

FIN TUBE 2 REHEAT VLV (FLOATING)	BO	FLOATING CONTROL VALVE CLOSE SIGNAL. USE EXISTING DEVICE, WIRING AND CONE
VAV REHEAT VLV (FLOATING)	BO	FLOATING CONTROL VALVE OPEN SIGNAL. USE EXISTING DEVICE, WIRING AND CONDUIT
VAV REHEAT VLV (FLOATING)	BO	FLOATING CONTROL VALVE CLOSE SIGNAL. USE EXISTING DEVICE, WIRING AND CONDUIT
TOTAL	8	

CONTROLLER #37 - VAV 24 ROOM 206W (NO FAN) BRIEFING ROOM WEST

POINT INFO	TYPE	NOTES/COMMENTS
VAV 24 RM 206W FLOW, CFM	AI	VAV OUTPUT CFM'S
RM 206W TEMP	AI	INSTALL NEW WALL SENSOR. USE EXISTING WIRING. CONTROLLER ACCESS FROM SENSOR REQUIRED. SEE NOTES BELOW.
VAV DAMPER CONTROL	AO	DAMPER ACTUATOR
CO2 ALARM	BI	USE EXISTING DEVICE, WIRING AND CONDUIT
VAV REHEAT VLV (FLOATING)	BO	FLOATING CONTROL VALVE OPEN SIGNAL. USE EXISTING DEVICE, WIRING AND CONDUIT
VAV REHEAT VLV (FLOATING)	BO	FLOATING CONTROL VALVE CLOSE SIGNAL. USE EXISTING DEVICE, WIRING AND CONDUIT
TOTAL	6	

CONTROLLER #38 - VAV 30 ROOM 211 (NO FAN)

POINT INFO	TYPE	NOTES/COMMENTS
VAV 30 RM 211 FLOW, CFM	AI	VAV OUTPUT CFM'S
RM 211 TEMP	AI	INSTALL NEW WALL SENSOR. USE EXISTING WIRING. CONTROLLER ACCESS FROM SENSOR REQUIRED. SEE NOTES BELOW.
VAV DAMPER CONTROL	AO	DAMPER ACTUATOR
CO2 ALARM	BI	USE EXISTING DEVICE, WIRING AND CONDUIT
VAV REHEAT VLV (FLOATING)	BO	FLOATING CONTROL VALVE OPEN SIGNAL. USE EXISTING DEVICE, WIRING AND CONDUIT
VAV REHEAT VLV (FLOATING)	BO	FLOATING CONTROL VALVE CLOSE SIGNAL. USE EXISTING DEVICE, WIRING AND CONDUIT
TOTAL	6	

CONTROLLER #39 - FBVAV 15 ROOM 224B & FIN TUBE 3 (*NOTE - THE AS-BUILTS SHOW THIS AS A FAN POWERED BUT THE PROGRAMMING INDICATES IT IS NOT)

POINT INFO	TYPE	NOTES/COMMENTS
RM 224B FLOW, CFM	AI	VAV OUTPUT CFM'S
RM 224B TEMP	AI	INSTALL NEW WALL SENSOR. USE EXISTING WIRING. CONTROLLER ACCESS FROM SENSOR REQUIRED. SEE NOTES BELOW.
VAV DAMPER CONTROL	AO	DAMPER ACTUATOR
CO2 ALARM	BI	USE EXISTING DEVICE, WIRING AND CONDUIT
REHEAT VLV (FLOATING) ONE OUTPUT FOR VAV AND FIN TUBE	BO	FLOATING CONTROL VALVE OPEN SIGNAL. USE EXISTING DEVICE, WIRING AND CONDUIT
REHEAT VLV (FLOATING) ONE OUTPUT FOR VAV AND FIN TUBE	BO	FLOATING CONTROL VALVE CLOSE SIGNAL. USE EXISTING DEVICE, WIRING AND CONDUIT
TOTAL	6	

ADDITIONAL REQUIREMENTS-ADD DISCHARGE AIR SENSORS TO ALL 62 VAV'S AND CURRENT SENSING RELAYS FOR FAN STATUS ON 28 FAN POWERED VAV'S

POINT INFO	TYPE	NOTES/COMMENTS
DISCHARGE AIR SENSORS (62 TOT.)	AI	INSTALL 62 NEW DISCHARGE AIR SENSORS TO ALL VAV'S
FPVAV 1-28 FAN STATUS (28 TOTAL)	BI	INSTALL 28 NEW CURRENT SENSING RELAYS FOR FAN STATUS
TOTAL	90	

Note on CT's listed above - FPVAV 15 current programming does not show it is fan-powered but the drawings do. Suspect that it is a fan-powered box.

ADDITIONAL REQUIREMENTS - METERING

POINT INFO	TYPE	NOTES/COMMENTS
GAS METER	BI	PROVIDE PULSE METER HEAD FOR EXISTING GAS METER. PULSE HEAD WILL BE WIRED INTO NEW CONTROLLER AND WILL PROVIDE CURRENT AND TOTALIZED GAS CONSUMPTION.
ELECTRICAL METER	BI	HAVE POWER METER IN CONTROLLER 4
WATER METER	BI	HAVE WATER METER IN CONTROLLER 3
TOTAL	1	

***NOTE - VAV WALL SENSORS**

All VAV wall temperature sensors and/or thermostats shall have the ability to access the VAV controller parameters either by using the buttons on the sensor itself or by plugging in a portable field service device for access using an available plug in port on the sensor.

***NOTE - WALL SENSORS/SETPOINT & OVERRIDE CONTROL**

Install wall sensors with setpoint and override control in occupied areas unless specifically noted to not install this type sensor. Typical wall sensors for hangars, warehouse areas and mechanical rooms will be industrial grade plate style sensors. Most of the buildings will not use the setpoint or override functions at this time but may in the future as building requirements change. Most buildings will be programmed so that the area setpoint is set in software and not set by occupants. Final determination as to which buildings have occupant setpoint control will be made during the software programming. The setpoints will have high and low limits in buildings where occupant setpoint control is allowed. See specific building requirements for additional information.

****NOTE - SINGLE POINT SHELTER-IN-PLACE (SIP) SWITCH**

All air handlers, exhaust fans, fan coils, fan-powered VAV's, unit heaters, cabinet heaters and furnaces will be programmed to immediately shut down when the shelter-in-place switch is activated. The shelter-in-place switch is located in the main fire station (Bldg. 0003) control room. Essentially, when the shelter-in-place switch is activated all mechanical equipment with a control output and that moves air will be shutdown. When the switch is placed back into the normal position all of the equipment shutdown will restart with delays. The delays are needed to prevent a large load on the utility systems.

SEQUENCE OF OPERATIONS

AIR HANDLER 1 AND EXHAUST FAN 1

Occupied Mode - AHU 1 feeds the first floor VAV's. The AHU fans and exhaust fan 1 will run continuously during the occupied mode. The supply fan VFD will maintain a 1.35 "WC (adjustable) set point. The return fan VFD will modulate to maintain the return flow at 1200 CFM (adjustable) less than the supply flow. The DDC system will modulate the mixed air dampers, cooling valve and heating valve in sequence to maintain the supply air set point of 62 °F (adjustable). When the outside air increases to 73 °F (adjustable) the outside air damper will modulate to the minimum position. The mixed air dampers minimum position will be 20% (adjustable) of damper range. The mixed air temp will have a low limit set point of 45 °F (adjustable).

Fan Interlocks - When the supply fan is off the return fan and exhaust fan 1 will stop, close the mixed air dampers, the heating and cooling valves. When the freeze stat is in alarm stop the fans and open the heating valve. When the fire alarm panel is in alarm stop the fans and exhaust fan 1 and generate an alarm. When the supply pressure high limit is in alarm the supply fan will be stopped.

Unoccupied Mode - During the unoccupied mode the AHU will be off, the outside air damper and the relief damper will be closed and the return damper will be in full recirculation mode. In a call for setback heating from the VAV's the damper positions will stay in the unoccupied mode.

Overrides - When any space sensor override button on the first floor or the foyer override button is pushed AHU 1 will be placed in the occupied mode for 2 hours.

The AHU will have an Opstart/Morning Warmup mode. During the Morning Warmup mode the dampers will be in full recirculation position.

AIR HANDLER 2 AND EXHAUST FAN 2

Occupied Mode - AHU 2 feeds the second floor VAV's. The AHU fans and exhaust fan 2 will run continuously during the occupied mode. The supply fan VFD will maintain a 1.35 "WC (adjustable) set point. The return fan VFD will modulate to maintain the return flow at 1200 CFM (adjustable) less than the supply flow. The DDC system will modulate the mixed air dampers, cooling valve and heating valve in sequence to maintain the supply air set point of 60 °F (adjustable). When the outside air increases to 73 °F (adjustable) the outside air damper will modulate to the minimum position. The mixed air dampers minimum position will be 20% (adjustable) of damper range. The mixed air temp will have a low limit set point of 45 °F (adjustable).

Fan Interlocks - When the supply fan is off the return fan and exhaust fan 1 will stop, close the mixed air dampers, the heating and cooling valves. When the freeze stat is in alarm stop the fans and open the heating valve. When the fire alarm panel is in alarm stop the fans and exhaust fan 1 and generate an alarm. When the supply pressure high limit is in alarm the supply fan will be stopped.

Unoccupied Mode - During the unoccupied mode the AHU will be off, the outside air damper and the relief damper will be closed and the return damper will be in the full recirculation mode. In a call for setback heating from the VAV's the damper positions will stay in the unoccupied mode.

Overrides - When any space sensor override button on the first floor or the 2nd floor override button is pushed AHU 2 will be placed in the occupied mode for 2 hours.

The AHU will have an Opstart/Morning Warmup mode. During the Morning Warmup mode the dampers will be in full recirculation position.

VAV TERMINAL UNITS

First floor VAV's will operate on the same occupied mode schedule as AHU 1. Second floor VAV's will operate on the same occupied mode schedule as AHU 2.

Occupied Mode - VAV's with Series Fans and Reheat Coils

Series fan VAV's will be started. On a call for full cooling at temperature sensor the VAV terminal unit controller shall position the VAV box damper to deliver maximum scheduled air quantity and the heating control valve will be closed to the coil. As the call for cooling decreases controller shall modulate box damper closed to minimum scheduled air quantity. On a call for heating, after the damper is at minimum position, the heating control valve shall modulate to flow through coil. The reverse shall occur on a decrease in call for heating.

Unoccupied Mode - VAV's with Series Fans and Reheat Coils

Terminal box damper shall position to minimum airflow position. A call for heating during the unoccupied mode will start the VAV fan to recirculate air. The heating control valve shall modulate to maintain space set point. The setback set point is 55 °F (adjustable) with a 5 °F (adjustable) deadband.

Occupied Mode - VAV's with Reheat Coils

On a call for full cooling at temperature sensor the VAV terminal unit controller shall position the VAV box damper to deliver maximum scheduled air quantity. As the call for cooling decreases controller shall modulate box damper closed to minimum scheduled air quantity. On a call for heating, after the damper is at minimum position, the heating control valve shall modulate to flow through coil. The reverse shall occur on a decrease in call for heating.

Unoccupied Mode - VAV's with Reheat Coils

Terminal box damper shall position to minimum airflow position. A call for heating on any VAV during the unoccupied mode to maintain the setback temperature set point shall start the applicable air handling unit (AHU 1 for 1st floor and AHU 2 for 2nd floor). The heating control valve shall modulate to maintain space set point. The setback set point is 55 °F (adjustable) with a 5 °F (adjustable) deadband.

Occupied Mode - Constant Volume VAV's with Reheat Coils (CV 6, 7, 32, 33)

Terminal box damper shall position to airflow setpoint. On a call for heating, the heating control valve shall modulate to flow through coil. The reverse shall occur on a decrease in call for heating.

Unoccupied Mode - Constant Volume VAV's with Reheat Coils (CV 6, 7, 32, 33)

Terminal box damper shall position to minimum airflow position. A call for heating on any VAV during the unoccupied mode to maintain the setback temperature set point shall start the applicable air handling unit (AHU 1 for 1st floor and AHU 2 for 2nd floor). The heating control valve shall modulate to maintain space set point. The setback set point is 55 °F (adjustable) with a 5 °F (adjustable) deadband.

Occupied Mode - VAV's with CO2 Monitoring

The VAV box damper will position to the maximum scheduled air quantity when the CO2 monitoring input indicates an alarm condition.

FIN TUBE VALVE CONTROL - Valve will be controlled in sequence with the VAV heating valve. Both the VAV heating valve and the Fin Tube valve shall control off of the same room sensor for the area served.

HONEYWELL HYDRONIC BOILER - The boiler will be enabled to operate when a hot water pump is running. The boiler setpoint is set by Honeywell. If the boiler goes into alarm, after a 60 second delay, a boiler alarm message will be sent to the appropriate pagers via a commercial paging system. This will require the ability to send the same alpha-numeric alarm message to multiple pagers. If the boiler is enabled and the hot water supply temp drops to 110 °F (adjustable) or rises to 200 °F (adjustable) and remains there for 30 minutes then a boiler/hot water supply alarm will be sent to the paging system. If at any time during the delay the hot water supply temperature returns to normal then the alarm condition will be terminated.

HOT WATER PUMPS CONTROL - When the outside air temp increases to 62 °F (adjustable) stop the hot water pumps. When the outside air temp decreases to 60 °F (adjustable) start the lead hot water pump. The lead hot water pump will be changed weekly based upon runtime. When the runtime lead pump changeover is made, both pumps shall run for 30 seconds (adjustable) before the lag pump is stopped. If a pump is commanded to run and the status switch indicates no flow after a 30 second delay (adjustable), a pump failure alarm will be generated and the lag pump will be given a start command.

CHILLER CONTROL - If the building is in the occupied mode and the outside air temp is greater than 62 °F (adjustable) and an air handler is calling for cooling then start the lead chilled water pump, delay 3 minutes, and enable the chiller after chilled water flow is proved. If any of these conditions are false, disable the chiller, delay 3 minutes and stop the chilled water pumps. If the outside air temp is less than 60 °F (adjustable) disable the chiller, delay 3 minutes and stop the chilled water pumps. The chiller will be disabled anytime at least one pump is not running. The chiller will operate on its own controls when enabled.

CHILLED WATER PUMPS CONTROL - The lead chilled water pump will be changed weekly based upon runtime. When the runtime lead pump changeover is made, both pumps shall run for 30 seconds (adjustable) before the lag pump is stopped. If a pump is commanded to run and the status switch indicates no flow after a 30 second delay (adjustable), a pump failure alarm will be generated and the lag pump will be given a start command. Both chilled water pumps will be started when the outside air temp drops to 30 °F (adjustable) and remain running until the outside air temp increase to 32 °F (adjustable).

DOMESTIC HOT WATER - The domestic hot water tank and pump will be enabled to run when the building is in the occupied mode.

EXHAUST FAN 5 DAMPER CONTROL - The damper will open when the mech room temp increases to 75 °F (adjustable) and close when the temp drops to 70 °F (adjustable).

CONVECTOR C1 ROOM 102A EAST ENTRY - Modulate heating valve to maintain 65 °F (adjustable) space temp during occupied mode. Modulate heating valve to maintain 55 °F (adjustable) space temp during unoccupied mode. Occupied mode shall be the same as AHU 1.

CONVECTOR C2 ROOM 103A NORTH ENTRY - Modulate heating valve to maintain 65 °F (adjustable) space temp during occupied mode. Modulate heating valve to maintain 55 °F (adjustable) space temp during unoccupied mode. Occupied mode shall be the same as AHU 1.

CONVECTOR C3 ROOM 108A WEST ENTRY - Modulate heating valve to maintain 65 °F (adjustable) space temp during occupied mode. Modulate heating valve to maintain 55 °F (adjustable) space temp during unoccupied mode. Occupied mode shall be the same as AHU 1.

CONVECTOR C4 ROOM 101A SOUTH ENTRY - Modulate heating valve to maintain 65 °F (adjustable) space temp during occupied mode. Modulate heating valve to maintain 55 °F (adjustable) space temp during unoccupied mode. Occupied mode shall be the same as AHU 1.

CONVECTOR C5 ROOM 122 OUTER STORAGE - Modulate heating valve to maintain 71 °F (adjustable) space temp during occupied mode. Modulate heating valve to maintain 55 °F (adjustable) space temp during unoccupied mode. Occupied mode shall be the same as AHU 1.

CONVECTOR C6 ROOM 126B VESTIBULE - Modulate heating valve to maintain 65 °F (adjustable) space temp during occupied mode. Modulate heating valve to maintain 55 °F (adjustable) space temp during unoccupied mode. Occupied mode shall be the same as AHU 1.

BLDG. 2071 SECURITY POLICE FACILITY

BLDG. TOTAL POINTS	52
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TOTAL EXISTING POINTS	48
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TOTAL NEW POINTS	4
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The original installation has an AHU that supplies a dual duct VAV system. This system has local controls. Three VAV's and some unit heaters were added to a building addition. These VAV's receive their supply air from the original AHU. A Honeywell steam boiler has also been installed. Fairchild personnel have added some additional DDC control to the chilled water and hot water pumps and a start/stop to the AHU for shelter-in-place shutdown.

CONTROLLER #1 - HONEYWELL 15# SINGLE STEAM BOILER

POINT INFO	TYPE	NOTES/COMMENTS
OUTSIDE AIR TEMP	AI	INSTALL NEW SENSOR. USE EXISTING WIRING
STEAM PRESSURE	AI	4-20ma=0-100 PSI. USE EXISTING DEVICE, WIRING AND CONDUIT
BOILER ALARM	BI	USE EXISTING DEVICE, WIRING AND CONDUIT
BOILER ENABLE	BO	USE EXISTING DEVICE, WIRING AND CONDUIT
TOTAL	4	

*Note on Controller 2 & 5. These controllers are located in the same enclosure in the mech room. It is possible that the points in these controllers can be placed in a single controller.

CONTROLLER #2 - AHU STR/STP / CWP'S / HWP'S / CWS & HWS

POINT INFO	TYPE	NOTES/COMMENTS
HOT WATER RETURN TEMP	AI	INSTALL NEW SENSOR. USE EXISTING WIRING
HOT WATER SUPPLY TEMP	AI	INSTALL NEW SENSOR. USE EXISTING WIRING
CHILL WATER SUPPLY TEMP	AI	INSTALL NEW SENSOR. USE EXISTING WIRING
AIR HANDLER STATUS	BI	USE EXISTING DEVICE, WIRING AND CONDUIT
CHILL WATER PUMP 1 STATUS	BI	USE EXISTING DEVICE, WIRING AND CONDUIT
CHILL WATER PUMP 2 STATUS	BI	USE EXISTING DEVICE, WIRING AND CONDUIT
HOT WATER PUMP 1 STATUS	BI	USE EXISTING DEVICE, WIRING AND CONDUIT
HOT WATER PUMP 2 STATUS	BI	USE EXISTING DEVICE, WIRING AND CONDUIT
AIR HANDLER STR/STP	BO	USE EXISTING DEVICE, WIRING AND CONDUIT
CHILLER ENABLE	BO	USE EXISTING DEVICE, WIRING AND CONDUIT
CHILL WATER PUMP 1 STR/STP	BO	USE EXISTING DEVICE, WIRING AND CONDUIT
CHILL WATER PUMP 2 STR/STP	BO	USE EXISTING DEVICE, WIRING AND CONDUIT
HOT WATER PUMP 1 STR/STP	BO	USE EXISTING DEVICE, WIRING AND CONDUIT
HOT WATER PUMP 2 STR/STP	BO	USE EXISTING DEVICE, WIRING AND CONDUIT
TOTAL	14	

CONTROLLER #3 - VAV INTEGRATOR FOR VAV'S 18, 19 & 20 - 3 VAV'S HOOKED UP TO AN INTEGRATOR CONTROLLER. THIS WILL REQUIRE 3 NEW VAV CONTROLLERS.

POINT INFO	TYPE	NOTES/COMMENTS
VAV 18		
RM 101 FLOW, CFM	AI	VAV OUTPUT CFM'S
RM 101 TEMP	AI	INSTALL NEW WALL SENSOR. CONTROLLER ACCESS FROM SENSOR REQUIRED. SEE NOTES BELOW.
DAMPER CONTROL	AO	DAMPER ACTUATOR
REHEAT VLV (FLOATING)	BO	FLOATING CONTROL VALVE OPEN SIGNAL. USE EXISTING DEVICE, WIRING AND CONDUIT
REHEAT VLV (FLOATING)	BO	FLOATING CONTROL VALVE CLOSE SIGNAL. USE EXISTING DEVICE, WIRING AND CONDUIT

VAV 19		
RM 109 FLOW, CFM	AI	VAV OUTPUT CFM'S
RM 109 TEMP	AI	INSTALL NEW WALL SENSOR. CONTROLLER ACCESS FROM SENSOR REQUIRED. SEE NOTES BELOW.
DAMPER CONTROL	AO	DAMPER ACTUATOR
REHEAT VLV (FLOATING)	BO	FLOATING CONTROL VALVE OPEN SIGNAL. USE EXISTING DEVICE, WIRING AND CONDUIT
REHEAT VLV (FLOATING)	BO	FLOATING CONTROL VALVE CLOSE SIGNAL. USE EXISTING DEVICE, WIRING AND CONDUIT
VAV 20		
RM 110 FLOW, CFM	AI	VAV OUTPUT CFM'S
RM 110 TEMP	AI	INSTALL NEW WALL SENSOR. CONTROLLER ACCESS FROM SENSOR REQUIRED. SEE NOTES BELOW.
DAMPER CONTROL	AO	DAMPER ACTUATOR
REHEAT VLV (FLOATING)	BO	FLOATING CONTROL VALVE OPEN SIGNAL. USE EXISTING DEVICE, WIRING AND CONDUIT
REHEAT VLV (FLOATING)	BO	FLOATING CONTROL VALVE CLOSE SIGNAL. USE EXISTING DEVICE, WIRING AND CONDUIT
TOTAL	15	

CONTROLLER #4 - UH 1 (RM 109N) / UH 2 (RM 109S) / FIN TUBE (RM 100)

POINT INFO	TYPE	NOTES/COMMENTS
ROOM 100 TEMP SENSOR (ENTRY)	AI	INSTALL NEW WALL SENSOR. USE EXISTING WIRING.
RM 109N TEMP (ROLL UP DOOR AREA)	AI	INSTALL NEW WALL SENSOR. USE EXISTING WIRING.
RM 109S TEMP (SIDE DOOR AREA)	AI	INSTALL NEW WALL SENSOR. USE EXISTING WIRING.
FIN TUBE VALVE (RM 100)	AO	N.O. VALVE. 0-10 VDC? USE EXISTING DEVICE, WIRING AND CONDUIT
UNIT HEATER 1 STR/STP	BO	USE EXISTING DEVICE, WIRING AND CONDUIT
UNIT HEATER 2 STR/STP	BO	USE EXISTING DEVICE, WIRING AND CONDUIT
TOTAL	6	

*Note on Controller 2 & 5. These controllers are located in the same enclosure in the mech room. It is possible that the points in these controllers can be placed in a single controller.

CONTROLLER #5 - ZONES 1-5 TEMPS / AHU TEMPS / CWP 3

POINT INFO	TYPE	NOTES/COMMENTS
AHU SUPPLY AIR TEMP	AI	INSTALL NEW SENSOR. USE EXISTING WIRING
AHU COLD DECK AIR TEMP	AI	INSTALL NEW SENSOR. USE EXISTING WIRING
AHU HOT DECK AIR TEMP	AI	INSTALL NEW SENSOR. USE EXISTING WIRING
ROOM 5 TEMP SENSOR (ZONE 1)	AI	INSTALL NEW WALL SENSOR. USE EXISTING WIRING.
ROOM 20 TEMP SENSOR (ZONE 2)	AI	INSTALL NEW WALL SENSOR. USE EXISTING WIRING.
ROOM 21 TEMP SENSOR (ZONE 3)	AI	INSTALL NEW WALL SENSOR. USE EXISTING WIRING.
ROOM 38 TEMP SENSOR (ZONE 4)	AI	INSTALL NEW WALL SENSOR. USE EXISTING WIRING.
ROOM 67 TEMP SENSOR (ZONE 5)	AI	INSTALL NEW WALL SENSOR. USE EXISTING WIRING.
CHILL WATER PUMP 3 STR/STP-NEW SMALL CHILLER	BO	USE EXISTING DEVICE, WIRING AND CONDUIT
TOTAL	9	

ADDITIONAL REQUIREMENTS - ADD DISCHARGE AIR SENSORS TO ALL 3 VAV'S

POINT INFO	TYPE	NOTES/COMMENTS
DISCHARGE AIR SENSORS	AI	INSTALL NEW DISCHARGE AIR SENSORS IN ALL VAV'S
TOTAL	3	

ADDITIONAL REQUIREMENTS - METERS

POINT INFO	TYPE	NOTES/COMMENTS
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GAS METER	BI	PROVIDE PULSE METER HEAD FOR EXISTING GAS METER. PULSE HEAD WILL BE WIRE INTO NEW CONTROLLER AND WILL PROVIDE CURRENT AND TOTALIZED GAS CONSUMPTION.
TOTAL	1	

***NOTE - VAV WALL SENSORS**

All VAV wall temperature sensors and/or thermostats shall have the ability to access the VAV controller parameters either by using the buttons on the sensor itself or by plugging in a portable field service device for access using an available plug in port on the sensor.

***NOTE - WALL SENSORS/SETPOINT & OVERRIDE CONTROL**

Install wall sensors with setpoint and override control in occupied areas unless specifically noted to not install this type sensor. Typical wall sensors for hangars, warehouse areas and mechanical rooms will be industrial grade plate style sensors. Most of the buildings will not use the setpoint or override functions at this time but may in the future as building requirements change. Most buildings will be programmed so that the area setpoint is set in software and not set by occupants. Final determination as to which buildings have occupant setpoint control will be made during the software programming. The setpoints will have high and low limits in buildings where occupant setpoint control is allowed. See specific building requirements for additional information.

****NOTE - SINGLE POINT SHELTER-IN-PLACE (SIP) SWITCH**

All air handlers, exhaust fans, fan coils, fan-powered VAV's, unit heaters, cabinet heaters and furnaces will be programmed to immediately shut down when the shelter-in-place switch is activated. The shelter-in-place switch is located in the main fire station (Bldg. 0003) control room. Essentially, when the shelter-in-place switch is activated all mechanical equipment with a control output and that moves air will be shutdown. When the switch is placed back into the normal position all of the equipment shutdown will restart with delays. The delays are needed to prevent a large load on the utility systems.

SEQUENCE OF OPERATIONS

AIR HANDLER - The AHU operates 24 hours a day. The AHU will shutdown when the shelter-in-place switch is activated.

MAIN CHILLER/PUMPS 1 & 2 CONTROL (CONTROLLER #2) - When the outside air temp increases to 53 °F (adjustable) start the lead chilled water pump, delay 30 seconds, verify that a chilled water pump is running and enable the chiller. When the outside air temp drops to 50 °F (adjustable) disable the chiller, delay 4 minutes and stop the chilled water pumps. The chiller will not be enabled unless at least one chilled water pump is operating.

The lead chilled water pump will be changed weekly based upon runtime. When the runtime lead pump changeover is made, both pumps shall run for 30 seconds (adjustable) before the lag pump is stopped. If a pump is commanded to run and the status switch indicates no flow after a 30 second delay (adjustable), a pump failure alarm will be generated and the lag pump will be given a start command.

CWP PUMP 3 (CONTROLLER #5) - When the outside air temp increases to 53 °F (adjustable) start the chilled water pump. When the outside air temp drops to 50 °F (adjustable) chilled water pump. *Note - the chiller operates whenever it has flow.

HONEYWELL BOILER - The boiler will be enabled to operate at all times. When the boiler goes into alarm a boiler alarm message will be sent to the appropriate pagers via a commercial paging system after a 60 second delay. This will require the ability to send the same alpha-numeric alarm message to multiple pagers. If the boiler is enabled and the steam pressure drops to 1 psi and remains there for 8 minutes then a steam low pressure alarm will be sent to the appropriate pagers via the paging system. If at any time during the 8 minute delay the boiler pressure rises above 2 psi then the alarm condition will be terminated.

HOT WATER PUMPS CONTROL - The hot water pumps will be enabled to operate anytime the steam pressure alarm is in the normal condition. The pumps will be stopped if the steam low pressure alarm is on. The lead hot water pump will be changed weekly based upon runtime. When the runtime lead pump changeover is made, both pumps shall run for 30 seconds (adjustable) before the lag pump is stopped. If a pump is commanded to run and the status switch indicates no flow after a 30 second delay (adjustable), a pump failure alarm will be generated and the lag pump will be given a start command.

Occupied Mode - VAV's with Reheat Coils (VAV's 18, 19, & 20 Occupied all the time)

On a call for full cooling at temperature setpoint, the VAV terminal unit controller shall position the VAV box damper to deliver maximum scheduled air quantity. As the call for cooling decreases controller shall modulate box damper closed to minimum scheduled air quantity. On a call for heating, after the damper is at minimum position, the heating control valve shall modulate to flow through coil. The reverse shall occur on a decrease in call for heating.

UH 1 & 2 - FIN TUBE - The fin tube valve will modulate to maintain a 70 °F (adjustable) set point in Room 100. Unit heater 1 will cycle to maintain the user entered setpoint in Room 109N. Unit heater 2 will cycle to maintain the user entered setpoint in Room 109S.

BLDG. 2075 COMBAT ARMS TRAINING & MAINTENANCE

BLDG. TOTAL POINTS	37
TOTAL EXISTING POINTS	35
TOTAL NEW POINTS	2

The original installation had two air handlers. AHU 1 for the gun room is no longer used. AHU 2 provides ventilation for the rooms that have fancoils with local controls. The original HSQ controls have been replaced with DMS controls by Fairchild personnel. Several pneumatics converted or controlled by DDC. A Honeywell steam boiler has also been installed. The FATS room has been added with a DMS controller installed.

All pneumatic actuators and controls will be converted to electronic at this building.

CONTROLLER #1 - HONEYWELL 15# SINGLE STEAM BOILER

POINT INFO	TYPE	NOTES/COMMENTS
OUTSIDE AIR TEMP	AI	INSTALL NEW SENSOR. USE EXISTING WIRING
STEAM PRESSURE	AI	4-20ma=0-100 PSI. USE EXISTING DEVICE, WIRING AND CONDUIT
BOILER ENABLE	BO	USE EXISTING DEVICE, WIRING AND CONDUIT
TOTAL	3	

*Note - Controller 2 points converted from HSQ to DMS by FAFB personnel. 2-pipe water system to building.

CONTROLLER #2 - AHU 2/CWS/HWS & PUMPS/HW CONVERTER/EX FANS/ROOM TEMPS

POINT INFO	TYPE	NOTES/COMMENTS
AHU 2 SUPPLY AIR TEMP	AI	INSTALL NEW SENSOR. USE EXISTING WIRING
BLDG. WATER SUPPLY TEMP	AI	INSTALL NEW SENSOR. USE EXISTING WIRING
CHILL WATER SUPPLY TEMP	AI	INSTALL NEW SENSOR. USE EXISTING WIRING
CHILL WATER RETURN TEMP	AI	INSTALL NEW SENSOR. USE EXISTING WIRING
HW CONVERTER SUPPLY TEMP	AI	INSTALL NEW SENSOR. USE EXISTING WIRING
MECH ROOM TEMP	AI	INSTALL NEW PLATE WALL SENSOR. USE EXISTING WIRING.
ROOM 101 TEMP (MAIN OFFICE)	AI	INSTALL NEW WALL SENSOR. SETPOINT CONTROL AND OVERRIDE BUTTON NOT REQUIRED. USE EXISTING WIRING.
ROOM 101 TEMP (MAIN OFFICE)	AI	INSTALL NEW WALL SENSOR. SETPOINT CONTROL AND OVERRIDE BUTTON NOT REQUIRED. USE EXISTING WIRING.
ROOM 102 TEMP (GUN ROOM)	AI	INSTALL NEW WALL SENSOR. SETPOINT CONTROL AND OVERRIDE BUTTON NOT REQUIRED. USE EXISTING WIRING.
ROOM 103 TEMP (BREAK ROOM)	AI	INSTALL NEW WALL SENSOR. SETPOINT CONTROL AND OVERRIDE BUTTON NOT REQUIRED. USE EXISTING WIRING.
ROOM 104 TEMP (STORAGE ROOM)	AI	INSTALL NEW WALL SENSOR. SETPOINT CONTROL AND OVERRIDE BUTTON NOT REQUIRED. USE EXISTING WIRING.
ROOM 105 TEMP (LRG CLASS ROOM)	AI	INSTALL NEW WALL SENSOR. SETPOINT CONTROL AND OVERRIDE BUTTON NOT REQUIRED. USE EXISTING WIRING.
ROOM 111 TEMP (VAULT)	AI	INSTALL NEW WALL SENSOR. SETPOINT CONTROL AND OVERRIDE BUTTON NOT REQUIRED. USE EXISTING WIRING.
STEAM TO HOT WATER CONVERTER CONTROL VALVE	AO	N.O. VALVE. INSTALL NEW 2-10 VDC ELECTRONIC ACTUATOR ON EXISTING VALVE. WILL REQUIRE NEW WIRING AND CONDUIT FROM CONTROLLER TO VALVE.
AHU 2 HEATING VALVE & FACE/BYPASS DAMPERS	AO	CURRENTLY HAS ONE PNEUMATIC OUTPUT TO BOTH. HTG VLV IS N.O. FACE/BYPASS DAMPERS ARE N.O. TO HEATING COIL. INSTALL <u>TWO</u> NEW 2-10 VDC ELECTRONIC ACTUATORS ON EXISTING VALVE AND DAMPERS. WILL REQUIRE NEW WIRING AND CONDUIT FROM CONTROLLER TO VALVE AND DAMPERS.
AHU 2 OUTSIDE AIR DAMPER	AO	OUTSIDE AIR DAMPER. INSTALL NEW 2-10 VDC ELECTRONIC ACTUATOR ON EXISTING DAMPER. WILL REQUIRE NEW WIRING AND CONDUIT FROM CONTROLLER TO ACTUATOR.
AHU 2 FAN STATUS	BI	USE EXISTING DEVICE, WIRING AND CONDUIT

CONDENSER FAN STATUS	BI	USE EXISTING DEVICE, WIRING AND CONDUIT
CIRC PUMP 1 STATUS	BI	USE EXISTING DEVICE, WIRING AND CONDUIT
CIRC PUMP 2 STATUS	BI	USE EXISTING DEVICE, WIRING AND CONDUIT
COOLING STR/STP	BO	USE EXISTING DEVICE, WIRING AND CONDUIT
AHU 2 STR/STP	BO	USE EXISTING DEVICE, WIRING AND CONDUIT
HEAT/COOL DIVERTING VALVE	BO	USE EXISTING DEVICE, WIRING AND CONDUIT
EXHAUST FAN 5 STR/STP	BO	USE EXISTING DEVICE, WIRING AND CONDUIT
CIRC PUMP 1 STR/STP	BO	USE EXISTING DEVICE, WIRING AND CONDUIT
CIRC PUMP 2 STR/STP	BO	USE EXISTING DEVICE, WIRING AND CONDUIT
TOTAL	26	

**Note on heating valve and face/bypass damper above - it may be better to have separate outputs to these actuators.

CONTROLLER #3 - FATS ROOM FURNACE

POINT INFO	TYPE	NOTES/COMMENTS
SUPPLY AIR TEMP	AI	INSTALL NEW SENSOR. USE EXISTING WIRING
FATS ROOM TEMP	AI	INSTALL NEW WALL SENSOR WITH SETPOINT AND OVERRIDE CONTROL. USE EXISTING WIRING.
DX COOLING STR/STP	BO	USE EXISTING DEVICE, WIRING AND CONDUIT
GAS HEATING STR/STP	BO	USE EXISTING DEVICE, WIRING AND CONDUIT
OUTSIDE AIR DAMPER OPEN/CLOSE	BO	USE EXISTING DEVICE, WIRING AND CONDUIT
SUPPLY FAN STR/STP	BO	USE EXISTING DEVICE, WIRING AND CONDUIT
TOTAL	6	

ADDITIONAL REQUIREMENTS - METERS & FATS ROOM FURNACE

POINT INFO	TYPE	NOTES/COMMENTS
GAS METER	BI	PROVIDE PULSE METER HEAD FOR EXISTING GAS METER. PULSE HEAD WILL BE WIRED INTO NEW CONTROLLER AND WILL PROVIDE CURRENT AND TOTALIZED GAS CONSUMPTION.
FATS ROOM FURNACE FAN STATUS	BI	INSTALL NEW CURRENT SENSING RELAY FOR FAN STATUS
TOTAL	2	

****NOTE - SINGLE POINT SHELTER-IN-PLACE (SIP) SWITCH**

All air handlers, exhaust fans, fan coils, fan-powered VAV's, unit heaters, cabinet heaters and furnaces will be programmed to immediately shut down when the shelter-in-place switch is activated. The shelter-in-place switch is located in the main fire station (Bldg. 0003) control room. Essentially, when the shelter-in-place switch is activated all mechanical equipment with a control output and that moves air will be shutdown. When the switch is placed back into the normal position all of the equipment shutdown will restart with delays. The delays are needed to prevent a large load on the utility systems.

SEQUENCE OF OPERATIONS

AIR HANDLER 2 - This AHU has a heating coil only and provides ventilation to the rooms. The rooms have fancoils with local control for heating and cooling of the spaces. The AHU has outside air only - there is no return duct or mixing chamber. The air handler will operate on a schedule. The face/bypass dampers will modulate to maintain a supply temp based upon the following reset: average room temp 76 °F (adjustable) = 60 °F (adjustable) set point, average room temp 60 °F (adjustable) = 70 °F (adjustable) set point. The outside air dampers will modulate between 20% (adjustable) and 100% (adjustable) open based upon the supply reset set point. Exact modulation parameters to be determined during programming. When the outside air is below 50 °F (adjustable) or above 73 °F (adjustable) the outside damper will be set at a 20% minimum. The air handler will shutdown if the supply air temp drops below 40 °F (adjustable).

EXHAUST FAN 5 CONTROL - EF 5 will operate on the same schedule as AHU 2.

COOL/HEAT MODE & DIVERTING VALVE - Outside air temp above 60 °F (adjustable) is cooling mode. Outside air temp below 58 °F (adjustable) is heating mode. The diverting valve position will be set based upon the mode. When the diverting valve is in cooling mode the hot water converter valve will be closed and the cooling enabled to operate. When the diverting valve is in the heating mode the cooling will be disabled and the hot water converter control enabled.

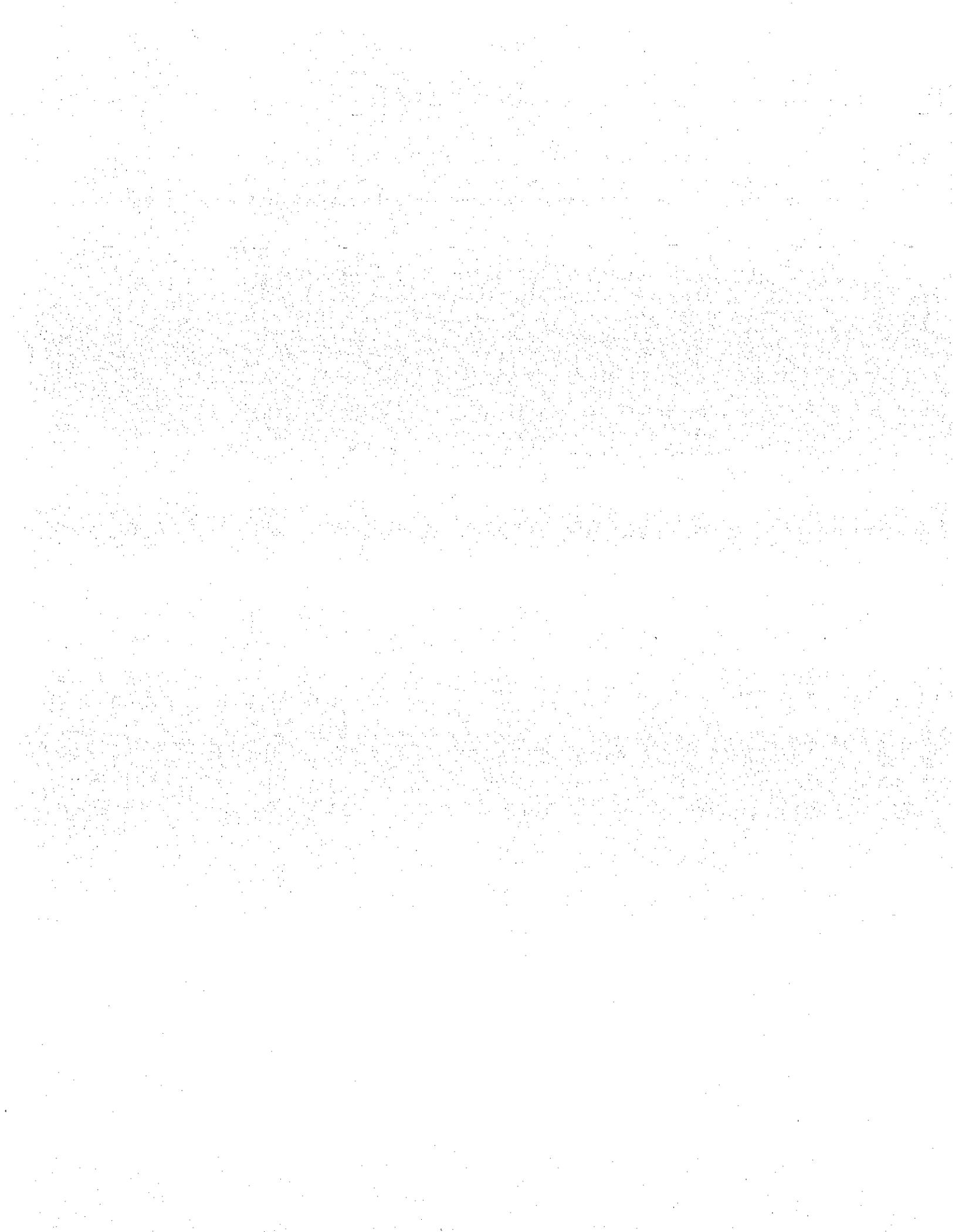
COOLING CONTROL - The cooling start/stop output will be cycled to maintain the chilled water supply temp between 45 °F (adj) and 50 °F (adjustable) when the cooling mode is on.

HOT WATER CONVERTER CONTROL - Modulate the steam valve to maintain the following outside air reset: Outside air 60 °F (adjustable) = 100 °F (adjustable), outside air 0 °F (adjustable) = 180 °F (adjustable) when the heating mode is on and at least one circ pump is on. Close the valve if a circ pump is not running.

CIRC PUMPS CONTROL - The lead circ pump will be changed weekly based upon runtime. When the runtime lead pump changeover is made, both pumps shall run for 30 seconds (adjustable) before the lag pump is stopped. If a pump is commanded to run and the status switch indicates no flow after a 30 second delay (adjustable), a pump failure alarm will be generated and the lag pump will be given a start command.

FATS ROOM FURNACE CONTROL - The furnace shall operate on a schedule. Cycle the cooling and heating to maintain the operator entered set point. Set point from wall stat will be limited to 68 - 74 °F (adjustable). Lockout cooling when outside air is less than 62 °F (adjustable). Lockout heating when outside air is greater than 60 °F (adjustable). When fan is off close the outside air dampers and stop the heating and cooling. The fan will cycle to maintain a 55 °F (adjustable) night setback. The furnace will have a opstart/morning warmup mode. The outside air damper will be closed during warmup and night setback heating modes. When the override button is activated the AHU will be placed in the occupied mode for 2 hours.

HONEYWELL BOILER - The boiler will be enabled to operate at all times. If the boiler is enabled and the steam pressure drops to 1 psi and remains there for 8 minutes then a steam low pressure alarm will be sent to the appropriate pagers via a commercial paging system. This will require the ability to send the same alpha-numeric alarm message to multiple pagers. If at any time during the 8 minute delay the boiler pressure rises above 2 psi then the alarm condition will be terminated.



BLDG. 2451 TELEPHONE ROOM

BLDG. TOTAL POINTS	1
TOTAL EXISTING POINTS	0
TOTAL NEW POINTS	1

This building being added to project to provide for transfer of single point Shelter-in-Place (SIP) shutdown switch status to the DMS system and automated paging of system alarms.

Install a global controller, DDC controller, relay and paging modem in telephone room located next to EMCS office. The modem will be setup to dial-out only and **WILL NOT, UNDER ANY AND ALL CIRCUMSTANCES, ANSWER INCOMING CALLS. ALL INCOMING CALLS WILL BE BLOCKED.** Install new wiring from relay contact to input of existing DMS controller in telephone room. DMS controller is located across the room from the new DDC controller installation location. Will also require that a phone line be run from existing phone jack located adjacent to the existing DMS controller to the new modem being installed.

CONTROLLER #1 - SHELTER-IN-PLACE (SIP) SWITCH OUTPUT TO DMS SYSTEM

POINT INFO	TYPE	NOTES/COMMENTS
SHELTER IN PLACE OUTPUT	BO	REQUIRES INSTALLING NEW RELAY AND ROUTING NEW WIRING FROM RELAY CONTACTS TO DMS CONTROLLER IN TELEPHONE ROOM.
TOTAL	1	

****NOTE - SINGLE POINT SHELTER-IN-PLACE (SIP) SWITCH**

All air handlers, exhaust fans, fan coils, fan-powered VAV's, unit heaters and cabinet heaters will be programmed to immediately shut down when the shelter-in-place switch is activated. The shelter-in-place switch is located in the main fire station (Bldg. 0003) control room. Essentially, when the shelter-in-place switch is activated all buildings mechanical equipment with a control output and that moves air will be shutdown. The few exceptions to this will be noted on the tab for that specific building. When the switch is placed back into the normal position all of the equipment shutdown will restart with delays. The delays are needed to prevent a large load on the utility systems.

SEQUENCE OF OPERATIONS

SHELTER - IN-PLACE SHUTDOWN - Energize the relay when the Shelter-in-Place (SIP) switch at Bldg. 3 is activated.

AUTOMATED ALARMS - Automated alarms, at a minimum, will be sent out from the Honeywell boilers to the Tele-Waves paging system as part of this project. Several hundred additional alarms will also be required in the future. The system must have the ability to send single alarms to multiple pager numbers as well as multiple alarms to a single pager number. Full functionality to send any alarms to any pagers at any time is required. The EMCS operators shall have the ability make all changes to the alarms setup and routing.