

**SUBSTATION BOUNDARY CORNER:**

PLOT CORNER - A	E-611760.9327	N-2624417.9399
PLOT CORNER - B	E-613836.1721	N-2624492.5780
PLOT CORNER - C	E-613935.7429	N-2624402.113
PLOT CORNER - D	E-614111.0295	N-2624594.4646
PLOT CORNER - E	E-614241.8273	N-2624399.6348
PLOT CORNER - F	E-614261.3942	N-2624332.2212
PLOT CORNER - G	E-614237.3336	N-2624264.8410
PLOT CORNER - H	E-614155.3984	N-2624065.1843

ITEMS	DESCRIPTION	MATERIAL QTY	UNIT	VAL
1	MAIN EARTHING CONDUCTOR TO BE BURIED IN GROUND.	40mm Dia. M.S. Rod	13015	Mtr.
2	MAIN EARTHING CONDUCTOR TO BE BELOW GROUND(SURF).	40mm Dia. M.S. Rod	15560	Mtr.
3	MAIN EARTHING CONDUCTOR FOR AUXILIARY EARTH MAT	40mm Dia. M.S. Rod	3348	Mtr.
4	400KV ISOLATORS (MOM-41 NOS. EOM-30 NOS)	40mm Dia. M.S. Rod	2034	Mtr.
5	220KV ISOLATORS (MOM-41 NOS. EOM-34 NOS)	40mm Dia. M.S. Rod	30	Mtr.
6	CONDUCTOR ABOVE GROUND & EARTHING LEADS (FOR EQUIPMENT & AUX. STRUCTURES)	75X12mm G.S. FLAT	5273	Mtr.
7	EARTHING OF OUTDOOR MARSHALLING BOXES, MOM BOXES AND JUNCTION BOXES & LIGHTING PANELS, FENCE COMPOUND WALL, TRENCH ETC.	50X6 MM G.S. FLAT	3720	Mtr.
8	ROD EARTH ELECTRODE	40MM DIA. 3000MM LONG M.S. ROD	12	Nos.
9	ROD EARTH ELECTRODE WITH TEST LINK, CI FRAME AND COVER	40MM DIA. 3000MM LONG M.S. ROD	152	Nos.
10	PIPE EARTH ELECTRODE (N TREATED EARTH PIT) AS PER IS	40MM DIA. 3000MM LONG GS PIPE	10	Nos.

- NOTES:**
- ALL DIMENSION ARE IN MM. UNLESS OTHERWISE SPECIFIED.
  - THIS EARTH MAT LAYOUT IS PREPARED ON THE BASIS OF EARTH MAT DESIGN CALCULATION ADOPTED AS PER IEE 80
  - EARTHING CONDUCTOR IN OUTDOOR AREA SHALL BE BURIED AT 600mm BELOW GFL.
  - ROUTE OF MAIN CONDUCTOR MAY CHANGE IF SITE CONDITION FORCES ACCORDINGLY QTY MAY VARY.
  - ROUTE OF RISER MAY CHANGE IF SITE CONDITION FORCES ACCORDINGLY QTY. MAY VARY.
  - THE QUANTITY OF RISERS FOR ALL THE EQUIPMENT SHOWN IN THE DRAWING IS INDICATIVE. ROUTE MAY BE DECIDED IN CONSULTATION WITH SITE INCHARGE.
  - EARTHING CONDUCTOR ALONG THEIR RUN ON CABLE TRENCH ON TOP TERS SHALL BE SUPPORTED / WELDED AT EACH RACK LOCATION AND TO ALL RACKS AND SHALL BE CONNECTED TO THE EARTH MAT AT 15M INTERVAL AND NEAR BEDDS.
  - RAIL TRACK AND METALLIC PIPES WITHIN THE SWITCHYARD SHALL BE EARTHED AT DISTANCE OF 30M AND ALSO AT BOTH ENDS, IF ANY.
  - 40MM GRAVEL THICKNESS OF CRUSHED LEVEL SHALL BE MAINTAINED TO MINIMUM 150MM.
  - OPERATING HANDLES OF ISOLATORS ARE TO BE CONNECTED TO MAIN MAT THROUGH GI FLEXIBLE BOND.
  - REQUIRED QTY OF CONDUCTOR, CLEAT CLAMP, PAD CLAMP, FLEXIBLE BOND, HARDWARES, ETC. ACCESSORIES SHALL BE PROVIDED AS PER EQUIPMENT'S EARTHING ARRANGEMENT DRAWING. NO. REC/RERA-E-SYD-010
  - A) METAL POST OF FENCE SHALL BE CONNECTED TO EARTH GRID AT ALTERNATE POST (5M) INTERVALS AS PER PRACTICE.  
B) CONTRACTED COMPOUND WALL SHALL BE CONNECTED TO THE GRID AT COLUMNS OF 6M INTERVALS.
  - ALL WELDED JOINTS SHALL BE TREATED WITH RED OXIDE PAINT AND THEN COATED WITH TWO LAYERS OF BITUMEN FOR BURIED JOINTS AND TWO COATS OF ALUMINUM PAINT FOR EXPOSED JOINTS.
  - ELECTRODE FOR LA, CVT, NEUTRAL OF TRANSFORMER SHALL BE PROVIDED AS PER EARTHING ARRANGEMENT DRAWING NO. REC/RERA-E-SYD-010
  - THE SEPARATION BETWEEN ANY TWO PIPE ELECTRODES SHALL NOT BE LESS THAN 6.0 m.
  - ELECTRODE FOR POWER TRANSFORMER NEUTRAL AND LIGHTNING ARRESTERS SHALL BE LOCATED AS CLOSE AS POSSIBLE TO EQUIPMENT.
  - THE INDIVIDUAL PIPE ELECTRODES SHALL BE LABELED FOR PROPER IDENTIFICATION.
  - ALL NON CURRENT CARRYING METAL PARTS SUCH AS BODY OF TRANSFORMERS, CIRCUIT BREAKERS, INSTRUMENT TRANSFORMERS, OUTDOOR STRUCTURES, ISOLATOR STRUCTURE ETC ARE TO BE DIRECTLY CONNECTED TO THE EARTH MAT USING GS FLATS WITH TWO DISTINCT CONNECTIONS RUNNING IN OPPOSITE DIRECTIONS.
  - ALL EARTH CONNECTIONS FROM EQUIPMENT / ROD ELECTRODE, GI PIPE ELECTRODE TO THE EARTH MAT SHALL BE MADE USING GS FLATS. ALL JOINTS OF THE FLATS SHALL BE WELDED. ALL CONNECTIONS TO EQUIPMENT SHALL BE OF BOLTED TYPE.
  - WHEREVER EARTH CONDUCTORS CROSSING CABLE TRENCHES UNDER GROUND SERVICES DUCTS, PIPE TUNNELS, ROADS ETC, IT SHALL BE LAID MIN 300MM BELOW THEM AND SHALL BE REROUTED IN CASE IT FOULS WITH EQUIPMENT/STRUCTURE FOUNDATION.
  - EARTH PIT LOCATION SHOWN IN THE DIAGRAM IS ONLY INDICATIVE. THE ELECTRODE AND EARTH ROD LOCATION SHALL BE CHANGED SLIGHTLY TO SUIT SITE CONDITION.
  - AUXILIARY EARTH MAT (1500X1500MM FOR 400KV & 220KV, 900X900MM FOR 33KV & 11KV) WITH GRID SPACING 300MM WILL BE PLACED BELOW ISOLATOR MOM/EOM AT 300MM DEPTH FROM GROUND LEVEL. THIS WILL BE DONE AS PER THE ACTUAL LOCATION OF MOM & EOM BOX FOR ISOLATOR.
  - EARTHING OF LT PANELS, BMK, LIGHTING PANELS AS PER EARTHING DETAILS DRAWING REC/RERA-E-SYD-010

- LEGEND:**
- LA - LIGHTNING ARRESTER
  - CVT - CAPACITIVE VOLTAGE TRANSFORMER
  - 4T5 - 400KV TOWER WITH PEAK
  - 2T5 - 220KV TOWER WITH PEAK
  - 1T5 - 11KV TOWER WITH SPIKE
  - CR - CONTROL ROOM
  - GSP - GALVANIZED STEEL PIPE
  - BW - BOUNDARY WALL
  - FE - FENCE
  - LP - LIGHTNING POLE
  - MOM - MAIN OPERATING MECHANISM
  - EOM - EARTH OPERATING MECHANISM

**G R I L**  
**G R INFRAPROJECTS LIMITED**  
 SECTOR-18, GURUGRAM (122015)  
 RAJGARH TRANSMISSION LTD. (400/220kv PACHORA SEZ PP S/S)

Approval status

A: APPROVED	<input checked="" type="checkbox"/>
B: APPROVED SUBJECT TO INCORPORATION OF COMMENTS	<input type="checkbox"/>
C: RESUBMIT FOR APPROVAL AFTER INCORPORATING COMMENTS	<input type="checkbox"/>
D: FOR INFORMATION & RECORD	<input type="checkbox"/>
E: NOT APPROVED	<input type="checkbox"/>

THIS APPROVAL SHALL NOT RELIEVE THE CONTRACTOR FROM ITS CONTRACTUAL OBLIGATIONS

DATE: 30.03.2023 SIGN: *[Signature]*

REV.	DESCRIPTION	DRAWN	CHECKED	APPROVED	STATUS
R2	THIRD ISSUE	Name SS MS Date 28.03.23 28.03.23			FOR REFERENCE
R1	SECOND ISSUE	Name SS MS Date 20.03.23 20.03.23			FOR REFERENCE
R0	FIRST ISSUE	Name SS MS Date 17.09.22 17.09.22			FOR REFERENCE

CUSTOMER: RAJGARH TRANSMISSION LIMITED

OWNER'S ENGINEER CONSULTANT: KNR ENGINEERS (INDIA) PVT. LTD.

PROJECT: TRANSMISSION SYSTEM FOR EVACUATION OF POWER FROM RE PROJECTS IN RAJGARH(2500MW) SEZ IN MADHYA PRADESH

REF NO: RECPDCL/TBCB/RAJGARH/2021-2022/3333 DATED-31.03.2022

TITLE: EARTH MAT LAYOUT PLAN - 400KV & 220KV SWITCHYARD

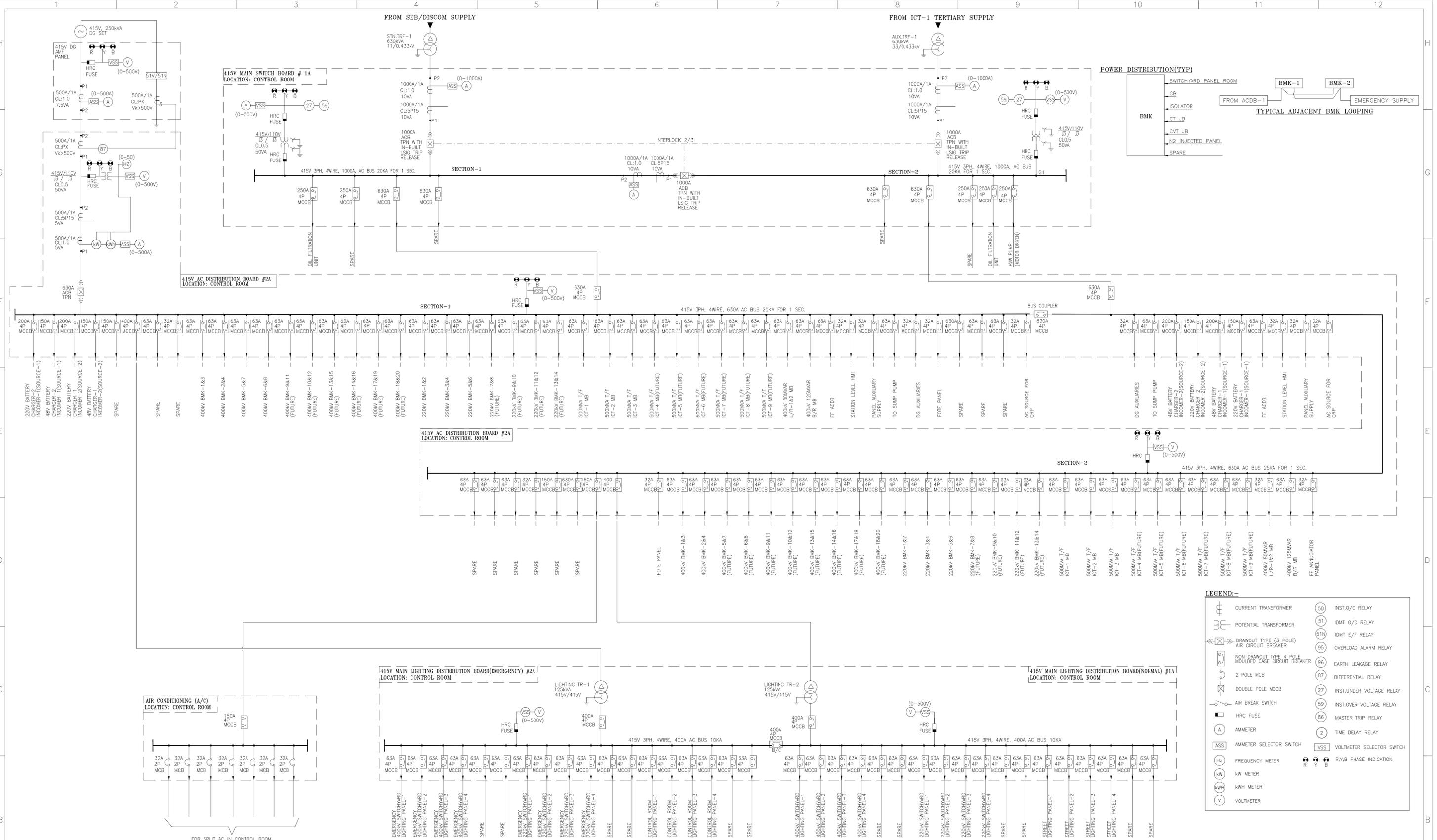
CLIENT: **G R I L**  
 G R INFRAPROJECTS LTD.  
 2nd Floor, Nexus Tower, Plot No. 18, Phase-IV, Udyog Vihar, Sector-18, Gurugram, Haryana-122015, India.

DRAWING No. REC/RERA/E-SYD/009

SHEET 01 OF 01

SCALE 1:500

REV. 02 DATE: 17.09.23



- SINGLE LINE DIAGRAM FOR 400/220KV SWITCHYARD RAJGARH SS-REC/RERA/E-SYD/002
- ELECTRICAL LAYOUT PLAN & SECTION FOR 400/220KV RAJGARH SS-REC/RERA/E-SYD/003
- 400/220KV CONTROL ROOM BUILDING LAYOUT FOR LAYOUT FOR RAJGARH SS-REC/RERA/E-SYD/004
- SWITCHYARD PANEL ARRANGEMENT LAYOUT FOR 400KV AND 220KV RAJGARH SS-REC/RERA/E-SYD/005

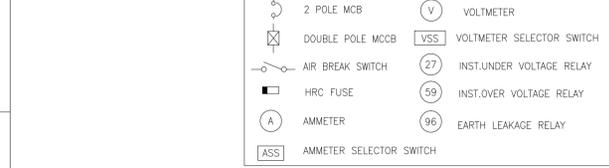
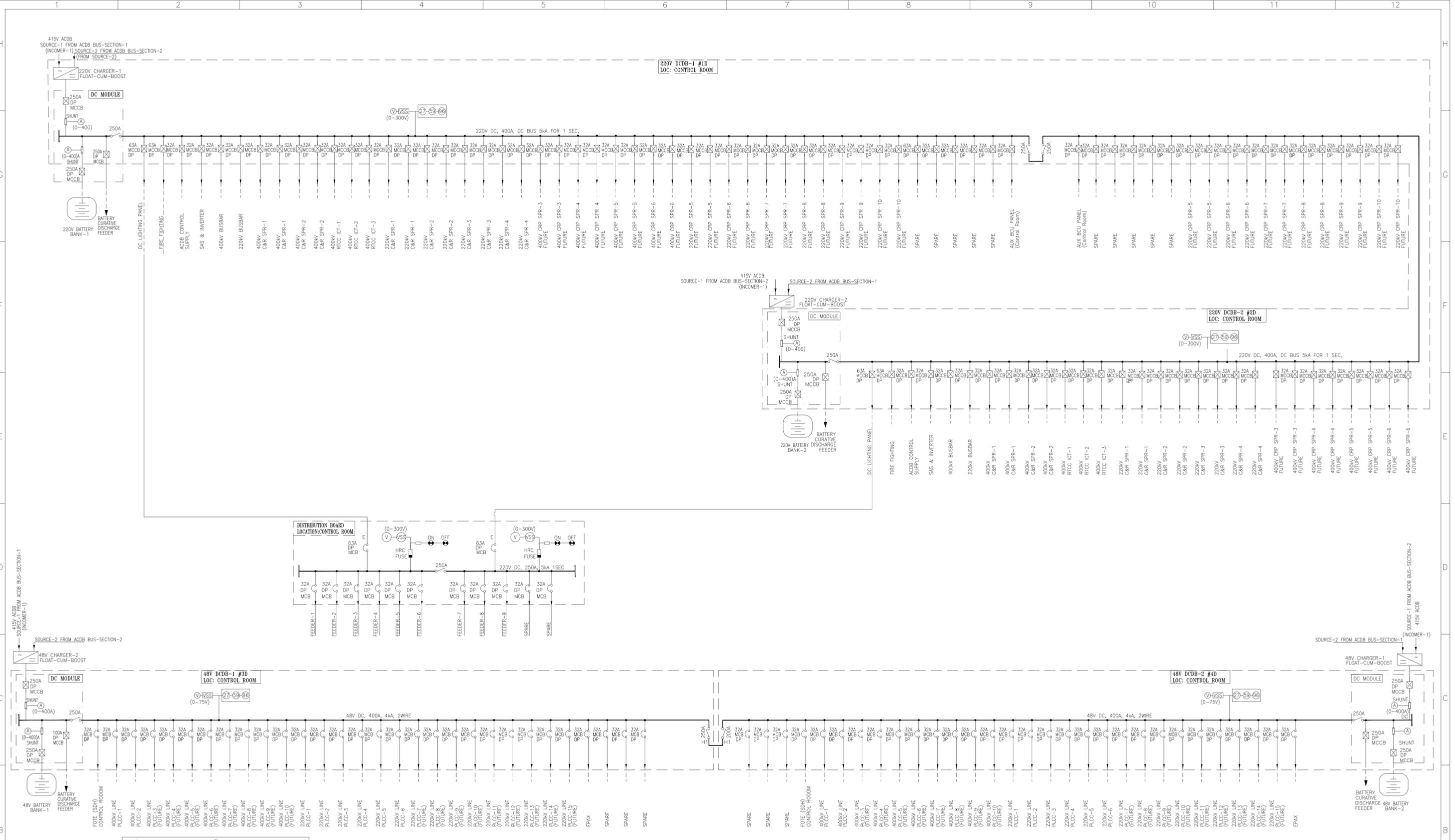
**NOTES:-**

1. DG SET SHALL BE OF AUTO START TYPE.
2. INTERLOCK OF BREAKER SHALL BE PROVIDED TO PREVENT PARALLEL OPERATION OF DG SET WITH NORMAL STATION SUPPLY.
3. ALL DATA (ANALOG INPUT AND OUTPUT REQUIRED FOR SAS SYSTEM SHALL BE CONSIDER IN LT SWITCHGEAR.
4. PANEL SHALL BE BOTTOM CABLE ENTRY.
5. LIFTING HOOK SHALL BE PROVIDED.
6. CONTINUOUS EARTH BUS BAR SHALL BE PROVIDED AT BOTTOM.
7. GENERAL ARRANGEMENT, PANEL MOUNTING DETAILS, TERMINAL DETAILS AND WIRING DETAILS SHALL BE FURNISHED IN PANEL GA DRAWINGS.
8. INTERLOCK OF ACB INCOMER, B/C & DG INCOMER SHALL BE PROVIDED.
9. LOOPING SHALL BE DONE BETWEEN BMK.
10. SUPPLIED BY LT SWITCHGEAR MANUFACTURER IN LOOSE.
11. NO TWO AC SOURCE SHALL BE PARALLELED AT ANY STAGE.
12. DETAILS OF FFDB SHALL BE PROVIDED DURING FIRE FIGHTING DETAIL ENGINEERING.

REV.	DESCRIPTION	DRAWN	ELECT.	PM	APPROVED	STATUS
R3	REVISED AS PER COMMENTS					FOR APPROVAL
R2	REVISED AS PER COMMENTS					FOR APPROVAL
R1	REVISED AS PER COMMENTS					FOR APPROVAL
R0	FIRST ISSUE					FOR APPROVAL

CUSTOMER:	RAJGARH TRANSMISSION LIMITED
OWNER'S ENGINEER CONSULTANT:	KNR ENGINEERS (INDIA) PVT. LTD.
PROJECT:	TRANSMISSION SYSTEM FOR EVACUATION OF POWER FROM RE PROJECTS IN RAJGARH(2500MW) SEZ IN MADHYA PRADESH
REF NO:	RECPDCL/TBCB/RAJGARH/2021-2022/3333 DATED-31.03.2022
TITLE:	SINGLE LINE DIAGRAM OF AC & DC AUXILIARY SYSTEMS (400kV&220KV FEEDERS)
CLIENT:	GRIL® G R INFRAPROJECTS LTD. 2nd Floor, Novus Tower, Plot No. 18, Phase-IV, Udhog Vihar, Sector-18, Gurugram, Haryana-122015, India.
DRAWING No.	REC/RERA/E-SYD/006
SHEET 01 OF 02	REV. 03
SCALE 1 : 1	DATE:20.03.22

Size: A1 (841 x 594)



1. SINGLE LINE DIAGRAM FOR 400/220kV SWITCHYARD RAJGARH SS-REC/RERA/E-SYD/002	<b>NOTES:-</b> 1. INTERLOCK OF BREAKER SHALL BE PROVIDED TO PREVENT PARALLEL OPERATION OF DC SET WITH NORMAL STATION SUPPLY. 2. ALL DIGITAL/ANALOG INPUT AND OUTPUT REQUIRED FOR SAS SYSTEM SHALL BE CONSIDER IN LT SWITCHGEAR. 3. PANEL SHALL BE BOTTOM CABLE ENTRY. 4. LIFTING HOOK SHALL BE PROVIDED. 5. CONTINUOUS EARTH BUS BAR SHALL BE PROVIDED AT BOTTOM. 6. GENERAL ARRANGEMENT, PANEL MOUNTING DETAILS, TERMINAL DETAILS AND WIRING DETAILS SHALL BE FURNISHED IN PANEL GA DRAWINGS. 7. 48V DC SUPPLY FOR THE PLC WILL BE (FUTURE). 8. THE CONTROL DC SUPPLY FOR AIS (FOR CONTROL, INTERLOCKING, SIGNALING) SHALL BE TAPPED FROM RESPECTIVE BAY CRP PANELS. 9. FOR C&R PANEL OF EACH BAYS, SEPARATE DC SUPPLY FROM POWER CIRCUIT OF SUBSTATION SHALL BE PROVIDED FED DIRECTLY FROM DCDB. 10. SUPPLIED BY LT SWITCHGEAR MANUFACTURER IN LOOSE. 11. DETAILS OF FEED SHALL BE PROVIDED DURING FIRE FIGHTING DETAIL ENGINEERING. 12. AT LEAST 20% SPARE FEEDERS WITH MINIMUM INO. OF EACH TYPE AND RATING SHALL BE PROVIDED IN DCDB
2. ELECTRICAL LAYOUT PLAN & SECTION FOR 400/220kV RAJGARH SS-REC/RERA/E-SYD/003	
3. 400/220kV CONTROL ROOM BUILDING LAYOUT FOR LAYOUT FOR RAJGARH SS-REC/RERA/E-SYD/004	
4. SWITCHYARD PANEL ARRANGEMENT LAYOUT FOR 400kV AND 220kV RAJGARH SS-REC/RERA/E-SYD/005	
REF. DRG. NO.	DESCRIPTION

R3	REVISED AS PER COMMENTS	Name V.MK	M.S				FOR APPROVAL
R2	REVISED AS PER COMMENTS	Name G.M	M.S				FOR APPROVAL
R1	REVISED AS PER COMMENTS	Name G.M	M.S				FOR APPROVAL
R0	FIRST ISSUE	Name S.V	P.I				FOR APPROVAL
REV.	DESCRIPTION	DRAWN	ELECT.	PM	CHECKED	APPROVED	STATUS

CUSTOMER:		RAJGARH TRANSMISSION LIMITED					
OWNER'S ENGINEER CONSULTANT:		KNR ENGINEERS (INDIA) PVT. LTD.					
PROJECT:		TRANSMISSION SYSTEM FOR EVACUATION OF POWER FROM RE PROJECTS IN RAJGARH(2500MW) SEZ IN MADHYA PRADESH					
REF NO:		RECPDCL/TBCB/RAJGARH/2021-2022/3333 DATED-31.03.2022					
TITLE:		SINGLE LINE DIAGRAM OF AC & DC AUXILIARY SYSTEMS (400kV&220kV FEEDERS)					
CLIENT:	G R INFRAPROJECTS LTD.	DRAWING No.		SHEET 02 OF 02		SCALE 1 : 1	
2nd Floor, Novus Tower, Plot No. 18, Phase-IV, Udhog Vihar, Sector-18, Gurugram, Haryana-122015, India.		REC/RERA/E-SYD/006		REV. 03		DATE:20.03.22	

Size: A1 (841 x 594)