

**400kV SYSTEM PARAMETERS**

Sl.No.	DESCRIPTION OF PARAMETER	VALUE
1	SYSTEM OPERATING VOLTAGE	400kV
2	MAX. OPERATING VOLTAGE OF THE SYSTEM (rms)	420kV
3	RATED FREQUENCY	50Hz
4	NO. OF PHASES	3
5	RATED INSULATION LEVELS	
i) FULL WAVE IMPULSE WITHSTAND VOLTAGE (1.2/50microsec.)		±1425kVp
ii) SWITCHING IMPULSE WITHSTAND VOLTAGE (250/2500microsec.)		±1050kVp
iii) ONE MINUTE POWER FREQUENCY WITHSTAND VOLTAGE (rms)		630kV (rms)
6	CORONA EXTINCTION VOLTAGE (MIN)	320kV (rms)
7	MAX. RADIO INTERFERENCE VOLTAGE FOR FREQUENCY BETWEEN 0.5MHz & 2MHz AT 26kV rms	1000 microV
8	MIN. CREEPAGE DISTANCE	25MM/kV (10550 MM)
9	MIN. CLEARANCE	
i) PHASE TO PHASE		4000MM
ii) PHASE TO EARTH		3500MM
iii) SECTIONAL CLEARANCE		6500MM
10	RATED SHORT CIRCUIT CURRENT FOR 1SEC DURATION	50KA
11	SYSTEM NEUTRAL EARTHING	EFFECTIVELY EARTHED
12	SUB CONDUCTOR SPACING	450MM
13	CONDUCTOR STATIC TENSION	
400KV TWIN		4T PER PHASE
400KV QUAD		6T PER PHASE

**CONDUCTOR & STRINGING DETAILS :-**

SL.NO.	DESCRIPTION	CONDUCTOR DETAIL	CONNECTION HEIGHT (ABOVE PLINTH LEVEL)
1.	EQUIPMENT INTERCONNECTION	4.0" IPS (EH) AL. TUBE/ MOOSE CONDUCTOR	8 mtr.
2.	MAIN BUS	4.0" IPS (EH) AL. TUBE	8 mtr.
3.	JACK BUS ON GT/ST SIDE	TWIN ACSR MOOSE CONDUCTOR	16 mtr.
4.	JACK BUS ON LINE SIDE	QUAD ACSR MOOSE CONDUCTOR	16 mtr.
5.	EARTHWARE	7/3.66mm SHIELD WIRE	24.5 mtr.
6.	DROPPER ON CVT, LA	TWIN ACSR MOOSE CONDUCTOR	-

FUTURE SWYD SPACE  
 PROVISION  
 LAYDOWN & PRE-ASSEMBLY

SEE SHEET 2 OF 3 FOR 220KV SWITCHYARD DETAIL

**400 kV EQUIPMENTS:-**

SYMBOL	EQUIPMENT
III	400kV, 2000A, 50KA FOR 1s, 3-PH CIRCUIT BREAKER WITHOUT PIR
III	400kV, 2000A, 50KA FOR 1s, 3-PH CIRCUIT BREAKER WITHOUT PIR, WITH CONTROLLED SWITCHING DEVICE
III	400kV, 3150A, 50KA FOR 1s, 3-PH CIRCUIT BREAKER WITHOUT PIR
III	400kV, 3150A, 50KA FOR 1s, 3-PH CIRCUIT BREAKER WITHOUT PIR, WITH CONTROLLED SWITCHING DEVICE
III	400kV, 3150A, 50KA FOR 1s, 3-PH HCB ISOLATORS, MOTOR OPERATED WITH 1 E/S
III	400kV, 2000A, 50KA FOR 1s, 3-PH HCB ISOLATORS, MOTOR OPERATED WITH 1 E/S
III	400kV, 2000A, 50KA FOR 1s, 3-PH HCB ISOLATORS, MOTOR OPERATED WITH 2 E/S
III	400kV, 3000A, 50KA FOR 1s, 1-PH, 5-CORE CURRENT TRANSFORMER WITH 120% EXTENDED CURRENT RATING
III	400kV, 2000A, 50KA FOR 1s, 1-PH, 5-CORE CURRENT TRANSFORMER WITH 120% EXTENDED CURRENT RATING
III	400kV, 1-PH CAPACITOR VOLTAGE TRANSFORMER
III	336 kV, 20KA, 50KA FOR 1 SEC, DISCHARGE CLASS-4, 1-PH SURGE ARRESTER
III	400kV, 3150A, 1mH, 1-PH WAVE TRAP
III	400 kV, 1 PHASE, SOLID CORE BUS POST INSULATOR

**400kV LEGEND:-**

	TOWER WITH PEAK
	TOWER WITHOUT PEAK
	LIGHTNING MAST
	SUSPENSION INSULATOR STRING (1X25 DISCS)
	DOUBLE TENSION INSULATOR STRING (2X25 DISCS)
	AL. TUBE
	R-PHASE ACSR MOOSE CONDUCTOR
	Y-PHASE ACSR MOOSE CONDUCTOR
	B-PHASE ACSR MOOSE CONDUCTOR
	END CAP/CORONA BELL FOR BUSBAR
	SHIELD WIRE (10.98MM)/ OPWG

**NOTES:**

- ALL DIMENSIONS ARE IN MM.
- ALL STRUCTURE/CONDUCTOR HEIGHTS ARE ABOVE PLINTH LEVEL. PLINTH LEVEL IS 300 MM ABOVE F.G.L.
- WAVE TRAP FOUNDATION SHALL BE PROVIDED FOR ALL THREE PHASE OF THE LINE AND SHALL BE SUITABLE FOR BPI ALSO. HOWEVER WAVE TRAP SHALL BE INSTALLED ON TWO PHASES ONLY. BPI SHALL BE PROVIDED FOR ONE PHASE WHEREVER WAVETRIP IS NOT INSTALLED.
- TYPE OF GANTRY STRUCTURES SHALL BE AS PER APPROVED STRUCTURAL LAYOUT DRAWING.
- LOCATION OF LM ARE TENTATIVE & FINAL LOCATION SHALL BE AS PER APPROVED D/S/LP LAYOUT
- 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 DETAILED PLAN LAYOUT OF 220kV BAYS REFER SHEET No. 02.
- FOR SECTION DETAILS REFER SHEET No. 03
- STRINGING UP TO GT & ST BAYS SHALL BE SHOWN AFTER FINALIZATION OF TRANSFORMER YARD & ACC LAYOUT.
- LOCATION OF GT & ST SIDE ISOLATOR & CVT IS TENTATIVE AND SHALL BE FINALISED AFTER APPROVAL OF GT & ST STRINGING LAYOUT FROM SWITCHYARD GANTRY.
- LOCATION, SIZE & NUMBER OF AC KIOSKS IS TENTATIVE.
- SIZE OF CONTROL ROOM BUILDING IS TENTATIVE & WILL BE FINALIZED IN A SEPARATE DRAWING OF CONTROL ROOM BUILDING LAYOUT PLAN.
- FOUNDATIONS OF LA & CVT NEAR ICT ARE TO BE KEPT ON HOLD & WILL BE FINALIZED AS PER FINAL TRANSFORMER DRAWING.
- ALL LINE SIDE EQUIPMENT FOUNDATIONS SHALL BE ON HOLD TILL FINALIZATION OF 400KV TRANSMISSION LINE TOWER LOCATIONS.
- SUPPLY AND STRINGING OF 400KV LINE CONDUCTOR, SHIELD WIRE, INSULATOR AND HARDWARE BETWEEN 400KV DEAD END TOWER AND SWITCHYARD TERMINAL GANTRY ARE NOT IN BHEL SCOPE. HOWEVER, JUMPING FOR THE RESPECTIVE EQUIPMENT, JUMPERS & HARDWARE REQUIRED FOR JUMPERS ARE IN SCOPE OF BHEL.

**REFERENCE DRGS.**

Sl No	NTPC Drg. No.	DESCRIPTION
1	4410-001-999-POC-F-001 (Rev-02)	PLOT PLAN
2	4410-001-572-PVE-P-002 (Rev-02)	400/220KV SWITCHYARD SINGLE LINE DIAGRAM

JOB NO. 83011		JOB NO. 83011	
STATUS CONTRACT		STATUS CONTRACT	
DISTRIBUTION		DISTRIBUTION	
NO.	DATE	NO.	DATE
02	11.08.15	01	27.03.15
REV.	DATE	REV.	DATE
02	11.08.15	01	27.03.15
AK	MM	AK	MM
CHD	AS	CHD	AS
APPD	AS	APPD	AS

NTPC DRG. No. 4410-001-572-PVE-F-0013

NORTH KARANPURA  
SUPER THERMAL POWER PROJECT (3x660MW)

**NTPC Limited**  
(A COMPANY OF NDA ENTERPRISES)

BHARAT HEAVY ELECTRICALS LTD  
POWER SECTION  
TRANSMISSION BUSINESS GROUP  
NOIDA

DEPT. NAME SIGN. DATE

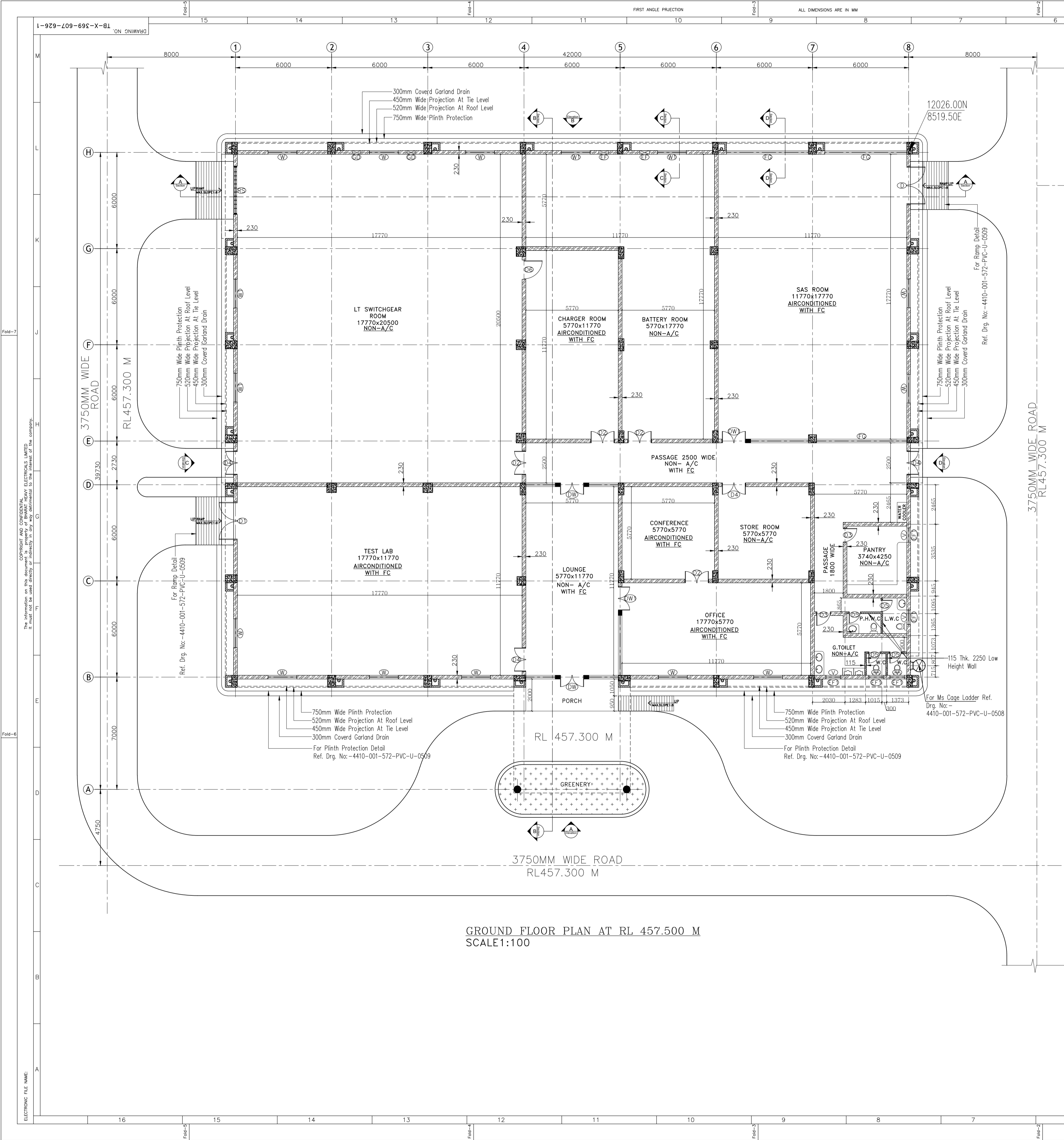
REVISIONS

NO.	DATE	BY	REASON
01	27.03.15	AK	ISSUED FOR CONSTRUCTION
02	11.08.15	MM	REVISED CONTROL ROOM BUILDING DRAWING INCORPORATED.

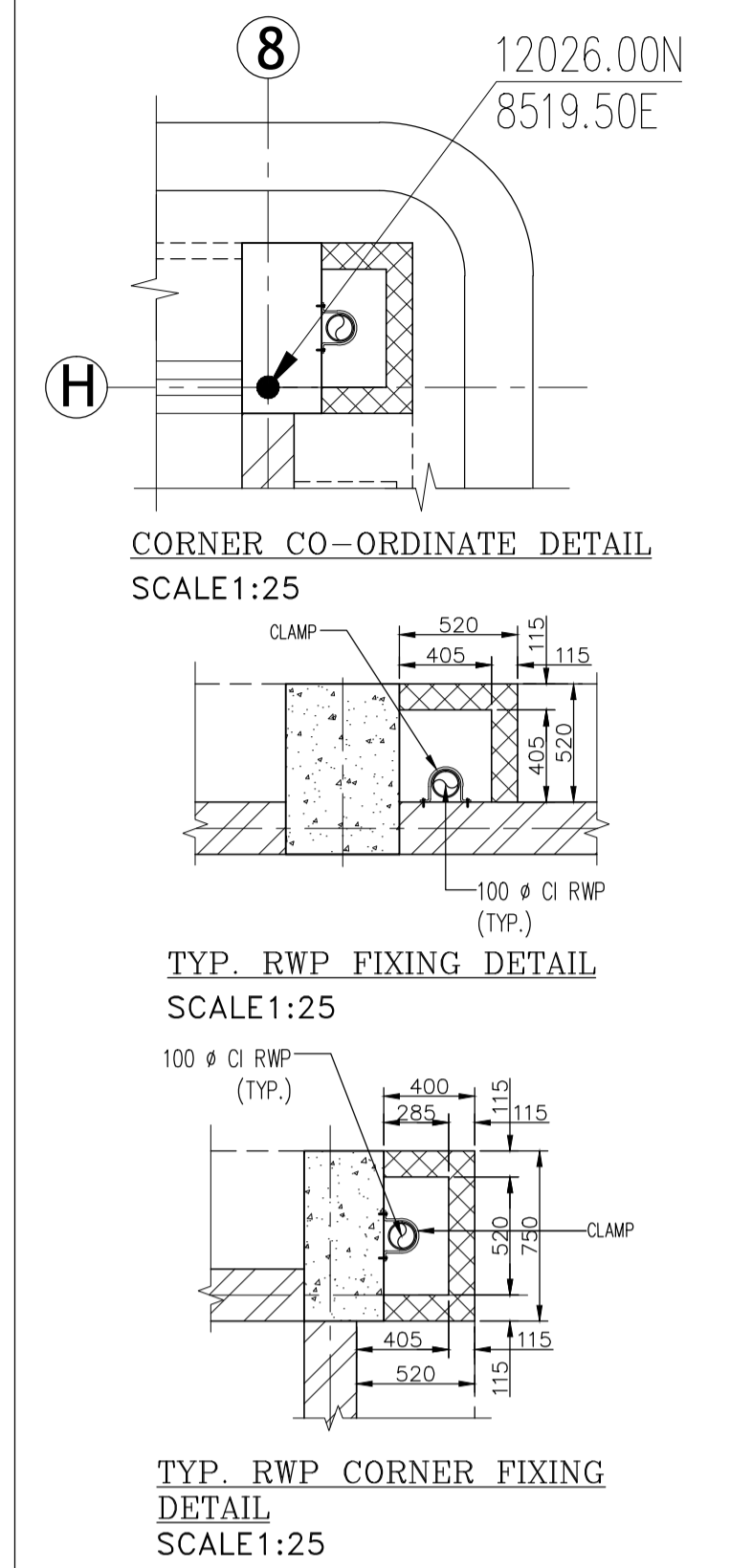
TITLE  
LAYOUT PLAN & SECTION OF 400/220KV SWITCHYARD AT NKSTPP END

DEPT. SCALE DRAWING NO.  
SIGN. DATE TB-0-369-318-002  
SHEET 01 OF 04 REV. 02

ELECTRONIC FILE NAME: TB-0-369-318-002

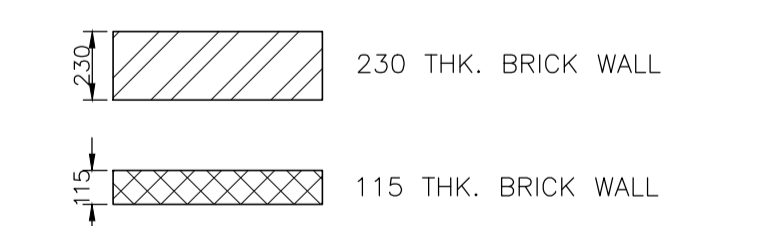


GROUND FLOOR PLAN AT RL 457.500 M  
SCALE 1:100

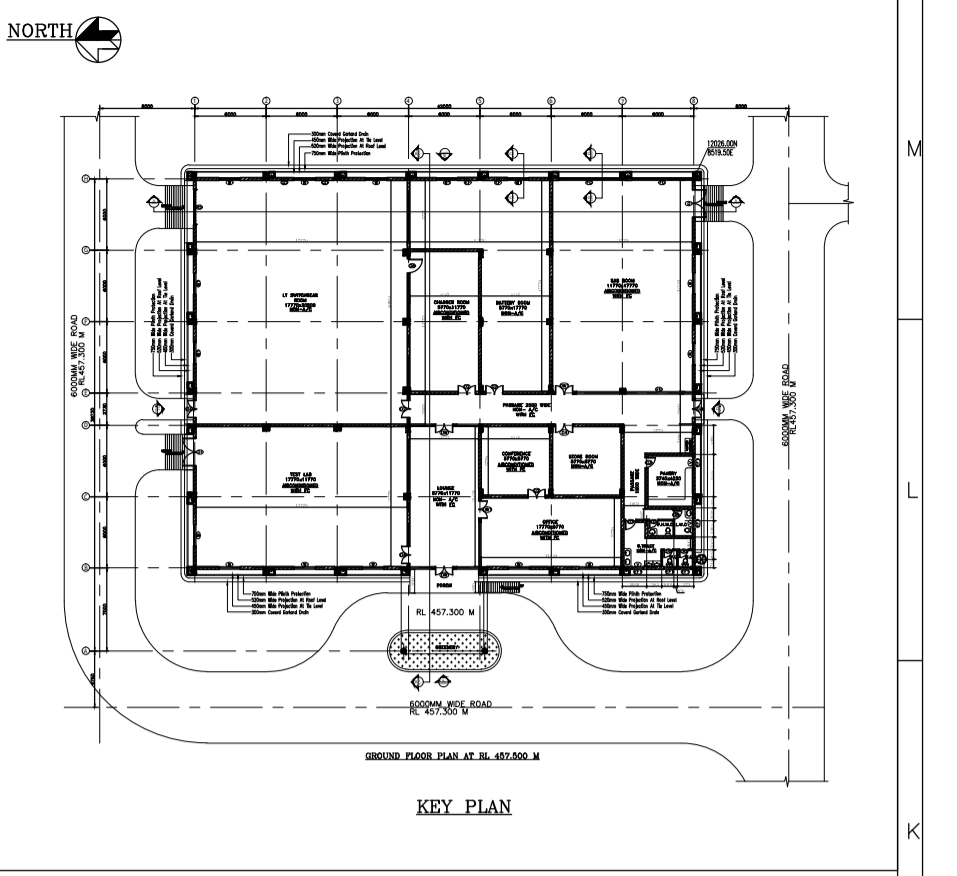


**LEGEND :-**

RL	REDUCED LEVEL
FGL	FINISHED GROUND LEVEL
TRL	TOP OF ROAD
FFL	FINISHED FLOOR LEVEL
BOB	BOTTOM OF BEAM
TOC	TOP OF CONCRETE
TOP	TOP OF PARAPET WALL
PCC	PLAIN CEMENT CONCRETE
TOB	TOP OF BEAM
FC	FALSE CEILING
DPC	DAMP PROOF COURSE
WPC	WATER PROOF COURSE
RS	ROLLING SHUTTER
D	DOOR
W	WINDOW
V	VENTILATOR
EF	EXHAUST FAN
FG	FIX GLAZING
GD	GRAVITY DAMPER



- NTPC REF. DWGS.**
- LAYOUT PLAN & SECTION OF 400/220 KV SWITCHYARD AT NKSTPP END NTPC DRG. NO. 4410-001-PVE-F-0013
  - SWITCHYARD CONTROL ROOM BUILDING LAYOUT AND DETAILS OF FOUNDATION AND COLUMN 4410-001-572-PVC-C-0497
  - SWITCHYARD CONTROL ROOM BUILDING DETAILS OF DOOR & WINDOW 4410-001-572-PVC-C-0501
  - SWITCHYARD CONTROL ROOM BUILDING FINISHING SCHEDULE 4410-001-572-PVC-U-0506
  - SWITCHYARD CONTROL ROOM BUILDING DETAILS OF TOILET AND PLUMBING 4410-001-572-PVC-U-0507
  - SWITCHYARD CONTROL ROOM BUILDING DETAILS OF CAGE LADDER 4410-001-572-PVC-U-0508
  - SWITCHYARD CONTROL ROOM BUILDING MISCELLANEOUS DETAIL 4410-001-572-PVC-U-0509



- GENERAL NOTES :-**
- ALL DIMENSIONS ARE IN MILLIMETRE AND ELEVATIONS ARE IN METRE.
  - RL 457.500 CORRESPONDS TO FFL OF CONTROL ROOM BUILDING & RL 457.00 IS FGL OF SWITCHYARD.
  - SIZE OF COLUMNS ARE TENTATIVE AND SUBJECTED TO CHANGE AS PER STRUCTURAL DWG.
  - THE DRAWING SHOULD NOT BE SCALED. ONLY THE WRITTEN DIMENSIONS SHALL BE FOLLOWED.
  - DOOR WIDTHS ARE CLEAR MASONRY OPENINGS AND DOOR HEIGHTS ARE FROM FFL TO BOTTOM OF LINTEL.
  - WALL GLAZING WORK SHALL BE CONFORM TO IS:1083 AND IS:3548.
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  - READ THIS DWG. IN CONJUNCTION WITH TECHNICAL SPEC. AND TENDER DRAWINGS.

**SCHEDULE OF DOORS & WINDOWS**

S.NO.	TYPE.	SIZE	SILL LVL.	LIN. LVL.	NOS.	DETAIL
1.	RS	3000x3000	-	3000	01	ROLLING SHUTTER AS/SPEC
2.	D1	2400x2400	-	2400	02	ALUMINUM GLAZED SHUTTER DOOR AS/SPEC
3.	D2	1500x2400	-	2400	04	STEEL FRAME WITH DOUBLE PLATE FLASH SHUTTER DOOR AS/SPEC
4.	D3	900x2100	-	2100	03	STEEL FRAME WITH WOODEN FLASH DOOR AS/SPEC
5.	D4	1500x2400	-	2400	05	ALUMINUM GLAZED SHUTTER DOOR (HERMETICALLY SEALED DOUBLE GLAZING) AS/SPEC
6.	D5	750x2100	-	2100	04	STEEL FRAME WITH WOODEN FLASH DOOR AS/SPEC
7.	D6	1200x2400	-	2400	01	STEEL FRAME WITH WOODEN FLASH DOOR AS/SPEC
8.	DW	1500x2400	-	2400	02	ALUMINUM GLAZED SHUTTER DOOR AND FIXED GLAZING AS/SPEC
9.	DW1	1500x2400	-	2400	02	ALUMINUM GLAZED SHUTTER DOOR AND FIXED GLAZING AS/SPEC (HERMETICALLY SEALED DOUBLE GLAZING)
10.	W	1800x1500	900	2400	16	ALUMINUM FRAMED GLAZED SHUTTER WINDOW (HERMETICALLY SEALED DOUBLE GLAZING) AS/SPEC
11.	W1	1800x1500	900	2400	06	ALUMINUM FRAMED GLAZED SHUTTER WINDOW AS/SPEC
12.	FG	AS/PLAN	150	2400	03	ALUMINUM FRAMED GLAZED AS/SPEC (HERMETICALLY SEALED DOUBLE GLAZING)
13.	V	900x600	1800	2400	06	ALUMINUM FRAMED GLAZED SHUTTER VENTILATOR AS/SPEC
14.	GD	500x500	3300	3800	02	(GRAVITY DAMPER)WALL OPENING
15.	EF	600x600	3300	3900	02	EXHAUST FAN

01	08.11.15	REV. AS PER NTPC COMMENTS OF 08.10.15	RK	BS	AA
0	24.09.15	FIRST SUBMISSION	RK	BS	AA
REV. DATE	REASONS FOR REVISION	PREPARED BY	CHECKED BY	APPROVED BY	

NTPC DRG. No. 4410-001-572-PVC-C-0497

**PROJECT**  
NORTH KARANPURA  
SUPER THERMAL POWER PROJECT (3x660MW)  
DEVELOPMENT CONSULTANTS PVT. LTD.  
CONSULTING ENGINEERS  
NEW DELHI

**OWNER**  
NTPC Limited  
(A GOVERNMENT OF INDIA ENTERPRISE)

THRM	SHARAT HEAVY ELECTRICALS LTD	DEPT	NAME	SIGN	DATE
CODE	SRN	BS	SRN	BS	21.08.15
C	TRANSMISSION BUSINESS GROUP	C	SRN	BS	
CHD	NOIDA	C	SRN	BS	
APPD		C	SRN	BS	

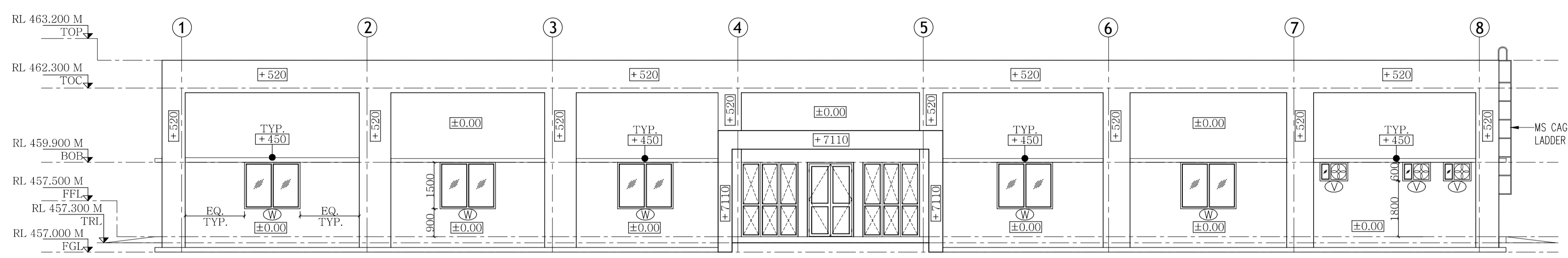
**TITLE**  
SWITCHYARD CONTROL ROOM BLD : ARCHITECTURAL PLANS AND ELEVATIONS  
(GROUND FLOOR PLAN)

DEPT.	SCALE 1:20	SHEL	TB-0-369-607-626-1
SIGN		DCPL	14X06-DWG-A-626-1
DATE		SHEET	01 OF 04
		REV.	01

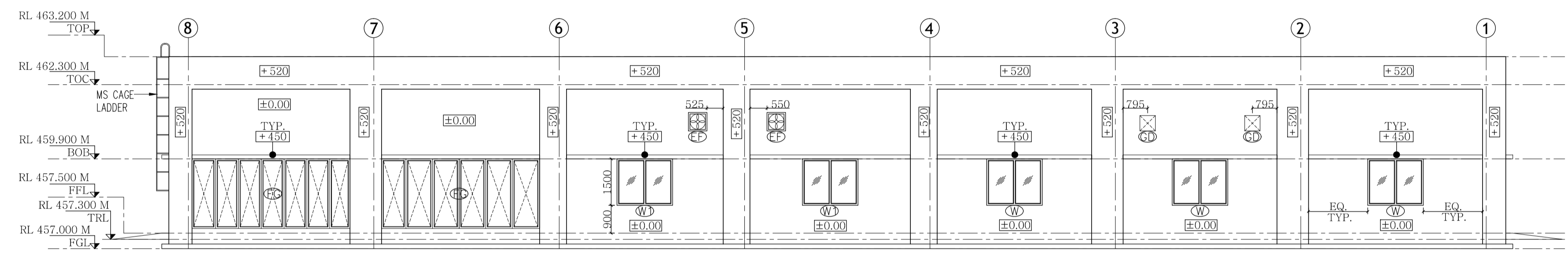
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**GENERAL NOTES :-**

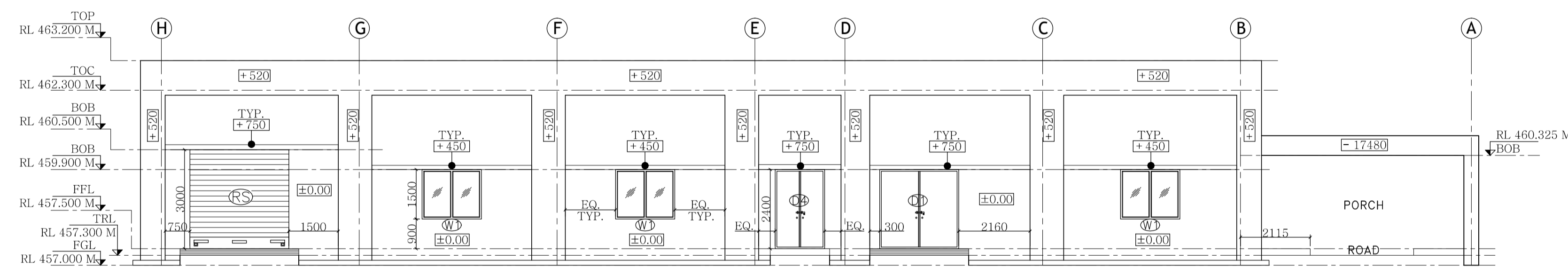
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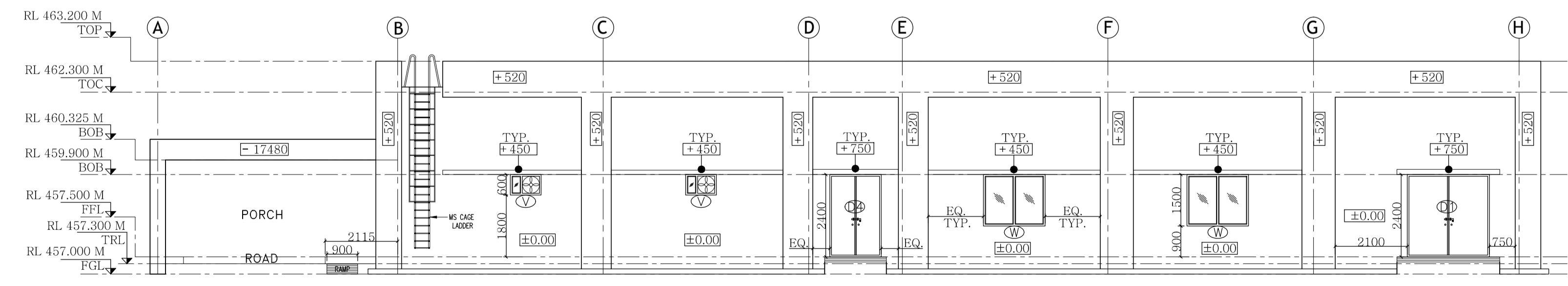
**ELEVATION - A**  
SCALE:1:100



**ELEVATION - B**  
SCALE:1:100



**ELEVATION - C**  
SCALE:1:100



**ELEVATION - D**  
SCALE:1:100

**LEGEND :-**

RL	REDUCED LEVEL
FGL	FINISHED GROUND LEVEL
TRL	TOP OF ROAD
FFL	FINISHED FLOOR LEVEL
BOB	BOTTOM OF BEAM
TOC	TOP OF CONCRETE
TOP	TOP OF PARAPET WALL
PCC	PLAIN CEMENT CONCRETE
TOB	TOP OF BEAM
FC	FALSE CEILING
DPC	DAMP PROOF COURSE
WPC	WATER PROOF COURSE
RS	ROLLING SHUTTER
D	DOOR
W	WINDOW
V	VENTILATOR
EF	EXHAUST FAN
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GD	GRAVITY DAMPER

01	08.11.15	REV. AS PER NTPC COMMENTS OF 08.10.15	RK	BS	AA
0	24.09.15	FIRST SUBMISSION	RK	BS	AA
REV.	DATE	REASONS FOR REVISION	PREPARED BY	CHECKED BY	APPROVED BY

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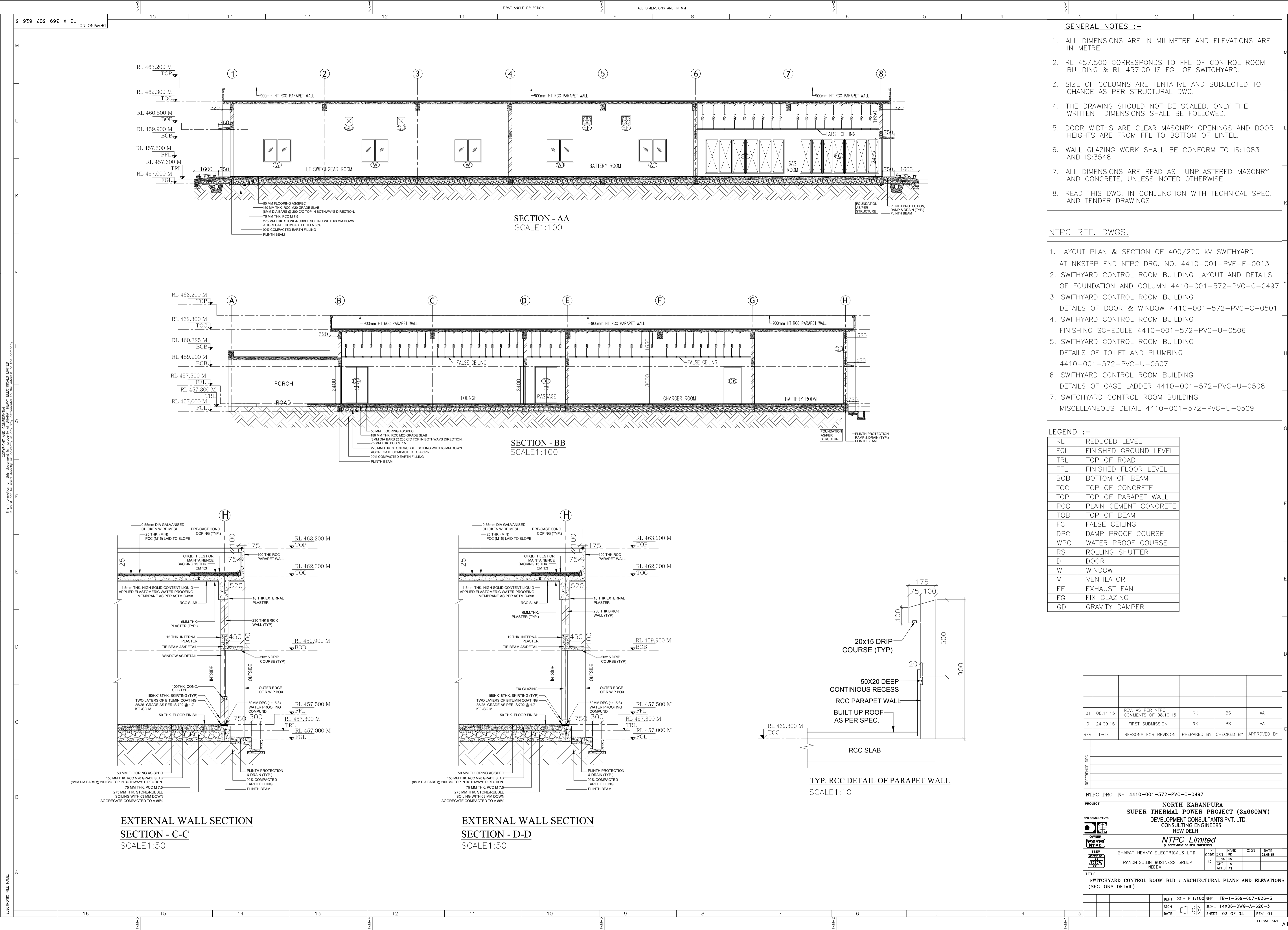
TRM	SHARAT HEAVY ELECTRICALS LTD	DEPT	INSE	SIGN	DATE
CODE	SRN	BS	BS		21.08.15
CHD	BS				
APPD	KS				

**TITLE**  
SWITCHYARD CONTROL ROOM BLD : ARCHITECTURAL PLANS AND ELEVATIONS  
(ELEVATIONS DETAILS)

DEPT.	SCALE 1:100	SHEL	TB-1-369-607-626-2
SIGN		DCPL	14X06-DWG-A-626-2
DATE		SHEET	02 OF 04
		REV.	01

FORMAT SIZE A1

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- NTPC REF. DWGS.**
1. LAYOUT PLAN & SECTION OF 400/220 KV SWITCHYARD AT NKSTPP END NTPC DRG. NO. 4410-001-PVE-F-0013
  2. SWITCHYARD CONTROL ROOM BUILDING LAYOUT AND DETAILS OF FOUNDATION AND COLUMN 4410-001-572-PVC-C-0497
  3. SWITCHYARD CONTROL ROOM BUILDING DETAILS OF DOOR & WINDOW 4410-001-572-PVC-C-0501
  4. SWITCHYARD CONTROL ROOM BUILDING FINISHING SCHEDULE 4410-001-572-PVC-U-0506
  5. SWITCHYARD CONTROL ROOM BUILDING DETAILS OF TOILET AND PLUMBING 4410-001-572-PVC-U-0507
  6. SWITCHYARD CONTROL ROOM BUILDING DETAILS OF CAGE LADDER 4410-001-572-PVC-U-0508
  7. SWITCHYARD CONTROL ROOM BUILDING MISCELLANEOUS DETAIL 4410-001-572-PVC-U-0509

**LEGEND :-**

RL	REDUCED LEVEL
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REV.	DATE	REASONS FOR REVISION	PREPARED BY	CHECKED BY	APPROVED BY
01	08.11.15	REV. AS PER NTPC COMMENTS OF 08.10.15	RK	BS	AA
0	24.09.15	FIRST SUBMISSION	RK	BS	AA

NTPC DRG. No. 4410-001-572-PVC-C-0497

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CONSULTING ENGINEERS  
NEW DELHI

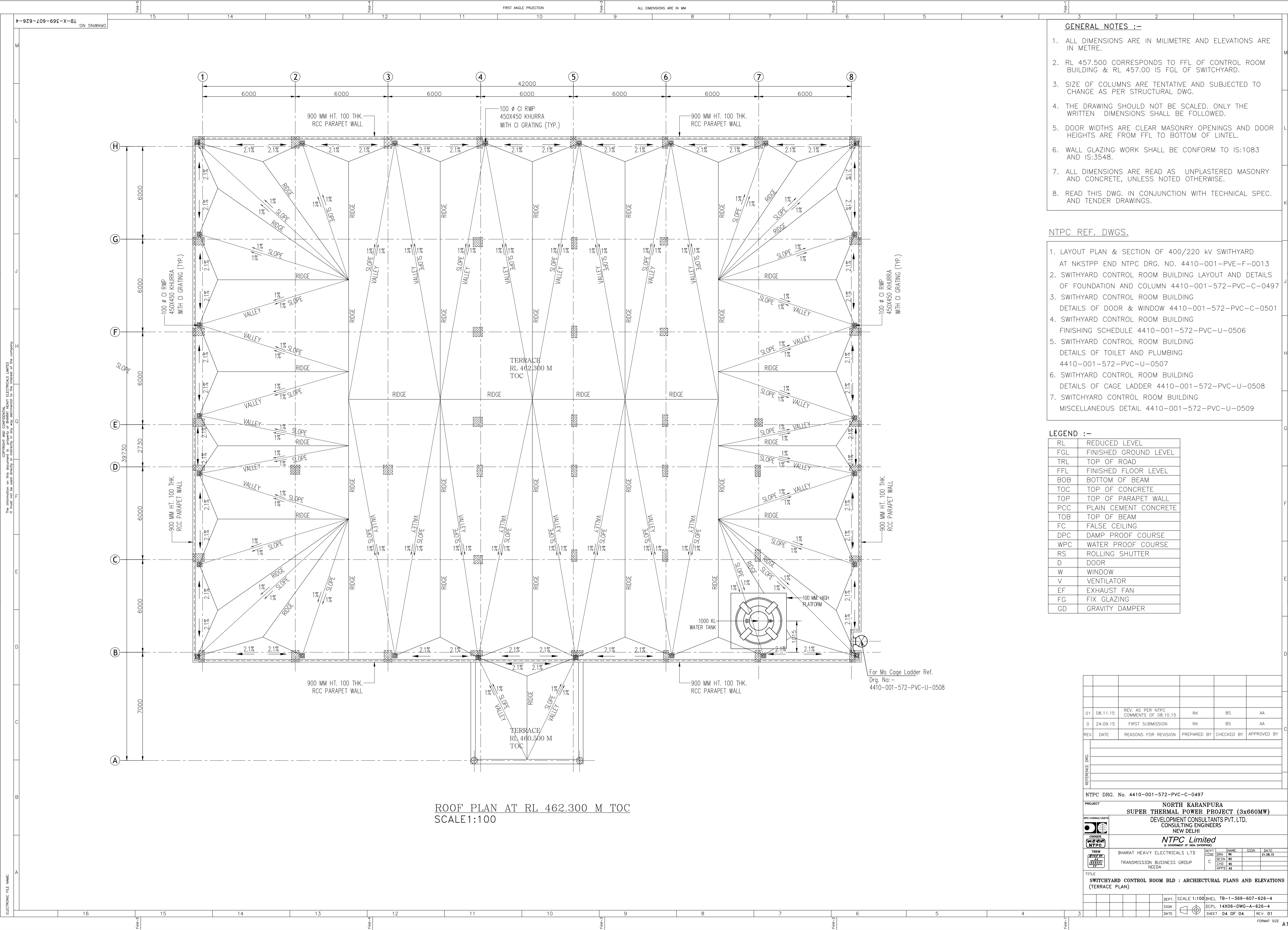
**OWNER**  
NTPC Limited  
(A GOVERNMENT OF INDIA ENTERPRISE)

DEPT.	SH.	DATE
TRANSMISSION BUSINESS GROUP	INDIA	21.08.15

**TITLE**  
SWITCHYARD CONTROL ROOM BLD : ARCHITECTURAL PLANS AND ELEVATIONS (SECTIONS DETAIL)

SCALE	1:100
DEPT.	SCALE 1:100
SIGN	DCPL 14X06-DWG-A-626-3
DATE	SHEET 03 OF 04
	REV. 01

FORMAT SIZE A1



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  5. SWITCHYARD CONTROL ROOM BUILDING DETAILS OF TOILET AND PLUMBING 4410-001-572-PVC-U-0507
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0	24.09.15	FIRST SUBMISSION	RK	BS	AA

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TEAM	BHARAT HEAVY ELECTRICALS LTD	DEPT	INSE	SIGN	DATE
	TRANSMISSION BUSINESS GROUP	C	BS		21.08.15
	NOIDA	CHD	BS		
		APPD	BS		

**TITLE**  
SWITCHYARD CONTROL ROOM BLD : ARCHITECTURAL PLANS AND ELEVATIONS (TERRACE PLAN)

DEPT.	SCALE 1:100	SHEET	TB-1-369-607-626-4
SIGN		DRAWN	14X06-DWG-A-626-4
DATE		SHEET	04 OF 04
		REV.	01

FORMAT SIZE A1

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 INVENTORY NO. 34640000 REF.DRG.NO. SIGN. DATE  
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DRG. NO. 3 464 00 01412

NTPC DRAWING. NO.	BHEL DRAWING. NO.	TITLE	DRAWING. NO.
4410-001-501-PVE-B-12	BP-DG-405-306-001	COVER SHEET FOR OGA & OGA PART LIST	34640001412 SHT.NO. 01
4410-001-501-PVE-B-12	BP-DG-405-306-001	OUTLINE GENERAL ARRANGEMENT	34640001412 SHT.NO. 02 TO 06
4410-001-501-PVE-B-12	BP-DG-405-306-001	OGA PART LIST	34640001412 SHT.NO. 07

REV	DATE	ALT	REV	DATE	ALT	BPC	-SD-	NTPC DRG. NO.	4410-001-501-PVE-B-12	BHEL DRG. NO.	BP-DG-405-306-001	ADDITIONAL INFORMATION	W.D.63070-P-512-01	भारत हेवी इलेक्ट्रिकल्स लिमिटेड भोपाल BHARAT HEAVY ELECTRICALS LTD. BHOPAL	NAME	SIGN	DATE	22.05.15		
		CKD	01	10.12.15	CKD	AKP	-SD-	NO. OF TRANSFORMER	1			STATUS OF DRAWING	'PR'	DEPT	CODE	WEIGHT(kg)	SCALE	CHD.	A.K.P.	
		APPD			APPD	AKP	-SD-	PROJECT	EPC PACKAGE FOR NORTH KARANPURA STPP (3X660 MW)			DISTRIBUTION OF PRINTS	TRE	406	----	NTS	APPD.	KGK/AKP		
			1.REVISED AS PER NTPC TRANSMITTAL REF.NO.-CC501:2446 DTD.16.06.2015			LOA. NO.			CS-4410-001-2-SC-NDA-6128 DT: 28-02-2014			TRE-1,TRM-3,			TITLE			COVER SHEET FOR OGA & OGA PART LIST		
						TYPE OF PRODUCT			1X315 MVA, 400/220/33KV, 3-PH. AUTO TRANSFORMER.						DRG. NO.			3 464 00 01412		
						NAME OF CUSTOMER			M/S NTPC LIMITED.						SHEET			01 OF 07		

101 102 103 104 105 106 107 108 109 110

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DRG. NO. 3 464 00 01412

CUSTOMER'S REFERENCE DRAWING			
SL.NO.	TITLE	SHEET	DRAWING NO.
001	COVER SHEET,OGA,OGA PART LIST	SHT. 1 TO 7	3 464 00 01412
002	FOUNDATION PLAN	SHT. 1 TO 1	3 464 00 01413
003	HV,IV,LV,HVN BUSHING	SHT. 1 TO 4	3 464 00 01414
004	LOADING GAUGE,ROLLER,INTERNAL SKETCH, VALVE SCHEDULE PLATE,OVER FLUXING CURVE	SHT. 1 TO 7	3 464 00 01415
005	RATING AND DIAGRAM PLATE	SHT. 1 TO 1	3 464 00 01416

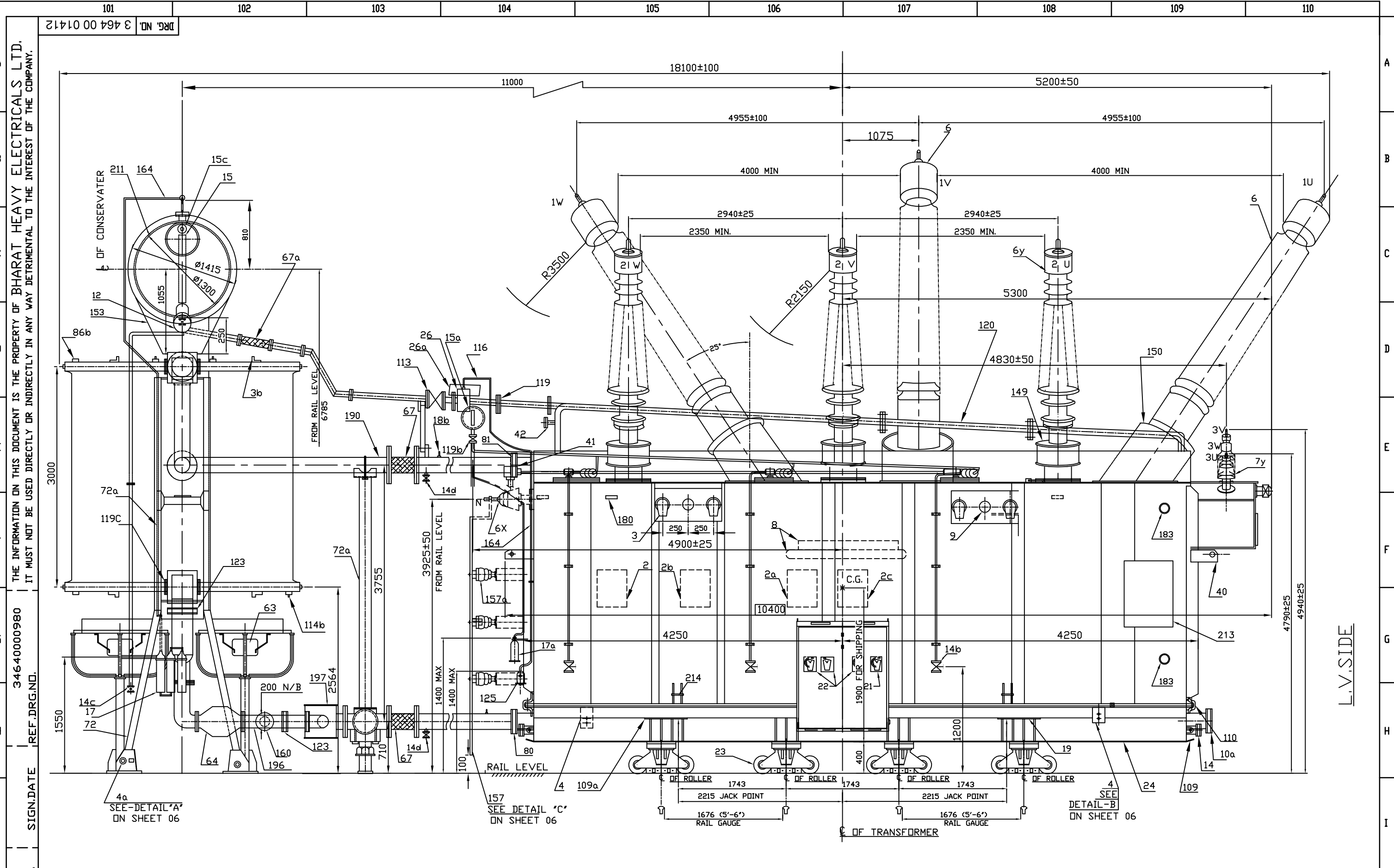
TABLE FOR WEIGHTS	
DESCRIPTION	APPROX. WEIGHTS IN KGS.
CORE AND WINDING	138000
TANK AND FITTINGS	31000
BUSHING	5700
COOLER CONTROL CABINET & WIRING	1300
RADIATOR BANK (INCLUDING CONSERVATORS,RADIATORS,HEADERS,HEADER SUPPORTS,PUMPS,FANS,FITTINGS &P/W ETC)	52000
OIL IN TRANSFORMER TANK & FITTING	74820
OIL IN RADIATOR BANK,CONSERVATORS & PIPE WORK	
TOTAL WEIGHT INCLUDING OIL	302820
SHIPPING WT. OF TRANSFORMER (GAS FILLED)	192000
UNTANKING WEIGHT (UPPER TANK)	20000
APPROXIMATE OIL CAPACITIES	
OIL IN TANK INCLUDING TURRETS, BUSHING, RADIATOR BANK, CONSERVATORS & PIPE WORK	86000

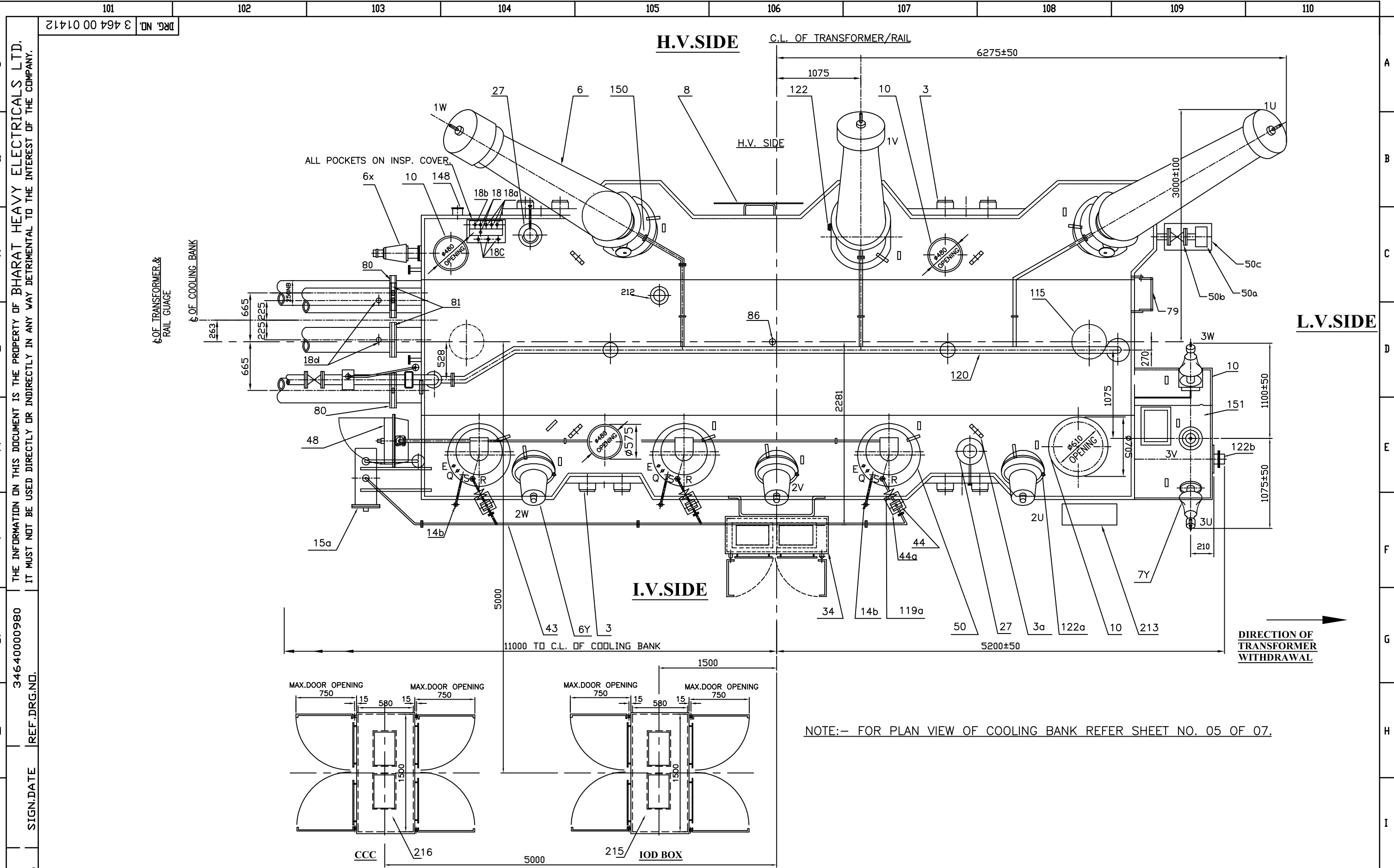
**NOTES:-**

1. THE DESIGN FEATURES SHOWN ON THIS DRAWING ( GENERALLY IN LINE WITH I.S. 2026 & CUSTOMER SPECIFICATION) MEETS THE STATUTORY, REGULATORY & SAFETY REQUIREMENTS WITH RESPECT TO EARTHING ARRANGEMENT, DANGER AND OTHER LABELS, CLEARANCES IN AIR, PROVISION FOR PRESSURE RELIEF DEVICE, GAS & OIL ACTUATED RELAY AND ANTI EARTH QUAKE CLAMPING ARRGT.
2. ALL HEIGHTWISE DIMENSIONS ARE GIVEN FROM RAIL LEVEL.
3. WHEN REFERRING THE O.G.A. DRG. PLEASE QUOTE MVA & W.O. NO.
4. DIMENSIONS SHOWN THUS  ARE OVERALL SHIPPING DIMENSION.
5. WIRING FROM INSTRUMENTS C.T.S ETC. NOT SHOWN FOR CLARITY.
6. JACK POINTS ARE FOR UNLOADING FROM WAGON.
7. FOR O.G.A. ELEVATION, PLAN, END VIEW & PART LIST REFER DRG. SHEETS 3,(4,5),6 & 7.
8. ALL VALVES ARE LOCATED IN SUCH A WAY THAT IT'S FUNCTIONAL (O&M) WILL NOT BE OBSTRUCTED BY RADIATOR PIPES ETC.
9. ALL BOLTS AND NUTS SHALL BE HOT DIP GALVANISED/SS.
10. SLOPE IS PROVIDED FOR TANK, M.BOX ETC. TO AVOID RAIN WATER ACCUMULATION.
11. ALL MAKES SHALL BE NTPC QA APPROVED.
12. TERMINAL MARKING PLATE WILL BE PROVIDED FOR BUSHING, CT TERMINAL BOX.
13. ALL GASKETS (IN CONTACT WITH OIL) SHALL BE O-RING NITRILE RUBBER (AS PER TECHNICAL SPECIFICATION).
14. EARTHING LINK SHALL BE PROVIDED AT ALL NON ELECTICALLY CONNECTED JOINTS INCLUDING M.BOX, DM BOX, RADIATOR PIPES ETC.
15. PAINTING AND OIL SHALL BE AS PER TECHNICAL SPECIFICATION.
16. PROVISION SHALL BE THERE FOR CONNECTING RADIATOR BANKS ON BOTH SIDE OF THE TANK, BUT NO CHANGE IN TERTIARY POCKET LOCATION.

HIGHEST VOLTAGE	AIR CLEARANCE (MIN) mm		
		LINE TO EARTH	LINE TO LINE
420 KV	H.V.	3500	4200
245 KV	I.V.	2150	2350
52 KV	L.V.	480	530
36 KV	H.V.N.	320	-

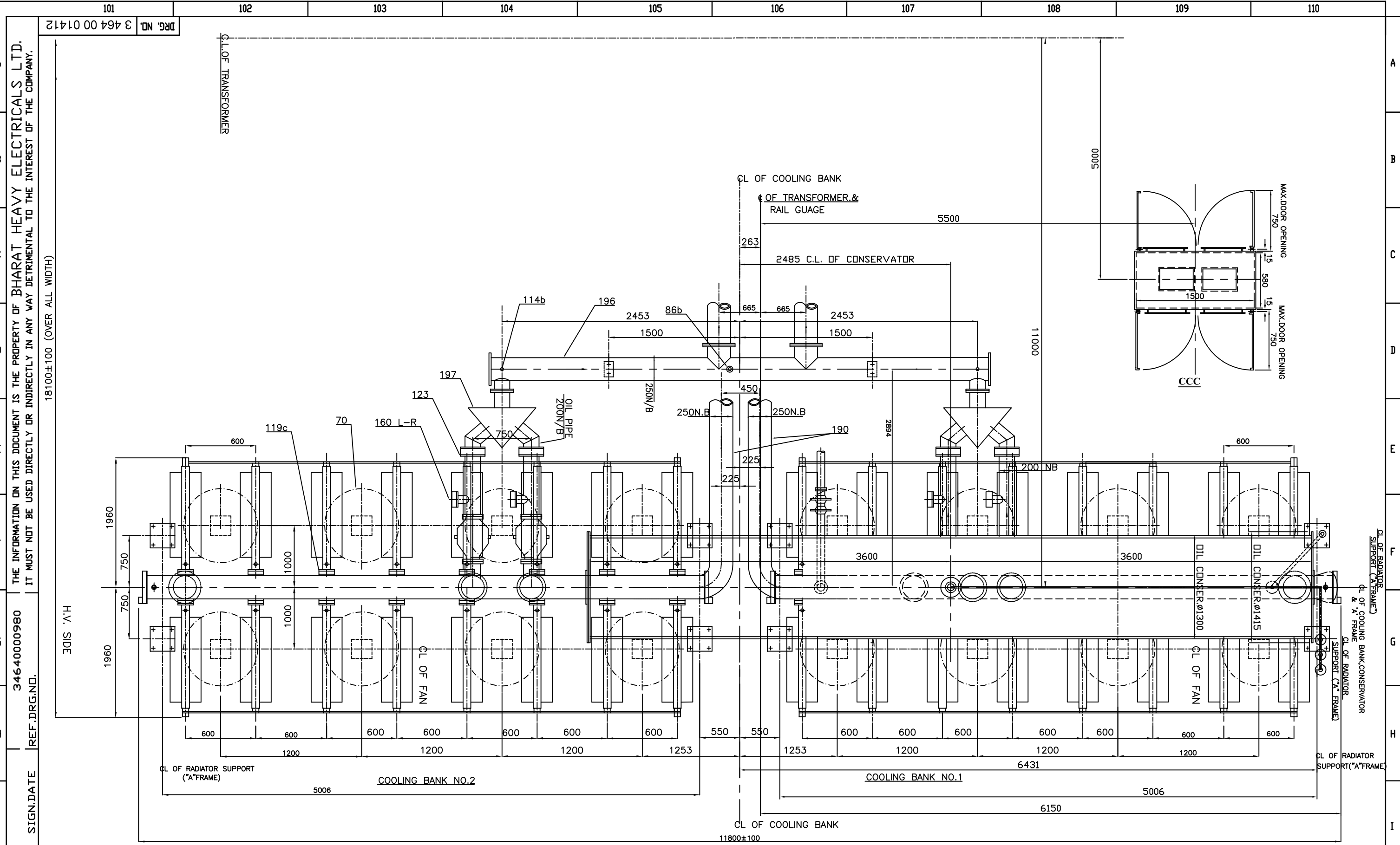
REV	DATE	ALT	BPC	-SD-	NTPC DRG. NO.	4410-001-501-PVE-B-12	BHEL DRG. NO. BP-DG-405-306-001	ADDITIONAL INFORMATION	W.D.63070-P-512-01	NAME	SIGN	DATE					
		CKD	AKP	-SD-	NO. OF TRANSFORMER	1				DRN.	N.S.R.	22.05.15					
		APPD	AKP	-SD-	PROJECT	EPC PACKAGE FOR NORTH KARANPURA STPP (3X660 MW)		STATUS OF DRAWING	'PR'	DEPT	CODE	WEIGHT(kg)	SCALE	CHD.	A.K.P.		
					LOA. NO.	CS-4410-001-2-SC-NDA-6128 DT: 28-02-2014		DISTRIBUTION OF PRINTS	TRE	406	----	NTS		APPD.	KGK/AKP		
					TYPE OF PRODUCT	1X315 MVA, 400/220/33KV, 3-PH. AUTO TRANSFORMER.		TRE-1,TRM-3,		TITLE	OUT LINE GENERAL ARRANGMENT			DRG. NO.	3 464 00 01412	REV.	01
					NAME OF CUSTOMER	M/S NTPC LIMITED.								SHEET	02 OF 07		





INVENTORY NO. SIGN. DATE REF. DRG. NO. 34640000980 THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LTD. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY. DRG. NO. 3 464 00 01412

REV	DATE	ALT	BPC	-SD-	NTPC DRG. NO.	4410-001-501-PVE-B-12	BHEL DRG. NO.	BP-DG-405-306-001	ADDITIONAL INFORMATION	W.D.63070-P-512-01	भारत हेवी इलेक्ट्रिकल्स लिमिटेड भोपाल	NAME	SIGN	DATE
		CKD	CKD	AKP	NO. OF TRANSFORMER	1			STATUS OF DRAWING	'PR'	BHARAT HEAVY ELECTRICALS LTD. BHOPAL	DRN.	N.S.R.	22.05.15
		APPD	APPD	AKP	PROJECT	EPC PACKAGE FOR NORTH KARANPURA STPP (3X660 MW)			DISTRIBUTION OF PRINTS	TRE	DEPT	CODE	WEIGHT(kg)	SCALE
					LOA. NO.	CS-4410-001-2-SC-NDA-6128	DT:	28-02-2014	TRE-1, TRM-3,	406				NTS
					TYPE OF PRODUCT	1X315 MVA, 400/220/33KV, 3-PH. AUTO TRANSFORMER.			TITLE	OUT LINE GENERAL ARRANGMENT (PLAN VIEW)				
					NAME OF CUSTOMER	M/S NTPC LIMITED.			DRG. NO.	3 464 00 01412	REV.	01		
									SHEET	04	OF	07		



PLAN VIEW OF COOLING BANK

INVENTORY NO.	REV	DATE	ALT	REV	DATE	ALT	BPC	-SD-	NTPC DRG. NO.	4410-001-501-PVE-B-12	BHEL DRG. NO.	BP-DG-405-306-001	ADDITIONAL INFORMATION	भारत हेवी इलेक्ट्रिकल्स लिमिटेड भोपाल BHARAT HEAVY ELECTRICALS LTD. BHOPAL	NAME	SIGN	DATE			
			CKD	01	10.12.15	CKD	AKP	-SD-	NO. OF TRANSFORMER	1			W.D.63070-P-512-01	DRN.	N.S.R.		22.05.15			
			APPD			APPD	AKP	-SD-	PROJECT	EPC PACKAGE FOR NORTH KARANPURA STPP (3X660 MW)			STATUS OF DRAWING	'PR'	DEPT	CODE	WEIGHT(kg)	SCALE		
									LOA. NO.	CS-4410-001-2-SC-NDA-6128	DT:	28-02-2014	DISTRIBUTION OF PRINTS	TRE	406	---	NTS	CHD.	A.K.P.	
								TYPE OF PRODUCT	1X315 MVA, 400/220/33KV, 3-PH. AUTO TRANSFORMER.			TRE-1,TRM-3,	TITLE	OUT LINE GENERAL ARRANGMENT PLAN VIEW OF COOLING BANK			DRG. NO.	3 464 00 01412	REV.	01
								NAME OF CUSTOMER	M/S NTPC LIMITED.							SHEET	05	OF	07	



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DRG. NO. 3 464 00 01412

TABLE OF FITTINGS

ITEM	DESCRIPTION	QTY.
2	RATING AND DIAGRAM PLATE (BILINGUAL)	1
2a	DO'S AND DON'T PLATE	1
2b	VALVE SCHEDULE PLATE	1
2c	OIL FILLING INSTRUCTION PLATE	1
3	LIFTING BOLLARD (FOR TRANSFORMER WITH OIL) Ø200	8
3a	LIFTING LUG FOR TANK (HOLE Ø70)	4
4	EARTHING TERMINALS WITH BOLTS,NUTS,PLAIN WASHERS SPRING WASHER (M10) DIAGONALLY OPPOSITE.	2
8	NAME PLATE (HINDI & ENGLISH) ONE EACH	2
9	INSTRUCTION PLATE FOR LIFTING	4
10	INSPECTION COVER ON TANK COVER/TANK WITH HANDLES.	7
10a	BLANKING PLATES (BOTTOM TANK) FOR BLANKING OF 250 NB PIPE FLANGE OPPOSITE TO COOLING BANK (NOT IN USE)	2
13	FILTER GATE VALVE WITH THREADED MALE ADAPTOR TOP AND BOTTOM 50 N.B.	2
14	DRAIN GATE VALVE FOR TOTAL DRAINAGE Ø100	1
14a	15NB SAMPLING GATE VALVE FOR BOTTOM TANK WITH PROVISION FOR FIXING RUBBER HOSE 10mm SIZE	1
18	POCKET FOR OIL TEMPERATURE INDICATOR & 1 SPARE POCKET	2
18a	POCKET FOR WINDING TEMPERATURE INDICATOR	3
18b	ORDINARY THERMOMETER WITH POCKET	1
18c	R.T.D. FOR REMOTE INDICATION	3
19	JACKING PADS (SUITABLE FOR TOTAL WT. WITH OIL)	4
21	OIL TEMP.INDICATOR (150mm DIAL TYPE) MOUNTED IN M.KIOSK	1
22	WINDING TEMPERATURE INDICATOR MOUNTED IN M.KIOSK	3
23	TWIN BI DIRECTIONAL ROLLERS Ø320 WITH ANTIEARTHQUAKE CLAMP	8
24	SKIDS (FOR PULLING IN BOTH DIRECTION WELDED ON BOTTOM TANK BASE)	1
25	FILTER GATE VALVE BOTTOM WITH SAMPLING ATTACH Ø50	1
25a	FILTER GATE VALVE WITH SAMPLING ATTACHMENT TOP Ø50	1
27	PRESSURE RELIEF VALVE AUTO RECLOSING TYPE WITH PROVISION FOR DISCHARGE OF OIL WITH PIPES	2
34	MARSHALLING KIOSK	1
40	WAGON ANCHORING LUGS (HOLE DIA 70)	4
50a	SUDDEN PRESUURE RELAY	1
50b	40 NB GATE VALVE FOR SUDDEN PRESUURE RELAY	1
50c	RAIN HOOD FOR SUDDEN PRESUURE RELAY	1
79	LADDER WITH LOCKING DEVICE	1
80	OIL INLET BUTTERFLY VALVE Ø250 BOTTOM	2
81	OIL OUTLET BUTTERFLY VALVE Ø250 TOP	2
85	15NB SAMPLING GATE VALVE FOR TOP TANK WITH PROVISION FOR FIXING RUBBER HOSE 10mm SIZE	1
86	AIR RELEASE VALVE 1/2" (B.S.P.)	1
109	HAULAGE LUG LONGITUDINAL Ø50	4
109a	HAULAGE LUG TRANSVERSAL Ø50	4
110	TOP TANK-BOTTOM TANK SHORTING LINK	2
114	DRAIN PLUG FOR BOTTOM TANK (1" B.S.P.)	2
115	HOLE FOR CLAMPING CORE & COIL TO TOP TANK (Ø480)	2
183	40 NB GUN METAL VALVE FOR ON LINE GAS MONITRING SYSTEM.	2
212	EARTHING CONNECTION (CORE/CLAMP/TANK 10kv ISOLATION)	1
215	IOD BOX	1
216	COOLER CONTROL CABINET (CCC) BOX	1

TRANSFORMER & ITS PIPE WORK

ITEM	DESCRIPTION	QTY.
10d	INSPECTION COVER FOR CONSERVATOR BOLTED (SIZE Ø 500)	1
12	OIL GAUGE MAGNETIC TYPE WITH LOLA(SUKRUT MAKE)	1
12a	RAIN HOOD FOR OIL GAUGE MAGNETIC TYPE WITH	1
14c	DRAIN GATE VALVE 50 DIA. MAIN CONSERVATOR (TOP & BOTTOM)	2
14f	15 NB GATE VALVE FOR BREATHER PIPE WORK	1
15	OIL CONSERVATOR 1300 DIA (ATMOSEAL TYPE) WITH AIR CELL , PRISMATIC OIL GAUGE AND WELDED LADDER	1
15a	AUX. CONSERVATOR 300 DIA WITH PRISMATIC OIL GAUGE FOR OLTC	1
15b	M.O.G. FOR AUX. CONSERVATOR OF OLTC	1
15c	AIR CELL LEAK DETECTOR FOR MAIN CONSERVATOR	1
17	ONLINE REGENERATIVE MAINTENANCE FREE BREATHER (COBALT FREE INDICATING TYPE) FOR MAIN CONSERVATOR IN SERIES (3 Nos.)	1
17a	DEHYDRATING BREATHER (COBALT FREE INDICATING TYPE) FOR AUX. CONSERVATOR IN SERIES (2 Nos.)	1
26	BUCHHOLZ RELAY 80 DIA.	1
26a	RAIN HOOD FOR BUCHHOLZ RELAY	1
42	VACCUM PULLING PIPE 50 N. B.	1
67a	FLEXIBLE HOSE Ø80 (SS)	1
86a	AIR RELEASE PLUG 1/4" BSP FOR MAIN CONSERVATOR	1
113	ISOLATING GATE VALVE FOR BUCHHOLZ RELAY (80 NB)	1
116	BUCHHOLZ GAS RELEASE DEVICE PIPE (COPPER TUBE 6 O/D, 4 I/D)	1
119	ISOLATING BUTTERFLY VALVE FOR BUCHHOLZ RELAY 80 NB	1
120	MAIN CONSERVATOR PIPE 80 NB (1SET)	1SET
125	GAS COLLECTING DEVICE	1
153	CONSERVATOR SUPPORT	2
164	BREATHER PIPE FOR MAIN & AUX. CONSERVATOR (15 NB)	2
206	MONOGRAM ON MAIN CONSERVATOR	1
211	AIR CELL ARRANGEMENT INSIDE MAIN CONSERVATOR	1
213	ON LINE DGA (TANK MOUNTED)	1
214	JACKING PAD ABOVE BELL JOINT FOR GASKET REPLACEMENT	4

COOLING SYSTEM

ITEM	DESCRIPTION	QTY.
3b	LIFTING LUG FOR RADIATORS/HEADERS (2NO. ON EACH RADIATOR)	72
4a	BOSS FOR EARTHING M12 WITH BOLT, PLAIN WASHER & SPRING WASHER M12 ON 'A' FRAME AND FAN SUPPORT & PIPE SUPPORT (2 NOS EACH)	ADEQUATE
14d	DRAIN/FILTER GATE VALVE FOR COOLING SYSTEM Ø50	4
18d	THERMOMETER ON COOLING SYSTEM (2 ON P/W & 4 ON HEADERS)	6
60	BANK OF RADIATORS (16 RADIATORS PER BANK) 2 X 50%	2
63	FAN AND MOTOR 8 NO. PER BANK WITH GI WIRE MESH GUARD (7 WORKING + 1 STANDBY IN PER BANK)	16
64	OIL PUMP & MOTOR 2 NO. PER BANK (1 WORKING + 1 STANDBY) EACH OF 100% CAPACITY WITH EARTHING AND DRAIN.	4
67	FLEXIBLE HOSE Ø250 (SS)	4
70	FAN SUPPORTS	16
72	A FRAME SUPPORT	4
72a	PIPE SUPPORT	4
73	TOP HEADERS (284 SQ. INSIDE)	2
74	BOTTOM HEADERS (284 SQ. INSIDE)	2
81a	ISOLATING BUTTERFLY VALVE 250 NB FOR TOP HEADER	2
86b	3/4"BSP AIR RELEASE PLUG FOR RADIATOR, HEADER & CONSERVATOR	38
114b	DRAIN PLUG FOR RADIATORS,PIPE WORKS & HEADERS 3/4"BSP.	40
119c	ISOLATING BUTTERFLY VALVE FOR RADIATORS Ø80	64
123	ISOLATING BUTTERFLY VALVE FOR RADIATOR BANK,PUMP & MOTOR SET	8
160	OIL FLOW INDICATOR (SEE O.G.A. FOR DIRECTION)	4
190	TOP OIL PIPE (RADIATOR BANK) 250NB WITH NO FLOW/RESERVE FLOW INDICATION	2
196	BOTTOM OIL PIPE (RADIATOR BANK) 200 & 250 NB	1SET
197	REVERSE FLOW BLOCKING DEVICE	2

TRANSFORMER

ITEM	DESCRIPTION	QTY.
6	H.V. LINE 420KV,1250Amp OIP CONDENSER BUSHING	3
6X	H.V.NEUTRAL 36KV, 1000Amp PORCELAIN BUSHING	1
6Y	I.V. 245KV,1250Amp OIP CONDENSOR BUSHING	3
7Y	L.V. 52KV,3150Amp OIP CONDENSER BUSHING	3
122	CONNECTION BOX FOR C.T. TERMINAL (H.V. SIDE)	3
122a	CONNECTION BOX C.T. TERMINAL (I.V. SIDE)	3
122b	CONNECTION BOX C.T. TERMINAL (L.V. SIDE)	1
148	CONNECTION BOX C.T. TERMINAL (NEUTRAL SIDE)	1
149	I.V. TURRET	3
150	H.V. TURRET	3
151	L.V. TURRET	1
157	NEUTRAL GROUNDING CONNECTION WITH 36KV CLASS INSULATOR (2 NOS COPPER FLAT SIZE 8TKX80 WIDE)	1
157a	36 KV POST INSULATOR	6
180	TERMINAL MARKING PLATE	ADEQUATE

TAPCHANGER

ITEM	DESCRIPTION	QTY.
14b	25 N.B. GATE VALVE FOR DIVERTER SUCTION VALVE	3
14e	DRAIN VALVE 15 N.B. FOR AUX. CONSERVATOR TOP & BOTTOM	2
41	BEVEL GEAR BOX	1
43	O.L.T.C. OIL CONS. CONNECTION PIPE 25 DIA.	1SET
44	O.L.T.C. PROTECTIVE RELAY	3
44a	RAIN HOOD FOR O.L.T.C. PROTECTIVE RELAY	3
48	O.L.T.C. DRIVING UNIT	1
49	O.L.T.C. MOTOR DRIVING HANDLE	1
50	ON LOAD TAP CHANGER	3
119a	25 NB ISOLATING GATE VALVE (FOR OLTC)	3
119b	25 NB ISOLATING GATE VALVE FOR AUX.CONS. OLTC EQ. PIPE	1

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 INVENTORY NO. 34640000981 REF.DRG.NO. 34640000981 SIGN.DATE

REV	DATE	ALT	REV	DATE	ALT	BPC	-SD-	NTPC DRG. NO.	4410-001-501-PVE-B-12	BHEL DRG. NO.	BP-DG-405-306-001	ADDITIONAL INFORMATION	W.D.63070-P-512-01	NAME	SIGN	DATE	
		CKD	01	10.12.15	CKD	AKP	-SD-	NO. OF TRANSFORMER	1			भारत हेवी इलेक्ट्रिकल्स लिमिटेड भोपाल	DRN.	N.S.R.		22.05.15	
		APPD			APPD	AKP	-SD-	PROJECT	EPC PACKAGE FOR NORTH KARANPURA STPP (3X660 MW)			STATUS OF DRAWING	'PR'	DEPT	CODE	WEIGHT(kg)	SCALE
								LOA. NO.	CS-4410-001-2-SC-NDA-6128	DT:	28-02-2014	DISTRIBUTION OF PRINTS	TRE	406	----	NTS	
								TYPE OF PRODUCT	1X315 MVA, 400/220/33KV, 3-PH. AUTO TRANSFORMER.			TRE-1,TRM-3,	TITLE	O.G.A. PART LIST			
								NAME OF CUSTOMER	M/S NTPC LIMITED.				DRG. NO.	3 464 00 01412	REV.	01	
													SHEET	07	OF	07	