

Lattice Structure for Towers & Beams		Standard Structures for 765kV	
a	PCA column	Nos.	16
b	PBB	Nos.	16
c	TBA	Nos.	8
d	PCB column	Nos.	26
e	PBC	Nos.	13
f	TRD	Nos.	26
g	PCWCB	Nos.	26
h	PCC column	Nos.	8
i	PBI	Nos.	4
j	PBF	Nos.	8
k	PCWCC	Nos.	8

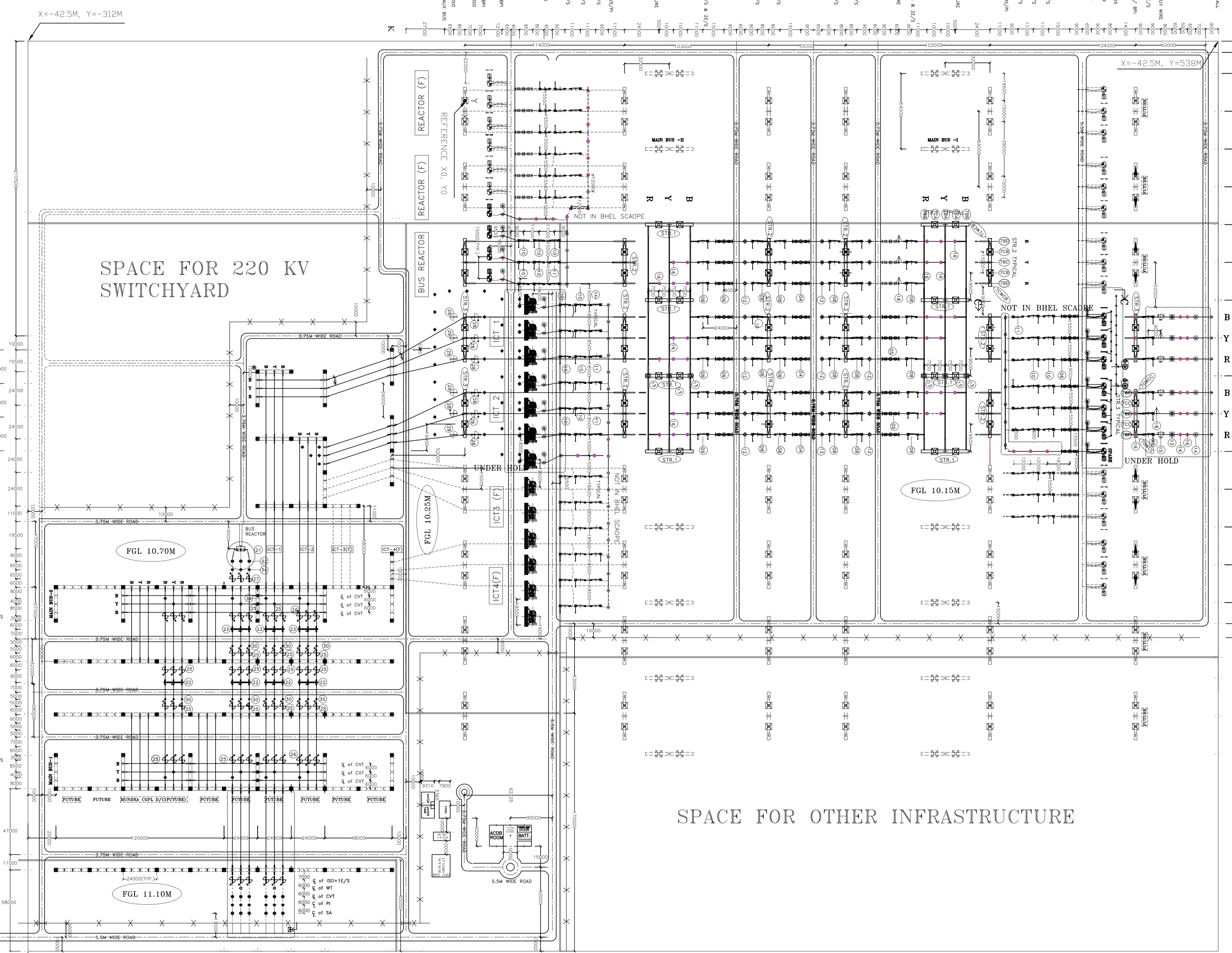
BILL OF QTY. FOR 765KV MAIN EQUIPMENTS (50KA FOR 1 SEC)

ITEM Code	DESCRIPTION	RATING	QTY. (NET)	SYMBOL	SCOPE OF SUPPLY
1	500 MVA, G-Phd AUTOTRANSFORMER	765/400/230KV	7		BHEL
2	110MVAR LINE REACTOR (1-Phd)	765KV	7		BHEL
3	110MVAR BUS REACTOR (1-Phd)	765KV	4		BHEL
4	SF6 CIRCUIT BREAKER WITH CR, WITH CSD (3-Phd)	3150A	3		BHEL
5	SF6 CIRCUIT BREAKER WITH CR, WITHOUT CSD (3-Phd)	3150A	2		BHEL
6	SF6 CIRCUIT BREAKER WITHOUT CR, WITH CSD (3-Phd)	3150A	5		BHEL
7	SF6 CIRCUIT BREAKER WITHOUT CR, WITHOUT CSD (3-Phd)	3150A	1		BHEL
8	ISOLATOR WITH ONE E/S/W (3 PH) VERTICAL KNEE TYPE	3150A	17		BHEL
9	ISOLATOR WITH TWO E/S/W (3 PH) VERTICAL KNEE TYPE	3150A	2		BHEL
10	ISOLATOR WITH ONE E/S/W (1 PH) VERTICAL KNEE TYPE	2000A	33		BHEL
11	ISOLATOR WITHOUT E/S/W (1 PH) VERTICAL KNEE TYPE	2000A	12		BHEL
12	CURRENT TRANSFORMER (1 PH) WITH 1200 EXTENDED CURRENT RATING	2000A	24		BHEL
13	CVT (1 PH)	8800pF	12		BHEL
14	SURGE ARRESTER (1 PH)	624 kV	24		BHEL
15	WAVE TRAP (1 PH) PEDESTAL TYPE	1PH, 3150A	04		BHEL
16	765KV PDST INSULATOR (FOR SWITCHYARD)		64		BHEL
17	765KV PDST INSULATOR (FOR WAVE TRAP)		12		BHEL
18	765KV GUY WIRE (FOR SWITCHYARD)		05		BHEL

BILL OF QTY. FOR 400kV MAIN EQUIPMENTS (63KA FOR 1 SEC)

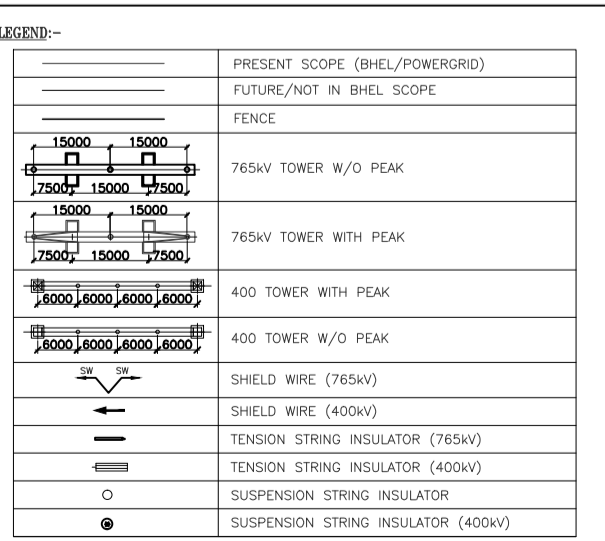
ITEM Code	DESCRIPTION	RATING	QTY. (NET)	SYMBOL	SCOPE OF SUPPLY
20	500MVA, G-Phd AUTOTRANSFORMER	400/220/230KV	0		BHEL
21	125MVAR BUS REACTOR (3-Phd)	420 kV	1		BHEL
22	SF6 CIRCUIT BREAKER WITH CR, WITH CSD (3-Phd)	3150A	4		BHEL
23	SF6 CIRCUIT BREAKER WITHOUT CR, WITH CSD (3-Phd)	3150A	3		BHEL
24	SF6 CIRCUIT BREAKER WITHOUT CR, WITHOUT CSD (3-Phd)	3150A	0		BHEL
25	ISOLATOR WITH ONE E/S/W (3 PH) DOUBLE BREAK TYPE	3150A	17		BHEL
26	ISOLATOR WITH TWO E/S/W (3 PH) DOUBLE BREAK TYPE	3150A	2		BHEL
27	ISOLATOR WITH ONE E/S/W (1 PH) DOUBLE BREAK TYPE	2000A	1		BHEL
28	ISOLATOR WITH ONE E/S/W (1 PH) DOUBLE BREAK TYPE	3150A	7		BHEL
29	ISOLATOR WITHOUT E/S/W (1 PH) DOUBLE BREAK TYPE	3150A	5		BHEL
30	CURRENT TRANSFORMER (1 PH) WITH 1200 EXTENDED CURRENT RATING	3000A	21		BHEL
31	CVT (1 PH)	4400pF	6		BHEL
32	SURGE ARRESTER (1 PH)	336 kV	10		BHEL
33	WAVE TRAP (1 PH) PEDESTAL TYPE	0.5PH, 2000A	0		BHEL
34	400KV BPI (FOR SWITCHYARD)	400KV	43		BHEL
35	400KV BPI (FOR WT)	400KV	0		BHEL

- NOTES :-
- LEVELS (RL) FOR SWITCHYARD ARE AS PER POWER GRID DRAWING NO C/200G/WR-4/SH/UL-11-13-03
 - HEAD END TOWER ERECTION AND OUTGOING STRINGING OF LINE CONDUCTOR & SHIELD WIRE ARE NOT IN BHEL SCOPE BUT CONNECTION OF EQUIPMENT TOWARDS LINE SIDE SHALL BE DONE BY BHEL. SUPPLY OF TENSION INSULATOR STRING ON LINE SIDE OF TAKE OFF GANTRY IS IN BHEL SCOPE OF WORK INCLUDING TENSION CLAMP FOR EXTERNALS.
 - SUPPLY ERECTION, TESTING, COMMISSIONING AND EARTHING OF 765KV TRAF0 & INCLUDING (CLC & TERMINAL CONNECTOR OF TRAF0) & (ONE, 120V LA, 250V NR & TERN CONNECTOR OF REACTOR), FORMATION OF PH, CV, TYPING, NEUTRAL & AERIALS BUSES ALONG WITH BPI & ITS STRUCTURE AND ASSOCIATED DIAL WORKS IS NOT COVERED IN SCOPE OF WORK AS PER ITS SECTION PROJECT.
 - INTER EQUIPMENT DIMENSION ARE PLANNED SO AS TO ACHIEVE REQUIRED PHYSICAL AND ELECTRICAL CLEARANCE. HOWEVER IF ELECTRICAL CLEARANCE ARE NOT AVAILABLE AT SITE AND MODIFICATIONS ARE REQUIRED TO ACHIEVE IT, THE REQUIRED MODIFICATION WILL BE DONE BY BHEL WITHOUT ANY EXTRA COST IMPLICATION TO OWNER.
 - FIRE RESISTANT WALL BETWEEN 765KV TRANSFORMER UNITS AND 765KV REACTORS UNITS ARE NOT IN BHEL SCOPE.
 - ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
 - LOCATION OF WT SHOWN IS INDICATIVE ONLY. EXACT LOCATION SHALL BE FINALIZED DURING ERECTION COMMISSIONING STAGE BASED ON LINE PARAMETERS FOUNDATION FOR NAME TRAP SHALL BE CONTINUED FOR ALL THREE PHASES IN 765KV AREA.
 - 765/400 KV CT AREA SHALL BE FINISHED AFTER RECEIVING PROJECT SPECIFIC CT AREA LAYOUT FROM POWERGRID. HENCE THE SAME SHALL BE ISSUED BY POWERGRID AND UPDATED ON SWITCHYARD LAYOUT DRAWING ACCORDINGLY & NOT INTERCONNECTIONS SHOWN ON THE LAYOUT ARE TENTATIVE.
 - 765KV REACTOR AREA SHALL BE FINISHED AFTER RECEIVING PROJECT SPECIFIC REACTOR AREA LAYOUT FROM POWERGRID. HENCE THE SAME SHALL BE UPDATED ON SWITCHYARD LAYOUT DRAWING ACCORDINGLY & REACTOR INTERCONNECTIONS SHOWN ON THE LAYOUT ARE TENTATIVE.
 - DETAILS OF BULK, CT, CVT, JUNCTION BOX & SWITCHYARD PANEL ROOM (SPR) LOCATION SHALL BE SHOWN IN CABLE TRENCH LAYOUT DRAWING.
 - PHASE SEQUENCE IS INDICATIVE & IT SHALL BE VERIFIED AT SITE DURING ERECTION, ALONG WITH TRANSFORMER LINE.
 - PLINTH HEIGHT OF FOUNDATION WILL BE 100MM FROM FINISHED GROUND LEVEL (F.G.L.).
 - CONSTRUCTION OF 765KV AXI, BUS UP TO 765KV TRANSFORMER AND 765KV REACTOR ARE NOT IN BHEL SCOPE.
 - PLINTH LEVEL WILL BE F.G.L. + 200MM, HOWEVER TO MEET BEAM AT SAME HEIGHT, RESPECTIVE PLINTH LEVEL WILL BE RAISED AS REQUIRED.



SYSTEM PARAMETERS (765KV):

S.No.	DESCRIPTION OF PARAMETER	765KV SYSTEM	400KV SYSTEM	220KV SYSTEM	50KV SYSTEM
1	HIGHEST SYSTEM VOLTAGE	800KV	420KV	245KV	35KV
2	NORMAL SYSTEM VOLTAGE	765KV	400KV	220KV	33KV
3	RATED FREQUENCY	50Hz	50Hz	50Hz	50Hz
4	NO. OF PHASES	3	3	3	3
5	RATED INSULATION LEVELS				
(i)	TRIAL WIRE LIGHTNING IMPULSE WITHSTAND VOLTAGE (1.2/50Microsec)	8210KV	8150KV	8100KV	8170KV
(ii)	SWITCHING IMPULSE WITHSTAND VOLTAGE (250/250Microsec)	8150KV	8100KV	-	-
(iii)	ONE MINUTE POWER FREQUENCY SW. WITHSTAND VOLTAGE (rms)	830V	830V	860V	70V
6	CORONA EXTINCTION VOLTAGE	508KV	505KV	500KV	-
7	MAX. HIGH RESISTANCE VOLTAGE LEVEL AT 500KV (rms) FOR 765 KV & AT 220KV 1 SEC. DURATION	200V	100V	100V	100V
8	RATED SHORT CIRCUIT CURRENT FOR 1 SEC. DURATION	50KA	63KA	45KA	25KA
9	SYSTEM NEUTRAL EARTHING	EFFECT. EARTHED	EFFECT. EARTHED	EFFECT. EARTHED	EFFECT. EARTHED



CONDUCTOR & STRINGING DETAILS - 400KV

S.No.	DESCRIPTION	LEVEL FROM PLINTH	SUB-CONDUCTOR	TENSION INSULATOR STRING/PHASE
1.	MAIN BUS-1 & II	(AT 15M HEIGHT)	QUAD ACB BALL CONDUCTOR WITH 450MM SUB-CONDUCTOR SPACING	DOUBLE TENSION 210 KN DISC INSULATOR (2x24 Nos.)
2.	JACKBUS	(AT 22M HEIGHT)	QUAD BERSIMS ACBR CONDUCTOR WITH 450MM SUB-CONDUCTOR SPACING	DOUBLE TENSION 120 KN DISC INSULATOR (2x24 Nos.)
3.	DROPPERS/DAMPERS	-	QUAD BERSIMS ACBR CONDUCTOR WITH 450MM SUB-CONDUCTOR SPACING	SINGLE STRING-120KN DISC INSULATOR (1x24 Nos.)
4.	EQUIPMENT INTERCONNECTION	(AT 8M HEIGHT)	4.5" IPS AL TUBE /QUAD ACBR BERSIMS CONDUCTOR WITH 450MM SPACING	-
5.	EARTHWARE	(AT 29.5M HEIGHT)	7/3.86mm GI WIRE (10.98mm DA)	-
6.	BUS CVT, CVT & LA IN LINE BAYS	-	765 BERSIMS ACBR CONDUCTOR WITH 450MM SUB-CONDUCTOR SPACING	-

CONDUCTOR & STRINGING DETAILS - 765KV

S.No.	DESCRIPTION	LEVEL FROM PLINTH	SUB-CONDUCTOR	TENSION INSULATOR STRING/PHASE
1.	MAIN BUS-1 & II	(AT 27M HEIGHT)	QUAD ACB BALL CONDUCTOR WITH 450MM SUB-CONDUCTOR SPACING	DOUBLE TENSION 210 KN DISC INSULATOR (2x24 Nos.)
2.	JACKBUS	(AT 39M HEIGHT)	QUAD ACB BALL CONDUCTOR WITH 450MM SUB-CONDUCTOR SPACING	DOUBLE TENSION 210 KN DISC INSULATOR (2x24 Nos.)
3.	DROPPERS/DAMPERS	-	QUAD ACB BALL CONDUCTOR WITH 450MM SUB-CONDUCTOR SPACING	DOUBLE TENSION 210 KN DISC INSULATOR (1x24 Nos.)
4.	EQUIPMENT INTERCONNECTION	(AT 14M HEIGHT)	4.5" IPS AL TUBE (120mm OD)/QUAD ACB BALL CONDUCTOR WITH 450MM SPACING	-
5.	EARTHWARE	(AT 45M HEIGHT)	7/3.86mm GI WIRE (10.98mm DA)	-
6.	INTERCONNECTION BETWEEN 765/400KV TRAY TO 400KV SUB-STATION	-	QUAD ACB BALL CONDUCTOR WITH 450MM SUB-CONDUCTOR SPACING/4.5" IPS AL TUBE	-
7.	EQUIPMENT INTERCONNECTION NEAR 765/400KV ICT AREA FOR HIGH BIPAHANGH LA	(AT 12M HEIGHT)	QUAD BALL/BERSIMS ACBR CONDUCTOR WITH 450MM SUB-CONDUCTOR SPACING/4.5" IPS AL TUBE	-

ADDITIONAL INFORMATION W.O.No.

STATUS OF DRAWING

REV.	DATE	ALTERED	CHECKED	APPROVED	ZONE

POWER GRID CORPORATION OF INDIA LTD

NAME OF PROJECT : SS01 for Construction of 765/400/220KV BHUJ POOL (New) S/S and Extension of 765KV Banaskantha S/S under Green Energy Corridor - I, Inter-State Transmission Scheme (ISTS) - Part C

NOA No. - CC-CS/484-WR/SS-2955/11/G8/NOA-1 & II/5727 & 5728 Dtd 31 March 2016

DISTRIBUTION OF PRINTS

REV.	DATE	ALTERED	CHECKED	APPROVED	ZONE

DATE: 13.09.16

SCALE: 1:1

PROJECT CODE: NTS

DRAWING NO: TB-385-510-002

SHEET NO: 01