

**JPD & DOWNTOWN LIBRARY
HVAC CONTROL UPGRADES**

VOLUME II OF II

Contract No. BE20-230



Construction Drawings



Police Station



Downtown Library

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City and Borough of Juneau HVAC Control Upgrades

Juneau, Alaska

Construction Documents

May 18, 2020

Owner

City and Borough of Juneau

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Juneau, Alaska 99801

907-586-0490

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JPD & Downtown Library
 City and Borough of Juneau
 Contract Number: BE20-230
HVAC Control Upgrades

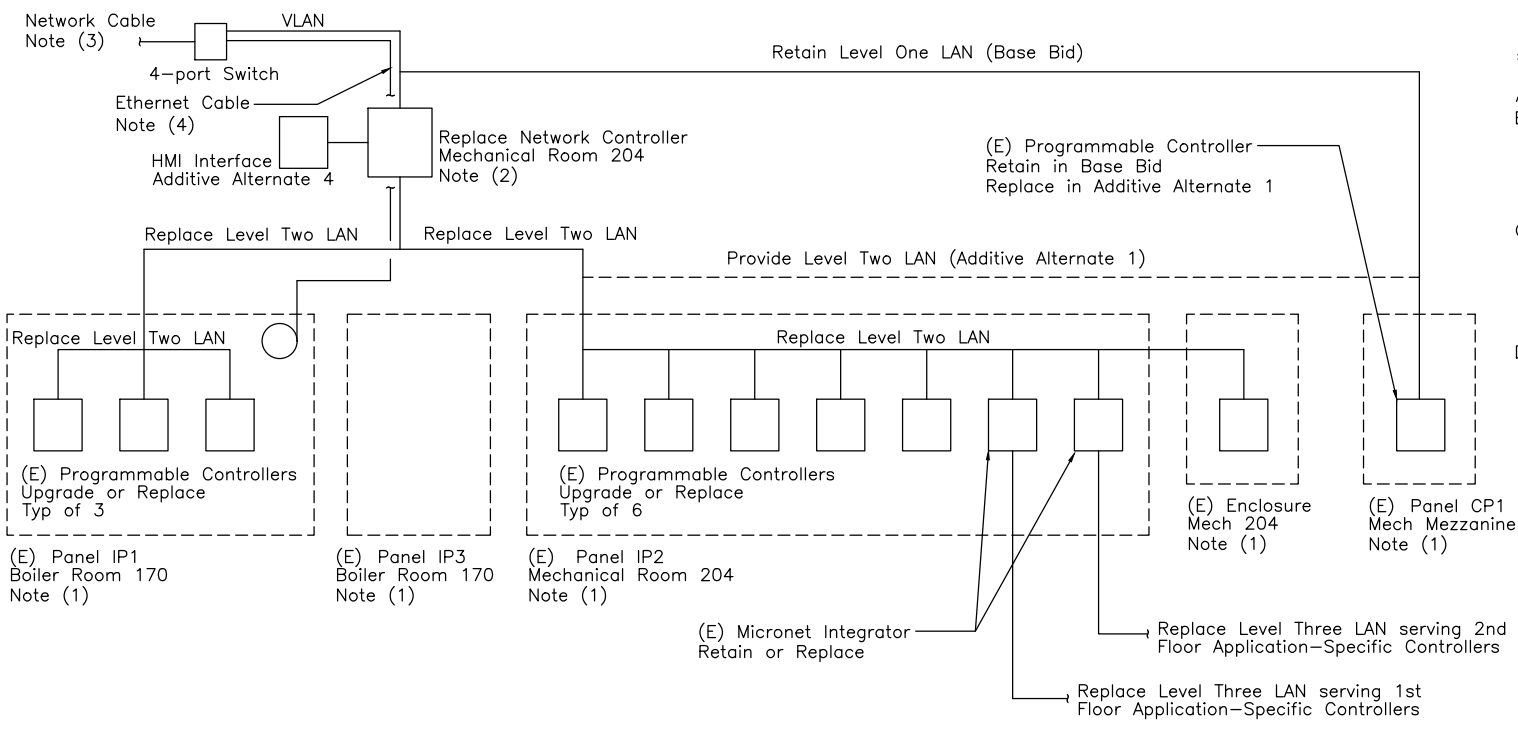
SHEET TITLE:
**JPD Scope of Work
 Equipment
 Schedules**

Date: May 18, 2020
 Scale:
 Drawn: KB/JR
 Checked: JR

M200

Police Station Scope of Work

- A. The Scope of Work includes, but is not limited to, the following.
- B. Work Requirements
1. Confirm existing conditions prior to performing the work. Notify Owner immediately of any discrepancies.
 2. Fire seal penetrations through fire rated assemblies.
 3. Conceal all wiring above ceilings and within walls.
 4. The building will be occupied and in full use during the work. See the Division 1 requirements for contractor operations on-site.
- C. Demolition
1. Remove all components of the existing DDC and electronic control system that are not used by the Control Upgrade including tubing, wiring, raceways, supports, and fasteners. Seal equipment and duct penetrations with plugs or neatly cut and fully adhered foil tape. Repair pipe and duct insulation with adhesive jacketing.
 2. Patch, prepare and paint finished wall and ceiling surfaces that are damaged or left in an unfinished state due to the removal or replacement of control system devices.
- D. Control Upgrade
1. Summary
 - a. Existing Conditions: The building is currently controlled by a Barber Coleman Network 8000 DDC system consisting of a network controller (Global Command Module), 9 programmable application controllers (Microzones), 33 application-specific controllers (VAV box controllers) and associated control panels and devices. A separate Delta control system controls and monitors cooling units HVAC-3 and HVAC-4. See Control System Reference Drawings.
 - b. Upgrade the DDC system as shown or specified in the construction documents. Provide a complete DDC control system for the specified control, monitoring, display and alarm functions.
 - c. Develop new control programming. Do not import the existing control logic or programming into the Upgraded DDC system. DDC System Architecture (See Diagram on Sheet M200)
 - a. Network Controller (Located in Boiler Room 170): Replace the network controller. The CBJ will provide a VLAN network cable/port.
 - b. Panel IP1 (Located in Boiler Room): Contains three Microzone controllers and other devices.
 - c. Panel IP2 (Located in Mechanical Room 204): Contains five Microzone controllers, two BUS integrators for the application-specific controllers, transformers and other devices. A separate Microzone controller for the CCU-1 cooling system is located in a separate enclosure.
 - d. Panel IP3 (Located in Mechanical Room 204): Panel IP3 contains transformers, pressure transducers and other devices.
 - e. Panel CP1 (Located in Mechanical Mezzanine): Panel contains a standalone Delta Controls system for HVAC-3 And HVAC-4.
 2. Programmable Controllers: The contractor has the option to upgrade or replace the Microzone controllers.
 - a. Microzone Upgrade: Upgrade each control board with a new board. In addition, provide a new and unopened control board for each upgraded control board. Place the spare boards in a sealed box inside an existing control cabinet.
 - b. Replace: Replace the Microzone controller with a programmable controller. Land the existing device wiring on the programmable controller without splicing or install terminal strips to extend the wiring to the new controller. The device wiring has no spare length in the wiring gutters.
 3. Delta Programmable Controller in Panel CP1:
 - a. Base Bid: The existing controller is BACnet-capable and is connected to the VLAN. Connect BACnet IP or BACnet Ethernet communication port to DDC system to provide the required control, monitoring and alarm functions.
 - b. Additive Alternate 1: Replace the Delta controller with a programmable controller and provide communication wiring to the network controller. Land the existing device wiring on the new controller without splicing or install terminal strips to extend the wiring to the new controller. The device wiring has minimal spare length in the wiring gutters.
 4. VAV Boxes: Replace each VAV controller with an application-specific controller. Replace the room thermostat and add a discharge temperature sensor.
 5. Field Devices: Devices that are compatible with the upgraded DDC system may be retained or replaced at the contractor's option. Replace all devices that are incompatible with the upgraded DDC system.
 6. Wiring: No wire splicing is allowed. Land existing wiring on new terminals without splices, install terminal strips in panels or equipment enclosures to extend the wiring, or replace the wiring.
 7. Provide a local human-machine interface (HMI), located in Mechanical Room 204. (Additive Alternate 4)
 8. Balancing: Adjust and balance the heating and ventilation systems as follows:
 1. Ventilation Systems AHU and HRU (Additive Alternate 3)
 - a. Full Outside Air Mode: Balance the system with the HRU face/bypass dampers in the full bypass position, the AHU in full outside air position and the VAV boxes at maximum airflow.
 - b. Minimum Outside Air Mode: Balance the system with the HRU face/bypass dampers in the full face position and the AHU in full recirculation position and VAV boxes at minimum airflow.
 - c. Supply Fan Static Pressure: Determine the minimum setpoint required to achieve design airflow at all diffusers and provide setpoint to the DDC technician.
 - d. Mechanical Room 204 Pressure: Determine the minimum setpoint required to maintain the building pressure setpoint with the system in full outside air mode.
 - e. Air Flow Monitoring Stations: Calibrate as follows
 - 1) Supply Air: At minimum and maximum airflow and three equal points between them.
 - 2) Return Air: At minimum and maximum airflow and three equal points between them.
 2. Exhaust Fan EF-1 (Additive Alternate 3): Measure airflow.
 3. Hydronic Heating System (Base Bid): Adjust and balance the hydronic heating system. Set the minimum flow bypass at 5 gpm. Calibrate the flow meter using the minimum flow bypass with all other heating valves closed.



1 **JPD DDC System Architecture**
 Refer to Reference Drawings for existing conditions

Heating Equipment Schedule

Mark	Equipment	Service	Make/Model	Capacity	Electrical
(E) B-1	Fuel Oil Boiler	Heating	Weil McLain 578	521 MBH Gross	120v / 1-ph
(E) B-2	Fuel Oil Boiler	Heating	Weil McLain 578	521 MBH Gross	120v / 1-ph
(E) B-3	Fuel Oil Boiler	Heating	Weil McLain 578	521 MBH Gross	120v / 1-ph
(E) P-1	Boiler Pump	Heating	Taco 0012-FU	22 gpm; 6' head	1/6 HP, 120v / 1-ph
(E) P-2	Boiler Pump	Heating	Taco 0012-FU	22 gpm; 6' head	1/6 HP, 120v / 1-ph
(E) P-3	Boiler Pump	Heating	Taco 0012-FU	22 gpm; 6' head	1/6 HP, 120v / 1-ph
(E) P-4A	Building Pump	Heating	Grundfos UPS32-160F	33 gpm; 30' head	3/4 HP / 460v / 3-ph
(E) P-4B	Building Pump	Heating	Grundfos UPS32-160F	33 gpm; 30' head	3/4 HP / 460v / 3-ph

Ventilation Equipment Schedule

Mark	Equipment	Service	Make/Model	Capacity	Electrical
(E) AHU	Air Handling Unit	Building	ScottSpringfield HQ-23	26,160 CFM; 1.75" TSP	15 HP/ 480v / 3-ph
(E) RF-1	Return Fan	Building	ACME 713A-10	11,250 cfm; 0.8" TSP	3 HP/ 480v / 3-ph
(E) RF-2	Return Fan	Building	ACME 713A-10	11,250 cfm; 0.8" TSP	3 HP/ 480v / 3-ph
(E) HRU	Heat Recovery Unit	Ventilation / Exhaust	Boss Air	6,700 cfm; 0.3" ESP	3 HP/ 480v / 3-ph
(E) EF-1	Exhaust Fan	Bio Dry / Narcotics	-	200 cfm; 1" TSP	1/4 HP / 120v / 1-ph
(E) EF-2	Exhaust Fan	ID Lab Fume Hood	-	1,170 cfm; 0.75" TSP	1/3 HP / 120v / 1-ph
(E) EF-3	Exhaust Fan	Fingerprint Dusting	Centri Master QBR100E1	115 cfm; 0.5" TSP	1/15 HP / 120v / 1-ph
(E) EF-4	Exhaust Fan	Secure Transfer	Centri Master QBR137	1,220 cfm; 0.5" TSP	1/4 HP / 120v / 1-ph
(E) CCU-1	Cooling Condenser Unit	Building	Carrier 38APD040	40 Tons	480v / 3-ph
(E) HVAC-2	Cooling Unit	Communications 245	Carrier 50AH036	3 Ton; 900 cfm; 0.6" ESP	480v / 3-ph
(E) HVAC-3	Cooling Unit	Comm Electrical 240	Carrier 50AH060	5 Ton; 1,980 cfm; 0.65" ESP	480v / 3-ph
(E) HVAC-4	Cooling Unit	Comm Electrical 240	Carrier 50AH060	5 Ton; 1,980 cfm; 0.65" ESP	480v / 3-ph

Plumbing Equipment Schedule

Mark	Equipment	Service	Make/Model	Capacity	Electrical
(E) HWT-1	Oil Fired Hot Water Heater	Domestic Hot Water	AO Smith	300 gallon / 300 MBH	120v / 1-ph
(E) HWRP	Hot Water Recirculating Pump	Domestic Hot Water	Taco 007	5 gpm; 10' head	120v / 1-ph

Drawing Notes

- (1) Retain or replace existing control panels as required. If panel is replaced, disconnect and reconnect 120 volt power.
 - (2) Remove the existing Network Controller from Boiler Room 170 and install a Network Controller in Mechanical Room 204.
 - (3) Provide network cable from switch in Communication Electronics 240. Route along cable trays in the Mechanical Mezzanine.
 - (4) Route Cat6 Ethernet cable to Panel IP1 and secure 12' length inside panel. Provide Ethernet connector on end of cable.
- All Equipment listed in the equipment schedules is existing.

Balancing Valve and Automatic Valve Schedule

NUMBER	UNIT SERVED	LOCATION	DESIGN GPM	SETER SIZE (INCHES)	VALVE TYPE	VALVE OPERATION	NORMAL POSITION
1	VAV-1	BREAK 124	0.2	1/2	2-WAY	MODULATING	OPEN
2	VAV-2	BREAK 124	0.6	1/2	2-WAY	MODULATING	OPEN
3	VAV-3	BREAK 124	0.3	1/2	2-WAY	MODULATING	OPEN
4	VAV-4	BREAK 124	0.4	1/2	2-WAY	MODULATING	OPEN
5	VAV-5	CORRIDOR 018	0.5	1/2	2-WAY	MODULATING	OPEN
6	VAV-6	CORRIDOR 018	0.3	1/2	2-WAY	MODULATING	OPEN
7	VAV-7	CORRIDOR 018	0.2	1/2	2-WAY	MODULATING	OPEN
8	VAV-8	CORRIDOR 018	0.3	1/2	2-WAY	MODULATING	OPEN
9	VAV-9	CORRIDOR 018	0.4	1/2	2-WAY	MODULATING	OPEN
10	VAV-10	CORRIDOR 018	0.2	1/2	2-WAY	MODULATING	OPEN
11	VAV-11	CORRIDOR 018	0.2	1/2	2-WAY	MODULATING	OPEN
12	VAV-12	CORRIDOR 018	0.5	1/2	2-WAY	MODULATING	OPEN
13	VAV-13	CORRIDOR 018	0.2	1/2	2-WAY	MODULATING	OPEN
14	VAV-14	CORRIDOR 018	0.4	1/2	2-WAY	MODULATING	OPEN
15	VAV-15	CORRIDOR 018	0.2	1/2	2-WAY	MODULATING	OPEN
16	VAV-16	CORRIDOR 018	0.3	1/2	2-WAY	MODULATING	OPEN
17	VAV-17	CORRIDOR 018	0.3	1/2	2-WAY	MODULATING	OPEN
18	VAV-18	CORRIDOR 018	0.3	1/2	2-WAY	MODULATING	OPEN
19	VAV-19	CORRIDOR 201	0.4	1/2	2-WAY	MODULATING	OPEN
20	VAV-20	CORRIDOR 201	0.4	1/2	2-WAY	MODULATING	OPEN
21	VAV-21	STAIR 010	0.2	1/2	2-WAY	MODULATING	OPEN
22	VAV-22	STAIR 010	0.3	1/2	2-WAY	MODULATING	OPEN
23	VAV-23	STAIR 010	0.3	1/2	2-WAY	MODULATING	OPEN
24	VAV-24	STAIR 010	0.4	1/2	2-WAY	MODULATING	OPEN
25	VAV-25	CORRIDOR 201	0.2	1/2	2-WAY	MODULATING	OPEN
26	-	-	-	-	-	-	-
27	VAV-27	CORRIDOR 201	0.2	1/2	2-WAY	MODULATING	OPEN
28	VAV-28	CORRIDOR 201	0.3	1/2	2-WAY	MODULATING	OPEN
29	VAV-29	CORRIDOR 201	0.2	1/2	2-WAY	MODULATING	OPEN
30	VAV-30	CORRIDOR 201	0.2	1/2	2-WAY	MODULATING	OPEN
31	VAV-31	CORRIDOR 201	0.2	1/2	2-WAY	MODULATING	OPEN
32	VAV-32	CORRIDOR 201	0.2	1/2	2-WAY	MODULATING	OPEN
33	VAV-33	CORRIDOR 201	0.5	1/2	2-WAY	MODULATING	OPEN
34	HC-34	EVIDENCE 187	0.5	1/2	2-WAY	2-POSITION	OPEN
35	HC-35	EVIDENCE 187	0.3	1/2	2-WAY	2-POSITION	OPEN
36	HC-36	EVIDENCE 187	0.3	1/2	2-WAY	2-POSITION	OPEN
37	HC-37	CORRIDOR 012	0.2	1/2	2-WAY	MODULATING	OPEN
38	HC-38	CORRIDOR 012	0.9	3/4	2-WAY	MODULATING	OPEN
39	HC-39	CORRIDOR 012	0.2	1/2	2-WAY	MODULATING	OPEN
40	HC-40	CORRIDOR 012	0.2	1/2	2-WAY	MODULATING	OPEN
41	HC-41	CORRIDOR 012	0.2	1/2	2-WAY	MODULATING	OPEN
42	HC-42	CORRIDOR 018	0.2	1/2	2-WAY	MODULATING	OPEN
43	HC-43	CORRIDOR 018	0.7	1/2	2-WAY	MODULATING	OPEN
44	HC-44	CORRIDOR 018	0.3	1/2	2-WAY	MODULATING	OPEN
45	HC-45	CORRIDOR 018	0.3	1/2	2-WAY	MODULATING	OPEN
46	HC-46	CORRIDOR 015	0.2	1/2	2-WAY	MODULATING	OPEN
47	HC-47	CORRIDOR 015	0.2	1/2	2-WAY	MODULATING	OPEN
48	HC-48	CORRIDOR 018	0.2	1/2	2-WAY	MODULATING	OPEN
49	HC-49	FITNESS 173	0.7	1/2	2-WAY	MODULATING	OPEN
50	HC-50	FITNESS 173	0.3	1/2	2-WAY	MODULATING	OPEN
51	HC-51	CORRIDOR 201	0.2	1/2	2-WAY	MODULATING	OPEN
52	HRU HC	MECHANICAL 204	42.0	2-1/2	2-WAY	MODULATING	OPEN
53	RH-1	ID LAB 114	1.4	3/4	3-WAY	MODULATING	RECIRCULATING
54	CV-1	VESTIBULE 002	0.4	1/2	2-WAY	2-POSITION	OPEN
55	CV-2	VESTIBULE 108	0.3	1/2	2-WAY	2-POSITION	OPEN
56	UH-2	SECURE TRANS. 100	0.6	1/2	2-WAY	2-POSITION	OPEN
57	UH-2	SECURE TRANS. 100	0.6	1/2	2-WAY	2-POSITION	OPEN
58	CV-2	VESTIBULE 013	0.3	1/2	2-WAY	2-POSITION	OPEN
59	CV-2	VESTIBULE 016	0.3	1/2	2-WAY	2-POSITION	OPEN
60	CV-2	VESTIBULE 019	0.3	1/2	2-WAY	2-POSITION	OPEN
61	UH-1	BOILER ROOM 170	2.2	1"	2-WAY	2-POSITION	OPEN
62	BYPASS	MECHANICAL 204	10.0	1-1/4"	2-WAY	MODULATING	CLOSED

VAV Box and Heating Coil Schedule

NUMBER	MAXIMUM OCCUPIED CFM	MINIMUM OCCUPIED CFM	COIL CAPACITY * (MBH)
VAV-1	190	95	2.1
VAV-2	705	355	9.2
VAV-3	795	535	4.4
VAV-4	600	285	5.8
VAV-5	630	315	7.8
VAV-6	350	180	4.4
VAV-7	280	140	3.5
VAV-8	500	250	4.1
VAV-9	470	240	5.7
VAV-10	300	150	3.5
VAV-11	480	325	1.8
VAV-12	1,120	560	7.2
VAV-13	290	145	3.4
VAV-14	510	255	5.8
VAV-15	705	470	2.5
VAV-16	390	200	4.3
VAV-17	225	150	4.9
VAV-18	175	90	4.2
VAV-19	860	450	5.3
VAV-20	805	200	5.1
VAV-21	680	340	2.8
VAV-22	330	165	4.0
VAV-23	390	195	3.9
VAV-24	720	360	5.4
VAV-25	215	110	0.6
VAV-26	855	100	NONE
VAV-27	400	200	3.1
VAV-28	840	420	4.4
VAV-29	400	200	3.1
VAV-30	570	285	2.9
VAV-31	420	420	2.3
VAV-32	385	190	2.5
VAV-33	965	485	6.5
HC-34	160	-	7.0
HC-35	155	-	3.6
HC-36	70	-	3.3
HC-37	280	-	1.5
HC-38	400	-	12.7
HC-39	145	-	2.5
HC-40	425	-	3.1
HC-41	95	-	1.9
HC-42	225	-	1.2
HC-43	975	975	9.7
HC-44	450	-	4.5
HC-45	810	-	4.4
HC-46	90	-	2.2
HC-47	145	-	0.4
HC-48	385	-	2.1
HC-49	850	-	10.0
HC-50	280	-	4.5
HC-51	350	-	1.9

* 190°F EWT, 160°F LWT, 65°F EAT

Automatic Damper Schedule

NAME	SERVICE	SIZE (WxH)	OPERATION	NORMAL POSITION
OAD-1	AHU OUTSIDE AIR	96x36	MODULATING	CLOSED
OAD-2	EMERGENCY GENERATOR	72x72	POSITIVE	CLOSED
RAD-1	AHU RETURN AIR	96x24	MODULATING	OPEN
RAD-2	EMERGENCY GENERATOR	42x48	MODULATING	OPEN
RLD-1	AHU RELIEF AIR	90x48	MODULATING	CLOSED
RLD-2	AHU RELIEF AIR	90x48	MODULATING	CLOSED
EAD-1	EMERGENCY GENERATOR	66x72	MODULATING	CLOSED
EAD-2	EF-2	18x12	2-POSITION	CLOSED
EAD-3	EF-3	6x12	2-POSITION	CLOSED
EAD-4	EF-4	18x12	2-POSITION	CLOSED
EAD-5	ID LAB MAKE-UP	24x24	2-POSITION	CLOSED
EAD-6	ID LAB EXHAUST	10"Ø	2-POSITION	OPEN
AD-1	RF-1	54x28	2-POSITION	CLOSED
AD-2	RF-2	54x28	2-POSITION	CLOSED
AD-3	EF-4	42x30	2-POSITION	CLOSED
CAD-1	COMBUSTION AIR	42x24	2-POSITION	CLOSED
CAD-2	COMBUSTION AIR	42x24	2-POSITION	CLOSED

Drawing Notes

- All Equipment is existing.



JPD & Downtown Library
 City and Borough of Juneau
 Contract Number: BE20-230
 HVAC Control Upgrades

SHEET TITLE:

JPD Equipment Schedules

Date: May 18, 2020
 Scale:
 Drawn: KB/JR
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M201

Diffuser And Grille Schedule

* DIFFUSER ATTACHED TO FSD-2. INCREASE SIZE SHOWN TO MATCH FSD-2 SIZE.

NOTE: SEE FLOOR PLANS FOR DIFFUSER BLOW PATTERNS

SUPPLY CEILING DIFFUSER OR WALL GRILLE						RETURN OR EXHAUST GRILLE					
ROOM	MARK	NUMBER	SUPPLY CFM	FACE SIZE	NECK SIZE	MARK	NUMBER	RETURN CFM	EXHAUST CFM	FACE SIZE	NECK SIZE
001	SD-2*	4	215	12x12	12x12	RG-1*	1	860	-	20x20	20x20
003	SD-1	1	170	24x24	8"φ	-	-	-	-	-	-
004	-	-	-	-	-	EG-1	1	-	65	6x6	6x6
005	SD-1	1	95	24x24	6"φ	-	-	-	-	-	-
006	SD-2*	1	200	9x9	9x9	-	-	-	-	-	-
008	-	-	-	-	-	EG-1	1	-	75	6x6	6x6
009	-	-	-	-	-	EG-1	1	-	50	6x6	6x6
012	SD-5	1	200	24x4	24x4	EG-1	1	-	1,135	24x24	24x24
018	SD-5	5	210	24x4	24x4	-	-	-	-	-	-
100	-	-	-	-	-	EG-4	1	-	1,320	18x18	18x18
101	SD-3	1	50	6x6	6x6	EG-3	1	-	60	6x6	6x6
102	SD-3	1	50	6x6	6x6	EG-3	1	-	60	6x6	6x6
103	SD-3	1	50	6x6	6x6	EG-3	1	-	60	6x6	6x6
104	SD-4	1	215	12x12	10"φ	EG-4	1	-	135	8x6	8x6
105	SD-4	1	135	9x9	8"φ	EG-4	1	-	140	8x6	8x6
106	SD-3	1	60	6x6	6x6	EG-3	1	-	70	6x6	6x6
107	SD-4	1	180	9x9	8"φ	EG-4	1	-	125	6x6	6x6
109	SD-4	1	85	6x6	6"φ	EG-4	1	-	95	6x6	6x6
110	-	-	-	-	-	EG-4	1	-	75	6x6	6x6
111	-	-	-	-	-	EG-4	1	-	40	6x6	6x6
112	-	-	-	-	-	EG-1	1	-	50	6x6	6x6
113	SD-1	1	50	24x24	6"φ	EG-1	1	-	75	6x6	6x6
114	SD-1	1	375	24x24	14"φ	EG-1	1	-	350	10x10	10x10
114	-	-	-	-	-	EG-1	1	-	1,135	24x24	24x24
114	-	-	-	-	-	EG-5	1	-	115	72x6	72x6
120	SD-1	3	235	24x24	10"φ	RG-2	3	470	-	24x24	16"φ
120	SD-1	3	180	24x24	8"φ	EG-1	1	-	100	6x6	6x6
121	SD-1	3	85	24x24	6"φ	RG-1	1	85	-	6x6	6x6
122	SD-2	1	100	6x6	6"φ	EG-1	1	-	120	6x6	6x6
123	SD-1	1	190	24x24	8"φ	RG-2	1	190	-	24x24	8"φ
124	SD-1	4	150	24x24	8"φ	RG-2	2	300	-	24x24	12"φ
125	SD-1	1	235	24x24	10"φ	EG-1	1	-	100	6x6	6x6
126	SD-1	1	40	24x24	6"φ	-	-	-	-	-	-
127	SD-2	1	75	6x6	6"φ	RG-1	1	75	-	6x6	6x6
130	SD-1	3	210	24x24	10"φ	RG-2	1	275	-	24x24	12"φ
131	SD-1	1	150	24x24	8"φ	RG-2	1	275	-	24x24	12"φ
132	SD-1	1	175	24x24	8"φ	RG-2	1	175	-	24x24	8"φ
133	SD-1	1	175	24x24	8"φ	RG-2	1	175	-	24x24	8"φ
134	SD-1	1	170	24x24	8"φ	RG-2	1	275	-	24x24	12"φ
136	SD-1	3	140	24x24	8"φ	RG-2	1	275	-	24x24	12"φ
137	SD-1	1	235	24x24	10"φ	RG-2	1	235	-	24x24	10"φ
138	SD-1	1	235	24x24	10"φ	RG-2	1	235	-	24x24	10"φ
139	SD-1	1	100	24x24	6"φ	-	-	-	-	-	-
140	SD-1	1	70	24x24	6"φ	RG-2	1	70	-	24x24	6"φ
141	SD-1	1	80	24x24	6"φ	RG-2	1	80	-	24x24	6"φ
142	SD-1	1	50	24x24	6"φ	RG-2	1	50	-	24x24	6"φ
143	SD-1	1	85	24x24	6"φ	RG-2	1	85	-	24x24	6"φ
151	SD-1	1	215	24x24	10"φ	RG-2	1	385	-	24x24	14"φ
152	SD-1	2	150	24x24	8"φ	RG-2	1	300	-	24x24	12"φ
153	SD-1	2	145	24x24	8"φ	RG-2	1	385	-	24x24	14"φ
153	SD-1	1	200	24x24	10"φ	-	-	-	-	-	-
154	SD-1	1	185	24x24	8"φ	RG-2	1	185	-	24x24	8"φ
155	SD-1	1	135	24x24	8"φ	RG-2	1	135	-	24x24	8"φ
156	SD-1	1	95	24x24	6"φ	RG-2	1	95	-	24x24	6"φ
157	SD-1	1	190	24x24	8"φ	RG-2	1	190	-	24x24	8"φ
158	SD-1	1	135	24x24	8"φ	RG-2	1	135	-	24x24	8"φ
159	SD-1	1	65	24x24	6"φ	-	-	-	-	-	-
159	SD-1	1	145	24x24	8"φ	-	-	-	-	-	-
160	SD-1	1	170	24x24	8"φ	RG-2	1	170	-	24x24	8"φ
161	SD-1	1	135	24x24	8"φ	RG-2	1	135	-	24x24	8"φ

SUPPLY CEILING DIFFUSER OR WALL GRILLE						RETURN OR EXHAUST GRILLE					
ROOM	MARK	NUMBER	SUPPLY CFM	FACE SIZE	NECK SIZE	MARK	NUMBER	RETURN CFM	EXHAUST CFM	FACE SIZE	NECK SIZE
162	SD-1	1	120	24x24	8"φ	RG-2	1	120	-	24x24	8"φ
163	SD-1	1	160	24x24	8"φ	RG-2	1	160	-	24x24	8"φ
164	SD-1	1	175	24x24	8"φ	RG-2	1	400	-	24x24	14"φ
164	SD-1	1	225	24x24	10"φ	-	-	-	-	-	-
165	SD-1	1	135	24x24	8"φ	RG-2	1	135	-	24x24	8"φ
173	SD-1	2	280	24x24	10"φ	RG-2	1	560	-	24x24	16"φ
174	SD-1	2	280	24x24	10"φ	RG-2	1	560	-	24x24	16"φ
175	SD-2	2	140	9x9	8"φ	EG-1	2	-	120	6x6	6x6
176	SD-2	5	170	9x9	8"φ	EG-1	2	-	245	8x8	8x8
177	SD-1	1	225	12x12	10"φ	EG-1	1	-	265	12x8	12x8
178	SD-1	1	225	12x12	10"φ	EG-1	1	-	265	12x8	12x8
180	SD-1	1	50	12x12	6"φ	-	-	-	-	-	-
181	SD-2	2	250	12x12	10"φ	-	-	-	-	-	-
182	SD-2	1	190	9x9	8"φ	EG-1	1	-	210	10x6	10x6
183	SD-2	1	145	9x9	8"φ	EG-1	1	-	160	8x6	8x6
184	SD-2	1	90	6x6	6"φ	-	-	-	-	-	-
185	SD-2	1	130	9x9	8"φ	EG-1	1	-	145	8x6	8x6
186	SD-2	1	95	6x6	6"φ	EG-1	1	-	110	6x6	6x6
187	SD-2	5	195	12x12	10"φ	EG-4	1	-	1,060	20x20	20x20
187	SD-2	1	160	9x9	8"φ	EG-4	1	-	100	6x6	6x6
187A	-	-	-	-	-	EG-4	1	-	75	6x6	6x6
187B	-	-	-	-	-	EG-4	1	-	75	6x6	6x6
188	SD-2	1	85	6x6	6"φ	-	-	-	-	-	-
189A	SD-2	1	35	6x6	6"φ	EG-1	1	-	40	6x6	6x6
189B	SD-2	1	35	6x6	6"φ	EG-1	1	-	40	6x6	6x6
190	SD-1	1	70	24x24	6"φ	-	-	-	-	-	-
200*	SD-2*	1	145	9x9	9x9	-	-	-	-	-	-
201	SD-5	2	160	24x4	24x4	-	-	-	-	-	-
202	SD-2	1	175	9x9	8"φ	EG-1	1	-	205	10x6	10x6
203	SD-2	1	175	9x9	8"φ	EG-1	1	-	205	10x6	10x6
205	SD-1	1	55	24x24	6"φ	-	-	-	-	-	-
206	SD-1	1	60	24x24	6"φ	-	-	-	-	-	-
210	SD-1	4	155	24x24	8"φ	RG-2	2	340	-	24x24	12"φ
211	SD-1	2	165	24x24	8"φ	RG-2	1	330	-	24x24	12"φ
212	-	-	-	-	-	EG-1	1	-	80	6x6	6x6
213	SD-1	2	195	24x24	8"φ	RG-2	1	390	-	24x24	14"φ
214	SD-1	2	100	24x24	6"φ	RG-2	1	200	-	24x24	8"φ
215	SD-1	1	240	24x24	10"φ	RG-2	1	240	-	24x24	10"φ
216	SD-1	1	240	24x24	10"φ	RG-2	1	240	-	24x24	10"φ
217	SD-1	1	240	24x24	10"φ	RG-2	1	240	-	24x24	10"φ
218	SD-1	1	200	24x24	8"φ	RG-2	1	200	-	24x24	8"φ
219	SD-1	1	200	24x24	8"φ	RG-2	1	200	-	24x24	8"φ
220	SD-1	1	200	24x24	8"φ	RG-2	1	200	-	24x24	8"φ
221	SD-1	1	200	24x24	8"φ	RG-2	1	200	-	24x24	8"φ
222	SD-1	1	225	24x24	10"φ	RG-2	1	385	-	24x24	14"φ
222	SD-1	1	160	24x24	8"φ	-	-	-	-	-	-
223	SD-1	1	55	24x24	6"φ	-	-	-	-	-	-
224	SD-1	1	110	24x24	6"φ	EG-1	1	-	100	6x6	6x6
230	SD-1	4	210	24x24	10"φ	RG-2	2	420	-	24x24	16"φ
231	SD-1	2	280	24x24	10"φ	RG-2	2	280	-	24x24	12"φ
232	SD-1	4	170	24x24	8"φ	RG-2	2	340	-	24x24	12"φ
233	SD-1	1	45	24x24	6"φ	-	-	-	-	-	-
234	SD-1	1	265	24x24	10"φ	RG-2	1	265	-	24x24	10"φ
240	SD-1	3	285	24x24	12"φ	RG-2	2	425	-	24x24	16"φ
240	SD-1	3	300	24x24	12"φ	RG-2	1	900	-	24x24	18x18
242	SD-1	1	215	24x24	10"φ	RG-2	1	215	-	24x24	10"φ
243	-	-	-	-	-	EG-1	1	-	55	6x6	6x6
244	SD-1	1	145	24x24	8"φ	RG-2	1	145	-	24x24	8"φ
245	SD-1	2	330	24x24	12"φ	RG-2	2	330	-	24x24	12"φ
245	SD-1	3	300	24x24	12"φ	RG-2	1	900	-	24x24	18x18

Drawing Notes

- All diffusers and grilles are existing.



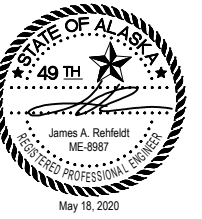
JPD & Downtown Library
 City and Borough of Juneau
 Contract Number: BE20-230
HVAC Control Upgrades

SHEET TITLE:

JPD Schedules

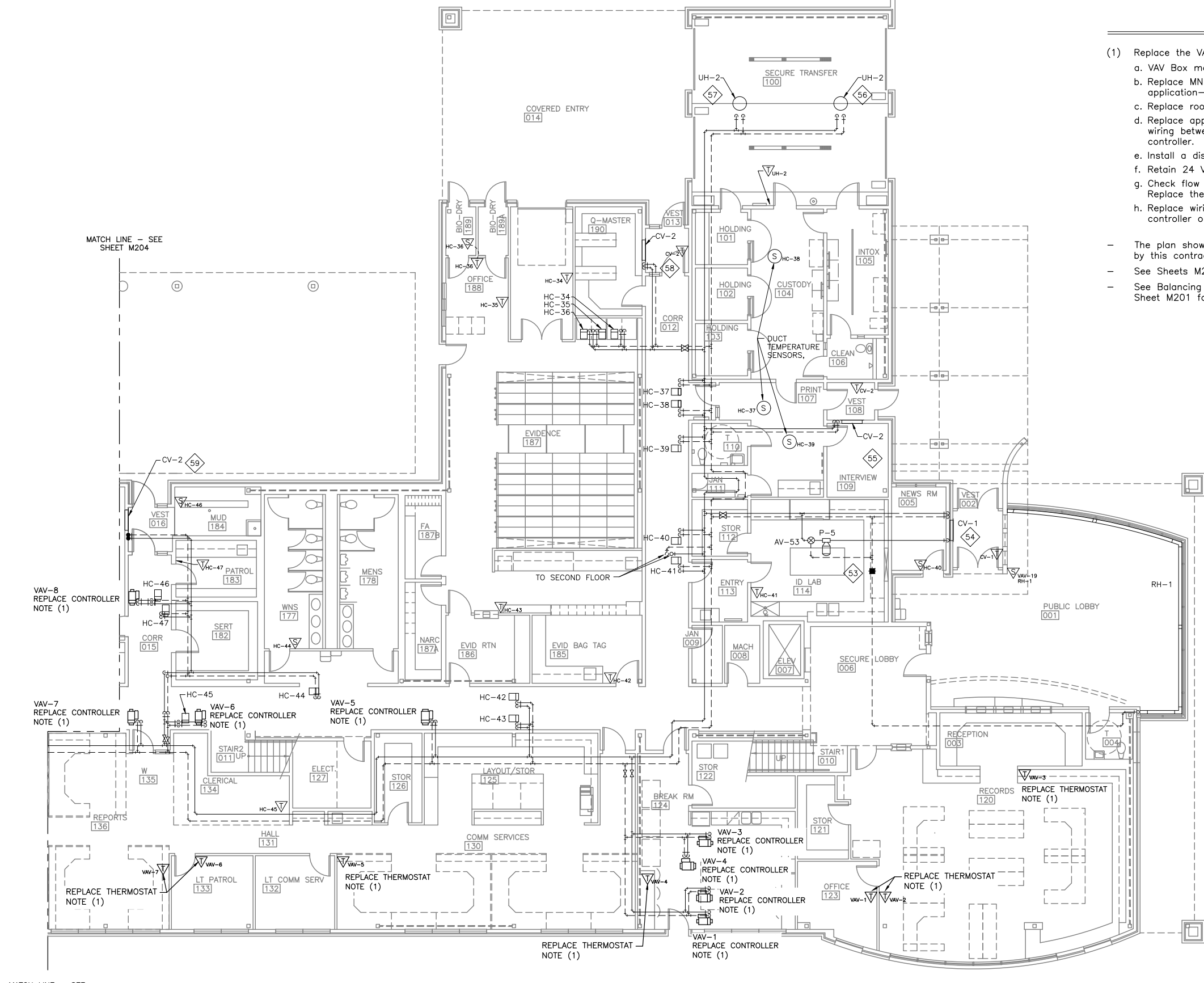
Date: May 18, 2020
 Scale:
 Drawn: KB/JR
 Checked: JR

M202



Drawing Notes

- (1) Replace the VAV controller and room thermostat/sensor.
 - a. VAV Box make/model is Titus DESV.
 - b. Replace MN-FLO3T Micronet controller with application-specific controller.
 - c. Replace room thermostat and thermostat wiring.
 - d. Replace application-specific controller communication wiring between the controllers and to the network controller.
 - e. Install a discharge air sensor.
 - f. Retain 24 VAC heating coil valve actuator and wiring.
 - g. Check flow sensor tubing and replace if damaged. Replace the rubber tubing caps with silicone caps.
 - h. Replace wiring that is incompatible with the new controller or devices.
- The plan shows the existing heating system. Work required by this contract is noted.
- See Sheets M212 to M215 for DDC control requirements.
- See Balancing Valve and Automatic Valve Schedule on Sheet M201 for heating unit flowrates.

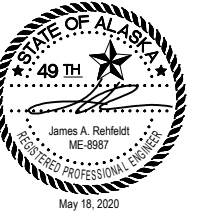


JPD & Downtown Library
 City and Borough of Juneau
 Contract Number: BE20-230
HVAC Control Upgrades

SHEET TITLE:
JPD First Floor East Heating Plan
 Date: May 18, 2020
 Scale:
 Drawn: KB/JR
 Checked: JR

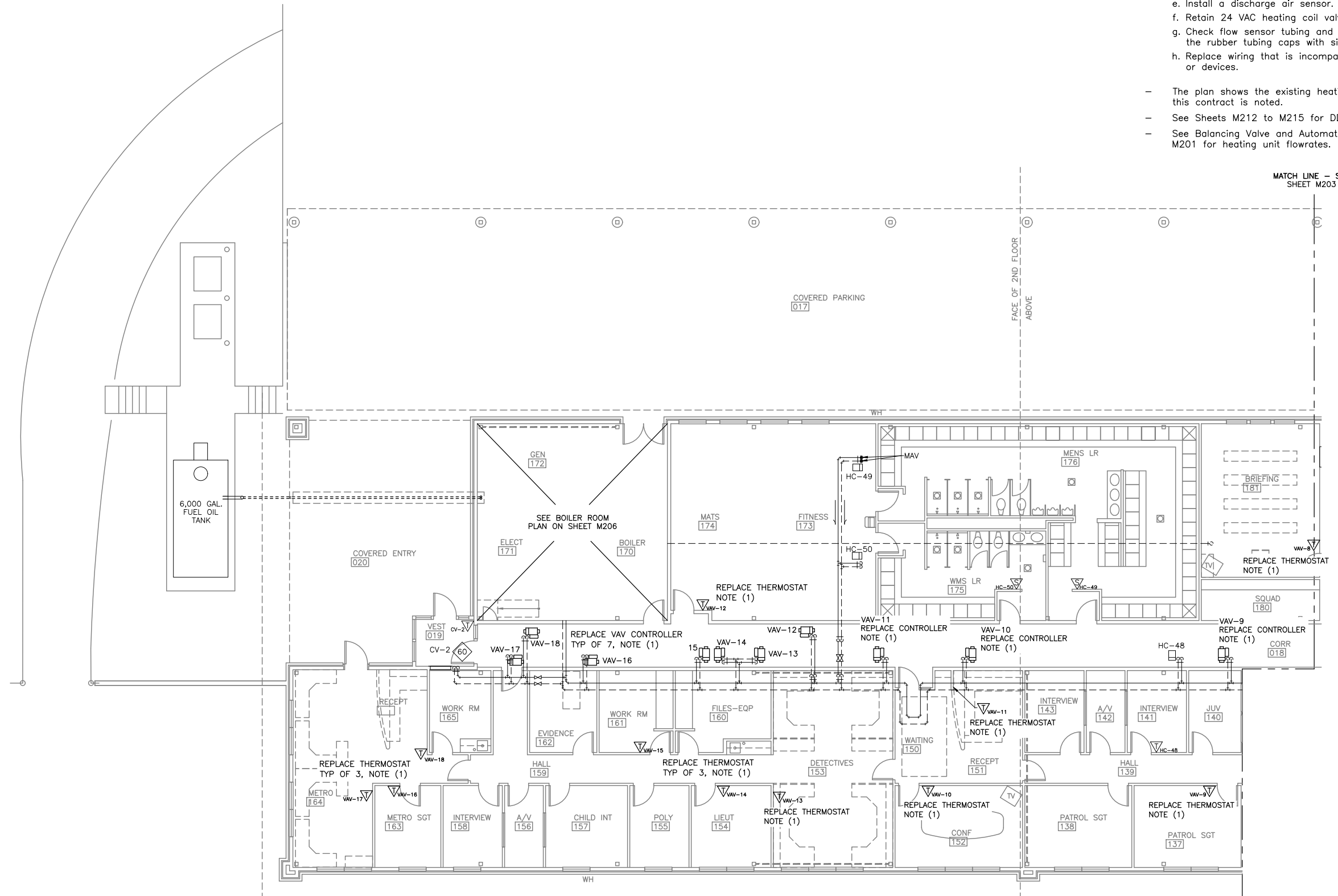
A **JPD First Floor East Heating Plan** PROJECT NORTH
 SCALE: 0 4' 8' 16'

M203

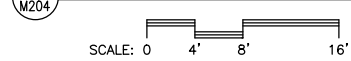


Drawing Notes

- (1) Replace the VAV controller and room thermostat/sensor.
 - a. VAV Box make/model is Titus DESV.
 - b. Replace MN-FLO3T Micronet controller with application-specific controller.
 - c. Replace room thermostat and thermostat wiring.
 - d. Replace application-specific controller communication wiring between the controllers and to the network controller.
 - e. Install a discharge air sensor.
 - f. Retain 24 VAC heating coil valve actuator and wiring.
 - g. Check flow sensor tubing and replace if damaged. Replace the rubber tubing caps with silicone caps.
 - h. Replace wiring that is incompatible with the new controller or devices.
- The plan shows the existing heating system. Work required by this contract is noted.
- See Sheets M212 to M215 for DDC control requirements.
- See Balancing Valve and Automatic Valve Schedule on Sheet M201 for heating unit flowrates.



JPD First Floor West Heating Plan

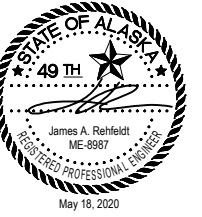


MATCH LINE - SEE SHEET M205

JPD & Downtown Library
 City and Borough of Juneau
 Contract Number: BE20-230
HVAC Control Upgrades

SHEET TITLE:
JPD First Floor West Heating Plan
 Date: May 18, 2020
 Scale:
 Drawn: KB/JR
 Checked: JR

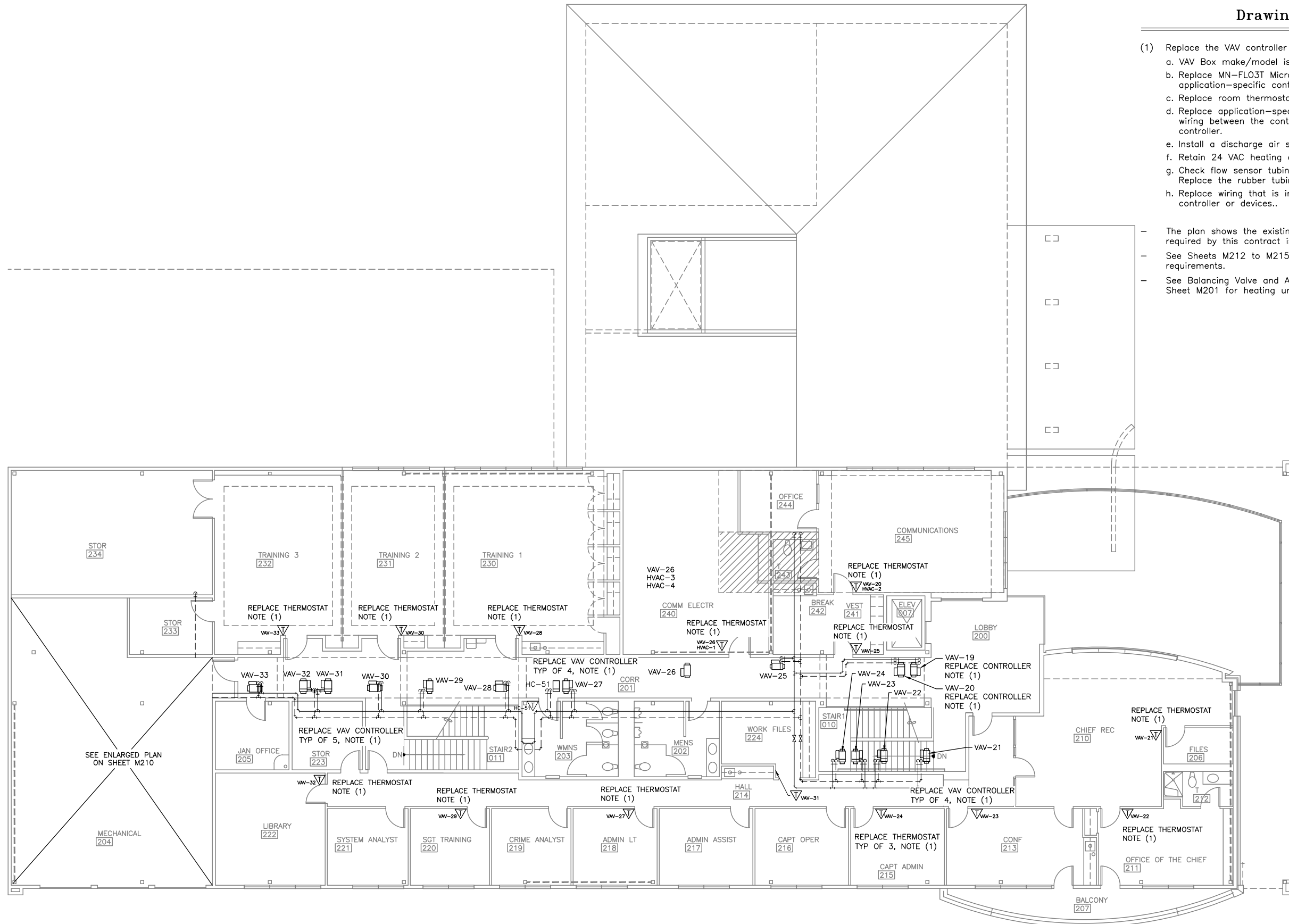
M204



Drawing Notes

- (1) Replace the VAV controller and room thermostat/sensor.
 - a. VAV Box make/model is Titus DESV.
 - b. Replace MN-FLO3T Micronet controller with application-specific controller.
 - c. Replace room thermostat and thermostat wiring.
 - d. Replace application-specific controller communication wiring between the controllers and to the network controller.
 - e. Install a discharge air sensor.
 - f. Retain 24 VAC heating coil valve actuator and wiring.
 - g. Check flow sensor tubing and replace if damaged. Replace the rubber tubing caps with silicone caps.
 - h. Replace wiring that is incompatible with the new controller or devices..

- The plan shows the existing heating system. Work required by this contract is noted.
- See Sheets M212 to M215 for DDC control requirements.
- See Balancing Valve and Automatic Valve Schedule on Sheet M201 for heating unit flowrates.



JPD & Downtown Library
 City and Borough of Juneau
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HVAC Control Upgrades

SHEET TITLE:
JPD Second Floor Heating Plan

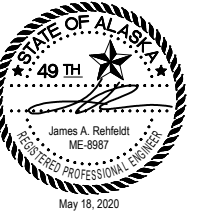
Date: May 18, 2020
 Scale:
 Drawn: KB/JR
 Checked: JR

M205

A **JPD Second Floor Heating Plan**

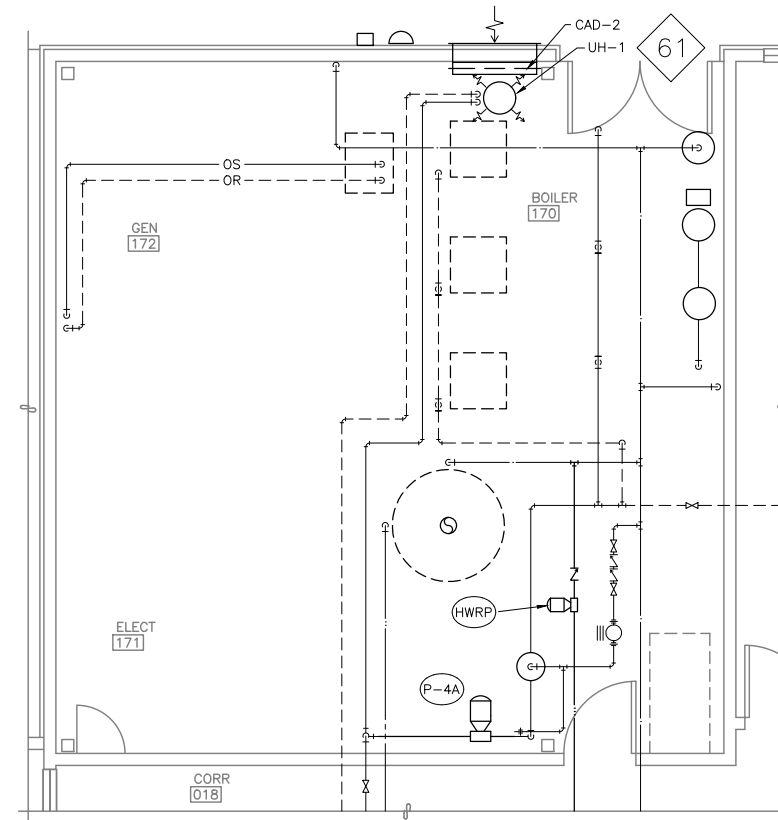
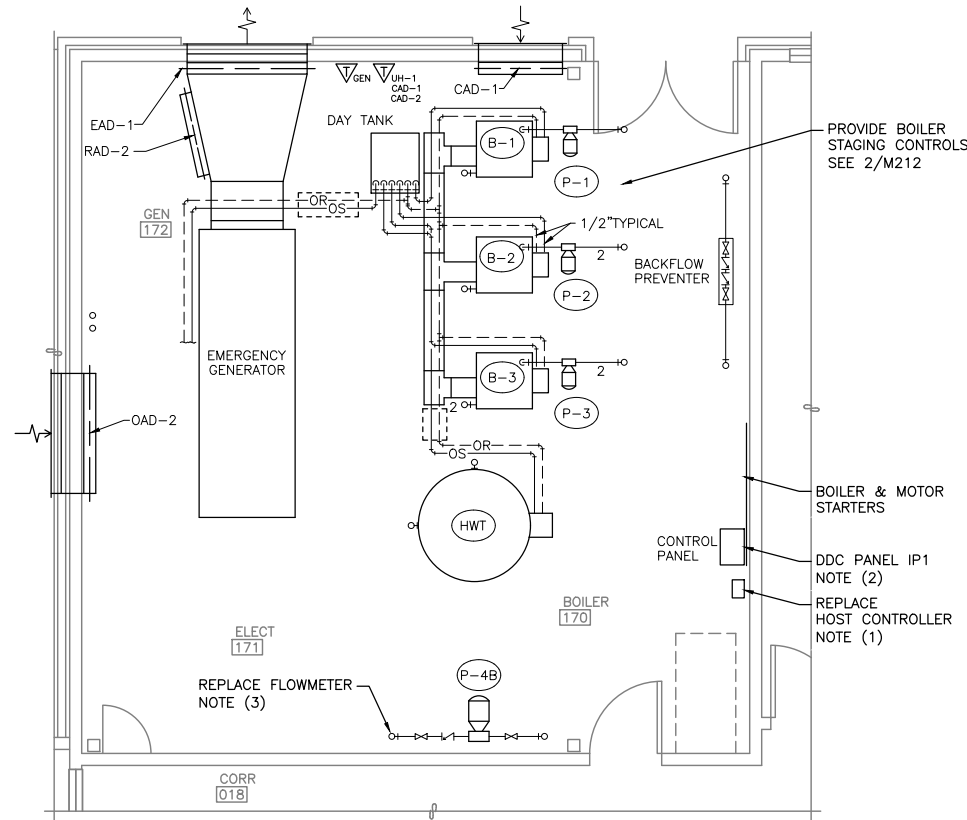
SCALE: 0 4' 8' 16'

PROJECT NORTH

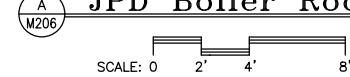


Drawing Notes

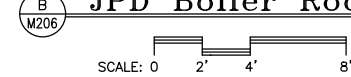
- (1) Replace the network controller. Replace communication cables between the network controller and DDC controllers in control panels IP1, IP2, IP3 and CP1 and the application-specific controllers.
 - (2) DDC Panel IP1: Retain or replace the panel as required. Upgrade or replace three programmable application controllers. If panel is replaced, disconnect and reconnect 120 volt power.
 - (3) The existing flow meter is a Kele Model UFT-1AE2 flow rate display and transmitter connected to Data Industrial 200 Series flow sensors. The display and transmitter has failed while the sensors are assumed to be functional. Replace the Kele UFT-1 transmitter/display and restore DDC control and monitoring. Verify the functionality of the DC power supply and replace if necessary.
- The plan shows the existing heating and generator system. Work required by this contract is noted.
 - See Sheets M212 to M215 for DDC control requirements.



A JPD Boiler Room - Lower Level



B JPD Boiler Room - Upper Level



JPD & Downtown Library
 City and Borough of Juneau
 Contract Number: BE20-230
HVAC Control Upgrades

SHEET TITLE:

JPD Boiler Room

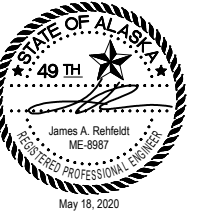
Date: May 18, 2020

Scale:

Drawn: KB/JR

Checked: JR

M206



JPD & Downtown Library
 City and Borough of Juneau
 Contract Number: BE20-230
HVAC Control Upgrades

SHEET TITLE:

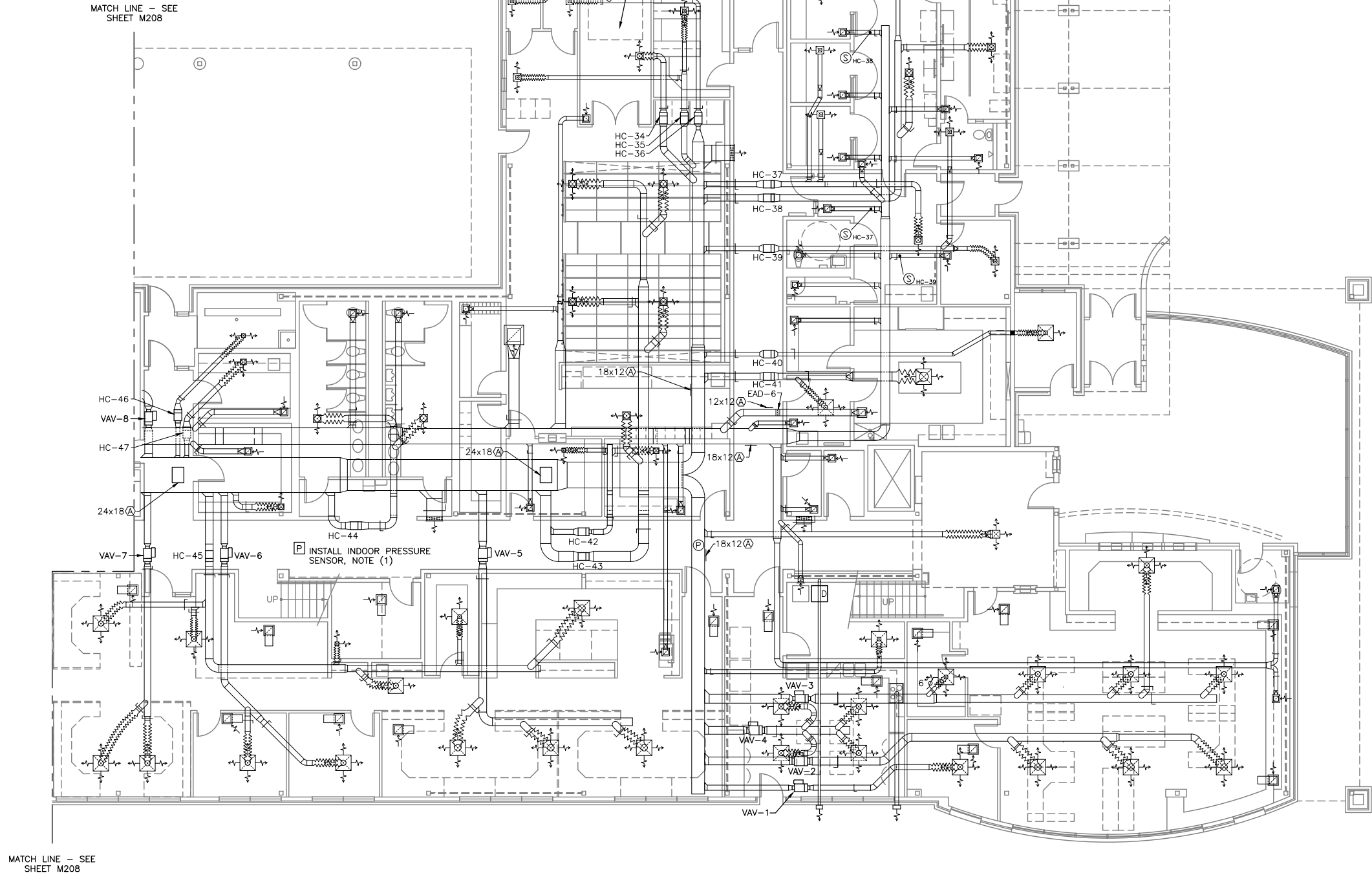
**JPD First Floor
 East HVAC Plan**

Date: May 18, 2020
 Scale:
 Drawn: KB/JR
 Checked: JR

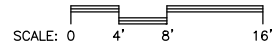
M207

Drawing Notes

- (1) Install pressure transducer in Panel IP3. See B/M210 for outdoor pressure sensor location.
- The plan shows the existing HVAC system. Work required by this contract is noted.
- See Sheets M212 to M215 for DDC control requirements.
- See VAV Box and Heating Coil Schedule on Sheet M202 for VAV box flowrates
- See Diffuser and Grille Schedule on M203 for flowrates.

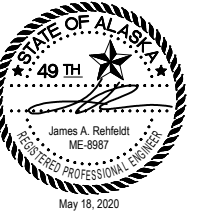


JPD First Floor East HVAC Plan



MATCH LINE - SEE SHEET M208

MATCH LINE - SEE SHEET M208



Drawing Notes

- The plan shows the existing HVAC system. Work required by this contract is noted.
- See Sheets M212 to M215 for DDC control requirements.
- See VAV Box and Heating Coil Schedule on Sheet M202 for VAV box flowrates
- See Diffuser and Grille Schedule on M203 for flowrates.



JPD & Downtown Library
 City and Borough of Juneau
 Contract Number: BE20-230
HVAC Control Upgrades

SHEET TITLE:

**JPD First Floor
 West HVAC Plan**

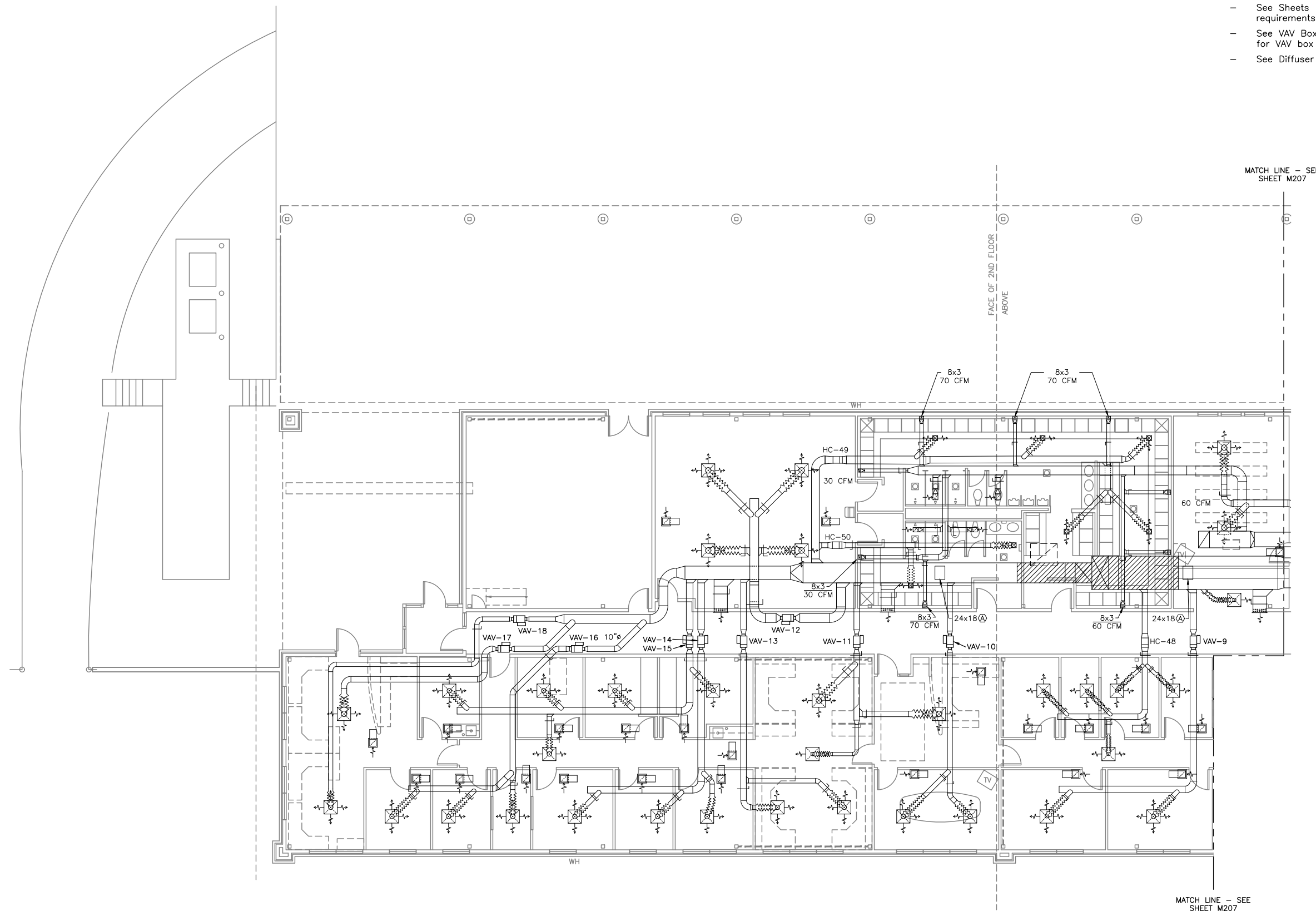
Date: May 18, 2020

Scale:

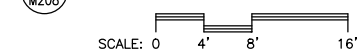
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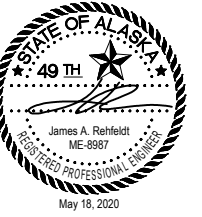
Checked: JR

M208



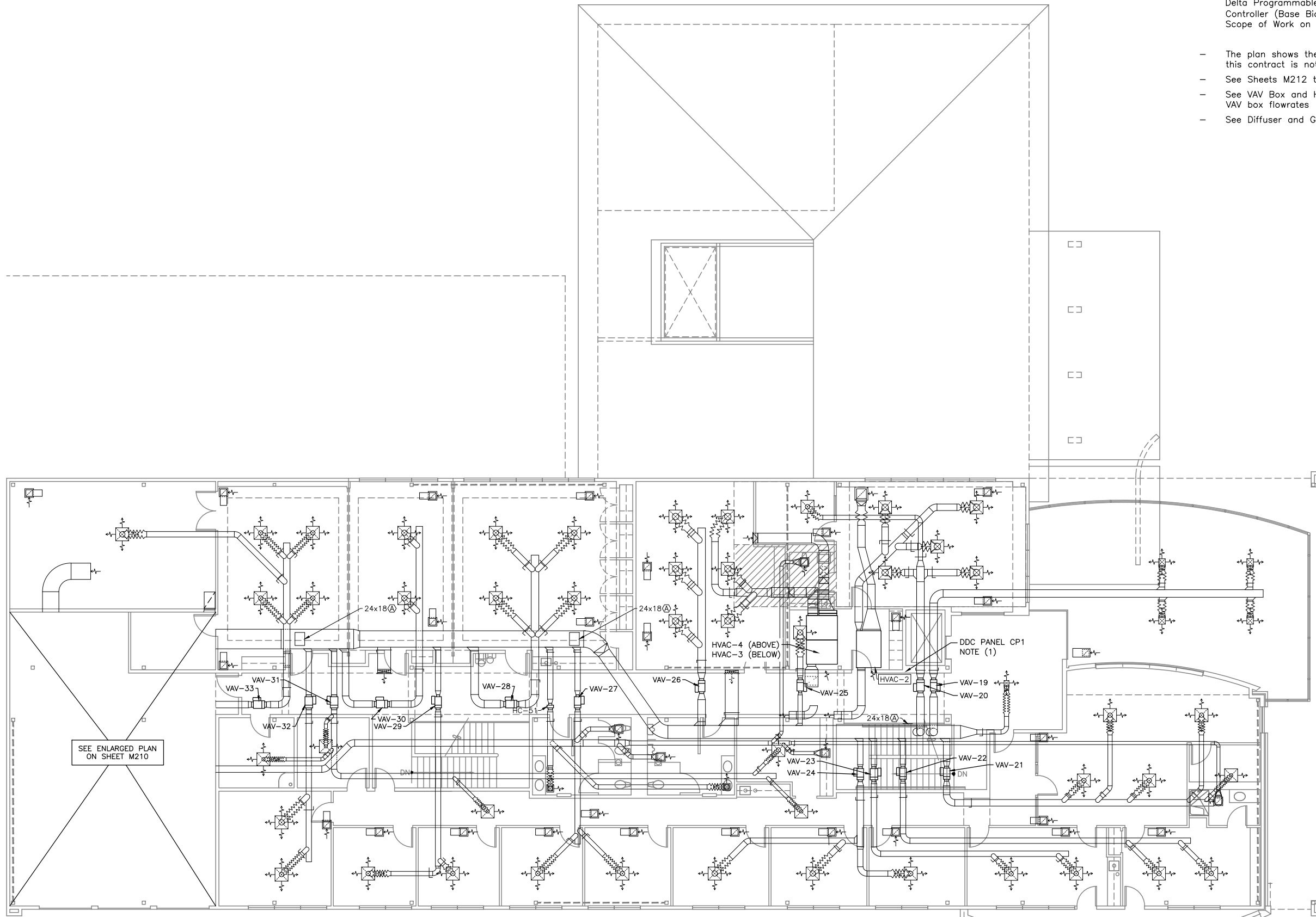
JPD First Floor West HVAC Plan





Drawing Notes

- (1) Delta Panel CP1 serves HVAC-3 and HVAC-4 and is located in mechanical mezzanine. The panel contains one Delta Programmable Application Controller. Connect to Host Controller (Base Bid) or replace (Additive Alternate 1). See Scope of Work on Sheet M200. Replace or retain panel.
- The plan shows the existing HVAC system. Work required by this contract is noted.
- See Sheets M212 to M215 for DDC control requirements.
- See VAV Box and Heating Coil Schedule on Sheet M202 for VAV box flowrates
- See Diffuser and Grille Schedule on M203 for flowrates.



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HVAC Control Upgrades

SHEET TITLE:

JPD Second Floor
HVAC Plan

Date: May 18, 2020

Scale:

Drawn: KB/JR

Checked: JR

M209

A
M209

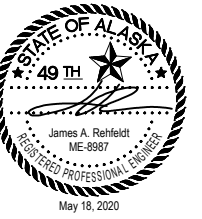
JPD Second Floor HVAC Plan

SCALE: 0 4' 8' 16'



Drawing Notes

- (1) DDC Panel IP2: Retain or replace the panel as required. Upgrade or replace five programmable application controllers in Panel IP2 and one programmable application controllers in separate enclosure. If the panel is replaced, disconnect and reconnect 120 volt power circuit.
 - (2) DDC Panel IP3: Retain or replace the panel as required. If the panel is replaced, disconnect and reconnect 120 volt power circuit.
- The plan shows the existing HVAC system. Work required by this contract is noted.
 - See Sheets M212 to M215 for DDC control requirements.



JPD & Downtown Library
 City and Borough of Juneau
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HVAC Control Upgrades

SHEET TITLE:

JPD Mechanical Room

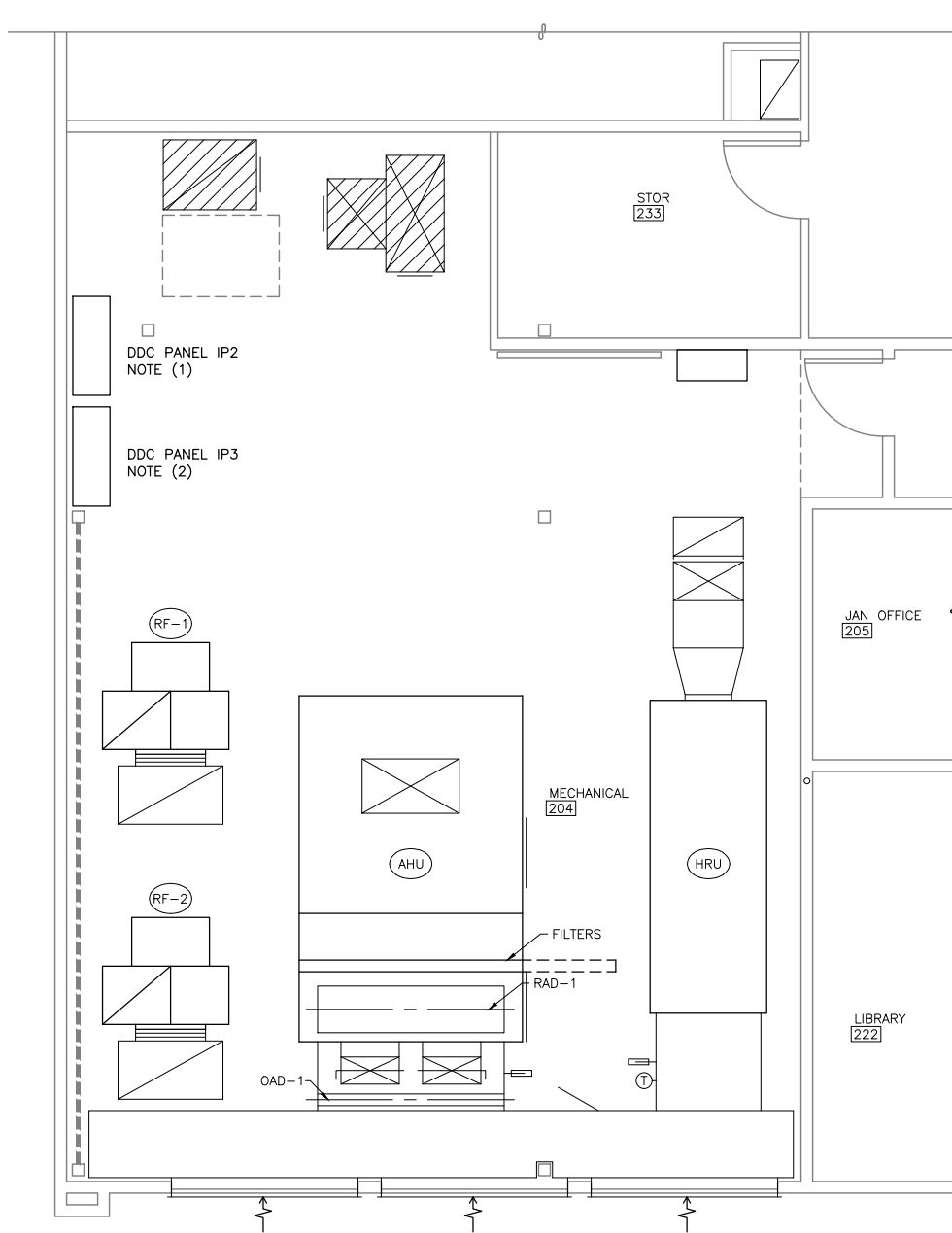
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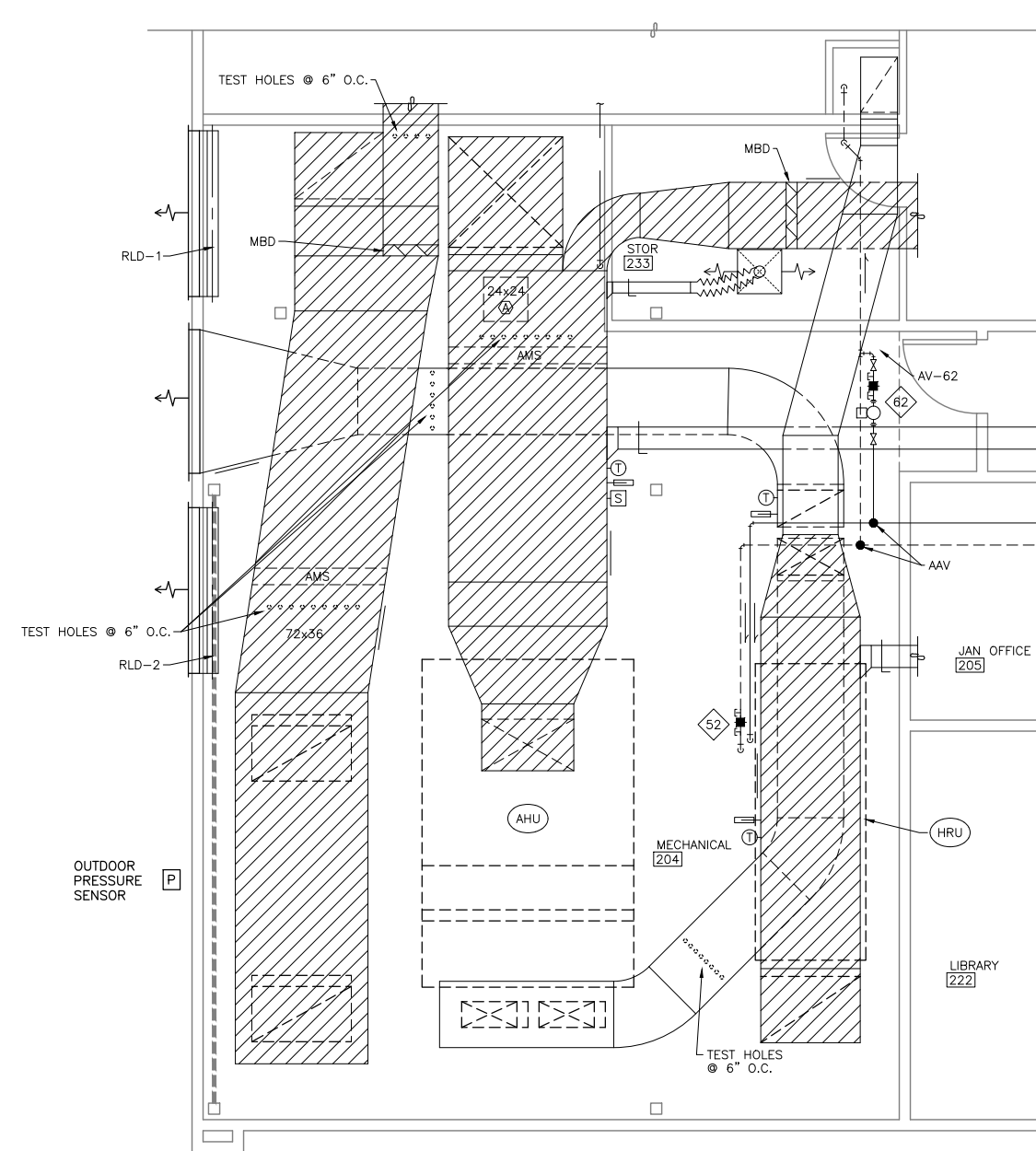
Drawn: KB/JR

Checked: JR

M210



A JPD Mechanical Room - Lower Level
 SCALE: 0 2' 4' 8'

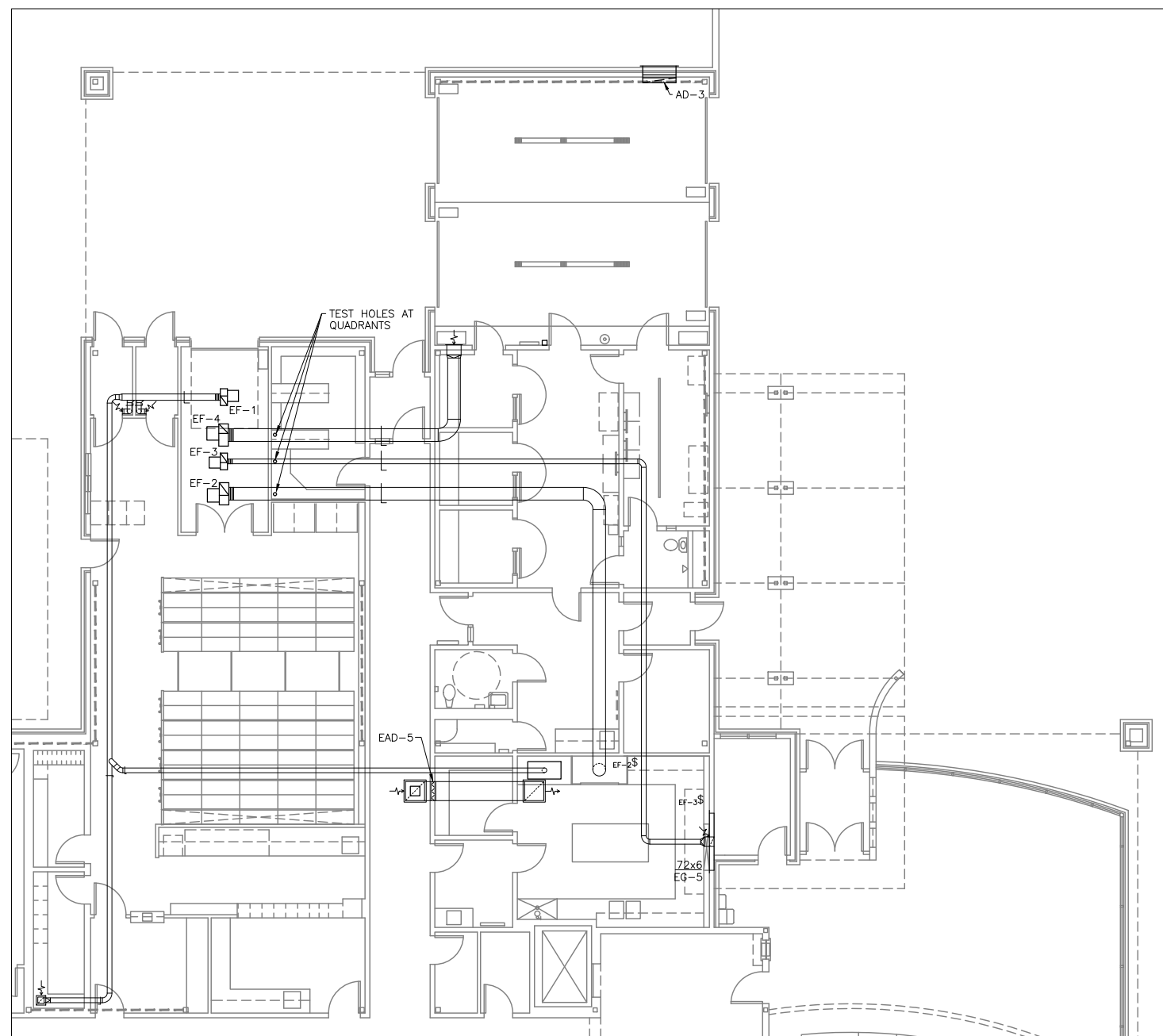


B JPD Mechanical Room - Upper Level
 SCALE: 0 2' 4' 8'



Drawing Notes

- The plan shows the existing HVAC system. Work required by this contract is noted.
- See Sheets M212 to M215 for DDC control requirements.



JPD Partial First Floor East HVAC Plan

SCALE: 0 4' 8' 16'

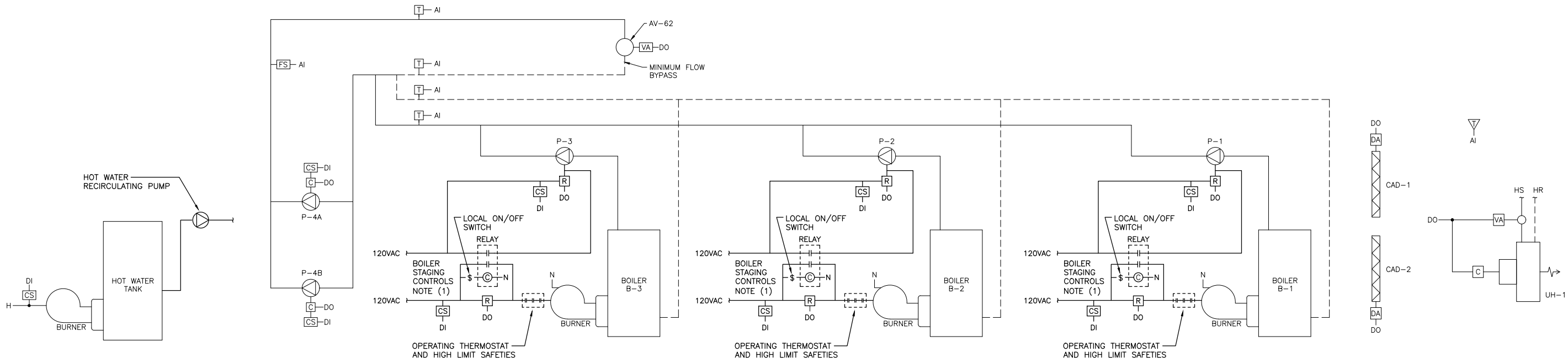
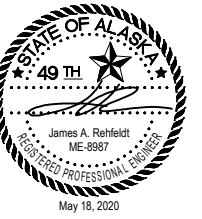


JPD & Downtown Library
 City and Borough of Juneau
 Contract Number: BE20-230
HVAC Control Upgrades

SHEET TITLE:
JPD Partial First Floor East HVAC Plan

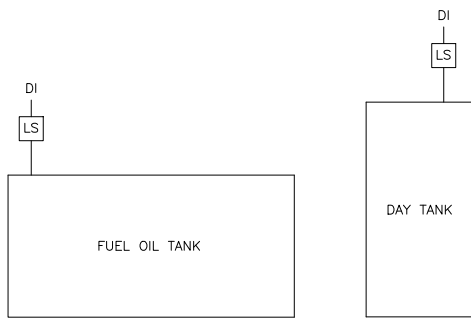
Date: May 18, 2020
 Scale:
 Drawn: KB/JR
 Checked: JR

M211



1 M212 Hot Water Heater Controls

- A. Control
- Hot Water Heater (Local): The hot water heater operates from integral controls to maintain the tank setpoint.
 - Combustion Air Damper CAD-1: Opens when the hot water heater is enabled.
 - Hot Water Recirculation Pump (Local): A line voltage thermostat in the hot water recirculating piping enables the pump when recirculation temperature drops below a setpoint of 110°F.
- B. Display and Monitoring: Display and archive all points shown on the control diagram.



4 M212 Fuel Oil Controls

- A. Local Control: The daytank is filled from its integral controls.
- B. Display and Monitoring: Display and archive all points shown on the control diagram.
- C. Alarms
- Critical
 - Day Tank Alarm: Activate when the day tank level drops below the alarm level.
 - Non-critical
 - Fuel Oil Tank: Activate when the fuel oil tank level drops below 4,600 gallons.

2 M212 Heating Plant Controls

- A. Control
- Boilers B-1, B-2 and B-3
 - Safeties: Two high limit immersion thermostats on each boiler override DDC and local control of the burners. The high limit thermostat disables the burner at 210°F and automatically resets at 190°F. A high high limit thermostat with manual reset disables the burner and respective pump at 225°F until manually reset.
 - Combustion Air Damper CAD-1: Opens when any boiler is enabled.
 - Local Boiler Control: When the manual on-off switch on the front of a boiler is turned on, enable the burner and respective boiler pump. Set burner controller to enable the burner at 160F and disable the burner at 190F.
 - DDC Boiler Control: Sequence the boilers and respective pumps P-1, P-2, and P-3 in a lead/lag/standby configuration, with monthly switchover, from the building loop heating supply temperature according to the following schedule:

Boiler	On	Off
Lead boiler	165°F	190°F
Lag boiler	155°F	180°F
Standby boiler	145°F	170°F

- DDC Boiler Pump P-1, P-2, and P-3 Control: Enable for 1 minute prior to enabling the respective boiler and disable 5 minutes after disabling the burner. If the pump fails to operate, disable the boiler and respective pump and enable the next boiler and pump in the sequence.
- Building Pumps P-4A and P-4B
 - Pump Starter: Magnetic starter with H-O-A switch supplies power to the motor.
 - Auto: Operates per the control sequence.
 - Hand: Manually enables the pump.
 - Off: Manually disables the pump.
 - Control Sequence
 - Sequencing: Sequence the pumps in a lead/lag configuration with monthly switchover. Enable the lag pump if the lead pump fails to operate.
 - Lead Pump: Enable pump continuously.
 - Lag Pump: Enable when the flowrate exceeds 30 gpm for over 2 minutes. Disable when the flowrate drops below 25 gpm for over 2 minutes.
 - Minimum Flow: Modulate minimum flow bypass valve AV-62 to maintain a minimum flowrate of 5 gpm.

- B. Display and Monitoring: Display and archive all points shown on the control diagram.
- C. Alarms
- Critical
 - Heating Supply Temperature: Activate when the heating supply temperature drops below 150°F for 5 minutes.
 - Non-critical
 - Boiler B-1, B-2 and B-3 Burners: Activate when the burner status differs from the command.
 - Boiler Pumps P-1, P-2, and P-3: Activate when a pump status differs from the command.
 - Building Pumps P-4A and P-4B: Activate when a pump status differs from the command.
- D. Trend Reports
- Heating Supply Temperature Trend
 - Outside air temperature
 - Boiler heating supply temperature
 - Boiler heating return temperature
 - Building heating supply temperature
 - Building heating return temperature
 - Boiler B-1 enable
 - Boiler B-2 enable
 - Boiler B-3 enable
 - Pump Control Trend
 - Pump P-1 enable
 - Pump P-2 enable
 - Pump P-3 enable
 - Pump P-4A enable
 - Pump P-4B enable
 - Heating main differential pressure setpoint
 - Heating main differential pressure
 - Heating flowrate
 - Minimum flow bypass valve position

3 M212 Boiler Room Temperature Controls

- A. Control
- Combustion Air Dampers CAD-1 and CAD-2: Open when the room temperature is 10°F above the setpoint and close when it drops to 2°F above the setpoint.
 - Unit Heater UH-1: Enable the unit heater fan and heating valve to maintain the room setpoint.
- B. Display and Monitoring: Display and archive all points shown on the control diagram.

Drawing Notes

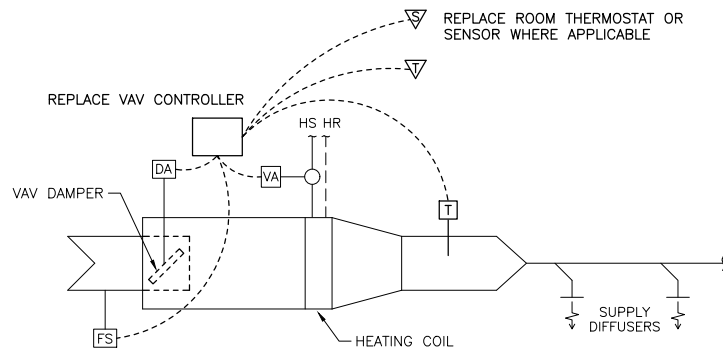
- (1) A On/Off switch is installed on each boiler but the boiler staging controls have been removed/disabled. Provide staging controls, reuse wiring and relays if compatible and remove all other items that are not reused.
- Provide DDC control, monitoring, display, alarm and trending per the control sequences.
 - Display and allow user adjustment of setpoints, control points and reset schedules from the graphical screens.
 - Display and log alarms on the CBJ server alarm page.
 - All control devices and wiring are existing except where noted.
 - Retain or replace existing wiring as required. No splicing of existing and new wiring is allowed.

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 Contract Number: BE20-230
 HVAC Control Upgrades

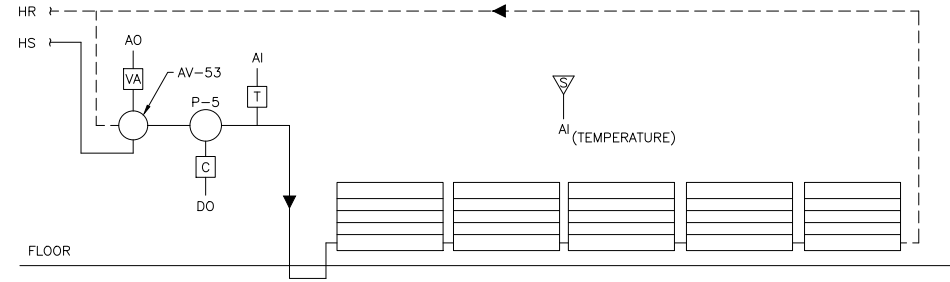
SHEET TITLE:
JPD Heating Plant & Domestic Hot Water Controls

Date: May 18, 2020
 Scale:
 Drawn: KB/JR
 Checked: JR

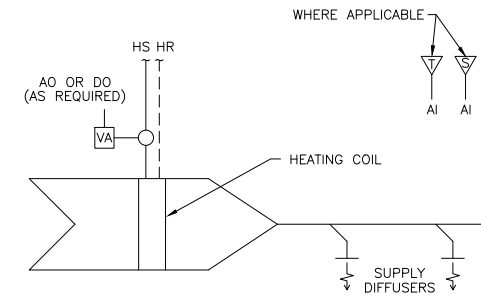
M212



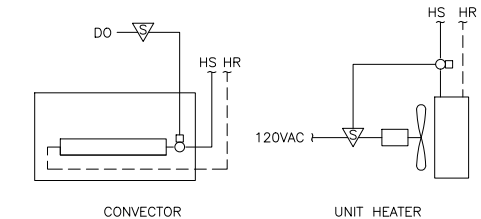
VAV Box with Heating Coil



Radiant Heat



Heating Coil



Convector & Unit Heater

1 M213 Room Temperature Controls

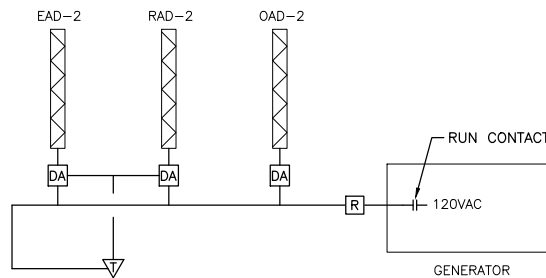
A. Control

1. VAV Box with Heating Coil (Except VAV-19, VAV-20 and VAV-26)
 - a. Schedule: Schedule occupied and unoccupied modes.
 - 1) Training 1, 2 and 3 (VAV-28, VAV-30, VAV-33): In addition to the schedule, enable occupied mode when an occupancy sensor establishes room occupancy for over 5 minutes.
 - b. Thermostats and Sensors
 - 1) Staff Area Thermostats:
 - a) Setpoints: Adjustable occupied setpoint initially set at 70°F. Program maximum heating setpoint of 70°F, unoccupied setpoint of 62°F, and cooling setpoint at 2°F above the heating setpoint.
 - b) Unoccupied Override: Provide unoccupied override button with visual indication of time period that the thermostat is in override status. Increase the override period one hour with each push of the button with a maximum of four hours.
 - 2) Public Area Sensors: Temperature sensor in room with setpoint of 70°F controlled from the DDC system.
 - c. Occupied Mode
 - 1) Heating: Modulate the heating coil valve with minimum airflow to maintain the heating setpoint.
 - 2) Cooling: Close the heating coil valve and modulate the airflow damper to maintain the cooling setpoint.
 - d. Unoccupied Mode:
 - 1) Normal: Close the heating coil valve and airflow damper.
 - 2) Unoccupied Heating: When the room temperature drops to 60°F, fully open the heating coil valve with minimum airflow until the room temperature increases to 64°F.

2. VAV-19 and Radiant Heating (Lobby 100)
 - a. Radiant Pump P-5 Starter: Magnetic starter with H-O-A switch supplies power to the motor.
 - 1) Auto: Control per the sequence.
 - 2) Hand: Enable pump and modulate automatic valve AV-53 to maintain a heating supply temperature of 140°F.
 - 3) Off: Disable pump and AV-53.
 - b. Public Area Sensor: Temperature sensor in room with setpoint of 70°F controlled from the DDC system.
 - c. Schedule: Schedule occupied and unoccupied modes.
 - d. Occupied Mode
 - 1) Heating: Modulate the VAV box heating coil valve with minimum airflow to maintain 70°F heating setpoint. When the heating coil valve is over 5% open, enable pump P-5 and modulate automatic valve AV-53 to maintain a heating supply temperature of 110°F.
 - 2) Cooling: Close the heating coil valve and modulate the airflow damper to maintain 72°F cooling setpoint.
 - e. Unoccupied Mode: Close the air damper and modulate the radiant heater valve to maintain an unoccupied setpoint of 62°F. When the valve is over 5% open, enable pump P-5 and modulate automatic valve AV-53

3. Heating Coil (HC-34 through HC-51)
 - a. Temperature Sensors:
 - 1) Bio-dry 189 (HC-36): Temperature sensor in Bio-dry 189 with remote setpoint controller in Office 188 set at 70°F.
 - 2) Custody Area (HC-37, HC-38, HC-39): Temperature sensor in exhaust duct with DDC setpoint of 70°F.
 - b. Schedule: Schedule occupied and unoccupied modes except as follows:
 - 1) Bio-dry 189 (HC-36): No occupied/unoccupied schedule.
 - 2) Custody Area (HC-37, HC-38, HC-39): No occupied/unoccupied schedule.
 - c. Occupied Mode: Modulate or position the automatic valve to maintain setpoint.
 - d. Unoccupied Mode: Modulate or position the automatic valve to maintain setpoint.
4. Convectors
 - a. Sensors: Temperature sensor with DDC setpoint of 60°F.
 - b. Control: Position the automatic valve to maintain a room temperature setpoint.
5. Unit Heater UH-2
 - a. Sensors: Temperature sensor with DDC setpoint of 55°F.
 - b. Control: Enable the fan and open the automatic valve

- B. Display and Monitoring: Display and archive all points shown on the control diagram.
- C. Trend Report: Display the following for each zone, as applicable:
 1. Zone Control Trends
 - a. Room temperature setpoint
 - b. Room temperature
 - c. VAV supply air temperature
 - d. Airflow
 - e. Air damper position
 - f. Heating valve position
 2. Radiant Heating Trend
 - a. Pump P-5 status
 - b. Radiant heating supply temperature
 - c. Radiant 3-way valve position



2 M213 Generator Controls

- A. Control
 1. Operating Mode: When the generator is operating, open OAD-2 and modulate RAD-2 and EAD-2 to maintain the room temperature setpoint of 65°F.
 2. Non-operating Mode: When the generator is not operating, close OAD-2 and EAD-2 and open RAD-2.
- B. Display and Monitoring: Display and archive all points shown on the control diagram.
- C. Alarms
 1. Critical
 - a. Temperature Alarm: Activate when the generator is operating and the room temperature rises above 80°F.

Drawing Notes

- Provide DDC control, monitoring, display, alarm and trending per the control sequences.
- Display and allow user adjustment of setpoints, control points and reset schedules from the graphical screens.
- Display and log alarms on the CBJ server alarm page.
- All control devices and wiring are existing except where noted.
- Retain or replace existing wiring as required. No splicing of existing and new wiring is allowed.

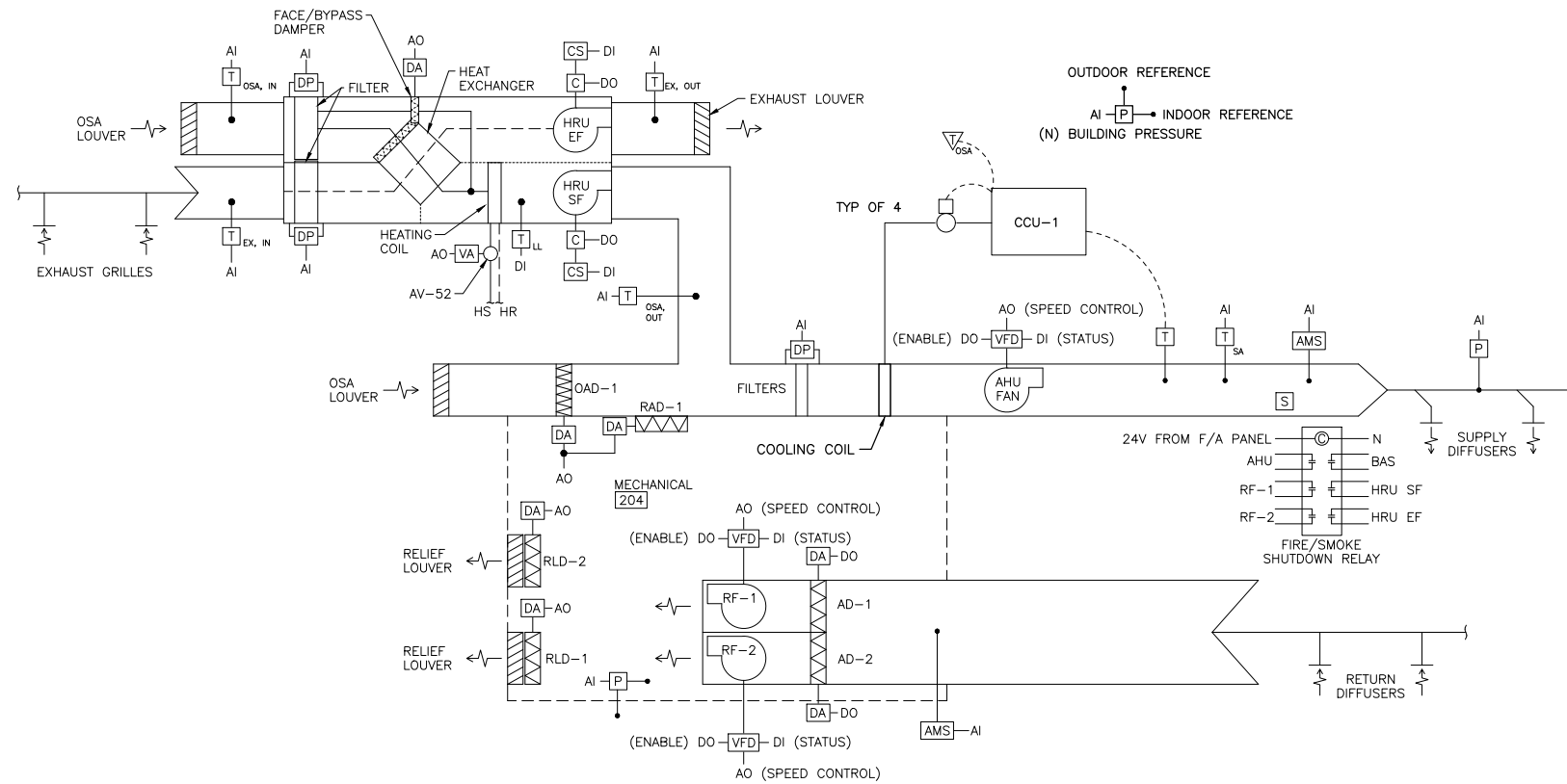


JPD & Downtown Library
 City and Borough of Juneau
 Contract Number: BE20-230
 HVAC Control Upgrades

SHEET TITLE:
JPD Room Temperature Controls

Date: May 18, 2020
 Scale:
 Drawn: KB/JR
 Checked: JR

M213



Drawing Notes

- Provide DDC control, monitoring, display, alarm and trending per the control sequences.
- Display and allow user adjustment of setpoints, control points and reset schedules from the graphical screens.
- Display and log alarms on the CBJ server alarm page.
- All control devices and wiring are existing except where noted.
- Retain or replace existing wiring as required. No splicing of existing and new wiring is allowed.



AHU, HRU and CCU-1 Controls

1
M214

A. Control

1. Motor Controllers

a. AHU Supply Fan Starter: A variable frequency drive supplies power to the fan motor.

- 1) Auto: Operate fan in accordance with the control sequence.
- 2) Hand: Manually enable the fan and operate the AHU in occupied mode. Control fan speed from the VFD display. Set the initial speed at the design speed determined during balancing.
- 3) Bypass: Manually enable fan at 60 Hz speed and operate the AHU in occupied mode.
- 4) Off: Manually disable fan. Disable the AHU in unoccupied mode.

b. AHU Return Fan RF-1 and RF-2 Starter: A variable frequency drive supplies power to the respective fan motor.

- 1) Auto: Operate fan in accordance with the control sequence.
- 2) Hand: Manually enable fan and open the respective inlet damper. Operate the AHU in occupied mode. Control fan speed from the VFD display. Set the initial speed at the design speed determined during balancing.
- 3) Bypass: Manually enable fan at 60 Hz speed, open the respective inlet duct damper and operate the AHU in unoccupied mode.
- 4) Off: Manually disable fan and closed the respective inlet duct damper.

c. HRU Supply Fan Starter: Magnetic starter with H-O-A switch supplies power to the fan motor.

- 1) Auto: Operate fan in accordance with the control sequence.
- 2) Hand: Manually enable the fan and operate the HRU in occupied mode.
- 3) Off: Manually disable the fan and operate the HRU in unoccupied mode.

d. HRU Exhaust Fan Starter: A variable frequency drive supplies power to the fan motor.

- 1) Auto: Operate fan in accordance with the control sequence.
- 2) Hand: Manually enable fan and operate the HRU in occupied mode.
- 3) Off: Manually disable the fan.

e. CCU-1 Power: Power is supplied directly to unit from an electrical panel.

2. Safeties

a. Smoke/Fire Alarm: When smoke is detected by a smoke sensor in the AHU supply duct or a fire alarm occurs, the fire alarm panel de-energizes the fire/smoke relay, disabling the AHU and HRU. Place the AHU and HRU in off mode until the alarm is cleared.

b. Low Temperature: When the HRU heating coil discharge temperature is below 35°F for more than one minute, place the AHU and HRU in off

mode and open the HRU heating coil valve fully until the alarm is cleared.

3. Schedule: Schedule the system to operate in operating and off modes.

4. Operating Mode

a. AHU Supply Fan: Modulate the fan speed to maintain a supply duct differential pressure of 0.8" w.g.

b. AHU Return Fans RF-1 and RF-2: Modulate the fan speed(s) to maintain 0.075" w.g. pressure in Mechanical Room 204.

1) Operate RF-1 and RF-2 in a lead/lag arrangement with monthly switchover. If the lead fan fails to operate, enable the lag fan.

2) Lead Fan: Open the respective inlet damper and enable the fan continuously.

3) Lag Fan

a) Open the respective inlet damper and enable the fan when the lead fan is operating over 95% speed for 15 minutes and modulate both fans at the same speed.

b) Disable the lag fan and close the respective inlet damper when both fans are operating below 40% speed for 15 minutes.

c. HRU Supply Fan: Enabled.

d. HRU Exhaust Fan: Enabled.

e. Supply Air Temperature Setpoint: Modulate the supply air temperature between 62°F and 55°F so no more than two VAV boxes serving south-facing perimeter zones are at 100% airflow.

f. Supply Air Temperature Control

1) Sequentially modulate the HRU heating coil valve, AHU economizer dampers (outside air and return air) to maintain the supply air temperature setpoint. When the return air temperature exceeds the outside air temperature, close the OAD and open the RAD.

2) Enable CCU-1 when the supply air temperature setpoint is 55°F, the outside temperature is above 55°F and the supply air temperature is more than 2°F above the setpoint for 30 minutes.

3) Disable CCU-1 when the supply air temperature setpoint is above 57°F or the outside temperature drops below 53°F.

4) Program CCU-1 to maintain 55°F supply air temperature.

g. HRU Face/Bypass Damper: Modulate the dampers to maintain the HRU exhaust air discharge temperature above 35°F and to maintain the HRU supply air discharge temperature at 2°F below the AHU supply air temperature setpoint.

h. Building Pressure: Sequentially modulate relief air dampers RLD-1 and RLD-2 to maintain the building pressure setpoint of 0.01" w.g.

i. Delayed Start After Emergency Generator Start: When a power disruption causes the emergency generator to start, delay enabling AHU and HRU for five minutes.

5. Unoccupied Mode: Operate the AHU as follows.

- a. AHU Supply Fan: Disable.
- b. AHU Return Fans RF-1 and RF-2: Disable and close inlet damper.
- c. AHU Mixing Dampers: Full recirculation position.
- d. HRU Supply Fan: Disable.
- e. HRU Exhaust Fan: Disable.
- f. HRU Face and Bypass Dampers: Full face position.
- g. Cooling unit CU-1: Disable.
- h. Building Relief Dampers: Close.
- i. Cooling Unit CCU-1: Disable.

B. Display and Monitoring: Display and archive all points shown on the control diagram.

C. Alarms

1. Critical

- a. Fire/Smoke: Activate when the fire/smoke relay is activated.
- b. HRU Low Temperature: Activate when safety is activated.
- c. AHU Supply Fan: Activate when the fan status differs from command.
- d. AHU Return Fans RF-1 and RF-2: Activate when the fan status differs from command.
- e. HRU Supply Fan: Activate when the fan status differs from command.
- f. HRU Exhaust Fan: Activate when the fan status differs from command.

2. Non-critical

- a. AHU Supply Air Temperature: Activate when temperature differs from the setpoint by 3°F for 15 minutes.
- b. HRU Supply Air Temperature: Activate when the HRU supply air temperature is above the AHU supply air setpoint and the face dampers are not in full bypass position for over one minute.
- c. AHU Filter Alarm: Activate when filter differential pressure exceeds 0.25" w.g.
- d. HRU Supply Filter Alarm: Activate when filter differential pressure exceeds 0.25" w.g.
- e. HRU Exhaust Filter Alarm: Activate when filter differential pressure exceeds 0.25" w.g.

D. Trend Reports

3. AHU Supply Air Temperature Trend

- a. Outside air temperature
- b. Supply air temperature setpoint
- c. Supply air temperature
- d. Outside air damper position
- e. Heating coil valve position
- f. Number of perimeter VAV boxes at 100% airflow
- g. CCU-1 status

4. AHU Fan Control Trend

- a. Supply duct pressure setpoint
- b. Supply duct pressure
- c. Supply fan speed
- d. Mechanical Room pressure setpoint
- e. Mechanical Room pressure
- f. Return Fan RF-1 speed
- g. Return Fan RF-2 speed

5. AHU Building Pressure Trend

- a. Building pressure setpoint
- b. Building pressure
- c. RLD-1 damper position
- d. RLD-2 damper position

6. HRU Supply Air Temperature Trend

- a. Outside air temperature
- b. HRU supply air temperature
- c. Return air temperature
- d. Exhaust air temperature
- e. HRU face/bypass damper position
- f. HRU heating coil valve position

JPD & Downtown Library
City and Borough of Juneau
Contract Number: BE20-230

HVAC Control Upgrades

SHEET TITLE:

JPD AHU HRU &
HVAC-4 Controls

Date: May 18, 2020
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Drawn: KB/JR
Checked: JR

M214



JPD & Downtown Library
 City and Borough of Juneau
 Contract Number: BE20-230
 HVAC Control Upgrades

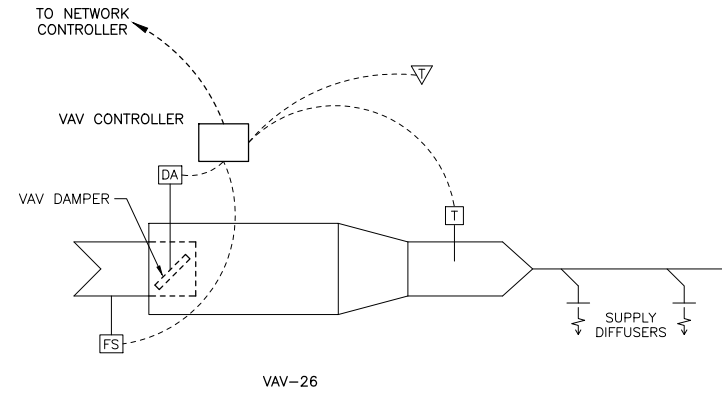
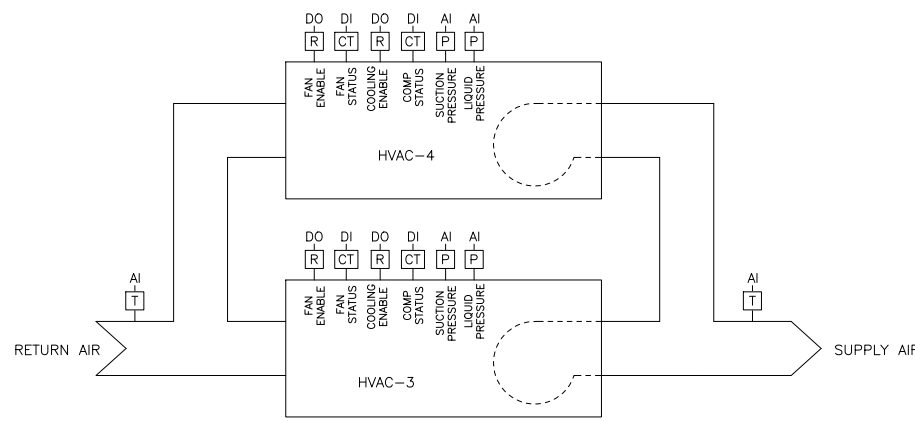
SHEET TITLE:
JPD HVAC Units & Exhaust Fan Controls

Date: May 18, 2020
 Scale:
 Drawn: KB/JR
 Checked: JR

M215

Drawing Notes

- Provide DDC control, monitoring, display, alarm and trending per the control sequences.
- Display and allow user adjustment of setpoints, control points and reset schedules from the graphical screens.
- Display and log alarms on the CBJ server alarm page.
- All control devices and wiring are existing except where noted.
- Retain or replace existing wiring as required. No splicing of existing and new wiring is allowed.



1 HVAC-3, HVAC-4 And VAV-26 Controls

M215

A. Control

1. VAV-26

- a. When the AHU supply air temperature is less than the room temperature setpoint, modulate the air damper to maintain the room temperature at 0.5°F below the setpoint.
- b. When the AHU supply air temperature is greater than the room temperature setpoint, modulate the air damper to minimum flow.

2. HVAC-3 and HVAC-4

- a. Enable in a lead/backup arrangement with weekly changeover.
- b. Generator Power: Verify that the lead HVAC unit automatically restarts when a power outage causes the generator to operate and when power is restored.
- c. Lead: Enable when the room temperature exceeds the setpoint. Unit operation per integral controls to maintain the setpoint with minimum 10-minute operating time.
- d. Lag: Enable when the lead unit fails to operate. If the room temperature rises 3°F above the setpoint for 15 minutes, disable the lead and enable the lag HVAC unit.

B. Display and Monitoring: Display and archive all points shown on the control diagram.

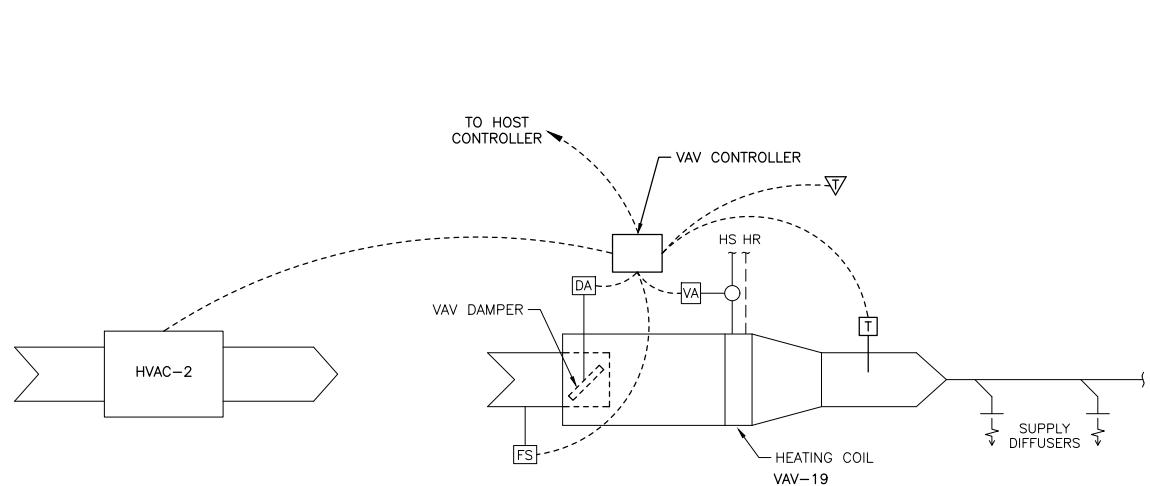
C. Alarms

1. Critical

- a. Lag HVAC Unit: Activate when the lag HVAC unit is enabled.
- b. Room Temperature: Activate when the room temperature is 2°F above the setpoint for 15 minutes.

D. Trend Report

1. Temperature Control Trend
 - a. Room temperature
 - b. Room temperature setpoint
 - c. VAV box airflow
 - d. VAV box supply air temperature
 - e. HVAC supply air temperature
 - f. HVAC return air temperature
 - g. HVAC-3 fan status
 - h. HVAC-4 fan status
 - i. HVAC-3 compressor status
 - j. HVAC-4 compressor status



2 HVAC-2 And VAV-20 Controls

M215

A. Control

1. VAV-20

- a. Heating Mode: Modulate the heating coil valve with minimum airflow to maintain 0.5°F below the room setpoint.
- b. Cooling Mode: When the AHU supply air temperature is less than the room temperature setpoint, close the heating coil valve and modulate the air damper to maintain the room setpoint.

2. HVAC-2: Enable HVAC-2 when the room temperature is 0.5°F above the setpoint for 15 minutes. Disable when the room temperature is 0.5°F below the setpoint.

B. Display and Monitoring: Display and archive all points shown on the control diagram.

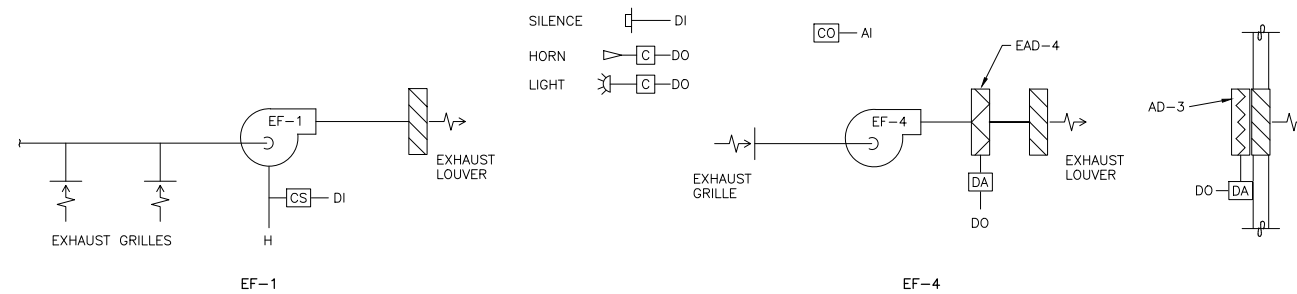
C. Alarms

1. Critical

- a. Room Temperature: Activate when the room temperature is 2°F above the setpoint for 15 minutes.

D. Trend Report: Display the following:

1. Temperature Control Trend
 - a. Room temperature
 - b. Room temperature setpoint
 - c. VAV box airflow
 - d. Heating coil valve position
 - e. VAV box supply air temperature
 - f. HVAC-2 status



3 Exhaust Fan Controls

M215

A. Control

1. Exhaust Fan EF-1 (Local Control): Enable the fan when the manual starter is in the on position. Fan operates continuously.
2. Exhaust fan EF-2 (Local Control): Manual starter operates fan.
 - a. On: Enable the fan, open EAD-2 and EAD-5 and close EAD-6.
 - b. Off: Disable fan, close EAD-2 and EAD-5 and open EAD-6.
3. Exhaust fan EF-3 (Local Control): Manual starter operates fan.
 - a. On: Enable the fan and open EAD-3.
 - b. Off: Disable fan and close EAD-3.
4. Exhaust Fan EF-4: Magnetic starter with H-O-A switch supplies power to the motor.
 - a. Auto: Enable the fan and open AD-3 and EAD-4 when the carbon monoxide level in Secure Transfer 100 exceeds 35 ppm. Minimum fan run-time of 30 minutes.
 - b. Hand: Enable fan and open AD-3 and EAD-4.
 - c. Off: Disable fan and close AD-3 and EAD-4.

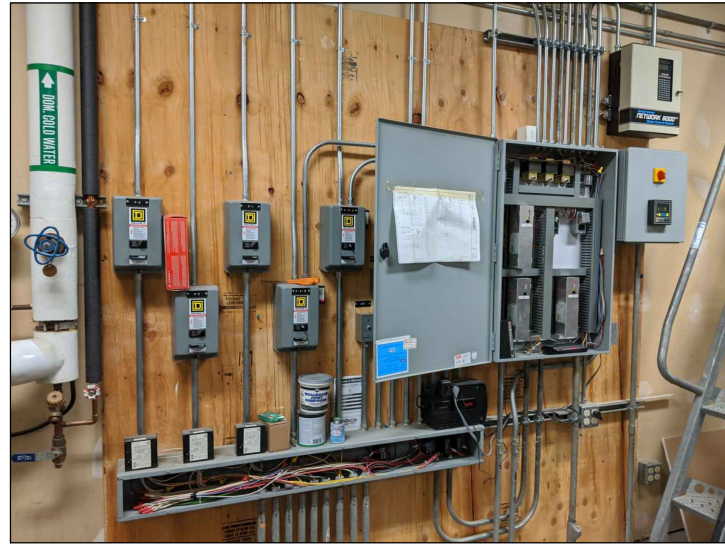
B. Display and Monitoring: Display and archive all points shown on the control diagram.

C. Alarms

1. Non-critical
 - a. Activate when EF-1 is not operating.
 - b. Activate when Secure Transfer 100 carbon dioxide level exceeds 35 ppm for over 1 hour. Enable strobe light and horn until CO level drops below 25 ppm. Horn is manually silenced.

D. Exhaust Fan Trend Report

1. EF-1 status
2. EF-4 command
3. EF-4 status
4. EAD-4 position
5. AD-3 position
6. CO level



1
M216 Boiler Room 170
Controls



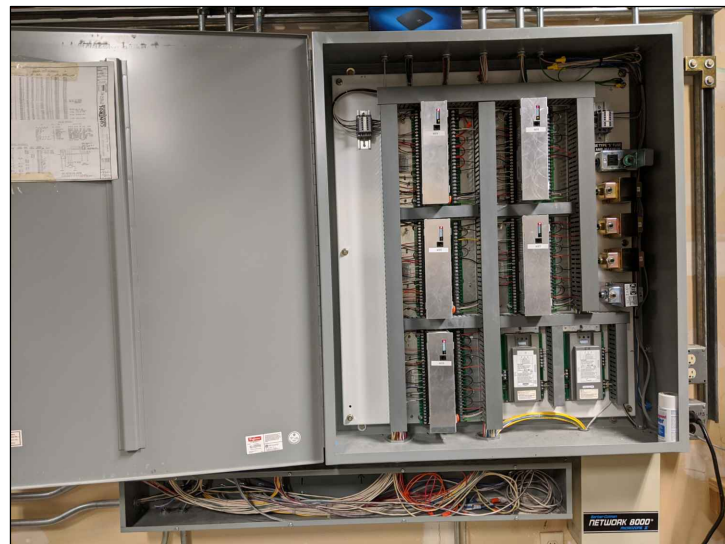
2
M216 Boiler Room 170
Panel IP1



3
M216 Boiler Room 170
Controllers



4
M216 Mechanical Room 204
Control Panels



5
M216 Mechanical Room 204
Control Panel IP2



6
M216 Mechanical Room 204
Control Panel IP3



7
M216 Mezzanine
Control Panel CP1



8
M216 Mezzanine
Control Panel CP1

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Contract Number: BE20-230
HVAC Control Upgrades

SHEET TITLE:

JPD Existing DDC
Control Photos

Date: May 18, 2020

Scale:

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Checked: JR



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 City and Borough of Juneau
 Contract Number: BE20-230
HVAC Control Upgrades

Ventilation Equipment Schedule

Mark	Equipment	Service	Make/Model	Capacity	Electrical	Notes
(E) AHU-1	Air Handling Unit	Ventilation and Heating	Pace A22AF-SI	7,050 cfm; 2.0" w.g.	7.5 HP / 208v / 3-ph	Replace motor
(E) AHU-2	Air Handling Unit	Ventilation and Heating	Pace A22AF-SI	8,150 cfm; 2.0" w.g.	7.5 HP / 208v / 3-ph	Replace motor
(E) EF-1	Exhaust Fan	Men's Toilet	Pace DD450GV	450 cfm; 0.3" w.g.	1/10 HP / 120v / 1-ph	
(E) EF-2	Exhaust Fan	Women's Toilet	Pace DD450GV	450 cfm; 0.3" w.g.	1/10 HP / 120v / 1-ph	
(E) EF-3	Exhaust Fan	Janitor Closet	Pace DD230GV	300 cfm; 0.3" w.g.	1/25 HP / 120v / 1-ph	

Heating Equipment Schedule

Mark	Equipment	Service	Make/Model	Capacity	Electrical	Notes
(E) B-1	Boiler	Heating	Weil McLain BL-888	1,904 MBH Gross	120v / 1-ph	High-low burner locked to low fire
(E) CP-1	Heating Pump	Heating	B&G 807T	152 gpm; 40' head	3 HP / 208v / 3-ph	Replace motor
(E) CP-2	Heating Pump	Heating	B&G 807T	152 gpm; 40' head	3 HP / 208v / 3-ph	Replace motor

Plumbing Equipment Schedule

Mark	Equipment	Service	Make/Model	Capacity	Electrical
(E) HW Heater	Hot Water Heater	Domestic Hot Water	Rheem XE50T	50 gallon / 4500 watts	208v / 3-ph
(E) CP-3	Hot Water Recirculating Pump	Domestic Hot Water	Grundfos 15-42F	10 gpm; 6' head	120v / 1-ph

Automatic Damper Schedule

Equipment	Damper	Size	Actuator	Fail Position	Note
AHU-1	(E) Outside Air Damper	24 x 72	Modulating	Closed	
AHU-1	(E) Return Air Damper	24 x 72	Modulating	Open	
AHU-1	Exhaust Air Damper	24 x 72	Modulating	Closed	Replace - See 1/M303 (1)
AHU-2	(E) Outside Air Damper	24 x 72	Modulating	Closed	
AHU-2	(E) Return Air Damper	24 x 72	Modulating	Open	
AHU-2	Exhaust Air Damper	24 x 72	Modulating	Closed	Replace - See 1/M303 (1)

(1) Provide opposed blade damper; Verify damper size prior to ordering.

Control Valve Equipment Schedule

Equipment	Design Flow GPM	Cv [1]	Type [2]	Operation	Fail Position
HC-1	5.5	3.2 - 3.9	2-way	Floating Control	Fail In-place
HC-2	12.0	6.9 - 8.5	2-way	Floating Control	Fail In-place
HC-3	5.0	2.9 - 3.5	2-way	Floating Control	Fail In-place
HC-4	6.4	3.7 - 4.5	2-way	Floating Control	Fail In-place
HC-5A	7.4	4.3 - 5.2	2-way	Floating Control	Fail In-place
HC-5B	11.3	6.5 - 8.0	2-way	Floating Control	Fail In-place
HC-6	7.8	4.5 - 5.5	2-way	Floating Control	Fail In-place
HC-7	3.2	1.8 - 2.3	2-way	Floating Control	Fail In-place
HC-8	20.5	11.8 - 14.5	2-way	Floating Control	Fail In-place
HC-9	6.4	3.7 - 4.5	2-way	Floating Control	Fail In-place
HC-10	18.9	10.9 - 13.4	2-way	Floating Control	Fail In-place
HC-11	3.2	1.8 - 2.3	2-way	Floating Control	Fail In-place
HC-12	1.8	1.0 - 1.3	2-way	Floating Control	Fail In-place
HC-13	1.8	1.0 - 1.3	2-way	Floating Control	Fail In-place
RP-1	3.3	1.9 - 2.3	2-way	Two Position	Fail In-place
RP-2	0.8	0.5 - 0.6	2-way	Two Position	Fail In-place
RP-3	1.5	0.9 - 1.1	2-way	Two Position	Fail In-place
RP-4	2.9	1.7 - 2.1	2-way	Two Position	Fail In-place
RP-5	1.7	1.0 - 1.2	2-way	Two Position	Fail In-place

[1] Size valves for 2-3 psig pressure drop at design flow

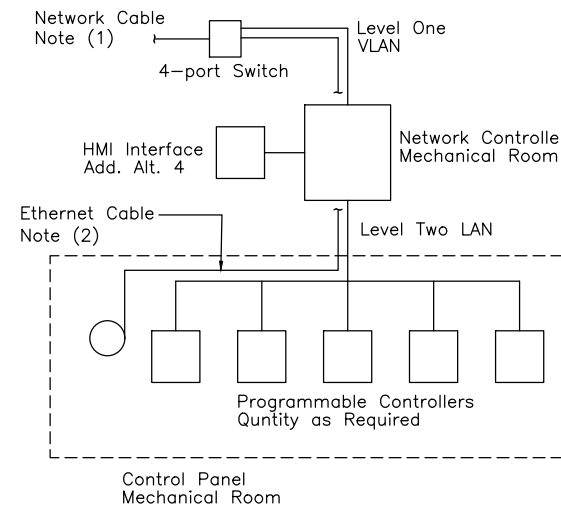
[2] Valve close-off pressure equals 45 feet.

Library Scope of Work

- A. The Scope of Work includes, but is not limited to, the following.
- B. Work Requirements
 1. Confirm existing conditions prior to performing the work. Notify Owner immediately of any discrepancies.
 2. Fire seal penetrations through fire rated assemblies.
 3. Conceal all wiring above ceilings and within walls.
 4. The building will be occupied and in full use during the work. See the Division 1 requirements for contractor operations on-site.
- C. Demolition
 1. Remove all components of the existing pneumatic and electronic control system including tubing, wiring, raceways, supports, fasteners, air compressor and dryer. Seal equipment and duct penetrations with plugs or neatly cut and fully adhered foil tape. Repair pipe and duct insulation with adhesive jacketing.
 2. Patch, prepare and paint finished wall and ceiling surfaces that are damaged or unfinished when control system components are removed or replaced.
- D. Control Upgrade
 1. Provide a complete DDC control system for the specified control, monitoring, display and alarm functions.
 2. See DDC System Architecture on Sheet M300.
 3. Provide a local human-machine interface (HMI) adjacent to the DDC control panel in Mechanical 20. (Additive Alternate 4).
 4. Replace all heating coil and radiant panel control valves and actuators.
 5. AHU-1 and AHU-2
 - a. Replace the exhaust air dampers.
 - b. Replace the supply fan motor, install a VFD and convert to variable flow.
 6. CP-1 and CP-2: Replace the pump motor, install a VFD and convert to variable flow.
- E. Balancing: Adjust and balance the heating and ventilation systems as follows:
 1. Ventilation Systems AHU-1 and AHU-2: Determine outside air damper position for minimum outside air flow.
 2. Ventilation Systems AHU-1 and AHU-2 (Additive Alternate 3)
 - a. Full Outside Air Mode: Balance the system in full outside air mode with airflows at design capacity.
 - b. Minimum Outside Air Mode: Reduce the total airflow to 67% of design using the VFD with the outside air damper set for a minimum outside airflow of 600 cfm, and measure the inlet and outlet airflows. Report air flows that are less than 50% of design to the Owner.
 3. Exhaust Fans: EF-1, EF-2 and EF-3: Measure airflow. (Additive Alternate 3)
 4. Hydronic Heating System: Adjust and balance each heating coil and radiant panel balancing valve and the minimum flow bypass. Existing balancing valves are B&G Circuit Setters.

Drawing Notes

- (1) Provide network cable from switch in the Server Room.
 - (2) Cat6 Ethernet cable to Control Panel. Secure 12' length inside panel. Provide Ethernet connector on end of cable.
- All equipment listed in the equipment schedules is existing, unless otherwise noted.



Library DDC System Architecture

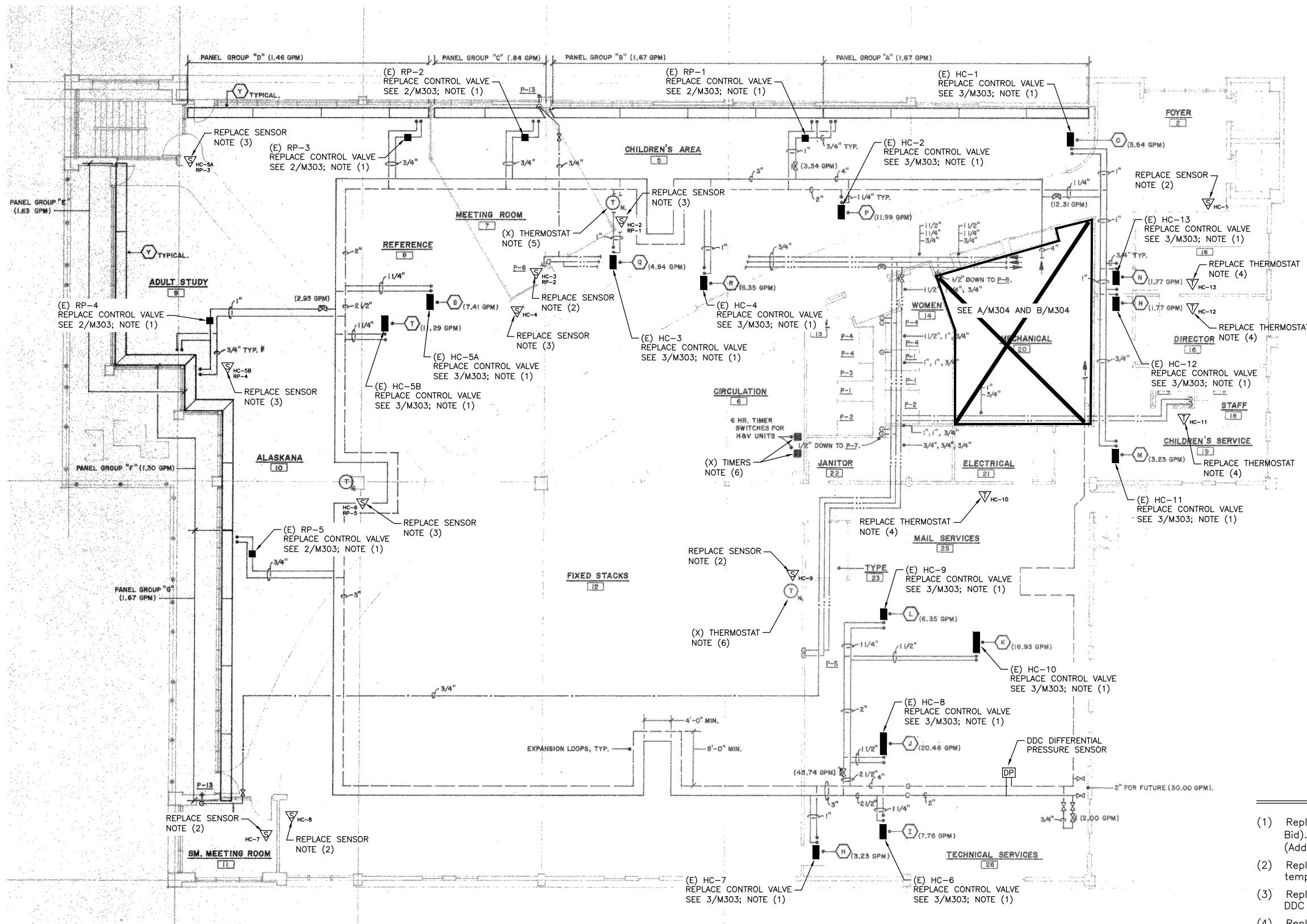
1
M300

SHEET TITLE:

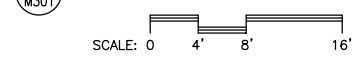
Library Scope of Work Equipment Schedules

Date: May 18, 2020
 Scale:
 Drawn: KB/JR
 Checked: JR

M300



Library Heating Plan



Drawing Notes

- (1) Replace control valve and pneumatic actuator. (Base Bid). Remove and replace pipe insulation as required. (Additive Alternate #2).
 - (2) Replace pneumatic wall thermostat/sensor with DDC temperature sensor.
 - (3) Replace pneumatic ceiling-mounted thermostat with DDC temperature sensor.
 - (4) Replace pneumatic wall thermostat with DDC thermostat.
 - (5) Remove ceiling mounted thermostat. Fill hole in ceiling tile with white latex caulk, finish smooth and apply a coat of acoustical ceiling touch-up paint.
 - (6) Remove wall mounted thermostat or timer. Install stainless steel box cover.
- The plan shows the existing heating system. Work required by this contract is noted.

JPD & Downtown Library
 City and Borough of Juneau
 Contract Number: BE20-230
HVAC Control Upgrades

SHEET TITLE:
Library Heating Plan
 Date: May 18, 2020
 Scale: As Shown
 Drawn: KB/JR
 Checked: JR

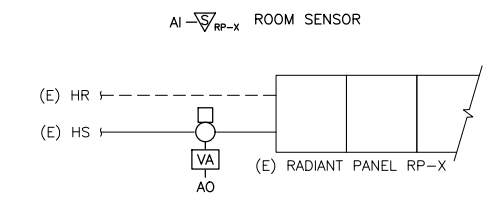
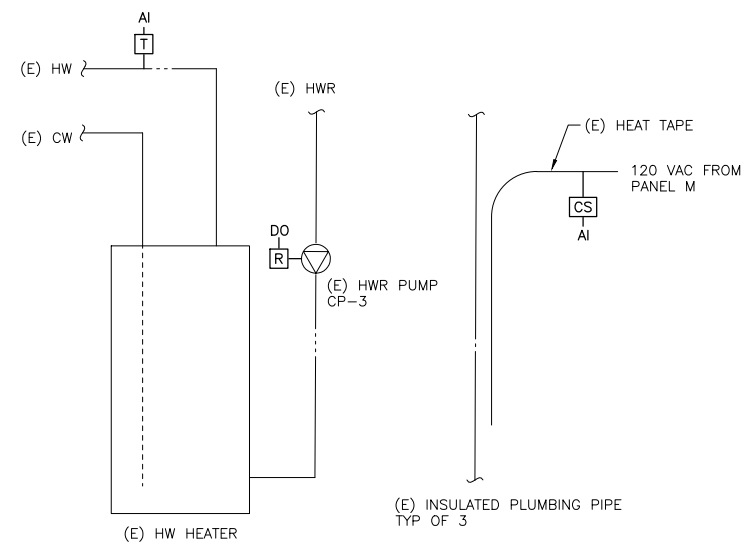
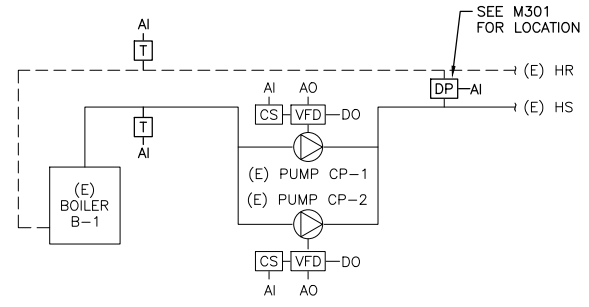
M301



JPD & Downtown Library
 City and Borough of Juneau
 Contract Number: BE20-230
HVAC Control Upgrades

SHEET TITLE:
Library Plumbing Diagrams
 Date: May 18, 2020
 Scale: As Shown
 Drawn: KB/JR
 Checked: JR

M304

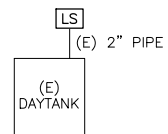


1 Heating System Controls

- A. Control
- Existing Boiler B-1 (Local Control): The boiler burner is controlled by the existing boiler controller to turn on the burner when boiler temperature drops to 160°F and turn off the burner when the boiler temperature increases to 190°F.
 - Existing Daytank (Local Control): The existing fuel oil pumps are controlled by existing level switches and controllers.
 - Existing Heating Pumps CP-1 and CP-2
 - Pump Starter: A VFD supplies power to the motor.
 - Auto: Operate in accordance with the control sequence.
 - Hand: Manually enables pump with speed controlled from VFD display. Set the initial speed at the design speed determined during balancing.
 - Bypass: Manually enables pump at 60 hz speed.
 - Off: Manually disables pump.
 - Pump Control
 - Operate the pumps in a lead/standby configuration with monthly switchover.
 - Lead Pump: Modulate the lead pump speed to maintain the differential pressure setpoint as determined during balancing. Initial setpoint of 16 feet w.g. Maintain a minimum speed of 20%.
 - Lag Pump: Upon failure of the lead pump, enable the lag pump.
- B. Display and Monitoring: Display and archive all points shown on the control diagram.
- C. Alarms
- Critical
 - Heating System Low Temperature Alarm: Activate when the heating supply temperature drops below 150°F for 15 minutes.
 - Heating Pump Failure: Activate when both pumps fail to operate when commanded on.
 - Non-critical
 - Pump Failure: Activate when a pump status differs from the command.
 - Heating Main Pressure Differential: Activate when the differential pressure differs from the setpoint by 25% for over 10 minutes.
- D. Trend Report: Display the following:
- Heating supply temperature
 - Heating return temperature
 - Pump P-1 speed
 - Pump P-2 speed
 - Heating main differential pressure setpoint
 - Heating main differential pressure

2 Plumbing System Controls

- A. Existing Hot Water Heater
- Local Control: The existing hot water heater controller maintains the tank at the setpoint.
- B. Hot Water Recirculation Pump
- Control: Enable the pump when the AHUs are in occupied mode.
- C. Plumbing Heat Tape – Three circuits supplied from Mechanical Room Panel M
- Local Control: Manually enable during cold weather.
- D. General Alarm
- Hot water temperature drops below 100°F for 15 minutes during occupied periods.
 - Hot water recirculation pump status differs from the command.
 - Heat tape amperage is 50% below normal.

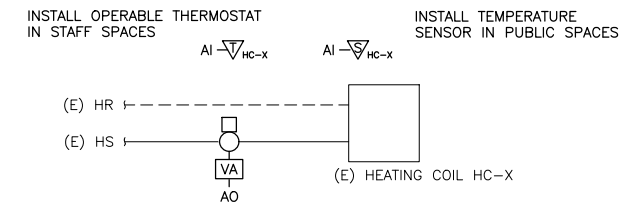


3 Daytank Controls

- A. Display and Monitoring: Display and archive all points shown on the control diagram.
- B. Critical Alarm
- Fuel Level Alarm: When the fuel oil level is above or below the operating level.

4 Radiant Panel Controls

- A. Control: See Air Handling Unit AHU-1 and AHU-2 Controls on 1/M306
- B. Display and Monitoring: Display and archive all points shown on the control diagram.



5 Heating Coil Controls

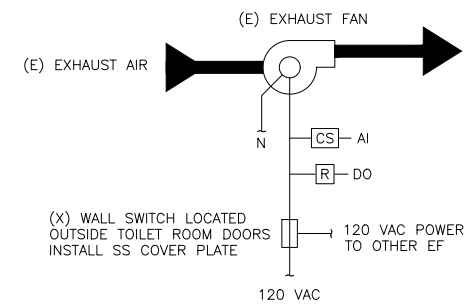
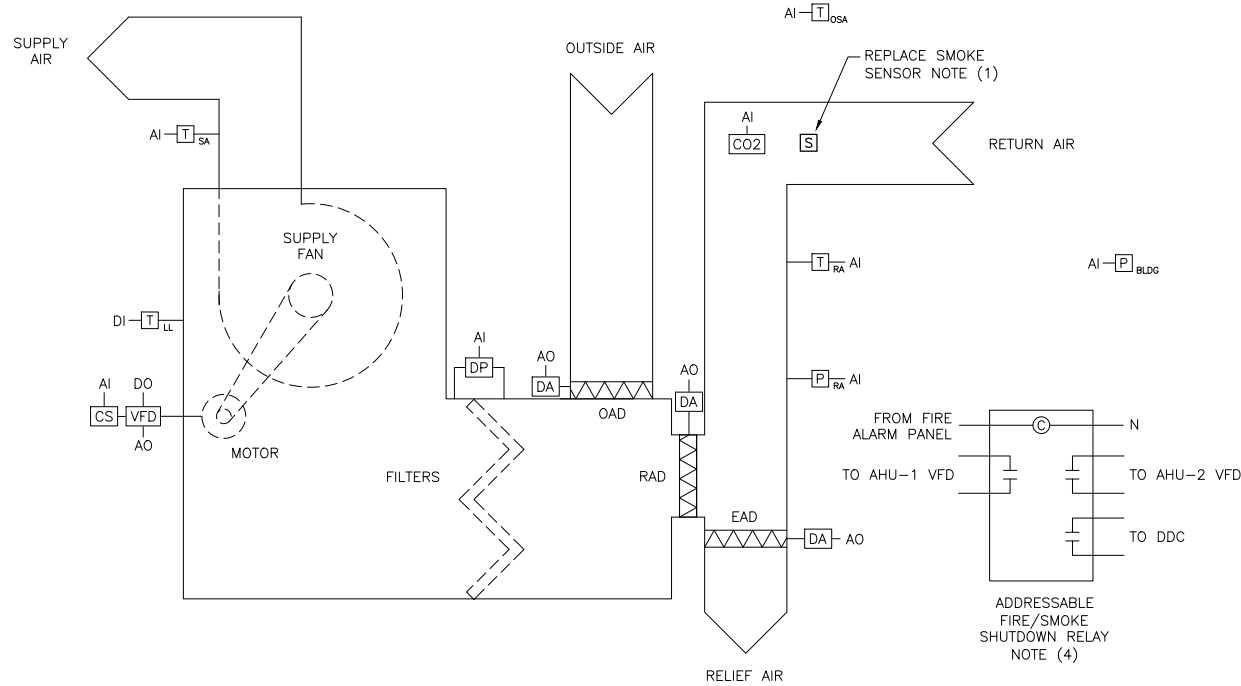
- A. Control: See Air Handling Unit AHU-1 and AHU-2 Controls on 1/M306
- B. Display and Monitoring: Display and archive all points shown on the control diagram.

Drawing Notes

- All control, display, monitoring, alarm and trending is provided by the DDC system except where specifically noted.

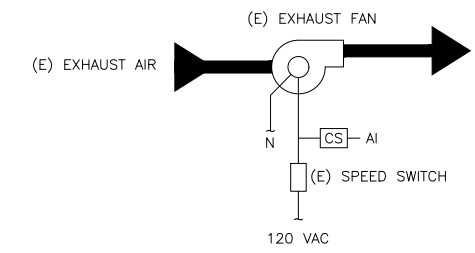


JPD & Downtown Library
 City and Borough of Juneau
 Contract Number: BE20-230
 HVAC Control Upgrades



2 Exhaust Fan EF-1 & EF-2 Controls

- A. Control: Enable the fan when the AHU's are in occupied mode
- B. Display and Monitoring: Display and archive all points shown on control diagram.
- C. General Alarm: Fan status differs from command.



3 Exhaust Fan EF-3 Controls

- A. Local Control: Manually enable fan from existing speed switch.
- B. Display and Monitoring: Display and archive all points shown on control diagram.
- C. General Alarm: Fan status is off.

1 Air Handling Unit AHU-1 and AHU-2 Controls

M306

- A. Control
 1. Supply Fan Starter: A VFD supplies power to the motor.
 - 1) Auto: Operate in accordance with the control sequence.
 - 2) Hand: Manually enable fan with speed controlled from VFD display. Set the initial speed at the design speed determined during balancing. Operate the AHU in occupied mode.
 - 3) Bypass: Manually enables fan at 60 Hz speed. Operate the AHU in occupied mode.
 - 4) Off: Manually disables fan. The AHU is disabled.
 2. Safeties: When the following safeties are activated, disable the supply fan, position the mixing dampers to full recirculation position and close the exhaust air damper. Restore normal operation when the alarm is manually cleared.
 - a. Low Temperature Alarm: When the mixed air temperature drops below 45°F for over 1-minute.
 - b. Fire/Smoke Alarm: When the return duct smoke sensor is activated, an alarm is sent to the fire alarm panel which disables the supply fan and signals the DDC system to activate the fire/smoke safety.
 3. Schedule: Provide a 7-day schedule of occupied and unoccupied modes.
 4. Occupied Mode
 - a. Supply Fan: Modulate the fan speed between the minimum and maximum speeds that are determined during balancing. Modulate the fan speed above minimum to maintain all critical perimeter cooling zone temperatures (HC-5A, HC-5B, HC-6 and HC-8) at 1°F above the setpoint.
 - b. Supply Air Temperature: Modulate the outside air and return air dampers (dampers work in opposition so one is open when the other is closed) to provide the following control, in order of priority:
 - 1) Maintain a minimum supply air temperature of 55°F.
 - 2) Maintain a minimum outside airflow of 600 cfm.
 - 3) Maintain a return air CO₂ level of 800 ppm.
 - 4) Maintain a maximum supply air temperature of 65°F.
 - 5) When the supply fan is at maximum speed to supply cooling air to the critical perimeter zones, modulate the supply air temperature between 65°F and 55°F to maintain the critical perimeter cooling zones HC-5A, HC-5B, HC-6 and HC-8 at 2°F above the setpoint.
 - c. Building Pressure: When the return plenum pressure is greater than 0.02" w.g., modulate the exhaust air damper to maintain a building pressure of 0.05" w.g.
 - d. Zone Temperature Control: Modulate the heating coil valve to maintain the room setpoint. Open the radiant panel valve (where applicable) when the zone valve is more than 10% open. Set the public space setpoints at 70°F. Limit the staff thermostats to a maximum setpoint of 70°F.

- 4. Unoccupied Mode
 - a. Normal Unoccupied Mode
 - 1) Supply Fan: Disable fan.
 - 2) Dampers: Close the outside air and exhaust air dampers and open the return air damper.
 - 3) Zone Heating Coils: Close zone valves
 - 4) Radiant Heaters: Enable the radiant heater valves to maintain an unoccupied setpoint of 62°F.
 - b. Unoccupied Heating Mode: Enable when the temperature in two or more zones drops below 60°F or any one zone drops below 58°F.
 - 1) Supply Fan: Enable the fan at minimum speed until all zone temperatures exceed 64°F.
 - 2) Dampers: Close the outside air and exhaust air dampers and open the return air damper.
 - 3) Zone Heating Coils: Fully open the zone valve until the room temperature rises to 64°F and then modulate the valve to maintain a setpoint of 65°F.
 - 4) Radiant Heaters: Enable the radiant heater valves to maintain an unoccupied setpoint of 62°F.
 - c. Unoccupied Override Mode: Enable when the unoccupied override button is pushed on a staff thermostat. User selects override period of 1-4 hours.
 - 1) Supply Fan: Operate the fan at minimum speed.
 - 2) Dampers: Close the outside air and exhaust air dampers and open the return air damper.
 - 3) Zone Temperature Control: In the zone where the unoccupied override control was enabled, modulate the heating coil valve to maintain the occupied room setpoint. In all other zones, modulate the heating coil valve to maintain an unoccupied setpoint of 64°F.
 - 4) Radiant Heaters: Enable the radiant heater valve when a zone valve is more than 10% open.
- B. Display and Monitoring: Display and archive all points shown on the control diagram.
- C. Alarms
 1. Critical
 - a. Activate when fan status differs from the command.
 - b. Activate with fire/smoke sensor safety.
 - c. Activate when low temperature safety is activated. If safety activates 3 times in 30 minutes, disable system until manually enabled through DDC system.
 2. General
 - a. Log an alarm when the filter pressure drop exceeds 0.5" w.g.

- D. Trend Reports: Display the following:
 1. Commissioning Trend
 - a. Supply fan speed
 - b. Supply air temperature setpoint
 - c. Supply air temperature
 - d. Outside air temperature
 - e. Outside air damper position
 - f. Exhaust air damper position
 - g. Building pressure setpoint
 - h. Building pressure
 - i. Return plenum pressure setpoint
 - j. Return plenum pressure
 2. Operator Trend
 - a. Supply fan speed
 - b. Supply air temperature
 - c. Outside air damper position
 - d. Exhaust air damper position
 - e. Building pressure

Drawing Notes

- (1) Install Silent Night SK duct smoke sensor and connect them to the addressable fire alarm wiring loop at the existing smoke sensors in the Foyer. Provide an addressable relay in the Mechanical Room to disable the AHU-1 and AHU-2 VFDs upon a fire/smoke alarm. Program the fire alarm system as required for the fire/smoke sensors and addressable relay.
- All control, display, monitoring, alarm and trending is provided by the DDC system except where specifically noted.

SHEET TITLE:
Library Ventilation Diagrams
 Date: May 18, 2020
 Scale: As Shown
 Drawn: KB/JR
 Checked: JR

M305

Juneau Police Department Building Mechanical Cooling

JUNEAU, ALASKA

SEE PREVIOUS JOB A99004-AI

ENGINEER
Murray & Assoc.
CONTRACTOR
Behrends
CCI ENGINEER
B. Bundy
DRAFTED BY
RSB
CHECKED BY

DATE
10/18/10

REPRESENTING
t.a.c.o.
WASHINGTON OREGON ALASKA CALIFORNIA
AUTHORIZED PARTNER
5660 "B" STREET ANCHORAGE, ALASKA 99518
(907) 561-3044

CONTROL CONTRACTORS

PROJECT
Juneau Police Department
Juneau, AK

#	DATE	REVISION

J10037-C1
CCI JOB NO.
J10037-AI
SHEET
C1

SEE PREVIOUS JOB A99004-AI:

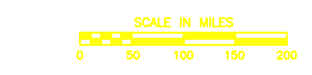
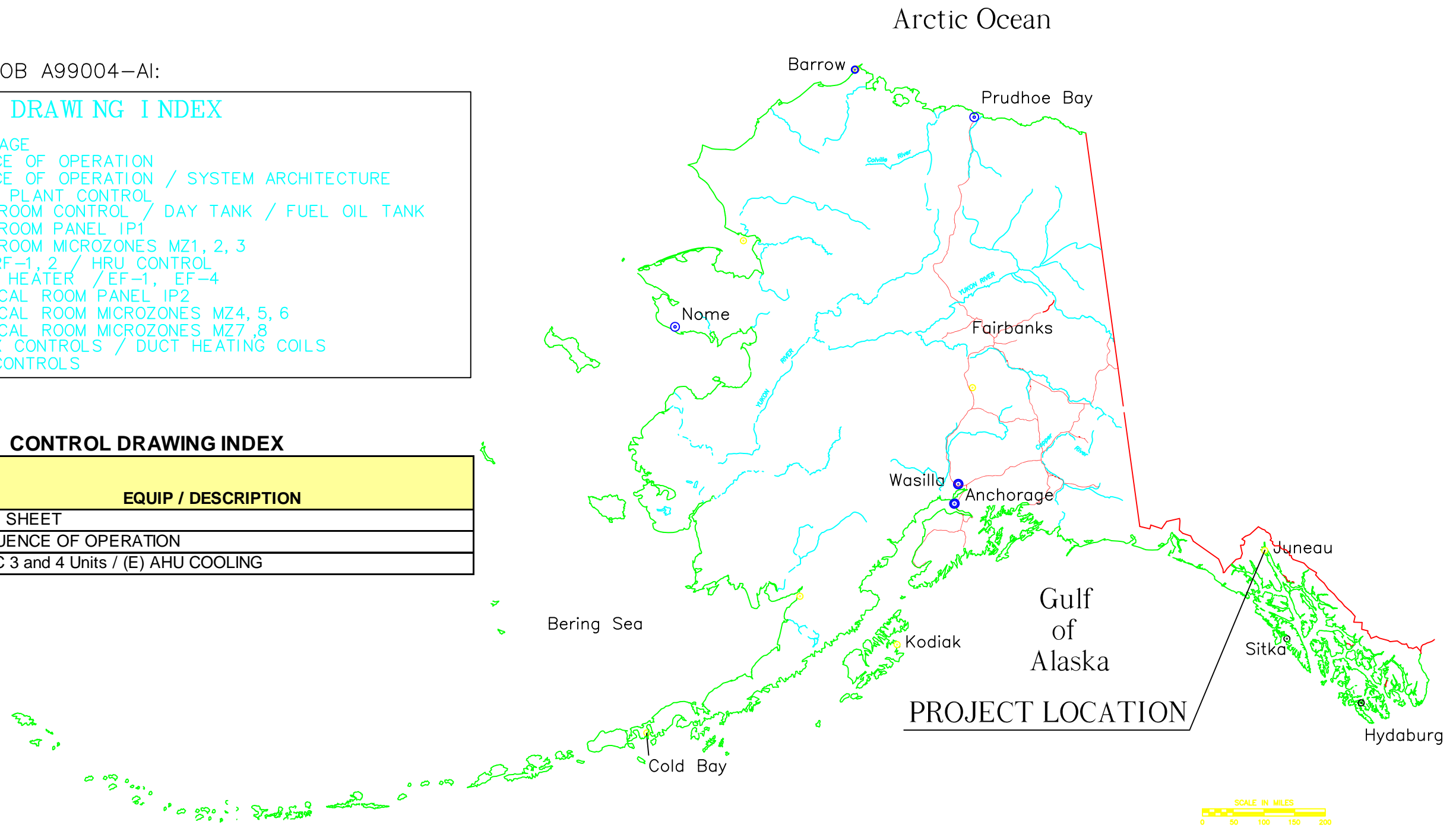
DRAWING INDEX

- SHEET 1 TITLE PAGE
- 2 SEQUENCE OF OPERATION
- 3 SEQUENCE OF OPERATION / SYSTEM ARCHITECTURE
- 4 HEATING PLANT CONTROL
- 5 BOILER ROOM CONTROL / DAY TANK / FUEL OIL TANK
- 6 BOILER ROOM PANEL IP1
- 7 BOILER ROOM MICROZONES MZ1, 2, 3
- 8 AHU / RF-1, 2 / HRU CONTROL
- 9 RADIANT HEATER / EF-1, EF-4
- 10 MECHANICAL ROOM PANEL IP2
- 11 MECHANICAL ROOM MICROZONES MZ4, 5, 6
- 12 MECHANICAL ROOM MICROZONES MZ7, 8
- 13 VAV BOX CONTROLS / DUCT HEATING COILS
- 14 LOCAL CONTROLS

JOB J10037-AI:

CONTROL DRAWING INDEX

DRAWING NO.	EQUIP / DESCRIPTION
C1	TITLE SHEET
15	SEQUENCE OF OPERATION
16	HVAC 3 and 4 Units / (E) AHU COOLING



SEQUENCE OF OPERATI ON

GENERAL: ALL CONTROL SEQUENCES SHALL BE PERFORMED AND MONITORED BY THE BAS, UNLESS OTHERWISE NOTED. ALL SETPOINTS, CONTROL POINTS AND RESET SCHEDULES SHALL BE DISPLAYED AND ADJUSTABLE FROM THE CENTRAL HOST COMPUTER DISPLAY SCREENS AND, VIA MODEM, AT THE CITY-WIDE CENTRAL CONTROL STATION AT THE BUILDING MAINTENANCE OFFICE. ALL ALARMS SHALL BE DISPLAYED AND LOGGED ON AN ALARM LISTING AT THE CENTRAL HOST COMPUTER FOR THIS BUILDING AND AT THE CITY'S CENTRAL CONTROL STATION. CONTROL SEQUENCES SHALL UTILIZE PID CONTROL LOGIC FOR ALL MODULATING CONTROL.

HOST COMPUTER DISPLAY SCREENS AND ALARMS: SEE SECTION 17000.

AIR HANDLING UNIT - AHU

A VARIABLE FREQUENCY DRIVE, LOCATED ON THE MOUNTING BOARD IN MECHANICAL 204, PROVIDES DIRECT POWER FOR THE AHU MOTOR. WHEN THE VFD IS IN THE AUTO POSITION, THE BAS SHALL OPERATE THE FAN AND MODULATE THE SPEED TO MAINTAIN A SUPPLY DUCT PRESSURE OF 0.8" TSP AS MEASURED BY A STATIC PRESSURE SENSOR. WHEN THE VFD IS IN MANUAL POSITION, A DIGITAL SPEED CONTROL INTEGRAL WITH THE VFD PROVIDES MANUAL SPEED CONTROL. AN AIRFLOW MEASURING STATION DETERMINES THE AHU SUPPLY FLOW RATE. ACTIVATE AN ALARM WHEN A VFD GENERATED STATUS ALARM OCCURS DUE TO LOW CURRENT.

SUPPLY AIR TEMPERATURE CONTROL: THE BAS SHALL MODULATE HRU HEATING COIL AUTOMATIC VALVE AV52, OAD1 AND RAD1 TO MAINTAIN THE SUPPLY AIR TEMPERATURE ACCORDING TO THE SUPPLY AIR RESET SCHEDULE SHOWN ON THE DRAWINGS SHEET M701. OAD1 DOES NOT HAVE A MINIMUM OPEN POSITION. THE AUTOMATIC VALVE SHALL ONLY MODULATE FROM CLOSED POSITION WHEN OAD1 IS FULLY CLOSED AND RAD1 IS FULLY OPEN. WHEN THE FAN IS OFF, OAD1 IS CLOSED AND RAD1 IS FULLY OPEN.

RELIEF AIR DAMPER (RLD1 AND RLD2) CONTROL: THE BAS SHALL MODULATE RLD1 AND RLD2 TO MAINTAIN 0.10" SP IN MECHANICAL ROOM 204 AS MEASURED BY A PRESSURE SENSOR LOCATED IN THE CONTROL CABINET. RLD1 SHALL MODULATE TO FULL OPEN PRIOR TO MODULATING RLD2.

FILTER ALARM: DIFFERENTIAL PRESSURE SWITCH MOUNTED ACROSS THE FILTERS. DISPLAY THE DIFFERENTIAL PRESSURE ACROSS THE FILTERS AND ACTIVATE AN ALARM WHENEVER THE DIFFERENTIAL PRESSURE EXCEEDS 0.25" WG.

SMOKE ALARM: IF SMOKE IS DETECTED BY A SMOKE SENSOR LOCATED ON THE SUPPLY AIR DUCT. THE FIRE ALARM PANEL SHALL DE-ENERGIZE THE FIRE/SMOKE RELAY, STOPPING THE AHU IN BOTH AUTO AND MANUAL MODE. ACTIVATE AN ALARM WHEN A SMOKE ALARM CONDITION EXISTS.

RETURN FANS - RF-1 AND RF-2

A VARIABLE FREQUENCY DRIVE, LOCATED ON THE MOUNTING BOARD IN MECHANICAL 204, PROVIDES DIRECT POWER TO THE RESPECTIVE RETURN FAN MOTOR. WHEN THE VFD IS IN THE AUTO POSITION. THE BAS SHALL OPERATE THE FAN(S) WHENEVER THE AHU OPERATES. SEQUENCE RF-1 AND RF-2 TO OPERATE IN A LEAD/LAG CONFIGURATION WITH MONTHLY SWITCHOVER, WHEN A VFD IS IN MANUAL POSITION, A DIGITAL SPEED CONTROL INTEGRAL WITH THE VFD PROVIDES MANUAL SPEED CONTROL. ACTIVATE AN ALARM WHEN A VFD GENERATED STATUS ALARM OCCURS DUE TO LOW CURRENT.

MODULATE FAN SPEED TO MAINTAIN RETURN AIR FLOW RATE (CFM), AS MEASURED FROM AN AIRFLOW MEASURING STATION, ACCORDING TO THE FOLLOWING EQUATION. PROVIDE LEAD/LAG OPERATION ACCORDING TO THE FLOW RATES IN THE TABLE BELOW. THE FANS SHALL OPERATE AT THE SAME SPEED WHENEVER THEY ARE BOTH OPERATING.

$$CFM(RA) = 0.95 \times CFM(SA) - 6700(HRU.EX) - 1280(EF-2) \text{ (WHEN OPERATING)}$$

CFM(HRU.EX) AND CFM(EF-2) FROM ADJUSTMENT REPORT

CFM RANGE????FAN OPERATION	LEAD FAN
0-10,500	BOTH FANS
9,400-22,100	

OPEN AD1 AND AD2, LOCATED IN THE INLET DUCT TO RF-1 AND RF-2 WHENEVER THE RESPECTIVE FAN OPERATES. DELAY FAN START UNTIL THE RESPECTIVE AUTOMATIC DAMPER OPENS FULLY.

SMOKE ALARM: IF SMOKE IS DETECTED BY A SMOKE SENSOR LOCATED ON THE AHU SUPPLY AIR DUCT, THE FIRE ALARM PANEL SHALL DE-ENERGIZE THE FIRE/SMOKE RELAY, STOPPING RF-1 AND RF-2 IN BOTH AUTO AND MANUAL MODE.

HEAT RECOVERY UNIT - HRU

SUPPLY FAN: MAGNETIC STARTER WITH H-O-A SWITCH, MOUNTED ON THE HRU, PROVIDES DIRECT POWER TO THE SUPPLY FAN MOTOR. IN THE AUTO POSITION, THE FAN OPERATES WHEN THE AHU OPERATES. IN THE HAND POSITION, THE FAN OPERATES. ALARM IF THE FAN CURRENT DROPS BELOW AN ADJUSTABLE SETPOINT WHILE THE FAN MOTOR IS ON.

EXHAUST FAN: MAGNETIC STARTER WITH H-O-A SWITCH, MOUNTED ON THE HRU, PROVIDES DIRECT POWER TO THE EXHAUST FAN MOTOR. IN THE AUTO POSITION, THE FAN OPERATES WHEN THE AHU OPERATES. IN THE HAND POSITION, THE FAN OPERATES. ALARM IF THE FAN CURRENT DROPS BELOW AN ADJUSTABLE SETPOINT WHILE THE FAN MOTOR IS ON.

SUPPLY AIR FACE/BYPASS DAMPER CONTROL: THE FACE/BYPASS DAMPER SHALL MODULATE TO MAINTAIN HRU EXHAUST AIR OUTLET TEMPERATURE ABOVE 35 F AND HRU SUPPLY AIR OUTLET TEMPERATURE BELOW THE AHU SUPPLY AIR TEMPERATURE SETPOINT.

LOW LIMIT MODE: IF THE HEATING COIL DISCHARGE TEMPERATURE IS BELOW 35 F FOR MORE THAN ONE MINUTE (ADJUSTABLE), THE HRU SUPPLY FAN MOTOR SHALL BE TURNED OFF, AV52 POSITIONED TO FULL HEATING AND AN ALARM SHALL BE ACTIVATED.

FILTER ALARM: DIFFERENTIAL PRESSURE SWITCH MOUNTED ACROSS THE SUPPLY AND EXHAUST FILTERS. DISPLAY THE DIFFERENTIAL PRESSURE ACROSS THE FILTERS AND ACTIVATE AN ALARM WHENEVER THE DIFFERENTIAL PRESSURE EXCEEDS 0.25" WC.

SMOKE ALARM: IF SMOKE IS DETECTED BY A SMOKE SENSOR LOCATED ON THE AHU SUPPLY AIR DUCT, THE FIRE ALARM PANEL SHALL DE-ENERGIZE THE FIRE/SMOKE RELAY, STOPPING THE AHU SUPPLY AND EXHAUST FANS IN BOTH AUTO AND MANUAL MODE.

ALARMS: ACTIVATE AN ALARM IF HRU EXHAUST OUTLET TEMPERATURE DROPS BELOW 35 F FOR MORE THAN ONE MINUTE (ADJUSTABLE). ACTIVATE AN ALARM IF HRU SUPPLY AIR OUTLET TEMPERATURE RISES ABOVE THE AHU SUPPLY AIR SETPOINT FOR OVER ONE MINUTE (ADJUSTABLE).

HEATING PLANT CONTROL

OIL-FIRED BURNERS FOR BOILERS B-1, B-2 AND B-3:

THE BAS SHALL SEQUENCE BOILERS B-1, B-2 AND B-3 AND PUMPS P-1, P-2 AND P-3 RESPECTIVELY, TO OPERATE IN A LEAD/LAG/STANDBY CONFIGURATION, WITH MONTHLY SWITCHOVER. BOILERS AND PUMPS SHALL BE CONTROLLED FROM THE PRIMARY LOOP HEATING SUPPLY TEMPERATURE ACCORDING TO THE FOLLOWING SCHEDULE:

	ON	OFF
LEAD BOILER???	180 F???	200 F
LAG BOILER	170 F	190 F
STANDBY BOILER	160 F	180 F

SECONDARY (BOILER) PUMPS P-1, P-2 AND P-3: PUMPS P-1, P-2 AND P-3 SHALL OPERATE FOR 30 SECONDS PRIOR TO OPERATING THE RESPECTIVE BURNER AND MAINTAIN PUMP OPERATION FOR 60 SECONDS AFTER THE BURNER HAS BEEN TURNED OFF, STOP THE PUMP AND RESPECTIVE BOILER, AND ACTIVATE AN ALARM IF THE PUMP CURRENT DROPS BELOW AN ADJUSTABLE SETPOINT WHILE THE BURNER IS ON.

A MANUAL ON-OFF SWITCH ON THE FRONT OF EACH BOILER SHALL OPERATE THE BURNER AND RESPECTIVE PUMP.

TWO HIGH LIMIT IMMERSION THERMOSTATS SHALL BE INSTALLED ON EACH BOILER TO OVERRIDE BOTH BAS AND MANUAL CONTROL OF THE BURNERS. THE HIGH LIMIT THERMOSTAT SHALL TURN OFF THE BOILER AT 210 F AND RESET AT 190 F. A HIGH LIMIT THERMOSTAT WITH MANUAL RESET SET AT 225 F SHALL TURN OFF THE BURNER UNTIL MANUALLY RESET.

PRIMARY HEATING LOOP PUMPS

PRIMARY (BUILDING LOOP) PUMPS P-4A AND P-4B: A MAGNETIC STARTER WITH H-O-A SWITCH, LOCATED ON THE MOUNTING BOARD IN BOILER 170, PROVIDES DIRECT POWER FOR THE RESPECTIVE PUMP MOTOR.

IN THE AUTO POSITION, SEQUENCE THE PUMPS TO OPERATE IN A LEAD/LAG CONFIGURATION WITH MONTHLY SWITCHOVER. THE LEAD PUMP SHALL OPERATE CONTINUOUSLY. THE LAG PUMP SHALL OPERATE WHEN FLOW RATE EXCEEDS 40 GPM FOR OVER 60 SECONDS AND TURN OFF WHEN FLOW RATE DROPS BELOW 30 GPM FOR OVER 60 SECONDS. FLOW RATE SHALL BE MONITORED FROM A FLOW METER IN THE PRIMARY LOOP HEATING SUPPLY PIPING. IN THE MANUAL POSITION, THE PUMP OPERATES.

STOP THE LEAD PUMP, START THE LAG PUMP AND ACTIVATE AN ALARM IF THE PUMP CURRENT DROPS BELOW AN ADJUSTABLE SETPOINT WHILE THE PUMP MOTOR IS ON.

MINIMUM FLOW BYPASS: MODULATE AV62 TO MAINTAIN A PRIMARY LOOP FLOW RATE OF 10 GPM.

FUEL OIL TANK ALARM

ACTIVATE AN ALARM WHEN THE FUEL OIL TANK LEVEL DROPS BELOW 4600 GALLONS. LEVEL SWITCH AND CONDUIT FROM THE BOILER ROOM TO THE TANK PROVIDED BY OTHERS.

DAY TANK ALARM

ACTIVATE AN ALARM WHEN THE DAY TANK LEVEL DROPS BELOW THE LEVEL INDICATED ON THE DAY TANK DETAIL ON SHEET M501. LEVEL SWITCH PROVIDED BY OTHERS.

BOILER ROOM TEMPERATURE CONTROL

ROOM THERMOSTAT, SET AT 60 F, SHALL CONTROL COMBUSTION AIR DAMPERS CAD-1 AND CAD-2 AND UNIT HEATER UH-1.

COMBUSTION AIR DAMPERS CAD-1 AND CAD-2: CAD-1 SHALL OPEN WHEN ANY BOILER OR THE HW TANK BURNER OPERATES. THE ROOM THERMOSTAT SHALL OPEN CAD-1 AND CAD-2 WHEN TEMPERATURE IS 10 F ABOVE SETPOINT AND CLOSE AT 5 F ABOVE SETPOINT.

UNIT HEATER UH-1 CONTROL: OPERATE THE UNIT HEATER FAN AND OPEN THE AUTOMATIC VALVE AS REQUIRED TO MAINTAIN SETPOINT WITH A 5 F THROTTLING RANGE.

EXHAUST FAN EF-1: A MANUAL STARTER, LOCATED ON THE MOUNTING BOARD ADJACENT TO THE FAN PROVIDES DIRECT POWER TO THE EF-1 MOTOR. ALARM IF THE FAN CURRENT DROPS BELOW AN ADJUSTABLE SETPOINT.

SECURE TRANSFER EXHAUST FAN EF-4:

MAGNETIC STARTER WITH H-O-A SWITCH, LOCATED IN SECURE TRANSFER 100, PROVIDES DIRECT POWER TO THE FAN MOTOR. IN THE AUTO POSITION, THE FAN OPERATES AND AD-3 OPENS WHEN THE CO SENSOR IN SECURE TRANSFER 100 REGISTERS ABOVE A SETPOINT OF 35 PPM. MINIMUM FAN RUN-TIME OF 30 MINUTES. IN THE HAND POSITION, THE FAN OPERATES AND AD-3 OPENS.

ALARMS: ACTIVATE AN ALARM WHEN CARBON MONOXIDE LEVELS EXCEED 35 PPM FOR OVER ONE HOUR. HORN AND FLASHING LIGHT SHALL INITIATE UPON ALARM. PROVIDE SILENCE BUTTON, WITH AUTOMATIC RESET, FOR HORN WITH LIGHT TO REMAIN ON UNTIL CO LEVELS DROP BELOW 25 PPM.

DELAYED START DURING EMERGENCY GENERATOR START-UP: WHEN A POWER DISRUPTION RESULTS IN START-UP OF THE EMERGENCY GENERATOR, THE BAS SHALL RESTART THE AHU AFTER FIVE MINUTES. BOTH RETURN FANS AND THE HRU SHALL RESTART 30 SECONDS AFTER THE AHU.

ROOM TEMPERATURE CONTROL:

VAV BOX WITH HEATING COIL (VAV-1 THROUGH VAV-33, EXCEPT VAV-19) CONTROLS:

ROOM TEMPERATURE SHALL BE MAINTAINED ACCORDING TO AN OCCUPIED/UNOCCUPIED SCHEDULE FOR EACH ZONE. ROOM THERMOSTAT WITH ADJUSTABLE OCCUPIED HEATING SETPOINT AND UNOCCUPIED OVERRIDE PUSHBUTTON. SET THE COOLING SETPOINTS AT 5 F ABOVE THE HEATING SETPOINTS. THE OVERRIDE BUTTON SHALL PROVIDE VISUAL INDICATION THAT THE THERMOSTAT IS IN OVERRIDE STATUS AND EACH PUSH OF THE BUTTON SHALL INCREASE THE OVERRIDE PERIOD ONE HOUR WITH A MAXIMUM OF FOUR HOURS. UNOCCUPIED HEATING AND COOLING SETPOINTS AND OCCUPIED SETPOINT LIMIT ADJUSTABLE FROM THE BAS.

CONTINUED.....

ENGINEER MURRAY & ASSOC.
CONTRACTOR NUNA
CCI ENGINEER B. BUNDY
CHECKED
DATE 03/10/99
REPRESENTING SIEBE WASHINGTON-ALASKA OREGON-CALIFORNIA
5660 B STREET ANCHORAGE, AK 99518 PH = 907-561-3044 FAX = 907-561-4225
CONTROL CONTRACTORS
PROJECT JUNEAU POLICE STATION JUNEAU, ALASKA
DATE 10/99
REVISION REVI SED
DATE 02/00
REVISION REVI SED
FILENAME 99004-02
CCI JOB NO. A99004-AI
SHEET # 2 of 14

CONTINUED.....

SEQUENCE OF OPERATI ON

EXCEPTIONS:

COMMUNICATIONS 245 (VAV-20): THE VAV BOX SHALL SUPPLY THE MINIMUM OCCUPIED CFM WHENEVER THE AHU SUPPLY AIR TEMPERATURE EXCEEDS 70 F. THE BAS SHALL OPERATE HVAC-2 TO MAINTAIN THE COOLING SETPOINT.

COMMUNICATIONS ELECTRONICS 240 (VAV-26): THE VAV BOX SHALL SUPPLY THE MINIMUM OCCUPIED CFM WHENEVER THE AHU SUPPLY AIR TEMPERATURE EXCEEDS 70 F. VAV-26 DOES NOT HAVE A HEATING COIL. THE BAS SHALL OPERATE HVAC-1 TO MAINTAIN THE COOLING SETPOINT.

TRAINING 1, 2 AND 3 (VAV-28, 30, 33): IN ADDITON TO AN OCCUPIED/UNOCCUPIED SCHEDULE, AN OCCUPANCY SENSOR SHALL BE INSTALLED IN EACH ROOM TO ESTABLISH ROOM OCCUPANCY AND SWITCH TO OCCUPIED MODE.

OCCUPIED MODE:

HEATING: THE VAV BOX SHALL SUPPLY THE MINIMUM OCCUPIED CFM AND THE AUTOMATIC VALVE MODULATED TO MAINTAIN THE HEATING SETPOINT WITHIN A 3 F THROTTLING RANGE.

COOLING: THE VAV BOX SHALL SUPPLY THE MINIMUM OCCUPIED CFM AND MODULATE TO FULL OPEN TO MAINTAIN THE COOLING SETPOINT WITHIN A 3F THROTTLING RANGE.

UNOCCUPIED MODE: THE VAV DAMPER IS CLOSED. MAINTAIN THE UNOCCUPIED HEATING SETPOINT WITHIN A 4F THROTTLING RANGE. WHEN HEAT IS REQUIRED, THE VAV BOX SHALL SUPPLY THE MINIMUM OCCUPIED CFM AND THE AUTOMATIC DAMPER POSITION TO FULL OPEN.

LOBBY 001 CONTROLS (VAV-19 AND RADIANT HEATING SYSTEM):

ROOM TEMPERATURE SHALL BE MAINTAINED ACCORDING TO AN OCCUPIED / UNOCCUPIED SCHEDULE. ROOM SENSOR INSTALLED IN THE LOBBY WITH OCCUPIED AND UNOCCUPIED SETPOINTS CONTROLLED FROM THE BAS.

RADIANT HEATING SYSTEM:

PUMP P-5: A MAGNETIC STARTER, WITH H-O-A SWITCH, LOCATED IN JANITOR 009 PROVIDES DIRECT POWER TO THE PUMP MOTOR. IN THE AUTO POSITION, THE PUMP OPERATES WHEN HEATING IS REQUIRED. IN THE HAND POSITION, THE PUMP OPERATES.

AUTOMATIC VALVE AV53: NORMAL POSITION SHALL BE IN FULL RECIRCULATION POSITION. WHEN PUMP P-5 OPERATES, THE VALVE SHALL MODULATE TO MAINTAIN 140 F HEATING SUPPLY TEMPERATURE TO THE RADIANT HEATERS.

OCCUPIED HEATING MODE:

VAV-19: THE VAV BOX SHALL SUPPLY THE MINIMUM OCCUPIED CFM. THE HEATING AUTOMATIC VALVE SHALL MODULATE TO MAINTAIN ROOM TEMPERATURE WITHIN A 3 F THROTTLING RANGE.

RADIANT HEATING SYSTEM: PUMP P-5 SHALL OPERATE AND AUTOMATIC VALVE AV53 SHALL MODULATE TO MAINTAIN A HEATING SUPPLY TEMPERATURE OF 140 F.

OCCUPIED COOLING MODE: THE VAV BOX SHALL SUPPLY THE MINIMUM OCCUPIED CFM AND MODULATE TO FULL OPEN TO MAINTAIN THE COOLING SETPOINT WITHIN A 3 F THROTTLING RANGE.

UNOCCUPIED MODE:

VAV-19: THE VAV DAMPER AND HEATING AUTOMATIC VALVE SHALL POSITION FULLY CLOSED.

RADIANT HEATING SYSTEM: PUMP P-5 SHALL OPERATE AND AUTOMATIC VALVE AV53 SHALL MODULATE TO MAINTAIN ROOM TEMPERATURE WITHIN A 4 F THROTTLING RANGE.

HEATING COIL (HC-34 THROUGH HC-51) CONTROLS:

ROOM THERMOSTAT WITH ADJUSTABLE HEATING SETPOINT. MODULATE OR POSITION THE AUTOMATIC VALVE WITHIN A 3 F THROTTLING RANGE TO MAINTAIN SETPOINT.

EXCEPTIONS:

PUBLIC AREAS: TEMPERATURE SENSOR IN ROOM. SETPOINT CONTROLLED FROM THE BAS.

BIO-DRY 189 (HC-36): NO OCCUPIED / UNOCCUPIED SCHEDULE. TEMPERATURE SENSOR IN BIO-DRY 189 WITH REMOTE SETPOINT CONTROL IN OFFICE 188.

CUSTODY AREA (HC-37, 38, 39): TEMPERATURE SENSOR IN EXHAUST DUCT. SETPOINT CONTROL FROM THE BAS.

LOCAL CONTROL

EXHAUST FAN EF-2: A MANUAL STARTER WITH INDICATING LIGHT, LOCATED ADJACENT TO THE FUME HOOD IN ID LAB 114 PROVIDES DIRECT POWER TO THE FAN. IN THE ON POSITION THE FAN OPERATES AND EAD-5 IS OPEN AND EAD-6 IS CLOSED.

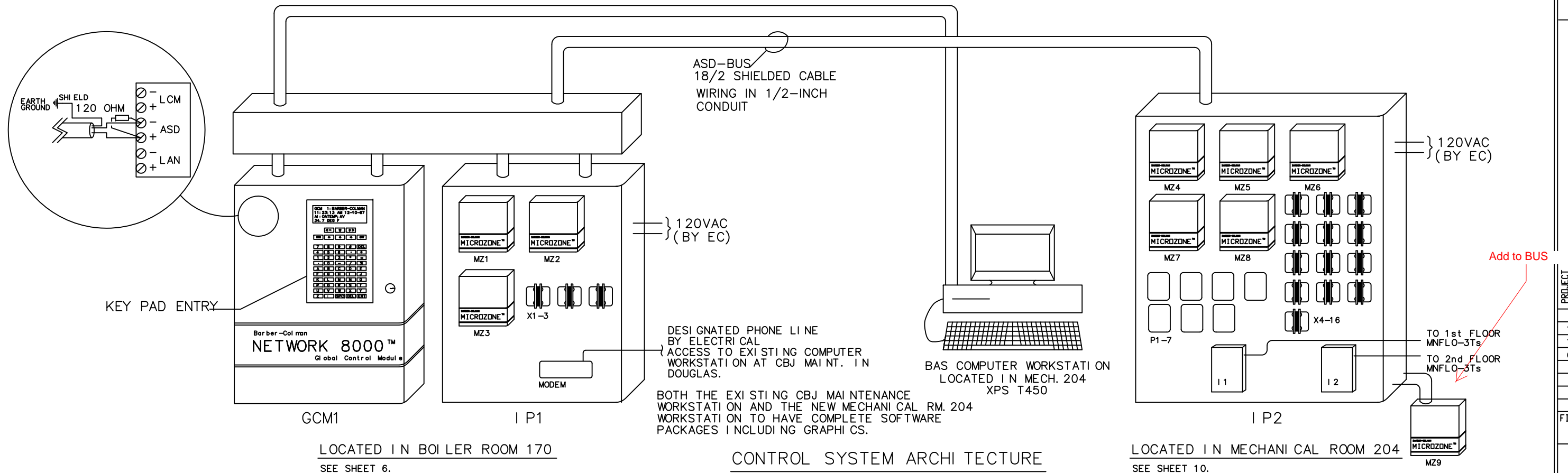
EXHAUST FAN EF-3: A MANUAL STARTER WITH INDICATING LIGHT, LOCATED ADJACENT TO THE FINGERPRINT DUSTING STATION IN ID LAB 114 PROVIDES DIRECT POWER TO THE FAN. IN THE ON POSITION THE FAN OPERATES AND EAD-5 IS OPEN.

HOT WATER RECIRCULATION PUMP: A MANUAL STARTER PROVIDES DIRECT POWER TO THE PUMP MOTOR. A LINE VOLTAGE THERMOSTAT IN THE HOT WATER RECIRCULATING PIPING SHALL OPERATE THE PUMP WHEN RECIRCULATION TEMPERATURE DROPS BELOW A SETPOINT OF 110 F.

CONVECTORS: ROOM THERMOSTAT, WITH INACCESSIBLE SETPOINT CONTROL, SET AT 60 F, SHALL POSITION THE AUTOMATIC VALVE TO MAINTAIN ROOM TEMPERATURE WITHIN A 3 F THROTTLING RANGE.

UNIT HEATER UH-2 (TWO INSTALLED): SINGLE ROOM THERMOSTAT WITH INACCESSIBLE SETPOINT CONTROL, SET AT 55 F, SHALL START THE FANS AND POSITION THE AUTOMATIC VALVES TO MAINTAIN THE SETPOINT WITHIN A 3 F THROTTLING RANGE.

STAND-BY GENERATOR DAMPER CONTROL: OAD-2 SHALL OPEN WHEN THE STAND-BY GENERATOR IS OPERATING. WHEN THE GENERATOR IS OPERATING, A ROOM THERMOSTAT, SET AT 65 F SHALL MODULATE RAD-2 AND EAD-2 TO MAINTAIN SETPOINT WITHIN A 5 F THROTTLING RANGE. THE DAMPERS SHALL RETURN TO THEIR NORMAL POSITION, RAD-2 OPEN AND EAD-2 CLOSED WHEN THE GENERATOR IS OFF.

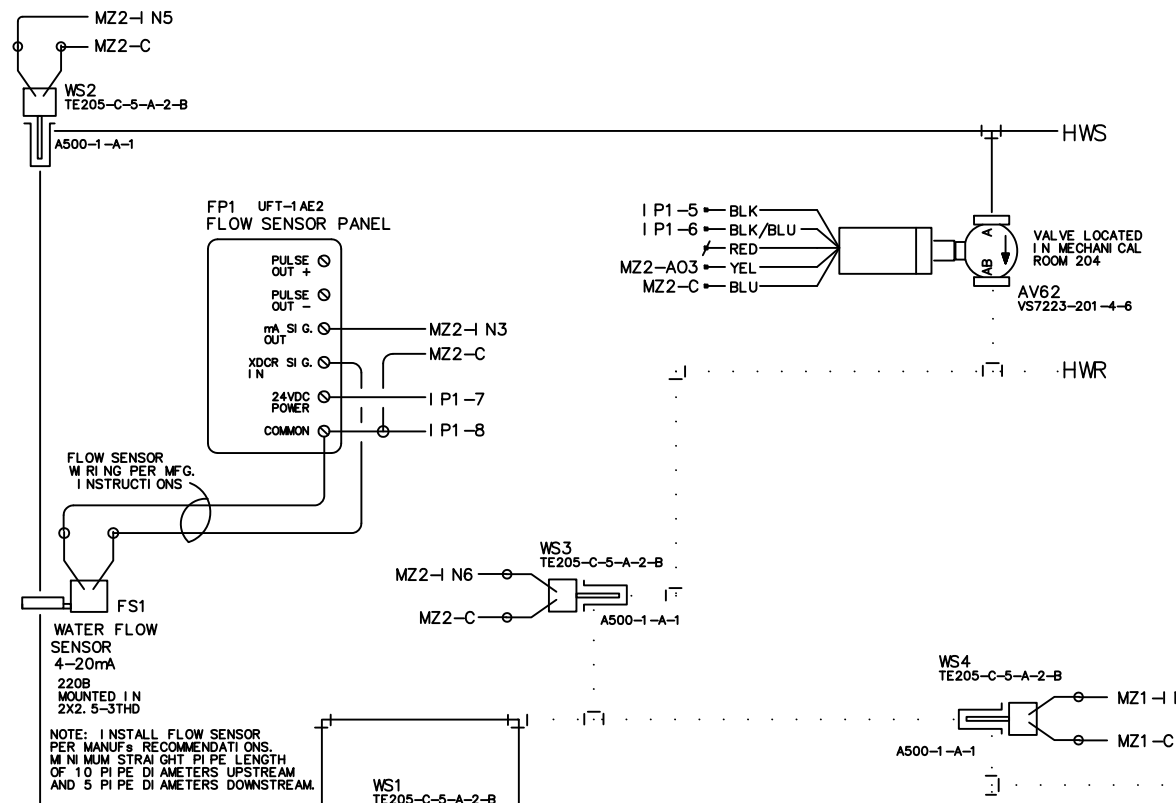
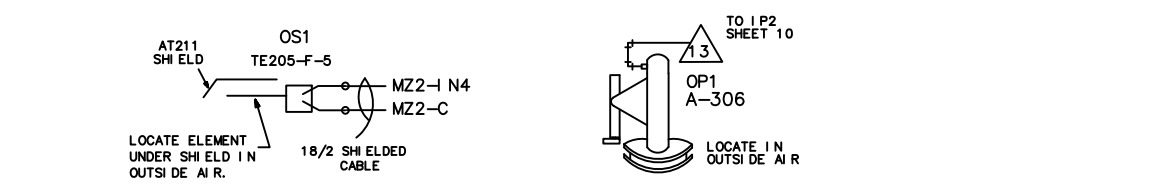


CONTROL SYSTEM ARCHITECTURE

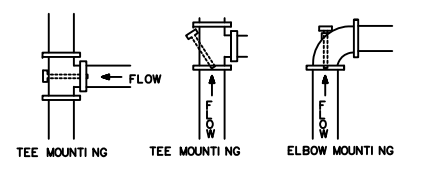
LOCATED IN MECHANICAL ROOM 204
SEE SHEET 10.

LOCATED IN BOILER ROOM 170
SEE SHEET 6.

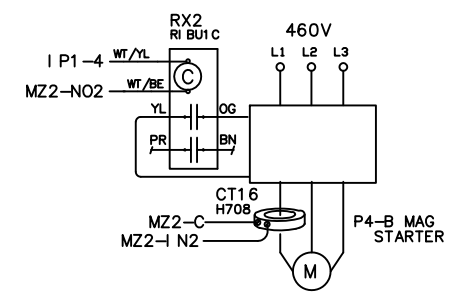
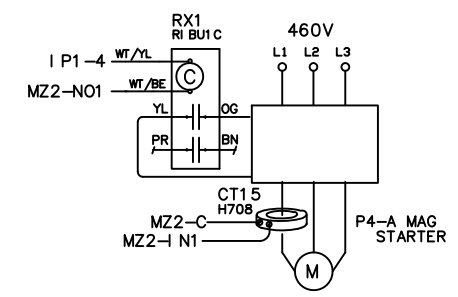
ENGINEER	MURRAY & ASSOC.
CONTRACTOR	NUNA
CCI ENGINEER	B. BUNDY
CHECKED	
DATE	03/10/99
REPRESENTING	SIEBE WASHINGTON-ALASKA OREGON-CALIFORNIA
5660 B STREET ANCHORAGE, AK 99518 PH = 907-561-3044 FAX = 907-561-4225	
CONTROL CONTRACTORS	
PROJECT	JUNEAU POLICE STATION JUNEAU, ALASKA
DATE	REVISION
10/99	REVI SED
11/99	REVI SED
02/00	REVI SED
FILENAME	99004-03
	CCI JOB NO. A99004-AI
	SHEET # 3 of 14



BULB MOUNTING - LIQUID LINE

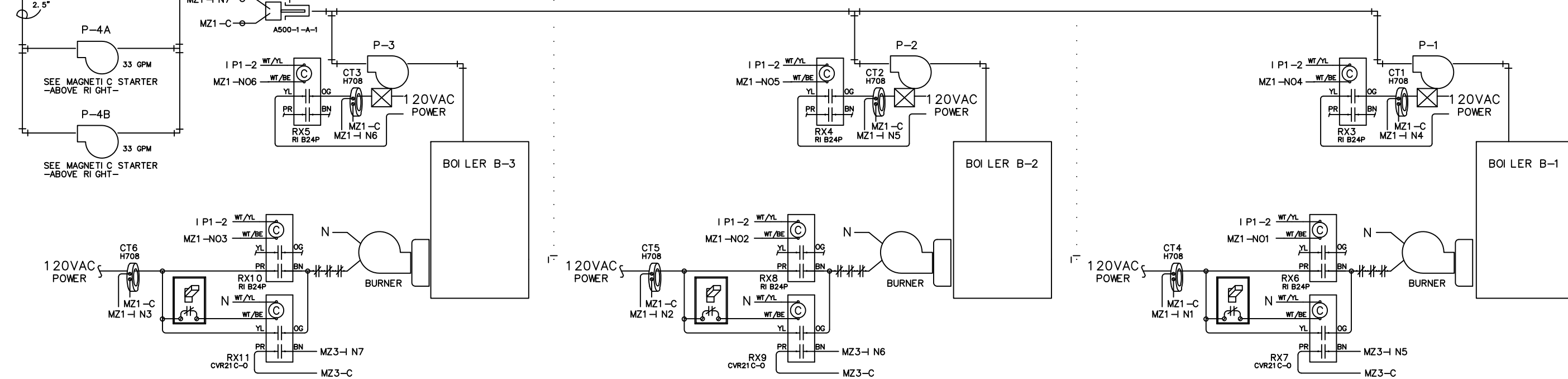


BOILER CONTROL SCHEDULE		
	ON	OFF
LEAD BOILER	180F	200F
LAG BOILER	170F	190F
STANDBY BOILER	160F	180F

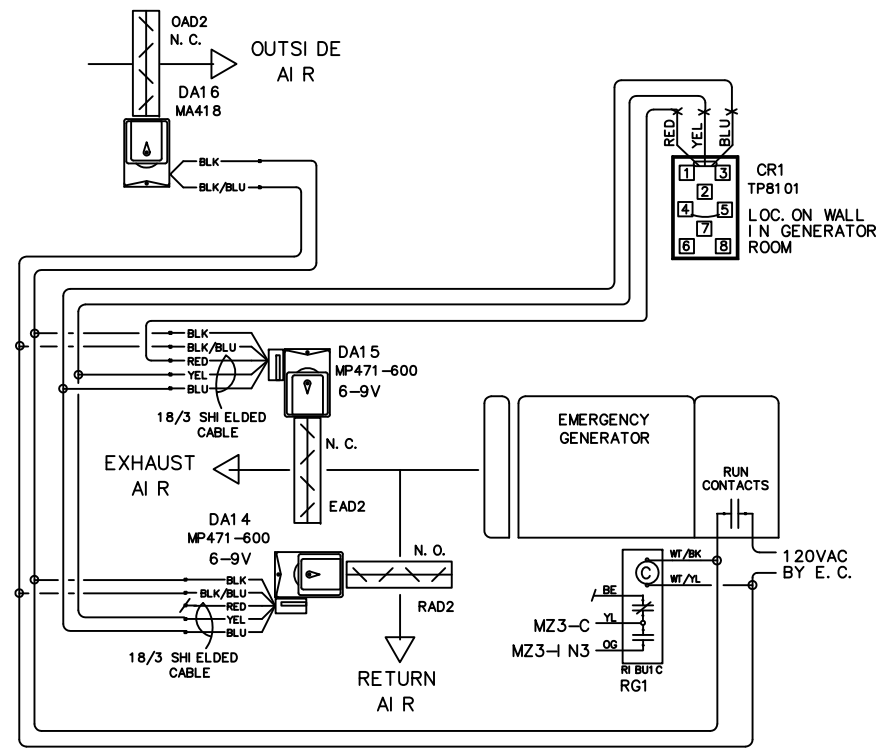


BILL OF MATERIALS

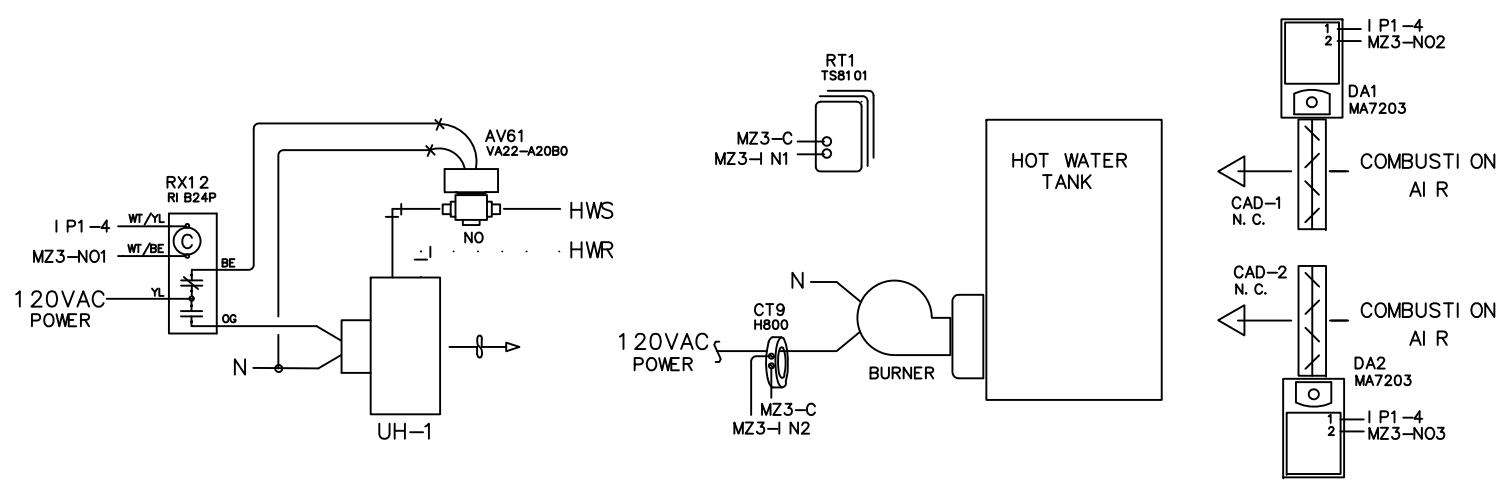
SYM	QTY	PART #	DESCRIPTION
AV62	1	VS7223-201-4-6	VALVE ASSY., 2-WAY, N.C., 3/4", 24V, SIEBE
CT1-6,15,16	1	H708	CURRENT SWITCH, VERIS
FP1	1	UFT-1AE2	FLOW TRANSMITTER, KELE
FS1	1	220B	FLOW SENSOR, DATA INDUSTRIAL
OP1	1	A306	OUTSIDE STATIC REFERENCE, DWYER
OS1	1	TE205-F-5	OUTSIDE TEMPERATURE SENSOR, MAMAC
RX1,2	2	RIBU1C	RELAY-IN-BOX, SIEBE
RX3-6,8,10	3	RIB24P	RELAY-IN-BOX, SIEBE
RX7,9,11	3	CVR21C-0	RELAY-IN-BOX, SIEBE
WS1-4	4	TE205-C-5-A-2-B	IMMERSION TEMPERATURE SENSOR, MAMAC
MISC.	4	A500-1-A-1	IMMERSION WELL, MAMAC
	1	2X2.5-3THD	THREADOLET, DATA INDUSTRIAL



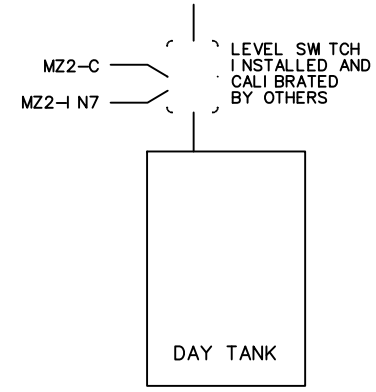
HEATING PLANT CONTROL



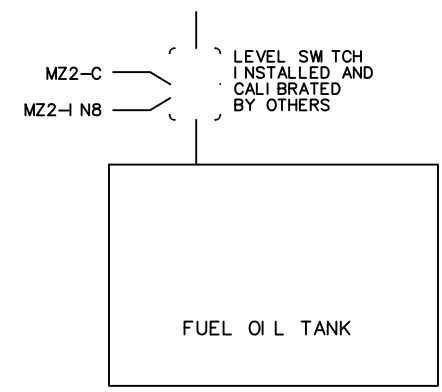
EMERGENCY GENERATOR VENTILATION



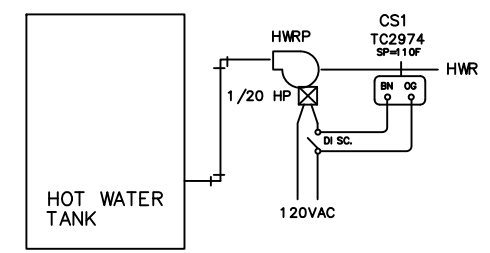
BOILER ROOM TEMPERATURE CONTROL DIAGRAM



DAY TANK CONTROL DIAGRAM



FUEL OIL TANK CONTROL DIAGRAM



HOT WATER TANK DIAGRAM

NOTE: POWER & DISCONNECT BY DIV. 16 CONTRACTOR

BILL OF MATERIALS

SYM	QTY	PART #	DESCRIPTION
AV61	1	VA22-A20B0	VALVE ASSMY., 2-WAY, N.O., 120V, SIEBE
CR1	1	TP8101	TEMPERATURE CONTROLLER, PROP., SIEBE
CS1	1	TC2974	STRAP-ON THERMOSTAT, SPDT, SIEBE
CT9	1	H800	CURRENT SWITCH, VERIS
DA1,2	2	MA7203	ACTUATOR, 2-POSITION, 24VAC, SIEBE
DA14,15	2	MP471-600	ACTUATOR, PROPORTIONAL, 120VAC, SIEBE
DA16	1	MA418	ACTUATOR, 2-POSITION, 120VAC, SIEBE
RG1	1	RIBU1C	RELAY-IN-BOX, SIEBE
RT1	1	TS8101	ROOM TEMPERATURE SENSOR, SIEBE
RX12	1	RIB24P	RELAY-IN-BOX, SIEBE

ENGINEER
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CCI ENGINEER
B. BUNDY
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DATE
03/10/99

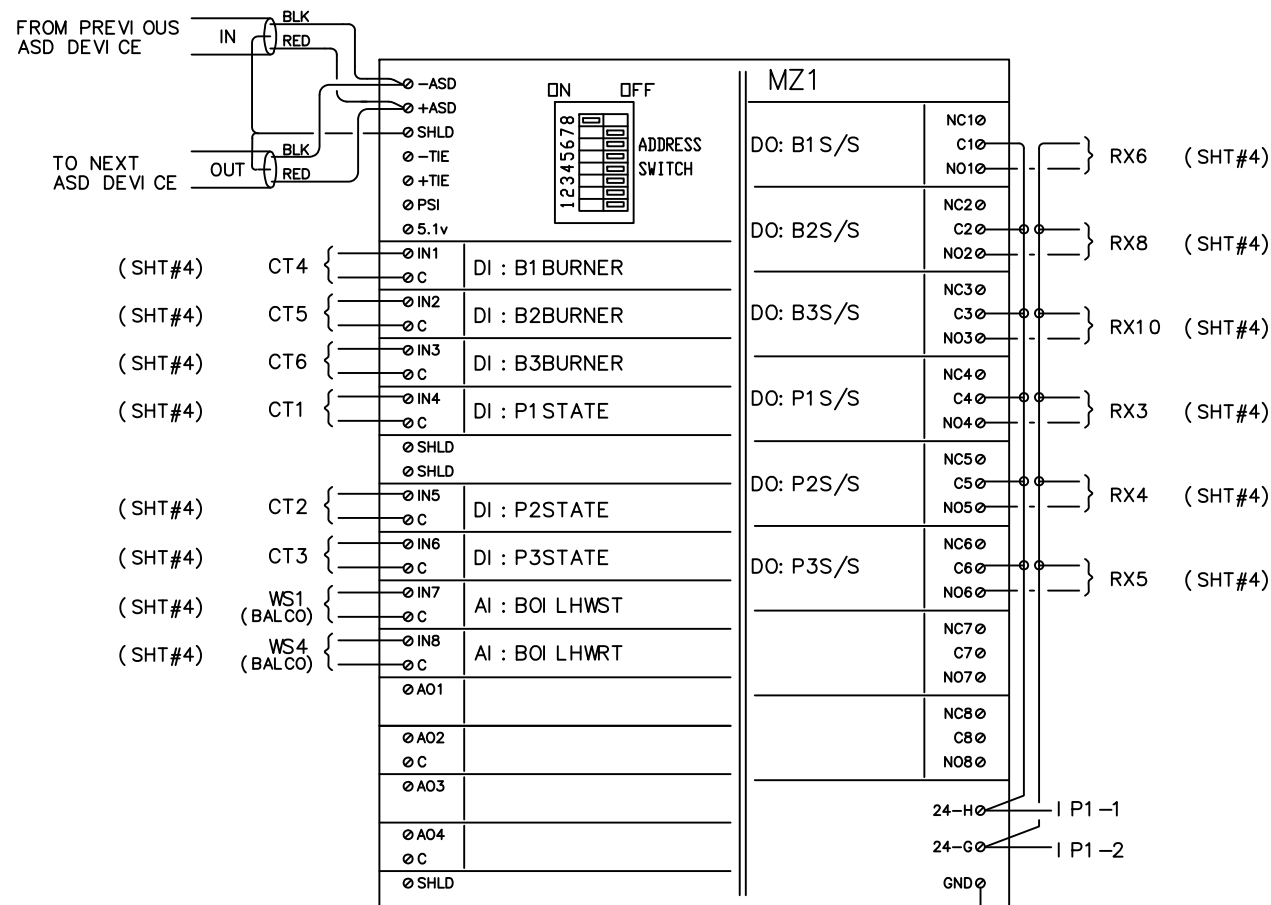
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5660 B STREET
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PH = 907-561-3044
FAX = 907-561-4225

CONTROL CONTRACTORS

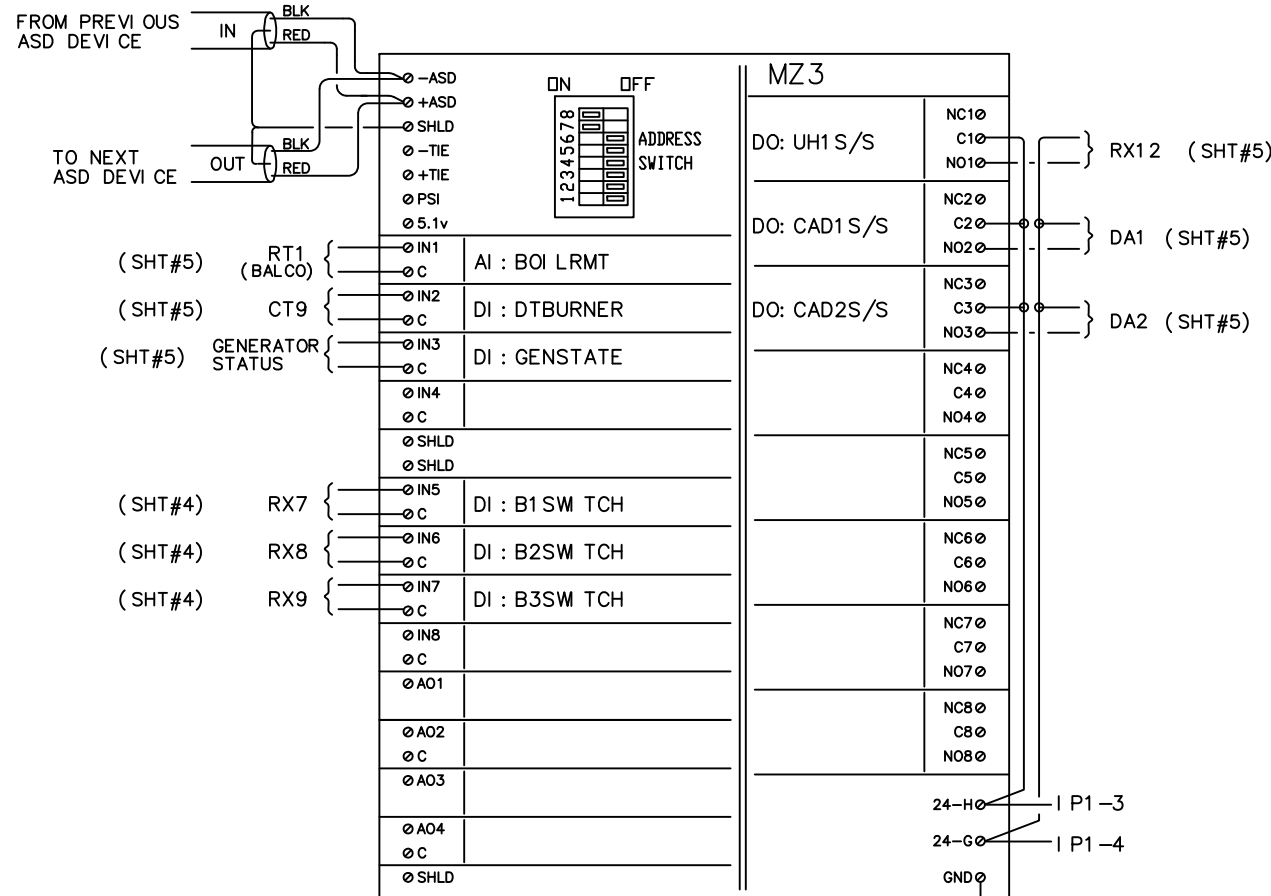
PROJECT
JUNEAU POLICE STATION
JUNEAU, ALASKA

DATE	REVISION
11/99	REVI SED

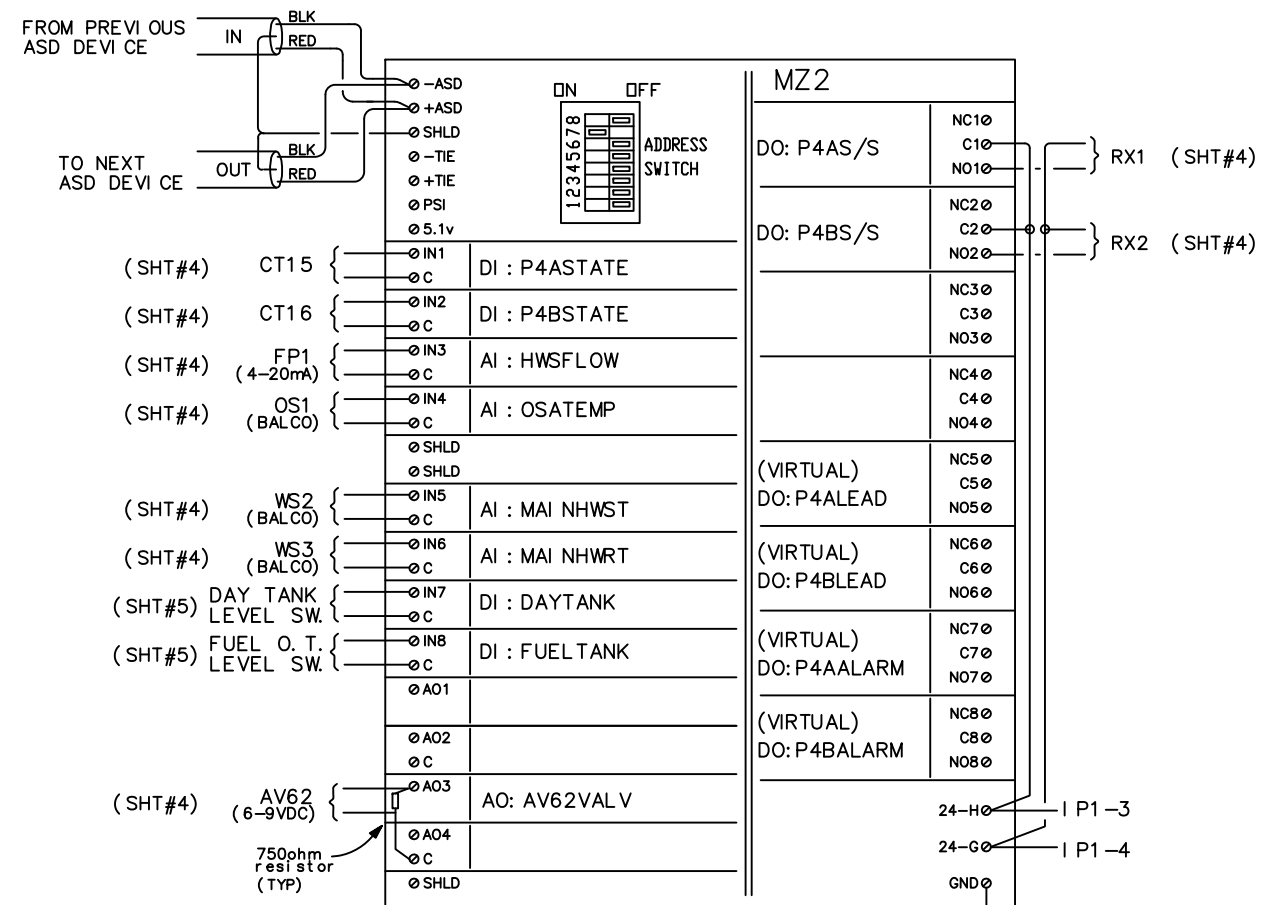
FILENAME
99004-05
CCI JOB NO.
A99004-AI
SHEET #
5 of 14



MZ2-1
LOCATE IN I P1 PANEL (SEE SHEET 6).
GROUND ALL SHIELDS AT THIS END ONLY.



MZ2-1
LOCATE IN I P1 PANEL (SEE SHEET 6).
GROUND ALL SHIELDS AT THIS END ONLY.



MZ2-1
LOCATE IN I P1 PANEL (SEE SHEET 6).
GROUND ALL SHIELDS AT THIS END ONLY.

ENGINEER
MURRAY & ASSOC.

CONTRACTOR
NUNA

CCI ENGINEER
B. BUNDY

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DATE
03/10/99

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WASHINGTON-ALASKA
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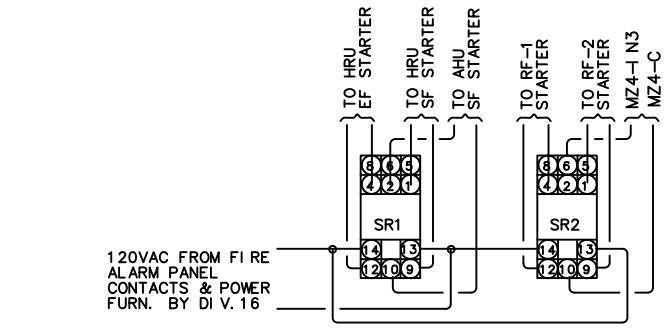
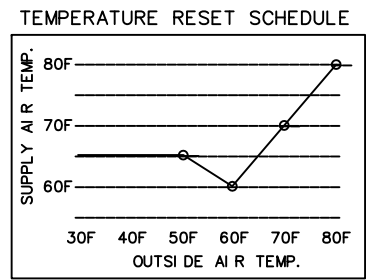
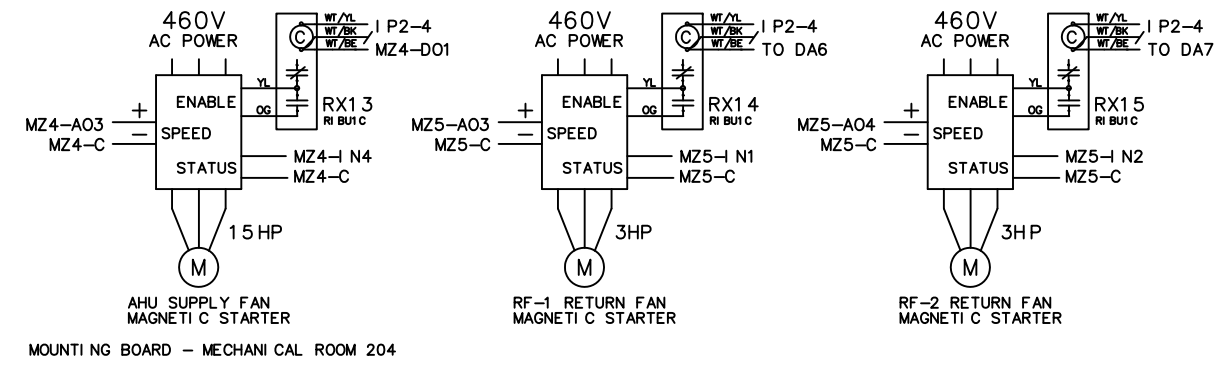
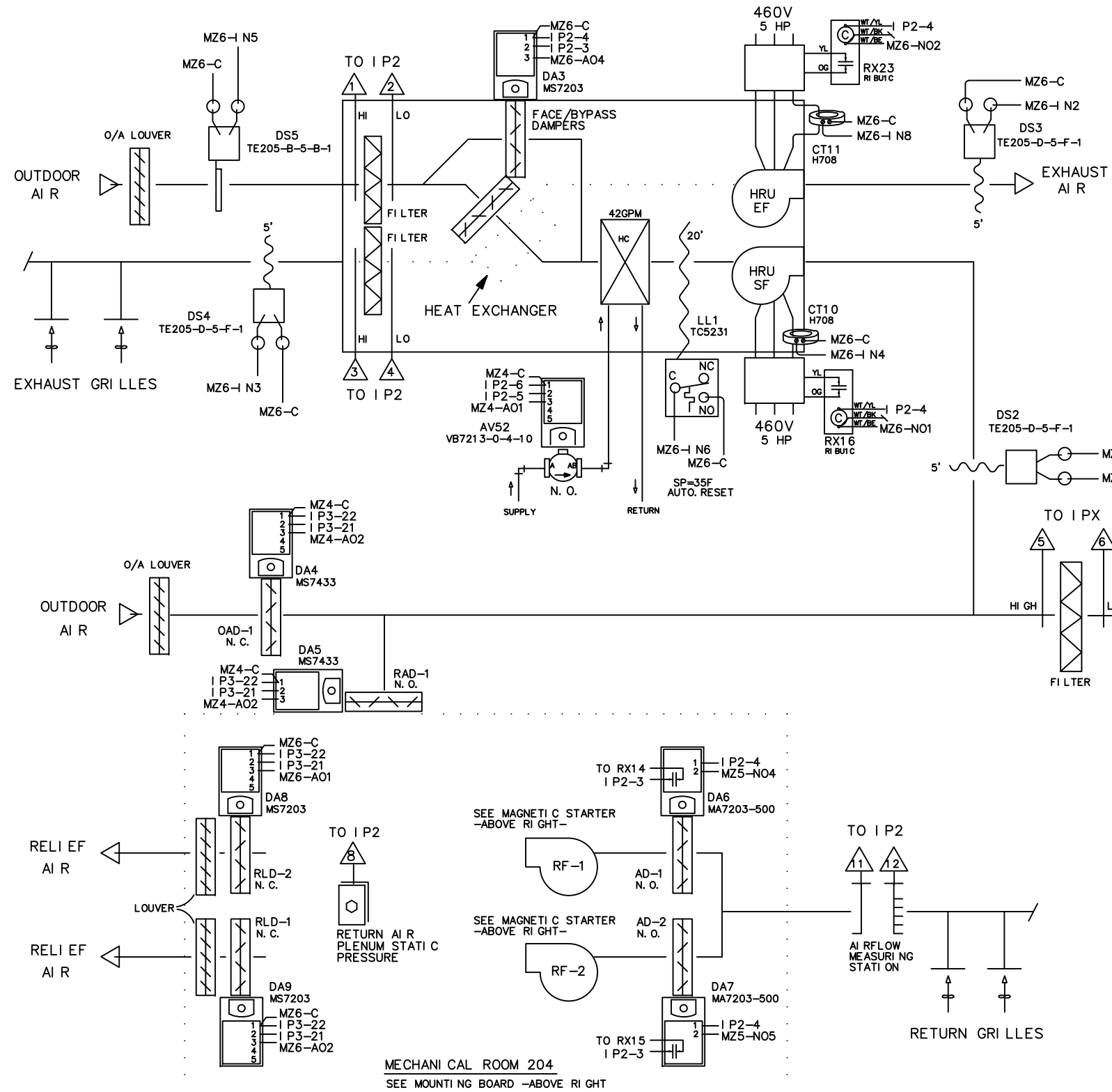
5660 B STREET
ANCHORAGE, AK 99518
PH = 907-561-3044
FAX = 907-561-4225

CONTROL CONTRACTORS

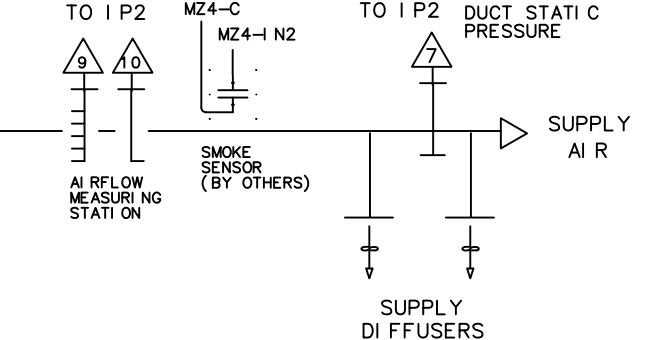
PROJECT
JUNEAU POLICE STATION
JUNEAU, ALASKA

DATE	REVISION
2/00	REVISED

FILENAME
99004-07
CCI JOB NO.
A99004-AI
SHEET #
7 of 14



NOTE: DUCT SMOKE SENSOR(S) FURNISHED BY DI V.16 CONTRACTOR



BILL OF MATERIALS

SYM	QTY	PART #	DESCRIPTION
AV52	1	VB7213-0-4-10	VALVE, 2-WAY, N.O., 1.5", SIEBE
CT10,11	2	H708	CURRENT SWITCH, VERIS
DA6,7	2	MA7203-500	ACTUATOR, 2-POSITION, 24V, SIEBE
DA4,5	2	MS7433	ACTUATOR, PROPORTIONAL, 24V, SIEBE
DA3,8,9	3	MS7203	ACTUATOR, PROPORTIONAL, 24V, SIEBE
DS1-4	4	TE205-D-5-F-1	DUCT AVG. TEMPERATURE SENSOR, MAMAC
DS5	1	TE205-B-5-B-1	DUCT TEMPERATURE SENSOR, MAMAC
LL1	1	TC5231	DUCT THERMOSTAT, SIEBE
RX13-16,25	1	RIBU1C	RELAY-IN-BOX, SIEBE
SR1,2	2	RH3B-UAC120V	RELAY, 3PDT, 120VAC, IDEC
MISC.	1	MS7433	VALVE ACTUATOR, PROP., 24V, SIEBE
	1	FUSE, 8 AMP, BUSS	FUSE, 8 AMP, BUSS
	7	AP302	DUCT STATIC REFERENCE, SIEBE
	1	RPS	ROOM STATIC REFERENCE, DWYER
	2	SH3B-05	RELAY BASE, IDEC

AIR HANDLING UNIT (AHU) RETURN FANS (RF-1,2) AND HEAT RECOVERY UNIT (HRU) CONTROL

ENGINEER
MURRAY & ASSOC.

CONTRACTOR
NUNA

CCI ENGINEER
B. BUNDY

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DATE
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CONTROL CONTRACTORS

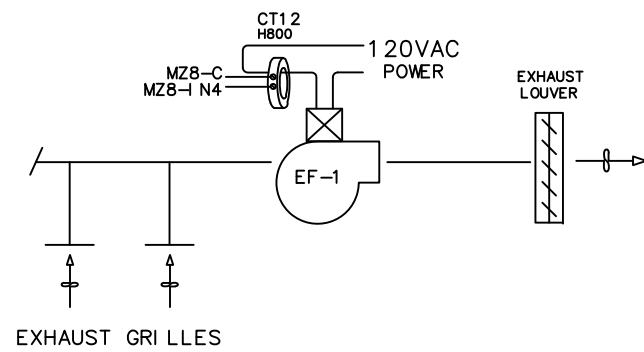
PROJECT
JUNEAU POLICE STATION
JUNEAU, ALASKA

DATE	REVISION
10/99	REVI SED
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02/00	REVI SED

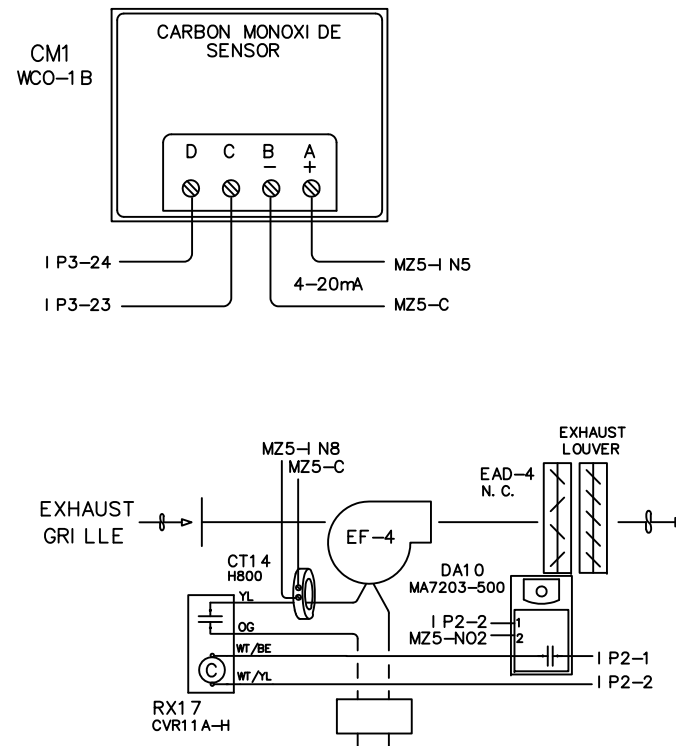
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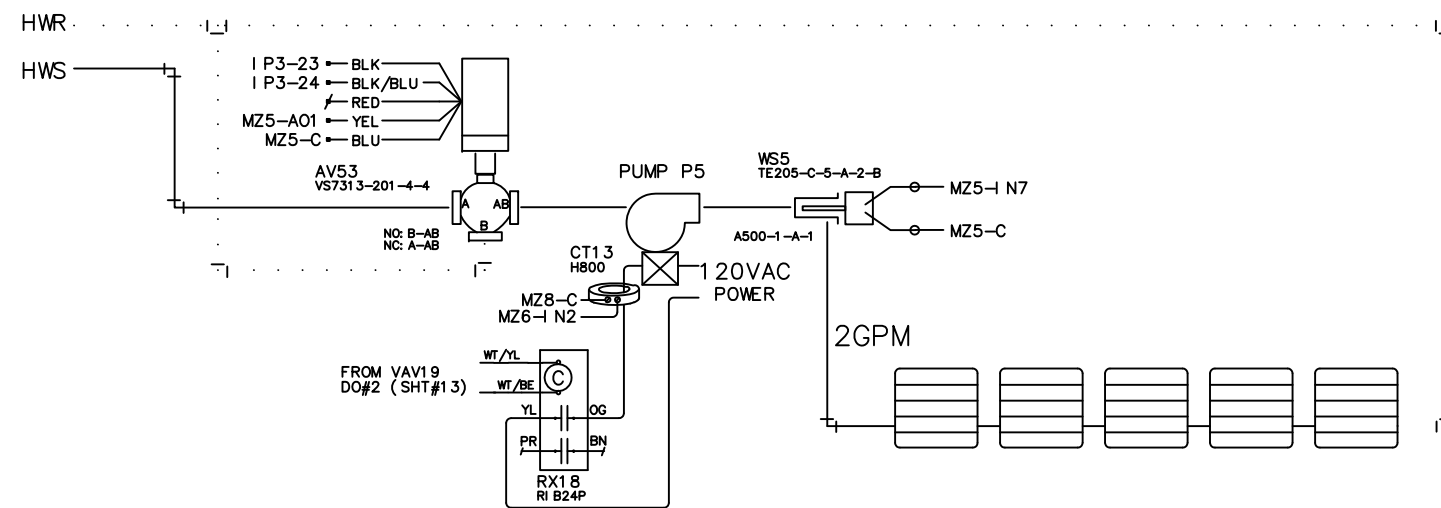
SHEET #
8 of 14



EXHAUST FAN (EF-1) CONTROL DIAGRAM

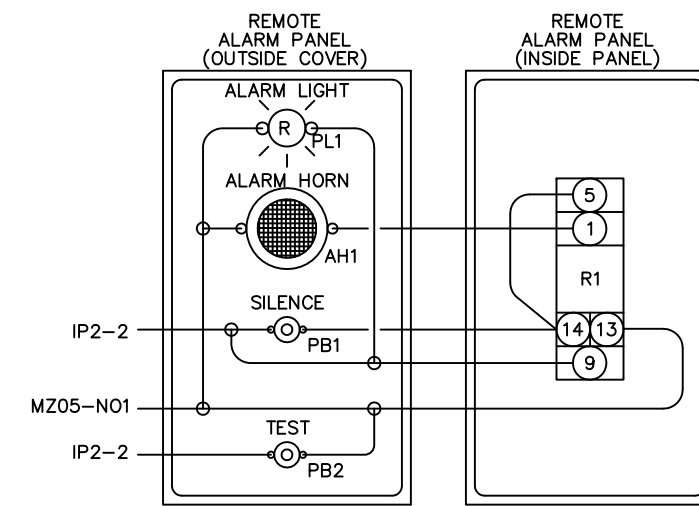


EXHAUST FAN (EF-4) CONTROL DIAGRAM



RADIANT HEATER CONTROL DIAGRAM

LOBBY001 - Temperature and setpoint From VAV19/MNFL03T



BILL OF MATERIALS

SYM	QTY	PART #	DESCRIPTION
AV53	1	VS7313-201-4-4	VALVE, 3-WAY MIXING, 1/2", SIEBE
CM1	1	WCO-1B	CARBON MONOXIDE SENSOR, KELE
CT12-14	3	H800	CURRENT SWITCH, VERIS
DA10,11	2	MA7203	ACTUATOR, 2-POSITION, 24VAC, SIEBE
RX17	1	CVR11A-H	RELAY-IN-BOX, W/HOA, SIEBE
RX18	1	RIB24P	RELAY-IN-BOX, SIEBE
WS5	1	TE205-C-5-A-2-B	IMMERSION TEMPERATURE SENSOR, MAMAC
MISC.	1	P349	HORN, 24VAC, SONALERT
	1	CYZP346	PUSHBUTTON, NO, MOMENTARY, SIEBE
	1	50C-G5	FLASHING LIGHT, 24VAC, EDWARDS
	1	A500-1-A-1	IMMERSION WELL, MAMAC

ENGINEER
MURRAY & ASSOC.

CONTRACTOR
NUNA

CCI ENGINEER
B. BUNDY

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DATE
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CONTROL CONTRACTORS

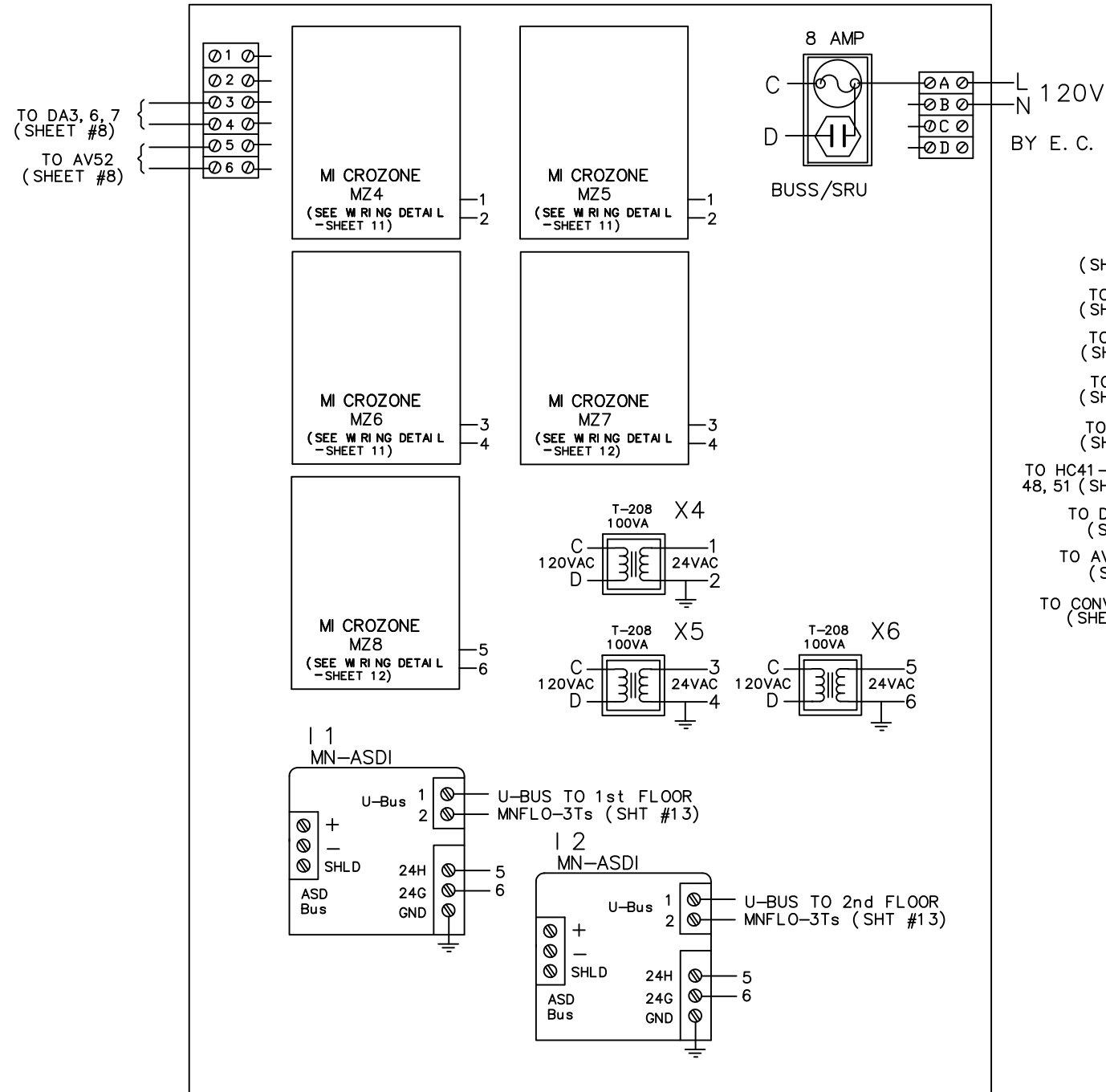
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JUNEAU POLICE STATION
JUNEAU, ALASKA

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10/99	REVI SED
02/00	REVI SED

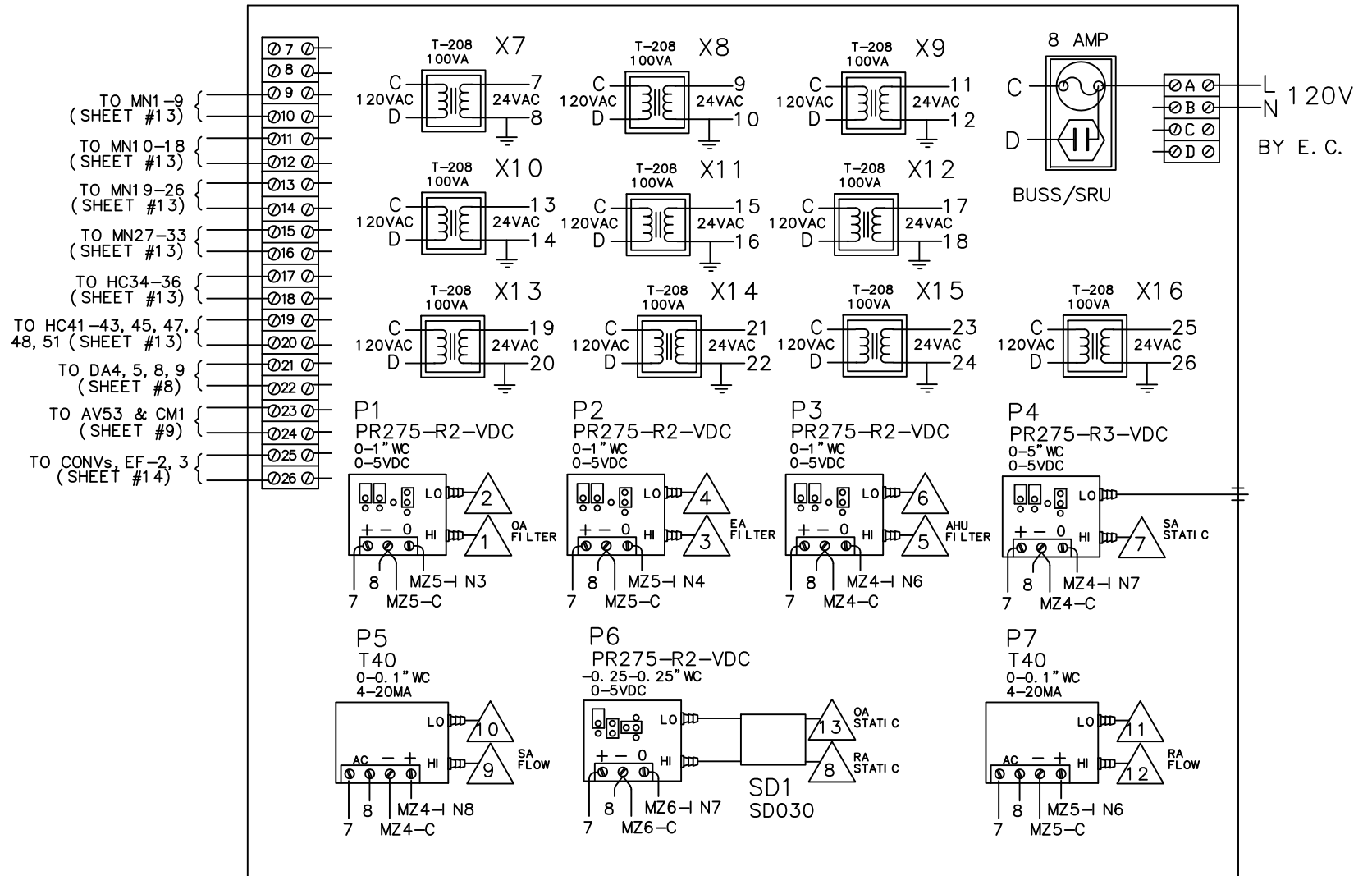
FILENAME
99004-09

CCI JOB NO.
A99004-AI

SHEET #
9 of 14



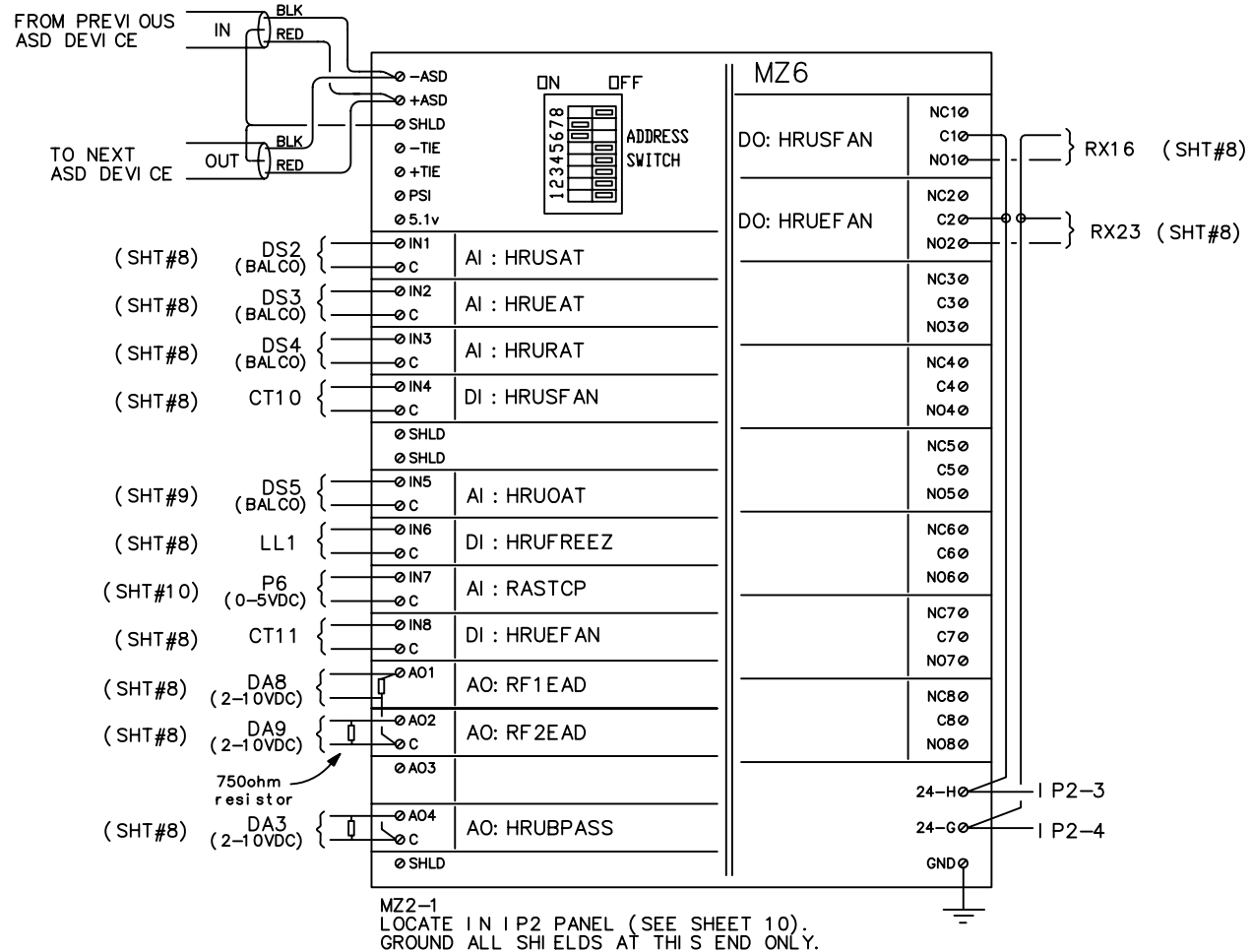
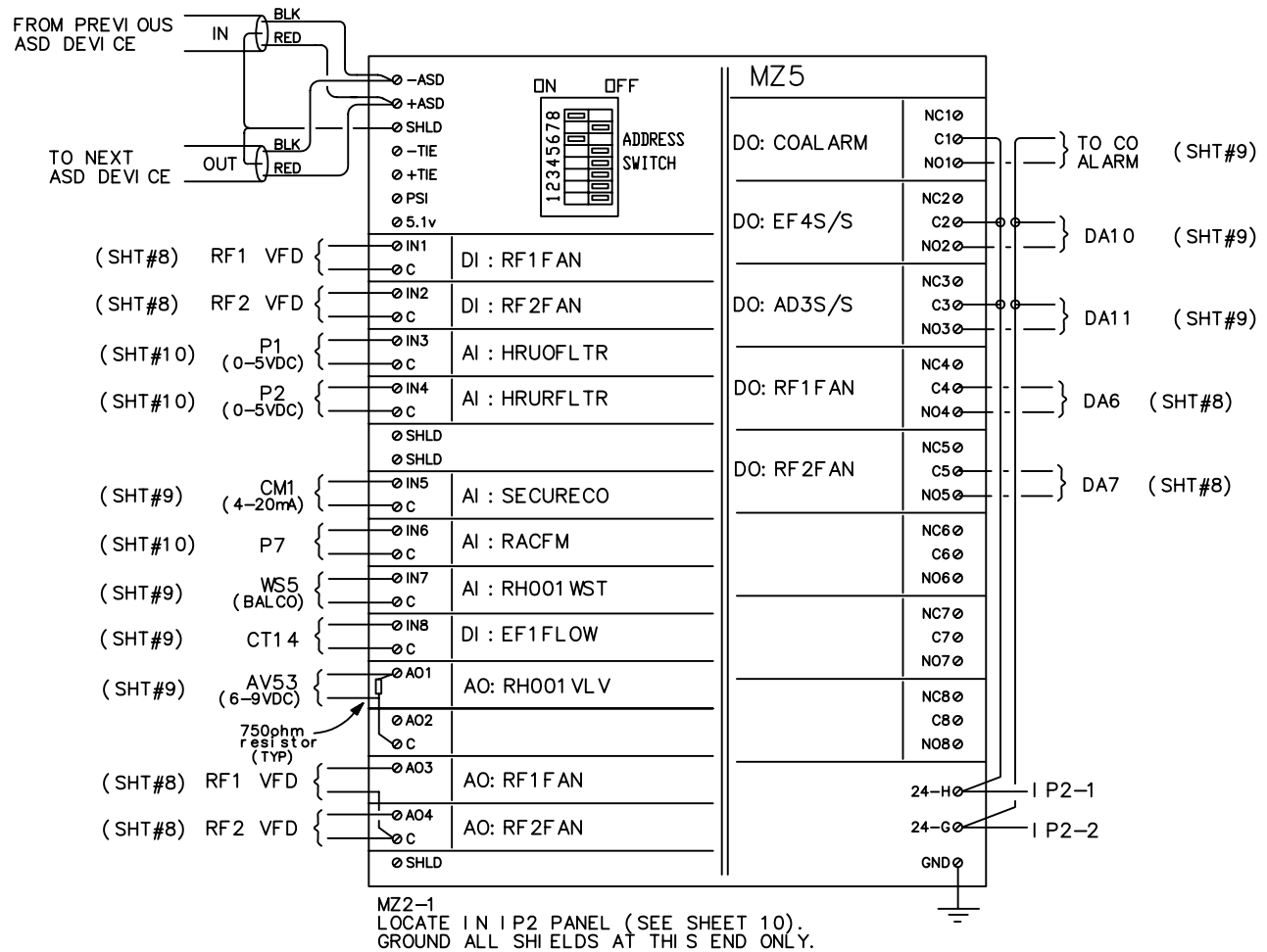
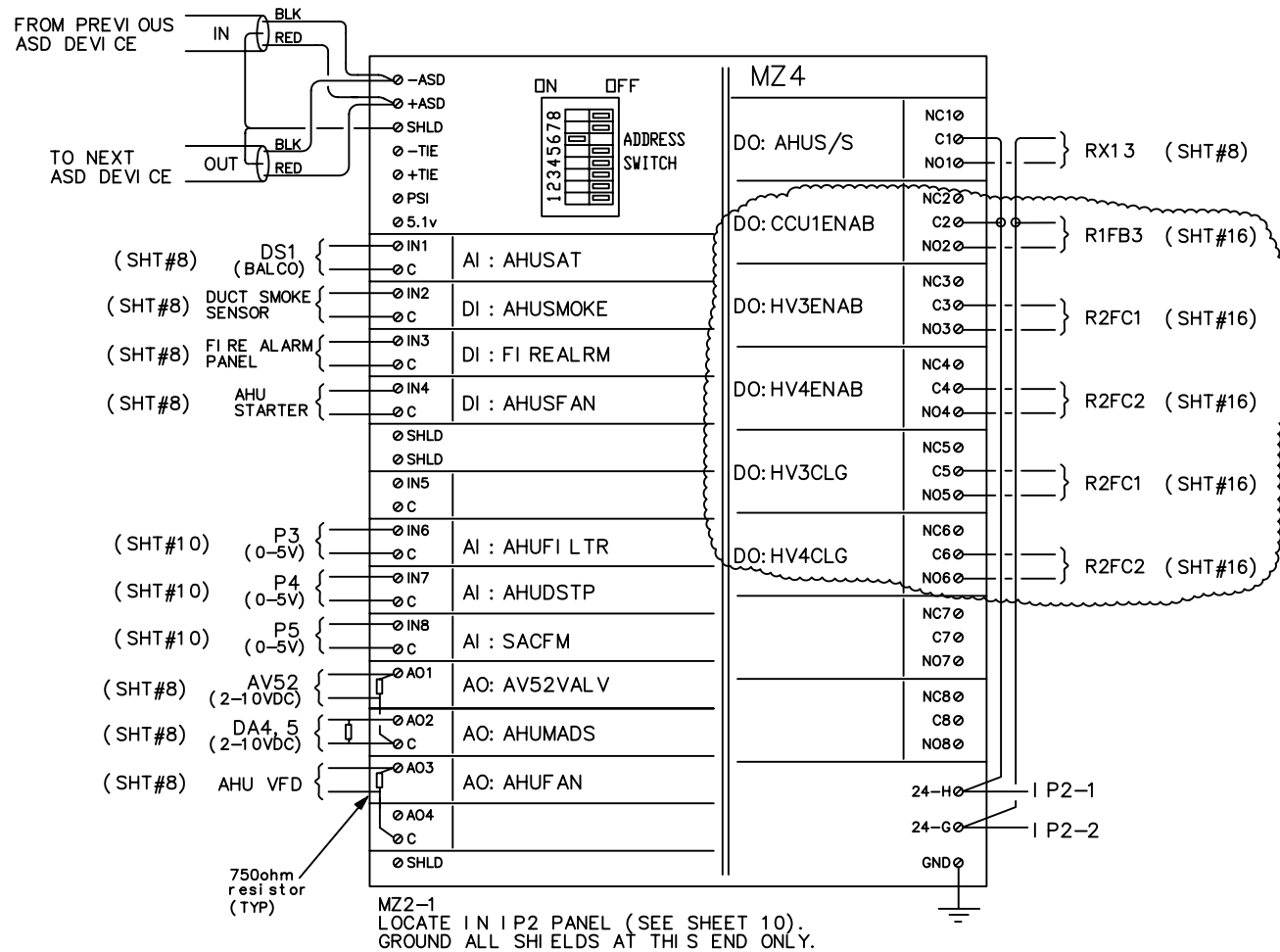
IP2 PANEL LOC. I IN MECHANICAL ROOM
42" X 36" X 8" NEMA 1
U. L. LISTED



IP3 PANEL LOC. I IN MECHANICAL ROOM
36" X 24" X 6" NEMA 1
U. L. LISTED

IP2/3 PANEL BILL OF MATERIALS

SYM	QTY	PART #	DESCRIPTION
I1,2	2	MN-ASDI	MICRONET INTEGRATOR, SIEBE
IP2	1	A-42N3609	ENCLOSURE, NEMA1, W/PANEL, HOFFMAN
IP3	1	A-36N24A	ENCLOSURE, NEMA1, W/PANEL, HOFFMAN
MZ4-8	5	MZ2-1	MICROZONE CONTROLLER, SIEBE
P1,2,3,6	4	PR275-R2-VDC	DIFF.PRESS.TRANSUDCER, MAMAC
P4	1	PR275-R3-VDC	DIFF.PRESS.TRANSUDCER, MAMAC
P5,7	2	T40	DIFF.PRESS.TRANSUDCER, KELE
SD1	1	SD030	SURGE DAMPENR, SIEBE
X4-16	13	T-208	TRANSFORMER, 100VA, SIEBE
MISC.	2	660	BOX, 1-GANG, BUSS
	2	SA8	FUSE ADAPTER, BUSS
	2	S8	FUSE, 8 AMP, BUSS
	2	SRU	HOUSING, BUSS
	1	A-42P36	PANEL, HOFFMAN
	2		TERMINAL STRIP



ENGINEER
MURRAY & ASSOC.

CONTRACTOR
NUNA

CCI ENGINEER
B. BUNDY

CHECKED

DATE
03/10/99

REPRESENTING
SIEBE
WASHINGTON-ALASKA
OREGON-CALIFORNIA

5660 B STREET
ANCHORAGE, AK 99518
PH = 907-561-3044
FAX = 907-561-4225

CONTROL CONTRACTORS

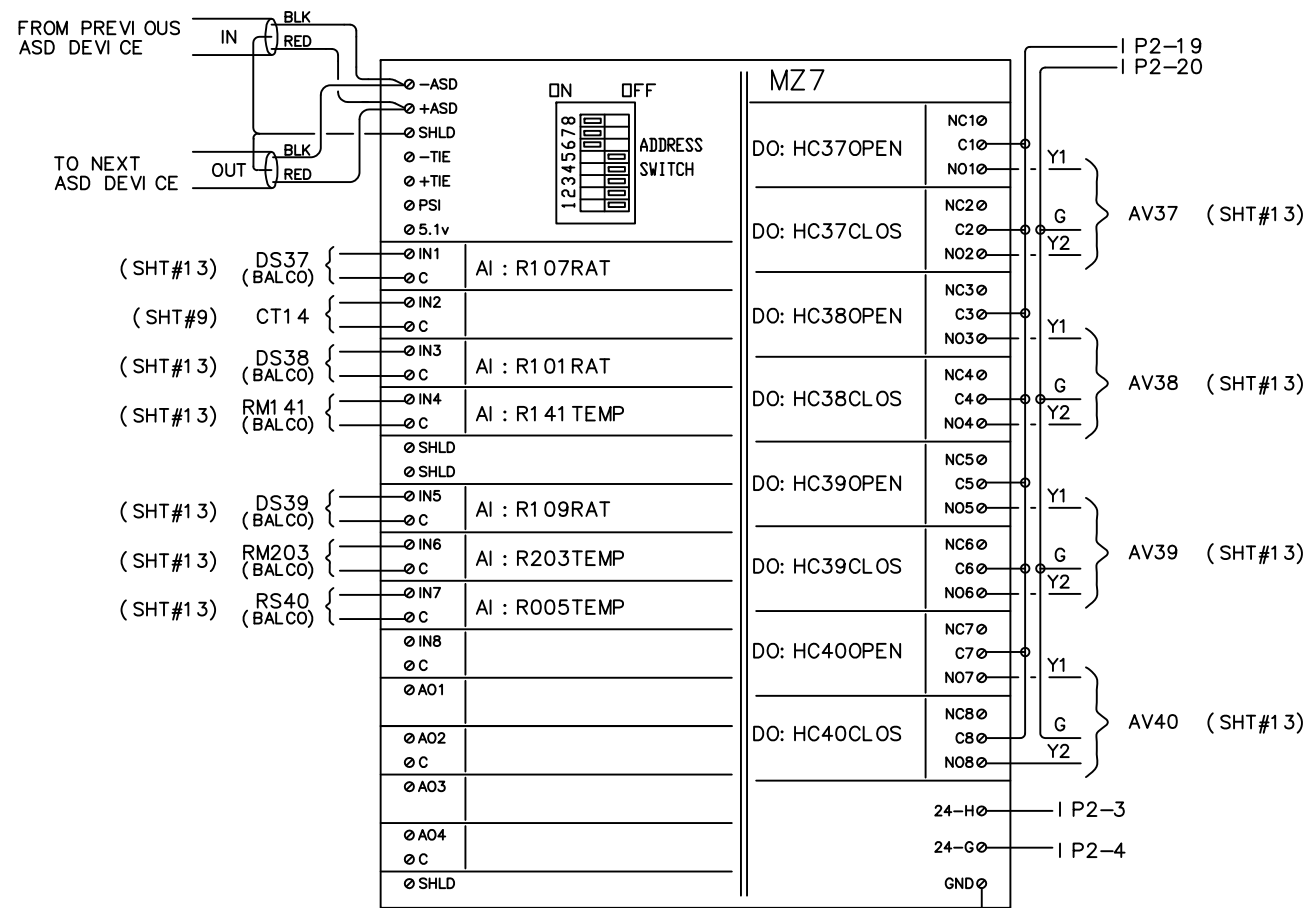
PROJECT
JUNEAU POLICE STATION
JUNEAU, ALASKA

DATE	REVISION
10/99	REVISED
02/00	REVISED
11/10	REVISED
03/11	REVISED

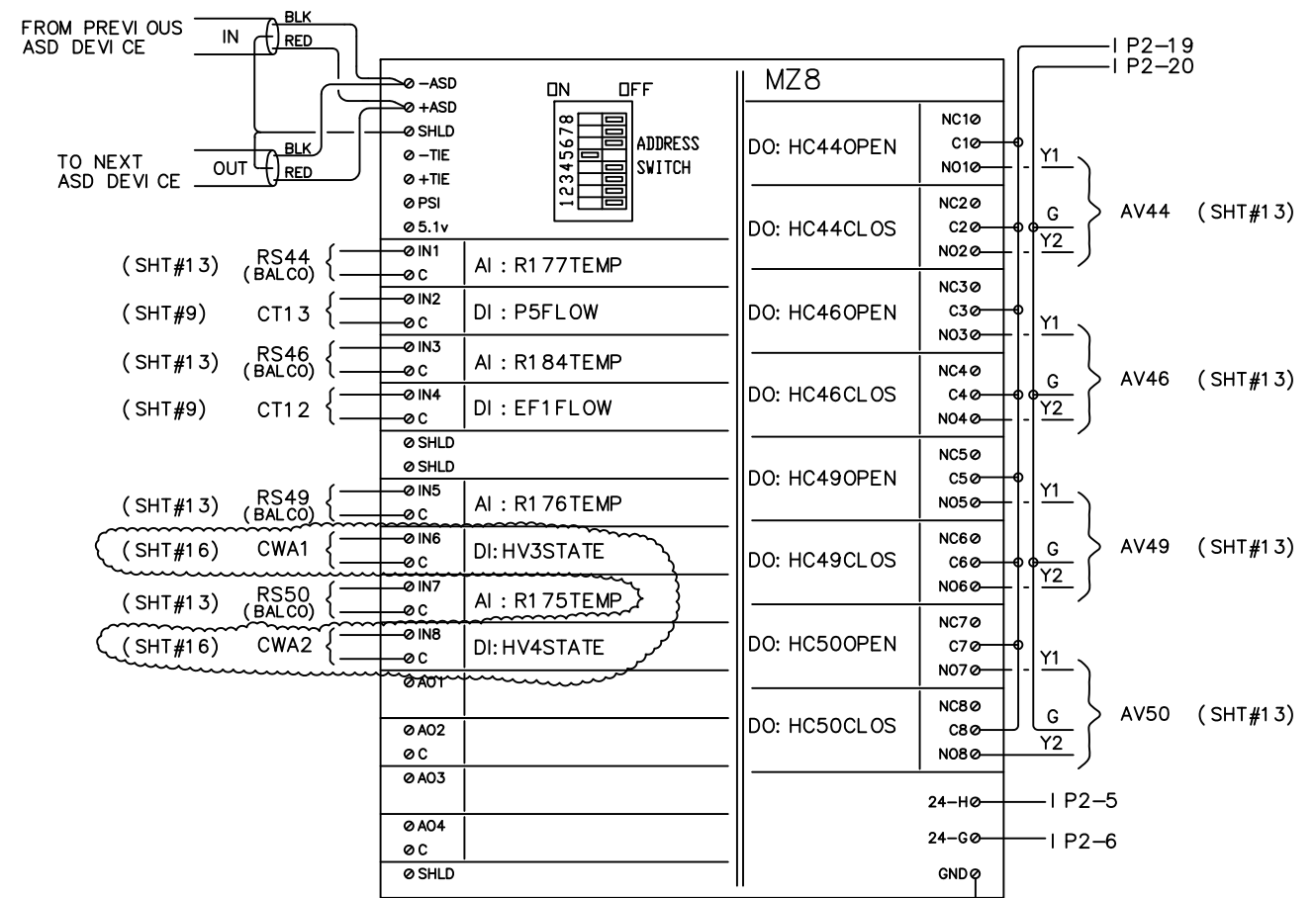
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A99004-AI

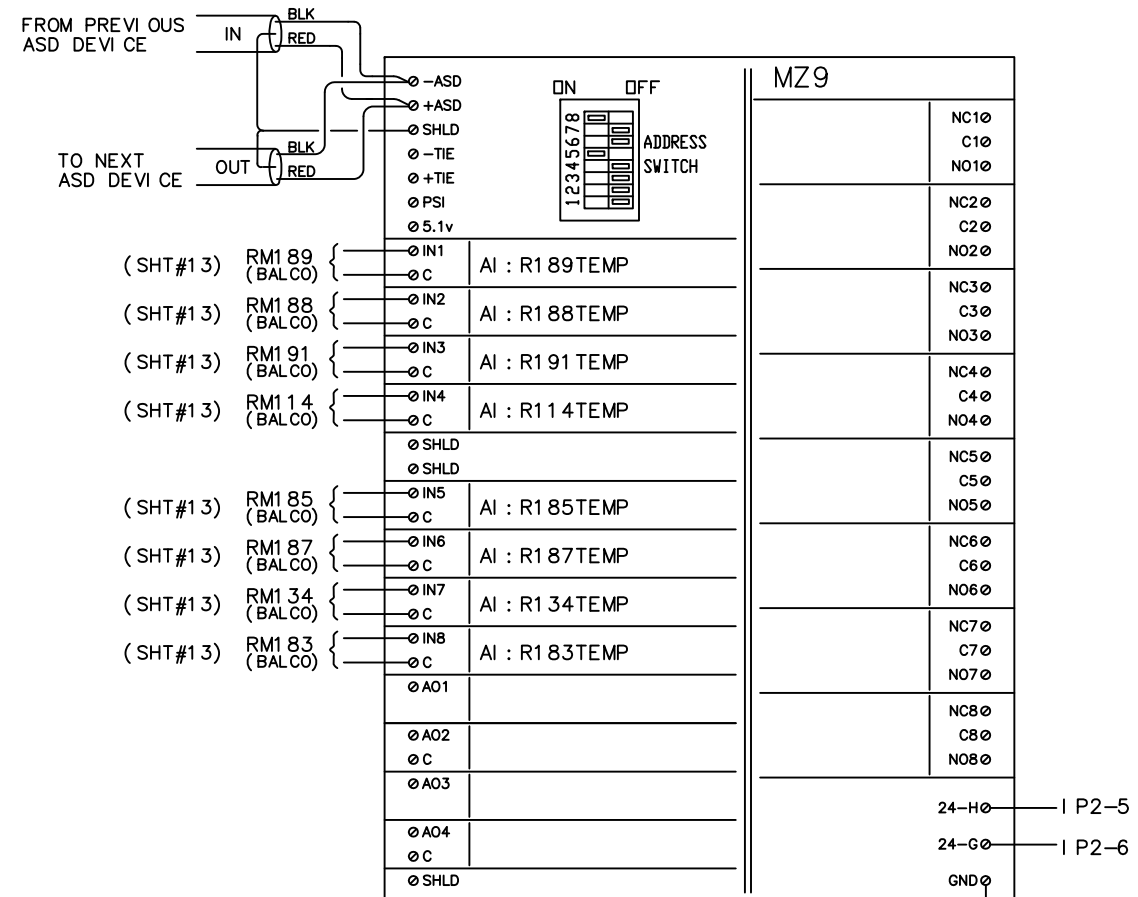
SHEET #
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MZ2-1
LOCATE IN I P2 PANEL (SEE SHEET 10).
GROUND ALL SHIELDS AT THIS END ONLY.



MZ2-1
LOCATE IN I P2 PANEL (SEE SHEET 10).
GROUND ALL SHIELDS AT THIS END ONLY.



MZ2-1
LOCATE OUTSIDE OF I P2 PANEL (SEE SHEET 10).
GROUND ALL SHIELDS AT THIS END ONLY.

ENGINEER
MURRAY & ASSOC.

CONTRACTOR
NUNA

CCI ENGINEER
B. BUNDY

CHECKED

DATE
03/10/99

REPRESENTING
SIEBE
WASHINGTON-ALASKA
OREGON-CALIFORNIA

5660 B STREET
ANCHORAGE, AK 99518
PH = 907-561-3044
FAX = 907-561-4225

CONTROL CONTRACTORS

PROJECT
JUNEAU POLICE STATION
JUNEAU, ALASKA

DATE	REVISION
10/99	REVI SED
02/00	REVI SED
11/10	REVI SED

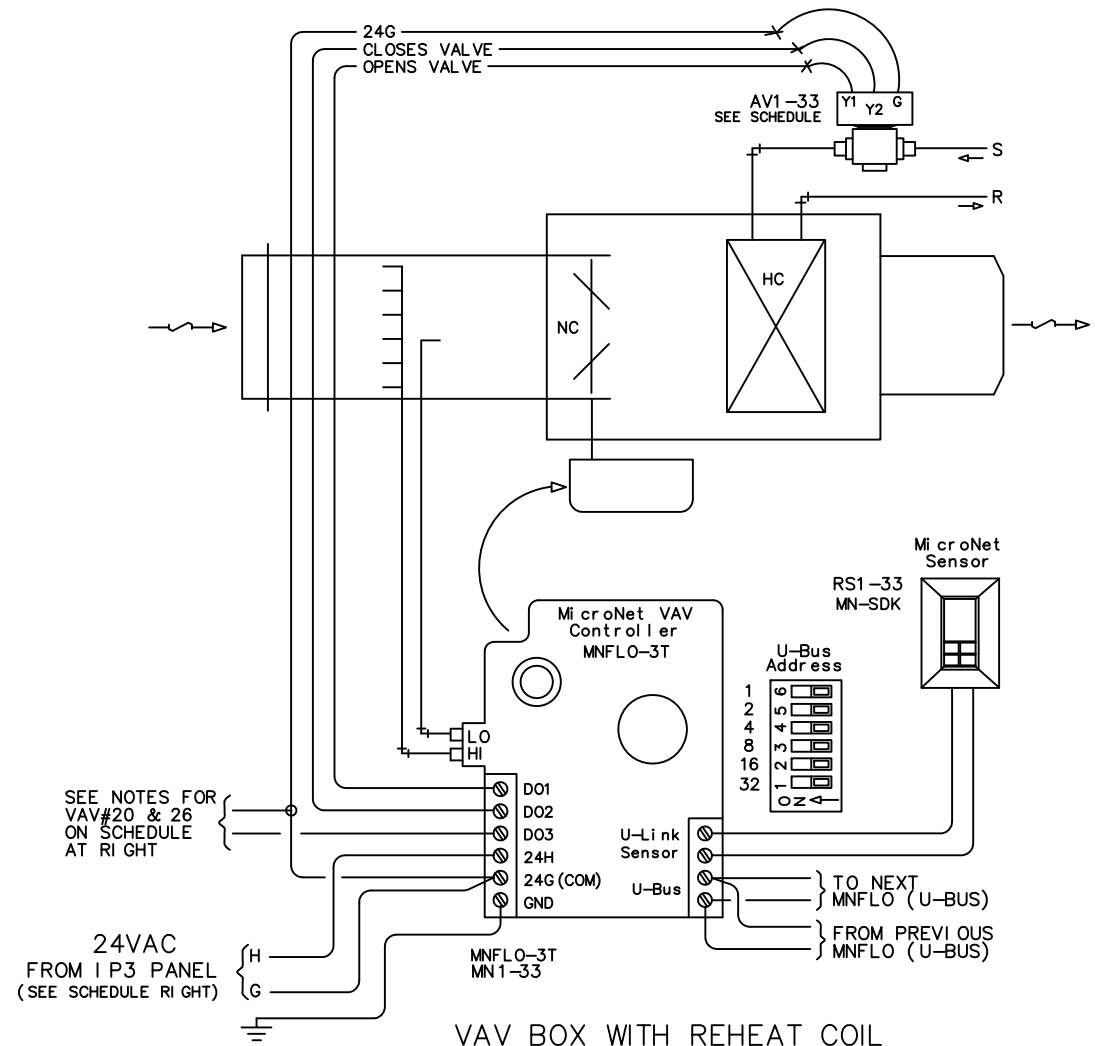
FILENAME
99004-12

CCI JOB NO.
A99004-AI

SHEET #
12 of 14

TERMI NAL UNI T SCHEDULE

VAV#	INT#	MN#/ADDR.	CFM MAX.	CFM MIN.	HT COI L (GPM/AV#)	24V POWER	ATU LOCATI ON	SENSOR LOCATI ON	NOTES
1	1	MN1 / 1	190	95	0.2 / AV1	IP3-9, 10	BRK124	RM1 23	
2	1	MN2 / 2	705	355	0.6 / AV2	IP3-9, 10	BRK124	RM1 20	
3	1	MN3 / 3	795	535	0.3 / AV3	IP3-9, 10	BRK124	RM003	
4	1	MN4 / 4	600	285	0.4 / AV4	IP3-9, 10	BRK124	RM1 24	
5	1	MN5 / 5	630	315	0.5 / AV5	IP3-9, 10	COR018	RM1 30	
6	1	MN6 / 6	350	180	0.3 / AV6	IP3-9, 10	COR018	RM1 33	
7	1	MN7 / 7	280	140	0.2 / AV7	IP3-9, 10	COR018	RM1 36	
8	1	MN8 / 8	500	250	0.3 / AV8	IP3-9, 10	COR018	RM1 81	
9	1	MN9 / 9	470	240	0.4 / AV9	IP3-9, 10	COR018	RM1 37	
10	1	MN10 / 10	300	150	0.2 / AV10	IP3-11, 12	COR018	RM1 52	
11	1	MN11 / 11	480	325	0.2 / AV11	IP3-11, 12	COR018	RM1 51	
12	1	MN12 / 12	1120	560	0.5 / AV12	IP3-11, 12	COR018	RM1 74	
13	1	MN13 / 13	290	145	0.2 / AV13	IP3-11, 12	COR018	RM1 53	
14	1	MN14 / 14	510	255	0.4 / AV14	IP3-11, 12	COR018	RM1 54	
15	1	MN15 / 15	705	470	0.2 / AV15	IP3-11, 12	COR018	RM1 61	
16	1	MN16 / 16	390	200	0.3 / AV16	IP3-11, 12	COR018	RM1 63	
17	1	MN17 / 17	225	150	0.3 / AV17	IP3-11, 12	COR018	RM1 64-WEST	
18	1	MN18 / 18	175	90	0.3 / AV18	IP3-11, 12	COR018	RM1 64-EAST	
19	2	MN19 / 1	860	450	0.4 / AV19	IP3-13, 14	COR201	RM001	NO ADJ. AT SENSOR, PUMP5 INTLK.
20	2	MN20 / 2	805	400	0.4 / AV20	IP3-13, 14	COR201	RM245	ADD DO FOR HVAC2 INTERLOCK
21	2	MN21 / 3	680	340	0.2 / AV21	IP3-13, 14	COR201	RM210	
22	2	MN22 / 4	330	165	0.3 / AV22	IP3-13, 14	COR201	RM211	
23	2	MN23 / 5	390	195	0.3 / AV23	IP3-13, 14	COR201	RM213	
24	2	MN24 / 6	720	360	0.4 / AV24	IP3-13, 14	COR201	RM215	
25	2	MN25 / 7	215	110	0.2 / AV25	IP3-13, 14	COR201	RM241	
26	2	MN26 / 8	855	375	—	IP3-13, 14	COR201	RM240	NO COI L/ADD DO FOR HVAC1 INTERLOCK
27	2	MN27 / 9	400	200	0.2 / AV27	IP3-15, 16	COR201	RM218	
28	2	MN28 / 10	840	420	0.3 / AV28	IP3-15, 16	COR201	RM230	ESTABL. OCCUPI ED MODE
29	2	MN29 / 11	400	200	0.2 / AV29	IP3-15, 16	COR201	RM220	
30	2	MN30 / 12	570	285	0.2 / AV30	IP3-15, 16	COR201	RM231	ESTABL. OCCUPI ED MODE
31	2	MN31 / 13	420	420	0.2 / AV31	IP3-15, 16	COR201	RM224	
32	2	MN32 / 14	385	190	0.2 / AV32	IP3-15, 16	COR201	RM222	
33	2	MN33 / 15	965	485	0.5 / AV33	IP3-15, 16	COR201	RM232	ESTABL. OCCUPI ED MODE



VAV BOX WITH REHEAT COI L

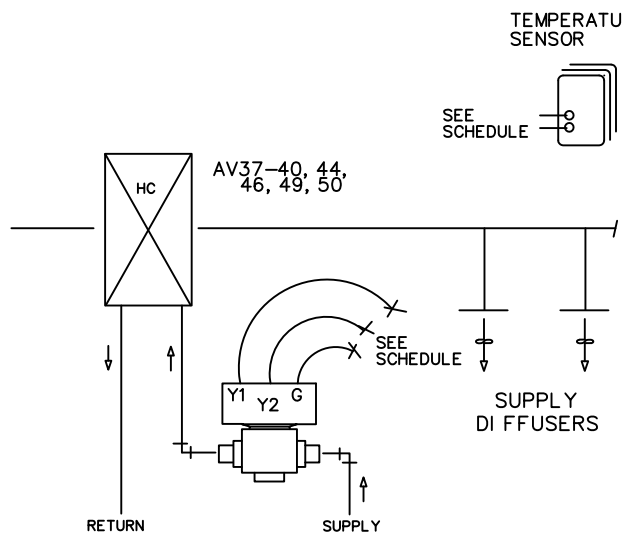
TYPI CAL OF 33 (SEE SCHEDULE)
NOTE: VAV-26 HAS NO HEATI NG COI L

BI LL OF MATERI ALS

SYM	QTY	PART #	DESCRI PTI ON
AV1-33, 37, 39-42, 44-48, 50, 51	44	V42102	REHEAT VALVE, NO, 24V, SI EBE
AV34-36	3	VA22-A23AO	REHEAT VALVE, NO, 24V, SI EBE
AV38, 43, 49	3	V42112	REHEAT VALVE, NO, 24V, SI EBE
DS37-39	3	TE205-B-5-B-1	DUCT TEMPERATURE SENSOR, MAMAC
MN1-33	33	MNFL0-3T	VAV CONTROLLER, SI EBE
RS1-33	33	MN-SDK	ROOM TEMPERATURE SENSOR, SI EBE
RS40, 44, 46, 49, 50	5	TS8101	ROOM TEMPERATURE SENSOR, SI EBE
T34-36	3	TC1101	ROOM THERMOSTAT, SI EBE
T41-43, 45, 47, 48, 51	7	TA157-005	THERMOSTAT, PROP. ERI E
MI SC.	10		BALCO SENSOR, SI EBE

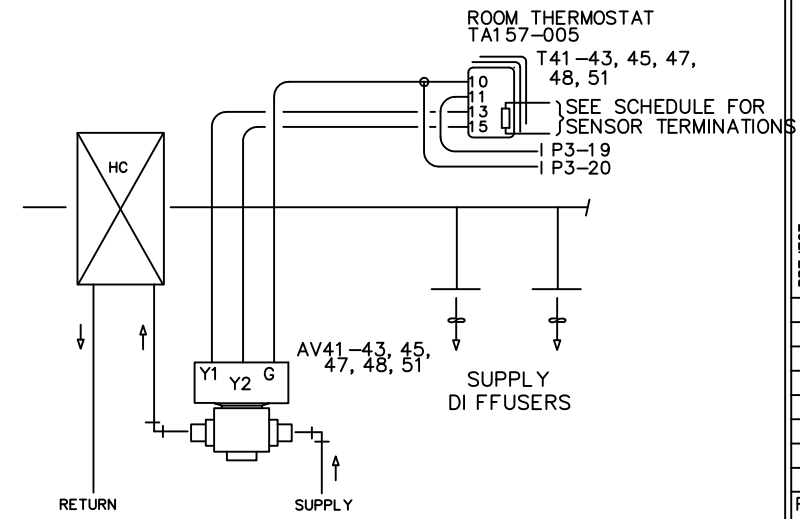
DUCT HEATI NG COI L SCHEDULE

HC#	HT COI L (GPM/AV#)	24V POWER	COI L LOCATI ON	VALVE TERMI NATI ON	ROOM SENSOR	ROOM TSTAT	DUCT SENSOR	SENSOR TERMI NATI ON	NOTES:
34	0.5 / AV34	IP3-17, 18	RM1 90	---	---	RM1 89	---	MZ9-I N1	REMOTE SENSOR
35	0.3 / AV35	IP3-17, 18	RM1 90	---	---	RM1 88	---	MZ9-I N2	TC1101 TSTAT
36	0.3 / AV36	IP3-17, 18	RM1 90	---	---	RM1 91	---	MZ9-I N3	TC1101 TSTAT
37	0.2 / AV37	IP3-19, 20	COR012	MZ7-N01, 2	---	---	RM1 07	MZ7-I N1	---
38	0.9 / AV38	IP3-19, 20	COR012	MZ7-N03, 4	---	---	RM1 01	MZ7-I N3	---
39	0.2 / AV39	IP3-19, 20	COR012	MZ7-N05, 6	---	---	RM1 09	MZ7-I N5	---
40	0.2 / AV40	IP3-19, 20	COR012	MZ7-N07, 8	RM005	---	---	MZ7-I N7	---
41	0.2 / AV41	IP3-19, 20	COR012	---	---	RM1 14	---	MZ9-I N4	---
42	0.2 / AV42	IP3-19, 20	COR018	---	---	RM1 85	---	MZ9-I N5	---
43	0.7 / AV43	IP3-19, 20	COR018	---	---	RM1 87	---	MZ9-I N6	---
44	0.3 / AV44	IP3-19, 20	COR018	MZ8-N01, 2	RM1 77	---	---	MZ8-I N1	---
45	0.3 / AV45	IP3-19, 20	COR018	---	---	RM1 34	---	MZ9-I N7	---
46	0.2 / AV46	IP3-19, 20	COR015	MZ8-N03, 4	RM1 84	---	---	MZ8-I N3	---
47	0.2 / AV47	IP3-19, 20	COR015	---	---	RM1 83	---	MZ9-I N8	---
48	0.2 / AV48	IP3-19, 20	COR018	---	---	RM1 41	---	MZ7-I N4	---
49	0.7 / AV49	IP3-19, 20	RM1 73	MZ8-N05, 6	RM1 76	---	---	MZ8-I N5	---
50	0.3 / AV50	IP3-19, 20	RM1 73	MZ8-N07, 8	RM1 75	---	---	MZ8-I N7	---
51	0.2 / AV51	IP3-19, 20	COR201	---	---	RM203	---	MZ7-I N6	---



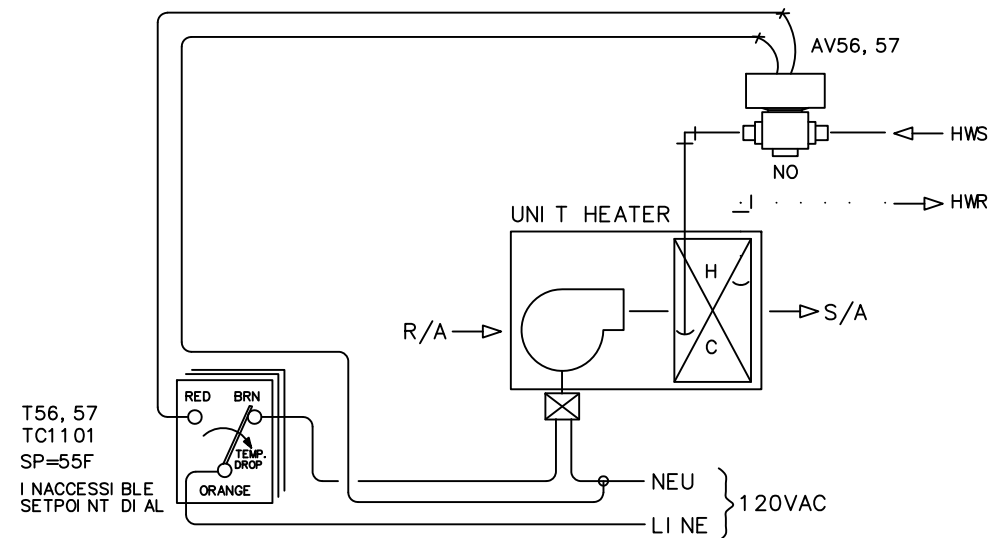
DUCT HEATI NG COI L CONTROL

TYPI CAL FOR HC-37, 38, 39, 40, 44, 46, 49 & 50.
REST ARE THERMOSTAT W RED DI RECTLY TO VALVE (NON-DDC) -SEE SCHEDULE-RI GHT

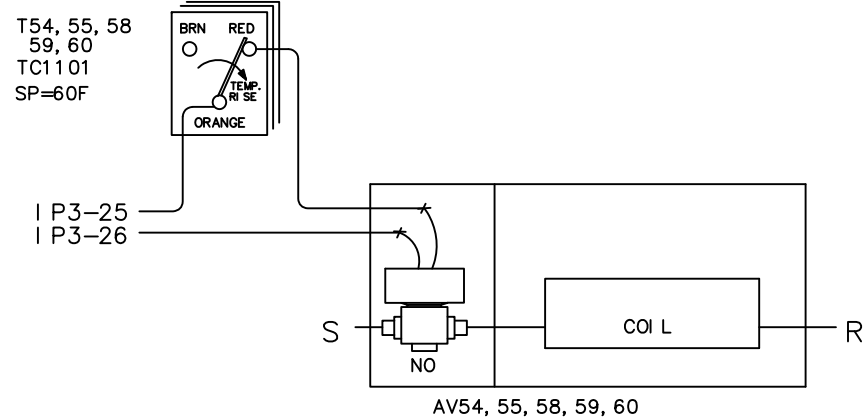


DUCT HEATI NG COI L CONTROL

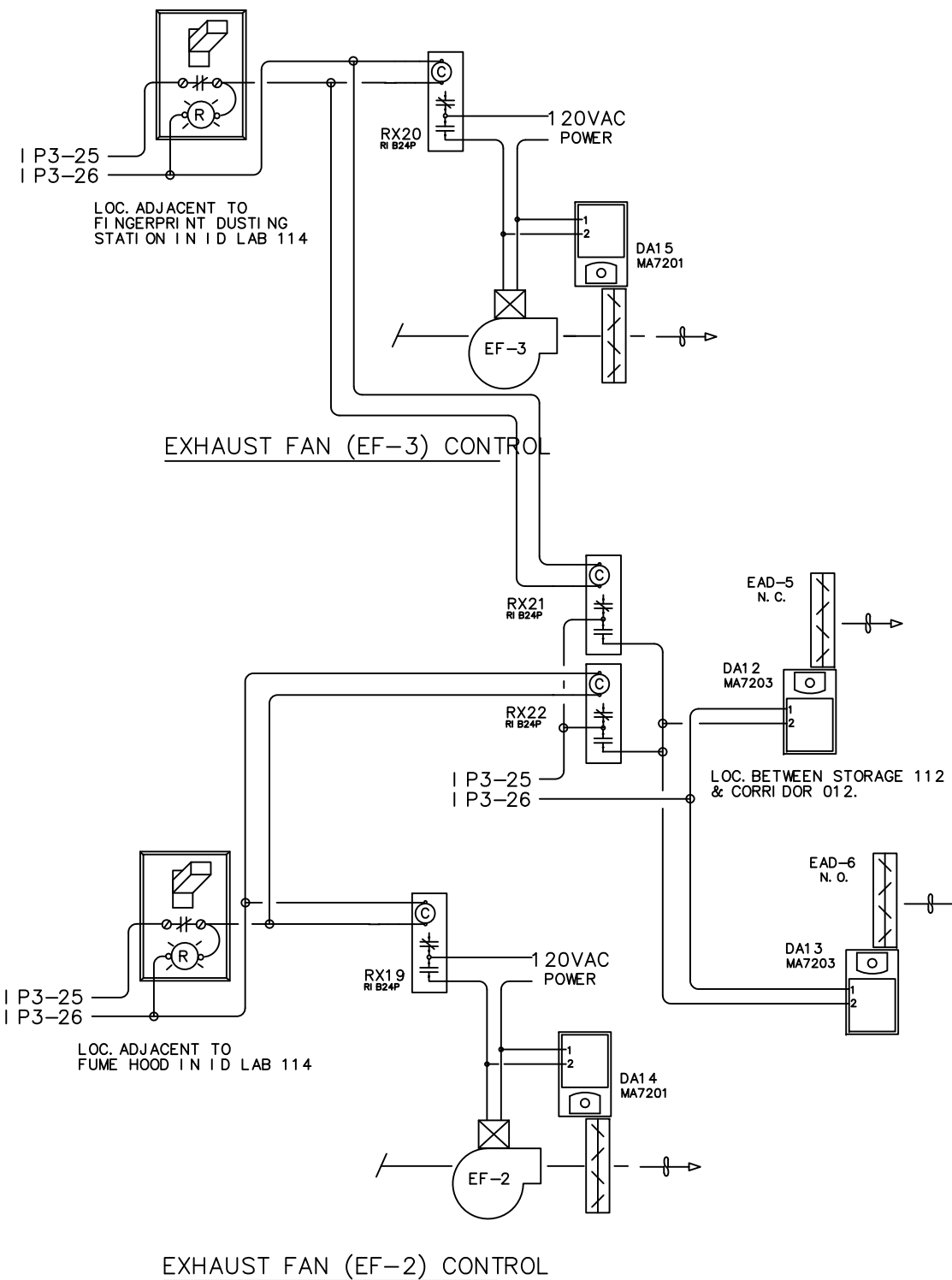
TYPI CAL FOR HC-41, 42, 43, 45, 47, 48, & 51
HC-34-36 HAVE TC1101 TSTAT W RED TO VA22 VALVE.



UNIT HEATER (UH-2) CONTROL
TYPICAL OF 2.



CONVECTOR (CV-1,2) CONTROL
TYPICAL OF 5.



EXHAUST FAN (EF-2) CONTROL

EXHAUST FAN (EF-3) CONTROL

BILL OF MATERIALS

SYM	QTY	PART #	DESCRIPTION
AV54,55,58,59,60	5	VA22-A23AO	VALVE, 2-WAY, NO, 24VAC, SIEBE
AV56,57	2	VA22-A20AO	VALVE, 2-WAY, NO, 120VAC, SIEBE
DA12-13	2	MA7203	ACTUATOR, 2-POSITION, 24VAC, SIEBE
DA14-15	2	MA7201	ACTUATOR, 2-POSITION, 120VAC, SIEBE
RX19-22	4	RIB24P	RELAY-IN-BOX, SIEBE
T54-60	7	TC1101	ROOM THERMOSTAT, SIEBE
MISC.	2	1201I	SWITCH, HUBBELL
	2	1090D1-28V	PILOT LIGHT, RED, LINROSE

ENGINEER
MURRAY & ASSOC.
CONTRACTOR
NUNA
CCI ENGINEER
B. BUNDY
CHECKED
DATE
03/10/99
REPRESENTING
SIEBE
WASHINGTON-ALASKA
OREGON-CALIFORNIA
5660 B STREET
ANCHORAGE, AK 99518
PH = 907-561-3044
FAX = 907-561-4225
CONTROL CONTRACTORS
PROJECT
JUNEAU POLICE STATION
JUNEAU, ALASKA
DATE
10/99
REVISION
REVI SED
02/00
REVI SED
FILENAME
99004-14
CCI JOB NO.
A99004-AI
SHEET #
14 of 14

Scope of Work: Install automatic controls as necessary to provide proper control of equipment, as intended, and as shown on the drawings and in the specifications. Integration with the existing SIEBE building automation system (BAS) shall be by Control Contractors, Inc. Provide all work necessary for proper control of system as required and as listed below.

Communication Electronics Room Control: Modify existing controls as follows:

BAS room thermostat, initially set at 64F, shall modulate VAV-26 damper to maintain room space temperature. If VAV-26 is at full open position (full cooling) and room thermostat reaches three degrees above setpoint (67F calculated room temperature), the VAV-26 damper shall close to minimum position and lead HVAC-3(4) unit shall be enabled. The VAV damper shall also modulate to minimum position whenever the AHU supply air temperature exceeds 65F. Communications Elec 240 room control shall utilize natural cooling from AHU unit prior to using mechanical HVAC cooling. VAV-26 does not have a heating coil.

HVAC-3 (and HVAC-4) operation: HVAC-3 and HVAC-4 operate on a lead/backup basis. When BAS room temperature sensor calls for cooling the lead unit (HVAC-3 or HVAC-4) shall be enabled by the BAS and shall operate according to HVAC unit internal controls to provide the required cooling for the space. Only one unit (HVAC-3 or HVAC-4) shall operate at a time. If lead unit fails to operate after a delay of 5 minutes the backup unit shall activate and an alarm shall be sent to the BAS. HVAC-3 and HVAC-4 shall alternate lead/backup designations once per week.

HVAC-3 and HVAC-4 units shall operate until room temperature sensor has returned to room temperature of 64F (three degrees below HVAC unit enable temperature setpoint). BAS system shall enable HVAC-3 (HVAC-4) for a minimum 10 minute run time unless shutoff by internal controls. Once room temperature setpoint is satisfied (and minimum run time is achieved) the lead HVAC unit shall deactivate and the room temperature control shall return to the VAV-26 terminal.

HVAC-3 (HVAC-4) unit shall operate when required during emergency generator operation. Verify that lead HVAC unit automatically restarts when building power is off and then re-energized through emergency generator.

Air Handling Unit (AHU) Cooling: Modify existing AHU supply air controls as follows.

Building cooling system shall be enabled when outdoor air is no longer able to provide cooling for VAV terminals as needed AND outdoor air temperature is above an adjustable 65F. BAS system shall enable outdoor condenser unit (CCU) internal controls to provide necessary cooling air.

CCU controls shall maintain AHU supply air discharge temperature (when enabled) according to the following adjustable cooling supply air reset schedule:

- 65F outdoor air temperature - 60F AHU cooling supply air discharge temperature
- 80F outdoor air temperature - 55F AHU cooling supply air discharge temperature

When enabled for cooling CCU unit internal controls shall open AHU evaporator coil refrigerant solenoid valves (4 total - located in Mech. 204) and modulate digital scroll compressors as required to provide AHU discharge cooling air temperature per above reset schedule. BAS shall deactivate CCU when building cooling is no longer required or when outdoor air temperature drops below 62F. CCU unit shall operate for minimum of 10 minutes.

A SEQUENCE OF OPERATIONS

ENGINEER Murray & Assoc.
CONTRACTOR Behrends
CCI ENGINEER B. Bundy
DRAFTED BY RSB
CHECKED BY
DATE 10/18/10

REPRESENTING

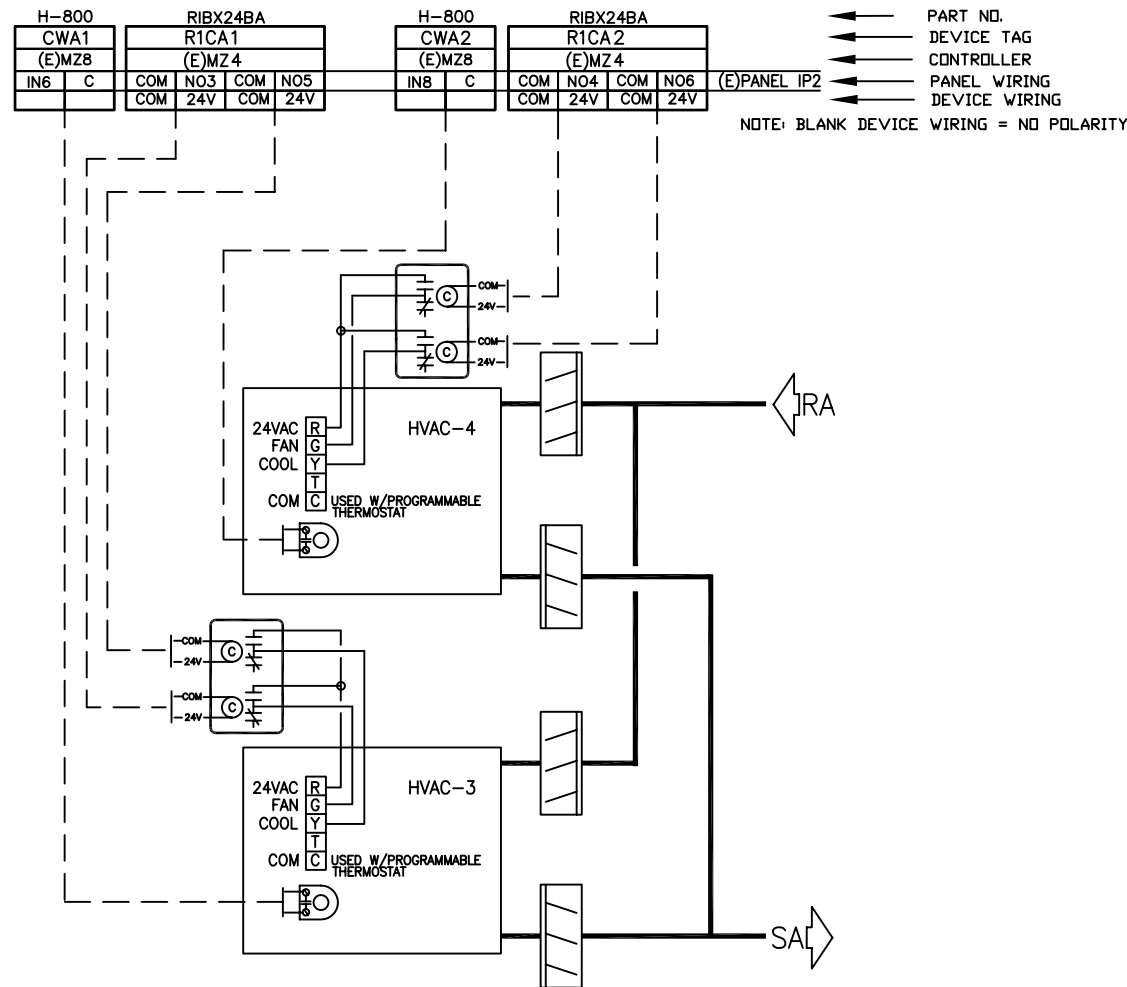
 AUTHORIZED PARTNER
 WASHINGTON OREGON ALASKA CALIFORNIA
 5660 "B" STREET ANCHORAGE, ALASKA 99518
 (907) 561-3044



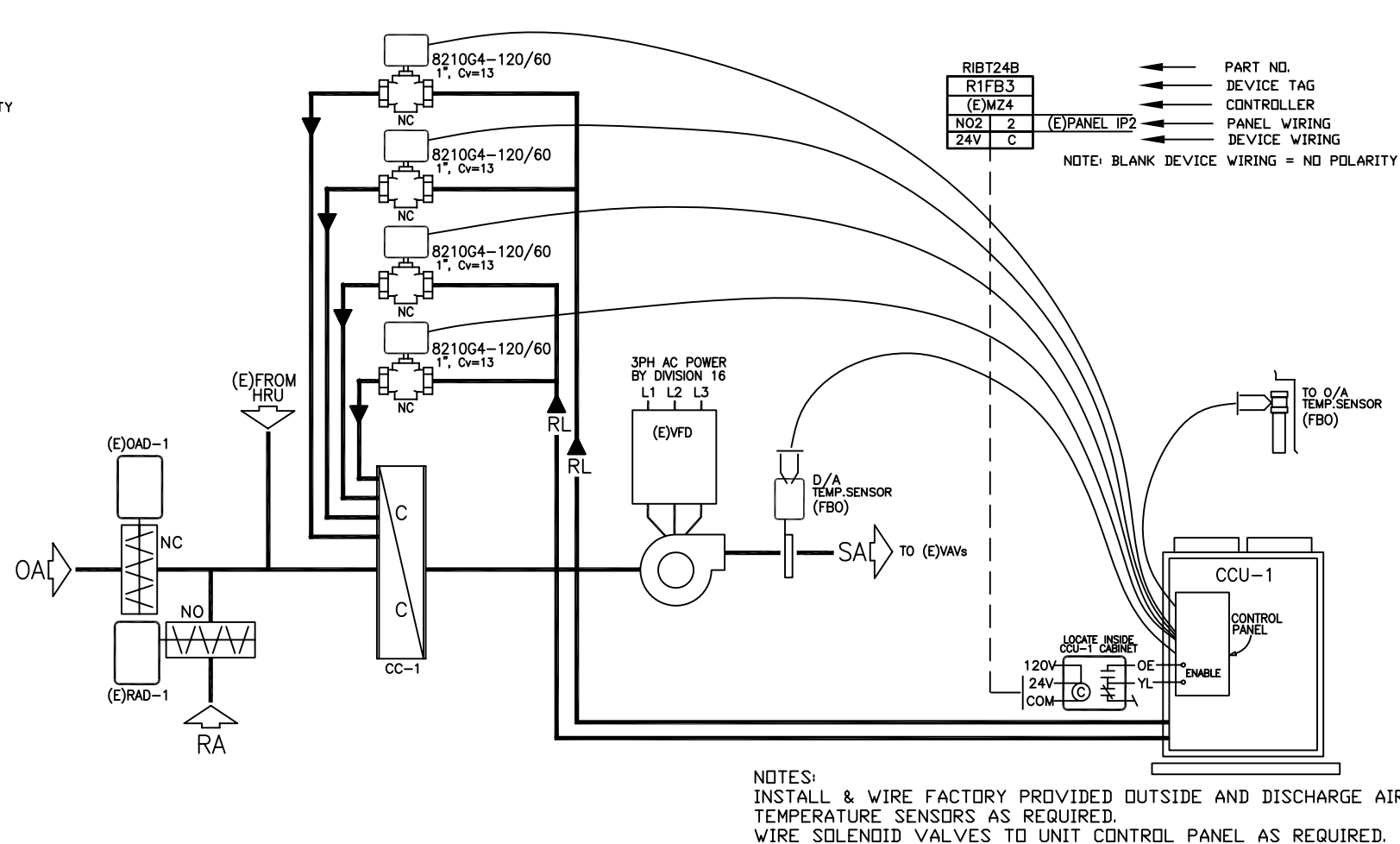
PROJECT
 Juneau Police Department
 Juneau, AK

#	DATE	REVISION

J10037-15
 CCI JOB NO.
 J10037-AI
 SHEET
 15



A SYSTEM: HVAC3&4 UNITS
16 LOCATION: ATTIC



NOTES:
INSTALL & WIRE FACTORY PROVIDED OUTSIDE AND DISCHARGE AIR TEMPERATURE SENSORS AS REQUIRED.
WIRE SOLENOID VALVES TO UNIT CONTROL PANEL AS REQUIRED.

B SYSTEM: (E) AIR HANDLING UNIT AHU COOLING
16 LOCATION: MECHANICAL ROOM 204

SYSTEM DEVICES - HVAC 3 and 4 Units						DEVICE WIRING		
New / Exist	QTY	TAG	PART NUMBER	MANUFACTURER	DESCRIPTION	CABLE (Type/Qty)	CTRL	POINT
N	1	CWA1	H-800	VERIS	Sensor, Current, 0.5-200A, Solid-Core, NO, On/Off	1x1	MZ8	DI-IN6
N	1	CWA2	H-800	VERIS	Sensor, Current, 0.5-200A, Solid-Core, NO, On/Off	1x1	MZ8	DI-IN8
N	1	R2FC1	RIBTU2C	FDI	Relay, 10A, 1/6HP@120V-NC, DPDT, 2 Coils, On/Off	1x1	MZ4	DO-NO3
N	1	R2FC1	RIBTU2C	FDI	Relay, 10A, 1/6HP@120V-NC, DPDT, 2 Coils, On/Off	1x1	MZ4	DO-NO5
N	1	R2FC2	RIBTU2C	FDI	Relay, 10A, 1/6HP@120V-NC, DPDT, 2 Coils, On/Off	1x1	MZ4	DO-NO4
N	1	R2FC2	RIBTU2C	FDI	Relay, 10A, 1/6HP@120V-NC, DPDT, 2 Coils, On/Off	1x1	MZ4	DO-NO6

SYSTEM DEVICES - Exist AHU Cooling						DEVICE WIRING
New / Exist	QTY	TAG	PART NUMBER	MANUF	DESCRIPTION	CABLE (Type/Qty)
N	1	R1FB3	RIBT24B	FDI	Relay, 20A, 1HP @ 120V, SPDT, On/Off	1x1
N	4	SV	8210G4-120/60	ASCO	2-Way Internal Pilot-Operated Solenoid Valves, Normally Open	

ENGINEER
Murray & Assoc.

CONTRACTOR
Behrends

CCI ENGINEER
B. Bundy

DRAFTED BY
RSB

CHECKED BY

DATE
10/18/10

REPRESENTING
t.a.c.o.
WASHINGTON OREGON ALASKA CALIFORNIA
AUTHORIZED PARTNER

5660 "B" STREET
ANCHORAGE, ALASKA 99518
(907) 561-3044

CONTROL CONTRACTORS

PROJECT
Juneau Police Department
Juneau, AK

#	DATE	REVISION
	03/11	REVISED

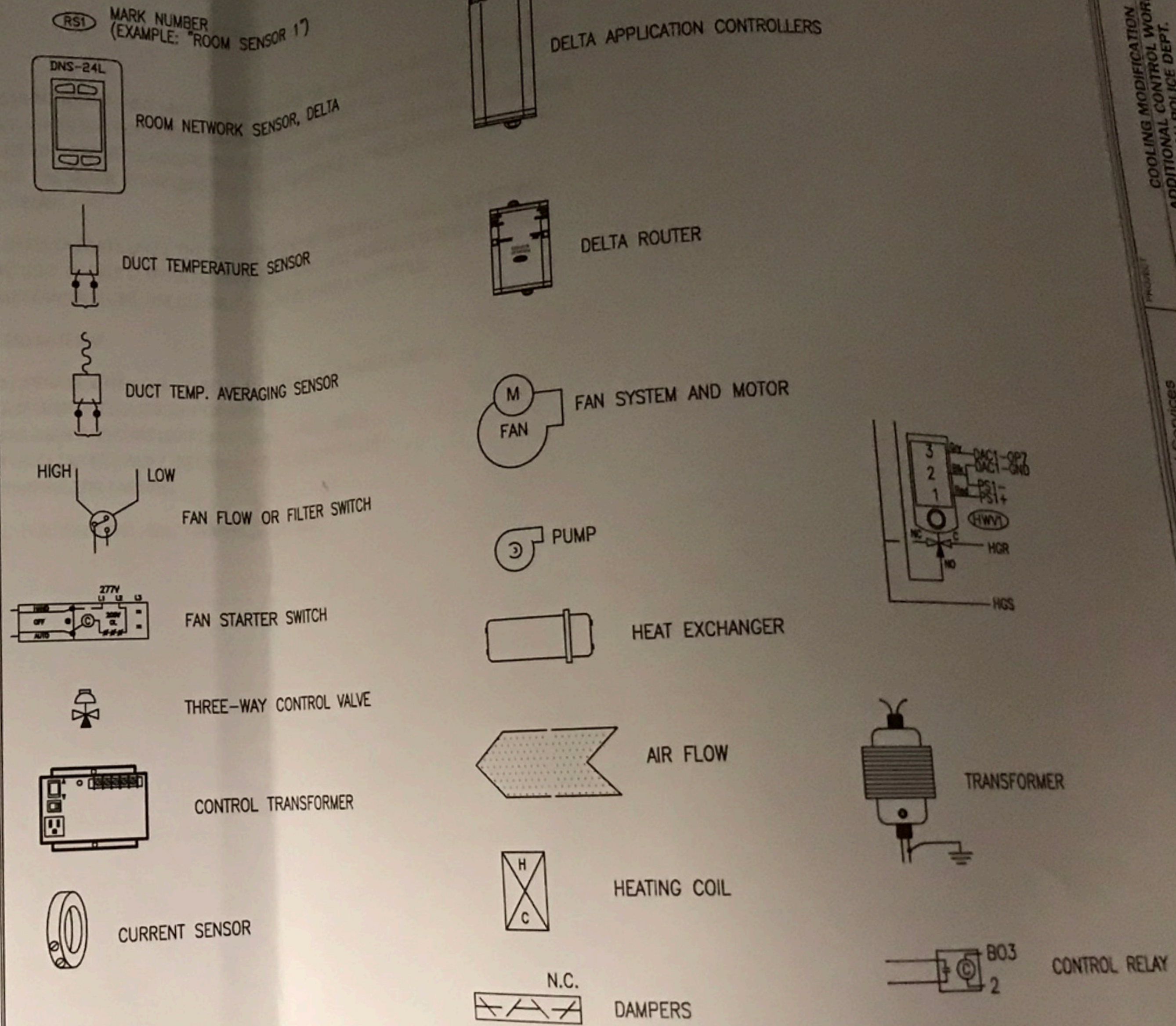
J10037-16
CCI JOB NO.
J10037-AI
SHEET
16

HVAC 3 & 4 COOLING MODIFICATION

SHEET INDEX

- # 1: TITLE SHEET, CONTROL DRAWINGS INDEX
- # 2: SEQUENCE OF OPERATION
- # 3: ARCHITECTURE
- # 4: CONTROL PANEL (CP1) LAYOUT
- # 5: HVAC3 & HVAC4 CONTROLLER
- # 6: HVAC3 & HVAC4 FIELD LAYOUT

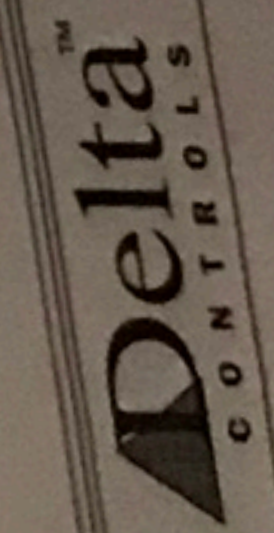
LEGEND



COOLING MODIFICATION
ADDITIONAL CONTROL WORK
JUNEAU POLICE DEPT.
JUNEAU, AK
TITLE SHEET

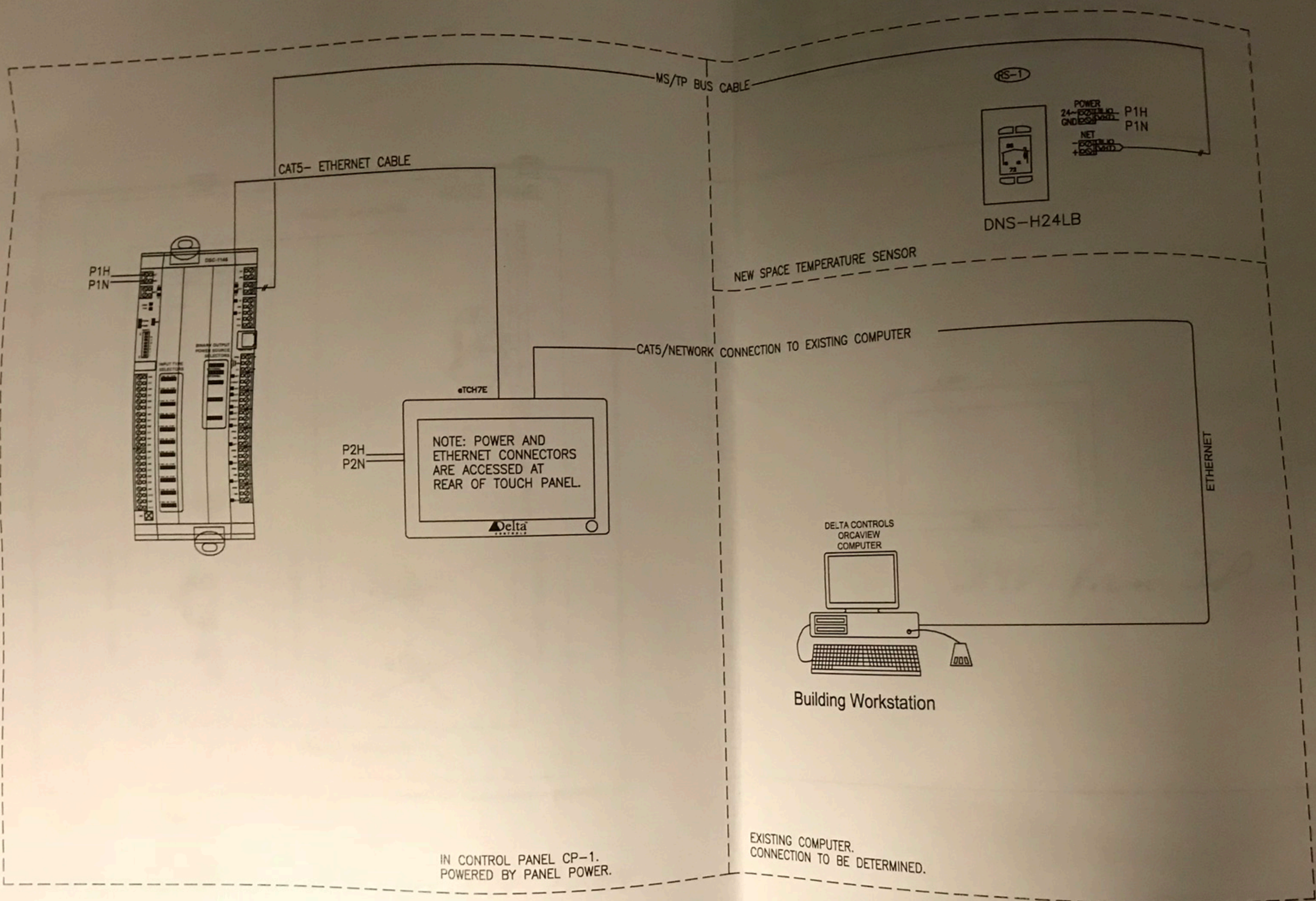
Alaska Integrated Services
9000 Glacier Ave
Juneau, Alaska 99801

PHILIP B. HURRAY & ASSOCIATES
Architect: HURRAY & ASSOCIATES
Engineer: CHUBACH
Contractor: CHUBACH



JOB:	26U-015-11
DRWR:	Walt Lindsey
CHKD:	
DATE:	Walt Lindsey
FILE:	
DATE:	02-19-12
SHEET:	
1 OF 6	

NETWORK ARCHITECTURE

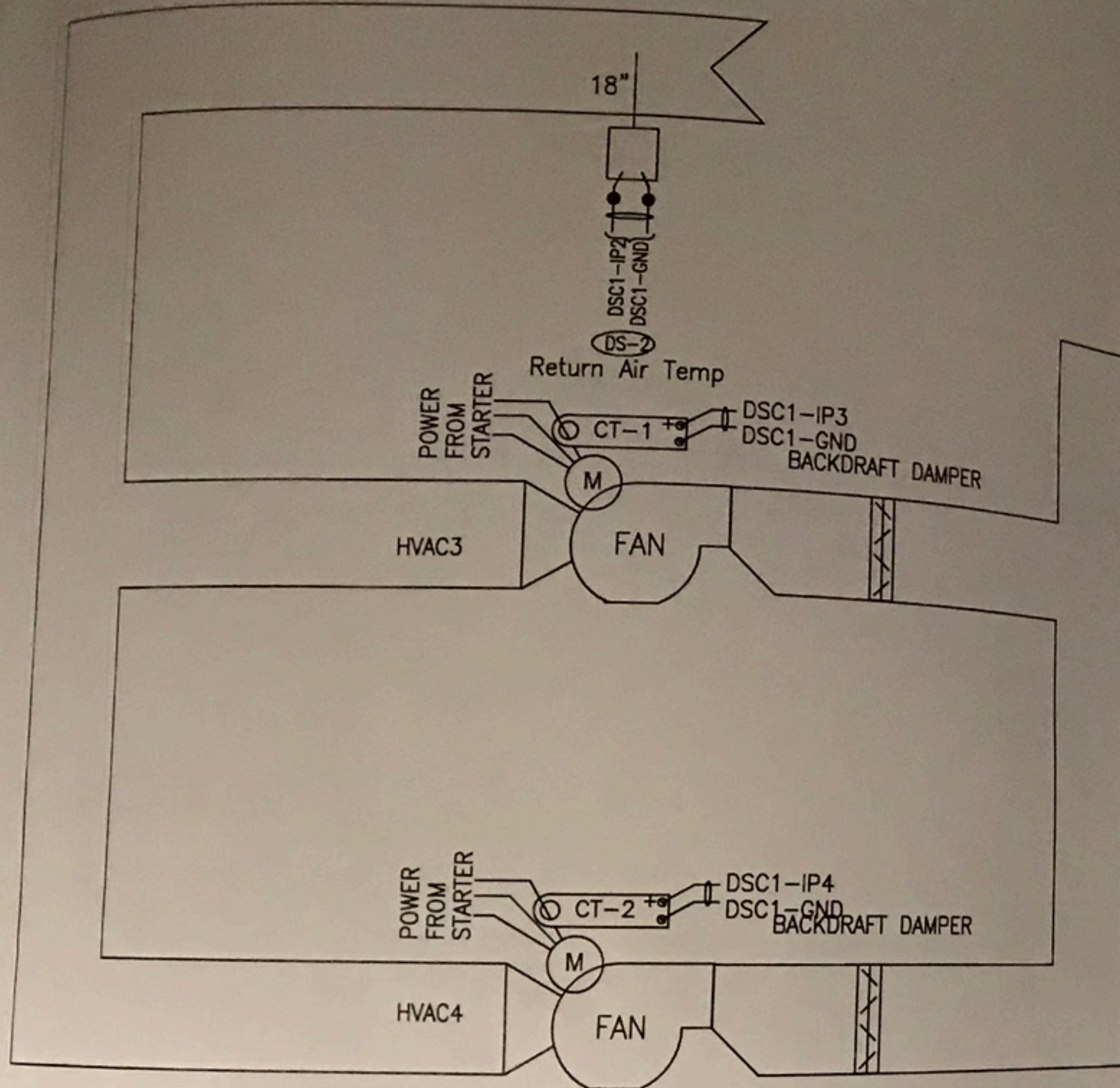


IN CONTROL PANEL CP-1.
POWERED BY PANEL POWER.

EXISTING COMPUTER.
CONNECTION TO BE DETERMINED.

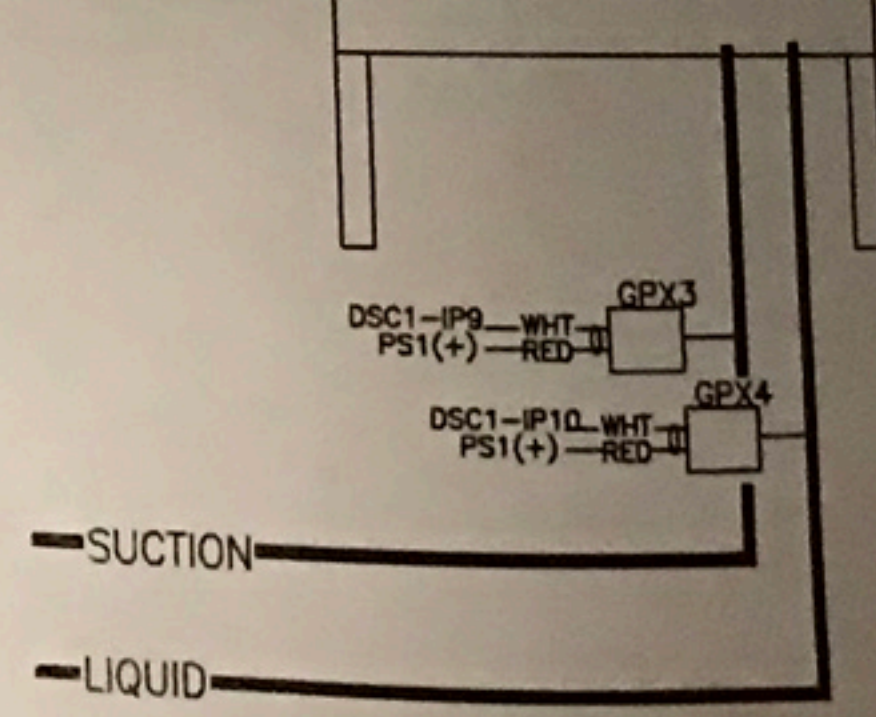
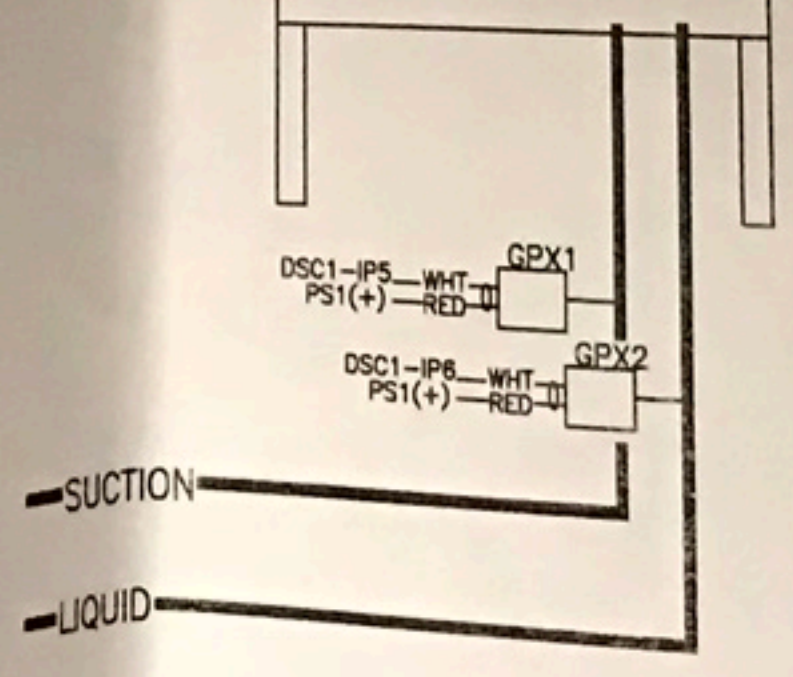
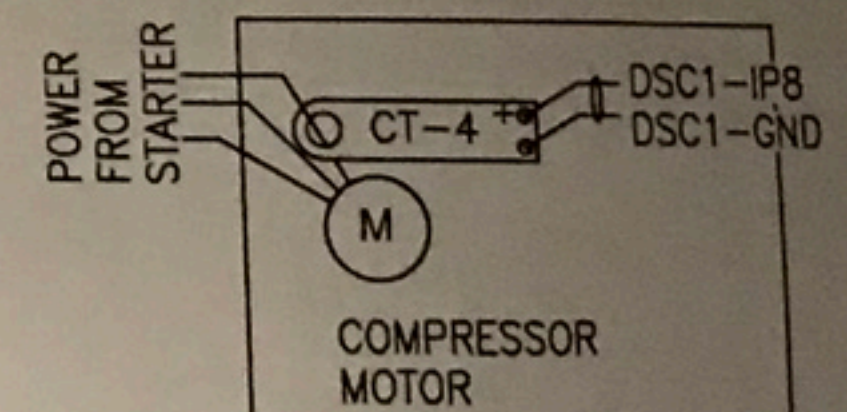
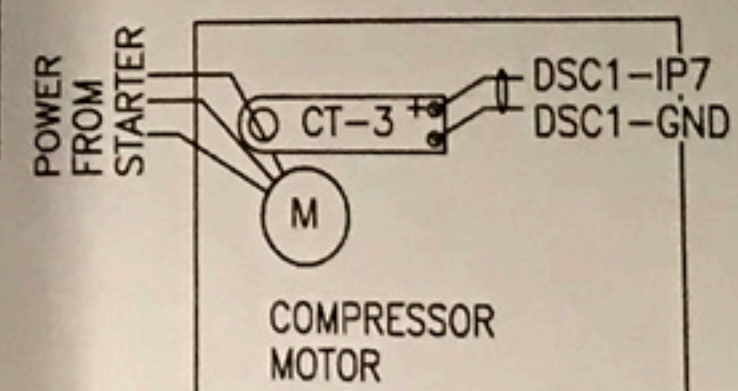
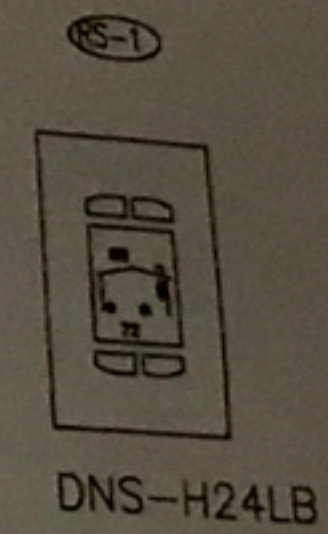
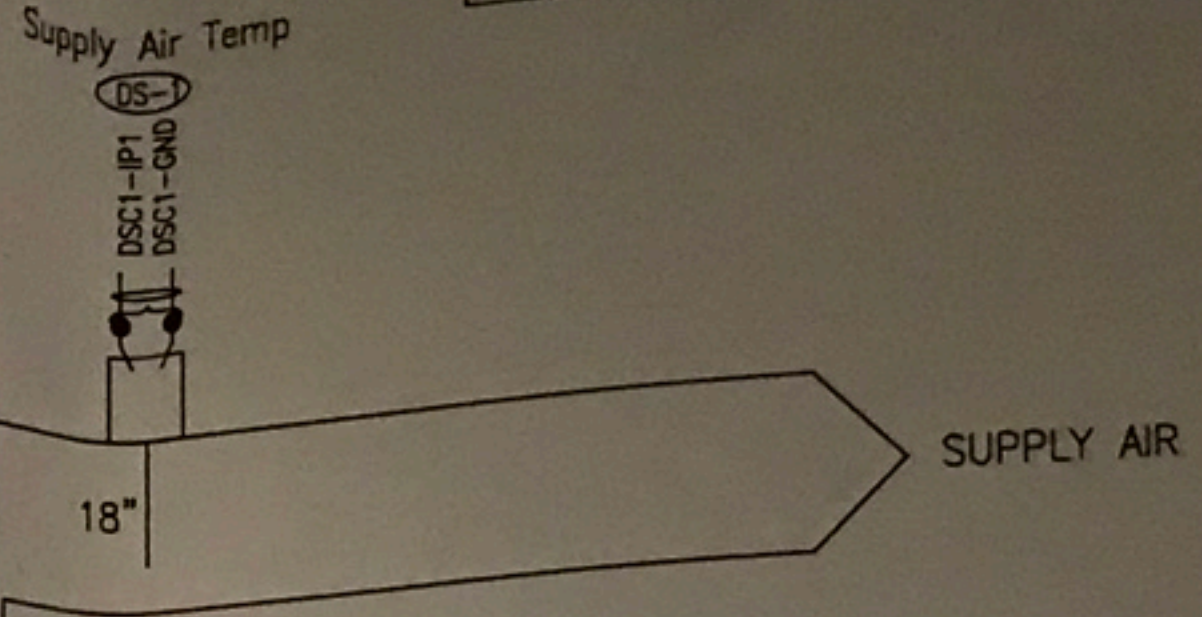
PROJECT COOLING MODIFICATION ADDITIONAL CONTROL WORK JUNEAU POLICE DEPT. JUNEAU, AK Regulator Shelter Panel	
PH: (907) 788-0214 Architect: MURRAY & ASSOCIATES Engineer: CHUGACH Contractor:	
Alaska Integrated Services 9000 Glacier Ave Juneau, Alaska 99801	
Delta CONTROLS	
JOB:	JNU-018-11
ENGR:	Walt Lindley
CHKBY:	
DRN BY:	Walt Lindley
FILE:	
DATE:	05-Jan-12
SHEET:	3 OF 6

HVAC 3 & 4 FIELD POINTS

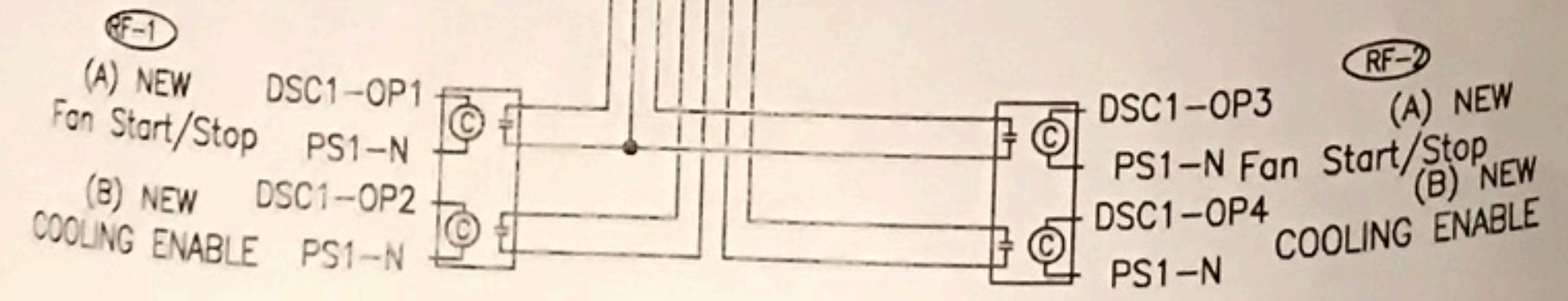


BILL OF MATERIALS USED

SYMBOL	QTY	PART #	DESCRIPTION
DS	2	A/AN-RA-18"-GD	10K 18" DUCT TEMP SENSOR, AGI
RF	2	RIBTU2C	FIELD RELAY, FUNCTIONAL DEVICES
RS	1	DNS-H24LB	NETWORK THERMOSTAT, DELTA
CT	4	RIBXG420-20	CURRENT SENSOR, FUNCTIONAL DEVICES
GPX	4	A/GP-(0-500)-(4-20mA)	GAUGE PRESSURE TRANSMITTER, AGI



VERIFY TERMINAL LABELS AND LAYOUT. TERMINATIONS ARE ON LOW VOLTAGE BOARD.



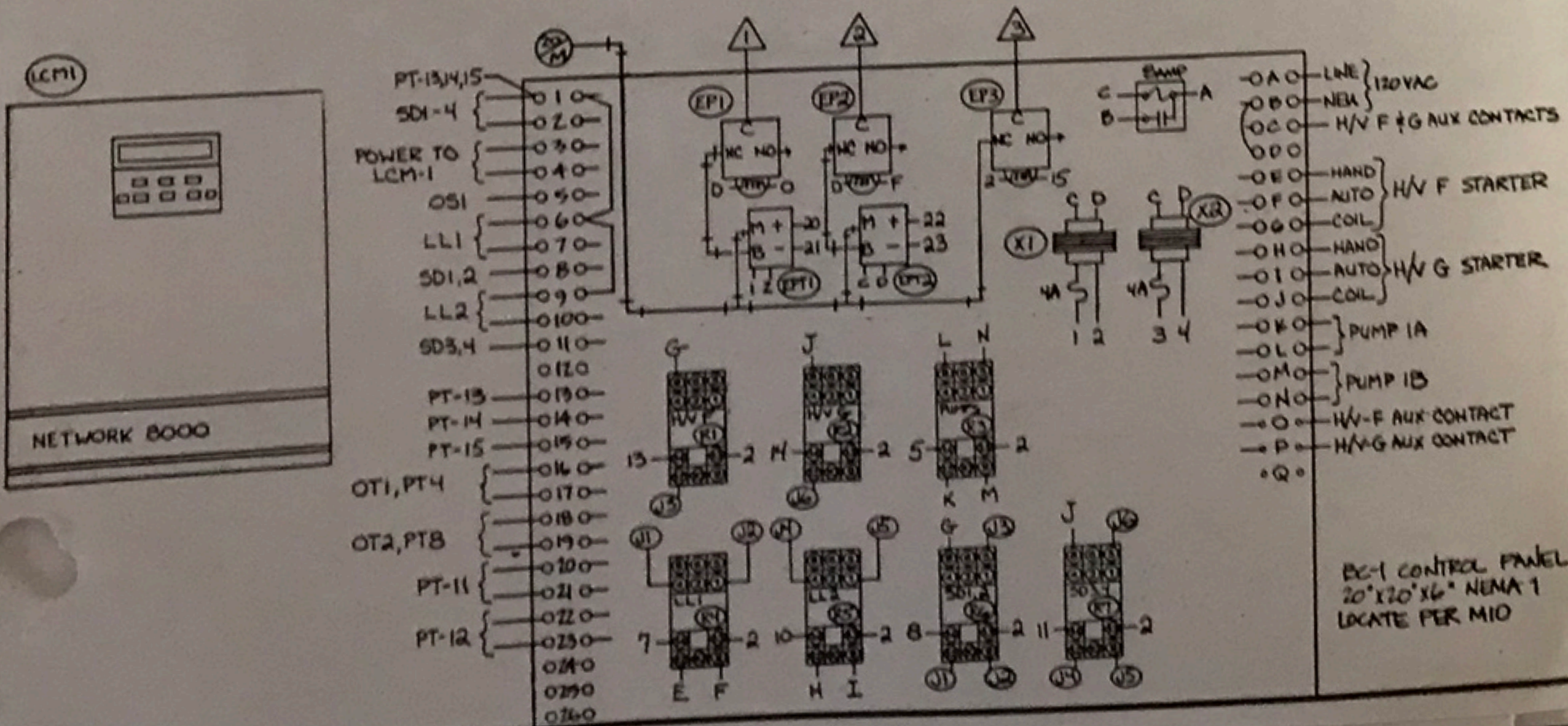
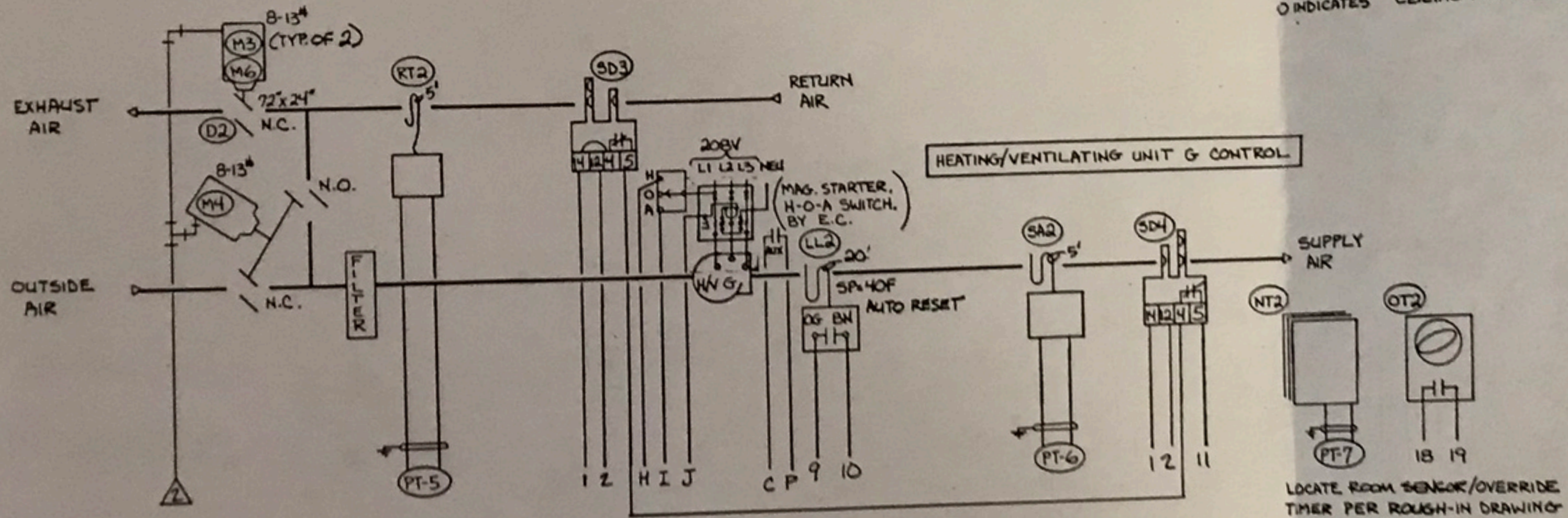
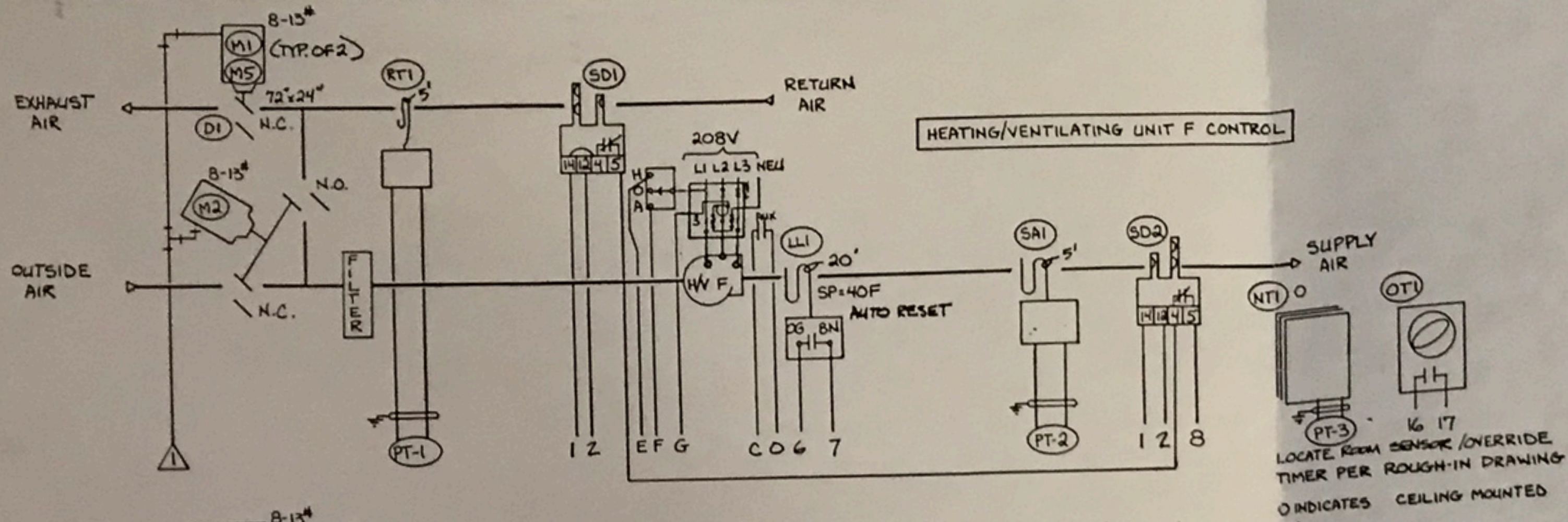
NOTE: GROUND ALL SHIELD AT CONTROLLER ONLY.

COOLING MODIFICATION
ADDITIONAL CONTROL WORK
JUNEAU POLICE DEPT.
JUNEAU, AK

Alaska Integrated Services
9000 Glacier Ave.
Juneau, Alaska 99801

Delta
CONTROLS

JOB: JNU-018-11
ENGR: Walt Underly
CHECKED: Walt Underly
DATE: 05-10-12



POINT LIST

POINT	TYPE	DESCRIPTION
PT-1	AI	H/V-F RETURN AIR TEMP.
PT-2	AI	H/V-F SUPPLY AIR TEMP.
PT-3	AI	H/V-F SPACE TEMP.
PT-4	DI	H/V-F OVERRIDE TIMER
PT-5	AI	H/V-G RETURN AIR TEMP.
PT-6	AI	H/V-G SUPPLY AIR TEMP.
PT-7	AI	H/V-G SPACE TEMP.
PT-8	DI	H/V-G OVERRIDE TIMER
PT-9	SPARE	
PT-10	SPARE	
PT-11	AO	H/V-F RISING DAMPERS
PT-12	AO	H/V-G RISING DAMPERS
PT-13	DO	H/V-F ON/OFF
PT-14	DO	H/V-G ON/OFF
PT-15	DO	DAY/NIGHT MAIN AIR
PT-16	SPARE	

BC-1 CONTROL PANEL
20"X30"X6" NEMA 1
LOCATE PER MID

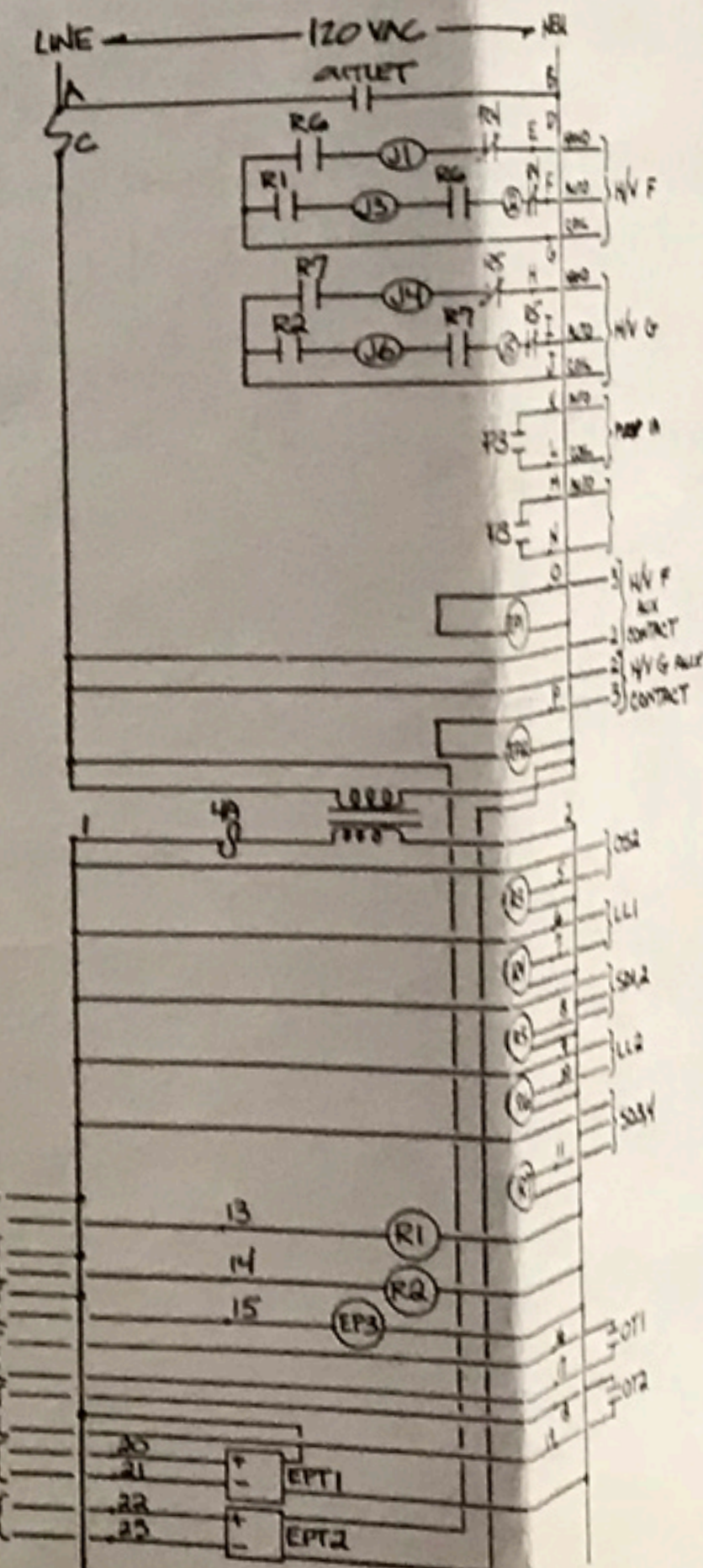
SEQUENCE OF OPERATION

3.3 HEATING/VENTILATING UNIT F: Include 7-day time clock with 12hr battery powered reserve to provide continuous fan operation and outside air fan control (through air control) during the day cycle and intermittent fan operation during the night cycle. A discharge air damper in the closed position will position the outside air damper in the damper to provide 55% (adj) supply air temperature. A separate stat located downstream of the outside air damper and return air will stop unit operation when the outside air temperature falls below 40F (adj, auto-reset). During the night operation, a separate night thermostat will be used to provide intermittent fan operation to maintain the thermostat set point. A separate setpoint of the night thermostat will be 10F (adj) lower than that of the day thermostat. The outside air damper will close when the unit is not operating.

During the warm-up period, going from night to day, no outside return air temperature has reached set (adj).

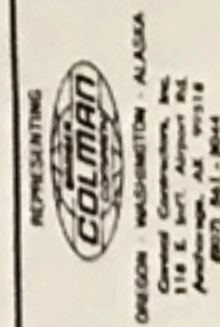
BILL OF MATERIALS

SYMBOL	QTY	PARTS	DESCRIPTION
D1,2	2	RCD-44	72"X24" CONTROL DAMPER, RASKIN
EP1,2	2	AL-110	SILENCED AIR VALVE, 120V
EP3	1	AL-100	SILENCED AIR VALVE, 24V
EPT1,2	2	CP-8511	PRESSURE TRANSDUCER
LCH1	1	LCH-88210	LOG CONTROL MODULE
LL1,2	2	TC-5131	DUCT TEMP. MODULE
M1-6	6	MK-3121	DUCT AIR LIMIT, AUTO RESET, 3A-40F
NT1,2	2	TS-8101	PNEUMATIC SWAMP ACTUATOR, 3A-40F
OT1,2	2	AE-182	OVERRIDE TIMER, ELECTRONIC, 0-15M
RT1-7	7	RHCB-UAC24V	RELAY, SPST, 24V, 120C
SA1,2	2	SHCB-05	RELAY BASE, 120C
SD1-4	4	TS-8405	DUCT SENSOR, ELECTRONIC
X1	1	TS-8405	DUCT SENSOR, ELECTRONIC
X2	1	L-302, w/L-303-1	DUCT TRANSDUCER SPOKE DETECTOR, BK
MISC.	1	T-203	TRANSFORMER, 150VA
	1	AM-113	TRANSFORMER, 80VA
	4	AM-125	DAMPER RIB
	8	AM-132	BALL JOINT CONNECTOR
	4	AT-208	DUCT MOUNTING KIT
	1	SRU	BASE/BRK AIR AMP FUSE
	6	AL-362	BASE, 0-30A
	1	AZON20A	CONTROL PANEL, NEMA 1, KOFFMAN



BC-1 LADDER DIAGRAM

ENGINEER	HANGER
CONTRACTOR	STRAND
CO ENGINEER	RSB/WEM
DRAWN	WEM
CHECKED	B. BUNDY
DATE	5-20-88

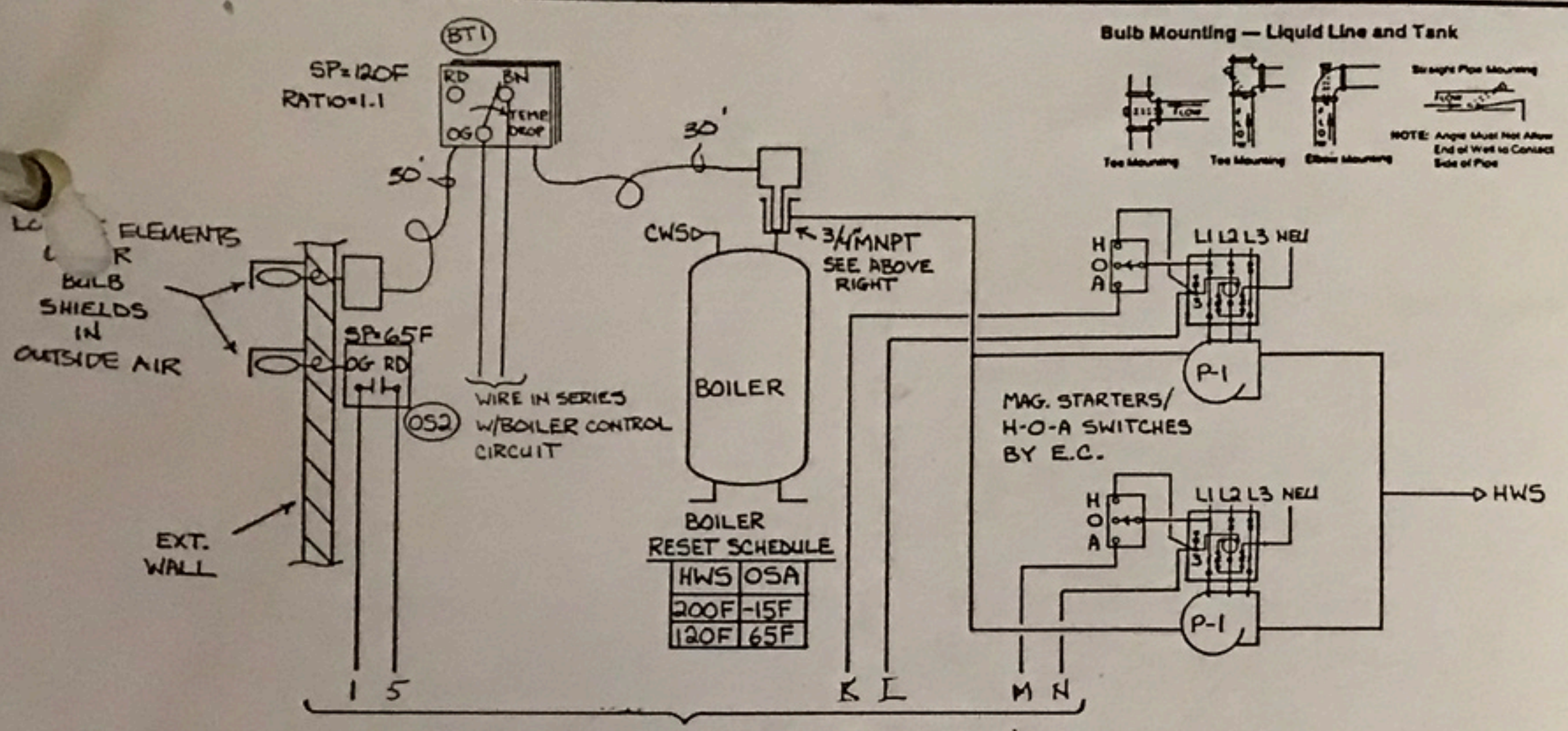


COLMAN
CONTROL CONTRACTORS, INC.

PROJECT: JUNE/1988 LIBRARY

DATE	REVISION
11-5-88	REV. 02-0000
12-19-88	REV. 02-0001

CO JOB NO: 4-88006-PI
SHEET: 1 of 2

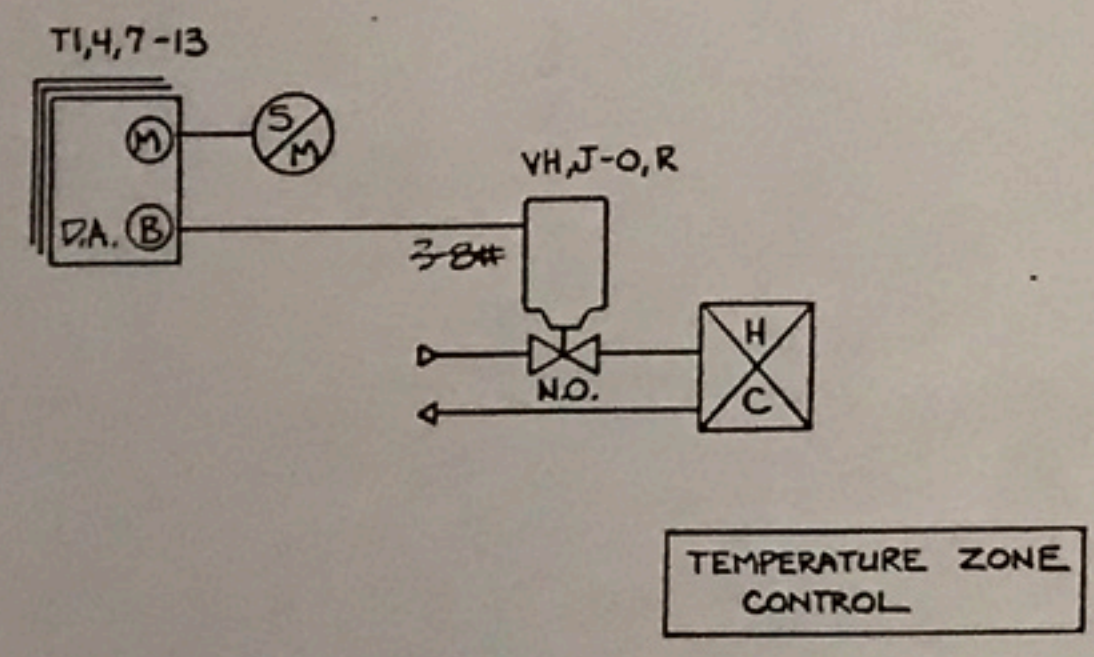


DETAIL @ RIGHT IS TYPICAL OF 9, SEE T'STAT/COIL SCHEDULE BELOW

THERMOSTAT/HEATING COIL

T7	H
T8	J
T10	K
T9	L
T11	M
T12	N
T13	N
T1	O
T4	R

O INDICATES A CEILING MOUNTED THERMOSTAT, SEE ROUGH-IN DRAWING



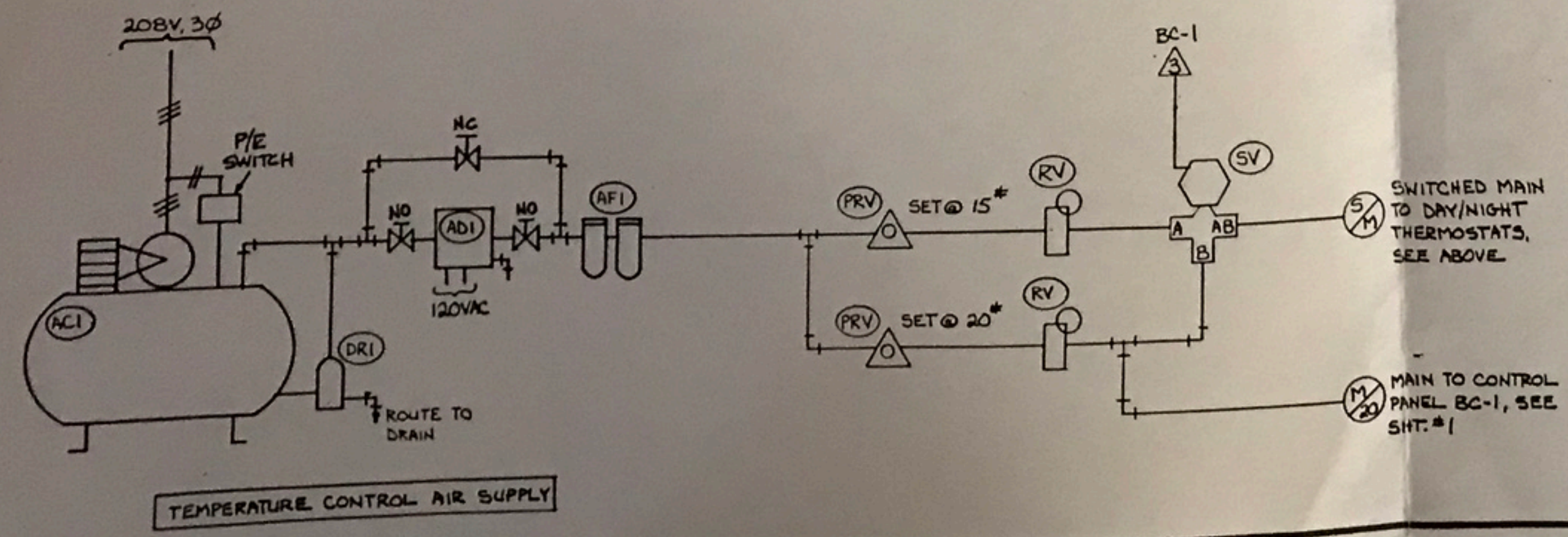
DETAIL @ RIGHT IS TYPICAL 5, NOTE BOTH T2 AND T5B SERVE AN ADDITIONAL RADIANT PANEL. SEE T'STAT/COIL/PANEL SCHEDULE BELOW

THERMOSTAT/HEATING COIL/RAD. PANEL

T2	P	A,B
T3	Q	C
T5A	S	D
T5B	T	E,F
T6	I	G

O INDICATES A CEILING MOUNTED THERMOSTAT, SEE ROUGH-IN DRAWING

NOTE VALVE DESIGNATIONS CORRESPOND WITH HEATING COIL/RADIANT PANEL DESIGNATIONS, VH FOR HEATING COIL H, VA FOR RADIANT PANEL GROUP A ETC.



SEQUENCE OF OPERATIONS

3.1 CIRCULATING PUMPS: Circulating pump (P-1) will operate continually through selected motor starting switch for outdoor temperatures below 65f (adj). Circulating pump (P-2) will operate continually.

A 3-position hand-off-auto switch and magnetic starter will be provided for each circulating pump (P-1) by the Electrical Contractor. The "hand" position of the motor starting switch will operate the pump as specified, bypassing the outdoor temperature control.

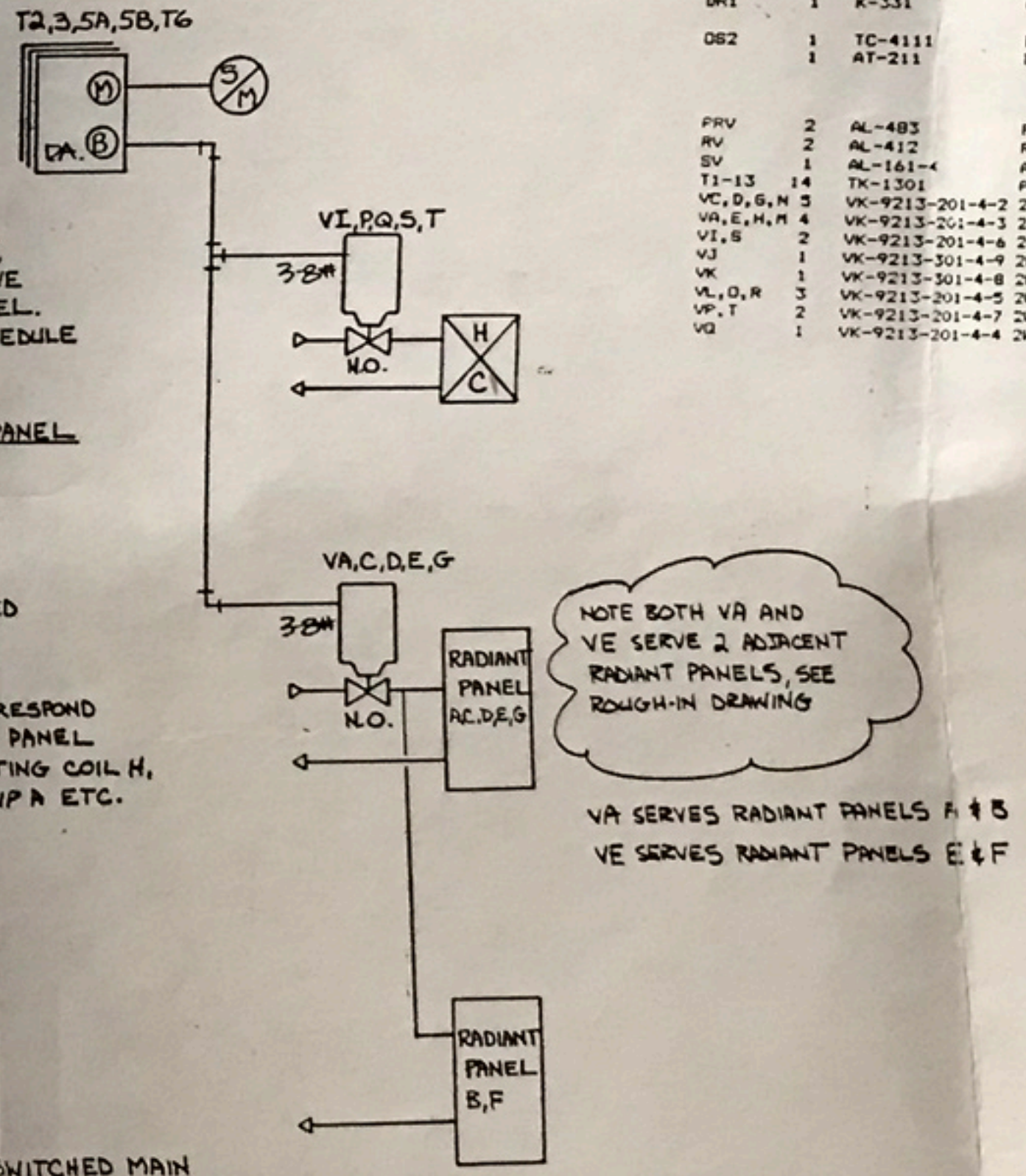
3.2 BOILER #881: Provide outdoor reset for boiler water temperature control such that the boiler water supply is varied from 200f at -15f outdoor air temperature to 120f at 65f outdoor air temperature. Provide an additional control to prevent the boiler water temperature from falling below 120f (adj) and utilize the boiler supplied operating aquastat to prevent the boiler water temperature from exceeding 200f (adj).

3.3 Heating Coils H through T1: Respective zone thermostat modulates heating control valve to maintain thermostat setpoint. The heating set point at night will be 10f (adj) lower than the day setting.

3.4 Radiant Ceiling Heating Panels V1: Respective zone thermostat modulates heating control valve to maintain thermostat setpoint. The heating set point at night will be 10f (adj) lower than the day setting.

BILL OF MATERIALS

SYMBOL	QTY	PART#	DESCRIPTION
AC1	1	K106-5-00-4	SIMPLEX AIR COMPRESSOR, 1/2HP, ENGLD
AD1	1	HK-8010	REFRIGERATED AIR DRYER, HANIKSON
AF1	1	AL-437	DUAL AIR FILTER
BT1	1	TC-4152	DUAL BULB RESET CONTROLLER
	1	AT-201	BULB WELD, 3/4" MNPT
DR1	1	K-331	AUTO DRAIN, DRAINVIEW
OS2	1	TC-4111	BULB THERMOSTAT, -40-120F
	1	AT-211	BULB SHIELD
PRV	2	AL-483	PRESSURE REDUCING VALVE
RV	2	AL-412	RELIEF VALVE
SV	1	AL-161-4	AIR SWITCHING VALVE
T1-13	14	TK-1301	PNEUMATIC DAY/NIGHT THERMOSTAT
VC, D, G, M	5	VK-9213-201-4-2	2WAY VALVE ASSEMBLY, 1/2", CV=1.3
VA, E, H, M	4	VK-9213-201-4-3	2WAY VALVE ASSEMBLY, 1/2", CV=2.2
V1, S	2	VK-9213-201-4-6	2WAY VALVE ASSEMBLY, 3/4", CV=6.2
VJ	1	VK-9213-301-4-9	2WAY VALVE ASSEMBLY, 1 1/4", CV=16.0
VK	1	VK-9213-301-4-8	2WAY VALVE ASSEMBLY, 1", CV=5.0
VL, D, R	3	VK-9213-201-4-5	2WAY VALVE ASSEMBLY, 3/4", CV=3.0
VP, T	2	VK-9213-201-4-7	2WAY VALVE ASSEMBLY, 1", CV=8.2
VQ	1	VK-9213-201-4-4	2WAY VALVE ASSEMBLY, 1/2", CV=3.6



ENGINEER
HANGER

CONTRACTOR
STRAND

CCI ENGINEER
E. MCCREADY

DRAFTED
E. MCCREADY

CHECKED
B. BUNDY

DATE
8-11-88

REPRESENTING
GOLMAN
CORPORATION
118 S. 1st, Airport Bldg.
Anchorage, AK 99518
907.561.7200

CONTROL CONTRACTORS, INC.

PROJECT
JUNEAU LIBRARY

DATE	REVISION
9-7-88	BOILER CONTROL
	BT1
11-3	TERM. CHANGES
12-19	AS BUILT

CCI JOB NO.
A-88006-PI

SHEET
2 of 2