

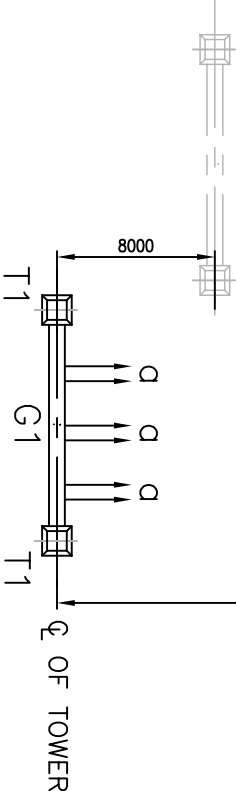
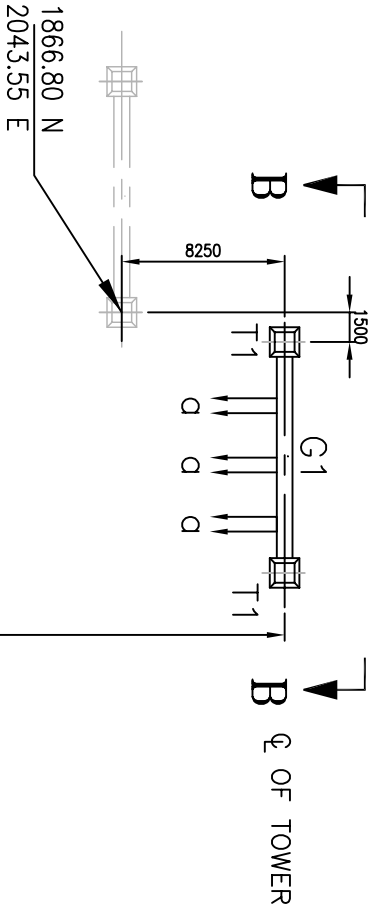
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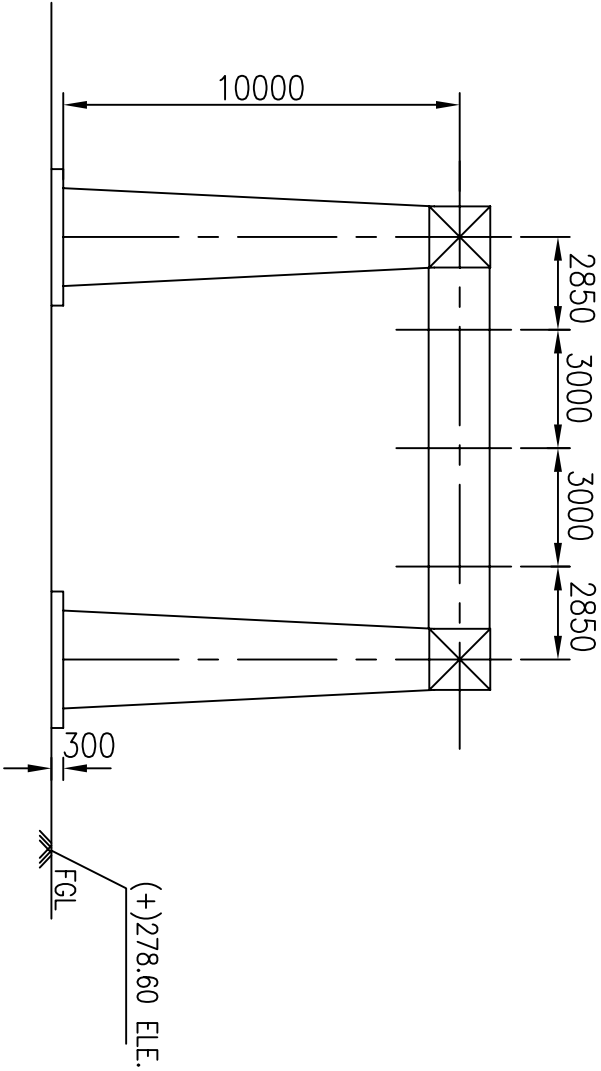
COMPUTER DRG. PATH NAME :
C:/MY-DOC-SAN/LAYOUTS/CLEARENCE/RIH/SH2.DWG

SIGN & DATE

INVENTORY NO.



ST#4 IBT#3



SECTION B-B

STRUCTURE LOADING

NOTATION	VOLTAGE (KV)	No. of points of anchoring	No. & Type of Cond./ Shield Wire per Phase	Normal Tension Per Phase (kg)	S/C Tension Per Phase(kg)	Separation Between Spacers (meters)
	145	2	TWIN ACSR MOOSE SPAN = 35750 MM	4000	4900	3.5

TOWERS

SL.NO.	TOWER DESIGNATION	STR. HEIGHT	QTY.	VOLTAGE (KV)
1	T1	10M	04	145

BEAMS

SL.NO.	STR. DESIGNATION	SPAN	QTY.	VOLTAGE (KV)
1	G1	11.7M	02	145

NOTES:

- ALL DIMENSIONS ARE IN MM
- DRAWING SHOWS THE MAXIMUM STATIC STRAINING TENSION IN MT ONLY & DO NOT INCLUDE THE EFFECTS OF DEAD & LIVE LOADS, WIND, SHORT CIRCUIT, SEISMIC FORCES CONDITIONS ETC.
- THE STRUCTURE SHALL BE DESIGNED FOR A FACTOR OF SAFETY OF 2 FOR NORMAL/ BROKEN WIRE CONDITION & 1.5 FOR SHORT CIRCUIT CONDITION
- THE TRANSVERSE, VERTICAL, LONGITUDINAL LOADS SHALL BE CONSIDERED AS PER IS 802: 1977
- WEIGHT OF THE MAN WITH TOOLS AT ANY POINT OF TIME SHALL BE CONSIDERED ON BEAM AS 150 Kg
- ALL HEIGHTS ARE WITH REFERENCE TO PLINTH LEVEL

PLINTH LEVEL IS 300 MM ABOVE GROUND LEVEL

REV.	DATE	ALTD.	CHD.	APPD.	REV.	DATE	ALTD.	CHD.	APPD.	NAME	SIGN.	DATE
					01	10.10.13	MS	DKM	RS	DRAWN	RK	
REVISED IN LINE WITH CUSTOMER'S DATED 15.07.13.										CHECKED	MS/DKM	-SD-
										APPROVED	RS	-SD-
										DISTRIBUTION OF PRINTS		
										DEPT.	CODE	
										TBEM	422	



1240-572D-POE-A-003 (SH-1 OF 1)	LAYOUT PLAN & SECTION OF 132KV SWITCHYARD (NTPR DRG. REFERENCE FOR LOCATION FOR TOWER & BEAM)	00
1240-572D-PVE-F-154	SECTION OF 400 KV & 132 KV SWITCHYARD	03
1240-572D-PVE-F-153	LAYOUT PLAN OF 400 KV & 132 KV SWITCHYARD FOR EXT. OF RIHAND STAGE-III	03
DRAWING REFERENCE	TITLE	REVISION

NTPC DRG. No. 1240-572D-PVE-F-155

CUSTOMER
NTPC LTD.
RIHAND STPP STAGE III
PROECT
400/132kv SWITCHYARD EXTENSION PACKAGE

CONTRACTOR
BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION PROJECTS DIVISION

STRUCTURE LOADING DIAGRAM of 132kv SWITCHYARD
EXTENSION FOR RIHAND STAGE-III

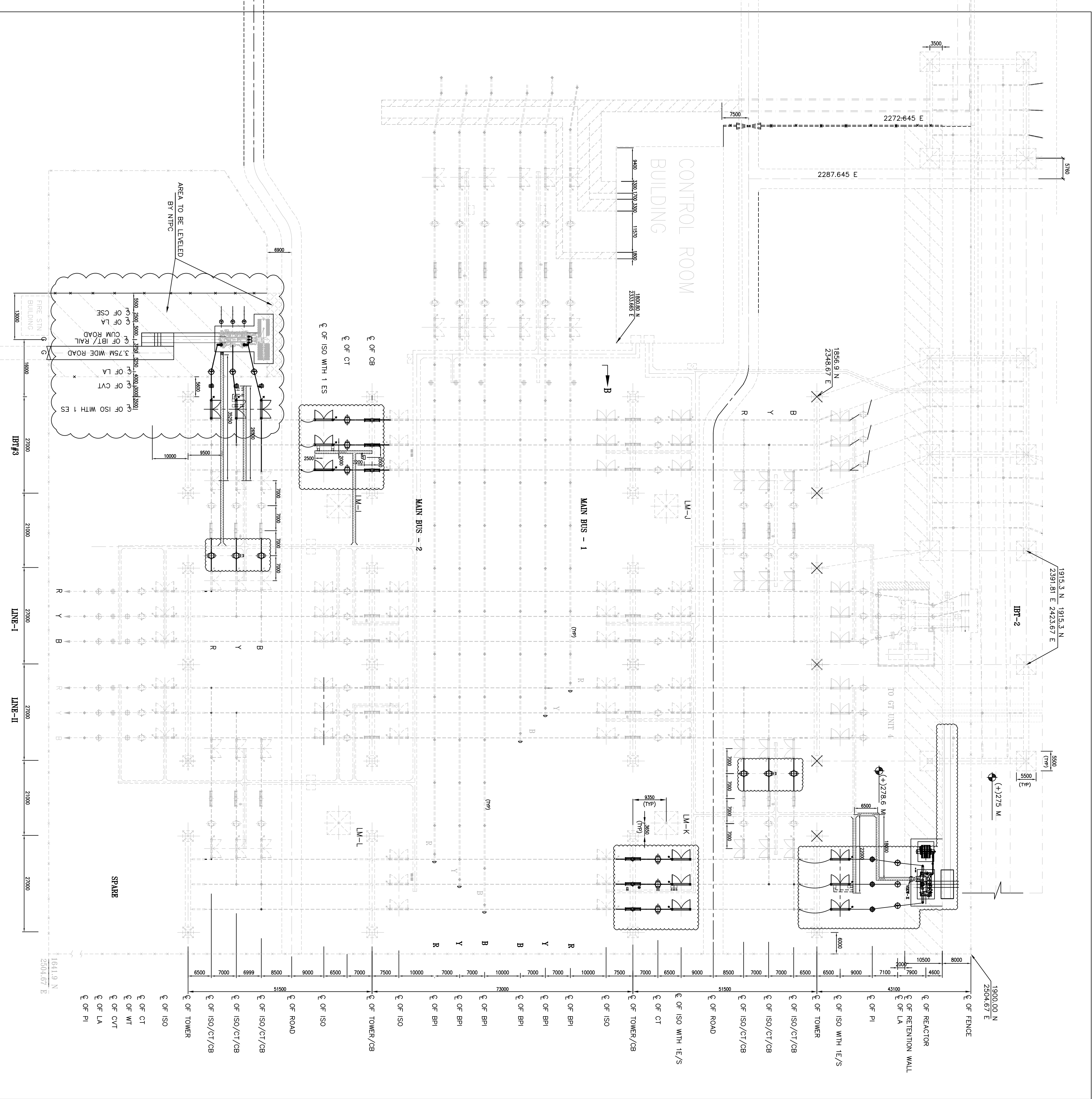
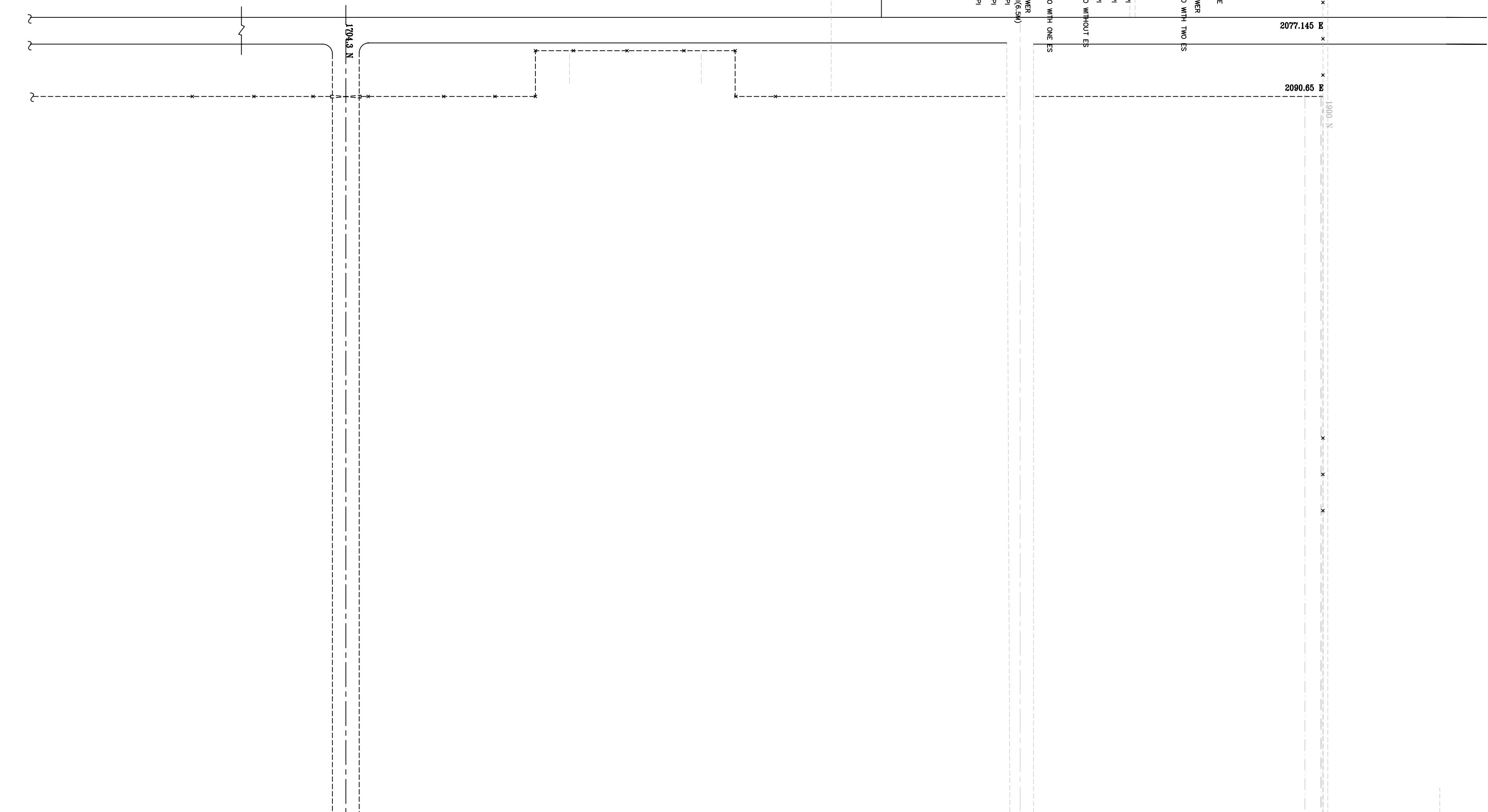
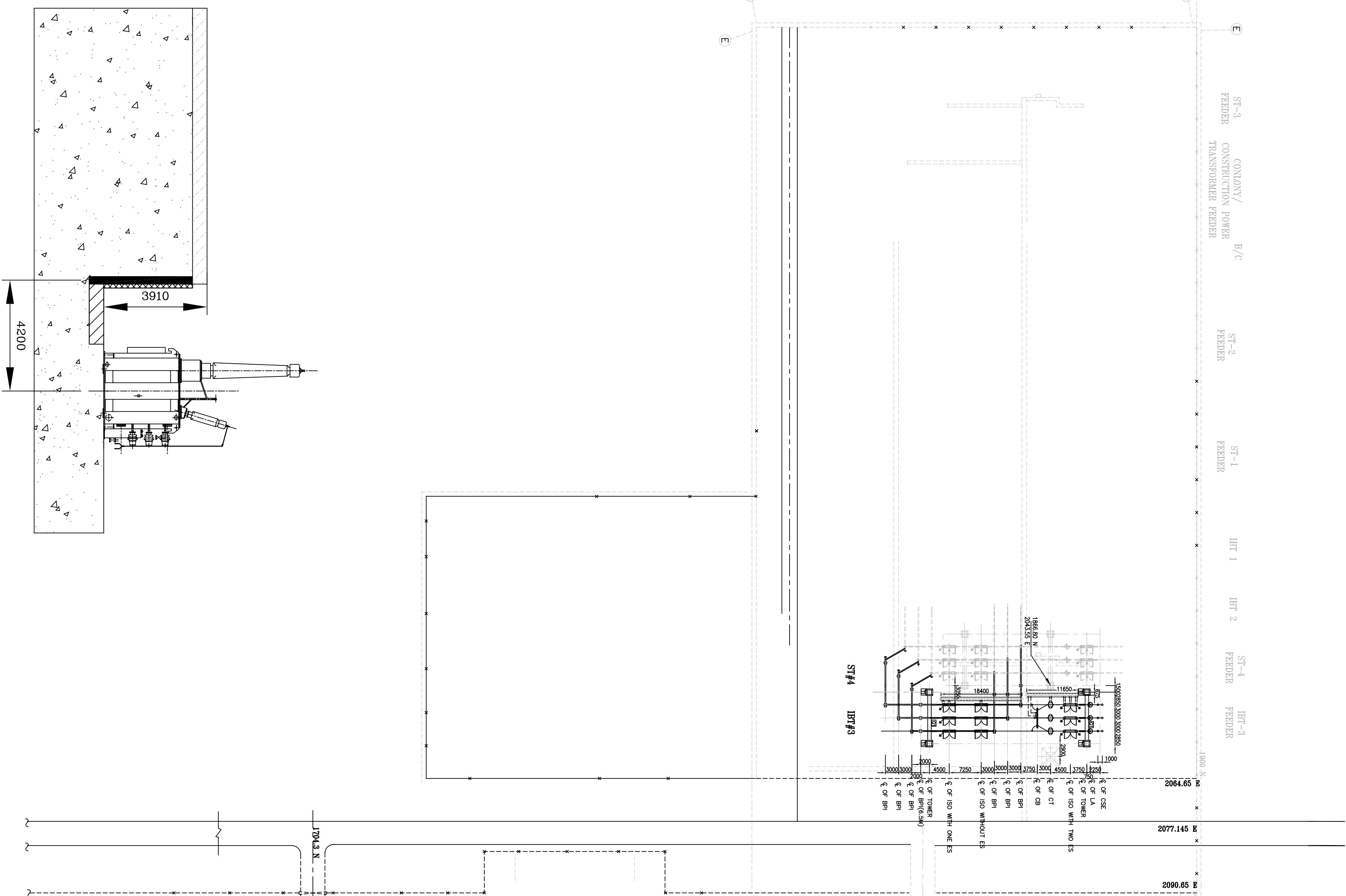
SCALE NTS
W.O. No. --

DRG. No. TB-3-359-316-155

CARD CODE
NEXT SHEET
SHEET No.
REV. 01

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VIEW-X

SECTION 2-2
(EXISTING)

SECTION 4-4

SECTION D-D

LEGEND:-

1) ———	PRESENT SCOPE
2) -----	EXISTING/ FUTURE/ NOT IN BHFL SCOPE

1. ALL DIMENSIONS ARE IN MM AND LEVELS IN METRES.
2. ALL DIMENSIONS ARE TO FACE UNLESS SPECIFIED OTHERWISE. ANGLE POINT AT AN INTERVAL OF 600mm.
3. LIFTING PITS ARE TO BE PROVIDED IN EVERY PRE-CAST COILER.
4. NECESSARY OPENINGS FOR GI PIPES SHALL BE CABLE TRENCH WALLS
5. A SLOPE OF 1:50 (DOWNHILL) SHALL BE GIVEN IN THE DIRECTION HORIZONTAL TO THE RUN OF THE TRENCH FOR ALL SECTIONS.
6. FOR ALL SECTIONS (UNLESS NOTED OTHERWISE) THE RUN OF THE CABLE TRENCH SHALL BE 1500MM MINIMUM.
7. EXISTING CONCRETION "E" 75X250 G.S. PLAT WOULD BE WELDED ON TOP TERS
8. CABLES SHALL BE LAYED IN CABLE TRAY INSULATION OF 10 CM CARBLS
9. TRENCH WALL SHALL CLEAR THE EQUIPMENT FOUNDATION.
10. ALL SPOUT ANGLE SHALL BE 150X50X5 MM.
11. AS PER THE CABLE TRENCH VULV REQUIREMENT, BRICK SLOE WALLS WITH PLASTERING

[illegible][illegible]

TABLE-1 : CT DETAILS

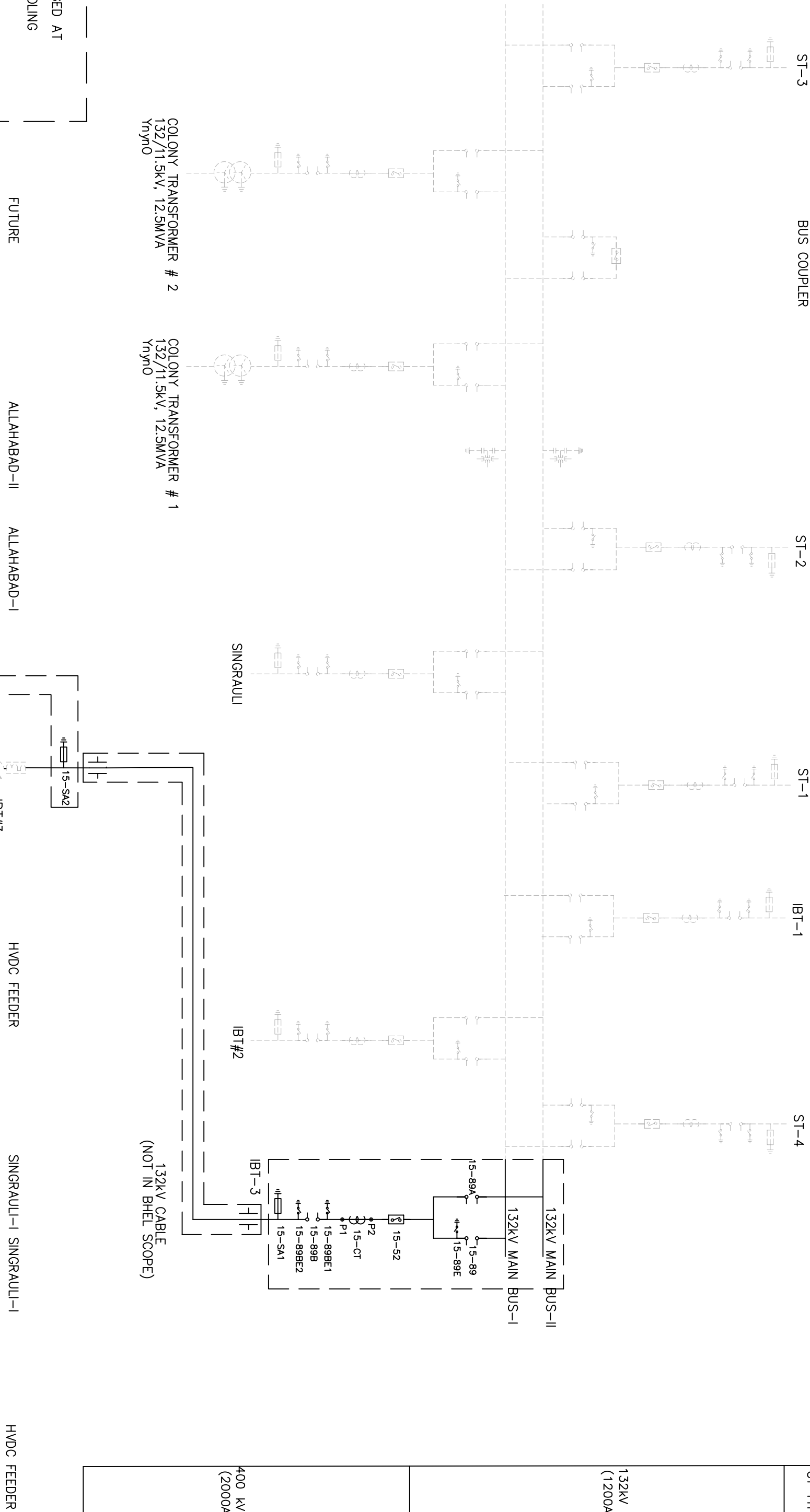
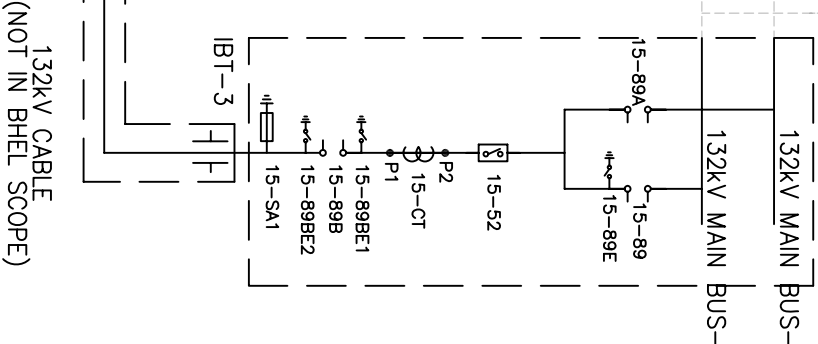
CT TYPE	CORE No.	RATIO	BURDEN (MN)	E (MAX)	R CT (MAX AT 75 °C)	ACCURACY CLASS
CORE 1	1200/1A	—	1200 V	40 mA AT KPV	10.2	PS
	600/1A	—	600 V	80 mA AT KPV	5.2	
	300/1A	—	300 V	160 mA AT KPV	2.52	
	1200/1A	—	1200 V	40 mA AT KPV	10.2	
	600/1A	—	600 V	80 mA AT KPV	5.2	
CORE 2	1200/1A	—	1200 V	40 mA AT KPV	10.2	PS
	600/1A	—	600 V	80 mA AT KPV	5.2	
	300/1A	—	300 V	160 mA AT KPV	2.52	
	1200/1A	—	1200 V	40 mA AT KPV	10.2	
	600/1A	—	600 V	80 mA AT KPV	5.2	
CORE 3	1200/1A	—	1200 V	40 mA AT KPV	10.2	PS
	600/1A	—	600 V	80 mA AT KPV	5.2	
	300/1A	—	300 V	160 mA AT KPV	2.52	
	1200/1A	—	1200 V	40 mA AT KPV	10.2	
	600/1A	—	600 V	80 mA AT KPV	5.2	
CORE 4	1200/1A	—	1200 V	40 mA AT KPV	10.2	PS
	600/1A	—	600 V	80 mA AT KPV	5.2	
	300/1A	—	300 V	160 mA AT KPV	2.52	
	1200/1A	—	1200 V	40 mA AT KPV	10.2	
	600/1A	—	600 V	80 mA AT KPV	5.2	
CORE 5	1200/1A	—	1200 V	40 mA AT KPV	10.2	PS
	600/1A	—	600 V	80 mA AT KPV	5.2	
	300/1A	—	300 V	160 mA AT KPV	2.52	
	1200/1A	—	1200 V	40 mA AT KPV	10.2	
	600/1A	—	600 V	80 mA AT KPV	5.2	
CORE 6	1200/1A	—	1200 V	40 mA AT KPV	10.2	PS
	600/1A	—	600 V	80 mA AT KPV	5.2	
	300/1A	—	300 V	160 mA AT KPV	2.52	
	1200/1A	—	1200 V	40 mA AT KPV	10.2	
	600/1A	—	600 V	80 mA AT KPV	5.2	

SYMBOL	ABR.	DESCRIPTION	RATING	QTY.
	52	CIRCUIT BREAKER (3-PH)	132kV, 1600A, 31.5KA FOR 1 SEC	01
	89A	HCB ISOLATOR MOTOR OPERATED & MECHANICALLY GANGED WITHOUT E/S (3-PH)	132kV, 1250A, 31.5KA FOR 1SEC.	01
	89	HCB ISOLATOR MOTOR OPERATED & MECHANICALLY GANGED WITH ONE E/S LOCALLY MOTOR OPERATED & MECHANICALLY GANGED (3-PH)	132kV, 1250A, 31.5KA FOR 1SEC.	01
	89B	HCB ISOLATOR MOTOR OPERATED & MECHANICALLY GANGED WITH TWO E/S LOCALLY MOTOR OPERATED & MECHANICALLY GANGED (3-PH)	132kV, 1250A, 31.5KA FOR 1SEC.	01
	CT	CURRENT TRANSFORMER (1-PH)	REFER TABLE-1	03
	SA	ZNO LIGHTNING ARRESTER (1-PH)	120kV, 10KA, CLASS-III, 5kA/kV	06

SYMBOL	ABR.	DESCRIPTION	RATING	QTY.
	52	CIRCUIT BREAKER WITHOUT CLOSING RESISTOR (3-PH)	420kV, 2000A, 50KA FOR 1 SEC	01
	52*	CIRCUIT BREAKER WITHOUT CLOSING RESISTOR BUT WITH REACTOR SWITCHING CAPABILITY INCLUDING CONTROL SWITCHING UNIT (3-PH)	420kV, 2000A, 50KA FOR 1 SEC	01
	89	HCB ISOLATOR MOTOR OPERATED & MECHANICALLY GANGED WITH ONE E/S LOCALLY MOTOR OPERATED & MECHANICALLY GANGED (3-PH)	400kV, 2000A, 50KA FOR 1 SEC	04
	CT	CURRENT TRANSFORMER (1-PH)	REFER TABLE-1	12
	CVT	CAPACITOR VOLTAGE TRANSFORMER (1-PH)	REFER TABLE-2	03
	SA	ZNO LIGHTNING ARRESTER (1-PH)	390kV, 10KA, CLASS-III, 8kA/kV	06
	IBT#3	INTER BUS TRANSFORMER (3-PH) (SUPPLY & ETC NOT IN BH&L SCOPE)	400/132/13kV, 200 MVA, Vmood11	01
	BR#2	BUS REACTOR (3-PH)	420kV, 80MVAR BCT-R-200/200/220/220/1A NCT-R-200/200/1A	01

COLONY TRANSFORMER # 2
 132/71.5kV, 12.5MVA
 71500

COLONY TRANSFORMER # 1
 132/71.5kV, 12.5MVA
 71500



400kV CT 4400pF	RATIO	400kV / 110V	400kV / 110V	400kV / 110V
		$\sqrt{3} / \sqrt{3}$	$\sqrt{3} / \sqrt{3}$	$\sqrt{3} / \sqrt{3}$
BURDEN	75 VA	75 VA	75 VA	75 VA
ACCBURDEN CLASS	3P	3P	3P	0.2

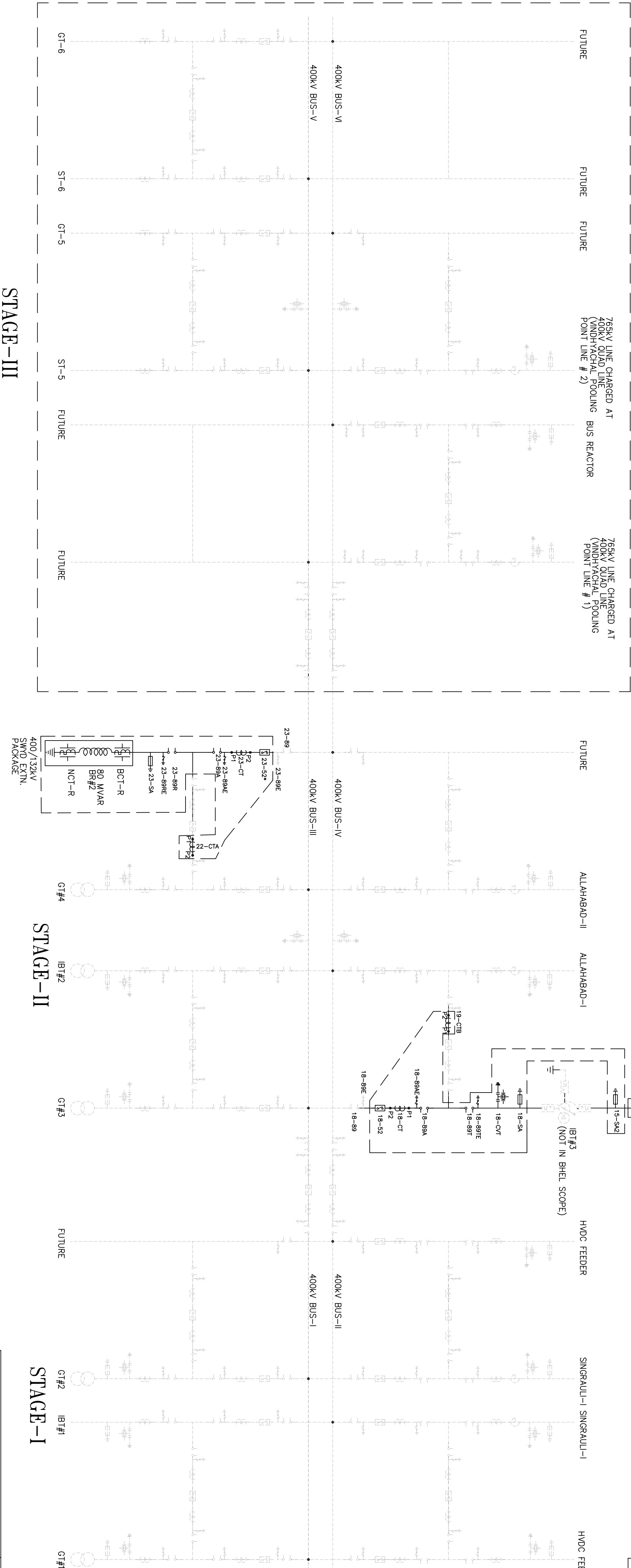
THE ACCURACY OF 0.2 ON SECONDARY III SHOULD BE MAINTAINED THROUGH THE ENTIRE BURDEN RANGE UP TO 75 VA ON ALL THE THREE WINDINGS WITHOUT ANY ADJUSTMENTS DURING OPERATION.

NOTE:-

1. SYSTEM PARAMETERS

i) HIGHEST SYSTEM VOLTAGE	400kV	132kV
ii) LIGHTING IMPULSE VOLTAGE	420kV /rms	145kV /rms
iii) SWITCHING IMPULSE VOLTAGE	1425kVp	1425kVp
iv) POWER FREQUENCY WITHSTAND FOR 1 MIN.	1050kVp	650kVp
v) MAX. FAULT LEVEL (1 sec.)	650kV (rms)	275kV (rms)
vi) MINIMUM CREEPAGE DISTANCE	50kV	31.5kV
	10500mm	3625mm

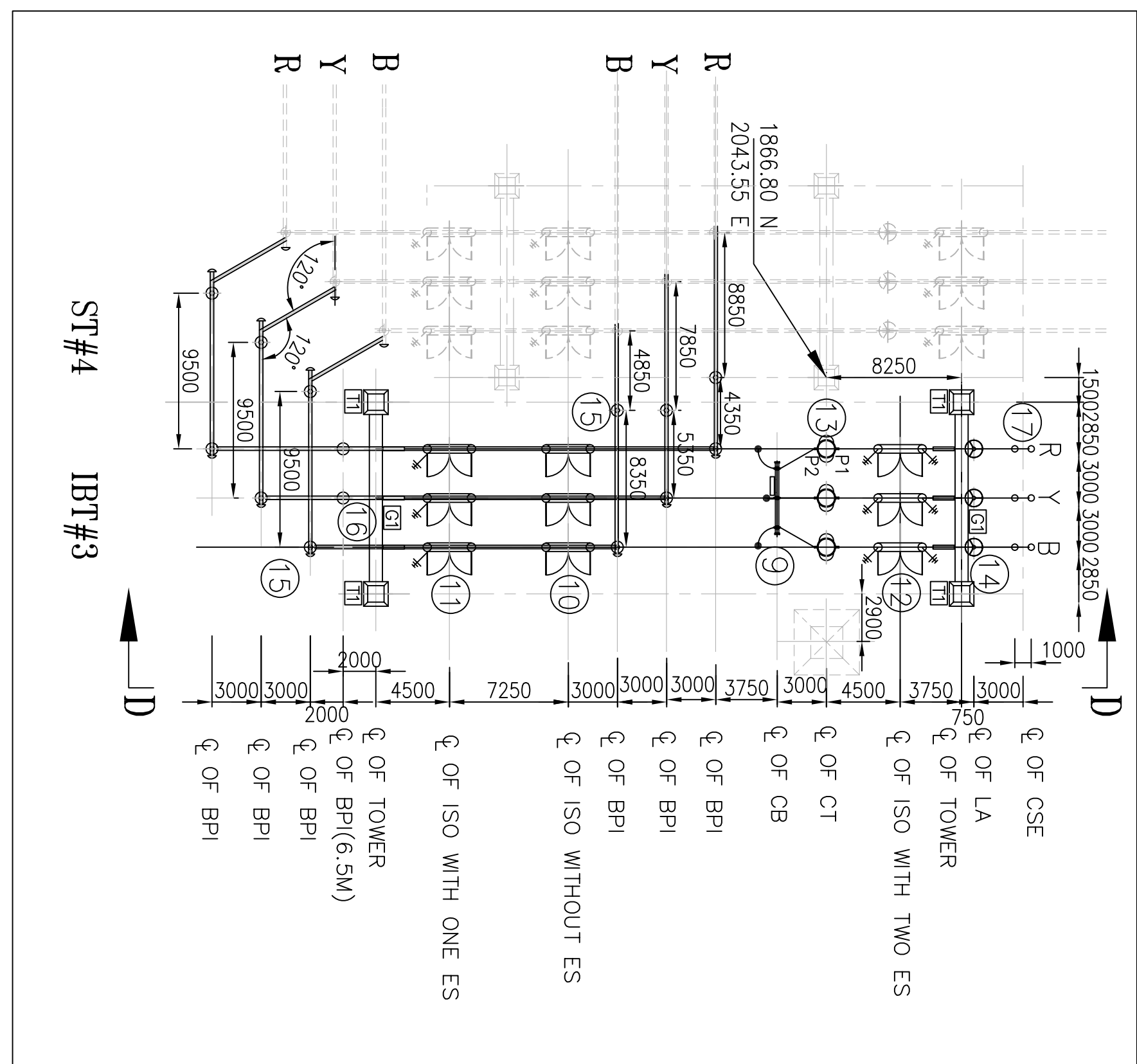
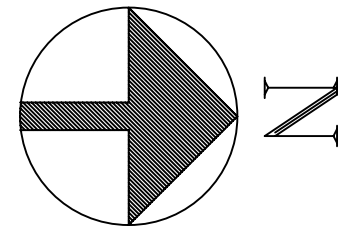
- SUPPLY OF IBT#3 & 132kV CABLE SEALING END ARE NOT IN BH&L SCOPE. HOWEVER FOUNDATION OF IBT#3 AND FOUNDATION & STRUCTURE OF 132kV CABLE SEALING END ARE IN BH&L'S SCOPE.
- PRESENT SCOPE
- EXISTING/FUTURE SCOPE



STAGE-III

STAGE-II

STAGE-I



132kV SWITCHYARD
(BLOWN UP VIEW)

SN	SYMBOL	DESCRIPTION	RATING	QTY.
1		CIRCUIT BREAKER WITH/OUT CLOSING RESISTOR (L-rn)	420V, 2000A, 50KA 10R 1 SEC	01
1A		CIRCUIT BREAKER WITH/OUT CLOSING RESISTOR WITH WITH KRAFTING SHOCKING CAPABILITY WITHOUT CONTROL, SHOCKING UNIT (L-rn)	420V, 2000A, 50KA 10R 1 SEC	01
2		WGS ISOLATOR MOTOR OPERATED & MECHANICALLY LOCKED WITH ONE 5/5 LOCKLY MOTOR OPERATED & MECHANICALLY LOCKED (L-rn)	400V, 2000A, 50KA 10R 1 SEC	04
3		CURRENT TRANSFORMER (L-rn)	400V, 2000A, 50KA 10R 1 SEC	12
4		CAPACITOR VOLTAGE TRANSFORMER (L-rn)	400V, 400V2, 50KA 10R 1 SEC	03
5		2NO LIGHTING ARRESTER (L-rn)	350KV, 10KA, C42-05-50 BA/AV	06
6		INTER BUS TRANSFORMER (L-rn) (NOT IN BILL SCOPES)	400/12/120KA, 200 MVA, 100MVA	01
7		BUS REACTOR (L-rn)	400KV, 800MVA	01
8		BUS POST INSULATOR (L-rn)	400KV, 8M	03
9		CIRCUIT BREAKER (L-rn)	120KV, 1200A, 51.5KA 10R 1 SEC	01
10		BUS ISOLATOR MOTOR OPERATED & MECHANICALLY LOCKED WITH/OUT 5/5 (L-rn)	120KV, 1200A, 51.5KA 10R 1 SEC	01
11		BUS ISOLATOR MOTOR OPERATED & MECHANICALLY LOCKED WITH ONE 5/5 LOCKLY MOTOR OPERATED & MECHANICALLY LOCKED (L-rn)	120KV, 1200A, 51.5KA 10R 1 SEC	01
12		BUS ISOLATOR MOTOR OPERATED & MECHANICALLY LOCKED WITH TWO 5/5 LOCKLY MOTOR OPERATED & MECHANICALLY LOCKED (L-rn)	120KV, 1200A, 51.5KA 10R 1 SEC	01
13		CURRENT TRANSFORMER (L-rn)	120KV, 1200A, 51.5KA 10R 1 SEC	03
14		2NO LIGHTING ARRESTER (L-rn)	120KV, 10KA, C42-05-50 BA/AV	06
15		BUS POST INSULATOR (L-rn)	120KV, 8M	15
16		BUS POST INSULATOR (L-rn)	120KV, 8M	12
17		CABLE STRANDING BOND (L-rn) (NOT IN BILL SCOPES)	120KV	02

- NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. MINIMUM CLEARANCES BETWEEN

- ### 3. SYSTEM PARAMETERS

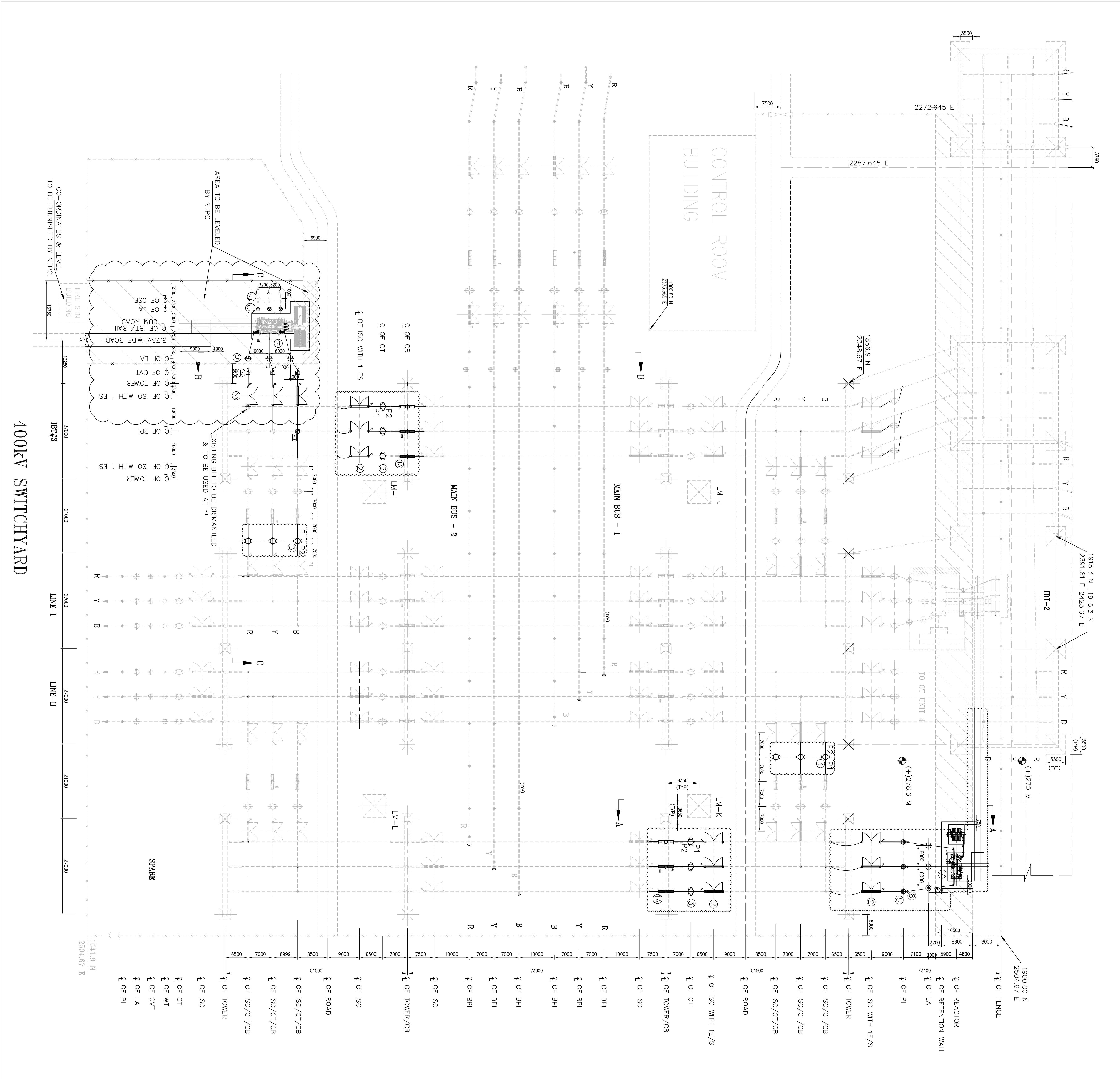
i) PHASE TO PHASE	400kV	132kV
ii) PHASE TO EARTH	4000 mm	1300 mm
iii) SECTION CLEARANCES	3500 mm	1300 mm
iv) GROUND CLEARANCES	6500 mm	4000 mm
	8000 mm	4600 mm

i) HIGHEST SYSTEM VOLTAGE	400kV	132kV
ii) LIGHTING IMPULSE VOLTAGE	420kV rms	145kV rms
iii) SWITCHING IMPULSE VOLTAGE	1625kVp	650kVp
iv) POWER FREQUENCY WITHSTAND FOR 1 MIN.	1050kVp	
v) MAX. FAULT LEVEL (1 sec.)	650kV (rms)	273kV (rms)
vi) MINIMUM CREEPAGE DISTANCE	50kA	31.5kA
	10500mm	3625mm

CONDUCTOR SIZE DETAILS		
EQUIPMENT INTERCONNECTION	400 KV	4" IPS ALUMINUM TUBE
JACK BUS & JUMPEERS	400 KV	TWIN MOOSE CONDUCTOR
MAIN BUS 1 & 2	132 KV	4" IPS ALUMINUM TUBE
EQUIPMENT INTERCONNECTIONS	132 KV	4" IPS ALUMINUM TUBE
JACK BUS & JUMPEERS	132 KV	TWIN MOOSE CONDUCTOR

- [illegible]

DRAWING REFERENCE	TITLE	
161810130F	3 PHASE, 400/230/380V AUTO TRANSFORMER.	REV. 01
1240-5720-POE-A-001 (SH 1 OF 1)	SINGLE LINE DIAGRAM OF 400 KV SWITCHBOARD	REV. 0
1240-5720-POE-A-003 (SH-1 OF 1)	LAYOUT PLAN & SECTION OF 132KV SWITCHBOARD	REV. 0
1240-5720-POE-A-002 (SH 1 OF 2)	LAYOUT PLAN & SECTION OF 400KV SWITCHBOARD	REV. 0

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& DATE

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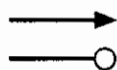
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REV.	DATE	ALTERED	REV.	DATE	ALTERED RJ	REV.	DATE	ALTERED RJ	-SD-
		CHECKED	01	21.08.13	CHECKED MS/DKM	00	01.07.13	CHECKED MS/DKM	-SD-
		APPD			APPD RS			APPD RS	-SD-
						JOB No. 82004			

LEGEND



CONNECTION TO GROUND MAT THROUGH RISER.

CONNECTION TO ROD ELECTRODE WITH TREATED PIT.

GENERAL NOTES:

- 1 EARTH STRIP CLEATED TO LATTICE /PIPE TYPE STRUCTURE AT AN INTERVAL OF 1.0M SUITABLE PROVISION SHALL BE MADE WITH SUPPORT STRUCTURE.
- 2 ALL EARTH STRIPS SHALL BE TAKEN ALONG EDGE OF STRUCTURE. ALL DRAWING SHOWS TYPICAL ARRANGEMENT ONLY.
- 3 ALL STRUCTURES/EQUIPMENTS SHALL BE EARTHED AS SHOWN IN THE FOLLOWING SHEETS.
- 4 BOLT SIZE FOR CONNECTING EARTHING FLAT TO THE EQPT/STRUCTURE SHALL BE TO SUIT RESPECTIVE HOLE SIZE.
5. ALL EARTHING SHALL BE DONE IN ACCORDANCE WITH IS:3043 UNLESS OTHERWISE STATED IN TECHNICAL SPECIFICATION
- 6 TWO EARTHING STRIPS CAN BE CONNECTED TO ONE RISER.
- 7 EACH RISER OF A PARTICULAR EQUIPMENT SHALL BE CONNECTED TO A DIFFERENT EARTHROD (EITHER HORIZONTAL OR VERTICAL CONDUCTORS OF MAIN EARTHMAT).
- 8 FOR WELDING DETAILS REFER SHEET #20 & 21
- 9 E/WIRE DOWN CONDUCTOR SHALL BE CLEATED AT AN INTERVAL OF 2.0 M ALONG WITH STRUCTURE NO HOLES IN STRUCTURE IS ALLOWED FOR THIS PURPOSE

SHEET NO. DESCRIPTION

01. TITLE
- 1A. NOTES
02. 400KV & 132KV SF6 CIRCUIT BREAKER
03. 400KV CVT
04. 400KV & 132KV POST INSULATOR (SOLID CORE TYPE)
05. 390KV & 120KV LIGHTNING ARRESTER
06. MARSHALLING KIOSK
- 7A. 400KV HORIZONTAL CENTER BREAK ISOLATOR WITH ONE EARTH SWITCH (TYPICAL)
- 7B. 132KV HORIZONTAL CENTER BREAK ISOLATOR WITH ONE EARTH SWITCH (TYPICAL)
- 7C. 132KV HORIZONTAL CENTER BREAK ISOLATOR WITH TWO EARTH SWITCH (TYPICAL)
- 7D. 132KV HORIZONTAL CENTER BREAK ISOLATOR WITHOUT EARTH SWITCH (TYPICAL)
08. TOWER WITHOUT PEAK
09. 400KV & 132KV CURRENT TRANSFORMER
10. CABLE TRENCH
11. PIPE EARTH ELECTRODE WITH TEST PIT
12. ROD EARTH ELECTRODE WITH TEST PIT

SHEET NO. DESCRIPTION

13. RAIL BONDING
14. IBT TRANSFORMER
15. AUXILIARY EARTH MAT FOR ISOLATOR MAIN MECH./S MECH. BOX
16. CONTROL AND RELAY PANELS
17. BUS REACTOR.
18. GATE/FENCE POST
19. TYPICAL ARRANGEMENT OF BOLTED JOINTS
20. WELDING DETAILS
21. WELDING DETAILS

NTPC DRAWING NO. 1240-572D-PYE-F-161			
CUSTOMER		एन टी सी लिमिटेड NTPC Limited (A Government of India Enterprise)	
PROJECT : RIHAND STPP STAGE III 400/132kV SWITCHYARD EXTENSION PACKAGE			
CONTRACTOR	BHARAT HEAVY ELECTRICALS LTD. TRANSMISSION PROJECTS DIVISION NEW DELHI	DEPT CODE	NAME RK SK DKM/RS
TITLE EQUIPMENT EARTHING PHILOSOPHY & DETAILS			
DRAWING NO. TB-4-359-316-161		SHEET 01 OF 21 REV. 01	

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.
8. EARTHING CONDUCTORS FROM EQUIPEMT 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.
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.

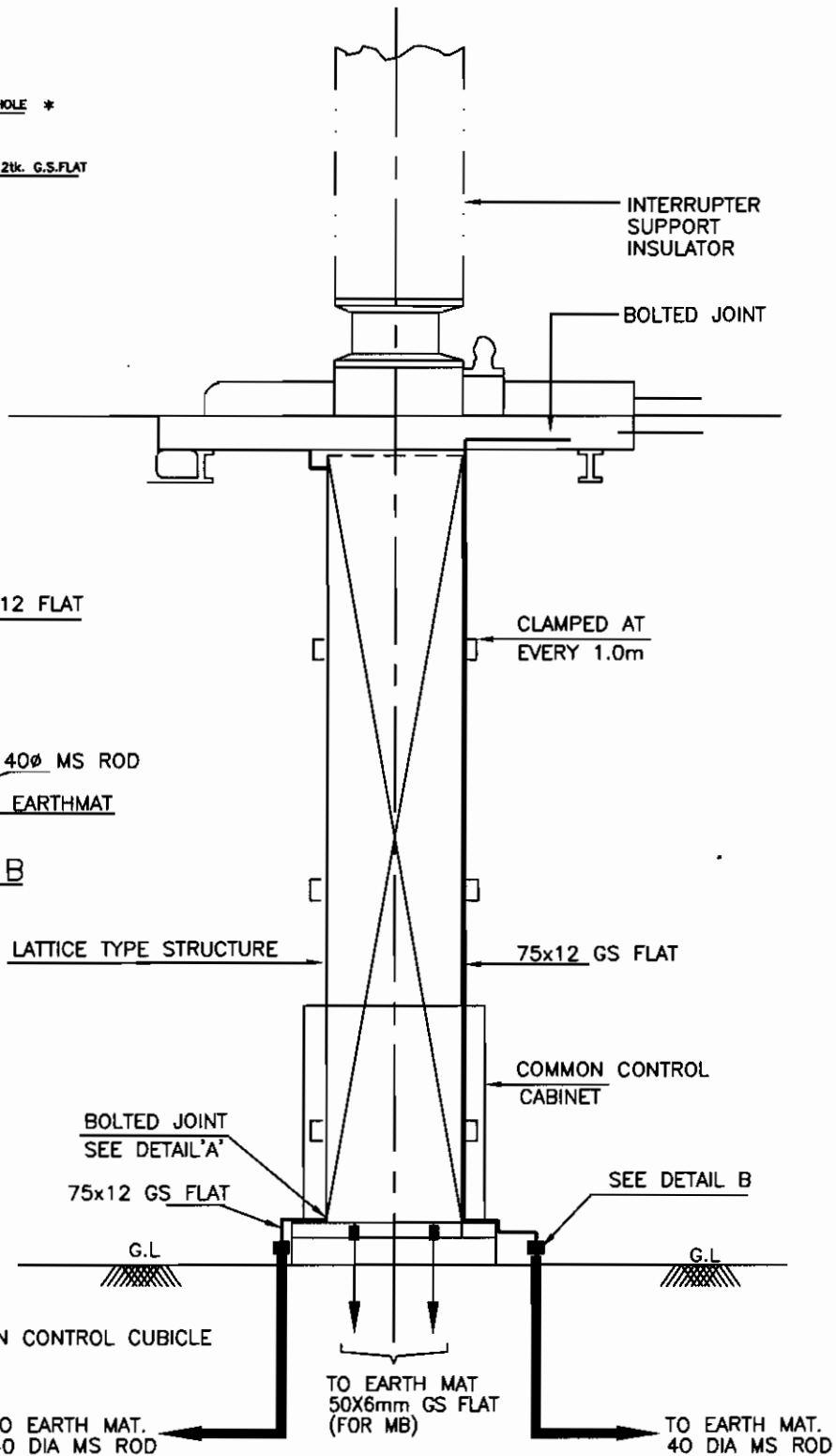
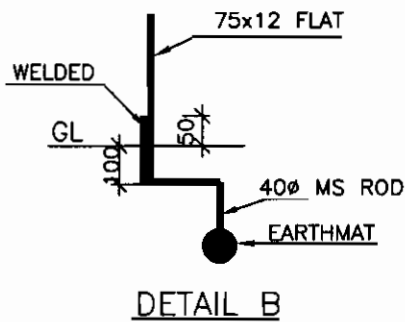
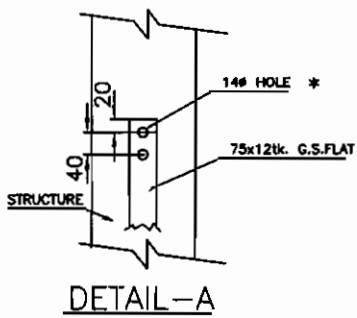


EQUIPMENT EARTHING DETAILS NOTES

DRG. No.

TB-4-359-316-161

SHEET No.
1A



NOS. OF RISERS
= 2 NOS. PER PHASE
+ 2 NOS. FOR COMMON CONTROL CUBICLE

NOTE:

1) * BOLT SIZE AND HOLE SIZE SHALL BE TO SUIT RESPECTIVE EQPT./STRUCTURE.



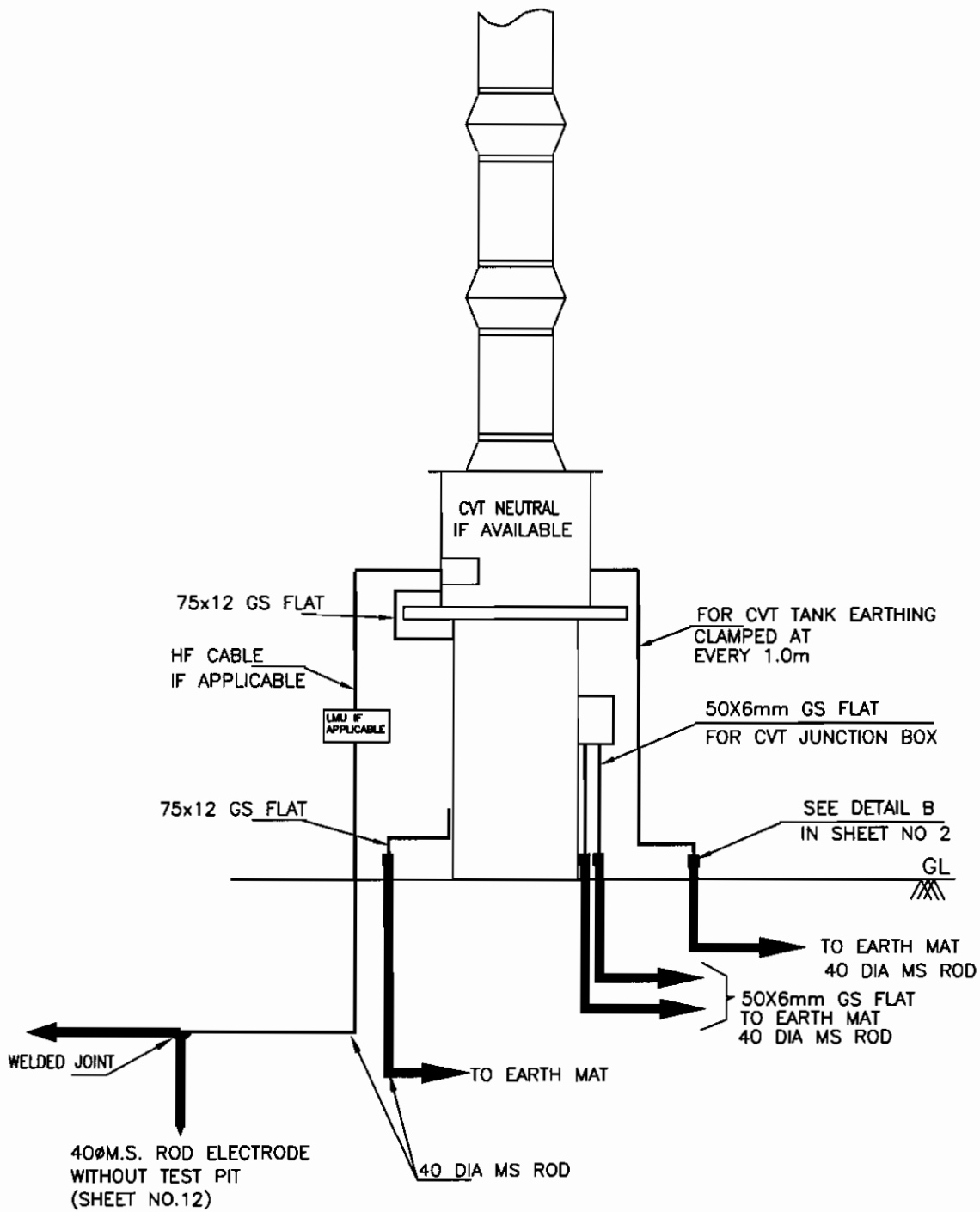
EQUIPMENT EARTHING DETAILS 400kV & 132kV SF6 CIRCUIT BREAKER

COMPUTER REF. NO.

DRG. No.

TB-4-359-316-161

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

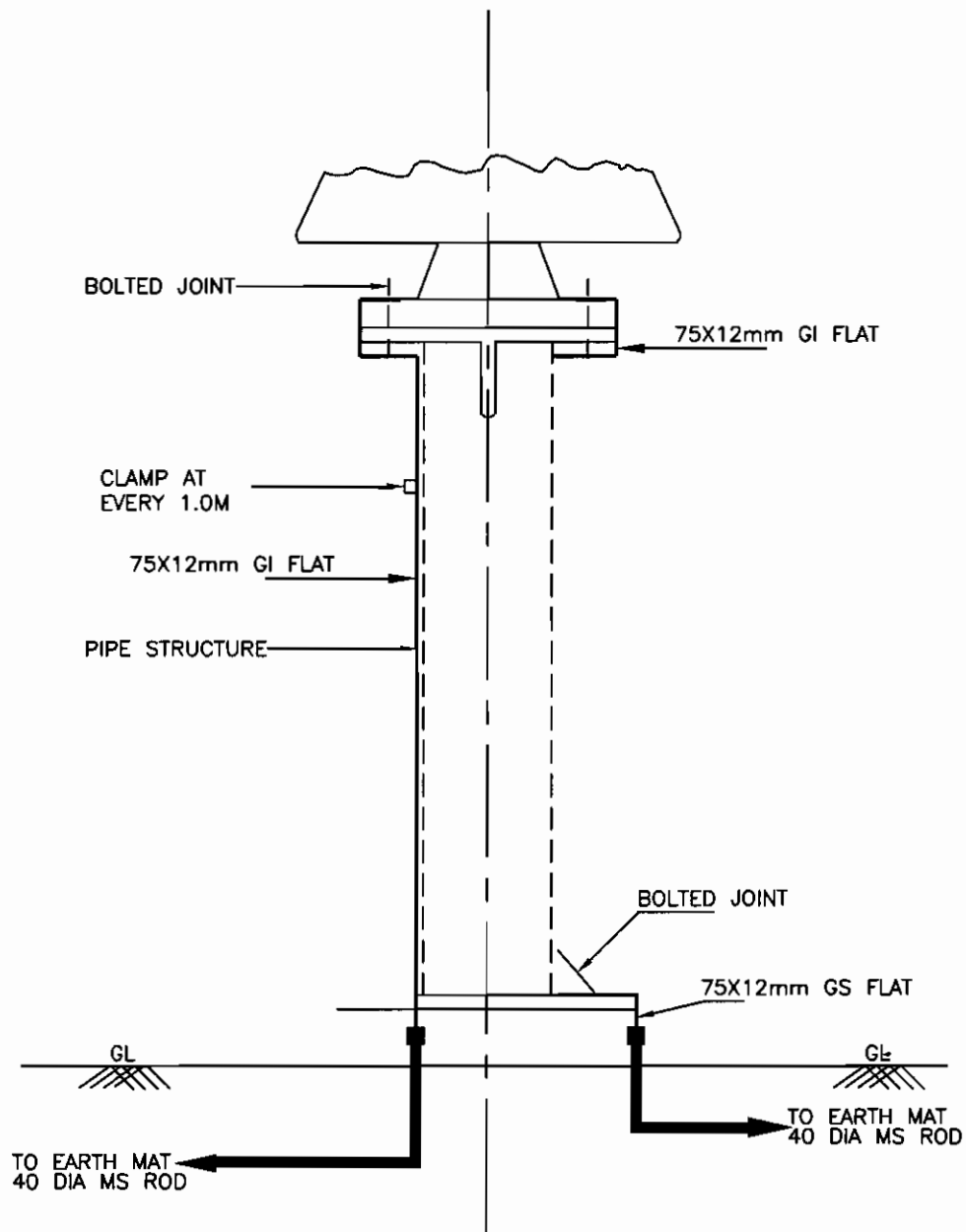
400kV CVT

COMPUTERREF.NO.

DRG. No.

TB-4-359-316-161

SHEET No.
3



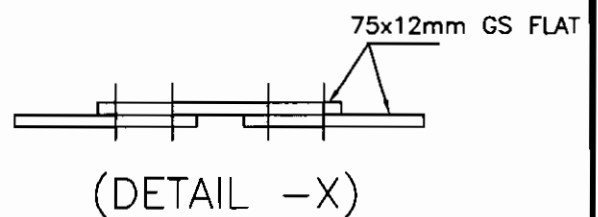
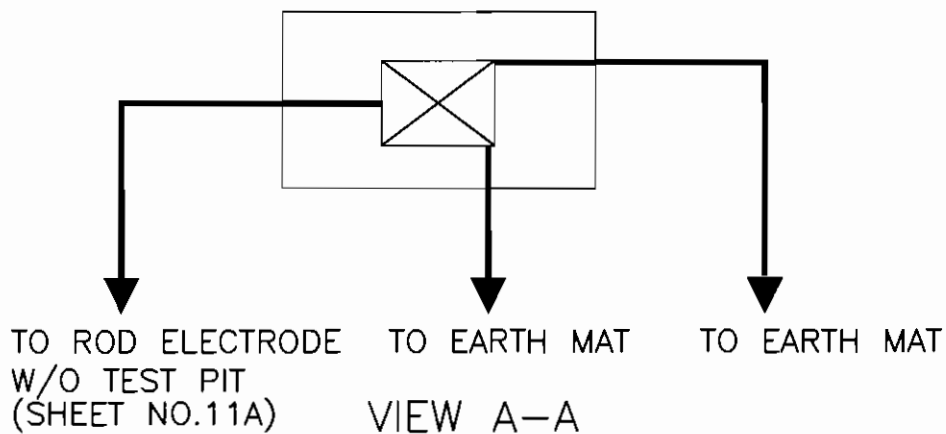
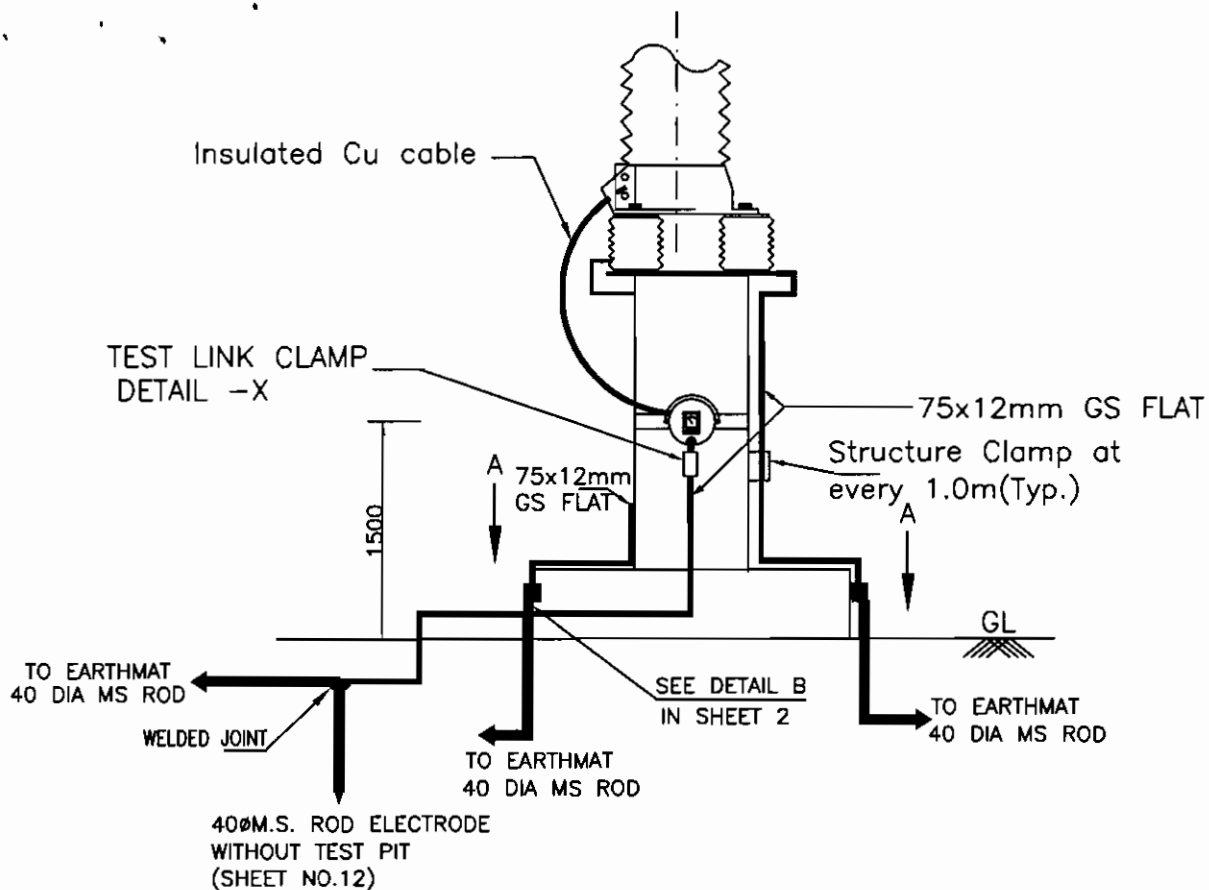
NOS.OF RISERS = 2 NOS.



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

DRG. No. TB-4-359-316-161

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.



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

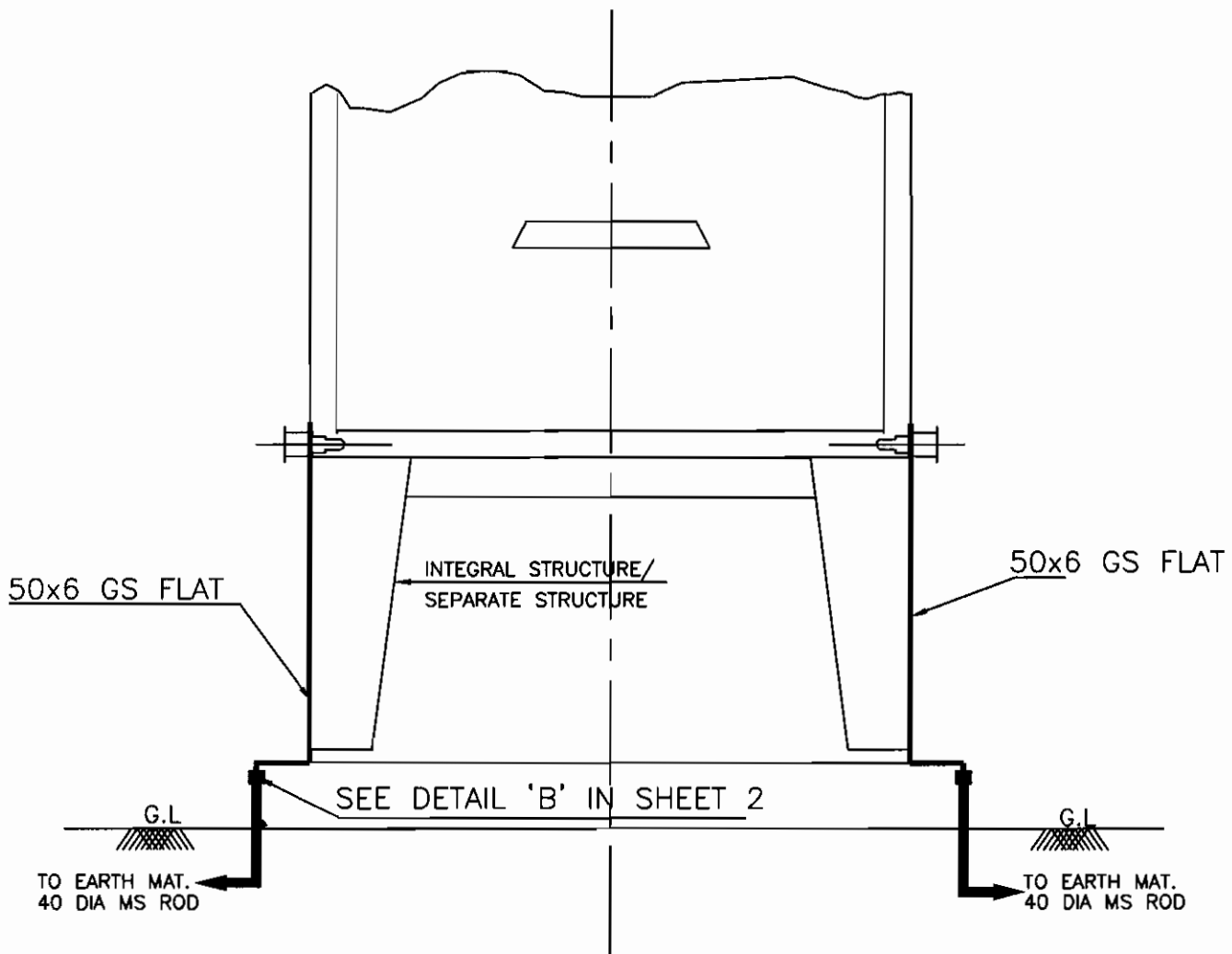
COMPU. DRG. REF.

DRG.NO.

TB-4-359-316-161

SHEET No.

5



NOS.OF RISERS = 2 NOS.



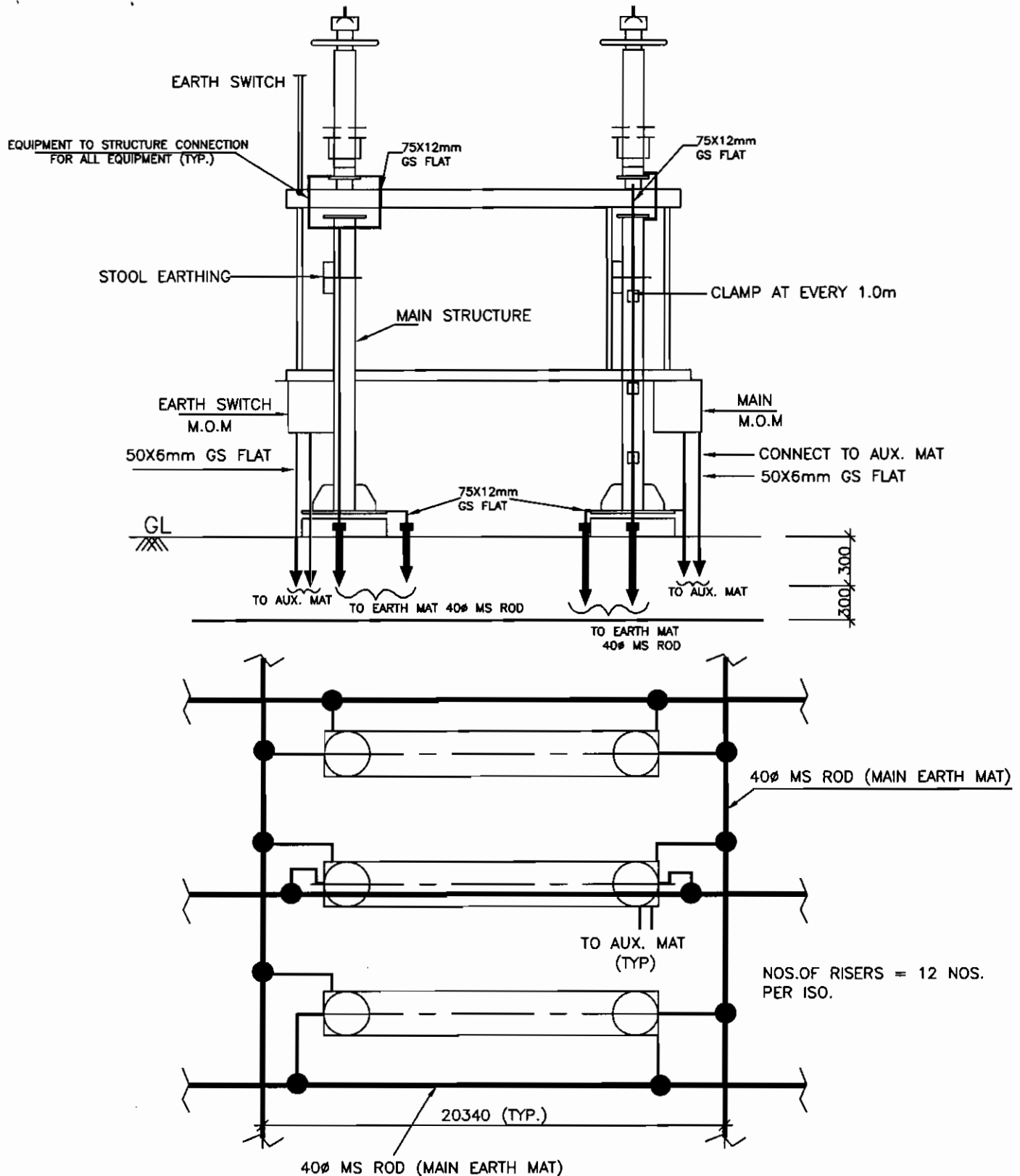
EQUIPMENT EARTHING DETAILS MARSHALLING KIOSK

COMPUTERREF.NO.

DRG. No.

TB-4-359-316-161

SHEET No.
6



NOTES

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

● RISER



EQUIPMENT EARTHING DETAILS

400KV HORIZONTAL CENTER BREAK ISOLATOR (TYPICAL) WITH ONE EARTHSWITCH

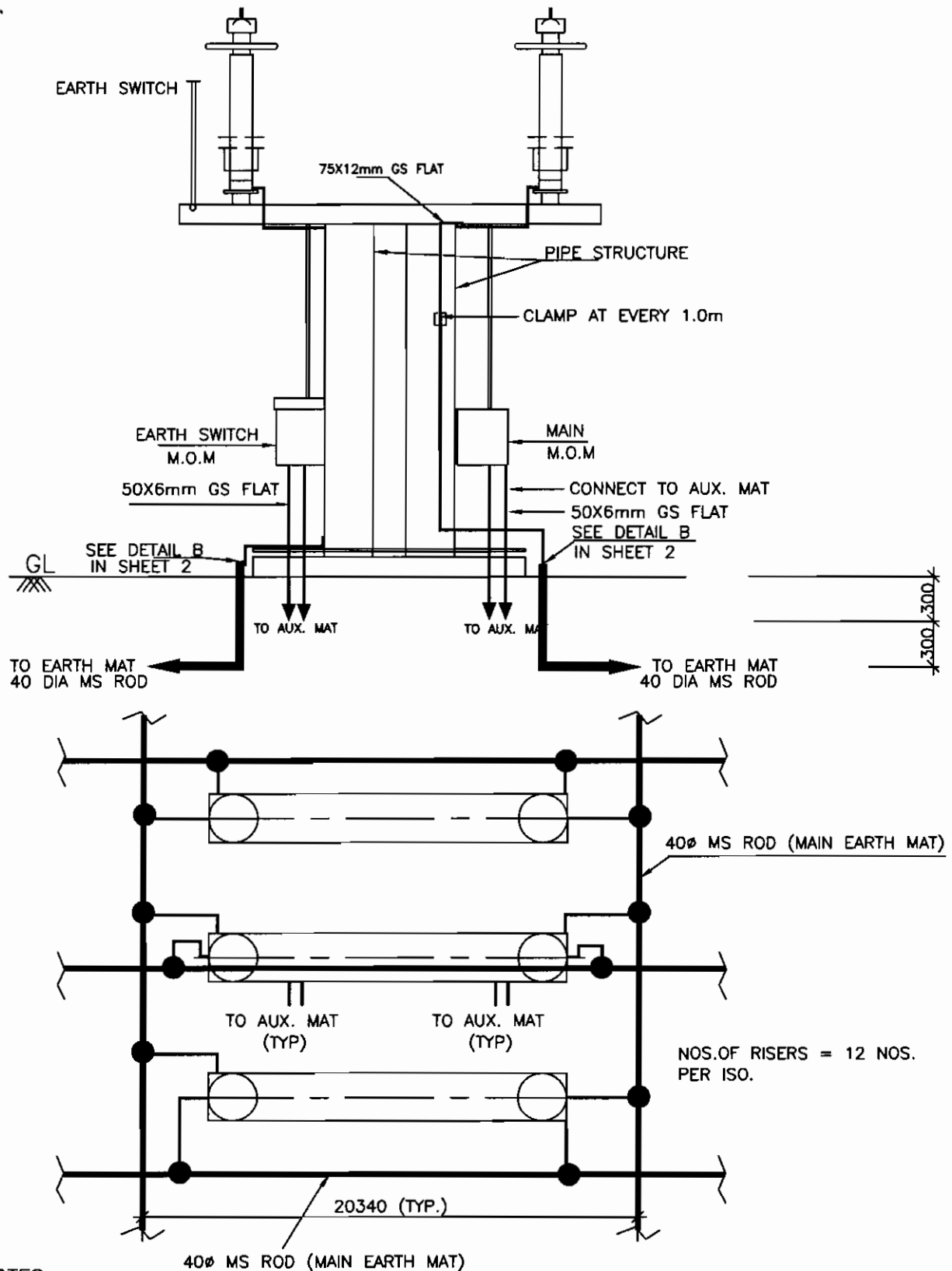
COMPUTERREF.NO.

DRG. No.

TB-4-359-316-161

REV. 00

SHEET No.
7A



NOTES

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



EQUIPMENT EARTHING DETAILS

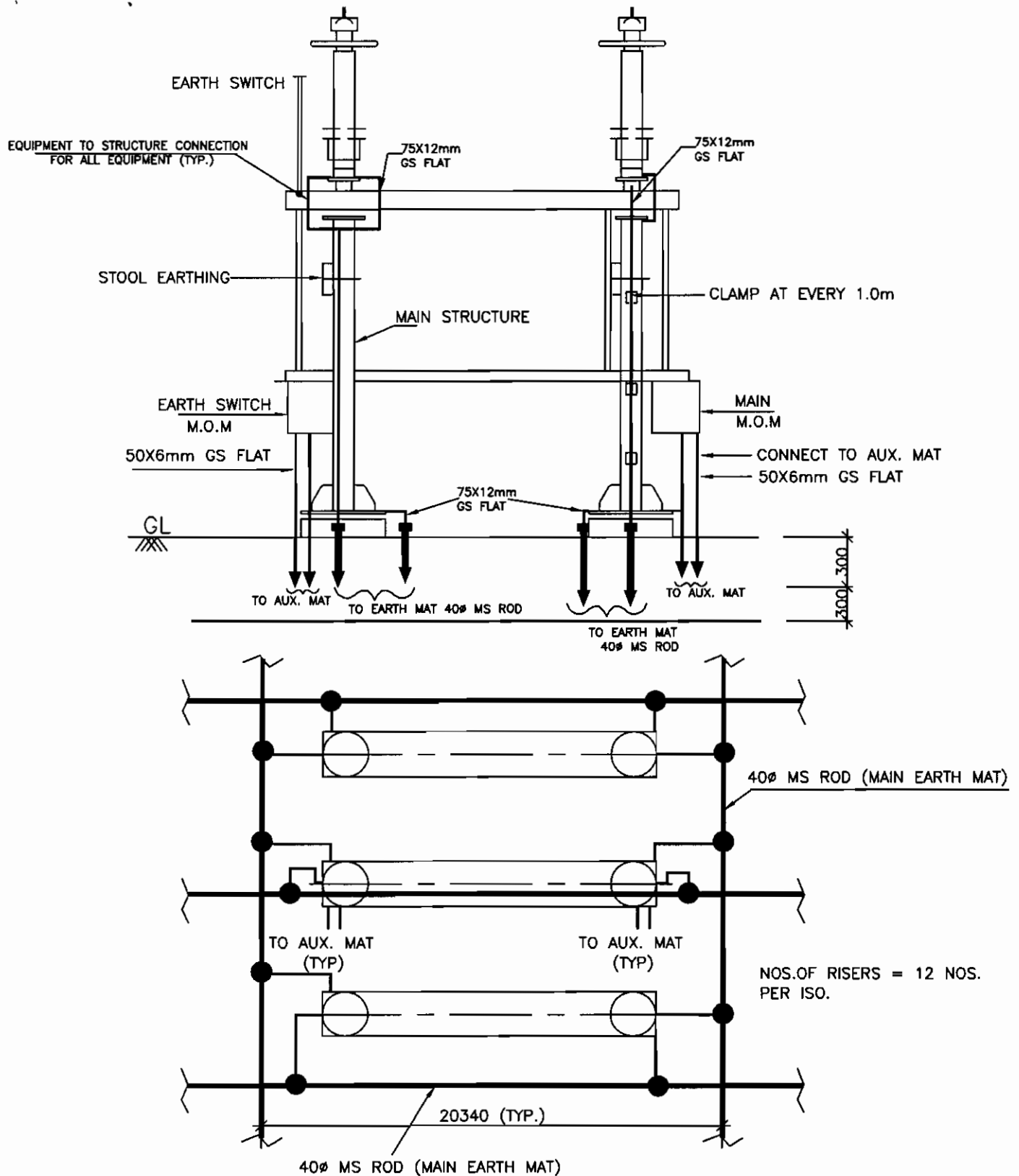
HORIZONTAL CENTER BREAK 132kV ISOLATOR WITH ONE EARTHSWITCH

COMPUTERREF.NO.

DRG. No.

TB-4-359-316-161

SHEET No.
7B



NOTES

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

● RISER



EQUIPMENT EARTHING DETAILS

400KV HORIZONTAL CENTER BREAK ISOLATOR (TYPICAL) WITH ONE EARTHSWITCH

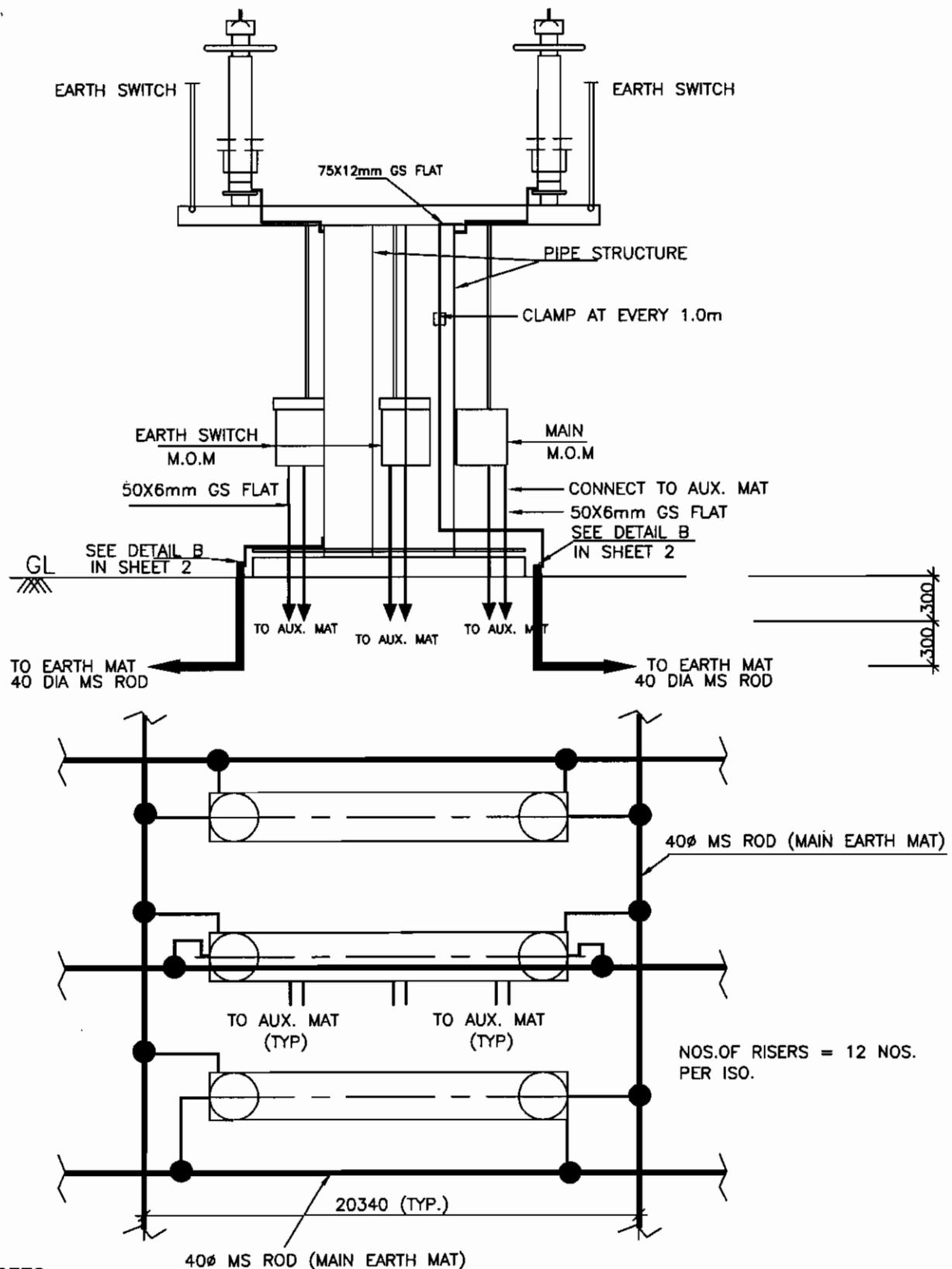
COMPUTERREF.NO.

DRG. No.

TB-4-359-316-161

REV. 00

SHEET No.
7A



NOTES

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

● RISER



EQUIPMENT EARTHING DETAILS

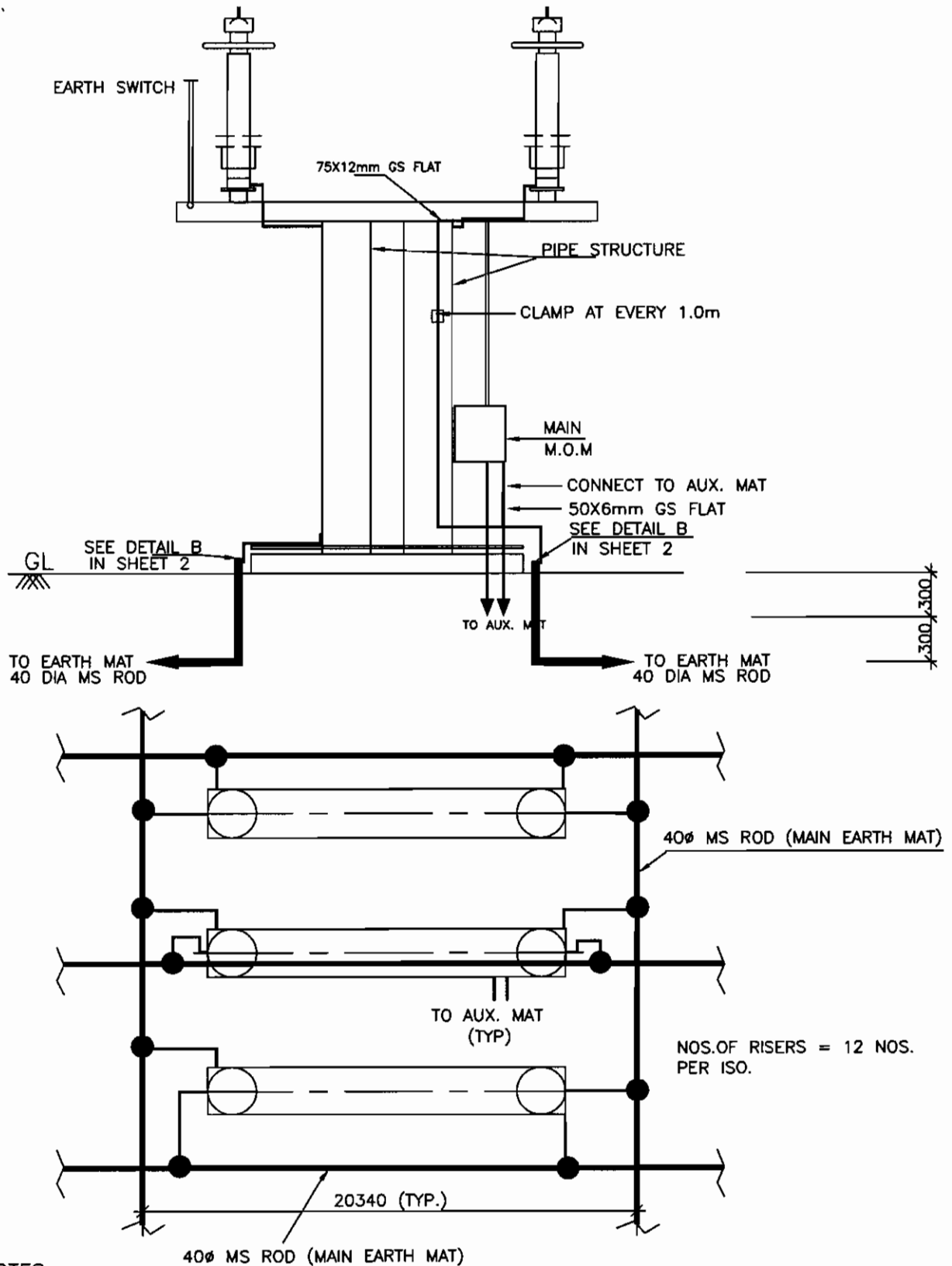
HORIZONTAL CENTER BREAK 132kV
ISOLATOR WITH TWO EARTHSWITCHES

COMPUTERREF.NO.

DRG. No.

TB-4-359-316-161

SHEET No.
7C



NOTES

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

● RISER



EQUIPMENT EARTHING DETAILS

HORIZONTAL CENTER BREAK 132kV

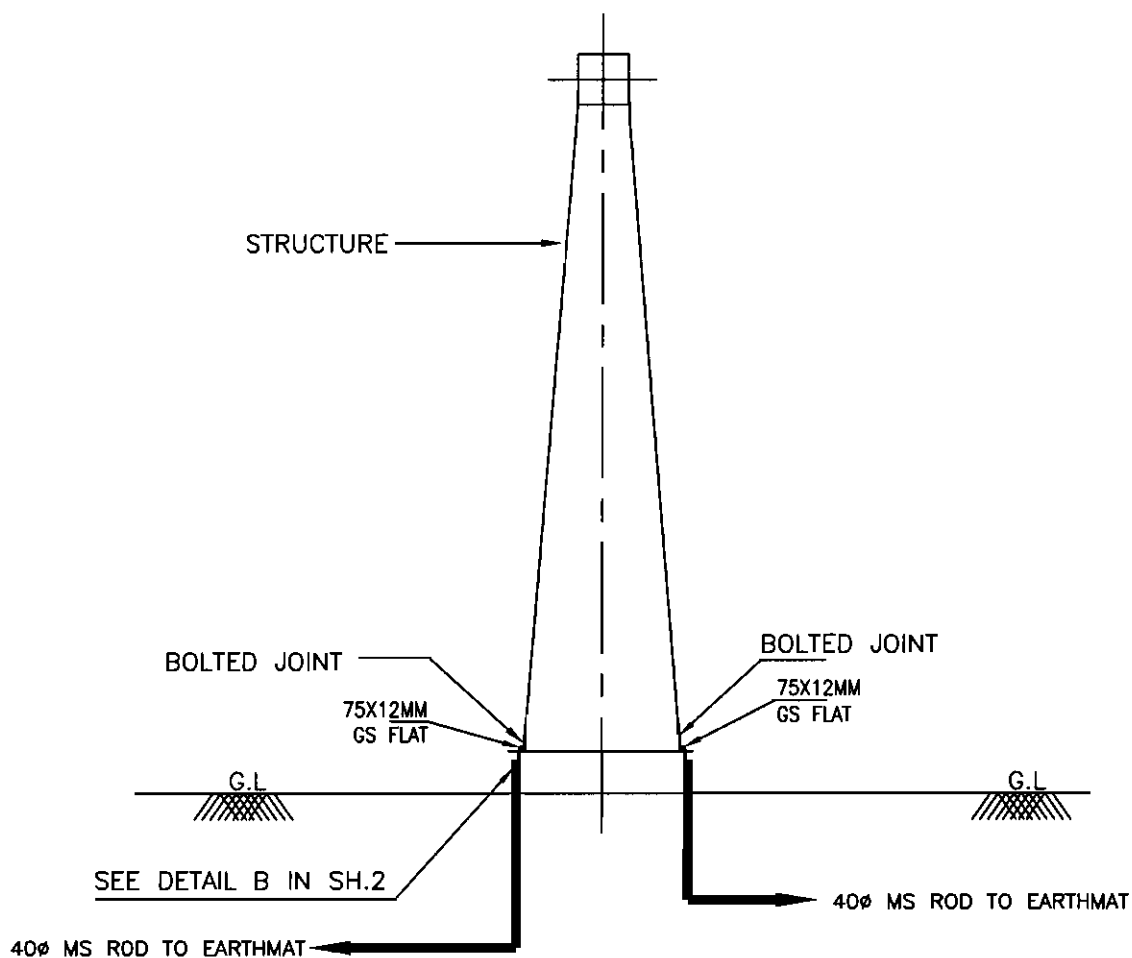
ISOLATOR WITHOUT EARTHSWITCH

COMPUTERREF.NO.

DRG. No.

TB-4-359-316-161

SHEET No.
7D



NOS.OF RISERS = 2 NOS. PER TOWER



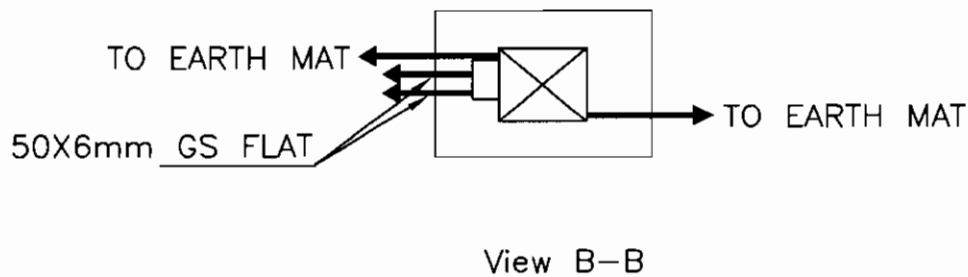
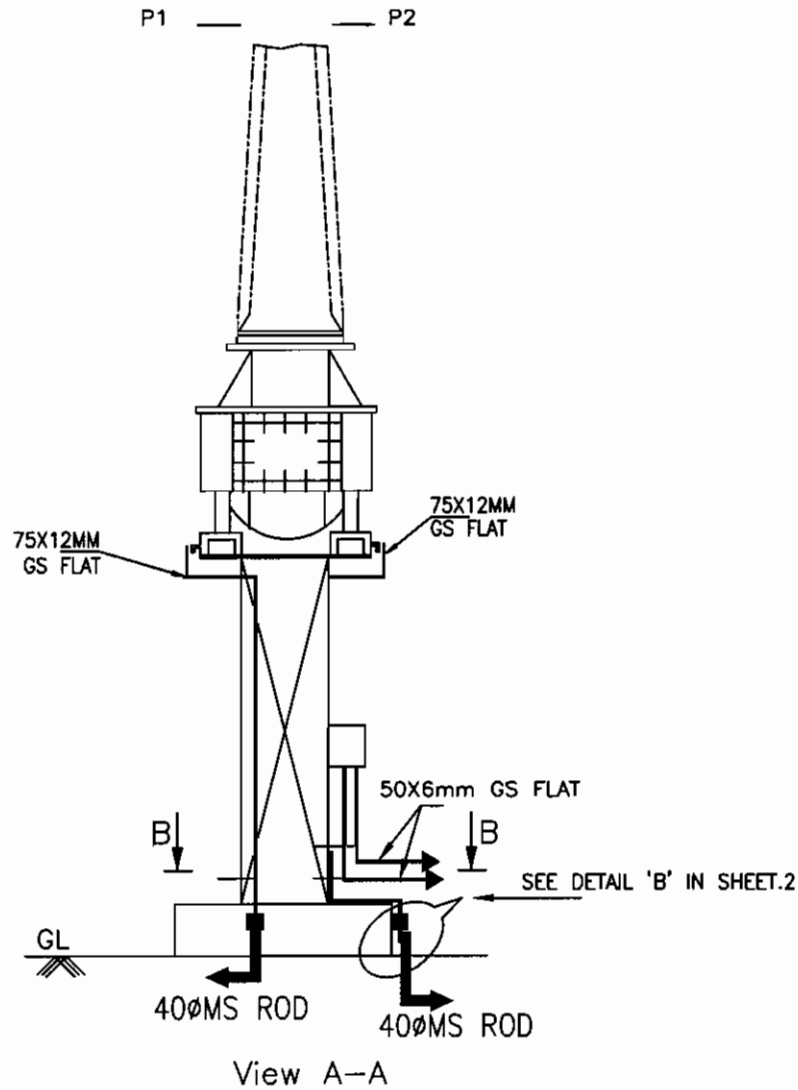
EQUIPMENT EARTHING DETAILS TOWER WITHOUT PEAK

COMPUTERREF.NO.

DRG. No.

TB-4-359-316-161

SHEET No.
8



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



EQUIPMENT EARTHING DETAILS 400kV & 132kV Current Transformer

COMPU. DRG. REF.

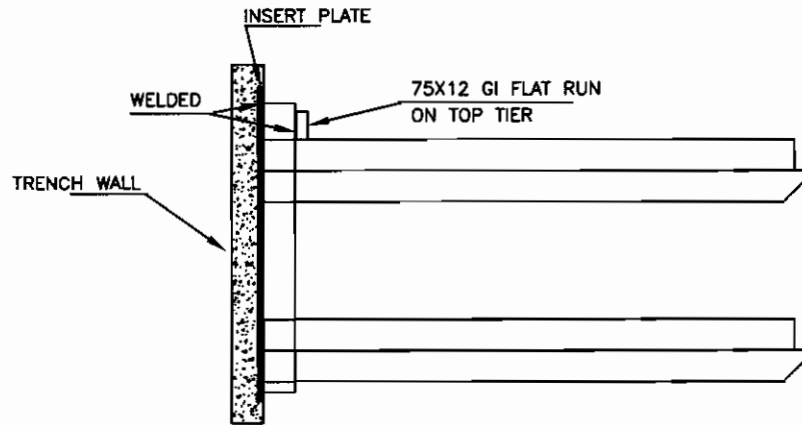
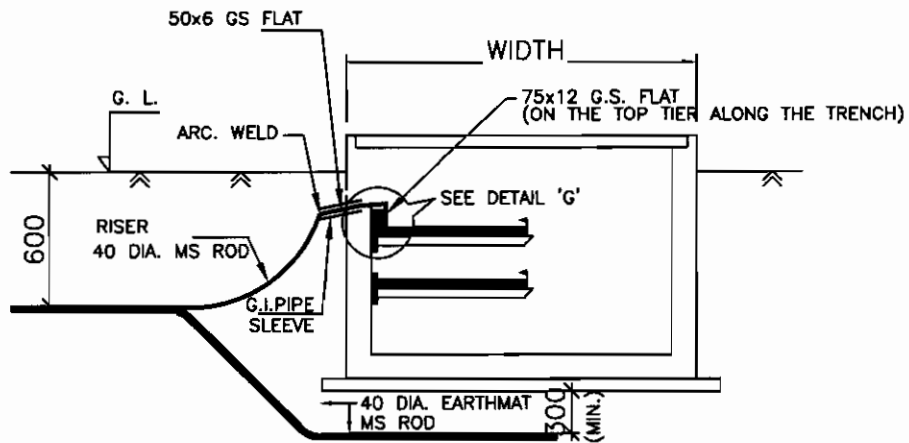
DRG.NO.

TB-4-359-316-161

REV. 00

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 TO TOP RACK ALONG THE TRENCH RUN & CONTROL ROOM AT EVERY 2M INTERVAL.
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.



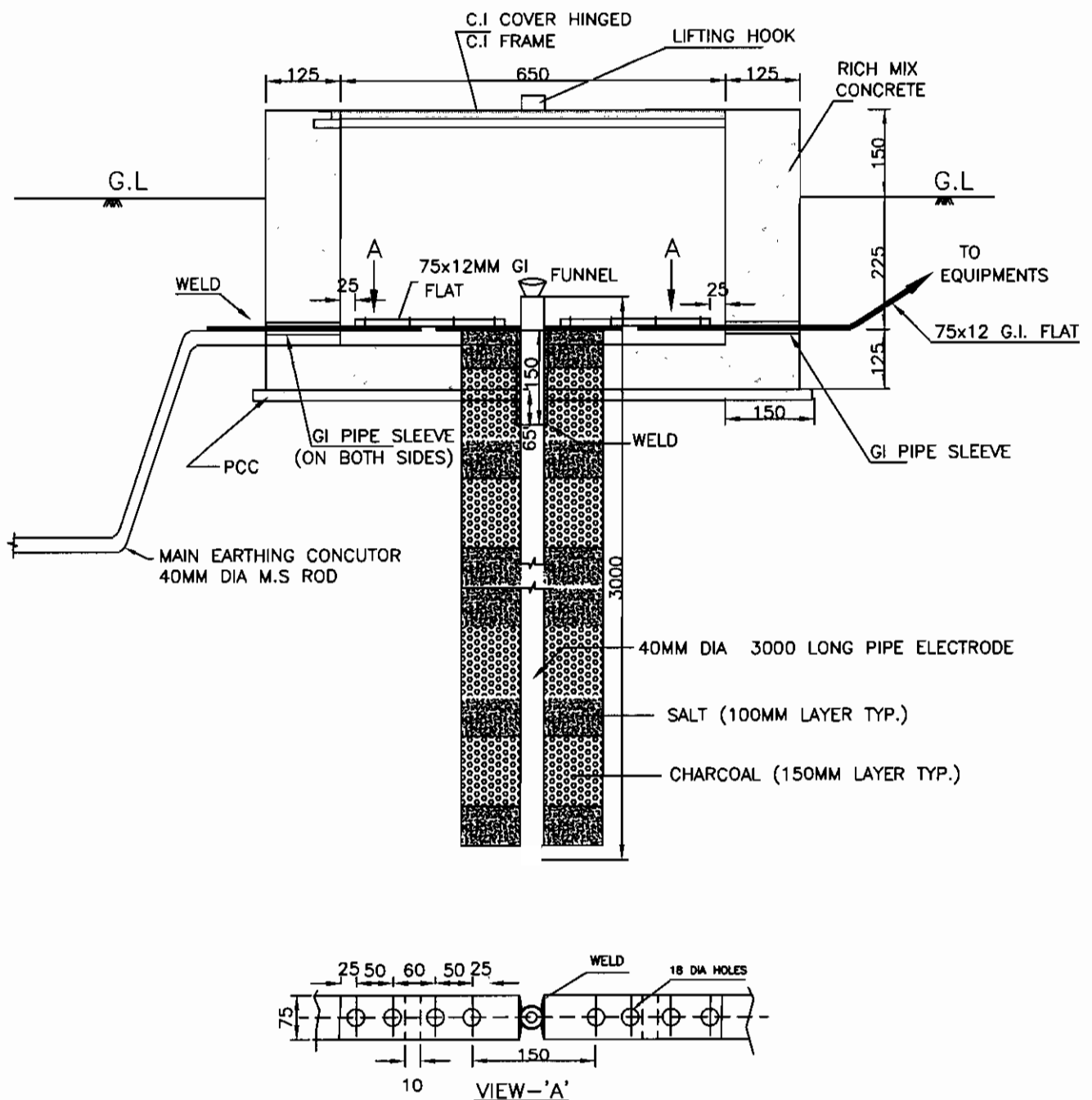
EQUIPMENT EARTHING DETAILS CABLE TRENCH

COMPU. DRG. REF.

DRG. NO.

TB-4-359-316-161

SHEET
10



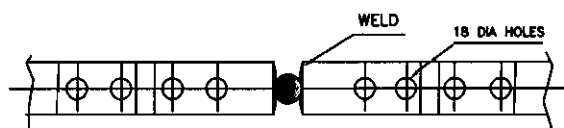
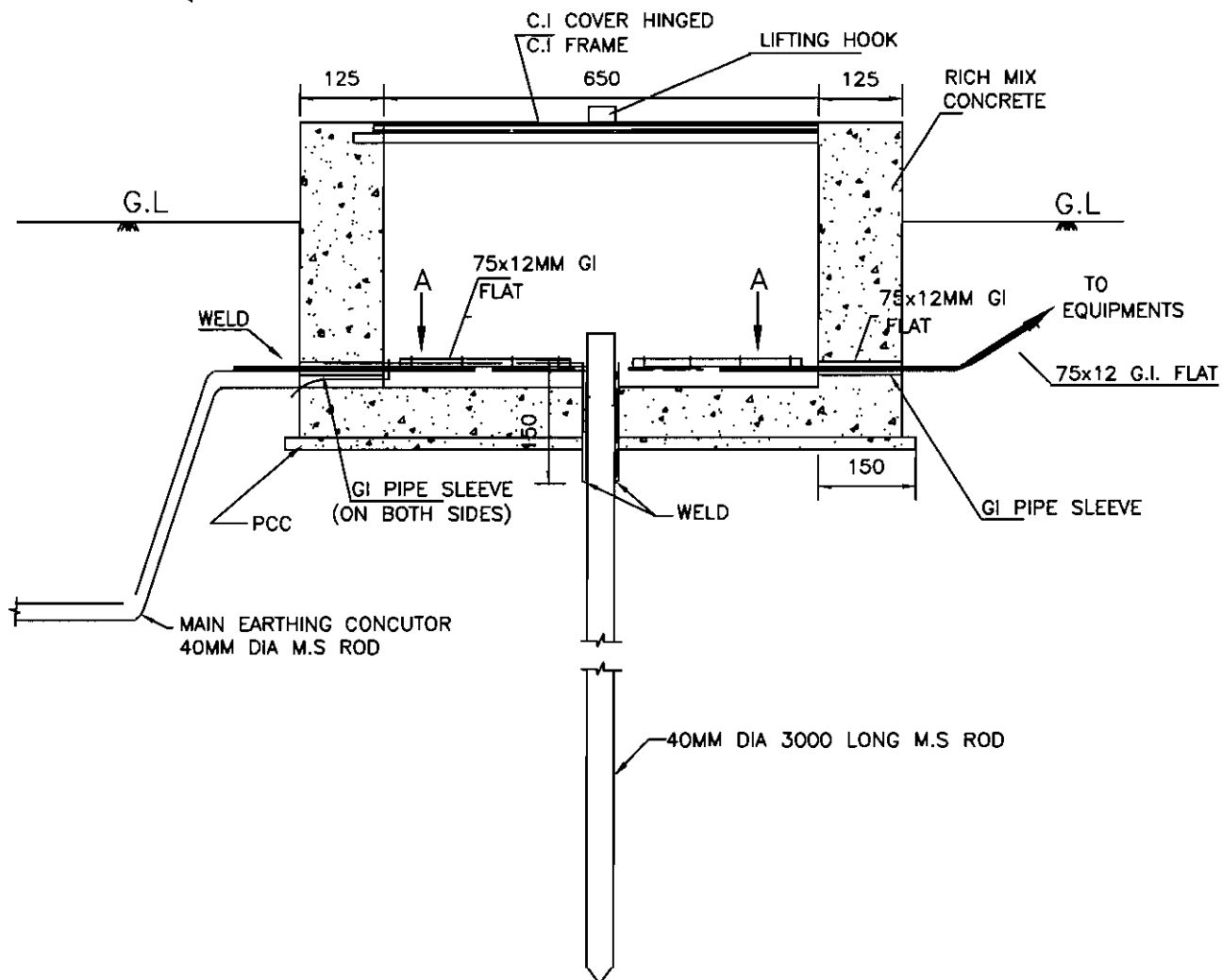
NOTE:

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



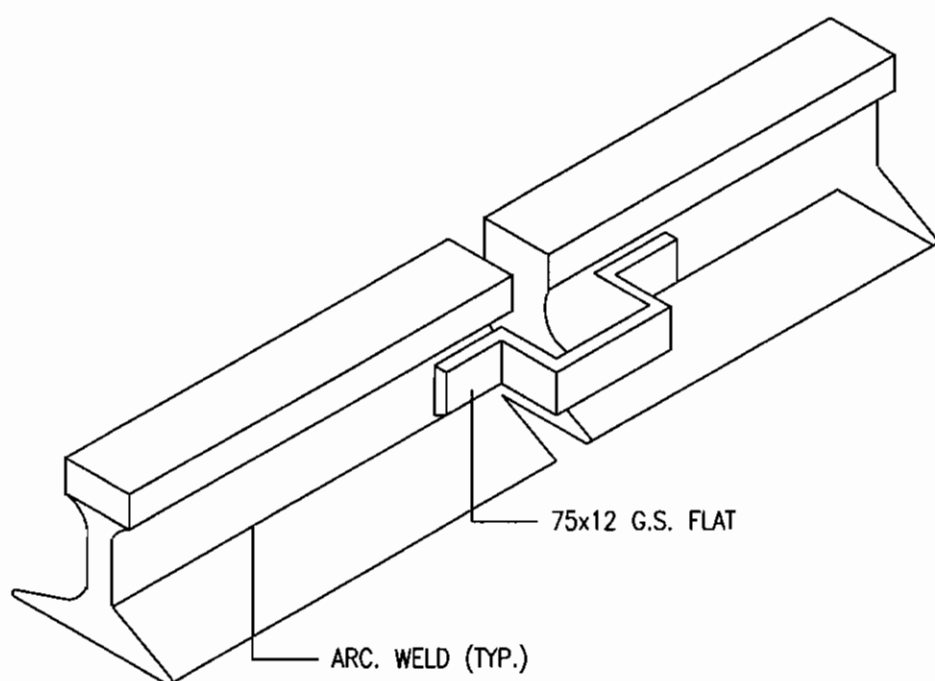
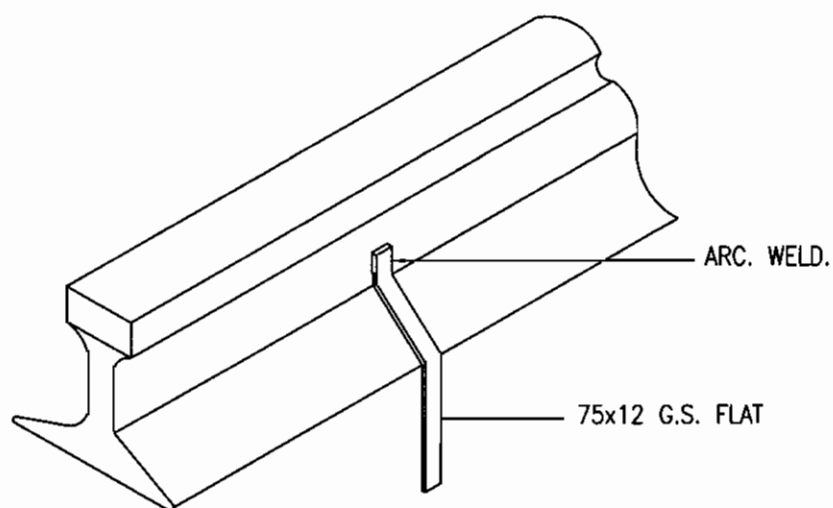
VIEW-'A'

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 WITH TEST PIT



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

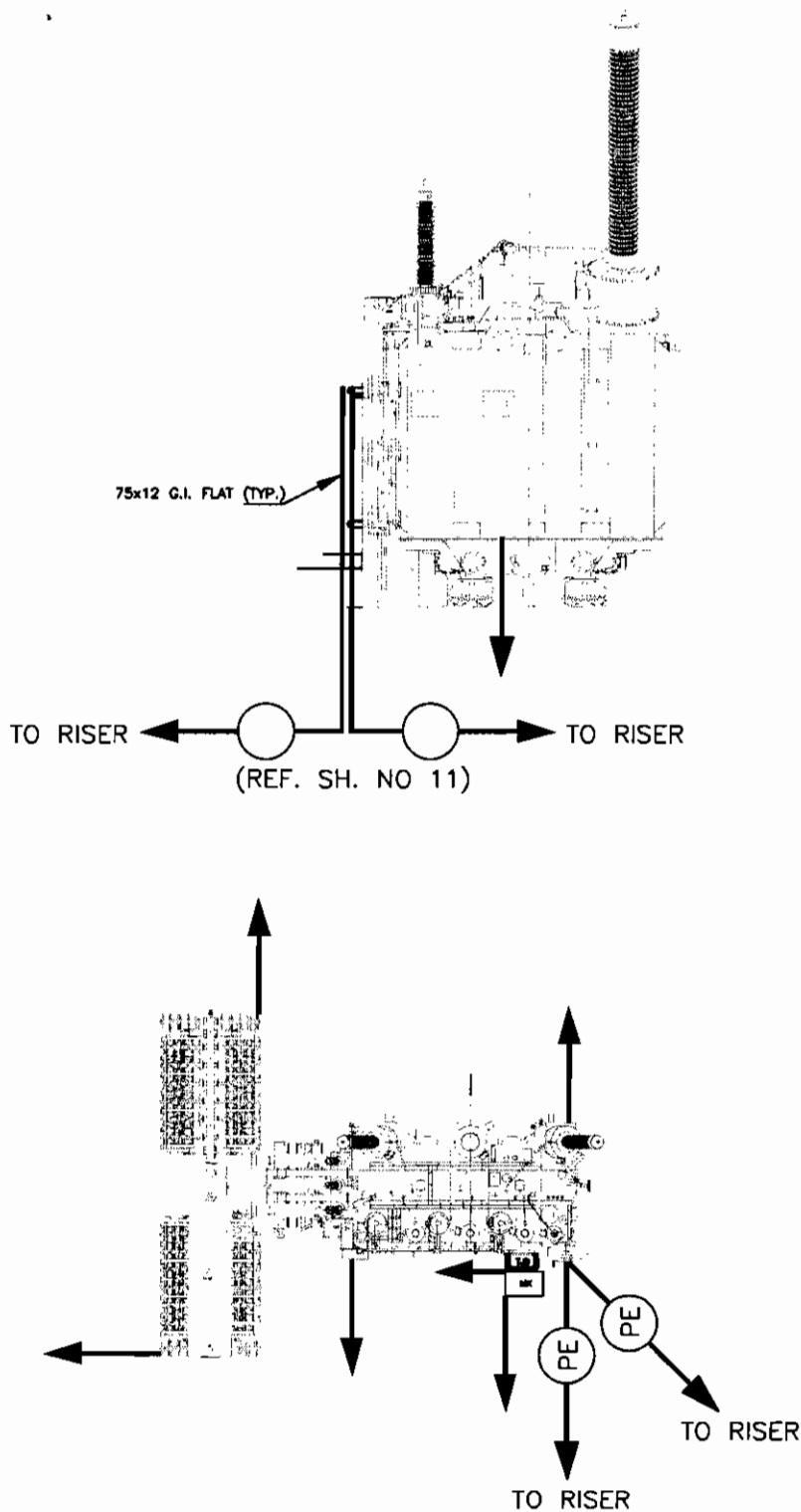
COMPU. DRG. REF.

DRG. NO.

TB-4-359-316-161

SHEET No.

13

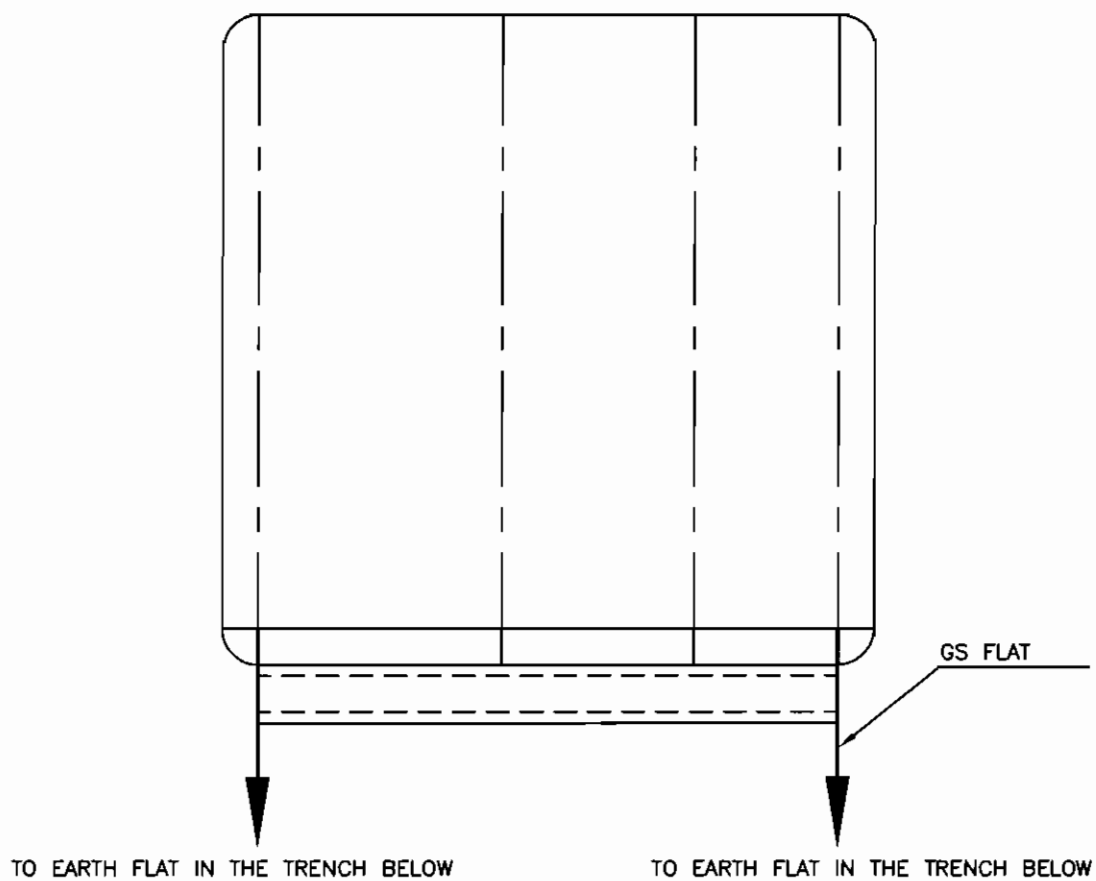


NO.OF PIPE EARTH ELECTRODE WITH TREATED PIT (REFER SHEET NO. 11) = 2 NOS.
 NO.OF RISERS = 8 NOS. FOR EARTHING OF FOLLOWING PARTS OF IBT TRANSFORMER
 BY 75X12 GI FLAT (TWO EARTHING STRIPS CAN BE CONNECTED TO ONE RISER):

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



EQUIPMENT EARTHING DETAILS TRANSFORMER



EQUIPMENT
CONTROL & RELAY PANELS

FLAT SIZE

50X6 MM

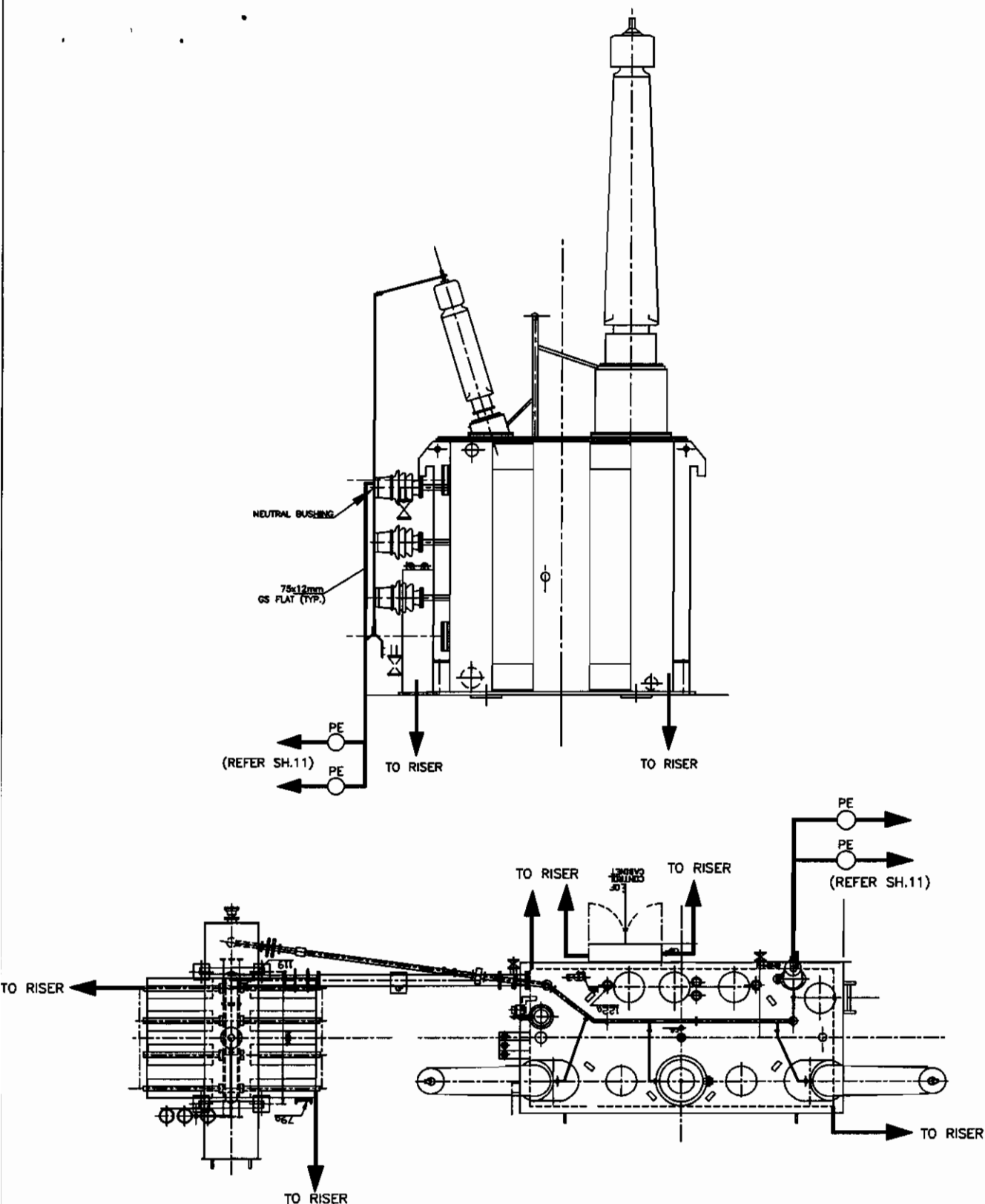


EQUIPMENT EARTHING DETAILS CONTROL AND RELAY BOARD

DRG. No. TB-4-359-316-161

REV. 00

SHEET No.
16



NO. OF PIPE EARTH ELECTRODE WITH TREATED PIT (REFER SHEET NO. 11) = 2 NOS.
 NO. OF RISERS = 6 NOS. FOR EARTHING OF FOLLOWING PARTS OF 400KV BUS REACTOR
 BY 75X12MM GI FLAT :

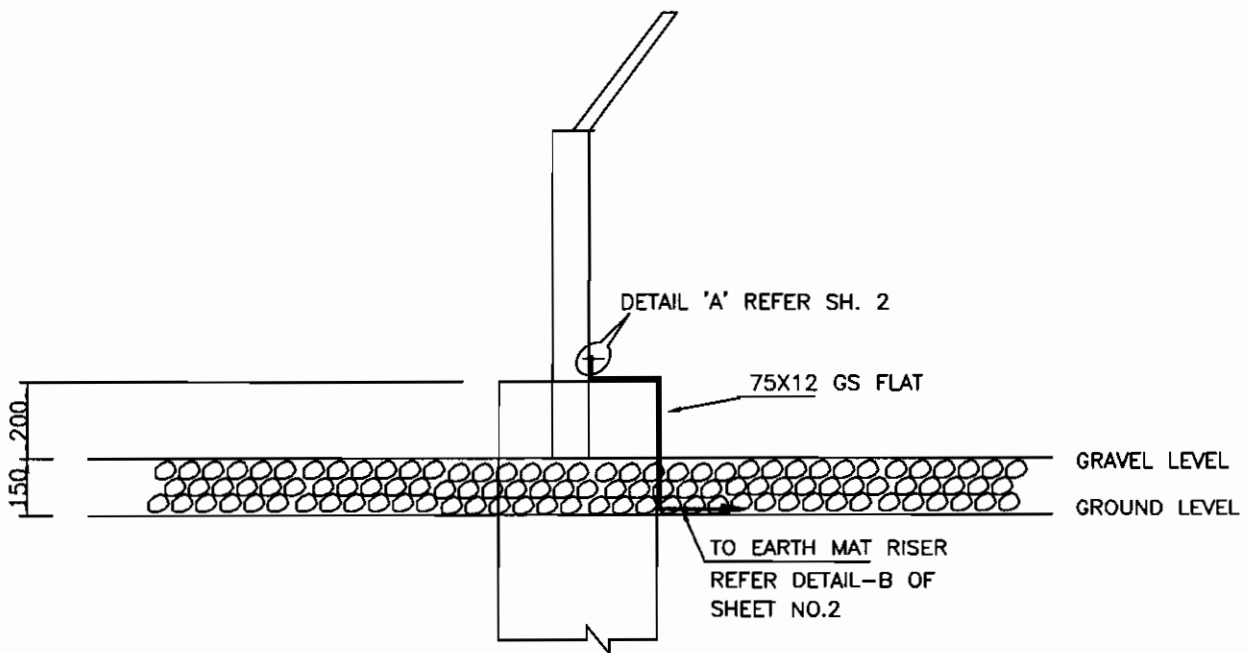
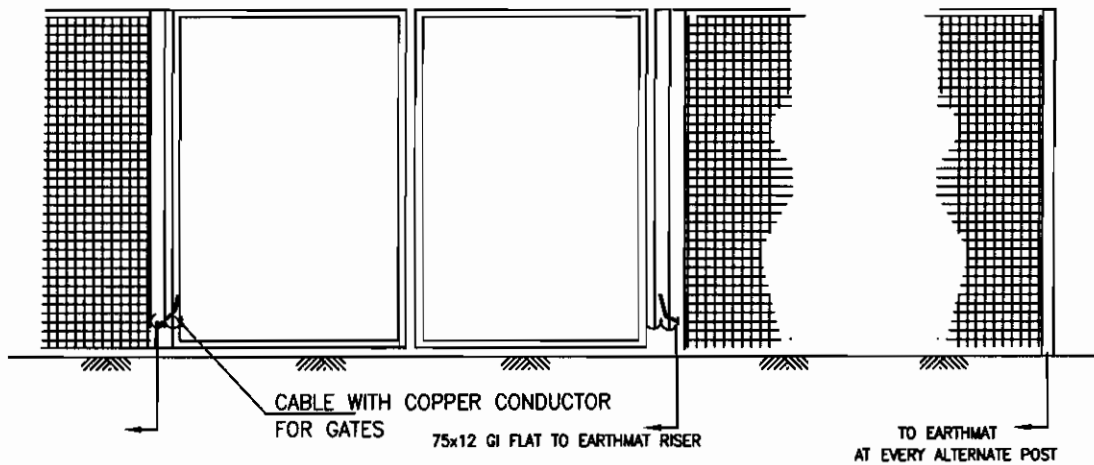
MAIN TANK	2 Nos.
RADIATOR SUPPORT	- 2 Nos.
CONTROL CABINET	- 2 Nos.



EQUIPMENT EARTHING DETAILS BUS REACTOR

FENCE GATE

FENCE GROUNDING



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

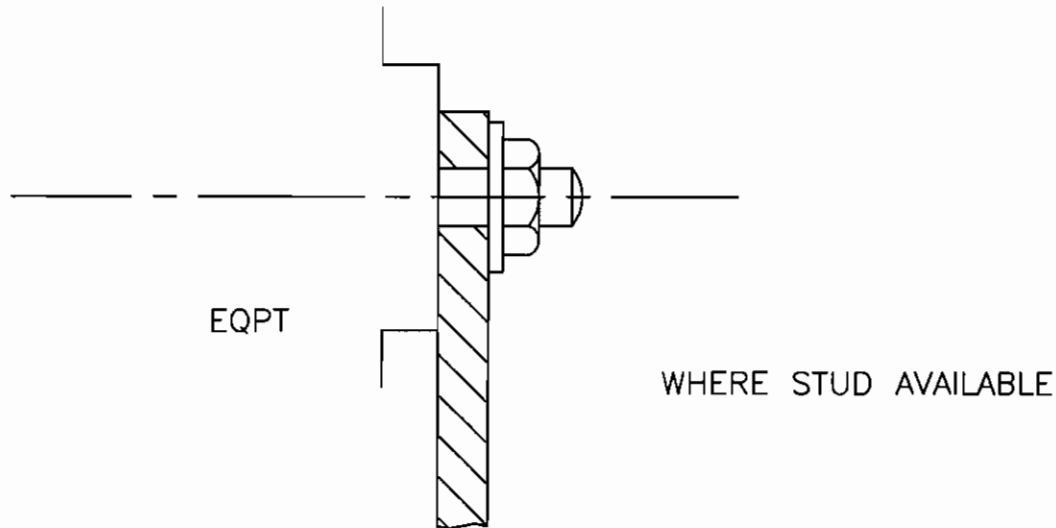


EQUIPMENT EARTHING DETAILS GATE/FENCE POST

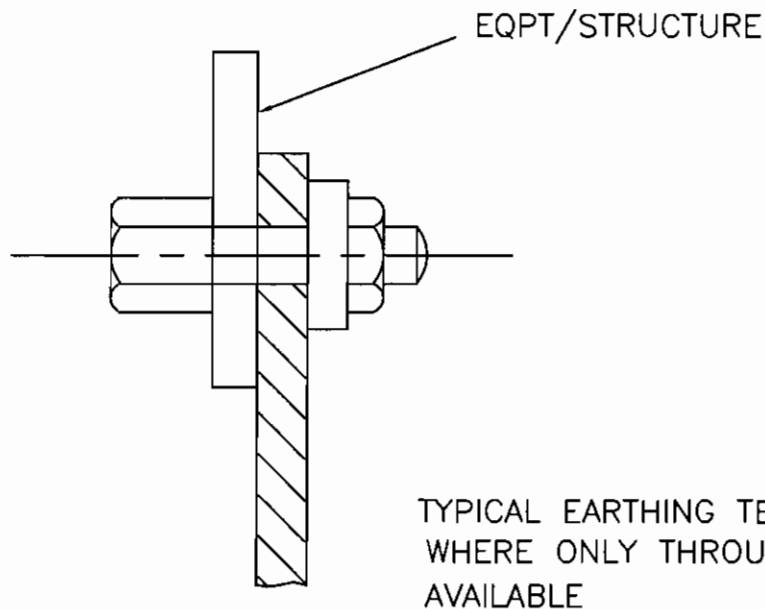
DRG. No.

TB-4-359-316-161

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

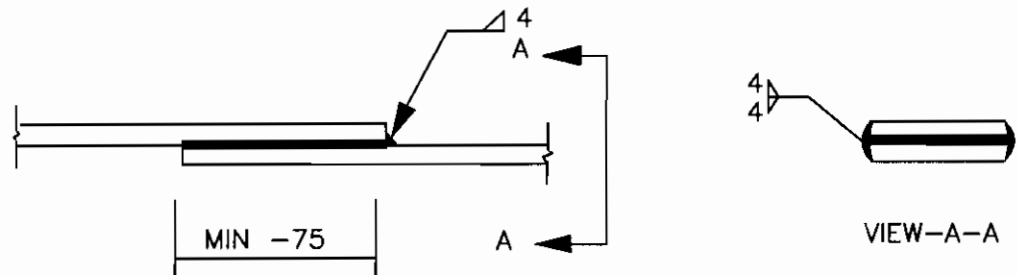
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REV. 00

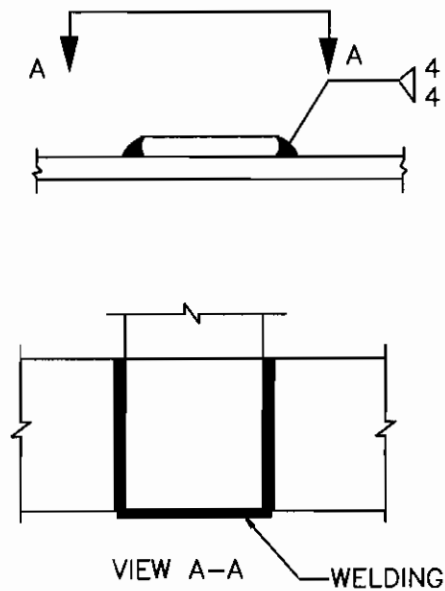
SHEET No.
19

C. STRIP TO STRIP (50X6 MS FLAT)

1. STRAIGHT LAP JOINT/RISER



2. CROSS LAP JOINT



COMPUTERREF.NO.

DRG. No.

TB-4-359-316-161

SHEET No.
20

EQUIPMENT EARTHING DETAILS
WELDING DETAILS

