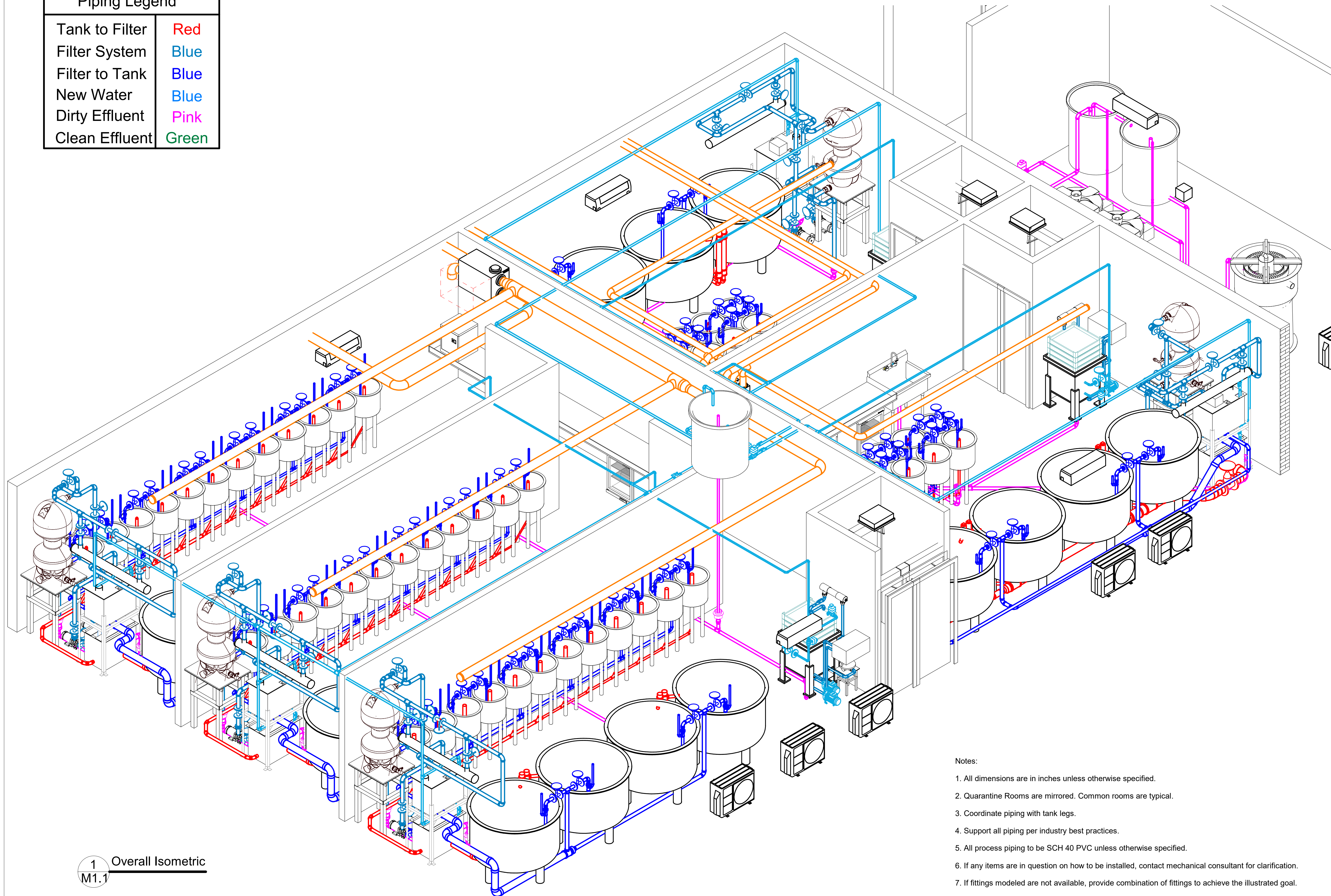


Piping Legend	
Tank to Filter	Red
Filter System	Blue
Filter to Tank	Blue
New Water	Blue
Dirty Effluent	Pink
Clean Effluent	Green



1 Overall Isometric
M1.1

Notes:

1. All dimensions are in inches unless otherwise specified.
2. Quarantine Rooms are mirrored. Common rooms are typical.
3. Coordinate piping with tank legs.
4. Support all piping per industry best practices.
5. All process piping to be SCH 40 PVC unless otherwise specified.
6. If any items are in question on how to be installed, contact mechanical consultant for clarification.
7. If fittings modeled are not available, provide combination of fittings to achieve the illustrated goal.



NOTE TO USER: DO NOT SCALE DRAWINGS. ALL DRAWINGS REMAIN THE PROPERTY OF ROMBALD INC. AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT WRITTEN PERMISSION.

NORTH:

CONSULTANT STAMP:

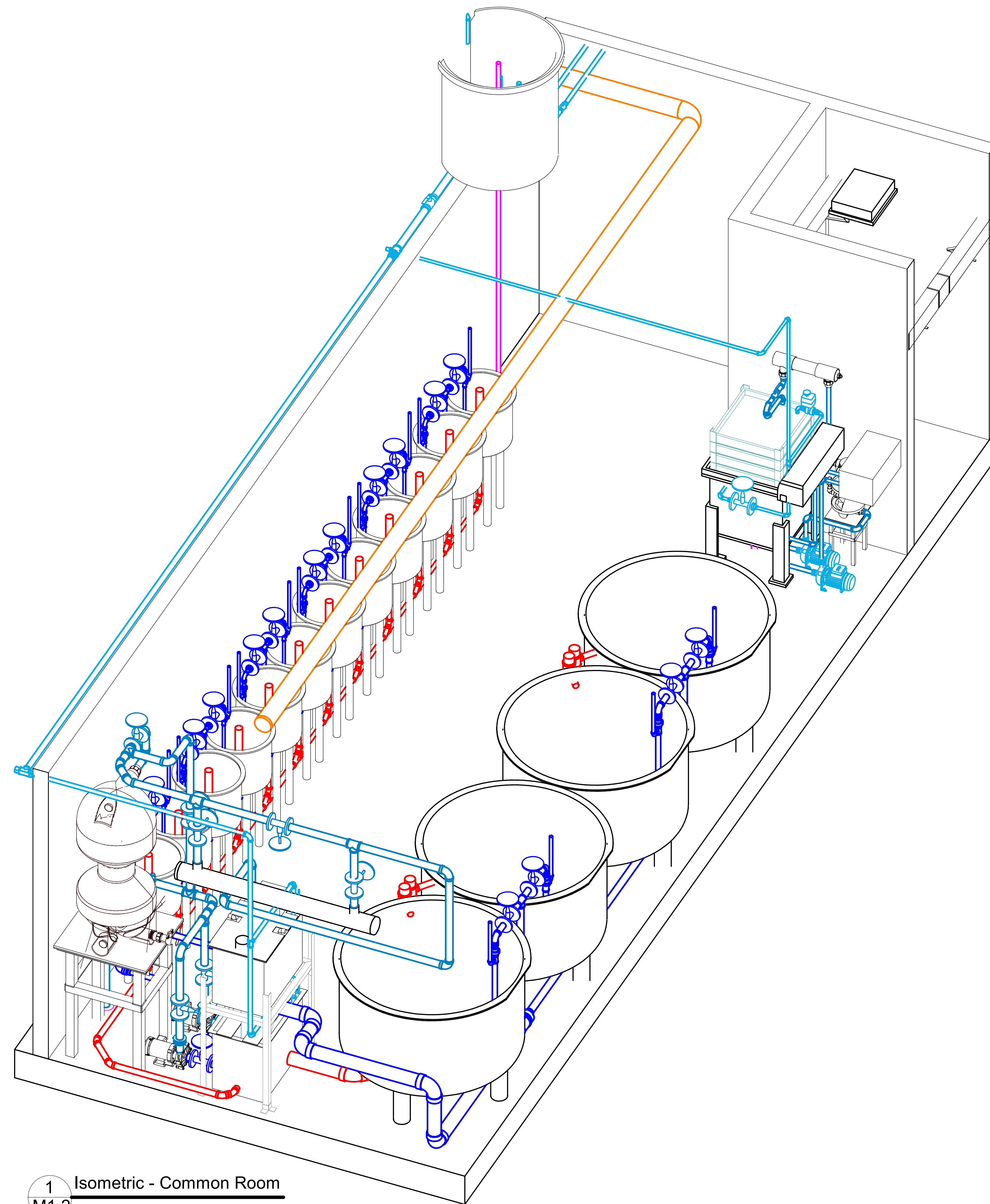


9	Issued for Tender	02/08/24
8	Issued for Tender	11/23/23
7	Issued for Review	06/16/23
6	Issued for Review	06/07/23
5	Issued for Tender Review	05/29/23
4	Issued for Coordination	04/20/23
3	Issued for Coordination	03/17/23
2	Issued for Coordination	03/03/23
1	Issued for Client Review	02/24/23
#	DESCRIPTION	MM/DD/YY

Codrington Research Facility
Codrington, ON

DRAWING TITLE:
Building Isometric View

DRAWN BY: J.V	CHECKED BY: N.B	APPROVED BY: T.N
SCALE:	SHEET SIZE: ARCH D	
PROJECT #: 22-250	SHEET #: M1.1	



1 Isometric - Common Room
M1.2



NOTE TO USER: DO NOT SCALE DRAWINGS. ALL DRAWINGS REMAIN THE PROPERTY OF ROMBALD INC. AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT WRITTEN PERMISSION.

NORTH: PN

CONSULTANT STAMP:

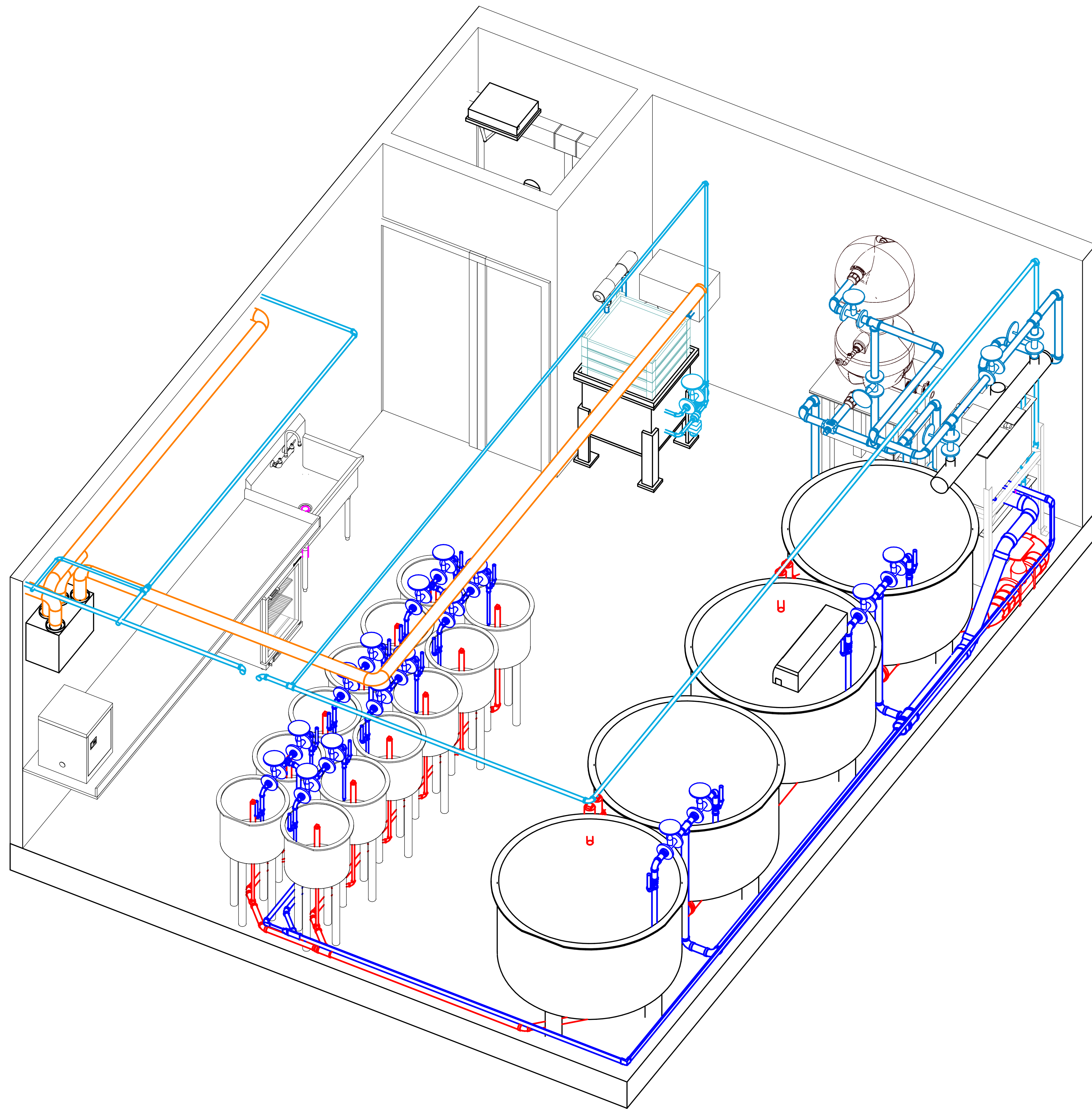


9	Issued for Tender	02/08/24
8	Issued for Tender	11/23/23
7	Issued for Review	06/16/23
6	Issued for Review	06/07/23
5	Issued for Tender Review	05/29/23
4	Issued for Coordination	04/20/23
3	Issued for Coordination	03/17/23
2	Issued for Coordination	03/03/23
1	Issued for Client Review	02/24/23
#	DESCRIPTION	MM/DD/YY

Codrington Research Facility
Codrington, ON

DRAWING TITLE:
Common Room Isometric Detail

DRAWN BY: J.V	CHECKED BY: N.B	APPROVED BY: T.N
SCALE:	SHEET SIZE: ARCH D	
PROJECT #: 22-250	SHEET #: M1.2	



1 Isometric - Quarantine Room
M1.3

NOTE TO USER: DO NOT SCALE DRAWINGS. ALL DRAWINGS REMAIN THE PROPERTY OF ROMBALD INC. AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT WRITTEN PERMISSION.

NORTH: PN

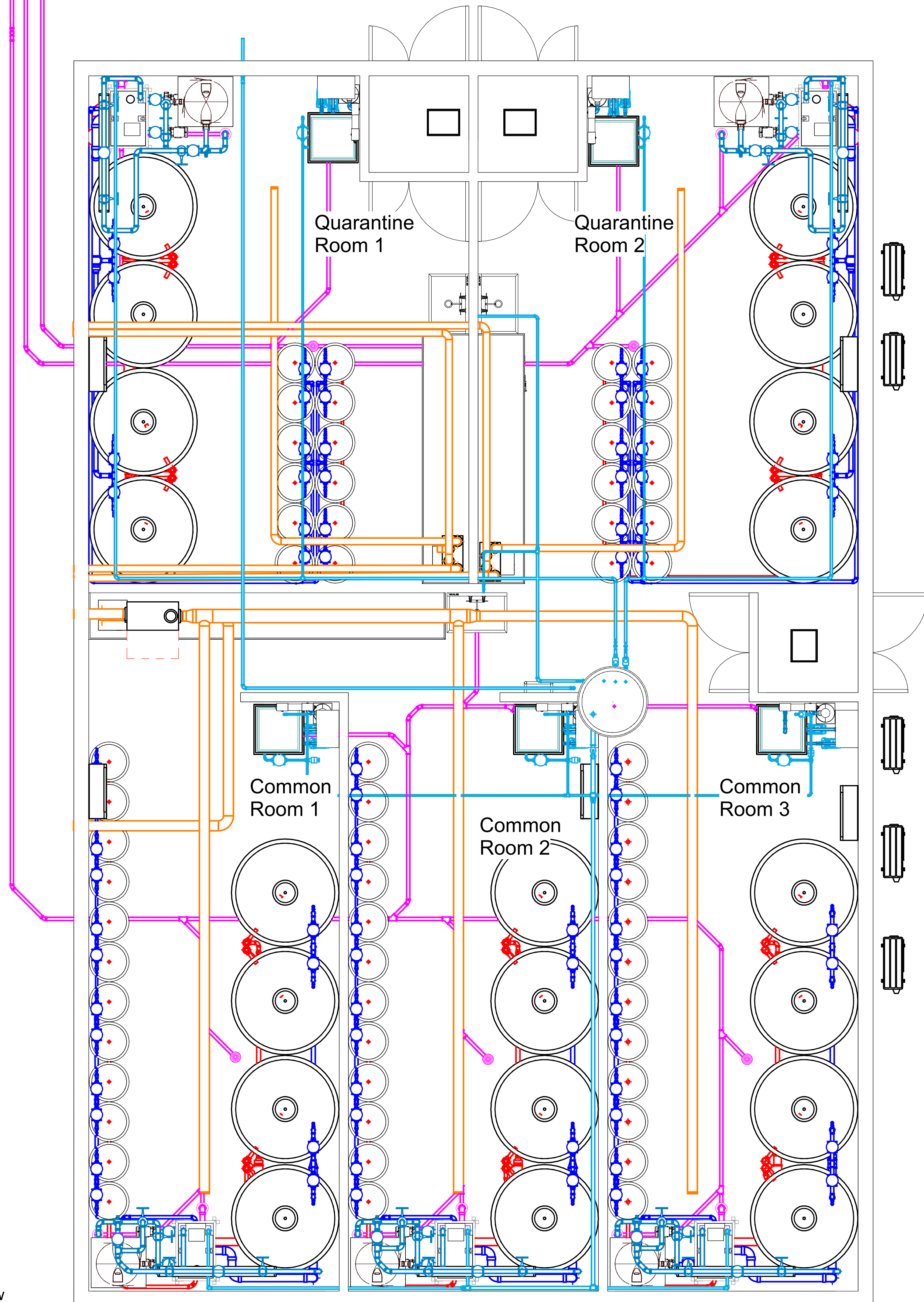
CONSULTANT STAMP:

9	Issued for Tender	02/08/24
8	Issued for Tender	11/23/23
7	Issued for Review	06/16/23
6	Issued for Review	06/07/23
5	Issued for Tender Review	05/29/23
4	Issued for Coordination	04/20/23
3	Issued for Coordination	03/17/23
2	Issued for Coordination	03/03/23
1	Issued for Client Review	02/24/23
#	DESCRIPTION	MM/DD/YY

Codrington Research Facility
 Codrington, ON

DRAWING TITLE:
**Quarantine Room
 Isometric Detail**

DRAWN BY: J.V	CHECKED BY: N.B	APPROVED BY: T.N
SCALE:	SHEET SIZE: ARCH D	
PROJECT #: 22-250	SHEET #: M1.3	



1 Overall Plan View
M1.4 1:35



NOTE TO USER: DO NOT SCALE DRAWINGS. ALL DRAWINGS REMAIN THE PROPERTY OF ROMBALD INC. AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT WRITTEN PERMISSION.

NORTH: PN

CONSULTANT STAMP:

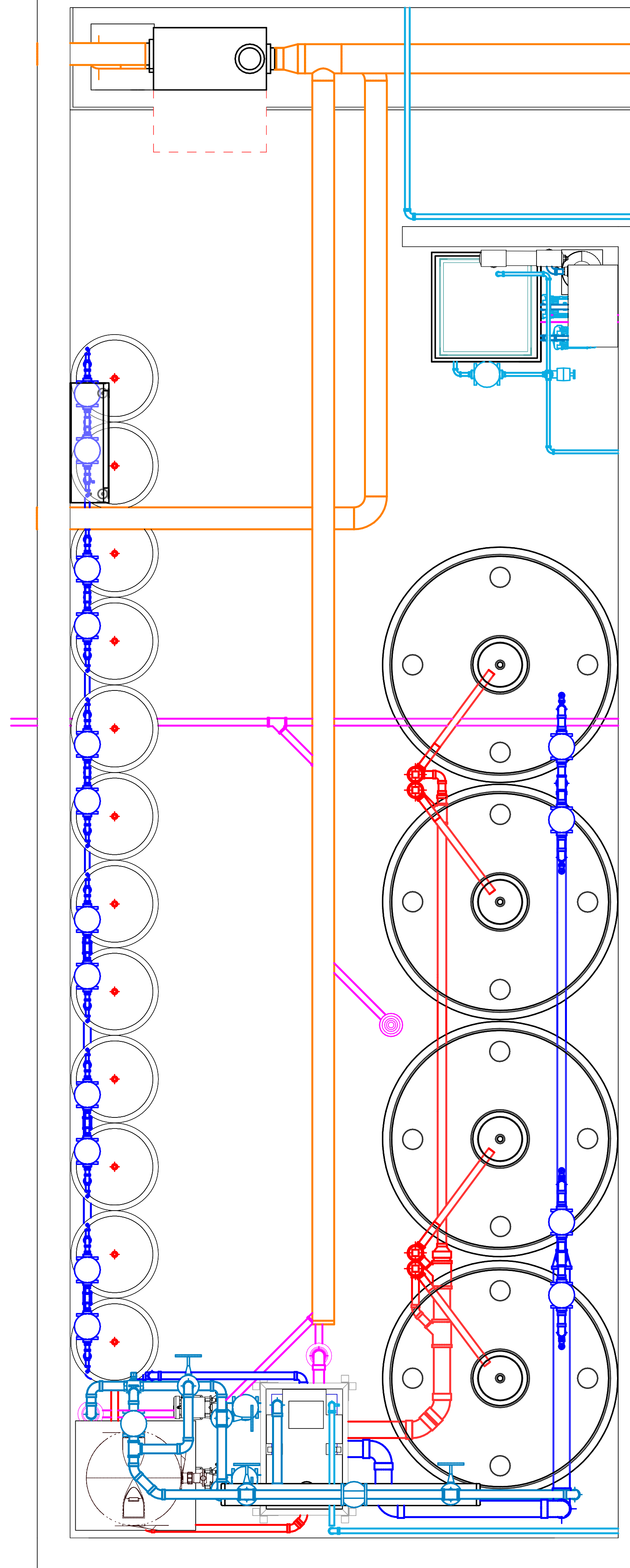


9	Issued for Tender	02/08/24
8	Issued for Tender	11/23/23
7	Issued for Review	06/16/23
6	Issued for Review	06/07/23
5	Issued for Tender Review	05/29/23
4	Issued for Coordination	04/20/23
3	Issued for Coordination	03/17/23
2	Issued for Coordination	03/03/23
1	Issued for Client Review	02/24/23
#	DESCRIPTION	MM/DD/YY

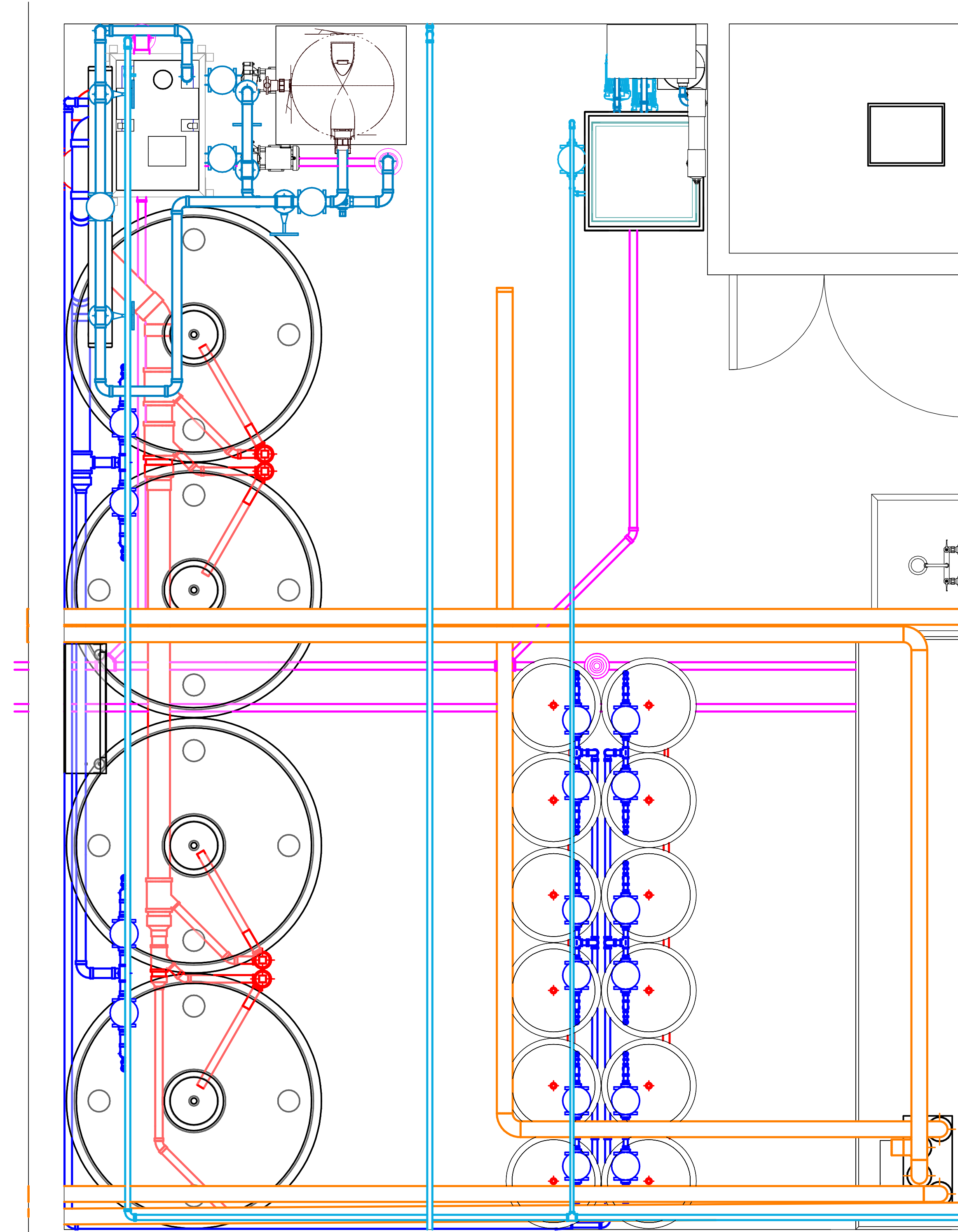
Codrington Research Facility
Codrington, ON

DRAWING TITLE:
Building Plan View

DRAWN BY: J.V	CHECKED BY: N.B	APPROVED BY: T.N
SCALE: 1:35	SHEET SIZE: ARCH D	
PROJECT #: 22-250	SHEET #: M1.4	

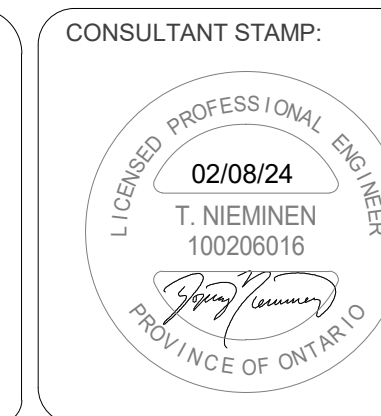
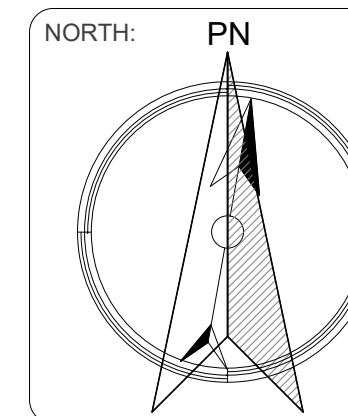


1 Level 1 Quarantine Room Plan
M1.5 1:20



2 Level 1 Common Room Plan
M1.5 1:20

NOTE TO USER: DO NOT SCALE DRAWINGS. ALL DRAWINGS REMAIN THE PROPERTY OF ROMBALD INC. AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT WRITTEN PERMISSION.



9	Issued for Tender	02/08/24
8	Issued for Tender	11/23/23
7	Issued for Review	06/16/23
6	Issued for Review	06/07/23
5	Issued for Tender Review	05/29/23
4	Issued for Coordination	04/20/23
3	Issued for Coordination	03/17/23
2	Issued for Coordination	03/03/23
1	Issued for Client Review	02/24/23
#	DESCRIPTION	MM/DD/YY

Codrington Research Facility
Codrington, ON

DRAWING TITLE:
Room Plan Views

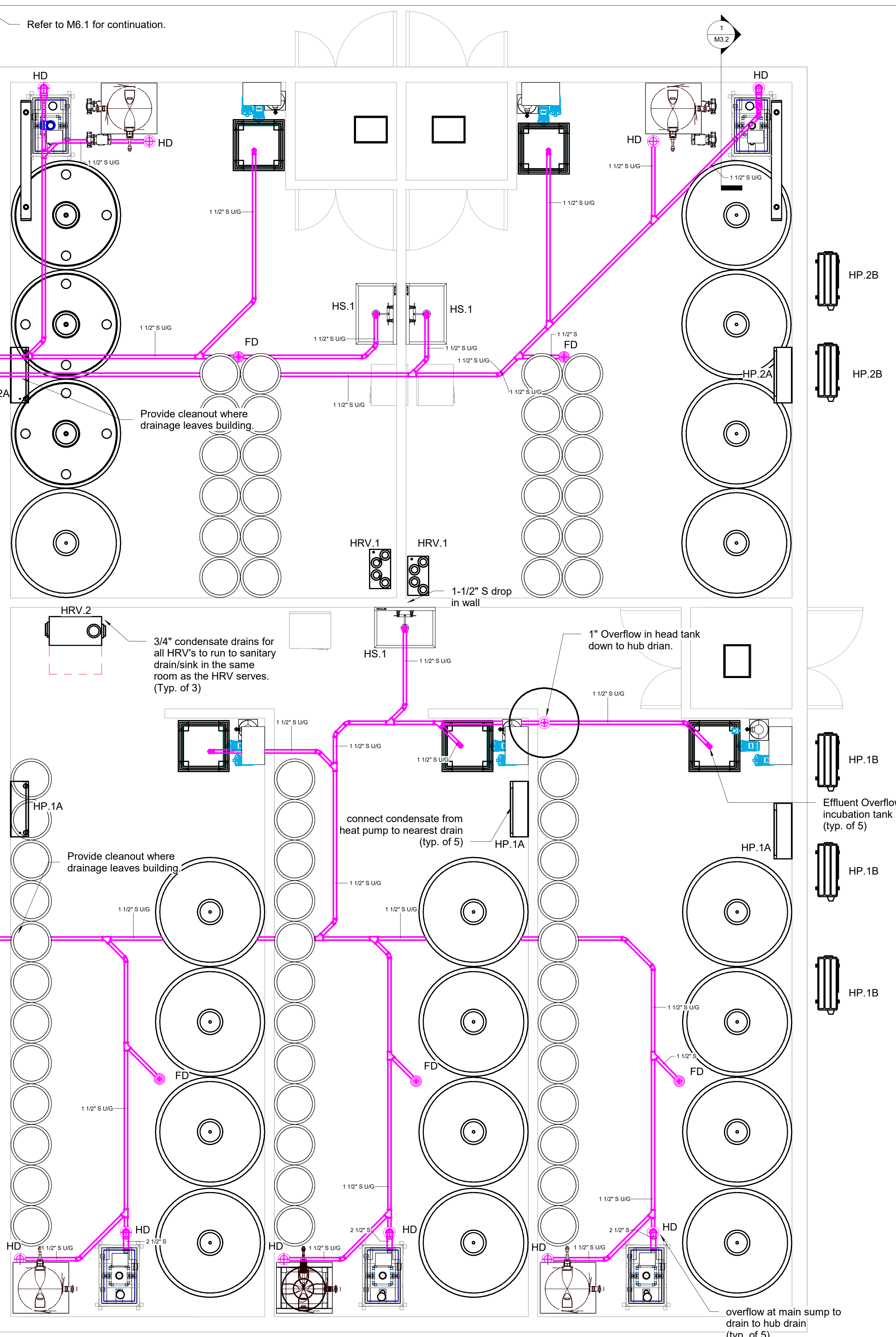
DRAWN BY: J.V. CHECKED BY: N.B. APPROVED BY: T.N.

SCALE: 1:20 SHEET SIZE: ARCH D

PROJECT #: 22-250 SHEET #: M1.5

Effluent lines from 3 separated rooms to remain separated back to treatment plant. Lines to run in chase, coordinate with civil and enter the treatment building above the floor.

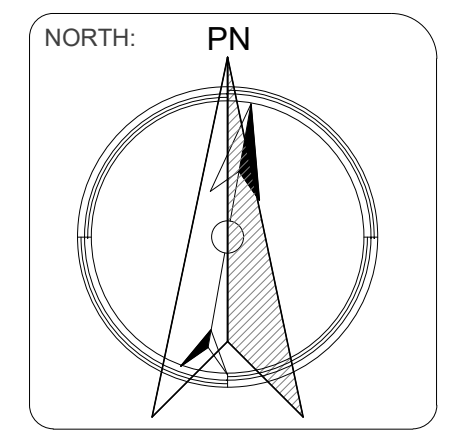
Slope all drainage piping at 1% or so piping enters treatment building at floor level. Contractor to coordinate pipe sloping with building elevations. Drainage piping outside buildings to be SDR26 and sch40 inside buildings.



1 Effluent Water
M2.1 1:35



NOTE TO USER: DO NOT SCALE DRAWINGS. ALL DRAWINGS REMAIN THE PROPERTY OF ROMBALD INC. AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT WRITTEN PERMISSION.

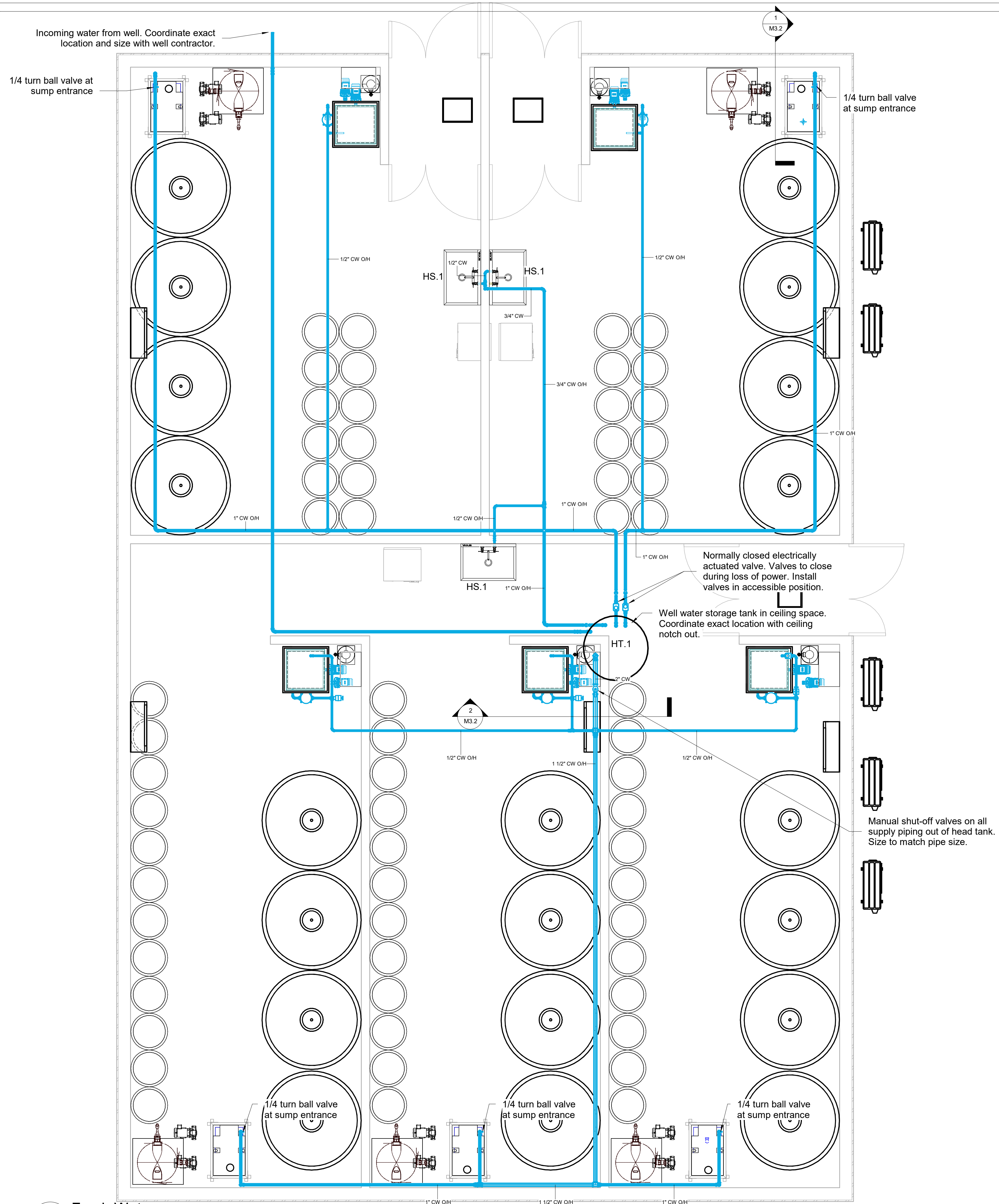


9	Issued for Tender	02/08/24
8	Issued for Tender	11/23/23
7	Issued for Review	06/16/23
6	Issued for Review	06/07/23
5	Issued for Tender Review	05/29/23
4	Issued for Coordination	04/20/23
3	Issued for Coordination	03/17/23
2	Issued for Coordination	03/03/23
1	Issued for Client Review	02/24/23
#	DESCRIPTION	MM/DD/YY

Codrington Research Facility
Codrington, ON

DRAWING TITLE:
Effluent Plans - Main Building

DRAWN BY: J.V	CHECKED BY: N.B	APPROVED BY: T.N
SCALE: 1:35	SHEET SIZE: ARCH D	
PROJECT #: 22-250	SHEET #: M2.1	



1 Fresh Water
M3.1 1:35



NOTE TO USER: DO NOT SCALE DRAWINGS. ALL DRAWINGS REMAIN THE PROPERTY OF ROMBALD INC. AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT WRITTEN PERMISSION.

NORTH: PN

CONSULTANT STAMP:

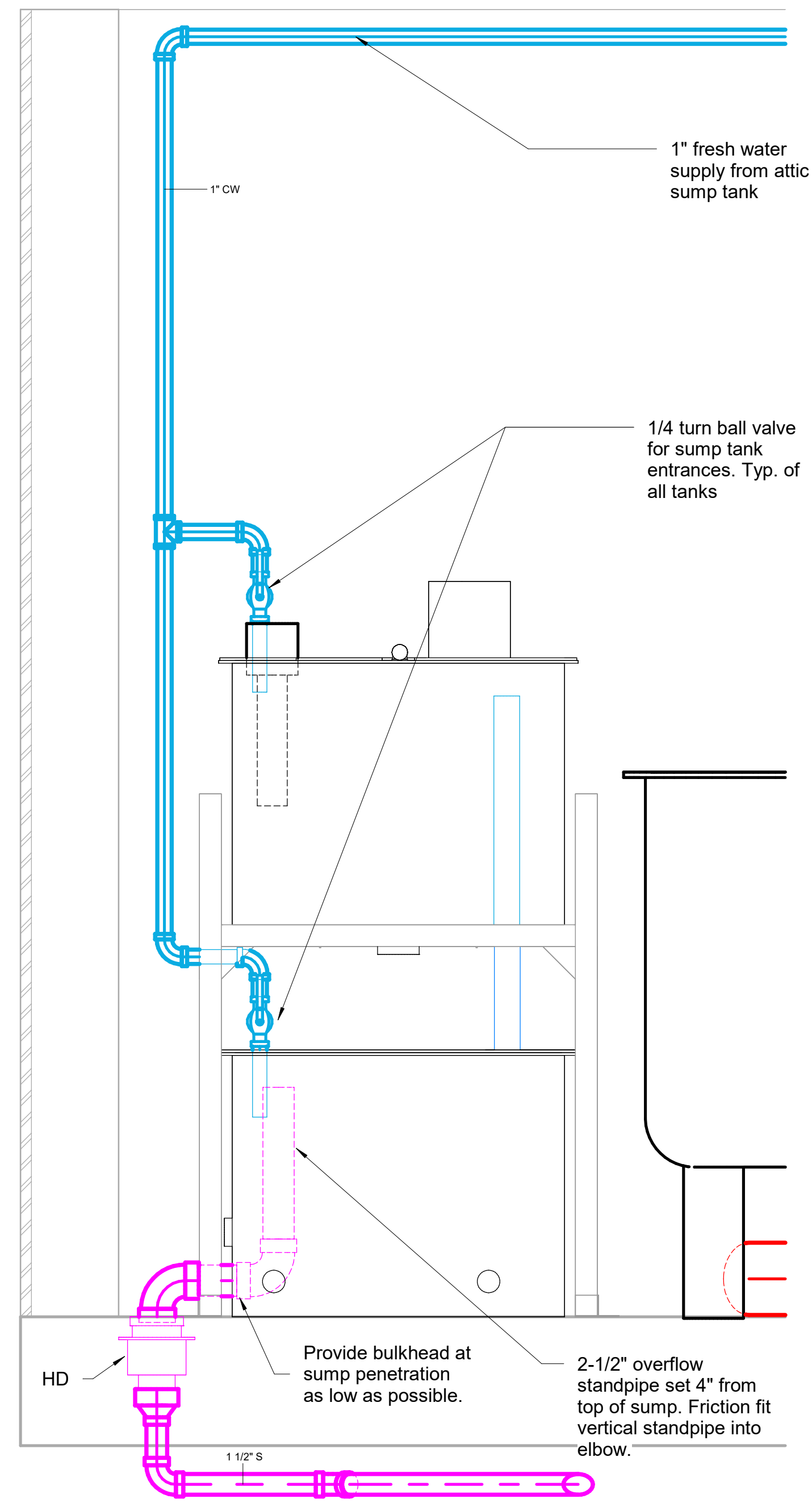


6	Issued for Tender	02/08/24
5	Issued for Tender	11/23/23
4	Issued for Review	06/16/23
3	Issued for Review	06/07/23
2	Issued for Tender Review	05/29/23
1	Issued for Coordination	04/20/23
#	DESCRIPTION	MM/DD/YY

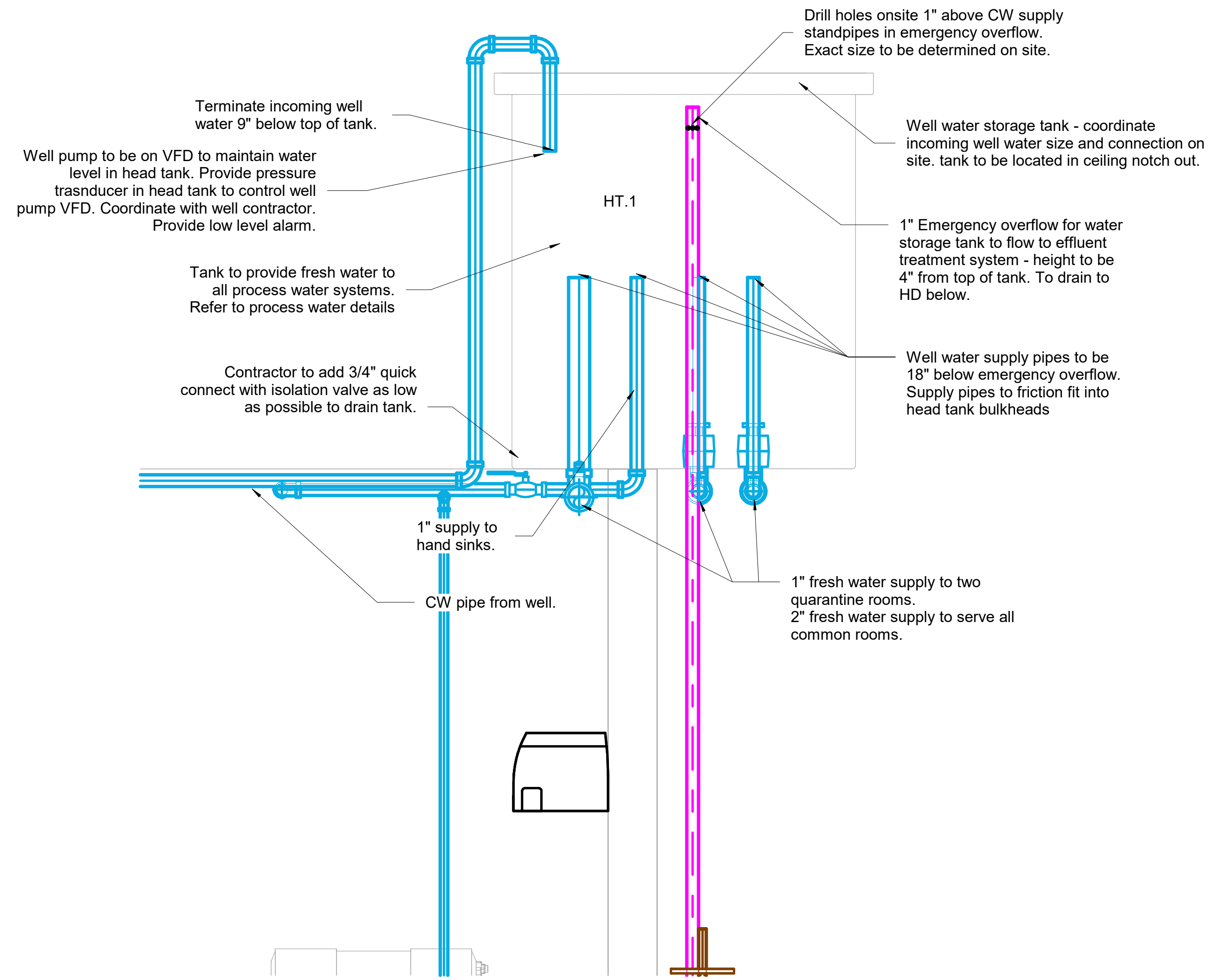
Codrington Research Facility
Codrington, ON

DRAWING TITLE:
Fresh Water Plans

DRAWN BY: J.V	CHECKED BY: N.B	APPROVED BY: T.N
SCALE: 1 : 35	SHEET SIZE: ARCH D	
PROJECT #: 22-250	SHEET #: M3.1	



1 Sump Tank Supply & Drain Piping Detail
M3.2 1 : 10



2 Head Tank Detail
M3.2 1 : 10

NOTE TO USER: DO NOT SCALE DRAWINGS. ALL DRAWINGS REMAIN THE PROPERTY OF ROMBALD INC. AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT WRITTEN PERMISSION.

NORTH: PN

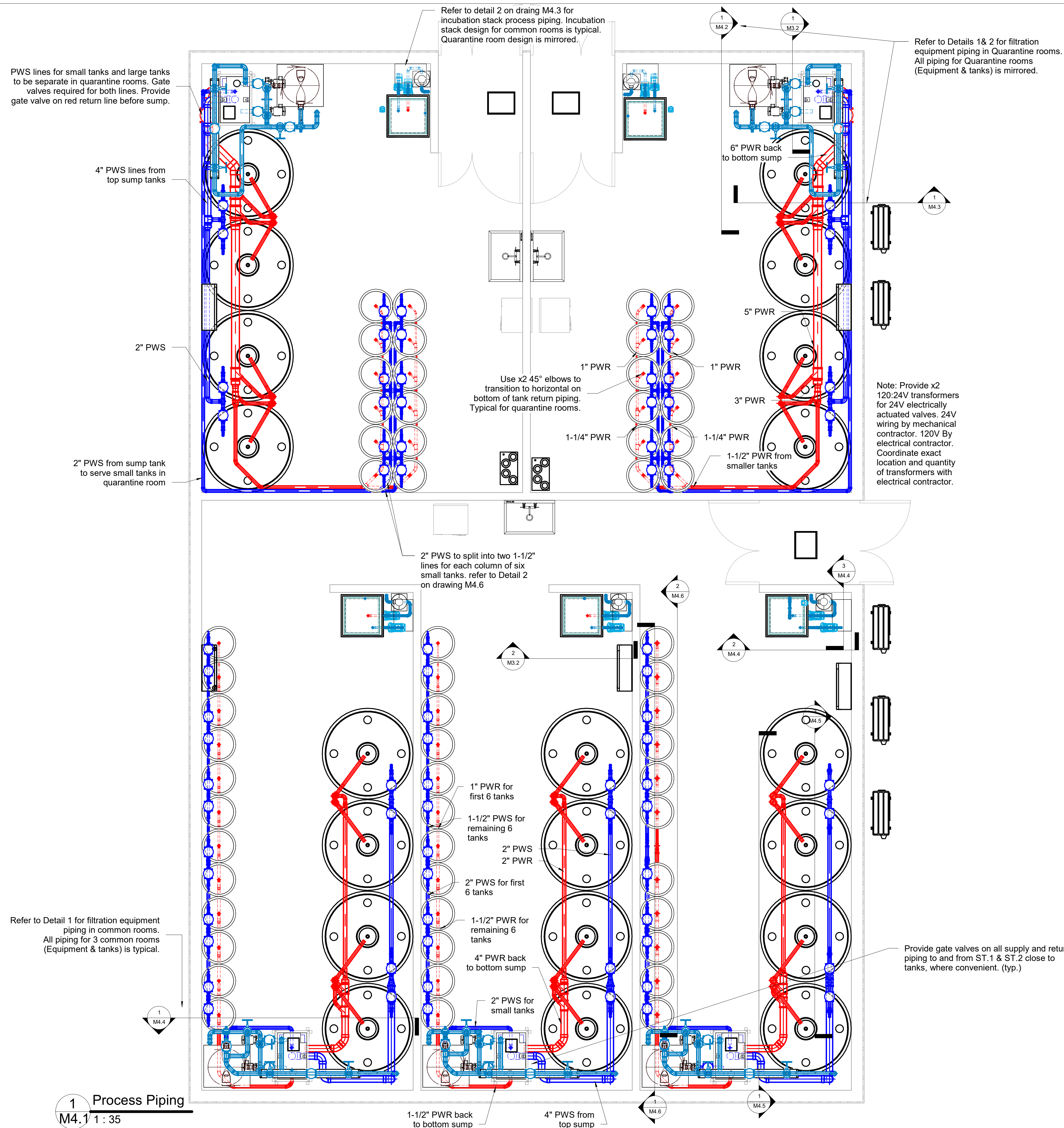
CONSULTANT STAMP:
LICENSED PROFESSIONAL ENGINEER
02/08/24
T. NIEMINEN
100206016
Province of Ontario

6	Issued for Tender	02/08/24
5	Issued for Tender	11/23/23
4	Issued for Review	06/16/23
3	Issued for Review	06/07/23
2	Issued for Tender Review	05/29/23
1	Issued for Coordination	04/20/23
#	DESCRIPTION	MM/DD/YY

Codrington Research Facility
Codrington, ON

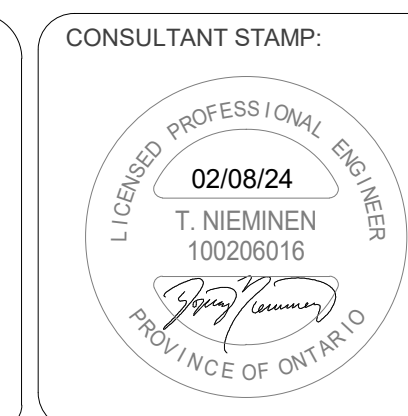
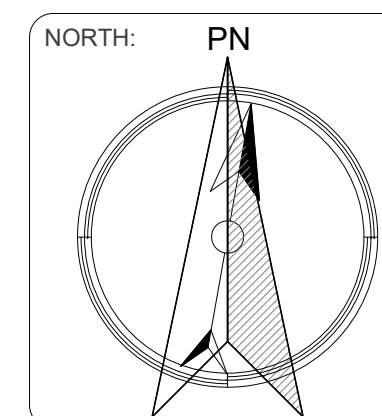
DRAWING TITLE:
Fresh Water Details

DRAWN BY: J.V	CHECKED BY: N.B	APPROVED BY: T.N
SCALE: 1 : 10	SHEET SIZE: ARCH D	
PROJECT #: 22-250	SHEET #: M3.2	



1 Process Piping
M4.1 1:35

NOTE TO USER: DO NOT SCALE DRAWINGS. ALL DRAWINGS REMAIN THE PROPERTY OF ROMBALD INC. AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT WRITTEN PERMISSION.



6	Issued for Tender	02/08/24
5	Issued for Tender	11/23/23
4	Issued for Review	06/16/23
3	Issued for Review	06/07/23
2	Issued for Tender Review	05/29/23
1	Issued for Coordination	04/20/23
#	DESCRIPTION	MM/DD/YY

Codrington Research Facility
Codrington, ON

DRAWING TITLE:
Process Piping Plans - Main Building

DRAWN BY: J.V	CHECKED BY: N.B	APPROVED BY: T.N
SCALE: 1:35	SHEET SIZE: ARCH D	
PROJECT #: 22-250	SHEET #: M4.1	

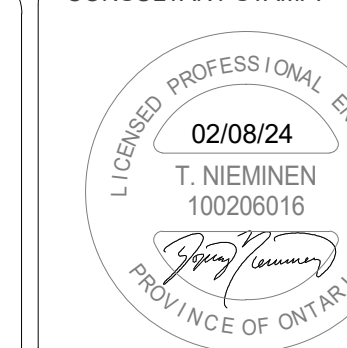
CONSULTANT



NOTE TO USER: DO NOT SCALE DRAWINGS. ALL DRAWINGS REMAIN THE PROPERTY OF ROMBALD INC. AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT WRITTEN PERMISSION.

NORTH:

CONSULTANT STAMP:



6	Issued for Tender	02/08/24
5	Issued for Tender	11/23/23
4	Issued for Review	06/16/23
3	Issued for Review	06/07/23
2	Issued for Tender Review	05/29/23
1	Issued for Coordination	04/20/23
#	DESCRIPTION	MM/DD/YY

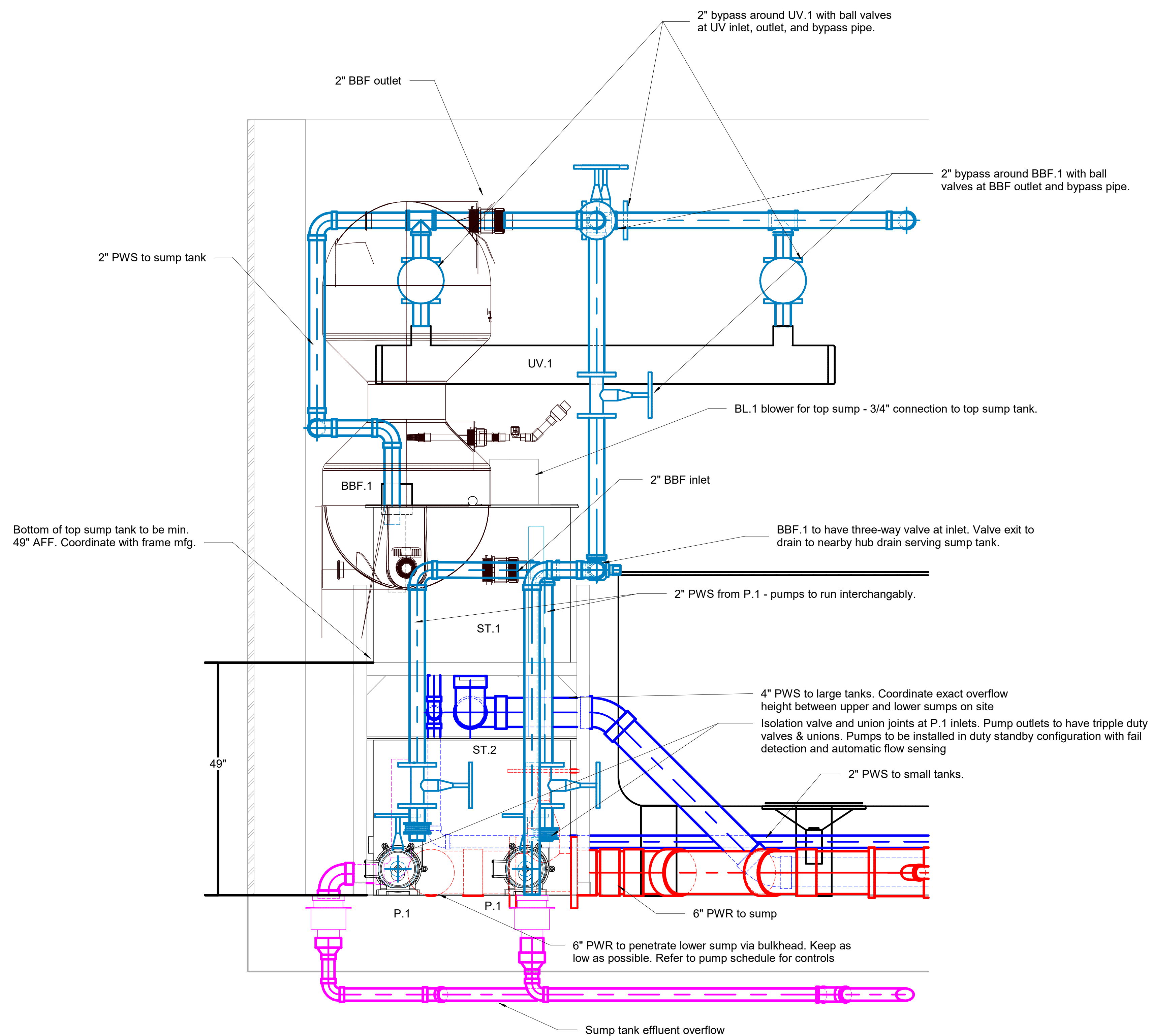
Codrington Research Facility
Codrington, ON

DRAWING TITLE:
Process Piping Equipment Details 1

DRAWN BY: Designer	CHECKED BY: Checker	APPROVED BY: Approver
-----------------------	------------------------	--------------------------

SCALE: 1 : 10	SHEET SIZE: ARCH D
------------------	-----------------------

PROJECT #: 22-250	SHEET #: M4.2
-----------------------------	-------------------------



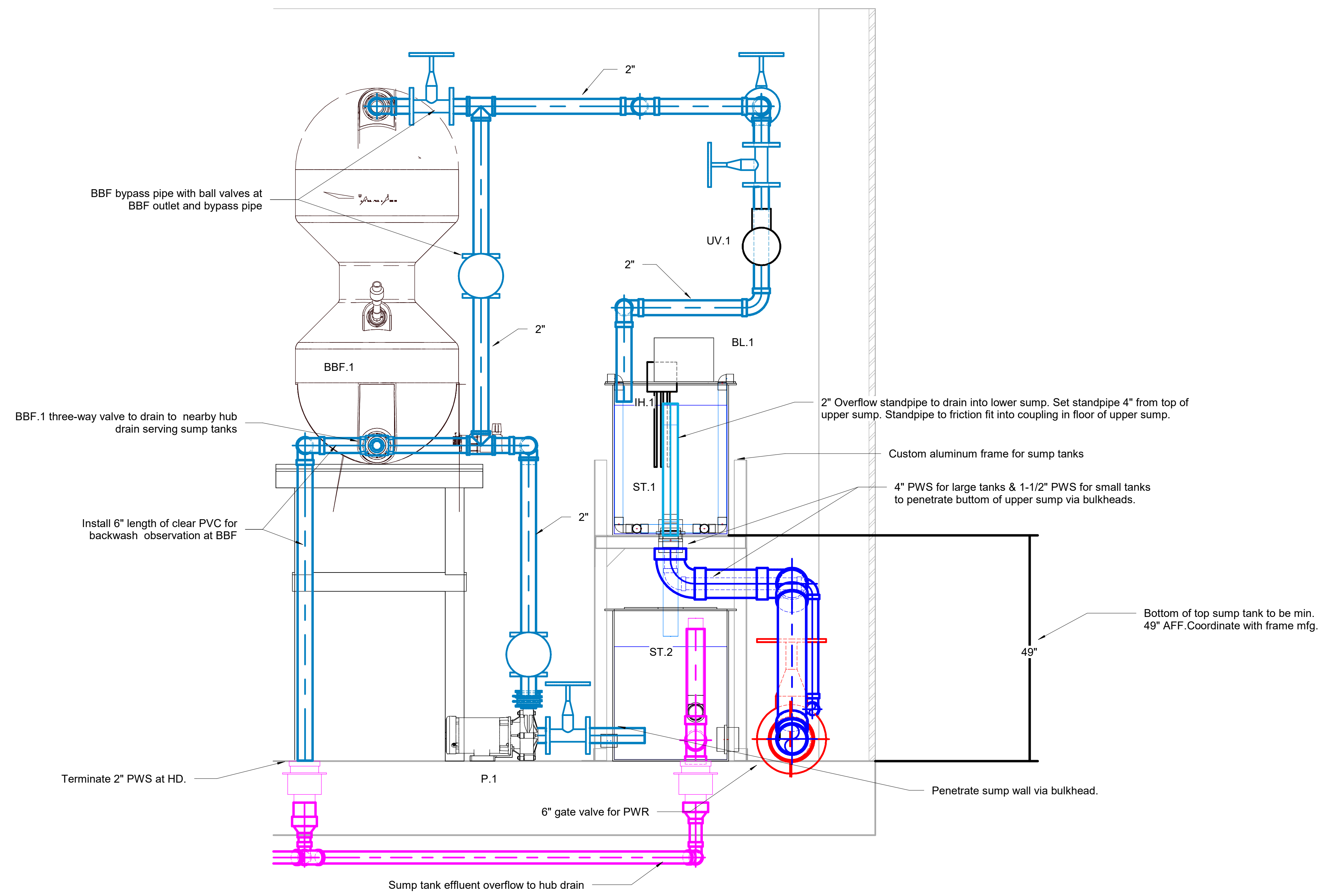
1 Quarantine Room Filtration Equipment Detail 1
M4.2 1 : 10

NOTE TO USER: DO NOT SCALE DRAWINGS. ALL DRAWINGS REMAIN THE PROPERTY OF ROMBALD INC. AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT WRITTEN PERMISSION.

NORTH:

CONSULTANT STAMP:

LICENCED PROFESSIONAL ENGINEER
 02/08/24
 T. NIEMINEN
 100206016
 PROVINCE OF ONTARIO



1 Quarantine Room Filtration Equipment Detail 2
 M4.3 1:10

6	Issued for Tender	02/08/24
5	Issued for Tender	11/23/23
4	Issued for Review	06/16/23
3	Issued for Review	06/07/23
2	Issued for Tender Review	05/29/23
1	Issued for Coordination	04/20/23
#	DESCRIPTION	MM/DD/YY

Codrington Research Facility
 Codrington, ON

DRAWING TITLE:
Process Piping Equipment Details 2

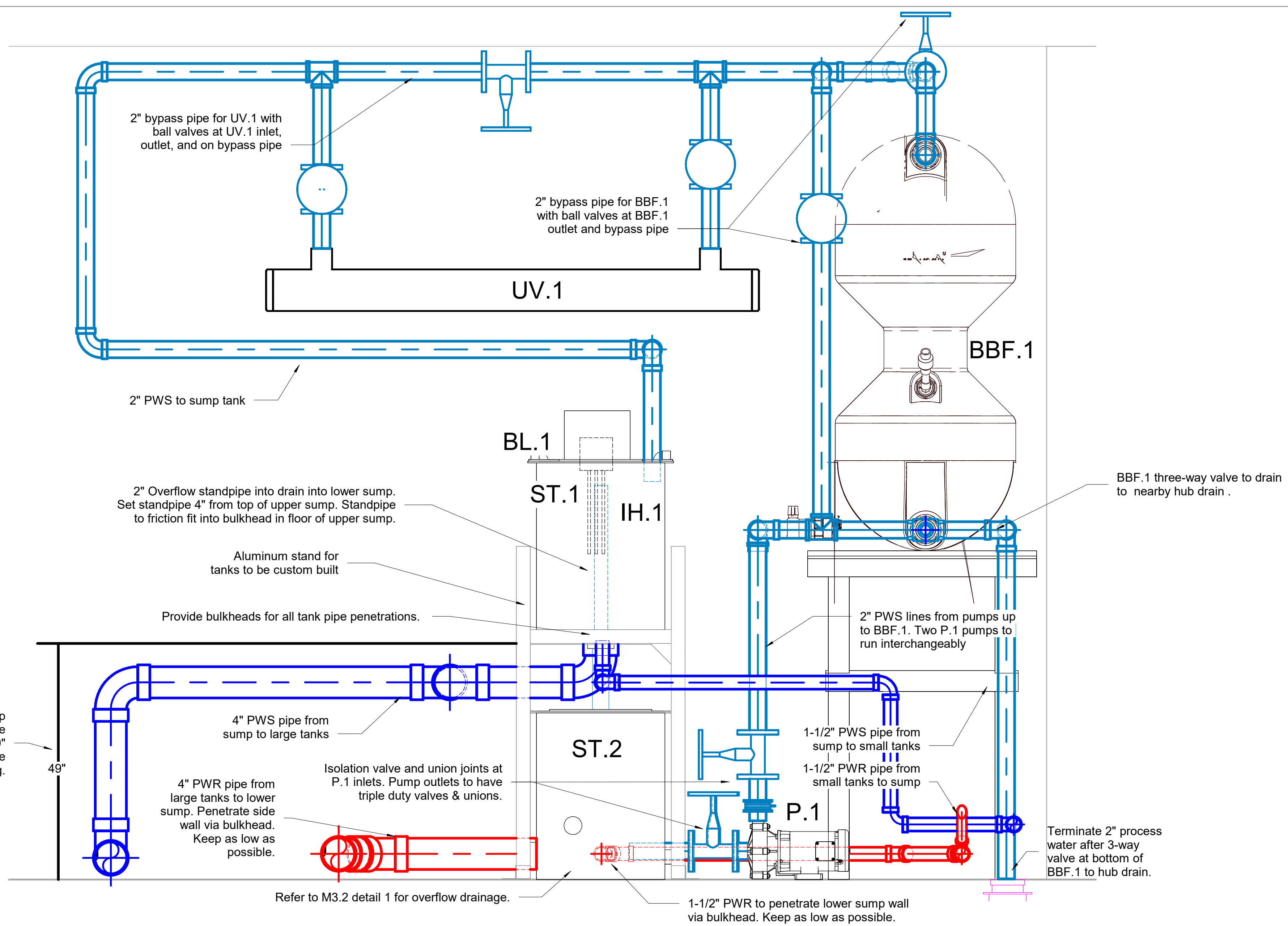
DRAWN BY: J.V	CHECKED BY: N.B	APPROVED BY: T.N
SCALE: 1:10	SHEET SIZE: ARCH D	
PROJECT #: 22-250	SHEET #: M4.3	

NOTE TO USER: DO NOT SCALE DRAWINGS. ALL DRAWINGS REMAIN THE PROPERTY OF ROMBALD INC. AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT WRITTEN PERMISSION.

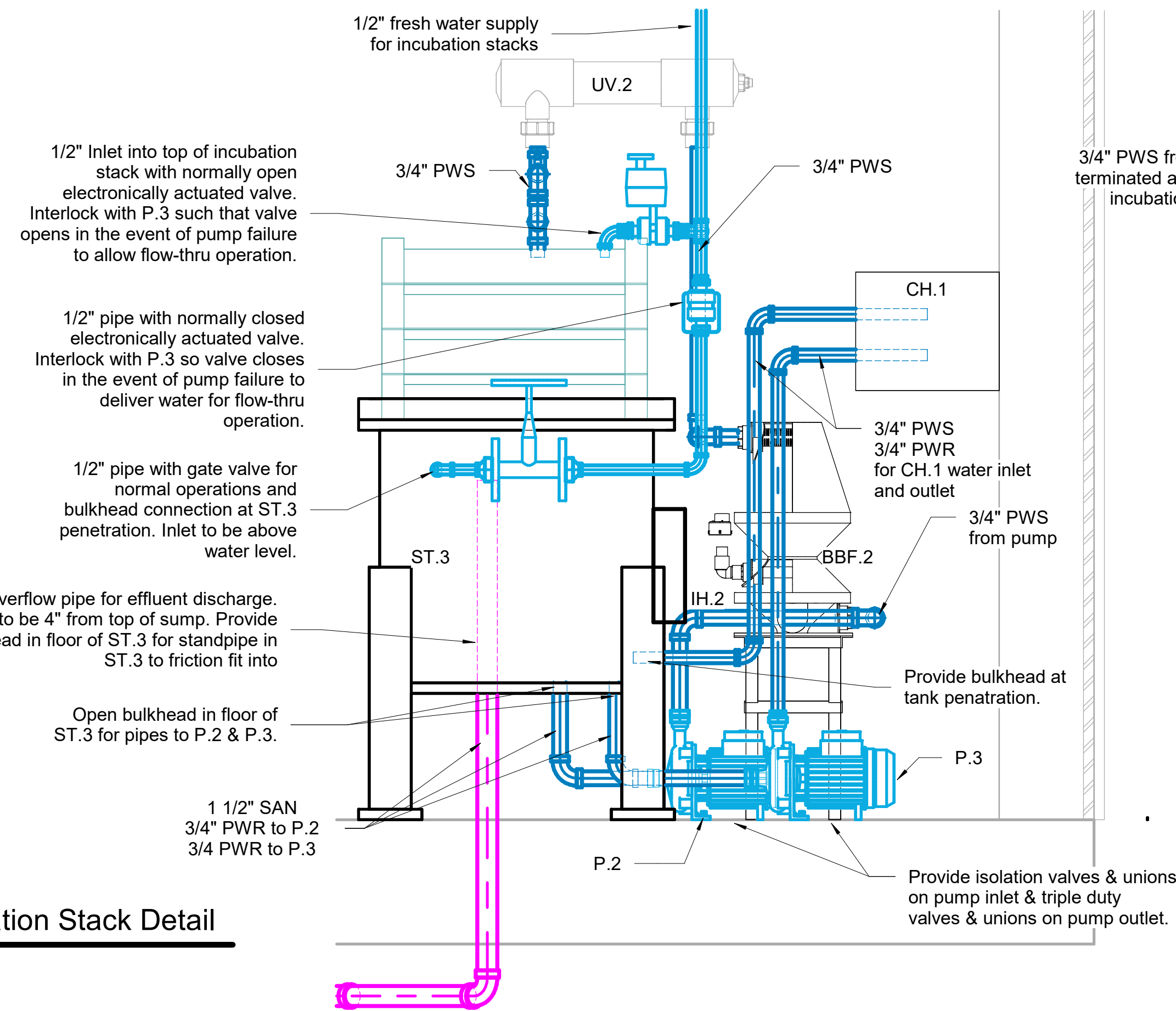
NORTH:

CONSULTANT STAMP:

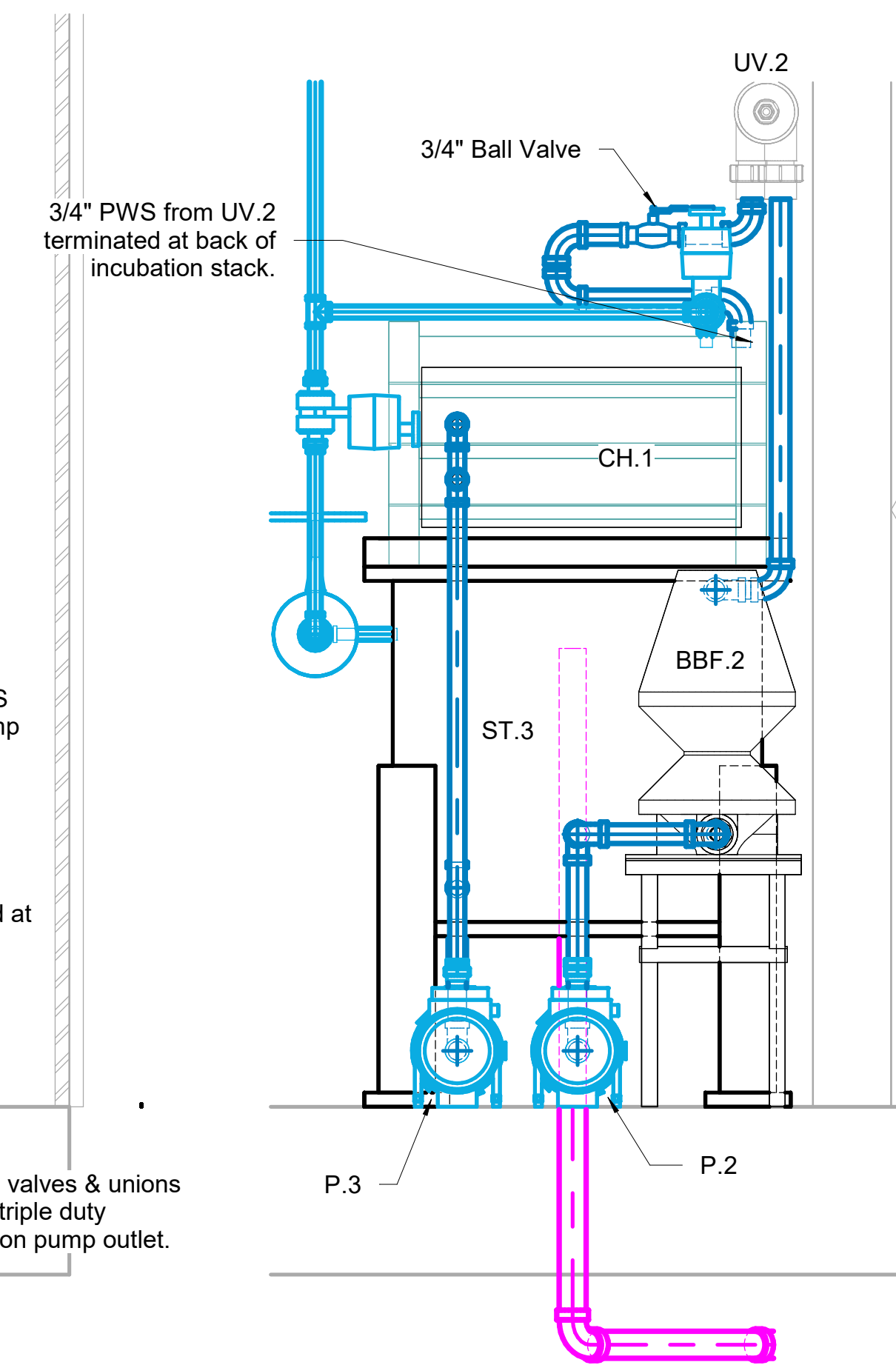
CA CANADIAN AQUACULTURE SYSTEMS INC.
 BIOENGINEERING TECHNOLOGIES & BUSINESS MANAGEMENT SOLUTIONS



1 Common Room Filtration Equipment Detail
 M4.4 1 : 10



2 Incubation Stack Detail
 M4.4 1 : 10



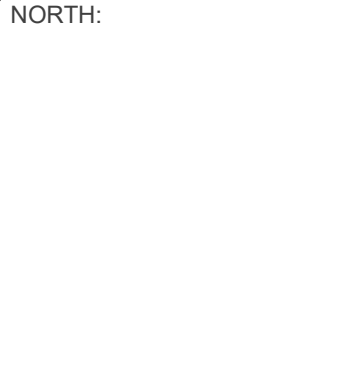
6	Issued for Tender	02/08/24
5	Issued for Tender	11/23/23
4	Issued for Review	06/16/23
3	Issued for Review	06/07/23
2	Issued for Tender Review	05/29/23
1	Issued for Coordination	04/20/23
#	DESCRIPTION	MM/DD/YY

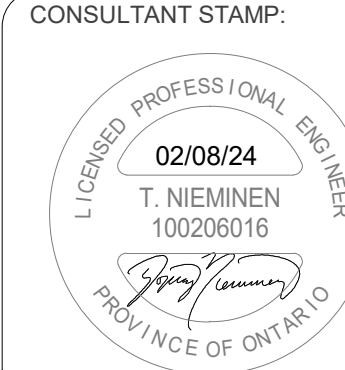
Codrington Research Facility
 Codrington, ON

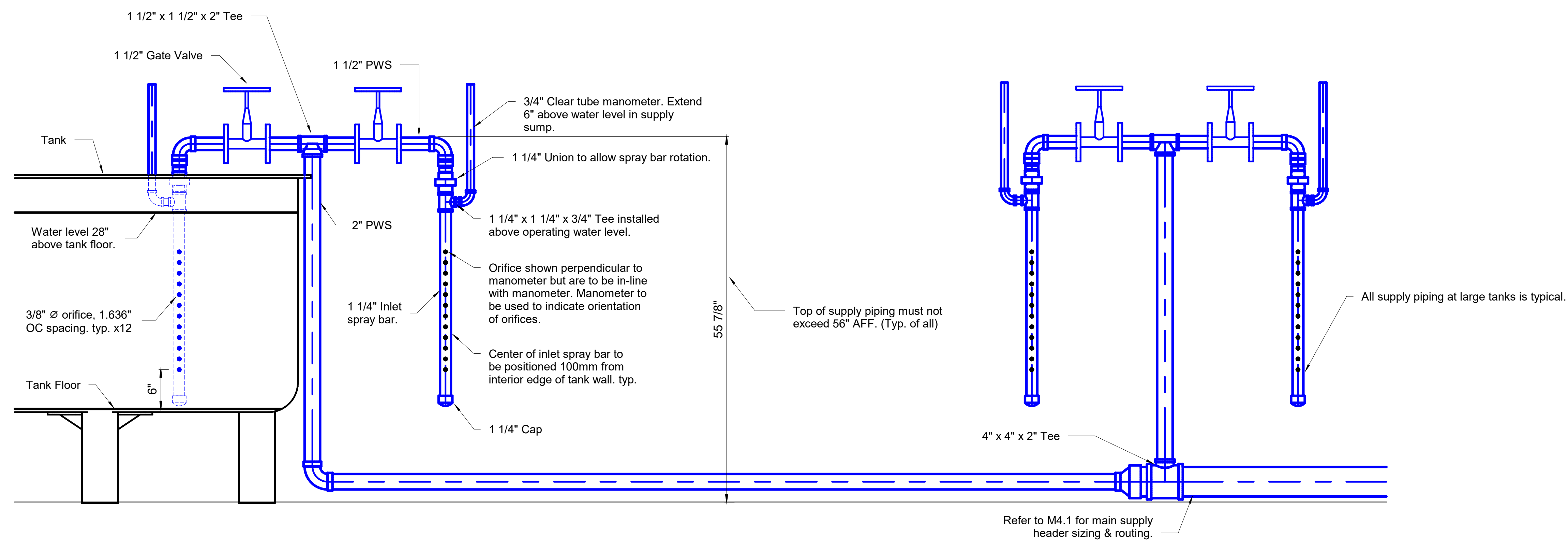
DRAWING TITLE:
Process Piping Equipment Details 3

DRAWN BY: Designer	CHECKED BY: Checker	APPROVED BY: Approver
SCALE: 1 : 10	SHEET SIZE: ARCH D	
PROJECT #: 22-250	SHEET #: M4.4	

NOTE TO USER: DO NOT SCALE DRAWINGS. ALL DRAWINGS REMAIN THE PROPERTY OF ROMBALD INC. AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT WRITTEN PERMISSION.

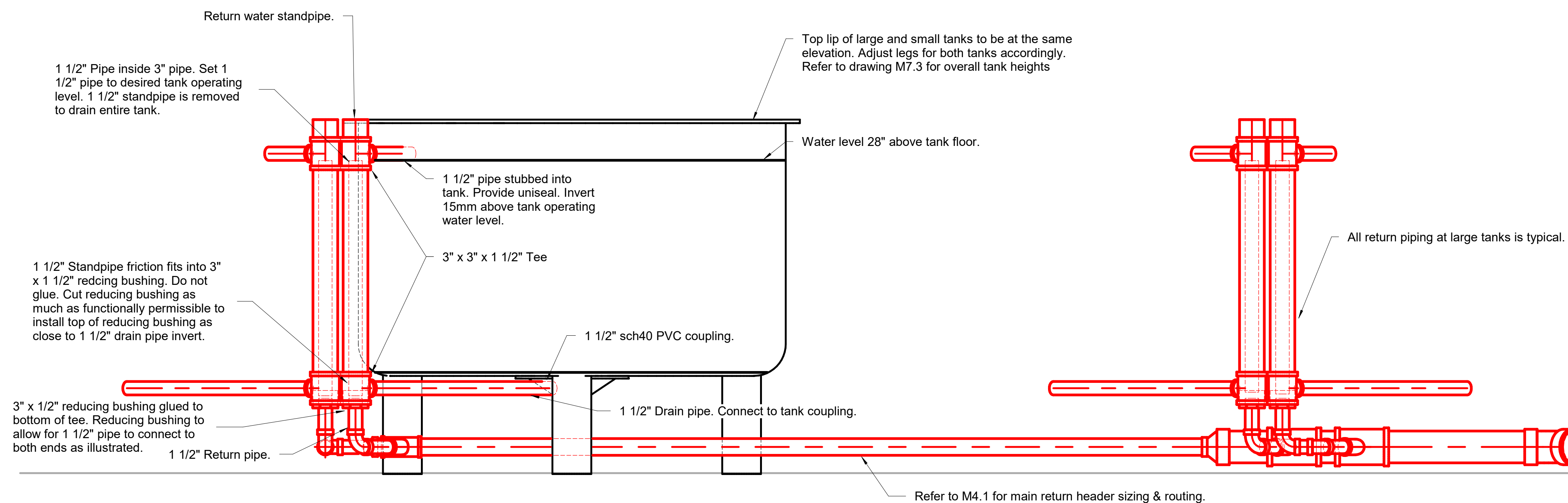
NORTH: 

CONSULTANT STAMP:




3 Typical Large Tanks Supply Piping
 M4.5 1 : 10

Supply & return piping details at tank are typical for both common and quarantine rooms. Tank placement & pattern to differ between rooms. Refer to M4.1 for tank pattern & main header sizing & routing.



1 Typical Large Tanks Return Piping
 M4.5 1 : 10

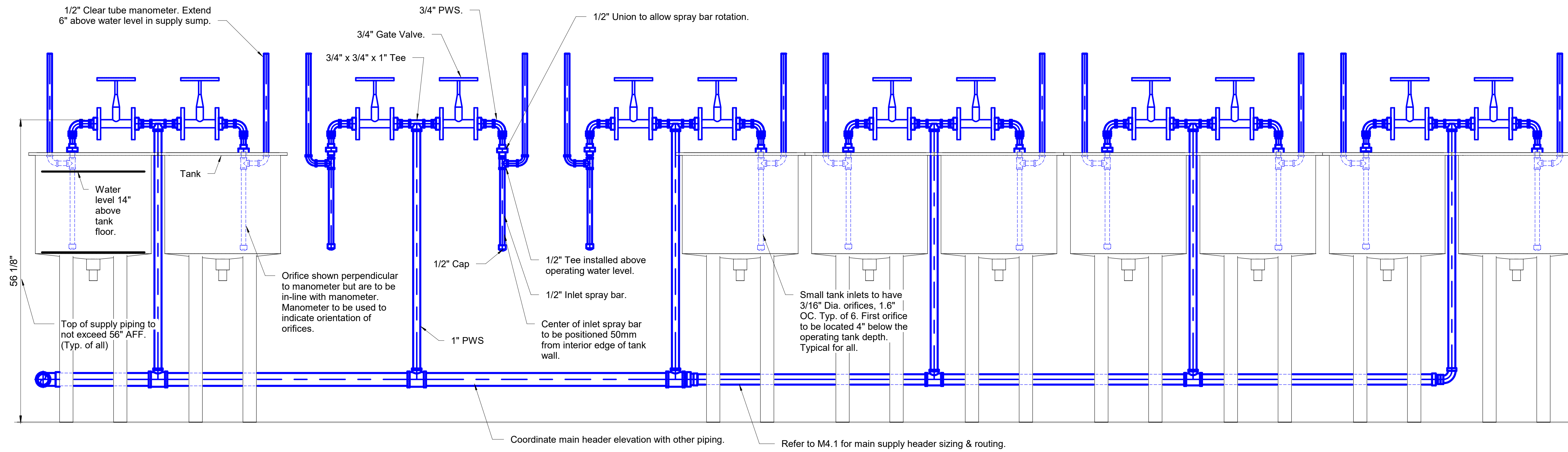
6	Issued for Tender	02/08/24
5	Issued for Tender	11/23/23
4	Issued for Review	06/16/23
3	Issued for Review	06/07/23
2	Issued for Tender Review	05/29/23
1	Issued for Coordination	04/20/23
#	DESCRIPTION	MM/DD/YY

Codrington Research Facility
 Codrington, ON

DRAWING TITLE:
Large Tank Piping Details

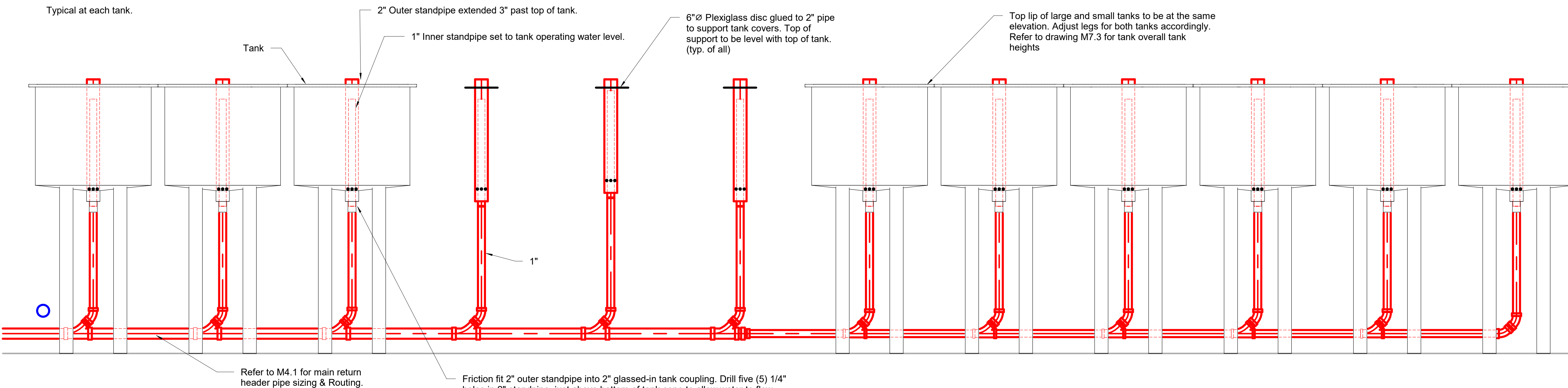
DRAWN BY: Designer	CHECKED BY: Checker	APPROVED BY: Approver
SCALE: 1 : 10	SHEET SIZE: ARCH D	
PROJECT #: 22-250	SHEET #: M4.5	

All tanks are typical.



1 Typical Small Tanks Supply Piping
M4.6 1 : 10

Supply & return piping details at tank are typical for both common and quarantine rooms. Tank placement & pattern to differ between rooms. Refer to M4.1 for tank pattern & main header sizing & routing.



2 Typical Small Tanks Return Piping
M4.6 1 : 10

Friction fit 2" outer standpipe into 2" glassed-in tank coupling. Drill five (5) 1/4" holes in 2" standpipe, just above bottom of tank cone to allow water to flow through holes & up thru annular space between 1" & 2" standpipes. Holes to be spaced equally apart. Friction fit 1" inner standpipe into 1" glassed in tank coupling. Glue 1" drain pipe to bottom half of 1" glassed in tank coupling. Refer to drawing M7.3 for connection schematic



NOTE TO USER: DO NOT SCALE DRAWINGS. ALL DRAWINGS REMAIN THE PROPERTY OF ROMBALD INC. AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT WRITTEN PERMISSION.

NORTH: []

CONSULTANT STAMP:

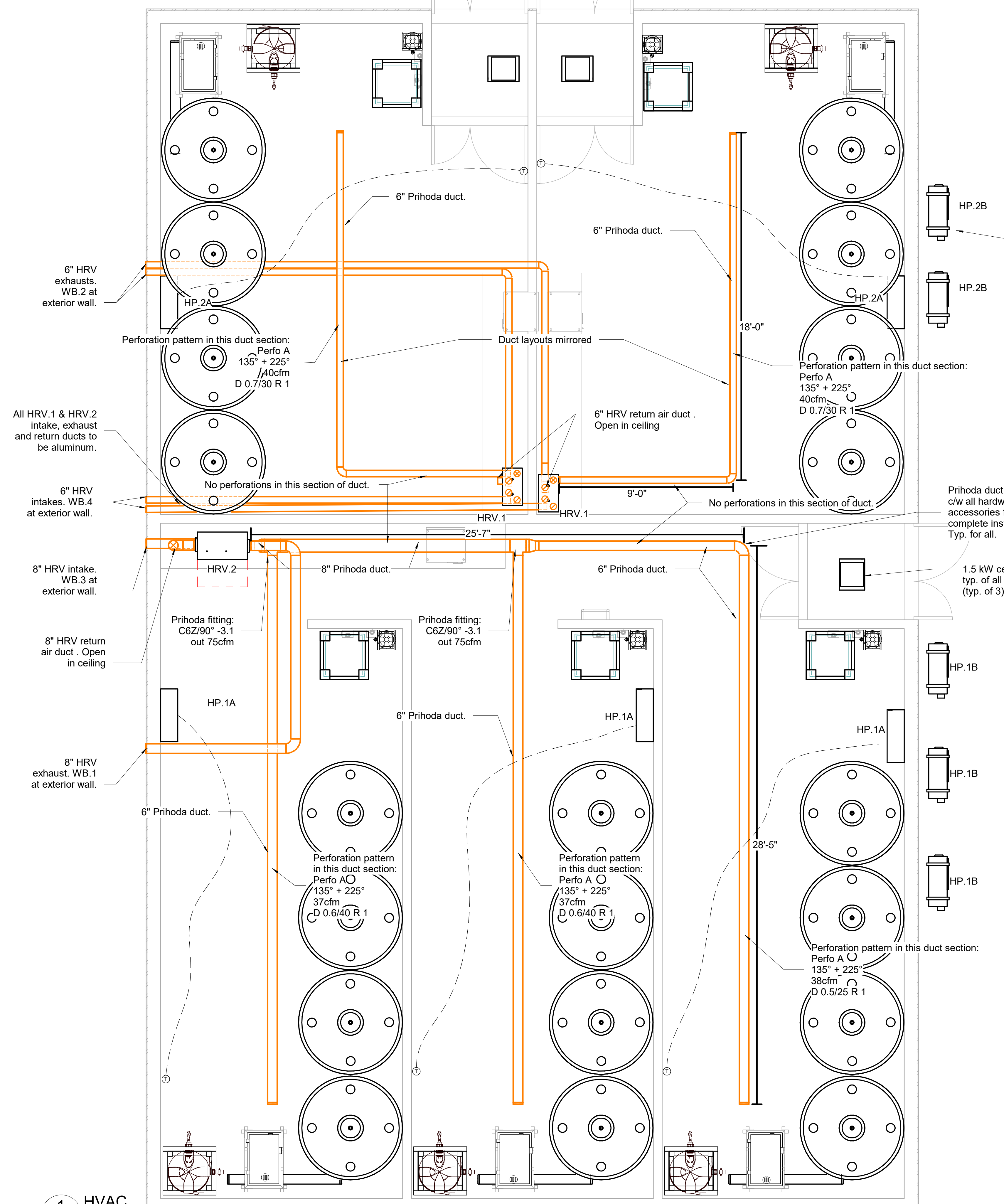


6	Issued for Tender	02/08/24
5	Issued for Tender	11/23/23
4	Issued for Review	06/16/23
3	Issued for Review	06/07/23
2	Issued for Tender Review	05/29/23
1	Issued for Coordination	04/20/23
#	DESCRIPTION	MM/DD/YY

Codrington Research Facility
Codrington, ON

DRAWING TITLE:
Small Tank Piping Details

DRAWN BY: J.V	CHECKED BY: N.B	APPROVED BY: T.N
SCALE: 1 : 10	SHEET SIZE: ARCH D	
PROJECT #: 22-250	SHEET #: M4.6	



- Notes:
- 1) Heat pump refrigerant lines not shown. Run high, along ceiling, & insulate per piping insulation schedule. Provide additional refrigerant charge if required.
 - 2) HRV supply ducts to be Pihoda. Intake, exhaust & return ducts to be aluminum. Insulate per duct insulation schedule.



NOTE TO USER: DO NOT SCALE DRAWINGS. ALL DRAWINGS REMAIN THE PROPERTY OF ROMBALD INC. AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT WRITTEN PERMISSION.

NORTH: PN

CONSULTANT STAMP:

LICENCED PROFESSIONAL ENGINEER
02/08/24
T. NIEMINEN
100206016
PROVINCE OF ONTARIO



HP.2B
HP.2B
HP.2B

Outdoor heat pump unit to be mounted 3ft above grade. Coordinate location & elevation with structural, typical for all outdoor heat pump units.

Pihoda duct to be c/w all hardware & accessories for a complete installation. Typ. for all.

1.5 kW ceiling fan heater, typ. of all entrances (typ. of 3)

6	Issued for Tender	02/08/24
5	Issued for Tender	11/23/23
4	Issued for Review	06/16/23
3	Issued for Review	06/07/23
2	Issued for Tender Review	05/29/23
1	Issued for Coordination	04/20/23
#	DESCRIPTION	MM/DD/YY

Codrington Research Facility
Codrington, ON

DRAWING TITLE:
HVAC Plan - Main Building

DRAWN BY: Designer	CHECKED BY: Checker	APPROVED BY: Approver
-----------------------	------------------------	--------------------------

SCALE:
1 : 35

SHEET SIZE:
ARCH D

PROJECT #:
22-250

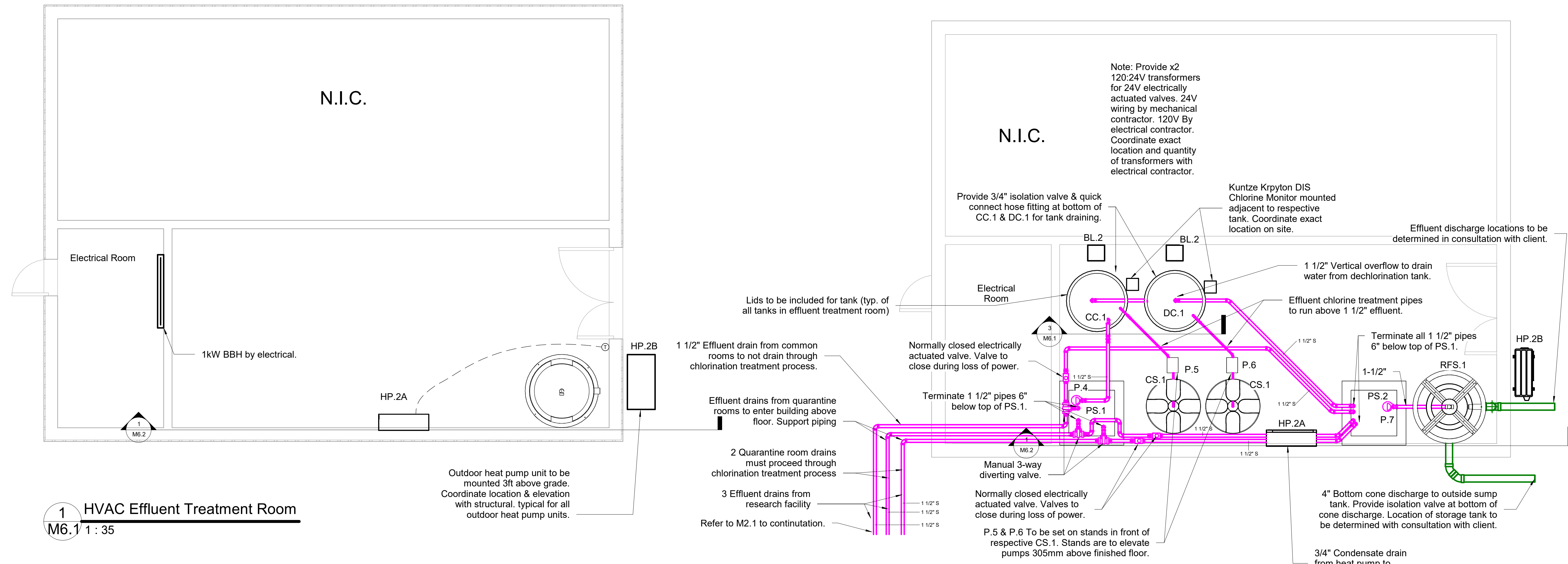
SHEET #:
M5.1

NOTE TO USER: DO NOT SCALE DRAWINGS. ALL DRAWINGS REMAIN THE PROPERTY OF ROMBALD INC. AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT WRITTEN PERMISSION.

NORTH: PN

CONSULTANT STAMP:
 LICENSED PROFESSIONAL ENGINEER
 02/08/24
 T. NIEMINEN
 100206016
 Province of Ontario

CANADIAN AQUACULTURE SYSTEMS INC.
 BIOENGINEERING TECHNOLOGIES & BUSINESS MANAGEMENT SOLUTIONS



1 HVAC Effluent Treatment Room
 M6.1 1 : 35

2 Effluent Treatment
 M6.1 1 : 35

Codrington Quarantine Effluent Treatment Requirements

All process effluent discharged from the Codrington Fisheries Research Station will be treated to remove total suspended solids and to reduce the concentration of total phosphorus before discharge. Two of the 5 rooms at the new research facility are designed to operate as quarantine facilities. Consequently, all effluent from these two rooms must be disinfected prior to discharge from the facility when the unit is operating under quarantine conditions. The fundamental aspects of the effluent treatment system are described below.

Non-Quarantine Operation

All process effluent flows directly via gravity into Pump Sump 2 from where it is pumped into the radial flow settler for removal and concentration of particulate waste. Clarified effluent is discharged to the receiver.

Quarantine Operation

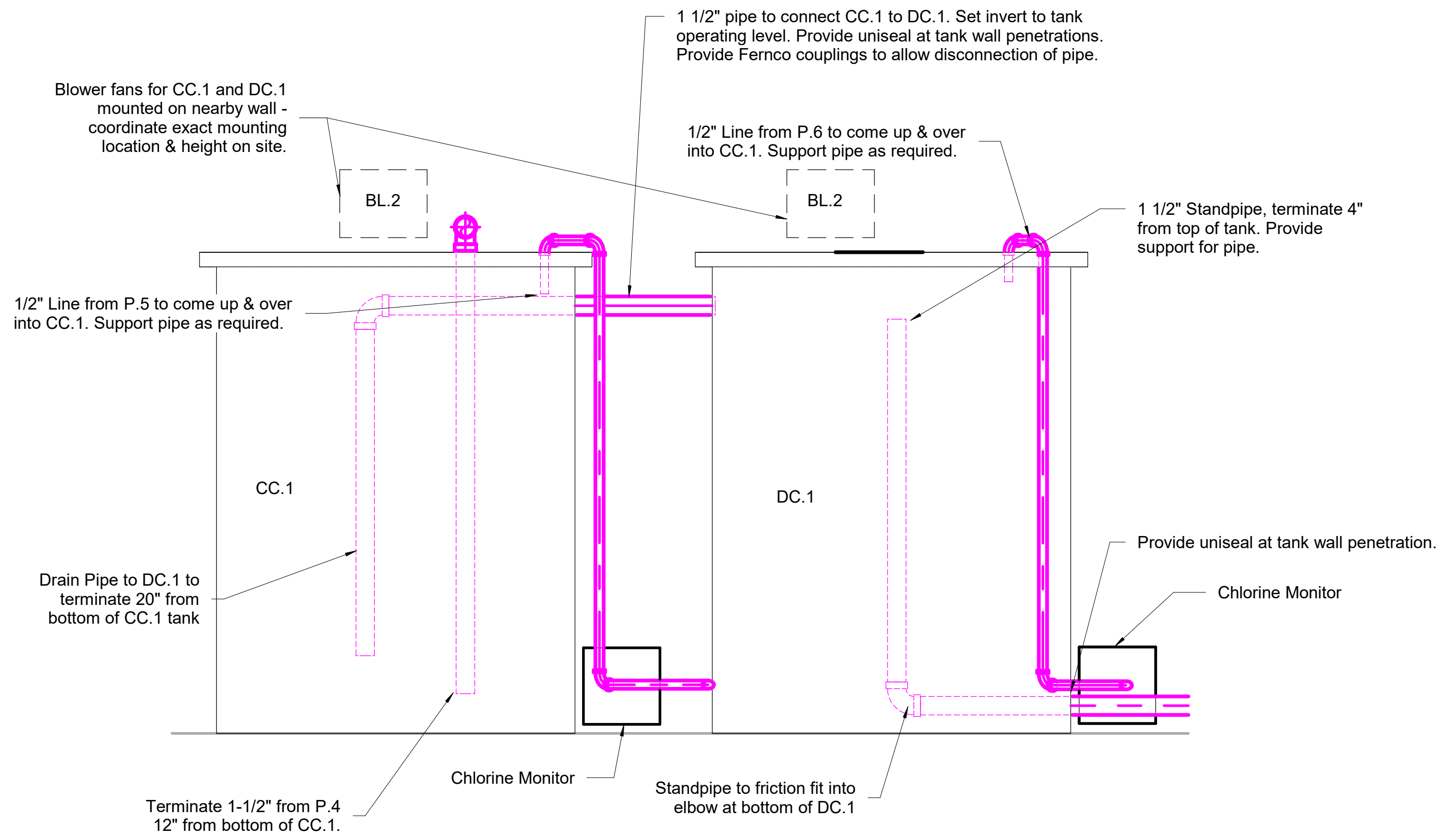
- When a room is operating under quarantine conditions, all process effluent from that room flows directly via gravity into Pump Sump 1 from where it is pumped into the chlorination contact chamber (CC1).
- A real-time chlorine monitor is required and will be installed to sample the effluent from the chlorine contact chamber (CC1) to monitor the effluent concentration of chlorine. The monitor will send a 4-20 mA signal to the chlorine dosing pump which will administer liquid chlorine into the chlorine contact chamber.
- A second chlorine monitor and dosing pump will be required to monitor the effluent from the dechlorination chamber (DC1) to ensure that sufficient sodium thiosulfate has been added to reduce the concentration of free chlorine to 0 mg/L.
- All effluent from the dechlorination contact chamber will flow via gravity to Pump Sump 2 from where it will be pumped through the radial flow settler.

Sensors

- (1) Free Chlorine System, pH, 0 to 20 ppm, Kuntze Krypton DIS Chlorine Monitor, or equivalent
- (1) Free Chlorine System, pH, 0 to 2 ppm, Kuntze Krypton DIS Chlorine Monitor, or equivalent
- cUL listed and/or CSA approved

Dosing Pumps

- (1) Chlorine dosing pump, Blue-White A1V Peristaltic Dosing Pump, or equivalent
- cUL listed and/or CSA approved
- (1) Thiosulfate dosing pump, Blue-White A1V Peristaltic Dosing Pump, or equivalent



3 CC.1 & DC.1 Detail
 M6.1 1 : 10

6	Issued for Tender	02/08/24
5	Issued for Tender	11/23/23
4	Issued for Review	06/16/23
3	Issued for Review	06/07/23
2	Issued for Tender Review	05/29/23
1	Issued for Coordination	04/20/23
#	DESCRIPTION	MM/DD/YY

Codrington Research Facility
 Codrington, ON

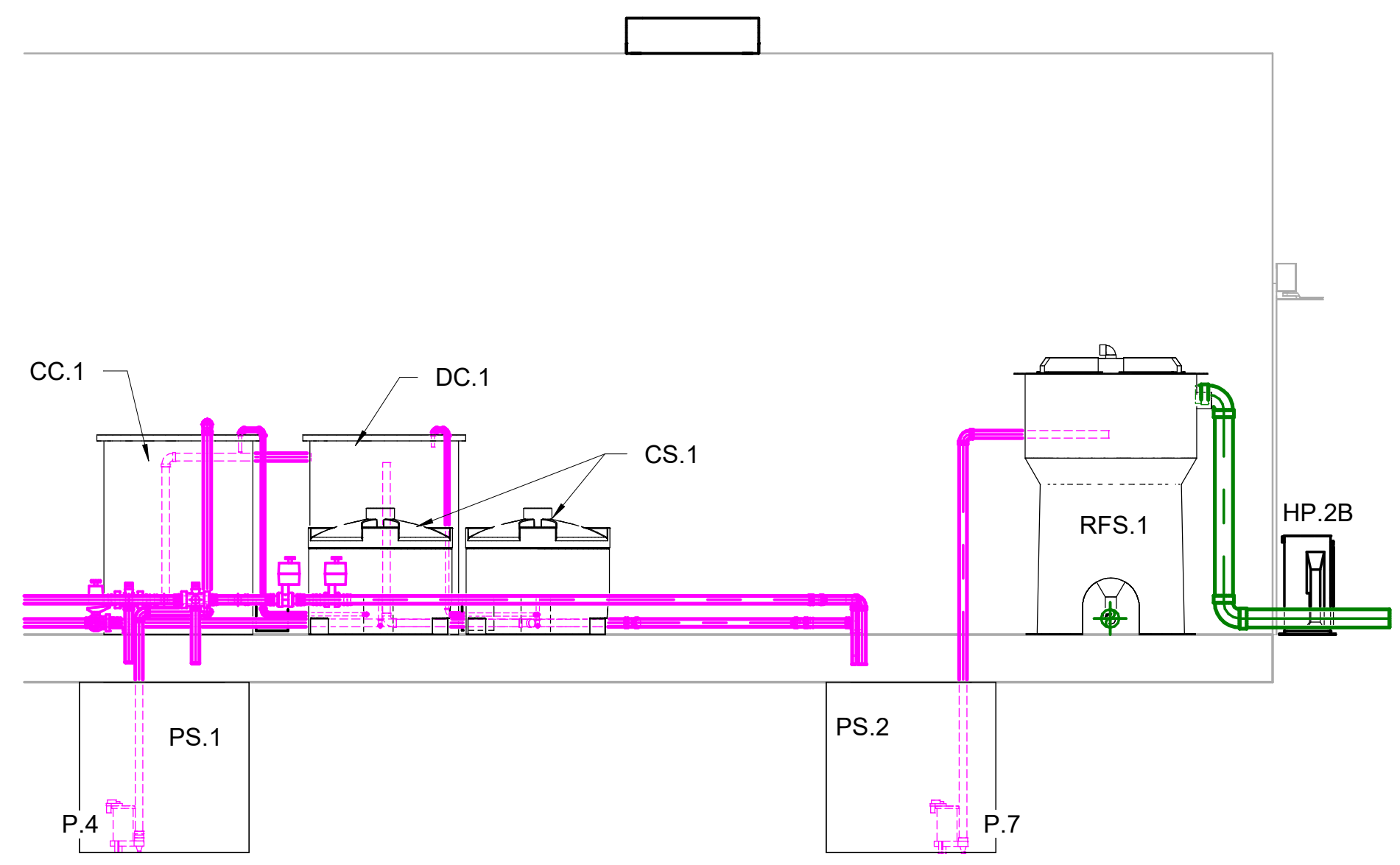
DRAWING TITLE:
Effluent Treatment Plans

DRAWN BY: J.V	CHECKED BY: N.B	APPROVED BY: T.N
SCALE: As indicated	SHEET SIZE: ARCH D	
PROJECT #: 22-250	SHEET #: M6.1	

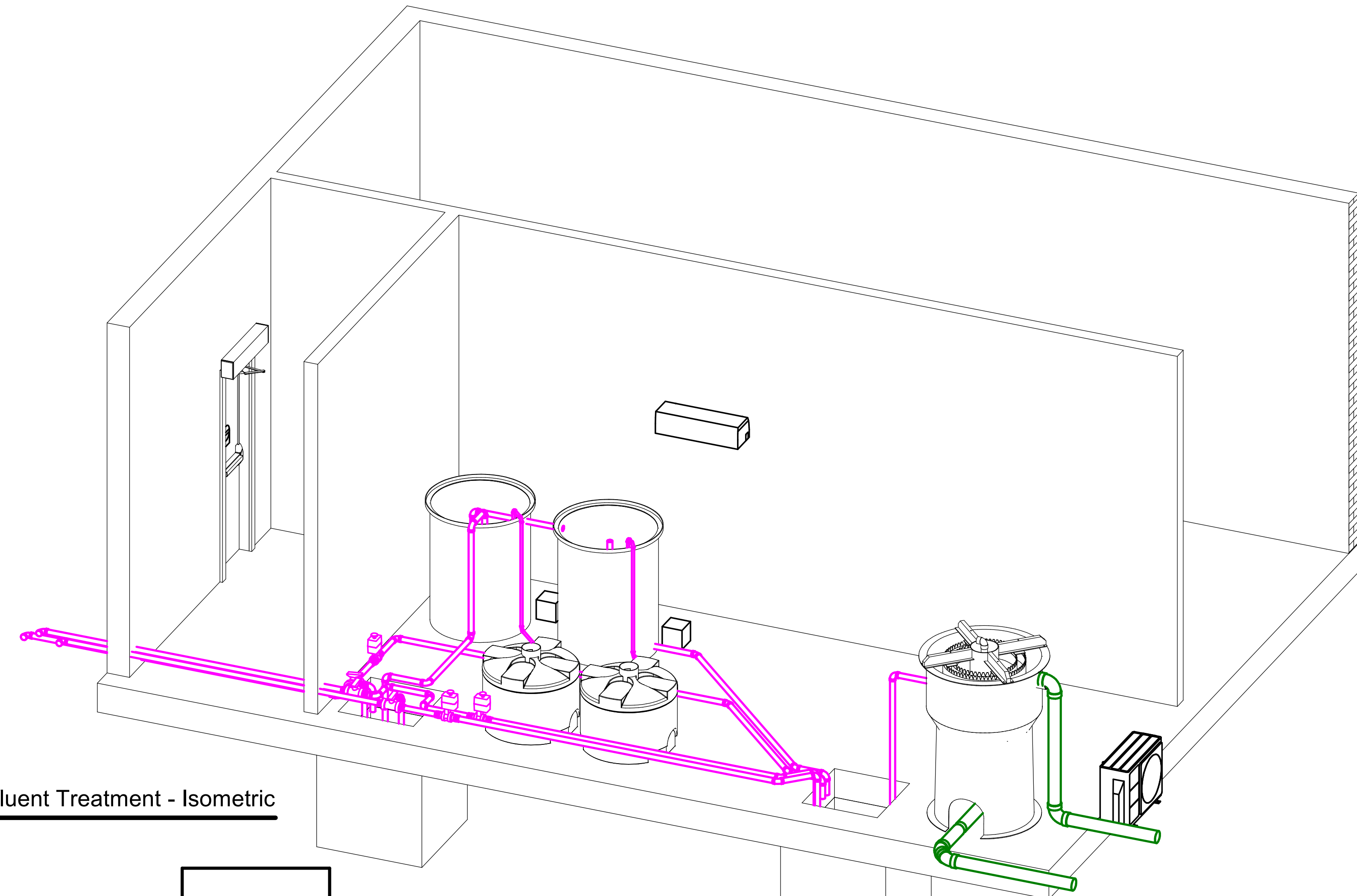
NOTE TO USER: DO NOT SCALE DRAWINGS. ALL DRAWINGS REMAIN THE PROPERTY OF ROMBALD INC. AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT WRITTEN PERMISSION.

NORTH: PN

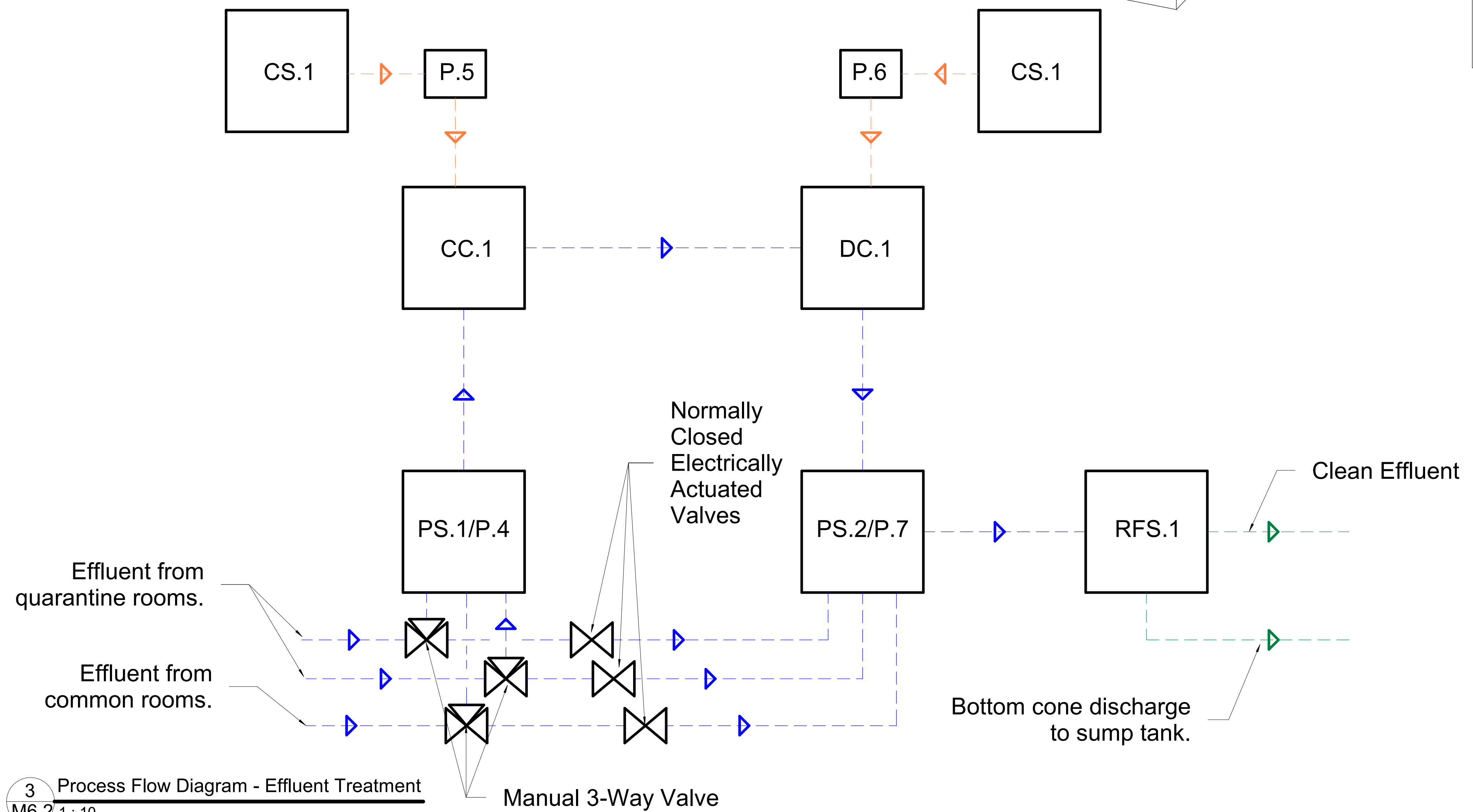
CONSULTANT STAMP:
 LICENSED PROFESSIONAL ENGINEER
 02/08/24
 T. NIEMINEN
 100206016
 PROVINCE OF ONTARIO



1 Effluent Treatment - Elevation View
 M6.2 1 : 35



2 Effluent Treatment - Isometric
 M6.2



3 Process Flow Diagram - Effluent Treatment
 M6.2 1 : 10

2	Issued for Tender	02/08/24
1	Issued for Tender	11/23/23
#	DESCRIPTION	MM/DD/YY

Codrington Research Facility
 Codrington, ON

DRAWING TITLE:
Effluent Treatment Views

DRAWN BY: J.V	CHECKED BY: N.B	APPROVED BY: T.N
SCALE: As indicated	SHEET SIZE: ARCH D	
PROJECT #: 22-250	SHEET #: M6.2	

MECHANICAL LEGEND			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
MECHANICAL LINE TYPES		PLUMBING	
—S—	SANITARY	C	PIPING DROP
—CW—	COLD WATER	Ⓢ	PIPING RISE
—SCW—	SOFT COLD WATER	(1)	PIPING DROP TEE
—HW—	HOT WATER	FD	FLOOR DRAIN
—HS—	HYDRONIC SUPPLY	HD	HUB DRAIN
—HR—	HYDRONIC RETURN	CHD	COOLER HUB DRAIN
—MW—	MIXED/TEMPERED WATER	RD	ROOF DRAIN
—CWF—	COLD WATER FILTERED	VAC	OFFSET HUB DRAIN
—RS—	REFRIGERANT PIPING SUPPLY	TRENCH DRAIN (AS PER SCHEDULE)	
—RL—	REFRIGERANT PIPING RETURN	MIXING STATION	
—SPR—	SPRINKLER PIPING	CLEANOUT	
—C—	CONDENSATE LINE	CONTINUATION LINE	
—HW-R—	RECIRCULATION LINE	CW HW MW	FIXTURE CONNECTION (COLD WATER/HOT WATER/MIXED WATER)
—WS—	WATER SERVICE	CWF	FIXTURE CONNECTION (COLD WATER FILTERED)
—ST—	STORM WATER	G	DOUBLE CHECK VALVE ASSEMBLY BACKFLOW PREVENTER (DCVA)
—G—	GAS LINE	G	GLOBE VALVE
—AR—	COMPRESSED AIR LINE	B	BALL VALVE
—PWS—	PROCESS WATER SUPPLY	BW	BACKWATER VALVE
—PWR—	PROCESS WATER RETURN	BV	BUTTERFLY VALVE
—DM-S—	DM. DENOTES DEMOLITION (TYP)	CV	CHECK VALVE
—EX-S—	EX. DENOTES EXISTING (TYP)	SO	SHUT-OFF VALVE
		GV	GATE VALVE
		PC	PIPE AND DUCTWORK CAP
		R	REDUCER
		GI	GREASE OR SEDIMENT INTERCEPTOR (AS PER SCHEDULE)
		HWH	HOT WATER HEATER (AS PER SCHEDULE)
		HWT	HOT WATER TANK (AS PER SCHEDULE)
		ET	EXPANSION TANK (AS PER SCHEDULE)
		WM	WATER METER
		P	PUMP
		NFHB	NON-FREEZE HOSE BIBB (NFHB)
HVAC		SPRINKLER	
—	SUPPLY DUCT	*	EXISTING SPRINKLER HEAD
—	RETURN DUCT	Ⓢ	RELOCATED SPRINKLER HEAD
—	EXHAUST DUCT	H	NEW SPRINKLER HEAD
—	AIR DUCT (SIZE AS PER DRAWING)	P	P' DENOTES PENDENT TYPE SPRINKLER HEAD
—	ACOUSTIC LINING (AS PER SPECIFICATIONS)	U	U' DENOTES UPRIGHT TYPE SPRINKLER HEAD
—	THERMAL INSULATION (AS PER SPECIFICATIONS)	S	S' DENOTES SIDEWALL TYPE SPRINKLER HEAD
—	EXISTING AIR DUCT (SIZE AS PER DRAWING)	RP	RP' DENOTES RECESSED PENDENT TYPE SPRINKLER HEAD
—	SQUARE DIFFUSER (AS PER SCHEDULE)	HT	HT' DENOTES HIGH TEMPERATURE UPRIGHT TYPE SPRINKLER HEAD
—	SQUARE DIFFUSER WITH BLANK-OFF PANEL (AS PER SCHEDULE)		
—	DIFFUSER/GRILLE LABEL, SIZE (MP), CAPACITY (CFM)		
—	LINEAR DIFFUSER LABEL, LENGTH OF DIFFUSER (FT), CAPACITY (CFM)		
—	CIRCULAR DIFFUSER (AS PER SCHEDULE)		
—	RETURN AIR GRILLE (AS PER SCHEDULE)		
—	FLEXIBLE DUCT		
—	MANUAL BALANCING DAMPER		
—	AIRFLOW INDICATOR		
—	EXHAUST FAN (AS PER SCHEDULE)		
—	THERMOSTAT		
—	IN-LINE EXHAUST FAN (AS PER SCHEDULE)		
—	LOUVER (AS PER SCHEDULE)		
—	WALL-MOUNTED FORCED FAN HEATER		
—	CEILING-MOUNTED FORCED FAN HEATER		
—	BASEBOARD HEATER (AS PER SCHEDULE)		
—	TOP/BOTTOM REGISTER		
—	SIDE REGISTER		
—	TRANSFER DUCT		
—	TURNING VANES IN A RECTANGULAR DUCT TURN		
—	LINEAR DIFFUSER (AS PER SCHEDULE)		
—	UNIT HEATER		
—	DYNAMIC FIRE DAMPER		
—	REVERSE-ACTING THERMOSTAT		
—	AIR TRANSFER GRILLE AS PER DRAWING		
—	GAS METER		
—	GAS CONNECTION		
—	GAS VALVE		
ABBREVIATIONS			
TBR	TO BE REMOVED	H, W, L, Ø	HEIGHT, WIDTH, LENGTH, DIAMETER
REL	RELOCATED	AFF	ABOVE FINISHED FLOOR
RAR	REMOVE AND RE-INSTALL	AF	ABOVE FLOOR
EXR	EXISTING TO REMAIN	UF	UNDER FLOOR
EX	EXISTING	OH	OVERHEAD
CTE	CONNECT TO EXISTING	UG	UNDERGROUND

GENERAL NOTES

- THE CONTRACTOR SHALL SUBMIT A LUMP SUM PRICE BASED ON THE DRAWING(S). IF THE CONTRACTOR CHOOSES TO USE ALTERNATIVE MATERIALS AND EQUIPMENT, THE BID MUST INCLUDE NAME OF THE ALTERNATIVE MANUFACTURER AND ANY ADJUSTMENT IN PRICE.
- BEFORE BIDDING, THE CONTRACTOR MUST VISIT SITE. THE CONTRACTOR IS RESPONSIBLE TO BE FAMILIAR WITH THE BUILDING CONSTRUCTION SO THAT THE BID INCLUDES ALL THAT IS NECESSARY FOR THE COMPLETION OF THE WORK.
- OBTAIN ALL REQUIRED LICENSES AND CERTIFICATES OF INSPECTION, ETC., AND PAY ALL ASSOCIATED FEES. FURNISH CERTIFICATES AND DRAWINGS AS REQUIRED AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH THE LAWS AND REGULATIONS OF ALL GOVERNING AUTHORITIES HAVING JURISDICTION.
- THE CONTRACTOR SHALL STUDY THE DRAWINGS AND SPECIFICATIONS AND SHALL REPORT ANY ERRORS, INCONSISTENCIES, OR OMISSIONS TO THE ENGINEER AND/OR CAS BEFORE BIDDING. DO NOT PROCEED IN UNCERTAINTY.
- PROVIDE WRITTEN GUARANTEE AGAINST DEFECTS OF ALL MATERIAL AND WORKMANSHIP FOR ALL NEW MECHANICAL WORK AND EQUIPMENT, INCLUDING MANUFACTURERS' GUARANTEES, FOR THE PERIOD OF MINIMUM TWO YEAR FROM THE DATE OF FINAL ACCEPTANCE.
- THE FOLLOWING DOCUMENTS ARE REQUIRED TO BE SUBMITTED BY THE MECHANICAL CONTRACTOR TO THE MECHANICAL CONSULTANT. THE DOCUMENTS SHALL BE SUBMITTED AT THE COMPLETION OF THE PROJECT AND PRIOR TO FINAL CLOSEOUT DOCUMENTATION ISSUED FROM THE CONSULTANT.
 - HVAC EQUIPMENT COMMISSIONING REPORTS.
- MECHANICAL CONTRACTOR SHALL SUBMIT ALL SHOP DRAWINGS TO CONSULTANT FOR REVIEW PRIOR TO ORDERING EQUIPMENT.
- MAINTAIN LIABILITY INSURANCE TO PROTECT OWNER AND THE CONTRACTOR FROM ANY AND ALL CLAIMS UNDER THE WORKER'S COMPENSATION ACT.

GENERAL PLUMBING NOTES

- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS.
- FOR PLUMBING FIXTURES SUPPLIED AND INSTALLED BY THE CONTRACTOR, REFER TO SPECIFICATION DETAILS FOR INFORMATION.
- ALL SANITARY AND WATER, ETC. SHOWN ON THE DRAWINGS ARE SHOWN IN THEIR APPROXIMATE LOCATIONS. THE MECHANICAL CONTRACTOR SHALL VISIT AND INVESTIGATE THE JOB SITE PRIOR TO INSTALLATION AND SHALL BE RESPONSIBLE FOR REPORTING ANY DISCREPANCIES TO THE CONSULTANT PRIOR TO CONSTRUCTION.
- ALL PIPE BROUGHT THROUGH CONCRETE FLOOR SLABS MUST BE SHEATHED IN FLEXIBLE PLASTIC PIPE EXTENDING 6" ABOVE AND BELOW THE SLAB TO PREVENT DAMAGE TO THE PIPE.
- PROVIDE WATER LINES TO ALL SINKS C/W SHUT-OFF VALVES AND DRAINS AS REQUIRED, UNLESS INDICATED OTHERWISE.
- PROVIDE DRAIN VALVES AT LOW SPOTS OF NEW FRESH WATER SYSTEM.
- ALL REFRIGERATION LINES TO BE INSULATED FOR FULL LENGTH OF RUN. ALL REFRIGERANT PIPING TO BE INSULATED WITH FLEXIBLE ELASTOMERIC FOAM PIPE INSULATION C/W VAPOUR BARRIER. REFER TO INSULATION SCHEDULE.
- ABS CAN ONLY BE USED IN A BUILDING OF COMBUSTIBLE CONSTRUCTION. AS PER OBC 3.6.4.3, ABS PIPING IS NOT PERMITTED IN A CEILING SPACE USED AS A RETURN AIR PLENUM. ABS PIPING IS NOT PERMITTED IN A VERTICAL SHAFT. AS PER OBC 3.6.4.3, PVC PIPING IS NOT PERMITTED IN A CEILING SPACE USED AS A RETURN AIR PLENUM. PVC PIPING IS NOT PERMITTED IN A VERTICAL SHAFT. COATED PVC (IPEX SYSTEM XFR OR EQUAL) IS PERMITTED IN CEILING SPACE RETURN AIR PLENUMS.
- PVC CAN BE USED IN A BUILDING OF COMBUSTIBLE CONSTRUCTION. PVC CANNOT BE USED IN A BUILDING OF NON-COMBUSTIBLE CONSTRUCTION. COATED PVC (IPEX SYSTEM XFR OR EQUAL) IS PERMITTED IN BUILDINGS OF NON-COMBUSTIBLE CONSTRUCTION AND IN HIGH BUILDINGS.
- ALL PLUMBING TO BE TESTED TO THE SATISFACTION OF LOCAL AUTHORITIES HAVING JURISDICTION.

11. CUT NEW WALL AND FLOOR PENETRATION AS REQUIRED. FIRESTOP ALL NEW PENETRATIONS THROUGH FIRE SEPARATIONS. FOR INSULATED STEEL PIPE, COPPER, CAST IRON PIPE OF MAXIMUM 150mm SIZE THROUGH CONCRETE PENETRATION PROVIDE HILTI CP 606 OR APPROVED EQUIVALENT. FOR INSULATED STEEL OR CAST IRON PIPE BETWEEN 150mm AND 600mm SIZE THROUGH CONCRETE PENETRATION PROVIDE HILTI FS-ONE OR APPROVED EQUIVALENT. FOR INSULATED STEEL OR CAST IRON PIPE MAXIMUM 200mm SIZE AND MAXIMUM 25Ø SIZE COPPER TUBING THROUGH GYPSUM PENETRATION PROVIDE HILTI FS-ONE OR APPROVED EQUIVALENT. FOR INSULATED STEEL, CAST IRON OR COPPER PIPE/TUBING MAXIMUM 100mm SIZE THROUGH GYPSUM PENETRATION PROVIDE HILTI CP 606 OR APPROVED EQUIVALENT. FOR INSULATED PLASTIC PIPE MAXIMUM 50mm SIZE THROUGH CONCRETE PENETRATION PROVIDE HILTI CP648E OR APPROVED EQUIVALENT. FOR UN-INSULATED STEEL OR CAST IRON PIPE MAXIMUM 200mm SIZE AND COPPER PIPE MAXIMUM 100mm SIZE THROUGH CONCRETE PENETRATIONS PROVIDE HILTI CP601S OR APPROVED EQUIVALENT. FOR UN-INSULATED STEEL OR CAST IRON PIPE MAXIMUM 200mm SIZE AND COPPER PIPE MAXIMUM 100mm SIZE THROUGH GYPSUM PENETRATIONS PROVIDE HILTI FS-ONE OR APPROVED EQUIVALENT. FOR UN-INSULATED PVC, FRPP, CPVC OR ABS PIPE MAXIMUM 150mm SIZE THROUGH CONCRETE AND GYPSUM PENETRATION PROVIDE HILTI CP643N AND FS-ONE OR APPROVED EQUIVALENT. FOR INSULATED OR UN-INSULATED METAL DUCTS PROVIDE HILTI FS-ONE OR APPROVED EQUIVALENT. FOR LARGE OPENINGS WITH MULTIPLE INSULATED OR NON-INSULATED STEEL, CAST IRON, COPPER, PVC PIPES THROUGH CONCRETE OR GYPSUM PENETRATIONS PROVIDE HILTI CP620 FIRE FOAM OR APPROVED EQUIVALENT.

- ALL DISSIMILAR METAL (STEEL-COPPER, ETC.) SHALL BE SEPARATED USING GASKETS AND INSULATING WASHERS OR WATTS "DI-ELECTRIC" FITTINGS.
- IDENTIFY ALL PIPING. USE STENCILS OR COLOR CODES AND DIRECTIONAL ARROWS CONFORMING TO ASME A13.1
- MECHANICAL CONTRACTOR SHALL PROVIDE MIXING VALVES AS REQUIRED BY OBC 7.6.5. FOR PLUMBING FIXTURES, EXCEPT DISHWASHERS AND CLOTHES WASHERS, TO ENSURE A MAXIMUM WATER TEMPERATURE OF NOT MORE THAN 120°F (49°C).
- PROCESS FLOW PLUMBING IS NOT SUBJECT TO SECTION 7 OF THE ONTARIO BUILDING CODE.
- ALL PENETRATIONS THROUGH CEILINGS, WALLS AND FLOORS ARE TO BE CAULKED AND SEALED TO PREVENT AIR OR WATER FROM SEEPIG THROUGH THE PENETRATION. POINTS OF SUPPORT AND/OR ATTACHMENT ARE ALSO TO BE CAULKED AND SEALED.

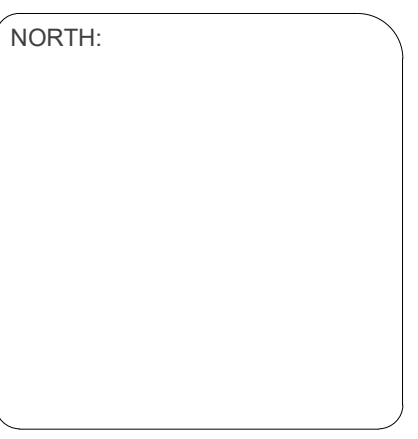
PIPING INSULATION SCHEDULE			
PIPE TYPE	PIPE SIZE	INSULATION THICKNESS	REMARKS
DOMESTIC HOT LINES	UNDER 1-1/2"	1"	
DOMESTIC HOT LINES	1-1/2" AND ABOVE	1-1/2"	
DOMESTIC COLD LINES (FILTERED AND UNFILTERED)	UNDER 1"	1/2"	
DOMESTIC COLD LINES (FILTERED AND UNFILTERED)	1" AND ABOVE	1"	
DOMESTIC HOT WATER RECIRCULATION LINES	ALL	1"	
CONDENSATE LINES	ALL	1/2"	
STORM PIPING WITHIN 50' OF ROOF DRAIN	ALL	1"	
CHILLED WATER PIPING	1-1/2" AND UNDER	1-1/2"	
CHILLED WATER PIPING	2" AND ABOVE	2"	
HEATING WATER PIPING	1-1/2" AND UNDER	1-1/2"	
HEATING WATER PIPING	2" AND ABOVE	2"	
REFRIGERANT PIPING	3/4" AND UNDER	1/2"	
REFRIGERANT PIPING	1" AND ABOVE	1"	

GENERAL HVAC NOTES

- ALL MATERIALS AND EQUIPMENT TO BE NEW AND FREE OF DEFECTS, AND SHALL BE C.S.A. APPROVED.
- ALL DUCT CONSTRUCTION SHALL ADHERE TO SMACNA HVAC DUCT CONSTRUCTION STANDARDS, METAL AND FLEXIBLE, 3rd EDITION.
- ANY METAL DUCTWORK SHALL BE FABRICATED FROM LOCK FORMING ALUMINUM SHEETS AND IN ACCORDANCE WITH CHAPTERS 2 AND 3 OF SMACNA HVAC DUCT CONSTRUCTION STANDARDS, METAL AND FLEXIBLE, 3rd EDITION, UNLESS SPECIFIED OTHERWISE.
- LONGITUDINAL SEAMS SHALL BE MADE WITH PITTSBURGH LOCK SEAMS IN ALL SIZES. TRANSVERSE JOINTS MAY BE S & DRIVE FOR DUCT PRESSURE CLASSES 1/2, 1, AND 2 IN.WG., BUT MUST BE MINIMUM TDC FOR HIGHER PRESSURE CLASSES UNLESS SPECIFICALLY APPROVED BY ENGINEER.
- ALL BENDS OR ELBOWS SHALL BE MADE WITH A CENTERLINE RADIUS OF NOT LESS THAN 1.5 TIMES THE WIDTH OF THE DUCT UNLESS OTHERWISE APPROVED BY THE ENGINEER. WHERE THIS IS NOT POSSIBLE, SINGLE THICKNESS TURNING VANES AND SPLITTER VANES SHALL BE USED FOR SQUARE ELBOWS AND RADIUS ELBOWS RESPECTIVELY, WITH CONSTRUCTION DETAILS ACCORDING TO CHAPTER 4 OF SMACNA HVAC DUCT CONSTRUCTION STANDARDS, METAL AND FLEXIBLE, 3rd EDITION.
- SEAL ALL DUCT FITTINGS AND JOINTS WITH APPROVED DUCT SEALANT TO SMACNA SEAL CLASS A FOR CONDITIONED SPACES AND SMACNA SEAL CLASS A FOR UNCONDITIONED SPACES. DUCT SEALANT MANUFACTURER SHALL BE DURO DYNE OR EQUAL.
- ALL GRILLES, REGISTERS, AND DIFFUSERS TO BE ALUMINUM CONSTRUCTION WITH WHITE POWER COAT UNLESS OTHERWISE SPECIFIED.
- DUCTWORK SHALL HAVE SUITABLE HANGERS FIRMLY SECURED TO STRUCTURE. HANGER SIZING, SPACING, CONSTRUCTION, AND INSTALLATION SHALL BE AS PER CHAPTER 5 OF SMACNA HVAC DUCT CONSTRUCTION STANDARDS, METAL AND FLEXIBLE, 3rd EDITION.
- PROVIDE BALANCING DAMPERS IN DUCTWORK WHERE SHOWN AND WHERE REQUIRED FOR PROPER ADJUSTMENT FOR AIR QUANTITIES. OPEN AND CLOSED POSITIONS MUST BE CLEARLY MARKED. BALANCING DAMPERS SHALL BE SINGLE BLADE ROUND BUTTERFLY, MINIMUM 20 GA. WITH LOCKING QUADRANT, UNLESS OTHERWISE SPECIFIED.
- SPLITTER DAMPERS SHALL NOT BE USED UNLESS APPROVED BY ENGINEER. IF ALLOWED, THEY SHALL BE AIRFLOW SHAPE DOUBLE THICKNESS, OF GAUGE HEAVIER THAN DUCT, WITH LOCKING QUADRANT ON EXTERIOR OF DUCT.
- ALL DAMPERS INSIDE DUCTWORK SHALL BE SUITABLY REINFORCED TO PREVENT CHATTERING OR VIBRATION
- USE DUCT SIZES AS SHOWN. IF NECESSARY DUE TO SITE CONDITIONS, DUCT SIZES MAY BE CHANGED IF THE NEW SIZES HAVE AN EQUIVALENT PRESSURE DROP PER UNIT LENGTH AS THE ORIGINALLY SPECIFIED SIZES. THE ASPECT RATIO MUST BE 3:1 OR BETTER FOR RECTANGULAR DUCTWORK, UNLESS SPECIFICALLY APPROVED BY ENGINEER.
- DUCT THERMAL INSULATION, IF SHOWN ON DRAWINGS OR OTHERWISE CALLED OUT, TO BE 1-1/2" JOHNS MANVILLE TYPE 814 SPIN-GLAS FOR EXPOSED DUCTWORK AND 1-1/2" JOHNS MANVILLE MGROLITE XG FOR CONCEALED DUCTWORK, UNLESS OTHERWISE SPECIFIED.
- DUCT ACOUSTIC INSULATION, IF SHOWN ON DRAWINGS OR OTHERWISE CALLED OUT, TO BE 1" JOHNS MANVILLE PERMACOTE LINACOUSTIC RC-HP, UNLESS OTHERWISE SPECIFIED. DUCT DIMENSIONS SHOWN ARE CLEAR INSIDE DIMENSIONS; INCREASE MARKED SIZE TO ACCOUNT FOR ACOUSTIC LINING AS REQUIRED.
- MAINTAIN TAPER ON DUCT FITTINGS FOR CONCENTRIC TRANSITION (TWO SIDED) AT MAXIMUM ANGLE OF 60° CONVERGING AND MAXIMUM ANGLE OF 45° DIVERGING. MAINTAIN ECCENTRIC TRANSITION (ONE SIDED) AT MAXIMUM ANGLE OF 30°.
- PROVIDE FIRE DAMPER AT ALL NEW PENETRATIONS THROUGH FIRE SEPARATIONS WITH NAILOR INDUSTRIES MODEL SERIES D0100 OR D0500 (DEPENDING ON FIRE-RATING OF ASSEMBLY BEING PENETRATED) OR APPROVED EQUAL AS REQUIRED BY UL 555 AND NFPA 90A.
- PROVIDE CANVAS FLEXIBLE DUCT CONNECTIONS TO ALL EQUIPMENT.
- IDENTIFY ALL FANS, RTU, UNIT HEATERS AND ALL OTHER EQUIPMENT BY A BLACK LAMACOID ENGRAVED NAMEPLATE WITH WHITE CORE, FIRMLY AFFIXED WITH SCREWS TO EACH UNIT.
- THE WORK SPECIFIED HEREIN SHALL ALSO BE IN ACCORDANCE WITH THE BUILDING MODEL NATIONAL BUILDING CODE. MECHANICAL EQUIPMENT SHALL COMPLY WITH SUPPLEMENTARY STANDARDS SB-10 OF THE ONTARIO BUILDING CODE.



NOTE TO USER: DO NOT SCALE DRAWINGS. ALL DRAWINGS REMAIN THE PROPERTY OF ROMBALD INC. AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT WRITTEN PERMISSION.



5	Issued for Tender	02/08/24
4	Issued for Tender	11/23/23
3	Issued for Review	06/16/23
2	Issued for Review	06/07/23
1	Issued for Coordination	04/20/23
#	DESCRIPTION	MM/DD/YY

Codrington Research Facility
Codrington, ON

DRAWING TITLE:
Mechanical Legend & Notes

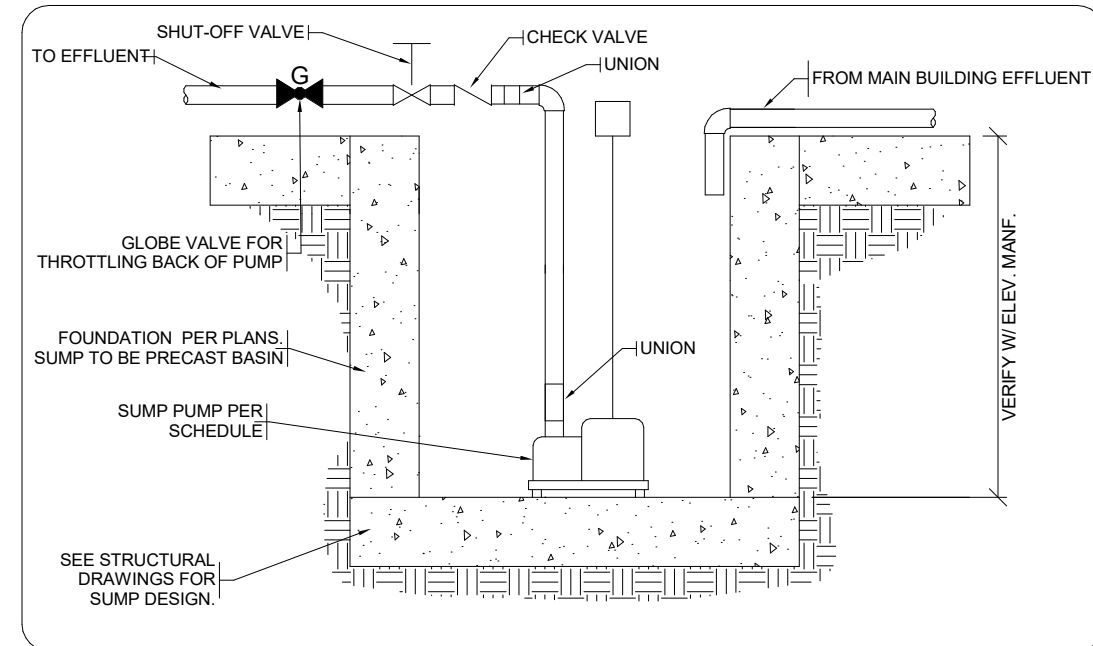
DRAWN BY: J.V	CHECKED BY: N.B	APPROVED BY: T.N
SCALE: 1 : 100		SHEET SIZE: ARCH D
PROJECT #: 22-250		SHEET #: M7.1

NEW MECHANICAL EQUIPMENT SCHEDULE				
SYMBOL	NAME	DESCRIPTION	ELECTRICAL	REMARKS
HP.2A	HEAT PUMP - INDOOR	SENVILLE SEN24HF-02 COOLING CAPACITY: 25,700 BTUH (2 TON) HEATING CAPACITY: 20,600 BTUH AIRFLOW RATE: 412 CFM APPROX. DIMENSIONS: 15" x 47" x 11" (HxWxD)	N/A FED FROM OUTDOOR UNIT	WALL MOUNT. SEER 21.5. REMOTE CONTROL THERMOSTAT. INTERLOCK WITH HP.2B. PROVIDE 3/4" CONDENSATE DRAIN TO CLOSEST SANITARY LINE.
HP.2B	HEAT PUMP - OUTDOOR	SENVILLE SEN24HF-02 COOLING CAPACITY: 25,700 BTUH (2 TON) HEATING CAPACITY: 20,600 BTUH AIRFLOW RATE: 412 CFM APPROX. DIMENSIONS: 32" x 37" x 16" (HxWxD) WEIGHT: 175 LBS	208-230/1/60 25 MCA 35 MOCOP	SEER 21.5. PROVIDE METAL CAGE FOR OUTDOOR UNIT. INTERLOCK WITH HP.2A.
HP.1A	HEAT PUMP - INDOOR	SENVILLE SEN18HF-02 COOLING CAPACITY: 19,400 BTUH (1.5 TON) HEATING CAPACITY: 16,500 BTUH AIRFLOW RATE: 323 CFM APPROX. DIMENSIONS: 12-5/8" x 40" x 9-3/4" (HxWxD)	N/A FED FROM OUTDOOR UNIT	WALL MOUNT. SEER 21.5. REMOTE CONTROL THERMOSTAT. INTERLOCK WITH HP.1B. PROVIDE 3/4" CONDENSATE DRAIN TO CLOSEST SANITARY LINE.
HP.1B	HEAT PUMP - OUTDOOR	SENVILLE SEN18HF-02 COOLING CAPACITY: 19,400 BTUH (1.5 TON) HEATING CAPACITY: 16,500 BTUH AIRFLOW RATE: 323 CFM APPROX. DIMENSIONS: 26-1/2" x 35" x 13-1/2" (HxWxD) WEIGHT: 75 LBS	208-230/1/60 9 MCA 25 MOCOP	SEER 21.5. PROVIDE METAL CAGE FOR OUTDOOR UNIT. INTERLOCK WITH HP.1A.
HRV.2	HEAT RECOVERY VENTILATOR	ALDES HOMO-RSG AIRFLOW: 250 CFM @ 0.67 w.g. APPROX. DIMENSIONS: 21-3/4" x 11-1/8" x 3-1/4" (HxWxD) WEIGHT: 62 LBS	120/160 2.89 A	#70 DUCTS. WALL MOUNTED CONTROLLER. SUSPENDED BY CHAINS WITH VIBRATION-ISOLATION SPRINGS HIGH ON CEILING.
HRV.1	HEAT RECOVERY VENTILATOR	ALDES 120-TQG AIRFLOW: 80 CFM @0.67 w.g. APPROX. DIMENSIONS: 16-3/4" x 12-3/8" x 23-1/8" (HxWxD) WEIGHT: 75 LBS	120/160 1.3 A	#70 DUCTS. WALL MOUNTED CONTROLLER. SUSPENDED BY CHAINS WITH VIBRATION-ISOLATION SPRINGS HIGH ON CEILING.
UV.1	ULTRA VIOLET FILTER	AST 18UV 3/4" INLET & OUTLET	120/160 150 W	INSTALL PER MANUFACTURER'S RECOMMENDATIONS. PURCHASED BY OTHERS. INSTALLED BY MECHANICAL CONTRACTOR. METAL SLIT THAT UNIT CAN SWING OUT TO BE ACCESSIBLE FOR MAINTENANCE TO REMOVE INNER LAMPS.
UV.2	ULTRA VIOLET FILTER	AST 18UV 3/4" INLET & OUTLET	120/160 18 W	INSTALL PER MANUFACTURER'S RECOMMENDATIONS. PURCHASED BY OTHERS. INSTALLED BY MECHANICAL CONTRACTOR.
CH.1	AIR-COOLED CHILLER	AQUALOGIC DS-4-TXV COOLING CAPACITY: 4500 BTUH FLOW: 10.0 GPM SIZE: 22-1/2" X 13-5/8" X 11-1/4" (LxWxH)	120/160 7.2 828 W	PROVIDE ALL PARTS, ACCESSORIES, AND LABOUR FOR COMPLETE INSTALLATION AS PER MANUFACTURER'S RECOMMENDATIONS. PURCHASED BY OTHERS. INSTALLED BY MECHANICAL CONTRACTOR.
IH.1	IMMERSION HEATER	PROCESS TECHNOLOGIES 273212 HEATING CAPACITY: 30W OVERALL LENGTH: 12 INCHES	240/100 3000 W	PROVIDE ALL PARTS, ACCESSORIES, AND LABOUR FOR COMPLETE INSTALLATION AS PER MANUFACTURER'S RECOMMENDATIONS. PURCHASED BY OTHERS. INSTALLED BY MECHANICAL CONTRACTOR.
IH.2	IMMERSION HEATER	PROCESS TECHNOLOGIES EASYPLUG - AQUACULTURE HEATING CAPACITY: 100W 40 W PER SQ IN	120/160 1000 W	PROVIDE ALL PARTS, ACCESSORIES, AND LABOUR FOR COMPLETE INSTALLATION AS PER MANUFACTURER'S RECOMMENDATIONS. PURCHASED BY OTHERS. INSTALLED BY MECHANICAL CONTRACTOR.
CM.1	CHLORINE MONITOR	KUNZTE KRYPTON DIS CHLORINE MONITOR	24V	PURCHASED BY OTHERS. INSTALLED BY MECHANICAL CONTRACTOR.
BL.1	SUMP TANK BLOWER	PENTAIR SWEETWATER SL56A 2 CFM @ 1 PSI 3/4" OUTLET INTO SUMP TANK (STARTING)	115/160 90 W	CW ALUMINUM CAST HOUSING, 0" POWER CORDS. RESET SAFETY SWITCH. 1/2" PENTAIR AER32 SILICA DIFFUSER WITH 1/2" NPT CONNECTION. MOUNTED INSIDE TANK. PENTAIR 400002 1/2" PVC TEE FITTING (NPT ON ALL ENDS). PENTAIR 1034 MALE ADAPTER (1/2" MPTX 0.9" BARB). BLOWERS TO RUN CONTINUOUSLY.
BL.2	EFFLUENT ROOM BLOWER	PENTAIR SWEETWATER SL56A 2 CFM @ 1 PSI 3/4" OUTLET INTO SUMP TANK (STARTING)	115/160 90 W	CW ALUMINUM CAST HOUSING, 0" POWER CORDS. RESET SAFETY SWITCH. VINYL TUBING AND ONE PENTAIR AB155 DIFFUSER. VINYL TUBING TO BE WEIGHTED SO IT REMAINS AT THE BOTTOM OF THE TANK. BLOWERS TO RUN CONTINUOUSLY.

PUMP SCHEDULE				
SYMBOL	NAME	DESCRIPTION	ELECTRICAL	REMARKS
P.1	MAIN SUMP PUMPS	SWEETWATER SHE4.4 SIZE: 270 SLIP CONNECTION 9.1 USGPM @ 18" HEAD 1725 RPM @ 100% FLOW	120/160 4 A 450 W	1/2 PUMPS TO RUN INTERCHANGEABLY. PUMPS TO BE DUTY-STANDBY WITH FAIL DETECTION & AUTOMATIC FLOW CONTROL. COORDINATE CONTROLS WITH PUMP MFGS. CW UNIONS FOR DISCONNECT.
P.2	INCUBATION STACK PUMP	IWAKI PM22 MAG DRIVE SIZE: 15.75" x 6.5" x 8.5" 5 USGPM @ 12" HEAD	120/160 1 A	CW 3" POWER CORD, THERMAL PROTECTOR & UNIONS FOR DISCONNECT.
P.3	CHILLER PUMP	IWAKI PM27 MAG DRIVE SIZE: 12.25" x 7.0" x 8.5" 20 USGPM @ 13" HEAD	120/160 3 A	CW 3" POWER CORD, THERMAL PROTECTOR & UNIONS FOR DISCONNECT.
P.4	QUARANTINE TREATMENT PUMP	PENTAIR MYERS D550 FLOW: 24 USGPM @ 10" HEAD SIZE: 12.1" x 6.4" x 9.6" (HxWxD)	115/160 0.5 HP	CW PIGGYBACK FLOAT SWITCHES, PUMP CONTROLLER FOR AUTOMATIC SHUT-OFF & ACTIVATION, UNIONS FOR DISCONNECT & 1.2" X 1" DISCHARGE ADAPTER. SUBMERSIBLE PUMP SUITABLE FOR 3/4" SOLIDS MAX. FLOAT SWITCHES TO MAINTAIN WATER HEIGHT AT 18" MIN. AND 30" MAX HEIGHT IN PIT.
P.5	PERISTALTIC CHLORINE DOSING PUMP	BLUE-WHITE A1 FLEXFLOW PERISTALTIC METERING PUMP 0.003-0.6 GPH MAX. SUCTON: 30" SIZE: 7.25" x 9" x 10"	120/160 0.6 A	CW POWER CORD, THERMAL PROTECTOR & ALL ACCESSORIES FOR A COMPLETE INSTALLATION.
P.6	PERISTALTIC CHLORINE DOSING PUMP	BLUE-WHITE A1 FLEXFLOW PERISTALTIC METERING PUMP 0.003-0.6 GPH MAX. SUCTON: 30" SIZE: 7.25" x 9" x 10"	120/160 0.6 A	CW POWER CORD, THERMAL PROTECTOR & ALL ACCESSORIES FOR A COMPLETE INSTALLATION.
P.7	FINAL TREATMENT PUMP	PENTAIR MYERS D550 FLOW: 24 USGPM @ 10" HEAD SIZE: 12.1" x 6.4" x 9.6" (HxWxD)	115/160 0.5 HP	CW PIGGYBACK FLOAT SWITCHES, PUMP CONTROLLER FOR AUTOMATIC SHUT-OFF & ACTIVATION, UNIONS FOR DISCONNECT & 1.2" X 1" DISCHARGE ADAPTER. SUBMERSIBLE PUMP SUITABLE FOR 3/4" SOLIDS MAX. FLOAT SWITCHES TO MAINTAIN WATER HEIGHT AT 18" MIN. AND 30" MAX HEIGHT IN PIT.

MECHANICAL FIXTURE SCHEDULE							
SYMBOL	NAME	MANUFACTURER	CW	HW	DR	V	REMARKS
BBF.1	BUBBLE BEAD FILTER	AST BBF-75B020 FLOW: 0.2 GPM @ 10 PSI (MAX)	2"0		2"0		MOUNTED UP HIGH ON PLATFORM (BY OTHERS) CW BEAD PACKAGES, WINDOW KIT. PURCHASED BY OTHERS. INSTALLED BY MECHANICAL CONTRACTOR.
BBF.2	BUBBLE BEAD FILTER	AST BBF-30300 FLOW: 10 GPM @ 10 PSI (MAX)	3/4"0		3/4"0		MOUNTED UP HIGH ON PLATFORM (BY OTHERS) PURCHASED BY OTHERS. INSTALLED BY MECHANICAL CONTRACTOR.
SS.1	SERVICE SINK	OMCAN 22118 SINGLE POT SINK 1 COMPARTMENT STAINLESS STEEL SINK FAUCET: 24" X 24" X 14" (LxWxD)	1/2"0		1-1/2"0		SUPPLIED BY OWNER AND INSTALLED BY MECHANICAL CONTRACTOR. CW SHUT OFF VALVES. NO HOT WATER TO BUILDING.
FD	FLOOR DRAIN	ZURN ZN4211-B			2"0		GENERAL DUTY CAST IRON BODY. ADJUSTABLE HEAD. NICKEL BRONZE STRAINER. INTEGRAL SELF-PAID PAN. AND CLAMPING COLLAR. USE SQUARE STRAINER IN TILE AREAS AND ROUND STRAINER ELSEWHERE. REDUCE DOWN TO INDICATED PIPE SIZE.
CO	CLEANOUT	ZURN ZN4-1612					SUPPLIED AND INSTALLED BY MECHANICAL CONTRACTOR. CO TO MATCH SIZE OF LINE INSTALLED.
HD	HUB DRAIN	ZURN Z211-5			2"0		REDUCE DOWN TO INDICATED PIPE SIZE.
PS.1	PUMP SUMP	CONCRETE PUMP SUMP INTERIOR DIMENSIONS: 30"x30"x48" (LxWxD)					SEE STRUCTURAL DRAWINGS FOR SUMP DESIGN.
PS.2	PUMP SUMP	CONCRETE PUMP SUMP INTERIOR DIMENSIONS: 30"x30"x48" (LxWxD)					SEE STRUCTURAL DRAWINGS FOR SUMP DESIGN.
RFS.1	RADIAL FLOW SETTLER	PENTAIR RF-560-038 APPROX. DIMENSIONS: 36"x59" (DxH)					PURCHASED BY OTHERS. INSTALLED BY MECHANICAL CONTRACTOR.
CC.1	CHLORINATION CHAMBER	RTS PLASTICS VOT-175 CAPACITY: 210 USG APPROX. DIMENSIONS: 36"x48" (DxH)					CW 3/8" CYL. SLIP COVER. PURCHASED BY OTHERS. INSTALLED BY MECHANICAL CONTRACTOR.
DC.1	DECHLORINATION CHAMBER	RTS PLASTICS VOT-175 CAPACITY: 210 USG APPROX. DIMENSIONS: 36"x48" (DxH)					CW 3/8" CYL. SLIP COVER. PURCHASED BY OTHERS. INSTALLED BY MECHANICAL CONTRACTOR.
CS.1	CHLORINE STORAGE	POLLY PROCESSING SAFE-A-0055 SAFE TANK CAPACITY: 55 USG APPROX. DIMENSIONS: 35.5"x32" (DxH)					CW STANDARD COVER. PURCHASED BY OTHERS. INSTALLED BY MECHANICAL CONTRACTOR.
CS.1	CHLORINE STORAGE	POLLY PROCESSING SAFE-A-0055 SAFE TANK CAPACITY: 55 USG APPROX. DIMENSIONS: 35.5"x32" (DxH)					CW STANDARD COVER. PURCHASED BY OTHERS. INSTALLED BY MECHANICAL CONTRACTOR.
ST.1	SUMP TANK	RTS PLASTICS RT-42 5M-G3 CAPACITY: 74 USG APPROX. DIMENSIONS: 36"x25"x24" (LxWxH)					FRAME TO BE CONSTRUCTED FROM ALUMINUM. PURCHASED BY OTHERS. INSTALLED BY MECHANICAL CONTRACTOR.
ST.2	SUMP TANK	RTS PLASTICS RT-42 5M-G3 CAPACITY: 74 USG APPROX. DIMENSIONS: 36"x25"x24" (LxWxH)					FRAME TO BE CONSTRUCTED FROM ALUMINUM. PURCHASED BY OTHERS. INSTALLED BY MECHANICAL CONTRACTOR.
ST.3	SUMP TANK	RTS PLASTICS RT-50 CAPACITY: 90 USG APPROX. DIMENSIONS: 24"x24"x20" (LxWxH)					PURCHASED BY OTHERS. INSTALLED BY MECHANICAL CONTRACTOR.
HT.1	HEAD TANK	RTS PLASTICS VOT-180 CAPACITY: 180 USG APPROX. DIMENSIONS: 36"x42" (DxH)					CW 3/8" CYL. SLIP COVER. MOUNTED IN ATTIC SPACE FOR DOMESTIC WATER STORAGE. PURCHASED BY OTHERS. INSTALLED BY MECHANICAL CONTRACTOR.

LOUVER SCHEDULE		
SYMBOL	DESCRIPTION	REMARKS
WB.1	REVERSOMATIC SINGLE WALL BOX SWB WITH EXTRUDED ALUMINUM GRILLE CW BDD, INSECT AND BIRD SCREEN. COORDINATE WITH CONNECTING DUCT SIZE.	FINISH TO BE SELECTED BY CLIENT/ARCHITECT.
WB.2	REVERSOMATIC DOUBLE WALL BOX DWB WITH EXTRUDED ALUMINUM GRILLE CW BDD, INSECT AND BIRD SCREEN. COORDINATE WITH CONNECTING DUCT SIZE.	FINISH TO BE SELECTED BY CLIENT/ARCHITECT.
WB.3	REVERSOMATIC LEAK PROOF FRESH AIR INTAKE WALL BOX SWBL-INTAKE. CW INSECT AND BIRD SCREEN. COORDINATE WITH CONNECTING DUCT SIZE.	FINISH TO BE SELECTED BY CLIENT/ARCHITECT.
WB.4	REVERSOMATIC LEAK PROOF FRESH AIR INTAKE WALL BOX DWBL-INTAKE. CW INSECT AND BIRD SCREEN. COORDINATE WITH CONNECTING DUCT SIZE.	FINISH TO BE SELECTED BY CLIENT/ARCHITECT.



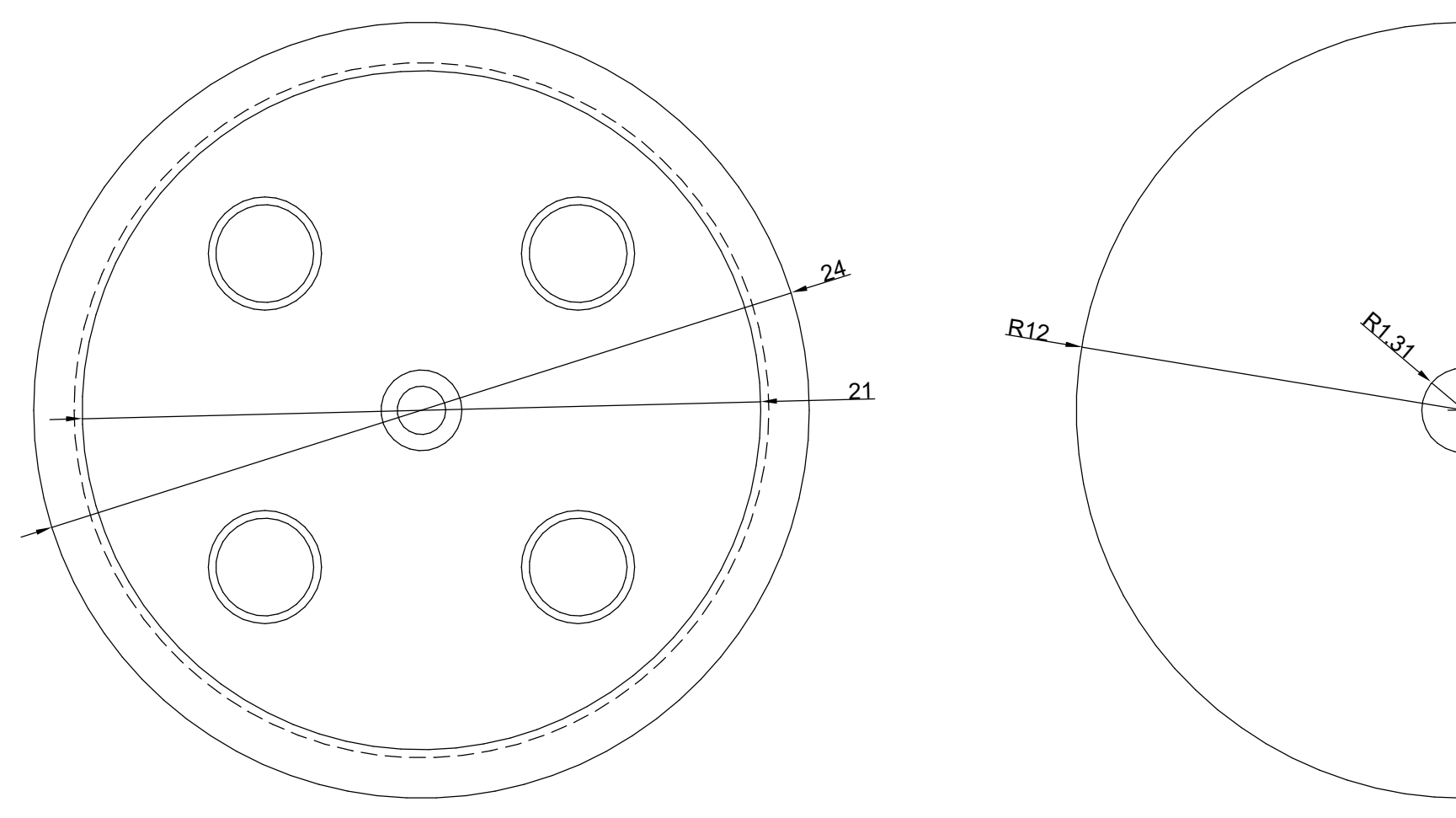
1 TYPICAL EFFLUENT SUMP DETAIL
M7.2 NTS

DUCTWORK INSULATION SCHEDULE				
DUCT TYPE	TYPE OF INSULATION	INSULATION THICKNESS	REMARKS	
INTERIOR EXHAUST DUCTS FOR THE LENGTH OF 3M (10 FT) FROM THE POINT OF WHERE THEY ENTER THE BUILDING	TYPE D1 OR D2	25mm (1")	TYPE D1: MINERAL FIBRE, FLEXIBLE, ASTM C553, NON-COMBUSTIBLE BLANKET, THERMAL CONDUCTIVITY: ASTM C518, 0.038W/M ² K @ 24°C (0.25 BTU/UF-HR-SQ FT) @ 70°F. MAXIMUM SERVICE TEMPERATURE: 121°C (250°F). MAXIMUM WATER VAPOUR SORPTION: 5% BY WEIGHT. PRODUCT: JOHNS MANVILLE MICROLOTE EQ TYPE 150 DUCT WRAP OR APPROVED EQUIVALENT. VAPOUR BARRIER SHALL BE FACTORY-APPLIED FSK (FOL-SCRM-KRAFF) VAPOUR BARRIER FACING WITH A 2" STAPLING TAB.	
OUTSIDE AIR INTAKE AND COMBUSTION SUPPLY AIR DUCTS	TYPE D2	50mm (2")	TYPE D2: ASTM C612; MINERAL FIBRE, RIGID, NON-COMBUSTIBLE BOARD, THERMAL CONDUCTIVITY: ASTM C518, 0.033W/M ² K @ 24°C (0.25 BTU/UF-HR-SQ FT) @ 70°F. MAXIMUM SERVICE TEMPERATURE: 232°C (450°F). MAXIMUM WATER VAPOUR SORPTION: 5% BY WEIGHT. PRODUCT: JOHNS MANVILLE SPIN-GLAS TYPE 814 DUCT INSULATION OR APPROVED EQUIVALENT. VAPOUR BARRIER: FACTORY-APPLIED FSK (FOL-SCRM-KRAFF) VAPOUR BARRIER FACING	
EXTERIOR DUCTS	TYPE D2	50mm (2")	TYPE D2: ASTM C612; MINERAL FIBRE, RIGID, NON-COMBUSTIBLE BOARD, THERMAL CONDUCTIVITY: ASTM C518, 0.033W/M ² K @ 24°C (0.25 BTU/UF-HR-SQ FT) @ 70°F. MAXIMUM SERVICE TEMPERATURE: 232°C (450°F). MAXIMUM WATER VAPOUR SORPTION: 5% BY WEIGHT. PRODUCT: JOHNS MANVILLE SPIN-GLAS TYPE 814 DUCT INSULATION OR APPROVED EQUIVALENT. VAPOUR BARRIER: FACTORY-APPLIED FSK (FOL-SCRM-KRAFF) VAPOUR BARRIER FACING	
SUPPLY, RETURN AND EXHAUST SPACES IN UNCONDITIONED SPACES OR MECHANICAL ROOMS	TYPE D1 OR D2	38mm (1-1/2")	TYPE D1: MINERAL FIBRE, FLEXIBLE, ASTM C553, NON-COMBUSTIBLE BLANKET, THERMAL CONDUCTIVITY: ASTM C518, 0.038W/M ² K @ 24°C (0.25 BTU/UF-HR-SQ FT) @ 70°F. MAXIMUM SERVICE TEMPERATURE: 121°C (250°F). MAXIMUM WATER VAPOUR SORPTION: 5% BY WEIGHT. PRODUCT: JOHNS MANVILLE MICROLOTE EQ TYPE 150 DUCT WRAP OR APPROVED EQUIVALENT. VAPOUR BARRIER SHALL BE FACTORY-APPLIED FSK (FOL-SCRM-KRAFF) VAPOUR BARRIER FACING WITH A 2" STAPLING TAB.	
SUPPLY DUCTS AFTER TERMINAL BOXES IN UNCONDITIONED SPACES	TYPE D1	25mm (1")	TYPE D1: MINERAL FIBRE, FLEXIBLE, ASTM C553, NON-COMBUSTIBLE BLANKET, THERMAL CONDUCTIVITY: ASTM C518, 0.038W/M ² K @ 24°C (0.25 BTU/UF-HR-SQ FT) @ 70°F. MAXIMUM SERVICE TEMPERATURE: 121°C (250°F). MAXIMUM WATER VAPOUR SORPTION: 5% BY WEIGHT. PRODUCT: JOHNS MANVILLE MICROLOTE EQ TYPE 150 DUCT WRAP OR APPROVED EQUIVALENT. VAPOUR BARRIER SHALL BE FACTORY-APPLIED FSK (FOL-SCRM-KRAFF) VAPOUR BARRIER FACING WITH A 2" STAPLING TAB.	
INTERIOR SUPPLY AND RETURN DUCTS FOR THE LENGTH OF 3M (10 FT) FROM THE POINT OF WHERE THEY ENTER THE BUILDING	TYPE D1 OR D2 AND TYPE D3 IN ADDITION TO EITHER D1 OR D2	25mm (1") FOR TYPE D1 OR D2 13mm (1/2") FOR TYPE D3	TYPE D3: ASTM C1071 GLASS FIBRE, FLEXIBLE DUCT LINER WITH ACRYLIC COATING ON AIRSTREAM SIDE WITH GLASS MAT REINFORCEMENT AND FACTORY-COATED LINER CORE EDGES. THERMAL CONDUCTIVITY: ASTM C518, 0.038W/M ² K @ 24°C (0.25 BTU/UF-HR-SQ FT) @ 70°F. MAXIMUM SERVICE TEMPERATURE: 121°C (250°F). MAXIMUM VELOCITY ON COATED AIR SIDE: 30.5 M/S (6000 FPM). NOISE REDUCTION COEFFICIENT: 0.55 FOR 13 MM (1/2 INCH) THICKNESS. PRODUCT: JOHNS MANVILLE UNACOUSTIC RC DUCT LINER OR APPROVED EQUIVALENT. ADHESIVE: ASTM E162. FIRE-RETARDANT. LINER FASTENERS: MINIMUM 14 GAUGE GALVANIZED STEEL PINS, FASTENED WITH PINSPOTER.	
TRANSFER DUCTS	TYPE D3	13mm (1/2")	TYPE D3: ASTM C1071 GLASS FIBRE, FLEXIBLE DUCT LINER WITH ACRYLIC COATING ON AIRSTREAM SIDE WITH GLASS MAT REINFORCEMENT AND FACTORY-COATED LINER CORE EDGES. THERMAL CONDUCTIVITY: ASTM C518, 0.038W/M ² K @ 24°C (0.25 BTU/UF-HR-SQ FT) @ 70°F. MAXIMUM SERVICE TEMPERATURE: 121°C (250°F). MAXIMUM VELOCITY ON COATED AIR SIDE: 30.5 M/S (6000 FPM). NOISE REDUCTION COEFFICIENT: 0.55 FOR 13 MM (1/2 INCH) THICKNESS. PRODUCT: JOHNS MANVILLE UNACOUSTIC RC DUCT LINER OR APPROVED EQUIVALENT. ADHESIVE: ASTM E162. FIRE-RETARDANT. LINER FASTENERS: MINIMUM 14 GAUGE GALVANIZED STEEL PINS, FASTENED WITH PINSPOTER.	
MAIN SUPPLY TRUNKS IN CEILING SPACE ABOVE OFFICES AND MEETING ROOMS	TYPE D3	13mm (1/2")	TYPE D3: ASTM C1071 GLASS FIBRE, FLEXIBLE DUCT LINER WITH ACRYLIC COATING ON AIRSTREAM SIDE WITH GLASS MAT REINFORCEMENT AND FACTORY-COATED LINER CORE EDGES. THERMAL CONDUCTIVITY: ASTM C518, 0.038W/M ² K @ 24°C (0.25 BTU/UF-HR-SQ FT) @ 70°F. MAXIMUM SERVICE TEMPERATURE: 121°C (250°F). MAXIMUM VELOCITY ON COATED AIR SIDE: 30.5 M/S (6000 FPM). NOISE REDUCTION COEFFICIENT: 0.55 FOR 13 MM (1/2 INCH) THICKNESS. PRODUCT: JOHNS MANVILLE UNACOUSTIC RC DUCT LINER OR APPROVED EQUIVALENT. ADHESIVE: ASTM E162. FIRE-RETARDANT. LINER FASTENERS: MINIMUM 14 GAUGE GALVANIZED STEEL PINS, FASTENED WITH PINSPOTER.	
BURIED SUPPLY DUCTS	MEMBRANE BUESKIN OR EQUIVALENT	N/A	TYPE D1: MINERAL FIBRE, FLEXIBLE, ASTM C553, NON-COMBUSTIBLE BLANKET, THERMAL CONDUCTIVITY: ASTM C518, 0.038W/M ² K @ 24°C (0.25 BTU/UF-HR-SQ FT) @ 70°F. MAXIMUM SERVICE TEMPERATURE: 121°C (250°F). MAXIMUM WATER VAPOUR SORPTION: 5% BY WEIGHT. PRODUCT: JOHNS MANVILLE MICROLOTE EQ TYPE 150 DUCT WRAP OR APPROVED EQUIVALENT. VAPOUR BARRIER SHALL BE FACTORY-APPLIED FSK (FOL-SCRM-KRAFF) VAPOUR BARRIER FACING WITH A 2" STAPLING TAB.	
VENTILATED ATTIC SUPPLY DUCTS	TYPE D2	50mm (2")	PVC JACKETING TYPE D1, ASTM D1784, HIGH IMPACT UV-RESISTANT POLYVINYL CHLORIDE THICKNESS: 0.40 MM (0.016 INCH) SHEET. FINISH: GLOSS, WHITE. JOINTING: LONGITUDINAL AND LATERAL 50 MM (2 INCH) LAPS. USE PRESSURE SENSITIVE WHITE VINYL TAPE. ALUMINUM JACKETING - TYPE D2, ASTM B209M (ASTM B209) AND ASTM C1720, AA-3003-H14 ALUMINUM THICKNESS: 0.40 MM (0.016 INCH) SHEET. FINISH: SMOOTH (PLAIN MILL). JOINTING: LONGITUDINAL AND LATERAL 50 MM (2 INCH) LAPS. LAP JOINTS SHALL HAVE FIRE-RESISTANT VAPOUR BARRIER MASTIC SEALANT APPLIED. METAL JACKET BANDS: 10 MM (3/8 INCH) WIDE, 0.43 MM (0.016 INCH) THICK ALUMINUM. STAINLESS STEEL JACKETING - TYPE D3, ASTM A240, AISI TYPE 304 STAINLESS STEEL. THICKNESS: 0.25 MM (0.010 INCH) SHEET. FINISH: #2B. JOINTING: LONGITUDINAL AND LATERAL 50 MM (2 INCH) LAPS. LAP JOINTS SHALL HAVE FIRE-RESISTANT VAPOUR BARRIER MASTIC SEALANT APPLIED. METAL JACKET BANDS: 10 MM (3/8 INCH) WIDE, 0.41 MM (0.015 INCH) THICK STAINLESS STEEL.	
VENTILATED ATTIC RETURN DUCTS	TYPE D2	50mm (2")	PVC JACKETING TYPE D1, ASTM D1784, HIGH IMPACT UV-RESISTANT POLYVINYL CHLORIDE THICKNESS: 0.40 MM (0.016 INCH) SHEET. FINISH: GLOSS, WHITE. JOINTING: LONGITUDINAL AND LATERAL 50 MM (2 INCH) LAPS. USE PRESSURE SENSITIVE WHITE VINYL TAPE. ALUMINUM JACKETING - TYPE D2, ASTM B209M (ASTM B209) AND ASTM C1720, AA-3003-H14 ALUMINUM THICKNESS: 0.40 MM (0.016 INCH) SHEET. FINISH: SMOOTH (PLAIN MILL). JOINTING: LONGITUDINAL AND LATERAL 50 MM (2 INCH) LAPS. LAP JOINTS SHALL HAVE FIRE-RESISTANT VAPOUR BARRIER MASTIC SEALANT APPLIED. METAL JACKET BANDS: 10 MM (3/8 INCH) WIDE, 0.43 MM (0.016 INCH) THICK ALUMINUM. STAINLESS STEEL JACKETING - TYPE D3, ASTM A240, AISI TYPE 304 STAINLESS STEEL. THICKNESS: 0.25 MM (0.010 INCH) SHEET. FINISH: #2B. JOINTING: LONGITUDINAL AND LATERAL 50 MM (2 INCH) LAPS. LAP JOINTS SHALL HAVE FIRE-RESISTANT VAPOUR BARRIER MASTIC SEALANT APPLIED. METAL JACKET BANDS: 10 MM (3/8 INCH) WIDE, 0.41 MM (0.015 INCH) THICK STAINLESS STEEL.	
SUPPLY DUCTS IN UNVENTILATED ATTIC ABOVE INSULATED CEILING	TYPE D2	50mm (2")	PVC JACKETING TYPE D1, ASTM D1784, HIGH IMPACT UV-RESISTANT POLYVINYL CHLORIDE THICKNESS: 0.40 MM (0.016 INCH) SHEET. FINISH: GLOSS, WHITE. JOINTING: LONGITUDINAL AND LATERAL 50 MM (2 INCH) LAPS. USE PRESSURE SENSITIVE WHITE VINYL TAPE. ALUMINUM JACKETING - TYPE D2, ASTM B209M (ASTM B209) AND ASTM C1720, AA-3003-H14 ALUMINUM THICKNESS: 0.40 MM (0.016 INCH) SHEET. FINISH: SMOOTH (PLAIN MILL). JOINTING: LONGITUDINAL AND LATERAL 50 MM (2 INCH) LAPS. LAP JOINTS SHALL HAVE FIRE-RESISTANT VAPOUR BARRIER MASTIC SEALANT APPLIED. METAL JACKET BANDS: 10 MM (3/8 INCH) WIDE, 0.43 MM (0.016 INCH) THICK ALUMINUM. STAINLESS STEEL JACKETING - TYPE D3, ASTM A240, AISI TYPE 304 STAINLESS STEEL. THICKNESS: 0.25 MM (0.010 INCH) SHEET. FINISH: #2B. JOINTING: LONGITUDINAL AND LATERAL 50 MM (2 INCH) LAPS. LAP JOINTS SHALL HAVE FIRE-RESISTANT VAPOUR BARRIER MASTIC SEALANT APPLIED. METAL JACKET BANDS: 10 MM (3/8 INCH) WIDE, 0.41 MM (0.015 INCH) THICK STAINLESS STEEL.	
RETURN DUCTS IN UNVENTILATED ATTIC ABOVE INSULATED CEILING	TYPE D2	50mm (2")	PVC JACKETING TYPE D1, ASTM D1784, HIGH IMPACT UV-RESISTANT POLYVINYL CHLORIDE THICKNESS: 0.40 MM (0.016 INCH) SHEET. FINISH: GLOSS, WHITE. JOINTING: LONGITUDINAL AND LATERAL 50 MM (2 INCH) LAPS. USE PRESSURE SENSITIVE WHITE VINYL TAPE. ALUMINUM JACKETING - TYPE D2, ASTM B209M (ASTM B209) AND ASTM C1720, AA-3003-H14 ALUMINUM THICKNESS: 0.40 MM (0.016 INCH) SHEET. FINISH: SMOOTH (PLAIN MILL). JOINTING: LONGITUDINAL AND LATERAL 50 MM (2 INCH) LAPS. LAP JOINTS SHALL HAVE FIRE-RESISTANT VAPOUR BARRIER MASTIC SEALANT APPLIED. METAL JACKET BANDS: 10 MM (3/8 INCH) WIDE, 0.43 MM (0.016 INCH) THICK ALUMINUM. STAINLESS STEEL JACKETING - TYPE D3, ASTM A240, AISI TYPE 304 STAINLESS STEEL. THICKNESS: 0.25 MM (0.010 INCH) SHEET. FINISH: #2B. JOINTING: LONGITUDINAL AND LATERAL 50 MM (2 INCH) LAPS. LAP JOINTS SHALL HAVE FIRE-RESISTANT VAPOUR BARRIER MASTIC SEALANT APPLIED. METAL JACKET BANDS: 10 MM (3/8 INCH) WIDE, 0.41 MM (0.015 INCH) THICK STAINLESS STEEL.	
SUPPLY DUCTS IN UNVENTILATED ATTIC WITH ROOF INSULATION	TYPE D2	25mm (1")	PVC JACKETING TYPE D1, ASTM D1784, HIGH IMPACT UV-RESISTANT POLYVINYL CHLORIDE THICKNESS: 0.40 MM (0.016 INCH) SHEET. FINISH: GLOSS, WHITE. JOINTING: LONGITUDINAL AND LATERAL 50 MM (2 INCH) LAPS. USE PRESSURE SENSITIVE WHITE VINYL TAPE. ALUMINUM JACKETING - TYPE D2, ASTM B209M (ASTM B209) AND ASTM C1720, AA-3003-H14 ALUMINUM THICKNESS: 0.40 MM (0.016 INCH) SHEET. FINISH: SMOOTH (PLAIN MILL). JOINTING: LONGITUDINAL AND LATERAL 50 MM (2 INCH) LAPS. LAP JOINTS SHALL HAVE FIRE-RESISTANT VAPOUR BARRIER MASTIC SEALANT APPLIED. METAL JACKET BANDS: 10 MM (3/8 INCH) WIDE, 0.43 MM (0.016 INCH) THICK ALUMINUM. STAINLESS STEEL JACKETING - TYPE D3, ASTM A240, AISI TYPE 304 STAINLESS STEEL. THICKNESS: 0.25 MM (0.010 INCH) SHEET. FINISH: #2B. JOINTING: LONGITUDINAL AND LATERAL 50 MM (2 INCH) LAPS. LAP JOINTS SHALL HAVE FIRE-RESISTANT VAPOUR BARRIER MASTIC SEALANT APPLIED. METAL JACKET BANDS: 10 MM (3/8 INCH) WIDE, 0.41 MM (0.015 INCH) THICK STAINLESS STEEL.	
INSULATED EXPOSED INTERIOR DUCTS IN MECHANICAL ROOMS	JACKETING TYPE D1	N/A	PVC JACKETING TYPE D1, ASTM D1784, HIGH IMPACT UV-RESISTANT POLYVINYL CHLORIDE THICKNESS: 0.40 MM (0.016 INCH) SHEET. FINISH: GLOSS, WHITE. JOINTING: LONGITUDINAL AND LATERAL 50 MM (2 INCH) LAPS. USE PRESSURE SENSITIVE WHITE VINYL TAPE. ALUMINUM JACKETING - TYPE D2, ASTM B209M (ASTM B209) AND ASTM C1720, AA-3003-H14 ALUMINUM THICKNESS: 0.40 MM (0.016 INCH) SHEET. FINISH: SMOOTH (PLAIN MILL). JOINTING: LONGITUDINAL AND LATERAL 50 MM (2 INCH) LAPS. LAP JOINTS SHALL HAVE FIRE-RESISTANT VAPOUR BARRIER MASTIC SEALANT APPLIED. METAL JACKET BANDS: 10 MM (3/8 INCH) WIDE, 0.43 MM (0.016 INCH) THICK ALUMINUM. STAINLESS STEEL JACKETING - TYPE D3, ASTM A240, AISI TYPE 304 STAINLESS STEEL. THICKNESS: 0.25 MM (0.010 INCH) SHEET. FINISH: #2B. JOINTING: LONGITUDINAL AND LATERAL 50 MM (2 INCH) LAPS. LAP JOINTS SHALL HAVE FIRE-RESISTANT VAPOUR BARRIER MASTIC SEALANT APPLIED. METAL JACKET BANDS: 10 MM (3/8 INCH) WIDE, 0.41 MM (0.015 INCH) THICK STAINLESS STEEL.	
INSULATED EXPOSED INTERIOR DUCTS IN UNCONDITIONED SPACES NOT IN MECHANICAL ROOMS	JACKETING TYPE D2	N/A	PVC JACKETING TYPE D1, ASTM D1784, HIGH IMPACT UV-RESISTANT POLYVINYL CHLORIDE THICKNESS: 0.40 MM (0.016 INCH) SHEET. FINISH: GLOSS, WHITE. JOINTING: LONGITUDINAL AND LATERAL 50 MM (2 INCH) LAPS. USE PRESSURE SENSITIVE WHITE VINYL TAPE. ALUMINUM JACKETING - TYPE D2, ASTM B209M (ASTM B209) AND ASTM C1720, AA-3003-H14 ALUMINUM THICKNESS: 0.40 MM (0.016 INCH) SHEET. FINISH: SMOOTH (PLAIN MILL). JOINTING: LONGITUDINAL AND LATERAL 50 MM (2 INCH) LAPS. LAP JOINTS SHALL HAVE FIRE-RESISTANT VAPOUR BARRIER MASTIC SEALANT APPLIED. METAL JACKET BANDS: 10 MM (3/8 INCH) WIDE, 0.43 MM (0.016 INCH) THICK ALUMINUM. STAINLESS STEEL JACKETING - TYPE D3, ASTM A240, AISI TYPE 304 STAINLESS STEEL. THICKNESS: 0.25 MM (0.010 INCH) SHEET. FINISH: #2B. JOINTING: LONGITUDINAL AND LATERAL 50 MM (2 INCH) LAPS. LAP JOINTS SHALL HAVE FIRE-RESISTANT VAPOUR BARRIER MASTIC SEALANT APPLIED. METAL JACKET BANDS: 10 MM (3/8 INCH) WIDE, 0.41 MM (0.015 INCH) THICK STAINLESS STEEL.	
INSULATED EXPOSED EXTERIOR DUCTS	JACKETING TYPE D2 OR D3	N/A	PVC JACKETING TYPE D1, ASTM D1784, HIGH IMPACT UV-RESISTANT POLYVINYL CHLORIDE THICKNESS: 0.40 MM (0.016 INCH) SHEET. FINISH: GLOSS, WHITE. JOINTING: LONGITUDINAL AND LATERAL 50 MM (2 INCH) LAPS. USE PRESSURE SENSITIVE WHITE VINYL TAPE. ALUMINUM JACKETING - TYPE D2, ASTM B209M (ASTM B209) AND ASTM C1720, AA-3003-H14 ALUMINUM THICKNESS: 0.40 MM (0.016 INCH) SHEET. FINISH: SMOOTH (PLAIN MILL). JOINTING: LONGITUDINAL AND LATER	

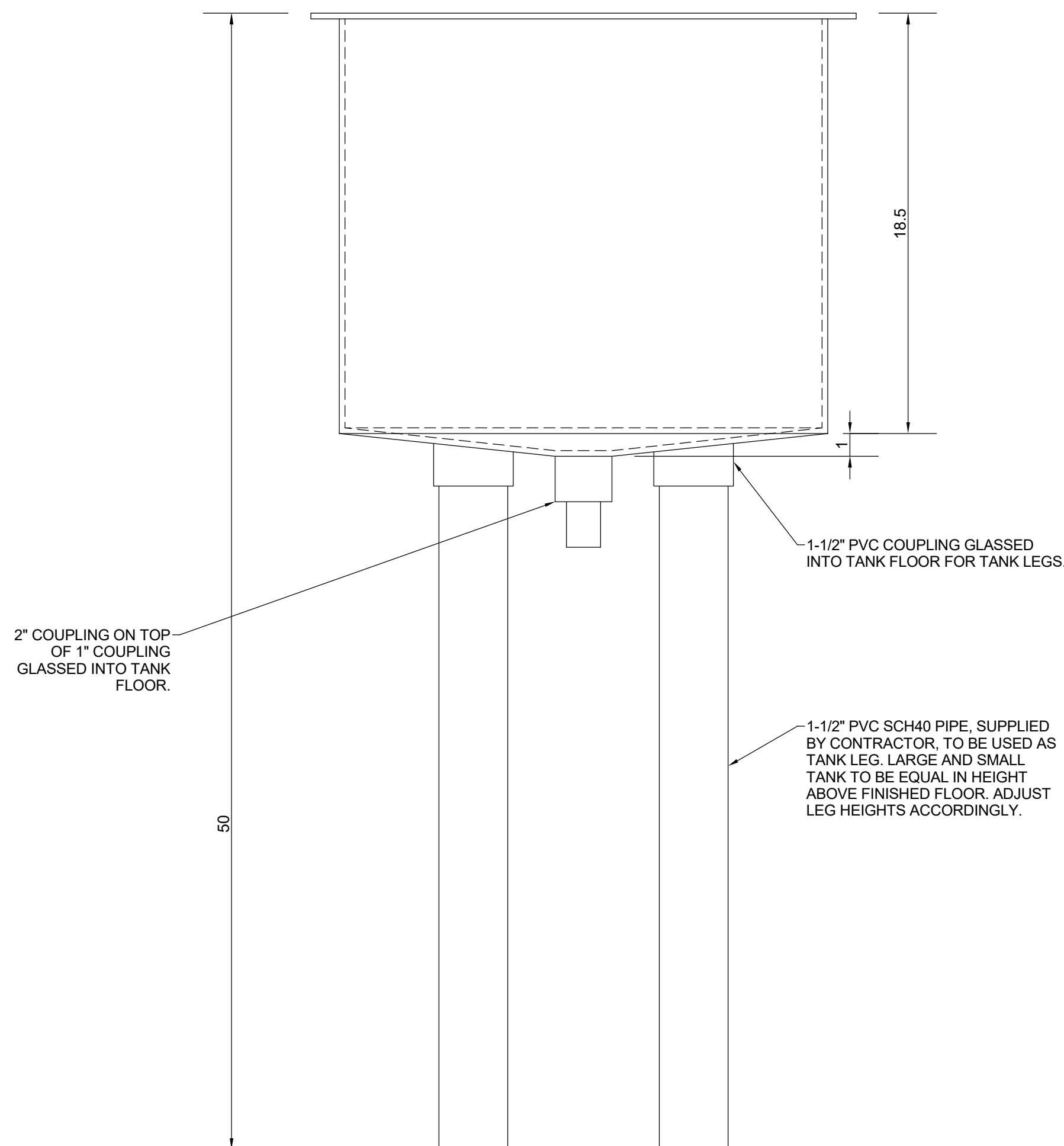
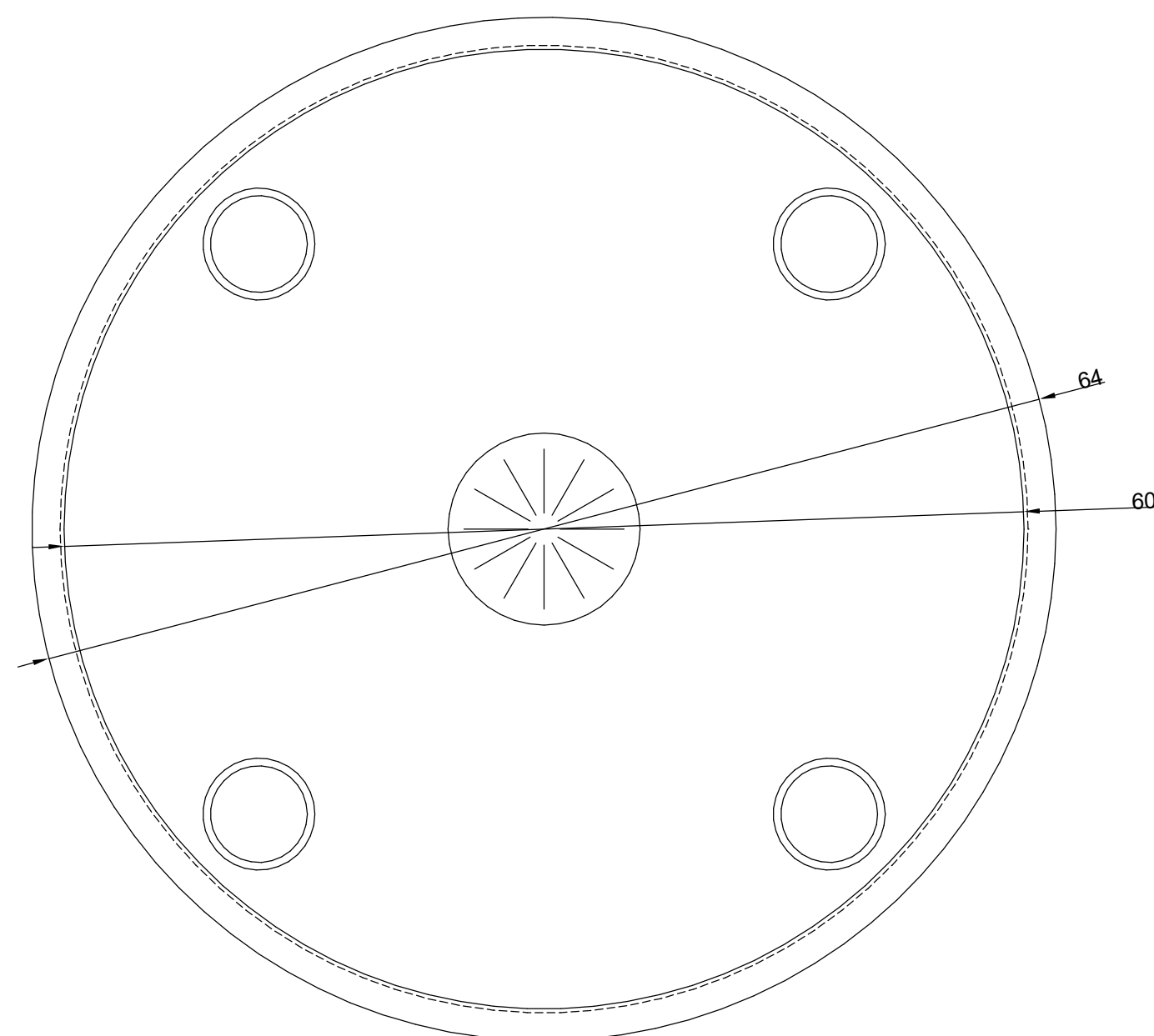
NOTE TO USER: DO NOT SCALE DRAWINGS. ALL DRAWINGS REMAIN THE PROPERTY OF ROMBALD INC. AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT WRITTEN PERMISSION.

NORTH:

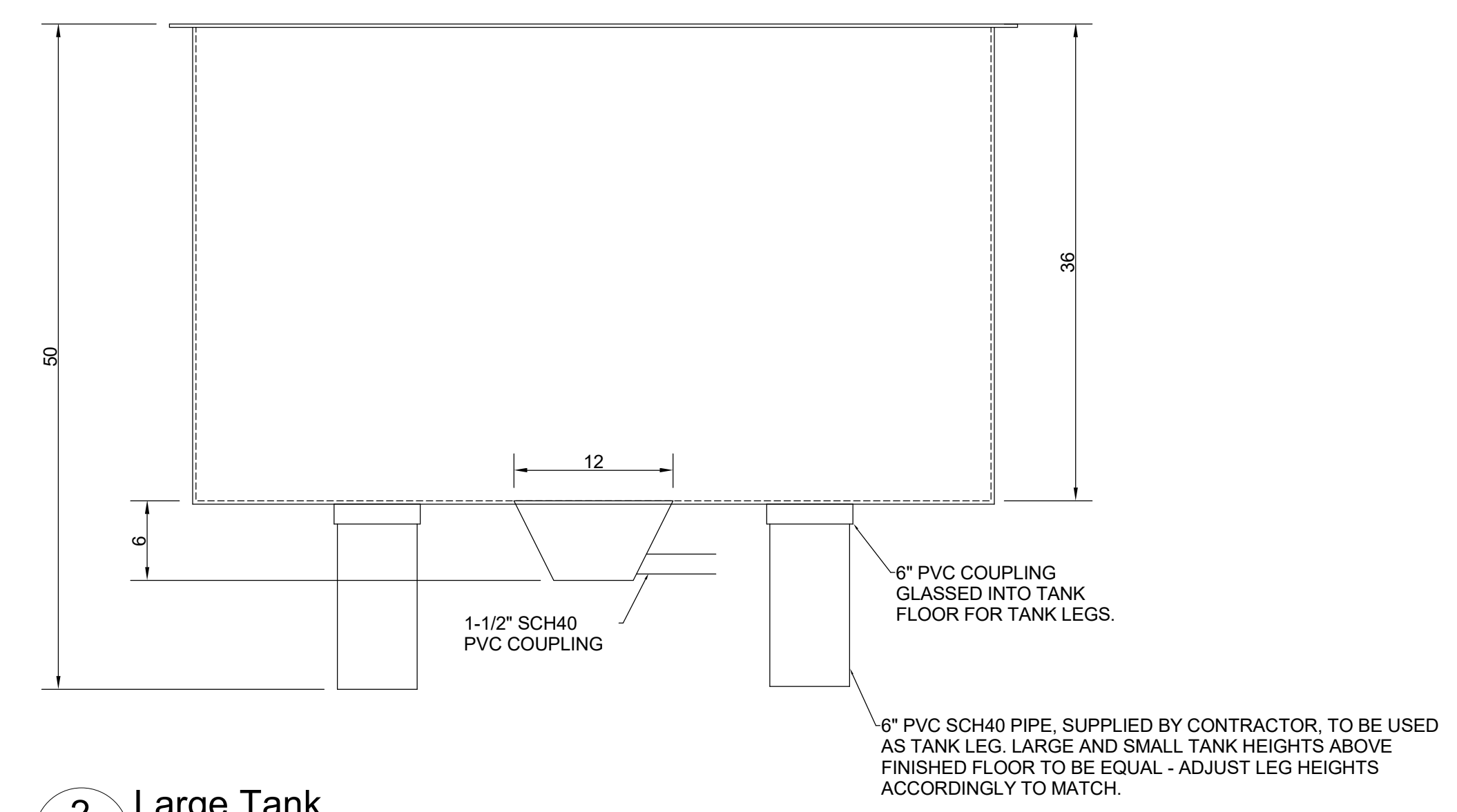
CONSULTANT STAMP:



TANK COVERS. PROVIDE TWO PER TANK. COVERS TO SIT ON TOP OF TANK WITH 2" STANDPIPE PROTRUDING THRU TOP. MATERIAL TO BE FIBERGLASS. EXACT MATERIAL COMPOSITE TO BE CONFIRMED WITH CLIENT. THICKNESS TO BE DETERMINED BY FABRICATOR.



1 Small Tank
 M7.3 1:5



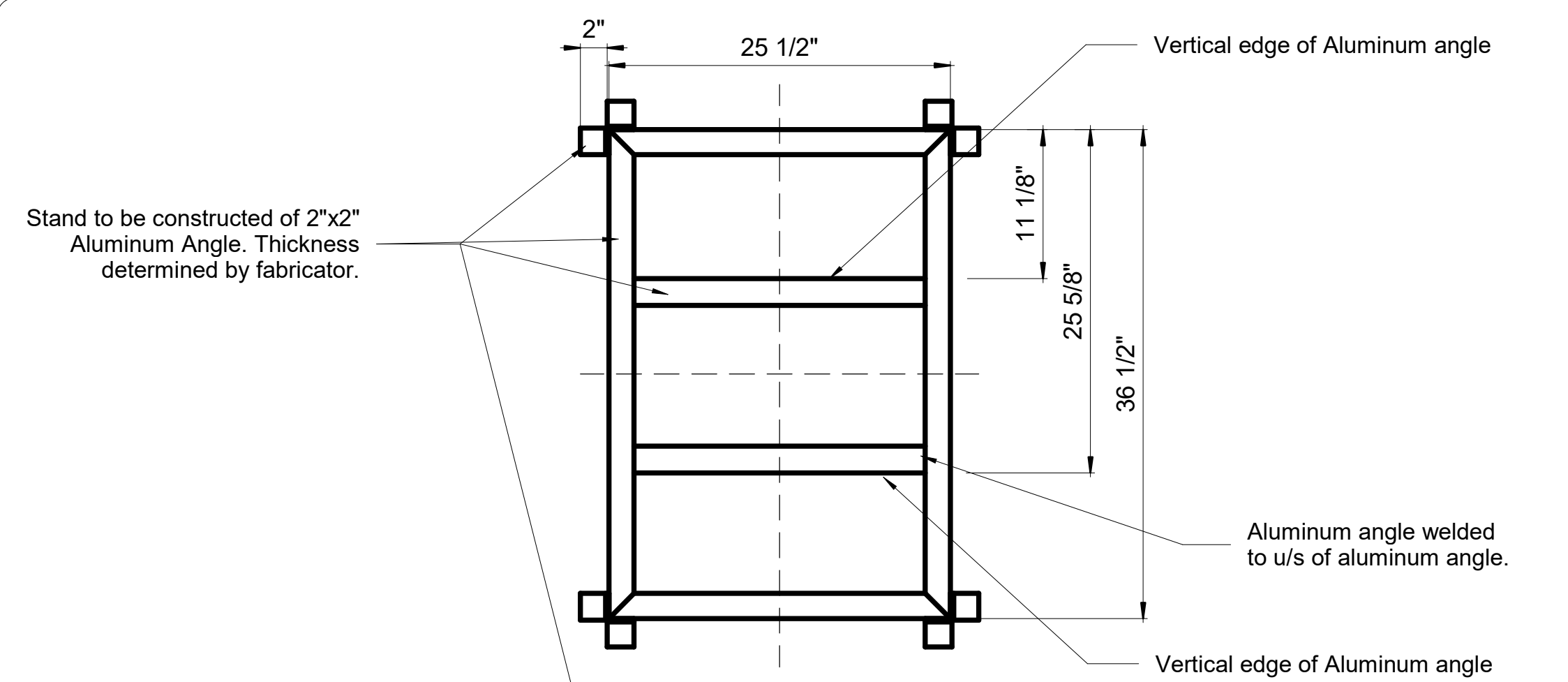
2 Large Tank
 M7.3 1:10

#	DESCRIPTION	MM/DD/YY
7	Issued for Tender	02/08/24
6	Issued for Addendum 1	11/29/23
5	Issued for Tender	11/23/23
4	Issued for Review	06/16/23
3	Issued for Review	06/07/23
2	Issued for Tender Review	05/29/23
1	Issued for Coordination	04/20/23

Codrington Research Facility
 Codrington, ON

DRAWING TITLE:
Fish Tanks

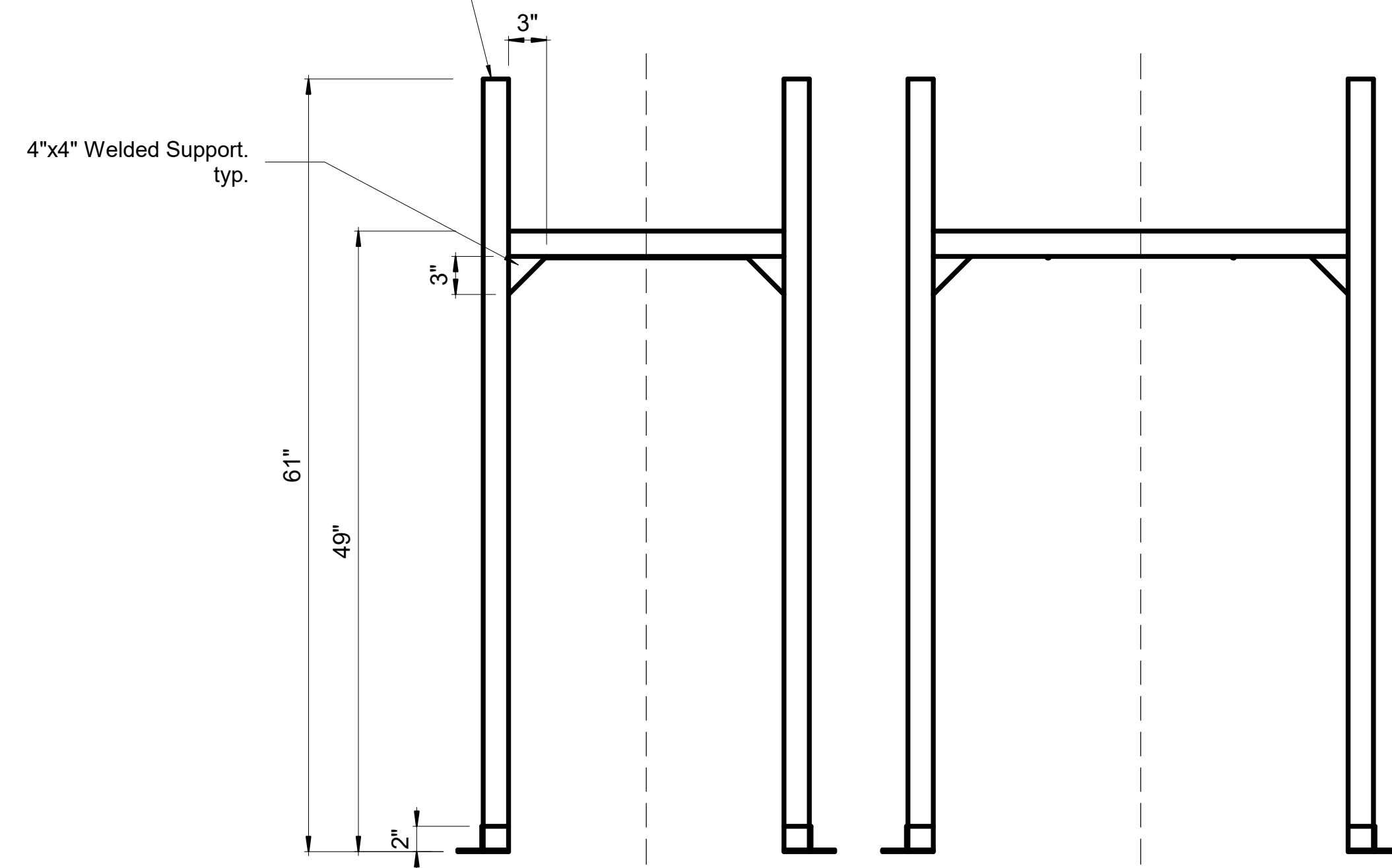
DRAWN BY: J.V	CHECKED BY: N.B	APPROVED BY: T.N
SCALE: As indicated	SHEET SIZE: ARCH D	
PROJECT #: 22-250	SHEET #: M7.3	



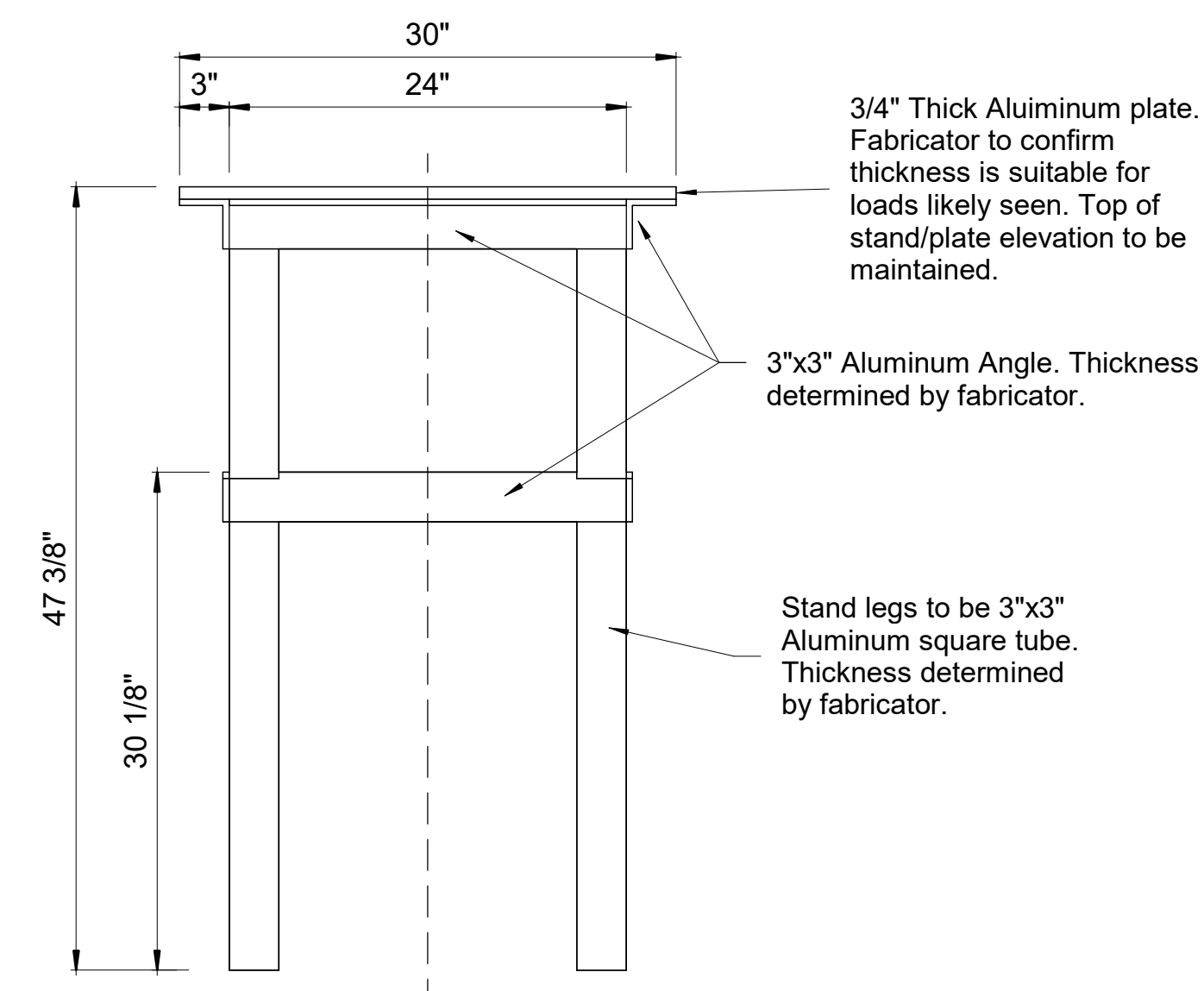
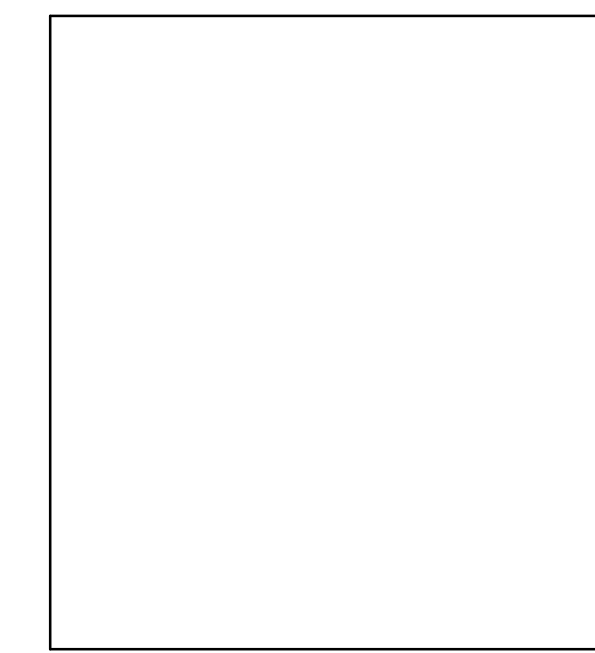
Stand to be constructed of 2"x2" Aluminum Angle. Thickness determined by fabricator.

Aluminum angle welded to u/s of aluminum angle.

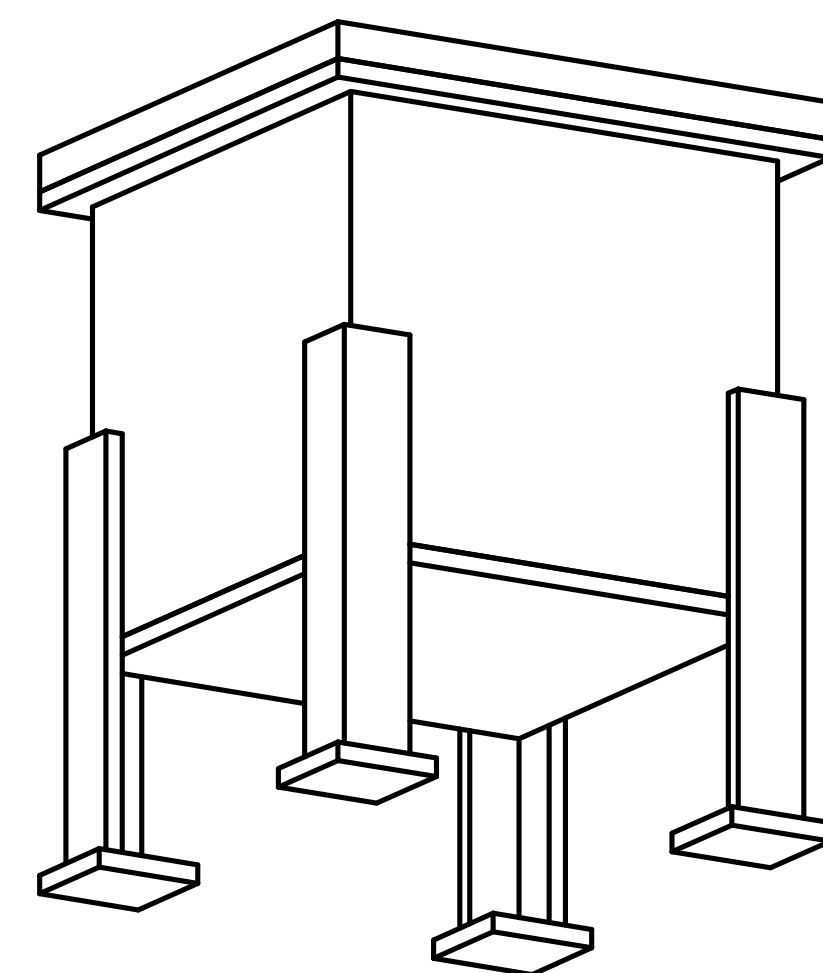
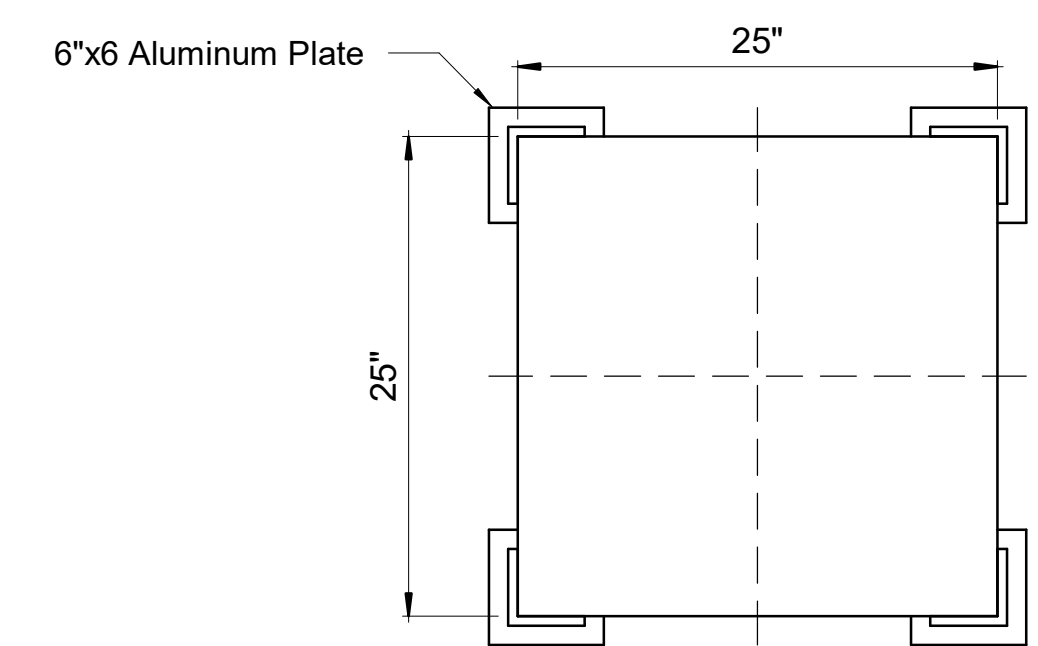
Vertical edge of Aluminum angle



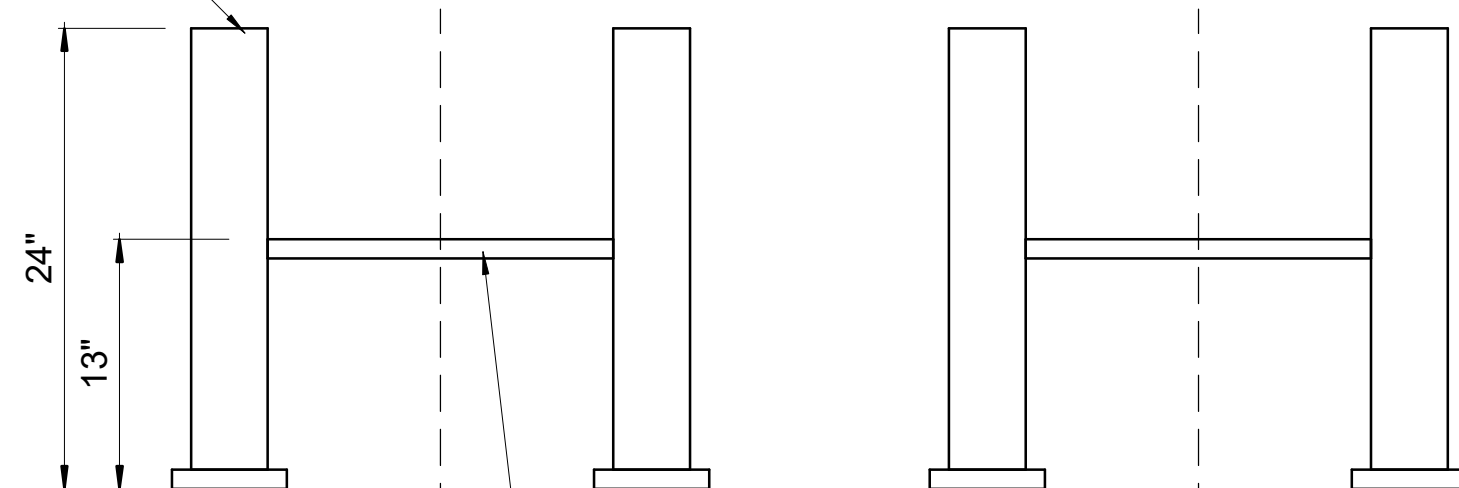
1 ST.1 Stand
M7.4 1 : 10



4 BBF.1 Stand
M7.4 1 : 10

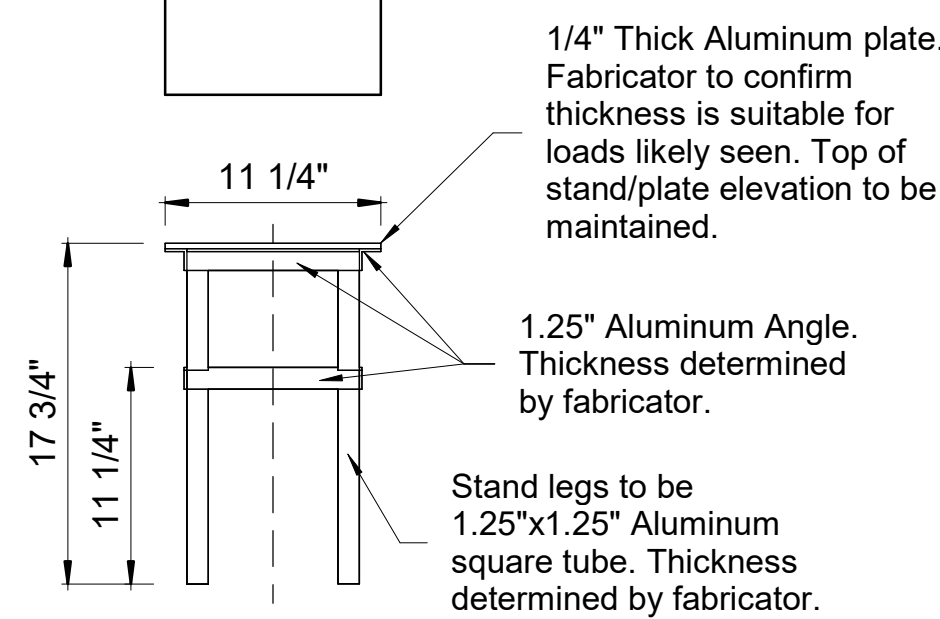
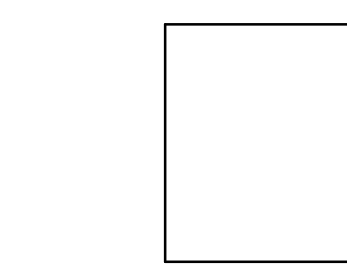


4"x4" Aluminum angle. Thickness determined by fabricator.

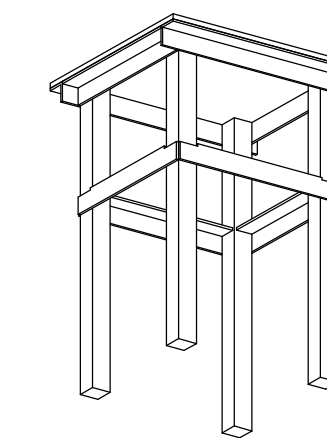


Aluminum plate welded to Aluminum angles. Thickness determined by fabricator & to be suitable for likely loads. Fabricator to determine if additional supporting of the plate is required.

5 ST.3 Stand
M7.4 1 : 10



8 BBF.2 Stand
M7.4 1 : 10



12 3/8"

12 3/8"

12 3/8"

12 3/8"

12 3/8"

12 3/8"

12 3/8"

12 3/8"

12 3/8"

12 3/8"

12 3/8"

12 3/8"

12 3/8"

12 3/8"

12 3/8"

12 3/8"

12 3/8"

12 3/8"

12 3/8"



NOTE TO USER: DO NOT SCALE DRAWINGS. ALL DRAWINGS REMAIN THE PROPERTY OF ROMBALD INC. AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT WRITTEN PERMISSION.

NORTH: []

CONSULTANT STAMP: []

LICENSED PROFESSIONAL ENGINEER
T. NIEMINEN
100206016
PROVINCE OF ONTARIO



2	Issued for Tender	02/08/24
1	Issued for Tender	11/23/23
#	DESCRIPTION	MM/DD/YY

Codrington Research Facility
Codrington, ON

DRAWING TITLE:
Equipment Stand Details

DRAWN BY: J.V	CHECKED BY: N.B	APPROVED BY: T.N
SCALE: 1 : 10	SHEET SIZE: ARCH D	
PROJECT #: 22-250	SHEET #: M7.4	

Bill of Material

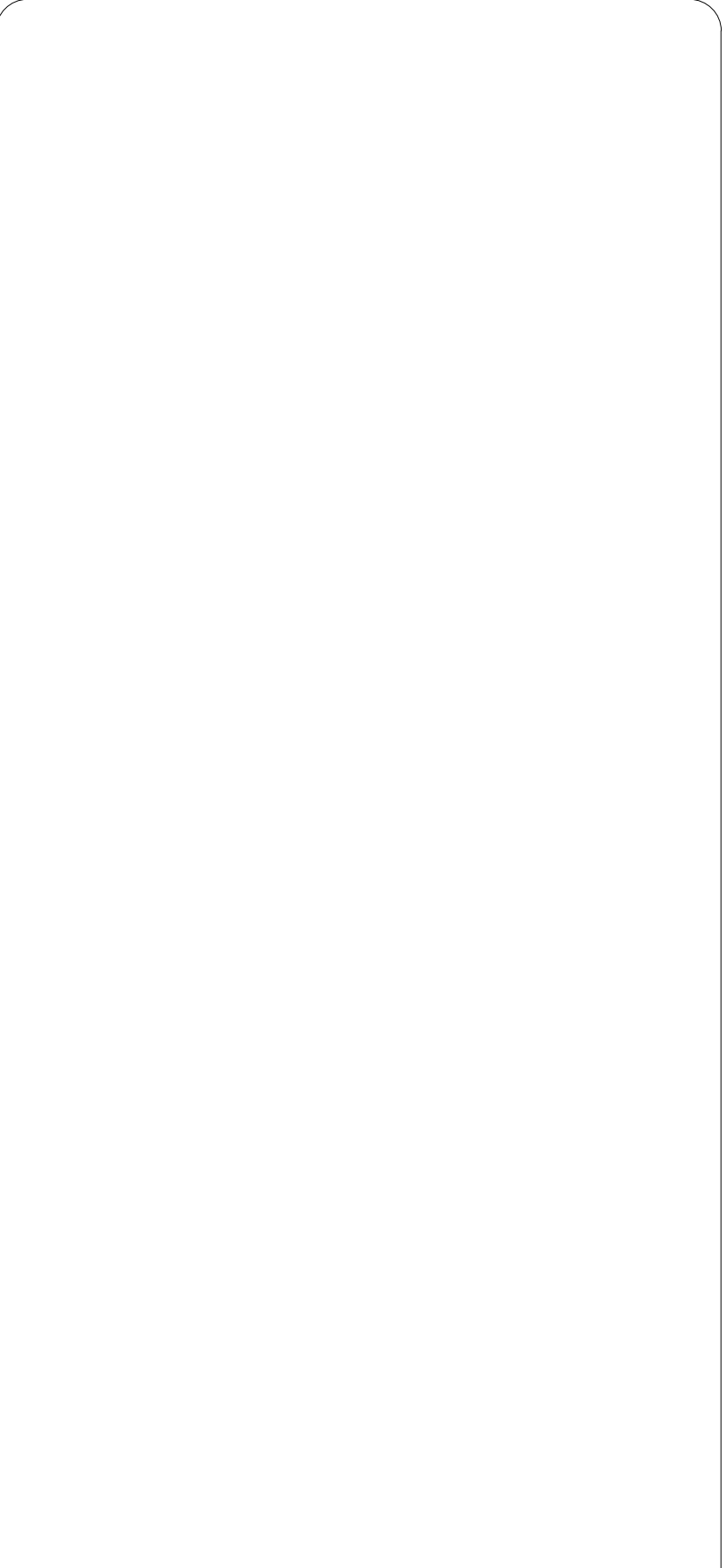
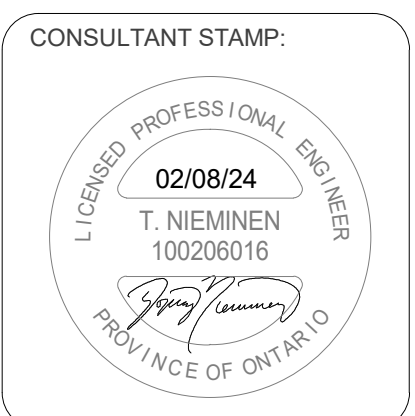
Fitting	Total	Notes	Pipe Size	Approximate Total Length (ft)
— 90°	6	Fittings are for piping from the water well to the head tank within the building footprint. Coordinate size with well contractor.		
1/2" 90°	27		Unknown	70.35
1/2" Tee	65		1/2"	250
1/2" Normally Open Electrically Actuated Valve	5		3/4"	164
1/2" Normally Closed Electrically Actuated Valve	5		1"	638.4
1/2" Gate Valve	5		1 1/4"	77.7
1/2" Cap	60		1 1/2"	1586.55
1/2" Union	60		2"	530.25
3/4" Ball Valve	18		2 1/2"	21
3/4" Check Valve	10		3"	76
3/4" Globe Valve	10		4"	Determined on site. RFS discharge.
3/4" Gate Valve	60		4"	71.4
3/4" 90°	133		5"	18.9
3/4" x 3/4" x 1/2" Reducing Tee	2		6"	113
3/4" x 3/4" x 1" Tee	18			
3/4" x 1/2" Concentric Reducer	63			
3/4" Union	20			
1" 45°	77			
1" 90°	46			
1" x 1" x 1/2" Reducing Tee	3			
1" x 3/4" Concentric Reducer	1			
1" Ball Valve	13			
1" Normally Closed Electrically Actuated Valve	2			
1" Tee	13			
1" Wye	23			
1 1/4" 45°	4			
1 1/4" Union	20			
1 1/4" x 1 1/4" x 3/4" Reducing Tee	20			
1 1/4" Cap	20			
1 1/4" x 1" Concentric Reducer	4			
1 1/4" x 1" Reducing Wye	12			
1 1/2" Tee	1			
1 1/2" 45°	48			
1 1/2" 90°	109			
1 1/2" Wye	20			
1 1/2" Union	4			
1 1/2" Globe Valve	2			
1 1/2" Check Valve	2			
1 1/2" Ball Valve	2			
1 1/2" Gate Valve	23			
1 1/2" Manual 3-way Diverting Valve	3			
1 1/2" Normally Closed Electrically Actuated Valve	3			
1 1/2" x 1 1/2" x 1" Reducing Tee	3			
1 1/2" x 1 1/2" x 2" Tee	6			
1 1/2" x 1" Reducing Wye	22			
1 1/2" x 1 1/4" Reducing Wye	2			
1 1/2" x 1" Concentric Reducer	5			
1 1/2" x 1 1/4" Concentric Reducer	22			
2" x 3/4" Reducing Cross	1			
2" x 1 1/2" Concentric Reducer	21			
2" 90°	70			
2" Tee	25			
2" x 2" x 1" Reducing Tee	3			
2" Ball Valve	36			
2" Three Way Valve	5			
2" Check Valve	10			
2" Globe Valve	10			
2" Gate Valve	5			
2" Union	20			
2" x 1 1/2" Reducing Wye	3			
2 1/2" 90°	10			
3" x 3" x 1 1/2" Reducing Tee	32			
3" x 1 1/2" Reducing Bushing	28	Reducer bushing to allow for 1 1/2" pipe to connect to both ends.		
3" x 1 1/2" Concentric Reducer	2			
3" x 1 1/2" Reducing Wye	2			
4" 45°	12			
4" 90°	12			
4" x 1 1/2" Reducing Wye	6			
4" x 4" x 2" Reducing Tee	3			
4" x 2" Concentric Reducer	6			
4" Gate Valve	8			
5" x 3" Concentric Reducer	2			
5" x 1 1/2" Reducing Wye	2			
6" x 5" Concentric Reducer	2			
6" 45°	4			
6" 90°	2			
6" x 1 1/2" Reducing Wye	4			
6" Gate Valve	2			

- Notes:** 1) Bill of Materials (BOM) may vary if plumbing routing is altered.
 2) Fittings required for valves or wall penetrations are not included in the BOM. This may include, but is not limited to, flanges for valves or uniseals/bulkheads at tank wall penetrations. Mechanical contractor to supply required fittings for proper installations of valves based on valve selection.
 3) BOM is to aid in pricing. Contractor to verify all required fittings and piping prior to ordering plumbing.
 4) If certain fittings are not available, provide a combination of fittings to achieve the illustrated goal.
 5) Clear tube manometers at fish tanks not included in BOM.
 6) Plumbing to and from pumps P.5 & P.6 not included in BOM.



NOTE TO USER: DO NOT SCALE DRAWINGS. ALL DRAWINGS REMAIN THE PROPERTY OF ROMBALD INC. AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT WRITTEN PERMISSION.

NORTH:



2	Issued for Tender	02/08/24
1	Issued for Tender	11/23/23
#	DESCRIPTION	MM/DD/Y

Codrington Research Facility
Codrington, ON

DRAWING TITLE:
Bill of Material

DRAWN BY: J.V	CHECKED BY: N.B	APPROVED BY: T.N
SCALE:		SHEET SIZE: ARCH D
PROJECT #: 22-250		SHEET #: M8.1