

YORK REGIONAL POLICE NEW HELICOPTER HANGAR

350 GARFIELD WRIGHT BOULEVARD
TOWN OF EAST GWILLIMBURY

ISSUED FOR TENDER

SEPTEMBER 9, 2024
PROJECT NO: TT-24-005



250 ROWNTREE DAIRY RD, WOODBRIDGE, ON
TEL: 905-507-0800
WWW.QUASARGROUP.COM

YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT
BOULEVARD
TOWN OF EAST GWILLIMBURY

Key
Plan

NO.	ISSUED FOR BUILDING PERMIT	ISSUED	DATE
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/ Lulian Turiga
Checked by: Ali Nakhaei-Zadeh
Original Issue Date: 2024-07-31
Project No: TT-24-005
Scale: 1:1

Sheet
Title:
**MECHANICAL LEGEND &
DRAWING LIST**

Drawing
No:
M-001

PLUMBING	
SYMBOL	DESCRIPTION
	SANITARY DRAINAGE - ABOVE GROUND
	SANITARY DRAINAGE - UNDERGROUND
	SANITARY DRAINAGE (ACID RESISTANT) - ABOVE GROUND
	SANITARY DRAINAGE (ACID RESISTANT) - UNDERGROUND
	STORM DRAINAGE - ABOVE GROUND
	STORM DRAINAGE - UNDERGROUND
	PUMPED DISCHARGE
	DOMESTIC COLD WATER SUPPLY
	DOMESTIC HOT WATER SUPPLY
	DOMESTIC HOT WATER RECIRC.
	TEMPERED WATER
	ACID RESISTANT VENT
	VENT
	GAS
	REVERSE OSMOSIS PIPING
	RADIO ISOTOPE DRAIN
	COMPRESSED AIR
	RUNNING TRAP
	P-TRAP
	EMERGENCY SHOWER
	EYE WASH
	CLEANOUT IN FLOOR/BELOW GRADE
	CLEANOUT IN CEILING
	HOSE BIBB
	NON FREEZE HOSE BIBB
	SINGLE GAS OUTLET
	DOUBLE GAS OUTLET
	COMPRESSED AIR OUTLET
	ROOF HYDRANT
	GROUND HYDRANT
	ROOF DRAIN
	CONTROL FLOW ROOF DRAIN
	VENT THROUGH ROOF
	RAIN WATER LEADER
	TRAP SEAL PRIMER
	SCUPPER DRAIN
	MANHOLE
	CATCH BASIN
	TRENCH GRATE & FRAME
	AREA DRAIN
	FUNNEL FLOOR DRAIN
	FLOOR DRAIN
	HUB DRAIN
	FLOOR SINK
	FLOOR DRAIN - FLUSHING RIM
	WATER METER ASSEMBLY
	GAS METER
	BACK WATER VALVE
	BACKFLOW PREVENTER
	DENOTES FIXTURE TYPE PER SPECIFICATION

GENERAL	
SYMBOL	DESCRIPTION
	EXISTING TO REMAIN
	NEW WORK
	CONNECT TO EXISTING
	AIRFLOW / PIPE FLOW DIRECTION
	PIPE TURNING DOWN
	PIPE TURNING UP
	PRESSURE REDUCING VALVE
	ROOM THERMOSTAT
	ROOM HUMIDISTAT
	PUMP
	CONTROL VALVE - TWO WAY
	CONTROL VALVE - THREE WAY
	ISOLATION VALVE
	BALANCING VALVE
	CHECK VALVE
	STRAINER - OVER 50MM WITH VALVED FLUSHING DRAIN
	PIPE BRANCH OFF TOP
	PIPE BRANCH OFF BOTTOM
	RELIEF VALVE
	PRESSURE GAUGE
	TEMPERATURE GAUGE
	CAP
	SOLENOID VALVE
	FUSIBLE LINK VALVE
	HEAT TRACING

VENTILATION	
SYMBOL	DESCRIPTION
	FUSIBLE LINK FIRE DAMPER (DOUBLE LINE)
	FUSIBLE LINK FIRE DAMPER (SINGLE LINE)
	SMOKE DAMPER (DOUBLE LINE)
	SMOKE DAMPER (SINGLE LINE)
	COMBINATION SMOKE/FIRE DAMPER (DOUBLE LINE)
	COMBINATION SMOKE/FIRE DAMPER (SINGLE LINE)
	BACK DRAFT DAMPER (DOUBLE LINE)
	BACK DRAFT DAMPER (SINGLE LINE)
	BALANCING DAMPER (DOUBLE LINE)
	BALANCING DAMPER (SINGLE LINE)
	MOTORIZED DAMPER (DOUBLE LINE)
	MOTORIZED DAMPER (SINGLE LINE)
	RECTANGULAR DUCTWORK - DIMENSIONS AS SHOWN
	ROUND DUCTWORK - DIMENSION AS SHOWN
	DUCTWORK (SINGLE LINE) - DIMENSION AS SHOWN
	RECTANGULAR SUPPLY/OUTDOOR AIR DUCT UP
	RECTANGULAR EXHAUST/RETURN AIR DUCT UP
	CIRCULAR SUPPLY/OUTDOOR AIR DUCT UP
	CIRCULAR EXHAUST/RETURN AIR DUCT UP
	RECTANGULAR SUPPLY/OUTDOOR AIR DUCT DOWN
	RECTANGULAR EXHAUST/RETURN AIR DUCT DOWN
	CIRCULAR SUPPLY/OUTDOOR AIR DUCT DOWN
	CIRCULAR EXHAUST/RETURN AIR DUCT DOWN
	MITRED ELBOW WITH TURNING VANES
	DUCT RISE (DOUBLE LINE)
	DUCT RISE (SINGLE LINE)
	SUPPLY GRILLE - DIMENSIONS AS SHOWN ON SCHEDULE
	EXHAUST/RETURN GRILLE - DIMENSIONS AS SHOWN ON SCHEDULE
	CEILING SUPPLY AIR DIFFUSER - DIMENSIONS AS SHOWN ON SCHEDULE
	LINEAR SLOT DIFFUSER - DIMENSIONS AS SHOWN ON SCHEDULE
	CEILING EXHAUST/RETURN GRILLE - DIMENSIONS AS SHOWN ON SCHEDULE
	SUPPLY AIR ROUND DIFFUSER
	BRANCH TAKE-OFF WITH ADJUSTABLE SPLITTER DAMPER IN SUPPLY DUCT (DOUBLE LINE)
	OPEN ENDED DUCT WITH BALANCING DAMPER AND BELLOW MOUTH. DIRECTION AS SHOWN (DOUBLE LINE)
	FLEXIBLE DUCT CONNECTION
	ACOUSTICALLY LINED DUCTWORK (DOUBLE LINE)
	DUCT SILENCER
	FLEXIBLE DUCT (DOUBLE LINE)
	FLEXIBLE DUCT (SINGLE LINE)
	FLEXIBLE DUCT CONNECTION WITH BALANCING DAMPER ON TAKE-OFF
	DUCT MOUNTED HEATING COIL (DOUBLE LINE)
	DUCT MOUNTED HEATING COIL (SINGLE LINE)
	FIRE RATED DUCTWORK (DOUBLE LINE)
	TRANSFER AIR DUCT
	SUPPLY AIR LIGHT TROFFER

HEATING & COOLING PIPING	
SYMBOL	DESCRIPTION
	HEATING WATER RETURN
	HEATING WATER SUPPLY
	HEATING GLYCOL RETURN
	HEATING GLYCOL SUPPLY
	HIGH TEMPERATURE HEATING WATER RETURN
	HIGH TEMPERATURE HEATING WATER SUPPLY
	HIGH TEMPERATURE HEATING GLYCOL RETURN
	HIGH TEMPERATURE HEATING GLYCOL SUPPLY
	CONDENSER WATER RETURN
	CONDENSER WATER SUPPLY
	CHILLED WATER RETURN
	CHILLED WATER SUPPLY
	CHILLED GLYCOL RETURN
	CHILLED GLYCOL SUPPLY
	CONDENSATE DRAIN
	PUMPED CONDENSATE
	REFRIGERANT GAS
	REFRIGERANT LIQUID
	LOW PRESSURE STEAM
	LOW PRESSURE CONDENSATE
	HIGH PRESSURE STEAM
	HIGH PRESSURE CONDENSATE
	VENT
	STEAM VENT
	GEO-EXCHANGE SUPPLY
	GEO-EXCHANGE RETURN
	FUEL OIL SUPPLY
	FUEL OIL RETURN
	FUEL OIL VENT
	FUEL OIL OVERFLOW
	UNION
	MANUAL AIR VENT
	AUTOMATIC AIR VENT
	EXPANSION COMPENSATOR
	EXPANSION LOOP
	PIPE ANCHOR
	PIPE GUIDE
	PIPE SLEEVE
	STEAM CONDENSATE TRAP
	BASEBOARD HEATER
	RADIANT PANEL TYPE - HEAT OUTPUT
	CABINET UNIT HEATER
	UNIT HEATER

FIRE PROTECTION	
SYMBOL	DESCRIPTION
	SPRINKLER LINE
	FIRE MAIN
	STANDPIPE
	WATER FLOW ALARM
	PRESSURE SWITCH
	TEST CONNECTION
	FIRE DEPARTMENT CONNECTION
	PRESSURE SWITCH
	WATER FLOW ALARM
	EXCESS PRESSURE PUMP
	WET ALARM CHECK VALVE
	TEST & DRAIN VALVE
	WATER FLOW ALARM
	PRESSURE SWITCH
	DRY ALARM CHECK VALVE
	TEST & DRAIN VALVE
	AIR COMPRESSOR
	SPRINKLER VALVE CABINET
	FIRE EXTINGUISHER CABINET
	FIRE HOSE CABINET
	FIRE EXTINGUISHER C/W WALL BRACKET
	POST-INDICATOR VALVE
	FIRE HYDRANT C/W SHUT-OFF VALVE
	PENDENT SPRINKLER HEAD
	UPRIGHT SPRINKLER HEAD
	CONCEALED SPRINKLER HEAD
	FIRE SUPPRESSION (CLEAN AGENT) SPRINKLER HEAD
	SIDEWALL SPRINKLER HEAD

CONTROLS	
SYMBOL	DESCRIPTION
	SUPPLY FAN
	RETURN FAN
	EXHAUST FAN
	HEATING COIL
	COOLING COIL
	PRE-HEAT COIL
	FILTERS
	HUMIDIFIER
	AIRFLOW / FLUID DIRECTION
	MOTORIZED DAMPER
	MANUAL ISOLATION DAMPER
	MOTOR CONTROL CENTRE
	LOCAL DISPLAY UNIT
	MANUFACTURER SUPPLIED EQUIPMENT CONTROLLER
	MOTOR STARTER
	VARIABLE FREQUENCY DRIVE
	NORMALLY OPEN
	NORMALLY CLOSED
	NORMALLY CLOSED CONTACT
	NORMALLY OPEN CONTACT
	FLOW SWITCH
	LEVEL SWITCH
	TEMPERATURE SWITCH
	PRESSURE SWITCH
	DIFFERENTIAL PRESSURE SWITCH
	DOOR SWITCH
	ACTUATOR NORMALLY CLOSED DE-ENERGIZED POSITION
	ACTUATOR NORMALLY OPEN DE-ENERGIZED POSITION
	ACTUATOR FAIL OPEN POSITION
	ACTUATOR FAIL CLOSED POSITION
	ACTUATOR FAIL LAST POSITION
	TWO-POSITION ACTUATOR
	MODULATING ACTUATOR
	PRESSURE SENSOR
	DIFFERENTIAL PRESSURE SENSOR
	VELOCITY SENSOR
	VELOCITY PRESSURE SENSOR
	HUMIDITY SENSOR
	TEMPERATURE SENSOR
	OCCUPANCY SENSOR
	CARBON MONOXIDE SENSOR
	CARBON DIOXIDE SENSOR
	DIESEL NITROGEN OXIDE SENSOR
	OXYGEN SENSOR
	BUILDING AUTOMATION SYSTEM
	ANALOG INPUT
	ANALOG OUTPUT
	DIGITAL INPUT
	DIGITAL OUTPUT
	BAS ADJUSTABLE SET POINT
	BACNET VARIABLE
	HAND-OFF-AUTO
	CONTROL WIRING

MECHANICAL DRAWING LIST	
DRAWING #	DRAWING NAME
M-000	COVER PAGE
M-001	MECHANICAL LEGEND & DRAWING LIST
M-100	MECHANICAL SITE PLAN
M-150	ROOF PLAN
M-250	FOUNDATION PLAN
M-251	PLUMBING NEW WORK - LEVEL 1
M-252	MECHANICAL ROOM PIPING
M-351	VENTILATION NEW WORK - LEVEL 1
M-551	FIRE PROTECTION NEW WORK - LEVEL 1
M-701	FIRE PROTECTION SCHEMATIC
M-702	HEATING SCHEMATIC
M-703	VRF SCHEMATIC
M-704	GAS SCHEMATIC
M-750	MECHANICAL CONTROL SEQUENCES I

MECHANICAL DRAWING LIST	
DRAWING #	DRAWING NAME
M-751	MECHANICAL CONTROL SEQUENCES II
M-752	MECHANICAL CONTROL SEQUENCES III
M-800	MECHANICAL TYPICAL DETAILS I
M-801	MECHANICAL TYPICAL DETAILS II
M-802	MECHANICAL TYPICAL DETAILS III
M-803	MECHANICAL TYPICAL DETAILS IV
M-804	MECHANICAL TYPICAL DETAILS V
M-805	MECHANICAL TYPICAL DETAILS VI
M-806	MECHANICAL TYPICAL DETAILS VII
M-807	MECHANICAL TYPICAL DETAILS VIII
M-808	MECHANICAL TYPICAL DETAILS IX
M-809	MECHANICAL TYPICAL DETAILS X
M-900	MECHANICAL SCHEDULES
M-901	MECHANICAL SCHEDULES II

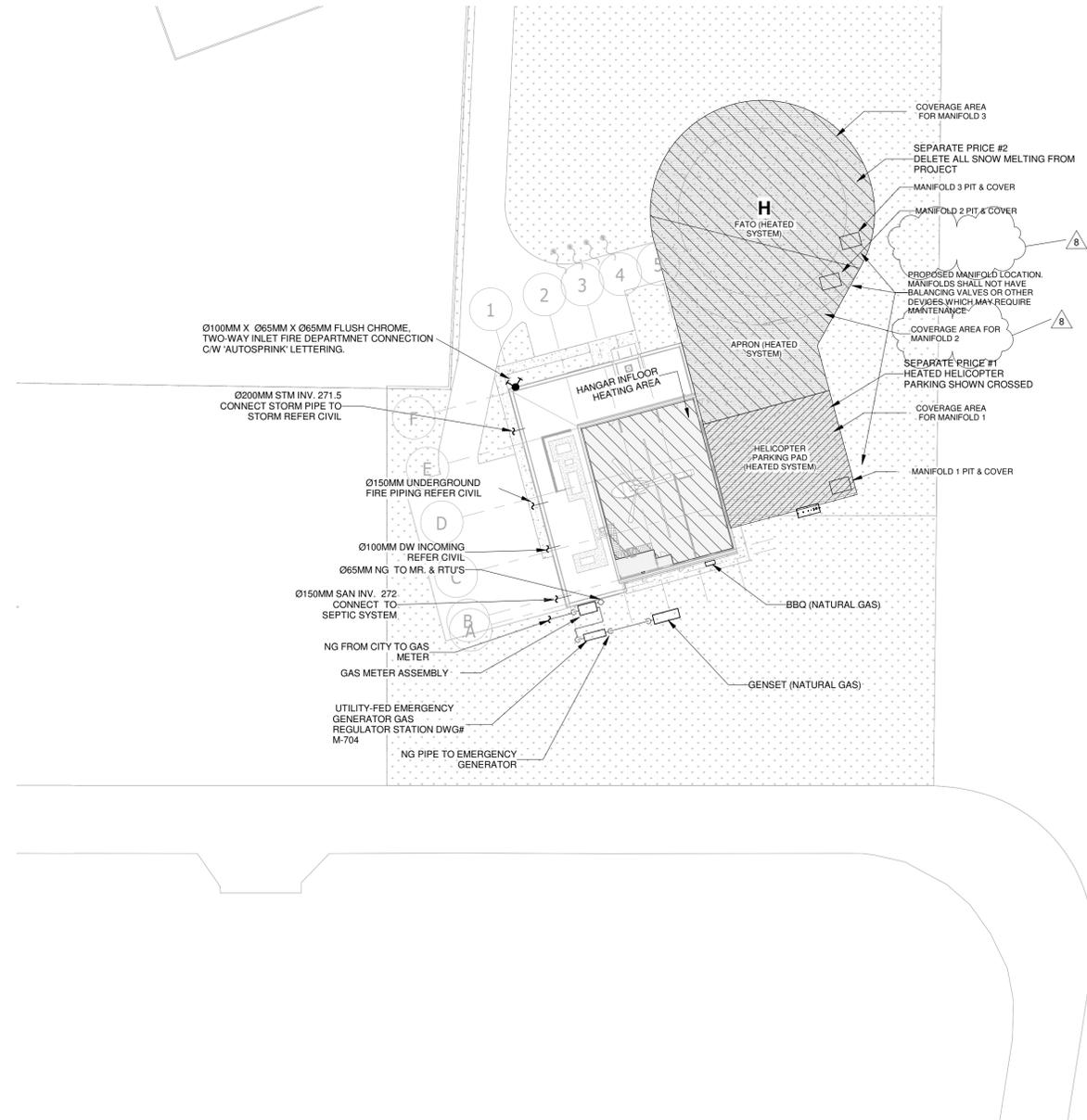


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8	ISSUED FOR ADDENDUM 15	2024-12-04
7	ISSUED FOR ADDENDUM 14	2024-11-27
6	ISSUED FOR ADDENDUM 13	2024-10-30
5	ISSUED FOR ADDENDUM 10	2024-10-15
4	ISSUED FOR ADDENDUM 6	2024-09-30
3	ISSUED FOR ADDENDUM 3	2024-09-23
2	ISSUED FOR TENDER	2024-09-09
1	ISSUED FOR BUILDING PERMIT	2024-07-31

Issues

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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 : 500

1 SITE PLAN M
SCALE: 1 : 500

Sheet
Title:
MECHANICAL SITE PLAN

Drawing
No:
M-100



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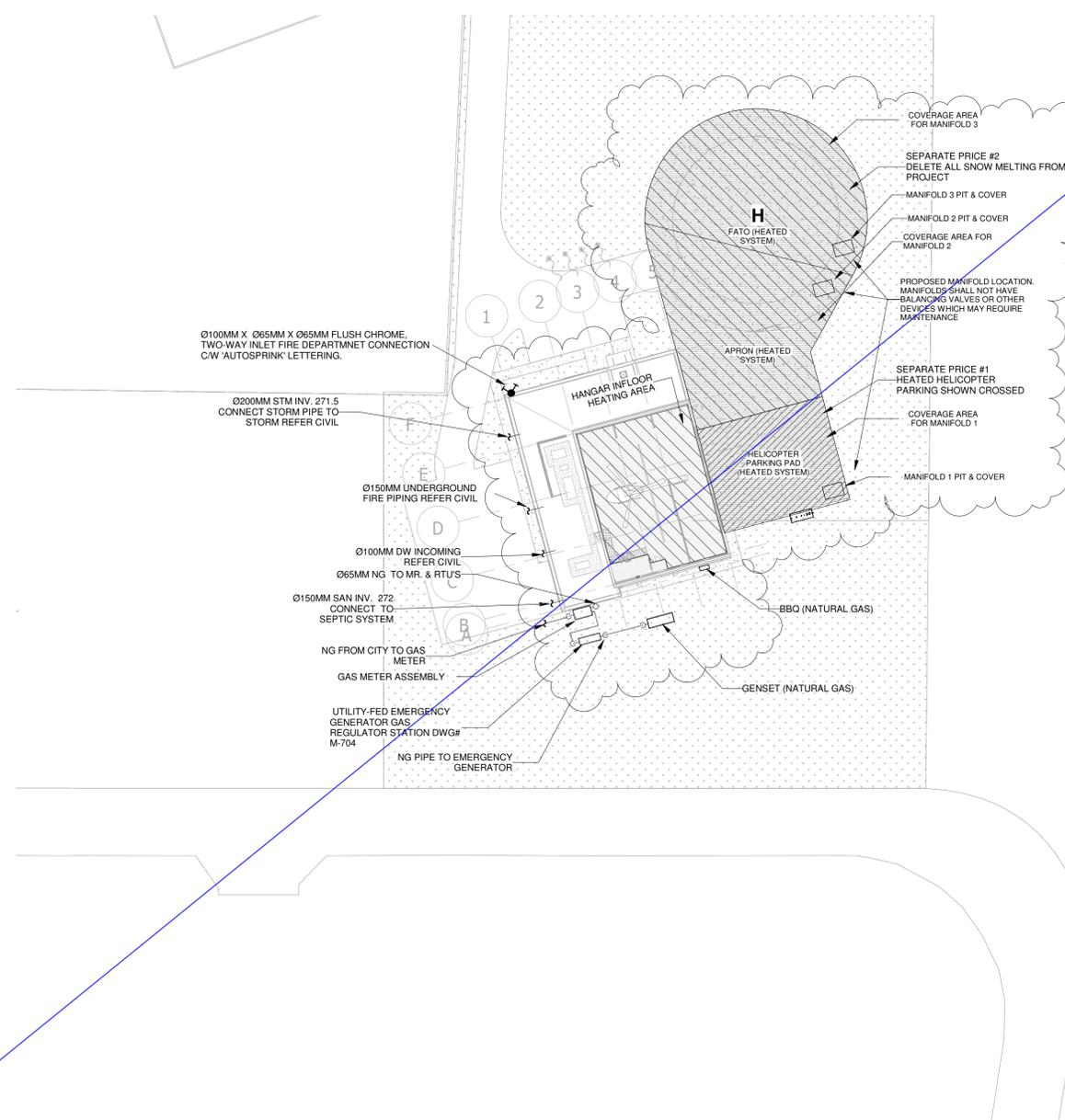
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1 **SITE PLAN M**
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11/27/2024 1:24:19 PM Autodesk Docs://2402 - YRP Helicopter Hangar/TT-24-005-YRP-OCG ME Model_R24.rvt

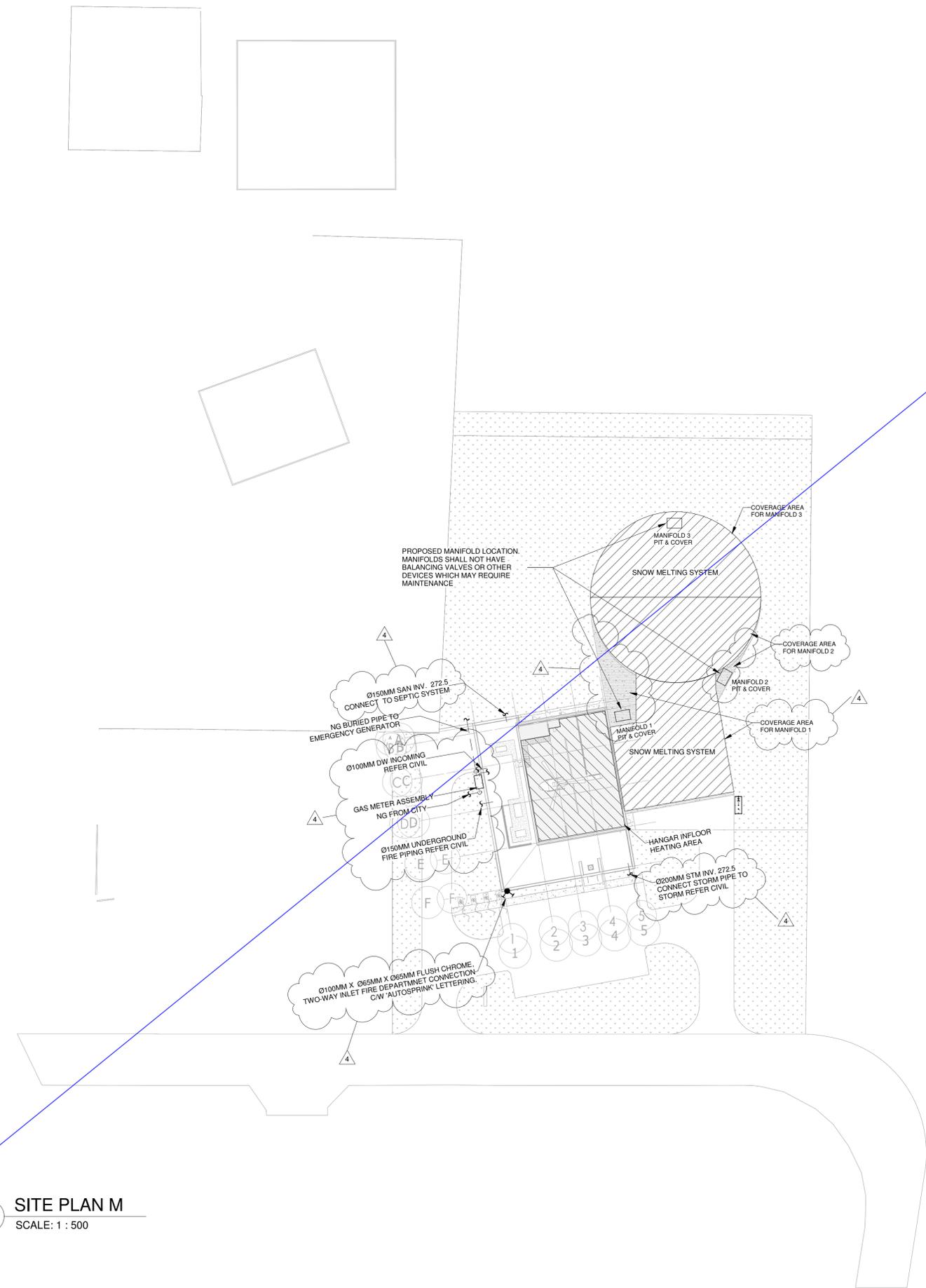


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1 SITE PLAN M
SCALE: 1 : 500

NO.	ISSUED	DATE
4	ISSUED FOR ADDENDUM 6	2024-09-30
3	ISSUED FOR ADDENDUM 3	2024-09-23
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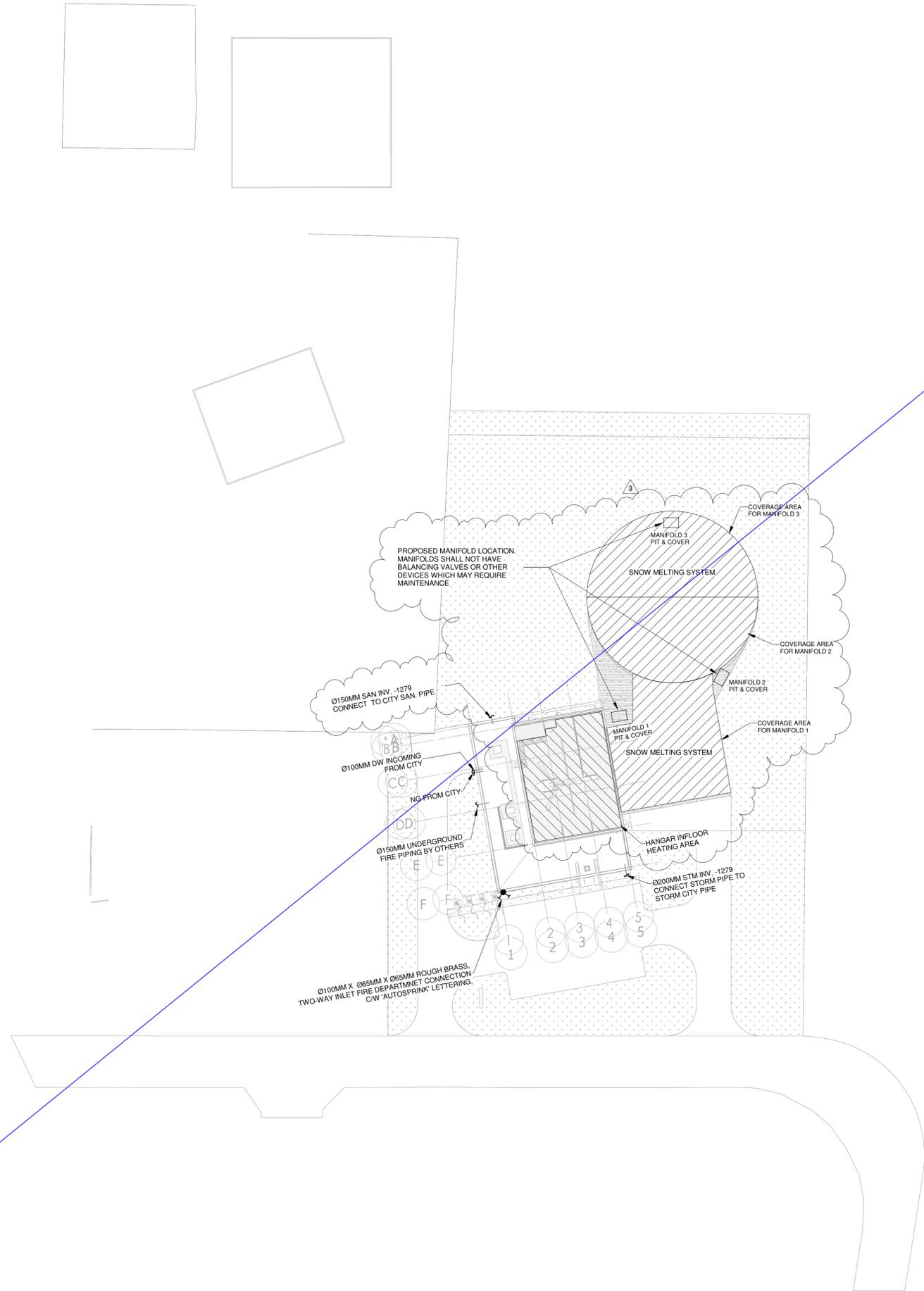


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3	ISSUED FOR ADDENDUM 3	2024-09-23
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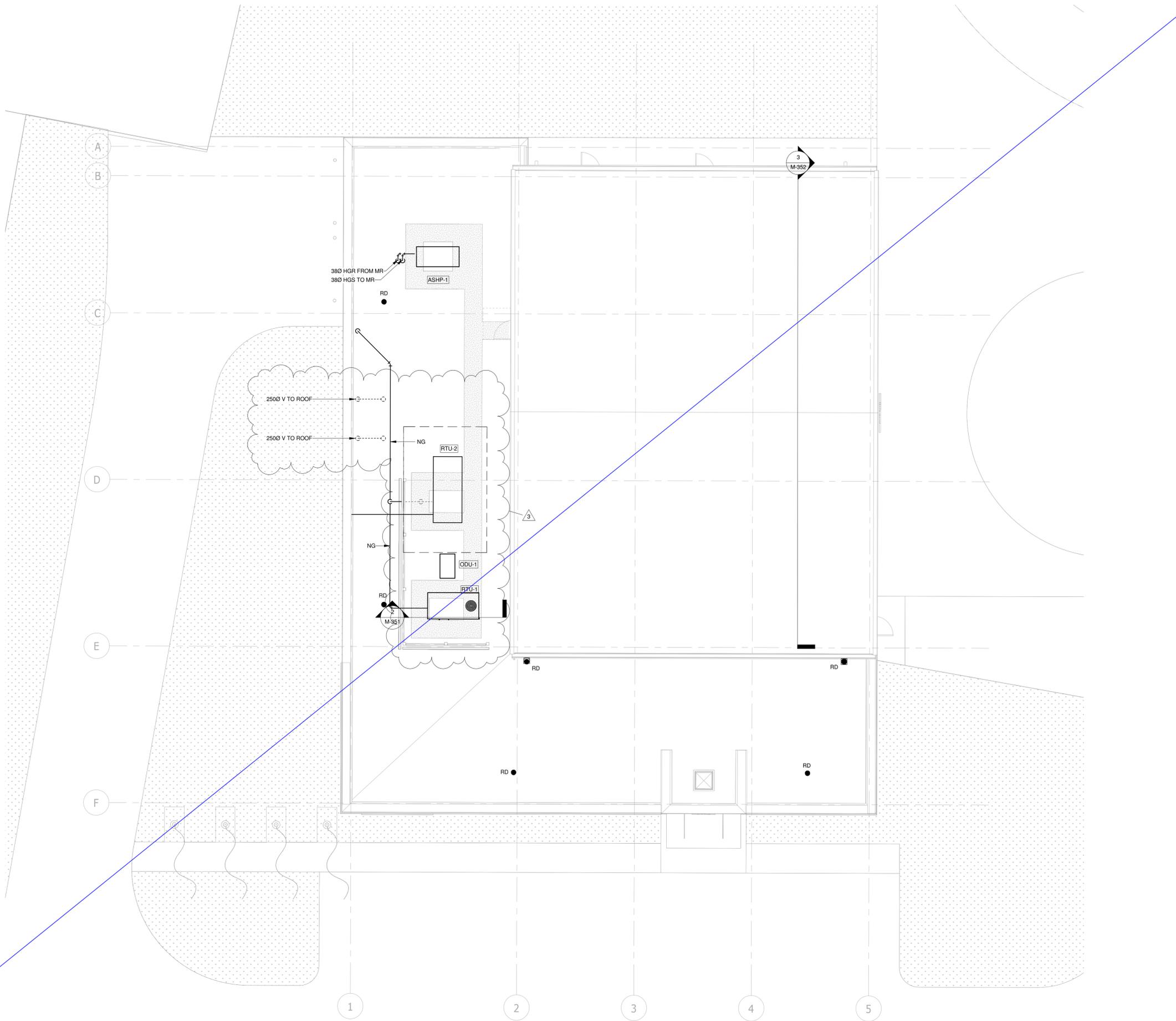
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Sheet
Title:

ROOF PLAN

Drawing
No.
M-150





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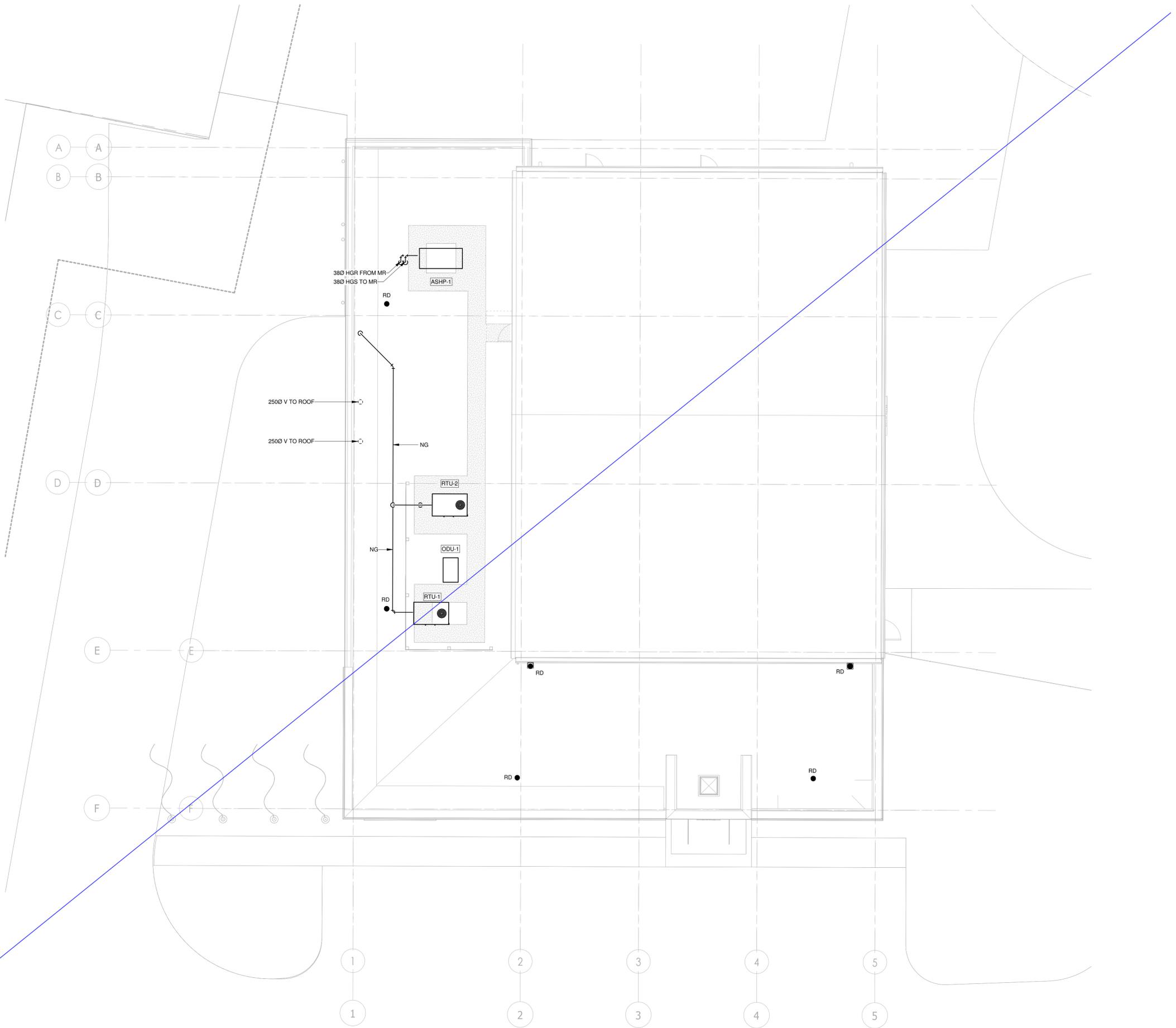
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ROOF PLAN

Drawing
No.
M-150





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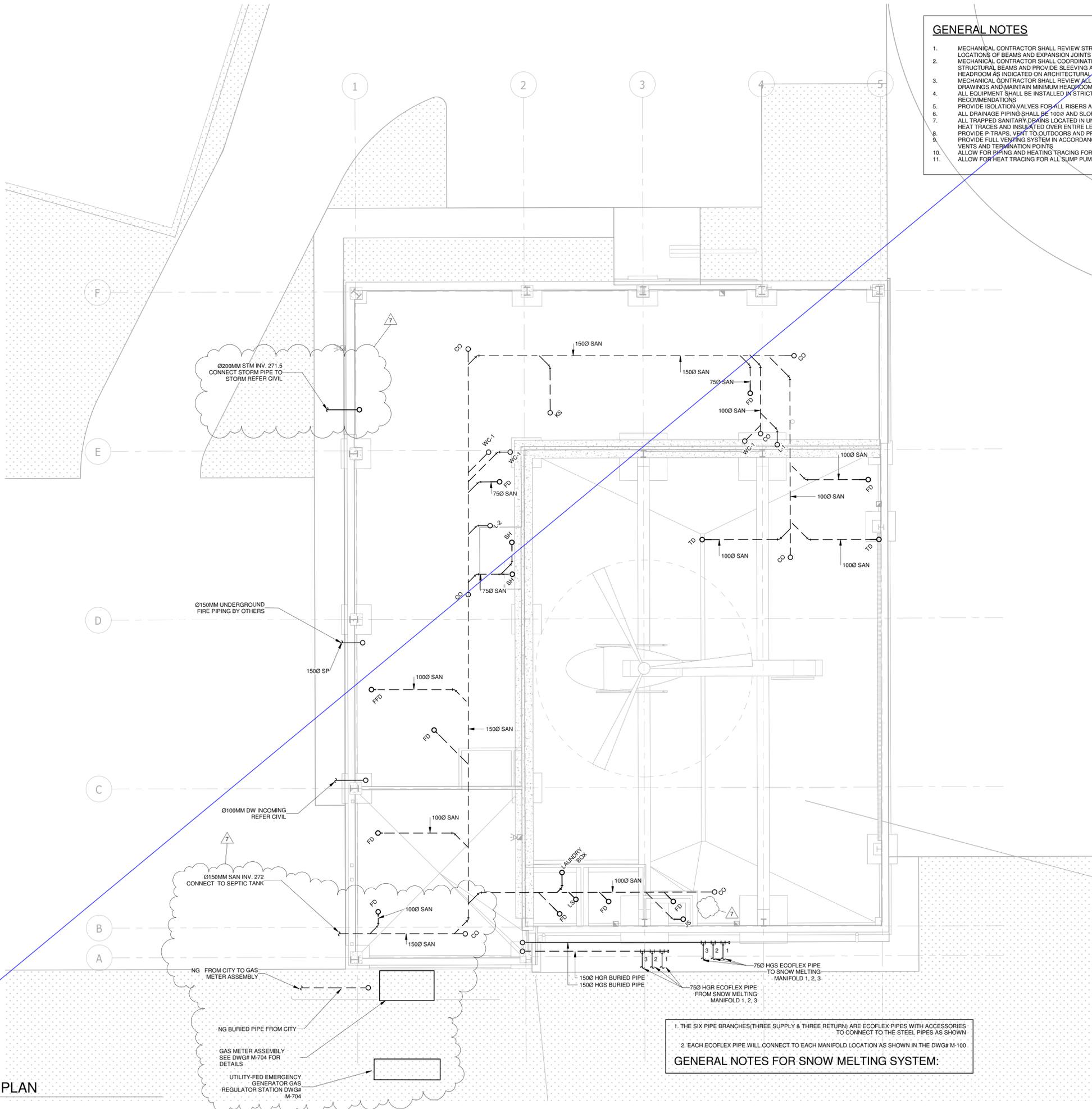
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Plan

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 100% AND SLOPED AT 1% UNLESS NOTED OTHERWISE
- ALL TRAPPED SANITARY DRAINS LOCATED IN UNHEATED SPACE SHALL BE ELECTRICAL 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

NO.	ISSUED	DATE
7	ISSUED FOR ADDENDUM 14	2024-11-27
6	ISSUED FOR ADDENDUM 10	2024-10-15
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Sheet
 Title: **FOUNDATION PLAN**

Drawing
 No: **M-250**

FOUNDATION PLAN

SCALE: 1 : 100



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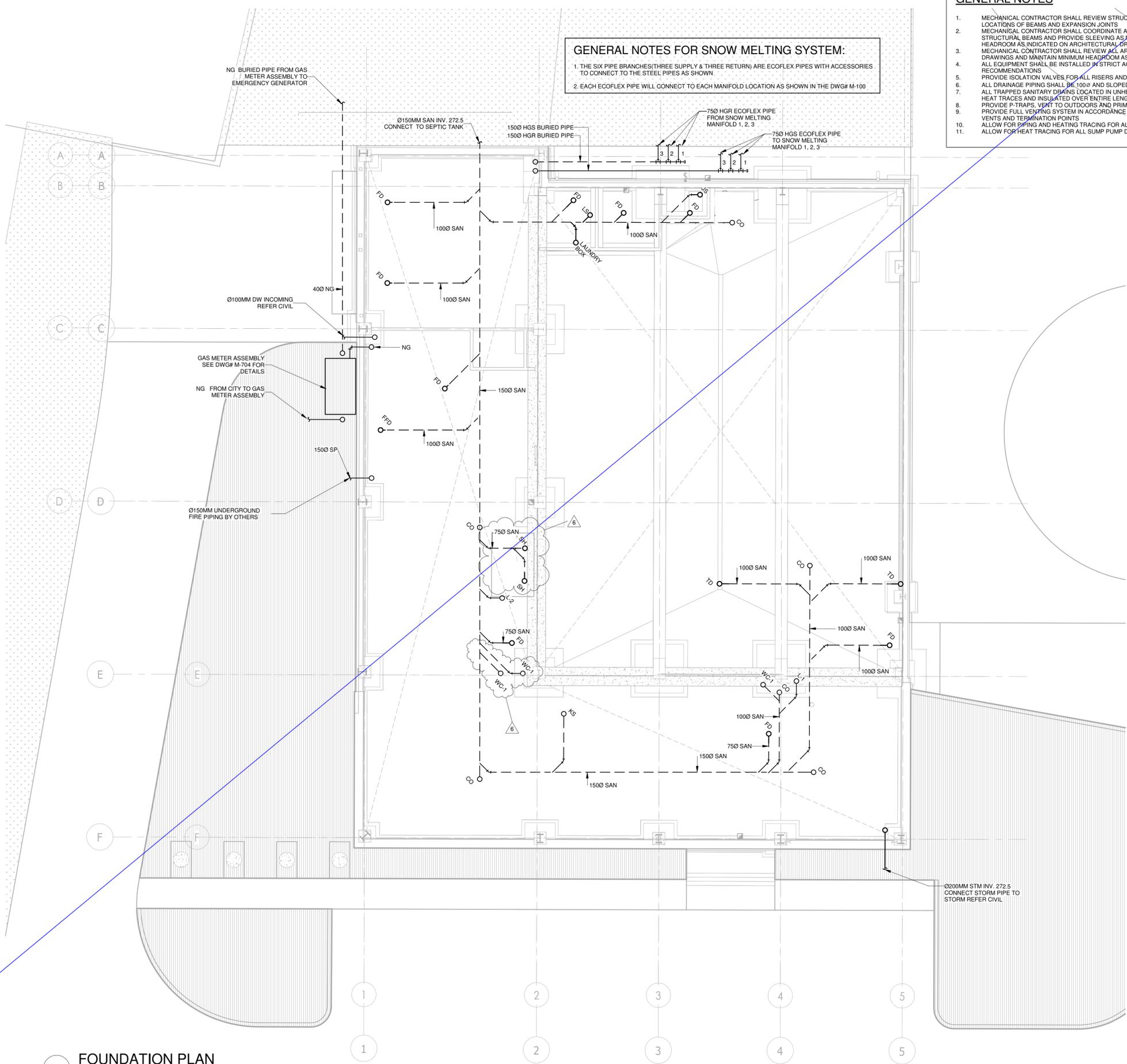
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Drawing
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- ### GENERAL NOTES
- MECHANICAL CONTRACTOR SHALL REVIEW STRUCTURAL DRAWINGS REGARDING SIZE AND LOCATIONS OF BEAMS AND EXPANSION JOINTS
 - MECHANICAL CONTRACTOR SHALL COORDINATE ALL PIPING 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 100% 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



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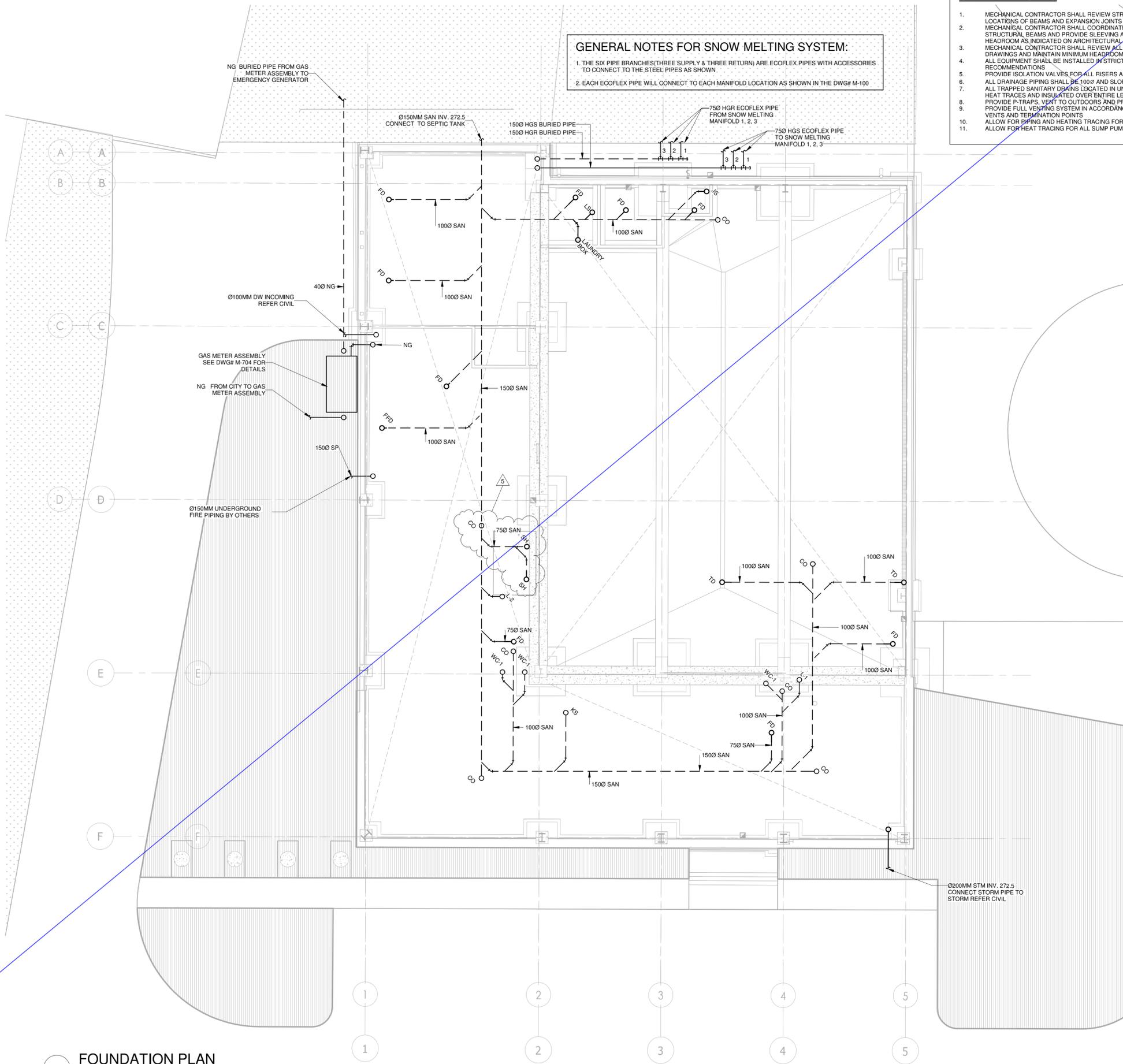
Drawing
No: **M-250**

GENERAL NOTES

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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
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

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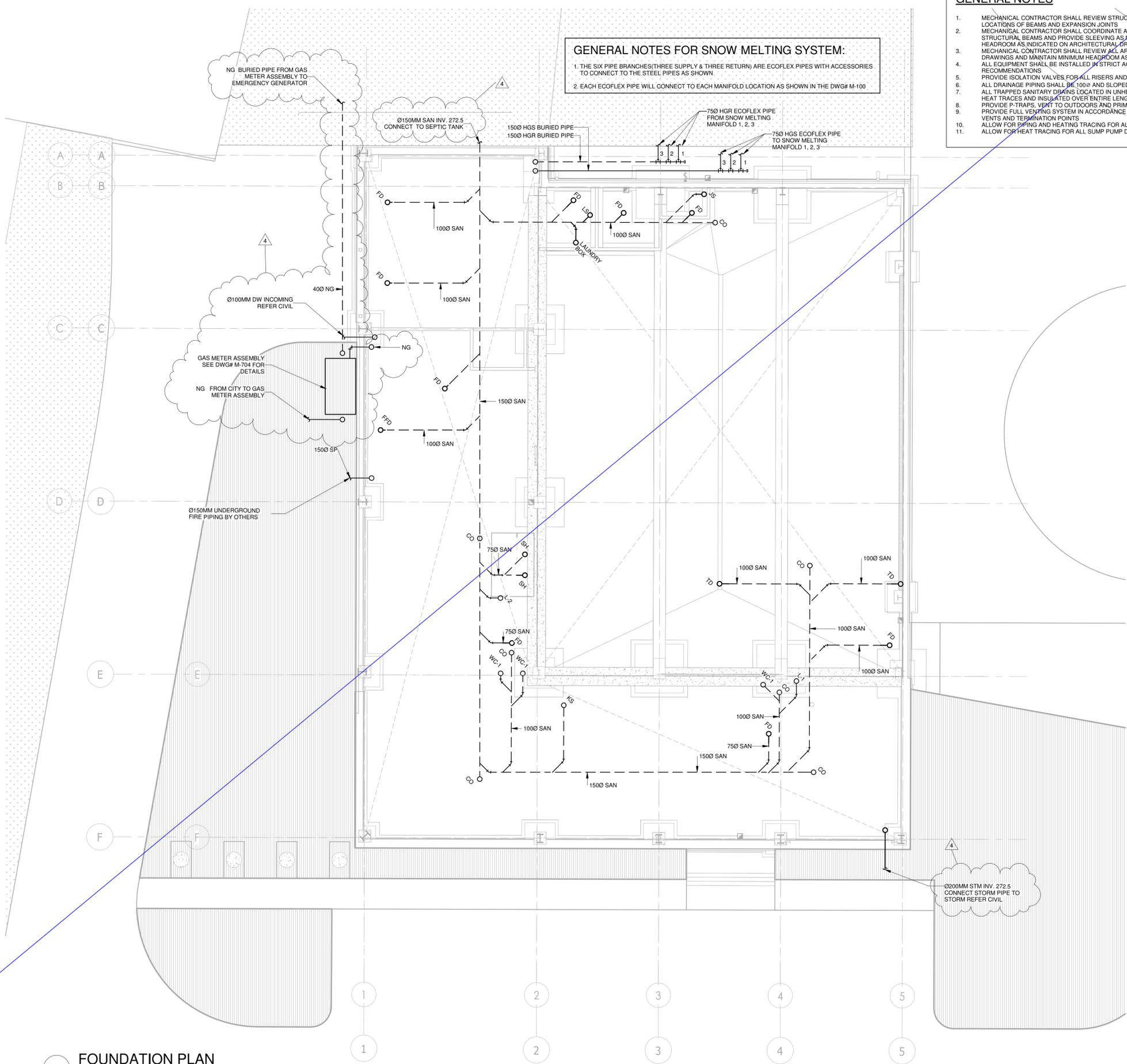
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Drawn by: Fizzah Khan/ Iulian Turiga
Checked by: Ali Nakhaei-Zadeh
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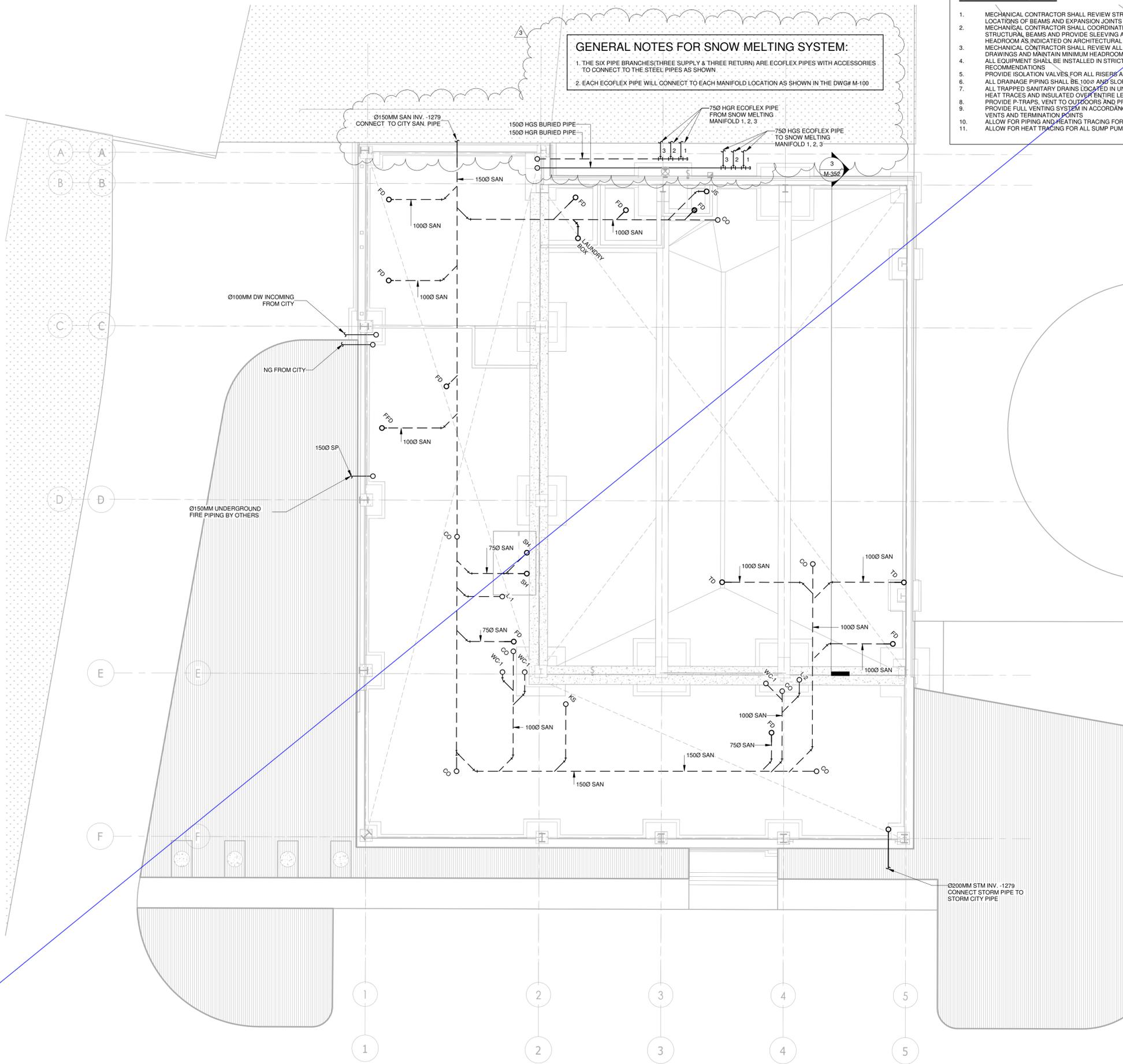
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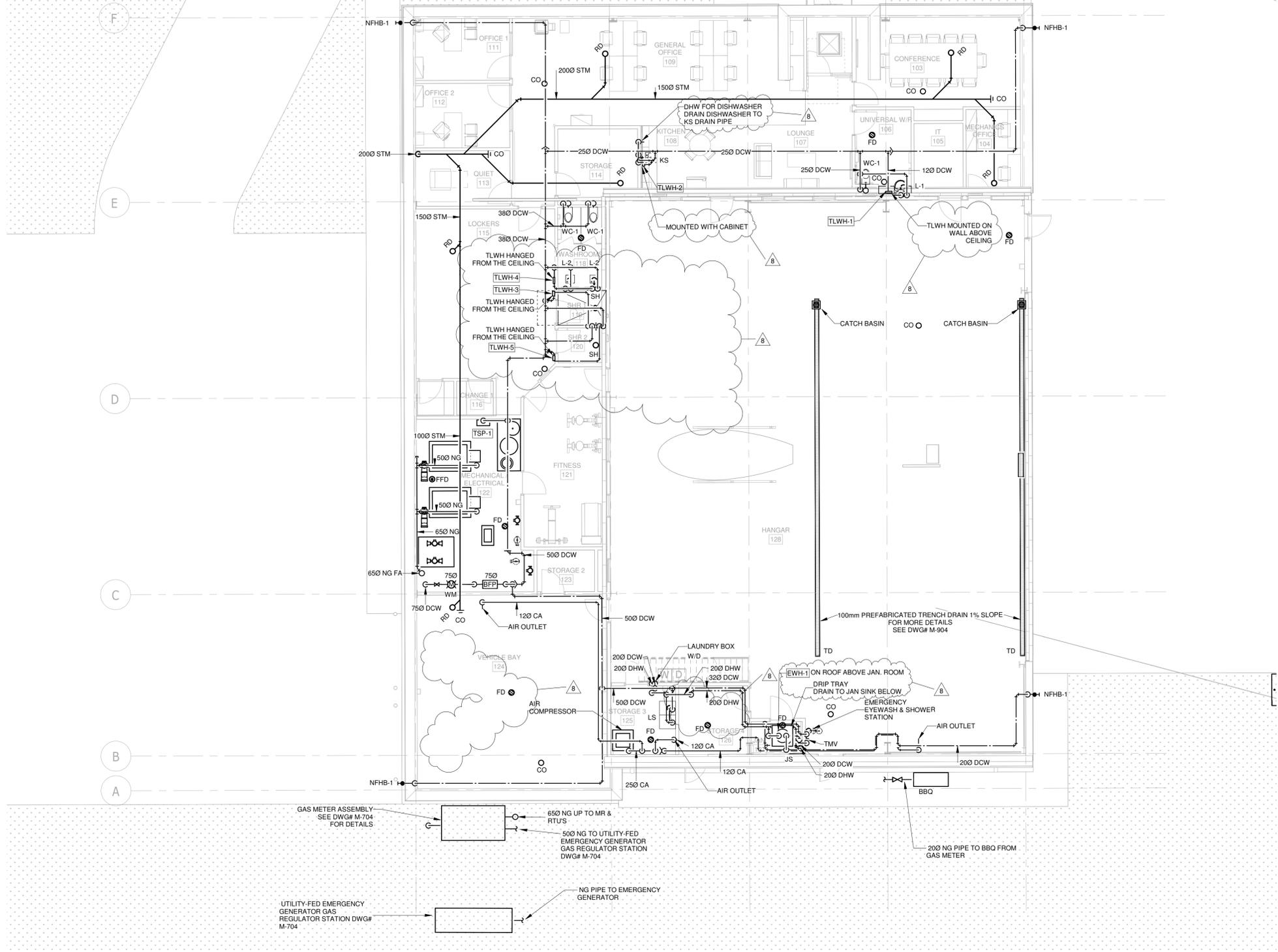
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6	ISSUED FOR ADDENDUM 10	2024-10-15
5	ISSUED FOR ADDENDUM 8	2024-10-07
4	ISSUED FOR ADDENDUM 6	2024-09-30
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 Title:
**PLUMBING NEW WORK -
 LEVEL 1**

Drawing
 No.
M-251

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

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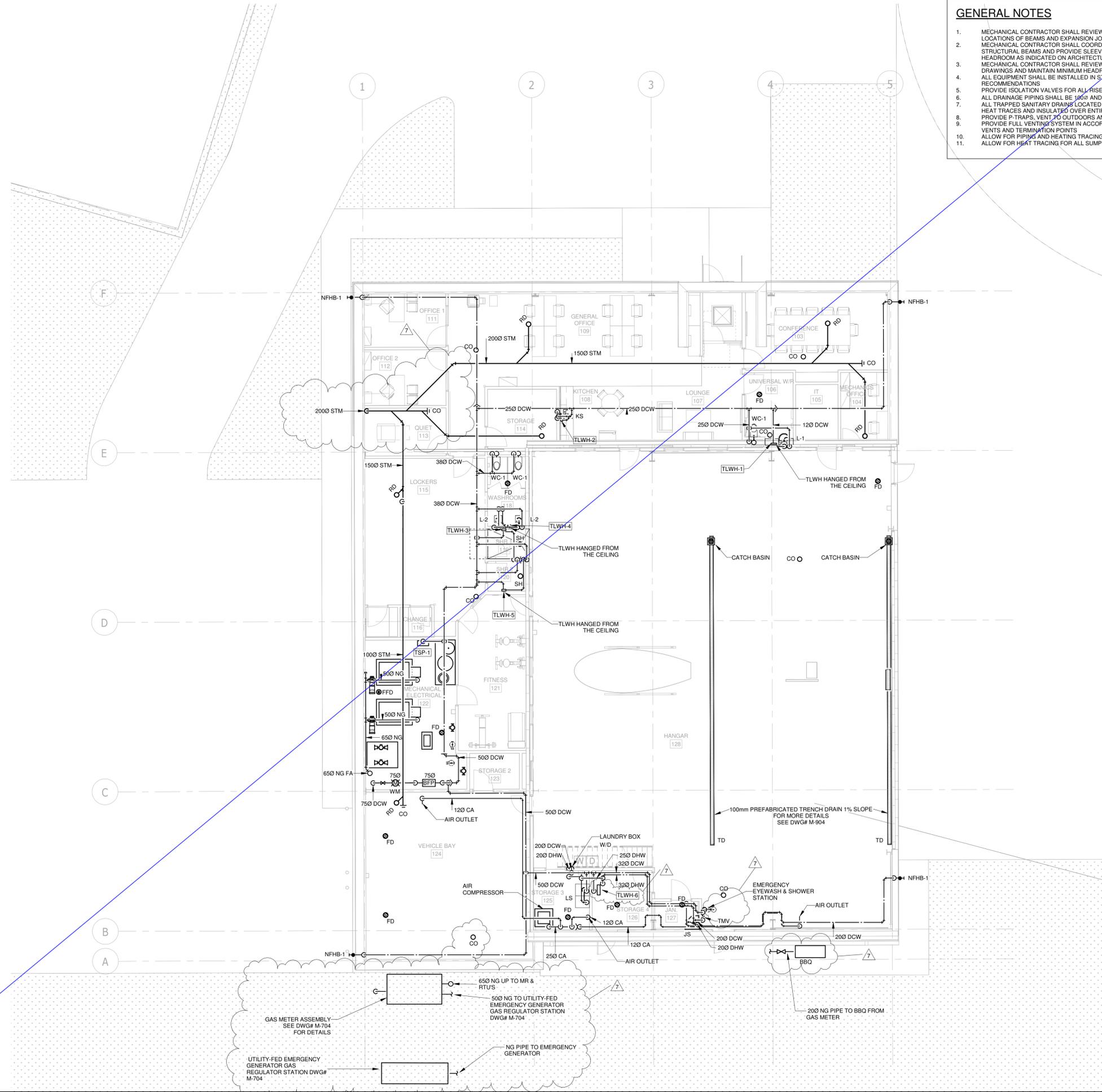
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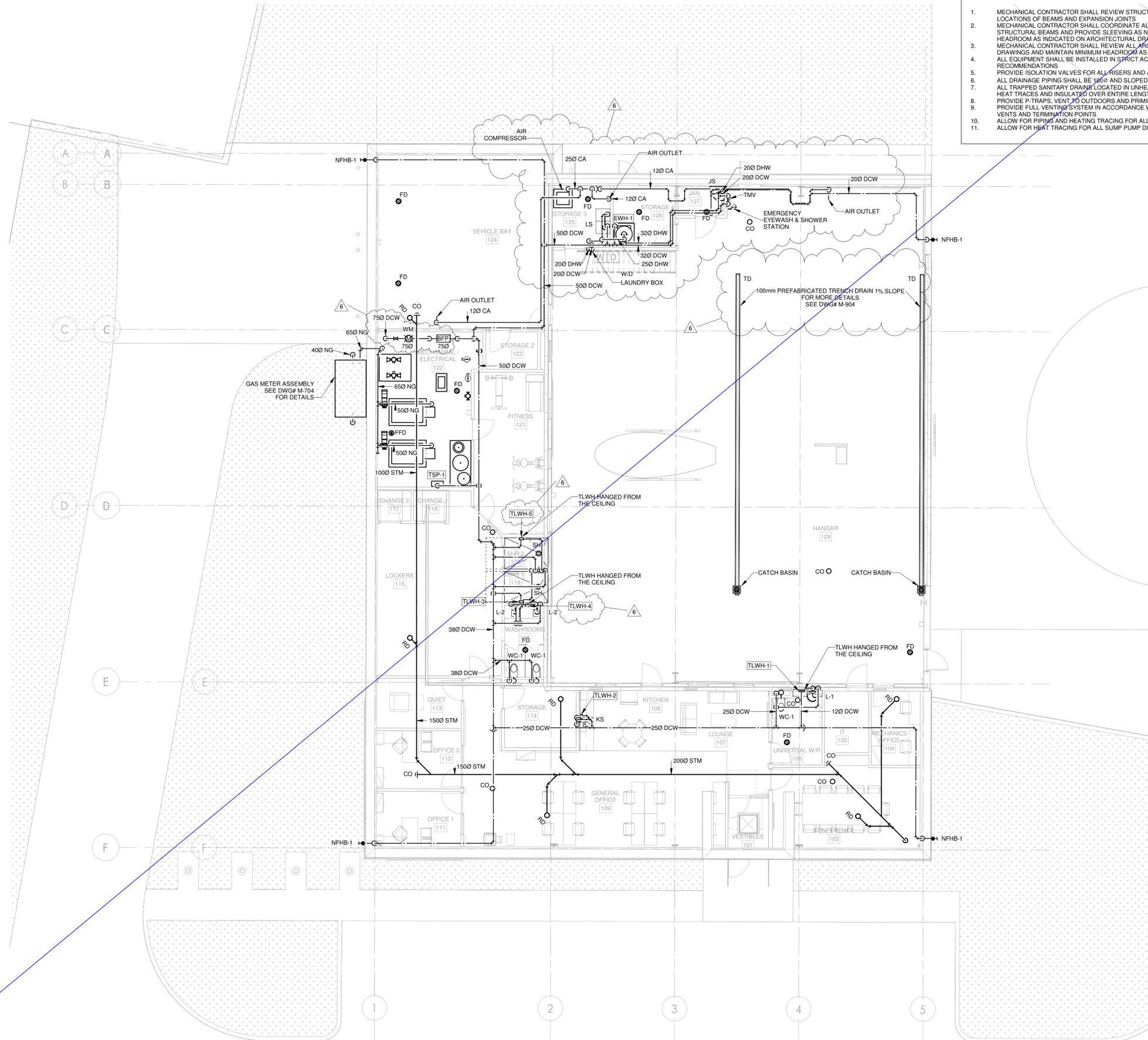
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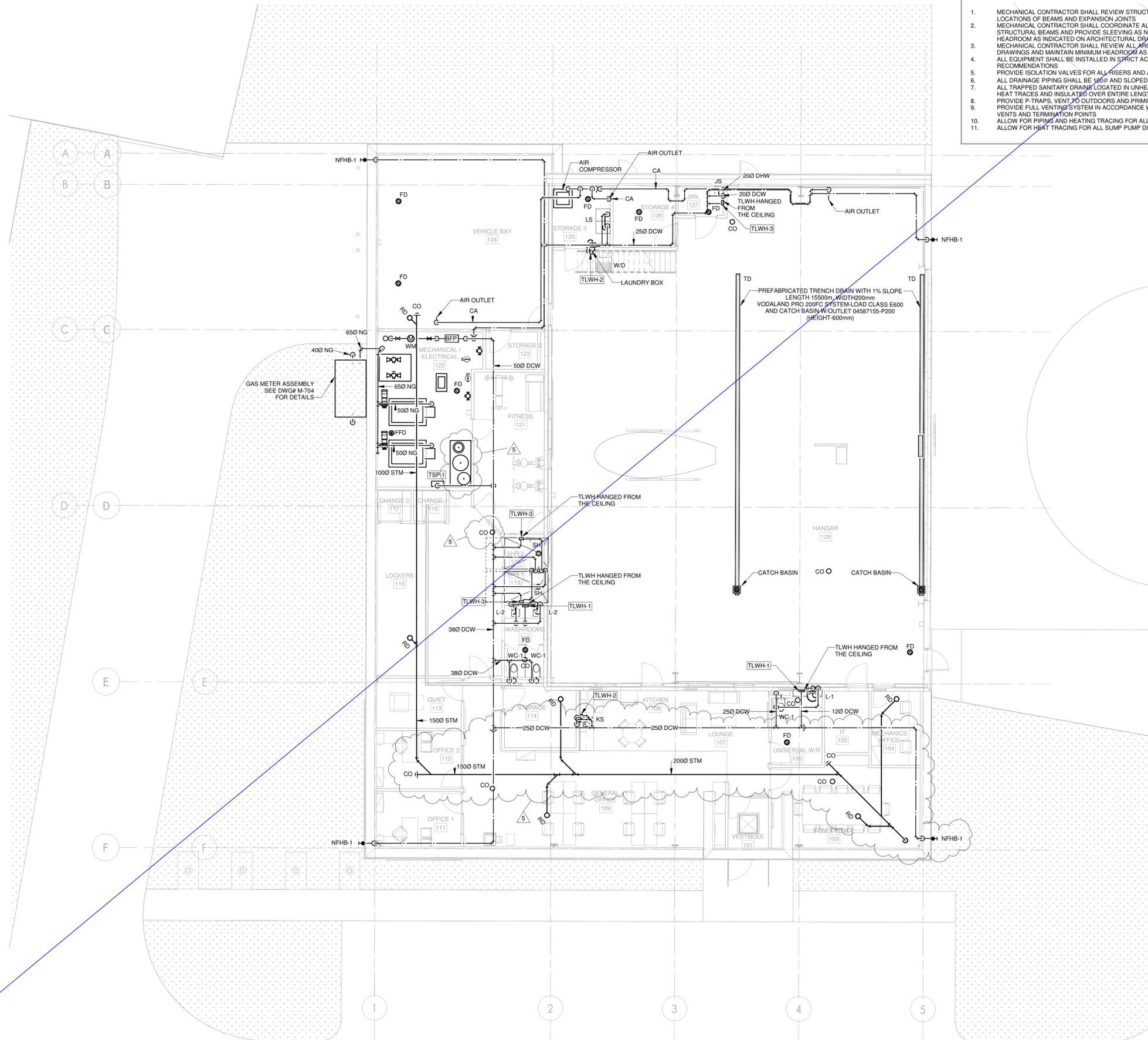
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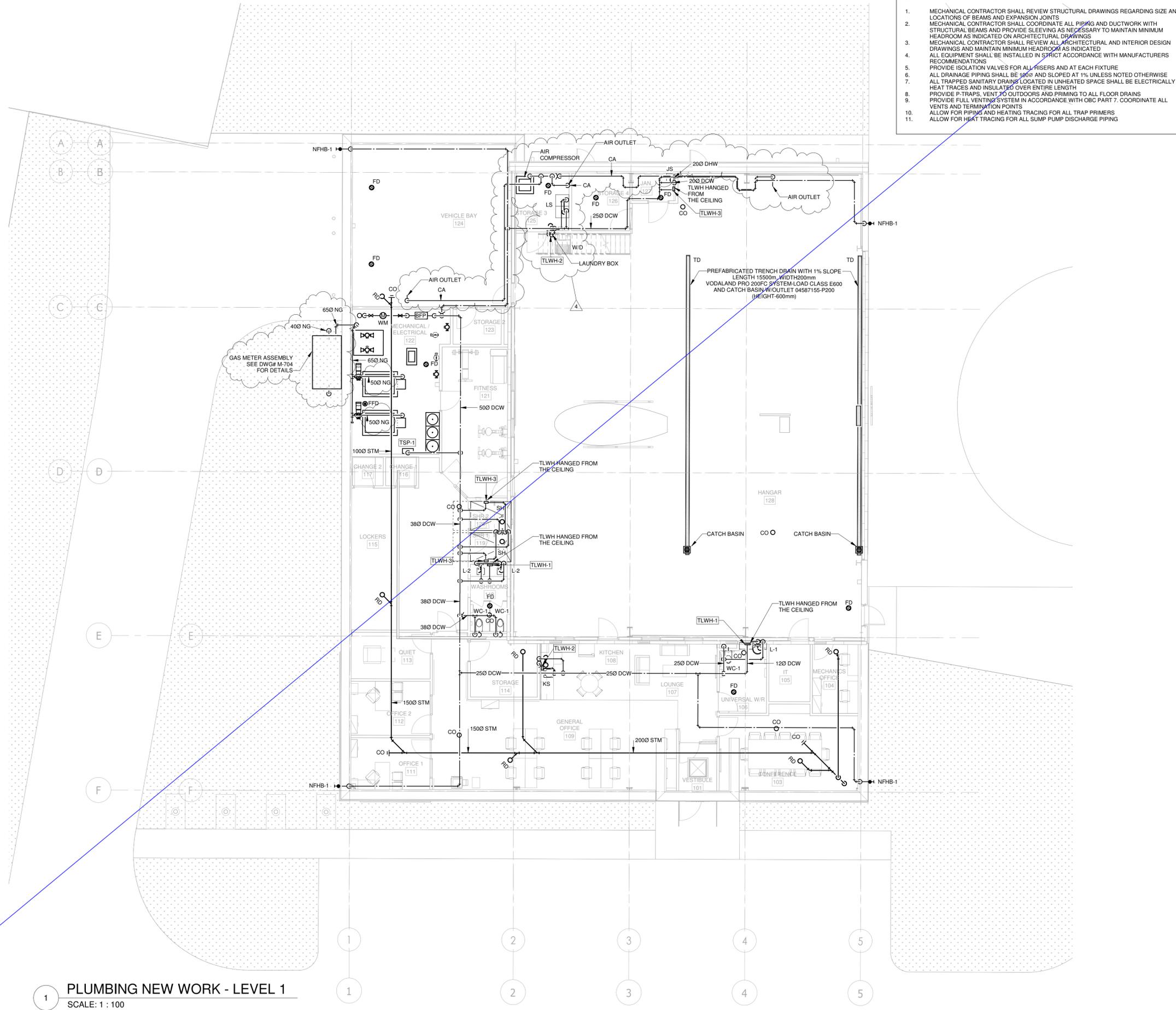
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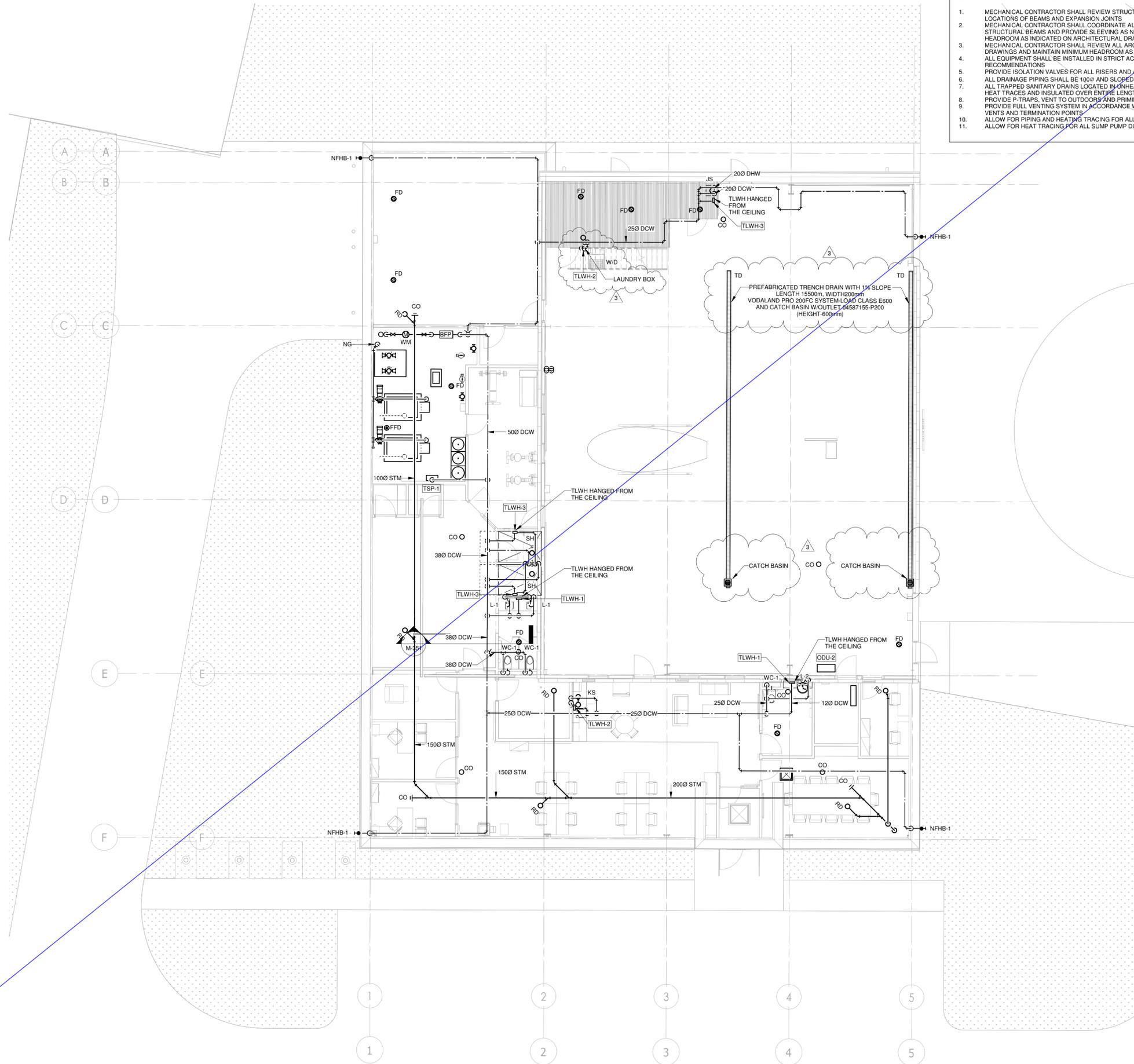
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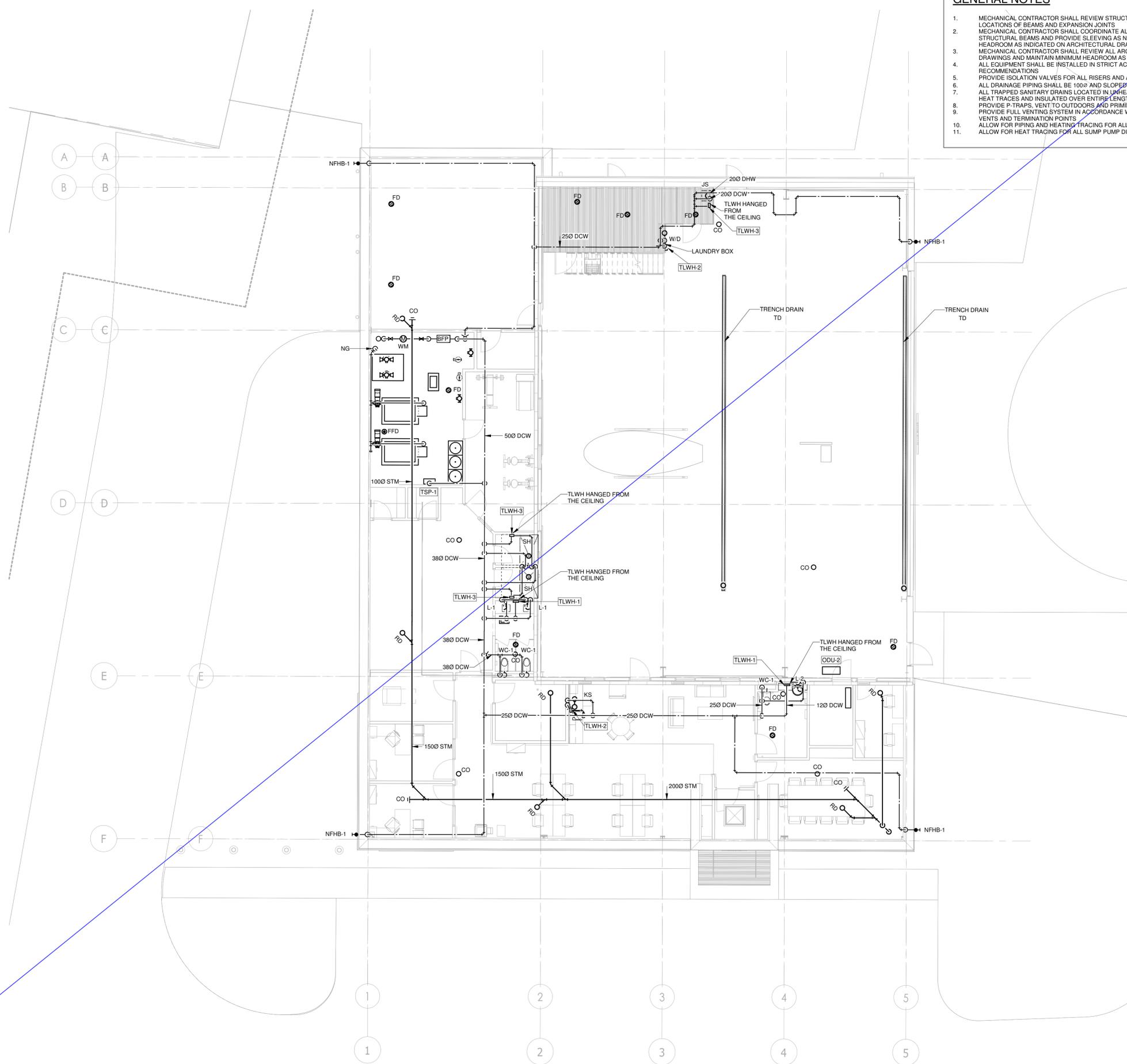
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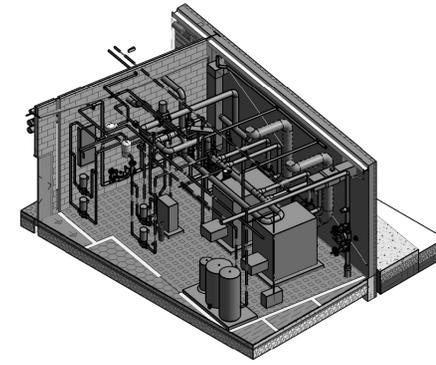


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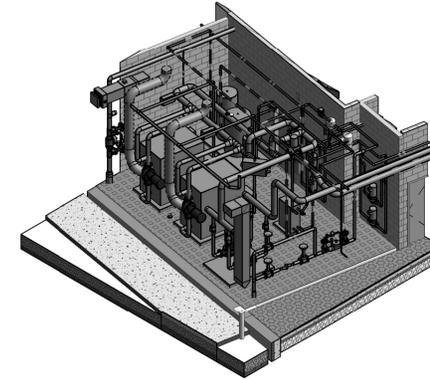
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BOULEVARD
TOWN OF EAST GWILLIMBURY

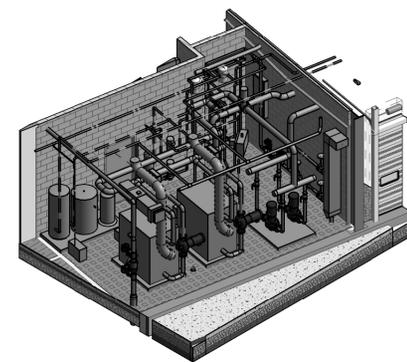
Key
Plan



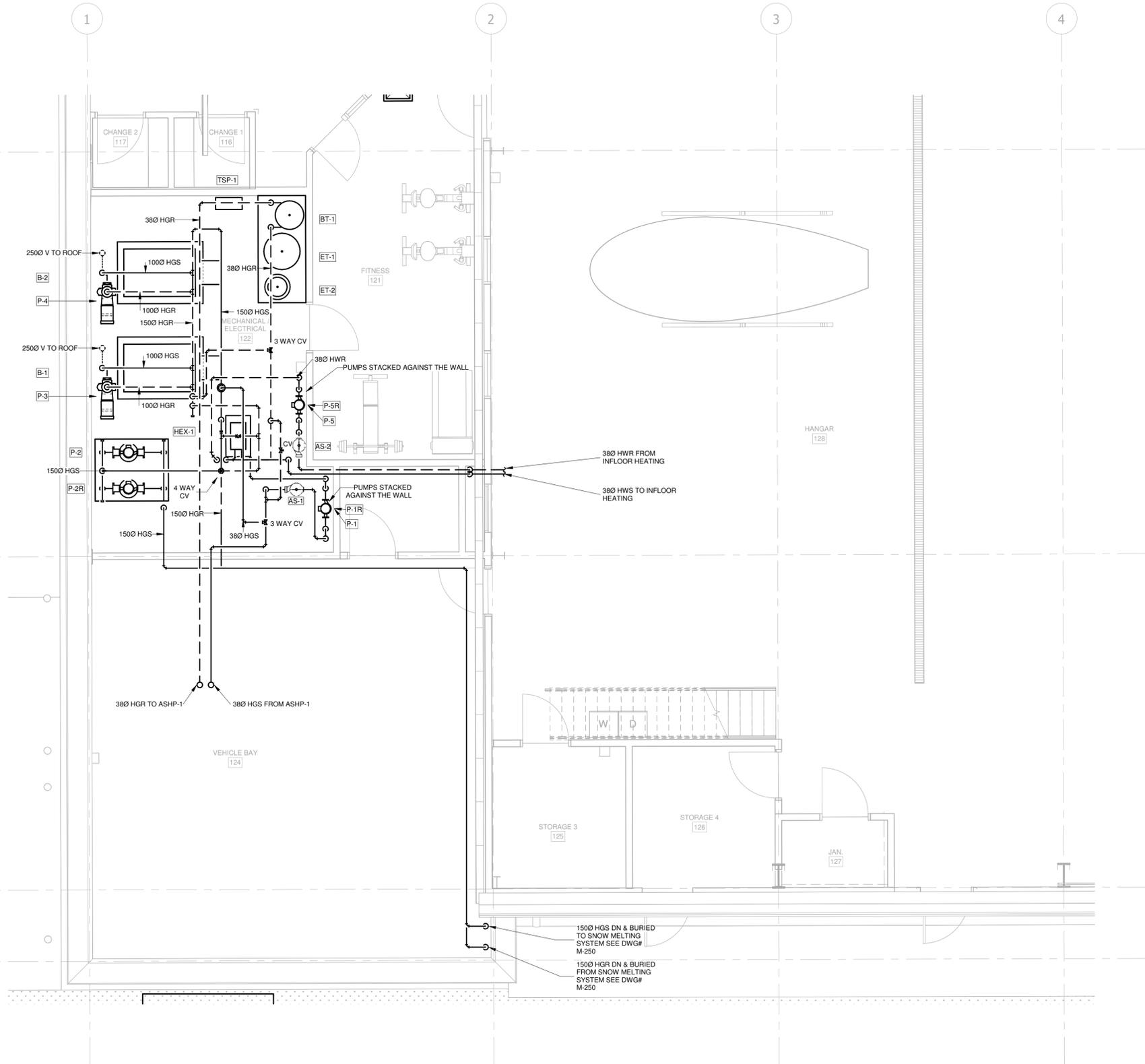
2 MECH ROOM 3D VIEW 1
SCALE:



3 MECH ROOM 3D VIEW 2
SCALE:



4 MECH ROOM 3D VIEW 3
SCALE:



GENERAL NOTES:
1. CONTRACTOR TO PROVIDE ALL MANIFOLDS AND CONNECTIONS AND PIPING FOR INFLOOR HEATING
2. CONTRACTOR TO PROVIDE PROPOSED MANIFOLD LOCATIONS AND SHOP DRAWING FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.

NO.	ISSUED	DATE
6	ISSUED FOR ADDENDUM 14	2024-11-27
5	ISSUED FOR ADDENDUM 8	2024-10-07
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: 1 : 50

Sheet
Title: **MECHANICAL ROOM PIPING**

Drawing
No: **M-252**



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YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT
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TOWN OF EAST GWILLIMBURY

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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

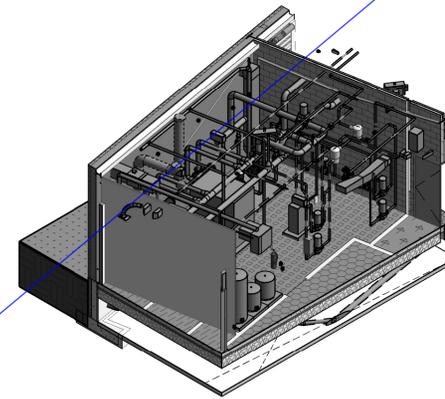
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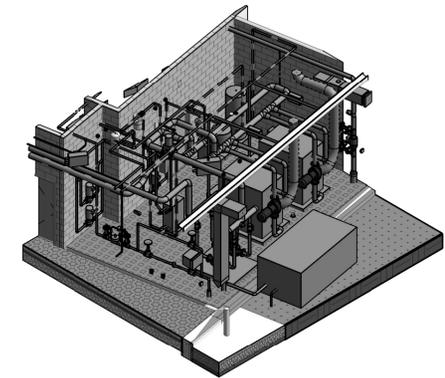
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Sheet
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**MECHANICAL ROOM
PIPING**

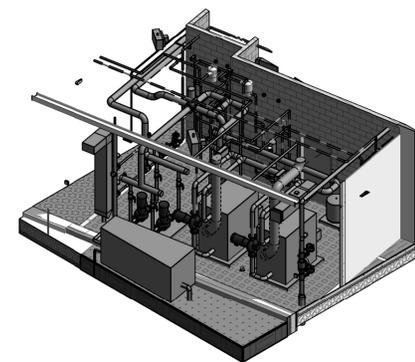
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No.
M-252



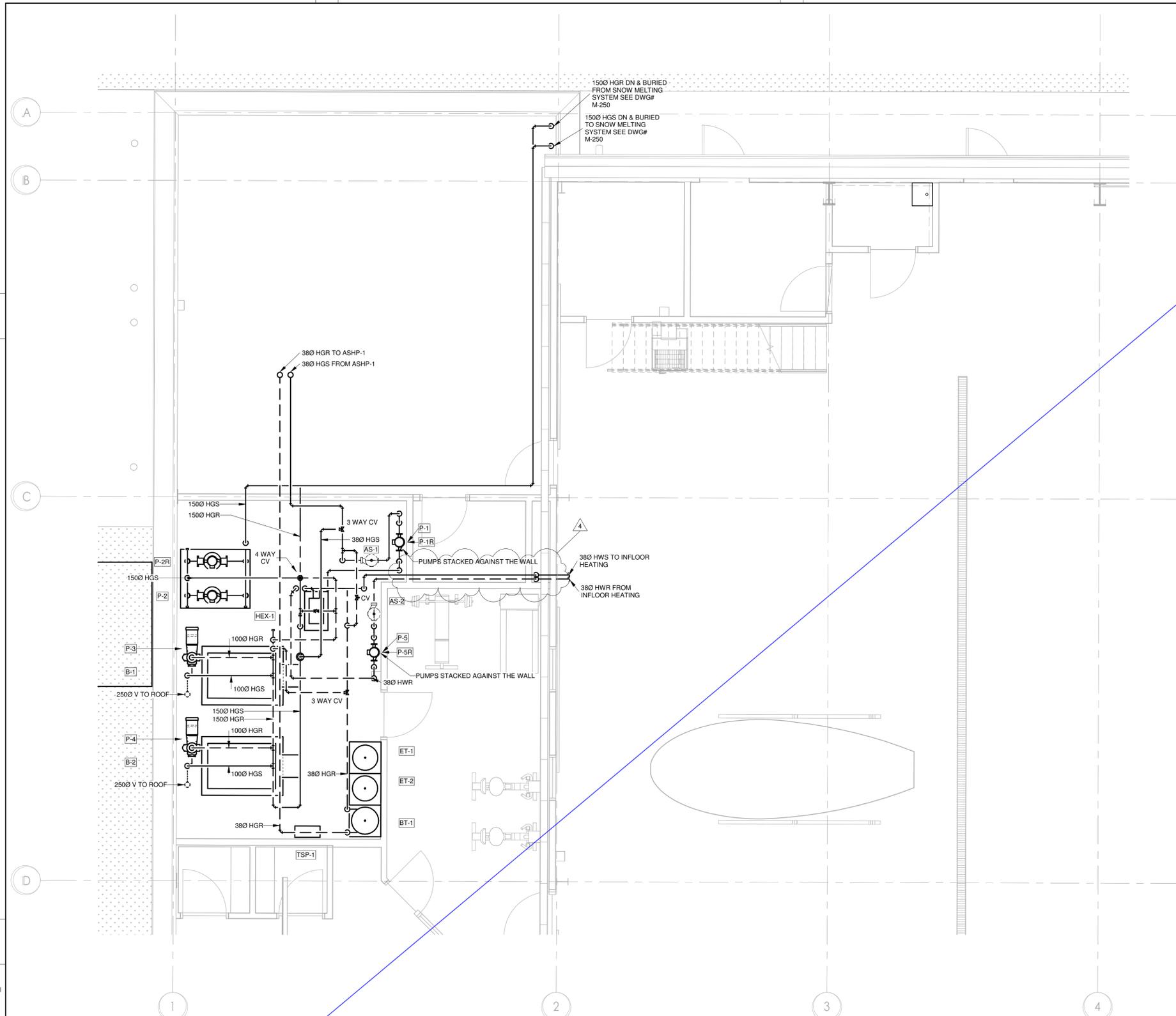
2 **MECH ROOM 3D VIEW 1**
SCALE:



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



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



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

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

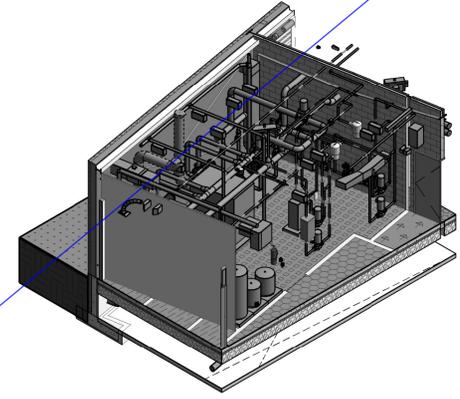
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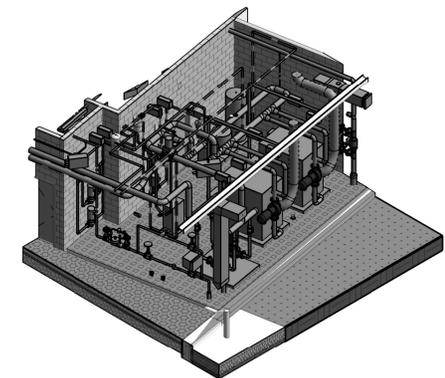
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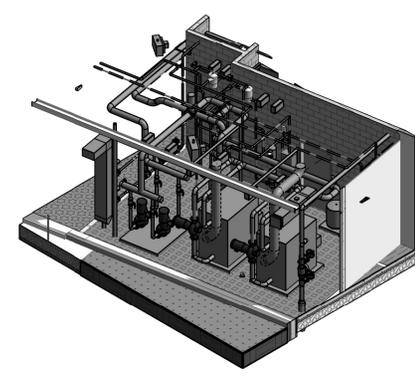
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No: **M-252**



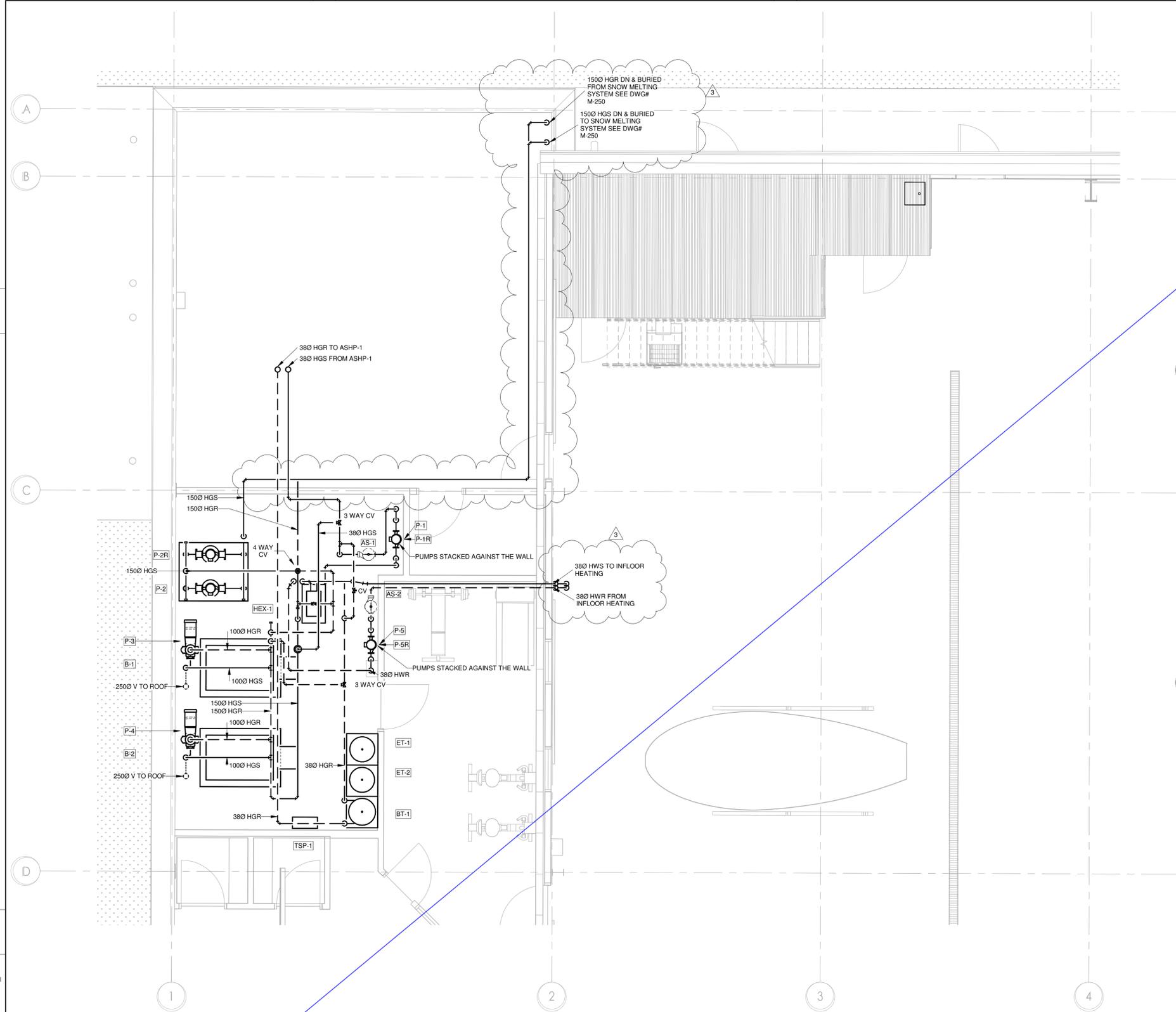
2 **MECH ROOM 3D VIEW 1**
SCALE:



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



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



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

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Key Plan

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8	ISSUED FOR ADDENDUM 15	2024-12-04
7	ISSUED FOR ADDENDUM 14	2024-11-27
6	ISSUED FOR ADDENDUM 10	2024-10-15
5	ISSUED FOR ADDENDUM 8	2024-10-07
4	ISSUED FOR ADDENDUM 6	2024-09-30
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1	ISSUED FOR BUILDING PERMIT	2024-07-31
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Sheet Title:

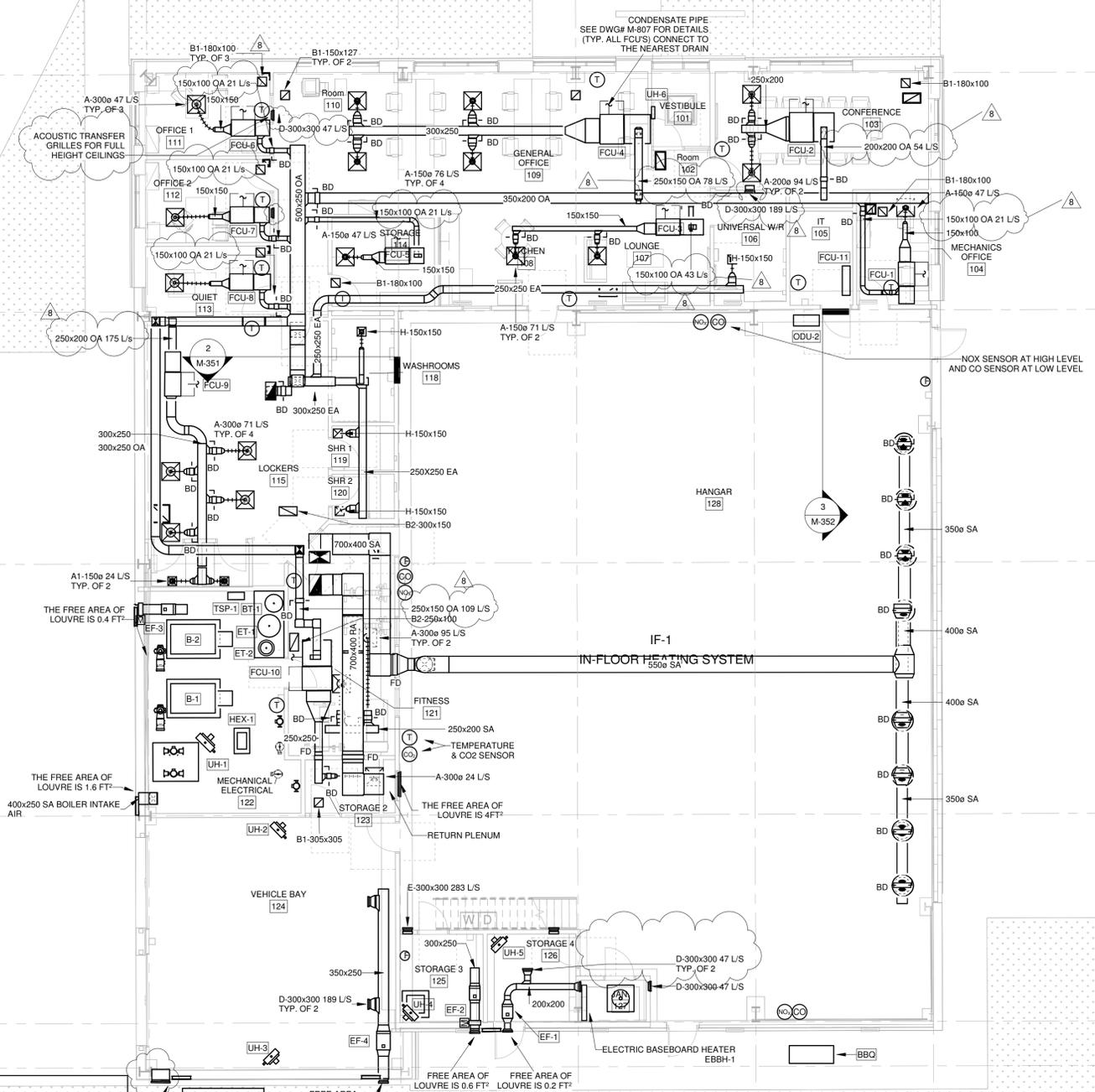
VENTILATION NEW WORK - LEVEL 1

Drawing No: M-351

- 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 FREEZESTAT 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 COILS. 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 18 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 IT IF NECESSARY TO MAINTAIN THE FROST SETPOINT WHICH VARIES WITH THE EXHAUST AIR HUMIDITY AND OUTDOOR AIR TEMPERATURE AS SHOWN IN THE TABLE BELOW.
- | OUT (C) | SETPOINT RH(%) | OUT (C) | SETPOINT RH(%) | OUT (C) | SETPOINT RH(%) |
|---------|----------------|---------|----------------|---------|----------------|
| -25 | -15.0 | -19.4 | -11.1 | -15.6 | 8.3 |
| -26.1 | -11.7 | -20.3 | -7.8 | -16.1 | 4.9 |
| -28.3 | -8.4 | -22.2 | -4.4 | -17.2 | -1.3 |
| -32.2 | -5.0 | -25 | -1.0 | -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. 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. SUPPLY AIR 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 OPERATION. UNIT 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 STROBEHORN IN THE SPACE FOR LOCAL HIGH GAS ALARM ANNUNCIATION.
- 1.1.5. OCCUPANCY STATUS IS NOT CONSIDERED FOR OPERATION.
- 1.2. SAFETIES AND LIMITS**
- 1.2.1. FAN SPEED MODULATION IS DISABLED UNTIL FAN RUN STATUS IS RECEIVED.
- 1.2.2. THE MINIMUM SPEED FOR THE VFD IS 50% (30 HZ - CONFIRM MIN SPEED WITH BALANCER).
- 1.2.3. SUPPLY AIR TEMPERATURE CONTROL IS DISABLED UNTIL FAN RUN STATUS IS RECEIVED.
- 1.2.4. DAMPER CONTROL IS DISABLED UNTIL FAN RUN STATUS IS RECEIVED.
- 1.2.5. SIMULTANEOUS HEATING AND COOLING IS NOT PERMITTED.
- 1.2.6. 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**
- 1.4. 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 16 DEG C (OR 18 DEG C WHEN ASHP IS OFF).
- 1.4.3. GAS DETECTION SETPOINTS: THE CO SETPOINT IS 25 PPM. THE NOX SETPOINT IS 1 PPM. UNIT RUNS AT 100%.
- 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 ITS 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 (FREE COOLING MODE): 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. UNIT TURNS ON FOR THE FOLLOWING TRIGGERS:
CO2 > LIMIT, 50% RETURN FAN, 50% SUPPLY FAN.
CO > LIMIT, 100% RETURN FAN, 80% SUPPLY FAN.
NOX > LIMIT, 100% RETURN FAN, 80% SUPPLY FAN OR TEMP < 18 DEG C.
OFF 18 DEG C, 100% FAN.
- 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(20%) | OUT (C) | SETPOINT RH(20%) | OUT (C) | SETPOINT RH(20%) |
|---------|------------------|---------|------------------|---------|------------------|
| -25 | -15.0 | -19.4 | -11.1 | -15.6 | 8.3 |
| -26.1 | -11.7 | -20.3 | -7.8 | -16.1 | 4.9 |
| -28.3 | -8.4 | -22.2 | -4.4 | -17.2 | -1.3 |
| -32.2 | -5.0 | -25 | -1.0 | -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 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.
- 1.6.4. NOX LEVEL ABOVE 3 PPM.
- 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 8 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.



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

2 RTU-1 SCHEMATIC CONCEPT
SCALE: 1 : 100

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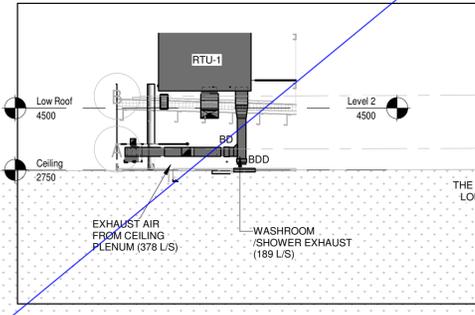
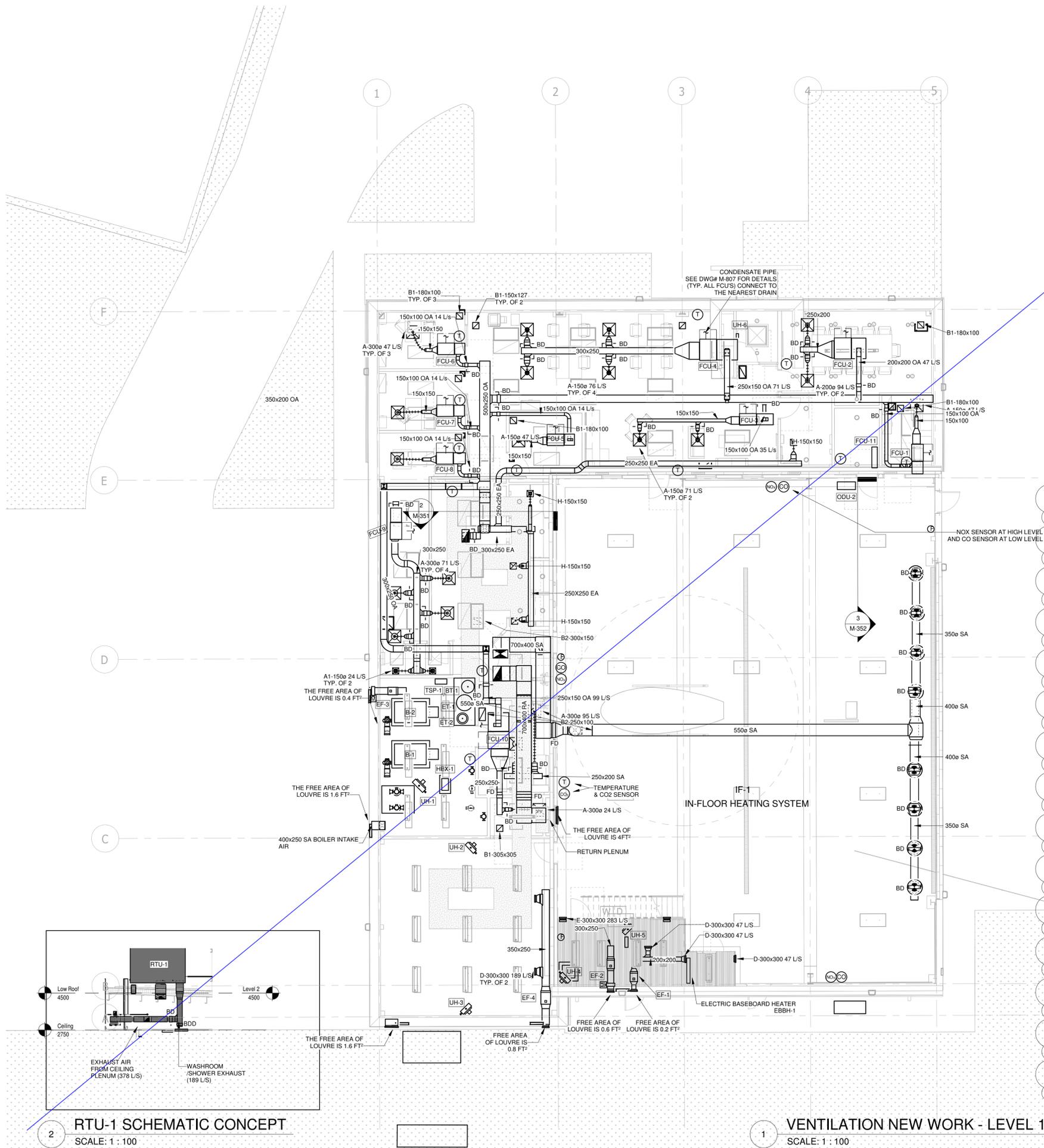
Sheet
Title:

VENTILATION NEW WORK - LEVEL 1

Drawing
No.
M-351

- ### 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. Setpoints and Limits
- 1.2.1. A freeze-stat 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 to 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 off 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 it 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:
- | OAT (C) | SETPOINT RH% (20%) | OAT (C) | SETPOINT RH% (30%) | OAT (C) | SETPOINT RH% (50%) |
|---------|--------------------|---------|--------------------|---------|--------------------|
| -25 | -15.6 C | -18.4 | -11.1 C | -15.6 | -8.2 C |
| -20.1 | -11.7 C | -20.3 | -7.8 C | -16.1 | -4.9 C |
| -28.9 | -8.3 C | -22.7 | -4.4 C | -17.2 | -3.9 C |
| -32.2 | -5.6 C | -25 | -3.0 C | -19.4 | 0.8 C |
| -35 | -3.9 C | -27.2 | -0.6 C | -20.6 | 2.3 C |
| -40 | -3.3 C | -31.1 | -0.3 C | -23.9 | 3.3 C |
- 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. Supply Air 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. Provide an alarm strobe/horn in the space for local high gas alarm annunciation.
- 1.1.4. Occupancy is determined based on lighting controls occupancy sensors.
- #### 1.2. Setpoints and Limits
- 1.2.1. Fan speed modulation is disabled until fan run status is received.
- 1.2.2. The minimum speed for the VFD is 50% (30 hz - confirm min speed with balancer).
- 1.2.3. Supply air temperature control is disabled until fan run status is received.
- 1.2.4. Damper control is disabled until fan run status is received.
- 1.2.5. Simultaneous heating and cooling is not permitted.
- 1.2.6. 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
- #### 1.4. 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 16 Deg C (or 18 Deg C when ASHP is OFF).
- 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 its 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 (Free Cooling Mode): 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. Unit turns on for the following triggers: CO2 > LIMIT, 50% RETURN FAN, 50% SUPPLY FAN, CO > LIMIT, 100% RETURN FAN, 80% SUPPLY FAN, NOx > LIMIT, 100% RETURN FAN, 80% SUPPLY FAN OR TEMP < 16 DEG C, OFF, 18 DEG C, 100% FAN.
- 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:
- | OAT (C) | SETPOINT RH% (20%) | OAT (C) | SETPOINT RH% (30%) | OAT (C) | SETPOINT RH% (50%) |
|---------|--------------------|---------|--------------------|---------|--------------------|
| -25 | -15.6 C | -19.4 | -11.1 C | -15.6 | -8.2 C |
| -26.1 | -11.7 C | -20.3 | -7.8 C | -16.1 | -4.9 C |
| -28.9 | -8.3 C | -22.7 | -4.4 C | -17.2 | -3.9 C |
| -32.2 | -5.6 C | -25 | -3.0 C | -19.4 | 0.8 C |
| -35 | -3.9 C | -27.2 | -0.6 C | -20.6 | 2.3 C |
| -40 | -3.3 C | -31.1 | -0.3 C | -23.9 | 3.3 C |
- #### 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 5 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.



RTU-1 SCHEMATIC CONCEPT
SCALE: 1 : 100

VENTILATION NEW WORK - LEVEL 1
SCALE: 1 : 100



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YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT
BOULEVARD
TOWN OF EAST GWILLIMBURY

Key
Plan

NO.	ISSUED FOR	DATE
6	ISSUED FOR ADDENDUM 10	2024-10-15
5	ISSUED FOR ADDENDUM 8	2024-10-07
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/ Lulian Turiga
Checked by: Ali Nakhaei-Zadeh
Original Issue Date: 2024-07-31
Project No: TT-24-005
Scale: 1 : 100

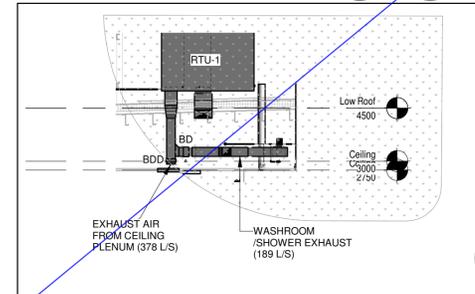
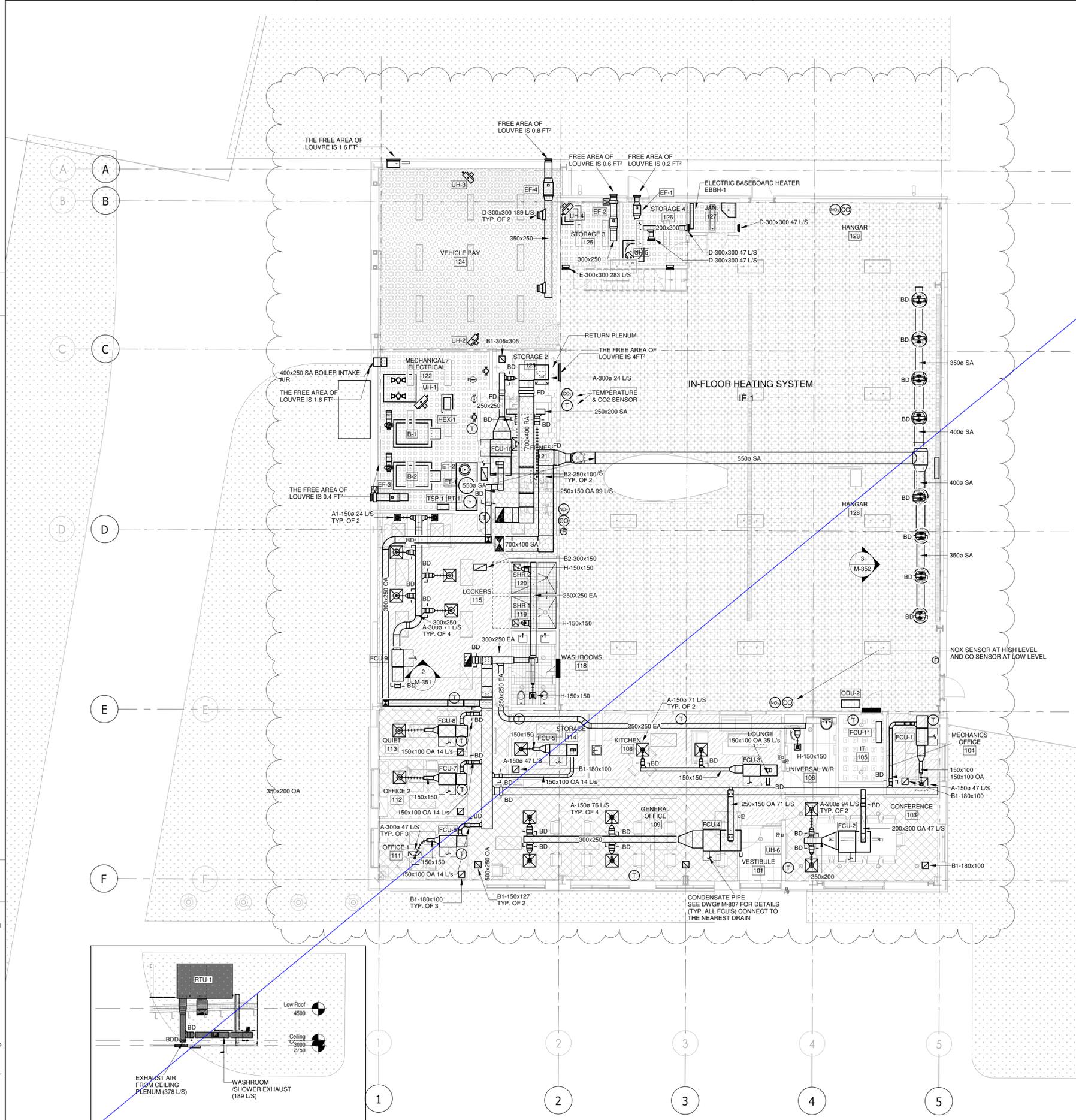
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Title:

VENTILATION NEW WORK - LEVEL 1

Drawing
No.
M-351

- 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 freezeback 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 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 it 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.
- | OAT (C) | SETPOINT RH% (DPS) | OAT (C) | SETPOINT RH% (DPS) | OAT (C) | SETPOINT RH% (DPS) |
|---------|--------------------|---------|--------------------|---------|--------------------|
| -25 | -15.5 C | -18 | -11.5 C | -10 | -7.5 C |
| -26.1 | -11.7 C | -20.3 | -7.8 C | -16.1 | -4.9 C |
| -28 | -8.5 C | -22.2 | -4.4 C | -17.2 | -1.9 C |
| -32.2 | -5.4 C | -25 | -1.9 C | -19.4 | 0.8 C |
| -35 | -3.9 C | -27.2 | -0.6 C | -20.6 | 2.3 C |
| -40 | -3.3 C | -31.1 | -0.3 C | -23.3 | 3.3 C |
- 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 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 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 announcement.
- 1.1.5. Provide an occupied mode push button at the main entrance.
- 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 it 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.
- | OAT (C) | SETPOINT RH% (DPS) | OAT (C) | SETPOINT RH% (DPS) | OAT (C) | SETPOINT RH% (DPS) |
|---------|--------------------|---------|--------------------|---------|--------------------|
| -25 | -15.5 C | -19.4 | -11.1 C | -15.6 | -8.2 C |
| -26.1 | -11.7 C | -20.3 | -7.8 C | -16.1 | -4.9 C |
| -28 | -8.5 C | -22.2 | -4.4 C | -17.2 | -1.9 C |
| -32.2 | -5.4 C | -25 | -1.9 C | -19.4 | 0.8 C |
| -35 | -3.9 C | -27.2 | -0.6 C | -20.6 | 2.3 C |
| -40 | -3.3 C | -31.1 | -0.3 C | -23.3 | 3.3 C |
- 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 not received (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.



RTU-1 SCHEMATIC CONCEPT
SCALE: 1 : 100

VENTILATION NEW WORK - LEVEL 1
SCALE: 1 : 100



YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT
BOULEVARD
TOWN OF EAST GWILLIMBURY

Key
Plan

NO.	ISSUED FOR	DATE
5	ISSUED FOR ADDENDUM 8	2024-10-07
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

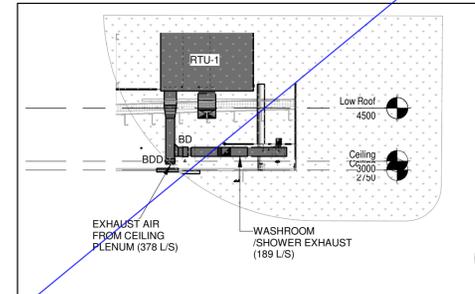
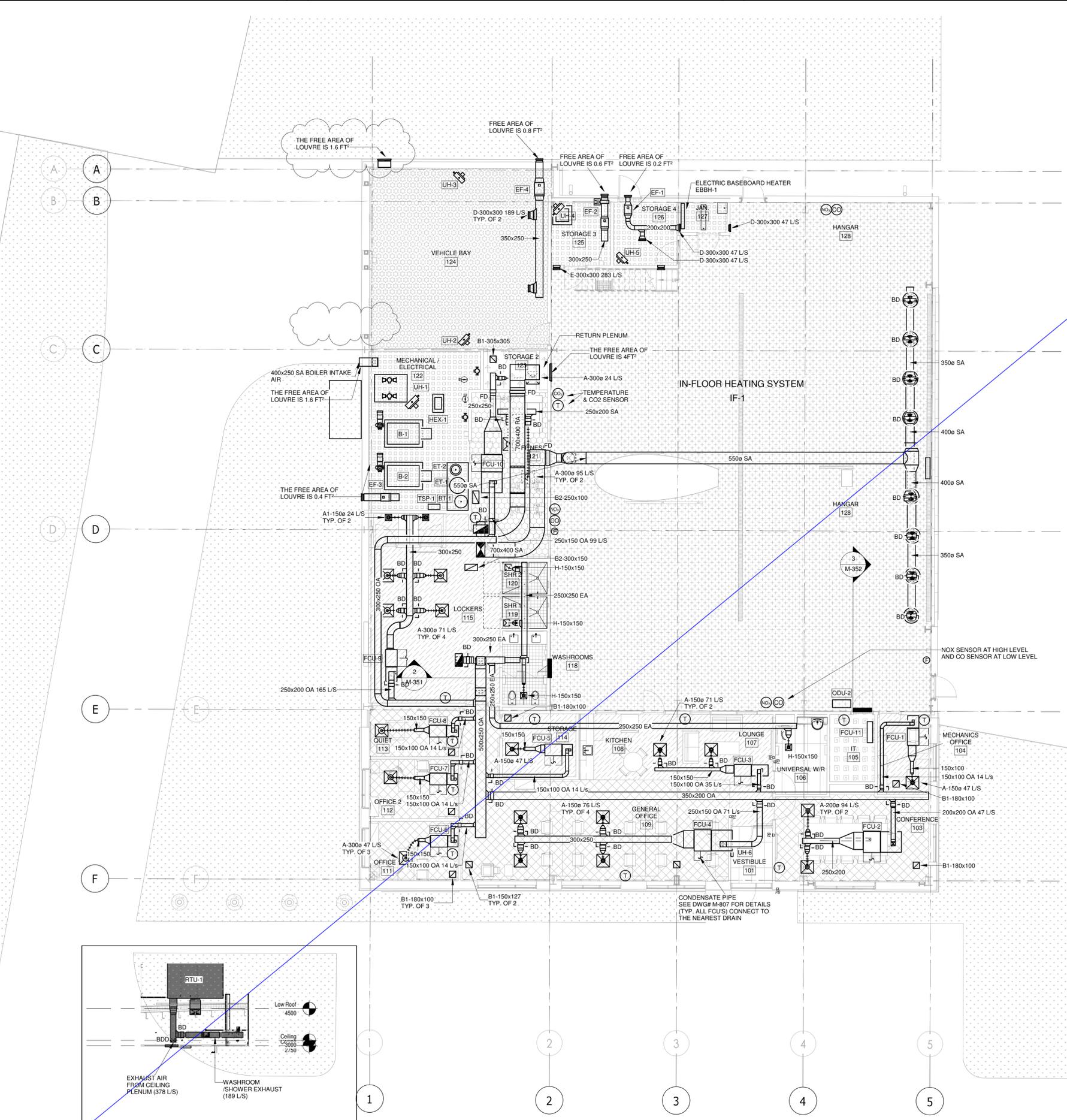
Drawn by: Fizzah Khan/ Lulian Turiga
Checked by: Ali Nakhaei-Zadeh
Original Issue Date: 2024-07-31
Project No: TT-24-005
Scale: 1 : 100

VENTILATION NEW WORK - LEVEL 1

Drawing
No. M-351

- 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 freeze-stat 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 it 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 | -15.5C | -18.5 | -13.5C | 15.5 | 25.2C |
| -26.1 | -11.7C | -20.3 | -7.8C | -16.1 | -4.9C |
| -28.3 | -8.3C | -22.2 | -4.4C | -17.2 | -1.9C |
| -32.2 | -5.4C | -25 | -1.5C | -19.4 | 0.8C |
| -35 | -3.9C | -27.2 | -0.6C | -20.6 | 2.3C |
| -40 | -3.3C | -31.1 | -0.3C | -23.3 | 3.3C |
- 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 the 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 announcement.
- 1.1.5. Provide an occupied mode push button at the main entrance.
- 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 it 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 | -15.5C | -19.4 | -11.1C | -15.6 | -8.2C |
| 26.1 | -11.7C | -20.3 | -7.8C | -16.1 | -4.9C |
| 28.3 | -8.3C | -22.2 | -4.4C | -17.2 | -1.9C |
| 32.2 | -5.4C | -25 | -1.5C | -19.4 | 0.8C |
| 35 | -3.9C | -27.2 | -0.6C | -20.6 | 2.3C |
| 40 | -3.3C | -31.1 | -0.3C | -23.3 | 3.3C |
- 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 not (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 the 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.



RTU-1 SCHEMATIC CONCEPT
SCALE: 1 : 100

VENTILATION NEW WORK - LEVEL 1
SCALE: 1 : 100



250 ROWNTREE DAIRY RD, WOODBRIDGE, ON
TEL: 905-907-0800
WWW.QUASARGROUP.COM

YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT
BOULEVARD
TOWN OF EAST GWILLIMBURY

Key Plan

NO.	ISSUED FOR	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
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: Fizzah Khan/ Lulian Turiga
Checked by: Ali Nakhaei-Zadeh
Original Issue Date: 2024-07-31
Project No: TT-24-005
Scale: 1: 100

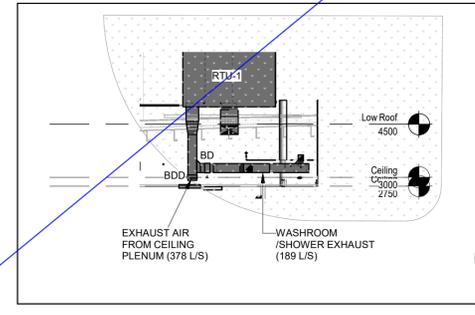
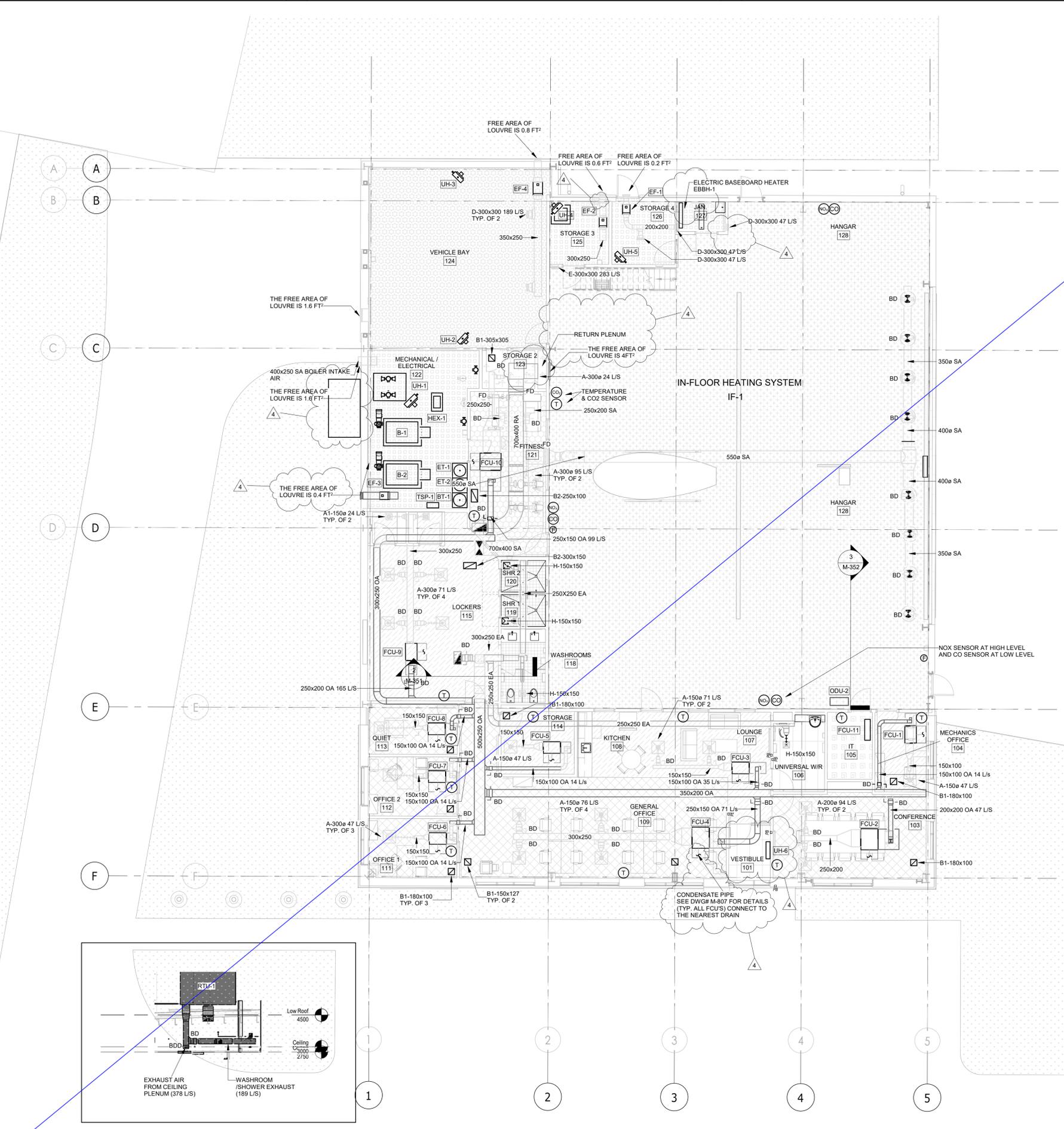
VENTILATION NEW WORK - LEVEL 1

Sheet No:
M-351

- 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 it 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 | 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 | -1.5 |
| 32.2 | -4.8 | 25 | -1.0 | -19.4 | 0.8 |
| 35 | -3.0 | 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 the 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.
- 1.1.5. Provide an occupied mode push button at the main entrance.
- 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 it 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 | -1.5 |
| 32.2 | -4.8 | 25 | -1.0 | -19.4 | 0.8 |
| 35 | -3.0 | 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 not received (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 the 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.

- 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 not received (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 the 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.



RTU-1 SCHEMATIC CONCEPT
SCALE: 1: 100

VENTILATION NEW WORK - LEVEL 1
SCALE: 1: 100



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Key
Plan

NO.	ISSUED	ISSUED	DATE
3	ISSUED FOR ADDENDUM 3		2024-09-23
2	ISSUED FOR TENDER		2024-09-09
1	ISSUED FOR BUILDING PERMIT		2024-07-31
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: Fizzah Khan/ Lulian Turiga
Checked by: Ali Nakhaei-Zadeh
Original Issue Date: 2024-07-31
Project No: TT-24-005
Scale: 1 : 100

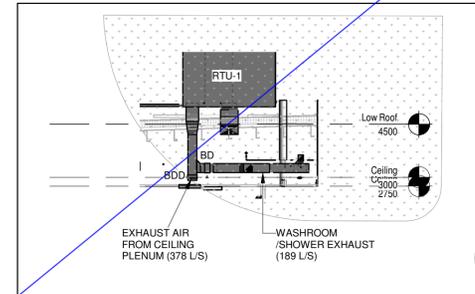
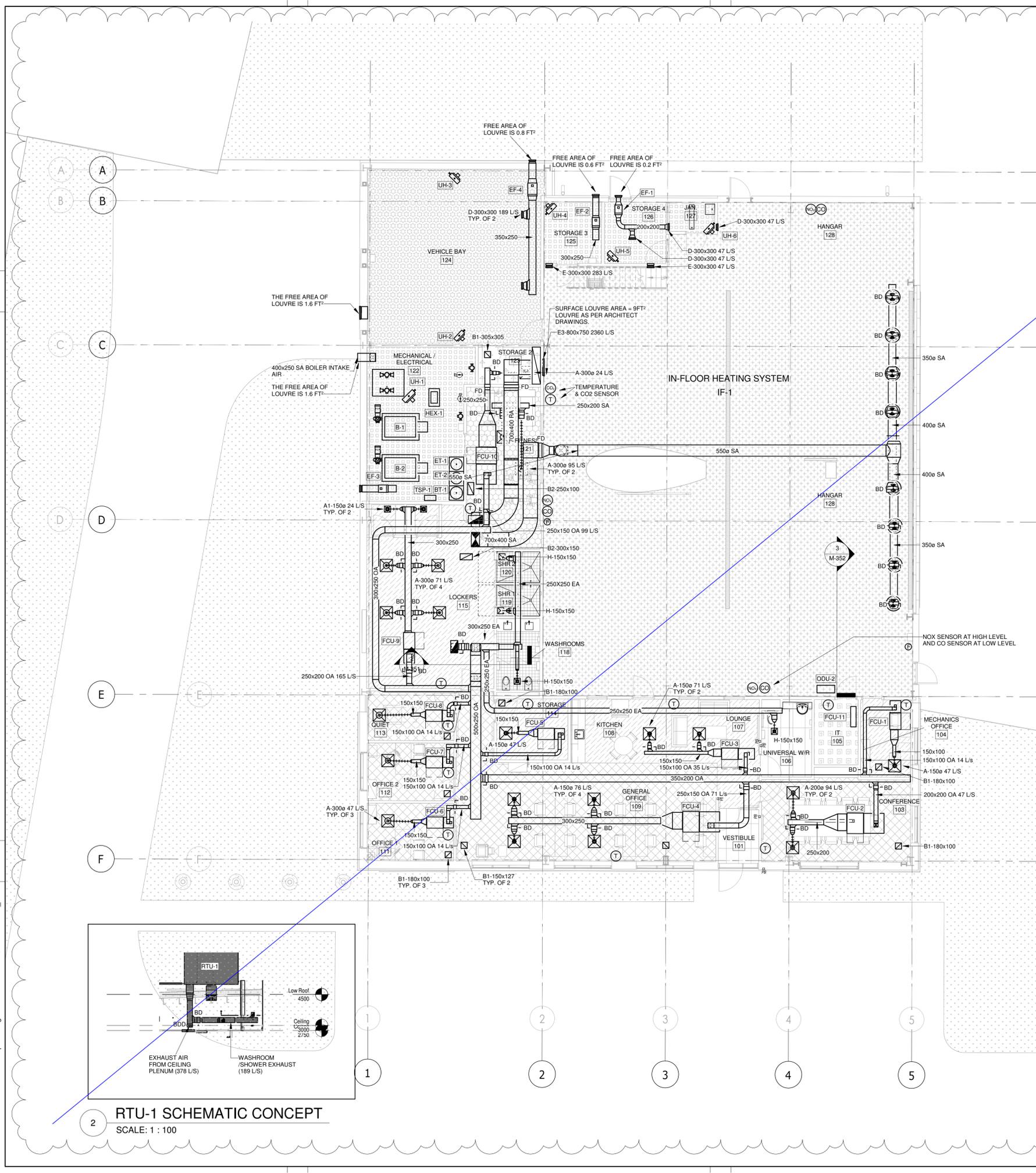
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VENTILATION NEW WORK - LEVEL 1

Drawing
No:
M-351

- 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 | -15.5C | -18.5 | -13.5C | 15.5 | 25.2C |
| -26.1 | -11.7C | -20.3 | -7.8C | -16.1 | -4.9C |
| -28.3 | -8.3C | -22.2 | -4.4C | -17.2 | -1.9C |
| -32.2 | -5.4C | -25 | -1.5C | -19.4 | 0.8C |
| -35 | -3.9C | -27.2 | -0.6C | -20.6 | 2.3C |
| -40 | -3.3C | -31.1 | -0.3C | -23.3 | 3.3C |
- 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. Supply Air 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 | -15.6C | -19.4 | -11.1C | -15.6 | -8.2C |
| -26.1 | -11.7C | -20.3 | -7.8C | -16.1 | -4.9C |
| -28.3 | -8.3C | -22.2 | -4.4C | -17.2 | -1.9C |
| -32.2 | -5.4C | -25 | -1.5C | -19.4 | 0.8C |
| -35 | -3.9C | -27.2 | -0.6C | -20.6 | 2.3C |
| -40 | -3.3C | -31.1 | -0.3C | -23.3 | 3.3C |
- 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 not received (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.



RTU-1 SCHEMATIC CONCEPT
SCALE: 1 : 100



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Plan

NO.	ISSUED	DATE
2	ISSUED FOR TENDER	2024-09-09
1	ISSUED FOR BUILDING PERMIT	2024-07-31

Issues

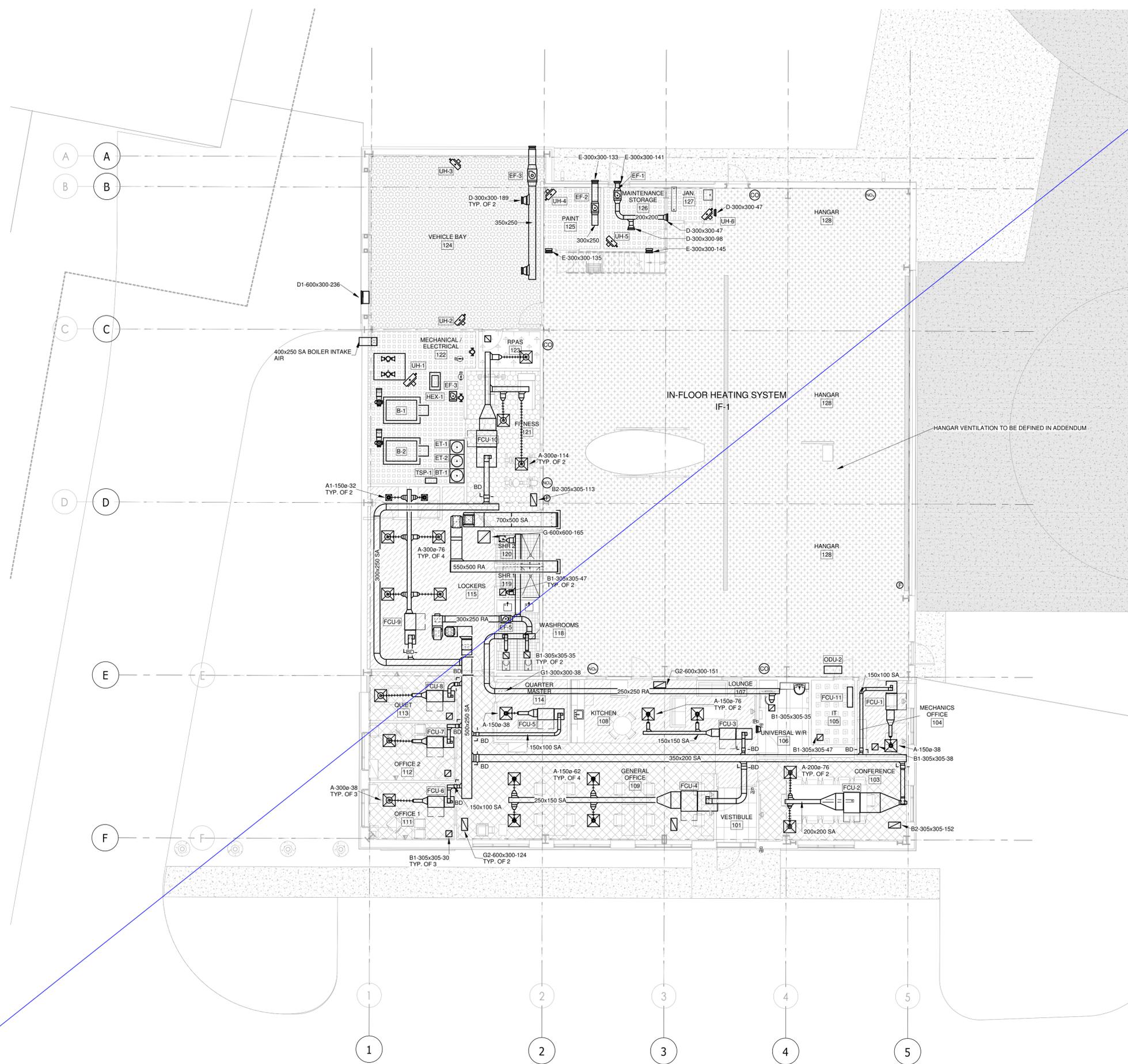
All measurements are to be checked and verified on site by the contractor before proceeding with work

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: 1 : 100

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WORK - LEVEL 1**

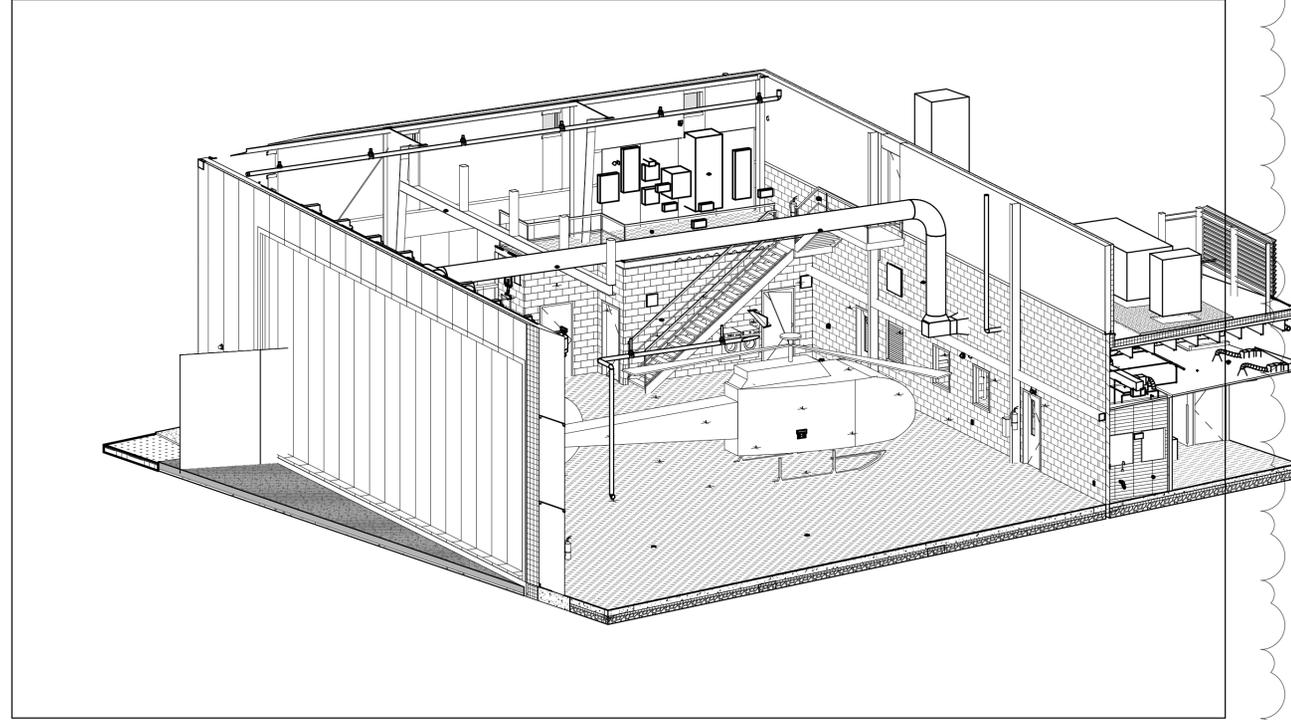
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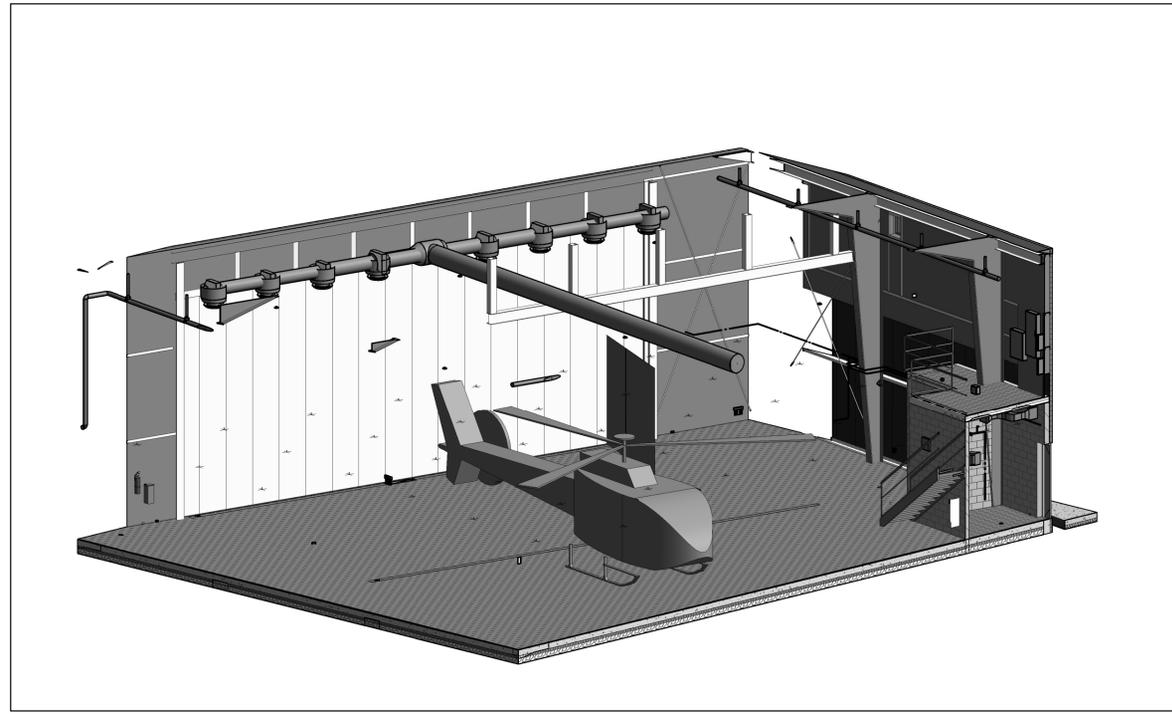
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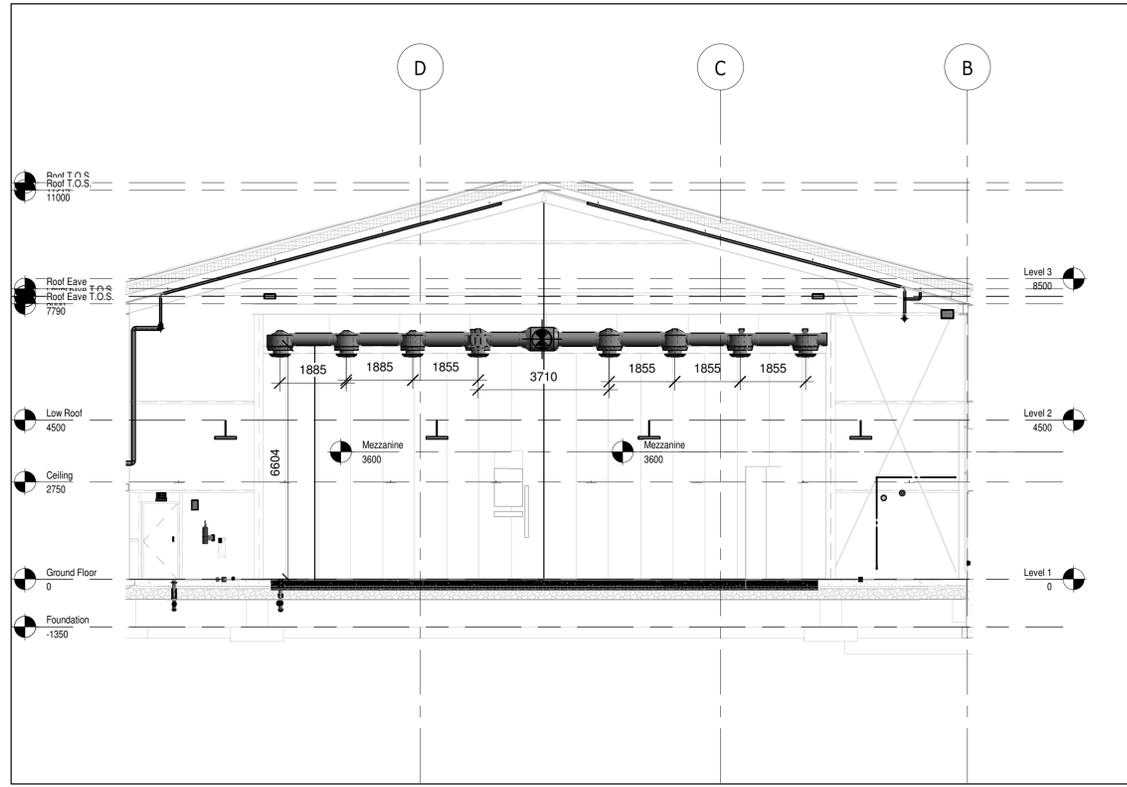
Key
Plan



2 HANGAR VENTILATION ISOMETRIC 2
SCALE:



1 HANGAR VENTILATION ISOMETRIC
SCALE:



3 HANGAR VENTILATION SECTION VIEW
SCALE: 1 : 100

NO.	ISSUED	DATE
2	ISSUED FOR ADDENDUM 14	2024-11-27
1	ISSUED FOR ADDENDUM 3	2024-09-23

Issues

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 Checked by: Ali Nakhaei-Zadeh
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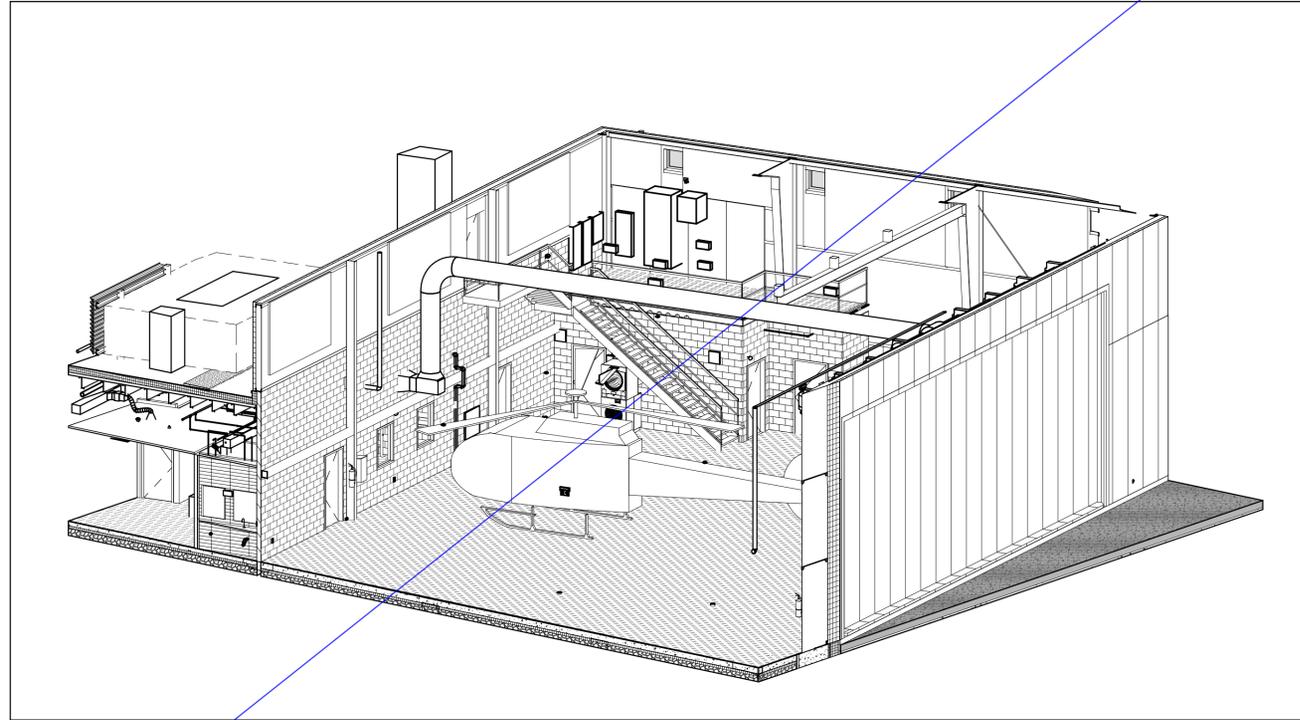
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**VENTILATION NEW
 WORK - ISOMETRIC
 VIEWS**

Drawing
 No.
M-352

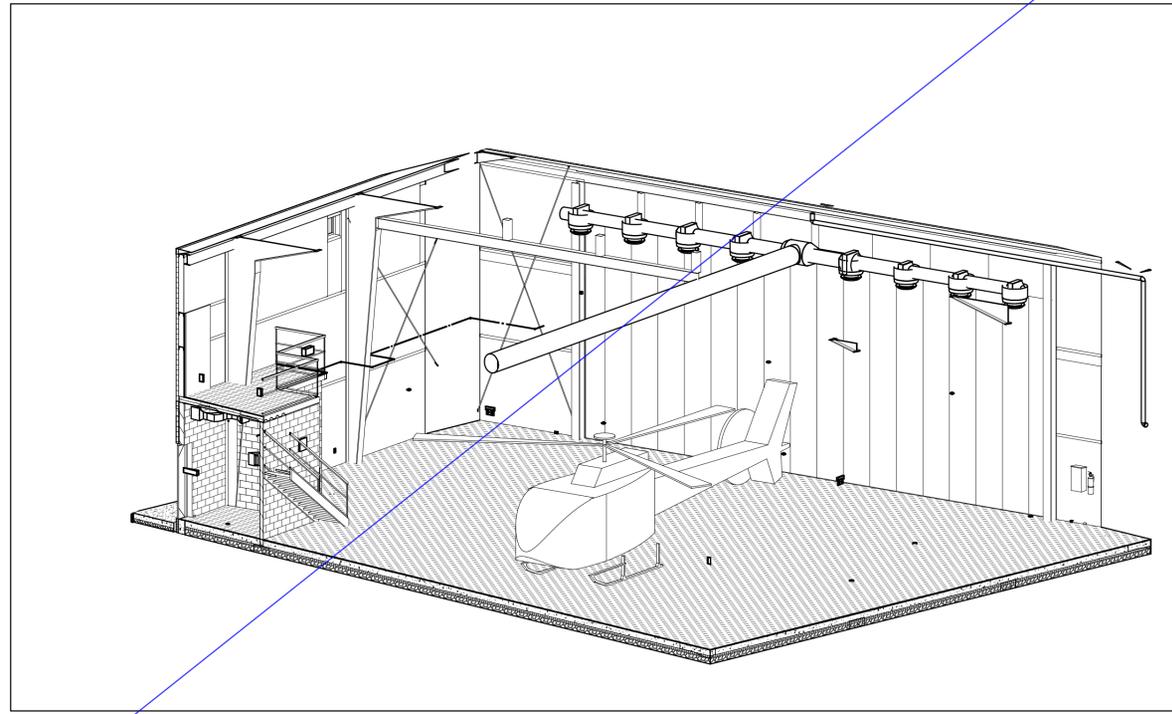
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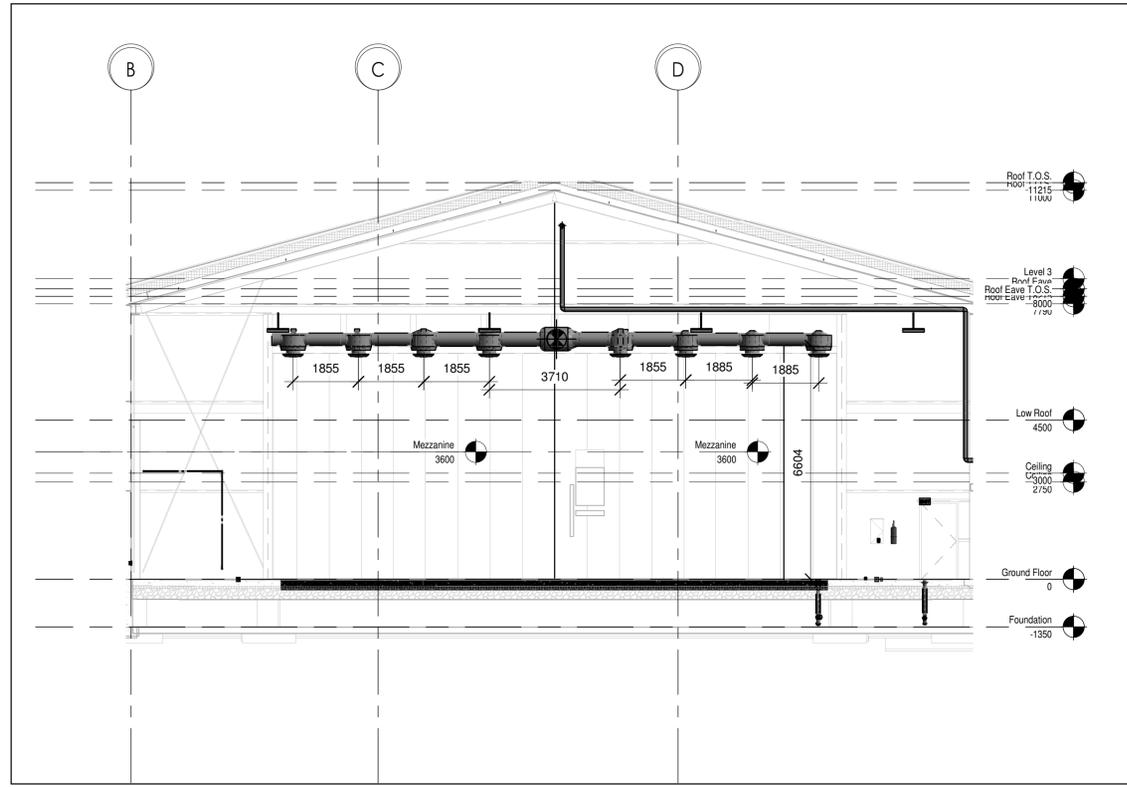
Key
Plan



2 HANGAR VENTILATION ISOMETRIC 2
SCALE:



1 HANGAR VENTILATION ISOMETRIC
SCALE:



3 HANGAR VENTILATION SECTION VIEW
SCALE: 1 : 100

NO.	ISSUED FOR ADDENDUM 3	ISSUED	DATE
1	ISSUED FOR ADDENDUM 3		2024-09-23

Issues

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Checked by: Ali Nakhai-Zadeh
Original Issue Date: 2024-07-31
Project No: TT-24-005
Scale: 1 : 100

Sheet
Title:
**VENTILATION NEW
WORK - ISOMETRIC
VIEWS**

Drawing
No.
M-352



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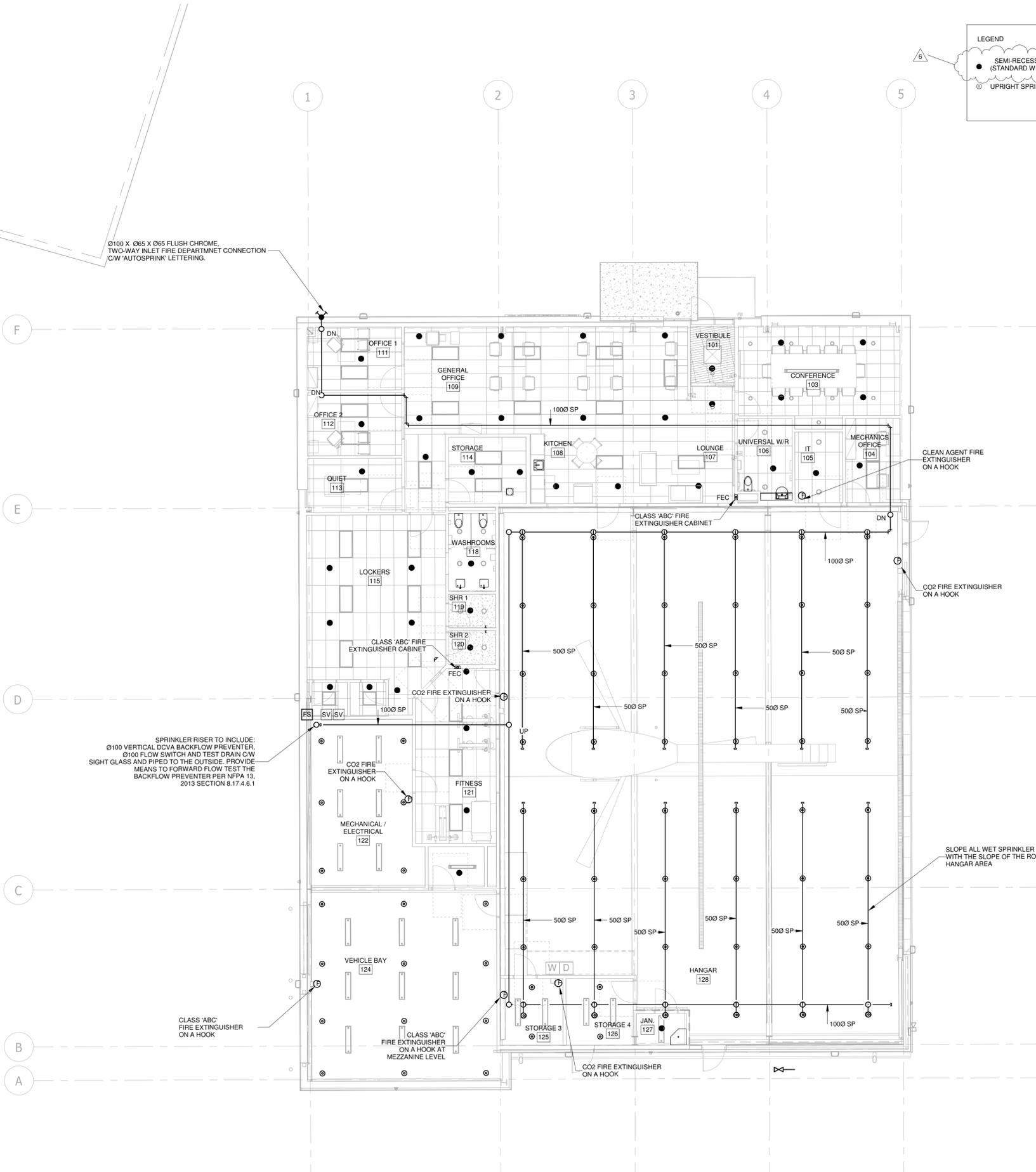
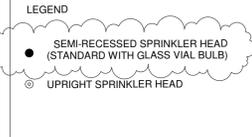
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GENERAL NOTES - FIRE PROTECTION

- 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 CW 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 CLEAN GUARD 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, MODEL SF-10CO2A (MECH. RM & PAINT RM) AND SF-20CO2A (HANGER BAY) CO2 FIRE EXTINGUISHER



NO.	ISSUED	DATE
6	ISSUED FOR ADDENDUM 14	2024-11-27
5	ISSUED FOR ADDENDUM 13	2024-10-30
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

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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: FIRE PROTECTION NEW WORK - LEVEL 1

Drawing
No.
M-551

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



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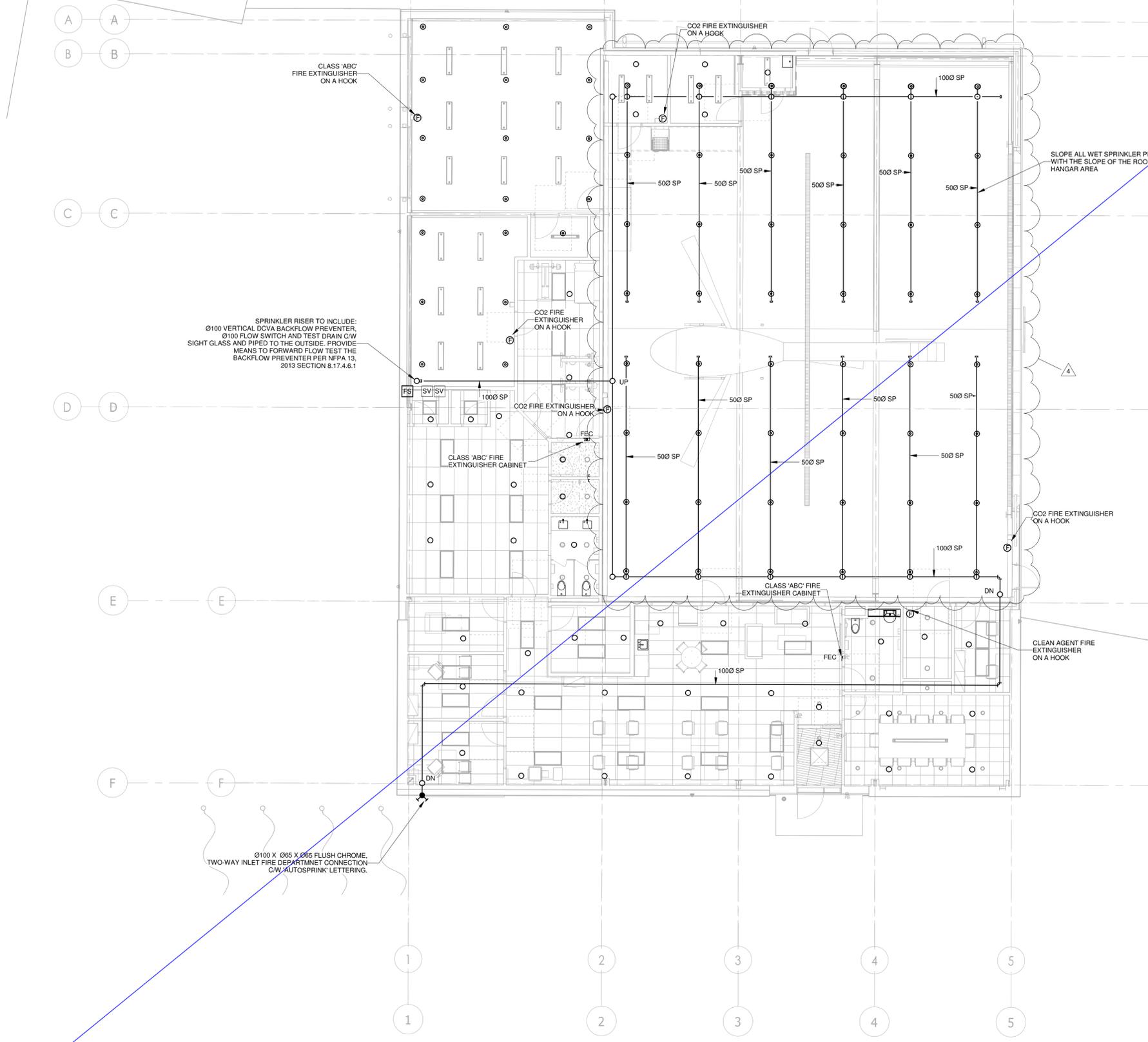
350 GARFIELD WRIGHT
BOULEVARD
TOWN OF EAST GWILLIMBURY

Key
Plan

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 CW 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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 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:
**FIRE PROTECTION NEW
 WORK - LEVEL 1**

Drawing
 No.
M-551

1 FIRE PROTECTION NEW WORK - LEVEL 1

SCALE: 1 : 100



YORK REGIONAL POLICE HELICOPTER HANGAR

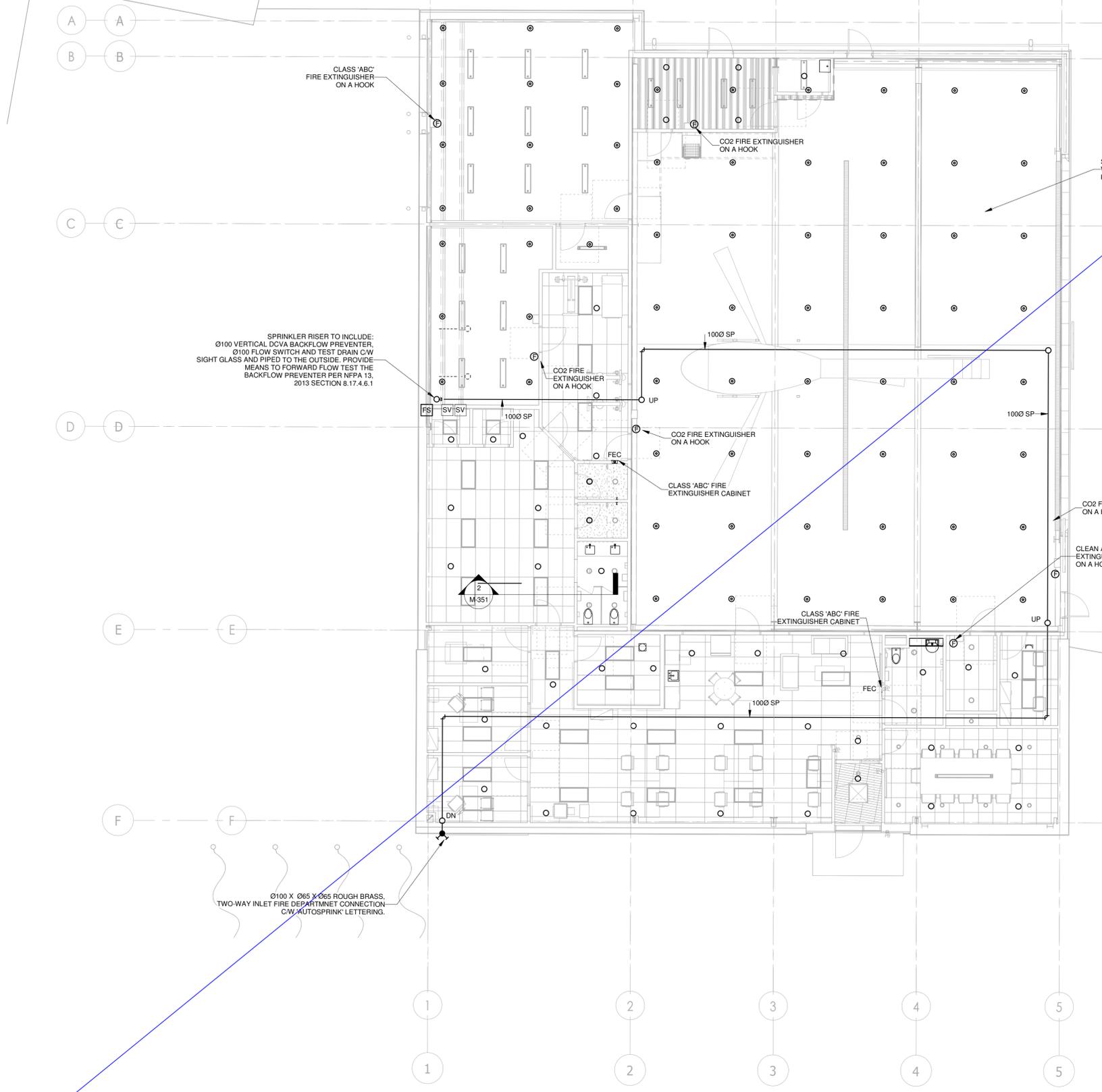
350 GARFIELD WRIGHT
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- LEGEND
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**FIRE PROTECTION NEW
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Drawing
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11. PROVIDE TAGS AND SIGNAGE AS PER NFPA 13-2016.
12. SPRINKLER SYSTEMS ARE TO BE HYDROSTATICALLY TESTED IN ACCORDANCE WITH NFPA 13-2013.





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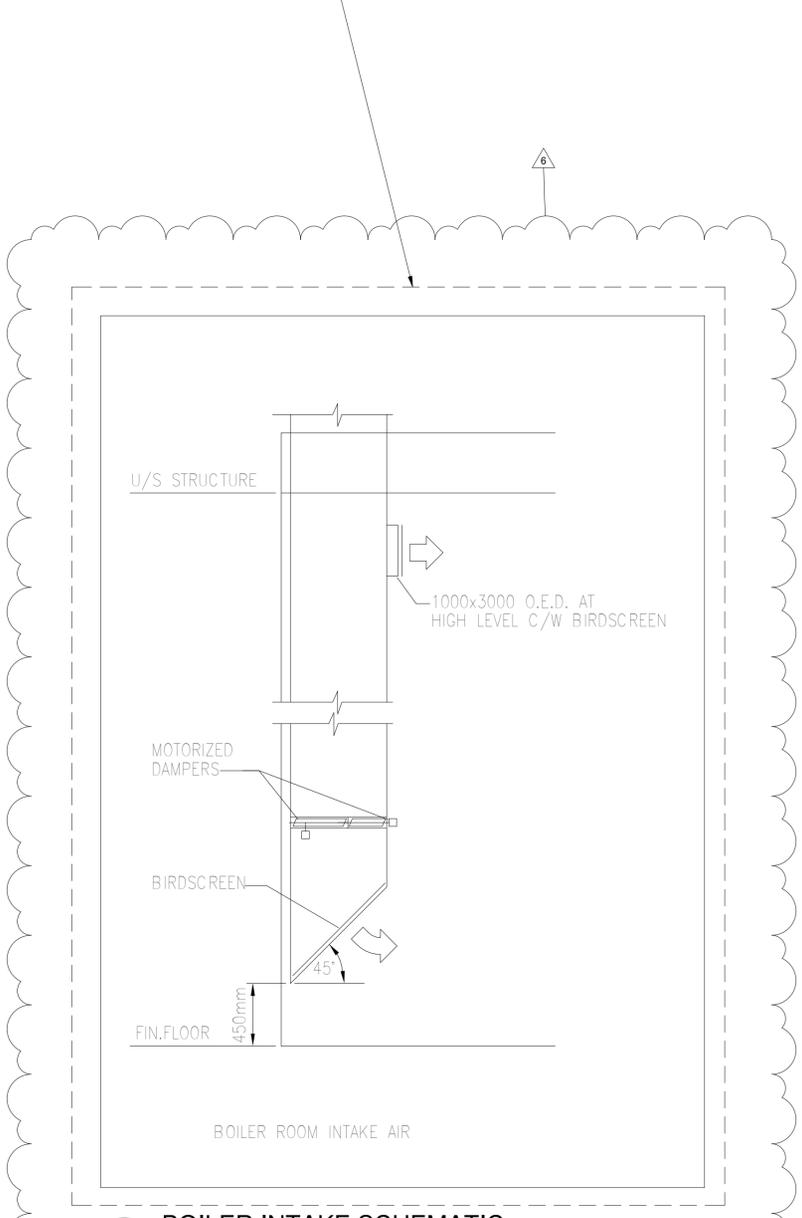
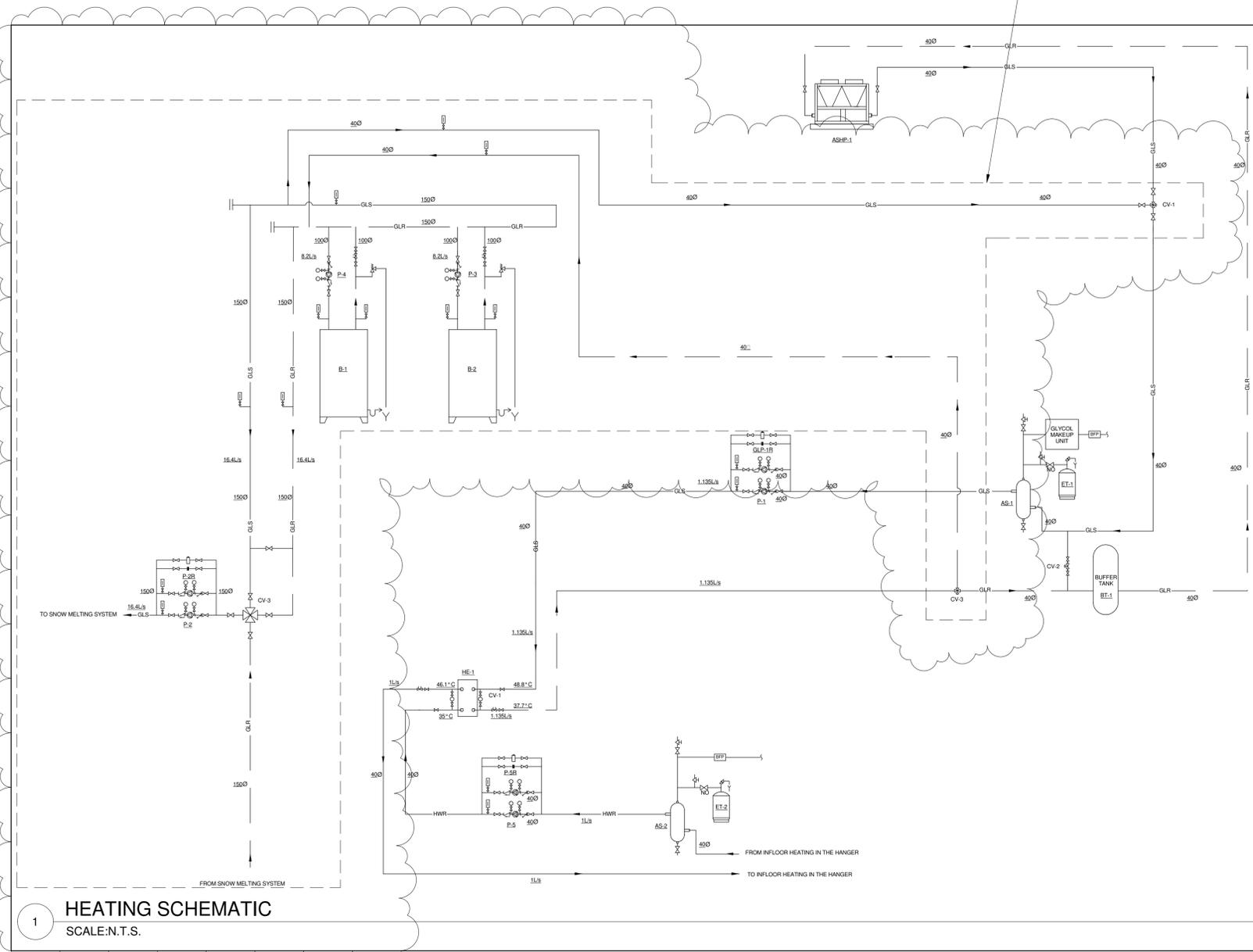
Key
Plan

SEQUENCE OF OPERATION FOR ASHP (IN FLOOR HEATING)

WHEN SPACE TEMPERATURE FALLS BELOW 18C (64F) (ADJUSTABLE):

1. ENABLE PUMP P-5 OR P-5R, P-1 OR P-1R SHALL BE ENABLED (BAS SHALL CYCLE PUMPS AFTER EVERY 30 HOURS OF OPERATION TO ENSURE EVEN WEAR)
2. ASHP SHALL BE ENABLED
3. WHEN SPACE TEMPERATURE REACHES 20C (68F) (ADJUSTABLE):
 - A) PUMPS P-5 AND P-5R SHALL BE DISABLED.
 - B) AIR SOURCE BOILER (ASHP-1) SHALL BE DISABLED
 - C) PUMPS P-1 AND P-1R SHALL BE DISABLED
4. WHEN OUTDOOR AIR TEMPERATURE IS BELOW -10 DEG C (ADJUSTABLE):
 - A) THE THREE WAY VALVE CV-3 WILL DIRECT THE FLOW BETWEEN THE BOILERS TO HEAT EXCHANGER VIA ASSOCIATED BOILER'S PUMP AND P-1 & P-1R
 - B) THE PORT AT CV-1 (ASHP SIDE) WILL BE CLOSED AND LET THE FLOW FROM BOILER(S) DIRECT TO PUMPS P-1 & P-1R.
 - C) THE BOILERS AND THE ASSOCIATED PUMPS WILL BE ACTIVATED TO ALLOW THE DESIGN REQUIREMENTS TO BE REACHED.
 - D) ASHP IS DISABLED

BASE PRICE AND SEPARATE PRICE NO.1
EXCLUDE IN SEPARATE PRICE NO.2



NO.	ISSUED	DATE
6	ISSUED FOR ADDENDUM 15	2024-12-04
5	ISSUED FOR ADDENDUM 14	2024-11-27
4	ISSUED FOR ADDENDUM 8	2024-10-07
3	ISSUED FOR ADDENDUM 6	2024-09-30
2	ISSUED FOR TENDER	2024-09-09
1	ISSUED FOR BUILDING PERMIT	2024-07-31

Issues

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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: **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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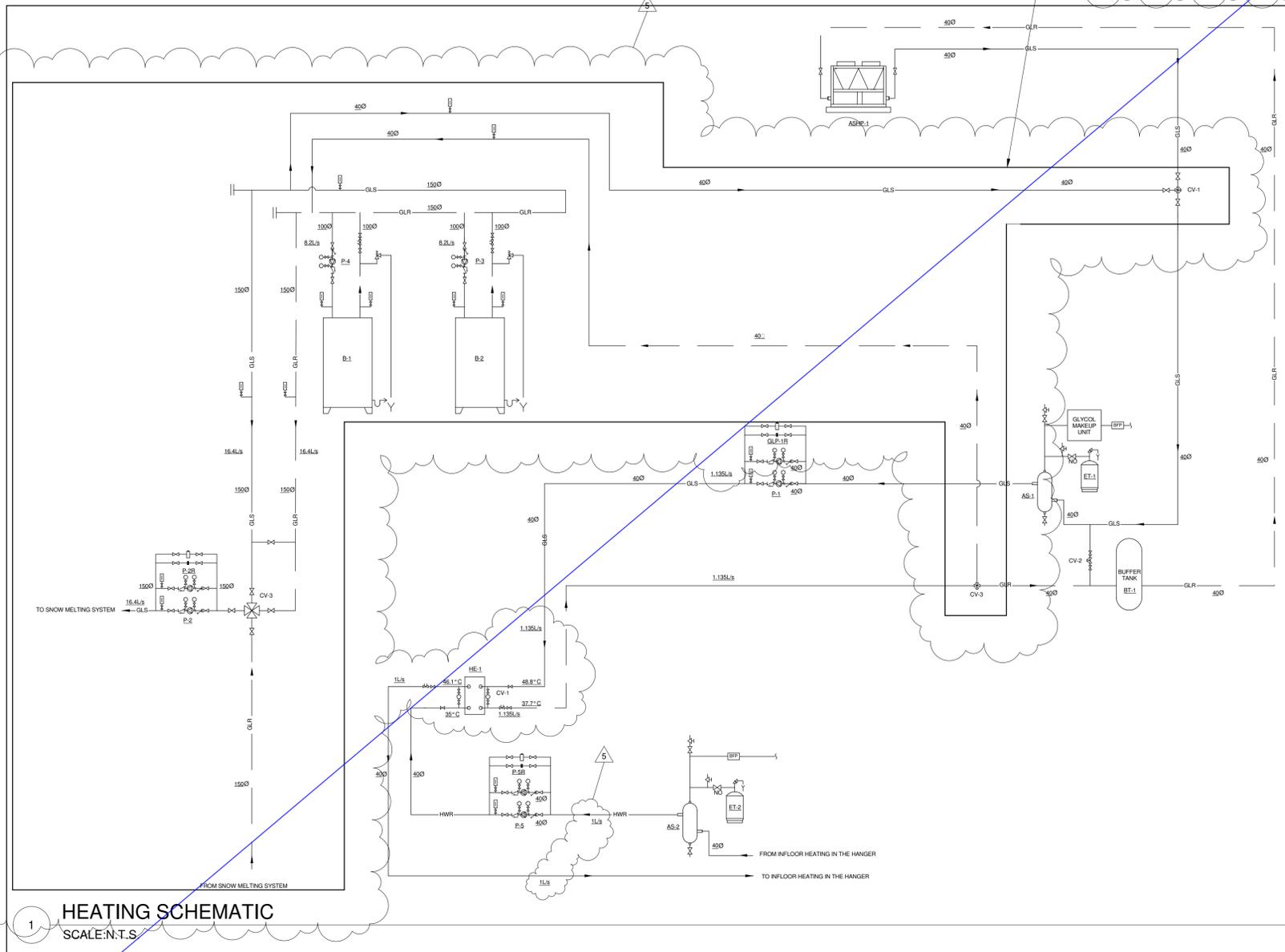
Key
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SEQUENCE OF OPERATION FOR ASHP (IN FLOOR HEATING)

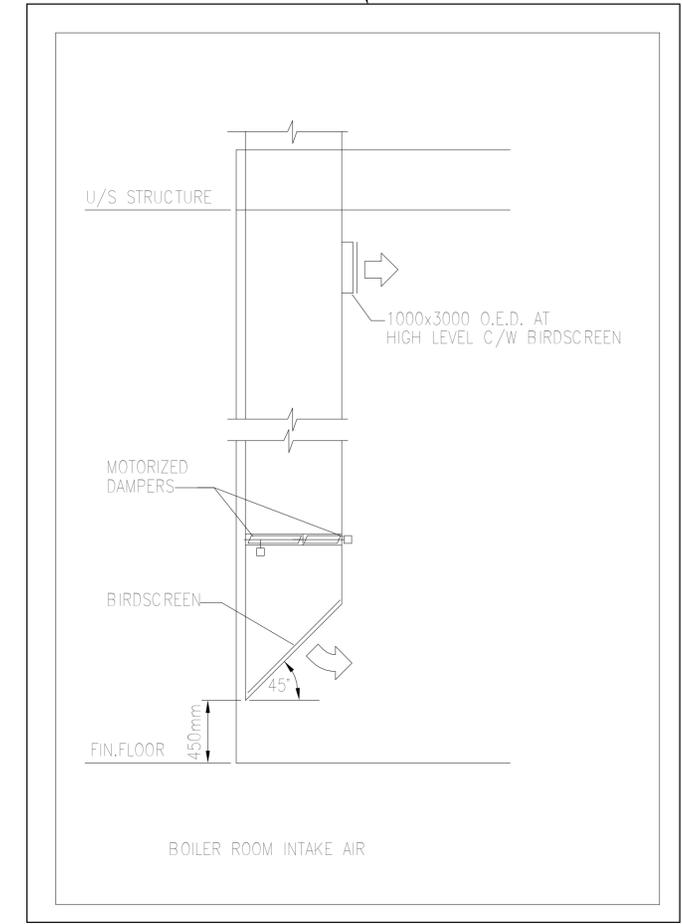
WHEN SPACE TEMPERATURE FALLS BELOW 18C (64F) (ADJUSTABLE):

1. ENABLE PUMP P-5 OR P-5R, P-1 OR P-1R SHALL BE ENABLED (BAS SHALL CYCLE PUMPS AFTER EVERY 30 HOURS OF OPERATION TO ENSURE EVEN WEAR)
2. ASHP SHALL BE ENABLED
3. WHEN SPACE TEMPERATURE REACHES 20C (68F) (ADJUSTABLE):
 - A) PUMPS P-5 AND P-5R SHALL BE DISABLED.
 - B) AIR SOURCE BOILER (ASHP-1) SHALL BE DISABLED
 - C) PUMPS P-1 AND P-1R SHALL BE DISABLED
4. WHEN OUTDOOR AIR TEMPERATURE IS BELOW -10 DEG C (ADJUSTABLE):
 - A) THE THREE WAY VALVE CV-3 WILL DIRECT THE FLOW BETWEEN THE BOILERS TO HEAT EXCHANGER VIA ASSOCIATED BOILER'S PUMP AND P-1 & P-1R
 - B) THE PORT AT CV-1 (ASHP SIDE) WILL BE CLOSED AND LET THE FLOW FROM BOILER(S) DIRECT TO PUMPS P-1 & P-1R.
 - C) THE BOILERS AND THE ASSOCIATED PUMPS WILL BE ACTIVATED TO ALLOW THE DESIGN REQUIREMENTS TO BE REACHED.
 - D) ASHP IS DISABLED

BASE PRICE AND SEPARATE PRICE NO.1
EXCLUDE IN SEPARATE PRICE NO.2



1 HEATING SCHEMATIC
SCALE: N.T.S.



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

NO.	ISSUED	DATE
5	ISSUED FOR ADDENDUM 14	2024-11-27
4	ISSUED FOR ADDENDUM 8	2024-10-07
3	ISSUED FOR ADDENDUM 6	2024-09-30
2	ISSUED FOR TENDER	2024-09-09
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Issues

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HEATING SCHEMATIC

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YORK REGIONAL POLICE HELICOPTER HANGAR

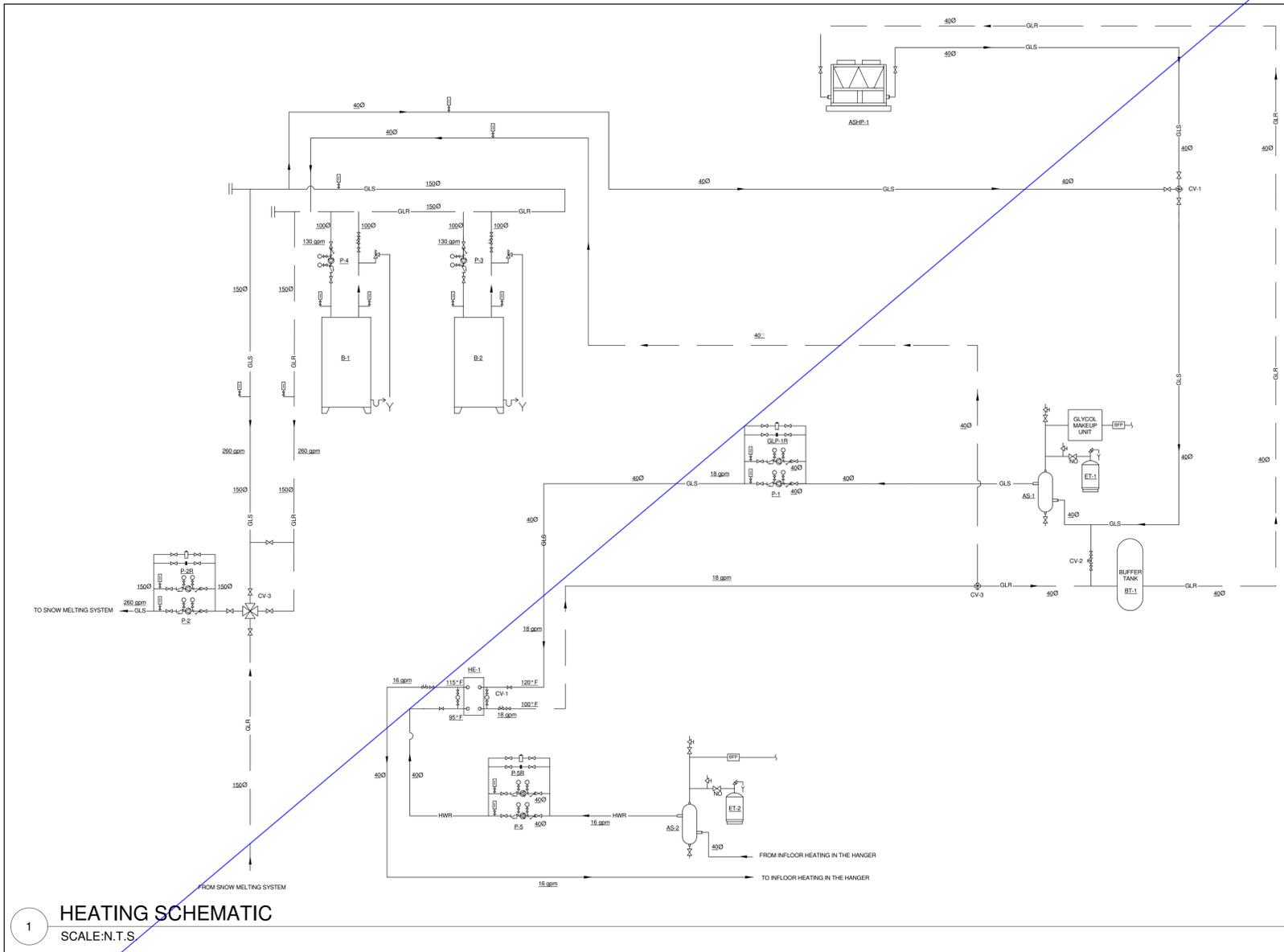
350 GARFIELD WRIGHT
BOULEVARD
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Key
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SEQUENCE OF OPERATION FOR ASHP (IN FLOOR HEATING)

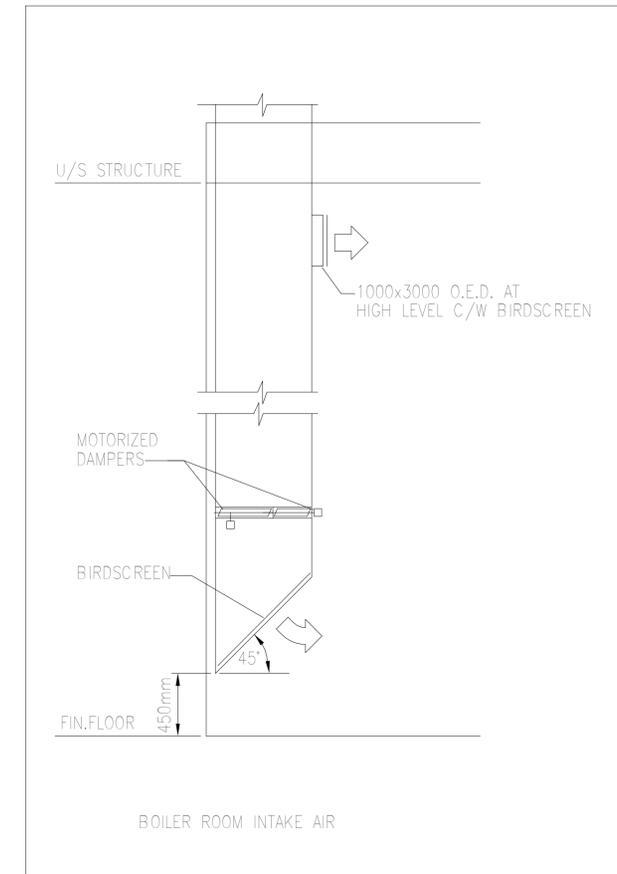
WHEN SPACE TEMPERATURE FALLS BELOW 20C (68F) (ADJUSTABLE):

1. ENABLE PUMP P-5 OR P-5R, P-1 OR P-1R SHALL BE ENABLED (BAS SHALL CYCLE PUMPS AFTER EVERY 30 HOURS OF OPERATION TO ENSURE EVEN WEAR)
2. ASHP SHALL BE ENABLED
3. WHEN SPACE TEMPERATURE REACHES 21.1C (70F) (ADJUSTABLE):
 - A) PUMPS P-5 AND P-5R SHALL BE DISABLED.
 - B) AIR SOURCE BOILER (ASHP-1) SHALL BE DISABLED
 - C) PUMPS P-1 AND P-1R SHALL BE DISABLED
4. IF ASHP BOILER IS NOT ABLE TO PROVIDE THE REQUIRED HEAT FOR IN FLOOR HEATING AT LOW AMBIENT TEMPERATURE:
 - A) THE THREE WAY VALVE CV-3 WILL DIRECT THE FLOW BETWEEN THE BOILERS TO HEAT EXCHANGER VIA ASSOCIATED BOILER'S PUMP AND P-1 & P-1R
 - B) THE PORT AT CV-1 (ASHP SIDE) WILL BE CLOSED AND LET THE FLOW FROM BOILER(S) DIRECT TO PUMPS P-1 & P-1R.
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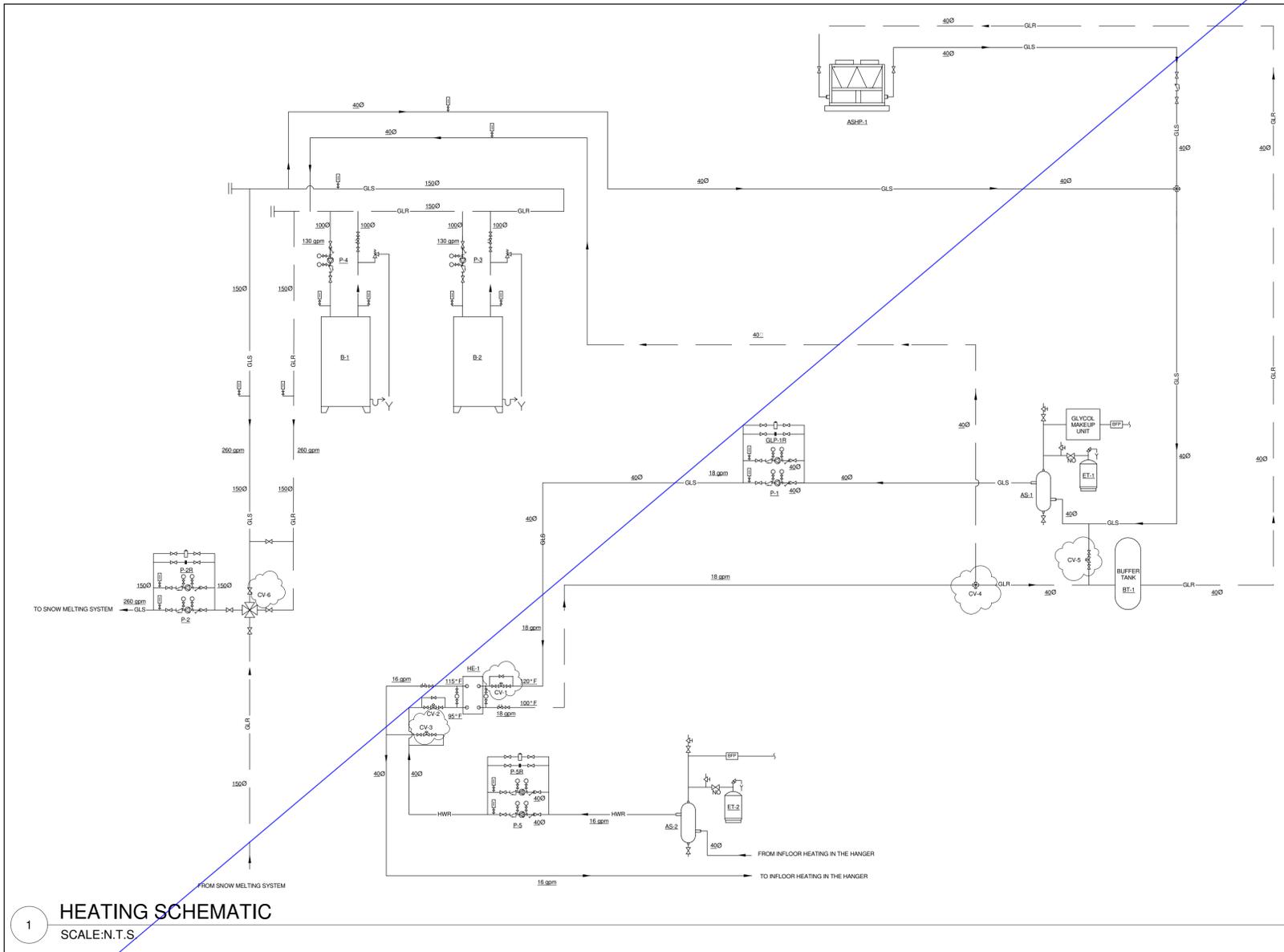
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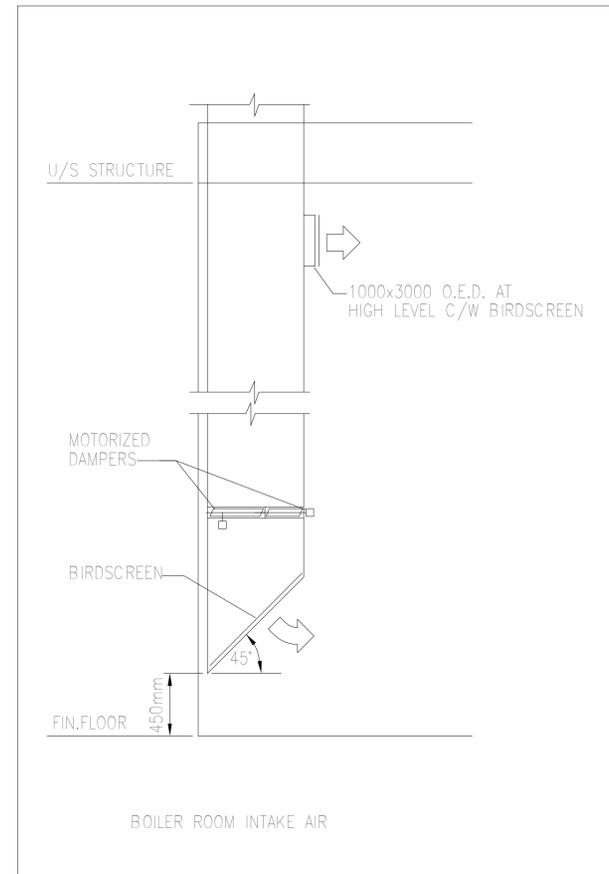
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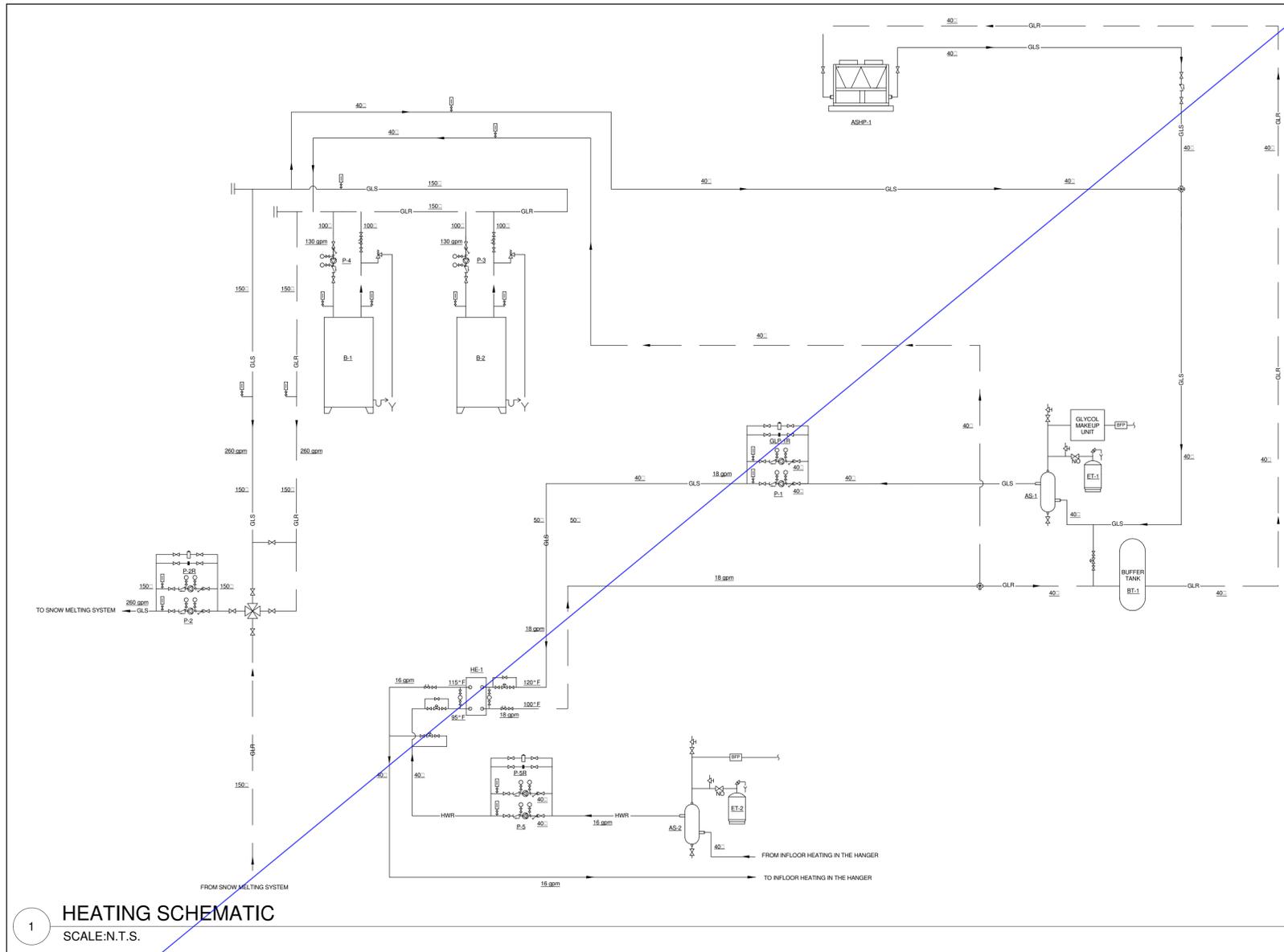
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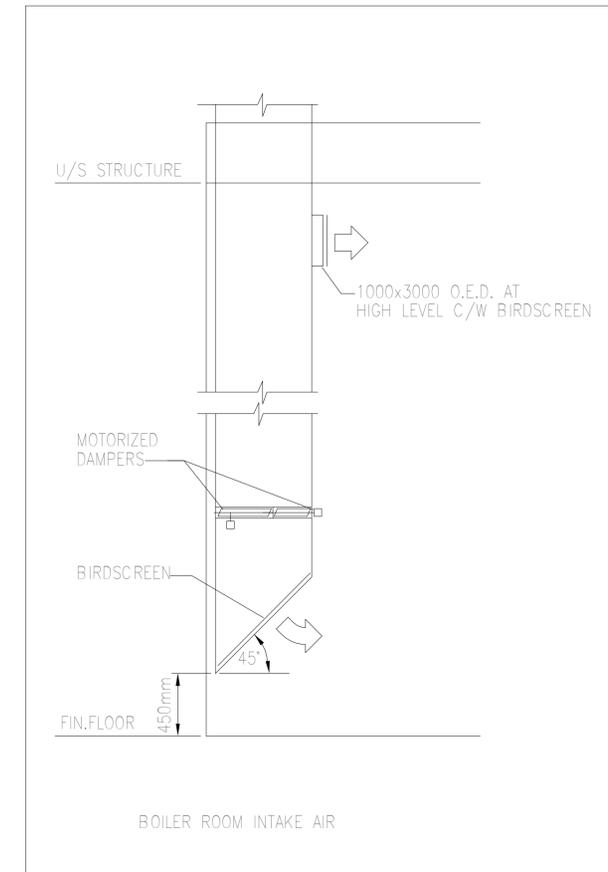
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SNOW MELTING SYSTEM SEQUENCE OF OPERATION

- 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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1	ISSUED FOR BUILDING PERMIT	2024-07-31

Issues

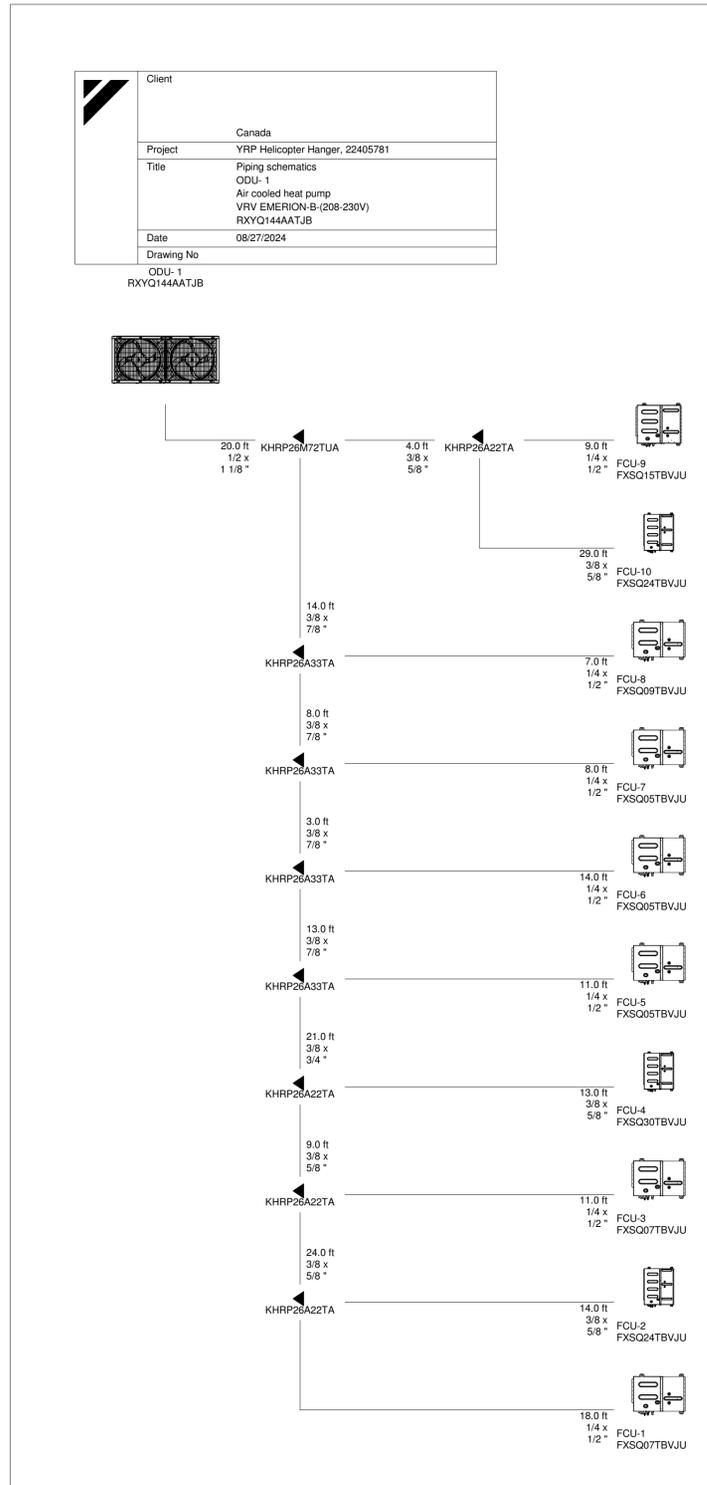
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Do not scale drawings

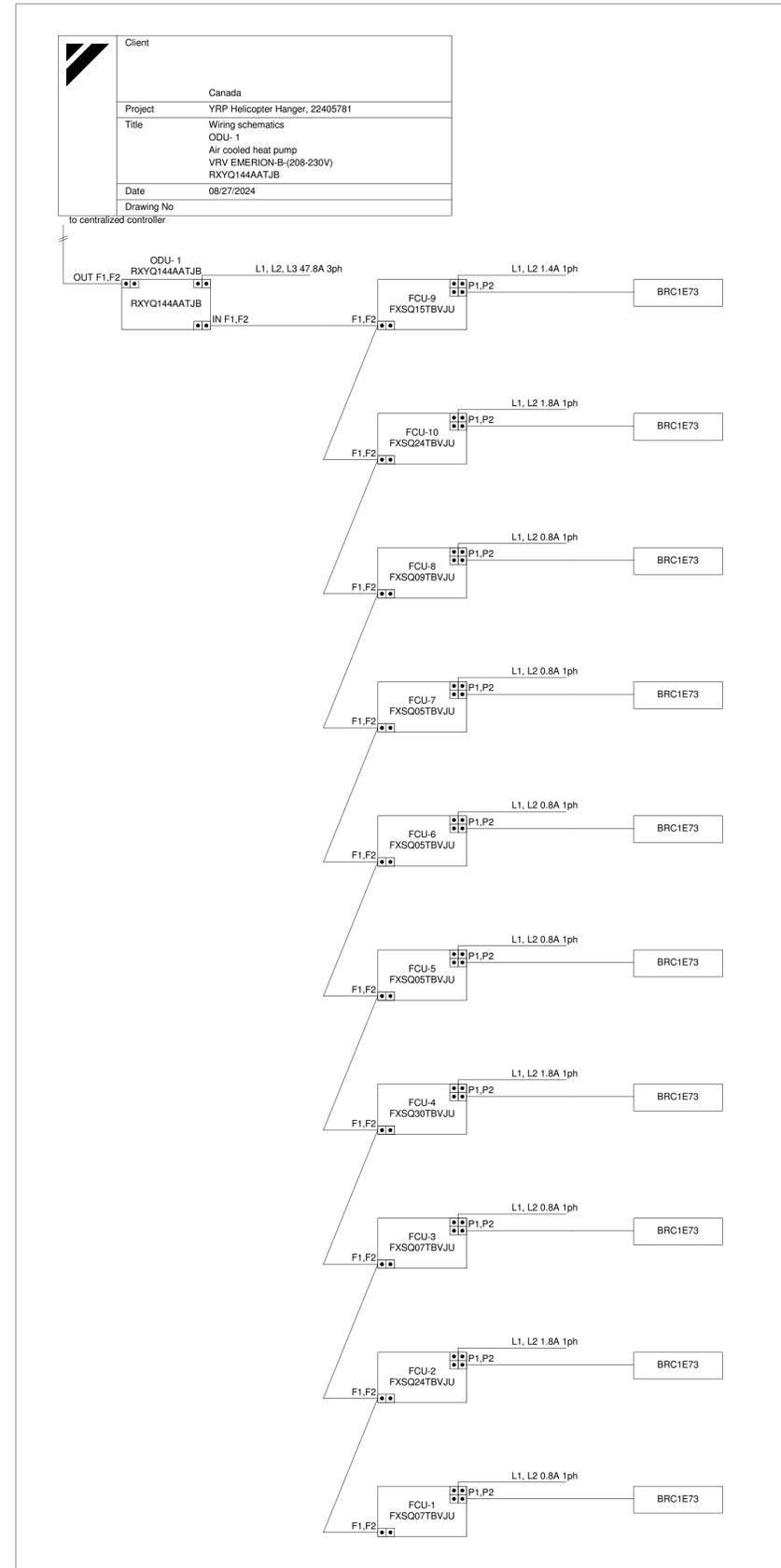
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Checked by: Ali Nakhaei-Zadeh
Original Issue Date: 2024-07-31
Project No: TT-24-005
Scale: N.T.S.

Sheet Title: **VRF SCHEMATIC**

Drawing No: **M-703**



1 **VRF PIPING**
SCALE:N.T.S.



2 **VRF WIRING**
SCALE:N.T.S.

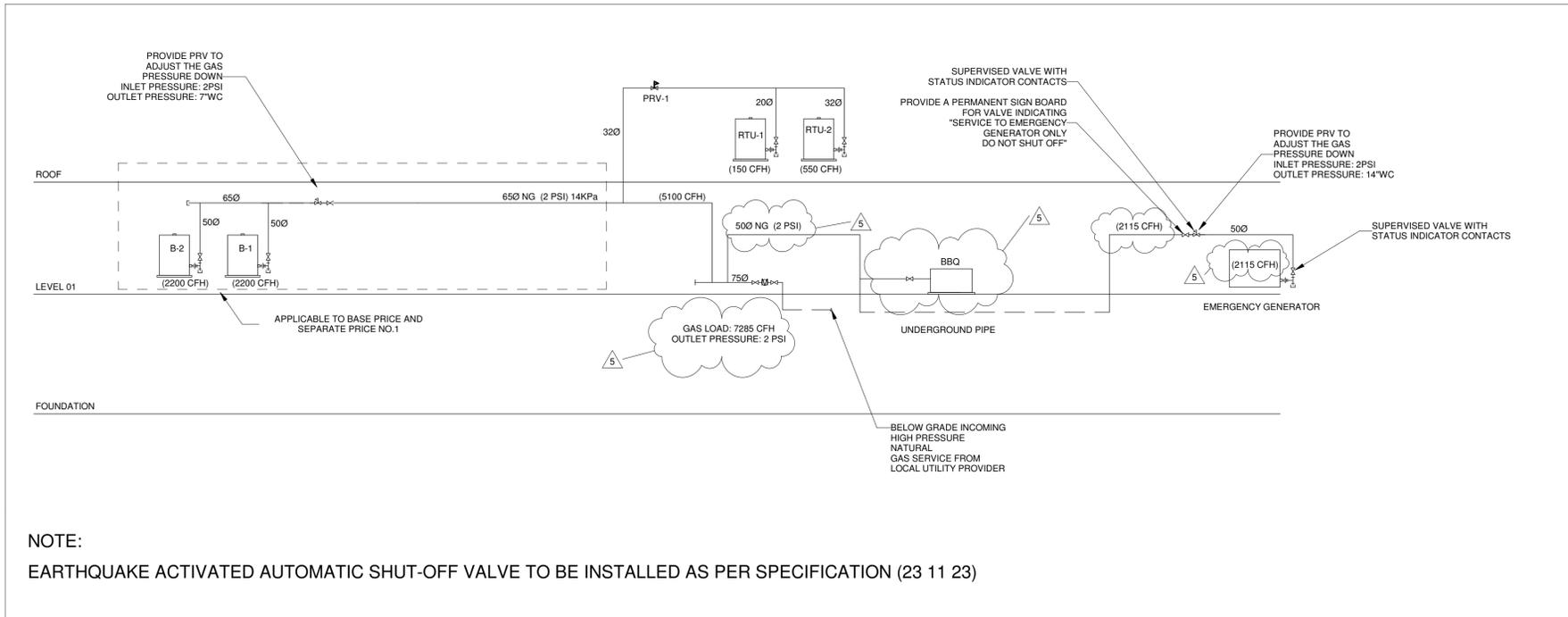


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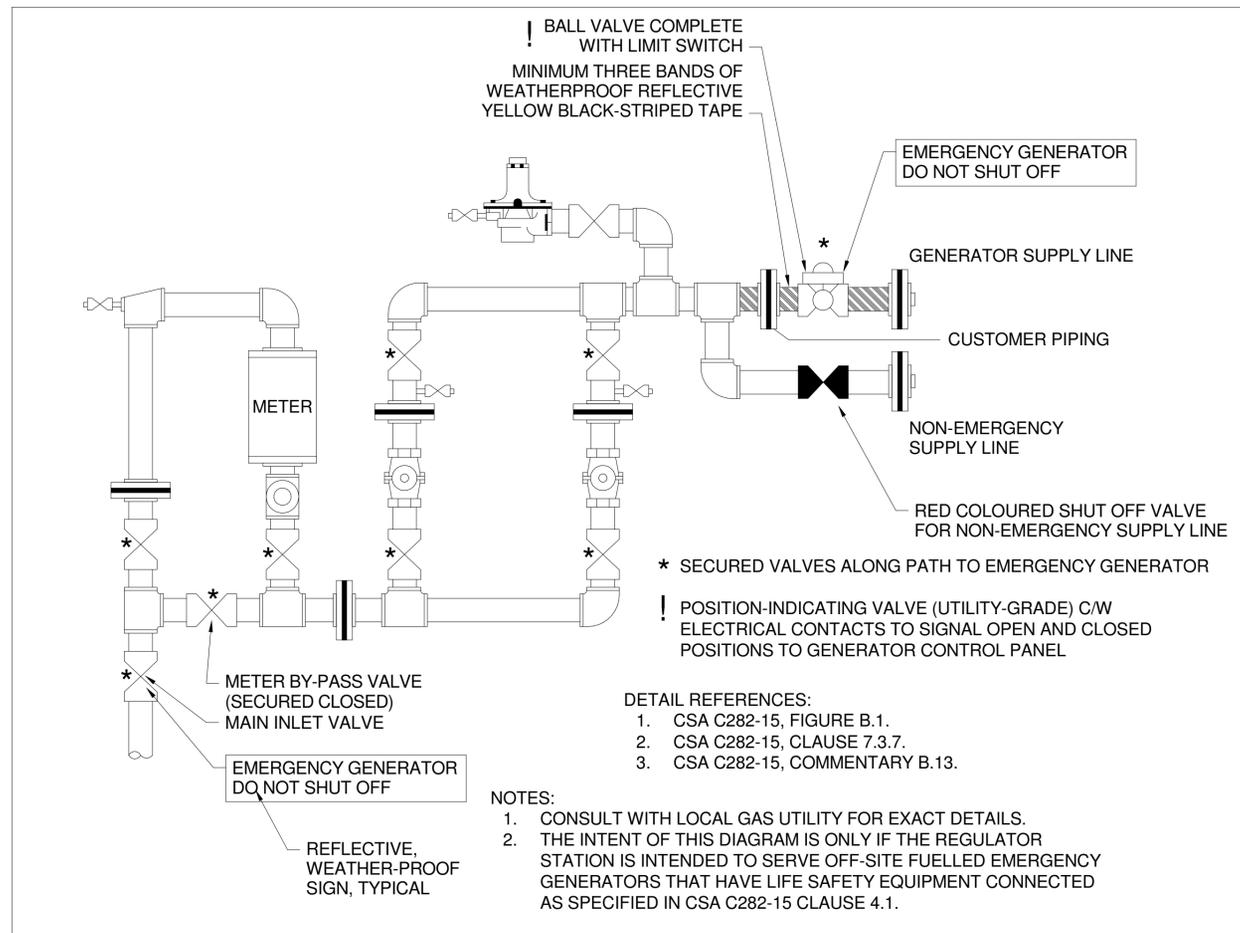
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BOULEVARD
TOWN OF EAST GWILLIMBURY

Key
Plan



1 GAS SCHEMATIC
SCALE: N.T.S.



2 UTILITY-FED EMERGENCY GENERATOR GAS REGULATOR STATION
SCALE: 1 : 1

NO.	ISSUED	DATE
5	ISSUED FOR ADDENDUM 14	2024-11-27
4	ISSUED FOR ADDENDUM 10	2024-10-15
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

Do not scale drawings

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Original Issue Date: 2024-07-31
Project No: TT-24-005
Scale: As indicated

Sheet
Title: GAS SCHEMATIC

Drawing
No: M-704



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NO.	ISSUED	DATE
4	ISSUED FOR ADDENDUM 10	2024-10-15
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

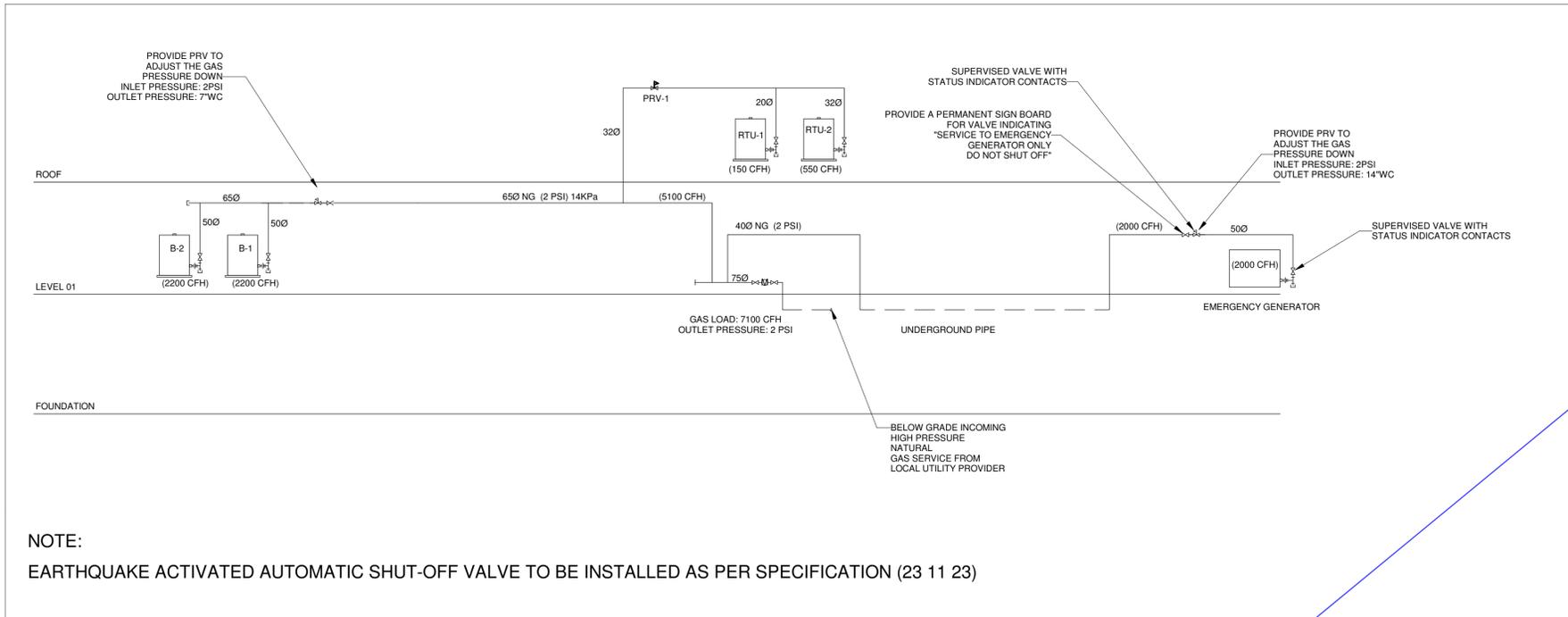
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Project No: TT-24-005
Scale: As indicated

Sheet
Title:

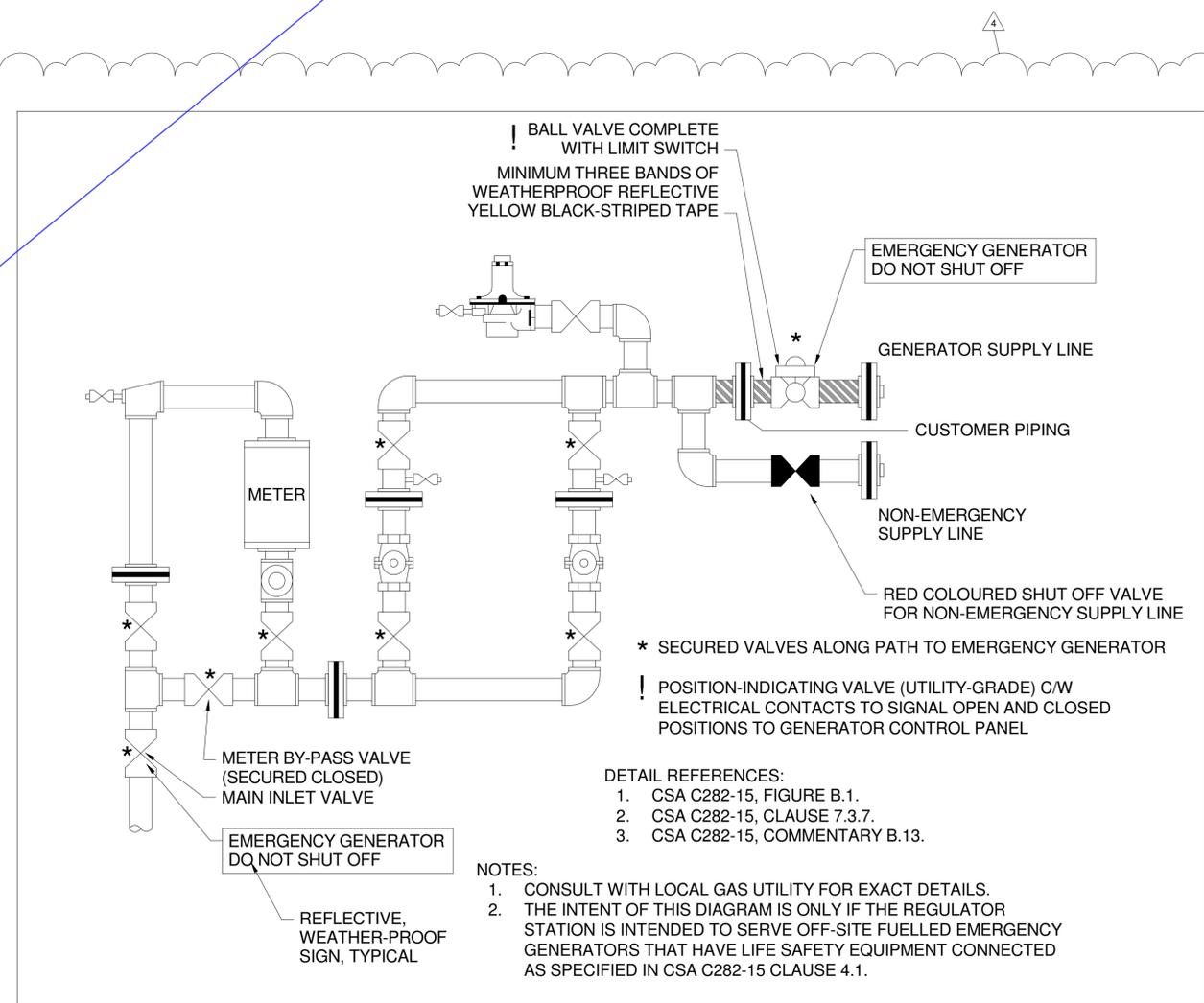
GAS SCHEMATIC

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.



- DETAIL REFERENCES:
1. CSA C282-15, FIGURE B.1.
 2. CSA C282-15, CLAUSE 7.3.7.
 3. CSA C282-15, COMMENTARY B.13.

- NOTES:
1. CONSULT WITH LOCAL GAS UTILITY FOR EXACT DETAILS.
 2. THE INTENT OF THIS DIAGRAM IS ONLY IF THE REGULATOR STATION IS INTENDED TO SERVE OFF-SITE FUELLED EMERGENCY GENERATORS THAT HAVE LIFE SAFETY EQUIPMENT CONNECTED AS SPECIFIED IN CSA C282-15 CLAUSE 4.1.

2 UTILITY-FED EMERGENCY GENERATOR GAS REGULATOR STATION
SCALE: 1 : 1



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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

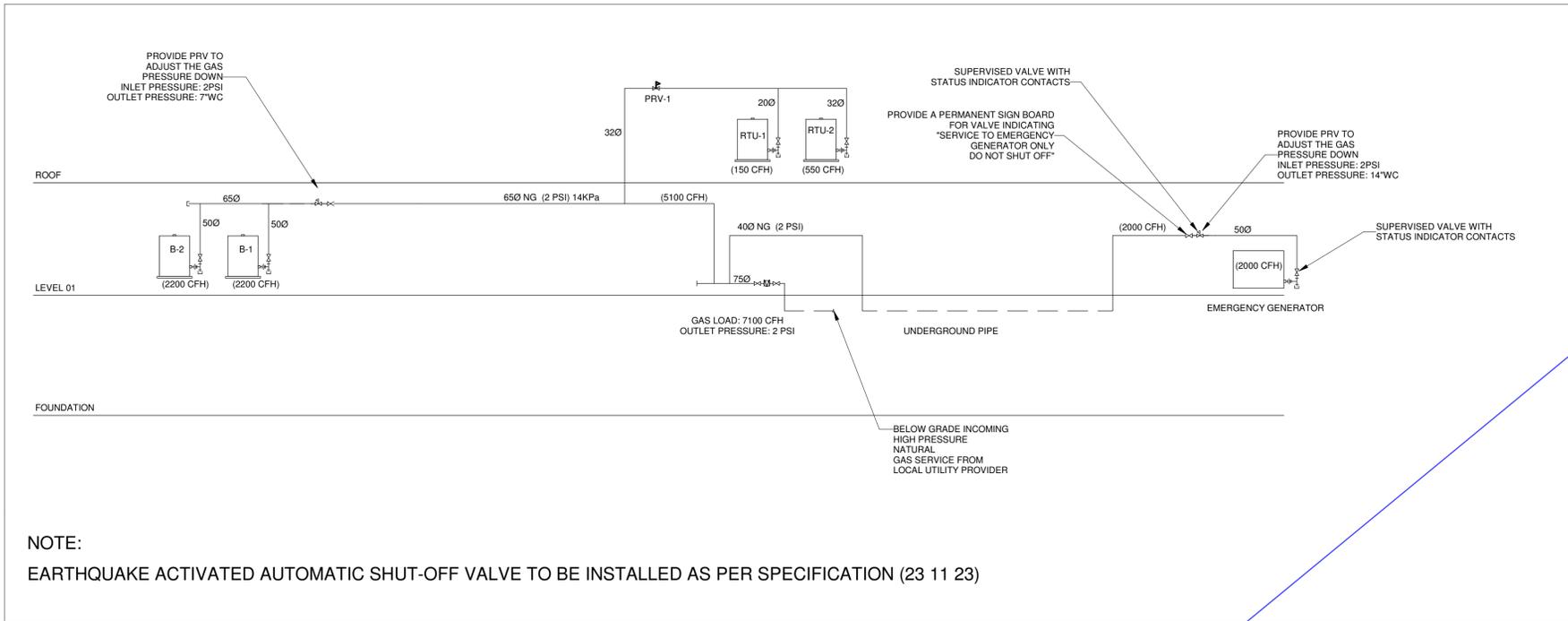
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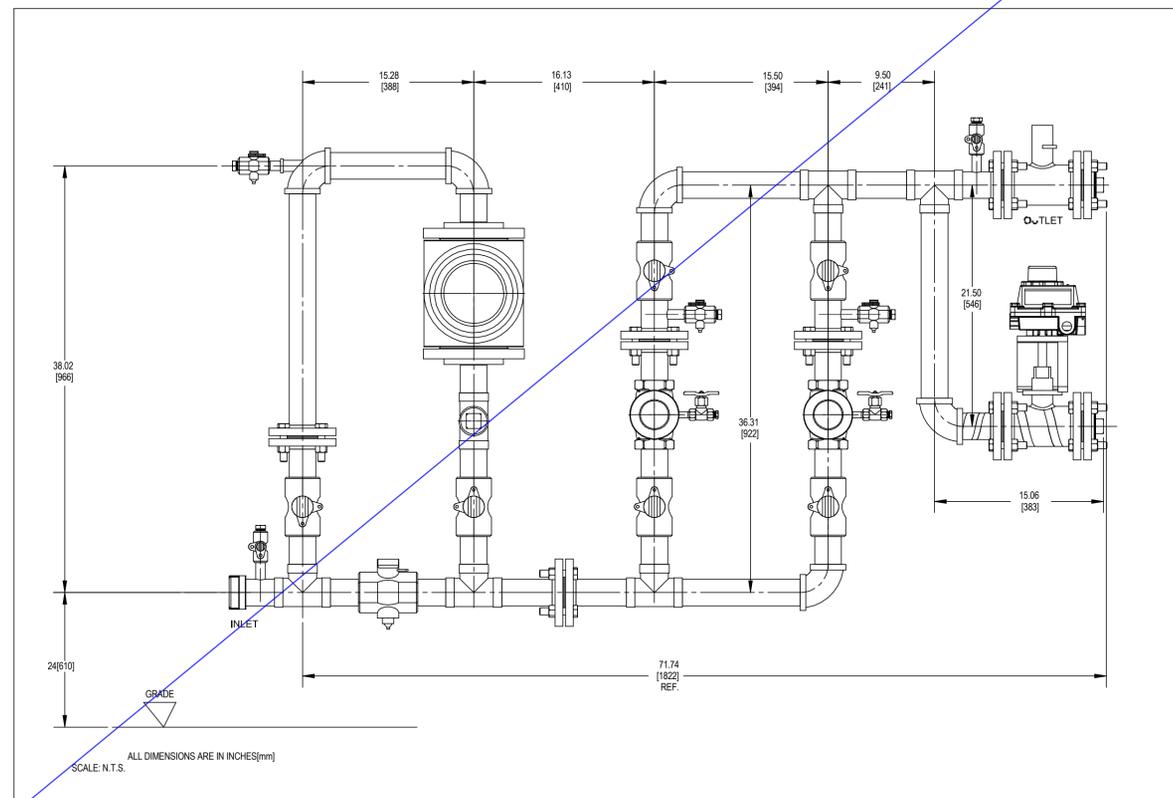
Sheet
Title: **GAS SCHEMATIC**

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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Plan

NO.	ISSUED	DATE
4	ISSUED FOR ADDENDUM 15	2024-12-04
3	ISSUED FOR ADDENDUM 14	2024-11-27
2	ISSUED FOR TENDER	2024-09-09
1	ISSUED FOR BUILDING PERMIT	2024-07-31

Issues

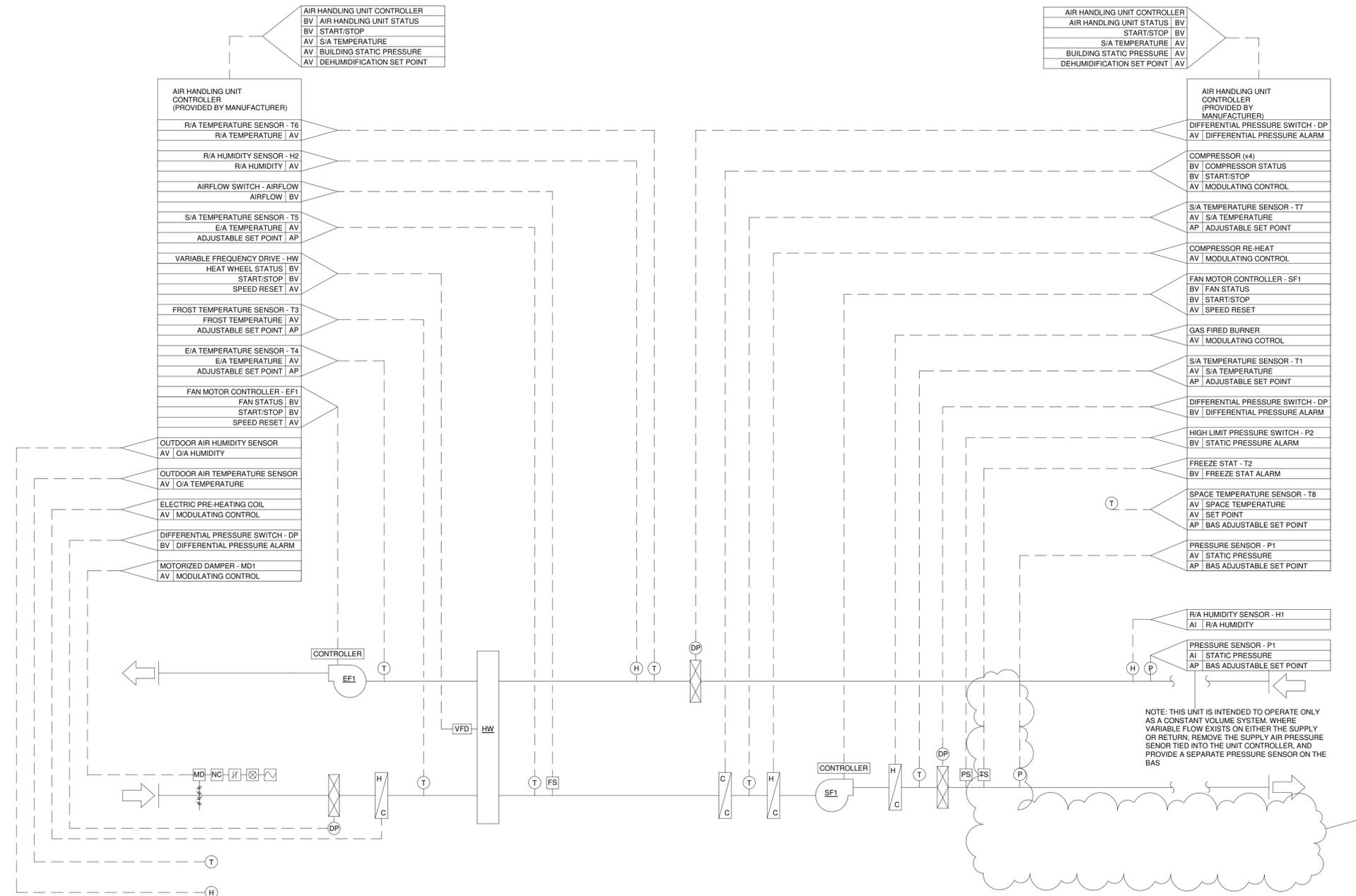
All measurements are to be checked and verified on site by the contractor before proceeding with work

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Original Issue Date: 2024-07-31
Project No: TT-24-005
Scale: N.T.S.

Sheet
Title:
**MECHANICAL CONTROL
SEQUENCES I**

Drawing
No:
M-750



- 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 BACKNET/MSFP CONTROLLER CAPABLE OF INTERFACING WITH THE BAS.
AND THE CONTROLS CONTRACTOR SHALL PROVIDE THE FOLLOWING FUNCTIONS:
- MECHANICAL COOLING VIA DX COOLING COIL AND CONDENSING UNIT.
 - MECHANICAL HEATING VIA GAS FIRED HEATING COIL AND BURNER.
 - MECHANICAL HOT GAS RECOVERY VIA COMPRESSOR RE-HEAT COIL. RE-HEAT SHALL BE AVAILABLE WHEN THERE IS A CALL FOR MECHANICAL COOLING.
 - ELECTRIC PRE-HEATING FOR FROST CONTROL. MODE OF OPERATION.
- 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 CONTRACTOR AND THE CONTROLS CONTRACTOR.
 - SYSTEM SHALL BE ENABLED BASED ON COOLING AND HEATING DISCHARGE AIR TEMPERATURE CONTROL AND CHANGE OVER MODE BASED ON NETWORK SIGNAL FOR SUMMER COOLING MODE AND WINTER HEATING MODE COOLING.
 - 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 CONTROL:**
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 SHALL MODULATE ITS SPEED TO MAINTAIN THE T1 SET POINT.
 - IF THE T1 SET POINT IS NOT SATISFIED AND ADDITIONAL HEATING IS REQUIRED, 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 SHALL MODULATE ITS SPEED TO MAINTAIN THE T1 SET POINT IF AVAILABLE.
 - IF THE T1 SET POINT IS NOT SATISFIED AND ADDITIONAL HEATING IS REQUIRED, 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 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.

- FIRE ALARM MODE:**
FANS SHALL (SHUT DOWN) DURING FIRE ALARM.

SMOKE VENTING MODE:

- N/A

100% RE-CIRCULATION MODE:

- 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 IN.WC.
 - FROST 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:

- N/A

SYSTEM ALARMS & PRIORITY AT BAS:

- 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

SYSTEM TRENDS AT BAS:

- ROOF TOP UNIT STATUS
- TEMPERATURE SET POINT
- BUILDING STATIC PRESSURE
- DEHUMIDIFICATION SET POINT



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3	ISSUED FOR ADDENDUM 14	2024-11-27
2	ISSUED FOR TENDER	2024-09-09
1	ISSUED FOR BUILDING PERMIT	2024-07-31

Issues

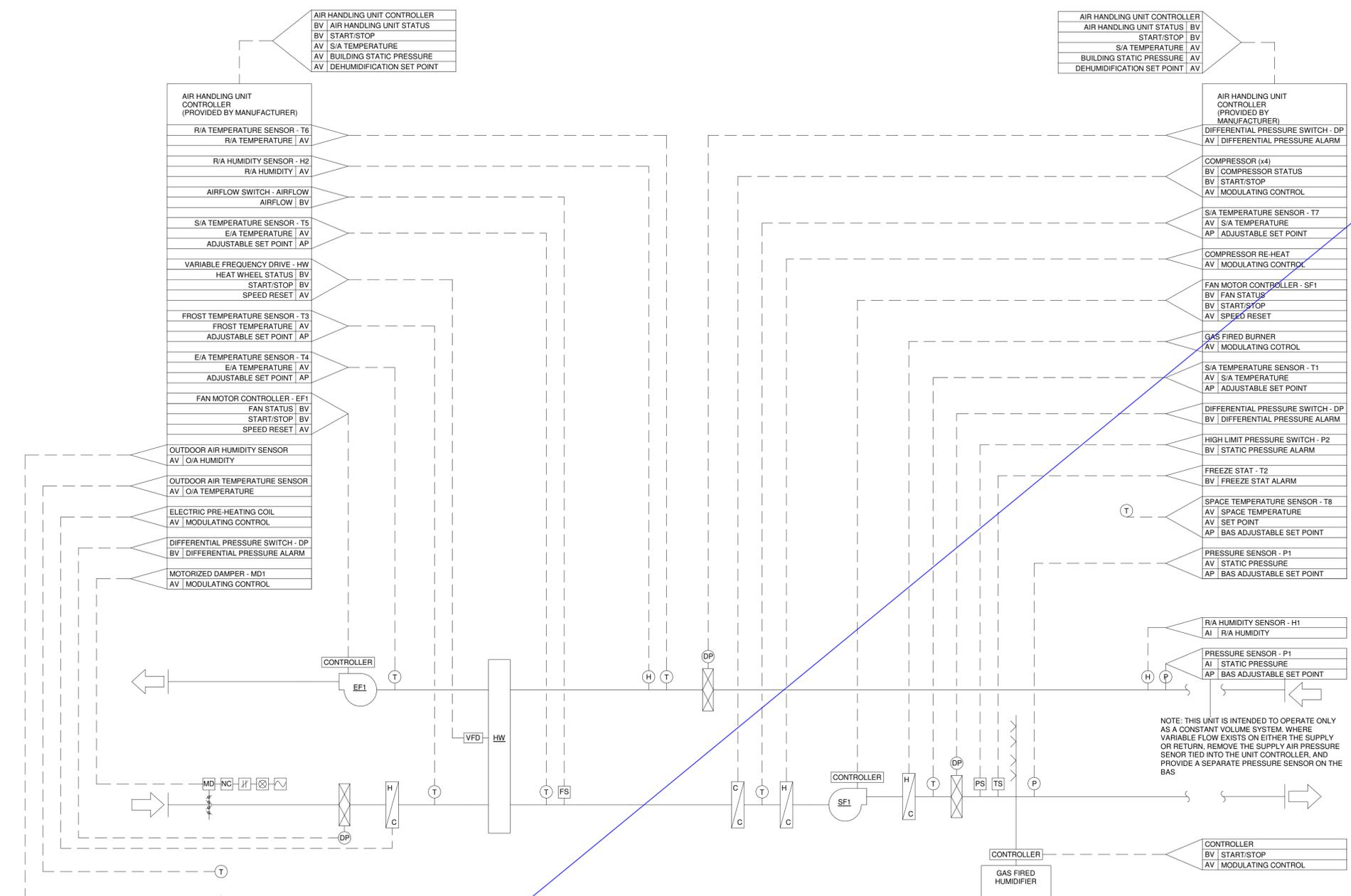
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Original Issue Date: 2024-07-31
Project No: TT-24-005
Scale: N.T.S.

Sheet
Title: MECHANICAL CONTROL SEQUENCES I

Drawing
No. M-750



- 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/MSDP CONTROLLER CAPABLE OF INTERFACING WITH THE BAS.
AND THE CONTROLS CONTRACTOR SHALL PROVIDE THE FOLLOWING FUNCTIONS:
- MECHANICAL COOLING VIA DX COOLING COIL AND CONDENSING UNIT.
 - MECHANICAL HEATING VIA GAS FIRED HEATING COIL AND BURNER.
 - MECHANICAL HOT GAS RECOVERY VIA COMPRESSOR RE-HEAT COIL. RE-HEAT SHALL BE AVAILABLE WHEN THERE IS A CALL FOR MECHANICAL COOLING.
 - ELECTRIC PRE-HEATING FOR FROST CONTROL. MODE OF OPERATION.
- 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 CONTRACTOR AND THE CONTROLS CONTRACTOR.
 - SYSTEM SHALL BE ENABLED BASED ON COOLING AND HEATING DISCHARGE AIR TEMPERATURE CONTROL AND CHANGE OVER MODE BASED ON NETWORK SIGNAL FOR SUMMER COOLING MODE AND WINTER HEATING MODE COOLING.
 - 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 CONTROL:**
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 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.
- 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 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 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:**
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 IN.WC.
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:**
N/A
- SYSTEM ALARMS & PRIORITY AT BAS:**
• FAN FAILURE - COMMAND 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
- SYSTEM TRENDS AT BAS:**
• ROOF TOP UNIT STATUS
• TEMPERATURE SET POINT
• BUILDING STATIC PRESSURE
• DEHUMIDIFICATION SET POINT

1 ROOF TOP UNIT - 100% OUTDOOR AIR WITH HOT GAS RE-HEAT AND HEAT WHEEL - RTU-1 - OFFICE SPACE
SCALE: N.T.S.

11/27/2024 1:25:08 PM
Autodesk Docs://2402 - YRP Helicopter Hangar/TT-24-005-YRP-COG ME Model_R24.rvt



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Plan

NO.	ISSUED FOR BUILDING PERMIT	DATE
2	ISSUED FOR TENDER	2024-09-09
1	ISSUED FOR BUILDING PERMIT	2024-07-31

Issues

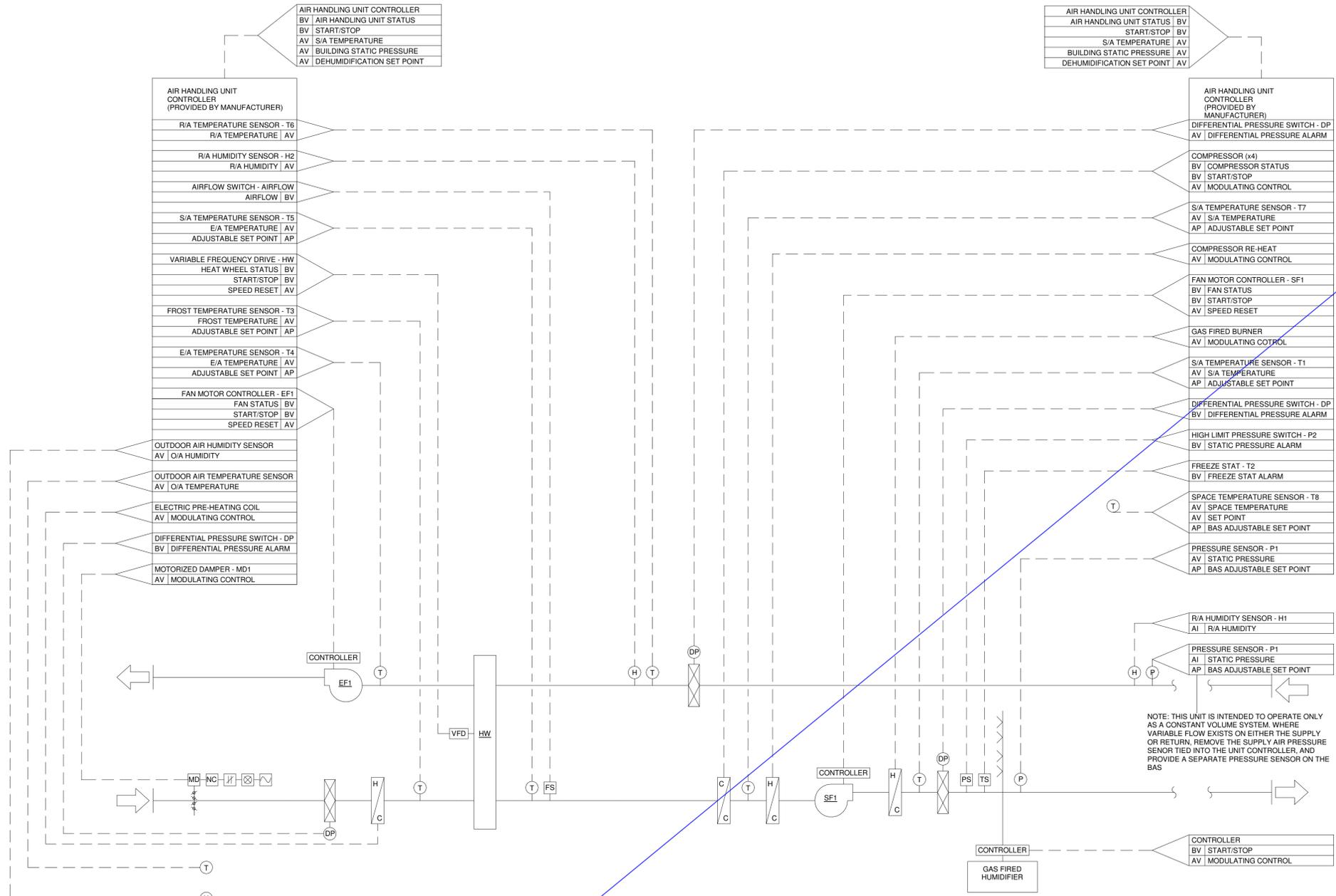
All measurements are to be checked and verified on site by the contractor before proceeding with work

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.

Sheet
Title:
MECHANICAL CONTROL SEQUENCES I

Drawing
No.
M-750



- OPERATING MODE:**
THE SYSTEM SHALL BE ENABLED BY THE BAS ACCORDING TO THE FOLLOWING MODE: (EDIT AS REQUIRED)
- 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/STP CONTROLLER CAPABLE OF INTERFACING WITH THE BAS.
- THE ROOF TOP UNIT SHALL BE CAPABLE OF PROVIDING THE FOLLOWING FUNCTIONS:
- MECHANICAL COOLING VIA DX COOLING COIL AND CONDENSING UNIT.
 - MECHANICAL HEATING VIA GAS FIRED HEATING COIL AND BURNER.
 - MECHANICAL HOT GAS RECOVERY VIA COMPRESSOR RE-HEAT COIL. RE-HEAT SHALL BE AVAILABLE WHEN THERE IS A CALL FOR MECHANICAL COOLING.
 - ELECTRIC PRE-HEATING FOR FROST CONTROL MODE OF OPERATION.
- 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 CONTRACTOR AND THE CONTROLS CONTRACTOR.
(SYSTEM SHALL BE ENABLED BASED ON COOLING AND HEATING DISCHARGE AIR TEMPERATURE CONTROL AND CHANGE OVER MODE BASED ON NETWORK SIGNAL FOR SUMMER COOLING MODE AND WINTER HEATING MODE COOLING).
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 CONTROL:**
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 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 SHALL MODULATE ITS SPEED TO MAINTAIN THE T1 SET POINT IF AVAILABLE.
 - IF THE T1 SET POINT IS NOT SATISFIED AND ADDITIONAL HEATING 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 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:**
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 IN.WC. 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:**
N/A
- SYSTEM ALARMS & PRIORITY AT BAS:**
- 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
- SYSTEM TRENDS AT BAS:**
- ROOF TOP UNIT STATUS
 - TEMPERATURE SET POINT
 - BUILDING STATIC PRESSURE
 - DEHUMIDIFICATION SET POINT

ROOF TOP UNIT - 100% OUTDOOR AIR WITH HOT GAS RE-HEAT AND HEAT WHEEL
SCALE: N.T.S.

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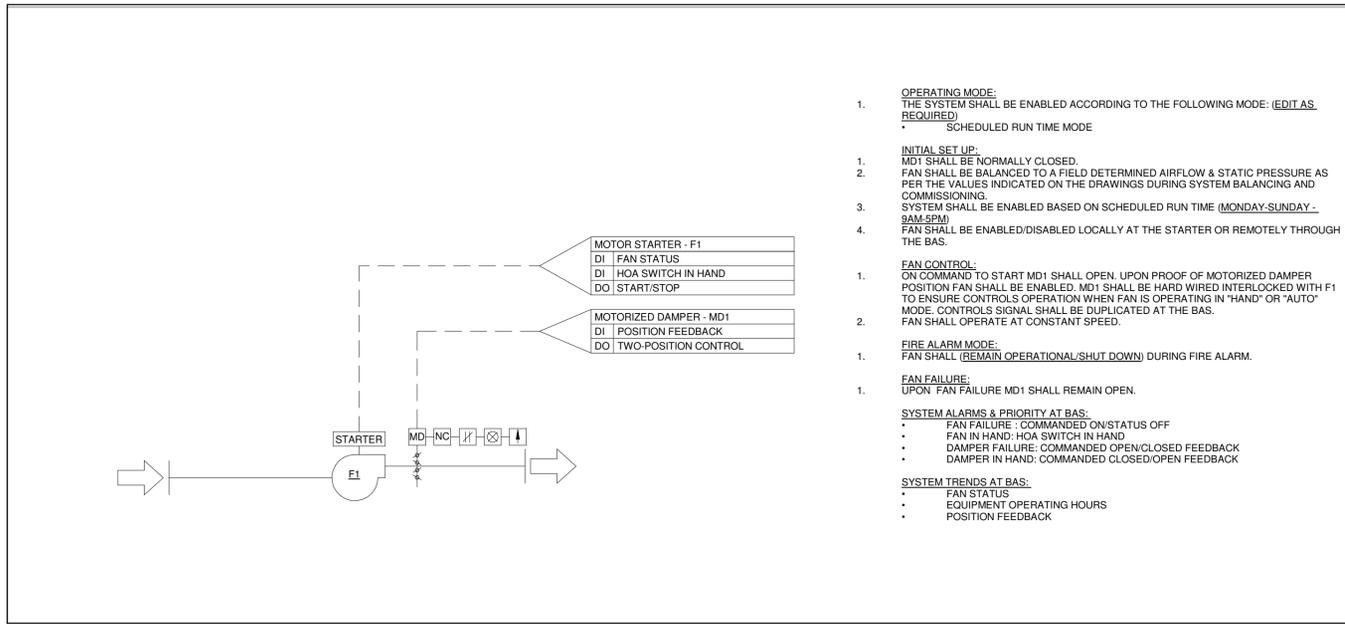


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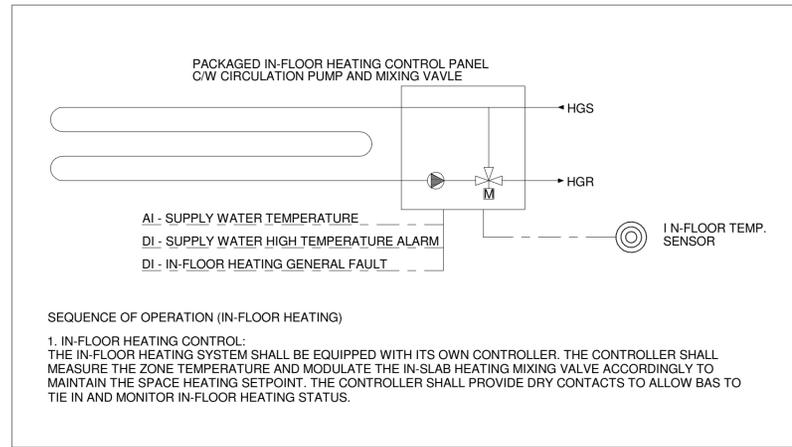
YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT
BOULEVARD
TOWN OF EAST GWILLIMBURY

Key
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- FAN CONTROL:**
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FAN SHALL OPERATE AT CONSTANT SPEED.
- FIRE ALARM MODE:**
FAN SHALL (REMAIN OPERATIONAL/SHUT DOWN) DURING FIRE ALARM.
- FAN FAILURE:**
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

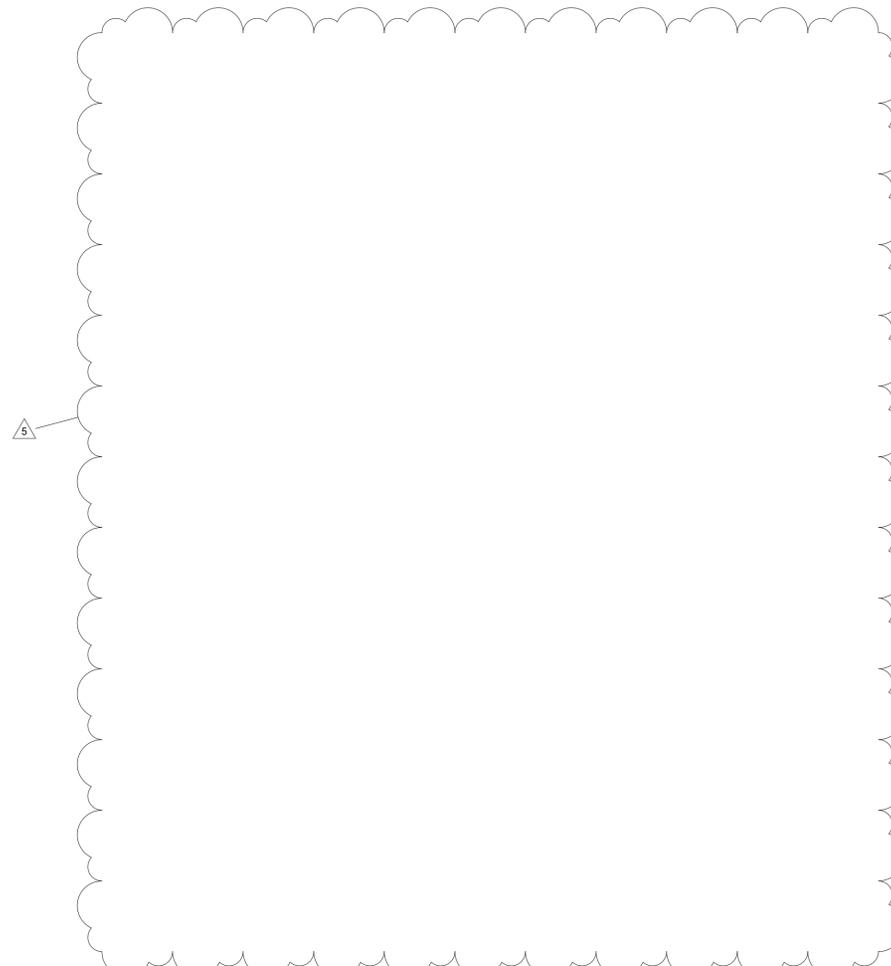


1 IN-FLOOR HEATING CONTROLS

SCALE: 1 : 1

3 CONSTANT SPEED FAN - DAMPER INTERLOCK CONTROL SEQUENCE

SCALE:N.T.S.



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.

NO.	ISSUED	DATE
5	ISSUED FOR ADDENDUM 8	2024-10-07
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: 1 : 1

Sheet
Title:
**MECHANICAL CONTROL
SEQUENCES II**

Drawing
No:
M-751

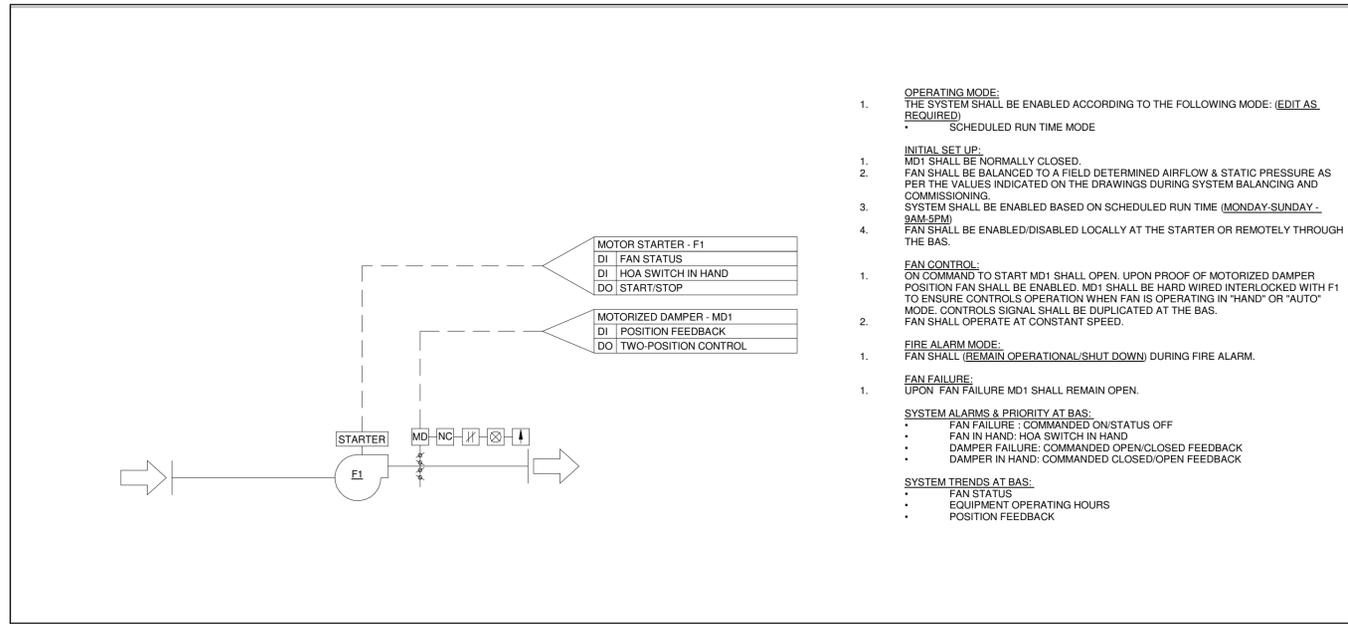


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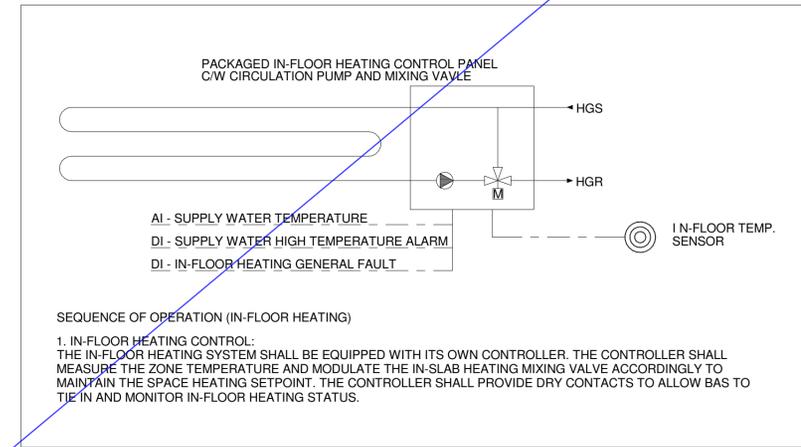
YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT
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Key
Plan



- 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.

NO.	ISSUED	DATE
4	ISSUED FOR ADDENDUM 6	2024-09-30
3	ISSUED FOR ADDENDUM 3	2024-09-23
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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 CONTROL SEQUENCES II

Drawing
 No.
M-751

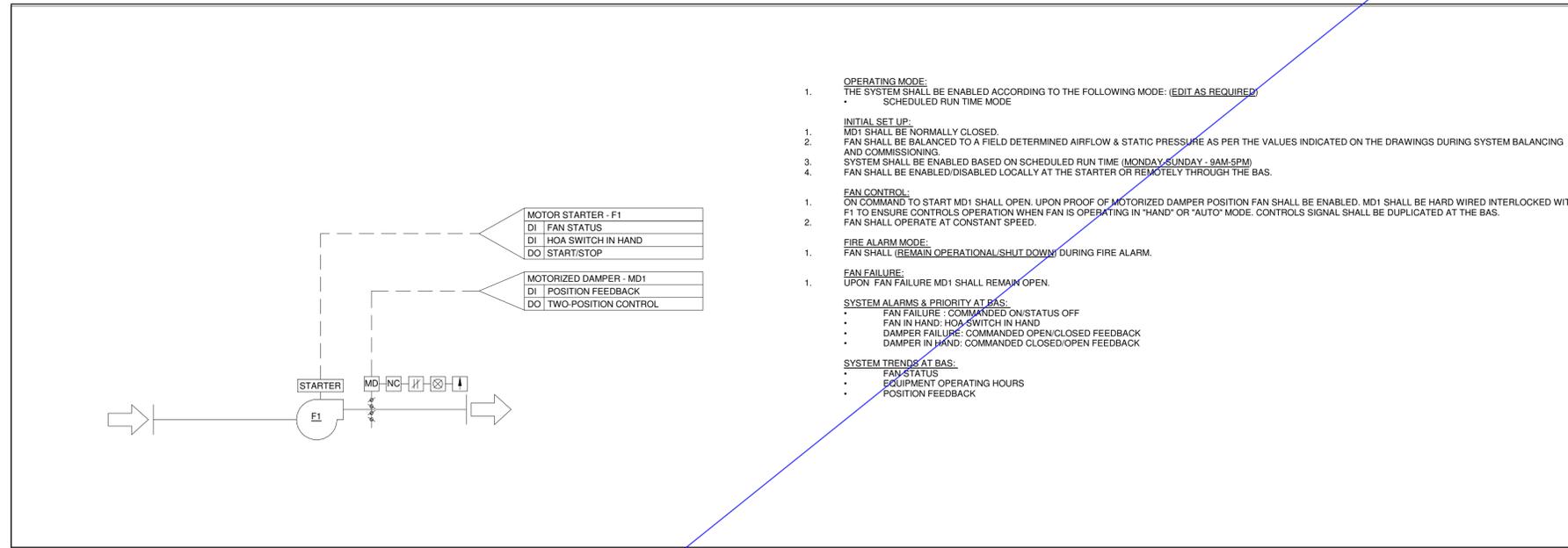


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Key
Plan

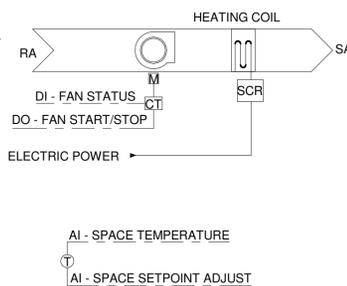


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FAN SHALL BE ENABLED/DISABLED LOCALLY AT THE STARTER OR REMOTELY THROUGH THE BAS.
- FAN CONTROL:**
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- FIRE ALARM MODE:**
FAN SHALL (REMAIN OPERATIONAL/SHUT DOWN) DURING FIRE ALARM.
- FAN FAILURE:**
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

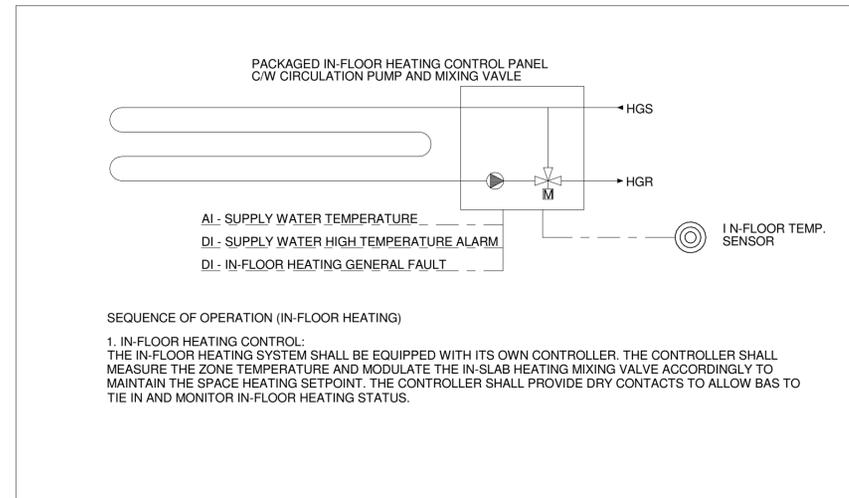
3 CONSTANT SPEED FAN - DAMPER INTERLOCK CONTROL SEQUENCE
SCALE: N.T.S.

TYPICAL ELECTRIC UNIT HEATER CONTROL SEQUENCE:

- RUN CONDITIONS:**
THE UNIT SHALL RUN ACCORDING TO A USER DEFINABLE TEMPERATURE SETPOINT OF 22°C (72°F) (ADJUSTABLE).
ALARMS SHALL BE PROVIDED AS FOLLOWS:
 - LOW ZONE TEMPERATURE: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY A USER DEFINABLE AMOUNT (ADJUSTABLE).
- ZONE SETPOINT ADJUST:**
THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING SETPOINT AT THE ZONE SENSOR.
- FAN:**
THE FAN SHALL RUN ANYTIME THE ZONE TEMPERATURE DROPS BELOW HEATING SETPOINT, UNLESS SHUTDOWN ON SAFETIES.
- ELECTRIC HEATING COIL:**
THE SCR (SILICON CONTROLLED RECTIFIER) CONTROLLER SHALL MODULATE THE ELECTRIC POWER INPUT TO HEATING ELEMENT IN ORDER TO MAINTAIN ZONE HEATING SETPOINT.
THE HEATING SHALL BE ENABLED WHENEVER:
 - OUTSIDE AIR TEMPERATURE IS LESS THAN 18°C (68°F) (ADJUSTABLE).
 - AND THE ZONE TEMPERATURE IS BELOW HEATING SETPOINT.
 - AND THE FAN IS ON.
- FAN STATUS:**
THE BAS SHALL BE ABLE TO MONITOR THE FAN STATUS.
ALARM SHALL BE PROVIDED AS FOLLOWS:
 - FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
 - FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
 - FAN RUNTIME EXCEEDED; FAN STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJUSTABLE)
 - LOW ZONE TEMPERATURE: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY A USER DEFINABLE AMOUNT (ADJUSTABLE)
- UNIT HEATER STOP:**
IN THE EVEN OF FIRE IN THE SPACE, THE FIRE ALARM SHALL TURN OFF THE UNIT HEATER.



2 TYPICAL ELECTRIC UNIT HEATER CONTROLS
SCALE: 1 : 1



SEQUENCE OF OPERATION (IN-FLOOR HEATING)

- 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.

1 IN-FLOOR HEATING CONTROLS
SCALE: 1 : 1

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

Sheet
Title:
**MECHANICAL CONTROL
SEQUENCES II**

Drawing
No:
M-751



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YORK REGIONAL POLICE HELICOPTER HANGAR

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Key
Plan

NO.	ISSUED	DATE
2	ISSUED FOR TENDER	2024-09-09
1	ISSUED FOR BUILDING PERMIT	2024-07-31

Issues

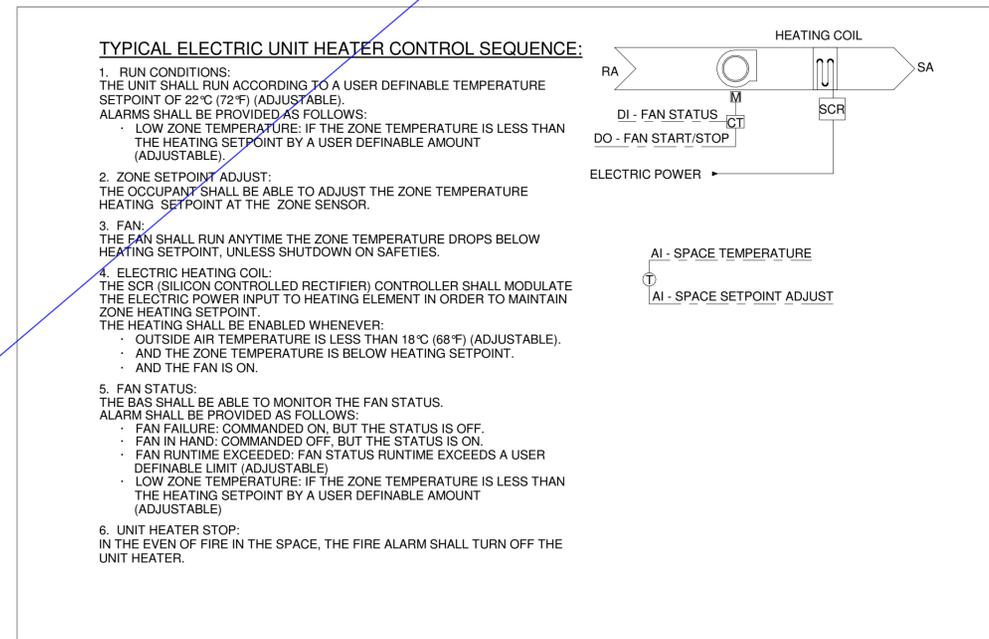
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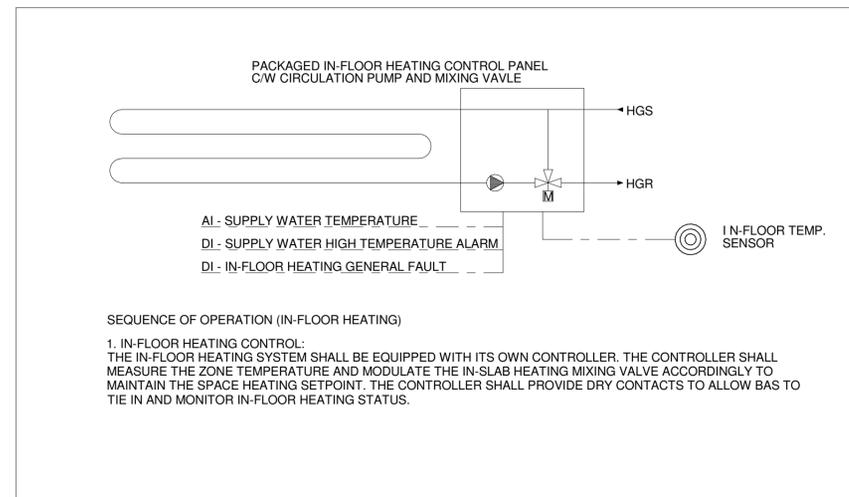
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**MECHANICAL CONTROL
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2 **TYPICAL ELECTRIC UNIT HEATER CONTROLS**
SCALE: 1 : 1



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

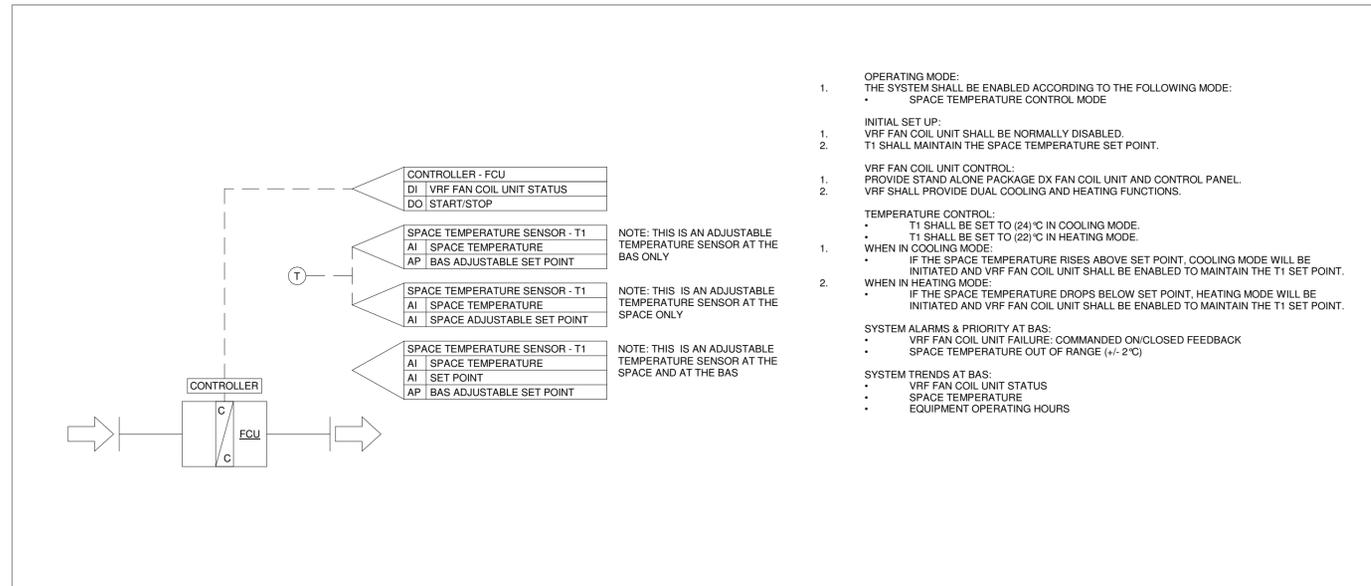


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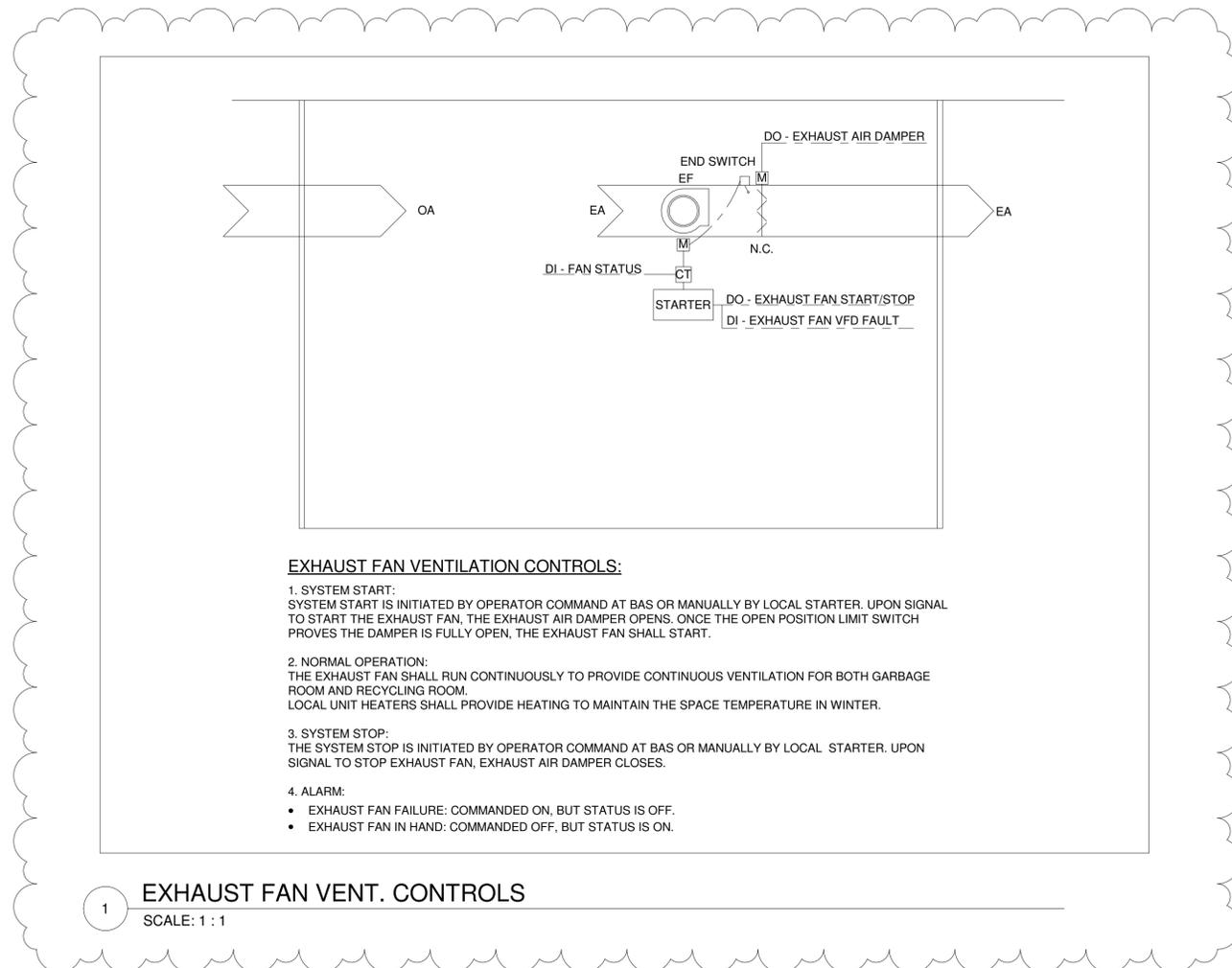
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2 VRF FAN COIL UNIT CONTROL SEQUENCE
SCALE: N.T.S.



1 EXHAUST FAN VENT. CONTROLS
SCALE: 1 : 1

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

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Sheet
Title:
**MECHANICAL CONTROL
SEQUENCES III**

Drawing
No:
M-752

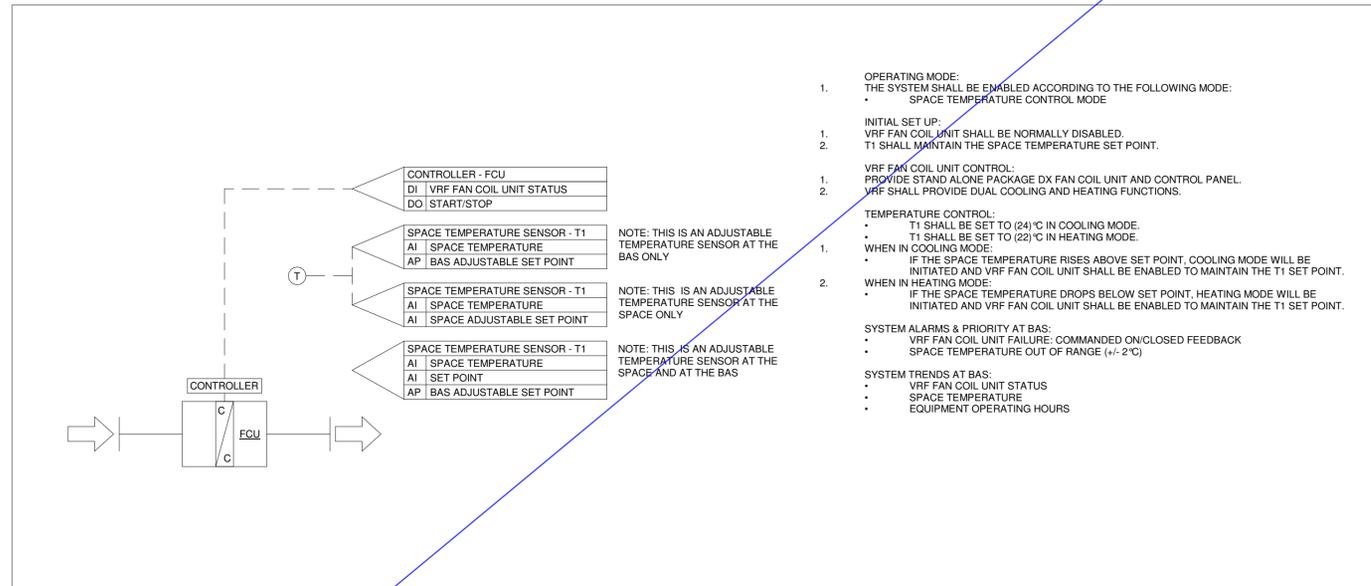


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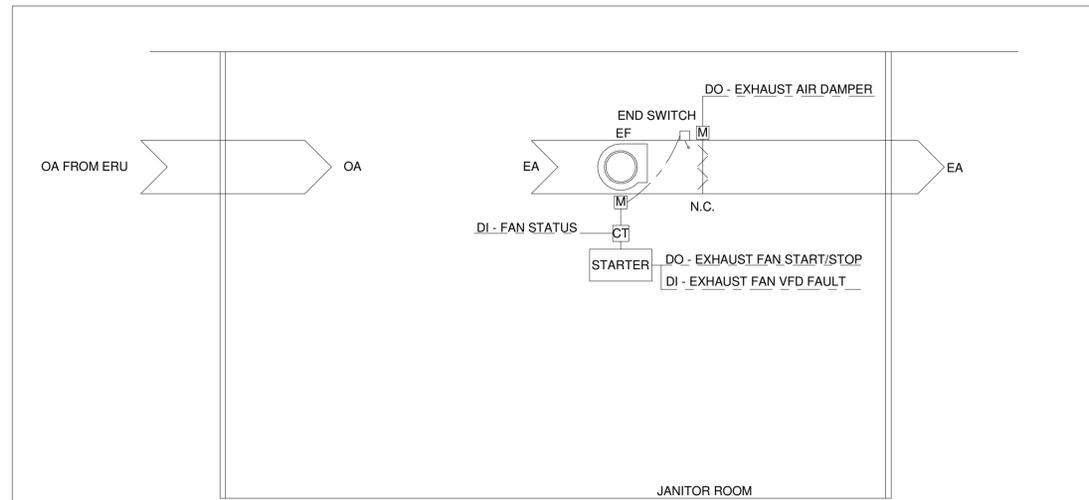
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2 VRF FAN COIL UNIT CONTROL SEQUENCE
SCALE: N.T.S.



JANITOR ROOM VENTILATION CONTROLS:

- SYSTEM START:**
SYSTEM START IS INITIATED BY OPERATOR COMMAND AT BAS OR MANUALLY BY LOCAL STARTER. UPON SIGNAL TO START THE EXHAUST FAN, THE EXHAUST AIR DAMPER OPENS. ONCE THE OPEN POSITION LIMIT SWITCH PROVES THE DAMPER IS FULLY OPEN, THE EXHAUST FAN SHALL START.
- NORMAL OPERATION:**
THE EXHAUST FAN SHALL RUN CONTINUOUSLY TO PROVIDE CONTINUOUS VENTILATION FOR BOTH GARBAGE ROOM AND RECYCLING ROOM.
LOCAL UNIT HEATERS SHALL PROVIDE HEATING TO MAINTAIN THE SPACE TEMPERATURE IN WINTER.
- SYSTEM STOP:**
THE SYSTEM STOP IS INITIATED BY OPERATOR COMMAND AT BAS OR MANUALLY BY LOCAL STARTER. UPON SIGNAL TO STOP EXHAUST FAN, EXHAUST AIR DAMPER CLOSES.
- ALARM:**
 - EXHAUST FAN FAILURE: COMMANDED ON, BUT STATUS IS OFF.
 - EXHAUST FAN IN HAND: COMMANDED OFF, BUT STATUS IS ON.

1 JANITOR RM. VENT. CONTROLS
SCALE: 1 : 1

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2	ISSUED FOR TENDER	2024-09-09
1	ISSUED FOR BUILDING PERMIT	2024-07-31

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**MECHANICAL CONTROL
SEQUENCES III**

Drawing
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1	ISSUED FOR ADDENDUM 3		2024-09-23

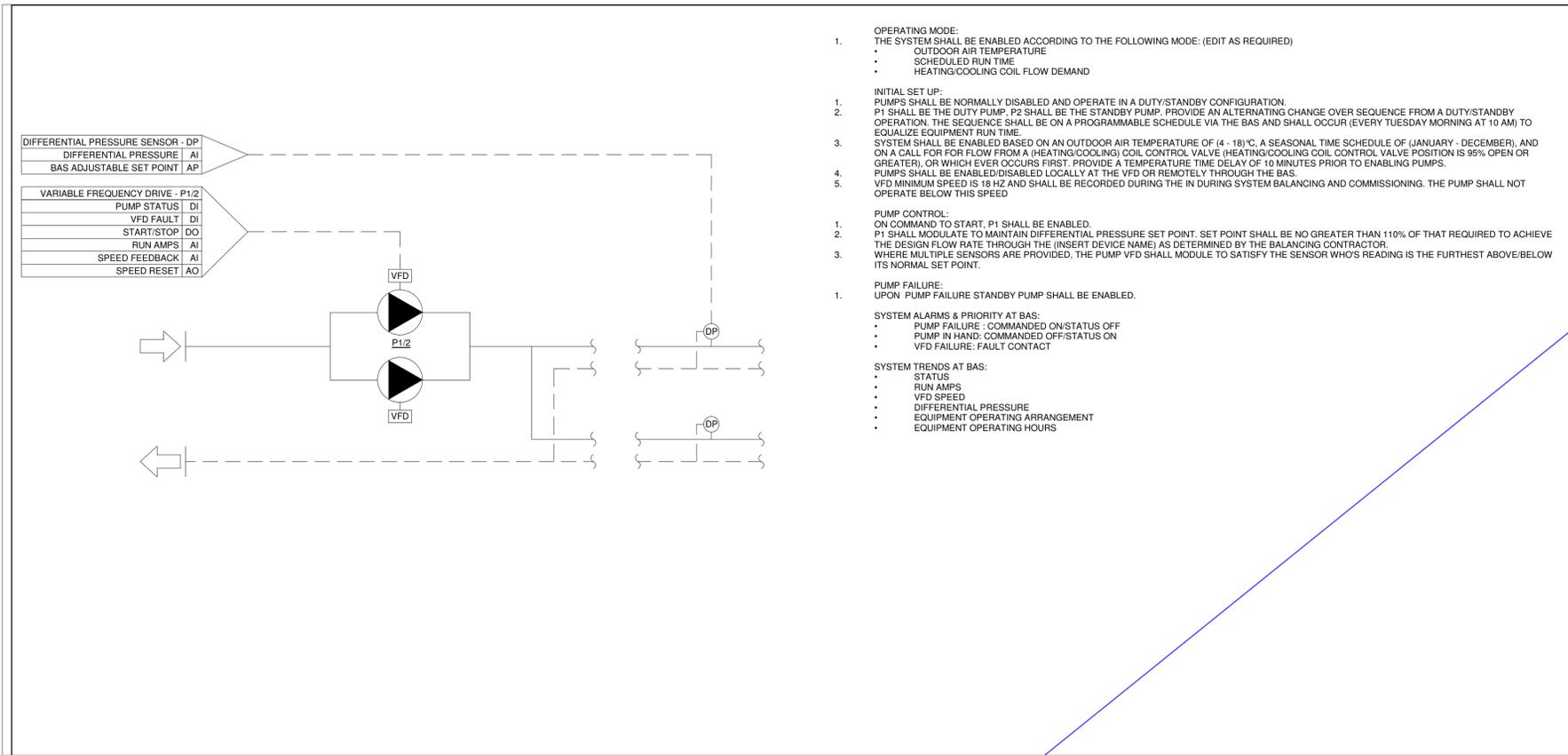
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Scale: N.T.S.

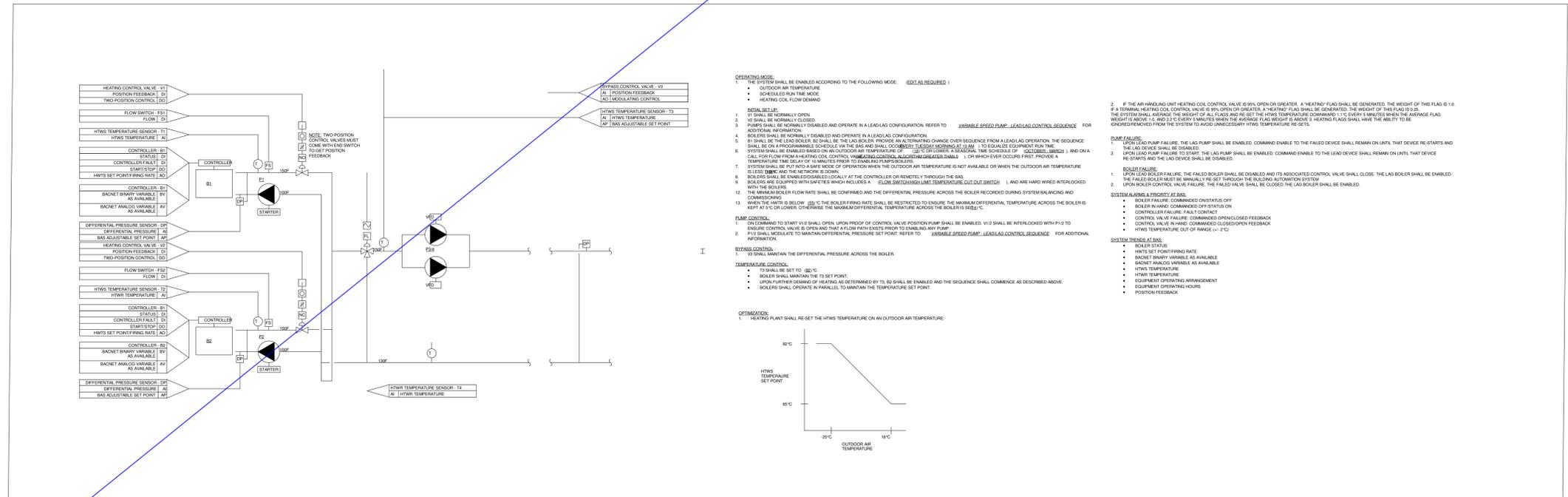
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**MECHANICAL CONTROL
SEQUENCES IV**

Drawing
No.
M-753

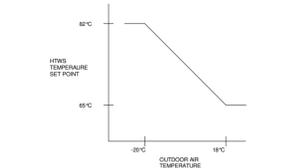


- OPERATING MODE:**
THE SYSTEM SHALL BE ENABLED ACCORDING TO THE FOLLOWING MODE: (EDIT AS REQUIRED)
- OUTDOOR AIR TEMPERATURE
 - SCHEDULED RUN TIME
 - HEATING/COOLING COIL FLOW DEMAND
- INITIAL SET UP:**
PUMPS SHALL BE NORMALLY DISABLED AND OPERATE IN A DUTY/STANDBY CONFIGURATION. P1 SHALL BE THE DUTY PUMP, P2 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, P1 SHALL BE ENABLED.
P1 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.
- 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: (EDIT AS REQUIRED)
- OUTDOOR AIR TEMPERATURE
 - SCHEDULED RUN TIME MODE
 - HEATING COIL FLOW DEMAND
- INITIAL SET UP:**
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. THE 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.
SYSTEM SHALL BE IN A DUTY/STANDBY MODE OF OPERATION WHEN THE OUTDOOR AIR TEMPERATURE IS NOT AVAILABLE OR WHEN THE OUTDOOR AIR TEMPERATURE IS LESS THAN AND NOT MORE THAN 18 °C.
BOILERS SHALL BE ENABLED/DISABLED LOCALLY AT THE CONTROLLER OR REMOTELY THROUGH THE BAS.
BOILERS SHALL BE EQUIPPED WITH SAFETY WHICH INCLUDES A (CLOSE) SWITCH (HIGH LIMIT TEMPERATURE) (SHUT DOWN) (1) AND ARE HARD WIRED INTERLOCKED WITH THE BOILERS.
THE MINIMUM BOILER 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.
- STARTUP SEQUENCE:**
ON COMMAND TO START VFD SHALL OPEN. UPON PROOF OF CONTROL VALVE POSITION PUMP SHALL BE ENABLED. VFD SHALL BE INTERLOCKED WITH P1 TO ENSURE CONTROL VALVE IS OPEN AND THAT A FLOW PATH EXISTS PRIOR TO ENABLING ANY PUMP.
P1 SHALL MODULATE TO MAINTAIN DIFFERENTIAL PRESSURE SET POINT. REFER TO VARIABLE SPEED PUMP - LEAD/LAG CONTROL SEQUENCE FOR ADDITIONAL INFORMATION.
- SYSTEM TRENDS AT BAS:**
- BOILER STATUS
 - HTWS SET POINT/FIRING RATE
 - BACKSET BINARY VARIABLE AS AVAILABLE
 - HTWS TEMPERATURE
 - HTWS TEMPERATURE
 - EQUIPMENT OPERATING ARRANGEMENT
 - EQUIPMENT OPERATING HOURS
 - POSITION FEEDBACK
- OPTIMIZATION:**
HEATING PLANT SHALL BE SET THE HTWS 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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2	ISSUED FOR ADDENDUM 6		2024-09-30
1	ISSUED FOR ADDENDUM 3		2024-09-23

Issues

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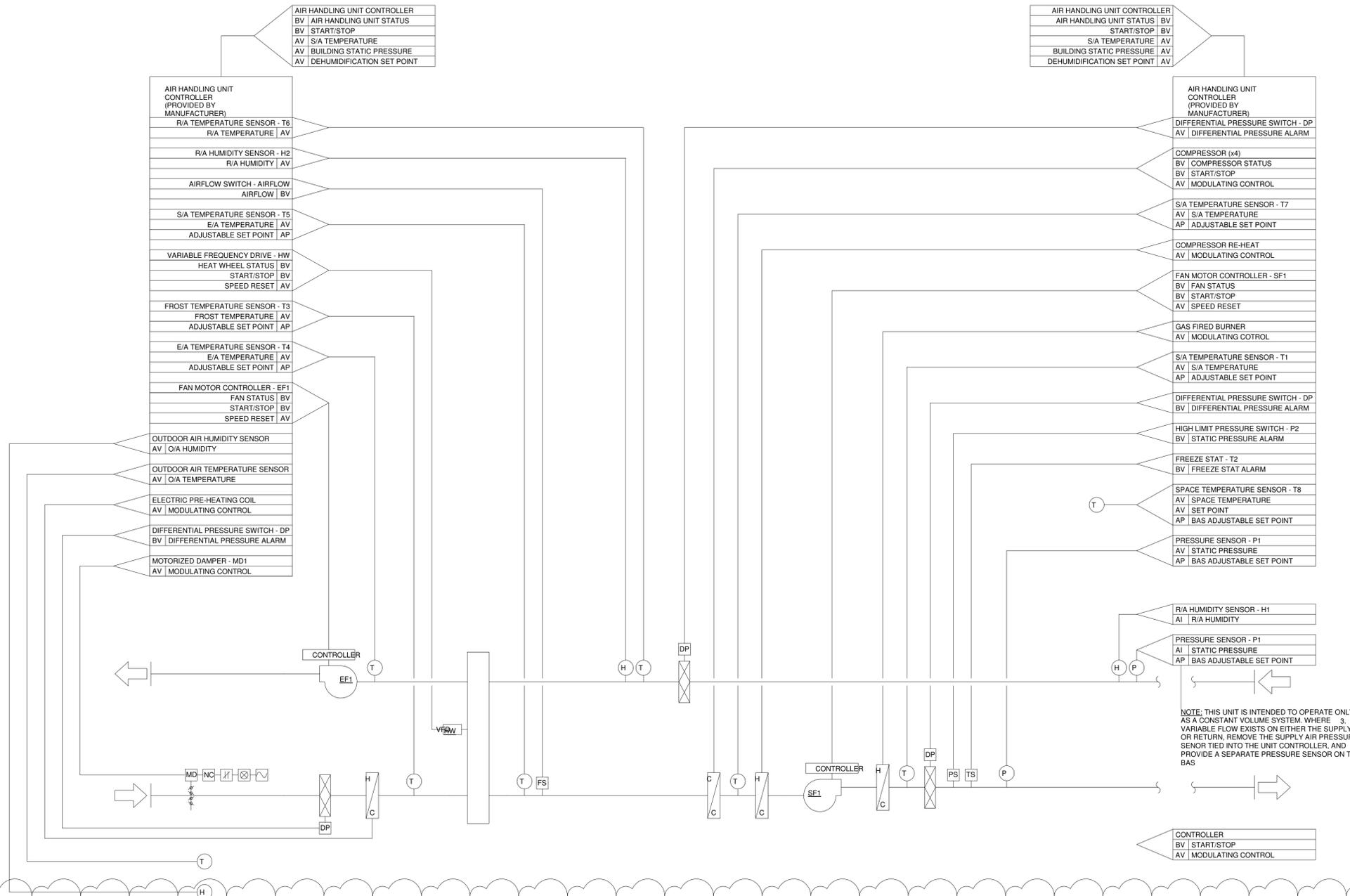
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Project No: TT-24-005
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SYSTEM TRENDS AT BAS:
 * ROOF TOP UNIT STATUS
 * TEMPERATURE SET POINT
 * BUILDING STATIC PRESSURE
 * DEHUMIDIFICATION SET POINT

MECHANICAL CONTROL SEQUENCES V

Sheet
Title:
Drawing No:
M-754



NOTE: THIS UNIT IS INTENDED TO OPERATE ONLY AS A CONSTANT VOLUME SYSTEM. WHERE 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:**
- 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

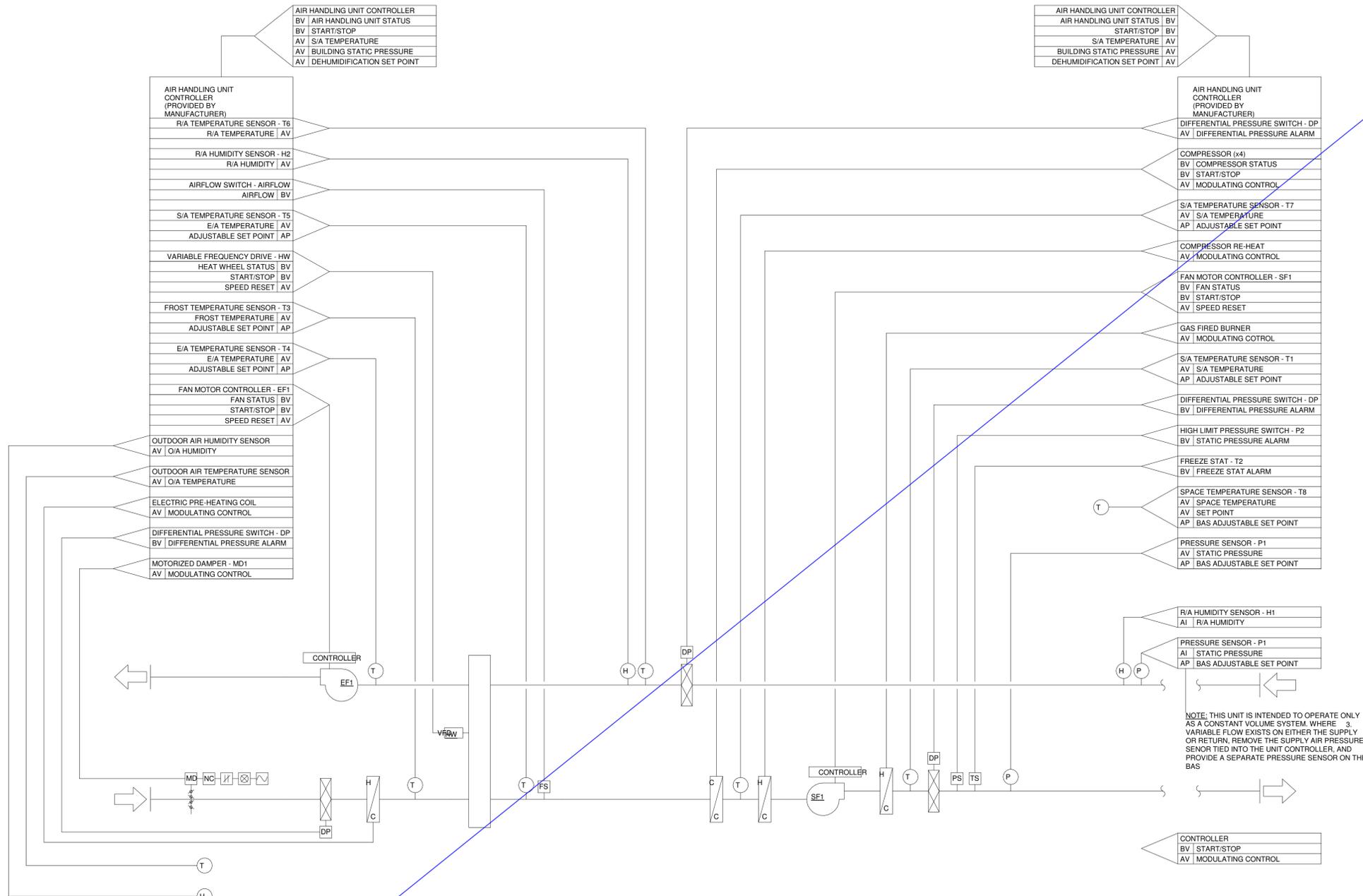


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1 ROOF TOP UNIT - 100% OUTDOOR AIR WITH HOT GAS RE-HEAT AND HEAT WHEEL - HANGAR SPACE NOT TO SCALE

- OPERATING MODE:**
- THE SYSTEM SHALL BE ENABLED BY THE BAS ACCORDING TO THE FOLLOWING MODE: (EDIT AS REQUIRED)
 - 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 COOLING VIA DX COOLING COIL AND CONDENSING UNIT.
 - 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 CALL FOR MECHANICAL COOLING.
 - 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 CONTRACTOR.
 - (SYSTEM SHALL BE ENABLED BASED ON COOLING AND HEATING DISCHARGE AIR TEMPERATURE CONTROL AND CHANGE OVER MODE BASED ON NETWORK SIGNAL FOR SUMMER COOLING MODE AND WINTER HEATING MODE COOLING)
 - 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:

- 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 IN.WC.
- FREEZE STAT T2 SHALL BE INTERLOCKED WITH THE SUPPLY AND EXHAUST FAN AND 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:

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

SYSTEM TRENDS AT BAS:

- ROOF TOP UNIT STATUS
- TEMPERATURE SET POINT
- BUILDING STATIC PRESSURE
- DEHUMIDIFICATION SET POINT

NO.	ISSUED	DATE
1	ISSUED FOR ADDENDUM 3	2024-09-23

Issues

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

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Scale:

MECHANICAL CONTROL SEQUENCES V

Sheet Title:
Drawing No:
M-754

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Issues

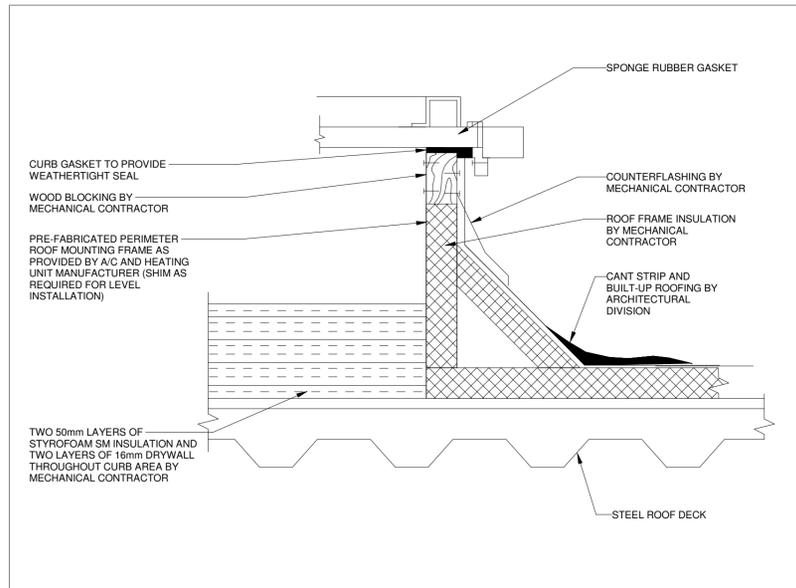
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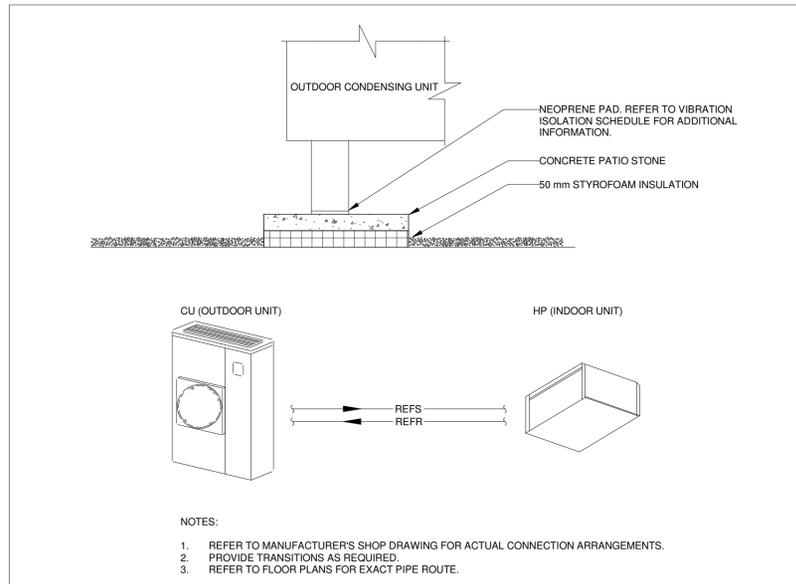
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Original Issue Date: 2024-07-31
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DETAILS I**

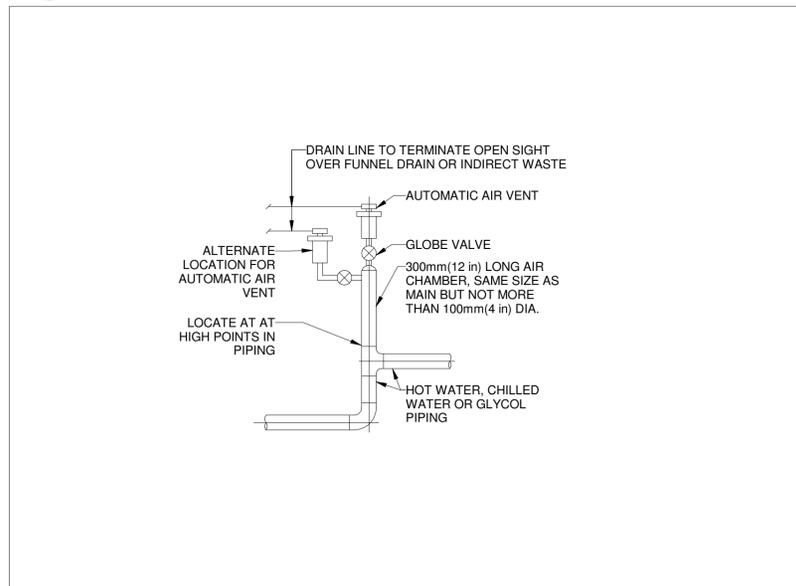
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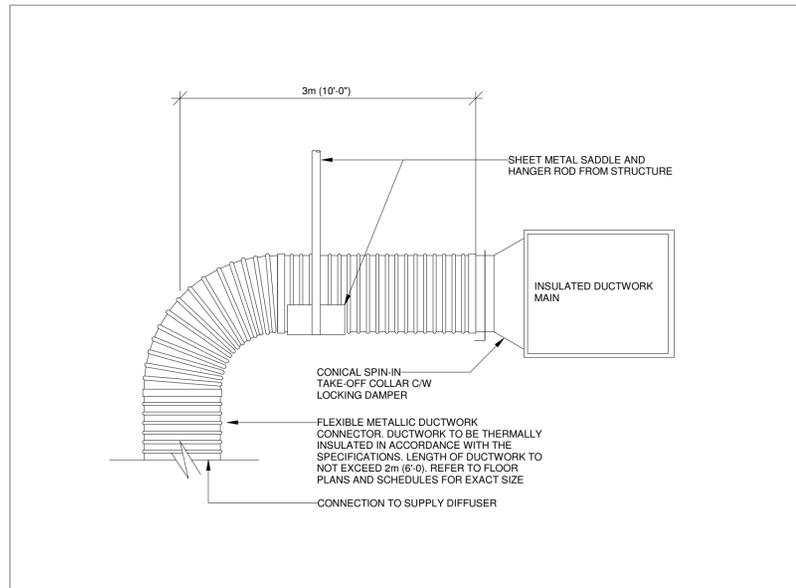
3 ROOFTOP UNIT ROOF CURB
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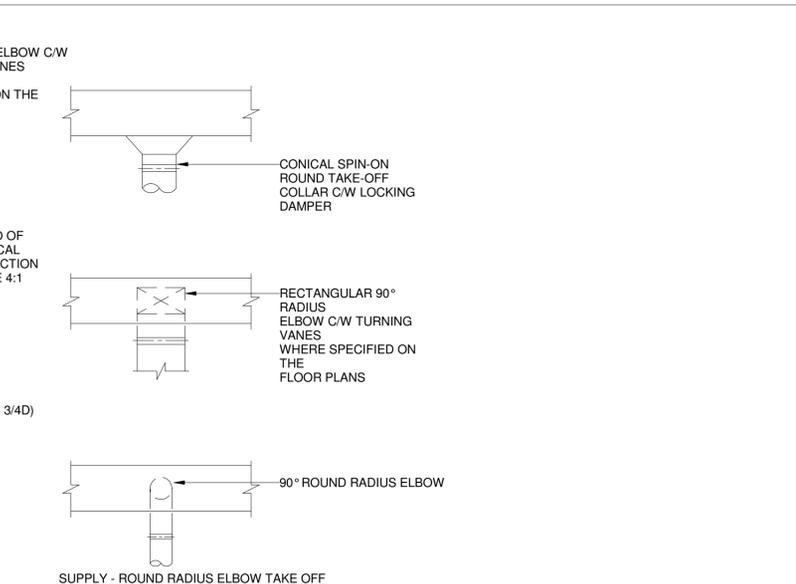
2 OUTDOOR CONDENSING UNIT
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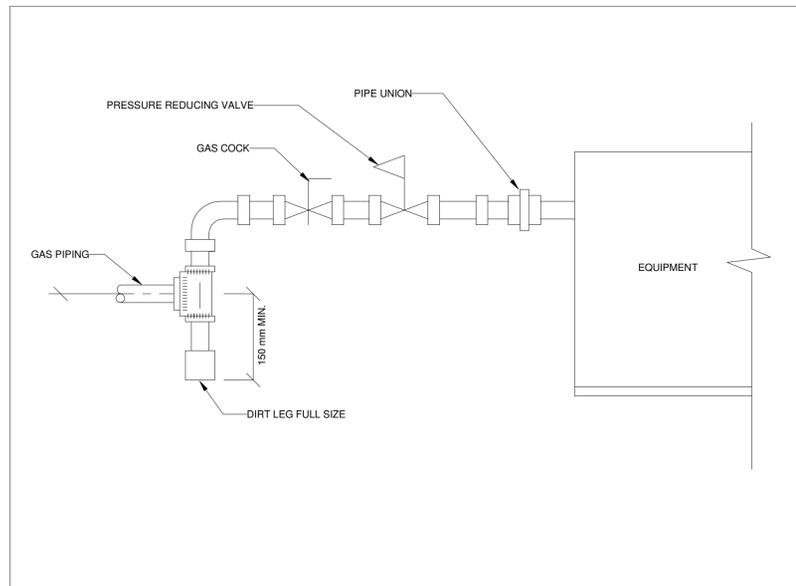
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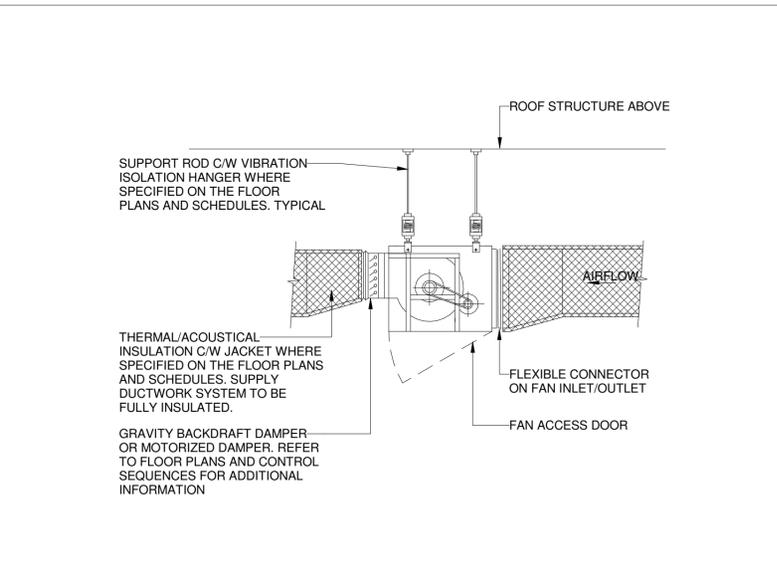
6 FLEXIBLE METALLIC DUCTWORK
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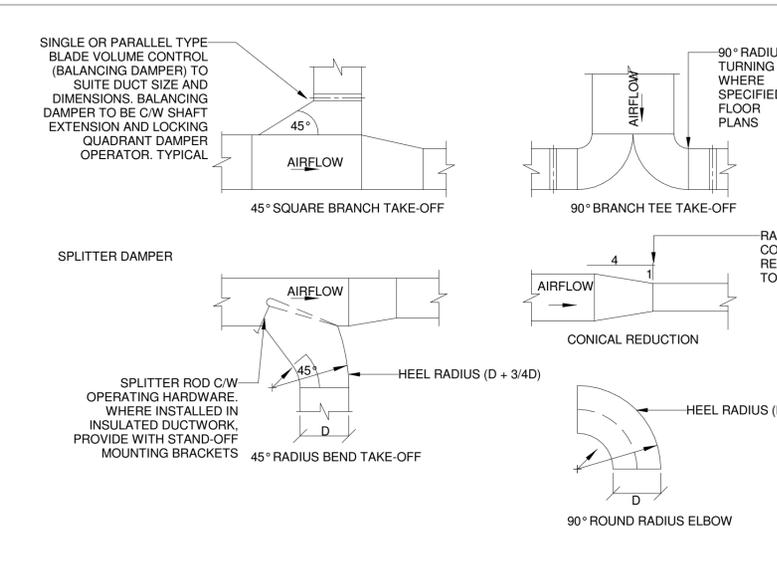
5 DUCTWORK FITTINGS & TAKE-OFF'S
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4 GAS PIPE CONNECTION TO EQUIPMENT
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8 CENTRIFUGAL INLINE FAN
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7 SUPPLY AIR LINEAR DIFFUSER (T-BAR CEILING)
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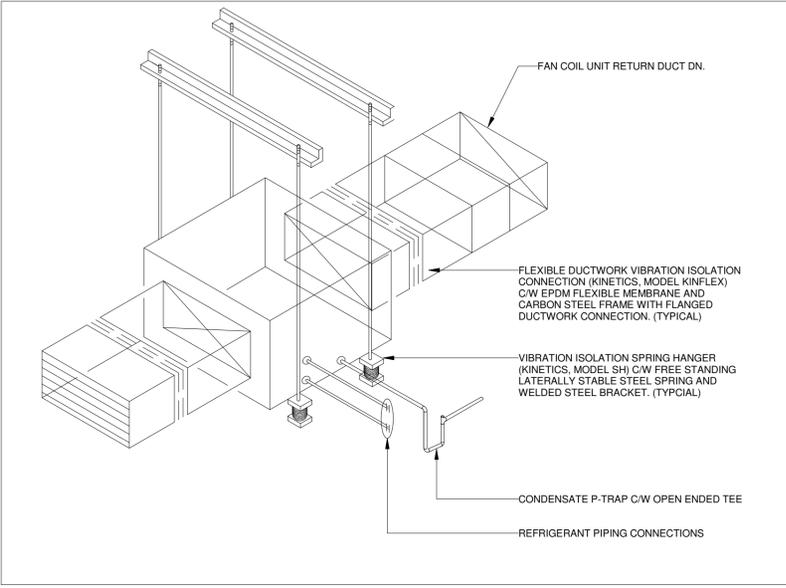


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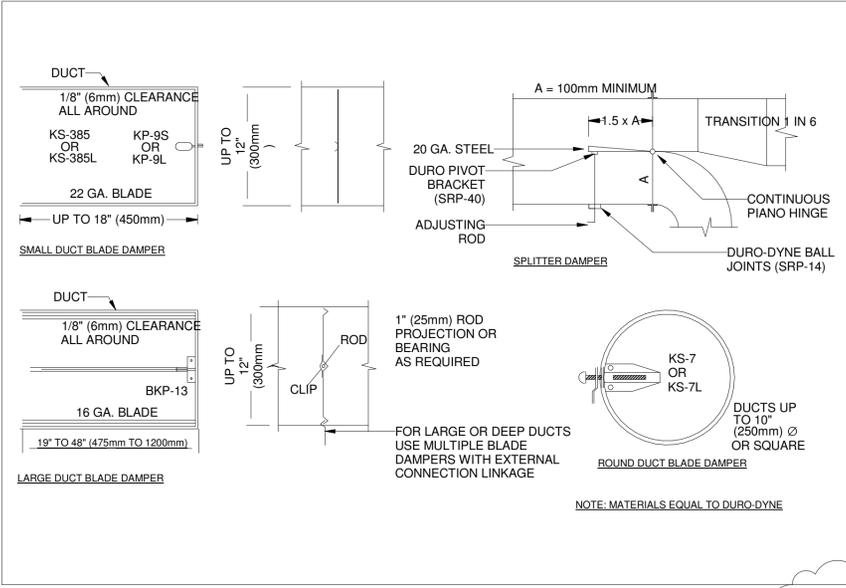
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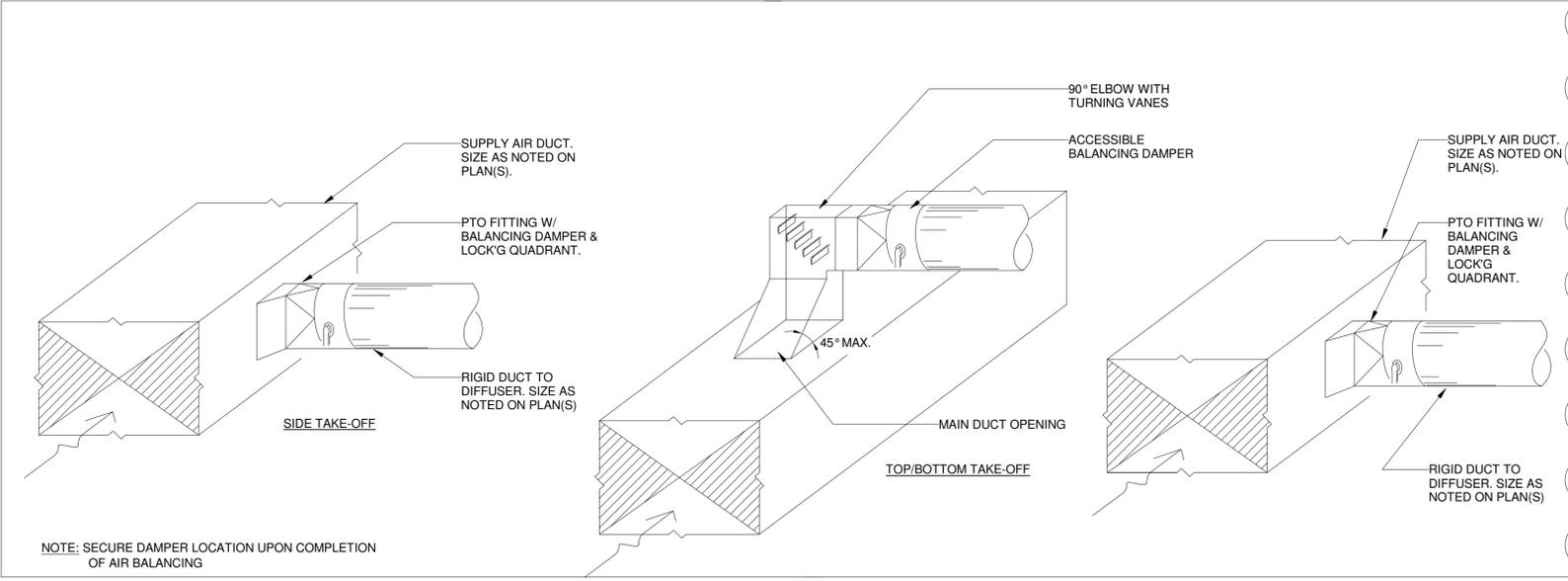
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Plan



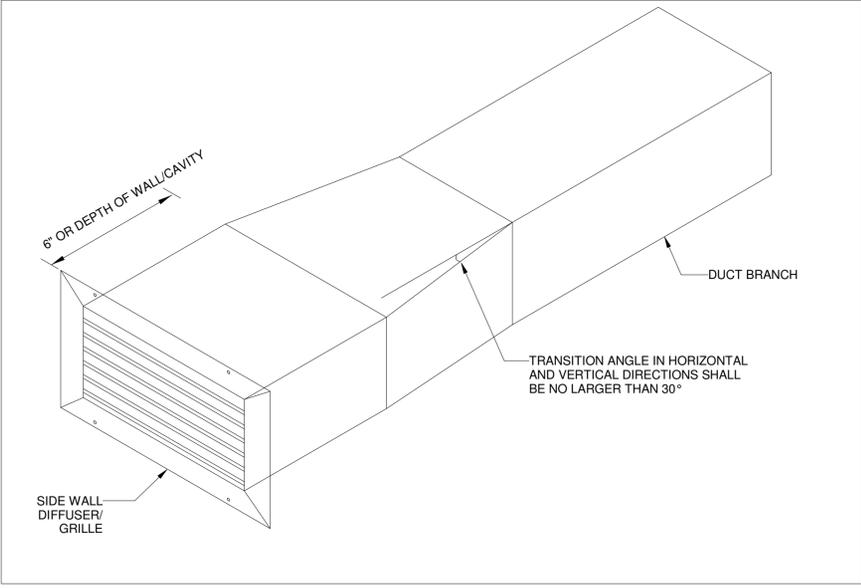
7 DUCTED FAN COIL UNIT
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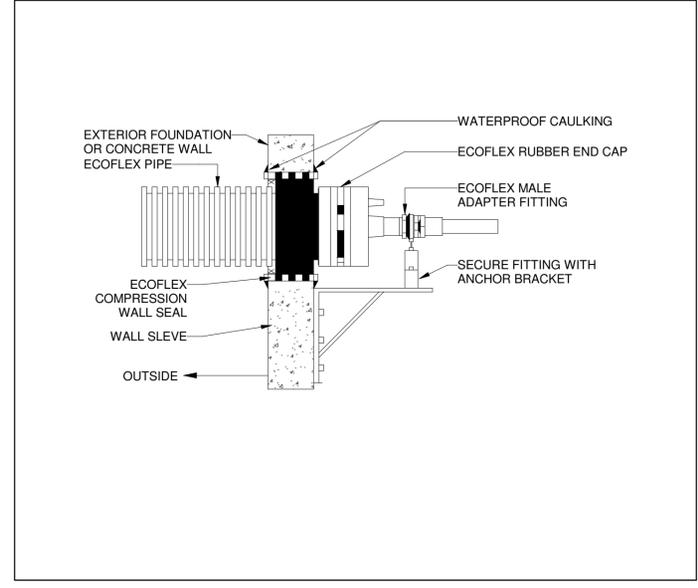
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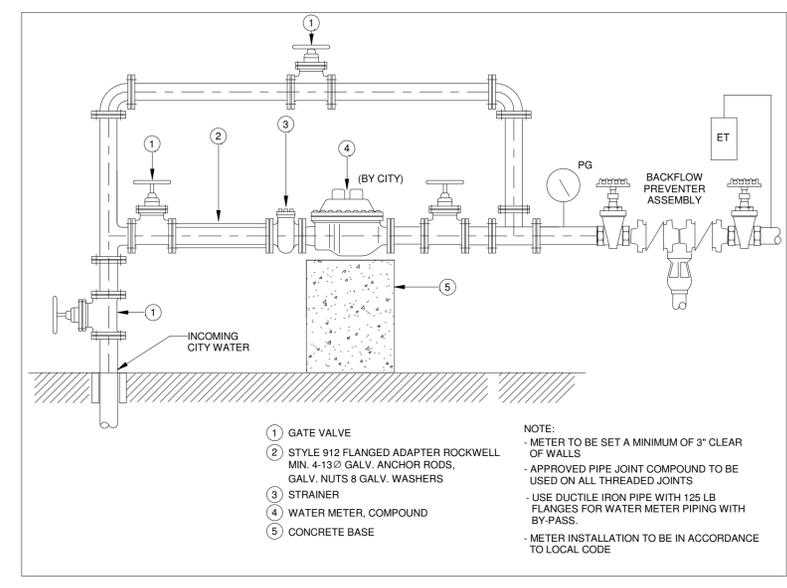
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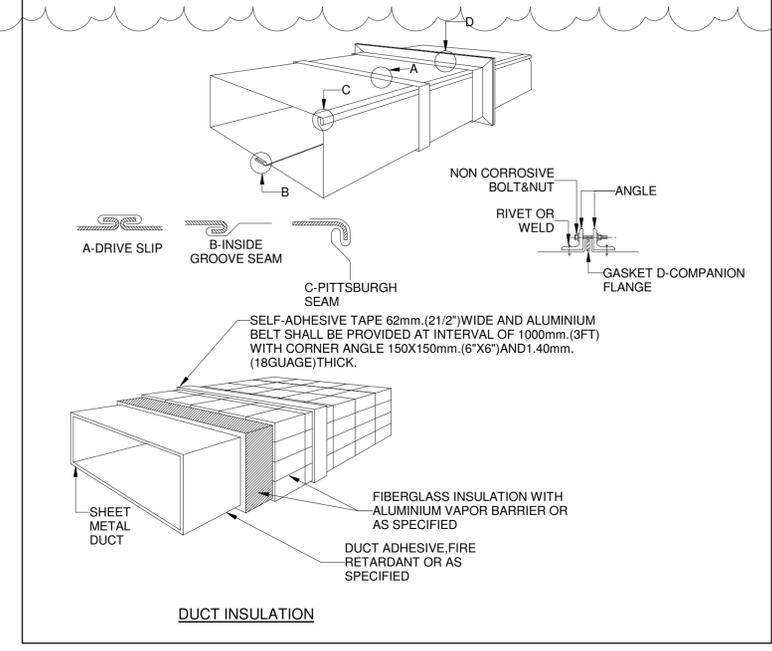
6 TYPICAL DETAIL OF SIDE WALL DIFFUSER/GRILLE
SCALE: N.T.S.



3 ECOFLEX THERMO CROSS LINKED WALL PENETRATION
SCALE: N.T.S.



5 WATER METER ASSEMBLY
SCALE: N.T.S.



1 RECTANGULAR DUCT INSULATION
SCALE: N.T.S.

NO.	ISSUED	DATE
3	ISSUED FOR ADDENDUM 10	2024-10-15
2	ISSUED FOR TENDER	2024-09-09
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Issues

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MECHANICAL TYPICAL DETAILS II

Drawing No:
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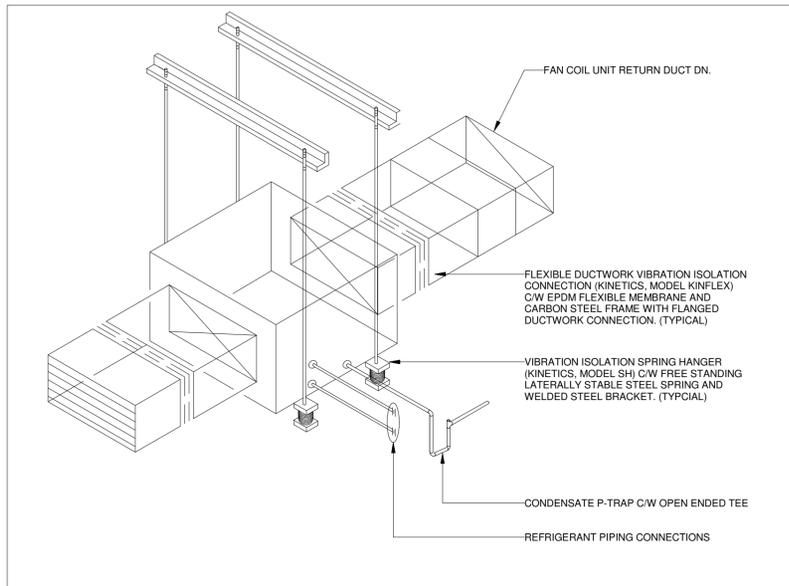
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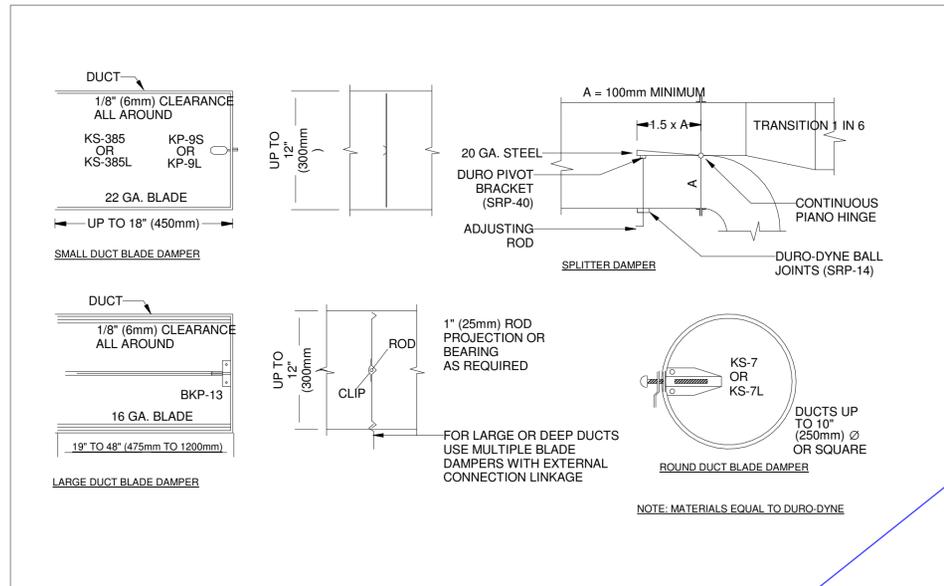
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Sheet
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**MECHANICAL TYPICAL
DETAILS II**

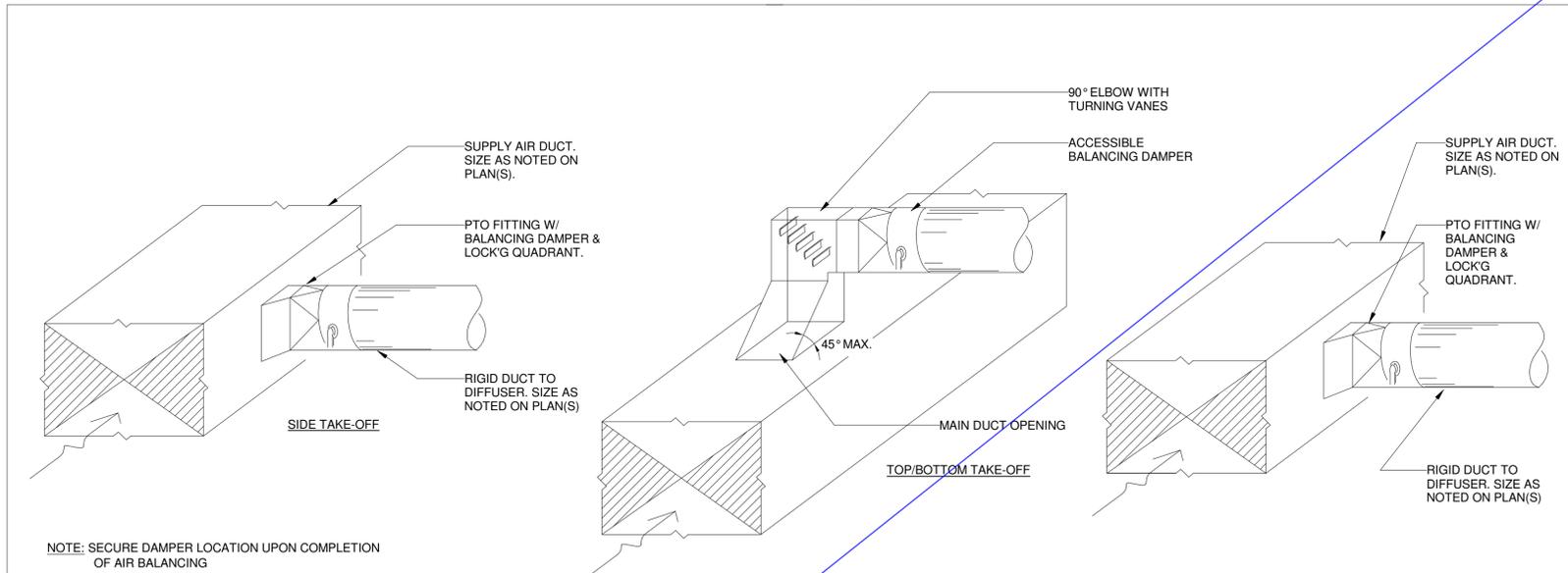
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M-801



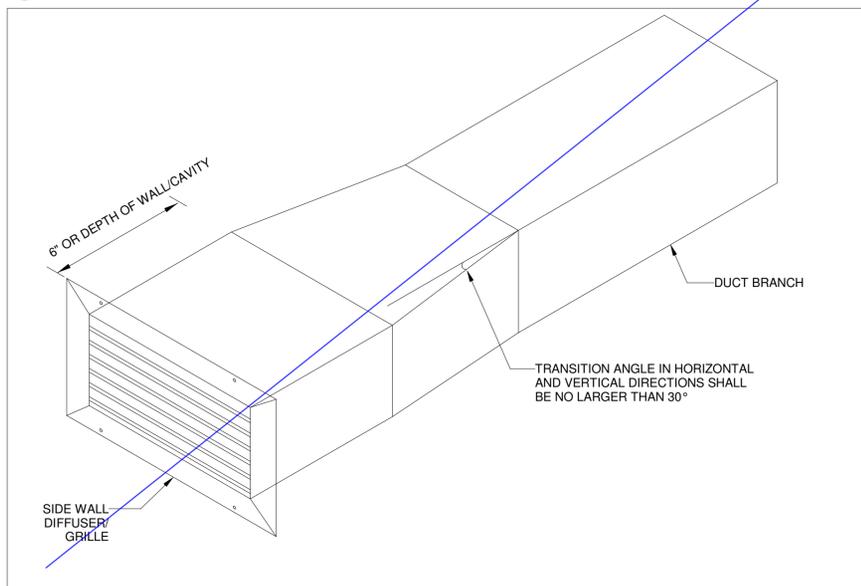
7 DUCTED FAN COIL UNIT
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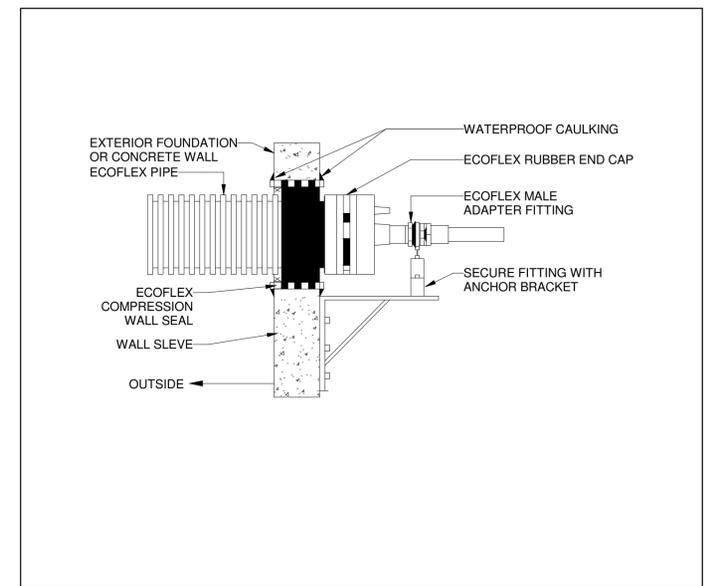
2 VOLUME DAMPER
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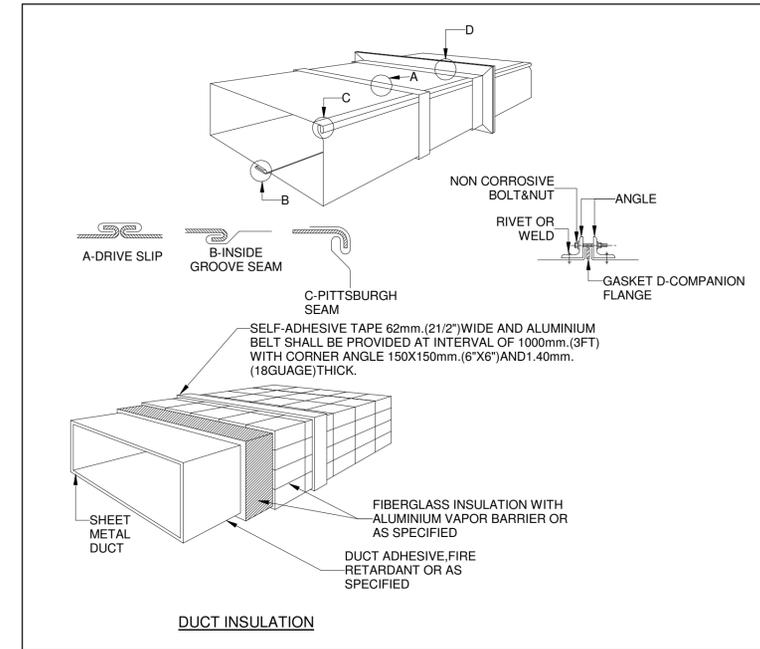
4 TYPICAL BRANCH TAKE-OFF INSTALLATION
SCALE: 1 : 1



6 TYPICAL DETAIL OF SIDE WALL DIFFUSER/GRILLE
SCALE:N.T.S.



3 ECOFLEX THERMO CROSS LINKED WALL PENETRATION
SCALE:N.T.S.



1 RECTANGULAR DUCT INSULATION
SCALE:N.T.S.



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Issues

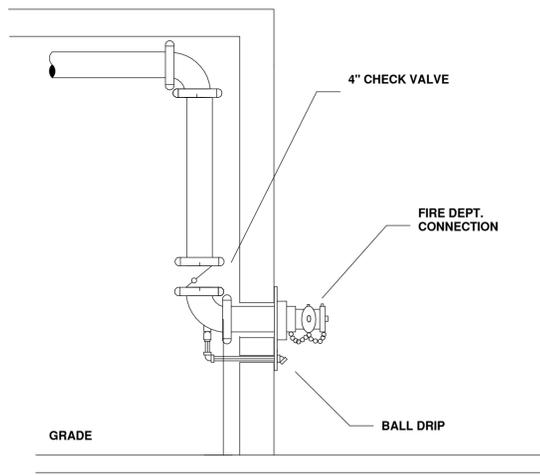
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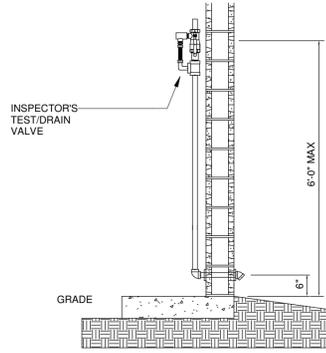
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Original Issue Date: 2024-07-31
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Sheet
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**MECHANICAL TYPICAL
DETAILS III**

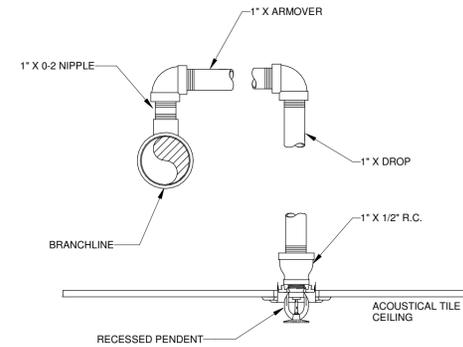
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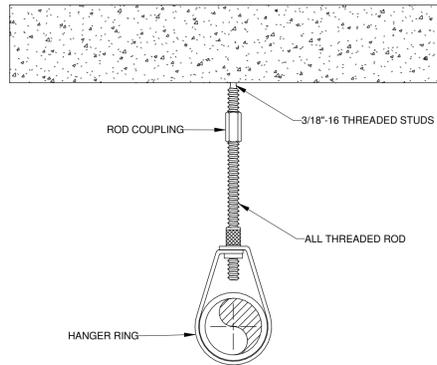
9 FIRE DEPARTMENT CONNECTION
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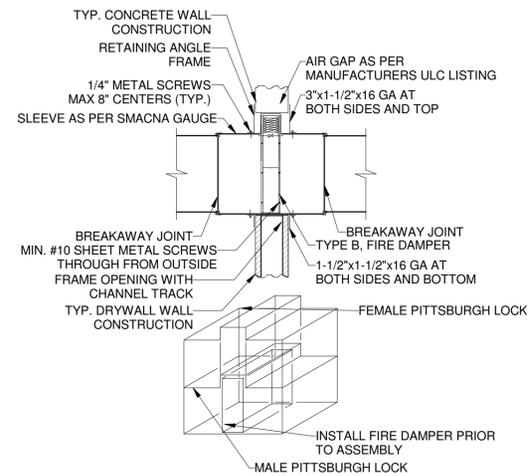
6 INSPECTOR'S TEST DETAIL
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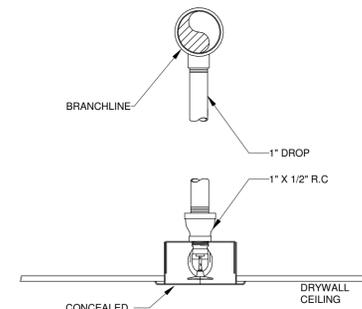
3 RETURN BEND DETAIL
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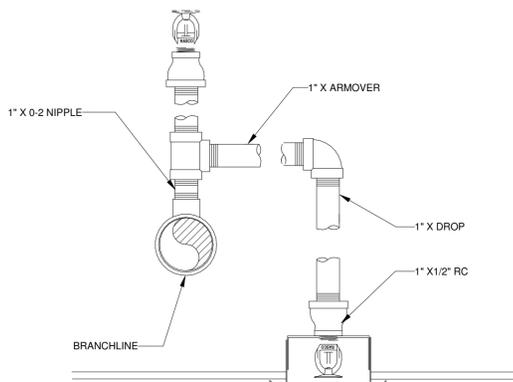
8 FIRE PROTECTION HANGER DETAIL-1
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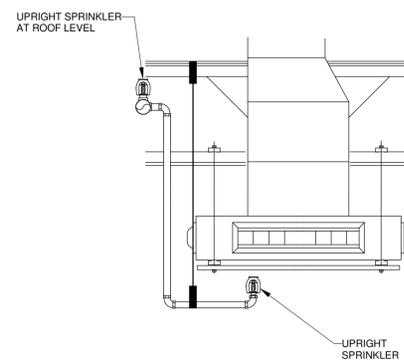
5 TYPE "B" FIRE DAMPER
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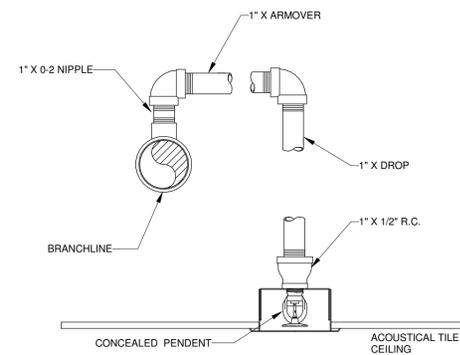
2 CONCEALED SPRINKLER DROP DETAIL
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7 SPRINKLER UP AND DOWN DETAIL
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4 SPRINKLERS BENEATH DUCTWORK
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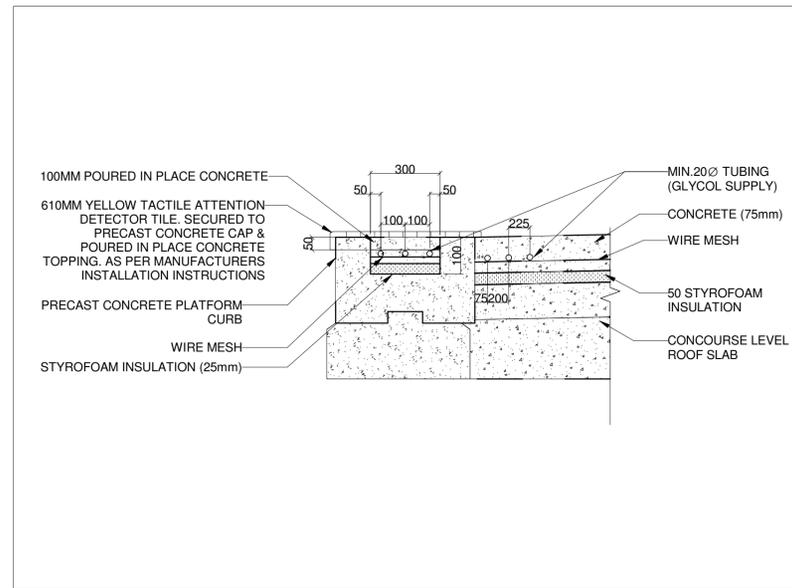


1 CONCEALED RETURN BEND DETAIL
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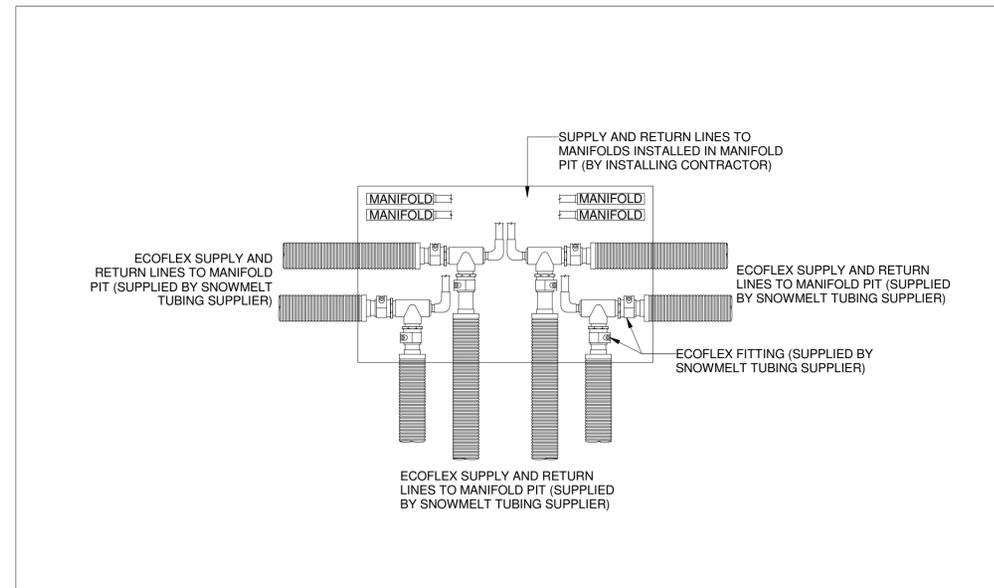
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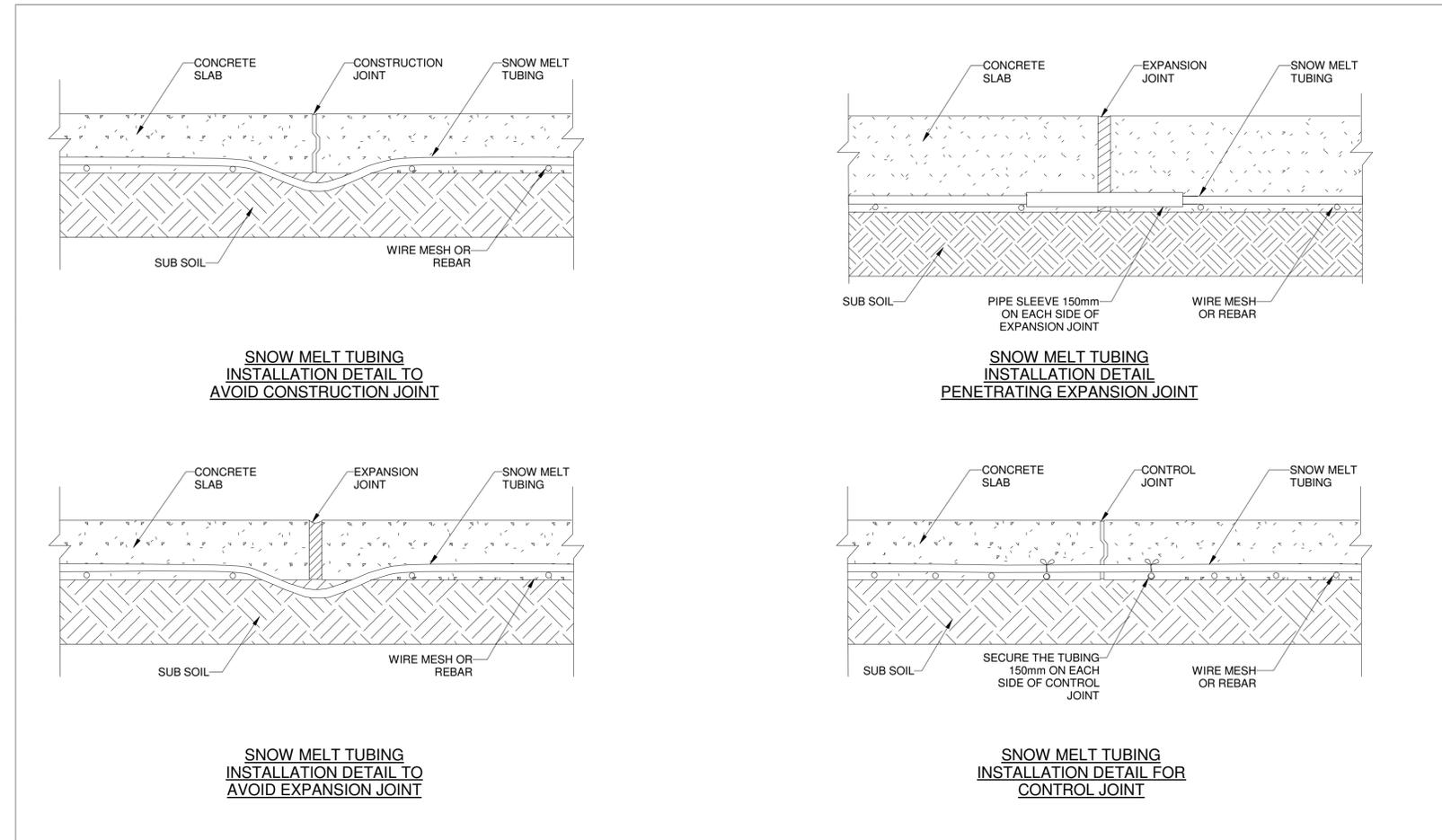
Key
Plan



3 SNOWMELT TUBING INSTALLATION
SCALE: N.T.S.



2 SNOWMELT MANIFOLD PIT PIPING
SCALE: N.T.S.



1 SNOWMELT TUBING CROSSING JOINT
SCALE: N.T.S.

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2	ISSUED FOR TENDER	2024-09-09
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Issues

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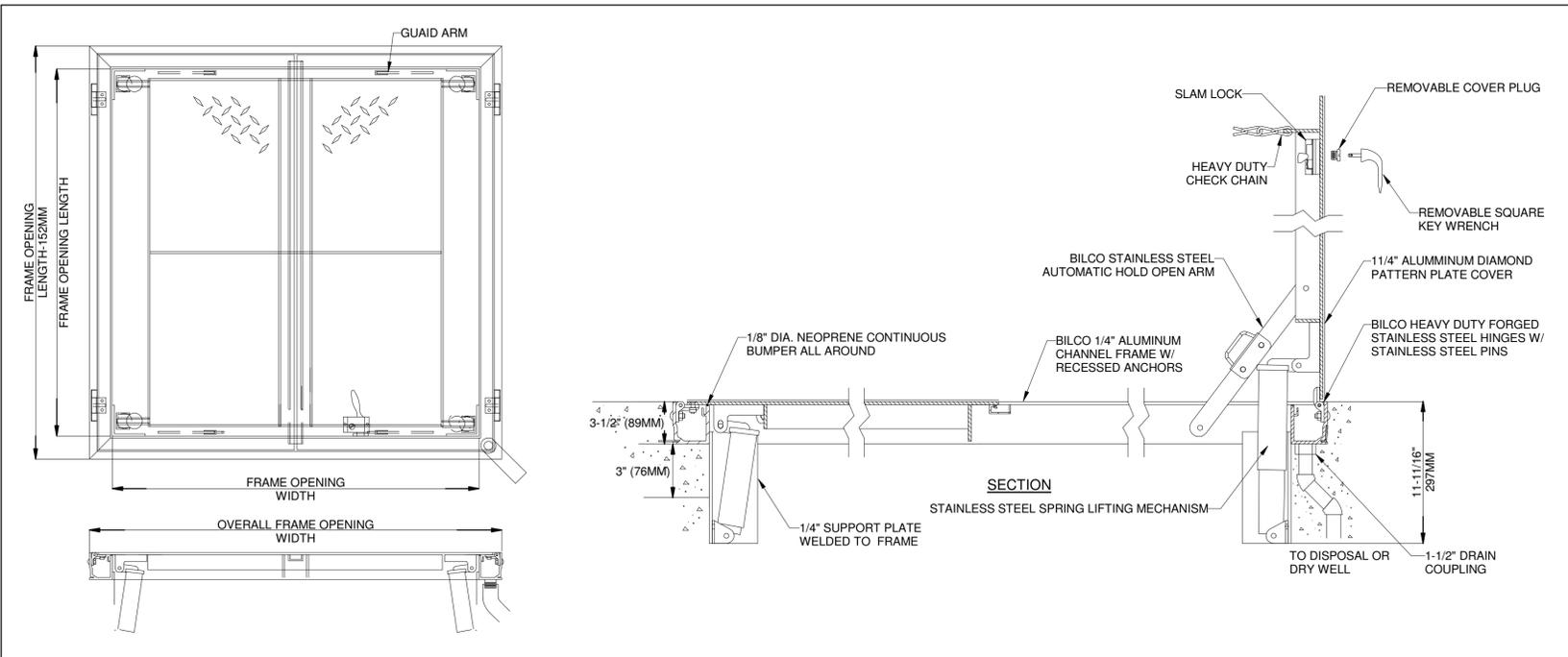
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**MECHANICAL TYPICAL
DETAILS V**

Drawing
No:
M-804

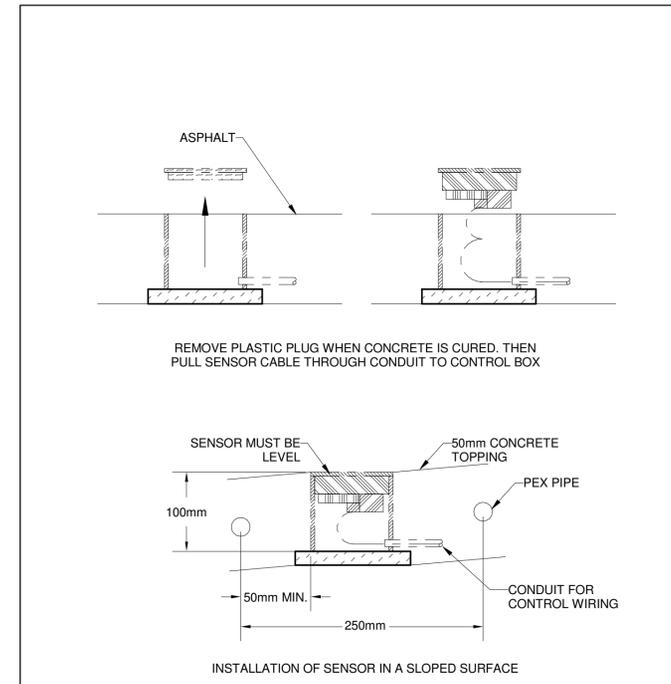
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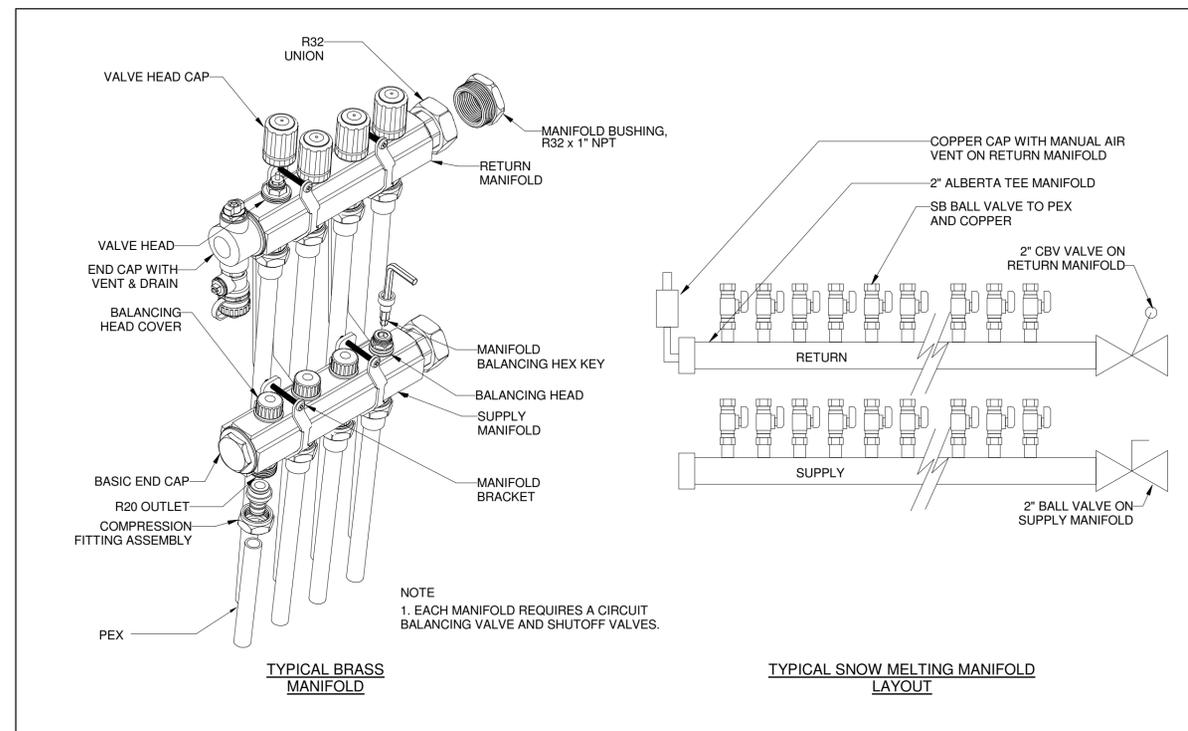
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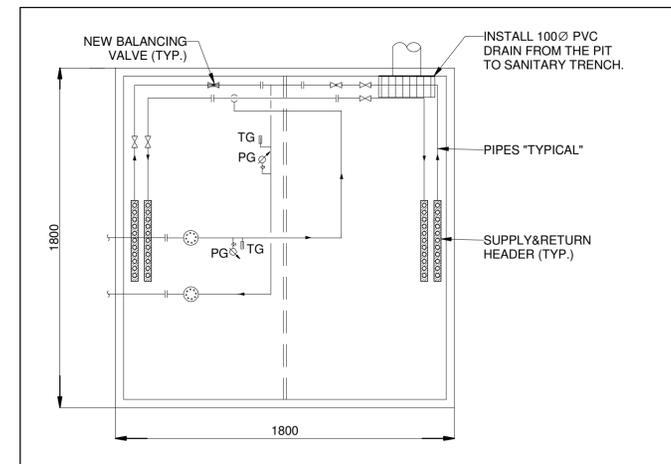
5 **SNOW MELT MANIFOLD PIT ACCESS DOOR DETAIL**
SCALE: N.T.S.



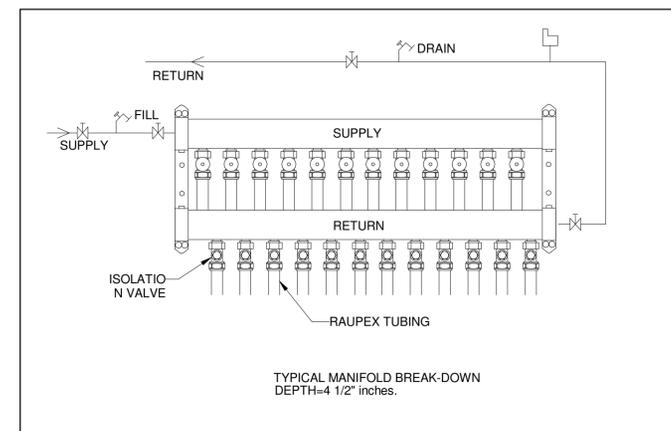
3 **SNOW/ICE SENSOR DETAIL**
SCALE: N.T.S.



4 **TYPICAL SNOW MELTING MANIFOLD DETAIL**
SCALE: N.T.S.



2 **SNOW MELT MANIFOLD PIT PLAN**
SCALE: N.T.S.



1 **SNOWMELT MANIFOLD DETAIL**
SCALE: N.T.S.

NO.	ISSUED	DATE
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

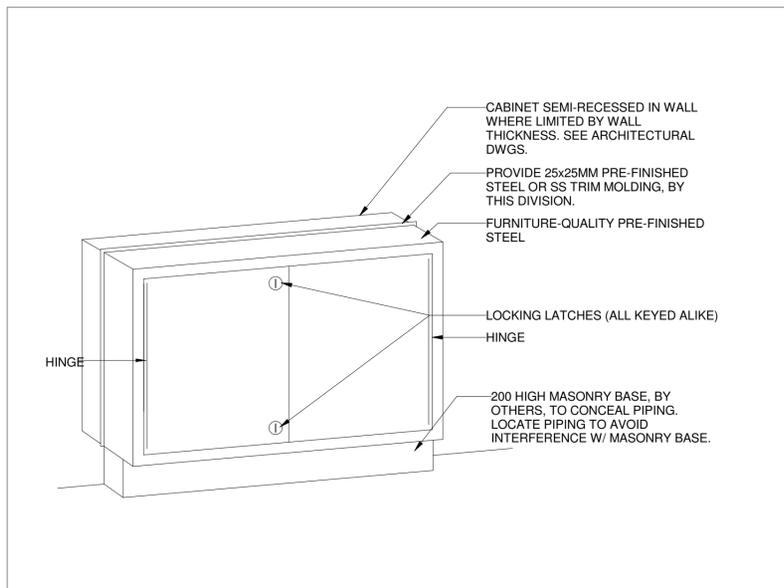
Sheet
Title:
**MECHANICAL TYPICAL
DETAILS VI**

Drawing
No:
M-805

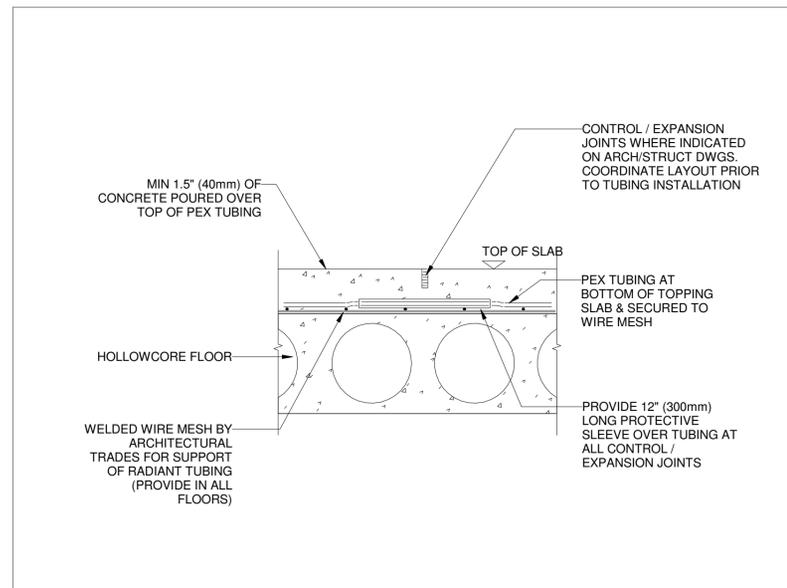
YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT
BOULEVARD
TOWN OF EAST GWILLIMBURY

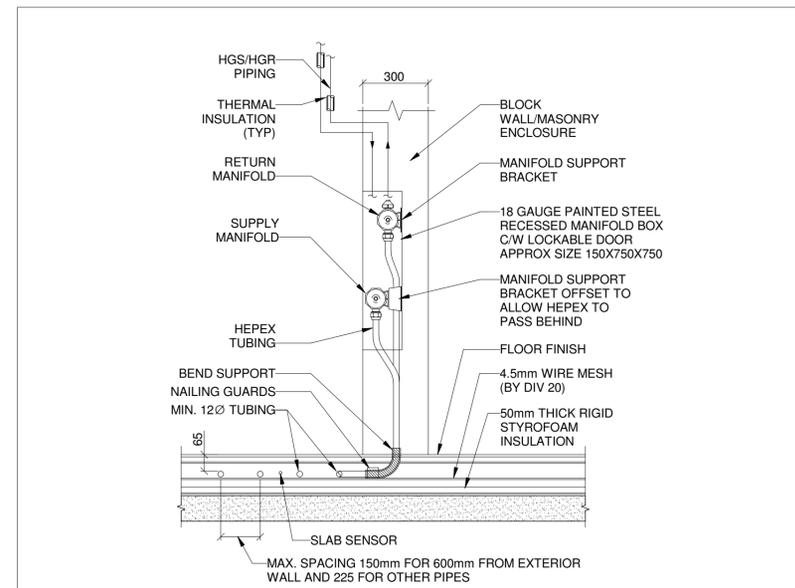
Key
Plan



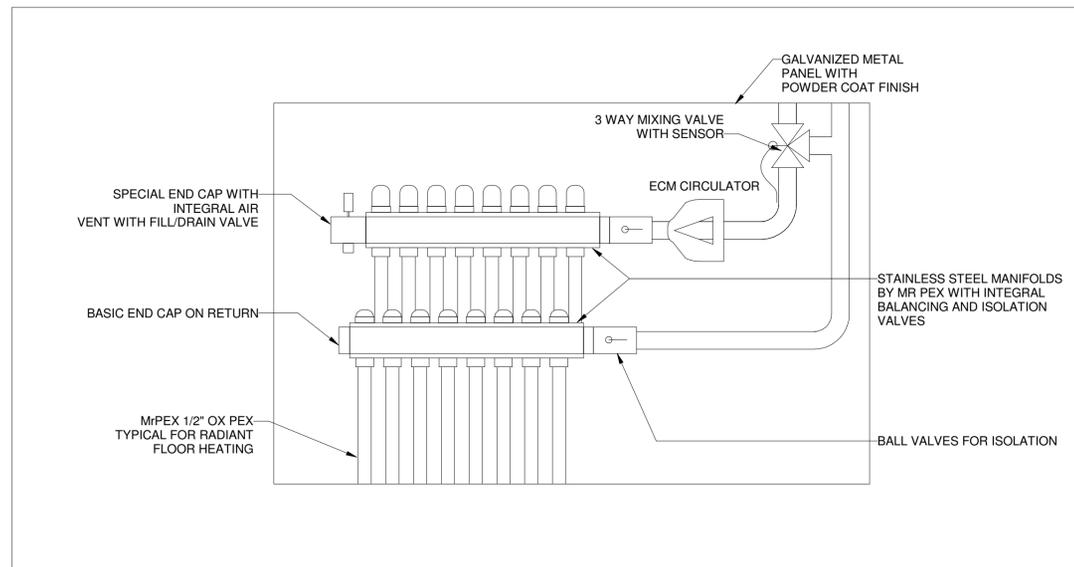
7 IN-FLOOR HEATING MANIFOLD CABINETS
SCALE:N.T.S.



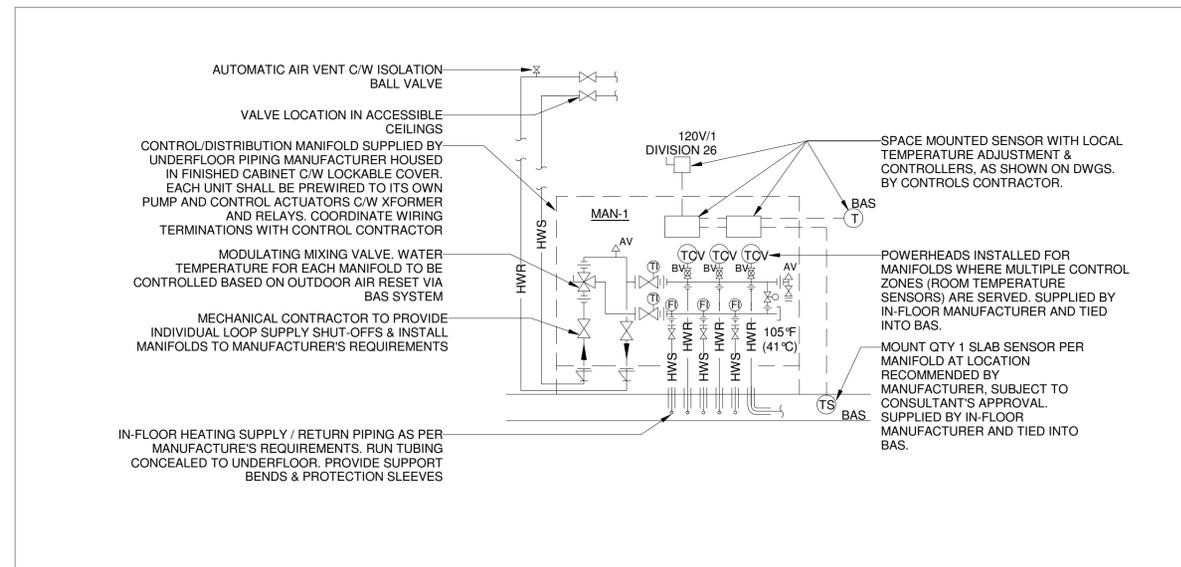
6 IN-FLOOR RADIANT TUBING INSTALLATION
SCALE:N.T.S.



3 IN-FLOOR HEATING MANIFOLD DETAILS
SCALE:N.T.S.



5 IN-FLOOR HEATING MANIFOLD LAYOUT
SCALE:N.T.S.



2 TYP. IN-FLOOR MANIFOLD INSTALLATION
SCALE:N.T.S.

NO.	ISSUED	DATE
4	ISSUED FOR ADDENDUM 15	2024-12-04
3	ISSUED FOR ADDENDUM 10	2024-10-15
2	ISSUED FOR TENDER	2024-09-09
1	ISSUED FOR BUILDING PERMIT	2024-07-31

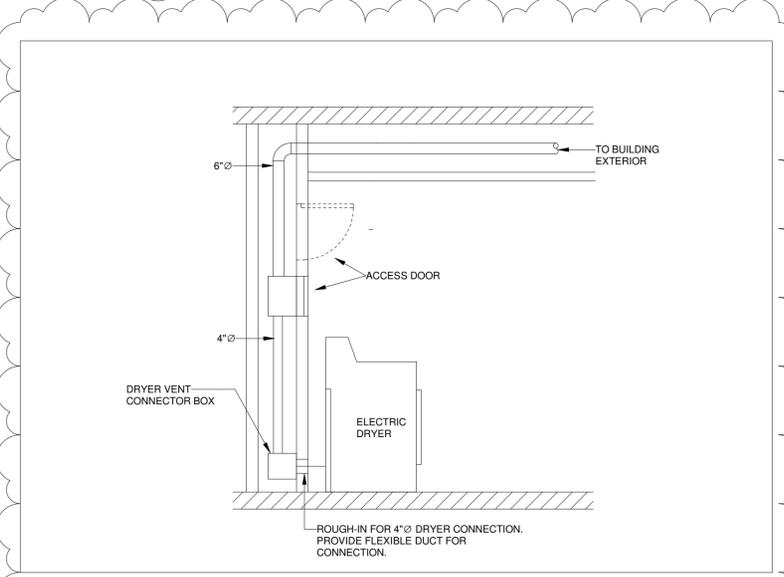
Issues

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

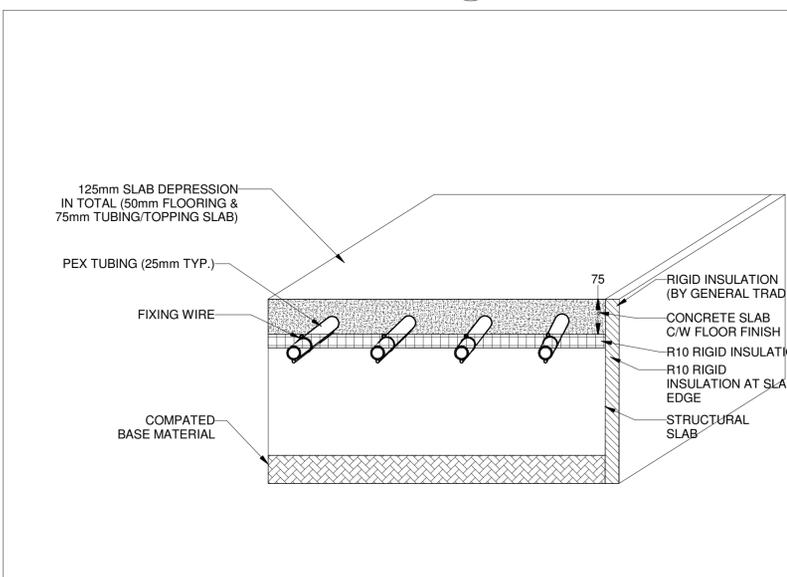
Do not scale drawings
Drawn by: Fizzah Khan/ Iulian Turiga
Checked by: Ali Nakhaei-Zadeh
Original Issue Date: 2024-07-31
Project No: TT-24-005
Scale: As indicated

Sheet Title:
MECHANICAL TYPICAL DETAILS VII

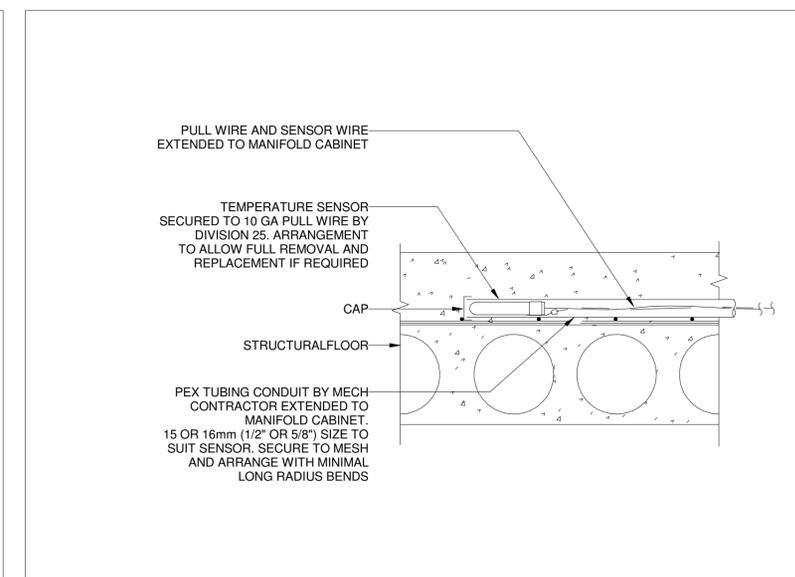
Drawing No:
M-806



8 LAUNDRY DRYER EXHAUST
SCALE:N.T.S.



4 IN-FLOOR HEATING PIPING AND INSULATION
SCALE:N.T.S.

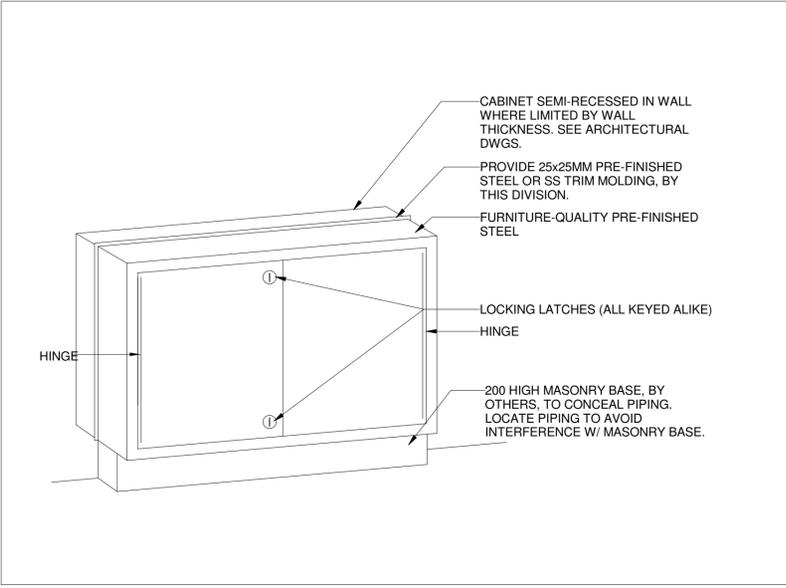


1 RADIANT FLOOR HEATING SLAB SENSOR
SCALE:N.T.S.

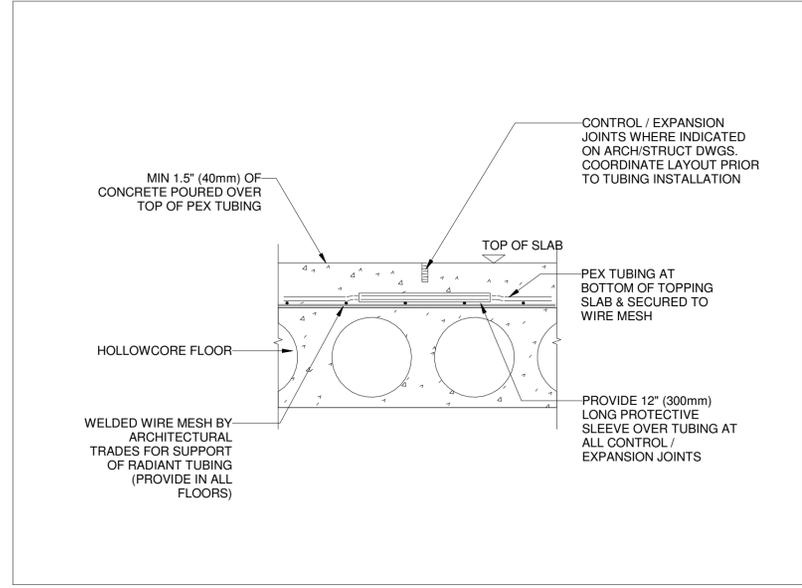
YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT
BOULEVARD
TOWN OF EAST GWILLIMBURY

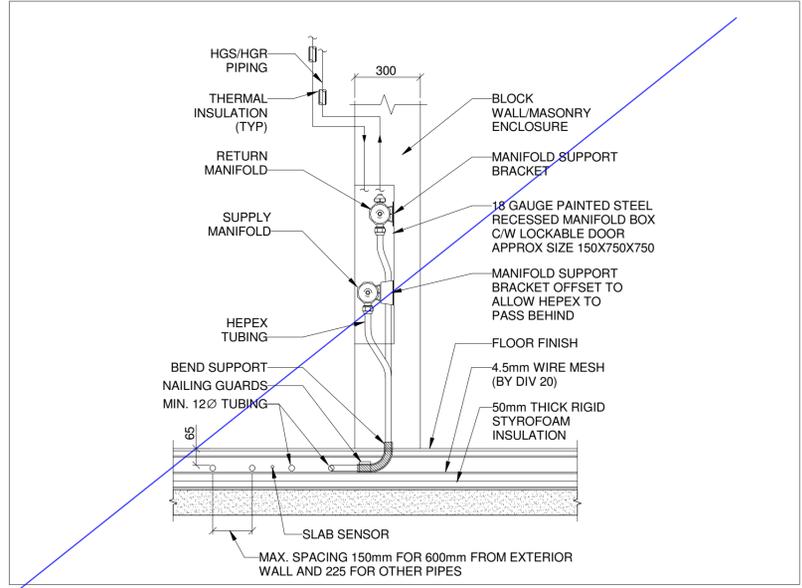
Key
Plan



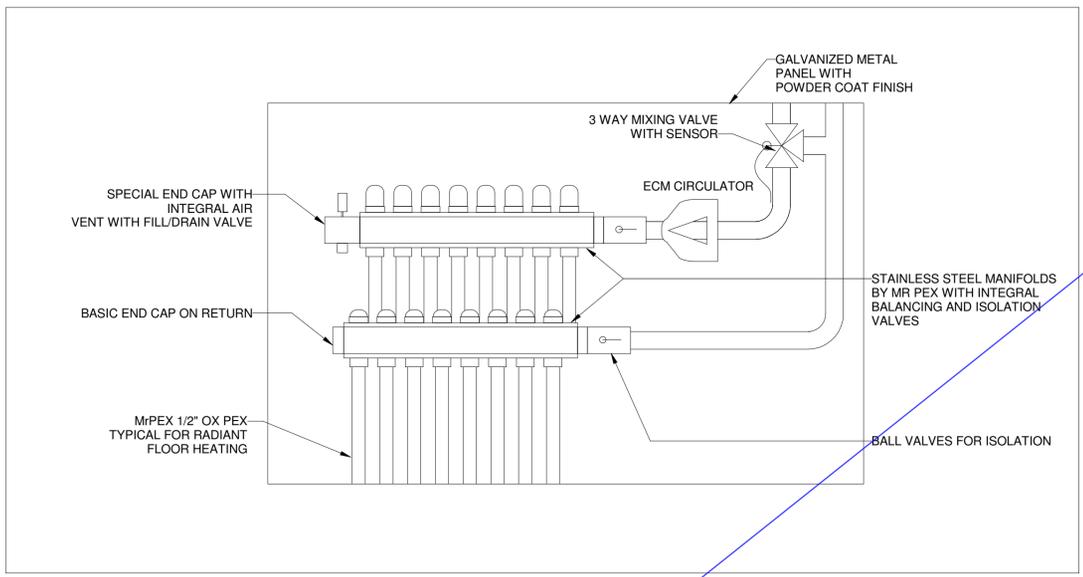
7 IN-FLOOR HEATING MANIFOLD CABINETS
SCALE:N.T.S.



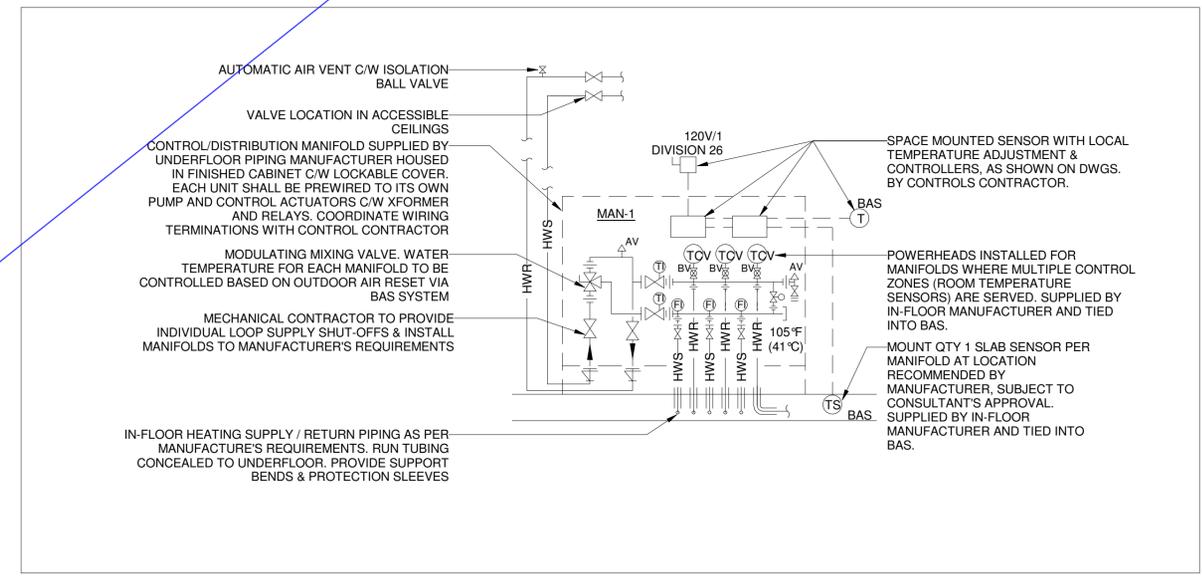
6 IN-FLOOR RADIANT TUBING INSTALLATION
SCALE:N.T.S.



3 IN-FLOOR HEATING MANIFOLD DETAILS
SCALE:N.T.S.



5 IN-FLOOR HEATING MANIFOLD LAYOUT
SCALE:N.T.S.



2 TYP. IN-FLOOR MANIFOLD INSTALLATION
SCALE:N.T.S.

NO.	ISSUED	DATE
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2	ISSUED FOR TENDER	2024-09-09
1	ISSUED FOR BUILDING PERMIT	2024-07-31

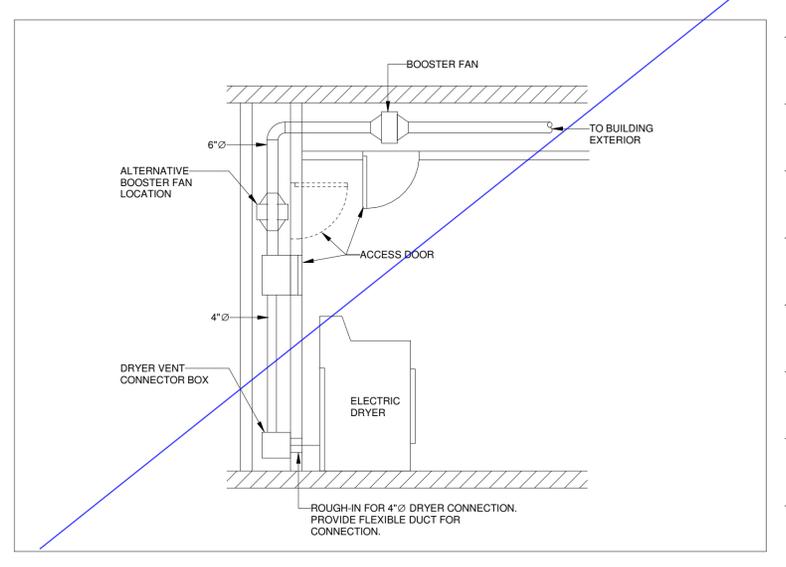
Issues

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

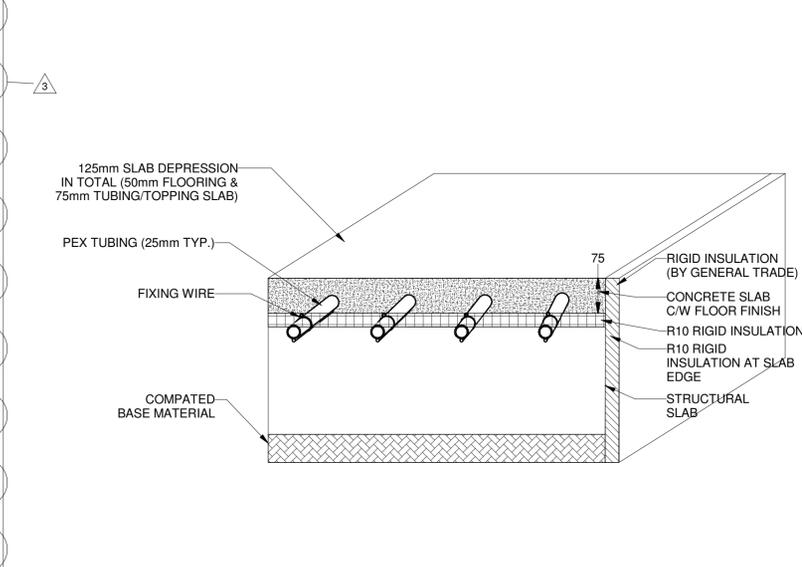
Do not scale drawings
Drawn by: Fizzah Khan/ Iulian Turiga
Checked by: Ali Nakhai-Zadeh
Original Issue Date: 2024-07-31
Project No: TT-24-005
Scale: As indicated

Sheet Title:
MECHANICAL TYPICAL DETAILS VII

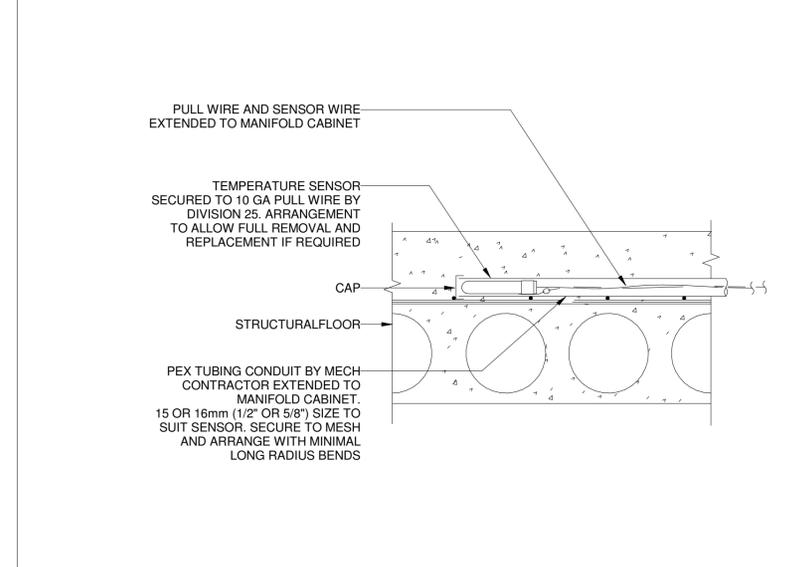
Drawing No:
M-806



8 LAUNDRY DRYER EXHAUST WITH INLINE BOOSTER FAN
SCALE:N.T.S.

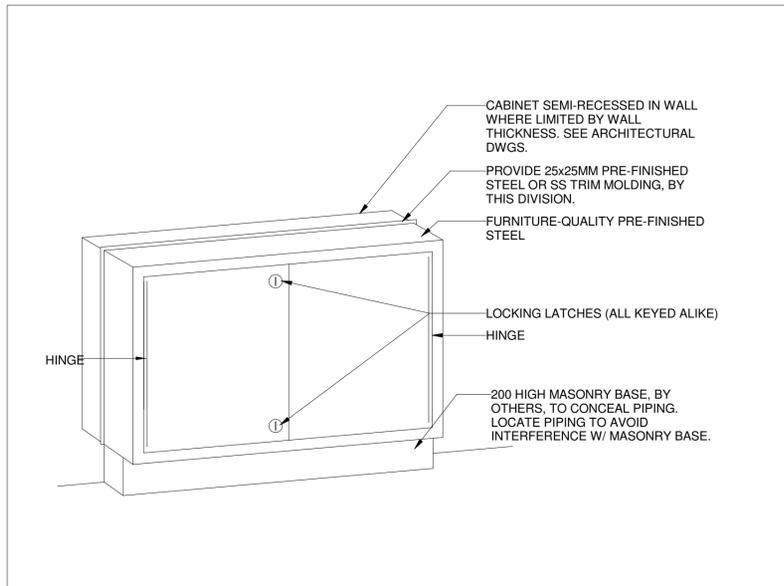


4 IN-FLOOR HEATING PIPING AND INSULATION
SCALE:N.T.S.

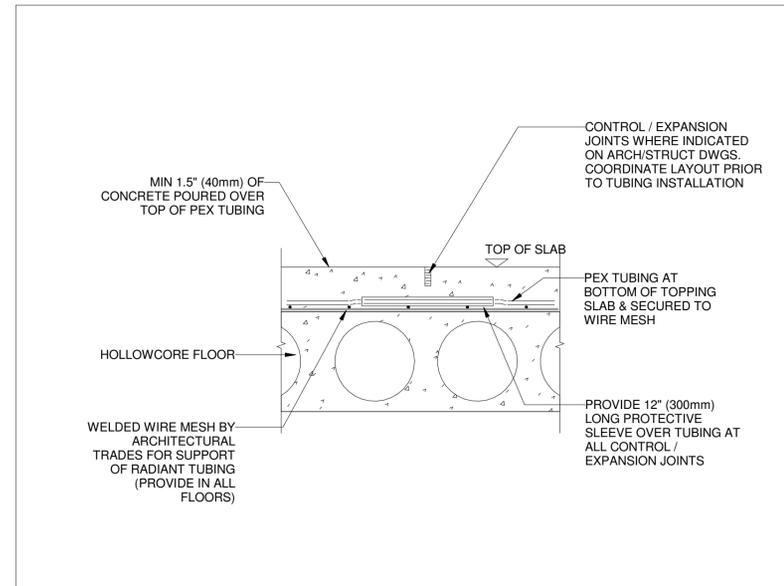


1 RADIANT FLOOR HEATING SLABL SENSOR
SCALE:N.T.S.

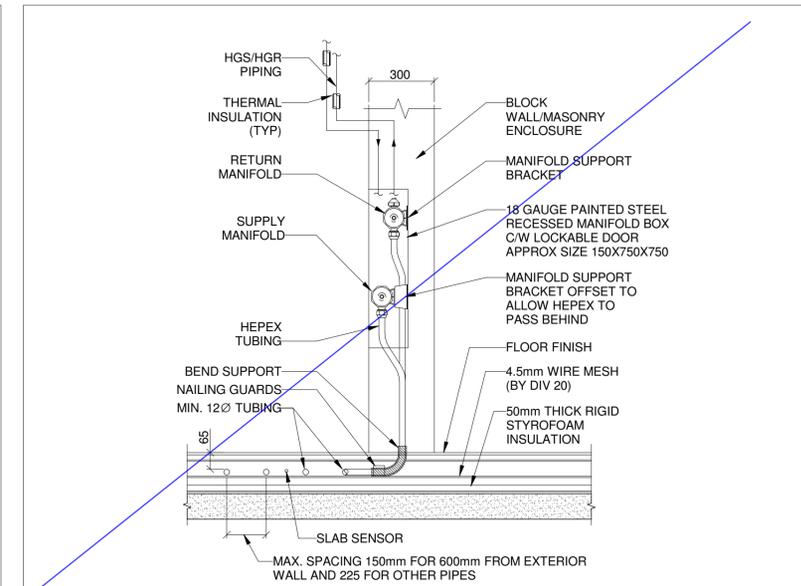
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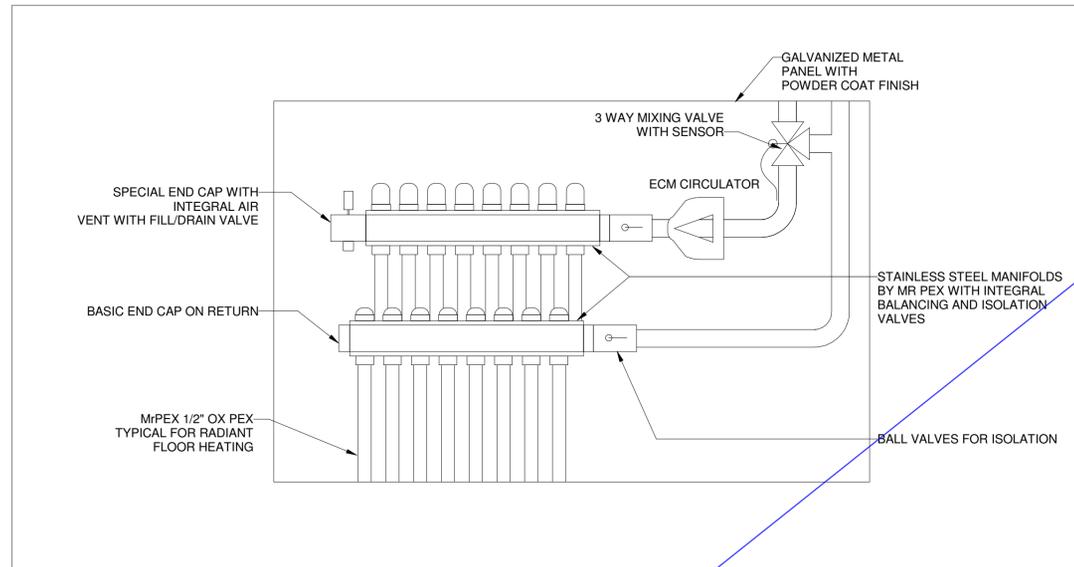
7 IN-FLOOR HEATING MANIFOLD CABINETS
SCALE:N.T.S.



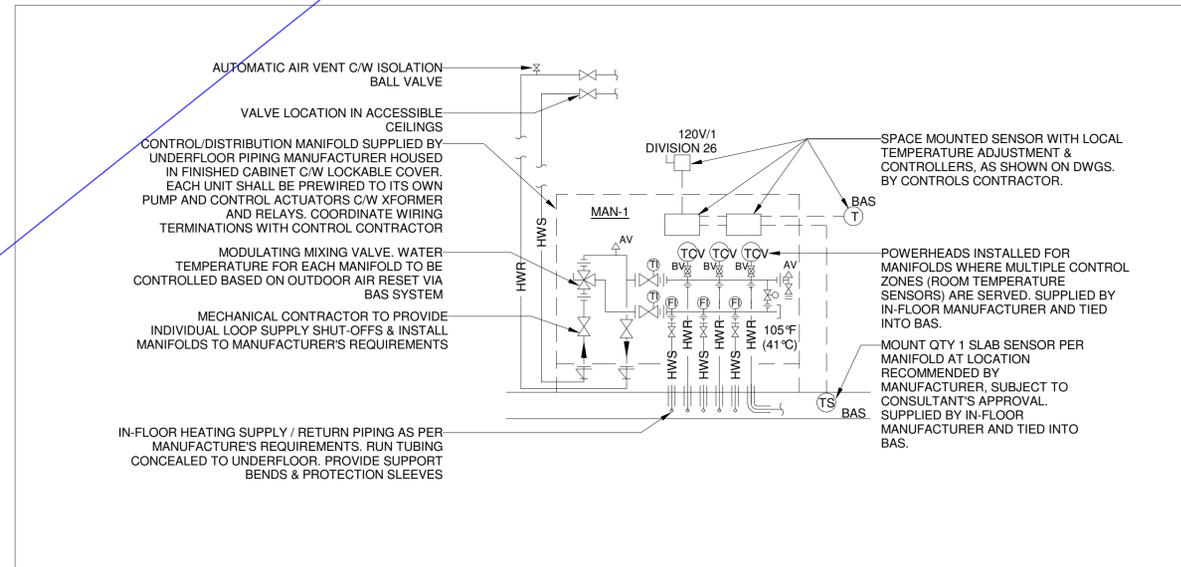
6 IN-FLOOR RADIANT TUBING INSTALLATION
SCALE:N.T.S.



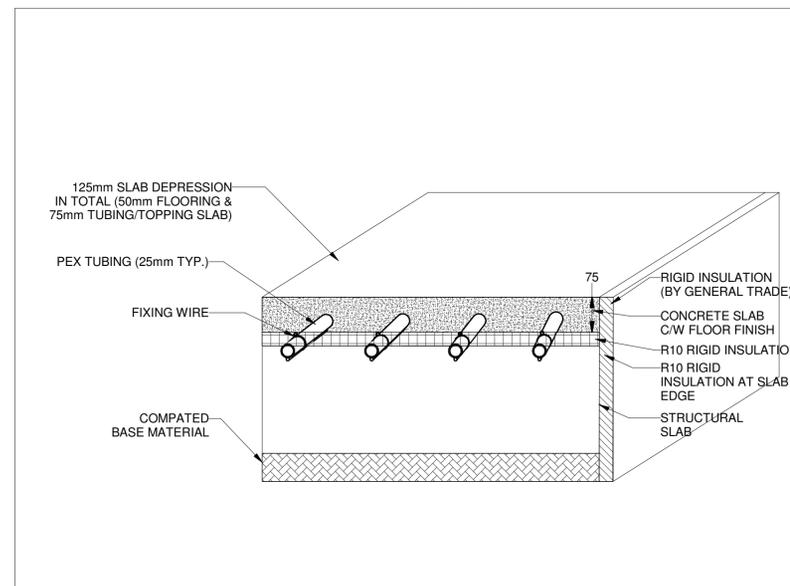
3 IN-FLOOR HEATING MANIFOLD DETAILS
SCALE:N.T.S.



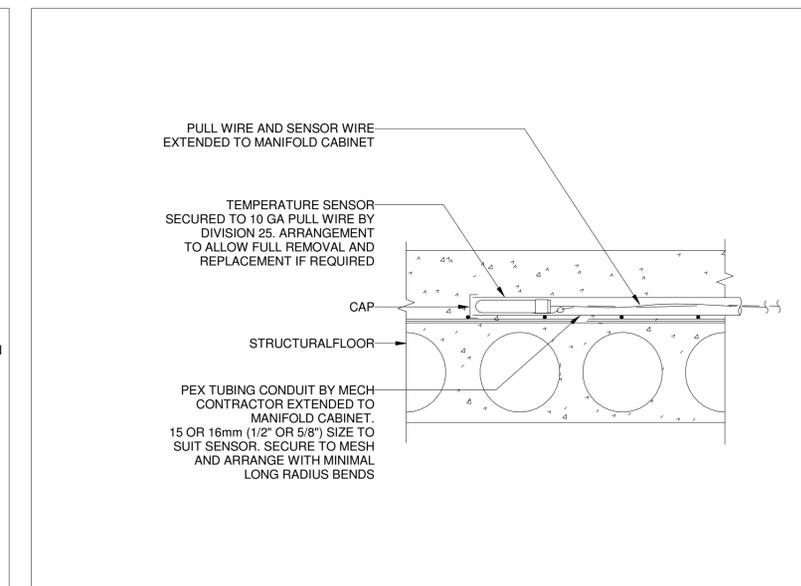
5 IN-FLOOR HEATING MANIFOLD LAYOUT
SCALE:N.T.S.



2 TYP. IN-FLOOR MANIFOLD INSTALLATION
SCALE:N.T.S.



4 IN-FLOOR HEATING PIPING AND INSULATION
SCALE:N.T.S.



1 RADIANT FLOOR HEATING SLABL SENSOR
SCALE:N.T.S.

NO.	ISSUED	DATE
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 TYPICAL
DETAILS VII**

Drawing
No:
M-806

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

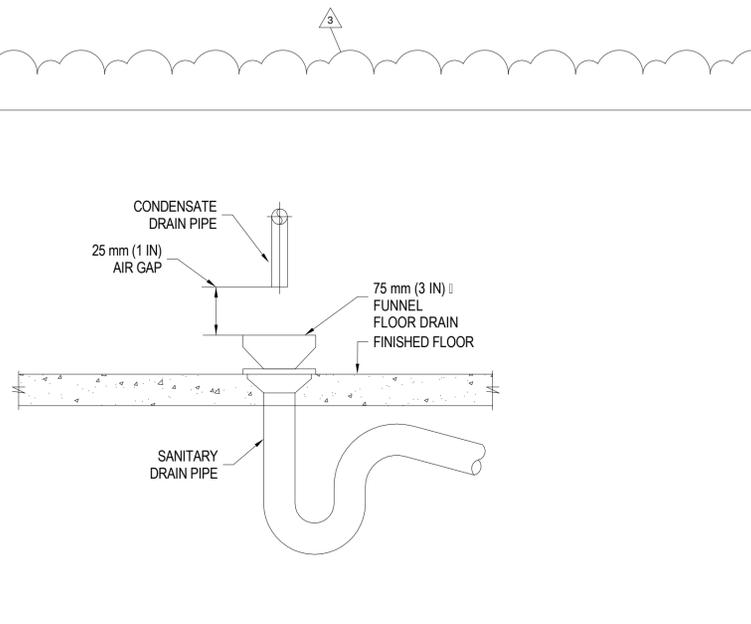
All measurements are to be checked and verified on site by the contractor before proceeding with work

Do not scale drawings

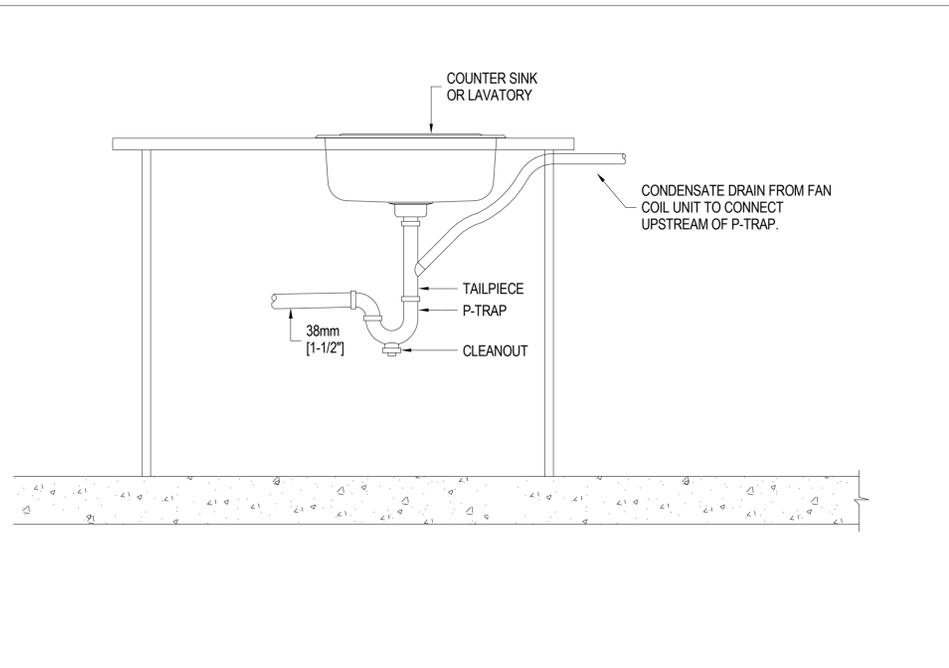
Drawn by: Fizzah Khan/ Iulian Turiga
Checked by: Ali Nakhaei-Zadeh
Original Issue Date: 2024-07-31
Project No: TT-24-005
Scale: 1 : 1

Sheet
Title:
**MECHANICAL TYPICAL
DETAILS VIII**

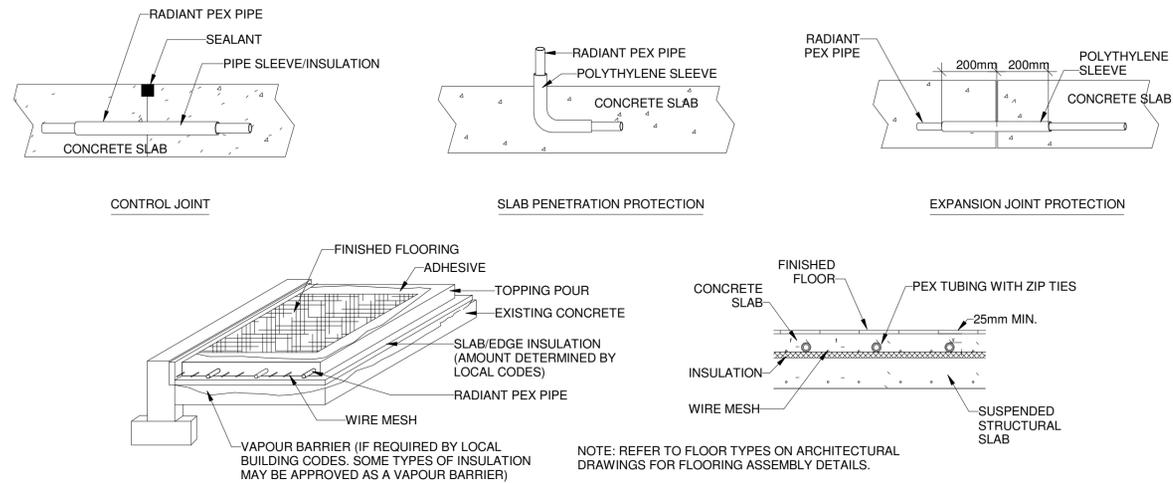
Drawing
No.
M-807



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



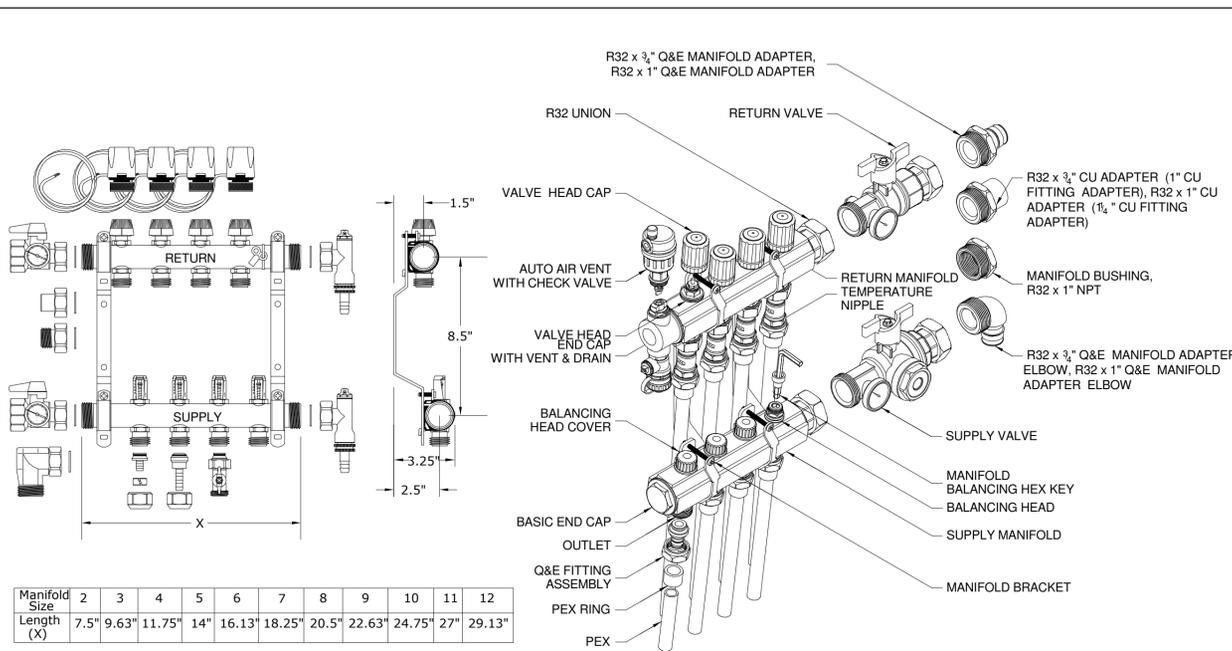
4 **CONDENSATE DRAIN CONNECTION TO SANITARY**
SCALE: 1 : 1



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.

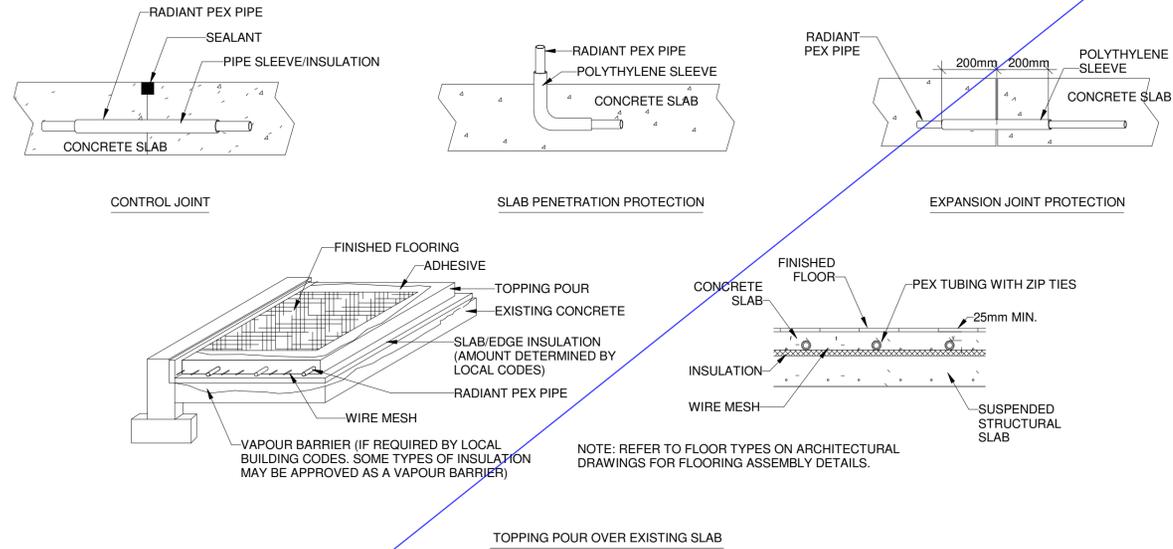


1 **IN-FLOOR HEATING SYSTEM MANIFOLD DETAIL**
SCALE:N.T.S.

YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT
BOULEVARD
TOWN OF EAST GWILLIMBURY

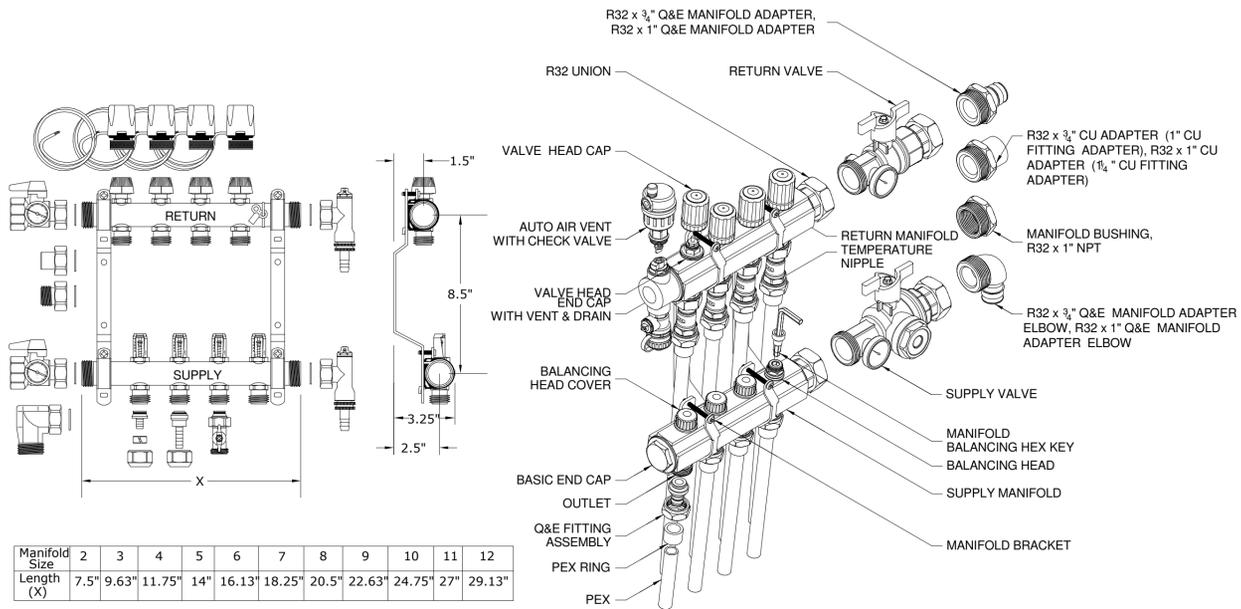
Key
Plan



OBSERVACIONES / NOTES:

- ① PIPE TO BE 1/2" PEX WITH OXYGEN BARRIER
- ② MANIFOLDS TO BE STAINLESS STEEL UNITS COMPLETE WITH SUPPLY & RETURN TRUNK ISOLATION VALVES & VENT PURGE ASSEMBLY
- ③ LOOP LENGTHS ON PLANS ARE APPROXIMATION ONLY. ACTUAL LOOP LENGTHS TO BE VERIFIED ON SITE BY INSTALLING CONTRACTOR.
- ④ 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.
- ⑤ 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.
- ⑥ THE MINIMUM CONCRETE COVER SHALL BE 25MM ABOVE THE TOP OF THE PEX/ONIX TUBING.
- ⑦ TUBING SHALL BE SLEEVED AT ALL CONTROL JOINT CROSSINGS (SEE ILLUSTRATIONS).
- ⑧ TUBING SHALL BE FASTENED EVERY 900 MM IN SLAB & EVERY 600 MM IN TOPPING POUR APPLICATIONS USING THE APPROPRIATE FASTENERS.
- ⑨ KEEP TUBING A MINIMUM OF 225 MM AWAY FROM ALL CLOSET FLANGES AND DRAIN TRAPS.
- ⑩ A MINIMUM R-5 INSULATION IS RECOMMENDED UNDER THE PERIMETER OF RADIANT HEATED SLAB.
- ⑪ 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.
- ⑫ 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.
- ⑬ 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.

NO.	ISSUED	DATE
2	ISSUED FOR TENDER	2024-09-09
1	ISSUED FOR BUILDING PERMIT	2024-07-31

Issues

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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.

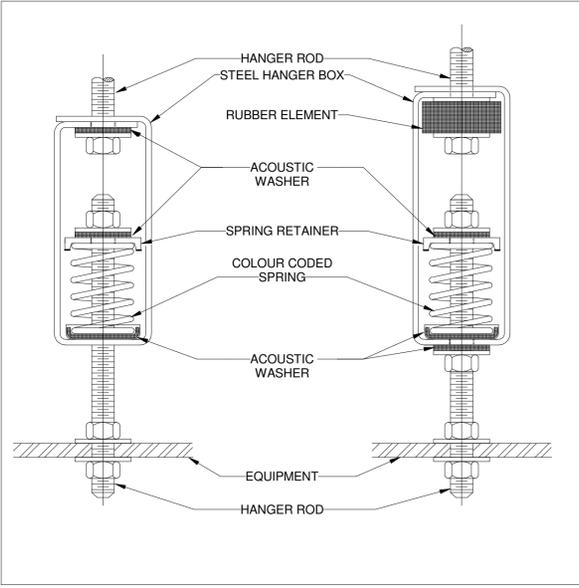
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Title:
**MECHANICAL TYPICAL
DETAILS VIII**

Drawing
No.
M-807

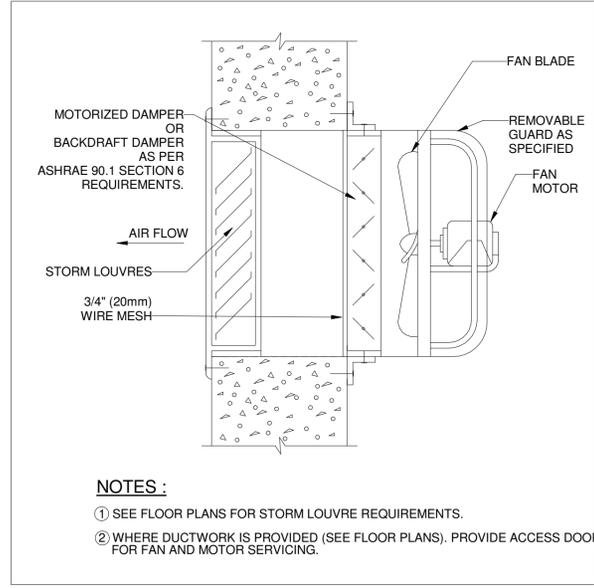
YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT
BOULEVARD
TOWN OF EAST GWILLIMBURY

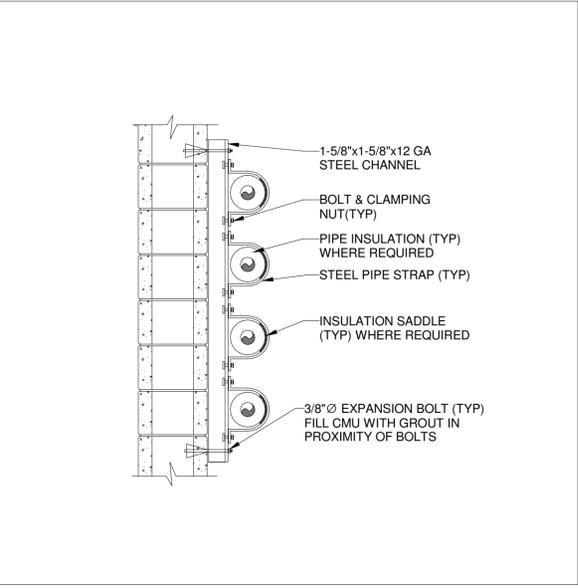
Key
Plan



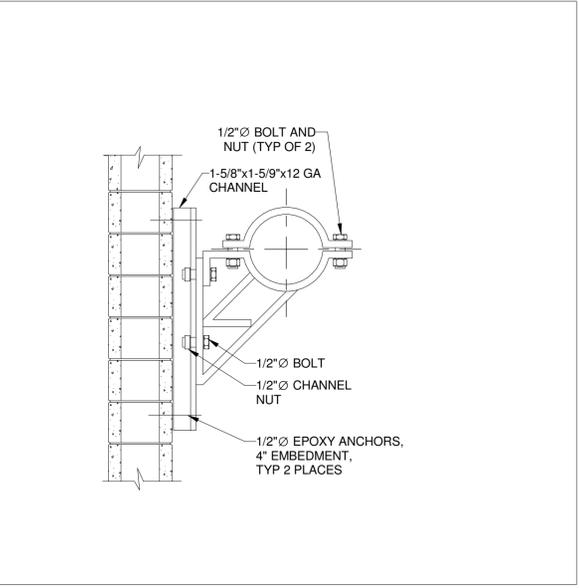
6 **SPRING HANGER**
SCALE: N.T.S.



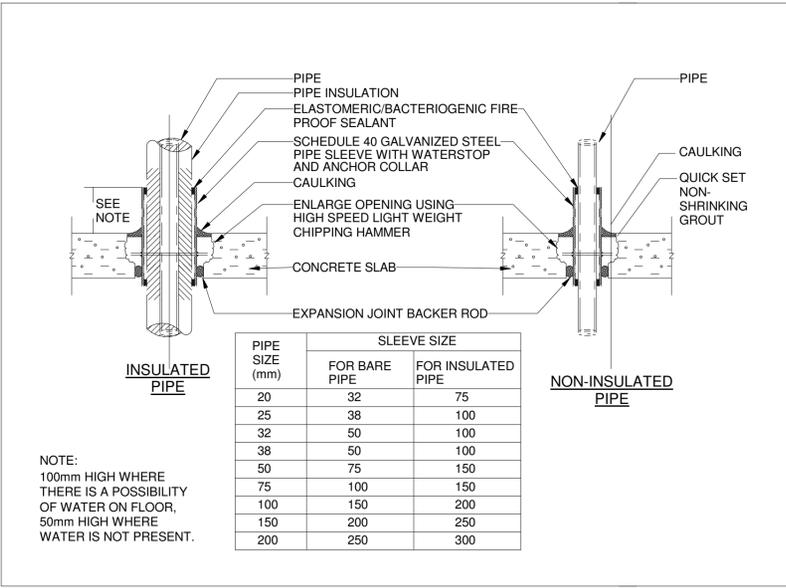
5 **WALL MOUNTED EXHAUST FAN**
SCALE: N.T.S.



4 **PIPE SUPPORT ON SIDEWALL**
SCALE: N.T.S.

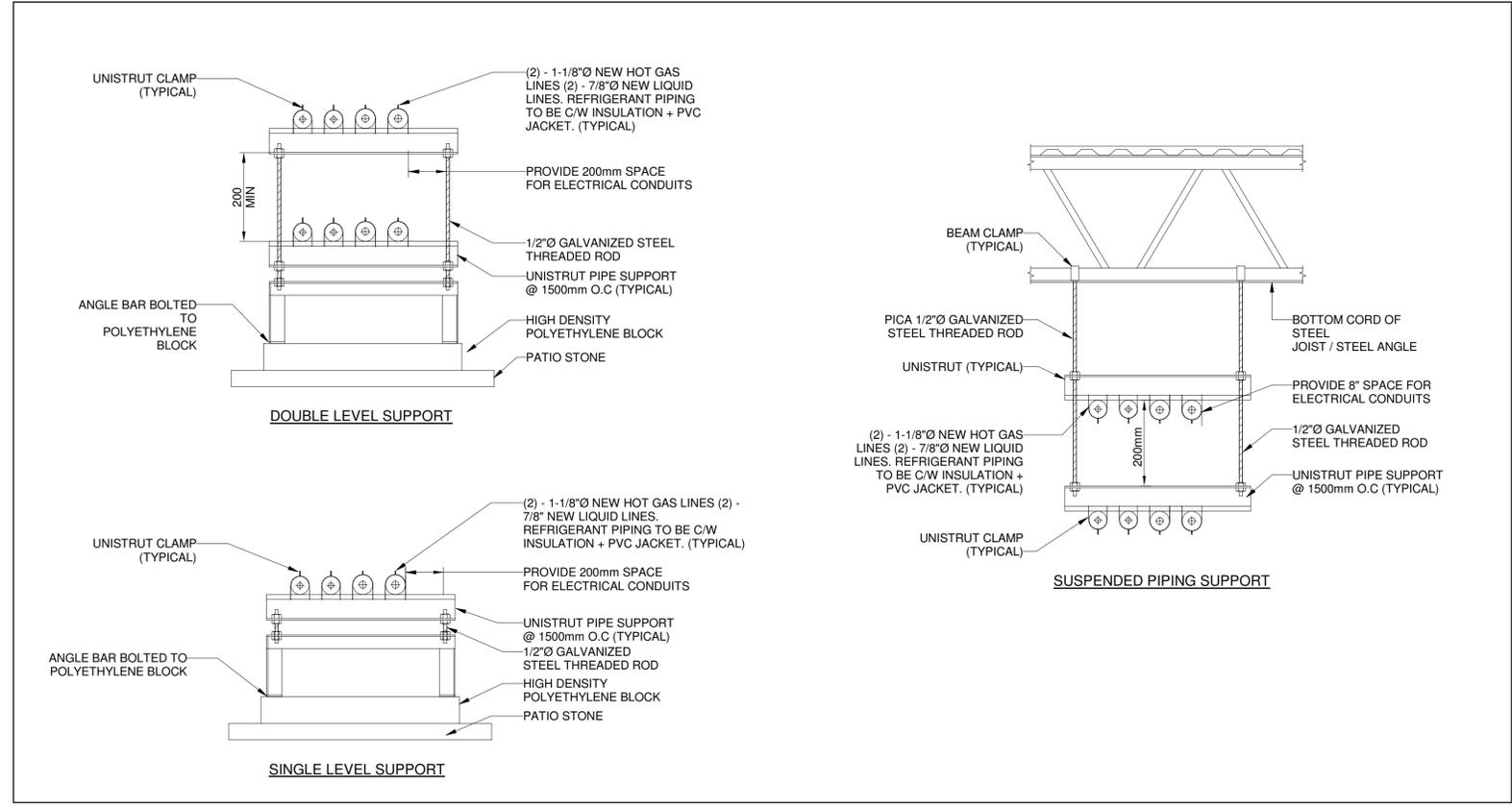


3 **PIPE SUPPORT ON SIDEWALL-SINGLE**
SCALE: N.T.S.

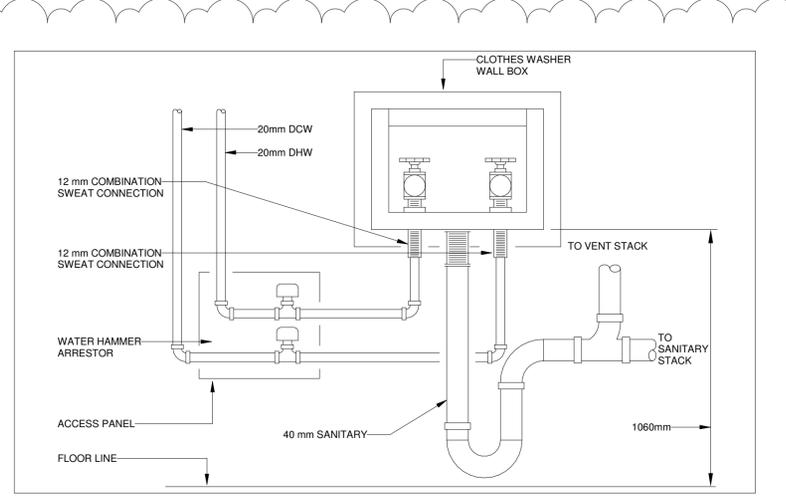


PIPE SIZE (mm)	SLEEVE SIZE	
	FOR BARE PIPE	FOR INSULATED PIPE
20	32	75
25	38	100
32	50	100
38	50	100
50	75	150
75	100	150
100	150	200
150	200	250
200	250	300

2 **PIPE SLEEVE THROUGH SLAB DETAIL**
SCALE: N.T.S.



1 **REFRIGERANT PIPING SUPPORT DETAILS**
SCALE: N.T.S.



7 **LAUNDRY BOX**
SCALE: N.T.S.

NO.	ISSUED	DATE
3	ISSUED FOR ADDENDUM 10	2024-10-15
2	ISSUED FOR TENDER	2024-09-09
1	ISSUED FOR BUILDING PERMIT	2024-07-31

Issues

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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

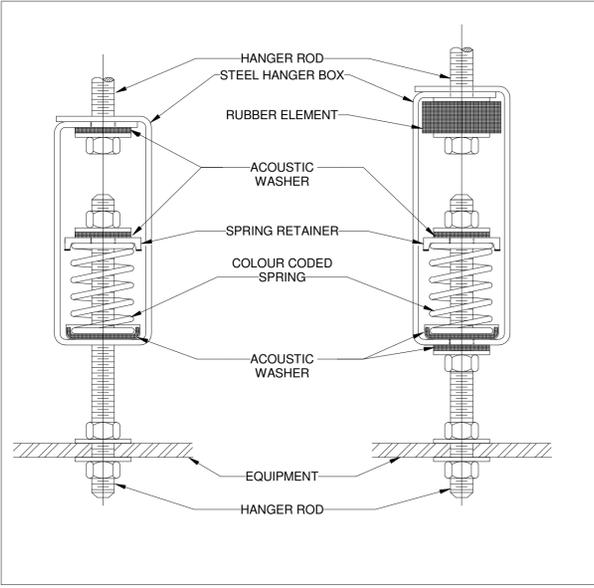
Sheet
Title:
**MECHANICAL TYPICAL
DETAILS IX**

Drawing
No.
M-808

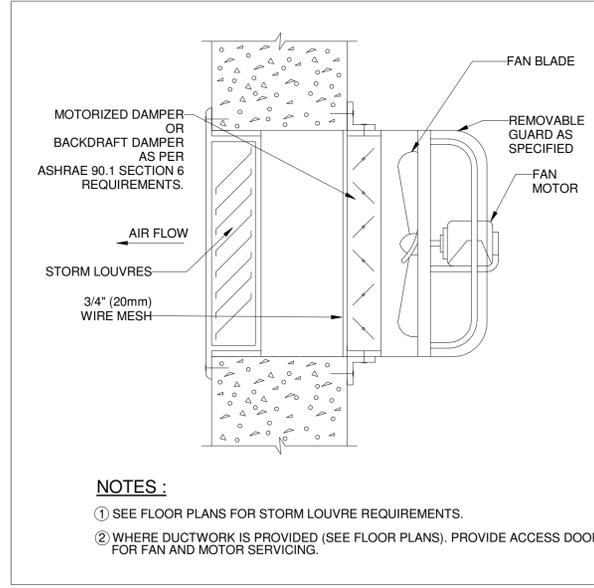
YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT
BOULEVARD
TOWN OF EAST GWILLIMBURY

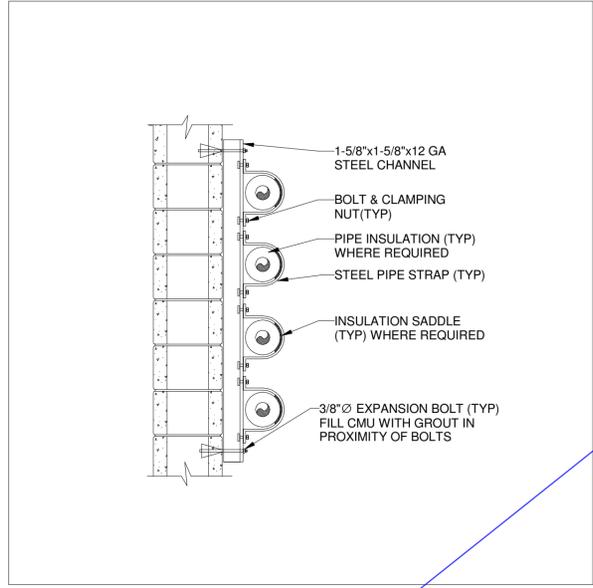
Key
Plan



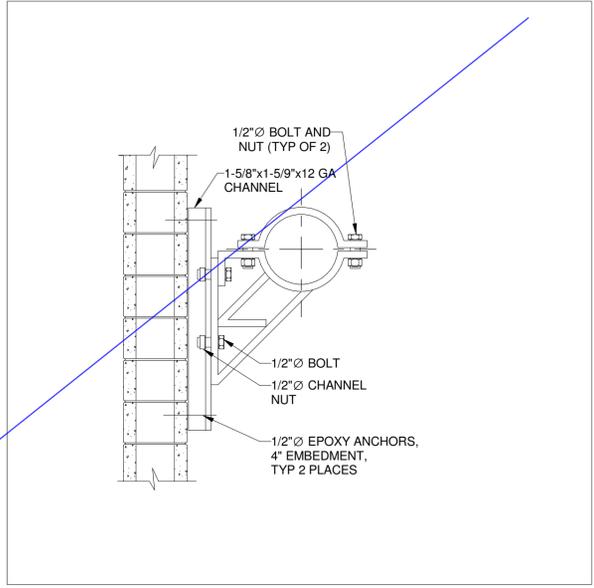
6 **SPRING HANGER**
SCALE: N.T.S.



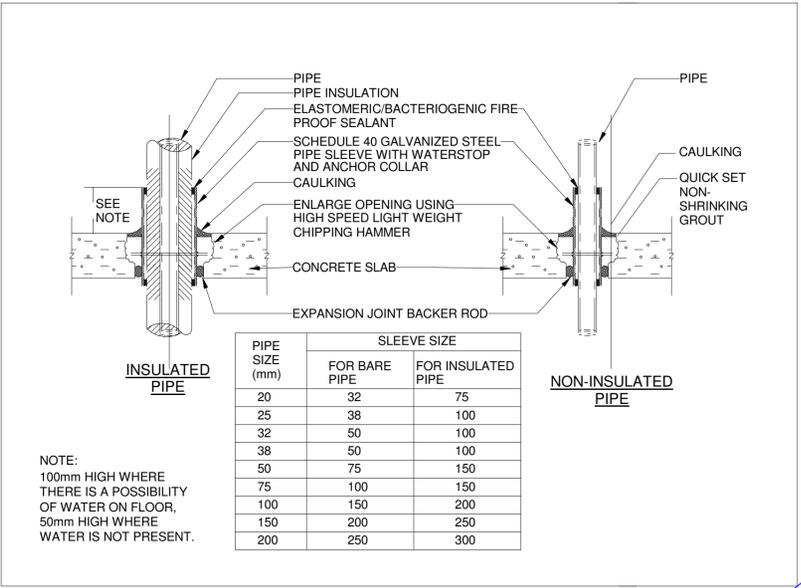
5 **WALL MOUNTED EXHAUST FAN**
SCALE: N.T.S.



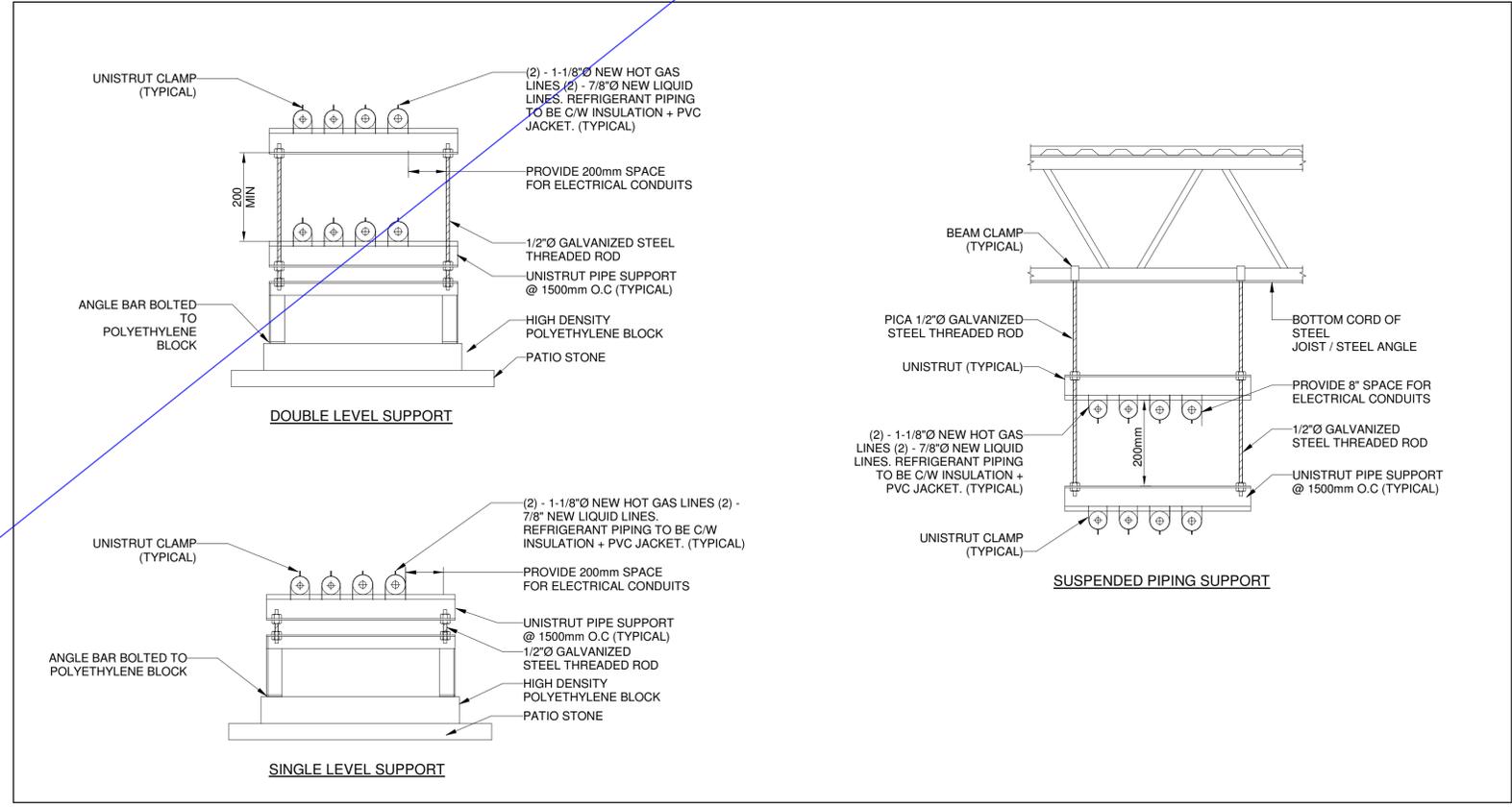
4 **PIPE SUPPORT ON SIDEWALL**
SCALE: N.T.S.



3 **PIPE SUPPORT ON SIDEWALL-SINGLE**
SCALE: N.T.S.



2 **PIPE SLEEVE THROUGH SLAB DETAIL**
SCALE: N.T.S.



1 **REFRIGERANT PIPING SUPPORT DETAILS**
SCALE: N.T.S.

NO.	ISSUED	DATE
2	ISSUED FOR TENDER	2024-09-09
1	ISSUED FOR BUILDING PERMIT	2024-07-31

Issues

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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 TYPICAL
DETAILS IX**

Drawing
No.
M-808

YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT
BOULEVARD
TOWN OF EAST GWILLIMBURY

Key
Plan

NO.	ISSUED	DATE
2	ISSUED FOR TENDER	2024-09-09
1	ISSUED FOR BUILDING PERMIT	2024-07-31

Issues

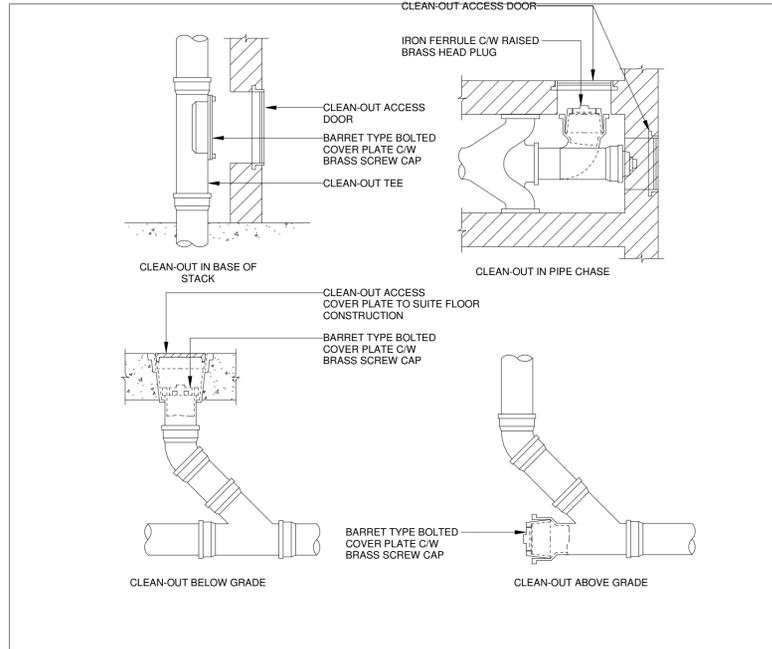
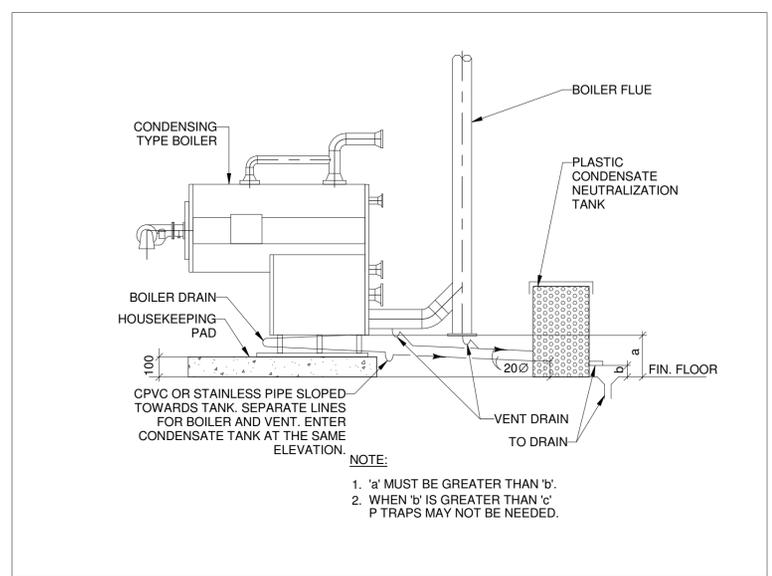
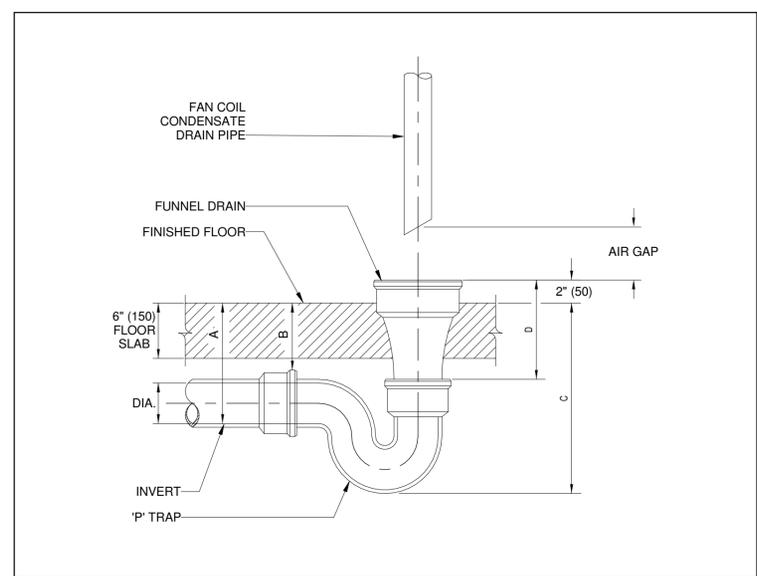
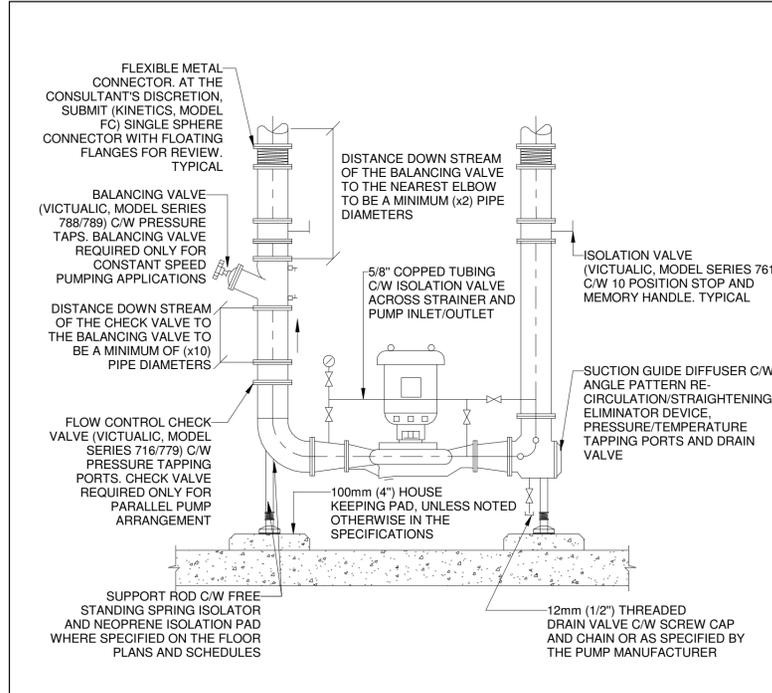
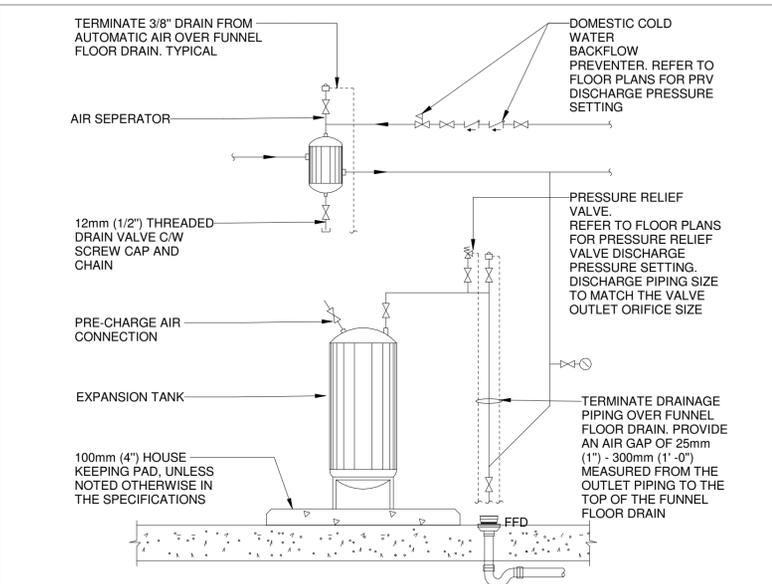
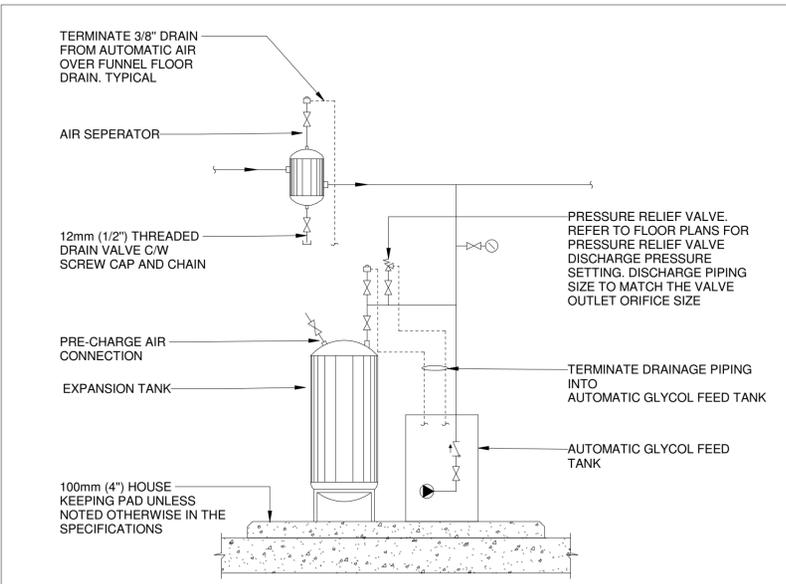
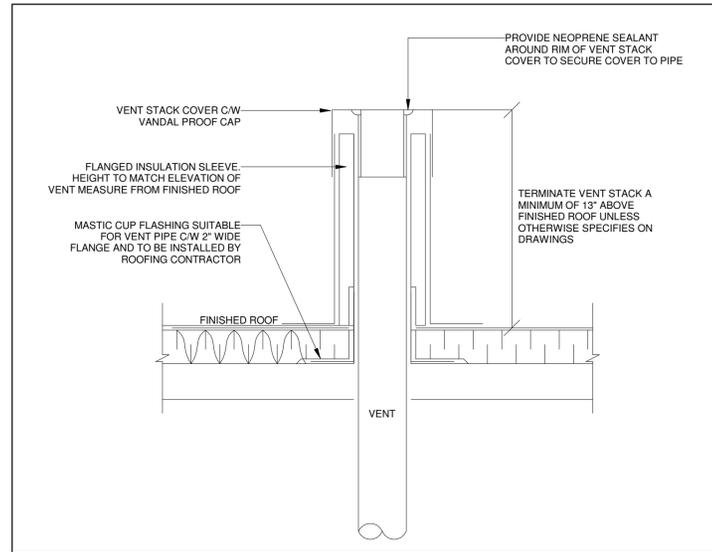
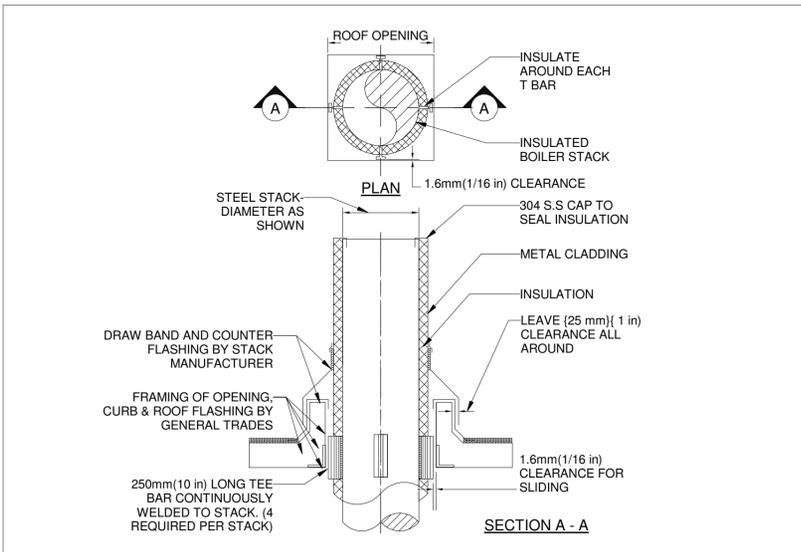
All measurements are to be checked and verified on site by the contractor before proceeding with work

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 TYPICAL
DETAILS X**

Drawing
No.
M-809





250 ROWNTREE DAIRY RD, WOODBRIDGE, ON
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YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT
BOULEVARD
TOWN OF EAST GWILLIMBURY

Key
Plan

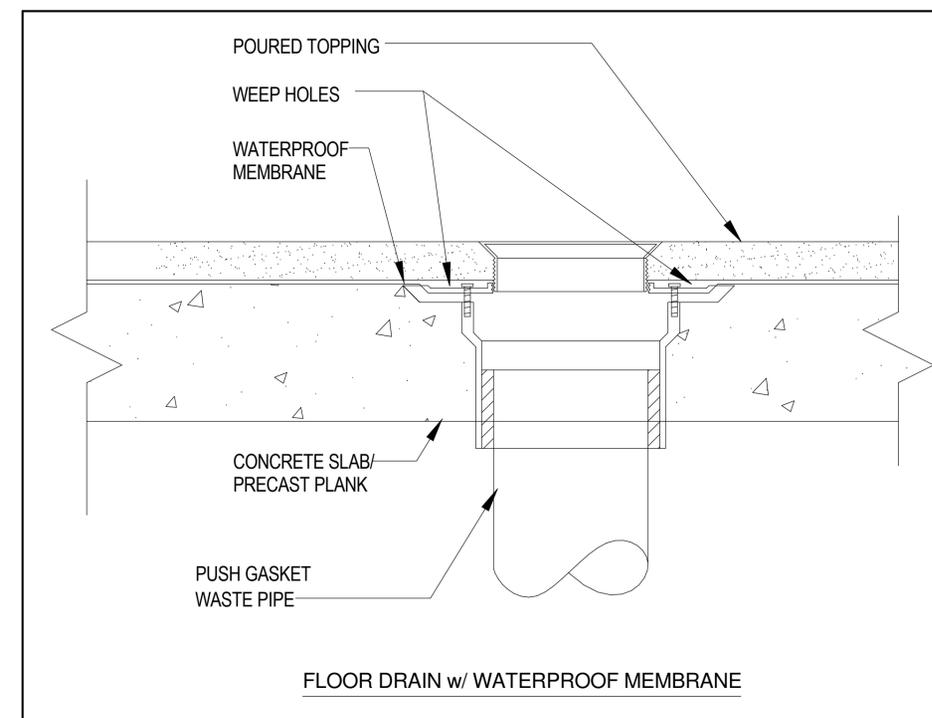
NO.	ISSUED	DATE
3	ISSUED FOR ADDENDUM 10	2024-10-15
2	ISSUED FOR TENDER	2024-09-09
1	ISSUED FOR BUILDING PERMIT	2024-07-31

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.



1 FLOOR DRAIN DETAILS
SCALE: N.T.S.

Sheet
Title:
**MECHANICAL TYPICAL
DETAILS XI**

Drawing
No.
M-810



250 ROWNTREE DAIRY RD. WOODBRIDGE, ON
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YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT
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Key
Plan

NO.	ISSUED	DATE
9	ISSUED FOR ADDENDUM 15	2024-12-04
8	ISSUED FOR ADDENDUM 14	2024-11-27
7	ISSUED FOR ADDENDUM 10	2024-10-15
6	ISSUED FOR ADDENDUM 8	2024-10-07
5	ISSUED FOR ADDENDUM 7	2024-10-03
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:

Sheet
Title:

MECHANICAL SCHEDULES

Drawing
No.
M-900

ROOFTOP UNITS - DOAS (DEDICATED OUTDOOR AIR SUPPLY)

TAG	MANUFACTURER	MODEL	LOCATION	SERVICE	AIRFLOW		OUTDOOR AIR %	FANS			FILTERS	SOUND POWER 0 INLET/OUTLET/RADIATED (DB)		SOUND POWER 0 INLET/OUTLET/RADIATED (DB)				VFD	ELECTRICAL				WEIGHT (kg)	NOTES			
					TOTAL AIRFLOW...	OUTDOOR AIRFLOW...		TYPE	SERIES	FAN SPEED...		HEATING COIL (KW)	COOLING COIL (KW)	63 HZ	125 HZ	250 HZ	500 HZ		1000 HZ	2000 HZ	4000 HZ	FLA			MCA	MOC P	V/Ph/Hz
RTU-1	DAIKIN	DPSH03B	ROOF	OFFICE	567	567	100	SWSI AF	II	2200	2 IN. MERV 8	8.78	11.3	78	77	85	80	82	81	76	YES	35.8	40.6	50	208/3/60	754	THE ROOF CURBS SUPPLIED BY THE MANUFACTURER AND INSTALLED BY THE MECHANICAL CONTRACTOR.
RTU-2	DAIKIN	DAHA11A	ROOF	HANGAR	1652	1652	100	SWSI AF	I	1441	2 IN. MERV 8	93.8	-	83	84	80	81	76	73	67	YES	23.7	27.1	40	208/3/60	866	THE ROOF CURBS SUPPLIED BY THE MANUFACTURER AND INSTALLED BY THE MECHANICAL CONTRACTOR.

VRF FAN COIL UNIT

TAG	ASSOCIATED CONDENSER	MANUFACTURER	MODEL	TYPE	SERVICE	REFRIGERANT	AIRFLOW (L/S)				TOTAL CAPACITY (KW)	SENSIBLE CAPACITY (KW)	COOLING				HEATING				SOUND (DBA)		ELECTRICAL			WEIGHT (kg)	NOTES
							LOW SPEED	AIRFLOW (L/S) MEDIUM SPEED	AIRFLOW (L/S) HIGH SPEED	E.S.P (Pa)			SET POINT DB (°C)	SET POINT WB (°C)	S.A.T DB (°C)	S.A.T WB (°C)	CAPACITY (KW)	SET POINT DB (°C)	S.A.T DB (°C)	PRESSURE (HMM)	POWER	MCA	MOC P	V/Ph/Hz			
FCU-1	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL DUCTED	CONFERENCE RM	R-410A	109	125	133	0.10	2.20	1.61	24.0	19.4	12.8	12.2	2.49	22.0	29.4	33/30/28	61	0.8	15	208/1/60	24.9		
FCU-2	ODU-1	DAIKIN	FXSQ24TBVJU	HORIZONTAL DUCTED	MECHANICS OFFICE	R-410A	242	292	350	0.10	7.03	5.01	24.0	19.4	12.8	12.2	7.91	22.0	29.4	36/32/29	64	1.8	15	208/1/60	60		
FCU-3	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL DUCTED	KITCHEN/LOUNGE	R-410A	109	125	133	0.10	2.20	1.61	24.0	19.4	12.8	12.2	2.49	22.0	29.4	33/30/28	61	0.8	15	208/1/60	24.9		
FCU-4	ODU-1	DAIKIN	FXSQ24TBVJU	HORIZONTAL DUCTED	GENERAL OFFICE	R-410A	242	292	350	0.10	7.03	5.01	24.0	19.4	12.8	12.2	7.91	22.0	29.4	36/32/29	64	1.8	15	208/1/60	60		
FCU-5	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL DUCTED	QUARTER MASTER	R-410A	133	125	133	0.10	1.70	1.38	24.0	19.4	12.8	12.2	1.90	22.0	29.4	33/30/28	61	0.8	15	208/1/60	24.9		
FCU-6	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL DUCTED	OFFICE 1	R-410A	133	125	133	0.10	1.70	1.38	24.0	19.4	12.8	12.2	1.90	22.0	29.4	33/30/28	61	0.8	15	208/1/60	24.9		
FCU-7	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL DUCTED	OFFICE 2	R-410A	133	125	133	0.10	1.70	1.38	24.0	19.4	12.8	12.2	1.90	22.0	29.4	33/30/28	61	0.8	15	208/1/60	24.9		
FCU-8	ODU-1	DAIKIN	FXSQ09TBVJU	HORIZONTAL DUCTED	QUIET RM	R-410A	109	125	150	0.10	2.78	2.05	24.0	19.4	12.8	12.2	3.08	22.0	29.4	33/30/28	61	0.8	15	208/1/60	24.9		
FCU-9	ODU-1	DAIKIN	FXSQ12TBVJU	HORIZONTAL DUCTED	LOCKER RM	R-410A	117	134	158	0.20	3.52	2.84	24.0	19.4	12.8	12.2	3.96	22.0	29.4	34/32/30	62	0.8	15	208/1/60	24.9		
FCU-10	ODU-1	DAIKIN	FXSQ24TBVJU	HORIZONTAL DUCTED	FITNESS RM	R-410A	242	292	350	0.10	7.03	5.01	24.0	19.4	12.8	12.2	7.91	22.0	29.4	36/32/29	64	1.8	15	208/1/60	60		
FCU-11	ODU-2	DAIKIN	FTX24WVJU9R	WALL MOUNTED, NON-DUCTED	IT ROOM	R-410A	0	0	155	0.00	6.21	4.62	24.0	19.4	12.8	12.2	7.03	18.0	273.2	5144/37	0	18.8	0	208/1/60	14.96		

EXHAUST FANS

TAG	QUANTITY	MANUFACTURER	MODEL	SERVICE	AIRFLOW (L/S)	SOUND POWER							E.S.P (PA)	MOTOR CHARACTERISTICS							WEIGHT (KG)	NOTES
						63 HZ	125 HZ	250 HZ	500 HZ	1000 HZ	2000 HZ	4000 HZ		FAN SPEED (RPM)	VFD	BHP	FLA	MOC P	V/PH/Hz			
EF-1	1	PENNBARRY	Z8H - INLINE - SC	JANITOR/STORAGE 4	95	59	60	56	52	48	43	38	0.5	1218	NO	0.04	1.6	115/1/60	7			
EF-2	1	PENNBARRY	SQX135	STORAGE 3	283	70	64/71	63/68	61/62	60/66	56/65	50/59	0.5	1053	NO	0.14	5.8	115/1/60	14	Spark resistance...		
EF-3	1	PENNBARRY	SQX100	MECHANICAL ROOM	182	73/76	62/73	67/71	65/66	64/65	68/64	53/52	0.5	1525	YES	0.1	7.2	115/1/60	20			
EF-4	1	PENNBARRY	SQX122	VEHICLE BAY	378	61/71	64/68	62/63	61/62	65/62	57/56	52/51	0.5	1525	NO	0.5	9.8	115/1/60	34			

TANKLESS ELECTRIC WATER HEATER

TAG	QUANTITY	MANUFACTURER	MODEL	SERVICE	OUTPUT CAPACITY (KW)	FLUID			ELECTRICAL			WEIGHT (kg)	REMARKS
						TYPE	FLOW RATE (L/S)	TEMP. RISE (C)	MCA (A)	MOC P (A)	V/Ph/Hz		
TLWH-1	1	RHEEM	RETEX-04	LAVATORY	3.5	WATER	0.03	8.9	29	30	120/1/60	2.0	
TLWH-2	1	RHEEM	RETEX-11	KITCHEN	11.8	WATER	0.09	10	46	50	240/1/60	3.9	
TLWH-3	1	RHEEM	RETEX-13	SHOWER	13.0	WATER	0.13	6.7	54	60	240/1/60	3.9	
TLWH-4	1	RHEEM	RETEX-04	LAVATORY	3.5	WATER	0.03	8.9	29	30	120/1/60	2.0	
TLWH-5	1	RHEEM	RETEX-13	SHOWER	13.0	WATER	0.13	6.7	54	50	240/1/60	3.9	

PRICING OPTIONS

- BASE PRICE: SNOW MELTING (FULL APRON)
- SEPARATE PRICE #1: SNOW MELTING (PARKING ONLY)
- SEPARATE PRICE #2: NO SNOW MELTING

BOILER

TAG	MANUFACTURER	MODEL	LOCATION	GAS				FLUID				ELECTRICAL			WEIGHT (kg)	REMARKS
				OUTPUT CAPACITY (KW)	BOILER EFF (%)	MIN GAS PRES. (IN)	MAX GAS PRES. (IN)	TYPE	FLOW RATE (GPM)	E.F.T (F)	L.F.T (F)	MCA	MOC P	V/Ph/Hz		
B-1	DE DIETRICH	GT 430-8A...	MECH RM	432	96	7	14	40% GLYCOL	130	120	95	9.8	15	120/1/60	1470	BASE PRICE
B-2	DE DIETRICH	GT 430-8A...	MECH RM	432	96	7	14	40% GLYCOL	130	120	95	9.8	15	120/1/60	1470	
B-3	ABSOLUTE SPIRE	SP-500	MECH RM	133	96.5	7	14	40% GLYCOL	130	120	95	-	15	120/1/60	205	SEPARATE PRICE NO. 1
B-4	ABSOLUTE SPIRE	SP-500	MECH RM	133	96.5	7	14	40% GLYCOL	38	180	155	-	15	120/1/60	205	
B-5	NO BOILER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	SEPARATE PRICE NO.2
B-6	NO BOILER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

ELECTRIC UNIT HEATER

TAG	MANUFACTURER	MODEL	LOCATION	MOUNTING CONFIGURATION	HEATING CAPACITY (KW)	AIRFLOW (L/S)	MOTOR KW	FAN RPM	ELECTRICAL			WEIGHT (kg)	NOTES
									FLA	MOC P	V/Ph/Hz		
UH-1	SIGMA	058H	MECH RM	WALL MOUNT	10.76	94	0.093	1550	1.8	15	120/1/60	21.8	
UH-2	SIGMA	047H	VEHICLE BAY	WALL MOUNT	7.62	190	0.093	1550	1.8	15	120/1/60	18.1	
UH-3	SIGMA	047H	VEHICLE BAY	WALL MOUNT	7.62	190	0.093	1550	1.8	15	120/1/60	18.1	
UH-4	SIGMA	047H	PAINT ROOM	WALL MOUNT	7.62	190	0.093	1550	1.8	15	120/1/60	18.1	
UH-5	SIGMA	047H	MAINTENANCE STG	WALL MOUNT	7.62	190	0.093	1550	1.8	15	120/1/60	18.1	
UH-6	REZNOR	EHC	VESTIBULE	RECESSED	3.00	76	-	-	-	-	-	-	

SNOW MELTING SYSTEM

TAG	AREA (M2)	HEATING LOAD (KW)	FLOW (L/S)	HEAD LOSS (M)	FLUID TYPE	DELTA T	LOOP TYPE	SPACING	COMMENT
SM-1	1,582	998	21	34	40% PROP. GLYCOL	13.9C	25.4MM UPONER HEPEX	229MM CTRS TUBES	BASE PRICE
SM-2	335	211	3.45	34	40% PROP. GLYCOL	13.9C	25.4MM UPONER HEPEX	229 CTRS TUBES	SEPARATE PRICE NO.1
SM-3	0	0	0	0	NONE	-	-	-	SEPARATE PRICE NO.2

IN FLOOR HEATING

TAG	AREA (M2)	TOTAL LOAD (KW)	FLOW (L/S)	HEAD LOSS (M)	FLUID TYPE	DELTA T	LOOP TYPE/SIZE	SPACING
IF-1	405	45	2	4	100% WATER	11 C	12.7MM UPONO HEPEX	305MM CTRS TUBES



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Plan

NO.	ISSUED	ISSUED	DATE
8	ISSUED FOR ADDENDUM 14		2024-11-27
7	ISSUED FOR ADDENDUM 10		2024-10-15
6	ISSUED FOR ADDENDUM 8		2024-10-07
5	ISSUED FOR ADDENDUM 7		2024-10-03
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:

Sheet
Title:

MECHANICAL SCHEDULES

Drawing
No:
M-900

ROOFTOP UNITS - DOAS (DEDICATED OUTDOOR AIR SUPPLY)

TAG	MANUFACTURER	MODEL	LOCATION	SERVICE	AIRFLOW		OUTDOOR AIR %	FANS			FILTERS	SOUND POWER 0 INLET/OUTLET/RADIATED (DB)						VFD	ELECTRICAL				WEIGHT (kg)	NOTES			
					TOTAL AIRFLOW...	OUTDOOR AIRFLOW...		TYPE	SERIES	FAN SPEED...		HEATING COIL (KW)	COOLING COIL (KW)	63 HZ	125 HZ	250 HZ	500 HZ		1000 HZ	2000 HZ	4000 HZ	FLA			MCA	MOC P	V/Ph/Hz
RTU-1	DAIKIN	DPSH03B	ROOF	OFFICE	567	567	100	SWSI AF	II	2200	2 IN. MERV 8	8.78	11.3	78	77	85	80	82	81	76	YES	35.8	40.6	50	208/3/60	754	THE ROOF CURBS SUPPLIED BY THE MANUFACTURER AND INSTALLED BY THE MECHANICAL CONTRACTOR.
RTU-2	DAIKIN	DAHA11A	ROOF	HANGAR	1652	1652	100	SWSI AF	I	1441	2 IN. MERV 8	93.8	-	83	84	80	81	76	73	67	YES	23.7	27.1	40	208/3/60	866	THE ROOF CURBS SUPPLIED BY THE MANUFACTURER AND INSTALLED BY THE MECHANICAL CONTRACTOR.

VRF FAN COIL UNIT

TAG	ASSOCIATED CONDENSER	MANUFACTURER	MODEL	TYPE	SERVICE	REFRIGERANT	AIRFLOW (L/S)				TOTAL CAPACITY (KW)	COOLING				HEATING				SOUND (DBA)				ELECTRICAL			WEIGHT (kg)	NOTES
							LOW SPEED	AIRFLOW (L/S) MEDIUM SPEED	AIRFLOW (L/S) HIGH SPEED	E.S.P (Pa)		SET POINT DB (°C)	SET POINT WB (°C)	S.A.T DB (°C)	S.A.T WB (°C)	CAPACITY (KW)	SET POINT DB (°C)	S.A.T DB (°C)	S.A.T WB (°C)	PRESSURE (HMM)	POWER	MCA	MOC P	V/Ph/Hz				
FCU-1	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL DUCTED	CONFERENCE RM	R-410A	109	125	133	0.10	2.20	1.61	26.7	19.4	12.8	12.2	2.49	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9			
FCU-2	ODU-1	DAIKIN	FXSQ24TBVJU	HORIZONTAL DUCTED	MECHANICS OFFICE	R-410A	242	292	350	0.10	7.03	5.01	26.7	19.4	12.8	12.2	7.91	21.1	29.4	36/32/29	64	1.8	15	208/1/60	60			
FCU-3	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL DUCTED	KITCHEN/LOUNGE	R-410A	109	125	133	0.10	2.20	1.61	26.7	19.4	12.8	12.2	2.49	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9			
FCU-4	ODU-1	DAIKIN	FXSQ24TBVJU	HORIZONTAL DUCTED	GENERAL OFFICE	R-410A	242	292	350	0.10	7.03	5.01	26.7	19.4	12.8	12.2	7.91	21.1	29.4	36/32/29	64	1.8	15	208/1/60	60			
FCU-5	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL DUCTED	QUARTER MASTER	R-410A	133	125	133	0.10	1.70	1.38	26.7	19.4	12.8	12.2	1.90	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9			
FCU-6	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL DUCTED	OFFICE 1	R-410A	133	125	133	0.10	1.70	1.38	26.7	19.4	12.8	12.2	1.90	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9			
FCU-7	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL DUCTED	OFFICE 2	R-410A	133	125	133	0.10	1.70	1.38	26.7	19.4	12.8	12.2	1.90	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9			
FCU-8	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL DUCTED	QUIET RM	R-410A	109	125	150	0.10	2.78	2.05	26.7	19.4	12.8	12.2	3.08	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9			
FCU-9	ODU-1	DAIKIN	FXSQ12TBVJU	HORIZONTAL DUCTED	LOCKER RM	R-410A	117	134	158	0.20	3.52	2.84	26.7	19.4	12.8	12.2	3.96	21.1	29.4	34/32/30	62	0.8	15	208/1/60	24.9			
FCU-10	ODU-1	DAIKIN	FXSQ24TBVJU	HORIZONTAL DUCTED	FITNESS RM	R-410A	242	292	350	0.10	7.03	5.01	26.7	19.4	12.8	12.2	7.91	21.1	29.4	36/32/29	64	1.8	15	208/1/60	60			
FCU-11	ODU-2	DAIKIN	FTX24WVJU9R	WALL MOUNTED, NON-DUCTED	IT ROOM	R-410A	0	0	155	0.00	6.21	4.62	26.7	19.4	12.8	12.2	7.03	21.1	-273.2	51/44/37	0	18.8	0	208/1/60	14.96			

EXHAUST FANS

TAG	QUANTITY	MANUFACTURER	MODEL	SERVICE	AIRFLOW (L/S)	SOUND POWER						MOTOR CHARACTERISTICS										WEIGHT (KG)	NOTES
						63 HZ	125 HZ	250 HZ	500 HZ	1000 HZ	2000 HZ	4000 HZ	E.S.P (PA)	FAN SPEED (RPM)	VFD	BHP	FLA	MOC P	V/PH/Hz				
EF-1	1	PENNBARRY	Z8H - INLINE - SC	JANITOR/STORAGE 4	95	59	60	56	52	48	43	38	0.5	1218	NO	0.04	1.6	115/1/60	7				
EF-2	1	PENNBARRY	SQX135	STORAGE 3	283	70	64/71	63/68	61/62	60/66	56/65	50/59	0.5	1053	NO	0.14	5.8	115/1/60	14	Spark resistance...			
EF-3	1	PENNBARRY	SQX100	MECHANICAL ROOM	182	73/76	62/73	67/71	65/66	64/65	68/64	53/52	0.5	1525	YES	0.1	7.2	115/1/60	20				
EF-4	1	PENNBARRY	SQX122	VEHICLE BAY	378	61/71	64/68	62/63	61/62	65/62	57/56	52/51	0.5	1525	NO	0.5	9.8	115/1/60	34				

TANKLESS ELECTRIC WATER HEATER

TAG	QUANTITY	MANUFACTURER	MODEL	SERVICE	FLUID			ELECTRICAL				WEIGHT (kg)	REMARKS
					OUTPUT CAPACITY (KW)	TYPE	FLOW RATE (L/S)	TEMP. RISE (C)	MCA (A)	MOC P (A)	V/Ph/Hz		
TLWH-1	1	RHEEM	RETEX-04	LAVATORY	3.5	WATER	0.03	8.9	29	30	120/1/60	2.0	
TLWH-2	1	RHEEM	RETEX-11	KITCHEN	11.8	WATER	0.09	10	46	50	240/1/60	3.9	
TLWH-3	1	RHEEM	RETEX-13	SHOWER	13.0	WATER	0.13	6.7	54	60	240/1/60	3.9	
TLWH-4	1	RHEEM	RETEX-04	LAVATORY	3.5	WATER	0.03	8.9	29	30	120/1/60	2.0	
TLWH-5	1	RHEEM	RETEX-13	SHOWER	13.0	WATER	0.13	6.7	54	50	240/1/60	3.9	
TLWH-6	1	EEMAX	PR027240	LS/WASHER/JAN.SINK	27.0	WATER	0.44	33.3	113	3X40	240/1/60	6.2	

PRICING OPTIONS
1. BASE PRICE: SNOW MELTING (FULL APRON)
2. SEPARATE PRICE #1: SNOW MELTING (PARKING ONLY)
3. SEPARATE PRICE #2: NO SNOW MELTING

BOILER

TAG	MANUFACTURER	MODEL	LOCATION	GAS				FLUID				ELECTRICAL			WEIGHT (kg)	REMARKS
				OUTPUT CAPACITY...	BOILER EFF (%)	MIN GAS PRES. (IN)	MAX GAS PRES. (IN)	TYPE	FLOW RATE (GPM)	E.F.T (F)	L.F.T (F)	MCA	MOC P	V/Ph/Hz		
B-1	DE DIETRICH	GT 430-8A...	MECH RM	432	96	7	14	40% GLYCOL	130	120	95	9.8	15	120/1/60	1470	BASE PRICE
B-2	DE DIETRICH	GT 430-8A...	MECH RM	432	96	7	14	40% GLYCOL	130	120	95	9.8	15	120/1/60	1470	
B-3	ABSOLUTE SPIRE	SP-500	MECH RM	133	96.5	7	14	40% GLYCOL	130	120	95	-	15	120/1/60	205	SEPARATE PRICE NO. 1
B-4	ABSOLUTE SPIRE	SP-500	MECH RM	133	96.5	7	14	40% GLYCOL	38	180	155	-	15	120/1/60	205	
B-5	NO BOILER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	SEPARATE PRICE NO.2
B-6	NO BOILER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

ELECTRIC UNIT HEATER

TAG	MANUFACTURER	MODEL	LOCATION	MOUNTING CONFIGURATION	HEATING CAPACITY (KW)	AIRFLOW (L/S)	MOTOR KW	FAN RPM	ELECTRICAL			WEIGHT (kg)	NOTES
									FLA	MOC P	V/Ph/Hz		
UH-1	SIGMA	058H	MECH RM	WALL MOUNT	10.76	94	0.093	1550	1.8	15	120/1/60	21.8	
UH-2	SIGMA	047H	VEHICLE BAY	WALL MOUNT	7.62	190	0.093	1550	1.8	15	120/1/60	18.1	
UH-3	SIGMA	047H	VEHICLE BAY	WALL MOUNT	7.62	190	0.093	1550	1.8	15	120/1/60	18.1	
UH-4	SIGMA	047H	PAINT ROOM	WALL MOUNT	7.62	190	0.093	1550	1.8	15	120/1/60	18.1	
UH-5	SIGMA	047H	MAINTENANCE STG	WALL MOUNT	7.62	190	0.093	1550	1.8	15	120/1/60	18.1	
UH-6	REZTOR	EHC	VESTIBULE	RECESSED	3.00	76	-	-	-	-	-	-	

SNOW MELTING SYSTEM

TAG	AREA (M2)	HEATING LOAD (KW)	FLOW (L/S)	HEAD LOSS (M)	FLUID TYPE	DELTA T	LOOP TYPE	SPACING	COMMENT
SM-1	1,582	998	21	34	40% PROP. GLYCOL	13.9C	25.4MM UPONER HEPEX	229MM CTRS TUBES	BASE PRICE
SM-2	335	211	3.45	34	40% PROP. GLYCOL	13.9C	25.4MM UPONER HEPEX	229 CTRS TUBES	SEPARATE PRICE NO.1
SM-3	0	0	0	0	NONE	-	-	-	SEPARATE PRICE NO.2

IN FLOOR HEATING

TAG	AREA (M2)	TOTAL LOAD (KW)	FLOW (L/S)	HEAD LOSS (M)	FLUID TYPE	DELTA T	LOOP TYPE/SIZE	SPACING
IF-1	405	45	2	4	100% WATER	11 C	12.7MM UPONO HEPEX	305MM CTRS TUBES



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NO.	ISSUED FOR	ISSUED	DATE
7	ISSUED FOR ADDENDUM 10		2024-10-15
6	ISSUED FOR ADDENDUM 8		2024-10-07
5	ISSUED FOR ADDENDUM 7		2024-10-03
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:

Sheet
Title:

MECHANICAL SCHEDULES

Drawing
No.
M-900

ROOFTOP UNITS - DOAS (DEDICATED OUTDOOR AIR SUPPLY)

TAG	MANUFACTURER	MODEL	LOCATION	SERVICE	AIRFLOW		OUTDOOR AIR %	FANS			FILTERS	HEATING COIL (KW)		COOLING COIL (KW)		SOUND POWER @ INLET/OUTLET/RADIATED (DB)						ELECTRICAL				WEIGHT (kg)	NOTES
					TOTAL AIRFLOW...	OUTDOOR AIRFLOW...		TYPE	SERIES	FAN SPEED...		63 HZ	125 HZ	250 HZ	500 HZ	1000 HZ	2000 HZ	4000 HZ	FLA	MCA	MOCPP	V/Ph/Hz					
RTU-1	DAIKIN	DPSH03B	ROOF	OFFICE	567	567	100	SWSI AF	II	2200	2 IN. MERV 8	8.78	11.3	78	77	85	80	82	81	76	35.8	40.6	50	208/3/60	754	THE ROOF CURBS SUPPLIED BY THE MANUFACTURER AND INSTALLED BY THE MECHANICAL CONTRACTOR.	
RTU-2	DAIKIN	DAHA11A	ROOF	HANGAR	1652	1652	100	SWSI AF	I	1441	2 IN. MERV 8	93.8	-	83	84	80	81	76	73	67	23.7	27.1	40	208/3/60	866	THE ROOF CURBS SUPPLIED BY THE MANUFACTURER AND INSTALLED BY THE MECHANICAL CONTRACTOR.	

VRF FAN COIL UNIT

TAG	ASSOCIATED CONDENSER	MANUFACTURER	MODEL	TYPE	SERVICE	REFRIGERANT	AIRFLOW (L/S)				TOTAL CAPACITY (KW)	SENSIBLE CAPACITY (KW)	COOLING				HEATING				SOUND (DBA)				ELECTRICAL				WEIGHT (kg)	NOTES
							LOW SPEED	MEDIUM SPEED	HIGH SPEED	E.S.P (Pa)			SET POINT DB (°C)	SET POINT WB (°C)	S.A.T. DB (°C)	S.A.T. WB (°C)	CAPACITY (KW)	SET POINT DB (°C)	S.A.T. DB (°C)	PRESSURE (H/M/L)	POWER	MCA	MOCPP	V/Ph/Hz						
FCU-1	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL, DUCTED	CONFERENCE RM	R-410A	109	125	133	0.10	2.20	1.61	26.7	19.4	12.8	12.2	2.49	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9					
FCU-2	ODU-1	DAIKIN	FXSQ24TBVJU	HORIZONTAL, DUCTED	MECHANICS OFFICE	R-410A	242	292	350	0.10	7.03	5.01	26.7	19.4	12.8	12.2	7.91	21.1	29.4	36/32/29	64	1.8	15	208/1/60	60					
FCU-3	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL, DUCTED	KITCHEN/LUNGE	R-410A	109	125	133	0.10	2.20	1.61	26.7	19.4	12.8	12.2	2.49	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9					
FCU-4	ODU-1	DAIKIN	FXSQ24TBVJU	HORIZONTAL, DUCTED	GENERAL OFFICE	R-410A	242	292	350	0.10	7.03	5.01	26.7	19.4	12.8	12.2	7.91	21.1	29.4	36/32/29	64	1.8	15	208/1/60	60					
FCU-5	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL, DUCTED	QUARTER MASTER	R-410A	133	125	133	0.10	1.70	1.38	26.7	19.4	12.8	12.2	1.90	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9					
FCU-6	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL, DUCTED	OFFICE 1	R-410A	133	125	133	0.10	1.70	1.38	26.7	19.4	12.8	12.2	1.90	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9					
FCU-7	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL, DUCTED	OFFICE 2	R-410A	133	125	133	0.10	1.70	1.38	26.7	19.4	12.8	12.2	1.90	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9					
FCU-8	ODU-1	DAIKIN	FXSQ09TBVJU	HORIZONTAL, DUCTED	QUIET RM	R-410A	109	125	150	0.10	2.78	2.05	26.7	19.4	12.8	12.2	3.08	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9					
FCU-9	ODU-1	DAIKIN	FXSQ12TBVJU	HORIZONTAL, DUCTED	LOCKER RM	R-410A	117	134	158	0.20	3.52	2.84	26.7	19.4	12.8	12.2	3.96	21.1	29.4	34/32/30	62	0.8	15	208/1/60	24.9					
FCU-10	ODU-1	DAIKIN	FXSQ24TBVJU	HORIZONTAL, DUCTED	FITNESS RM	R-410A	242	292	350	0.10	7.03	5.01	26.7	19.4	12.8	12.2	7.91	21.1	29.4	36/32/29	64	1.8	15	208/1/60	60					
FCU-11	ODU-2	DAIKIN	FTX24WVJU9R	WALL MOUNTED, NON-DUCTED	IT ROOM	R-410A	0	0	155	0.00	6.21	4.82	26.7	19.4	12.8	12.2	7.03	21.1	273.2	51/44/37	0	18.8	0	208/1/60	14.96					

EXHAUST FANS

TAG	QUANTITY	MANUFACTURER	MODEL	SERVICE	AIRFLOW (L/S)	SOUND POWER								MOTOR CHARACTERISTICS								WEIGHT (KG)	NOTES
						63 HZ	125 HZ	250 HZ	500 HZ	1000 HZ	2000 HZ	4000 HZ	E.S.P (PA)	FAN SPEED (RPM)	VFD	BHP	FLA	MOCPP	V/PH/Hz				
EF-1	1	PENNBARRY	Z8H - INLINE - SC	JANITOR/STORAGE 4	95	59	60	56	52	48	43	38	0.5	1218	NO	0.04	1.6	115/1/60	7				
EF-2	1	PENNBARRY	SQX135	STORAGE 3	283	70	64/71	63/68	61/62	60/66	56/65	50/59	0.5	1053	NO	0.14	5.8	115/1/60	14	Spark resistance...			
EF-3	1	PENNBARRY	SQX100	MECHANICAL ROOM	182	73/76	62/73	67/71	65/66	64/65	68/64	53/52	0.5	1525	YES	0.1	7.2	115/1/60	20				
EF-4	1	PENNBARRY	SQX122	VEHICLE BAY	378	61/71	64/68	62/63	61/62	65/62	57/56	52/51	0.5	1525	NO	0.5	9.8	115/1/60	34				

TANKLESS ELECTRIC WATER HEATER

TAG	QUANTITY	MANUFACTURER	MODEL	SERVICE	FLUID			ELECTRICAL			WEIGHT (kg)	REMARKS	
					OUTPUT CAPACITY (KW)	TYPE	FLOW RATE (L/S)	TEMP. RISE (C)	MCA (A)	MOCPP (A)			V/Ph/Hz
TLWH-1	1	RHEEM	RETEX-04	LAVATORY	3.5	WATER	0.03	8.9	29	30	120/1/60	2.0	
TLWH-2	1	RHEEM	RETEX-11	KITCHEN	11.8	WATER	0.09	10	46	50	240/1/60	3.9	
TLWH-3	1	RHEEM	RETEX-13	SHOWER	13.0	WATER	0.13	6.7	54	60	240/1/60	3.9	
TLWH-4	1	RHEEM	RETEX-04	LAVATORY	3.5	WATER	0.03	8.9	29	30	120/1/60	2.0	
TLWH-5	1	RHEEM	RETEX-13	SHOWER	13.0	WATER	0.13	6.7	54	50	240/1/60	3.9	

BOILER

TAG	MANUFACTURER	MODEL	LOCATION	GAS				FLUID				ELECTRICAL			WEIGHT (kg)	REMARKS
				OUTPUT CAPACITY (KW)	BOILER EFF (%)	MIN GAS PRES. (IN)	MAX GAS PRES. (IN)	TYPE	FLOW RATE (GPM)	E.F.T (F)	L.F.T (F)	MCA	MOCPP	V/Ph/Hz		
B-1	DE DIETRICH	GT 430-8A PLUS	MECH RM	432	96	7	14	40% GLYCOL	130	120	95	9.8	15	120/1/60	1470	CONDENSING
B-2	DE DIETRICH	GT 430-8A PLUS	MECH RM	432	96	7	14	40% GLYCOL	130	120	95	9.8	15	120/1/60	1470	CONDENSING

ELECTRIC UNIT HEATER

TAG	MANUFACTURER	MODEL	LOCATION	MOUNTING CONFIGURATION	HEATING CAPACITY (KW)	AIRFLOW (L/s)	MOTOR KW	FAN RPM	ELECTRICAL			WEIGHT (kg)	NOTES
									FLA	MOCPP	V/Ph/Hz		
UH-1	SIGMA	058H	MECH RM	WALL MOUNT	10.76	94	0.093	1550	1.8	15	120/1/60	21.8	
UH-2	SIGMA	047H	VEHICLE BAY	WALL MOUNT	7.62	190	0.093	1550	1.8	15	120/1/60	18.1	
UH-3	SIGMA	047H	VEHICLE BAY	WALL MOUNT	7.62	190	0.093	1550	1.8	15	120/1/60	18.1	
UH-4	SIGMA	047H	PAINT ROOM	WALL MOUNT	7.62	190	0.093	1550	1.8	15	120/1/60	18.1	
UH-5	SIGMA	047H	MAINTENANCE STG	WALL MOUNT	7.62	190	0.093	1550	1.8	15	120/1/60	18.1	
UH-6	REZNOR	EHC	VESTIBULE	WALL MOUNTED	3.00	76							

SNOW MELTING SYSTEM

TAG	AREA (M2)	HEATING LOAD (KW)	FLOW (L/S)	HEAD LOSS (M)	FLUID TYPE	DELTA T	LOOP TYPE	SPACING
SM-1	1,582	998	21	34	40% PROP. GLYCOL	13.9C	25.4MM UPONER HEPEX	229MM CTRS TUBES

IN FLOOR HEATING

TAG	AREA (M2)	TOTAL LOAD (KW)	FLOW (L/S)	HEAD LOSS (M)	FLUID TYPE	DELTA T	LOOP TYPE/SIZE	SPACING
IF-1	405	45	2	4	100% WATER	11 C	12.7MM UPONO HEPEX	305MM CTRS TUBES



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NO.	ISSUED	DATE
5	ISSUED FOR ADDENDUM 7	2024-10-03
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:

Sheet
Title:

MECHANICAL SCHEDULES

Drawing
No.
M-900

ROOFTOP UNITS - DOAS (DEDICATED OUTDOOR AIR SUPPLY)

TAG	MANUFACTURER	MODEL	LOCATION	SERVICE	AIRFLOW		OUTDOOR AIR %	FANS			FILTERS	SOUND POWER @ INLET/OUTLET/RADIATED (DB)						ELECTRICAL				WEIGHT (kg)	NOTES			
					TOTAL AIRFLOW...	OUTDOOR AIRFLOW...		TYPE	SERIES	FAN SPEED...		HEATING COIL (KW)	COOLING COIL (KW)	63 HZ	125 HZ	250 HZ	500 HZ	1000 HZ	2000 HZ	4000 HZ	FLA			MCA	MOCP	V/Ph/Hz
RTU-1	DAIKIN	DPSH03B	ROOF	OFFICE	567	567	100	SWSI AF	II	2200	2 IN. MERV 8	8.78	11.3	78	77	85	80	82	81	76	35.8	40.6	50	208/3/60	754	THE ROOF CURBS SUPPLIED BY THE MANUFACTURER AND INSTALLED BY THE MECHANICAL CONTRACTOR.
RTU-2	DAIKIN	DAHA11A	ROOF	HANGAR	1652	1652	100	SWSI AF	I	1441	2 IN. MERV 8	93.8	-	83	84	80	81	76	73	67	23.7	27.1	40	208/3/60	866	THE ROOF CURBS SUPPLIED BY THE MANUFACTURER AND INSTALLED BY THE MECHANICAL CONTRACTOR.

VRF FAN COIL UNIT

TAG	ASSOCIATED CONDENSER	MANUFACTURER	MODEL	TYPE	SERVICE	REFRIGERANT	AIRFLOW (L/S)			E.S.P (Pa)	TOTAL CAPACITY (KW)	SENSIBLE CAPACITY (KW)	COOLING				HEATING				SOUND (DBA)			ELECTRICAL			WEIGHT (kg)	NOTES
							LOW SPEED	MEDIUM SPEED	HIGH SPEED				SET POINT DB (°C)	SET POINT WB (°C)	S.A.T. DB (°C)	S.A.T. WB (°C)	CAPACITY (KW)	SET POINT DB (°C)	S.A.T. DB (°C)	PRESSURE (H/M/L)	POWER	MCA	MOCP	V/Ph/Hz				
FCU-1	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL, DUCTED	CONFERENCE RM	R-410A	109	125	133	0.10	2.20	1.61	26.7	19.4	12.8	12.2	2.49	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9			
FCU-2	ODU-1	DAIKIN	FXSQ24TBVJU	HORIZONTAL, DUCTED	MECHANICS OFFICE	R-410A	242	292	350	0.10	7.03	5.01	26.7	19.4	12.8	12.2	7.91	21.1	29.4	36/32/29	64	1.8	15	208/1/60	60			
FCU-3	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL, DUCTED	KITCHEN/LUNGE	R-410A	109	125	133	0.10	2.20	1.61	26.7	19.4	12.8	12.2	2.49	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9			
FCU-4	ODU-1	DAIKIN	FXSQ24TBVJU	HORIZONTAL, DUCTED	GENERAL OFFICE	R-410A	242	292	350	0.10	7.03	5.01	26.7	19.4	12.8	12.2	7.91	21.1	29.4	36/32/29	64	1.8	15	208/1/60	60			
FCU-5	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL, DUCTED	QUARTER MASTER	R-410A	133	125	133	0.10	1.70	1.38	26.7	19.4	12.8	12.2	1.90	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9			
FCU-6	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL, DUCTED	OFFICE 1	R-410A	133	125	133	0.10	1.70	1.38	26.7	19.4	12.8	12.2	1.90	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9			
FCU-7	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL, DUCTED	OFFICE 2	R-410A	133	125	133	0.10	1.70	1.38	26.7	19.4	12.8	12.2	1.90	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9			
FCU-8	ODU-1	DAIKIN	FXSQ09TBVJU	HORIZONTAL, DUCTED	QUIET RM	R-410A	109	125	150	0.10	2.78	2.05	26.7	19.4	12.8	12.2	3.08	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9			
FCU-9	ODU-1	DAIKIN	FXSQ12TBVJU	HORIZONTAL, DUCTED	LOCKER RM	R-410A	117	134	158	0.20	3.52	2.84	26.7	19.4	12.8	12.2	3.96	21.1	29.4	34/32/30	62	0.8	15	208/1/60	24.9			
FCU-10	ODU-1	DAIKIN	FXSQ24TBVJU	HORIZONTAL, DUCTED	FITNESS RM	R-410A	242	292	350	0.10	7.03	5.01	26.7	19.4	12.8	12.2	7.91	21.1	29.4	36/32/29	64	1.8	15	208/1/60	60			
FCU-11	ODU-2	DAIKIN	FTX24WVJUR	WALL MOUNTED, NON-DUCTED	IT ROOM	R-410A	0	0	155	0.00	6.21	4.82	26.7	19.4	12.8	12.2	7.03	21.1	-273.2	5144/37	0	18.8	0	208/1/60	14.96			

EXHAUST FANS

TAG	QUANTITY	MANUFACTURER	MODEL	SERVICE	AIRFLOW (L/S)	SOUND POWER							MOTOR CHARACTERISTICS							WEIGHT (KG)	NOTES
						63 HZ	125 HZ	250 HZ	500 HZ	1000 HZ	2000 HZ	4000 HZ	E.S.P (PA)	FAN SPEED (RPM)	VFD	BHP	FLA	V/PH/Hz			
EF-1	1	PENNBARRY	Z8H - INLINE - SC	JANITOR/STORAGE 4	95	59	60	56	52	48	43	38	0.5	1218	NO	0.04	1.6	115/1/60	7		
EF-2	1	PENNBARRY	SQX135	STORAGE 3	283	70	64/71	63/68	61/62	60/66	56/65	50/59	0.5	1053	NO	0.14	5.8	115/1/60	14	Spark resistance construction	
EF-3	1	PENNBARRY	SQX100	MECHANICAL ROOM	182	73/76	62/73	67/71	65/66	64/65	68/64	53/52	0.5	1525	YES	0.1	7.2	115/1/60	20		
EF-4	1	PENNBARRY	SQX122	VEHICLE BAY	378	61/71	64/68	62/63	61/62	65/62	57/56	52/51	0.5	1525	NO	0.5	9.8	115/1/60	34		

TANKLESS ELECTRIC WATER HEATER

TAG	MANUFACTURER	MODEL	SERVICE	OUPUT CAPACITY (KW)	FLUID			ELECTRICAL				WEIGHT (kg)	REMARKS
					TYPE	FLOW RATE (L/S)	TEMP. RISE (C)	AMPS (A)	MCA	MOCP	V/Ph/Hz		
TLWH-1	RHEEM	RETEX-04	LAVATORY	3.5	WATER	0.03	8.9	29			120/1/60	2.0	
TLWH-2	RHEEM	RETEX-11	KITCHEN/WASHER	11.8	WATER	0.09	10	46			240/1/60	3.9	
TLWH-3	RHEEM	RETEX-13	SHOWER/JAN RM	13.0	WATER	0.13	6.7	54			240/1/60	3.9	

BOILER

TAG	MANUFACTURER	MODEL	LOCATION	GAS				FLUID				ELECTRICAL				WEIGHT (kg)	REMARKS
				OUPUT CAPACITY (KW)	BOILER EFF (%)	MIN GAS PRES. (IN)	MAX GAS PRES. (IN)	TYPE	FLOW RATE (GPM)	E.F.T (F)	L.F.T (F)	AMP	MCA	MOCP	V/Ph/Hz		
B-1	DE DIETRICH	GT 430-8A PLUS	MECH RM	432	96	7	14	40% GLYCOL	130	120	95	9.8			120/1/60	1470	CONDENSING
B-2	DE DIETRICH	GT 430-8A PLUS	MECH RM	432	96	7	14	40% GLYCOL	130	120	95	9.8			120/1/60	1470	CONDENSING

ELECTRIC UNIT HEATER

TAG	MANUFACTURER	MODEL	LOCATION	MOUNTING CONFIGURATION	HEATING CAPACITY (KW)	AIRFLOW (L/s)	MOTOR KW	FAN RPM	ELECTRICAL			WEIGHT (kg)	NOTES
									FLA	MOCP	V/Ph/Hz		
UH-1	SIGMA	058H	MECH RM	WALL MOUNT	10.76	94	0.093	1550	1.8	15	120/1/60	21.8	
UH-2	SIGMA	047H	VEHICLE BAY	WALL MOUNT	7.62	190	0.093	1550	1.8	15	120/1/60	18.1	
UH-3	SIGMA	047H	VEHICLE BAY	WALL MOUNT	7.62	190	0.093	1550	1.8	15	120/1/60	18.1	
UH-4	SIGMA	047H	PAINT ROOM	WALL MOUNT	7.62	190	0.093	1550	1.8	15	120/1/60	18.1	
UH-5	SIGMA	047H	MAINTENANCE STG	WALL MOUNT	7.62	190	0.093	1550	1.8	15	120/1/60	18.1	
UH-6	REZVOR	EHC	VESTIBULE	WALL MOUNTED	3.00	75							

SNOW MELTING SYSTEM

TAG	AREA (M2)	HEATING LOAD (KW)	FLOW (L/S)	HEAD LOSS (M)	FLUID TYPE	DELTA T	LOOP TYPE	SPACING
SM-1	1,582	998	21	34	40% PROP. GLYCOL	13.9C	25.4MM UPONER HEPEX	229MM CTRS TUBES

IN FLOOR HEATING

TAG	AREA (M2)	TOTAL LOAD (KW)	FLOW (L/S)	HEAD LOSS (M)	FLUID TYPE	DELTA T	LOOP TYPE/SIZE	SPACING
IF-1	405	45	2	4	100% WATER	11 C	12.7MM UPONO HEPEX	305MM CTRS TUBES



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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:

Sheet
Title:

MECHANICAL SCHEDULES

Drawing
No:
M-900

ROOFTOP UNITS - DOAS (DEDICATED OUTDOOR AIR SUPPLY)

TAG	MANUFACTURER	MODEL	LOCATION	SERVICE	AIRFLOW		OUTDOOR AIR %	FANS			FILTERS	SOUND POWER @ INLET/OUTLET/RADIATED (DB)								ELECTRICAL				WEIGHT (kg)	NOTES	
					TOTAL AIRFLOW...	OUTDOOR AIRFLOW...		TYPE	SERIES	FAN SPEED...		HEATING COIL (KW)	COOLING COIL (KW)	63 HZ	125 HZ	250 HZ	500 HZ	1000 HZ	2000 HZ	4000 HZ	FLA	MCA	MOCP			V/Ph/Hz
RTU-1	DAIKIN	DPSH03B	ROOF	OFFICE	567	567	100	SWSI AF	II	2200	2 IN. MERV 8	8.78	11.3	78	77	85	80	82	81	76	35.8	40.6	50	208/3/60	754	THE ROOF CURBS SUPPLIED BY THE MANUFACTURER AND INSTALLED BY THE MECHANICAL CONTRACTOR.
RTU-2	DAIKIN	DAHA11A	ROOF	HANGAR	1652	1652	100	SWSI AF	I	1441	2 IN. MERV 8	93.8	-	83	84	80	81	76	73	67	23.7	27.1	40	208/3/60	866	THE ROOF CURBS SUPPLIED BY THE MANUFACTURER AND INSTALLED BY THE MECHANICAL CONTRACTOR.

VRF FAN COIL UNIT

TAG	ASSOCIATED CONDENSER	MANUFACTURER	MODEL	TYPE	SERVICE	REFRIGERANT	AIRFLOW (L/S)			E.S.P (Pa)	TOTAL CAPACITY (KW)	SENSIBLE CAPACITY (KW)	COOLING				HEATING				SOUND (DBA)			ELECTRICAL				WEIGHT (kg)	NOTES
							LOW SPEED	MEDIUM SPEED	HIGH SPEED				SET POINT DB (°C)	SET POINT WB (°C)	S.A.T. DB (°C)	S.A.T. WB (°C)	CAPACITY (KW)	SET POINT DB (°C)	S.A.T. DB (°C)	PRESSURE (H/M/L)	POWER	MCA	MOCP	V/Ph/Hz					
FCU-1	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL, DUCTED	CONFERENCE RM	R-410A	109	125	133	0.10	2.20	1.61	26.7	19.4	12.8	12.2	2.49	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9				
FCU-2	ODU-1	DAIKIN	FXSQ24TBVJU	HORIZONTAL, DUCTED	MECHANICS OFFICE	R-410A	242	292	350	0.10	7.03	5.01	26.7	19.4	12.8	12.2	2.49	21.1	29.4	36/32/29	64	1.8	15	208/1/60	60				
FCU-3	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL, DUCTED	KITCHEN/LUNGE	R-410A	109	125	133	0.10	2.20	1.61	26.7	19.4	12.8	12.2	2.49	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9				
FCU-4	ODU-1	DAIKIN	FXSQ24TBVJU	HORIZONTAL, DUCTED	GENERAL OFFICE	R-410A	242	292	350	0.10	7.03	5.01	26.7	19.4	12.8	12.2	2.49	21.1	29.4	36/32/29	64	1.8	15	208/1/60	60				
FCU-5	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL, DUCTED	QUARTER MASTER	R-410A	133	125	133	0.10	1.70	1.38	26.7	19.4	12.8	12.2	1.90	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9				
FCU-6	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL, DUCTED	OFFICE 1	R-410A	133	125	133	0.10	1.70	1.38	26.7	19.4	12.8	12.2	1.90	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9				
FCU-7	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL, DUCTED	OFFICE 2	R-410A	133	125	133	0.10	1.70	1.38	26.7	19.4	12.8	12.2	1.90	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9				
FCU-8	ODU-1	DAIKIN	FXSQ09TBVJU	HORIZONTAL, DUCTED	QUIET RM	R-410A	109	125	150	0.10	2.78	2.05	26.7	19.4	12.8	12.2	3.08	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9				
FCU-9	ODU-1	DAIKIN	FXSQ12TBVJU	HORIZONTAL, DUCTED	LOCKER RM	R-410A	117	134	158	0.20	3.52	2.84	26.7	19.4	12.8	12.2	3.96	21.1	29.4	34/32/30	62	0.8	15	208/1/60	24.9				
FCU-10	ODU-1	DAIKIN	FXSQ24TBVJU	HORIZONTAL, DUCTED	FITNESS RM	R-410A	242	292	350	0.10	7.03	5.01	26.7	19.4	12.8	12.2	2.49	21.1	29.4	36/32/29	64	1.8	15	208/1/60	60				
FCU-11	ODU-2	DAIKIN	FTX24WVJURR	WALL MOUNTED, NON-DUCTED	IT ROOM	R-410A	0	0	155	0.00	6.21	4.82	26.7	19.4	12.8	12.2	7.03	21.1	-273.2	5144/37	0	18.8	0	208/1/60	14.96				

EXHAUST FANS

TAG	QUANTITY	SERVICE	AIRFLOW...	SOUND POWER								MOTOR CHARACTERISTICS							WEIGHT (KG)	NOTES
				AIRFLOW (L/s)	63 HZ	125 HZ	250 HZ	500 HZ	1000 HZ	2000 HZ	4000 HZ	E.S.P (PA)	FAN SPEED (RPM)	VFD	BHP	FLA	V/PH/Hz			
EF-1	1	JANITOR/STORAGE 4	95	59	60	56	52	48	43	38	0.5	1218	NO	0.04	1.6	115/1/60	7			
EF-2	1	STORAGE 3	283	70	64/71	63/68	61/62	60/66	56/65	50/59	0.5	1053	NO	0.14	5.8	115/1/60	14	Spark resistance construction		
EF-3	1	MECHANICAL ROOM	182	73/76	62/73	67/71	65/66	64/65	68/64	53/52	0.5	1525	YES	0.1	7.2	115/1/60	20			
EF-4	1	VEHICLE BAY	378	61/71	64/68	62/63	61/62	65/62	57/56	52/51	0.5	1525	NO	0.5	9.8	115/1/60	34			

TANKLESS ELECTRIC WATER HEATER

TAG	MANUFACTURER	MODEL	SERVICE	FLUID			ELECTRICAL				WEIGHT (kg)	REMARKS	
				OUTPUT CAPACITY (KW)	TYPE	FLOW RATE (L/S)	TEMP. RISE (C)	AMPS (A)	MCA	MOCP			V/Ph/Hz
TLWH-1	RHEEM	RETEX-04	LAVATORY	3.5	WATER	0.03	8.9	29			120/1/60	2.0	
TLWH-2	RHEEM	RETEX-11	KITCHEN/WASHER	11.8	WATER	0.09	10	46			240/1/60	3.9	
TLWH-3	RHEEM	RETEX-13	SHOWER/JAN RM	13.0	WATER	0.13	6.7	54			240/1/60	3.9	

BOILER

TAG	MANUFACTURER	MODEL	LOCATION	GAS				FLUID				ELECTRICAL				WEIGHT (kg)	REMARKS	
				OUTPUT CAPACITY (KW)	BOILER EFF (%)	MIN GAS PRES. (IN)	MAX GAS PRES. (IN)	TYPE	FLOW RATE (GPM)	E.F.T (F)	L.F.T (F)	AMP	MCA	MOCP	V/Ph/Hz			
B-1	DE DIETRICH	GT 430-8A PLUS	MECH RM	432	96	7	14	40% GLYCOL	130	120	95	9.8				120/1/60	1470	CONDENSING
B-2	DE DIETRICH	GT 430-8A PLUS	MECH RM	432	96	7	14	40% GLYCOL	130	120	95	9.8				120/1/60	1470	CONDENSING

ELECTRIC UNIT HEATER

TAG	MANUFACTURER	MODEL	LOCATION	MOUNTING CONFIGURATION	HEATING CAPACITY (kW)	AIRFLOW (L/s)	MOTOR KW	FAN RPM	ELECTRICAL			WEIGHT (kg)	NOTES
									FLA	MOCP	V/Ph/Hz		
UH-1	SIGMA	058H	MECH RM	WALL MOUNT	10.76	94	0.093	1550	1.8	15	120/1/60	21.8	
UH-2	SIGMA	047H	VEHICLE BAY	WALL MOUNT	7.62	190	0.093	1550	1.8	15	120/1/60	18.1	
UH-3	SIGMA	047H	VEHICLE BAY	WALL MOUNT	7.62	190	0.093	1550	1.8	15	120/1/60	18.1	
UH-4	SIGMA	047H	PAINT ROOM	WALL MOUNT	7.62	190	0.093	1550	1.8	15	120/1/60	18.1	
UH-5	SIGMA	047H	MAINTENANCE STG	WALL MOUNT	7.62	190	0.093	1550	1.8	15	120/1/60	18.1	
UH-6	REZVOR	EHC	VESTIBULE	WALL MOUNTED	3.00	75	3.0		12.5	15	240/1/60	10.9	RECESSED MOUNTED

SNOW MELTING SYSTEM

TAG	AREA (M2)	HEATING LOAD (KW)	FLOW (L/S)	HEAD LOSS (M)	FLUID TYPE	DELTA T	LOOP TYPE	SPACING
SM-1	1,582	998	21	34	40% PROP. GLYCOL	13.9C	25.4MM UPONER HEPEX	229MM CTRS TUBES

IN FLOOR HEATING

TAG	AREA (M2)	TOTAL LOAD (KW)	FLOW (L/S)	HEAD LOSS (M)	FLUID TYPE	DELTA T	LOOP TYPE/SIZE	SPACING
IF-1	405	45	2	4	100% WATER	11 C	12.7MM UPONO HEPEX	305MM CTRS TUBES



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ROOFTOP UNITS - DOAS (DEDICATED OUTDOOR AIR SUPPLY)

TAG	MANUFACTURER	MODEL	LOCATION	SERVICE	AIRFLOW		OUTDOOR AIR %	FANS			FILTERS	COOLING COIL (KW)		SOUND POWER 0 INLET/OUTLET/RADIATED (DB)							ELECTRICAL				WEIGHT (kg)
					TOTAL AIRFLOW (L/S)	OUTDOOR AIRFLOW (L/S)		TYPE	SERIES	FAN SPEED V(RPM)		HEATING COIL (KW)	COOLING COIL (KW)	63 HZ	125 HZ	250 HZ	500 HZ	1000 HZ	2000 HZ	4000 HZ	FLA	MCA	MOCPP	V/Ph/Hz	
RTU-1	DAIKIN	DPSH03B	ROOF	OFFICE	567	567	100	SWSI AF	SERIES II	2200	2 IN. MERV 8	28.3 KW	11.3 KW	78	77	85	80	82	81	76	35.8	40.6	50	208/3/60	754
RTU-2	DAIKIN	DAHA11A	ROOF	HANGAR	2076	2076	100	SWSI...	SERIES I	1441	2 IN. MERV 8	117.2 KW	-	83	84	80	81	76	73	67	23.7	27.1	40	208/3/60	866

VRF FAN COIL UNIT

TAG	ASSOCIATED CONDENSER	MANUFACTURER	MODEL	TYPE	SERVICE	REFRIGERANT	AIRFLOW (L/S)		COOLING				HEATING		SOUND (DBA)		ELECTRICAL			WEIGHT (kg)	NOTES		
							RATE (L/S)	E.S.P (Pa)	TOTAL CAPACITY (KW)	SENSIBLE CAPACITY (KW)	SET POINT DB (°C)	SET POINT WB (°C)	SET POINT DB (°C)	S.A.T WB (°C)	CAPACITY (KW)	SET POINT DB (°C)	S.A.T. DB (°C)	PRESSURE (H/M/L)	POWER			MCA	MOCPP
FCU-1	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL DUCTED	CONFERENCE RM	R-410A	133	0.10	2.20	1.61	26.7	19.4	12.8	12.2	2.49	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9
FCU-2	ODU-1	DAIKIN	FXSQ24TBVJU	HORIZONTAL DUCTED	MECHANICS OFFICE	R-410A	350	0.10	7.03	5.01	26.7	19.4	12.8	12.2	7.91	21.1	29.4	36/32/29	64	1.8	15	208/1/60	60
FCU-3	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL DUCTED	KITCHEN LOUNGE	R-410A	133	0.10	2.20	1.61	26.7	19.4	12.8	12.2	2.49	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9
FCU-4	ODU-1	DAIKIN	FXSQ24TBVJU	HORIZONTAL DUCTED	GENERAL OFFICE	R-410A	350	0.10	7.03	5.01	26.7	19.4	12.8	12.2	7.91	21.1	29.4	36/32/29	64	1.8	15	208/1/60	60
FCU-5	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL DUCTED	QUARTER MASTER	R-410A	133	0.10	1.70	1.38	26.7	19.4	12.8	12.2	1.90	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9
FCU-6	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL DUCTED	OFFICE 1	R-410A	133	0.10	1.70	1.38	26.7	19.4	12.8	12.2	1.90	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9
FCU-7	ODU-1	DAIKIN	FXSQ07TBVJU	HORIZONTAL DUCTED	OFFICE 2	R-410A	133	0.10	1.70	1.38	26.7	19.4	12.8	12.2	1.90	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9
FCU-8	ODU-1	DAIKIN	FXSQ09TBVJU	HORIZONTAL DUCTED	QUIET RM	R-410A	150	0.10	2.78	2.05	26.7	19.4	12.8	12.2	3.08	21.1	29.4	33/30/28	61	0.8	15	208/1/60	24.9
FCU-9	ODU-1	DAIKIN	FXSQ12TBVJU	HORIZONTAL DUCTED	LOCKER RM	R-410A	250	0.20	3.52	2.84	26.7	19.4	12.8	12.2	3.96	21.1	29.4	34/32/30	62	0.8	15	208/1/60	24.9
FCU-10	ODU-1	DAIKIN	FXSQ24TBVJU	HORIZONTAL DUCTED	FITNESS RM	R-410A	350	0.10	7.03	5.01	26.7	19.4	12.8	12.2	7.91	21.1	29.4	36/32/29	64	1.8	15	208/1/60	60
FCU-11	ODU-2	DAIKIN	FTX24WVJU9R	WALL MOUNTED, NON-DUCTED	IT ROOM	R-410A	155	0.00	6.21	4.62	26.7	19.4	12.8	12.2	7.03	21.1	-273.2	51/44/37	0	18.8	0	208/1/60	14.96

EXHAUST FANS

TAG	QUANTITY	SERVICE	AIRFLOW...	SOUND POWER							MOTOR CHARACTERISTICS							NOTES
			AIRFLOW (L/s)	63 HZ	125 HZ	250 HZ	500 HZ	1000 HZ	2000 HZ	4000 HZ	E.S.P (PA)	FAN SPEED (RPM)	VFD	BHP	FLA	V/PH/Hz	WEIGHT (KG)	
EF-1	1	JANITOR ROOM	95	59	60	56	52	48	43	38	0.5	1218	NO	0.04	1.6	115/1/60	7	
EF-2	1	PAINT ROOM	283	70	64/71	63/68	61/62	60/66	56/65	50/59	0.5	1053	NO	0.14	5.8	115/1/60	14	Spark resistance construction
EF-3	1	MECHANICAL ROOM	182	73/76	62/73	67/71	65/66	64/65	68/64	53/52	0.5	1525	YES	0.1	7.2	115/1/60	20	
EF-4	1	VEHICLE BAY	378	61/71	64/68	62/63	61/62	65/62	57/56	52/51	0.5	1525	NO	0.5	9.8	115/1/60	34	
EF-5	1	SHOWER/WASHROOMS	205	63/74	64/68	64/65	61/62	67/64	54/53	53/52	0.5	1233	NO	0.2	6.7	115/1/60	22	

TANKLESS ELECTRIC WATER HEATER

TAG	MANUFACTURER	MODEL	SERVICE	FLUID			ELECTRICAL				WEIGHT (kg)	REMARKS	
				OUTPUT CAPACITY (KW)	TYPE	FLOW RATE (GPM)	TEMP. RISE (C)	AMPS (A)	MCA	MOCPP			V/Ph/Hz
TLWH-1	RHEEM	RETEX-04	LAVATORY	3.5	WATER	0.5	8.9	29			120/1/60	2.0	
TLWH-2	RHEEM	RETEX-11	KITCHEN/WASHER	11.8	WATER	1.5	10	46			240/1/60	3.9	
TLWH-3	RHEEM	RETEX-13	SHOWER/JAN RM	13.0	WATER	2.0	6.7	54			240/1/60	3.9	

BOILER

TAG	MANUFACTURER	MODEL	LOCATION	GAS			FLUID			ELECTRICAL				WEIGHT (kg)	REMARKS	
				OUTPUT CAPACITY (KW)	COMB. EFF (%)	MIN GAS PRES. (PSI)	MAX GAS PRES. (PSI)	TYPE	FLOW RATE	E.F.T	L.F.T	FLA	MCA			MOCPP
B-1	DE DIETRICH	GT 430-8A	MECH RM	432	86			40% GLYCOL						120/1/60	1470	
B-2	DE DIETRICH	GT 430-8A	MECH RM	432	86			40% GLYCOL						120/1/60	1470	

ELECTRIC UNIT HEATER

TAG	MANUFACTURER	MODEL	LOCATION	MOUNTING CONFIGURATION	HEATING CAPACITY (KW)	AIRFLOW (L/s)	FLUID CHARACTERISTICS				ELECTRICAL				WEIGHT (kg)	NOTES		
							FLUID	E.F.T. (°C)	L.F.T. (°C)	FLOW RATE (L/min)	PRESSURE DROP (kPa)	MOTOR KW	FAN RPM	FLA			MOCPP	V/Ph/Hz
UH-1	SIGMA	058H	MECH RM	WALL MOUNT	10.76	94	HOT WATER	71.1	60.0	14.0	1.79	0.093	1550	1.8	15	120/1/60	21.8	
UH-2	SIGMA	047H	VEHICLE BAY	WALL MOUNT	7.62	190	HOT WATER	71.1	60.0	10.2	4.18	0.093	1550	1.8	15	120/1/60	18.1	
UH-3	SIGMA	047H	VEHICLE BAY	WALL MOUNT	7.62	190	HOT WATER	71.1	60.0	10.2	4.18	0.093	1550	1.8	15	120/1/60	18.1	
UH-4	SIGMA	047H	PAINT ROOM	WALL MOUNT	7.62	190	HOT WATER	71.1	60.0	10.2	4.18	0.093	1550	1.8	15	120/1/60	18.1	
UH-5	SIGMA	047H	MAINTENANCE STG	WALL MOUNT	7.62	190	HOT WATER	71.1	60.0	10.2	4.18	0.093	1550	1.8	15	120/1/60	18.1	
UH-6	SIGMA	047H	VEHICLE BAY	WALL MOUNT	7.62	190	HOT WATER	71.1	60.0	10.2	4.18	0.093	1550	1.8	15	120/1/60	18.1	

SNOW MELTING SYSTEM

TAG	AREA (M2)	HEATING LOAD (KW)	FLOW (L/S)	HEAD LOSS (M)	FLUID TYPE	DELTA T	LOOP TYPE	SPACING
SM-1	1,582	998	21	34	40% PROP. GLYCOL	4C	25.4MM UPONER HEPEX	229MM CTRS TUBES

IN FLOOR HEATING

TAG	AREA (M2)	TOTAL LOAD (KW)	FLOW (L/S)	HEAD LOSS (M)	FLUID TYPE	DELTA T	LOOP TYPE/SIZE	SPACING
IF-1	405	45	2	4	100% WATER	11 C	12.7MM UPONER HEPEX	305MM CTRS TUBES

PLUMBING FIXTURE SCHEDULE

PROVIDE EACH FIXTURE WITH WASTE AND TRAP, VENT AND WATER, AS SHOWN OR REQUIRED IN ACCORDANCE WITH THE FOLLOWING SCHEDULE:

FIXTURE	TRAP (MM)	VENT (MM)	DCW (MM)	DHW (MM)
WATER CLOSET	3" (80)	1-1/2" (40)	1/2" (15)	-
LAVATORY	1 1/2" (32)	1 1/2" (32)	1/2" (15)	1/2" (15)
FLOOR AND HUB DRAIN	3" (80 MIN)	1-1/2" (40)	3/8" (10)	-
SERVICE SINK	3" (80)	1-1/2" (40)	1/2" (15)	1/2" (15)
KITCHEN SINK	3" (80)	1-1/2" (40)	1/2" (15)	1/2" (15)
HOSE BIBB	-	-	3/4" (20)	-
SHOWER UNIT	3" (80)	1-1/2" (40)	1 1/4" (20)	3/4" (20)
NON FREEZE HOSE BIBB	-	-	1 1/4" (20)	-

NOTE:
EXPOSED DRAIN PIPE SERVING SINK, LAVATORY AND LAUNDRY TUB, IS TO BE FINISHED CHROME PLATE COMPLETE WITH DEEP CUP ESCUTCHEON.

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: 1 : 1

Sheet
Title:

MECHANICAL SCHEDULES

Drawing
No.
M-900



250 ROWNTREE DAIRY RD. WOODBRIDGE, ON
TEL: 905-507-0900
WEB: WWW.QUASARGROUP.COM

YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT
BOULEVARD
TOWN OF EAST GWILLIMBURY

Key
Plan

PUMPS															
TAG	MANUFACTURER	MODEL	DISCHARGE SIZE	VFD	FLOW (GPM)	HEAD (FT)	EFF. (%)	FLUID	POWER (HP)	SPEED @ 100% (RPM)	MCA (A)	MOCP (A)	V/PH/HZ	DESIGN OPTIONS	DUTY ASSIST / STANDBY
P-1	ARMSTRONG	SERIES 4380	2 IN.	YES	20	115	18.3	40% PG	10	4209	3.4	10	575/3/60		DUTY STANDBY
P-1R	ARMSTRONG	SERIES 4380	2 IN.	YES	20	115	18.3	40% PG	10	4209	3.4	10	575/3/60		DUTY STANDBY
P-2	ARMSTRONG	V2A9A-RC	2 IN.	YES	170	180	60.4	40% PG	20	3600	18.6		575/3/60	NOT REQ. FOR SE...	DUTY ASSIST
P-2R	ARMSTRONG	V2A9A-RC	2 IN.	YES	170	180	60.4	40% PG	20	3600	18.6		575/3/60	NOT REQ. FOR SE...	DUTY ASSIST
P-3	ARMSTRONG	V2B7A-CC	4 IN.	YES	130	45	70.2	40% PG	3	1800	3.05		575/3/60	NOT REQ. FOR SEP PRICE #2	DUTY
P-4	ARMSTRONG	V2B7A-CC	4 IN.	YES	130	45	70.2	40% PG	3	1800	3.05		575/3/60	NOT REQ. FOR SEP PRICE #2	DUTY
P-5	ARMSTRONG	SERIES 4380	2 IN.	YES	20	75	41.4	WATER	2	3326	3.4	10	575/3/60		DUTY STANDBY
P-5R	ARMSTRONG	SERIES 4380	2 IN.	YES	20	75	41.4	WATER	2	3326	3.4	10	575/3/60		DUTY STANDBY

AIR SOURCE HEAT PUMP														
TAG	MODEL	REFRIGERANT	OUTDOOR AMB. TEMP C (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	-23.4 (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	MOCP (A)	MCA (A)	V/PH/HZ	WEIGHT (KG)
						AMB. TEMP (C)	CAPACITY (KW)	AMB. TEMP (C)	CAPACITY (KW)					
ODU-1	ROOF	RXYQ144XBYCA	DAIKIN	92.6	4475	35	40	-20	29.4	R-410A	30	22.3	575/3/60	360

GRILLES AND DIFFUSERS														
TAG	BASIS OF DESIGN		TYPE	VOLUME CONTROL	DIMENSIONS			MATERIAL	NOTES					
	MANUFACTURER	MODEL			LENGTH (mm)	WIDTH (mm)	DIAMETER (mm)							
A	EH PRICE	SPD	SQUARE PLAQUE DIFFUSER	YES	600	600		STEEL						
A1	EH PRICE	SPD	SQUARE PLAQUE DIFFUSER	YES	300	300		STEEL	REFER TO FLOOR PLANS					
B1	EH PRICE	80 DAL	EGG GRATE GRILLE	YES	300	300		ALUMINUM	REFER TO FLOOR PLANS					
B2	EH PRICE	80 DAL	EGG GRATE 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 GRATE EXHAUST GRILLE				200							

EXPANSION TANKS									
TAG	LOCATION	SERVICE	BASIS OF DESIGN		VOLUME (L)	MAX DESIGN PRESSURE (KPA)	WEIGHT (KG)	REMARKS	
			MANUFACTURER	MODEL					
ET-1	MECHANICAL ROOM	GLYCOL SYSTEM	PATTERSON	NLA-400	400	882.0 kPa	136		
ET-2	MECHANICAL ROOM	INFLOOR HEATING	PATTERSON	NLA-85	87	882.0 kPa	41		

PLUMBING FIXTURES SCHEDULE									
UNIT TAG	DESCRIPTION	MANUFACTURER	MODEL	WASTE	VENT	DCW	DHW	TRAP	REMARKS
WC-1	Atwall 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 (LOCKER ROOM)	INTEGRAL SOLID POLYMER		40	32	12	12	40	SEE DWG# 8/A-201 FOR DETAILS
LS	LAUNDRY SINK (PAINT ROOM)	WHITEHAUS COLLECTION	WHLSDB4020-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						
EW	EMERGENCY EYEWASH & SHOWER	HAWS	8300.158	32	-	32	32	-	SEE DWG# M-903 FOR DETAILS

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

OUTDOOR CONDENSERS														
TAG	LOCATION	MODEL	MANUFACTURER	AIRFLOW RATE (L/S)	INDOOR CONDITIONS TEMP. (C)		OUTDOOR CONDITIONS TEMP. (C)		REFRIGERANT	MCA	MOCP	V/PH/HZ	WEIGHT (KG)	
					26.7 DB/19.4 WB	21.1 DB / 15.6 WB	35 DB/24 WB	8.3DB/6.1 WB						
ODU-2	HANGAR	AURORA WALL...	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	20	208/1/60	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			

NO.	ISSUED	DATE
8	ISSUED FOR ADDENDUM 15	2024-12-04
7	ISSUED FOR ADDENDUM 14	2024-11-27
6	ISSUED FOR ADDENDUM 10	2024-10-15
5	ISSUED FOR ADDENDUM 8	2024-10-07
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.

Sheet Title:
MECHANICAL SCHEDULES II

Drawing No:
M-901



250 ROWNTREE DAIRY RD, WOODBRIDGE, ON
TEL: 905-507-0900
WWW.QUASARGROUP.COM

YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT
BOULEVARD
TOWN OF EAST GWILLIMBURY

Key
Plan

PUMPS														
TAG	MANUFACTURER	MODEL	DISCHARGE SIZE	VFD	FLOW (GPM)	HEAD (FT)	EFF. (%)	FLUID	POWER (HP)	SPEED @ 100% (RPM)	MCA (A)	MOCP (A)	V/PH/Hz	DESIGN OPTIONS
P-1	ARMSTRONG	SERIES 4380	2 IN.	YES	20	115	18.3	40% PG	10	4209	3.4	10	575/3/60	
P-1R	ARMSTRONG	SERIES 4380	2 IN.	YES	20	115	18.3	40% PG	10	4209	3.4	10	575/3/60	
P-2	ARMSTRONG	V2A9A-RC	2 IN.	YES	170	180	60.4	40% PG	20	3600	18.6		575/3/60	NOT REQ. (SEP PRICE #2)
P-2R	ARMSTRONG	V2A9A-RC	2 IN.	YES	170	180	60.4	40% PG	20	3600	18.6		575/3/60	NOT REQ. (SEP PRICE #2)
P-3	ARMSTRONG	V2B7A-CC	4 IN.	YES	130	45	70.2	40% PG	3	1800	3.05		575/3/60	NOT REQ. (SEP PRICE #2)
P-4	ARMSTRONG	V2B7A-CC	4 IN.	YES	130	45	70.2	40% PG	3	1800	3.05		575/3/60	NOT REQ. (SEP PRICE #2)
P-5	ARMSTRONG	SERIES 4380	2 IN.	YES	20	75	41.4	WATER	2	3326	3.4	10	575/3/60	
P-5R	ARMSTRONG	SERIES 4380	2 IN.	YES	20	75	41.4	WATER	2	3326	3.4	10	575/3/60	

AIR SOURCE HEAT PUMP														
TAG	MODEL	REFRIGERANT	OUTDOOR AMB. TEMP C (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	-23.4 (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	MOCP (A)	MCA (A)	V/PH/Hz	WEIGHT (KG)
						AMB. TEMP (C)	CAPACITY (KW)	AMB. TEMP (C)	CAPACITY (KW)					
ODU-1	ROOF	RXYQ144XBYCA	DAIKIN	92.6	4475	35	40	-20	29.4	R-410A	30	22.3	575/3/60	360

GRILLES AND DIFFUSERS										
TAG	BASIS OF DESIGN		TYPE	VOLUME CONTROL	DIMENSIONS				MATERIAL	NOTES
	MANUFACTURER	MODEL			LENGTH (mm)	WIDTH (mm)	DIAMETER (mm)	NECK DIAMETER (mm)		
A	EH PRICE	SPD	SQUARE PLAQUE DIFFUSER	YES	600	600			STEEL	
A1	EH PRICE	SPD	SQUARE PLAQUE DIFFUSER	YES	300	300			STEEL	REFER TO FLOOR PLANS
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 PUNJAN LOUVERJET NOZZLE		305	213	254		ALUMINUM	
H	EH PRICE	RECG	EGG CRATE EXHAUST GRILLE				200			

EXPANSION TANKS								
TAG	LOCATION	SERVICE	BASIS OF DESIGN		VOLUME (L)	MAX DESIGN PRESSURE (KPA)	WEIGHT (KG)	REMARKS
			MANUFACTURER	MODEL				
ET-1	MECHANICAL ROOM	GLYCOL SYSTEM	PATTERSON	NLA-400	400	862.0 kPa	136	
ET-2	MECHANICAL ROOM	INFLOOR HEATING	PATTERSON	NLA-85	87	862.0 kPa	41	

OUTDOOR CONDENSERS													
TAG	LOCATION	MODEL	MANUFACTURER	AIRFLOW RATE (L/S)	INDOOR CONDITIONS TEMP. (C)		OUTDOOR CONDITIONS TEMP. (C)		REFRIGERANT	MCA	MOCP	V/PH/Hz	WEIGHT (KG)
					DB	WB	DB	WB					
ODU-2	HANGAR	AURORA WALL...	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	20	208/1/60	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 Millennium 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 (LOCKER ROOM)	INTEGRAL SOLID POLYMER		40	32	12	12	40	SEE DWG# B/A-201 FOR DETAILS
LS	LAUNDRY SINK (PAINT ROOM)	WHITEHAUS COLLECTION	WHLSDB4020-C	40	32	12	12	40	
KS	KITCHEN SINK	KINDRED	OSL2020/R/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						
EW	EMERGENCY EYEWASH & SHOWER	HAWS	8300.158	32	-	32	32	-	SEE DWG# M-903 FOR DETAILS

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
7	ISSUED FOR ADDENDUM 14	2024-11-27
6	ISSUED FOR ADDENDUM 10	2024-10-15
5	ISSUED FOR ADDENDUM 8	2024-10-07
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.

Sheet
Title:

MECHANICAL SCHEDULES II

Drawing
No.
M-901



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YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT
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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	115	18.3	40% PG	10	4209	575/3/60
P-1R	ARMSTRONG	SERIES 4380	2 IN.	YES	20	115	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	75	41.4	WATER	2	3326	575/3/60
P-5R	ARMSTRONG	SERIES 4380	2 IN.	YES	20	75	41.4	WATER	2	3326	575/3/60

AIR SOURCE HEAT PUMP														
TAG	MODEL	REFRIGERANT	OUTDOOR AMB. TEMP C (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	-23.4 (-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	EH PRICE	RPLP	ROUND PUNKAH LOUVERJET NOZZLE	YES	305	213	254		ALUMINUM	
H	EH PRICE	RECG	EGG CRATE EXHAUST GRILLE				200			

EXPANSION TANKS								
TAG	LOCATION	SERVICE	BASIS OF DESIGN		VOLUME (L)	MAX DESIGN PRESSURE (KPa)	WEIGHT (KG)	REMARKS
			MANUFACTURER	MODEL				
ET-1	MECHANICAL ROOM	GLYCOL SYSTEM	PATTERSON	NLA-400	400	862.0 kPa	136	
ET-2	MECHANICAL ROOM	INFLOOR HEATING	PATTERSON	NLA-85	87	862.0 kPa	41	

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)
					DB	WB	DB	WB				
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	Awall 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 FOR BUILDING PERMIT	ISSUED	DATE
5	ISSUED FOR ADDENDUM 8		2024-10-07
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.

Sheet
Title:

MECHANICAL SCHEDULES II

Drawing
No.
M-901



250 ROWNTREE DAIRY RD, WOODBRIDGE, ON
TEL: 905-507-0800
WWW.QUASARG.COM

YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT
BOULEVARD
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.

Sheet
Title:

MECHANICAL SCHEDULES II

Drawing
No.
M-901



YORK REGIONAL POLICE HELICOPTER HANGAR

350 GARFIELD WRIGHT
BOULEVARD
TOWN OF EAST GWILLIMBURY

Key
Plan

NO.	ISSUED	DATE
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

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Original Issue Date: 2024-07-31
Project No: TT-24-005
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Sheet
Title:

MECHANICAL SCHEDULES II

Drawing
No:
M-901

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	WATER	10	4209	208/3/60
P-1R	ARMSTRONG	SERIES 4380	2 IN.	YES	20	140	18.3	WATER	10	4209	208/3/60
P-2	ARMSTRONG	V2A9A-RC	2 IN.	YES	170	180	60.4	WATER	20	3600	208/3/60
P-2R	ARMSTRONG	V2A9A-RC	2 IN.	YES	170	180	60.4	WATER	20	3600	208/3/60
P-3	ARMSTRONG	V2B7A-CC	4 IN.	YES	130	45	70.2	WATER	3	1800	208/3/60
P-4	ARMSTRONG	V2B7A-CC	4 IN.	YES	130	45	70.2	WATER	3	1800	208/3/60
P-5	ARMSTRONG	SERIES 4380	2 IN.	YES	20	90	41.4	WATER	2	3326	208/3/60
P-5R	ARMSTRONG	SERIES 4380	2 IN.	YES	20	90	41.4	WATER	2	3326	208/3/60

AIR SOURCE HEAT PUMP

TAG	REFRIGERANT	HEAT CAPACITY (KW)	FLUID TYPE	FLOW RATE (GPM)	R. TEMP (C)	S. TEMP (C)	P. DROP (PSI)	POWER (KW)	MCA	FLA	MOCP	V/PH/HZ
ASHP-1	R-507	48.7	40% PG	17.1	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	230/3/60	350

GRILLES AND DIFFUSERS

TAG	BASIS OF DESIGN		TYPE	VOLUME CONTROL	DIMENSIONS			MATERIAL	NOTES
	MANUFACTURER	MODEL			LENGTH (mm)	WIDTH (mm)	DIAMETER (mm)		
A	EH PRICE	SPD	SQUARE PLAQUE DIFFUSER	YES	600	600		STEEL	
A1	EH PRICE	SPD	SQUARE PLAQUE DIFFUSER	YES	300	300		STEEL	
B	EH PRICE	80 DAL	EGG GRATE GRILLE	YES	1800	400		ALUMINUM	
B1	EH PRICE	80 DAL	EGG GRATE GRILLE	YES	300	300		ALUMINUM	
B2	EH PRICE	80 DAL	EGG GRATE 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 PUNJAI LOUVERJET NOZZLE		305	213	254		
H	EH PRICE	RECG	EGG GRATE 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)
					26.7 DB/19.4 WB	21.1 DB / 15.6 WB	35 DB/24 WB	8.3DB/6.1 WB				
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

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

WHLSDB4020

11'2" x 20" x 39"

47 1/4"

LIVE WITH STYLE!

MOEN SPECIFIER SERVICES 1-800-321-8809 Ext. 2158

MOEN COMMERCIAL

Specifications

Two-Handle Wall Mount Faucet
Model: 8126
For Hands-Abs 2011

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MOEN COMMERCIAL

Specifications

Two-Handle Wall Mount Faucet
Model: 8126

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MOEN COMMERCIAL

Specifications

Two-Handle Wall Mount Faucet
Model: 8126

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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

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
----------	----------------

Compliance & Certifications

Certifications	ASME, UL, CSA
----------------	---------------

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

FIAT PRODUCTS

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

SEE REVERSE FOR ROUGHING-IN DIMENSIONS

FIAT QUALITY FINISH

Customer Service Center: 1-800-321-8809

MOEN COMMERCIAL

Specifications

Two-Handle Service Sink Faucet
Model: 8134 Chrome

MOEN SPECIFIER SERVICES 1-800-321-8809 Ext. 2158

MOEN COMMERCIAL

Specifications

Two-Handle Service Sink Faucet
Model: 8134 Chrome

MOEN SPECIFIER SERVICES 1-800-321-8809 Ext. 2158

Haws

model 8300.158
Emergency Eyewash and Shower

FEATURES & BENEFITS

CONSTRUCTION

WALL MOUNT

SHOWERHEAD

FLOW CONTROL

QUALITY CONTROL

REQUIRED OPTIONS

APPLICATIONS

INSTALLATION

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

ZURN

ZN-415-Y FPD SHOWER
BODY ASSEMBLY WITH TYPE Y STRAINER TAG

ENGINEERING SPECIFICATION: ZURN ZN-415-Y FPD and Shower Drain. Dura-Coated cast-iron body with bottom outlet, combination overflow, temperature controls and adjustable collar with Type Y, polished metal bronze square strainer with stainless steel screws.

REVISIONS

REV. A DATE: 06/16/95 C.L. NO. 89832
DWG. NO. 6368 PRODUCT NO. ZN-415-Y

4 EMERGENCY EYEWASH & SHOWER
SCALE:N.T.S.

MOEN COMMERCIAL

Specifications

Two-Handle Service Sink Faucet
Model: 8134 Chrome

MOEN SPECIFIER SERVICES 1-800-321-8809 Ext. 2158

5 SHOWER FLOOR DRAIN
SCALE:N.T.S.

ZURN

ZN-415-Y FPD SHOWER
BODY ASSEMBLY WITH TYPE Y STRAINER TAG

ENGINEERING SPECIFICATION: ZURN ZN-415-Y FPD and Shower Drain. Dura-Coated cast-iron body with bottom outlet, combination overflow, temperature controls and adjustable collar with Type Y, polished metal bronze square strainer with stainless steel screws.

REVISIONS

REV. A DATE: 06/16/95 C.L. NO. 89832
DWG. NO. 6368 PRODUCT NO. ZN-415-Y

PARKIN

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

250 ROWNTREE DAIRY RD. WOODBRIDGE, ON
TEL: 905-507-0800
WWW.QUASARCG.COM

YORK REGIONAL POLICE
HELICOPTER HANGAR

350 GARFIELD WRIGHT
BOULEVARD
TOWN OF EAST GWILLIMBURY

Key Plan

3	ISSUED FOR ADDENDUM 14	2024-11-27
2	ISSUED FOR ADDENDUM 10	2024-10-15
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

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

Model: WHLSDB4020

Specifications:

- Material: 304 Stainless Steel
- Dimensions: 47 1/4" x 20" x 11"
- Weight: 255 lbs
- Capacity: 60 gallons

Whitehaus

WHLSDB4020

LIVE WITH STYLE!

MOEN SPECIFIER SERVICES 1-800-321-8809 Ext. 2158

MOEN COMMERCIAL

Specifications

Model: 8126

CRITICAL DIMENSIONS

MOEN SPECIFIER SERVICES 1-800-321-8809 Ext. 2158

MOEN COMMERCIAL

Specifications

Model: 8126

CRITICAL DIMENSIONS

MOEN SPECIFIER SERVICES 1-800-321-8809 Ext. 2158

GLOBAL INDUSTRIAL

Model: WBB2764020

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

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

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

FIAT PRODUCTS

12" MOP SERVICE BASIN WITH 6" DROP FRONT

Model: TSB3000

Specifications:

- Material: 304 Stainless Steel
- Dimensions: 12" x 12" x 12"
- Weight: 15 lbs

FIAT PRODUCTS

12" MOP SERVICE BASIN WITH 6" DROP FRONT

CRITICAL DIMENSIONS

FIAT QUALITY PRODUCTS

MOEN COMMERCIAL

Specifications

Model: 8134

CRITICAL DIMENSIONS

MOEN SPECIFIER SERVICES 1-800-321-8809 Ext. 2158

2 AIR COMPRESSOR VERTICAL
SCALE: N.T.S.

Haws

model 8300.158

Emergency Eyewash and Shower

Features & Benefits:

- 30" x 30" stainless steel cabinet
- 1/2" NPT connections
- Integral check valves
- 3000 series pump

Specifications:

Model: 8300.158

CRITICAL DIMENSIONS

INSTALLATION INSTRUCTIONS

Mounting Detail

Applications

8300.158 SHOWER EYEWASH COMBO

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

ZURN

ZN-415-Y 1/2" FIP SHOWER BODY ASSEMBLY WITH TYPE Y STRAINER

CRITICAL DIMENSIONS

ENGINEERING SPECIFICATION: ZURN ZN-415-Y

Options:

- 3/4" IPS
- 1/2" IPS
- 1/4" IPS

ZURN

ZN-415-Y 1/2" FIP SHOWER BODY ASSEMBLY WITH TYPE Y STRAINER

CRITICAL DIMENSIONS

ENGINEERING SPECIFICATION: ZURN ZN-415-Y

MOEN COMMERCIAL

Specifications

Model: 8134

CRITICAL DIMENSIONS

MOEN SPECIFIER SERVICES 1-800-321-8809 Ext. 2158

4 EMERGENCY EYEWASH & SHOWER
SCALE: N.T.S.

Haws

model 8300.158

Emergency Eyewash and Shower

Features & Benefits:

- 30" x 30" stainless steel cabinet
- 1/2" NPT connections
- Integral check valves
- 3000 series pump

Specifications:

Model: 8300.158

CRITICAL DIMENSIONS

INSTALLATION INSTRUCTIONS

Mounting Detail

Applications

8300.158 SHOWER EYEWASH COMBO

5 SHOWER FLOOR DRAIN
SCALE: N.T.S.

ZURN

ZN-415-Y 1/2" FIP SHOWER BODY ASSEMBLY WITH TYPE Y STRAINER

CRITICAL DIMENSIONS

ENGINEERING SPECIFICATION: ZURN ZN-415-Y

6 ELECTRIC WATER HEATER
SCALE: N.T.S.

ZURN

ZN-415-Y 1/2" FIP SHOWER BODY ASSEMBLY WITH TYPE Y STRAINER

CRITICAL DIMENSIONS

ENGINEERING SPECIFICATION: ZURN ZN-415-Y

PARKIN

Parkin Architects Limited
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250 ROWNTREE DAIRY RD, WOODBRIDGE, ON
TEL: 905-507-0800
WWW.QUASARGROUP.COM

YORK REGIONAL POLICE
HELICOPTER HANGAR

350 GARFIELD WRIGHT
BOULEVARD
TOWN OF EAST GWILLIMBURY

Key Plan

2	ISSUED FOR ADDENDUM 10	2024-10-15
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

