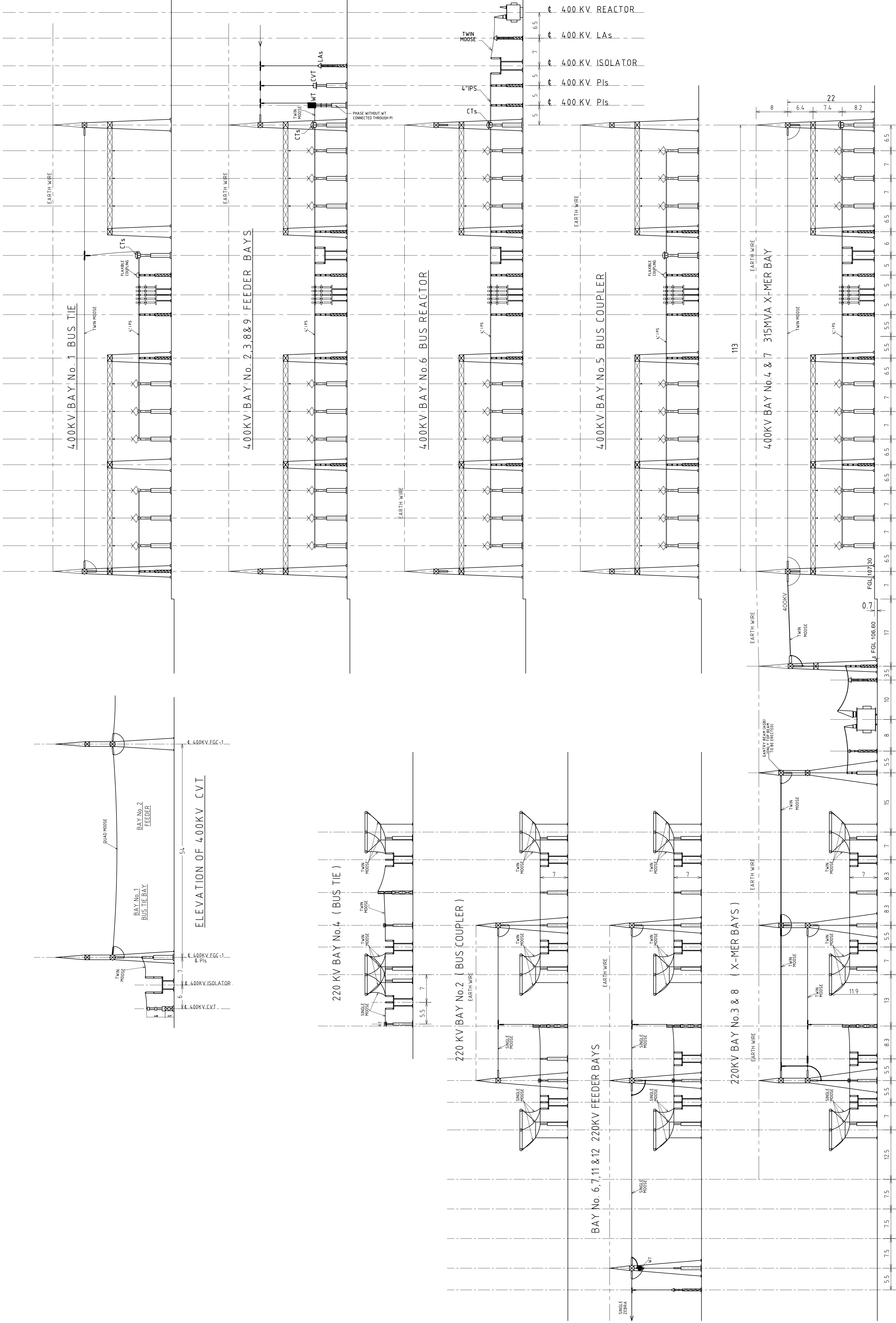
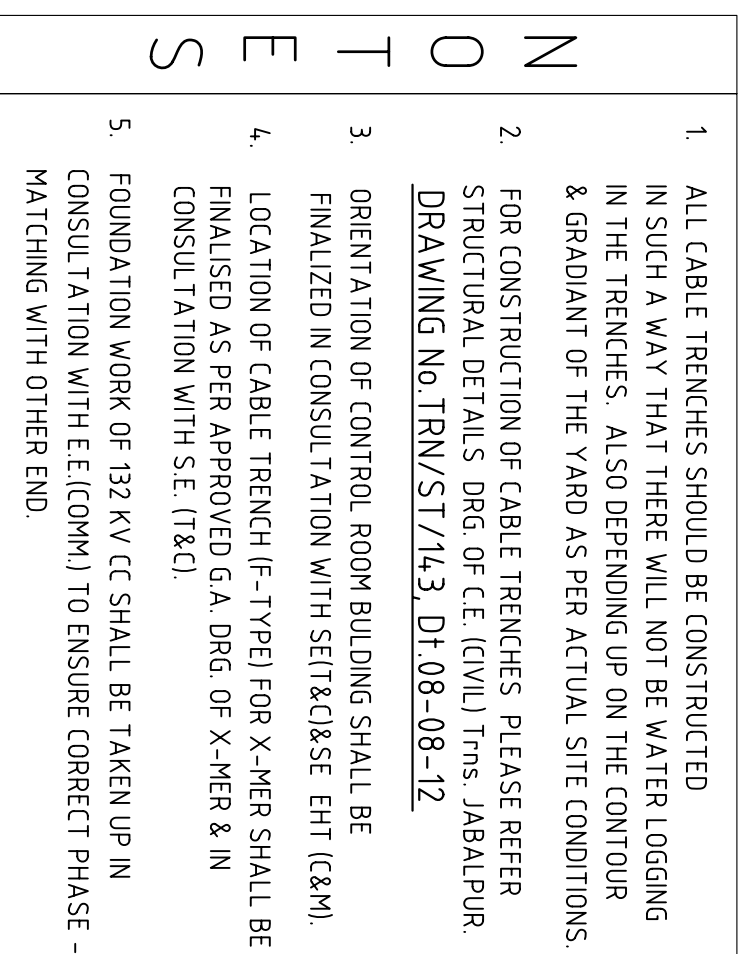


	Annexure 1		
	Drawing list for Badnawar		
S. No.	Title	Drawing No., Rev no.	Remarks
		Badnawar	
1	Layout Plan	XII-NO8-2133 , R1	Attached
2	Elevation	XII-N08-2136, R1	Attached
3	Foundation plan & cable Trench	XII-N08-2134, R1	Attached
4	Earthmat arrangement	XII-N08-2135, R1	Attached
5	Equipment earthing details	TB-3-368-316-004, 00	Attached
6	Single line diagram	TB-3-368-510-001B,00	Attached

Sarob M



400/220 KV SUB-STATION				NAME	DATE
BADNAWAR				DRN.	G.S. DUBEY /03-09-14
				CKD	
				APP.	
ELEVATION				REVISED ON	
				DRAWING NO. XII-N08-2136	
SCALE				O/O THE CHIEF ENGINEER (P&D)	
				M.P. POWER TRANSMISSION Co. Ltd. JABALPUR	
				REV.	
				--	



FOUNDATION PLAN & CABLE TRENCHES FOR 400/220KV SUBSTATION	NAME	DATE
	D/R	6.5 DUBCH 02-09-05
	C/D	
	APP.	
BADNAWAR (DHAR)	REVISED ON	20-11-14
	DRAWING NO -	REV
SCALE 0/0 THE CHIEF ENGINEER (P & D) M P POWER TRANSMISSION Co. Ltd JABALPUR	XI-IN-08-2134	RI

To Petlawad

BADNAWAR - PETLAWAD ROAD

KACHCHA APPROACH ROAD

EXISTING SCHOOL BUILDING

CONTROL ROOM

4 BAY SHED

4No.'D' TYPE QUARTERS

4No.'E' TYPE QUARTERS

4No.'F' TYPE QUARTERS

FUTURE 33 KV FEEDERS

RATLAM - BADNAGAR CKT-I

RATLAM - BADNAGAR CKT-II

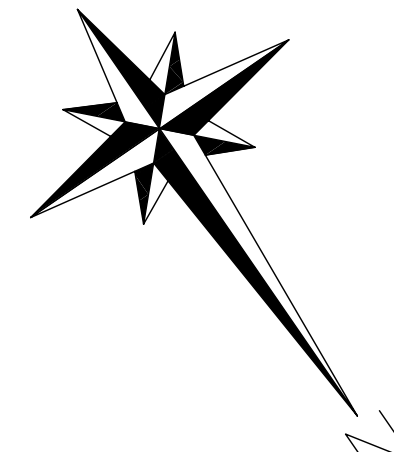
LEGEND

LEGEND

AREA TO BE CONSIDERED FOR LEVELLING :-

EARTHMAT ARRANGEMENT OF 400/220 KV SUBSTATION		
DRN	NAME	DATE
CKD	G.S. DUBEY-03-09-16	
APP		
REVISED ON	20-11-16	
DRAWING NO.	REV	
XI-M08-2135		

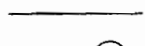
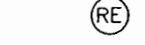
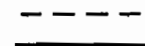
- NOTES:-
1. MAKE EARTHING & BELOW GROUND 100/20mm MS FLAT RIGID ROADS & STRIP STEEL RIGID ROADS 50mm MS FLAT RIGID ROADS 50mm MS FLAT
 2. MS FLATS WOULD BE BURIED BELOW THE FINISHED LEVEL OF GROUNDING ROD 250 3000mm LONG
 3. GROUNDING ROD SHALL BE PARALLEL TO THE GROUND SURFACE VERTICALLY AT INTERVALS AS SHOWN IN DRG. AND PROPERLY EARTHED AT EACH END. THE END OF THE ROD SHOULD BE DRIVEN 1/2" Ø PIPE LINE FOR WATER SUPPLY TO EARTHPIES
 4. EACH EQUIPMENT STRUCTURE SHALL BE CONNECTED TO THE EARTH MAT MINIMUM AT TWO POINTS
 5. CABLE RACKS OR TRAYS SHALL BE CONNECTED TO THE NEAREST EARTH MAT MINIMUM AT TWO POINTS
 6. THE FOUNDATIONS DETAILS OF WELDING LAP JOINING AS GIVEN IN SHEET DRAWING
 7. DUE CARE HAS BEEN EXERCISED TO ELIMINATE THE FOLLING OF FOUNDATIONS FOR SWITCHEAROD EQUIPMENT/POLE TOWERS WITH SUCH A POSSIBILITY
 8. 1/2" Ø PIPE LINE FOR WATER SUPPLY TO EARTHPIES
 9. OVERHEAD EARTH WIRE SHOULD BE CONNECTED WITH EARTHPIES THROUGH RISER OF 50mm MS FLATS



ADDITIONAL INFORMATION W.O.No. 86012			ग्राहक/परियोजना का नाम 400 kV S/s, T/s lines at Balaghat, Bednawar, Bhopal, Chhegaon and Nagda (Lot no. 1)		
STATUS OF DRAWING			LOA No. 04-01/ADB-III/MPPTCL/TR501/LOT-1/TK-11/08802-3		
DISTRIBUTION OF PRINTS			भारत हेवी इलेक्ट्रिकल्स लिमिटेड  भारत हेवी इलेक्ट्रिकल्स लिमिटेड ट्रांसमिशन परियोजना विभाग BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION		
REV.	DATE	ALTERED CHECKED APPROVED	REV.	DATE	ALTERED CHECKED APPROVED
ZONE			ZONE		
			प्रमाणन 422 ग्राहक/परियोजना का नाम EQUIPMENT & STRUCTURE EARTHING DETAILS		
			जलपत्र / SCALE कार्ड कोड 51671.01/DRAWING NO. TB-4-368-316-004 पृष्ठ कुलमेल SHEET 30		
			10/08/14 82 RS 00		

13966
20 SEP 2014

LEGEND

	CONNECTION TO GROUND MAT THROUGH RISER.
	EARTH MAT (100X12mm MS FLAT)
	TREATED EARTH PIT
	50X6mm MS FLAT
	RISER (75X8mm MS FLAT)

GENERAL NOTES:

1. EARTH STRIP WELDED TO LATTICE TYPE STRUCTURE AT AN INTERVAL OF 1000mm.
2. ALL ELECTRICAL EQUIPMENTS SHALL BE EARTHED BY TWO SEPARATE AND DISTINCT EARTH CONNECTIONS AND SHALL BE CONNECTED TO DIFFERENT CONDUCTORS OF EARTHING GRID.
3. 75X8 mm MS FLAT RISERS SHOULD BE BROUGHT CLOSE TO EQUIPMENTS FOUNDATION.
4. ALL WELDED CONNECTION SHALL BE MADE BY ELECTRIC ARC WELDING.
5. THE MAIN EARTH MAT (100X12 mm MS FLAT) SHALL BE 500mm BELOW FGL.
6. ALL WELDED AND BRAZED JOINTS OF RISER/CONDUCTOR SHALL BE COATED WITH BITUMINOUS PAINT.
7. CABLE RACKS AND SUPPORTS SHALL BE PAINTED AFTER INSTALLATION WITH TWO COATS OF METAL PRIMER (COMPRISING OF RED OXIDE AND ZINC CHROMATE IN A SYNTHETIC MEDIUM) FOLLOWED BY TWO FINISHING COATS OF ALUMINIUM PAINT.
8. EARTHING SHALL BE DONE IN ACCORDANCE WITH IS:3043 UNLESS OTHERWISE AS STATED IN TECHNICAL SPECIFICATION.

SHEET NO. DESCRIPTION

01. LEGEND, NOTES & DESCRIPTION
02. 400KV SF6 CIRCUIT BREAKER
03. 220/132/33KV CIRCUIT BREAKER
04. 400/220KV CVT
05. 132KV COUPLING CAPACITOR
06. 220/132/33KV PT
07. 40KV SURGE CAPACITOR
08. 400/220/132/33KV POST INSULATOR (SOLID CORE TYPE)
09. LIGHTNING ARRESTER (390/198KV)
10. LIGHTNING ARRESTER (120/36/30KV)
11. 400/220/132/33KV CURRENT TRANSFORMER
12. 400KV WAVE TRAP
13. 400KV HCB ISOLATOR (TYPICAL) WITH EARTH SWITCH
14. 400KV PANTOGRAPH ISOLATOR WITH 1 E/S
15. 220/132/33KV HDB ISOLATOR (TYPICAL) WITH EARTH SWITCH

SHEET NO. DESCRIPTION

16. 33KV DROP OUT FUSE
17. BUS SHUNT REACTOR
18. POWER TRANSFORMER
19. LT TRANSFORMER
20. MARSHALLING KIOSK
21. LT SWITCHGEAR / CHARGER / RELAY & CONTROL PANEL
22. TOWER WITH EARTH WIRE
23. TOWER WITHOUT EARTH WIRE
24. FENCE POST
25. CABLE TRENCH
26. TYPICAL ARRANGEMENT OF BOLTED JOINTS
27. RAIL BONDING
28. TREATED EARTH PIT DETAILS
29. WELDING DETAILS
30. WELDING DETAILS


Executive Engineer
O/o Chief Engineer (Procurement) (P&D)
MPPTCL, JABALPUR



EQUIPMENT & STRUCTURE, EARTHING, DETAILS

LEGEND, NOTES & DESCRIPTION

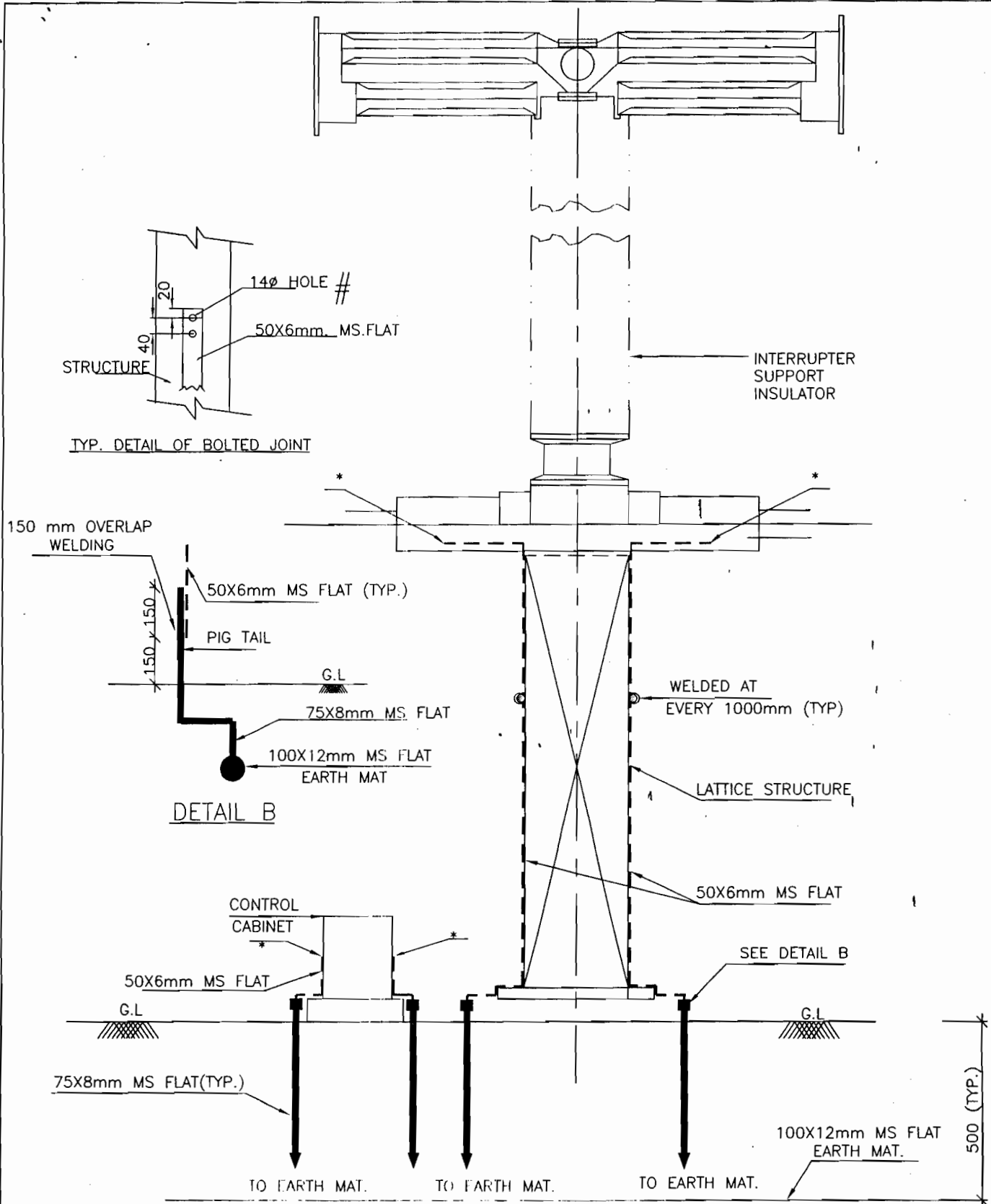
COMPUTER REF. NO.

DRG. No.

TB-4-368-316-004

REV. 00

SHEET No.
01



NOTE:

- 1) # BOLT SIZE AND HOLE SIZE SHALL BE TO SUIT RESPECTIVE EQPT./STRUCTURE.
- 2) NO. OF RISERS PER CIRCUIT BREAKER = 2 NOS./PHASE
- 3) NO. OF RISERS FOR CONTROL CABINET = 2 NOS.
- 4) * BOLTED JOINTS

Executive Engineer (P&D)
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR



EQUIPMENT & STRUCTURE EARTHING DETAILS 400kV SF6 CIRCUIT BREAKER

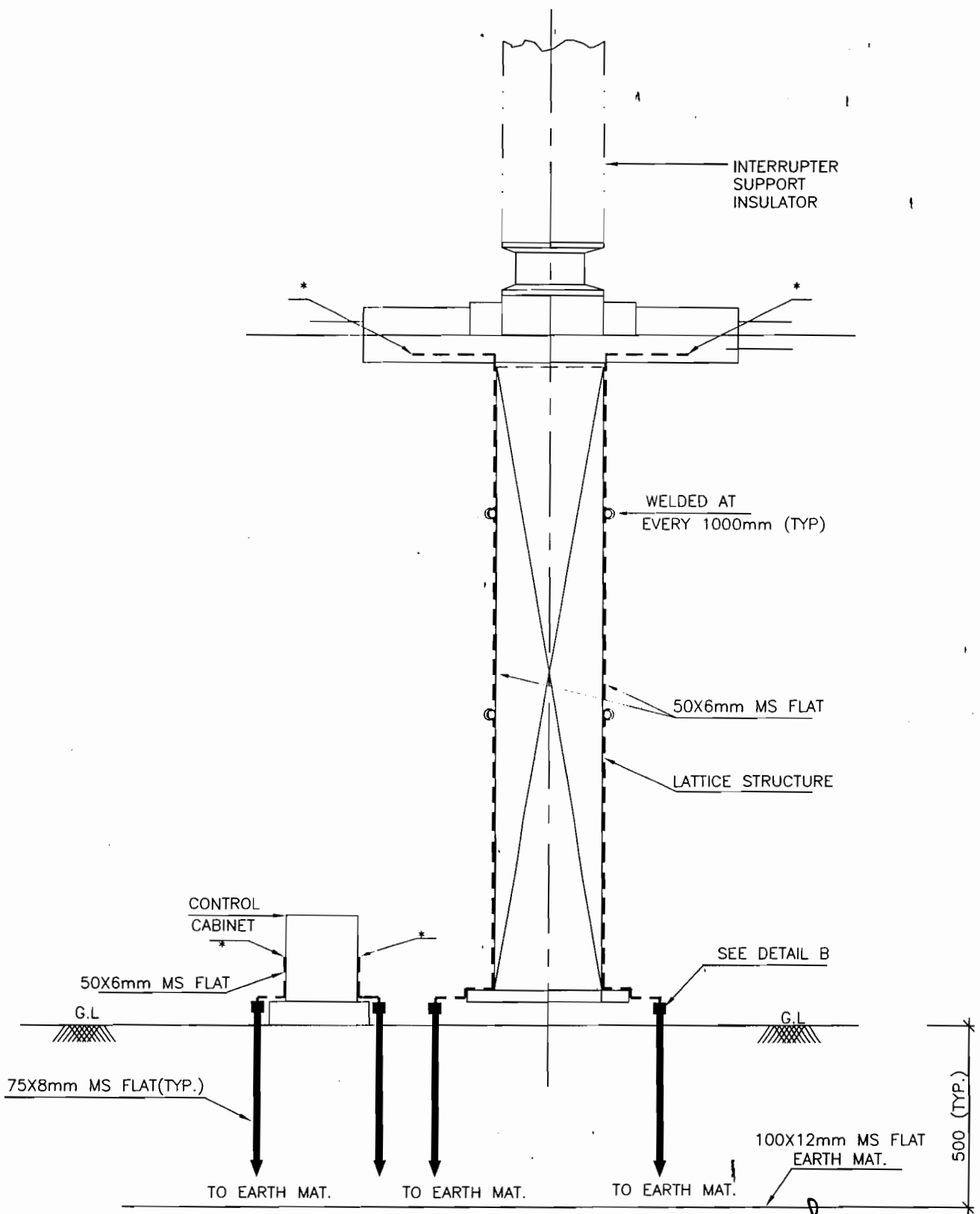
COMPUTER REF. NO.

DRG. No.

TB--4--368--316--004

REV. 00

SHEET No.
2



NOTE:

- 1) NO. OF RISERS PER CIRCUIT BREAKER = 2 NOS./PHASE
- 2) NO. OF RISERS FOR CONTROL CABINET = 2 NOS.
- 3) * BOLTED JOINTS

Executive Engineer (P&D)
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR



EQUIPMENT & STRUCTURE EARTHING DETAILS 220/132/33kV CIRCUIT BREAKER

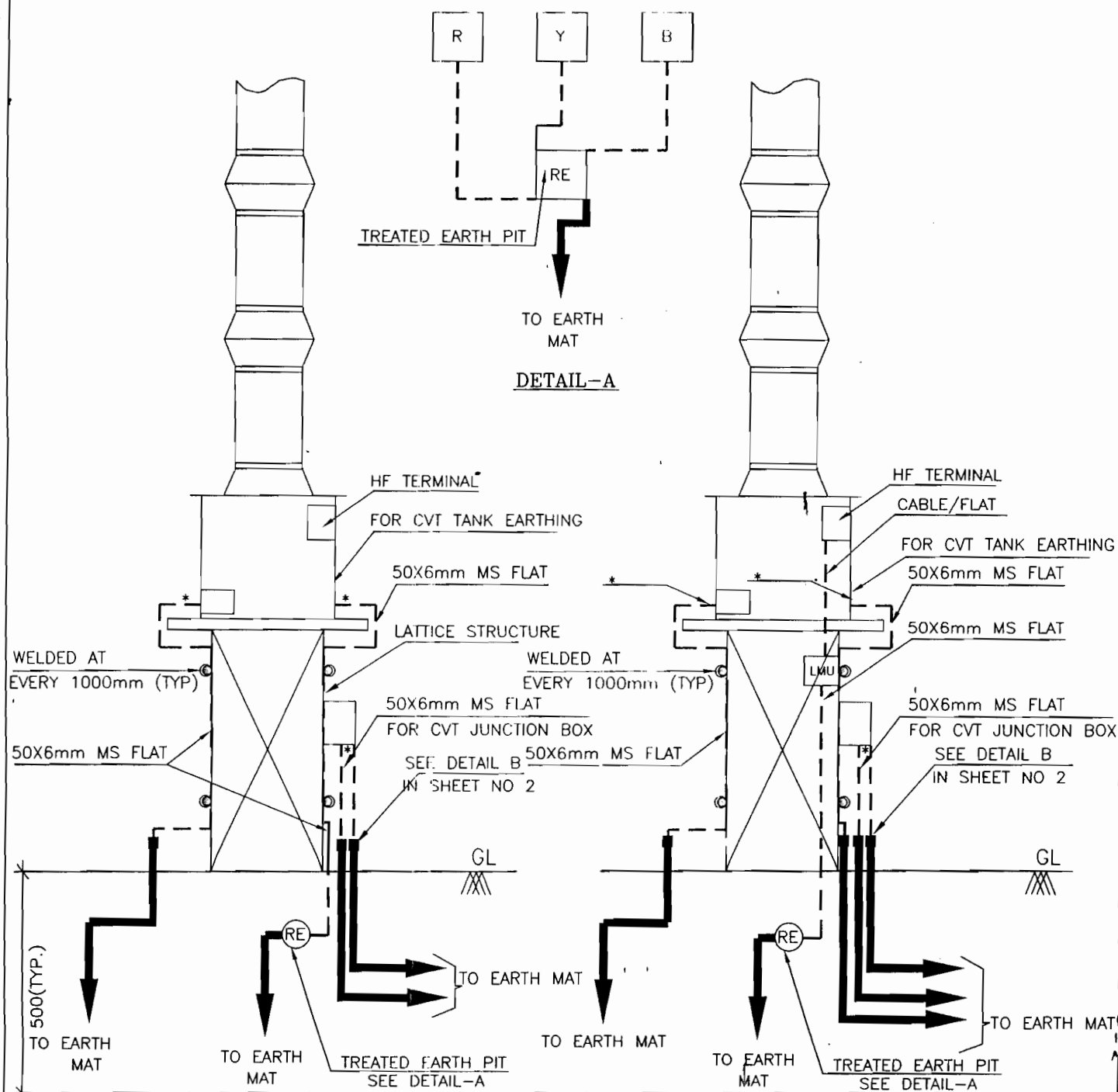
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DRG. No.

TB-4-368-316-004

REV. 00

SHEET No.
3



NOTE:

- (1) 1 NO. TREATED EARTH PIT SHALL BE PROVIDED FOR 3 PH. OF CVT.
- (2) NO. OF RISERS = 1 NOS PER PHASE FOR CVT WITHOUT LMU.
- (3) NO. OF RISERS = 2 NOS PER PHASE FOR CVT WITH LMU.
- (4) NO. OF RISERS FOR CVT JUNCTION BOX = 2 NOS.
- (5) NO. OF RISERS FOR TREATED EARTH PIT = 1 NO.
- (6) * BOLTED JOINTS


Executive Engineer (P&D)
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR



EQUIPMENT & STRUCTURE EARTHING DETAILS

400/220KV CVT

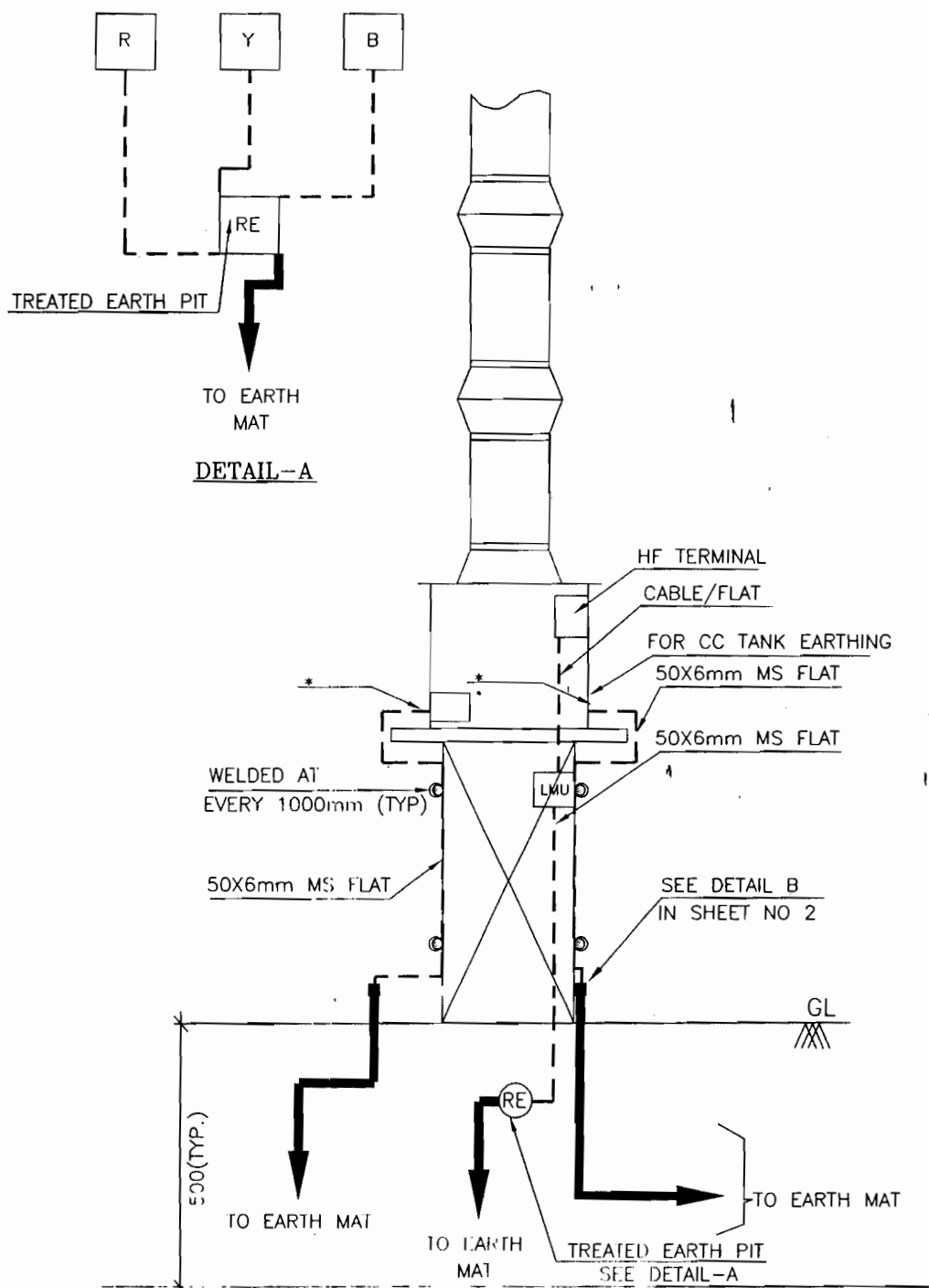
COMPUTER REF. NO.

DRG. No.

TB-4-368-316-004

REV. 00

SHEET No.
4



NOTE:

- (1) 1 NO. TREATED EARTH PIT SHALL BE PROVIDED FOR 3 P.H. OF CC.
- (2) NO. OF RISERS = 2 NOS PER PHASE FOR CC WITH LMU.
- (3) NO. OF RISERS FOR TREATED EARTH PIT = 1 NO.
- (4) * BOLTED JOINTS


Executive Engineer (P&D)
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR



EQUIPMENT & STRUCTURE EARTHING DETAILS

132KV COUPLING CAPACITOR

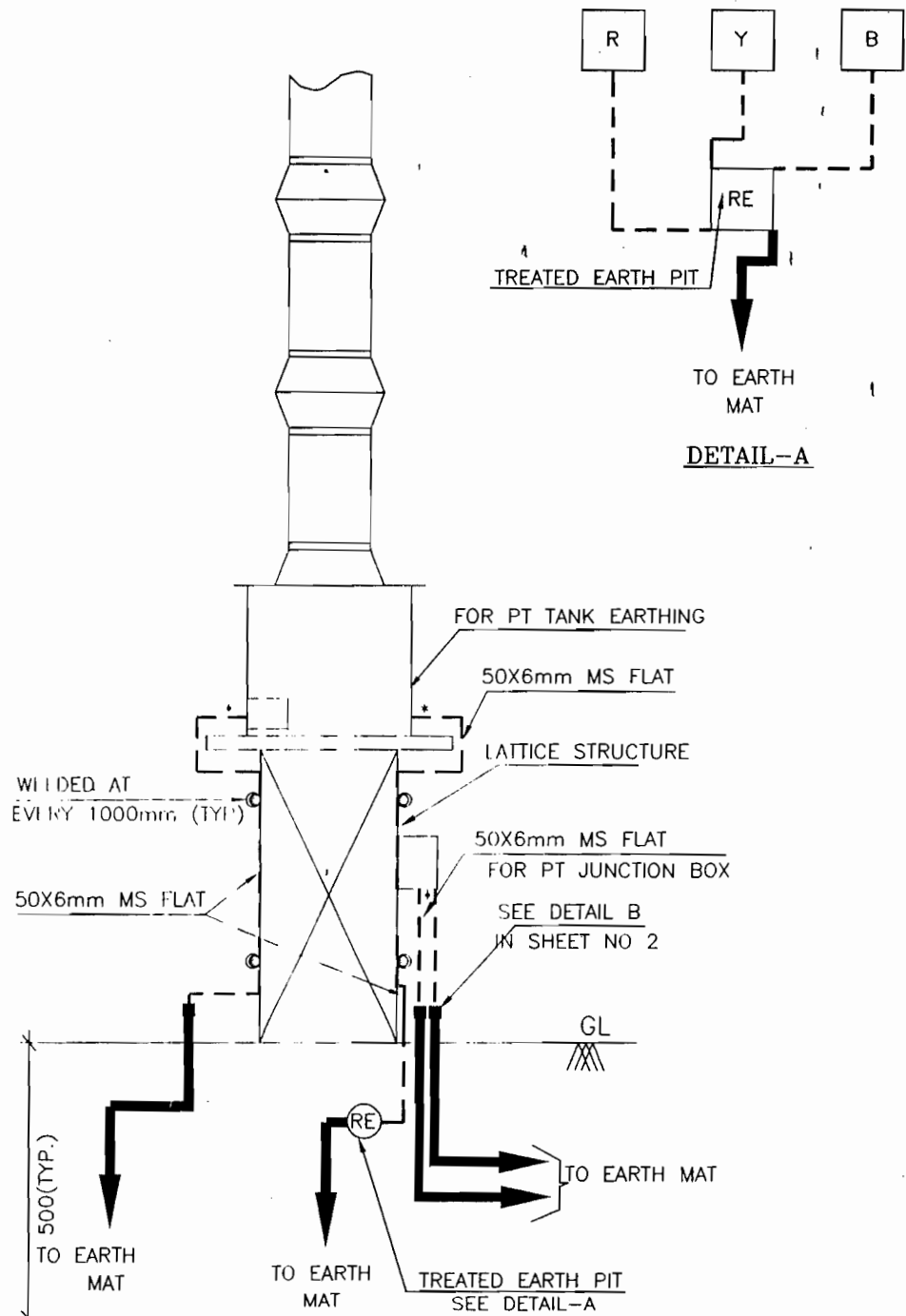
COMPUTER REF. NO.

DRG. No.

TB-4-368-316-004

REV. 00

SHEET No.
5



NOTE:

- (1) 1 NO. TREATED EARTH PIT SHALL BE PROVIDED FOR 3 PH. OF PT.
- (2) NO. OF RISERS = 1 NOS PER PHASE FOR PT
- (3) NO. OF RISERS FOR PT JUNCTION BOX = 2 NOS.
- (4) NO. OF RISERS FOR TREATED EARTH PIT = 1 NO.
- (5) * BOLTED JOINTS

Executive Engineer (P&D)
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR



EQUIPMENT & STRUCTURE EARTHING DETAILS

220/132/33KV PT

COMPUTER REF. NO.

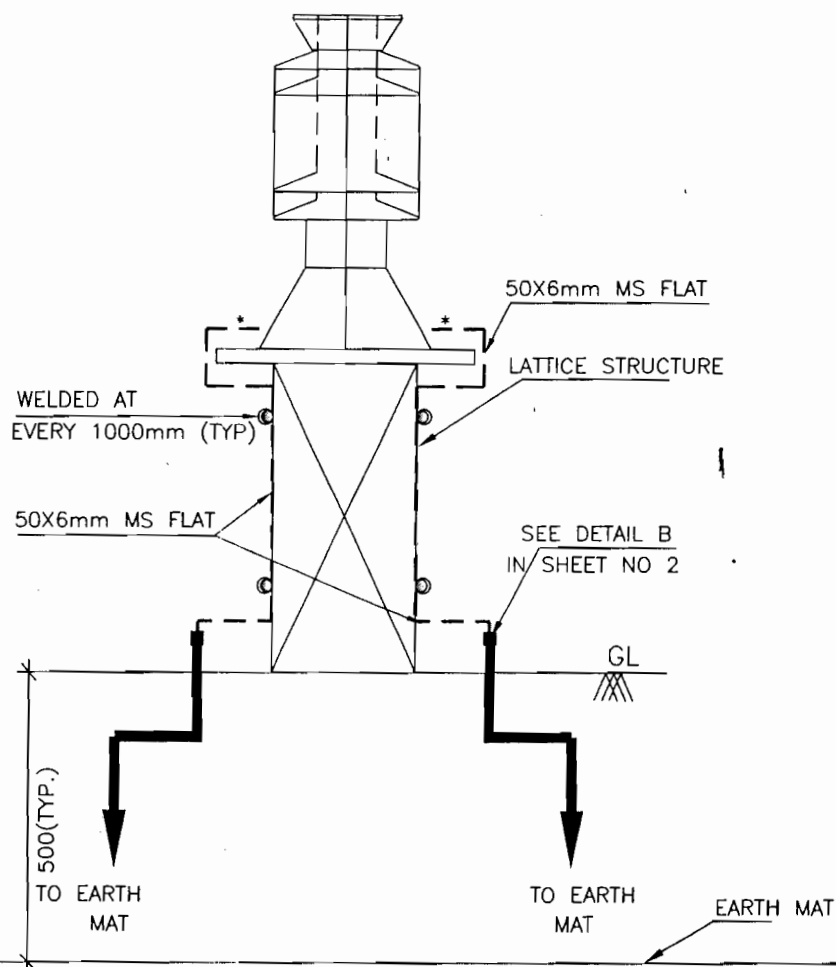
DRG. No.

TB-4-368-316-004

REV. 00

SHEET No.

6



NOTE:

- (1) NO. OF RISERS = 2 NOS PER PHASE FOR SURGE CAPACITOR
- (2) * BOLTED JOINTS

Executive Engineer (P&D)
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR



EQUIPMENT & STRUCTURE EARTHING DETAILS 40KV SURGE CAPACITOR

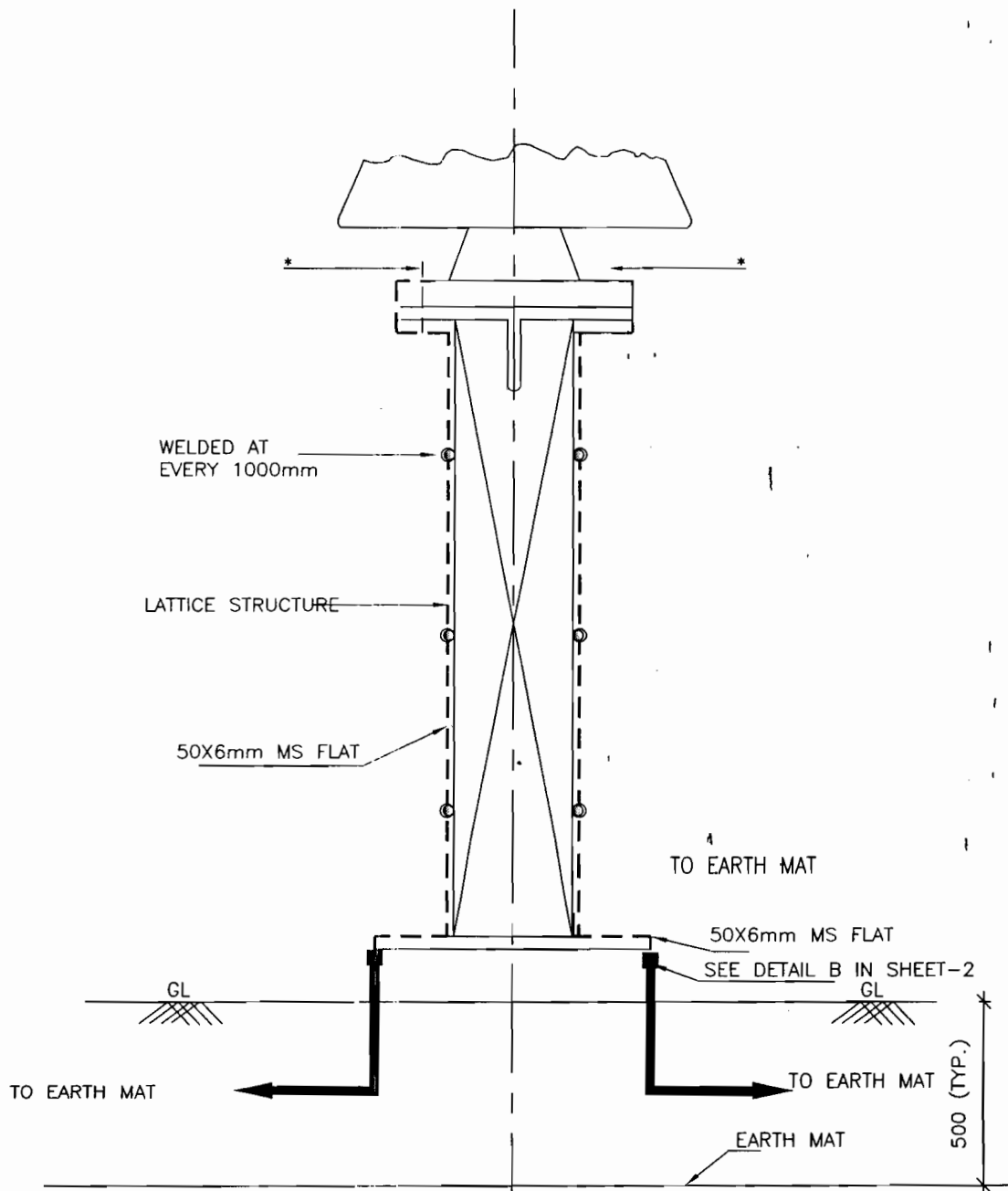
COMPUTER REF. NO.

DRG. No.

TB-4-368-316-004

REV. 00

SHEET No.
7



NOTE:

- (1) NO. OF RISERS :: 2 NOS./PHASE
- (2) * BOLTED JOINTS.

(Signature)
Executive Engineer (P&D)
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR

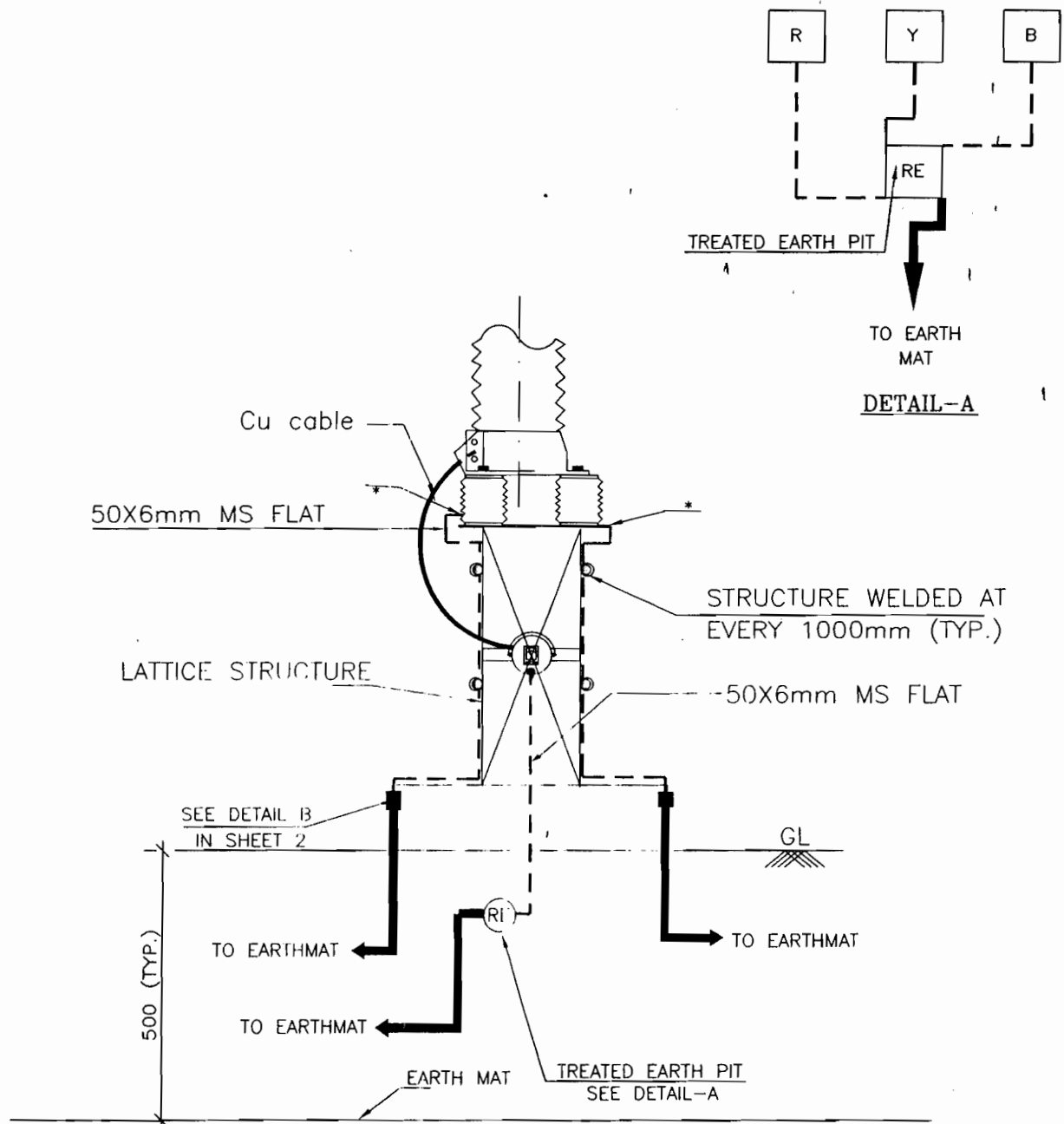


EQUIPMENT & STRUCTURE EARTHING DETAILS 400/220/132/33KV POST INSULATOR (SOLID CORE TYPE)

DRG. No. TB-4-368-316-004

REV. 00

SHEET No.
8



NOTES;

1. LA SHALL BE EARTHED THROUGH EARTH TERMINAL OF SURGE COUNTER
2. 1 NO. TREATED EARTH PIT SHALL BE PROVIDED FOR 3 PH. OF LA.
3. * BOLTED JOINTS.
4. NO. OF RISERS= 2 NOS. PER PHASE
5. NO. OF RISERS FOR TREATED EARTH PIT =1 NO.

Executive Engineer (P&D)
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR



EQUIPMENT & STRUCTURE EARTHING DETAILS LIGHTNING ARRESTER(390/198kv)

COMPU. DRG. REF.

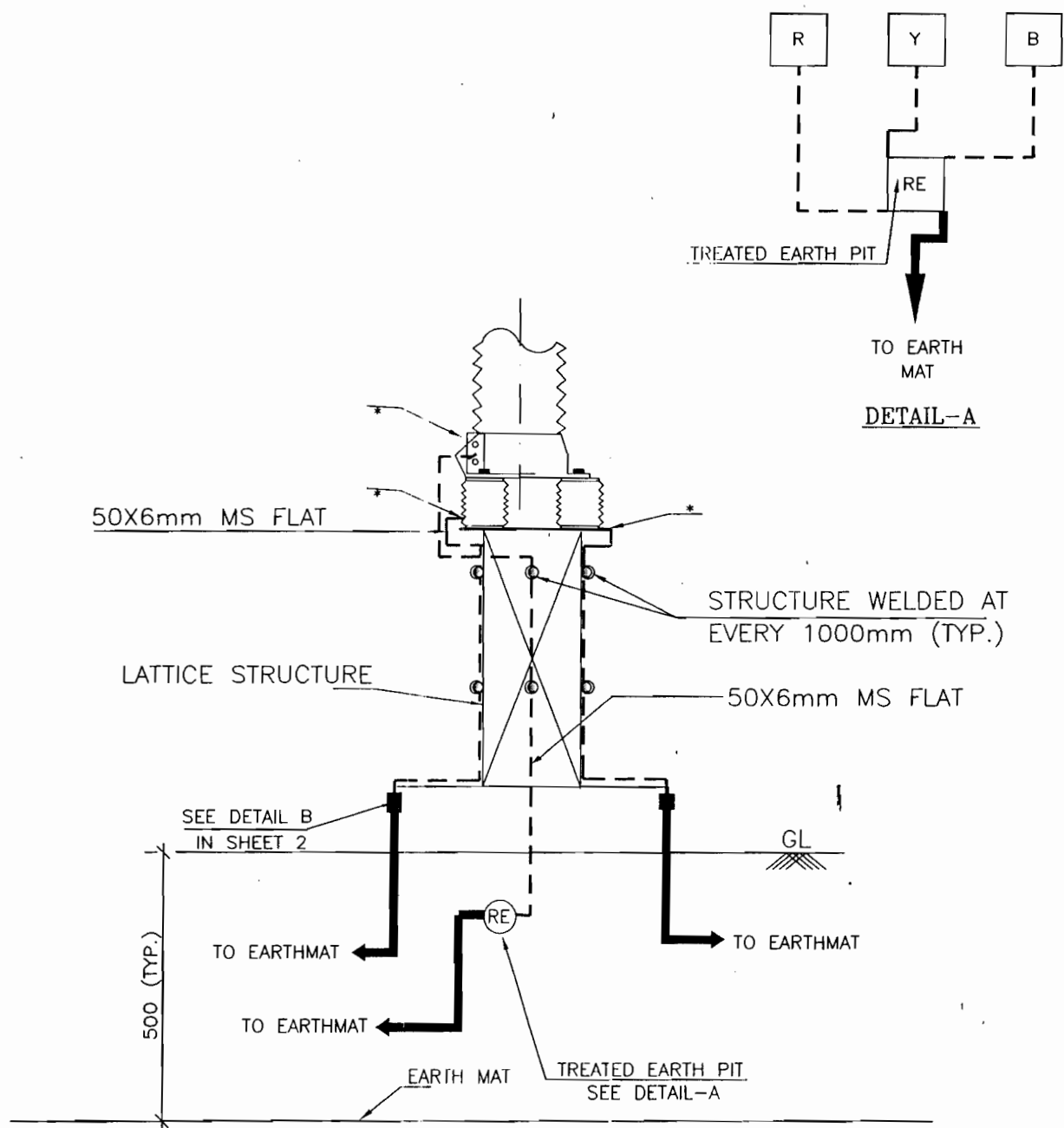
DRG.NO.

TB--4--368--316--004

REV. 00

SHEET No.

9



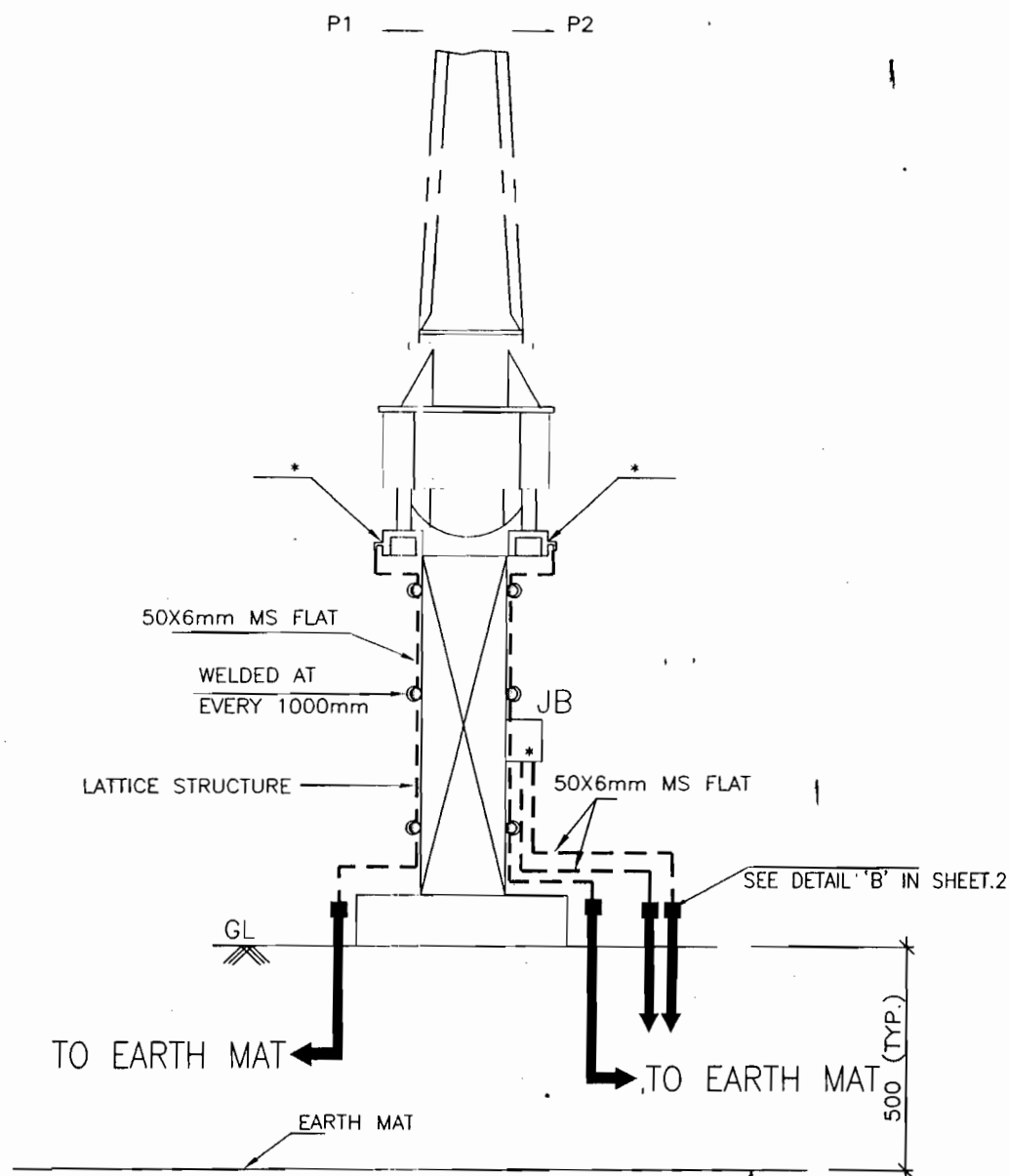
NOTES;

1. 1 NO. TREATED EARTH PIT SHALL BE PROVIDED FOR 3 PH. OF LA.
2. * BOLTED JOINTS.
3. NO. OF RISERS= 2 NOS. PER PHASE
4. NO. OF RISERS FOR TREATED EARTH PIT =1 NO.

Executive Engineer (P&D)
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR



EQUIPMENT & STRUCTURE EARTHING DETAILS LIGHTNING ARRESTER(120/36/30kV)



NOTE:

1. NO. OF RISERS=2 NOS./PHASE
2. NO. OF RISERS FOR JUNCTION BOX=2 NOS.
3. * BOLTED JOINTS.

Executive Engineer (P&D)
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR



EQUIPMENT & STRUCTURE EARTHING DETAILS
400/220/132/3.3KV CURRENT TRANSFORMER

COMPU. DRG. REF.

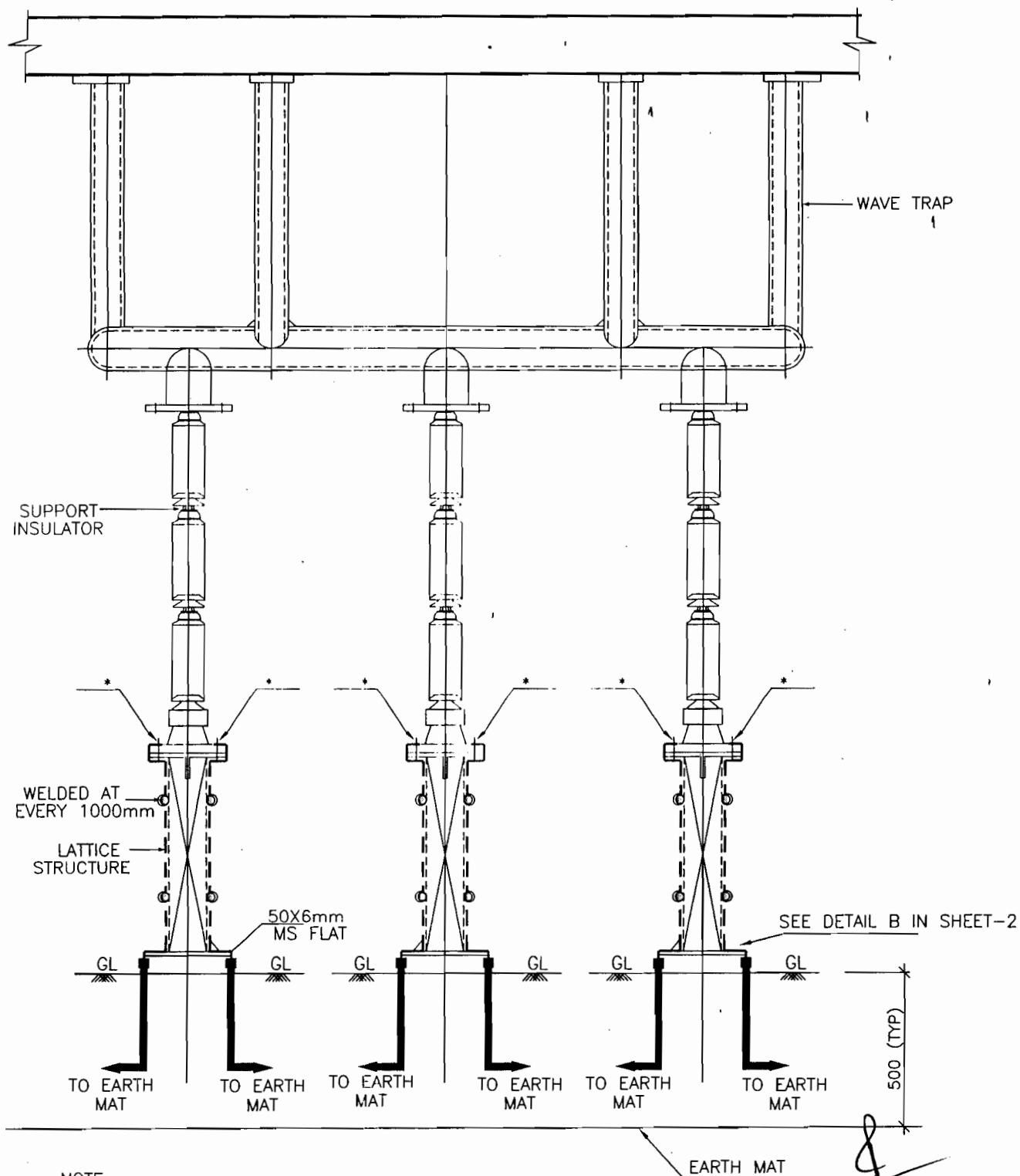
DRG.NO.

TB-4-368-316-004

REV. 00

SHEET No.

11



NOTE:

1. NO. OF RISERS : 6 NOS. PER PHASE.
2. * BOLTED JOINTS.

Executive Engineer (P&D)
 b/o Chief Engineer (Procurement)
 MPPTCL, JABALPUR



EQUIPMENT & STRUCTURE EARTHING DETAILS 400kV WAVE TRAP

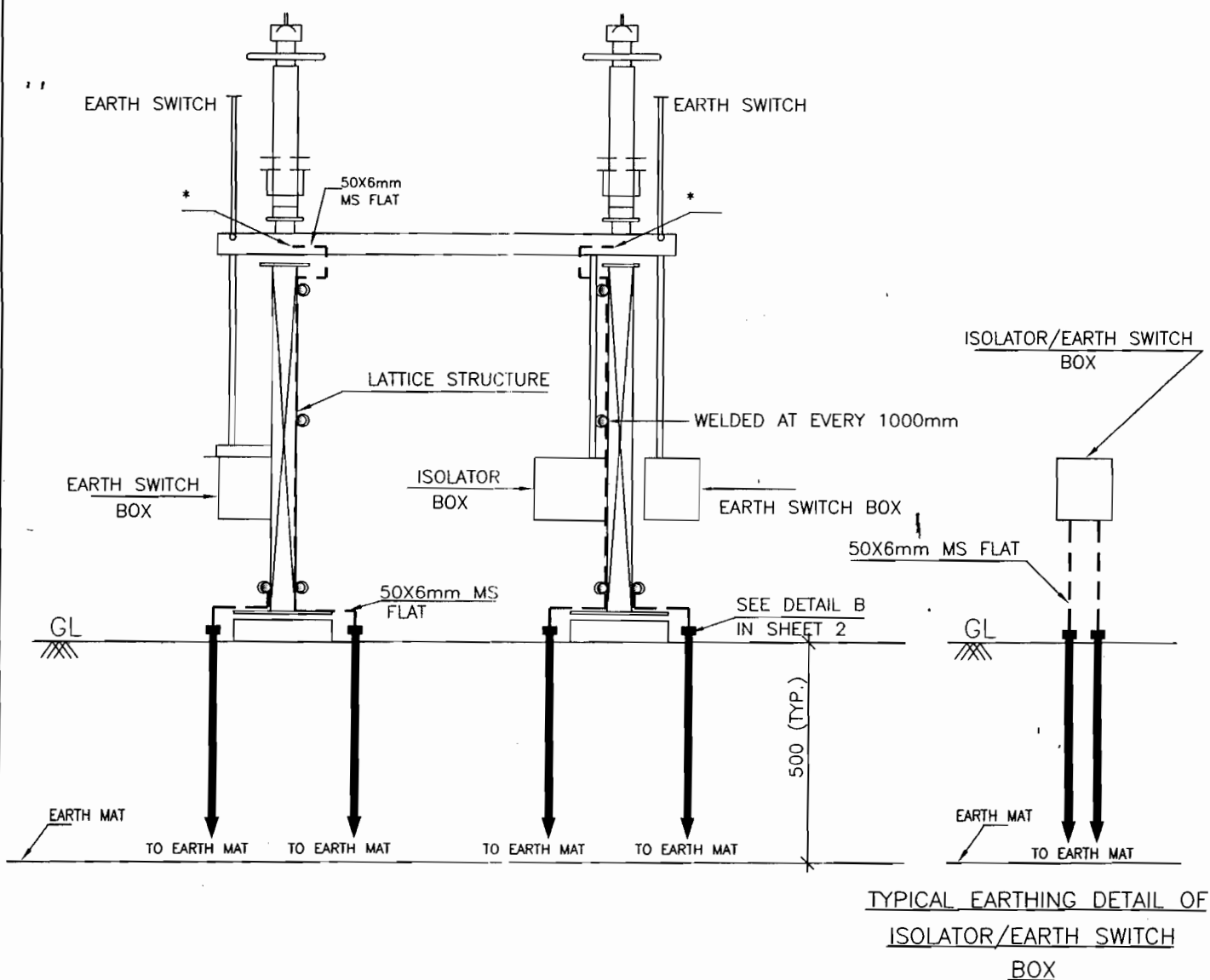
COMPUTERREF.NO.

DRG. No.

TB-4-368-316--004

REV. 00

SHEET No.
 12



NOTES

1. NO. OF RISERS FOR ISOLATOR = 4 NOS./PHASE
2. NO. OF RISERS FOR MAIN ISOLATOR MECHANISM BOX = 2 NOS.
3. NO. OF RISERS FOR EARTH SWITCH MECHANISM BOX = 2 NOS.
4. * BOLTED JOINTS.

Executive Engineer (P&D)
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR



EQUIPMENT & STRUCTURE EARTHING DETAILS

400KV HCB ISOLATOR (TYPICAL) WITH EARTH SWITCH

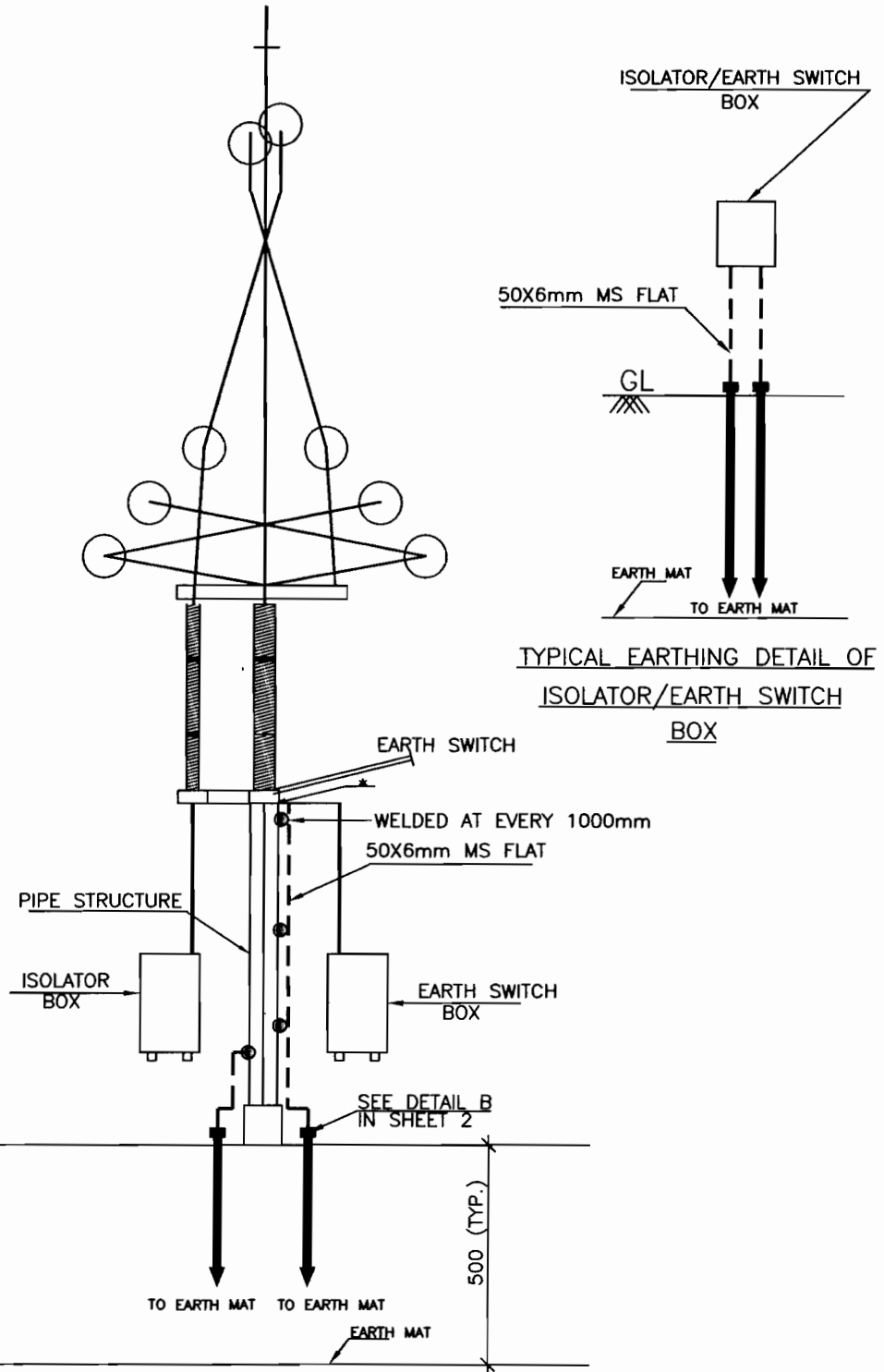
COMPUTER REF. NO.

DRG. No.

TB-4-368-316-004

REV. 00

SHEET No.
13



NOTES

1. NO. OF RISERS FOR ISOLATOR = 2 NOS./PHASE
2. NO. OF RISERS FOR MAIN ISOLATOR MECHANISM BOX = 2 NOS.
3. NO. OF RISERS FOR EARTH SWITCH MECHANISM BOX = 2 NOS.
4. * BOLTED JOINTS.

Executive Engineer (P&D)
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR



EQUIPMENT EARTHING DETAILS

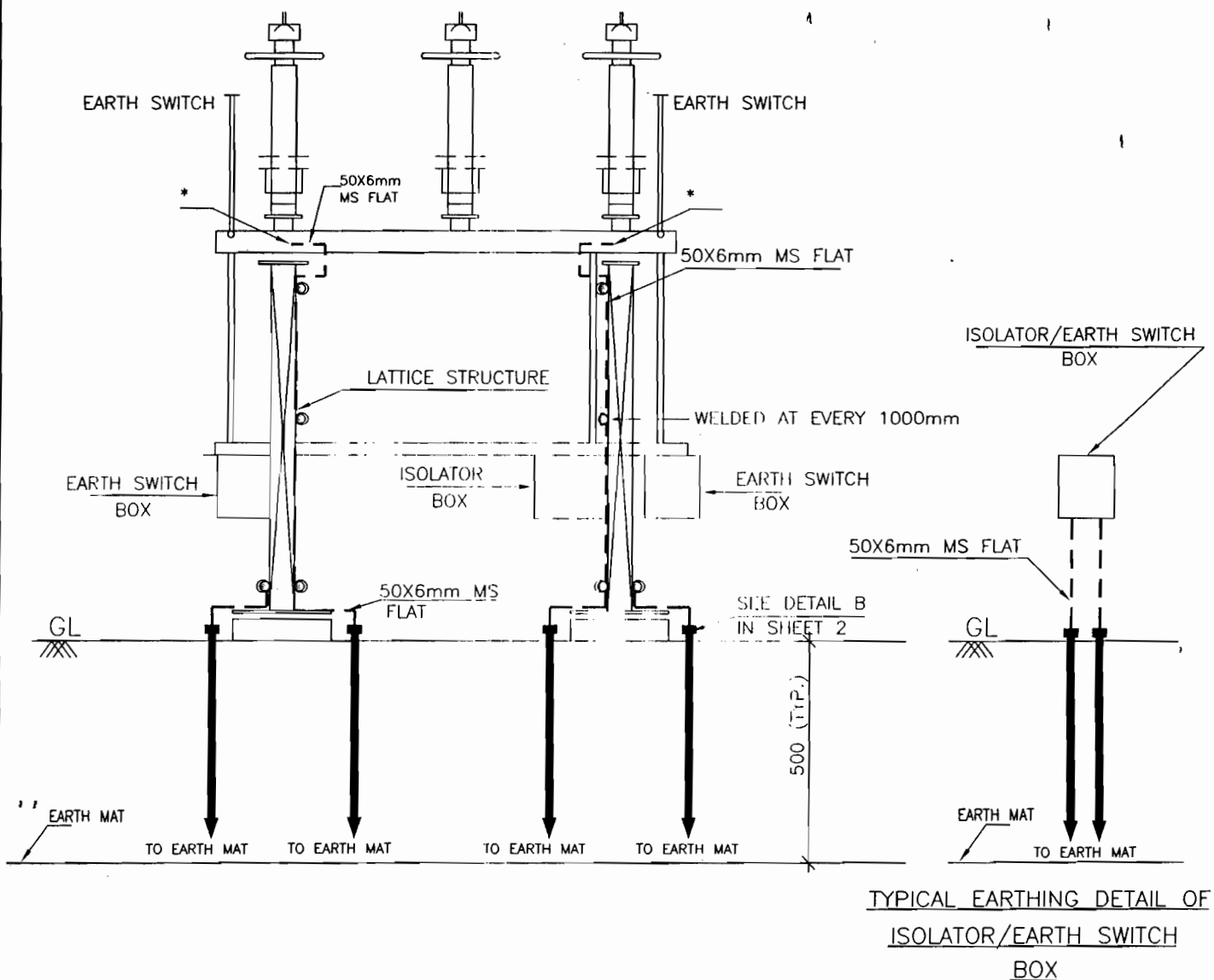
400KV PANTOGRAPH ISOLATOR WITH 1 E/S

COMPUTER REF. NO.

DRG. No. TB-4-368-316-004

REV. 00

SHEET No.
14



NOTES

1. NO. OF RISERS FOR 220/132kV ISOLATOR = 4 NOS./PHASE
2. NO. OF RISERS FOR 33kV ISOLATOR = 4 NOS./THREE PHASE
3. NO. OF RISERS FOR MAIN ISOLATOR MECHANISM BOX = 2 NOS.
4. NO. OF RISERS FOR EARTH SWITCH MECHANISM BOX = 2 NOS.
5. * BOLTED JOINTS.


 Executive Engineer (P&D)
 O/o Chief Engineer (Procurement)
 MPPTCL, JABALPUR



EQUIPMENT & STRUCTURE EARTHING DETAILS

220/132/33KV HDB ISOLATOR (TYPICAL) WITH EARTH SWITCH

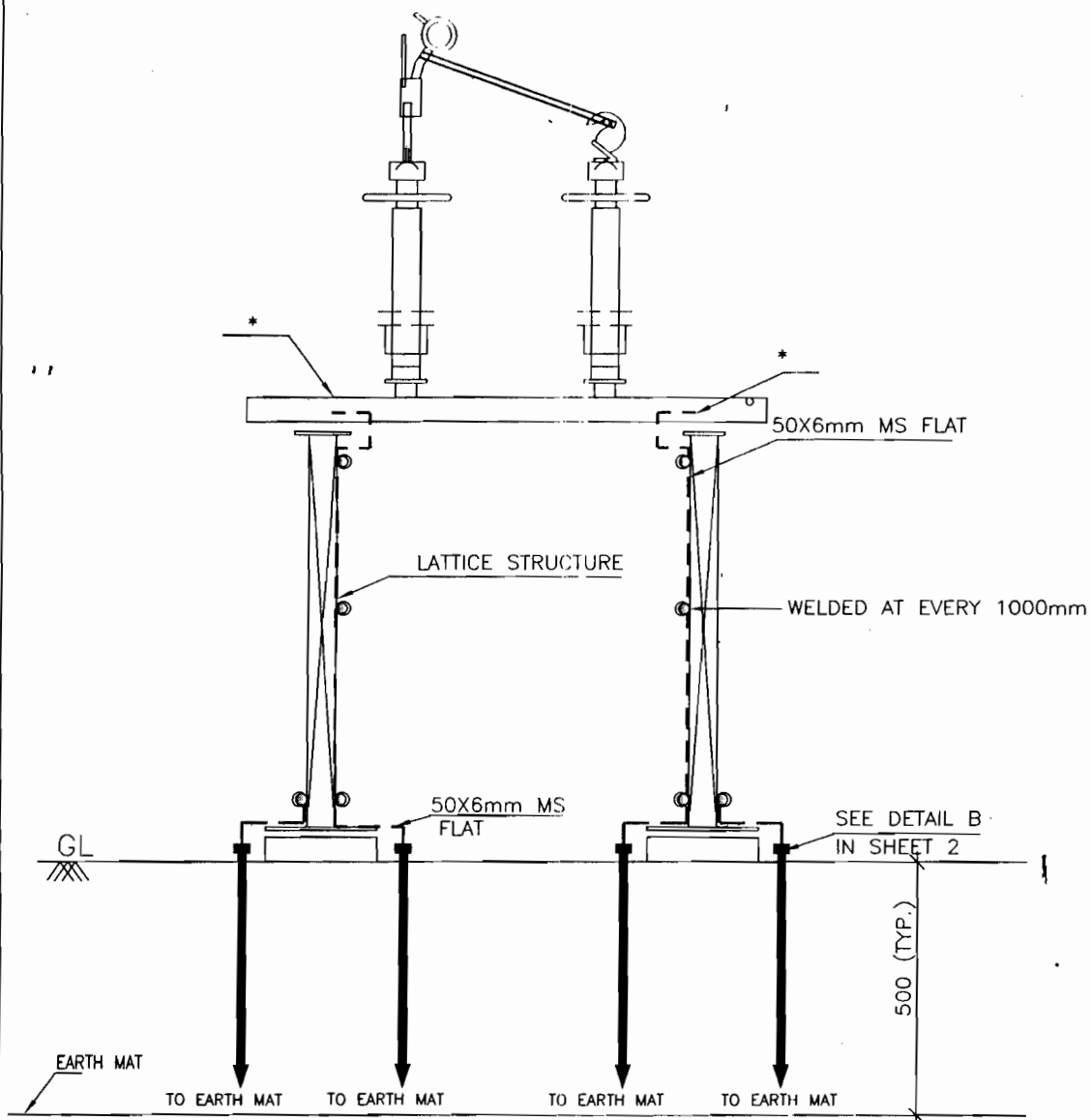
COMPUTER REF. NO.

DRG. No.

TB-4-368-316-004

REV. 00

SHEET No.
15



NOTES

1. NO. OF RISERS FOR 33KV DROP OUT FUSE = '4' NOS./THREE PHASE
2. * BOLTED JOINTS.

Executive Engineer (P&D)
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR



EQUIPMENT & STRUCTURE EARTHING DETAILS

33KV DROP OUT FUSE

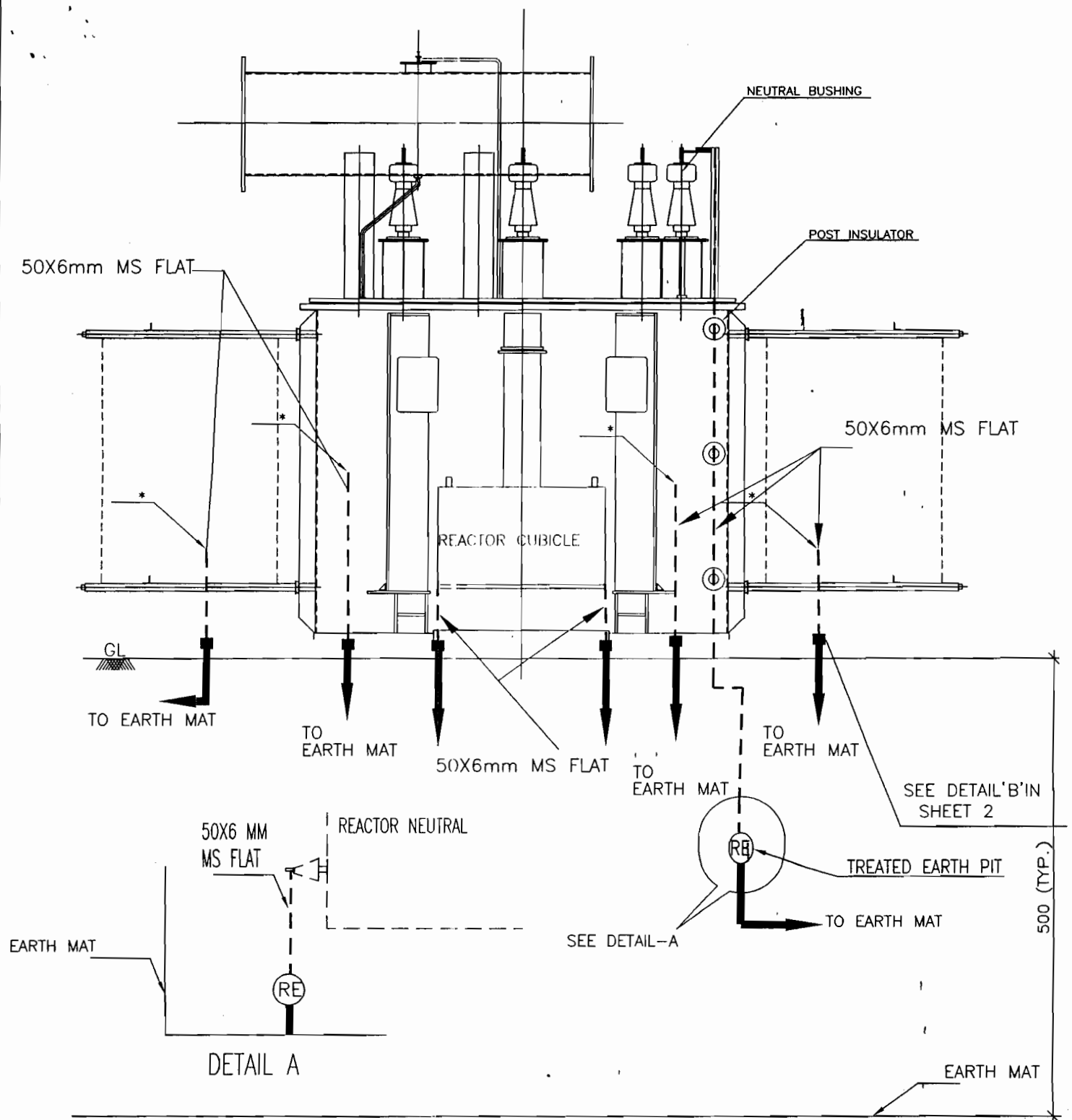
COMPUTER REF. NO.

DRG. No.

TB-4-368-316-004

REV. 00

SHEET No.
16



NOTE:

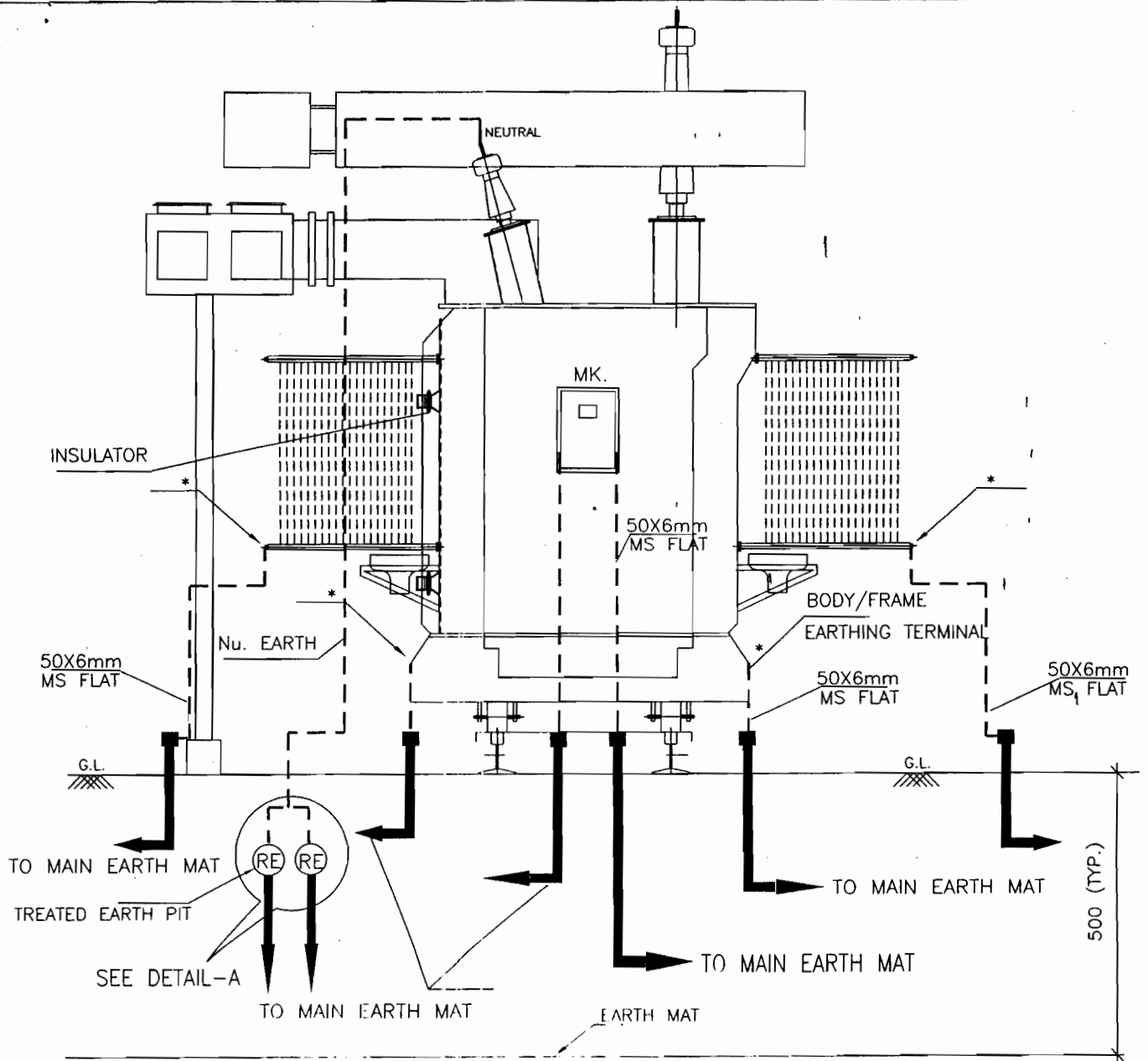
1. NO. OF RISERS FOR MAIN TANK = 2 NOS.
2. NO. OF RISERS FOR TREATED EARTH PIT = 1 NO.
3. NO. OF RISERS FOR RADIATOR = 2 NOS.
4. * BOLTED JOINTS.
5. NO. OF RISER FOR REACTOR CUBICLE=2 NOS.


Executive Engineer (P&D)
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR



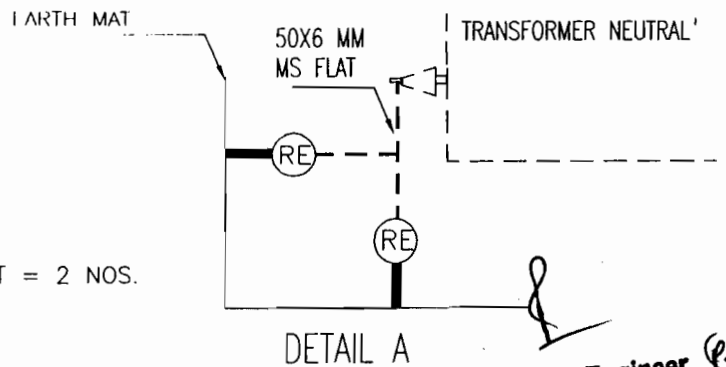
EQUIPMENT & STRUCTURE EARTHING DETAILS

BUS SHUNT REACTOR



NOTE:

1. NO. OF RISERS FOR MAIN TANK = 2 NOS.
2. NO. OF RISERS FOR 2 NOS. TREATED EARTH PIT = 2 NOS.
3. NO. OF RISERS FOR RADIATOR = 2 NOS.
4. * BOLTED JOINTS.
5. NO. OF RISER FOR MK OF TRANSFORMER=2 NOS.



Executive Engineer (P&D)
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR



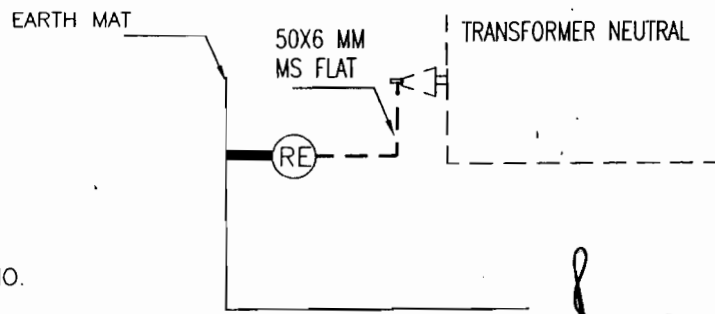
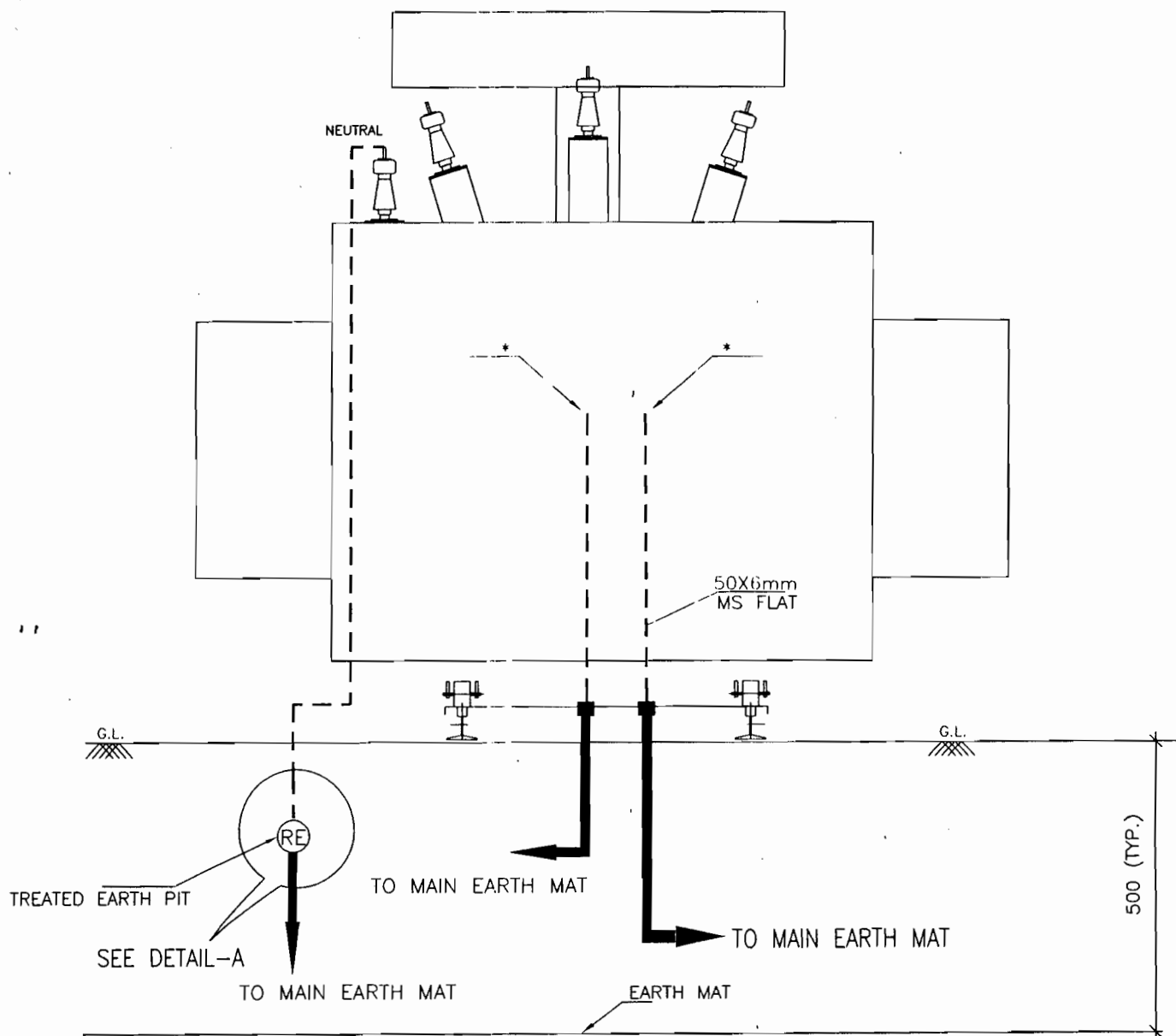
EQUIPMENT EARTHING DETAILS POWER TRANSFORMER

DRG. No.

TB-4-368-316-004.

REV. 00

SHEET No.
18



NOTE:

1. NO. OF RISERS FOR MAIN TANK = 2 NOS.
2. NO. OF RISERS FOR TREATED EARTH PIT = 1 NO.
3. * BOLTED JOINTS.

DETAIL A

Executive Engineer (P&M)
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR



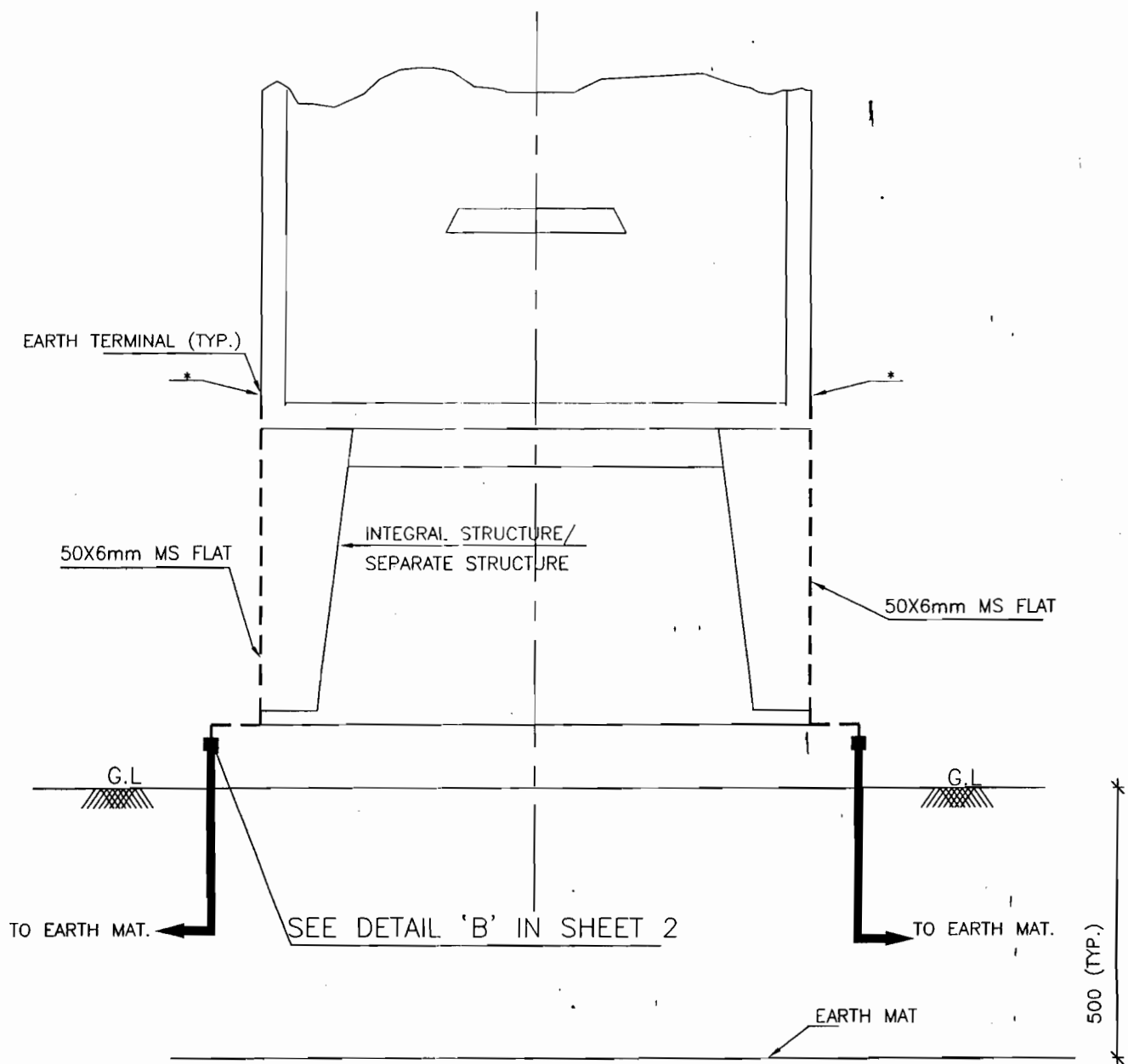
EQUIPMENT EARTHING DETAILS LT TRANSFORMER

DRG. No.

TB-4-368-316-004

REV. 00

SHEET No.
19



NOTES;

1. NO. OF RISERS= 2NOS.
2. * BOLTED JOINTS.

Executive Engineer (P&D)
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR



EQUIPMENT & STRUCTURE EARTHING DETAILS MARSHALLING KIOSK

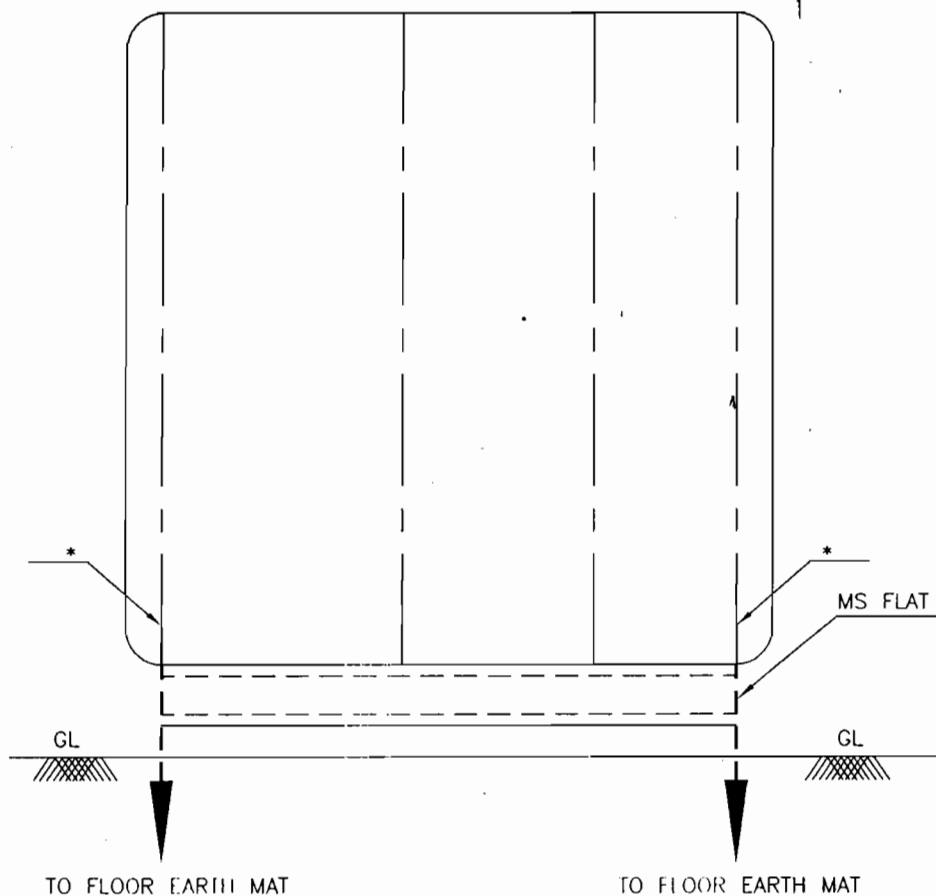
COMPUTERREF.NO.

DRG. No.

TB-4-368-316-004

REV. 00

SHEET No.
20



EQUIPMENT

LT SWITCHGEAR

CHARGER

RELAY & CONTROL PANELS

FLAT SIZE

50X6 mm MS FLAT

50X6 mm MS FLAT

50X6 mm MS FLAT

NOTE:

1. * BOLTED JOINTS.

Executive Engineer (P&D)
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR



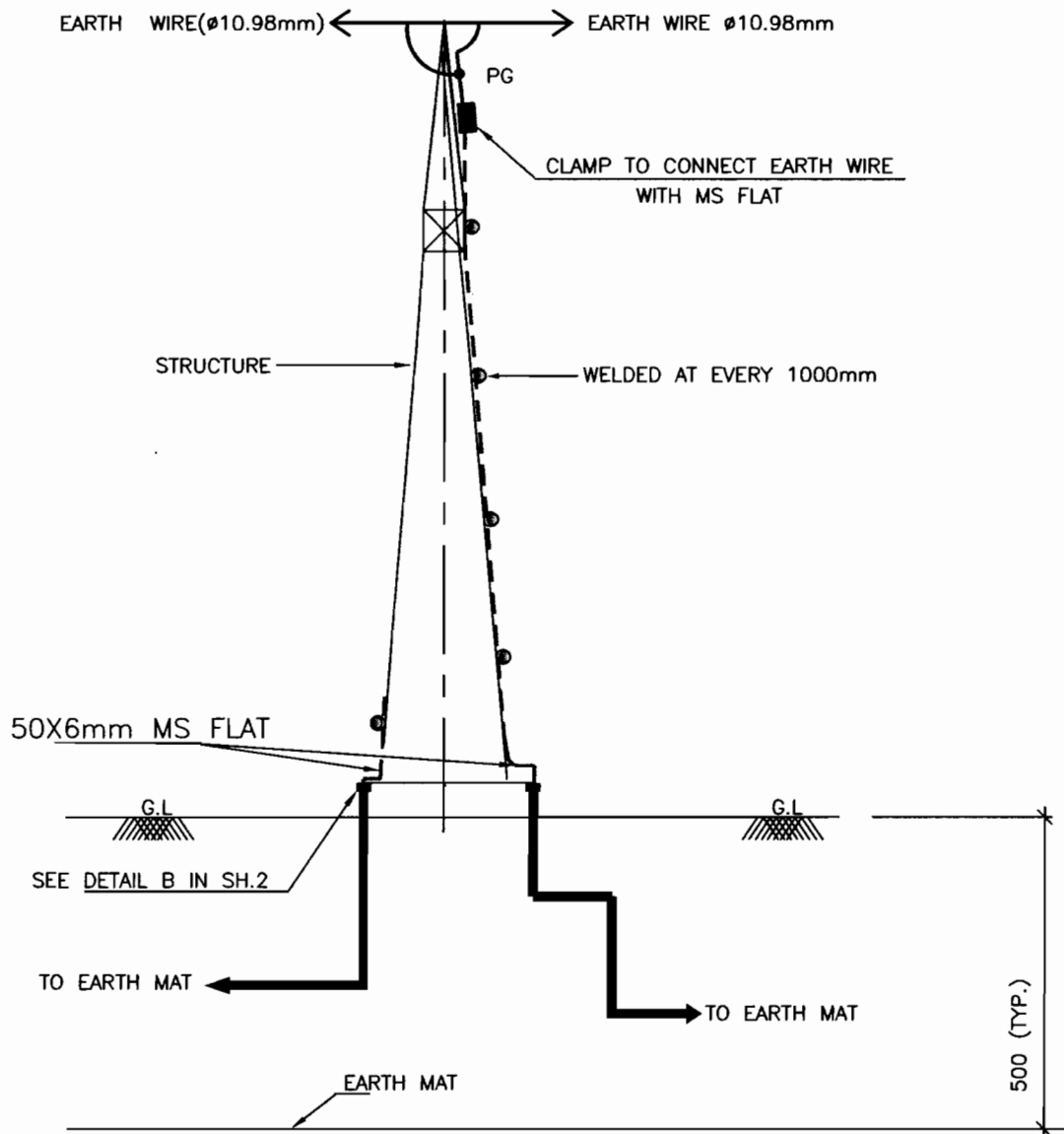
EQUIPMENT & STRUCTURE EARTHING DETAILS
LT SWITCHGEAR / CHARGER / RELAY & CONTROL PANEL

DRG. No.

TB-4-368-316-004

REV. 00

SHEET No.
21



NOTE:

1. NO. OF RISERS 2 NOS. / TOWER
2. CLAMP BETWEEN SHIELD WIRE & 50X6MM MS FLAT WILL WORK AS A TEST LINK.

Executive Engineer (R&D)
O/o Chief Engineer (Procurement)
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EQUIPMENT & STRUCTURE EARTHING DETAILS

TOWER WITH EARTH WIRE

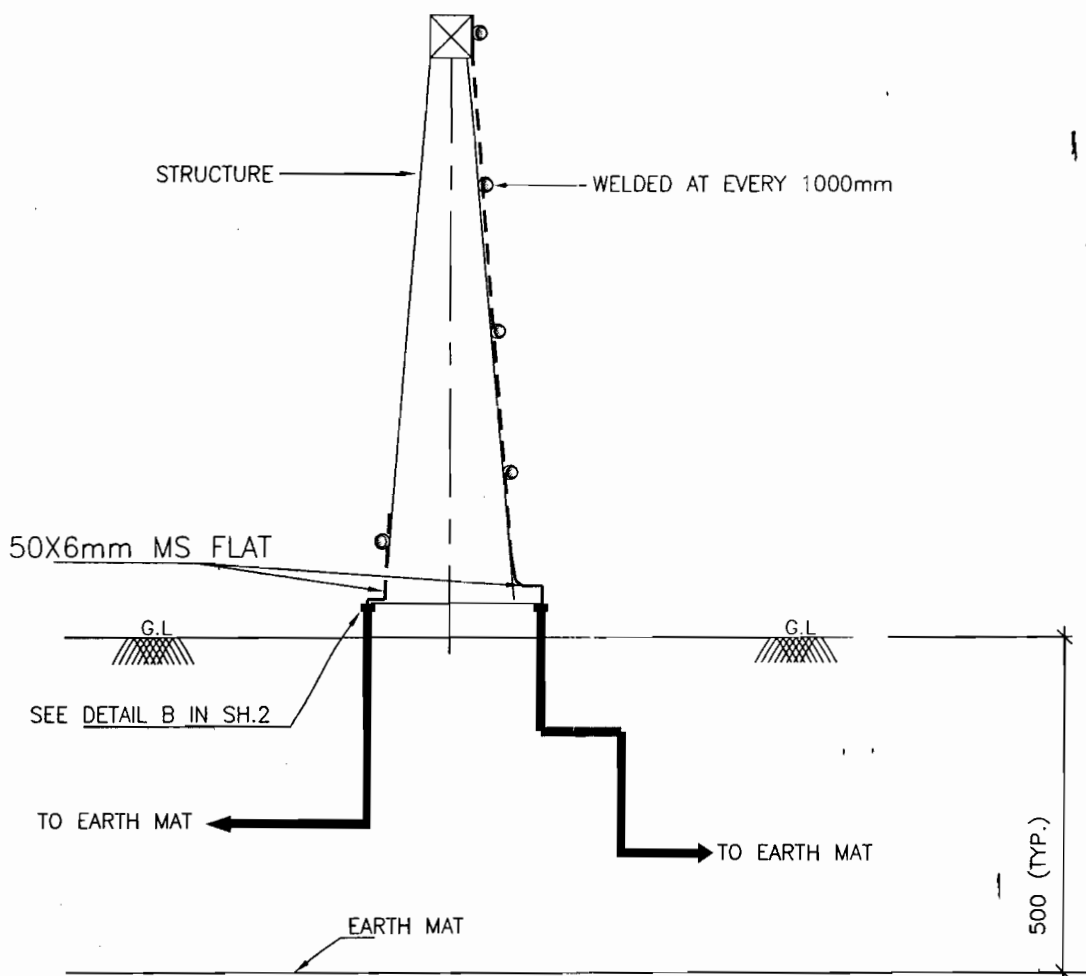
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DRG. No.

TB-4-368-316-004

REV. 00

SHEET No.
22



NOTE:

1. NO. OF RISERS 2 NOS. / TOWER

(Signature)
 Executive Engineer
 O/o Chief Engineer (Procurement)
 MPPTCL, JABALPUR



EQUIPMENT & STRUCTURE EARTHING DETAILS TOWER WITHOUT EARTH WIRE

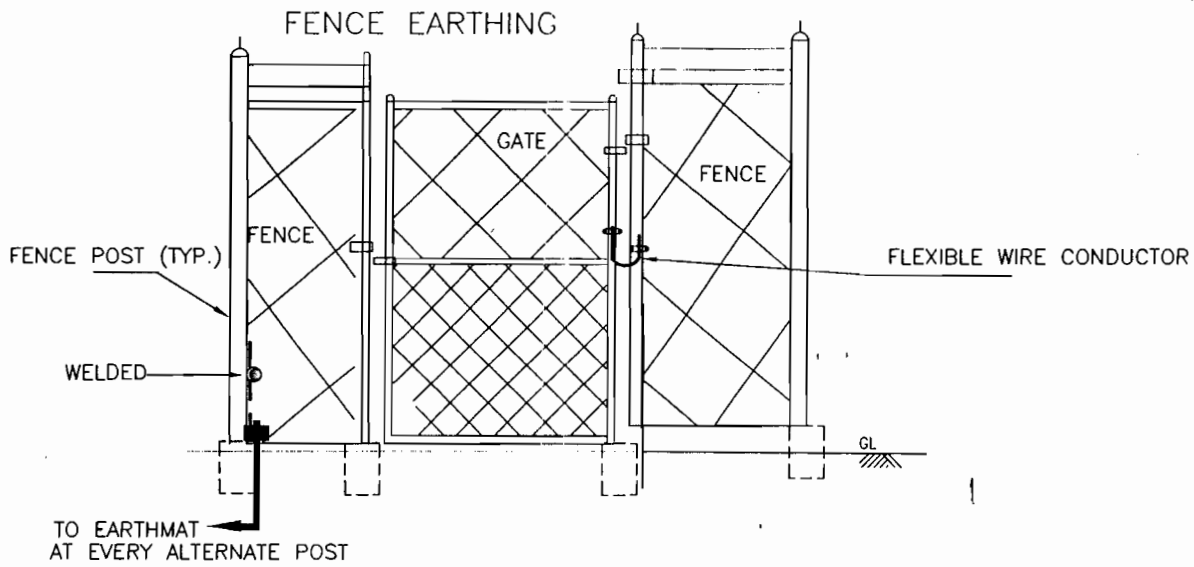
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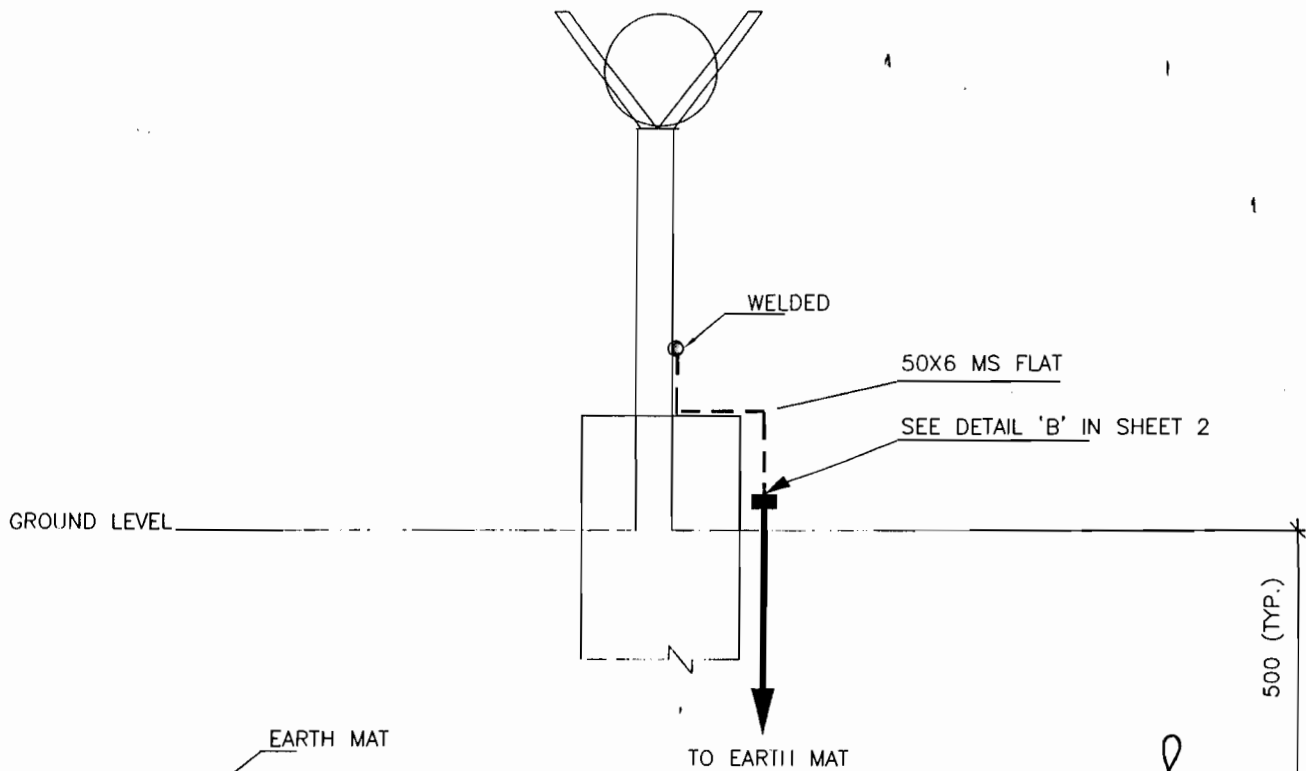
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REV. 00

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23



NOTE:- EVERY ALTERNATE FENCE POSTS SHALL BE EARTHED BY 50X6mm MS FLAT.



FENCE EARTHING

Executive Engineer (P&D)
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR



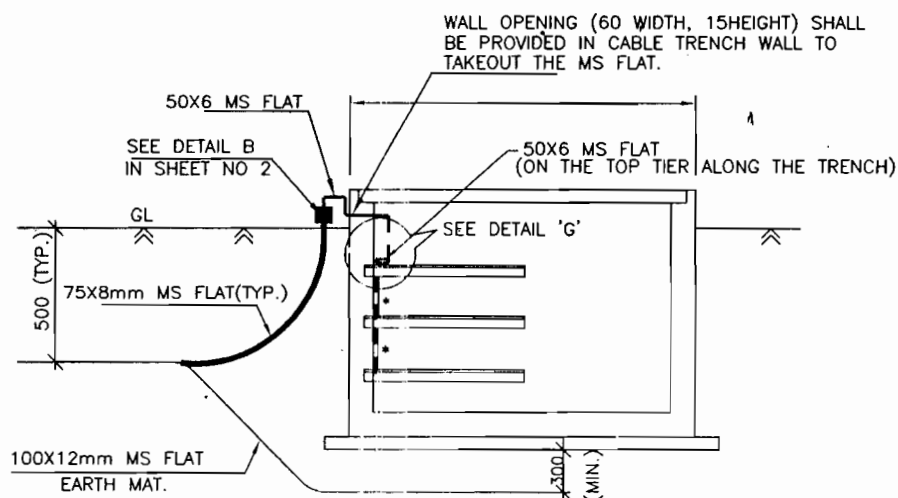
EQUIPMENT & STRUCTURE EARTHING DETAILS
FENCE POST

DRG. No.

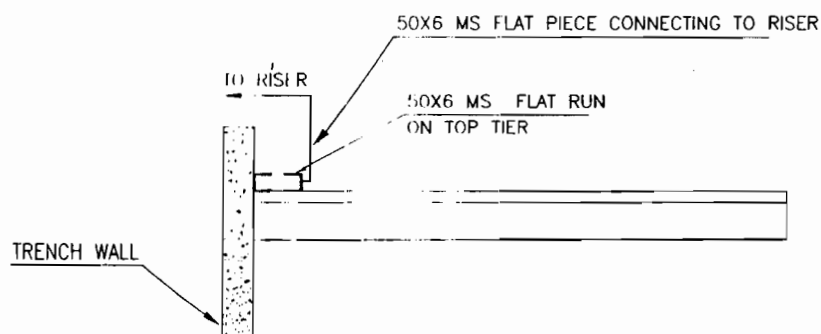
TB-4-368-316-004

REV. 00

SHEET No.
24



* NOTE- 50X6mm MS FLAT SHALL BE CONNECTED BETWEEN RACK ASSEMBLY.



DETAIL 'G'

DETAIL FOR CONNECTING MS FLAT RUNNING ON TOP TIER TRENCH TO RISER.

NOTE:

1. ALL TRENCHES SHALL BE EARTHED AT AN INTERVAL OF 30M ALONG THE LENGTH OF TRENCH.
2. THE EARTH STRIP (50X6 MS. FLAT) SHALL RUN ON THE TOP TIER ALONG THE CABLE TRENCHES & WELDED TO EACH OF THE RACK AT EVERY 750mm INTERVAL.
3. WHERE THE CABLE RACKS ARE PROVIDED ON BOTH SIDES OF THE TRENCH, BOTH SIDES SHALL BE EARTHED.

Executive Engineer (P&M)
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR



EQUIPMENT & STRUCTURE EARTHING DETAILS CABLE TRENCH

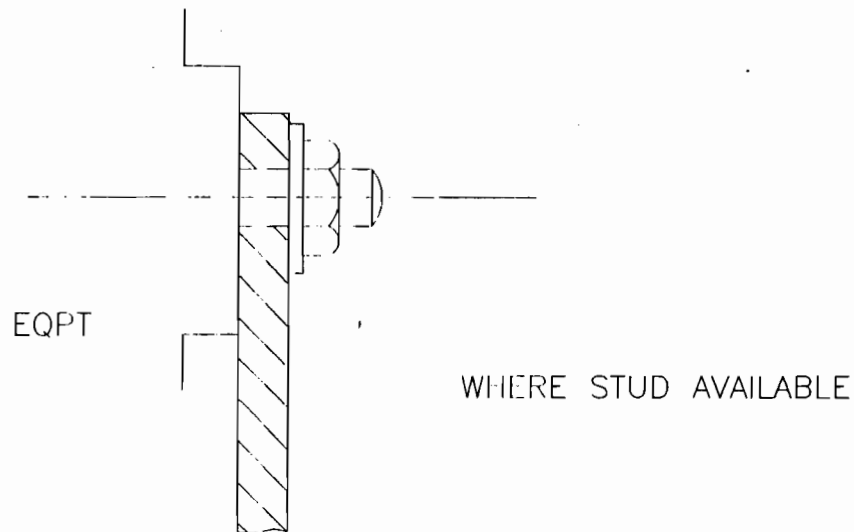
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DRG. NO.

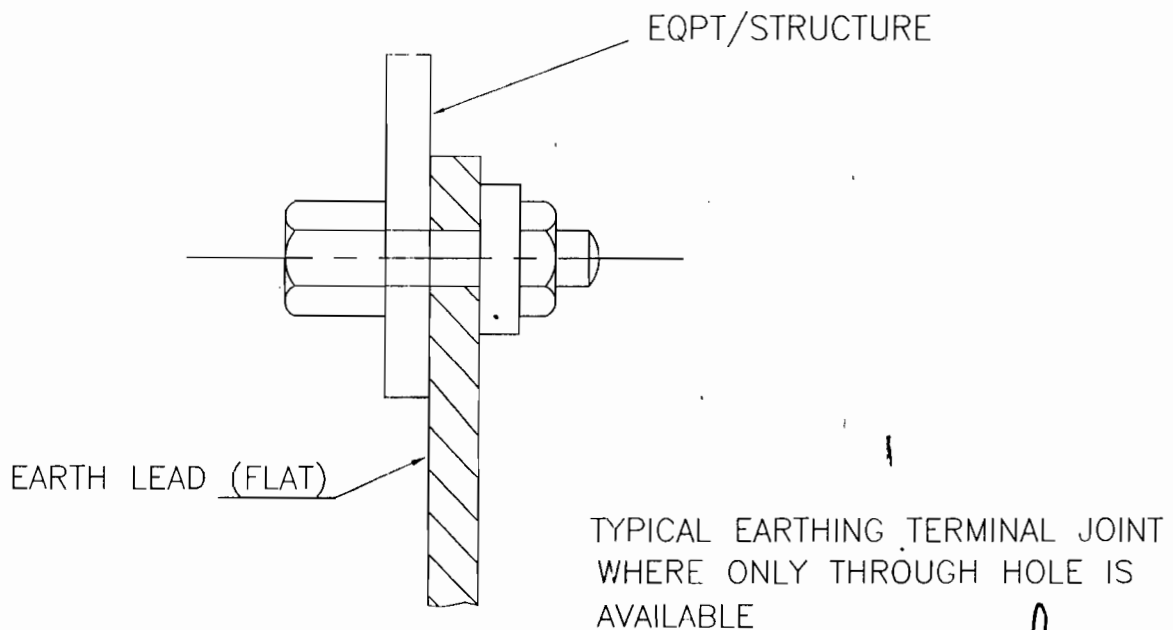
TB-4-368-316-004

REV. 00

SHEET
25



TYPICAL EARTHING TERMINAL JOINT



NOTE

1. THIS IS GENERAL TYPICAL BOLTING ARRANGEMENT APPLICABLE TO ALL PANELS, EQUIPMENT, ETC, WHERE BOLTING ARRANGEMENT IS PROVIDED.
2. IN CASE EARTHING TERMINAL COMPRISES ONLY A TAPPED HOLE SUITABLE BOLT/ SCREW WITH WASHER MAY BE USED FOR EARTHING CONDUCTOR TERMINATION


 Executive Engineer (P&D)
 O/o Chief Engineer (Procurement)
 MPPTCL, JABALPUR



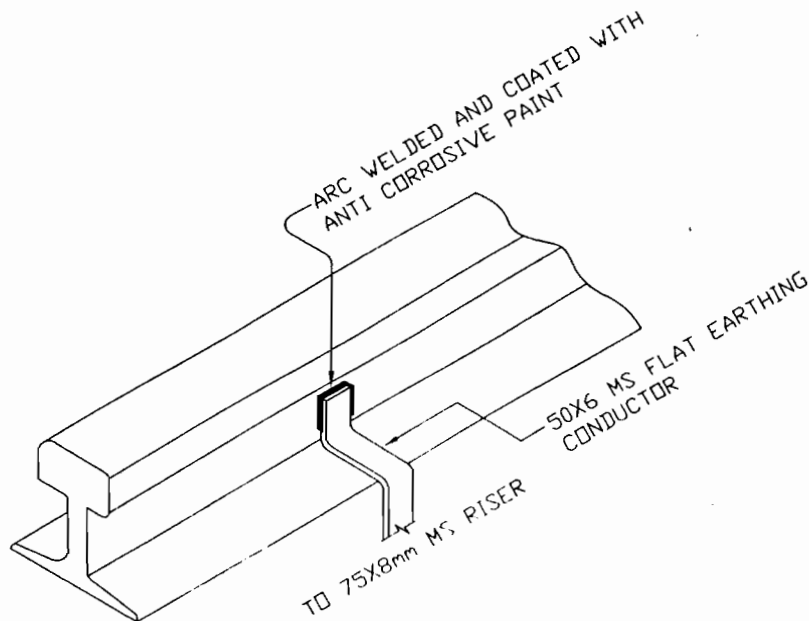
EQUIPMENT & STRUCTURE EARTHING DETAILS
TYPICAL ARRANGEMENT OF BOLTED JOINTS

DRG. No.

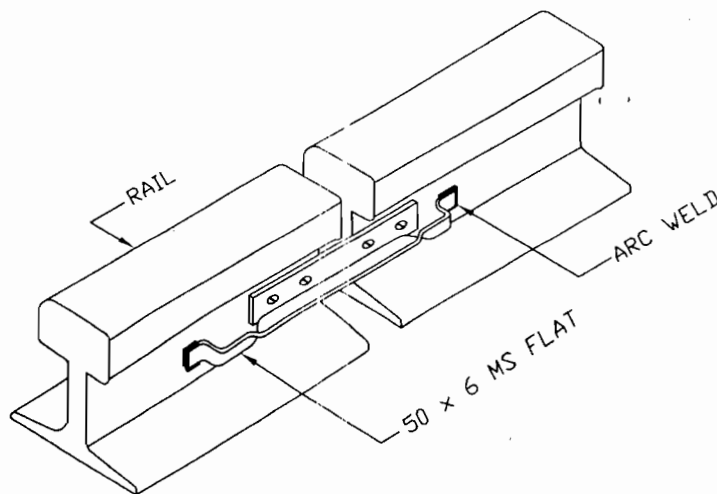
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SHEET No.
26



RAIL EARTHING



RAIL BONDING

Executive Engineer (P&D)
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR

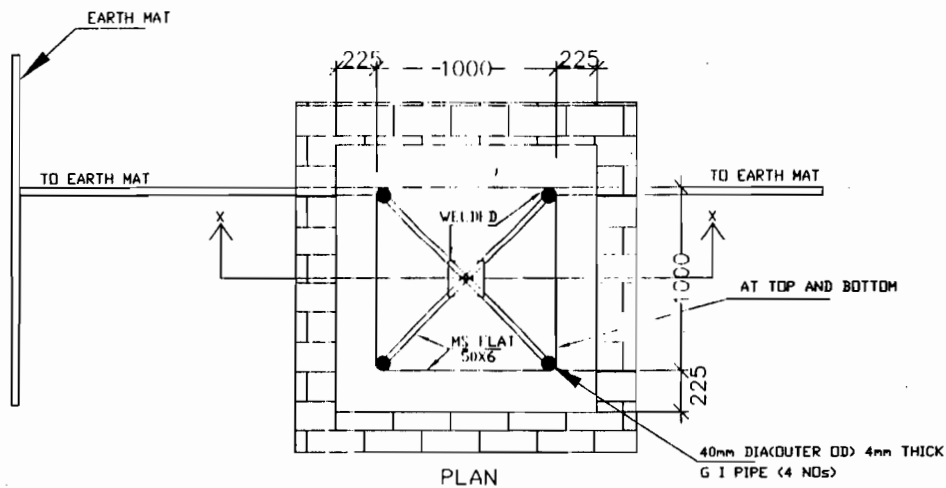
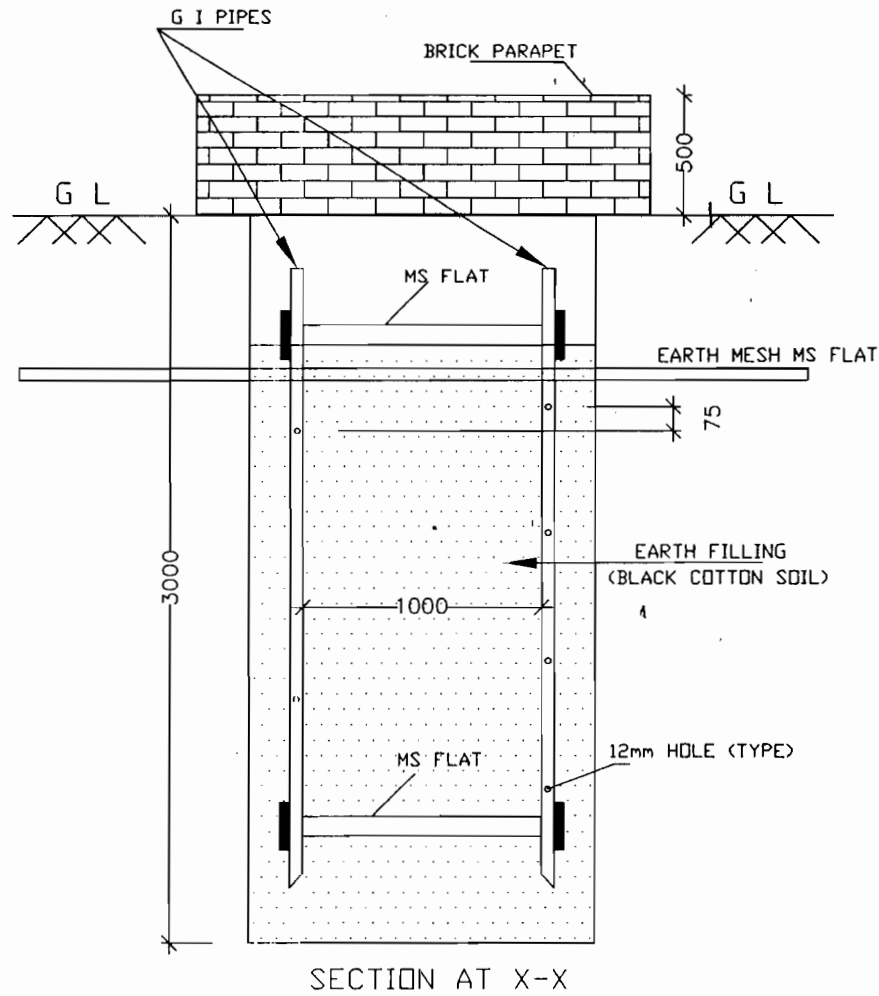
NOTE:-

1. RAILWAY TRACKS WITHIN SWITCHYARD AREA SHALL BE EARTHED AT A SPACING OF 30 m AND ALSO AT BOTH ENDS.



EQUIPMENT & STRUCTURE EARTHING DETAILS

RAIL BONDING



DETAILS OF TREATED EARTH PIT

Executive Engineer (P&D)
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR



EQUIPMENT & STRUCTURE EARTHING DETAILS

TREATED EARTH PIT DETAILS

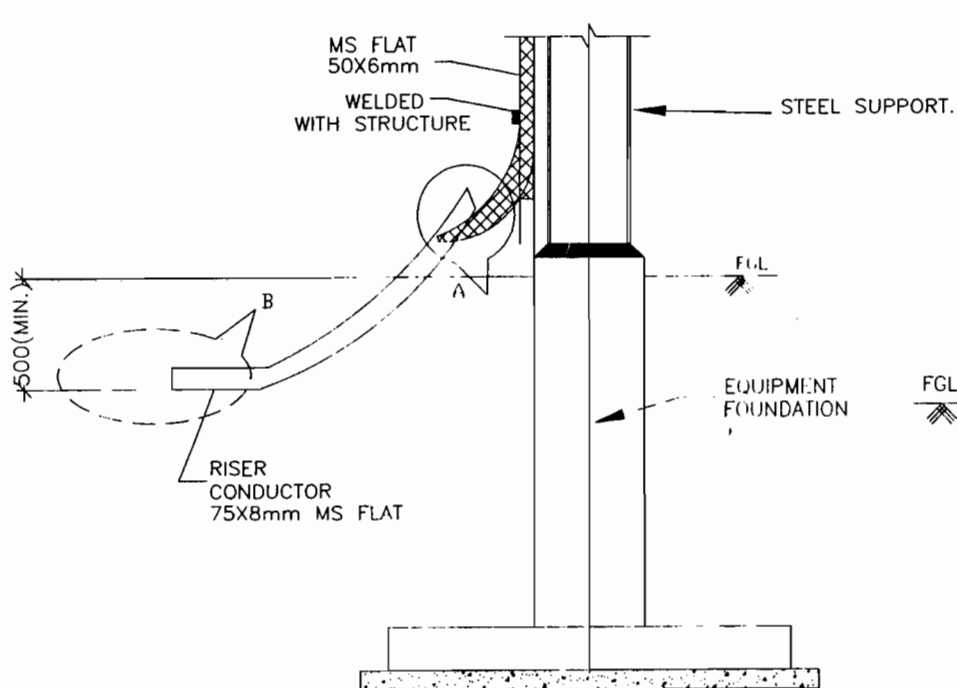
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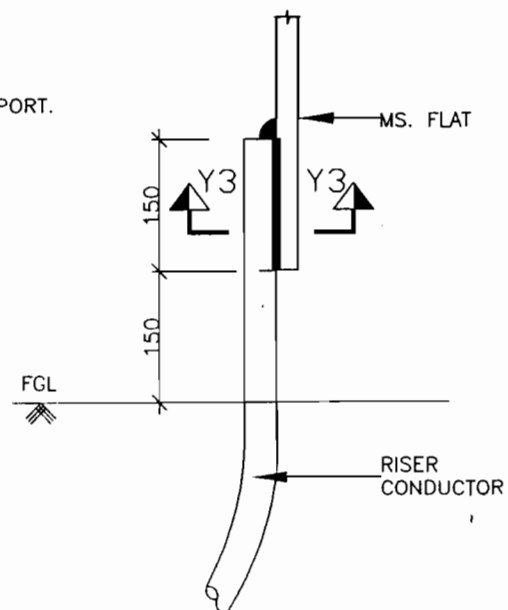
TB-4-368-316-004

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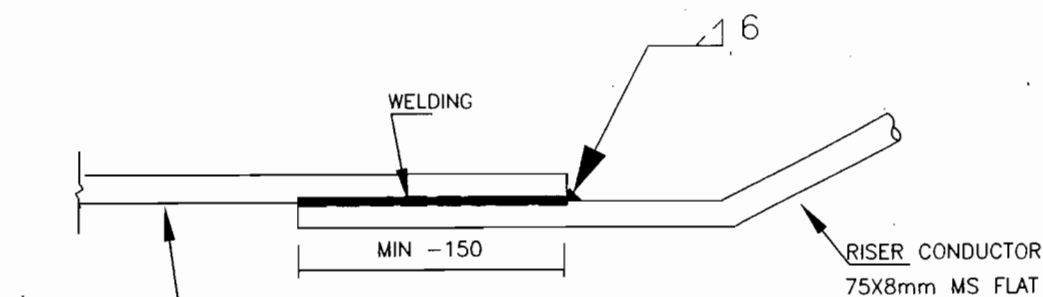
SHEET No.
28



TYPICAL DETAILS OF RISER

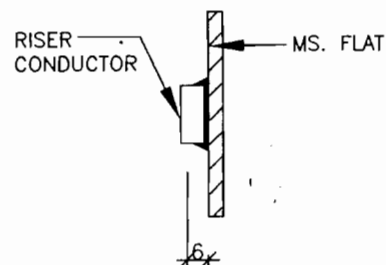


ELEVATION
DETAIL-A



MAIN EARTH MAT
100X12mm MS FLAT

ELEVATION
DETAIL-B

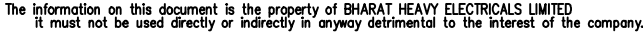


SECTION Y3-Y3

Executive Engineer (P&D)
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR



EQUIPMENT & STRUCTURE EARTHING DETAILS WELDING DETAILS



BILL OF QUANTITY

S.NO.	400KV EQUIPMENT DESCRIPTION	SYMBOL	QTY.	DESIG.
1	315MVA, 400/220/33kV 3 PH. AUTO TRANSFORMER		02	-
2	125 MVAR, 400KV BUS SHUNT REACTOR		01	-
3	400KV, 2500A, 3 PH., 40A FOR 3S SPRING OPERATED SF6 GAS CIRCUIT BREAKER SUITABLE FOR SINGLE PHASE AND THREE PHASE OPERATION WITHOUT PIR		04	52
4	400KV, 2500A, 3 PH., 40A FOR 3S SPRING OPERATED SF6 GAS CIRCUIT BREAKER SUITABLE FOR SINGLE PHASE AND THREE PHASE OPERATION WITH PIR		05	52
5	400KV, 2000A, 3 PH., 40A FOR 1S PANTOGRAPH ISOLATOR (ELECTRICALLY GANGED MOTOR OPERATED) WITH 1 E/S (INDIVIDUAL MANUALLY OPERATED)		26	89
6	400KV, 2000A, 3 PH., 40A FOR 1S HCB ISOLATOR (ELECTRICALLY GANGED MOTOR OPERATED) WITH 1 E/S (INDIVIDUAL MANUALLY OPERATED).		06	89
7	400KV, 2000A, 3 PH., 40A FOR 1S HCB ISOLATOR (ELECTRICALLY GANGED MOTOR OPERATED) WITH 2 E/S (INDIVIDUAL MANUALLY OPERATED).		04	89
8	400KV, 2000-1000-500/-1-1-1-1 A, 40A FOR 1S CT, 1 PH.		27	CT
9	400KV, 4400pf, 3 CORE, CVT 1-PH		18	CVT
10	390KV, 20KA, CLASS-4, SURGE ARRESTER 1-PH		21	LA
11	WAVE TRAP (2000A, 1mH) 40KA FOR 1 SEC., 1 PH. PEDESTAL TYPE.		08	WT

400kV CT PARAMETERS

Case No.	Ratio	Output Burden (V/A) at lowest I _{mp}	Min K _{TPV} (V)	Max I _c (mA)	Max Ret (Ohms)	Acc Class as per IEC 185
				at E _{TPV}		
1	2000:1000:500/1 A	N/A	2000/1000:500	30 on 2000/1 tpp 60 on 1000/1 tpp 120 on 500/1 tpp	10/5/2.5	PS
2	2000:1000:500/1 A	N/A	2000/1000:500	30 on 2000/1 tpp 60 on 1000/1 tpp 120 on 500/1 tpp	10/5/2.5	PS
3	2000:1000:500/1 A	20	N/A	N/A	N/A	0.2s, ISF ≤ 5
4	2000:1000:500/1 A	N/A	4000/2000/1000	30 on 2000/1 tpp 60 on 1000/1 tpp 120 on 500/1 tpp	10/5/2.5	PS
5	2000:1000:500/1 A	N/A	4000/2000/1000	30 on 2000/1 tpp 60 on 1000/1 tpp 120 on 500/1 tpp	110/5/2.5	PS

125 MVAR 400KV BUS REACTOR (LINE side)

Circ No.	RA TIO	Output Burden at Resonance Imp (kΩ)	Min V _{in} (V)	Max I _{in}	Max R _{in}	Acc Class	Purpose
1	200:1	200V	40μA at 15V/4	1 0mA	P-S	Positive Differential	
2	200:1	200V	40μA at 15V/4	1 0mA	P-S	Positive Differential	
3	200:1	200V	40μA at 15V/4	1 0mA	P-S	Positive DUT	
4	200:1	10V/4	-	-	0.5	Measuring	

125 MVAR BUS REACTOR NEUTRAL SIDE
(BEFORE NEUTRAL FORMATION)

Case No.	RATIO	Output Btu./cu ft. lower temp. (°F)	Mean Temp. (°F)	Max.ile	Max.Rid	Act Class	Purpose
1	200/1	-	200°F	30 in. x KSPV/4	1 Ounce	PS	Reactor Differential
2	500-1000-2000/1	-	500- 1000- 2000- KSPV/4	30-1.5 30 in. x 1000- 2000- KSPV/4	2.5 Ounces 5 Ounces 10 Ounces	PS	SPACE
3	500-1000-2000/1	-	500- 1000- 2000-	30-1.5 30 in. x 1000- 2000-	2.5 Ounces 5 Ounces 10 Ounces	PS	SPACE

400/220/33kV ICT BUSHING CT (HV & IV Side)

Cure No.	RATIO	Output Burden at Input Tap (VA)	Max KVP (V)	Test at KVP (max)	Max Rect	Acc Class
1	500:1000/1	-	1000V	1000mA	2.5 Ohms	ES
2	500:1000/1	-	1000V	1000mA	2.5 Ohms	ES
3	500:1000/1	-	1000V	1000mA	2.5 Ohms	ES

125 MYAR BUS REACTOR NEUTRAL SIDE
(AFTER NEUTRAL FORMATION)

Core No.	R.RATIO	Output Burden at lowest Tap (V/A)	Min K/PV (V)	Max Ie	Max Ret	Acc Class	Purpose
1	200/1	-	200V	40mA at K/PV/4	1 Ohms	PS	R.E.F.

400/220/33kV ICT BUSHING CT (Neutral Side)

Core No.	RATIO	Compart Bandwidth at Tower Tap (VA)	Min K _{FPV} (V)	Le AT K _{FPV} (max)	Max Rct	Acc Class
1	5500-1000/1	-	1000V	100 mA	2.5 Ohm	PS
2	5500-1000/1	-	1000V	100 mA	2.5 Ohm	PS

400kV CVT PARAMETERS

	RATIO	ACCURACY CLASS	BURDEN (%)
SEC-1	400 kV/√3 / 110V/√3	3P	100
SEC-2	400 kV/√3 / 110V/√3	3P	100
SEC-3	400 kV/√3 / 110V/√3	0.2	100

400/220/33kV ICT BUSHING CT (Tertiary Side)

Cure No.	RATIO	Output Burden at lowest Tap (VA)	Min KVP (V)	1st At KVP (max)	Max Ret	Arc Class
1	1200/1	15	-	-	-	5F10
2	1200/1	15	-	-	-	1
3	1200/1	-	1100	100 mA	6	FS

S.NO	33KV EQUIPMENT DESCRIPTION	SYMBOL	QTY.	DESIG.
20	33KV, 1250A, 3 PH, 25KA FOR 3S VACUUM CIRCUIT BREAKER SUITABLE FOR 3 PH. OPERATION		02	52
21	33KV, 800A, 3 PH, 26.2 KA FOR 2S HDB ISOLATOR (MECHANICALLY GANGED MANUALLY OPERATED) WITHOUT E/S		04	89
22	33KV, CT 400/-1-1-1A, 26.2KA FOR 2S, 1-PH		06	CT
23	33KV CT 10/-1-1A, 1KA FOR 1S, 1-PH		06	CT
24	33KV, 2 CORE PT 1-PH		06	PT
25	30KV, 10KA, CLASS-2, SURGE ARRESTER 1-PH		06	LA
26	500KVA, 33/0,433KV STATION TRANSFORMER 3 PH		02	-
27	40KV, 0.125 MICRO FARAD SURGE CAPACITOR 3 PH		02	SC

ADDITIONAL INFORMATION W/O No. 86012	
STATUS OF DRAWING	
DISTRIBUTION OF PRINTS	
प्रमाणित/परिशीलना का प्रमाण NAME OF CUSTOMER/PROJECT	MADHYA PRADESH POWER TRANSMISSION COMPANY LTD. 400 kV S/S/ T/s lines at Balenpat, Baidanwar, Bhopal, Chitagon and Nagda (Lot no. 1)
LDA No.	04-01/ADB-III/MPPGC/TRSO/LDT-II/TK-11/06960-3 DATED 28.02.2014
जांचकर्ता आचार्य केपी सुनीलकुमार तिवारी निरीक्षक संस्कार गोपा /NAME हस्ताक्षर /SIGN. दि./DATE	

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INVENTORY No.	ZONE	ZONE	ZONE	ZONE	ಕೋಡ್ / TITLE SINGLE LINE DIAGRAM FOR 400/220KV SUBSTATION AT BADNAVAR	ಡ್ರಿಂಗ್ / ರೆವೈಸ್ / DRAWING NO. TB-3-388-510-001B		ಪ್ರತಿ / REV. 00
						ಪುಟ / SHEET No. 02	ಅನಂತ ಪುಟ / NEXT SHEET 03	

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Core No.	RATIO	Output Burden (VA)	Min KPV (V)	Max Ie (mA) at KPV	Max Ret (Ohms)	Acc Class as per IEC 185
1	400/1	30	NA	100	3	5P10
2	400/1	15	NA	NA	NA	0.2S, ISF ≤ 5
3	400/1	-	400	50	2	PS

33kV 400/1-1-1A CT PARAMETERS

Core No.	RATIO	Output Burden (VA)	Min KVPV (V)	Max Ie (mA) at KVPV	Max Ret (Ohms)	Acc Class as per IEC 185
1	400/1	30	NA	100	3	5P10
2	400/1	15	NA	NA	NA	0.25% ISF ≤ 5
3	400/1	-	400	50	2	PS

Core No.	Current Ratio	Output Burden	Accuracy class	Min. Knee Point Voltage V _K	Max. CT Secondary winding resistance	Max. exciting current at K _{VP}
1	10/1 A	15 V/A	5P10	-	-	-
2	10/1 A	15 V/A, ISF≤5	0.2s	-	-	-

33kV PT PARAMETERS	
	RATIO

	RATIO	ACCURACY CLASS	BURDEN (VA)
SEC-1	33 kV/ $\sqrt{3}$ / 110V/ $\sqrt{3}$	3P	100
SEC-2	33 kV/ $\sqrt{3}$ / 110V/ $\sqrt{3}$	0.2	100

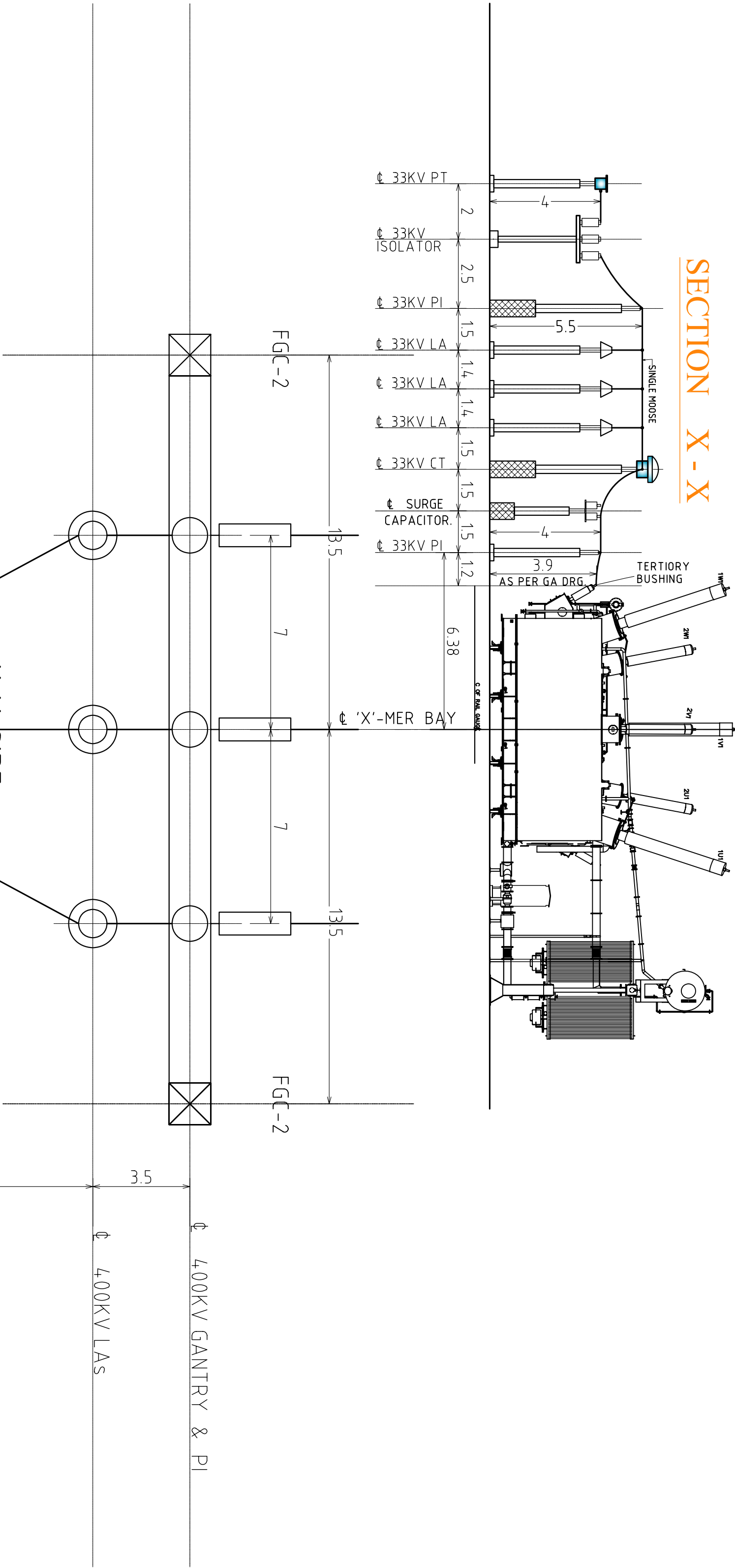
	RATIO	ACCURACY CLASS	BURDEN (VA)
SEC-1	220 kV/ $\sqrt{3}$ / 110V/ $\sqrt{3}$	3P	100
SEC-2	220 kV/ $\sqrt{3}$ / 110V/ $\sqrt{3}$	0.2	50
SEC-3	220 kV/ $\sqrt{3}$ / 110V/ $\sqrt{3}$	0.2	50

	RATIO	ACCURACY CLASS	BURDEN (VA)
SEC-1	220 kV/23 / 110V/23	3P	200
SEC-2	220 kV/23 / 110V/23	0.2	100
SEC-3	220 kV/23 / 110V/23	0.2	100

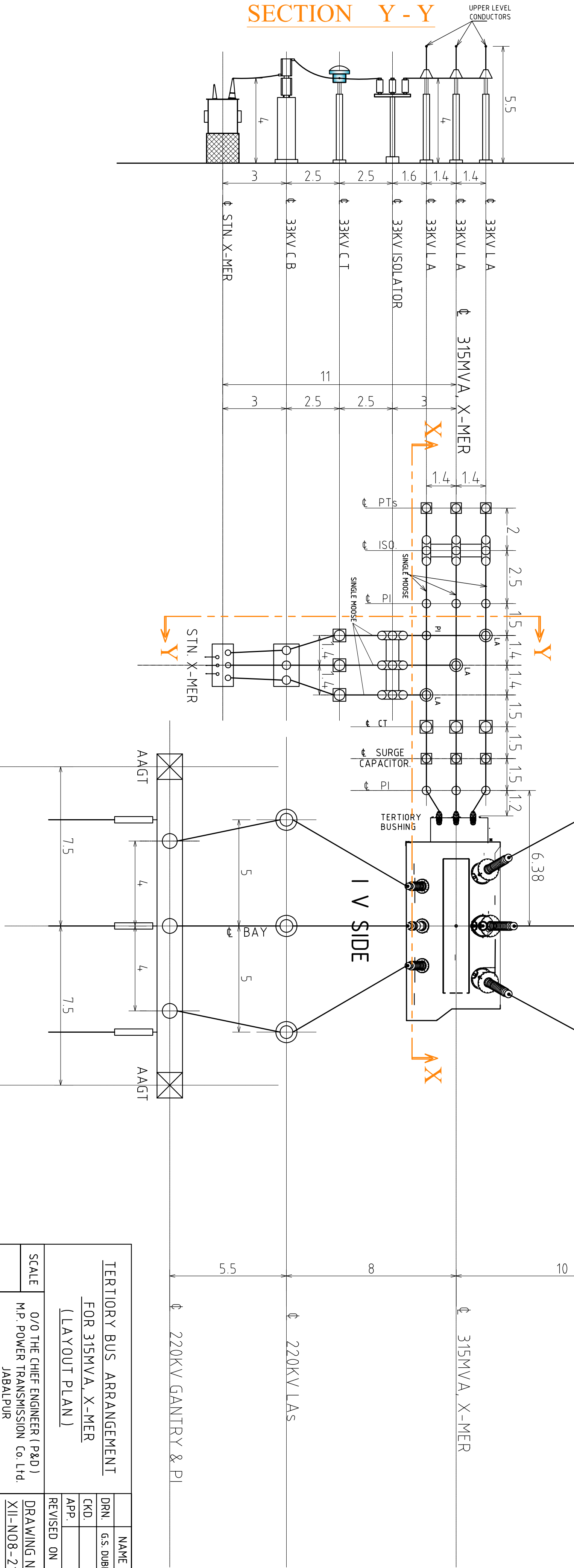
	RATIO	ACCURACY CLASS	BURDEN (VA)
SEC-1	220 kV/23 / 110V/23	3P	200
SEC-2	220 kV/23 / 110V/23	0.2	100
SEC-3	220 kV/23 / 110V/23	0.2	100

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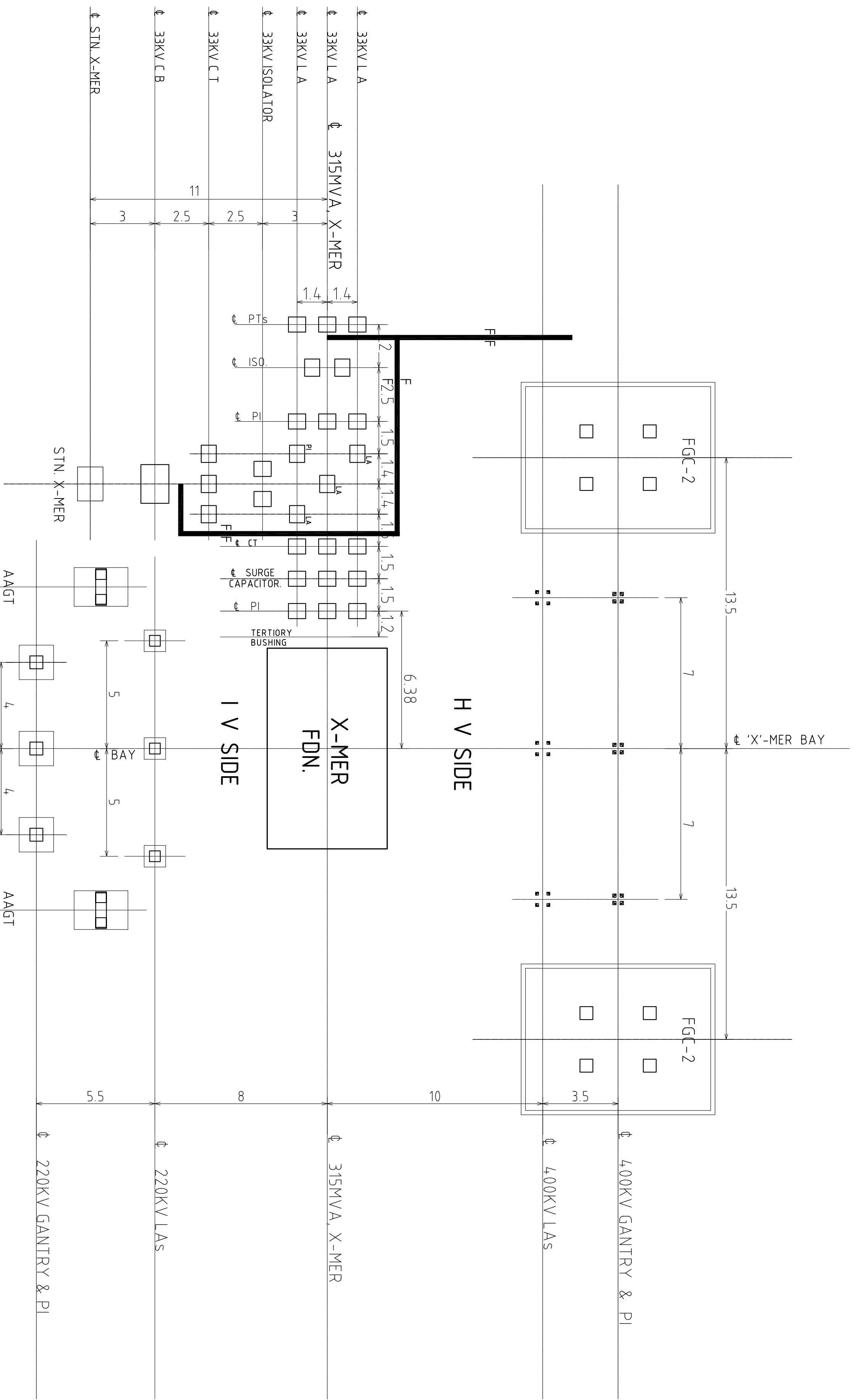
SECTION X - X



SECTION Y - Y



TERTIORY BUS ARRANGEMENT		NAME	DATE
FOR 315MVA, X-MER		DRN. G.S. DUBEY	03-09-14
(LAYOUT PLAN)		CKD.	
		APP.	
		REVISED ON	
SCALE	O/O THE CHIEF ENGINEER (P&D)	DRAWING NO. -	
	M.P. POWER TRANSMISSION Co. Ltd.	XII-N08-2137	
	JABALPUR		REV.



<u>TERTIORY BUS ARRANGEMENT</u> <u>FOR 315MVA, X-MER</u> <u>(FOUNDATION PLAN)</u>			NAME	DATE
		DRN.	G.S. DUBEY	03-09-11
		CKD.		
		APP.		
		REVISED ON		
SCALE	O/O THE CHIEF ENGINEER (P&D) M.P. POWER TRANSMISSION Co. Ltd. JABALPUR	DRAWING NO. -	REV	
		XII-N08--2138		