

TOWERS IN 400KV S/Y:

TOWER S/L.NO	STR. HEIGHT	QTY.
1	11-P	14
2	13	26
3	14	02
4	15	26
5	CS	03
6	LM	08

BEAMS IN 400KV S/Y:

BEAM S/L.NO	SPAN	QTY.
1	B1	48
2	B2	02
3	B3	14
4	B6	02

TOWERS IN 220KV S/Y:

TOWER S/L.NO	STR. HEIGHT	QTY.
1	TA1	04
2	TA2	08
3	TA3	09
4	TA3-P	04
5	TA4	05
6	TA5	06
7	TA6-P	07
8	TA6	06
9	LM	04

BEAMS IN 220KV S/Y:

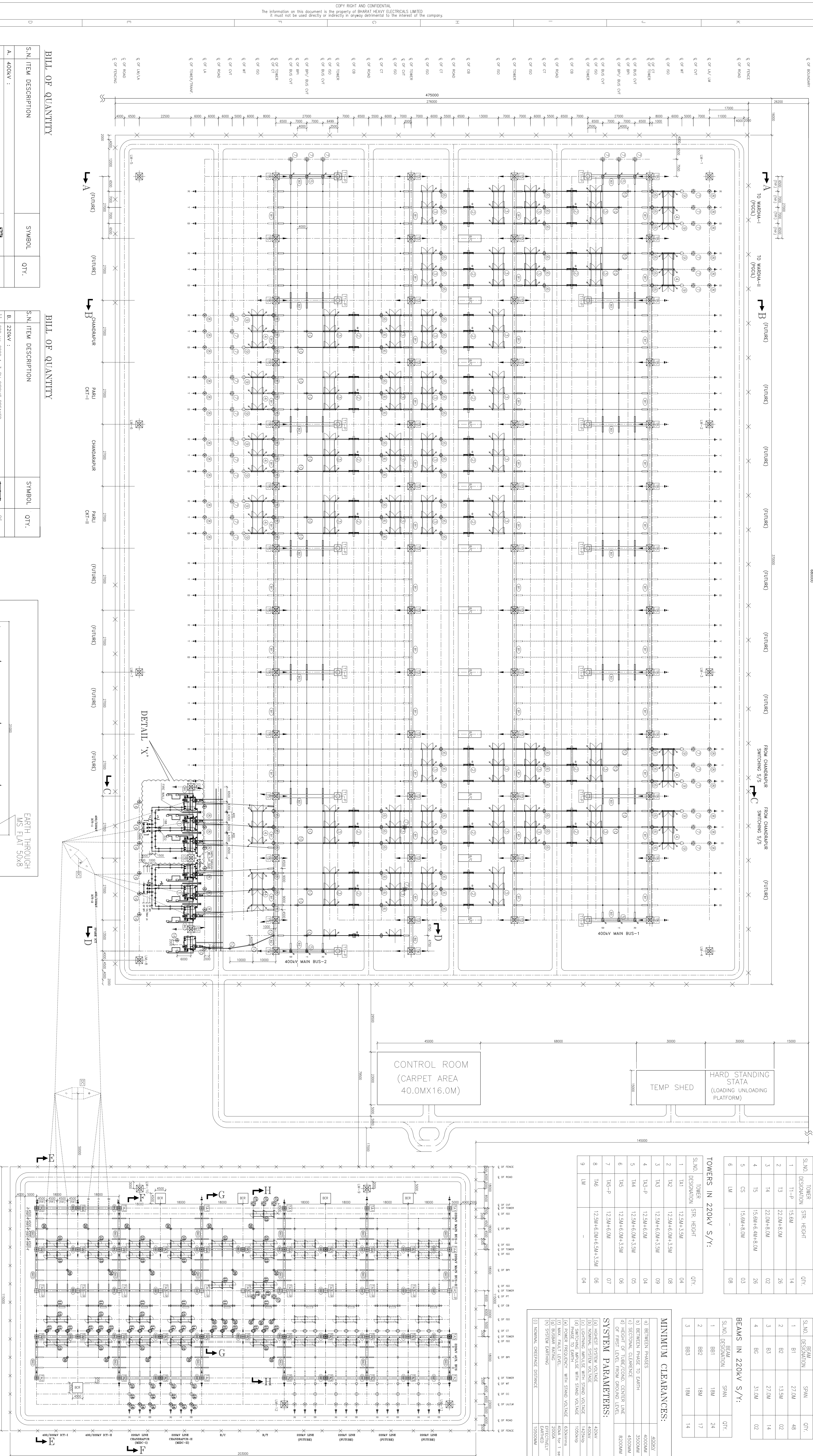
BEAM S/L.NO	SPAN	QTY.
1	BH1	24
2	BH2	17
3	BH3	14

MINIMUM CLEARANCES:

400KV	220KV	33KV
0) BETWEEN PHASES	4500MM	2550MM
1) BETWEEN PHASES	3500MM	2550MM
2) BETWEEN PHASES	4500MM	3000MM
3) HEIGHT OF TOWER/CONC. CENTER LINE	8000MM	3700MM
4) OF THE LEVEL FROM GROUND LEVEL		

SYSTEM PARAMETERS:

0) HIGHEST SYSTEM VOLTAGE	400KV	33KV
1) NOMINAL SYSTEM VOLTAGE	400KV	33KV
2) LIGHTNING SURGE WITH STAND VOLTAGE	1450KV	170KV
3) POWER FREQUENCY WITH STAND VOLTAGE	165KV	195KV
4) POWER FREQUENCY WITH STAND VOLTAGE	165KV	195KV
5) SYSTEM EARTHING	400KV	33KV
6) EFFICIENCY	1000MM	1000MM
7) EFFICIENCY	1000MM	1000MM
8) EFFICIENCY	1000MM	1000MM
9) EFFICIENCY	1000MM	1000MM
10) NOMINAL CRESTED DISTANCE	1000MM	1000MM



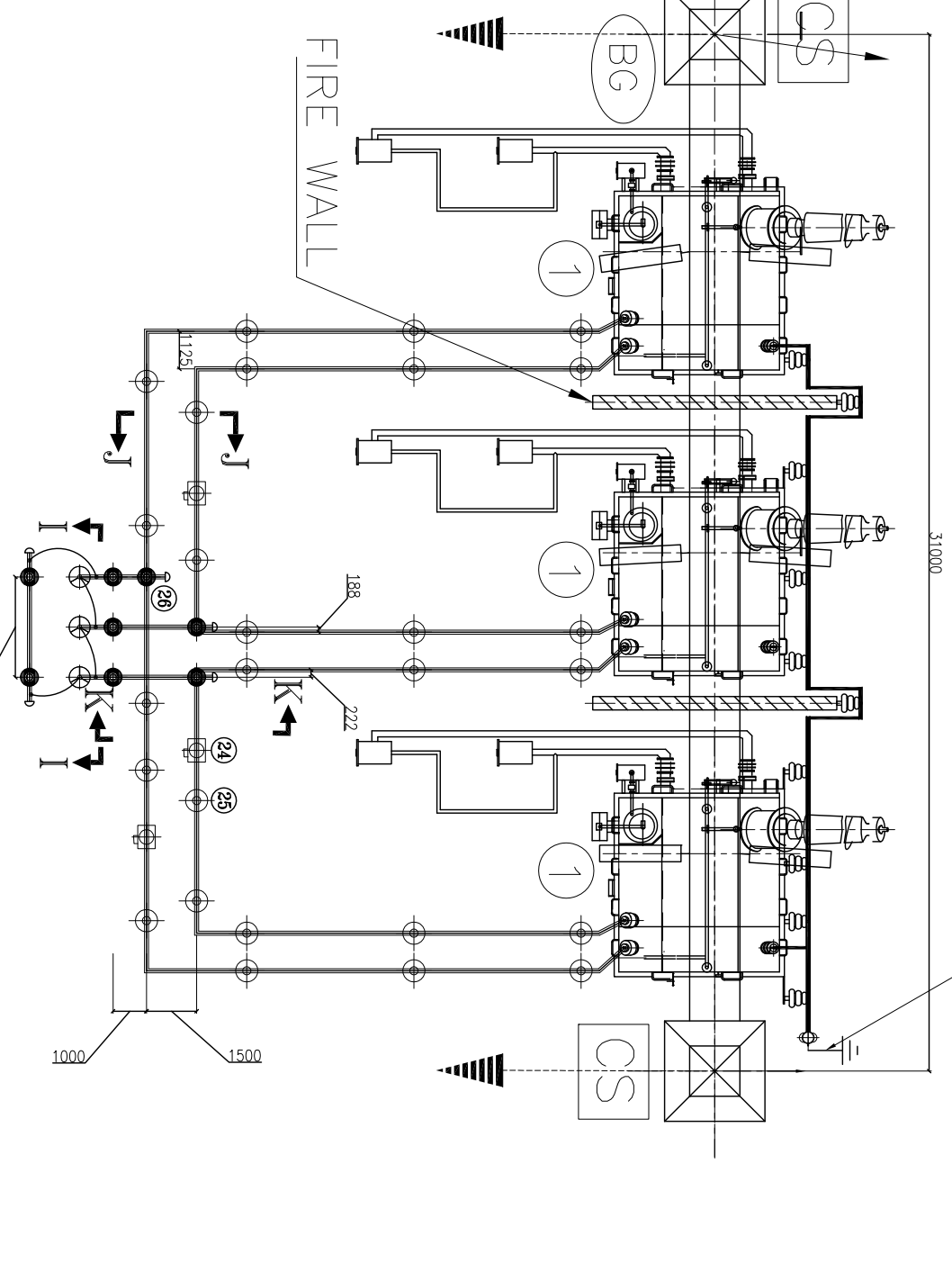
BILL OF QUANTITY

S.N	ITEM DESCRIPTION	SYMBOL	QTY.
A.	400KV :		
1.	3x177 MM <sup>2</sup> 400/220/25KV VMD11, TAPPING = 10% TO - 10%	02-01	
2.	400 KV 2000 A, 3-PH CIRCUIT BREAKER WITHOUT PIR	19-01	
3.	400 KV 3150 A, 3-PH HCB ISOLATOR WITH ONE ES	38-02	
4.	400 KV 3150A, 3-PH HCB ISOLATOR WITH TWO EARTH SWITCH	10	
5.	400 KV 3150A, 3-PH, BUS EXHAUSTING SWITCH	04	
6.	400 KV, 1-PH, 5-CORE CURRENT TRANSFORMER	87-01	
7.	2000-1000-500V/1-1-1-1 A, ACUBACV CLASS 0.2	32	
8.	300 KV, 1-PH SURGE ARRESTER	30-01	
9.	400 KV 2000A, 10PH, 1-PH MAKE TRAP	16	
10.	400 KV POST INSULATOR	23	

BILL OF QUANTITY

S.N	ITEM DESCRIPTION	SYMBOL	QTY.
B.	220KV :		
11.	220 KV 2000 A, 3-PH CIRCUIT BREAKER	06	
12.	220 KV 2000 A, 3-PH HCB ISOLATOR WITH ONE ES	02	
13.	220 KV 2000 A, 3-PH HCB ISOLATOR WITHOUT ES	21	
14.	220 KV 800-400-200/1A, 1-PH CURRENT TRANSFORMER	09	
15.	220 KV 2400-1200-80/1A, 1-PH CURRENT TRANSFORMER	09	
16.	198 KV, 1-PH SURGE ARRESTER	12-01	
17.	220 KV 220KV/55KV(3)-110/55KV(3)-110/55KV(3), 1-PH PT	06	
18.	220 KV 6600V, 1-PH COUPLING CAPACITOR	04	
19.	220 KV 1250A, 03PH, 1-PH MAKE TRAP	04	
20.	220 KV POST INSULATOR	23	
C.	33KV :		
21.	54 KV, 1-PH SURGE ARRESTER	06	
22.	39 KV, 1-PH SURGE ARRESTER	06	
23.	30 KV, 1-PH SURGE ARRESTER (FOR STATION TRANSFORMER)	06	
24.	33 KV, 1-PH PT	06	
25.	33KV, 1-PHASE BUS POST INSULATOR (HIGH LEVEL : 35.10 MM)	54	
26.	33KV, 1-PHASE BUS POST INSULATOR (LOW LEVEL : 43.10 MM)	16	

DETAIL 'X' - 33KV TERTIARY CONNECTION DETAILS



LEGEND TABLE

PRESENT SCOPE
..... CUSTOMER/TENDER SCOPE
..... SHIELD WIRE
..... FENCE
..... TENSION STRING INSULATOR
..... SUSPENSION STRING INSULATOR
..... COLUMN WITHOUT PEAK
..... COLUMN WITH PEAK

NOTES:  
1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.

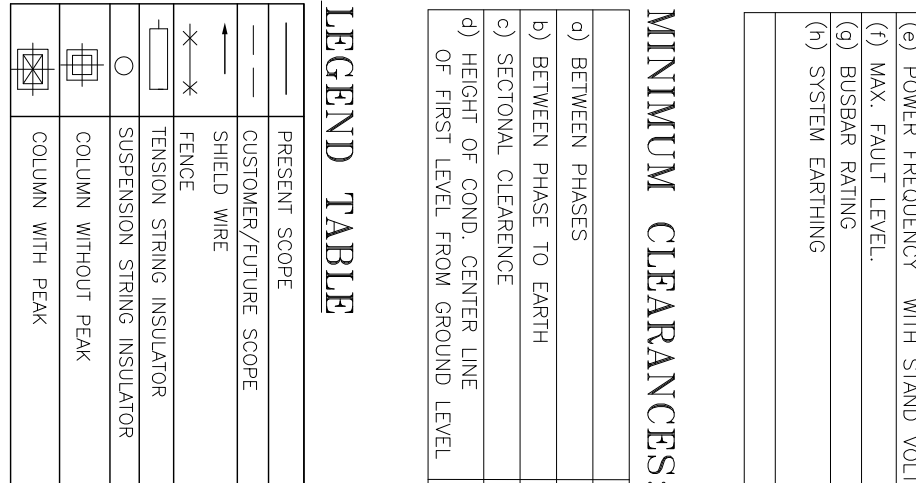
TITLE

TA-1-32S-51G-001	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-002	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-003	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-004	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-005	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-006	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-007	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-008	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-009	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-010	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-011	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-012	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-013	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-014	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-015	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-016	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-017	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-018	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-019	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-020	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-021	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-022	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-023	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-024	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-025	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-026	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-027	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-028	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-029	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-030	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-031	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-032	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-033	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-034	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-035	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-036	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-037	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-038	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-039	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-040	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-041	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-042	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-043	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
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TA-1-32S-51G-045	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-046	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-047	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-048	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-049	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-050	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-051	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-052	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-053	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-054	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-055	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
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TA-1-32S-51G-057	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-058	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
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TA-1-32S-51G-060	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-061	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-062	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-063	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-064	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-065	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-066	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
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TA-1-32S-51G-068	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-069	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
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TA-1-32S-51G-071	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-072	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-073	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-074	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-075	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-076	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-077	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
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TA-1-32S-51G-079	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-080	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-081	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-082	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-083	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-084	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-085	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-086	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-087	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-088	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-089	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-090	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-091	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-092	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-093	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-094	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
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TA-1-32S-51G-097	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-098	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-099	PROPOSED MASTER PLAN FOR 400KV SUB-STATION
TA-1-32S-51G-100	PROPOSED MASTER PLAN FOR 400KV SUB-STATION









INVENTORY No.	SIGN. & DATE	REF. ORG. No.	COMPUTER DRG. PATH NAME :
A	REV. DATE	REV. DATE	REV. DATE
16	2006	2006	2006
15	2006	2006	2006
14	2006	2006	2006
13	2006	2006	2006
12	2006	2006	2006
11	2006	2006	2006
10	2006	2006	2006
9	2006	2006	2006
8	2006	2006	2006
7	2006	2006	2006
6	2006	2006	2006
5	2006	2006	2006
4	2006	2006	2006
3	2006	2006	2006
2	2006	2006	2006
1	2006	2006	2006

Technical drawing of a cable-stayed bridge cross-section. The drawing shows the bridge deck, piers, and stay cables. Key dimensions and labels include:

- Dimensions:** 21000, 12500, 6000, 3500, 5500, 4500, 300, 9000, 6500, 5500, 5500, 5500, 5500, 6500, 9000.
- Labels:** FGL, Q OF LA, Q OF CC, Q OF WT OF TOWER, Q OF BPI, Q OF ISO, Q OF TOWER, Q OF CT, Q OF ISO, Q OF CB, Q OF TOWER, Q OF ISO, Q OF BPI, Q OF TOWER.
- Structural Features:** PLINTH LEVEL, 220KV AUX BUS, SINGLE ZEBRA, SINGLE MORCULLA, 220KV MAIN BUS.
- Notes:** NOT IN BH&L SCOPE, BH&L SCOPE, SHIELD WIRE 7/9 SMC.

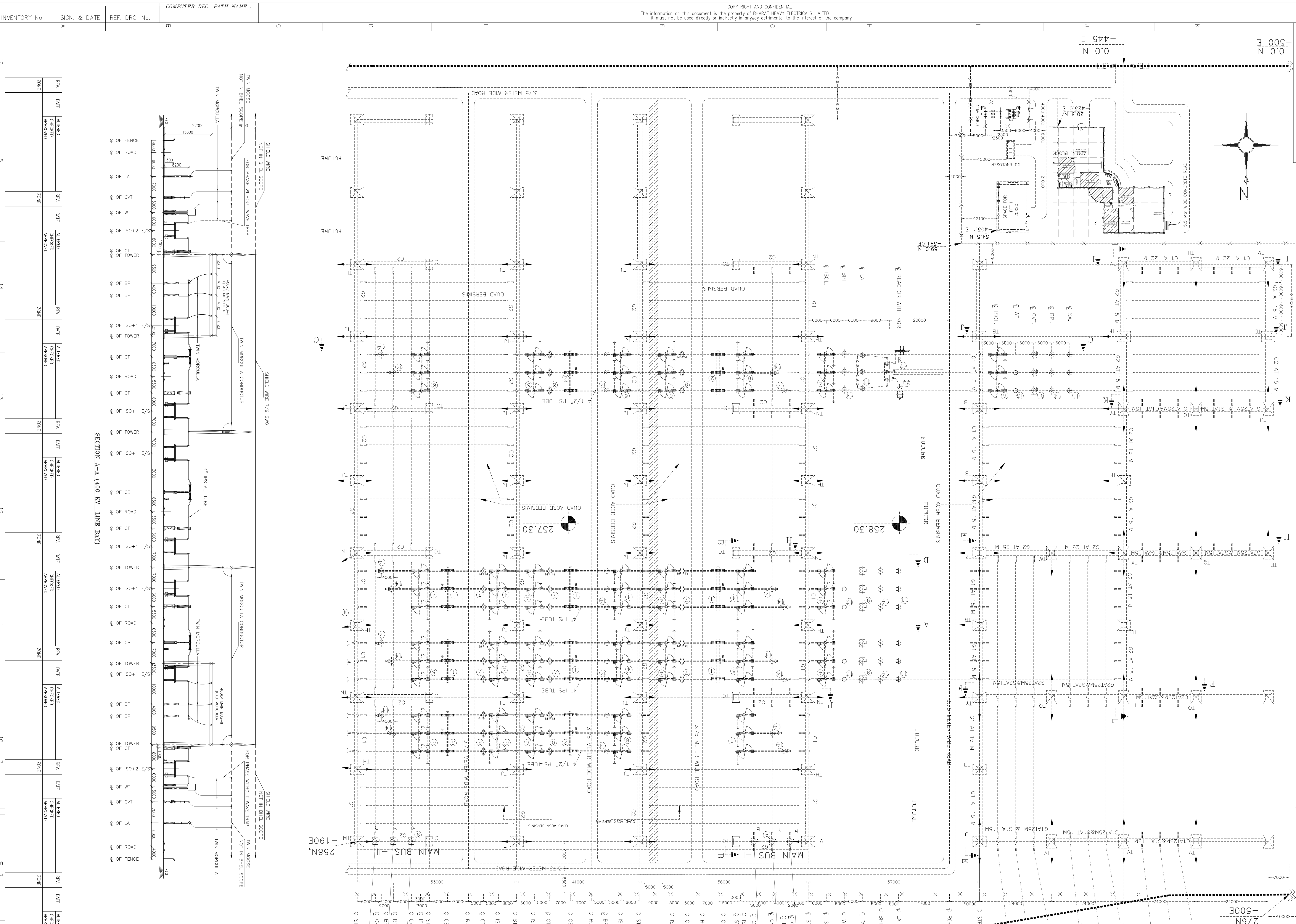


MINIMUM CLEARANCES:	
a) BETWEEN PHASES	220KV
b) BETWEEN PHASE TO EARTH	2350MM
c) SECTIONAL CLEARANCE	2150MM
d) HEIGHT OF COND. GENDER LINE OF FIRST LEVEL FROM GROUND LEVEL	4300MM
	5500MM

	PRESENT SCOPE
	CUSTOMER/FUTURE SCOPE
	SHIELD WIRE
	FENCE
	TENSION STRING INSULATOR
	SUSPENSION STRING INSULATOR
	COLUMN WITHOUT PEAK
	COLUMN WITH PEAK

INVENTORY No.	SIGN. & DATE
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S.N.	ITEM DESCRIPTION	SYMBOL	QUANTITY		
			KORAD-II	CHANDRAPUR-II	TOTAL
1.	400 KV, 2000 A, 40KA FOR 1SEC, 3-PM	1-1	02	04	06
2.	CIRCUIT BREAKER WITHOUT 100 SEC, 3-PM	1-1	04	08	12
3.	400 KV, 1550 A, 40KA, 100 SEC, 3-PM HCB ISOLATOR WITH TWO EARTH SWITCH	1-1	02	02	04
4.	400 KV, 1-PM, 5-000E CURRENT TRANSFORMER	1-1	12	18	30
5.	2000-1000-500V/1A, ACCUMULR DUES 0.2	1-1	06	06	12
6.	400KV, 400A/SWRT3-110V/SWRT3-110V/ 50RT3110V/SWRT3-1-PM CAV.	1-1	06	06	12
7.	400KV, 2000A, 100PM, 1-PM WAVE TRAP	1-1	04	04	08
8.	420KV, 1-PHASE BUS POST INSULATOR	1-1	04	04	08

LEGEND TABLE	
---	PRESENT SCOPE
---	CUSTOMER/FUTURE SCOPE
→	SHIELD WIRE
×—×	FENCE
□	TENSION STRING INSULATOR
○	SUSPENSION STRING INSULATOR
□	COLUMN WITHOUT PEAK
⊠	COLUMN WITH PEAK
—	4" IPS AL. TUBE

NOTES:-

- |  |                       |
|--|-----------------------|
| 1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED                 |                       |
| 2. MINIMUM CLEARANCE ARE AS PER SPECIFICATION                          |                       |
| (a) BETWEEN PHASES   | 400MM                 |
| (b) BETWEEN PHASE TO EARTH   | 550MM                 |
| (c) SECONDARY CLEARANCE  | 650MM                 |
| (d) MINIMUM CLEARANCE BETWEEN LINE<br>TO FIRST EARTH FROM GROUND LEVEL | 800MM                 |
| 3. THE PARAMETERS FOR WHICH THE SYSTEM IS DESIGNED FOR ARE             |                       |
| (a) HIGHEST SYSTEM VOLTAGE   | 420KV                 |
| (b) NOMINAL SYSTEM VOLTAGE   | 400KV                 |
| (c) SURGING IMPULSE WITH STAND VOLTAGE                                 | 1050KV                |
| (d) SWITCHING IMPULSE WITH STAND VOLTAGE                               | 1025KV                |
| (e) POWER FREQUENCY WITH STAND VOLTAGE                                 | 630kvar               |
| (f) MAX. FAULT LEVEL   | 40KA FOR 1 sec        |
| (g) BUSBAR RATING  | 2000A                 |
| (h) SYSTEM FACTORING   | EFFECTIVELY<br>BARRED |
| (i) NOMINAL CLEARANCE DISTANCE   | 1050MM                |

4. BOUNDARY WALL & FENCE NOT IN BEHL SCOPE.

**TOWERS IN 400KV S/Y:**

S.NO.	TOWER DESCRIPTION	S/R. HEIGHT	QTY
1	11+P	15.6M	04
2	13	22.0M+8.0MP	06
3	15	16.6M+6.4M+8.0MP	06

BEAMS IN 400KV S/Y:		
S/LNO.	BEAM DESIGNATION	QTY. CHANBAPUR-II
1	B1	08
2	B3	04

BEAMS IN 400KV S/Y:

4. BOUNDARY WALL & FENCE NOT IN BHEL SCOP  
TOWERS IN 400k

### DETAILS OF CONDUCTOR IN DIFFERENT SECTIONS:

SECTION	CONDUCTOR
400KY MAIN BUS-1 & MAIN BUS-2	QUAD WIRELESS WITH SUB CONDUCTOR SPACING 450mm.
400KY LINE/ TIE BARS	TWIN WIRELESS WITH SUB CONDUCTOR SPACING 450mm.
400KY INCOMING LINES	TWIN WIRELESS WITH SUB CONDUCTOR SPACING 450mm.

[illegible]