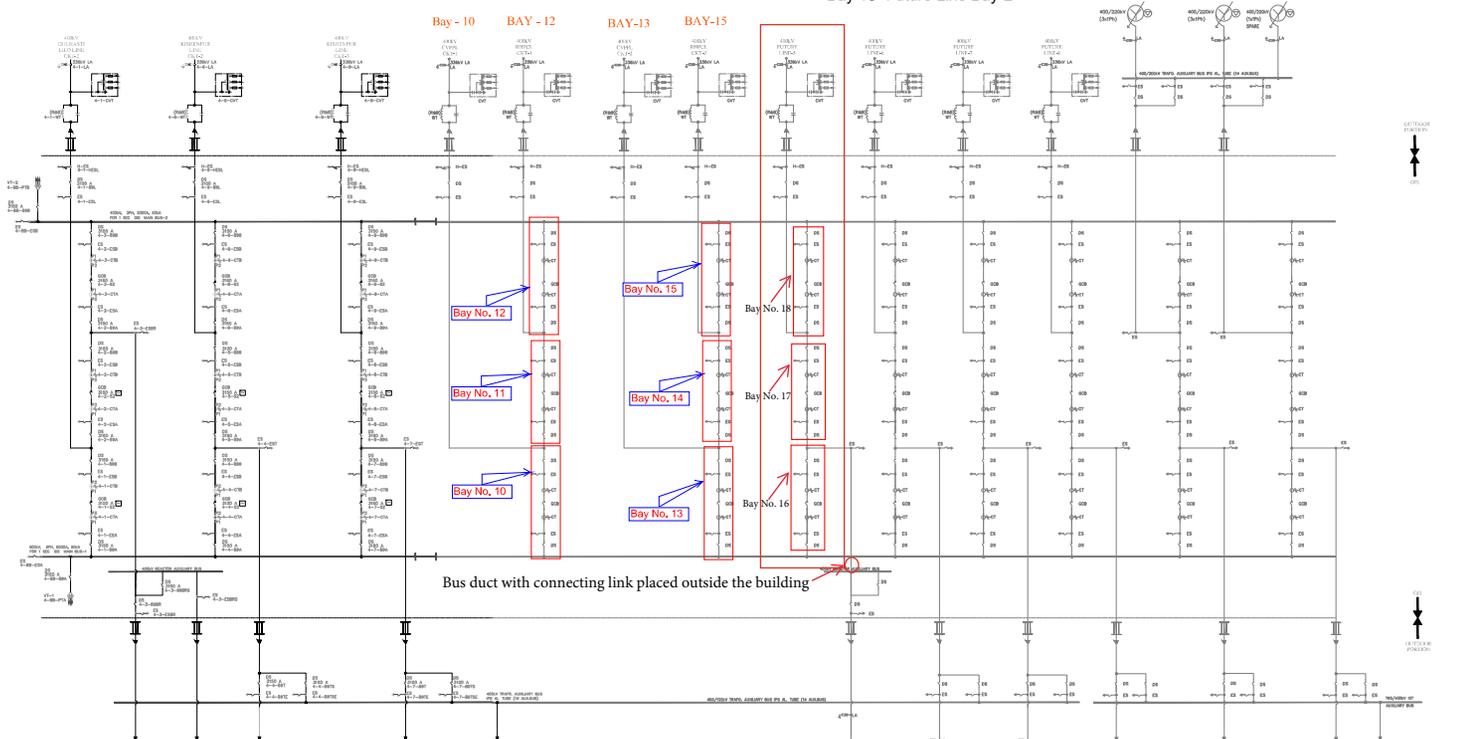


A. 400KV KISHTWAR S/S

Bay number 12 and 15 for Rate
Bay number 10 and 13 for CVPLP
Bay 16- Future Line Bay-1
Bay 18- Future Line Bay-2



- NOTE:**
1. ALL THE ISOLATORS AND EARTH SWITCHES SHALL BE MOTORIZED.
 2. SUITABLE ACF SHALL BE APPLIED FOR ALL EQUIPMENT.
 3. THE MENTIONED EQUIPMENT RATINGS ARE WITHOUT CONSIDERING ACF.
 4. THE LOCATION OF WAVE TRAP SHOWN IS TENTATIVE. THE EXACT LOCATION WILL BE FINALISED LATER BASED ON REMOTE END SUBSTATION DETAILS.

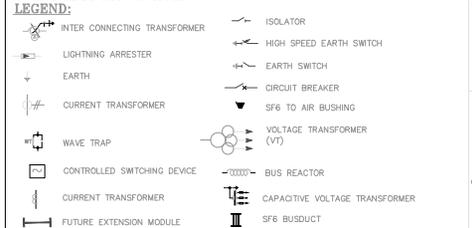


TABLE-C: CURRENT TRANSFORMER DETAILS:

LOCATION	CORE TYPE	RATIO	PURPOSE	BURDEN	ACCURACY CLASS	IEEE POINT	MAGNETIZING CURRENT (mA @ 1A)
400V BUS REACTOR							
4-3-CTA	1	1000-2000-500/1	PROTECTION	—	FX	1000-2000-500	100mA @ 3000V/1
4-3-CTB	2	1000-2000-500/1	METERING	20VA	0.2S	1000-2000-500	100mA @ 3000V/1
4-3-CTC	3	1000-2000-500/1	PROTECTION	—	FX	1000-2000-500	100mA @ 3000V/1
400V LINE FEEDER							
4-1-CTA	1	1000-2000-500/1	METERING	20VA	0.2S	—	—
4-1-CTB	2	1000-2000-500/1	PROTECTION	—	FX	1000-2000-500	100mA @ 3000V/1
4-1-CTC	3	1000-2000-500/1	PROTECTION	—	FX	1000-2000-500	100mA @ 3000V/1
4-2-CTA	1	1000-2000-500/1	METERING	20VA	0.2S	—	—
4-2-CTB	2	1000-2000-500/1	PROTECTION	—	FX	1000-2000-500	100mA @ 3000V/1
4-2-CTC	3	1000-2000-500/1	PROTECTION	—	FX	1000-2000-500	100mA @ 3000V/1

TABLE-D: INTERCONNECTING TRANSFORMER DETAILS:

LOCATION	RATIO	PURPOSE	BURDEN	ACCURACY CLASS	IEEE POINT	MAGNETIZING CURRENT (mA @ 1A)
4-4-BCT-1HV	1000/1	PROTECTION	—	PS	1000	60mA
4-4-BCT-1MV	660/1	METERING	20VA	0.2S	—	—
1-1-BCT-1HV	1000/1	PROTECTION	—	PS	1000	60mA
1-1-BCT-1MV	2	1000/1	METERING	20VA	0.2S	—
4-3-BCT-1HV-1MV	1	289/2	WT	30VA	3	—
1-1-BCT-1HV-1MV	1	684/2	WT	30VA	3	—
4-3-BCT-1LV	1	87/2	WT	30VA	3	—
1-1-BCT-1LV	1	684/1	WT	30VA	3	—

TABLE-E: BUSBARS TRANSFORMER DETAILS:

LOCATION	RATIO	PURPOSE	BURDEN	ACCURACY CLASS	IEEE POINT	MAGNETIZING CURRENT (mA @ 1A)	
4-4-BCT-1HV	1	1000/1	PROTECTION	—	FX	1000	40mA
4-4-BCT-1MV	1	1000/1	PROTECTION	—	FX	1000	60mA
1-1-BCT-1HV	2	1000/1	PROTECTION	—	FX	1000	60mA

TABLE-F: VOLTAGE TRANSFORMER DETAILS:

LOCATION	RATIO	PRIMARY VOLTAGE (KV)	SECONDARY VOLTAGE (V)	PURPOSE	BURDEN	ACCURACY CLASS
MAN BUS 1 & 2	—	400	110/115	PROTECTION	3P	50VA
4-4-BCT-1HV	—	1000	110/115	PROTECTION	3P	50VA
4-4-BCT-1MV	—	1000	110/115	METERING	0.2	50VA

TABLE-G: VOLTAGE TRANSFORMER DETAILS:

LOCATION	RATIO	PRIMARY VOLTAGE (KV)	SECONDARY VOLTAGE (V)	PURPOSE	BURDEN	ACCURACY CLASS
LINE 1,2&3	—	400	110/115	PROTECTION	3P	50VA
4-3-CTA	—	1000	110/115	PROTECTION	3P	50VA
4-3-CTB	—	1000	110/115	METERING	0.2	50VA

SYSTEM DATA (WITHOUT ACF):

S.No.	PARAMETER	400 kV	33 kV (OUTSIDE)	33 kV (NON-TERRACE)	11 kV (OUTSIDE)	11 kV (NON-TERRACE)
1.	SYSTEM VOLTAGE	400 kV	33 kV	33 kV	11 kV	11 kV
2.	HIGHEST SYSTEM VOLTAGE	420 kV	66 kV	33 kV	11 kV	11 kV
3.	No. OF PHASES	3	3	3	3	3
4.	RATED FREQUENCY	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz
5.	ALTITUDE	1832 MTR. ABOVE MSL	1832 MTR. ABOVE MSL	1832 MTR. ABOVE MSL	1832 MTR. ABOVE MSL	1832 MTR. ABOVE MSL
6.	ONE MIN. POWER FREQUENCY WITHSTAND VOLTAGE	430 kV(m.a)	140 kV(m.a)	70 kV(m.a)	28 kV(m.a)	28 kV(m.a)
7.	LIGHTNING WITHSTAND VOLTAGE	1300 kVp	350 kVp	170 kVp	75 kVp	75 kVp
8.	TRANSFORMER AND REACTOR	1425 kVp	250 kVp	170 kVp	75 kVp	75 kVp
9.	INSULATOR STRING	1600 kVp	250 kVp	170 kVp	75 kVp	75 kVp
10.	SWITCHING IMPULSE VOLTAGE	1050 kVp	—	—	—	—
11.	OVERVOLTAGE DISTANCE FOR OUTDOOR EQUIPMENT	50 kA/1 Sec. 25 kA/1 Sec. 25 kA/1 Sec.	31 mm/kV	—	—	—
12.	SYSTEM NEUTRAL EARTHING	SOLIDLY EARTHED	UN-EARTHED	UN-EARTHED	UN-EARTHED	UN-EARTHED

SYSTEM DATA (WITH ACF):

S.No.	PARAMETER	400 kV	33 kV (OUTSIDE)	33 kV (NON-TERRACE)	11 kV (OUTSIDE)	11 kV (NON-TERRACE)
1.	SYSTEM VOLTAGE	400 kV	33 kV	33 kV	11 kV	11 kV
2.	HIGHEST SYSTEM VOLTAGE	420 kV	66 kV	33 kV	11 kV	11 kV
3.	No. OF PHASES	3	3	3	3	3
4.	RATED FREQUENCY	50 Hz	50 Hz	50 Hz	50 Hz	50 Hz
5.	ALTITUDE	1832 MTR. ABOVE MSL	1832 MTR. ABOVE MSL	1832 MTR. ABOVE MSL	1832 MTR. ABOVE MSL	1832 MTR. ABOVE MSL
6.	ALTRITUDE CORRECTION FACTOR	1.107 (For Lightning Impulse & Power Frequency)	1.079 (For Switching Impulse)	—	—	—
7.	ONE MIN. POWER FREQUENCY WITHSTAND VOLTAGE	698 kV(m.a)	155 kV(m.a)	76 kV(m.a)	31 kV(m.a)	31 kV(m.a)
8.	LIGHTNING WITHSTAND VOLTAGE	1440 kVp	277 kVp	188 kVp	83 kVp	83 kVp
9.	TRANSFORMER AND REACTOR	1576 kVp	277 kVp	188 kVp	83 kVp	83 kVp
10.	INSULATOR STRING	1716 kVp	—	—	—	—
11.	SWITCHING IMPULSE VOLTAGE	1133 kVp	—	—	—	—
12.	RATED SHORT CIRCUIT LEVEL	50 kA/1 Sec. 25 kA/1 Sec. 25 kA/1 Sec.	34.3 mm/kV	—	—	—
13.	GREASEPASTE DISTANCE FOR OUTDOOR EQUIPMENT	—	—	—	—	—
14.	SYSTEM NEUTRAL EARTHING	SOLIDLY EARTHED	UN-EARTHED	UN-EARTHED	UN-EARTHED	UN-EARTHED

3. 420kV, 3150MVA@0.7C, 50MVA/SEC. TRANSFORMER BAY MODULE

S.No.	EQUIPMENT	CURRENT RATING (A)	QUANTITY	EQUIPMENT DESCRIPTION
1.	3-PH, SF6 CIRCUIT BREAKER WITHOUT PR & WITH CID	3150	01	4-3-32
2.	1-PH, 3 CORE, MULTI RATIO CT (REFER TABLE-A FOR CT DETAILS)	3000	03	4-3-CTA
3.	1-PH, 2 CORE, MULTI RATIO CT (REFER TABLE-A FOR CT DETAILS)	3000	03	4-3-CTB
4.	3-PH, SINGLE POLE, GROUP OPERATED ISOLATOR SWITCH	3150	02	4-3-88A 4-3-88B 4-3-88C
5.	3-PH, SINGLE POLE, GROUP OPERATED EARTHING SWITCH	—	03	4-3-88A 4-3-88B 4-3-88C
6.	1-PH, SF6 BUS DUCT INSIDE THE GIS HALL	3150	03	—

4. 420kV, 3150MVA@0.7C, 50MVA/SEC. TX. BAY MODULE

S.No.	EQUIPMENT	CURRENT RATING (A)	QUANTITY	EQUIPMENT DESCRIPTION
1.	3-PH, SF6 CIRCUIT BREAKER WITHOUT PR & WITH CID	3150	01	4-3-32
2.	1-PH, 3 CORE, MULTI RATIO CT (REFER TABLE-A FOR CT DETAILS)	3000	03	4-3-CTA
3.	1-PH, 2 CORE, MULTI RATIO CT (REFER TABLE-A FOR CT DETAILS)	3000	03	4-3-CTB
4.	3-PH, SINGLE POLE, GROUP OPERATED ISOLATOR SWITCH	3150	02	4-3-88A 4-3-88B 4-3-88C
5.	3-PH, SINGLE POLE, GROUP OPERATED EARTHING SWITCH	—	02	4-3-88A 4-3-88B 4-3-88C

1. 420kV, 3150MVA@0.7C, 50MVA/SEC. FEEDER BAY MODULE

S.No.	EQUIPMENT	CURRENT RATING (A)	QUANTITY	EQUIPMENT DESCRIPTION
1.	3-PH, SF6 CIRCUIT BREAKER WITHOUT PR & WITHOUT CID	3150	01	4-3-32
2.	1-PH, 3 CORE, MULTI RATIO CT (REFER TABLE-A FOR CT DETAILS)	3000	03	4-3-CTA
3.	1-PH, 2 CORE, MULTI RATIO CT (REFER TABLE-A FOR CT DETAILS)	3000	03	4-3-CTB
4.	3-PH, SINGLE POLE, GROUP OPERATED ISOLATOR SWITCH	3150	03	4-3-88A 4-3-88B 4-3-88C
5.	3-PH, SINGLE POLE, GROUP OPERATED EARTHING SWITCH	—	03	4-3-88A 4-3-88B 4-3-88C
6.	1-PH, SF6 BUS DUCT INSIDE THE GIS HALL	3150	03	—

3. 420kV, 3150MVA@0.7C, 50MVA/SEC. REACTOR BAY MODULE

S.No.	EQUIPMENT	CURRENT RATING (A)	QUANTITY	EQUIPMENT DESCRIPTION
1.	3-PH, SF6 CIRCUIT BREAKER WITHOUT PR & WITH CID	3150	01	4-3-32
2.	1-PH, 3 CORE, MULTI RATIO CT (REFER TABLE-A FOR CT DETAILS)	3000	03	4-3-CTB
3.	1-PH, 2 CORE, MULTI RATIO CT (REFER TABLE-A FOR CT DETAILS)	3000	03	4-3-CTA
4.	3-PH, SINGLE POLE, GROUP OPERATED ISOLATOR SWITCH	3150	02	4-3-88A 4-3-88B
5.	3-PH, SINGLE POLE, GROUP OPERATED EARTHING SWITCH	—	03	4-3-88A 4-3-88B 4-3-88C
6.	1-PH, SINGLE POLE, INDIVIDUAL OPERATED EARTHING SWITCH	3150	03	4-3-88B 4-3-88C
7.	1-PH, SINGLE POLE, INDIVIDUAL OPERATED EARTHING SWITCH (FOR SWITCHING OF SPARE REACTOR THROUGH 400V AUX. BUS)	3150	03	4-3-88B(S) 4-3-88C(S)
8.	1-PH, SINGLE POLE, INDIVIDUAL OPERATED EARTHING SWITCH	—	03	4-3-88C(S)
9.	1-PH, SF6 BUS DUCT INSIDE THE GIS HALL	3150	03	—
10.	1-PH, AUX. BUS BAR ENCLOSURE OPERATED GROUNDING SWITCH FOR AUX. BUS	3150	01	4-3-88C(S)
11.	1-PH, SF6 BUS DUCT INSIDE THE GIS HALL	3150	01	—
12.	1-PH, SF6 BUS DUCT INSIDE THE GIS HALL	3150	01	—
13.	FUTURE EXTENSION / END PIECE MODULE FOR AUX. BUS	3150	01	—

4. 420kV, 300MVA@0.7C, 50MVA/SEC. BUS BARS

S.No.	EQUIPMENT	CURRENT RATING (A)	QUANTITY	EQUIPMENT DESCRIPTION
1.	BUS BAR ENCLOSURE FOR ONE & HALF BREAKER BUS SYSTEM	5000	03	—
2.	3-PH, SINGLE POLE, GROUP OPERATED ISOLATOR SWITCH	3150	01	4-3-88A 4-3-88B 4-3-88C
3.	3-PH, SINGLE POLE, GROUP OPERATED EARTHING SWITCH	3150	01	4-3-88A 4-3-88B 4-3-88C
4.	1-PH, BUS VOLTAGE TRANSFORMER (REFER TABLE-C FOR VT DETAILS)	3150	03	4-3-88A 4-3-88B 4-3-88C
5.	FUTURE EXTENSION / END PIECE MODULE	5000	03	—

REV.	DATE	DESCRIPTION	SSK	MLC
7	05.01.2024	REVISED AS PER CLIENT'S COMMENT	CPS	GSSR
6	18.07.2023	REVISED AS PER CLIENT'S COMMENT	CPS	GSSR
5	11.07.2023	REVISED AS PER CLIENT'S COMMENT	CPS	GSSR
4	29.06.2023	REVISED AS PER CLIENT'S COMMENT	CPS	GSSR
3	02.05.2023	REVISED AS PER CLIENT'S COMMENT	BS	GSSR
2	11.05.2023	REVISED AS PER CLIENT'S COMMENT	BS	GSSR
1	21.04.2023	FOR APPROVAL	BS	GSSR

ESTABLISHMENT OF 400/132 KV POOLING SUBSTATION (GIS) AT KISHTWAR ALONG WITH 420 KV, 125 MVAR BUS REACTOR.

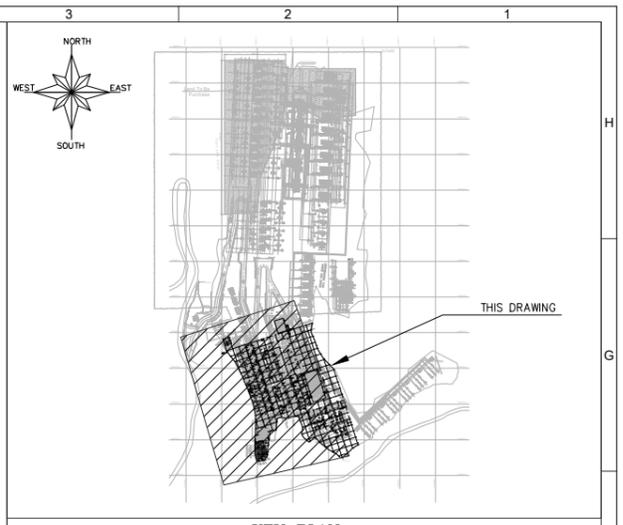
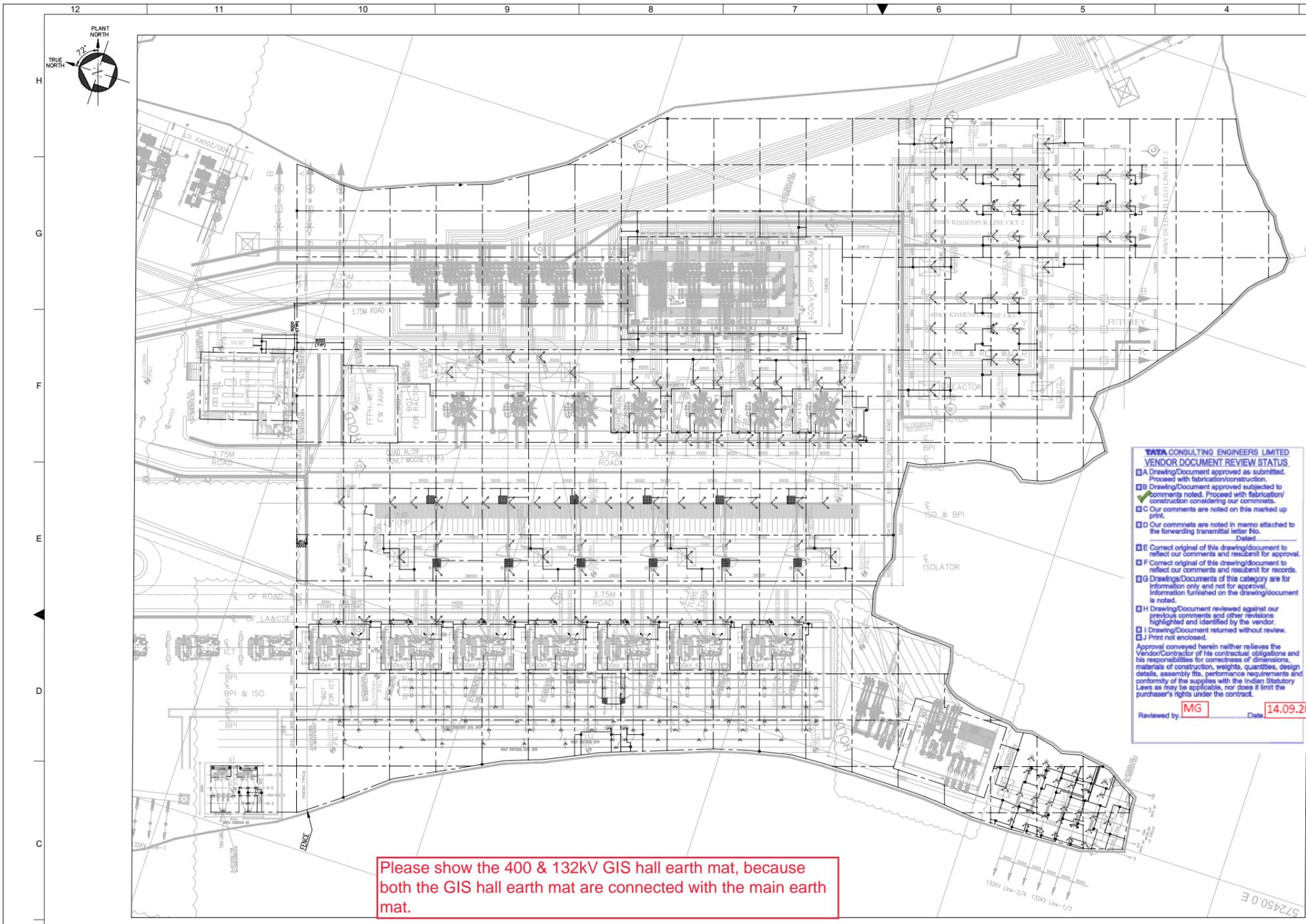
OWNER: STERILITE POWER TRANSMISSION LIMITED

CLIENT'S CONSULTANT: FICHTNER Consulting Engineers (India) Private Limited

DESIGNED	CHECKED	DEPT. HEAD	PROJ. MGR.	DATE
KRM	KRM	KRM	MLC	21.04.2023
KRM	KRM	KRM	MLC	21.04.2023
KRM	KRM	KRM	MLC	21.04.2023
KRM	KRM	KRM	MLC	21.04.2023

SINGLE LINE DIAGRAM FOR 400/132KV GIS SWITCHYARD

S. No.	Projectwise Document No.	REV. No.	Document / Drawing Description	Document Type	Classification	Status of the Observation (Open/Close)	Date:xx/xx/xxxx	TCE Observations	Date:xx/xx/xxxx	SPTL Response
D80	EARTHMAT LAYOUT	0	Earthmat Layout For 400/132kV GIS Switchyard	Drawing	Observation	Open	29-08-2023	Please show the auxiliary earthmat below 400 & 132kV GIS Hall as per GIS manufacturer recommendation.	07-09-2023	Please note that auxiliary mat for 400kV & 132kV GIS building shall be shown in the indoor earthing layout of 400 & 132kV GIS building.
D80	EARTHMAT LAYOUT	0	Earthmat Layout For 400/132kV GIS Switchyard	Drawing	Observation	Open	29-08-2023	Please show the earth electrode for DG set in the layout drawing as well as in the BOQ.	07-09-2023	Noted & Incorporated
D80	EARTHMAT LAYOUT	0	Earthmat Layout For 400/132kV GIS Switchyard	Drawing	Observation	Open	29-08-2023	Please consider & specify for the earthing of FFPH.	07-09-2023	Please note that Periphery grid is already indicated for FFPH building. 2 no of riser connection to the building is also indicated. However inside building earthing will be submitted later on.
D80	EARTHMAT LAYOUT	0	Earthmat Layout For 400/132kV GIS Switchyard	Drawing	Observation	Open	29-08-2023	Please recheck the required qty of pipe electrode for TR & Reactor.	07-09-2023	Please note that 2 no of pipe electrode considered for body earthing of each ICT & Reactor. For neutral, 2 no of pipe electrode is considered for each ICT's & Reactor after the neutral formation through neutral CT.



- NOTES:**
- ALL DIMENSIONS ARE IN mm, UNLESS OTHERWISE SPECIFIED.
 - EARTH MAT CONDUCTOR SIZE 32mm DIA MS ROD SHALL BE BURIED AT A DEPTH OF 600mm @9000mm SPACING.
 - THE SPACING BETWEEN TWO ELECTRODES SHALL BE ATLEAST EQUIVALENT TO TWICE THE LENGTH OF THE ELECTRODE (i.e.,) 6 MTR.
 - FOR INSTALLATION DETAILS OF THE EARTH MAT, REFER KIST-KSW-11-03-020(SWITCHYARD EQUIPMENT TYPICAL EARTHING ARRANGEMENT).
 - INDOOR EARTHING LAYOUT OF CONTROL ROOM BUILDING SHALL BE REFERRED IN KIST-KSW-11-03-015, 400kV GIS BUILDING EARTHING SHALL BE REFERRED IN KIST-KSW-11-03-013 AND 132kV GIS BUILDING EARTHING LAYOUT SHALL BE REFERRED IN KIST-KSW-11-03-014.
 - WHENEVER EARTHING CONDUCTOR CROSS CABLE TRENCHES, PIPES, ROADS, ETC., IT SHALL BE LAID MINIMUM 300mm BELOW THEM.
 - EARTH MAT RUNNING THROUGH THE FOUNDATIONS OF EQUIPMENTS SHALL BE RE-ROUTED AS PER SITE CONDITIONS.
 - AUXILIARY MAT OF (1500x1500mm) FOR 400kV AND (900x900mm) FOR 132kV & BELOW WITH A SPACING OF 300mm SHALL BE PROVIDED AT A DEPTH OF 300mm FROM GROUND LEVEL. LOCATION OF THE SAME IS INDICATIVE ONLY. THE SAME SHALL BE BASED ON ACTUAL LOCATION OF EQUIPMENT MASHALLING BOXES.
 - ALL THE GATES AND EVERY ALTERNATE POST OF THE FENCE/ BOUNDARY WALL SHALL BE CONNECTED TO EARTHING GRID.
 - A CONTINUOUS 50x6mm MS FLAT SHALL RUN ON THE TOP TIER ALONG THE CABLE TRENCHES AND THE SAME SHALL BE WELDED TO EACH RACKS. FURTHER THIS FLAT SHALL BE EARTHED AT BOTH ENDS AND AT AN INTERVAL OF 30 MTRS. THE MS FLAT SHALL BE FINALLY PAINTED WITH TWO COATS OF RED OXIDE PRIMER AND TWO COATS OF ZINC RICHED ENAMEL PAINT.
 - ALL STEEL COLUMNS WHETHER SPECIFICALLY MENTIONED OR NOT, SHALL BE CONNECTED TO EARTHING SYSTEM.
 - ALONG THE BOUNDARY WALL, MAIN EARTH MAT IS LAID 500mm FROM THE CENTER OF THE BOUNDARY WALL.

TATA CONSULTING ENGINEERS LIMITED
VENDOR DOCUMENT REVIEW STATUS

A Drawing/Document approved as submitted. Proceed with fabrication/construction.
 B Drawing/Document approved subjected to comments noted. Proceed with fabrication/construction considering our comments.
 C Our comments are noted on this marked up print.
 D Our comments are noted in memo attached to the forwarding transmittal letter No. _____ Dated: _____
 E Correct original of this drawing/document to reflect our comments and resubmit for approval.
 F Correct original of this drawing/document to reflect our comments and resubmit for records.
 G Drawings/Documents of this category are for information only and not for approval. Information furnished on the drawing/document is noted.
 H Drawing/Document reviewed against our previous comments and other revisions highlighted and identified by the vendor.
 I Drawing/Document returned without review.
 J Print not enclosed.

Approval conveyed herein neither relieves the Vendor/Contractor of his contractual obligations and his responsibilities for correctness of dimensions, materials of construction, weights, quantities, design details, assembly fits, performance requirements and conformity of the supplies with the Indian Statutory Laws as may be applicable, nor does it limit the purchaser's rights under the contract.

Reviewed by: **MG** Date: **14.09.2023**

Please show the 400 & 132kV GIS hall earth mat, because both the GIS hall earth mat are connected with the main earth mat.

REFERENCE DRAWINGS

KIST-KSW-11-03-001 - ELECTRICAL LAYOUT(PLAN & SECTION) FOR 400/132kV GIS SWITCHYARD

REV.	DATE	DESCRIPTION	DRN	STR.	MECH.	ELEC.	INST.
1	07.09.2023	REVISED AS PER CLIENT'S COMMENTS	SSK				MLC
0	11.08.2023	FOR APPROVAL	SS				MLC

PROJECT: ESTABLISHMENT OF 400/132 KV POOLING SUBSTATION (GIS) AT KISHTWAR ALONG WITH 420 KV, 125 MVAR BUS REACTOR.

OWNER: **STERLITE POWER TRANSMISSION LIMITED**

OWNER'S CONSULTANT: **FICHTNER Consulting Engineers (India) Private Limited**
 Chennai

DRAWN	SS	DATE	11.08.2023
DESIGNED	MK	11.08.2023	
CHECKED	JS	11.08.2023	
DEPT. HEAD	MLC	11.08.2023	
PROJ. MGR.	MLC	11.08.2023	

EARTH MAT LAYOUT FOR 400/132KV GIS SWITCHYARD

RELEASED FOR	CONSTRUCTION	DEPT.	ELECTRICAL	JOB NO.	20423102	SCALE:	1:500	REV.
TENDER ENGINEERING	✓	DWG. NO.						1

KIST-KSW-11-03-002 SHEET-01 OF 01

BILL OF QUANTITY:

SL NO	LEGEND	DESCRIPTION	UNIT	QTY
1	⊙	40mm DIA, 3000mm LONG MS ROD EARTH ELECTRODE		
		FOR 400kV LA	NOS	20
		FOR 400kV CVT	NOS	09
		FOR 400kV TOWER	NOS	05
		FOR 132kV TOWER	NOS	03
		TOWER WITH SPIKE, SPIKE IN BUILDING	NOS	14
		FOR 132kV LA	NOS	19
		FOR 132kV CVT	NOS	12
		FOR PERIPHERY	NOS	10
		FOR 33kV PT	NOS	03

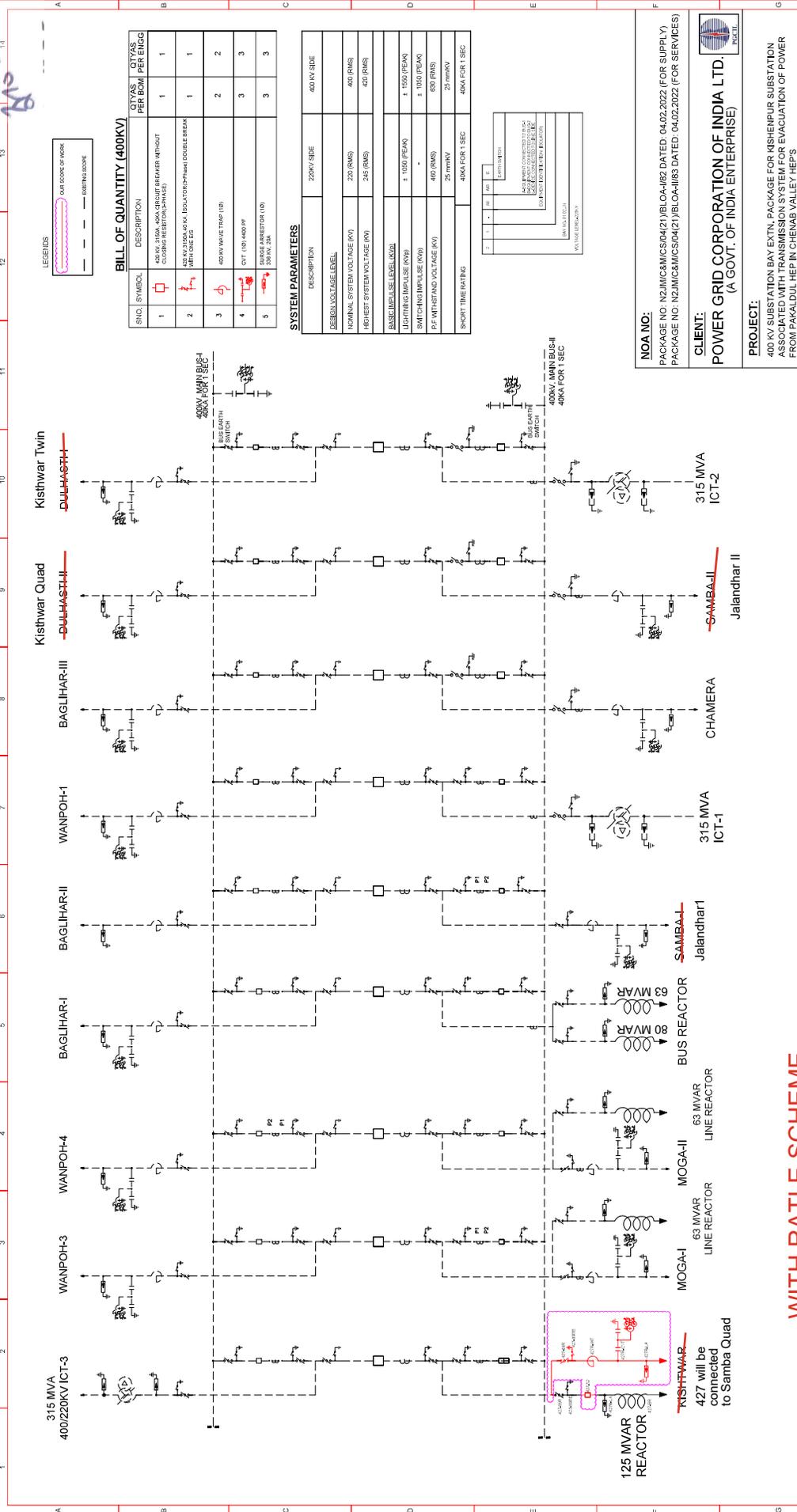
2	⊙	40mm DIA, 3000mm LONG PIPE ELECTRODE(TREATED)		
		FOR ICT NEUTRAL EARTHING	NOS	04
		FOR AUXILIARY TRANSFORMER NEUTRAL EARTHING	NOS	04
		FOR REACTOR NEUTRAL EARTHING	NOS	02
3	---	32mm DIA MS ROD FOR MAIN EARTH MAT	MTRS	10800
		FOR DIESEL GENERATOR NEUTRAL EARTHING	NOS	02
4	⊠	32mm DIA MS ROD FOR AUXILIARY EARTH MAT	MTRS	350
		FOR REACTOR NEUTRAL EARTHING	NOS	02
5	→	65 X 10mm GS FLAT FOR EQUIPMENT & RISER CONNECTION	MTRS	3300
		FOR DIESEL GENERATOR NEUTRAL EARTHING	NOS	02
6	⇒	50 X 6mm GS FLAT RISER FOR PANELS, JB'S & MB'S	MTRS	500
		FOR DIESEL GENERATOR NEUTRAL EARTHING	NOS	02
7	⇒	50 X 6mm MS FLAT FOR CABLE TRAYS	MTRS	800
		FOR DIESEL GENERATOR NEUTRAL EARTHING	NOS	02

EQUIPMENT RISER DETAILS:

SL NO	DESCRIPTION	DESCRIPTION
1	TOWER	65 X 10mm GS FLAT
2	CAPACITIVE VOLTAGE TRANSFORMER	65 X 10mm GS FLAT
3	LIGHTNING ARRESTOR	65 X 10mm GS FLAT
4	BUS POST INSULATOR	65 X 10mm GS FLAT
5	WAVE TRAP	65 X 10mm GS FLAT
6	ISOLATOR	65 X 10mm GS FLAT
7	ICT'S BODY & NEUTRAL	65 X 10mm GS FLAT
8	REACTOR BODY & NEUTRAL	65 X 10mm GS FLAT
9	DG SET	65 X 10mm GS FLAT
10	AUX. TRANSFORMER	65 X 10mm GS FLAT
11	PANELS, JB'S & MB'S	50 X 6mm GS FLAT
12	CABLE TRAYS	50 X 6mm MS FLAT

B. 400KV KISHENPUR S/S

W.P.K. S.A.

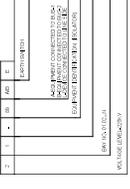


BILL OF QUANTITY (400KV)

SNO.	SYMBOL	DESCRIPTION	QTY/AS PER BOM	QTY/AS PER ENG
1	□	400KV 315MVA 400A CIRCUIT BREAKER WITHOUT COUPLER RESISTOR (PHASE)	1	1
2	⌋	400KV 315MVA 400A ISOLATOR (CHINA) DOUBLE BREAK WITH ONE IES	1	1
3	⌋	400KV WAVE TRAP (10)	2	2
4	⌋	400KV WAVE TRAP (10)	3	3
5	⌋	400KV WAVE TRAP (10)	3	3

SYSTEM PARAMETERS

DESCRIPTION	220KV SIZE	400KV SIZE
DESIGN VOLTAGE LEVEL		
NOMINAL SYSTEM VOLTAGE (KV)	220 (RMS)	400 (RMS)
HIGHEST SYSTEM VOLTAGE (KV)	245 (RMS)	420 (RMS)
BASIC IMPULSE LEVEL (KV)		
LIGHTNING IMPULSE (KV)	+ 1050 (PEAK)	+ 1050 (PEAK)
SWITCHING IMPULSE (KV)	-	+ 1050 (PEAK)
P.F. WITH STAND VOLTAGE (KV)	400 (RMS)	630 (RMS)
SHORT TIME RATING	25 min/KV	400A FOR 1 SEC



NOA NO: N2/JMC&MGS0421/BLOA-I/82 DATED: 04.02.2022 (FOR SUPPLY)
 PACKAGE NO: N2/JMC&MGS0421/BLOA-I/83 DATED: 04.02.2022 (FOR SERVICES)

CLIENT: **POWER GRID CORPORATION OF INDIA LTD.**
 (A GOVT. OF INDIA ENTERPRISE)

PROJECT: 400 KV SUBSTATION BAY EXTN, PACKAGE FOR KISHENPUR SUBSTATION ASSOCIATED WITH TRANSMISSION SYSTEM FOR EVACUATION OF POWER FROM PAKALDUL HEP IN CHEINAB VALLEY T/HEP'S

CONTRACTOR: **JK ELECTRIC ENGINEERS PVT. LTD.**

DRAWING TITLE: **SINGLE LINE DIAGRAM FOR 400 KV BAY EXTENSION SUB-STATIONS AT KISHENPUR**

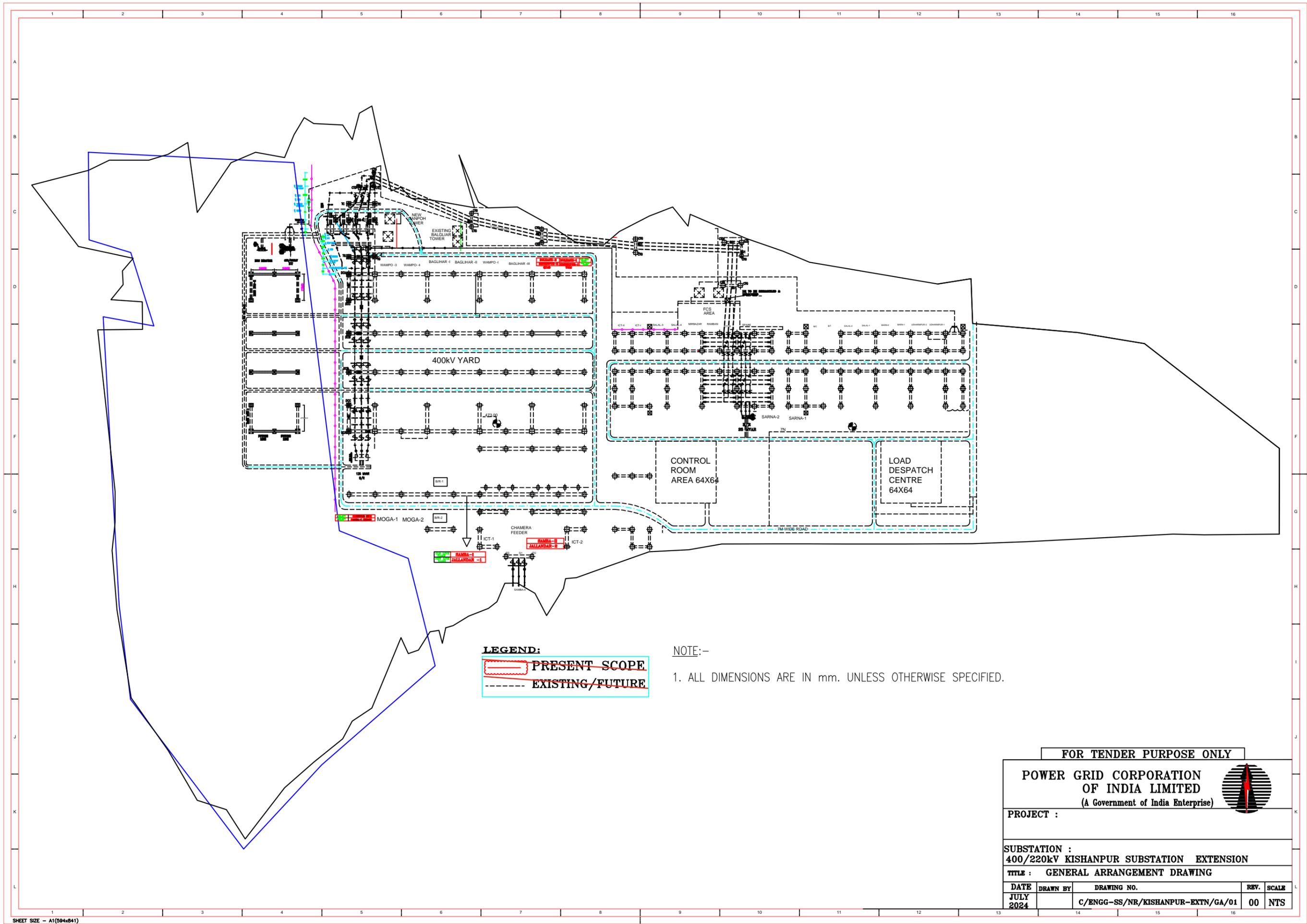
DRAWING NO: **JKEEPL/PGCIL/KSS/KISHENPUR-01**

PAPER SIZE: **A2** SCALE: **N.T.S**

PGCIL REF. DRG. **C/ENGG-SS/IR/KISHENPUR-EXTN/SLD/02**

REV.	DATE	DESCRIPTION	DRN. BY	CHK. BY
0	29.04.2022	ISSUED FOR REVIEW	PRANAV	DKC

WITH RATLE SCHEME

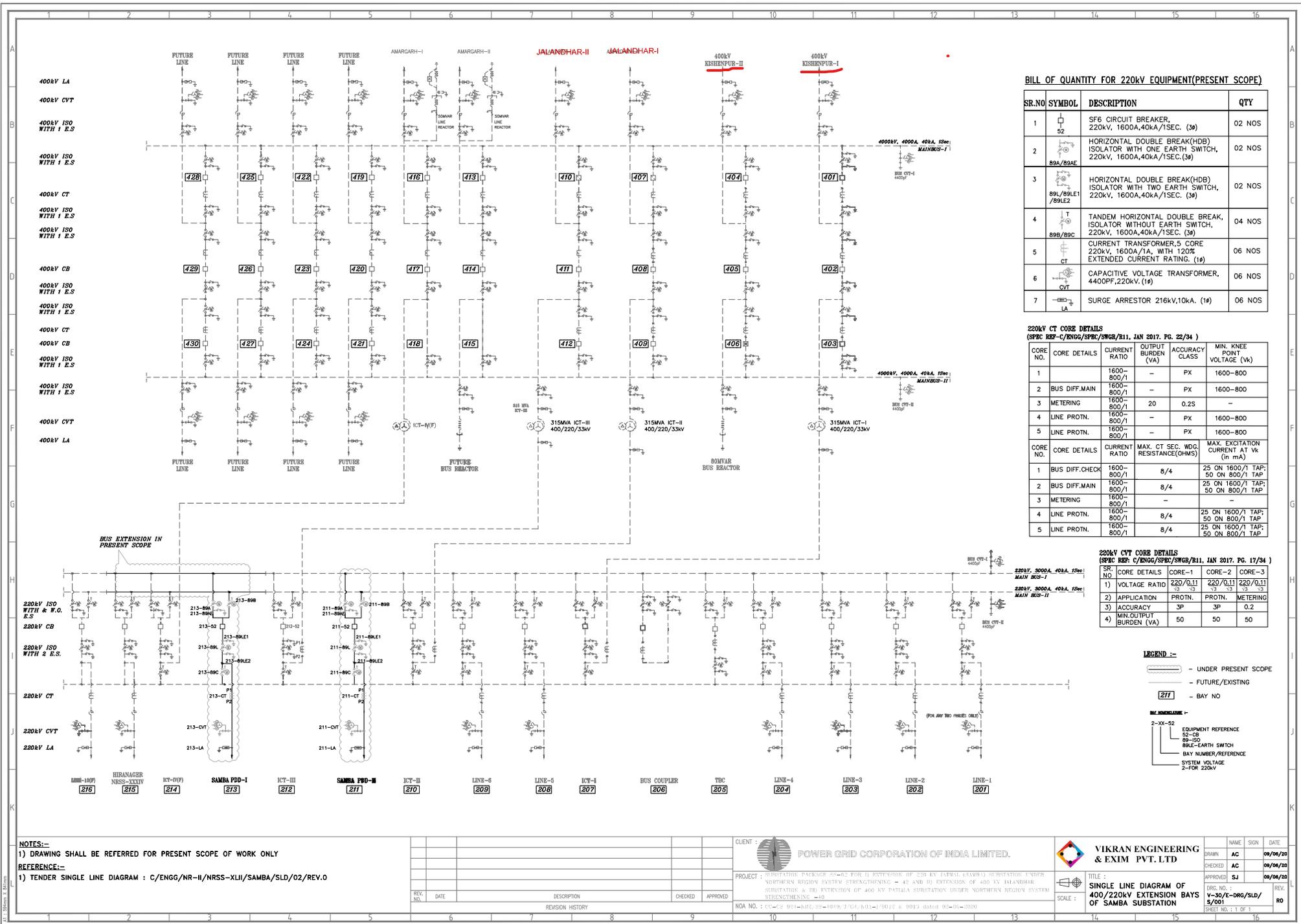


LEGEND:
PRESENT SCOPE
EXISTING/FUTURE

NOTE:-
 1. ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE SPECIFIED.

FOR TENDER PURPOSE ONLY				
POWER GRID CORPORATION OF INDIA LIMITED (A Government of India Enterprise)				
PROJECT :				
SUBSTATION : 400/220kV KISHANPUR SUBSTATION EXTENSION				
TITLE : GENERAL ARRANGEMENT DRAWING				
DATE	DRAWN BY	DRAWING NO.	REV.	SCALE
JULY 2024		C/ENGG-SS/NR/KISHANPUR-EXTN/GA/01	00	NTS

C. 400KV SAMBA S/S



BILL OF QUANTITY FOR 220kV EQUIPMENT(PRESENT SCOPE)

SR.NO	SYMBOL	DESCRIPTION	QTY
1	52	SF6 CIRCUIT BREAKER, 220kV, 1600A,40kA/1SEC. (3ø)	02 NOS
2	89A/89AE	HORIZONTAL DOUBLE BREAK(HDB) ISOLATOR WITH ONE EARTH SWITCH, 220kV, 1600A,40kA/1SEC.(3ø)	02 NOS
3	89L/89LE1/89LE2	HORIZONTAL DOUBLE BREAK(HDB) ISOLATOR WITH TWO EARTH SWITCH, 220kV, 1600A,40kA/1SEC. (3ø)	02 NOS
4	89B/89BC	TANDEM HORIZONTAL DOUBLE BREAK, ISOLATOR WITHOUT EARTH SWITCH, 220kV, 1600A,40kA/1SEC. (3ø)	04 NOS
5	CT	CURRENT TRANSFORMER,5 CORE 220kV, 1600A/1A, WITH 120% EXTENDED CURRENT RATINGS. (1ø)	06 NOS
6	CVT	CAPACITIVE VOLTAGE TRANSFORMER, 4400PF,220kV. (1ø)	06 NOS
7	LA	SURGE ARRESTOR 216kV,10kA. (1ø)	06 NOS

220kV CT CORE DETAILS (SPEC REF-C/ENGG/SPRC/SWGR/R11, JAN 2017, PG. 22/34)

CORE NO.	CORE DETAILS	CURRENT RATIO	OUTPUT BURDEN (VA)	ACCURACY CLASS	MIN. KNEE POINT VOLTAGE (V _k)
1		1600-800/1	-	PX	1600-800
2	BUS DIFF.MAIN	1600-800/1	-	PX	1600-800
3	METERING	1600-800/1	20	0.2S	-
4	LINE PROT.N.	1600-800/1	-	PX	1600-800
5	LINE PROT.N.	1600-800/1	-	PX	1600-800

CORE NO.	CORE DETAILS	CURRENT RATIO	MAX. CT SEC. WDG RESISTANCE(OHMS)	MAX. EXCITATION CURRENT AT V _k (in mA)
1	BUS DIFF.CHECK	1600-800/1	6/4	25 ON 1600/1 TAP; 50 ON 800/1 TAP
2	BUS DIFF.MAIN	1600-800/1	6/4	25 ON 1600/1 TAP; 50 ON 800/1 TAP
3	METERING	1600-800/1	-	-
4	LINE PROT.N.	1600-800/1	6/4	25 ON 1600/1 TAP; 50 ON 800/1 TAP
5	LINE PROT.N.	1600-800/1	6/4	25 ON 1600/1 TAP; 50 ON 800/1 TAP

220kV CVT CORE DETAILS (SPEC REF-C/ENGG/SPRC/SWGR/R11, JAN 2017, PG. 17/34)

CORE NO.	CORE DETAILS	CORE-1	CORE-2	CORE-3
1)	VOLTAGE RATIO	220/0.11	220/0.11	220/0.11
2)	APPLICATION	PROTN.	PROTN.	METERING
3)	ACCURACY	3P	3P	0.2
4)	MIN.OUTPUT BURDEN (VA)	50	50	50

LEGEND :-

- UNDER PRESENT SCOPE
- FUTURE/EXISTING
- BAY NO

REFERENCE :-

- EQUIPMENT REFERENCE
- 82-52
- 89A-E-EARTH SWITCH
- BAY NUMBER/REFERENCE
- SYSTEM VOLTAGE
- 2-FOR 220kV

NOTES:-
 1) DRAWING SHALL BE REFERRED FOR PRESENT SCOPE OF WORK ONLY
REFERENCE:-
 1) TENDER SINGLE LINE DIAGRAM : C/ENGG/NR-II/NRSS-XLII/SAMBA/SLD/02/REV.0

REV. NO.	DATE	DESCRIPTION	CHECKED	APPROVED

CLIENT : **POWER GRID CORPORATION OF INDIA LIMITED.**

PROJECT : SUBSTATION PACKAGE 05-02 FOR II EXTENSION OF 220 KV (ATWL (SAMBA) SUBSTATION UNDER NORTHERN REGION SYSTEM STRENGTHENING - 42 AND III EXTENSION OF 400 KV JALANDHAR SUBSTATION & III EXTENSION OF 400 KV PATLA SUBSTATION UNDER NORTHERN REGION SYSTEM STRENGTHENING - 40

NO. NAME : CC-C-014-NR2/09-0010/2/01/K01-1/0012 & 0013 0508 05-05-2020

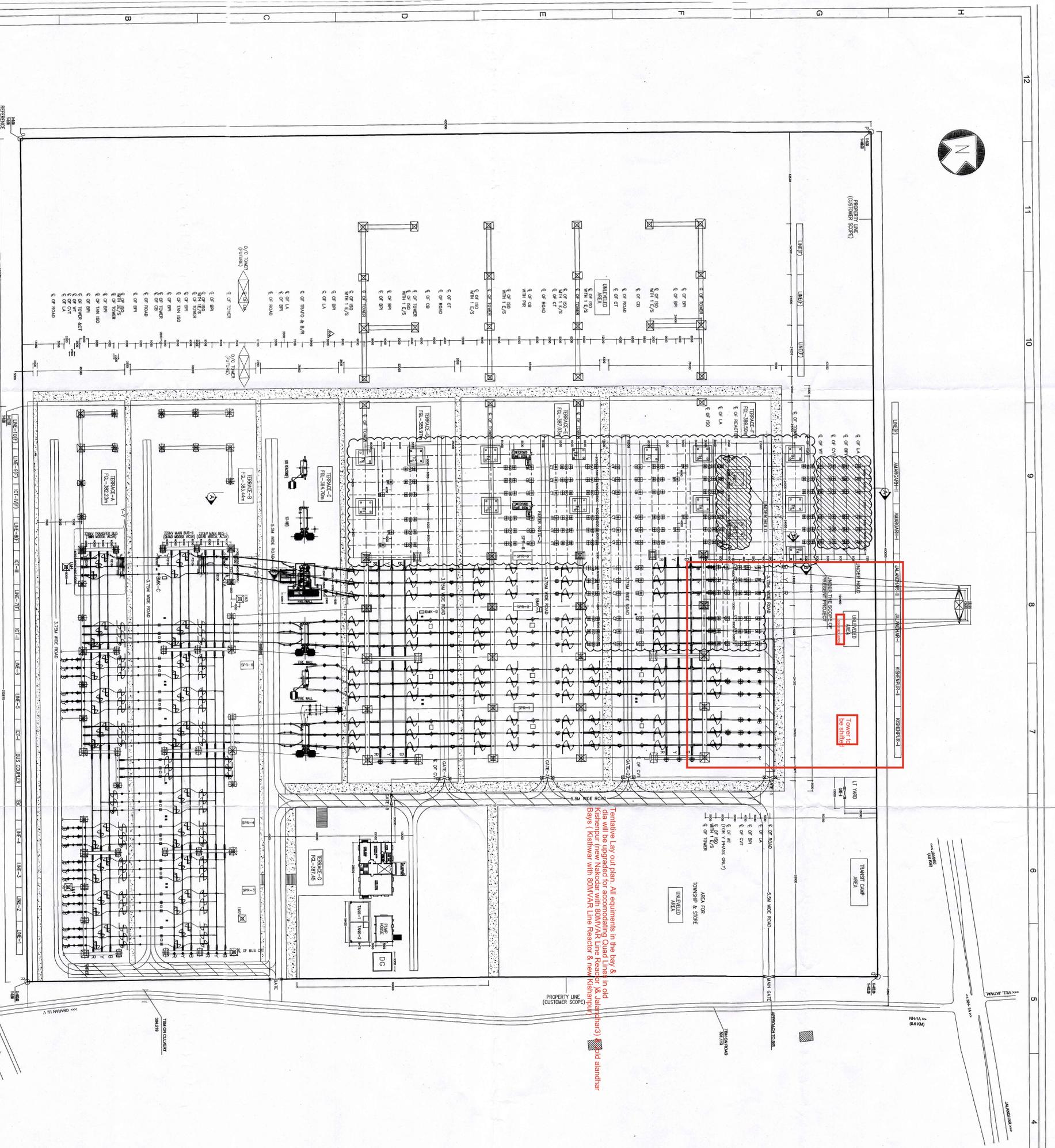
VIKRAN ENGINEERING & EXIM PVT. LTD

TITLE : **SINGLE LINE DIAGRAM OF 400/220KV EXTENSION BAYS OF SAMBA SUBSTATION**

SCALE :

DRAWN	AC	09/06/20
CHECKED	AC	09/06/20
APPROVED	SJ	09/06/20

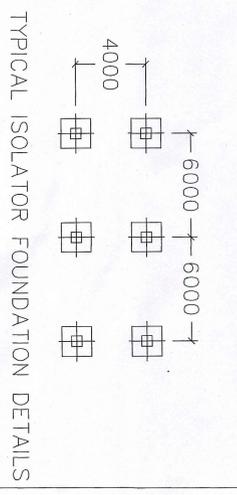
DRG. NO. : V-30/E-DRG/SLD/5/001
 SHEET NO. : 1 OF 1



Tentative Lay out plan. All equipments in the bay & dia will be upgraded for accommodating Cured Lines in old Sambra (New Naxosod with 800V AR Line Reactor & Jalaranahar 3 Bay 3 (Naxosod with 500V AR Line Reactor & new Naxosod 1 Bay 3)

- NOTES:**
1. ALL DIMENSIONS ARE IN MM & LEVELS IN METERS.
 2. (±) 0.00M CORRESPOND TO F.G.L. (FINISH GROUND LEVEL).
 3. WHEREVER EQUIPMENT RAFT SHALL COME IN THE BACK FILLING IN ADJACENT TO TOWER FOUNDATION, THE SOIL IN BETWEEN THE TOWER RAFT FOR AND RCC BOTTOM OF EQUIPMENT RAFT SHALL BE WELL COMPACTED.
 4. NO FOUNDATION SHALL REST ON FILLED UP SOIL. IN CASE FILLED UP SOIL IS ENCOUNTER, 500mm BELOW VERGIN SOIL FOR TOWERS & FOUNDATION SHALL BE TAKEN 1000mm BELOW VERGIN SOIL FOR TOWERS & FOUNDATION.
 5. FOUNDATION DETAILS SHOWN IN THIS DRAWING ARE INDICATIVE ONLY. FOR EXACT DETAILS OF FOUNDATION REFER INDIVIDUAL FOUNDATION DRAWING / TOWER.
 6. THIS DRAWING SHALL BE REFERRED ONLY FOR FOUNDATION PURPOSE IN CONSTRUCTION.
 7. LAYOUT SHALL BE DONE ONLY AFTER CO-ORDINATING LATEST APPROVED S/Y PLAN & DISCREPANCY IF ANY SHALL BE BROUGHT TO NOTICE BEFORE EXECUTION.
 8. WHILE CONSTRUCTION OF TOWER / EQUIPMENT FOUNDATIONS PROPER STRUTTING & SHORING HAD TO BE ENSURED AT SITE TO AVOID COLLAPSE OF EXISTING TOWER / EQUIPMENT FOUNDATIONS & CABLE TRENCH FOUNDATION / WALL.

- EGOL REFERENCE DRAWINGS:**
1. 400/220KV SAMBA S/S SID - C/ENG/NRI/05-381/SAMBA/SID/01
 2. 400/220KV SAMBA S/S GA LAYOUT - C/ENG/NRI/05-381/SAMBA/GA/02
 3. 400/220KV SAMBA S/S ELECTRICAL LAYOUT - GET/SAW/ELE/LAY/002
 4. SWITCHYARD PANEL ROOM (SPR) - GA AND RCC DETAIL - C/ENG/STD/SPR/STR/3011
 5. SWITCHYARD PANEL ROOM (SPR) - ARCHITECTURAL DRAWING - C/ENG/STD/ARCH/3000



FOUNDATIONS BOQ OF MAJOR EQUIPMENTS - SAMBRA SUBSTATION

Sl. No.	Type of equipment foundation	Quantity		Remarks
		As per BPS	As per Layout	
1	400KV CT	18	18	
2	400KV CVT	12	12	
3	400KV LA	18	18	
4	400KV BR	34	26	
5	400KV ISO (HBB)	18	18	
6	400KV WT	12	12	
7	400KV CB without closing resistor	4	2	
8	400KV CB with closing resistor	2	4	
9	Tower TH	5	5	
10	Tower TT	4	4	
11	Tower TC	2	2	
12	Tower TN	2	2	
13	400KV Line Reactor	2	2	
14	NSR for Line Reactor	2	2	
15	235KV 2.0M Breaker	2	2	



CLIENT:
Power Grid Corporation of India Limited
(A Government of India Enterprise)

CONTRACTOR:
GODREJ & BOYCE WFG. CO. LTD.
VIKAROLI, MUMBAI

PROJECT: Substation Package (Including 400KV Line Reactors) For (1) Extension of 400KV Jalaranahar Provision of Bays for NRSS XXXX

DRG TITLE: SAMBRA SUBSTATION EXTENSION WORKS

DRG NO.: G&B/WSS/S&M-E-005

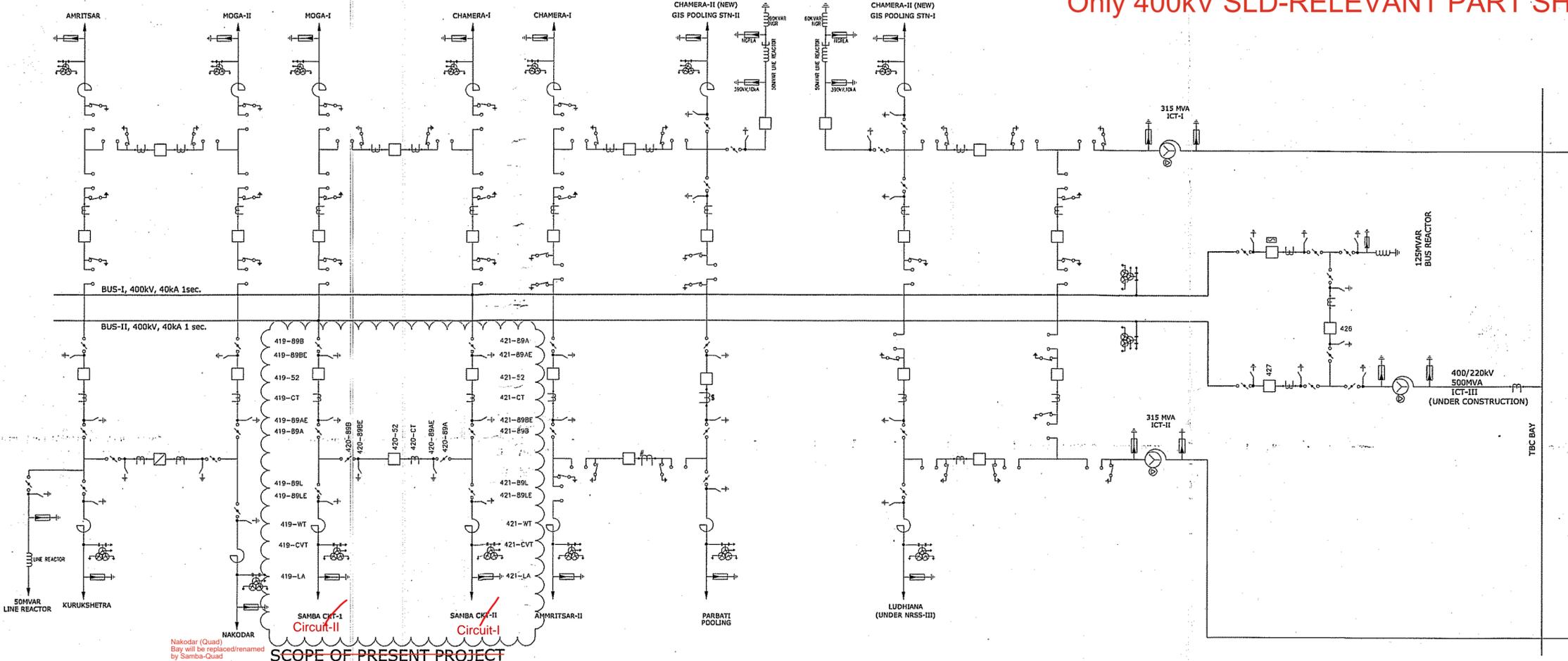
LOA NO.: CC/CS/695-M/2/SS-322/4/7/CS/NOA/1/5645 DT/0, 29 JAN-2016

DRAWN: CHKD VERIFIED DATE SCALE SHEET REV

SS: VOSP 29.03.2016 NTS 1 OF 1 00

D. 400KV JALANDHAR S/S

Only 400kV SLD-RELEVANT PART SHOWN



In Rattle scheme these Samba 1&2 bays will be replaced/renamed as Kishenpur 1&2 bays along with addition of 63MVAR switchable Line Reactors

INDICATIVE / FOR REFERENCE ONLY

EQUIPMENT DESIGNATION FOR SLD

Z/4	-	1	B9	A/B/C/L/T/BR/LR-E
-----	---	---	----	-------------------

EARTH SWITCH

A-EQUIPMENT CONNECTED TO BUS-1
 B-EQUIPMENT CONNECTED TO BUS-2
 C-DEVICE CONNECTED TO TRANSFER BUS
 L-DEVICE CONNECTED TO LINE SIDE
 T-EQUIPMENT CONNECTED TO TRANSFORMER
 BR-DEVICE CONNECTED TO BUS REACTOR
 LR-DEVICE CONNECTED TO LINE REACTOR

EQUIPMENT IDENTIFICATION (ISOLATOR)

BAY NO. :01,02..N

VOLTAGE LEVEL -220/400kV

SYSTEM PARAMETERS:- (TABLE-1)

Sl.No.	DESCRIPTION OF PARAMETER	400kV SYSTEM
1	SYSTEM OPERATING VOLTAGE	400kV
2	MAX. OPERATING VOLTAGE OF THE SYSTEM (rms)	420kV
3	RATED FREQUENCY	50Hz
4	NO. OF PHASES	3
5	CORONA EXTINGUISH VOLTAGE	320kV
6	RATED 3-PH. SYMMETRICAL SHORT CIRCUIT CURRENT WITHSTAND CAPACITY	40kA/1sec.
7	SYSTEM NEUTRAL EARTHING	EFFECT. EARTHED

BOQ OF MAJOR EQUIPMENTS - JALANDHAR SUBSTATION

Sl. No.	Description of equipments	Unit	Quantity as per drawing	LOA Quantity	Remarks
1	420kV, 2000A, 40kA Circuit Breaker(3-Phase) without closing resistor(with support structure)	Set	3	3	
2	420 kV, 3000A, 40KA, 1-Phase Current Transformer with 120% extended current rating	No.	9	9	
3	420 kV, 4400 pF Capacitive Voltage Transformer (1-Phase)	No.	6	6	
4	420kV, 2000A, 40 KA, Isolator (3-phase)(Double Break) with one E/S	Set	8	8	
5	336kV Surge Arrester (1-phase)	No.	6	6	
6	400kV, 2000A, 1.0mH, 40kA Line Trap	No.	4	4	

LEGEND :

ITEM No.	DESCRIPTION	SYMBOL AS PER IEC
1.	3-φ,SF6,CIRCUIT BREAKER WITHOUT CR	
2.	CONTROL SWITCHING DEVICE	
3.	3-φ,HDB ISOLATOR WITH ONE EARTH SWITCH	
4.	1-φ,CURRENT TRANSFORMER	
5.	1-φ,LIGHTING ARRESTER	
6.	CAPACITOR VOLTAGE TRANSFORMER	
7.	WAVE TRAP	

कत-I

श्रेणिक
 कोटिकेशन, निर्माण / हेतु अनुमोदित / जारी
 कोटिकेशन / निर्माण / हेतु अनुमोदित / जारी
 बसने वी मई दिवसिगो एव आशोपित को
 सामिलि। किय चार। कृपया आशोपित पत्तावेज
 अनुमोदनाथ प्रस्तुत करे।
 III. दिवसिगो सामिलित कर पुनः अनुमोदनाथ प्रस्तुत करे।
 IV सूचनाथ एव रिकार्ड हेतु।
 V अनुमोदित नही।
 पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड
 (दिनांक) अनियात्रिकी (उपकेन्द्र) मुडरौल, हरियाणा

REV	DESCRIPTION	DATE	DRN
1	CLIENT'S COMMENTS INCORPORATED	11-02-2016	SS
0	SUBMITTED FOR APPROVAL	01-02-2016	SS

CLIENT:
 POWERGRID CORPORATION OF INDIA LIMITED
 GURGAON

CONTRACTOR:
 GODREJ & BOYCE MFG. CO. LTD.
 VIKHROLI, MUMBAI

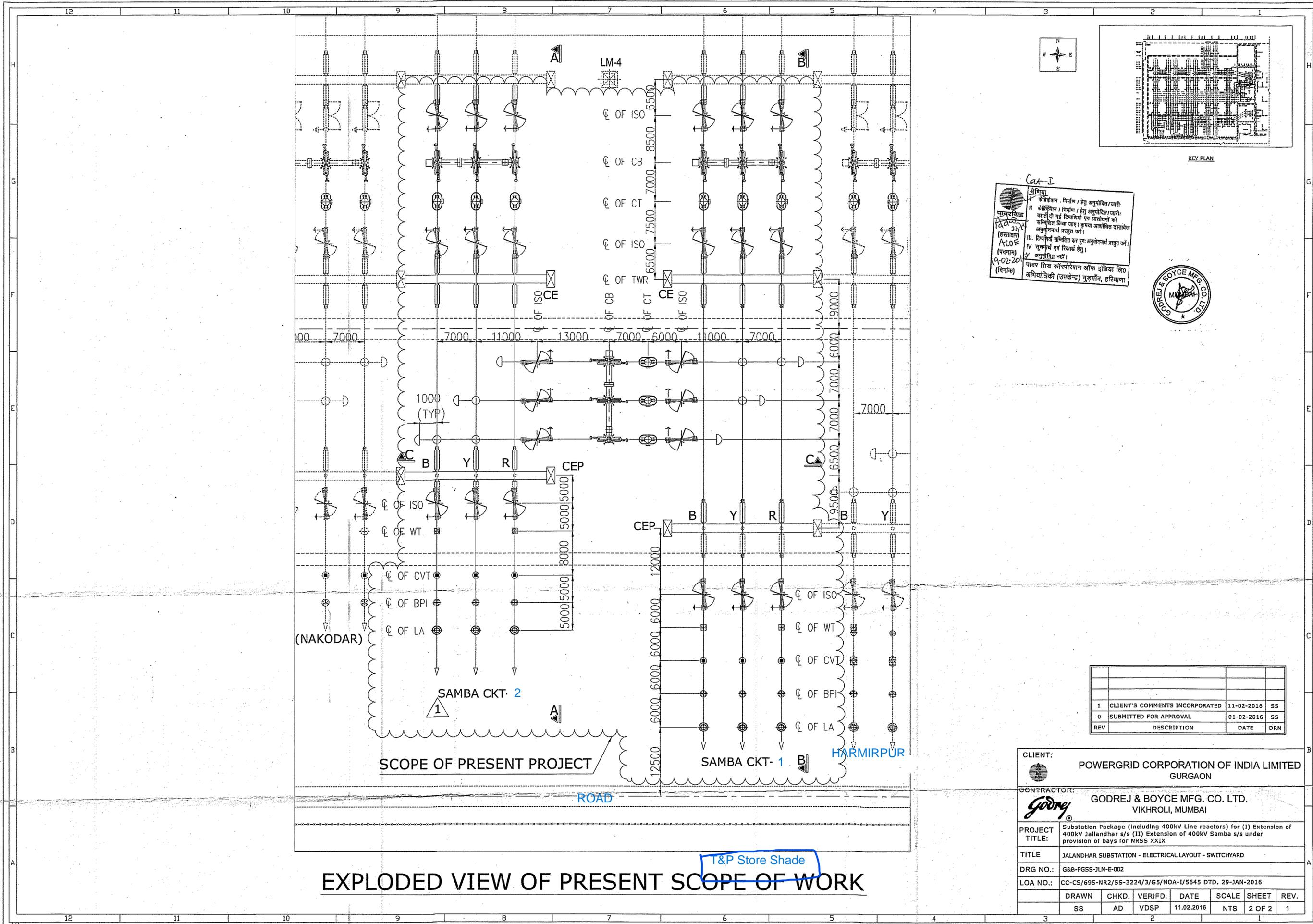
PROJECT TITLE:
 Substation Package (Including 400kV Line reactors) for (I) Extension of 400kV Jalandhar s/s (II) Extension of 400kV Samba s/s under provision of bays for NRSS XXIX

TITLE:
 JALANDHAR SUBSTATION - SINGLE LINE DIAGRAM

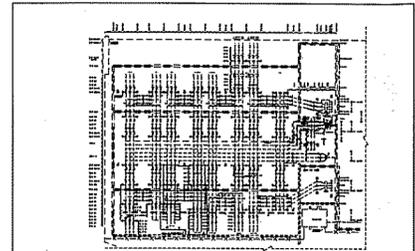
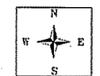
DRG NO.:
 G&B-PGSS-JLN-E-001

LOA NO.:
 CC-CS/695-NR2/SS-3224/3/GS/NOA-1/5645 DTD. 29-JAN-2016

DRAWN	CHKD.	VERIFD.	DATE	SCALE	SHEET	REV.
SS	AD	VDSP	11.02.2016	NTS	1 OF 1	1



EXPLODED VIEW OF PRESENT SCOPE OF WORK



KEY PLAN

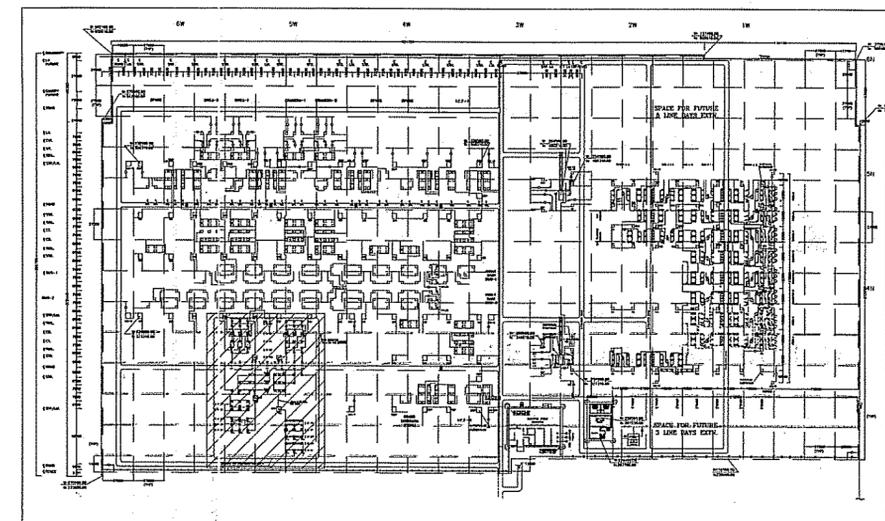
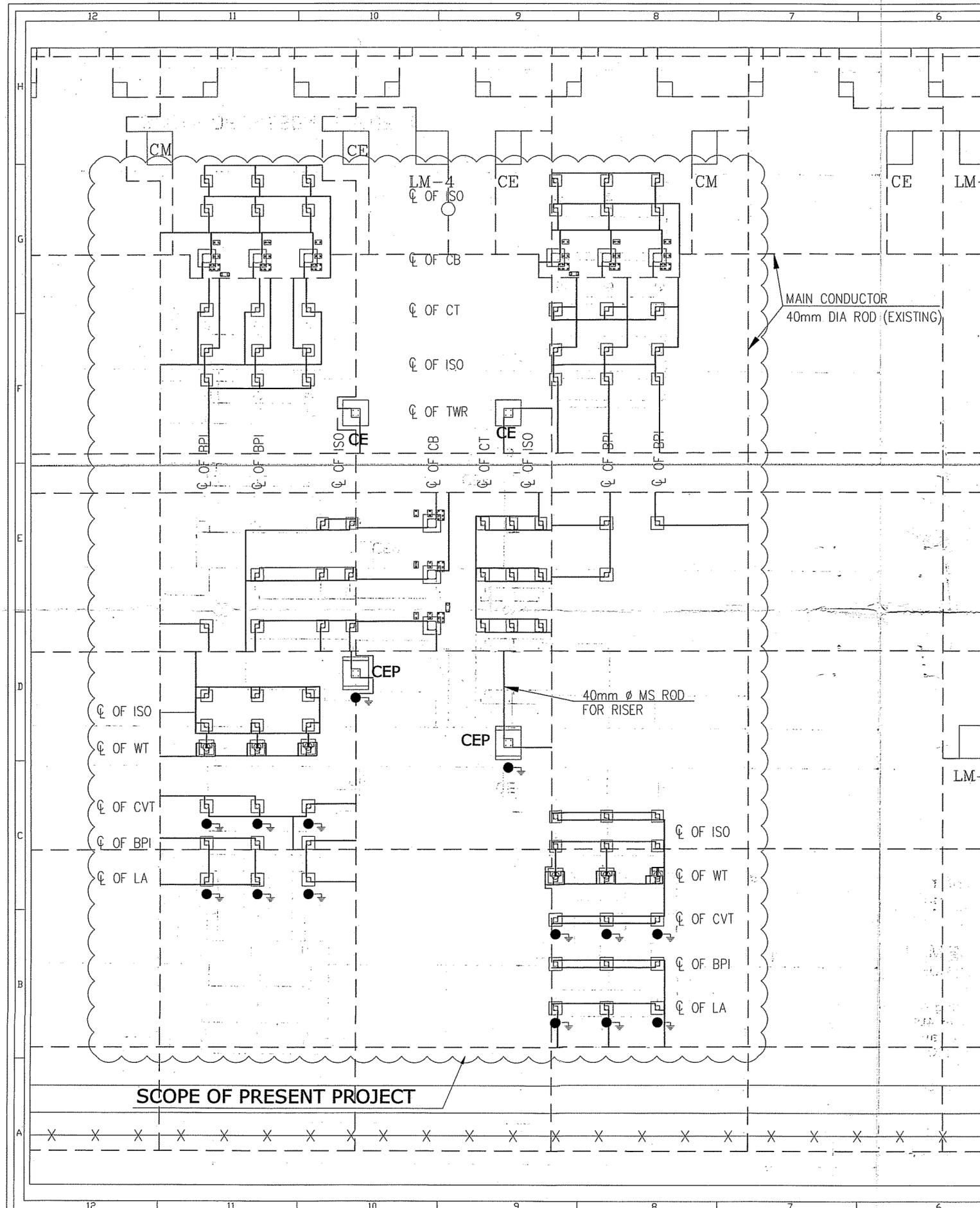
Cat-I

श्रीगणेशाय नमः
 I. कंत्रिक्केशन / निर्माण / हेतु अनुमोदित / जारी
 II. कंत्रिक्केशन / निर्माण / हेतु अनुमोदित / जारी
 बसतो ही गई टिप्पणियो एव आशोधनो को
 समितित किया जाए। कृपया आशोधित दस्तावेज
 अनुमोदनाथ प्रस्तुत करे।
 III. टिप्पणियो समितित कर पुनः अनुमोदनाथ प्रस्तुत करे।
 IV. सुचनार्थ एव रिकार्ड हेतु।
 V. अनुमोदित नहीं।
 पावर ग्रिड कॉरपोरेशन ऑफ इंडिया लिमिटेड
 अभियांत्रिकी (उपकेन्द्र) गुडगांव, हरियाणा



REV	DESCRIPTION	DATE	DRN
1	CLIENT'S COMMENTS INCORPORATED	11-02-2016	SS
0	SUBMITTED FOR APPROVAL	01-02-2016	SS

CLIENT:	POWERGRID CORPORATION OF INDIA LIMITED GURGAON					
CONTRACTOR:	GODREJ & BOYCE MFG. CO. LTD. VIKROLI, MUMBAI					
PROJECT TITLE:	Substation Package (Including 400kV Line reactors) for (I) Extension of 400kV Jalandhar s/s (II) Extension of 400kV Samba s/s under provision of bays for NRSS XXIX					
TITLE:	JALANDHAR SUBSTATION - ELECTRICAL LAYOUT - SWITCHYARD					
DRG NO.:	G&B-PG55-JLN-E-002					
LOA NO.:	CC-CS/695-NR2/SS-3224/3/G5/NOA-1/5645 DTD. 29-JAN-2016					
DRAWN	CHKD.	VERIFD.	DATE	SCALE	SHEET	REV.
SS	AD	VDSP	11.02.2016	NTS	2 OF 2	1



KEY PLAN

BILL OF QUANTITY				
Si.No	DESCRIPTION	Unit	Quantity	Remarks
1	40mm dia MS Rod	Mtr	1812	
4	40mm dia 3000mm long MS Earth Electrode	Nos	14	

- NOTES :
1. ALL DIMENSIONS ARE IN MM & LEVELS IN METERS.
 2. (±)0.00M CORRESPOND TO F.G.L. (FINISH GROUND LEVEL).

REF. DRG. NO. :-
 1. EARTHING LAYOUT } -C/ENGG/NR-II/JAL/ENG/LAY/019
 400/220kV SUBSTATION

- LEGEND:-
- PRESENT EARTHING
 - - - EXISTING EARTHING
 - EARTH ELECTRODE

Any additional item/quantity required for successful completion of scope of work shall be supplied by M.S. Grid without any additional cost implication to POWERGRID.

Cat-IV
 श्रीगणेशाय नमः
 Power Grid Corporation of India Limited
 22/09/2016
 अधिकारी (उपकेन्द्र) मुडगाँव, हरियाणा

CLIENT:						
Power Grid Corporation of India Limited (A Government of India Enterprises)						
CONTRACTOR:						
GODREJ & BOYCE MFG. CO. LTD. VIKROLI, MUMBAI						
PROJECT TITLE:	Substation Package (including 400kV Line reactors) for (I) Extension of 400kV Jalandhar s/s (II) Extension of 400kV Samba s/s under provision of bays for NRSS XXIX					
DRG. TITLE:	EARTH MAT LAYOUT FOR 400/220KV JALANDHAR SUBSTATION EXTENSION WORKS					
DRG NO.:	G&B-PGSS-JAL-E-012					
LOA NO.:	CC-CS/695-NR2/SS-3224/3/G5/NOA-1/5645 DTD. 29-JAN-2016					
DRAWN	CHKD.	VERIFD.	DATE	SCALE	SHEET	REV.
YGB	ASG	VDSP	22.09.2016	NTS	1 OF	00