

SMOKE AND COMBINATION FIRE/SMOKE DAMPER SCHEDULE								
MARK	LOCATION	FAN SYSTEM	SYSTEM AND/OR SERVICE	DUCT SIZE		DUCT PRESSURE CLASS		REMARKS
				IN	[mm]	IN	[Pa]	
FSD-1	G105	AHU-1	SUPPLY AIR	8	[200]	2	[14]	COMBINATION FIS
FSD-2	G105	N/A	TRANSFER DUCT	22x20	[559x508]	0.5	[4]	COMBINATION FIS
FSD-3	G114	AHU-1	SUPPLY AIR	16x14	[406x356]	1	[7]	COMBINATION FIS
FSD-4	G114	EF-1	GEN EXH	36x10	[914x254]	1	[7]	COMBINATION FIS
FSD-5	G205	AHU-1	SUPPLY AIR	8	[200]	2	[14]	COMBINATION FIS
FSD-6	G205	N/A	TRANSFER DUCT	22x20	[559x508]	0.5	[4]	COMBINATION FIS
FSD-7	G213	AHU-1	SUPPLY AIR	16x14	[406x356]	1	[7]	COMBINATION FIS
FSD-8	G213	EF-3	GEN EXH	36x10	[914x254]	1	[7]	COMBINATION FIS
NOTE:								
1. PROVIDE SMOKE DETECTOR WITHIN 5 FT OF DAMPER WITH NO AIR OUTLETS OR INLETS BETWEEN. PER CBC 716.3.2.1.								

HVAC DESIGN DATA							
DESIGN CONDITIONS	SUMMER					WINTER	
	TEMP		WET BULB TEMP		% HUMIDITY	TEMP	
	°F	[°C]	°F	[°C]		°F	[°C]
OUTDOOR DESIGN CONDITIONS	92.3	[34]	66.9	[19]	27	35.7	[2]
INDOOR AREA DESIGN CONDITIONS							
GENERAL SUPPORT AREAS	75	[24]	N/A		N/A	70	[21]
LABORATORY AREAS	75	[24]	N/A		N/A	70	[21]
TISSUE CULTURE AREAS	75	[24]	N/A		N/A	70	[21]

AIR SEPARATOR SCHEDULE											
MARK	LOCATION	SYSTEM AND/OR SERVICE	TYPE	AIR SEPARATOR						REMARKS	
				SIZE IN		FLOW		WPD			BUILT-IN STRAINER REQ'D
				IN	[mm]	GPM	[L/s]	FT	[kPa]		
AS-1	ROOF	HEATING WATER	TANGENTIAL	2.5	[63]	65	[4]	0.5	[2]	NO	
AS-2	ROOF	CHILLED WATER	TANGENTIAL	4	[100]	200	[13]	0.5	[2]	NO	
					[]		[]		[]		

FUME HOOD EXHAUST SCHEDULE (FOR REFERENCE ONLY)										
MARK	LOCATION	SYSTEM AND/OR SERVICE	HOOD TYPE	HOOD SIZE (WIDTH)		EXHAUST				REMARKS
						AIR FLOW		APD HOOD ONLY		
				IN	[mm]	CFM	[L/s]	IN WG	[Pa]	
HD-1	ROOM G105, G206	EF-SA, SB	FH-01	60	[1500]	1000	[470]	0.18	[45]	SEE DETAIL FOR HEPA FILTER
NOTE										
THE HOOD DATA (EXHAUST AIR VOLUME AND PRESSURE DROP) IS BASED ON A REPRESENTATIVE MAKE AND MODEL NUMBER. IN THE EVENT THE HOOD SELECTED AND FURNISHED BY THE CONTRACTOR HAS DIFFERENT HOOD DATA, THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING NECESSARY MODIFICATIONS TO THE DESIGN AND CONSTRUCTION WITHOUT ANY ADDITIONAL COST TO THE GOVERNMENT.										

BIOLOGICAL SAFETY CABINET EXHAUST SCHEDULE (FOR REFERENCE ONLY)										
MARK	LOCATION	SYSTEM AND/OR SERVICE	HOOD TYPE	HOOD SIZE (WIDTH)		EXHAUST				REMARKS
						AIR FLOW		APD HOOD ONLY		
				IN	[mm]	CFM	[L/s]	IN WG	[Pa]	
HD-2	ROOM G106, G206	EF-2, EF-4	CLASS II TYPE A2	48	[1200]	342	[160]	0.2	[50]	----
HD-3	ROOM G106, G104, G206, G204	EF-2, EF-4	CLASS II TYPE A2	66	[1700]	570	[270]	0.2	[50]	----
					[]		[]		[]	
					[]		[]		[]	
NOTE										
THE HOOD DATA (EXHAUST AIR VOLUME AND PRESSURE DROP) IS BASED ON A REPRESENTATIVE MAKE AND MODEL NUMBER. IN THE EVENT THE HOOD SELECTED AND FURNISHED BY THE CONTRACTOR HAS DIFFERENT HOOD DATA, THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING NECESSARY MODIFICATIONS TO THE DESIGN AND CONSTRUCTION WITHOUT ANY ADDITIONAL COST TO THE GOVERNMENT.										

PUMP SCHEDULE																						
MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	TYPE	FLUID	CIRCULATING FLUID										MIN % EFF	ELECTRICAL MOTOR					REMARKS
						FLOW		HEAD		NPSH REQUIRED		TEMPERATURE		SP GR	NOMINAL POWER		PHASE	VOLT	MAX RPM	SPEED CONTROL		
						GPM	[L/s]	FT	[kPa]	FT	[kPa]	°F	[°C]		HP						[kW]	
CHP-1	ROOF	ENTIRE BLDG	CHILLED WATER	END SUCTION	CHILLED WATER	200	[13]	60	[960]	6.7	[110]	56	[13]	1	74	7.5	[6]	3	460	1750	VARIABLE	
CHP-2	ROOF	ENTIRE BLDG	CHILLED WATER	END SUCTION	CHILLED WATER	200	[13]	60	[960]	6.7	[110]	56	[13]	1	74	7.5	[6]	3	460	1750	VARIABLE	
HWP-1	ROOF	ENTIRE BLDG	PRIMARY HEATING HOT WATER	END SUCTION	HEATING HOT WATER	65	[4]	10	[160]	5.2	[83]	160	[71]	1	55	0.5	[]	3	460	1750	VARIABLE	
HWP-2	ROOF	ENTIRE BLDG	PRIMARY HEATING HOT WATER	END SUCTION	HEATING HOT WATER	65	[4]	10	[160]	5.2	[83]	160	[71]	1	55	0.5	[]	3	460	1750	VARIABLE	
HWS-1	ROOF	ENTIRE BLDG	SECONDARY HEATING HOT WATER	END SUCTION	HEATING HOT WATER	65	[4]	30	[480]	4.8	[77]	160	[71]	1	61	1.5	[1]	3	460	1750	VARIABLE	
HWS-2	ROOF	ENTIRE BLDG	SECONDARY HEATING HOT WATER	END SUCTION	HEATING HOT WATER	65	[4]	30	[480]	4.8	[77]	160	[71]	1	61	1.5	[1]	3	460	1750	VARIABLE	
NOTES																						
PROVIDE ALL PUMPS WITH EMERGENCY POWER																						

EXPANSION TANK SCHEDULE																										
MARK	LOCATION	SYSTEM AND/OR SERVICE	TYPE	APPROX SYSTEM VOLUME		SYSTEM TEMPERATURE RANGE				INITIAL PRESSURE IN TANK		MAX OPERATING PRESSURE		FILL PRESSURE AT TANK				MIN VOLUME TANK		MIN BLADDER VOLUME		PIPE SIZE TO TANK		COLD WATER FILL SIZE		REMARKS
						MIN		MAX						RELIEF VALVE		AT TANK										
				GAL	[L]	°F	[°C]	°F	[°C]	PSIG	[kPa]	PSIG	[kPa]	PSIG	[kPa]	PSIG	[kPa]	GAL	[L]	GAL	[L]	IN	[mm]	IN	[mm]	
BT-1	ROOF	CHILLED WATER	BUFFER TANK	800	[260]	NA	[]	NA	[]	NA	[]	125	[860]	NA	[]	NA	[]	550	[2100]	NA	[]	4	[100]	NA	[]	
ET-1	ROOF	CHILLED WATER	BLADDER TANK	800	[3000]	NA	[4]	100	[38]	9.8	[68]	125	[860]	125	[860]	27.8	[190]	11	[42]	4.6	[17]	1	[25]	1.5	[38]	
ET-2	ROOF	HEATING HOT WATER	BLADDER TANK	250	[950]	50	[10]	200	[93]	9.8	[68]	125	[860]	125	[860]	72.8	[500]	12	[45]	8.7	[33]	1	[25]	1.5	[38]	
NOTES:																										
*SYSTEM VOLUME WITHOUT BUFFER TANK																										

AIR TERMINAL UNIT SIZING SCHEDULE																							
SIZE	MIN ALLOWABLE AIR FLOW		MAX ALLOWABLE AIR FLOW		DUCT INLET SIZE		MAX APD		MAXIMUM SOUND POWER LEVEL (Re -10 -12 WATTS) FOR BOX DISCHARGE AT MAXIMUM INLET DUCT STATIC					HOT WATER HEATING COIL							REMARKS		
	CFM	[L/s]	CFM	[L/s]	IN	[mm]	IN WG	[Pa]	OCTAVE BANDS					EAT		EWT	MAX WPD		PIPE RUNOUT SIZE TO COIL				
									2	3	4	5	6	7	°F	[°C]	°F	[°C]	FT	[kPa]		IN	[mm]
A	60	[28]	170	[80]	4	[100]	0.4	[100]	69	65	58	52	51	47	55	[13]	160	[71]	3	[9]	0.75	[19]	----
B	90	[42]	260	[120]	5	[130]	0.4	[100]	69	63	59	52	51	47	55	[13]	160	[71]	3	[9]	0.75	[19]	----
C	130	[61]	380	[180]	6	[150]	0.4	[100]	69	67	61	55	52	49	55	[13]	160	[71]	4	[12]	0.75	[19]	----
D	160	[76]	490	[230]	7	[180]	0.4	[100]	70	68	63	57	53	49	55	[13]	160	[71]	4	[12]	0.75	[19]	----
E	230	[110]	680	[320]	8	[200]	0.4	[100]	71	68	59	53	51	47	55	[13]	160	[71]	3	[9]	0.75	[19]	----
F	270	[130]	790	[370]	9	[230]	0.4	[100]	71	69	60	54	51	47	55	[13]	160	[71]	4	[12]	0.75	[19]	----
G	350	[170]	1050	[500]	10	[250]	0.4	[100]	74	68	61	57	54	52	55	[13]	160	[71]	4	[12]	0.75	[19]	----
H	500	[240]	1500	[710]	12	[300]	0.4	[100]	73	69	64	59	57	53	55	[13]	160	[71]	3	[9]	0.75	[19]	----
I	750	[350]	2250	[1100]	14	[350]	0.4	[100]	73	68	65	61	61	59	55	[13]	160	[71]	4	[12]	0.75	[19]	----
J	1000	[470]	3000	[1400]	16	[400]	0.4	[100]	73	68	66	60	58	55	55	[13]	160	[71]	4	[12]	1	[25]	----
NOTES																							
1. INLET STATIC BASED ON ARI 885-98.																							
2. THIS SCHEDULE IS USED WITH THE TERMINAL UNIT SCHEDULE.																							
3. CONTROL SEQUENCE SHALL BE AS INDICATED ON THE AIR TERMINAL UNIT SCHEDULE.																							
4. PROVIDE FIBERLESS SOUND ATTENUATION AFTER-SECTION AS REQUIRED TO MEET ROOM NC LEVEL.																							

AIR FLOW MEASURING DEVICE SCHEDULE								
MARK	SYSTEM AND/OR SERVICE	AIR FLOW				APD		REMARKS
		MIN		MAX		IN	[mm]	
		CFM	[L/s]	CFM	[L/s]			
AFMD-1	AHU-1	5750	[2700]	10730	[5100]	0.01	[]	NOTE 1, 2
	AHU-1	6310	[3000]	12960	[6100]	0.01	[]	NOTE 1, 2
AFMD-3	EF-1	2660	[1300]	7600	[3600]	0.01	[]	NOTE 1, 2
AFMD-4	EF-3	3650	[1700]	10300	[4900]	0.01	[]	NOTE 1, 2

NOTE

- SEE FLOOR PLANS FOR DUCT SIZE AND LOCATION.
- INSTALL PER MANUFACTURER'S RECOMMENDATION.

MARK	LOCATION	SYSTEM AND/OR SERVICE	TYPE	AIRFLOW		APD		INLET SIZE		LENGTH		DYNAMIC INSERTION LOSS DB OCTAVE BAND AND MID-FREQUENCY [CPS]								REMARKS
				CFM	[L/s]	IN WG	[Pa]	IN	[mm]	IN	[mm]	63	125	250	500	1000	2000	4000	8000	
												1	2	3	4	5	6	7	8	
SAD-1	ROOF SUPPLY DUCT	AHU-1	HIGH VELOCITY	26000	[12000]	0.09	[23]	54x42	[1372 x 1066]	60	[1500]	5	12	16	12	12	10	11	7	
NOTE																				
IN THE INLET SIZE COLUMN, WHEN ONE VALUE IS INDICATED, THE DUCT IS A ROUND DUCT. IF SIZE IS INDICATED AS ###" x ##," THE DUCT IS A RECTANGULAR DUCT WITH SPECIFICATIONS OF "DUCT WIDTH" BY "DUCT DEPTH."																				

		CONSULTANTS:				ARCHITECT/ENGINEERS:		Drawing Title		Project Title		Project Number		Office of Construction and Facilities Management	
		 <p>SYSKA HENNESSY GROUP A member company of SH Group, Inc.</p>		<p>Syska Hennessy Group, Inc. 425 California Street Suite 700 San Francisco, CA 94104 Tel: 415.288.9000 Fax: 415.835.0385 www.syska.com</p>		 <p>HILLIARD ARCHITECTS, INC <i>251 Post Street, Suite 620</i> <i>San Francisco, CA 94109-5017</i> <i>Tel 415 989 6400, Fax 415 989 3056</i> <i>www.HilliardArchitects.com</i></p>		<p>MECHANICAL SCHEDULES</p>		<p>GENOMICS CLINICAL RESEARCH CENTER, PALO ALTO</p>		<p>640-389</p>			
								Approved: Project Director		Location		Drawing Number			
										<p>VAPAHCS - PALO ALTO</p>		<p>M002</p>			
										<p>Date</p> <p>06/20/2014</p>		<p>Checked</p> <p>Checker</p>		<p>Drawn</p> <p>Author</p>	
Revisions:		Date										Dwg. of		 <p>Department of Veterans Affairs</p>	

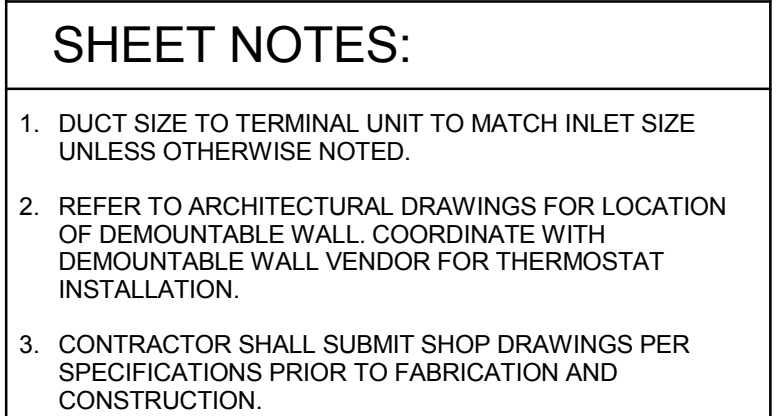
HOT WATER HEATING BOILER SCHEDULE																										
MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	TYPE	FLUID								% EFF	NATURAL GAS SUPPLY PRESSURE		FUEL	RELIEF VALVE SETTING		ELECTRICAL			REMARKS				
					FLOW		EWT		LWT		WPD			OUTPUT GENERATED			MAX HEAT INPUT		PSIG	[kPa]	AMPS FLA		PHASE	VOLT		
					GPM	[LPS]	*F	[°C]	*F	[°C]	FT	[kPa]		MBH	[kW]		MBH	[kW]								
B-1	ROOF	ENTIRE BLDG	BUILDING HOT WATER	CONDENSING	50	[3]	120	[49]	160	[71]	9	[27]	942	[280]	1000	[290]	94	7	[1800]	NG	75	[520]	12	1	120	NOTE 1, 2
B-2	ROOF	ENTIRE BLDG	BUILDING HOT WATER	CONDENSING	50	[3]	120	[49]	160	[71]	9	[27]	942	[280]	1000	[290]	94	7	[1800]	NG	75	[520]	12	1	120	NOTE 1, 2
NOTES																										
PROVIDE ALL BOILERS WITH EMERGENCY POWER																										
1. OPERATING WEIGHT, 700 LBS																										
2. PROVIDE WITH MANUFACTURER RECOMMENDED COMBUSTION AIR INTAKE KIT AND VENTING KIT																										

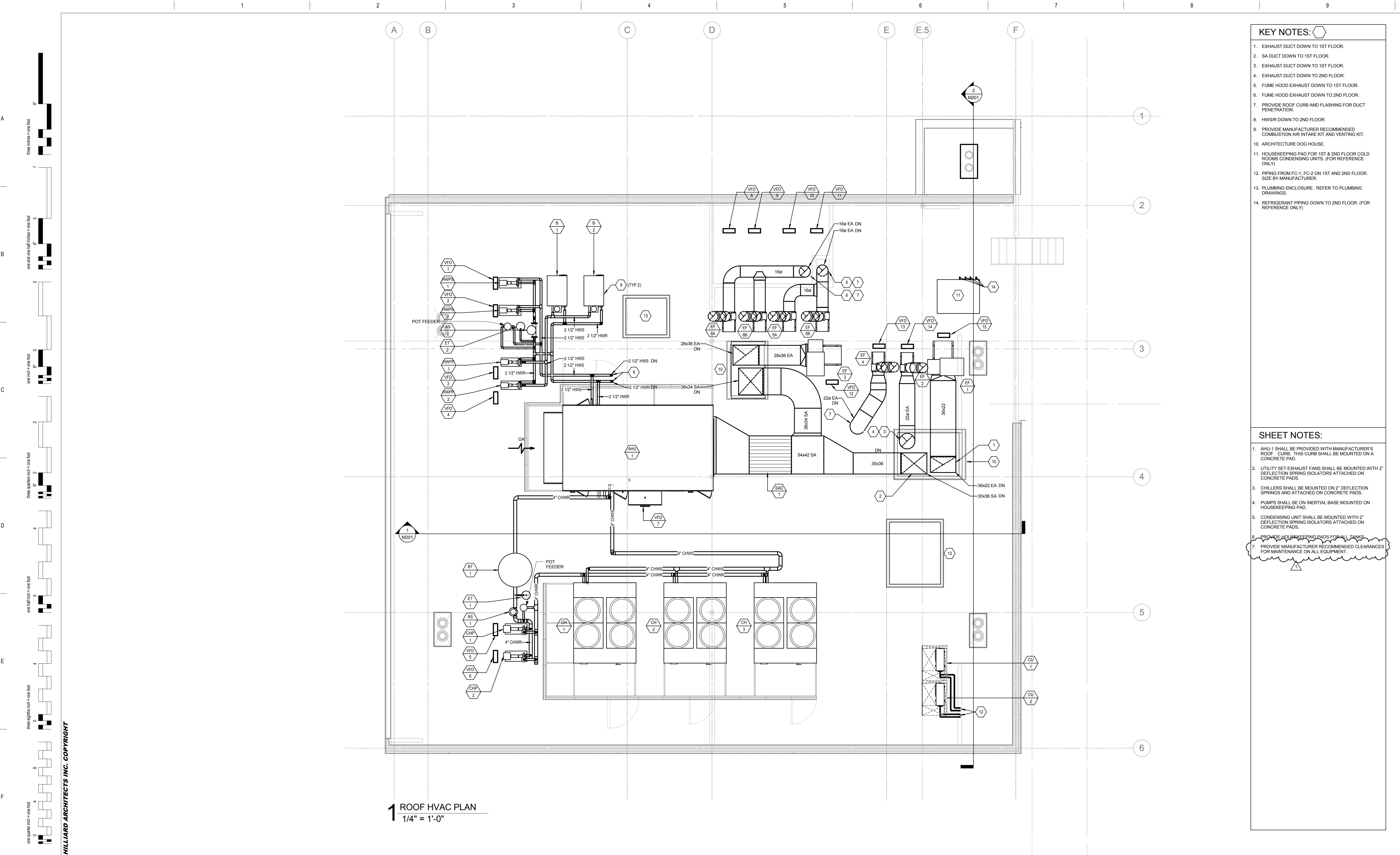
SPLIT SYSTEM OUTDOOR AIR COOLED CONDENSING UNIT SCHEDULE										
TAG	SERVICE	LOCATION	DESIGN AMBIENT AIR TEMP	ELECTRICAL CONNECTION			SEER	OPERATING WEIGHT LBS.	FACTORY CHARGED REFRIGERANT	REMARKS
				MCA	MOCP	V/HZ/PH				
CU-1	FC-1	ROOF	87	25	30	208/60/1	14	175	R410A	1, 2, 3
CU-2	FC-2	ROOF	87	25	30	208/60/1	14	175	R410A	1, 2, 3
NOTES:										
1. PROVIDE CONDENSING UNIT WITH LOW AMBIENT CONTROLS FOR OPERATION AT 20 DEGREE F AMBIENT TEMPERATURE.										
2. UNIT DISCONNECT BY ELECTRICAL DIV. 26.										
3. MOUNT CONDENSING UNIT ON SLEEPERS ON ROOF.										

SPLIT SYSTEM INDOOR FAN COIL UNIT SCHEDULE															
UNIT TAG	MODEL	SERVICE	ASSOCIATED CONDENSING UNIT ON ROOF	LOCATION	SUPPLY AIR	MIN. OUTSIDE AIR	EVAPORATOR ENTERING AIR TEMPERATURES		COOLING CAPACITY	HEATING CAPACITY	ELECTRICAL			OPERATING WEIGHT (LBS)	REMARKS
					CFM	CFM	DBT (°F)	WBT (°F)	TOTAL (MBH)	TOTAL (MBH)	MCA (AMP)	MOCP (AMP)	SERVICE V/HZ/PH		
FC-1	HIGH WALL MOUNTED	TELECOM ROOM	CU-1	ROOM G112	920	NA	95	71	36.0	NA	1.00	--	208 / 60 / 1	50	1, 2, 3, 4, 5, 6, 7
FC-2	HIGH WALL MOUNTED	TELECOM ROOM	CU-2	ROOM G212	920	NA	95	71	36.0	NA	1.00	--	208 / 60 / 1	50	1, 2, 3, 4, 5, 6, 7
NOTES:															
1. INSTALL FAN COIL AS RECOMMENDED BY THE UNIT MANUFACTURER. SEE MECHANICAL DETAILS FOR MOUNTING.															
2. PROVIDE UNIT WITH MANUFACTURER SUPPLIED CONDENSATE WATER PUMP.															
3. PROVIDE MFR SUPPLIED, WALL MOUNTED WIRED THERMOSTAT.															
4. INDOOR FAN COIL UNIT IS POWERED FROM OUTDOOR CONDENSING UNIT USING A-CONTROL. COORDINATE WITH DIV. 26 TO PROVIDE CONDUIT AND WIRING ACCORDINGLY.															
5. PROVIDE UNIT WITH FACTORY SUPPLIED REFRIGERANT LINE SETS OF REQUIRED LENGTH.															
6. COOLING ONLY UNIT. PROVIDE UNIT WITH BACNET COMMUNICATION INTERFACE MODULE TO CONNECT TO THE BUILDING BMS TO MONITOR SPACE TEMPERATURE.															
7. PROVIDE ON EMERGENCY POWER.															

AIR DEVICE SCHEDULE (EXHAUST)																
MARK	TYPE	AIR FLOW				MAX APD		MOUNTING	PANEL/FRAME SIZE		NECK SIZE		NC	DAMPER	FINISH	REMARKS
		MIN		MAX		IN WG	[Pa]		IN x IN	[mm x mm]	IN x IN	[mm x mm]				
		CFM	[L/s]	CFM	[L/s]											
EG-21	PERFORATED	60	[28]	100	[47]	0.088	22.000	CEILING	24 x 24	[600 x 600]	6 DIAM	[152 DIAM]	13	NONE	WHITE	
EG-22	PERFORATED	110	[52]	170	[80]	0.088	22.000	CEILING	24 x 24	[600 x 600]	8 DIAM	[203 DIAM]	13	NONE	WHITE	
EG-23	PERFORATED	170	[80]	250	[120]	0.088	22.000	CEILING	24 x 24	[600 x 600]	10 DIAM	[254 DIAM]	14	NONE	WHITE	
EG-24	PERFORATED	240	[110]	400	[190]	0.088	22.000	CEILING	24 x 24	[600 x 600]	12 DIAM	[305 DIAM]	12	NONE	WHITE	
EG-25	PERFORATED	320	[150]	500	[240]	0.087	22.000	CEILING	24 x 24	[600 x 600]	14 DIAM	[356 DIAM]	14	NONE	WHITE	
EG-26	PERFORATED	420	[200]	700	[330]	0.087	22.000	CEILING	24 x 24	[600 x 600]	16 DIAM	[406 DIAM]	16	NONE	WHITE	
ER-51	RETURN REGISTER	130	[61]	210	[99]	0.078	20.000	WALL	10 x 10	[254 x 254]	8 x 8	[203 x 203]	13	OBD	WHITE	
ER-52	RETURN REGISTER	200	[94]	330	[160]	0.078	20.000	WALL	12 x 12	[305 x 305]	10 x 10	[254 x 254]	15	OBD	WHITE	
ER-53	RETURN REGISTER	270	[130]	440	[210]	0.078	20.000	WALL	14 x 14	[356 x 356]	12 x 12	[305 x 305]	17	OBD	WHITE	
ER-54	RETURN REGISTER	250	[120]	610	[290]	0.082	21.000	WALL	16 x 16	[406 x 406]	14 x 14	[356 x 356]	18	OBD	WHITE	
ER-55	RETURN REGISTER	320	[150]	810	[380]	0.082	21.000	WALL	18 x 18	[457 x 457]	16 x 16	[406 x 406]	19	OBD	WHITE	
ER-56	RETURN REGISTER	90	[42]	160	[76]	0.078	20.000	WALL	10 x 8	[254 x 203]	8 x 6	[203 x 152]	12	OBD	WHITE	
ER-57	RETURN REGISTER	140	[66]	240	[110]	0.078	20.000	WALL	14 x 8	[356 x 203]	12 x 6	[305 x 152]	14	OBD	WHITE	
ER-58	RETURN REGISTER	210	[99]	350	[170]	0.078	20.000	WALL	20 x 8	[508 x 203]	18 x 6	[457 x 152]	16	OBD	WHITE	
ER-59	RETURN REGISTER	190	[90]	320	[150]	0.078	20.000	WALL	14 x 10	[356 x 254]	12 x 8	[305 x 203]	15	OBD	WHITE	
ER-510	RETURN REGISTER	220	[100]	360	[170]	0.078	20.000	WALL	14 x 12	[356 x 305]	12 x 10	[305 x 254]	16	OBD	WHITE	
ER-511	RETURN REGISTER	330	[160]	560	[260]	0.078	20.000	WALL	20 x 12	[508 x 305]	18 x 10	[457 x 254]	17	OBD	WHITE	
ER-512	RETURN REGISTER	360	[170]	850	[400]	0.082	21.000	WALL	26 x 14	[660 x 356]	24 x 12	[600 x 305]	20	OBD	WHITE	
ER-513	RETURN REGISTER	460	[220]	1260	[590]	0.095	24.000	WALL	32 x 14	[813 x 356]	30 x 12	[762 x 305]	24	OBD	WHITE	
NOTE																
PROVIDE SQUARE TO ROUND ADAPTER.																

AIR DEVICE SCHEDULE (SUPPLY)																
MARK	TYPE	AIR FLOW				MAX APD		MOUNTING	PANEL/FRAME SIZE		NECK SIZE		NC	DAMPER	FINISH	REMARKS
		MIN		MAX					IN x IN	[mm x mm]	IN	[mm]				
		CFM	[L/s]	CFM	[L/s]	IN WG	[Pa]									
SD-11	LOUVERED FACE	40	[19]	160	[76]	0.080	[20]	CEILING	24 x 24	[600 x 600]	6 ø	[152 ø]	19	NONE	WHITE	
SD-12	LOUVERED FACE	70	[33]	280	[130]	0.100	[25]	CEILING	24 x 24	[600 x 600]	8 ø	[203 ø]	23	NONE	WHITE	
SD-13	LOUVERED FACE	110	[52]	380	[180]	0.090	[23]	CEILING	24 x 24	[600 x 600]	10 ø	[254 ø]	22	NONE	WHITE	
SD-14	LOUVERED FACE	160	[76]	470	[220]	0.080	[20]	CEILING	24 x 24	[600 x 600]	12 ø	[305 ø]	19	NONE	WHITE	
SD-15	LOUVERED FACE	220	[100]	640	[300]	0.090	[23]	CEILING	24 x 24	[600 x 600]	14 ø	[356 ø]	21	NONE	WHITE	
SD-16	LOUVERED FACE	250	[120]	740	[350]	0.100	[25]	CEILING	24 x 24	[600 x 600]	16 ø	[406 ø]	22	NONE	WHITE	
SD-51	SUPPLY REGISTER	80	[38]	120	[57]	0.100	[25]	WALL	8 x 8	[203 x 203]	6 x 6	[152 x 152]	25	OBD	WHITE	
SD-52	SUPPLY REGISTER	80	[38]	160	[76]	0.090	[23]	WALL	12 x 8	[305 x 203]	10 x 6	[254 x 152]	25	OBD	WHITE	
SD-53	SUPPLY REGISTER	130	[61]	350	[170]	0.080	[20]	WALL	14 x 10	[356 x 254]	12 x 8	[305 x 203]	26	OBD	WHITE	
SD-54	SUPPLY REGISTER	200	[94]	500	[240]	0.100	[25]	WALL	14 x 12	[356 x 305]	12 x 10	[305 x 254]	26	OBD	WHITE	
SD-55	SUPPLY REGISTER	400	[190]	700	[330]	0.080	[20]	WALL	18 x 12	[508 x 305]	18 x 10	[457 x 254]	26	OBD	WHITE	
SD-56	SUPPLY REGISTER	360	[170]	700	[330]	0.070	[18]	WALL	18 x 18	[457 x 457]	16 x 16	[406 x 406]	27	OBD	WHITE	
SD-57	SUPPLY REGISTER	560	[260]	1100	[520]	0.070	[18]	WALL	22 x 22	[560 x 560]	20 x 20	[508 x 508]	28	OBD	WHITE	
SD-58	SUPPLY REGISTER	1250	[590]	3000	[1400]	0.100	[25]	WALL	32 x 32	[813 x 813]	30 x 30	[762 x 762]	36	OBD	WHITE	
NOTES																
1. SEE FLOOR PLAN FOR THROW PATTERN.																
2. SEE DETAIL FOR DAMPER IN BRANCH DUCT SERVING EACH DIFFUSER.																
3. PROVIDE SQUARE TO ROUND ADAPTER.																





1 ROOF HVAC PLAN
1/4" = 1'-0"

KEY NOTES:

1. EXHAUST DUCT DOWN TO 1ST FLOOR.
2. SA DUCT DOWN TO 1ST FLOOR.
3. EXHAUST DUCT DOWN TO 1ST FLOOR.
4. EXHAUST DUCT DOWN TO 2ND FLOOR.
5. FUME HOOD EXHAUST DOWN TO 1ST FLOOR.
6. FUME HOOD EXHAUST DOWN TO 2ND FLOOR.
7. PROVIDE ROOF CURB AND FLASHING FOR DUCT PENETRATION.
8. HWS/R DOWN TO 2ND FLOOR.
9. PROVIDE MANUFACTURER RECOMMENDED COMBUSTION AIR INTAKE KIT AND VENTING KIT.
10. ARCHITECTURE DOG HOUSE.
11. HOUSEKEEPING PAD FOR 1ST & 2ND FLOOR COLD ROOMS CONDENSING UNITS. (FOR REFERENCE ONLY)
12. PIPING FROM FC-1, FC-2 ON 1ST AND 2ND FLOOR. SIZE BY MANUFACTURER.
13. PLUMBING ENCLOSURE. REFER TO PLUMBING DRAWINGS.
14. REFRIGERANT PIPING DOWN TO 2ND FLOOR. (FOR REFERENCE ONLY)

SHEET NOTES:

1. AHU-1 SHALL BE PROVIDED WITH MANUFACTURER'S ROOF CURB. THIS CURB SHALL BE MOUNTED ON A CONCRETE PAD.
2. UTILITY SET EXHAUST FANS SHALL BE MOUNTED WITH 2" DEFLECTION SPRING ISOLATORS ATTACHED ON CONCRETE PADS.
3. CHILLERS SHALL BE MOUNTED ON 2" DEFLECTION SPRING ISOLATORS ATTACHED ON CONCRETE PADS.
4. PUMPS SHALL BE ON INERTIAL BASE MOUNTED ON HOUSEKEEPING PAD.
5. CONDENSING UNIT SHALL BE MOUNTED WITH 2" DEFLECTION SPRING ISOLATORS ATTACHED ON CONCRETE PADS.
6. PROVIDE HOUSEKEEPING PADS FOR ALL TANKS.
7. PROVIDE MANUFACTURER RECOMMENDED CLEARANCES FOR MAINTENANCE ON ALL EQUIPMENT.

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AMENDMENT NO. 1	7/18/14
Revisions:	Date

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Drawing Title

MECHANICAL ROOF PLAN

Approved: Project Director

Project Title

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Location

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Date

06/20/2014

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Drawn

Author

Project Number

640-389

Building Number

51

Drawing Number

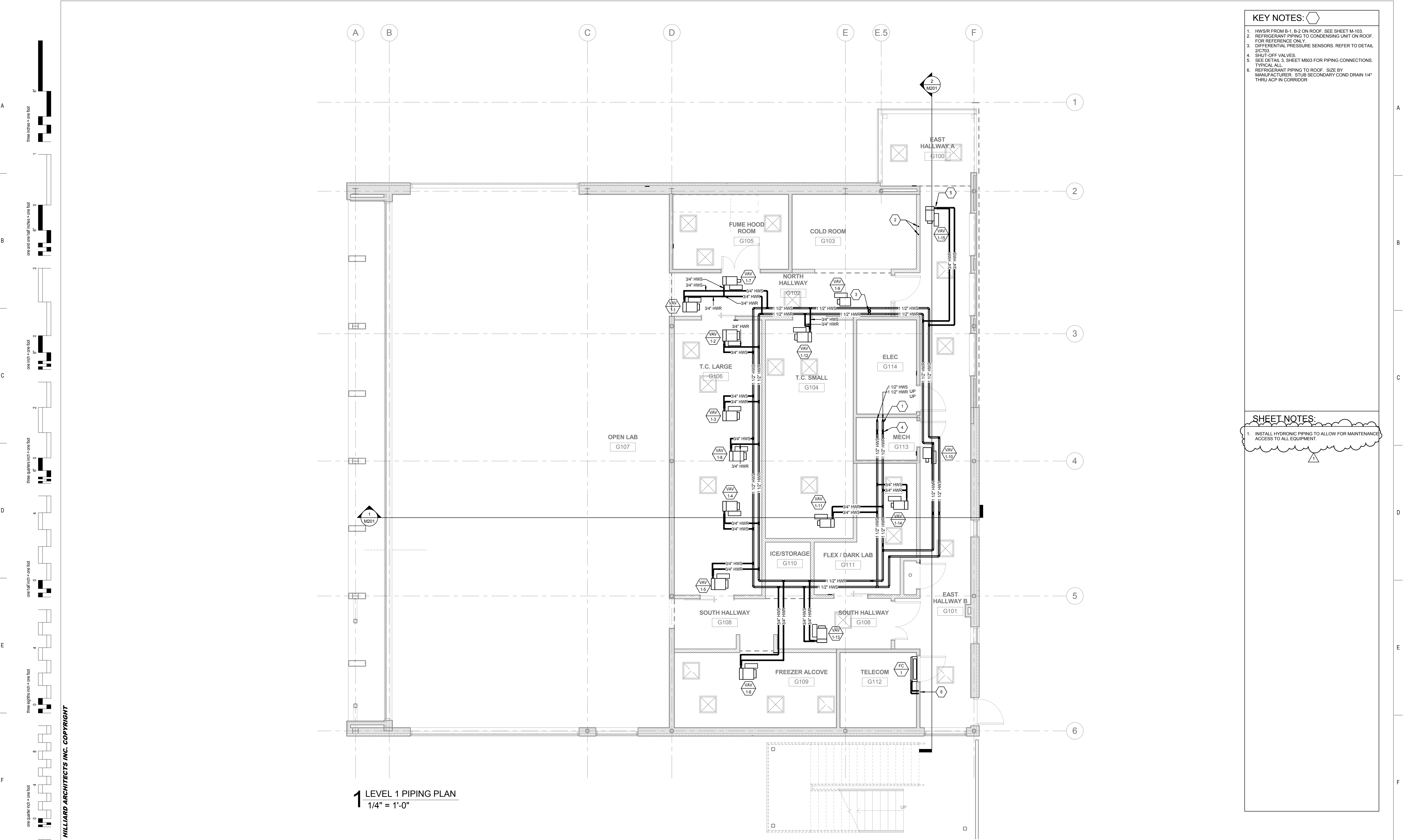
M103

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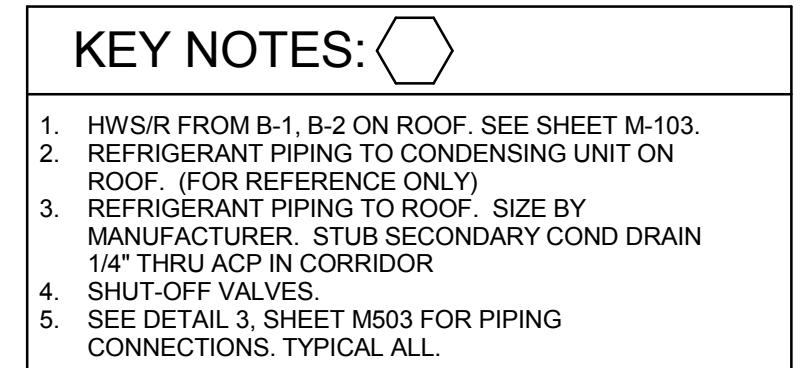
- KEY NOTES:**
1. HWS/R FROM B-1, B-2 ON ROOF. SEE SHEET M-103.
 2. REFRIGERANT PIPING TO CONDENSING UNIT ON ROOF. FOR REFERENCE ONLY.
 3. DIFFERENTIAL PRESSURE SENSORS. REFER TO DETAIL 2/C703.
 4. SHUT-OFF VALVES.
 5. SEE DETAIL 3, SHEET M503 FOR PIPING CONNECTIONS. TYPICAL ALL.
 6. REFRIGERANT PIPING TO ROOF. SIZE BY MANUFACTURER. STUB SECONDARY COND DRAIN 1/4\"/>

- SHEET NOTES:**
1. INSTALL HYDRONIC PIPING TO ALLOW FOR MAINTENANCE ACCESS TO ALL EQUIPMENT.

1 LEVEL 1 PIPING PLAN
1/4" = 1'-0"

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SHEET NOTES:

1. INSTALL HYDRONIC PIPING TO ALLOW FOR MAINTENANCE ACCESS TO ALL EQUIPMENT.


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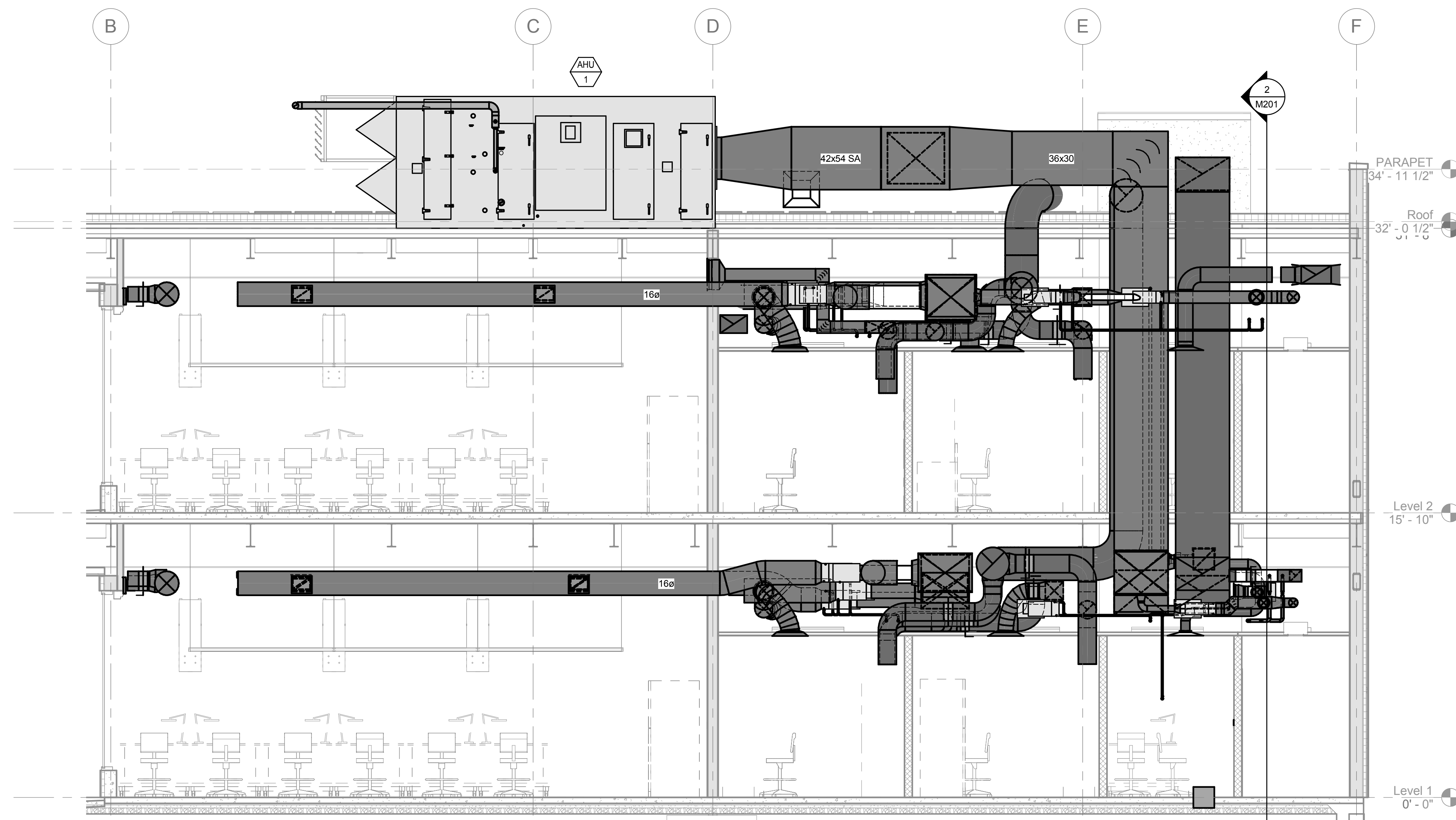
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 <p>SYSKA HENNESSY GROUP</p> <p>A member company of SH Group, Inc.</p>	<p>Syska & Hennessy Group, Inc. 425 California Street Suite 700 San Francisco, CA 94104 Tel: 415.288.9090 Fax: 415.385.0385 www.syska.com</p>

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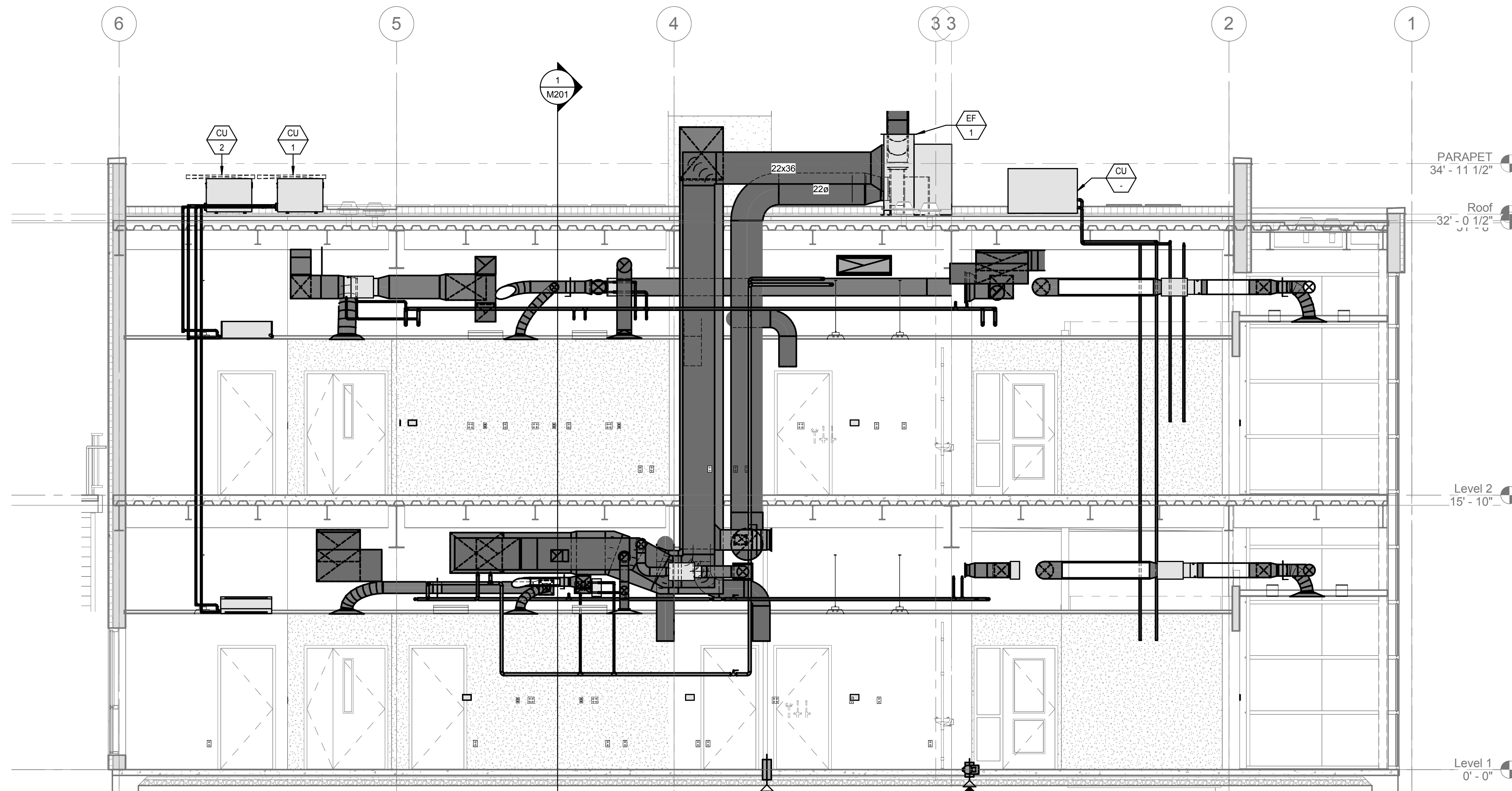
**MECHANICAL PIPING 2ND
FLOOR PLAN**

Approved: Project Director

Project Title		Project Number		<div>Office of Construction and Facilities Management</div> <div>  <div>Department of Veterans Affairs</div> </div>
GENOMICS CLINICAL RESEARCH CENTER, PALO ALTO		640-389		
Location		Building Number		
VAPAHC5 - PALO ALTO		51		
Date		Drawing Number		
06/20/2014	Checked	MP102		
Checker	Author	Dwg. of		



1 SECTION VIEW FACING NORTH
1/4" = 1'-0"



2 SECTION VIEW FACING WEST
1/4" = 1'-0"

KEY NOTES:

SHEET NOTES:

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Drawing Title

MECHANICAL SECTIONS

Approved: Project Director

Project Title
**GENOMICS CLINICAL
RESEARCH CENTER,
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Location
VAPAHCS - PALO ALTO

Date
06/20/2014

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Project Number
640-389

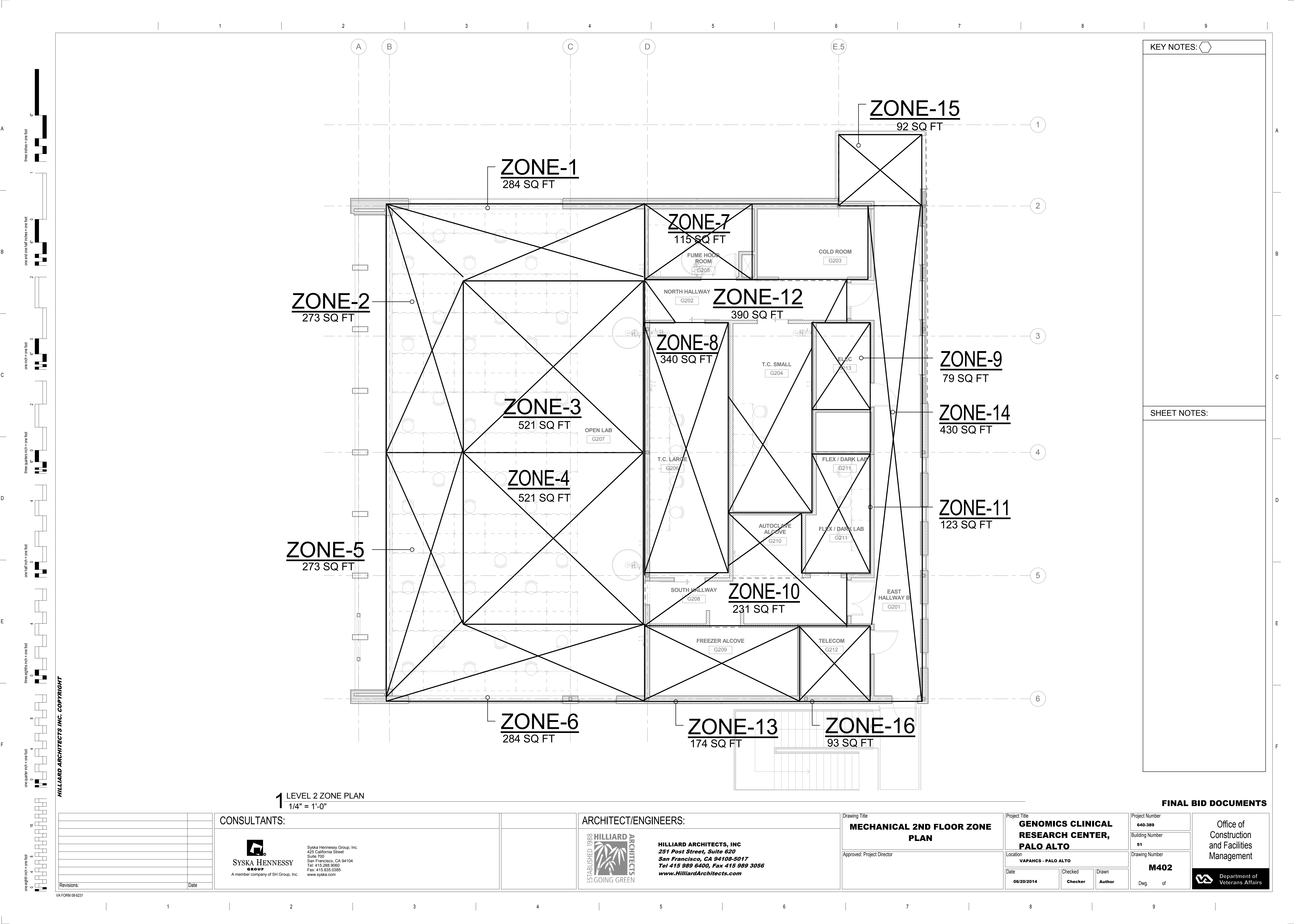
Building Number
51

Drawing Number
M201

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KEY NOTES:

SHEET NOTES:

1 LEVEL 2 ZONE PLAN
1/4" = 1'-0"

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Drawing Title
**MECHANICAL 2ND FLOOR ZONE
PLAN**

Approved: Project Director

Project Title
**GENOMICS CLINICAL
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PALO ALTO**

Location
VAPAHCS - PALO ALTO

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06/20/2014

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640-389
Building Number
51

Drawing Number
M402
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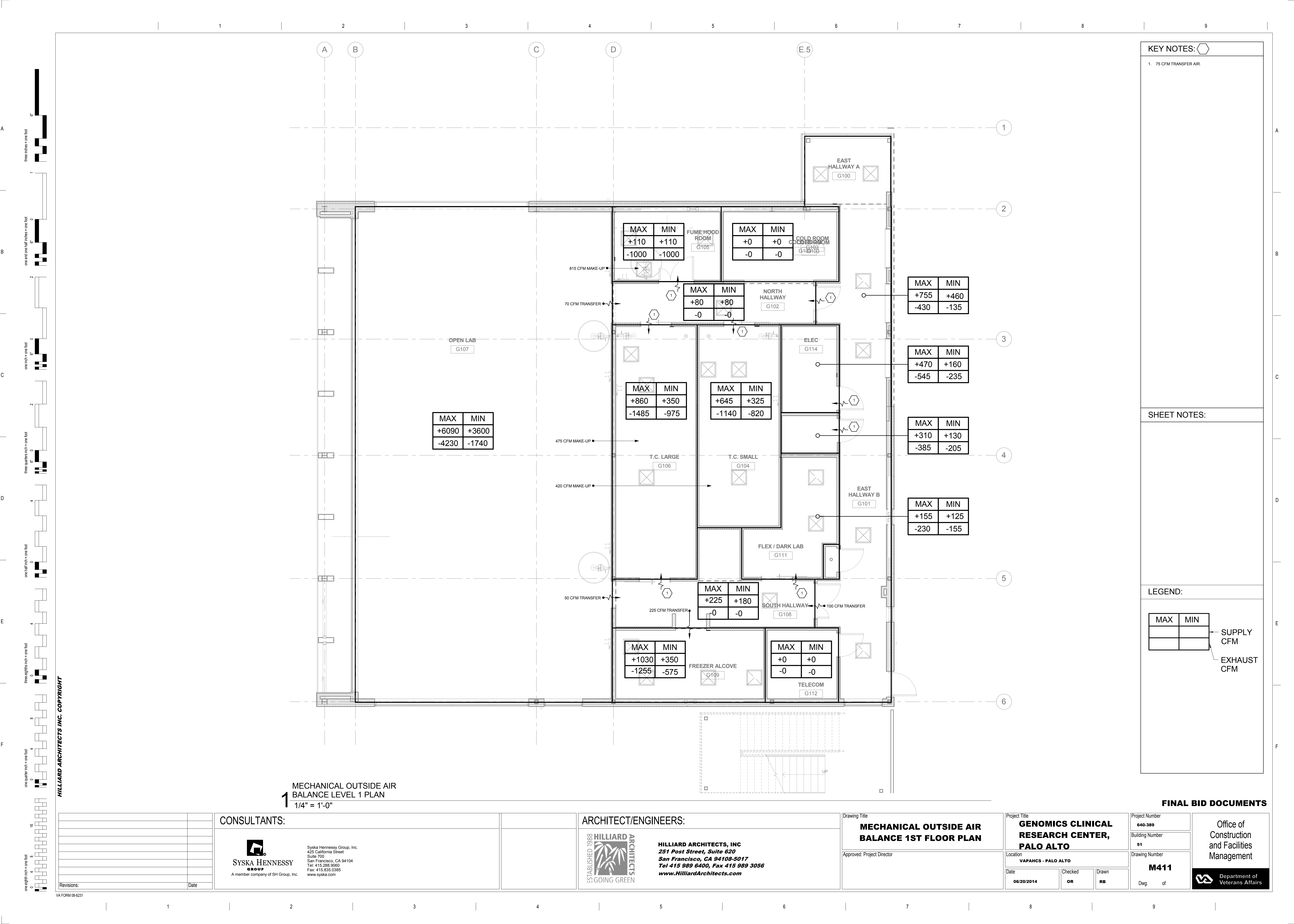
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KEY NOTES:

1. 75 CFM TRANSFER AIR.

SHEET NOTES:

LEGEND:

MAX	MIN	
		SUPPLY CFM
		EXHAUST CFM

MECHANICAL OUTSIDE AIR
BALANCE LEVEL 1 PLAN
1/4" = 1'-0"

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Drawing Title
**MECHANICAL OUTSIDE AIR
BALANCE 1ST FLOOR PLAN**

Approved: Project Director

Project Title
**GENOMICS CLINICAL
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PALO ALTO**

Location
VAPAHCS - PALO ALTO

Date
06/20/2014

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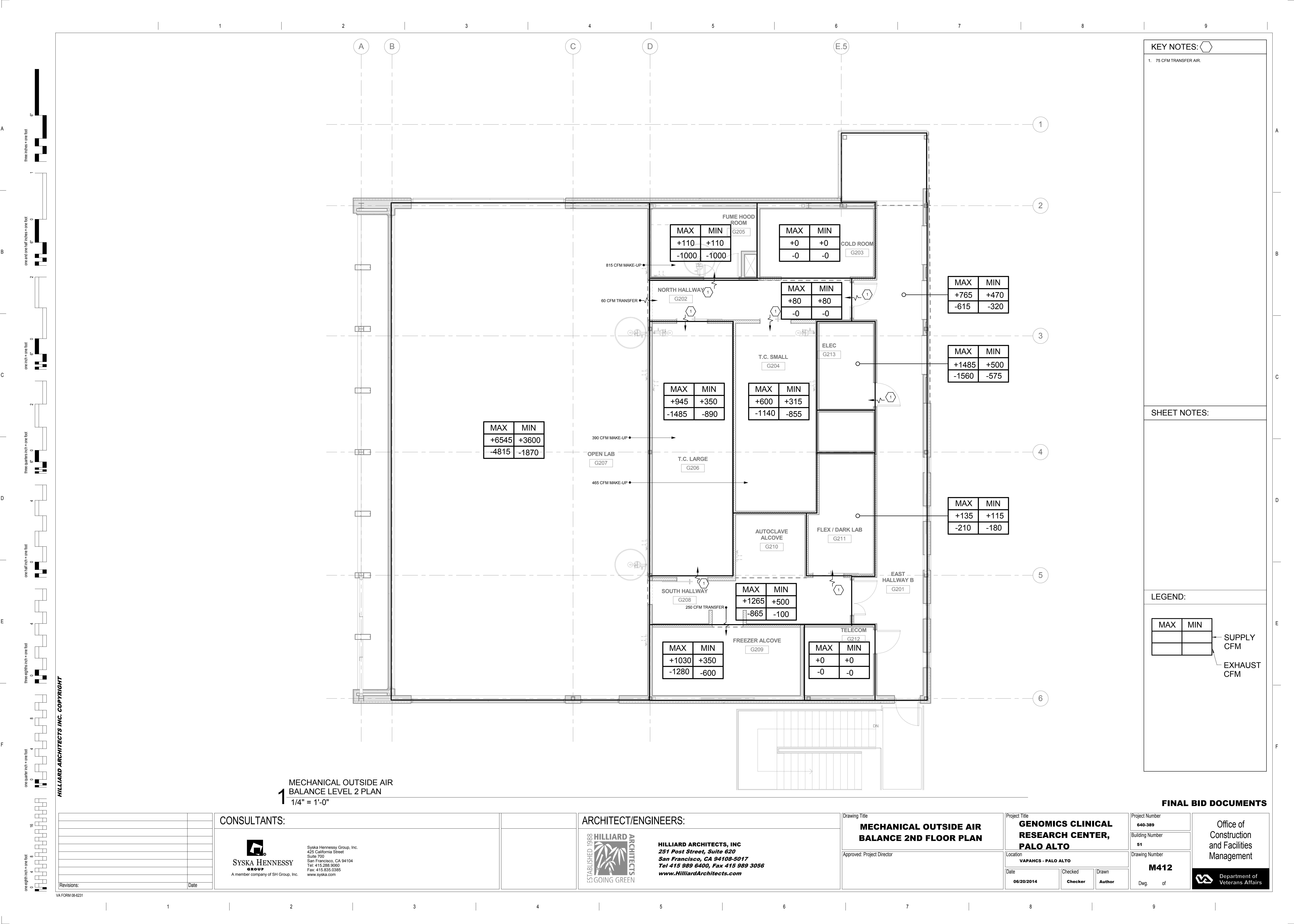
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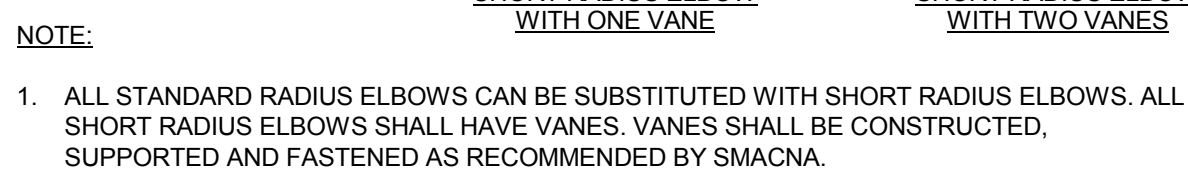
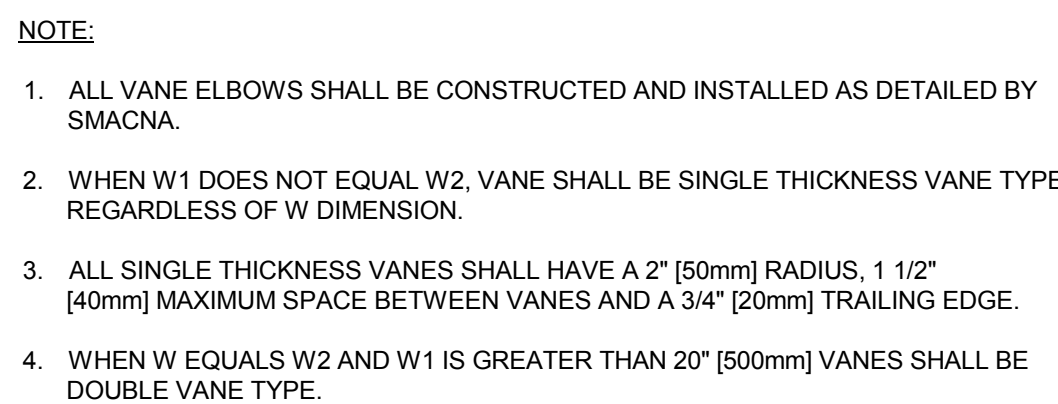
Project Number
640-389
Building Number
51
Drawing Number
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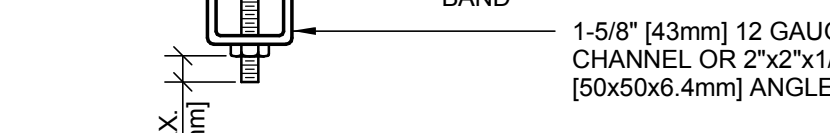
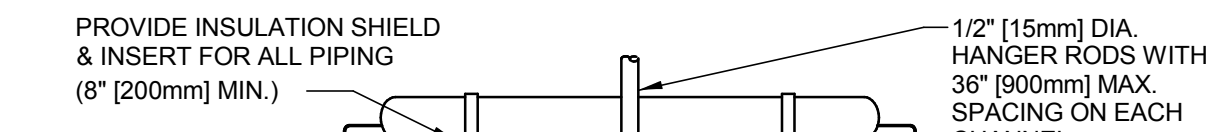
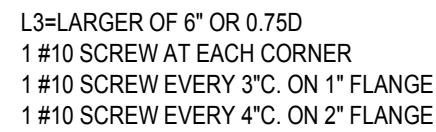
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Date
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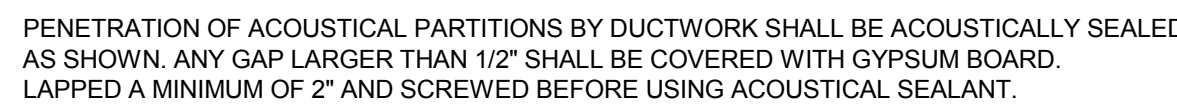
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MAXIMUM PIPE/TUBING SUPPORT SPACING																			
NOM. SIZE	IN (mm)	THRU 3/4 IN (20)	1 (25)	1 1/4 (32)	2 (51)	2 1/2 (64)	3 (76)	4 (102)	5 (127)	6 (152)	8 (203)	10 (254)	12 (305)	14 (356)	16 (406)	18 (457)	20 (508)	24 (609)	
PIPE	FT. (mm)	[2100]	[2100]	[2100]	[2100]	[910]	[1175]	[1440]	16	17	18	22	23	25	27	28	30	32	
TUBING	FT. (mm)	5 FT [1500]	6 [1800]	7 [2100]	8 [2400]	8 [2400]	9 [2700]	10 [3000]	12 [3700]	13 [4000]	14 [4100]	16 [4600]	-	-	-	-	-	-	
NOTE: FOR TRAPEZE HANGER TIE SPACING OF SMALLEST SIZE ON TRAPEZE.																			



- NOTES:**
1. LATCHES SHALL BE OF THE WEDGE TYPE TO CLOSE DOORS TIGHTLY
 2. HINGES ON THE ACCESS DOORS SHALL HAVE NON-CORROSIVE PINS
 3. SEE SMACNA 2005, FIGURE 9-15

RECTANGULAR TO ROUND DETAIL (10)

PIPE HANGERS

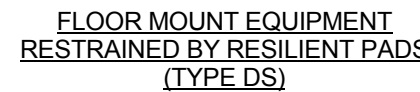
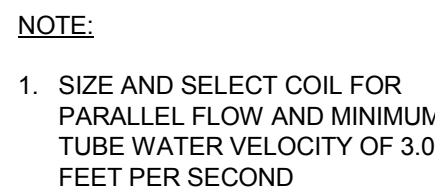
DUCT THROUGH ACOUSTICAL PARTITION | 4

ACCESS PANEL AND DOOR DETAIL

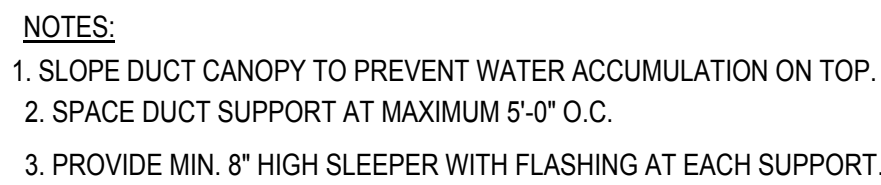


NOT USED (11)

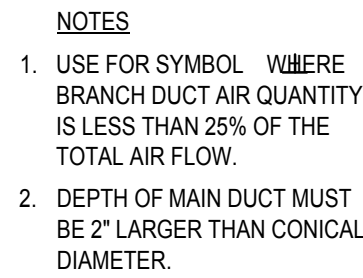
TYPICAL THERMOSTAT DETAIL (8)



PREHEAT COIL (HOT WATER) - PIPING CONNECTIONS (12)



OUTDOOR EXPOSED DUCTWORK SUPPORT ON ROOF DETAIL 6



CIRCULAR CONICAL TAP WITH VOLUME DAMPER



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Drawing Title

MECHANICAL DETAILS

Approved: Project Director

Project Title	GENOMICS CLINICAL RESEARCH CENTER, PALO ALTO
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VAPAHCS - PALO ALTO

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Project Number

Building Blocks

Building Number
74

Drawing Number

M502

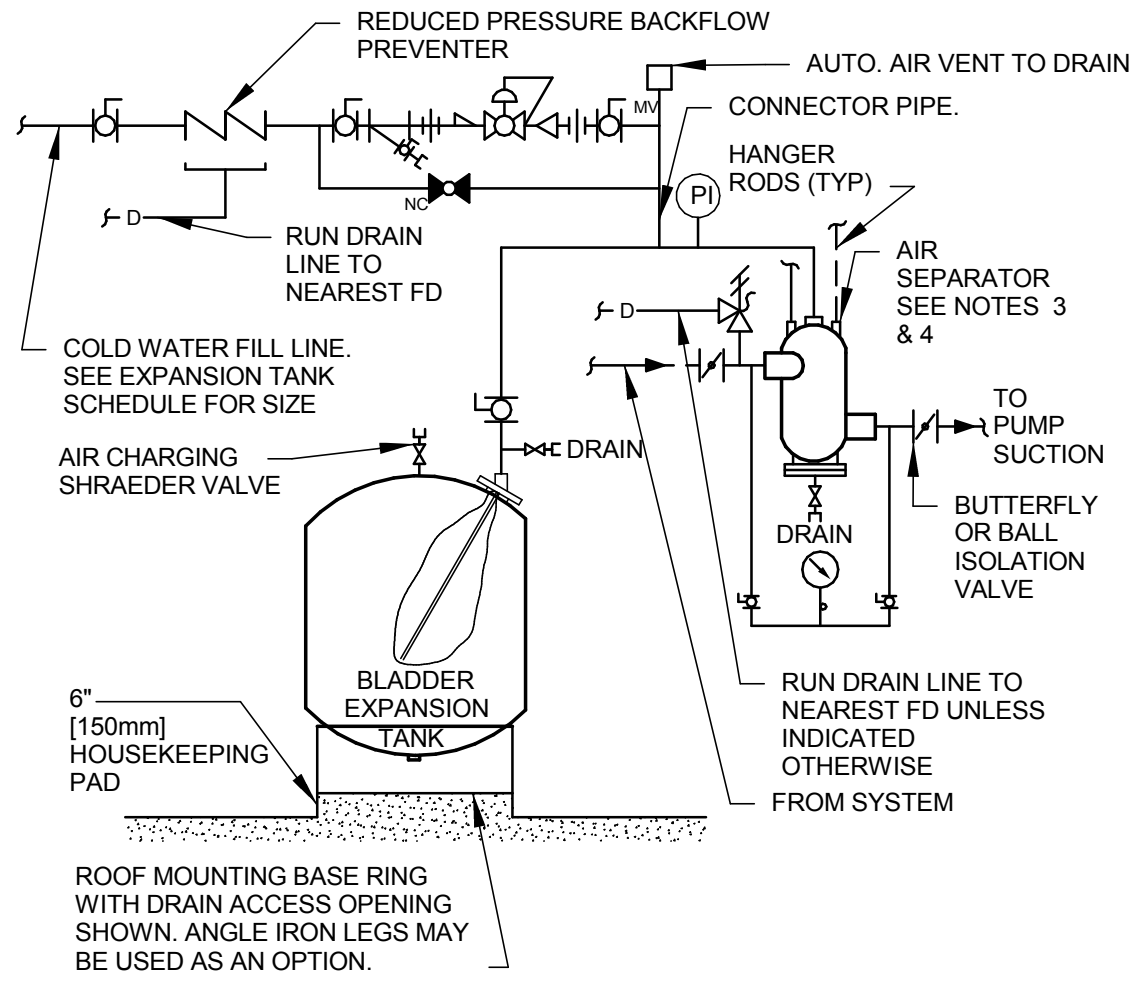
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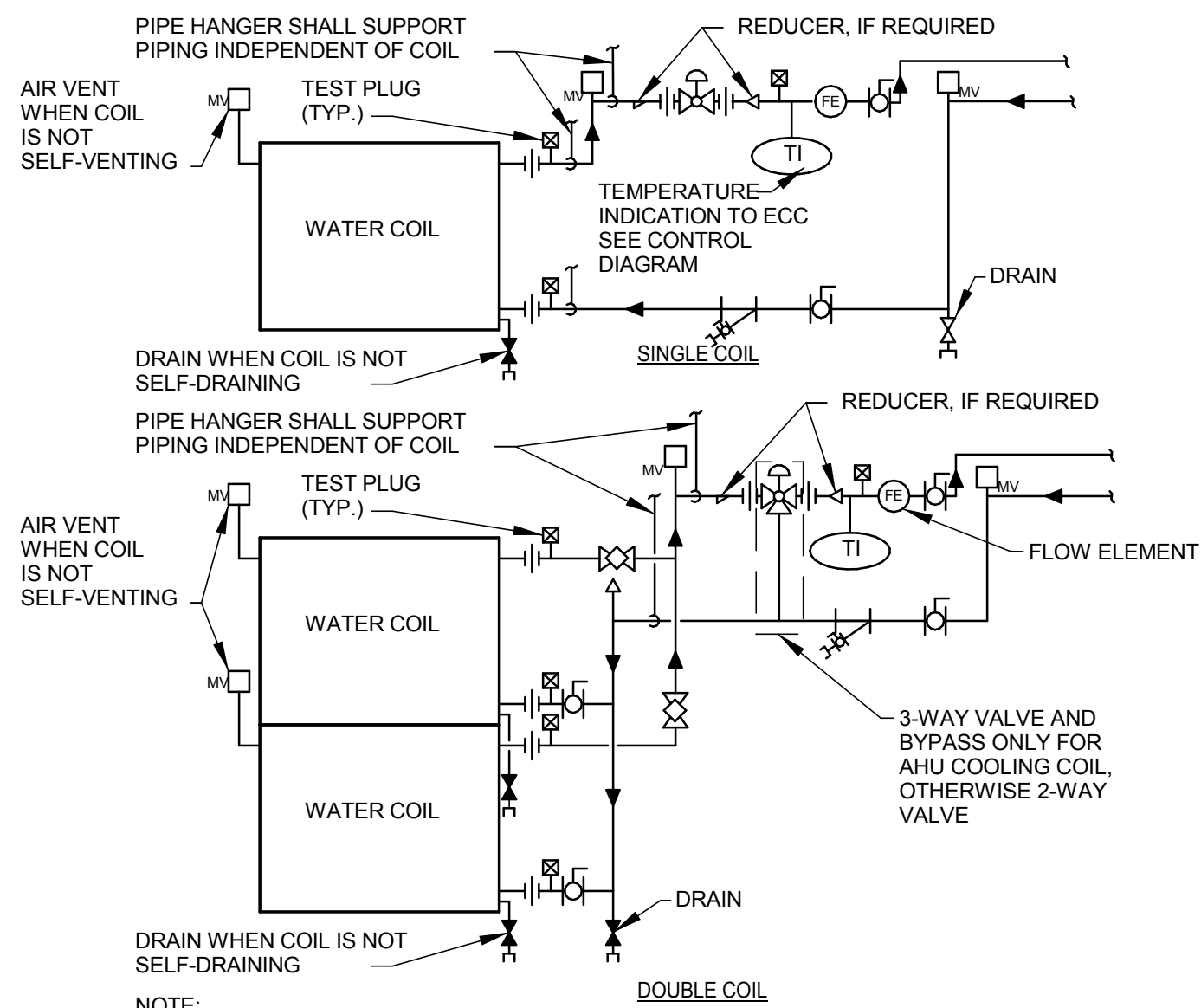
Department of
Veterans Affairs

NOTES:

1. SEE EXPANSION TANK SYSTEM SCHEDULE FOR COMPONENT SIZES.
2. FOR HOT WATER SYSTEMS 2" (50mm) AND SMALLER AND CHILLED WATER SYSTEMS USE IN-LINE AIR PURGER IN LIEU OF AIR SEPARATOR.
3. SET PRESSURE REDUCING VALVE SO PRESSURE AT HIGHEST POINT IN SYSTEM HAS A MINIMUM OF 4 PSIG (28kPa).



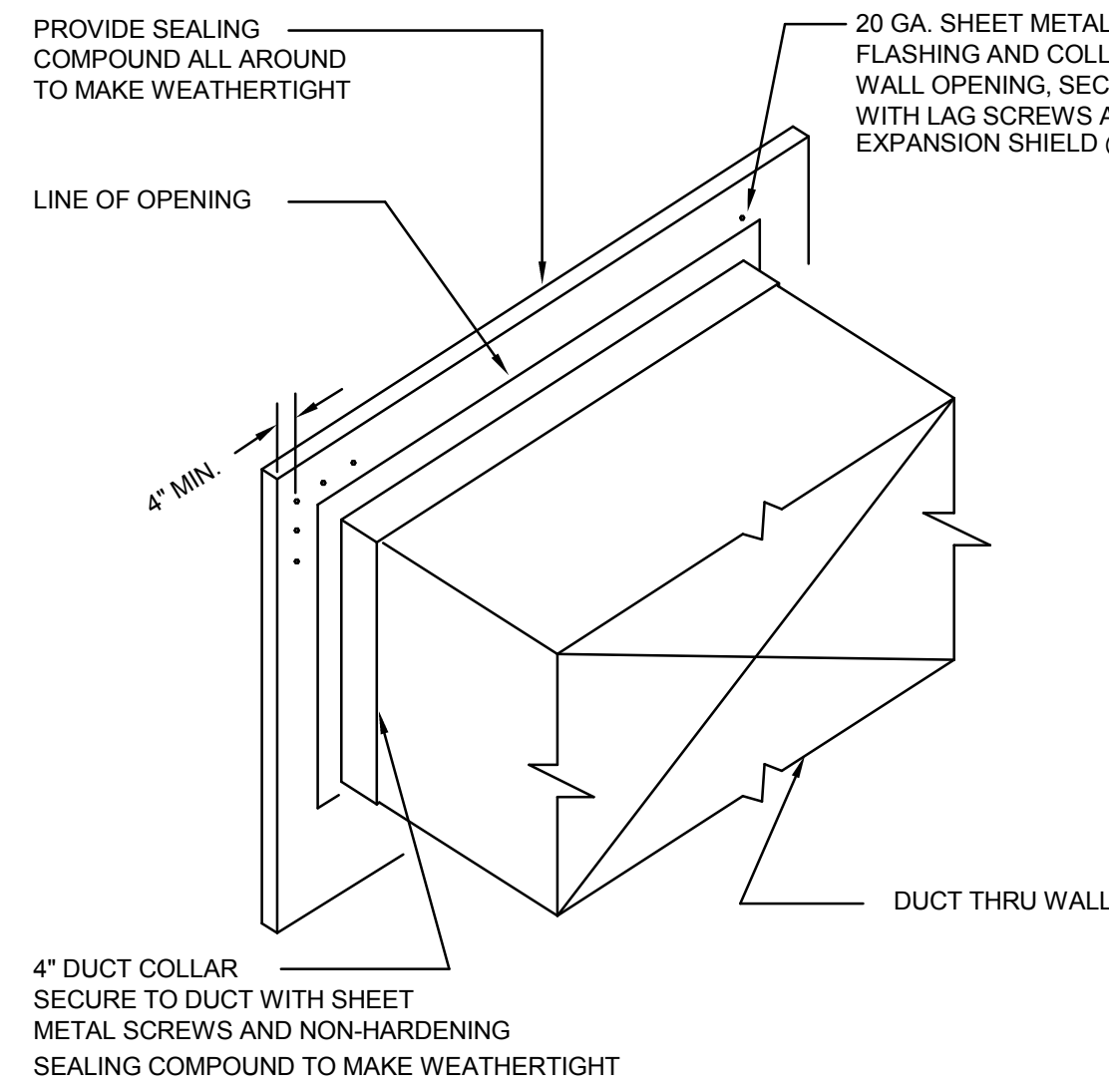
FLOOR MOUNTED EXPANSION TANK 10



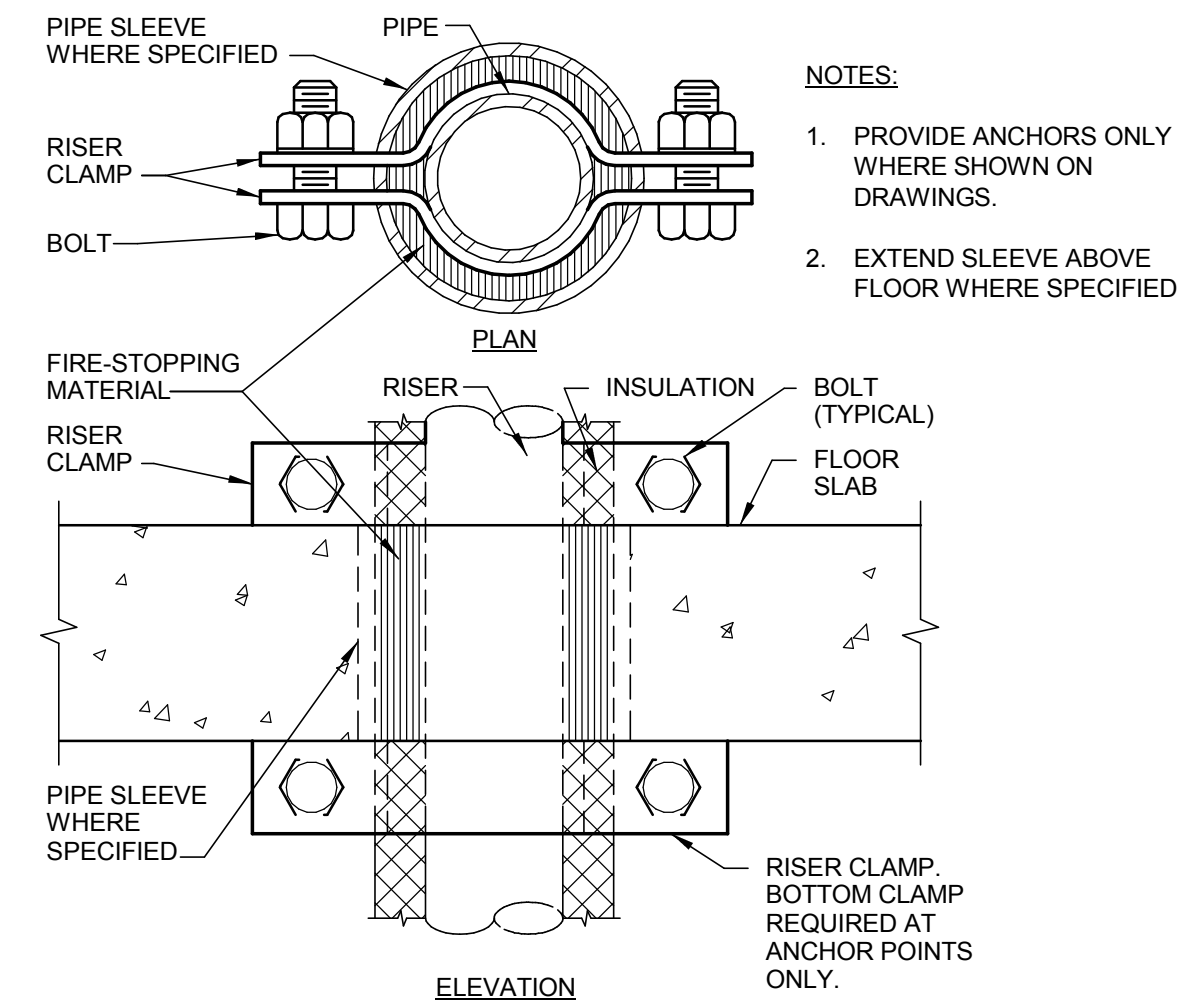
NOTE:

1. WHEN COIL IS INCLUDED IN CASING MOUNTED ON VIBRATION ISOLATORS THE FIRST 2 HANGERS FOR EACH PIPE SHALL BE SPRING & NEOPRENE TYPE, TYPE "H" FOR 4" (100mm) PIPE & SMALLER, TYPE "H-P" FOR 5" (125mm) PIPE & LARGER.
2. PIPING SHALL BE INSTALLED IN SUCH MANNER THAT IT WILL NOT BLOCK THE SWING OR USE OF ACCESS DOORS OR PANELS; NEITHER SHALL IT BLOCK THE SERVICING OF FILTERS, VALVES, OR EQUIPMENT.
3. THE FLOW ELEMENT MAY BE INSTALLED IN THE SUPPLY PIPING IF THE REQUIRED MINIMUM UPSTREAM AND DOWNSTREAM DIMENSIONS CANNOT BE OBTAINED IN THE RETURN PIPING.

WATER COILS - PIPING CONNECTIONS 7



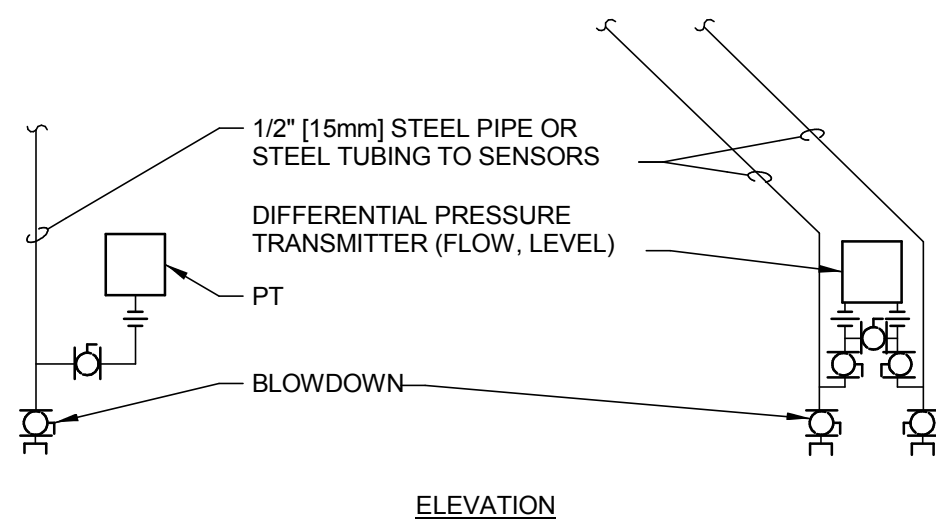
DUCT THROUGH WALL 4



NOTES:

1. PROVIDE ANCHORS ONLY WHERE SHOWN ON DRAWINGS.
2. EXTEND SLEEVE ABOVE FLOOR WHERE SPECIFIED.

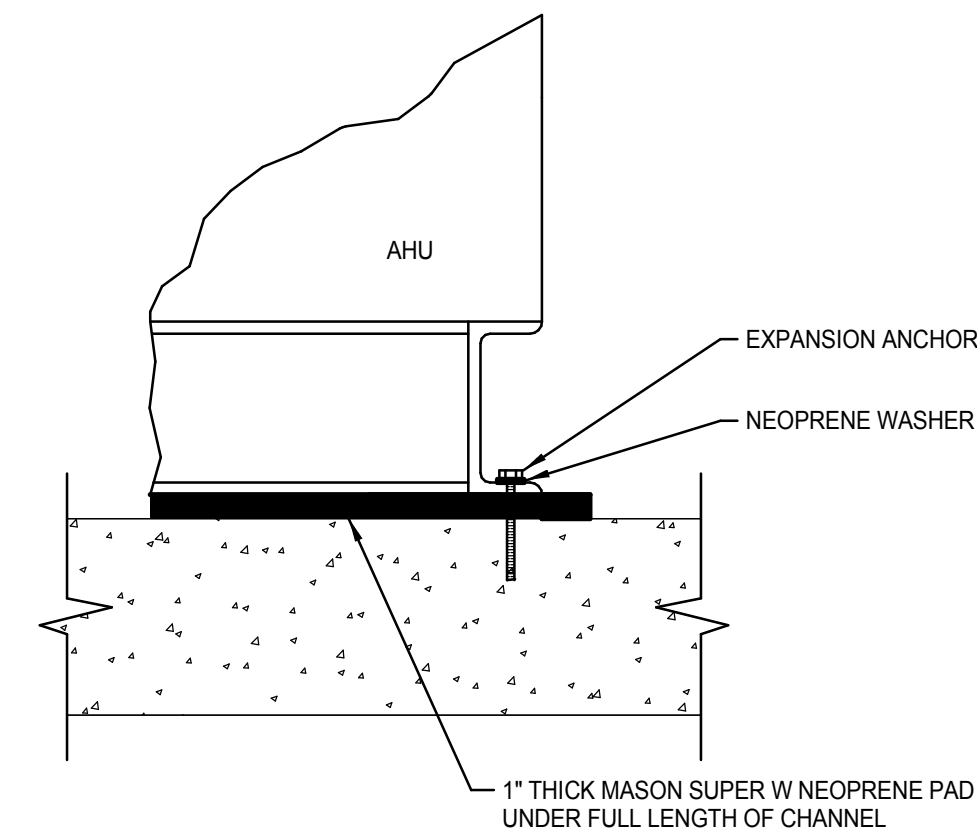
SUPPORT/ANCHOR FOR PIPE RISERS 1



NOTES:

1. INSTALLATION OF SENSORS AND TRANSMITTERS SHALL CONFORM TO RECOMMENDATIONS OF MANUFACTURERS OF TRANSMITTERS.

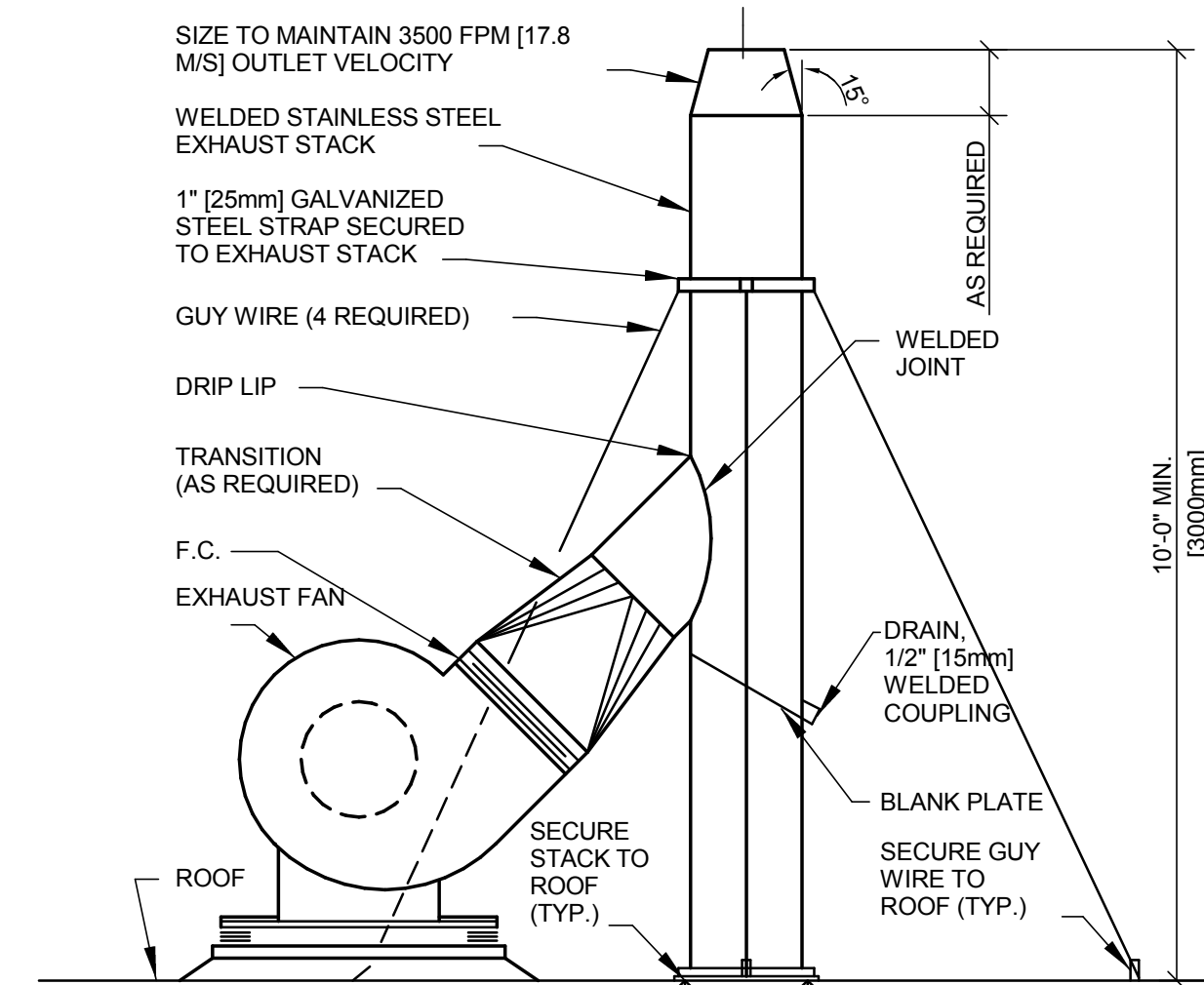
PRESSURE TRANSMITTER INSTALLATION 11



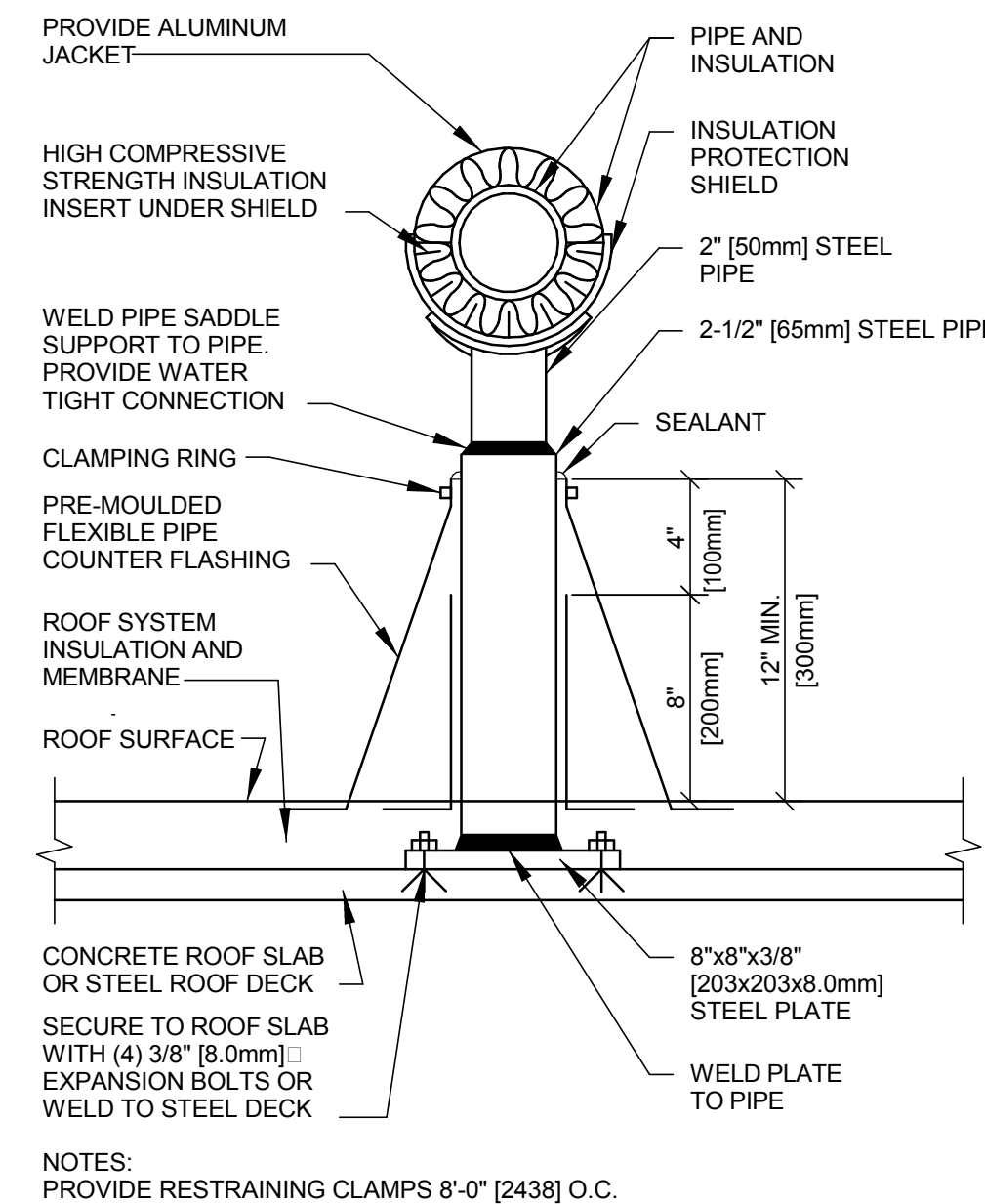
NOTE:

1. LOCATE RADIANT TUBING AND STEEL REINFORCING PRIOR TO INSTALLATION OF EXPANSION ANCHORS.
2. ANCHORING REQUIREMENTS TO BE DESIGN BUILD BY INSTALLING CONTRACTOR.

AHU MOUNTING DETAIL 8



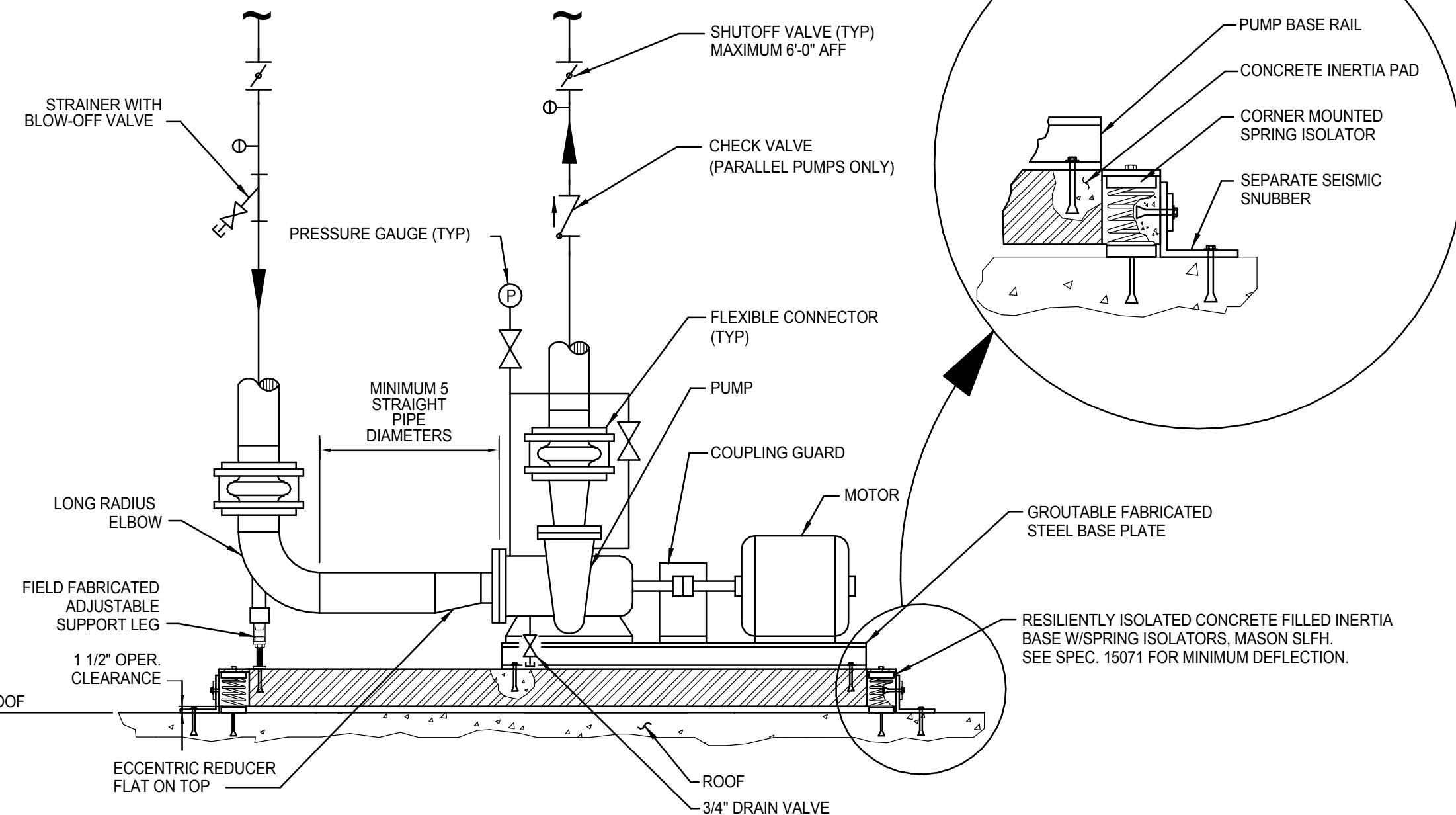
EXHAUST STACK DETAIL 5



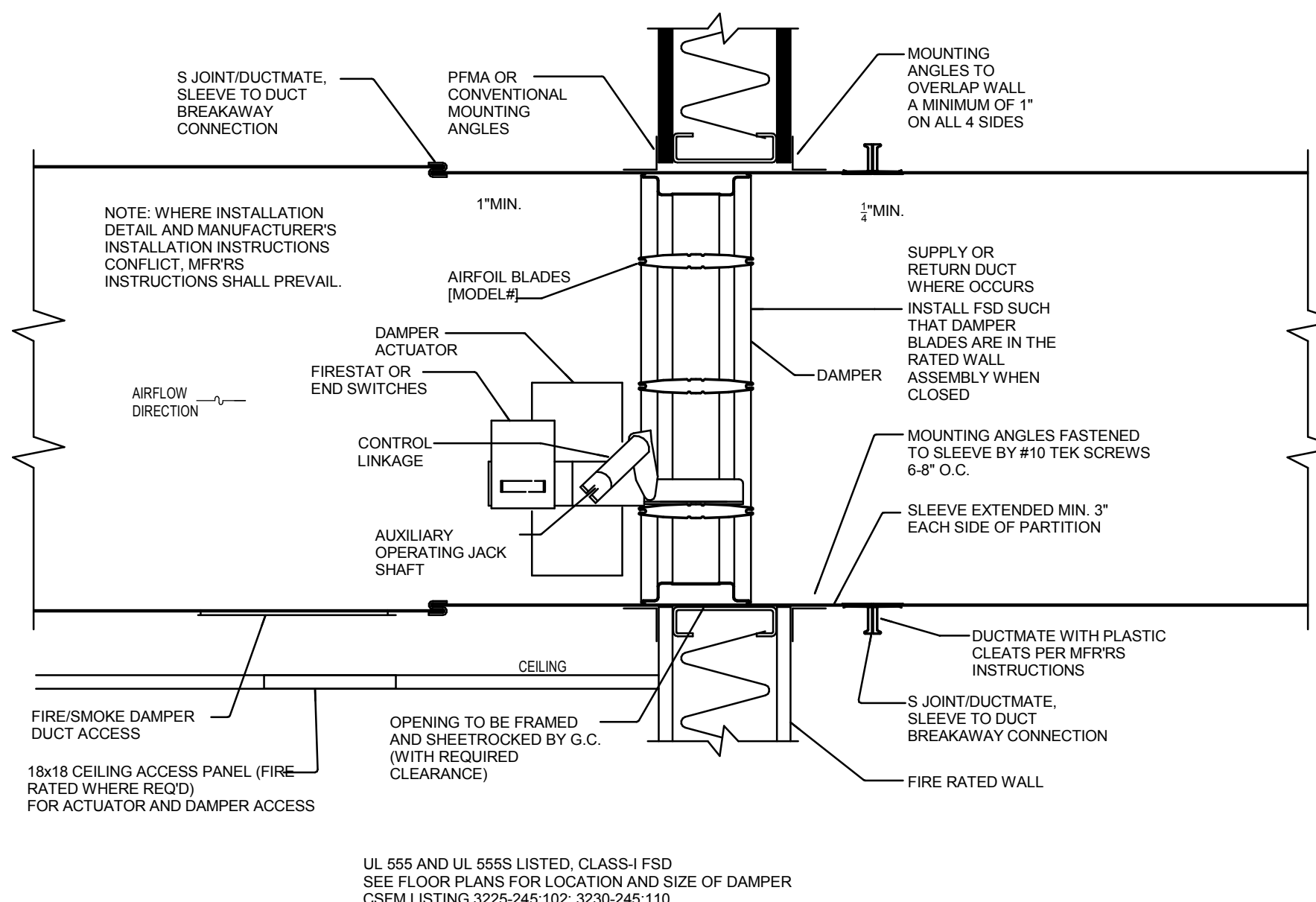
RESTRAINING CLAMP DETAIL FOR SUPPORTING PIPE ON ROOF 2

NOTES:

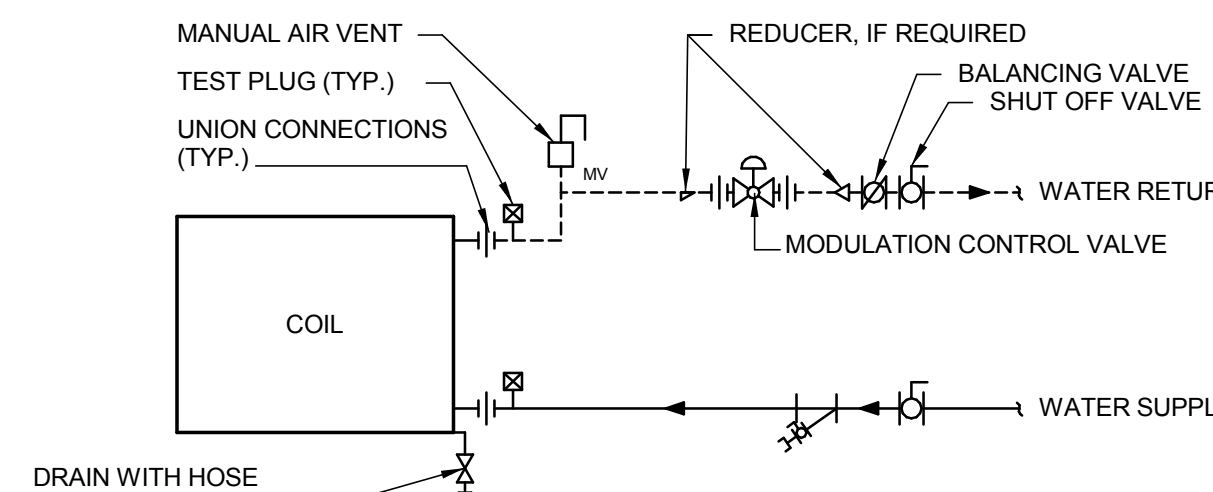
1. PUMP MOUNTED PER MANUFACTURER'S RECOMMENDATION.
2. INCLUDE CHECK VALVE MOUNTED PER MANUFACTURER'S RECOMMENDATIONS AFTER ALL PUMPS INSTALLED IN PARALLEL, SEE PIPING SCHEMATIC.



INERTIA BASE MOUNTED PUMP DETAIL 9



FSD DETAIL 6



TERMINAL UNIT WATER COILS - PIPING CONNECTIONS 3

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MECHANICAL DETAILS

Approved: Project Director

FINAL BID DOCUMENTS

Project Title
**GENOMICS CLINICAL
RESEARCH CENTER,
PALO ALTO**

Location
VAPAHCS - PALO ALTO

Date
06/20/2014

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Checker

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Author

Project Number
640-389

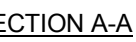
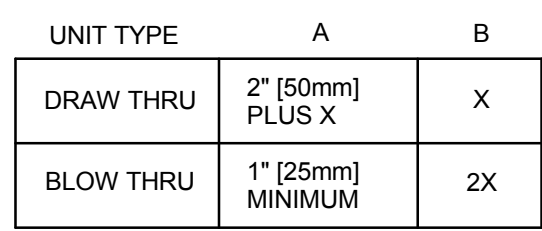
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Drawing Number
M503

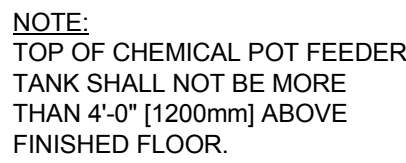
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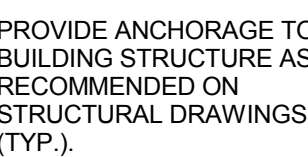
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* AS REQUIRED

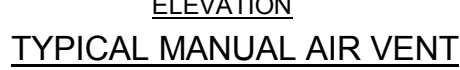
- NOTE



2. WHEN



NOTES



11

8

5

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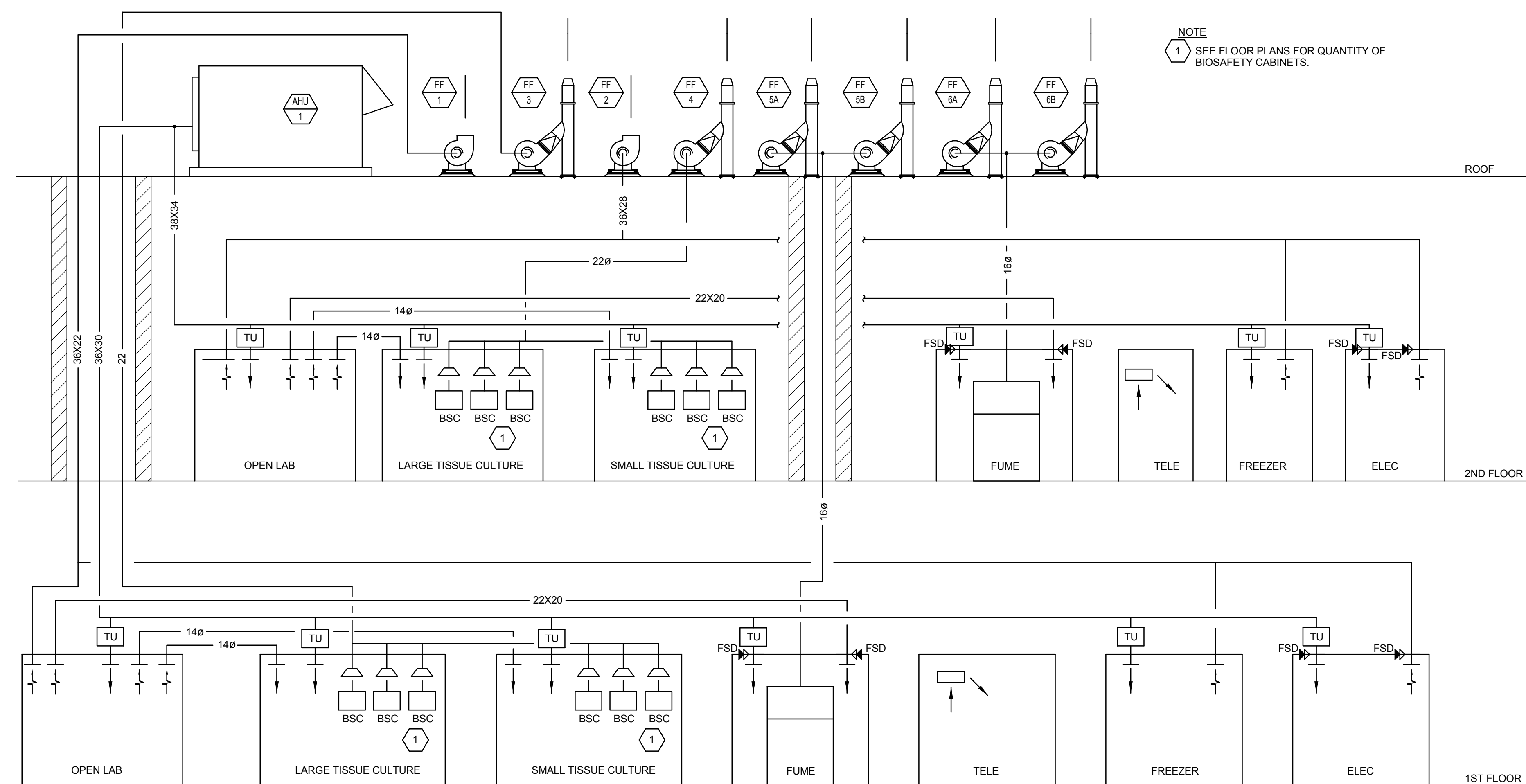
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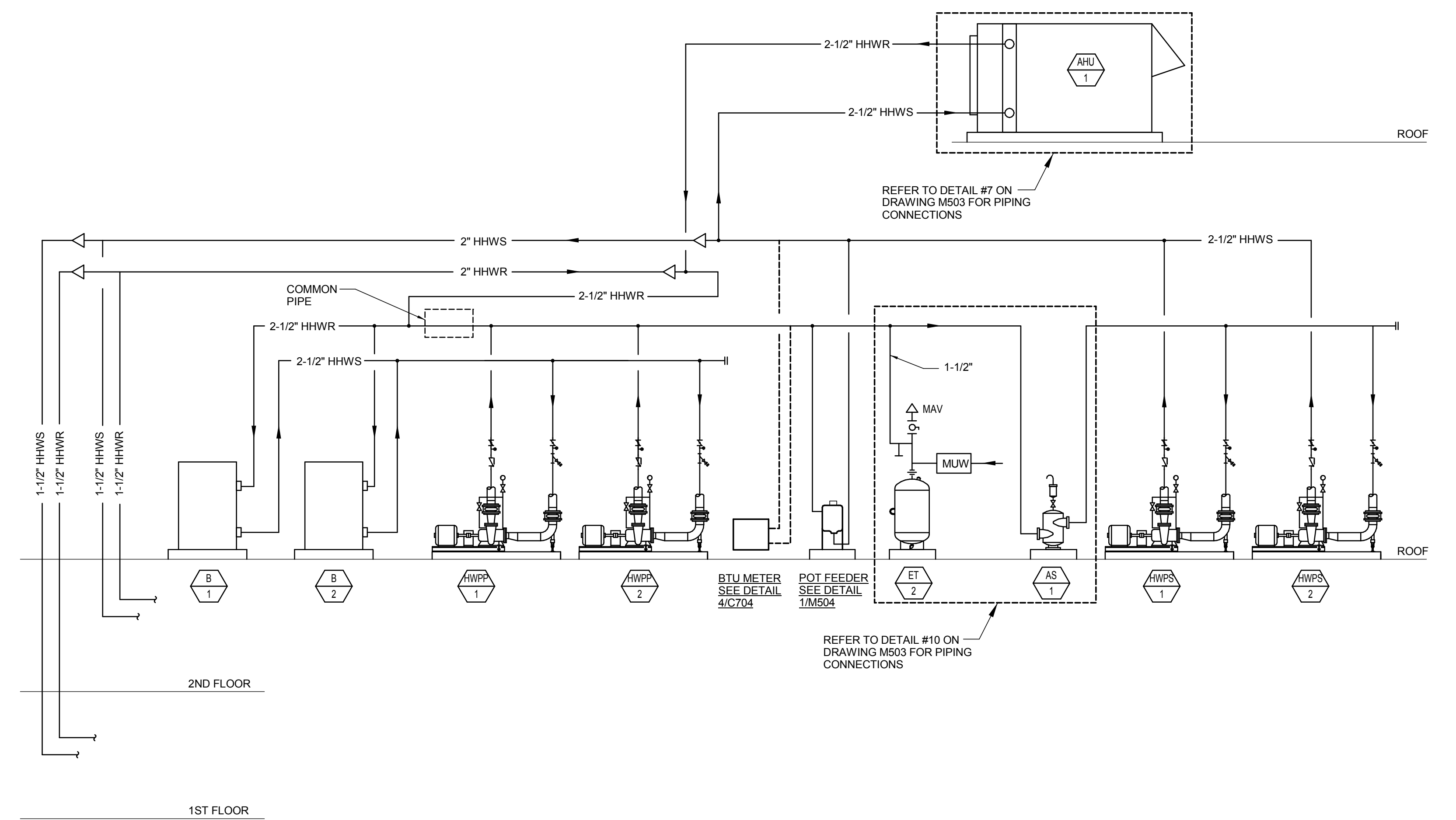
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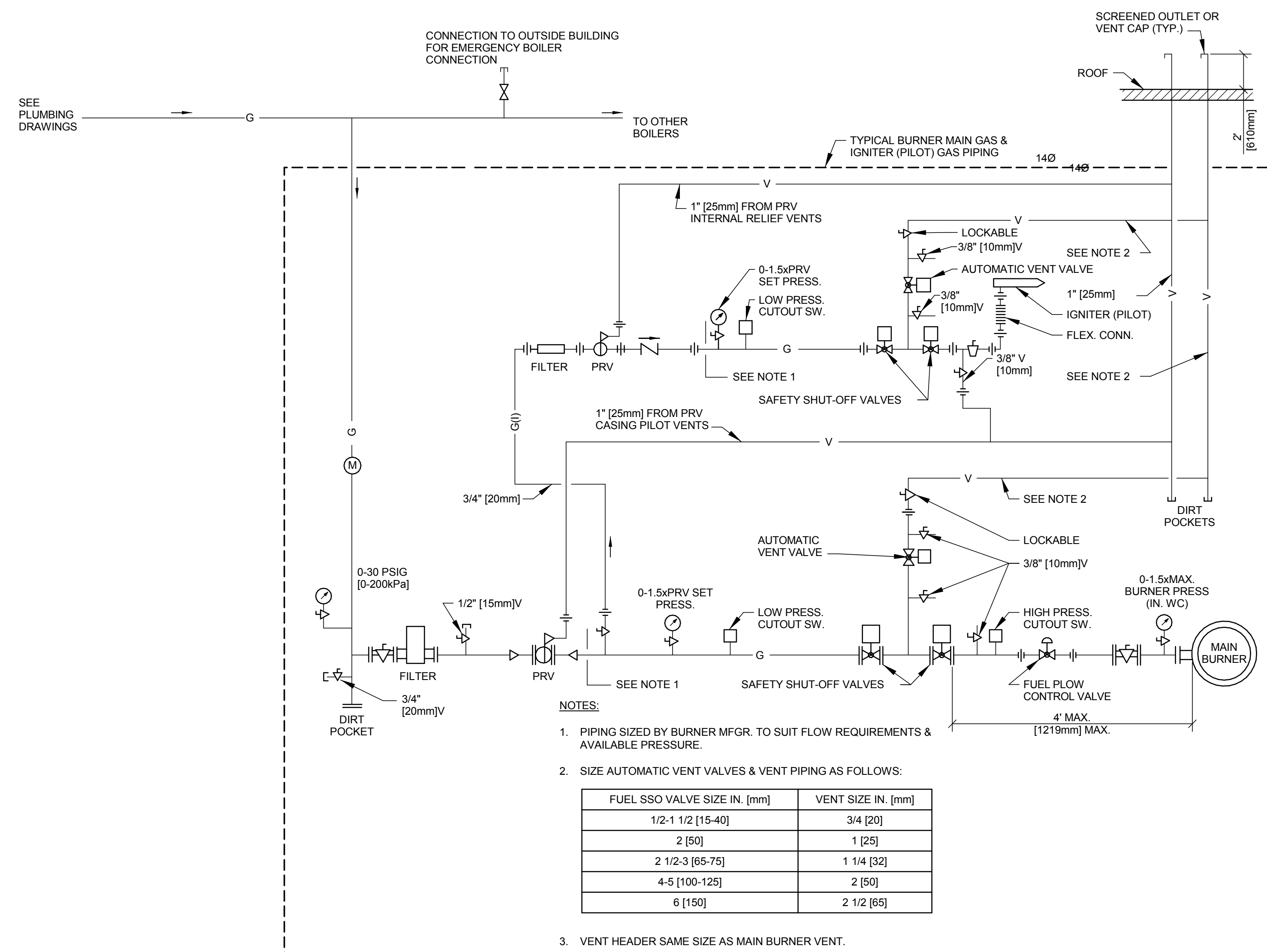
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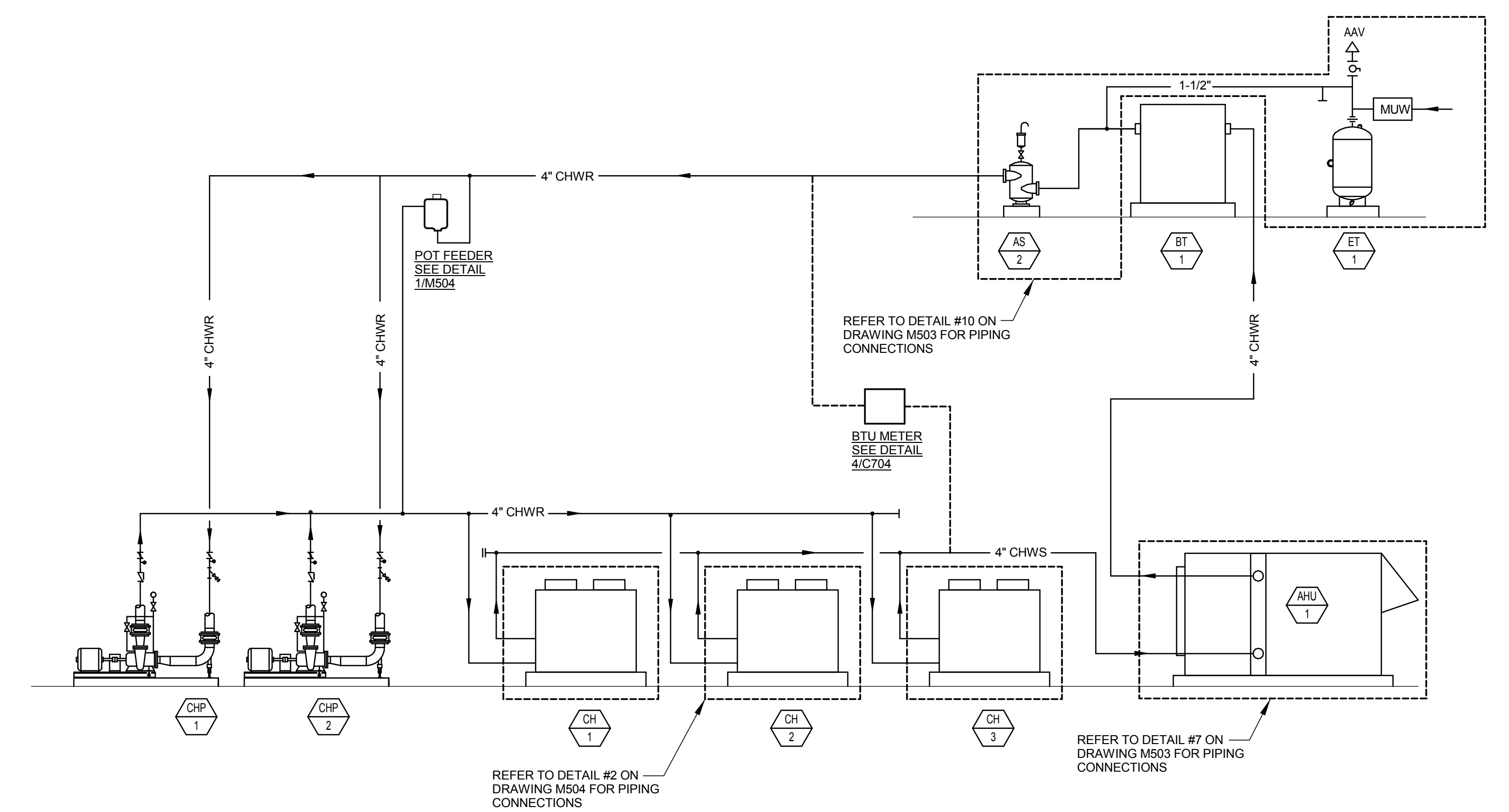
SCHEMATIC AIR RISER DIAGRAM (3)



HEATING HOT WATER SYSTEM SCHEMATIC PIPING DIAGRAM 1



NATURAL GAS - BURNER AND IGNITER FUEL STANDARD PIPING DIAGRAM 4



CHILLED WATER SYSTEM SCHEMATIC PIPING DIAGRAM (2)

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Drawing Title

MECHANICAL DIAGRAMS

Approved: Project Director

Project Title	GENOMICS CLINICAL RESEARCH CENTER, PALO ALTO
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	PALO ALTO
Location	VAPAHCS - PALO ALTO

Date
06/20/2014

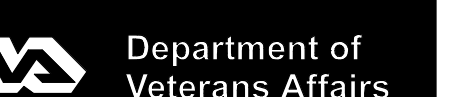
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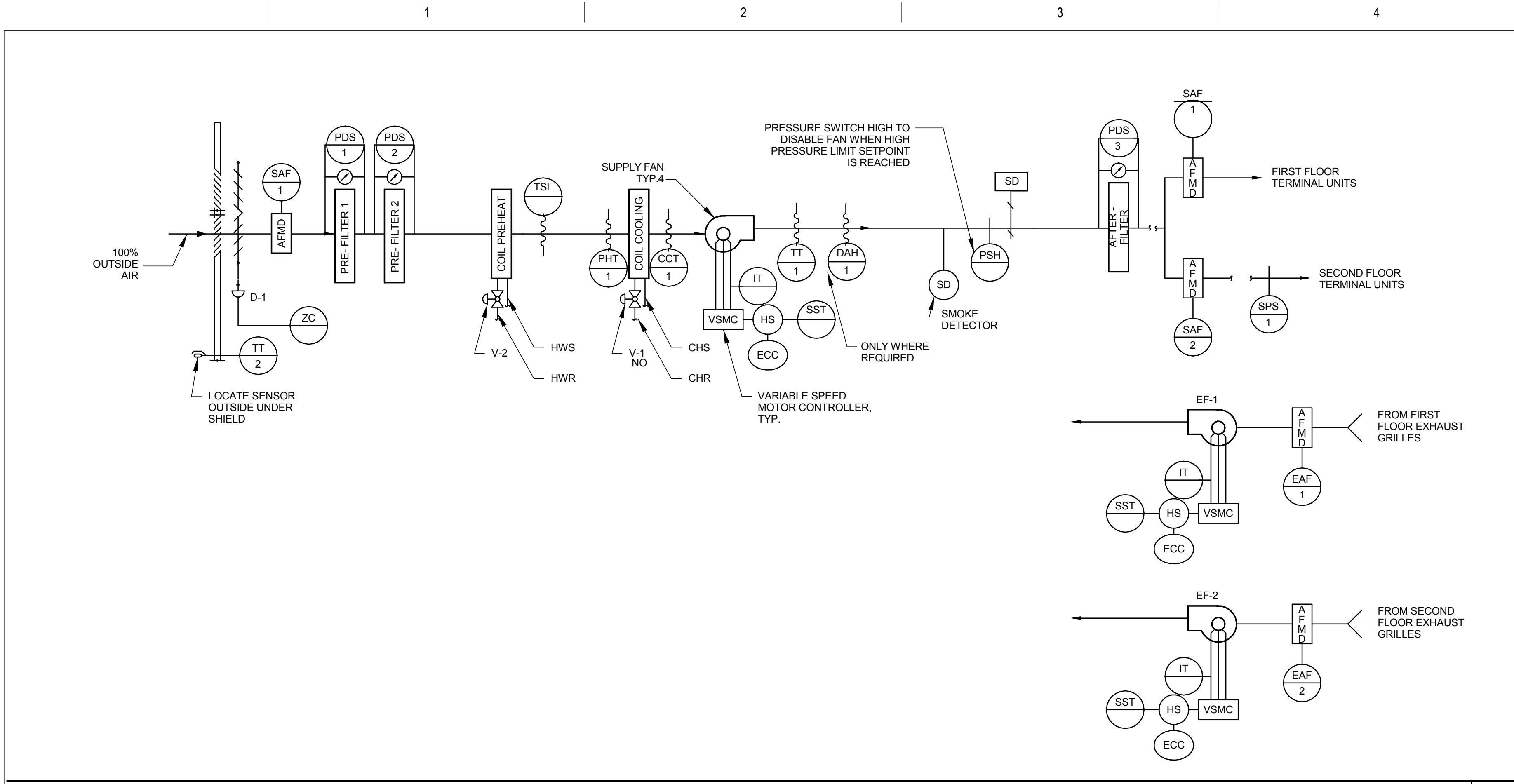
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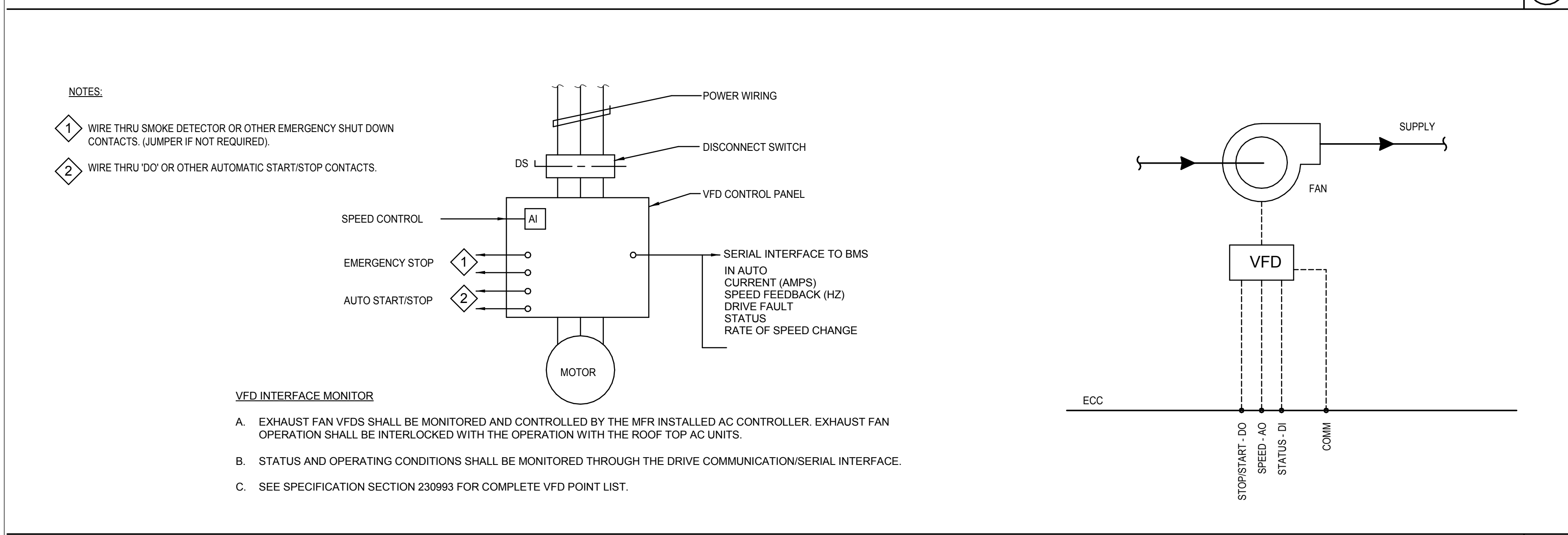
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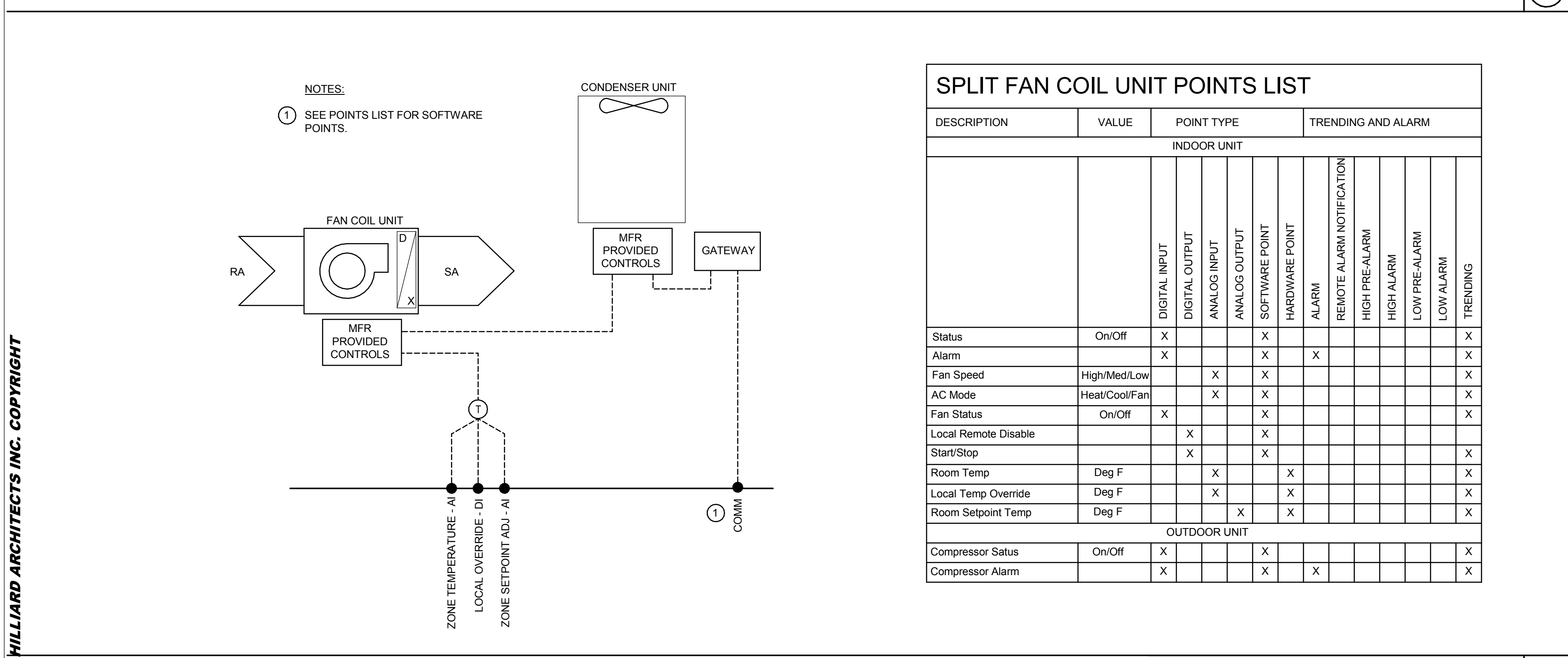




VARIABLE AIR VOLUME AIR HANDLING UNIT WITH 100% OUTSIDE AIR CONTROL DIAGRAM 1



VFD CONTROL DIAGRAM 2



SPLIT FAN COIL UNIT CONTROLS DIAGRAM 3

POINTS LIST FOR VAV AIR HANDLING UNIT WITH 100% OUTSIDE AIR

JOB: 640-389 BUILDING: VA GENOMICS RESEARCH BUILDING		POINT LEGEND	SYSTEM OUTPUTS		SYSTEM INPUTS		SYSTEM SOFTWARE/CONTROL		PAGE:																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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SEQUENCE OF OPERATION FOR VARIABLE AIR VOLUME AIR HANDLING

WITH 100% OUTSIDE AIR

1. GENERAL

1.1 UNIT IS NORMALLY STARTED AND STOPPED REMOTELY AT THE ECC. H-O-A SWITCH SHALL BE KEPT IN THE "AUTO" POSITION. "HAND" AND "OFF" POSITIONS SHALL BE USED ONLY FOR MAINTENANCE. WHEN THE UNIT IS "OFF" D-1 SHALL BE FULLY CLOSED. WHEN THE UNIT IS "ON" D-1, SD-1 AND SD-2 SHALL BE FULLY OPEN.
4. HUMIDITY CONTROL

4.1 SYSTEM SHALL MONITOR DISCHARGE AIR HUMIDITY USING DAH-1. ISSUE ALARM ON HIGH HUMIDITY LEVEL (ADJ.)
2. TEMPERATURE CONTROL

2.1 SUPPLY AIR TEMPERATURE, SENSED BY TT-1, SHALL BE MAINTAINED AT SETPOINT VIA DIGITAL CONTROL PANEL BY MODULATING V-1 OR V-2 IN SEQUENCE.

2.2 NOT USED.

2.3 NOT USED.

2.4 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY TT-2, IS BELOW THE SUPPLY AIR TEMPERATURE, SENSED BY TT-1, V-2 SHALL MODULATE OPEN TO MAINTAIN THE SUPPLY AIR TEMPERATURE, SENSED BY TT-1.

2.5 SUPPLY AIR TEMPERATURE SETPOINT SHALL BE RESET USING A TRIM AND RESPOND LOGIC FROM INITIAL SETPOINT OF 55°F TO 65°F BASED ON VAV BOX DAMPER POSITION.
5. FREEZE PROTECTION

5.1 IF THE AIR TEMPERATURE AS SENSED BY TT-1 FALLS BELOW 45°F (7°C), AN ALARM SIGNAL SHALL INDICATE AT THE DCP AND ECC. IF THIS TEMPERATURE FALLS BELOW 40°F (4.4°C), AS SENSED BY THE TSL THE SUPPLY AND EXHAUST FANS SHALL SHUT DOWN AND A CRITICAL ALARM SHALL INDICATE AT THE DIGITAL CONTROL PANEL AND ECC. TSL SHALL BE HARDWIRED TO THE SUPPLY FAN UFD AND UNIT SHALL BE SHUTDOWN IN HAND AUTO OR BYPASS MODE. TSL WILL REQUIRE MANUAL RESET AT THE DEVICE.
6. AUTOMATIC SHUTDOWN/RESTART

6.1 WHEN SMOKE IS DETECTED BY DUCT SMOKE DETECTOR, SD, THE SUPPLY FANS SHALL SHUT "OFF" AND AN ALARM SIGNAL SHALL BE TRANSMITTED TO THE FIRE ALARM SYSTEM. ALL SMOKE DAMPERS IN THE SUPPLY AND RETURN DUCTS SHALL CLOSE.

6.2 EXHAUST FANS SERVING AREA OF THE SUPPLY FAN SHALL CONTINUE TO RUN. SUPPLY FANS SHALL RESTART AND SMOKE DAMPERS SHALL OPEN WHEN FIRE ALARM CIRCUIT IS RESET.
3. AIR FLOW CONTROL

3.1 THE SUPPLY AIR FLOW SHALL BE CONTROLLED BY THE DIGITAL CONTROL PANEL MODULATING THE SUPPLY FANS VARIABLE SPEED MOTOR CONTROLLER TO MAINTAIN 1.0" (25mm) OF DUCT STATIC PRESSURE (FIELD ADJUSTABLE), SENSED BY SPS-1. RESET STATIC PRESSURE BASED ON ACTUAL BUILDING LOAD BY PULLING ALL VAV BOXES.

3.2 THE FOUR AFMD'S SHALL MONITOR AND SUPPLY AIR FLOW TO EACH FLOOR AND EXHAUST AIR FLOW FROM EACH FLOOR. VFD'S SHALL RAMP EXHAUST FANS UP AND DOWN TO MAINTAIN POSITIVE PRESSURE ON EACH FLOOR BASED ON THE DIFFERENTIAL BETWEEN ALL EXHAUST AND SUPPLY. TO MAINTAIN 10% MORE SUPPLY THAN EXHAUST TO EACH FLOOR.

3.3 USING HIGH PRESSURE SENSOR SPS-1 LOCATED AT THE SUPPLY FAN DISCHARGE, SHALL PREVENT THE SUPPLY FAN FROM DEVELOPING OVER 3" (75mm) OF STATIC PRESSURE (FIELD ADJUSTABLE). IF STATIC PRESSURE AT SPS-2 DOES EXCEED 3" (75mm) THE SUPPLY AIR FAN SHALL STOP. SPS-2 SHALL BE HARDWIRED TO THE SUPPLY FAN VSMC AND UNIT SHALL BE SHUTDOWN IN HAND AUTO OR BYPASS MODE. SPS-2 WILL REQUIRE MANUAL RESET AT THE DEVICE.
7. EMERGENCY CONSTANT SPEED OPERATION

7.1 UPON FAILURE OF THE VSMC, THE SUPPLY FANS SHALL BE STARTED/STOPPED MANUALLY AT THE DIGITAL CONTROL PANEL OR THE ECC THROUGH THE BY-PASS STARTER. FANS SHALL THEN BE OPERATED AT CONSTANT SPEED.
8. OAD DAMPER

8.1 OAD DAMPER WILL CLOSE WHENEVER AHU IS SHUT OFF.

VARIABLE AIR VOLUME AIR HANDLING UNIT WITH 100% OUTSIDE AIR CONTROL DIAGRAM 1

CONTROLS SYMBOLS

- T ROOM THERMOSTAT/TRANSMITTER - WALL MOUNT

M ROOM HUMIDISTAT (MOISTURE)/TRANSMITTER - WALL MOUNT

TT TEMPERATURE TRANSMITTER

TT TEMPERATURE TRANSMITTER, AVERAGING ELEMENT

MT MOISTURE (HUMIDITY) TRANSMITTER

PT PRESSURE TRANSMITTER

SPS STATIC PRESSURE SENSOR

FT FLOW TRANSMITTER

IT CURRENT TRANSMITTER

CT CONDUCTIVITY TRANSMITTER

SD SMOKE DETECTOR

PDT PRESSURE DIFFERENTIAL TRANSMITTER

PDS PRESSURE DIFFERENTIAL SWITCH

HS HAND SWITCH (HAND-OFF-AUTO SWITCH)

ZC VALVE OR DAMPER POSITION CONTROLLER

KR LOCAL RECORDING TIME CLOCK (RUNTIME)

TSL TEMPERATURE SWITCH, LOW (FREEZE/STAT)

TSH TEMPERATURE SWITCH, HIGH (FREEZE/STAT)

LC LEVEL CONTROLLER

LT LEVEL TRANSMITTER

PSH PRESSURE SWITCH HIGH

PSL PRESSURE SWITCH LOW

EPT ELECTRONIC TO PNEUMATIC TRANSDUCER

AT CO2 CARBON DIOXIDE TRANSMITTER

AT CO CARBON MONOXIDE TRANSMITTER

AT OC OCCUPANCY SENSOR

LTCP LOCAL TEMPERATURE CONTROL PANEL

HVAC HVAC CONTROL PANEL

VSMC VARIABLE SPEED MOTOR CONTROLLER

ECC INTEGRATE CONTROL POINT ON REMOTE GRAPHICS WORKSTATION AT ENERGY CONTROL CENTER

TC TEMPERATURE CONTROLLER. SEE SEQUENCE OF OPERATION

PC PRESSURE CONTROLLER. SEE SEQUENCE OF OPERATION

SC SPEED CONTROLLER. SEE SEQUENCE OF OPERATION

FC FLOW CONTROLLER. SEE SEQUENCE OF OPERATION

FSH FLOW SWITCH HIGH

FSL FLOW SWITCH LOW

KC TIME CLOCK CONTROLLING EQUIPMENT ON A SCHEDULE
- TEMPERATURE SENSING ELEMENT FOR TRANSMITTING TEMPERATURE TO EMCS (PROVIDE 12 INCHES (200mm) MINIMUM LENGTH IN DUCT WHEN SPACE PERMITS.)

SENSOR WITH AVERAGING ELEMENT TO TRANSMIT TEMPERATURE TO EMCS

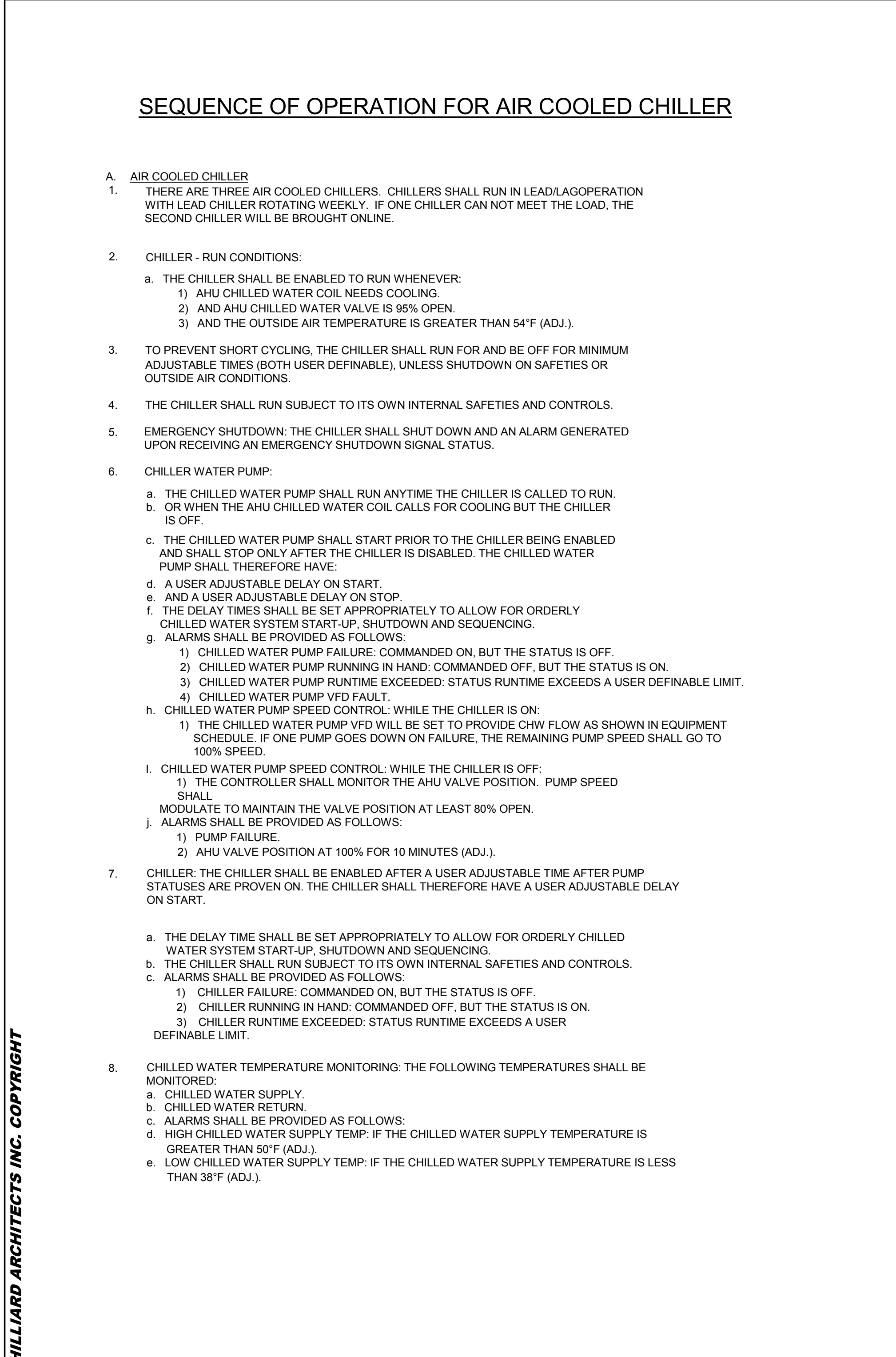
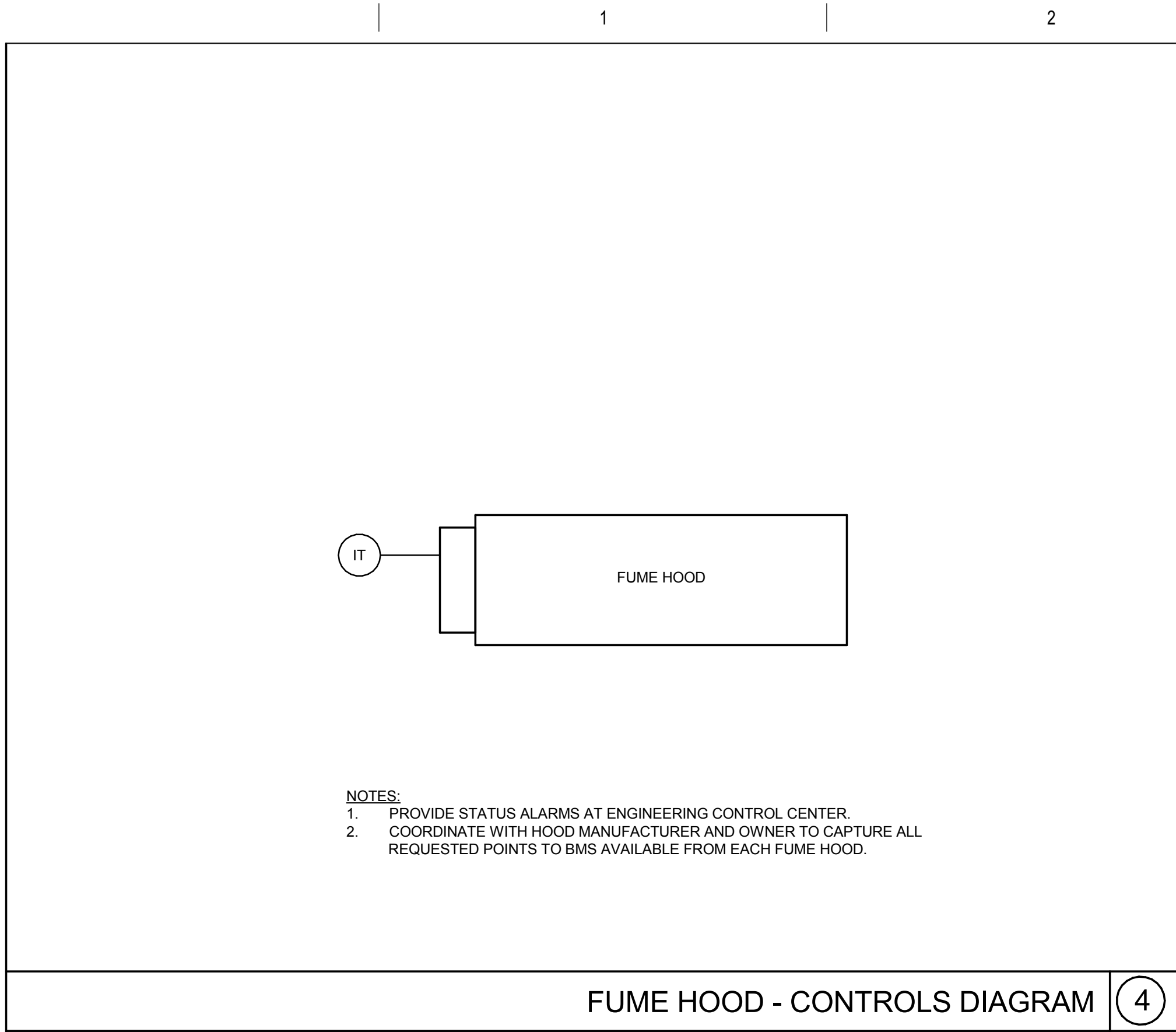
MOTOR STARTER


ELECTRIC OPERATED CONTROL DAMPER/OR VALVE

FINAL BID DOCUMENTS


CONSULTANTS:		ARCHITECT/ENGINEERS:		Drawing Title		Project Title		Project Number	
SYSKA HENNESSY GROUP		HILLIARD ARCHITECTS, INC.		MECHANICAL CONTROL DIAGRAMS		GENOMICS CLINICAL RESEARCH CENTER, PALO ALTO		640-389	
A member company of SH Group, Inc.		251 Post Street, Suite 620 San Francisco, CA 94108-5017 Tel: 415 989 6400, Fax: 415 989 3056 www.HilliardArchitects.com		Approved: Project Director		Location VAPAHCS - PALO ALTO		Building Number 51	
Revisions:						Date 06/20/2014		Drawing Number M1701	
Date						Checked JH		Dwg. of	
						Drawn OR			

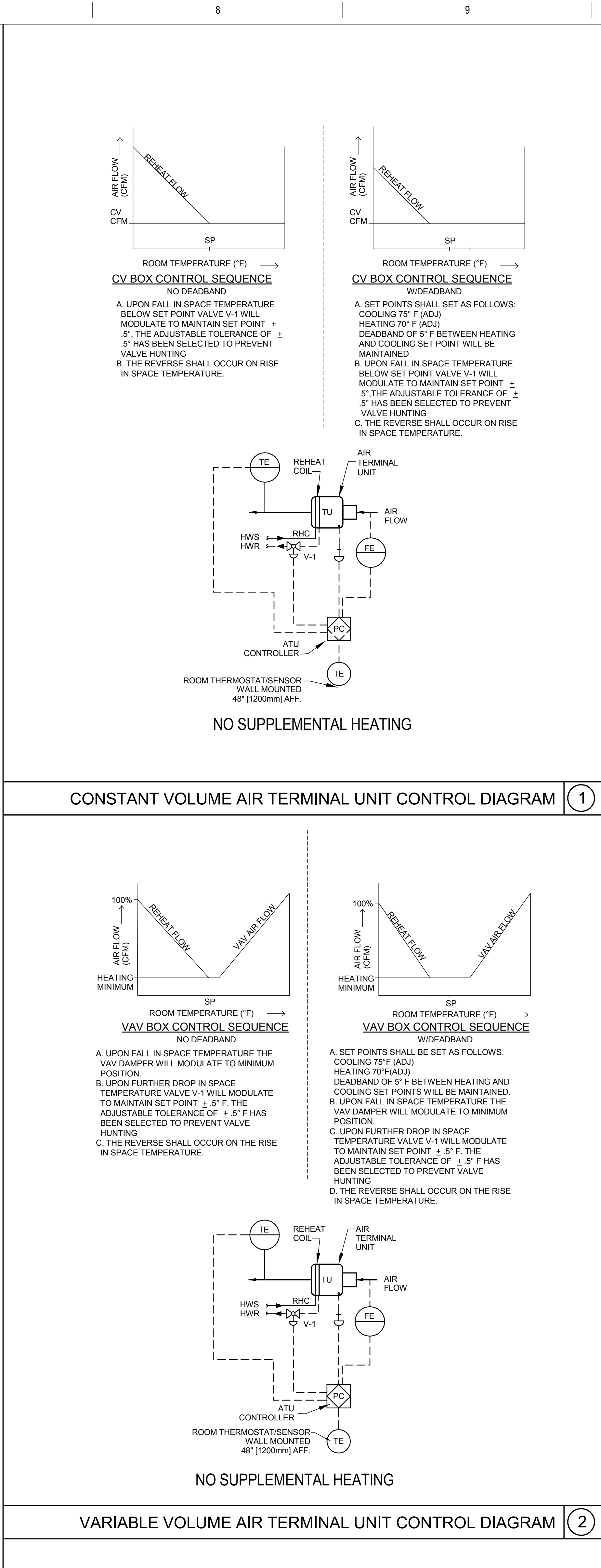
Office of Construction and Facilities Management
Department of Veterans Affairs



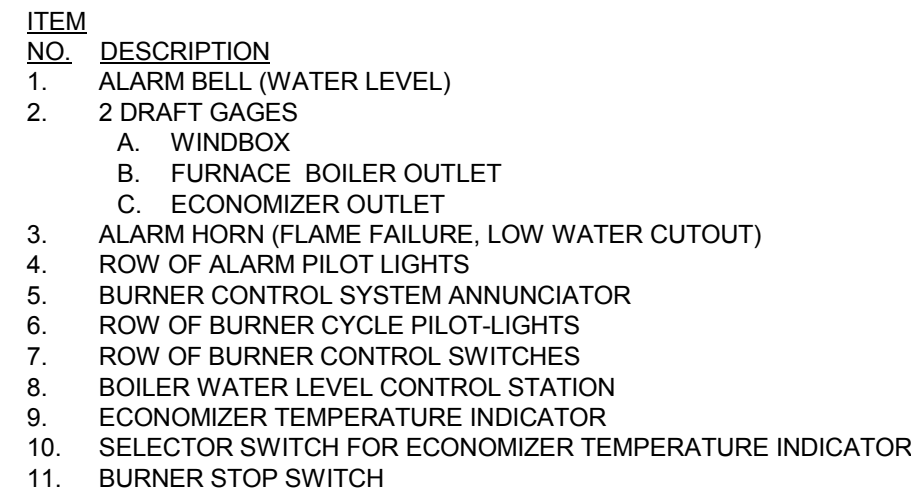
NOT USED	5
CONSULTANTS:	
	Syska Hennessy Group, Inc. 425 California Street Suite 700 San Francisco, CA 94104 Tel: 415.288.9060 Fax: 415.635.0385 www.syska.com
Revisions:	Date

POINTS LIST FOR AIR COOLED CHILLER		POINT LEGEND	SYSTEM OUTPUTS	SYSTEM INPUTS	SYSTEM SOFTWARE/CONTROL	PAGE:
SYSTEM:			BINARY	ANALOG	ALARM PROCESSING	APPLICATION/FUNCTION
AIR COOLED CHILLER						
SYSTEM COMPONENT:		POINT ID	ANALOG	ANALOG	ANALOG	ANALOG
CHILLER-1 POWER	AI-1	COMM				
CHILLER-1 CAPACITY	AI-2	COMM				
CHW RETURN TEMP	AI-3	TT-1				
CHILLER-1 CHW SUPPLY TEMP	AI-4	TT-2				
CHILLER-1 CKT-1 SUCTION TEMP	AI-5	COMM				
CHILLER-1 CKT-2 SUCTION TEMP	AI-6	COMM				
CHILLER-1 CKT-1 DISCHARGE TEMP	AI-7	COMM				
CHILLER-1 CKT-2 DISCHARGE TEMP	AI-8	COMM				
CHILLER-1 CKT-1 SUCTION PRESSURE	AI-9	COMM				
CHILLER-1 CKT-2 SUCTION PRESSURE	AI-10	COMM				
CHILLER-1 CKT-1 DISCHARGE PRESSURE	AI-11	COMM				
CHILLER-1 CKT-2 DISCHARGE PRESSURE	AI-12	COMM				
CHILLER-1 START/STOP	BI-1	COMM				
CHILLER-1 COMP 1A STATUS	BI-2	COMM				
CHILLER-1 COMP 1B STATUS	BI-3	COMM				
CHILLER-1 COMP 2A STATUS	BI-4	COMM				
CHILLER-1 COMP 2B STATUS	BI-5	COMM				
CHILLER-1 ALARM	BI-6	COMM				
CHILLER-1 FAN STATUS	BI-7	IT-1				
CHILLER-1 FLOW	BI-8	COMM				
CHILLER-1 COMP 1C STATUS	BI-9	COMM				
CHILLER-1 COMP 2C STATUS	BI-10	COMM				
CHILLER-1 COMP 1C ALARM	BI-11	COMM				
CHILLER-1 COMP 2C ALARM	BI-12	COMM				
CHILLER-1 CHWST SETPOINT	AO-1	COMM				
CHILLER-1 ISOLATION VALVE	BO-1	ZC				
CHILLER-2 POWER	AI-13	COMM				
CHILLER-2 CAPACITY	AI-14	COMM				
CHILLER-2 CHW SUPPLY TEMP	AI-15	TT-3				
CHILLER-2 CKT-1 SUCTION TEMP	AI-16	COMM				
CHILLER-2 CKT-2 SUCTION TEMP	AI-17	COMM				
CHILLER-2 CKT-1 DISCHARGE TEMP	AI-18	COMM				
CHILLER-2 CKT-2 DISCHARGE TEMP	AI-19	COMM				
CHILLER-2 CKT-1 SUCTION PRESSURE	AI-20	COMM				
CHILLER-2 CKT-2 SUCTION PRESSURE	AI-21	COMM				
CHILLER-2 CKT-1 DISCHARGE PRESSURE	AI-22	COMM				
CHILLER-2 CKT-2 DISCHARGE PRESSURE	AI-23	COMM				
CHILLER-2 START/STOP	BI-13	COMM				
CHILLER-2 COMP 1A STATUS	BI-14	COMM				
CHILLER-2 COMP 1B STATUS	BI-15	COMM				
CHILLER-2 COMP 2A STATUS	BI-16	COMM				
CHILLER-2 COMP 2B STATUS	BI-17	COMM				
CHILLER-2 ALARM	BI-18	COMM				
CHILLER-2 FAN STATUS	BI-19	IT-1				
CHILLER-2 FLOW	BI-20	COMM				
CHILLER-2 COMP 1C STATUS	BI-21	COMM				
CHILLER-2 COMP 2C STATUS	BI-22	COMM				
CHILLER-2 COMP 1C ALARM	BI-23	COMM				
CHILLER-2 COMP 2C ALARM	BI-24	COMM				
CHILLER-2 CHWST SETPOINT	AO-2	COMM				
CHILLER-2 ISOLATION VALVE	BO-2	ZC				
CHILLER-3 POWER	AI-24	COMM				
CHILLER-3 CAPACITY	AI-25	COMM				
CHILLER-3 CHW SUPPLY TEMP	AI-26	TT-4				
CHILLER-3 CKT-1 SUCTION TEMP	AI-27	COMM				
CHILLER-3 CKT-2 SUCTION TEMP	AI-28	COMM				
CHILLER-3 CKT-1 DISCHARGE TEMP	AI-29	COMM				
CHILLER-3 CKT-2 DISCHARGE TEMP	AI-30	COMM				
CHILLER-3 CKT-1 SUCTION PRESSURE	AI-31	COMM				
CHILLER-3 CKT-2 SUCTION PRESSURE	AI-32	COMM				
CHILLER-3 CKT-1 DISCHARGE PRESSURE	AI-33	COMM				
CHILLER-3 CKT-2 DISCHARGE PRESSURE	AI-34	COMM				
CHILLER-3 START/STOP	BI-25	COMM				
CHILLER-3 COMP 1A STATUS	BI-26	COMM				
CHILLER-3 COMP 1B STATUS	BI-27	COMM				
CHILLER-3 COMP 2A STATUS	BI-28	COMM				
CHILLER-3 COMP 2B STATUS	BI-29	COMM				
CHILLER-3 ALARM	BI-30	COMM				
CHILLER-3 FAN STATUS	BI-31	IT-1				
CHILLER-3 FLOW	BI-32	COMM				
CHILLER-3 COMP 1C STATUS	BI-33	COMM				
CHILLER-3 COMP 2C STATUS	BI-34	COMM				
CHILLER-3 COMP 1C ALARM	BI-35	COMM				
CHILLER-3 COMP 2C ALARM	BI-36	COMM				
CHILLER-3 CHWST SETPOINT	AO-3	COMM				
CHILLER-3 ISOLATION VALVE	BO-3	ZC				

ARCHITECT/ENGINEERS:	Drawing Title	Project Title	Project Number
	MECHANICAL CONTROLS DIAGRAMS	GENOMICS CLINICAL RESEARCH CENTER, PALO ALTO	640-389
HILLIARD ARCHITECTS, INC 251 Post Street, Suite 620 San Francisco, CA 94108-5017 Tel 415 989 6400, Fax 415 989 3056 www.HilliardArchitects.com	Approved: Project Director	Location VAPAHCS - PALO ALTO	Building Number 51
		Date 06/20/2014	Drawing Number M1702
		Checked Checker	Dwg. of
		Drawn Author	



VARIABLE VOLUME AIR TERMINAL UNIT CONTROL DIAGRAM	2
FINAL BID DOCUMENTS	
Office of Construction and Facilities Management	
Department of Veterans Affairs	



- NOTES:**
1. INTERIOR OF PANEL SHALL BE UTILIZED FOR MOUNTING RELAYS, BURNER CONTROL PROGRAMMER, AND OTHER DEVICES.
 2. PROVIDE FRONT OR REAR ACCESS DOORS FULL HEIGHT AND WIDTH OF PANEL.
 3. PANEL DIMENSIONS APPROX. 3'-0" (1 M) W x 1'-8" (0.5 M) D x 7'-4" (2.3 M) H.
 4. WINDOW AND FURNACE GATE SCALE RANGES RECOMMENDED BY BOILER AND BURNER MANUFACTURER.
 5. SCALE RANGE OF BOILER OUTLET DRAFT GAGE MUST BE COORDINATED WITH ECONOMIZER DRAFT LOSS, IF THERE IS NO ECONOMIZER.
 6. BOILER COMBUSTION CONTROL, SUBMASTER, DRAFT CONTROL, AND OXYGEN TRIM CONTROL STATIONS MAY BE LOCATED ON THIS PANEL.

THE BOILER SYSTEM CONSISTS OF TWO BOILERS IN PARALLEL WITH PRIMARY / SECONDARY PUMP CONFIGURATION

1. BOILER SYSTEM - RUN CONDITIONS: THE BOILER SYSTEM SHALL BE ENABLED TO RUN WHENEVER OUTSIDE AIR TEMPERATURE IS GREATER THAN 20°F (ADJ.)

2. TO PREVENT SHORT CYCLING, THE BOILER SYSTEM SHALL RUN FOR AND BE OFF FOR MINIMUM ADJUSTABLE TIMES (BOTH USER DEFINABLE), UNLESS SHUTDOWN ON SAFETIES OR OUTSIDE AIR CONDITIONS.

3. EACH BOILER SHALL RUN SUBJECT TO ITS OWN INTERNAL SAFETIES AND CONTROLS.

4. THE BOILER SYSTEM SHALL ALSO RUN FOR FREEZE PROTECTION WHENEVER OUTSIDE AIR TEMPERATURE IS LESS THAN 38°F (ADJ.)

5. BOILER SAFETIES: THE FOLLOWING SAFETIES SHALL BE MONITORED:

- a. BOILER ALARM
- b. LOW WATER LEVEL

6. ALARMS SHALL BE PROVIDED AS FOLLOWS:

- a. BOILER ALARM
- b. LOW WATER LEVEL ALARM

7. PRIMARY HOT WATER PUMP:

- a. THE HOT WATER PUMP SHALL RUN ANYTIME THE BOILER IS CALLED TO RUN AND SHALL HAVE A USER DEFINABLE DELAY (ADJ.) ON STOP
- b. ALARMS SHALL BE PROVIDED AS FOLLOWS:
 - b.1. HOT WATER PUMP FAILURE: COMMANDED ON, BUT THE STATUS IS OFF
 - b.2. HOT WATER PUMP RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON
 - b.3. HOT WATER PUMP RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT

8. SECONDARY HOT WATER PUMP:

- a. THE CONTROLLER SHALL MEASURE HOT WATER DIFFERENTIAL PRESSURE AND MODULATE THE SECONDARY HOT WATER PUMP FLOW TO MAINTAIN ITS HOT WATER DIFFERENTIAL PRESSURE SETPOINT
- b. ALARMS SHALL BE PROVIDED AS FOLLOWS:
 - b.1. HOT WATER PUMP FAILURE: COMMANDED ON, BUT THE STATUS IS OFF
 - b.2. HOT WATER PUMP RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON
 - b.3. HOT WATER PUMP RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT

9. BOILER ENABLE: THE BOILER SHALL BE ENABLED WHEN THE BOILER SYSTEM IS COMMANDED ON. THE BOILER SHALL BE ENABLED AFTER PUMP STATUS IS PROVEN ON AND SHALL RUN SUBJECT TO ITS OWN INTERNAL SAFETIES AND CONTROLS

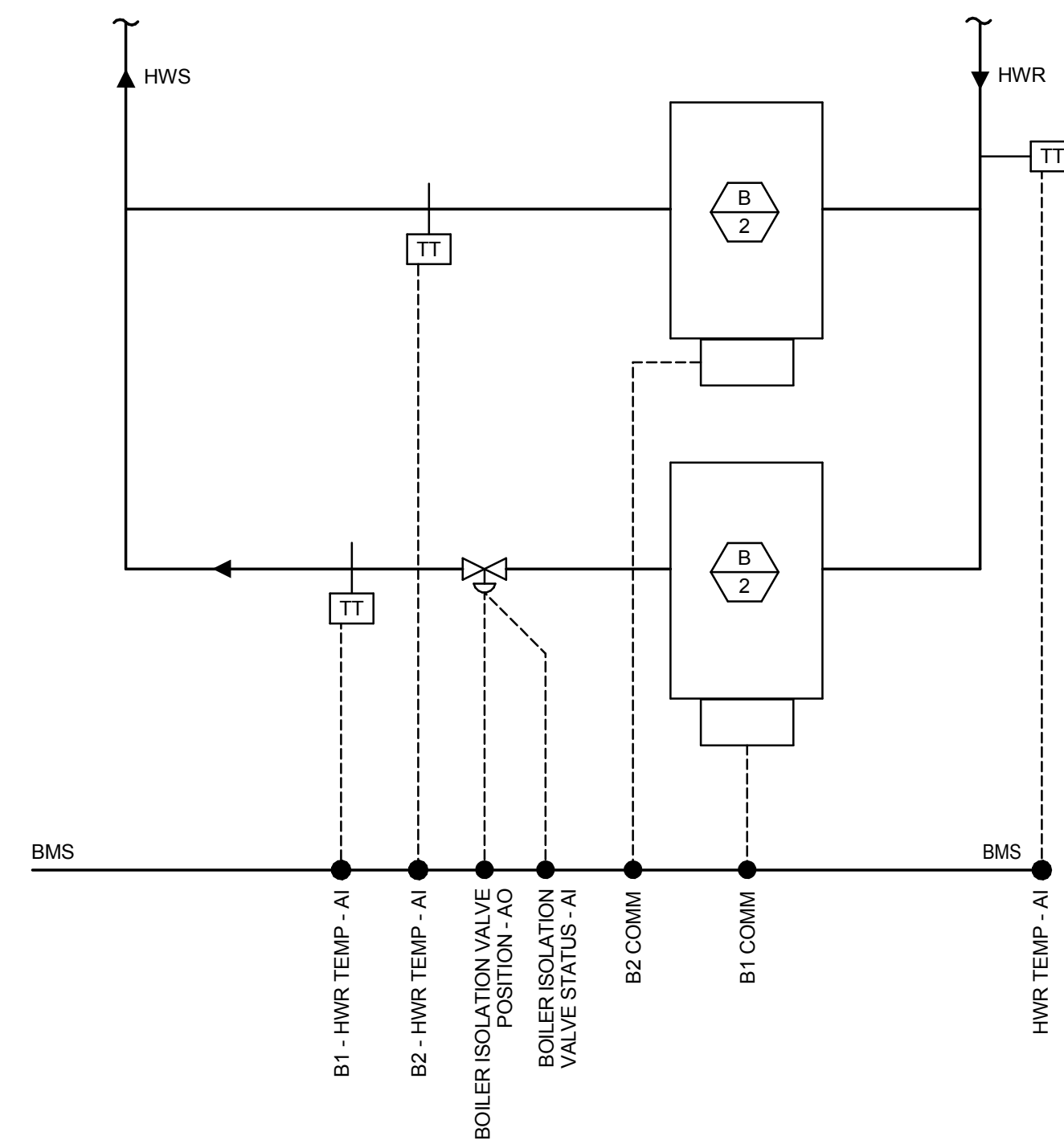
- a. ALARMS SHALL BE PROVIDED AS FOLLOWS:
 - a.1. BOILER FAILURE: COMMANDED ON, BUT THE STATUS IS OFF
 - a.2. BOILER RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON
 - a.3. BOILER RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT
- b. HOT WATER SUPPLY TEMPERATURE SETPOINT RESET: THE HOT WATER SUPPLY TEMPERATURE SETPOINT SHALL BE RESET BASED ON OUTSIDE AIR TEMPERATURE
- b.1. OUTSIDE AIR TEMPERATURE RISES FROM 0°F (ADJ.) TO 70°F (ADJ.) THE HOT WATER SUPPLY TEMPERATURE SETPOINT SHALL RESET DOWNWARDS BY SUBTRACTING FROM 10° (ADJ.) UP TO 20° (ADJ.) FROM THE CURRENT BOILER SETPOINT

10. PRIMARY HOT WATER TEMPERATURE MONITORING: THE FOLLOWING TEMPERATURES SHALL BE MONITORED

- c. PRIMARY HOT WATER SUPPLY
- d. PRIMARY HOT WATER RETURN

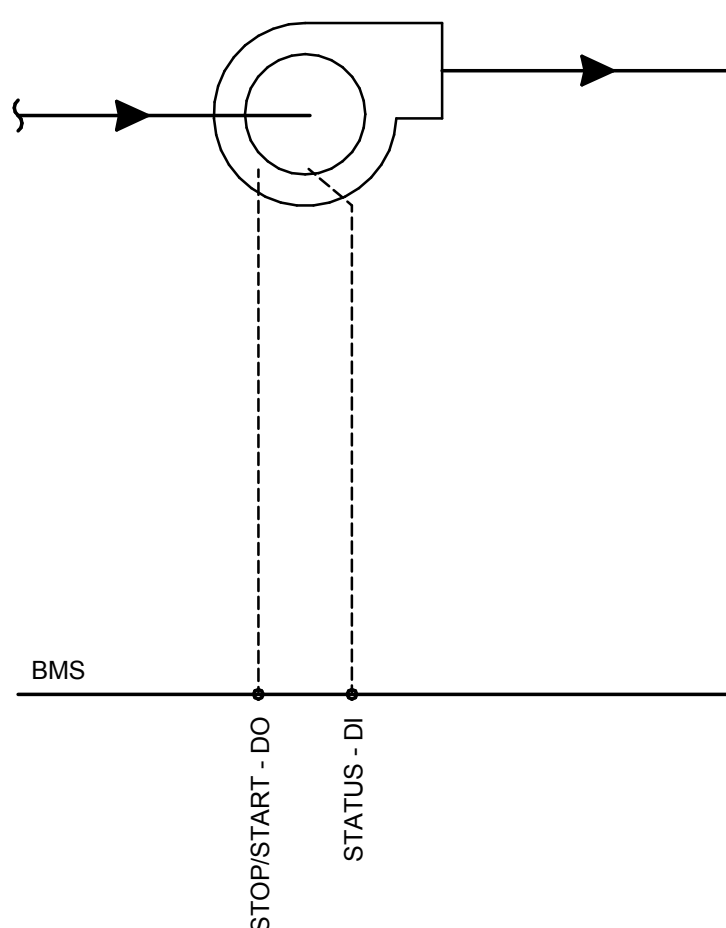
11. ALARMS SHALL BE PROVIDED AS FOLLOWS:

- c.1. HIGH PRIMARY HOT WATER SUPPLY TEMP: IF GREATER THAN 200°F (ADJ.)
- c.3.2. LOW PRIMARY HOT WATER SUPPLY TEMP: IF LESS THAN 100°F (ADJ.)



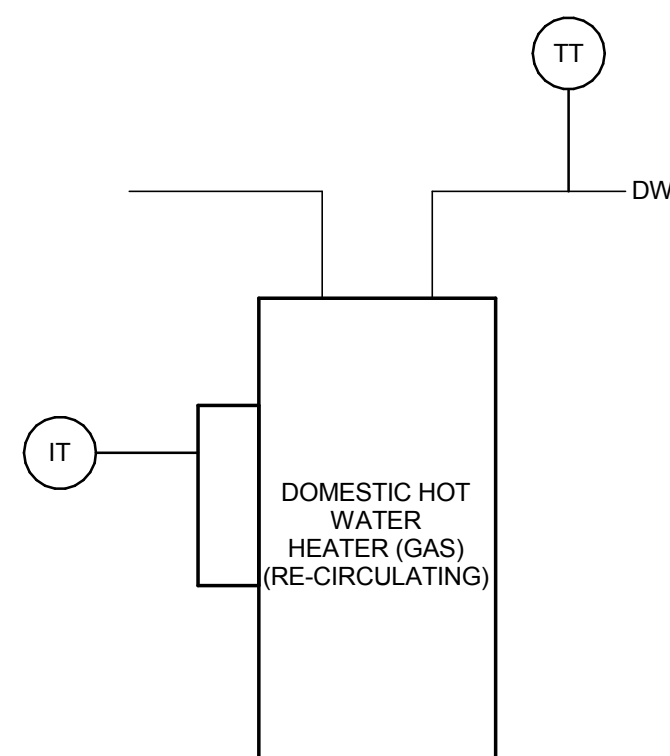
BOILER POINTS		LIST											
DESCRIPTION	VALUE	POINT TYPE				TRENDING AND ALARM							
		DIGITAL INPUT	DIGITAL OUTPUT	ANALOG INPUT	ANALOG OUTPUT	SOFTWARE POINT	ALARM	REMOTE ALARM NOTIFICATION	HIGH PRE-ALARM	HIGH ALARM	LOW PRE-ALARM	LOW ALARM	TRENDING
B1 Boiler HW Supply Temp Setpt	Deg F			X		X						X	
B1 Boiler Alarm Status		X				X	X						X
B1 Low Water Level			X			X							X
B1 Boiler Status		X		X		X							X
B1 Boiler Enable			X			X							X
B1 Boiler Failure		X				X	X						X
B1 Boiler Running In Hand		X				X							X
B1 High HW Supply Temp	Deg F		X			X	X						X
B1 Low HW Supply Temp	Deg F	X				X	X						X
B1 Boiler Firing Rate	%			X									X
B1 Boiler Flow Switch		X				X							X
B1 HWS Temperature	Deg F			X		X							X
B1 HWR Temperature	Deg F			X		X							X
B1 Boiler Isolation Valve Status	%			X			X						X
B1 Boiler Isolation Valve Position	%				X	X							X
HW Energy (See BTU Meter)													X
B2 Boiler HW Supply Temp Setpt	Deg F				X		X						X
B2 Boiler Alarm Status		X				X	X						X
B2 Low Water Level			X			X							X
B2 Boiler Status		X				X							X
B2 Boiler Enable			X			X							X
B2 Boiler Failure		X				X	X						X
B2 Boiler Running In Hand		X				X							X
B2 High HW Supply Temp	Deg F		X			X	X						X
B2 Low HW Supply Temp	Deg F	X				X	X						X
B2 Boiler Firing Rate	%			X		X							X
B2 Boiler Flow Switch		X				X							X
B2 HWS Temperature	Deg F			X			X						X
B2 Boiler Isolation Valve Status	%			X									X
B2 Boiler Isolation Valve Position	%				X		X						X

BOILER CONTROL DIAGRAM

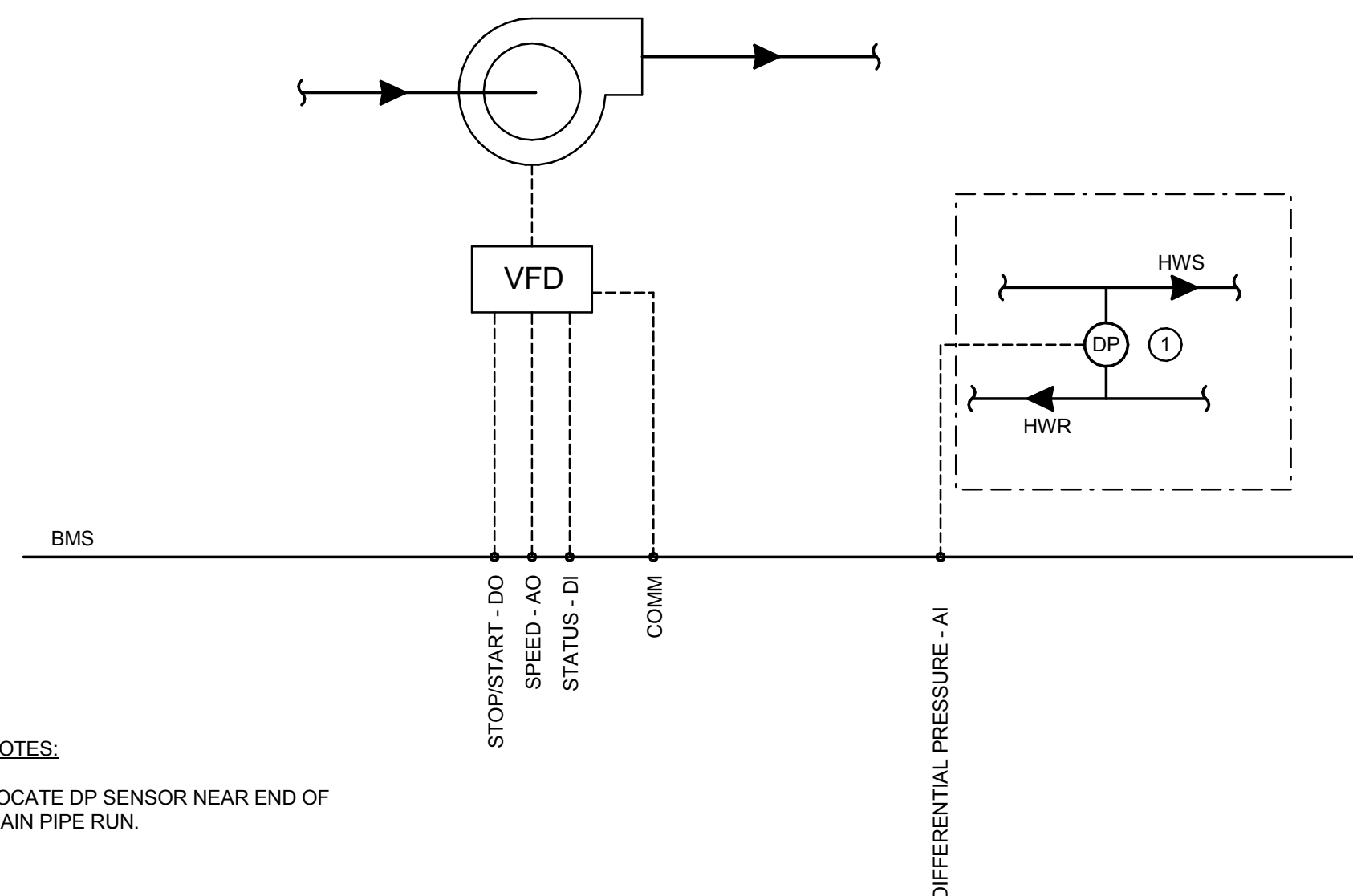


PRIMERY HOT WATER PUMP POINTS LIST									
DESCRIPTION	VALUE	POINT TYPE				TRENDING AND ALARM			
Monitor and Control Points	Units								
		DIGITAL INPUT	DIGITAL OUTPUT	ANALOG INPUT	ANALOG OUTPUT	SOFTWARE POINT	HARDWARE POINT	ALARM	REMOTE ALARM NOTIFICATION
								HIGH PRE-ALARM	HIGH ALARM
								LOW PRE-ALARM	LOW ALARM
									TRENDING
On/Off			X						X
Status		X							

- NOTES:
1. PROVIDE LOW TEMP AND HIGH TEMP ALARMS AT ENGINEERING CONTROL CENTER. (ADJ.)



- NOTES:**
- ① LOCATE DP SENSOR NEAR END OF MAIN PIPE RUN.



SECONDARY HOT WATER PUMP POINTS LIST														
DESCRIPTION	VALUE	POINT TYPE					TRENDING AND ALARM							
Monitor and Control Points	Units													
			DIGITAL INPUT	DIGITAL OUTPUT										
					ANALOG INPUT									
						ANALOG OUTPUT								
							SOFTWARE POINT							
								HARDWARE POINT						
									ALARM					
										REMOTE ALARM NOTIFICATION				
											HIGH PRE-ALARM			
												HIGH ALARM		
											LOW PRE-ALARM			
												LOW ALARM		
													TRENDING	
On/Off				X										X
Status		X												X
Alarm		X						X						X
Loop Differential Pressure					X			X			X			X

SECONDARY HOT WATER PUMP CONTROL DIAGRAM

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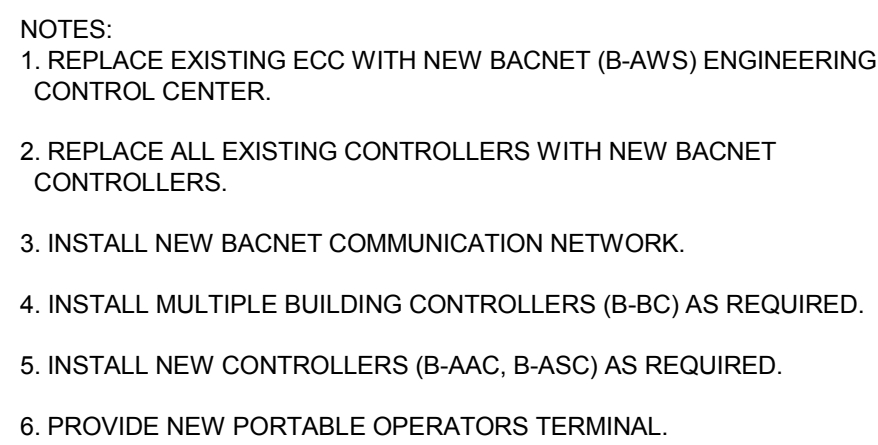
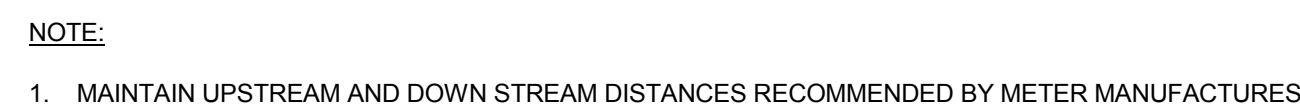
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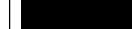


NOTES:

1. ELECTRICAL, BTU, AND GAS METERS SHALL BE INSTALLED TO MEASURE AND CONFIRM ENERGY USE, PEAK POWER AND EQUIPMENT EFFICIENCY FOR EACH CATEGORY NOTED ABOVE.
2. EQUIPMENT EFFICIENCY SHALL BE DEFINED AS (HEATING OR COOLING OUTPUT) / (ENERGY INPUT)
3. CONTROLS CONTRACTOR SHALL PULL ENERGY USE DATA FROM METERS INTO THE BMS FOR DATA PROCESSING AND ANALYSIS.
4. THE BMS SHALL AUTOMATICALLY GENERATE ANNUAL AND MONTHLY REPORTS THAT DISPLAY REPORTED UNITS FOR EACH CATEGORY.
5. CONTROLS CONTRACTOR SHALL PROVIDE SUBMITTER. ELECTRICAL OR MECHANICAL CONTRACTOR SHALL INSTALL (AS APPLICABLE). CONTROLS CONTRACTOR SHALL INTEGRATE INTO BMS.
6. MORE THAN ONE SUBMITTER MAY BE REQUIRED FOR EACH CATEGORY. SEE ELECTRICAL AND MECHANICAL PLANS FOR SUBMITTER QUANTITIES.
7. CONTROLS CONTRACTOR SHALL PROVIDE ALL PROGRAMMING AND MATH TO COMBINE MULTIPLE METERS INTO EACH CATEGORY, AND OVERALL EQUIPMENT EFFICIENCY.

BMS SUBMETERING LIST (2)

FINAL BID DOCUMENTS

Project Title GENOMICS CLINICAL RESEARCH CENTER, PALO ALTO			Project Number 640-389		<div>Office of Construction and Facilities Management</div> <div>  Department of Veterans Affairs </div>
Location VAPAHCS - PALO ALTO			Building Number 51		
Date 06/20/2014			Drawing Number M1704		
Checked Checker		Drawn Author	Dwg. of		

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CONSULTANTS:



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MECHANICAL CONTROLS DIAGRAMS

Approved: Project Director

Project Title

**GENOMICS CLINICAL
RESEARCH CENTER,
PALO ALTO**

Location
VAPAHCS - PALO ALTO

Date
06/20/2014

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	Drawing Number
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