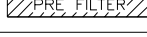




2X100% AHU

FGD CONTROL ROOM BUILDING

BILL OF QUANTITY

LEGEND	DESCRIPTION
	BALL VALVE
	Y-STRAINER
	EXPANSION VALVE
	PILOT OPERATED SOL. VALVE
 —DDCMIS	AIRSTAT
 —DDCMIS	GYSERSTAT
DDCMIS—  —TS —RH	RH. SENSOR & TEMP. SENSOR
 —	DIFFERENTIAL PRESSURE SWITCH
	PRESSURE SWITCH
 —DDCMIS	TEMPERATURE TRANSMITTER
 — 	MOTORIZED FIRE DAMPER
 NRD	NON RETURN DAMPER
	FINE FILTER
	VOLUME CONTROL DAMPER
	PER FILTER
	STRIP HEATER

NOTES

1. ALL PIPES SHALL BE AS PER TECHNICAL SPECIFICATION.
2. SUCTION & LIQUID LINES INSULATION AS PER SPECIFICATION.
3. ALL INSTRUMENT AND TEST POINT SHALL BE PROVIDED WITH ISOLATING ROOT VALVE.
4. TEMP. SENSOR(TS) ALONG WITH TEMP. TRANSMITTERS & RELATIVE HUMIDITY SENSOR(RHS) SHALL BE PROVIDED IN EACH AHU ROOM.
5. AIR RELEASE VALVE SHALL BE PROVIDED AS PER SYSTEM REQUIREMENT AT AT SUITABLE LOCATION.
6. BIDDER TO NOTE THAT THE P&ID SHOWS ONLY THE BARE MINIMUM REQUIREMENT OF VALVES AND INSTRUMENTS. ANY INSTRUMENTATION & VALVES AS REQUIRED FOR THE COMPLETION OF THE SYSTEM IN LINE WITH TECHNICAL SPECIFICATION SHALL BE PROVIDED BY BIDDER DURING DETAILED ENGINEERING WITHOUT ANY COMMERCIAL IMPLICATION.

TYP P&ID FOR EACH CONTROL ROOM

ORDER NO.:

एन टी पी सी
NTPC

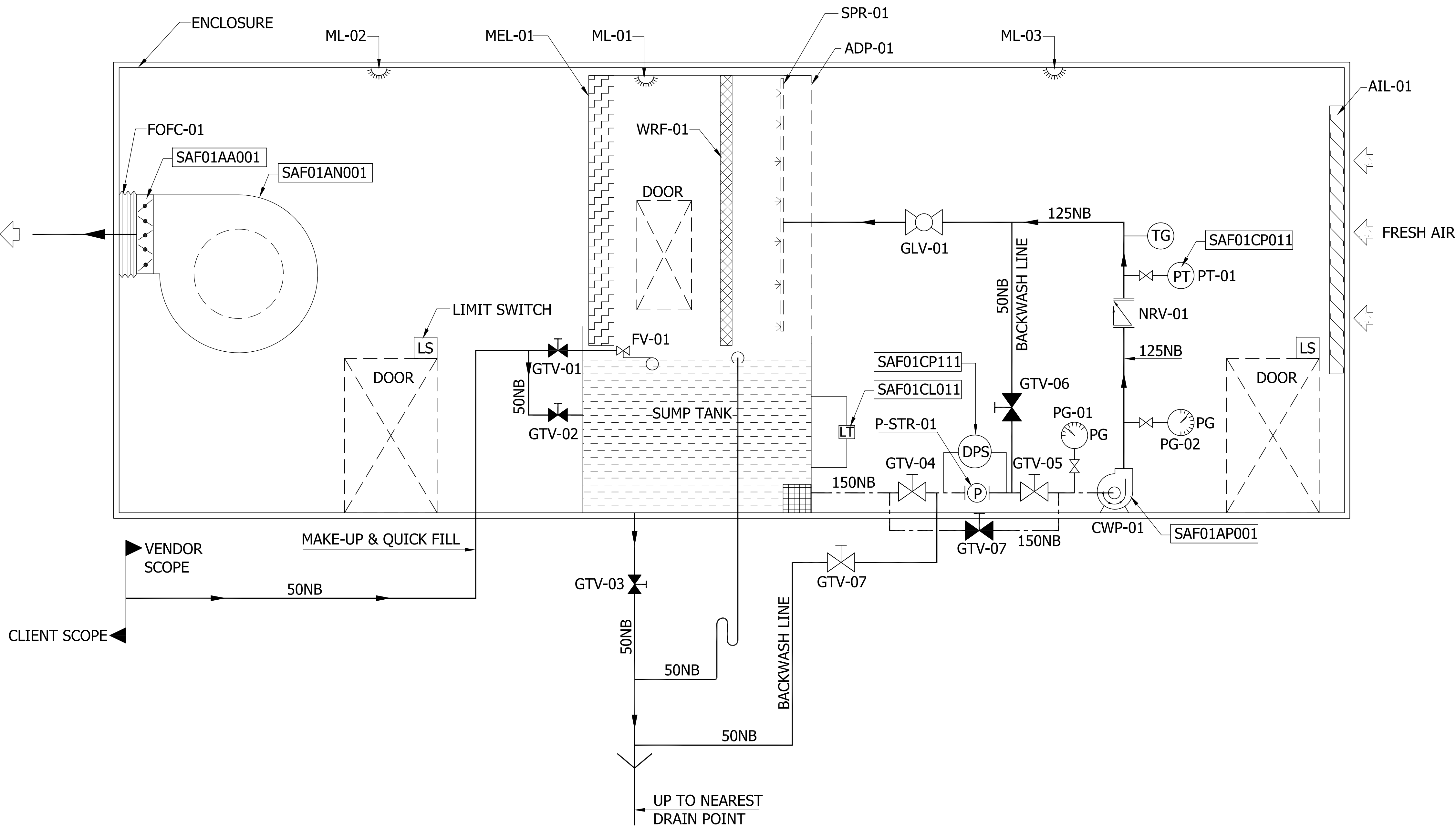
NTPC Limited

(A GOVT. OF INDIA ENTERPRISE)

ENGINEERING DIVISION

PROJECT:	KAHALGAON STPP (FGD System Package)			
CONTRACTOR:	बीएचईएल BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECT ENGINEERING MANAGEMENT NOIDA			
PACKAGE:				
DESIGNED		TITLE : P & I DIAGRAM FOR AIR COOLED CONDENSING UNIT (DX- TYPE)		
DRAWN				
CHECKED				
APPROVED		SCALE – NTS.		
DATE			SHEET	REV.

FOR TENDER PURPOSE ONLY



P & ID FOR UAF UNIT

FOR TENDER PURPOSE ONLY

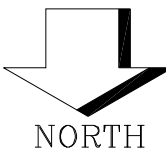
- NOTES:-
- CASHING OF UAF SHALL BE DOUBLE SKIN OUTER 22G GALVANIZED INNER 20G GALVANIZED SANDWICH WITH 25MM THICK PU FOAM.
 - THE MS TANK FOR THE UAF UNIT SHALL BE 6 mm THICK.
 - SATURATION EFFICIENCY OF THE UAF UNIT SHALL BE MINIMUM 60%.
 - ALL PARTS SHALL BE PLACED ON MS CHANNEL AND DOUBLE SKIN CASING SHALL BE PROVIDED BELOW MS CHANNEL WITH COMPLETE ENCLOSURE OF UAF FROM BOTTOM ALSO.

S.N	LEGEND	DESCRIPTION	TAG NO
01		CENTRIFUGAL AIR FAN	CAF-01
02		VOLUME CONTROL DAMPER	VCD-01
03		FAN OUTLET FLEXIBLE CONNECTION	FOFC-01
04		AIR INTAKE LOUVER WITH BIRDMESH	AIL-01
05		MIST ELIMINATOR	MEL-01
06		WATER REPELANT TYPE FILTER	WRF-01
07		PRESSURE GAUGE	PG-01 & 02
08		GATE VALVE OPEN/CLOSE	GTV-01 TO 07
09		POT STRAINER	P-STR-01
10		COOLING WATER PUMP	CWP-01
11		MARRINE LIGHT	ML-01 & 03
12		NON RETURN VALVE	NRV-01
13		AIR DISTRIBUTION PLATE	ADP-01
14		LEVEL TRANSMITTER	LT-01
15		PRESSURE TRANSMITTER	PT-01
16		DIFFERENTIAL PRESSURE SWITCH	DPS-01
17		TEMPERATURE GAUGE	TG-01
18		GLOBE VALVE	GLV-01
19		DOOR	-
20		SPRAY NOZZLE	SPR-01
21		LIMIT SWITCH	LS
22		SUCTION SCREEN	-

- LINE LEGENDS:-
- MAKE-UP QUICKFILL LINE
 - DRAIN & OVER FLOW LINE
 - CIRCULATING WATER LINE/BACKWASH LINE
 - CIRCULATING WATER LINE/BACKWASH LINE
 - BACKWASH LINE

TYP P&ID for EACH UAFs of FGD CR 1 & 2

REV. NO.	DESCRIPTION				DATE	DRN	CHKD	APPD	
STAMP									
CUSTOMER		GOVERNMENT OF INDIA NTPC		<i>NTPC Limited</i> (A GOVERNMENT OF INDIA ENTERPRISE)					
PROJECT		4x210 + 3x500 MW KAHALGOAN STPS							
BHEL LTD BHEL		BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECT ENGINEERING MANAGEMENT NOIDA							
COPY RIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED it must not be used directly or indirectly in any way detrimental to the interest of the company.					DEPT CODE	DRN CHEN	NAME	SSGN	DATE
					CHD				
					APPD				
TITLE									
P&ID FOR UAF UNIT FOR FGD BUILDING									
					DEPT.	SCALE	NTS	BHEL DOC. NO.	
					SIGN			AVPL DOC. NO.	
					DATE		SHEET	1 OF 1	REV.



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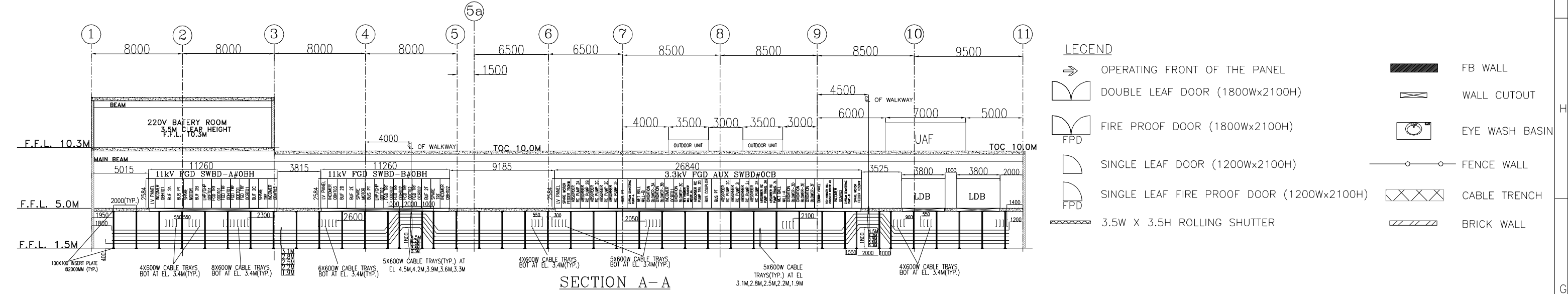
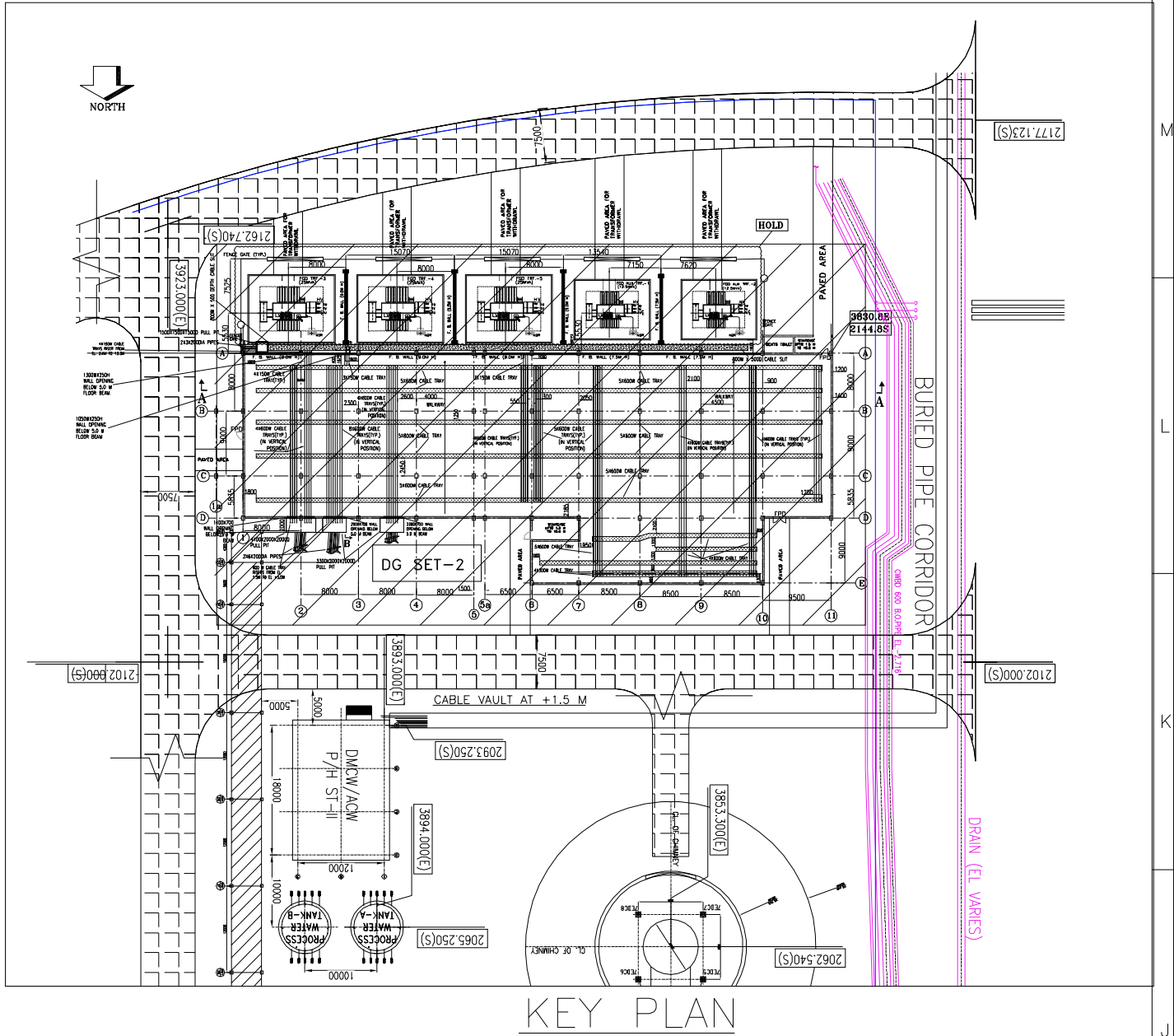
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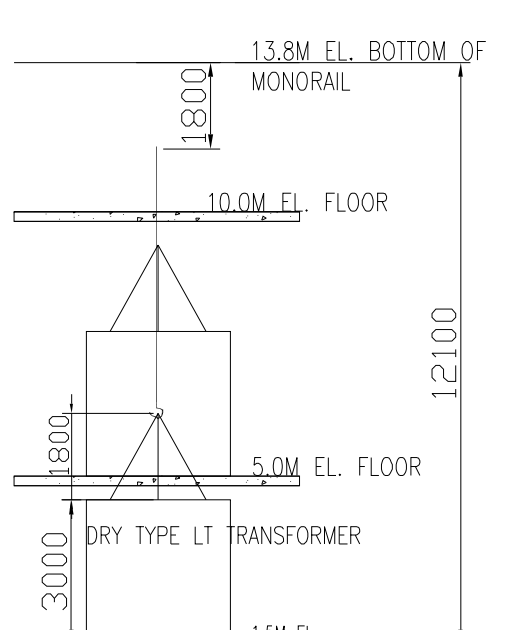
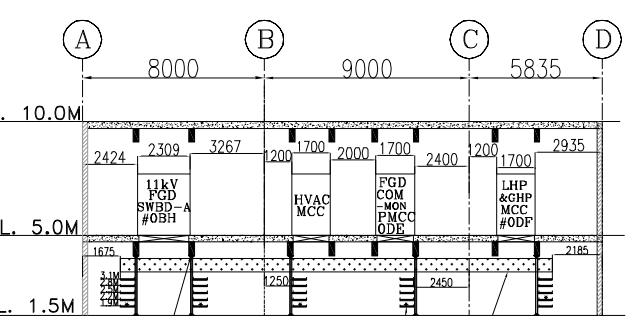
S.NO.	TITLE	DRAWING NO.
01. LAYOUT OF FGD SYSTEM		4200-109-001-RPT-PVM-B-010A
02. ELECTRICAL SLD FOR FGD SYSTEM		4200-109-PEM-PVE-W-672
03. OGA OF 2500 KVA TRANSFORMERS		
04. OGA OF 2000 KVA TRANSFORMERS		
05. OGA OF 11kV FGD SWBD-A#0BH		
06. OGA OF 11kV FGD SWBD-B#0BH		
07. OGA OF 3.3 kV FGD AUX SWBD#0CB		
08. OGA OF HVAC MCC		
09. OGA OF MISC MCC#0DJ		
10. OGA OF FGD EMERGENCY MCC#0DI		
11. OGA OF FGD COMMON PMCC#0DE		
12. OGA OF FGD MCC#0DD		
13. OGA OF LHP & GHP PMCC#0DF		
14. OGA OF VFD BKR PANEL		
15. OGA OF DCDB#1FC		
16. OGA OF LDB		
17. OGA OF LIGHTING ACDB (2X100KVA)		
18. OGA OF WELDING ACDB (2X100KVA)		
19. OGA OF 220V CHARGERS		
20. OGA OF ILMS		
21. OGA OF SUSPENDED MAGNET PANELS		



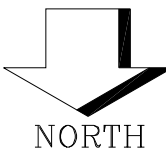
NOTE :

- ALL ELEVATIONS ARE WITH RESPECT TO MAIN POWER HOUSE BUILDING GROUND FLOOR LEVEL AS EL.(+/-)0.00 M. WHICH CORRESPONDS TO R.L. (+)35.0M.
- ALL DIMENSIONS ARE IN MM AND ELEVATIONS IN METRES UNLESS STATED OTHERWISE.
- THE DIMENSIONS OF EQUIPMENTS INDICATED IN DRAWING ARE TENTATIVE AND ARE SHOWN FOR DEVELOPING CONCEPTUAL LAYOUT.
- THIS DRAWING IS TO BE REFERRED FOR DETAILS OF ELECTRICAL EQUIPMENT AND CABLING LAYOUT ONLY. LAYOUT SHOWN FOR FACILITIES SUCH AS AC & VENTILATION SYSTEM IS INDICATIVE & FOR INTERFACE PURPOSE. FOR EXACT LAYOUT OF OTHER SYSTEMS, RELEVANT DISCIPLINE DRAWINGS SHALL BE REFERRED.
- ALL AREAS SHOWN IN THIS DRAWING ARE NON A/C UNLESS STATED OTHERWISE.
- BOTTOM MOST/OUTERMOST TRAY OF ALL RUNS SHALL BE PERFORATED TYPE.
- BOTH SWITCHGEAR ROOM & CABLE VAULT ROOM SHALL BE VENTILATED.
- DOORS IN CABLE VAULT SHALL BE FIRE PROOF.
- FIRE BARRIER WALLS WILL BE 355 MM THICK BRICKWORK OR 200 MM THICK CONCRETE, AS PER CIVIL DETAILING AND WILL PROJECT MINIMUM 600 MM BEYOND THE OIL CONTAINING PART OF THE TRANSFORMER.
- FOLLOWING CIVIL DETAILS FROM Pt. a to d SHALL BE DECIDED SEPARATELY BY CIVIL.
 - SOAK PIT INVERT LEVEL OF TRANSFORMERS, FOUNDATIONS FOR TRANSFORMERS/ RAIL TRACKS/ RADIATORS/ COOLERS AS PER TRANSFORMER FOUNDATION FOUNDATION PLANS AND OTHER PIPE SUPPORT ARRANGEMENT. INVERT LEVEL OF SOAK PIT SHALL BE FIXED IN LINE WITH TRANSFORMER OIL QUANTITY AND QUANTITY OF WATER SPRAY (TO BE INDICATED SEPARATELY BY FIRE FIGHTING SYSTEM ENGINEER).
 - FENCING DETAILS.
- APPROX. TOTAL QUANTITY OF OIL AND APPROX. TOTAL WEIGHT OF EACH TRANSFORMER SHALL BE INDICATED AFTER RECEIPT OF OGA.
- ALL PANELS ARE PROVIDED WITH BOTTOM ENTRY FOR CABLES.
- AFTER ERECTION OF PANELS THE TRENCH GAP/FLOOR CUT-OUT SHALL BE SUITABLY COVERED WITH CHEQUERED PLATE.
- FALSE CEILING SHALL BE PROVIDED AT 3.6M EL FROM FFL IN A/C AREA.
- EARTHING FLATS SHALL BE RUN IN THE CABLE VAULT ALONG WITH THE CABLE TRAYS.
- THE CABLE TRAY EXIT SHALL BE SEALED PROPERLY SO THAT RAIN WATER AND DUST SHALL NOT ENTER INSIDE THE ROOM/TRENCH.
- WEIGHT OF THE PANELS :

PLC	= 400 KG./PLC PANEL(APPROX)
COMMON MCC	= 25000 KG/MCC PANEL(APPROX)
FGD MCC	= 20000 KG/PCC PANEL(APPROX)
ACDB/DCDB	= 1000 KG/ACDB/DCDB PANEL(APPROX)
LDB	= 1000 KG/LDB PANEL(APPROX)
LHP MCC & GHP MCC	= 20000 KG/PANEL(APPROX)
HVAC MCC	= 20000 KG/PANEL(APPROX)
- CARE SHALL BE TAKEN WHILE DESIGNING CIVIL CONTRUCTION, SO THAT BEAMS SHALL NOT FOUL WITH CABLE TRAY ROUTING/PANEL CABLE TERMINATION.
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PANELS/TRANSFORMERS LIFTING DETAIL



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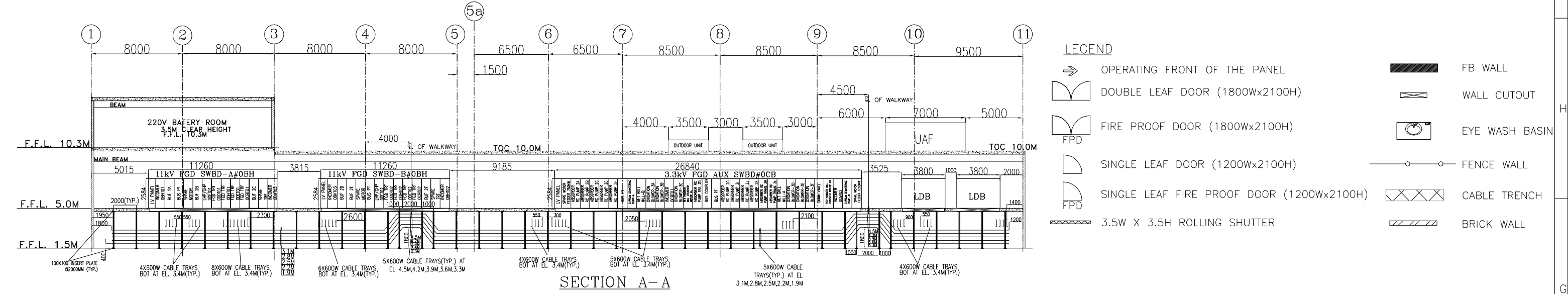
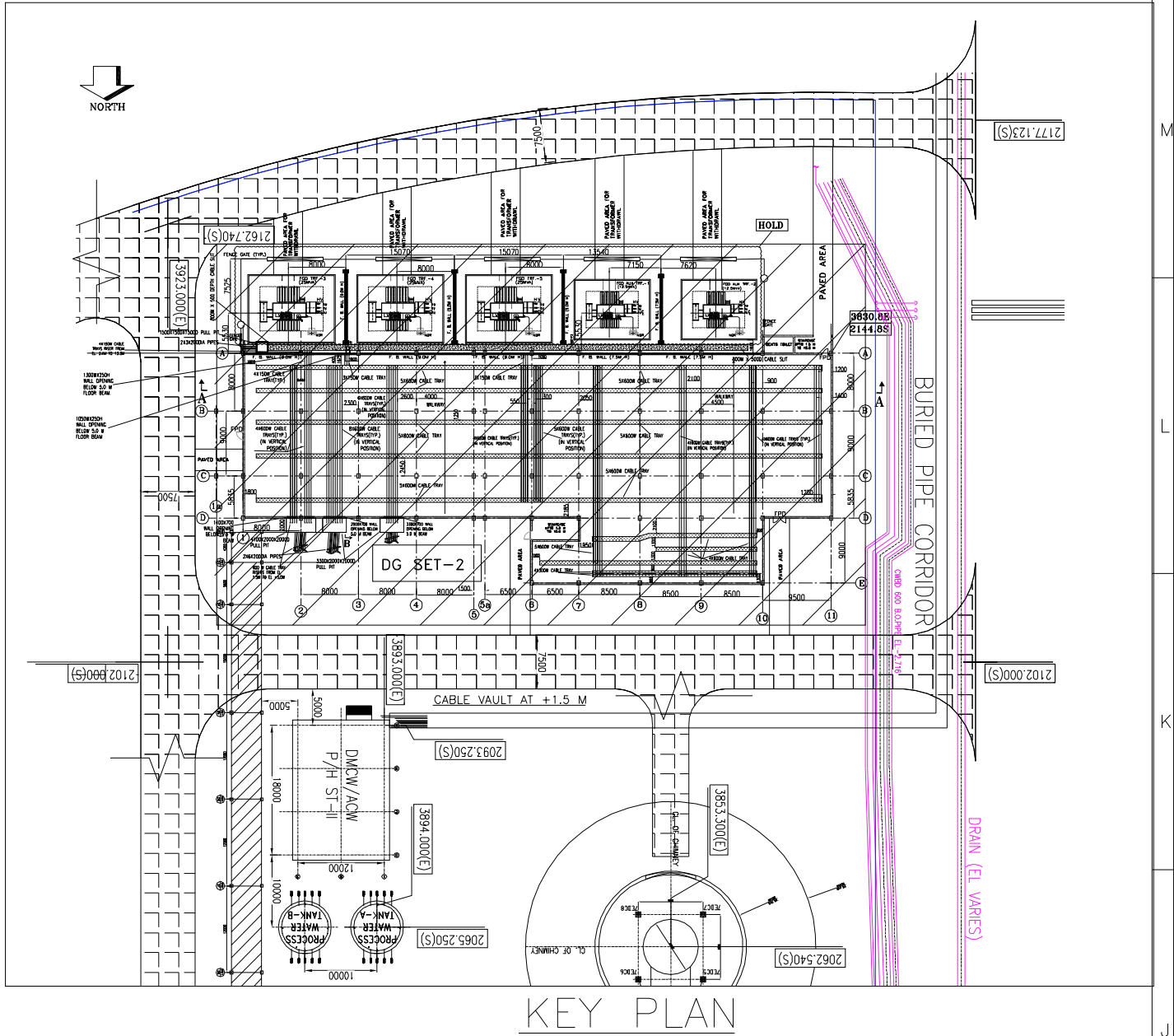
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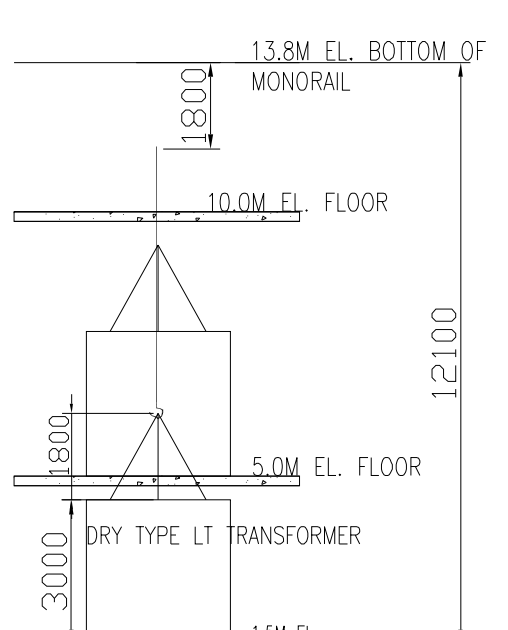
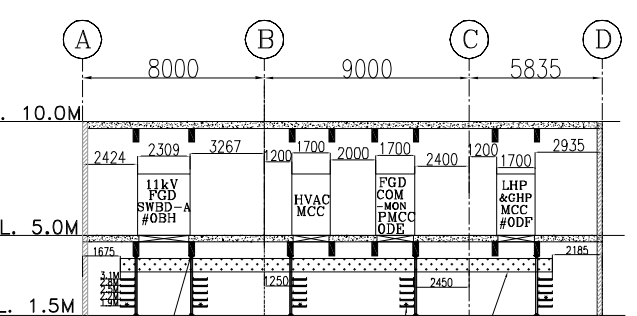
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04. OGA OF 2000 KVA TRANSFORMERS		
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06. OGA OF 11kV FGD SWBD-B#0BH		
07. OGA OF 3.3 kV FGD AUX SWBD#0CB		
08. OGA OF HVAC MCC		
09. OGA OF MISC MCC#0DJ		
10. OGA OF FGD EMERGENCY MCC#0DI		
11. OGA OF FGD COMMON PMCC#0DE		
12. OGA OF FGD MCC#0DD		
13. OGA OF LHP & GHP PMCC#0DF		
14. OGA OF VFD BKR PANEL		
15. OGA OF DCDB#1FC		
16. OGA OF LDB		
17. OGA OF LIGHTING ACDB (2X100KVA)		
18. OGA OF WELDING ACDB (2X100KVA)		
19. OGA OF 220V CHARGERS		
20. OGA OF ILMS		
21. OGA OF SUSPENDED MAGNET PANELS		



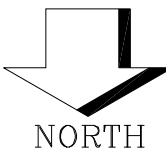
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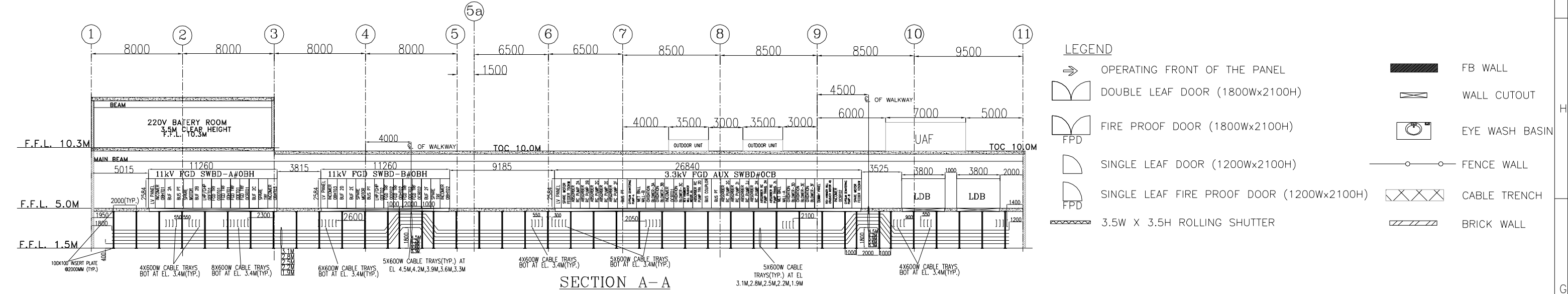
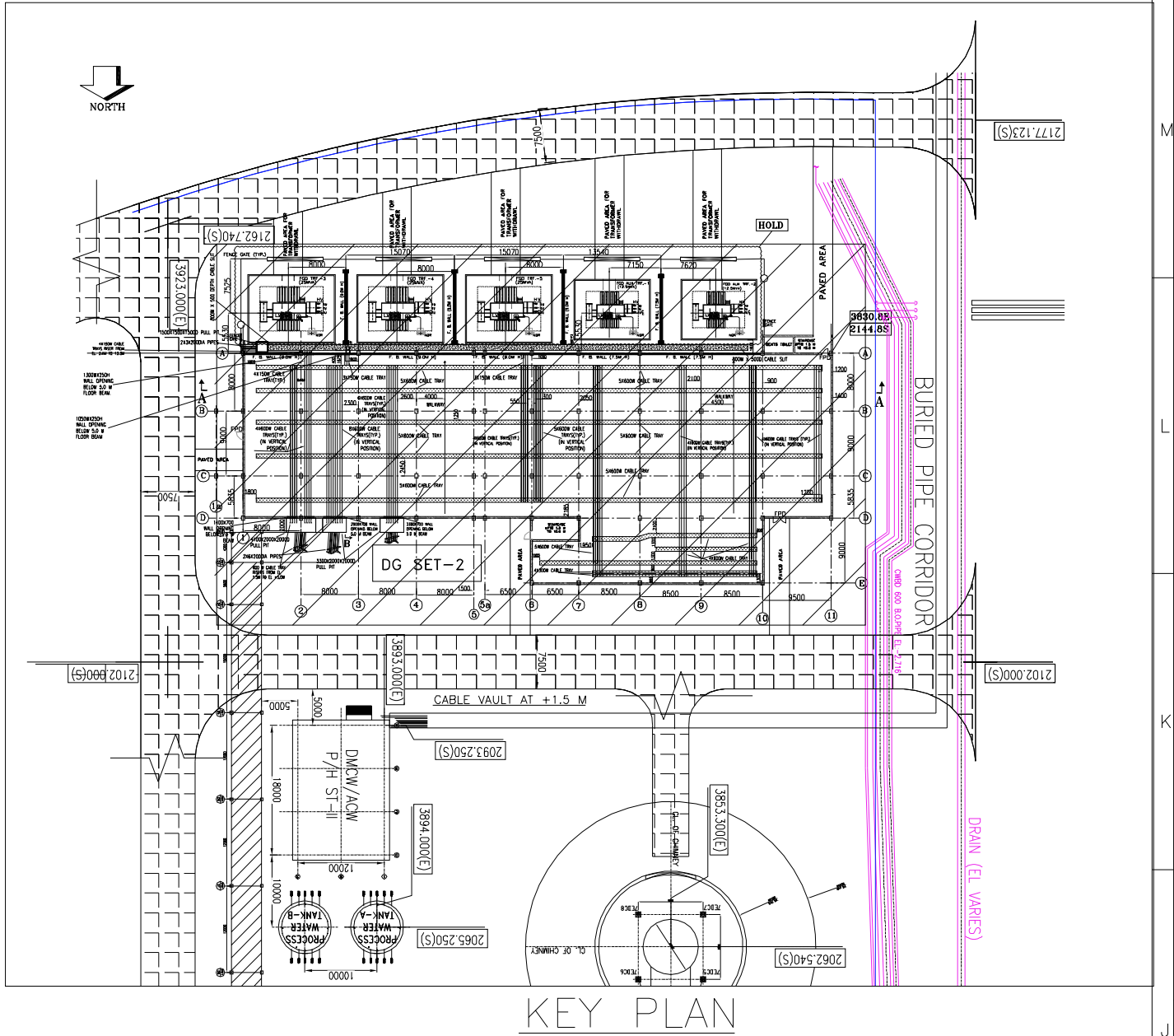
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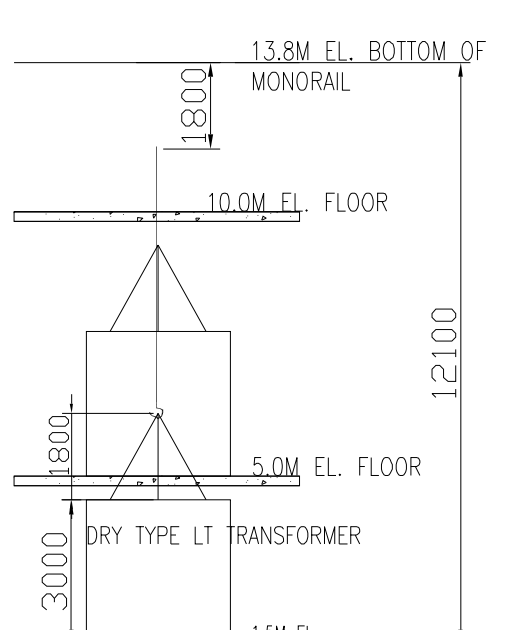
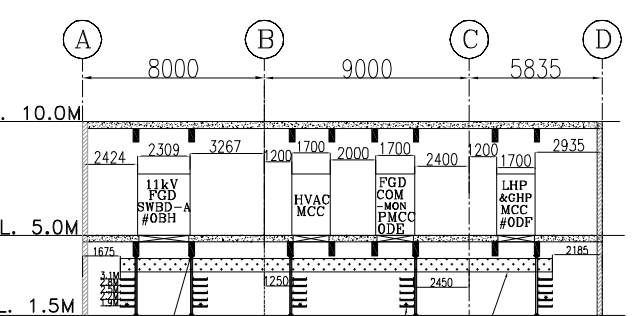
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18. OGA OF WELDING ACDB (2X100KVA)		
19. OGA OF 220V CHARGERS		
20. OGA OF ILMS		
21. OGA OF SUSPENDED MAGNET PANELS		



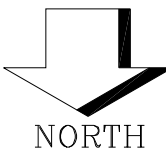
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PANELS/TRANSFORMERS LIFTING DETAIL



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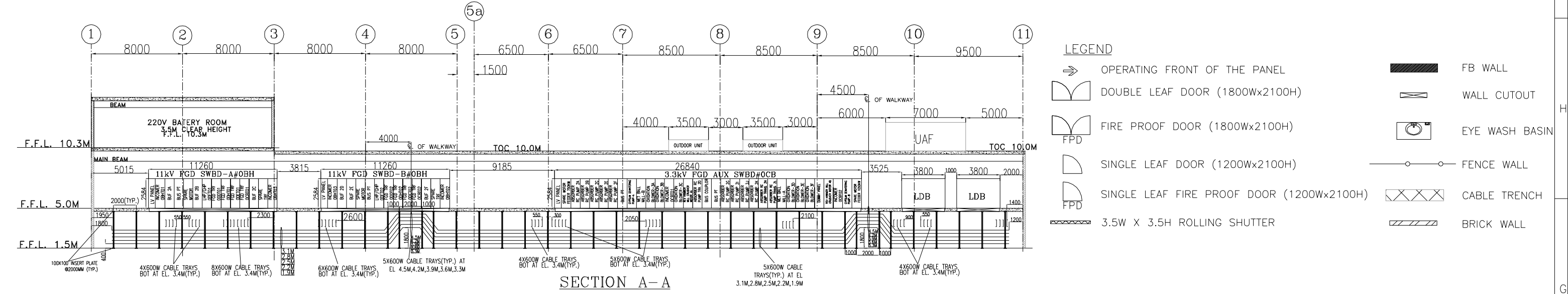
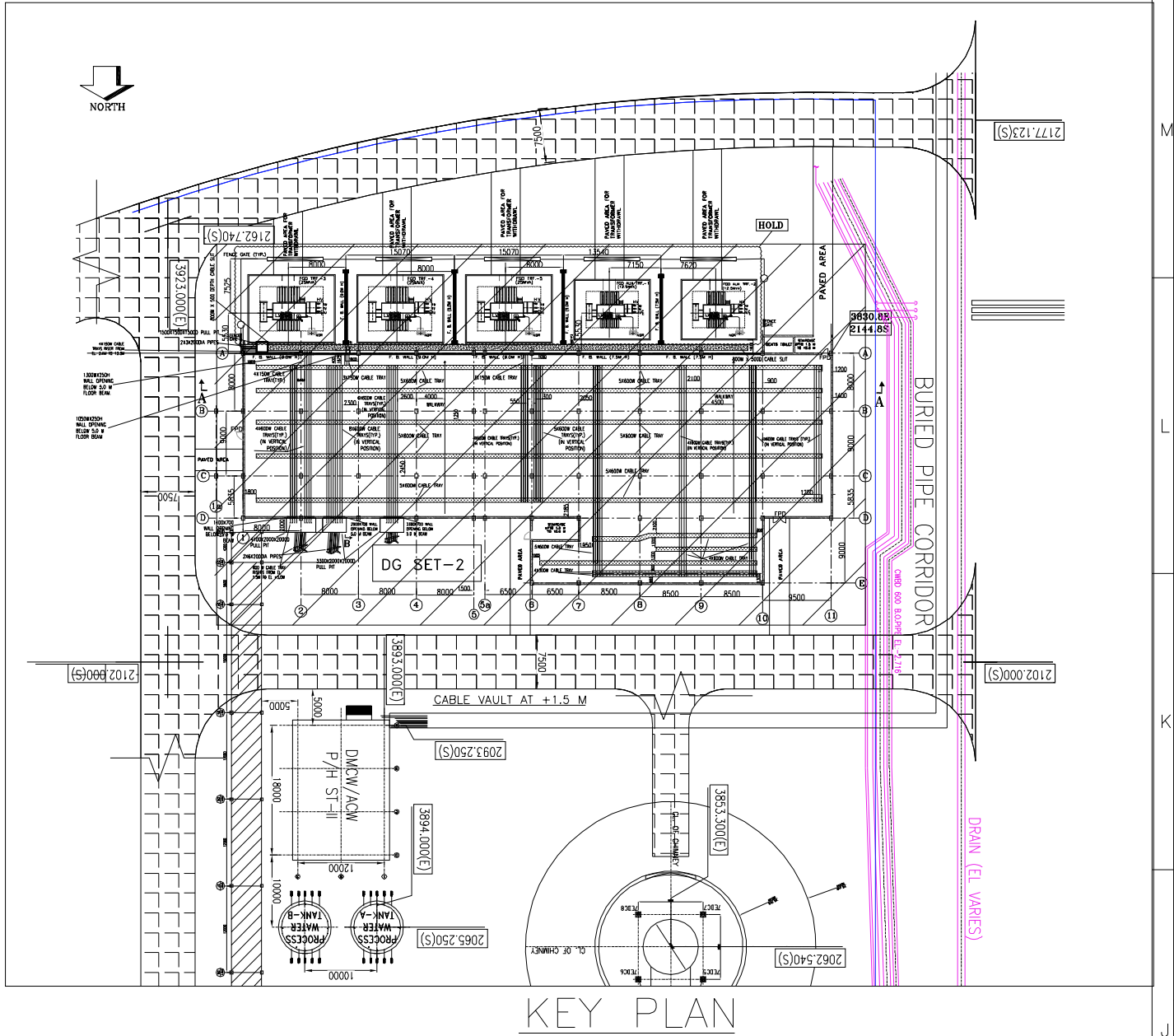
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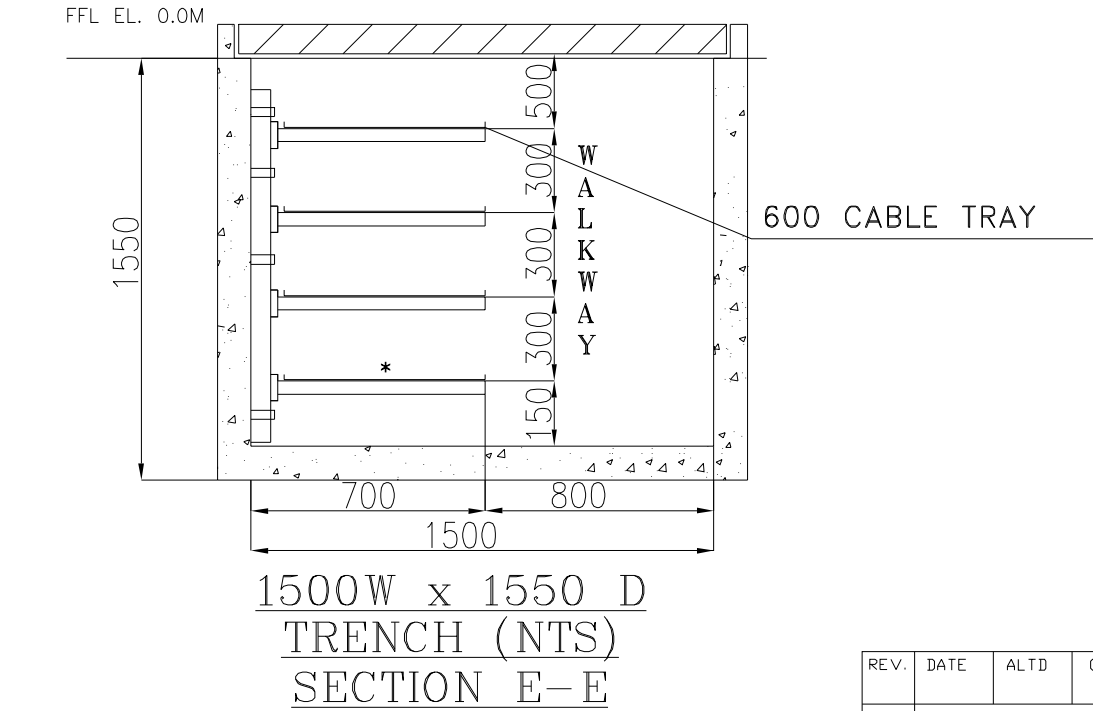
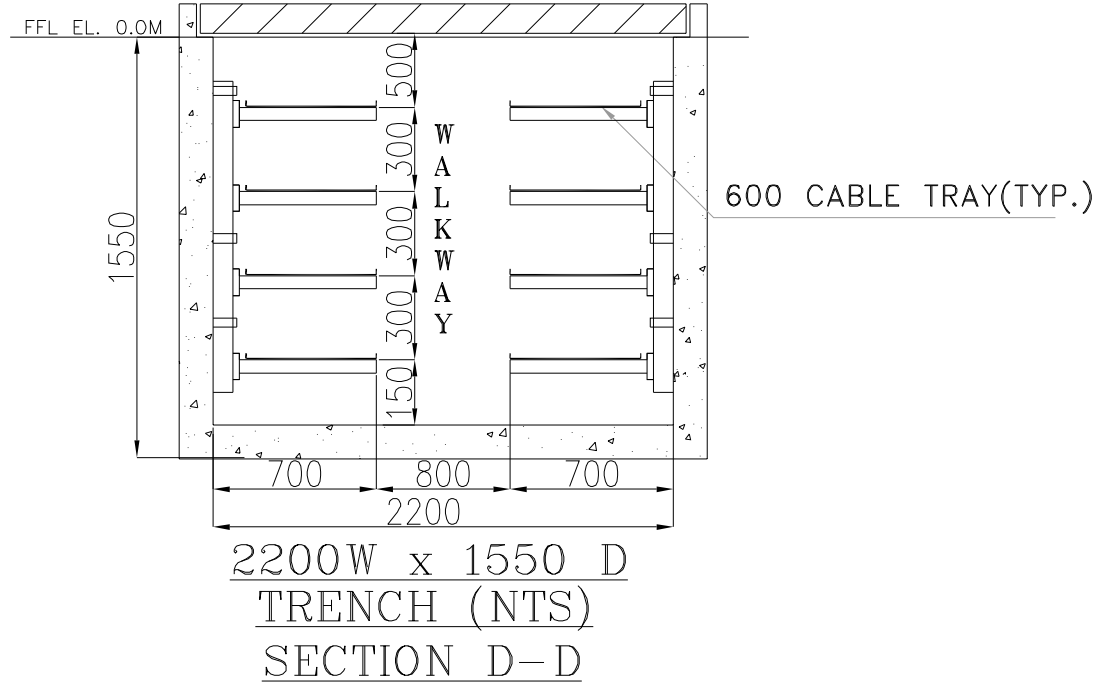
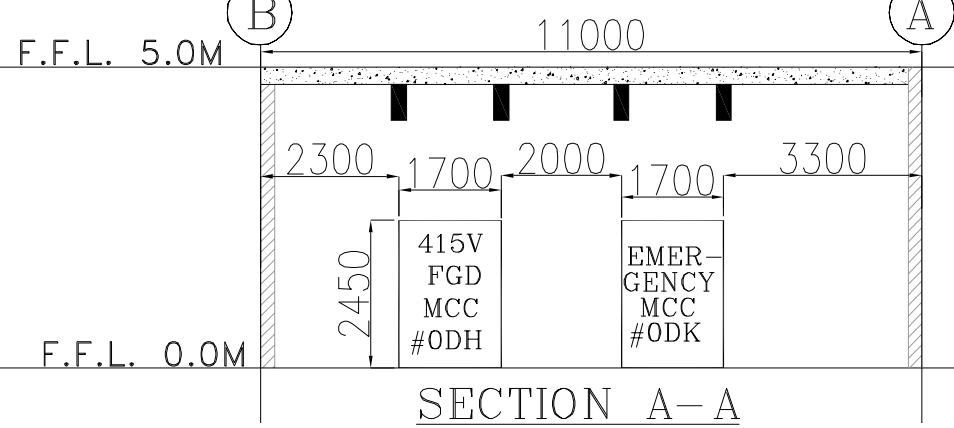
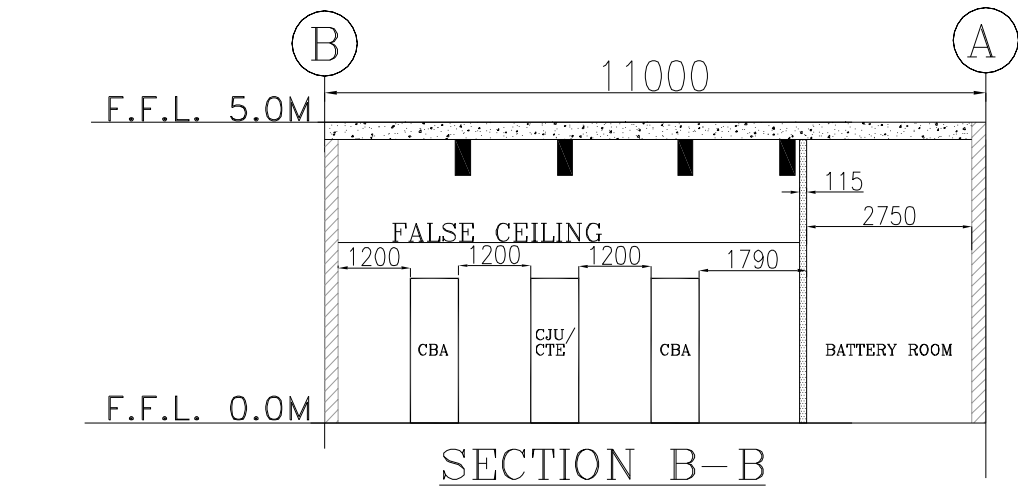
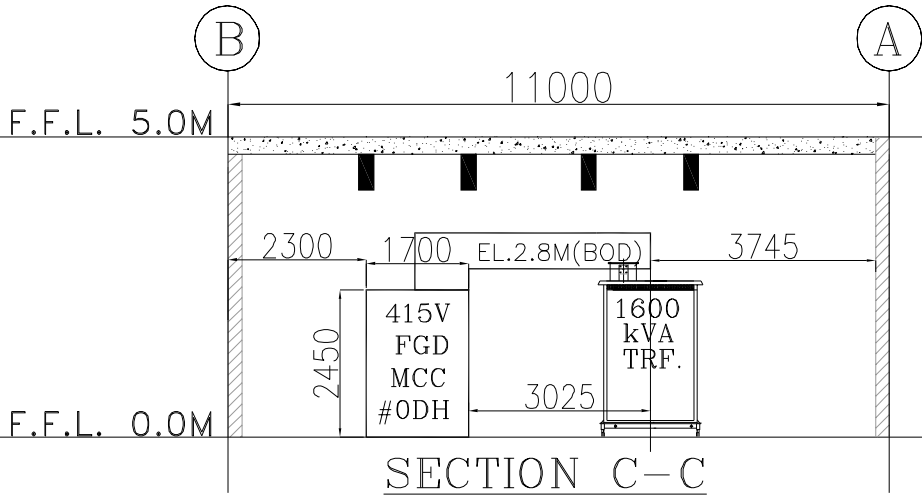
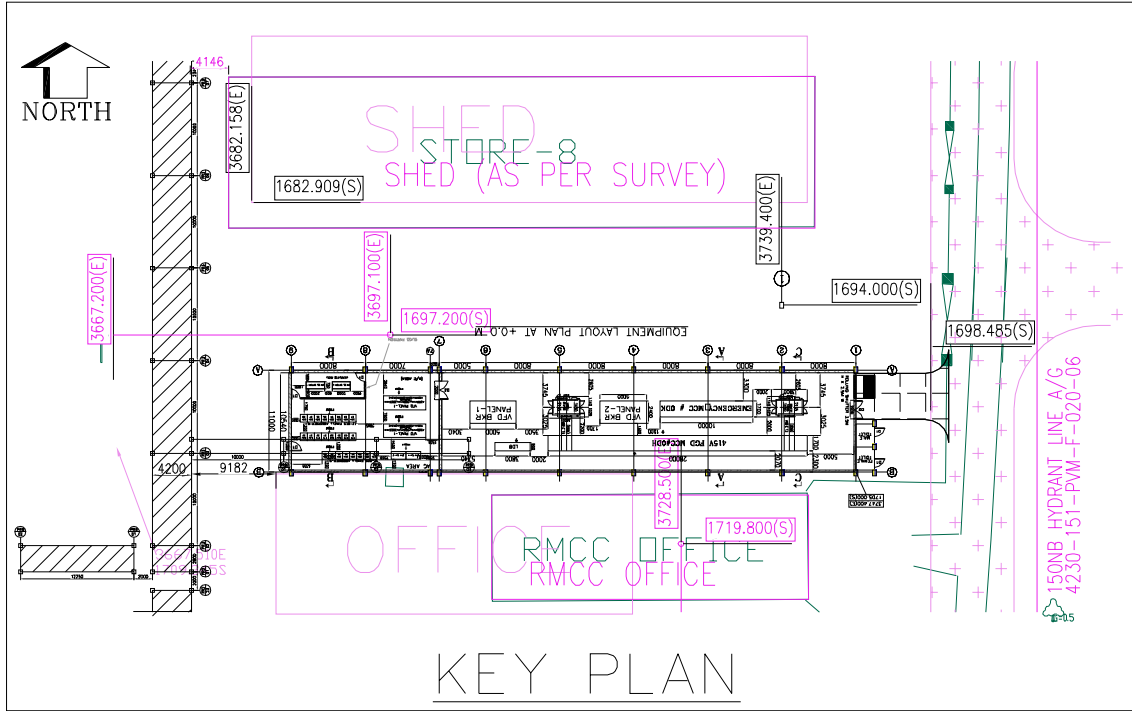
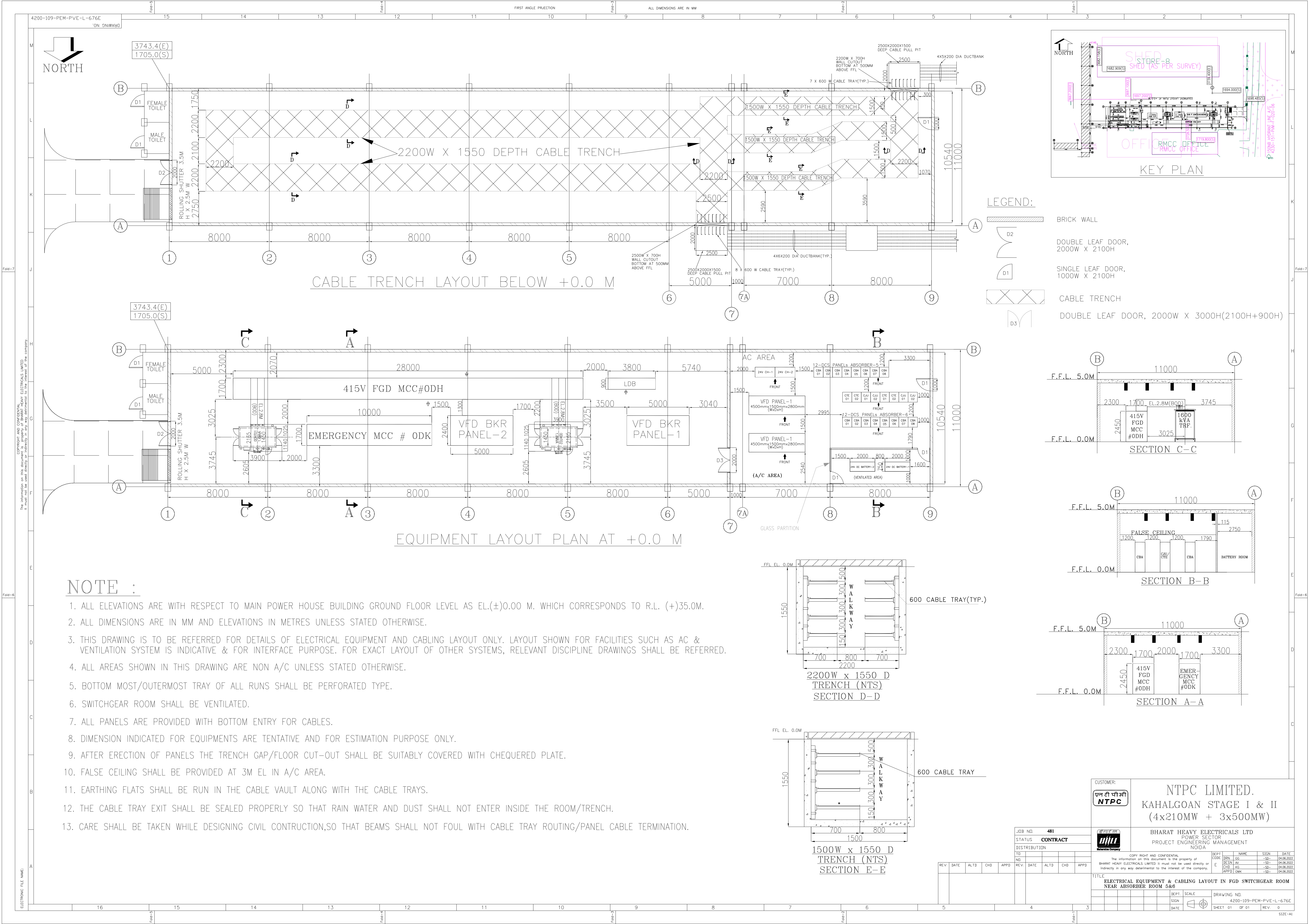
REFERENCE DRAWINGS :

S.NO.	TITLE	DRAWING NO.
01. LAYOUT OF FGD SYSTEM		4200-109-001-RPT-PVM-B-010A
02. ELECTRICAL SLD FOR FGD SYSTEM		4200-109-PEM-PVE-W-672
03. OGA OF 2500 KVA TRANSFORMERS		
04. OGA OF 2000 KVA TRANSFORMERS		
05. OGA OF 11kV FGD SWBD-A#0BH		
06. OGA OF 11kV FGD SWBD-B#0BH		
07. OGA OF 3.3 kV FGD AUX SWBD#0CB		
08. OGA OF HVAC MCC		
09. OGA OF MISC MCC#0DJ		
10. OGA OF FGD EMERGENCY MCC#0DI		
11. OGA OF FGD COMMON PMCC#0DE		
12. OGA OF FGD MCC#0DD		
13. OGA OF LHP & GHP PMCC#0DF		
14. OGA OF VFD BKR PANEL		
15. OGA OF DCDB#1FC		
16. OGA OF LDB		
17. OGA OF LIGHTING ACDB (2X100KVA)		
18. OGA OF WELDING ACDB (2X100KVA)		
19. OGA OF 220V CHARGERS		
20. OGA OF ILMS		
21. OGA OF SUSPENDED MAGNET PANELS		

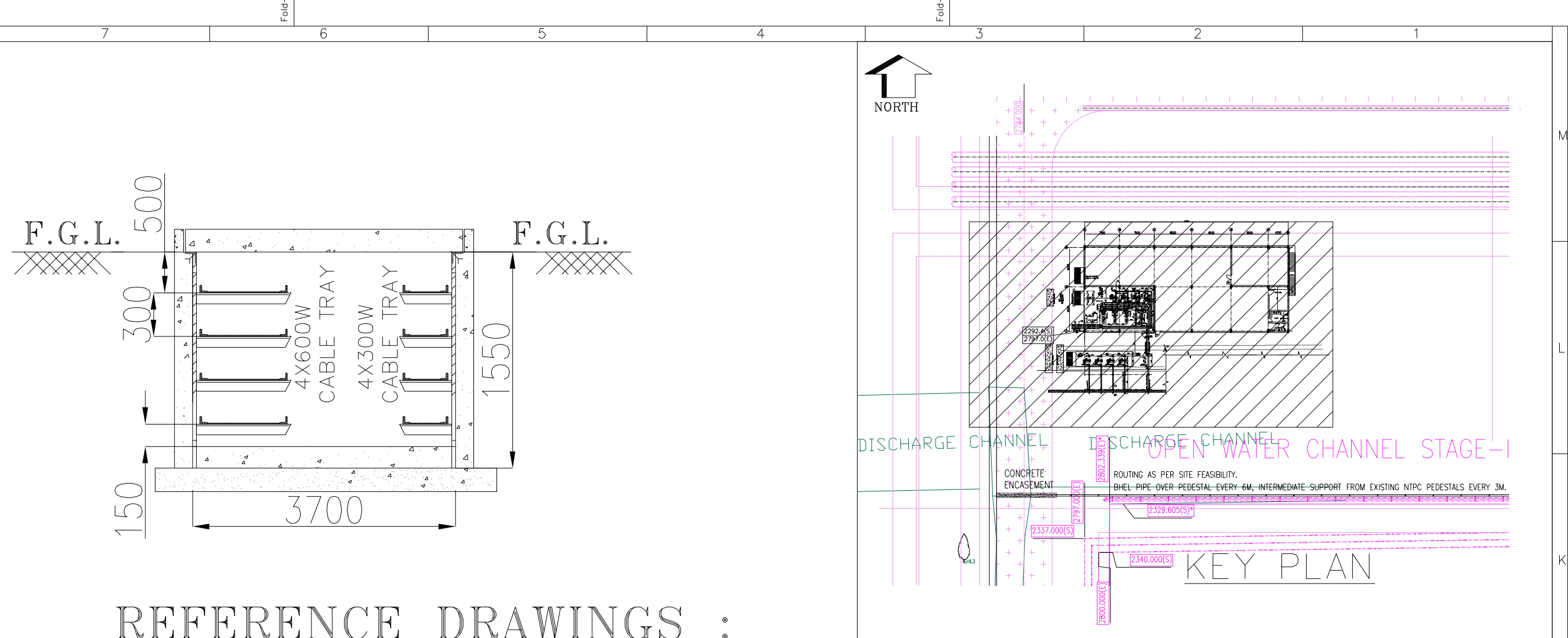


NOTE :

- ALL ELEVATIONS ARE WITH RESPECT TO MAIN POWER HOUSE BUILDING GROUND FLOOR LEVEL AS EL.(+/-)0.00 M. WHICH CORRESPONDS TO R.L. (+)35.0M.
- ALL DIMENSIONS ARE IN MM AND ELEVATIONS IN METRES UNLESS STATED OTHERWISE.
- THE DIMENSIONS OF EQUIPMENTS INDICATED IN DRAWING ARE TENTATIVE AND ARE SHOWN FOR DEVELOPING CONCEPTUAL LAYOUT.
- THIS DRAWING IS TO BE REFERRED FOR DETAILS OF ELECTRICAL EQUIPMENT AND CABLING LAYOUT ONLY. LAYOUT SHOWN FOR FACILITIES SUCH AS AC & VENTILATION SYSTEM IS INDICATIVE & FOR INTERFACE PURPOSE. FOR EXACT LAYOUT OF OTHER SYSTEMS, RELEVANT DISCIPLINE DRAWINGS SHALL BE REFERRED.
- ALL AREAS SHOWN IN THIS DRAWING ARE NON A/C UNLESS STATED OTHERWISE.
- BOTTOM MOST/OUTERMOST TRAY OF ALL RUNS SHALL BE PERFORATED TYPE.
- BOTH SWITCHGEAR ROOM & CABLE VAULT ROOM SHALL BE VENTILATED.
- DOORS IN CABLE VAULT SHALL BE FIRE PROOF.
- FIRE BARRIER WALLS WILL BE 355 MM THICK BRICKWORK OR 200 MM THICK CONCRETE, AS PER CIVIL DETAILING AND WILL PROJECT MINIMUM 600 MM BEYOND THE OIL CONTAINING PART OF THE TRANSFORMER.
- FOLLOWING CIVIL DETAILS FROM Pt. a to d SHALL BE DECIDED SEPARATELY BY CIVIL.
 - SOAK PIT INVERT LEVEL OF TRANSFORMERS, FOUNDATIONS FOR TRANSFORMERS/ RAIL TRACKS/ RADIATORS/ COOLERS AS PER TRANSFORMER FOUNDATION FOUNDATION PLANS AND OTHER PIPE SUPPORT ARRANGEMENT. INVERT LEVEL OF SOAK PIT SHALL BE FIXED IN LINE WITH TRANSFORMER OIL QUANTITY AND QUANTITY OF WATER SPRAY (TO BE INDICATED SEPARATELY BY FIRE FIGHTING SYSTEM ENGINEER).
 - FENCING DETAILS.
- APPROX. TOTAL QUANTITY OF OIL AND APPROX. TOTAL WEIGHT OF EACH TRANSFORMER SHALL BE INDICATED AFTER RECEIPT OF OGA.
- ALL PANELS ARE PROVIDED WITH BOTTOM ENTRY FOR CABLES.
- AFTER ERECTION OF PANELS THE TRENCH GAP/FLOOR CUT-OUT SHALL BE SUITABLY COVERED WITH CHEQUERED PLATE.
- FALSE CEILING SHALL BE PROVIDED AT 3.6M EL FROM FFL IN A/C AREA.
- EARTHING FLATS SHALL BE RUN IN THE CABLE VAULT ALONG WITH THE CABLE TRAYS.
- THE CABLE TRAY EXIT SHALL BE SEALED PROPERLY SO THAT RAIN WATER AND DUST SHALL NOT ENTER INSIDE THE ROOM/TRENCH



CUSTOMER:		NTPC LIMITED. KAHALGOAN STAGE I & II (4x210MW + 3x500MW)			
JOB NO. 481		Bharat Heavy Electricals Ltd			
STATUS CONTRACT		POWER SECTOR			
DISTRIBUTION		PROJECT ENGINEERING MANAGEMENT			
T.D. NO.		Noida			
REV. DATE		COPY RIGHT AND CONFIDENTIAL			
ALTD		The information on this document is the property of			
CHD		Bharat Heavy Electricals Limited. It must not be used directly or			
APPD		indirectly in any way detrimental to the interest of the company.			
REV. DATE		TITLE			
ALTD		ELECTRICAL EQUIPMENT & CABLING LAYOUT IN FGD SWITCHGEAR ROOM			
CHD		NEAR ABSORBER ROOM 5&6			
APPD		4200-109-PEM-PVE-L-676E			
REV. DATE		DEPT. SCALE			
ALTD		SIGN.			
CHD		DATE			
APPD		DRAWING NO.			
REV. DATE		SHEET 01 OF 01			
ALTD		REV. 0			
CHD		SIZE-A1			
APPD					



<u>S. NO.</u>	<u>TITLE</u>	<u>DRAWING NO.</u>
01.	LAYOUT OF FGD SYSTEM	4200-109-001-RPT-PVM-B-010A
02.	ELECTRICAL SLD FOR FGD SYSTEM	4200-109-PEM-PVE-W-672
03.	PIPING LAYOUT IN & AROUND ACW/DMCW PUMP HOUSE FOR FGD (STG-I)	4200-109A-PEM-PVM-U-001

	OPERATING FRONT OF THE PANEL		BRICK WALL
	SINGLE LEAF DOOR (1200Wx2100H)		B.O.O BOTTOM OF OPENING
	DOUBLE LEAF DOOR, 2000W X 2100H		WALL CUTOUT
	DOUBLE LEAF DOOR, 2000W X 3000H (2100H+900H)		FENCE WALL
			CABLE TRENCH

1. ALL ELEVATIONS ARE WITH RESPECT TO MAIN POWER HOUSE BUILDING FLOOR LEVEL AS EL.(±)0.00 M. WHICH CORRESPONDS TO R.L. (+)35.0M.
2. ALL DIMENSIONS ARE IN MM AND ELEVATIONS IN METRES UNLESS STATED OTHERWISE.
3. THIS DRAWING IS TO BE REFERRED FOR DETAILS OF ELECTRICAL EQUIPMENT AND CABLING LAYOUT ONLY. LAYOUT SHOWN FOR FACILITIES SUCH AS AC & VENTILATION SYSTEM IS INDICATIVE & FOR INTERFACE PURPOSE. FOR EXACT LAYOUT OF OTHER SYSTEMS, RELEVANT DISCIPLINE DRAWINGS SHALL BE REFERRED.
4. ALL AREAS SHOWN IN THIS DRAWING ARE NON A/C UNLESS STATED OTHERWISE.
5. BOTTOM MOST/OUTERMOST TRAY OF ALL RUNS SHALL BE PERFORATED TYPE.
6. SWITCHGEAR ROOM SHALL BE VENTILATED.
7. ALL PANELS ARE PROVIDED WITH BOTTOM ENTRY FOR CABLES.
8. DIMENSION INDICATED FOR EQUIPMENTS ARE TENTATIVE AND FOR ESTIMATION PURPOSE ONLY.
9. AFTER ERECTION OF PANELS THE TRENCH GAP/FLOOR CUT-OUT SHALL BE SUITABLY COVERED WITH CHEQUERED PLATE.
10. FALSE CEILING SHALL BE PROVIDED AT 3M EL IN A/C AREA.
11. EARTHING FLATS SHALL BE RUN IN THE CABLE VAULT ALONG WITH THE CABLE TRAYS.
12. THE CABLE TRAY EXIT SHALL BE SEALED PROPERLY SO THAT RAIN WATER AND DUST SHALL NOT ENTER INSIDE THE ROOM/TRENCH.
13. CARE SHALL BE TAKEN WHILE DESIGNING CIVIL CONSTRUCTION,SO THAT BEAMS SHALL NOT FOUL WITH CABLE TRAY ROUTING/PANEL CABLE TERMINATION.

