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COMPUTER DRG. PATH NAME :

SIGN & DATE

INVENTORY NO.

DRG. NO. TB-3-350-510-100-04

1

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN MM)

2

3

4

5

6

7

CVT PARAMETERS

400 kV LINE CVT

Ratio	$\frac{400kV}{\sqrt{3}} / \frac{110V}{\sqrt{3}} / \frac{110V}{\sqrt{3}} / \frac{110V}{\sqrt{3}}$
Sec-I	Class - 3P, 75VA
Sec-II	Class - 3P, 75VA
Sec-III	Class -0.2, 75VA
	Capacitance – 4400 pF

BILL OF QUANTITY – 400kV

S.NO.	SYMBOL	LEGEND	DESCRIPTION	BAY NO	QTY.
1		52	400kV, 2000A, 50kA FOR 1s, 3–PH CIRCUIT BREAKER WITHOUT PIR	405–52,406–52,410–52	03
2		89	400kV, 2000A, 50kA FOR 1s, 3–PH HCB ISOLATORS, MOTOR OPERATED WITH 1 E/S	404–89A,405–89A,405–89B,406–89A,406–89B, 406–89L,410–89B,410–89L	08
3		CT	400kV, 2000A, 50kA FOR 1s, 1–PH, 5–CORE CURRENT TRANSFORMER WITH 120% EXTENDED CURRENT RATING	405–CTA,406–CTA, 406–CTB,410–CTA,410–CTB,411–CTB	18
4		CVT	400kV, 4400 picoFarad, 1–PH CAPACITOR VOLTAGE TRANSFORMER	406–CVT,410–CVT	06
5		SA	390 kV, 10kA, 1–PH SURGE ARRESTER	406–SA,410–SA	06

CT PARAMETERS

400 kV, 2000A CT (5 CORE)

Core No.	Current Ratio	Accuracy Class	Output Burden (VA)	Min KPV (Volt)	Max Rct (Ohm)	Max Im at KPV (mA)	Purpose
1	2000-1000 / 1	PS	-	2000-1000	10-5	30-60	BUS DIFF. MAIN-1
2	2000-1000 / 1	PS	-	2000-1000	10-5	30-60	BUS DIFF. MAIN-2
3	2000-1000-500 / 1	0.2s ISF<= 5	20	-	-	-	METERING & SYNCH
4	2000-1000-500 / 1	PS	-	4000-2000-1000	10-5-2.5	30-60-120	LINE PROTIN
5	2000-1000-500 / 1	PS	-	4000-2000-1000	10-5-2.5	30-60-120	LINE PROTIN

MAIN SYSTEM PARAMETERS:

- NOMINAL VOLTAGE - 400kV
- HIGHEST SYSTEM VOLTAGE - 420kV
- RATED FREQUENCY - 60 HZ
- RATED SHORT TIME CURRENT - 50kA FOR 1 SEC
- POWER FREQUECY WITHSTAND VOLTAGE- 630kV (rms)
- LIGHTNING IMPULSE WITHSTAND VOLTAGE - ±1425 kV peak
- SWITCHING IMPULSE WITHSTAND VOLTAGE - ±1050 kV peak
- CREEPAGE - 25mm/kV (10500 mm)

NOTES :

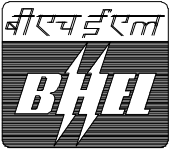
1. PRESENT _____
EXISTING -----

NAME OF CUSTOMER: NABINAGAR POWER GENERATING CO. PVT. LIMITED (NPGC)
NAME OF PROJECT : 400/132 KV SWITCHYARD PACKAGE AT NABINAGAR SUPER THERMAL POWER PROJECT (3 X 660 MW)

NTPC DRAWING NO. 0370–572–PVE–P–425

REF. DWG. 0270–572–PVE–P–002, REV–02

REV.	DATE	ALTD.	CHD.	APPD.	REV.	DATE	ALTD.	CHD.	APPD.		NAME	SIGN.	DATE
02	01.04.14	MM	MM/VK/DKM	RS	01	01.09.13	MM	MM/VK/DKM	RS	DRAWN	MM		31–07–13
										CHECKED	MM/VK/DKM		31–07–13
										APPROVED	RS		01–08–13
										DISTRIBUTION OF PRINTS			
										DEPT.	CODE		
										TBEM	422		



BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS GROUP

CARD CODE

400KV NABINAGAR TPP (BRBCL) EXTN – SINGLE LINE DIAGRAM

NEXT SHEET	02
SHEET No.	01

SCALE NTS W.O. No. 81004 DRG. No. TB–3–350–510–100–04 REV 02

[illegible]

DRG. NO. TB-3-350-510-100-03	1	2	3	4	5	6	7



COMPUTER DRG. PATH NAME :

SIGN & DATE

1. NOMINAL VOLTAGE - 33kV
2. HIGHEST SYSTEM VOLTAGE - 36kV
3. RATED FREQUENCY - 50 HZ
4. RATED SHORT TIME CURRENT - 25kA FOR 1 SEC
5. POWER FREQUENCY WITHSTAND VOLTAGE- 70KV (rms)
6. LIGHTNING IMPULSE WITHSTAND VOLTAGE - 170 kV peak
7. CREEPAGE - 25mm/kV (900 mm)

ISOLATOR WITHOUT E/S

ISOLATOR WITH 1 E/S

SURGE ARRESTOR

1. PRESENT _____
FUTURE/EXISTING _____

HOWEVER THE CIVIL AND STRUCTURAL WORKS FOR CABLE SEALING END IS UNDER BHEL SCOPE.

NAME OF CUSTOMER: NABINAGAR POWER GENERATING CO. PVT. LIMITED (NPGC)
NAME OF PROJECT : 400/132 KV SWITCHYARD PACKAGE AT NABINAGAR SUPER
THERMAL POWER PROJECT (3 X 660 MW)

BHARAT HEAVY ELECTRICALS LIMITED TRANSMISSION BUSINESS GROUP	CARD CODE
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SINGLE LINE DIAGRAM OF 33kV SWITCHYARD AT NABINAGAR STPP (3 X 660 MW)			NEXT SHEET	—
			SHEET No.	01
SCALE	NTS	W.O. No. 81004	DRG. No. TB-3-350-510-100-03	REV

(ALL DIMENSIONS ARE IN MM)

DRG. NO. TB-3-350-510-100-02

BILL OF QUANTITY - 132kV

SYMBOL	LEGEND	DESCRIPTION	BAY NO/LOCATION	QTY.
	52X	132kV, 2000A, 31.5kA FOR 1s, 3-PH CIRCUIT BREAKER WITHOUT PIR	103-52X,107-52X,108-52X,110-52X	4
	52Y	132kV, 1250A, 31.5kA FOR 1s, 3-PH CIRCUIT BREAKER WITHOUT PIR	101-52Y,102-52Y,104-52Y,106-52Y,109-52Y,112-52Y,114-52Y	7
	89V	132kV, 1250A, 31.5kA FOR 1s, 3-PH HCB TANDEM ISOLATOR MOTOR OPERATED, W/O E/S	101-89VA,102-89VA,104-89VA,106-89VA,109-89VA,112-89VA,114-89VA	7
	89W	132kV, 2000A, 31.5KA FOR 1s, 3-PH HCB ISOLATOR MOTOR OPERATED, WITH 1 E/S	107-89WA,107-89WB,108-89WA,108-89WB	4
	89X	132kV, 1250A, 31.5kA FOR 1s, 3-PH HCB ISOLATOR MOTOR OPERATED, WITH 1 E/S	101-89XB,102-89XB,104-89XB,106-89XB,109-89XB,112-89XB,114-89XB	7
	89Y	132kV, 2000A, 31.5kA FOR 1s, 3-PH HCB ISOLATOR MOTOR OPERATED, WITH 2 E/S	103-89YA,103-89YB,110-89YA,110-89YB	4
	89Z	132kV, 1250A, 31.5kA FOR 1s, 3-PH HCB ISOLATOR MOTOR OPERATED, WITH 2 E/S	101-89ZL,102-89ZL,104-89ZL,106-89ZL,109-89ZL,112-89ZL,114-89ZL	7
	CT1	132kV, 1200A, 31.5 kA FOR 1s, 1-PH, 5-CORE CURRENT TRANSFORMER WITH 150% EXTENDED CURRENT RATING	103-CT1,107-CT1,108-CT1,110-CT1	12
	CT2	132kV, 1200A, 31.5 kA FOR 1s, 1-PH, 5-CORE CURRENT TRANSFORMER WITH 120% EXTENDED CURRENT RATING	101-CT2,102-CT2,104-CT2,106-CT2,109-CT2,112-CT2,114-CT2	21
	CVT	132kV, 8800 picoFarad, 1-PH CAPACITOR VOLTAGE TRANSFORMER	BUS-I CVT, BUS-II CVT, BUS-III CVT, BUS-IV-CVT	12
	SA	120kV, 10kA, 1-PH SUREGE ARRESTERS	101-SA-1,101-SA-2,102-SA,104-SA-1,104-SA-2,106-SA,109-SA,112-SA,114-SA-1,114-SA-2	30

CVT PARAMETERS

132 kV CVT

Ratio	$\frac{132\text{kV}}{\sqrt{3}} / \frac{110\text{V}}{\sqrt{3}} / \frac{110\text{V}}{\sqrt{3}} / \frac{110\text{V}}{\sqrt{3}}$
Sec-I	Class - 3P, 75VA
Sec-II	Class - 3P, 75VA
Sec-III	Class -0.2, 75VA
	Capacitance – 8800 pF

CT PARAMETERS

132 kV, 1200A CT (5 CORE)

Core No.	Current Ratio	Accuracy Class	Output Burden (VA)	Min KPV (Volt)	Max Rct (Ohm)	Max Im at KPV (mA)	Purpose
1	1200-600-300 / 1	PS	-	1200-600-300	10-5-2.5	40-80-160	BUS DIFF MAIN-1
2	1200-600-300 / 1	PS	-	1200-600-300	10-5-2.5	40-80-160	BUS DIFF MAIN-2
3	1200-600-300 / 1	0.2 ISF <= 5	20	-	-	-	METERING & SYNCH.
4	1200-600-300 / 1	PS	-	1200-600-300	10-5-2.5	40-80-160	TRANS. BACKUP
5	1200-600-300 / 1	PS	-	1200-600-300	10-5-2.5	40-80-160	TRANS. DIFF./BUS DIFF.

MAIN SYSTEM PARAMETERS:

1. NOMINAL VOLTAGE - 132kV
2. HIGHEST SYSTEM VOLTAGE - 145kV
3. RATED FREQUENCY - 50 HZ
4. RATED SHORT TIME CURRENT - 31.5kA FOR 1 SEC
5. POWER FREQUENCY WITHSTAND VOLTAGE- 275kV (rms)
6. LIGHTNING IMPULSE WITHSTAND VOLTAGE - ±650 kV peak
8. CREEPAGE - 25mm/kV (3625 mm)

NOTES :

**1. PRESENT
FUTURE**

NAME OF CUSTOMER: NABINAGAR POWER GENERATING CO. PVT. LIMITED (NPGC)

NAME OF PROJECT : 400/132 KV SWITCHYARD PACKAGE AT NABINAGAR SUPER
THERMAL POWER PROJECT (3 X 660 MW)

NTPC DRAWING NO. 0370-572-PVE-P-423

REV.	DATE	ALTD.	CHD.	APPD.	REV.	DATE	ALTD.	CHD.	APPD.		NAME	SIGN.	DATE	बी.एच.ई.एल. BHEL							
02	21.09.13	MM/RD	MM/VK/DKM	RS	01	01.09.13	MM	MM/VK/DKM	RS	DRAWN	RK										
DRG. REVISED AS PER NTPC COMMENTS DATED 17.09.13 AND ACCURACY CLASS OF CT CORE-3 HAS BEEN CHANGED TO 0.2. AS PER CONTRACT SPECIFICATION.					DRG. REVISED AS PER NTPC COMMENTS DATED 21.08.13					CHECKED	MM/VK/DKM		31.07.13								
										APPROVED	RS		01.08.13								
										DISTRIBUTION OF PRINTS										DEPT.	CODE
																				TBEM	422



BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS GROUP

CARD CODE

132KV NABINAGAR (STPP)-SINGLE LINE DIAGRAM

NEXT SHEET	02
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SHEET No.	01
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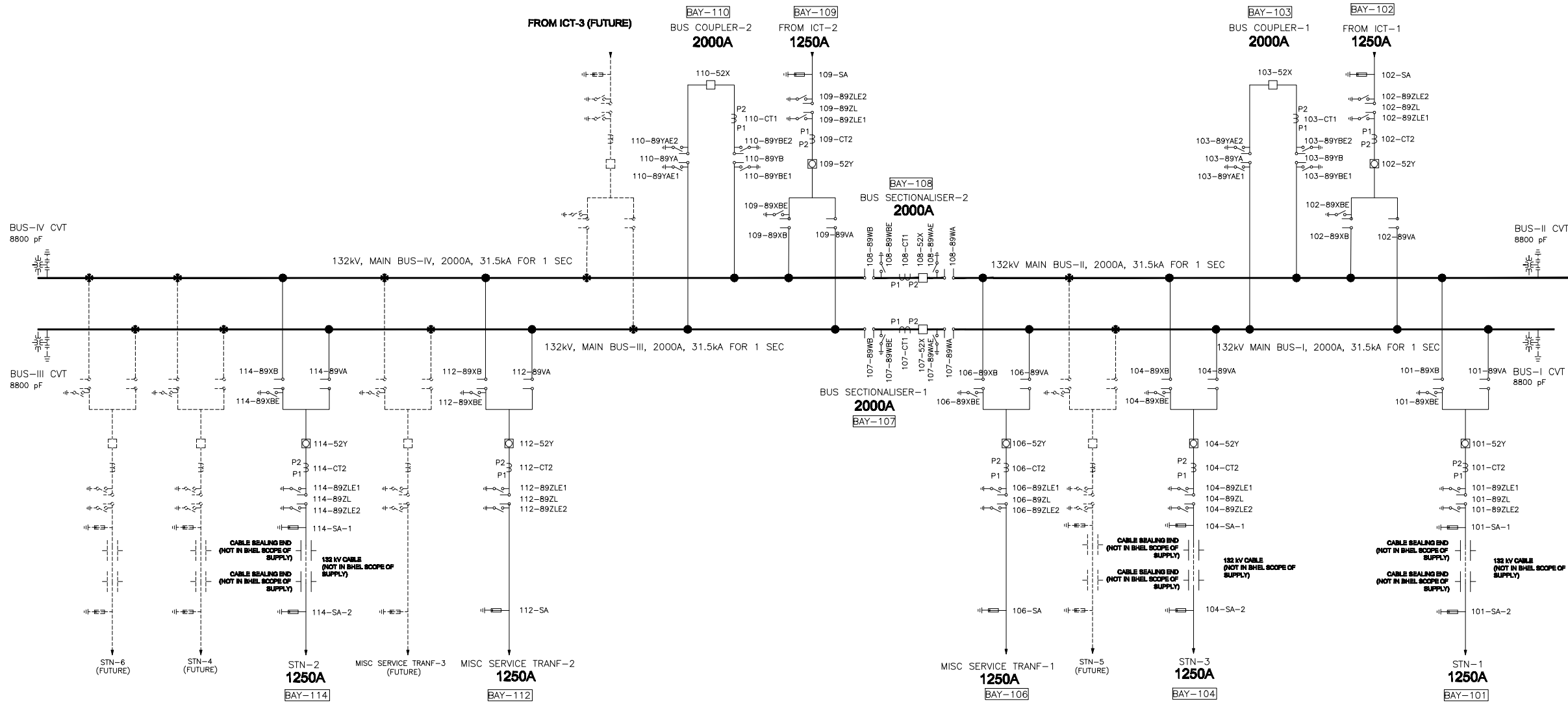
SCALE	NTS	W.O. No.	81004	DRG. No.	TB-3-350-510-100-02	REV 02
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FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN MM)

DRG. NO. TB-3-350-510-100-02



REF. DWG.
400KV SINGLE DIAGRAM - 0370-572-PVE-P-422
(TB-3-350-510-100-02)
NTPC DRG. NO. 0370-999-POE-J-001

NAME OF CUSTOMER: NABINAGAR POWER GENERATING CO. PVT. LIMITED (NPGC)
NAME OF PROJECT : 400/132 KV SWITCHYARD PACKAGE AT NABINAGAR SUPER
THERMAL POWER PROJECT (3 X 660 MW)

NTPC DRAWING NO. 0370-572-PVE-P-423

BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS GROUP

132KV NABINAGAR (STPP)-SINGLE LINE DIAGRAM

CARD CODE

NEXT SHEET

SHEET No.

REV 02

SCALE NTS W.O. No. 81004

DRG. No. TB-3-350-510-100-02

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COMPUTER DRG. PATH NAME :

SIGN & DATE

REV.	DATE	ALTD.	CHD.	APPD.	REV.	DATE	ALTD.	CHD.	APPD.
02	17.09.13	MM/RD	MM/VK/DKM	RS	01	01.09.13	MM	MM/VK/DKM	RS

DRG. REVISED AS PER NTPC
COMMENTS DATED 17.09.13
ACCURACY CLASS OF CT CORE-3
HAS BEEN CHANGED TO 0.2.
AS PER CONTRACT SPECIFICATION.

DRG. REVISED AS PER NTPC
COMMENTS DATED 21.08.13

NAME	SIGN.	DATE
DRAWN RK		
CHECKED MM/VK/DKM		31.07.13
APPROVED RS		01.08.13

DISTRIBUTION OF PRINTS



DEPT. TBEM
CODE 422

SCALE NTS

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COMPUTER DRG. PATH NAME :

SIGN & DATE

INVENTORY NO.

DRG. NO. TB-3-350-510-100-01	1	2	3	4	5	6	7
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BILL OF QUANTITY – 400kV

SYMBOL	LEGEND	DESCRIPTION	BAY NO/LOCATION	QTY. (Nos.)
	52X	400kV, 3150A, 50kA FOR 1s, 3–PH CIRCUIT BREAKER WITHOUT PIR	401–52X,402–52X,403–52X,404–52X,405–52X,406–52X,410–52X,411–52X	8
	52Y	400kV, 2000A, 50kA FOR 1s, 3–PH CIRCUIT BREAKER WITHOUT PIR	409–52Y,413–52Y,414–52Y,415–52Y,420–52Y,421–52Y,423–52Y,424–52Y,428–52Y,429–52Y	10
	52Z	400kV, 2000A, 50kA FOR 1s, 3–PH CIRCUIT BREAKER WITHOUT PIR, WITH CONTROLLED SWITCHING FACILITY	407–52Z,408–52Z	2
	89X	400kV, 3150A, 50kA FOR 1s, 3–PH HCB ISOLATORS, MOTOR OPERATED WITH 1 E/S	401–89XA,401–89XB,401–89XL,402–89XA,402–89XB,403–89XA,403–89XB,404–89XA,404–89XB,404–89XL,405–89XA,405–89XB,406–89XA,406–89XB,406–89XL,410–89XA,410–89XB,410–89XL,411–89XA,411–89XB,412–89XA	21
	89Y	400kV, 2000A, 50kA FOR 1s, 3–PH HCB ISOLATORS, MOTOR OPERATED WITH 1 E/S	403–89YL,407–89YB,407–89YL,408–89YA,408–89YB,409–89YB,409–89YL,413–89YA,413–89YB,413–89YL,414–89YA,414–89YB,415–89YA,415–89YB,415–89YL,419–89YA,420–89YA,420–89YB,421–89YA,421–89YB,421–89YL,422–89YA,423–89YA,423–89YB,424–89YA,424–89YB,424–89YL,428–89YA,428–89YB,428–89YL,429–89YA,429–89YB,430–89YA	33
	89Z	400kV, 2000A, 50kA FOR 1s, 3–PH HCB ISOLATORS, MOTOR OPERATED WITH 2 E/S	407–89ZA,409–89ZA	2
	CT1	400kV, 3000A, 50kA FOR 1s, 1–PH, 5–CORE CURRENT TRANSFORMER WITH 120% EXTENDED CURRENT RATING	401–CT1A,401–CT1B,402–CT1A,402–CT1B,403–CT1A,404–CT1A, 404–CT1B,405–CT1A,405–CT1B,406–CT1A,406–CT1B,410–CT1A,410–CT1B,411–CT1A	42
	CT2	400kV, 2000A, 50kA FOR 1s, 1–PH, 5–CORE CURRENT TRANSFORMER WITH 120% EXTENDED CURRENT RATING	403–CT2B,407–CT2A,408–CT2A,408–CT2B,409–CT2A,409–CT2B,413–CT2A,413–CT2B,414–CT2A,414–CT2B,415–CT2A,415–CT2B,420–CT2B,421–CT2A,421–CT2B,423–CT2B,424–CT2A,424–CT2B,428–CT2A,428–CT2B,429–CT2A	63
	CVT	400kV, 4400 picoFarad, 1–PH CAPACITOR VOLTAGE TRANSFORMER	BUS–I CVT,BUS–II CVT,403–CVT,409–CVT,413–CVT,424–CVT,428–CVT,401–CVT,404–CVT,406–CVT,410–CVT	33
	SA	390 kV, 10kA, 1–PH SURGE ARRESTER	401–SA,403–SA,403–SA–GT,404–SA,406–SA,407–SA,409–SA,409–SA–GT,410–SA,413–SA,413–SA–GT,415–SA,421–SA,424–SA,428–SA	45
	WT	400kV, 3150A, 1mH, 1–PH WAVE TRAP	406–WT,410–WT,401–WT,404–WT	8

CT PARAMETERS

400 kV, 3000A CT (5 CORE)

Core No.	Current Ratio	Accuracy Class	Output Burden (VA)	Min KPV (Volt)	Max Rct (Ohm)	Max Im at KPV (mA)	Purpose
1	3000-2000-1000 / 1	FS	-	3000-2000-1000	15-10-5	20-30-60	BUS DIFF. MAIN-1
2	3000-2000-1000 / 1	FS	-	3000-2000-1000	15-10-5	20-30-60	BUS DIFF. MAIN-2
3	3000-2000-1000-500 / 1	0.2s ISF <= 5	20	-	-	-	METERING & SYNCH
4	3000-2000-1000-500 / 1	FS	-	6000-4000-2000-1000	15-10-5-2.5	20-30-60-120	TRANS BACKUP/LINE PROTIN
5	3000-2000-1000-500 / 1	FS	-	6000-4000-2000-1000	15-10-5-2.5	20-30-60-120	TRANS DIFF /LINE PROTIN

400 kV, 2000A CT (5 CORE)

Core No.	Current Ratio	Accuracy Class	Output Burden (VA)	Min KPV (Volt)	Max Rct (Ohm)	Max Im at KPV (mA)	Purpose
1	2000-1000 / 1	FS	-	2000-1000	10-5	30-60	BUS DIFF. MAIN-1
2	2000-1000 / 1	FS	-	2000-1000	10-5	30-60	BUS DIFF. MAIN-2
3	2000-1000-500 / 1	0.2s ISF <= 5	20	-	-	-	METERING & SYNCH
4	2000-1000-500 / 1	FS	-	4000-2000-1000	10-5-2.5	30-60-120	TRANS BACKUP/LINE PROTIN
5	2000-1000-500 / 1	FS	-	4000-2000-1000	10-5-2.5	30-60-120	TRANS DIFF /LINE PROTIN

CVT PARAMETERS

400 KV CVT

Ratio	400kV / 110V / 110V / 110V √3 √3 √3 √3
Sec-I	Class - 3P, 75VA
Sec-II	Class - 3P, 75VA
Sec-III	Class-0.2, 75VA Capacitance – 4400 pF

400 KV LINE CVT

Ratio	400kV / 110V / 110V / 110V √3 √3 √3 √3
Sec-I	Class - 3P, 75VA
Sec-II	Class - 3P, 75VA
Sec-III	Class-0.2, 75VA Capacitance – 8800 pF

MAIN SYSTEM PARAMETERS:

- 1. NOMINAL VOLTAGE - 400kV
- 2. HIGHEST SYSTEM VOLTAGE - 420kV
- 3. RATED FREQUENCY - 50 HZ
- 4. RATED SHORT TIME CURRENT - 50kA FOR 1 SEC
- 5. POWER FREQUECY WITHSTAND VOLTAGE- 630kV (rms)
- 6. LIGTHNING IMPULSE WITHSTAND VOLTAGE - ±1425 kV peak
- 7. SWITCHING IMPULSE WITHSTAND VOLTAGE - ±1050 kV peak
- 8. CREEPAGE - 25mm/kV (10500 mm)

NOTES :

- 1. WAVE TRAPS WOULD BE IN TWO PHASES OF LINES ONLY.
- 2. PRESENT _____
- FUTURE _____

NAME OF CUSTOMER: NABINAGAR POWER GENERATING CO. PVT. LIMITED (NPGC)

NAME OF PROJECT : 400/132 KV SWITCHYARD PACKAGE AT NABINAGAR SUPER THERMAL POWER PROJECT (3 X 660 MW)

NTPC DRAWING NO. 0370–572–PVE–P–422

BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS GROUP

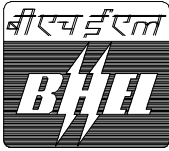
CARD CODE

400kV NABINAGAR (STPP) – SINGLE LINE DIAGRAM

NEXT SHEET	02
SHEET No.	01

SCALE NTS W.O. No. 81004 DRG. No. TB–3–350–510–100–01 REV 03

REF. DWG.
132kV SINGLE DIAGRAM – 0370–572–PVE–P–423
(TB–3–350–510–100–02)
NTPC DRG. NO. 0370–999–POE–J–001



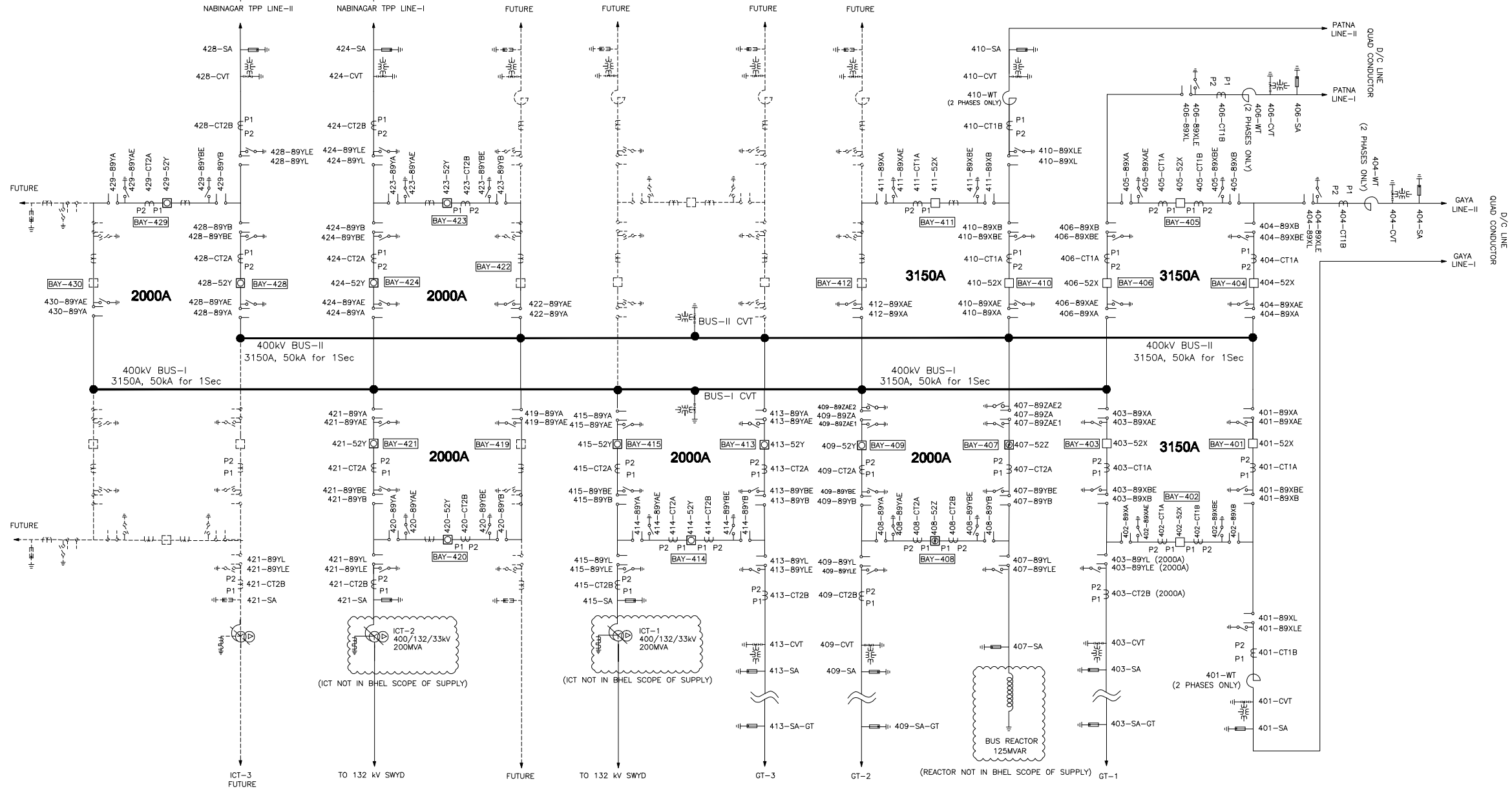
REV.	DATE	ALTD.	CHD.	APPD.		NAME	SIGN.	DATE
01	01.09.13	MM	MM/VK/DKM	RS	DRAWN	RK		
					CHECKED	MM/VK/DKM		31.07.13
					APPROVED	RS		01.08.13
DISTRIBUTION OF PRINTS								

DEPT.	CODE
TBEM	422

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN MM)

DRG. NO. TB-3-350-510-100-01

D/C LINE (OPGW)
TO NABINAGAR TPP



REV.	DATE	ALTD.	CHD.	APPD.
03	02.04.14	MM/RD	MM/VK/DKM	RS

CVT & WT RATING FINALISED

REV.	DATE	ALTD.	CHD.	APPD.
02	24.09.13	MM/RD	MM/VK/DKM	RS

DRG. REVISED AS PER NTPC
COMMENTS DATED 19.09.13

REV.	DATE	ALTD.	CHD.	APPD.
01	01.09.13	MM	MM/VK/DKM	RS

DRG. REVISED AS PER NTPC
COMMENTS DATED 21.08.13

	NAME	SIGN.	DATE
DRAWN	RK		

CHECKED	MM/VK/DKM		31.07.13
APPROVED	RS		01.08.13

DISTRIBUTION OF PRINTS



DEPT.	CODE
TBEM	422

REF. DWG.
132kV SINGLE DIAGRAM - 0370-572-PVE-P-423
(TB-350-510-100-02)
NTPC DRG. NO. 0370-999-POE-J-001

NAME OF CUSTOMER: NABINAGAR POWER GENERATING CO. PVT. LIMITED (NPGC)
NAME OF PROJECT : 400/132 KV SWITCHYARD PACKAGE AT NABINAGAR SUPER
THERMAL POWER PROJECT (3 X 660 MW)

NTPC DRAWING NO. 0370-572-PVE-P-422

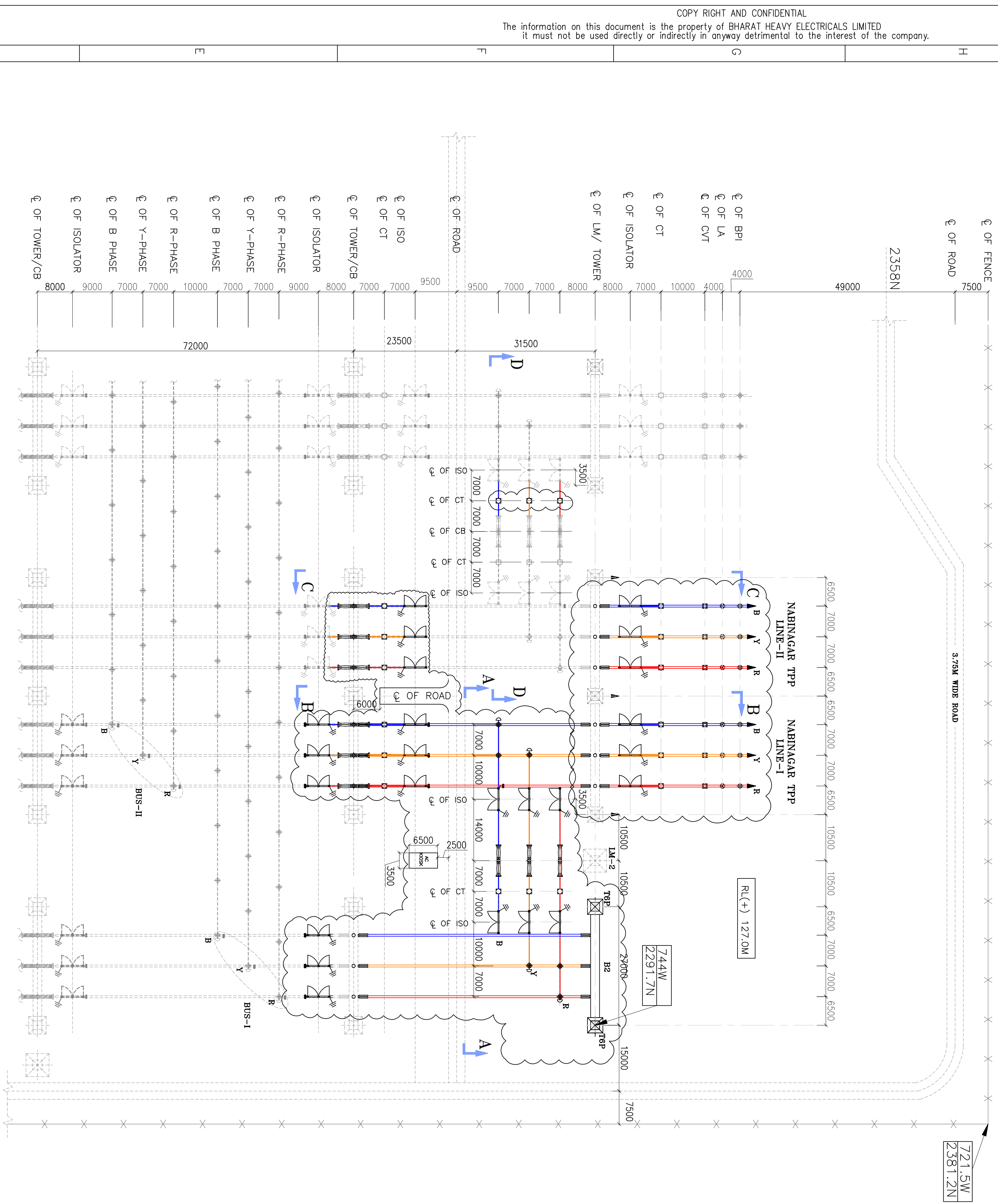
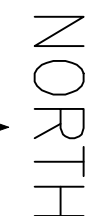
BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS GROUP

400kV NABINAGAR (STPP) - SINGLE LINE DIAGRAM

CARD CODE

NEXT SHEET	-
SHEET No.	02

SCALE NTS W.O. No. 81004 DRG. No. TB-3-350-510-100-01 REV 03



LEGEND : 400 kV EQUIPMENTS

SYMBOL	EQUIPMENT
	400kV, 2000A, 50kA FOR 1s, 3-PH CIRCUIT BREAKER WITHOUT PIR
	400kV, 2000A, 50kA FOR 1s, 3-PH HCB ISOLATORS, MOTOR OPERATED WITH 1 E/S
	400 kV, 2000A, 50kA FOR 1SEC, 5 CORE 1 PHASE, CURRENT TRANSFORMER WITH 120% EXTENDED CURRENT RATING
	400 kV, 4400pF, 1 PHASE, CAPACITOR VOLTAGE TRANSFORMER
	390 kV, 10 kA, 1 PHASE, SURGE ARRESTOR
	400 kV, BKN, 1 PHASE, SOLID CORE BUS POST INSULATOR

LEGEND

	TOWER WITH PEAK
	TOWER WITHOUT PEAK
	SUSPENSION INSULATOR STRING (25 DISCS PER STRING SET)
	DOUBLE TENSION INSULATOR STRING (25 DISCS/1 TENSION INSULATOR STRING)
	4 INCH IPS AL. TUBE
	ACSR MOOSE CONDUCTOR
	END CAP/CORONA BELL FOR BUSBAR
	SHIELD WIRE (10.98MMØ)

SYSTEM PARAMETERS

S.No	DESCRIPTION OF PARAMETER	400kV SYSTEM
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) ii) SWITCHING IMPULSE WITHSTAND VOLTAGE (250/2500microsec.) DRY & WET iii) ONE MINUTE POWER FREQUENCY TRANSFORMER DRY & WET WITHSTAND VOLTAGE (rms)	±1425kVp ±1050kVp 630kV (rms)
6	CORONA EXTINCTION VOLTAGE (MIN)	320kV
7	MAX. RADIO INTERFERENCE VOLTAGE FOR FREQUENCY BETWEEN 0.5mhz & 2Mhz AT 267KV rms	1000 microV
8	MIN. CREEPAGE DISTANCE	25MM/KV (10300 MM)
9	MIN. CLEARANCE i) PHASE TO PHASE ii) PHASE TO EARTH iii) SECTIONAL CLEARANCE	4000MM 3500MM 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/PHASE
14	MAIN BUS 1 & 2 JACK BUS EQUIPMENT INTER CONNECTION	4" AL TUBE TWIN ACSR MOOSE 4" AL TUBE/TWIN ACSR MOOSE
15	MAIN BUS & EQUIPMENT CONNECTION LEVEL (FROM PLINTH)	8000MM

LEGENDS:-

PRESENT SCOPE
NOT IN BHEL SCOPE

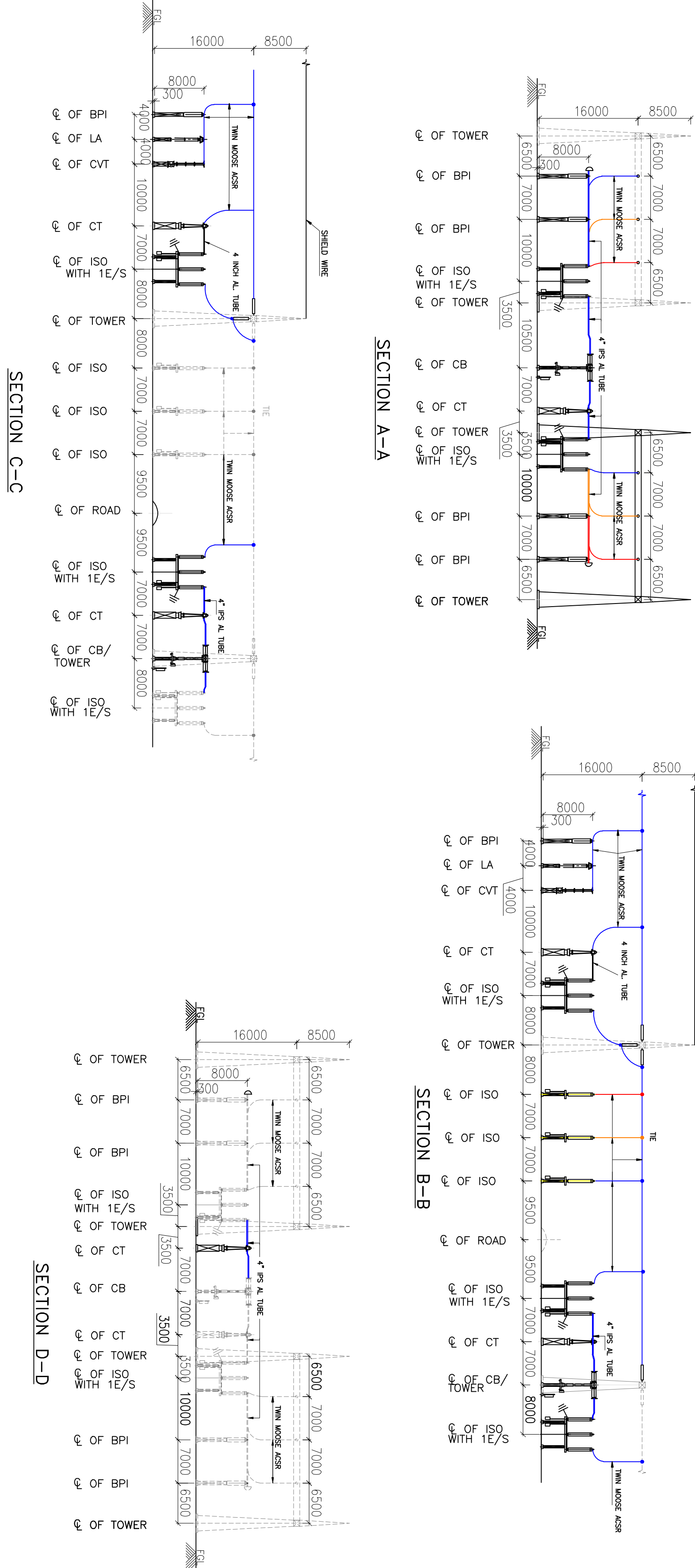
NOTES:

- ALL DIMENSIONS ARE IN MM. UNLESS NOTIFIED OTHERWISE.
- ALL STRUCTURE/CONDUCTOR HEIGHTS ARE ABOVE PLINTH LEVEL. PLINTH LEVEL IS 300 MM ABOVE G.L. (GROUND LEVEL)
- TYPE OF GANTRY STRUCTURES SHALL BE AS PER APPROVED STRUCTURAL LAYOUT DRAWING.
- SA PRESSURE RELIEF VALVE SHALL NOT BE TOWARDS ANY EQUIPMENT
- THIS DRG. SHALL BE READ IN CONJUNCTION WITH SLD AND TECHNICAL SPEC.
- FGL CORRESPONDS TO RL(+)-127.00M.

2. Please measure and fix dimensions for fitting & tapping provision.

REF.DWG

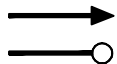
NTPC TENDER DRG. NO. 0370-572-POE-A-011 REV 0
SINGLE LINE DIAGRAM 0370-572-PVE-P-425
NABNAGAR TPP LAYOUT PLAN & SECTION 0270-572-PVE-F-302



INVENTORY No.	SIGN. & DATE	REF. DRG. No.	COMPUTER DRG. PATH NAME :
A	A	B	C
12	11	10	9
8	7	6	5
4	3	2	1
ADDITIONAL INFORMATION			
W.O.No. 81004			
STATUS OF DRAWING			
DISTRIBUTION OF PRINTS			
NAME OF CUSTOMER/PROJECT 400/132kV SWITCHYARD PACKAGE AT NABNAGAR STPP (3x560MM)			
NTPC DRAWING NO. 0370-572-PVE-F-450			
DATE 05.08.13			
DRAWN KULDEEP			
CHECKED MM			
APPROVED RS			
DATE 06.08.13			
TITLE			
400KV NABNAGAR TPP (BRBC) EXTN-LAYOUT PLAN & SECTION			
DRAWING NO. TB-1-350-316-031			
REV. 03			
SHEET No. 01			
NEXT SHEET			

REV.	DATE	ALTERED RJ	REV.	DATE	ALTERED RJ	REV.	DATE	ALTERED
		CHECKED MS/DKM			CHECKED MS/DKM	00		CHECKED
		APPD RS			APPD RS			APPD
						JOB No. 81004		

LEGEND



CONNECTION TO GROUND MAT THROUGH RISER.

CONNECTION TO ROD ELECTRODE WITH TREATED PIT.

GENERAL NOTES:

- EARTH STRIP CLEATED TO LATTICE /PIPE TYPE STRUCTURE AT AN INTERVAL OF 1.0M SUITABLE PROVISION SHALL BE MADE WITH SUPPORT STRUCTURE.
- ALL EARTH STRIPS SHALL BE TAKEN ALONG EDGE OF STRUCTURE. DRAWING SHOWS TYPICAL ARRANGEMENT ONLY.
- ALL STRUCTURES/EQUIPMENTS SHALL BE EARTHED AS SHOWN IN THE FOLLOWING SHEETS.
- BOLT SIZE FOR CONNECTING EARTHING FLAT TO THE EQPT/STRUCTURE SHALL BE TO SUIT RESPECTIVE HOLE SIZE.
- ALL EARTHING SHALL BE DONE IN ACCORDANCE WITH IS:3043 UNLESS OTHERWISE STATED IN TECHNICAL SPECIFICATION
- ~~TWO EARTHING STRIPS CAN BE CONNECTED TO ONE RISER.~~
- EACH RISER OF A PARTICULAR EQUIPMENT SHALL BE CONNECTED TO A DIFFERENT EARTHROD (EITHER HORIZONTAL OR VERTICAL CONDUCTORS OF MAIN EARTHMAT).
- FOR WELDING DETAILS REFER SHEET #20 & 21
- E/WIRE DOWN CONDUCTOR SHALL BE CLEATED AT AN INTERVAL OF 2.0 M ALONG WITH STRUCTURE.

SL.NO.	ITEM	NABINAGAR STPP	NABINAGAR TPP(EXTN)	TOTAL
01.	75X12 GI FLAT	86.9 MT	9.54 MT	96.44 MT
02.	50X6 GI FLAT	7.32 MT	0.6 MT	7.92 MT

Quantity shall be as per actual requirements

SHEET NO. DESCRIPTION

- TITLE
- NOTES
- 400kV & 132kV SF6 CIRCUIT BREAKER
- 400kV & 132 kV CVT
- 400kV, 132kV & 33kV POST INSULATOR (SOLID CORE TYPE)
- LIGHTNING ARRESTER (390kV, 120kV & 30 kV)
- MARSHALLING KIOSK
- 400kV HORIZONTAL CENTER BREAK ISOLATOR (TYPICAL) WITH ONE EARTH SWITCH
- 132kV HORIZONTAL CENTER BREAK ISOLATOR WITH ONE EARTH SWITCH
- 132kV HORIZONTAL CENTER BREAK ISOLATOR WITH TWO EARTH SWITCH
- 33kV HORIZONTAL CENTER BREAK ISOLATOR WITHOUT EARTH SWITCH
- 33kV HORIZONTAL CENTER BREAK ISOLATOR WITH ONE EARTH SWITCH
- 132kV HORIZONTAL CENTER BREAK ISOLATOR WITHOUT EARTH SWITCH
- TOWER WITH PEAK
- TOWER WITHOUT PEAK
- LIGHTNING MAST
- 400kV & 132kV CURRENT TRANSFORMER
- CABLE TRENCH
- PIPE EARTH ELECTRODE WITH TREATED PIT
- ROD EARTH ELECTRODE WITHOUT TEST PIT
- ROD EARTH ELECTRODE WITH TEST PIT

SHEET NO. DESCRIPTION

- RAIL BONDING
- TRANSFORMER
- AUXILIARY EARTH MAT FOR ISOLATOR MAIN MECH.,E/S MECH. BOX
- CONTROL AND RELAY PANELS
- BUS REACTOR.
- GATE/FENCE POST
- TYPICAL ARRANGEMENT OF BOLTED JOINTS
- WELDING DETAILS
- WELDING DETAILS
- 400 kV WAVE TRAP

NTPC DRAWING NO. 0370-572-PVE-F-442				
CUSTOMER NABINAGAR POWER GENERATING CO. PVT. LTD. (NPGC)				
PROJECT : NABINAGR STPP (3X660 MW) 400/132kV SWITCHYARD PACKAGE				
CONTRACTOR 	BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION NEW DELHI	DEPT CODE DRN CHD APPD	NAME RK SK DKM/RS	SIGN
TITLE Equipment Earthing Philosophy & Details				
DEPT.	SCALE	DRAWING NO. TB-4-350-316-017		
SIGN		SHEET 01 OF 22		
DATE		REV. 00		

1. RISER FROM THE EARTH GRID SHALL BE 40MM DIAMETER MILD STEEL ROD. RISER SHALL RISE FROM THE GROUND ALONG THE NEAREST EQUIPMENT FOUNDATION/BUILDING COLUMN/WALL TO AVOID ANY OBSTRUCTION TO MOVEMENT OF PERSONNEL.
 2. CONNECTION TO ALL EQUIPMENT AND TOWERS SHALL BE BY BOLTED JOINTS. CONTACT SURFACES SHALL BE THOROUGHLY CLEANED BEFORE CONNECTIONS. EQUIPMENT BOLTED CONNECTIONS AFTER BEING TESTED AND CHECKED SHALL BE PAINTED WITH ANTI CORROSIVE PAINT/COMPOUND.
 3. CONNECTIONS BETWEEN EQUIPMENT EARTHING LEADS AND BETWEEN MAIN EARTHING CONDUCTORS SHALL BE OF WELDED TYPE. FOR RUST PROTECTION THE WELDS SHOULD BE TREATED WITH RED LEAD COMPOUND AND AFTERWARDS THICKLY COATED WITH BITUMEN COMPOUND.
THE SURFACES TO BE WELDED SHALL BE CLEANED OF DIRT, OIL, GREASE AND OXIDES BEFORE WELDING. ANY OXIDE FILMS THAT MAY HAVE FORMED DURING WELDING MUST BE REMOVED FROM THE WELDED JOINT.
 4. EARTHING CONDUCTOR FOR EQUIPMENT SHALL BE OF GALVANISED M.S. OF SIZE 75x12 mm.
THE CONDUCTOR BELOW THE GROUND LEVEL SHALL BE 40 mm DIA **BLACK** MS ROD.
 5. IN THE ATTACHED DRAWINGS GL REPRESENTS GROUND LEVEL.
 6. ALL THE EQUIPMENTS SHALL BE EARTHED AT TWO POINTS WITH 75x12 mm. G.S. FLAT EVEN THOUGH THEY ARE SHOWN OR NOT IN THE DRAWING DUE TO CLARITY.
 7. ALL JUNCTION BOXES, OPERATING MECHANISAM BOXES, **GROUND MOUNTED** CONTROL CABINETS SHALL BE EARTHED AT TWO POINTS WITH 50x6mm G.S. FLAT BY TWO SEPARATE AND DISTINCT EARTH CONNECTERS.
- However ground mounted boxes shall be earthed at two points with 75x12 mm GS flat at two separate and distinct earthing rod of grid.**
8. EARTHING CONDUCTORS FROM EQUIPMEMT STRUCTURES SHALL BE CONNECTED TO THE NEAREST POSSIBLE EARTH MAT RISER. EQUIPMENT EARTHING SHALL BE AS PER IS 3043.
 9. ALL JOINTS BETWEEN 40 DIA M.S. ROD AND 75x12 mm. G.S. FLAT SHALL BE BELOW GRAVEL LEVEL.
 10. FOR WELDED JOINTS LOW HYDROGEN CONTENT ELECTRODES SHALL BE USED.
 11. METTALIC SHEATHS/SCREENS, AND ARMOUR OF MULTI CORE CABLES SHALL BE EARTHED AT BOTH ENDS.
METTALIC SHEATHS AND ARMOUR OF SINGLE CORE CABLES SHALL BE EARTHED **AT SWITCHGEAR END ONLY**
UNLESS OTHERWISE INSTRUCTED BY THE EMPLOYER **AS PER STANDARDS**
 12. EQUIPMENT BOLTED CONNECTIONS AFTER BEING TESTED AND CHECKED SHALL BE PAINTED WITH ANTI CORROSIVE PAINT/COMPOUND.
 13. LOCATION OF EARTHING CONDUCTORS/RISERS SHOWN IN THE EARTHING DRAWING MAY CHANGE TO SUIT THE SITE CONDITION.
 14. FOR SURGE ARRESTER, EARTHING LEAD FROM SURGE COUNTER TO MAIN EARTHMAT SHALL BE SHORTEST IN LENGTH AS PRACTICALLY AS POSSIBLE.
 15. AN ADDITIONAL AUXILIARY GRID OF 1500MMX1500MM COMPRISING OF CLOSELY SPACED(300MMX300MM) 40 DIA CONDUCTORS AT A DEPTH OF 300MM FROM FINISHED GROUND LEVEL SHALL BE PROVIDED BELOW THE OPERATING HANDLE OF ISOLATORS AND EARTH SWITCHES. THIS GRID SHALL BE CONNECTED TO THE MAIN GROUND GRID. THE EARTH CONNECTION TO OPERATING HANDLE SHALL BE MADE OF FLEXIBLE CONNECTION. THE MOM BOX OF THE ISOLATOR TO BE CONNECTED TO THIS AUX. GRID.
 16. ALL NON CURRENT CARRYING METALIC PARTS SHALL BE EARTHED AT TWO DIFFERENT PLACES.
 17. ALL EQUIPMENT DRAWINGS SHOWN ARE INDICATIVE ONLY.
 18. WELDING OF EARTHING CONDUCTOR SHALL BE CONNECTED IN VERTICAL PLANE WHEREVER POSSIBLE.
 19. MS ROD SHALL BE AS PER GRADE-A DESIGNATION Fe410WA OF IS 2062-2011 OR GREADE SAE 1018 AS PER ASTM A 576-90B.

Rod shall be spec requirements/ approval

Pl refer Annexure-I of Chapter-E13 of tech spec for earthing requirements.

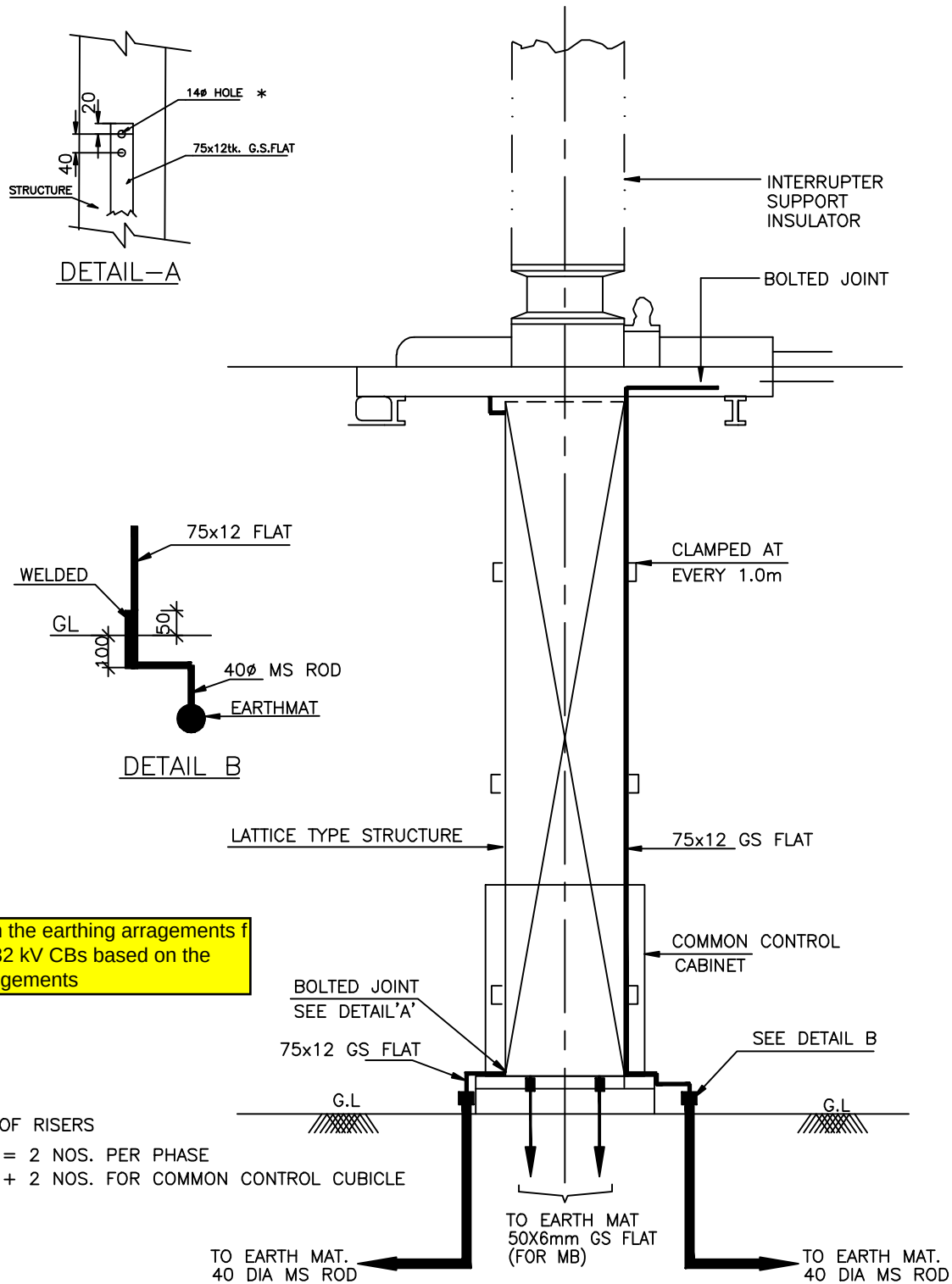


EQUIPMENT EARTHING DETAILS NOTES

DRG. No.

TB-4-350-316-017

SHEET No.
1A



Please furnish the earthing arrangements for 400kV & 132 kV CBs based on the general arrangements



EQUIPMENT EARTHING DETAILS

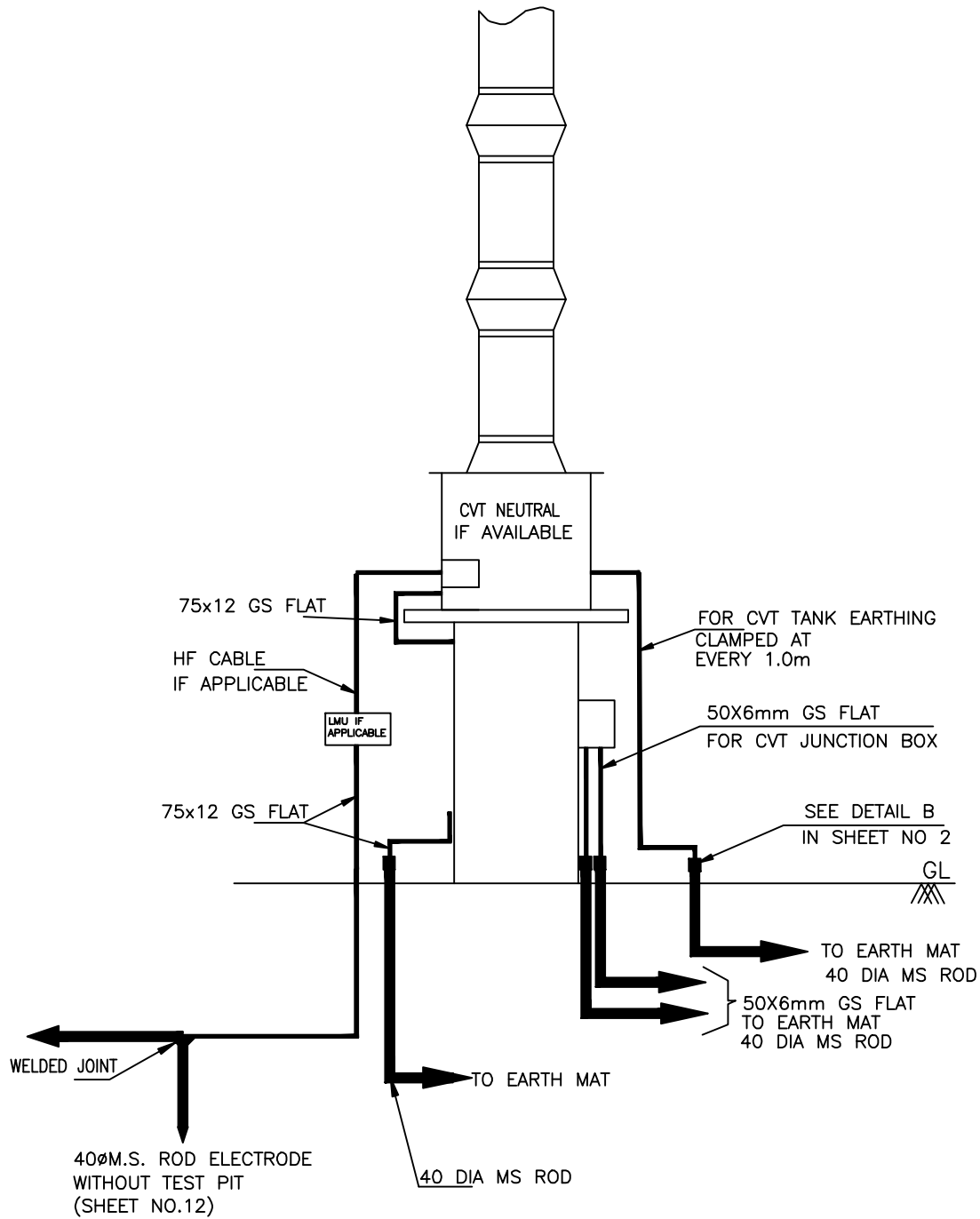
400kV & 132kV SF6 CIRCUIT BREAKER

COMPUTER REF. NO.

DRG. No.

TB-4-350-316-017

SHEET No.
2



NOS.OF RISERS

= 2 NOS. PER PHASE

+ 2 NOS. FOR CVT JUNCTION BOX

ROD ELECTRODE = 1 NO. PER CVT IF NEUTRAL IS CONNECTED TO GROUND VIA LMU



EQUIPMENT EARTHING DETAILS

400kV & 132kV CVT

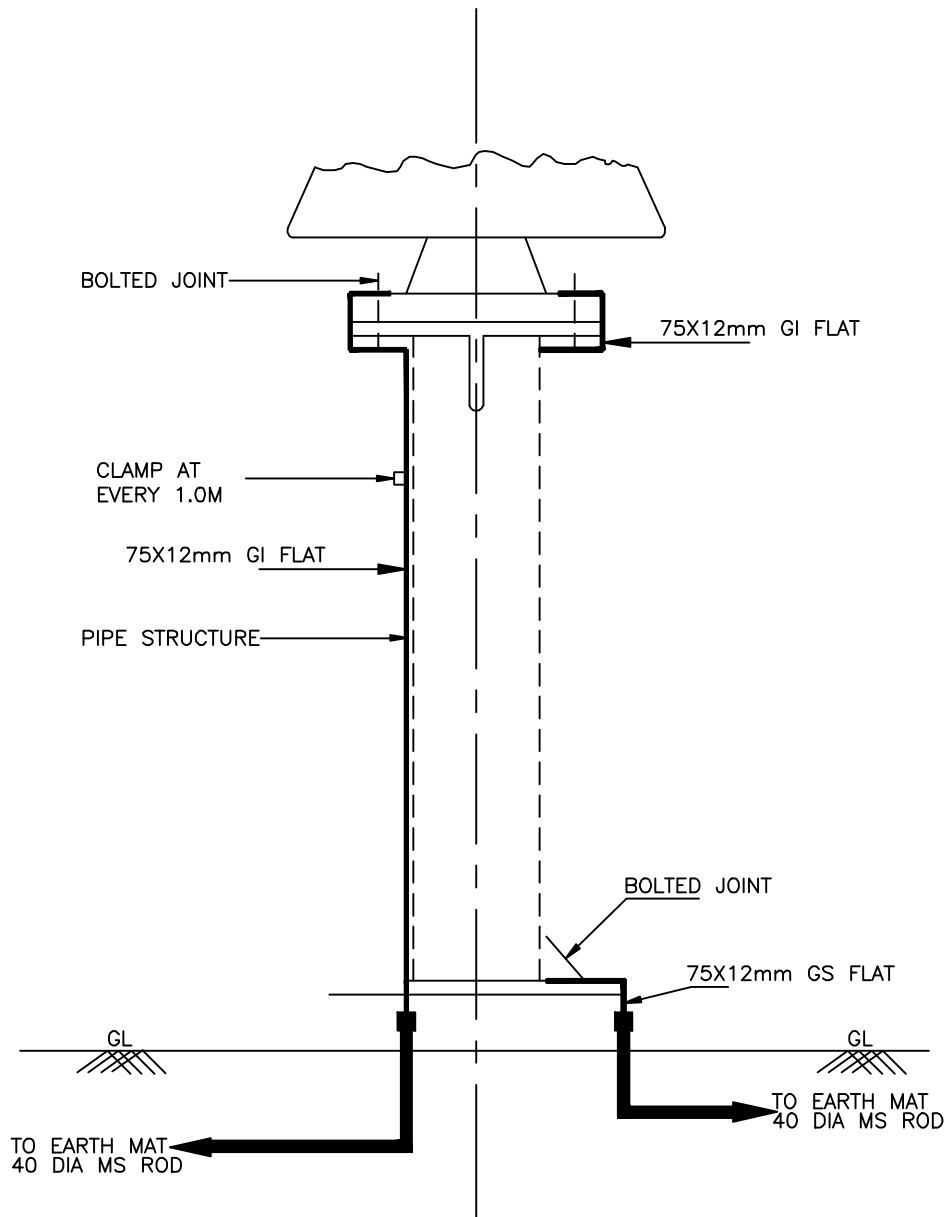
COMPUTER REF. NO.

DRG. No.

TB-4-350-316-017

SHEET No.

3



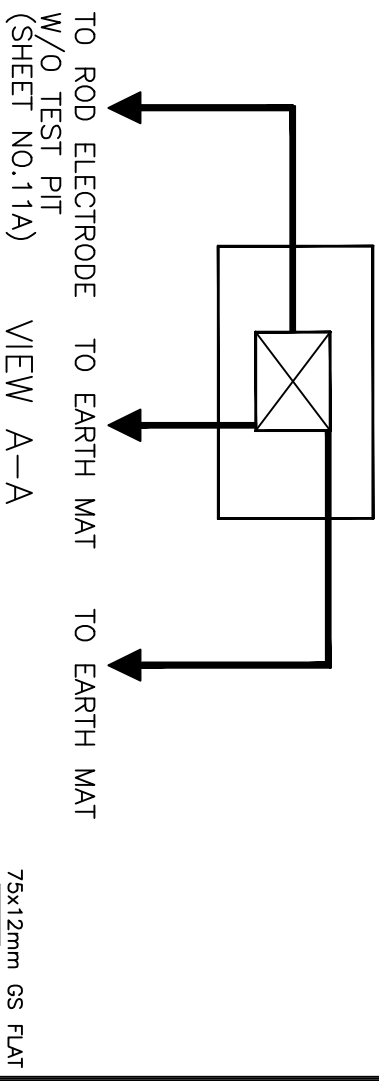
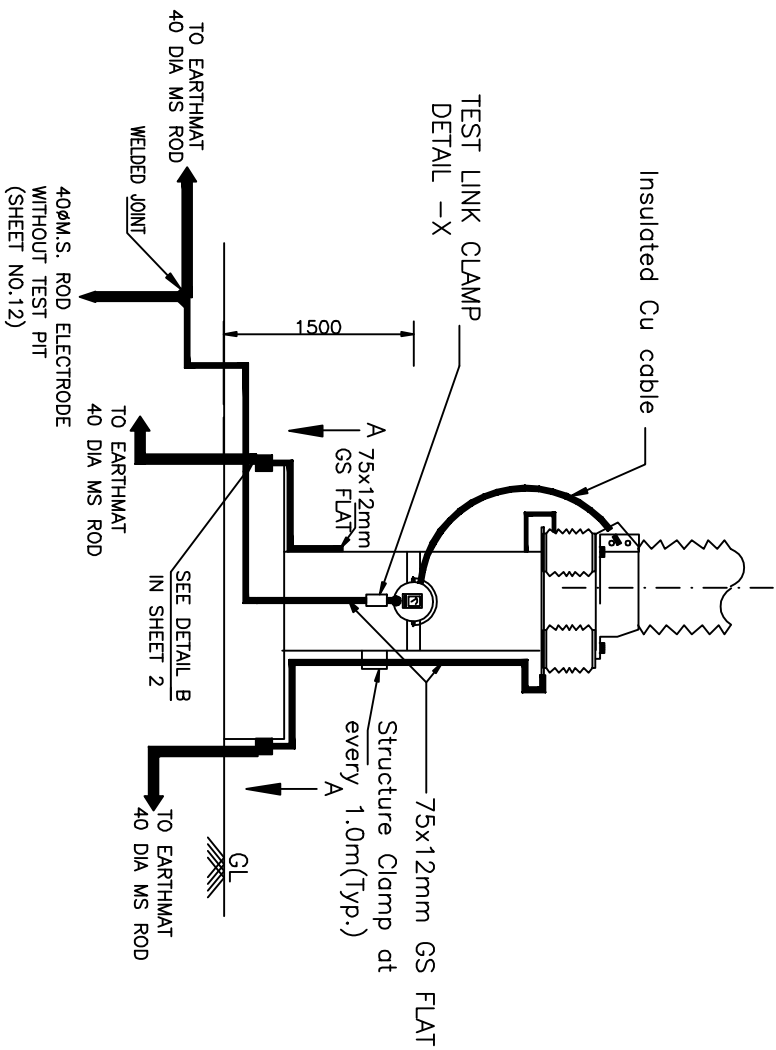
NOS.OF RISERS = 2 NOS.



EQUIPMENT EARTHING DETAILS 400kV, 132kV & 33kV POST INSULATOR (SOLID CORE TYPE)

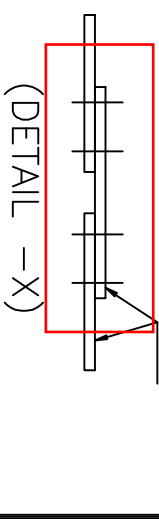
DRG. No. TB-4-350-316-017

SHEET No.
4



NOTES;

1. LA SHALL BE EARTHED THROUGH EARTH TERMINAL OF SURGE COUNTER
2. NO. OF ROD ELECTRODE : 1 NO. PER PHASE, NO OF RISERS = 2 NOS. PER PHASE.
3. TEST LINK SHALL HAVE PROVISION TO BOLT TEST LEAD BEFORE ISOLATING THE MAIN EARTHING CONNECTIONS (AS PER SKETCH ABOVE) = 1NO.



Please furnish the dimensions and details of not & Bolts



EQUIPMENT EARTHING DETAILS LIGHTNING ARRESTER (390kV, 120kV & 30 kV)

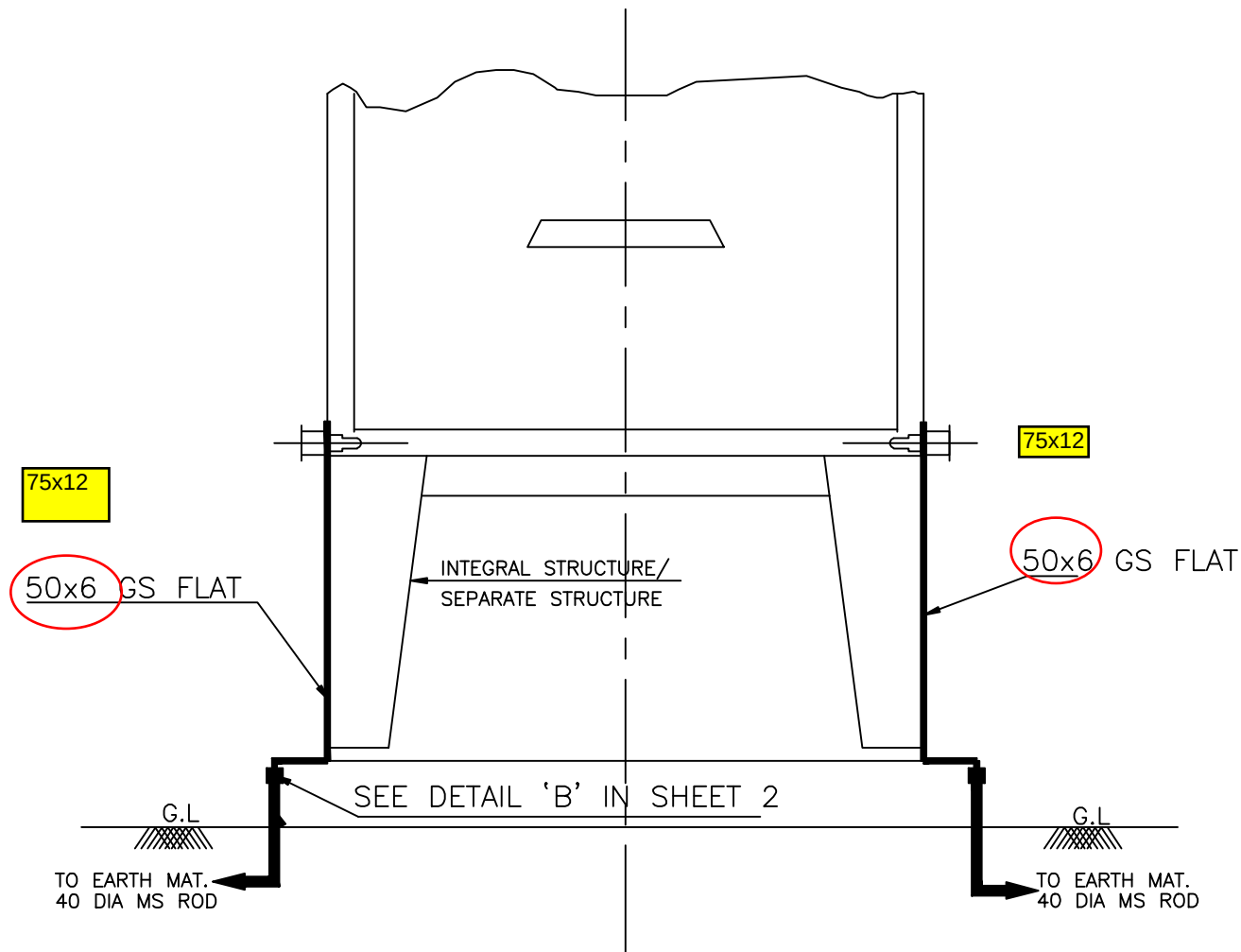
COMPU. DRG. REF.

DRG.NO.

TB-4-350-316-017

SHEET No.

5



NOS.OF RISERS = 2 NOS.



EQUIPMENT EARTHING DETAILS

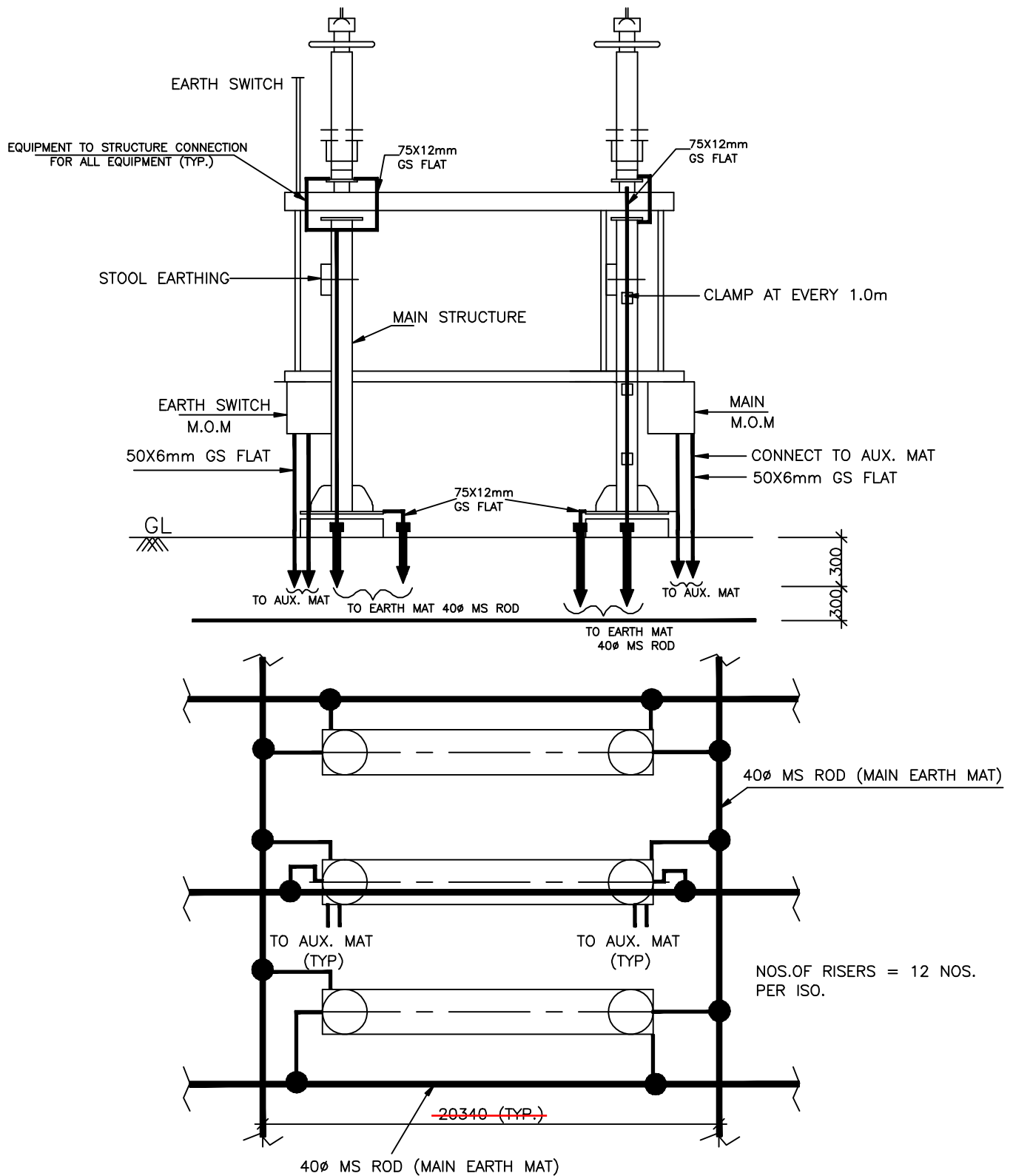
MARSHALLING KIOSK

COMPUTERREF.NO.

DRG. No.

TB-4-350-316-017

SHEET No.
6



NOTES

1. AUXILIARY EARTH MAT SHALL BE PROVIDED BELOW EVERY MOM BOX (REFER SHEET 15)

● RISER

M/s BHEL to ensure the Isolator arrangement drawing



EQUIPMENT EARTHING DETAILS

400KV HORIZONTAL CENTER BREAK ISOLATOR (TYPICAL) WITH ONE EARTH SWITCH

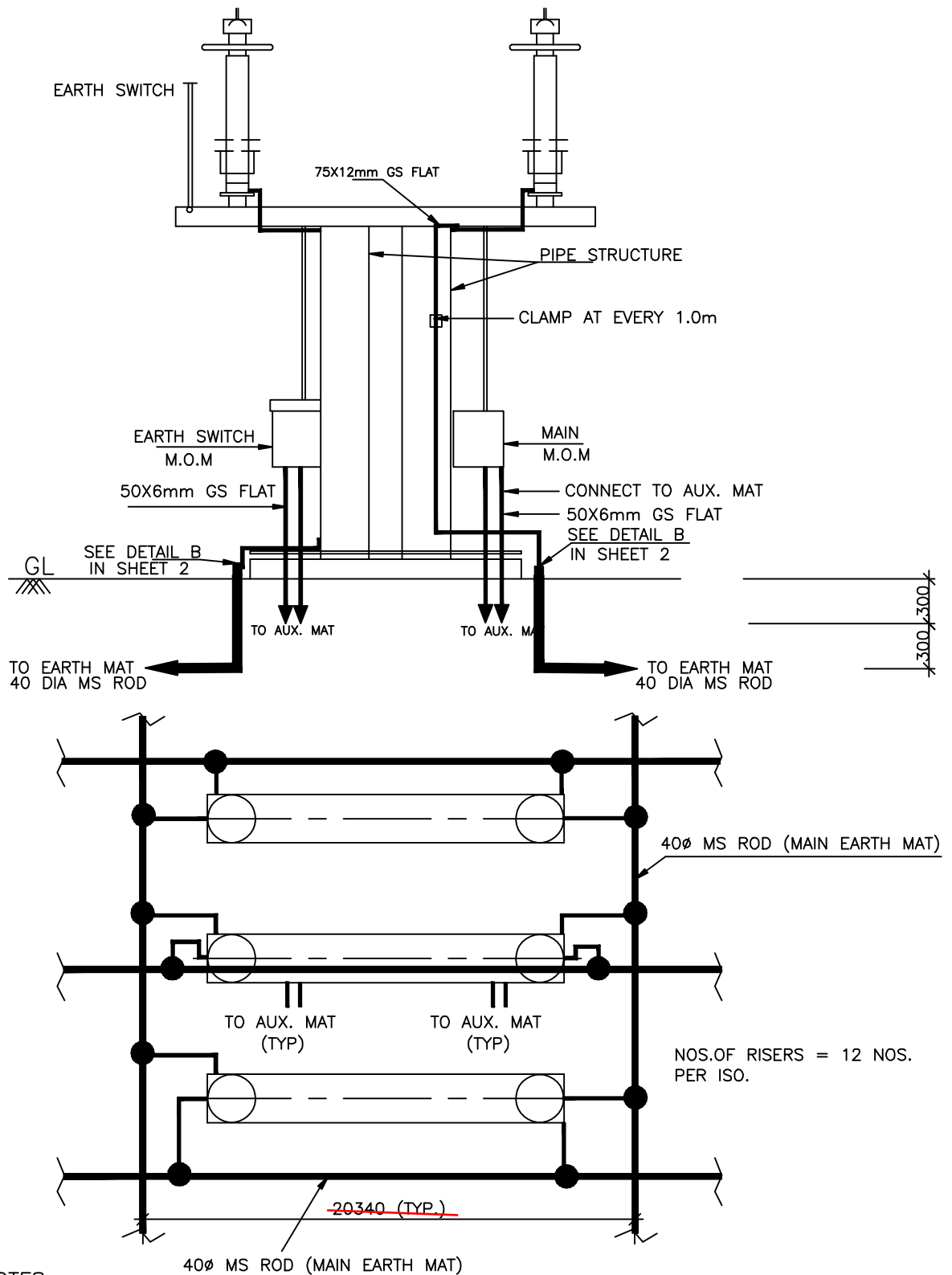
COMPUTERREF.NO.

DRG. No.

TB-4-350-316-017

REV. 00

SHEET No.
7A



NOTES

- AUXILIARY EARTH MAT SHALL BE PROVIDED NEAR EVERY MOM BOX (REFER SHEET 15)
- RISER

M/s BHEL to ensure the Isolator arrangement drawing



EQUIPMENT EARTHING DETAILS

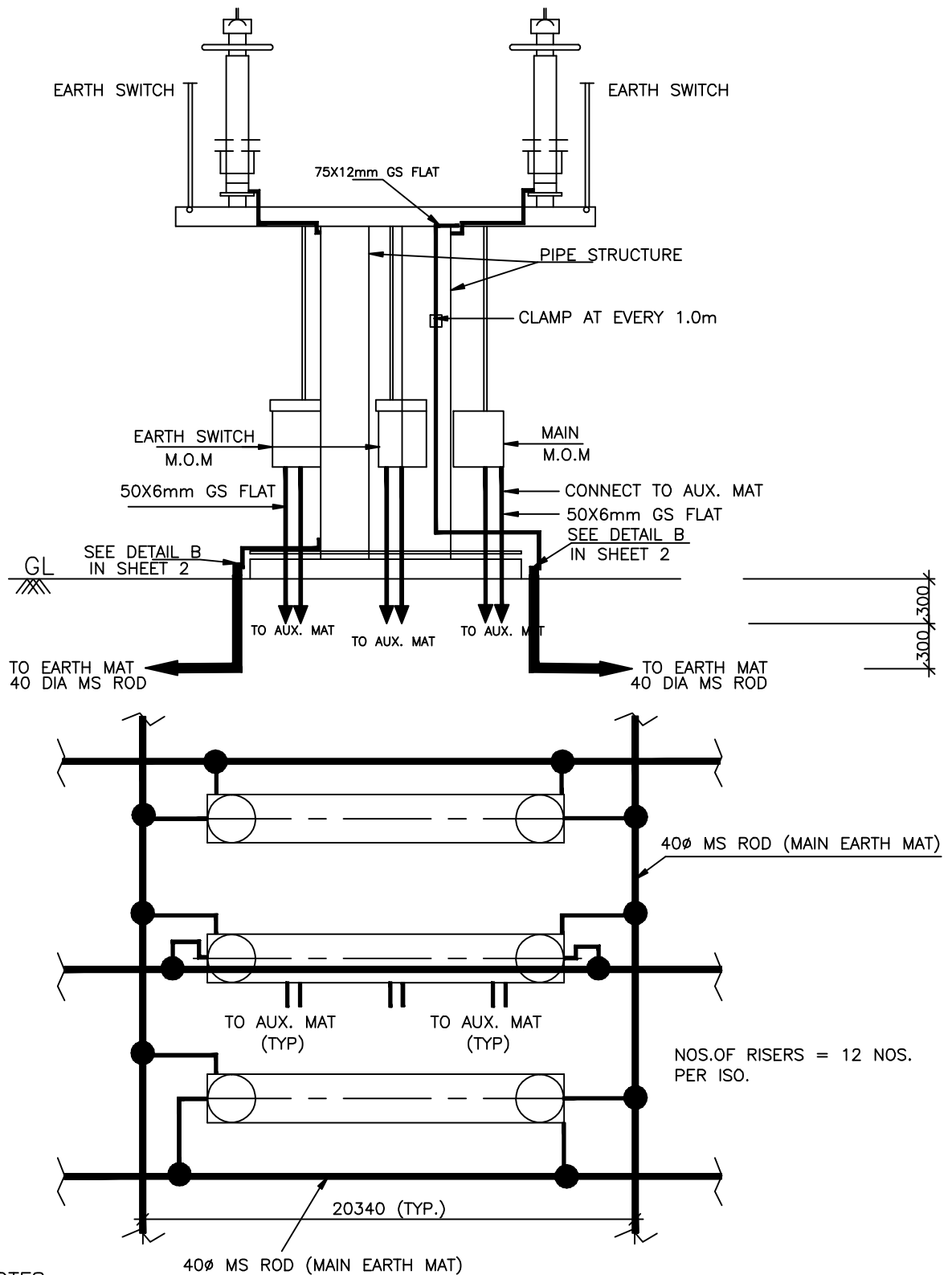
132 kV HORIZONTAL CENTER BREAK ISOLATOR WITH ONE EARTH SWITCH

COMPUTERREF.NO.

DRG. No.

TB-4-350-316-017

SHEET No.
7B



NOTES

- AUXILIARY EARTH MAT SHALL BE PROVIDED NEAR EVERY MOM BOX (REFER SHEET 15)
- RISER

M/s BHEL to ensure the Isolator arrangement drawing



EQUIPMENT EARTHING DETAILS

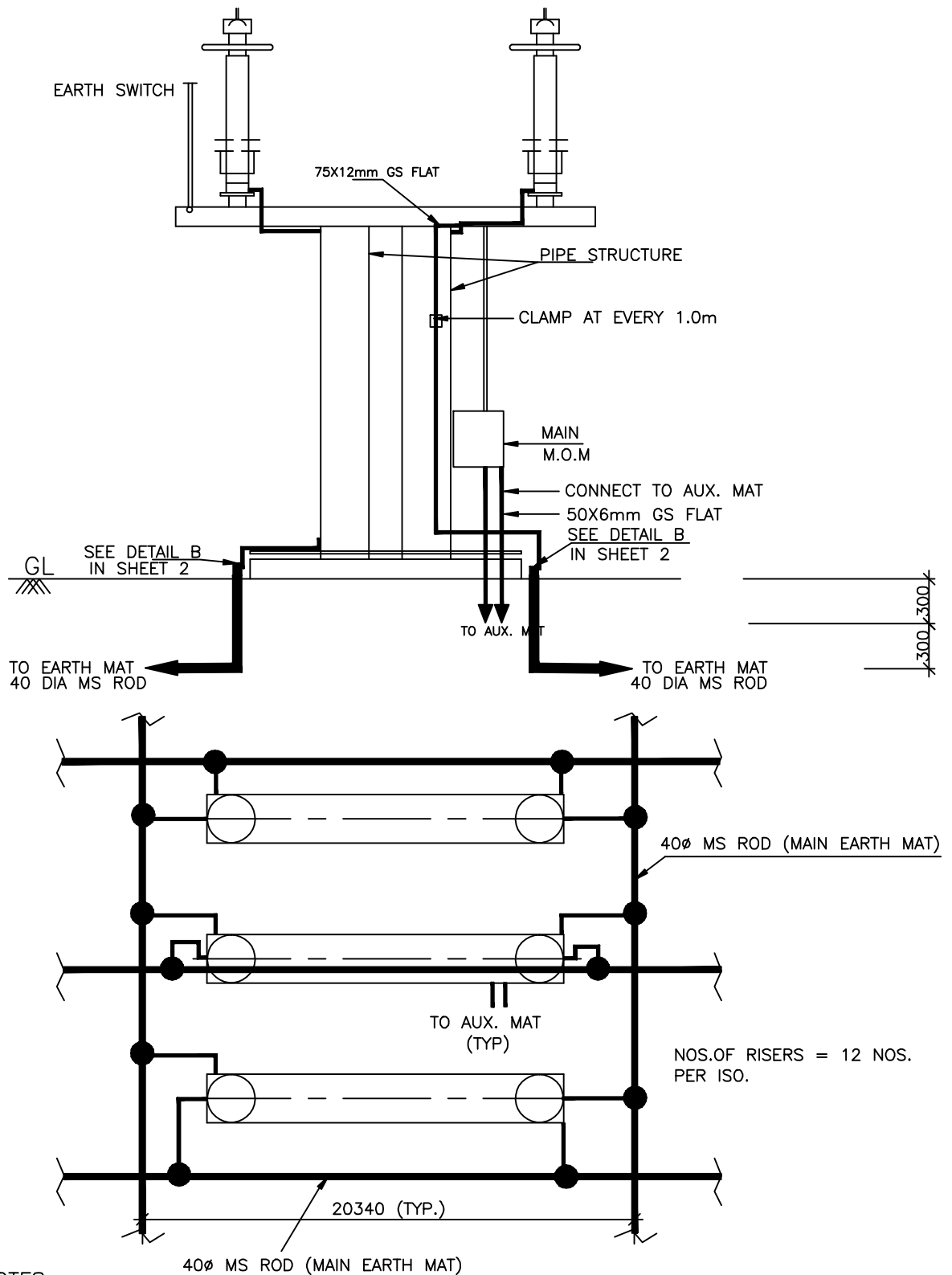
132kV HORIZONTAL CENTER BREAK ISOLATOR WITH TWO EARTHSWITCHES

COMPUTERREF.NO.

DRG. No.

TB-4-350-316-017

SHEET No.
7C



NOTES

- AUXILIARY EARTH MAT SHALL BE PROVIDED NEAR EVERY MOM BOX (REFER SHEET 15)
- RISER

M/s BHEL to ensure the Isolator arrangement drawing



EQUIPMENT EARTHING DETAILS

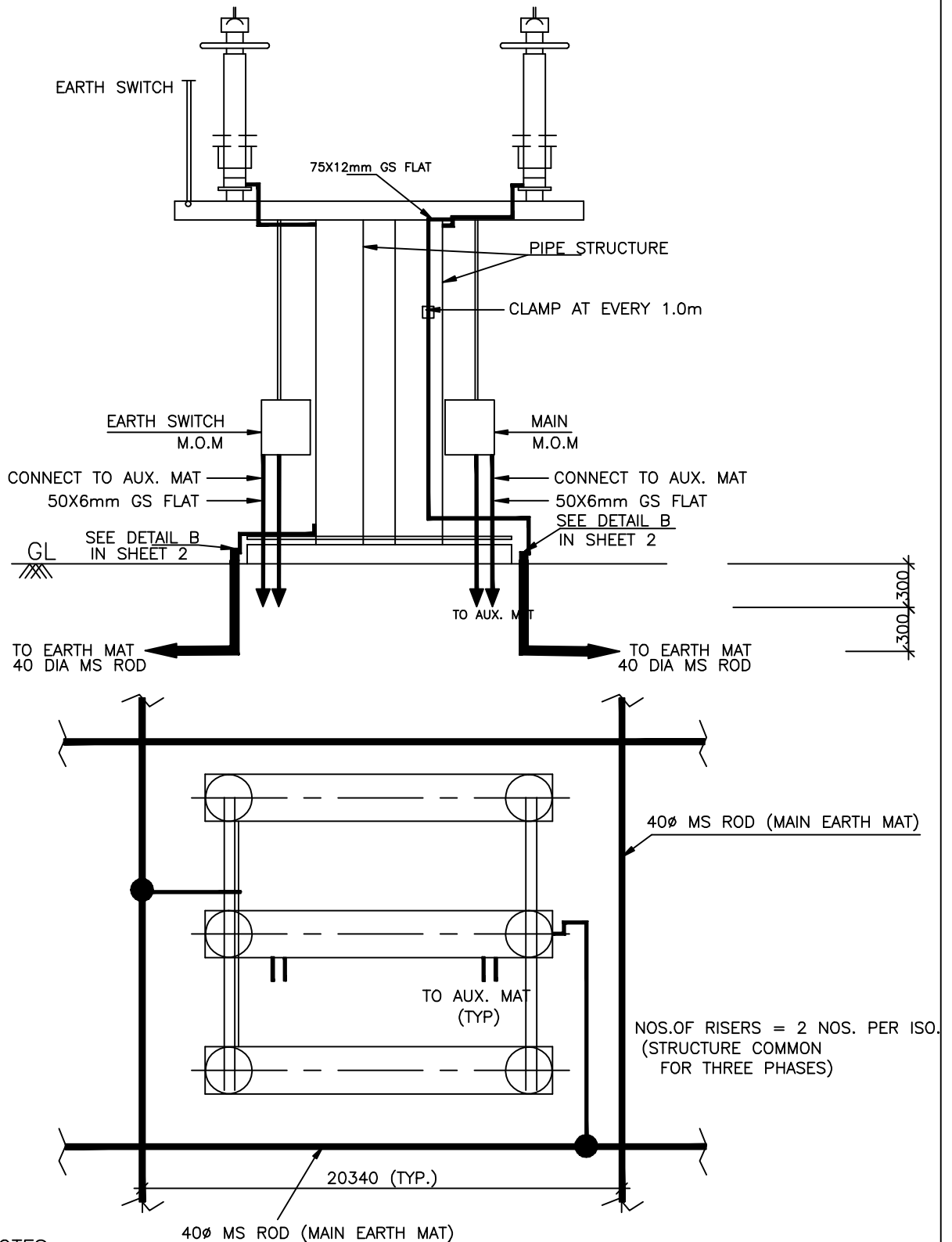
132kV HORIZONTAL CENTER BREAK ISOLATOR WITHOUT EARTHSWITCH

COMPUTERREF.NO.

DRG. No.

TB-4-350-316-017

SHEET No.
7D



NOTES

1. AUXILIARY EARTH MAT SHALL BE PROVIDED NEAR EVERY MOM BOX (REFER SHEET 15)

● RISER

M/s BHEL to ensure the Isolator arrangement drawing



EQUIPMENT EARTHING DETAILS

33kV HORIZONTAL CENTER BREAK

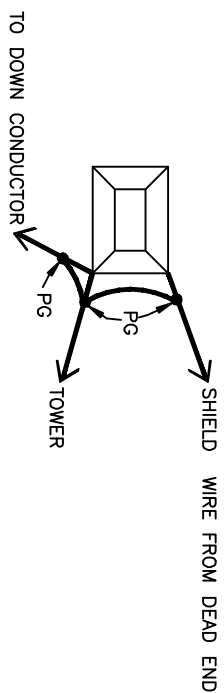
ISOLATOR WITH EARTH SWITCH

COMPUTERREF.NO.

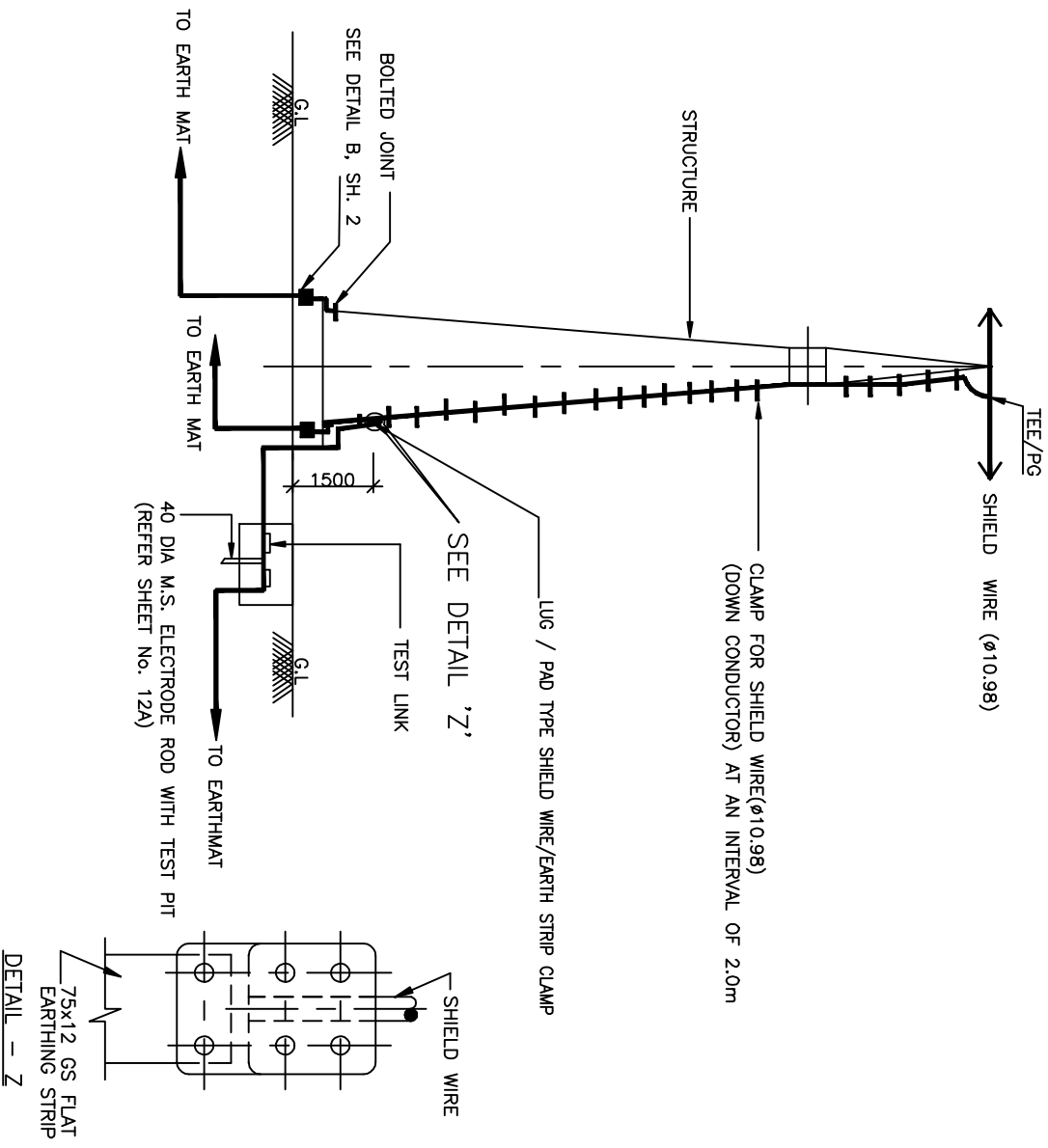
DRG. No.

TB-4-350-316-017

SHEET No.
7E



DETAIL WHEN 2 & E/WIRE TERMINATES A TOWER



NOTE:

1. TWO EARTHING STRIP SHALL BE CONNECTED TO ONE RISER.
2. NO. OF ROD ELECTRODE : 1 NO. PER TOWER WITH DOWN CONDUCTOR.
3. NO. OF RISERS = 2 NOS.



EQUIPMENT EARTHING DETAILS TOWER WITH PEAK

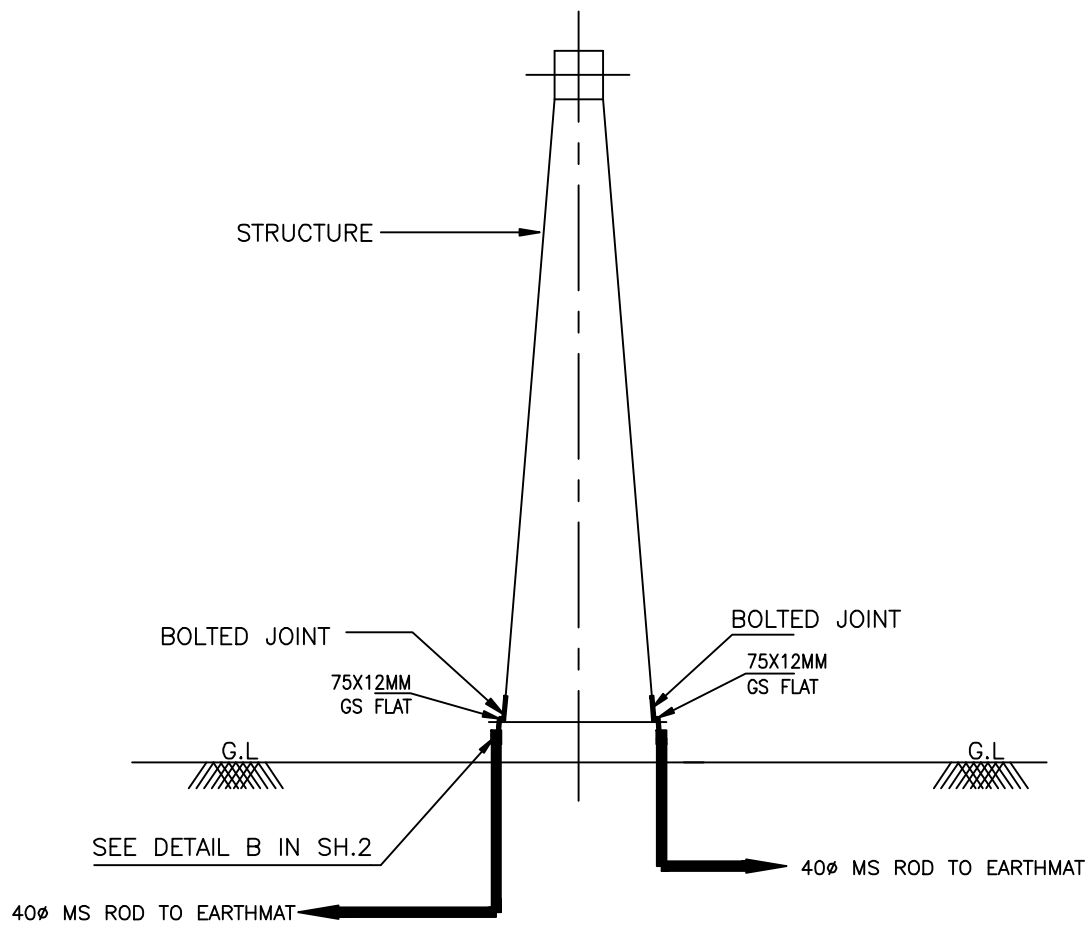
COMPUTERREF. NO.

DRG. No.

TB-0-350-316-017

SHEET No.

8



NOS.OF RISERS = 2 NOS. PER TOWER



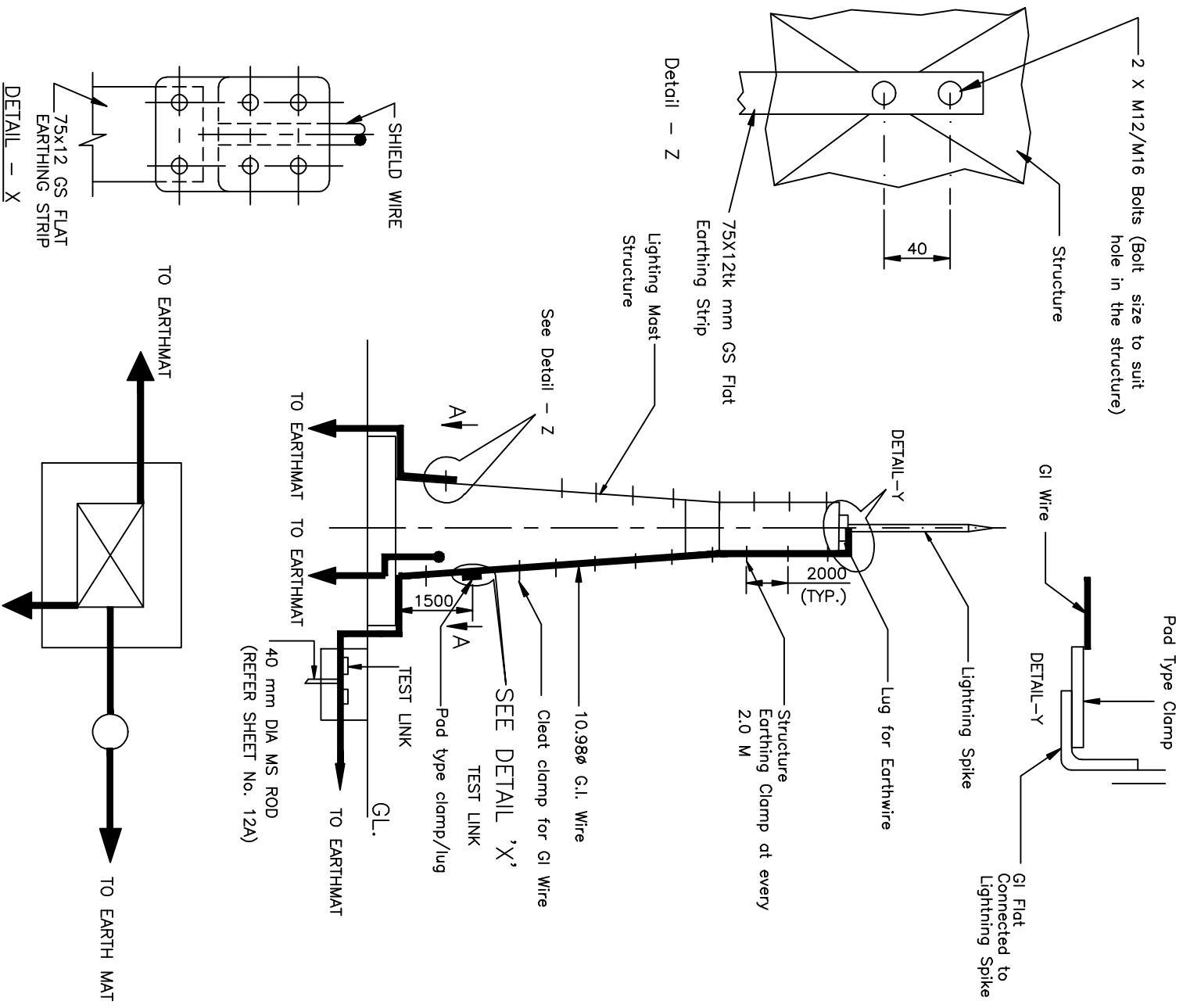
EQUIPMENT EARTHING DETAILS TOWER WITHOUT PEAK

COMPUTERREF.NO.

DRG. No.

TB-4-350-316-017

SHEET No.
8A



NOTE:

1. TWO EARTHING STRIP SHALL BE CONNECTED TO ONE RISER.
2. NO. OF ROD ELECTRODE WITH TEST PIT : 1 NO.
3. PAD TYPE CLAMP 1 NOS.
4. THE DOWN CONDUCTORS (E/WIRE) SHALL BE CONNECTED TO EARTH ELECTRODE.



EQUIPMENT EARTHING DETAILS

Lightning Mast

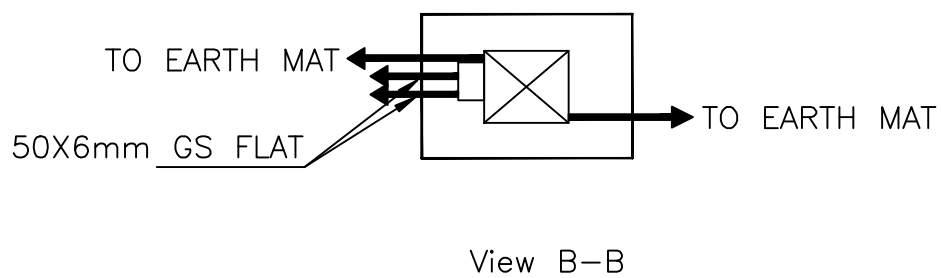
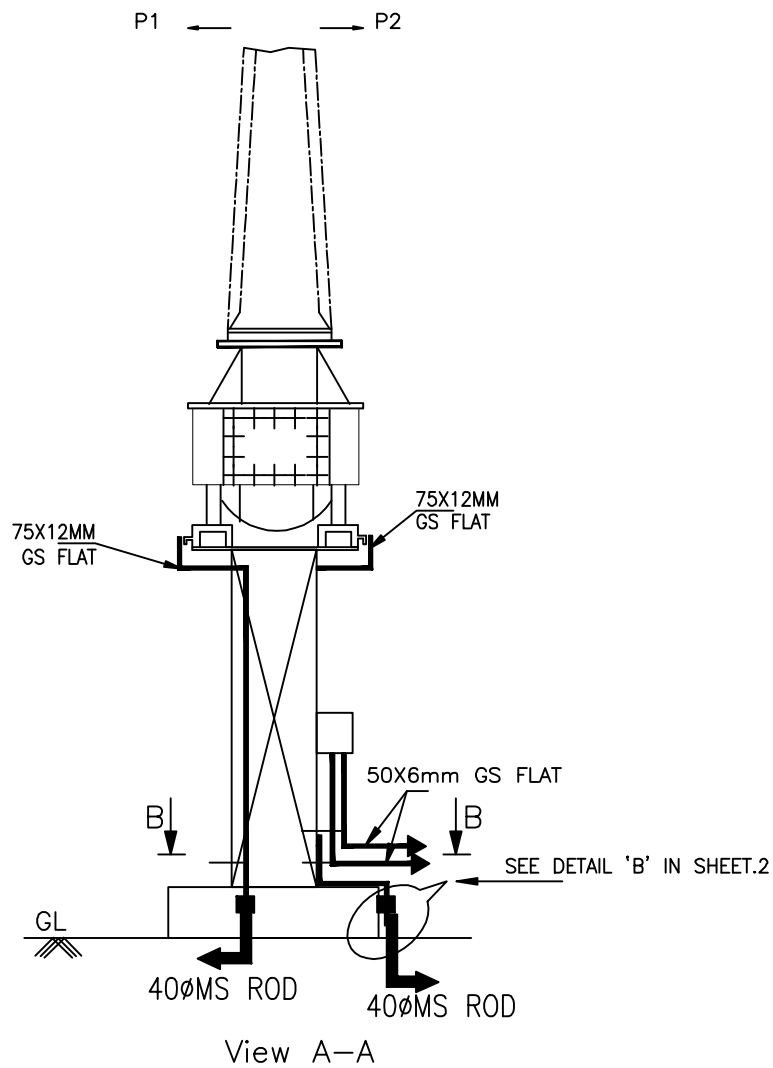
COMPU. DRG. REF.

DRG.NO.

TB-4-350-316-017

SHEET No.

8B



NOS.OF RISERS
= 2 NOS. PER PHASE
+ 2 NOS. FOR CT JB



EQUIPMENT EARTHING DETAILS 400kV & 132kV Current Transformer

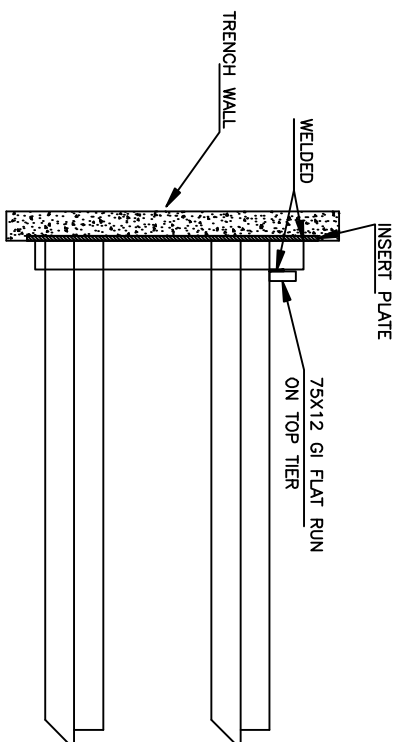
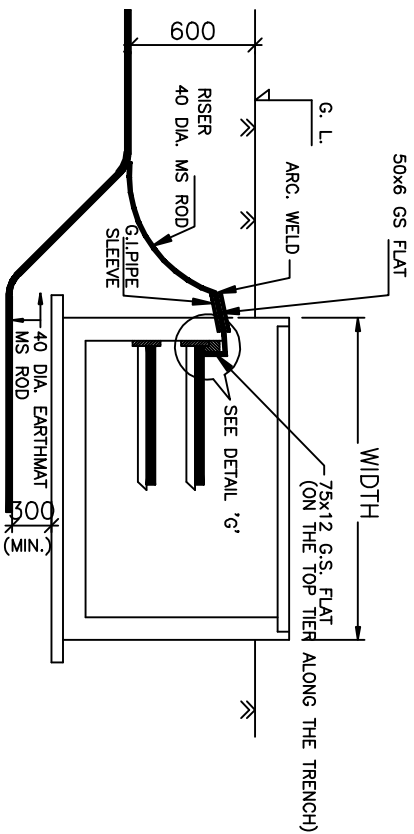
COMPU. DRG. REF.

DRG.NO.

TB-4-350-316-017

SHEET No.

9



DETAIL 'G'

DETAIL FOR CONNECTING GI FLAT RUNNING
ON TOP TIER TRENCH TO EMBEDDED PLATE.

NOTE:

1. ALL TRENCHES SHALL BE EARTHED AT AN INTERVAL OF ~~30M~~ ALONG THE LENGTH OF TRENCH & FREE ENDS.
2. THE EARTH STRIP (75x12 G.S. FLAT) SHALL BE WELDED/CLEATED TO TOP RACK ALONG THE TRENCH RUN & CONTROL ROOM AT EVERY 0.6m IN OUTDOOR INTERVAL & 0.75 IN INDOOR.
3. WHERE THE CABLE RACKS ARE PROVIDED ON BOTH SIDES OF THE TRENCH, BOTH SIDES SHALL BE EARTHED AS PER ABOVE.
4. CABLE & CABLE TRAY EARTHING SHALL BE DONE AS PER SPECIFICATION.



EQUIPMENT EARTHING DETAILS
CABLE TRENCH

COMPU. DRG. REF.

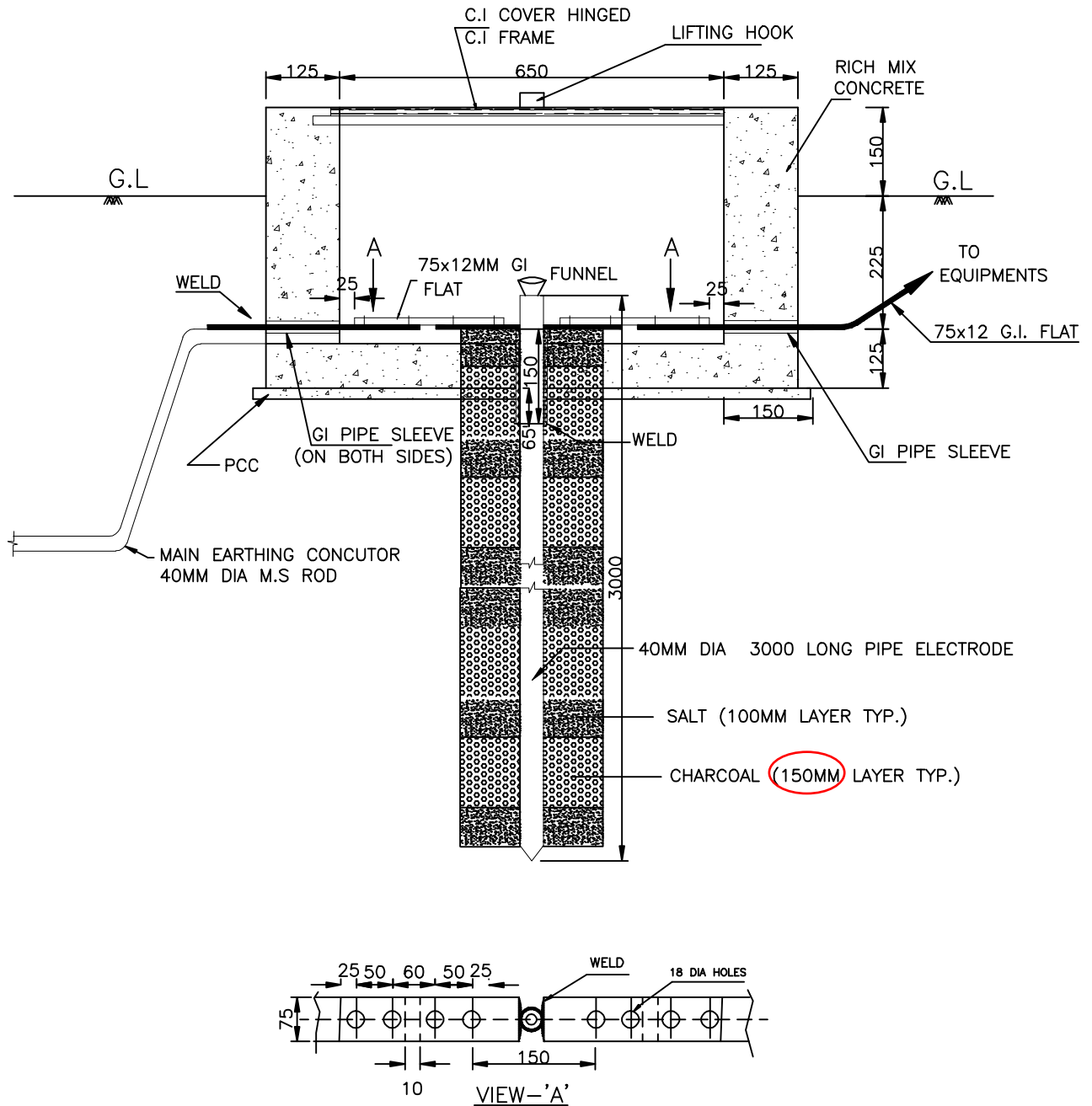
DRG. NO.

TB-4-350-316-017

SHEET

10

Please furnish the cover detail with its hinged arrangement



NOTE:

1. SUPPLY OF FIXING BOLTS NUTS & WASHERS FOR GI FLAT EARTHING CONDUCTOR IS ALSO FORMS PART OF THE SCOPE.
2. TO BE USED FOR CONNECTING TRANSFORMER /REACTOR NEUTRAL



EQUIPMENT EARTHING DETAILS PIPE EARTH ELECTRODE WITH TREATED PIT

COMPU. DRG. REF.

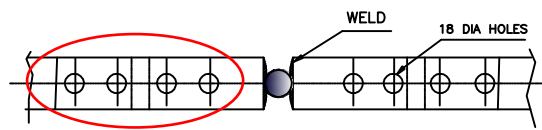
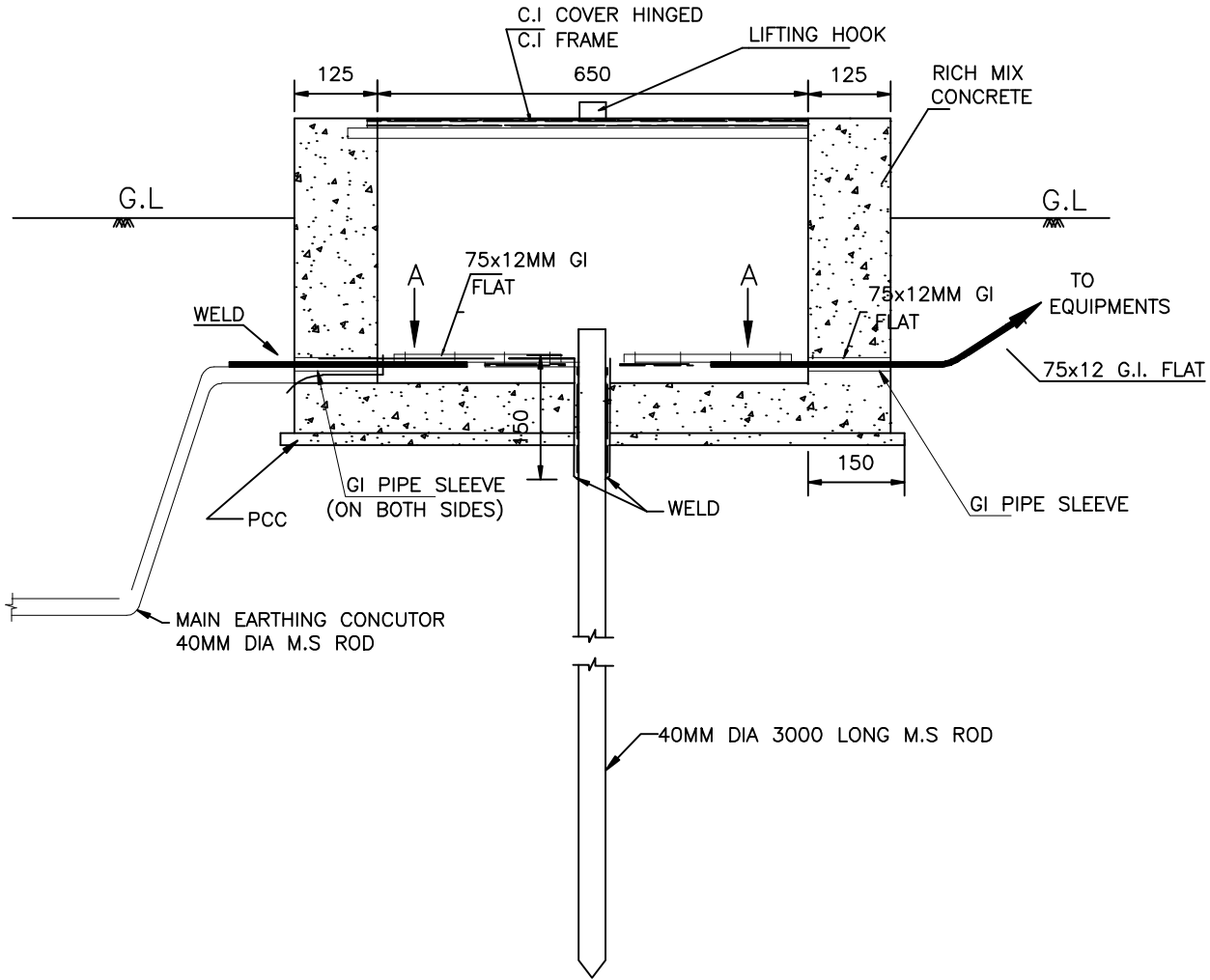
DRG. No.

TB-4-350-316-017

SHEET No.

11

Comments as marked above



VIEW-A'

NOTES:-

1. SUPPLY OF FIXING BOLTS NUTS & WASHERS FOR GI FLAT EARTHING CONDUCTOR IS ALSO FORMS PART OF THE SCOPE.
2. ALL NUTS, BOLTS & WASHERS SHALL BE GALVANISED.



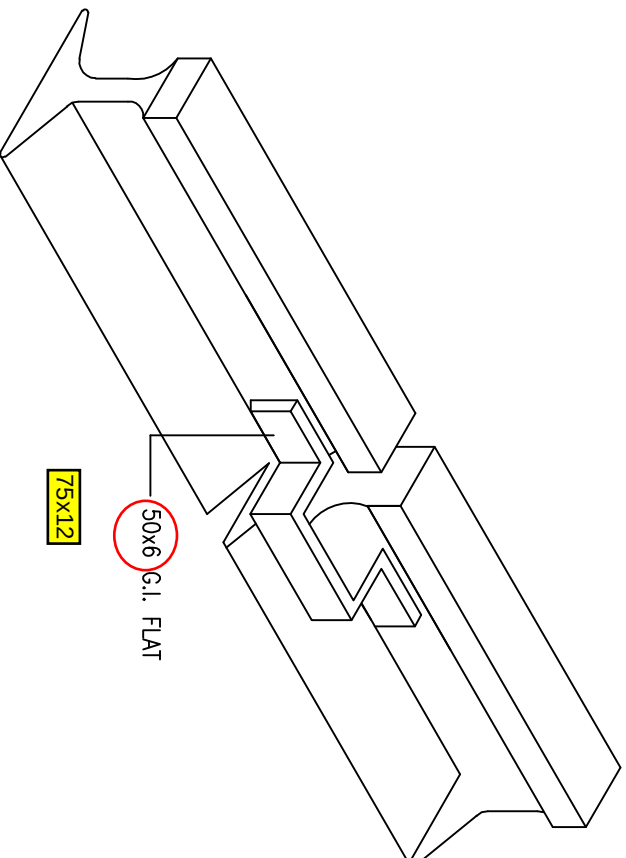
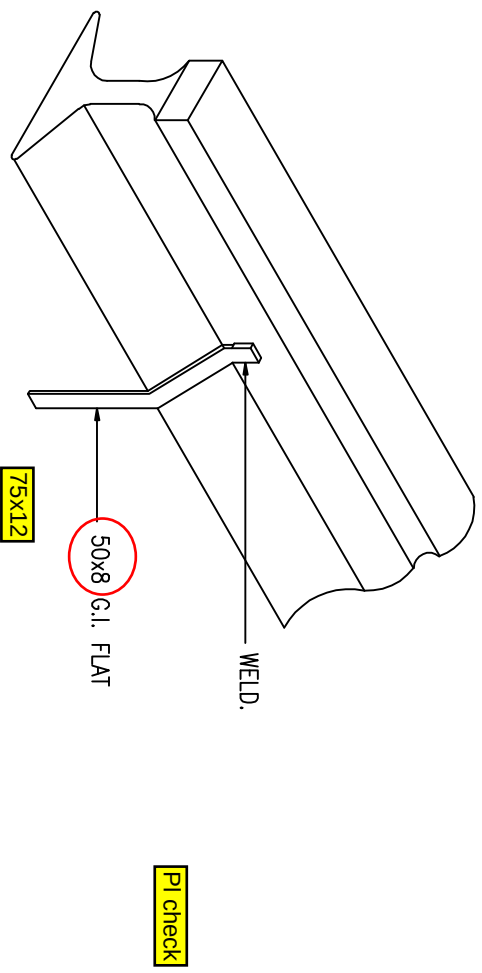
EQUIPMENT EARTHING DETAILS ROD EARTH ELECTRODE WITHOUT TEST PIT

COMPU. DRG. REF.

DRG. No.

TB-4-350-316-017

SHEET No.
12



NOTE:—

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



EQUIPMENT EARTHING DETAILS RAIL BONDING

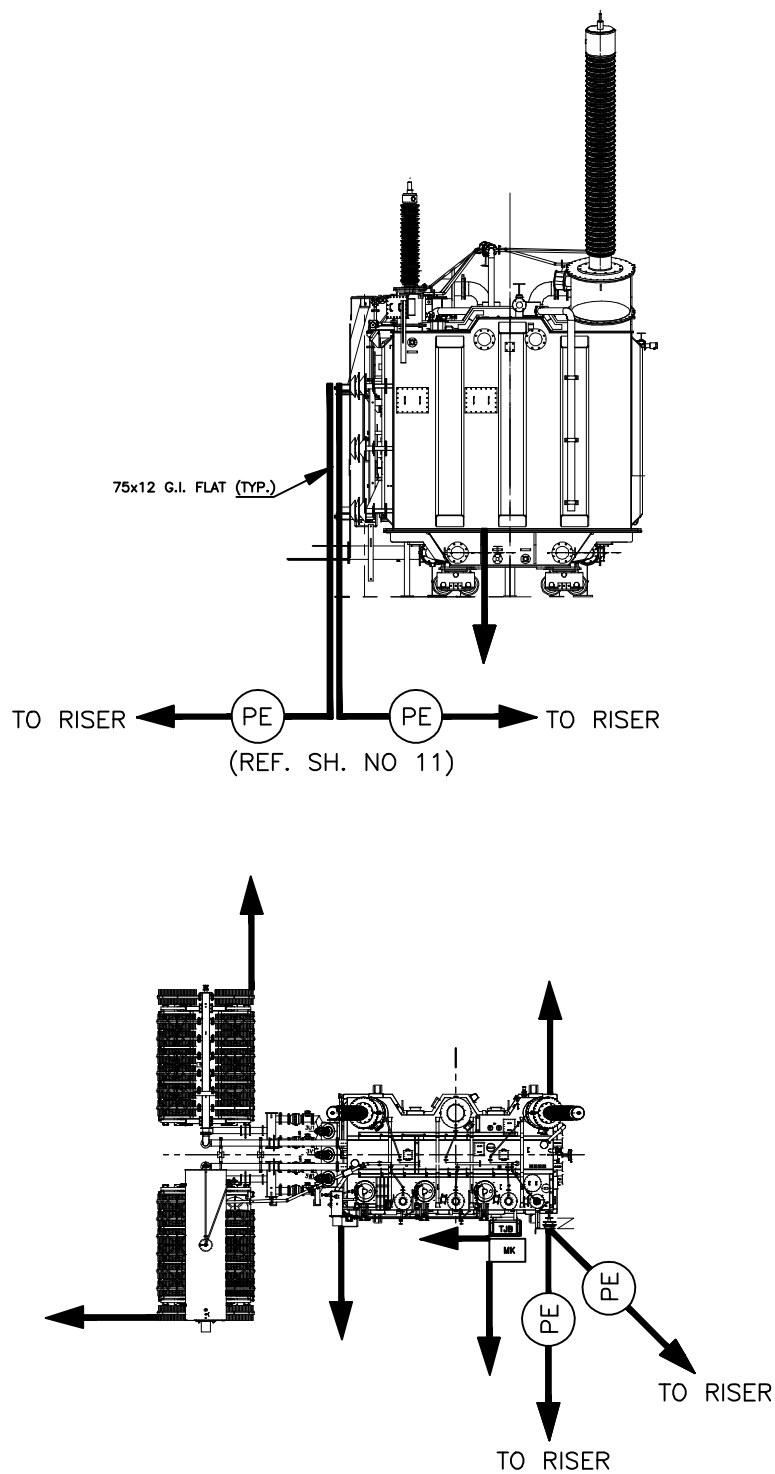
COMPU. DRG. REF.

DRG. NO.

TB-4-350-316-017

SHEET No.

13



NO.OF PIPE EARTH ELECTRODE WITH TREATED PIT (REFER SHEET NO. 11) = 2 NOS.

NO.OF RISERS = 8 NOS. FOR EARTHING OF FOLLOWING PARTS OF TRANSFORMER BY 75X12 GI FLAT (TWO EARTHING STRIPS CAN BE CONNECTED TO ONE RISER):

MAIN TANK	2 Nos.
RADIATOR BANK	2 Nos.
MARSHALLING BOX	2 Nos.
NEUTRAL EARTHING	2 Nos.



EQUIPMENT EARTHING DETAILS TRANSFORMER

COMPU. DRG. REF.

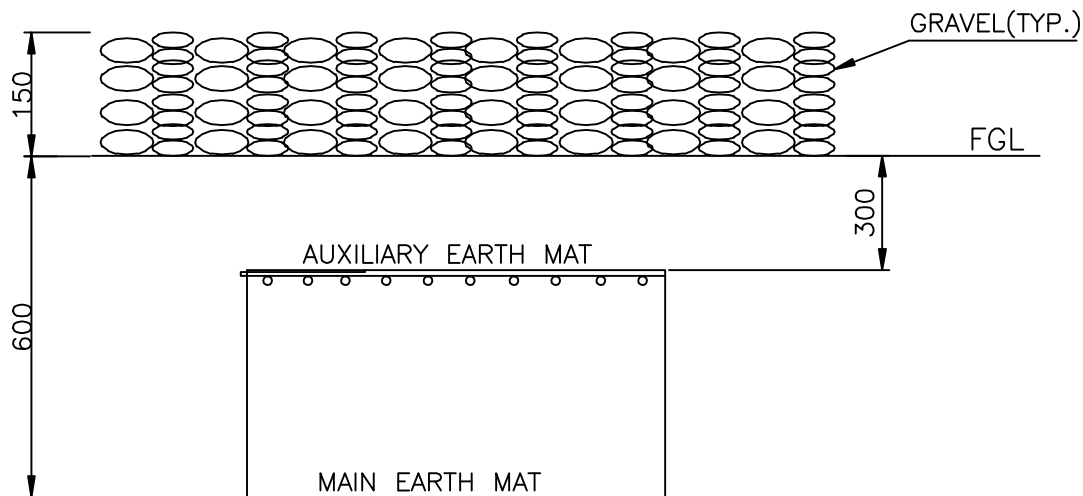
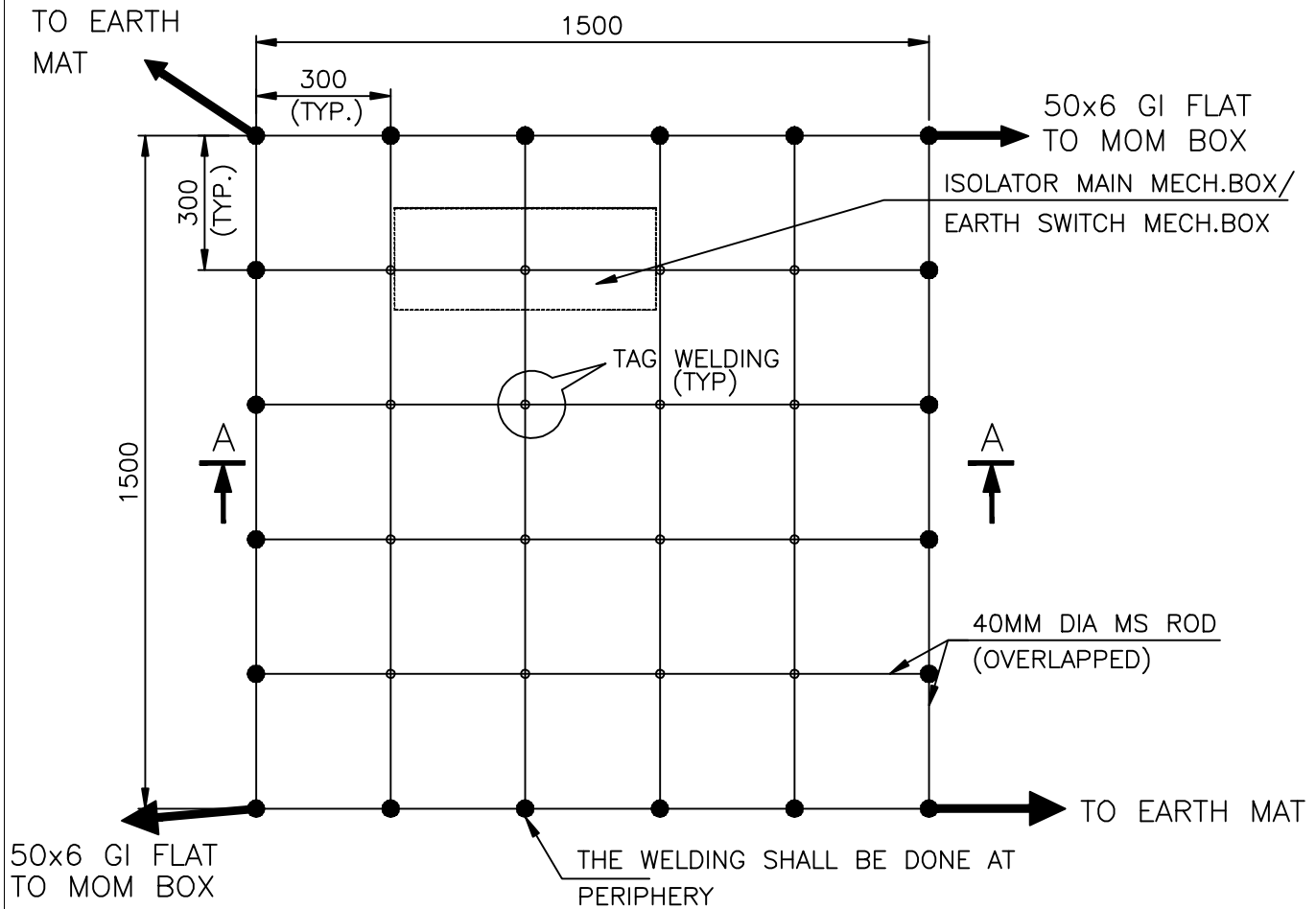
D:\RAWAT\MURADNAGAR\EQ-ERTH\SH26

Report No.

TB-4-350-316-017

SHEET No.

14



SECTION AA

NOTE:

AUX. EARTH MAT SHALL BE SO POSITIONED THAT THE FOOT OF THE OPERATOR ALWAYS LIE OVER THE AUX. EARTH MAT AREA WHILE ATTENDING / OPERATING THE MECH. BOX THE CABLE TRENCH ROUTING SHALL BE PLANNED ACCORDINGLY.



EQUIPMENT EARTHING DETAILS

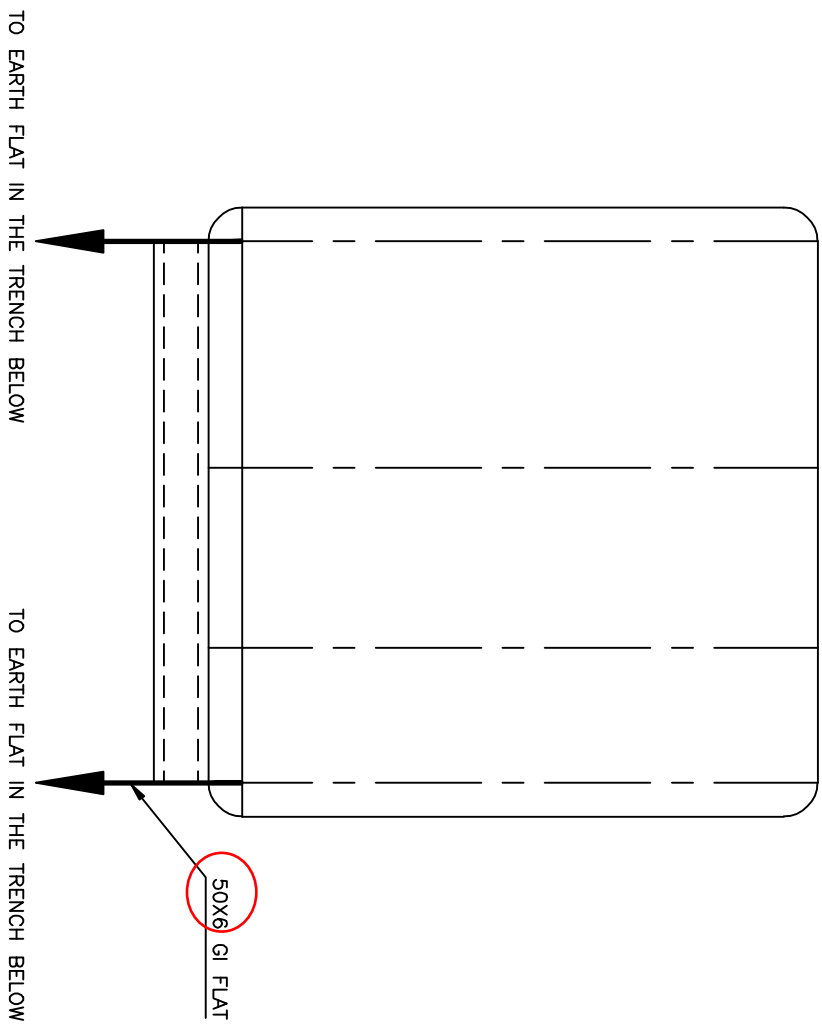
AUXILIARY EARTH MAT FOR ISOLATOR MAIN MECH., E/S MECH. BOX

COMPU. DRG. REF.

Report No.

TB-4-350-316-017

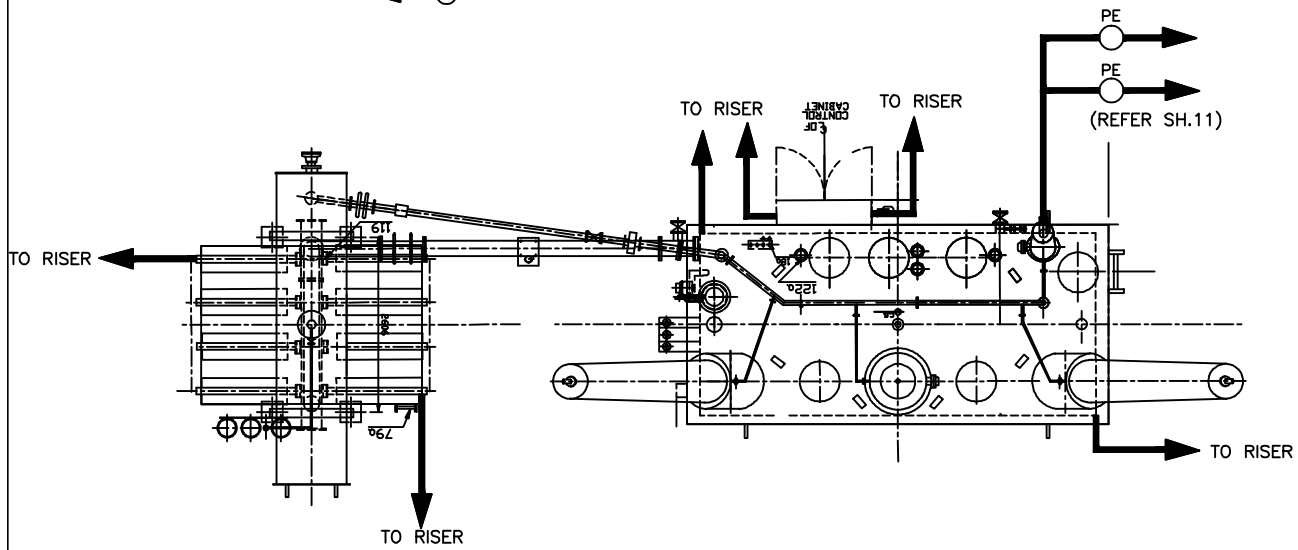
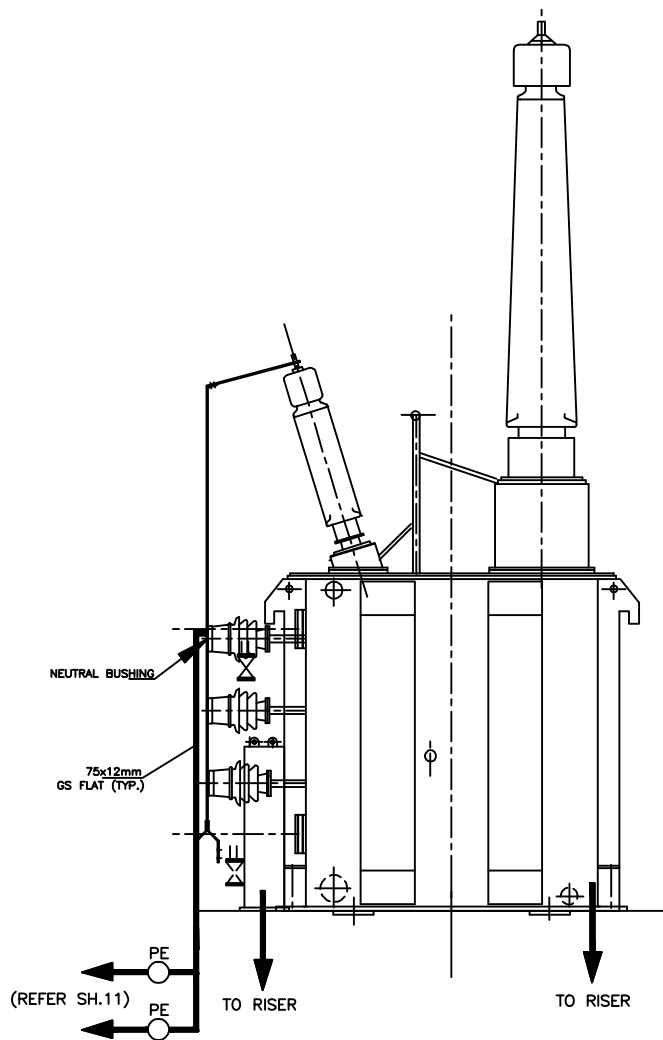
SHEET No.
15



EQUIPMENT
CONTROL & RELAY PANELS



EQUIPMENT EARTHING DETAILS
CONTROL AND RELAY PANELS



NO. OF PIPE EARTH ELECTRODE WITH TREATED PIT (REFER SHEET NO. 11) = 2 NOS.
 NO.OF RISERS $\equiv$ 6 NOS. FOR EARTHING OF FOLLOWING PARTS OF 400KV BUS REACTOR
 BY 75X12MM GI FLAT :
 MAIN TANK 2 Nos.
 RADIATOR SUPPORT – 2 Nos.
 CONTROL CABINET – 2 Nos.



EQUIPMENT EARTHING DETAILS BUS REACTOR

COMPU. DRG. REF.

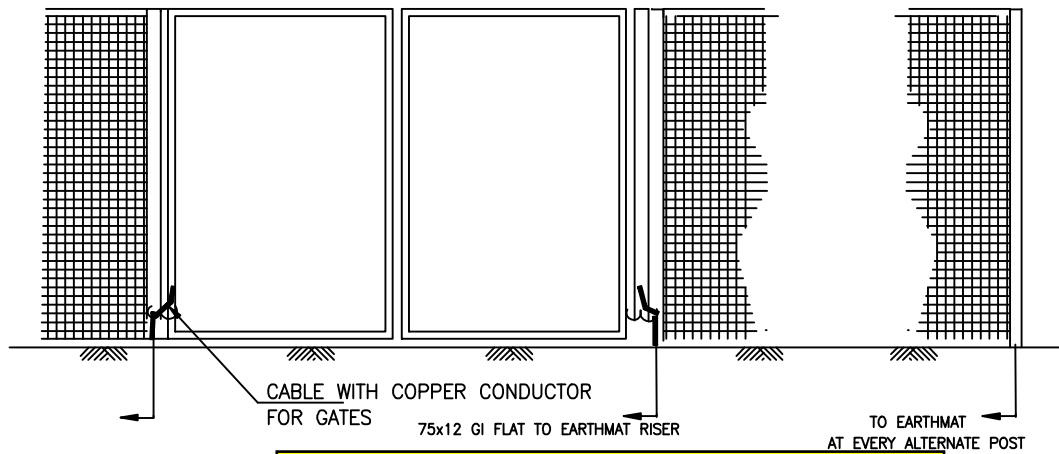
DRG. NO.

TB-4-350-316-017

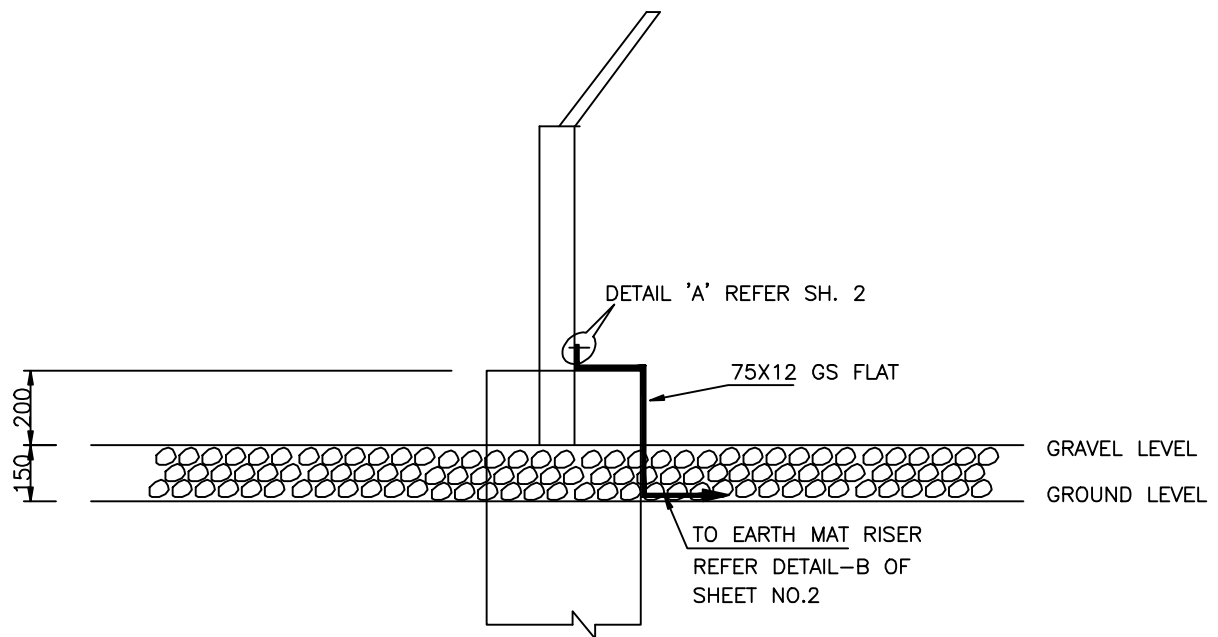
SHEET
17

FENCE GATE

FENCE GROUNDING



Pl refer fence and gate drawing and its earthing arrangements



EVERY POST OF FENCE & GATES SHALL BE CONNECTED TO EARTHING LOOP BY 75X12 MM GS FLAT. EARTHING CONDUCTOR SHALL BE BURIED 2000mm OUTSIDE THE SWITCHYARD FENCE.

FENCE EARTHING

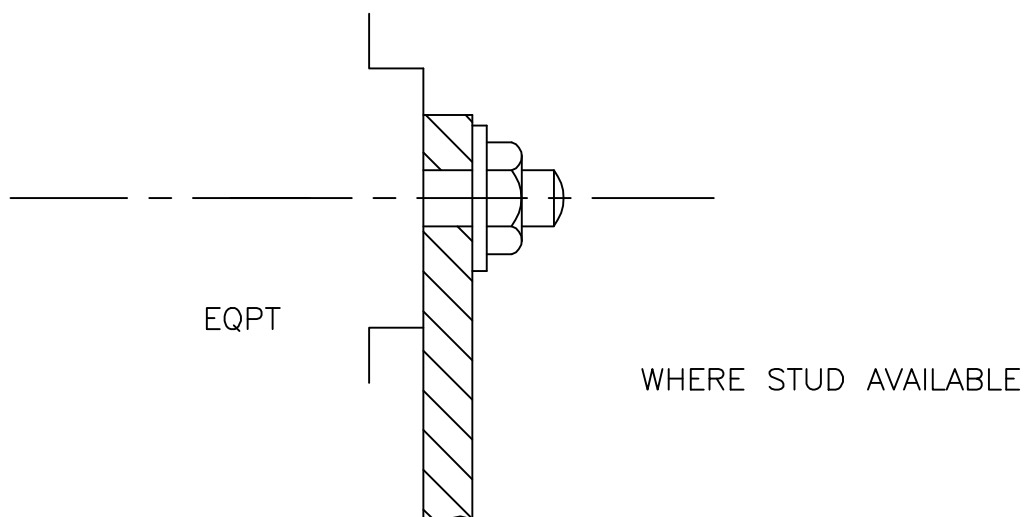


EQUIPMENT EARTHING DETAILS GATE/FENCE POST

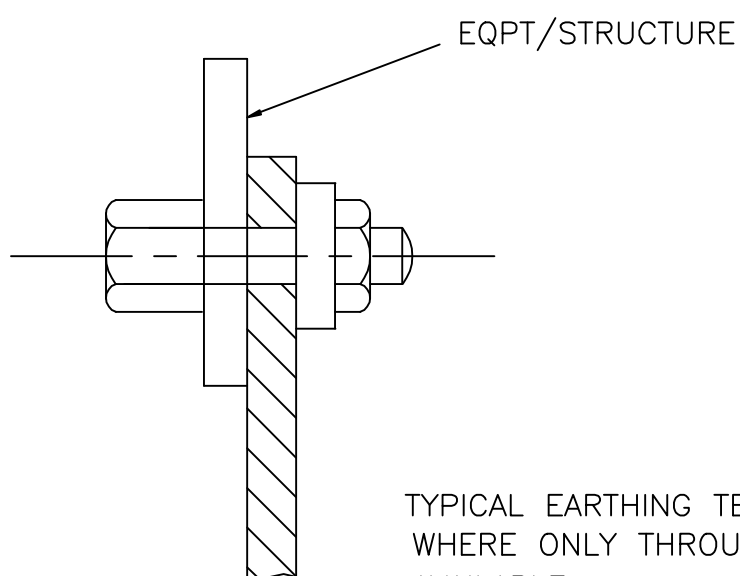
DRG. No.

TB-4-350-316-017

SHEET No.
18



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



EQUIPMENT EARTHING DETAILS TYPICAL ARRANGEMENT OF BOLTED JOINTS

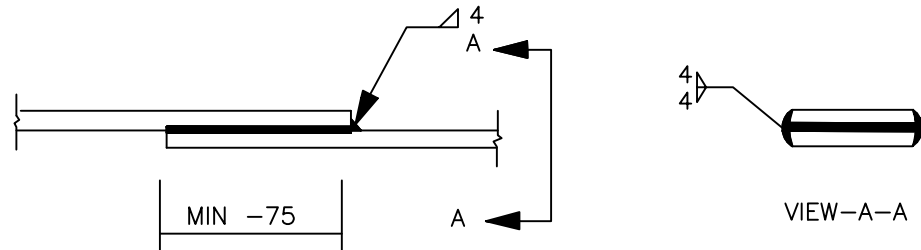
DRG. No. TB-4-350-316-017

REV. 00

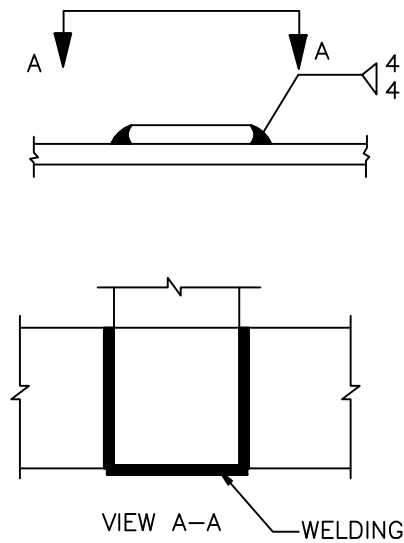
SHEET No.
19

C. STRIP TO STRIP (50X6 MS FLAT)

1. STRAIGHT LAP JOINT/RISER



2. CROSS LAP JOINT



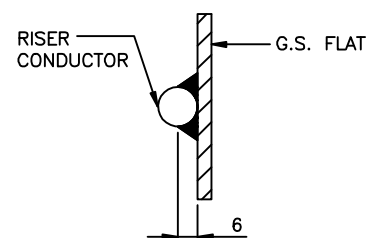
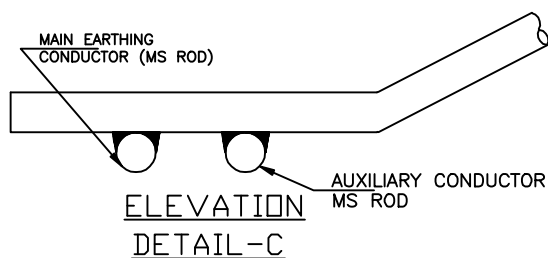
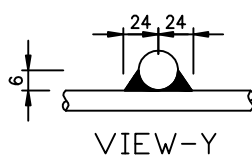
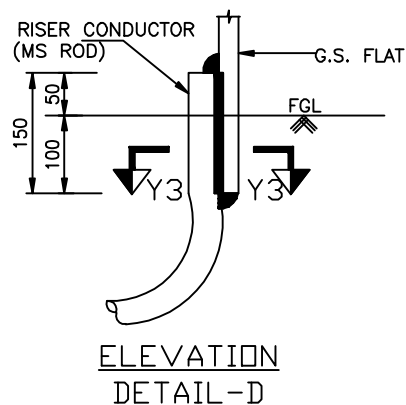
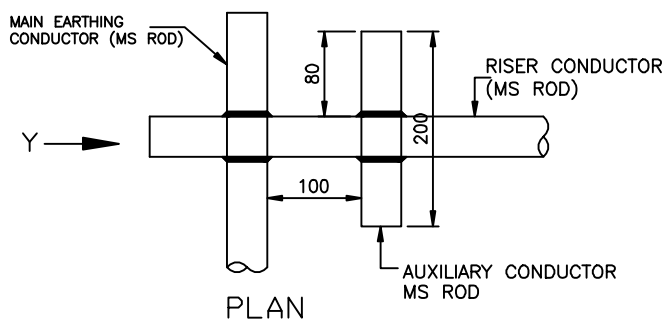
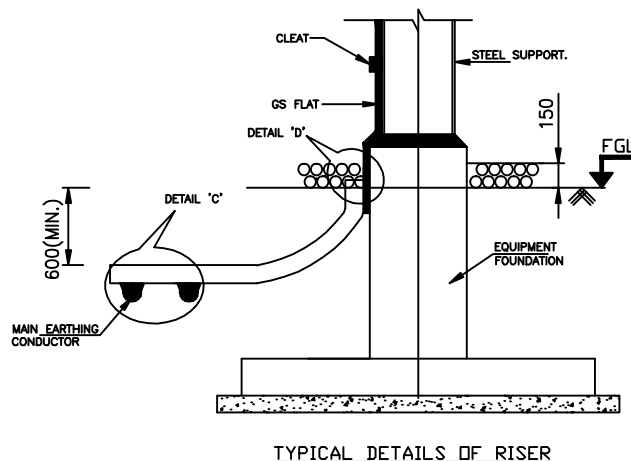
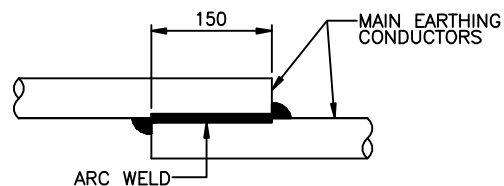
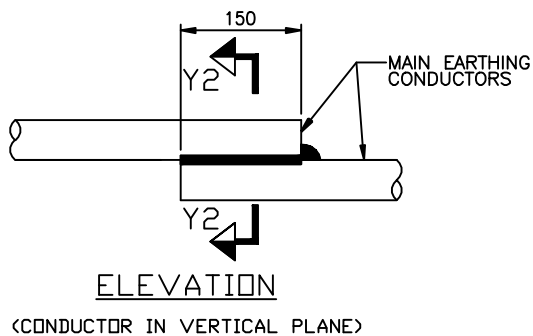
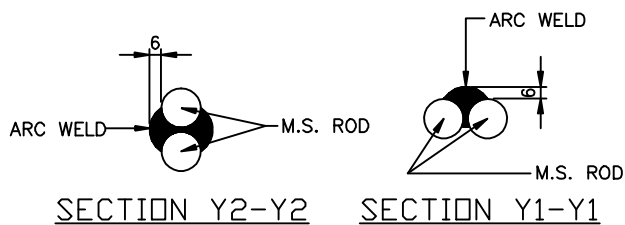
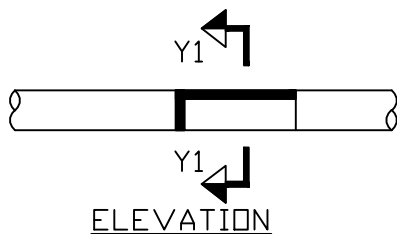
EQUIPMENT EARTHING DETAILS WELDING DETAILS

COMPUTERREF.NO.

DRG. No.

TB-4-350-316-017

SHEET No.
20



TYPICAL OVERLAPPING JOINT OF TWO CONDUCTORS



EQUIPMENT EARTHING DETAILS

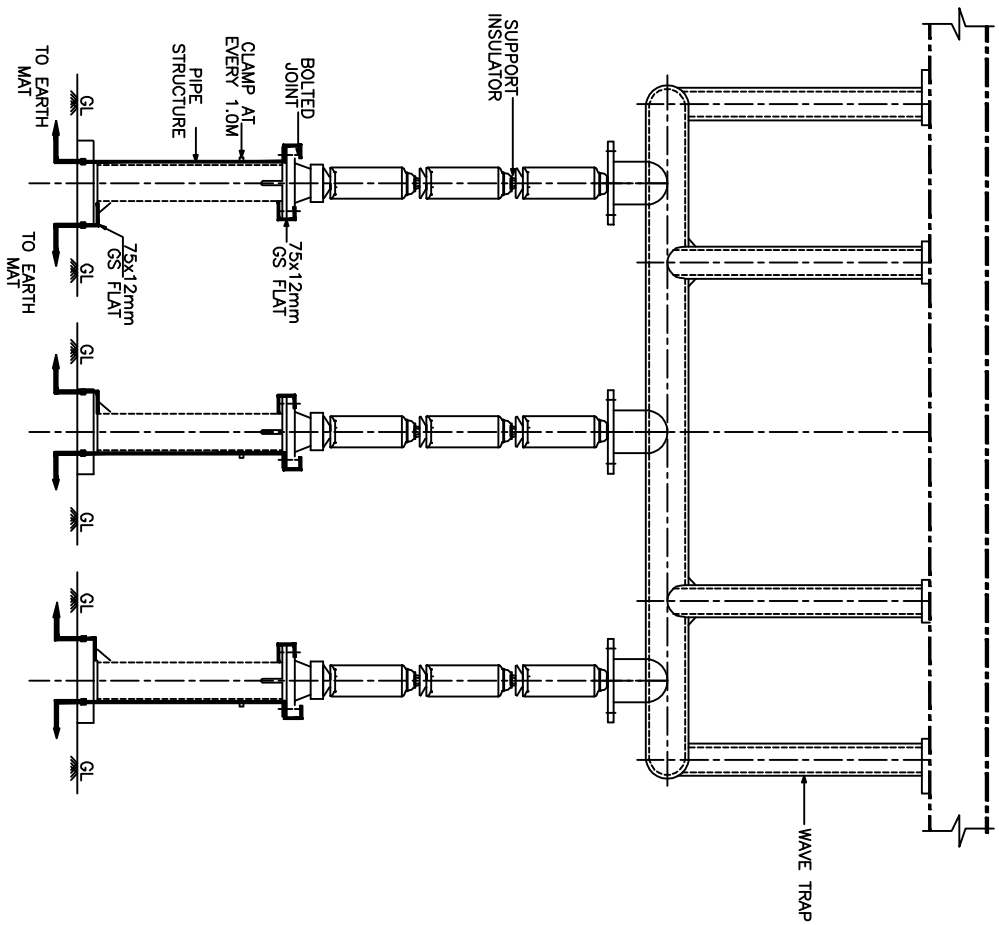
WELDING DETAILS

COMPUTERREF.NO.

DRG. No.

TB-4-350-316-017

SHEET No.
21



NOS. OF RISERS = 6 NOS.



EQUIPMENT EARTHING DETAILS 400kV WAVE TRAP

COMPUTER REF. NO.

DRG. No.

TB-0-350-316-017

SHEET No.
22

-143.92 E
4798.02 N
(TENTATIVE)

-170.03 E
4798.02 N
(TENTATIVE)

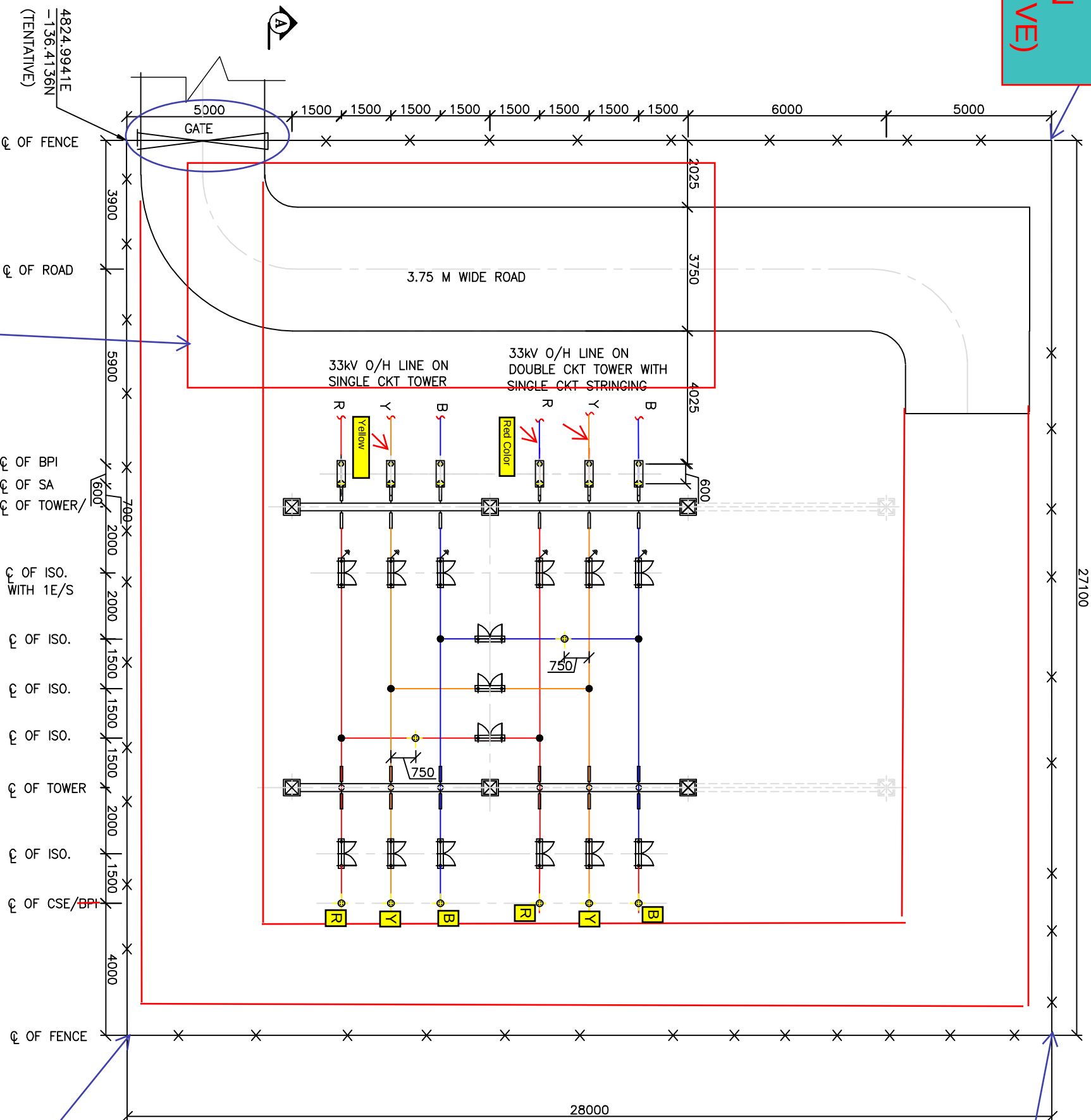
MARK NORTH

15°33'

MARK FGL.

Please provide the suitable road and accordingly revise the dimensions considering adequate clearances.

Please ensure and show the provision for lighting and lightning protection.
Distance between equipments/ other facilities and equipments requirements are subject to meeting clearances.

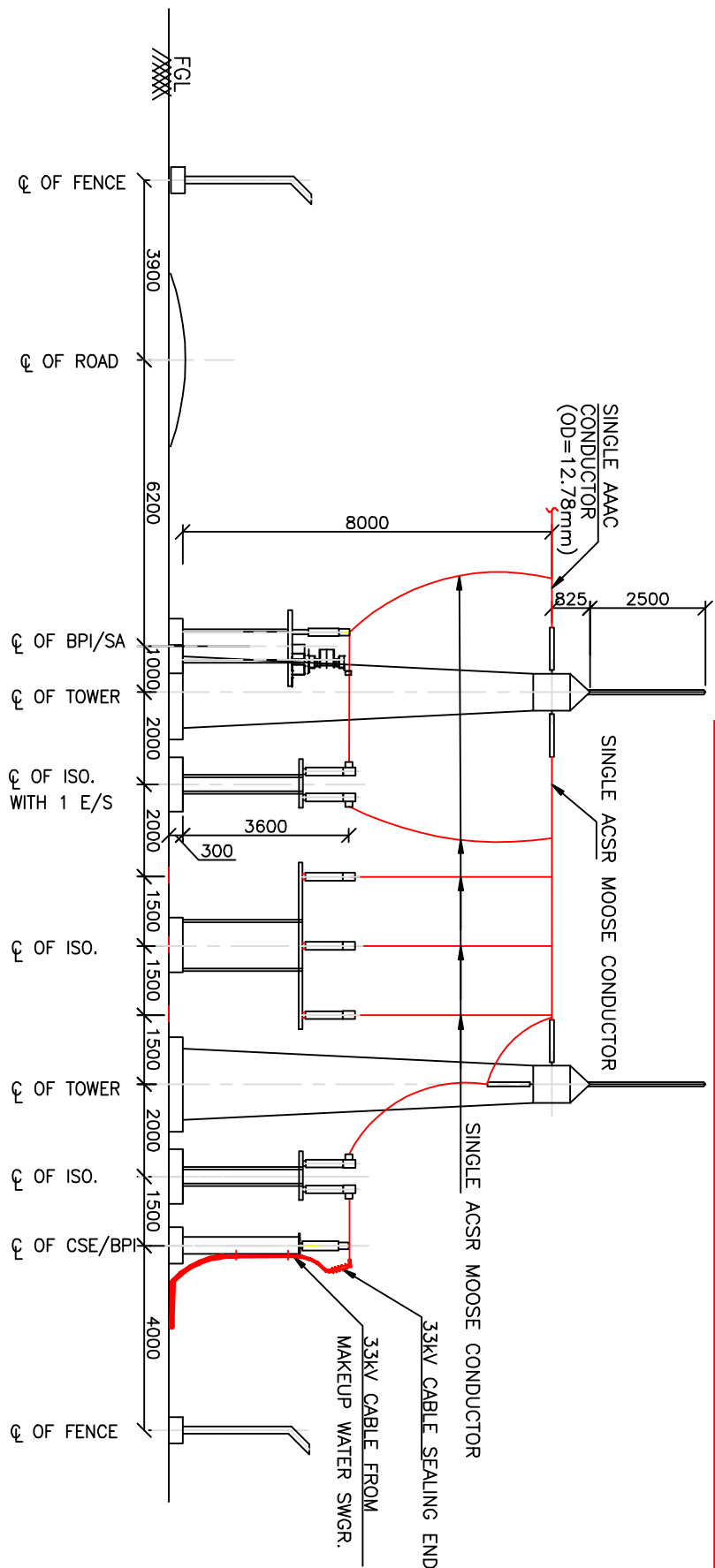


🔗🔗

-162.52 E
4832.26 N
(TENTATIVE)

PLEASE CHECK FOR ELECTRICAL CLEARANCE.

FFENCE, ROAD AND GATES SHALL BE FINALIZED BASED ON LAYOUT AT THE MAKE-UP WATER PUMP HOUSE END. COORDINATES AT MAKE UP WATER END ARE TENTATIVE ONLY.



SECTION A-A

INVENTORY No.	SIGN. & DATE	REF. DRG. No.
	➤	

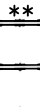
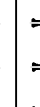
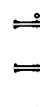
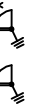
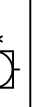
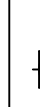
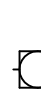
REV.	DATE	ALTERED	
		CHECKED	
		APPROVED	
ZONE			
6			

ADDITIONAL INFORMATION						81004					
W.O.NO.											
STATUS OF DRAWING											
DISTRIBUTION OF PRINTS											
REV. DATE ALTERED											
01 18.04.14 APPROVED											
Dwg. REVISED IN LINE WITH NTPC COMMENTS DTD. 12.02.14.											
3											
2											
1											

REVISE AS PER THE COMMENTS MARKED ON THE 400 KV STRUCTURAL LAYOUT.

LEGEND : 400 KV EQUIPMENTS

Items shall be as per EKD

SYMBOL	EQUIPMENT
	400V, 3150A, 500A FOR 1 ₂ , 3-PH CIRCUIT BREAKER WITHOUT PIR
	400V, 2000A, 500A FOR 1 ₂ , 3-PH CIRCUIT BREAKER WITHOUT PIR
	400V, 2000A, 500A FOR 1 ₂ , 3-PH CIRCUIT BREAKER WITHOUT PIR, WITH CONTROLLED SWITCHING DEVICE
	400V, 3150A, 500A FOR 1 ₂ , 3-PH HCB ISOLATORS, MOTOR OPERATED WITH 1 E/S
	400V, 2000A, 500A FOR 1 ₂ , 3-PH HCB ISOLATORS, MOTOR OPERATED WITH 1 E/S
	400V, 2000A, 500A FOR 1 ₂ , 3-PH HCB ISOLATORS, MOTOR OPERATED WITH 2 E/S
	400V, 3000A, 500A FOR 1 ₂ , 1-PH, 5-CORE CURRENT TRANSFORMER WITH 120V EXTENDED CURRENT RATING
	400V, 3000A, 500A FOR 1 ₂ , 1-PH, 5-CORE CURRENT TRANSFORMER WITH 120V EXTENDED CURRENT RATING
	400V, 4400 pF/60V, 1-PH CAPACITOR VOLTAGE TRANSFORMER
	300 W, 100A, 1-PH SURGE ARRESTER
	400V, 3150A, 0.5MVA, 1-PH WAVE TRAP
	400V, 3150A, 1MVA, 1-PH WAVE TRAP
	400 W, 60A, 1 PHASE, SOLID CORE BUS POST INSULATOR

	TOWER WITH PEAK
	TOWER WITHOUT PEAK
	SUSPENSION INSULATOR STRING (24 DISCS PER STRING SET)
	DOUBLE TENSION INSULATOR STRING (24 DISCS/1 TENSION INSULATOR STRING)
	ACSR MOOSE CONDUCTOR
	END CAP/CORONA BELL FOR BUSBAR
	SHIELD WIRE (10.95MM)

SYSTEM PARAMETERS

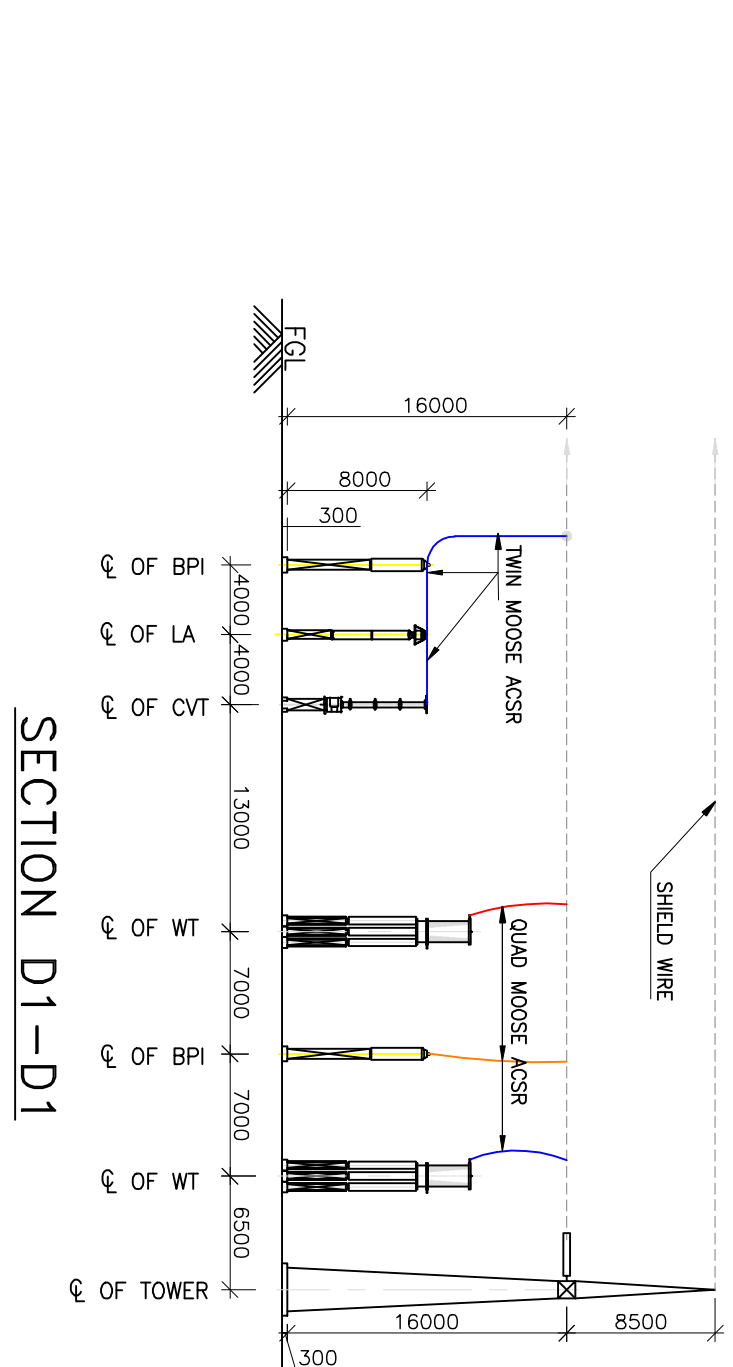
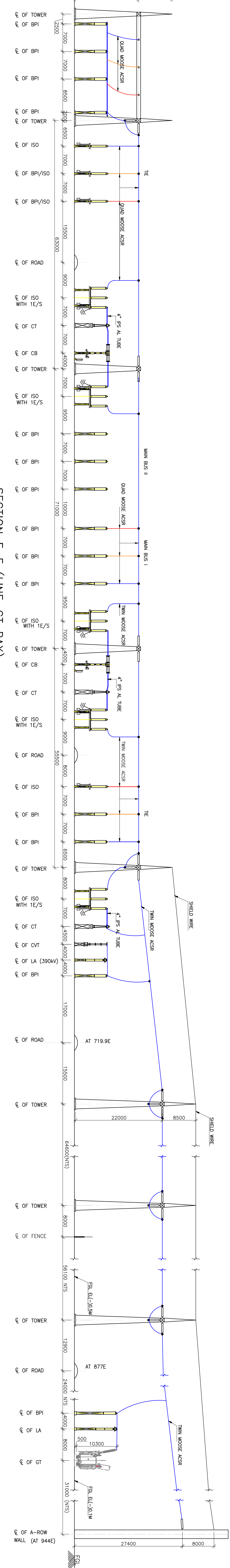
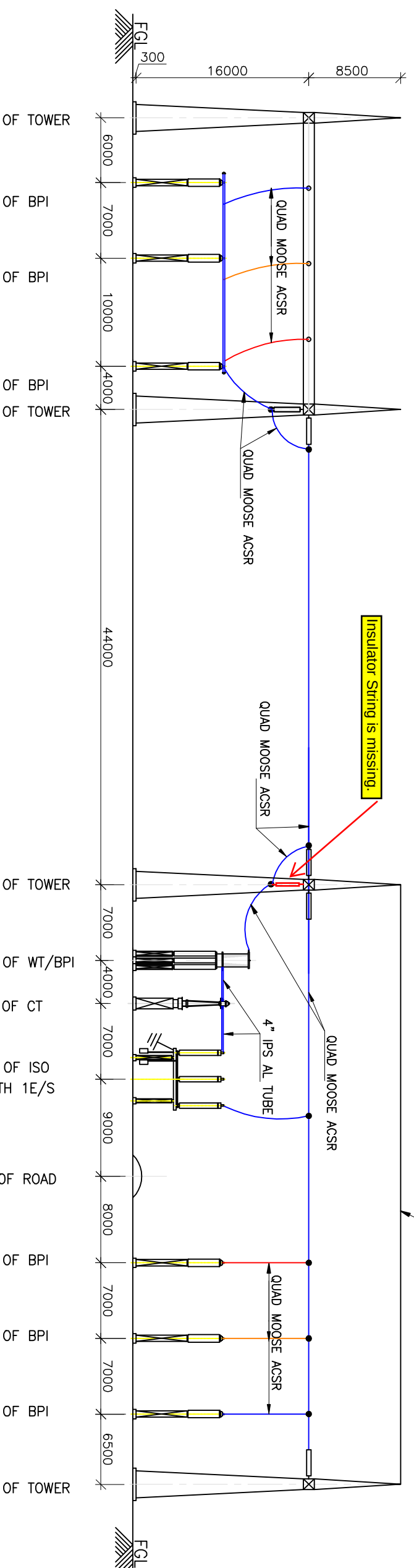
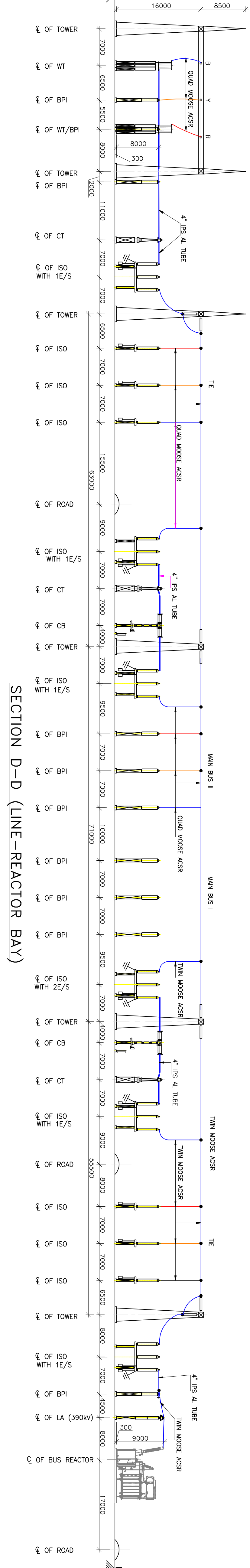
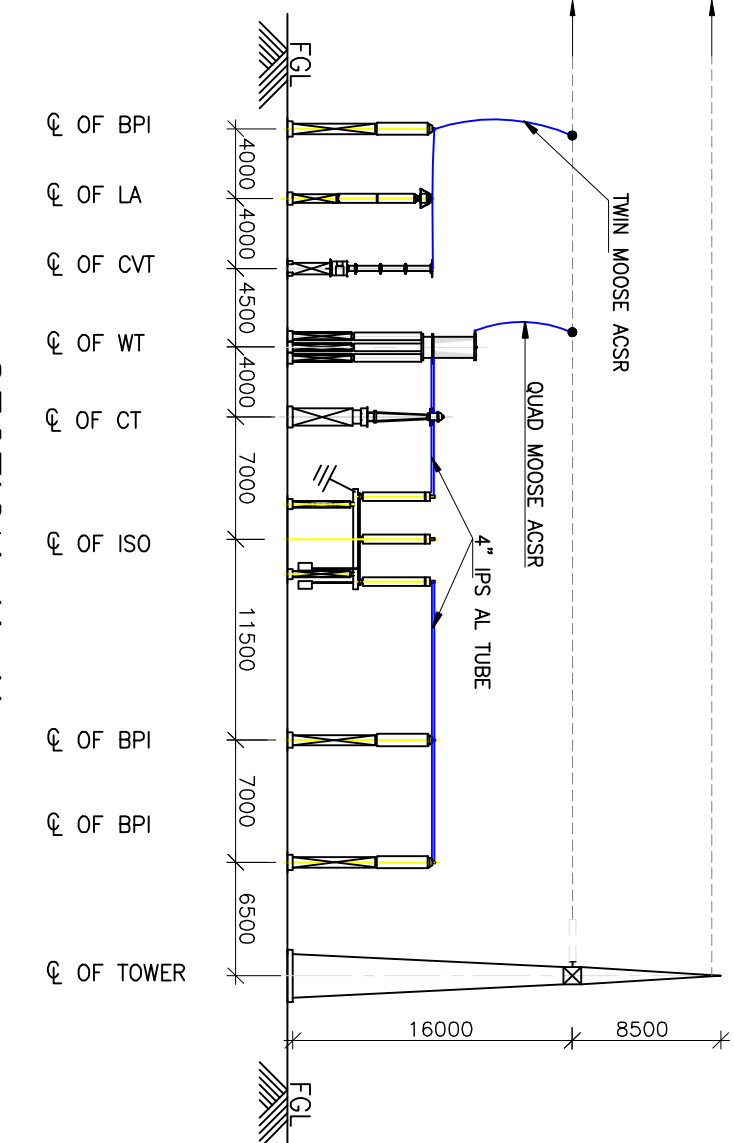
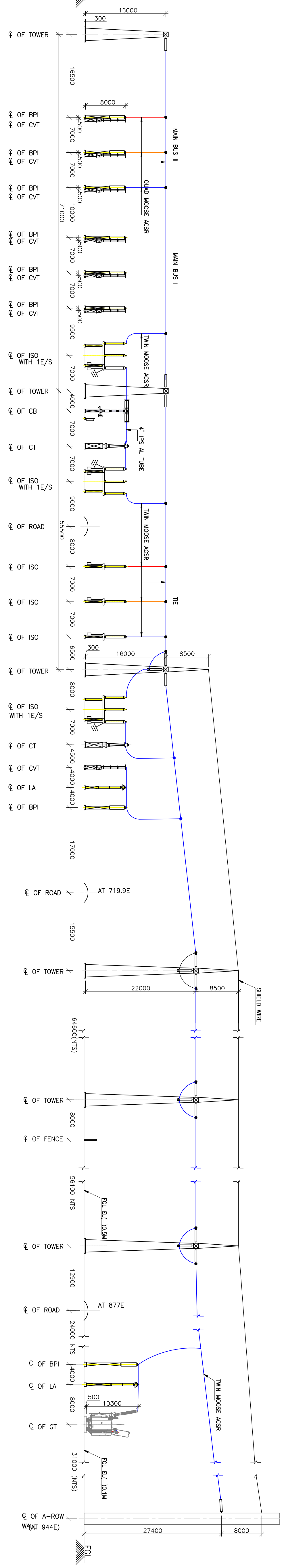
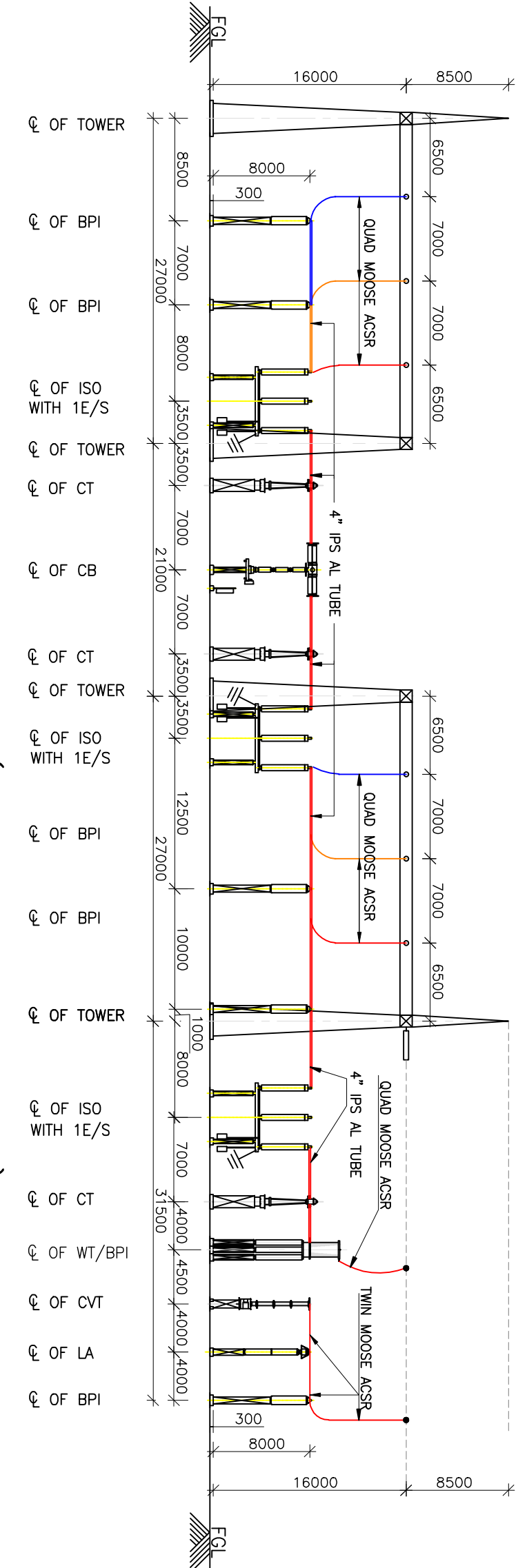
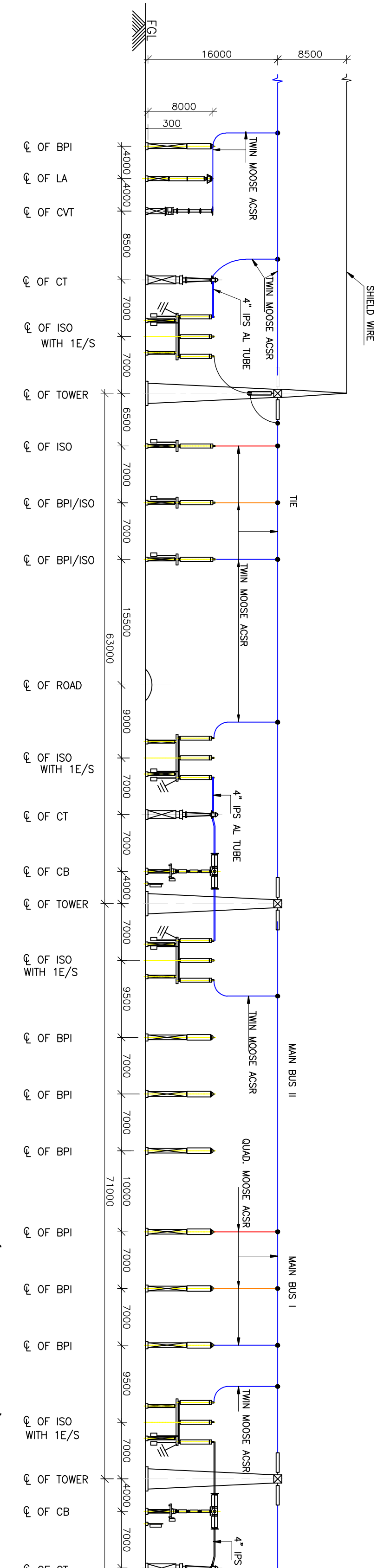
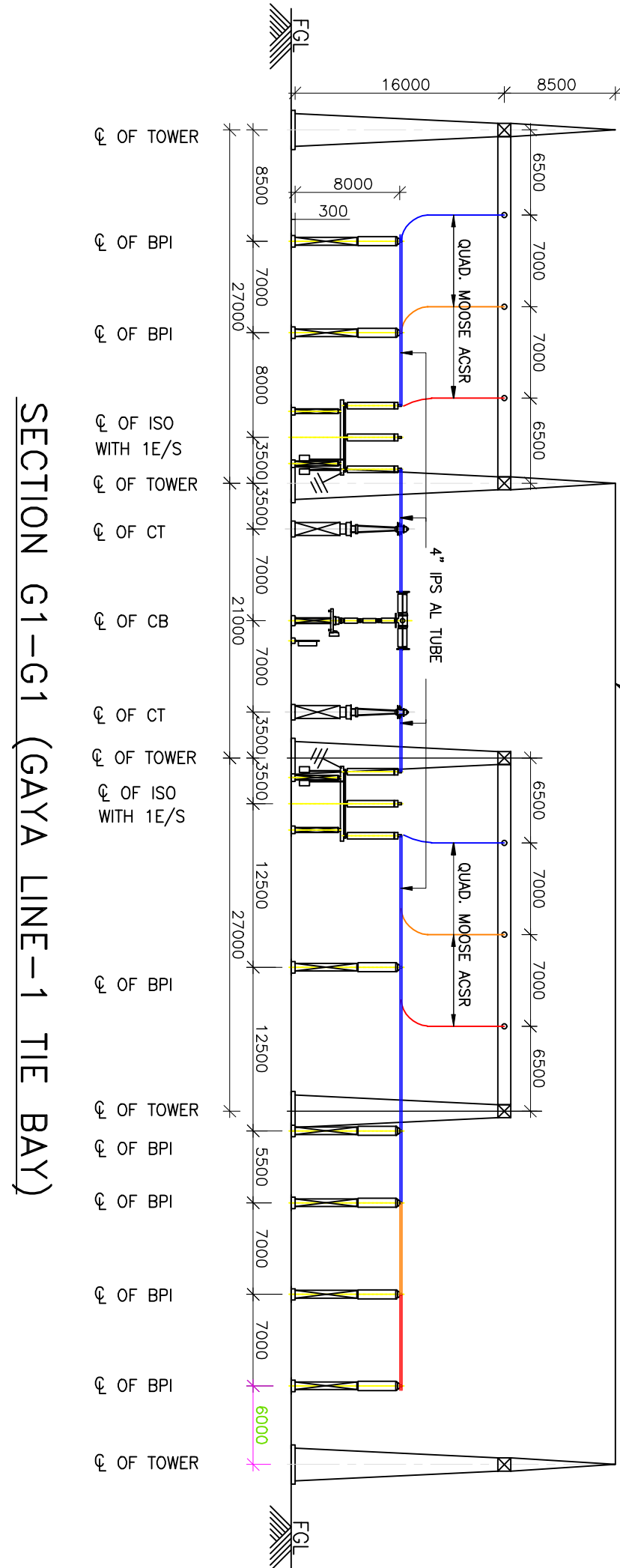
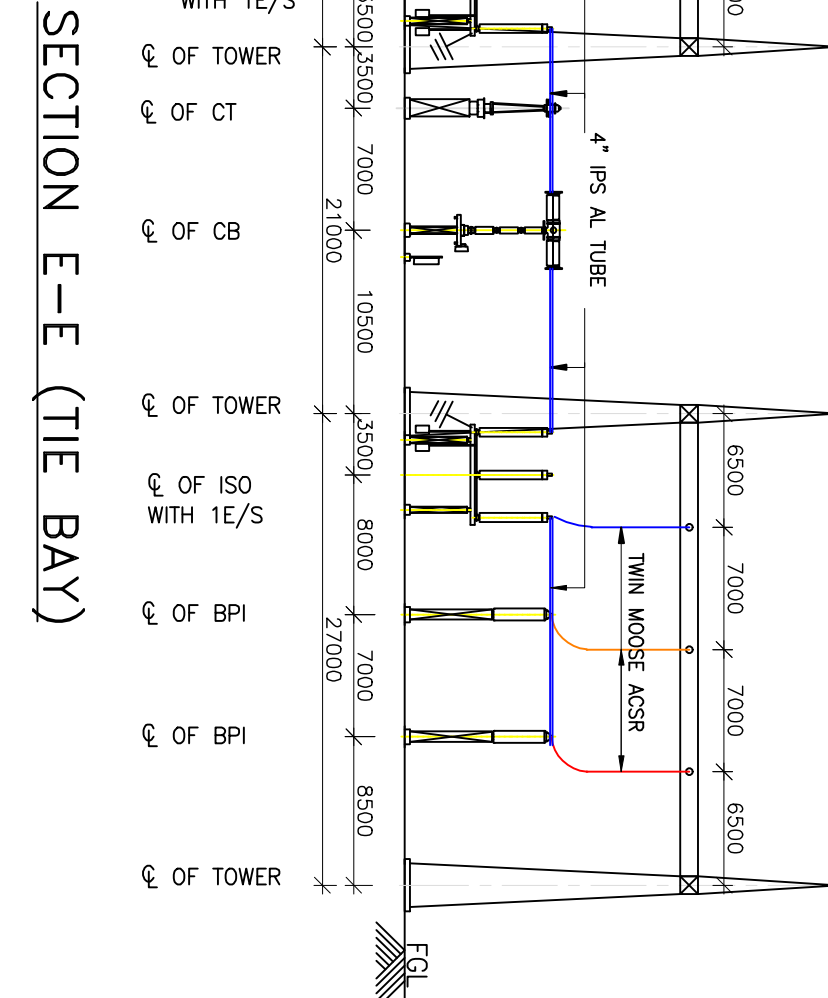
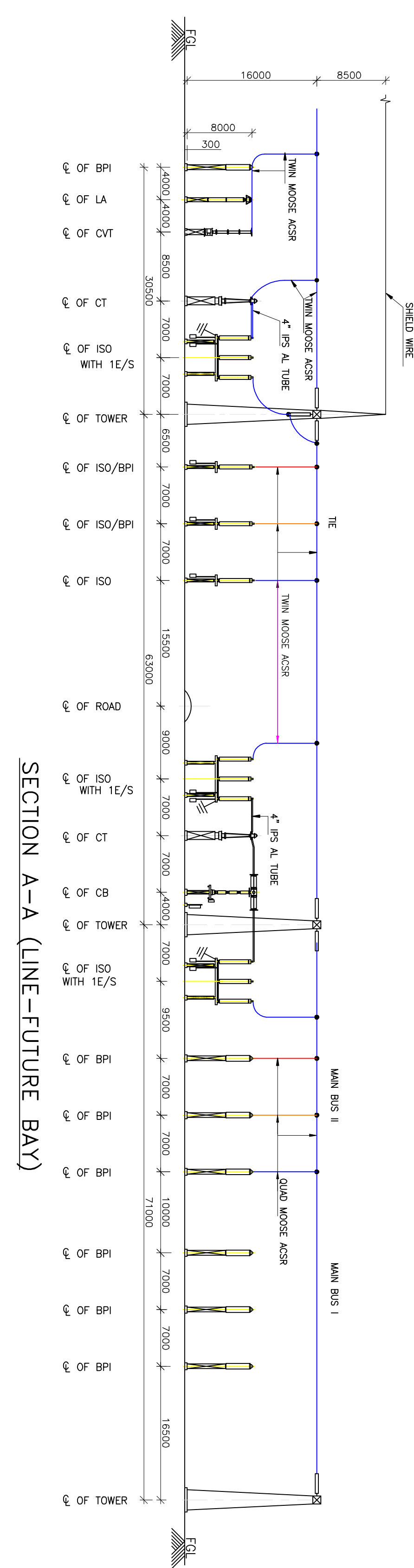
15	MAN BUS B & EQUIPMENT CONNECTION	BROAD	400V
14	EQUIPMENT WIRE CONNECTION	THW/ALB ALB MOOSE	400V
13	MAN BUS A & 2	4" ALB TUBE	400V
12	MAN BUS A & 2	4" ALB TUBE	400V
11	CONDUIT STATIC TENSION	AT PER PHASE	400V
10	CONDUIT QUAD	6" PER PHASE	400V
9	CONDUIT QUAD	4" PER PHASE	400V
8	CONDUIT QUAD	4" PER PHASE	400V
7	CONDUIT QUAD	4" PER PHASE	400V
6	CONDUIT QUAD	4" PER PHASE	400V
5	CONDUIT QUAD	4" PER PHASE	400V
4	CONDUIT QUAD	4" PER PHASE	400V
3	CONDUIT QUAD	4" PER PHASE	400V
2	CONDUIT QUAD	4" PER PHASE	400V
1	CONDUIT QUAD	4" PER PHASE	400V

Ignore this comment

- ALL DIMENSIONS ARE IN MM. 121.2M
ALL STRUCTURE/CONDUCTOR HEIGHTS ARE ABOVE PLINTH LEVEL.
IS 300 MM ABOVE G.L. (GROUND LEVEL).
WAVE TRAP FOUNDATION SHALL BE PROVIDED FOR ALL THREE PHASE OF WAVE TRAP. THE FOUNDATION SHALL BE 1000 MM BELOW GROUND LEVEL. WAVE TRAP SHALL BE INSTALLED ON ALL PHASES. ONE WAVE TRAP SHALL BE PROVIDED FOR EACH PHASE. WAVE TRAP SHALL BE PROVIDED FOR ONE PHASE WHEREVER WAVE TRAP IS NOT INSTALLED.
FOR SECTION DETAILS REFER SHEET NO. 02
TYPE OF GANTRY STRUCTURES SHALL BE AS PER APPROVED STRUCTURAL LAYOUT DRAWING.
LOCATION OF LM SHALL BE AS PER APPROVED SSP LAYOUT
SAFETY PRESSURE RELIEF VALVE SHALL NOT BE TOWARDS TRANSMITTER SIDE / ANY EQUIPMENT NEARBY NEAR LIGHTNING ARRESTOR AND SHELL SHALL ESCAPE THE SHAPE DURING EQUIPMENT AT SITE.
SUPPORT OF O.C, O.S AND SWAYAN REDUCTION, SWITCH AND SERVICE TRANSDUCERS ARE NOT IN THE SCOPE OF THIS PACKAGE.
REACTORS, SWITCHBOARD SERVICE TRANSFORMERS IS IN THE SCOPE OF THIS PACKAGE.
TO APPLY & ERECTION OF 132KV CABLES AND CABLE STAYING PINS, ARE NOT IN THE SCOPE OF THIS PACKAGE. HOWEVER PROVISION OF STRUCTURE AND FOUNDATION FOR THE SAME IS IN THE SCOPE OF THIS PACKAGE.
LOCATION OF DEAD END TOWERS SHOWN IS TENTATIVE, **AND SHALL BE MODIFIED AS PER FINAL LAYOUT.**
LOCATION OF LINE SITE EQUIPMENT IS TENTATIVE AND SHALL BE FINALISED BASE ON APPROVED TRANSMISSION LINE TOWERS.
LOCATION OF AC ROCKERS IS TENTATIVE. FINAL LOCATION SHALL BE AS PER APPROVED CABLE TRENCH LAYOUT.

ADDITIONAL INFORMATION
W.O.No. 81004

STATUS OF DRAWING		NAME OF CUSTOMER/PROJECT		DATE	
DISTRIBUTION OF PRINTS		NTPC DRAWING NO.		03/07-572-PYE-F-427	
		भारत हेवी इलेक्ट्रिकल्स लिमिटेड सुपरीग्रिड इन्फ्रास्ट्रक्चर विभाग भारत हेवी इलेक्ट्रिकल्स लिमिटेड TRANSMISSION BUSINESS GROUP		03.08.13	
REV.	DATE	ALTERED BY	DATE	NAME	DATE
01	17.06.13	CHECKED BY	MM/DMM	SD	03.08.13
ZONE	DRAWING REVISIONS AS PER NTPC COMMENTS DATED 21.08.13 AND NTPC DATED 04.09.2013	APPROVED BY	MM/DMM	SD	03.08.13
TITLE		DEPT.	SCALE	CARD CODE	REV.
400KV NABINAGAR STPP- LAYOUT PLAN & SECTION			1 : 850		03
DRAWING NO.		SHEET No.		NEXT SHEET	
TB-0-350-316-002		01		02	



NOTE:-
ALL HEIGHTS ARE WITH RESPECT TO PUNTH LEVEL.

REF. DWG.

NTPC DRG. No. 0370-999-POC-F-001 REV 7
SINGLE LINE DIAGRAM 0370-572-PVE-F-422
TRANSFORMER YARD LAYOUT-NTPC DRG. NO. 0370-215-POC-F-001

FOL FOR SWD - 121.2M
PAVING LEVEL/FEL FOR TRANSFORMER YARD - 121.6M

WVD - 121.2M										EL/FTL FOR TRANSFORMER YARD - 121.6M									
ADDITIONAL INFORMATION										W.O.NO. 81004									
NAME OF CUSTOMER/PROJECT										भारत भारती बिजली उत्पादन निगम लि. 400/132KV SWITCHYARD PACKAGE AT NABHANGAR STP (3X60KV)									
STATUS OF DRAWING										DISTRIBUTION OF PRINTS									
DRAWING NO.										REV.									
DATE										DATE									
CHECKED										CHECKED									
APPROVED										APPROVED									
RS										RS									
DRAWING REVISIONS PER NTPC										DRAWING REVISIONS PER REGION									
CONTROL ROOM BLDG. CO-0RD										CO-ORDINATES OF TRANSFORMER AREA									
CHANGED TO 733.91E										AND COOLING WATER AREA GIVEN									
CO-0RD OF 400 KV TOWER CORRECTED.										ON 06.12.13									
DEPT.										SCALE									
CODE										CARD CODE									
TITLE										DRAWING NO.									
400KV NABHANGAR STP- LAYOUT PLAN & SECTION										REV.									
SHEET NO. 03										NEXT SHEET									



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it must not be used directly or indirectly in anyway detrimental to the interest of the company.

the property of BHARAT HEAVY ELECTRICALS LTD. and is not in any way directly or indirectly in anyway detrimental to the interest of BHARAT HEAVY ELECTRICALS LTD.

1. Distance between the equipments/ other facilities are subject to meeting clearances.
2. Please show the R, Y & B phases in their respective colors i.e. Red, Yellow and Blue color for all the phases.
3. Quantity & location of LVA are subject to DSI-P calculations
4. Nos of AC Kiosk shall be as per spec requirements.

SYMBOL	EQUIPMENT
	125kV, 1250A, 31.5kA for 1s, 3-s-HI CIRCUIT BREAKER WITHOUT PIR
	135kV, 1250A, 31.5kA for 1s, 3-s-HI CIRCUIT BREAKER WITHOUT PIR
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 100% RATED ISOLATOR, MOTOR OPERATED, W/O E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 125% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 150% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 200% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 250% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 300% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 350% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 400% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 450% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 500% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 550% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 600% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 650% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 700% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 750% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 800% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 850% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 900% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 950% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 1000% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 1050% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 1100% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 1150% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 1200% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 1250% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 1300% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 1350% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 1400% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 1450% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 1500% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 1550% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 1600% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 1650% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 1700% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 1750% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 1800% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 1850% ISOLATOR MOTOR OPERATED, WITH E/S
	135kV, 1250A, 31.5kA FOR 1s, 3-s-HI 1900% ISOLATOR MOTOR OPERATED,

THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH SLD FOR 132 KV S/S
AND 400KV S/S LAYOUT PLAN.

MARK TOWER AND GIRDER NOMENCLATURES IN SUBSEQUENT REVISIONS.

YOU ARE REQUESTED TO INCLUDE THE LAYOUT AT MAKE-UP WATER END AS WELL IN SHEET 2 OF THIS DRAWING.

NOTES:

2. ALL STRUCTURE/CONDUCTOR HEIGHTS ARE ABOVE PLUMB LEVEL. PLUMB LEVEL IS 300 MM ABOVE O.L. (GROUND LEVEL).
3. ALL RIGID CONNECTIONS ARE THROUGH 3" IPS (BH) ALL FLEXIBLE CONNECTIONS ARE WITH SINGLE/11MM MOORE ASSEY CONDUCTOR WITH 22MM SPACING
4. THE TYPE OF SANTRY STRUCTURAL SHALL BE AS PER APPROVED STRUCTURAL LAYOUT DRAWINGS
5. LOCATION OF LM SHALL BE AS PER APPROVED DSDP LAYOUT
6. SUPPLY OF PHASE 1 & 2 NOS. SWITCHBOARD SERVICE TRANSFORMER ARE NOT IN THE SCOPE OF THIS WORK. HOWEVER FOUNDATION FOR 2 NOS. TRANS & 2 NOS. SWITCHBOARD SERVICE TRANSFORMER ARE IN THE SCOPE OF THIS PROPOSED WORK
7. SUPPLY OF 11MM MOORE ASSEY CONDUCTORS AND CABLE STRAPPING ARE NOT IN THE SCOPE OF THIS PROJECT. HOWEVER PROVISION OF STRUCTURE AND FOUNDATION FOR THE SAME IS IN THE SCOPE OF THIS PROJECT.
8. LA PRESSURE RELIEF VALVE SHALL NOT BE TOWARDS TRANSFORMER SIDE / ANY EQUIPMENT. HEAVY WET LOGGING ARE REQUIRED
9. ALL HEIGHTS ARE WITH RESPECT TO PLUMB LEVEL. **THIS SHALL ENSURE THE SAME PLUMB LEVEL**

10	RATED SHORT CIRCUIT CURRENT FOR ISC DURATION	3,544
11	SYSTEM NEUTRAL EARTHING	EFFECTIVELY EARTHED
12	SUB CONDUCTOR SPACING	250MM
13	CONDUCTOR STATIC TENSION	27/19 SUB CONDUCTOR TWIN 40SR MOOSE TWIN 40SR MOOSE TWIN 40SR MOOSE
14	EQUIPMENT INTER CONNECTION	(TWIN)SINGLE 40SR
15	HEIGHT OF EQUIPMENT CONNECTION (ELECTRICAL PLUMB)	4400

	TOWER WITH PEAK
	TOWER WITHOUT PEAK
	SUSPENSION INSULATOR STRING (10 DISCS PER STRING SET)
	BOTTLE INSULATOR STRING (10 DISCS / TENSION INSULATOR STRING)
	AL. TUBE
	ACSR MOOSE CONDUCTOR
	OP CAR/CONCRETE ROLL FOR INSULANT
	SHIELD WIRE (10.95mm)

REF. DWG.
NTPC DRG. NO. 0370-999-POC-F-001 REV 7
SINGLE LINE DIAGRAM 0370-572-PVE-P-423
400 KV NABINAGAR STPP-LAYOUT PLAN & SECTION 0370-572-PVE-F-4
TRANSFORMER YARD LAYOUT - NTPC DRG. NO. 0370-215-POE-F-001

ZONE	REV.	DATE	REV.	DATE
	CHECKED		ALtered	RM
	APPROVED		02	26.12.13
	DRAWING REVISED AS PER DESIGN CALCULATIONS, STRUCTURE LAYOUT & COOLING WATER AREA GIVEN ON 06.12.13		APPROVED AS	

[illegible]