



# NOTES

1. DEEP EARTH OR TRENCH SYSTEM SEE CODE OF PRACTICE: EARTH SYSTEMS FOR ELECTRIC LIGHT AND POWER AND TRACTION INSTALLATIONS. ALSO TO BE CONNECTED TO SUPPLY AUTHORITY EARTH SYSTEM.
2. THE OVERALL RESISTANCE OF A LIGHTNING ARRESTER EARTH SYSTEM EITHER AC OR DC WHEN DISCONNECTED FROM THE EQUIPMENT EARTHING CIRCUITS MUST NOT EXCEED 5 OHMS.
3. THE INSTALLED EARTHING SYSTEM SHOULD BE LOCATED DIRECTLY BENEATH THE AC OR DC LIGHTNING ARRESTER OR AS CLOSE TO THIS POSITION AS POSSIBLE. UNNECESSARY BENDS IN THE DOWN LEADS FROM THE LIGHTNING ARRESTERS SHOULD BE AVOIDED.
4. ALL UNDERGROUND EARTHING CONNECTIONS MUST BE EXOTHERMIC WELDED OR CRIMPED TINNED CABLE LUGS OR BRASS CLAMPS IN ACCORDANCE TO SPECIFICATION BBB3059
5. ALL CORNER AND GATE POSTS TO BE DIRECTLY EARTHED.
6. THE SWITCH ATTACHED TO THE SUB-STATION OUTDOOR YARD GATE, THE 3kV DC O/H FEEDER SECURITY AREA GATE AND THE REGEN RESISTANCE ENCLOSURE GATE ARE TO BE SO MOUNTED THAT THE SWITCH IS OPEN WHEN THE GATE IS CLOSED AND IS CLOSED WHEN THE YARD GATE IS OPEN.
7. CABLE ARMOURING TO BE EARTHED TO REGEN DC/EL BUSBAR AT RESISTANCE BANKS.
8. WHERE A CABLE FAULT INDICATION RELAY IS INSTALLED THE ARMOURING OF THE 3kV DC TRACK FEEDER CABLES SHALL BE BLOCK JOINTED AT THE MAST.
9. WHERE NO CABLES FAULT INDICATION RELAY IS INSTALLED THE ARMOURING OF THE 3kV DC FEEDER CABLES SHALL BE BLOCK JOINTED IN THE 3kV DC BUSBAR CHAMBER.
10. CONNECTIONS NEED NOT BE IN THE NUMERICAL ORDER AS SHOWN IN DC/EL (SUBSTATION AND REGEN) GROUPS.
11. ALL INTERCONNECTIONS OF THE EARTH LEAKAGES TO BE 95mm<sup>2</sup> OR EQUIVALENT PVC INSULATED CABLE.
12. SUBSTATION DC/EL BUSBAR SHALL BE MARKED ACCORDING TO GROUP NUMBERS FOR EASY REFERENCE.
13. FOR END BOX ASSY EARTHING DETAIL SEE DRG NO CEE-TCL-78.
14. THE SPARK GAP ASSEMBLY SHALL COMPLY TO THE ASSEMBLY DRAWING BBB0906 AND SPECIFICATION BBB1616.
15. VOLTAGE TRANSFORMER (VT) - MUST BE CONNECTED TO NORMAL EARTH.
16. CURRENT TRANSFORMER (CT) - MUST BE CONNECTED TO AC EARTH LEAKAGE.
17. LIGHTNING ARRESTER (LA) - MUST BE CONNECTED TO NORMAL EARTH.

# LEGEND (EQUIPMENT)

## GP1 - BUSBAR CHAMBER GROUP.

1. BREAKER CELL(S).
2. UNDERVOLTAGE POTENTIAL DEVIDER SUPPORT BRACKET.
3. DOOR FRAME.
4. CHEQUER PLATES WHERE APPLICABLE.
5. 3kV O/H FEEDER WALL PLATE.

## GP3 - HT BAY GROUP.

1. RECTIFIER STEELWORK.
2. WAVE FILTER STEELWORK.
3. REACTOR STEELWORK.
4. POSITIVE ISOLATOR STEELWORK.
5. BAY FENCES STEELWORK.
6. FAN FRAMEWORK.
7. CHEQUER PLATES WHERE APPLICABLE.
8. ANODE WALL PLATE.

1. BATTERY CHARGER.
2. TELECONTROL PANEL.
3. POWER AND LIGHTING DISTRIBUTION BOX AND STEEL TUBING.
4. UNDERVOLTAGE RELAY STEEL BOX.
5. ALL STEEL ENTRY DOORS.
6. CHEQUER PLATES WHERE APPLICABLE.
7. LT CONTROL PANEL.

## RGP - REGEN GROUP.

1. REGEN CONTROL PANEL.
2. BAY GATE.
3. BAY GATE EARTH LINK.
4. ALL STEEL DOORS AND FRAMES.
5. POTENTIAL DEVIDER SUPPORT BRACKET.
6. CHEQUER PLATES WHERE APPLICABLE.
7. REGEN RESISTANCE BOXES.

# LEGEND (SYSTEMS)

- REGENERATIVE DC EARTH LEAKAGE SYSTEM
- SUBSTATION DC EARTH LEAKAGE SYSTEM
- X—X— DC NEGATIVE SYSTEM
- AC EQUIPMENT EARTH LEAKAGE SYSTEM
- X••X— AC EARTH SYSTEM
- X—X— SECURITY FENCE

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DIMENSIONS : mm SCALE : NTS  
TOLERANCE : LIN ± ANG ± ITEM NO :  
MATERIAL :  
VERSION INFO : DRAWING REVISED

DO REF : CDO/9047  
ECP REF :  
DRAWN : CJ MARAIS  
DESIGNED :  
CHECKED : H VAN VUUREN

APPROVED  
2018-4-6  
AUTHORISED

3kV DC EARTHING ARRANGEMENT SYSTEM  
FOR TRACTION SUBSTATIONS

**TRANSNET**  
freight rail  
CEE-TBD-7  
VERSION 12