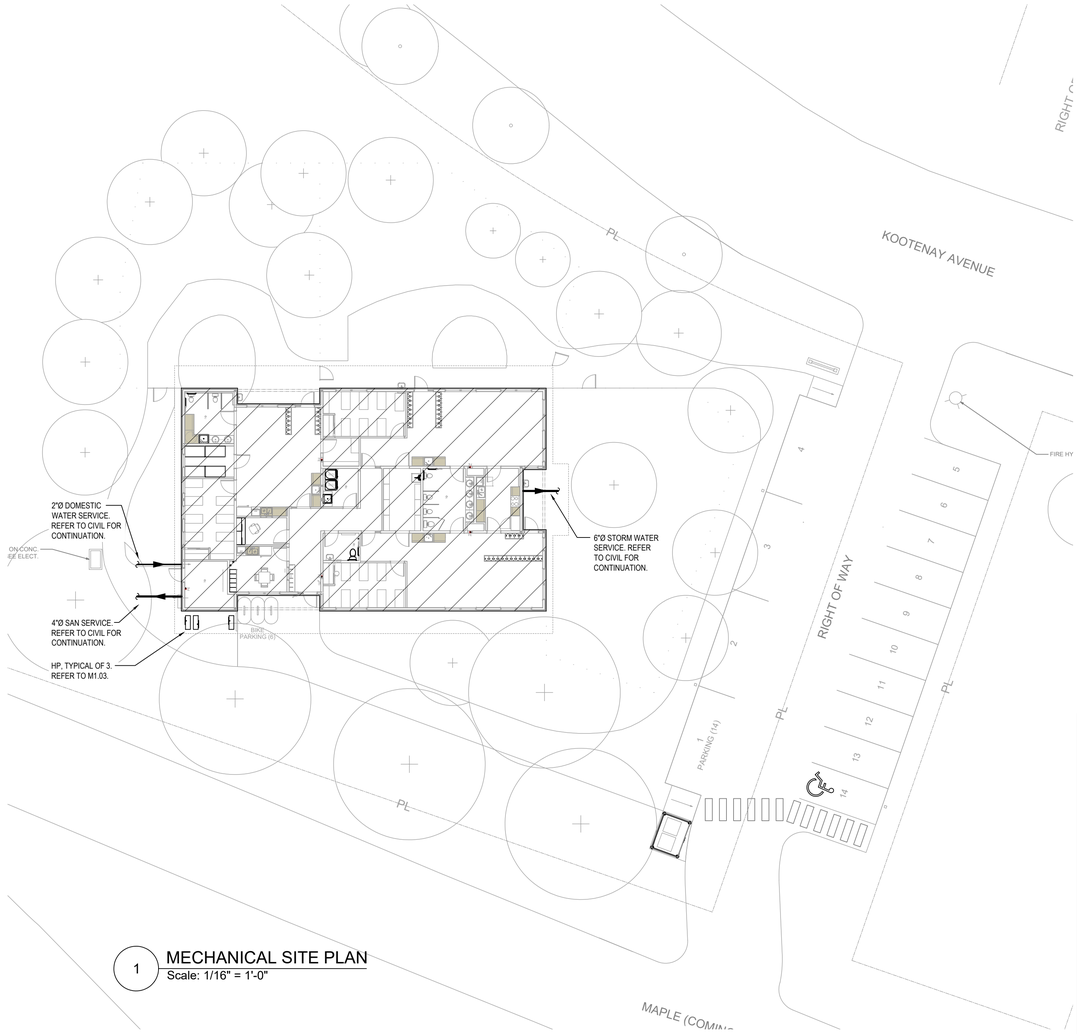
SYMBOL SCHEDULE

	SUPPLY OR OUTDOOR AIR DUCT UP
	SUPPLY OR OUTDOOR AIR DUCT DOWN
	RETURN AIR DUCT UP
	RETURN AIR DUCT DOWN
	EXHAUST AIR DUCT UP
	EXHAUST AIR DUCT DOWN
	TURNING VANES
	ACOUSTIC INSULATION
	BALANCING DAMPER
B.D.D.	BACK DRAFT DAMPER
M.D.	MOTORIZED DAMPER
	FIRE DAMPER - VERTICAL INSTALLATION
	FIRE DAMPER - HORIZONTAL INSTALLATION
FS	FIRE SMOKE DAMPER - VERTICAL INSTALLATION
FS	FIRE SMOKE DAMPER - HORIZONTAL INSTALLATION
AP	ACCESS PANEL
	ROOF FAN - EXHAUST AIR
	DUCT OR PIPE CAP-OFF
	SUPPLY AIR DIFFUSER
	SUPPLY AIR GRILLE
	EXHAUST AIR GRILLE
	RETURN AIR GRILLE
	DOMESTIC COLD WATER (DCW)
	DOMESTIC HOT WATER (DHW)
	DOMESTIC HOT WATER RECIRC. (DHWR)
V	SANITARY VENT
	SANITARY SEWER
ST	STORM SEWER
RA	RADON
	PIPE CLEAN-OUT
	PIPE CLEAN-OUT TO GRADE
X X X	DRAIN TILE
R	REFRIGERANT
	DIRECTION OF FLOW
	SLOPE PIPE OR DUCT
	PIPE DROP
	PIPE RISE
	PIPE TEE DOWN
	PIPE TEE UP
	PIPE SLEEVE
	PIPE ANCHOR
	PIPE UNION
	PIPE REDUCER
	GATE VALVE
	CHECK VALVE
	BALANCING VALVE
P.R.V.	PRESSURE REDUCING VALVE
	STRAINER
	RELIEF VALVE
B.F.P.	BACKFLOW PREVENTOR
	TEMPERATURE GAUGE
	PRESSURE GAUGE
	THERMOMETER
	PUMP
	OPEN DRAIN
	HOSE-BIBB
	FLOOR DRAIN
	FUNNEL FLOOR DRAIN
	ROOF DRAIN
	AREA DRAIN
T	THERMOSTAT
PT	PROTECTED THERMOSTAT
S	ELECTRIC SWITCH
- / - / -	GRILLE TYPE NECK / GRILLE SIZE AIR VOLUME
-	EQUIPMENT / FIXTURE TYPE
-	KEYED NOTE
-	DRAWING REVISION
- / M-	DETAIL NUMBER DRAWING NUMBER
- / M-	SECTION NUMBER DRAWING NUMBER
UC	UNDER-CUT DOOR
-	DETAIL NOTE
S/A	SUPPLY AIR
R/A	RETURN AIR
O/A	OUTDOOR AIR
E/A	EXHAUST AIR
T/A	TRANSFER AIR
RWL	RAIN WATER LEADER
WV	WET VENT
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
C/W	COMPLETE WITH



1 MECHANICAL SITE PLAN
Scale: 1/16" = 1'-0"

BUILDING SITE INFORMATION

ADDRESS	
351 KOOTENAY AVENUE, TRAIL, BC	
LEGAL DESCRIPTION	
PARCEL A, PLAN 27413-I, BLOCK B, PLAN 623A, DISTRICT LOT 367	

BUILDING WATER SERVICE

PIPING SIZED USING AVERAGE PRESSURE LOSS METHOD

DESCRIPTION	FIXTURE UNITS	USGPM	LITRES/SECOND
DOMESTIC WATER	78	37.4	2.36
TOTAL WATER SERVICE	78	37.4	2.36

BUILDING STORM LOAD

(BASED ON 10MM/15MIN RAINFALL INTENSITY)

DESCRIPTION	AREA [sq. m / sq. ft.]	LITRES
BUILDING	478 sm (5,145 sf)	4,785
TOTAL STORM SERVICE	478 sm (5,145 sf)	4,785

BUILDING SANITARY LOAD

DESCRIPTION	FIXTURE UNITS
BUILDING	59
TOTAL SANITARY SERVICE	59

BUILDING ENERGY - MECHANICAL

HVAC DESIGN	
ENERGY STANDARD/CODE	ASHRAE 90.1-2019
COMPLIANCE PATH	PRESCRIPTIVE
DESIGN METHOD	MANDATORY PROVISIONS & PRESCRIPTIVE
IN ACCORDANCE WITH	SECTION 6
CLIMATE ZONE	5
VENTILATION	ASHRAE 62.1-2016

GENERAL NOTES:

1. INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE BRITISH COLUMBIA BUILDING CODE 2024, BRITISH COLUMBIA PLUMBING CODE 2024, LOCAL BUILDING BYLAWS, MUNICIPAL GUIDELINES AND REQUIREMENTS WHERE APPLICABLE.
2. MECHANICAL SERVICES ARE SCHEMATIC REPRESENTATION ONLY. MECHANICAL CONTRACTOR SHALL FIELD MEASURE ALL MATERIAL PRIOR TO INSTALLATION. PROVIDE OFFSETS WHERE NECESSARY TO AVOID CONFLICT WITH STRUCTURAL AND ALL OTHER TRADES.

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REVISIONS:

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C	2026/07/31	90% COORDINATION
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A	2026/06/19	50% REVIEW SET

ISSUES:

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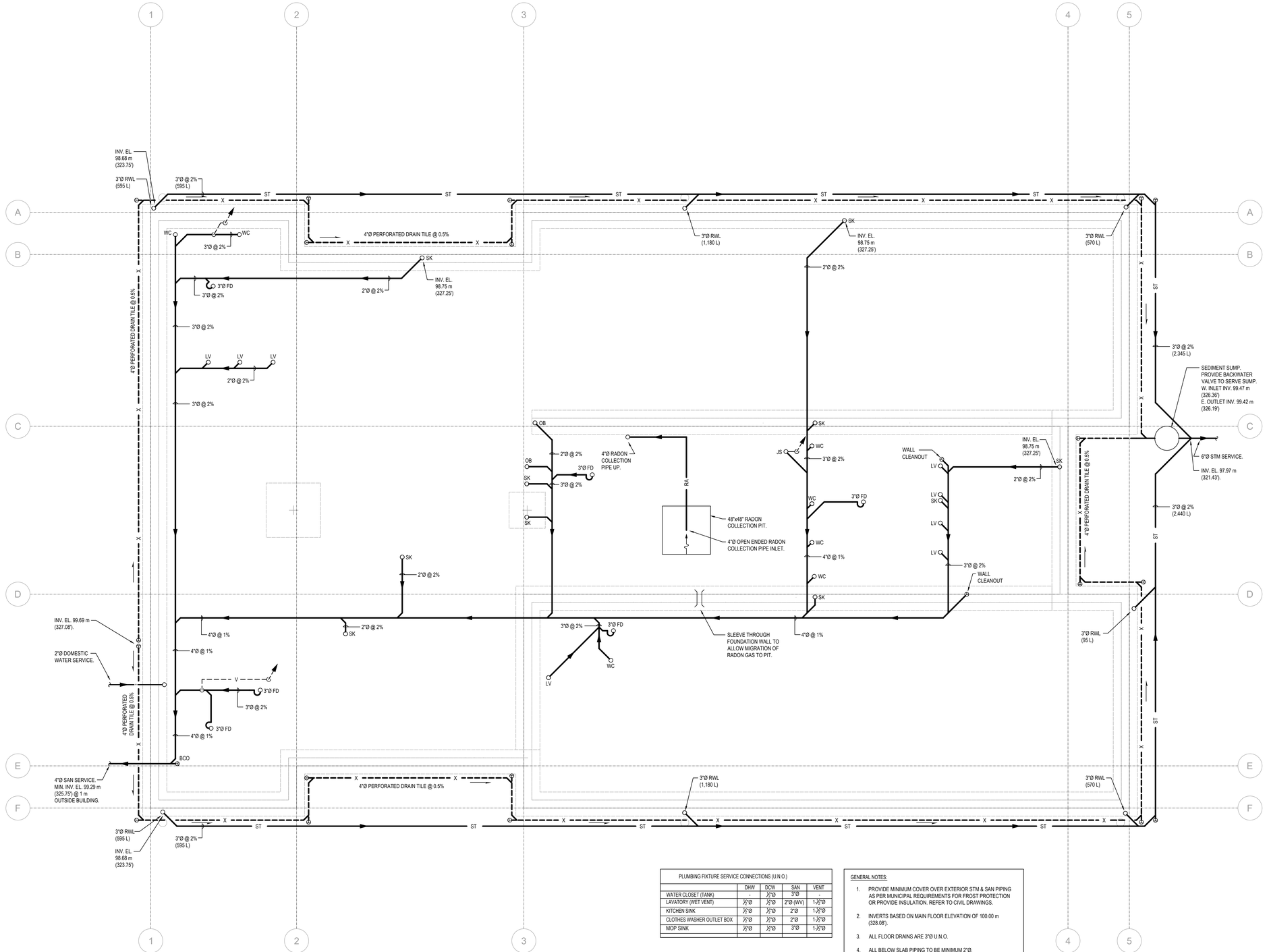
PROJECT:
UNICORN DAYCARE

TITLE:
MECHANICAL SITE PLAN & COVER PAGE

DRAWN: PF	DRAWING Nº: M0.05
SCALE: 1/16" = 1'-0	
JOB Nº: 25539	
DATE: MAY 2026	REV. Nº: D



1 MECHANICAL FOUNDATION PLAN
Scale: 1/4" = 1'-0"

PLUMBING FIXTURE SERVICE CONNECTIONS (U.N.O.)				
	DHW	DCW	SAN	VENT
WATER CLOSET (TANK)	-	½"Ø	3"Ø	-
LAVATORY (WET VENT)	½"Ø	½"Ø	2"Ø (WV)	1-½"Ø
KITCHEN SINK	½"Ø	½"Ø	2"Ø	1-½"Ø
CLOTHES WASHER OUTLET BOX	½"Ø	½"Ø	2"Ø	1-½"Ø
MOP SINK	½"Ø	½"Ø	3"Ø	1-½"Ø

GENERAL NOTES:

1. PROVIDE MINIMUM COVER OVER EXTERIOR STM & SAN PIPING AS PER MUNICIPAL REQUIREMENTS FOR FROST PROTECTION OR PROVIDE INSULATION. REFER TO CIVIL DRAWINGS.
2. INVERTS BASED ON MAIN FLOOR ELEVATION OF 100.00 m (328.08').
3. ALL FLOOR DRAINS ARE 3"Ø U.N.O.
4. ALL BELOW SLAB PIPING TO BE MINIMUM 2"Ø.
5. PROVIDE CLEAN GRANULAR MATERIAL BELOW THE SLAB ON GRADE PORTION OF THE BUILDING FOR THE RADON SYSTEM AS PER BCBC 2024.
6. INSTALL DRAIN TILE AS PER GEOTECH REPORT SECTION 6.7 SUBSURFACE DRAINAGE.

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PROJECT:
UNICORN DAYCARE

TITLE:
MECHANICAL FOUNDATION PLAN

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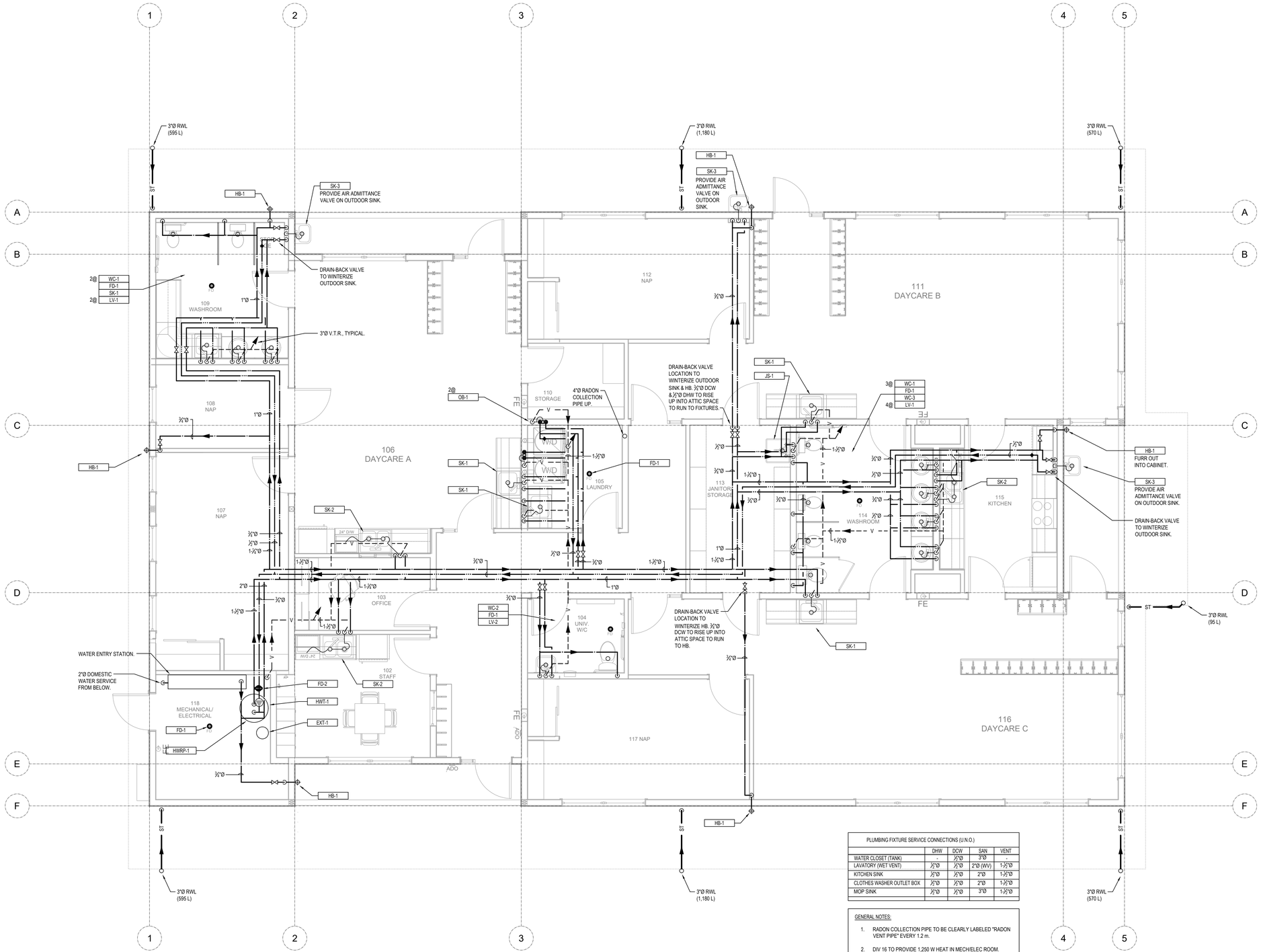
SCALE: 1/4" = 1'-0	
JOB N°: 25539	
DATE: MAY 2026	REV. N°: D



PLUMBING FIXTURE SERVICE CONNECTIONS (U.N.O.)				
	DHW	DCW	SAN	VENT
WATER CLOSET (TANK)		¾"Ø	3"Ø	
LAVATORY (WET VENT)	½"Ø	½"Ø	2"Ø (WV)	1-½"Ø
KITCHEN SINK	½"Ø	½"Ø	2"Ø	1-½"Ø
CLOTHES WASHER OUTLET BOX	½"Ø	½"Ø	2"Ø	1-½"Ø
MOP SINK	½"Ø	½"Ø	3"Ø	1-½"Ø

GENERAL NOTES:

1. RADON COLLECTION PIPE TO BE CLEARLY LABELED "RADON VENT PIPE" EVERY 1.2 m.
2. DIV 16 TO PROVIDE 1,250 W HEAT IN MECH/ELEC ROOM.
3. RUN ALL WATER LINES IN CEILING SPACE / BULKHEADS BELOW ATTIC. COORDINATE w/ HVAC DUCTING.

1 PLUMBING FLOOR PLAN
Scale: 1/4" = 1'-0"

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PROJECT:
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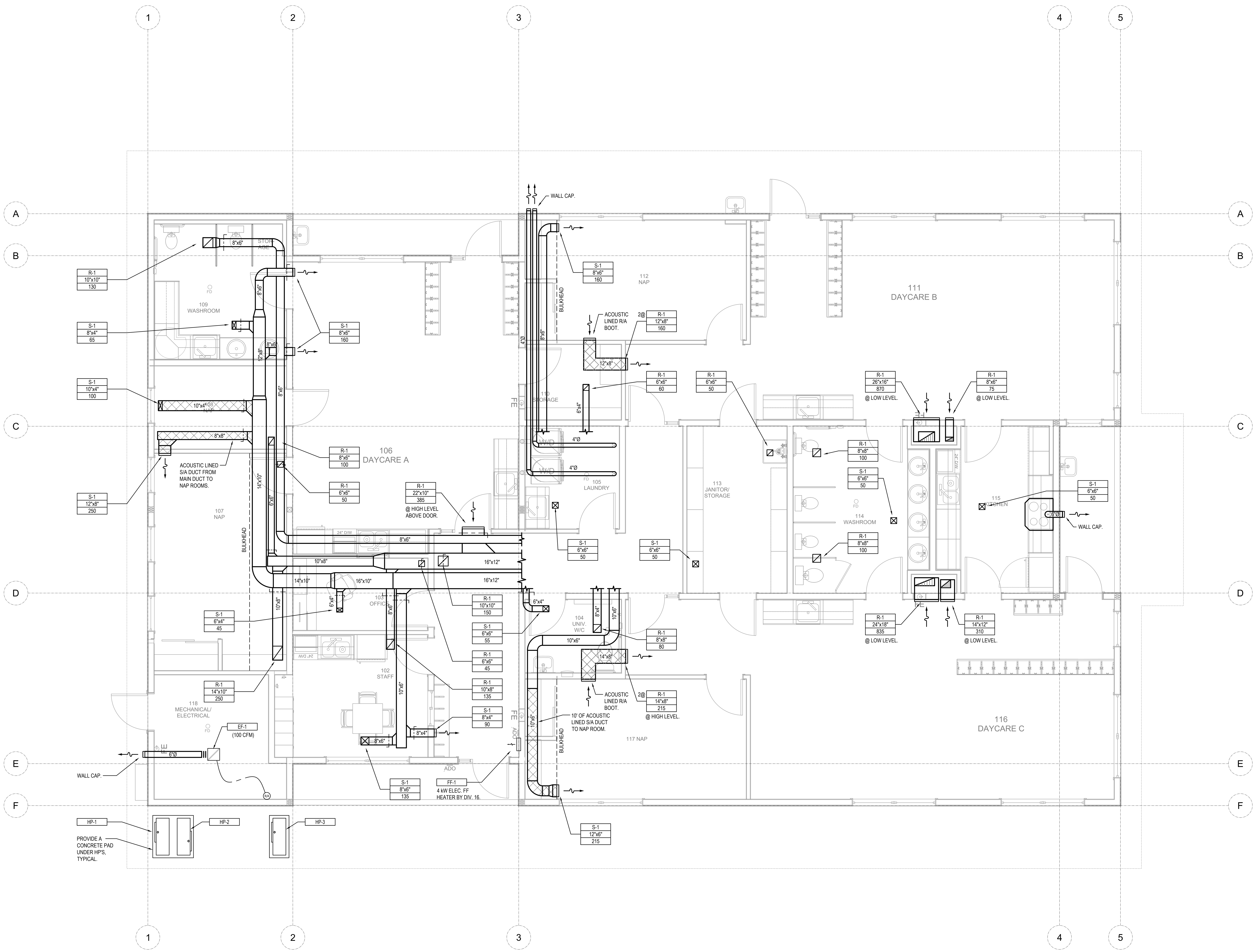
TITLE:
PLUMBING FLOOR PLAN

DRAWN: PF	DRAWING N°: M1.02
SCALE: 1/4" = 1'-0	
JOB N°: 25539	
DATE: MAY 2026	REV. N°: D



1 HVAC FLOOR PLAN
Scale: 1/4" = 1'-0"

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ISSUES:

DIMENSIONS:
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PROJECT:
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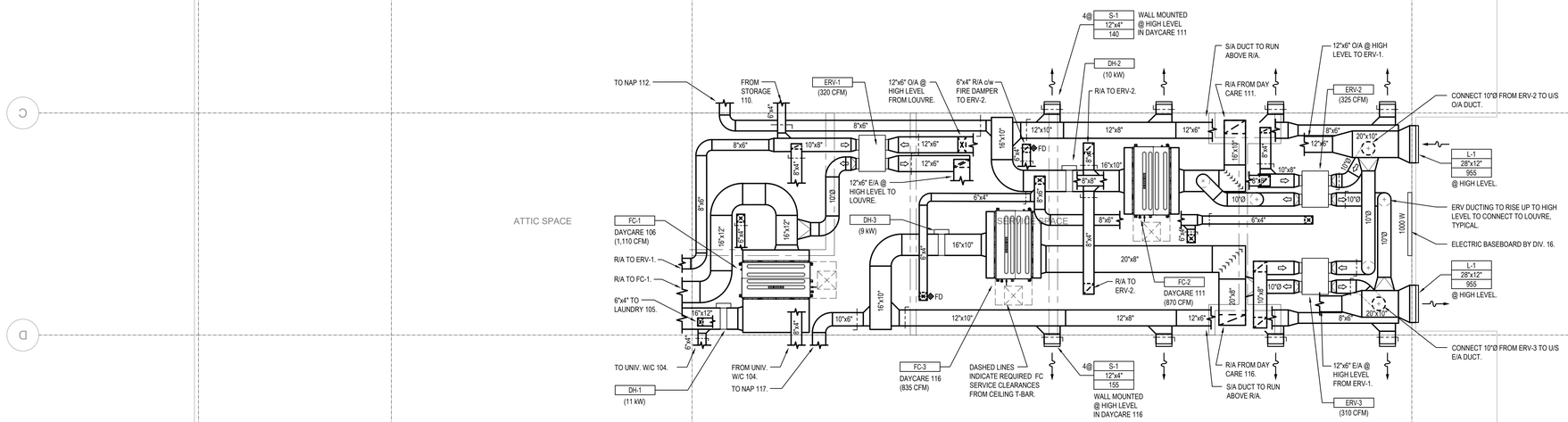
TITLE:
HVAC FLOOR PLAN

DRAWN:	PF	DRAWING Nº:	M1.03
SCALE:	1/4" = 1'-0		
JOB Nº:	25539		
DATE:	MAY 2026	REV. Nº:	D



GENERAL NOTES:

1. HANG FC'S & ERV'S @ LOW LEVEL IN SERVICE SPACE TO BE EASILY ACCESSED THROUGH CEILING T-BAR.

1 MECHANICAL SERVICE SPACE & ATTIC PLAN
Scale: 1/4" = 1'-0"

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PROJECT:
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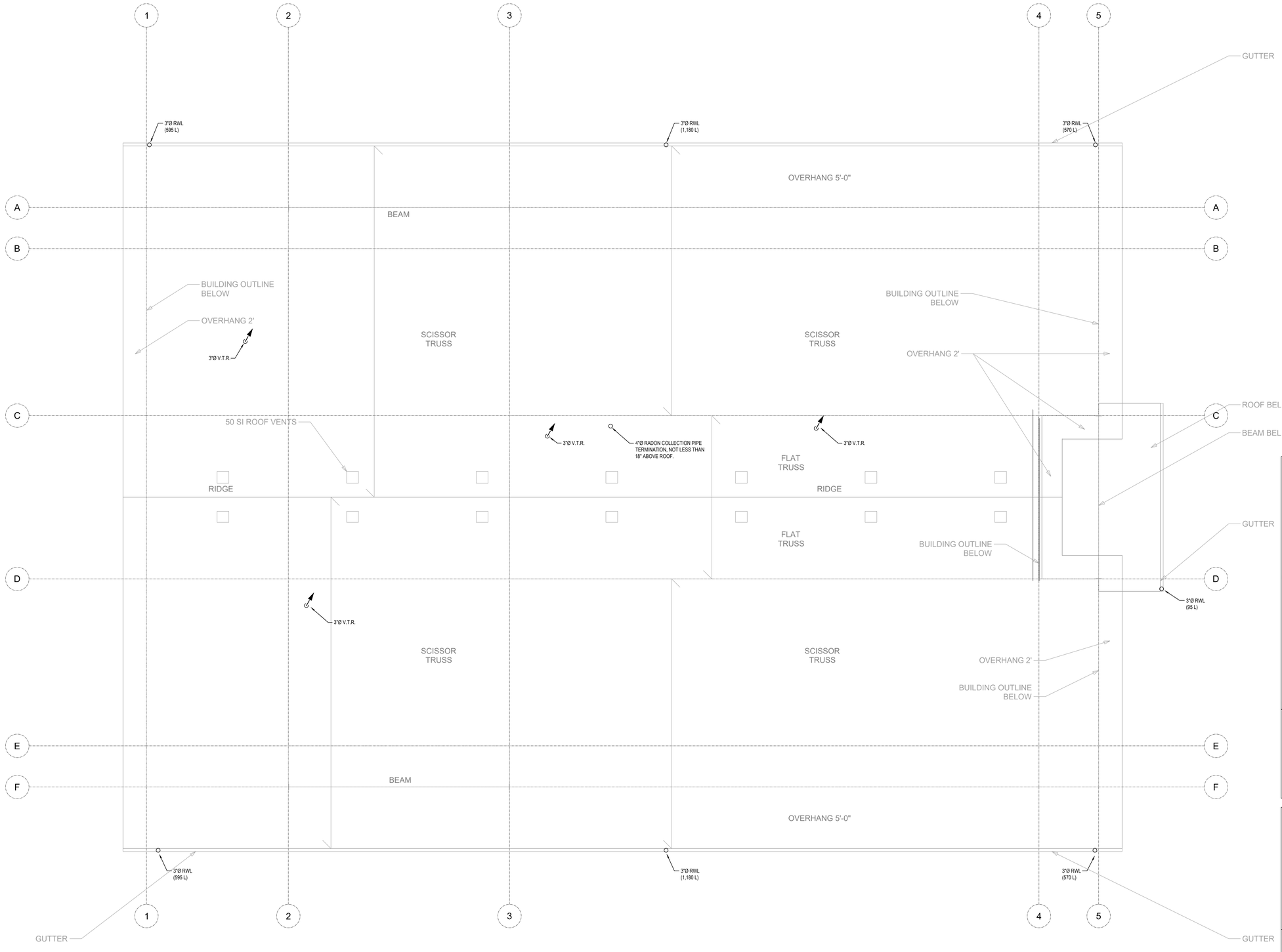
TITLE:
MECHANICAL SERVICE SPACE & ATTIC PLAN

DRAWN:	PF	DRAWING N°:	M1.04
SCALE:	1/4" = 1'-0		
JOB N°:	25539		
DATE:	MAY 2026	REV. N°:	D



1 MECHANICAL ROOF PLAN
Scale: 1/4" = 1'-0"

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TITLE:
MECHANICAL ROOF PLAN

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JOB N°: 25539	
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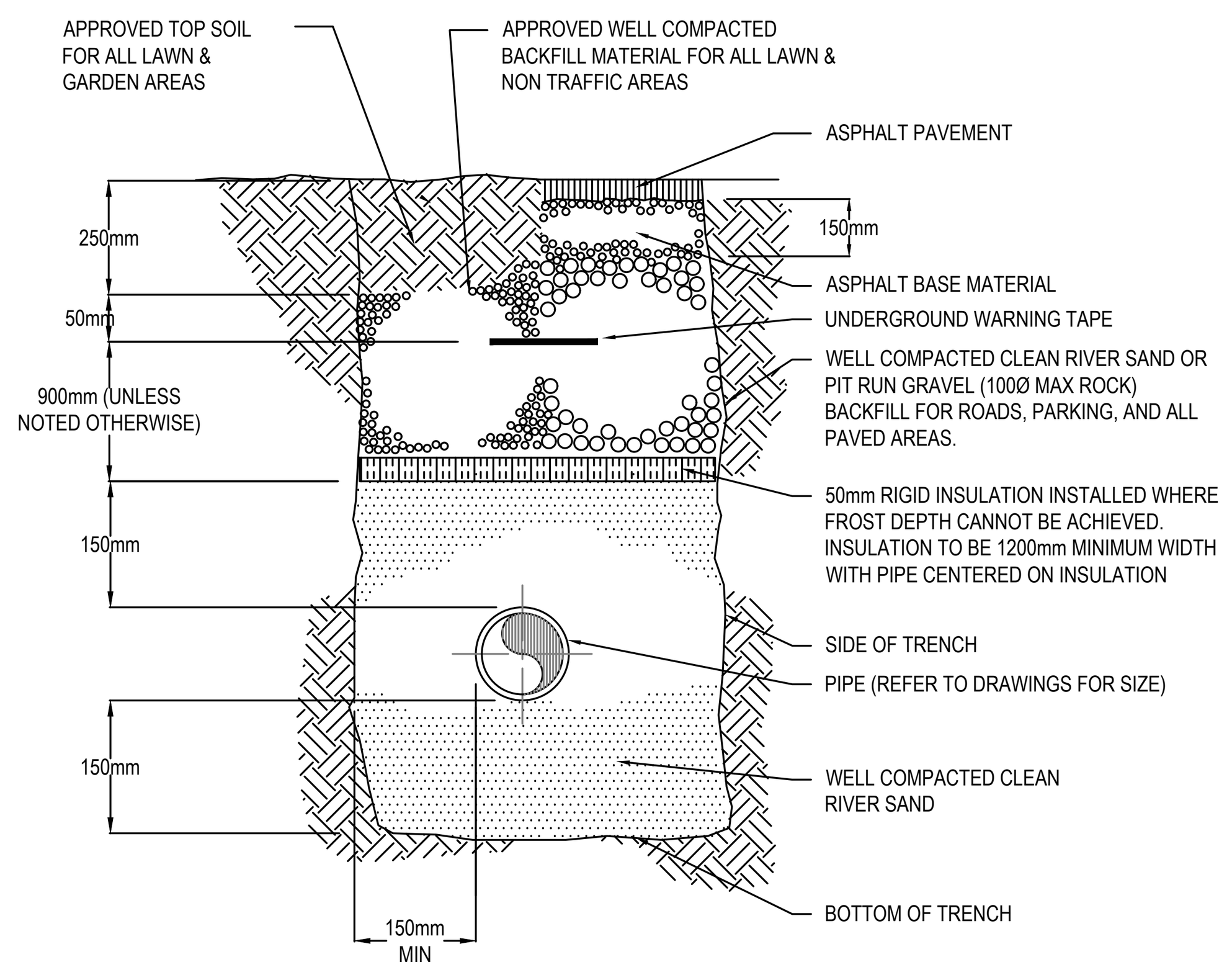
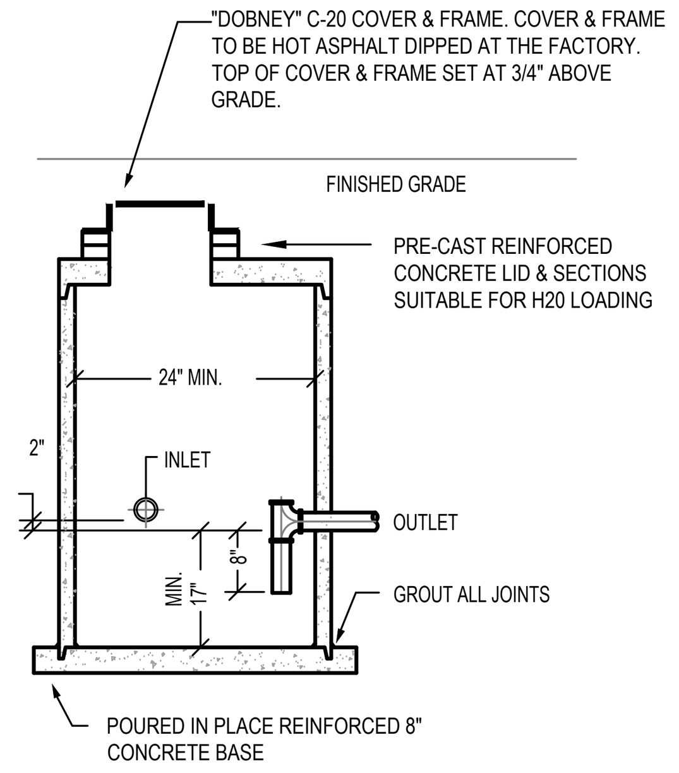
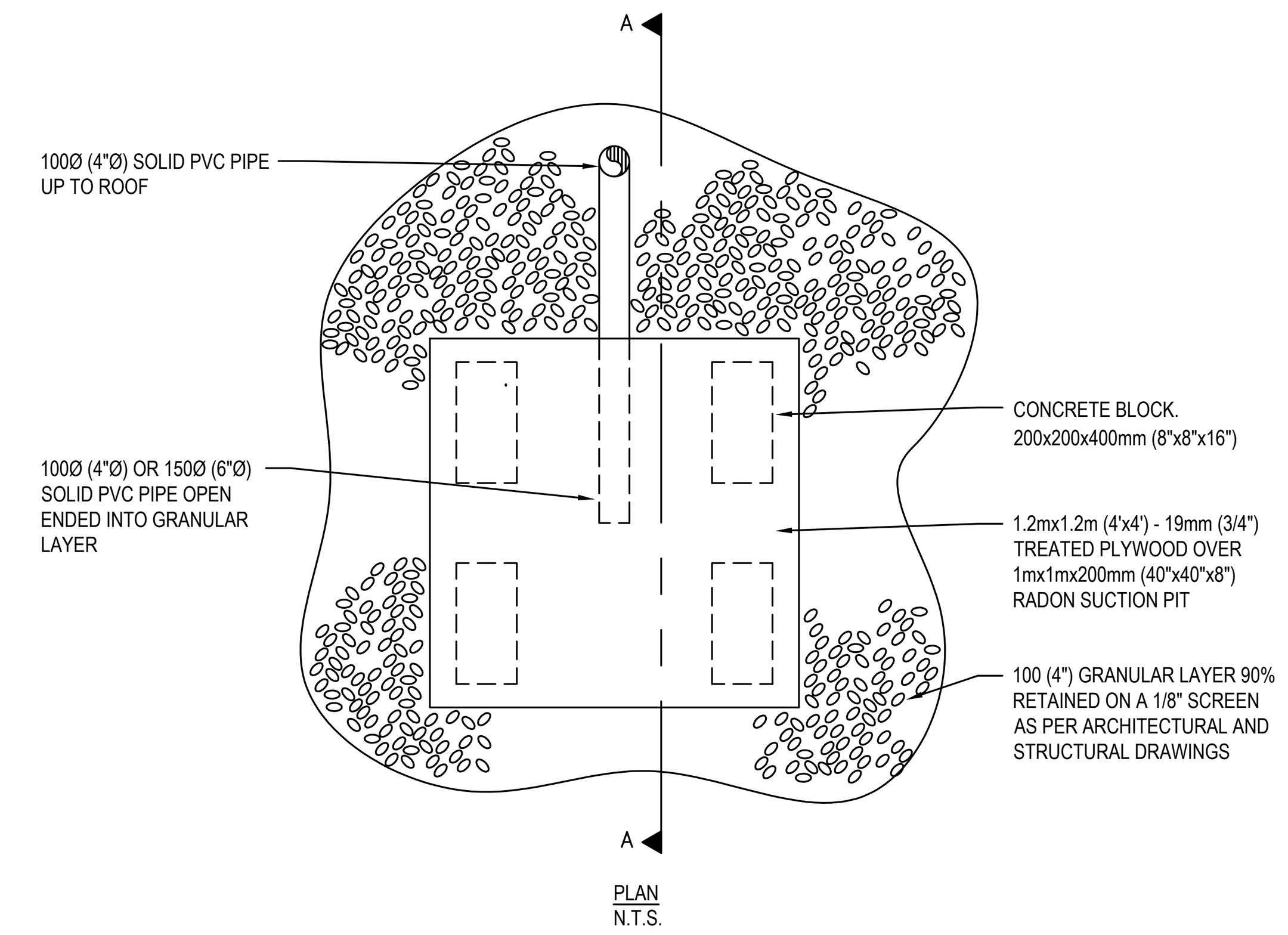


WATER PIPE BEDDING DETAIL
N.T.S.

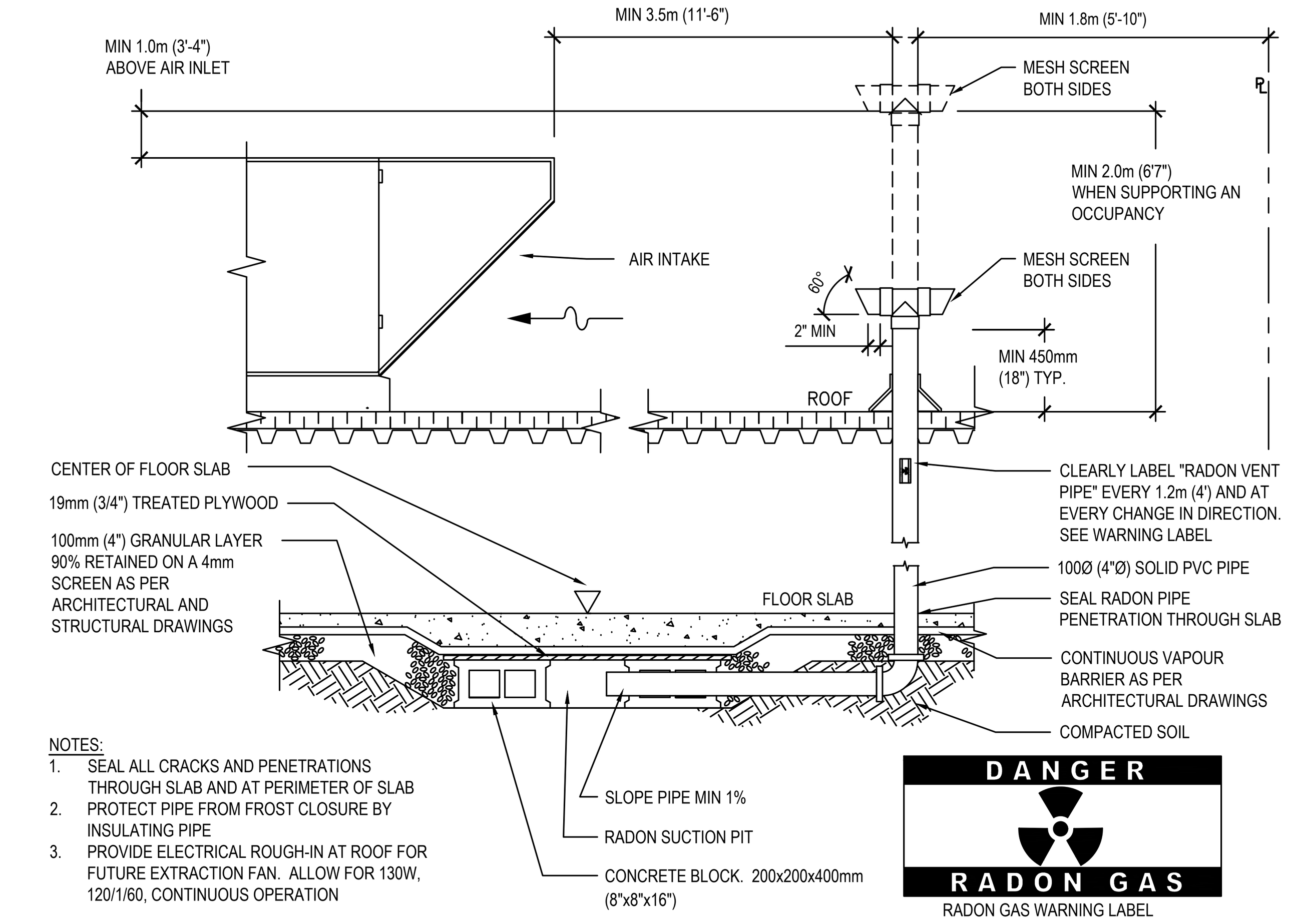


NOTE :
1. FOR SUMPS LESS THAN 48" TOTAL DEPTH, MIN. 24" DIA.
2. FOR SUMPS EXCEEDING 48" DEPTH, MIN. 30" DIA.
3. SUMP TO BE c/w BACKWATER VALVE.

SEDIMENT SUMP DETAIL
N.T.S.



RADON DEPRESSURIZATION SYSTEM DETAIL
N.T.S.



NOTES:
1. SEAL ALL CRACKS AND PENETRATIONS THROUGH SLAB AND AT PERIMETER OF SLAB
2. PROTECT PIPE FROM FROST CLOSURE BY INSULATING PIPE
3. PROVIDE ELECTRICAL ROUGH-IN AT ROOF FOR FUTURE EXTRACTION FAN. ALLOW FOR 130W, 120/1/60, CONTINUOUS OPERATION

SECTION A-A - RADON DEPRESSURIZATION SYSTEM DETAIL
N.T.S.

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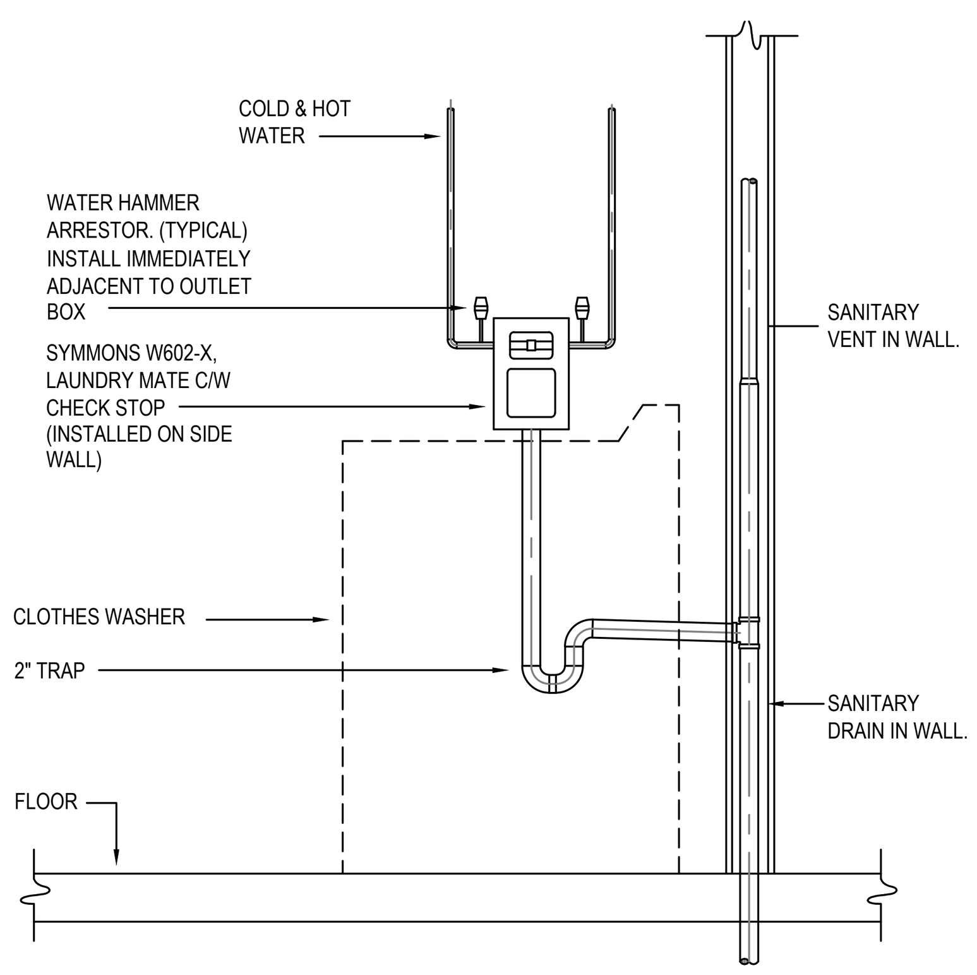
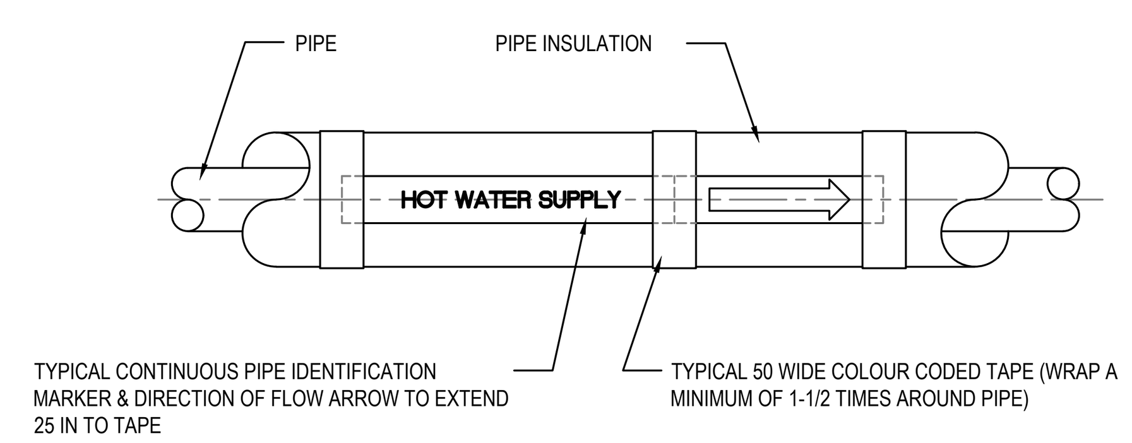


CLOTHES WASHER OUTLET BOX DETAIL
N.T.S.

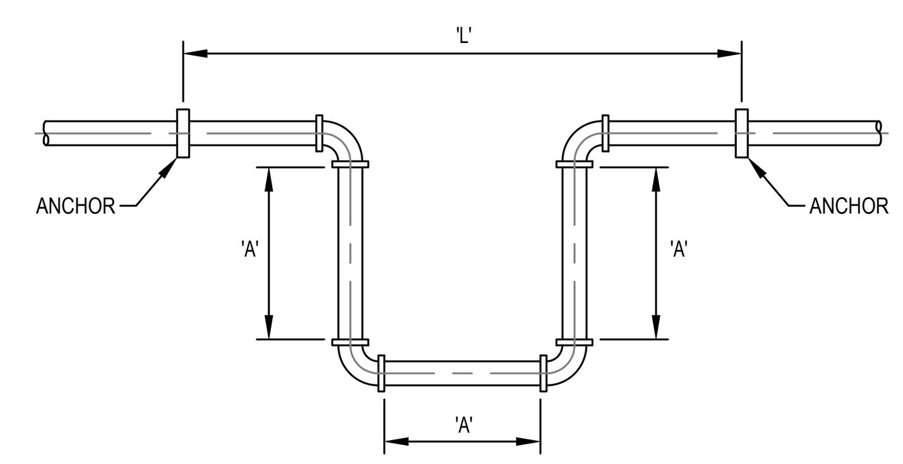


NOTES
APPLY A CONTINUOUS COATING OF CONTACT CEMENT TO THE LABEL TO ENSURE PERMANENT ADHESION

REFER TO SPECIFICATION FOR COLOUR CODING OF SERVICES

INSTALL AT 15000 INTERVALS (MAXIMUM) AND AT EACH CHANGE DIRECTION.

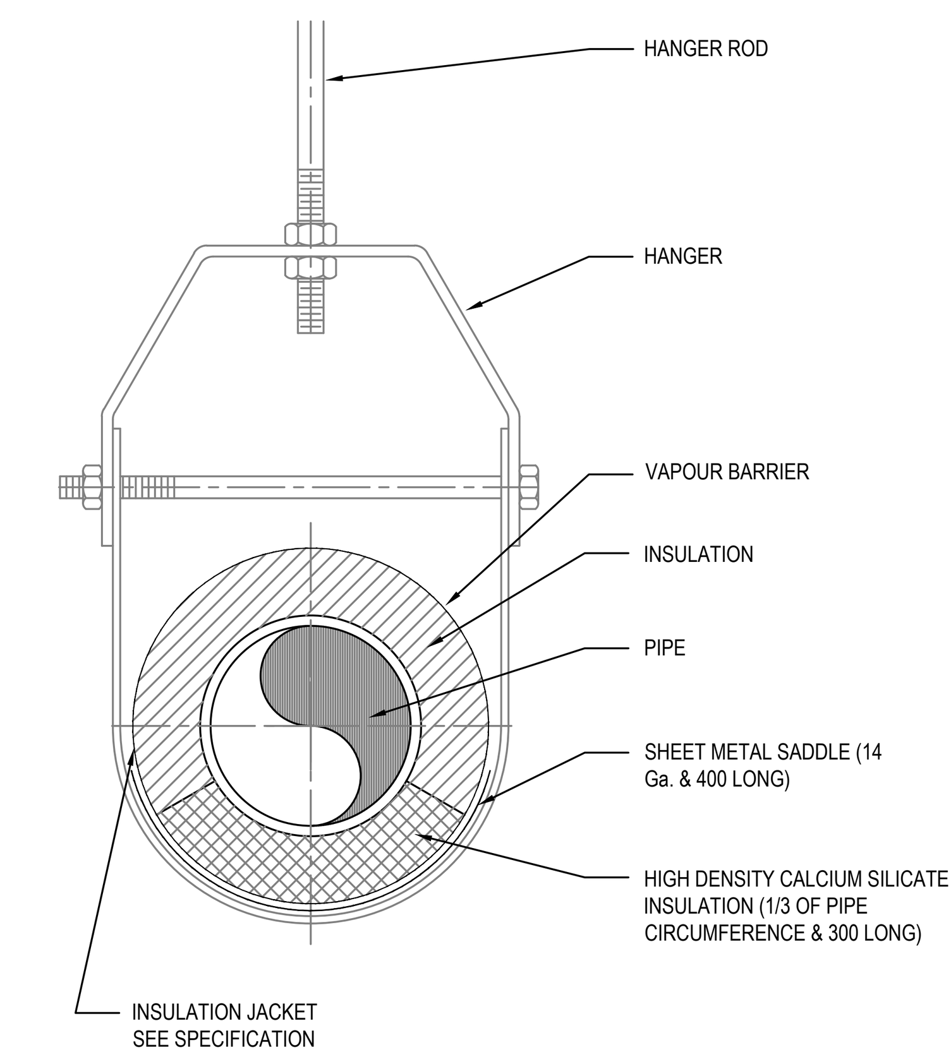
PIPE IDENTIFICATION DETAIL
N.T.S.



LOOP SIZE REQUIRED FOR LENGTH BETWEEN ANCHORS	
PIPE SIZE (in.)	LENGTH 'A' (in.)
1/2"	12"
3/4"	24"
1"	30"
1-1/4"	30"
1-1/2"	33"
2"	40"
2-1/2"	44"
3"	48"
4"	58"
6"	64"

DETAIL NOTES:
1. FOR COPPER PIPE THE MAXIMUM LENGTH OF 'L'= 100'. FOR STEEL PIPE THE MAXIMUM LENGTH OF 'L' = 150'.
2. IF THE LENGTH BETWEEN ANCHORS IS 1/2 OF THE LENGTH GIVEN ABOVE THEN MULTIPLY LOOP SIZES BY 2/3.

EXPANSION LOOP DETAIL
N.T.S.



INSULATED PIPE HANGER DETAIL
N.T.S.

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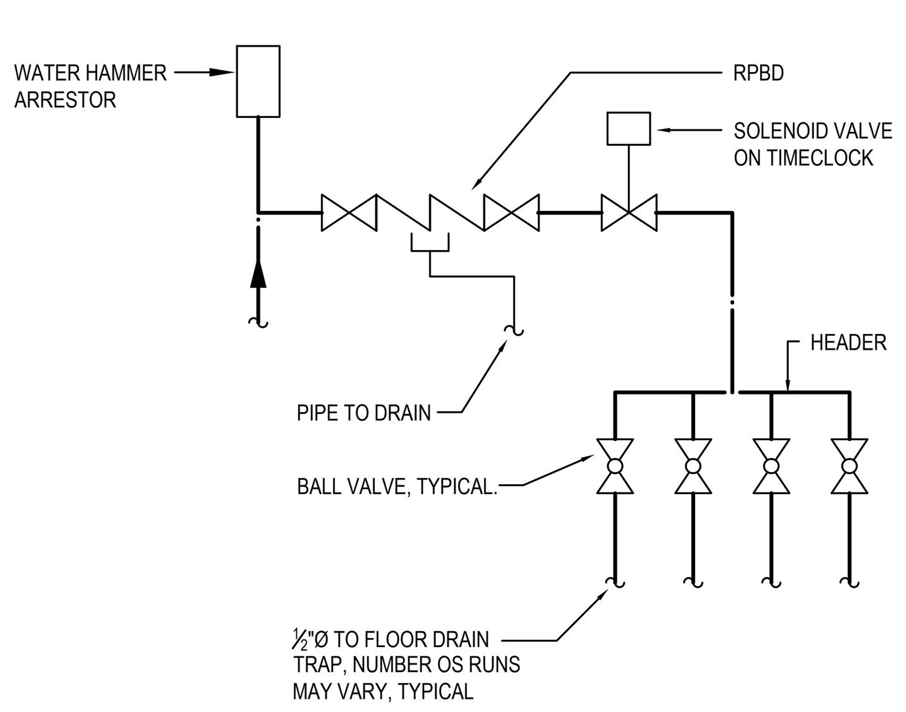
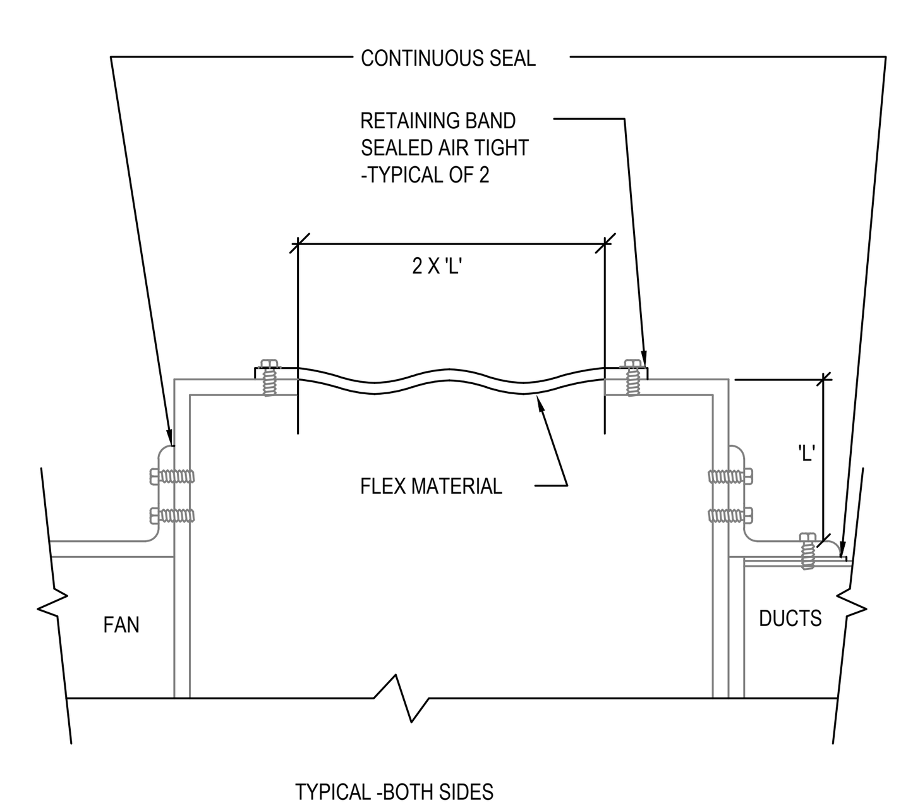
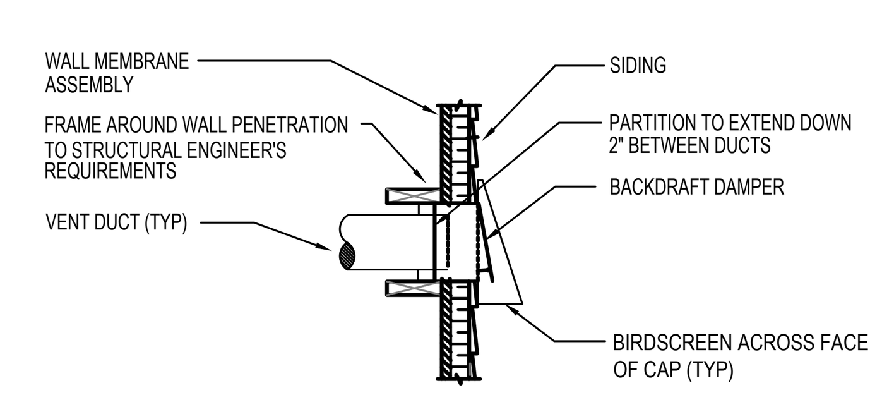


TRAP PRIMER DETAIL
N.T.S.

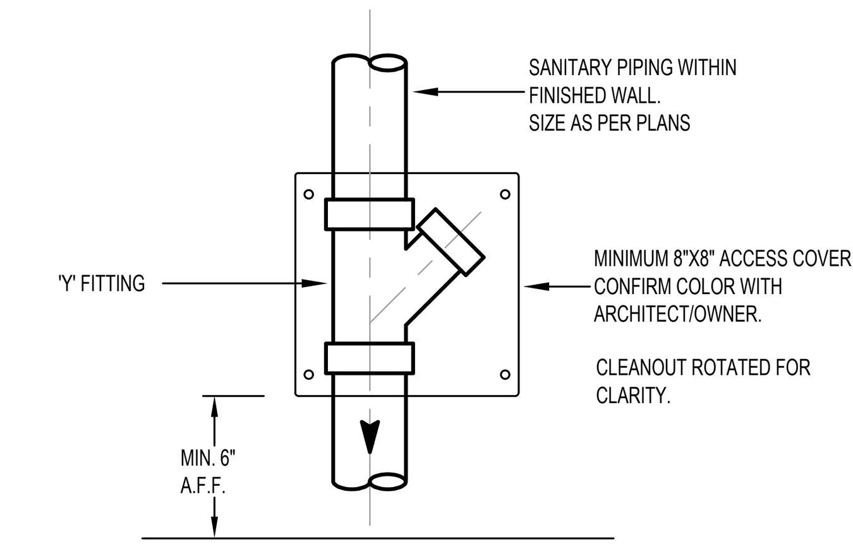


FAN/DUCT FLEXIBLE CONNECTION DETAIL
N.T.S.



NOTES:
1. WALL CAP SHALL BE PRIMEX WC SERIES SIZED TO MATCH DUCT.
2. ALL DUCTS ARE TO ATTACH DIRECTLY TO THE WALL CAP.
3. BIRDSCREEN IS TO COVER THE BOTTOM OF THE OUTLET FOR THE WASHROOM, & KITCHEN EXHAUST ONLY.
4. OUTLET MUST BE REMOVABLE & CLEANED REGULARLY TO ENSURE THE CAP DOES NOT PLUG WITH LINT ON DRYER APPLICATIONS.
5. ROLL OR FOLD ALL UNSUPPORTED SHEET METAL EDGES.
6. REFER TO ARCHITECTS DWGS FOR BUILDING ENCLOSURE DETAILING REQUIREMENTS.

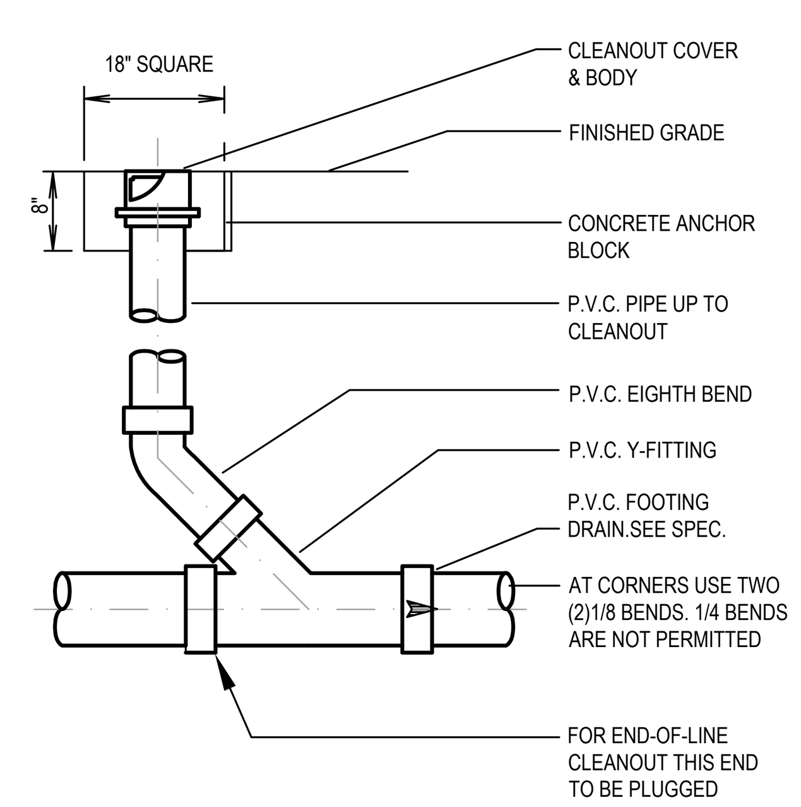
EXHAUST WALL CAP DETAIL
N.T.S.



NOTE:
CLEANOUTS TO BE INSTALLED IN CONCEALED LOCATIONS WHEREVER POSSIBLE. (IE. CABINETS, BEHIND COUNTERS, ETC.)

IN FINISHED AREAS WHERE THIS IS NOT ACHIEVABLE,CONSULT WITH MECHANICAL ENGINEER PRIOR TO INSTALLATION.

WALL CLEAN OUT DETAIL
N.T.S



CLEANOUT TO GRADE DETAIL
N.T.S.

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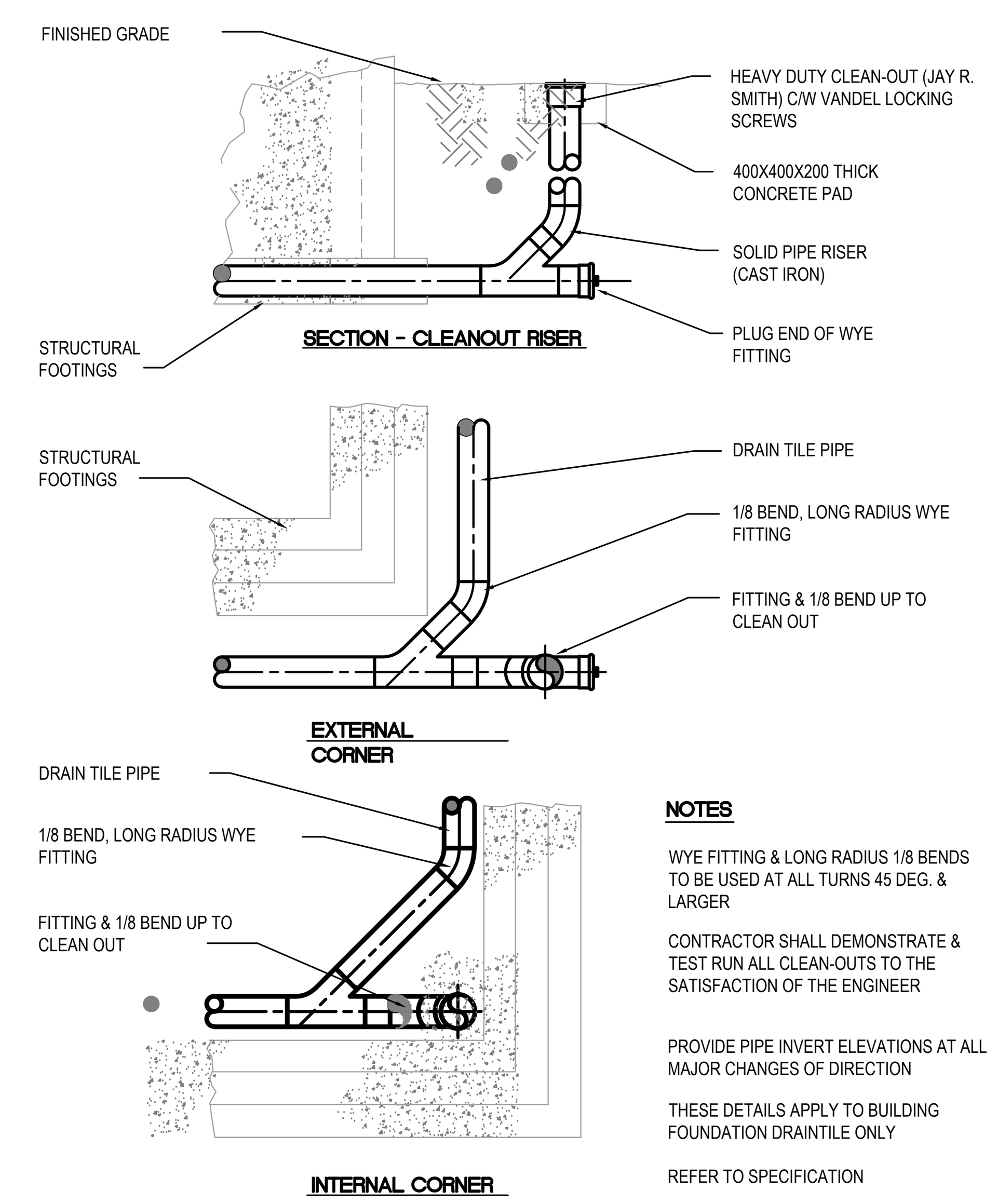
PROJECT:
UNICORN DAYCARE

TITLE:
MECHANICAL DETAILS

DRAWN: PF	DRAWING Nº: M2.01
SCALE: N.T.S.	
JOB Nº: 25539	
DATE: MAY 2026	REV. Nº: D



NOTES

WYE FITTING & LONG RADIUS 1/8 BENDS TO BE USED AT ALL TURNS 45 DEG. & LARGER

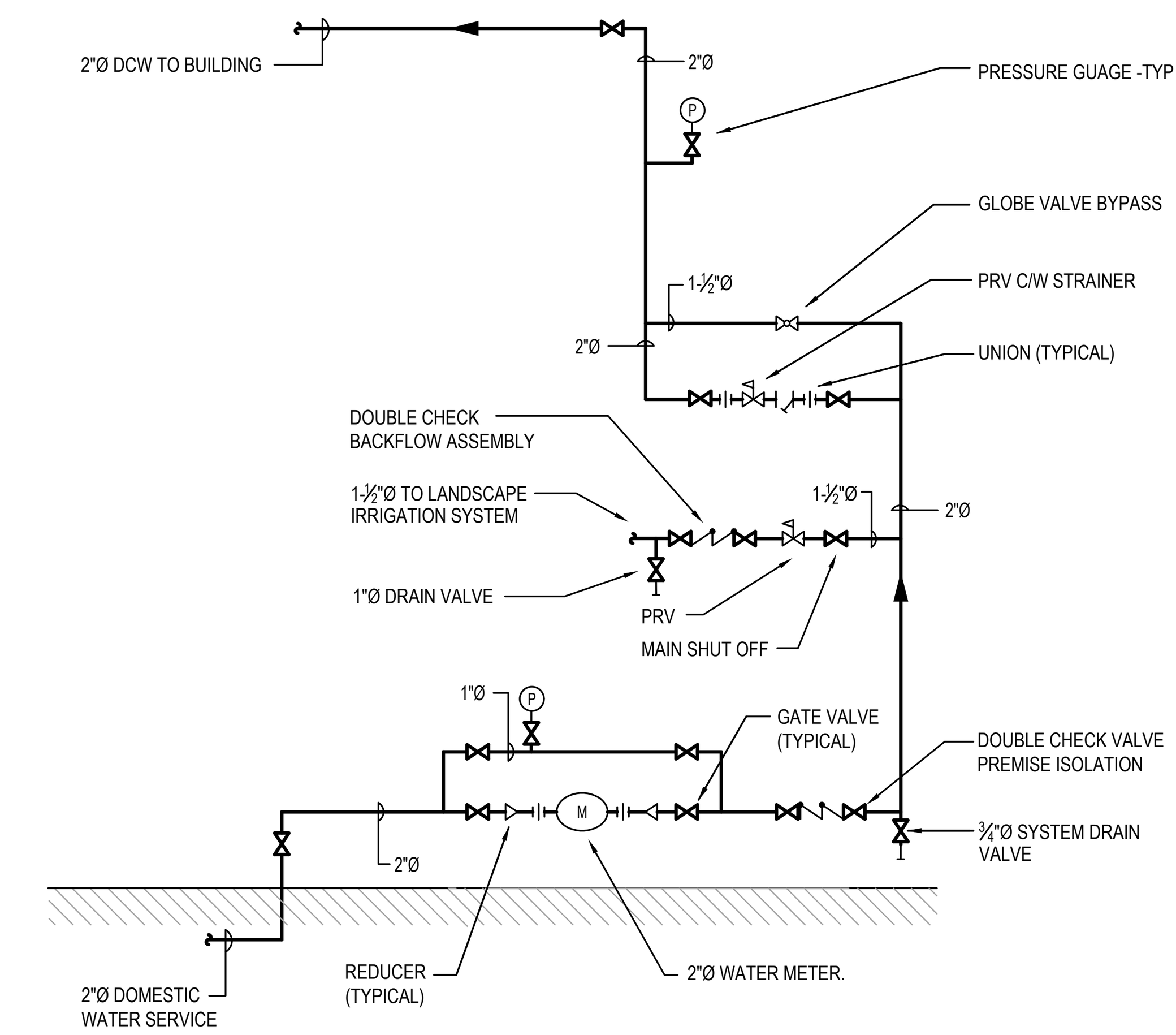
CONTRACTOR SHALL DEMONSTRATE & TEST RUN ALL CLEAN-OUTS TO THE SATISFACTION OF THE ENGINEER

PROVIDE PIPE INVERT ELEVATIONS AT ALL MAJOR CHANGES OF DIRECTION

THESE DETAILS APPLY TO BUILDING FOUNDATION DRAINTILE ONLY

REFER TO SPECIFICATION

EXTERIOR CLEANOUT DETAIL
N.T.S.



COMBINED WATER ENTRY STATION DETAIL
N.T.S.

Association of Professional Engineers and Geoscientists of the Province of British Columbia
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PROFESSIONAL LICENSEE ENGINEERING
Licence 51314
2026-08-24

PERMIT TO PRACTICE: 1000700

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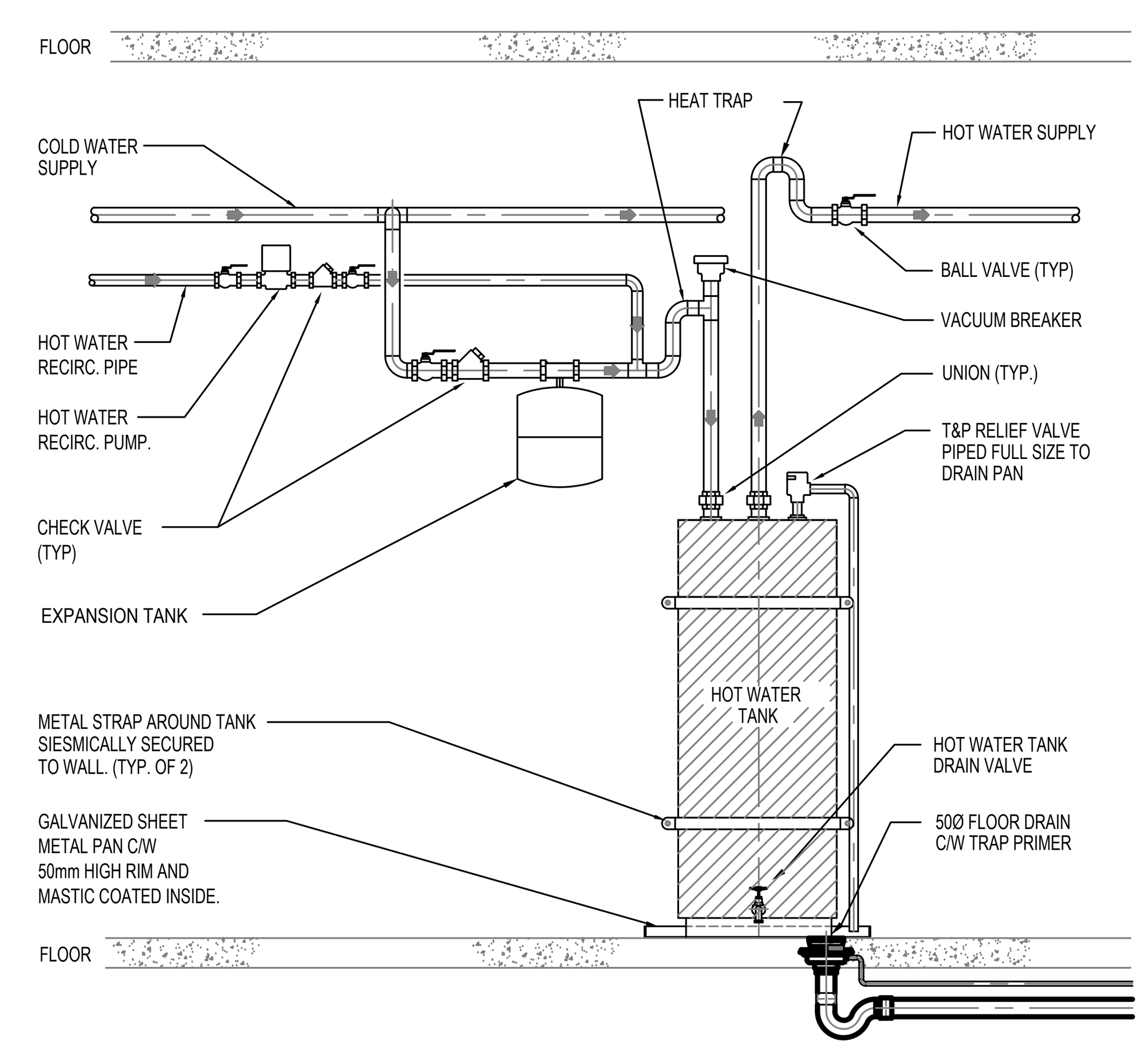
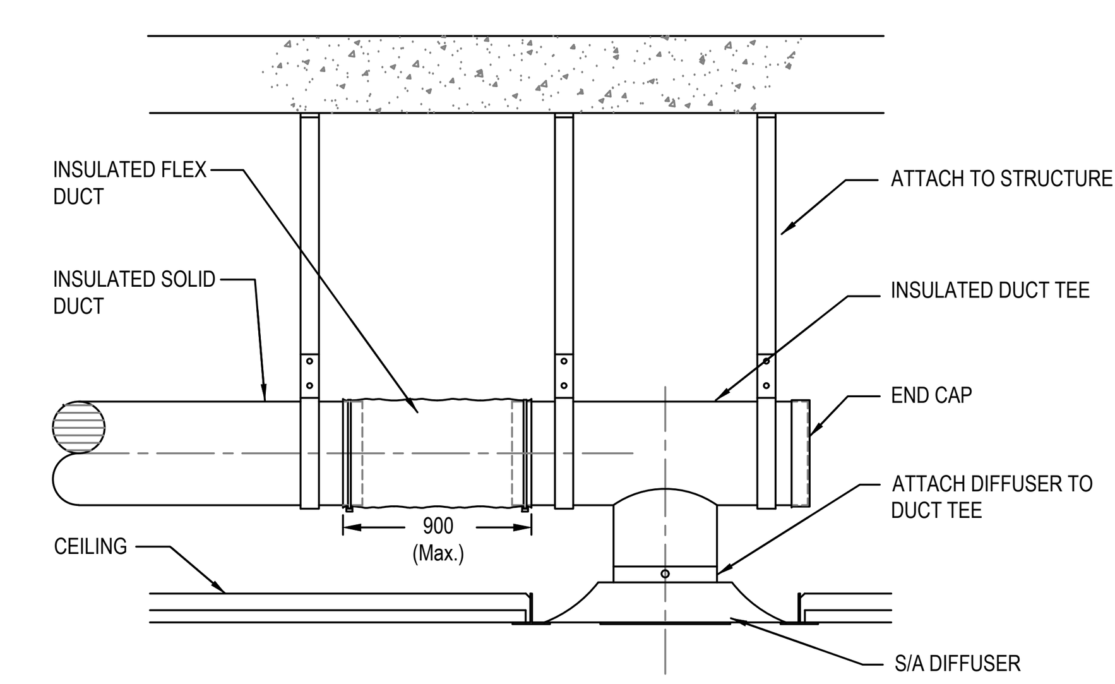


DOMESTIC HOT WATER TANK DETAIL
N.T.S.

NOTE: SEISMIC RESTRAINTS AS PER SPECIFICATIONS



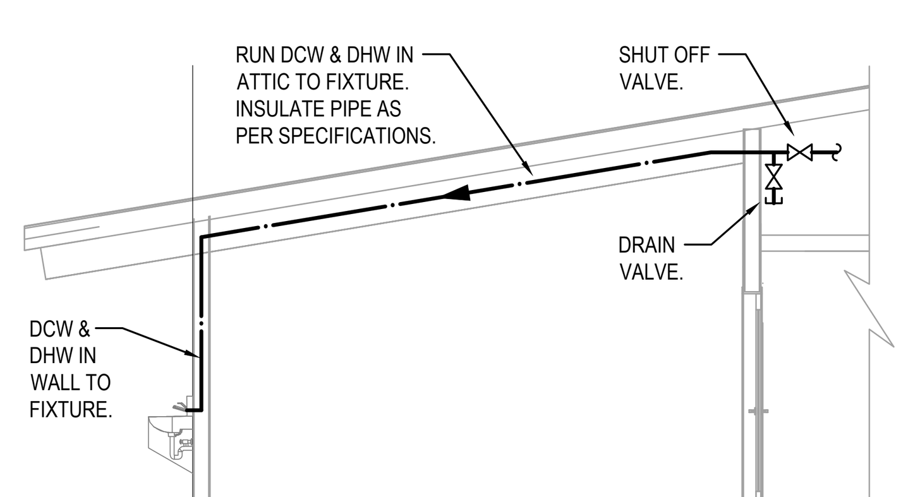
S/A DIFFUSER DETAIL
N.T.S.

REVISIONS:

D	2026/08/25	ISSUE FOR TENDER
C	2026/07/31	90% COORDINATION
B	2026/07/04	ISSUED FOR BUILDING PERMIT
A	2026/06/19	50% REVIEW SET

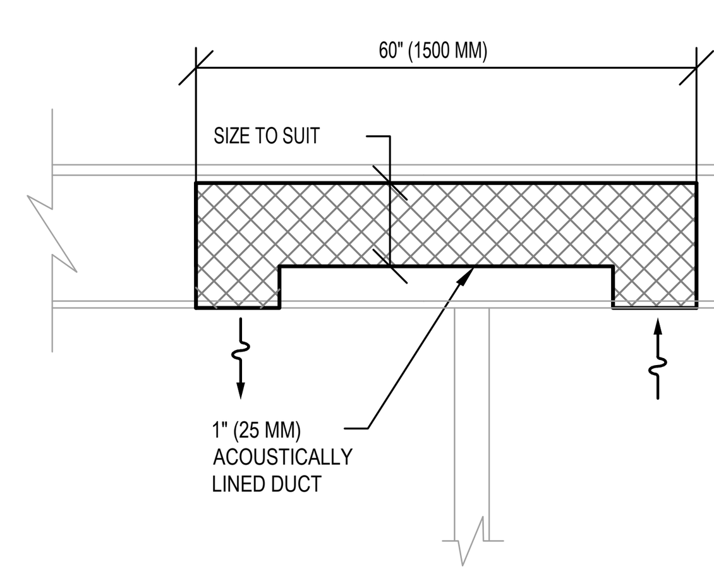
ISSUES:

DIMENSIONS:
THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, AND IMMEDIATELY REPORT ANY ERRORS AND/OR OMISSIONS. DO NOT SCALE DRAWINGS.

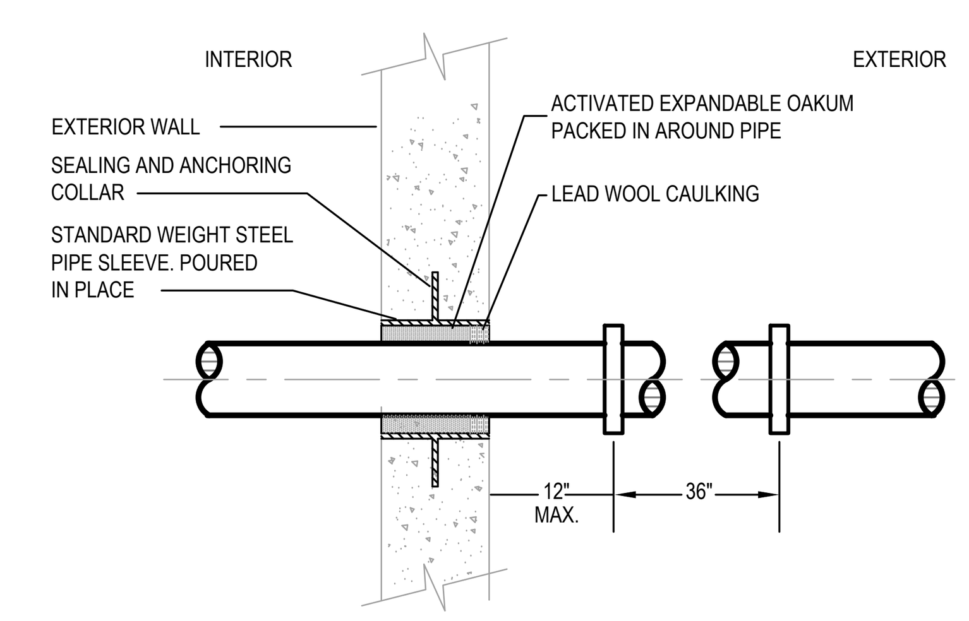


NOTES:
OUTDOOR SINK TO BE WINTERIZED. CLOSE SHUT-OFF VALVE, OPEN TAPS & BLOW OUT WATER LINE FROM DRAIN VALVE.

DOMESTIC WATER RUN IN ATTIC SPACE DETAIL
N.T.S.



RETURN AIR BOOT DETAIL
N.T.S.



NOTES:

EXCAVATE AND INSTALL EXTERIOR PIPING ONLY AFTER BACKFILLING TO GRADE HAS BEEN COMPACTED TO 85% MODIFIED PROCTOR DENSITY.

REFER TO GEOTECHNICAL CONSULTANT SOILS REPORT. POVIDE FLEXIBLE PIPE FITTING AT WALL PENETRATION IF DIFFERENTIAL SETTLEMENT IS EXPECTED.

EXTERIOR WALL PIPE SEAL
N.T.S.

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PROJECT:
UNICORN DAYCARE

TITLE:
MECHANICAL DETAILS

DRAWN: PF	DRAWING Nº: M2.02
SCALE: N.T.S.	
JOB Nº: 25539	
DATE: MAY 2026	REV. Nº: D

PUMP SCHEDULE

UNIT NUMBER	MANUFACTURER	MODEL	DUTY	PUMP CAPACITY (GPM)	PUMP HEAD (FT.)	MOTOR HP	MOTOR V/PH/HZ	SHIPPING WEIGHT	REMARKS
HWRP-1	GRUNDFOS	UPS 26-96 SF	DOMESTIC WATER RECIRC	5	20	1.7 A	120/1/60	12.5	1,2

1. COMPLETE WITH FLOW RATE AND PRESSURE DROP DATA STAMPED ON NAME PLATE
2. ALL BRONZE OR SS CONSTRUCTION
3. FLANGED PUMP CONNECTIONS
4. BRONZE IMPELLER, FULLY ENCLOSED, KEYED TO SHAFT
5. CARBON ROTATING SEAL AGAINST A STATIONARY CERAMIC SEAT
6. SUCTION DIFFUSER c/w STAINLESS STEEL STRAINER AND STABILIZING GUIDE VANES, FLANGED CONNECTIONS
7. TRIPLE DUTY VALVE c/w NON SLAM CHECK AND EFFECTIVE THROTTLING WITH FLOW MEASUREMENT CAPABILITY, FLANGED CONNECTIONS
8. HIGH GRADE HEAT TRACED CAST IRON BASEPLATE
9. DRIP PROOF, RESILIENT MOUNT, SLEEVE BEARING MOTOR
10. FOUR LIQUID LEVEL SWITCH IN WATER PROOF FLOAT BULBS WITH SUPPORT WIRING CHANNEL
11. CEMA 1 SINGLE PACKAGED DUPLEX CONTROL PANEL WITH CIRCUIT BREAKERS, REMOTE ALARM PANEL, 24 VOLT CONTROL CIRCUIT TRANSFORMER ELECTRIC ALTERNATOR, RUN LIGHTS, VANDAL PROOF COVER, MAGNETIC STARTERS HAND-OFF-AUTO SELECTOR SWITCHES
12. OIL RESISTANT POWER CORD, REMOTE HIGH WATER AND OVERLOAD ALARM, CHECK VALVES
13. SUPPORT PUMP FROM ADJACENT PIPING
14. PUMP SUITABLE FOR FLUIDS OF 110°C (230° F)
15. 40% PROPYLENE GLYCOL
16. VARIABLE FREQUENCY DRIVE

ELECTRIC HEAT SCHEDULE

UNIT	MANUFACTURER	MODEL	AREA SERVED	CAPACITY WATTS	DUCT STAT SETPOINT (°F)	V	Ph	Hz	REMARKS
DH-1	THERMOLEC	FC-11-12x16-208-3-2	FC-1 AUX HEAT	11 kW	N/A	208	3	60	7,8
DH-2	THERMOLEC	FC-10-10x16-208-3-2	FC-2 AUX HEAT	10 kW	N/A	208	3	60	7,8
DH-3	THERMOLEC	FC-9-10x16-208-3-2	FC-3 AUX HEAT	9 kW	N/A	208	3	60	7,8

REMARKS:

1 WALL MOUNTED
2 CEILING MOUNTED
3 FULLY RECESSED
4 SEMI RECESSED
5 SURFACE INSTALL
6 WALL T'STAT
7 INTERFACE WITH FAN COIL TSTAT
8 SCR CONTROLLER
9 DISCHARGE AIR TEMP SENSOR (INTERFACE W/ SCR CONTROLLER)

MOTOR LIST

ABBREVIATIONS:
M=Mechanical DIV 15
E=Electrical DIV 16
B.A.S.= Building Automation System
C.C.F.=Firefighters Central Control Facility
EMERG. PWR.=Emergency Power

STARTERS:
VSD=Variable speed drive
MG=Magnetic starter (HOA)
MN=Manual starter
INT=Integral
RL=Relay

PILOT DEVICES:
F=Float Switch
T=Thermostat
P=Pressure Switch
C=Time Clock
I=Interlock
S=Manual Switch
ET-Electronic Thermostat
FA-Fire Alarm
O=Other
GS= Gas Sensor
B = Building Automation System

SPECIAL INSTRUCTIONS
1.All starters to be magnetic H.O.A. unless otherwise specified
2.A terminal section shall be provided with all MCC's & wired in accordance with standard detail drawing

UNIT No.	UNIT DESCRIPTION	LOCATION or ROOM NUMBER	V.	PH	CY	LOAD	STARTER TYPE	STARTER SUPPLIED	STARTER INSTALLED	STARTER WIRED	DISCONN SUPPLIED	DISCONN INSTALLED	DISCONN WIRED	PILOT DEVICE TYPE	PILOT DEVICE SUPPLIED	PILOT DEVICE INSTALLED	PILOT DEVICE WIRED	REMARKS
ERV-1	Energy Recovery Unit	Service Space Ceiling	120	1	60	220 W, 15 MCA, 15 MOCP	INT	M	M	E	E	E	E	S	M	E	E	Continuous OperationDuring Occupied Hours
ERV-2	Energy Recovery Unit	Service Space Ceiling	120	1	60	220 W, 15 MCA, 15 MOCP	INT	M	M	E	E	E	E	S	M	E	E	Continuous OperationDuring Occupied Hours
ERV-3	Energy Recovery Unit	Service Space Ceiling	120	1	60	220 W, 15 MCA, 15 MOCP	INT	M	M	E	E	E	E	S	M	E	E	Continuous OperationDuring Occupied Hours
DH-1	Duct Heater, FC-1 Aux Heat	Service Space Ceiling	208	3	60	11 kW					E	E	E	T	M	M	E	SCR Controller & Interface w/ FC-1 Tstat
DH-2	Duct Heater, FC-2 Aux Heat	Service Space Ceiling	208	3	60	10 kW					E	E	E	T	M	M	E	SCR Controller & Interface w/ FC-2 Tstat
DH-3	Duct Heater, FC-3 Aux Heat	Service Space Ceiling	208	3	60	9 kW					E	E	E	T	M	M	E	SCR Controller & Interface w/ FC-3 Tstat
HWT-1	Domestic Hot Water Tank	Mechanical 119 Room	208	1	60	15 kW	INT	M	M	E	E	E	E	S	M	E	E	
HWRP-1	Hot Water Recirc Pump	Mechanical 119 Room	120	1	60	1.7 A, 205 W, 0.275 HP	INT	M	M	E	E	E	E	S	E	E	E	Continuous Operation
EF-1	Exhaust Fan	Electrical Room 118 Ceiling	120	1	60	0.29 FLA	INT	M	M	E	E	E	E	T	E	E	E	Wire to R/A TSTAT
HP-1	Heat Pump	Outside on Pad	208	1	60	MCA 27.6, MOCP 30	INT	M	M	E	E	E	E	T	M	E	E	Unit Serves FC-1
HP-2	Heat Pump	Outside on Pad	208	1	60	MCA 26.7, MOCP 30	INT	M	M	E	E	E	E	T	M	E	E	Unit Serves FC-2
HP-3	Heat Pump	Outside on Pad	208	1	60	MCA 26.7, MOCP 30	INT	M	M	E	E	E	E	T	M	E	E	Unit Serves FC-3
FC-1	Fan Coil	Service Space Ceiling	208	1	60	Powered by Outdoor Unit	INT	M	M	E	E	E	E	T	M	E	E	Remote T'STAT, Interface Tstat w/ DH-1
FC-2	Fan Coil	Service Space Ceiling	208	1	60	Powered by Outdoor Unit	INT	M	M	E	E	E	E	T	M	E	E	Remote T'STAT, Interface Tstat w/ DH-2
FC-3	Fan Coil	Service Space Ceiling	208	1	60	Powered by Outdoor Unit	INT	M	M	E	E	E	E	T	M	E	E	Remote T'STAT, Interface Tstat w/ DH-3
FF-1*	Force Flow Heater	Hall 101 Wall				4 kW					E	E	E	T	E	E	E	On Unit
BB*	Baseboard Heater	Various				Refer to Elect & Mech Drawings					E	E	E	T	E	E	E	Wire to Tstat
*EF	Rough-In for future Radon EF	Attic at Radon pipe location	120	1	60	130 W					E	E	E					

Additional Instructions:
* Equipment supplied by Div. 16.

FAN SCHEDULE

UNIT NUMBER	MANUFACTURER	MODEL	DUTY	CAPACITY (CFM)	S.P. W.C.	SONES	MOTOR RPM	MOTOR LOAD	MOTOR V/PH/Hz	WEIGHT (LBS)	REMARKS
EF-1	GREENHECK	SP-LP0810W	ELECTRICAL ROOM 118	100	0.2	1.3	894	0.29 FLA	120/1/60	8	4,5,13,14,16

REMARKS

1. WIRE TO WALL SWITCH
2. OCCUPANCY SENSOR /LIGHT SWITCH
3. WIRE TO VARIABLE SPEED SWITCH
4. WIRE TO REV.-ACTING T-STAT
5. BACKDRAFT DAMPERS
6. ACOUSTIC LINED CABINETS
7. EXPLOSION PROOF MOTOR
8. HIGH EFFICIENCY MOTOR
9. EPOXY COATED WHEEL AND B.D.D.
10. FACTORY LIGHT
11. 7" ROUND CONNECTION
12. NFPA-96 FOOD SERVICE INSTALLATION
13. POLYPROPYLENE CONSTRUCTION
14. DISCONNECT SWITCH
15. WIRE TO TIMECLOCK CONTROL
16. PRIMEX WALL CAP
17. CO / GAS DETECTOR CONTROL
18. LINT TRAP
19. HEAT SENSOR CONTROL
20. FANTECH 7" LD DUCT SILENCER
21. SOLID STATE SPEED CONTROL
22. MOTOR GUARD
23. FAN TO RUN CONTINUOUSLY AT LOW SPEED
24. CONTINUOUS OPERATION
25. UPBLAST DISCHARGE.
26. C/W WEATHERHOOD
27. C/W ACCESS DOOR
28. C/W 1" DRAIN CONNECTION
29. INTERLOCK W/ MOTORIZED DAMPER
30. INTERLOCK W/ KITCHEN MAKE-UP AIR UNIT
31. NO ALTERNATE ACCEPTED
32. DDC CONTROL

FANCOIL UNIT SCHEDULE

UNIT NUMBER	MANUFACTURER	MODEL	DUTY	NOMINAL COOLING CAPACITY	COOLING RANGE BTUH	NOMINAL HEATING CAPACITY	HEATING RANGE BTUH	VOLTAGE V/PH/HZ	AIR FLOW CFM	WEIGHT LBS	REMARKS
FC-1	SAMSUNG	AC036DNHDCG	DAYCARE A SPACES	36,000	11,000-43,000	40,000	9,000-54,000	208/1/60	1,110	98.1	1,2,3,4,5
FC-2	SAMSUNG	AC030DNHDCG	DAYCARE B SPACES	30,000	9,000-36,000	34,000	8,000-47,000	208/1/60	870	98.1	1,2,3,4,5
FC-3	SAMSUNG	AC030DNHDCG	DAYCARE C SPACES	30,000	9,000-36,000	34,000	8,000-47,000	208/1/60	835	98.1	1,2,3,4,5

REMARKS:

1. DERATED COOLING CAPACITY BASED ON OUTDOOR TEMP 95 (°F DB), INDOOR TEMP 75/63 (°F DB/WB)
2. DERATED HEATING CAPACITY BASED ON OUTDOOR TEMP 42 (°F DB), INDOOR TEMP 73 (°F DB)
3. WIRED PROGRAMMABLE THERMOSTAT WITH AUXILIARY HEAT CAPABILITY
4. R32 REFRIGERANT
5. INDOOR UNIT POWERED BY OUTDOOR UNIT

ERV SCHEDULE

UNIT	MANUFACTURER	MODEL	AREA SERVED	AIR VOLUME CFM	SP "	V/Ph/Hz	POWER MOCP	POWER MCA	POWER W	WEIGHT LBS	REMARKS
ERV-1	RENEWAIRE	EV PREMIUM X	DAYCARE A SPACES	320	0.6	120/1/60	15	15.0	220	65	3, 8
ERV-2	RENEWAIRE	EV PREMIUM X	DAYCARE B SPACES	325	0.6	120/1/60	15	15.0	220	65	3, 8
ERV-3	RENEWAIRE	EV PREMIUM X	DAYCARE C SPACES	310	0.6	120/1/60	15	15.0	220	65	3, 8

REMARKS:

1 c/w DAMPER DEFROST
2 INTERLOCK RELAY
3 WASHABLE 2" MERV 13 FILTER
4 BASIC CONTROL
5 SCR CONTROLLER
6 ARCTIC DEFROST MODE
7 RECIRCULATION DEFROST
8 20 MIN. TIMER
9 PROVIDE TWO SPARE FILTERS PER ERV
10 PROVIDE 2 SPARE MERV 13 FILTER FOR EACH ERV
11 TIMECLOCK

HEAT PUMP UNIT SCHEDULE

UNIT NUMBER	MANUFACTURER	MODEL	DUTY	NOMINAL TONS	VOLTAGE V/PH/HZ	ELECT. MOCP	ELECT. MCA	WEIGHT LBS	REMARKS
HP-1	SAMSUNG	AC036DXADCG	DAYCARE A SPACES FC-1	3	208/1/60	30	27.6	168.7	1,3,4,5,6
HP-2	SAMSUNG	AC030DXADCG	DAYCARE B SPACES FC-2	2.5	208/1/60	30	26.7	156.5	1,3,4,5,6
HP-3	SAMSUNG	AC030DXADCG	DAYCARE C SPACES FC-3	2.5	208/1/60	30	26.7	156.5	1,3,4,5,6

REMARKS:

1. 100% HEATING CAPACITY DOWN TO 5°F, MINIMUM 75% CAPACITY DOWN TO -13°F
2. CAPABLE OF COOLING DOWN TO -32°F
3. PROVIDE ADVANCED PROGRAMMABLE THERMOSTAT
4. PROVIDE WIND/SNOW GUARDS AS REQUIRED
5. c/w PAN HEATER
6. OUTDOOR UNIT POWERS INDOOR UNIT

GRILLES & DIFFUSER SCHEDULE

UNIT MARK	MANUFACTURER	MODEL	SERVICE	NOMINAL SIZE	CONNECTION SIZE	FINISH	MOUNTING	REMARKS
R-1	PRICE	530D/F/L/A	RETURN	SEE DWG	SEE DWG	ARCH TO CONFIRM COLOUR	WALL/CEILING	
E-1	PRICE	530D/F/L/A	EXHAUST	SEE DWG	SEE DWG	ARCH TO CONFIRM COLOUR	DUCT	PRIMED FOR FIELD PAINTING
S-1	PRICE	520/F/L/A	SUPPLY	SEE DWG	SEE DWG	ARCH TO CONFIRM COLOUR	WALL	
WC	PRIMEX	WC / WCD / WCT	WALL CAP		SEE DWG	ARCH TO CONFIRM COLOUR	WALL	CONFIRM NECK SIZE WITH DRAWINGS
L-1	PRICE	DE439	SUPPLY/EXHAUST	SEE DWG	SEE DWG	ARCH TO CONFIRM COLOUR	WALL	C/W INSECT SCREEN

DOMESTIC HOT WATER TANK SCHEDULE

UNIT NUMBER	MANUFACTURER	MODEL	DUTY	CAPACITY GAL	FUEL N/P/E	V/PH/HZ	INPUT kW	SHIPPING WEIGHT (LBS)	REMARKS
HWT-1	BRADFORD WHITE	E32-120R-3	DOMESTIC WATER	120	E	208/1/60	15.0	312	2,3,6,9,12,18

REMARKS:

1. SAFTEY SHUT-OFF INTERLOCKED W/ FLUE DAMPER
2. ELECTRONIC IGNITION
3. LOW WATER CUT-OFF
4. LOW GAS PRESSURE SWITCH
5. HIGH GAS PRESSURE SWITCH
6. FLOW SWITCH
7. SEISMIC RESTRAINTS
8. DIRECT CONNECTION INTAKE AND EXHAUST
9. TEMP. & PRESSURE RELIEF VALVE
10. TRIDICATOR
11. FLUE DAMPER KIT
12. OPERATING AQUASTAT
13. THREE PASS FLUE SYSTEM
14. MAXITROL GAS PRESSURE REGULATING VALVE
15. MODULATING GAS VALVE
16. ELECTRONIC MODULATING GAS VALVE
17. POWER VENT KIT
18. HIGH LIMIT TEMPERATURE CONTROL

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REVISIONS:

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PROJECT:
UNICORN DAYCARE

TITLE:
MECHANICAL SCHEDULES

DRAWN: PF	DRAWING Nº: M2.03
SCALE: N.T.S.	
JOB Nº: 25539	
DATE: MAY 2026	REV. Nº: D

1. **General Mechanical Provisions**

1.1 **Conformance**

.1 Conform to terms and conditions of the General Contract Document.

1.2 **Scope**

.1 Provide complete, fully tested and operational mechanical systems to meet the requirements described herein and in complete accordance with applicable codes and ordinances.
.2 Contract documents of this division and drawings are diagrammatic and approximately to scale unless detailed otherwise. They establish scope, material and installation quality and are not detailed installation instructions.
.3 Follow manufacturer's recommended installation details and procedures for equipment, supplemented by requirements of contract documents.
.4 Install equipment generally in locations and routes shown close to building structure with minimum interference with other services or free space. Remove and replace improperly installed equipment to the satisfaction of the consultant at no extra cost.
.5 The drawings indicate the general location and route to be followed by the piping and ductwork. Where details are not shown on the drawings or only shown diagrammatically, the pipes and ductwork shall be installed in such a way as to conserve headroom and interfere as little as possible with the free use of space through which they pass. Service lines shall run parallel to building lines. All duct and pipes at ceiling shall be kept as tight as possible to beams or other limiting members at high end. All pipes and ducts shall be coordinated in elevation to ensure that they are concealed in the ceiling space provided unless detailed and dimensioned otherwise on drawings and permitted otherwise by the consultant.
.6 Contractor to coordinate with all other subtrades involved to confirm the locations of equipment, piping, and ductwork. Particular care shall be given to large ductwork and sloped piping to coordinate with other critical services to preserve head room. No extra charge for material or labour shall be added to the contract for relocation of equipment, piping, or ductwork within 10 ft of the location shown on the plans during rough in.
.7 Connect to equipment specified in other sections and to equipment supplied and installed by other contractors or by the owner. Uncrate equipment, move in place and install complete; start-up and test.
.8 Connect into existing systems with minimum disruption to the existing systems.
.9 Provide seismic restraints for all equipment, piping and ductwork when required by code.
.10 Field verify all building and site dimensions prior to any fabrication and installation of equipment or materials. No additional charge shall be entertained for failure to verify these dimensions on site.
.11 Identify all openings and holes required for the passage of mechanical services through structures and dividing walls to the general contractor. Such identification shall be via marked up drawings showing opening locations, sizes, and levels. If required, the contractor is to clearly mark on site the intended openings for review by the structural engineer.
.12 The work shall include but not limit to the following:
  .1 Complete heating / ventilating installation.
  .2 Complete plumbing installation.
  .3 Complete automatic control and related wiring installation.
  .4 Commissioning and balancing.
.13 Project is located in ASHRAE Climate Zone 5 -Trail.

1.3 **Site Examination**

.1 The contractor shall examine the site of work and become familiar with all features and characteristics affecting this work prior to submitting a price.
.2 No additional compensation will be provided for extra work due to existing conditions which an examination of site would uncover.
.3 Report to the engineer any unsatisfactory conditions which may adversely affect the proper completion of this work prior to submitting a price. This may be in the form of an RFI during the pricing phase.
.4 After work has begun, report to the engineer any unsatisfactory conditions which may adversely affect the proper completion of this work that are uncovered during the renovation work.

1.4 **Materials**

.1 Materials and equipment installed shall be new, full weight and of quality specified. Use same brand or manufacturer for each specified application.
.2 Each major component of equipment shall bear manufacturer's name, address, catalog and serial number.

1.5 **Cutting and Patching**

.1 Provide holes and sleeves, cutting and fitting required for mechanical work. Relocate improperly located holes and sleeves.
.2 Drill for expansion bolts, hanger rods, brackets, and supports.
.3 Obtain written approval from structural consultant before cutting or burning structural members. This work shall be carried out by the specialist trade only.
.4 Provide openings and holes required in precast members for mechanical work. Cast holes larger than 100mm (4") in diameter tight to columns shall not exceed 200mm (8") in diameter. Cast or field cut holes smaller than 100mm (4"). Caulk gaps between wall finishes and pipes where the gap is approximately 13mm (½"). For gaps greater than 13mm (½"), install an escutcheon plate. In fire rated walls, where the total size of a hole exceeds 645 mm2 (20 in2), the condition is unacceptable and must be patched with fire rated drywall or similar to maintain the required fire resistance rating.
.5 Repair building where damaged from equipment installation, improperly located holes, etc., by this section of the work. This repair work shall be carried out by the specialist trade at the expense of this section of work. Use matching materials as specified in the respective sections.

1.6 **Shop Drawings**

.1 Provide pdf shop drawings as indicated in accordance with the MCA-BC standards for shop drawings.
.2 Identify materials and equipment by manufacturer, trade name and model number. Include copies of applicable brochure or catalog material.
.3 Clearly mark submittal material using arrows, underlining or circling to show differences from specified, e.g. Ratings, capabilities and options being proposed. Cross out non-applicable material. Specifically note on the submittal specified features such as special tank linings, pumps, seals, material, or painting.
.4 Include dimensional and technical data sufficient to check if equipment meets requirements. Include wiring, piping, service connection data and motor sizes.
.5 Installed materials and equipment shall meet specified requirements regardless of whether or not shop drawings are reviewed by the consultant.
.6 Do not order equipment or material until the consultant has reviewed and returned approved shop drawings.
.7 Shop drawings shall be reviewed by the General Contractor and Mechanical Sub-Contractor indicating that the shop drawings have been reviewed, coordinated with the work and that the shop drawings are submitted without qualifications. Shop drawings shall bear the 'reviewed' stamp dated and initialed by the Mechanical Sub-contractor prior to submitting the shop drawings to the consultant. Shop drawings which do not bear the General Contractor's, Mechanical Sub-contractor's and sub-trades 'reviewed' stamp, initials and date will be rejected and sent back as 'not reviewed'.
.8 Submit a minimum of (4) copies of shop drawings prior to ordering equipment if pdf not available.
.9 Submit weights of all major equipment for review such that the loads can be reviewed by the appropriate consultant.
.10 Submit list of all electrical motors and power requirements to Electrical Consultant and Contractor.

1.7 **Standards of Materials, Equipment and Installation**

.1 Requests for changes to the specification in standards, materials, equipment or installation techniques shall be submitted for review seven (7) working days prior to close of tenders, and if applicable will be incorporated in an addendum to the specification.
.2 Equipment used shall not exceed space limitations in any dimension. Replace any equipment or apparatus which does not meet this specification at no cost. Assume full responsibility for the expense of redesign and adjustment to other parts of the building when proposing the use of approved equal or alternate equipment.
.3 Submit samples, in addition to drawings, of all items which in the consultant's judgment, can be better examined for capacity, quality, finish or detail by sample rather than by drawings. Samples shall be submitted before equipment is ordered.
.4 Provide equipment from the following manufacturers. Those manufacturers not listed are considered as alternatives. All mechanical equipment shall have the manufacturers name permanently affixed to it. It is the responsibility of both the 'named' product/supplier as well as the following listed "acceptable" products/suppliers to ensure that they meet or exceed the scheduled performance and are suitable for the intended use.
.5 Alternate manufacturers may be shown along with cost savings; however, these alternatives must be shown in addition to a manufacturer from the acceptable list.
.6 If shop drawings are rejected technically after 3 submissions, the contractor, at no additional expense to the owner, shall revert to the specified product and manufacturer for this project.
.7 The equipment manufacturer shall ensure that the strength and anchorage of the internal components of the equipment exceeds the force level used to restrain and anchor the equipment unit itself to the supporting structure.
.8 Equipment to meet ASHRAE 90.1-2019 minimum efficiency requirements.
.9 Acceptable Products/Suppliers/Manufacturers:

ITEM	ACCEPTABLE PRODUCTS/ SUPPLIERS/MANUFACTURERS
Access Doors	Acudor, E.H. Price, Maxam, Steel Brothers, Milcor, Mifab, Cendrex
Balancing	Inland Technical Services Ltd., Western Mechanical Services Ltd., K.D. Engineering, MDT Systems.
Backflow Protection	Watts, Febco, Clayton, Beeco, Wilkins, Ames, Conbraco
Commissioning	Inland Technical Services Ltd., Webir, K.D. Engineering, Airmec, Western Mechanical
Controls (Electric)	Johnson, Honeywell, Barber Coleman, White Rodgers
Couplings	Victaulic, Grinnell
Damper - Low Leakage	American Warming, Tamco, Ruskin, Pottorff
Domestic Hot Water Heaters	John Wood, State, A.O. Smith, P.V.I., Rudd, Giant, Bradford White, Rinnai
Ductless Split A/C Systems	Mitsubishi, Sanyo, Fujitsu, Samsung, Hitachi, LG, Daikin AC
Duct Spiral and Fittings	United Sheet Metal, B.C. Ventilating, Spiro-Lok, Ecco
Expansion Joints	Flexonics, Hyspan, Uniroyal, Keflex, Mason, Goodall
Fans, Ceiling	Greenheck, Delhi, Penn, Broan, Cook, Nutone, Panasonic
Fan Range Hoods	Nutone, Broan
Filter Gauges	Dwyer, Cambridge
Filters	Farr, Continental, Cambridge, AAF
Filters - Fibreglass Free	Viledon, Tridec
Fire Dampers	Canadian Advanced Air, Maxam, Ruskin, Controlled Air, Nailor-Hart, Price
Fire Stopping and Smoke Seals	3M, Tremco, Hilti
Flow Meters	Western Meter, Annubar, PSE, Bell & Gossett, Armstrong
Flexible Air Duct	Thermoflex, Wiremold, Flexmaster, Canaflex
Grilles, Diffusers and Registers	E.H. Price, Krueger, Titus, Tuttle & Bailey
Energy Recovery Units	Broan, BKM, VanEE, Greenheck, Venmar, American Aldes, Tempeff, Nuaire, Lifebreath, Renewaire
Insulation - Duct	Fiberglas, Knauf, Johns-Manville, Atlas, PPG, Manson, Certainteed
Insulation - Flexible Duct	Flexmaster
Insulation - Flexible Piping	Armstrong, PPG, Knauf, Johns-Manville, Manson
Insulation - Piping	Fiberglas, Knauf, Johns-Manville, Manson, Atlas, PPG, Certainteed
Jacketing Material	Childers, Fiberglas, Johns-Manville, Flamex FR Canvas
Louvres	Airolite, Penn, Westvent, Alumavent, Ruskin, Price
Mixing Valves	Leonard, Bradley, Powers, Symmons
Pipe Fittings and Flanges	Crane, Grinnell (groove lock for grooved pipe), Jenkins, Victaulic
Pipe Supports and Hangers	Crane, Unistrut, Myatt, L.E. Taylor, Grinnell, Sarco
Plumbing Drainage Accessories	J.R. Smith, Watts, Zurn, Mifab, ACO
Plumbing Trim (All to be CSA approved)	American Standard, Crane, Cambridge, Kohler, Eljer, Alsons, Bradley, Powers, Symmons, Moen, Delta, Brasscraft, T & S Brass, Emco, Acorn, Leonard, Briggs, Chicago, Toto, Zurn
Plumbing Fixtures (All to be CSA approved)	Crane, K.I.L., Fiat, Kohler, Eljer, American Standard, Williams, Metcraft, Wessan/Elkay, Haws, Aquarius, Jacuzzi, Sunroc, Western, Swan, Bradley, Speakman, Valley, Hytec, Watrous, Briggs, Kindred, Waltec, Venco, Encon, Gerber, Toto, Sloan
Pressure Gauges	Weiss, Ametek, Trerice, Winters
Pumps - In-Line	Grundfos, Taco, Wilo
Relief Valves	Crosby, Sarco, Watts
Sound Attenuation	I.A.C., Vibron, Vibro Acoustics, Wisp Air
Strainers	Red & White, Crane, Sarco, Armstrong, Kitz, Mueller, Plenty, Conbraco
Tanks (Expansion)	Anthes, Leitch, Armstrong, Enermax Clemmer, Westeel-Rosco, Conbraco, Amtrol
Thermometers	Trerice, Weiss, Weksler, Winters
Toilet Seats	Beneke, Bemis, Olsonite, Moldex, Sperzel, Centoco
Valves - Ball	Red & White, Grinnell, Jenkins, Watts, Hills, Crane, McCanna, Kitz, Millwaukee, Nibco, Valpres, Fortune
Valves - Gate & Globe	Red & White, Crane, Jenkins, Kitz Grinnell, Vogt, Millwaukee, Nibco, Fortune
Valves - Balancing	DeZurik, Millcentric, Grinnell
Valves - Check Spring Loaded	Mission, Moyes & Groves, Grinnell, Crane
Vibration Control Equipment	Vibro-Acoustics, Lo-Rez, Vibron, Korfund, Mason
Water Treatment & Pot Feeder	Dearborn, Calgon, IPAC, Pace
Water Pressure Reducing Valves	Wilkins, Slinger, Watts, Clayton, Bermad, Conbraco

1.8 **Performance Verification of Installed Equipment**

.1 Installed mechanical equipment whose performance is questioned by the consultant, may be subject to performance verification as specified herein.
.2 When performance verification is requested, equipment shall be tested to determine compliance with specified performance requirements.
.3 The consultant will determine by whom testing shall be carried out. When requested, the contractor shall arrange for services of an independent testing agency.
.4 Testing procedures shall be approved by the consultant.
.5 Maintain building comfort conditions when equipment is removed from service for testing purposes.
.6 Promptly provide the consultant with all test reports.
.7 Should test results reveal that originally installed equipment meets specified performance requirements the owner will pay all costs resulting from performance verification procedure.
.8 Should test results reveal that equipment does not meet specified performance requirements the equipment will be rejected and the following shall apply:
  .1 Remove rejected equipment. Replace with equipment which meets requirements of contract documents including specified performance requirements.
  .2 Replacement equipment will be subject to performance verification using the same testing procedures as on originally installed equipment.
  .3 Contractor shall pay all costs resulting from the performance verification procedure.

1.9 **Operating and Maintenance Data**

.1 Instruct the building operators in the operation and preventative maintenance of each piece of equipment and system supplied and installed. Complete and turn over documentation prior to substantial performance.
.2 Provide operation and maintenance data as required under Section 01300.
.3 The agency shall supply four final and one preliminary copy of the equipment data and maintenance cards. The preliminary copy referred to above shall include only the systems descriptions, operating and maintenance instructions and shall be delivered to the Consultant for review and comment no later than one (1) month prior to the date of Substantial Performance. This copy may be in a loose-leaf ring binder.
.4 Provide three (3) copies to Owner of hard cover three ring binders labeled on front and spine indicating Mechanical Operating and Maintenance Manuals, Arch., Mech. Engineering Firm, Contractor's and Project Name and one (1) CD/DVD containing a pdf of the manual, inclusive of all documents.
.5 Index mechanical portion of maintenance manuals according to the following index system.
.6 Tab 1.0 Mechanical Systems:
  .1 Provide title page with clear plastic cover.
  .2 The front title page shall include the cover information in addition to:
    - The Owner
    - The Architect
    - The Engineer
    - The General Contractor
    - The Mechanical Contractor
    - The Agency preparing the Manuals
  .3 The addresses, phone and fax numbers for the above will be given adjacent to their name.
.7 Tab 1.1 List of Mechanical Drawings.
.8 Tab 1.2 Description of Systems:
  .1 Provide complete description of each system.
  .2 Include detailed system description and components comprising that system, explanation of how each component interfaces with others to complete the system, location of each thermostat, controller, or operating setpoints.
  .3 Provide a complete description of emergency shut-down and start-up procedures for all major equipment, systems and controls, including fire alarm functions, power failure mode, back-up equipment/systems operation.
.9 Tab 1.3 Operating Division:
  .1 Provide complete and detailed operation of each major component.
  .2 Include starting procedure, exact switch and control location.
  .3 Describe operation of component controls, changes required for summer or winter operation and method of accomplishment.
  .4 Describe trouble shooting sequence when set points can not be maintained.
  .5 Describe safe guards to check if equipment goes off line.
  .6 Describe fire protection and smoke control.
.10 Tab 1.4 Maintenance and Lubrication Division:
  .1 Provide detailed preventative maintenance and lubrication schedule for each of the major components including daily, weekly, monthly, semi-annual and yearly checks and tasks.
  .2 Describe lubrication and maintenance procedure for equipment components such as bearings, drives, motors, and filters. Include recommended lubricants.
  .3 Compile this information for each typical piece of equipment.
  .4 Provide a belt schedule.
.11 Tab 1.5 List of Equipment Suppliers and Sub-contractors:
  .1 Provide complete list of Equipment Suppliers and Sub-contractors, including address and telephone number.
  .2 Outline procedures for purchasing parts and equipment.
  .3 Provide a parts list and repair manual for each piece of complete equipment specified.
  .4 Provide a warranty list for all items that extend beyond the standard one-year contractor's warranty period such as gas fired burners for roof top units, drinking fountain chillers, boiler burners, variable frequency drives, electrical motors, etc. Indicate the start date of the one-year contractor's warranty period.
.12 Tab Certification (2.0, 2.1, etc.) Include copies of:
  .1 Pre-operational cleaning reports and chemical treatment as specified.
  .2 Hydrostatic and air tests performed on piping systems.
  .3 Equipment alignment certificates.
  .4 Balancing reports for air and water systems.
  .5 Valve tag identification. Schedule including location, service and normal position.
  .6 Pipe colour code.
  .7 Inspection approval certificates for plumbing systems.
  .8 Inspection approval certificates for all air heating and ventilation systems.
  .9 Start-up reports of equipment
  .10 Guarantee certificate.
.13 Tab Shop Drawings (3.0, 3.1, etc.):
  .1 Include copy of all reviewed only Shop Drawings.
  .2 Include reduced record control drawings (8½ x 11 or 11 x 14 fold out).
.14 The divider tabs shall be laminated mylar plastic, and coloured according to Section. The colouring is as follows: Mechanical Systems - 1.0 - 1.5 - Orange, Certification 2.0 - 2.4 - Green, Shop Drawings and Maintenance 3.0 - 3.17 - Yellow. Plastic tabs with typed insertions will not be accepted.
.15 Provide a minimum of three (3) monthly, one day visits to the building to check that building operators are operating and maintaining mechanical systems in proper manner and keeping schedules up to date. Forward complete written report to the Consultant after each visit.

1.10 **Record Drawings**

.1 Submit record drawings identifying location of fire dampers, access doors, tagged valves and actual room names.
.2 The contractor shall be responsible for and keep one set of white prints, including revision drawings in the job site office. Backfilling will not be allowed until underground service dimensions are marked on plans. A set of white prints shall be maintained in constant up-to-date condition by each trade (as-built conditions marked in red pencil). The 1 white set of prints will be provided to the contractor by the consultant at the contractor's cost.
.3 The record drawings shall include, but not be limited to, the following changes and shall be recorded daily:
  .1 Size, location, arrangement, route and extent of ductwork, piping, conduit, terminal units, equipment, fixtures, cleanouts, valves, rough-in, etc., Above and below grade inside the building, including locations of buried piping.
  .2 Sanitary sewers: all sanitary sewers. Invert elevations and locations to be given at each clean-out.
  .3 Storm drains & sewers: all storm drains and sewers. Invert elevations to be given at each manhole, clean out, change of direction, junction, and at every 30 m run.
  .4 Location, tagging and numbering of all valves except individual plumbing fixtures or equipment isolation valves.
.4 The as-built daily marked-up prints shall conform to the standards of the contract drawings and shall include all details from revision drawings, supplementary drawings, change orders, addenda and site revisions, etc.
.5 At the end of construction, all of the above changes shall be transferred by the consultant, at the contractors cost, to a set of "AutoCad" disks. The CADD files shall be used to produce 1-set of originals turned over to the owner. The contractor shall allow $200.00 / revised drawing.

1.11 **Painting and Identification**

.1 Clean all exposed bare metal surfaces supplied by the mechanical and plumbing trade by removing all dirt, dust, grease and millscale.
.2 Repaint all marred factory finished equipment, which is not scheduled to be repainted, to match the original factory finish.
.3 Pipe markers and direction arrows - in all exposed areas and in the mechanical room:
  .1 Provide commercially available pipe markers having standard sizes of lettering and colours. Standard colours designate classes of materials follows and are consistent with those specified by the CSA and the USASI. Provide markers to all pipes provided under this contract.
    .1 Yellow - Dangerous Materials
    .2 Blue - Protective Materials
    .3 Green - Safe Materials
.2 Pipe markers and direction arrows shall be made of a vinyl film material that becomes permanent after curing in place for 24 hours or a spray on stencil is acceptable.
.3 Pipe markers and direction arrows shall be suitable for continuous operating temperatures between -40°C and 48.9°C (-40°F and 120°F).
.4 Pipe marker letters are to be 50mm (2") high for pipes 75mm (3") and larger outside diameter (including insulation) and not less than 18mm (¾") high for smaller diameters.
.5 Pipe marker direction arrows are to be 150mm long by 50mm wide (6" x 2") for pipes 75mm (3") and larger outside diameters (including insulation) and 100mm long by 18mm wide (4" x ¾") for smaller diameters. Mini-markers are to be used for very small diameter pipes.
.6 Location of pipe markers and direction arrows
  .1 Pipe marker and direction arrow shall be placed side by side in the bottom quarter of the pipe to be identified.
  .2 Adjacent to all major changes in direction and at connections to each piece of equipment.
  .3 At least once in each room that the pipe passes through.
  .4 Where piping passes through walls, partitions, or floors, identify piping on both sides of the section and at entry and exits to shafts.
.7 Provide ceiling access panel identification for the location of terminal units, valves, etc. above ceiling panels. Mechanical elements shall have their location identified by means of a coloured tack or data dot.
  .1 Provide a schedule of the representation of each colour with the operation and maintenance manuals.
.8 Duct access panel. Identification identify the function of duct access panels by the following schedule:
  .1 Cleaning & Service Access: C.A.
  .2 Controls (including sensors): C
  .3 Dampers (backdraft, balance & control): D
  .4 Fire Dampers: D
.9 Valve tags
  .1 All valves, except convector hand valves and individual plumbing fixture stop valves, shall be provided with 50mm x 30mm (2" x 1¼") brass tags with stamped numbers, secured by chains to the valve concerned.
  .2 Each trade shall prepare a list detailing the valves location, normal position, and purpose served. The list shall be included in the maintenance manual.

1.12 **Temporary Heating**

.1 Do not use the permanent system for temporary heating or other purposes without written permission from the owner and/or consultant.
.2 All equipment used shall be returned to new condition and warranties extended.

1.13 **Equipment Protection and Clean-up**

.1 Protect equipment and material in storage on site and after installation until final acceptance. Leave factory covers in place. Take special precautions to prevent entry of foreign material into working parts of piping and duct systems.
.2 Thoroughly clean piping, ducts and equipment of dirt, cuttings, and other foreign material.
.3 Protect bearings and shafts during installation. Grease shafts and sheaves to prevent corrosion. Supply and install necessary extended nipples for lubrication purposes.
.4 Ensure that existing equipment is carefully dismantled and not damaged or lost. Do not reuse existing materials and equipment unless specifically indicated.

1.14 **Site Utility Services**

.1 Co-ordinate and maintain liaison with the Owner and/or Consultant to interrupt, re-route or connect to water, sewer, or storm systems, with minimum interruption of service. Contact respective utility companies prior to starting work.

1.15 **Access Doors and Panels**

.1 Contractor to provide access panels required in building construction including in architectural walls and ceilings for access to any concealed mechanical equipment which, in the consultant's opinion, requires maintenance or adjustment. Access panel shall match wall/ ceiling finish. Obtain approval from architect prior to installation. General to install.
.2 Coordinate location of panel(s) with other trades.
.3 Such panels shall be manufactured panels, with fastening devices, appropriate to the construction involved, provide access panel (300mm x 300mm (12"x 12") for hand access, otherwise 460mm x 460mm (18"x 18") min.) In wall / ceiling to all mechanical system (such as valve, damper) requiring access. Provide access panel sized to allow manufacturers required access for any other concealed equipment such as HRVs. Dry wall surface: Milcor style DW flush panel access door; masonry tile surface: Milcor style M; plastered wall: Milcor style K.
.4 Provide rated panels where required to maintain fire separation ratings of walls, ceilings and floors.

1.16 **Access of Equipment**

.1 Make all arrangements to ensure that adequate access is available for all mechanical equipment. Do all hoisting and rigging into place of all specified equipment and be responsible for any damages incurred therefrom.
.2 Contractor to demonstrate reasonable access to all equipment service locations.

1.17 **Liability**

.1 Assume full responsibility for laying out the work and for any damage caused to the owner or other trades by improper location or carrying out of the work.
.2 Be responsible for prompt installation of his work in advance of concrete pouring or similar work. Provide and set sleeves where required. Should any cutting or repairing of either unfinished or finished work be required, this contractor shall direct the particular sub-contractor whose work is involved to do such cutting and repairing without expense to the owner. Before being undertaken, such work shall be laid out for the consultant's review.
.3 Examine the site and the local conditions affecting work under this contract. Examine carefully the mechanical, electrical, structural and architectural drawings and confirm that the work under this contract can be satisfactorily carried out without changes to the building as shown on these plans. Before commencing the work, examine the work of the other trades and report at once any defect of interference affecting the work of this section, of the guarantee of same. No extras will be subsequently allowed to cover any such error, omission or oversight on the thorough inspection of the grounds, building, conditions, etc.
.4 Arrange work in co-operation with other trades in the building in such a manner as not to interfere with other work being carried on in the building and places where other pipes and equipment be installed along with the pipes and ducts pertaining to this trade. Co-operate with the other trades to get all the pipes, ducts, conduit, etc., installed to the best advantage. When open web structural joists are used, the contractor must obtain structural shop drawings to ensure space available for installation of pipes and ductwork.
.5 Where any pipes, ducts and equipment must be built into the work of other trades such as masonry, structural, or plastering, be responsible for supplying the equipment to be built in or measurements to allow the necessary openings to be left. All pipes and ducts which are to be concealed shall be installed neatly and closely to the building structure so that the necessary furring can be kept as small as possible. Any pipes, ducts, or other work which are not, in the opinion of the consultant, installed as they should be, shall be taken out and replaced without cost to the owner.
.6 Protect finished and unfinished work from damage due to the carrying out of his work, giving special attention to the protection of building vapour barriers, waterproof membranes, etc. Cover floors and other parts of the building with tarpaulins, etc., and repair all damage to the satisfaction of the owner and the consultant. During freezing weather, protect all his materials in such a manner that no harm can be done to the installation already made and/or to materials and equipment on the job.
.7 Be responsible for the condition of all materials and equipment supplied and shall provide all necessary protection for same.
.8 Be responsible for the protection and maintenance of the work of this section until the building has been completed and accepted by the owner and be responsible for the sorting of his material inside and out of the way, and to clean up all refuse caused by his work to meet consultant's review.
.9 On completion of the work all tools, surplus and waste materials shall be removed and the work left in a clean and perfect condition.

1.18 **Liability Insurance**

.1 This contractor shall maintain such insurance as will fully protect both the owner and himself from any and all claims, all as noted within the general conditions and supplementary general conditions. When requested the contractor shall provide and show proof of, at his expense, comprehensive general liability insurance of not less than $2,000,000.00 Including non-owned car coverage, contractual liability and containing a cross liability clause. Coverage shall include loss or damage the contractor may cause to any work, building, equipment, structural, on the owner's property. The insurance may contain a deductible clause not to exceed $500.00.
.2 The contractor shall carry full employee's liability insurance for the whole of the work in accordance with the Workers' Compensation Act.

1.19 **Guarantee Warranty**

.1 This contractor shall furnish a written warranty stating that all work executed under this division will be free from defects of material and workmanship for a period of one (1) year from the date of substantial performance, which shall include one (1) complete summer and one (1) complete winter of uninterrupted operation. Warranty shall include any part of equipment, units or structures furnished hereunder that show defects in the works under normal operating conditions and/or for the purpose of which they were intended.
.2 The contractor shall at his own expense promptly investigate any mechanical or control malfunction, and repair or replace all such defective work, and all other damages thereby which becomes defective during the time of the guarantee-warranty.

1.20 **Hoists and Scaffolds**

.1 Provide interior movable or roller scaffolds for the installation of the mechanical work. All other hoists, scaffolds, temporary elevators, ladders, runways, etc., shall be requested by this contractor and arranged with the general contractor.

1.21 **Pipe Chases and Duct Shafts**

.1 Unless otherwise indicated, conceal piping and ductwork in the construction of the walls and ceilings, and in pipe chases, duct shafts and furring. If it is necessary, move the location of pipes and ducts from those indicated and provided. Consult the consultant for review before installation of this work.

1.22 **Inspection**

.1 The consultant or his representative may choose to review all work prior to it being concealed.
.2 The contractor shall notify the consultant in writing for the following minimum, but not limited to, reviews: (Required to provide a Schedule 'C' for occupancy)
  .1 Below grade piping prior to backfill.
  .2 All HVAC and plumbing rough-in prior to wall and ceiling finish installation.
  .3 Fire stopping of all openings.
  .4 Drop test all fire dampers and demonstrate access.
  .5 Final occupancy review and verification of all equipment being fully operational.
.3 All work shall be approved by any other regulatory body having jurisdiction where required.
.4 The contractor is to provide copies of all permits, inspection reports and certificates for insertion into the maintenance manuals.
.5 The contractor is to provide the consultant reasonable notice prior to calling an inspection.
.6 After the pre-occupancy review for substantial performance all deficiencies shall be completed for the final review. The contractor will be permitted one additional final review to finish all remaining deficiencies. Any additional reviews after final occupancy will be at the contractor's cost and paid to the consultant, in advance, at $700.00 per site visit.

1.23 **Substantial Performance Inspection**

.1 Prior to the contractor requesting an inspection for substantial performance all the following items must be provided to permit beneficial use by the owner.
  .1 Comply with requirements in general contract conditions.
  .2 Maintenance and operating manuals to be submitted.
  .3 As-built drawings submitted.
  .4 Balancing reports (air and water) to be submitted.
  .5 All systems shall be certified in writing by the contractor as complete and fully operational.
  .6 Instructions to the owner's operating personnel shall be provided in accordance with the specifications.
  .7 A complete list of items which the contractor has not finished, or are deficient, shall be provided. If in the opinion of the consultant this list indicates the project is excessively incomplete, a substantial completion review will not be performed.
  .8 The contractor shall be fully responsible to accumulate all necessary data from his sub-trades and suppliers and present same in the specified format for the approval by the consultant.
  .9 All life/safety items such as fire stopping, fire dampers, plumbing and ventilation fixtures and ventilation must be operational.

1.24 **Laws, Notices, Permits and Fees**

.1 Give all necessary notices, obtain all necessary permits and pay all fees in order that the work specified may be carried out, and furnish any certificates necessary as evidence that the work installed conforms with the law and regulations of all authorities having jurisdiction.
.2 All work shall be in accordance with the regulations of the following authoritative bodies, the codes in effect at the time of tender, and any others having jurisdiction:
  .1 Fire Marshall
  .2 Canadian Electrical Code
  .3 B.C. Building code and local building by-laws
  .4 Worksafe BC
  .5 Canadian Standards Association
  .6 Pollution Control Board
  .7 B.C. Refrigeration Code and C.S.A. Codes governing refrigeration plants
  .8 Canadian Gas Code B-149.1
  .9 B.C. Plumbing Code
  .10 National Building Code of Canada
  .11 B.C. Boiler and Pressure Vessel Act.
  .12 National Fire Protection Association
  .13 I.A.O. Insurers Assurance Organization
  .14 Underwriters' Laboratories of Canada

1.25 **Demonstration and Instruction to Owner**

.1 Demonstrate to and instruct the representative designated by the owner on the complete mechanical systems operating and maintenance procedures using the assistance of specialist sub-trades and manufacturer's representatives.
.2 The following systems shall be demonstrated in regards to performance and safety features (to the fullest):
  .1 Air handling systems (supply, return, exhaust)
  .2 Heating systems (D.H.W.S.)
  .3 Controls system
  .4 Plumbing systems
.3 Obtain a signed statement from the owner certifying that the demonstration and instructions have been given to his satisfaction.

1.26 **Temporary Facilities**

.1 Provide any temporary buildings and workshops that may be required for workmen, on-the-site operations, storage of materials and sewer connected water closets for the use of workmen. Provide, near the site and keep open at all times during construction on the project, an office for his own use where all notices and instructions from the consultant will be received and acknowledged by himself or his authorized representative. Accommodations shall conform in appearance to the general contractor's.

1.27 **Contract Price Breakdown**

.1 10 days after the award of contract submit mechanical breakdown in materials and labour for plumbing, ventilation, fire protection, heating, and controls in order to assess progress claims.
.2 In particular cases more detail may be necessary to properly assess a change order or progress claim. This additional information, which could include all suppliers and all sub-contractors, shall be supplied when requested by the Consultant.
.3 Mark-up information is required for change orders but is optional on the original tender price.

1.28 **Progress Claims**

.1 Provide mechanical breakdown in materials and labour for plumbing, ventilation, fire protection, heating, and controls in order to assess progress claims.
.2 Submit detailed price breakdowns for each separate mechanical change order item exceeding $20,000.00. Single line items for change orders $20,000.00 or less are acceptable.

2. **Testing**

.1 Perform all testing required by the authority having jurisdiction.
.2 Obtain test certificates for all tests performed and include in operating manuals.
.3 Perform the following tests:
  .1 Sanitary & storm hydraulic test.
  .2 Domestic water test to 1 1/2 times max water pressure or 1380kPa (200psi).
  .3 Ductwork - test medium velocity systems to a static pressure of system + 500Pa (+ 2") of W.G.
  .4 Drop test all fire dampers.
.4 All tests shall be documented and witnessed by the consultant or general contractor.

3. **Balancing**

.1 Contractor is to provide the services of an approved professional testing & balancing firm.
.2 Provide a balance report of all air & water balance points and performance testing & balancing of all equipment as per the AABC.
.3 Balance all air and water quantities to - 5% or + 10% of the design requirement, except in air systems part of life safety where deviation shall be 0 to + 5%.
.4 Provide all required sheave, belt and impeller changes to achieve the required fan and pump flow rates.
.5 Measure and balance the following (where applicable):
  .1 Supply, exhaust and return fan volumes and speeds.
  .2 Airflow at each air outlet and branch connection.
  .3 Adjust pattern control on supply diffusers.
  .4 Balance domestic water recirculation.
.6 Additional testing of the system may be requested by the consultant to spot check air and water flow quantities. (10% of the system will be re-checked at the discretion of the consultant) at the contractors cost.

4. **Systems Commissioning, Verification and Demonstration**

.1 Be responsible for the performance and commissioning of all equipment provided under Division 21-23. Commissioning is the process of advancing the installation from the stage of static completion to full working order to specified requirements. It is the activation of the completed installation.
.2 In consultation with the General Contractor, ensure that sufficient time is allowed and fully identified on the construction schedule for the proper commissioning of all mechanical systems.
.3 Commissioning is concluded when mechanical systems have been balanced and the installation is in full working order and acceptable for use. The work will include the following:
  .1 Balancing of the air systems as specified.
  .2 Balancing of domestic hot water recirculation systems.
  .3 Set up air diffusers, registers and grilles for optimum distribution/comfort.
  .4 Plug all air pressure and flow measuring holes.
  .5 Adjust vibration isolators and seismic restraints for optimum performance. Provide letter of certification.
  .6 Verification of tight closure of outside air dampers.
  .7 Verification and certification of operation of all fire dampers.
  .8 Verification and certification of the sealing of all HVAC penetrations through fire separations (rated & non-rated) and sound separations.
  .9 Verification of water tightness of all roof and exterior wall penetrations.
  .10 Verification that all coil drain pans operate.
  .11 Verification that equipment is not short cycling.
  .12 Verification of fire extinguisher pressures.
  .13 Verification of operation of all mechanical related fire alarm functions.
  .14 Set up all automatic control valves/dampers and automatic temperature control devices.
.4 At the conclusion of commissioning, demonstrate the operation of the systems to the Consultant and then to the Owner's Operating Staff.
.5 At the completion of the commissioning, testing, balancing and demonstration submit the following to the Consultant:
  .1 A letter certifying that all work specified under this contract is complete, clean and operational in accordance with the specification and drawings.
  .2 Completed copies of all commissioning check lists plus copies of start-up reports from specialty contractors and vendors.
  .3 "AS-BUILT" record drawings, as specified.
.6 The verification process shall include instructional seminars to demonstrate all systems and to explain the operation of each. The instruction shall include the following:
  .1 Ease of access provided throughout for servicing coils, filters, motors, drives, fusible link fire dampers, control dampers and damper operators.
  .2 Operation of all equipment and systems under each mode of operation and failure, including:
    .1 Air conditioners and refrigeration systems.
    .2 Pumps, fans, heaters.
    .3 Tanks - domestic hot water and expansion.
.7 After demonstration obtain the Owner's signature certifying that the demonstration has been performed and completed to their satisfaction.

5. **Indoor Air Quality**

.1 In the interest of providing an acceptable level of indoor air quality for the occupants, the air systems will be used to flush out fumes that may be present from building products. (Cabinets, carpets, paints, solvents etc.)
.2 After all systems are fully operational and the building is clean, run the fan systems at 100% outside air for a period of 10 days prior to occupancy. Maintain the building at 21°C (70°F) for heating and 24°C (75°F) for cooling.

6. **Pipe & Pipe Fittings**

.1 Ensure all pipe materials and fittings are acceptable to the authority having jurisdiction.
.2 All type 'K' copper must be certified to ASTM B88. Provide written guarantee that lead-free solder was used on all domestic water systems.
.3 All fittings used for domestic water piping shall be lead free with less than 0.25% average lead content when evaluated in accordance with the test method specified in NSF/ANSI 372. Fittings shall conform to ASME A112.1/CSA B125.1 or CSA B125.3, and NSF/ANSI 61.
.4 Contractor to provide drains at all low points in the piping system.
.5 Plumbing Drainage Piping
  .1 Inside buildings:
    .1 Above floor slab
      .1 Cast iron with stainless steel couplings.
      .2 D.W.V. copper pipe and fittings.

Association of Professional Engineers and Geoscientists of the Province of British Columbia
C. J. LANGEVIN
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REVISIONS:

D	2026/08/25	ISSUE FOR TENDER
C	2026/07/31	90% COORDINATION
B	2026/07/04	ISSUED FOR BUILDING PERMIT
A	2026/06/19	50% REVIEW SET

ISSUES:

DIMENSIONS:
THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, AND IMMEDIATELY REPORT ANY ERRORS AND/OR OMISSIONS. DO NOT SCALE DRAWINGS.

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PROJECT:
UNICORN DAYCARE

TITLE:
MECHANICAL SPECIFICATIONS

DRAWN:	PF	DRAWING Nº:	M3.01
SCALE:	N.T.S.		
JOB Nº:	25539		
DATE:	MAY 2026	REV. Nº:	D

.3 System 15 PVC pipe and fittings. If System 15 PVC is used System XFR pipe and fittings is required in any air plenum.
.4 ABS-DWV pipe to CAN3_B181.1_M and PVC_DWV pipe to CAN/CSA_B181.2_M only permitted when no fire-rated separations are present in the building. Approval from the Consultant is required prior to installation. Transition from plastic pipe to metallic pipe must be performed prior to penetrating the floor slab in buildings with fire rated separations.
.2 Under floor slab only
.1 ABS drain and waste pipe and fittings.
.2 PVC drain and waste pipe and fittings.
.2 Outside buildings:
.1 ABS drain and waste pipe and fittings.
.2 PVC drain and waste pipe and fittings.
.3 Footing Drains:
.1 PVC perforated building sewer pipe and fittings conforming to CGSB 41-GP-29M and CSDA B182.1.
.2 Provide minimum 6" drain rock cover and bedding for all footing drains.
.3 Filter cloth - 2.2 mm thick polyester filter cloth equal to Mirafi P-40, Permaliner, Staff, Nilex. Surround drain rock
.6 Plumbing Water Piping
.1 Type 'K' soft copper pipe underground - 75 mm [3"] and smaller - brazed.
.2 Stainless steel pipe.
.3 Type 'L' copper pipe above ground with
.1 Fittings: Cast brass or wrought copper fittings 95/5 Sn/Sb solder.
.4 Cement lined ductile iron for pipe underground - 100 mm [4"] and larger.
.1 Fittings: Grooved mechanical joints.
.5 PVC Blue Brute 1034 kPa [150 psi] water piping for underground outside the building.
.1 Fittings: Grooved mechanical joints.
.6 Material: Crosslinked polyethylene PEX A
.1 Fittings: Brass compression, PEX press, expansion connection, heat fusion.
.7 Material: CPVC "flowguard" (up to 65mm (2½") through fire separation)
.1 Fittings: Solvent weld
.7 Radon Piping:
.1 Schedule 40 PVC.
.2 System 15 or System 15 XFR.
.3 RadonX PVC Soil Gas Venting.
.8 Hangers and Supports: Cadmium plated hanger rods. For steel or cast iron pipe, Grinnell Fig. 260. For copper pipe, Grinnell Fig. CT-65 (copper plated) or Grinnell Fig. 260 epoxy coated
.9 Install dielectric couplings at copper piping connections to plumbing equipment of dissimilar material.
.10 Valves:
.1 Sweat ends - Acceptable Products: Toyo 5049ALF, Apollo, Crane, Kitz 859, Neuman-Hattersley, Nibco, Watts, Worcester.
.2 Threaded ends - Acceptable Products: Toyo 5044ALF, Apollo-76F Series, Kitz 858, Watts LFIT-6300.
.3 Provide valve box and cover for all outside valves. Valve box Terminal City.
.11 Strainers: Bronze equal to Crane 9881-1/2. Acceptable Manufacturers: Toyo, Jenkins.
.12 Pressure Reducing Valve: Singer PR-___L/s [___gpm] at 68.9 kPa [10 psig] pressure drop.
.13 Vacuum Breakers: Watts No. 900.
.14 Backflow preventers:
.1 Vacuum breakers:
.1 Pressure applications
.1 12 mm [1/2"] unit on pipe sizes up to 25 mm [1"]
.2 20 mm [3/4"] unit on pipe sizes up to 40 mm [1½"]
.3 25 mm [1"] unit on pipe sizes up to 75 mm [3"]
.4 Continuous pressure, high hazard, anti-siphon, anti-spill vacuum breaker
.5 Standard of Acceptance: Watts series 008PCQT
.6 Acceptable Manufacturers: Cla-Val, Febco, Wilkins, SMR
.2 Atmospheric applications:
.1 Standard of Acceptance: Watts 288A, Hose End Series 8
.2 Acceptable Manufacturers: Febco, Rainbird, SMR
.2 Reduced pressure principle device (RPPD)
.1 Factory assembled station complete with inlet and outlet isolation valves
.2 Provide a repair/maintenance kit for each size of RPPD installed.
.3 Standard of Acceptance: Watts series 909
.4 Acceptable Manufacturers: Ames, Beeco, Braukman, Cla-Val, Craneline, Febco, Grinnell, Lawler, Neptune, Rockwell, Wilkins, Viking
.3 Double check valve (DCV):
.1 Factory assembled station complete with inlet and outlet isolation valves
.2 Standard of Acceptance: Watts series 709
.3 Acceptable Manufacturers: Ames, Beeco, Braukman, Cla-Val, DHC, Febco, Grinnell, Neptune, Rockwell, Wilkins, Viking
.15 HVAC Piping:
.1 Piping:
.1 Service: Refrigerant.
Material: ACR Copper.
.2 Service: Condensate; Pumped Condensate.
Material: CPVC Schedule 40.
.3 Service: Equipment drains and overflows.
Material: Galvanized steel pipe to ASTM A120, Schedule 40, D.W.V. copper.
.2 Pipe Fittings - Steel Pipe
.1 Cast iron pipe flanges: Class 125 to ANSI B16.1.
.2 Cast iron screwed fittings: Class 125 to ANSI B16.4.
.3 Steel pipe flanges and flanged fittings: to ANSI B16.5.
.4 Steel butt-welding fittings: to ANSI B16.9a.
.5 Malleable iron unions, ground joint type: ANSI B16.3; Class 150 for 30 mm [1-1/4"] and smaller; Class 250 for 40 mm and 50 mm [1-1/2", 2"].
.6 Malleable iron screwed fittings: to ASME B16.3, Class 150.
.3 Pipe Fittings - Copper Pipe
.1 Cast bronze: to ANSI B16.18 or wrought copper and bronze: to ANSI B16.22.
.4 Flanges - Copper Pipe
.1 Brass or bronze: to ANSI B16.15 or cast iron: to ANSI B16.4.
.5 Pipe Joints
.1 50 mm [2"] and smaller: screwed fittings, except where otherwise noted, with teflon tape or pulverized lead paste.
.2 65 mm [2-1/2"] and larger: welding fittings and flanges to CSA W47.1.
.3 Provide dielectric couplings on all systems except closed loop systems wherever pipes of dissimilar metals are joined.
.16 Install piping with all necessary changes of direction, expansion loops, anchors and guides to prevent overstressing the piping and equipment piping connections from thermal expansion and contraction.
.17 Hangers and Supports:
.1 Cadmium plated hanger rods.
.2 For steel or cast iron pipe, Grinnell Fig. 260.
.3 For copper pipe, Grinnell Fig. CT-65 (copper plated) or Grinnell Fig. 260 epoxy coated
.18 Refrigerant Tubing and Fittings
.1 Tubing:
.1 Processed tubing for refrigeration installation, deoxidized, dehydrated and sealed.
.2 Hard copper tube, type L, to ASTM B88M.
.3 Annealed copper tube to ASTM B280, with minimum wall thickness as per CSA B52.
.2 Fittings
.1 Service: design pressure 300 psig and temperature 250°F.
.2 Brazed: wrought copper to ANSI B16.22 or cast bronze to MIL-F-1183E.
.3 Flanged: bronze or brass, Class 150 and Class 300 to ANSI B16.24.
.4 Flare: Bronze or brass, for refrigeration, to ANSI B16.26.
.5 Long radius type for elbows and return bends.
.3 Joints
.1 Brazing materials shall be SIL-FOS-15 phosphor-copper-silver alloy for copper piping jointed by copper fittings and silver solder for brass fittings.
.19 Valves
.1 Install valves with stems upright or horizontal.
.2 Provide shop drawings for all valves.
.1 For all backflow valves contractor to mark up flow rates on manufacturer's data sheet to show size, flow, and pressure drop for each valve.
.2 For all balance valves contractor to mark up flow rates on manufacturer's data sheet to show size, flow, and pressure drop for each valve.
.3 Shop drawings to be approved by consultant prior to ordering.
.4 Ball Valves:
.1 50 mm [2"] and smaller, screwed, Class 600 (4140 kPa):
.1 Forged brass body; chrome plated, full port ball; PTFE seats; blow out proof stem.
.2 Acceptable Products: Crane 9302, Grinnell 3700, Jenkins 901A, Kitz 68, Newman Hattersley 1969, Nibco T-585-70, Toyo 5044A.
.2 50 mm [2"] and smaller, soldered, Class 500 (3450 kPa):
.1 Forged brass body; chrome plated, full port ball; PTFE seats; blow out proof stem.
.2 Acceptable Products: Crane 9322, Grinnell 3700SJ, Kitz 69, Newman Hattersley 1979, Nibco S-585-70, Toyo 5049A
.5 Gate Valves
.1 65 mm [2-1/2"] and larger, flanged, Class 125 (860 kPa).
.1 Acceptable Products: Crane 465-1/2, Grinnell 6020A, Jenkins 454, Kitz 72, Newman Hattersley 504, Nibco F-617-0, Toyo 421A.
.6 Balancing Valves - Flow Measuring
.1 50 mm [2"] and smaller - screwed copper alloy body.
.2 65 mm [2-1/2"] and larger - ductile iron body.
.1 Provide calibration charts.
.2 Removable preformed rigid polyurethane insulation.
.3 Acceptable Products: Armstrong CBV, Tour & Anderssen STA.
.7 Swing Check Valves - in horizontal pipes
.1 50 mm [2"] and smaller, screwed, Class 125 (860 kPa):
.1 Acceptable Products: Crane 37, Grinnell 3300, Kitz 22, Newman Hattersley 60, Nibco T-413-B, Toyo 236.
.2 65 mm [2-1/2"] and larger, Class 125 (860 kPa):
.1 Acceptable Products: Crane 373, Grinnell 6300A, Jenkins 587, Kitz 78, Newman Hattersely 731, Nibco F-918, Toyo 435A.
.8 Silent Check Valves (spring type) - in vertical pipes.
.1 50 mm [2"] and smaller, screwed, Class 125 (860 kPa):
.1 Acceptable Products: Durabla, Grinnell 3600, Muessco 203BP, Nova 700.
.2 65 mm [2-1/2"] and larger, Class 125 (860 kPa):
.1 Acceptable Products: Apco, centreline, Durabla, Grinnell CV817, Nibco W-910, M & G.
.9 Drain Valves - at each low point in the piping system and where shown.
.1 Class 250 (1724 kPa), screwed, brass ball valve, lockshield in public areas.
.1 20 mm [3/4"] size unless shown as 40 mm [1-1/2"] - shall have threaded hose end with forged cast brass cap and chain.
.2 Acceptable Products: Dahl#50-430, Kitz 58CC, Toyo 5046.
.10 Strainers
.1 50mm [2"] and smaller: bronze body, screwed connections.
.2 65mm [2-1/2"] and larger: cast iron body, flanged connections.
.1 Suitable for maximum system operating pressure. Where system pressure exceeds 860 kPa [125 psig], use 1725 kPa [250 psig] strainer bodies.
.2 Basket Screen: Bronze, stainless steel or monel perforated screen.
.3 35 holes/cm2, 1.2 mm dia. perforations, 36% open area.
.4 Acceptable Products: Armstrong, Erwel, Kitz, Mech-Line, Muesco, Spirax/Sarco, Toyo, Victaulic.

7. **Radon System**
.1 Radon piping to be 100mm (4") dia. solid PVC pipe.
.2 Piping shall be constructed so as to be air tight and installed through floor-on-ground.
.3 Piping shall open into a 1.2m x1.2m x200mm deep (4'x4'x8" deep) radon suction pit in approximately the center of each contiguous area of the granular layer with not less than 100mm (4") of granular material projecting beyond the terminus of the pipe measured along its axis.
.4 Horizontal piping shall be sloped a minimum of 1% to avoid accumulation of condensation.
.5 Piping terminates not less than 1m (3'-4") above and not less than 3.5m (11'-6") in any other direction from any air inlet, door or openable window.
.6 Piping terminates not less than 0.5m (18") above roof.
.7 Piping is not less than 2m (6'-7") above and not less than 3.5m (11'-6") in any other direction from a roof that supports an occupancy, i.e. a roof deck.
.8 Piping terminates not less than 1.8m (5'-11") from a property line.
.9 Piping shall be fitted with a corrosion-resistant screen of mesh with openings not larger than 15mm (½") to protect from the weather.
.10 Piping is protected from frost closure by insulating the pipe.
.11 Piping is clearly labeled "RADON VENT PIPE" every 1.2m (4') and at every change in direction.
.12 Provide electrical rough-in at roof for future extraction fan to allow for 130W, 120/1/60, continuous operation.

8. **Support, Anchors, Seals & Firestopping**
.1 Provide all necessary supports, and hangers to secure mechanical systems and equipment.
.2 Provide firestopping at all duct and piping penetrations through rated floors/walls and shafts. Provide shop drawings showing applicable assemblies. All products to be ULC listed. Provide fire stop certificate at substantial completion.
.3 Provide oversize hangers on all cold pipes to fit over pipe insulation where required.
.4 Provide isolation and prevent contact with dissimilar metals.
.5 All sleeves for mechanical piping to extend 1" above the floor in all mechanical room, shaft and wet areas.
.6 All ductwork to be supported as per SMACNA.
.7 All exposed piping penetrations shall be provided with escutcheons.
.8 All roof mounted piping to be installed with Dura-Blok supports or equivalent. Pressure treated wood is not permitted.
.9 All exposed roof mounted ductwork to be installed with Unistrut and Dura-Blok supports or equivalent. Pressure treated wood is not permitted.
.10 All heat pumps and condensing units to be installed on weather resistant supports a minimum of 4" high or per manufacturer's requirements. Pressure treated wood is not permitted. Provide vibration isolation.

9. **Vibration Isolation**
.1 Provide vibration isolation (spring isolators) on all motor driven equipment with motors of 0.37 kW (.5hp) and greater. For equipment less than 0.37 kW (.5hp), provide neoprene grommets at the support points.
.2 For ceiling mounted equipment with motors larger than 0.37 kW (.5hp), mount on spring hangers for a minimum static deflection of 25mm (1"). Design is based on Vibron Series VH or Mason HD, HS.
.3 Structural steel bases for fan mounts shall be sufficiently rigid to keep deflection and misalignment within acceptable limited as determined by the equipment manufacturer. Bases are Mason type WF or approved equal. Provide seismic snubbers.

10. **Seismic Requirements**
.1 Scope
.1 Seismic restraints for all equipment, ductwork, and piping covered by mechanical. Attachment to structural members.
.2 Reference standards
Seismic requirements shall be in accordance with the following:
.1 2024 B.C. Building code section 4.1.8.
.2 SMACNA "Seismic Restraint Manual Guidelines for Mechanical Systems".
.2 Seismic requirements
.1 Provide and install seismic restraints for all equipment, ductwork and piping installed by this division in accordance with all current applicable building codes.
.2 The installation of seismic restrains shall not compromise vibration isolation capabilities.
.3 Seismic restraints for hot water tanks for tanks larger than 190 litres (50 gallons).
.4 For t-bar ceiling diffusers provide minimum two risers for attachment to structure.

11. **Insulation**
.1 Installation shall conform to the B.C.I.C.A. Quality Standards Manual for mechanical insulation.
.2 Piping Insulation
.1 General
.1 Provide vapour barrier for all cold pipes.
.2 Exposed rain water leaders to be insulated in all heated spaces.
.3 Provide insulation for first 3.05m (10'-0") on rain water leaders in ceiling space.
.4 Insulate all plumbing traps and sanitary piping in unheated areas such as underground parkades. Traps to be c/w removable insulated cap.
.5 Insulate all storm piping in unheated areas such as underground parkades.
.6 Insulate all sanitary vents within 2m (6'-6") of roof/wall penetration.
.7 Insulate radon pipe within 2m (6'-6") of roof/wall penetration.
.8 All exposed piping to be complete with PF-2 premium finish. No finish required on concealed piping.
.2 Materials:
.1 Mineral Fibre - Low and Medium Temperature, vapour barrier jacket. Maximum thermo conductivity: as per Tables 6.8.3A and 6.8.3B in ASHRAE 90.1-2019:
.1 Acceptable Products: Johns Manville Micro Lok Ap-T Plus, Manson Alley K, Owens Corning SSL-II, Partek Paroc 1200 ASJ/SSL.
.2 Flexible Foamed Elastomeric Insulation.
.1 Acceptable Products: AP Armaflex, Rubatex R-180-FS.
.3 Flexible Closed Cell Insulation.
.1 Acceptable Products: Bondtex Polyethylene, Therma-Cel.
.4 Flexible elastomeric and flexible closed cell insulation adhesive:
.1 Acceptable Products: Armstrong 520, Therma-Cel 1590, Rubatex R-373, Zipcoat 8A.
.5 Flexible elastomeric and flexible closed cell insulation finish coating: Acceptable Products: Armstrong, Bakelite 120-13, Rubatex, Zipcoat, Robson's Rubber Coat.
.6 Tape - self-adhesive, aluminum, reinforced, 50 mm [2"] wide
.7 Vapour barrier jacket adhesive:
.1 Acceptable Products: Childers CP-82, Foster 85-20.
.8 Vapour barrier coating on reinforcing membrane or on insulating cement:
.1 Acceptable Products: Bakelite 120-09, Childers CP-50, Epolux Cadalag 336, Robson White Lag.
.9 Insulating Cement:
.1 Acceptable Products: Fibrex Superkote, Partek No. 1, Ryder Thermokote MW high temperature.
.10 PVC Jacket and Fitting Covers: Staples and PVC self-adhesive tape, plastic pop rivets, staples
.11 Aluminum Jacket:
.1 22 ga. corrugated or smooth aluminum jacketing.
.2 Longitudinal slip joints and 50 mm [2"] end laps.
.3 Factory applied protective liner on interior surface.
.4 Acceptable Products: Childers, Alco Thermoclad 1.
.3 Scope: Warm/Hot Piping
.1 Insulation as required in Table 6.8.3A in ASHRAE 90.1-2019.
.2 Piping insulation thickness shall be selected as per Table 1:

TABLE 1
Pipe Insulation Thickness - Hot Piping

	Max. Operating Temp °F (°C)	≤ 1" (25 mm)	1-¼" to <1-½" (25 mm to 38 mm)	1-½" to <4" (38 mm to 100 mm)	6" (150 mm)	≥ 8" (200mm)
Dom. Hot Water Including re-circ & tempered.	-	1" (25)	1" (25)	1-½" (38)	1-½" (38)	1-½" (38)
Waste Arm & P-trap on H/C Sink	-	-	½" (13)	-	-	-

.3 Installation:
.1 Mineral fibre insulation
.2 Spreading staples at 75 mm centres.
.3 Tape over all joints and secure with staples
.4 Fittings - tightly wrapped flexible insulation to full thickness with PVC fitting cover
.5 Valves, Strainers - fitted pipe insulation with drains, blowoff plugs and caps uninsulated
.6 Flanges, mechanical joints - oversized pipe insulation overlapping adjoining insulation at least 75 mm [3"]
.4 Scope: Cold Piping
.1 Insulation as required in Table 6.8.3B in ASHRAE 90.1-2019.
.2 Piping insulation thickness shall be selected as per Table 2:

TABLE 2
Pipe Insulation Thickness - Cold Piping

	Max. Operating Temp °F (°C)	< 1" (25 mm)	1" to 1-½" (25 mm to 38 mm)	1-½" to <4" (38 mm to 100 mm)	6" (150 mm)	≥ 8" (200mm)
Domestic Cold Water	-	1" (25)	1" (25)	1" (25)	1" (25)	1" (25)
Condensate drains from cooling units	-	1" (25)	1" (25)	1" (25)	1" (25)	1" (25)
Refrigerant suction	-	1" (25)	1" (25)	1" (25)	1" (25)	1" (25)
Roof drains, interior RWL & storm subject to freezing	-	-	1" (25)	1" (25)	1" (25)	1" (25)
Traps & sanitary piping subject to freezing	-	-	1" (25)	1" (25)	1" (25)	-
Plumbing vents & Radon vent	-	1" (25)	1" (25)	1" (25)	1" (25)	1" (25)

.3 Installation:
.1 The insulation shall include provision of a continuous vapour barrier.
.2 Mineral fibre insulation
.3 Spreading staples at 75 mm centres.
.4 Tape over all joints with vapour-barrier adhesive and staples
.5 Fittings - tightly wrapped flexible insulation to full thickness with PVC fitting cover
.6 Valves, Strainers - fitted pipe insulation with drains, blowoff plugs and caps uninsulated
.7 Flanges, mechanical joints - oversized pipe insulation overlapping adjoining insulation at least 75 mm [3"]
.5 Scope: Refrigerant Piping
.1 Insulation as required in Table 6.8.3B in ASHRAE 90.1-2019.
.2 Piping insulation thickness shall be selected as per Table 2, above.
.3 Flexible foamed elastomeric or flexible closed cell preformed piping insulation. Secure longitudinal and butt joints with adhesive. Insulate all fittings and components. Finish with flexible elastomeric or flexible closed cell insulation coating. Maintain continuous vapour-barrier for suction and mixed phase piping.
.4 Aluminum Jacket: 22 ga. smooth aluminum jacketing with longitudinal slip joints on all pipe insulation outdoors
.1 Acceptable Products: Childers, Alco Thermoclad 1
.5 Where refrigerant linesets must be exposed on the building interior, contractor to provide, furring, bulkhead, or line set ducting to conceal the piping. Coordinate this requirement with the general contractor.
.1 Acceptable Products: Fortress Lineset Duct and Fittings.
.6 Insulate all exposed traps under accessible sinks with factory installation kit.
.7 Insulate heat pump and air conditioning unit condensate drain for the first 1.5m (5'-0").
.3 Ductwork Insulation
.1 Products
.1 External Insulation - Flexible.
.1 Acceptable Manufacturers: Certainteed STP Ductwrap #75, Johns Manville Microlite FSK, Manson Alley-Wrap FSK, Owens Corning all service faced duct wrap, Knauf FSK Ductwrap.
.2 Duct Liner - Flexible. Minimum noise reduction criteria (NRC): 0.70 as per ASTM C423 'Type A mounting'.
.1 Acceptable Manufacturers: Certainteed Ultralite #150, Johns Manville Linacoustic, Johns Manville Permacote, Knauf Duct Liner EM, Manson Akousti-Liner, Owens Corning Areomat Duct Liner.
.3 Duct Liner- Rigid. Minimum noise reduction criteria (NRC): 0.70 as per ASTM C423 'Type A mounting'.
.1 Acceptable Manufacturers: Johns Manville Linacoustic R, Knauf Rigid Coated Duct, Manson Akousti-Liner R.
.4 Insulation Adhesive:
.1 Acceptable Products: Foster 85-20, Robson Ticki-Tuff, 3M 4230, United UNI-GRAB.
.5 Vapour Barrier Tape:
.1 Acceptable Products: Scrim foil self-adhesive tape.
.6 Insulation Coating:
.1 Acceptable Products: Childers CP-50, Foster 30-36, Robson's Mastic RJ-10.
.7 Weather Coating - vapour barrier:
.1 Acceptable Products: Childers CHIL-PRUF CP 22/23/24, Foster 60-25, Insul-Mastic 15187.
.2 Scope: Ductwork exterior thermal insulation
.1 Insulation as required in Table 6.8.2A and Table 6.8.2B in ASHRAE 90.1-2019.
.2 Insulation shall be provided as follows:

Mechanical System Application	BCICA Insulation Type	Application Type
Outdoor Air Ductwork and plenums (intake to mixing plenum)	2" (50 mm) thick, A.2 - rigid or flexible insulation (with vapour barrier).	Externally Applied
Sheet Metal Supply Air Ductwork (Concealed)	1-½" (38 mm) thick, B.2 - flexible insulation (with vapour barrier)	Externally Applied
Exhaust ducts within 10' of exterior walls or roof	1" (25 mm) thick C.2 flexible duct wrap	Externally Applied
10' from fan discharge and suction (whichever is least)	1" (25 mm) thick C.2 flexible duct liner	Internally Applied
Where indicated or denoted on drawings	1" (25 mm) thick C.2 flexible duct liner	Internally Applied

.3 Insulate outdoor air ductwork from intake to mixing plenum.
.3 Installation:
.1 Adhere insulation with insulation adhesive applied in 150 mm [6"] wide strips on 300 mm [12"] centres.
.2 On rectangular ductwork and plenums, over 610 mm [24"] in width secure insulation with pins at one per 0.1 sq. m [1.0 sq ft] minimum.
.3 Adhere vapour barrier tape over all butt joints, raw edges, holding washers and other points of penetration of the vapour barrier jacket.
.4 Scope: Ductwork, interior flexible or rigid acoustic insulation.
.1 Installation:
.1 Provide internal acoustic insulation upstream and downstream a minimum of 3.05m (10'-0") from all supply, return and exhaust fans .37kW (½ hp) and larger.
.2 Provide internal acoustic insulation where shown hatched on drawings.
.3 All insulation edges must be sealed. Provide fasteners at 300mm (12") O.C. with pins cut and capped.
.4 Adhere insulation with insulation adhesive applied to the entire metal surface.
.5 On rectangular ductwork and plenums, over 610 mm [24"] in width secure insulation with pins at one per 0.1 sq. m [1.0 sq ft] minimum to supplement the adhesive. Cover holding washers with reinforcing membrane and insulation coating/sealer.
.6 Seal all transverse joints, raw edges, and other points of penetration of the coating with reinforcing membrane and insulation coating/sealer.
.7 Seal all longitudinal joints with insulation coating sealer.
.8 Protect leading and trailing edges of duct sections with sheet metal nosing having 15 mm overlap and fastened to duct.
.2 All exposed ductwork in mechanical rooms to be rigid insulation with RF3 premium finish.
.3 External insulation is not required where ductwork is internally lined, indoors only.

12. **Plumbing General**
.1 To comply with BC Plumbing Code 2024 and local municipality requirements.
.2 Fire stop all penetrations through rated separations. Provide necessary thermal insulation and vapour barrier at penetrations. Contractor to provide professional certification from specialist fire-stopping trade prior to report for completion or occupancy review, whichever is the earlier.
.3 Supply and install cleanouts on all drains, changes in direction, at base of riser and on main sanitary and storm leaving building in addition to the B.C. Plumbing Code.
.4 Provide water meter c/w remote read-out as per the local authority having jurisdiction. Each water station shall be complete with a P.R.V. bypass and pressure gauges and strainer.
.5 Where drains are located over an occupied area, membrane clamp is to be provided with drain for a waterproof installation.
.6 Prior to commencing the underground plumbing installation excavate and verify:
.1 The location, elevation and size of storm and sanitary service connections.
.2 The sanitary and storm lines can be routed and sufficiently sloped with adequate cover for freezing protection to meet the service connections.
.3 Inform the engineer immediately if any changes are required.
.4 All floor drains shall have trap primer connection and trap primer.
.5 Water distribution pipe to be 19mm (3/4") minimum.
.6 Provide installation of plumbing fixtures when supplied by others.
.7 Lead free solder to be used for all potable water systems. Contractor to issue guarantee in maintenance manual.
.7 Provide unions to all equipment and valve connections for 65mm (2-1/2") and below. Flanged connections for 75mm (3") and over.
.8 Provide stainless steel bellows type water hammer arrestors on water lines connected to clothes washer, dish washer, washrooms with quick valve fixtures and at top of risers. Provide accessible isolation valve and access to arrestors for servicing.
.9 Provide any excavations necessary for the installation of the mechanical work. No cutting, boring or excavating necessary for this work in or about the building which may cause interference with the progress of the work or weaken the structure in any way, shall be undertaken without the approval of the consultant before commencing work. Trenches for all underground piping shall be excavated to a depth slightly more than required and graded so as to secure all available fall. Support each length of pipe and backfill the trench with gravel to the required depth and grade. Sanitary and storm lines outside of the building shall be kept as deep as practical.
.10 Backfilling in all trenches shall be with sand or pea gravel where approved, 150mm (6") below pipe and up to 150mm (6") over top of piping. Remainder of all trenches shall be filled by the General Contractor.
.11 Where sewer, water or storm pipes pass under a grade beam or footing the trench around the piping up to and in contact with the footing, provide a 450 kg (1000lbs) concrete grouting so as to seal the outside trenching from normal storm run off and backflow of rain water through the trenching and into the crawl space and/or under the basement floor.
.12 Where sewer, water or storm pipes pass through exterior walls below grade, the General Contractor shall install corbels on the exterior walls and run bridging from corbel to undisturbed soil for the support of the pipes. One inch thick waterproof mastic shall be applied around the pipes, which pass through the wall.
.13 Provide chrome escutcheon plates for all plumbing rough-in.
.14 Provide flashing and counter flashing for pipe passing through roof deck structure.
.15 Provide non-conducting type connection for joining or supporting. Provide separation between dissimilar metals.
.16 Provide stop valve to all equipment and plumbing fixture connection. Provide stop valve to base of water risers. Provide isolation valves for all fixture trim unless complete with integral stops.
.17 Support plumbing risers at floor level only. Pipes to be c/w riser clamps every other floor. To avoid contact with studs and drywall, orient all clamps supporting piping parallel to walls. Use plastic pipe clamps on 13mm Ø (½" Ø) supply piping within suites. Attach wing back elbows, shut off valves, faucets, etc. to separate wood plates in separate rows of studs in party walls. Provide clearance and use resilient (fire) caulking where piping passes through party walls and floors. The intent of these requirements is to minimize bridging of the wall by the plumbing system.
.18 Supply and install all hangers, supports, brackets, reinforcement, 14 gauge steel back_up plates, floor flanges and all accessory piping and fittings, for the proper installation and support of all fixtures and their respective supply fittings
.19 Where piping is suspended from hangers from the floor above, use oversized hangers/straps and include a layer of resilient pipe insulation between the hanger and the pipe (e.g. Armaflex neoprene, 13mm (½ ") thick), with a metal shim to distribute the load (20% maximum compression). Fibreglass pipe insulation is also acceptable provided manufacturer's loading criteria are met.
.20 Terminate all vertical waste stacks and rain water leaders in two 45° bends at the bottom of vertical runs, or a large radius 90° bend.
.21 Maintain a minimum 13mm (½") clearance between pipes and studs, electrical conduit, or other pipes. If the clearance is minimal, use resilient insulation (Armaflex) to avoid contact. (This requirement is to avoid rattling between pipes.)
.22 Do not use foam spray-on products for insulation.
.23 Where plumbing fixtures come in contact with wall and/or floor, joints shall be sealed with building sealant, made watertight and beaded smooth in a neat and workmanlike manner.
.24 Provide high lip drain pan for all hot water tanks and pipe drain to nearest floor drain. Provide side drain pan to allow for piping to remote drain or provide provisions for bottom drain to pipe to drain. Pan equivalent to Menzies Hot Water Pan High Lip 701-1200 series. Size to suit hot water tank.
.25 Provide thermal expansion tank connected to cold water supply to domestic hot water tank. Where not specified on the mechanical drawings, expansion tanks to be equal to the following:
.1 Commercial System:
.1 Greater than 60 gallons and 210 gallons or less hot water system volume
.1 Amtrol ST-12C-DD - 6.4 gallon tank, 3.2 gallon acceptance, ASME rated
.26 Approval of the plumbing system is required before insulation and drywall work is started. Do not commence final boarding until plumbing has been reviewed for clearance.

13. **Plumbing Fixtures & Trim**
.1 Floor drains and roof drains to be manufactured by approved manufacturer.
.2 Coordinate all floor drains with general contractor to suit final floor finishes.
.3 Coordinate all roof drains with general contractor to maintain water proofing membrane.
FD-1 Watts #FD-100-C-7-A5-1 Floor Drain - epoxy coated, cast iron body, reversible flashing clamp with primary and secondary weepholes, trap primer connection with plug, no hub outlet. Watts -A5-1 5" (127 mm) diameter, nickel bronze, adjustable round strainer. Provide trap primer.
FD-2 Watts #FD-100-C-DD Floor Drain with Hub Funnel - epoxy coated, cast iron body, reversible flashing clamp with primary and secondary weepholes, trap primer connection with plug, cast iron hub outlet. Provide trap primer.
NOTE: For membrane flooring, i.e. use alternate FD-1 below instead of typical FD-1
FD-1 Mifab F1100-C-FC Floor Drain with Surface Membrane Clamp for Membrane Floor Areas, lacquered cast iron with anchor flange, cast iron membrane clamp ring with primary and secondary weepholes, reinforced satin finished nickel bronze strainer with surface membrane clamp and vandal resistant, allen key screws. Provide trap primer.
.4 Cleanouts in finished areas to be Smith 4020S cast iron cleanout with adjustable scoriated nickel bronze top. In lino tile area use Smith 4140S c/w 3.5mm (1/8") tile recess.
.5 Hose bibs
HB-1 Watts Drainage HY-725 concealed non-freeze key operated wall hydrant with nickel bronze box and door, chrome plated hydrant face, integral vacuum breaker, 3/4"(19) hose connection, 3/4"(19) female x 1"(25) male pipe connection, all bronze head, seat casting and internal working parts, bronze wall casing, and loose key. Thickness to suit wall location.
.6 Clothes washer outlet box
OB-1 Clothes washer supply and drain fixture for 13mm (1/2") hot & cold water supplies, 38mm (1-1/2") drain, complete with service stops. Plastic box to be 190mm x 200mm x 90mm (7½" x 8" x 3½") c/w faceplate. Provide fire-rated outlet boxes when installed in rated assemblies.
.7 All plumbing fixtures shall be white in colour.
WC-1 American Standard 2315228.020 Toilet - BABY DEVORO™, Tank type Toilet, Floor mounted with floor outlet, High Efficiency 4.8 LPF (1.28 GPF), Vitreous china, White finish, Junior bowl, 10-1/4" rim height for toddlers, Minimum 10" rough-in from wall to the center of waste outlet, Siphon jet flush action, Manual, Polished chrome left-hand trip lever (738903-0020A), Tank not lined, Without tank cover locking device, Gravity-assisted flush, Tank coupling components, Fully-glazed trapway, Sanitary dam on bowl, two (2) colour-matched bolt caps, 17-1/4" wide, 25" from finished wall, 24-1/2" high, ASME A112.19.2 compliant, CSA B45.1 compliant. American Standard 5001G055.020 Seat - BABY DEVORO, Heavy-duty Open front Toddler toilet seat without cover, For baby seat, White, Solid plastic, antimicrobial surface, Installed from the bottom of the bowl. McGuire LFBV172SS12 Supply - CONVERTIBLE™ Commercial Toilet Supply kit, consisting of (1) stop valve, (1) riser, (1) flange, Lead Free Brass body, Chrome-plated finish, 20 - 125 PSI operating pressure, Convertible loose key/triangle handle, Quarter turn ball valve, Angle stop, C.P. wrought steel deep bell wall flange (standard), C.P. prefabricated 5" copper sweat tube extension nipple, 12" C.P. toilet braided stainless riser tube, 1/2" Sweat inlet x 3/8" O.D. outlet, AB 100 compliant, ASME A112.18.1 compliant, ASME A112.18.2-2 (risers), CSA B125.2 compliant (risers), Certified to NSF/ANSI 372, Certified to NSF/ANSI 61, UPC compliant.
WC-2 American Standard 215AA174.020 Toilet - CADET® PRO™, Tank type Toilet, Floor mounted with floor outlet, High Efficiency 4.8 LPF (1.28 GPF), Vitreous china, White finish, antimicrobial surface, Elongated bowl, Right Height® rim at 16-1/2", Minimum 12" rough-in from wall to the center of waste outlet, Siphon jet flush action, Manual, Polished chrome left-hand trip lever (7381231-200.0020A), Tank with Aquaguard liner, With tank cover locking device, Gravity-assisted flush, 3" flush valve, metal shank fill valve, Tank coupling components, 9" x 8" water surface area, Fully-glazed 2-1/8" trapway, Includes EZ-Install Tools, Trade exclusive tank, Colour-matched bolt caps, 17-3/8" wide, 30-1/8" from finished wall, 30-3/8" high, ASME A112.19.2 compliant, CSA B45.1 compliant, EPA WaterSense® compliant. Centoco 820STSS-001 Seat - Heavy-duty Open front Toilet seat With cover, For elongated bowl, White, Polypropylene plastic, Color-matched plastic self-sustaining check hinges with one solid metal hinge pin and bolt, Includes stainless steel hardware. McGuire LFBV172SS12 Supply - CONVERTIBLE™ Commercial Toilet Supply kit, consisting of (1) stop valve, (1) riser, (1) flange, Lead Free Brass body, Chrome-plated finish, 20 - 125 PSI operating pressure, Convertible loose key/triangle handle, Quarter turn ball valve, Angle stop, C.P. wrought steel deep bell wall flange (standard), C.P. prefabricated 5" copper sweat tube extension nipple, 12" C.P. toilet braided stainless riser tube, 1/2" Sweat inlet x 3/8" O.D. outlet, AB 100 compliant, ASME A112.18.1 compliant, ASME A112.18.2-2 (risers), CSA B125.2 compliant (risers), Certified to NSF/ANSI 372, Certified to NSF/ANSI 61, UPC compliant.

Association of Professional Engineers and Geoscientists of the Province of British Columbia
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REVISIONS:

D 2026/08/25 ISSUE FOR TENDER
C 2026/07/31 90% COORDINATION
B 2026/07/04 ISSUED FOR BUILDING PERMIT
A 2026/06/19 50% REVIEW SET
ISSUES:

DIMENSIONS:
THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, AND IMMEDIATELY REPORT ANY ERRORS AND/OR OMISSIONS. DO NOT SCALE DRAWINGS.

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PROJECT:
UNICORN DAYCARE

TITLE:
MECHANICAL SPECIFICATIONS

DRAWN: PF	DRAWING Nº: M3.02
SCALE: N.T.S.	
JOB Nº: 25539	
DATE: MAY 2026	REV. Nº: D

WC-3 American Standard 215AA154.020 Toilet - CADET® PRO™, Tank type Toilet, Floor mounted with floor outlet, High Efficiency 4.8 LPF (1.28 GPF), Vitreous china, White finish, antimicrobial surface, Elongated bowl, Right Height® rim at 16-1/2", Minimum 12" rough-in from wall to the center of waste outlet, Siphon jet flush action, Manual, Polished chrome left-hand trip lever (7381231-200.0020A), Tank with Aquaguard liner, Without tank cover locking device, Gravity-assisted flush, 3" flush valve, metal shank fill valve, Tank coupling components, 9" x 8" water surface area, Fully-glazed 2-1/8" trapway Includes EZ-Install Tools, Trade exclusive tank, Colour-matched bolt caps, 17-3/8" wide, 30-1/8" from finished wall, 30-3/8" high, ASME A112.19.2 compliant, CSA B45.1 compliant, EPA WaterSense® compliant. Centoco 820STSS-001 Seat - Heavy-duty Open front Toilet seat With cover, For elongated bowl, White, Polypropylene plastic, Color-matched plastic self-sustaining check hinges with one solid metal hinge pin and bolt, Includes stainless steel hardware. McGuire LFBV172SS12 Supply - CONVERTIBLE™ Commercial Toilet Supply kit, consisting of (1) stop valve, (1) riser, (1) flange, Lead Free Brass body, Chrome-plated finish, 20 - 125 PSI operating pressure, Convertible loose key/triangle handle, Quarter turn ball valve, Angle stop, C.P. wrought steel deep bell wall flange (standard), C.P. prefabricated 5" copper sweat tube extension nipple, 12" C.P. toilet braided stainless riser tube, 1/2" Sweat inlet x 3/8" O.D. outlet, AB 100 compliant, ASME A112.18.1 compliant, ASME A112.18.2-2 (risers), CSA B125.2 compliant (risers), Certified to NSF/ANSI 372, Certified to NSF/ANSI 61, UPC compliant.

LV-1 American Standard 0491019.020 Basin - RONDALYN, Drop-in Lavatory, Vitreous china, White finish, 4" centerset, Front overflow, With faucet ledge, Overall Dimensions: 19-1/8" dia., 7-5/8" high, Bowl Dimensions: 15" long, 12-1/8" wide, 5-3/4" dia., 5-3/4" deep. Sloan SL-EBF-650 Faucet - OPTIMA®, Counter mounted, Automatic no-touch, Battery powered, Lavatory faucet, Polished chrome finish, 4" centerset, Brass spout, 1.9 LPM (0.5 GPM) maximum flowrate, Multi-laminar spray outlet, Fixed spout, 4-9/16" spout reach, 3-5/8" high, Self-adapting infrared sensor, Dual inlet filter assembly with 3/8" compression brass cap for tempered water included, Wireless bluetooth status view, setting adjustment and diagnostic via Sloan Connect App®, Integral water supply shut off. McGuire LFBV170SS12 Supply - CONVERTIBLE™ Commercial Faucet Supply kit, consisting of (2) stop valves, (2) risers, (2) flanges (standard), Lead Free Brass body, Chrome-plated finish, 20 - 125 PSI operating pressure, 4 to 60 °C (40 to 140 °F) operating temperature, Convertible loose key/triangle handle, Quarter turn ball valve, Angle stop, C.P. wrought steel deep bell wall flange (standard), C.P. prefabricated 5" copper sweat tube extension nipple, 12" C.P. lavatory braided stainless riser tube, 1/2" Sweat inlet x 3/8" O.D. outlet, 82 °C (180 °F) maximum during high-temperature system flush, AB 100 compliant, ASME A112.18.1 compliant, ASME A112.18.2-2 (risers), CSA B125.2 compliant (risers), Certified to NSF/ANSI 372, Certified to NSF/ANSI 61, UPC compliant.

LV-2 American Standard 0955001EC.020 0059020EC.020 Basin - MURRO, Wall-hung Lavatory, Vitreous china, antimicrobial surface, White finish, Single hole centerset, Rear overflow, Faucet ledge with recessed self-draining deck, For concealed arm or wall support, Vitreous china shroud/knee contact guard with EverClean (0059020EC), When installed with a below deck electronics faucet which has the control box, the accessories will not fit under the shroud and will need to be installed outside the shroud, Overall Dimensions: 21-7/16" long, 21-1/4" wide, 6" high, Bowl Dimensions: 13-1/2" long, 15-1/2" wide, 5" deep. Sloan EBF-615-BAT-TEE-CP-0.5GPM-MLM-IR-FCT Faucet - OPTIMA®, Counter mounted, Automatic no-touch, Battery powered, Lavatory faucet, Polished chrome finish, Single hole centerset, Brass spout, 1.9 LPM (0.5 GPM) maximum flowrate, Multi-laminar spray outlet, Fixed spout, 4-1/2" spout reach, 3-1/2" high, Self-adapting infrared sensor, Twist-off/shut-off solenoid assembly with serviceable strainer filter, Four (4) AA-size alkaline batteries, Dual inlet filter assembly with 3/8" compression brass cap for tempered water included, Wireless bluetooth status view, setting adjustment and diagnostic via Sloan Connect App®, Integral water supply shut off, Hygienic line flush. McGuire LFBV170SS12 Supply - CONVERTIBLE™ Commercial Faucet Supply kit, consisting of (2) stop valves, (2) risers, (2) flanges (standard), Lead Free Brass body, Chrome-plated finish, 20 - 125 PSI operating pressure, 4 to 60 °C (40 to 140 °F) operating temperature, Convertible loose key/triangle handle, Quarter turn ball valve, Angle stop, C.P. wrought steel deep bell wall flange (standard), C.P. prefabricated 5" copper sweat tube extension nipple, 12" C.P. lavatory braided stainless riser tube, 1/2" Sweat inlet x 3/8" O.D. outlet, 82 °C (180 °F) maximum during high-temperature system flush, AB 100 compliant, ASME A112.18.1 compliant, ASME A112.18.2-2 (risers), CSA B125.2 compliant (risers), Certified to NSF/ANSI 372, Certified to NSF/ANSI 61, UPC compliant. Watts WCA-411-CA-481 Carrier - WCA-411/WCA-411-WC, Lavatory carrier, Single floor-mounted lavatory carrier with concealed arms, For concealed arm carrier, adjustable arms, epoxy coated cast iron, integral welded feet, upper tie rod, Heavy gauge steel offset uprights, basin locking device, Plated hardware, levelling screws, Wall mounted steel support plate with plated hardware.

SK-1 Franke Commercial LBS6108P-1-1 Sink - Single compartment sink, Single hole centerset, Commercial sinks, with overall dimension, 23-1/8" long, 20-13/16" wide, 8" high, constructed from 18 gauge Type 304 Stainless steel, Bowl dimensions are, 21" long, 16" wide, 8" deep, Polished to #4 satin finish, Factory installed fasteners, Factory applied rim seal, Center back waste location, 1-1/2" (DN38) brass tailpiece, 3-1/2" crumb cup strainer, waste fitting included, Undercoated to reduce condensation and resonance, Compliances and certifications: ASME A112.19.3 compliant, CSA B45.4 compliant. American Standard 7074100.002 Faucet - COLONY PRO, Counter mounted, Manual, Single handle, Sink faucet, Polished chrome finish, Single hole centerset, Lead Free ANSI/NSF 61 and ANSI/NSF 372 compliant Metal, Integral check valve, 24" braided flexible stainless steel supply hoses with 3/8" compression connection, Washerless ceramic disc valve cartridge, 5.7 LPM (1.5 GPM) maximum flowrate, Pressure compensating spray outlet, Swivel Mid-arc spout, Pull out, 8-11/16" spout reach, 9-5/8" high, Lever handle, Adjustable high temperature limit stop. McGuire LFBV170SS12 Supply - CONVERTIBLE™ Commercial Faucet Supply kit, consisting of (2) stop valves, (2) risers, (2) flanges (standard), Lead Free Brass body, Chrome-plated finish, 20 - 125 PSI operating pressure, 4 to 60 °C (40 to 140 °F) operating temperature, Convertible loose key/triangle handle, Quarter turn ball valve, Angle stop, C.P. wrought steel deep bell wall flange (standard), C.P. prefabricated 5" copper sweat tube extension nipple, 12" C.P. lavatory braided stainless riser tube, 1/2" Sweat inlet x 3/8" O.D. outlet, 82 °C (180 °F) maximum during high-temperature system flush, AB 100 compliant, ASME A112.18.1 compliant, ASME A112.18.2-2 (risers), CSA B125.2 compliant (risers), Certified to NSF/ANSI 372, Certified to NSF/ANSI 61, UPC compliant.

SK-2 Franke Commercial LBD6407-1-3 Sink - Double compartment sink, 8" centerset, Commercial sinks, with overall dimension, 31-1/4" long, 20-1/2" wide, 7" high, constructed from 20 gauge Type 302 Stainless steel, Left bowl is 14" long and right bowl is 14" long, Left bowl is 16" wide and right bowl is 16" wide, Left bowl is 7" deep and right bowl is 7" deep, Polished to #4 satin finish, Factory installed fasteners, Factory applied rim seal, Center back waste location, 1-1/2" (DN38) brass tailpiece, 3-1/2" crumb cup strainer, waste fitting included, Undercoated to reduce condensation and resonance, Compliances and certifications: ASME A112.19.3 compliant, CSA B45.4 compliant. American Standard 7074100.075 Faucet - COLONY PRO, Counter mounted, Manual, Single handle, Sink faucet, PVD stainless steel finish, 8" centerset, Installed with included 10" deck plate, Lead Free ANSI/NSF 61 and ANSI/NSF 372 compliant Metal, Integral check valve, 24" braided flexible stainless steel supply hoses with 3/8" compression connection, Washerless ceramic disc valve cartridge, 5.7 LPM (1.5 GPM) maximum flowrate, Pressure compensating spray outlet, Swivel Mid-arc spout, Pull out, 8-11/16" spout reach, 9-5/8" high, Lever handle, Adjustable high temperature limit stop. McGuire LFBV170SS12 Supply - CONVERTIBLE™ Commercial Faucet Supply kit, consisting of (2) stop valves, (2) risers, (2) flanges (standard), Lead Free Brass body, Chrome-plated finish, 20 - 125 PSI operating pressure, 4 to 60 °C (40 to 140 °F) operating temperature, Convertible loose key/triangle handle, Quarter turn ball valve, Angle stop, C.P. wrought steel deep bell wall flange (standard), C.P. prefabricated 5" copper sweat tube extension nipple, 12" C.P. lavatory braided stainless riser tube, 1/2" Sweat inlet x 3/8" O.D. outlet, 82 °C (180 °F) maximum during high-temperature system flush, AB 100 compliant, ASME A112.18.1 compliant, ASME A112.18.2-2 (risers), CSA B125.2 compliant (risers), Certified to NSF/ANSI 372, Certified to NSF/ANSI 61, UPC compliant.

SK-3 Franke Commercial WSS6713-2 Sink - Single compartment sink, 8" centerset, Service sink, with overall dimension, 20" long, 19" wide, 25" high, constructed from 14 gauge Type 304 Stainless steel, Bowl dimensions are, 17" long, 16" wide, 13" deep, Polished to #4 satin finish, With 12" high backsplash, Radius coved bowl corners, Less overflow, Center waste location, 3-1/2" crumb cup strainer, Compliances and certifications: ASME A112.19.3 compliant, CSA B45.4 compliant. American Standard 8350243.002 Faucet - Wall-hung, Manual, Two handles, Mop sink faucet, Polished chrome finish, 8" centerset, Brass construction, Ceramic disc cartridge, no flow restrictor, 37.8 LPM (10 GPM) @20 PSI, Threaded hose end, Fixed Spout with bucket hook, 6-3/4" spout reach, Vandal-resistant lever handles, 1/2" female inlet.

JS-1 Fiat MSB2424100-830AA-MSG24-832AA-889CC-E77AA24 Sink - Single compartment sink, Mop service sinks, with overall dimension, 24" long, 24" wide, 10" high, constructed from Molded stone, Bowl dimensions are, White finish, A combination dome strainer and lint basket made from stainless steel shall be included with factory installed stainless steel drain body for caulked joint or QDC-3 joint to accept a 3" drain pipe, Chrome-plated service faucet with vacuum breaker, integral stops, adjustable wall brace, pail hook and 3/4" hose thread on spout (830AA), 24" wall guard one (1) extra 24" x 12" stainless steel panel (MSG24), Hose and hose bracket (832AA), Mop hanger (889CC), Vinyl bumper guard (E77AA).

14. **Cleaning & Chemical Treatment**

.1 Provide for cleaning and disinfection of all domestic hot & cold water systems.
.2 During system flushing ensure that all control valves and other system valves are in the full open position.
.3 All domestic water piping shall be thoroughly flushed so that it is free from all scale, sediment, etc.

15. **Equipment**

15.1 **Fan Coil Units/ Heat Pump Units**

.1 Scope:
  .1 Horizontal slim fan coil unit.
  .2 Operating controls.
  .3 Condensing unit.
  .4 Seismic restraint.
.2 Provide 5 year unconditional parts warranty on heat exchangers and compressor unit.
.3 Unit Construction
  .1 Cabinet: Casing shall be constructed of 18 gauge (1.3mm) unpainted satin coat galvanized steel. Units shall include 1" (25mm) 1 1/2" lb/ft^3 (24 kg/m^3) insulation, integral stainless steel drain pan, slotted hanger channels, duct collars on inlet and outlet, screwed access panels, adjustable motor mounts and 2" (50mm) throwaway filters. Unit construction is one piece. Units are factory tested. Field assembly of components, including mounting of motor and drives is not acceptable.
  .2 Coils: Heating and/or cooling coils shall be 1/2" (13mm) copper tube with rippled aluminum fins and Schraeder vent fittings on fluid coils. D.X. coils shall include distributors. Expansion valves and refrigeration accessories are by refrigeration contractor (others).
  .3 Fans: Double width, double inlet, forward curved fan. Fan shall be belt driven and statically and dynamically balanced.
  .4 Motor: Constant speed motor with variable pitch drive and adjustable motor mount.
  .5 Filters: 50mm (2") standard size disposable MERV 13 filter.
.4 Provide 5 year unconditional parts warranty on heat exchangers and compressor unit.
.5 Air Cooled Heat Pump Units:
  .1 Separate package air cooled heat pump units are required for fan coil units provided with DX heating/cooling coils.
  .2 Supply and install remote condensing units as per manufacturer's requirements. Co-ordinate exact location with Consultant prior to installation.
  .3 For split installations the fan coil unit manufacturer is to retain the services of a TQ licensed refrigeration mechanic to provide and install all interconnecting refrigeration pipe and equipment required, and include this work in the price quoted for the equipment supply.
  .4 Seal all piping and wiring penetrations through the building structure.
  .5 Provide unit capable of 100% heating capacity down to 5°F (-15°C) and a minimum of 75% heating capacity down to -13°F (-25°C).
  .6 Provide integral base pan heater within outdoor unit.
.6 Controls
  .1 Provide manufacturer supplied control and monitoring box for remote wall mounting. Push button control to allow full function modification of all operating parameters of the system. LCD display.
  .2 Controller to allow setpoint and user adjustment for room temperature, alarms for high and low threshold of temperature, loss of power and condensate drain pan high water.
  .3 Provide controls to allow operation under low ambient conditions down to -18 degrees C.
  .4 Controller to be programmable, with up to four changes per day allowable for temperature.
  .5 Controllers to have auxiliary heat module capable of turning on and off auxiliary electric duct heater from a single thermostat. Indoor fan to continue to operate while auxiliary heat is enabled. Interface tstat of fan coil with associated back up duct heater for when HP cannot keep up with demand.
.7 Installation
  .1 Install refrigerant piping between indoor and outdoor sections. Review requirements of Section 01000 for firestopping where piping penetrates fire rated walls and for roofing where lines run outdoors to connect to condensing section.
  .2 Pipe indoor unit condensate to nearest storm or sanitary drain. Provide indirect connection for sanitary drain connection complete with 25mm (1") air gap. Provide additional P-trap as required.
  .3 Mount controller on wall at a height of 1500-mm (5-feet) above finished floor. Install all control wiring required to make the system operational.
  .4 Secure outdoor unit to structure.
  .5 Provide solid, level base below heat pump where grade is uneven or concrete slab is not below heat pump outdoor unit location.
  .6 Provide raised mounting base for all heat pumps. Raised base to be minimum of 150 mm (6") above the ground. Where units are installed on the roof raised base to be a minimum of 300mm (12") above the ground. Refer to the manufacturer's literature and install to the most restrictive requirement.
  .7 Provide vibration isolation pads under outdoor unit.
.8 Refer to drawings for heat pump schedules.

15.2 **Energy Recovery Unit**

.1 Scope:
  .1 Packaged heat recovery unit.
  .2 Operating controls.
  .3 Heat Recovery Core.
  .4 Seismic restraint.
.2 Provide (2) two year non-prorated warranty on parts, and a (15) fifteen year polypropylene core warranty or a (2) two year enthalpy core warranty.
.3 Unit Construction
  .1 Materials: Formed double wall insulated metal cabinet, fabricated to permit access to internal components for maintenance.
  .2 Outside casing: 20 gauge, galvanized (G90) steel meeting ASTM A653 for components that do not receive a painted finish. Painted components as supplied by the factory shall have polyester urethane paint on 20 gauge G90 galvanized steel.
  .3 Access doors shall be hinged with airtight closed cell foam gaskets. Door pressure taps, with captive plugs, shall be provided for cross-core pressure measurement allowing for accurate airflow measurement.
  .4 Unit shall have factory-installed duct flanges on all duct openings.
  .5 Cabinet Insulation: Unit walls and doors shall be insulated with 1 inch, 4 pound density, foil faced, high density fiberglass board insulation, providing a cleanable surface and eliminating the possibility of exposing the fresh air to glass fibers, and with a minimum R-value of 4.3 (hr-ft2-°F/BTU).
  .6 Control center / connections: Energy Recovery Ventilator shall have an electrical control center where all high and low voltage connections are made. Control center shall be constructed to permit single-point high voltage power supply connections to the disconnect.
  .7 Passive Frost Control: The ERV core shall perform without condensing or frosting under normal operating conditions (defined as outside temperatures above -10ºF and inside relative humidity below 40%). Occasional more extreme conditions shall not affect the usual function, performance or durability of the core. No condensate drains will be allowed.
.4 Heat Recovery Core and Filters
  .1 Energy recovery core shall be of the total enthalpy type, capable of transferring both sensible and latent energy between airstreams. Latent energy transfer shall be accomplished by direct water vapor transfer from one airstream to the other, without exposing transfer media in succeeding cycles directly to the exhaust air and then to the fresh air. No condensate drains shall be allowed. The energy recovery core shall be designed and constructed to permit cleaning and removal for servicing. The energy recovery core shall have a ten year warranty. Performance criteria are to be as specified in AHRI Standard 1060.
  .2 The core shall have cross leakage of less than 2%.
  .3 ERV shall have 2" thick MERV 13 disposable pleated filters located in the outdoor air and exhaust airstreams. All filters shall be accessible from the exterior of the unit.
.5 Motors
  .1 Unit shall be equipped with 2 (two) forward curve direct drive ECM blowers using permanently sealed bearings.
  .2 The analog voltage command to the supply fan ECM can be set from the unit controller display. The adjustable range of 0% to 100% correspond to the minimum and maximum fan operating speed. This supply fan operation mode can be used to field balance the supply air flow rate.
  .3 Blower motors shall be Premium Efficiency, EISA compliant for energy efficiency. The blower motors shall be totally enclosed (TEFC) and be shall be supplied with factory installed motor starters. Direct drive models shall be EISA-compliant for energy efficiency with open drip proof design and integral thermal protection.
.6 Electrical
  .1 Unit shall have a wired power connection complete with disconnect, operating on 120 volt/1 phase/60 Hz.
.7 Service Access
  .1 Provide service access to unit.
  .2 Provide removable doors to allow service access through module drop ceiling.

15.3 **Diffusers, Grilles and Registers.**

.1 Provide steel or aluminum ceiling grilles scheduled as shown on drawings.
.2 Balancing Dampers
  .1 Install where indicated.
  .2 Install in accordance with recommendations of SMACNA and in accordance with manufacturer's instructions.
  .3 Dampers must be manufactured; fabricated dampers are not acceptable.

15.4 **Pumps**

.1 Scope
  .1 All pumps except where integral with a manufactured piece of equipment.
  .2 Pumps controls where self contained.
  .3 Seismic restraints.
.2 Submittals
  .1 Submit with shop drawings certified curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable.
.3 Quality Assurance
  .1 Pumps shall be aligned by qualified millwright and alignment certified.
  .2 Ensure pumps operate at specified system fluid temperatures without binding and cavitation, are non overloading in parallel or individual operation, operate within 25% of midpoint of published maximum efficiency curve.
  .3 Where pumps are operated in conjunction with others such as parallel pumps, show all operating points on the pump curve.
  .4 Ensure installation complies with Workers' Compensation Board requirements.
.4 General
  .1 Statically and dynamically balance rotating parts.
  .2 Construction shall permit complete servicing without breaking piping or motor connections.
  .3 Pumps shall operate at 1750 r/min. unless specified otherwise.
  .4 Pump connections shall be flanged.
  .5 Heating pumps shall be suitable for handling water at 110°C.
  .6 Domestic water pumps shall be all bronze construction.
.5 In-Line Circulators
  .1 In-line circulator pumps shall be of type, size and capacity as specified on the drawings.
  .2 Pump shall be standard iron body for all applications except domestic water and indirect hot water heating where all bronze construction is required.
  .3 Pump shall be equipped with a 1750 r/min. drip proof, resilient mount, sleeve bearing motor.
  .4 The pump shaft shall have an integral thrust collar and shall be supported by two oil lubricated bronze sleeve bearings. Pump to be equipped with a water-tight long-life mechanical seal.
.6 Installation
  .1 Provide air cock and drain connection on horizontal pump casings.
  .2 Provide line sized gate valve and strainer on suction and line sized soft seated check valve and memory stop balancing valve on discharge.
  .3 Decrease from line size, with long radius reducing elbows or reducers. Support piping adjacent to pump such that no weight is carried on pump casings. Provide support under elbows on pump suction and discharge line sizes 100 mm and over.
  .4 Shave or replace pump impellers to meet actual operating conditions.
  .5 Where remote control panels are used, this contractor shall allow for wiring from panel to pumps.
  .6 Provide spacer at inlet and outlet on vertical in-line pumps complete with screen diffuser.
  .7 Provide seismic restraints for pumps.
  .8 Secure control panels for seismic loads.
.7 Performance
  .1 Refer to the pump schedule.

15.5 **Duct Mounted Electric Reheat Coils**

.1 Open coil resistance heaters mounted in a galvanized or aluminized, flanged steel frame of gauge required by CSA. Configure to fit into a horizontal duct with side mounted terminal housing. The entire heating coil assembly shall bear the CSA label and each unit certified as factory run and tested. The following factory installed and pre-wired items shall be included:
  .1 SCR controller with solid state relays
  .2 Disconnect
  .3 Sail switch
  .4 Automatic reset high limit switch mounted in the coil frame.
  .5 Terminal block
  .6 Control transformer

16. **Sheet Metal Ductwork**

.1 Ductwork shall be galvanized steel, lock formed 500 Pa (2") W.G. SMACNA standard for low velocity and medium velocity ductwork quality. Fabricated in accordance with SMACNA duct manuals and ASHRAE handbooks. Ductwork shall meet the requirements of NFPA 90A and 91 and conform to applicable codes.
.2 Prior to fabrication of ductwork, check all ceiling spaces and heights and conflict with other trades. Include and provide necessary offset to maintain ceiling height, headroom etc.
.3 Provide minimum 300mm x 300mm (12"x 12") access panels to manual dampers, equipment, fire dampers.
.4 All ductwork shall be delivered to site in a clean condition and remain clean. During installation all open ends of ductwork shall be capped and kept clean.
.5 Provide flexible duct connections from duct branches to supply air diffusers, 1500mm (5'-0") maximum. Flex shall be thermally insulated if supply ductwork is insulated.
.6 All ducts associated with fans, and other vibration isolated equipment shall be installed with flexible connections on the inlet and outlet openings.
.7 All ductwork penetrating floor slabs above and below or fire separations shall be complete with fire dampers.
.8 Provide return air openings and/or sound traps where indicated complete with 1" acoustic lining.
.9 Provide balancing dampers where indicated on drawings and at all duct branches. Provide additional balance dampers at the request of the balancing agent to facilitate balancing.
.10 Paint all visible ductwork through supply, return or exhaust grilles matte black. Coordinate on site with General Contractor.
.11 Size round ducts, installed in place of rectangular ducts, from ASHRAE table of equivalent rectangular and round ducts. No variation of duct configuration or sizes permitted except by permission from consultant.
.12 Provide seismic supports for grilles and diffusers.
.13 Provide turning vanes for all rectangular elbows installed as per SMACNA.
.14 Provide back draft damper to all exhaust outlets at exterior.
.15 Provide galvanized steel screen, 13mm x 13mm (1/2" x 1/2") square mesh for exterior intake & exhaust outlets.
.16 Provide flashing, curb and counter flashing for all ducting passing through roof and external envelope of the building.
.17 Duct sealing requirements:
  .1 Ducts with pressure over 500 Pa (2") use Class A sealing.
  .2 Ducts up to 500 Pa (2") use Class B sealing.
  .3 Branch duct to diffuser other than take-off, use Class C sealing.
.18 Provide sheet metal tray underneath domestic hot water heaters.
.19 Provide sheet metal tray on top of electrical equipment to prevent sprinkler spray.
.20 Provide access doors upstream and downstream of all coils and square elbows with turning vanes.

17. **Fire dampers**

.1 Provide U.L.C. Approved fire dampers made of galvanized steel or prime coated black steel weighted to close and lock in closed position when released by fusible link.
.2 Fire dampers in low pressure ductwork may be multi blade or curtain type.
.3 Fabricate combination fire and balancing dampers with linkage readily adjustable in open position.
.4 Curtain fire dampers shall have blades retained in a recess so free area of connecting ductwork is not reduced.
.5 Fusible links shall be set for 72°C (162°F).
.6 The contractor shall drop test all fire dampers in the presence of the consultant.
.7 Fire dampers to be dynamic type.

18. **Control System Electric**

.1 Provide complete control system to form fully operable, safe installation. Provide shop drawings of equipment and control sequences prior to installation.
.2 The motor list and work stated therein forms part of the contract document.
.3 Division 26 to provide wiring to 120V/1 phase motor and also the wiring between such motor and its control device such as thermostat and time clock. All other wiring are generally by mechanical. The motor list scope of work shall be follows.
.4 All Division 21-23 wiring and conduit requirements to follow Division 26 specifications for this project. This shall include low-voltage wiring. Mount of control devices.
  .1 By electrical contractor - mounting and wiring thermostats controlling single phase motor. Wiring of aquastats and timers controlling single phase motors.
  .2 By mechanical contractor - mounting of all in-line piping devices (well, valves, pressure switches, orifices, etc.). Mounting of aquastats and all control devices.
  .3 By sheet metal contractor - mounting of dampers, baffling in mixed air plenum to control contractor requirements, access door for duct or unit mounted controls.
.5 Install vandal resistant thermostats in all public areas.
.6 Split Air Conditioning Unit
  .1 Supply and install programmable t'stat and wire to heat pump unit.
  .2 Interlock heat pump unit and supply fan to ensure both run at same time.
  .3 Interlock cooling section and reheat coil to prevent operation of both sections at the same time.
  .4 Interface tstat of fan coil with associated back up duct heater for when HP cannot keep up with demand.
.7 Exhaust Fan - EF-1
  .1 Controlled by reverse acting thermostat.
.8 Energy Recovery Units, ERV-1, 2, & 3
  .1 ERV unit shall operate continuously during occupied hours.
.9 Duct Heaters, DH-1, 2, & 3
  .1 SCR controller to interface with associated fan coil tstat.

END OF SECTION

Association of Professional Engineers and Geoscientists of the Province of British Columbia
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REVISIONS:

D	2026/08/25	ISSUE FOR TENDER
C	2026/07/31	90% COORDINATION
B	2026/07/04	ISSUED FOR BUILDING PERMIT
A	2026/06/19	50% REVIEW SET

ISSUES:

DIMENSIONS:
THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, AND IMMEDIATELY REPORT ANY ERRORS AND/OR OMISSIONS. DO NOT SCALE DRAWINGS.

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PROJECT:
UNICORN DAYCARE

TITLE:
MECHANICAL SPECIFICATIONS

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