HITACHI

GE Hitachi Nuclear Energy

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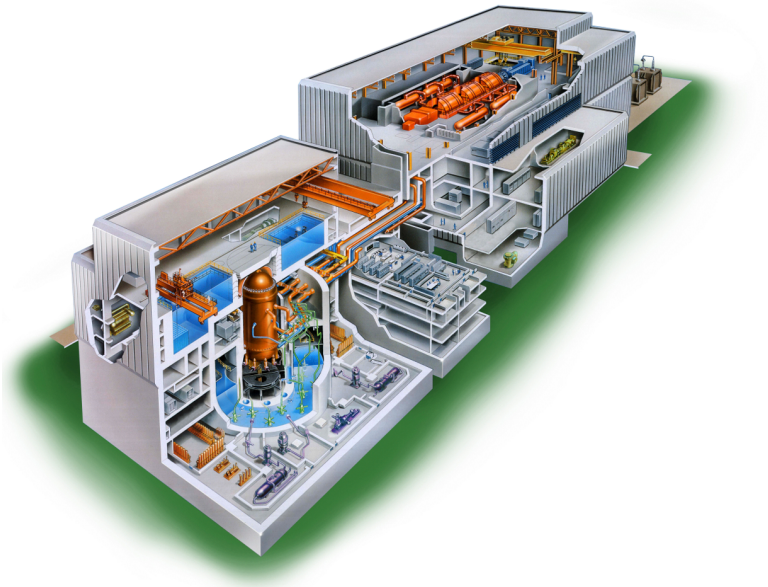
ABWR
Design Control Document
Tier 2



Chapter 21

Volume 1

Chapter 21 Volume 1
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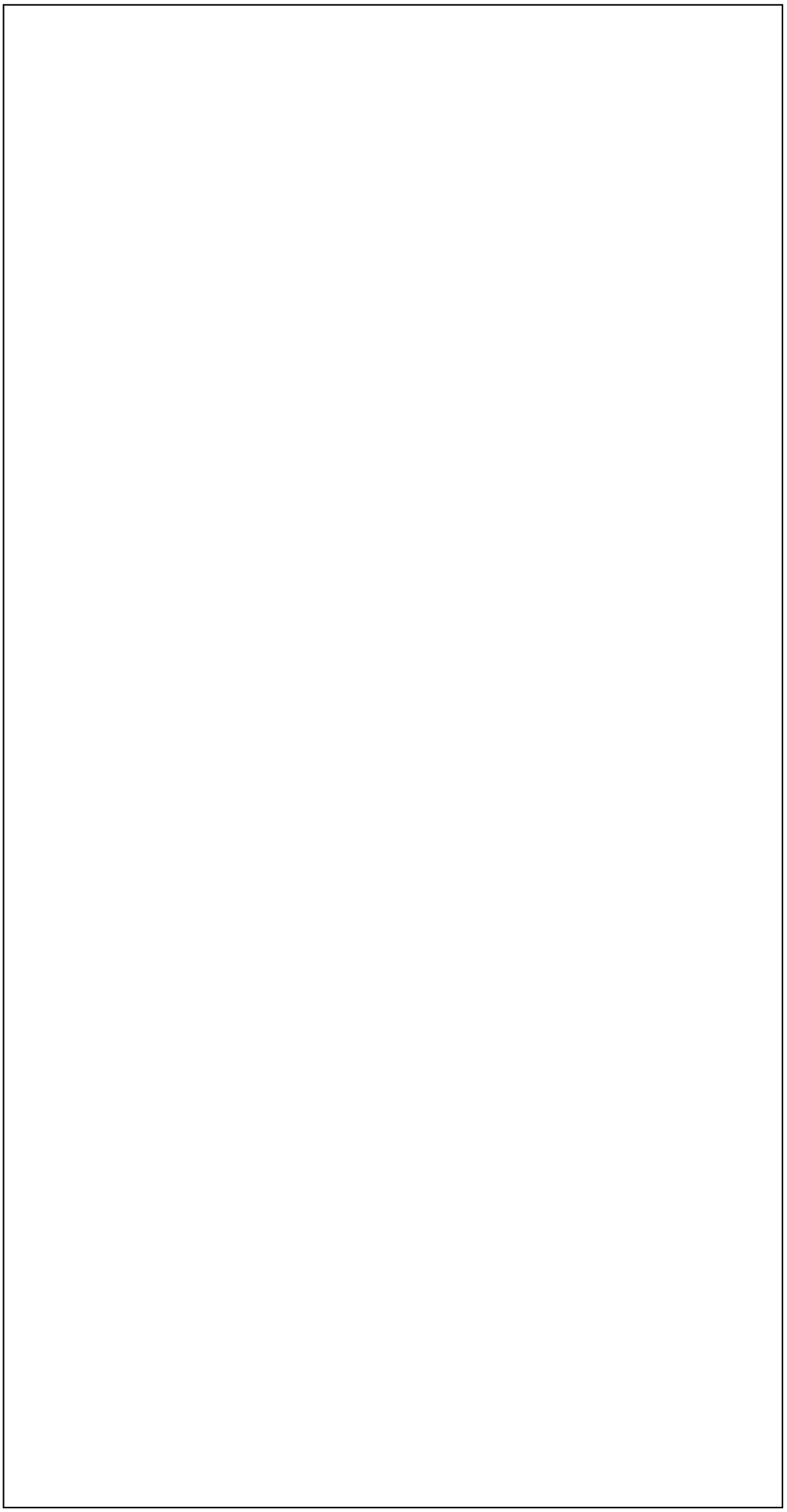


Figure 1.2-2 Reactor Building, Arrangement Elevation, Section A-A

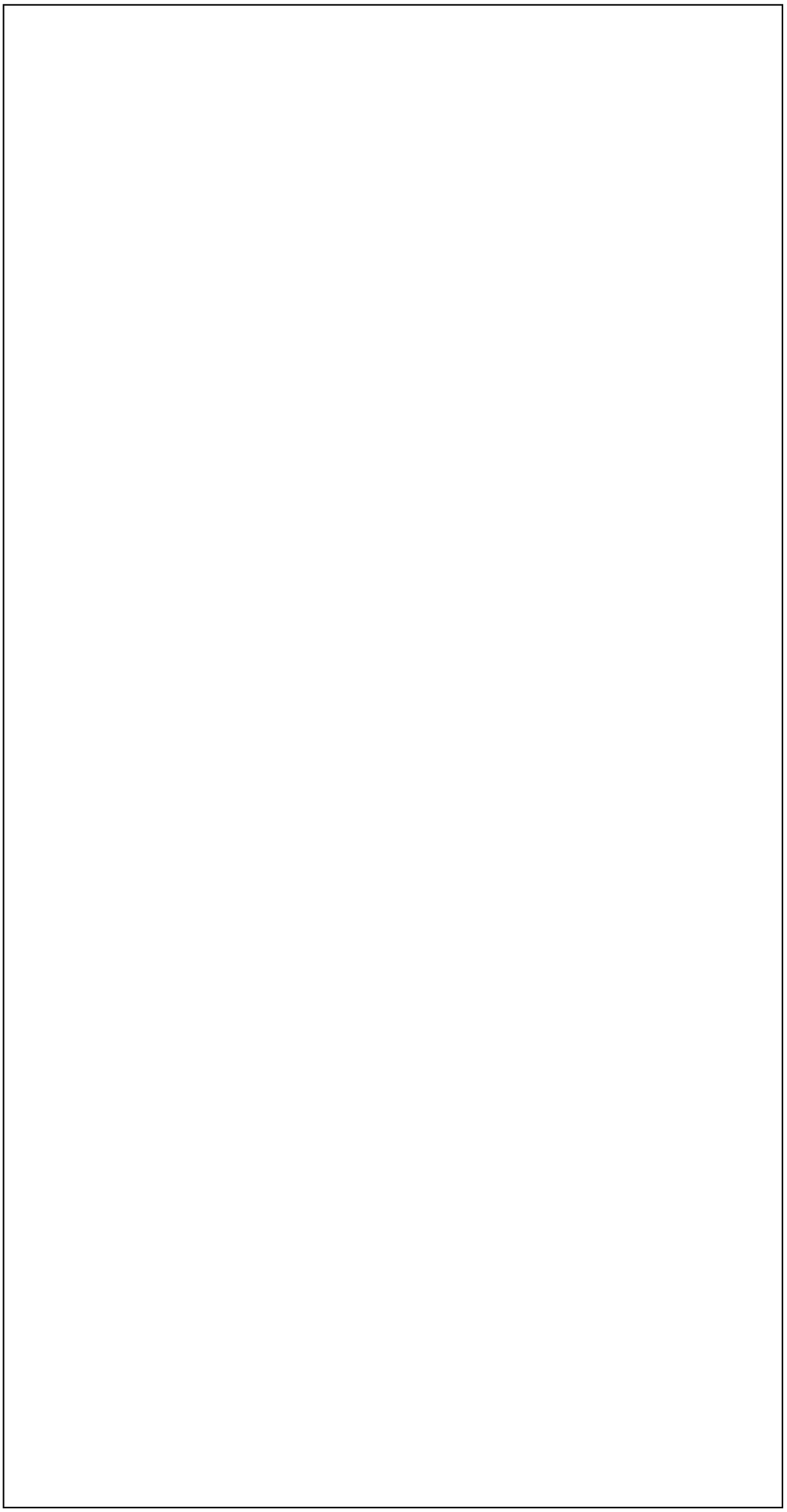


Figure 1.2-2a Reactor Building, Arrangement Elevation, Section B-B

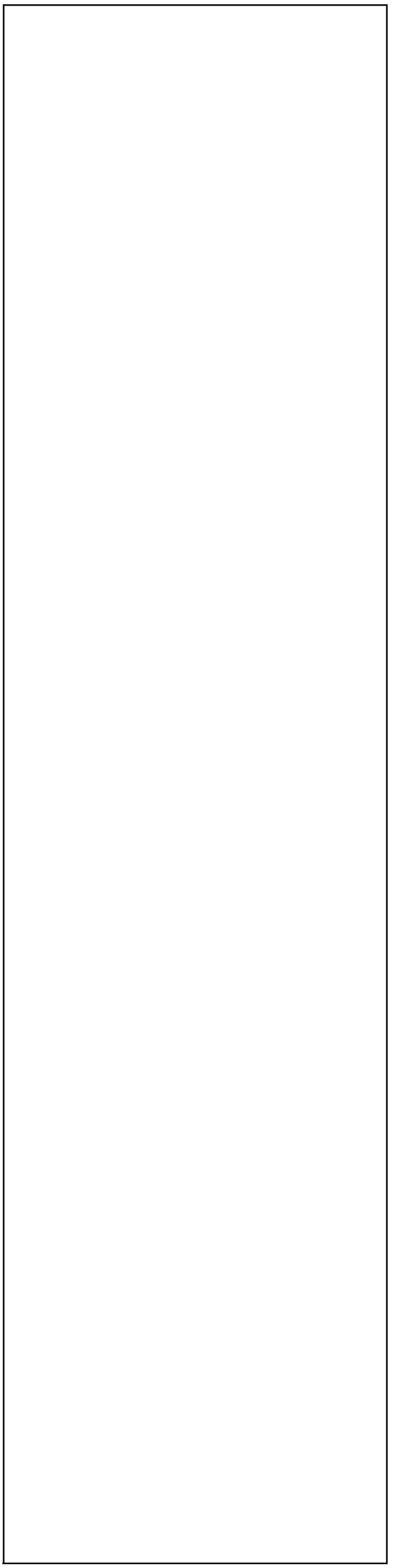


Figure 1.2-3 Upper Drywell, Arrangement Elevation, Section A-A

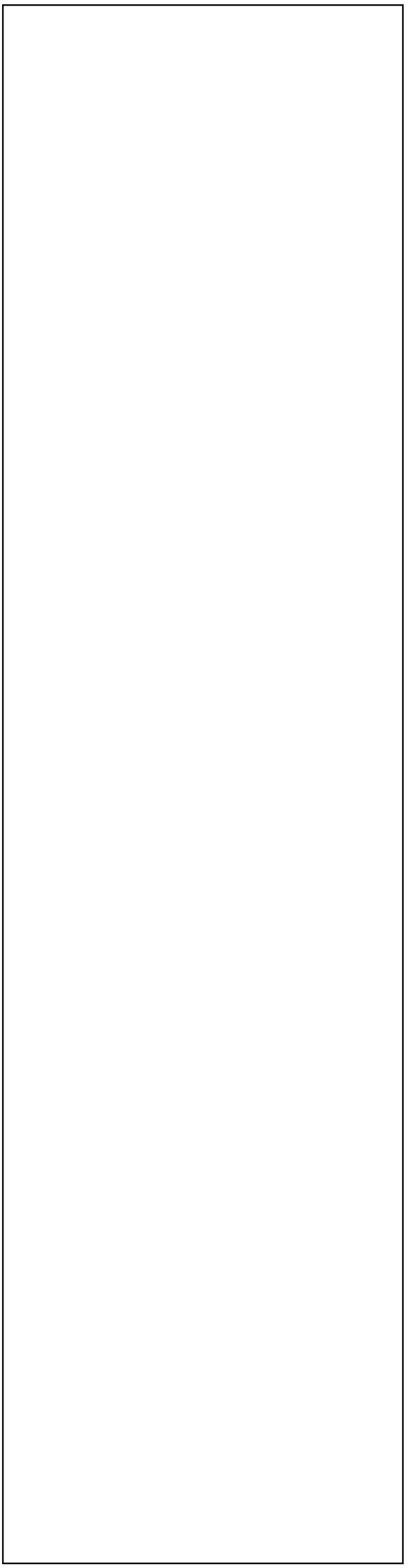


Figure 1.2-3a Upper Drywell, Arrangement Elevation, Section B-B

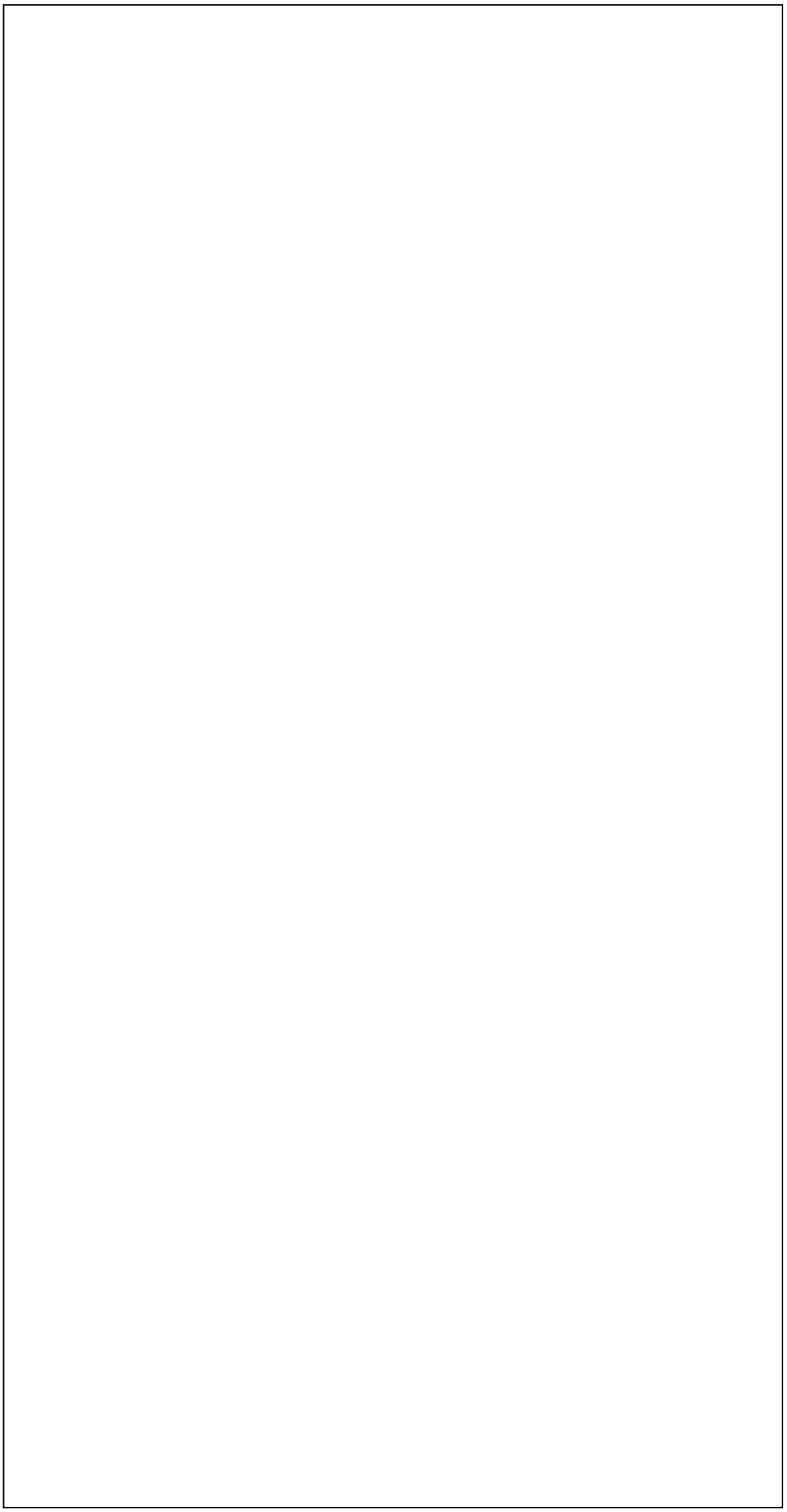


Figure 1.2-3b Lower Drywell, Arrangement Elevation, Section A-A

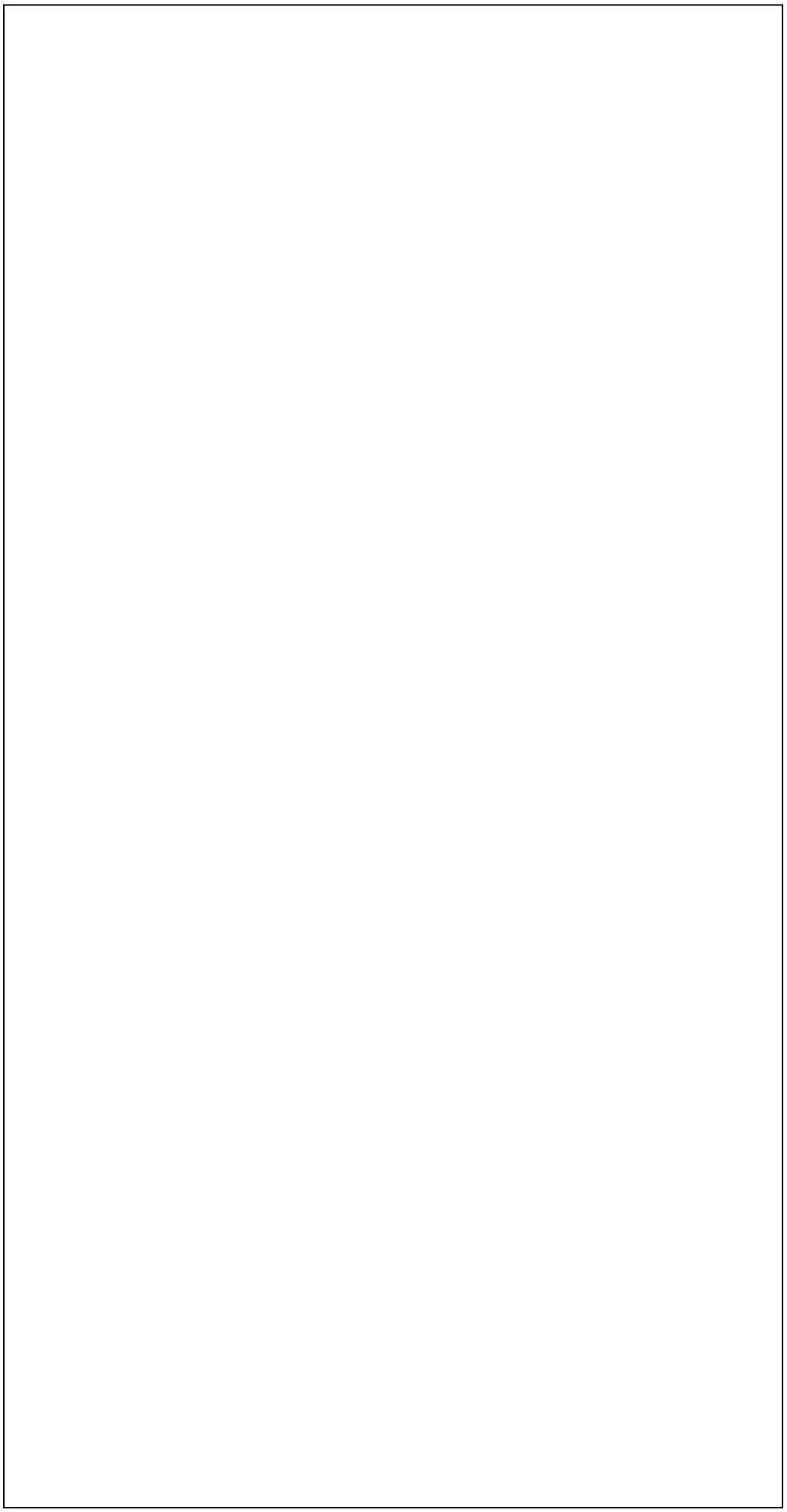


Figure 1.2-3c Wetwell, Arrangement Elevation, Sections A-A & B-B

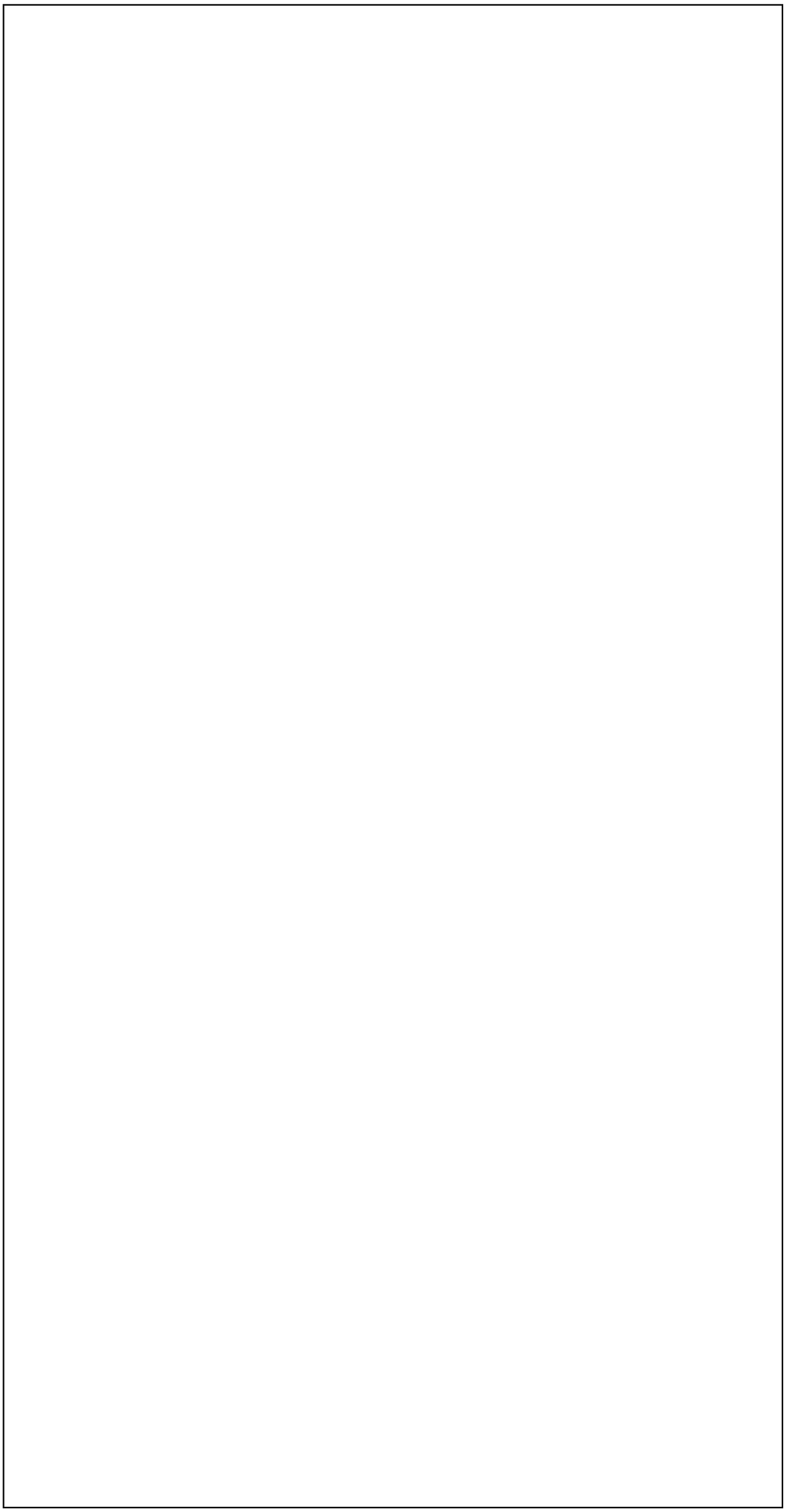


Figure 1.2-4 Reactor Building, Arrangement Plan at Elevation -8200 mm

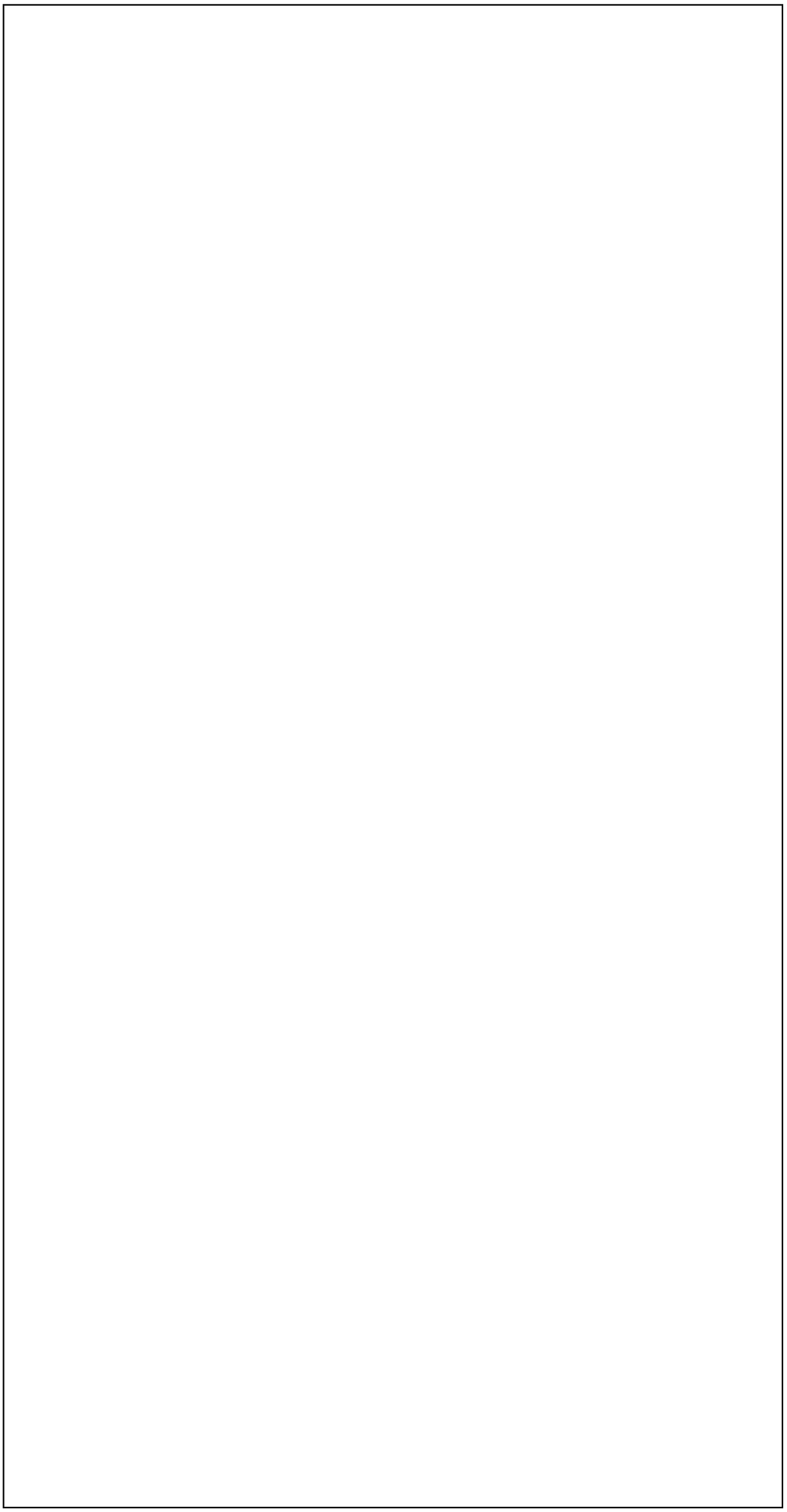


Figure 1.2-5 Reactor Building, Arrangement Plan at Elevation -1700 mm

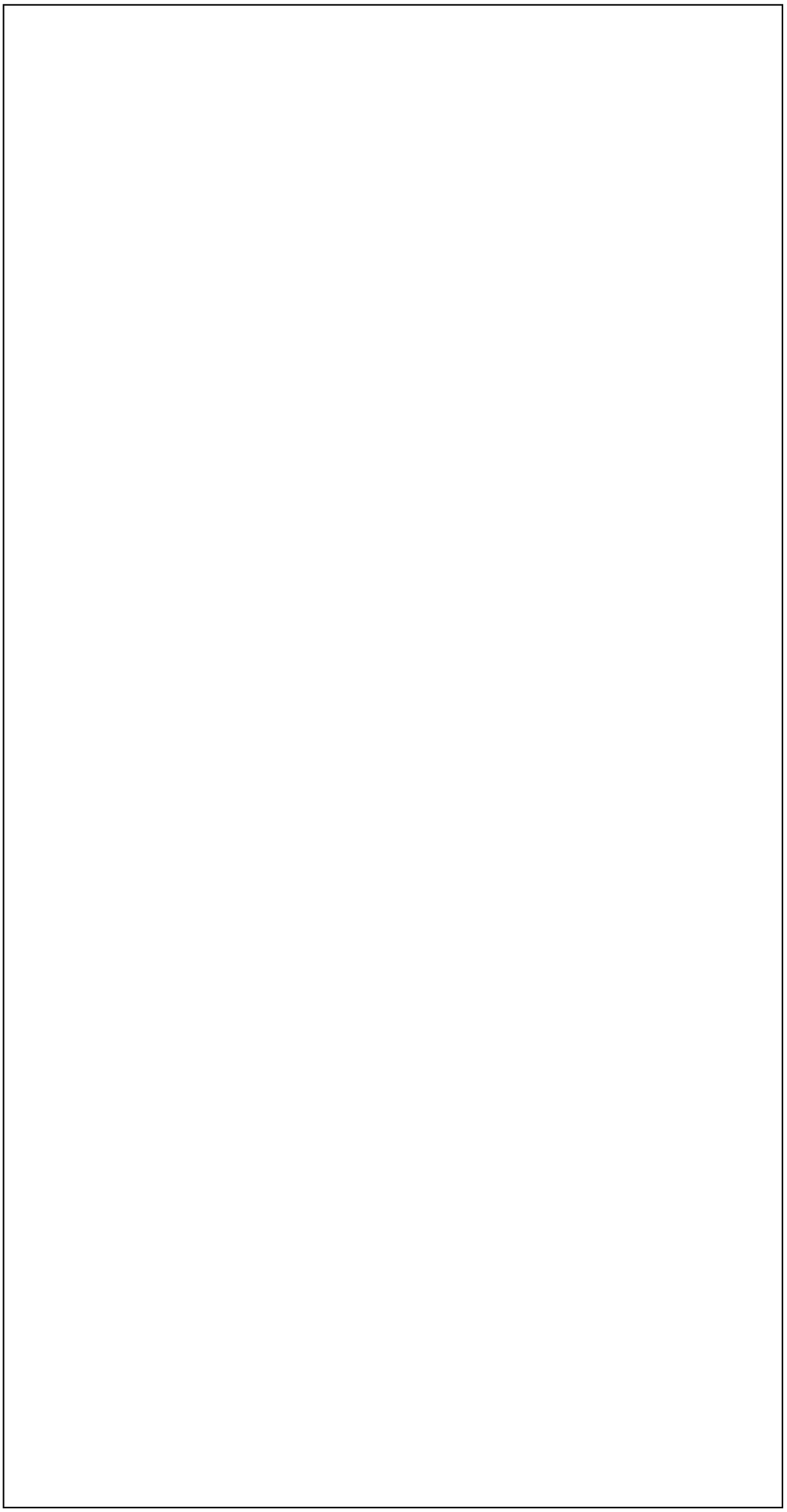


Figure 1.2-6 Reactor Building, Arrangement Plan at Elevation 4800/8500 mm

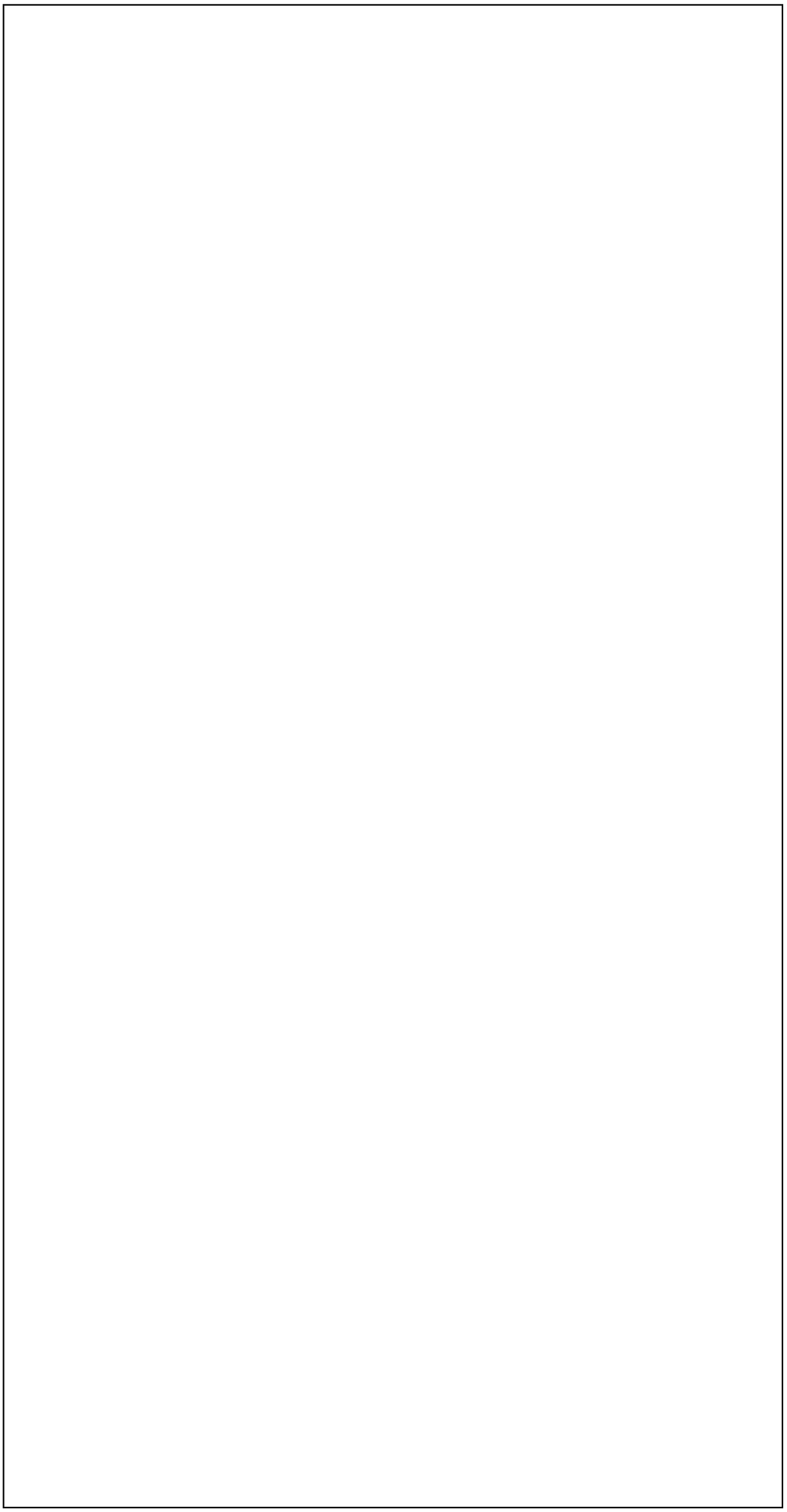


Figure 1.2-8 Reactor Building, Arrangement Plan at Elevation 12300 mm

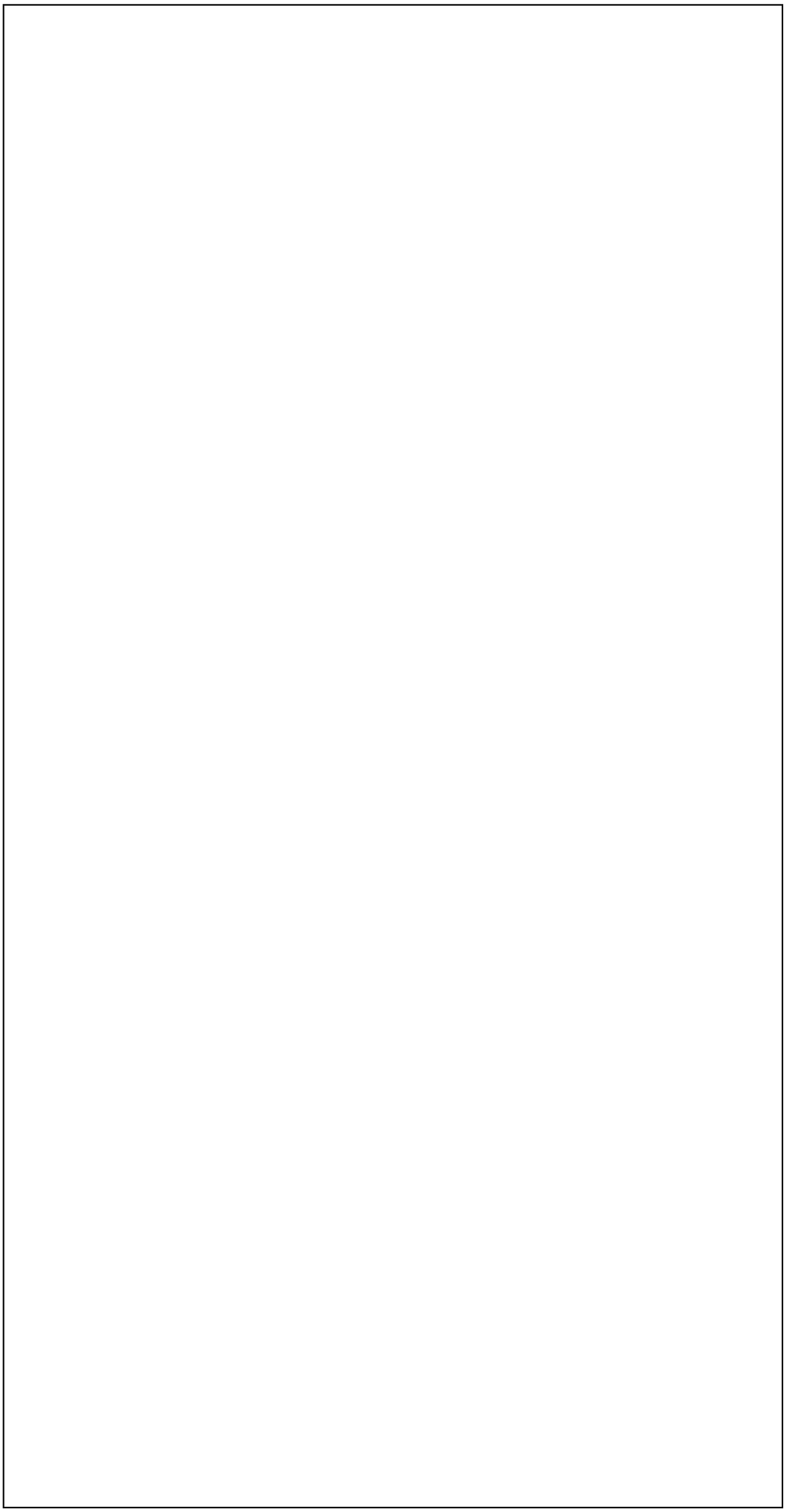


Figure 1.2-9 Reactor Building, Arrangement Plan at Elevation 18100 mm

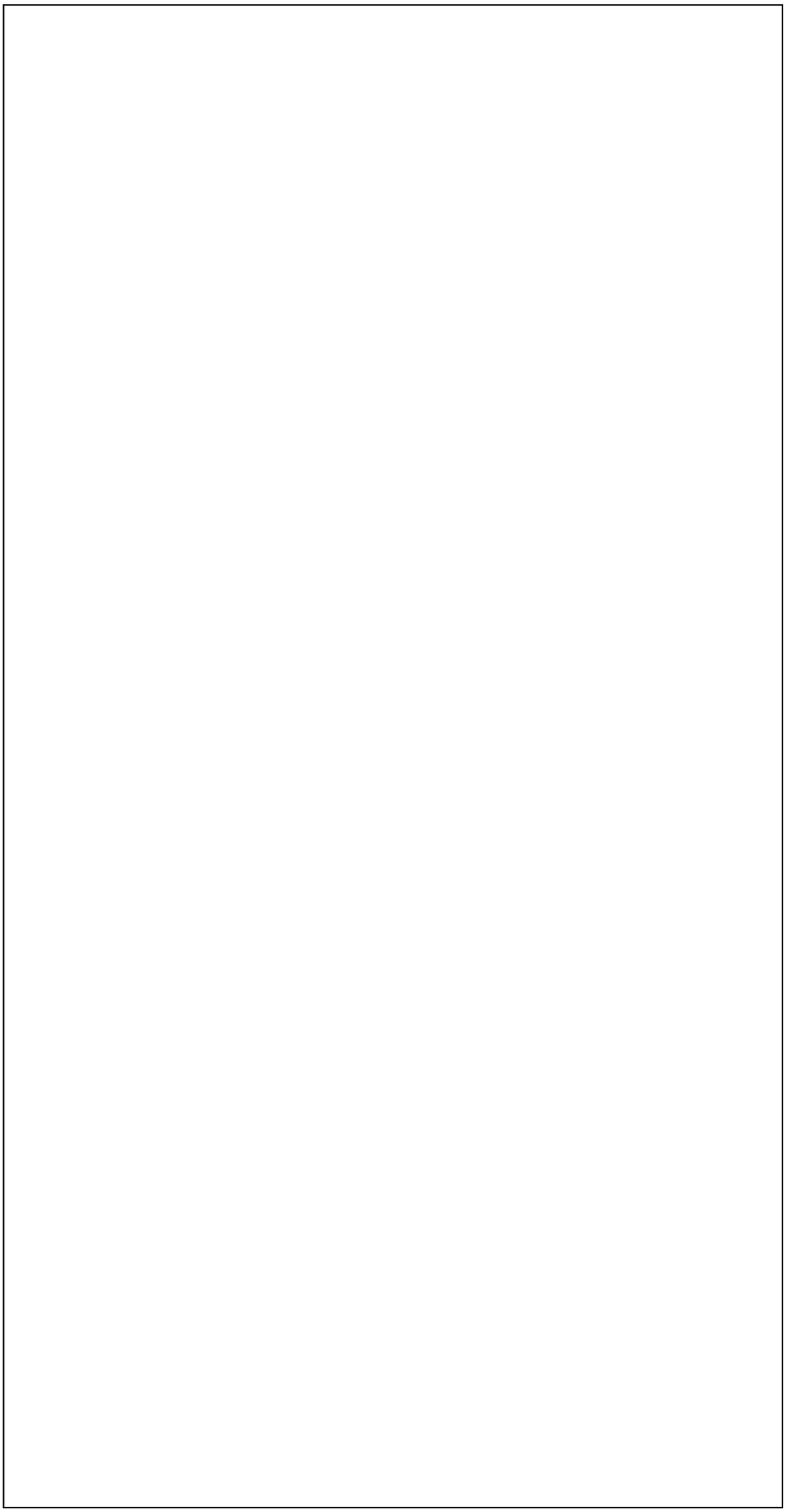


Figure 1.2-10 Reactor Building, Arrangement Plan at Elevation 23500 mm

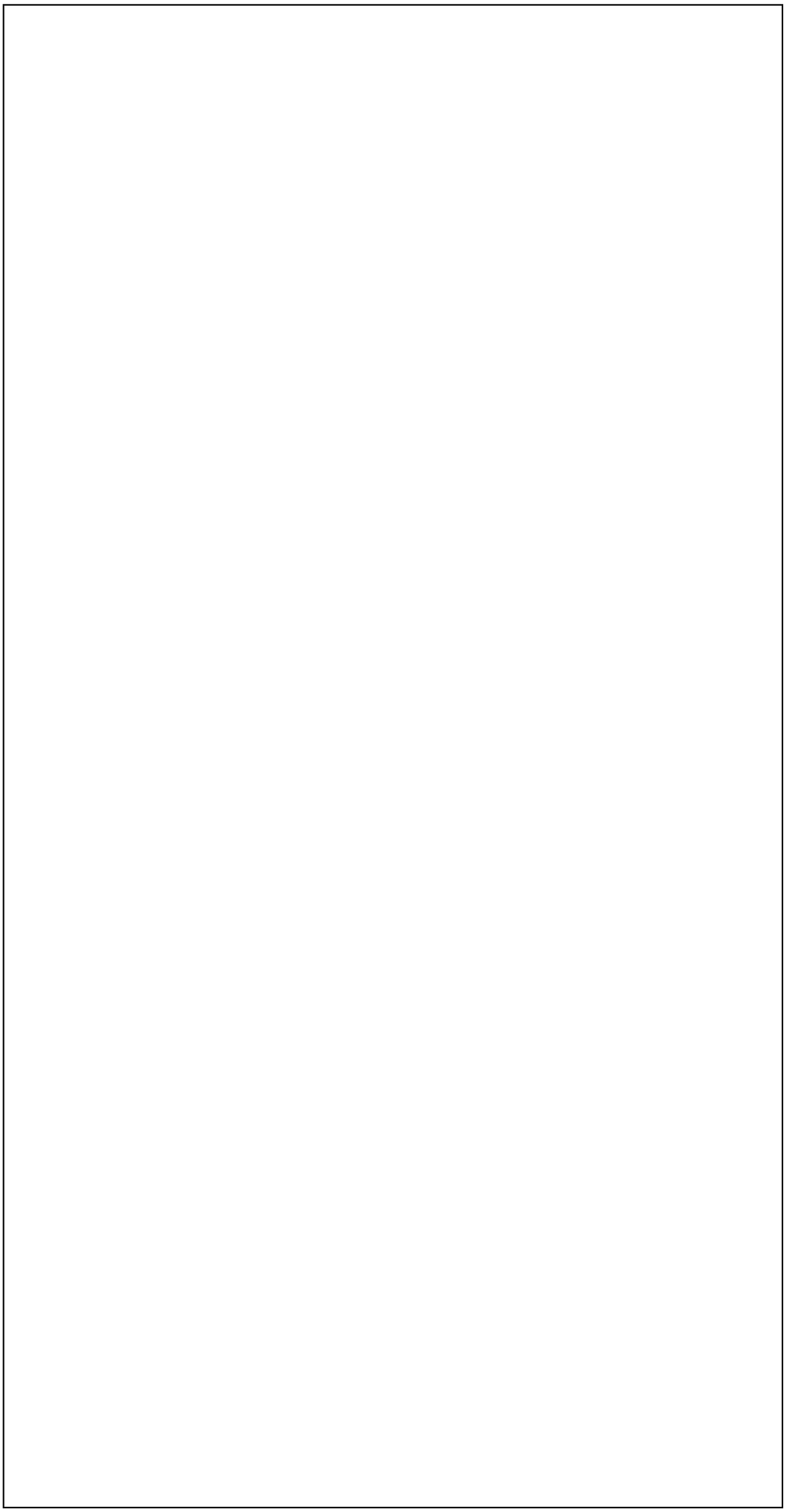


Figure 1.2-11 Reactor Building, Arrangement Plan at Elevation 27200 mm

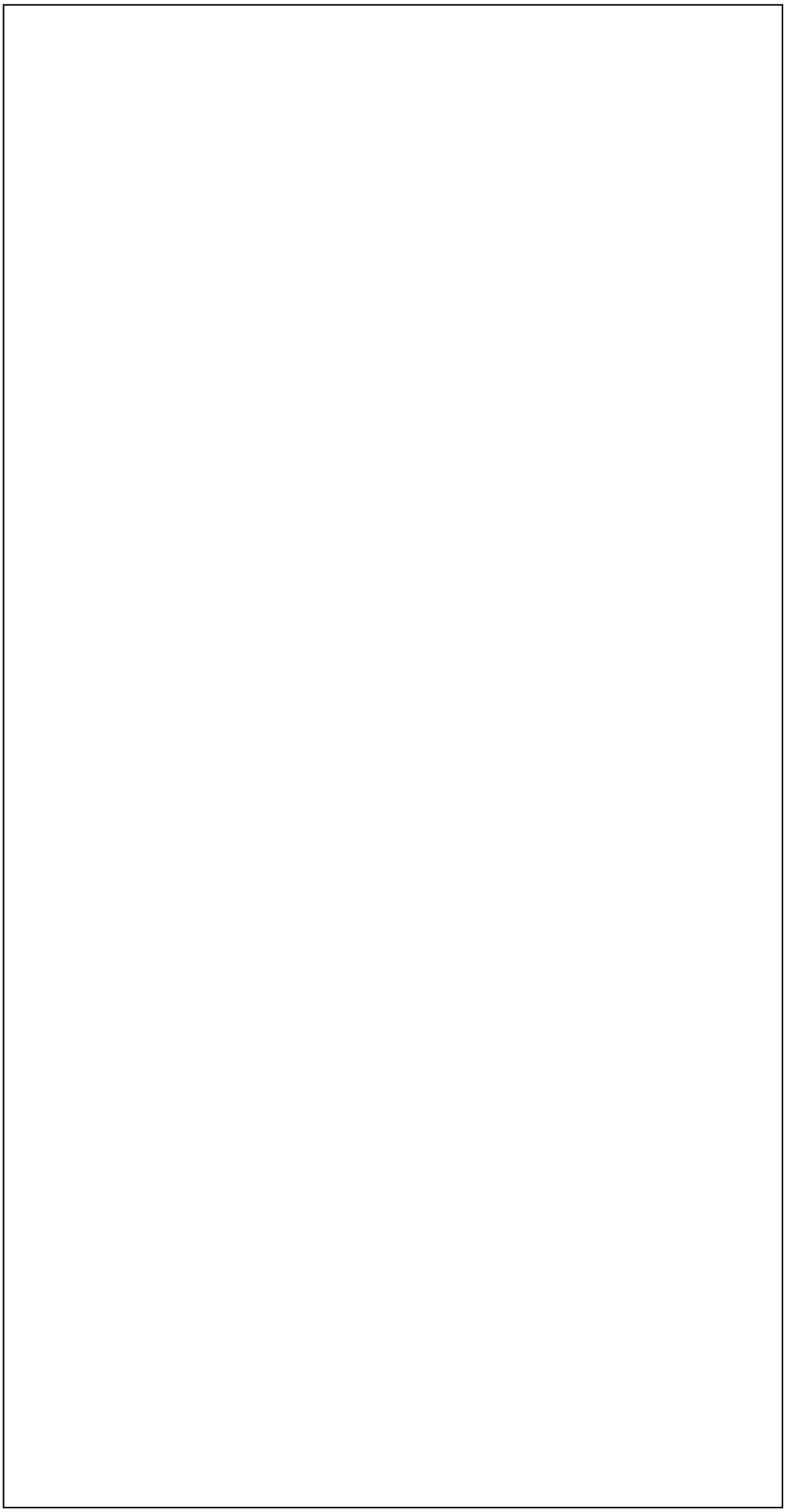


Figure 1.2-12 Reactor Building, Arrangement Plan at Elevation 31700/38200 mm

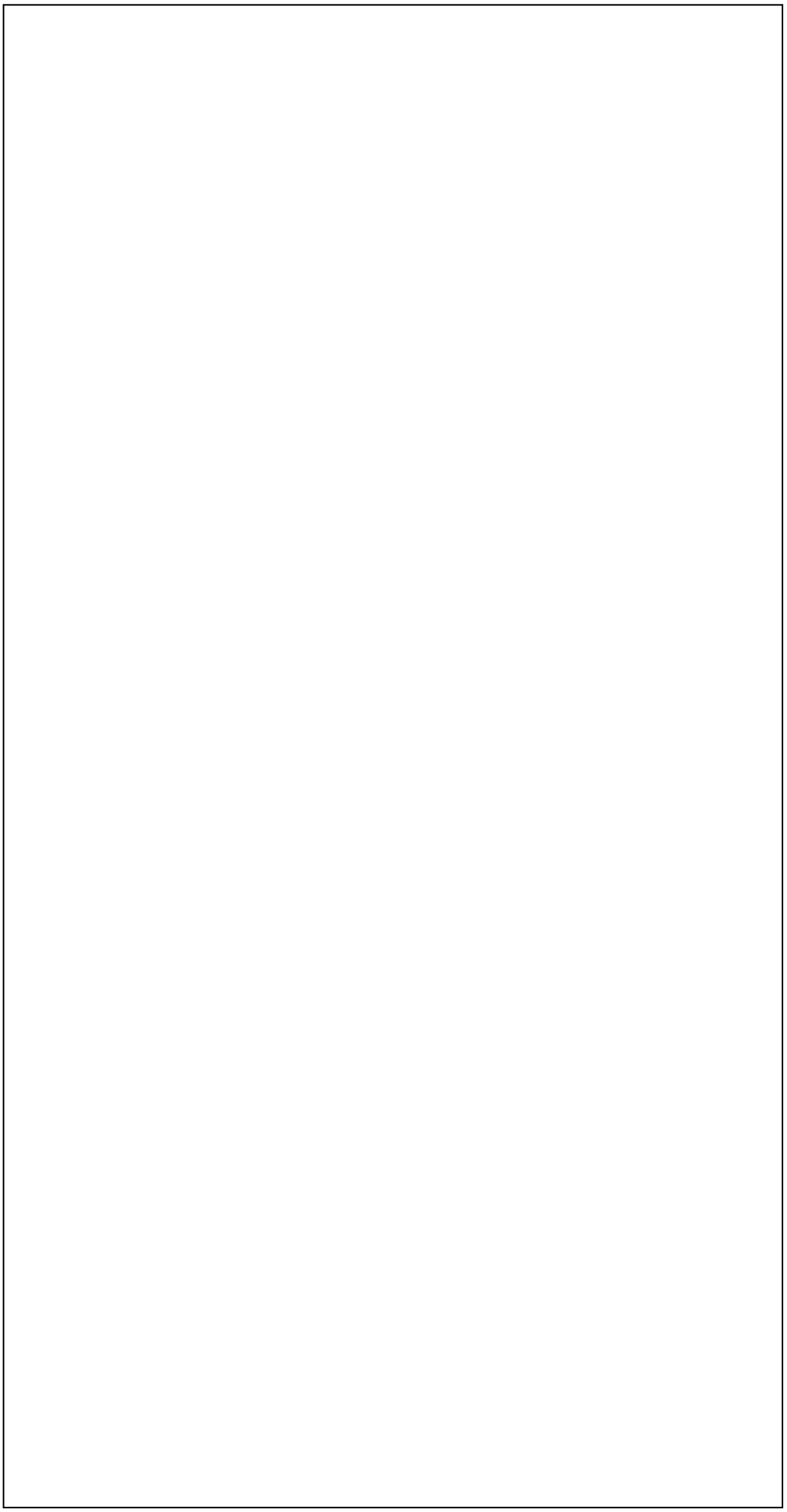


Figure 1.2-13a Drywell, Arrangement Plan at Elevation 12300 mm

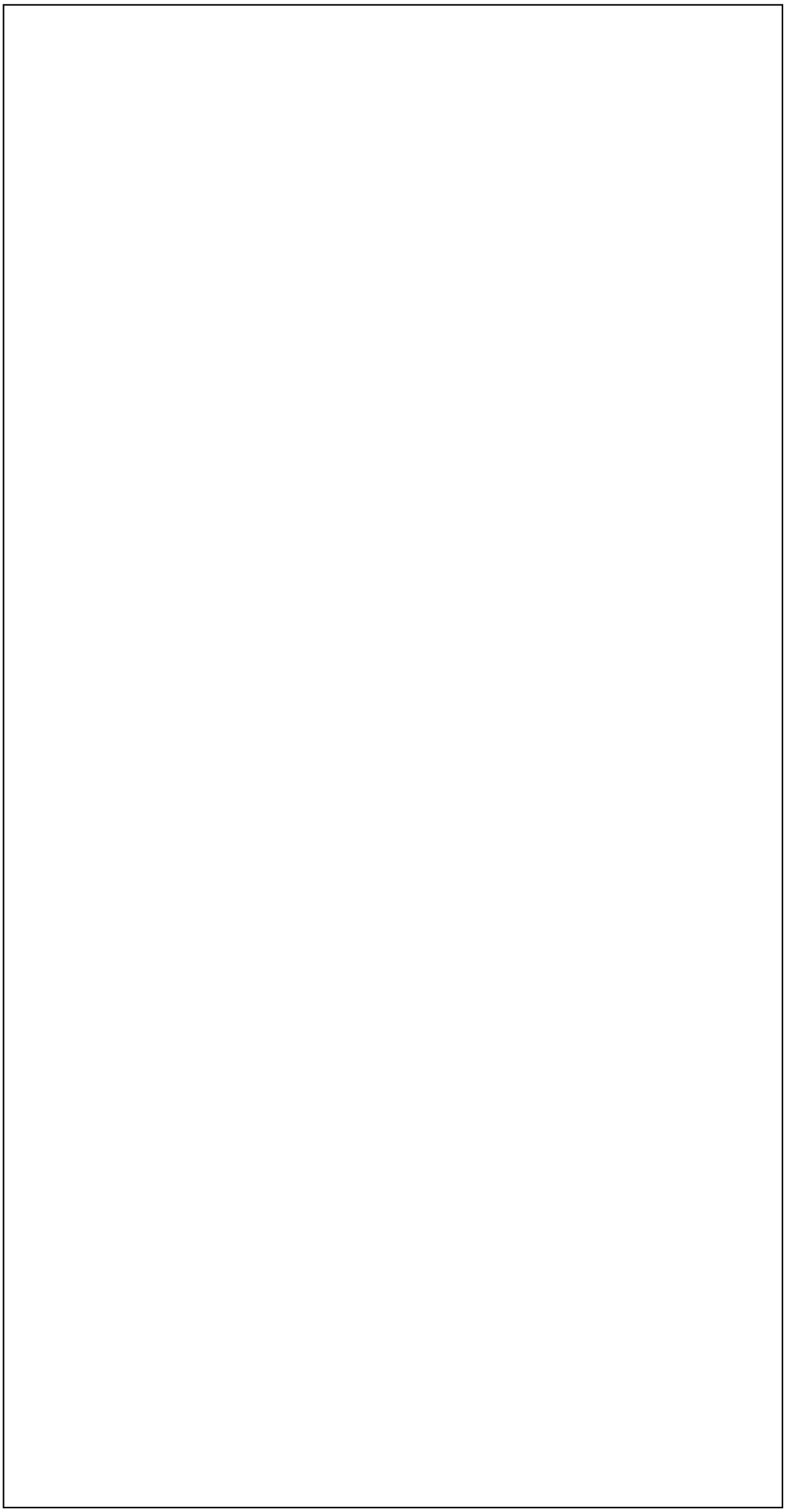


Figure 1.2-13b Drywell, Arrangement Plan at Elevation 15600 mm

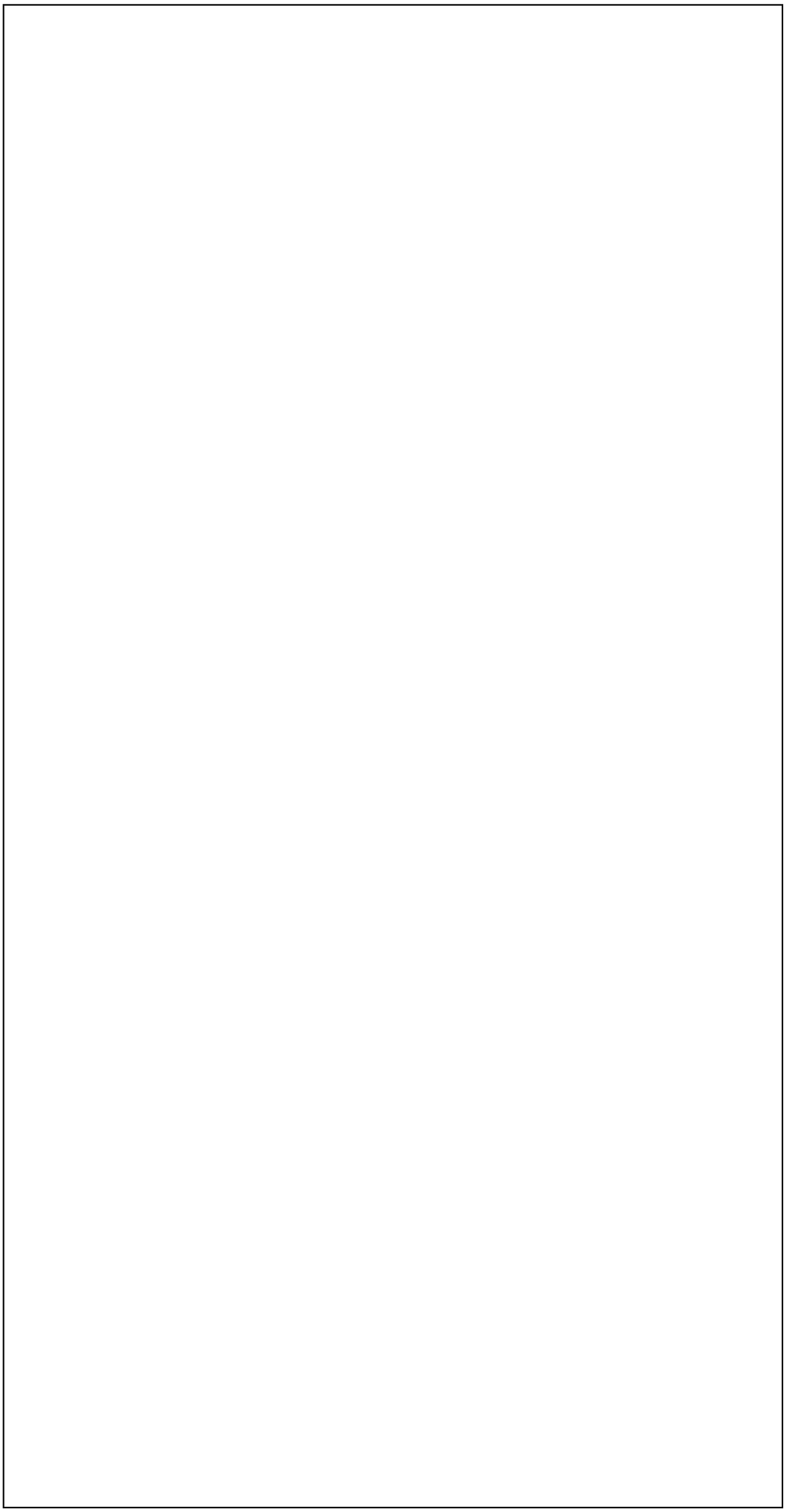


Figure 1.2-13c Drywell, Arrangement Plan at Elevation 18100 mm

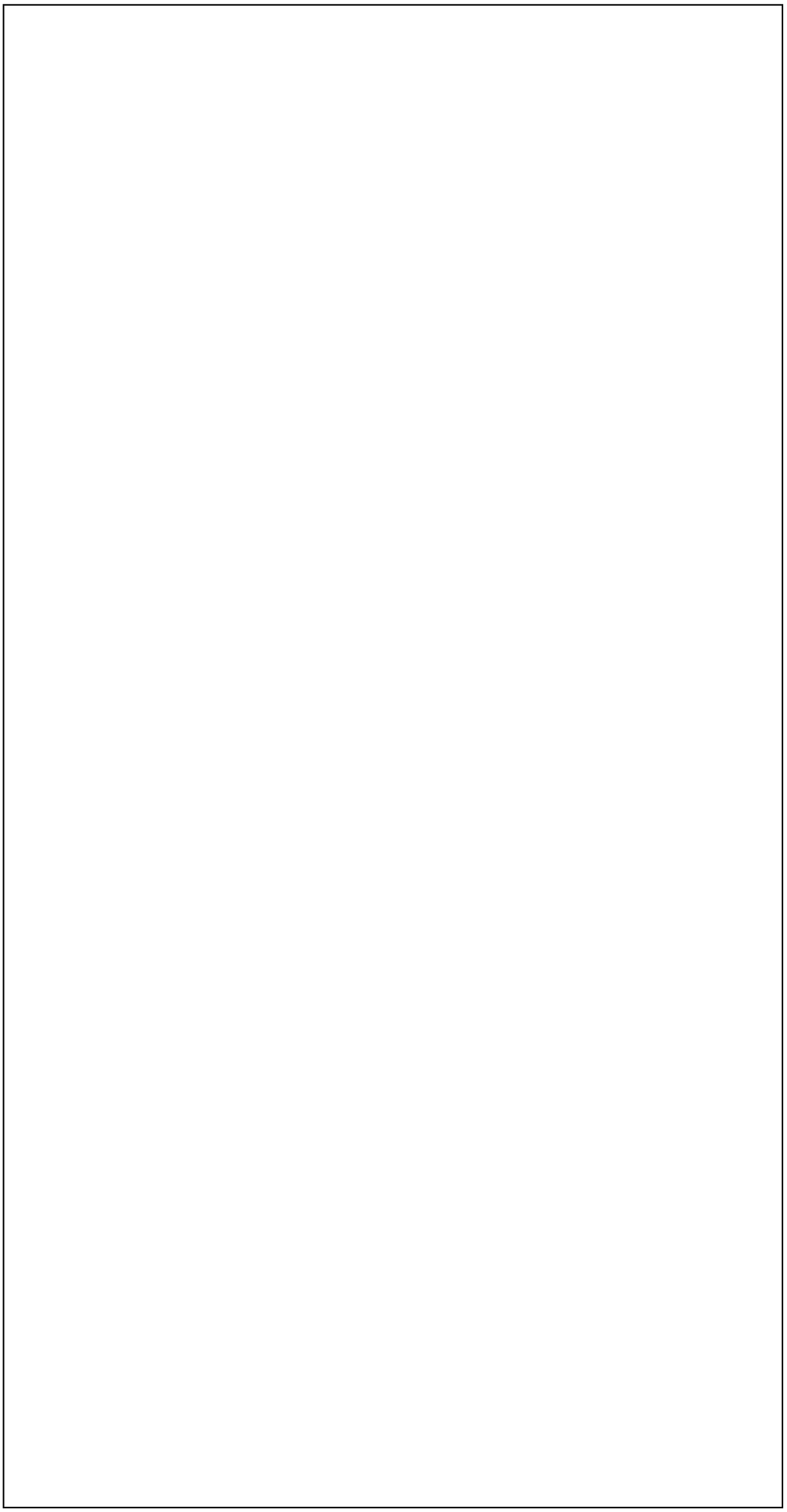


Figure 1.2-13d Drywell Steel Structure at Elevation 18100 mm

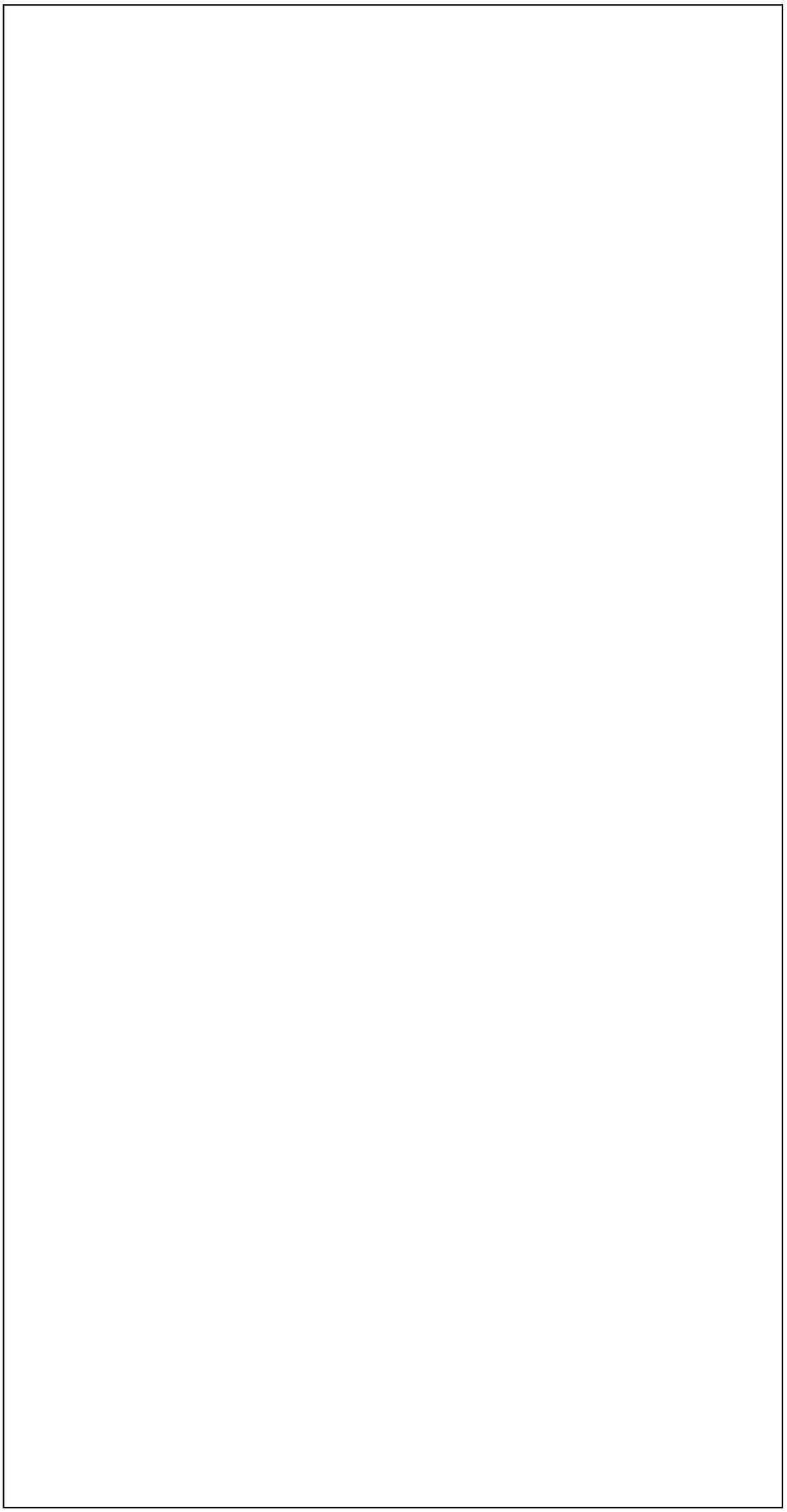


Figure 1.2-13e Lower Drywell, Arrangement Plan at Elevation -6600 to -1850 mm

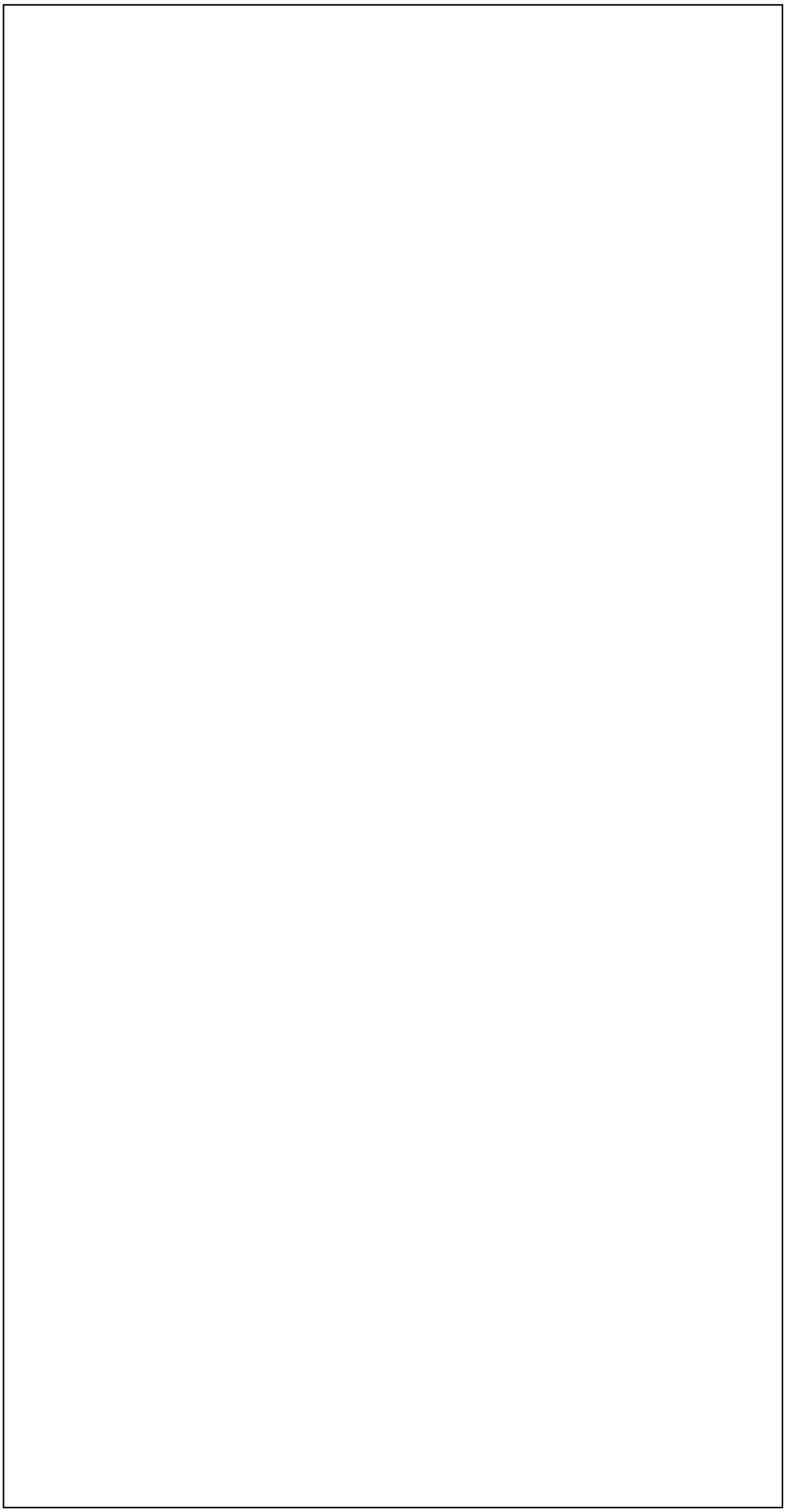


Figure 1.2-13f Lower Drywell, Arrangement Plan at Elevation -1850 to 1750 mm

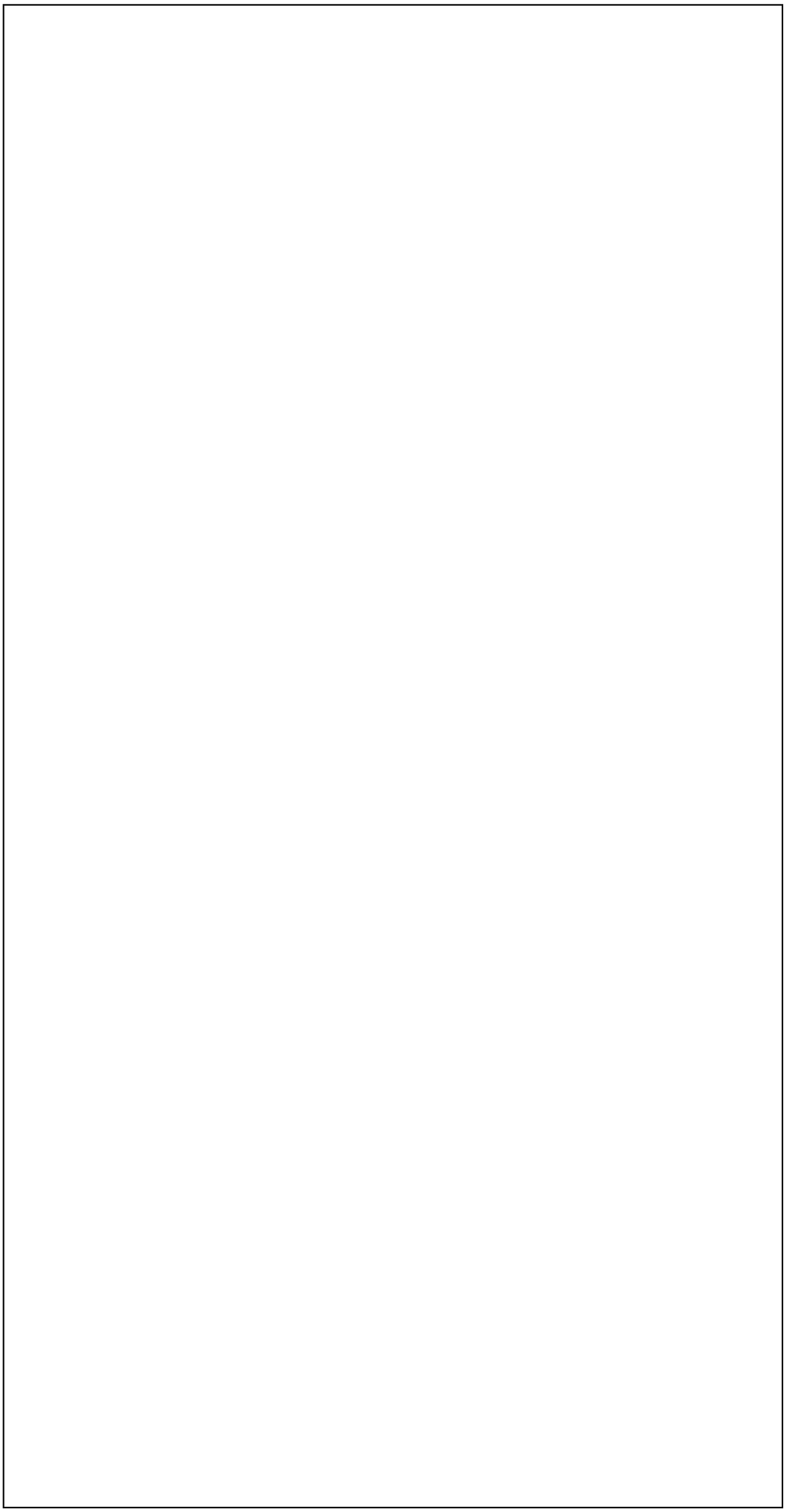


Figure 1.2-13g Lower Drywell, Arrangement Plan at Elevation 1750 to 4800 mm

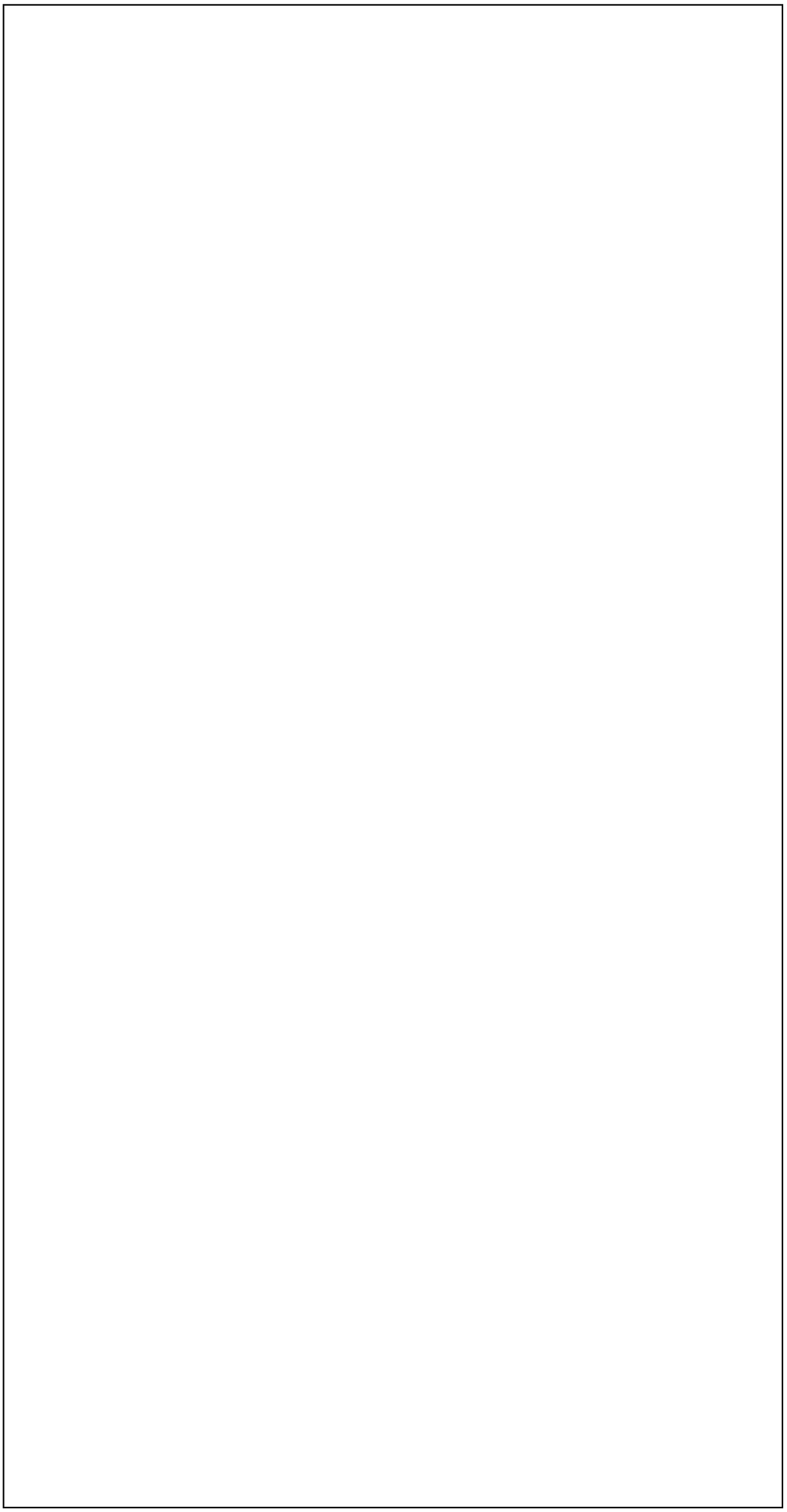


Figure 1.2-13h Lower Drywell, Arrangement Plan at Elevation 4800 to 6700 mm

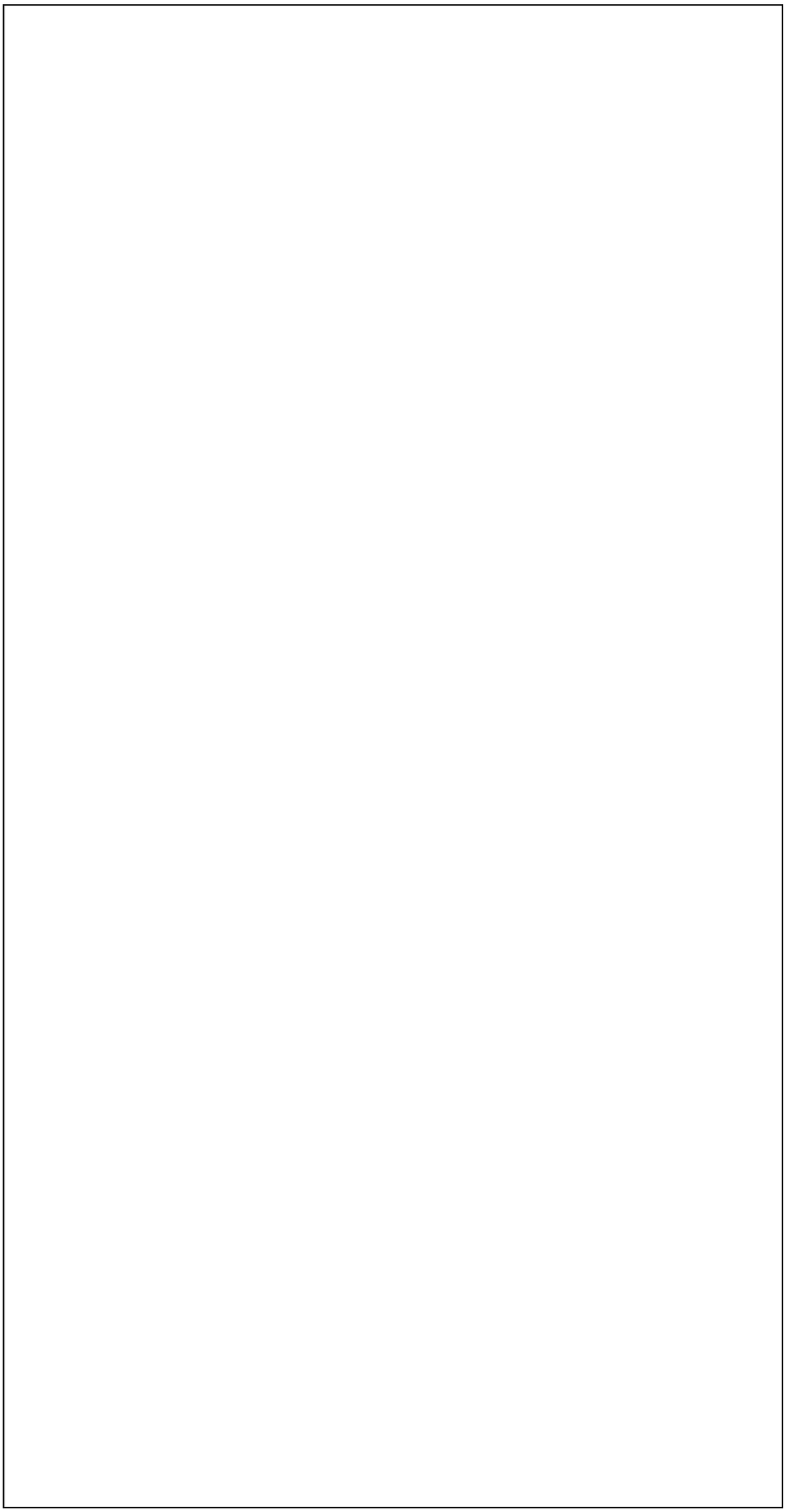


Figure 1.2-13i Wetwell, Arrangement Plan at Elevation -8200 mm

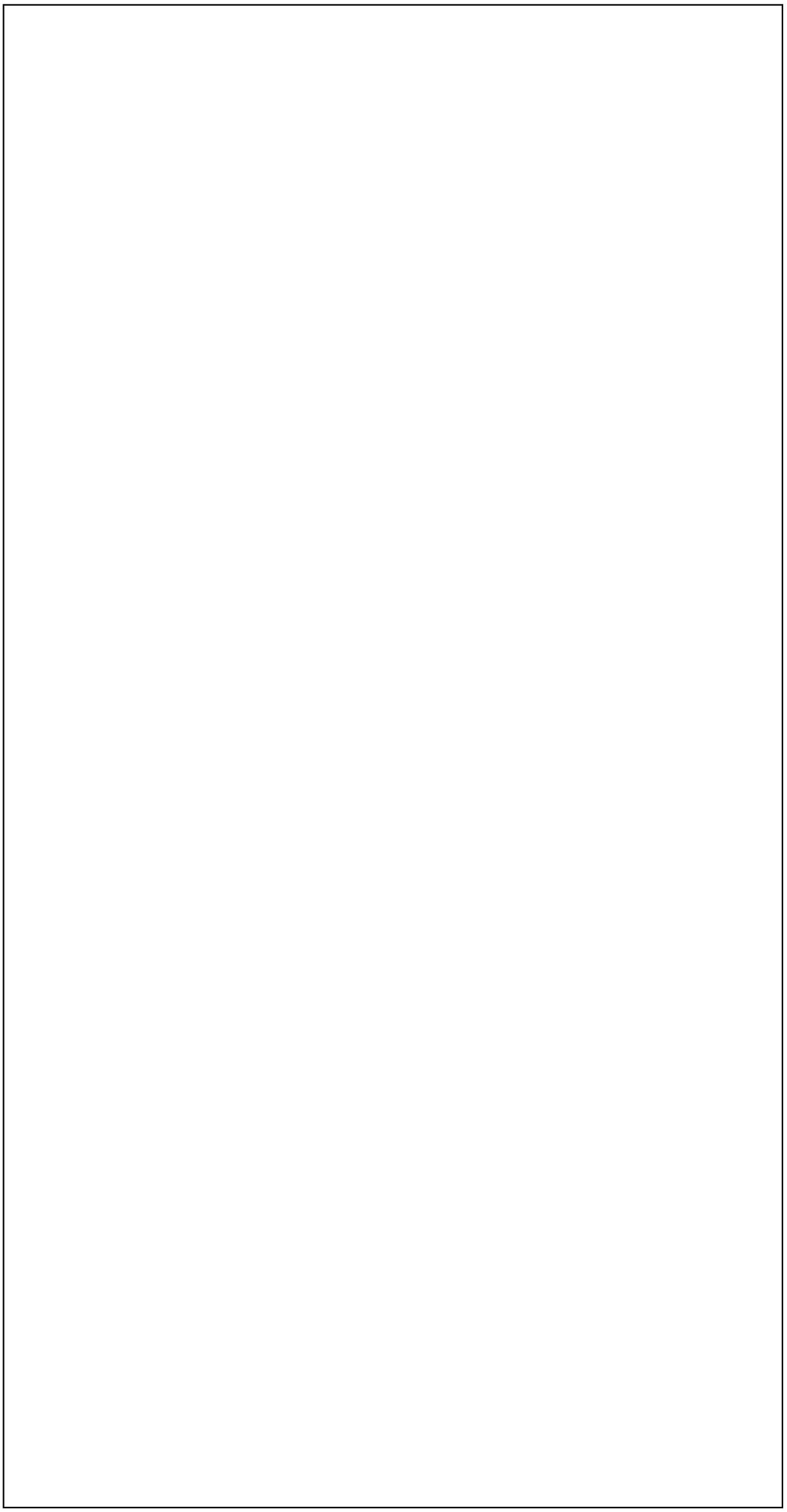


Figure 1.2-13j Wetwell, Arrangement Plan at Elevation -1700 mm

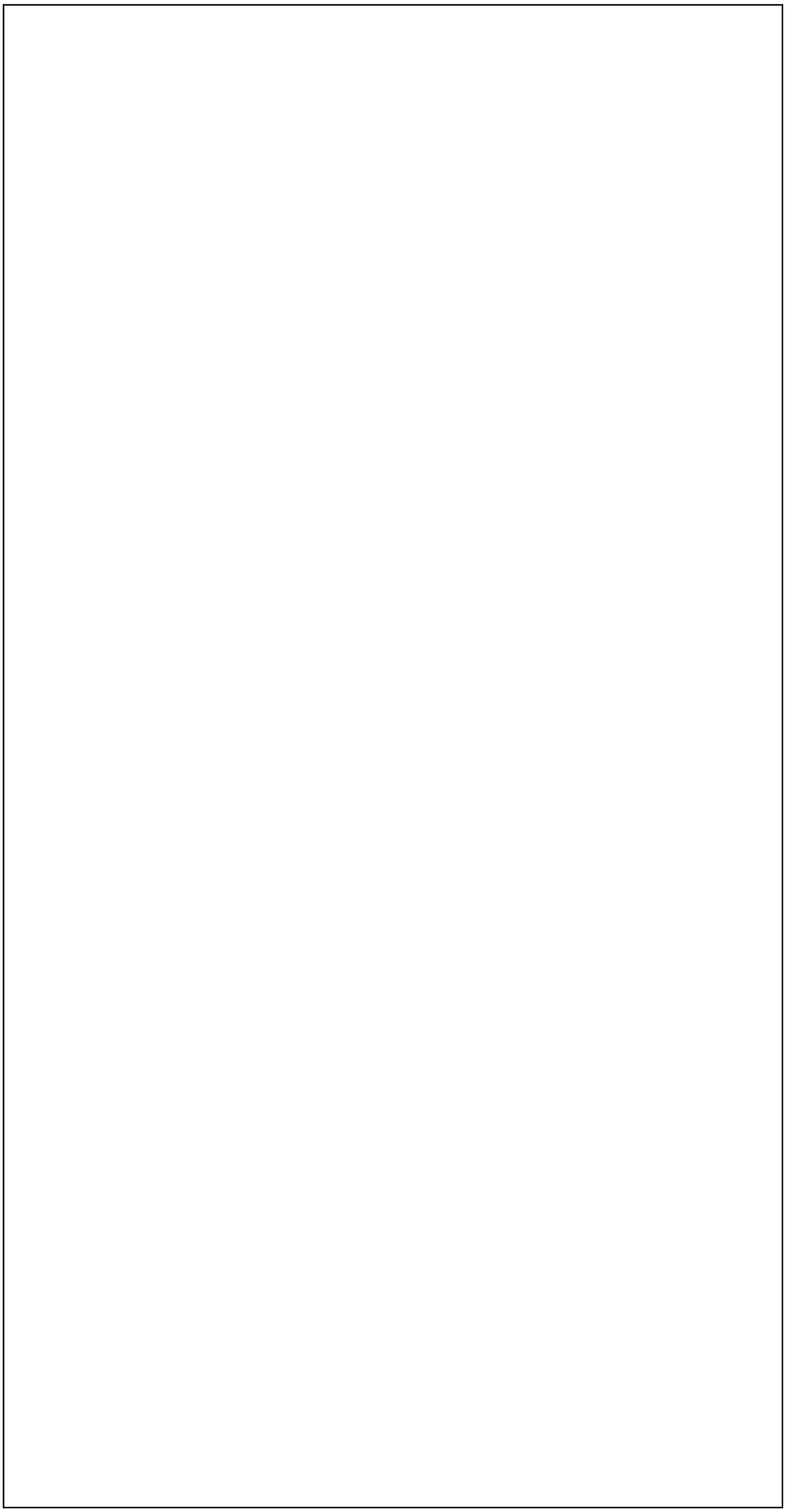


Figure 1.2-13k Wetwell, Arrangement Plan at Elevation 4800 mm

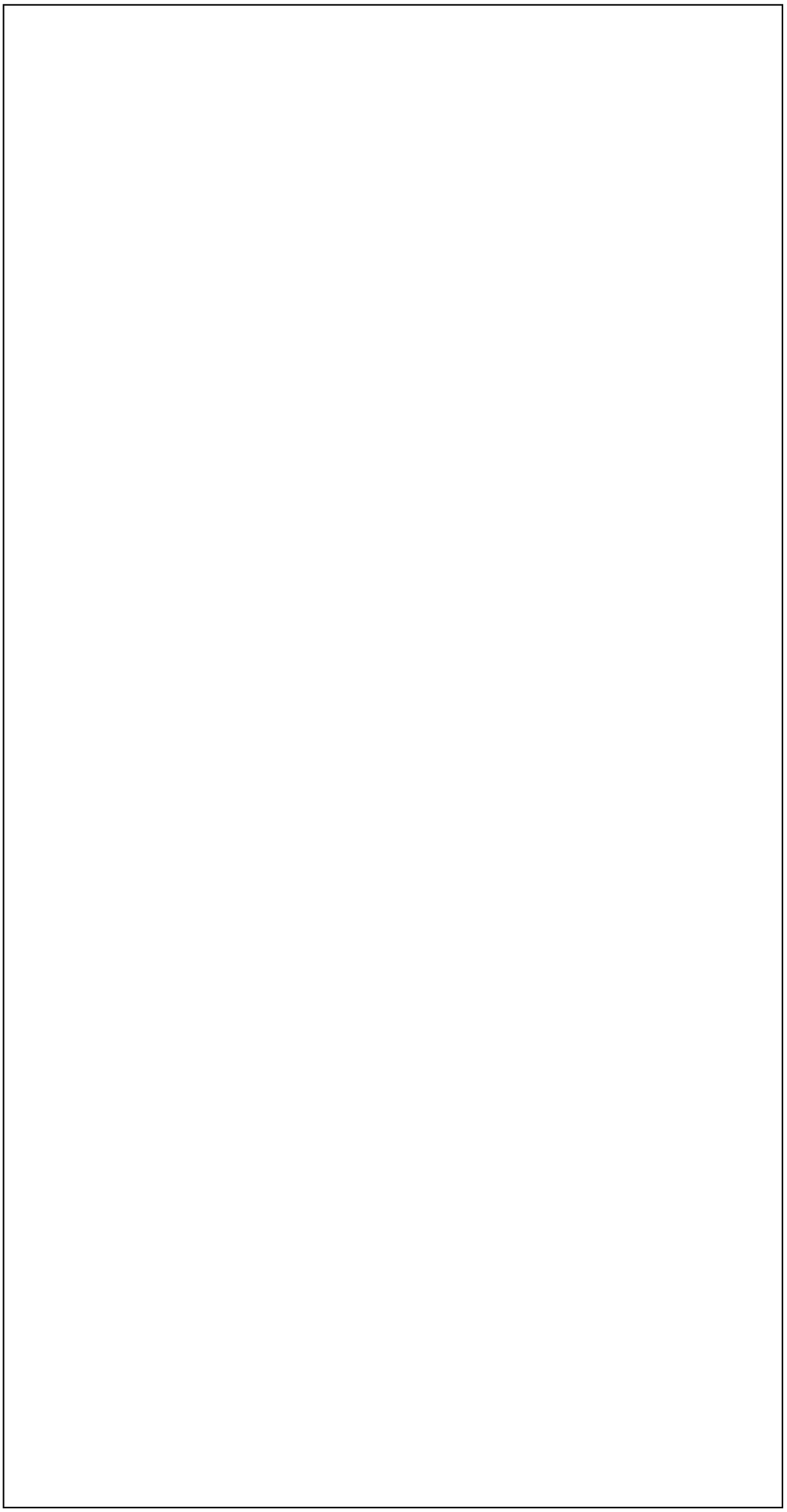


Figure 1.2-14 Control and Service Building, Arrangement Elevation, Section A-A

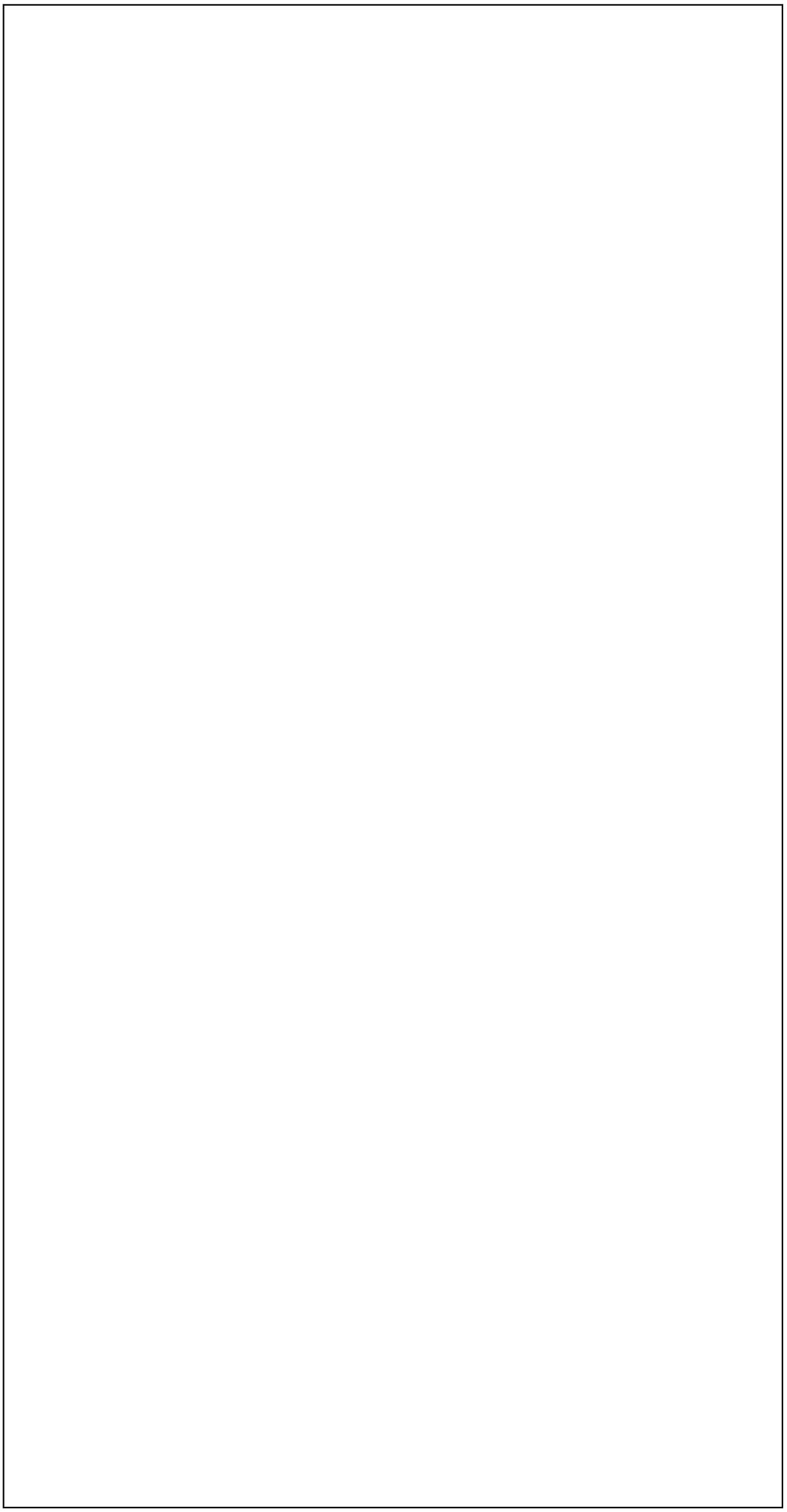


Figure 1.2-15 Control and Service Building, Arrangement Elevation, Section B-B

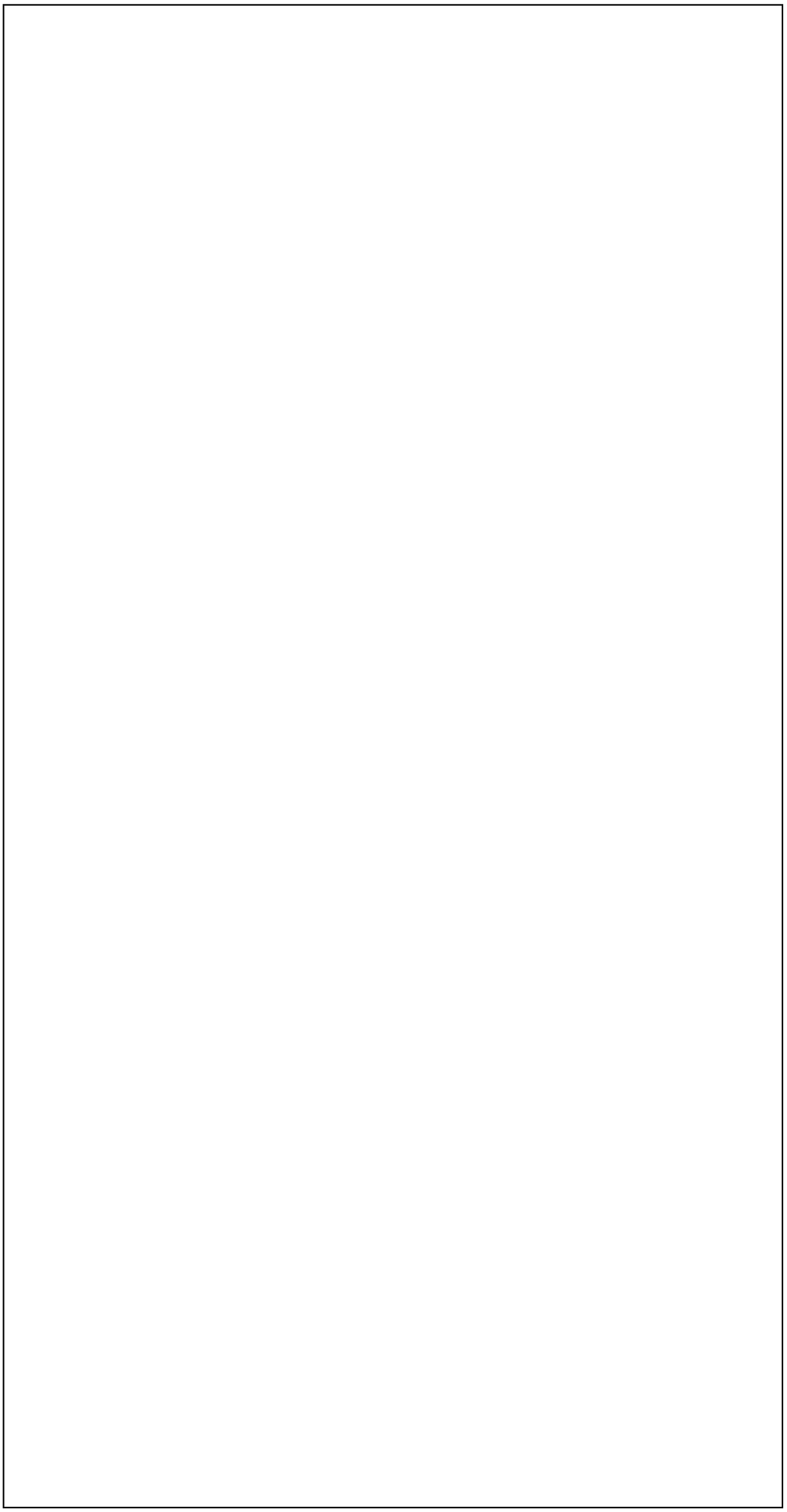


Figure 1.2-16 Control Building, Arrangement Plan at Elevation -8200 mm

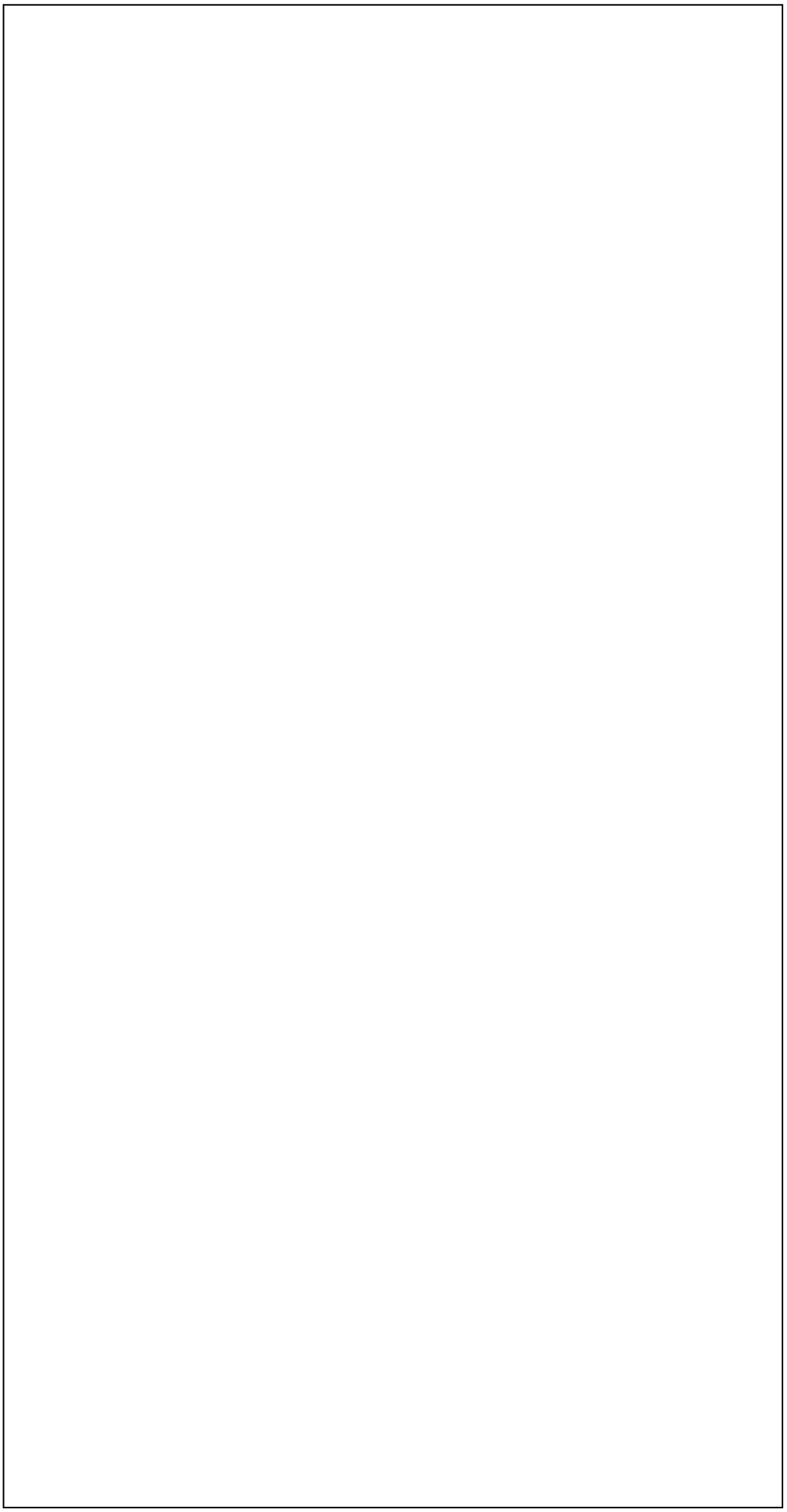


Figure 1.2-17 Control and Service Building, Arrangement Plan at Elevation -2150 mm

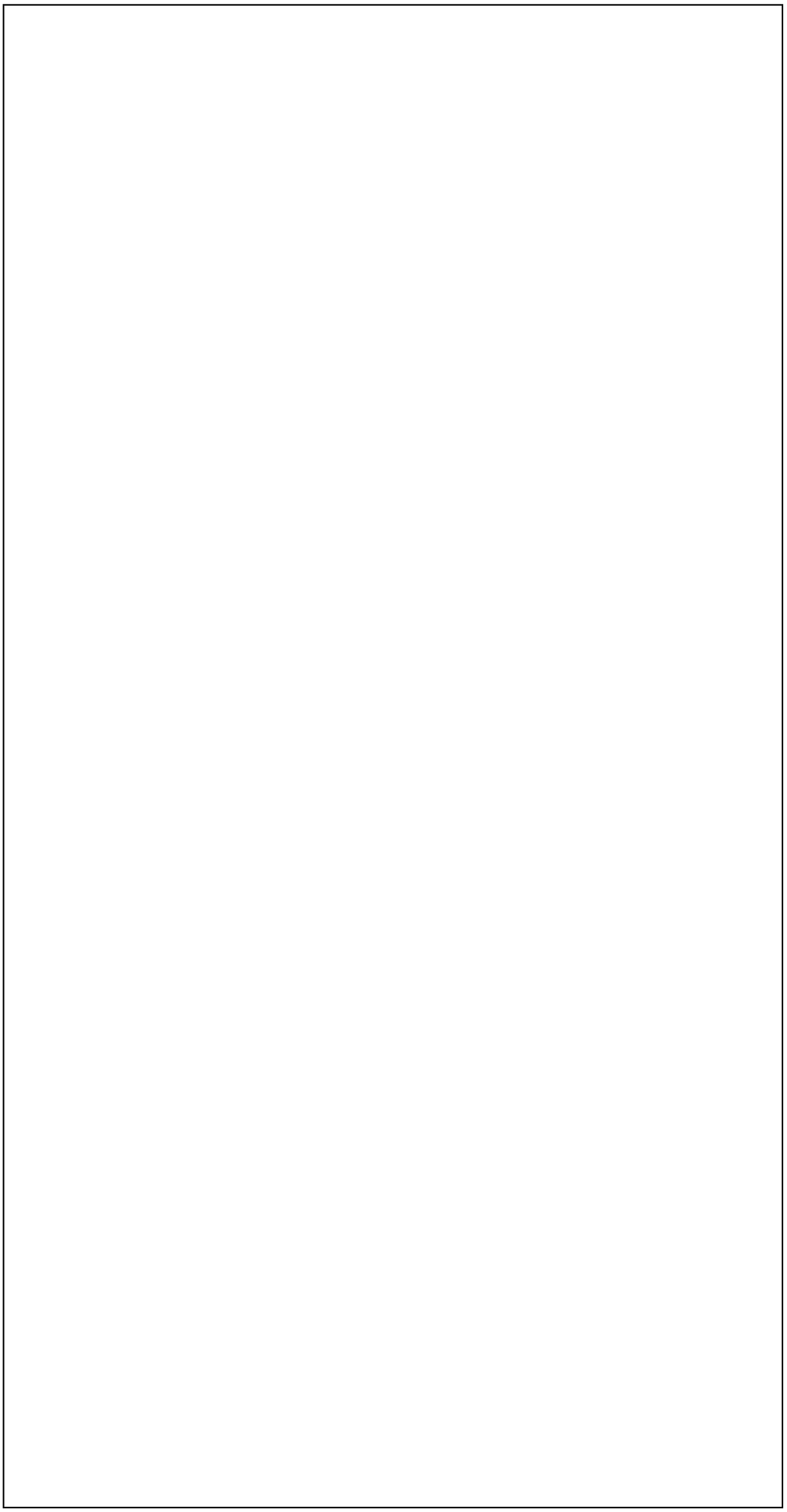


Figure 1.2-18 Control and Service Building, Arrangement Plan at Elevation 3500 mm

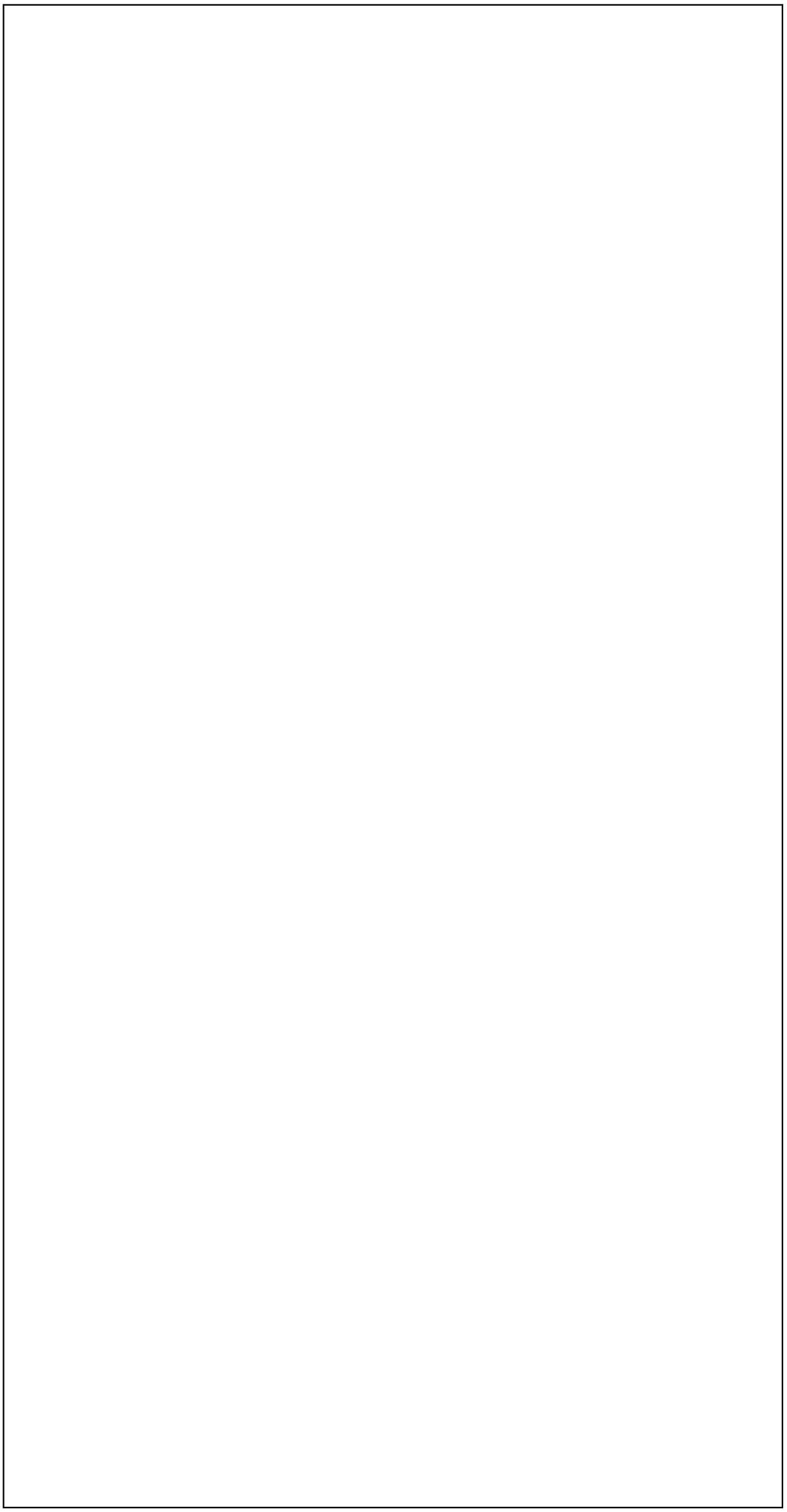


Figure 1.2-19 Control and Service Building, Arrangement Plan at Elevation 7900 mm

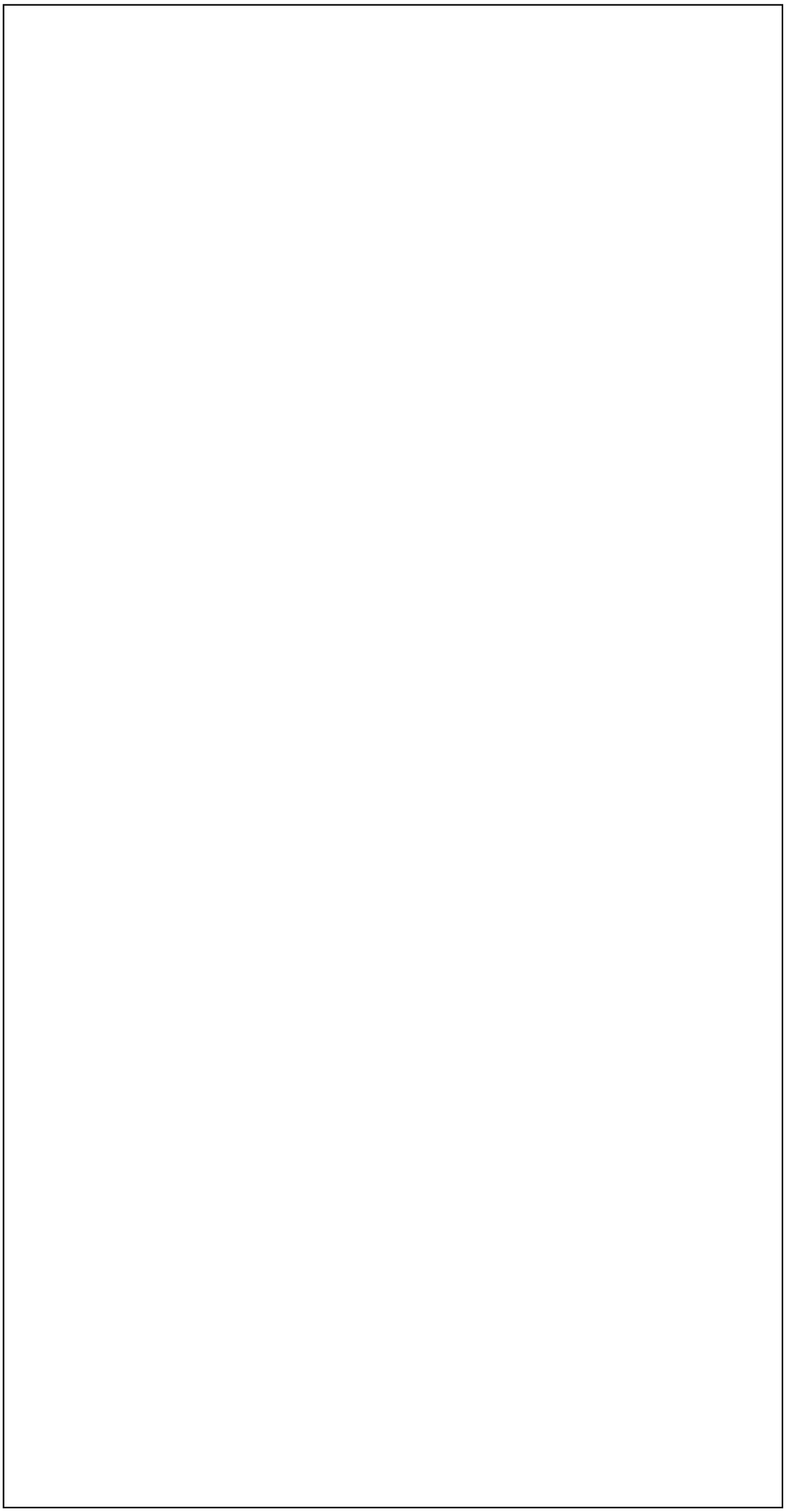


Figure 1.2-20 Control and Service Building, Arrangement Plan at Elevation 12300 mm

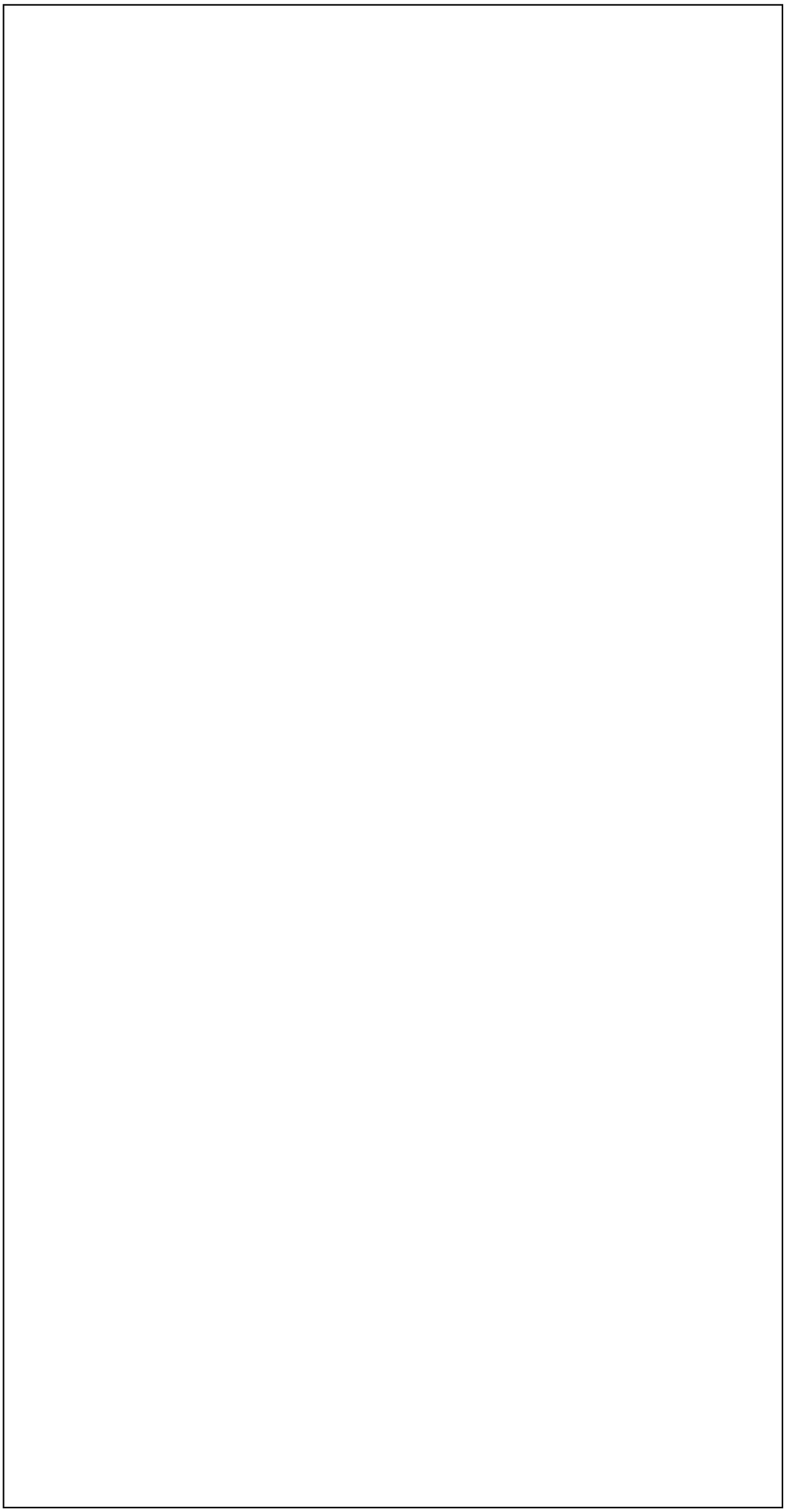


Figure 1.2-21 Control and Service Building, Arrangement Plan at Elevation 17150 mm

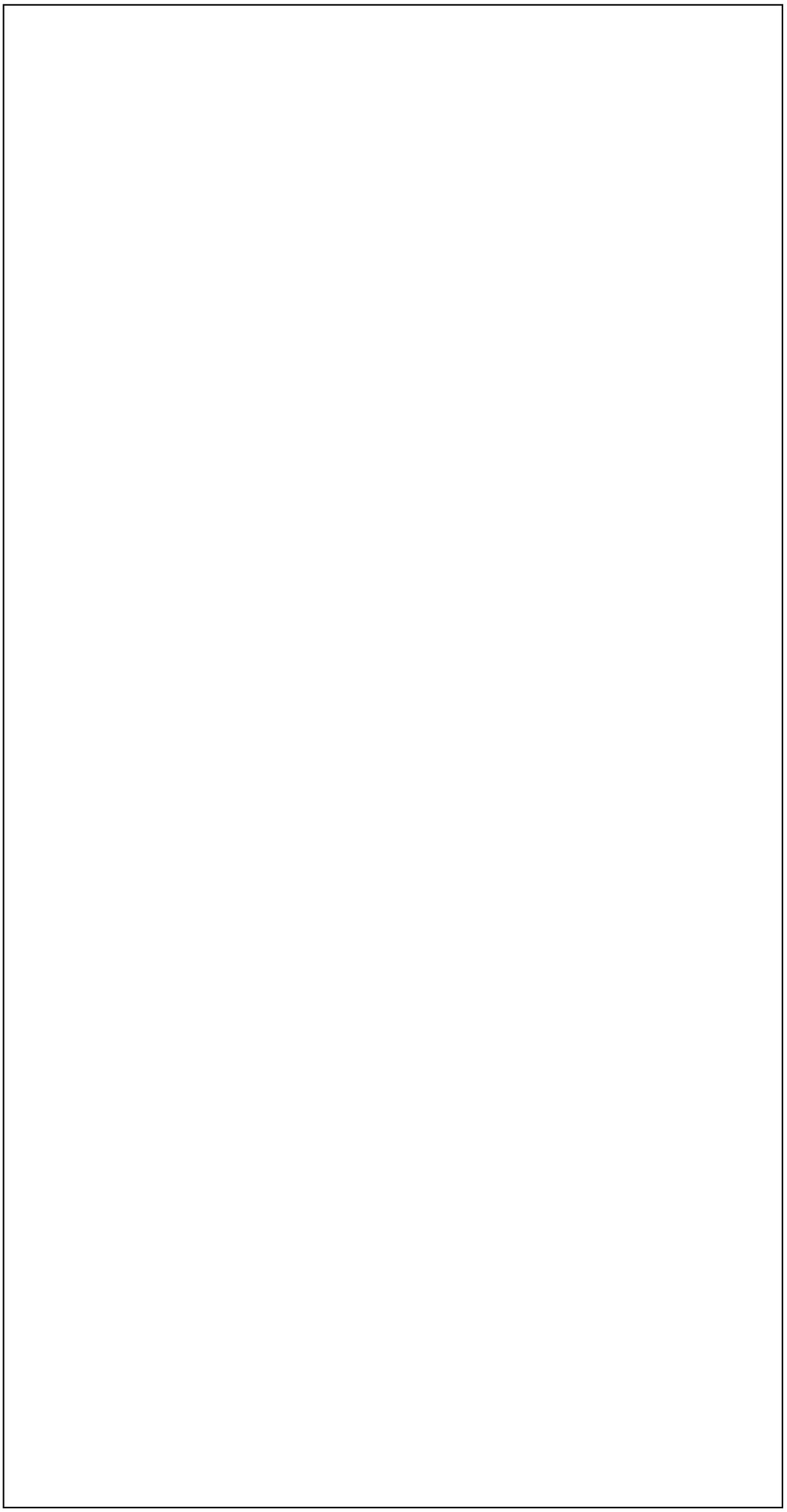


Figure 1.2-22 Control and Service Building, Arrangement Plan at Elevation 22200 mm

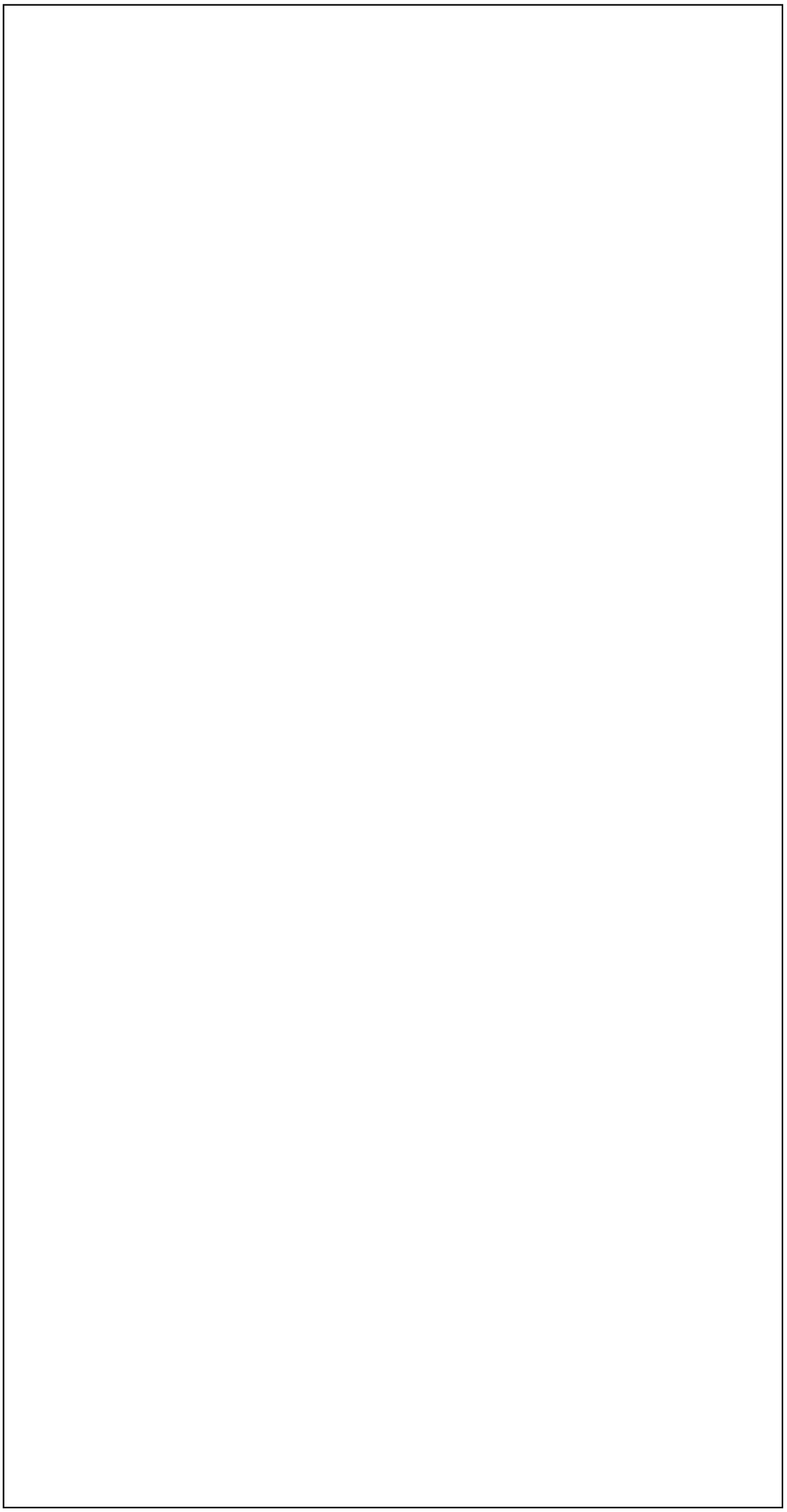


Figure 1.2-23a Radwaste Building at Elevation -1500 mm

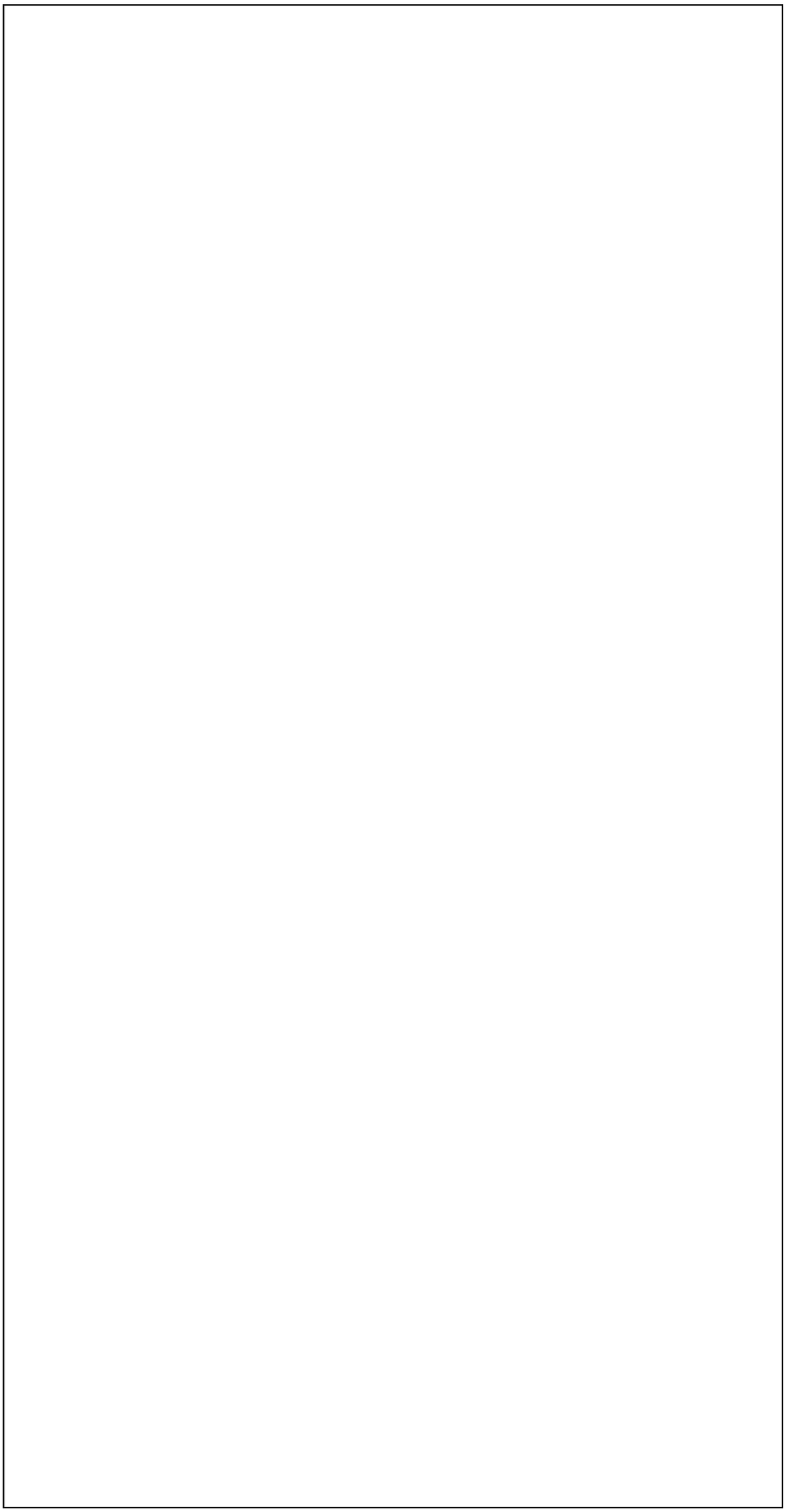


Figure 1.2-23b Radwaste Building at Elevation 4800 mm

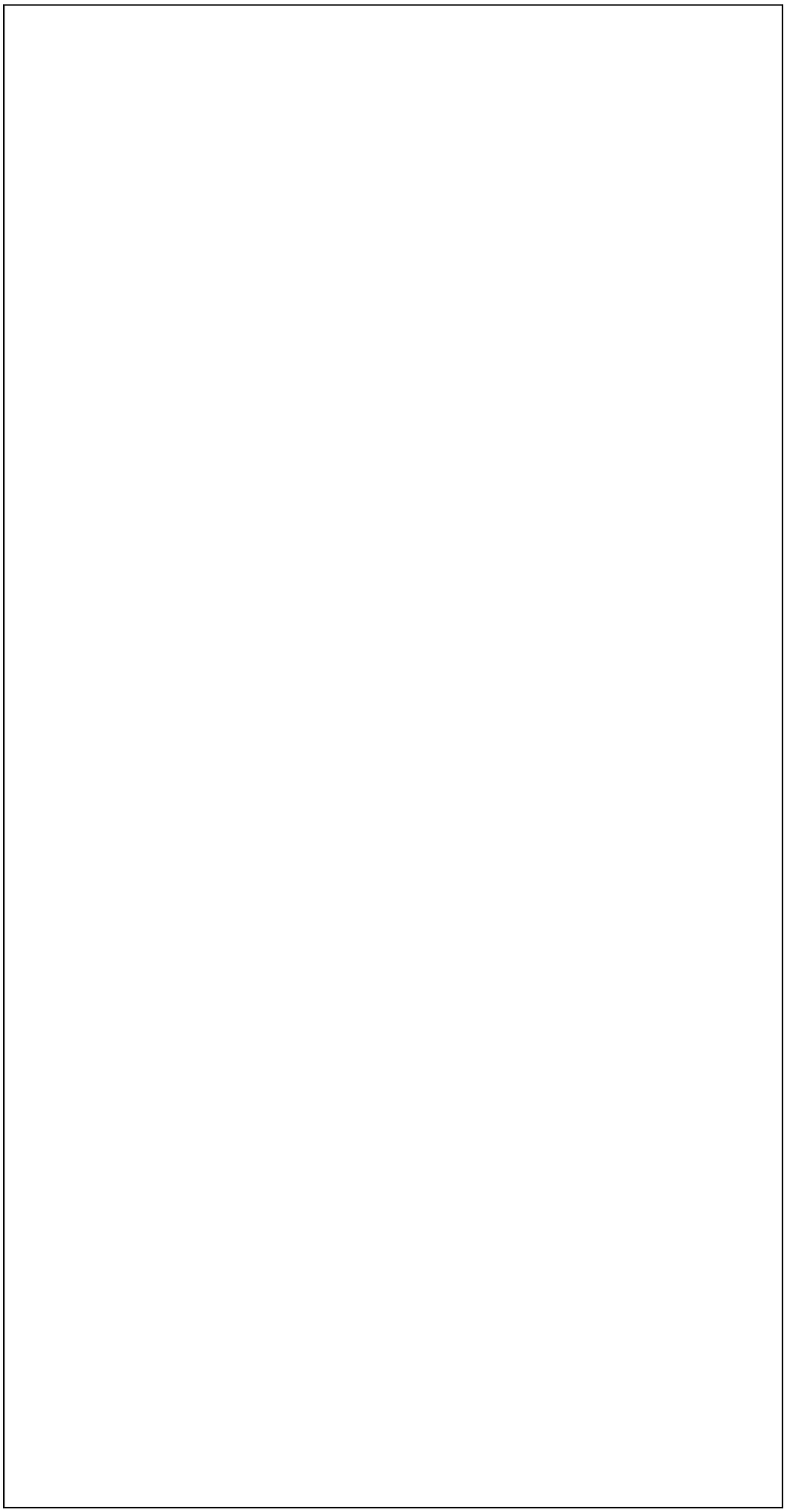


Figure 1.2-23c Radwaste Building at Elevation 12300 mm

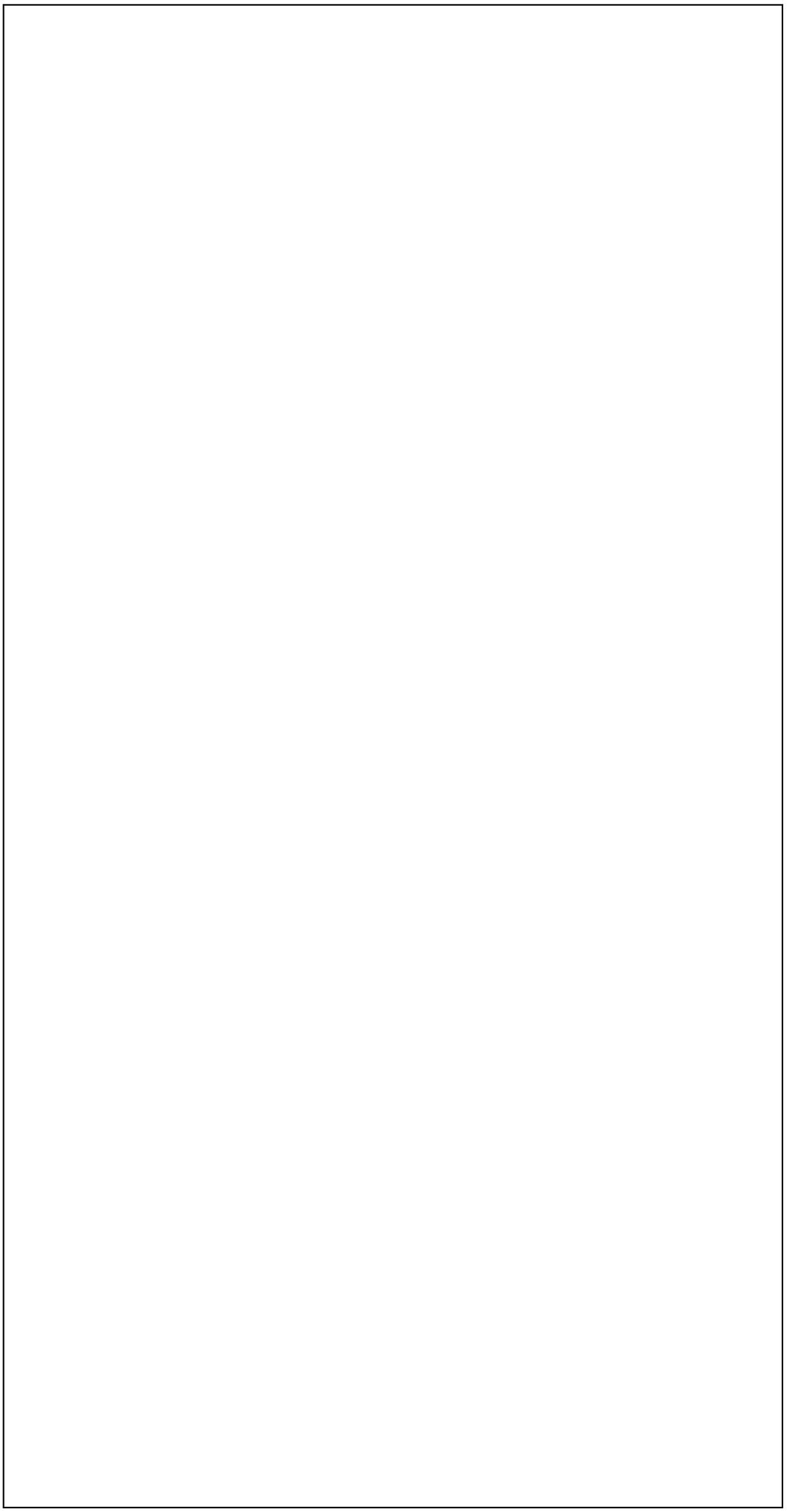


Figure 1.2-23d Radwaste Building at Elevation 21000 mm

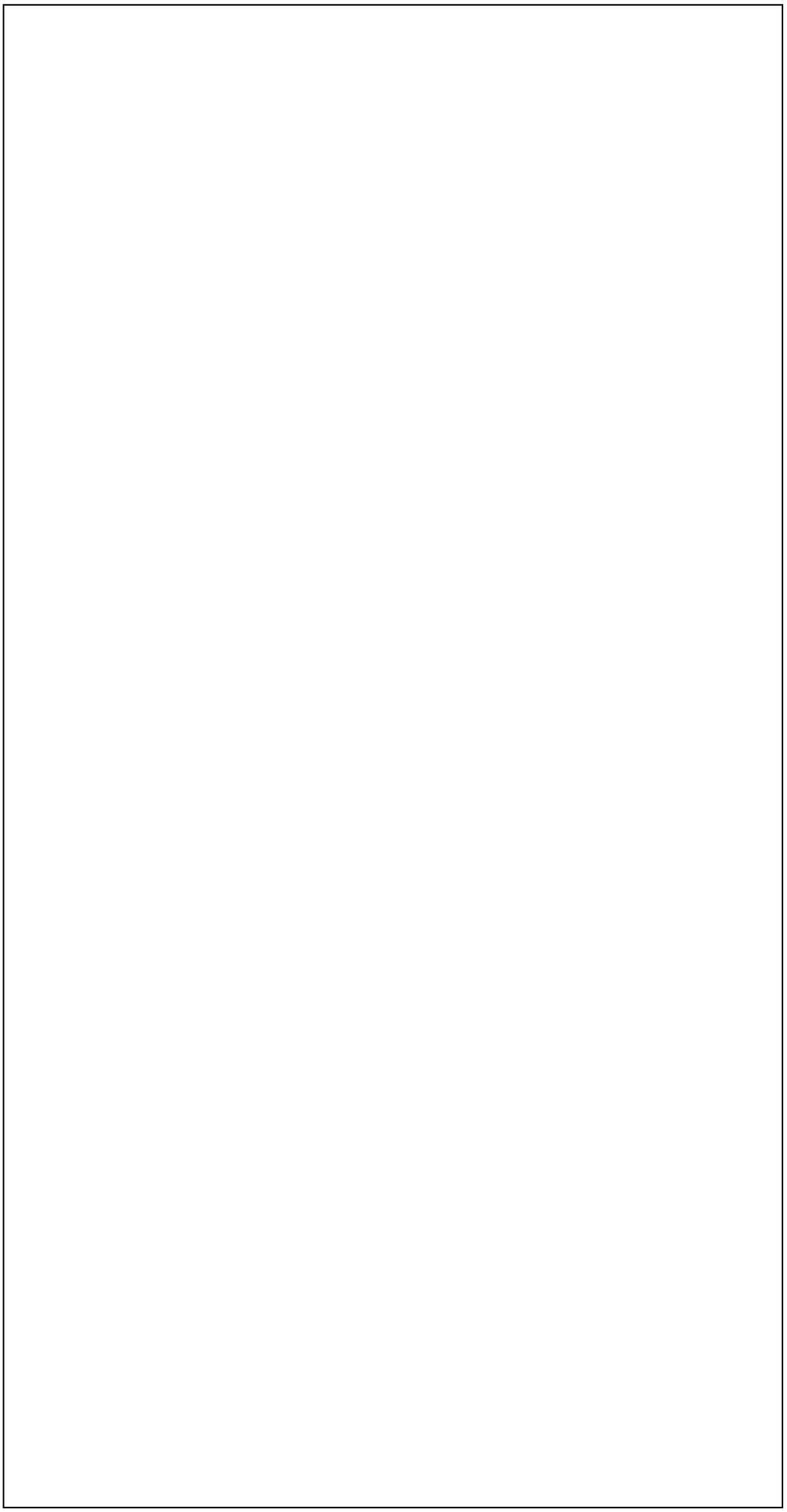


Figure 1.2-23e Radwaste Building, Section A-A

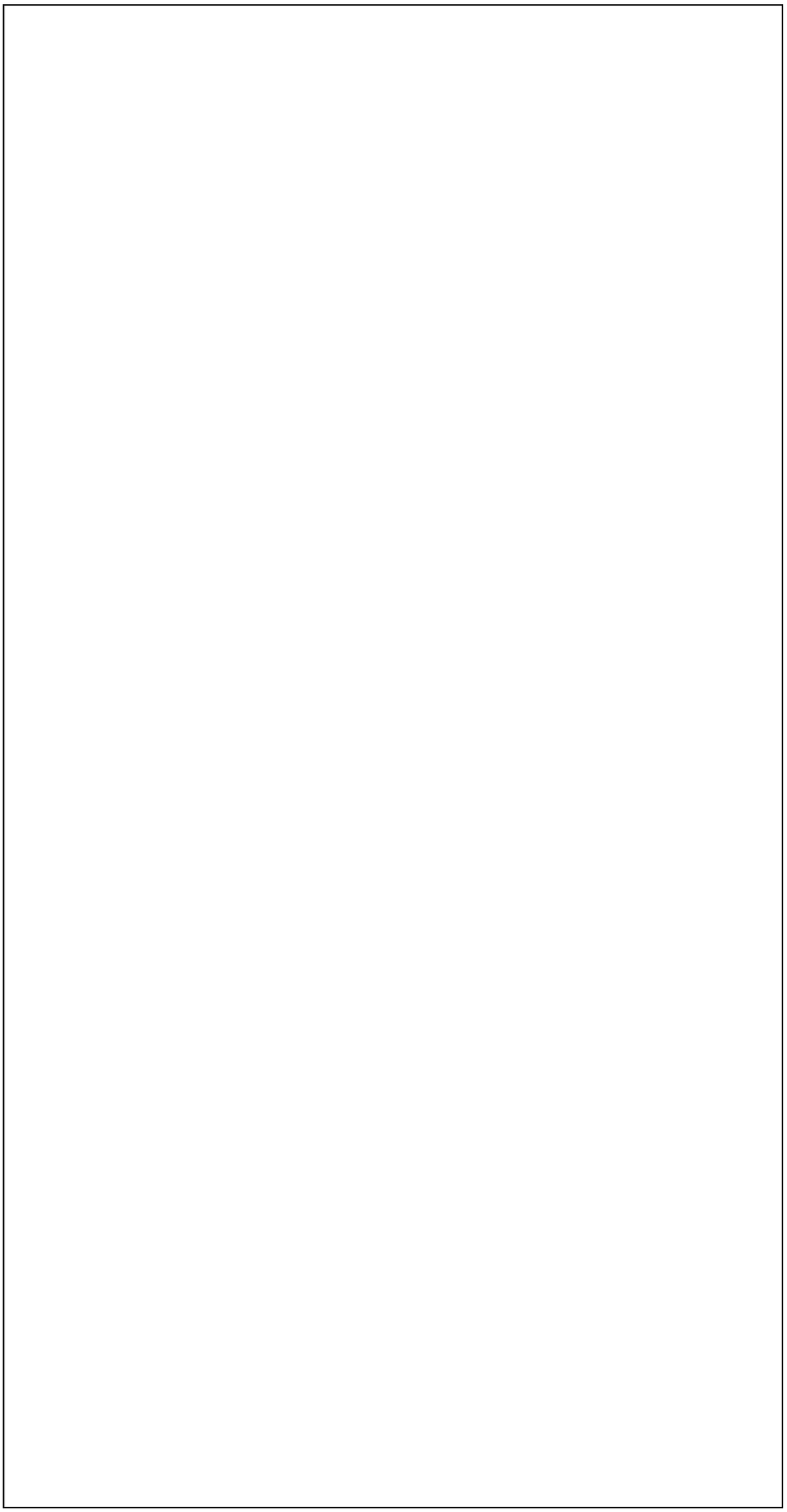


Figure 1.2-24 Turbine Building, General Arrangement at Elevation 5300 mm

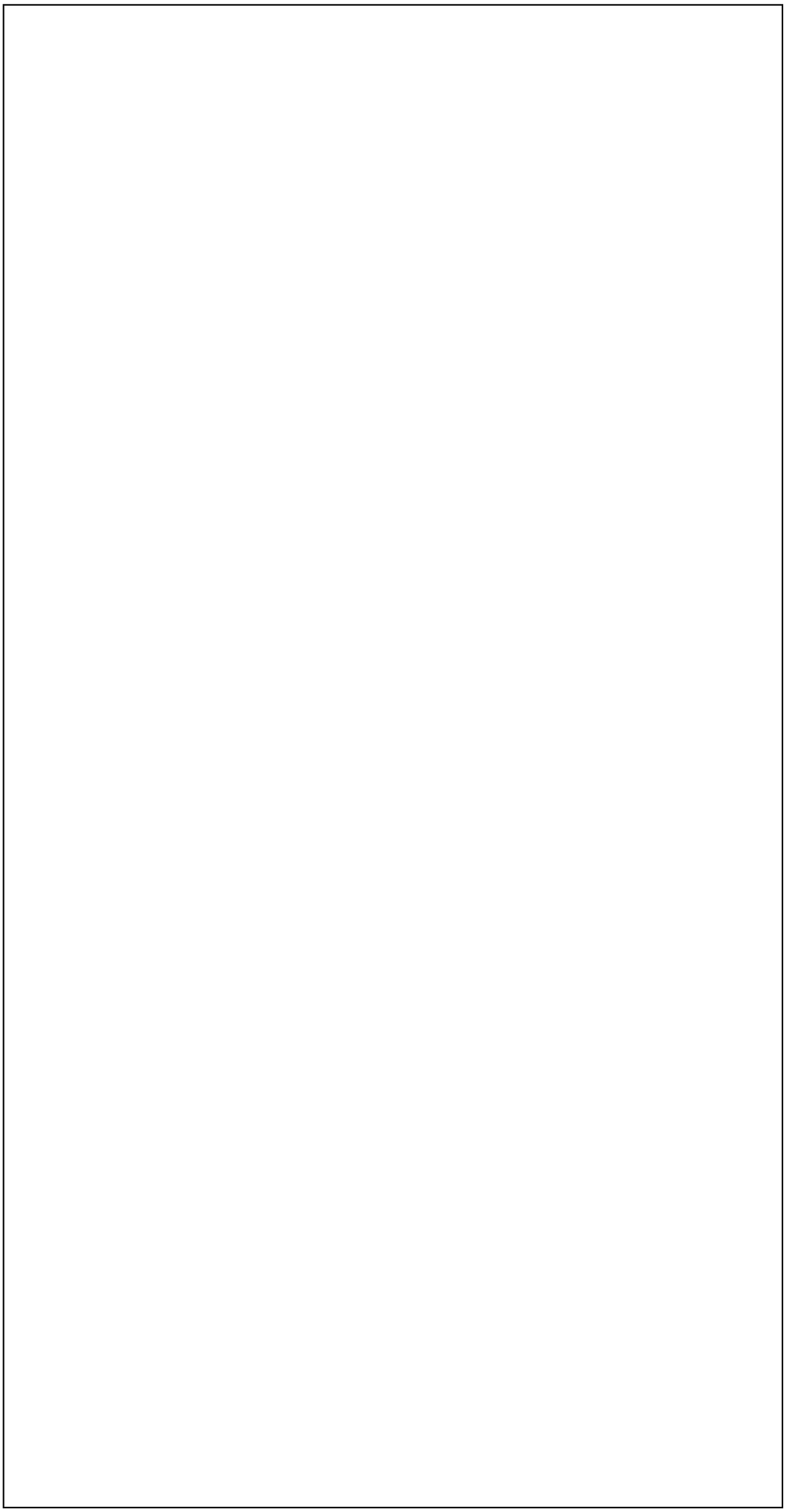


Figure 1.2-25 Turbine Building, General Arrangement at Elevation 12300 mm

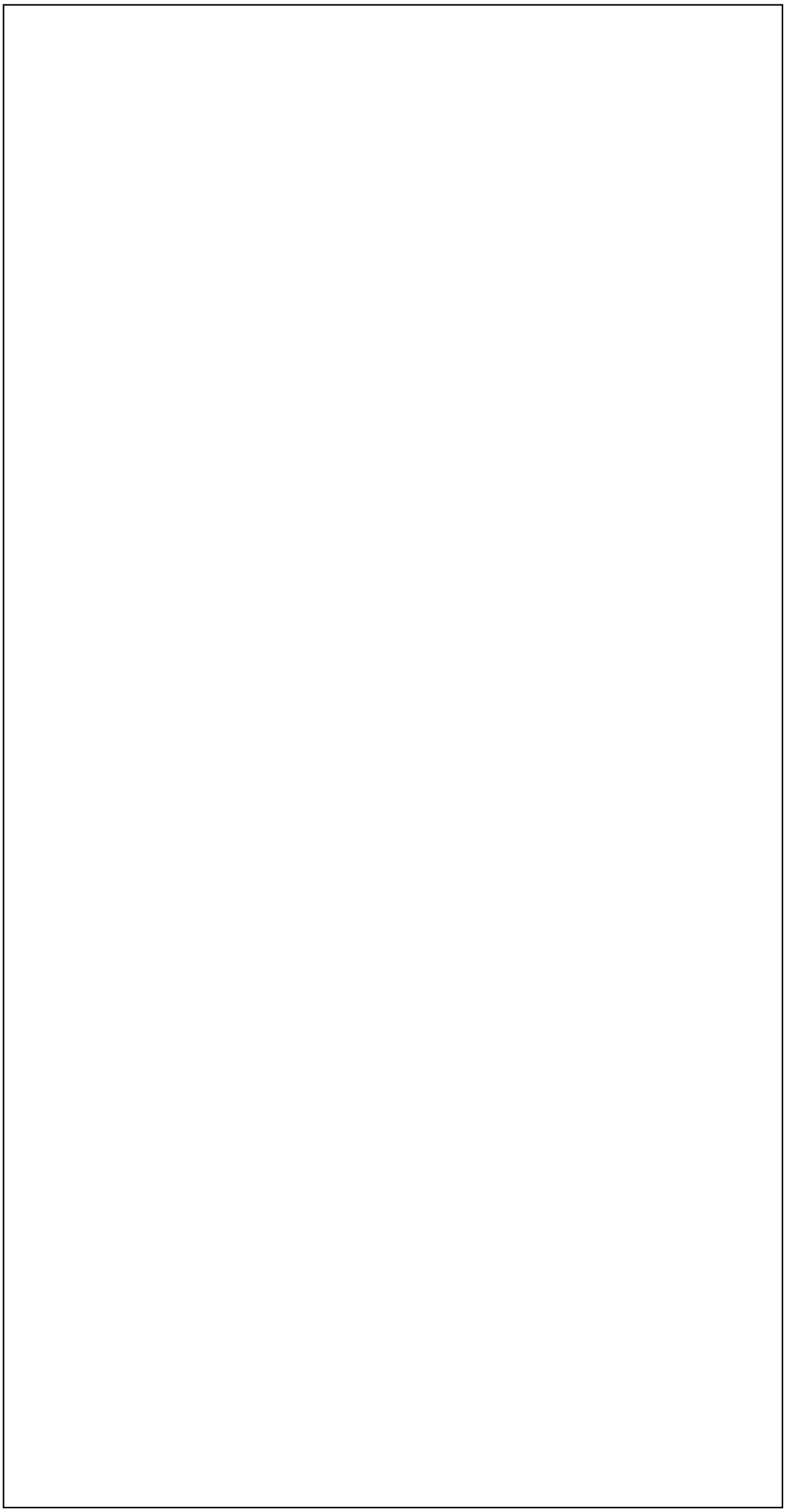


Figure 1.2-26 Turbine Building, General Arrangement at Elevation 20300 mm

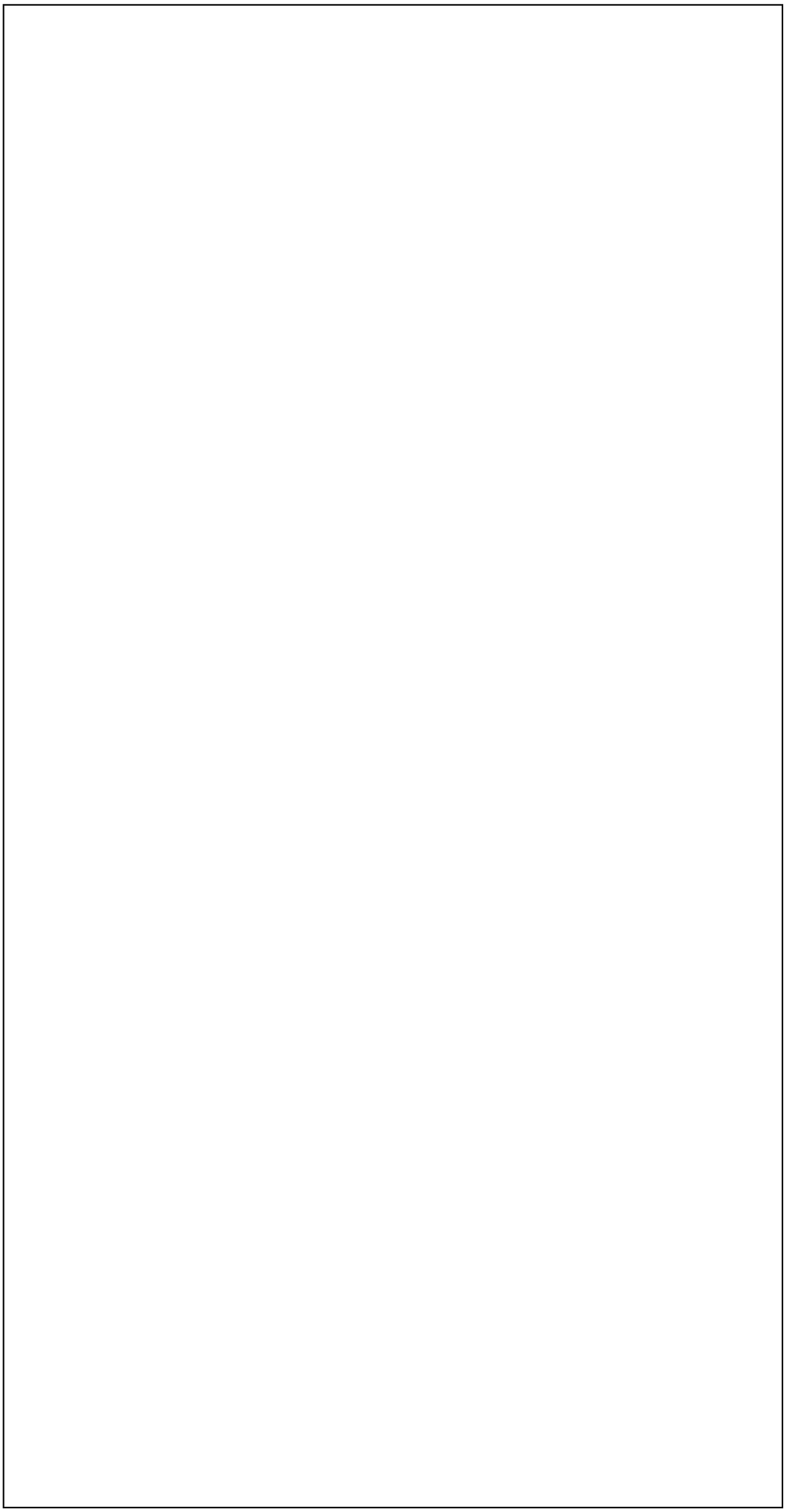


Figure 1.2-27 Turbine Building, General Arrangement at Elevation 30300 mm

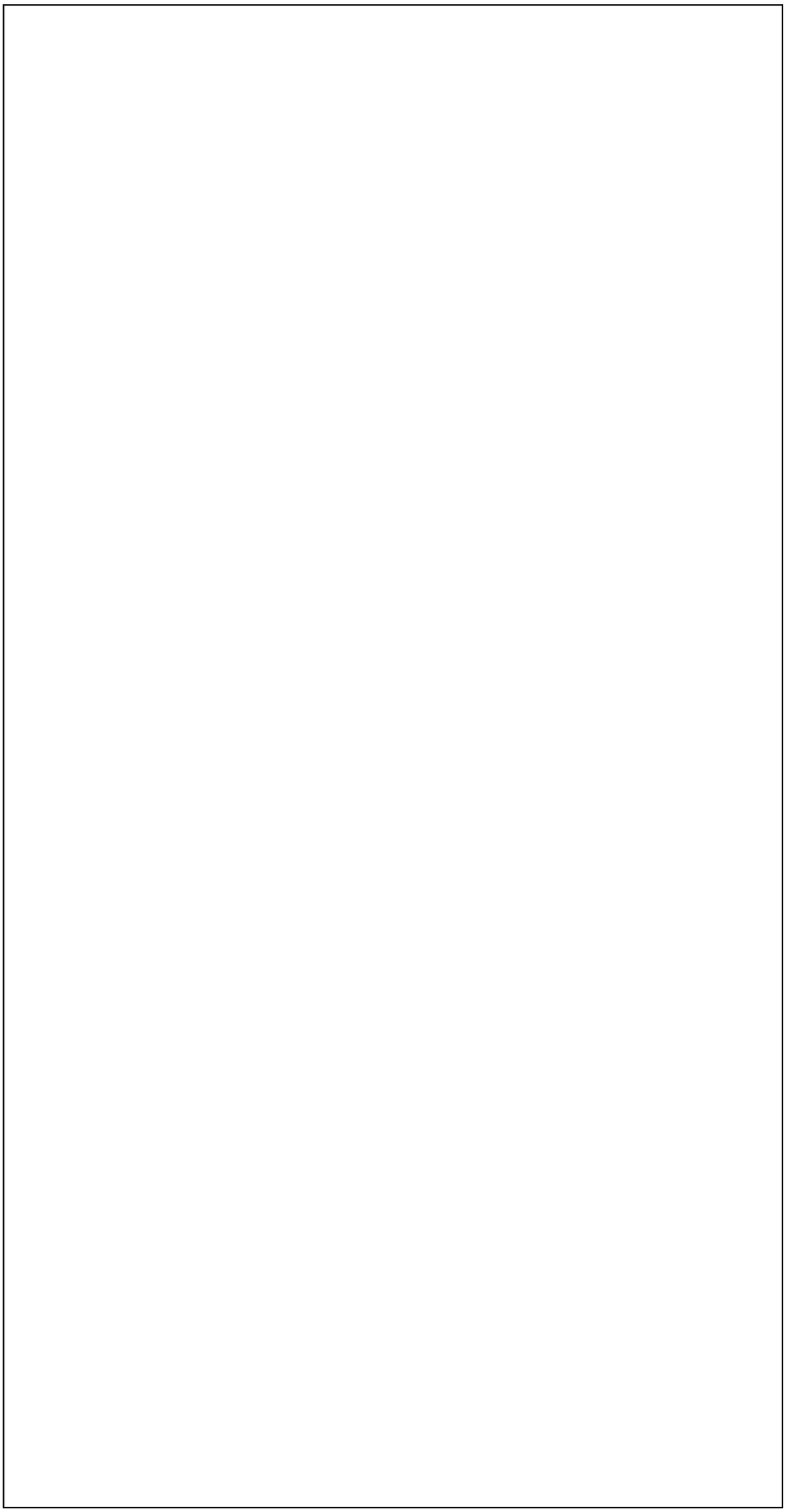


Figure 1.2-28 Turbine Building, General Arrangement, Longitudinal Section A-A

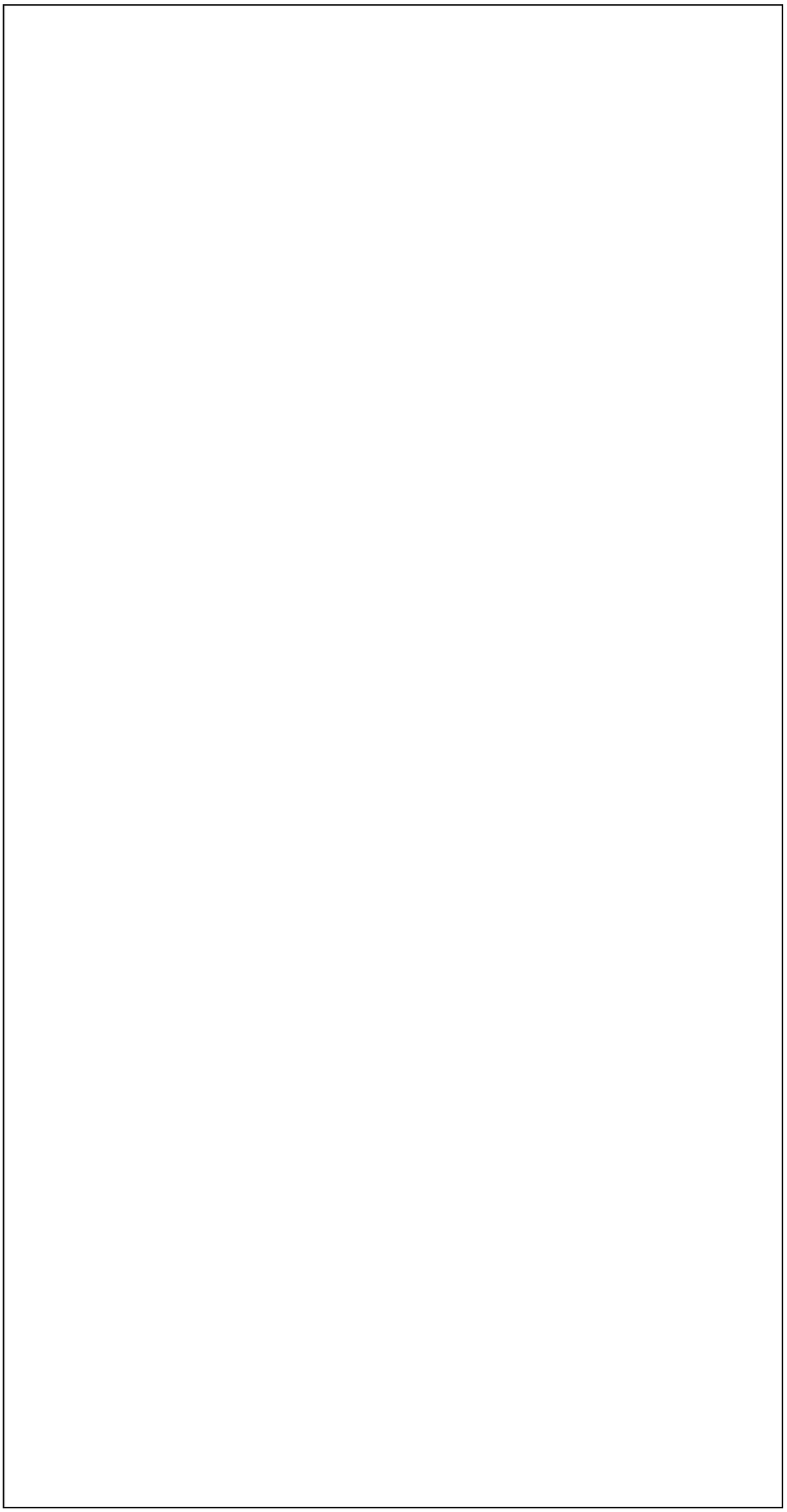


Figure 1.2-29 Turbine Building, General Arrangement, Section B-B

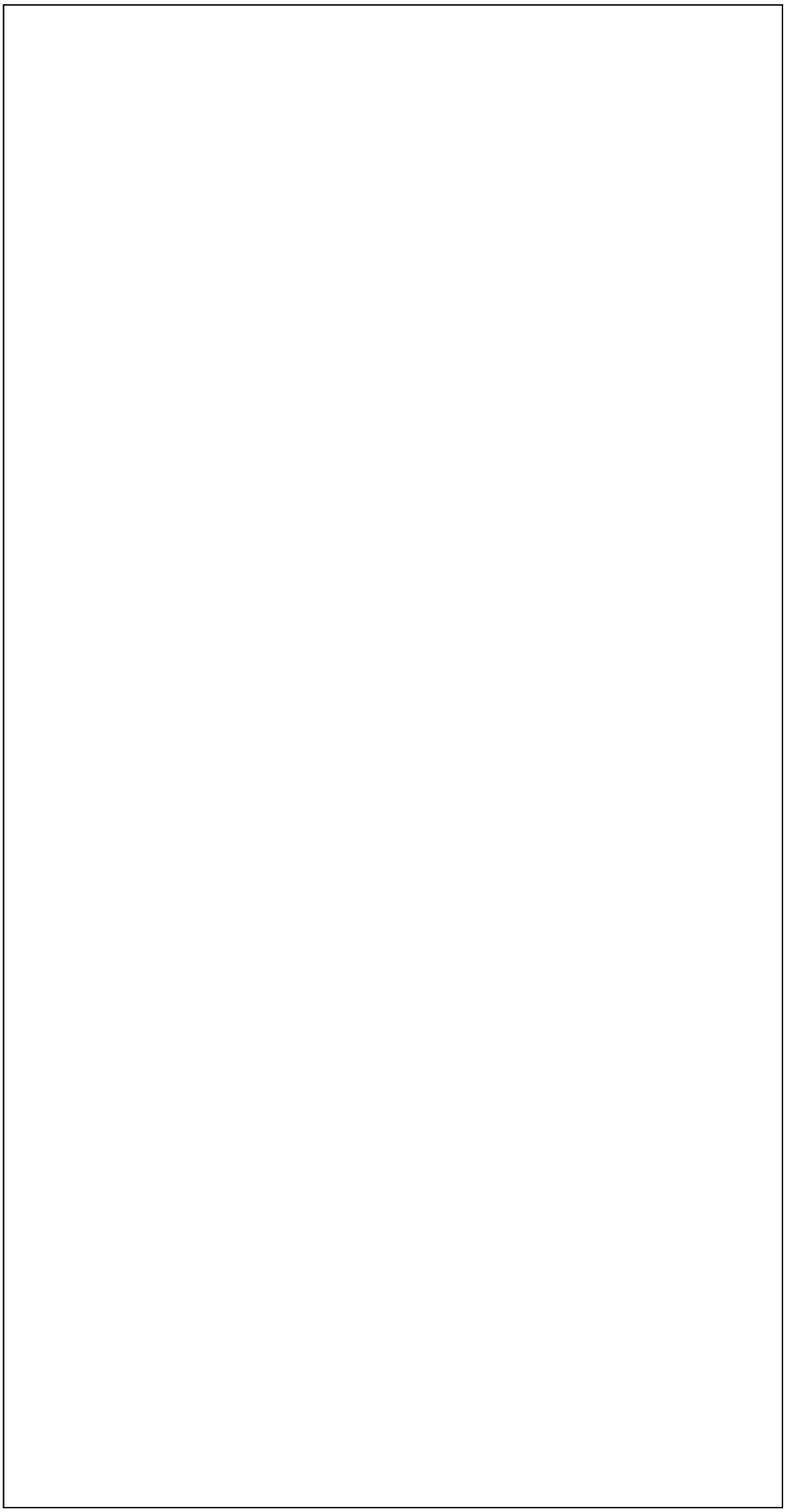


Figure 1.2-30 Turbine Building, General Arrangement, Section C-C

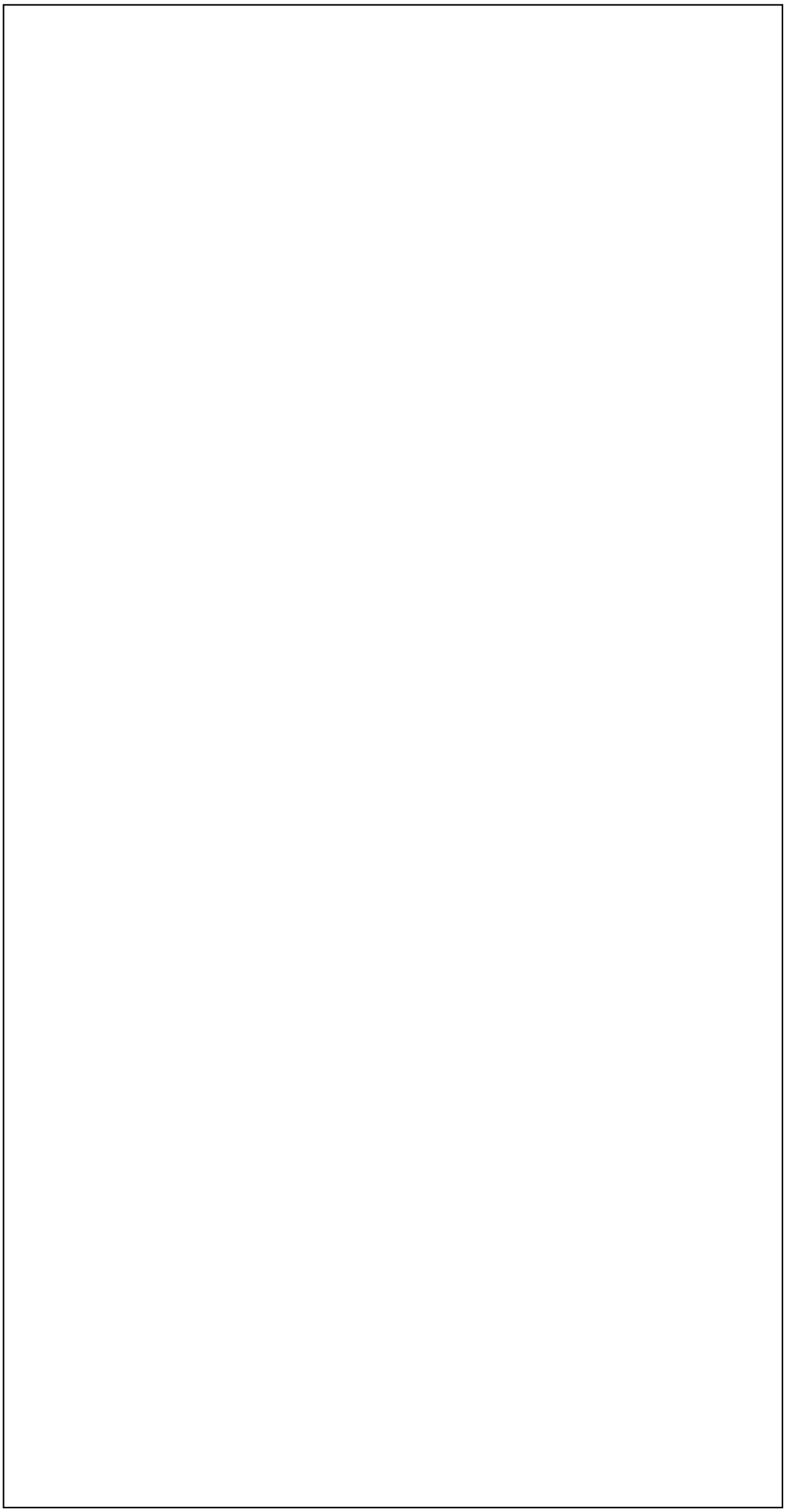


Figure 1.2-31 Turbine Building, General Arrangement, Section D-D

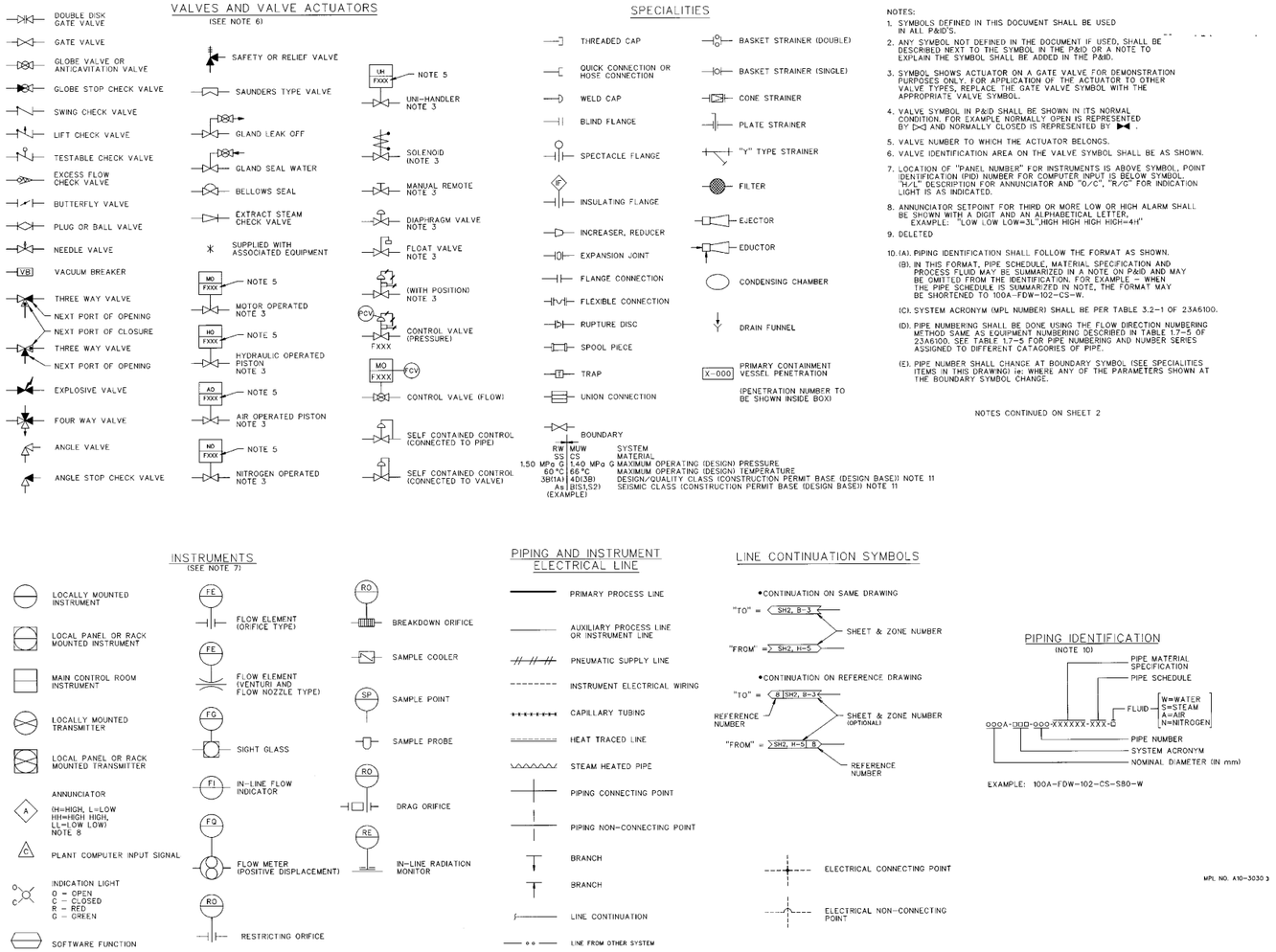


Figure 1.7-1 Piping and Instrumentation Diagram Symbols (Sheet 1 of 2)

TABLE 1: INSTRUMENT LEGENDS

MEASURED VARIABLE / FUNCTION		AMPLIFIER	CONTROLLER	FUNCTION GENERATOR	PRIMARY ELEMENT	INDICATOR	INDICATING CONTROLLER	INDICATING RECORDER	INDICATING SWITCH	INTEGRATOR	RECORDER	RECORDER SWITCH	SAMPLER	SIGHT GLASS	SWITCH	TEST POINT	TRANSMITTER	TELEMETER
		AM	C	F	E	I	IC	IR	IS	Q	R	RS	SM	G	S	X	T	TL
CONCENTRATION	CN				CNE	CNI					SXR				SXS		SXT	
CASING ELONGATION	SX				SXE	SXI					SXR				SXS		SXT	
DENSITY	D		DC		DE	DI			DIS		DR	DRS			DS	DX	DT	
DEW POINT	DW				DWE	DWI					DWR				DWS		DWT	
DIFFERENTIAL ELONGATION	DX	DXAM			DXE	DXI					DXR				DXS		DXT	
DIFFERENTIAL FLOW	DF					DFI			DFIS		DFR	DFRS			DFS		DFT	
DIFFERENTIAL PRESSURE	DP		DPC			DPI			DPIS		DPR	DPRS			DPS	DPX	DPT	
DIFFERENTIAL TEMPERATURE	DT		DTC			DTI			DTIS		DTR	DTRS			DTS		DTT	
ECCENTRICITY	E	EAM			EE	EI					ER						ET	
ELECTRICAL CONDUCTIVITY	C				CE	CI			CIS		CR		CSM		CS	CX	CT	
ELECTRICAL CURRENT	A					AI					AR						AT	ATL
ELECTRICAL FREQUENCY	HZ					HZI					HZR						HZT	HZTL
ELECTRICAL POWER	W					WI					WR						WT	WTL
ELECTRICAL POTENTIAL	V					VI					VR						VT	VTL
FLOW	F		FC	FF	FE	FI	FIC	FIR	FIS	FQ	FR	FRS		FG	FS	FX	FT	
HYDROGEN	H2				H2E	H2I		H2IR	H2IS		H2R	H2RS	H2SM		H2S		H2T	
HUMIDITY	M				ME	MI					MR						MT	
HYDROGEN ION DENSITY	PH	PHAM	PHC		PHE	PHI					PHR		PHSM			PHX		
LEVEL	L		LC		LE	LI			LIS		LR	LRS		LG	LS	LX	LT	
NEUTRON FLUX	N	NAM	NC		NE	NI				NQ	NR					NX	NT	
OXYGEN	O2		O2C		O2E	O2I		O2IR	O2IS		O2R	O2RS			O2S			
PRESSURE	P		PC		PE	PI			PIS		PR	PRS			PS	PX	PT	
POSITION	PO		POC		POE	POI			POIS		POR	PORS			POS		POT	
RADIATION	R				RE	RI			RIS	RQ	RR	RRS	RSM		RS	RX	RT	
REDUCTION OXIDATION POTENIAL DIFF	RO				ROE					ROQ	ROR				ROS		ROT	
SPEED OR ROTATION FREQUENCY	S	SAM	SC		SE	SI					SR				SS		ST	
SIGNAL MONITOR	OS														OSS			
SMOKE	SM				SME	SMI									SMS		SMT	
TEMPERATURE	T		TC		TE	TI			TIS		TR	TRS			TS	TX	TT	
TIME	TM		TMC			TMI			TMIS	TMQ		TMRS						
TORQUE	TQ				TQE						TQR				TQS		TQT	
TURBIDITY	TU				TUE	TUI					TUR				TUS		TUT	
VIBRATION	VB		VBC		VBE	VBI			VBIS		VBR				VBS		VBT	
VIBRATION PHASE ANGLE	PA				PAE	PAI					PAR						PAT	
VOLT-AMPERE REACTIVE POWER HOUR	QH					QHI					QHR						QHT	QHTL
VOLT-AMPERE REACTIVE POWER	Q					QI					QR						QT	QTL
WATT-HOUR	WH					WHI					WHR						WHT	WHTL
WEIGHT	WF		WFC		WFE	WFI					WFR				WFS			

ABBREVIATIONS

MATERIAL

CS – CARBON STEEL
SS – STAINLESS STEEL

SERVICE SUPPLY SOURCES

A/S – AIR SUPPLY
E/S – ELECTRICAL POWER SUPPLY
N_2/S– NITROGEN SUPPLY

FAILURE CONDITION

FAI – FAIL AS–IS
FO – OPEN ON AIR OR ELECTRICAL FAILURE
FC – CLOSE ON AIR OR ELECTRICAL FAILURE

VALVE CONDITION

LO – LOCKED OPEN
LC – LOCKED CLOSED
NO – NORMALLY OPEN
NC – NORMALLY CLOSED
NE – NORMALLY ENERGIZED
ND – NORMALLY DE–ENERGIZED

MISCELLEOUS

AC – ALTERNATING CURRENT
DC – DIRECT CURRENT

DRAINS

LCW – LOW CONDUCTIVITY WASTE
HCW – HIGH CONDUCTIVITY WASTE
SD – STORM DRAIN
NSD – NON–RADIOACTIVE STORM DRAIN
HSD – HOT SHOWER DRAIN

CONTROL VALVES

FCV – FLOW CONTROL VALVE
PCV – PRESSURE CONTROL VALVE
LCV – LEVEL CONTROL VALVE
TCV – TEMPERATURE CONTROL VALVE

PRESSURE UNIT

MPa – megapascal

NOTES (CONT)

11. DESIGN AND SAFETY CLASSIFICATION CORRELATION

BOUNDARY SYMBOL		REFERENCE TABLE 3.2–2 OF 23A6100	
DESIGN CLASS	QUALITY CLASS	SAFETY DESIGNATION	QUALITY GROUP
1	A	SC–1	A
2	B	SC–2	B
3	A	SC–2	B
	B	SC–2	B
4	A	SC–2	B
	C	SC–3	C
	D	NNS	C
	F	NNS	–
5	B	SC–2	B
6	D	NNS	D
	F	NNS	–
7	C	NNS	–
	D	NNS	–
	F	NNS	–
	G	NNS	–

SEISMIC DESIGN CLASSIFICATION CORRELATION

BOUNDARY SYMBOL	REFERENCE TABLE 3.2–2 OF 23A6100
SEISMIC CLASS	SEISMIC CATEGORY
As	I
A	I
B	I
C	NSC

NNS – NON NUCLEAR SAFETY
NSC – NON SEISMIC CATEGORY I

Figure 1.7-1 Piping and Instrumentation Diagram Symbols (Sheet 2 of 2)

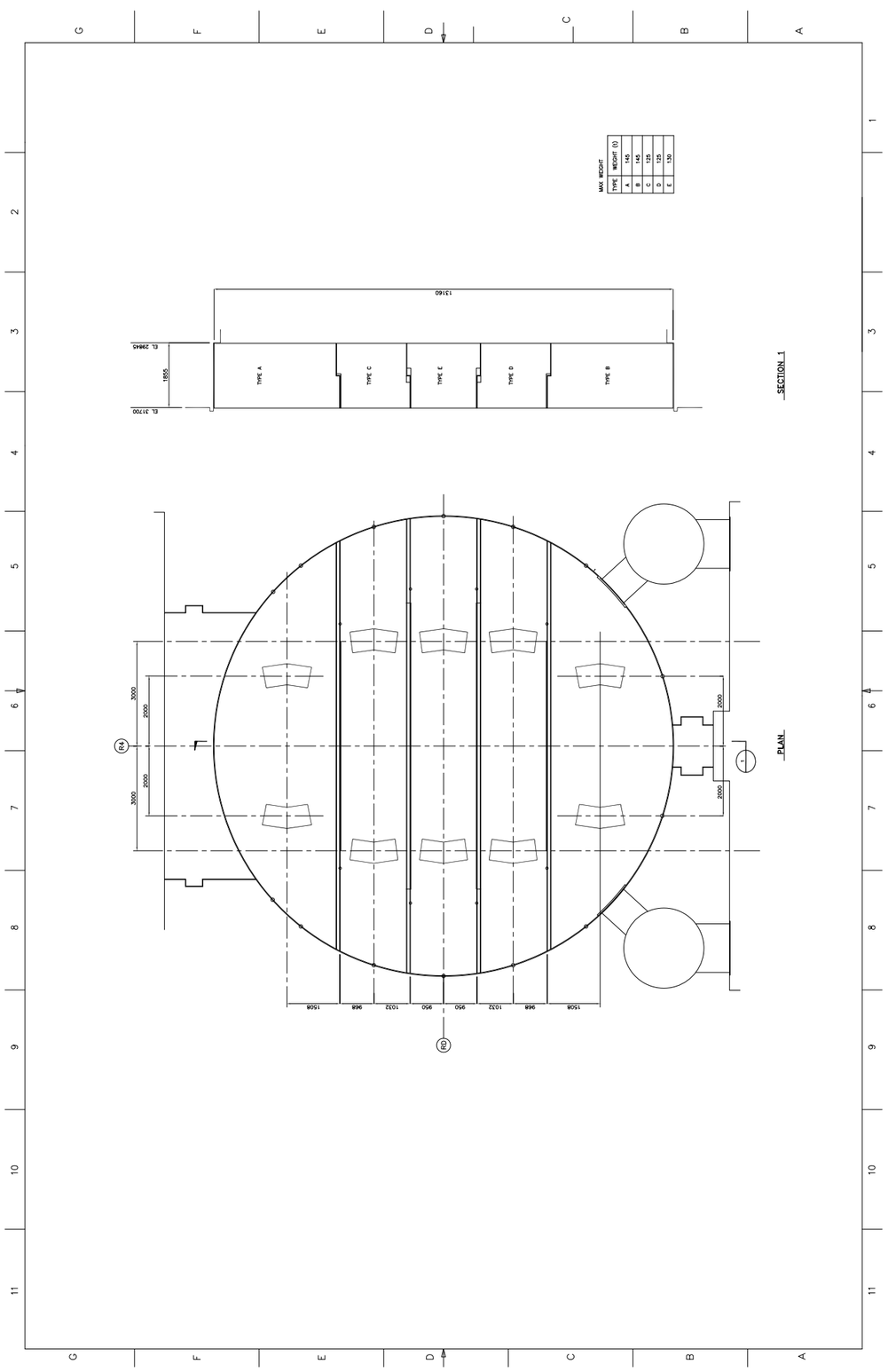


Figure 3H.1-23 Reactor Building Reactor Cavity Shield Blocks

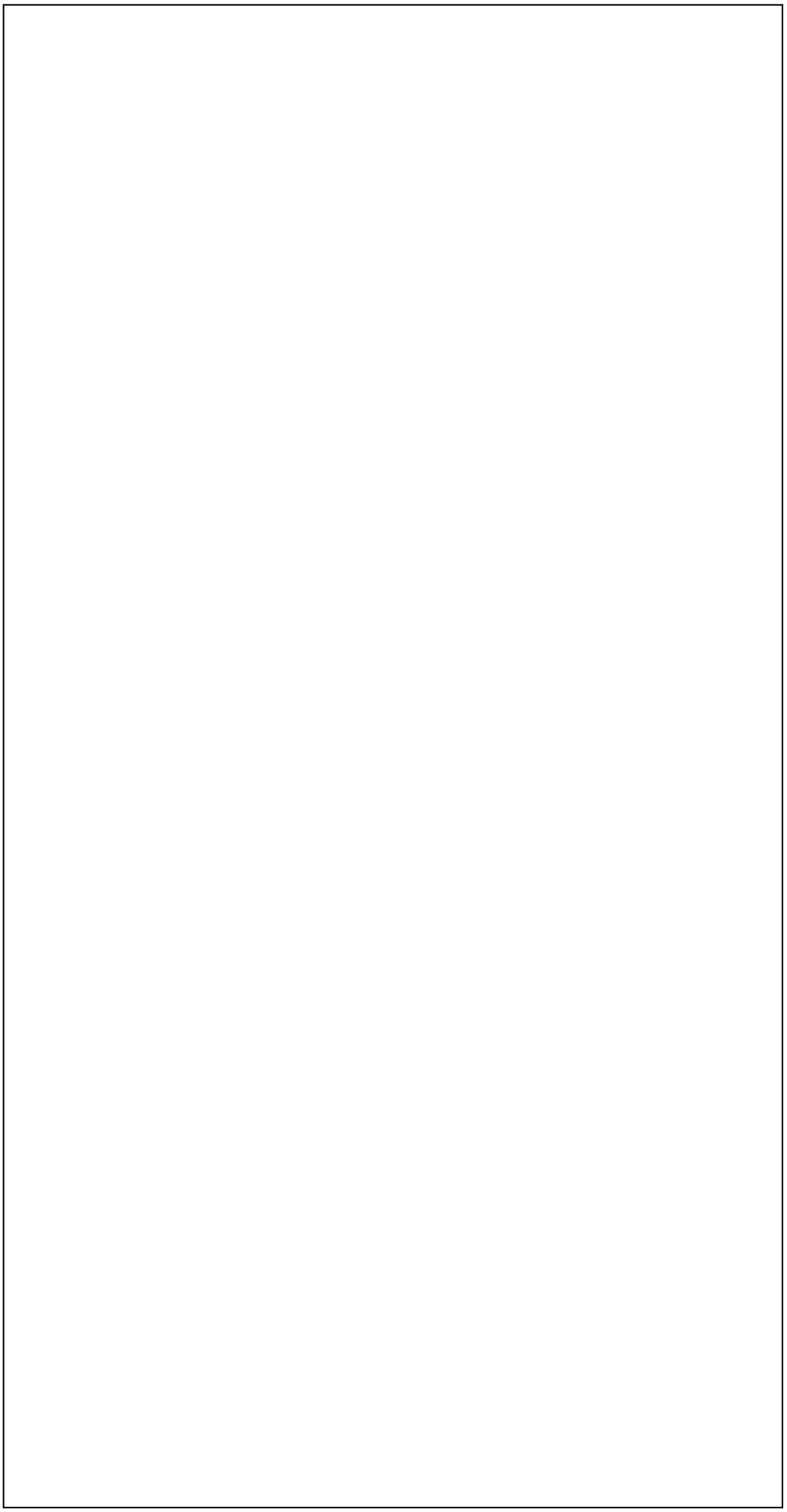


Figure 3H.1-28 Configuration of RPV Pedestal

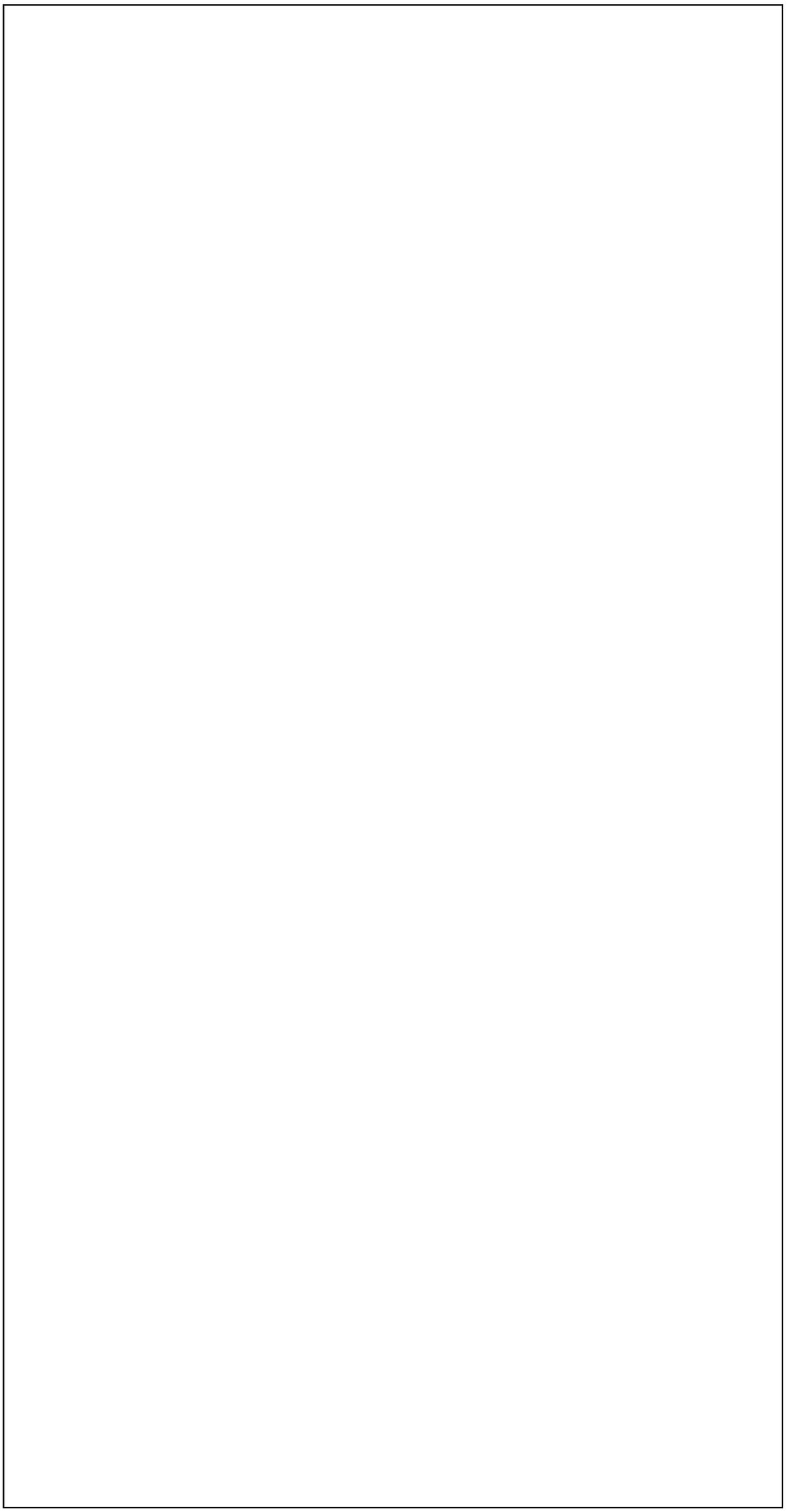


Figure 3H.1-29 Rebar Arrangement of F/P Girder and Slab (1/2)

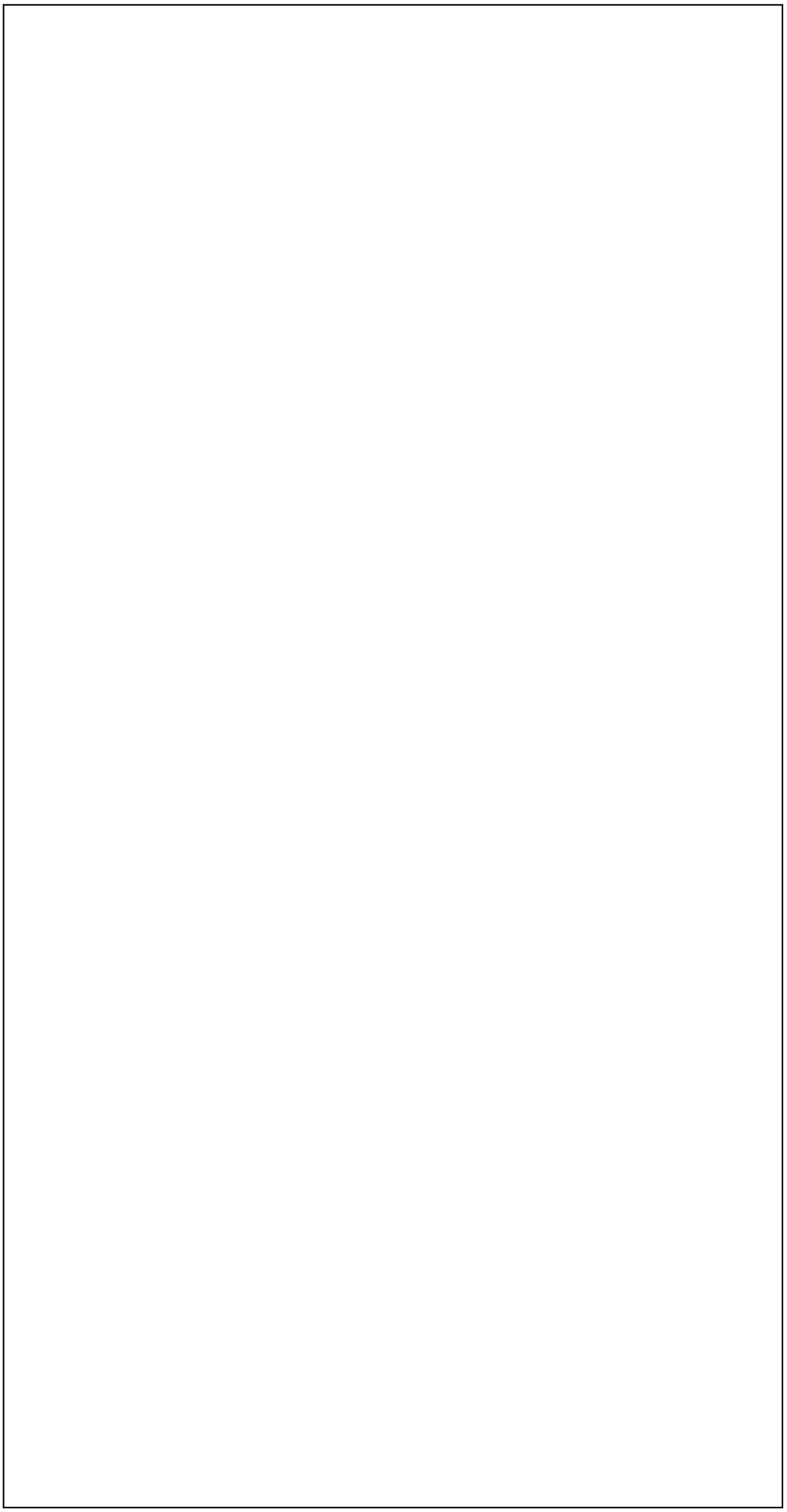


Figure 3H.1-30 Containment Structure Wall Reinforcement

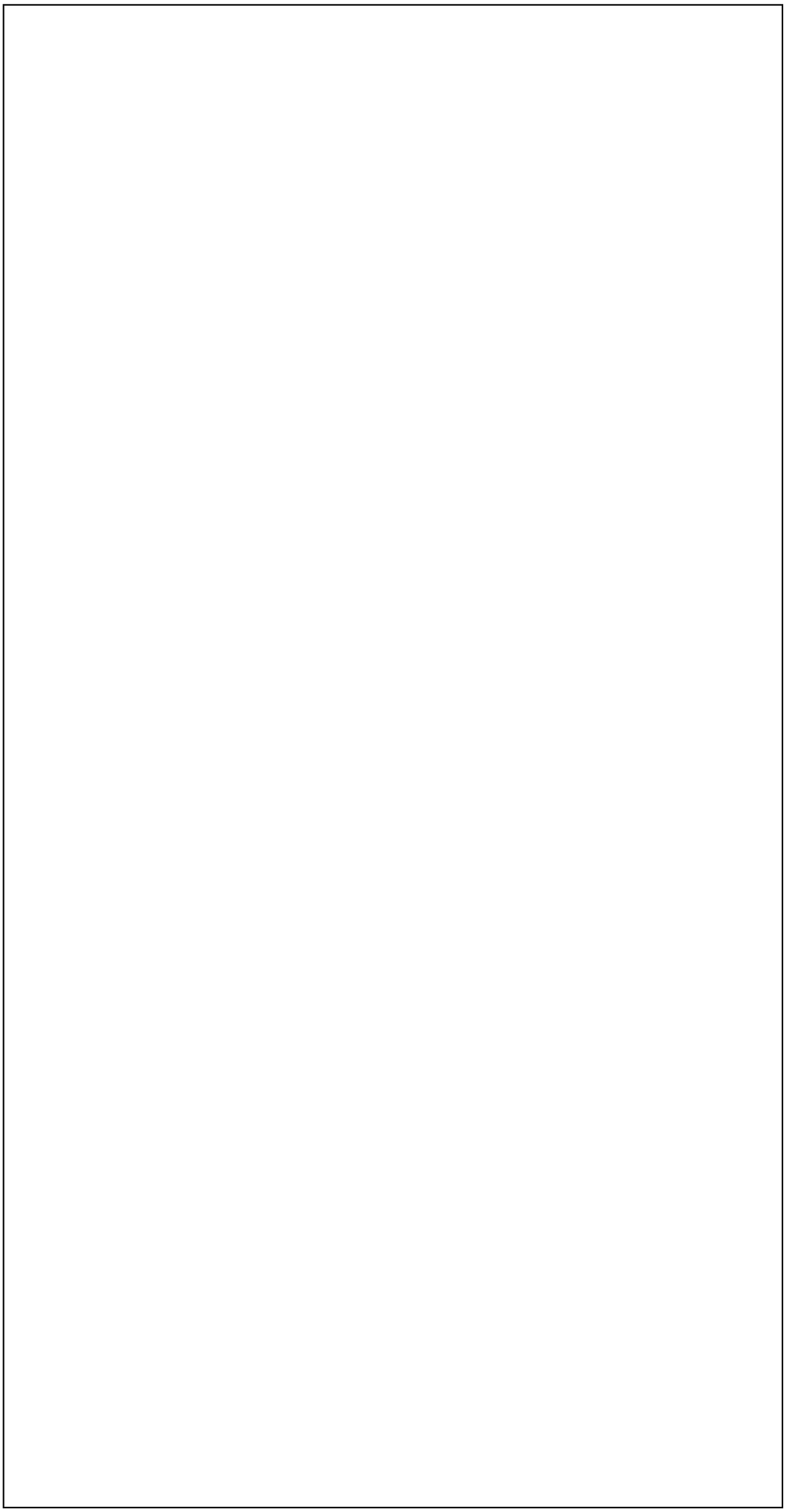


Figure 3H.1-31 Containment Structure Opening Reinforcement

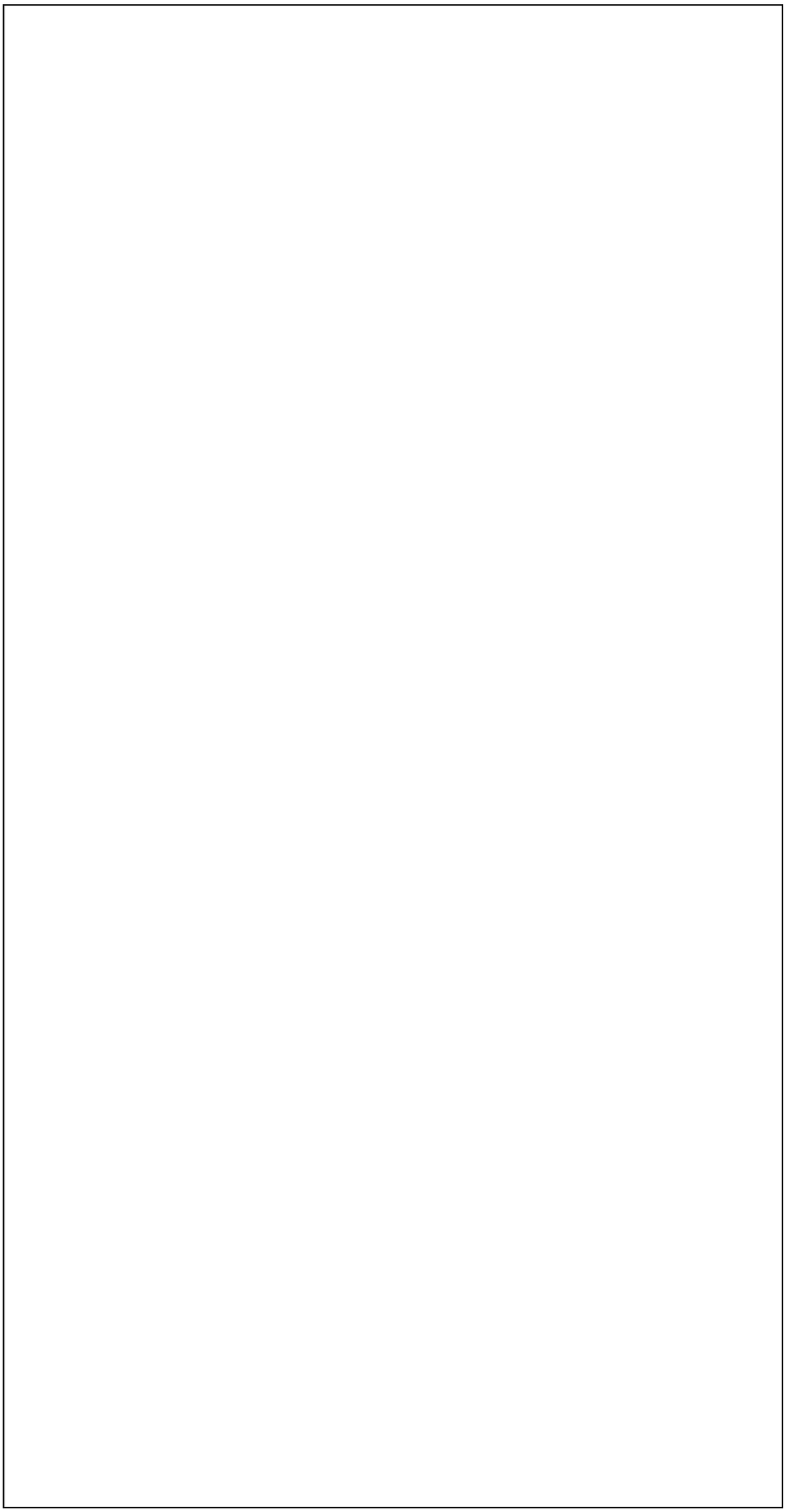


Figure 3H.1-32 Containment Structure Opening Reinforcement

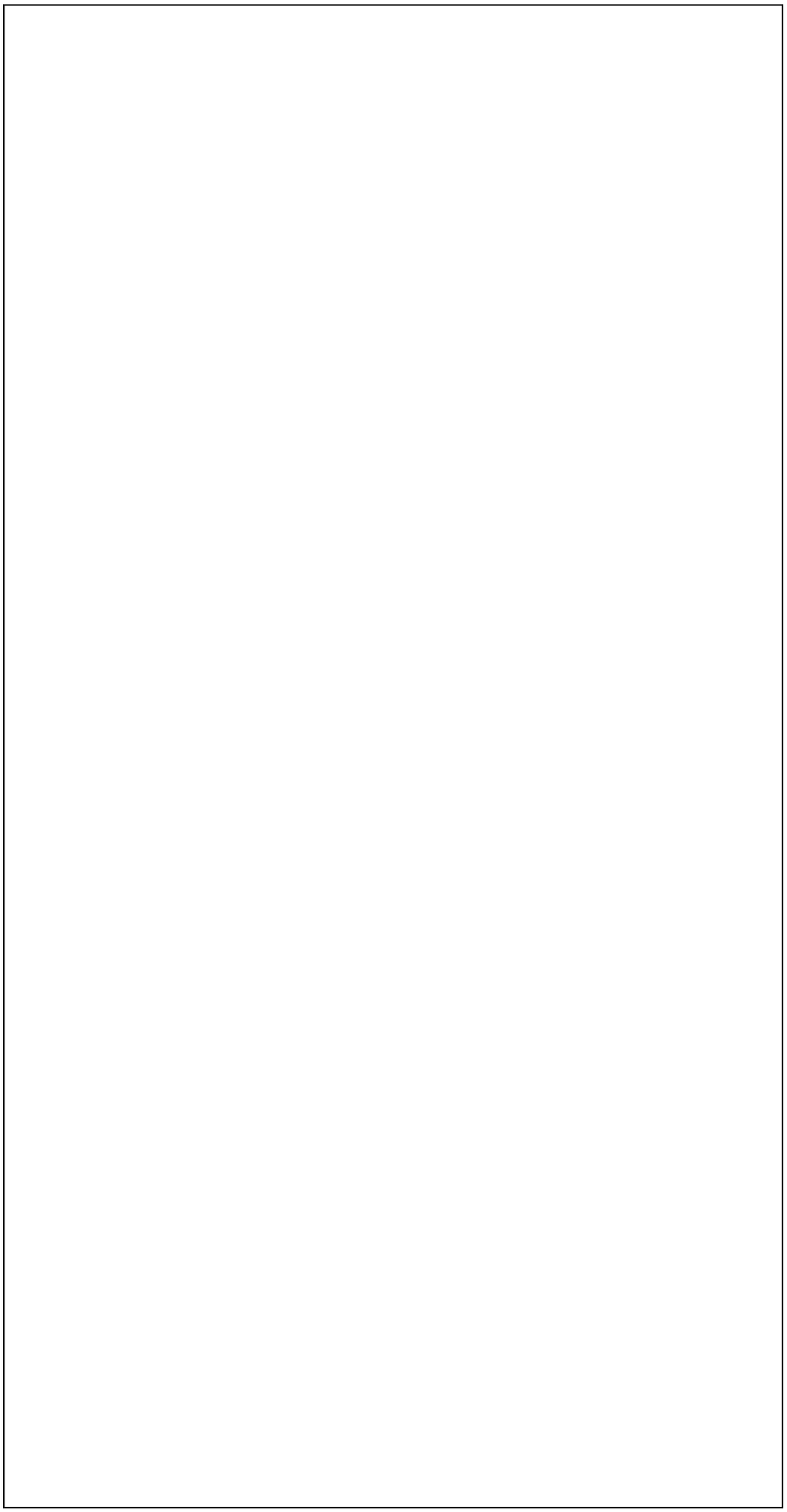


Figure 3H.1-33 Containment Structure Top Slab Reinforcement

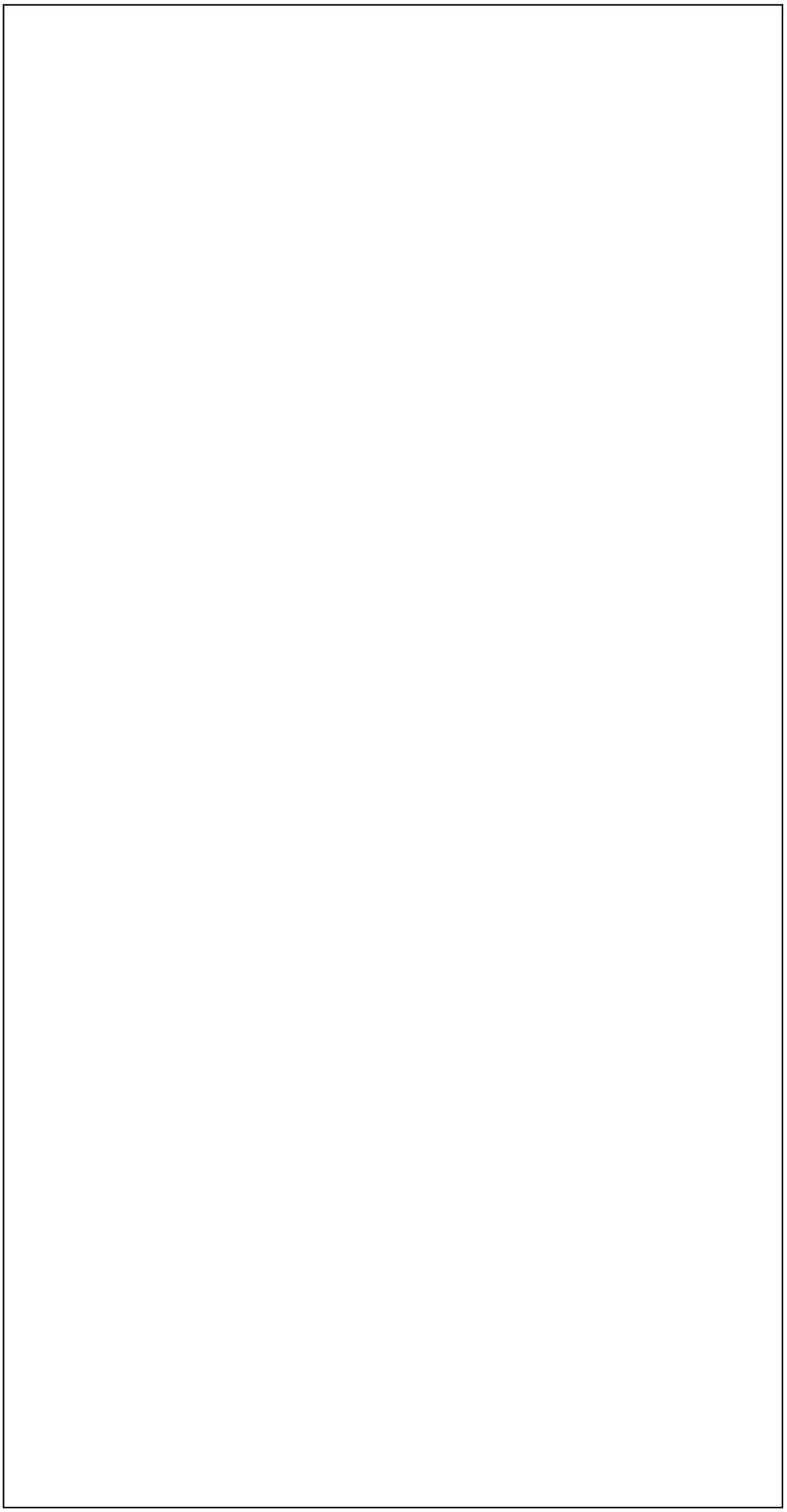


Figure 3H.1-34 Reactor Building Foundation Reinforcement (Sheet 1)

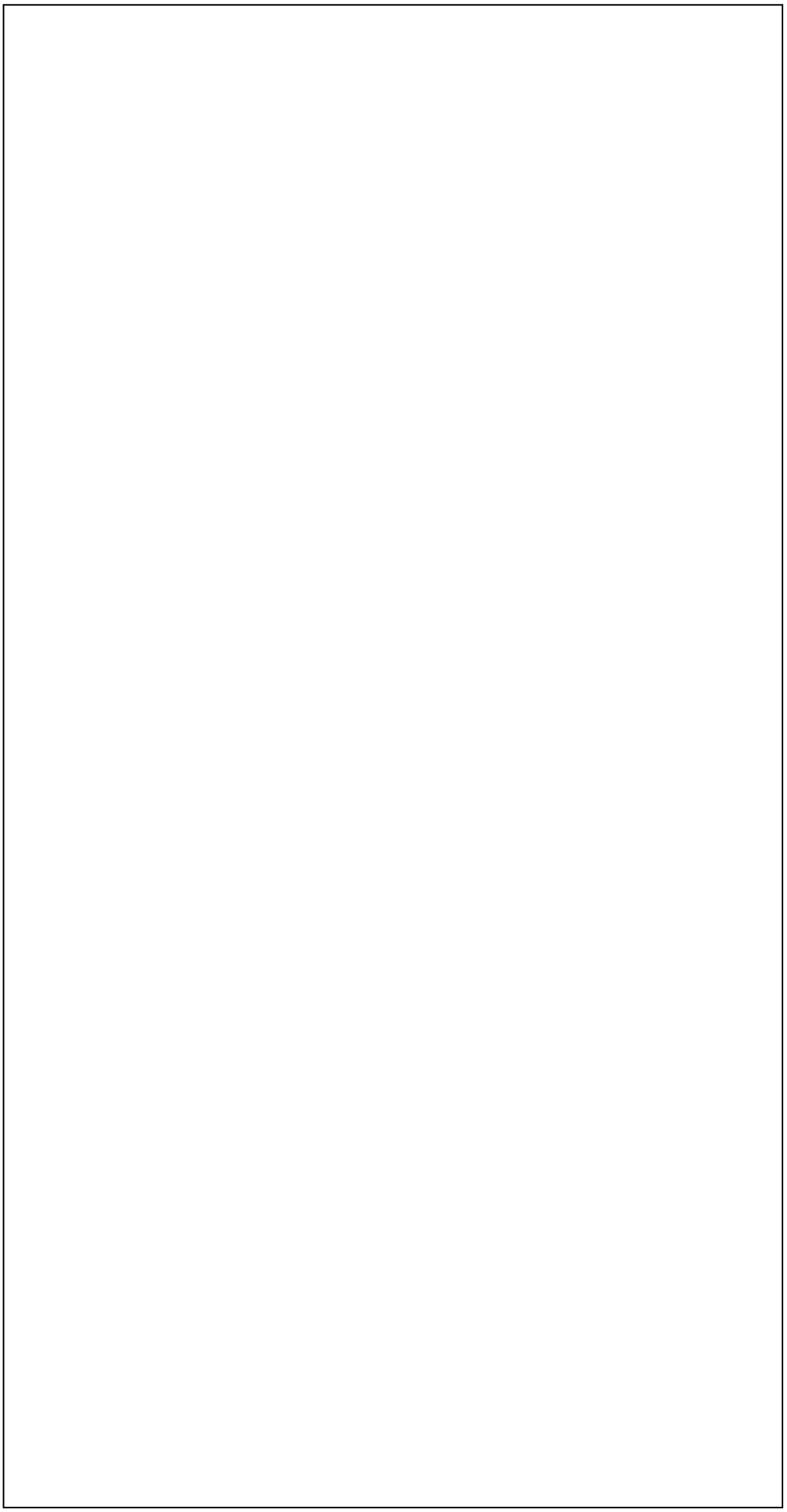


Figure 3H.1-35 Reactor Building Foundation Reinforcement (Sheet 2)

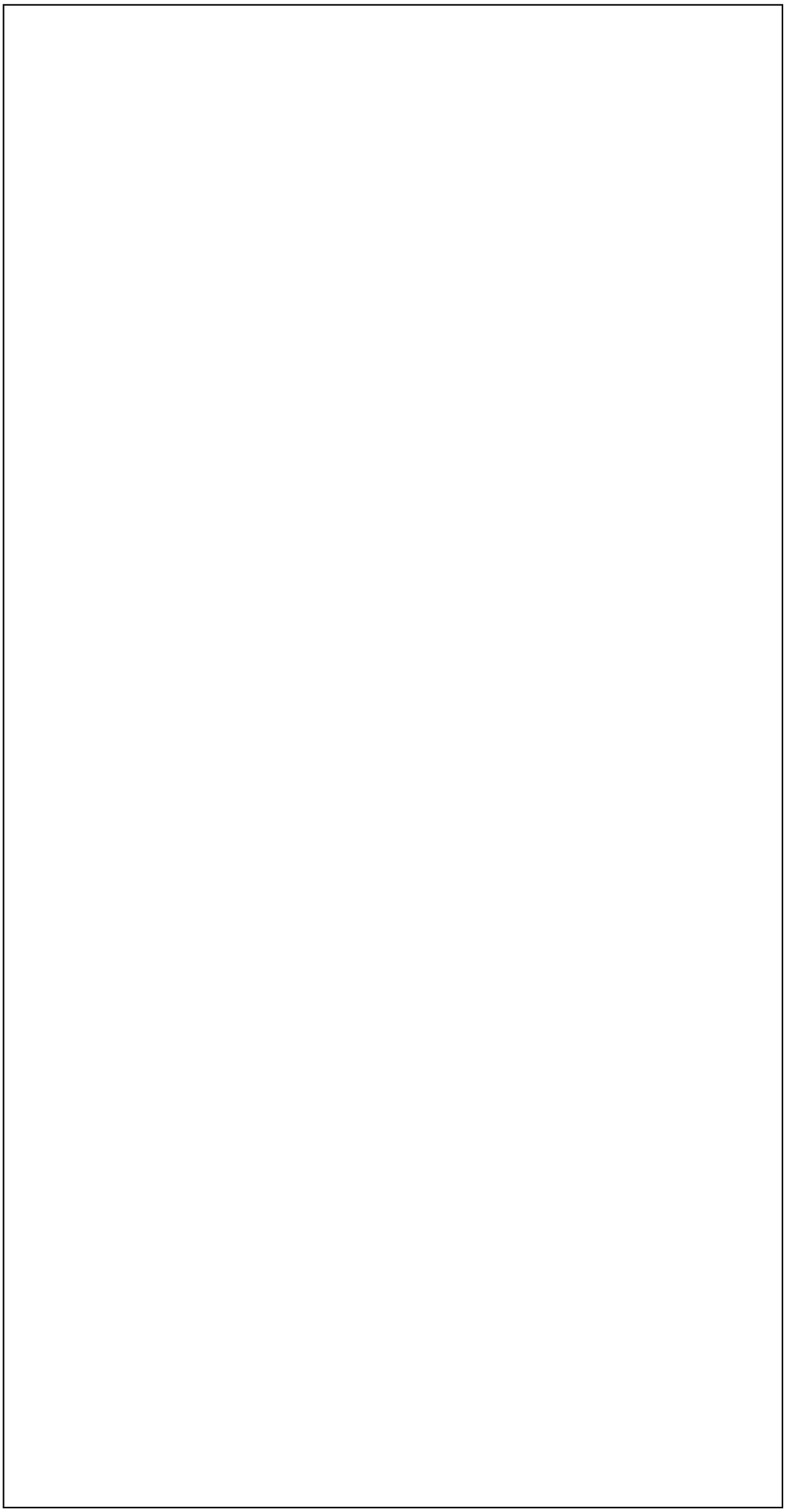


Figure 3H.1-36 Diaphragm Floor Reinforcement

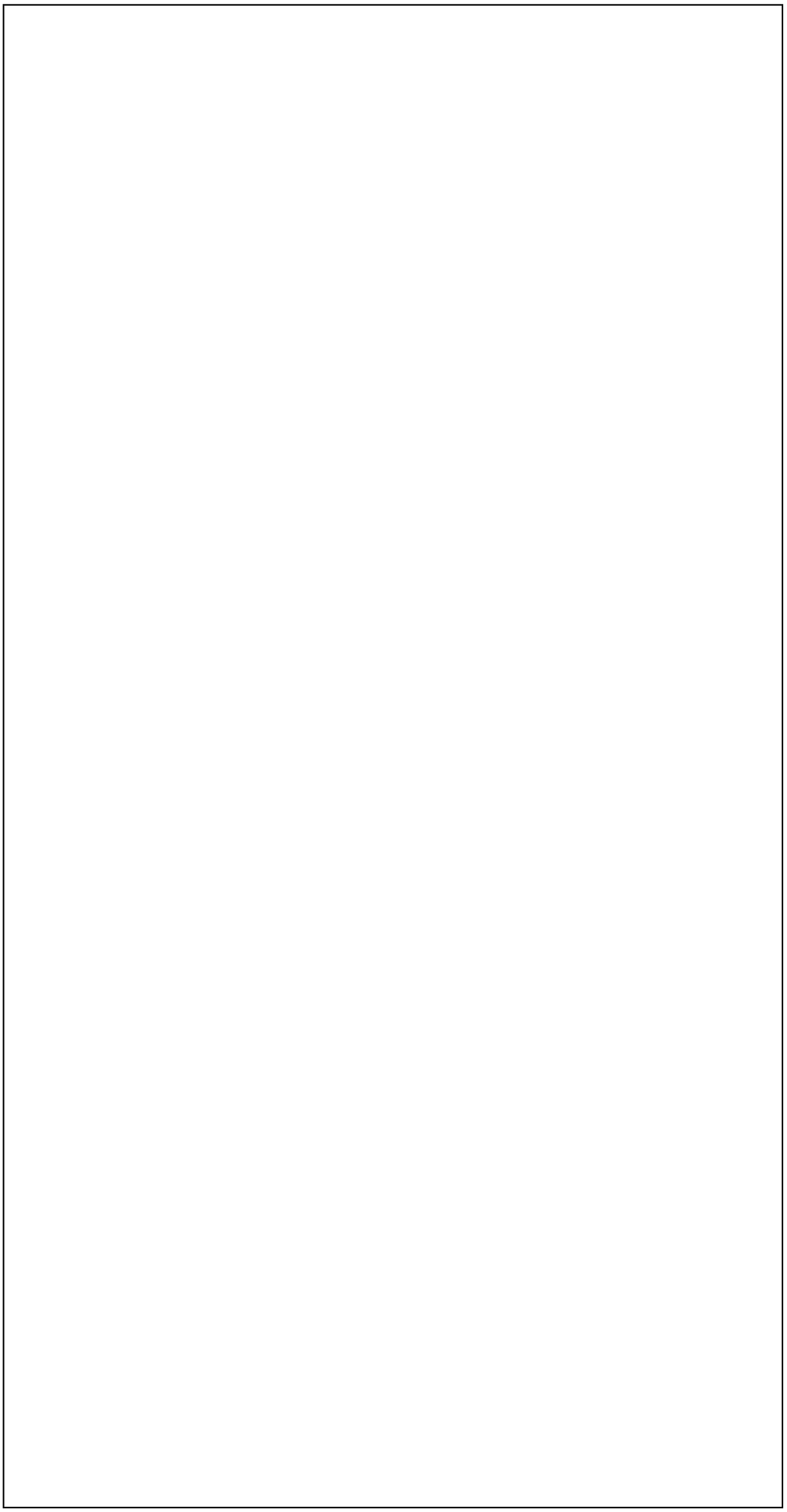


Figure 3H.1-37 List of Seismic Wall Sections

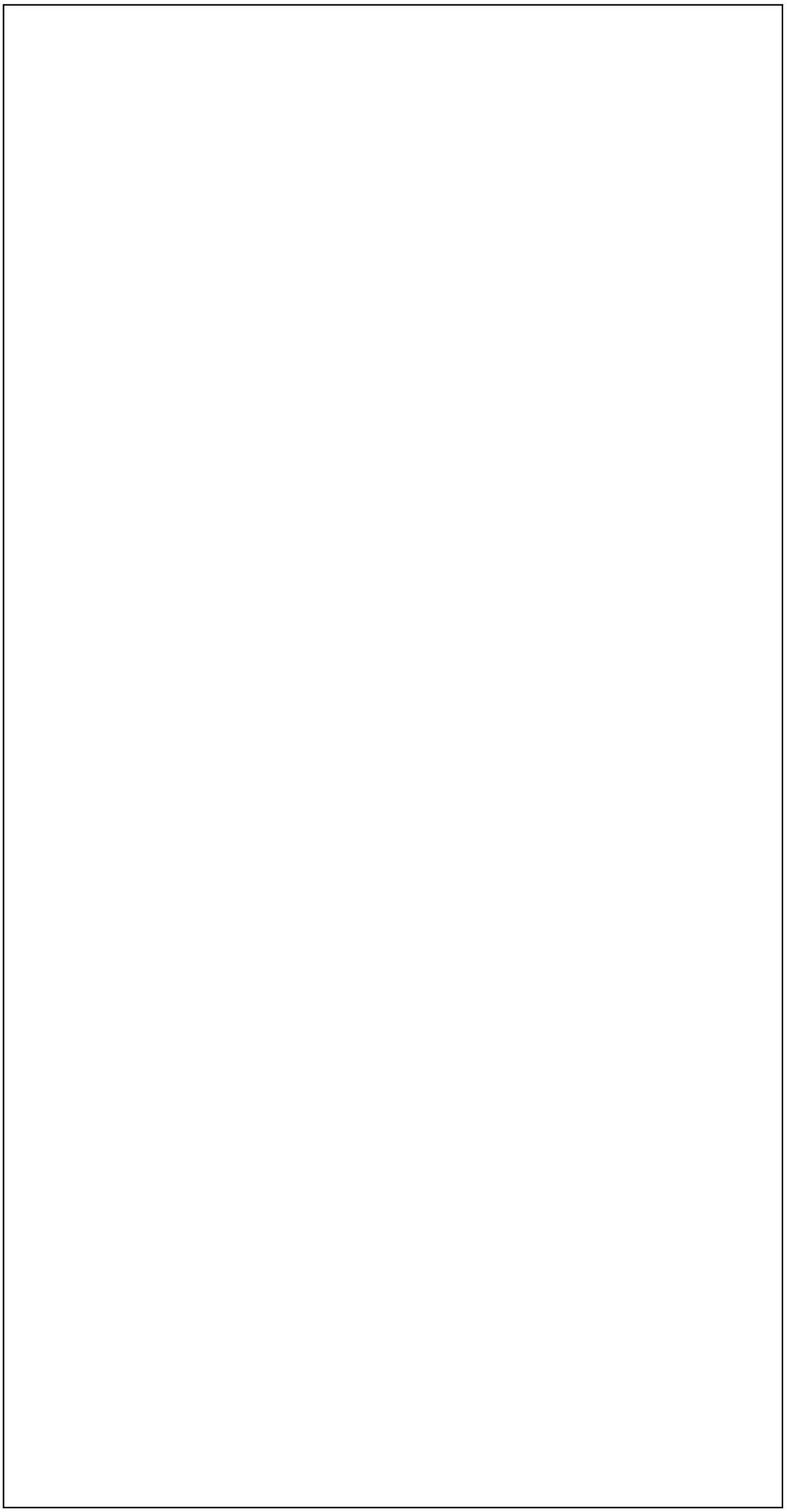


Figure 3H.2-21 Control Building Floor Plan at Elevation -8200 mm

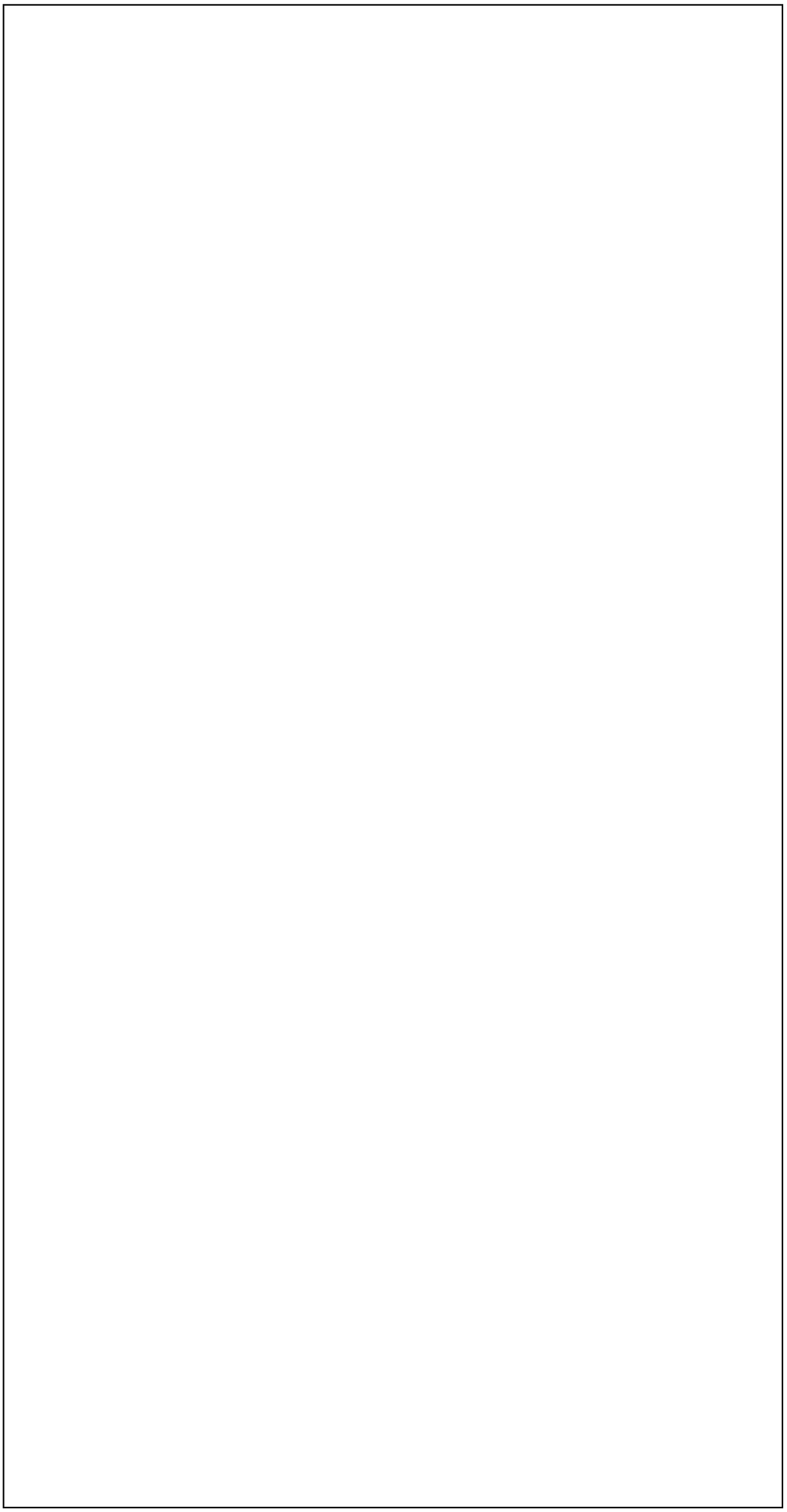


Figure 3H.2-22 Control Building Framing Plan at Elevation -2150 mm

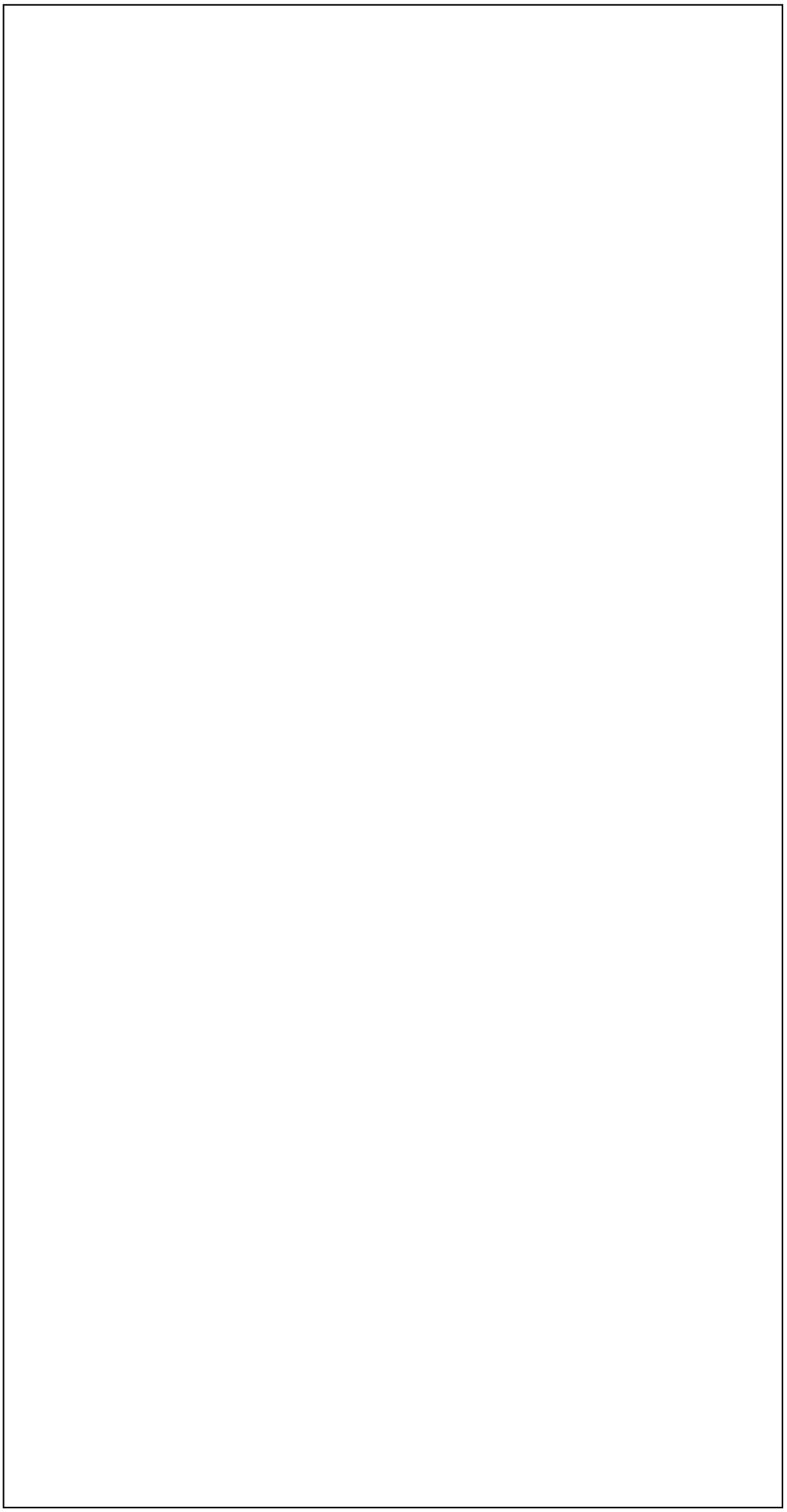


Figure 3H.2-23 Control Building Framing Plan at Elevation 3500 mm

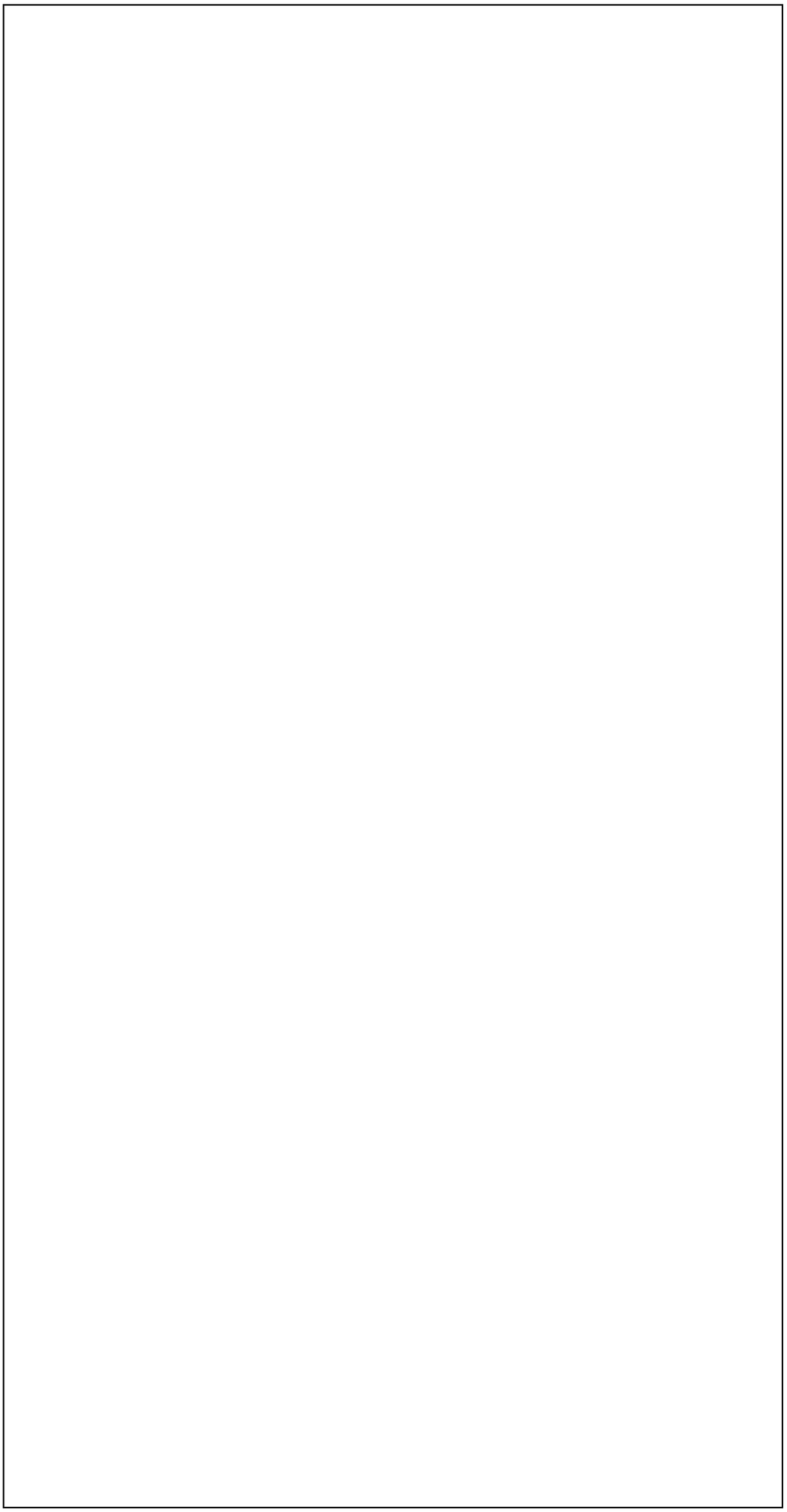


Figure 3H.2-24 Control Building Framing Plan at Elevation 7900 mm

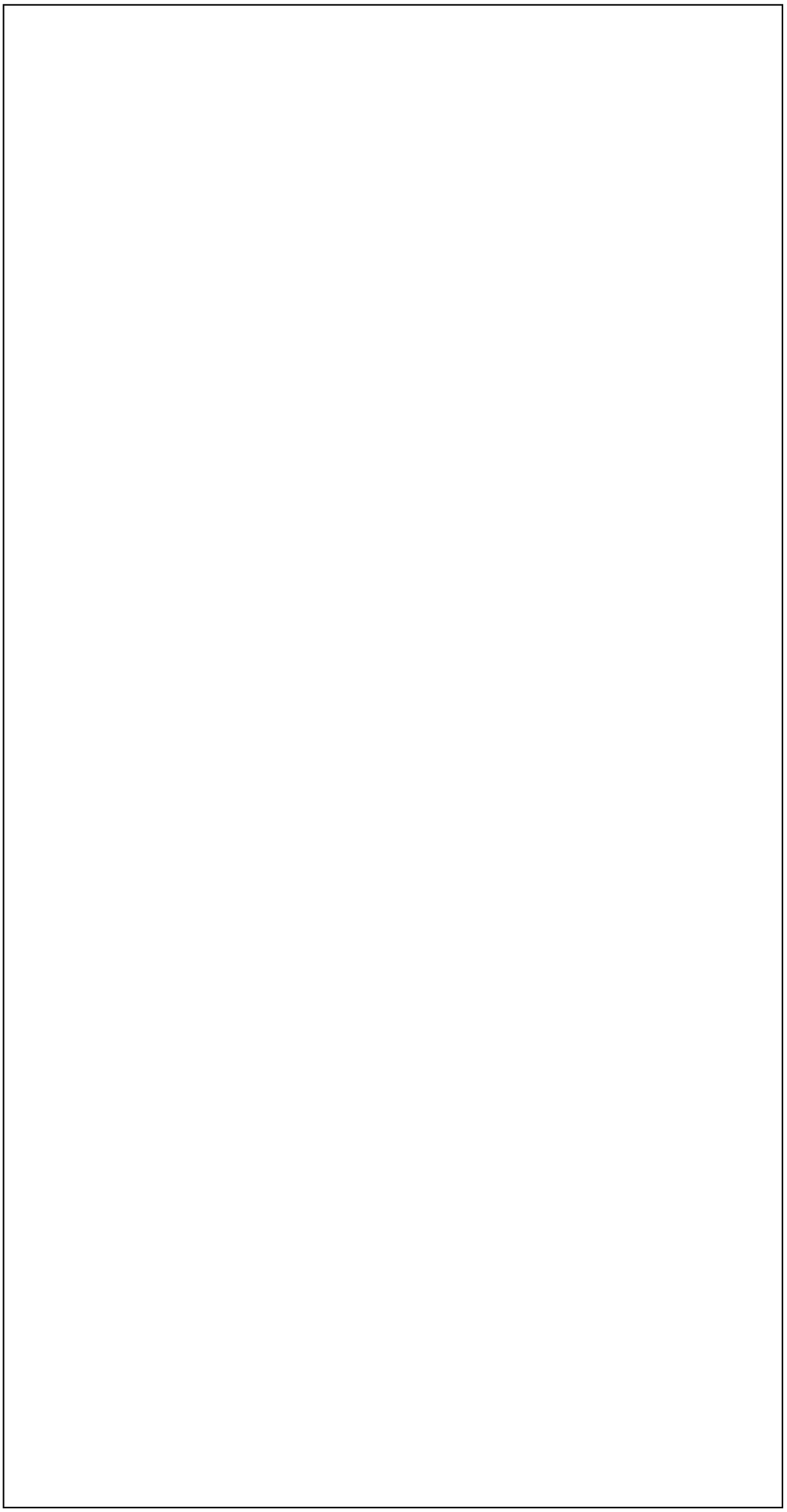


Figure 3H.2-25 Control Building Framing Plan at Elevation 12300 and 13100 mm

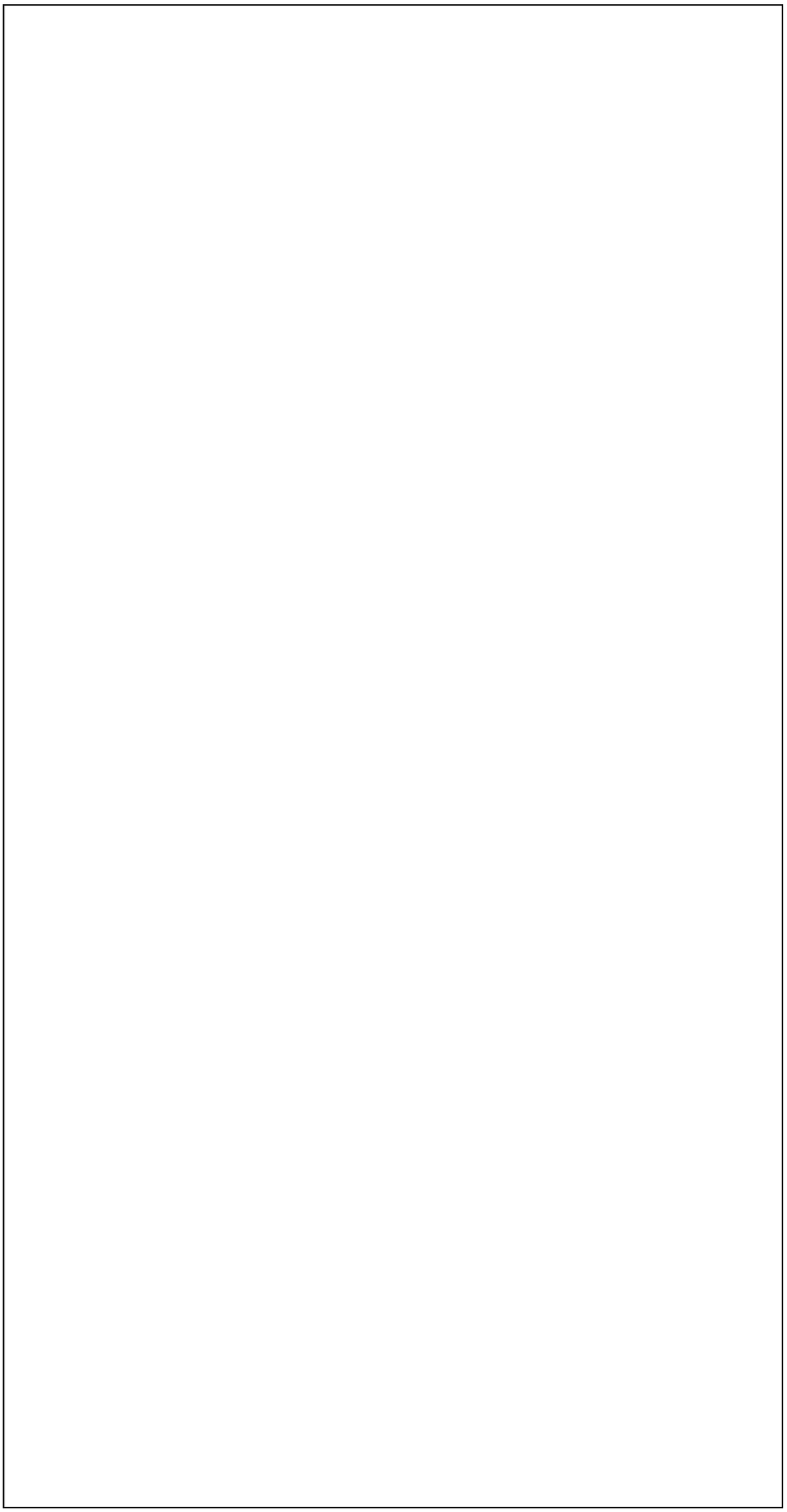


Figure 3H.2-26 Control Building Framing Plan at Elevation 17150 and 18250 mm

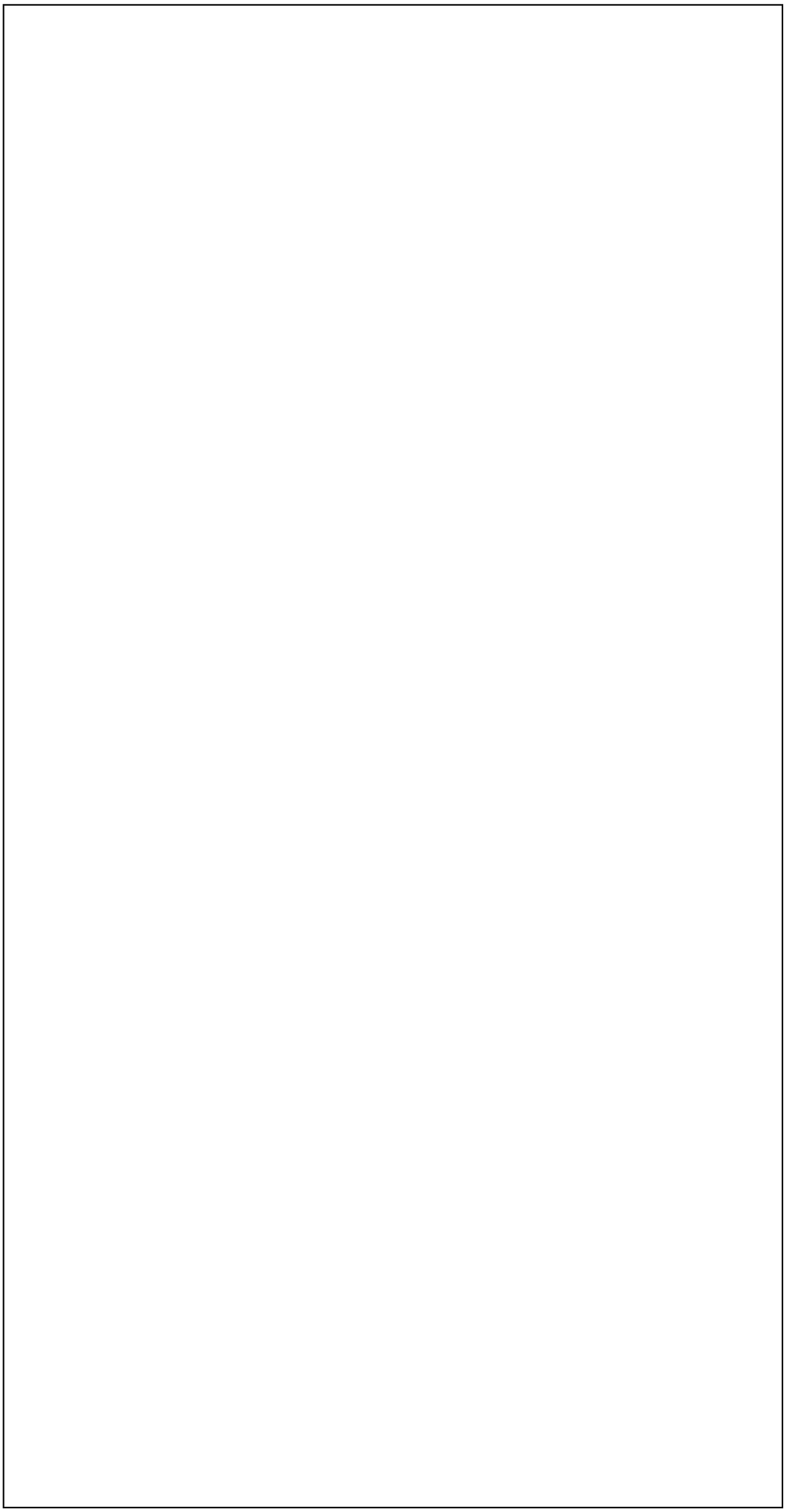


Figure 3H.2-27 Control Building Framing Plan at Elevation 22200 and 22750 mm

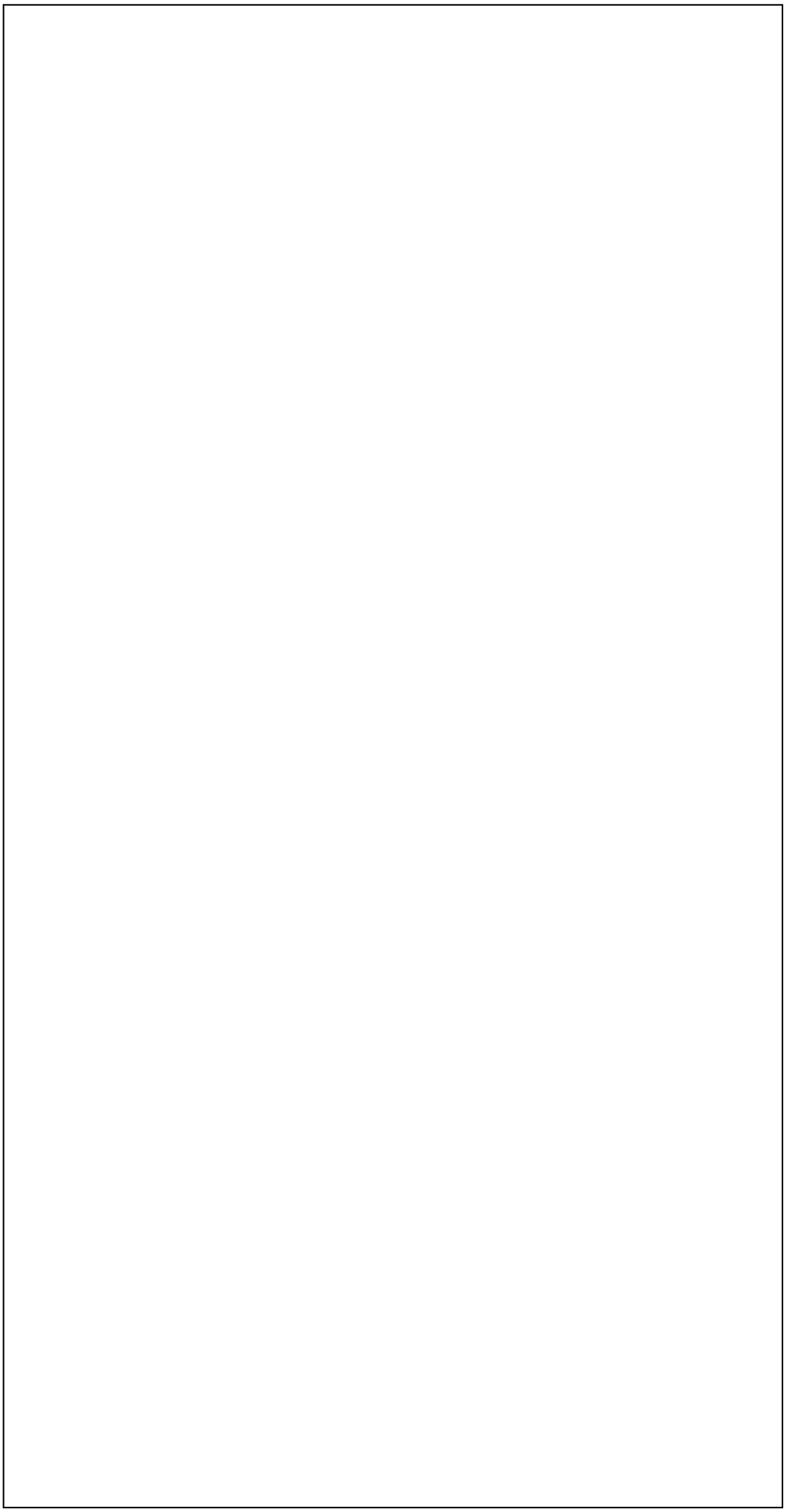


Figure 3H.2-28 Control Building Section

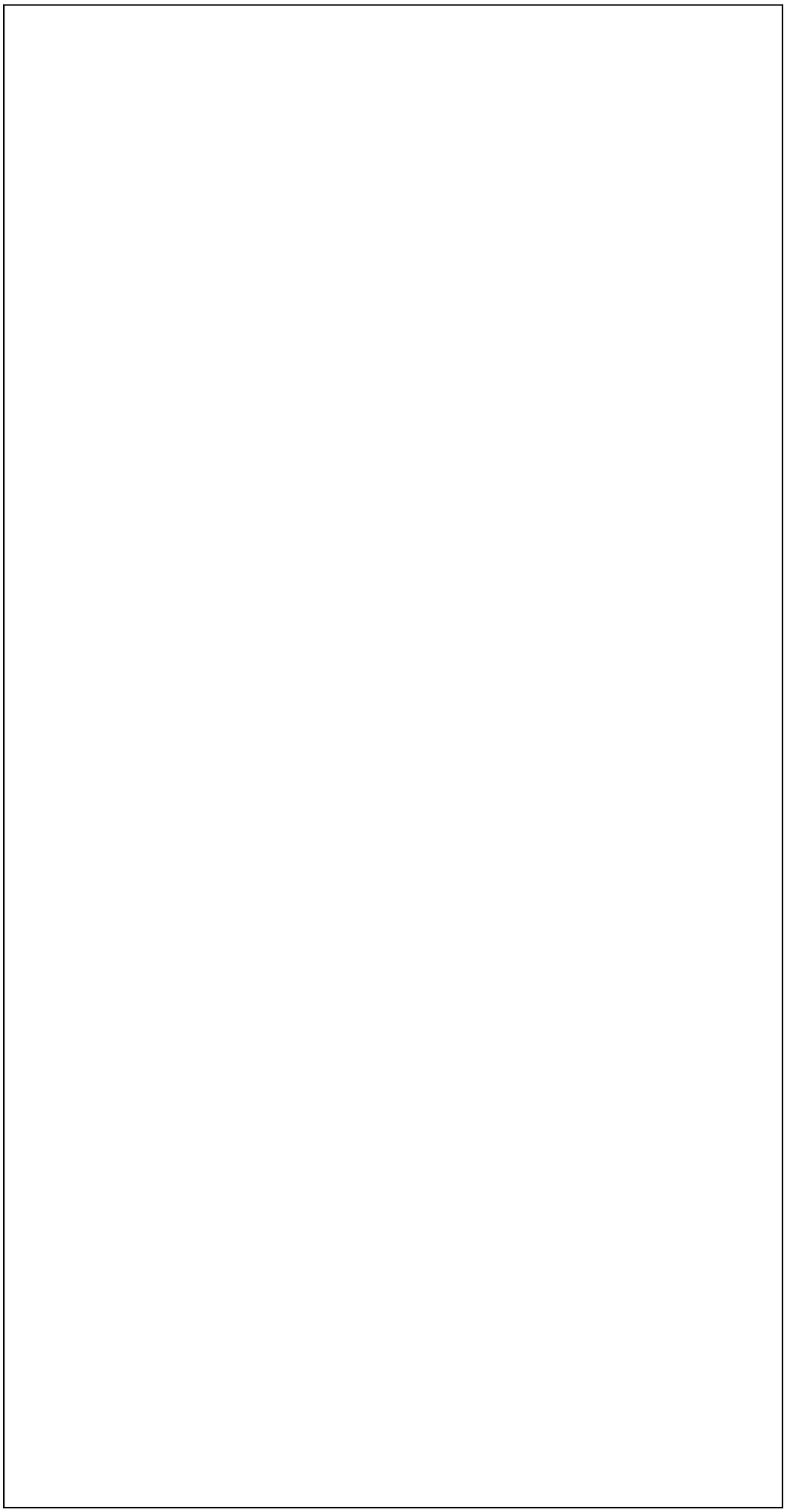


Figure 3H.2-29 Control Building Section and Details

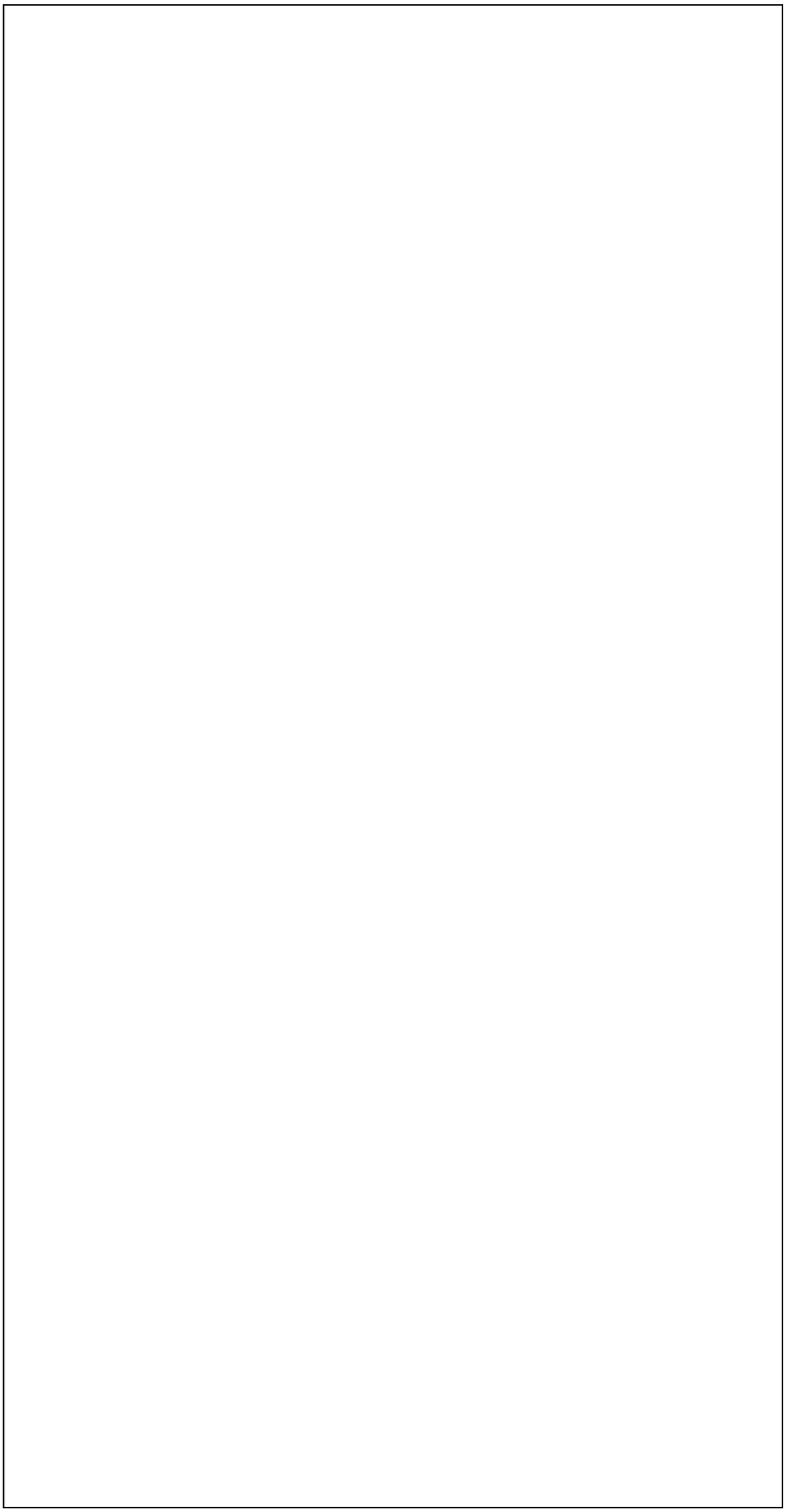


Figure 3H.2-30 Control Building Details

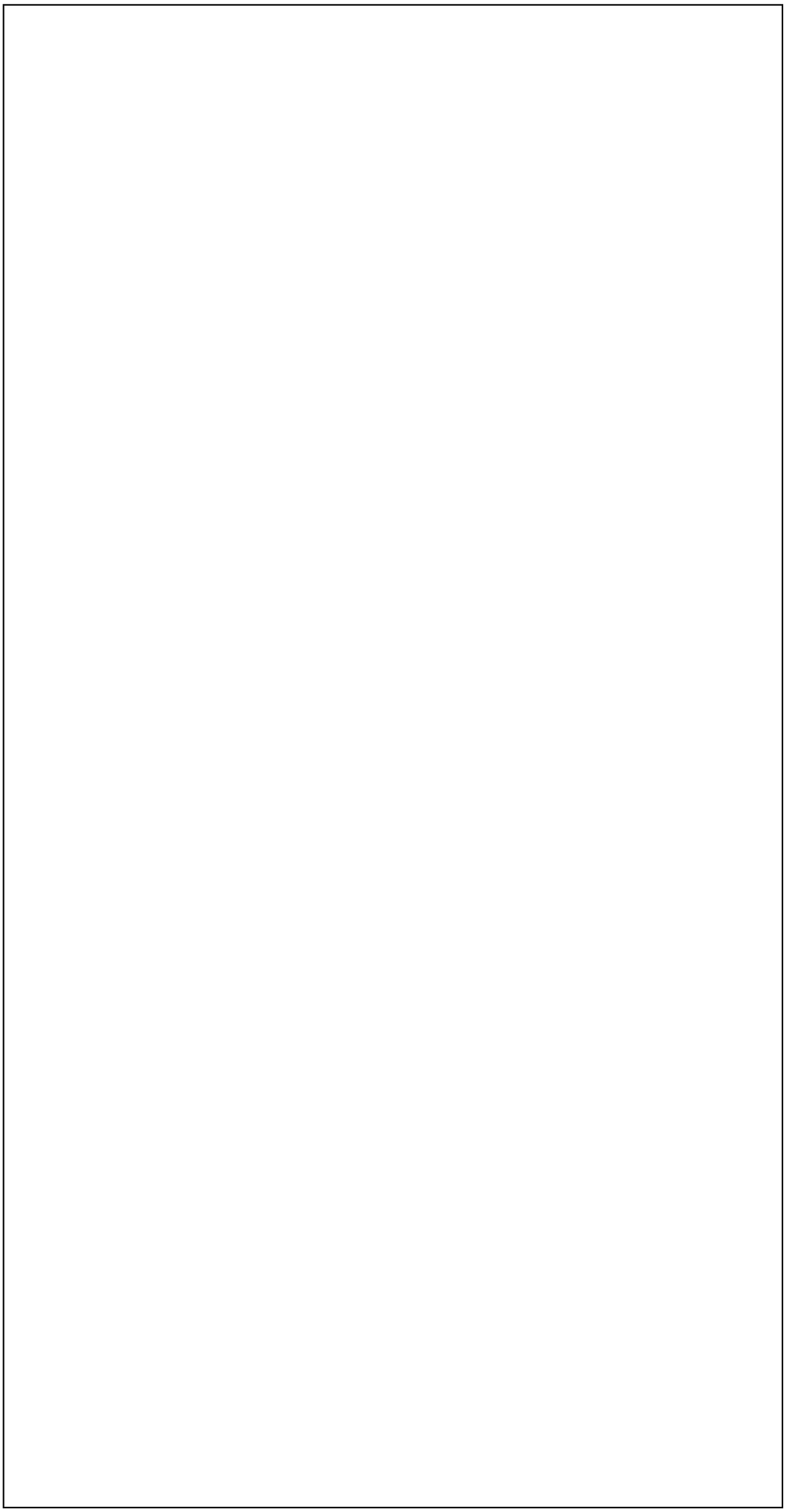


Figure 3H.3-11 Radwaste Building, Reinforced Concrete Basemat

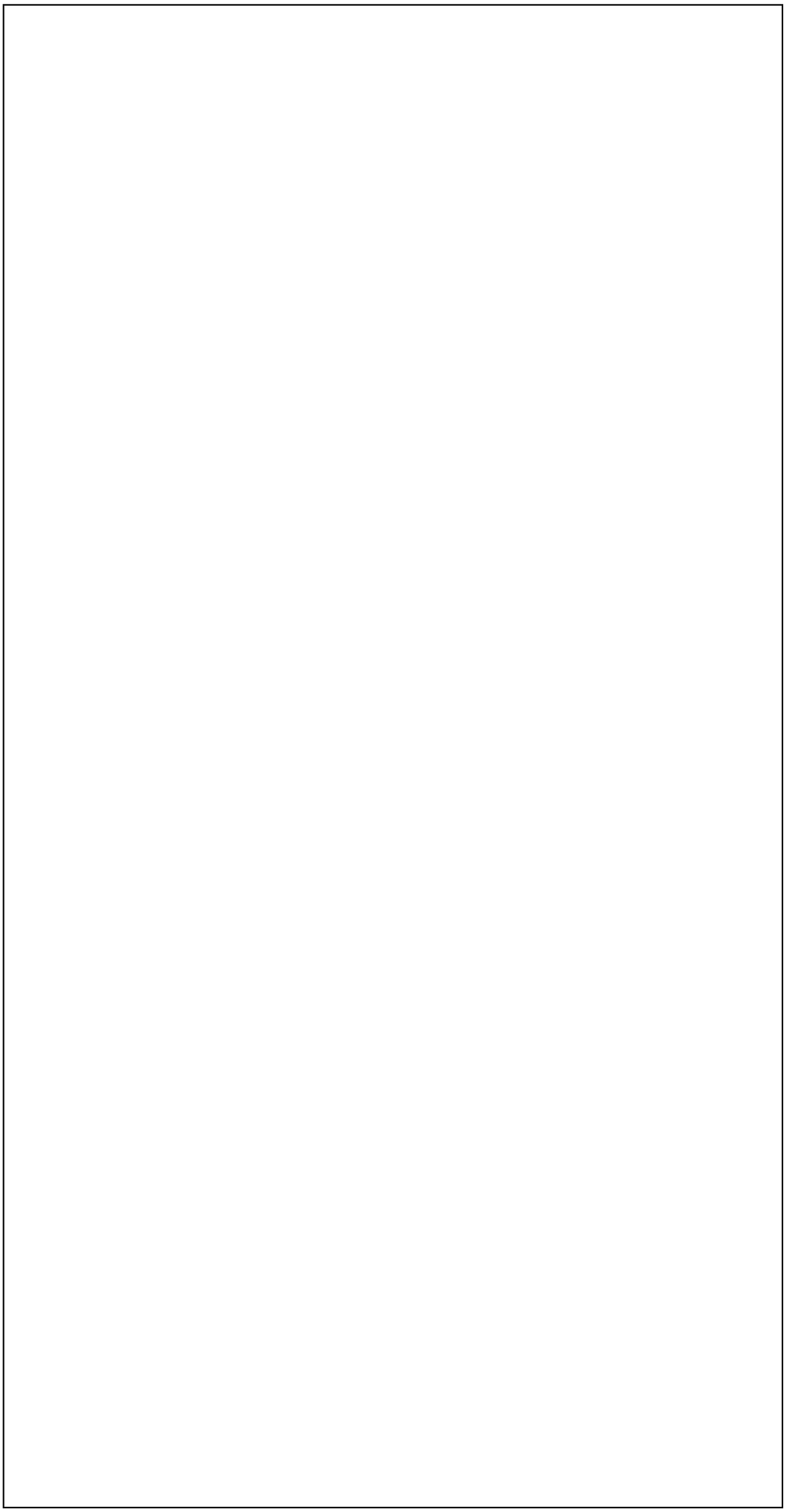


Figure 3H.3-12 Radwaste Building, Structural Steel Framing Plan, Typical Floor

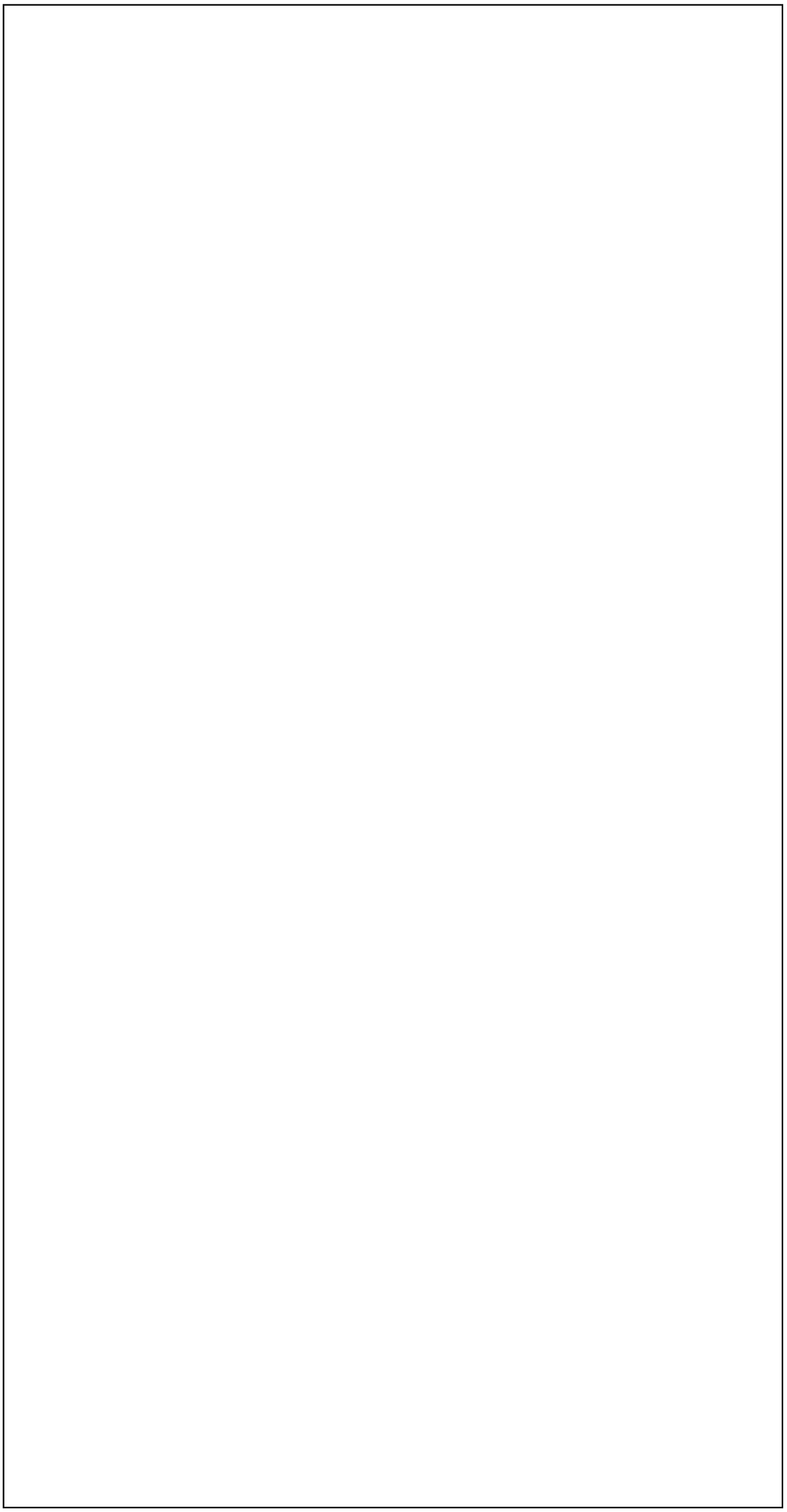


Figure 3H.3-13 Radwaste Building, Structural Steel Framing Plan, Elevation 28000 mm

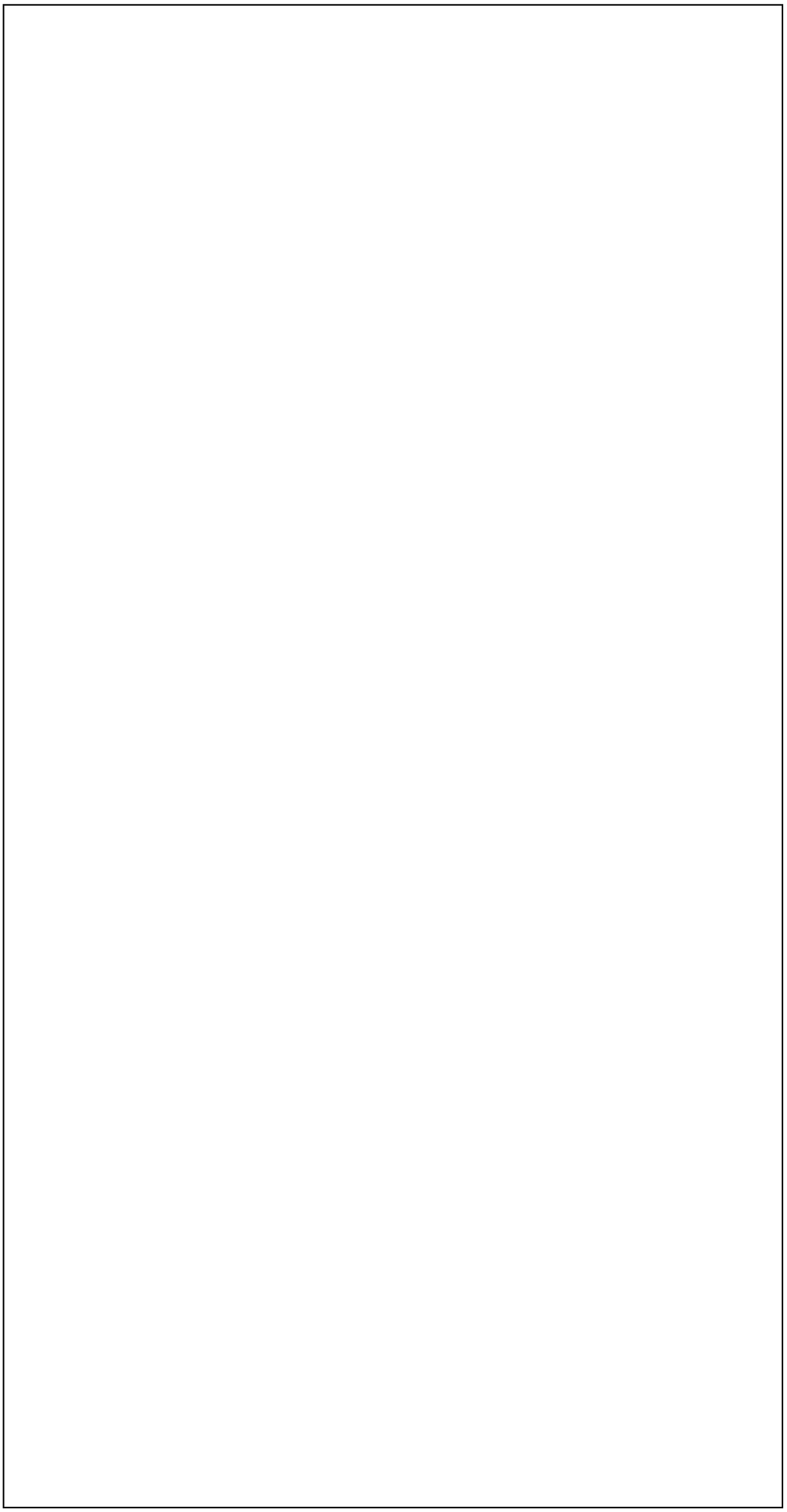


Figure 3H.3-14 Radwaste Building, Section A-A

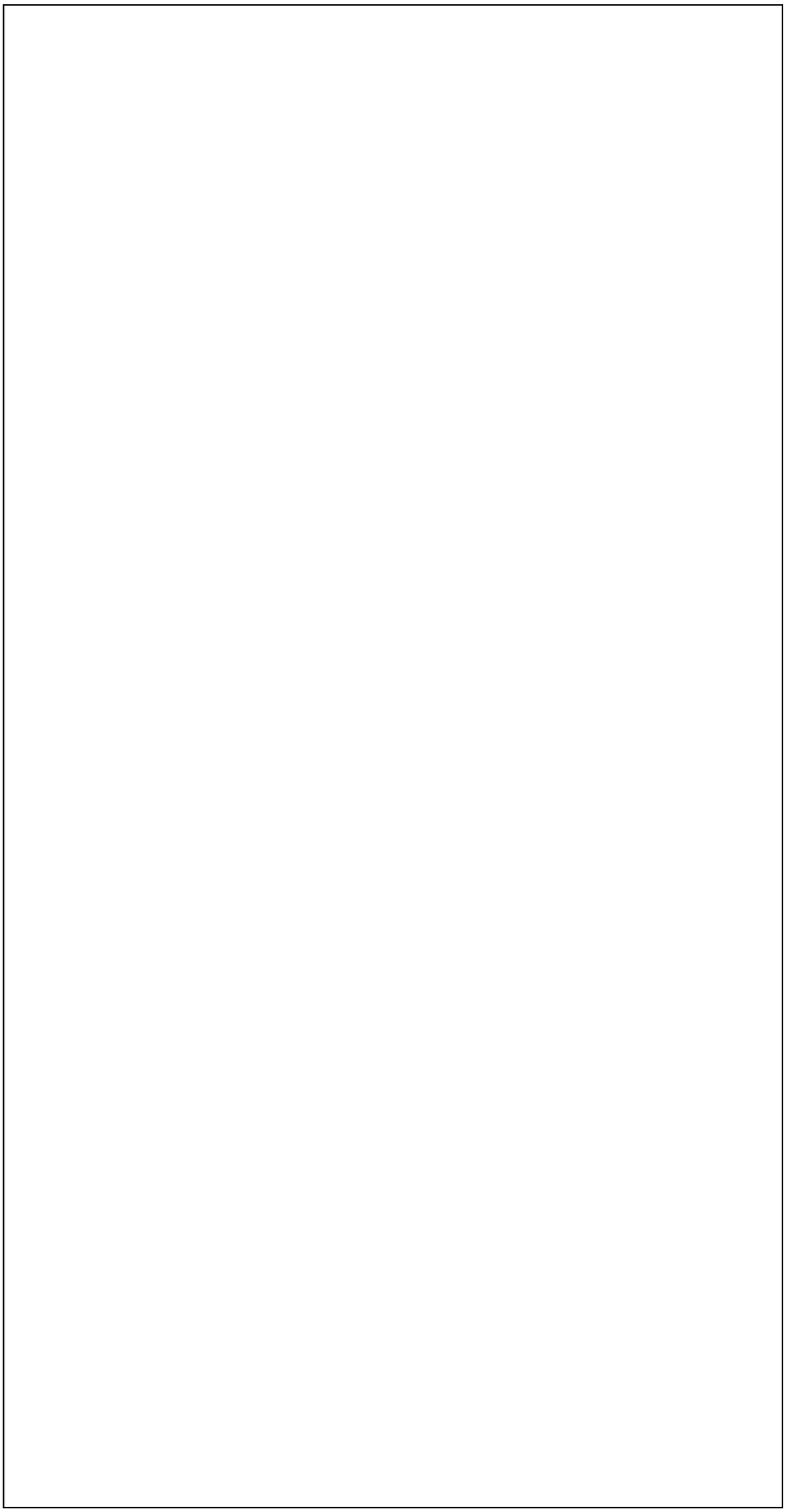


Figure 3H.3-15 Radwaste Building, Exterior Walls Sections

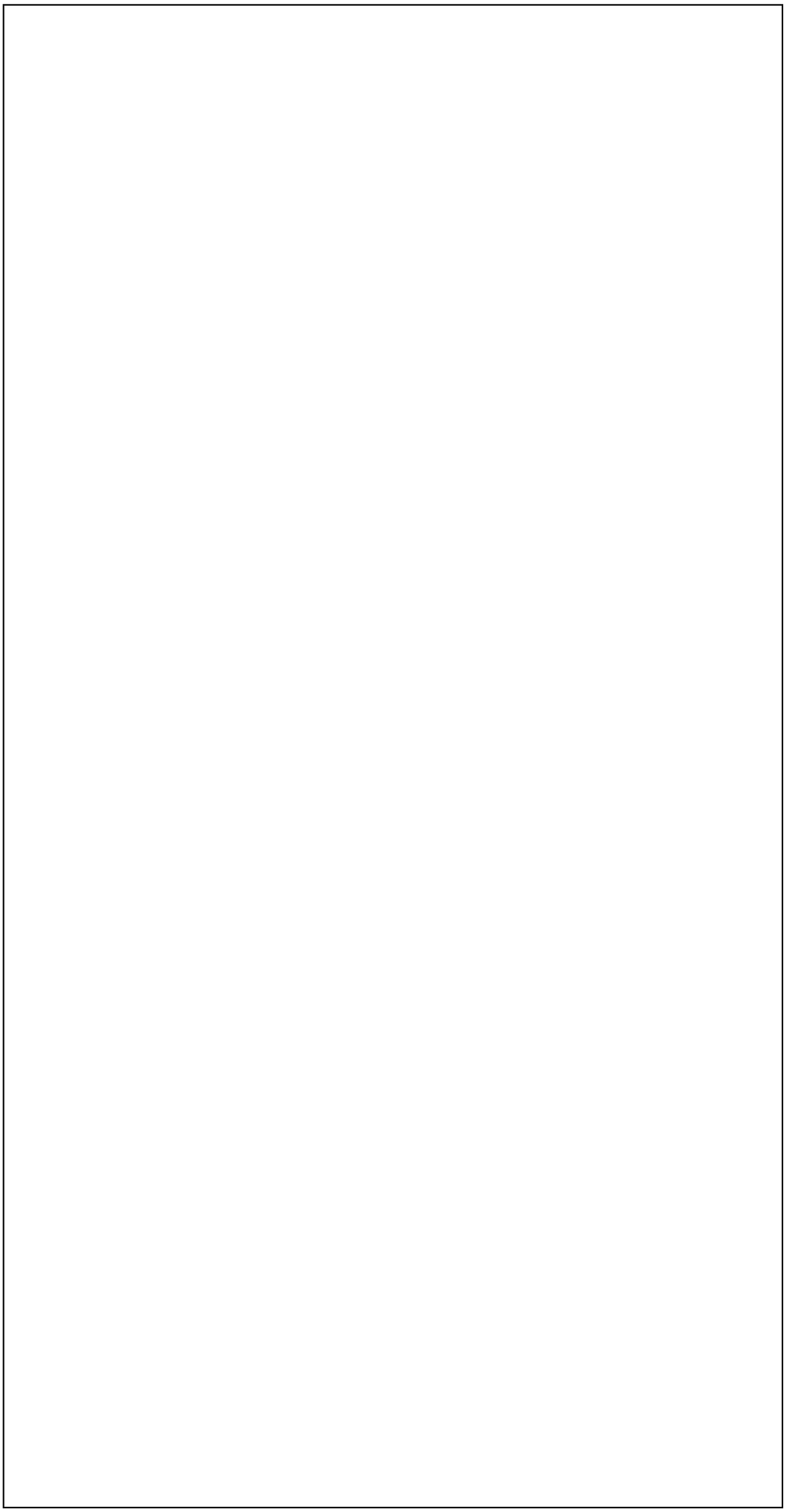


Figure 3H.3-16 Radwaste Building, Sections and Details

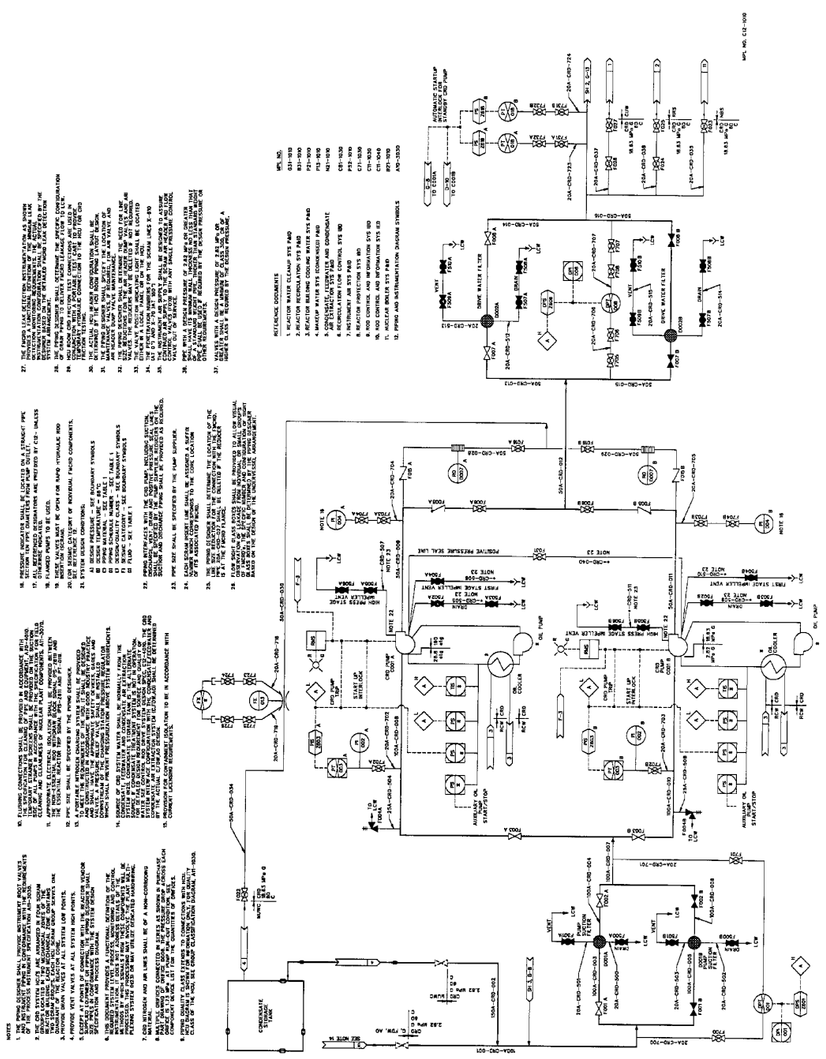


Figure 4.6-8 Control Rod Drive System P&ID (Sheet 1 of 3)

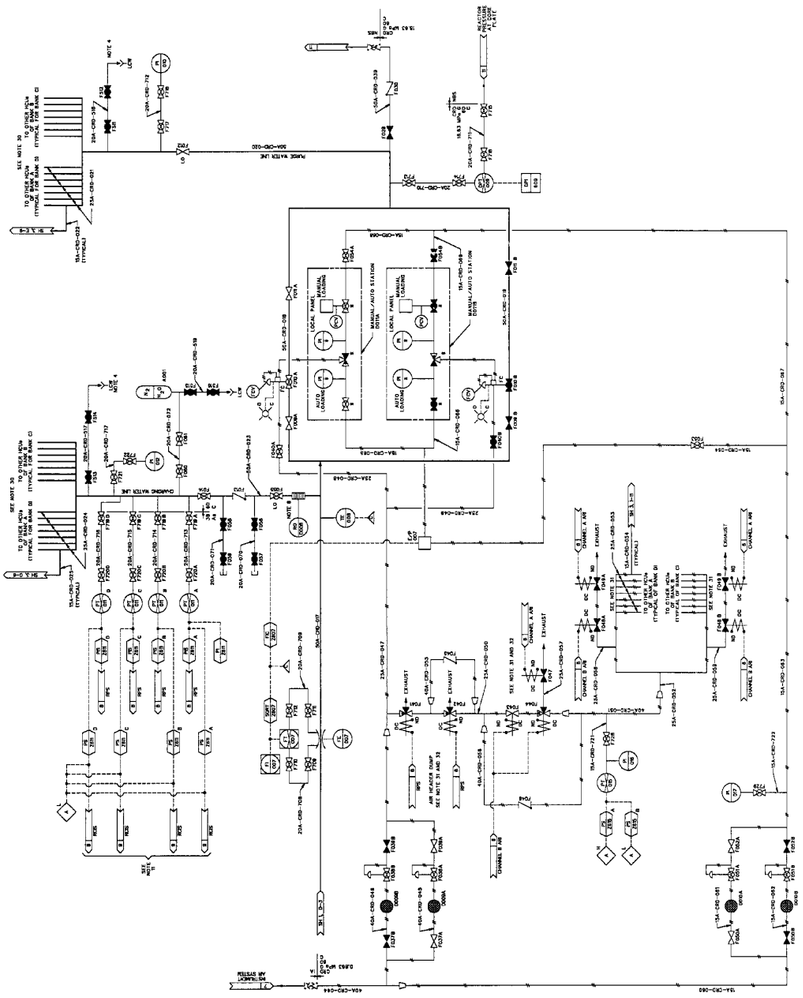


Figure 4.6-8 Control Rod Drive System P&ID (Sheet 2 of 3)

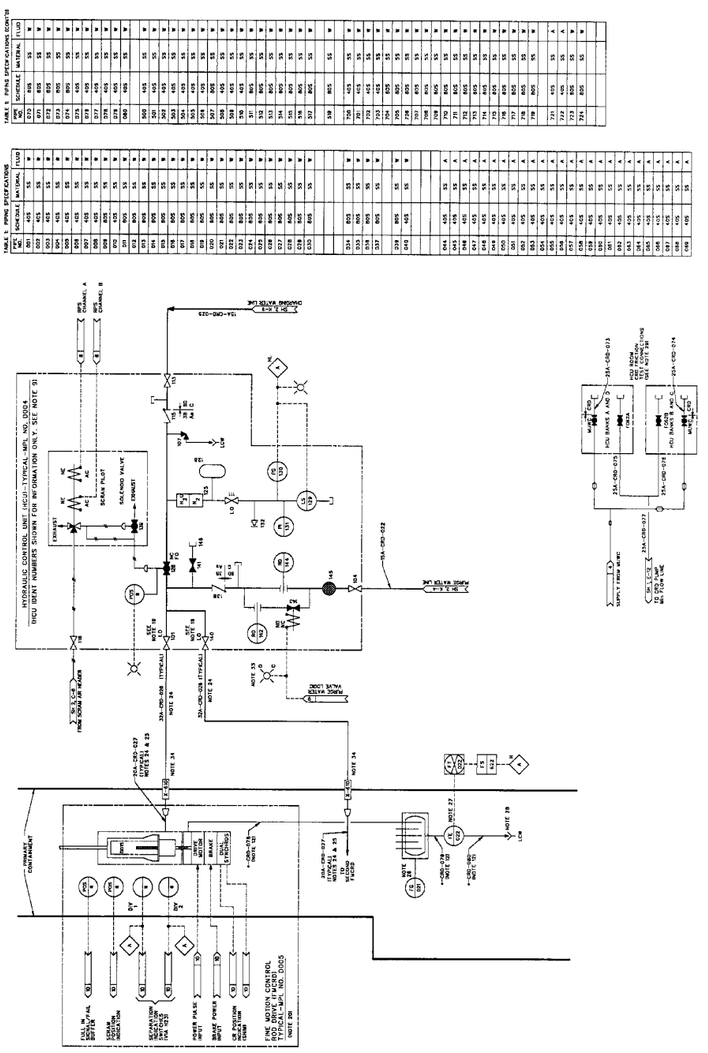
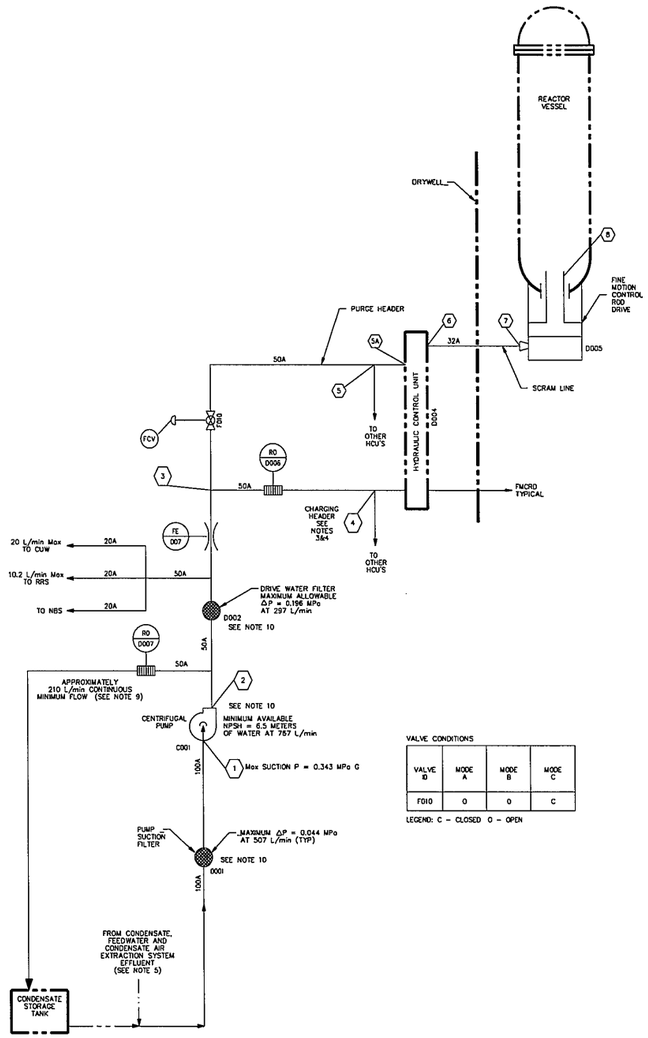


Figure 4.6-8 Control Rod Drive System P&ID (Sheet 3 of 3)



VALVE CONDITIONS

VALVE ID	MODE A	MODE B	MODE C
FD10	O	O	C

LEGEND: C – CLOSED O – OPEN

MODE A NORMAL OPERATION – SIZES PURGE WATER HEADERS (SEE NOTES 6 AND 7)

NODE ⬡	1	2	3	4	5	5A	6	7	8
FLOW, L/min	507	507	267	0	267	2.6	1.3 Max	1.3 Max	1.3 Max
PRESSURE, MPa G	0.343 (Max)	TDH = 15.30 (Min)			PR+0.245 (Min)	PR+0.245 (Min)	PR+0.196	PR+0.196	PR
CONDITIONS :		Max LINE LOSS 0.490				SEE NOTE 6 AND 7			

1. NORMAL DRIVE OPERATION
2. Min/Max PURGE FLOW TO DRIVES.
3. PRESSURE OF REACTOR AT 7.48 MPa G MEASURED AT VESSEL BOTTOM

MODE B SCRAM – SIZES SCRAM LINE

NODE ⬡	1	2	3	4	5	6	7	8
FLOW, L/min	240	240				473	473	473
PRESSURE, MPa G						0.716 Min 1.16 Max LINE LOSSES (SEE NOTE 8)		PR

CONDITIONS :
1. DRIVES SCRAMMING
2. FLOWS BASED ON ROD VELOCITY OF 344 cm/Sec
3. PRESSURE OF REACTOR AT 7.48 MPa G MEASURED AT VESSEL BOTTOM

MODE C SCRAM COMPLETED – SIZES THE PUMP SUCTION LINE

NODE ⬡	1	2	3	4	5	6	7	8
FLOW, L/min	767 Max	767 Max	527	527 Max	0	SEE NOTES 3&4		
PRESSURE, MPa G	TDH=11.77 Min					SEE NOTES 3&4		PR

CONDITIONS :
1. SCRAMMING OF DRIVES COMPLETED
2. MAXIMUM CRD SUPPLY PUMP FLOW
3. PRESSURE OF REACTOR (PR) AT 0 MPa G

TABLE 1: DESIGN PRESSURE/TEMPERATURE

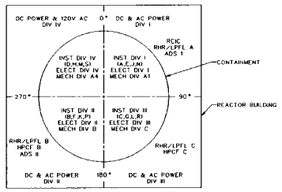
NODE ⬡	1	2	3	4	5	6	7	8
PRESSURE, MPa G	2.82	18.63	18.63	18.63	18.63	23.5	23.5	23.5
TEMP \C	66	66	66	66	66	66	66	302

NOTES :

1. DESIGN PRESSURE, TEMPERATURE AND LINE SIZE WILL BE FINALIZED AT THE DETAILED DESIGN PHASE. ACTUAL LINE SIZES DETERMINED BY PIPING DESIGNER SHALL MEET THE PROCESS DATA HYDRAULIC REQUIREMENTS.
2. THE TERM PR IS DEFINED AS THE REACTOR PRESSURE IMMEDIATELY ABOVE THE CORE PLATE.
3. PUMP RUNOUT CAPACITY OF 787 L/min SHALL NOT BE EXCEEDED. ORIFICE REDUCES THE PRESSURE AT THE INSERT LINE SO THAT NO GREATER THAN A TOTAL OF 527 L/min WILL LEAK THROUGH ALL THE DRIVES WHEN PR = 0 MPa G. LEAKAGE FLOW AT NODES (7) AND (8) IS EQUAL TO 527 DIVIDED BY NUMBER OF DRIVES.
4. RESTRICTING ORIFICE D006 IS COMPOSED OF MULTIPLE ORIFICES CONNECTED IN SERIES. SEE MPL FOR THE QUANTITIES OF ORIFICES. THE PRESSURE DROP EACH ORIFICE IS 1.73 MPa AT 787 L/min .
5. LINE FROM THE CONDENSATE, FEEDWATER AND CONDENSATE AIR EXTRACTION SYSTEM (N21) SHALL BE SIZED TO MAINTAIN A FLOW RATE APPROXIMATELY TWICE NORMAL (MODE A) CRD SYSTEM FLOW RATE. SURPLUS FLOW WILL BE DIVERTED TO CONDENSATE STORAGE TANK (CST). CST WILL PROVIDE AN ALTERNATE SOURCE OF WATER FOR THE CRD SYSTEM IF SYSTEM N21 IS NOT AVAILABLE.
6. IN MODE A, THE DRIVE PURGE FLOW RATE AT LOCATIONS 6 & 7 SHALL NOT BE LESS THAN 0.7 L/min TO ANY DRIVE WHILE ALL DRIVES ARE STATIONARY. THE PURGE FLOW RATE TO THE STATIONARY DRIVES IN MODE A MAY BE LESS THAN THIS LIMIT FOR BRIEF PERIODS OF TIME DURING GANG ROD MOVEMENTS AS DESCRIBED IN NOTE 7.
7. DURING NORMAL MOTOR-DRIVEN ROD INSERTIONS IN MODE A (EITHER SINGLE ROD OR GANGED ROD MOVEMENTS UP TO 26 RODS), THE PURGE WATER FLOW AT LOCATION 5A IS INCREASED TO A MINIMUM OF 8.2 L/min TO EACH HCU ASSOCIATED WITH A MOVING DRIVE. THIS IS ACCOMPLISHED BY AUTOMATIC OPENING OF THE PURGE WATER MAKE-UP VALVE IN THE HCU. THE FLOW FROM EACH HCU DIVIDES EVENLY BETWEEN THE TWO DRIVES SUCH THAT THE FLOW AT LOCATIONS 6 AND 7 IS 4.1 L/min. THE PURGE WATER FLOW TO THE STATIONARY DRIVES DECREASES SINCE THE TOTAL PURGE WATER HEADER FLOW RATE AT THE LOCATION 5 REMAINS CONSTANT.
8. LINE LOSSES ARE FOR THE SCRAM LINES ONLY. TOTAL COMBINED LOSSES FOR THE HCU AND SCRAM LINES ARE 1.67 MPa MINIMUM AND 2.11 MPa MAXIMUM.
9. ACTUAL FLOW WILL BE DETERMINED DURING THE DETAILED DESIGN PHASE.
10. TYPICAL OF BOTH LOOPS. ONLY ONE LOOP SHOWN.

C12-1020

Figure 4.6-9 Control Rod Drive System PFD



ORIENTATION OF THE MUCLEAR BOILER SYSTEM
INSTRUMENTS TO WET SEPARATION REQUIREMENTS
INCLUDES ASSOCIATED INSTRUMENT SUFFIX AND ECCS LOCATION

NOTES

1. ENCLOSED EQUIPMENT AND COMPONENTS ARE TYPICAL FOR THE SYSTEM AND MAY NOT HAVE THE SAME PART NUMBERS UNLESS OTHERWISE NOTED.
   EXAMPLE: XXXB IS ON LINE "B"
   EXAMPLE: XXXC IS ON LINE "C"

2. SEE REFERENCE DOCUMENT 4G FOR THE SIZE OF THE INLET FLANGE FOR THE SAFETY RELIEF VALVES (SRVS).

3. PIPE SIZES SHOWN ON THIS DRAWING ARE APPROXIMATE EXCEPT AT POINTS OF CONNECTION WITH THE SUPPLIED EQUIPMENT. VERIFY THE SIZES SHOWN ON THIS DRAWING WITH THE PIPING LAYOUT DRAWINGS. THE PIPING LAYOUT FOR CONFORMANCE WITH THE NUCLEAR BOILER SYSTEM DESIGN SPECIFICATION (B21-XXXX) AND PROCESS DIAGRAM (B21-H100).

4. THE ISOLATION VALVE F007 MAY NOT BE PROVIDED IF A SINGLE REFERENCE LEG INSTRUMENT WITH THE LEVEL TRANSMITTER LESSER IF THE SECOND SHUT-OFF VALVE IS PART OF L1100H. THE DESIGN PRESSURE FOR THIS INSTRUMENT LINE IS 8.62 MPa G ALL THE WAY TO L1100H.

5. TO BE CONNECTED IN TO THE STRAIGHT RUN OF PIPE DOWNSTREAM OF F009 WITH UPSTREAM AND DOWNSTREAM STRAIGHT LENGTHS FROM THE TAP TO EXIT AS ACCURATE A PRESSURE MEASUREMENT AS POSSIBLE. SEE ASME PTC 19.5 - 1977 & 1984 "STEAM TURBINE" PARAGRAPH 4.7.1.

6. AN EXPANSION LEG SHALL BE PROVIDED IN THE INSTRUMENT LINE BETWEEN THE CONDENSING POT (D01) AND THE WATER TIGHT PENETRATION. THE EXPANSION LEG AND THE INSTRUMENT LEG AND PIPING INSTALLATION SHALL BE DESIGNED TO ALLOW FOR THE MAXIMUM CHANGE OF VESSEL LENGTH WITH TEMPERATURE TO AVOID OVERSTRESSING THE PIPING OR THE SEAL OR DAMAGE TO THE INSULATION AROUND THE PENETRATION. THE PIPING SHALL BE SLOPED CONTINUOUSLY UPWARD 3/12.5 AND BE KEPT AS FREE AS POSSIBLE FROM LOCAL HIGH POINTS. THE PIPING SHALL BE INSULATED FROM THE CONNECTION WITH THE RPV HEAD VENT LINE TO THE CONDENSING POT. THE INSULATION SHALL HAVE A MAXIMUM CONDUCTANCE OF 4.163E-01 J/h-cm²-°C.

7. PROVISIONS FOR INSTRUMENT LINE ISOLATION SHALL BE IN ACCORDANCE WITH SUPPORTING DOCUMENTS 3 & 4. ONE ORIFICE SHALL BE INSTALLED IN EACH INSTRUMENT LINE PENETRATING THE DRYWELL WALL. THE ORIFICE DIAMETER SHOULDBE NOT LESS THAN 6.4mm (1/4 INCH) NOR MORE THAN MAXIMUM NUMBER OF ORIFICES PER LINE IS ONE.

8. VALVE MOTOR OPERATORS AND PILOT SOLENOIDS ARE AC OPERATED UNLESS OTHERWISE NOTED.

9. THE CONDENSING CHAMBER SHALL BE CLOSE COUPLED TO THE 50A RPV INSTRUMENT LINE NOZZLE BY A 50A PIPE. THE 50A PIPE FROM THE REACTOR VESSEL INSTRUMENT LINE NOZZLE SHALL BE LEVEL IN THE HORIZONTAL PLANE FOR ALL CONDITIONS WITHIN 5° mm.

   THE INSTRUMENT LINE CONNECTED TO THE BOTTOM OF THE CONDENSING CHAMBER SHALL HAVE A MINIMUM SLOPE OF 1/25 INSIDE THE PRIMARY CONTAINMENT. THE TOTAL VERTICAL DROP FROM THE CONDENSING CHAMBER TO THE CONTAINMENT WALL SHALL NOT EXCEED 0.9 METERS AT THE BOTTOM CONNECTION TO THE CONDENSING CHAMBER. THE SLOPE OF THE PIPE OUTSIDE THE VESSEL BUT PRIOR TO PENETRATING THE PRIMARY CONTAINMENT, SHALL BE REDUCED TO 2DA PIPE.

   IN ADDITION, THE CONDENSING CHAMBER HAS A 25A DRAIN LINE WHICH DRAINS THE EXCESS CONDENSATE OF 0.015 L/S OF THE VARIOUS ELECTRO-GRAPHIC PRESS CONTROL RPV WIDE RANGE WATER LEVEL INSTRUMENTATION.

   FLEXIBILITY SHALL BE PROVIDED IN THE INSTRUMENT LINE AND CONDENSING CHAMBER DRAIN LINE SUCH THAT THE CONDENSING CHAMBER AND THE DRAIN LINE CAN ACCOMMODATE THE THERMAL EXPANSION AND CONTRACTILE THERMAL EXPANSION SHALL BE CONSIDERED ELEVATION OF THE CONDENSING CHAMBER WITH RESPECT TO THE RPV INSTRUMENT LINE NOZZLE BY MORE THAN 3 mm.

   INSULATE THE 50A PIPE WHICH ATTACHES THE RPV INSTRUMENT NOZZLE TO THE CONDENSING CHAMBER AND THE CONDENSING CHAMBER WHICH HAS A MAXIMUM CONDUCTANCE OF 4.163E-01 J/h-cm²-°C. THE INSULATION SHALL EXTEND FROM THE RPV INSTRUMENT LINE NOZZLE TO THE CONDENSING CHAMBER. THE CONDENSING CHAMBER AND THE INSTRUMENT LINE FROM THE CONDENSING CHAMBER TO THE CONTAINMENT PENETRATION SHALL NOT BE INSULATED. THE 25A DRAIN LINE SHALL BE INSULATED.

10. LOCATE THE TEE AS CLOSE AS POSSIBLE TO REACTOR VESSEL

11. THE MAXIMUM OPERATING PRESSURE OF AT LEAST 2.83 MPa G, AND TEMPERATURE FOR THE PORTION OF THE MAIN STEAM LINE DRAIN LINE HEADER DOWNSTREAM OF THE MOTOR OPERATED VALVES (MOVS) F016 AND F018 AND THE RESTRICTING ORIFICE (D005 AND D007, TO BE DETERMINED BY THE DESIGNERS OF THE MAIN CONDENSER SYSTEM.

12. LOCATE THE DRAIN LINE 25A-HB-542 AND ASSOCIATED EQUIPMENT FOR DETECTING THE LEAKAGE AS CLOSE AS PRACTICAL TO THE RPV.

13. FOR DETAILS, SEE B11-D021 & D025.

14. THERMAL SLEEVE IS SHOWN AS ONE POSSIBLE METHOD OF ATTACHMENT. THE 50A PIPE IS NOT REQUIRED FOR FEEDWATER SPARGER. ANY ATTACHMENT WHICH MEET APPLICABLE CODE REQUIREMENTS MAY BE USED.

15. SPRING CLOSING CHECK VALVE, SPRING ACTUATOR HELD IN OPEN POSITION BY AIR PRESSURE DURING NORMAL OPERATION IF NO OTHER CHECK VALVE BETWEEN THE REACTOR AND THE FEEDWATER PUMPS IS DESIGNED TO CLOSE DIRECT TO APPROPRIATE FLOW RATE AND PRESSURE DIFFERENTIAL AND BE HELD OPEN BY AIR PRESSURE AUTOMATICALLY IN THE EVENT ALL FEEDWATER PUMPS TRIP.

16. TRANSITION FROM 250A TO 300A PIPING TO BE DETERMINED BY THE PLANT ARRANGEMENT OF THE SRV DISCHARGE LINES.

17. SRV DISCHARGE LINE PIPING TO THE QUENCHER SHALL BE QUALITY GROUP C. IN ADDITION ALL WELDS IN THE SRV DISCHARGE LINE PIPING IN THE WETWELL ABOVE THE SURFACE OF THE SUPPRESSION POOL SHALL BE NON-DESTRUCTIVELY EXAMINED TO THE REQUIREMENTS OF ASME BOILER AND PRESSURE VESSEL CODE SECTION III, CLASS 2.

18. NOT USED.

19. WHEN ALL FEEDWATER FLOW IS THROUGH A LOW FLOW FEEDWATER NOZZLE, THE FEEDWATER LINE FLOW MUST BE SHUT OFF AND SWITCHED TO HP SHUT-OFF TO ARREST THERMAL CYCLING OF THE FEEDWATER NOZZLES ON THE RPV. WITH BOTH FEEDWATER LINES OPEN, FLOW MAY OSCILLATE BETWEEN THE TWO LINES DUE TO THE PARTIALLY OPEN CHECK VALVE.

20. ROUTE THE PIPE THROUGH THE MANHOLE IN BETWEEN THE DRYWELL AND THE RPV FLANGE

21. WATER LEVEL INSTRUMENTS FOR VARIOUS RANGES ARE CALIBRATED AS STATED BELOW. ALL WATER LEVEL SWITCH SETPOINTS ARE NOMINAL (E.G. THE ANALYSIS ARE PERFORMED WITH THE SWITCH TRIP UNCERTAINTY INCLUDED). THE CONTAINMENT BUILDING TEMPERATURE ASSUMED TO BE 28.7°C

   A. FUEL ZONE: THE INSTRUMENTS ARE CALIBRATED FOR SATURATED WATER AND STEAM CONDITIONS AT 0 kPa G IN THE VESSEL AND 57.2°C IN THE DRYWELL.

   B. WIDE RANGE: THE INSTRUMENTS ARE CALIBRATED FOR 7.07 MPa G IN THE VESSEL, 57.2°C IN THE DRYWELL AND 55.6°C SUBCOOLING BELOW THE MIDDLE WATER LEVEL NOZZLE.

   C. NARROW RANGE: SATURATED CONDITIONS AND FEEDWATER THE INSTRUMENTS ARE CALIBRATED FOR SATURATED WATER AND STEAM CONDITIONS AT 7.07 MPa G IN THE VESSEL, AND 57.2°C IN THE DRYWELL.

   D. SHUTDOWN: THE INSTRUMENT IS CALIBRATED FOR 48.8°C WATER AT 0 MPa IN THE VESSEL AND 28.7°C IN THE DRYWELL

22. THE STARTUP/LOW ELEVATE MPL B21-F0033 MAY BE LOCATED ON THE RPV HEAD VENT LINE BETWEEN THE NORMALLY-OPERATED VALVES MPL B21-F008 AND B21-F020 PROVIDING THE FOLLOWING CONDITION IS SATISFIED: THE TEMPERATURE ELEMENT MPL B21-T0512 SHALL NOT BE LOCATED ON THE PIPING BETWEEN THE VALVE MPL B21-F020 AND THE SEAL OF THE MOTOR-OPERATED VALVE MPL B21-F019 WHEN THERE IS ZERO LEAKAGE THROUGH THE VALVES B21-F019 & B21-F020

23. UNLESS OTHERWISE INDICATED, ALL REFERENCED MPL ARE PREFIXED BY B21-

24. SEE MAIN STEAM PIPING DESIGN SPECIFICATION B21-G009 FOR THE SPECIAL DESIGN REQUIREMENTS WHICH ARE APPLICABLE TO THE PIPING BETWEEN THE MAIN STEAM LINE INBOARD AND OUTBOARD CONTAINMENT ISOLATION VALVES.

25. SEE FEEDWATER PIPING DESIGN SPECIFICATION B21-G010 FOR THE SPECIAL DESIGN REQUIREMENTS WHICH ARE APPLICABLE TO THE PIPING BETWEEN THE FEEDWATER LINE INBOARD AND OUTBOARD CONTAINMENT ISOLATION VALVES

26. OPERATION OF 3 OF 3 MANUAL SWITCHES IS REQUIRED FOR GANGED OPERATION OF THE 8 SRVS USED FOR THE ADS.

27. SEE SUPPORTING DOCUMENT 1 FOR SYSTEM IDENTIFICATION AT INTERCONNECTIONS.

28. PNEUMATIC SUPPLY FROM REFERENCE DOCUMENT 33.

29. THE CONDENSING CHAMBER SHALL CONSIST OF A 25A x 25A PIPE ELBOW ONE HORIZONTAL LENGTH OF 25A PIPE AND ONE 25A INSTRUMENT LINE FROM THE TAP ON THE MAIN STEAM LINE (1)A RESTRICTOR TO THE ELBOW SHALL BE LEVEL IN THE HORIZONTAL PLANE WITHIN 0.5D OR FOR ALL CONDITIONS WITHIN 5° mm. THE INSTRUMENT LINE FROM THE TAP SHALL BE LOCATED VERTICALLY AND EXTEND DOWNWARD. THE 25A PIPE SHALL HAVE A DOWNWARD SLOPE OF 1/24 PRIOR TO PENETRATING THE CONTAINMENT WALL. THE 25A PIPE SHALL BE REDUCED TO 20A. FLEXIBILITY SHALL BE PROVIDED IN THE 25A AND 20A PIPE SUCH THAT THE CONDENSING CHAMBER MOVES WITH THE RPV AS IT THERMALLY EXPANDS AND CONTRACTS.

30. INSULATE WITH INSULATION THAT HAS A MAXIMUM CONDUCTANCE OF 4.163E-01 J/h-cm²-°C. THE INSULATION SHALL EXTEND FROM THE INSTRUMENT LINE TAP TO WITHIN 51 DIA OF THE DOWNWARD LEG OF THE ELBOW. THE INSTRUMENT LINE FROM THE CONDENSING TAP TO THE JUNCTION WITH THE DOWNWARD LYSTENING INSTRUMENT LINE SHOULD BE LESS THAN ONE TO METER.

31. THE MOTOR-OPERATED VALVES (MOVS) MPL B21-F002A&B IN THE CLEAN-UP WATER SYSTEM (CUW) AND THE MOV IN THE FEEDWATER LINE MAY BE DELETED IF THE STRESS ANALYSIS SHOWS THAT IT IS NOT REQUIRED.

32. THE THERMAL SLEEVE SHOWN MAY BE DELETED IF THE STRESS ANALYSIS SHOWS THAT IT IS NOT REQUIRED.

33. SEE REFERENCE DOCUMENT 3 FOR THE INSTRUMENT SETPOINT REQUIREMENTS.

34. FOR INTERFACE CONNECTIONS, SEE THE MSIV EQUIPMENT REQUIREMENTS, SPECIFICATION SUPPORT DRAWING MPL T008 AND T009.

35. FOR VENT AND DRAIN LINES OPEN TO THE ATMOSPHERE, DOWNSTREAM OF THE OUTBOARD SHUT-OFF VALVE, THE FOLLOWING BOUNDARY CONDITIONS APPLY:

   MAXIMUM OPERATING PRESSURE = 0 MPa G
   MAXIMUM OPERATING TEMPERATURE = 66°C
   DESIGN CLASS AND QA CLASS = 7G
   SEISMIC CLASS = C

36. PIPING DESIGN SPECIFICATION AS FOLLOWS:
   A. MAXIMUM OPERATING PRESSURE - SEE SPECIFIC BOUNDARIES ON DRAWING
   B. MAXIMUM OPERATING TEMPERATURE - SEE SPECIFIC BOUNDARIES ON DRAWING
   C. MATERIAL - SEE TABLE S
   D. PIPING THICKNESS - SEE TABLE S
   E. ASME CLASS - SEE SPECIFIC BOUNDARIES ON DRAWING
   F. QUALITY CLASS - SEE SPECIFIC BOUNDARIES ON DRAWING
   G. SEISMIC CLASS - SEE SPECIFIC BOUNDARIES ON DRAWING
   H. FLUID - SEE TABLE S

37. THE RELIEF VALVE (TSM-G) NOT REQUIRED IF INTERNAL PROTECTION IS PROVIDED WITHIN (TSM-T) TO LIMIT THE DIFFERENTIAL PRESSURE ACROSS THE SENSING ELEMENT.

38. THE INSTRUMENT LINES SHALL BE SEISMIC CLASS AS FROM THE LAST ANCHOR POINT TO THE PRESSURE TRANSMITTERS PT008 AND PT301

39. PROVIDES INTERFACE BETWEEN SEISMIC CATEGORY I AND NON-SEISMIC CATEGORY PIPING

40. THE MAXIMUM OPERATING TEMPERATURE OF THE FEEDWATER LINE FROM THE CLEANUP WATER SYSTEM (CU) THE (LPFL) DOWNSTREAM OF THE MOTOR OPERATED VALVE MPL B21-F003 SHALL BE DETERMINED BY THE DESIGNER OF THE FEEDWATER SYSTEM

41. PIPE WITH A DESIGN PRESSURE OF 2.82 MPa G OR GREATER SHALL HAVE ITS MINIMUM WALL THICKNESS NO LESS THAN THAT OF SCHEDULE 80 PIPE. WHERE THE DESIGN PRESSURE OF 50A PIPING, SCHEDULE 80 PIPE SHALL BE USED IF REQUIRED BY THE DESIGN PRESSURE OR OTHER REQUIREMENTS.

42. VALVES WITH A DESIGN PRESSURE OF 7.07 MPa G OR GREATER SHALL HAVE A MINIMUM CLASS OF 600 AND A HIGHER CLASS IF REQUIRED BY THE DESIGN PRESSURE.

43. THE FLOW CONTROL STATION CONTAINS THE EQUIPMENT NECESSARY FOR LOCAL FLOW INDICATION AND LOCAL FLOW CONTROL

REFERENCE DOCUMENT UNDER THE FOLLOWING IDENTIFIES ARE TO BE USED IN CONJUNCTION WITH THIS DRAWING

	MPL NO.
1. WATER QUALITY REQUIREMENTS	A11-3040
2. REACTOR PRESSURE VESSEL SYSTEM, ID	B11-2020
3. NUCLEAR BOILER SYS, P&ID DATA	B21-1010
4. NUCLEAR BOILER SYSTEM, PD	B21-1030
5. NUCLEAR BOILER SYSTEM, ID	B21-1030
6. NOT USED	-------
7. NOT USED	-------
8. NOT USED	-------
9. CONTROL ROD DRIVE SYSTEM, P&ID	C12-1010
10. REACTOR RECIRCULATION SYSTEM, P&ID	B31-1010
11. FEEDWATER CONTROL SYSTEM ID3	C31-1030
12. FEEDWATER CONTROL SYSTEM ID	C31-1040
13. REMOTE SHUTDOWN SYSTEM ID	C61-1040
14. REACTOR PROTECTION SYSTEM, ID	C71-1040
15. RECIRCULATION FLOW CONTROL SYS, ID	C85-1030
16. RECIRCULATION FLOW CONTROL SYS, ID	C81-1040
17. RESIDUAL HEAT REMOVAL SYSTEM, P&ID	E11-1010
18. RESIDUAL HEAT REMOVAL SYSTEM, ID	E11-1030
19. HIGH PRESSURE CORE FLOODER SYSTEM, ID	E22-1030
20. LEAK DETECTION AND ISOLATION SYSTEM, ID	E31-1030
21. LEAK DETECTION AND ISOLATION SYSTEM, ID	E31-1040
22. REACTOR CORE ISOLATION COOLING SYSTEM, P&ID	E51-1010
23. REACTOR CORE ISOLATION COOLING SYSTEM, ID	E51-1030
24. REACTOR WATER CLEANUP SYS, P&ID	G31-1010
25. LIQUID WASTE, RADWASTE SYSTEM, P&ID	K17-1010
26. LOW CONDUCTIVITY WASTE, RADWASTE SYSTEM, P&ID	K17-1010
27. TURBINE MAIN STEAM SYSTEM, P&ID	N31-1010
28. CONDENSATE AND FEEDWATER SYSTEM, P&ID	N21-1010
29. TURBINE CONTROL SYSTEM, ID	N32-1030
30. TURBINE CONTROL SYSTEM, ID	N32-1040
31. STEAM BYPASS & PRESSURE CONTROL SYS, ID	C85-1040
32. MAIN CONDENSER	N63-1010
33. INSTRUMENT AIR SYSTEM, P&ID	P52-1010
34. HIGH PRESS NITROGEN GAS SUPPLY SYS, P&ID	P54-1010
35. VALVE GLAND LEAKAGE TREATMENT, RADWASTE SYS, P&ID	K17-1010
36. SAMPLING SYSTEM, P&ID	P81-1010
37. NOT USED	-------
38. NOT USED	-------
39. ATMOSPHERIC CONTROL SYSTEM P&ID	T31-1010
40. MAIN STEAM PIPING EQUIPMENT REQUIREMENTS SPECIFICATION SUPPORT DRAWING	B21-G001

‡ DENOTES THAT THIS COMPONENT IS PART OF AN ASSEMBLY WHERE THE ENTIRE ASSEMBLY HAS ONE MPL NUMBER.

** REFERENCE INFORMATION TO BE PROVIDED AS INTERFACE DOES NOT AFFECT THE DESIGN INFORMATION SHOWN ON THIS DRAWING OR ITS VERIFICATION

SUPPORTING DOCUMENTS	MPL NO.
1. NUCLEAR PLANT SYSTEM STRUCTURE	A10-3010
2. PIPING AND INSTRUMENT SYMBOLS	A10-3030
3. GROUP CLASSIFICATION AND CONTAINMENT ISOLATION BOUNDAR	A11-1030
4. PROCESS INSTRUMENTATION REQUIREMENT SPEC	A11-3030

MPL NO. B21-1010

Figure 5.1-3 Nuclear Boiler System P&ID (Sheet 1 of 11)

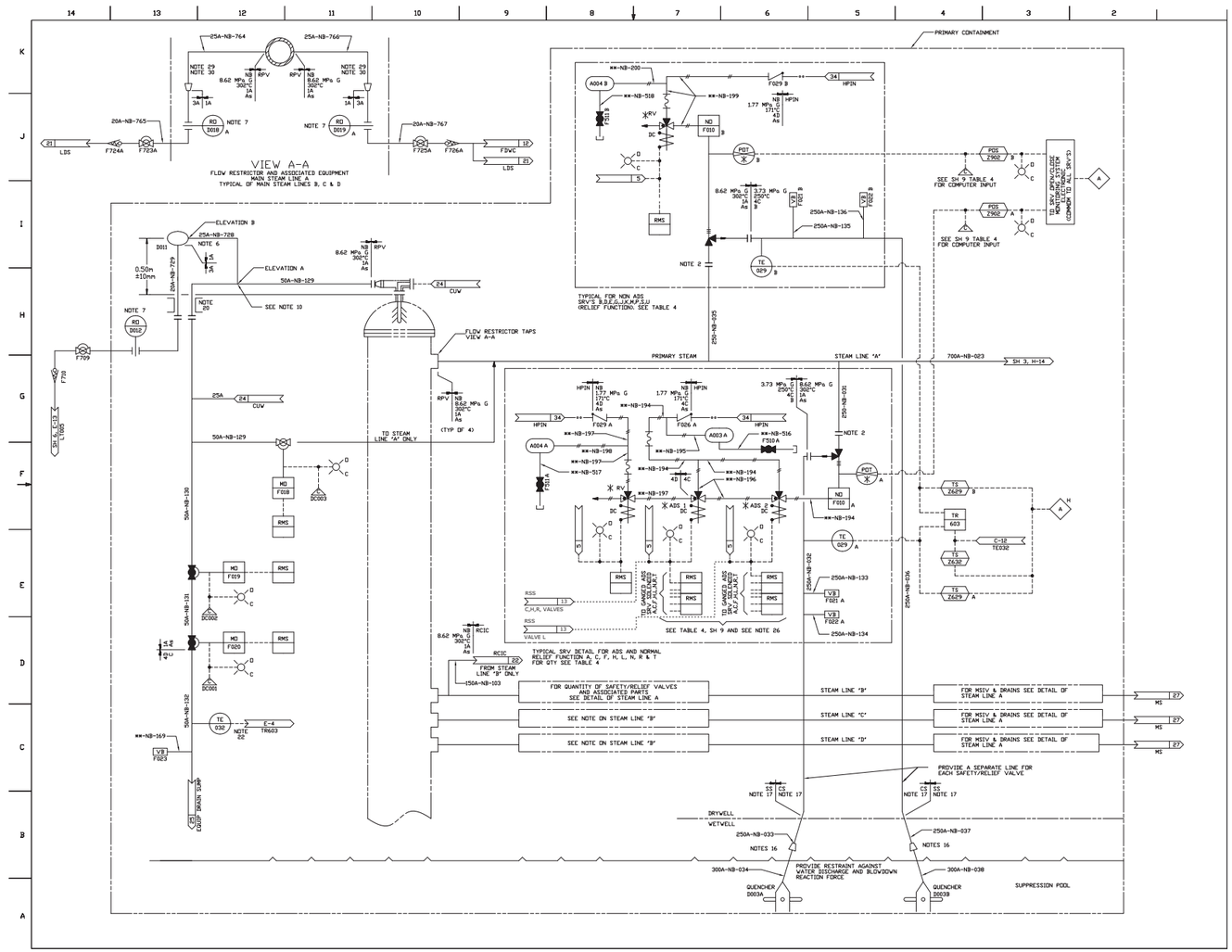


Figure 5.1-3 Nuclear Boiler System P&ID (Sheet 2 of 11)

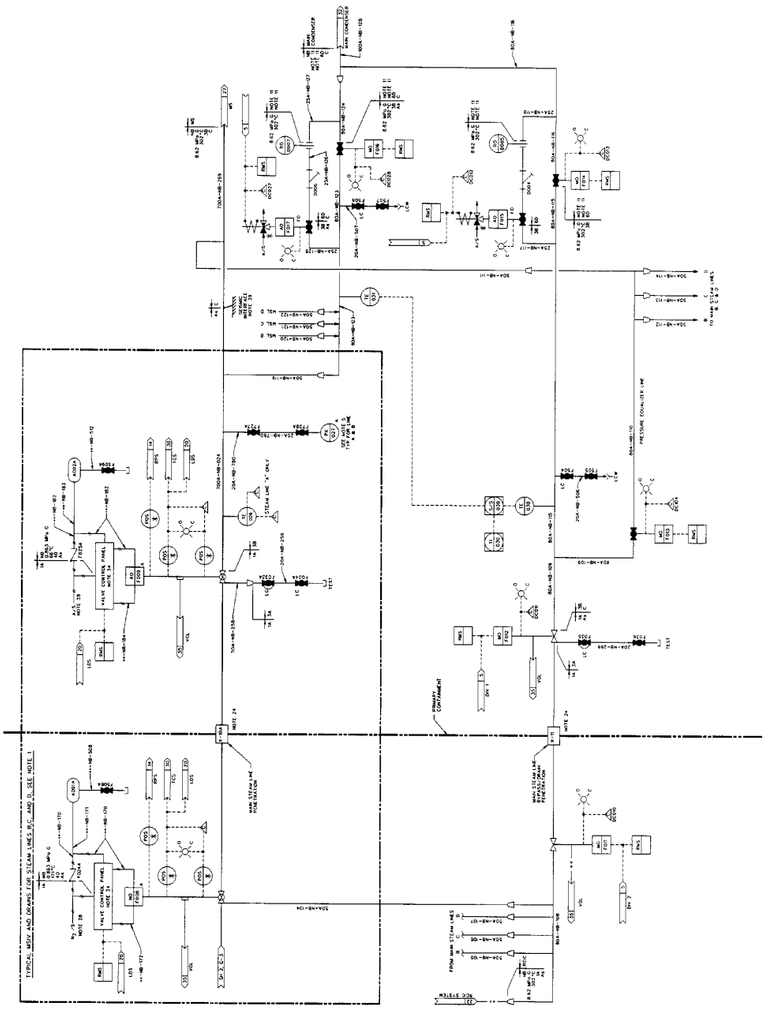


Figure 5.1-3 Nuclear Boiler System P&ID (Sheet 3 of 11)

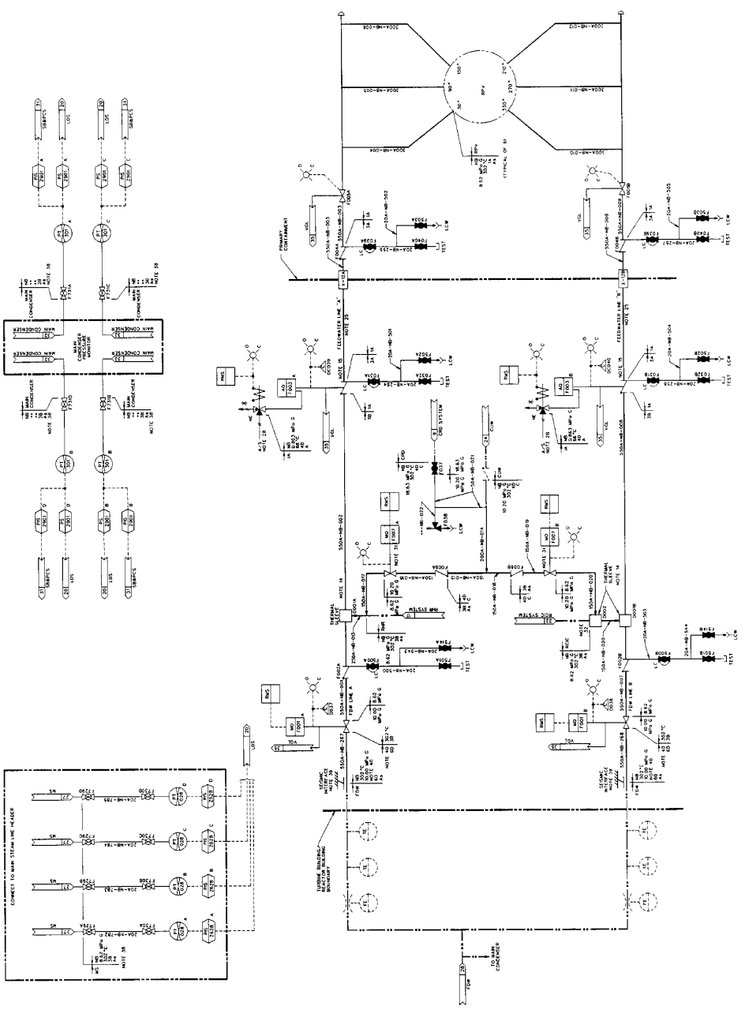


Figure 5.1-3 Nuclear Boiler System P&ID (Sheet 4 of 11)

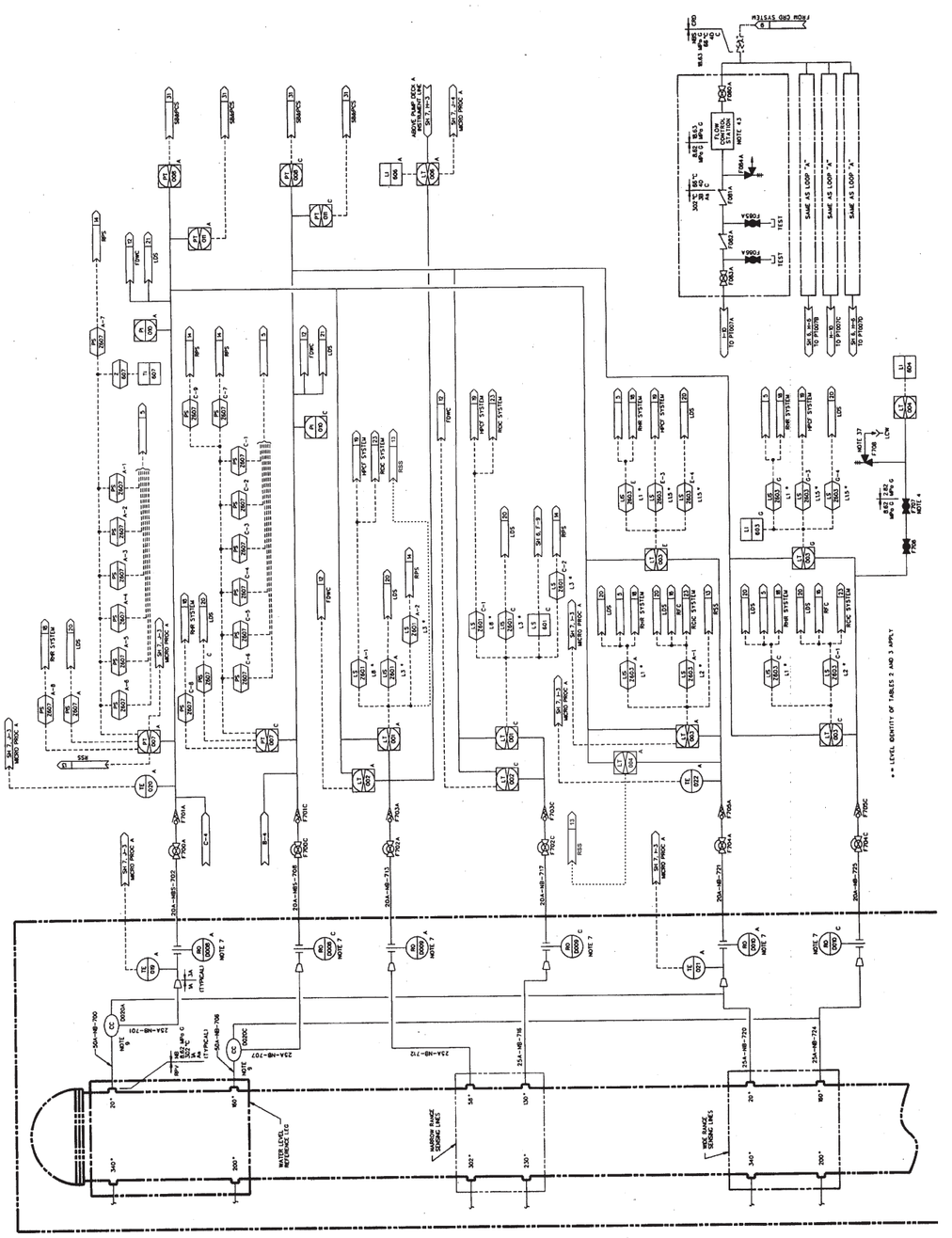


Figure 5.1-3 Nuclear Boiler System P&ID (Sheet 5 of 11)

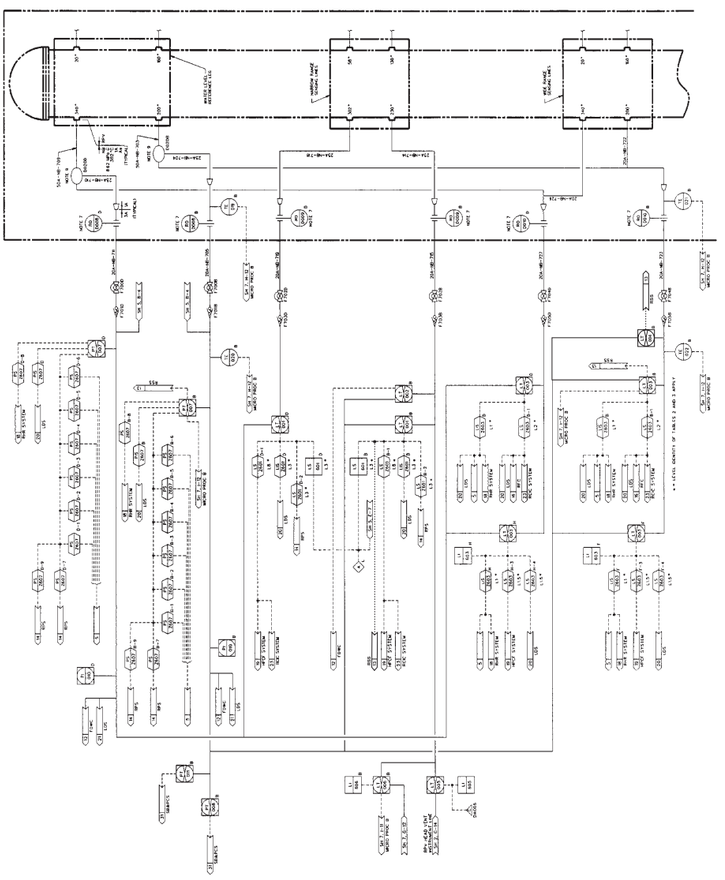


Figure 5.1-3 Nuclear Boiler System P&ID (Sheet 6 of 11)

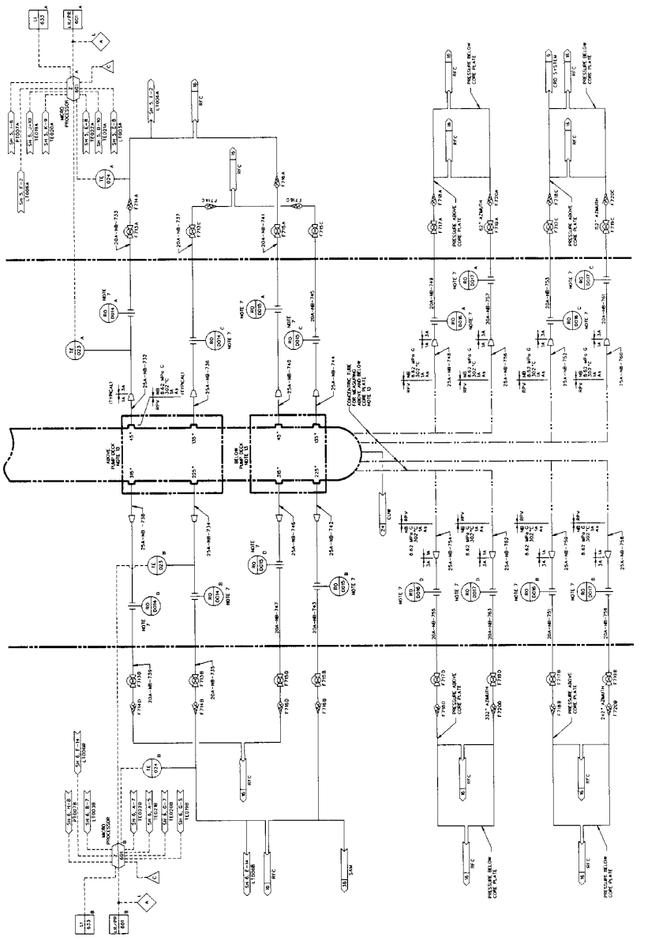


Figure 5.1-3 Nuclear Boiler System P&ID (Sheet 7 of 11)

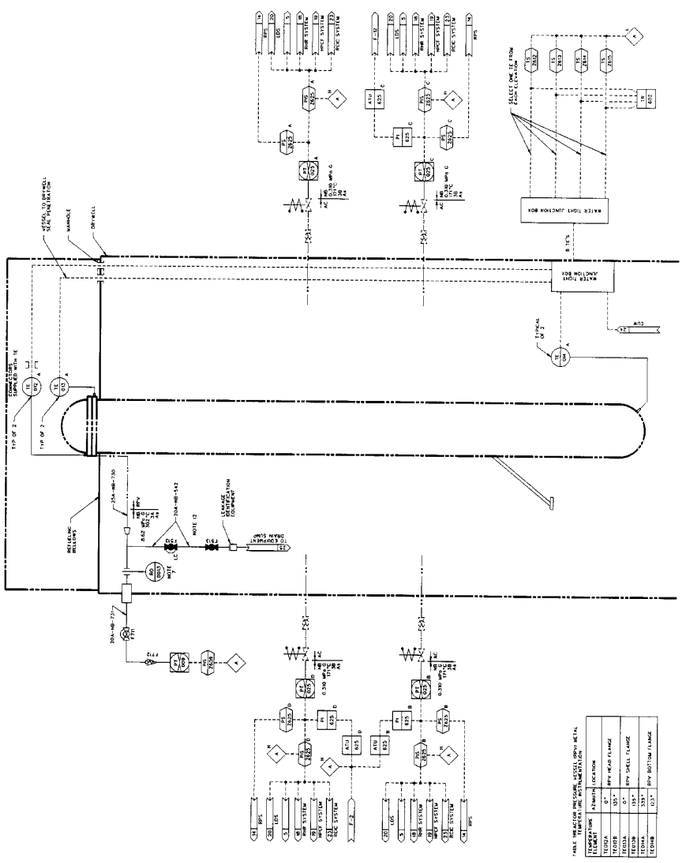


Figure 5.1-3 Nuclear Boiler System P&ID (Sheet 8 of 11)

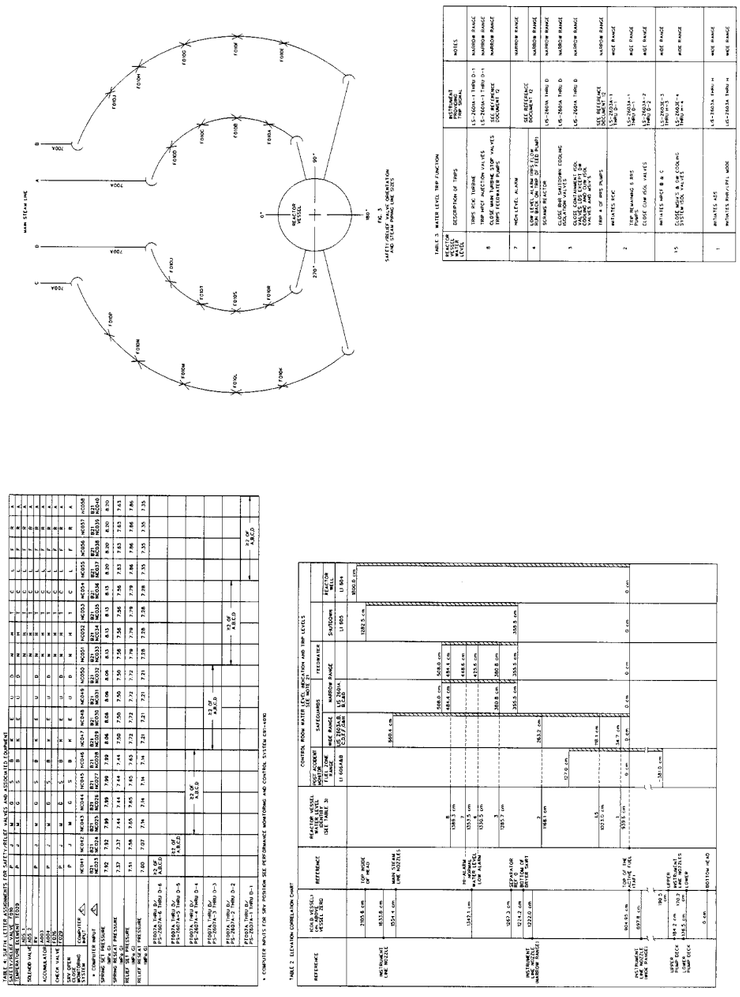


Figure 5.1-3 Nuclear Boiler System P&ID (Sheet 9 of 11)

TABLE 5: PIPING SPECIFICATIONS

PIPE NO.	SCHEDULE	MATERIAL	FLUID
001	**	CS	W
002	**	CS	W
003	100	CS	W
004	100	CS	W
005	100	CS	W
006	100	CS	W
007	**	CS	W
008	**	CS	W
009	160	CS	W
010	160	CS	W
011	100	CS	W
012	100	CS	W
013	**	CS	W
014	**	CS	W
015	**	CS	W
016	**	CS	W
017	**	CS	W
018	**	CS	W
019	**	CS	W
020	**	CS	W
021	**	CS	W
022	**	CS	W
023	80	CS	S
024	**	CS	S
025	80	CS	S
026	**	CS	S
027	80	CS	S
028	**	CS	S
029	80	CS	S
030	**	CS	S
031	N/A	CS	S
032	80	CS	S
033	60	SS	S
034	80	SS	S
035	N/A	CS	S
036	80	CS	S
037	80	SS	S
038	60	SS	S
039	N/A	CS	S
040	80	CS	S
041	80	SS	S
042	60	SS	S
043	N/A	CS	S
044	80	CS	S
045	60	SS	S
046	60	SS	S
047	N/A	CS	S
048	80	CS	S
049	80	SS	S
050	60	SS	S
051	N/A	CS	S
052	80	CS	S
053	60	SS	S
054	40	SS	S
055	N/A	CS	S
056	80	CS	S
057	80	SS	S
058	40	SS	S
059	N/A	CS	S
060	80	CS	S
061	80	SS	S
062	80	SS	S
063	N/A	CS	S
064	80	CS	S
065	60	SS	S
066	80	SS	S
067	N/A	CS	S
068	80	CS	S
069	60	SS	S
070	60	SS	S
071	N/A	CS	S
072	80	CS	S
073	80	SS	S
074	60	SS	S
075	N/A	CS	S
076	80	CS	S
077	60	SS	S
078	80	SS	S
079	N/A	CS	S
080	80	CS	S

TABLE 5: PIPING SPECIFICATIONS (CONT'D)

PIPE NO.	SCHEDULE	MATERIAL	FLUID
081	80	SS	S
082	80	SS	S
083	N/A	CS	S
084	80	CS	S
085	80	SS	S
086	80	SS	S
087	N/A	CS	S
088	80	CS	S
089	80	SS	S
090	80	SS	S
091	N/A	CS	S
092	80	CS	S
093	80	SS	S
094	80	SS	S
095	N/A	CS	S
096	80	CS	S
097	80	SS	S
098	N/A	CS	S
099	N/A	CS	S
100	80	CS	S
101	80	SS	S
102	80	SS	S
103	120	CS	S
104	160	CS	S
105	160	CS	S
106	160	CS	S
107	160	CS	S
108	160	CS	S
109	--	CS	S
110	--	CS	S
111	**	CS	S
112	**	CS	S
113	**	CS	S
114	**	CS	S
115	**	CS	S
116	**	CS	S
117	**	CS	S
118	**	CS	S
119	**	CS	S
120	**	CS	S
121	**	CS	S
122	**	CS	S
123	**	CS	S
124	**	CS	S
125	**	CS	S
126	**	CS	S
127	**	CS	S
128	**	CS	S
129	80	CS	S
130	80	CS	S
131	80	CS	S
132	**	CS	S
133	80	CS	S
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150	80	CS	S
151	80	CS	S
152	60	CS	S
153	80	CS	S
154	80	CS	S
155	80	CS	S
156	80	CS	S
157	80	CS	S
158	80	CS	S
159	80	CS	S
160	80	CS	S

TABLE 5: PIPING SPECIFICATIONS (CONT'D)

PIPE NO.	SCHEDULE	MATERIAL	FLUID
161	80	CS	S
162	80	CS	S
163	80	CS	S
164	80	CS	S
165	80	CS	S
166	80	CS	S
167	80	CS	S
168	**	SS	N
169	**	SS	N
170	**	SS	N
171	**	SS	N
172	**	SS	N
173	**	SS	N
174	**	SS	N
175	**	SS	N
176	**	SS	N
177	**	SS	N
178	**	SS	N
179	**	SS	N
180	**	SS	N
181	**	SS	N
182	**	SS	A
183	**	SS	A
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186	**	SS	A
187	**	SS	A
188	**	SS	A
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191	**	SS	A
192	**	SS	A
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200	**	SS	N
201	**	SS	N
202	**	SS	N
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204	**	SS	N
205	**	SS	N
206	**	SS	N
207	**	SS	N
208	**	SS	N
209	**	SS	N
210	**	SS	N
211	**	SS	N
212	**	SS	N
213	**	SS	N
214	**	SS	N
215	**	SS	N
216	**	SS	N
217	**	SS	N
218	**	SS	N
219	**	SS	N
220	**	SS	N
221	**	SS	N
222	**	SS	N
223	**	SS	N
224	**	SS	N
225	**	SS	N
226	**	SS	N
227	**	SS	N
228	**	SS	N
229	**	SS	N
230	**	SS	N
231	**	SS	N
232	**	SS	N
233	**	SS	N
234	**	SS	N
235	**	SS	N
236	**	SS	N
237	**	SS	N
238	**	SS	N
239	**	SS	N
240	**	SS	N

TABLE 5: PIPING SPECIFICATIONS (CONT'D)

PIPE NO.	SCHEDULE	MATERIAL	FLUID
241	**	SS	N
242	**	SS	N
243	**	SS	N
244	**	SS	N
245	**	SS	N
246	**	SS	N
247	**	SS	N
248	**	SS	N
249	**	SS	N
250	**	SS	N
251	**	SS	N
252	**	SS	N
253	**	SS	N
254	160	CS	W
255	160	CS	W
256	160	CS	W
257	160	CS	W
258	160	CS	S
259	160	CS	S
260	60	CS	S
261	160	CS	S
262	160	CS	S
263	160	CS	S
264	160	CS	S
265	160	CS	S
266	**	CS	S
267	**	CS	W
268	**	CS	W
269	**	CS	S
270	**	CS	S
271	**	CS	S
272	**	CS	S
500	**	CS	W
501	160	CS	W
502	160	CS	W
503	**	CS	W
504	160	CS	W
505	160	CS	W
506	**	CS	S
507	**	CS	S
508	**	SS	N
509	**	SS	A
510	**	SS	N
511	**	SS	N
512	**	SS	N
513	**	SS	A
514	**	SS	N
515	**	SS	A
516	**	SS	N
517	**	SS	N
518	**	SS	N
519	**	SS	N
520	**	SS	N
521	**	SS	N
522	**	SS	N
523	**	SS	N
524	**	SS	N
525	**	SS	N
526	**	SS	N
527	**	SS	N
528	**	SS	N
529	**	SS	N
530	**	SS	N
531	**	SS	N
532	**	SS	N
533	**	SS	N
534	**	SS	N
535	**	SS	N
536	**	SS	N
537	**	SS	N
538	**	SS	N
539	**	SS	N
540	**	SS	N
541	**	SS	N
542	**	CS	S
543	160	CS	W
544	40	CS	W

TABLE 5: PIPING SPECIFICATIONS (CONT'D)

PIPE NO.	SCHEDULE	MATERIAL	FLUID
700	80	SS	S
701	**	SS	W
702	**	SS	W
703	80	SS	S
704	**	SS	W
705	**	SS	W
706	80	SS	S
707	**	SS	W
708	**	SS	W
709	80	SS	S
710	**	SS	W
711	**	SS	W
712	80	SS	W
713	**	SS	S
714	80	SS	W
715	**	SS	W
716	80	SS	W
717	**	SS	W
718	80	SS	W
719	**	SS	W
720	80	SS	W
721	**	SS	W
722	80	SS	W
723	**	SS	W
724	80	SS	W
725	**	SS	W
726	80	SS	W
727	**	SS	W
728	**	CS	S
729	**	SS	W
730	**	SS	S
731	**	SS	S
732	80	SS	W
733	**	SS	W
734	80	SS	W
735	**	SS	W
736	80	SS	W
737	**	SS	W
738	80	SS	W
739	**	SS	W
740	80	SS	W
741	**	SS	W
742	80	SS	W
743	**	SS	W
744	80	SS	W
745	**	SS	W
746	80	SS	W
747	**	SS	W
748	80	SS	W
749	**	SS	W
750	80	SS	W
751	**	SS	W
752	80	SS	W
753	**	SS	W
754	80	SS	W
755	**	SS	W
756	80	SS	W
757	**	SS	W
758	80	SS	W
759	**	SS	W
760	80	SS	W
761	**	SS	W
762	80	SS	W
763	**	SS	W
764	**	SS	S
765	**	SS	W
766	**	SS	S
767	**	SS	W
768	**	SS	W
769	**	SS	W
770	**	SS	S
771	**	SS	W
772	**	SS	S
773	**	SS	W
774	**	SS	S
775	**	SS	W
776	**	SS	S
777	**	SS	W
778	**	SS	S
779	**	SS	W

TABLE 5: PIPING SPECIFICATIONS (CONT'D)

PIPE NO.	SCHEDULE	MATERIAL	FLUID
780	**	CS	S
781	**	SS	W
782	**	SS	W
783	**	SS	S
784	**	SS	S
785	**	SS	S

Figure 5.1-3 Nuclear Boiler System P&ID (Sheet 10 of 11)

TABLE 6 : PIPE NUMBERS FOR THE MAIN STEAM LINES

MAIN STEAM LINE	RPV TO THE OUTBOARD MSIV	OUTBOARD MSIV TO SEISMIC INTERFACE	SEISMIC INTERFACE TO MAIN STEAM TUNNEL	OUTBOARD MSIV TEST LINE	
				OUTBOARD MSIV TO REDUCER	DOWNSTREAM OF REDUCER
A	700A-MB-023	700A-MB-024	700A-MB-269	50A-MB-258	20A-MB-259
B	700A-MB-025	700A-MB-026	700A-MB-270	50A-MB-260	20A-MB-261
C	700A-MB-027	700A-MB-028	700A-MB-271	50A-MB-262	20A-MB-263
D	700A-MB-029	700A-MB-030	700A-MB-272	50A-MB-264	20A-MB-265

TABLE 7 : PIPE NUMBERS FOR THE SAFETY/RELIEF VALVE (SRV) DISCHARGE LINES

SRV	SRV DISCHARGE LINE				VACUUM BREAKER LINES	
	MSL TO SRV NOTE 2	SRV TO DIAPHRAGM FLOOR	DIAPHRAGM FLOOR TO REDUCER	REDUCER TO QUENCHER	UPSTREAM	DOWNSTREAM
F001A	350A-ME-031	250A-MB-037	250A-MB-053	300A-MB-034	250A-MD-133	250A-MD-134
F001B	250A-MB-035	250A-MB-036	250A-MB-037	300A-MB-038	250A-MD-135	250A-MD-136
F001C	250A-MB-039	250A-MB-040	250A-MB-041	300A-MB-042	250A-MD-137	250A-MB-138
F001D	250A-MB-043	250A-MB-044	250A-MB-045	300A-MB-046	250A-MD-139	250A-MD-140
F001E	250A-MB-047	250A-MB-048	250A-MB-049	300A-MB-050	250A-MB-141	250A-MB-142
F001F	250A-MB-051	250A-MB-052	250A-MB-053	300A-MB-054	250A-MB-143	250A-MD-144
F001G	250A-MB-055	250A-MB-056	250A-MB-057	300A-MB-058	250A-MD-145	250A-MD-146
F001H	250A-MB-059	250A-MB-060	250A-MB-061	300A-MB-062	250A-MD-147	250A-MD-148
F001J	250A-MB-063	250A-MB-064	250A-MB-065	300A-MB-066	250A-MD-149	250A-MD-150
F001K	250A-MB-067	250A-MB-068	250A-MB-069	300A-MB-070	250A-MB-151	250A-MD-152
F001L	250A-MB-071	250A-MB-072	250A-MB-073	300A-MB-074	250A-MD-153	250A-MB-154
F001M	250A-MB-075	250A-MB-076	250A-MB-077	300A-MB-078	250A-MB-155	250A-MB-156
F001N	250A-MB-079	250A-MB-080	250A-MB-081	300A-MB-082	250A-MB-157	250A-MB-158
F001P	250A-MB-083	250A-MB-084	250A-MB-085	300A-MB-086	250A-MB-159	250A-MB-160
F001R	250A-MB-087	250A-MB-088	250A-MB-089	300A-MB-090	350A-MB-181	350A-MB-182
F001S	250A-MB-091	250A-MB-092	250A-MB-093	300A-MB-094	350A-MB-183	350A-MB-184
F001T	250A-MB-095	250A-MB-096	250A-MB-097	300A-MB-098	250A-MB-185	250A-MB-186
F001U	250A-MB-099	250A-MB-100	250A-MB-101	300A-MB-102	250A-MB-187	250A-MB-188

TABLE 8 : PIPE NUMBERS FOR THE SAFETY/RELIEF VALVE (SRV) PNEUMATIC LINES

SRV	MSL FLOW RESTRICTOR INSTRUMENT LINES						
	INSTRUMENT LINE TO LOG		INSTRUMENT LINE TO LOG & PENC				MSL PRESSURE TEST POINT
	MSL TO REDUCER	REDUCER TO EXCESS FLOW CHECK VALVE	MSL TO REDUCER	REDUCER TO EXCESS FLOW CHECK VALVE			
A	25A-MB-764	20A-MB-765	25A-MB-766	20A-MB-767			20A-MB-780
B	25A-MB-768	20A-MB-769	25A-MB-770	20A-MB-771			20A-MB-781
C	25A-MB-772	20A-MB-773	25A-MB-774	20A-MB-775			-
D	25A-MB-776	20A-MB-777	25A-MB-778	20A-MB-779			-

TABLE 9 : PIPE NUMBERS FOR THE SAFETY/RELIEF VALVE (SRV) PNEUMATIC LINES

SRV	MSIV PNEUMATIC LINES				PNEUMATIC LINES FOR POWER-ACTUATED RELIEF		
	CHECK VALVE TO SRV "ADS 2" TO SRV	BRANCH LINE FROM ACCUMULATOR	BRANCH LINE FROM SRV "ADS 2" TO SOV "ADS 2"	ACCUMULATOR DRAIN LINE	CHECK VALVE TO SOLENOID VALVE OR SRV "ADS 2"	BRANCH LINE FROM ACCUMULATOR	ACCUMULATOR DRAIN LINE
F001A	***-MB-194	***-MB-195	***-MB-196	***-MB-548	***MB-197	***-MB-198	***-MB-517
F001B					***MB-199	***-MB-200	***-MB-518
F001C	***-MB-201	***-MB-202	***-MB-203	***-MB-519	***-MB-204	***-MB-205	***-MB-520
F001D					***-MB-208	***-MB-207	***-MB-521
F001E					***-MB-208	***MB-209	***MB-522
F001F	***-MB-210	***-MB-211	***-MB-212	***-MB-523	***-MB-213	***-MB-214	***-MB-524
F001G					***-MB-210	***-MB-216	***-MB-525
F001H	***-ME-217	***-MB-218	***-MB-219	***-MB-526	***-MB-220	***-MB-221	***-MB-527
F001J					***-ME-222	***-MB-223	***-MB-528
F001K					***-MB-224	***-MB-225	***-MB-529
F001L	***-MB-226	***-MB-227	***-MB-228	***-MB-530	***-MB-229	***-MB-230	***-MB-531
F001M					***-MB-231	***-MB-232	***-MB-532
F001N	***-MB-233	***-MB-234	***-MB-235	***-MB-533	***-MB-236	***-MB-237	***-MB-534
F001P					***-MB-238	***-MB-239	***-MB-535
F001R	***MB-240	***MB-241	***-MB-242	***-MB-538	***-MB-243	***-MB-244	***-MB-537
F001S					***-MB-245	***-MB-246	***MB-538
F001T	***-MB-247	***-MB-248	***-MB-249	***-MB-539	***-MB-250	***-MB-251	***-MB-540
F001U					***-MB-252	***-MB-253	***-MB-541

TABLE 9 : PIPE NUMBERS FOR THE MAIN STEAM ISOLATION VALVE (MSIV) PNEUMATIC LINES

MSIV	OPENING-CHECK VALVE TO MSIV	OPENING-FROM ACCUMULATOR	CLOSING-VALVE CONTROL PANEL TO MSIV	DRAIN LINE
F002A	***-MB-173	***-MB-171	***-MB-172	***-MB-508
F002B	***-MB-173	***-MB-174	***-MB-175	***-MB-509
F002C	***-MB-176	***-MB-177	***-MB-178	***-MB-510
F002D	***-MB-179	***-MB-180	***-MB-181	***-MB-511
F002A	***-MB-182	***-MB-183	***-MB-184	***-MB-512
F002B	***-MB-185	***-MB-186	***-MB-187	***-MB-513
F002C	***-MB-188	***-MB-189	***-MB-190	***-MB-514
F002D	***-MB-191	***-MB-192	***-MB-193	***-MB-515

Figure 5.1-3 Nuclear Boiler System P&ID (Sheet 11 of 11)

NOTES:

1. ALL SIGNALS ARE TRANSMITTED AS SERIAL DATA TO EACH TLU OR SLU THROUGH EACH SERIAL OUTPUT.

2. FOUR TEMPERATURE ELEMENTS SHALL BE LOCATED AT APPROXIMATELY EQUAL INTERVALS IN THE VERTICAL DIRECTION SO AS TO SENSE AMBIENT TEMPERATURES OVER THE FULL HEIGHT OF THE DRYWELL.

3. TEMPERATURE DETECTORS SHALL BE LOCATED OR SHIELDED SO THAT THE DETECTOR IS SENSITIVE TO THE AIR TEMPERATURE AND NOT THE RADIATED HEAT FROM HOT EQUIPMENT.

4. ALL INSTRUMENT LINES THAT CONNECT TO THE REACTOR COOLANT PRESSURE BOUNDARY AND PENETRATE THE CONTAINMENT WALL SHALL HAVE 6.35 MM RESTRICTING ORIFICES INSIDE THE CONTAINMENT. SEE SUPPORTING DOCUMENTS 2&3 FOR ADDITIONAL REQUIREMENTS

5. EACH INSTRUMENT LINE THROUGH THE CONTAINMENT WALL SHALL HAVE TWO ISOLATION VALVES OUTSIDE THE CONTAINMENT LOCATED AS CLOSE TO THE CONTAINMENT AS PRACTICAL

6. SOLENOID OPERATED GLOBE VALVES MAY BE ADOPTED FOR THE AIR OPERATED VALVES

7. THIS DOCUMENT PROVIDES A FUNCTIONAL DESCRIPTION OF THE REQUIRED SYSTEM AND ITS INTERFACES WITH OTHER SYSTEMS. CONTROL INSTRUMENTATION DIAGRAMS ADDRESS DETAILS OF THE METHODS BY WHICH SIGNALS FROM THESE COMPONENTS WILL BE PROCESSED. UNIT PROCESSING MAY INVOLVE THE PLANT MULTIPLEXING SYSTEM (PMS) OR THE SAFETY SYSTEM LOGIC AND CONTROL. ELECTRICAL ISOLATION REQUIREMENTS SHOWN ON THIS DRAWING MAY BE UNNECESSARY IF MULTIPLEXED SIGNAL TRANSMISSION PROVIDES INHERENT ISOLATION.

8. ALL ALARMS SHALL BE LOCATED IN THE MAIN CONTROL ROOM

9. ALL INPUTS TO CRT/PMCS SHALL BE CONTINUOUSLY RECORDED.

10. THE LDS SHALL BE DESIGNED IN ACCORDANCE WITH THE SYSTEM DESIGN IN THIS IED. THE LDS DOES NOT CONTROL VALVES OR PUMPS. THE MOTOR OPERATED VALVES, WHICH ARE PART OF OTHER SYSTEMS, ARE NOT SHOWN IN THIS IED. THOSE VALVES ARE SHOWN ON THE LDS-MD — INTERLOCK BLOCK DIAGRAM (E31-1030)

11. FOR REACTOR WATER LEVELS MONITORING, SEE B21-1010.

12. FOR DRYWELL PRESSURE MONITORING SEE B21-1010

13. FOR DETECTION OF RADIATION LEAKAGE INTO COOLING WATER SUPPLYING RECIRC PUMP, RHR, AND CUW HEAT EXCHANGERS, SEE D11-1040

14. LETTER DESIGNATIONS FOR FOUR DIVISIONS ARE AS FOLLOWS

    A, F, J, M = DIVISION 1
    B, F, K, P = DIVISION 2
    C, G, L, R = DIVISION 3
    D, M, N, S = DIVISION 4

15. IF HEAT TRACING OF SAMPLE LINE IS NECESSARY TO PREVENT CONDENSATION, THE MAXIMUM ALLOWABLE SAMPLE TEMPERATURE IS LIMITED BY THE PHOTO MULTIPLIER TUBES IN THE MONITORING CHANNELS.

16. BALL VALVE MAY BE ADOPTED FOR THIS GATE VALVE

17. DTM, TLU, SLU, OLU ARE PART OF SAFETY SYSTEM LOGIC AND CONTROL. (SEE REFERENCE DOCUMENT (3).

    A. DTMs SHOWN ON SHEETS 3 & 4 PROCESS SENSOR INPUTS FOR MSIV ISOLATION TRIP LOGIC

    B. DTMs SHOWN ON SHEETS 5 & 6 PROCESS SENSOR INPUTS FOR ECCS ISOLATION TRIP LOGIC

    C. DTMs SHOWN ON SHEETS 7 & 10 PROCESS SENSOR INPUTS FOR AUXILIARY ESF ISOLATION TRIP LOGIC

    D. TLUs AND OLUs SHOWN ON SHEET 3 AND SHEET 4 PROCESS 2-OUT-OF-4 COINCIDENCE LOGIC FOR MSIV CLOSURE TRIP

    E. SLUs SHOWN ON SHEETS 5 & 6 PROCESS 2-OUT-OF-4 COINCIDENCE LOGIC FOR ECCS ISOLATION

    F. SLUs SHOWN ON SHEETS 7 & 10 PROCESS 2-OUT-OF 4 COINCIDENCE LOGIC FOR AUXILIARY ESF ISOLATION

18. RMUs, MUX, EWS AND NEWS ARE PART OF THE MULTIPLEXING SYSTEM (M23)

19. ALL INSTRUMENT LINES ARE 304-SS (STAINLESS STEEL) SCHEDULE 80, SAMPLING LINES ARE 316-SS SCHEDULE 40

REFERENCES

		MPL NO.
1	REACTOR CORE ISOLATION COOLING SYSTEM P&ID	E51-1010
2	NUCLEAR BOILER SYSTEM P&ID	B21-1040
3	REACTOR WATER CLEANUP SYSTEM P&ID	G31-1010
4	SAMPLING SYSTEM P&ID	P81-1010
5	PROCESS RADIATION MONITORING SYSTEM #D	D11-1040
6	RADWASTE SYSTEM P&ID	K17-1010
7	INSTRUMENT AIR SYSTEM P&ID	P52-1010
8	ESSENTIAL MULTIPLEXING SYSTEM #D	M23-1030
9	LEAK DETECTION & ISOLATION SYSTEM #D	E31-1030
10	REACTOR PROTECTION SYSTEM #D	C71-1040
11	STANDBY LIQUID CONTROL SYSTEM #D	C41-1030
12	SAFETY SYSTEM & LOGIC CONTROL DS	A32-5280
13	PERFORMANCE MONITORING & CONTROL SYSTEM #D	C61-1040
14	NEUTRON MONITORING SYSTEM #D	C51-1010
15	SUPPRESSION POOL CLEAN-UP SYSTEM P&ID	G51-1010
16	REACTOR BUILDING WATER CLEAN-UP SYSTEM P&ID	P31-1040
17	HVAC NORMAL COOLING WATER SYSTEM P&ID	P24-1010
18	STANDBY GAS TREATMENT SYSTEM P&ID	T22-1040
19	ATMOSPHERIC CONTROL SYSTEM P&ID	T31-1010
20	FLAMMABILITY CONTROL SYSTEM P&ID	T48-1010
21	HEATING, VENTILATING & AIR CONDITIONING P&ID	U41-1010

SUPPORTING DOCUMENTS

		MPL NO.
1	PIPING AND INSTRUMENT DIAGRAM SYMBOLS	A10-3030
2	PROCESS INSTRUMENTATION	A11-3030
3	GROUP CLASSIFICATION & CONTAINMENT ISOLATION DIAG	A11-1030

LEGEND

SERIAL MULTIPLEXED DATA

MULTIPLE INSTRUMENT ELECTRICAL WIRING

SERIAL DATA

ABBREVIATIONS

OLU = OUTPUT LOGIC UNIT
TLU = TRIP LOGIC UNIT
DTM = DIGITAL TRIP MODULE
RMU = REMOTE MULTIPLEXING UNIT
SLU = SAFETY SYSTEM LOGIC UNIT
EWS = ESSENTIAL MULTIPLEXING SYSTEM
NEWS = NON-ESSENTIAL MULTIPLEXING SYSTEM

MPL NO. E31-1040

Figure 5.2-8 Leak Detection and Isolation System IED (Sheet 1 of 10)

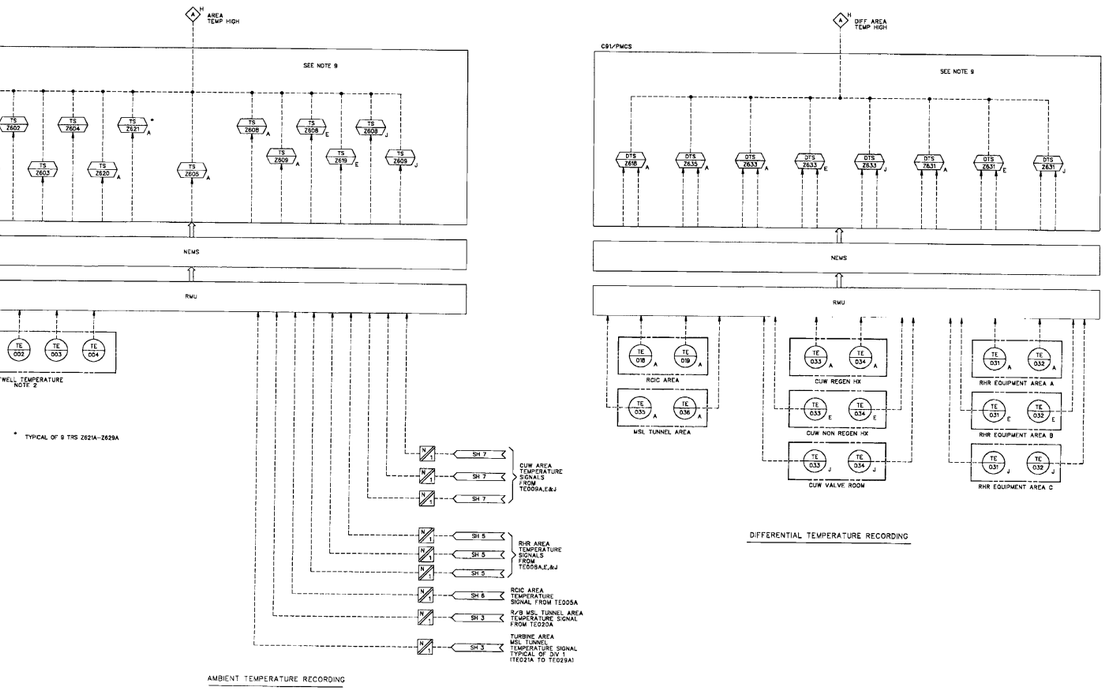
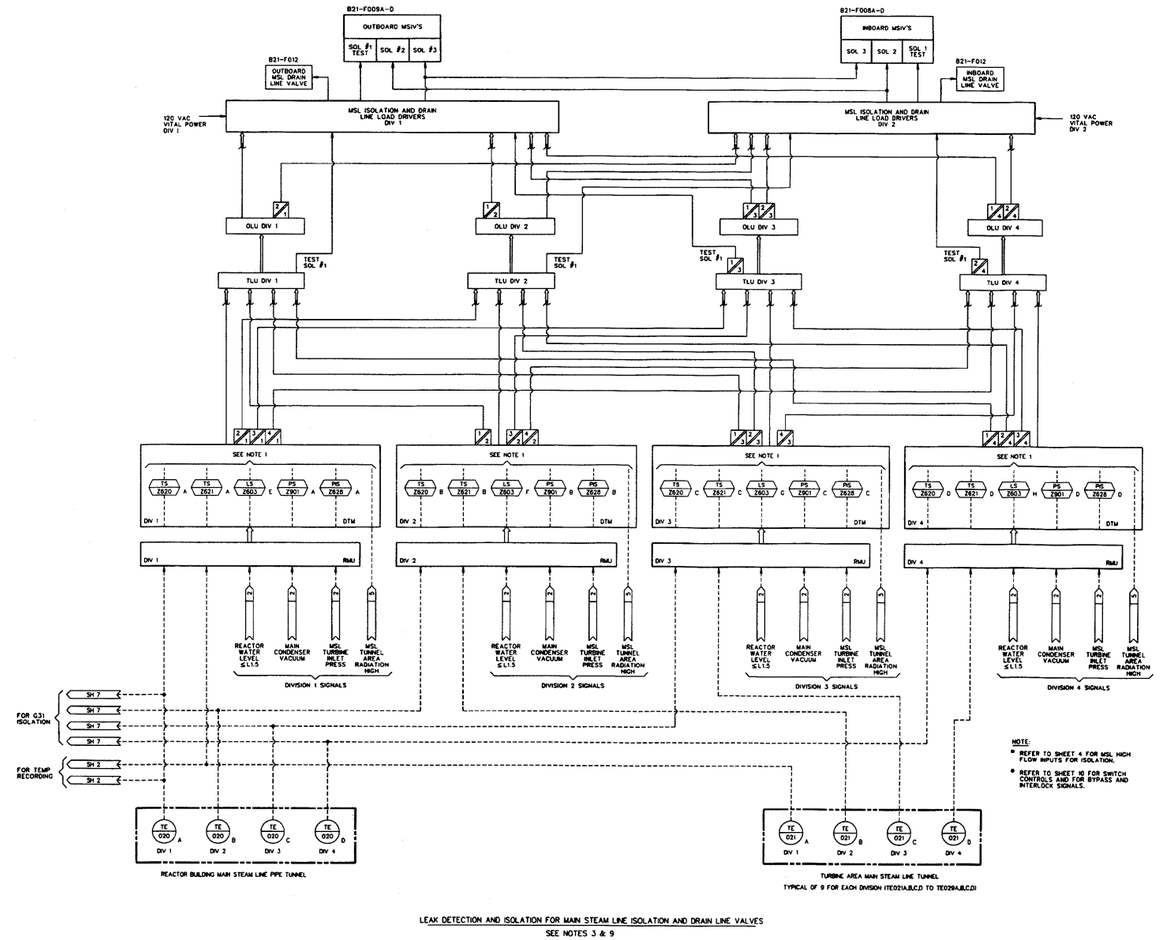


Figure 5.2-8 Leak Detection and Isolation System IED (Sheet 2 of 10)



LEAK DETECTION AND ISOLATION FOR MAIN STEAM LINE ISOLATION AND DRAIN LINE VALVES
SEE NOTES 3 & 9

Figure 5.2-8 Leak Detection and Isolation System IED (Sheet 3 of 10)

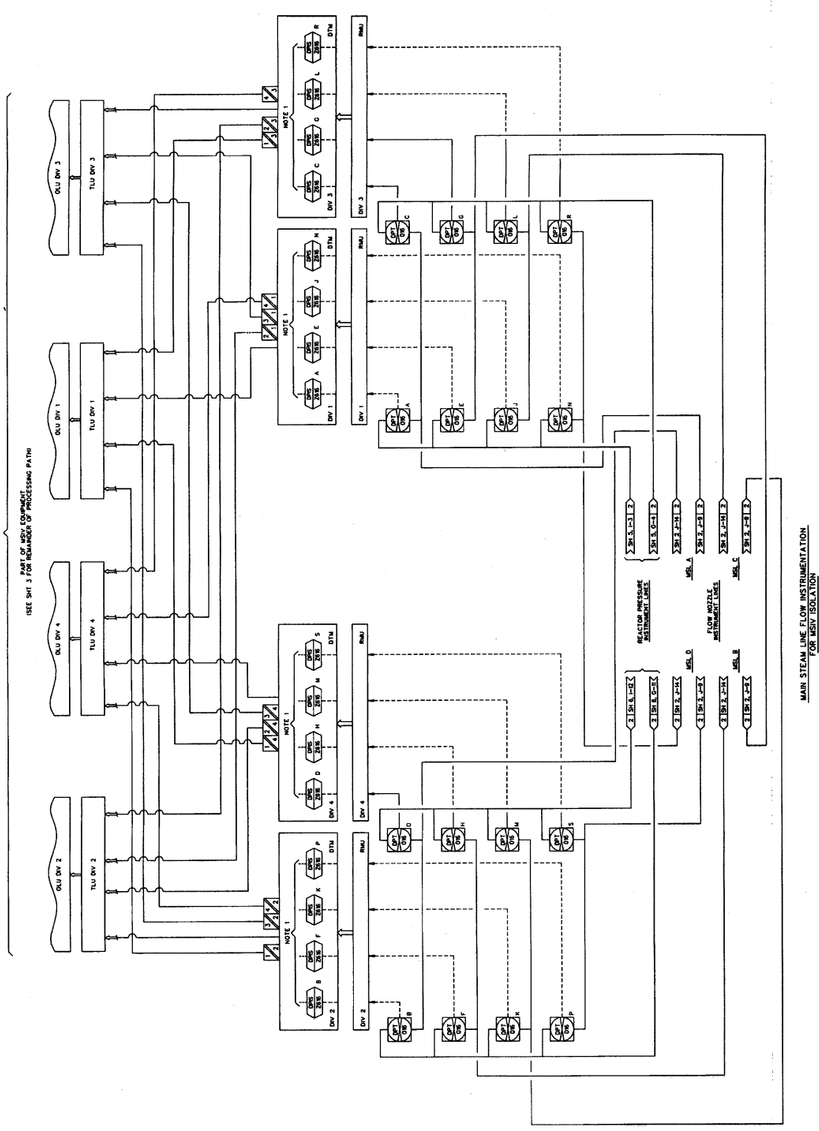


Figure 5.2-8 Leak Detection and Isolation System IED (Sheet 4 of 10)

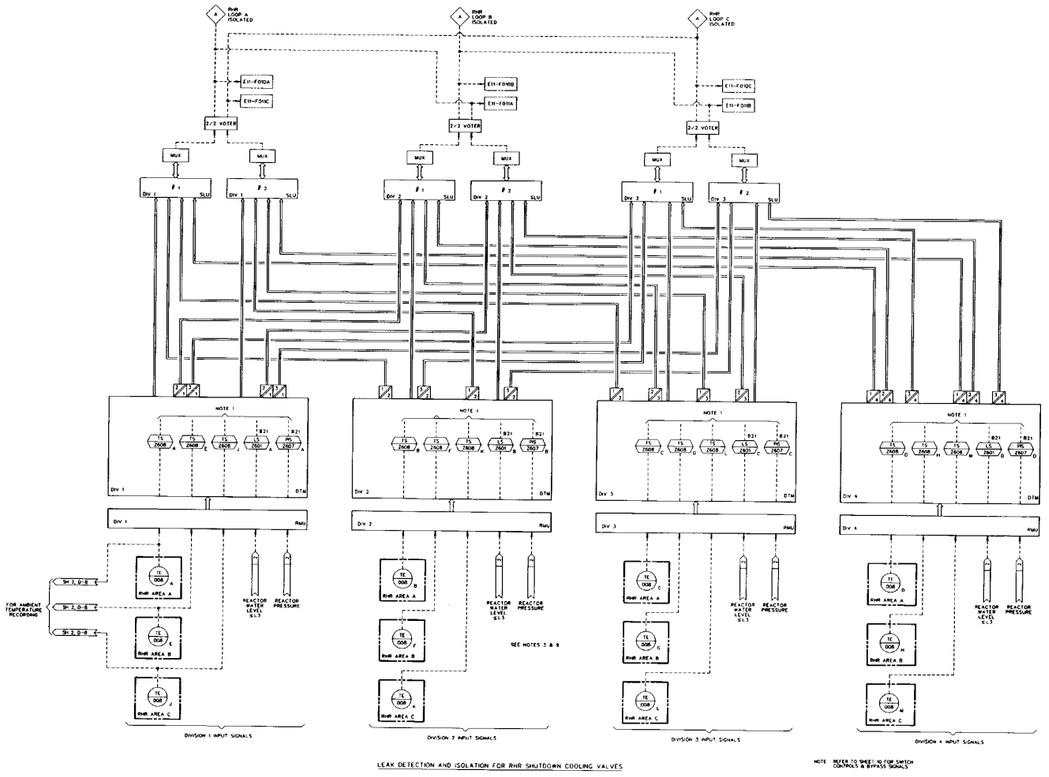


Figure 5.2-8 Leak Detection and Isolation System IED (Sheet 5 of 10)

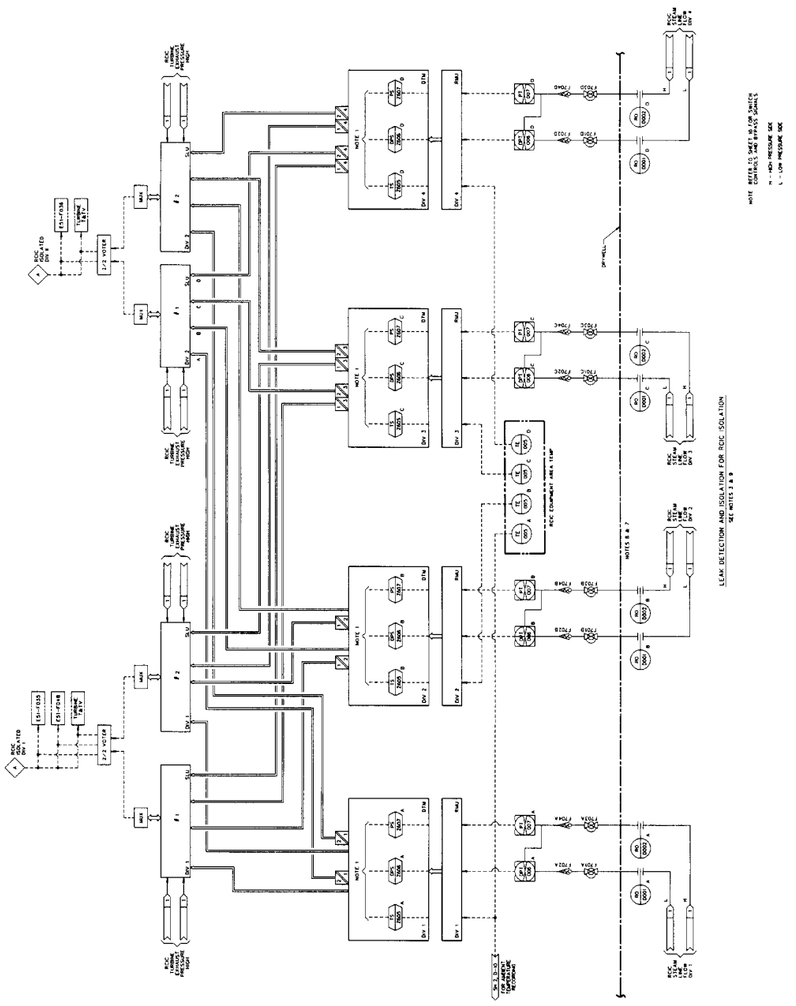


Figure 5.2-8 Leak Detection and Isolation System IED (Sheet 6 of 10)

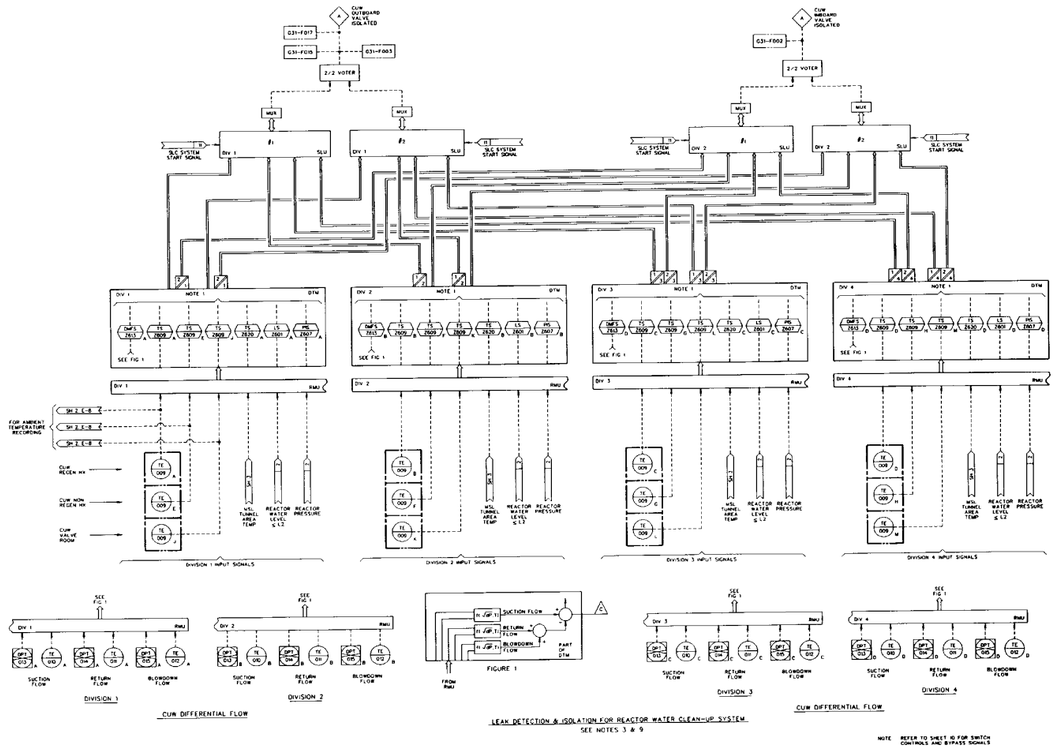


Figure 5.2-8 Leak Detection and Isolation System IED (Sheet 7 of 10)

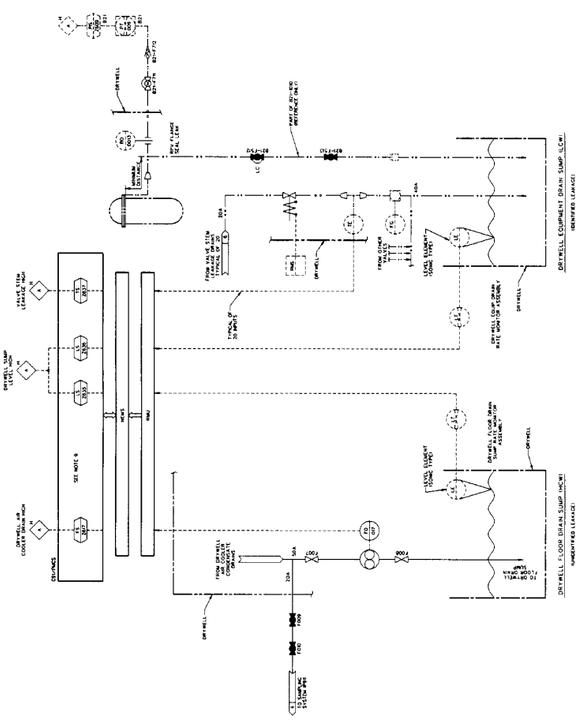


Figure 5.2-8 Leak Detection and Isolation System IED (Sheet 8 of 10)

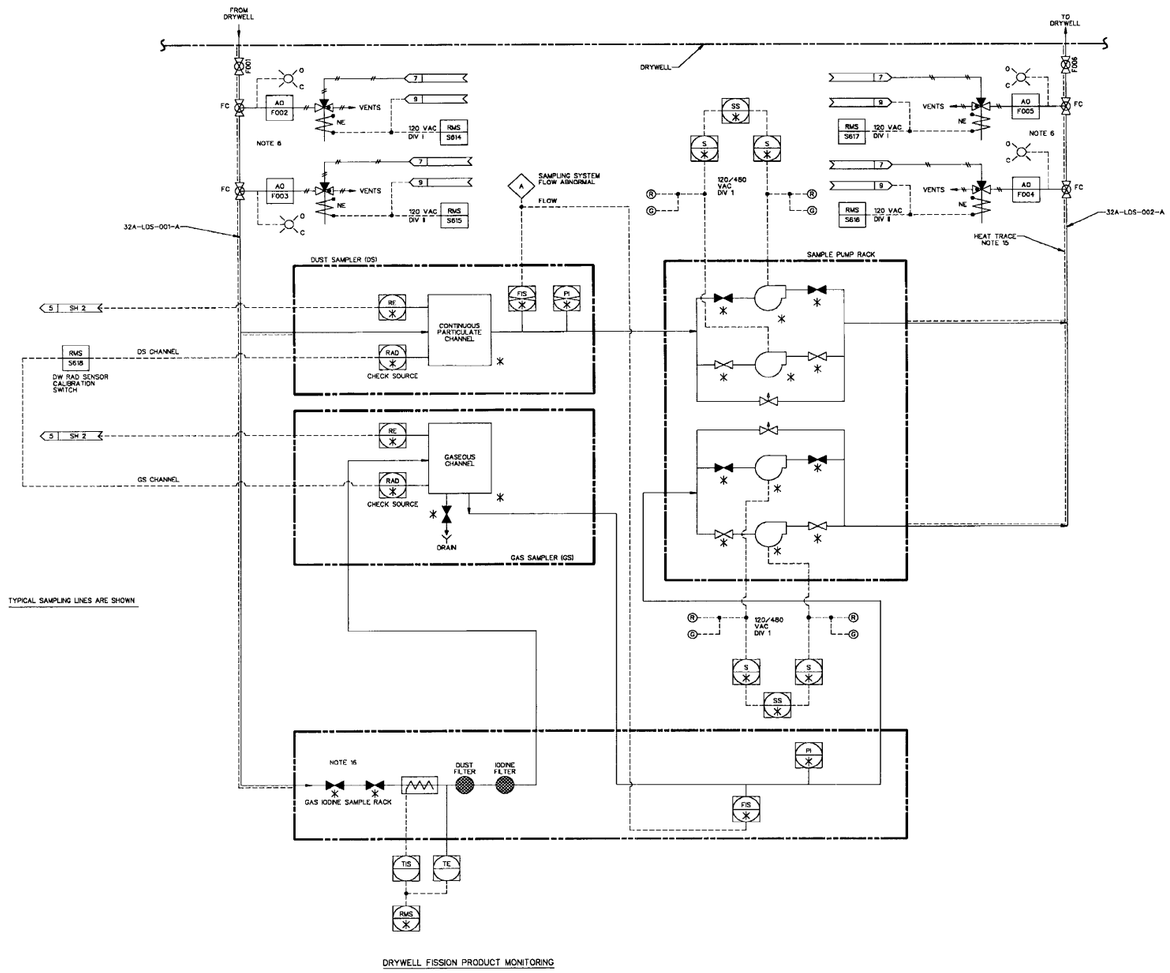


Figure 5.2-8 Leak Detection and Isolation System IED (Sheet 9 of 10)

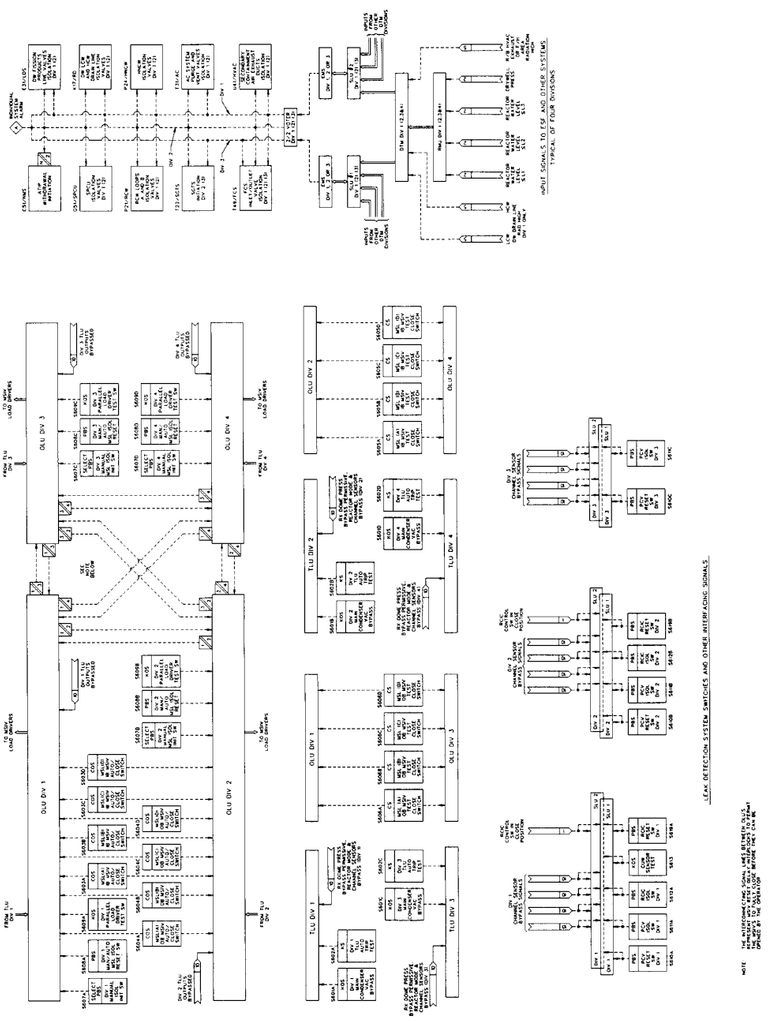
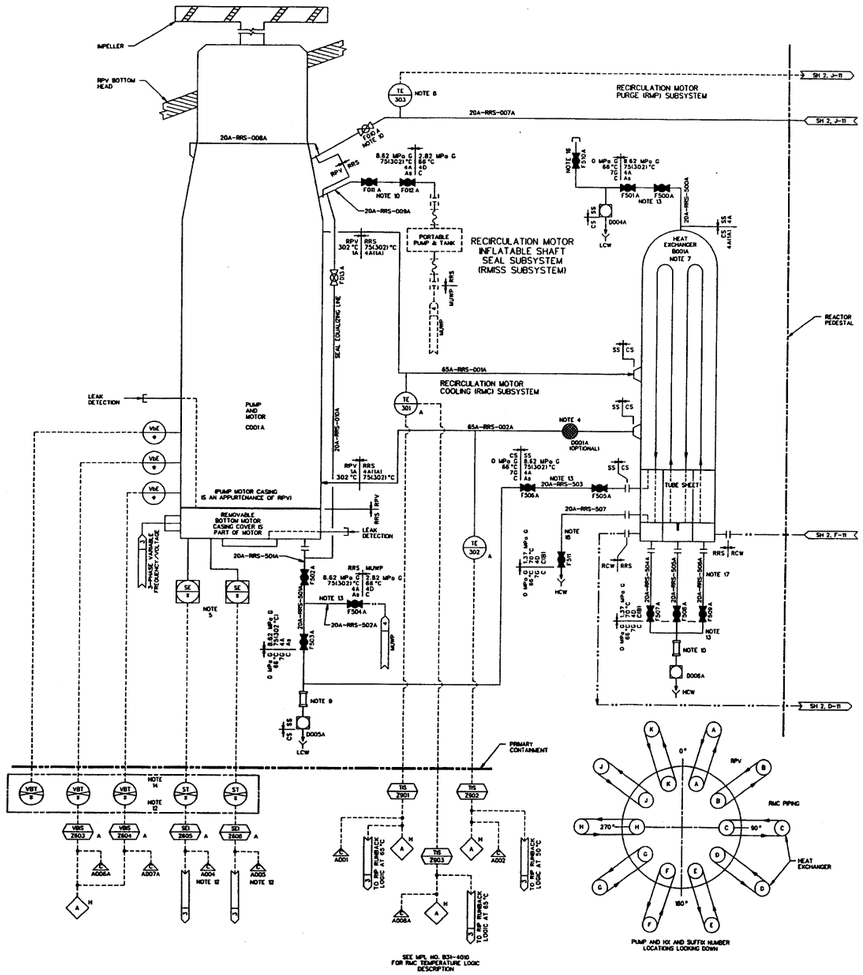


Figure 5.2-8 Leak Detection and Isolation System IED (Sheet 10 of 10)



NOTES:

1. HIGH POINT VENT SHOULD BE PROVIDED FOR PURGE SUBSYSTEM, IF INTERMEDIATE HIGH POINTS EXIST.
2. CONTAINMENT ISOLATION VALVES SHALL BE LOCATED AS CLOSE AS POSSIBLE TO THE DRYWELL PENETRATION AND IN A HORIZONTAL POSITION.
3. ALL EQUIPMENT AND INSTRUMENTS SHALL BE PREFIXED BY B31 UNLESS OTHERWISE SPECIFIED.
4. FILTER D001 IS OPTIONAL IF REACTOR PRE CRITICAL FLUSHING IS ACCORDING TO ASME-3071 ICF 1.A.1.5(c). IF FILTER IS USED, SEPARATOR OR FILTER INTERNALS FOR INITIAL SYSTEM FLUSHING TO BE INSTALLED TEMPORARILY WHEN NEEDED. HOUSING IS WELDED PERMANENTLY IN LINE.
5. SPEED ELEMENTS ACCURACY SHALL CONFORM TO REFERENCE DOCUMENT 5 REQUIREMENTS.
6. D003 MAY BE EXCLUDED IF THE D002 FLOW REGULATOR IS CAPABLE OF THE COMPLETE DIFFERENTIAL PRESSURE RANGE.
7. RECIRCULATION MOTOR HEAT EXCHANGER B001 SUPPLIED WITH EACH C001 PUMP. INTERNAL TUBING CONFIGURATION OPTIONAL.
8. TE 303 LOCATED AS CLOSE AS POSSIBLE TO MOTOR CASING. TE 303 INSTALLED ONLY IN SHORTEST AND LONGEST PURGE LINES ONLY (TWO TOTAL).
9. OPTIONAL REMOVABLE SPOOL PIECE FOR DRAIN WATER SAMPLING.
10. LOCATE VALVES AS CLOSE TO MOTOR CASING AS POSSIBLE BUT BELOW RPV BOTTOM HEAD INSULATION.
11. RCW SYSTEM SHOWN IN PHANTOM, BUT THIS RCW PIPE CONFIGURATION AND COMPONENTS ARE REQUIRED BY RMS (B31) SYSTEM.
12. THE RMP SPEED AND VIBRATION ANALOG SIGNALS SHALL BE INPUT TO THE PLANT PROCESS COMPUTER AND PERMANENT CONNECTIONS FOR TEMPORARY SPECIAL RMP MOTOR ANALYTICAL AND RECORDING EQUIPMENT.
13. VENT AND DRAIN VALVES SHOULD BE CENTRALLY LOCATED FOR EACH PUMP AND HX.
14. LOCAL PANEL CONTAINING 3G VIBRATION AND 2G SPEED TRANSMITTERS, ALL SUPPLIED BY PUMP SUPPLIER.
15. ALL RRS PIPING IS SEISMIC CLASS As EXCEPT RIP HX TUBE SIDE DRAIN PIPES.
16. F510 VENT VALVE OPTIONAL FOR FASTER HX DRAINING/VENTING. IF F510 IS USED, VENT PIPE SHOULD BE ROUTED UPWARDS TO PREVENT WATER DRAINING ONTO FLOOR.
17. HX DRAIN LINES MUST BE DIFFERENT CONFIGURATION THAN SHOWN PROVIDING HX BOTTOM COVER CAN BE COMPLETELY DRAINED PRIOR TO DISASSEMBLY.
18. OPTIONAL RCW VENT.
19. PIPE WITH A DESIGN PRESSURE OF 3.83 MPa OR GREATER SHALL HAVE ITS MINIMUM WALL THICKNESS NO LESS THAN THAT OF A STANDARD WEIGHT PIPE. THICKER THAN STANDARD WEIGHT PIPE SHALL BE USED IF REQUIRED BY THE DESIGN PRESSURE OR OTHER REQUIREMENTS.
20. VALVES WITH A DESIGN PRESSURE OF 3.83 MPa OR GREATER SHALL BE A MINIMUM OF CLASS 300, OR OF A HIGHER CLASS IF REQUIRED BY THE DESIGN PRESSURE.

REFERENCE DOCUMENTS UNDER THE FOLLOWING IDENTITIES ARE TO BE USED IN CONJUNCTION WITH THIS DRAWING.

	MPL NO.
1. CONTROL ROD DRIVE SYS P&ID	C12-1010
2. REACTOR BUILDING COOLING WATER SYS P&ID	P21-1010
3. RECIRC FLOW CONTROL SYS ED	C81-1040
4. MAKE-UP WATER (PURIFIED) SYS P&ID	P11-1010
5. PIPING AND INSTRUMENT SYMBOLS DIAGRAM	A10-3030

MPL NO. B31-1010

Figure 5.4-4 Reactor Recirculation System P&ID (Sheet 1 of 2)

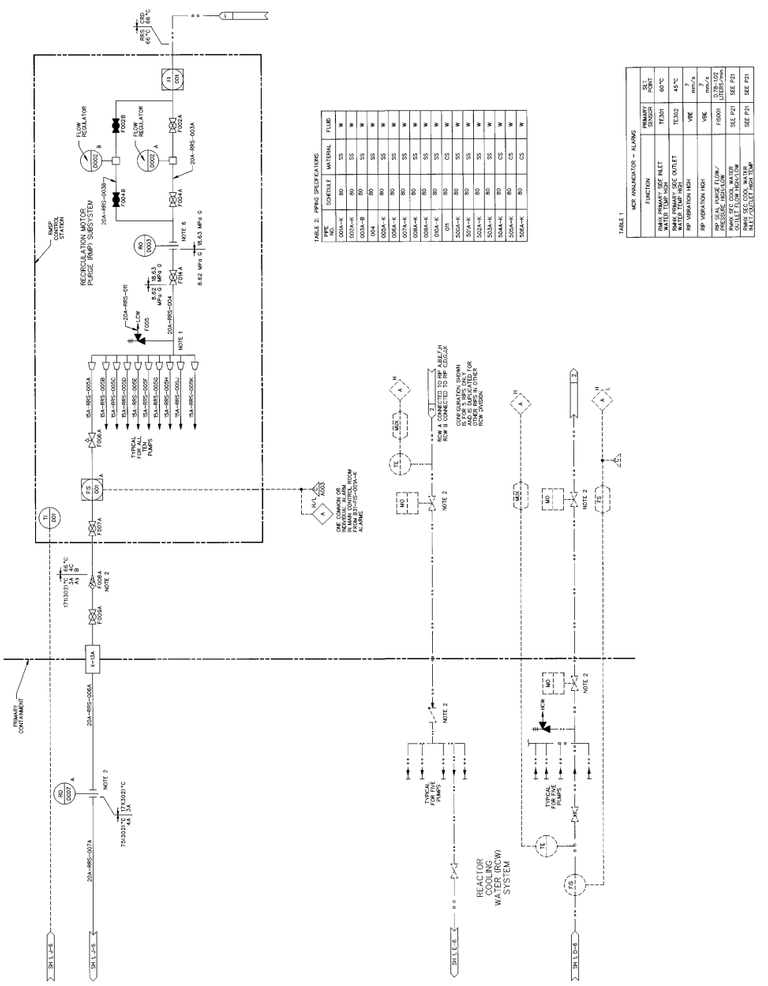


Figure 5.4-4 Reactor Recirculation System P&ID (Sheet 2 of 2)

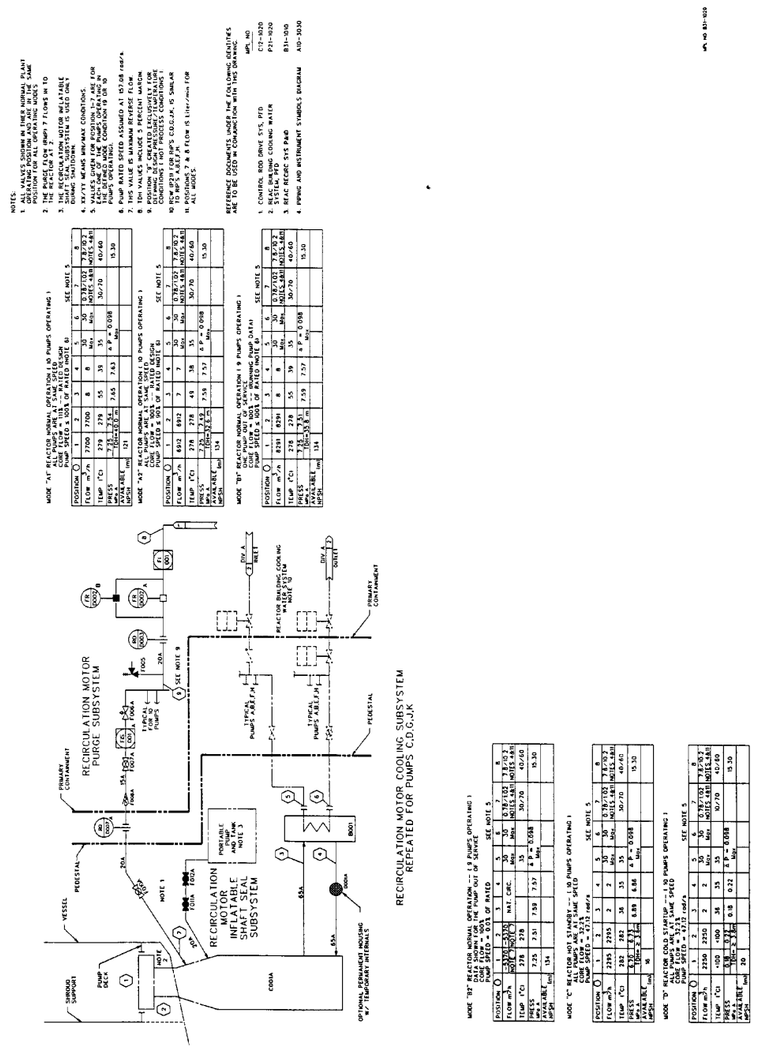


Figure 5.4-5 Reactor Recirculation System PFD

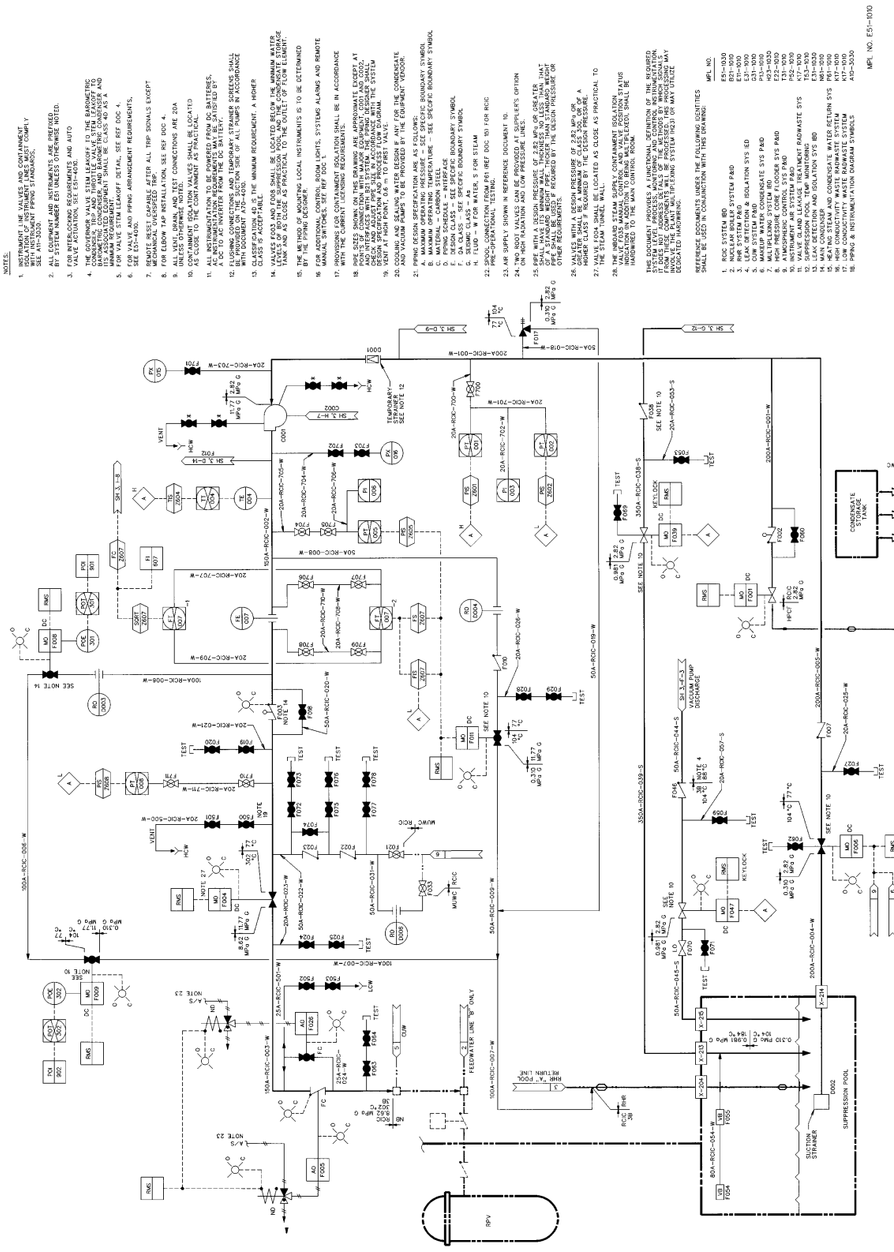


Figure 5.4-8 Reactor Core Isolation Cooling System P&ID (Sheet 1 of 3)

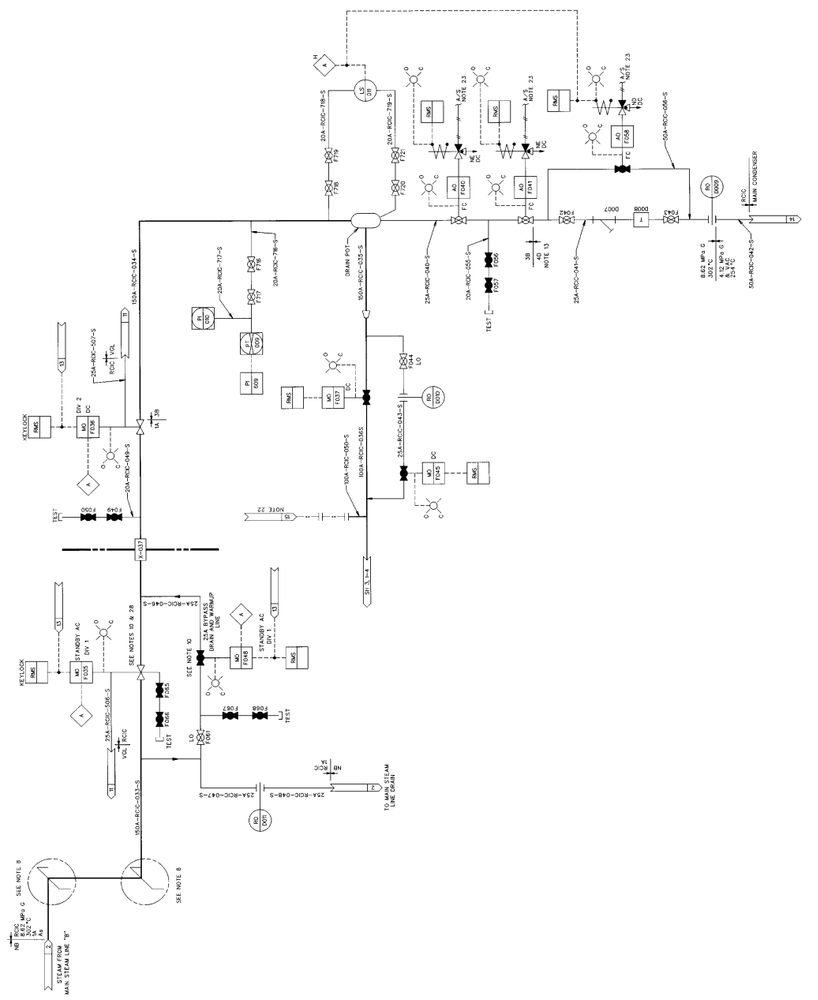


Figure 5.4-8 Reactor Core Isolation Cooling System P&ID (Sheet 2 of 3)

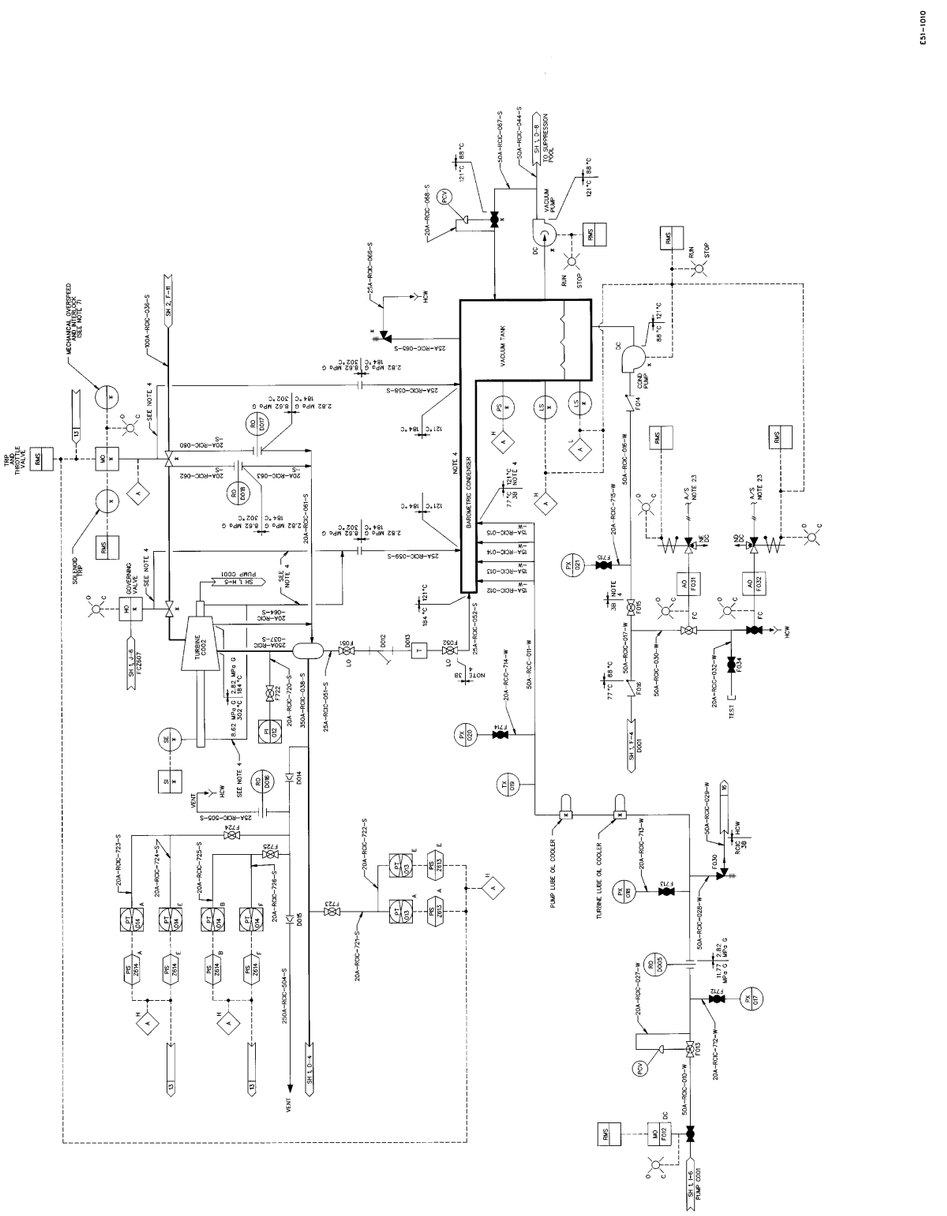


Figure 5.4-8 Reactor Core Isolation Cooling System P&ID (Sheet 3 of 3)