

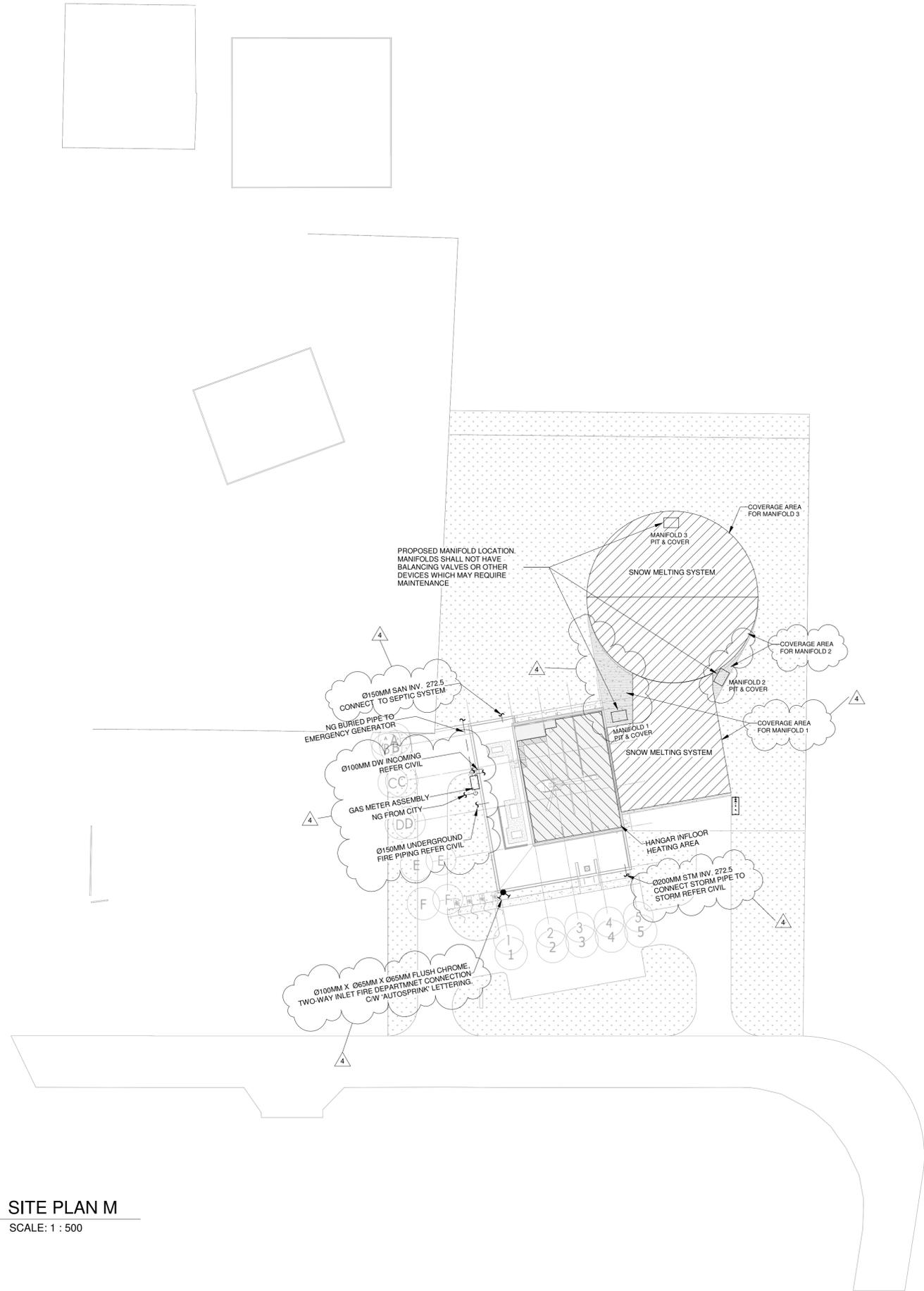


250 ROWNTREE DAIRY RD, WOODBRIDGE, ON  
TEL: 905-507-0800  
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## YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT  
BOULEVARD  
TOWN OF EAST GWILLIMBURY

Key  
Plan



NO.	ISSUED	DATE
4	ISSUED FOR ADDENDUM 6	2024-09-30
3	ISSUED FOR ADDENDUM 3	2024-09-23
2	ISSUED FOR TENDER	2024-09-09
1	ISSUED FOR BUILDING PERMIT	2024-07-31

Issues

All measurements are to be checked and verified on site by the contractor before proceeding with work

Do not scale drawings  
 Drawn by: Fizzah Khan/ Iulian Turiga  
 Checked by: Ali Nakhaei-Zadeh  
 Original Issue Date: 2024-07-31  
 Project No: TT-24-005  
 Scale: As indicated

Sheet  
 Title:  
**MECHANICAL SITE PLAN**

Drawing  
 No.  
**M-100**





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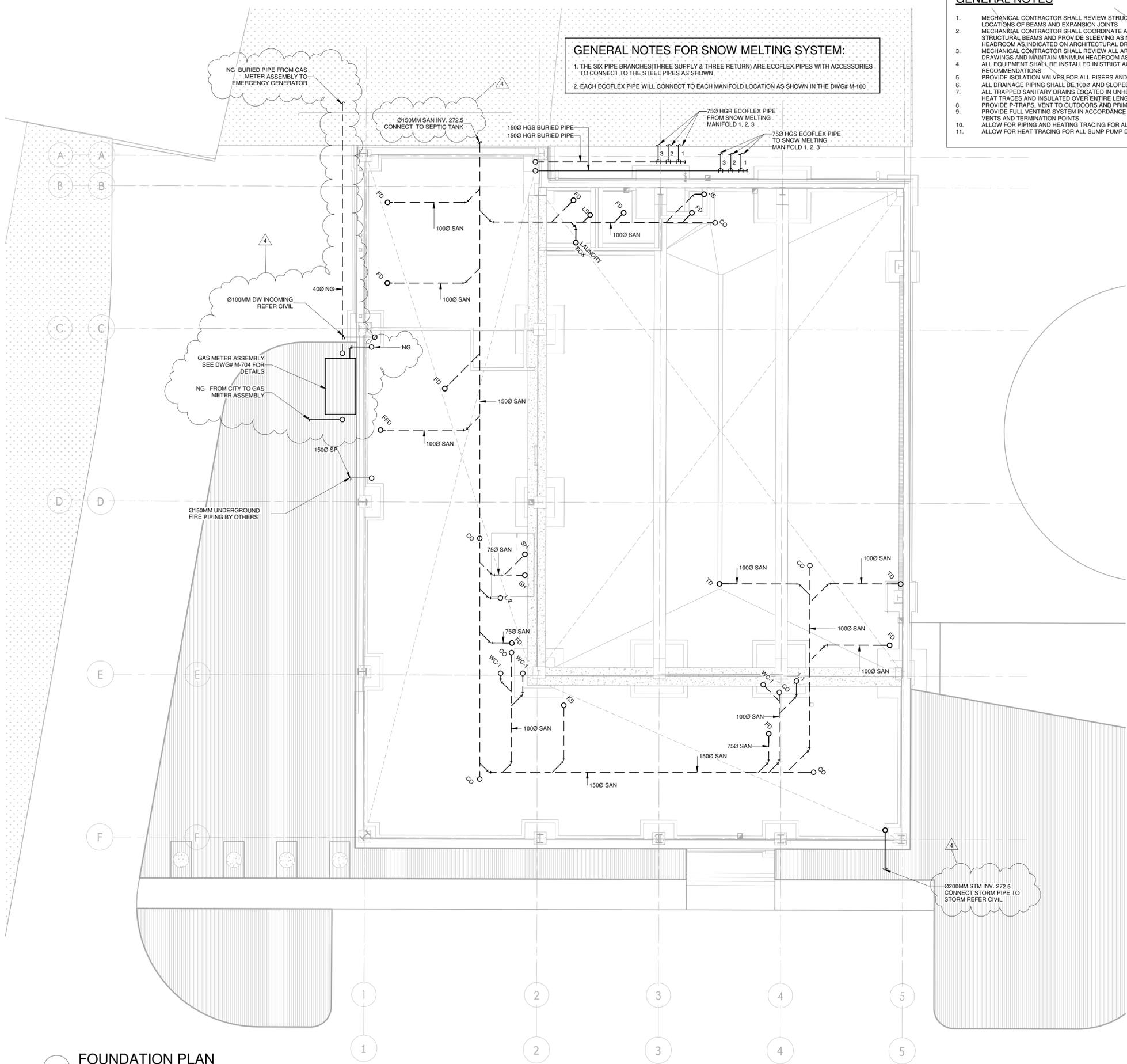
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Sheet  
Title: **FOUNDATION PLAN**

Drawing  
No: **M-250**

- ### GENERAL NOTES
- MECHANICAL CONTRACTOR SHALL REVIEW STRUCTURAL DRAWINGS REGARDING SIZE AND LOCATIONS OF BEAMS AND EXPANSION JOINTS
  - MECHANICAL CONTRACTOR SHALL COORDINATE ALL PIPING AND DUCTWORK WITH STRUCTURAL BEAMS AND PROVIDE SLEEVING AS NECESSARY TO MAINTAIN MINIMUM HEADROOM AS INDICATED ON ARCHITECTURAL DRAWINGS
  - MECHANICAL CONTRACTOR SHALL REVIEW ALL ARCHITECTURAL AND INTERIOR DESIGN DRAWINGS AND MAINTAIN MINIMUM HEADROOM AS INDICATED
  - ALL EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS
  - PROVIDE ISOLATION VALVES FOR ALL RISERS AND AT EACH FIXTURE
  - ALL DRAINAGE PIPING SHALL BE 100Ø AND SLOPED AT 1% UNLESS NOTED OTHERWISE
  - ALL TRAPPED SANITARY DRAINS LOCATED IN UNHEATED SPACE SHALL BE ELECTRICALLY HEAT TRACES AND INSULATED OVER ENTIRE LENGTH
  - PROVIDE P-TRAPS, VENT TO OUTDOORS AND PRIMING TO ALL FLOOR DRAINS
  - PROVIDE FULL VENTING SYSTEM IN ACCORDANCE WITH OBC PART 7. COORDINATE ALL VENTS AND TERMINATION POINTS
  - ALLOW FOR PIPING AND HEATING TRACING FOR ALL TRAP PRIMERS
  - ALLOW FOR HEAT TRACING FOR ALL SUMP PUMP DISCHARGE PIPING

- ### GENERAL NOTES FOR SNOW MELTING SYSTEM:
- THE SIX PIPE BRANCHES (THREE SUPPLY & THREE RETURN) ARE ECOFLEX PIPES WITH ACCESSORIES TO CONNECT TO THE STEEL PIPES AS SHOWN
  - EACH ECOFLEX PIPE WILL CONNECT TO EACH MANIFOLD LOCATION AS SHOWN IN THE DWG# M-100



**1 FOUNDATION PLAN**  
SCALE: 1 : 100



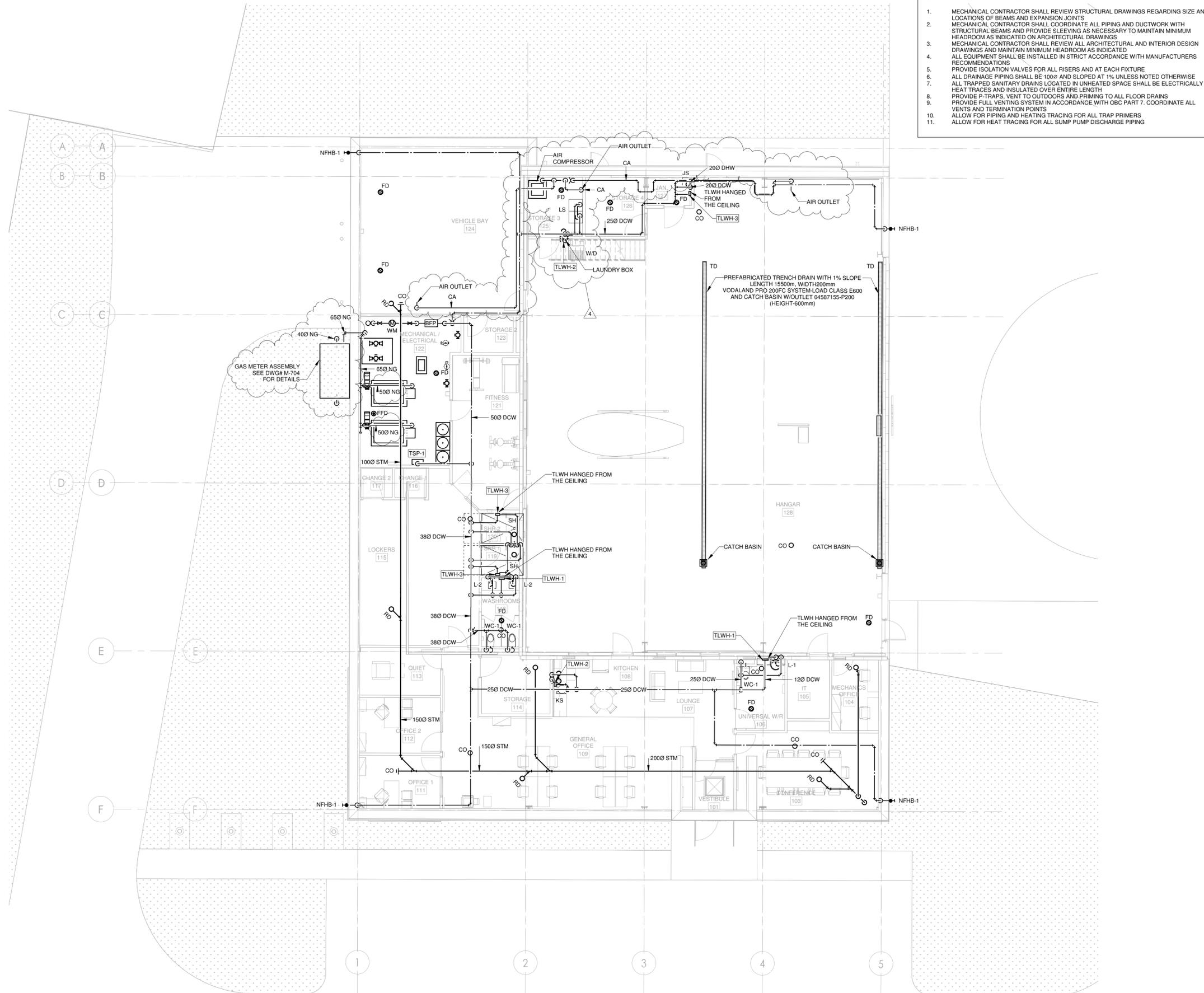
## YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT  
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Sheet  
 Title:  
**PLUMBING NEW WORK -  
 LEVEL 1**

Drawing  
 No:  
**M-251**

**1 PLUMBING NEW WORK - LEVEL 1**  
 SCALE: 1 : 100



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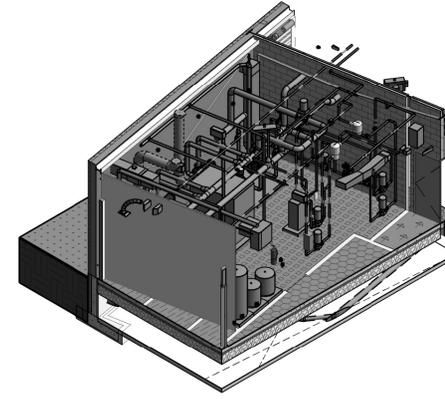
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Do not scale drawings

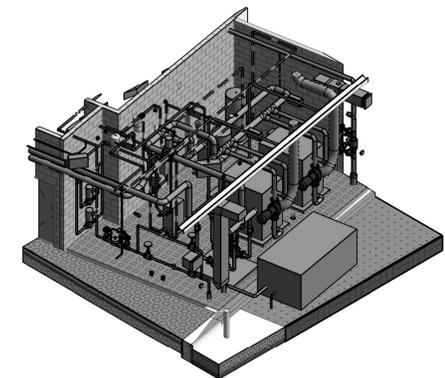
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Project No: TT-24-005  
Scale: 1 : 50

Sheet  
Title:  
**MECHANICAL ROOM  
PIPING**

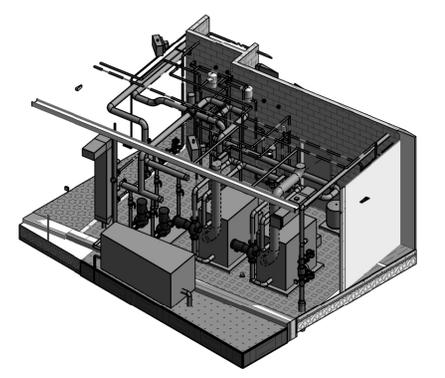
Drawing  
No.  
**M-252**



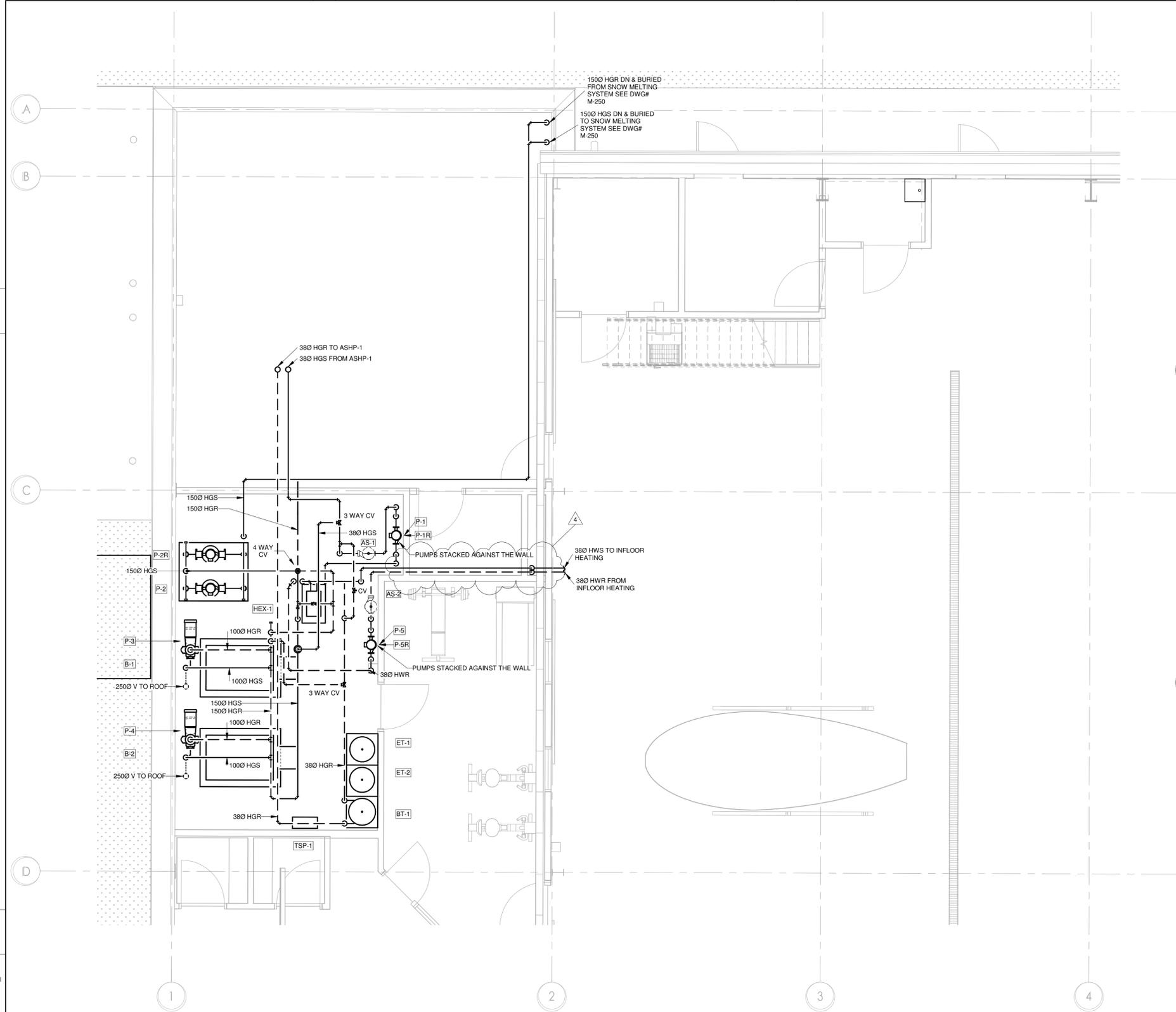
2 **MECH ROOM 3D VIEW 1**  
SCALE:



3 **MECH ROOM 3D VIEW 2**  
SCALE:



4 **MECH ROOM 3D VIEW 3**  
SCALE:



1 **MECHANICAL ROOM PIPING**  
SCALE: 1 : 50

**GENERAL NOTES:**

- CONTRACTOR TO PROVIDE ALL MANIFOLDS AND CONNECTIONS AND PIPING FOR INFLOOR HEATING
- CONTRACTOR TO PROVIDE PROPOSED MANIFOLD LOCATIONS AND SHOP DRAWING FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.

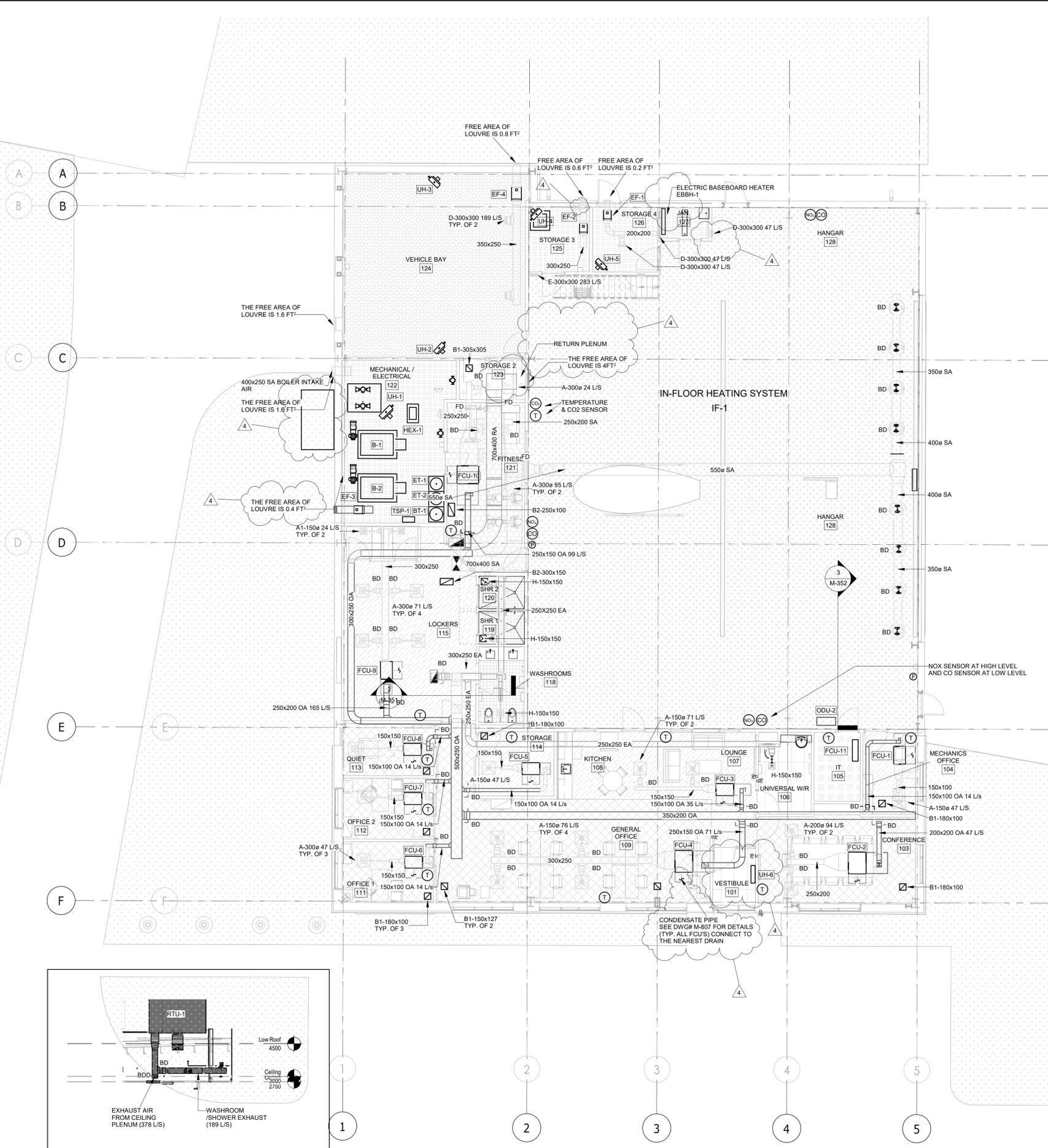


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- 1. SEQUENCE OF OPERATION RTU-1**
- 1.1. General**
- 1.1.1. The rooftop unit provides heating, cooling and ventilation air to the spaces via the fan coils. The unit exhaust fan is used to exhaust air from the washrooms. Scheduling should be coordinated with the washroom exhaust fan.
- 1.1.2. The unit is a constant volume unit and consists of supply fan, an exhaust fan, a heat wheel with bypass dampers, a gas fired burner and a DX cooling coil.
- 1.2. Safeties and Limits**
- 1.2.1. A freestat is hardwired to shutdown the fans and close the dampers when the sensed temperature drops below 2 Deg C. A 5 minute time delay is provided on start-up to bypass the limit and allow time for the heating system to come under control. Once the timer has expired the unit will trip if it detects an air temperature of less than 2 Deg C. Once tripped the limit must be reset manually. Provide a reset button on the control panel. Protection will work when the fan is in either 'hand' or 'auto'.
- 1.2.2. Supply air temperature control is disabled until fan run status is received.
- 1.2.3. Simultaneous heating and cooling is prohibited.
- 1.2.4. Minimum on/off run times are provided for both the DX staging and gas burner. Coordinate with manufacturer to ensure proper time delays.
- 1.2.5. If the heat wheel is off for more than 1 day the controller will rotate the wheel at minimum speed for a minimum of 5 minutes.
- 1.3. Modes of Operation**
- 1.3.1. The occupied and unoccupied modes are determined by a time of day schedule.
- 1.4. Occupied Mode**
- 1.4.1. Overview: The unit will provide heating, cooling and ventilation to the spaces via the fan coil units. The unit will control to maintain the supply air temperature at setpoint.
- 1.4.2. Supply Air Temperature Setpoint: The unit delivers neutral air for the fan coils. The setpoint will be set to 16 Deg C (heating) and 18 Deg C (cooling).
- 1.4.3. Supply Fan + OA Damper: The outside air damper is open, and the supply fan runs continuously.
- 1.4.4. Exhaust Fan + EA Damper: The exhaust air damper is open, and the exhaust fan runs continuously.
- 1.4.5. Heat Wheel + Bypass Dampers: When the outdoor air temperature is below 12 Deg C the heat wheel will modulate to either maintain the supply air temperature at setpoint or to provide frost control. When the outdoor air temperature is more than 2 Deg C above the return air temperature the heat wheel will operate at maximum speed. Otherwise when the outdoor air temperature is above 12 Deg C and less than the exhaust air temperature the heat wheel will be off. When the heat wheel is rotating the bypass dampers will be closed. When the heat wheel is off the dampers will be fully open. The controller will provide frost protection for the heat wheel. The controller will slow the wheel down and stop if necessary to maintain the frost temperature slightly above the frost setpoint which varies with the exhaust air humidity and outdoor air temperature as shown in the table below.
- | OUT (C) | SETPOINT RH% (DPS) | OUT (C) | SETPOINT RH% (DPS) | OUT (C) | SETPOINT RH% (DPS) |
|---------|--------------------|---------|--------------------|---------|--------------------|
| 25      | -15.0              | -18.0   | -18.0              | 15.0    | 25.0               |
| -26.1   | -11.7              | -20.3   | -7.8               | -16.1   | -4.9               |
| -28.3   | -8.3               | -22.2   | -4.4               | -17.2   | -1.9               |
| -32.2   | -5.4               | -25     | -1.5               | -19.4   | 0.8                |
| -35     | -3.9               | -27.2   | -0.6               | -20.6   | 2.3                |
| -40     | -3.3               | -31.1   | -0.3               | -23.3   | 3.3                |
- 1.4.6. DX System: DX cooling will be controlled to maintain the supply air temperature at setpoint.
- 1.4.7. Gas Burner: The gas burner will be controlled to maintain the supply air temperature at setpoint.
- 1.5. Unoccupied Mode**
- 1.5.1. Overview: The unit is off.
- 1.5.2. Supply Fan + OA Damper: The damper is closed and the supply fan is off.
- 1.5.3. Exhaust Fan + EA Damper: The damper is closed and the exhaust fan is off.
- 1.5.4. DX System: DX cooling is off.
- 1.5.5. Gas Burner: The gas burner is off.
- 1.6. Urgent Alarms**
- 1.6.1. Low temperature safety alarm is tripped.
- 1.7. Non-Urgent Alarms**
- 1.7.1. Fan is commanded on and status is not received (2 minute delay).
- 1.7.2. The unit is running and the supply air temperature is below 8 Deg C or above 24 Deg C.
- 1.7.3. Fan is commanded off and status is received (10 minute delay).
- 1.8. Maintenance Alarms**
- 1.8.1. Filter differential is above setpoint.
- 1.8.2. Manual overrides are placed on the system.
- 1.9. Operational Trends (5-minute intervals, 7-days)**
- 1.9.1. All inputs and outputs.
- 1.9.2. Supply air temperature setpoint.
- 1.10. Performance Trends (daily intervals, 5-years)**
- 1.10.1. Space Temperature Index: Daily average of the percentage of time the supply air temperature is within normal limits (between the cooling setpoint (plus 1 Deg C) and heating setpoint (minus 1 Deg C)).
- 1.10.2. Airflow Cooling Intensity: Daily average of the amount of time in the cooling mode.
- 1.10.3. Airflow Heating Intensity: Daily average of the amount of time in the heating mode.
- 1.10.4. Daily Airflow Hours: The total number of hours the unit operated during the day.

- 1.0 SEQUENCE OF OPERATIONS RTU-2**
- 1.1. General**
- 1.1.1. The rooftop unit provides heating, cooling (free cooling only), and ventilation to the hangar. When gas detection sensors (CO/NOx) detect the presence of gas, the unit will operate at full volume and 100% outside air regardless of the mode of operation, until gas levels drop to suitable levels.
- 1.1.2. The unit consists of a supply fan, exhaust fan, mixing dampers, energy recovery wheel, and a gas fired burner.
- 1.1.3. The unit is a variable volume unit and the supply and exhaust fans have been provided with variable frequency drives.
- 1.1.4. Provide an alarm strobe/horn in the space for local high gas alarm annunciation.
- 1.2. Safeties and Limits**
- 1.2.1. The DDC controller will shutdown and lockout the unit if the supply air temperature drops below 4 Deg C when the unit is running. Once shutdown the operator must correct the problem and manually restart the unit. Low temperature protection is hardwired to the starter and will work when the fans are being controlled in either hand or auto.
- 1.2.2. Fan speed modulation is disabled until fan run status is received.
- 1.2.3. The minimum speed for the VFD is 50% (30 hz - confirm min speed with balancer).
- 1.2.4. Supply air temperature control is disabled until fan run status is received.
- 1.2.5. Damper control is disabled until fan run status is received.
- 1.2.6. Simultaneous heating and cooling is not permitted.
- 1.2.7. If the heat wheel is off for more than 1 day the controller will rotate the wheel for a minimum of 5 minutes.
- 1.3. Modes of Operation**
- 1.3.1. The occupied and unoccupied modes of operation are determined by a time-of-day schedule or via the occupancy button located at the main entrance. When pressed, the occupancy button will set the occupied mode for 4 hours (adjustable).
- 1.4. Occupied Mode**
- 1.4.1. Overview: The unit will provide heating, cooling (free cooling only), and ventilation to the space. The unit will control to maintain the space temperature at setpoint.
- 1.4.2. Space Temperature Setpoints: The heating setpoint will be set to 22 Deg C and the cooling setpoint set to 24 Deg C.
- 1.4.3. Gas Detection Setpoints: The CO setpoint is 25 ppm. The NOx setpoint is 1 ppm.
- 1.4.4. Supply Fan: The supply fan runs continuously at full speed.
- 1.4.5. Exhaust Fan: The power exhaust fan runs in conjunction with the fresh air damper. Once the damper is open above 30% the power exhaust fan will start and it's speed will be set in accordance with the amount of fresh air being provided.
- 1.4.6. Mixed Air Dampers: The dampers will control to maintain the minimum amount of fresh air to the space, gas detection sensors below setpoint and free cooling when available and required. The minimum fresh air limit is set to 20% (balancer to confirm). If any gas detection sensor is above setpoint, the dampers will be set to 100% outdoor air (gas detection overrides all other control strategies). Free cooling will provide the only stage of cooling for the unit. When free cooling is available the mixed air dampers will modulate to maintain the space temperature at setpoint. Free cooling will be available when the outdoor air temperature is below 18 Deg C.
- 1.4.7. Gas Burner: The gas burner will be controlled to maintain the space temperature at setpoint.
- 1.4.8. Heat Wheel + Bypass Dampers: When the outdoor air temperature is below 12 Deg C the heat wheel will modulate to either maintain the space temperature at setpoint or to provide frost control. When the outdoor air temperature is more than 2 Deg C above the return air temperature the heat wheel will operate at maximum speed. Otherwise when the outdoor air temperature is above 12 Deg C and less than the return air temperature the heat wheel will be off. When the heat wheel is rotating the bypass dampers will be closed. When the heat wheel is off the dampers will be fully open. The control system will provide frost protection for the heat wheel. The controller will slow the wheel down and stop if necessary to maintain the frost temperature slightly above the frost setpoint.
- 1.4.9. Frost Temperature Setpoint: The frost temperature setpoint varies with the exhaust air humidity and outdoor air temperature as shown in the table below.
- | OUT (C) | SETPOINT RH% (DPS) | OUT (C) | SETPOINT RH% (DPS) | OUT (C) | SETPOINT RH% (DPS) |
|---------|--------------------|---------|--------------------|---------|--------------------|
| -25     | -15.0              | -19.4   | -11.1              | -15.6   | -8.2               |
| -26.1   | -11.7              | -20.3   | -7.8               | -16.1   | -4.9               |
| -28.3   | -8.3               | -22.2   | -4.4               | -17.2   | -1.9               |
| -32.2   | -5.4               | -25     | -1.5               | -19.4   | 0.8                |
| -35     | -3.9               | -27.2   | -0.6               | -20.6   | 2.3                |
| -40     | -3.3               | -31.1   | -0.3               | -23.3   | 3.3                |
- 1.5. Unoccupied Mode**
- 1.5.1. Overview: The rooftop unit is off. During the unoccupied mode the RTU will start up to provide heating/cooling as required to maintain the space temperature at the unoccupied setpoints and for gas detection ventilation. If the space temperature drops below the heating setpoint or rises above the cooling setpoint the unit will be enabled to provide unoccupied heating/cooling. A deadband of 2 Deg C is applied to return the unit to the off state. If the gas detection sensors (either CO or NOx) rise above setpoint, the unit will be engaged to ventilate the space.
- 1.5.2. Space Temperature Unoccupied Setpoints: The unoccupied heating setpoint is set to 18 Deg C. The unoccupied cooling setpoint is set to 28 Deg C.
- 1.5.3. Gas Detection Setpoints: The CO setpoint is 25 ppm. The NOx setpoint is 1 ppm.
- 1.5.4. Supply Fan: When the outdoor air temperature is below 5 Deg C, the fan will run continuously at 50% speed, otherwise the fan is off (5 Deg C differential). During unoccupied cooling or heating, the fan will run at 100% speed. During unoccupied gas detection ventilation, the fan will run at 100% speed.
- 1.5.5. Exhaust Fan: The exhaust fan controls as per the occupied mode.
- 1.5.6. Mixed Air Dampers: The fresh air damper is closed and the return damper is open at all points in time except: 1) When gas is detected - dampers go to 100% fresh air, 2) The unit is running for temperature control and free cooling is permitted and required.
- 1.5.7. Gas Heating: Controlled as per the occupied mode. Heating is off when the unit is off.
- 1.5.8. Heat Wheel Control: Controlled as per the occupied mode. The heat wheel is off when the unit is off and/or when the unit is simply circulating air.
- 1.6. Urgent Alarms**
- 1.6.1. Low temperature limit.
- 1.6.2. Low space temperature.
- 1.6.3. CO level above 50 ppm. Alarm strobe/horn in space is activated.
- 1.6.4. NOx level above 3 ppm. Alarm strobe/horn in space is activated.
- 1.7. Non-Urgent Alarms**
- 1.7.1. Fan is commanded on and status is not received (2 minute delay).
- 1.7.2. The supply air temperature drops below 7 Deg C.
- 1.7.3. The supply air temperature rises above 43 Deg C.
- 1.7.4. Fan is commanded off and status is on (10 minute delay).
- 1.8. Maintenance Alarms**
- 1.8.1. Filter alarm.
- 1.8.2. Manual overrides are placed on the system.
- 1.9. Operational Trends (5-minute intervals, 7-days)**
- 1.9.1. All inputs and outputs.
- 1.9.2. Supply air temperature setpoint.
- 1.10. Performance Trends (daily intervals, 5-years)**
- 1.10.1. Space Temperature Index: Daily average of the percentage of time the space temperature is within normal limits (between the cooling setpoint (plus 1 Deg C) and heating setpoint (minus 1 Deg C)).
- 1.10.2. Airflow Heating Intensity: Daily average of the amount of time in the heating mode.
- 1.10.3. Daily Airflow Hours: The total number of hours the unit operated during the day.

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Sheet  
 Title: **VENTILATION NEW  
 WORK - LEVEL 1**

Drawing  
 No. **M-351**

**RTU-1 SCHEMATIC CONCEPT**  
 SCALE: 1 : 100

**VENTILATION NEW WORK - LEVEL 1**  
 SCALE: 1 : 100



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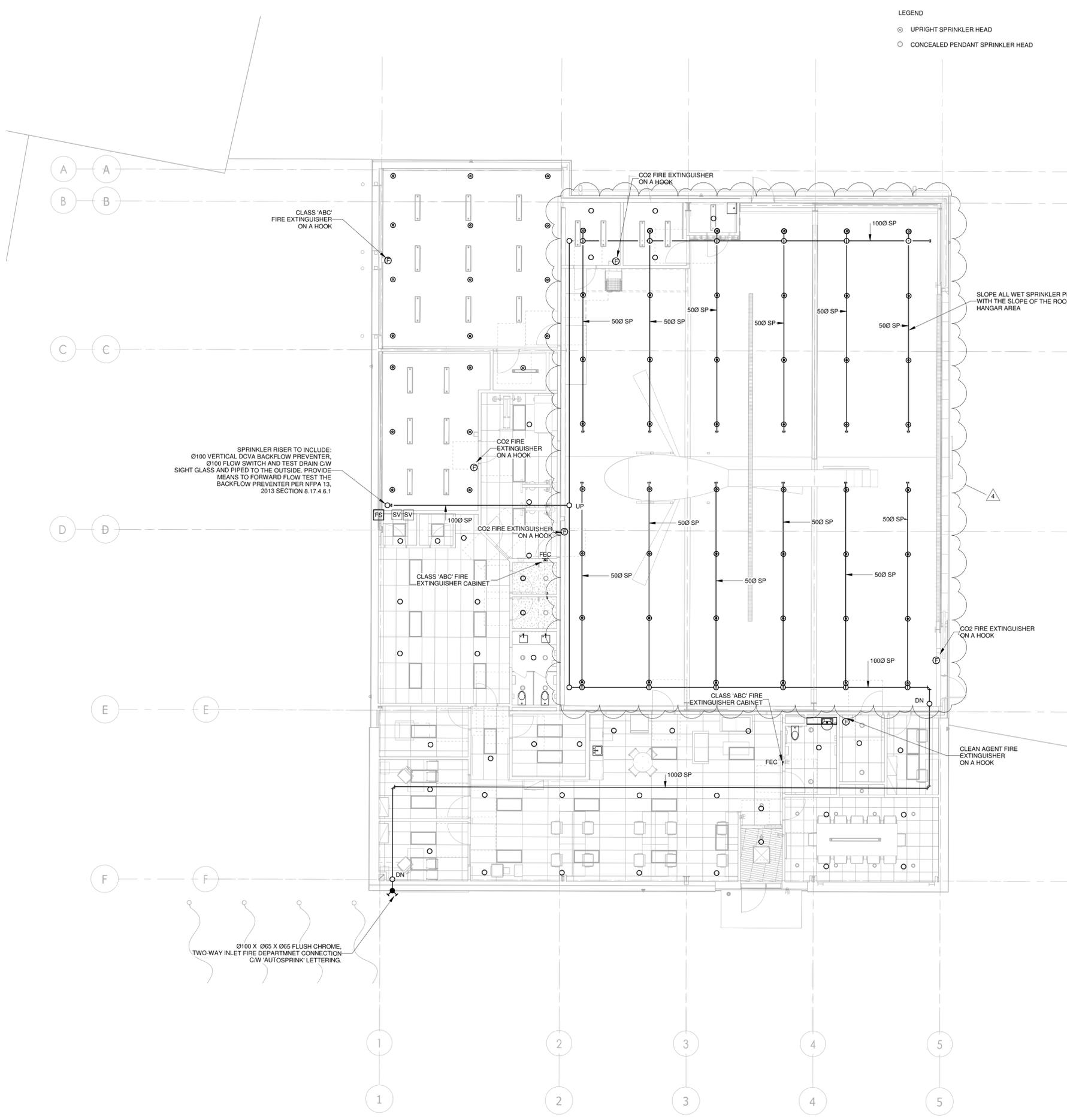
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### GENERAL NOTES - FIRE PROTECTION

- SPRINKLER SYSTEM DESIGN AND INSTALLATION TO BE IN ACCORDANCE WITH NFPA 13-2013, THE ONTARIO BUILDING CODE-2012, THE ONTARIO FIRE CODE-2012, AND LOCAL AUTHORITY REQUIREMENTS.
- ADHERE TO AND OBTAIN ALL PERMITS, LICENSES AND GOVERNMENT REQUIREMENTS, IF APPLICABLE.
- CUTTING OF STRUCTURAL AND/OR ARCHITECTURAL MEMBERS TO BE DONE ONLY WITH THE WRITTEN APPROVAL OF THE ARCHITECT AND/OR STRUCTURAL ENGINEER.
- ALL ELECTRICAL WIRING OF SPRINKLER DEVICES IS BY OTHERS. COORDINATE ALL ELECTRICAL ITEMS WITH ELECTRICAL CONTRACTOR AND ENSURE PROPER COORDINATION.
- PROVIDE STOCK OF EXTRA SPRINKLERS IN ACCORDANCE WITH NFPA 13, 6.2.9.
- COORDINATION IS TO TAKE PLACE BETWEEN THE SPRINKLER CONTRACTOR AND ALL OTHER TRADES.
- THE SPRINKLER CONTRACTOR IS TO FIELD SURVEY THE SITE, INCLUDING STRUCTURAL STEEL AND MECHANICAL/ELECTRICAL SERVICES PRIOR TO FABRICATION AND INSTALLATION. CONFLICTS OR DISCREPANCIES ARE TO BE REPORTED IMMEDIATELY TO THE DESIGN CONSULTANTS.
- INSTALL HIGH TEMPERATURE SPRINKLERS AROUND ALL HEAT SOURCES IN ACCORDANCE WITH NFPA 13-2013.
- INSTALL GUARDS ON SPRINKLERS IN WAREHOUSE, MECHANICAL, ELECTRICAL AND STORAGE ROOMS.
- INSTALL LOW POINT DRAINS ON ALL TRAPPED SECTIONS OF PIPING IN ACCORDANCE WITH NFPA 13-2013.
- PROVIDE TAGS AND SIGNAGE AS PER NFPA 13-2013.
- SPRINKLER SYSTEMS ARE TO BE HYDROSTATICALLY TESTED IN ACCORDANCE WITH NFPA 13-2013.
- CONTRACTOR SHALL VERIFY FLOWS AND PRESSURES VIA A FIRE HYDRANT FLOW TEST PERFORMED BY A LICENSED COMPANY, AT THE SITE PRIOR TO ANY DESIGN, HYDRAULIC CALCULATIONS AND INSTALLATION OF ANY FIRE PROTECTION SYSTEMS.
- CONTRACTOR SHALL PROVIDE AND INSTALL NEW FIRE EXTINGUISHERS ON HOOKS OR IN CABINETS AS SHOWN ON THE DRAWINGS.
- CONTRACTOR SHALL INSTALL THE FOLLOWING TYPES OF FIRE EXTINGUISHERS OR EQUIVALENT:
  - FIRE EXTINGUISHER CABINETS-BOH AND OFFICE AREAS: NATIONAL FIRE EQUIPMENT LTD OR EQUIVALENT, MODEL 102F C/W A CLASS 'ABC' 5LB DRY CHEM FIRE EXTINGUISHER
  - FIRE EXTINGUISHER ON HOOK-VEHICLE BAY: NATIONAL FIRE EQUIPMENT LTD OR EQUIVALENT, MODEL SF-ABC680, 10LB CLASS 'ABC' DRY CHEM FIRE EXTINGUISHER
  - CLEAN AGENT FIRE EXTINGUISHER ON HOOK-IT ROOM: NATIONAL FIRE EQUIPMENT LTD OR EQUIVALENT, MODEL CA07, 7.5LB CLEANGUARD FK-5-1-12 CLEAN AGENT FIRE EXTINGUISHER
  - CO2 FIRE EXTINGUISHER ON HOOK-MECHANICAL ROOMS, HANGER AREA, PAINT ROOM: NATIONAL FIRE EQUIPMENT LTD OR EQUIVALENT, STRIKE FIRST, MODELS SF-10CO2A (MECH. RM & PAINT RM) AND SF-20CO2A (HANGER BAY) CO2 FIRE EXTINGUISHER



- LEGEND
- UPRIGHT SPRINKLER HEAD
  - CONCEALED PENDANT SPRINKLER HEAD

NO.	ISSUED	DATE
4	ISSUED FOR ADDENDUM 6	2024-09-30
3	ISSUED FOR ADDENDUM 3	2024-09-23
2	ISSUED FOR TENDER	2024-09-09
1	ISSUED FOR BUILDING PERMIT	2024-07-31

#### Issues

All measurements are to be checked and verified on site by the contractor before proceeding with work

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 Checked by: Ali Nakhaei-Zadeh  
 Original Issue Date: 2024-07-31  
 Project No: TT-24-005  
 Scale: As indicated

Sheet  
 Title:  
**FIRE PROTECTION NEW  
 WORK - LEVEL 1**

Drawing  
 No.  
**M-551**

**1** FIRE PROTECTION NEW WORK - LEVEL 1  
 SCALE: 1 : 100



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### Issues

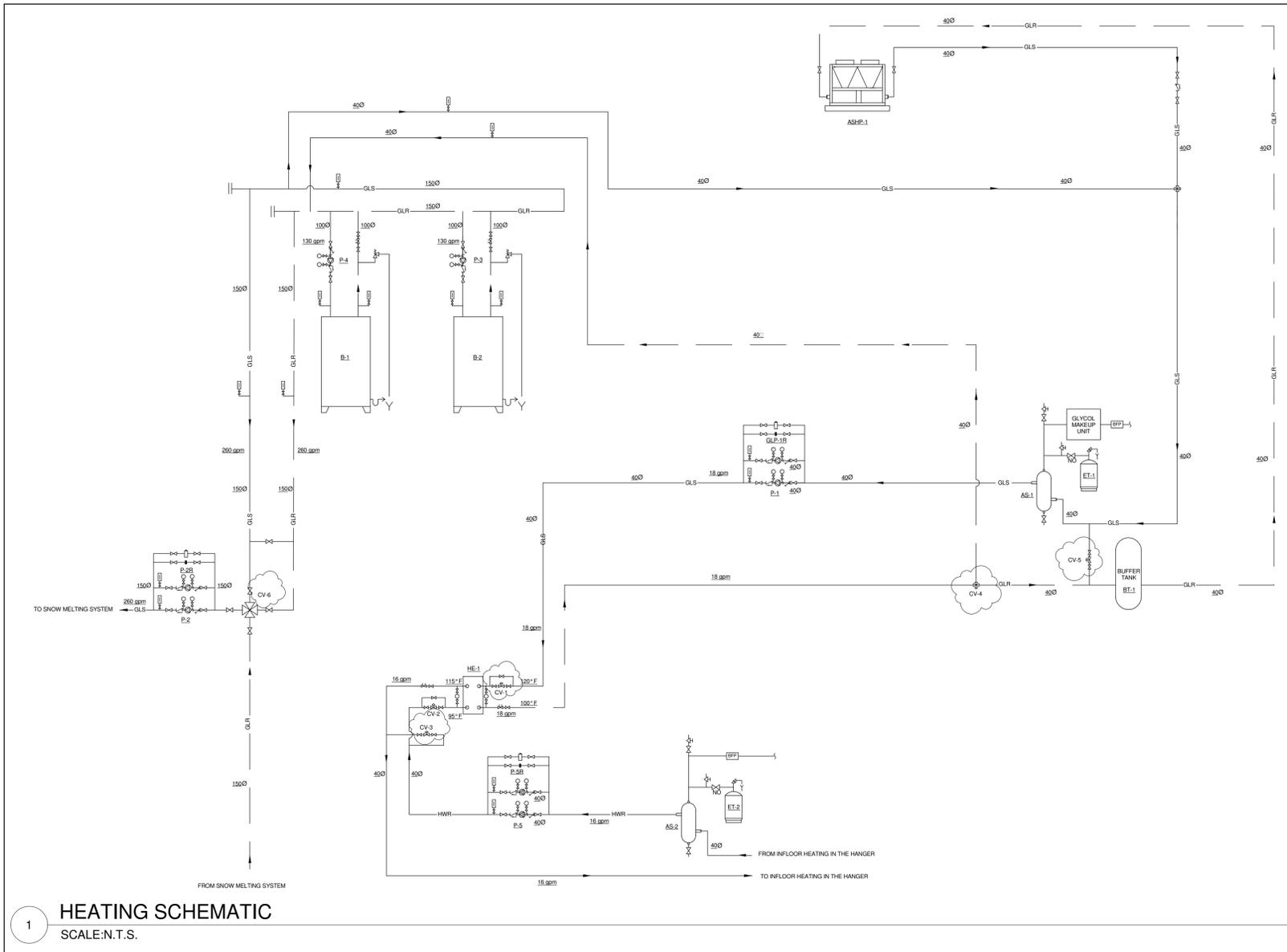
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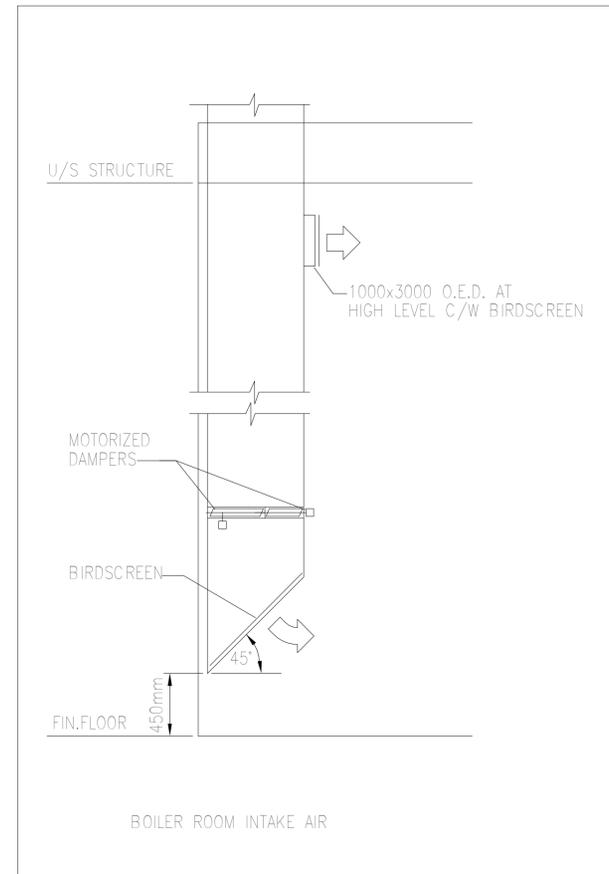
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Original Issue Date: 2024-07-31  
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Sheet  
Title:  
**HEATING SCHEMATIC**

Drawing  
No:  
**M-702**



**1 HEATING SCHEMATIC**  
SCALE:N.T.S.



**2 BOILER INTAKE SCHEMATIC**  
SCALE:N.T.S.



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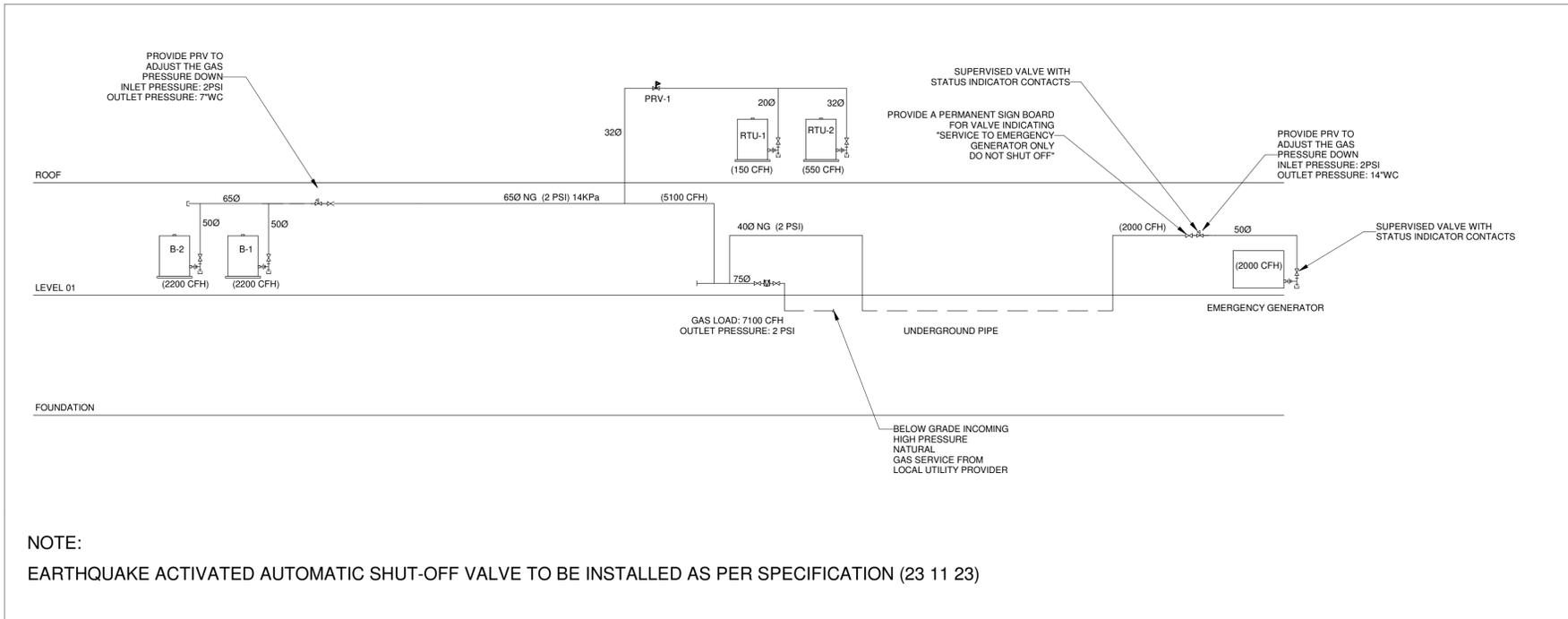
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Project No: TT-24-005  
Scale: As indicated

Sheet  
Title: **GAS SCHEMATIC**

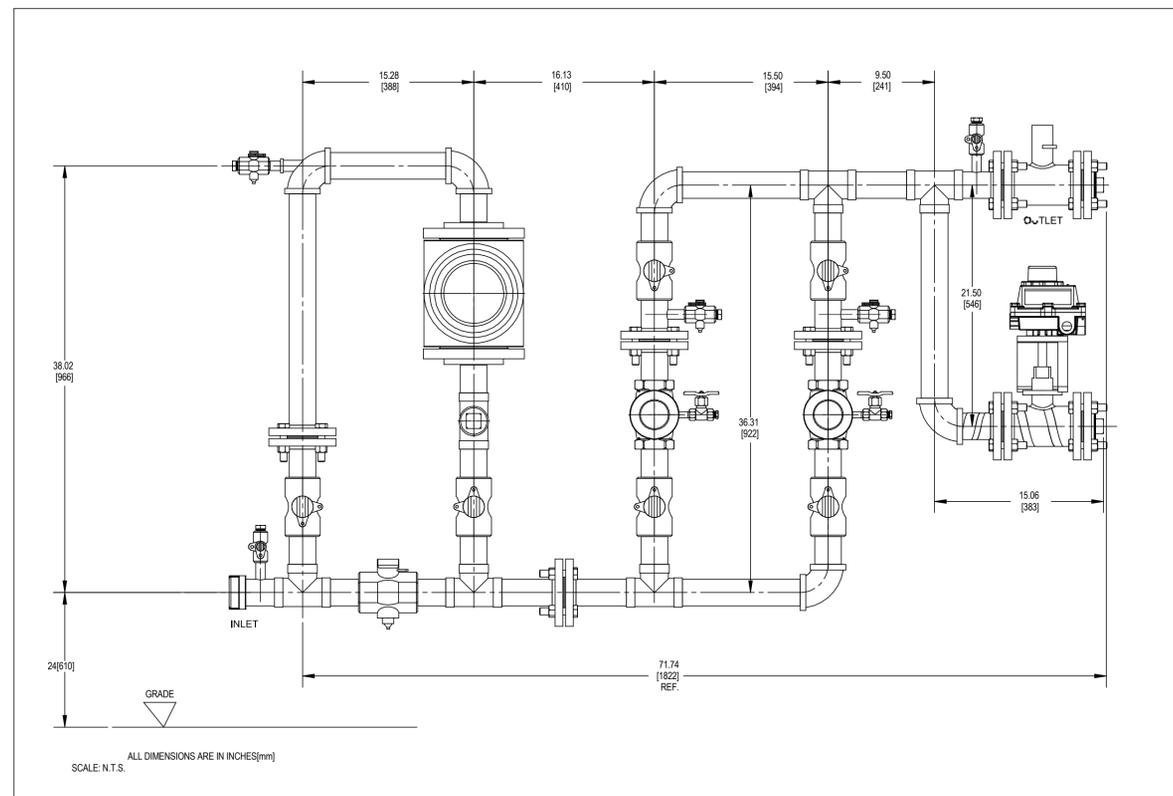
Drawing  
No: **M-704**



NOTE:

EARTHQUAKE ACTIVATED AUTOMATIC SHUT-OFF VALVE TO BE INSTALLED AS PER SPECIFICATION (23 11 23)

1 **GAS SCHEMATIC**  
SCALE: N.T.S.



2 **GAS METER DETAILS**  
SCALE: 1 : 1

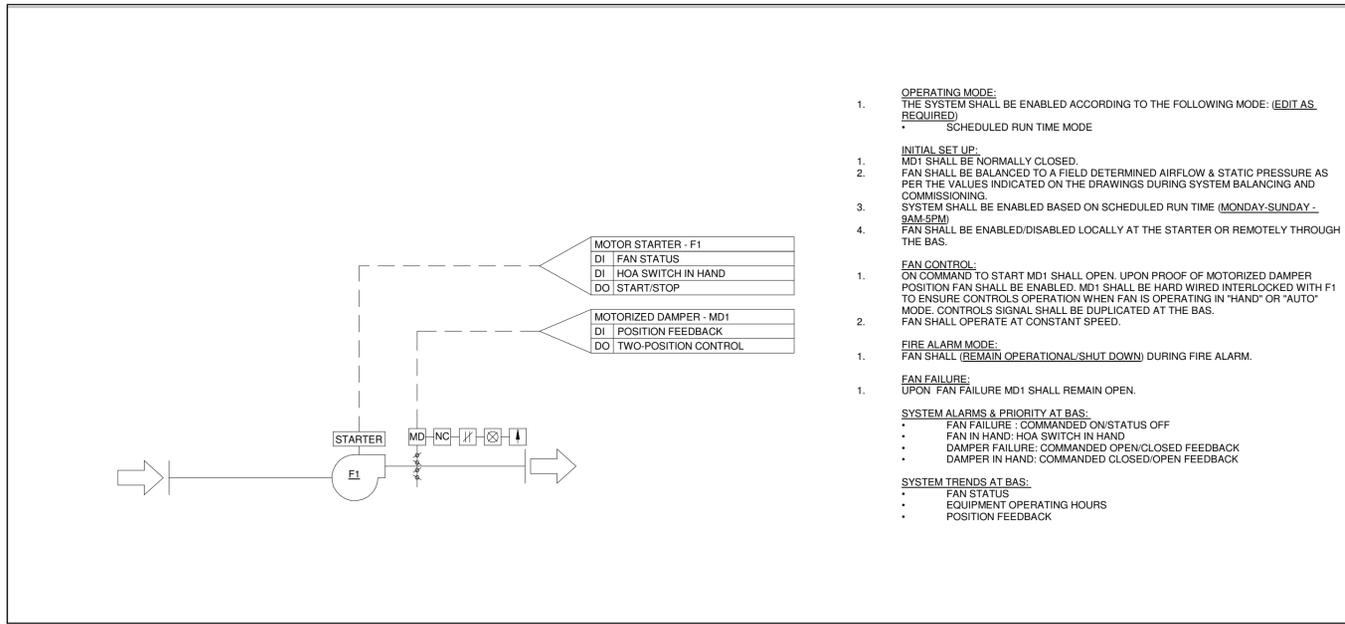


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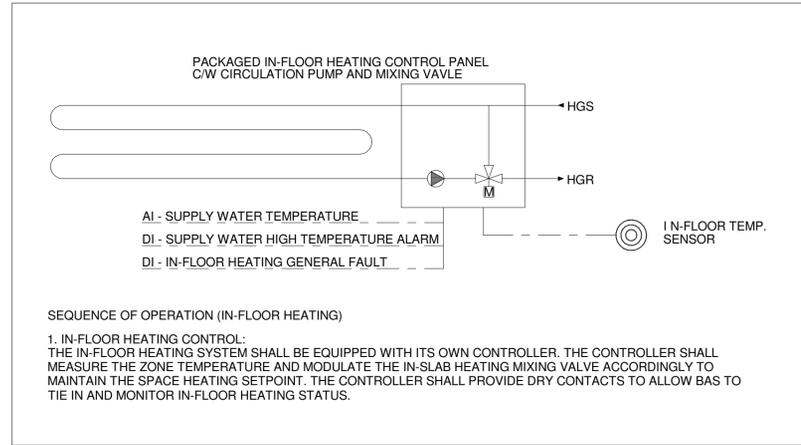
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- OPERATING MODE:**  
THE SYSTEM SHALL BE ENABLED ACCORDING TO THE FOLLOWING MODE: (EDIT AS REQUIRED)  
\* SCHEDULED RUN TIME MODE
- INITIAL SET UP:**  
1. MD1 SHALL BE NORMALLY CLOSED.  
2. FAN SHALL BE BALANCED TO A FIELD DETERMINED AIRFLOW & STATIC PRESSURE AS PER THE VALUES INDICATED ON THE DRAWINGS DURING SYSTEM BALANCING AND COMMISSIONING.  
3. SYSTEM SHALL BE ENABLED BASED ON SCHEDULED RUN TIME (MONDAY-SUNDAY - 9AM-5PM)  
4. FAN SHALL BE ENABLED/DISABLED LOCALLY AT THE STARTER OR REMOTELY THROUGH THE BAS.
- FAN CONTROL:**  
1. ON COMMAND TO START MD1 SHALL OPEN. UPON PROOF OF MOTORIZED DAMPER POSITION FAN SHALL BE ENABLED. MD1 SHALL BE HARD WIRED INTERLOCKED WITH F1 TO ENSURE CONTROLS OPERATION WHEN FAN IS OPERATING IN "HAND" OR "AUTO" MODE. CONTROLS SIGNAL SHALL BE DUPLICATED AT THE BAS.  
2. FAN SHALL OPERATE AT CONSTANT SPEED.
- FIRE ALARM MODE:**  
1. FAN SHALL (REMAIN OPERATIONAL/SHUT DOWN) DURING FIRE ALARM.
- FAN FAILURE:**  
1. UPON FAN FAILURE MD1 SHALL REMAIN OPEN.
- SYSTEM ALARMS & PRIORITY AT BAS:**  
\* FAN FAILURE: COMMANDED ON/STATUS OFF  
\* FAN IN HAND: HOA SWITCH IN HAND  
\* DAMPER FAILURE: COMMANDED OPEN/CLOSED FEEDBACK  
\* DAMPER IN HAND: COMMANDED CLOSED/OPEN FEEDBACK
- SYSTEM TRENDS AT BAS:**  
\* FAN STATUS  
\* EQUIPMENT OPERATING HOURS  
\* POSITION FEEDBACK



- SEQUENCE OF OPERATION (IN-FLOOR HEATING)**
1. IN-FLOOR HEATING CONTROL:  
THE IN-FLOOR HEATING SYSTEM SHALL BE EQUIPPED WITH ITS OWN CONTROLLER. THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE IN-SLAB HEATING MIXING VALVE ACCORDINGLY TO MAINTAIN THE SPACE HEATING SETPOINT. THE CONTROLLER SHALL PROVIDE DRY CONTACTS TO ALLOW BAS TO TIE IN AND MONITOR IN-FLOOR HEATING STATUS.

3 **CONSTANT SPEED FAN - DAMPER INTERLOCK CONTROL SEQUENCE**  
SCALE: N.T.S.

1 **IN-FLOOR HEATING CONTROLS**  
SCALE: 1 : 1

### SEQUENCE OF OPERATION FOR ASHP (IN FLOOR HEATING)

- UPON CALL FOR IN FLOOR HEATING (BASED ON OAT (12 C OR LESS) ADJUSTABLE)
  - VALVE CV-1 SHALL OPEN, VALVE CV-2 SHALL CLOSE
  - ENABLE PUMP P-5 OR P-5R SHALL BE ENABLED (BAS SHALL CYCLE PUMPS AFTER EVERY 30 HOURS OF OPERATION TO ENSURE EVEN WEAR)
  - IF IN FLOOR HEATING LOOP SUPPLY TEMPERATURE IS LESS THAN 115F:
    - BAS TO ENABLE PUMP P-1 OR GLP-1R (BAS SHALL CYCLE PUMPS AFTER EVERY 30 HOURS OF OPERATION TO ENSURE EVEN WEAR)
    - BAS TO ENABLE AIR SOURCE BOILER ASHP-1 TO MAINTAIN 120F GLYCOL SUPPLY TEMPERATURE TO HEAT EXCHANGER HE-1
    - IN FLOOR HEATING WATER SUPPLY TEMPERATURE SHALL BE MAINTAINED AT 115F TO HANGER IN FLOOR HEATING. IF SUPPLY WATER TEMPERATURE REACHES 118F (ADJUSTABLE), VALVE CV-2 SHALL OPEN AND VALVE CV-1 SHALL CLOSE TO BYPASS HEAT EXCHANGER. AIR SOURCE BOILER SHALL CONTINUE TO MAINTAIN 120F GLYCOL SUPPLY TEMPERATURE.
    - IF IN FLOOR HEATING WATER SUPPLY TEMPERATURE CONTINUES TO DROP BY 112F (ADJUSTABLE), VALVE CV-2 SHALL CLOSE AND VALVE CV-1 SHALL OPEN SO THAT HE-1 IS NOT BYPASSED
    - SYSTEM SHALL OPERATE AS SUCH TO MAINTAIN 115F IN FLOOR HOT WATER HEATING SUPPLY UNTIL THERE IS NO LONGER A CALL FOR IN FLOOR HEATING.
- WHEN CALL FOR IN FLOOR HEATING IS COMPLETE:
  - PUMPS P-5 AND P-5R SHALL BE DISABLED.
  - VALVE CV-1 SHALL CLOSE AND VALVE CV-2 SHALL OPEN
  - AIR SOURCE BOILER ASHP-1 SHALL BE DISABLED
  - PUMPS P-1 AND GLP-1R SHALL BE DISABLED
  - PUMPS P-5, P-5R, P-1 AND GLP-1R TO BE EXERCISED ONCE PER WEEK DURING OFF CYCLES FOR 5 MINUTES.
- IF ASHP BOILER IS NOT ABLE TO PROVIDE THE REQUIRED HEAT FOR IN FLOOR HEATING:
  - THE THREE WAY VALVE CV-3 WILL DIRECT THE FLOW BETWEEN THE BOILERS TO THE HEAT EXCHANGER VIA ASSOCIATED BOILER'S PUMPS AND P-1 & P-1R
  - THE PORT AT CV-3 (ASHP SIDE) WILL BE CLOSED.
  - THE BOILERS AND THE ASSOCIATED PUMPS WILL BE ACTIVATED TO ALLOW THE DESIGN REQUIREMENTS TO BE SATISFIED

### SNOW MELTING SYSTEM SEQUENCE OF OPERATION

- ONCE OUTDOOR TEMPERATURE DROPS BELOW 0°C, THE WARM WEATHER CUT OFF (WWCO) IS CANCELLED AND THE CONTROL SHALL BE ACTIVE.
- THE CONTROL SHALL ENABLE THE SNOW MELT PUMP TO OPERATE MODULATING THE 4-WAY VALVE TO INJECT HEAT INTO THE SLAB TO MAINTAIN IDLING TEMPERATURE OF 0°C (ADJUSTABLE).
- IF SUPPLY WATER TEMPERATURE IS NOT AT SET POINT, THE CONTROL SHALL INITIATE THE LEAD BOILER PUMP TO START AND FIRE THE BOILER.
- THE BOILER AND 4-WAY VALVE SHALL INJECT HEAT INTO THE SLAB UNTIL THE IDLE TEMPERATURE IS SATISFIED.
- ONCE THE SLAB IS UP TO TEMPERATURE, THE OILER SHALL SHUT DOWN. THE BOILER PUMP WILL OPERATE FOR 3 MINUTES THEN SHUT DOWN.
- THE FOUR WAY VALVE WILL MODULATE TO MAINTAIN SET POINT SUPPLY WATER TEMPERATURE AS LONG AS THE SNOW MELT SYSTEM IS ACTIVE.
- IF SNOW IS DETECTED ON ANY OF THE SNOW/ICE SENSORS, THE CONTROL SHALL INITIATE A SNOW MELT DEMAND. THE SLAB SURFACE SET POINT SHALL BE INCREASED TO 4°C TO MELT SNOW.
- THE FOUR WAY VALVE SHALL MODULATE OPEN TO INJECT HEAT INTO THE SLAB. ONCE THE SUPPLY WATER TEMPERATURE DROPS BELOW SETPOINT. THE LEAD BOILER WILL FIRE AND MODULATE TO MEET DEMAND. IF AFTER 5 MINUTES SET POINT IS NOT ACHIEVED, THE STANDBY BOILER (3) SHALL STAY ON UNTIL THE 3RD BOILER IS TURNED ON. ONCE ALL BOILERS ARE RUNNING, THEY WILL MODULATE IN UNISON, AND INCREASE MODULATION TO MEET DEMAND. ONCE DEMAND IS REACHED AND BOILERS MODULATE DOWN BELOW 50%, THE LAG BOILER SHALL RUN FOR 15 MINUTES, THEN STAGE OFF.
- WHEN SNOW/ICE SENSOR DETECTS NO MOISTURE ON ITS SURFACE IT WILL CONTINUE MELTING DEMAND FOR 4 HOURS TO ENSURE SLAB IS CLEAR CONTROL WILL DROP SLAB BACK TO IDLING MODE AND MAINTAIN SLAB AT 0°C.
- WHEN OUTDOOR TEMPERATURE DROPS BELOW -15°C, CONTROLS WILL INITIATE COLD WEATHER CUT OFF (CWCO).
- CONTROL SYSTEMS WILL DUTY CYCLE PRIMARY SNOW MELT PUMPS AFTER EVERY 30 HOURS OF OPERATION TO ENSURE EVEN WEAR. PRIMARY PUMPS WILL BE EXERCISED ONCE PER WEEK DURING OFF CYCLES FOR 5 MINUTES.
- CONTROL SYSTEM WILL DUTY CYCLE BOILERS AND BOILER PUMPS AFTER EVERY 30 HOURS OF OPERATION TO ENSURE EVEN WEAR.
- CONTROL SYSTEM SHALL BE CAPABLE TO TRANSMIT INFORMATION REGARDING MELTING MODE, WWCO, CWCO, FAULT ON SENSOR, PUMP OPERATION, BOILER OPERATION AND FAULT, CONTROL SYSTEM TO OPEN PROTOCOL SYSTEM VIA MODEM.

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Issues

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Sheet  
 Title:  
**MECHANICAL CONTROL SEQUENCES II**

Drawing  
 No.  
**M-751**



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### Issues

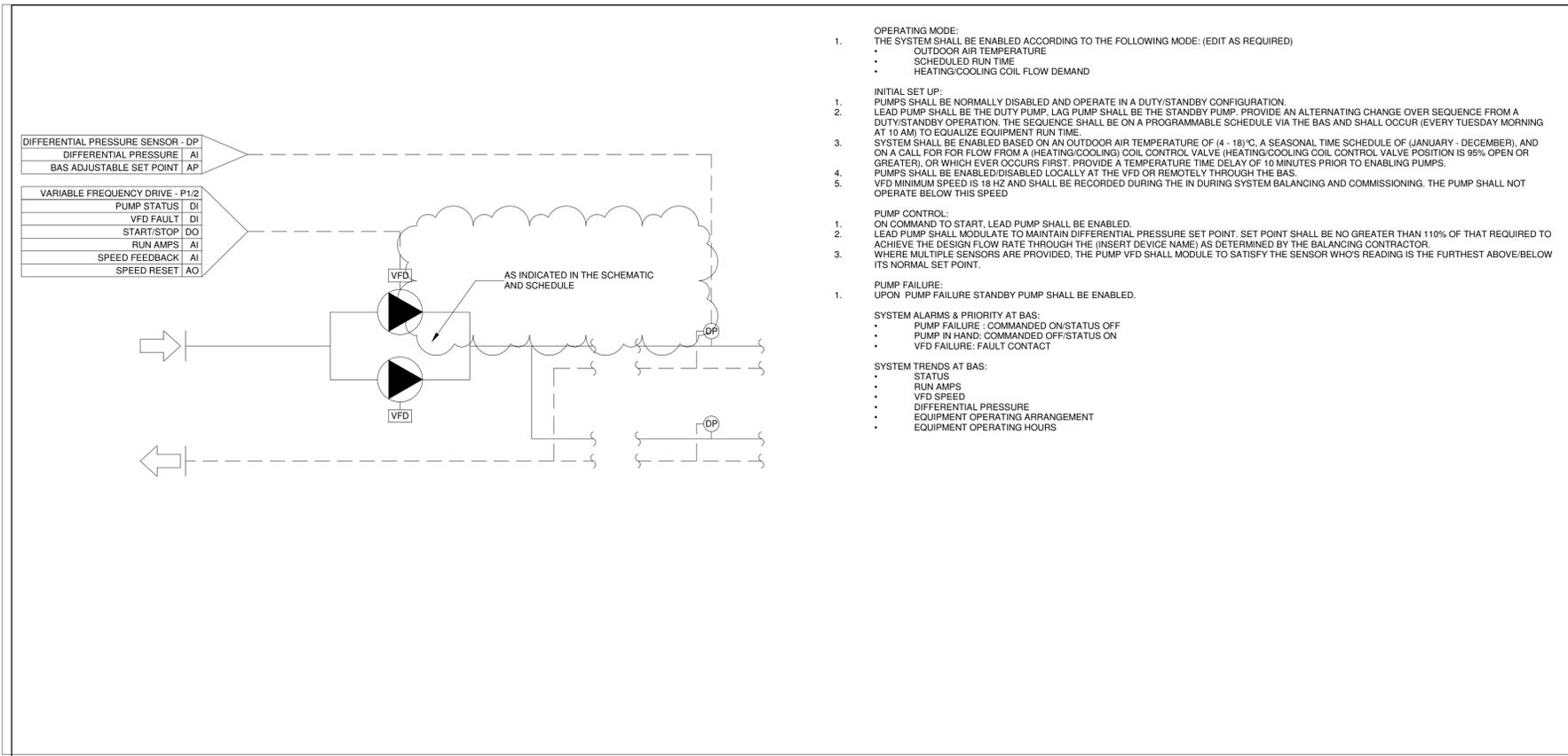
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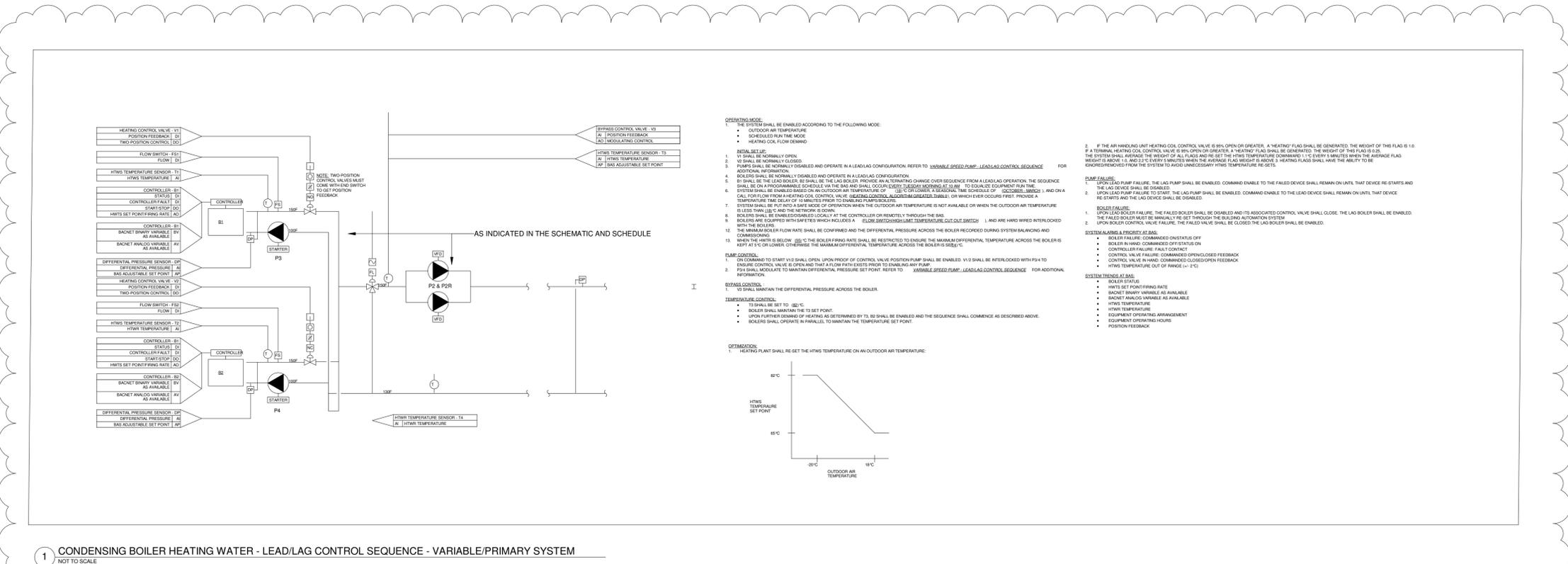
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Title:  
**MECHANICAL CONTROL  
SEQUENCES IV**

Drawing  
No.  
**M-753**

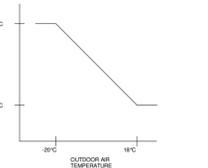


- OPERATING MODE:**  
THE SYSTEM SHALL BE ENABLED ACCORDING TO THE FOLLOWING MODE: (EDIT AS REQUIRED)
- OUTDOOR AIR TEMPERATURE
  - SCHEDULED RUN TIME
  - HEATING/COOLING COIL FLOW DEMAND
- INITIAL SET UP:**  
PUMPS SHALL BE NORMALLY DISABLED AND OPERATE IN A DUTY/STANDBY CONFIGURATION. LEAD PUMP SHALL BE THE DUTY PUMP. LAG PUMP SHALL BE THE STANDBY PUMP. PROVIDE AN ALTERNATING CHANGE OVER SEQUENCE FROM A DUTY/STANDBY OPERATION. THE SEQUENCE SHALL BE ON A PROGRAMMABLE SCHEDULE VIA THE BAS AND SHALL OCCUR (EVERY TUESDAY MORNING AT 10 AM) TO EQUALIZE EQUIPMENT RUN TIME.
- SYSTEM SHALL BE ENABLED BASED ON AN OUTDOOR AIR TEMPERATURE OF (4 - 18) °C, A SEASONAL TIME SCHEDULE OF (JANUARY - DECEMBER), AND ON A CALL FOR FLOW FROM A (HEATING/COOLING) COIL CONTROL VALVE (HEATING/COOLING COIL CONTROL VALVE POSITION IS 95% OPEN OR GREATER), OR WHICH EVER OCCURS FIRST. PROVIDE A TEMPERATURE TIME DELAY OF 10 MINUTES PRIOR TO ENABLING PUMPS.**
- PUMPS SHALL BE ENABLED/DISABLED LOCALLY AT THE VFD OR REMOTELY THROUGH THE BAS.**
- VFD MINIMUM SPEED IS 18 HZ AND SHALL BE RECORDED DURING THE IN DURING SYSTEM BALANCING AND COMMISSIONING. THE PUMP SHALL NOT OPERATE BELOW THIS SPEED**
- PUMP CONTROL:**  
ON COMMAND TO START, LEAD PUMP SHALL BE ENABLED.  
LEAD PUMP SHALL MODULATE TO MAINTAIN DIFFERENTIAL PRESSURE SET POINT. SET POINT SHALL BE NO GREATER THAN 110% OF THAT REQUIRED TO ACHIEVE THE DESIGN FLOW RATE THROUGH THE (INSERT DEVICE NAME) AS DETERMINED BY THE BALANCING CONTRACTOR.  
WHERE MULTIPLE SENSORS ARE PROVIDED, THE PUMP VFD SHALL MODULE TO SATISFY THE SENSOR WHO'S READING IS THE FURTHEST ABOVE/BELOW ITS NORMAL SET POINT.
- PUMP FAILURE:**  
UPON PUMP FAILURE STANDBY PUMP SHALL BE ENABLED.
- STATUS:**
- SYSTEM ALARMS & PRIORITY AT BAS:**
- PUMP FAILURE - COMMANDED ON/STATUS OFF
  - PUMP IN HAND - COMMANDED OFF/STATUS ON
  - VFD FAILURE: FAULT CONTACT
- SYSTEM TRENDS AT BAS:**
- STATUS
  - RUN AMPS
  - VFD SPEED
  - DIFFERENTIAL PRESSURE
  - EQUIPMENT OPERATING ARRANGEMENT
  - EQUIPMENT OPERATING HOURS

### 1 VARIABLE SPEED PUMP - DUTY/STANDBY CONTROL SEQUENCE SCALE:N.T.S.



- OPERATING MODE:**  
THE SYSTEM SHALL BE ENABLED ACCORDING TO THE FOLLOWING MODE:
- OUTDOOR AIR TEMPERATURE
  - SCHEDULED RUN TIME MODE
  - HEATING COIL FLOW DEMAND
- INITIAL SET UP:**  
V1 SHALL BE NORMALLY OPEN  
V2 SHALL BE NORMALLY CLOSED
- PUMPS SHALL BE NORMALLY DISABLED AND OPERATE IN A LEAD/LAG CONFIGURATION. REFER TO VARIABLE SPEED PUMP - LEAD/LAG CONTROL SEQUENCE FOR ADDITIONAL INFORMATION.**
- B1 SHALL BE THE LEAD BOILER. B2 SHALL BE THE LAG BOILER. PROVIDE AN ALTERNATING CHANGE OVER SEQUENCE FROM A LEAD/LAG OPERATION. THE SEQUENCE SHALL BE ON A PROGRAMMABLE SCHEDULE VIA THE BAS AND SHALL OCCUR (EVERY TUESDAY MORNING AT 10 AM) TO EQUALIZE EQUIPMENT RUN TIME. SYSTEM SHALL BE ENABLED BASED ON AN OUTDOOR AIR TEMPERATURE OF (4 - 18) °C (LOWER A SEASONAL TIME SCHEDULE OF (JANUARY - DECEMBER), AND ON A CALL FOR FLOW FROM A (HEATING/COOLING) COIL CONTROL VALVE (HEATING/COOLING COIL CONTROL VALVE POSITION IS 95% OPEN OR GREATER), OR WHICH EVER OCCURS FIRST. PROVIDE A TEMPERATURE TIME DELAY OF 10 MINUTES PRIOR TO ENABLING PUMPS/BOILERS.**
- BOILERS SHALL BE ENABLED/DISABLED LOCALLY AT THE CONTROLLER OR REMOTELY THROUGH THE BAS.**
- BOILERS SHALL BE ENABLED/DISABLED LOCALLY AT THE CONTROLLER OR REMOTELY THROUGH THE BAS.**
- BOILERS ARE EQUIPPED WITH SAFETY WHICH INCLUDES A (LOW WATER LIMIT) (TEMPERATURE SAFETY LIMIT) (NO AND HAND WHEED) INTERLOCKED WITH THE BOILERS**
- THE MINIMUM FLOW RATE SHALL BE CONFIRMED AND THE DIFFERENTIAL PRESSURE ACROSS THE BOILER RECORDED DURING SYSTEM BALANCING AND COMMISSIONING**
- WHERE THE WATER IS BELOW (55 °C) THE BOILER FIRING RATE SHALL BE RESTRICTED TO ENSURE THE MAXIMUM DIFFERENTIAL TEMPERATURE ACROSS THE BOILER IS KEPT AT 1 °C OR LOWER. OTHERWISE THE MAXIMUM DIFFERENTIAL TEMPERATURE ACROSS THE BOILER IS (5) °C.**
- TEMPERATURE CONTROL:**  
ON COMMAND TO START V13 SHALL OPEN. UPON PROOF OF CONTROL VALVE POSITION PUMP SHALL BE ENABLED. V13 SHALL BE INTERLOCKED WITH P34 TO ENSURE CONTROL VALVE IS OPEN AND THAT A FLOW PATH EXISTS PRIOR TO ENABLING ANY PUMP.  
P34 SHALL MODULATE TO MAINTAIN DIFFERENTIAL PRESSURE SET POINT. REFER TO VARIABLE SPEED PUMP - LEAD/LAG CONTROL SEQUENCE FOR ADDITIONAL INFORMATION.
- STATUS:**  
V13 SHALL MAINTAIN THE DIFFERENTIAL PRESSURE ACROSS THE BOILER.
- TEMPERATURE CONTROL:**
- T3 SHALL BE SET TO (82) °C
  - BOILER SHALL MAINTAIN THE T3 SET POINT
  - UPON FURTHER DEMAND OF HEATING AS DETERMINED BY T3, B2 SHALL BE ENABLED AND THE SEQUENCE SHALL COMMENCE AS DESCRIBED ABOVE.
  - BOILERS SHALL OPERATE IN PARALLEL TO MAINTAIN THE TEMPERATURE SET POINT.
- OPTIMIZATION:**  
HEATING PLANT SHALL RE-SET THE HWTS TEMPERATURE ON AN OUTDOOR AIR TEMPERATURE:



### 1 CONDENSING BOILER HEATING WATER - LEAD/LAG CONTROL SEQUENCE - VARIABLE/PRIMARY SYSTEM NOT TO SCALE



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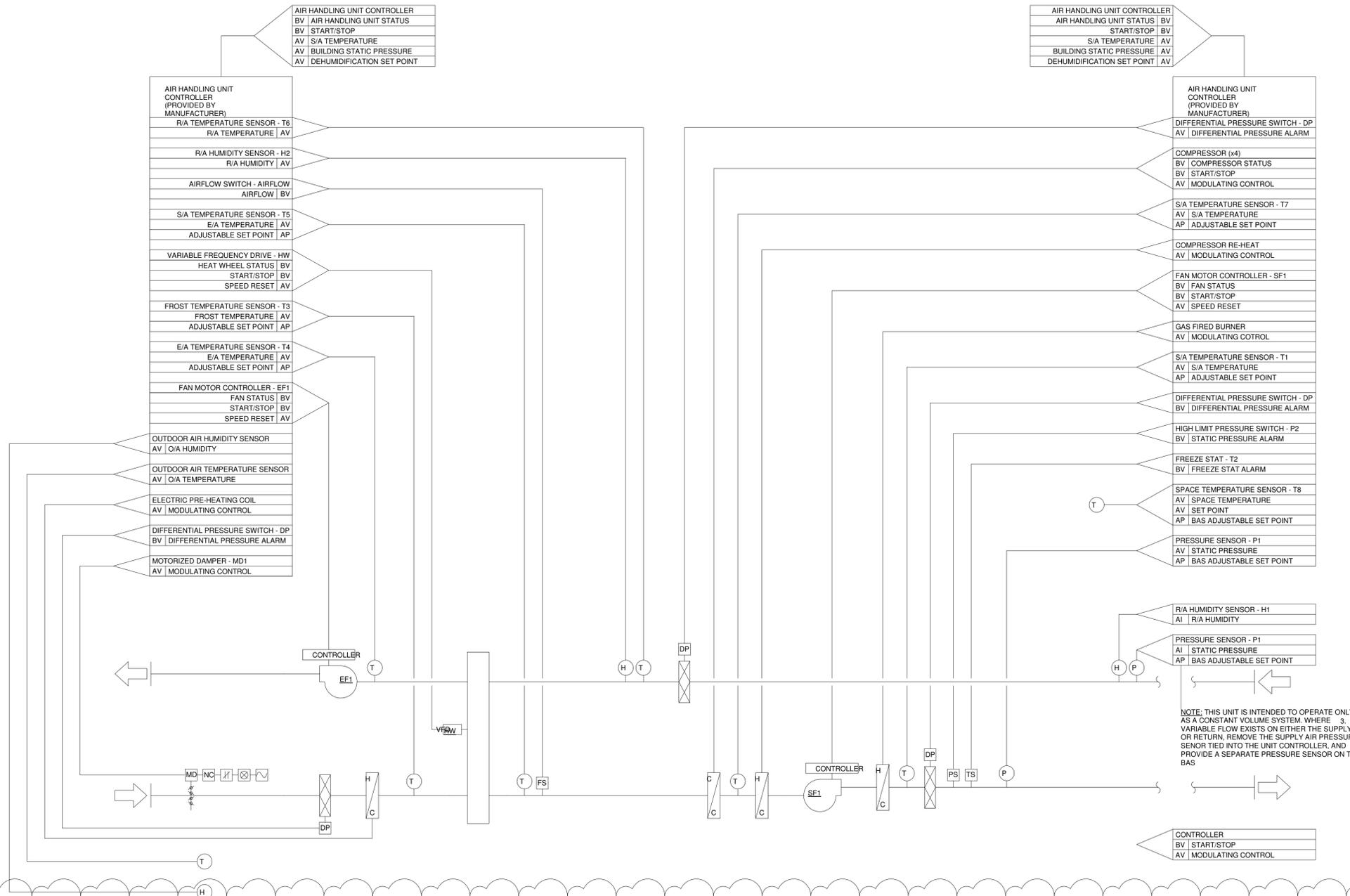
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Scale:

SYSTEM TRENDS AT BAS:  
 \* ROOF TOP UNIT STATUS  
 \* TEMPERATURE SET POINT  
 \* BUILDING STATIC PRESSURE  
 \* DEHUMIDIFICATION SET POINT

## MECHANICAL CONTROL SEQUENCES V

Sheet  
Title:  
Drawing No:  
M-754



NOTE: THIS UNIT IS INTENDED TO OPERATE ONLY AS A CONSTANT VOLUME SYSTEM. WHERE 3. VARIABLE FLOW EXISTS ON EITHER THE SUPPLY OR RETURN, REMOVE THE SUPPLY AIR PRESSURE SENSOR TIED INTO THE UNIT CONTROLLER, AND PROVIDE A SEPARATE PRESSURE SENSOR ON THE BAS

### 1 ROOF TOP UNIT - 100% OUTDOOR AIR WITH HOT GAS RE-HEAT AND HEAT WHEEL - RTU-2 (HANGAR SPACE)

NOT TO SCALE

- OPERATING MODE:**
- THE SYSTEM SHALL BE ENABLED BY THE BAS ACCORDING TO THE FOLLOWING MODE:
    - CONTROL MODE (OFF, AUTO, COOL ONLY, FAN ONLY, HEAT ONLY)
    - OCCUPANCY MODE (AUTO, TENANT, OVERRIDE, OCCUPIED, UNOCCUPIED)
    - CHANGE OVER MODE (RETURN AIR, SPACE TEMPERATURE, NETWORK SIGNAL)
    - COOLING AND HEATING DISCHARGE AIR TEMPERATURE CONTROL
    - SCHEDULING
    - BUILDING STATIC PRESSURE CONTROL
- INITIAL SET UP:**
- THE SYSTEM SHALL BE A 100% OUTDOOR AIR SYSTEM.
  - THE ROOF TOP UNIT SHALL BE SUPPLIED WITH A BACNET/MSTP CONTROLLER CAPABLE OF INTERFACING WITH THE BAS.
  - THE ROOF TOP UNIT SHALL BE CAPABLE OF PROVIDING THE FOLLOWING FUNCTIONS:
    - MECHANICAL HEATING VIA GAS FIRED HEATING COIL AND BURNER.
    - MECHANICAL HOT GAS RECOVERY VIA COMPRESSOR RE-HEAT COIL.
    - ELECTRIC PRE-HEATING FOR FROST CONTROL. MODE OF OPERATION RE-HEAT SHALL BE AVAILABLE WHEN THERE IS A
  - THE ROOF TOP UNIT SHALL BE PROVIDED WITH A MANUFACTURER SUPPLIED SPACE TEMPERATURE SENSOR (T8) CAPABLE OF MAINTAINING THE SPACE TEMPERATURE SET POINT. THE SPACE TEMPERATURE SENSOR (T1) SHALL INCLUDE THE FOLLOWING:
    - DESCRIBE SPECIFIC FEATURES ABOUT THE SPACE TEMPERATURE SENSOR
  - MD1 SHALL BE NORMALLY CLOSED.
  - HEAT WHEEL SHALL BE DISABLED.
  - ELECTRIC PRE-HEATING COIL SHALL BE DISABLED.
  - GAS FIRED BURNER SHALL BE DISABLED.
  - COMPRESSOR SHALL BE DISABLED.
  - GAS FIRED HUMIDIFIER SHALL BE DISABLED.
  - FANS SHALL OPERATE AT A FIELD DETERMINED AIRFLOW & STATIC PRESSURE AS PER THE VALUES INDICATED ON THE DRAWINGS DURING SYSTEM BALANCING AND COMMISSIONING.
  - AFTER THE SYSTEM BALANCING AND COMMISSIONING IS COMPLETE, OBTAIN THE AIRFLOW DIFFERENTIAL BETWEEN THE SUPPLY FAN AND THE EXHAUST FAN.
  - P1 SHALL BE LOCATED APPROXIMATELY TWO-THIRDS DOWNSTREAM/UPSTREAM OF THE FAN. FINAL LOCATION SHALL BE COORDINATED WITH THE BALANCING
  - FANS SHALL BE ENABLED/DISABLED LOCALLY AT THE UNIT OR REMOTELY THROUGH THE BAS.
- FAN CONTROL:**
- ON COMMAND TO START MD1 SHALL OPEN. UPON PROOF OF MOTORIZED DAMPER POSITION FANS SHALL BE ENABLED.
  - FAN SHALL MODULATE TO MAINTAIN THE STATIC PRESSURE SET POINT DETERMINED BY P1.
  - EXHAUST FAN SHALL RUN AT CONSTANT SPEED.
- ECONOMIZER (FREE COOLING) CONTROL:**
- N/A
- DEHUMIDIFICATION IS ENABLED WHEN:  
 O/A DEWPOINT IS GREATER THAN SET POINT.  
 O/A DEWPOINT SHALL BE SET TO (15°C DRY BULB, 15°C WET BULB)

- HEAT WHEEL CONTROL:**
- HEAT WHEEL IS ENABLED WHEN:
    - ROOF TOP UNIT IS IN OPERATION AND ECONOMIZER (FREE COOLING) CONTROL IS NOT REQUIRED OR AVAILABLE.
- FROST PREVENTION CONTROL SEQUENCE:**
- FIRST STAGE.
    - T3 SHALL BE SET TO (15°C DRY BULB).
    - ELECTRIC PRE-HEATING COIL SHALL BE ENABLED TO MAINTAIN THE T3 SET POINT.
  - SECOND STAGE OF FROST PROTECTION.
    - N/A
- COMPRESSOR RE-HEAT CONTROL SEQUENCE:**
- COMPRESSOR RE-HEAT IS ENABLED WHEN:
    - DEHUMIDIFICATION SEQUENCE IS REQUIRED AND AVAILABLE.
- TEMPERATURE CONTROL:**
- THE AIR HANDLING SYSTEM SHALL MAINTAIN THE FOLLOWING S/A TEMPERATURE SET POINTS:
    - SUMMER COOLING MODE: (18°C DRY BULB). O/A TEMPERATURE IS GREATER THAN (20°C DRY BULB).
    - WINTER HEATING MODE: (24°C DRY BULB). O/A TEMPERATURE IS LESS THAN (18°C DRY BULB)
  - O/A TEMPERATURE IS GREATER THAN (20°C DRY BULB).
    - T1 SHALL BE SET TO (18°C DRY BULB).
    - ELECTRIC PRE-HEATING COIL SHALL BE DISABLED.
    - GAS FIRED BURNER SHALL BE DISABLED.
    - GAS FIRED HUMIDIFIER SHALL BE DISABLED.
    - HEAT WHEEL CONTROL SHALL BE ENABLED, AND THE HEAT WHEEL SHALL MODULATE ITS SPEED TO MAINTAIN THE T1 SET POINT.
    - IF THE T1 SET POINT IS NOT SATISFIED AND ADDITIONAL COOLING IS REQUIRED, COMPRESSORS SHALL BE ENABLED TO MAINTAIN THE T1 SET POINT.
    - COMPRESSORS SHALL BE STAGED ON/OFF AS REQUIRED.
    - COMPRESSOR RE-HEAT SHALL BE ENABLED TO MAINTAIN THE T1 SET POINT.
- O/A TEMPERATURE IS BETWEEN (12°C DRY BULB & 20°C DRY BULB).  
 T1 SHALL BE SET TO (20°C DRY BULB).  
 ELECTRIC PRE-HEATING COIL SHALL BE DISABLED.  
 GAS FIRED BURNER SHALL BE DISABLED.  
 COMPRESSOR SHALL BE DISABLED.  
 GAS FIRED HUMIDIFIER SHALL BE DISABLED.  
 HEAT WHEEL CONTROL SHALL BE ENABLED, AND THE HEAT WHEEL SHALL MODULATE ITS SPEED TO MAINTAIN THE T1 SET POINT IF AVAILABLE.  
 IF THE T1 SET POINT IS NOT SATISFIED AND ADDITIONAL COOLING IS REQUIRED, COMPRESSORS SHALL BE ENABLED TO MAINTAIN THE T1 SET POINT.  
 COMPRESSORS SHALL BE STAGED ON/OFF AS REQUIRED.  
 COMPRESSOR RE-HEAT SHALL BE ENABLED TO MAINTAIN THE T1 SET POINT.

- O/A TEMPERATURE LESS THAN (18°C DRY BULB).
    - T1 SHALL BE SET TO (24°C DRY BULB).
    - COMPRESSOR SHALL BE DISABLED.
    - HEAT WHEEL CONTROL SHALL BE ENABLED, AND THE HEAT WHEEL SHALL MODULATE ITS SPEED TO MAINTAIN THE T1 SET POINT. SET POINT CAN BE OVERRIDDEN BY HEAT WHEEL FROST PROTECTION CONTROL SEQUENCE.
    - IF THE T1 SET POINT IS NOT SATISFIED AND ADDITIONAL HEATING IS REQUIRED, THE GAS FIRED BURNER SHALL BE ENABLED TO MAINTAIN THE T1 SET POINT.
- HUMIDITY CONTROL:**
- H1 SHALL BE SET TO (30% R.H.).
  - GAS FIRED HUMIDIFIER SHALL BE ENABLED TO MAINTAIN H1 AT/BELOW SET POINT.
- FIRE ALARM MODE:**
- FANS SHALL (SHUT DOWN) DURING FIRE ALARM.
- SMOKE VENTING MODE:**  
N/A
- 100% RE-CIRCULATION MODE:**  
1. N/A
- FAN FAILURE:**
- UPON SUPPLY FAN OR EXHAUST FAN FAILURE THE FOLLOWING SHALL OCCUR:
    - REMAINING OPERATIONAL FAN SHALL BE DISABLED.
    - MD1 SHALL BE CLOSED.
- SAFETY SHUT DOWN:**
- HIGH LIMIT DUCT STATIC PRESSURE SENSOR P2 AT THE SUPPLY AIR MAIN SHALL BE INTERLOCKED WITH THE SUPPLY FAN AND THE EXHAUST FAN. FANS WILL BE DISABLED WHEN P2 EXCEEDS 3 INWC.
  - FREEZE STAT T2 SHALL BE INTERLOCKED WITH THE SUPPLY AND EXHAUST FAN AND DISABLE THE FANS WHEN T2 DROPS BELOW 4°C. FANS MUST BE MANUALLY RESET PRIOR TO RESTARTING. CLOSE ALL DAMPERS.
- HEAT WHEEL FAILURE:**
- N/A
- OPTIMIZATION:**  
1. N/A
- SYSTEM ALARMS & PRIORITY AT BAS:**  
 CONTRACTOR AND THE CONTROLS CONTRACTOR.  
 \* FAN FAILURE : COMMANDED ON/STATUS OFF  
 \* HIGH SUPPLY AIR TEMPERATURE: T1 IS GREATER THAN 20°C FOR MORE THAN 30 MINUTES IN SUMMER COOLING MODE  
 \* LOW SUPPLY AIR TEMPERATURE: T1 IS LOWER THAN 22°C FOR MORE THAN 30 MINUTES IN WINTER HEATING MODE  
 \* FREEZE STAT: T2 IS EQUAL TO OR LOWER THAN 4°C  
 \* HIGH RETURN AIR TEMPERATURE: T3 IS GREATER THAN 26°F FOR MORE THAN 30 MINUTES IN SUMMER COOLING MODE  
 \* LOW RETURN AIR TEMPERATURE: T3 IS LOWER THAN 18°C FOR MORE THAN 30 MINUTES IN WINTER HEATING MODE  
 \* HIGH RETURN AIR HUMIDITY: H1 IS GREATER THAN 10% R.H. ABOVE DEHUMIDIFICATION MODE SET POINT FOR MORE THAN 30 MINUTES  
 \* LOW RETURN AIR HUMIDITY: H1 IS LOWER THAN 5% R.H. BELOW DEHUMIDIFICATION MODE SET POINT FOR MORE THAN 30 MINUTES

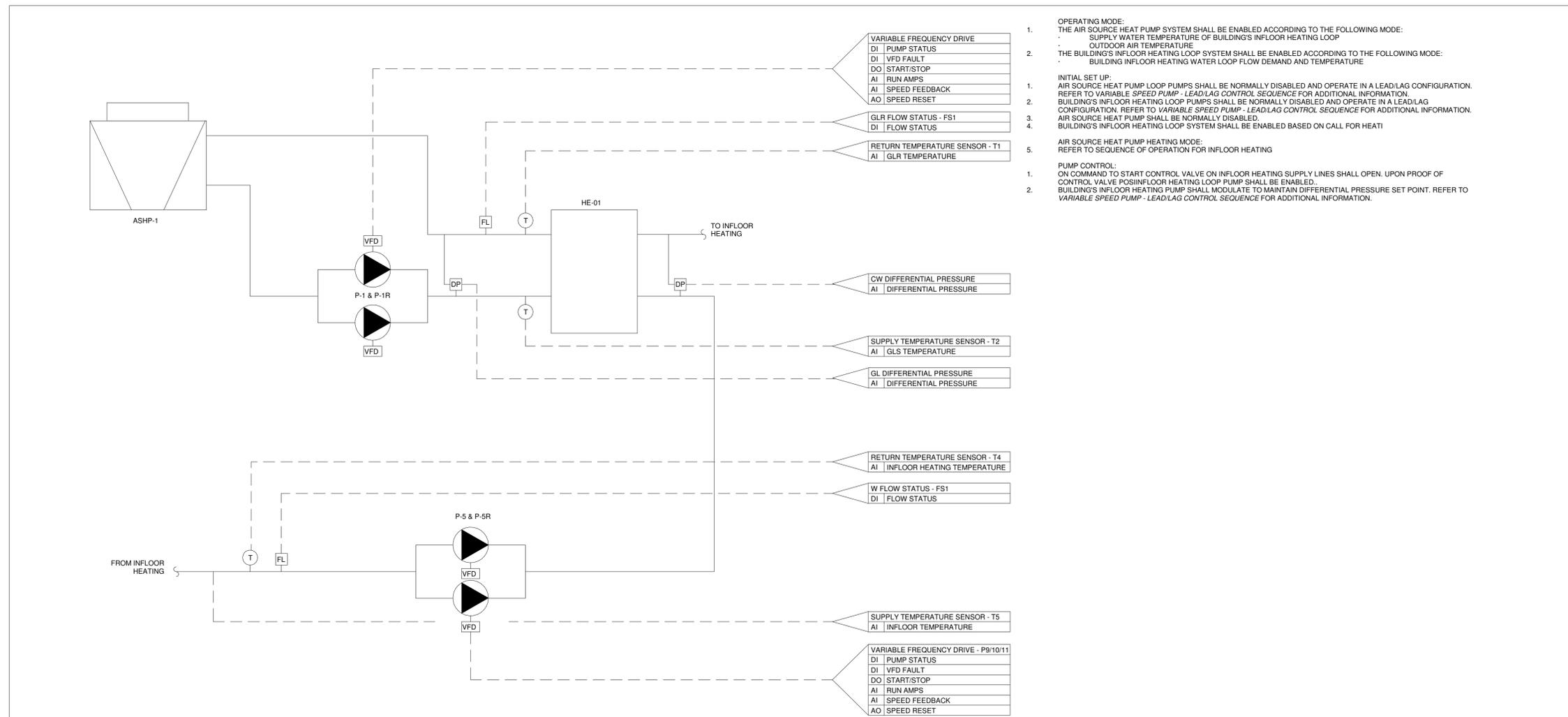


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## YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT  
BOULEVARD  
TOWN OF EAST GWILLIMBURY

Key  
Plan



1 AIR SOURCE HEAT PUMP LOOP CONTROL SEQUENCE DIAGRAM(HANGAR)  
SCALE: N.T.S.

NO.	ISSUED FOR ADDENDUM #	ISSUED	DATE
1	ISSUED FOR ADDENDUM #	ISSUED	2024-09-30

**Issues**

All measurements are to be checked and verified on site by the contractor before proceeding with work

Do not scale drawings  
 Drawn by: Author  
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 Project No: TT-24-005  
 Scale: N.T.S.

Sheet  
 Title:  
**MECHANICAL CONTROL SEQUENCES VI**

Drawing  
 No.  
**M-755**

## YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT  
BOULEVARD  
TOWN OF EAST GWILLIMBURY

Key  
Plan

NO.	ISSUED	DATE
3	ISSUED FOR ADDENDUM 6	2024-09-30
2	ISSUED FOR TENDER	2024-09-09
1	ISSUED FOR BUILDING PERMIT	2024-07-31

### Issues

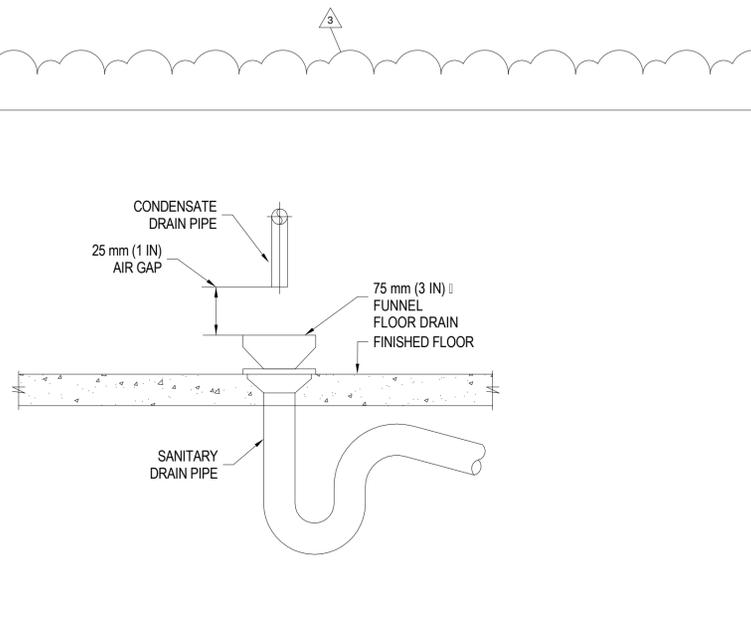
All measurements are to be checked and verified on site by the contractor before proceeding with work

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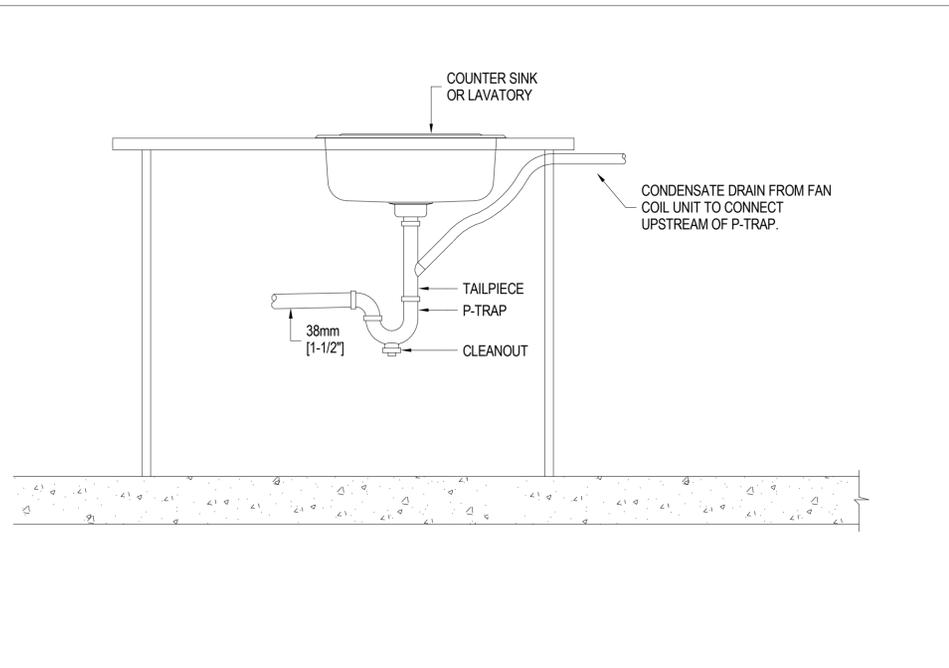
Drawn by: Fizzah Khan/ Iulian Turiga  
Checked by: Ali Nakhaei-Zadeh  
Original Issue Date: 2024-07-31  
Project No: TT-24-005  
Scale: 1:1

Sheet  
Title:  
**MECHANICAL TYPICAL  
DETAILS VIII**

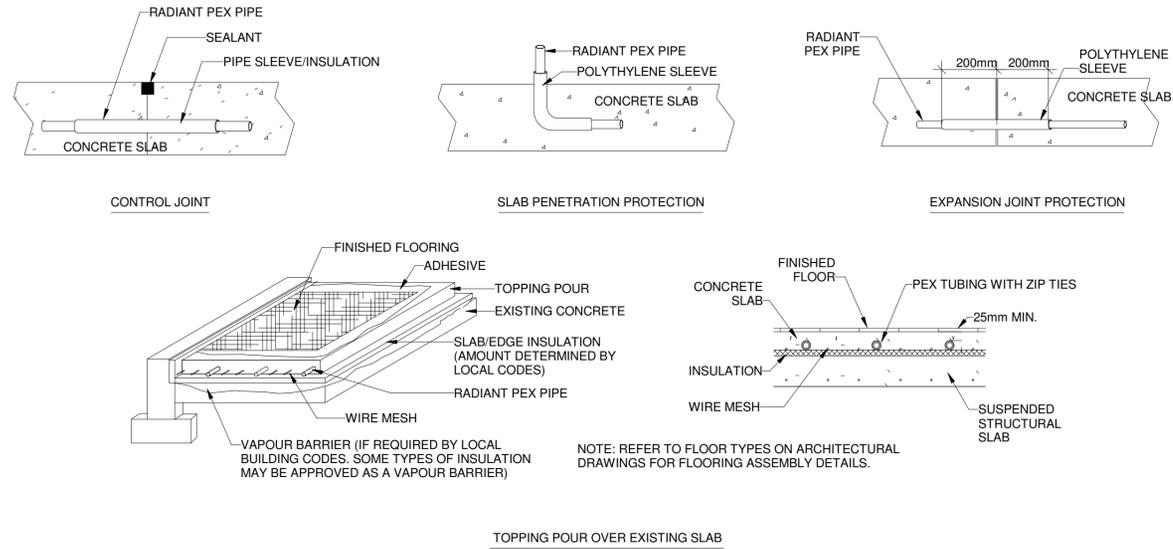
Drawing  
No.  
**M-807**



3 **CONDENSATE DRAIN TO FUNNEL FLOOR DRAIN**  
SCALE: 1 : 1



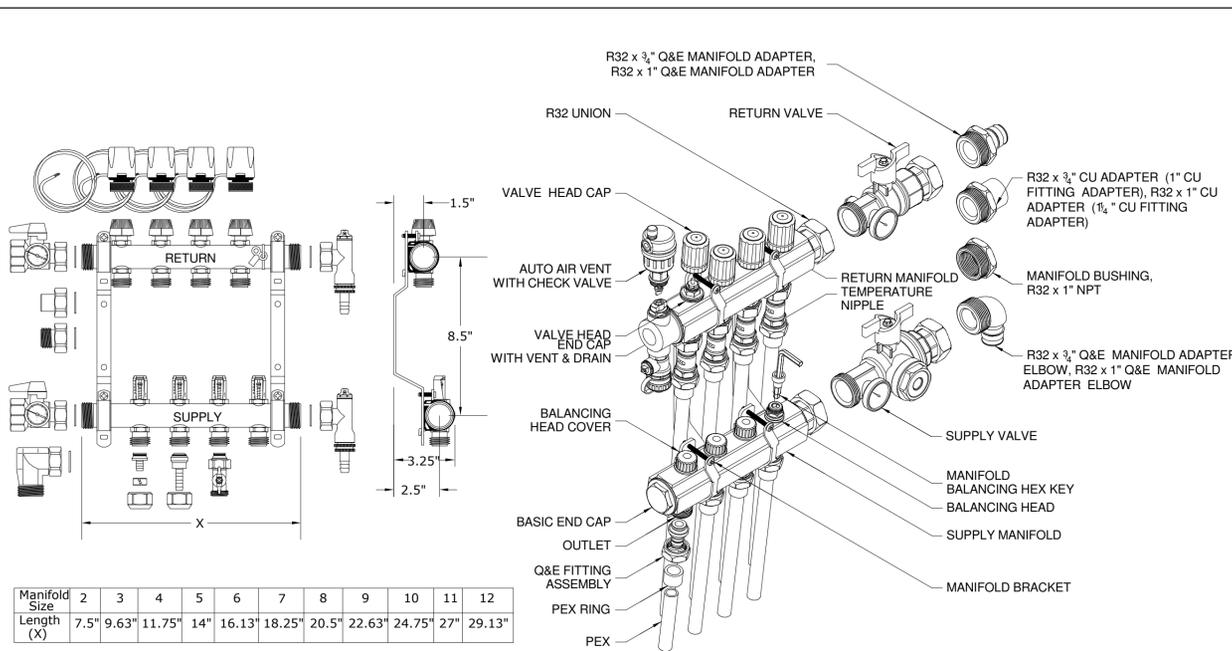
4 **CONDENSATE DRAIN CONNECTION TO SANITARY**  
SCALE: 1 : 1



### OBSERVACIONES / NOTES:

- PIPE TO BE 1/2" PEX WITH OXYGEN BARRIER
- MANIFOLDS TO BE STAINLESS STEEL UNITS COMPLETE WITH SUPPLY & RETURN TRUNK ISOLATION VALVES & VENT PURGE ASSEMBLY
- LOOP LENGTHS ON PLANS ARE APPROXIMATION ONLY. ACTUAL LOOP LENGTHS TO BE VERIFIED ON SITE BY INSTALLING CONTRACTOR.
- RADIANT TUBING TO BE SPACED AT 225 MM ON CENTERS, EXCEPT WHERE NOTED ON THE LOOP SCHEDULE OR ON THE PLANS, AND NOT TO BE PLACED 150 MM TO 300 MM FROM EXTERIOR WALLS.
- AVERAGE FLOOR SURFACE TEMPERATURE SHOULD NOT EXCEED 31°C. THIS WILL LIMIT THE MAXIMUM UPWARD OUTPUT TO 120 W/M² AT 20°C. IF THE REQUIRED SURFACE TEMPERATURE EXCEEDS 31°C IT WILL BE NECESSARY TO REDUCE THE HEAT LOSS OR ADD SUPPLEMENTAL HEAT.
- THE MINIMUM CONCRETE COVER SHALL BE 25MM ABOVE THE TOP OF THE PEX/ONIX TUBING.
- TUBING SHALL BE SLEEVED AT ALL CONTROL JOINT CROSSINGS (SEE ILLUSTRATIONS).
- TUBING SHALL BE FASTENED EVERY 900 MM IN SLAB & EVERY 600 MM IN TOPPING POUR APPLICATIONS USING THE APPROPRIATE FASTENERS.
- KEEP TUBING A MINIMUM OF 225 MM AWAY FROM ALL CLOSET FLANGES AND DRAIN TRAPS.
- A MINIMUM R-5 INSULATION IS RECOMMENDED UNDER THE PERIMETER OF RADIANT HEATED SLAB.
- THE SYSTEM SHALL BE PRESSURE TESTED PRIOR TO & DURING THE CONCRETE POUR TO AT LEAST TWO TIMES THE OPERATING PRESSURE OR 414 KPA WITH WATER OR AIR. PRESSURE TEST SHALL REMAIN ON DURING THE FINAL FLOOR INSTALLATION.
- IF THE JOB SITE IS SUBJECT TO FREEZING DURING CONSTRUCTION A PROPYLENE GLYCOL/WATER SOLUTION, OF THE APPROPRIATE MIXTURE FOR THE LOCATION, SHALL BE USED TO PREVENT FREEZING.
- UNLESS OTHERWISE INDICATED, PRESSURE DROPS SHOWN ON LOOP SCHEDULE INCLUDE PRESSURE DROPS FOR MANIFOLD & TUBING ONLY.

2 **IN-FLOOR HEATING INSTALLATION DETAILS**  
SCALE:N.T.S.



1 **IN-FLOOR HEATING SYSTEM MANIFOLD DETAIL**  
SCALE:N.T.S.



YORK REGIONAL POLICE  
HELICOPTER HANGAR

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Table with 3 columns: NO., ISSUED, DATE. Contains revision history entries.

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Issues

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Checked by: Ali Nakhaei-Zadeh  
Original Issue Date: 2024-07-31  
Project No: TT-24-005  
Scale:

Sheet  
Title:

MECHANICAL  
SCHEDULES

Drawing  
No. M-900

ROOFTOP UNITS - DOAS (DEDICATED OUTDOOR AIR SUPPLY)

Table with columns: TAG, MANUFACTURER, MODEL, LOCATION, SERVICE, AIRFLOW (TOTAL, OUTDOOR), OUTDOOR AIR %, FANS (TYPE, SERIES, FAN SPEED), FILTERS, SOUND POWER (HEATING COIL, COOLING COIL, 63-4000 HZ), ELECTRICAL (FLA, MCA, MOCP, V/Ph/Hz), WEIGHT (kg), NOTES.

VRF FAN COIL UNIT

Table with columns: TAG, ASSOCIATED CONDENSER, MANUFACTURER, MODEL, TYPE, SERVICE, REFRIGERANT, AIRFLOW (LOW, MEDIUM, HIGH SPEED), COOLING (TOTAL CAPACITY, SENSIBLE CAPACITY, SET POINT, S.A.T.), HEATING (CAPACITY, SET POINT, S.A.T.), SOUND (DBA), ELECTRICAL (MCA, MOCP, V/Ph/Hz), WEIGHT (kg), NOTES.

EXHAUST FANS

Table with columns: TAG, QUANTITY, SERVICE, AIRFLOW (L/s), SOUND POWER (63-4000 HZ), MOTOR CHARACTERISTICS (E.S.P., FAN SPEED, VFD, BHP, FLA, V/PH/HZ), WEIGHT (KG), NOTES.

TANKLESS ELECTRIC WATER HEATER

Table with columns: TAG, MANUFACTURER, MODEL, SERVICE, FLUID (OUTPUT CAPACITY, TYPE, FLOW RATE, TEMP. RISE), ELECTRICAL (AMPS, MCA, MOCP, V/Ph/Hz), WEIGHT (kg), REMARKS.

BOILER

Table with columns: TAG, MANUFACTURER, MODEL, LOCATION, GAS (OUTPUT CAPACITY, BOILER EFF, MIN GAS PRES, MAX GAS PRES), FLUID (TYPE, FLOW RATE, E.F.T, L.F.T), ELECTRICAL (AMP, MCA, MOCP, V/Ph/Hz), WEIGHT (kg), REMARKS.

ELECTRIC UNIT HEATER

Table with columns: TAG, MANUFACTURER, MODEL, LOCATION, MOUNTING CONFIGURATION, HEATING CAPACITY, AIRFLOW, MOTOR KW, FAN RPM, ELECTRICAL (FLA, MOCP, V/Ph/Hz), WEIGHT (kg), NOTES.

SNOW MELTING SYSTEM

Table with columns: TAG, AREA (M2), HEATING LOAD (KW), FLOW (L/S), HEAD LOSS (M), FLUID TYPE, DELTA T, LOOP TYPE, SPACING.

IN FLOOR HEATING

Table with columns: TAG, AREA (M2), TOTAL LOAD (KW), FLOW (L/S), HEAD LOSS (M), FLUID TYPE, DELTA T, LOOP TYPE/SIZE, SPACING.



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TOWN OF EAST GWILLIMBURY

Key  
Plan

PUMPS											
TAG	MANUFACTURER	MODEL	DISCHARGE SIZE	VFD	FLOW (GPM)	HEAD (FT)	EFF. (%)	FLUID	POWER (HP)	SPEED @ 100% (RPM)	V/PH/HZ
P-1	ARMSTRONG	SERIES 4380	2 IN.	YES	20	140	18.3	40% PG	10	4209	575/3/60
P-1R	ARMSTRONG	SERIES 4380	2 IN.	YES	20	140	18.3	40% PG	10	4209	575/3/60
P-2	ARMSTRONG	V2A9A-RC	2 IN.	YES	170	180	60.4	40% PG	20	3600	575/3/60
P-2R	ARMSTRONG	V2A9A-RC	2 IN.	YES	170	180	60.4	40% PG	20	3600	575/3/60
P-3	ARMSTRONG	V2B7A-CC	4 IN.	YES	130	45	70.2	40% PG	3	1800	575/3/60
P-4	ARMSTRONG	V2B7A-CC	4 IN.	YES	130	45	70.2	40% PG	3	1800	575/3/60
P-5	ARMSTRONG	SERIES 4380	2 IN.	YES	20	90	41.4	WATER	2	3326	575/3/60
P-5R	ARMSTRONG	SERIES 4380	2 IN.	YES	20	90	41.4	WATER	2	3326	575/3/60

AIR SOURCE HEAT PUMP															
TAG	MODEL	REFRIGERANT	OUTDOOR AMB. TEMP (F)	HEAT CAPACITY (KW)	FLUID TYPE	FLOW RATE (L/S)	R. TEMP (C)	S. TEMP (C)	P. DROP (PSI)	POWER (KW)	MCA	FLA	MOCP	V/PH/HZ	
ASHP-1	ASB-25	R-507	-10	48.7	40% PG	1.1	38	50	0.3	23	87.6	73.3	125	575/3/60	

HEAT EXCHANGER													
TAG	LOCATION	MODEL	HEAT EXCH. (KBTU/H)	HOT SIDE				COLD SIDE				PLATE MATERIAL	
				FLOW RATE (L/S)	INLET TEMP (C)	OUTLET TEMP (C)	P. DROP (PSI)	FLOW RATE (L/S)	INLET TEMP (C)	OUTLET TEMP (C)	P. DROP (PSI)		
HEX-1	MECH RM	AQ2T-BFG	233.9	1.6	50	38	4.7	1.5	35	46	3.7	ALLOY 340/0.5 MM	

CONDENSERS													
TAG	LOCATION	MODEL	MANUFACTURER	COMB RATIO	AIRFLOW RATE (L/S)	COOLING		HEATING		REFRIGERANT	MCA	V/PH/HZ	WEIGHT (KG)
						AMB. TEMP (C)	CAPACITY (KW)	AMB. TEMP (C)	CAPACITY (KW)				
ODU-1	ROOF	RXYQ144AATJB	DAIKIN	92.6	-	35	40	-20	29.4	R-410A	47.8	575/3/60	350

GRILLES AND DIFFUSERS										
TAG	BASIS OF DESIGN		TYPE	VOLUME CONTROL	DIMENSIONS			NECK DIAMETER (mm)	MATERIAL	NOTES
	MANUFACTURER	MODEL			LENGTH (mm)	WIDTH (mm)	DIAMETER (mm)			
A	EH PRICE	SPD	SQUARE PLAQUE DIFFUSER	YES	600	600		REFER TO FLOOR PLANS	STEEL	
A1	EH PRICE	SPD	SQUARE PLAQUE DIFFUSER	YES	300	300		REFER TO FLOOR PLANS	STEEL	
B1	EH PRICE	80 DAL	EGG CRATE GRILLE	YES	300	300			ALUMINUM	
B2	EH PRICE	80 DAL	EGG CRATE GRILLE	YES	600	300			ALUMINUM	
D	EH PRICE	620 DAL	LOUVERED FACE SUPPLY GRILLE	YES	300	300			ALUMINUM	
D1	EH PRICE	620 DAL	LOUVERED FACE SUPPLY GRILLE	YES	600	300			ALUMINUM	
E	EH PRICE	630 DAL	LOUVERED FACE RETURN GRILLE	YES	300	300			ALUMINUM	
E3	EH PRICE	630 DAL	LOUVERED FACE RETURN GRILLE	YES	800	750			ALUMINUM	
F	NAILOR	RPLP	ROUND PUNKAH LOUVERJET NOZZLE		305	213	254			
H	EH PRICE	RECG	EGG CRATE EXHAUST GRILLE				200			

EXPANSION TANKS							
TAG	LOCATION	SERVICE	BASIS OF DESIGN	VOLUME (L)	TANK ACCEPTANCE (L)	FILL PRESSURE (kPa)	REMARKS
			MANUFACTURER	MODEL			
ET-1	MECHANICAL ROOM	GLYCOL SYSTEM					
ET-2	MECHANICAL ROOM	INFLOOR HEATING					

OUTDOOR CONDENSERS												
TAG	LOCATION	MODEL	MANUFACTURER	AIRFLOW RATE (L/S)	INDOOR CONDITIONS TEMP. (C)		OUTDOOR CONDITIONS TEMP. (C)		REFRIGERANT	MCA	V/PH/HZ	WEIGHT (KG)
ODU-2	HANGAR	FTX24WVJU9...	DAIKIN	1141	26.7 DB/19.4 WB	21.1 DB / 15.6 WB	35 DB/24 WB	8.3DB/6.1 WB	R-410A	18.8	230/1/60	60

BUFFER TANK								
TAG	MODEL	PART NUMBER	DESCRIPTION	TANK VOLUME (L)	MAX. DESIGN TEMP. (F)	MAX DESIGN PRES. (PSIG)	WEIGHT (KG)	REMARKS
BT-1	HBT-120	55621200	2-PORT HOT WATER BUFFER TANK	454.2	450	125	0.3	TANK SHOULD BE INSULATED

ELECTRIC BASEBOARD HEATER							
TAG	MANUFACTURER	PART NUMBER	DESCRIPTION	POWER (W)	V/PH/HZ	WEIGHT (KG)	REMARKS
EBBH-1	OUELLET	OPR0500	HEAVY DUTY STEEL DRAFT BARRIER	500	240/1/60	6.4	

PLUMBING FIXTURES SCHEDULE									
UNIT TAG	DESCRIPTION	MANUFACTURER	MODEL	WASTE	VENT	DCW	DHW	TRAP	REMARKS
WC-1	Atwell Millenium Flowise Elongated Flushometer Toilet	AMERICAN STANDARD	3353.101	100	40	25	-	INT	
L-1	LAV. MEZZO SEMI COUNTERTOP (UNIVERSAL WASHROOM)	AMERICAN STANDARD	9960.001	40	32	12	12	40	
L-2	LAVATORY (LOOKER ROOM)	INTEGRAL SOLID POLYMER		40	32	12	12	40	SEE DWG# 8/A-201 FOR DETAILS
LS	LAUNDRY SINK (PAINT ROOM)	WHITEHAUS COLLECTION	WHLSD84020-C	40	32	12	12	40	
KS	KITCHEN SINK	KINDRED	QSL2020/8/3	40	32	12	12	40	
JS	JANITOR'S MOP SINK	STERN-WILLIAMS CO	SB902T35T40BP	75	40	12	12	75	
SH	SHOWER TRIM KIT	MOEN	TL183						

NOTES: VALUES IN MM. REFER TO SPECIFICATIONS DWG# M-902 FOR PLUMBING FIXTURE DETAILS  
ALL PLUMBING FIXTURES COMPLETE WITH FAUCET. REFER TO DWG# M-902 FOR MORE DETAILS

NO.	ISSUED	DATE
4	ISSUED FOR ADDENDUM 6	2024-09-30
3	ISSUED FOR ADDENDUM 3	2024-09-23
2	ISSUED FOR TENDER	2024-09-09
1	ISSUED FOR BUILDING PERMIT	2024-07-31

### Issues

All measurements are to be checked and verified on site by the contractor before proceeding with work

Do not scale drawings

Drawn by: Fizzah Khan/ Iulian Turiga  
Checked by: Ali Nakhaei-Zadeh  
Original Issue Date: 2024-07-31  
Project No: TT-24-005  
Scale: N.T.S.

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## MECHANICAL SCHEDULES II

Drawing  
No.  
M-901



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## YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT BOULEVARD  
TOWN OF EAST GWILLIMBURY

Key Plan

**WC-1**

**American Standard**

**Atwell® Millennium™ FloWise® Elongated Flushometer Toilet**

WC-1

**WC-1**

**DELTA**

**Electronic Flush Valves & Retrofit Kits**

Model No: 1600T6102ARH-42

WC-1

**WC-1**

**DELTA**

**Electronic Flush Valves & Retrofit Kits**

Model No: 1600T6102ATR-42

WC-1

**WC-1**

**DELTA**

**Electronic Flush Valves & Retrofit Kits**

Model No: 1600T6102ATR-42

WC-1

### 1 WC-1 & FV SCALE:N.T.S.

**L-1**

**American Standard**

**MEZZO™ SEMI-COUNTERTOP SINK**

**COLONY® PRO SINGLE CONTROL LAVATORY FAUCET**

Model # 7075.102

L-1

**L-1**

**American Standard**

**COLONY® PRO SINGLE CONTROL LAVATORY FAUCET**

L-1

**SH-1**

**SYMONS' Origin®**

**SHOWER SH TRIM KIT**

SH-1

### 2 L-1 & FAUCET SCALE:N.T.S.

### 4 SHOWER SH TRIM KIT SCALE:N.T.S.

**S-1**

**American Standard**

**EDGEWATER™ PULL-DOWN BAR FAUCET**

**EDGEWATER™ PULL-DOWN BAR FAUCET**

S-1

**S-1**

**American Standard**

**EDGEWATER™ PULL-DOWN BAR FAUCET**

S-1

**S-1**

**American Standard**

**BEALE™ Deck Plate**

S-1

### 3 KITCHEN SINK KS & FAUCET SCALE:N.T.S.

**ES-WD-101-L/R**

**WATTS**

**ISCA-101-L/R Industry Standard Single Horizontal Adjustable Closet Carrier**

ES-WD-101-L/R

### 5 Toilet Carrier SCALE:N.T.S.

1	ISSUED FOR ADDENDUM 6	2024-09-30
NO.	ISSUED	DATE

#### Issues

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Project No: TT-24-005  
Scale: N.T.S.

## MECHANICAL SCHEDULES III

Sheet Title:  
Drawing No. M-902

**WHSDB4020**

DOUBLE BOWL LARGE LAUNDRY TUB: FREESTANDING RECTANGULAR DESIGN IN STAINLESS STEEL WITH INCLUDED BASKET STRAINERS

Specifications:

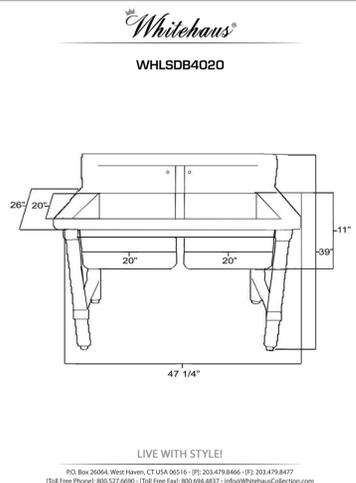
- Whitehaus WHSDB4020 Freestanding Rectangular Stainless Steel Large Laundry Tub is perfect for the owner who wants a work or laundry room.
- WHSD4020C features a stainless steel tub with a 19 gauge, 48" x 24" stainless steel work top with 1/2" thick chrome and nickel plated. Making it one of the most durable tubs on the market.
- The tub's four diagonal braces support the tub and make it stand sturdy, while the 4" feet make it easy to clean up for even the toughest messes.
- WHSD4020C features an adjustable front leg brace for extra stability, plus a 4" footrest with 2" x 1/2" rubber feet. This tub has a 4" front lip for a built-in work surface area 4" x 1/2" center deep.

Includes:

- 2 1/2" center drain bracket
- Brushed brass drain
- Adjustable front leg brace
- 4" footrest with 2" x 1/2" rubber feet
- Each tub has a diagonal brace to support tub and connect to the drain

Inside Bowl Dimensions: 20" x 12" x 11"  
Overall Dimensions: 47" x 20" x 39"  
\*Tub is Non-Returnable Item.

Whitehaus Commercial



**MOEN COMMERCIAL**

**Specifications**

**Two-Handle Wall Mount Faucet**

Model: 8126  
As An ASME A112.18.2

**CRITICAL DIMENSIONS**

MOEN SPECIFIER SERVICES 1-800-321-8809 Ext. 2158  
www.moen.com

**MOEN COMMERCIAL**

**Specifications**

**Two-Handle Wall Mount Faucet**

Model: 8126

**CRITICAL DIMENSIONS**

MOEN SPECIFIER SERVICES 1-800-321-8809 Ext. 2158  
www.moen.com

**GLOBAL INDUSTRIAL**  
We can supply that

Sales: 1.888.645.0878

Model: WBB2764020

**Campbell Hausfeld® 3.75HP 2-Stage 60 Gallon Single Phase Vertical Air Compressor**

★★★★★ (0)

Ships in 10 Business Days (ships from US)

**Product Description**

The Campbell Hausfeld CE5002 compressor features a cast iron, oil lubricated 2 stage pump for increased longevity and reduced noise. Boasting 175 PSI max pressure and 7.6 SCFM @ 90 PSI, the unit allows the user optimum tool performance. The 60 gallon ASME vertical tank design is ideal for garage and workshop applications with a space-saving footprint. Needing a 230V power supply, the CE5002 is ideal for rotating tires, repairing engines, grinding, sanding, painting, nailing and more.

**Specifications**

Campbell Hausfeld® 3.75HP 2-Stage 60 Gallon Single Phase Vertical Air Compressor  
9/25/24, 5:30 PM

**Weights & Dimensions**

Length	23 in
Width	23 in
Height	67.5 in
Weight	255 lbs
Tank Size	60 gal

**Product Details**

CFM	6.9 CFM
Horsepower	3.7 HP
Color	Black
Amperage	17.2 A
Max PSI	175 psi
Voltage	230 V
Phase	1
Usage	Home, Workshop
Description	2 Stage Air Compressor
Manufacturers Part Number	CE5002
Fuel Type	Electric
Pump Type	Two Stage
Engine Type	Induction
Brand	Campbell Hausfeld

**Warranty**

Warranty	3 Year Limited
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**Compliance & Certifications**

Certifications	ASME, UL, CSA
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Campbell Hausfeld® 3.75HP 2-Stage 60 Gallon Single Phase Vertical Air Compressor  
1 / 3 9/25/24, 5:30 PM 2 / 3

1 **LAUNDRY SINK LS & FAUCET**  
SCALE:N.T.S.

**FIAT TERRAZZO MOP SERVICE BASIN**  
12" DEPTH WITH 6" DROP FRONT

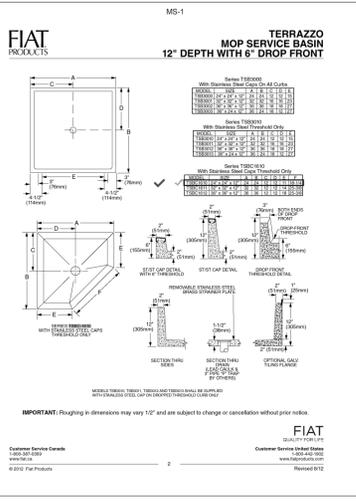
Shown: TSB026B

SEE REVERSE FOR ROUGHING IN DIMENSIONS

NOTES: Terrazzo Mop Basins must be installed on a 1/2" level of mortar in order that the mop basin be level and to prevent cracking. Failure to install terrazzo without a mortar bed will void the warranty. Installation requires a 1/4" clearance between mop basin and wall.

CERTIFICATIONS:  
[801 - GREY PORTLAND CEMENT WITH WHITE CHIPS]

FIAT QUALITY FOR LIFE  
Customer Service Center  
1-800-321-8809  
www.moen.com  
Revised 8/12



**MOEN COMMERCIAL**

**Specifications**

**Two-Handle Service Sink Faucet**

Model: 8124 (Chrome)

**CRITICAL DIMENSIONS**

MOEN SPECIFIER SERVICES 1-800-321-8809 Ext. 2158  
www.moen.com

3 **JANITOR SINK JS & FAUCET**  
SCALE:N.T.S.

**FIAT TERRAZZO MOP SERVICE BASIN**  
12" DEPTH WITH 6" DROP FRONT

Shown: TSB026B

SEE REVERSE FOR ROUGHING IN DIMENSIONS

NOTES: Terrazzo Mop Basins must be installed on a 1/2" level of mortar in order that the mop basin be level and to prevent cracking. Failure to install terrazzo without a mortar bed will void the warranty. Installation requires a 1/4" clearance between mop basin and wall.

CERTIFICATIONS:  
[801 - GREY PORTLAND CEMENT WITH WHITE CHIPS]

FIAT QUALITY FOR LIFE  
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Revised 8/12



**MOEN COMMERCIAL**

**Specifications**

**Two-Handle Service Sink Faucet**

Model: 8124 (Chrome)

**CRITICAL DIMENSIONS**

MOEN SPECIFIER SERVICES 1-800-321-8809 Ext. 2158  
www.moen.com

**PARKIN**

Parkin Architects Limited  
1 VALLEYBROOK DRIVE, TORONTO, CANADA, M3B 2S7 416-467-8000



**YORK REGIONAL POLICE HELICOPTER HANGAR**

350 GARFIELD WRIGHT BOULEVARD  
TOWN OF EAST GWILLIMBURY

Key Plan

1	ISSUED FOR ADDENDUM 6	2024-09-30
NO.	ISSUED	DATE

Issues

All measurements are to be checked and verified on site by the contractor before proceeding with work

Do not scale drawings

Drawn by: Author  
Checked by: Checker  
Original Issue Date: 2024-07-31  
Project No: TT-24-005  
Scale: N.T.S.

Sheet Title:

**MECHANICAL SCHEDULES IV**

Drawing No. **M-903**