PLUMBING SYMBOLS & ABBREVIATIONS LEGEND

PLUMBING ABBREVIATIONS

ATC	AUTOMATIC TEMPERATURE CONTROLS
BAS	BUILDING AUTOMATION SYSTEM
CONT.	CONTINUATION
CO	CLEAN OUT
CW	COLD WATER
D	DRAIN
EC	ELECTRICAL CONTRACTOR
HW	HOT WATER
IWT	ICE MACHINE TRIM
MC	MECHANICAL CONTRACTOR
MER	MECHANICAL EQUIPMENT ROOM
NOM	NOMINAL
RHW	RECIRCULATING HOT WATER
TWV	TEMPERATURE MIXING VALVE
V	VENT PIPE
VTR	VENT THROUGH ROOF
W	WASTE
WCO	WALL CLEAN OUT
WMT	WASHING MACHINE TRIM
XST	EXISTING

EQUIPMENT TAGS

DF-1	DRINKING FOUNTAIN
EW-1	EYE WASH
EWC-1	ELECTRIC WATER COOLER
FD-1	FLOOR DRAIN
HB-1	HOSE BIBB
L-1	LAVATORY
LT-1	LAUNDRY TUB
MV-1	MIXING VALVE
MB-1	MOP BASIN
P-1	PUMP
RCP-1	RE-CIRCULATOR PUMP
S-1	SINK
SH-1	SHOWER
TS-1	TUB/SHOWER
U-1	URINAL
WC-1	WATER CLOSET
WH-1	WATER HEATER
WHY-1	WALL HYDRANT

PIPING SYSTEMS

SYMBOL	DESCRIPTION
— — —AV— — —	ACID VENT
—AW—	ACID WASTE
— — — CRV — — —	CHEMICAL RESISTANT VENT
—CRW—	CHEMICAL RESISTANT WASTE
—A—	COMPRESSED AIR
—D—	CONDENSATE DRAIN
— • —	DOMESTIC COLD WATER
— • • —	DOMESTIC HOT WATER
— • • • —	DOMESTIC RECIRCULATING HOT WATER
—SW—	DOMESTIC SOFT WATER
—T—	DOMESTIC TEMPERED WATER
—N—	NITROGEN
—N_2O—	NITROUS OXIDE
—OSW—	OIL/SAND WASTE
—OX—	OXYGEN
—SAN—	SANITARY WASTE
—ST—	STORM DRAIN
— — — — — — —	VENT

PIPING SYMBOLS

SYMBOL	DESCRIPTION
	ANGLE RELIEF VALVE
	AUTOMATIC FLOW CONTROL VALVE
	BACK FLOW PREVENTER
	BALL VALVE
	BALL VALVE VENTURI
	BUTTERFLY VALVE
	CAPPED PIPE
	CHECK VALVE, FLOW DIRECTION
	CONCENTRIC REDUCER
	ECCENTRIC REDUCER
	EMERGENCY GAS SHUT-OFF
	FLEXIBLE PIPE CONNECTION
	FLOW MEASURING DEVICE
FS	FLOW SWITCH
	GAS PRESSURE REGULATOR
	GATE VALVE
	GLOBE VALVE
	HOSE BIBB OR WALL HYDRANT
	PIPE CONNECTION - BOTTOM
	PIPE CONNECTION - TOP
	PIPE DOWN
	PIPE GUIDE
	PIPE UP
	PRESSURE GAUGE
	PRESSURE REDUCING VALVE

PIPING SYMBOLS CONTINUED

SYMBOL	DESCRIPTION
PS	PRESSURE SWITCH
PT	PRESSURE TRANSMITTER
	PUMP
	SENSOR WELL
SOL	SOLENOID VALVE
	STRAINER
	TEMPERATURE-PRESSURE TEST FITTING
T	TEMPERATURE TRANSMITTER
T	THERMOMETER
	UNION
	CONNECT NEW TO EXISTING
1	KEY NOTE
1	DEMOLITION NOTE
1	REVISION NOTE

HVAC SYMBOLS & ABBREVIATIONS LEGEND

HVAC ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
AD	ACCESS DOOR
ATC	AUTOMATIC TEMPERATURE CONTROLS
BAS	BUILDING AUTOMATION SYSTEM
CFM	CUBIC FEET PER MINUTE
CONT.	CONTINUATION
D	DRAIN
Db	DRY BULB TEMPERATURE
dB	DECIBELS
Dp	DEWPOINT TEMPERATURE
DN	DOWN
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
ECG	EGG CRATE GRILLE
EG	ETHYLENE GLYCOL
EWT	ENTERING WATER TEMPERATURE
EXIST.	EXISTING
GPM	GALLONS PER MINUTE
HC	HEATING COIL
HP	HORSEPOWER
HW	HOT WATER
HX	HEAT EXCHANGER
LAT	LEAVING AIR TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
MC	MECHANICAL CONTRACTOR
MER	MECHANICAL EQUIPMENT ROOM
MAT	MIXED AIR TEMPERATURE
NOM.	NOMINAL
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NTS	NOT TO SCALE
PD	PRESSURE DROP
PG	PROPYLENE GLYCOL
OA	OUTSIDE AIR
OBD	OPPOSED BLADE DAMPER
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH (GAUGE)
RA	RETURN AIR
REG	REGISTER
RD	ROOF DRAIN
SA	SUPPLY AIR
SP	STATIC PRESSURE
TYP	TYPICAL
VFD	VARIABLE FREQUENCY DRIVE
V	VENT PIPE
Wb	WET BULB
XST	EXISTING

EQUIPMENT TAGS

AFM-1	AIRFLOW MEASURING STATION
AHU-1	AIR HANDLING UNIT
B-1	BOILER
CC-1	COOLING COIL
CH-1	CHILLER
CU-1	CONDENSING UNIT
CUH-1	CABINET UNIT HEATER
EF-1	EXHAUST FAN
ET-1	EXPANSION TANK
FD-1	FIRE DAMPER
FT-1	FIN TUBE RADIATION
FSD	FIRE SMOKE DAMPER
HC-1	HEATING COIL
HP-1	HEAT PUMP
HX-1	HEAT EXCHANGER
LVR-1	LOUVER
MAU-1	MAKEUP-AIR UNIT
MOD-1	MOTOR OPERATED DAMPER
P-1	PUMP
RAF-1	RETURN AIR FAN
RTU-1	ROOFTOP UNIT
SAF-1	SUPPLY AIR FAN
SD-1	SMOKE DAMPER
UH-1	UNIT HEATER
V-1-	VARIABLE AIR VOLUME TERMINAL UNIT

PIPING SYSTEMS

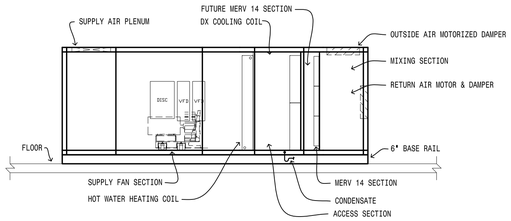
SYMBOL	DESCRIPTION
— — —CHWR— — —	CHILLED WATER RETURN
—CHWS—	CHILLED WATER SUPPLY
— — —CWR— — —	CONDENSER WATER RETURN
—CWS—	CONDENSER WATER SUPPLY
— — —D— — —	CONDENSATE DRAIN
—FG—	FIRM NATURAL GAS
— — —FOR— — —	FUEL OIL RETURN
—FOS—	FUEL OIL SUPPLY
—FOV—	FUEL OIL VENT
— — —GCWR— — —	GLYCOL CHILLED WATER RETURN
—GCWS—	GLYCOL CHILLED WATER SUPPLY
— — —GHWR— — —	GLYCOL HOT WATER RETURN
—GHWS—	GLYCOL HOT WATER SUPPLY
— — —HPR— — —	HEAT PUMP RETURN
—HPS—	HEAT PUMP SUPPLY
—HGB—	HOT GAS BYPASS
— — —HWR— — —	HOT WATER RETURN
—HWS—	HOT WATER SUPPLY
—IG—	INTERRUPTIBLE NATURAL GAS
— — —LFR— — —	LOOP FIELD RETURN
—LFS—	LOOP FIELD SUPPLY
— — —STC— — —	STEAM CONDENSATE
—STM—	STEAM
—G—	NATURAL GAS
—LP—	PROPANE
— — —PC— — —	PUMPED CONDENSATE
—RL—	REFRIGERANT LIQUID
—RS—	REFRIGERANT SUCTION

PIPING SYMBOLS

SYMBOL	DESCRIPTION
	ANGLE RELIEF VALVE
	ARROW INDICATES DIRECTION OF FLOW
	AUTOMATIC 2-WAY CONTROL VALVE
	AUTOMATIC 3-WAY CONTROL VALVE
	AUTOMATIC FLOW CONTROL VALVE
	BACK FLOW PREVENTER
	BALL VALVE
	BALL VALVE VENTURI
	BUTTERFLY VALVE
	CAPPED PIPE
	CHECK VALVE, FLOW DIRECTION
	CONCENTRIC REDUCER
	ECCENTRIC REDUCER
	FLEXIBLE PIPE CONNECTION
	FLOW MEASURING DEVICE
FS	FLOW SWITCH
	GAS PRESSURE REGULATOR
	GATE VALVE
	GLOBE VALVE
	HOSE BIBB OR WALL HYDRANT
H	HUMIDISTAT
	PIPE ANCHOR
	PIPE CONNECTION - BOTTOM
	PIPE CONNECTION - TOP
	PIPE DOWN
	PIPE GUIDE
	PIPE UP
	PRESSURE GAUGE
	PRESSURE REDUCING VALVE
PT	PRESSURE TRANSMITTER
	PUMP
	RETURN AIR OR EXHAUST AIR INLET
	SENSOR WELL
SOL	SOLENOID VALVE
	STEAM TRAP
	STRAINER
	SUPPLY AIR OUTLET
	TEMPERATURE-PRESSURE TEST FITTING
T	TEMPERATURE TRANSMITTER
T	THERMOMETER
T	THERMOSTAT
	UNION
S-1 150	AIR INLET/OUTLET REFERENCE SYMBOL WITH TYPE AND AIRFLOW SHOWN (TYPE S-1; 150 CFM). REFER TO SCHEDULE. (E=EXHAUST, R=RETURN, S=SUPPLY, T=TRANSFER, XST=EXISTING)
	CONNECT NEW TO EXISTING
1	KEY NOTE
1	DEMOLITION NOTE
1	REVISION NOTE

DUCTWORK SYSTEMS/SYMBOLS

SYMBOL	DESCRIPTION
UP DOWN	POSITIVE PRESSURE DUCT
UP DOWN	NEGATIVE PRESSURE DUCT
POS. NEG.	DUCT UP THROUGH ROOF OR FLOOR ABOVE
18x10	RECTANGULAR DUCT, ACOUSTICALLY LINED (INSIDE DIMENSIONS INDICATED)
18x10	RECTANGULAR DUCT, FIRST DIMENSION IS SIDE SHOWN
18"Ø	ROUND DUCT, DIAMETER SHOWN
	ROUND DUCT DOWN
	ROUND DUCT UP
	SIDEWALL AIR INLET OR OUTLET
	RADIUSED ELBOW
	MITERED ELBOW
	MITERED ELBOW WITH TURNING VANES
AD	DUCT ACCESS DOOR
DROP RISE	SLOPING RISE OR DROP IN DUCTWORK
	FLEXIBLE DUCT CONNECTION
D	BACKDRAFT DAMPER
	COMBINATION FIRE/SMOKE DAMPER
	FIRE DAMPER
M	MOTOR OPERATED DAMPER
	SMOKE DAMPER
	MANUAL VOLUME DAMPER
	AIRFLOW MEASURING STATION
R	RADIATION DAMPER
8"Ø	SQUARE NECK CEILING DIFFUSER w/ HIGH EFFICIENCY TAKE OFF AND FLEXIBLE DUCT FROM MAIN WITH SIZE INDICATED
8"Ø	ROUND NECK CEILING DIFFUSER w/ HIGH EFFICIENCY TAKE OFF AND FLEXIBLE DUCT FROM MAIN WITH SIZE INDICATED
8"Ø	RETURN AIR GRILLE w/ HIGH EFFICIENCY TAKE OFF AND FLEXIBLE DUCT FROM MAIN WITH SIZE INDICATED
8x8	RETURN AIR GRILLE w/ HIGH EFFICIENCY TAKE OFF AND RIGID DUCT FROM MAIN WITH SIZE INDICATED
HC-1	DUCT MOUNTED HEATING COIL
14"Ø UGD	UNDERGROUND DUCT



1 M000 AHU-1 SECTION VIEW

0' 2' 4' 8'

AIR TERMINAL DEVICE SCHEDULE

VAV ID	MAX CFM	MIN COOLING CFM	MIN HEATING CFM	INLET SIZE (INCH)	HEATING CAPACITY (MBH)	GPM	LAT (°F)	NOTES
V-1	1920	580	580	16	22.2	1.5	90	1,2,3,4,5,6,7
V-2	400	120	120	07	4.5	0.5	90	1,2,3,4,5,6,7
V-3	600	180	180	08	6.8	0.5	90	1,2,3,4,5,6,7
V-4	2320	700	700	16	44.1	2.9	113	1,2,3,4,5,6,7
V-5	1240	370	700	12	44.1	2.9	113	1,2,3,4,5,6,7
V-6	565	170	350	08	22.0	1.5	113	1,2,3,4,5,6,7
V-7	860	260	450	10	28.2	1.9	113	1,2,3,4,5,6,7
V-8	360	110	110	06	4.2	0.5	90	1,2,3,4,5,6,7
V-9	930	280	280	10	10.7	0.7	90	1,2,3,4,5,6,7
V-10	200	60	60	05	2.3	0.5	90	1,2,3,4,5,6,7
V-11	330	100	100	06	3.8	0.5	90	1,2,3,4,5,6,7
V-12	275	80	170	05	10.4	0.7	112	1,2,3,4,5,6,7
V-13	870	260	260	10	12.6	0.8	100	1,2,3,4,5,6,7
V-14	1450	440	440	12	21.5	1.4	100	1,2,3,4,5,6,7
V-15	870	260	450	10	24.5	1.6	105	1,2,3,4,5,6,7
V-16	870	260	450	10	24.5	1.6	105	1,2,3,4,5,6,7

1) DESIGN MAX AIR SIDE PRESSURE DROP TO 0.5 INCH AND MAX WATER SIDE PRESSURE DROP TO 5 FT.
2) DESIGN ENTERING AIR TEMPERATURE TO 55° F.
3) DESIGN BASED ON PRICE SDV MODEL
4) HEATING CAPACITY BASED ON 35% ETHYLENE GLYCOL SOLUTION.
5) ENTERING WATER TEMPERATURE 160° F AND 30° F WATER TEMPERATURE DROP.
6) PROVIDE WITH MINIMUM OF 2 ROW HEATING COIL.
7) FACTORY PROVIDED ACCESS DOOR IN BOTTOM OF VAV BOX BETWEEN COIL AND DAMPER.

BOILER SCHEDULE

BOILER ID	FUEL TYPE	FLUID TYPE	HEATING INPUT (MBH)	HEATING OUTPUT (MBH)	GPM OR LBS/HR	EWT (°F)	LWT (°F)	VOLTAGE/ PHASE	MANUFACTURER & MODEL	NOTES
B-1	NG	EG35	650	549	41	130	160	120/1	LOCHINVAR KBX0650N	1,2,3,4,5,6
B-2	NG	EG35	650	549	41	130	160	120/1	LOCHINVAR KBX0650N	1,2,3,4,5,6

1) DESIGN MAX WATER SIDE PRESSURE DROP TO 10 FT.
2) 35% ETHYLENE GLYCOL/WATER MIXTURE
3) PROVIDE 50 PSI BOILER RELIEF VALVE, BOILER PRESSURE RATING OF 160 PSI.
4) BOILER EMERGENCY SHUTDOWN SWITCH BY DIV. 26.
5) PROVIDE WITH CONDENSATE NEUTRALIZATION KIT.
6) PROVIDE SMART SYSTEM BOILER CONTROL SYSTEM TO CONTROL, BOILER MODULATION, OUTDOOR AIR RESET (WITH SENSOR) AND CASCADING BOILER CONTROLS.

EGxx

CONDENSING UNIT SCHEDULE

CONDENSING UNIT ID	UNIT SERVED	FLUID	COOLING CAPACITY (MBH)	VOLTAGE/ PHASE	MIN SCCR	MCA	MOCP	NUMBER OF COMPRESSORS	MANUFACTURER & MODEL	NOTES
CU-1	AHU-1	R-410A	469	208/3	65K	151.1	175	4	JCI J40YDC00A2	1,2,3,4,5

1) INSTALL REFRIGERANT PIPING PER MANUFACTURERS GUIDELINES.
2) PROVIDE HOUSED SPRING TYPE VIBRATION ISOLATORS.
3) DISCONNECT BY DIVISION 26.
4) PROVIDE WITH 4 STAGES COOLING AND APR VALVE OR MODULATING COMPRESSORS.
5) PROVIDE LUGS THAT ARE RATED FOR BOTH COPPER AND ALUMINUM CONDUCTORS.

AIR HANDLING UNIT SCHEDULE

			COOLING COIL					HEATING COIL								SUPPLY AIR FAN							
AIR HANDLING UNIT ID	CFM	OUTSIDE AIR CFM	EAT (°F)	LAT (°F)	TOTAL CAPACITY (MBH)	SENSIBLE CAPACITY (MBH)	REFRIGERANT	FACE VELOCITY (FPM)	EAT (°F)	LAT (°F)	EWT (°F)	LWT (°F)	TOTAL CAPACITY (MBH)	GPM	WPD (FT)	FACE VELOCITY (FPM)	ESP (INCH)	HP	VFD	BLOWER SIZE/TYPE SAF	CLASS	VOLTAGE/ PHASE	MANUFACTURER & MODEL	NOTES
AHU-1	16,000	1,500	77/65	56/55	481	352	R-410A	430	50	65	160	130	260	18	5	430	2.5	10	Y	222/DDP	II	208/3	JCI XTI-72x102	1,2,3,4,5

DIRECT DRIVE PLENUM

1) HEATING CAPACITY BASED ON 35% ETHYLENE GLYCOL SOLUTION.
2) VFD FURNISHED BY MECHANICAL. INSTALLED BY DIVISION 26.
3) DESIGN MAX FACE VELOCITY AT 500 FPM.
4) DESIGN MAX OUTLET VELOCITY AT 2000 FPM.
5) PROVIDE WITH 6" HIGH BASE RAIL UNDER UNIT.

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KLJ

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REGISTERED PROFESSIONAL ENGINEER
JEREMY MAGELKY
PE-6248
DATE: 04/05/22
NORTH DAKOTA

NO.	DATE	REVISION

DRAFTED DD
REVIEWED JM
PROJECT NUMBER FOSS #2003.01
ISSUE DATE 04/05/22

PUBLIC WORKS BSE IT HVAC UPGRADES

CITY OF FARGO
2401 3rd Avenue North

MECHANICAL EQUIPMENT PACKAGE

SHEET M000

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