

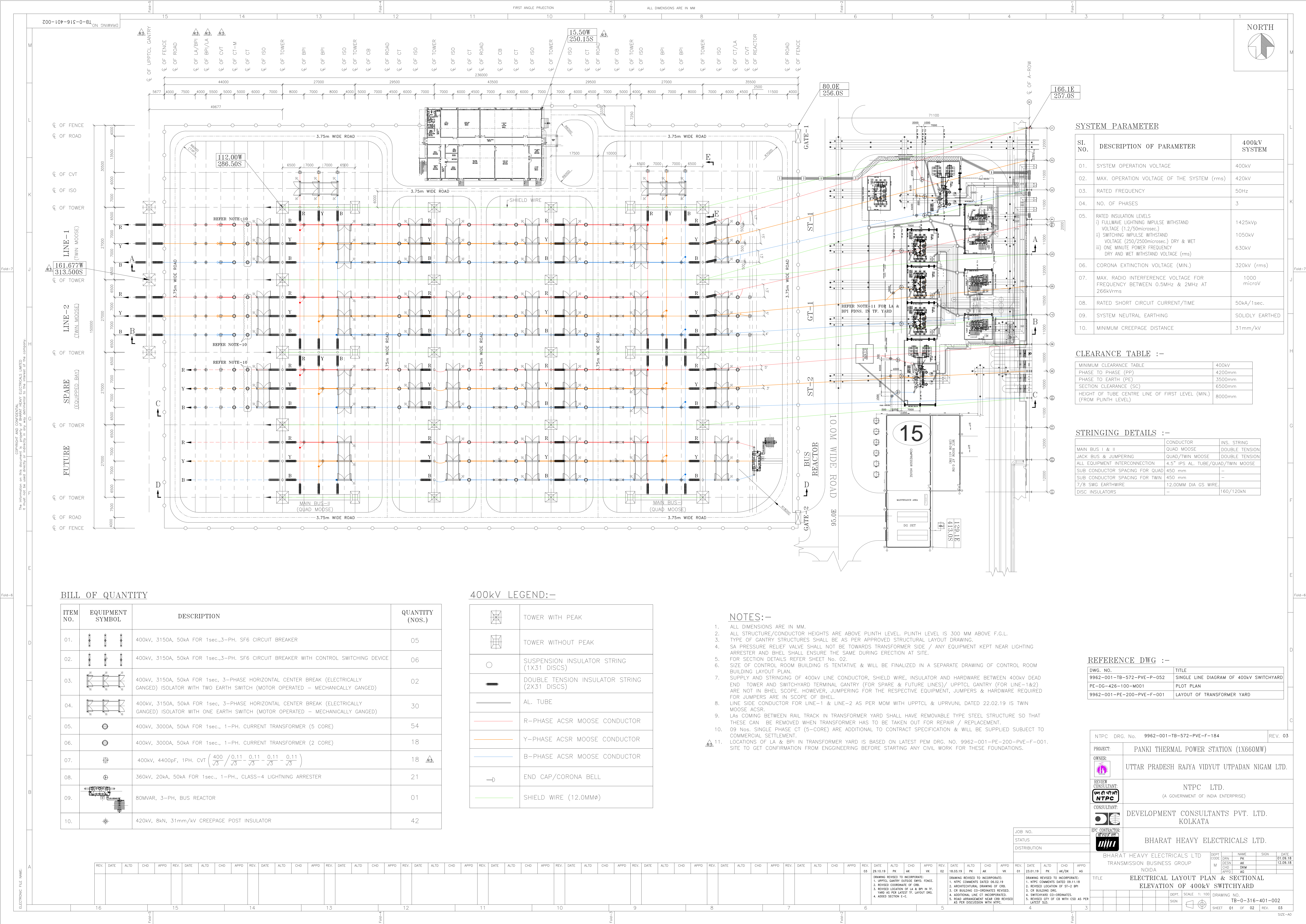
CLARIFICATION/ COMPLIANCE REPORT

400 kV Switchyard at Panki Thermal Power Project (1 X 660 MW)

DRG. ELECTRICAL LAYOUT PLAN & SECTIONAL ELEVATION OF 400kV SWITCHYARD

DRG NO. 9962-001-TB-572-PVE-F-184

SL. NO.	NTPC/ Customer COMMENTS	BHEL COMPLIANCE/ CLARIFICATION
NTPC comments dtd. 02.04.19 & discussions with UPRVUNL, UPPTCL at site for power evacuation arrangement		
1	Provide the detail arrangement to accommodate shoulder, drain, fencing as per proposed drawing.	Details of drain, road shoulders will be shown in separate civil drawings.
Additional changes done in layout of Switchyard		
1	Co-ordinate of CRB modified. Building shifted inside Switchyard as per recommendation of PEM on plot plan drawing. This drawing is inline with the arrangement of roads shown in approved Outdoor cable trench Layout (Drg. No. 9962-001-TB-572-PVE-F-190).	
2	Arrangement of roads modified as per the location of CRB. This drawing is inline with the arrangement of roads shown in approved Outdoor cable trench Layout (Drg. No. 9962-001-TB-572-PVE-F-190).	
3	UPPTCL scope gantry outside Switchyard fence has been shown in the revised drawing for Line-1 & 2 as per the inputs provided by UPRVUNL site & UPPTCL. For these two lines Line side equipment arrangement (LA, BPI & CVT) has been changed to suit the cantilever requirement of BPI, CVT & CT. Input drawing of UPPTCL (for power evacuation from Lines 1 & 2) & co-ordinate of UPPTCL scope gantry as provided by UPPTCL vide mails dated 14.08.19 & 03.10.19 are enclosed as reference documents.	
4	Details of Section E-E added in the drawing.	



SYSTEM PARAMETER		
Sl. NO.	DESCRIPTION OF PARAMETER	400kV SYSTEM
01.	SYSTEM OPERATION VOLTAGE	400kV
02.	MAX. OPERATION VOLTAGE OF THE SYSTEM (rms)	420kV
03.	RATED FREQUENCY	50Hz
04.	NO. OF PHASES	3
05.	RATED INSULATION LEVELS i) FULLWAVE LIGHTNING IMPULSE WITHSTAND VOLTAGE (1.2/50microsec.) ii) SWITCHING IMPULSE WITHSTAND VOLTAGE (250/2500microsec.) DRY & WET iii) ONE MINUTE POWER FREQUENCY DRY AND WET WITHSTAND VOLTAGE (rms)	1425kVp 1050kV 630kV
06.	CORONA EXTINCTION VOLTAGE (MIN.)	320kV (rms)
07.	MAX. RADIO INTERFERENCE VOLTAGE FOR FREQUENCY BETWEEN 0.5MHz & 2MHz AT 266kVrms	1000 microV
08.	RATED SHORT CIRCUIT CURRENT/TIME	50kA/1sec.
09.	SYSTEM NEUTRAL EARTHING	SOLIDLY EARTHED
10.	MINIMUM CREEPAGE DISTANCE	31mm/kV

CLEARANCE TABLE :-	
MINIMUM CLEARANCE TABLE	400kV
PHASE TO PHASE (PP)	4200mm
PHASE TO EARTH (PE)	3500mm
SECTION CLEARANCE (SC)	6500mm
HEIGHT OF TUBE CENTRE LINE OF FIRST LEVEL (MIN.) (FROM PLINTH LEVEL)	8000mm

STRINGING DETAILS :-		
MAIN BUS I & II	CONDUCTOR	INS. STRING
JACK BUS & JUMPING	QUAD MOOSE	DOUBLE TENSION
ALL EQUIPMENT INTERCONNECTION	QUAD/TWIN MOOSE	DOUBLE TENSION
SUB CONDUCTOR SPACING FOR QUAD	450 mm	-
SUB CONDUCTOR SPACING FOR TWIN	450 mm	-
7/8 SWG EARTHWIRE	12.00MM DIA GS WIRE	-
DISC INSULATORS	-	160/120kN

BILL OF QUANTITY

ITEM NO.	EQUIPMENT SYMBOL	DESCRIPTION	QUANTITY (NOS.)
01.		400kV, 3150A, 50kA FOR 1sec., 3-PH. SF6 CIRCUIT BREAKER	05
02.		400kV, 3150A, 50kA FOR 1sec., 3-PH. SF6 CIRCUIT BREAKER WITH CONTROL SWITCHING DEVICE	06
03.		400kV, 3150A, 50kA FOR 1sec, 3-PHASE HORIZONTAL CENTER BREAK (ELECTRICALLY GANGED) ISOLATOR WITH TWO EARTH SWITCH (MOTOR OPERATED - MECHANICALLY GANGED)	02
04.		400kV, 3150A, 50kA FOR 1sec, 3-PHASE HORIZONTAL CENTER BREAK (ELECTRICALLY GANGED) ISOLATOR WITH ONE EARTH SWITCH (MOTOR OPERATED - MECHANICALLY GANGED)	30
05.		400kV, 3000A, 50kA FOR 1sec., 1-PH. CURRENT TRANSFORMER (5 CORE)	54
06.		400kV, 3000A, 50kA FOR 1sec., 1-PH. CURRENT TRANSFORMER (2 CORE)	18
07.		400kV, 4400pF, 1PH. CVT $\left(\frac{400}{\sqrt{3}} \right) / \left(\frac{0.11}{\sqrt{3}} - \frac{0.11}{\sqrt{3}} - \frac{0.11}{\sqrt{3}} - \frac{0.11}{\sqrt{3}} \right)$	18
08.		360kV, 20kA, 50kA FOR 1sec., 1-PH., CLASS-4 LIGHTNING ARRESTER	21
09.		80MVAR, 3-PH, BUS REACTOR	01
10.		420kV, 8kN, 31mm/kV CREEPAGE POST INSULATOR	42

400kV LEGEND:-

	TOWER WITH PEAK
	TOWER WITHOUT PEAK
	SUSPENSION INSULATOR STRING (1X31 DISCS)
	DOUBLE TENSION INSULATOR STRING (2X31 DISCS)
	AL. TUBE
	R-PHASE ACSR MOOSE CONDUCTOR
	Y-PHASE ACSR MOOSE CONDUCTOR
	B-PHASE ACSR MOOSE CONDUCTOR
	END CAP/CORONA BELL
	SHIELD WIRE (12.0MMø)

NOTES:-

- ALL DIMENSIONS ARE IN MM.
- ALL STRUCTURE/CONDUCTOR HEIGHTS ARE ABOVE PLINTH LEVEL. PLINTH LEVEL IS 300 MM ABOVE F.G.L.
- TYPE OF GANTRY STRUCTURES SHALL BE AS PER APPROVED STRUCTURAL LAYOUT DRAWING.
- SA PRESSURE RELIEF VALVE SHALL NOT BE TOWARDS TRANSFORMER SIDE / ANY EQUIPMENT KEPT NEAR LIGHTING ARRESTER AND BHEL SHALL ENSURE THE SAME DURING ERECTION AT SITE.
- FOR SECTION DETAILS REFER SHEET No. 02.
- SIZE OF CONTROL ROOM BUILDING IS TENTATIVE & WILL BE FINALIZED IN A SEPARATE DRAWING OF CONTROL ROOM BUILDING LAYOUT PLAN.
- SUPPLY AND STRINGING OF 400kV LINE CONDUCTOR, SHIELD WIRE, INSULATOR AND HARDWARE BETWEEN 400kV DEAD END TOWER AND SWITCHYARD TERMINAL GANTRY (FOR SPARE & FUTURE LINES)/ UPPTCL GANTRY (FOR LINE-1&2) ARE NOT IN BHEL SCOPE. HOWEVER, JUMPING FOR THE RESPECTIVE EQUIPMENT, JUMPERS & HARDWARE REQUIRED FOR JUMPERS ARE IN SCOPE OF BHEL.
- LINE SIDE CONDUCTOR FOR LINE-1 & LINE-2 AS PER MOM WITH UPPTCL & UPRVUNL DATED 22.02.19 IS TWIN MOOSE ACSR.
- LAS COMING BETWEEN RAIL TRACK IN TRANSFORMER YARD SHALL HAVE REMOVABLE TYPE STEEL STRUCTURE SO THAT THESE CAN BE REMOVED WHEN TRANSFORMER HAS TO BE TAKEN OUT FOR REPAIR / REPLACEMENT.
- 09 Nos. SINGLE PHASE CT (5-CORE) ARE ADDITIONAL TO CONTRACT SPECIFICATION & WILL BE SUPPLIED SUBJECT TO COMMERCIAL SETTLEMENT.
- LOCATIONS OF LA & BPI IN TRANSFORMER YARD IS BASED ON LATEST PEM DRG. NO. 9962-001-PE-200-PVE-F-001. SITE TO GET CONFIRMATION FROM ENGINEERING BEFORE STARTING ANY CIVIL WORK FOR THESE FOUNDATIONS.

REFERENCE DWG :-

DWG. NO.	TITLE
9962-001-TB-572-PVE-P-052	SINGLE LINE DIAGRAM OF 400kV SWITCHYARD
PE-DG-426-100-M001	PLOT PLAN
9962-001-PE-200-PVE-F-001	LAYOUT OF TRANSFORMER YARD

NTPC DRG. No. 9962-001-TB-572-PVE-F-184		REV. 03
PROJECT:	PANKI THERMAL POWER STATION (1X660MW)	
OWNER:	UTTAR PRADESH RAJYA VIDYUT UTPADAN NIGAM LTD.	
REVIEW CONSULTANT:	NTPC LTD.	
CONSULTANT:	(A GOVERNMENT OF INDIA ENTERPRISE)	
DEVELOPMENT CONSULTANTS PVT. LTD.	KOLKATA	
BHARAT HEAVY ELECTRICALS LTD.		

BHARAT HEAVY ELECTRICALS LTD		DEPT. NAME	SIGN	DATE
TRANSMISSION BUSINESS GROUP		DESIGN	AK	01.05.14
NOIDA		CHECK	AK	12.09.18

TITLE		DEPT. SCALE	1: 100	DRAWING NO.	TB-0-316-401-002
ELECTRICAL LAYOUT PLAN & SECTIONAL ELEVATION OF 400kV SWITCHYARD		SIGN		SHEET	01 OF 02
				REV.	03

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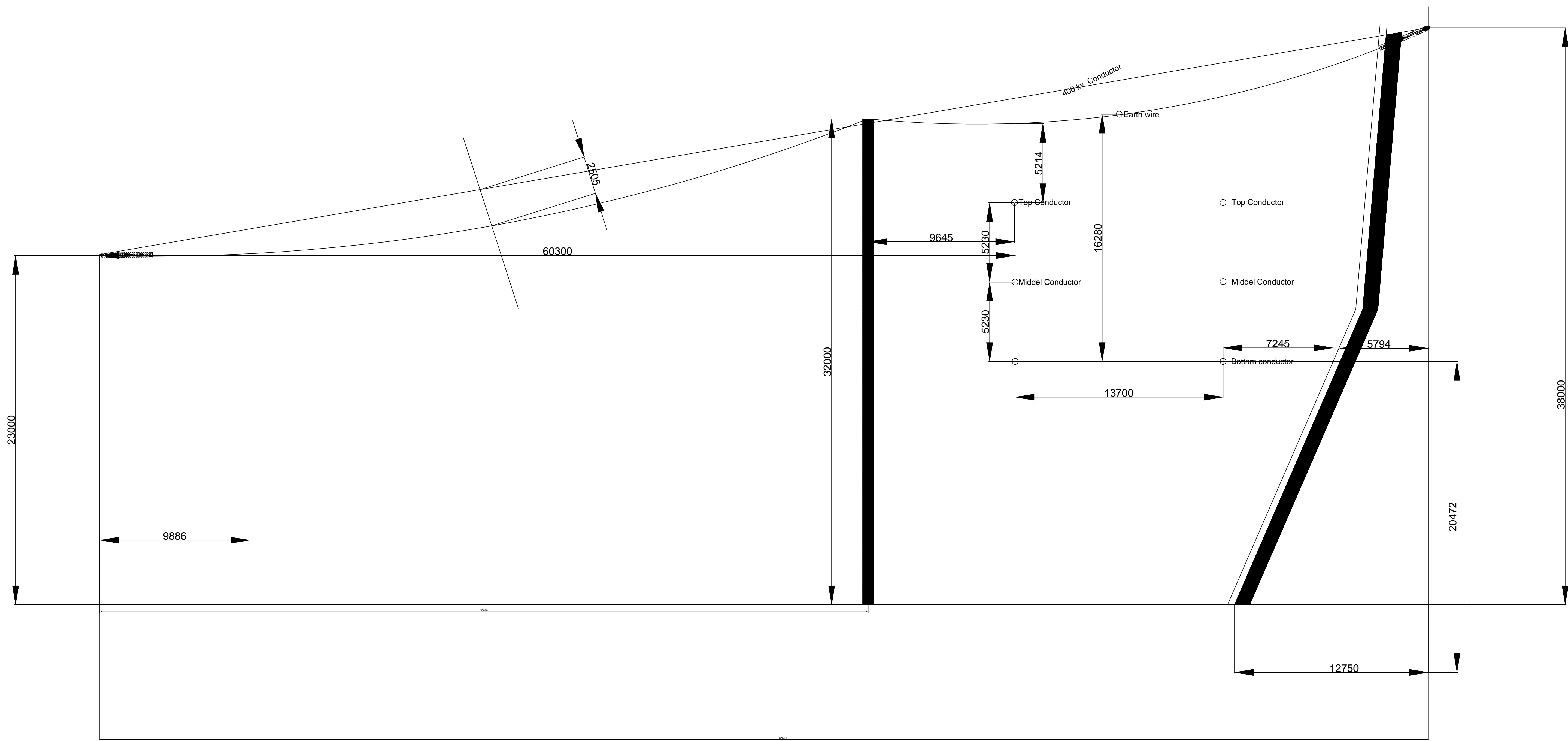
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NOTES:-
1. 'H' - HEIGHT OF LA & BP IN TRANSFORMER YARD SHALL BE KEPT TO MATCH BUSHING HEIGHTS OF GT / ST. DETAILS SHALL BE INFORMED AFTER GETTING ACTUAL GT/ST DRAWINGS FROM BHEL BHOPAL.

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REVIEW CONSULTANT:	NTPC LTD. (A GOVERNMENT OF INDIA ENTERPRISE)	
CONSULTANT:	DEVELOPMENT CONSULTANTS PVT. LTD. KOLKATA	
EXECUTIVE CONTRACTOR:	BHARAT HEAVY ELECTRICALS LTD.	
BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP NOIDA		DEPT. NAME SIGN DATE -td- 01.03.13 M DESN AK -sd- 12.09.18 CHD CHD SKM -sd- APPO AG
TITLE ELECTRICAL LAYOUT PLAN & SECTIONAL ELEVATION OF 400kV SWITCHYARD		DEPT. SCALE 1:100 DRAWING NO. TB-0-316-401-002
SHEET 02 OF 02		02 REV. 03
SIZE-A0		

Electrical clearances from 400 kv Line Conductor to Existing 220 kv line conductor by +18 M Ext. with 32 M GENTRY



Hospital

Hospital

(BHEL Office
closed school

220kv Powerline

220kv Powerline

Sp. GENTRY

SYWD. FENCE

3.75m WIDE ROAD

R

B

R

Y

B

R

Y

B

S=332.244
W=259.630

S=316.179
W=221.23

S=309.144
W=207.177

S=313.580
W=161.677

S=341.095
W=177.042

S=349.970
W=172.174

S=346.035
W=185.767

S=354.852
W=181.122

66

WATER

TESTING POND

28°

AP.2

AP.1

AP.3

M/s Unawala Engineers Pvt. Ltd.
A-9, R-9, D

S.P. Na-1
PB
220 kv x/s QV
Panki