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CEILING DIFFUSER SCHEDULE

NOTES:
1. PERFORMANCE OF SA-SE BASED ON PRICE MODEL ASPD PLAQUE FACED DIFFUSER
2. PERFORMANCE OF SF BASED ON PRICE MODEL LFD LAMINAR FLOW DIFFUSER
3. ALL DIFFUSERS SHALL BE FURNISHED WITHOUT DAMPERS UNLESS OTHERWISE NOTED.
4. ROUTE RUN-OUT SIZE TO GRILLE UNLESS OTHERWISE NOTED ON DRAWINGS.

SYMBOL	RUN OUT SIZE	NECK SIZE	FACE SIZE	MAX. NC	MAX. SP
SA-12	6"ø	6"ø	12"x12"	–	.016
SA	6"ø	6"ø	24"x24"	–	.016
SB	8"ø	8"ø	24"x24"	–	.042
SC	10"ø	10"ø	24"x24"	–	.065
SD	12"ø	12"ø	24"x24"	15	.093
SE	14"ø	14"ø	24"x24"	18	.127
SF	10"ø	10"ø	48"x24"	17	.030"

RETURN/EXHAUST GRILLE SCHEDULE

NOTES:
1. GRILLES BASED ON PRICE MODEL 80 0.5" GRID DESIGN.
2. GRILLES TO BE FURNISHED WITHOUT DAMPER.
3. FACE SIZE BASED ON LAY-IN CEILING. ADD 1.75" TO FACE SIZE FOR DRYWALL APPLICATIONS.
4. PROVIDE SQUARE TO ROUND TRANSITION ON BACK OF GRILLE.

SYMBOL		RUN OUT SIZE	NECK SIZE	FACE SIZE	MAX. NC	MAX. SP
RA	EA	6"ø	12"x12"	12"x12"	18	.02"
RB	EB	8"ø	24"x24"	24"x24"	24	.03"
RC	EC	10"ø	24"x24"	24"x24"	24	.03"
RD	ED	12"ø	24"x24"	24"x24"	24	.03"
RE	EE	14"ø	24"x24"	24"x24"	24	.03"
RF	EF	18"ø	24"x24"	24"x24"	24	.03"
RG	EG	24"x24"	24"x24"	24"x24"	24	.03"
RH	EH	24"x24"	24"x24"	24"x24"	24	.03"

SECURITY CEILING DIFFUSER SCHEDULE

NOTES:
1. ⬢ = DENOTES SECURITY TYPE DIFFUSER.
2. PERFORMANCE BASED ON PRICE "MSRRCD".
3. PROVIDE 6" SLEEVE AND SQUARE TO ROUND TRANSITION ON BACK OF GRILLE.

SYMBOL	RUN OUT SIZE	FACE SIZE	MAX. CFM	MAX. NC
SSA	6"ø	6"x6"	75	30
SSB	8"ø	8"x8"	130	30
SSC	10"ø	12"x12"	300	30
SSD	12"ø	15"x15"	470	30
SSE	14"ø	18"x18"	675	30

SECURITY CEILING RETURN/EXHAUST SCHEDULE

NOTES:
1. ⬢ = DENOTES SECURITY TYPE DIFFUSER.
2. PERFORMANCE BASED ON PRICE "MSRRP".
3. PROVIDE 2" SLEEVE AND SQUARE TO ROUND TRANSITION ON BACK OF GRILLE.

SYMBOL	RUN OUT SIZE	FACE SIZE	MAX. CFM	MAX. NC
SRA/SEA	6"ø	6"x6"	75	30
SRB/SEB	8"ø	9"x9"	170	30
SRC/SEC	10"ø	12"x12"	300	30
SRD/SED	12"ø	14"x14"	400	30
SRE/SEE	12"ø	16"x16"	530	30
SEF/SEF	14"ø	20"x20"	830	30
SRG/SEG	16"ø or 14"x14"	24"x24"	1200	30

HVAC SPECIFICATIONS

1. ALL MECHANICAL WORK SHALL BE IN ACCORDANCE WITH THE STATE AND LOCAL CODES. SEE ARCHITECTURAL DRAWINGS FOR APPLICABLE CODES. CONTRACTOR SHALL PAY FOR FEES AND PERMITS.
2. ALL DUCTWORK SHALL BE SHEETMETAL IN ACCORDANCE WITH THE LATEST SMACNA HVAC DUCT CONSTRUCTION STANDARDS. DUCT DIMENSIONS ARE INSIDE CLEAR.
3. ALL SUPPLY DIFFUSERS SHALL BE PRICE MODEL ASPD AND RETURN GRILLS SHALL BE PRICE MODEL 80 ALUMINUM ½"X½" GRID OR APPROVED EQUAL OR AS OTHERWISE NOTED. INSULATE BACK OF DIFFUSERS SIMILAR TO DUCTWORK IF DIFFUSER HAS ROOF ABOVE.
4. ALL ROUND TAPS SHALL BE MADE USING SPIN-IN METAL COLLARS WITH SCOOP AND DAMPER (METALCRAFT #156S-D OR EQUAL) OR STICK-ON AIRTIGHT COLLARS WITH NEOPRENE GASKET, SCOOP AND DAMPER (METALCRAFT #ATSD OR EQUAL) WITH SHEET METAL SCREWS 6" ON CENTER.
5. WHERE INDIVIDUAL SPIN-IN FITTINGS WITH MANUAL VOLUME DAMPERS ARE PROVIDED FOR EACH DIFFUSER OR REGISTER, THE OPPOSED BLADE DAMPER IN THE DIFFUSER OR REGISTER MAY BE OMITTED.
6. SEAL ALL DUCT (SUPPLY, RETURN, OUTSIDE AIR, EXHAUST) JOINTS WITH MEI EDS 44-55 OR 44-52; DESIGN POLYMERICS DP1010; IRON GRIP OR EQUAL. APPLY WHEN ENVIRONMENT IS BETWEEN 50 deg F TO 95 deg F.
7. ALL SUPPLY, RETURN, AND OUTSIDE AIR DUCT TO BE EXTERNALLY INSULATED WITH 2" THICK, 3/4 PCF DENSITY, FLEXIBLE, MINIMUM INSTALLED (25% COMPRESSION) "R" VALUE OF 5.6. FACTORY-REINFORCED GLASS FIBER BLANKET WITH FOIL-FACED VAPOR BARRIER EQUAL TO KNAUF DUCT WRAP. INSULATE TOPS OF ALL SUPPLY DIFFUSERS WITH 2" THICK INSULATION. EXHAUST DUCT NEED NOT BE INSULATED.
8. REFRIGERANT PIPING TO BE ACR GRADE TYPE L HARD COPPER SIZED AND INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS. SUCTION LINES WILL BE INSULATED WITH 3/4" ARMAFLEX INSULATION.
9. CONDENSATE DRAIN PIPING SHALL BE TYPE M HARD COPPER WITH 1/2" ARMAFLEX INSULATION.
10. PIPE HANGERS SHALL BE GRINNELL OR EQUAL WITH HANGER TYPE MATCHING THE REQUIREMENT. MAXIMUM ALLOWABLE SPACING SHALL BE AS FOLLOWS:

3/4" to 1-1/4"	dia. PIPE	6 FOOT ON CENTER SPACING
1-1/2" to 2-1/2"	dia. PIPE	10 FOOT ON CENTER SPACING
3" to 5"	dia. PIPE	12 FOOT ON CENTER SPACING
6" to 8"	dia. PIPE	14 FOOT ON CENTER SPACING

11. TESTING AND BALANCING TO BE PERFORMED BY AN INDEPENDENT NEBB OR AABC CERTIFIED TEST AND BALANCE COMPANY. BALANCE ALL DIFFUSERS AND REGISTERS TO WITHIN 10% OF VALUES SHOWN ON DRAWINGS. RECORD DISCHARGE AIR TEMPERATURE ON HEATING AND COOLING OF ALL AC UNITS. RECORD OUTSIDE AIR TEMPERATURE AT THE SAME TIME. BALANCE OUTSIDE AIR TO WITHIN +10% OF VALUES SHOWN ON DRAWINGS. BALANCING SHALL BE PERFORMED WITH ALL DOORS TO THE ROOM CLOSED.
12. ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR. NEW COMPRESSORS SHALL HAVE A FIVE YEAR REPLACEMENT WARRANTY.
13. PROVIDE SHOP DRAWINGS FOR ALL MECHANICAL EQUIPMENT AS REQUIRED BY ARCHITECT OR OWNERS REPRESENTATIVE.
14. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS SHOWN ON MECHANICAL DRAWINGS. CONNECTIONS TO EXISTING SERVICES ARE ENGINEERS BEST UNDERSTANDING BASED ON AVAILABLE INFORMATION, CONTRACTOR SHALL ROUTE DUCT AND PIPING AS NECESSARY TO MAKE CONNECTIONS TO EXISTING SERVICES AS THEY EXIST IN THE FACILITY REGARDLESS OF HOW THEY'RE SHOWN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COMMUNICATE ANY DEVIATION FOUND PRIOR TO CONSTRUCTION.
15. IF, AFTER BALANCING TO THE REQUIREMENTS ABOVE, SOME ROOM TEMPERATURES DEVIATE MORE THAN 2°F FROM THE THERMOSTATIC SET POINT FOR THE RESPECTIVE ZONE, THE CONTRACTOR SHALL MAKE MINOR ADJUSTMENTS IN THE AIRFLOW TO MINIMIZE TEMPERATURE DEVIATIONS AT NO ADDITIONAL COST TO THE OWNER.

VENDOR EQUIPMENT NOTES

1. THE OWNER FURNISHED EQUIPMENT (VENDOR) DOCUMENTS ARE AN INTEGRAL PART OF THESE CONTRACT DOCUMENTS FOR THIS PROJECT. ANY MATERIALS, LABOR, OR COORDINATION LISTED IN THE VENDOR DOCUMENTS AND SPECIFICALLY NOTED TO BE INCLUDED BY THE CONTRACTOR ARE TO BE FURNISHED AND INSTALLED UNDER THIS CONTRACT. REFER TO VENDOR DRAWINGS AND OWNER FURNISHED EQUIPMENT BROCHURES TO COORDINATE SIZE AND LOCATION OF ALL ROUGH-IN AND FINAL CONNECTION REQUIREMENTS FOR VENTING, EXHAUST CONNECTIONS, STEAM PIPING STEAM CONDENSATE PIPING, TRAPS, VALVES,DRAINS, AND WATER CONNECTIONS.
2. COORDINATE ROUGH-IN SIZES AND REQUIREMENTS WITH ACTUAL PURCHASED EQUIPMENT.

SEISMIC REQUIREMENTS

HVAC DUCTWORK, PIPING, AND EQUIPMENT SHALL BE SUPPORTED BASED ON A SEISMIC CATEGORY "D" WITH Ip = 1.5. MECHANICAL CONTRACTOR IS RESPONSIBLE TO HAVE A LICENSED STRUCTURAL ENGINEER DESIGN SEISMIC SUPPORT SYSTEMS. CONTRACTOR SHALL ALSO COORDINATE WITH LOCAL AHJ TO CONFIRM SEISMIC DESIGN CONSIDERATIONS AND BRACING OF DUCTWORK, PIPING, AND EQUIPMENT.

REQUIRED COORDINATION

1. VISIT SITE AND BE INFORMED OF CONDITIONS UNDER WHICH WORK MUST BE PERFORMED.
2. NO SUBSEQUENT ALLOWANCE WILL BE MADE BECAUSE OF ERROR OR FAILURE TO OBTAIN NECESSARY INFORMATION TO COMPLETELY ESTIMATE AND PERFORM ALL WORK INVOLVED.
3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FLAG ALL DEVIATIONS ON THE SHOP DRAWINGS FROM THE SPECIFIED ITEM AND APPROVAL OF THE SHOP DRAWINGS WILL NOT BE CONSIDERED ACCEPTANCE OF THE DEVIATION UNLESS IT'S BEEN EXPLICITLY FLAGGED.
4. CAREFULLY EXAMINE DRAWINGS AND SPECIFICATIONS TO BE THOROUGHLY FAMILIAR WITH ITEMS WHICH REQUIRE PLUMBING OR HVAC CONNECTIONS AND COORDINATION.
5. NOTIFY OTHER TRADES OF ANY DEVIATIONS OR SPECIAL CONDITIONS NECESSARY FOR INSTALLATION OF WORK.
6. RESOLVE INTERFERENCES BETWEEN WORK OF OTHER TRADES PRIOR TO INSTALLATION OR FABRICATION.
7. ADVISE OTHERS TRADES TO LEAVE PROPER CHASES AND OPENINGS. PLACE OUTLETS, ANCHORS, SLEEVES AND SUPPORTS PRIOR TO POURING CONCRETE OR INSTALLATION OF MASONRY WORK.
8. ADVISE OTHER TRADES TO LEAVE FLOOR DEPRESSIONS WHERE REQUIRED FOR PROPER INSTALLATION OF SHOWERS OR OTHER EQUIPMENT.
9. COORDINATE ALL NECESSARY POWER CONNECTIONS AS RECOMMENDED BY THE MANUFACTURERS OF INSTALLED EQUIPMENT WITH ELECTRICAL TRADESMAN.
10. DO NOT ROUTE ANY PIPING DIRECTLY ABOVE OR 42-INCHES IN FRONT OF ELECTRICAL SWITCHGEAR, PANELS, OR TRANSFORMERS.
11. SHOULD THIS COORDINATION BE NEGLECTED, ANY CUTTING AND/OR PATCHING REQUIRED TO BE DONE AT CONTRACTOR'S EXPENSE.

HVAC GENERAL NOTES

1. ALL DRAWINGS ARE DIAGRAMMATIC.
2. ROUTE NEW DUCTWORK ABOVE CEILING TIGHT TO STRUCTURE. RELOCATE OR OFFSET EXISTING PIPING, CONDUIT AND DUCTWORK AS REQUIRED FOR INSTALLATION OF NEW WORK.
3. ALL LAY-IN DIFFUSERS, RETURN AND EXHAUST GRILLES SHALL BE 24"x24" OR 12"x12" FULL FACE UNLESS OTHERWISE NOTED. CONTRACTOR SHALL COORDINATE DIFFUSER FRAMES WITH REFLECTED CEILING PLAN TO DETERMINE TYPE OF FRAME REQUIRED, GYP-BOARD MOUNTING OR LAY-IN TYPE.
4. FOR BRANCH DUCT SIZES AND GRILLE / DIFFUSER NECK SIZES REFER TO SCHEDULE DRAWINGS.
5. PROVIDE MANUAL VOLUME DAMPERS IN MAIN SUPPLY, RETURN AND EXHAUST TRUNKS WHERE SHOWN ON DRAWINGS FOR BALANCING AS INDICATED AND AT LOCATIONS REQUIRED BY INDEPENDENT TEST AND BALANCING AGENCY. SEE DETAIL FOR EXACT LOCATION REQUIREMENTS OF MANUAL VOLUME DAMPERS.
6. COORDINATE DIFFUSERS, RETURN AND EXHAUST GRILLES WITH LIGHTS AND ARCHITECTURAL REFLECTIVE CEILING PLANS.
7. ALL DUCT DIMENSIONS SHOWN ARE INSIDE CLEAR.
8. PROVIDE FLEXIBLE CONNECTION ON DUCTWORK AT ALL MECHANICAL EQUIPMENT.
9. IT IS THE CONTRACTORS RESPONSIBILITY TO COORDINATE SYSTEMS AND VERIFY DIMENSION CONDITIONS PRIOR TO INSTALLATION. PROVIDE MANUFACTURERS' RECOMMENDED CLEARANCE REQUIREMENTS ON ALL AC UNITS AND EQUIPMENT FOR SERVING CLEANING, COIL REMOVAL, AND FILTER CHANGING.
10. COORDINATE WITH ARCHITECTURAL FLOOR PLANS FOR EXACT FIRE, FIRE/SMOKE RATINGS, INSTALL APPROPRIATE DAMPERS AS REQUIRED BY CODES. PROVIDE IDENTIFICATION STENCILING ON ALL CONCEALED ACCESS DOORS FOR FIRE DAMPERS AND COMBINATION FIRE/SMOKE DAMPERS.
11. IT IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR TO COORDINATE ALL FLOOR AND ROOF PENETRATIONS WITH THE GENERAL CONTRACTOR PRIOR TO STEEL FABRICATION.
12. EXHAUST DUCTS TO BE UN-INSULATED GALVANIZED SHEET METAL CONSTRUCTED TO LATEST SMACNA STANDARDS.
13. INSTALL EXHAUST FANS AND EXHAUST OUTLETS TO MAINTAIN AT LEAST 25 FEET CLEARANCE FROM FRESH AIR INTAKES ON AIR HANDLERS AND OPERABLE ROOM WINDOWS.
14. ALL NEW ROOF MOUNTED EQUIPMENT MUST BE LOCATED A MINIMUM 10 FEET FROM THE ROOF EDGE.
15. HVAC CHILLED WATER PIPING 2" AND SMALLER TO TYPE "L" HARD DRAWN SEAMLESS ASTM B-88 COPPER. SEE SPECIFICATIONS.
16. HVAC CHILLED WATER PIPING 2-1/2" AND LARGER TO BE WELDED CARBON STEEL. SEE SPECIFICATIONS.
17. INSULATION FOR CHILLED WATER PIPING TO BE 1" THICK FOR 1-1/2" AND SMALLER PIPE, 1-1/2" THICK FOR 2" AND LARGER PIPE. SEE SPECIFICATIONS.
18. INSULATION FOR STEAM PIPING TO BE 1-1/2" THICK FOR 1-1/2" AND SMALLER PIPE, 3" THICK FOR 2" AND LARGER PIPE. SEE SPECIFICATIONS.
19. EACH SUBCONTRACTOR SHALL PERFORM CUTTING AND PATCHING OF PENETRATIONS FOR THEIR OWN DISCIPLINE.
20. UNLESS SPECIFICALLY NOTED OTHERWISE, NO T-DRILL FITTINGS OR TYPE M COPPER PIPING IS ALLOWED FOR ANY SERVICE.
21. INTERMEDIATE SUPPORTS SUCH AS ANGLES, UNISRUT, ETC. NECESSARY FOR SUPPORT OF PIPING, DUCTWORK AND EQUIPMENT AS WELL AS ANGLE FRAMING FOR DAMPERS SHALL BE FURNISHED AND INSTALLED BY MECHANICAL DIVISION. STRUCTURAL OPENINGS REQUIRING FRAMING SHALL BE FURNISHED UNDER STRUCTURAL DIVISION.
22. MECHANICAL CONTRACTOR TO PROVIDE COORDINATION DRAWINGS FOR MECHANICAL SYSTEMS AND SHALL COORDINATE ALL TRADES INCLUDING STRUCTURAL, DUCTWORK, PIPING, ELECTRICAL, COMMUNICATION SYSTEMS, FIRE PROTECTION AND MECHANICAL PIPING PRIOR TO INSTALLATION OF SYSTEMS.

FIRE & FIRE/SMOKE DAMPER NOTES

1. INSTALL FIRE DAMPERS AT DUCTWORK PENETRATIONS OF ALL ONE-HOUR AND HIGHER FIRE-RATED BARRIERS.
2. DO NOT INSTALL FLEXIBLE DUCT WITHIN 5 FEET OF A ONE-HOUR WALL PENETRATION UNLESS PENETRATION IS PROTECTED BY A FIRE DAMPER.
3. INSTALL SMOKE DAMPERS AT ALL DUCTWORK PENETRATIONS OF SMOKE-BARRIER WALLS AND PARTITIONS.
4. FIRE DAMPERS TO BE UL555 STATIC RATED CURTAIN STYLE TYPE "C" WITH ZERO (0) PERCENT OBSTRUCTION TO AIRFLOW. AS MANUFACTURED BY GREENHECK, RUSKIN, OR LEADER INDUSTRIES.
5. COMBINATION FIRE/SMOKE DAMPERS: PROVIDE COMBINATION FIRE AND SMOKE DAMPERS WITH AIRFOIL BLADES WHICH ARE 1-1/2 HOUR RATED UNDER U.L. STANDARD 555 AND ALSO QUALIFIED UNDER U.L. STANDARD 555S.

QUALITY ASSURANCE

1. CONTRACTOR IS RESPONSIBLE TO BE IN FULL COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL CODES. NOTIFY ENGINEER OF ANY DISCREPANCIES BETWEEN DESIGN AND LOCAL CODES. CONTRACTOR'S PRICING TO REFLECT INSTALLATION IN ACCORDANCE WITH LOCAL CODE REQUIREMENTS.
2. COMPLY WITH APPLICABLE REQUIREMENTS OF RECOGNIZED INDUSTRY ASSOCIATIONS WHICH PUBLISH STANDARDS FOR THE VARIOUS TRADES.
3. EMPLOY ONLY QUALIFIED JOURNEYMEN FOR THIS WORK.
4. DO NOT ROUTE ANY PIPING DIRECTLY ABOVE OR 42" IN FRONT OF ELECTRICAL SWITCHGEAR, PANELS OR TRANSFORMERS.
5. ADDITIONAL INSTALLATION COSTS ASSOCIATED WITH SUBSTITUTED EQUIPMENT REQUIRING ADDITIONAL WORK ON THE PART OF THIS CONTRACTOR OR OTHER SUBCONTRACTORS TO SATISFY THE MANUFACTURER'S INSTALLATION REQUIREMENTS SHALL BE THE RESPONSIBILITY OF THE SUBMITTING CONTRACTOR.
6. SUPERVISE ALL WORK BY COMPETENT MECHANIC SPECIFICALLY QUALIFIED IN HIS DISCIPLINE.
7. ANY UNIT EQUIPPED WITH FINAL FILTERS SHALL NOT BE OPERATED WITHOUT THE FINAL FILTERS IN PLACE. IF UNIT IS OPERATED WITHOUT FINAL FILTERS IN PLACE, THE ENTIRE SUPPLY AIR DUCT SYSTEM MUST BE CLEANED IN IT'S ENTIRETY.

HVAC LEGEND

PIPING		DUCTWORK	
CHWS	CHILLED WATER SUPPLY		SUPPLY DUCTWORK
CHWR	CHILLED WATER RETURN		RETURN OR EXHAUST DUCTWORK
HWS	HOT WATER SUPPLY	F	FIRE DAMPER
HWR	HOT WATER RETURN	S	SMOKE DAMPER
HWRR	HOT WATER REVERSE RETURN	FS	COMBINATION FIRE & SMOKE DAMPER
CWS	CONDENSER WATER SUPPLY	SC 240	SUPPLY DIFFUSER & AIR QUANTITY (INDICATES 4-WAY BLOW)
CWR	CONDENSER WATER RETURN	SC 240	SUPPLY DIFFUSER & AIR QUANTITY (INDICATES 3-WAY BLOW)
STM.(PSI)	STEAM SUPPLY PIPING AND IT'S PRESSURE	RB 140	RETURN AIR GRILLE & AIR QUANTITY
C.R.	STEAM CONDENSATE RETURN	EB 150	EXHAUST AIR GRILLE & AIR QUANTITY
P.C.R.	PUMPED STEAM CONDENSATE RETURN		REDUCER/TRANSITION
D	DRAIN LINE	H	STEAM HUMIDIFIER
RS	REFRIGERANT SUCTION	T	THERMOSTAT (ADJUSTABLE)
RL	REFRIGERANT LIQUID	Tc	THERMOSTAT (CONCEALED / KEY OPER.)
FTS	FINNED TUBE SUPPLY	H	HUMIDISTAT
FTR	FINNED TUBE RETURN	S	TEMPERATURE SENSOR
FOS	FUEL OIL SUPPLY	P	BUILDING PRESSURE SENSOR
FOR	FUEL OIL RETURN	CO2	WALL MOUNTED CO2 SENSOR
V	EQUIPMENT VENT	R.	RISE IN DUCTWORK
E.O.M.	END OF MAIN DRIP	D.	DROP IN DUCT
P.R.V.	PRESSURE REDUCING VALVE		CONICAL TEE
T	STEAM TRAP		BELLMOUTH CONNECTION
	BALL VALVE		DUCT WITH INTERNAL SOUND LINER
	GATE VALVE		REHEAT COIL
	GLOBE VALVE	ID CFM	ELECTRIC REHEAT BOX, CLEARANCE SPACE AND IDENTIFICATION
	BUTTERFLY VALVE	ID GPM **	ASTERISK WITH REHEAT BOX INDICATES 3-WAY HOT WATER CONTROL VALVE
	CONTROL VALVE	1-1-01 650 / 1-1-01 3.7	AHU # – FLOOR SERVING – BOX # CFM (on ductwork layouts) GPM (on piping layouts)
	STRAINER WITH HOSE END DRAIN CONNECTION		SQUARE ELBOW WITH TURNING VANES
	STRAINER AND BLOWDOWN VALVE	M.B.D.	MANUAL BALANCE DAMPER
	B&G CIRCUIT SETTER, OR EQUAL, BALANCING VALVE	A.T.C.	AUTOMATIC TEMP. CONTROL PANEL
	PLUG COCK (BALANCING VALVE)	A.D.	ACCESS DOOR
	UNION		DIFFERENTIAL PRESSURE MONITOR AND ALARM
	COMPANION FLANGE	50	INDICATES 3/4" DOOR UNDERCUT. DIRECTION & QUAN .OF ROOM AIR PRESS.
	CHECK VALVE	50	INDICATES DIRECTION & QUANTITY OF ROOM AIR PRESSURIZATION.
	GUIDE	SD	DUCT MOUNTED SMOKE DETECTOR
	ANCHOR	SP	DUCT MOUNTED STATIC PRESSURE CONTROLLER
	GAUGE & GAUGE COCK	A.F.F.	ABOVE FINISHED FLOOR
	THERMOMETER	A.F.R.	ABOVE FINISHED ROOF

HVAC Sheet Index

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A Replacement Facility for
Wrangell Medical Center
Wrangell, Alaska

AHFD | AMERICAN HEALTH FACILITIES DEVELOPMENT

STATE OF ALASKA · 49TH · THOMAS HUNTER DANIEL · No. ME12715 · REGISTERED PROFESSIONAL ENGINEER · 3/21/12

PROJECT NUMBER
10528.00
DATE
March 21, 2012

M0.1

HVAC LEGEND & SCHEDULES

Fire Marshal Review Set

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Enfinity Project # 10050

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HOOD SCHEDULE

ACCESSORIES:
1 – 304 STAINLESS STEEL
2 – STAINLESS STEEL WITH HANDLES
3 – LIGHT SWITCH
4 – FAN SWITCH
5 – FIRE SUPPRESSION SYSTEM
6 – FILLER PANELS

DESIGNATION			KRH-1		
MANUFACTURER			CAPTIVE-AIRE		
MODEL NO.			4824 ND-2-FS		
MAX. COOKING TEMPERATURE(°F)			450		
EXHAUST PLENUM	TOTAL EXHAUST CFM		1110		
	RISERS	LENGTH/WIDTH	–		
		DIA. (ø)	12"		
		CFM	1110		
		S.P.	-.648		
SUPPLY PLENUM	TOTAL SUPPLY CFM		–		
	RISERS	LENGTH/WIDTH	–		
		DIA. (ø)	–		
		CFM	–		
		S.P.	–		
HOOD CONSTRUCTION			304 SS WHERE EXPOSED		
FILTERS	TYPE		CAPTRATE SOLO FILTER WI		
	QUANTITY		2/2		
	HEIGHT/LENGTH		16"X16"/16"X20"		
LIGHTS	TYPE		INCANDESCENT LIGHT		
	QUANTITY		2		
	WIRE GUARD		NO		
UTILITY CABINET(S)	LOCATION		LEFT		
	FIRE SYS.	TYPE	ANSUL R102		
		SIZE	3.0		
		ELECTRICAL MODEL #	110110FP		
	SWITCHES	QUANTITY	2		
		LOCATION	OUTSIDE		
FIRE SYSTEM PIPING			YES		
HOOD WEIGHT (LBS.)			325#		
ACCESSORIES			1,2,3,4,5,6		

REMARKS:
– IF BIDDING CAPTIVE-AIRE, PLEASE COORDINATE CAPTIVE-AIRE PRICING W/ DARRIN RICHARDSON, CAPTIVE-AIRE REPRESENTATIVE, FRANKLIN, TN. (615) 599-8300.

AIR HANDLING UNIT SCHEDULE

ACCESSORIES:
1 – 2-WAY CHILLED WATER VALVE
2 – MERV 8 PREFILTER/ MER 14 FINAL FILTER
3 – DISCONNECT FOR SUPPLY AND RETURN FAN
4 – SUPPLY FAN VFD
5 – RETURN FAN VFD
6 – SEISMIC ROOF CURB (DOUBLE-WALL WITH INSULATION) (O.A. INTAKE AT LEAST 36" ABOVE ROOF SURFACE)
7 – CONVENIENCE OUTLET WIRED SEPARATELY BY DIV. 16
8 – CLASS 1 SMOKE RATED RETURN/O.A. DAMPERS

MODULES TO INCLUDE: 1. PRE-FILTER (MERV8), 2, SCR ELECTRIC PREHEAT, 3. CHILLED WATER COIL, 4. SUPPLY FAN (AF), 5. DIFFUSER, 6. FINAL FILTER (MERV14), 7. DISCHARGE PLENUM.

DESIGNATION	AHU-1	AHU-2	AHU-3	AHU-4	
MANUFACTURER	TRANE	TRANE	TRANE	TRANE	
MODEL NO.	PCC – 30	PCC – 30	PCC – 30	PCC – 30	
TYPE	CHILLED WATER	CHILLED WATER	CHILLED WATER	CHILLED WATER	
SERVICE	LTC PATIENT RMS	M/S PATIENT RMS	SURG/IMAGING	ADMIN	
TOTAL SUPPLY CFM	11,850	11,300	14,905	15,480	
TOTAL RETURN CFM	8,320	7,890	10,760	10,800	
O.A. CFM (MAX/MIN)	3530 / 11,850	3410 / 11,300	4025 / 14,905	4680 / 15,480	
SUPPLY FAN					
E.S.P. (IN. H_2O)	4.0	4.0	4.0	4.0	
H.P.	30	30	30	30	
V/ø/HZ	460/3/60	460/3/60	460/3/60	460/3/60	
PREHEAT COIL	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC	
KW	60	60	60	75	
EAT/LAT	40/55	40/56	40/52	40/50	
COOLING COIL	CHILLED WATER	CHILLED WATER	CHILLED WATER	CHILLED WATER	
ROWS/FINS	8/76	8/77	8/150	8/95	
V/ø/HZ	460/3/60	460/3/60	460/3/60	460/3/60	
E.A.D.B./E.A.W.B. (°F)	76.6/63.9	76.6/63.9	76.2/63.7	76.7/63.9	
L.A.D.B./L.A.W.B. (°F)	52.0/51.6	52.0/51.6	48.0/47.9	52.0/51.6	
G.P.M.	60.1	57.2	93.1	78.0	
MAX P.D. (FT. H20)	10	10	10	10	
E.W.T. / L.W.T.	43.0/57.0	43.0/57.0	43.0/57.0	43.0/57.0	
OPERATING WEIGHT (LBS.)	5500	5500	6100	5500	
ACCESSORIES	1,2,3,4,5	1,2,3,4,5	1,2,3,4,5,8	1,2,3,4,5	

REMARKS:
– DUCT MTD. SMOKE DETECTORS IN SUPPLY AND RETURN DUCT PROVIDED AND WIRED BY ELECTRICAL DIVISION, INSTALLED BY MECHANICAL DIVISION
– PROVIDE DDC CONTROLS
– STARTERS AND DISCONNECTS SHALL BE FURNISHED AND INSTALL BY ELECTRICAL DIVISION

COMPUTER ROOM A.C. UNIT SCHEDULE

ACCESSORIES:
1 – AUXILIARY DRAIN PAN WITH FLOAT SWITCH
2 – FACTORY MOUNTED DISCONNECT SWITCH
3 – FACTORY SUPPLIED CONDENSATE PUMP
4 – PROGRAMMABLE THERMOSTAT
5 – FACTORY MOUNTED SMOKE DETECTOR
6 – HOT GAS BYPASS

DESIGNATION		CRAC-1		
MANUFACTURER		DATA AIRE		
MODEL NO.		DAPA-05		
SERVICE		SERVER		
TOTAL CAPACITY (MBH)		57.8		
SENSIBLE CAPACITY (MBH)		52.0		
E.A.D.B./E.A.W.B. (°F)		75.0/61.0		
O.A.D.B. (°F)		85		
MIN. COIL SQ. FT.		5		
MIN. COIL ROWS		4		
VOLTAGE		460/3/60		
F.L.A/M.C.A/M.O.C.P		18/22/25		
FAN	TOTAL CFM	2000		
	O.A. CFM	–		
	E.S.P. (IN. H_2O)	0.5"		
	MIN. H.P.	2		
HUMIDIFIER TYPE		STEAM		
HUMIDIFIER CAPACITY (LBS./HR.)		5.0		
REHEAT	TYPE	–		
	CAPACITY (KW)	–		
CONDENSING UNIT	DESIGNATION	C-5		
	MODEL NO.	DRCU-05		
	VOLTAGE	460/3/60		
	F.L.A./M.C.A./M.O.C.P.	11/13/20		
WEIGHT (LBS.)		365		
ACCESSORIES		1, 2, 3, 4, 5, 6		

REMARKS:

AIR-COOLED CHILLER SCHEDULE

ACCESSORIES:
1. BACNET MASTER CONTROLLER WITH DISPLAY
2. LOW AMBIENT CONTROL

DESIGNATION	CH-1	CH-2	
MANUFACTURER	TRANE	TRANE	
MODEL NO.	RTUD 90HE	RTUD 90HE	
NUMBER OF MODULES	4	4	
TYPE	AIR COOLED SPLIT	AIR COOLED SPLIT	
CAPACITY (TONS)	87.8	87.8	
E.W.T. / L.W.T.	56.0 / 42	56.0 / 42	
G.P.M.	150	150	
PRESSURE DROP (FT.)	3.8	3.8	
V/ø/HZ	460/3/60	460/3/60	
R.L.A.	134	134	
M.C.A. / M.O.C.P	153 / 200.0	153 / 200.0	
REFRIGERANT TYPE	R-134A	R-134A	
OPERATING WEIGHT (LBS.)	4892	4892	
CONDENSER			
DESIGNATION	C-1	C-2	
QUANTITY	1	1	
V/ø/HZ	460/3/60	460/3/60	
R.L.A.	24	24	
M.C.A. / M.O.C.P	24.8 / 25 EACH	24.8 / 25 EACH	
OPERATING WEIGHT (LBS)	2651	2651	
ACCESSORIES	1,2	1,2	

REMARKS:
PLEASE COORDINATE TRANE PRICING W/ MIKE KARL, TRANE REPRESENTATIVE, NASHVILLE, TN (615) 242-0311
DISCONNECTS FURNISHED AND INSTALLED BY ELECTRICAL DIVISION

PUMP SCHEDULE

ACCESSORIES:
1 – SUCTION DIFFUSER
2 – FLEX CONNECTOR
3 – TRIPLE DUTY VALVE
4 – VFD

DESIGNATION	P-1	P-2	P-3	P-4
MANUFACTURER	BELL & GOSSETT	BELL & GOSSETT	BELL & GOSSETT	BELL & GOSSETT
MODEL NO.	SERIES 80	SERIES 80	1510	1510
TYPE	INLINE	INLINE	END SUCTION	END SUCTION
SYSTEM	PRIMARY CHW	PRIMARY CHW	SECONDARY CHW	SECONDARY CHW
SIZE	4 x 4 x 11	4 x 4 x 11	3E	3E
FRAME SIZE	254TC	254TC	254T	254T
FLOW (GPM)	300	300	290	290
T.D.H. (FT. H_2O)	40	40	100	100
SUCTION SIZE (IN.)	4"	4"	4"	4"
DISCHARGE SIZE (IN.)	4"	4"	3"	3"
MIN. MOTOR H.P.	7.5	7.5	15	15
MOTOR R.P.M.	1150	1150	1750	1750
V/ø/HZ	460/3/60	460/3/60	460/3/60	460/3/60
ACCESSORIES	2, 3	2, 3	1, 2, 3, 4	1, 2, 3, 4

REMARKS: – MOTOR STARTERS AND DISCONNECTS FURNISHED AND INSTALLED BY ELECTRICAL DIVISION

FAN SCHEDULE

ACCESSORIES:
1 – OUTLET SCREEN
2 – ROOF CURB
3 – BACKDRAFT DAMPER
4 – INTEGRAL DISCONNECT SWITCH
5 – ROOF JACK
6 – BIRDSCREEN
7 – FAN SPEED CONTROLLER
8 – WALL HOUSING
9 – INTAKE LOUVER W/ RAIN HOOD & MOTOR OPERATED INTAKE DAMPER
10 – FAN GUARD
11 – U.L. LISTED FOR GREASE REMOVAL
12 – HINGED CURB
13 – DOOR FEED SWITCH WITH TRANSFORMER
14 – W/MOTOR OPERATED OUTLET DAMPER
15 – LINE VOLTAGE THERMOSTAT
16 – MOTOR GUARD
17 – VFD
18 – FACTORY MOUNTED AIR FLOW PROBES
19 – SPRING ISOLATION

DESIGNATION	EF-1	EF-2	EF-3	EF-4	EF-5	EF-6	EF-7	EF-8	EF-9	EF-10	EF-11	EF-12	EF-13-19	RAF-1	RAF-2	RAF-3	RAF-4
MANUFACTURER	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	CAPTIVEAIRE	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK
MODEL NO.	GB-180-15	GB-101-3	VEKTOR-H-9-7	GB-101-5	GB-121-7	CUBE-141-7	DU50HFA	GB-141-15	GB-121-5	CUBE-141-10	CSP-B200	CSP-A290	CSP-A290	QEI-24-I	QEI-24-I	QEI-24-I	QEI-24-I
SERVICE	GENERAL EXHAUST	GENERAL EXHAUST	ISOLATION	GENERAL EXHAUST	GENERAL EXHAUST	DISHWASHER	KITCHEN HOOD	GENERAL EXHAUST	GENERAL EXHAUST	O.R. SMOKE RELIEF	NITROGEN	MED GAS	CRAWLSPACE	RETURN FAN	RETURN FAN	RETURN FAN	RETURN FAN
TYPE	POWER ROOF VENTILATOR	PWER ROOF VENTILATOR	HIGH PLUME	POWER ROOF VENTILATOR	POWER ROOF VENTILATOR	UPBLAST	UPBLAST	POWER ROOF VENTILATOR	POWER ROOF VENTILATOR	UPBLAST	INLINE	INLINE	INLINE	MIXED FLOW	MIXED FLOW	MIXED FLOW	MIXED FLOW
CFM	2955	755	1135	1020	1140	1500	1110	1925	1285	2215	150	225	225	8320	7890	10,880	10,800
S.P. (IN. H_2O)	1.5	1.0	1.5	1.0	1.5	1.25	1.1	1.5	1.0	1.0	0.5	0.5	0.5	3.0	3.0	3.0	3.0
MAX. FAN RPM	1442	1624	3654	1767	1715	1470	1449	1656	1548	1591	947	1038	1038	1304	1293	1414	1414
MIN. MOTOR H.P.	1-1/2	1/3	2	1/2	3/4	3/4	1/2	1-1/2	1/2	1	173W	80W	80W	7-1/2	7-1/2	7-1/2	7-1/2
V/ø/HZ	460/3/60	120/1/60	460/3/60	120/1/60	460/3/60	460/3/60	120/1/60	460/3/60	120/1/60	460/3/60	120/1/60	120/1/60	120/1/60	460/3/60	460/3/60	460/3/60	460/3/60
WEIGHT (LBS.)	105	55	105	60	65	75	70	85	65	83	10	25	20	470	470	470	470
INTERLOCK W/	AHU-1	AHU-2	CONTINUOUS	AHU-2	AHU-4	EF-7	WALL SWITCH/BAS	AHU-3	AHU-3	BAS	CONTINUOUS	CONTINUOUS	CONTINUOUS	AHU-1	AHU-2	AHU-3	AHU-4
ACCESSORIES	1,2,6,12	1,2,4,6,12	1,2,6,12	1,2,4,6,12	1,2,6,12	1,2,6,12	1,2,6,11,12	1,2,6,12	1,2,6,12	1,2,6,12	4,6,7	4,6,7	4,6,7	16,17,18,19	16,17,18,19	16,17,18,19	16,17,18,19

REMARKS: DISCONNECTS AND STARTERS BY ELECTRICAL DIVISION

ELECTRIC STEAM HUMIDIFIER SCHEDULE

ACCESSORIES:
1 – FULLY MODULATING SCR CONTROL
2 – AIR PROVING SWITCH, PRESSURE
3 – 316 STAINLESS STEEL CONSTRUCTION
4 – HUMIDISTAT, ON-OFF HIGH LIMIT, DUCT
5 – ELECTRONIC CONTROL
6 – ELECTRONIC TEMP. SWITCH
7 – VAPOR-LOGIC 3
8 – BUILDING AUTOMATION SYSTEM
9 – RAPID-SORB DISPERSION TUBES
10 – CONDENSATE DRAIN COOLER

DESIGNATION	H-1	H-2	H-3	H-4
MANUFACTURER	DRI-STEEM	DRI-STEEM	DRI-STEEM	DRI-STEEM
MODEL NO.	VLC-32-2	VLC-32-2	VLC-42-2	VLC-42-2
SERVICE	MED/SURG	LTC	SURG/IMAGING	SURG/IMAGING
TYPE	DUCT-MOUNTED	DUCT-MOUNTED	DUCT-MOUNTED	DUCT-MOUNTED
CAPACITY (LBS./HR)	91.2	91.2	119.7	119.7
AIRFLOW (CFM)	11,850	11,300	14,905	14,905
DUCT SIZE	SEE DWGS	SEE DWGS	SEE DWGS	SEE DWGS
SPACE CONDITIONS	71°F / 30%	71°F / 30%	71°F / 30%	71°F / 30%
MAX. ABSORB. DISTANCE	12"	12"	12"	12"
V/ø/HZ	460/3/60	460/3/60	460/3/60	460/3/60
KW / F.L.A.	32.0 / 38.5	32.0 / 38.5	42.0 / 50.5	42.0 / 50.5
ACCESSORIES	1 THRU 10	1 THRU 10	1 THRU 10	1 THRU 10

REMARKS:
– INSULATE DRAIN LINE FROM UNIT SAME AS STEAM CONDENSATE LINE (SEE SPECIFICATIONS)
– PROVIDE DISPERSION TUBES AS SHOWN ON THE DRAWINGS
– SIZE AND ROUTE STEAM LINES PER MANUFACTURER'S RECOMMENDATIONS.

A Replacement Facility for
Wrangell Medical Center
Wrangell, Alaska

AHFD AMERICAN HEALTH FACILITIES DEVELOPMENT

STATE OF ALASKA – 49TH – THOMAS PEARTER DANIEL – No. ME12715 – REGISTERED PROFESSIONAL ENGINEER – 3/21/12

PROJECT NUMBER
10528.00
DATE
March 21, 2012

M0.2
HVAC SCHEDULES

Fire Marshal Review Set

DX SPLIT SYSTEM SCHEDULE

ACCESSORIES:
1 – PROVIDE WALL MTD. DIGITAL/PROG. THERMOSTAT
2 – AUX. DRAIN PAN W/ FLOAT SWITCH
3 – 2" PRE–FILTER
4 – HANGING ISOLATORS
5 – SMOKE DETECTORS IN SUPPLY AND RETURN DUCTWORK
6 – LOW AMBIENT TO 0 DEGREES

DESIGNATION		AC–1		
MANUFACTURER		TRANE		
INDOOR UNIT	MODEL NO.	GAM5A0A60		
	SERVICE	LAB		
	TOTAL COOLIING CAPACITY (MBH)	56.3		
	SENSIBLE COOLING CAPACITY (MBH)	47.3		
	E.A.B.B./E.A.W.B. (°F)	75/61		
	L.A.D.B./L.A.W.B. (°F)	52.9/50.6		
	TOTAL CFM	2000		
	O.A. CFM	–		
	E.S.P. (IN. H_2O)	0.75		
	FAN H.P.	1		
	VOLTAGE	460/3/60		
	M.C.A./M.O.C.P.	3.2/15		
	WEIGHT (LBS.)	170		
CONDENSING UNIT	DESIGNATION	C–6		
	MODEL NO.	4TTA3060		
	VOLTAGE	460/3/60		
	F.L.A./M.C.A./M.O.C.P.	9.2/12/20		
	WEIGHT (LBS.)	260		
ACCESSORIES		1, 2, 3, 4, 6		

REMARKS:
- MOTOR STARTER BY DIV. 16 UNLESS NOTED OTHERWISE
- DISCONNECT BY DIV. 16 UNLESS NOTED OTHERWISE
- RETURN AND SUPPLY DUCT MOUNTED SMOKE DETECTORS PROVIDED & WIRED BY DIV. 16, INSTALLED BY DIV. 15. PROVIDE REMOTE ALARM INDICATORS FOR SMOKE DETECTORS.

AIR CURTAIN

ACCESSORIES:
1 – DOOR INTERLOCK RELAY

DESIGNATION	DAC–1	
MANUFACTURER	MARS	
MODEL NO.	LPN48–1U	
TYPE	HORIZONTAL	
TOTAL CFM	1200	
SIZE	48"	
ELECTRIC HEAT (KW)	–	
V/φ/HZ	120/1/60	
AMPS	2.4	
FAN MOTOR H.P.	1/6	
ACCESSORIES	1	

REMARKS:
- STARTERS AND DISCONNECTS BY ELECTRICAL DIVISION

FAN COIL UNIT SCHEDULE

ACCESSORIES:
1 – 2 WAY 2 POS. PIPING PACKAGE HEAT–N.O. COOL–N.C.
2 – TRACER ZN010 CONTROL
3 – CONDENSATE OVERFLOW CONTROL

DESIGNATION		FCU–1	FCU–2	FCU–3	
MANUFACTURER		TRANE	TRANE	TRANE	
MODEL NO.		BCHC036	BCHC036	BCHC036	
TYPE		HORIZONTAL	HORIZONTAL	HORIZONTAL	
TOTAL CFM		1200	1200	1000	
O.A. CFM		–	–	–	
S.P. (IN. H_2O)		0.5	0.5	0.5	
COOLING COIL	TOTAL CAPACITY (MBH)	36	36	29.6	
	SENSIBLE CAPACITY (MBH)	28	28	23.2	
	E.A.D.B./E.A.W.B.	75/63	75/63	75/63	
	L.A.D.B./L.A.W.B.	53.9/52.8	53.9/52.8	53.9/52.8	
	G.P.M.	8.5	8.5	7.1	
	MAX. P.D. (FT.)	5	5	5	
	E.W.T./L.W.T.	45/53.6	45/53.6	45/53.6	
ELECTRIC HEAT (KW)		10	5	5	
V/φ/HZ		460/3/60	460/3/60	460/3/60	
FAN MOTOR H.P.		1/2	1/2	1/2	
ACCESSORIES		1,2,3	1,2,3	1,2,3	

REMARKS:
- STARTERS AND DISCONNECTS BY ELECTRICAL DIVISION

ELECTRIC UNIT HEATER SCHEDULE

ACCESSORIES:
1 – MOUNTING BRACKET
2 – U.L. LISTED
3 – WALL THERMOSTAT

DESIGNATION	EH–1,2,3,4,7	EH–5,6		
MANUFACTURER	MARKEL	MARKEL		
MODEL NO.	P3PUH03CA1	P3PUH03CA1		
TYPE	UNIT HEATER	UNIT HEATER		
CAPACITY (KW)	5	3		
NO. OF CIRCUITS	1	1		
V/φ/HZ	460/3/60	460/3/60		
MAX. AMPS	6	4		
FAN CFM	400	400		
ACCESSORIES	1, 2, 3	1, 2, 3		

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A Replacement Facility for
Wrangell Medical Center
Wrangell, Alaska

ELECTRIC AIR VOLUME BOX SCHEDULE

ACCESSORIES:
1 – SCR CONTROLS/PULSE WIDTH MODULATION
2 – MAGNETIC CONTACTS
3 – MERCURY CONTACTS
4 – 24 VOLT TRANSFORMER
5 – DISCONNECT SWITCH
6 – DOUBLE–WALL CONSTRUCTION
7 – DDC CONTROLS

DESIGNATION	1–01	1–02	1–03	1–04	1–05	1–06	1–07	1–08	1–09	1–10	1–11	1–12	1–13	1–14	1–15	1–16	1–17	1–18	1–19	1–20	1–21
MANUFACTURER	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE
MODEL NO.	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF
SIZE	8	8	8	8	8	8	8	8	8	8	8	8	8	6	14	6	8	6	6	8	8
MAX. CFM	490	460	460	465	390	390	390	450	390	390	390	450	420	210	1780	275	450	150	210	680	560
MIN. CFM	490	460	460	465	390	390	390	450	390	390	390	450	420	210	890	140	450	150	210	345	315
S.P. (IN. H_2O)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
MAX. N.C.	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
EAT / LAT	50/91.75	50/91.05	50/91.05	50/90.61	50/90.35	50/90.35	50/90.35	50/91.97	50/90.35	50/90.35	50/90.35	50/91.97	50/91.22	50/87.47	50/92.44	50/89.34	50/91.97	50/81.47	50/87.47	50/91.05	50/84.97
KW	6.5	6.0	6.0	6	5	5	5	6	5	5	5	6	5.5	2.5	12	3	6	1.5	2.5	4.5	3.5
V/φ/HZ	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60
INLET DIAMETER	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	8"	6"	14"	6"	8"	6"	6"	8"	8"
ACCESSORIES	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7

REMARKS:
1. IF BIDDING TRANE, PLEASE COORDINATE TRANE PRICING W/ MIKE KARL, TRANE REPRESENTATIVE, NASHVILLE, TN. (615) 565–9422
2. BOXES ARE PRESSURE INDEPENDENT, WITH DDC VOLUME REGULATOR.

ELECTRIC AIR VOLUME BOX SCHEDULE

ACCESSORIES:
1 – SCR CONTROLS/PULSE WIDTH MODULATION
2 – MAGNETIC CONTACTS
3 – MERCURY CONTACTS
4 – 24 VOLT TRANSFORMER
5 – DISCONNECT SWITCH
6 – DOUBLE–WALL CONSTRUCTION
7 – DDC CONTROLS

DESIGNATION	1–22	1–23	1–24	2–01	2–02	2–03	2–04	2–05	2–06	2–07	2–08	2–09	2–10	2–11	2–12	2–13	2–14	2–15	2–16	2–17	2–18
MANUFACTURER	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE
MODEL NO.	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF
SIZE	8	6	12	8	8	8	8	8	8	8	8	8	6	8	6	8	6	8	6	8	6
MAX. CFM	450	385	1215	435	390	390	390	485	510	510	525	415	275	475	345	460	385	460	385	455	385
MIN. CFM	265	385	615	435	390	390	390	390	420	420	420	210	275	475	345	380	385	380	385	455	385
S.P. (IN. H_2O)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
MAX. N.C.	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
EAT / LAT	50/91.57	50/82.7	50/90.94	50/89.8	50/90.35	50/90.35	50/90.35	50/90.35	50/91.22	50/91.22	50/91.22	50/94.96	50/90.06	50/89.76	50/86.49	50/91.41	50/82.7	50/91.41	50/82.7	50/91.5	50/82.1
KW	3.5	4	8	5.5	5	5	5	5	5.5	5.5	5.5	3	3.5	6	4	5	4	5	4	6	4
V/φ/HZ	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60
INLET DIAMETER	8"	6"	12"	8"	8"	8"	8"	8"	8"	8"	8"	8"	6"	8"	6"	8"	6"	8"	6"	8"	6"
ACCESSORIES	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7

REMARKS:
1. IF BIDDING TRANE, PLEASE COORDINATE TRANE PRICING W/ MIKE KARL, TRANE REPRESENTATIVE, NASHVILLE, TN. (615) 565–9422
2. BOXES ARE PRESSURE INDEPENDENT, WITH DDC VOLUME REGULATOR.

AHFD | AMERICAN HEALTH FACILITIES DEVELOPMENT

THOMAS HUNTER DANIEL
No. ME12715
3/21/12

PROJECT NUMBER
10528.00
DATE
March 21, 2012

M0.3
HVAC SCHEDULES

Fire Marshal Review Set

enfinity engineering
9019 Overlook Boulevard, Suite C-4
Brentwood, Tennessee 37027
Phone: 615.377.0093
Fax: 615.377.0983
Enfinity Project # 10050

ELECTRIC AIR VOLUME BOX SCHEDULE

ACCESSORIES:
1 – SCR CONTROLS/PULSE WIDTH MODULATION
2 – MAGNETIC CONTACTS
3 – MERCURY CONTACTS
4 – 24 VOLT TRANSFORMER
5 – DISCONNECT SWITCH
6 – DOUBLE-WALL CONSTRUCTION
7 – DDC CONTROLS

DESIGNATION	2–19	2–20	2–21	2–22	3–01	3–02	3–03	3–04	3–05	3–06	3–07	3–08	3–09	3–10	3–11	3–12	3–13	3–14	3–15	3–16	3–17
MANUFACTURER	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE
MODEL NO.	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF
SIZE	14	8	6	10	8	12	6	6	8	10	8	10	6	10	8	6	12	8	16	10	8
MAX. CFM	1995	510	215	915	515	1020	200	200	490	985	700	890	265	780	380	200	1495	525	2065	780	455
MIN. CFM	1040	420	180	460	265	1020	180	180	265	495	350	450	180	780	380	180	785	525	2065	780	265
S.P. (IN. H_20)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
MAX. N.C.	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
EAT / LAT	50/92.37	50/91..22	50/84.97	50/91.05	50/91.57	50/90.11	50/84.97	50/84.97	50/91.57	50/91.33	50/90.47	50/91.97	50/84.97	50/90.35	50/91.41	50/84.97	50/90.1	50/91.97	50/89.63	50/90.35	50/91.57
KW	14	5.5	2	6	3.5	13	2	2	3.5	6.5	4.5	6	2	10	5	2	10	7	26	10	3.5
V/ϕ/HZ	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60
INLET DIAMETER	14"	8"	6"	10"	8"	12"	6"	6"	8"	10"	8"	10"	6"	10"	8"	6"	12"	8"	16"	10"	8"
ACCESSORIES	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7

REMARKS:
1. IF BIDDING TRANE, PLEASE COORDINATE TRANE PRICING W/ MIKE KARL, TRANE REPRESENTATIVE, NASHVILLE, TN. (615) 565–9422
2. BOXES ARE PRESSURE INDEPENDENT, WITH DDC VOLUME REGULATOR.

ELECTRIC AIR VOLUME BOX SCHEDULE

ACCESSORIES:
1 – SCR CONTROLS/PULSE WIDTH MODULATION
2 – MAGNETIC CONTACTS
3 – MERCURY CONTACTS
4 – 24 VOLT TRANSFORMER
5 – DISCONNECT SWITCH
6 – DOUBLE-WALL CONSTRUCTION
7 – DDC CONTROLS

DESIGNATION	3–18	3–19	3–20	3–21	3–22	3–23	4–01	4–02	4–03	4–04	4–05	4–06	4–07	4–08	4–09	4–10	4–11	4–12	4–13	4–14	4–15
MANUFACTURER	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE
MODEL NO.	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF
SIZE	6	10	6	6	8	10	8	10	8	6	10	8	8	8	10	8	8	6	10	10	6
MAX. CFM	210	855	255	255	585	855	480	900	485	235	7985	625	495	610	1015	395	725	305	1210	1005	200
MIN. CFM	180	450	180	180	295	450	265	450	265	180	795	315	265	315	510	210	365	180	605	505	180
S.P. (IN. H_20)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
MAX. N.C.	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
EAT / LAT	50/84.97	50/91.97	50/84.97	50/84.97	50/87.34	50/91.97	50/91.57	50/91.97	50/91.57	50/84.97	50/89.59	50/89.97	50/91.57	50/89.97	50/90.11	50/94.96	50/88.8	50/84.97	50/89.02	50/90.51	50/84.97
KW	2	6	2	2	3.5	6	3.5	6	3.5	2	10	4	3.5	4	6.5	3	4.5	2	7.5	6.5	2
V/ϕ/HZ	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60
INLET DIAMETER	6"	10"	6"	6"	8"	10"	8"	10"	8"	6"	10"	8"	8"	8"	10"	8"	8"	6"	10"	10"	6"
ACCESSORIES	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7

REMARKS:
1. IF BIDDING TRANE, PLEASE COORDINATE TRANE PRICING W/ MIKE KARL, TRANE REPRESENTATIVE, NASHVILLE, TN. (615) 565–9422
2. BOXES ARE PRESSURE INDEPENDENT, WITH DDC VOLUME REGULATOR.

ELECTRIC AIR VOLUME BOX SCHEDULE

ACCESSORIES:
1 – SCR CONTROLS/PULSE WIDTH MODULATION
2 – MAGNETIC CONTACTS
3 – MERCURY CONTACTS
4 – 24 VOLT TRANSFORMER
5 – DISCONNECT SWITCH
6 – DOUBLE-WALL CONSTRUCTION
7 – DDC CONTROLS

DESIGNATION	4–16	4–17	4–18	4–19	4–20	4–21	4–22	4–23	4–24
MANUFACTURER	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE
MODEL NO.	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF	VCEF
SIZE	6	6	6	8	8	8	24"x16"	8	6
MAX. CFM	200	200	200	480	505	555	3115	455	290
MIN. CFM	180	180	180	265	265	280	1600	265	180
S.P. (IN. H_20)	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
MAX. N.C.	30	30	30	30	30	30	30	30	30
EAT / LAT	50/84.97	50/84.97	50/84.97	50/91.57	50/91.57	50/89.34	50/93.28	50/91.57	50/84.97
KW	2	2	2	3.5	3.5	3.5	22	3.5	2
V/ϕ/HZ	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60	480/3/60
INLET DIAMETER	6"	6"	6"	8"	8"	8"	24"x16"	8"	6"
ACCESSORIES	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7	1, 3, 4, 5, 6, 7

REMARKS:
1. IF BIDDING TRANE, PLEASE COORDINATE TRANE PRICING W/ MIKE KARL, TRANE REPRESENTATIVE, NASHVILLE, TN. (615) 565–9422
2. BOXES ARE PRESSURE INDEPENDENT, WITH DDC VOLUME REGULATOR.

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DEJA
David E. Johnson
Architect

A Replacement Facility for
Wrangell Medical Center
Wrangell, Alaska

AHFD | AMERICAN HEALTH FACILITIES DEVELOPMENT

THOMAS HUNTER DANIEL
No. ME12715
3/2[illegible]/12

PROJECT NUMBER
10528.00
DATE
March 21, 2012

M0.4
HVAC SCHEDULES

Fire Marshal Review Set

enfinity engineering
9019 Overlook Boulevard, Suite C-4
Brentwood, Tennessee 37027
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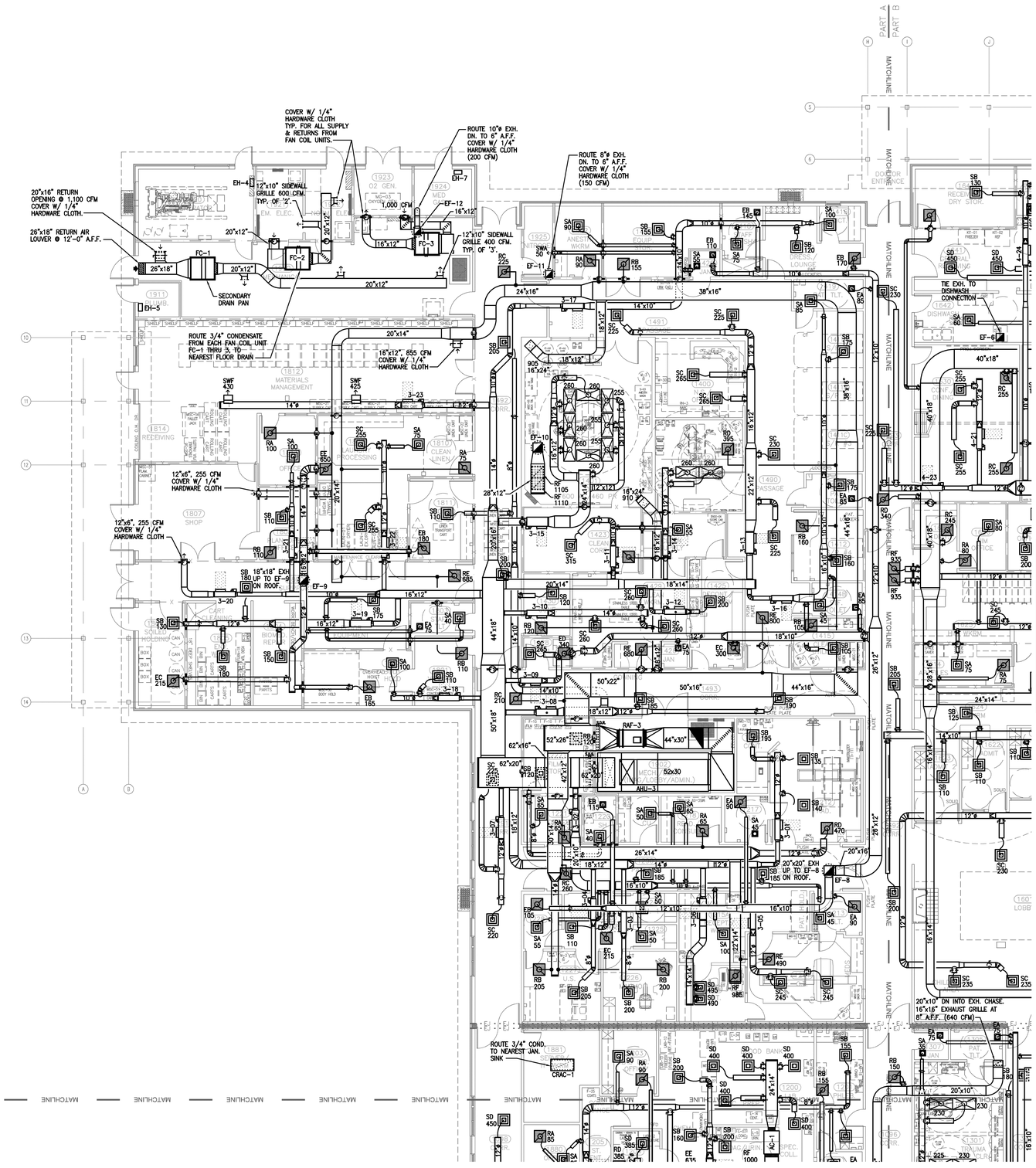
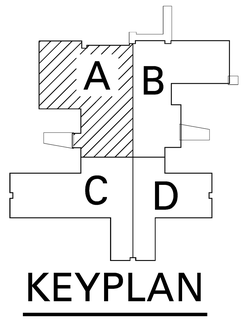
Fax: 615.377.0983
Enfinity Project # 10050



WALL LEGEND-NOTED SHEETS

SYMBOL	DESCRIPTION	DOOR/DAMPER INFO.	PRIORITY
	NON-RATED PARTITION	-	(-)
	SMOKE-RESISTIVE PARTITION (CORRIDOR)	POSITIVE LATCH, NO CLOSER, NO DAMPERS	(6TH)
	SMOKE-RESISTIVE PARTITION (SUITE)	POSITIVE LATCH, NO CLOSER, NO DAMPERS	(5TH)
	SMOKE RESISTIVE PARTITION (INCIDENTAL USE)	POSITIVE LATCH, CLOSER, NO DAMPERS	(4TH)
	1-HOUR SMOKE BARRIER (SMOKE COMP. SEPARATION)	20 MIN. CLOSER, S DAMPERS	(3RD)
	1-HOUR FIRE BARRIER (INCIDENTAL USE)	POSITIVE LATCH, 45-MIN. CLOSER, NO DAMPERS IF HARD DUCTED	(2ND)
	2-HOUR FIRE WALL (CMU CONSTR./STR. INDEPENDENT)	POSITIVE LATCH, 90 MIN. CLOSER, F/S DAMPERS	(1ST)

*SEE DIMENSIONED SHEETS FOR SOUND WALL LOCATIONS.



KEYPLAN

FIRST FLOOR PLAN PART A - HVAC

8' 0 8'

Fire Marshal Review Set

DEJA

A Replacement Facility for
Wrangell Medical Center
Wrangell, Alaska

David E. Johnson
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Nashville, TN 37204
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fax 615.837.0657

AHFD AMERICAN HEALTH FACILITIES DEVELOPMENT

STATE OF ALASKA
49TH
THOMAS PORTER DANIEL
No. ME12715
REGISTERED PROFESSIONAL ENGINEER
3/30/12

PROJECT NUMBER
10528.00
DATE
March 21, 2012

M1.1A

FIRST FLOOR PLAN
PART A - HVAC

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Brentwood, Tennessee 37027
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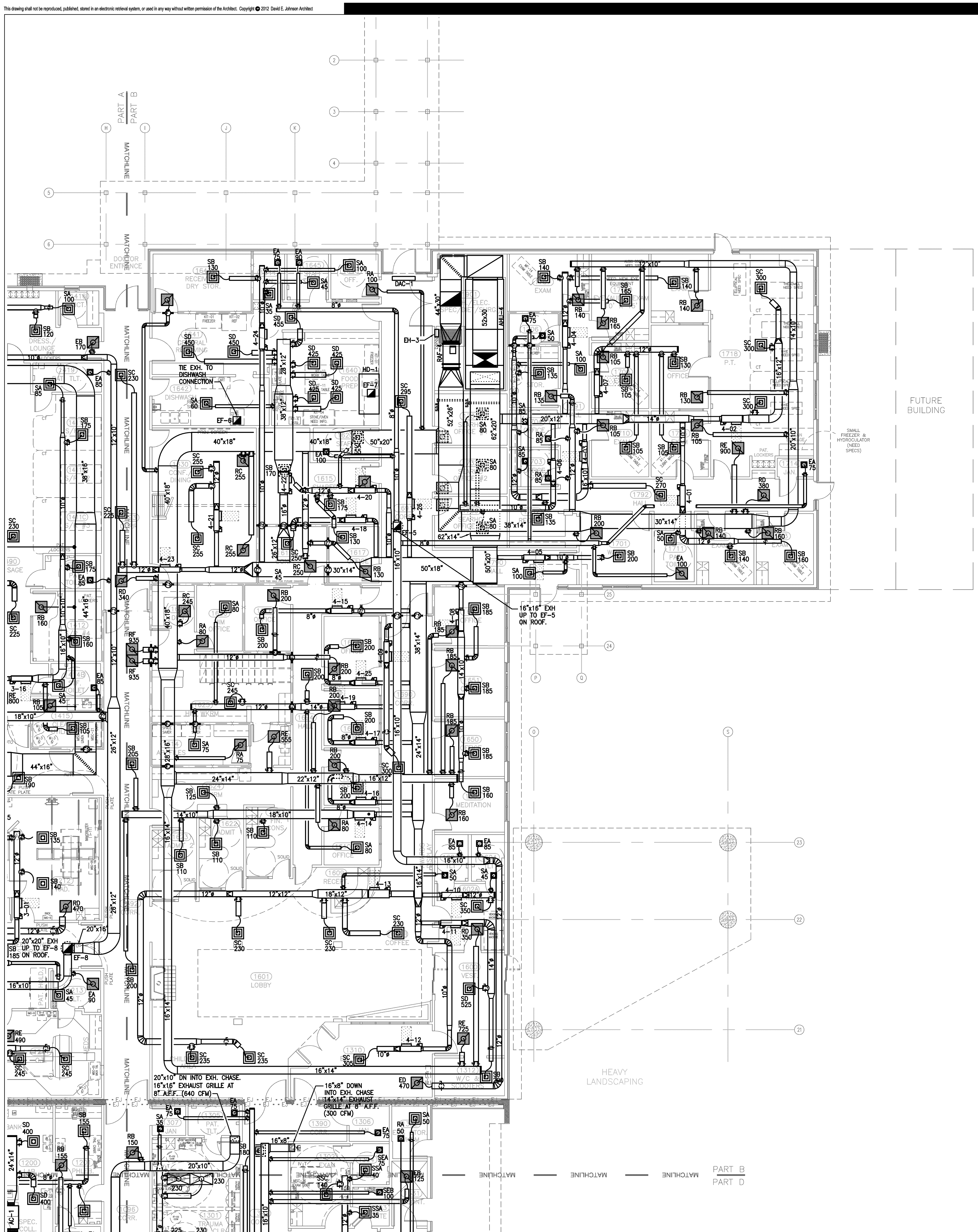
Enfinity Project # 10050



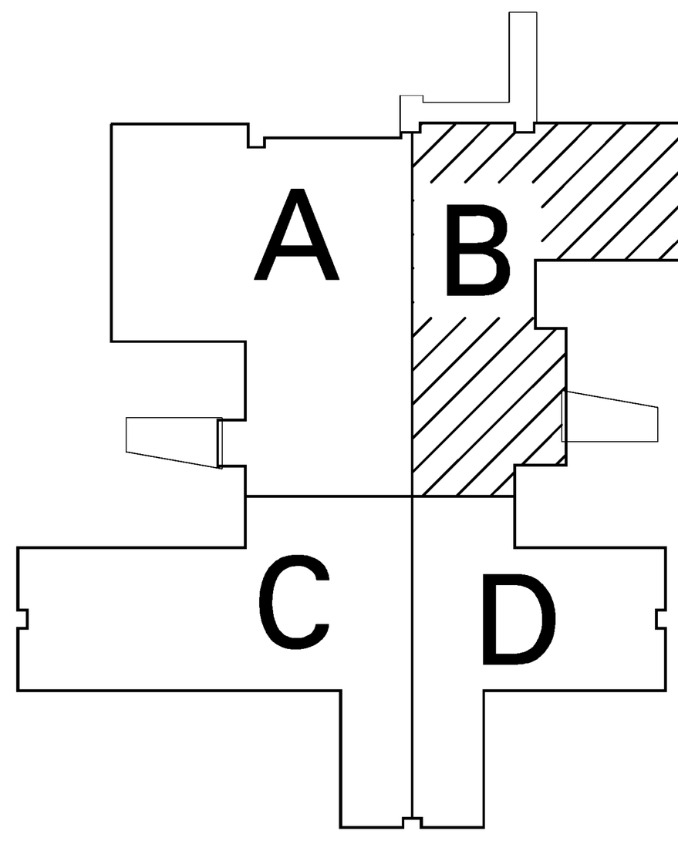
FIRST FLOOR PLAN PART B - HVAC

8' 0 8'

WALL LEGEND-NOTED SHEETS

SYMBOL	DESCRIPTION	DOOR/DAMPER INFO.	PRIORITY
	NON-RATED PARTITION	-	(–)
	SMOKE-RESISTIVE PARTITION (CORRIDOR)	POSITIVE LATCH, NO CLOSER, NO DAMPERS	(6TH)
SUITE	SMOKE-RESISTIVE PARTITION (SUITE)	POSITIVE LATCH, NO CLOSER, NO DAMPERS	(5TH)
	SMOKE RESISTIVE PARTITION (INCIDENTAL USE)	POSITIVE LATCH, CLOSER, NO DAMPERS	(4TH)
	1-HOUR SMOKE BARRIER (SMOKE COMP. SEPARATION)	20 MIN, CLOSER, S DAMPERS	(3RD)
	1-HOUR FIRE BARRIER (INCIDENTAL USE)	POSITIVE LATCH, 45-MIN, CLOSER, NO DAMPERS IF HARD DUCTED	(2ND)
	2-HOUR FIRE WALL (CMU CONSTR./STR. INDEPENDENT)	POSITIVE LATCH, 90 MIN, CLOSER, F/S DAMPERS	(1ST)

*SEE DIMENSIONED SHEETS FOR SOUND WALL LOCATIONS.



KEYPLAN

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fax 615.837.0657

A Replacement Facility for
Wrangell Medical Center
Wrangell, Alaska

AHFD | AMERICAN HEALTH FACILITIES DEVELOPMENT

STATE OF ALASKA 49TH THOMAS HUNTER DANIEL No. ME12715 REGISTERED PROFESSIONAL ENGINEER 3/21/12

PROJECT NUMBER
10528.00
DATE
March 21, 2012

M1.1B

FIRST FLOOR PLAN
PART B -HVAC

Fire Marshal Review Set

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Enfinity Project # 10050

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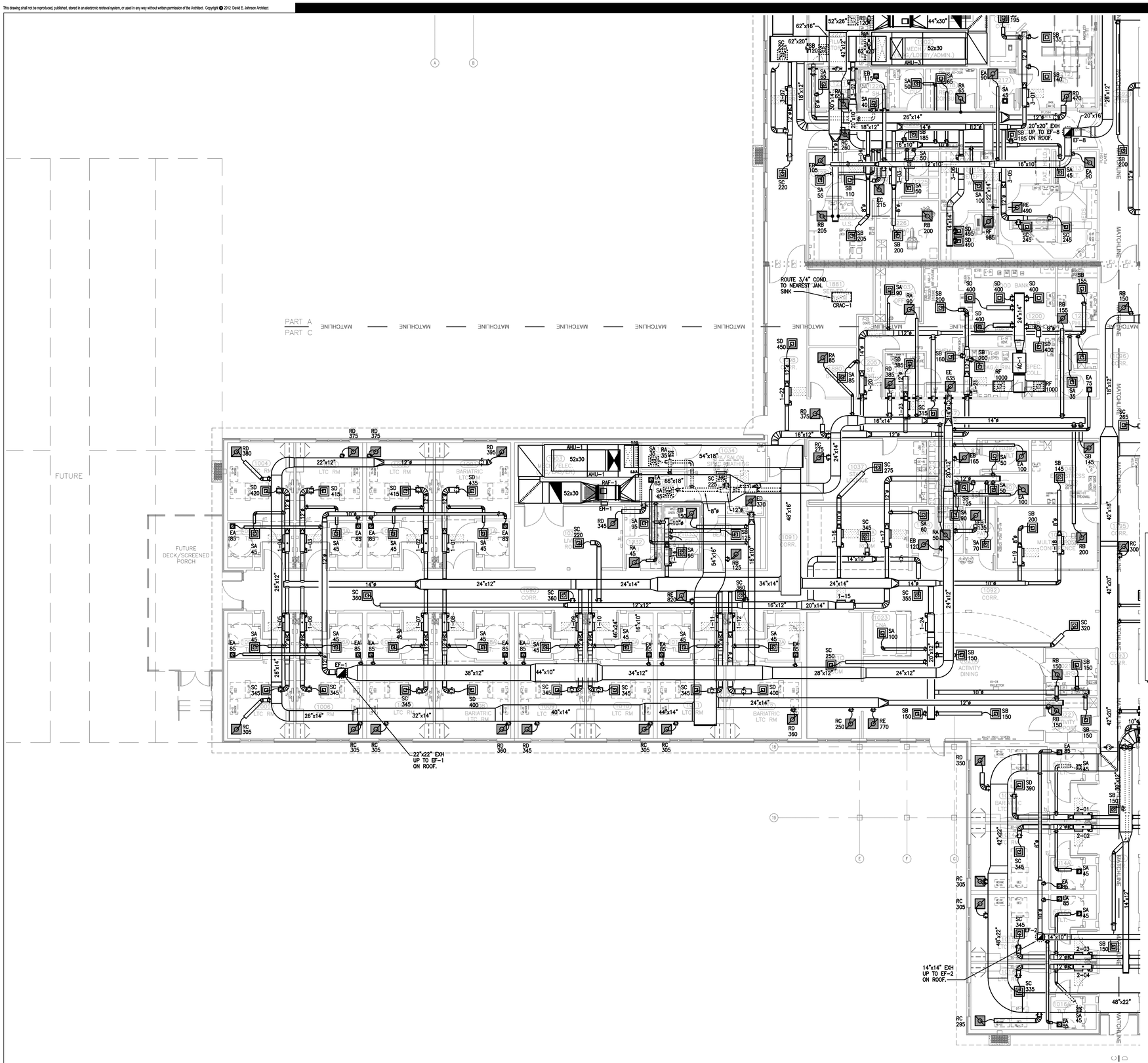
A Replacement Facility for
Wrangell Medical Center
Wrangell, Alaska



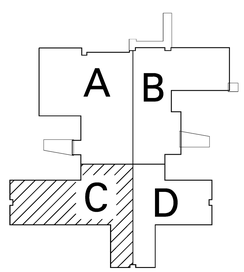
WALL LEGEND-NOTED SHEETS

SYMBOL	DESCRIPTION	DOOR/DAMPER INFO.	PRIORITY
	NON-RATED PARTITION	-	(-)
	SMOKE-RESISTIVE PARTITION (CORRIDOR)	POSITIVE LATCH, NO CLOSER, NO DAMPERS	(6TH)
	SMOKE-RESISTIVE PARTITION (SUITE)	POSITIVE LATCH, NO CLOSER, NO DAMPERS	(5TH)
	SMOKE RESISTIVE PARTITION (INCIDENTAL USE)	POSITIVE LATCH, CLOSER, NO DAMPERS	(4TH)
	1-HOUR SMOKE BARRIER (SMOKE COMP. SEPARATION)	20 MIN. CLOSER, S DAMPERS	(3RD)
	1-HOUR FIRE BARRIER (INCIDENTAL USE)	POSITIVE LATCH, 45-MIN. CLOSER, NO DAMPERS IF HARD DUCTED	(2ND)
	2-HOUR FIRE WALL (CMU CONSTR./STR. INDEPENDENT)	POSITIVE LATCH, 90 MIN. CLOSER, F/S DAMPERS	(1ST)

*SEE DIMENSIONED SHEETS FOR SOUND WALL LOCATIONS.

AHFD | AMERICAN HEALTH FACILITIES DEVELOPMENT

STATE OF ALASKA
49TH
THOMAS PORTER DANIEL
No. ME12715
REGISTERED PROFESSIONAL ENGINEER
3/21/12



KEYPLAN

PROJECT NUMBER
10528.00
DATE
March 21, 2012

M1.1C
FIRST FLOOR PLAN
PART C - HVAC

FIRST FLOOR PLAN PART C - HVAC

8' 0 8'

Fire Marshal Review Set

enfinity engineering
9019 Overlook Boulevard, Suite C-4
Brentwood, Tennessee 37027
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Fax: 615.377.0983
Enfinity Project # 10050

DEJA
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Nashville, TN 37204
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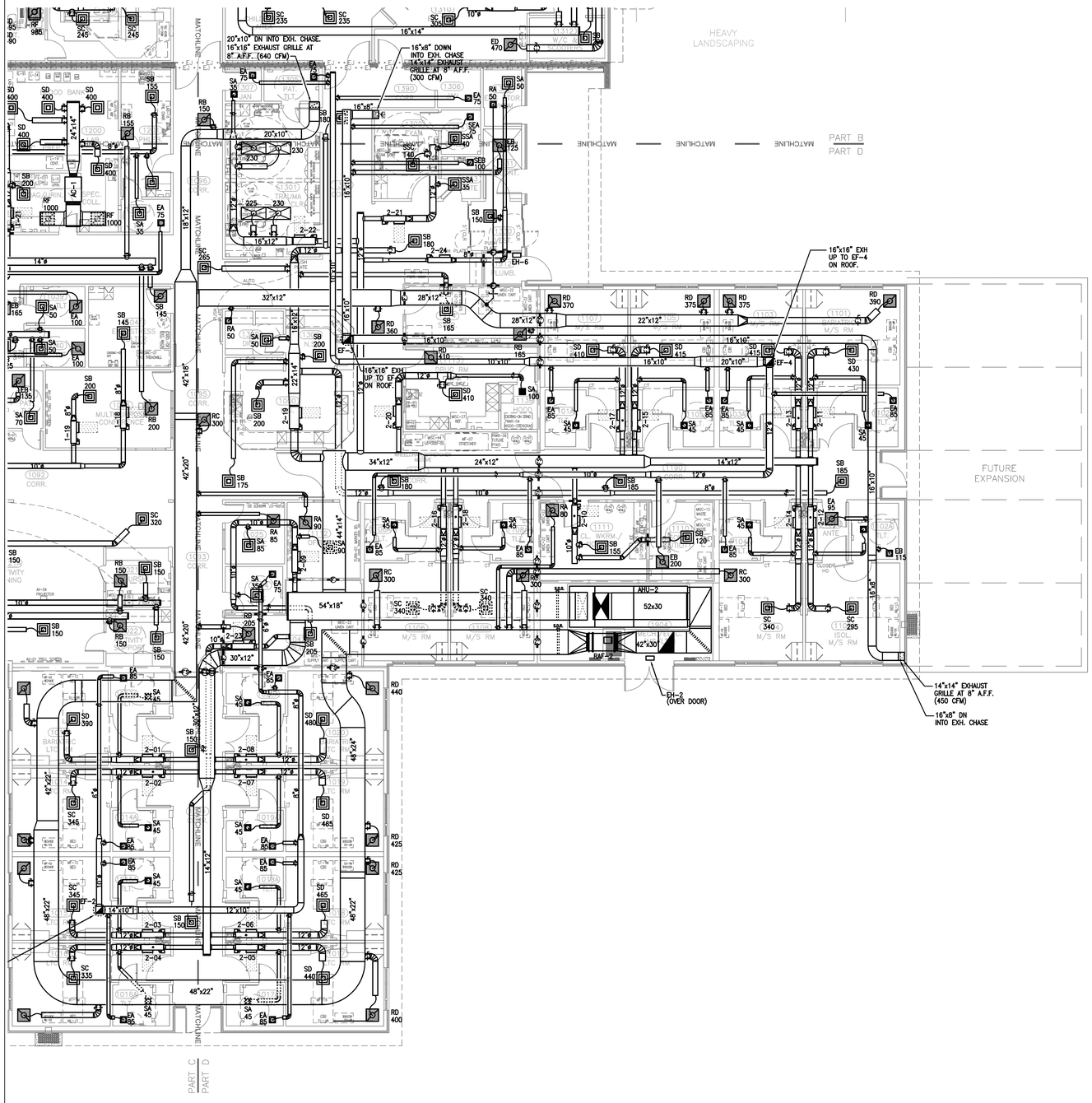
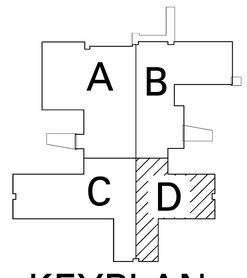
fax 615.837.0657



WALL LEGEND-NOTED SHEETS

SYMBOL	DESCRIPTION	DOOR/DAMPER INFO.	PRIORITY
	NON-RATED PARTITION	-	(-)
	SMOKE-RESISTIVE PARTITION (CORRIDOR)	POSITIVE LATCH, NO CLOSER, NO DAMPERS	(6TH)
	SMOKE-RESISTIVE PARTITION (SUITE)	POSITIVE LATCH, NO CLOSER, NO DAMPERS	(5TH)
	SMOKE RESISTIVE PARTITION (INCIDENTAL USE)	POSITIVE LATCH, CLOSER, NO DAMPERS	(4TH)
	1-HOUR SMOKE BARRIER (SMOKE COMP. SEPARATION)	20 MIN. CLOSER, S DAMPERS	(3RD)
	1-HOUR FIRE BARRIER (INCIDENTAL USE)	POSITIVE LATCH, 45-MIN. CLOSER, NO DAMPERS IF HVAC DUCTED	(2ND)
	2-HOUR FIRE WALL (CMU CONSTR./STR. INDEPENDENT)	POSITIVE LATCH, 90 MIN. CLOSER, F/S DAMPERS	(1ST)

*SEE DIMENSIONED SHEETS FOR SOUND WALL LOCATIONS.



KEYPLAN

FIRST FLOOR PLAN PART D - HVAC

8' 0 8'

A Replacement Facility for
Wrangell Medical Center
Wrangell, Alaska

AHFD AMERICAN HEALTH FACILITIES DEVELOPMENT

STATE OF ALASKA
49TH
THOMAS PEARTER DAMERON
No. ME12715
REGISTERED PROFESSIONAL ENGINEER
3/21/12

PROJECT NUMBER
10528.00
DATE
March 21, 2012

M1.1D

FIRST FLOOR PLAN
PART B - HVAC

Fire Marshal Review Set

enfinity engineering
9019 Overlook Boulevard, Suite C-4
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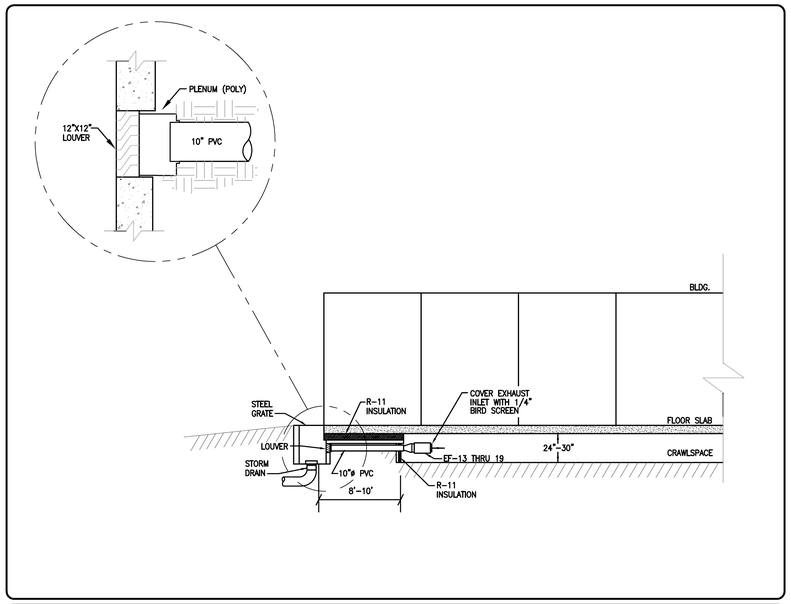
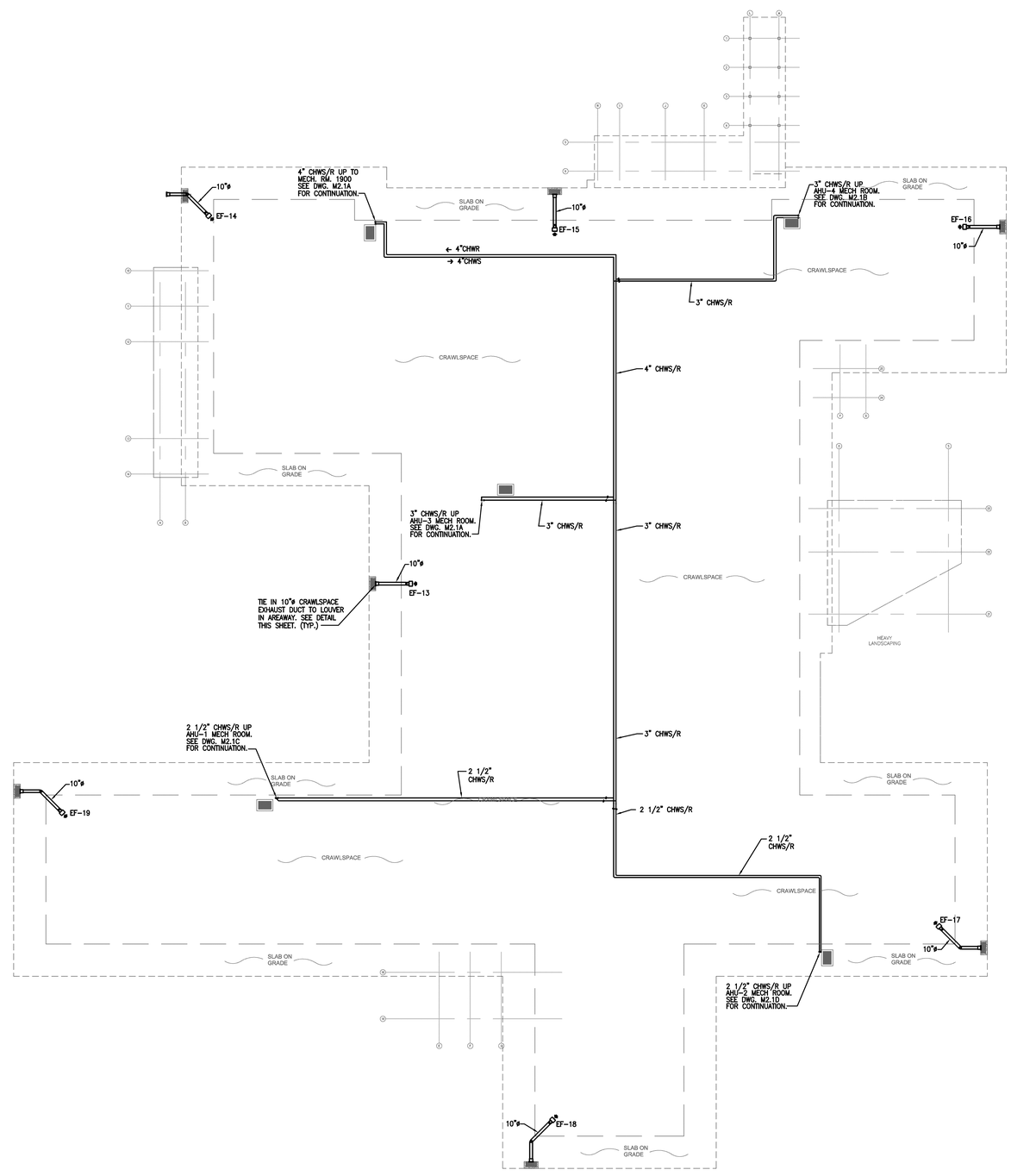
Fax: 615.377.0983
Enfinity Project # 10050



CRAWLSPACE VENTILATION DETAIL

NOT TO SCALE



CRAWLSPACE PLAN - HVAC PIPING

16' 0 16'

Fire Marshal Review Set

DEJA

A Replacement Facility for

Wrangell Medical Center

Wrangell, Alaska

David E. Johnson Architect
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AHFD AMERICAN HEALTH FACILITIES DEVELOPMENT

STATE OF ALASKA 49TH
THOMAS HUNTER DANIEL
No. ME12715
REGISTERED PROFESSIONAL ENGINEER
3/21/12

PROJECT NUMBER
10528.00

DATE
March 21, 2012

M2.0

CRAWLSPACE PLAN - HVAC PIPING

enfinity engineering
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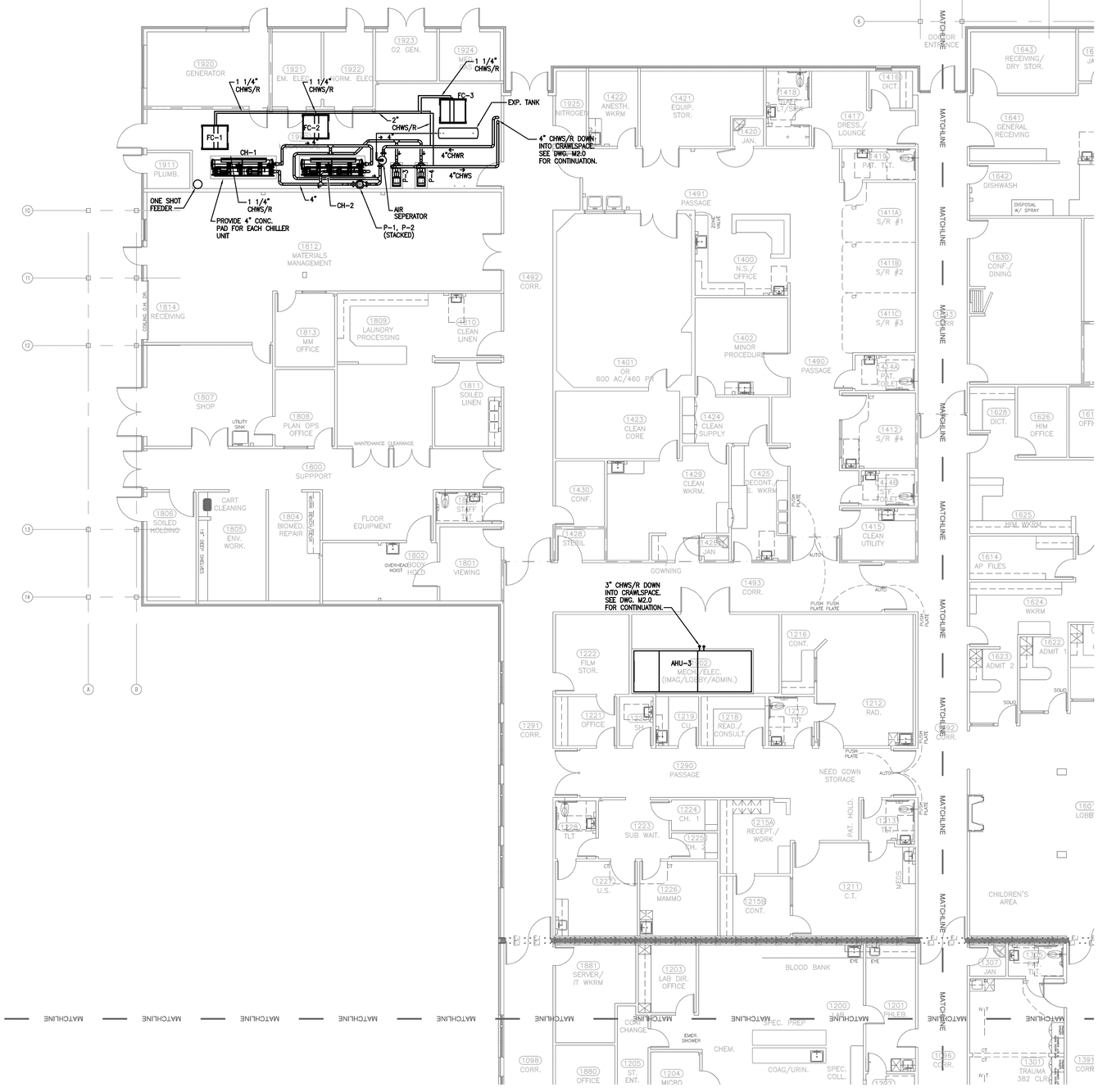
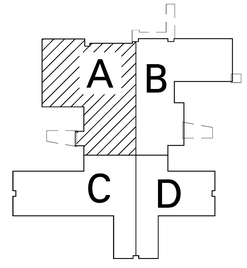
Enfinity Project # 10050



WALL LEGEND-NOTED SHEETS

SYMBOL	DESCRIPTION	DOOR/DAMPER INFO.	PRIORITY
	NON-RATED PARTITION	-	(-)
	SMOKE-RESISTIVE PARTITION (CORRIDOR)	POSITIVE LATCH, NO CLOSER, NO DAMPERS	(6TH)
	SMOKE-RESISTIVE PARTITION (SUITE)	POSITIVE LATCH, NO CLOSER, NO DAMPERS	(5TH)
	SMOKE RESISTIVE PARTITION (INCIDENTAL USE)	POSITIVE LATCH, CLOSER, NO DAMPERS	(4TH)
	1-HOUR SMOKE BARRIER (SMOKE COMP. SEPARATION)	20 MIN. CLOSER, S DAMPERS	(3RD)
	1-HOUR FIRE BARRIER (INCIDENTAL USE)	POSITIVE LATCH, 45-MIN. CLOSER, NO DAMPERS IF HVAC DUCTED	(2ND)
	2-HOUR FIRE WALL (CMU CONSTR./STR. INDEPENDENT)	POSITIVE LATCH, 90 MIN. CLOSER, F/S DAMPERS	(1ST)

*SEE DIMENSIONED SHEETS FOR SOUND WALL LOCATIONS.



KEYPLAN

FIRST FLOOR PLAN PART A - HVAC PIPING

8' 0 8'

Fire Marshal Review Set

DEJA

A Replacement Facility for
Wrangell Medical Center
Wrangell, Alaska

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AHFD AMERICAN HEALTH FACILITIES DEVELOPMENT

STATE OF ALASKA
49TH
THOMAS HUNTER DANIEL
No. ME12715
REGISTERED PROFESSIONAL ENGINEER
5/04/12

PROJECT NUMBER
10528.00
DATE
March 21, 2012

M2.1A

FIRST FLOOR PLAN
PART A - HVAC PIPING

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Wrangell, Alaska

WALL LEGEND-NOTED SHEETS

SYMBOL	DESCRIPTION	DOOR/DAMPER INFO.	PRIORITY
	NON-RATED PARTITION	-	(-)
	SMOKE-RESISTIVE PARTITION (CORRIDOR)	POSITIVE LATCH, NO CLOSER, NO DAMPERS	(6TH)
	SMOKE-RESISTIVE PARTITION (SUITE)	POSITIVE LATCH, NO CLOSER, NO DAMPERS	(5TH)
	SMOKE RESISTIVE PARTITION (INCIDENTAL USE)	POSITIVE LATCH, CLOSER, NO DAMPERS	(4TH)
	1-HOUR SMOKE BARRIER (SMOKE COMP. SEPARATION)	20 MIN. CLOSER, S DAMPERS	(3RD)
	1-HOUR FIRE BARRIER (INCIDENTAL USE)	POSITIVE LATCH, 45-MIN. CLOSER, NO DAMPERS IF HVAC DUCTED	(2ND)
	2-HOUR FIRE WALL (CMU CONSTR./STR. INDEPENDENT)	POSITIVE LATCH, 90 MIN. CLOSER, F/S DAMPERS	(1ST)

*SEE DIMENSIONED SHEETS FOR SOUND WALL LOCATIONS.

AHFD AMERICAN HEALTH FACILITIES DEVELOPMENT

STATE OF ALASKA
THOMAS HUNTER DANIEL
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REGISTERED PROFESSIONAL ENGINEER
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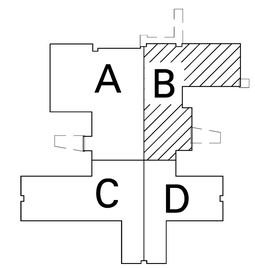


KEYPLAN

PROJECT NUMBER
10528.00
DATE
March 21, 2012

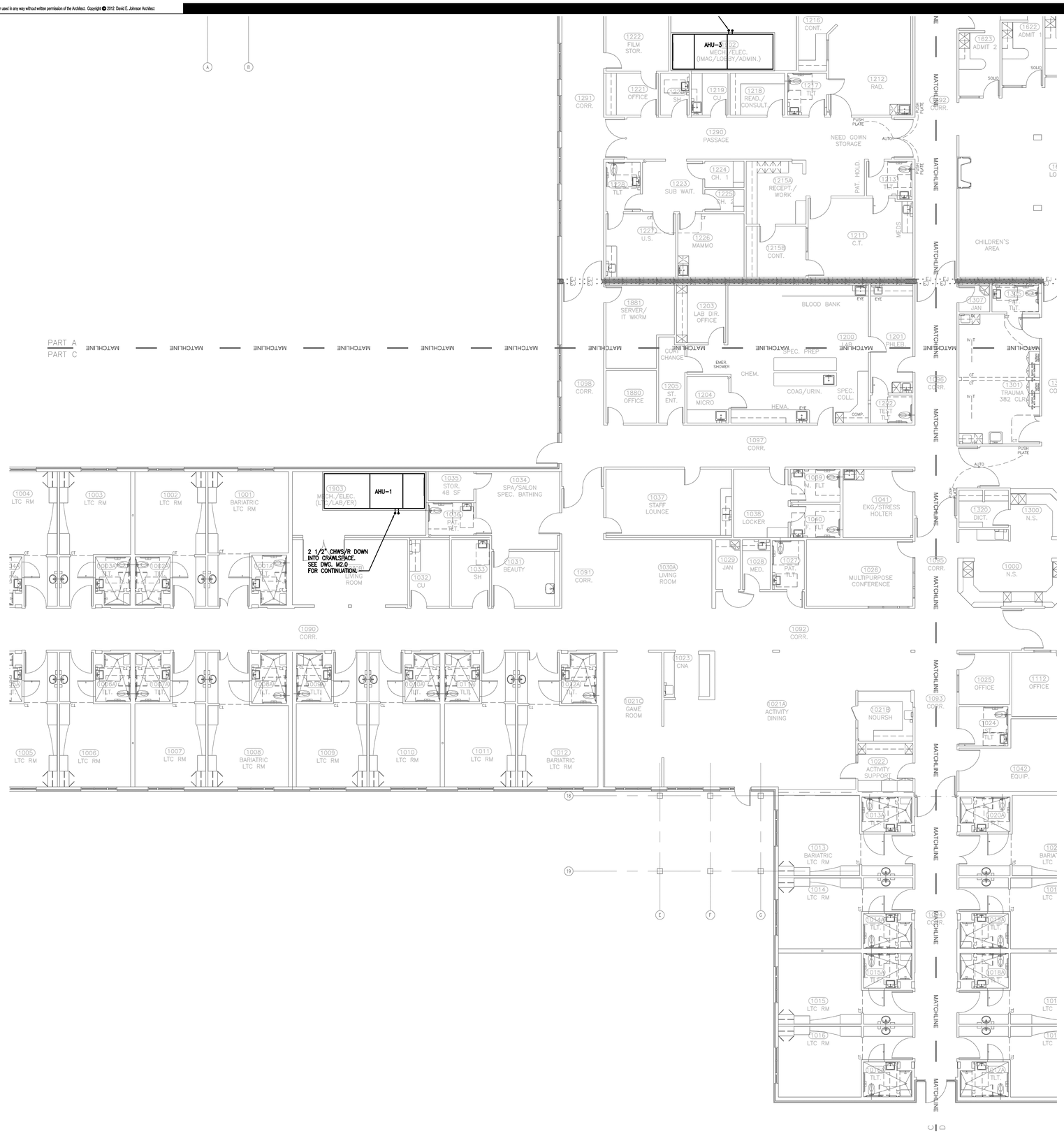
M2.1B

FIRST FLOOR PLAN
PART B -HVAC PIPING

FIRST FLOOR PLAN PART B - HVAC PIPING

8' 0 8'

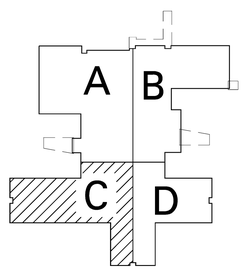
Fire Marshal Review Set



WALL LEGEND-NOTED SHEETS

SYMBOL	DESCRIPTION	DOOR/DAMPER INFO.	PRIORITY
	NON-RATED PARTITION	-	(-)
	SMOKE-RESISTIVE PARTITION (CORRIDOR)	POSITIVE LATCH, NO CLOSER, NO DAMPERS	(6TH)
	SMOKE-RESISTIVE PARTITION (SUITE)	POSITIVE LATCH, NO CLOSER, NO DAMPERS	(5TH)
	SMOKE RESISTIVE PARTITION (INCIDENTAL USE)	POSITIVE LATCH, CLOSER, NO DAMPERS	(4TH)
	1-HOUR SMOKE BARRIER (SMOKE COMP. SEPARATION)	20 MIN. CLOSER, S DAMPERS	(3RD)
	1-HOUR FIRE BARRIER (INCIDENTAL USE)	POSITIVE LATCH, 45-MIN. CLOSER, NO DAMPERS IF HARD DUCTED	(2ND)
	2-HOUR FIRE WALL (CMU CONSTR./STR. INDEPENDENT)	POSITIVE LATCH, 90 MIN. CLOSER, F/S DAMPERS	(1ST)

*SEE DIMENSIONED SHEETS FOR SOUND WALL LOCATIONS.



KEYPLAN

FIRST FLOOR PLAN PART C - HVAC PIPING

8' 0 8'

Fire Marshal Review Set

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A Replacement Facility for
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Wrangell, Alaska

AHFD AMERICAN HEALTH FACILITIES DEVELOPMENT

STATE OF ALASKA 49TH
THOMAS HUNTER DANIEL
No. ME12715
REGISTERED PROFESSIONAL ENGINEER
3/21/12

PROJECT NUMBER
10528.00
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M2.1C
FIRST FLOOR PLAN
PART C - HVAC PIPING

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WALL LEGEND-NOTED SHEETS

SYMBOL	DESCRIPTION	DOOR/DAMPER INFO.	PRIORITY
	NON-RATED PARTITION	-	(-)
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	SMOKE RESISTIVE PARTITION (INCIDENTAL USE)	POSITIVE LATCH, CLOSER, NO DAMPERS	(4TH)
	1-HOUR SMOKE BARRIER (SMOKE COMP. SEPARATION)	20 MIN, CLOSER, S DAMPERS	(3RD)
	1-HOUR FIRE BARRIER (INCIDENTAL USE)	POSITIVE LATCH, 45-MIN, CLOSER, NO DAMPERS IF HVAC DUCTED	(2ND)
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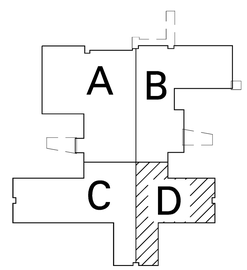
*SEE DIMENSIONED SHEETS FOR SOUND WALL LOCATIONS.



KEYPLAN

FIRST FLOOR PLAN PART D - HVAC PIPING

8' 0 8'

A Replacement Facility for
Wrangell Medical Center
Wrangell, Alaska

AHFD AMERICAN HEALTH FACILITIES DEVELOPMENT

STATE OF ALASKA
40TH
THOMAS HUNTER DANIEL
No. ME12715
REGISTERED PROFESSIONAL ENGINEER
5/9/12

PROJECT NUMBER
10528.00
DATE
March 21, 2012

M2.1D

FIRST FLOOR PLAN
PART B - HVAC PIPING

Fire Marshal Review Set

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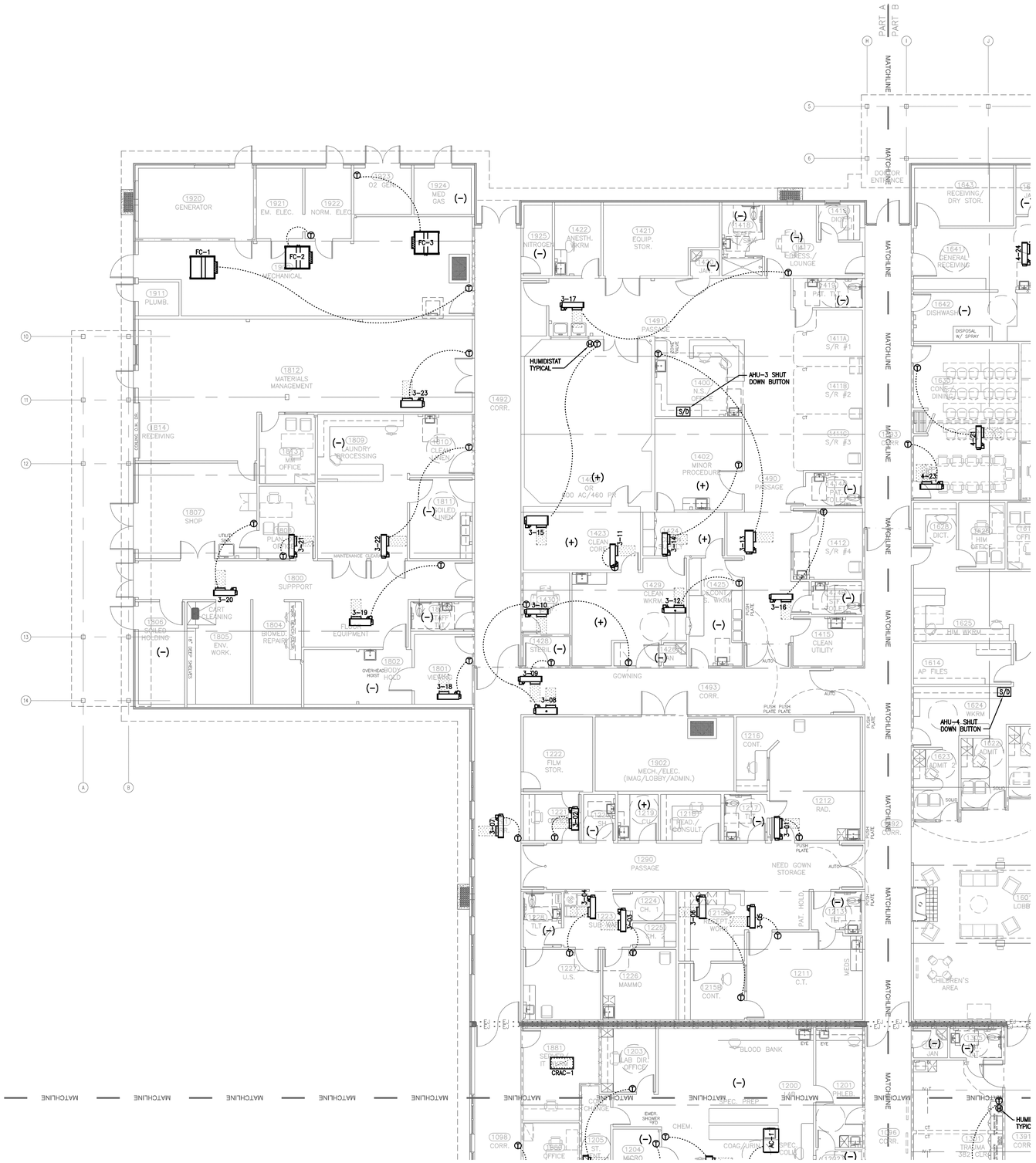
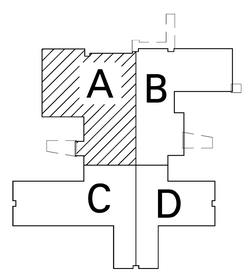


HVAC LEGEND

- (T) THERMOSTAT
- (H) HUMIDISTAT
- VAV BOX ELECTRICAL CONNECTIONS TO BE REVERSED FOR CLEARANCE REQUIREMENTS.
- (+) POSITIVE PRESSURE
- (–) NEGATIVE PRESSURE



KEYPLAN

FIRST FLOOR PLAN PART A - HVAC THERMOSTATS & PRESSURIZATION

8' 0 8'

Fire Marshal Review Set

DEJA

A Replacement Facility for
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Wrangell, Alaska

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AHFDI AMERICAN HEALTH FACILITIES DEVELOPMENT

STATE OF ALASKA
40TH
THOMAS HUNTER DANIEL
No. ME12715
REGISTERED PROFESSIONAL ENGINEER
4/30/12

PROJECT NUMBER
10528.00
DATE
March 21, 2012

M3.1A

FIRST FLOOR PLAN
PART A - HVAC T'STAT
& PRESSURIZATION

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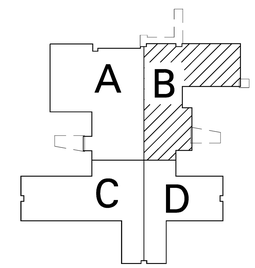
A Replacement Facility for
Wrangell Medical Center
Wrangell, Alaska

HVAC LEGEND

T	THERMOSTAT
H	HUMIDISTAT
	VAV BOX ELECTRICAL CONNECTIONS TO BE REVERSED FOR CLEARANCE REQUIREMENTS.
(+)	POSITIVE PRESSURE
(–)	NEGATIVE PRESSURE



KEYPLAN

FIRST FLOOR PLAN PART B - HVAC THERMOSTATS & PRESSURIZATION

8' 0 8'

AHFD AMERICAN HEALTH FACILITIES DEVELOPMENT

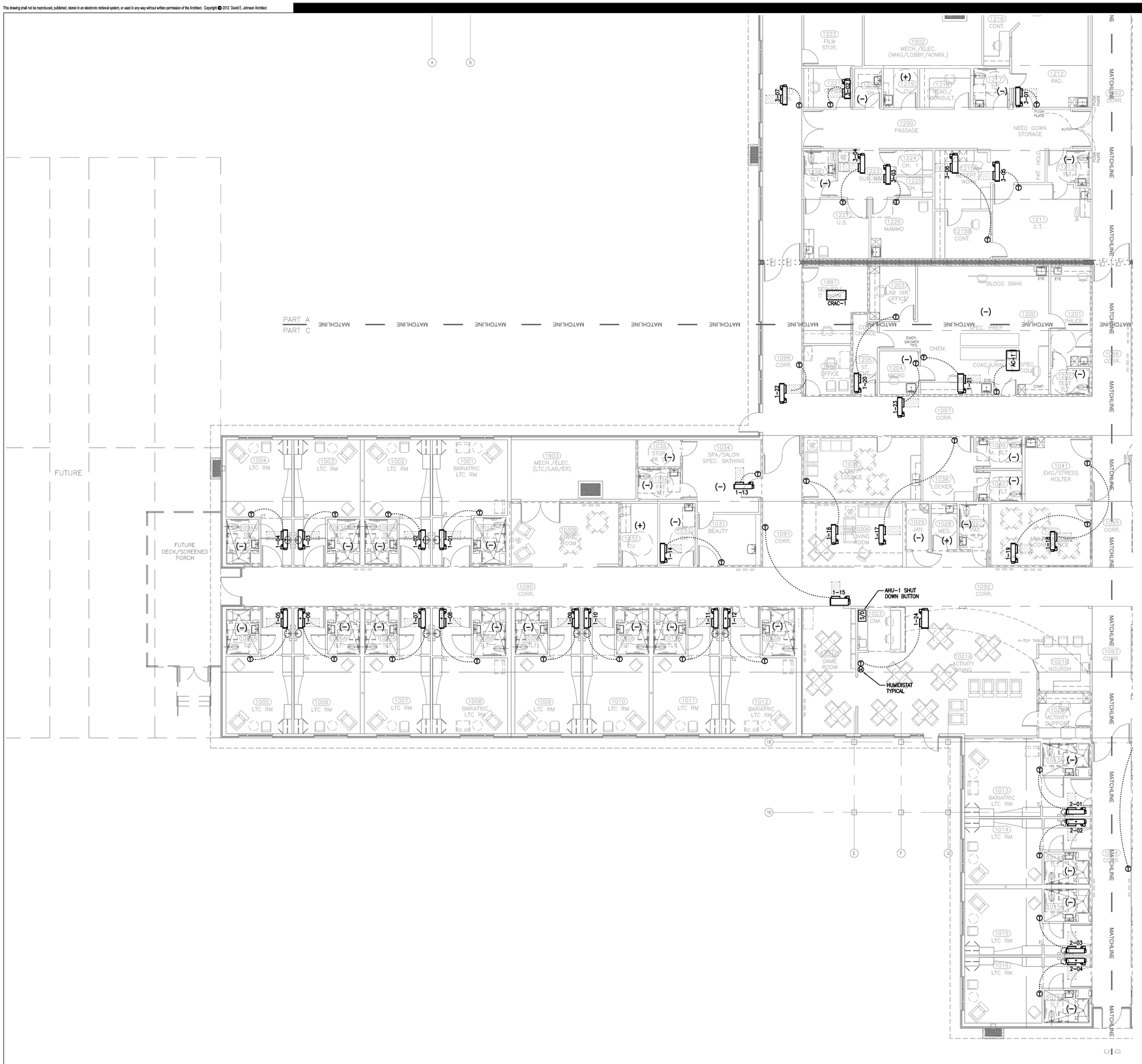
STATE OF ALASKA
THOMAS HUNTER DANIEL
No. ME12715
REGISTERED PROFESSIONAL ENGINEER
4/3/12

PROJECT NUMBER
10528.00
DATE
March 21, 2012

M3.1B

FIRST FLOOR PLAN
PART B - HVAC T'STAT
& PRESSURIZATION

Fire Marshal Review Set



HVAC LEGEND

- (T) THERMOSTAT
- (H) HUMIDISTAT
- VAV BOX ELECTRICAL CONNECTIONS TO BE REVERSED FOR CLEARANCE REQUIREMENTS.
- (+) POSITIVE PRESSURE
- (–) NEGATIVE PRESSURE

KEYPLAN

FIRST FLOOR PLAN PART C - HVAC THERMOSTATS & PRESSURIZATION

8' 0 8'

Fire Marshal Review Set

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A Replacement Facility for
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Wrangell, Alaska

AHFDI AMERICAN HEALTH FACILITIES DEVELOPMENT

STATE OF ALASKA 49TH
THOMAS PORTER DANIEL
No. ME12715
REGISTERED PROFESSIONAL ENGINEER
3/21/12

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March 21, 2012

M3.1C
FIRST FLOOR PLAN
PART C - HVAC T'STAT
& PRESSURIZATION

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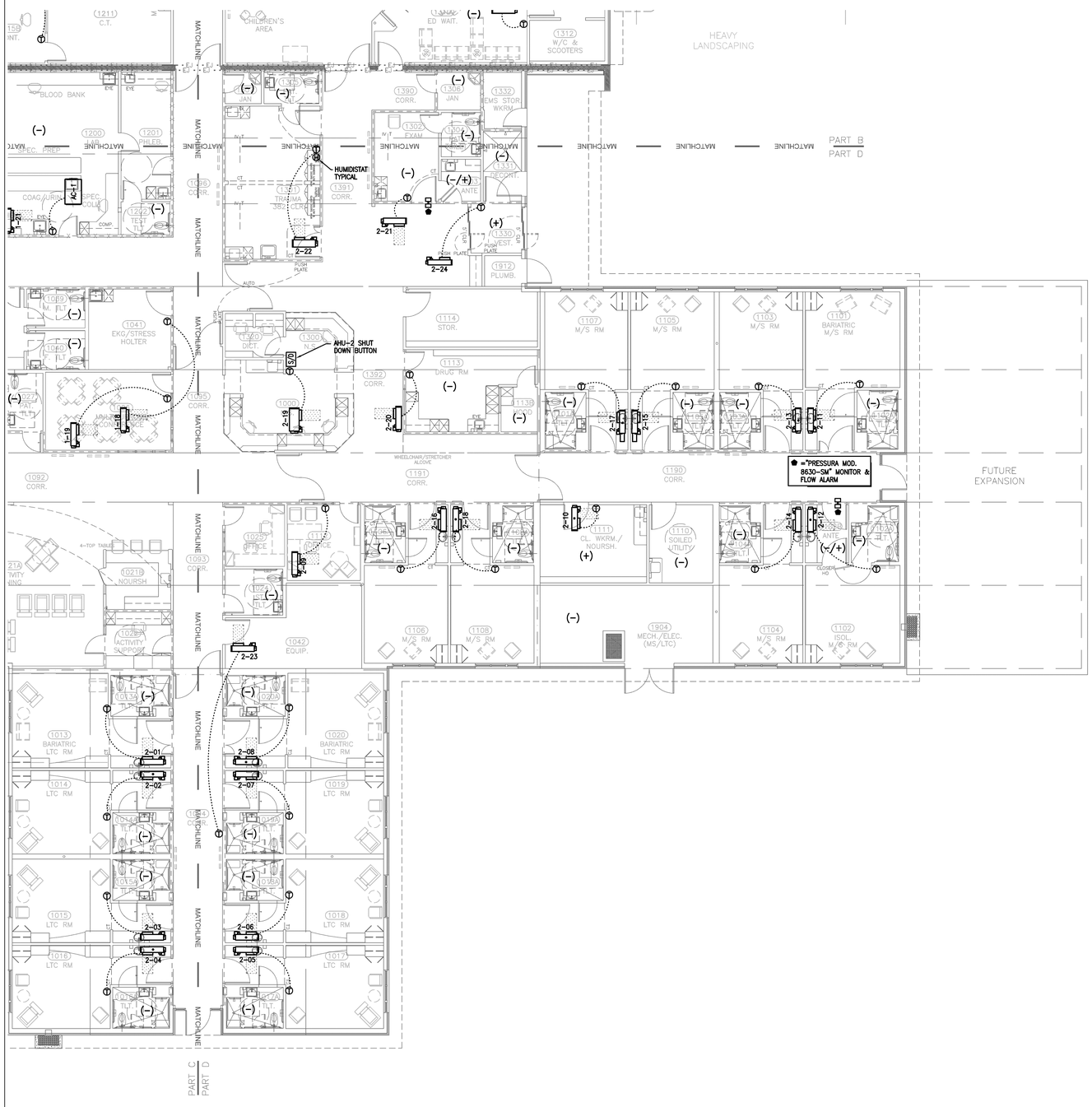

HVAC LEGEND

T	THERMOSTAT
H	HUMIDISTAT
	VAV BOX ELECTRICAL CONNECTIONS TO BE REVERSED FOR CLEARANCE REQUIREMENTS.
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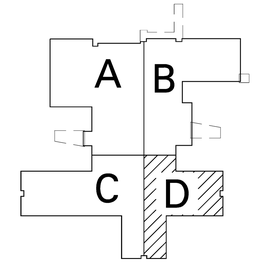

KEYPLAN

FIRST FLOOR PLAN PART D - HVAC THERMOSTATS & PRESSURIZATION

8' 0 8'

A Replacement Facility for
Wrangell Medical Center
Wrangell, Alaska

AHFD AMERICAN HEALTH FACILITIES DEVELOPMENT

STATE OF ALASKA 49TH — THOMAS PAINTER DANIEL — No. ME12715 — REGISTERED PROFESSIONAL ENGINEER — 3/21/12

PROJECT NUMBER
10528.00
DATE
March 21, 2012

M3.1D

FIRST FLOOR PLAN
PART B - HVAC T'STAT
& PRESSURIZATION

Fire Marshal Review Set

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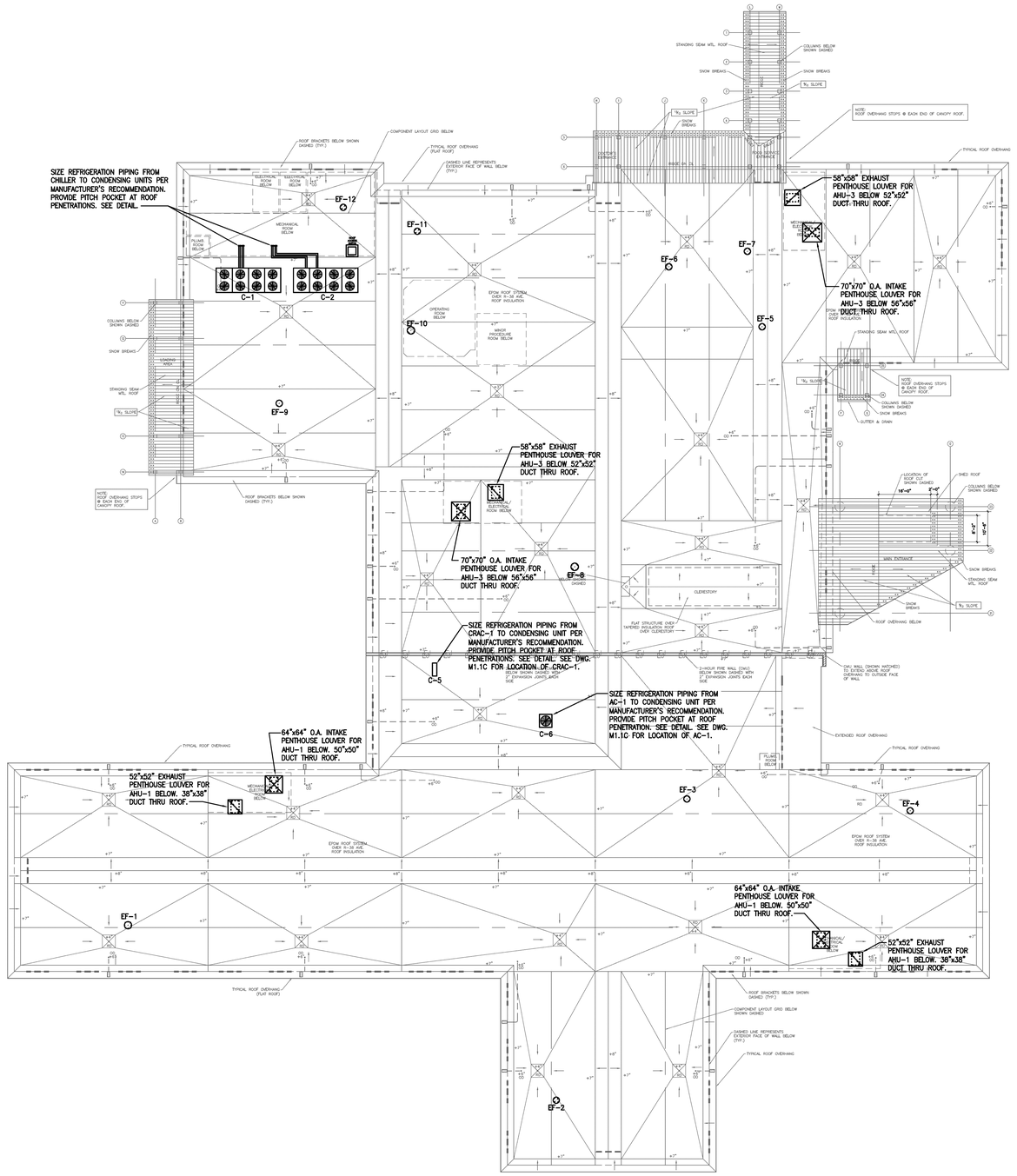

HVAC ROOF PLAN

16' 0 16'

Fire Marshal Review Set

A Replacement Facility for
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Wrangell, Alaska

AHFD AMERICAN HEALTH FACILITIES DEVELOPMENT

STATE OF ALASKA
THOMAS HUNTER DANIEL
No. ME12715
REGISTERED PROFESSIONAL ENGINEER
4/9/12

PROJECT NUMBER
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M4.1
HVAC ROOF PLAN

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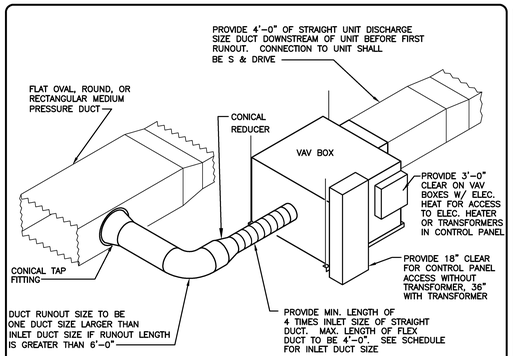
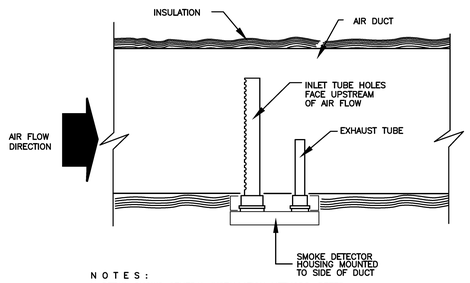


NOTES:

1. CENTER LINE OF BOX INLET MUST ALIGN WITH CENTER LINE OF MEDIUM PRESSURE DUCT WITH NO MORE THAN A 15 DEGREE OFFSET
2. TAP FITTING TO RECTANGULAR MEDIUM PRESSURE DUCT MAY ALSO BE RECTANGULAR 45 DEGREE ENTRY, SIZED PER SMACNA RECOMMENDATIONS, AND THEN TRANSITION TO ROUND.
3. MEDIUM PRESSURE ROUND OR FLAT OVAL TRUNK DUCT TO HAVE CONICAL TEE FITTING, OR SADDLE TAP WITH OTHER REQUIREMENTS AS SHOWN.
4. BOXES 1,400 CFM OR SMALLER TO BE SUPPORTED WITH 1-1/2" x 1/8" GALVANIZED BAND IRON ON FOUR CORNERS. BOXES GREATER THAN 1,400 CFM SHALL HAVE TRAPEZE SUPPORT OF REINFORCING ANGLE WITH 3/8" GALVANIZED ALL THREAD ROD HANGERS
5. COORDINATE REQUIREMENTS FOR CEILING ACCESS PANELS.
6. CONFIRM WITH LOCAL CODES IF FLEX DUCT IS PERMISSIBLE.
7. COORDINATE REQUIREMENT FOR USE OF DOUBLE WALL CONSTRUCTION PRIOR TO PURCHASE ON HEALTH CARE AREAS AS REQUIRED BY CODES.

VAV BOX DETAIL

NOT TO SCALE

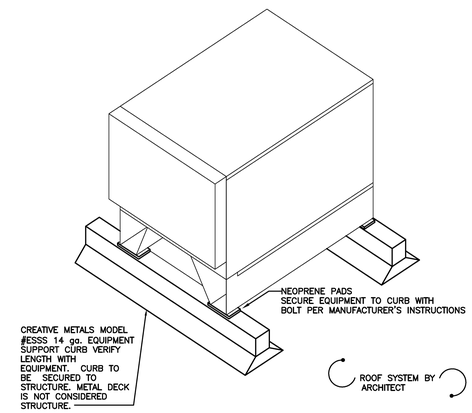


N O T E S :

1. DETAIL SHOWS GENERAL INSTALLATION METHODS. REFER TO INDIVIDUAL MFGR. FOR SPECIFIC INSTALLATION AND LOCATION INSTRUCTIONS.
2. CUT INLET AND EXHAUST TUBES TO LENGTH SPECIFIED BY MAUNFACTURER.

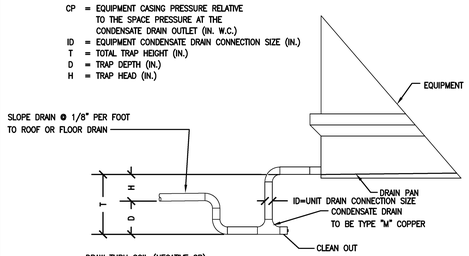
DUCT MOUNTED SMOKE DETECTOR DETAIL

NOT TO SCALE



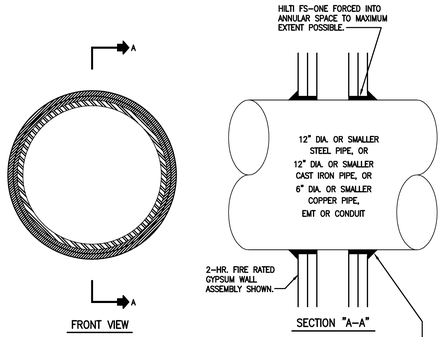
ROOFTOP EQUIPMENT SUPPORT DETAIL

NOT TO SCALE



CONDENSATE DRAIN DETAIL

NOT TO SCALE



NOTE:
MAXIMUM DIAMETER OF OPENING IS 13-1/4".
ANNULAR SPACE OF MIN. 0" TO MAXIMUM 1/4".

U.L.# WL1085

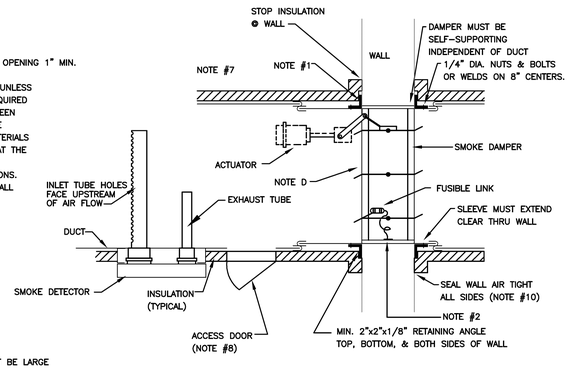
PIPE THRU RATED WALL DETAIL

NOT TO SCALE

FIRE AND SMOKE DAMPER NOTES:

1. RETAINING ANGLES, MIN. 2"x2"x1/8" RETAINING ANGLES MUST LAP STRUCT. OPENING 1" MIN. & COVER CORNERS OF OPENINGS.
2. CLEARANCE, 1/8" PER LINEAR FOOT BOTH DIMENSIONS, w/ MIN. OF 1/4" UNLESS OTHERWISE STATED IN THE LISTING OF THE ASSEMBLY. THE DIMENSIONS REQUIRED FOR THE OPENING SHALL BE THOSE REMAINING AFTER THE OPENING HAS BEEN FRAMED & FIRE RESISTIVE MATERIALS PROVIDED WHERE REQUIRED. THE FIRE RESISTIVE SHALL BE EQUAL TO THE REQUIREMENTS FOR FIRE RESISTIVE MATERIALS USED IN THE CONSTRUCTED WALL SO THAT A CONTINUOUS RATING EXISTS AT THE WALL PENETRATION.
3. STEEL SLEEVE, MIN. 14 GA. OR GAUGE AS REQUIRED BY MFG'R. INSTRUCTIONS. WHERE SMOKE DAMPERS MUST BE LOCATED OUTSIDE THE PLANE OF THE WALL OR FLOOR, PROVIDE A MIN. 10 GA. SLEEVE.
4. APPROVED FIRE DAMPER (CURTAIN OR BLADE TYPE)
5. SECURE RETAINING ANGLES TO SLEEVE ONLY, ON 8" CENTERS WITH:
   A. 1/2" LONG WELDS, OR
   B. 1/4" BOLTS & NUTS, OR
   C. NO. 10 STEEL SCREWS (PREFERRED), OR
   D. MIN. 3/16" STEEL RIVETS
6. SECURE DAMPER TO SLEEVE ON 8" CENTERS WITH:
   A. 1/2" WELDS, OR
   B. 1/4" BOLTS & NUTS IN HOLES PROVIDED, OR
   C. NO. 10 STEEL SCREWS, OR
   D. MIN. 3/16" STEEL RIVETS.
7. CONNECT DUCT TO SLEEVE AS REQUIRED BY THE MANUFACTURER.
8. INSTALL ACCESS DOOR OR PANEL FOR SERVICE & INSPECTION. DOOR MUST BE LARGE ENOUGH TO CHANGE LINK.
9. THE FIRE DAMPER MANUFACTURER'S INSTALLATION DETAILS & INSTRUCTIONS AS TESTED & APPROVED BY UL MUST BE USED IN LIEU OF THE ABOVE DETAILS WHERE APPLICABLE.
10. PROVIDE A COPY OF THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AT THE FINAL INSPECTION.

FIRE CAULKING IS NOT ALLOWED AT THE ANGLES FOR FIRE OR FIRE/SMOKE DAMPER INSTALLATIONS. FIRE DAMPERS MUST BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND THE SMACNA FIRE DAMPER GUIDE WITH PROPER DRYWALL GAPS AND DRYWALL INSTALLATION (NOT MUD OR TAPE TO FILL THE EXCESS GAP). ANY UL TESTED DAMPER ASSEMBLY OR DAMPER MANUFACTURER'S INSTRUCTIONS THAT HAVE FIRE CAULKING AS PART OF THE INSTALLATION WILL BE ACCEPTED AS LONG AS THE CAULKING IS DONE EXACTLY PER THE PROCEDURES.
IF THE LOCAL OR STATE FIRE OFFICIALS REQUIRE FIRE CAULKING, THEN A LETTER FROM THESE OFFICIALS WILL BE REQUIRED STATING THAT THE FIRE CAULKING IS REQUIRED, WHAT MATERIAL IS TO BE USED AND HOW IT IS TO BE APPLIED.



NOTES:

A. SEE MECHANICAL SPECIFICATIONS FOR TYPE OF DAMPERS.

B. DAMPER TO BE LOCATED AS CLOSE AS POSSIBLE TO WALL BUT NO FARTHER THAN 18" PROVIDED THERE IS NO JOINT BETWEEN WALL AND DAMPER.

C. DAMPER SHALL BE TESTED IN ACCORDANCE WITH "UL 555S" AND BEAR U.L. LABEL.

D. PROVIDE AIRFOIL BLADE DESIGN FOR ALL MEDIUM PRESSURE DUCT INSTALLATIONS

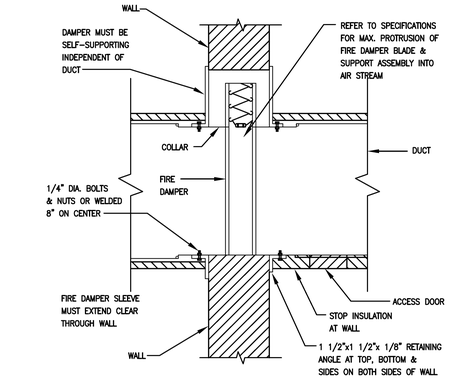
E. SMOKE DETECTOR SHALL BE PROVIDED WITHIN 5'-0" OF DAMPER w/ NO OUTLETS OR INLETS BETWEEN DETECTOR & DAMPER.

F. WHERE A SMOKE DAMPER IS INSTALLED ABOVE SMOKE BARRIER DOORS, A SPOT-TYPE DETECTOR LISTED FOR RELEASING SERVICE SHALL BE INSTALLED ON EITHER SIDE OF THE SMOKE BARRIER DOOR OPENING.

G. WHERE A SMOKE DAMPER IS INSTALLED IN A CORRIDOR WALL OR CEILING, THE DAMPER SHALL BE PERMITTED TO BE CONTROLLED BY A SMOKE DETECTION SYSTEM INSTALLED IN THE CORRIDOR.

COMBINATION FIRE/SMOKE DAMPER DETAIL "UL 555S"

NOT TO SCALE



NOTES:
A. SEE MECHANICAL SPECIFICATIONS FOR TYPE OF DAMPERS.
B. DAMPER SHALL BE TESTED IN ACCORDANCE WITH "UL 555" AND BEAR U.L. LABEL.

FIRE CAULKING IS NOT ALLOWED AT THE ANGLES FOR FIRE OR FIRE/SMOKE DAMPER INSTALLATIONS. FIRE DAMPERS MUST BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND THE SMACNA FIRE DAMPER GUIDE WITH PROPER DRYWALL GAPS AND DRYWALL INSTALLATION (NOT MUD OR TAPE TO FILL THE EXCESS GAP). ANY UL TESTED DAMPER ASSEMBLY OR DAMPER MANUFACTURER'S INSTRUCTIONS THAT HAVE FIRE CAULKING AS PART OF THE INSTALLATION WILL BE ACCEPTED AS LONG AS THE CAULKING IS DONE EXACTLY PER THE PROCEDURES.
IF THE LOCAL OR STATE FIRE OFFICIALS REQUIRE FIRE CAULKING, THEN A LETTER FROM THESE OFFICIALS WILL BE REQUIRED STATING THAT THE FIRE CAULKING IS REQUIRED, WHAT MATERIAL IS TO BE USED AND HOW IT IS TO BE APPLIED.

VERTICAL FIRE DAMPER DETAIL

NOT TO SCALE

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AHFDI AMERICAN HEALTH FACILITIES DEVELOPMENT

STATE OF ALASKA
49TH
THOMAS HUNTER DANIEL
No. M.E.12715
REGISTERED PROFESSIONAL ENGINEER
4/30/12

PROJECT NUMBER
10528.00
DATE
March 21, 2012

M5.1
HVAC DETAILS

Fire Marshal Review Set

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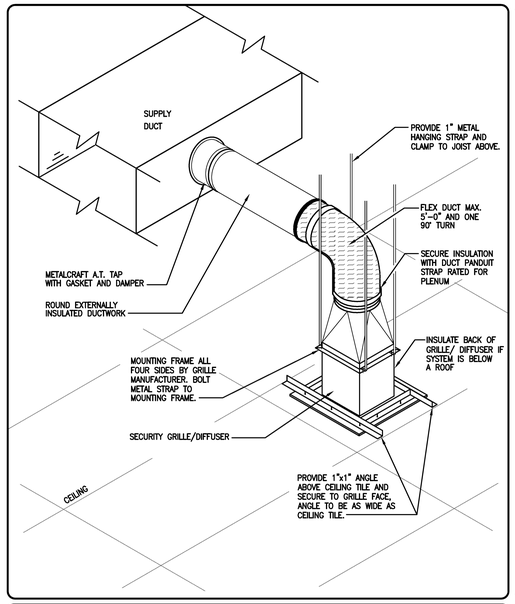
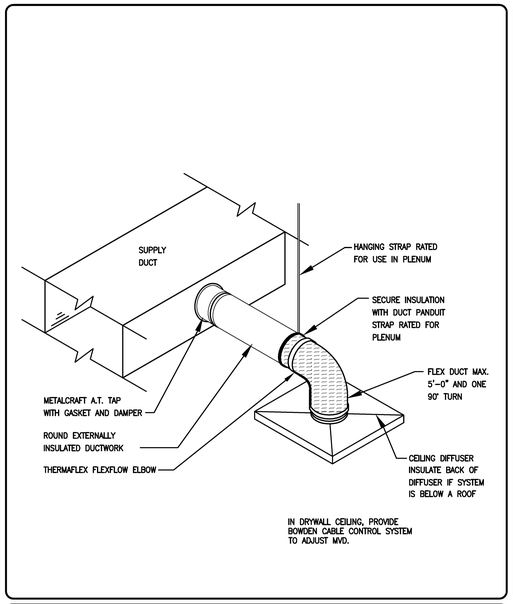
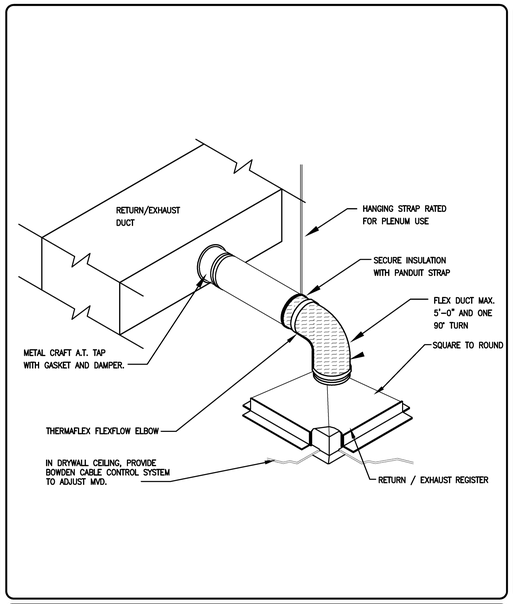


TYPICAL SECURITY DIFFUSER IN LAY-IN CEILING DETAIL
NOT TO SCALE



TYPICAL DIFFUSER RUNOUT DETAIL
NOT TO SCALE



TYPICAL RETURN/EXHAUST CONNECTION DETAIL
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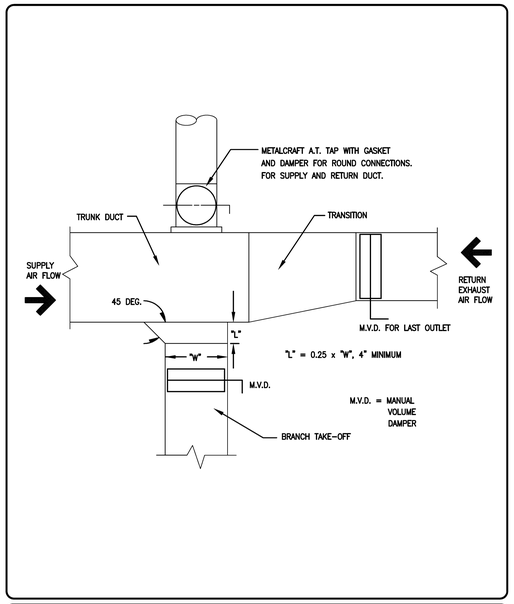
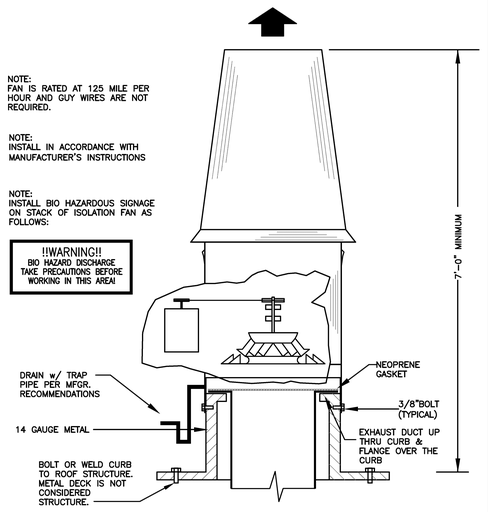
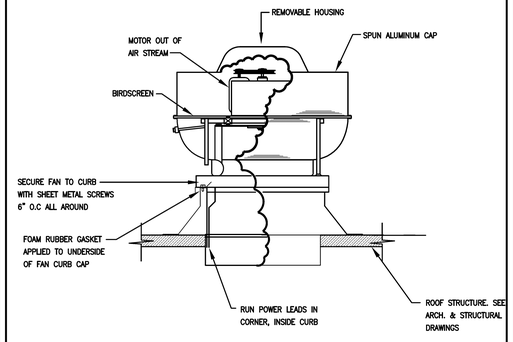


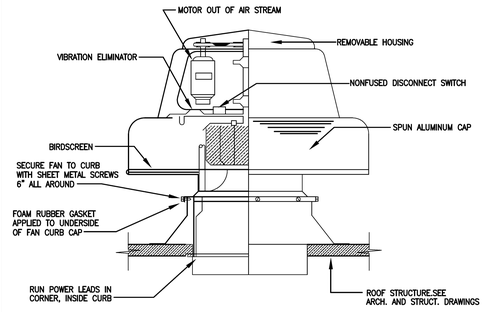
RECT. L.P. MAIN DUCT BRANCH TAKE-OFF DETAIL
NOT TO SCALE



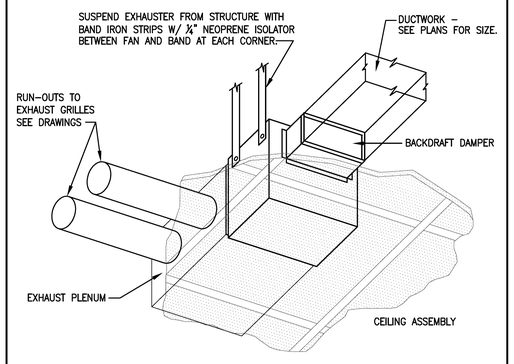
HIGH PLUME EXHAUST FAN DETAIL
NOT TO SCALE



UPBLAST EXHAUST FAN DETAIL
NOT TO SCALE



POWER ROOF EXHAUSTER DETAIL
NOT TO SCALE



EXHAUST FAN ABOVE CEILING DETAIL
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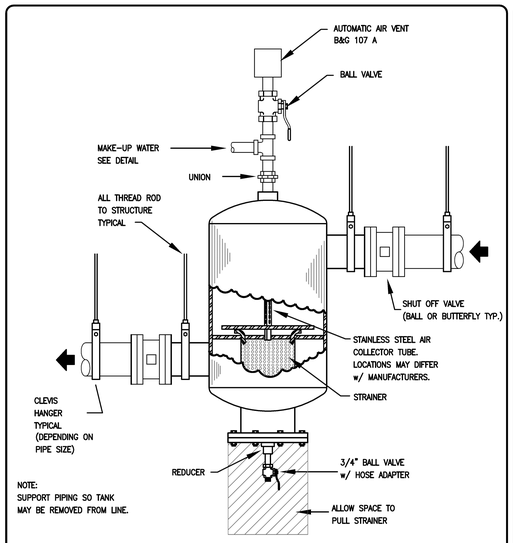
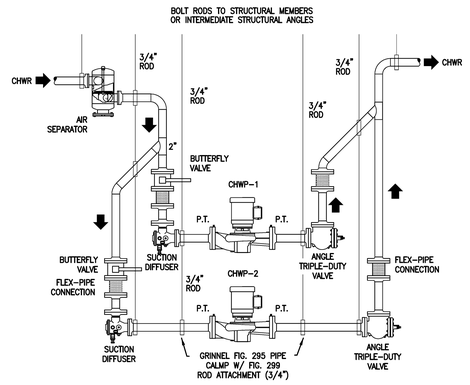


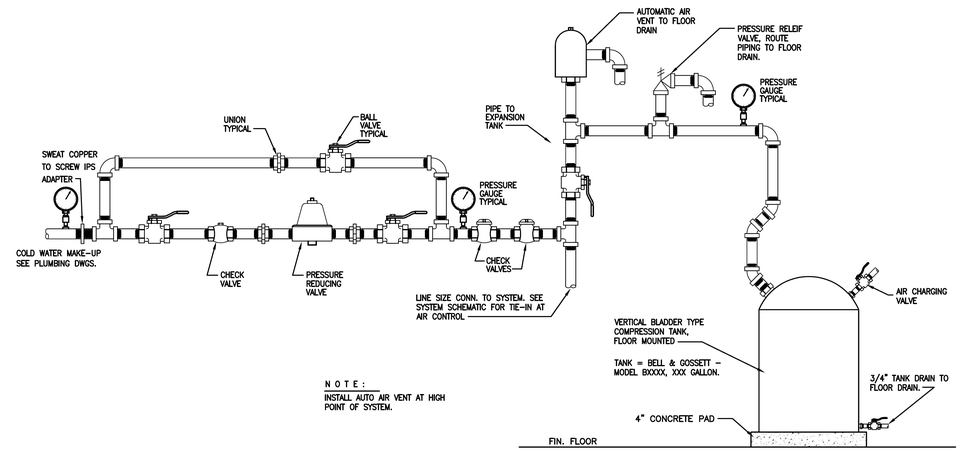
AIR SEPARATOR DETAIL

NOT TO SCALE



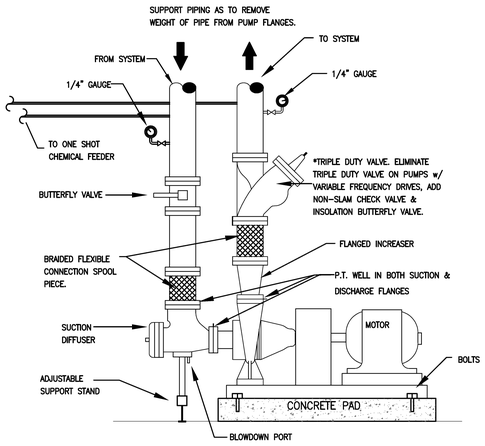
VERTICAL INLINE PUMP PIPING DETAIL

NOT TO SCALE



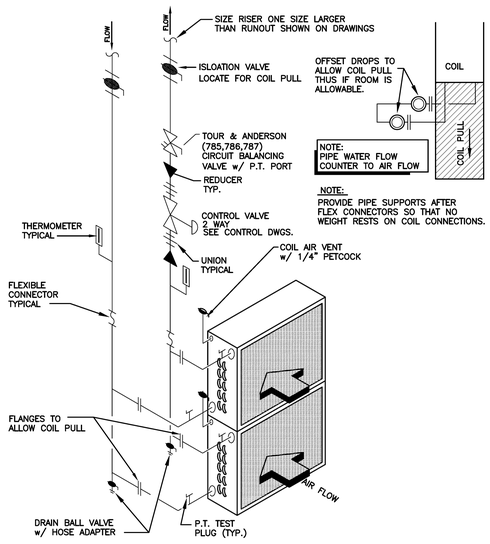
MAKE-UP WATER CONNECTION AND FLOOR MOUNTED BLADDER EXPANSION TANK DETAIL

NOT TO SCALE



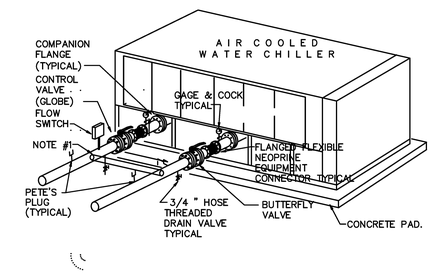
END SUCTION PUMP DETAIL

NOT TO SCALE



STACKED CHILLED WATER COIL PIPING DETAIL

NOT TO SCALE

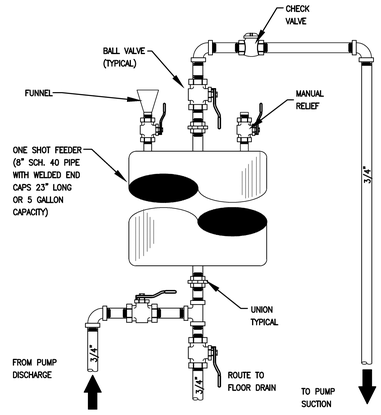


NOTES:

1. TEMPORARY FLUSHING LOOP, CONNECTION ONE SIZE SMALLER THAN LINE SIZE. REMOVE AND CAP WHEN SYSTEM IS PROVEN CLEAN FROM FLUSHING.
2. CONNECT CHILLED WATER PIPING TO COOLER WITH FLANGES OR UNIONS TO ALLOW CLEANING OR REMOVAL OF COOLER WITHOUT NEED TO REMOVE PIPING.

CHILLER WATER PIPING DETAIL AT AIR COOLED CHILLER

NOT TO SCALE



ONE SHOT FEEDER DETAIL

NOT TO SCALE

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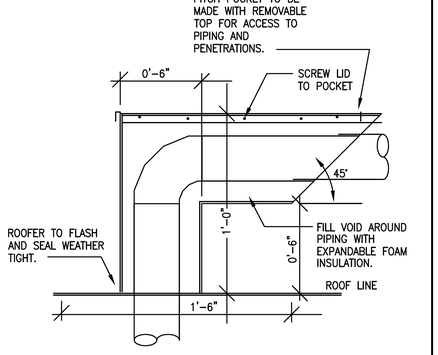
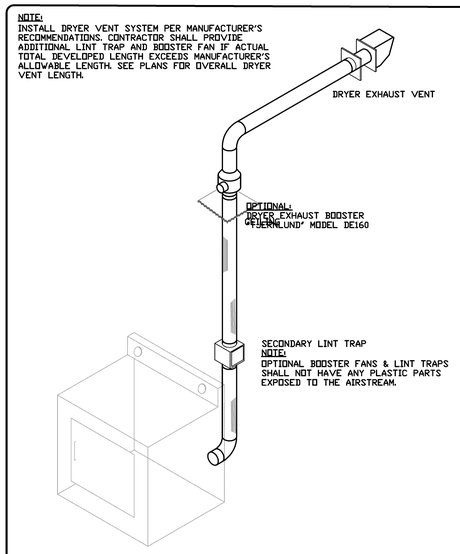


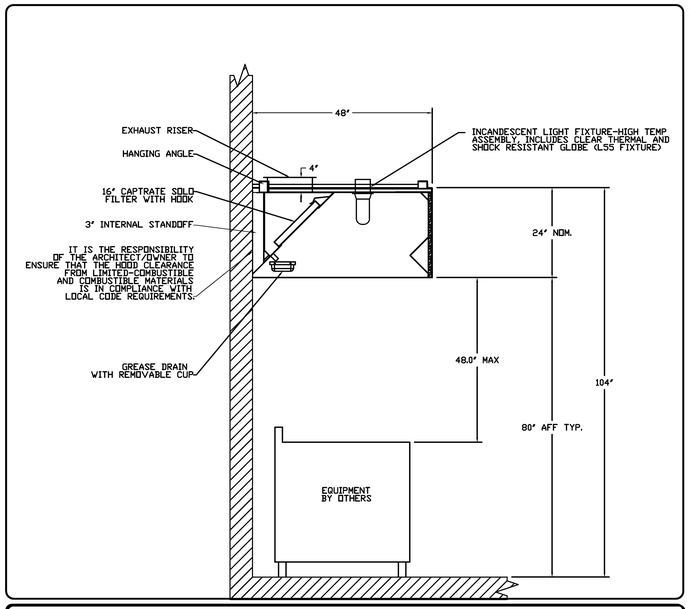
PITCH POCKET DETAIL

NOT TO SCALE



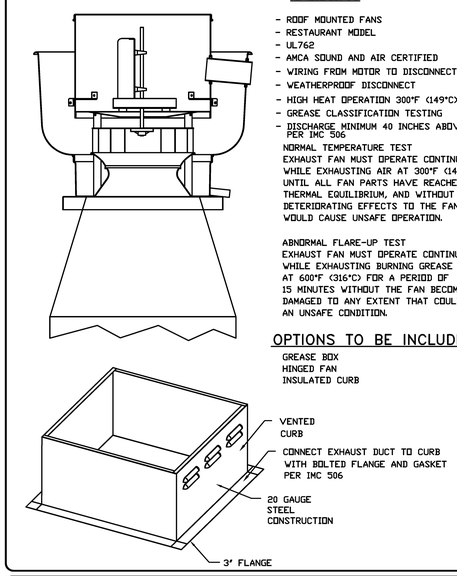
DRYER VENT DETAIL

NOT TO SCALE



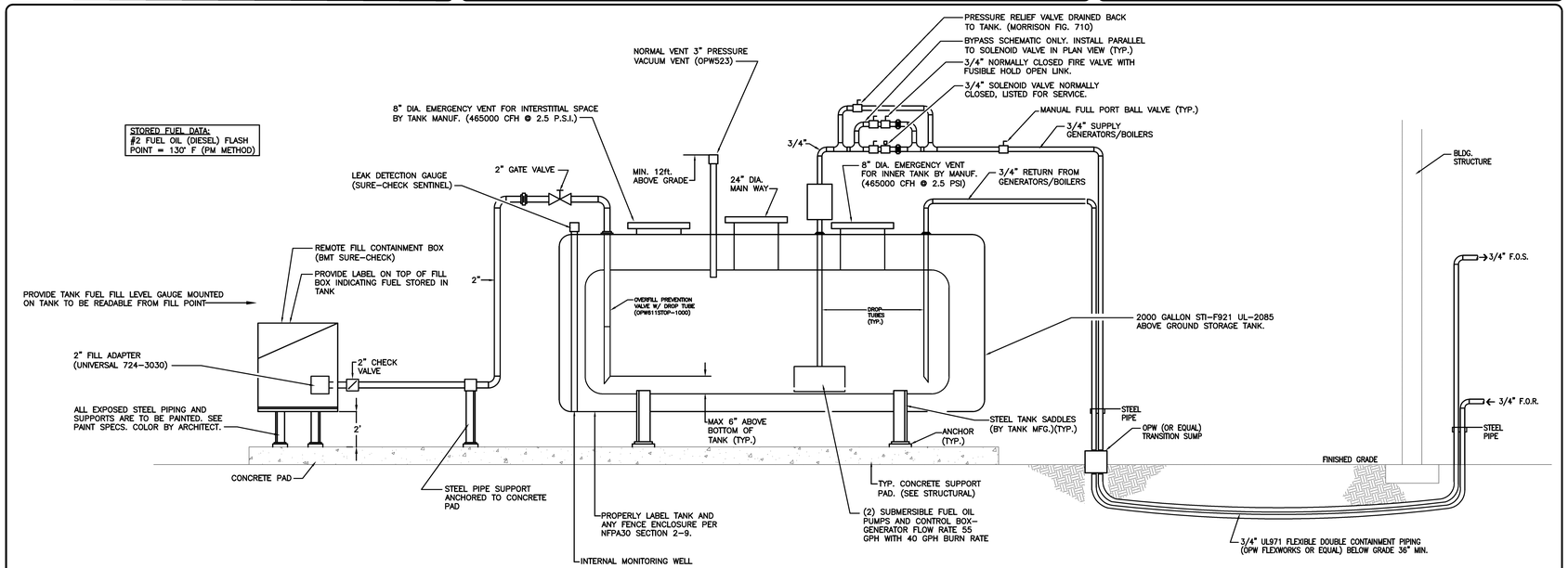
KITCHEN HOOD SECTION VIEW

NOT TO SCALE



KITCHEN EXHAUST FAN

NOT TO SCALE



PROVIDE 2000 GALLON ABOVE GROUND DOUBLE WALL STEEL FUEL OIL TANK BY MODERN WELDING OR EQUAL. FUEL OIL TANK, PIPING PUMPS AND ACCESSORIES SHALL BE FURNISHED AND INSTALLED BY A SINGLE LICENSED FUEL OIL VENDOR

TANK CONTROLS

ELECTRIC SOLENOID SUPPLY VALVE IS TO BE NORMALLY CLOSED. VALVES ARE TO OPEN WHEN EITHER OF THE GENERATOR FUEL OIL PUMPS START. THE VALVES SHALL BE PROVIDED WITH A MANUAL BYPASS NORMALLY CLOSED FIRE VALVE TO BE USED WHEN SOLENOID VALVE REQUIRES MAINTENANCE. THE FIRE VALVE SHALL HAVE A FUSIBLE HOLD OPEN LINK THAT WILL ALLOW THE VALVE TO AUTOMATICALLY SHUT IF THERE IS A FIRE.

FUEL STORAGE TANK SHALL BE EQUIPPED WITH FLOAT, FLOAT SWITCH, AND AUDIBLE/VISUAL ALARM AT STORAGE TANK LOCATION TO INDICATE WHEN FUEL STORAGE TANK IS 90% FULL. AN AUTOMATIC SHUTOFF OVERFILL PROTECTION VALVE SHALL BE PROVIDED AS SPECIFIED TO SHUT DOWN FILL WHEN TANK REACHES 95% FULL LEVEL.

FUEL STORAGE TANK (2000 GALLON) SHALL HAVE FLOAT, FLOAT SWITCH, AND AUDIBLE/VISUAL ALARM TO INDICATE WHEN FUEL LEVEL IN TANK HAS DROPPED TO 300 GALLONS. SEPARATE AUDIBLE/VISUAL ALARMS SHALL BE LOCATED IN THE MAINTENANCE SHOP.

ABOVE GROUND FUEL STORAGE TANK SCHEMATIC

NOT TO SCALE

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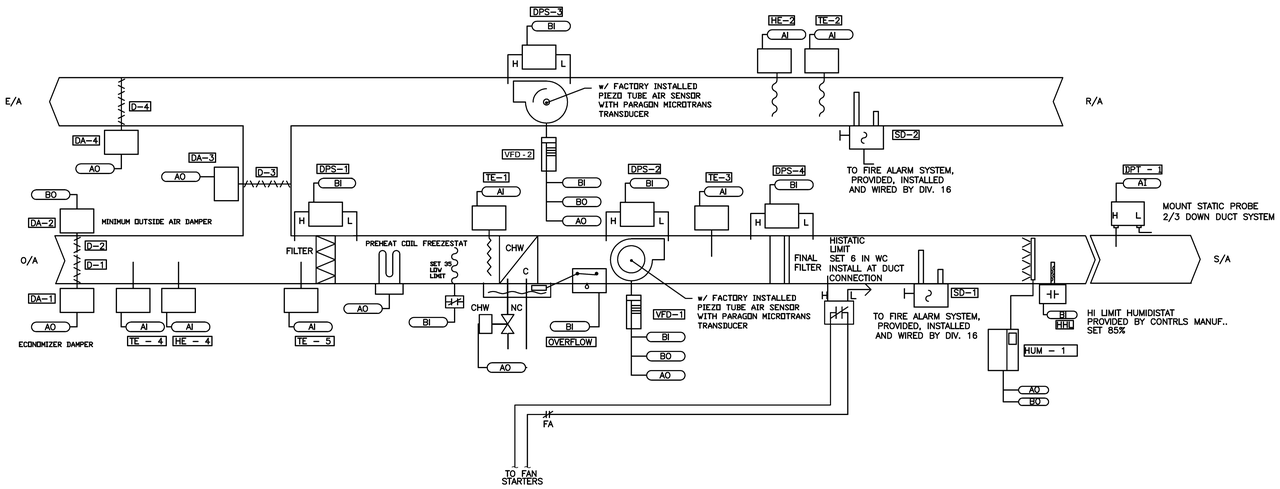


AHU-1, 2, 4 CONTROL

CONTROLS SEQUENCE OF OPERATION

1. THE AIR HANDLER SHALL BE CONTROLLED BY THE LOCAL ENERGY MANAGEMENT CONTROLLER INTER-FACE TO CENTRAL BUILDING ENERGY MANAGEMENT SYSTEM VIA ENERGY MANAGEMENT GATEWAY OR BACNET INTERFACE.

2. THE SUPPLY FAN IS ENERGIZED BY A HAND-OFF-AUTOMATIC LOCATED IN THE LOCAL CONTROL PANEL WHEN IN THE HAND POSITION OR BY THE LOCAL ENERGY MANAGEMENT CONTROLLER WHEN IN THE AUTOMATIC POSITION. A TIME DELAY RELAY SHALL BE PROVIDED TO DELAY STARTING OF FAN TO ALLOW SMOKE DAMPERS TIME TO FULLY OPEN.

3. THE RETURN FAN IS ENERGIZED BY A HAND-OFF-AUTOMATIC LOCATED IN THE LOCAL CONTROL PANEL WHEN IN THE HAND POSITION OR BY SUPPLY FAN CONTACT WHEN IN THE AUTOMATIC POSITION. A TIME DELAY RELAY SHALL BE PROVIDED TO DELAY STARTING OF FAN TO ALLOW SMOKE DAMPERS TIME TO FULLY OPEN.

4. DISCHARGE AIR TEMPERATURE SENSORS IN SUPPLY AIR DUCT SHALL SEND A SIGNAL TO THE LOCAL ENERGY MANAGEMENT CONTROLLER. THE CONTROLLER SHALL MODULATE THE CHILLED WATER VALVE WHEN IN NORMAL POSITION OR MAXIMUM OUTSIDE AIR DAMPER, RELIEF AIR DAMPER, AND RETURN AIR DAMPER WHEN IN ECONOMIZER OPERATION TO MAINTAIN LEAVING AIR TEMPERATURE SET POINT. LEAVING AIR TEMPERATURE FROM AHUs SHALL BE SET AT 56 DEGREES (ADJ.) THE DISCHARGE AIR SETPOINT SHALL BE INDEXED TO INCREASE TO 62 DEGREES (ADJ) AS OUTSIDE AIR TEMPERATURE DECREASES FROM 50 DEGREES (ADJ.) TO 25 DEGREES (ADJ.)

5. OUTSIDE AIR TEMPERATURE/ENTHALPY SENSOR TO SEND SIGNAL TO LOCAL ENERGY MANAGEMENT CONTROLLER. AT AN OUTDOOR AIR TEMPERATURE BELOW 52 DEGREES DRY BULB, THE CHILLED WATER VALVE WILL SHUT AND THE CONTROLLER WILL MODULATE THE OUTDOOR, RELIEF AND RETURN AIR DAMPERS TO MAINTAIN DISCHARGE AIR TEMPERATURE SET POINT. AT AN OUTDOOR TEMPERATURE BELOW 50 DEGREES (ADJ.), IF THE DISCHARGE AIR TEMPERATURE IS BELOW SETPOINT BY 2 DEGREES (ADJ.), THE PREHEAT COIL WILL MODULATE TO CONTROL DISCHARGE AIR AT SETPOINT MINUS TWO DEGREES. AT AN OUTDOOR AIR TEMPERATURE ABOVE 52 DEGREES, WHEN THE ENTHALPY OF THE OUTDOOR AIR IS LOWER THAN THE ENTHALPY OF THE RETURN AIR, THE CONTROLLER WILL DRIVE THE OUTDOOR AIR AND RELIEF AIR DAMPERS FULLY OPEN, THE RETURN DAMPER FULLY CLOSED AND THE CHILLED WATER VALVE WILL MODULATE TO MAINTAIN DISCHARGE AIR TEMPERATURE SET POINT. AT OUTDOOR AIR ENTHALPY ABOVE RETURN AIR ENTHALPY. CHILLED WATER COOLING ONLY IS UTILIZED AND THE MINIMUM OUTDOOR AIR DAMPER REMAINS OPEN, THE OUTDOOR AIR AND RELIEF DAMPERS REMAIN FULLY CLOSED AND THE RETURN DAMPER REMAINS FULLY OPEN.

6. AN AVERAGING MIXED AIR SENSOR SHALL BE INSTALLED ON THE ENTERING SIDE OF THE COOLING COIL. AT A MIXED AIR TEMPERATURE OF 42 DEGREES F, THE DDC SHALL ALARM, FULLY CLOSE THE MAXIMUM OUTSIDE AIR AND RELIEF AIR DAMPERS AND FULLY OPEN THE RETURN AIR DAMPERS

   IF ANY SECTION OF THE FREEZESTAT SENSES TEMPERATURE OF 35 DEGREE (ADJUST) OR LESS, THE DDC SHALL ALARM, FULLY CLOSE THE MAXIMUM AND MINIMUM OUTSIDE AIR AND RELIEF AIR DAMPERS, FULLY OPEN THE RETURN AIR DAMPERS, FULLY OPEN THE CHILLED WATER VALVE AND START THE SECONDARY CHILLED WATER PUMP TO MOVE WATER THRU THE COIL.

7. SUPPLY AND RETURN FAN CONTROL

   THE AHU SHALL OPERATE CONTINUOUSLY. WHEN THE AIR HANDLER IS STARTED, THE MINIMUM OUTSIDE AIR DAMPER SHALL BE ENERGIZED AND WILL OPEN. THE SUPPLY FAN SHALL BE CONTROLLED VIA AN OPTIMIZED SUPPLY DUCT STATIC PRESSURE CONTROL AS GIVEN IN THE SEQUENCE BELOW. THE SUPPLY FAN SHALL MODULATE ITS ASSOCIATED VFD IN RESPONSE TO THE REQUIRED STATIC PRESSURE SETPOINT OF THE SUPPLY DUCT. A STATIC PRESSURE SENSOR SHALL BE LOCATED AT A POINT 2/3 DISTANCE DOWN THE SUPPLY DUCT. THE SUPPLY AND RETURN FAN SHALL BE SUPPLIED WITH AIRFLOW MONITORING STATIONS AND TRANSMITTERS THAT SHALL ALLOW THE SUPPLY AND RETURN FAN TO TRACK A FLOW DIFFERENTIAL EQUAL TO THE SCHEDULED OUTSIDE AIR FLOW.

8. STATIC PRESSURE OPTIMIZATION
   THE BUILDING AUTOMATION SYSTEM (BAS) SHALL CONTINUOUSLY MONITOR THE DAMPER POSITION OF ALL VAV TERMINAL UNITS. WHEN ANY VAV DAMPER IS MORE THAN 90% (ADJ.) OPEN, THE SUPPLY FAN DISCHARGE DUCT STATIC PRESSURE SETPOINT SHALL BE RESET UPWARD BY 0.1 IN W.C. (ADJ.), AT A FREQUENCY OF 15 MINUTES (ADJ.), UNTIL NO DAMPER IS MORE THAN 90% OPEN OR THE STATIC PRESSURE SETPOINT HAS RESET UPWARD TO THE SYSTEM MAXIMUM DUCT STATIC PRESSURE SETPOINT (4 IN. W.G. ADJUSTABLE) OR THE AHU VARIABLE-FREQUENCY DRIVE IS AT THE MAXIMUM SPEED SETTING. WHEN ALL VAV DAMPERS ARE LESS THAN 65% (ADJ.) OPEN, THE SUPPLY FAN DISCHARGE DUCT STATIC PRESSURE SETPOINT SHALL BE RESET DOWNWARD BY 0.1 IN W.G. (ADJ.), AT A FREQUENCY OF 15 MINUTES (ADJ.), UNTIL AT LEAST ONE DAMPER IS MORE THAN 65% OPEN OR THE STATIC PRESSURE SETPOINT HAS RESET DOWNWARD TO THE SYSTEM MINIMUM DUCT STATIC PRESSURE SETPOINT (1 IN. W.G ADJUSTABLE) OR THE AHU VARIABLE-FREQUENCY DRIVE IS AT THE MINIMUM SPEED SETTING. THE BAS SHALL HAVE THE CAPABILITY TO ALLOW THE OPERATOR TO EXCLUDE "PROBLEM" ZONES THAT SHOULD NOT BE CONSIDERED WHEN DETERMINING THE OPTIMIZED SETPOINT. THE BAS SHALL HAVE THE ABILITY TO IDENTIFY, AND DISPLAY TO THE USER, THE VAV BOX THAT SERVES THE CRITICAL ZONE (THAT IS, THE ZONE WITH THE MOST WIDE-OPEN VAV DAMPER). THIS INFORMATION SHALL UPDATE DYNAMICALLY AS THE LOCATION OF THE CRITICAL ZONE CHANGES BASED ON BUILDING LOAD, AND DUCT STATIC PRESSURE SETPOINT OPTIMIZATION CONTROL. DURING THE COMMISSIONING PROCESS, THE CONTROLS CONTRACTOR SHALL DEMONSTRATE THE PERFORMANCE OF FAN PRESSURE OPTIMIZATION.

   A HIGH LIMIT DIFFERENTIAL PRESSURE SENSOR SHALL BE INSTALLED IN THE FAN CABINET ON THE DISCHARGE SIDE OF THE FAN AND SHALL SHUT DOW THE FAN ON A RISE IN PRESSURE TO 6" W.G.

9. WHEN LOCAL ENERGY MANAGEMENT CONTROLLER IS DE-ENERGIZED, CHILLED WATER VALVE AND CONTROL DAMPERS TO ASSUME THEIR NORMAL POSITION.

10. CENTRAL FIRE ALARM PANEL TO SEND SIGNAL TO LOCAL ENERGY MANAGEMENT CONTROLLER WHICH WILL DE-ENERGIZE AIR HANDLER WHEN ALARM CONDITION EXISTS. SEE ELECTRICAL DRAWINGS.

11. WHEN FREEZESTAT SENSES ABNORMAL LOW TEMPERATURE AIR ENTERING COOLING COIL, LOCAL ENERGY MANAGEMENT CONTROLLER WILL CLOSE OUTSIDE AIR DAMPERS AND RELIEF AIR DAMPERS, AND OPEN RETURN AIR DAMPER, CHILLED WATER VALVE AND DE-ENERGIZE SUPPLY AND RETURN FANS. LOCAL CONTROLLER TO SEND SIGNAL TO CENTRAL ENERGY MANAGEMENT CONTROLLER WHICH WILL ENERGIZE SECONDARY CHILLED WATER PUMP AND ACTIVATE ALARM. SENSOR SHALL PROVIDE 1 LINEAR FT. FOR EVERY 1 SQ. FT. IF COIL AREA.

12. BUILDING ENERGY MANAGEMENT SYSTEM TO HAVE CONTROL OF THE FOLLOWING FUNCTIONS:
    A. SUPPLY AND RETURN FAN START/STOP
    B. SUPPLY AND RETURN FAN STATUS
    C. DISCHARGE AIR TEMPERATURE CONTROL
       I. CHILLED WATER VALVES
       II. ECONOMIZER DAMPERS
    D. MONITOR FILTER PRESSURE
    E. SUPPLY AND RETURN FAN CFM CAPACITY CONTROL

14. ALL SMOKE DAMPERS ASSOCIATED WITH THIS AIR HANDLING UNIT ARE OPENED AND CLOSED BY A FAN STARTER CONTACT. ALL SMOKE DAMPERS ARE CLOSED WHEN UNIT IS DE-ENERGIZED.

15. MINIMUM OUTSIDE AIR DAMPER TO BE OPEN WHEN SUPPLY FAN ENERGIZED.

16. ALL EXHAUST FANS SHALL BE INTERLOCKED WITH RESPECTIVE AHU. SEE EXHAUST SCHEDULE FOR INTERLOCK ASSIGNMENTS.

17. PROVIDE MANUAL SHUT DOWN OF AHU AT MAIN NURSES STATION. LABEL "EMERGENCY AHU SHUT DOWN". COORDINATE LOCATION WITH ARCH.

UNIT STATUS REPORT
FOR EACH ROOFTOP UNIT, THE BAS SHALL PROVIDE AN OPERATING STATUS SUMMARY OF THE FOLLOWING INFORMATION TO PROVIDE THE OPERATOR WITH CRITICAL ROOFTOP OPERATING DATA.
1. UNIT TYPE AND SIZE
2. OPERATING MODE
3. ACTIVE AHU DIAGNOSTICS
4. ACTIVE COOLING/HEATING MODE
5. ACTIVE COOLING/SUPPLY AIR SETPOINT
6. ACTIVE HEATING/SUPPLY AIR SETPOINT
7. SUPPLY AIR TEMPERATURE
8. SPACE TEMPERATURE
9. SUPPLY FAN STATUS
10. SUPPLY FAN PERCENT MODULATION
11. RETURN FAN STATUS
12. RETURN FAN PERCENT MODULATION
13. ACTIVE SPACE PRESSURE
14. ACTIVE SUPPLY AIR PRESSURE
15. CHILLED WATER VALVE POSITION
16. RETURN AIR TEMPERATURE
17. RETURN AIR RELATIVE HUMIDITY
18. ECONOMIZER STATUS
19. ECONOMIZER POSITION - PERCENT
20. MINIMUM OUTDOOR AIR CCFM SETPOINT
21. OUTDOOR AIR FLOW

DIAGNOSTICS
THE BAS SYSTEM SHALL BE ABLE TO ALARM FROM ALL SENSED POINTS FROM THE AHUs AND DIAGNOSTIC ALARMS SENSED BY THE UNIT CONTROLLER. ALARM LIMITS SHALL BE DESIGNATED FOR ALL SENSED POINTS.
1. INDIVIDUAL AHU DIAGNOSTIC AND ALARM STATUSES SHALL INCLUDE THE FOLLOWING LATCHING ITEMS FOR EACH UNIT:
   A. EMERGENCY STOP
   B. SUPPLY FAN FAILURE
   C. RETURN FAN FAILURE
   D. FREEZESTAT TRIP
   E. MANUAL SUPPLY AIR STATIC PRESSURE LIMIT

2. INDIVIDUAL UNIT DIAGNOSTIC AND ALARM STATUSES SHALL INCLUDE THE FOLLOWING NON-LATCHING ITEMS FOR EACH UNIT:
   A. ZONE TEMPERATURE SENSOR FAILURE
   B. SUPPLY AIR TEMPERATURE SENSOR FAILURE
   C. AUXILIARY TEMPERATURE SENSOR FAILURE
   D OUTDOOR AIR TEMPERATURE SENSOR FAILURE
   E. SUPPLY AIR PRESSURE SENSOR FAILURE
   F. OUTDOOR AIR HUMIDITY SENSOR FAILURE
   G. SUPPLY AIR PRESSURE SETPOINT FAILURE
   H. SPACE STATIC PRESSURE SETPOINT FAILURE
   I. SPACE PRESSURE SENSOR FAILURE
   J. RETURN AIR TEMPERATURE SENSOR FAILURE
   K. RETURN AIR HUMIDITY SENSOR FAILURE
   L. AUTO SUPPLY AIR STATIC PRESSURE LIMIT
   M. UNIT COMMUNICATIONS LOSS
   N. SUPPLY AIR TEMPERATURE COOL
   O. DIRTY FILTER

SMOKE DETECTORS- IF THE SMOKE DETECTORS IN EITHER THE SUPPLY OR RETURN DUCTS SENSE PRODUCTS OF COMBUSTION, THEY SHALL SIGNAL THE GENERAL FIRE ALARM SYSTEM WHICH SHALL ACTIVATE A VISIBLE AND AUDIBLE ALARM AND SHUT DOWN THE SUPPLY AND RETURN FANS. IF THE GENERAL FIRE ALARM SYSTEM IS ACTIVATED, IT SHALL SEND A SIGNAL TO DE-ENERGIZE THE SUPPLY AND RETURN FANS. EXHAUST FANS SERVING THE AREA SERVED BY THE AHU SHALL BE DE-ENERGIZED.

HUMIDIFIER CONTROL
THE HUMIDIFIER SHALL BE CONTROLLED BY DIGITAL CONTROLLER. WHEN THE CONTROLLER SENSES SPACE HUMIDITY FROM A HUMIDISTAT AS NOTED ON THE DRAWINGS BELOW THE SETPOINT OF 35% RH (ADJUSTABLE), THE CONTROLLER SHALL MODULATE THE HUMIDIFIER OUTPUT VIA A 4-20MA SIGNAL TO INCREASE THE ROOM HUMIDITY. WHEN THE HUMIDITY REACHES 35% (ADJUSTABLE), THE CONTROLLER SHALL MODULATE THE HUMIDIFIER OFF. A HUMIDITY HIGH LIMIT (HHL) SHALL BE INSTALLED A MINIMUM OF 15' DOWNSTREAM OF THE HUMIDIFIER DISTRIBUTION TUBE (OR AT A DISTANCE THAT EXCEEDS THE ABSORPTION RATING DISTANCE OF THE DISTRIBUTION TUBE, WHICHEVER IS GREATER) TO ALLOW THE SYSTEM TO OPERATE PROPERLY AND PROTECT THE DUCT SYSTEM FROM HUMIDITY LEVELS IN EXCESS OF 85% RH IN THE DISCHARGE AIR STREAM. UPON ACTIVATION OF THE HHL, THE HUMIDIFIER SHALL BE SHUT DOWN UNTIL THE HUMIDITY LEVEL DROPS BELOW THE 85% RH SETPOINT, AT WHICH TIME THE HUMIDIFIER SYSTEM WILL BE ALLOWED TO RETURN TO NORMAL OPERATION. IF THE UNIT IS IN ECONOMIZER MODE AND THE HUMIDIFIER IS OPERATING AT 100% CAPACITY AND THE SPACE HUMIDITY FALLS BELOW 30%, THE UNIT OUTSIDE AIR DAMPER SHALL CLOSE BY 50% OF IT'S CURRENT PERCENTAGE OPEN BUT NOT LESS THAN THE MINIMUM OUTSIDE AIR. IF AFTER 15 MINUTES, THE HUMIDITY REMAINS BELOW 30%, THE UNIT SHALL DIS-ENGAGE THE ECONOMIZER OPERATION, REVERT TO MINIMUM OUTSIDE AIR AND SHALL UTILIZE MECHANICAL COOLING. AFTER 24 HOURS, THE UNIT SHALL ENABLE THE ECONOMIZER.

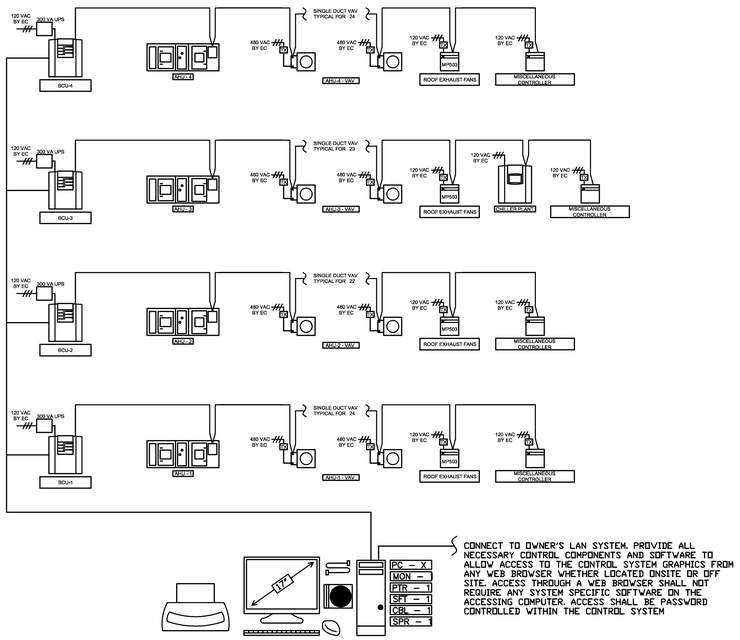
WHEN THE DEWPOINT OF THE OUTSIDE AIR REACHES 42 DEGREES F OR ABOVE, THE HUMIDIFIERS SHALL BE DISABLED.

ABBREVIATIONS

ADJ	ADJUSTABLE
AFS	AIR FLOW STATION
AHU	AIR HANDLING UNIT
AUX	AUXILIARY
AVG	AVERAGE
BAS	BUILDING AUTOMATION SYSTEM
BCU	BUILDING CONTROL UNIT
CB	CIRCUIT BREAKER
CCW	COUNTERCLOCKWISE
CFM	CUBIC FEET PER MINUTE
CHW	CHILLED WATER
CKT.	CIRCUIT
CO	CARBON MONOXIDE
CO2	CARBON DIOXIDE
COMM 2	COMMUNICATIONS LINK TYPE 2
COMM 3	COMMUNICATIONS LINK TYPE 3
COMM 4	COMMUNICATIONS LINK TYPE 4
COMM L	LONTALK
COMMUNICATIONS LINK	
COMP	COMPRESSOR
COND	CONDENSER
CS	CURRENT SWITCH
CU	CONDENSING UNIT
Cv	VALVE COEFFICIENT
CV	CONSTANT VOLUME
CW	CONDENSER WATER
CW	CLOCKWISE
D	DAMPER
DA	DAMPER ACTUATOR
DDC	DIRECT DIGITAL CONTROL
DPS	DIFFERENTIAL PRESSURE SWITCH
DPT	DIFFERENTIAL PRESSURE TRANSMITTER
DX	DIRECT EXPANSION
E/A	EXHAUST AIR
ECEM	EXHAUST/COMPARATIVE
ENTHALPY	MODULE
EDH	ELECTRIC DUCT HEATER
EP	ELECTRIC PRESSURE SWITCH
EPT	ELECTRIC TO PNEUMATIC TRANSDUCER
EVAP	EVAPORATOR
F/A	FRESH AIR
FB	FUSE BLOCK
FS	FLOAT SWITCH
GBAS	GENERIC BUILDING AUTOMATION SYSTEM
GND	GROUND
GPM	GALLONS PER MINUTE
H	HOT (VOLTAGE)
HE	HUMIDITY ELEMENT
HUM	HUMIDIFIER
HGBP	HOT GAS BYPASS
HI	HUMAN INTERFACE
HOA	HAND-OFF-AUTOMATIC
HS	HUMIDITY SWITCH
HTR	HEATER
HVAC	HEATING, VENTILATION AND AIR CONDITIONING
HW	HOT WATER
I/O	INPUT / OUTPUT
ICS	INTEGRATED COMFORT SYSTEM
IGV	INLET GUIDE VANES
IPC	INTERPROCESSOR COMMUNICATIONS
IPCB	INTERPROCESSOR COMMUNICATIONS BRIDGE
KW	KILOWATTS
KWH	KILOWATT HOURS
LH	LEFT HAND
LHP	LIMIT SWITCH ? HIGH PRESSURE
LHT	LIMIT SWITCH ? HIGH TEMP
LLT	LIMIT SWITCH ? LOW TEMP
MA	MILLIAMP
MCC	MOTOR CONTROL CENTER
MCM	MULTIPLE COMPRESSOR MODULE
MP	TRANE MULTIPURPOSE CONTROLLER
MS	MOTOR STARTER
MWU	MORNING WARM-UP
N	NEUTRAL
N.C.	NORMALLY CLOSED CONTACT
N.O.	NORMALLY OPEN CONTACT
NSB	NIGHT SETBACK
O/A	OUTSIDE AIR
P	PRESSURE SENSOR
PCM	TRANE PROG DDC CONTROLLER
PE	PRESSURE SWITCH
PL	PILOT LIGHT
PRI	PRIMARY
PS	POWER SUPPLY
psig	POUNDS PER SQUARE INCH, GUAGE
PT	PRESSURE TRANSMITTER
R	RELAY
R/A	RETURN AIR
RFM	REFRIGERANT MONITOR
RH	RELATIVE HUMIDITY
RH	RIGHT HAND
RPM	REVOLUTIONS PER MINUTE
RTM	ROOFTOP MODULE
S/A	SUPPLY AIR
SCM	SINGLE CIRCUIT MODULE
SD	SMOKE DETECTOR
SEC	SECONDARY
SH	SHIELDED
SV	SOLENOID VALVE
SZ	SINGLE ZONE (UNIT FLOW)
T	THERMOSTAT (ELECTRONIC)
TCI	TRACER COMMUNICATIONS MODULE
TCM	TRANE THERMOSTAT CONTROL PANEL
TE	TEMPERATURE ELEMENT
TP	TWISTED PAIR CABLE
TS	TEMPERATURE SWITCH
TSP	TWISTED SHIELDED PAIR CABLE
TUC	TERMINAL UNIT CONTROL PANEL
UCM	UNIT CONTROL MODULE
UCP	TRANE CHILLER UNIT CONTROL PANEL
UPCM	UNIVERSAL PROG DDC CONTROLLER
V	VALVE
VAC	VOLTS ALTERNATING CURRENT
VAV	VARIABLE AIR VOLUME
VCM	VENTILATION CONTROL MODULE
VDC	VOLTS DIRECT CURRENT
VFD	VARIABLE FREQUENCY DRIVE
VOM	VENTILATION OVERRIDE MODULE
w.c.	WATER COLUMN
WSM	WATERSIDE MODULE
XFMR	TRANSFORMER
ZN	TRANE ZONE DDC CONTROLLER
ZSM	ZONE SENSOR MODULE

SYMBOL LEGEND

FLOW SWITCH	DAMPER WITH ACTUATOR
FLOAT SWITCH	
TEMPERATURE SWITCH	AIR FLOW STATION
PRESSURE SWITCH	
LIMIT SWITCH - N.O.	SMOKE DETECTOR
PUSHBUTTON SWITCH	
SELECTOR SWITCH	DUCT HUMIDITY SENSOR
PILOT LIGHT	
CONTACTOR / RELAY COIL	HUMIDITY SENSOR W/TEMPERATURE
NORMALLY CLOSED CONTACTS	HUMIDITY SENSOR (SPACE)
NORMALLY OPEN CONTACTS	STATIC PRESSURE TIP
TRANSFORMER	INDOOR AIR QUALITY SENSOR
VARIABLE FREQUENCY DRIVE (VFD)	ZONE SENSOR (THERMOSTAT)
WATER FLOW METER	INSERTION TEMP SENSOR
CURRENT SENSING SWITCH	AVERAGING TEMP SENSOR
PUMP / FAN	PRESSURE SENSOR
C-COOLING COIL H-HEATING COIL	DIFFERENTIAL PRESS SENSOR
FILTER	2-WAY MOTORIZED VALVE
	3-WAY MOTORIZED VALVE



LOCATE AT PLANT OPS OFFICE 1808 OR AS DIRECTED BY OWNER

BUILDING AUTOMATION SYSTEM RISER DIAGRAM

A Replacement Facility for
Wrangell Medical Center
Wrangell, Alaska

AHFD | AMERICAN HEALTH FACILITIES DEVELOPMENT

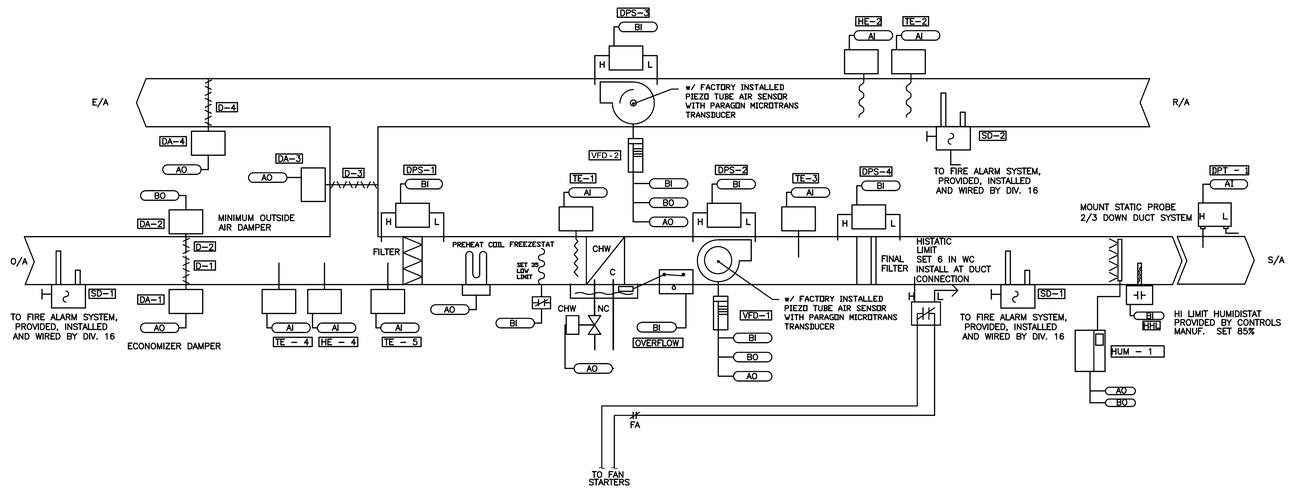
STATE OF ALASKA 49TH
THOMAS PORTER DANIEL
No. ME12715
REGISTERED PROFESSIONAL ENGINEER
3/21/12

PROJECT NUMBER
10528.00
DATE
March 21, 2012

M6.1
HVAC CONTROLS

Fire Marshal Review Set

enfinity engineering
9019 Overlook Boulevard, Suite C-4
Brentwood, Tennessee 37027
Phone: 615.377.0093
Fax: 615.377.0983
Enfinity Project # 10050



AHU-3 CONTROL

SYSTEM POINTS LIST FOR AHU-1,2,4,5,6,7

SYSTEM POINT DESCRIPTION LARGE COMMERICAL ROOFTOPS	ANALOG INPUT					ANALOG OUTPUT	BINARY INPUT						BINARY OUTPUT				SYSTEM FEATURES: ALARMS																SYSTEM FEATURES: PROGRAMS																				NOTES
	TEMPERATURE	PRESSURE	RELATIVE HUMIDITY	PERCENT	FLOW RATE - CFM	DDC (4-20 ma, 0-10 vdc)	PNEUMATIC TRANSDUCER	STATUS ON/OFF	FILTER STATUS	STATUS OPEN/CLOSED	STATUS	-	ON/OFF	OPEN/CLOSE	LOCK OUT	ENABLE/DISABLE	-	HIGH ANALOG	LOW ANALOG	BINARY	PROOF	SENSOR FAIL	FLOW FAIL	COMMUNICATION FAIL	LOCKOUT	DIAGNOSTICS	-	TIME SCHEDULING	OPTIMUM START/STOP	DEMAND LIMITING	RESET	EVENT PROGRAM	DDC	ALARM INSTRUCT	MAINT WORK ORDER	RUN TIME	EMERGENCY STOP	NIGHT SETBACK	MORNING WARMUP	DAYTIME WARMUP	OCCUPY/UNOCCUPY	TOTALIZING	TIMED OVERRIDE	VAV CHANGEOVER	SET BACK/SET UP	NIGHT PURGE	TREND LOG	-	
CONTROL PANEL																																																	
MIXED AIR	X																				X																												
DIRTY FILTER (PRE)								X											X																													
DIRTY FILTER (FINAL)								X											X																													
FREEZE STAT										X									X																													
OUTSIDE AIR MIN. POSITION			X			X				X											X																											
RETURN FAN								X								X						X		X																							
RETURN VFD			X			X										X																															
SYSTEM MODE										X						X																															
SUPPLY FAN								X								X						X		X																							
SUPPLY AIR	X			X		X												X	X			X																									
SUPPLY AIR PRESS.		X				X												X	X			X																									
SUPPLY FAN VFD				X		X										X																															
UNIT START RELAY										X						X																															
RETURN AIRFLOW	X		X		X	X																																									
OUTSIDE AIRFLOW	X		X		X	X																																									
ECONOMIZER				X		X										X																															NOTE 1
OUTSIDE AIR	X		X		X		X															X																									
RETURN AIR	X		X		X																	X																									
ENTHALPY						X							X																																		
RELIEF DAMPER				X		X																																									
O.A. DAMPERS				X		X																																									
RETURN DAMPERS				X		X																																									
CHILLED WATER SUPPLY	X																																														
CHILLED WATER RETURN	X																																													
CHILLED WATER VALVE						X										X																															
HOT WATER VALVE																																															
HUMIDIFIER						X	X									X																															
SPACE HUMIDITY			X															X	X																												
COND. PAN OVERFLOW																				X																												

NOTES: 1. COMPARITIVE ENTHALPY
2. BAS WILL SIGNAL AN ALARM WHEN OUTSIDE AIR PERCENTAGE FALLS BELOW 10% OF DESIGN AIRFLOW

CONTROLS SEQUENCE OF OPERATION

1. THE AIR HANDLER SHALL BE CONTROLLED BY THE LOCAL ENERGY MANAGEMENT CONTROLLER INTER-FACE TO CENTRAL BUILDING ENERGY MANAGEMENT SYSTEM VIA ENERGY MANAGEMENT GATEWAY OR BACNET INTERFACE.

2. THE SUPPLY FAN IS ENERGIZED BY A HAND-OFF-AUTOMATIC LOCATED IN THE LOCAL CONTROL PANEL WHEN IN THE HAND POSITION OR BY THE LOCAL ENERGY MANAGEMENT CONTROLLER WHEN IN THE AUTOMATIC POSITION. A TIME DELAY RELAY SHALL BE PROVIDED TO DELAY STARTING OF FAN TO ALLOW SMOKE DAMPERS TIME TO FULLY OPEN.

3. THE RETURN FAN IS ENERGIZED BY A HAND-OFF-AUTOMATIC LOCATED IN THE LOCAL CONTROL PANEL WHEN IN THE HAND POSITION OR BY SUPPLY FAN CONTACT WHEN IN THE AUTOMATIC POSITION. A TIME DELAY RELAY SHALL BE PROVIDED TO DELAY STARTING OF FAN TO ALLOW SMOKE DAMPERS TIME TO FULLY OPEN.

4. DISCHARGE AIR TEMPERATURE SENSORS IN SUPPLY AIR DUCT SHALL SEND A SIGNAL TO THE LOCAL ENERGY MANAGEMENT CONTROLLER. THE CONTROLLER SHALL MODULATE THE CHILLED WATER VALVE WHEN IN NORMAL POSITION OR MAXIMUM OUTSIDE AIR DAMPER, RELIEF AIR DAMPER, AND RETURN AIR DAMPER WHEN IN ECONOMIZER OPERATION TO MAINTAIN LEAVING AIR TEMPERATURE SET POINT. LEAVING AIR TEMPERATURE FROM AHUs SHALL BE SET AT 52 DEGREES (ADJ.) THE DISCHARGE AIR SETPOINT SHALL BE INDEXED TO INCREASE TO 62 DEGREES (ADJ) AS OUTSIDE AIR TEMPERATURE DECREASES FROM 50 DEGREES (ADJ.) TO 25 DEGREES (ADJ.)

5. OUTSIDE AIR TEMPERATURE/ENTHALPY SENSOR TO SEND SIGNAL TO LOCAL ENERGY MANAGEMENT CONTROLLER. AT AN OUTDOOR AIR TEMPERATURE BELOW 50 DEGREES DRY BULB, THE CHILLED WATER VALVE WILL SHUT AND THE CONTROLLER WILL MODULATE THE OUTDOOR, RELIEF AND RETURN AIR DAMPERS TO MAINTAIN DISCHARGE AIR TEMPERATURE SET POINT. AT AN OUTDOOR TEMPERATURE BELOW 50 DEGREES (ADJ.), IF THE DISCHARGE AIR TEMPERATURE IS BELOW SETPOINT BY 2 DEGREES (ADJ), THE PREHEAT COIL WILL MODULATE TO CONTROL DISCHARGE AIR AT SETPOINT MINUS TWO DEGREES. AT AN OUTDOOR AIR TEMPERATURE ABOVE 50 DEGREES, WHEN THE ENTHALPY OF THE OUTDOOR AIR IS LOWER THAN THE ENTHALPY OF THE RETURN AIR, THE CONTROLLER WILL DRIVE THE OUTDOOR AIR AND RELIEF AIR DAMPERS FULLY OPEN, THE RETURN DAMPER FULLY CLOSED AND THE CHILLED WATER VALVE WILL MODULATE TO MAINTAIN DISCHARGE AIR TEMPERATURE SET POINT. AT OUTDOOR AIR ENTHALPY ABOVE RETURN AIR ENTHALPY. CHILLED WATER COOLING ONLY IS UTILIZED AND THE MINIMUM OUTDOOR AIR DAMPER REMAINS OPEN, THE OUTDOOR AIR AND RELIEF DAMPERS REMAIN FULLY CLOSED AND THE RETURN DAMPER REMAINS FULLY OPEN.

6. AN AVERAGING MIXED AIR SENSOR SHALL BE INSTALLED ON THE ENTERING SIDE OF THE COOLING COIL. AT A MIXED AIR TEMPERATURE OF 42 DEGREES F, THE DDC SHALL ALARM, FULLY CLOSE THE MAXIMUM OUTSIDE AIR AND RELIEF AIR DAMPERS AND FULLY OPEN THE RETURN AIR DAMPERS

   IF ANY SECTION OF THE FREEZESTAT SENSES TEMPERATURE OF 35 DEGREE (ADJUST) OR LESS, THE DDC SHALL ALARM, FULLY CLOSE THE MAXIMUM AND MINIMUM OUTSIDE AIR AND RELIEF AIR DAMPERS, FULLY OPEN THE RETURN AIR DAMPERS, FULLY OPEN THE CHILLED WATER VALVE AND START THE SECONDARY CHILLED WATER PUMP TO MOVE WATER THRU THE COIL.

7. SUPPLY AND RETURN FAN CONTROL

   THE AHU SHALL OPERATE CONTINUOUSLY. WHEN THE AIR HANDLER IS STARTED, THE MINIMUM OUTSIDE AIR DAMPER SHALL BE ENERGIZED AND WILL OPEN. THE SUPPLY FAN SHALL BE CONTROLLED VIA AN OPTIMIZED SUPPLY DUCT STATIC PRESSURE CONTROL AS GIVEN IN THE SEQUENCE BELOW. THE SUPPLY FAN SHALL MODULATE ITS ASSOCIATED VFD IN RESPONSE TO THE REQUIRED STATIC PRESSURE SETPOINT OF THE SUPPLY DUCT. A STATIC PRESSURE SENSOR SHALL BE LOCATED AT A POINT 2/3 DISTANCE DOWN THE SUPPLY DUCT. THE SUPPLY AND RETURN FAN SHALL BE SUPPLIED WITH AIRFLOW MONITORING STATIONS AND TRANSMITTERS THAT SHALL ALLOW THE SUPPLY AND RETURN FAN TO TRACK A FLOW DIFFERENTIAL EQUAL TO THE SCHEDULED OUTSIDE AIR FLOW.

8. STATIC PRESSURE OPTIMIZATION
   THE BUILDING AUTOMATION SYSTEM (BAS) SHALL CONTINUOUSLY MONITOR THE DAMPER POSITION OF ALL VAV TERMINAL UNITS. WHEN ANY VAV DAMPER IS MORE THAN 90% (ADJ.) OPEN, THE SUPPLY FAN DISCHARGE DUCT STATIC PRESSURE SETPOINT SHALL BE RESET UPWARD BY 0.1 IN W.C. (ADJ.), AT A FREQUENCY OF 15 MINUTES (ADJ.), UNTIL NO DAMPER IS MORE THAN 90% OPEN OR THE STATIC PRESSURE SETPOINT HAS RESET UPWARD TO THE SYSTEM MAXIMUM DUCT STATIC PRESSURE SETPOINT (4 IN. W.G. ADJUSTABLE) OR THE AHU VARIABLE-FREQUENCY DRIVE IS AT THE MAXIMUM SPEED SETTING. WHEN ALL VAV DAMPERS ARE LESS THAN 65% (ADJ.) OPEN, THE SUPPLY FAN DISCHARGE DUCT STATIC PRESSURE SETPOINT SHALL BE RESET DOWNWARD BY 0.1 IN W.G. (ADJ.), AT A FREQUENCY OF 15 MINUTES (ADJ.), UNTIL AT LEAST ONE DAMPER IS MORE THAN 65% OPEN OR THE STATIC PRESSURE SETPOINT HAS RESET DOWNWARD TO THE SYSTEM MINIMUM DUCT STATIC PRESSURE SETPOINT (1 IN. W.G ADJUSTABLE) OR THE AHU VARIABLE-FREQUENCY DRIVE IS AT THE MINIMUM SPEED SETTING. THE BAS SHALL HAVE THE CAPABILITY TO ALLOW THE OPERATOR TO EXCLUDE "PROBLEM" ZONES THAT SHOULD NOT BE CONSIDERED WHEN DETERMINING THE OPTIMIZED SETPOINT. THE BAS SHALL HAVE THE ABILITY TO IDENTIFY, AND DISPLAY TO THE USER, THE VAV BOX THAT SERVES THE CRITICAL ZONE (THAT IS, THE ZONE WITH THE MOST WIDE-OPEN VAV DAMPER). THIS INFORMATION SHALL UPDATE DYNAMICALLY AS THE LOCATION OF THE CRITICAL ZONE CHANGES BASED ON BUILDING LOAD, AND DUCT STATIC PRESSURE SETPOINT OPTIMIZATION CONTROL. DURING THE COMMISSIONING PROCESS, THE CONTROLS CONTRACTOR SHALL DEMONSTRATE THE PERFORMANCE OF FAN PRESSURE OPTIMIZATION.

   A HIGH LIMIT DIFFERENTIAL PRESSURE SENSOR SHALL BE INSTALLED IN THE FAN CABINET ON THE DISCHARGE SIDE OF THE FAN AND SHALL SHUT DOW THE FAN ON A RISE IN PRESSURE TO 6" W.G.

9. WHEN LOCAL ENERGY MANAGEMENT CONTROLLER IS DE-ENERGIZED, CHILLED WATER VALVE AND CONTROL DAMPERS TO ASSUME THEIR NORMAL POSITION.

10. CENTRAL FIRE ALARM PANEL TO SEND SIGNAL TO LOCAL ENERGY MANAGEMENT CONTROLLER WHICH WILL DE-ENERGIZE AIR HANDLER WHEN ALARM CONDITION EXISTS. SEE ELECTRICAL DRAWINGS.

11. WHEN FREEZESTAT SENSES ABNORMAL LOW TEMPERATURE AIR ENTERING COOLING COIL, LOCAL ENERGY MANAGEMENT CONTROLLER WILL CLOSE OUTSIDE AIR DAMPERS AND RELIEF AIR DAMPERS, AND OPEN RETURN AIR DAMPER, CHILLED WATER VALVE AND DE-ENERGIZE SUPPLY AND RETURN FANS. LOCAL CONTROLLER TO SEND SIGNAL TO CENTRAL ENERGY MANAGEMENT CONTROLLER WHICH WILL ENERGIZE SECONDARY CHILLED WATER PUMP AND ACTIVATE ALARM. SENSOR SHALL PROVIDE 1 LINEAR FT. FOR EVERY 1 SQ. FT. IF COIL AREA.

12. BUILDING ENERGY MANAGEMENT SYSTEM TO HAVE CONTROL OF THE FOLLOWING FUNCTIONS:
   A. SUPPLY AND RETURN FAN START/STOP
   B. SUPPLY AND RETURN FAN STATUS
   C. DISCHARGE AIR TEMPERATURE CONTROL
      I. CHILLED WATER VALVES
      II. ECONOMIZER DAMPERS
   D. MONITOR FILTER PRESSURE
   E. SUPPLY AND RETURN FAN CFM CAPACITY CONTROL

14. ALL SMOKE DAMPERS ASSOCIATED WITH THIS AIR HANDLING UNIT ARE OPENED AND CLOSED BY THE BAS. ALL SMOKE DAMPERS ARE CLOSED WHEN UNIT IS DE-ENERGIZED.

15. MINIMUM OUTSIDE AIR DAMPER TO BE OPEN WHEN SUPPLY FAN ENERGIZED.

16. ALL EXHAUST FANS SHALL BE INTERLOCKED WITH RESPECTIVE AHU. SEE EXHAUST SCHEDULE FOR INTERLOCK ASSIGNMENTS.

17. PROVIDE MANUAL SHUT DOWN OF AHU AT MAIN NURSES STATION. LABEL "EMERGENCY AHU SHUT DOWN". COORDINATE LOCATION WITH ARCH.

UNIT STATUS REPORT
FOR EACH ROOFTOP UNIT, THE BAS SHALL PROVIDE AN OPERATING STATUS SUMMARY OF THE FOLLOWING INFORMATION TO PROVIDE THE OPERATOR WITH CRITICAL ROOFTOP OPERATING DATA.
1. UNIT TYPE AND SIZE
2. OPERATING MODE
3. ACTIVE AHU DIAGNOSTICS
4. ACTIVE COOLING/HEATING MODE
5. ACTIVE COOLING/SUPPLY AIR SETPOINT
6. ACTIVE HEATING/SUPPLY AIR SETPOINT
7. SUPPLY AIR TEMPERATURE
8. SPACE TEMPERATURE
9. SUPPLY FAN STATUS
10. SUPPLY FAN PERCENT MODULATION
11. RETURN FAN STATUS
12. RETURN FAN PERCENT MODULATION
13. ACTIVE SPACE PRESSURE
14. ACTIVE SUPPLY AIR PRESSURE
15. CHILLED WATER VALVE POSITION
16. RETURN AIR TEMPERATURE
17. RETURN AIR RELATIVE HUMIDITY
18. ECONOMIZER STATUS
19. ECONOMIZER POSITION - PERCENT
20. MINIMUM OUTDOOR AIR CCFM SETPOINT
21. OUTDOOR AIR FLOW

DIAGNOSTICS
THE BAS SYSTEM SHALL BE ABLE TO ALARM FROM ALL SENSED POINTS FROM THE AHUs AND DIAGNOSTIC ALARMS SENSED BY THE UNIT CONTROLLER. ALARM LIMITS SHALL BE DESIGNATED FOR ALL SENSED POINTS.
1. INDIVIDUAL AHU DIAGNOSTIC AND ALARM STATUSES SHALL INCLUDE THE FOLLOWING LATCHING ITEMS FOR EACH UNIT:
   A. EMERGENCY STOP
   B. SUPPLY FAN FAILURE
   C. RETURN FAN FAILURE
   D. FREEZESTAT TRIP
   E. MANUAL SUPPLY AIR STATIC PRESSURE LIMIT

2. INDIVIDUAL UNIT DIAGNOSTIC AND ALARM STATUSES SHALL INCLUDE THE FOLLOWING NON-LATCHING ITEMS FOR EACH UNIT:
   A. ZONE TEMPERATURE SENSOR FAILURE
   B. SUPPLY AIR TEMPERATURE SENSOR FAILURE
   C. AUXILIARY TEMPERATURE SENSOR FAILURE
   D OUTDOOR AIR TEMPERATURE SENSOR FAILURE
   E. SUPPLY AIR PRESSURE SENSOR FAILURE
   F. OUTDOOR AIR HUMIDITY SENSOR FAILURE
   G. SUPPLY AIR PRESSURE SETPOINT FAILURE
   H. SPACE STATIC PRESSURE SETPOINT FAILURE
   I. SPACE PRESSURE SENSOR FAILURE
   J. RETURN AIR TEMPERATURE SENSOR FAILURE
   K. RETURN AIR HUMIDITY SENSOR FAILURE
   L. AUTO SUPPLY AIR STATIC PRESSURE LIMIT
   M. UNIT COMMUNICATIONS LOSS
   N. SUPPLY AIR TEMPERATURE COOL
   O. DIRTY FILTER

HUMIDIFIER CONTROL
THE HUMIDIFIER SHALL BE CONTROLLED BY DIGITAL CONTROLLER. WHEN THE CONTROLLER SENSES SPACE HUMIDITY FROM A REPRESENTATIVE HUMIDISTAT AS NOTED ON THE DRAWINGS BELOW THE SETPOINT OF 35% RH (ADJUSTABLE), THE CONTROLLER SHALL MODULATE THE HUMIDIFIER OUTPUT VIA A 4-20MA SIGNAL TO INCREASE THE ROOM HUMIDITY. WHEN THE HUMIDITY REACHES 35% (ADJUSTABLE), THE CONTROLLER SHALL MODULATE THE HUMIDIFIER OFF. A HUMIDITY HIGH LIMIT (HHL) SHALL BE INSTALLED A MINIMUM OF 15' DOWNSTREAM OF THE HUMIDIFIER DISTRIBUTION TUBE (OR AT A DISTANCE THAT EXCEEDS THE ABSORPTION RATING DISTANCE OF THE DISTRIBUTION TUBE, WHICHEVER IS GREATER) TO ALLOW THE SYSTEM TO OPERATE PROPERLY AND PROTECT THE DUCT SYSTEM FROM HUMIDITY LEVELS IN EXCESS OF 85% RH IN THE DISCHARGE AIR STREAM. UPON ACTIVATION OF THE HHL, THE HUMIDIFIER SHALL BE SHUT DOWN UNTIL THE HUMIDITY LEVEL DROPS BELOW THE 85% RH SETPOINT, AT WHICH TIME THE HUMIDIFIER SYSTEM WILL BE ALLOWED TO RETURN TO NORMAL OPERATION. HUMIDITY SENSORS LOCATED IN O.R.s NOT CONTROLLING THE HUMIDIFIER SHALL BE CONNECTED TO THE B.A.S. FOR REMOTE MONITORING.

IF THE UNIT IS IN ECONOMIZER MODE AND THE HUMIDIFIER IS OPERATING AT 100% CAPACITY AND THE SPACE HUMIDITY FALLS BELOW 30%, THE UNIT OUTSIDE AIR DAMPER SHALL CLOSE BY 50% OF IT'S CURRENT PERCENTAGE OPEN BUT NOT LESS THAN THE MINIMUM OUTSIDE AIR. IF AFTER 15 MINUTES, THE HUMIDITY REMAINS BELOW 30%, THE UNIT SHALL DIS-ENGAGE THE ECONOMIZER OPERATION, REVERT TO MINIMUM OUTSIDE AIR AND SHALL UTILIZE MECHANICAL COOLING. AFTER 24 HOURS, THE UNIT SHALL ENABLE THE ECONOMIZER.

WHEN THE DEWPOINT OF THE OUTSIDE AIR REACHES 42 DEGREES F OR ABOVE, THE HUMIDIFIERS SHALL BE DISABLED.

GENERAL FIRE ALARM SEQUENCE

FAN SHUTDOWN - IF THE SUPPLY OR RETURN DUCT SMOKE DETECTOR, AREA SMOKE DETECTOR OUTSIDE THE OPERATING SUITE, SPRINKLER FLOW OR PULL STATION SIGNALS THE GENERAL FIRE ALARM, A VISIBLE AND AUDIBLE ALARM SHALL BE ACTIVATED, THE AHU SUPPLY AND RETURN FANS WILL BE DE-ENERGIZED. ALL FIRE/SMOKE DAMPERS WILL SHUT.

IF SMOKE IS SUBSEQUENTLY DETECTED IN THE OPERATING ROOM BY THE OR AREA SMOKE DETECTOR DURING AHU SHUTDOWN, THEN THE SEF SHALL BE ENERGIZED, AND THE OPERATING ROOM SHALL BE EXHAUSTED. AHU SUPPLY AND RETURN FANS SHALL REMAIN OFF AND THE FIRE/SMOKE DAMPERS IN THE SUPPLY AND RETURN DUCT WILL REMAIN CLOSED.

PROVIDE FIRE ALARM INTERFACE AS REQUIRED.

PROVIDE A MANUAL ACTIVATION SWITCH IN EACH OPERATING ROOM TO OVERRIDE THE NORMAL FUNCTION OF THE AIR HANDLER UPON THE STAFF'S DIRECTION:

THE SWITCH SHALL INCLUDE FOUR MODES:
- NORMAL MODE: UNIT OPERATES IN NORMAL MODE.
- SMOKE PURGE MODE: THE RETURN AIR DAMPERS CLOSE, THE AHU GOES TO 100% OUTSIDE AIR, THE SEF STARTS.
- RECIRCULATION MODE: OUTSIDE AIR DAMPERS CLOSE.
- SHUTDOWN: THE AIRHANDLER SHUTS DOWN, ALL ASSOCIATED DAMPERS CLOSE.

EMERGENCY SMOKE CONTROL/EXHAUST AND SHUT DOWN SEQUENCE

FIRE MODES - UPON SENSING PRODUCTS OF COMBUSTION IN A OPERATING ROOM SUITE BY THE ROOM SMOKE DETECTORS DURING NORMAL OPERATION, THE FIRE ALARM SYSTEM WILL INITIATE THE FOLLOWING SEQUENCE OF OPERATION FOR THE HVAC UNIT SERVING THE AFFECTED AREA. CONTROL LOGIC FOR THE AHU FANS AND SMOKE DAMPERS SHALL BE PROVIDED BY THE BAS BASED ON INPUT FROM THE FIRE ALARM SYSTEM/ZONE ALARM MODULES.

SMOKE PURGE - IN THIS OPERATIONAL MODE;
- THE AHU SUPPLY FAN WILL RUN TO MAINTAIN DUCT STATIC PRESSURE
- THE OUTSIDE AIR INTAKE MINIMUM DAMPERS AND ECONOMIZER DAMPERS WILL OPEN FULLY
- THE RETURN FAN WILL RUN AT 100%, THE RETURN DAMPER WILL CLOSE AND THE RELIEF DAMPER WILL OPEN
- THE ROOM SMOKE EXHAUST FAN (SEF) WILL START
- THE FIRE/SMOKE DAMPERS IN THE SUPPLY DUCT WILL REMAIN POWERED OPEN
- THE SMOKE DAMPERS SERVING THE OPERATING ROOM IN THE RETURN DUCT WILL SHUT

SMOKE EVAC MODE - DURING SMOKE PURGE, UPON DETECTION OF SMOKE IN THE OUTSIDE AIR INTAKE OF THE HVAC UNIT OR ITS SUPPLY DUCT, THE FIRE ALARM SYSTEM WILL SIGNAL THE BAS TO START THE SMOKE EVAC SEQUENCE. IN THIS OPERATIONAL MODE;
- THE AHU SUPPLY FAN WILL STOP RUNNING
- THE OUTSIDE AIR INTAKE AIR DAMPERS AND ECONOMIZER DAMPERS WILL CLOSE FULLY
- THE RETURN FAN WILL STOP RUNNING
- ALL SMOKE DAMPERS IN THE SUPPLY & RETURN DUCT WILL CLOSE OR REMAIN CLOSED
- THE ROOM SMOKE EXHAUST FAN (SEF) WILL CONTINUE TO RUN

SMOKE IN OUTSIDE AIRSTREAM (RECIRC MODE) -IF SMOKE IS FIRST DETECTED IN THE OUTSIDE AIRSTREAM BY THE OUTSIDE AIR SMOKE DETECTOR, THE FOLLOWING SHALL OCCUR:
- THE OUTSIDE AIR INTAKE DAMPERS AND ECONOMIZER DAMPER WILL CLOSE FULLY
- THE SUPPLY FAN WILL RUN TO MAINTAIN DUCT STATIC PRESSURE IN THE UNIT
- THE FIRE/SMOKE DAMPERS IN THE SUPPLY/RETURN DUCT WILL REMAIN POWERED OPEN
- IF SMOKE IS THEN DETECTED WITHIN THE OR OR SUITE, THE SUPPLY AND RETURN FAN SHALL STOP RUNNING
- SUPPLY & RETURN FIRE/SMOKE DAMPERS SHALL CLOSE
- THE ROOM SMOKE EXHAUST FAN (SEF) WILL START

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A Replacement Facility for
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Wrangell, Alaska

AHFD AMERICAN HEALTH FACILITIES DEVELOPMENT

STATE OF ALASKA
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R. THOMAS PUNTER DANIEL
No. ME12715
REGISTERED PROFESSIONAL ENGINEER
4/30/12

PROJECT NUMBER
10528.00
DATE
March 21, 2012

M6.2
HVAC CONTROLS

Fire Marshal Review Set

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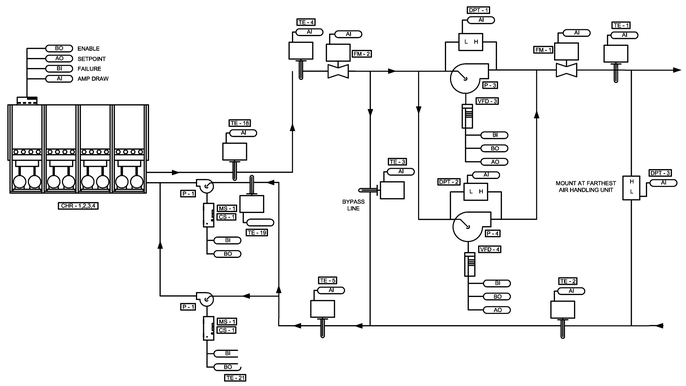

SEQUENCE OF OPERATION – PARALLEL CHILLER SYSTEM
PRIMARY SECONDARY PUMPING

CHILLER SEQUENCING AND CONTROL

THE CHILLER PLANT CONTROL SYSTEM SHALL MONITOR AND CONTROL THE CHILLED WATER SYSTEM INCLUDING THE CHILLER(S), PUMP(S), COOLING TOWER(S), AND VARIABLE SPEED DRIVE(S) AS REQUIRED. THE BAS SHALL PROVIDE A CUSTOM GRAPHIC TO DEPICT OPERATIONAL CONDITIONS, ALARMS, AND CHILLER ADD AND SUBTRACT STATUS MESSAGES, ETC.

CHILLER OPERATIONAL STATUS SCREEN TO INCLUDE:
- CHILLER SYSTEM STATUS (OFF/SOFT START/NORMAL/AMBIENT LOCKOUT/SHUTDOWN IN PROGRESS)
- CHILLER PLANT SUPPLY WATER SETPOINT
- CHILLED WATER SYSTEM SUPPLY WATER TEMPERATURE
- CHILLED WATER SYSTEM RETURN WATER TEMPERATURE

PREDICTIVE OF CHILLER ADDITION / SUBTRACTION STATUS MESSAGES (I.E. 'NEXT CHILLER WILL BE ADDED IF THE SYSTEM SUPPLY WATER TEMP 41.7 EXCEEDS 43.5 DEGREES FOR 10 MINUTES.' OR 'NEXT CHILLER WILL BE SUBTRACTED IF THERE IS NO ADD REQUEST AND THE ACTUAL SYSTEM DELTA T 10.7 DEGREES IS LESS THAN 7.5 DEGREES FOR 10 MINUTES.')
- INDIVIDUAL CHILLER FAILURE RESET (PUSH BUTTON)
- ALL CHILLER FAILURE RESET (PUSH BUTTON)
- SYSTEM PUMP FAILURE RESET (PUSH BUTTON)
- MANUAL ADDITION OF CHILLER (PUSH BUTTON)
- MANUAL SUBTRACTION OF CHILLER (PUSH BUTTON)
- MANUAL ROTATION OF CHILLER SEQUENCE (PUSH BUTTON)

SCREEN THAT ALLOWS EDITING OF THE FOLLOWING DATA (TO BE PERFORMED WITHOUT ENTERING PROGRAM CODE EDITOR):
- SUPPLY WATER SETPOINT
- SYSTEM SOFT LOADING PARAMETERS
- AMBIENT LOCKOUT PARAMETERS
- CHILLER ADDITION PARAMETERS
- CHILLER SUBTRACTION PARAMETERS
- AUTO ROTATION PARAMETERS
- ALARM HANDLING SETUP
- SECURITY SETUP

INDIVIDUAL CHILLER GRAPHIC(S) TO INCLUDE ALL DATA LISTED ON THE SUPPLEMENTARY CHILLER SYSTEM POINT LIST, INCLUDING:
- CHILLER NAME
- CHILLER OPERATING MODE
- CHILLED WATER SETPOINT
- CHILLER RLA %
- ENTERING CHILLER WATER TEMPERATURE
- LEAVING CHILLED WATER TEMPERATURE
- EVAPORATOR FLOW STATUS
- CONDENSER FLOW STATUS

SYSTEM START/STOP – THE CHILLED WATER SYSTEM SHALL START WHEN ANY SINGLE CONTROL VALVE IS OPEN 15% (ADJ.) OR MORE AND SHALL SHUT DOWN WHEN ALL CHILLED WATER VALVES CLOSE WITH THE OPTION TO USE OUTSIDE AMBIENT TEMPERATURE LOCKOUT.

WHEN THE CHILLED WATER SYSTEM IS ENABLED THE CHILLER PLANT CONTROL SYSTEM SHALL:

- START THE LEAD SECONDARY CHILLED WATER PUMP IN THE SEQUENCE. THE CHILLED WATER PUMP VFD SHALL BE CONTROLLED TO MAINTAIN THE DESIGN PRESSURE SETPOINT FOR THE SECONDARY SYSTEM. UPON CONFIRMATION OF SECONDARY CHILLED WATER FLOW, AN ENABLE SIGNAL SHALL BE SENT TO THE LEAD CHILLER AND ITS EVAPORATOR ISOLATION VALVE SHALL OPEN. UPON RECEIVING THE ENABLE SIGNAL, THE CHILLER SHALL ENABLE ITS CHILLED WATER PUMP. UPON CONFIRMATION OF EVAPORATOR WATER FLOW THE CHILLER SHALL ENABLE THE CHILLER CONDENSER ISOLATION VALVE AND CALL FOR THE LEAD CHILLER'S CONDENSER WATER PUMP TO OPERATE. UPON CONFIRMATION OF CONDENSER WATER FLOW THE CHILLER SHALL CONTINUE ITS PRE-START SEQUENCE AND START ITS COMPRESSOR.

THE CHILLER PLANT CONTROL SYSTEM SHALL INITIATE THE START OF THE NEXT SECONDARY CHILLED WATER PUMP WHEN THE PRESSURE SETPOINT IS NOT MET FOR 5 MINUTES. THE ACTIVE PUMPS SHALL RUN AT THE SAME SPEED.

THE CHILLER PLANT CONTROL SYSTEM SHALL INITIATE THE SHUTDOWN OF THE NEXT SECONDARY SYSTEM CHILLED WATER PUMP WHENEVER EXCESS PUMP CAPACITY EXISTS AS DETERMINED BY THE PUMP SPEED, THE SYSTEM PRESSURE, AND THE NUMBER OF PUMPS RUNNING.

THE CHILLER PLANT CONTROL SYSTEM SHALL INITIATE THE START OF THE NEXT CHILLER IN THE SEQUENCE WHENEVER INSUFFICIENT CHILLED WATER CAPACITY EXISTS CONTINUOUSLY, AS INDICATED BY SUPPLY WATER TEMPERATURE DEVIATION OF 2.5 DEGREES (ADJUSTABLE) ABOVE SETPOINT FROM SYSTEM CHILLED WATER TEMPERATURE SETPOINT, FOR 15 MINUTES OR BY SECONDARY FLOW EXCEEDING 90% (ADJUSTABLE) OF PRIMARY FLOW FOR 15 MINUTES. AS A BACK-UP, IF THE BYPASS WATER TEMPERATURE EXCEEDS THE PRIMARY WATER TEMPERATURE BY 2.5 DEGREES (ADJUSTABLE) FOR A PERIOD OF 15 MINUTES THE NEXT CHILLER SHALL BE STARTED AND AN ALARM SHALL BE SENT TO THE BAS WORKSTATION THAT 'A BACKUP METHOD HAS BEEN USED TO START A CHILLER'.

THE CHILLER PLANT CONTROL SYSTEM WILL UNLOAD OPERATING CHILLERS TO AN OPERATOR EDITABLE CURRENT LIMIT PRIOR TO STARTING A LAG CHILLER. LAG CHILLERS SHALL START IN A SIMILAR MANNER TO THE LEAD CHILLER START SEQUENCE. THE ISOLATION VALVES SHALL OPEN SLOWLY FOR LAG CHILLER START SO AS NOT TO PRESENT A LARGE VARIATION IN THE FLOW OF THE OPERATING CHILLER. THE STROKE TIME FOR THE ACTUATOR SHALL BE ADJUSTABLE EITHER THROUGH THE ACTUATOR ITSELF OR THE BAS TO ALLOW PROPER SEQUENCING OF THE CHILLERS WITHOUT NUISANCE ALARM TRIPPING OR CHILLER SHUTDOWN.

THE CHILLER PLANT CONTROL SYSTEM SHALL INITIATE THE SHUT DOWN OF THE NEXT CHILLER IN THE SEQUENCE WHENEVER FLOW IN THE SECONDARY LOOP DROPS TO 70% OF THE REMAINING CHILLER(S) FLOW RATE FOR 20 MINUTES. THE CHILLER SHALL SHUT DOWN ITS PUMP WHEN THE CHILLER DETERMINES IT IS SAFE TO DO SO.

UPON SENSING A CHILLER FAILURE THE CHILLER PLANT CONTROL SYSTEM SHALL SHUT DOWN THE FAILED CHILLER IMMEDIATELY AND INITIATE THE START OF THE NEXT CHILLER IN THE ROTATION SEQUENCE.

THE CHILLER PLANT CONTROL SYSTEM SHALL CONTROL INDIVIDUAL CHILLER SETPOINTS TO MAINTAIN THE SYSTEM SUPPLY WATER TEMPERATURE AT SETPOINT. THE DESIGN SYSTEM CHILLED WATER SETPOINT SHALL BE 42 DEGREES F AND EDITABLE BY THE OPERATOR.

SYSTEM SOFT START – THE CHILLER PLANT CONTROL SYSTEM WILL INITIATE A 'SOFT START' MODE WHENEVER THE SYSTEM CHILLED WATER TEMPERATURE EXCEEDS THE SPECIFIED CHILLED WATER SYSTEM SETPOINT BY 20 DEGREES F AT SYSTEM START-UP. THE CHILLER PLANT CONTROL APPLICATION WILL ADD COOLING CAPACITY DURING SOFT START MODE ONLY IF RETURN WATER TEMPERATURE IS NOT DECLINING AT A RATE OF AT LEAST 0.5 DEGREES F PER MINUTE. THIS PREVENTS THE UNNECESSARY OPERATION OF CHILLERS AND LIMITS SYSTEM ELECTRICAL DEMAND DURING CHILLED WATER LOOP PULL DOWN.

CHILLED WATER CONTROL SCHEMATIC

AUTOMATIC ROTATION OF CHILLERS AND PUMPS
CHILLER ROTATION SHALL BE INITIATED BASED ON AN OPERATOR ENTERED DAY INTERVAL OR BY THE CYCLING OF A BINARY POINT. THE METHOD OF SEQUENCE SHALL BE OPERATOR SELECTABLE. CHILLER CYCLING CAUSED BY NORMAL SYSTEM LOAD FLUCTUATIONS SHALL CAUSE THE CHILLERS TO CHANGE ROTATION SEQUENCE OR AT THE OPERATOR'S OPTION CHILLERS MAY BE FORCED INTO THE NEW ROTATION SEQUENCE AT THE TIME OF SEQUENCE CHANGE. PUMP ROTATION SHALL BE INITIATED BY A SCHEDULE OR BY THE CYCLING OF A BINARY POINT.

END OF CURVE PUMP PROTECTION
THE BAS SHALL MODEL THE END OF CURVE CONDITION FOR THE SECONDARY CHILLED WATER PUMPS AND PROVIDE AN ALGORITHM TO TEST FOR END OF PUMP CURVE OPERATION. IN THE EVENT THE PUMPING SYSTEM IS REQUIRED TO OPERATE BEYOND THE SYSTEM CURVE, THE BAS SHALL START THE SECOND PUMP AND CONTROL THE SECONDARY SYSTEM OPERATING DP WITH BOTH PUMPS. IN THE EVENT THIS CONDITION OCCURS, THE BAS SHALL SEND AN ALARM MESSAGE TO THE WORKSTATION SAYING 'AN END OF PUMP CURVE OPERATING CONDITION HAS OCCURRED REQUIRING THE START OF THE LAG SECONDARY SYSTEM PUMP'. IF THE TWO PUMP OPERATION EXTENDS BEYOND THE PUMP CURVE FOR THE TWO OPERATING PUMPS, THE BAS SHALL NOT ALLOW A VFD COMMAND THAT WILL CAUSE THE PUMPING SYSTEM TO OPERATE IN THIS MANNER AND SHALL ALARM THE BAS THAT 'AN OPERATING CONDITION HAS BEEN DETECTED THAT EXTENDS BEYOND THE SAFE SECONDARY PUMP OPERATING RANGE. THE PUMP OPERATION IS BEING LIMITED.'

DIAGNOSTICS/PROTECTION –
THE BUILDING AUTOMATION SYSTEM SHALL BE ABLE TO ALARM FROM ALL SENSED POINTS AND DIAGNOSTIC ALARMS MONITORED BY THE CHILLER CONTROLLER.

SYSTEM POINTS LIST FOR CHILLERS AND TOWERS

SYSTEM POINT DESCRIPTION	POINT TYPE					ALARMS							
PRIMARY SECONDARY WATER COOLED CHILLED WATER SYSTEM	GRAPHIC	HARDWARE INPUT	HARDWARE OUPUT	SOFTWARE POINT	DEFAULT VALUE	HIGH ANALOG	LOW ANALOG	BINARY	LATCH DIAGNOSTIC	SENSOR FAIL	COMM. FAIL	DIAGNOSTICS	NOTES
CHILLED WATER SETPOINT	X		≈	X									
CHILLED WATER TEMP ENT	X	≈											
CHILLED WATER TEMP LVG	X	≈											
CHILLER DESIGN FLOW	X			X									
PRIMARY CHILLED WATER TEMPERATURE	X	1				X	X			X			
CHILLER DESIGN CAPACITY	X			X									
PRIMARY CHILLED WATER FLOW	X	1						X					FLOW METER
COMPRESSOR CURRENT DRAW	X	≈											
COMPRESSOR POWER	X			X									
CHILLER ENABLE/DISABLE	X		≈	X									
CHILLER STATUS	X	≈		X				X					INDICATION CHILLER IS RUNNING
CHILLER AVAILABLE	X			X									
CHILLER 1 FAILURE	X	1											
CHILLER 2 FAILURE	X	1		X				X					
CHILLER 1 ISOLATION VALVES	X	≈											
CHILLER 2 ISOLATION VALVES	X	≈											
CHILLER SEQUENCE NUMBER	X			X									
CHILLER OPERATING MODE				X									
CHILLED WATER SETPOINT MIN	X		≈	X									
CHILLED WATER PUMP STATUS	X	≈						X					SYSTEM AND CHILLER PUMPS
CHILLED WATER PUMP S/S OUTPUT	X		≈										SYSTEM AND CHILLER PUMPS
CHILLED WATER PUMP FAILURE	X			X				X					SYSTEM AND CHILLER PUMPS
SYSTEM CHILLED WATER RETURN TEMP	X	1				X	X						
DESIGN SYSTEM CHILLED WATER TEMP DIFFERENCE	X			X		X	X						
SECONDARY CHILLED WATER FLOW	X	1											FLOW METER
BYPASS DECOUPLER TEMP	X	1				X	X						
SYSTEM ENABLE REFERENCER				X									
SOFT START DEADBAND				X									
ADD TEMP DEADBAND				X									
MINIMUM COOL DOWN RATE				X									
FLOW TYPE (VARIABLE OR CONSTANT)				X									
ADD DELAY INTERVAL				X									
ADD DELAY TIME				X									
SUBTRACT TEMP DEADBAND				X									
EXCESS FLOW PERCENTAGE				X									
SUBTRACT DELAY TIME				X									
SUBTRACT DELAY INTERVAL				X									
POWER FAIL RECOVERY MODE (ENABLE/DISABLE)				X									
START INTERVAL				X									
ADD INPUT				X									
SUBTRACT METHOD				X									
SUBTRACT INPUT				X									
ROTATION SCHEDULE				X									
ROTATION INTERVAL				X									
ROTATION INPUT				X									
ROTATION DAY				X									
ROTATION TIME				X									
FORCE ROTATION				X									
CONTROL FEEDBACK DELAY TIME				X									
FAILURE RESET				X									
FAILURE OUTPUT				X				X					
FAIL ON LOSS OF FLOW				X				X					
NUMBER OF RETRIES IF CHILLER FAILS				X									
CHILLER INDEX NUMBER	X			X									
CHILLER SEQUENCING TYPE				X									
AMBIENT WETBULB TEMP				X									
AMBIENT RELATIVE HUMIDITY		1											
AMBIENT TEMPERATURE		1											
SECONDARY PUMP SYSTEM OPERATING PRESSURE	X	1											MOUNT AT FURTHEST AHU

GENERAL NOTES:

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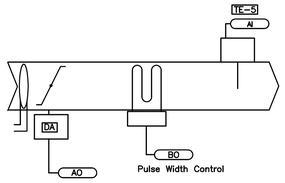
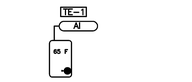


VAV SYSTEM WITH REHEAT



WALL MOUNTED TEMPERATURE SENSORS WITH DIGITAL DISPLAY FOR O.R.s, C-SECTION AND TRAUMA ROOMS

TYPICAL WALL MOUNTED TEMPERATURE SENSOR

WALL MOUNTED HUMIDISTAT WITH DIGITAL DISPLAY – LOCATE IN ROOM AS SHOWN ON PLANS IN O.R.s, AND TRAUMA ROOMS.

WALL MOUNTED HUMIDITY SENSOR WITH DIGITAL DISPLAY – LOCATE IN O.R.s/C-SECTION/TRAUMA ROOMS WITHOUT HUMIDISTAT. CONNECT SENSORS TO THE B.A.S.

GENERAL

ALL CAV/VAV TERMINAL REHEAT BOXES HAVE A MODULATING AIR VALVE TO CONTROL THE VOLUME OF AIR FLOWING TO THE DIFFUSERS SERVED BY THAT BOX USING PID BASED CONTROL ALGORITHMS. IN VARIABLE AIR VOLUME (VAV) APPLICATIONS, THE AIR VOLUME IS MODULATED BETWEEN A MAXIMUM AND MINIMUM SET POINT (ADJUSTABLE). IN CONSTANT AIR VOLUME APPLICATIONS (CAV), THE AIR VOLUME IS MAINTAINED AT A CONSTANT SET POINT (ADJUSTABLE).

SPACE SETPOINT OPERATION

SPACE SETPOINTS PROVIDE TEMPERATURE BOUNDARIES FOR EACH OF THE OCCUPANCY MODES OF THE CONTROLLERS. TWO SETS OF POSSIBLE HEATING AND COOLING SETPOINTS ARE AVAILABLE:

- OCCUPIED (ALSO USED BY OCCUPIED BYPASS)
- UNOCCUPIED

OCCUPANCY DETERMINED BY SCHEDULE

BUILDING AUTOMATION SYSTEMS TYPICALLY COMMUNICATE AN OCCUPANCY MODE REQUEST USING THE OCCUPANCY SCHEDULE INPUT. THE CONTROLLER ACCEPTS COMMUNICATED OCCUPANCY SCHEDULE IN THE COMMUNICATED OCCUPANCY SCHEDULE NETWORK VARIABLE INPUT.

OVERRIDING OCCUPANCY

THE CONTROLLER ALWAYS RECOGNIZES THE TIMED OVERRIDE ON BUTTON. USE THE TIMED OVERRIDE ON BUTTON TO PLACE THE CONTROLLER IN OVERRIDE (OCCUPIED BYPASS MODE). USE THE TIMED OVERRIDE CANCEL BUTTON TO CANCEL THE OVERRIDE REQUEST.

COOLING OPERATION

UNDER SPACE TEMPERATURE CONTROL, DURING THE COOLING MODE (COMMUNICATED HEAT/COOL MODE IS COOL), THE CONTROLLER ATTEMPTS TO MAINTAIN THE ACTIVE SPACE TEMPERATURE AT THE ACTIVE SPACE COOLING SETPOINT. BASED ON THE CONTROLLER OCCUPANCY MODE, THE ACTIVE SPACE COOLING SETPOINT IS EITHER THE OCCUPIED COOLING SETPOINT, THE OCCUPIED STANDBY COOLING SETPOINT, OR THE UNOCCUPIED COOLING SETPOINT. THE OUTPUTS ARE CONTROLLED BASED ON THE UNIT CONFIGURATION AND THE REQUIRED COOLING CAPACITY. AT 0% REQUIRED COOLING CAPACITY, THE AIR VALVE IS CLOSED OR AT THE ACTIVE MINIMUM FLOW SETPOINT. AS THE REQUIRED COOLING CAPACITY INCREASES, THE AIR VALVE OPENS ABOVE THE MINIMUM POSITION. AT 100% REQUIRED COOLING CAPACITY, THE AIR VALVE OPENS TO THE MAXIMUM POSITION OR TO THE ACTIVE MAXIMUM FLOW SETPOINT. ALL UNITS HAVE A MODULATING AIR VALVE. THE MODULATING AIR VALVE IS USED TO CONTROL THE VOLUME OF AIR FLOWING THROUGH THE DIFFUSERS AND INTO THE SPACE. MODULATING THE VOLUME OF AIR MODULATES THE UNIT COOLING CAPACITY.
ALSO, UNITS HAVE LOCAL REHEAT. THE REHEAT IS ELECTRIC AND IS ALLOWED TO TURN ON WHEN THE SPACE TEMPERATURE IS BELOW THE HEATING SETPOINT.

HEATING OPERATION

UNDER SPACE TEMPERATURE CONTROL, DURING THE HEATING MODE (COMMUNICATED HEAT/COOL MODE IS HEAT), THE CONTROLLER ATTEMPTS TO MAINTAIN THE SPACE TEMPERATURE AT THE ACTIVE HEATING SETPOINT. BASED ON THE CONTROLLER OCCUPANCY MODE, THE ACTIVE SPACE HEATING SETPOINT IS EITHER THE OCCUPIED HEATING SETPOINT, THE OCCUPIED STANDBY HEATING SETPOINT, OR THE UNOCCUPIED HEAT SETPOINT. THE OUTPUTS ARE CONTROLLED BASED ON THE UNIT CONFIGURATION AND THE REQUIRED HEATING CAPACITY. AS ROOM TEMPERATURE FALLS BELOW SETPOINT, HEATING COIL WILL INCREASE THE HEAT TO THE AIRSTREAM. AS TEMPERATURE RISES ABOVE SETPOINT, HEATING COIL WILL DECREASE THE HEAT TO THE AIRSTREAM.

PWM ELECTRIC HEAT (LOCAL STAGES ONLY)

THE AMOUNT OF PWM ELECTRIC HEAT REQUIRED IS CALCULATED BY A CONTROL ALGORITHM IDENTICAL TO THE ALGORITHM THAT CALCULATES THE DESIRED AIRFLOW FOR THE AIR VALVE. PWM ELECTRIC HEAT MODULATES ONE, TWO, OR THREE LOCAL STAGES. PWM ELECTRIC HEAT USES A HARD CODED THREE-MINUTE PERIOD AND 10-SECOND MINIMUM ON AND OFF TIMES. THESE VALUES ARE NOT CONFIGURABLE. EACH STAGE OF PWM ELECTRIC HEAT IS AN EQUAL PERCENTAGE OF THE TOTAL REHEAT CAPACITY.

REFRIGERANT VENTILATION FAN SEQUENCE OF OPERATION

FANS SHALL BE CONTROLLED BY WALL MOUNTED REFRIGERANT SENSORS. ON SENSING REFRIGERANT IN THE CHILLER ROOM, FAN SHALL ENERGIZE AND MOTOR OPERATED DAMPER ON INTAKE LOUVER SHALL OPEN.

ISOLATION ROOM CONTROL

EACH ISOLATION ROOM EXHAUST FAN IS TO RUN CONTINUOUSLY EVEN IN THE EVENT OF A UNLESS GENERAL FIRE ALARM. LOCAL AUDIBLE/VISUAL ALARM EQUAL TO TSI PRESSURA-8631 HMBAC IS TO BE PROVIDED AT EVERY ISOLATION ROOM. TSI 8694-7 NEGATIVE NEUTRAL CHANGEOVER SWITCH SHALL BE LOCATED AT THE NURSES STATION. ON LOSS OF POWER, EXHAUST FAN IS TO AUTO RESTART WHEN EMERGENCY POWER IS PROVIDED OR NORMAL POWER IS RESTORED. MONITORS SHALL BE CONNECTED INTO THE BAS FOR MONITORING AND ALARMING.

FAN COIL UNITS (FCU) SEQUENCE OF OPERATION

THE MICROPROCESSOR BASED CONTROLLER SHALL MONITOR AND CONTROL BLOWER COIL AND SHALL BE INTEGRATED INTO THE BAS FOR REMOTE MONITORING AND CONTROL. THE CONTROL PANEL SHALL PERFORM THE FOLLOWING CONTROL STRATEGIES AND PROVIDE THE POINTS AS LISTED ON THE SYSTEM POINTS LISTS, WITH SPECIFIED MONITORING AND DIAGNOSTICS.

WHEN THE UNIT IS TURNED ON, ALL UNIT CONTROL FUNCTIONS WILL BE ENABLED. AS TEMPERATURE IN SPACE RISES ABOVE SETPOINT, CONTROLLER SHALL OPEN TWO POSITION CHILLED WATER VALVE TO MAINTAIN SPACE TEMPERATURE SETPOINT. AS TEMPERATURE IN SPACE DROPS BELOW SPACE SETPOINT, CONTROLLER SHALL OPEN TWO POSITION HOT WATER VALVE TO MAINTAIN SPACE TEMPERATURE SETPOINT.

DOMESTIC HOT WATER CIRCULATING PUMPS

PUMPS ARE TO OPERATE CONTINUOUSLY. TWO 120 F PUMPS (ONE STANDBY) AND TWO 140 F PUMPS (ONE STANDY) ARE TO ALTERNATE RUN TIME BASED ON SCHEDULE INPUT BY USERS. IF PUMP FAILS, ALARM IS TO BE INITIATED AND BACKUP PUMP STARTED.

ALL CIRCULATING PUMPS ARE TO BE MONITORED AND ALARM INITIATED IF ANY PUMP FAILS.

SEQUENCE OF OPERATION (SMOKE DAMPERS)

GENERAL:
ALL SMOKE DAMPERS ARE TO BE POWERED OPEN. SMOKE DAMPERS ARE TO CLOSE ON LOSS OF POWER. SPRINKLER FLOW ALARM, OR BY THE FIRE ALARM SYSTEM, FIRE ALARM SYSTEM SHALL SHUT DOWN AHU'S AND CLOSE SMOKE DAMPERS IN THE SMOKE COMPARTMENT IN WHICH A SMOKE DETECTOR (SPACE OR DUCT) IS ACTIVATED AND IN ALL ADJACENT SMOKE COMPARTMENTS

KITCHEN HOOD EXHAUST AND MAKEUP AIR/ FIRE SUPPRESSION CONTROL SEQUENCE

THE KITCHEN EXHAUST FANS SHALL BE ENABLED BY THE BUILDING AUTOMATION SYSTEM OR A WALL SWITCH AT EACH HOOD. WHEN ANY WALL SWITCH IS ENERGIZED, CONTACTS IN THE EXHAUST FAN STARTERS WILL MAKE SIGNALING THE DISHWASHER EXHAUST FAN TO RUN. WHEN ALL WALL SWITCHES HAVE BEEN DE-ENERGIZED, THE CONTACTS WILL BREAK DE-ENERGIZING ALL EXHAUST FANS. WHEN THE HOOD FIRE SUPPRESSION SYSTEM IS ACTIVATED, THE KITCHEN HOOD EXHAUST FAN SHALL REMAIN IN OPERATION. PROVIDE HEAT SENSOR IN EXHAUST COLLAR OF HOOD TO AUTOMATICALLY ENERGIZE THE EXHAUST FAN AND MAKEUP AIR SYSTEM WHENEVER TEMPERATURE IS 15 DEGREES F (ADJ) ABOVE THE ROOM TEMPERATURE.

COMPUTER ROOM UNIT CONTROL

THE COMPUTER ROOM UNIT WILL BE PROVIDED WITH ITS OWN INTEGRAL CONTROLS ALONG WITH AN INTERFACE TO INTEGRATE WITH THE BAS SYSTEM. ALL POINTS AND ALARMS SHALL BE MAPPED THROUGH TO THE BAS.

LAB SPLIT SYSTEM/ROOFTOP HEAT PUMP

THE SPLIT SYSTEM FOR THE LAB AND THE RTU SERVING THE ELECTRIC ROOM SHALL BE PROVIDED WITH AN INTERFACE TO CONNECT TO THE BAS FOR REMOTE MONITORING AND CONTROL

CRAWLSPACE EXHAUST FANS

THE EXHAUST FANS SERVING THE CRAWLSPACE SHALL BE ENABLED/DISABLED THROUGH THE BAS AS WELL AS LOCAL DISCONNECTS AND SHALL BE SET TO RUN CONTINUOUSLY.

SYSTEM POINTS LIST FOR VAV BOXES

SYSTEM POINT DESCRIPTION VAV BOXES	ANALOG INPUT: TEMPERATURE	ANALOG INPUT: CFM	ANALOG INPUT: –	ANALOG OUTPUT: DDC (4-20 ma, 0-10 vdc)	ANALOG OUTPUT: SETPOINT ADJUSTMENT	ANALOG OUTPUT: –	BINARY INPUT: PNEUMATIC TRANSDUCER	BINARY INPUT: STATUS ON/OFF	BINARY INPUT: TIMED OVERRIDE	BINARY INPUT: –	BINARY OUTPUT: OPEN/CLOSE	BINARY OUTPUT: LOCK OUT	BINARY OUTPUT: –	ALARMS: HIGH ANALOG	ALARMS: LOW ANALOG	ALARMS: BINARY	ALARMS: PROOF	ALARMS: SENSOR FAIL	ALARMS: FLOW FAIL	ALARMS: COMMUNICATION FAIL	ALARMS: LOCKOUT	ALARMS: DIAGNOSTICS	ALARMS: –	SYSTEM FEATURES: TIME SCHEDULING	SYSTEM FEATURES: OPTIMUM START/STOP	SYSTEM FEATURES: DEMAND LIMITING	SYSTEM FEATURES: RESET	SYSTEM FEATURES: EVENT PROGRAM	SYSTEM FEATURES: DDC	SYSTEM FEATURES: ALARM	SYSTEM FEATURES: MAINT WORK ORDER	SYSTEM FEATURES: RUN TIME	SYSTEM FEATURES: TOTALIZING	SYSTEM FEATURES: TIMED OVERRIDE	SYSTEM FEATURES: SET BACK/SET UP	SYSTEM FEATURES: LEAD / LAG	SYSTEM FEATURES: TREND LOG	SYSTEM FEATURES: DA. TEMP RESET	NOTES
ZONE TEMPERATURE	X													X	X			X			X																			
HEATING SETPOINT				X	X																																		
COOLING SETPOINT				X	X																																		
CFM		X		X															X																				
MAXIMUM CFM					X																																		
MINIMUM CFM					X																																		
HEATING MINIMUM CFM					X																																		
ZONE HEAT STATUS							X																																
LEAVING TEMPERATURE	X														X	X		X			X																		
AUXILIARY TEMPERATURE	X													X	X		X																						
UNOCCUPIED HEAT SETPOINT					X																																		
UNOCCUPIED COOL SETPOINT					X																																		
ELECTRIC COIL OVERRIDE											X																												
LOCKOUT FAN												X																											
LOCKOUT HEAT												X																											
TIMED OVERRIDE REQUEST									X																														

NOTES:

SYSTEM POINTS LIST FOR MISCELLANEOUS EQUIPMENT

SYSTEM POINT DESCRIPTION MISC. EQUIPMENT	ANALOG INPUT: CO2 LEVEL	ANALOG INPUT: CFM	ANALOG INPUT: DIFFERENTIAL PRESSURE	ANALOG OUTPUT: DDC (4-20 ma, 0-10 vdc)	ANALOG OUTPUT: SETPOINT ADJUSTMENT	ANALOG OUTPUT: –	BINARY INPUT: PNEUMATIC TRANSDUCER	BINARY INPUT: STATUS ON/OFF	BINARY INPUT: PROOF	BINARY INPUT: FILTER STATUS	BINARY OUTPUT: ENABLE/DISABLE	BINARY OUTPUT: LOCK OUT	BINARY OUTPUT: –	ALARMS: HIGH ANALOG	ALARMS: LOW ANALOG	ALARMS: BINARY	ALARMS: PROOF	ALARMS: SENSOR FAIL	ALARMS: FLOW FAIL	ALARMS: COMMUNICATION FAIL	ALARMS: LOCKOUT	ALARMS: DIAGNOSTICS	ALARMS: –	SYSTEM FEATURES: TIME SCHEDULING	SYSTEM FEATURES: OPTIMUM START/STOP	SYSTEM FEATURES: DEMAND LIMITING	SYSTEM FEATURES: RESET	SYSTEM FEATURES: EVENT PROGRAM	SYSTEM FEATURES: DDC	SYSTEM FEATURES: ALARM	SYSTEM FEATURES: MAINT WORK ORDER	SYSTEM FEATURES: RUN TIME	SYSTEM FEATURES: TOTALIZING	SYSTEM FEATURES: TIMED OVERRIDE	SYSTEM FEATURES: SET BACK/SET UP	SYSTEM FEATURES: LEAD / LAG	SYSTEM FEATURES: TREND LOG	SYSTEM FEATURES: DA. TEMP RESET	NOTES
OR PRESSURE MONITORS			X													X		X																					
C-SECTION PRESSURE MONITORS			X													X		X																					
PHARMACY PRESSURE MONITORS			X													X		X																					
ISOLATION RM PRESSURE MONITORS			X													X		X																					
EMERGENCY POWER ALARM								X										X																					
BOILER NAT GAS PRESSURE LOSS																X		X																					
COOLING TOWER LOW WATER																X		X																					
CO2 SENSORS	X														X			X																					
EXH. FANS									X		X													X											X				
VH-1/2											X																								X				
DOM. CIRC PUMPS									X		X							X	X																X				
UNIT HEATERS											X																								X				
BLDV (FAN) COILS			X		X				X		X							X		X				X											X				
CRAWLSPACE SUMP PUMP																X																							

NOTE 1: LOCATE ALARM AT NURSES STATION

AHFD AMERICAN HEALTH FACILITIES DEVELOPMENT

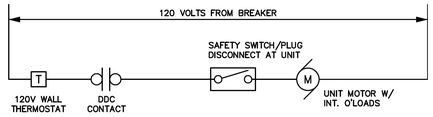
STATE OF ALASKA
49TH
THOMAS HUNTER DANIEL
No. ME12715
REGISTERED PROFESSIONAL ENGINEER
5/8/12

PROJECT NUMBER
10528.00
DATE
March 21, 2012

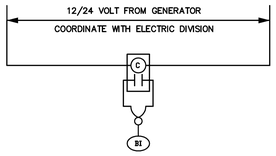
M6.4
HVAC CONTROLS

Fire Marshal Review Set

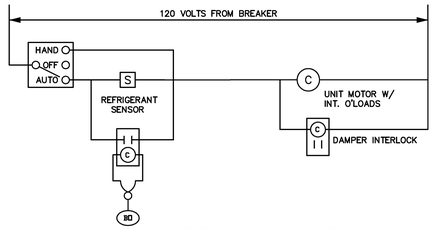
enfinity engineering
9019 Overlook Boulevard, Suite C-4
Brentwood, Tennessee 37027
Phone: 615.377.0093
Fax: 615.377.0983
Enfinity Project # 10050



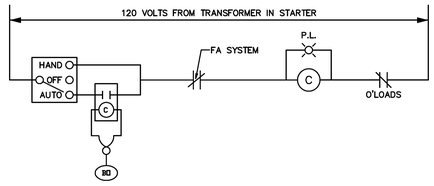
UNIT HEATERS CONTROL



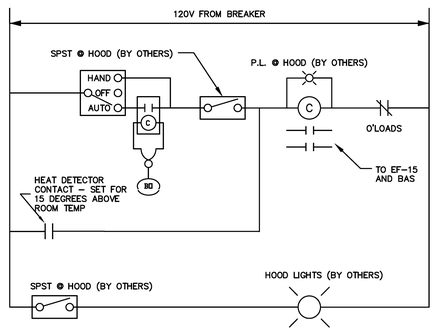
EMERGENCY POWER ALARM TO BAS



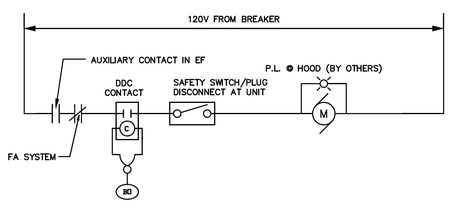
REFRIGERANT EXHAUST FAN CONTROL



EXHAUST FAN THREE PHASE CONTROL

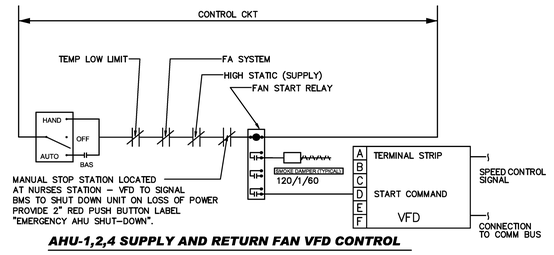


KITCHEN HOOD FANS (EF11,12,13,14) CONTROL

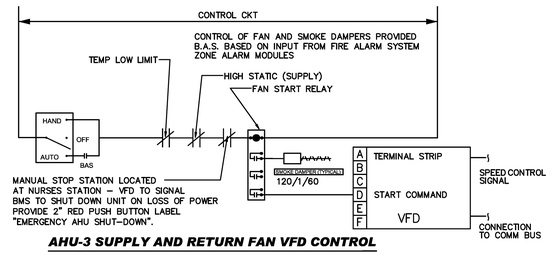


DISHWASHER EXHAUST FAN (EF-15) CONTROL

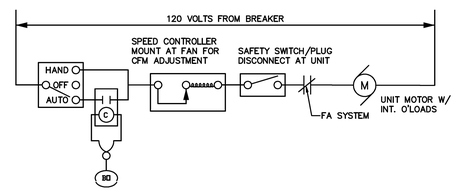
NOTE:
POWER WIRING TO THE S.D. ACTUATORS IS BY ELECTRICAL CONTRACTOR
CONTROL SMOKE DAMPERS IS BY FIRE ALARM SYSTEM EXCEPT FOR SMOKE DAMPERS SERVING ORs. CONTROL CONTRACTOR IS TO COORDINATE WITH ELECTRICAL CONTRACTOR. BAS TO MONITOR SMOKE DAMPER POSITION SWITCH ON MAIN DAMPERS IN SUPPLY AND RETURN DUCTS. COORDINATE WITH MECHANICAL CONTRACTOR.



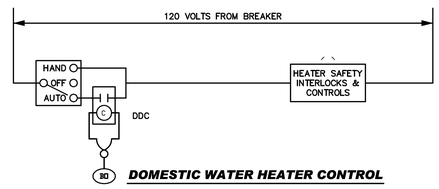
AHU-1,2,4 SUPPLY AND RETURN FAN VFD CONTROL



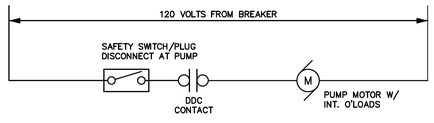
AHU-3 SUPPLY AND RETURN FAN VFD CONTROL



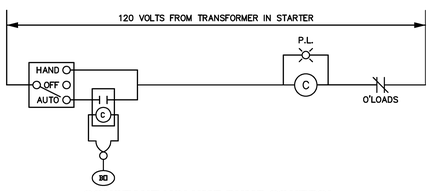
EXHAUST FAN SINGLE PHASE DIRECT DRIVE CONTROL



DOMESTIC WATER HEATER CONTROL



DOMESTIC WATER CIRCULATING PUMP CONTROL



CONSTANT VOLUME PUMP CONTROL

DEJA

A Replacement Facility for
Wrangell Medical Center
Wrangell, Alaska

David E. Johnson
Architect

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AHFDI AMERICAN HEALTH FACILITIES DEVELOPMENT

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