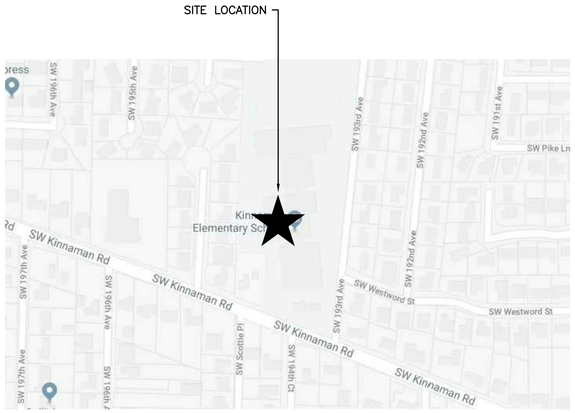
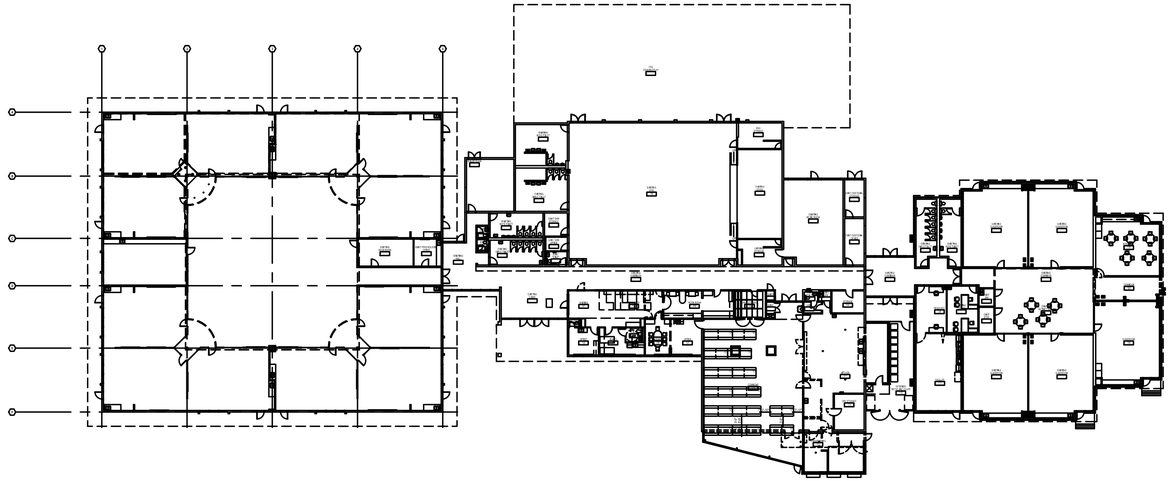
KINNAMAN HVAC UPGRADE PROJECT

4205 SW 193RD AVE
ALOHA, OREGON 97078



KINNAMAN VICINITY MAP



KINNAMAN AREA MAP

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PROJECT TEAM

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REGISTERED PROFESSIONAL ENGINEER
17884
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JULY 25, 1989
SCOTT W. MILLER
EXPIRES: 31DEC22

BID SET

Date: 08/09/21
Proj No: 10180
Drawn By: TF/LKF
Chkd By: SWM
DSGN By: SWM
Acad File: –

BEAVERTON SCHOOL DISTRICT
KINNAMAN HVAC UPGRADE PROJECT
4205 SW 193RD STREET
BEAVERTON OREGON

COVER SHEET

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SHEET
M0.0

MECHANICAL LEGEND

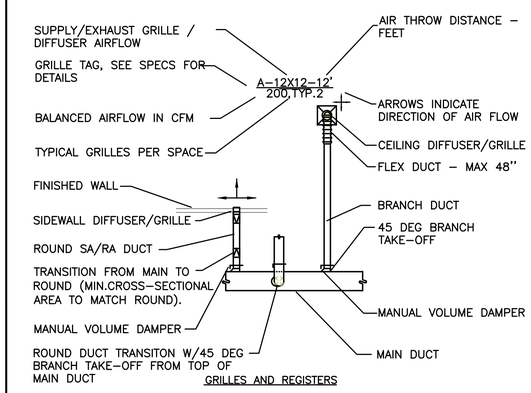
- SUPPLY AIR DIFFUSER
- RETURN AIR DIFFUSER
- EXHAUST AIR DIFFUSER
- DIRECTIONAL AIR FLOW
- MANUAL VOLUME DAMPER
- SUPPLY AIR DUCT UP & DOWN
- RETURN AIR DUCT UP & DOWN
- EXHAUST OR OUTSIDE AIR DUCT UP & DOWN
- SUPPLY AIR DUCT UP & DOWN
- RETURN AIR DUCT UP & DOWN
- EXHAUST OR OUTSIDE AIR DUCT UP & DOWN
- VAV TERMINAL UNIT W/ REHEAT COIL
- (D) DEMOLISH
- (E) EXISTING
- CONNECT TO EXISTING
- T F-? THERMOSTAT
- S TEMPERATURE SENSOR
- ? NOTE
- XX ? EQUIPMENT DESIGNATOR
- GATE VALVE/SHUT-OFF VALVE SEE SPECS
- CHECK VALVE
- BALANCING VALVE
- FLOW CONTROL/LIMITING VALVE
- THERMOMETER
- DIRECTION OF FLOW
- PUMP
- STRAINER W/DRAIN VALVE
- PRESSURE GUAGE
- PETE'S PLUG
- DOUBLE CHECK ASSEMBLY
- PRESSURE REDUCING VALVE
- UNION
- 2-WAY CONTROL VALVE
- 3-WAY CONTROL VALVE
- TRIPLE DUTY VALVE
- CAP
- MOTORIZED DAMPER
- BALL/SHUT-OFF VALVE (SEE SPECS)
- FIRE DAMPER
- FIRE / SMOKE DAMPER
- S SMOKE DAMPER

EQUIPMENT MAINTENANCE CLEARANCE AND ACCESS

AFF	ABOVE FINISH FLOOR
AHU	AIR HANDLING UNIT
B.D.	BOTTOM OF DUCT
BHP	BRAKE HORSEPOWER
BOG	BOTTOM OF GRILLE
BTU	BRITISH THERMAL UNITS
CFM	CUBIC FEET PER MINUTE
CONN.	CONNECTION
CONT.	CONTINUATION
CW	DOMESTIC COLD WATER
DB	DRY BULB
DIA.	DIAMETER
DIST.	DISTRIBUTION
EXH	EXHAUST AIR
EDB	ENTERING DRY BULB TEMPERATURE
EWB	ENTERING WET BULB TEMPERATURE
EWT	ENTERING WATER TEMPERATURE
FF	FINISH FLOOR
FIXT.	FIXTURE
F.O.B.	FLAT ON BOTTOM
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FT.	FEET / FOOT
GA.	GAUGE
GEXH	GREASE EXHAUST AIR DUCT
GPM	GALLONS PER MINUTE
H	HEIGHT
HP	HORSEPOWER
I.D.	INSIDE DIAMETER
IN.	INCHES
L	LENGTH
LBS.	POUNDS
LDB	LEAVING DRY BULB
LWB	LEAVING WET BULB
LWT	LEAVING WATER TEMPERATURE
MA	MAKE UP AIR
MAX.	MAXIMUM
MBH	THOUSANDS OF BTUs PER HOUR
MD	MOTORIZED DAMPER
MIN.	MINIMUM
MVD	MANUAL VOLUME DAMPER
NC	NOISE CRITERIA
N.C.	NORMALLY CLOSED
N.I.M.	NOT IN MECHANICAL
NO.	NUMBER
N.O.	NORMALLY OPEN
O.A.	OUTSIDE AIR
P	PERSON
PSI	POUNDS PER SQUARE INCH
P/T	PRESSURE / TEMPERATURE
R.A.	RETURN AIR
RECT.	RECTANGULAR
REQ'D	REQUIRED
S.A.	SUPPLY AIR
S.P.	STATIC PRESSURE
SQ.	SQUARE
TEMP.	TEMPERATURE
TYP.	TYPICAL
VAV	VARIABLE AIR VOLUME
W	WIDTH
WB	WET BULB
WPD	WATER PRESSURE DROP
ø	DIAMETER

- HWS (HWS) HEATING WATER SUPPLY
- HWR (HWR) HEATING WATER RETURN
- HWRR (HWRR) HEATING WATER REVERSE RETURN
- CHS (CHS) CHILLED WATER SUPPLY
- CHR (CHR) CHILLED WATER RETURN

AIR DISTRIBUTION DETAILS



MECHANICAL GENERAL NOTES

A. THE DRAWINGS ARE DIAGRAMMATIC. PROVIDE ALL MATERIAL (NEW AND UNDAMAGED) AND LABOR FOR A COMPLETE AND OPERABLE SYSTEM. VERIFY ALL BUILDING MEASUREMENTS DIMENSIONS AND EQUIPMENT LOCATIONS BEFORE PROCEEDING WITH ANY OF THE WORK.

B. VERIFY ALL EXISTING CONDITIONS RELATIVE TO THE SCOPE OF WORK. REPORT DISCREPANCIES BACK TO THE ENGINEER.

C. VERIFY INDICATED (E)DUCTWORK/PIPE SIZES PRIOR TO RECONNECTING NEW EQUIPMENT. EQUIPMENT SHALL NOT BE CONNECTED TO EXISTING DUCT/PIPE OF SMALLER DIAMETER THAN NEW DUCT/PIPE. REPORT DISCREPANCIES BACK TO ENGINEER.

D. DO NOT FABRICATE EQUIPMENT SUPPORTS/BASES W/O CONFIRMING SPACE EXISTS AND THE BUILDING ATTACHMENT POINTS.

E. REFER TO THE MECHANICAL SPECIFICATIONS FOR MATERIALS, EQUIPMENT, AND ADDITIONAL CONSTRUCTION INSTRUCTIONS NOT COVERED BY THESE PLANS.

F. ALL INSTALLATIONS SHALL COMPLY WITH APPLICABLE FEDERAL AND STATE CODES INCLUDING, 2019 OREGON STRUCTURAL SPECIALTY CODE (OSSC), OREGON ADOPTED FIRE CODE WITH OREGON AMENDAMENTS, 2021 OREGON PLUMBING SPECIALTY CODE (OPSC), 2019 OREGON MECHANICAL SPECIALTY CODE (OMSC), 2021 OREGON ENERGY EFFICIENCY SPECIALTY CODE (OEES), AND NATIONAL FIRE PROTECTION ASSOCIATION (NFPA). WHERE TWO CODES DIFFER THE MORE STRICT OF THE TWO SHALL BE FOLLOWED.

G. OBTAIN ALL NECESSARY PERMITS AND INSPECTIONS REQUIRED BY THE GOVERNING AUTHORITIES HAVING JURISDICTION. SUBMIT ALL CERTIFICATES PRIOR TO ACCEPTANCE.

H. COORDINATE ALL MECHANICAL AND CONTROL WORK WITH GENERAL CONTRACTOR, CONTROL CONTRACTOR, ELECTRICAL AND ARCHITECTURAL.

I. COORDINATE OTHER TRADES FOR PATCH/REPAIR OF WALLS WHERE EXISTING SENSORS ARE REMOVED OR MODIFIED.

J. PATCH & REPAIR WALLS / FLOORS / CEILING WHERE OLD DUCTWORK/PIPES HAVE BEEN REMOVED TO MATCH EXISTING FINISHES.

K. SEE SPECIFICATIONS FOR BALANCING SCOPE.

L. COORDINATE WITH OTHER CRAFTS AS REQUIRED TO COMPLETE WORK IN ACCORDANCE WITH CONSTRUCTION SCHEDULE.

M. PROVIDE OWNER INSTRUCTION BY QUALIFIED PERSONNEL ON EQUIPMENT AND SYSTEMS AT OWNER'S REQUEST.

N. ALL DUCTWORK SHALL BE GALVANIZED STEEL, UNLESS OTHERWISE INDICATED, CONFORMING TO LATEST SMACNA, ASHRAE, OMSC, NFPA, AND UL STANDARDS.

O. MANUFACTURERS AND MODEL NUMBERS LISTED IN THE EQUIPMENT SCHEDULES ARE THE BASIS OF DESIGN.

P. CUT WALLS FOR PROPER EQUIPMENT, DUCT OR PIPE INSTALLATION. FILL HOLES WHICH ARE CUT OVERSIZED FOR A TIGHT FIT AROUND OBJECTS PASSING THROUGH.

Q. PROVIDE UL LISTED FIRESTOP SYSTEM TO MAINTAIN THE CODE REQUIRED F AND T RATING OF THE CONSTRUCTION ASSEMBLY AT A DUCT/PIPE PENETRATION THROUGH A RATED BUILDING CONSTRUCTION.

R. INSTALL LABELS ON ALL MECHANICAL EQUIPMENT. SEE SPECIFICATIONS FOR CRITERIA.

S. CONTROLS AND WIRING SHALL MEET ALL ELECTRICAL REQUIREMENTS OF APPLICABLE ELECTRICAL AND/OR CONTROL SPECIFICATIONS AND REQUIREMENTS OF OWNER, BUILDING OFFICIALS AND EQUIPMENT SUPPLIERS OF EQUIPMENT INSTALLED ON PROJECT.

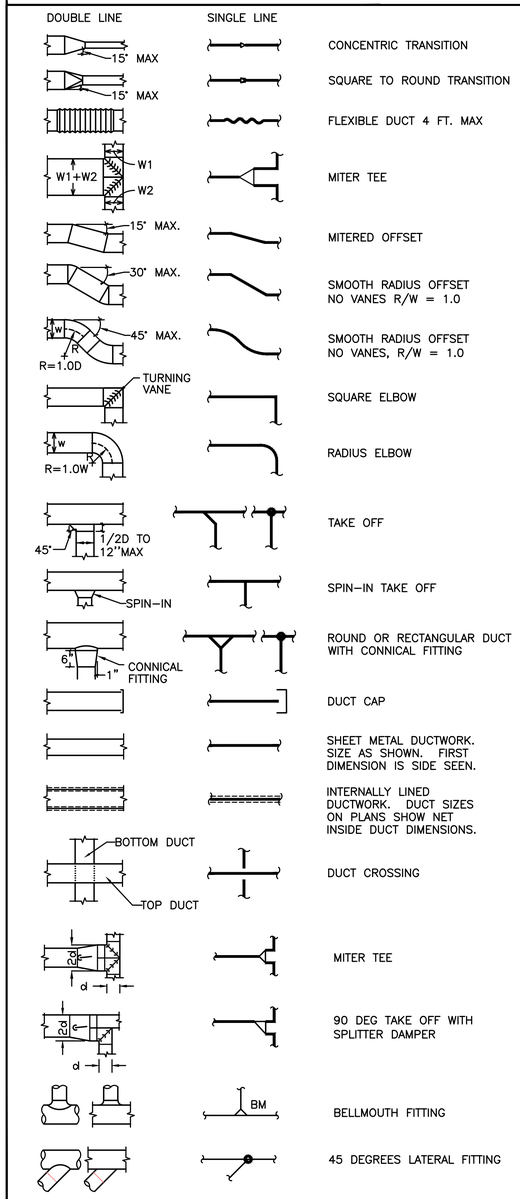
T. ELECTRIC MOTORS SHALL HAVE BUILT-IN THERMAL OVERLOAD PROTECTION OR BE PROTECTED EXTERNALLY WITH SEPARATE THERMAL OVERLOAD DEVICES, WITH LOW-VOLTAGE RELEASE OR LOCK OUT AS REQUIRED.

U. ALL NEW EQUIPMENT, PIPING, CONDUIT, AND DUCTWORK SHALL BE INSTALLED PER CURRENT SEISMIC CODE REQUIREMENTS.

V. PROVIDE LOW LEAK AUTOMATIC DAMPERS ON OUTSIDE AIR, EXHAUST AIR AND RELIEF AIR CONTROL DAMPERS WHERE THESE ARE INDICATED.

W. CONTRACTOR SHALL ASSIST COMMISSIONER AS REQUIRED BY SPECIFICATION SECTION 230800.

AIR DISTRIBUTION DETAILS



REGISTERED PROFESSIONAL ENGINEER
17884
OREGON
JULY 25, 1980
SCOTT W. MILLER
EXPIRES: 31DEC22

BID SET

Date: 08/09/21
Proj No.: 10180
Drawn By: TF/LKF
Chkd By: SWM
DSGN By: SWM
Acad File: -

BEAVERTON SCHOOL DISTRICT
KINNAMAN HVAC UPGRADE PROJECT
4205 SW 193RD STREET
BEAVERTON OREGON

MECHANICAL LEGEND, ABBREVIATIONS & GENERAL NOTES

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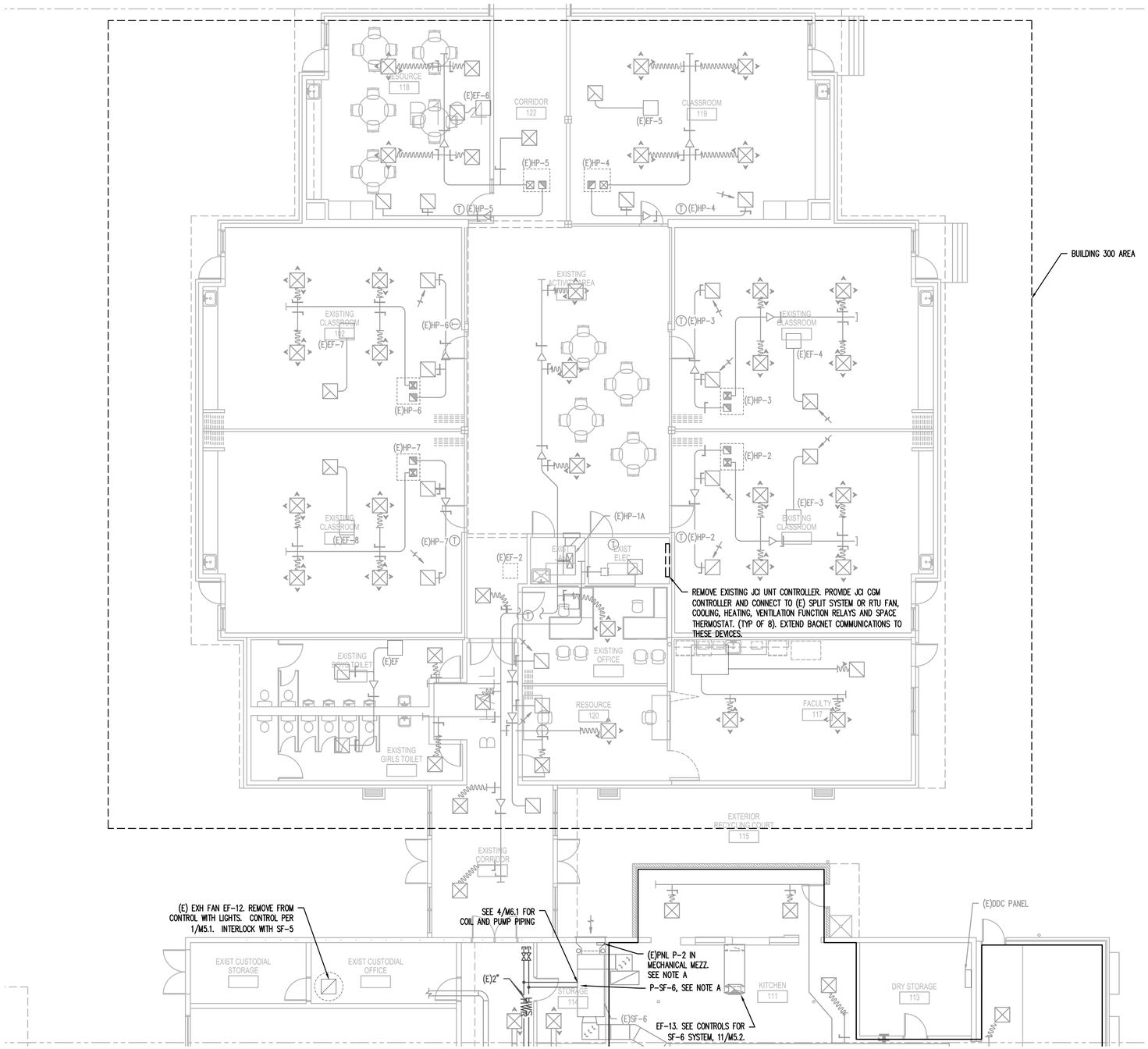
SHEET
MO.1
2 OF 10

GENERAL NOTES:

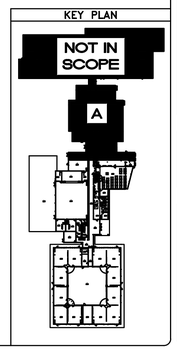
1. ENSURE ALL CHILLED WATER AND HEATING WATER VALVES AND PIPING WERE MODIFIED PER SPECS.
2. REMOVE ALL PNEUMATIC CONTROL DEVICES AND TUBING NO LONGER USED FROM MECHANICAL ROOMS AND ABOVE ACCESSIBLE CEILINGS. ABANDON TUBING ABOVE HARD LID CEILINGS AND IN WALLS.

NOTE A:
INSTALL 120 VOLT 20 AMP BREAKER IN (E) ITE PANEL SPARE LOCATION. ROUTE 1/2" CONDUIT WITH #12 CONDUCTORS AND GROUND TO P-SF6. BREAKER TO ACT AS MEANS OF DISCONNECT.



1 / M1.1 PARTIAL MECHANICAL FLOOR PLAN
SCALE: 1/8" = 1'-0"

KEY PLAN



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OREGON
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DSGN By: SWM
Acad File: -

BEAVERTON SCHOOL DISTRICT
KINNAMAN HVAC UPGRADE PROJECT
4205 SW 193RD STREET
BEAVERTON
OREGON

BUILDING AREA 300

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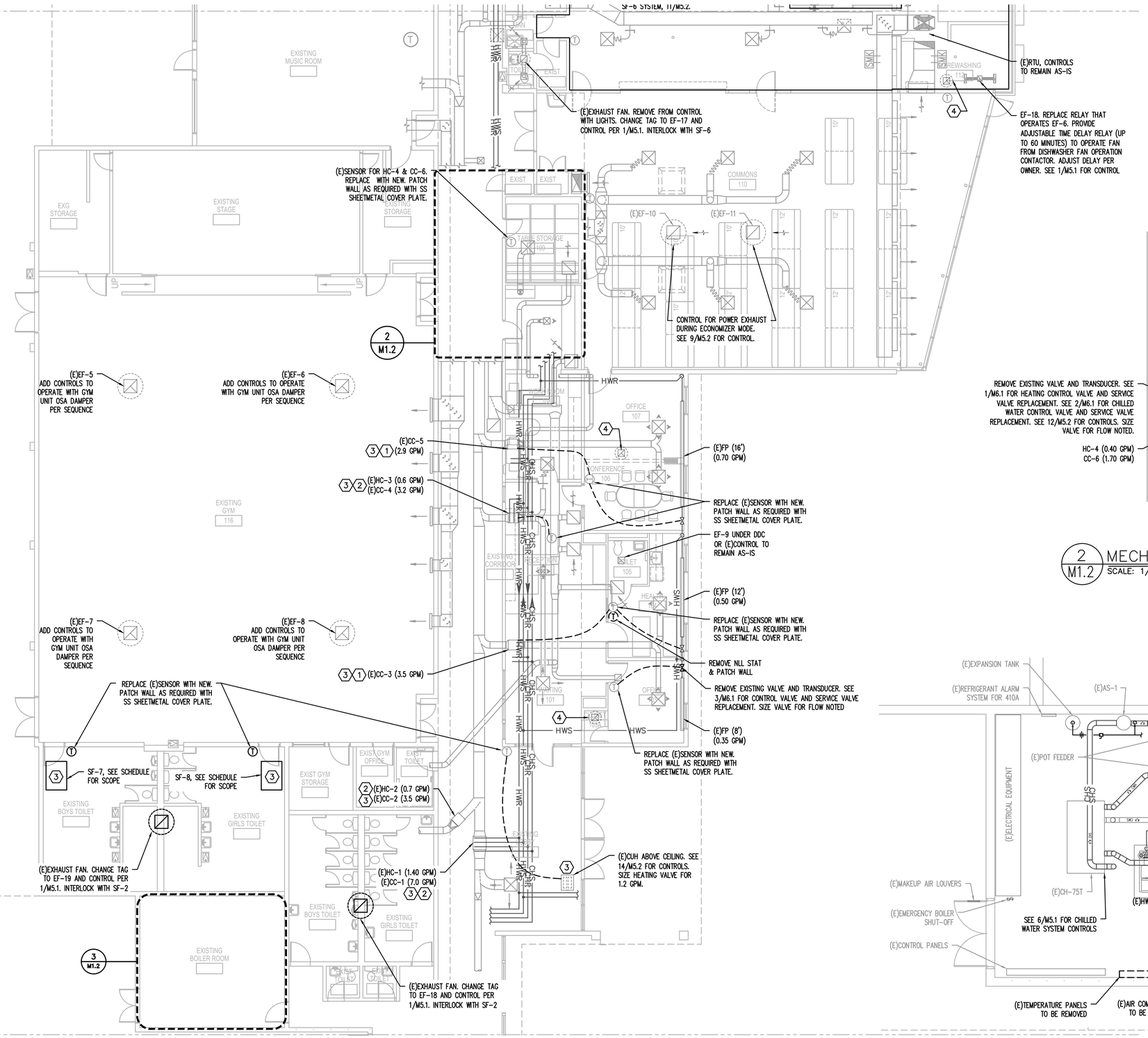
SHEET
M1.1
3 OF 10

GENERAL NOTES:

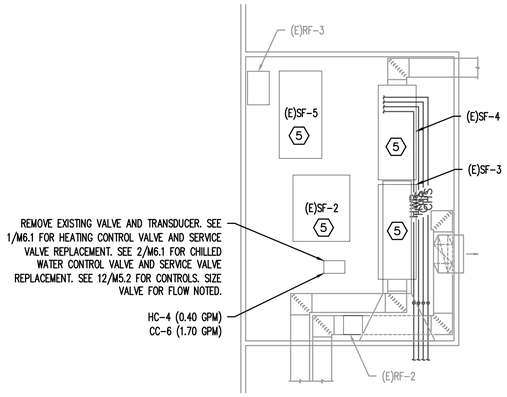
1. ENSURE ALL CHILLED WATER AND HEATING WATER VALVES AND PIPING WERE MODIFIED PER SPECS.
2. REMOVE ALL PNEUMATIC CONTROL DEVICES AND TUBING NO LONGER USED FROM MECHANICAL ROOMS AND ABOVE ACCESSIBLE CEILINGS. ABANDON TUBING ABOVE HARD LID CEILINGS AND IN WALLS.

KEY NOTES:

1. REMOVE EXISTING VALVE AND TRANSDUCER. SEE 12/M5.2 FOR CONTROL SEE 2/M6.1 FOR CHILLED WATER VALVE AND COIL TRIM REPLACEMENT. SIZE VALVE FOR FLOW NOTED.
2. REMOVE EXISTING VALVE AND TRANSDUCER. SEE 12/M5.2 FOR CONTROL SEE 2/M6.1 FOR CHILLED WATER VALVE AND COIL TRIM REPLACEMENT. SEE 1/M6.1 FOR HEATING WATER VALVE AND COIL TRIM REPLACEMENT. SIZE VALVE FOR FLOW NOTED.
3. APPLY TAG TO CEILING TILE NEAR UNIT.
4. (E) ABANDONED FAN, REMOVE AND PATCH ROOF. REMOVE ELECTRICAL TO SOURCE. CONFIRM SITE CONDITIONS PRIOR TO DEMO TO ENSURE FAN IS NOT BEING USED.
5. SEE SCHEDULE FOR SCOPE RELATED TO UNIT. CONTROLS (M5.1 OR M5.2) FOR CONTROL SCHEMATIC.



1 M1.2 PARTIAL MECHANICAL FLOOR PLAN
SCALE: 1/8" = 1'-0"



2 M1.2 MECHANICAL ROOM
SCALE: 1/8" = 1'-0"

3 M1.2 ENLARGED BOILER ROOM
SCALE: 1/4" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER
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JULY 25, 1986
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DSGN By: SWM
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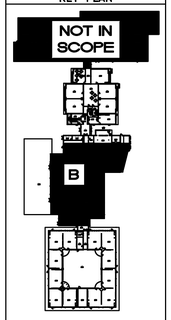
BEAVERTON SCHOOL DISTRICT
KINNAMAN HVAC UPGRADE PROJECT
4205 SW 193RD STREET
BEAVERTON OREGON

BUILDING AREA 200

KEY PLAN



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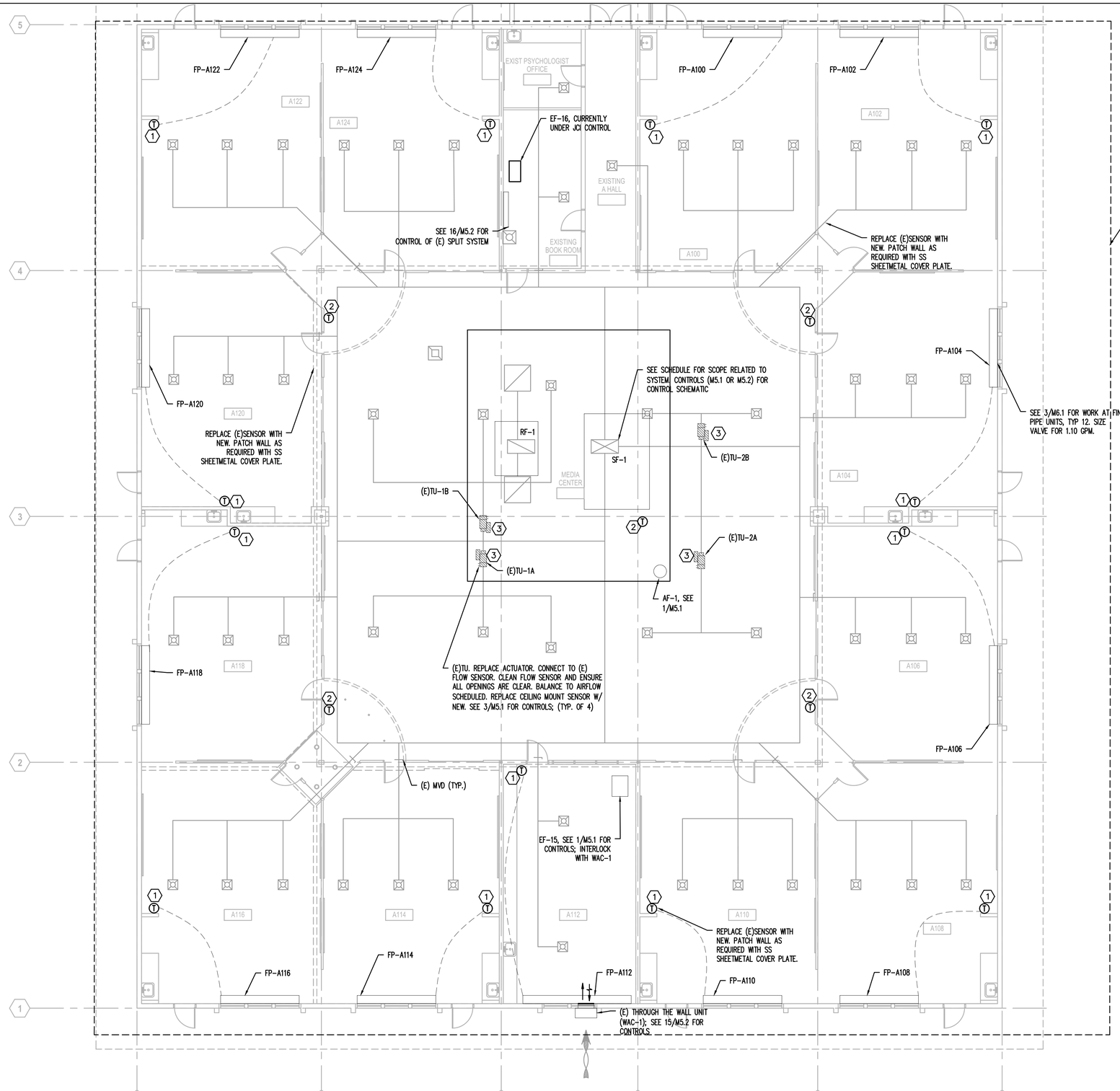
SHEET
M1.2
4 OF 10



1 M1.3 PARTIAL MECHANICAL FLOOR PLAN
SCALE: 1/8" = 1'-0"

GENERAL NOTES:

1. ENSURE ALL CHILLED WATER AND HEATING WATER VALVES AND PIPING WERE MODIFIED PER SPECS.
2. REMOVE ALL PNEUMATIC CONTROL DEVICES AND TUBING NO LONGER USED FROM MECHANICAL ROOMS AND ABOVE ACCESSIBLE CEILINGS. ABANDON TUBING ABOVE HARD LID CEILINGS AND IN WALLS.

KEYED NOTES:

(1) – REPLACE (E)SENSOR WITH NEW. PATCH WALL AS REQUIRED WITH SS SHEETMETAL COVER PLATE. ROUTE SENSOR WIRES DOWN IN WALL CAVITY.

(2) – REPLACE (E)SENSOR WITH NEW. PATCH WALL AS REQUIRED WITH SS SHEETMETAL COVER PLATE. SENSOR IS USED FOR SF-1 DAT CONTROL SEQUENCE.

(3) – APPLY TAG TO CEILING TILE NEAR UNIT.

REGISTERED PROFESSIONAL ENGINEER
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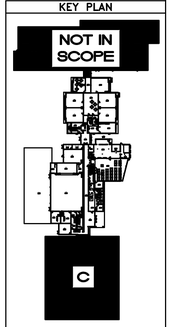
BEAVERTON SCHOOL DISTRICT
KINNAMAN HVAC UPGRADE PROJECT
4205 SW 193RD STREET
BEAVERTON OREGON

BUILDING AREA 100

KEY PLAN



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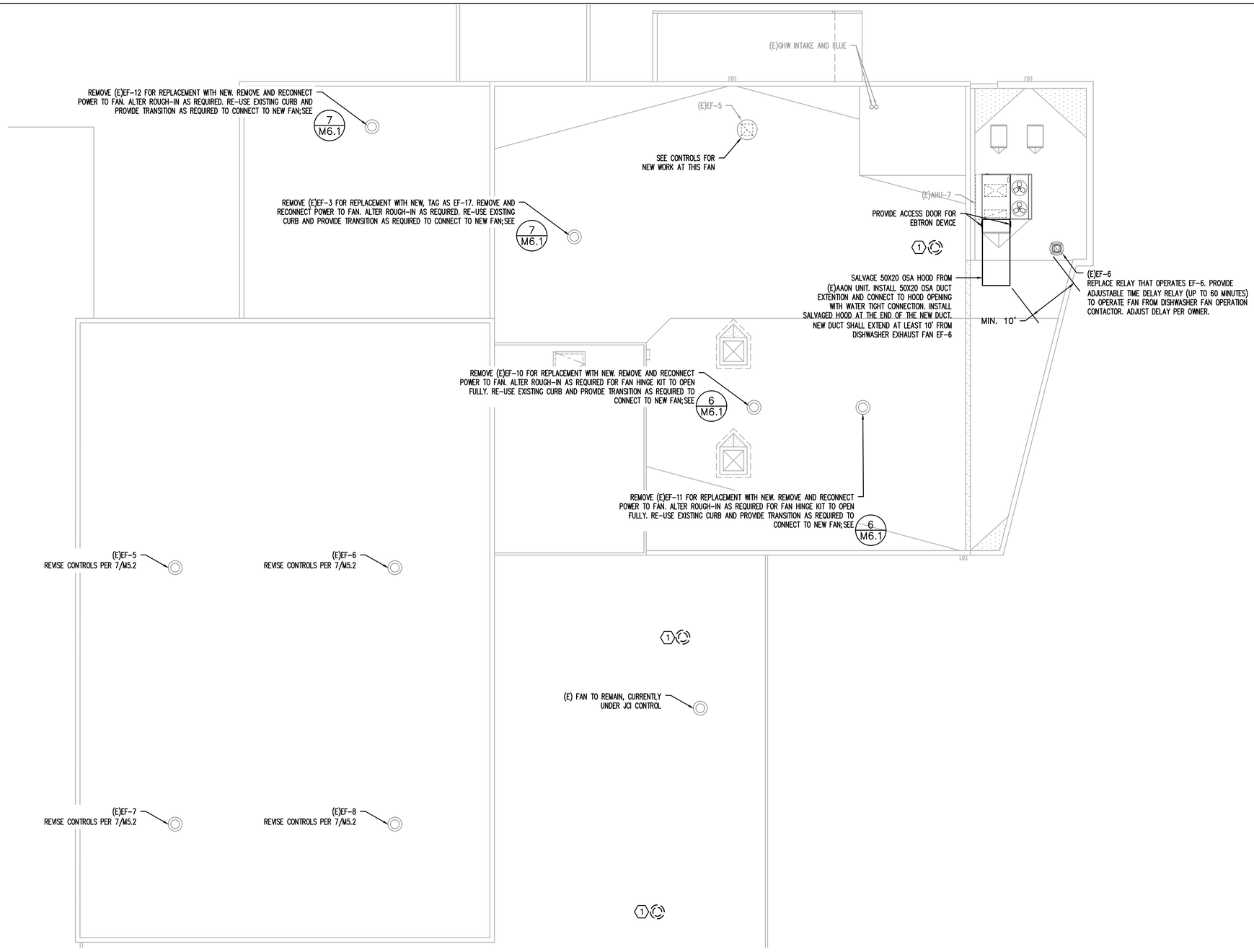
SHEET
M1.3
5 OF 10

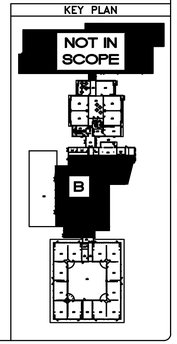
KEY NOTES:

1. (E) ABANDONED FAN, REMOVE AND PATCH ROOF. REMOVE ELECTRICAL TO SOURCE. CONFIRM SITE CONDITIONS PRIOR TO DEMO TO ENSURE FAN IS NOT BEING USED.



1/M2.2 PARTIAL MECHANICAL ROOF PLAN
SCALE: 1/8" = 1'-0"

KEY PLAN



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BEAVERTON SCHOOL DISTRICT
KINNAMAN HVAC UPGRADE PROJECT
4205 SW 193RD STREET
BEAVERTON OREGON

BUILDING AREA 200

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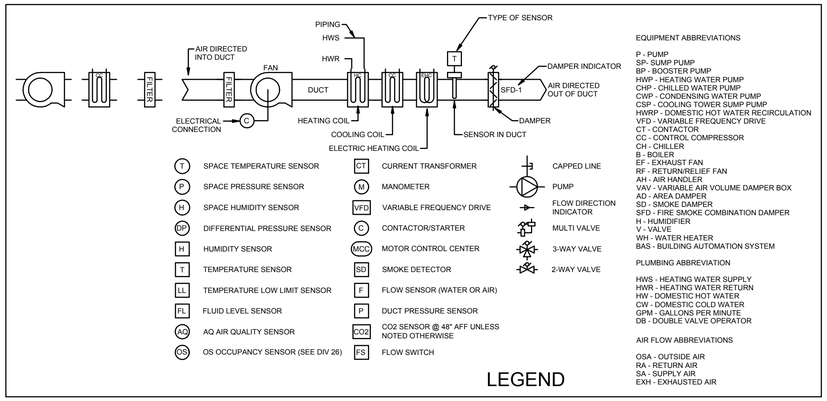
SHEET
M2.2
6 OF 10



LEGEND

EQUIPMENT ABBREVIATIONS

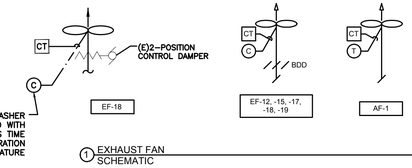
P - PUMP
SP- SUMP PUMP
BP - BOOSTER PUMP
HWP - HEATING WATER PUMP
CHP - CHILLED WATER PUMP
CWP - CONDENSING WATER PUMP
CSP - COOLING TOWER SUMP PUMP
HWRP - DOMESTIC HOT WATER RECIRCULATION
VFD - VARIABLE FREQUENCY DRIVE
CT - CONTACTOR
CC - CONTROL COMPRESSOR
CH - CHILLER
B - BOILER
EF - EXHAUST FAN
RF - RETURN/RELIEF FAN
AH - AIR HANDLER
VAV - VARIABLE AIR VOLUME DAMPER BOX
AD - AREA DAMPER
SD - SMOKE DAMPER
SFD - FIRE SMOKE COMBINATION DAMPER
H - HUMIDIFIER
V - VALVE
WH - WATER HEATER
BAS - BUILDING AUTOMATION SYSTEM

PLUMBING ABBREVIATION

HWS - HEATING WATER SUPPLY
HWR - HEATING WATER RETURN
HW - DOMESTIC HOT WATER
CW - DOMESTIC COLD WATER
GPM - GALLONS PER MINUTE
DB - DOUBLE VALVE OPERATOR

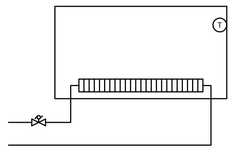
AIR FLOW ABBREVIATIONS

OSA - OUTSIDE AIR
RA - RETURN AIR
SA - SUPPLY AIR
EXH - EXHAUSTED AIR



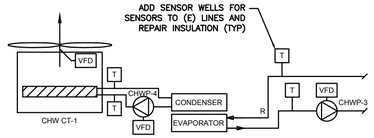
1 EXHAUST FAN SCHEMATIC

CONTROLS FOR EXHAUST FANS					
POINT DESCRIPTION	INPUT		OUTPUT		ALARM
	DIGITAL	ANALOG	DIGITAL	ANALOG	
SWITCH ENABLE (EF-18 ONLY)	X				
FAN MOTOR STATUS	X				X
START STOP (TYP OF ALL)			X		
OSA TEMPERATURE (AF-1 ONLY)		X			
MOTORIZED DAMPER (EF-18) ONLY			X		



2 FIN PIPE CONTROLS SCHEMATIC

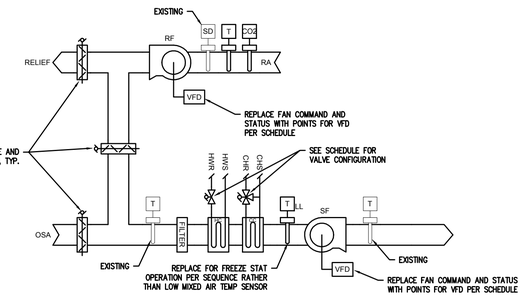
CONTROLS FOR FIN PIPE					
POINT DESCRIPTION	INPUT		OUTPUT		ALARM
	DIGITAL	ANALOG	DIGITAL	ANALOG	
FIN PIPE VALVE				X	
SPACE TEMPERATURE		X			



CONTROLS FOR CHILLER					
POINT DESCRIPTION	INPUT		OUTPUT		ALARM
	DIGITAL	ANALOG	DIGITAL	ANALOG	
CHILLER ENABLE / DISABLE (1)			X		
CHILLER RESET SIGNAL (1)				X	
CHILLER WATER PUMP START / STOP			X		
CHILLER WATER PUMP STATUS	X				X
CHILLER WATER PUMP SPEED				X	
CHILLER ALARM (1)	X (2)				X
CHILLER SUPPLY WATER TEMPERATURE (1)		X			
CHILLER RETURN WATER TEMPERATURE (1)		X			
CONDENSING WATER TEMP IN		X			
CONDENSING WATER TEMP OUT		X			
CONDENSING WATER PUMP START/STOP			X		
CONDENSING WATER PUMP STATUS	X				
CONDENSING WATER PUMP SPEED		X			
TOWER FAN START/STOP			X		
TOWER FAN STATUS	X				X
TOWER FAN SPEED				X	

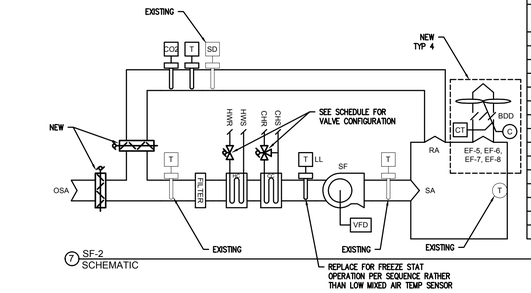
(1) VIA BACNET INTEGRATION
(2) ALARM CODE TO BE SHOWN.

6 CHILLER CONTROL DIAGRAM SCHEMATIC



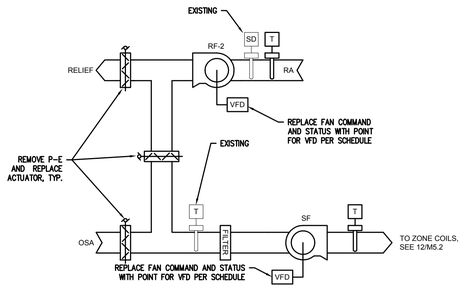
4 AIR HANDLER CONTROL DIAGRAM - HEATING AND CHILLED WATER (SF-1) SCHEMATIC

CONTROLS FOR SF-1/RF-1					
POINT DESCRIPTION	INPUT		OUTPUT		ALARM
	DIGITAL	ANALOG	DIGITAL	ANALOG	
SUPPLY FAN START / STOP			X		
RETURN FAN START / STOP			X		
SUPPLY FAN VFD STATUS	X				X
RETURN FAN VFD STATUS	X				X
(E)DISCHARGE AIR TEMPERATURE		X			
(E)MIXED AIR TEMPERATURE		X			
RETURN AIR TEMPERATURE		X			
RETURN AIR CO2 LEVEL		X			X
LOW LIMIT	X				X
SMOKE DETECTOR	X				X
OUTSIDE DAMPER POSITION				X	
EXHAUST DAMPER POSITION				X	
RETURN AIR DAMPER POSITION				X	
HEATING WATER VALVE				X	
CHILLED WATER VALVE				X	



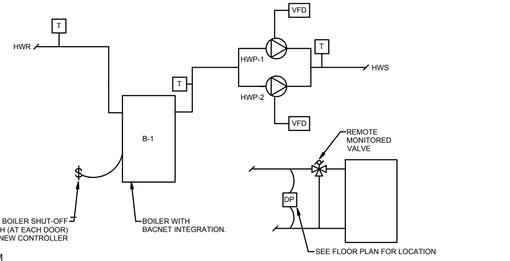
7 SF-2 SCHEMATIC

CONTROLS FOR SF-2					
POINT DESCRIPTION	INPUT		OUTPUT		ALARM
	DIGITAL	ANALOG	DIGITAL	ANALOG	
SUPPLY FAN START / STOP			X		
SUPPLY FAN VFD STATUS	X				X
SUPPLY FAN SPEED				X	
(E)DISCHARGE AIR TEMPERATURE		X			
(E)MIXED AIR TEMPERATURE		X			
RETURN AIR TEMPERATURE		X			
RETURN AIR CO2 LEVEL		X			X
LOW LIMIT	X				X
(E)SMOKE DETECTOR	X				X
OUTSIDE AIR DAMPER POSITION				X	
RELIEF FAN START/STOP (TYP. OF 4)			X		
RELIEF FAN STATUS (TYP. OF 4)	X				X
RETURN AIR DAMPER POSITION				X	
HEATING WATER VALVE				X	
CHILLED WATER VALVE				X	



8 SF-3 CONTROL DIAGRAM SCHEMATIC

CONTROLS FOR SF-3					
POINT DESCRIPTION	INPUT		OUTPUT		ALARM
	DIGITAL	ANALOG	DIGITAL	ANALOG	
SUPPLY FAN START / STOP			X		
RETURN FAN START / STOP			X		
SUPPLY FAN VFD STATUS	X				X
RETURN FAN VFD STATUS	X				X
SUPPLY FAN SPEED				X	
RETURN FAN SPEED				X	
(E)DISCHARGE AIR TEMPERATURE		X			
(E)MIXED AIR TEMPERATURE		X			
(E)RETURN AIR TEMPERATURE		X			
LOW LIMIT	X				X
(E)SMOKE DETECTOR	X				X
OUTSIDE DAMPER POSITION				X	
EXHAUST DAMPER POSITION				X	
RETURN AIR DAMPER POSITION				X	



5 BOILER SYSTEM SCHEMATIC

CONTROLS FOR BOILER SYSTEM					
POINT DESCRIPTION	INPUT		OUTPUT		ALARM
	DIGITAL	ANALOG	DIGITAL	ANALOG	
HEATING SYSTEM ENABLE			X		
HWS RESET				X	
HEATING SYSTEM ALARM / FAULT	X				
HW PUMP COMMAND VFD (TYP OF 2)				X	
HW PUMP STATUS VFD (TYP OF 2)	X				X
HW PUMP SPEED VFD (TYP OF 2)		X			
BOILER SUPPLY WATER TEMPERATURE		X			
SYSTEM SUPPLY WATER TEMPERATURE		X			
SYSTEM RETURN WATER TEMPERATURE		X			
SYSTEM DIFFERENTIAL PRESSURE		X			X
EMERGENCY SHUTDOWN SWITCH	X				

REGISTERED PROFESSIONAL ENGINEER
17884
OREGON
JULY 25, 1980
SCOTT W. MILLER
EXPIRES: 31DEC22

BID SET

Date: 08/09/21
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Drawn By: TF/LKF
Chkd By: SWM
DSGN By: SWM
Acad File: –

BEAVERTON SCHOOL DISTRICT
KINNAMAN HVAC UPGRADE PROJECT
4205 SW 193RD STREET
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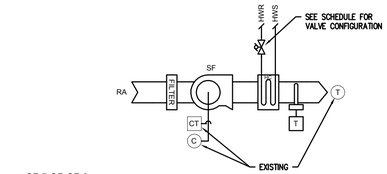
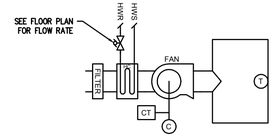


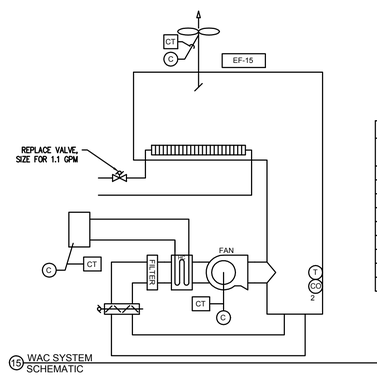
13 SF-7 OR SF-8 SCHEMATIC

CONTROLS FOR SF-7 OR SF-8					
POINT DESCRIPTION	INPUT		OUTPUT		ALARM
	DIGITAL	ANALOG	DIGITAL	ANALOG	
(E)SUPPLY FAN START / STOP			X		
(E)SUPPLY FAN STATUS	X				X
DISCHARGE AIR TEMPERATURE		X			
(E)SPACE TEMPERATURE		X			
HEATING WATER VALVE				X	



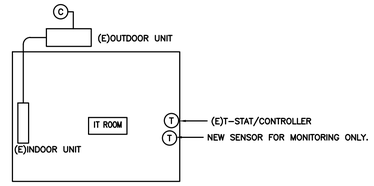
14 CABINET UNIT HEATER SCHEMATIC

CONTROLS FOR CABINET UNIT HEATER					
POINT DESCRIPTION	INPUT		OUTPUT		ALARM
	DIGITAL	ANALOG	DIGITAL	ANALOG	
SPACE TEMPERATURE		X			
FAN START / STOP			X		
HEATING COIL			X		
FAN STATUS	X				



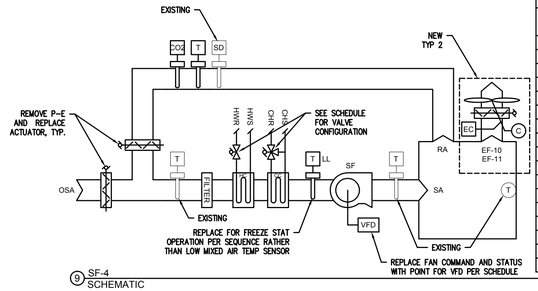
15 WAC SYSTEM SCHEMATIC

CONTROLS FOR WAC SYSTEM					
POINT DESCRIPTION	INPUT		OUTPUT		ALARM
	DIGITAL	ANALOG	DIGITAL	ANALOG	
SPACE TEMPERATURE		X			
FAN START / STOP			X		
HEATING COIL			X		
FAN STATUS	X				
FAN MOTOR STATUS	X				X
START STOP (TYP OF ALL)			X		
COOLING START/STOP			X		
COOLING STATUS	X				
OSA DAMPER			X		



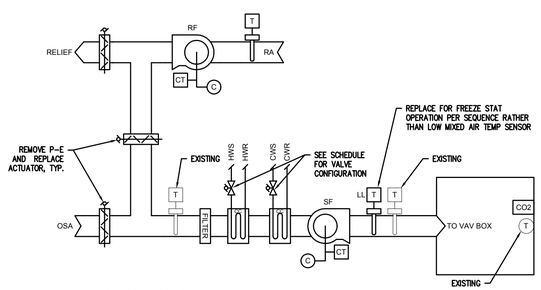
16 SPLIT SYSTEM SCHEMATIC

CONTROLS FOR SPLIT SYSTEMS					
POINT DESCRIPTION	INPUT		OUTPUT		ALARM
	DIGITAL	ANALOG	DIGITAL	ANALOG	
SPACE TEMP		X			X



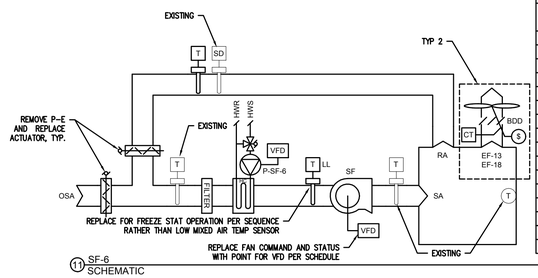
9 SF-4 SCHEMATIC

CONTROLS FOR SF-4					
POINT DESCRIPTION	INPUT		OUTPUT		ALARM
	DIGITAL	ANALOG	DIGITAL	ANALOG	
SUPPLY FAN START / STOP			X		
SUPPLY FAN VFD STATUS	X				X
SUPPLY FAN SPEED				X	
RELIEF FAN SPEED				X	
(E)DISCHARGE AIR TEMPERATURE		X			
(E)MIXED AIR TEMPERATURE		X			
RETURN AIR TEMPERATURE		X			
RETURN AIR CO2 LEVEL		X			X
LOW LIMIT	X				X
(E)SMOKE DETECTOR	X				X
OUTSIDE AIR DAMPER POSITION				X	
RELIEF FAN START/STOP (TYP. OF 2			X		
RELIEF FAN STATUS (TYP. OF 2)	X				
RETURN AIR DAMPER POSITION				X	
HEATING WATER VALVE				X	
CHILLED WATER VALVE				X	
MOTORIZED DAMPER (TYP OF 2)			X		



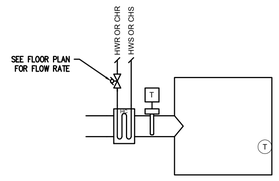
10 SF-5 & RF-3 CONTROL DIAGRAM SCHEMATIC

CONTROLS FOR SF-5 & RF-3					
POINT DESCRIPTION	INPUT		OUTPUT		ALARM
	DIGITAL	ANALOG	DIGITAL	ANALOG	
SUPPLY FAN START / STOP			X		
RETURN FAN START / STOP			X		
SUPPLY FAN VFD STATUS	X				X
RETURN FAN VFD STATUS	X				X
SUPPLY FAN SPEED				X	
RETURN FAN SPEED				X	
(E)DISCHARGE AIR TEMPERATURE		X			
(E)MIXED AIR TEMPERATURE		X			
RETURN AIR TEMPERATURE		X			
LOW LIMIT	X				X
OUTSIDE DAMPER POSITION				X	
EXHAUST DAMPER POSITION				X	
RETURN AIR DAMPER POSITION				X	
HEATING WATER VALVE				X	
CHILLED WATER VALVE				X	
SPACE TEMP		X			
CO2 LEVEL		X			



17 SF-6 SCHEMATIC

CONTROLS FOR SF-6					
POINT DESCRIPTION	INPUT		OUTPUT		ALARM
	DIGITAL	ANALOG	DIGITAL	ANALOG	
(E)SUPPLY FAN START / STOP			X		
(E)SUPPLY FAN VFD STATUS	X				X
(E)SUPPLY FAN SPEED				X	
(E)DISCHARGE AIR TEMPERATURE		X			
(E)MIXED AIR TEMPERATURE		X			
RETURN AIR TEMPERATURE		X			
LOW LIMIT	X				X
(E)SMOKE DETECTOR	X				X
OUTSIDE AIR DAMPER POSITION				X	
(E)GREASE/DISHWASHER FAN START/STOP (TYP. OF 2)			X		
(E)GREASE/DISHWASHER FAN STATUS (TYP. OF 2)	X				
RETURN AIR DAMPER POSITION				X	
HEATING WATER VALVE				X	
SPACE TEMP		X			
CIRCULATION PUMP START / STOP			X		
CIRCULATION PUMP STATUS	X				X



12 COIL CONTROL DETAIL SCHEMATIC

CONTROLS FOR HC OR CC					
POINT DESCRIPTION	INPUT		OUTPUT		ALARM
	DIGITAL	ANALOG	DIGITAL	ANALOG	
DISCHARGE AIR TEMPERATURE		X			
(E)SPACE TEMPERATURE		X			
HEATING OR CHILLED WATER VALVE				X	

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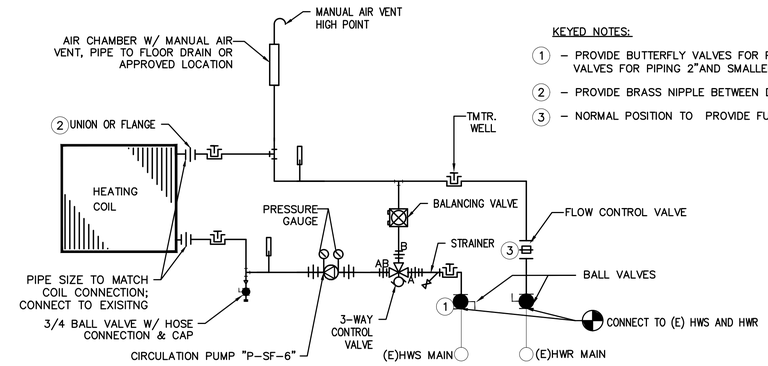
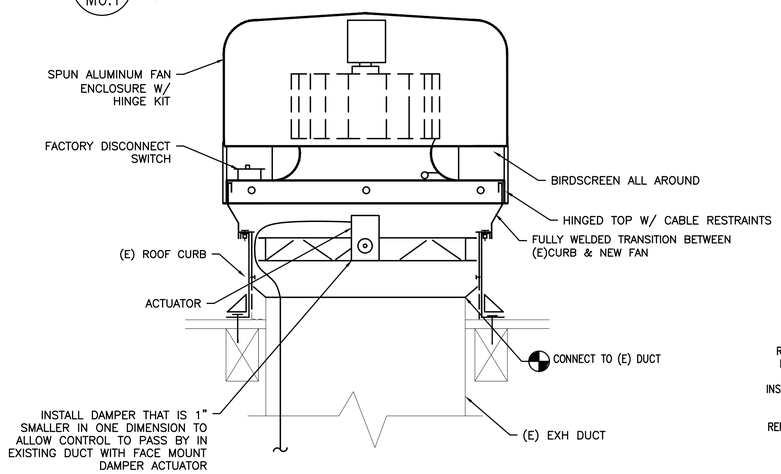
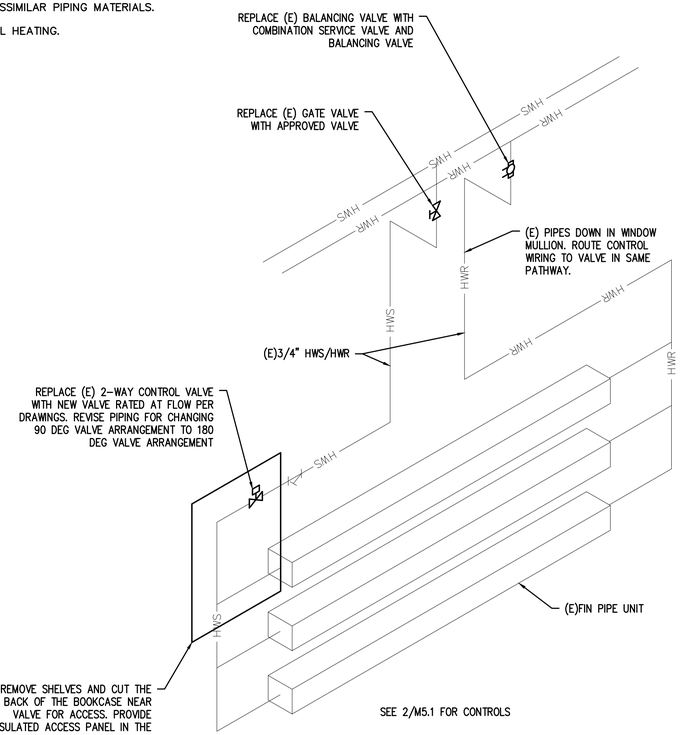


KEYED NOTES:

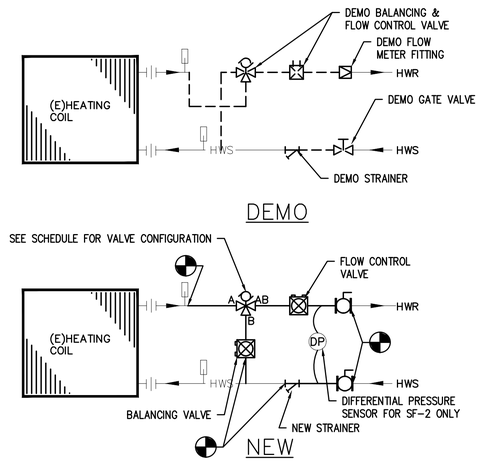
1. – PROVIDE BUTTERFLY VALVES FOR PIPING 2-1/2" AND LARGER, AND BALL VALVES FOR PIPING 2"AND SMALLER.
2. – PROVIDE BRASS NIPPLE BETWEEN DISSIMILAR PIPING MATERIALS.
3. – NORMAL POSITION TO PROVIDE FULL HEATING.

4 M6.1 HEATING COIL– THREE WAY NON-FREEZE
NTS

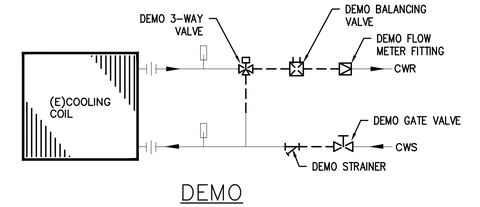


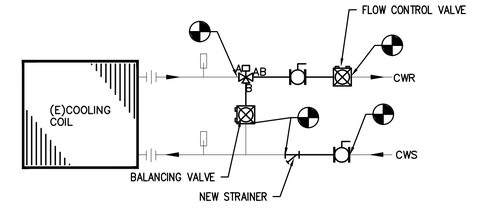


3 M6.1 TYP CLASSROOM FINNED PIPE UNIT
SCALE: DETAIL

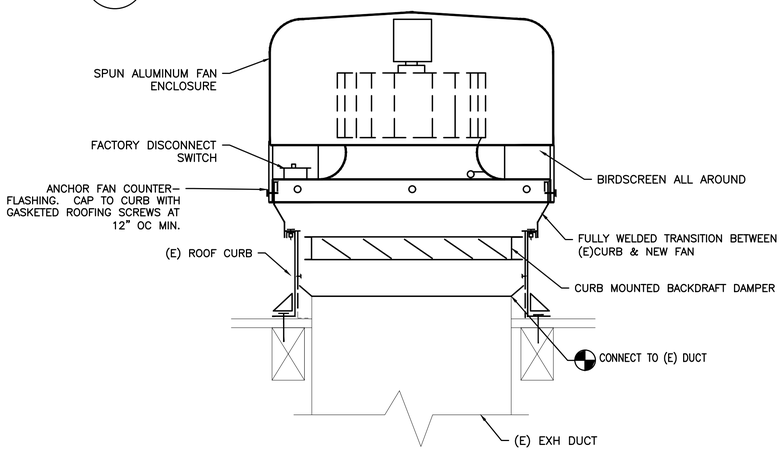


1 M6.1 HEATING COIL PIPING DETAIL
SCALE: DETAIL



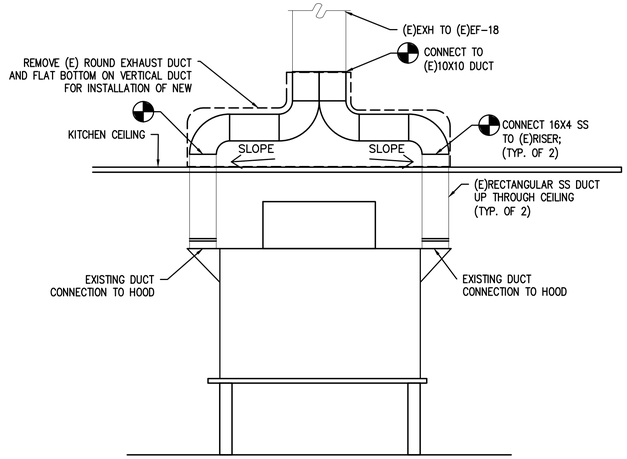


2 M6.1 CHILLED COIL PIPING DETAIL
SCALE: DETAIL



6 M6.1 NEW EXHAUST FAN EF-10 AND EF-11 ON (E) CURB
SCALE: DETAIL

7 M6.1 NEW EXHAUST FANS EF-12 AND EF-17 ON (E) CURB
SCALE: DETAIL



NOTE: ALL DUCTWORK TO BE WELDED 304 S.S. W/ #4 FINISH.

5 M6.1 DISHWASHER EXHAUST DUCT
SCALE: DETAIL

REGISTERED PROFESSIONAL ENGINEER
17884
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9 OF 10

VENTILATION AIR SCHEDULE -

ROOM NUMBER AND NAME	AREA (SQ. FT.)	OCCUPANT LOAD (#/1000 SQ. FT.)	NUMBER OF OCCUPANTS	OUTSIDE AIR REQUIREMENT (CFM/P)	OUTSIDE AIR REQUIREMENT (CFM/SQ FT.)	OUTSIDE AIR REQUIRED (CFM)		ZONE OSA (CFM)	SUPPLY AIR (CFM)	PRIMARY OSA FRACTION	RETURN AIR (CFM)	EXHAUST AIR (CFM)	Zone Ventilation Efficiency	Corrected OSA CFM	AIR SYSTEMS
	Az		Pz	Rp	Ra	Vbz	Ez	Voz	Vpz	Zp			Evz		
SF-1															
MEDIA CENTER	1295	25	33	10	0.12	485	1.0	485	1000	0.49	1000	0	0.91	531	VAV-1A
MEDIA CENTER	1295	25	33	10	0.12	485	1.0	485	1000	0.49	1000	0	0.91	531	VAV-1B
MEDIA CENTER	1295	25	33	10	0.12	485	1.0	485	1000	0.49	1000	0	0.91	531	VAV-2A
MEDIA CENTER	1295	25	33	10	0.12	485	1.0	485	1000	0.49	1000	0	0.91	531	VAV-2B
A122	927	35	33	10	0.12	441	1.0	441	1000	0.44	1000	0	0.96	482	VAV-A122
A124	916	35	33	10	0.12	440	1.0	440	1000	0.44	1000	0	0.96	481	VAV-A124
A100	916	35	33	10	0.12	440	1.0	440	1000	0.44	1000	0	0.96	481	VAV-A100
A102	930	35	33	10	0.12	442	1.0	442	1000	0.44	1000	0	0.96	483	VAV-A102
A104	925	35	33	10	0.12	441	1.0	441	1000	0.44	1000	0	0.96	482	VAV-A104
A106	910	35	32	10	0.12	429	1.0	429	1000	0.43	1000	0	0.97	469	VAV-A106
A109	927	35	33	10	0.12	441	1.0	441	1000	0.44	1000	0	0.96	482	VAV-A108
A110	918	35	33	10	0.12	440	1.0	440	1000	0.44	1000	0	0.96	481	VAV-A110
A112	686	35	25	10	0.12	332	1.0	332	1000	0.33	1000	0	1.07	363	VAV-A112
A114	911	35	32	10	0.12	429	1.0	429	1000	0.43	1000	0	0.97	469	VAV-A114
A116	954	35	34	10	0.12	454	1.0	454	1000	0.45	1000	0	0.95	497	V AV-A116
A118	934	35	33	10	0.12	442	1.0	442	1000	0.44	1000	0	0.96	483	VAV-A118
A120	922	35	33	10	0.12	441	1.0	441	1000	0.44	1000	0	0.96	482	VAV-A120
OFFICE/BOOK ROOM	400	5	2	5	0.06	34	1.0	34	1000	0.03	1000	0	1.37	37	VAV-A1
A HALL	264	0	0	0	0.06	16	1.0	16	1000	0.02	1000	0	1.38	17	VAV-A2
TOTAL	**17620**		**554**			**7605**		**7605**	**19000**		**19000**	**0**	**0.91**	**8312**	
								Vou	**Vps**				**Ev**		
								CORRECTED TOTAL OUTDOOR AIR FLOW RATE			**8312**	**CFM**	**Corrected OSA Fractio**	**Zs =**	**0.44**
SF-2															
(E)GYM 116	4207	30	127	0	0.3	1262	1.0	1262	1000	1.26	1000	0	1.00	1262	SF-2
TOTAL	**4207**		**127**			**1262**		**1262**	**1000**		**1000**	**0**	**1.00**	**1262**	
								Vou	**Vps**				**Ev**		
								CORRECTED TOTAL OUTDOOR AIR FLOW RATE			**1262**	**CFM**	**Corrected OSA Fractio**	**Zs =**	**1.26**
SF-3															
OFFICE 107	194	5	1	5	0.06	17	1.0	17	1000	0.02	1000	0	1.02	18	CC-5
CONFERENCE 106	154	50	8	5	0.06	49	1.0	49	1000	0.05	1000	0	0.98	53	CC-5
OFFICE 107	184	5	1	5	0.06	16	1.0	16	1000	0.02	1000	0	1.02	17	CC-4/HC-3
WAITING 101/RECEPTION 102	459	30	14	5	0.06	98	1.0	98	1000	0.10	1000	0	0.94	104	CC-4/HC-3
CORRIDOR	1000	0	0	0	0.06	60	1.0	60	1000	0.06	1000	0	0.97	64	CC-4/HC-3
HEALTH 104	194	5	1	5	0.06	17	1.0	17	1000	0.02	1000	0	1.02	18	CC-3
OFFICE 103	144	5	1	5	0.06	14	1.0	14	1000	0.01	1000	0	1.02	15	CC-3
GYM STORAGE	94	0	0	0	0.12	11	1.0	11	1000	0.01	1000	0	1.02	12	CC-1/HC-1
RESTROOM	550	0	0	0	0	0	1.0	0	1000	0.00	0	0	1.03	0	CC-1/HC-1
GYM OFFICE	53	5	1	5	0.06	8	1.0	8	1000	0.01	1000	0	1.02	9	CC-1/HC-1
CORRIDOR	1238	0	0	0	0.06	74	1.0	74	1000	0.07	1000	0	0.96	79	CC-1/HC-1
TOTAL	**4264**		**27**			**363**		**363**	**11000**		**10000**	**0**	**0.94**	**389**	
								Vou	**Vps**				**Ev**		
								CORRECTED TOTAL OUTDOOR AIR FLOW RATE			**389**	**CFM**	**Corrected OSA Fractio**	**Zs =**	**0.04**
SF-4															
COMMONS 110	2449	100	245	7.5	0.18	2278	1.0	2278	2000	1.14	1000	0	1.00	2278	SF-4
TOTAL	**2449**		**245**			**2278**		**2278**	**2000**		**1000**	**0**	**1.00**	**2278**	
								Vou	**Vps**				**Ev**		
								CORRECTED TOTAL OUTDOOR AIR FLOW RATE			**2278**	**CFM**	**Corrected OSA Fractio**	**Zs =**	**1.14**
SF-5															
MUSIC ROOM	887	35	32	10	0.06	373	1.0	373	1000	0.37	1000	0	1.00	373	SF-5
TOTAL	**887**		**32**			**373**		**373**	**1000**		**1000**	**0**	**1.00**	**373**	
								Vou	**Vps**				**Ev**		
								CORRECTED TOTAL OUTDOOR AIR FLOW RATE			**373**	**CFM**	**Corrected OSA Fractio**	**Zs =**	**0.37**
SF-6															
KITCHEN 111	550	0	0	0	0.7	385	1.0	385	1000	0.39	1000	0	0.82	470	SF-6
DRY STORAGE 119	191	0	0	0	0.12	23	1.0	23	1000	0.02	1000	0	1.18	28	SF-6
TOTAL	**741**		**0**			**408**		**408**	**2000**		**2000**	**0**	**0.82**	**498**	
								Vou	**Vps**				**Ev**		
								CORRECTED TOTAL OUTDOOR AIR FLOW RATE			**498**	**CFM**	**Corrected OSA Fractio**	**Zs =**	**0.25**
SF-7															
BOYS TOILET	380	0	0	0	0	0	1.0	0	1000	0.00	0	0	1.00	0	SF-7
TOTAL	**380**		**0**			**0**		**0**	**1000**		**0**	**0**	**1.00**	**0**	
								Vou	**Vps**				**Ev**		
								CORRECTED TOTAL OUTDOOR AIR FLOW RATE			**0**	**CFM**	**Corrected OSA Fractio**	**Zs =**	**0.00**
SF-8															
GIRLS TOILET	401	0	0	0	0	0	1.0	0	1000	0.00	1000	0	1.00	0	SF-8
TOTAL	**401**		**0**			**0**		**0**	**1000**		**1000**	**0**	**1.00**	**0**	
								Vou	**Vps**				**Ev**		
								CORRECTED TOTAL OUTDOOR AIR FLOW RATE			**0**	**CFM**	**Corrected OSA Fractio**	**Zs =**	**0.00**

AIR HANDLER SCHEDULE

MARK		SF	RF	SF	SF	RF	SF	SF	RF	SF	SF	SF
NUMBER		1	1	2	3	2	4	5	3	6	7	8
TYPE		SUPPLY	RETURN	SUPPLY	SUPPLY	RETURN	SUPPLY	SUPPLY	RETURN	SUPPLY	SUPPLY	SUPPLY
SUPPLY	CFM (NOTE 1)	20,650	N/A	9,400	3,820	N/A	4,200	1,800	N/A	3,750	600	600
	MOTOR HP (NOTE 2)	15	N/A	5	3	N/A	3	1.5	0.5	1.5	0.08	0.08
	SHAFT GROUNDING	YES	N/A	YES	YES	N/A	YES	NO	NO	NO	N/A	N/A
	VFD (NOTE 6 OR 7)	YES	N/A	YES	YES	N/A	YES	NO	N/A	YES	N/A	N/A
	DISCONNECT	YES	N/A	YES	YES	N/A	YES	NO	N/A	YES	N/A	N/A
RETURN	CFM (NOTE 1)	N/A	18,900	N/A	N/A	2,800	N/A	N/A	1,500	N/A	N/A	N/A
	MOTOR HP	N/A	5 (8)	N/A	N/A	0.75	N/A	N/A	0.5	N/A	N/A	N/A
	SHAFT GROUNDING	N/A	YES	N/A	N/A	NO	N/A	N/A	NO	N/A	N/A	N/A
	VFD (NOTE 6 OR 7)	N/A	YES	N/A	N/A	YES	N/A	N/A	NO	N/A	N/A	N/A
	DISCONNECT	N/A	YES	N/A	N/A	YES	N/A	N/A	NO	N/A	N/A	N/A
	SMOKE DETECTOR (NOTE 9)	N/A	YES	N/A	N/A	N/A	N/A	N/A	NO	N/A	N/A	N/A
COOLING COIL (NOTE 3)		115(10)	N/A	51	N/A	N/A	51	51	N/A	N/A	N/A	N/A
HEATING COIL (NOTE 4)		11.5	N/A	16	4.6	N/A	16	16	N/A	12.5	0.65	0.65
MIN. OSA		7,605	N/A	1,265	365	N/A	2,280	375	N/A	408	0	0
VOLTAGE/PH		208/3	208/3	208/3	208/3	208/3	208/3	208/3	208/3	208/3	120/1	120/1
CONTROL DIAGRAM (NOTE 5)		4/M5.0	4/M5.0	7/M5.0	8/M5.0	8/M5.0	9/M5.0	10/M5.0	10/M5.0	11/M5.0	13/M5.0	13/M5.0
HEATING VALVE CONFIGURATION		3-WAY	N/A	3-WAY	2-WAY	N/A	2-WAY	2-WAY	N/A	3-WAY	2-WAY	2-WAY
COOLING VALVE CONFIGURATION		3-WAY	N/A	3-WAY	N/A	N/A	3-WAY	3-WAY	N/A	N/A	N/A	N/A

NOTES:

1. SEE SPECS FOR UNIT CLEANING AND FULL SCOPE OF RESTORATION WORK. REPLACE BEARINGS, BELTS, AND SHEAVES (SEE SPECS). PROVIDE TEMPORARY SHEAVES TO DETERMINE MAXIMUM AMPS OF THE MOTOR. REPLACE WITH FIXED SHEAVES AND BALANCE FAN WITH VFD. PERMANENTLY SET (WITH MECHANICAL FASTENERS) INLET VANE DAMPERS OR DISCHARGE DAMPERS TO FULL OPEN. BALANCE UNIT AS LISTED. REPLACE DISCHARGE, SUCTION SIDE, OSA DUCT AND RELIEF DUCT FLEX CONNECTIONS. REPLACE FILTERS PRIOR TO BALANCING AND COMMISSIONING.
2. REMOVE EXISTING MOTOR AND REPLACE WITH VFD RATED MOTOR, SEE SPECS. WHERE VFD IS NOTED REMOVE STARTER AND REPLACE WITH VFD INCLUDING INTEGRAL DISCONNECT, SEE SPECS. IF NO NEW VFD IS NOTED RETAIN EXISTING STARTER AND DISCONNECT.
3. SEE SPECS FOR COIL CLEANING UNLESS NOTED OTHERWISE. REMOVE AND REPLACE EXISTING CHILLED WATER VALVE TO MATCH REQUIRED FLOW RATE AT SPECIFIED PRESSURE DROP, SEE 2/M6.1 FOR WORK ASSOCIATED WITH COIL. INSULATE PIPING NEAR REPLACED VALVES PER SPECIFICATIONS.
4. SEE SPECS FOR COIL CLEANING. REMOVE AND REPLACE EXISTING HEATING WATER VALVE TO MATCH REQUIRED FLOW RATE AT SPECIFIED PRESSURE DROP, SEE 1/M6.1 FOR WORK ASSOCIATED WITH COIL. INSULATE PIPING NEAR REPLACED VALVES PER SPECIFICATIONS.
5. REPLACE ALL CONTROL DEVICE, SEE NOTED DETAIL FOR SCHEMATIC AND POINTS LIST. REMOVE ALL OLD CONTROL DEVICES NO LONGER USED.
6. WHERE VFD IS NOTED TEST FAN WITH ADJUSTABLE PITCH SHEAVES TO DETERMINE FIXED PITCH SHEAVES THAT PLACE THE FAN NEAR BUT NOT OVER MAXIMUM MOTOR AMPS. REPLACE ADJUSTABLE PITCH SHEAVES WITH SELECTED FIXED PITCH UNITS AND BALANCE FAN WITH VFD.
7. WHERE VFD IS NOT TO BE INSTALLED TEST FAN WITH ADJUSTABLE PITCH SHEAVES TO DETERMINE FIXED PITCH SHEAVES THAT PLACE THE FAN NEAR REQUIRED AIRFLOW RATE. REPLACE ADJUSTABLE PITCH SHEAVES WITH SELECTED FIXED PITCH UNITS AND CONFRIM FINAL AIR BALANCE.
8. RETAIN (E) MOTOR. ADD SHAFT GROUNDING AND INSTALL VFD WITH DISCONNECT TO REPLACE (E)STARTER AND DISCONNECT.
9. SMOKE DETECTOR IS EXISTING.
10. RETAIN (E) 2" CHILLED WATER CONTROL VALVE (ROBERSHAW V3002-45407) PROVIDE BELIMO ACTUATOR RETROFIT KIT TO EXISTING VALVE. VALVE DOES NOT NEED TO BE REPIPED.

EXHAUST FANS

MARK NUMBER	EF 10	EF 11	EF 12	EF 17
AREA SERVED	CAFETERIA	CAFETERIA	CUSTODIAN	TOILET
TYPE	ROOF MOUNT	ROOF MOUNT	ROOF MOUNT	ROOF MOUNT
CFM	2000	2000	200	100
TOTAL SP. (IN H20)	0.38	0.38	0.38	0.38
FAN RPM	460	460	1576	1725
VOLTAGE/HZ/PHASE	208/60/3	208/60/3	115/60/1	115/60/3
MOTOR HP	2	2	1/4	1/4
CONTROLLED BY	DDC	DDC	DDC	DDC
INTERLOCK WITH	–	–	–	–
VFD/EC MOTOR	EC MOTOR	EC MOTOR	EC MOTOR	EC MOTOR
BACK DRAFT DAMPER/2-POSITION CONTROL DAMPER	MOTORIZED 2-POSITION	MOTORIZED 2-POSITION	MOTORIZED 2-POSITION	MOTORIZED 2-POSITION
ISOLATION	RUBBER IN SHEAR	RUBBER IN SHEAR	RUBBER IN SHEAR	RUBBER IN SHEAR
DESIGN WEIGHT (LBS)	135	135	20	36
MAX INLET SONES	4.2	4.2	4.6	4.4
BASIS OF DESIGN: GREENHECK (UON)	G-240-VG	G-240-VG	G-070-VG	G-060-VG

PUMPS

MARK NUMBER	P SF-6
SERVICE	(E)SF-6 HEATING COIL
ARRANGEMENT	IN-LINE
FLOW RATE (GPM)	12.5
HEAD (FT)	15
MOTOR TYPE	ECM
MOTOR POWER	125 WATTS
RPM	830-3,380
ELECTRICAL CONNECTION, V/PH	115/1
BASIS OF DESIGN	TACO 0026e

REGISTERED PROFESSIONAL ENGINEER 17884 OREGON JULY 25, 1986 SCOTT W. MILLER EXPIRES: 31DEC22

BID SET

Date: 08/09/21
Proj No.: 10180
Drawn By: TF/LKF
Chkd By: SWM
DSGN By: SWM
Acad File: –

BEAVERTON SCHOOL DISTRICT
KINNAMAN HVAC UPGRADE PROJECT
4205 SW 193RD STREET
BEAVERTON OREGON

MECHANICAL SCHEDULES

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SHEET
M6.2
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