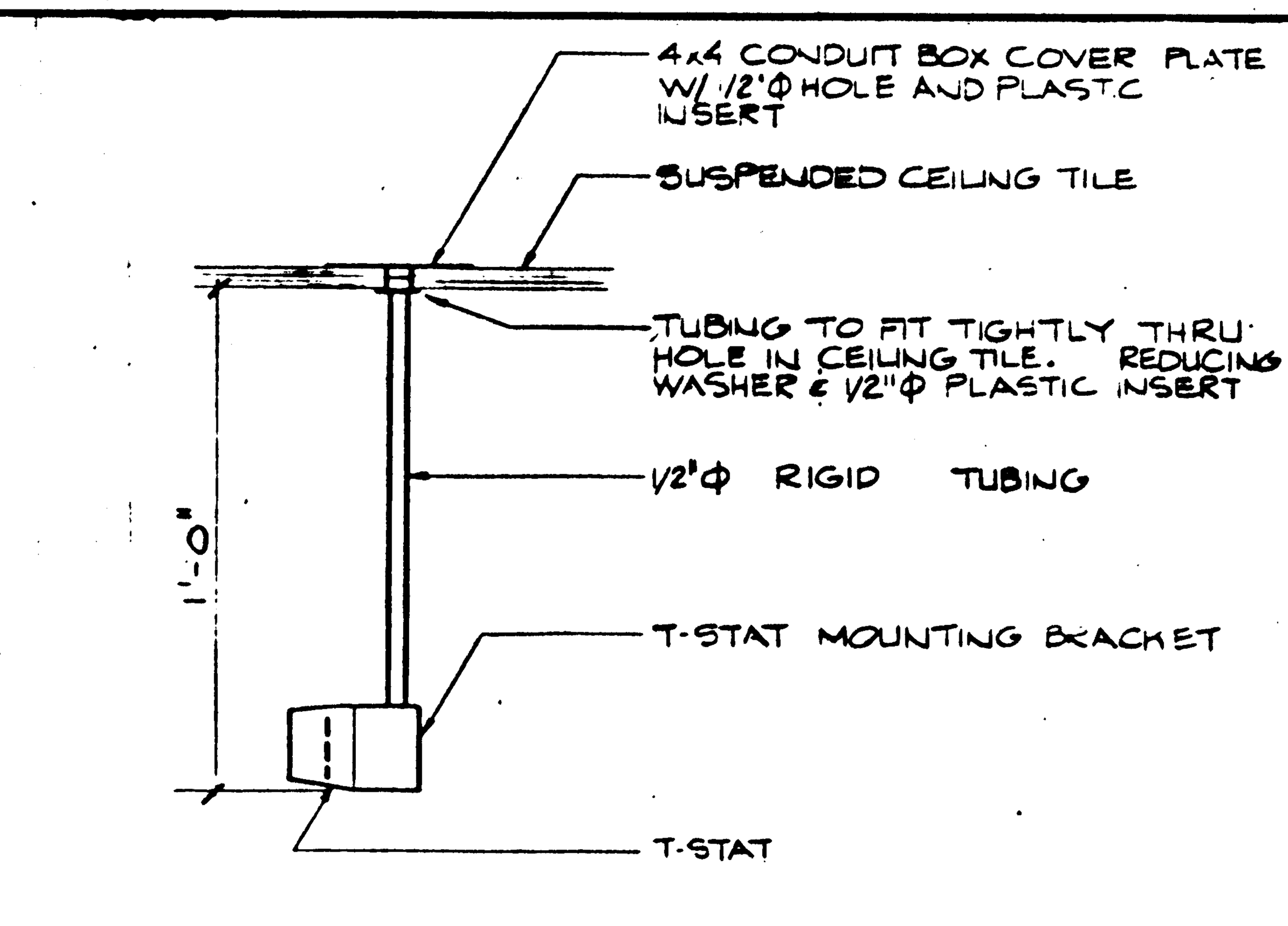
HITEON ELEMENTARY SCHOOL
• CLASSROOM ADDITION •

REGISTERED PROFESSIONAL ENGINEER OREGON JULY 25, 1975 TIMOTHY W. POUND 12276

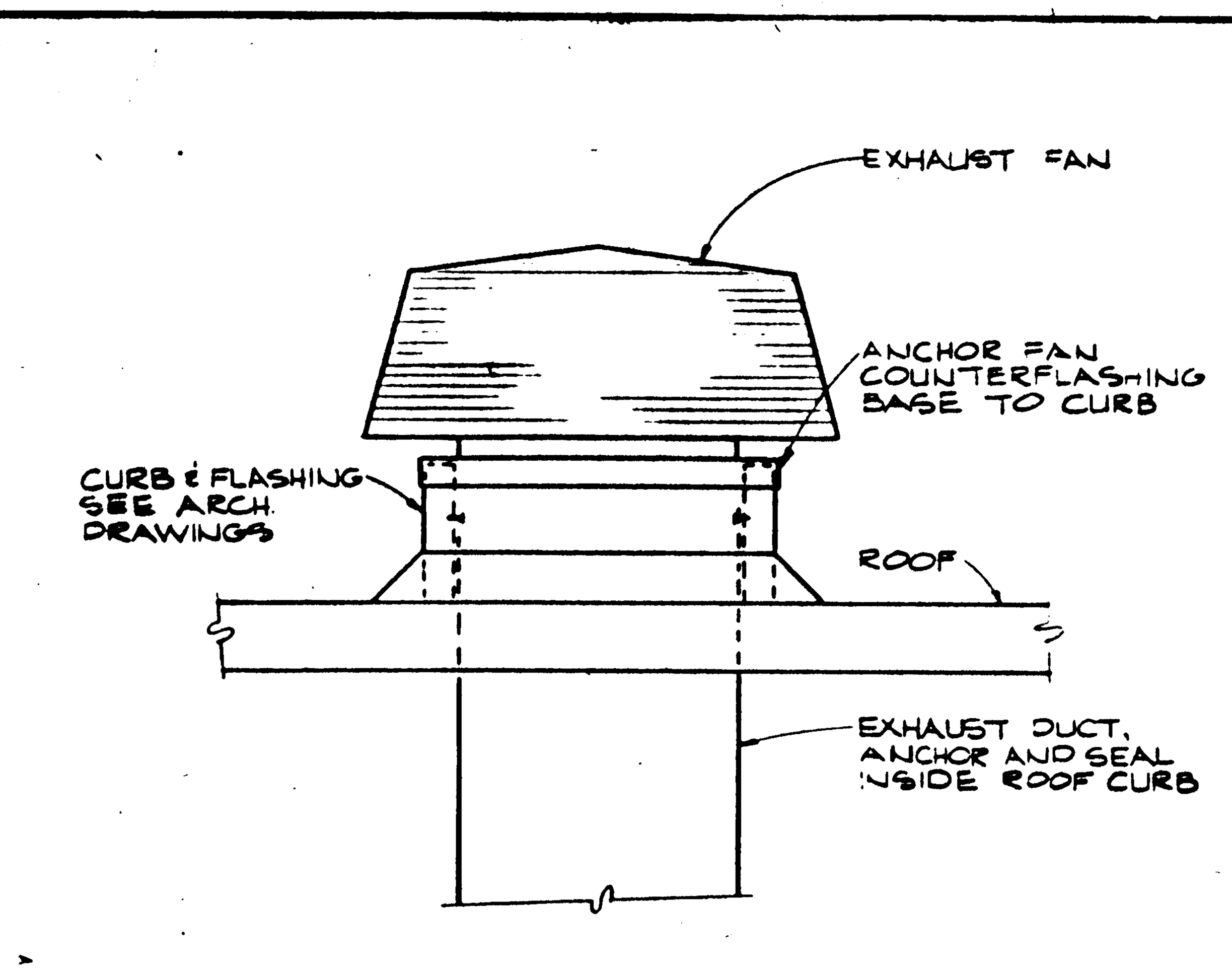
12 MAY 2012 date
revised 8-6-12 job no.

smith/dull partnership architects
20915 S.W. 105th AVENUE, TUALATIN, OREGON 97062 503/692-6065

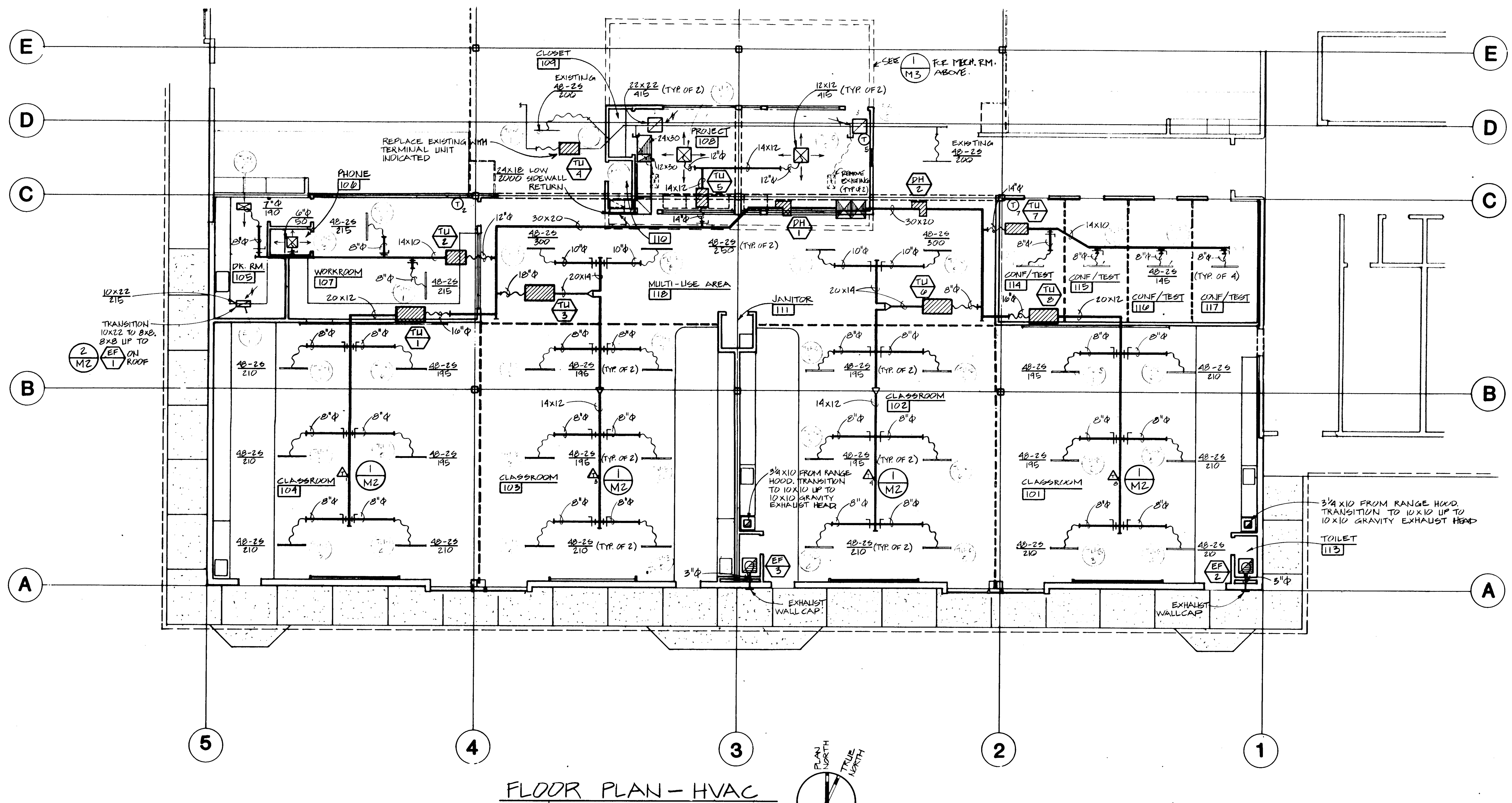
M1



1/M2 SUSPENDED THERMOSTAT
SCALE: NONE



2/M2 ROOF EXHAUST FAN
SCALE: NONE



FLOOR PLAN – HVAC
SCALE: 1/8"=1'-0"

NOTES: (X/Y) X = TERMINAL UNIT DESIGNATION, Y = OUTLET NUMBER

FLOOR PLAN – HVAC

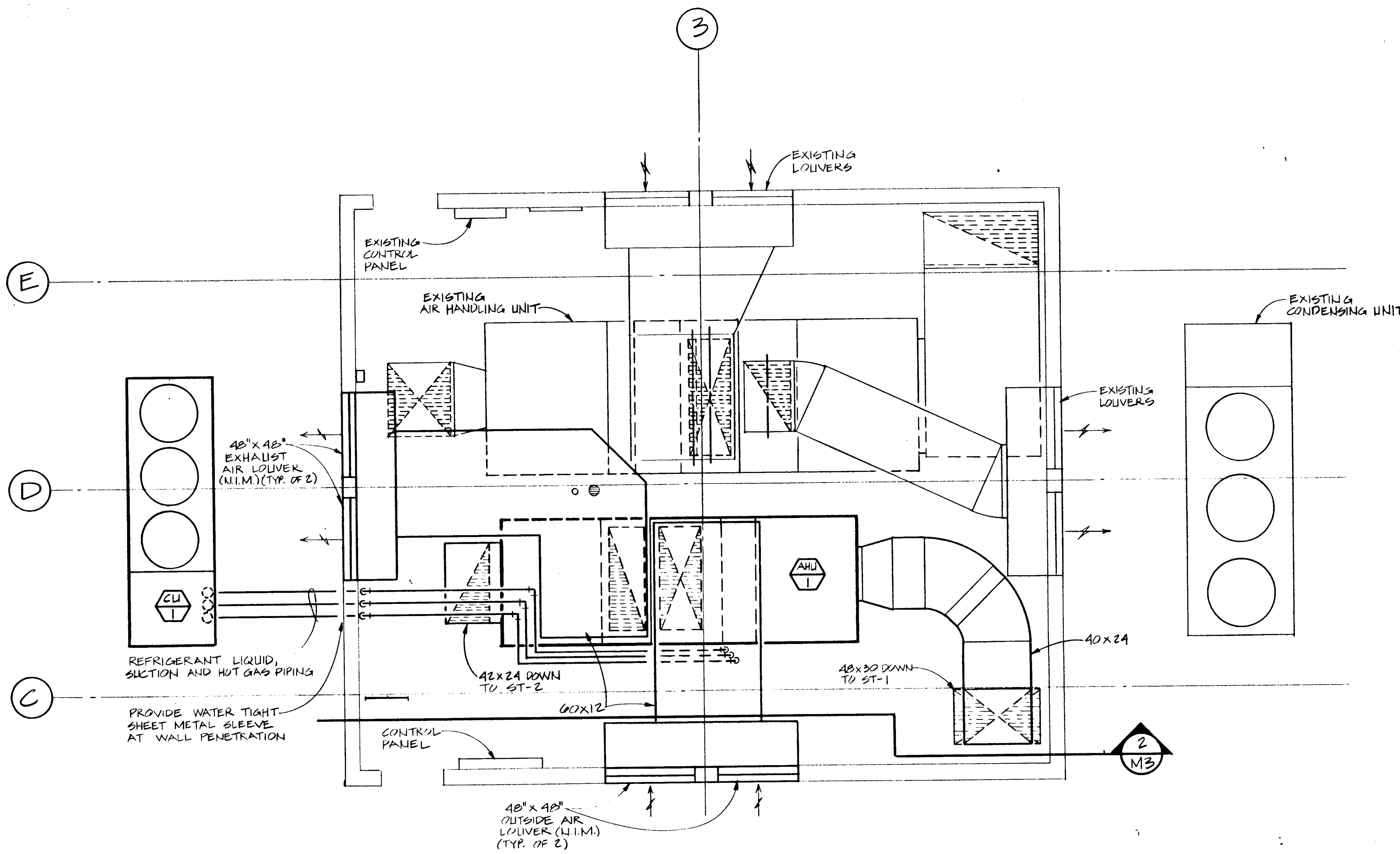
HITEON ELEMENTARY SCHOOL
• CLASSROOM ADDITION •

12 MAY 1986
date
revised
86-14-12
job no.

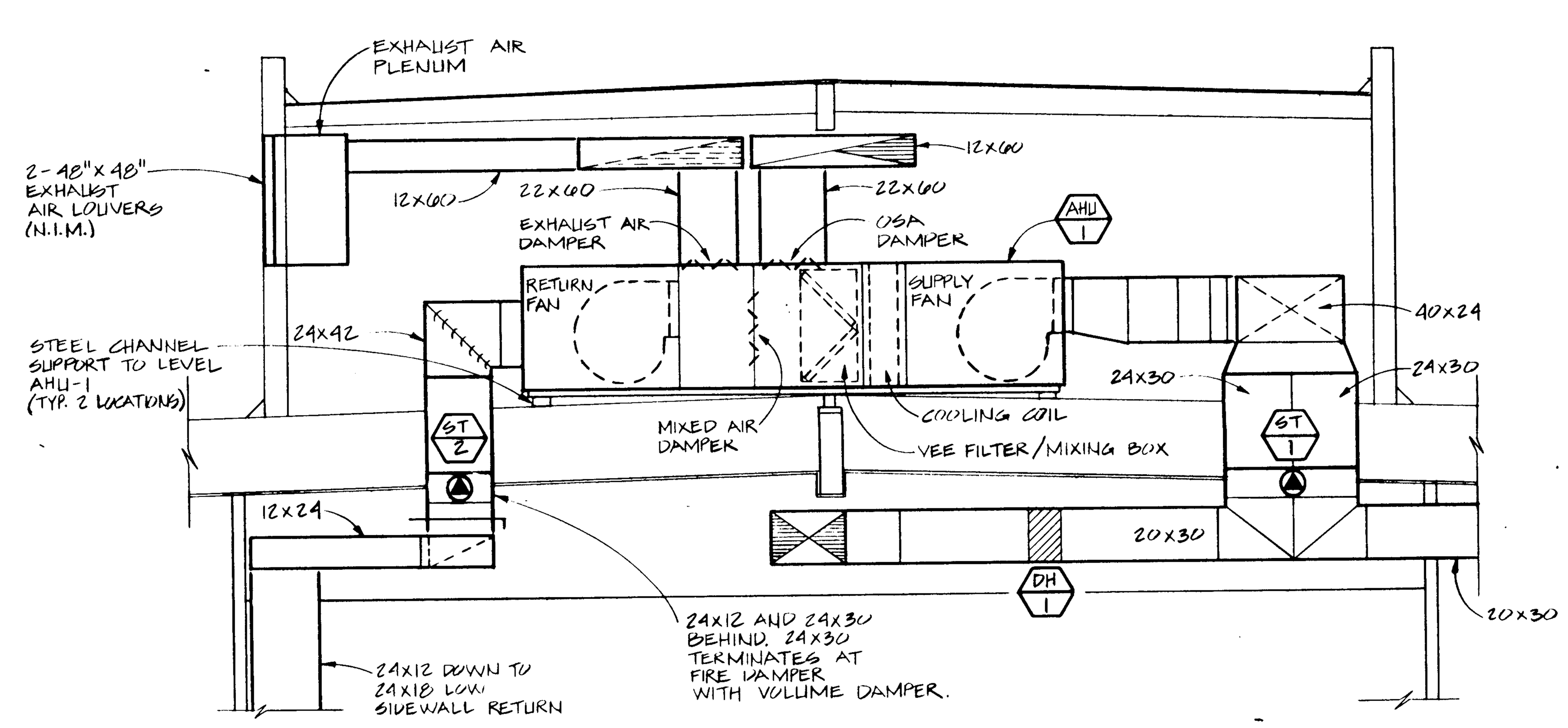
smith/bull partnership architects
20915 S.W. 105th AVENUE, TUALATIN, OREGON 97062
503/692-6065

Carson, Bekooy, Gulick & Associates, Inc.
Consulting Engineers
3220 S.W. First Avenue, Portland, Oregon 97201
(503) 227-4406

M2



1 M3 FLOOR PLAN – MECHANICAL ROOM
SCALE: 1/4"=1'-0"

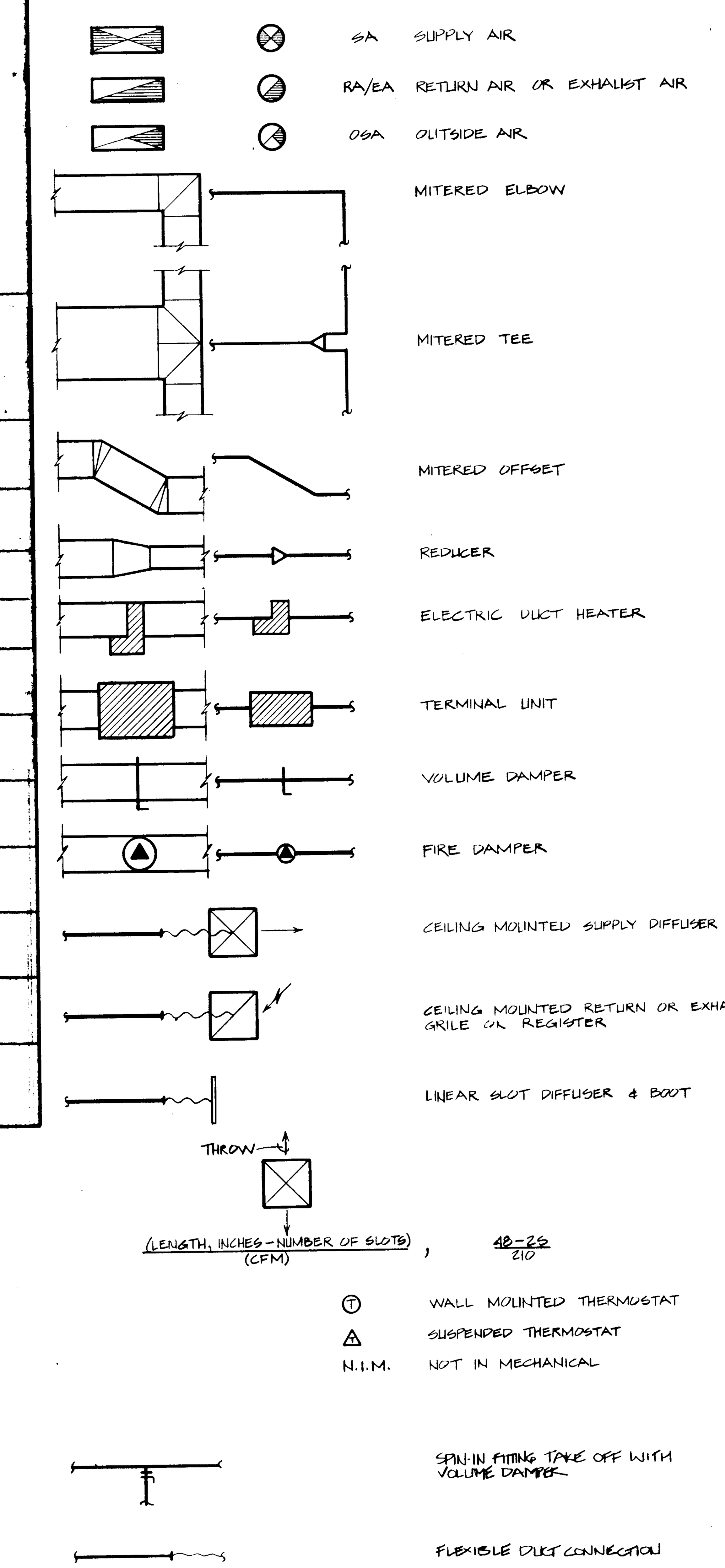


2 M3 SECTION – MECHANICAL ROOM
SCALE: 1/4"=1'-0"

EQUIPMENT SCHEDULE

MARK	DESCRIPTION
AHU 1	SUPPLY FAN: 8,030 CFM @ 2.25" STATIC PRESSURE, 1440 RPM, 20" DIAM. BACKWARD INCLINED AIR FOIL FAN WHEEL, 5 MOTOR H.P. RETURN FAN: 7,830 CFM @ .75" STATIC PRESSURE, 494 RPM, 20" DIAM. FORWARD CURVED FAN WHEEL, 3 MOTOR H.P. COOLING COIL: 8,030 CFM, 222 MBH TOTAL COOLING CAPACITY, 187 MBH SENSIBLE COOLING CAPACITY @ 76.2 DEGREE F. DB, 61.5 DEGREE F. WB EAT. 55 DEGREE F. DB, 52 DEGREE F. WB LAT. 40 DEGREE F. SAT SUC. TEMP. 4 ROW, 8 FPI. AIR PRESS. DROP = .55" S.P. COOLING COIL TO OPERATE IN CONJUNCTION WITH CU-1. FILTERS: 4 - 20" x 25", 8 - 20" x 20" FILTERS. TOTAL 36.1 SQ. FT. FACE AREA. (~~PRE-~~PURCHASED BY OWNER)
CU 1	AIR-COOLED-CONDENSING UNIT: MINIMUM 222 MBH COOLING CAPACITY @ 40 DEGREE F. SATURATED SUCTION TEMPERATURE AND 100 DEGREE F. CONDENSER ENTERING AIR TEMPERATURE. CU-1 TO OPERATE IN CONJUNCTION WITH AHU-1 COOLING COIL WITH TWO STAGE COOLING OPERATION.
EF 1	ROOF MOUNTED EXHAUST FAN: 210 CFM @ .375" ESP. 6 3/4" FORWARD CURVED FAN WHEEL, 1111 RPM, 1/4 MOTOR H.P.
EF 2,3	CEILING MOUNTED EXHAUST FAN: 70 CFM. BROAN 671. PROVIDE BROAN 640 WALL CAP.
DH 1	ELECTRIC DUCT HEATER: 15.0 KW, 30" x 20", FOUR STAGE.
DH 2	ELECTRIC DUCT HEATER: 12.5 KW, 30" x 20", FOUR STAGE.
ST 1	SOUND TRAP: 2 - 24" x 30" MODULES, 8030 CFM, 803 FPM, .15" STATIC PRESSURE DROP. IAC 3ES.
ST 2	SOUND TRAP: 1 - 42" x 24" MODULE, 1 - 42" x 12" MODULE, 7820 CFM, 745 FPM, .125" STATIC PRESSURE DROP. IAC 3ES.
TU 1,8	TERMINAL UNIT, VAV RELIEF TYPE: 1230 CFM, 1200 CFM MIN - 1800 CFM MAX, 14"O INLET.
TU 2	TERMINAL UNIT, VAV RELIEF TYPE: 620 CFM, 600 CFM MIN - 900 CFM MAX, 10"O INLET.
TU 3,6	TERMINAL UNIT, VAV RELIEF TYPE: 1750 CFM, 1600 CFM MIN - 2400 CFM MAX, 16"O INLET
TU 4,7	TERMINAL UNIT, VAV RELIEF TYPE: 580 CFM, 400 CFM MIN - 600 CFM MAX, 9"O INLET.
TU 5	TERMINAL UNIT, VAV RELIEF TYPE: 830 CFM, 800 CFM MIN - 1200 CFM MAX, 12"O INLET.

HVAC LEGEND



Carson, Bekooy, Gulick & Associates, Inc.
Consulting Engineers
3220 S.W. First Avenue, Portland, Oregon 97201
(503) 227-4405

MECHANICAL ROOM PLAN & SECTION SCHEDULE

HITEON ELEMENTARY SCHOOL

• CLASSROOM ADDITION •

REGISTERED PROFESSIONAL ENGINEER 12276 OREGON TIMOTHY W. YOUNG

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20915 S.W. 105th AVENUE, TUALATIN, OREGON 97062 503/692-6065

M3