

SEQUENCE OF OPERATION

BOILER PLANT

FUEL OIL SUPPLY SYSTEM
A 20,000 GALLON FUEL OIL TANK SHALL BE BURIED OUTSIDE THE WEST END OF THE NEW ADDITION. UPON A CALL FROM THE 200 GALLON FUEL OIL DAY TANK IN THE BOILER PLANT A SUBMERSIBLE PUMP IN THE 20,000 GALLON OIL TANK SHALL BEGIN UNTIL THE DAY TANK LEVEL CONTROL SHUTS IT OFF. FROM THE 200 GALLON DAY TANK IN THE BOILER ROOM, THE FUEL SHALL BE DRAWN TO THE BOILERS AND WATER HEATERS WHEN THE BURNER MOTOR FUEL PUMPS RUN.

BOILERS
THE PLANT SHALL CONTAIN TWO DUAL-FUEL, NATURAL GAS/NO. 2 FUEL OIL FIRED HOT WATER BOILERS. EACH BOILER SHALL BE EQUIPPED WITH A MODULATING BURNER INCLUDING A VFD ON THE BURNER MOTOR. THE DDC SYSTEM SHALL ENABLE THE BOILERS FOR OPERATION WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW 50 DEG F. ADJUSTABLE. THE BOILER BURNER SHALL MODULATE TO MAINTAIN THE BOILER WATER SUPPLY SET POINT WHICH WILL BE RESET BY THE DDC SYSTEM TO FOLLOW THE AMBIENT TEMPERATURE. AN ASSOCIATED BOILER SUPPLY PUMP SHALL CYCLE TO PROVIDE HEAT TO THE HYDRONIC WATER HEATING SYSTEM TO MAINTAIN THE SYSTEM SUPPLY SETPOINT. A SYSTEM OF EXHAUST FANS MOUNTED AT THE FLUE OUTLET SHALL MODULATE TO MAINTAIN A CONSTANT DRAFT PRESSURE SET POINT. THE BOILER PLANT SHALL PROVIDE WATER FOR THE HYDRONIC HEATING SYSTEM AND SHALL PROVIDE DOMESTIC HOT WATER DURING THE HEATING SEASON. DURING THE SUMMER MONTHS, THE BOILERS SHALL BE SHUT OFF.

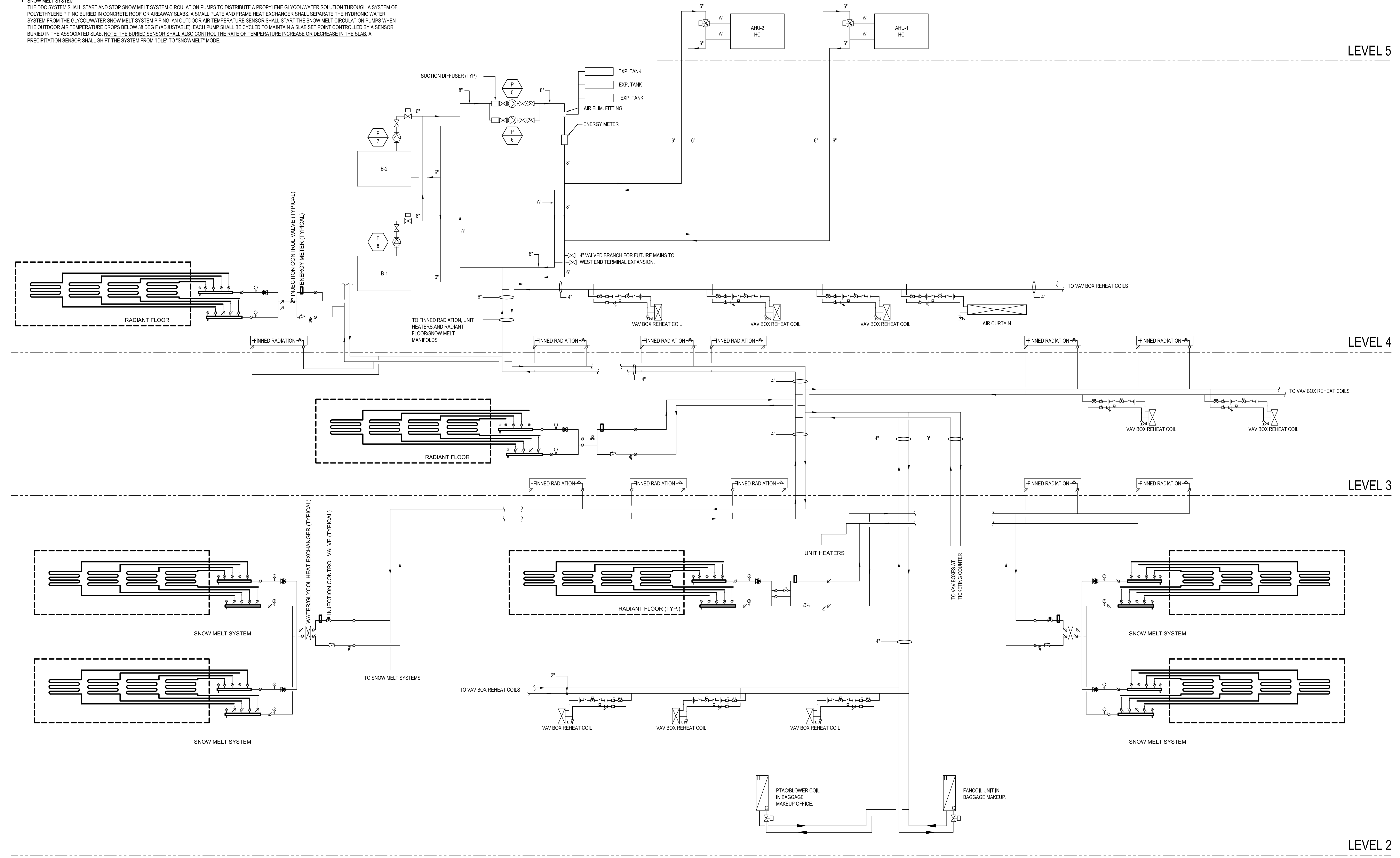
DOMESTIC WATER HEATER
DURING THE SUMMER MONTHS, THE BOILERS SHALL BE LOCKED OUT AND DOMESTIC HOT WATER SHALL BE SUPPLIED BY A PAIR OF DUAL-FUEL, NATURAL GAS/NO. 2 FUEL OIL FIRED DOMESTIC WATER HEATERS. A SYSTEM OF EXHAUST FANS MOUNTED AT THE FLUE OUTLET SHALL MODULATE TO MAINTAIN A CONSTANT DRAFT PRESSURE SET POINT. A DOMESTIC HOT WATER RECIRCULATION PUMP SHALL RUN CONTINUOUSLY TO MAINTAIN HOT WATER FLOW TO REMOTE FIXTURES.

HYDRONIC SYSTEM SUPPLY PUMPS
THE DDC SYSTEM SHALL ENABLE THE HYDRONIC SYSTEM SUPPLY PUMPS FOR OPERATION WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW 50 DEG F. (ADJUSTABLE). THE HYDRONIC SYSTEM SUPPLY PUMPS SHALL BE ARRANGED IN A LEADING SEQUENCE. IF THE LEAD HYDRONIC SYSTEM SUPPLY PUMP FAILS TO START, THE LAG PUMP WILL BE STARTED AND THE DDC SYSTEM SHALL SEND AN ALARM TO THE DESIGNATED MAINTENANCE REPRESENTATIVE. THE LEAD AND LAG PUMPS SHALL BE SWITCHED OVER ON A WEEKLY BASIS. THE PUMPS SHALL BE FURNISHED WITH VFDs AND THE PUMP RPM SHALL BE MODULATED TO MAINTAIN A SYSTEM SUPPLY/RETURN TEMPERATURE DIFFERENTIAL OF 25 DEG F. (ADJUSTABLE).

HYDRONIC SYSTEM
THE DDC SYSTEM SHALL MONITOR THE HYDRONIC SYSTEM SUPPLY TEMPERATURE, RETURN TEMPERATURE, SUPPLY PRESSURE OFF THE PUMPS AND RETURN PRESSURE JUST BEFORE THE PUMPS. THE HYDRONIC SYSTEM SUPPLY TEMPERATURE SHALL BE RESET FROM THE OUTDOOR AIR TEMPERATURE IN ACCORDANCE WITH THE FOLLOWING SCHEDULE:

OUTDOOR AIR TEMPERATURE	HYDRONIC WATER SUPPLY TEMPERATURE
50 DEG F (ADJUSTABLE)	140 DEG F (ADJUSTABLE)
0 DEG F (ADJUSTABLE)	180 DEG F (ADJUSTABLE)

- AHU HEATING COILS
THE DDC SYSTEM SHALL MODULATE THE AHU HEATING COIL THREE WAY CONTROL VALVES TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT.
- FAN POWERED VARIABLE AIR VOLUME (FPVAV) HEATING COILS
THE DDC SYSTEM SHALL MODULATE THE FPVAV HEATING COIL CONTROL VALVES TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT.
- UNIT HEATERS/CABINET UNIT HEATERS
A WALL-MOUNTED SENSOR SHALL OPEN A TWO WAY CONTROL VALVE IN THE SUPPLY PIPE AND SHALL CYCLE THE UNIT FAN TO MAINTAIN THE SPACE AIR TEMPERATURE SET POINT. A PIPE MOUNTED AQUASTAT SHALL PREVENT THE FAN FROM OPERATING IF THE SUPPLY WATER TEMPERATURE IS BELOW 130 DEG F. (ADJUSTABLE)
- FINNED RADIATION
THE DDC SYSTEM SHALL CYCLE TWO WAY CONTROL VALVES TO CONTROL FLOW THROUGH PEDESTAL MOUNTED FINNED RADIATION MOUNTED ALONG THE EXTERIOR WALLS. THE VALVES SHALL CYCLE TO MAINTAIN A SPACE TEMPERATURE SET POINT FROM A WALL MOUNTED SENSOR.
- RADIANT FLOORS
THE DDC SYSTEM SHALL START AND STOP RADIANT FLOOR CIRCULATION PUMPS TO DISTRIBUTE WATER THROUGH A SYSTEM OF POLYETHYLENE PIPING BURIED IN CONCRETE FLOOR SLABS. EACH PUMP SHALL BE CYCLED TO MAINTAIN A FLOOR SLAB SET POINT CONTROLLED BY A SENSOR BURIED IN THE ASSOCIATED SLAB.
- SNOW MELT SYSTEM
THE DDC SYSTEM SHALL START AND STOP SNOW MELT SYSTEM CIRCULATION PUMPS TO DISTRIBUTE A PROPYLENE GLYCOL/WATER SOLUTION THROUGH A SYSTEM OF POLYETHYLENE PIPING BURIED IN CONCRETE ROOF OR AREAWAY SLABS. A SMALL PLATE AND FRAME HEAT EXCHANGERS SHALL SEPARATE THE HYDRONIC WATER SYSTEM FROM THE GLYCOL/WATER SNOW MELT SYSTEM PIPING. AN OUTDOOR AIR TEMPERATURE SENSOR SHALL START THE SNOW MELT CIRCULATION PUMPS WHEN THE OUTDOOR AIR TEMPERATURE DROPS BELOW 38 DEG F (ADJUSTABLE). EACH PUMP SHALL BE CYCLED TO MAINTAIN A SLAB SET POINT CONTROLLED BY A SENSOR BURIED IN THE ASSOCIATED SLAB. NOTE: THE BOILER SENSOR SHALL ALSO CONTROL THE RATE OF TEMPERATURE INCREASE OR DECREASE IN THE SLAB. A PRECIPITATION SENSOR SHALL SHIFT THE SYSTEM FROM "IDLE" TO "SNOWMELT" MODE.



SHEET NOTES

- A THIS SCHEMATIC IS GENERIC AND DOES NOT INDICATE ALL THE DETAILS OF THE INSTALLED PIPING SYSTEM. SEE PIPING PLANS FOR DETAILED ROUTING.
- B PIPE MAIN SIZES ONLY INDICATED. SEE PIPING PLANS AND SCHEDULES FOR BRANCH SIZES.

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GENERAL NOTES

- A SEE SHEET M00.00 FOR LEGEND AND GENERAL NOTES.

Issue	Date & Issue Description	By	Check
01	12/03/08	PWZ	RHB
02	01/23/09	PWZ	RHB
02	10/26/09	PWZ	RHB

Project Name: PWM Terminal Enhancement
Project Number: 09-8395-000
CAD File Name: T:\5330101\Sheets\M12.03.dwg
Description: MECHANICAL PIPING SYSTEM SCHEMATIC

Scale: NOT TO SCALE

M12.03

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