

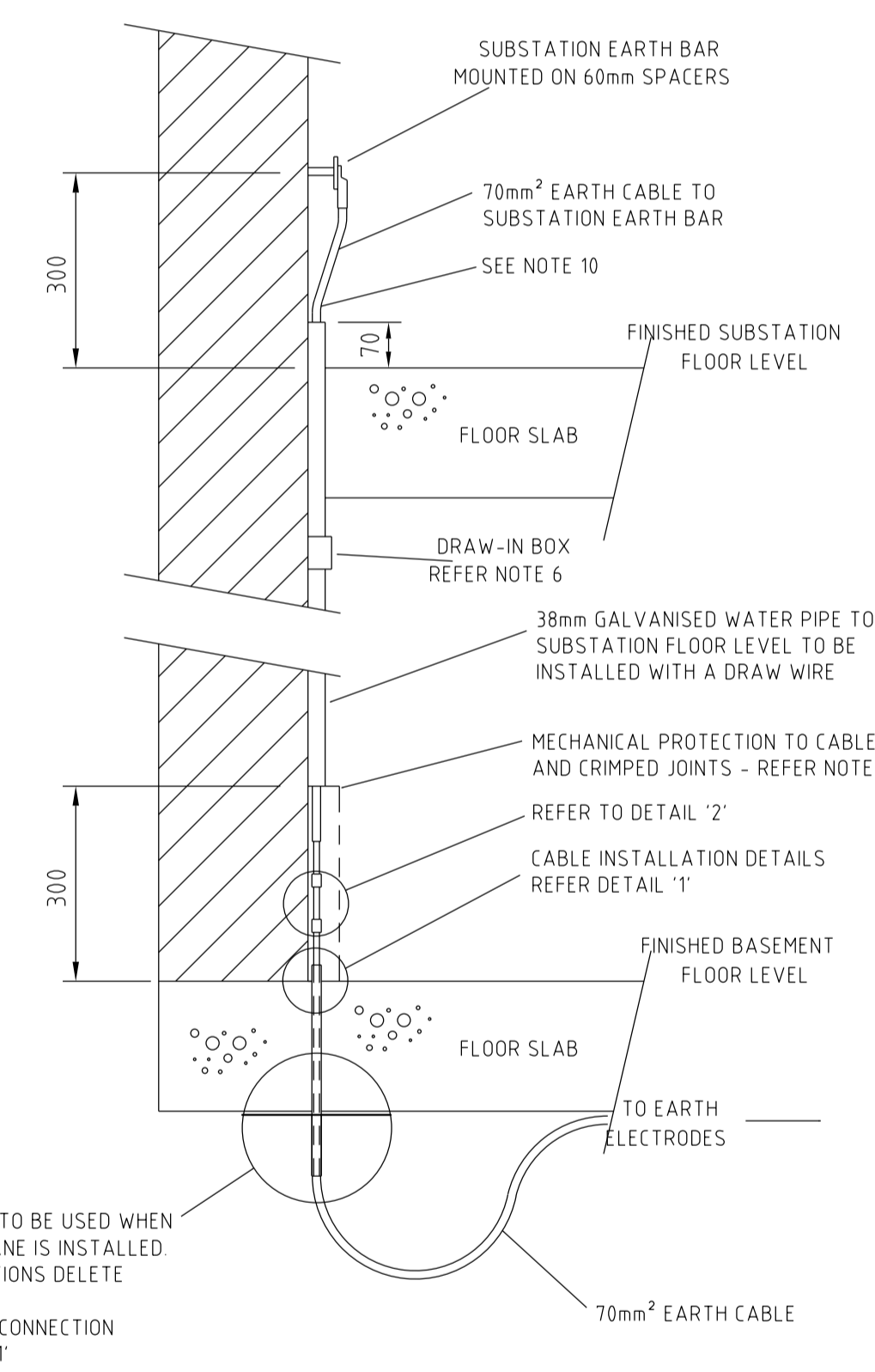
- NOTES**
- THIS DRAWING SHOWS TYPICAL INSTALLATION OF EARTH ELECTRODES IN CHAMBER SUBSTATIONS AND INDICATES
    - TYPE 'A' INSTALLATION (USED ONLY WHEN A WATERPROOF MEMBRANE IS INSTALLED)
    - TYPE 'B' INSTALLATION (USED ONLY WHEN A WATERPROOF MEMBRANE IS NOT REQUIRED)
 AND SHOULD BE READ IN CONJUNCTION WITH THE SUBSTATION DRAWINGS, AND NETWORK STANDARDS NS113, NS114 AND NS116. THE TYPICAL INSTALLATION DETAILS SHOWN CAN BE USED IN EITHER A STANDARD MINIMUM EARTHING DESIGN OR A SITE SPECIFIC DESIGN.
  - SUPPLY AND INSTALLATION OF EARTH ELECTRODES, FITTINGS AND CABLES IS TO BE CARRIED OUT BY THE SUBSTATION EQUIPPING CONTRACTOR BEFORE THE INSTALLATION OF ANY WATERPROOF MEMBRANE AND POURING OF THE BASEMENT OR SUBSTATION FLOOR SLAB. ALL TERMINATIONS AND JOINTS IN STRANDED EARTH CONDUCTORS ARE TO BE MADE BY APPROVED COMPRESSION TECHNIQUES.
  - WHERE GROUND CONDITIONS PERMIT, ELECTRODES ARE TO BE DRIVEN USING APPROPRIATE ROD DRIVERS AND DRIVING HEADS. WHERE GROUND CONDITIONS REQUIRE BORE HOLES, A 35mm DIAMETER HOLE FOR ROCK OR A 50mm DIAMETER HOLE FOR CLAY IS TO BE BORED FOR EACH EARTH CABLE. AN APPROVED EARTHING COMPOUND IS TO BE PUMPED INTO THE BORE HOLE AFTER BARE EARTH CABLE HAS BEEN INSTALLED. ALL ELECTRODE AND EARTH CABLE INSTALLATIONS ARE TO BE AT THE DEPTH SPECIFIED IN THE EARTHING DESIGN.
  - COPPER EARTHING CONNECTIONS ARE TO BE KEPT CLEAR OF STEEL REINFORCING OF FLOOR SLAB WHERE POSSIBLE. OTHERWISE INSULATED CABLES ARE TO BE USED AND COMPRESSION FITTINGS ARE TO BE TAPED OVER.
  - A SUITABLE GALVANISED STEEL DRAW-IN BOX IS TO BE INSTALLED AT EACH CHANGE OF DIRECTION. THE BOX IS TO BE MOUNTED SUCH THAT IT IS ACCESSIBLE TO AUSGRID STAFF AT ALL TIMES. IF A CABLE JOIN IS REQUIRED INSIDE THE BOX, ENSURE THE BOX IS LARGE ENOUGH TO HOUSE CRIMPING JOINTS SHOWN IN DETAIL '2'. WHERE A VERTICAL CABLE JOIN IS REQUIRED WITHIN A DRAW-IN BOX THE BOTTOM CABLE IS TO BE PROPERLY SUPPORTED WITH SADDLE OR CABLE TIE SO THAT NO STRESS IS PLACED ON THE CONNECTING CRIMPS.
  - THE MECHANICAL PROTECTION TO CABLES AND CRIMPED JOINTS SHOWN IN LOW BASEMENT INSTALLATIONS IS TO BE PERFORMED BY A REMOVABLE GALVANISED STEEL COVER. THIS COVER IS TO BE ACCESSIBLE TO AUSGRID STAFF AT ALL TIMES.
  - THE INSTALLATION AND CONNECTION OF THE EARTH RODS AND CONNECTING CABLES ARE TO BE INSPECTED AND APPROVED BY AUSGRID'S NOMINATED OFFICER BEFORE THE INSTALLATION OF ANY WATERPROOF MEMBRANE AND POURING OF THE BASEMENT OR SUBSTATION FLOOR SLAB. CONNECTING CABLES FOR EACH EARTHING GROUP UNDER THE SLAB MUST BE CONTINUOUS AND CONNECTIONS TO ELECTRODES OR BARE WIRE FOR BORE HOLES AS DETAILED.
  - ALL 70mm² EARTH CABLE TO BE BLACK INSULATED STRANDED COPPER CONDUCTOR.
  - CABLES ARE TO BE PROPERLY SUPPORTED WITH SADDLES TO THE WALL OR CABLE TIES SO THAT NO STRESS IS PLACED ON THE LUG CONNECTION TO EARTH BAR.

**TYPE A INSTALLATION**  
SCALE 1:10

**TYPE B INSTALLATION**  
SCALE 1:10

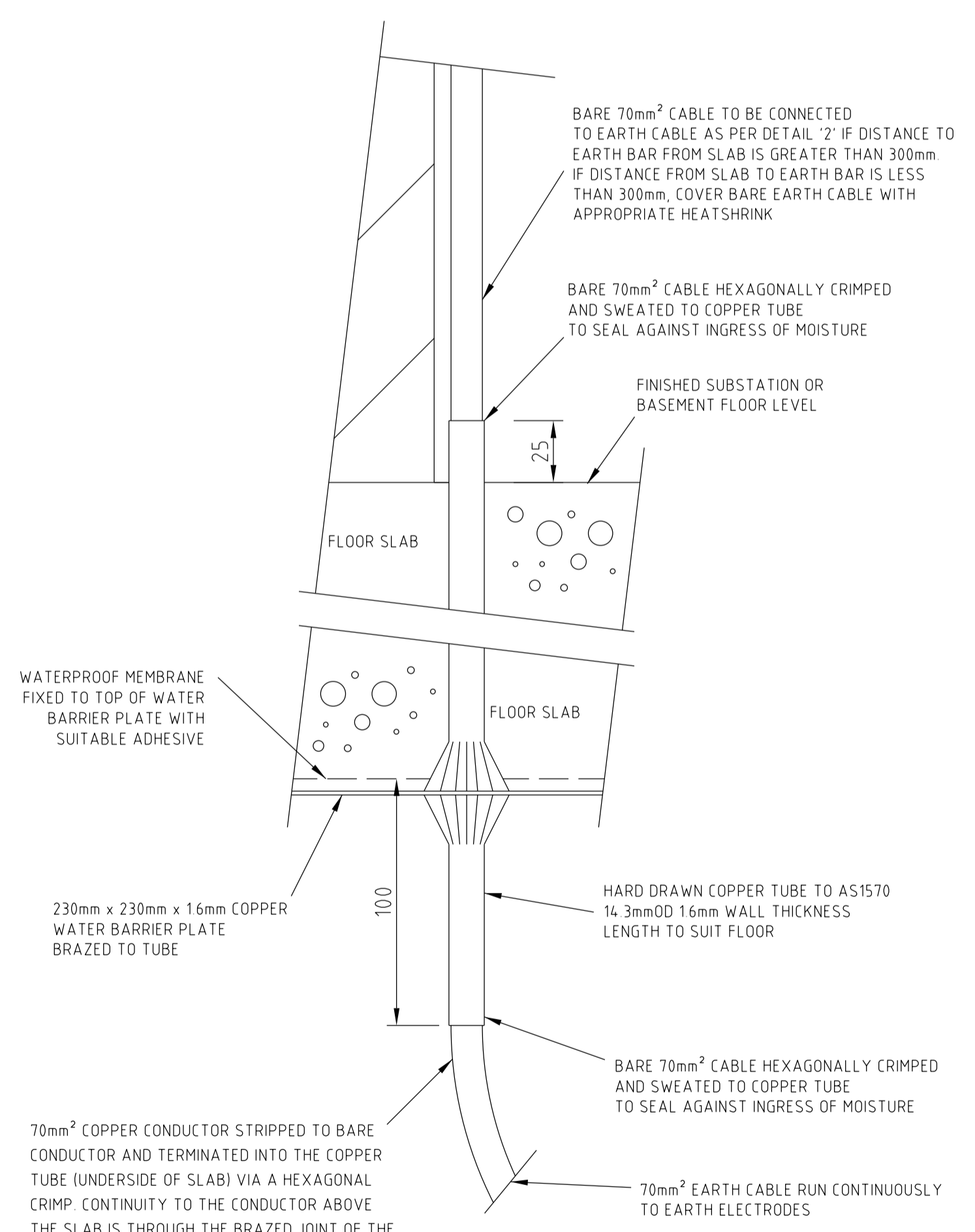
TYPE 'A' INSTALLATION TO BE USED WHEN A WATERPROOF MEMBRANE IS INSTALLED. FOR TYPE 'B' INSTALLATIONS DELETE WATER BARRIER PLATE FOR INSTALLATION AND CONNECTION DETAILS REFER DETAIL '1'.

**TYPES A & B INSTALLATIONS CONSTRUCTED WITH TOPPING SLAB**  
SCALE 1:10

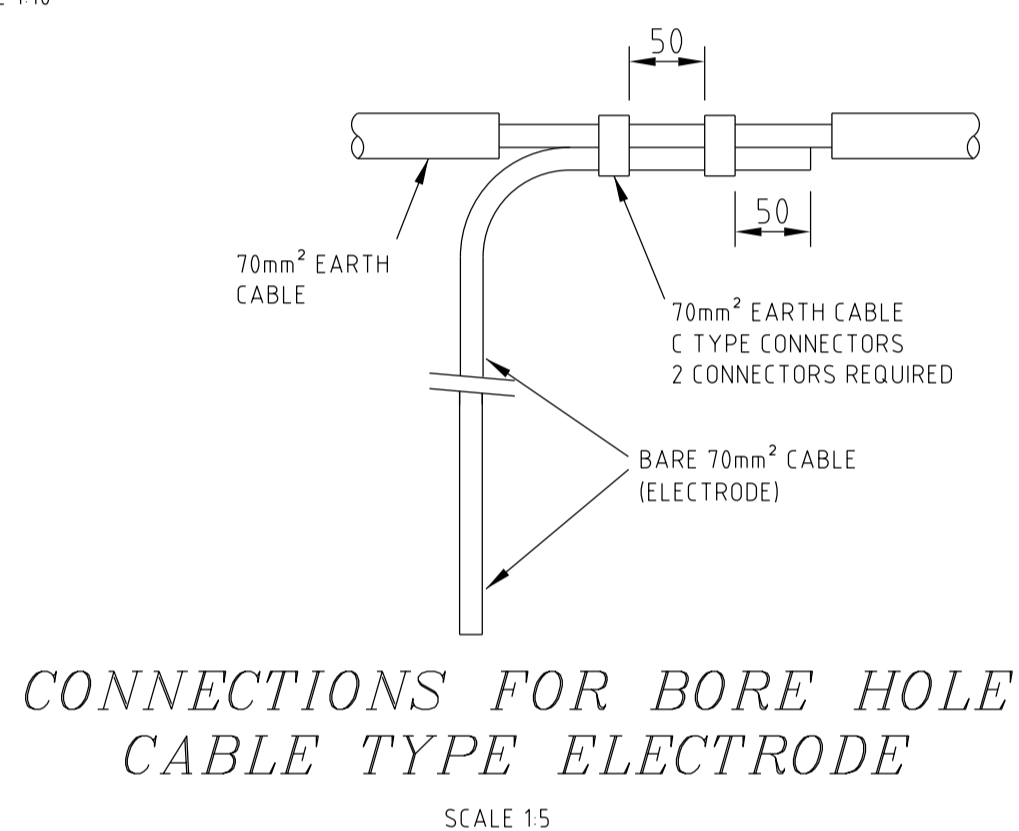


**TYPES A & B INSTALLATIONS WITH EARTH RODS IN THE LOWEST BASEMENT LEVEL**  
SCALE 1:10

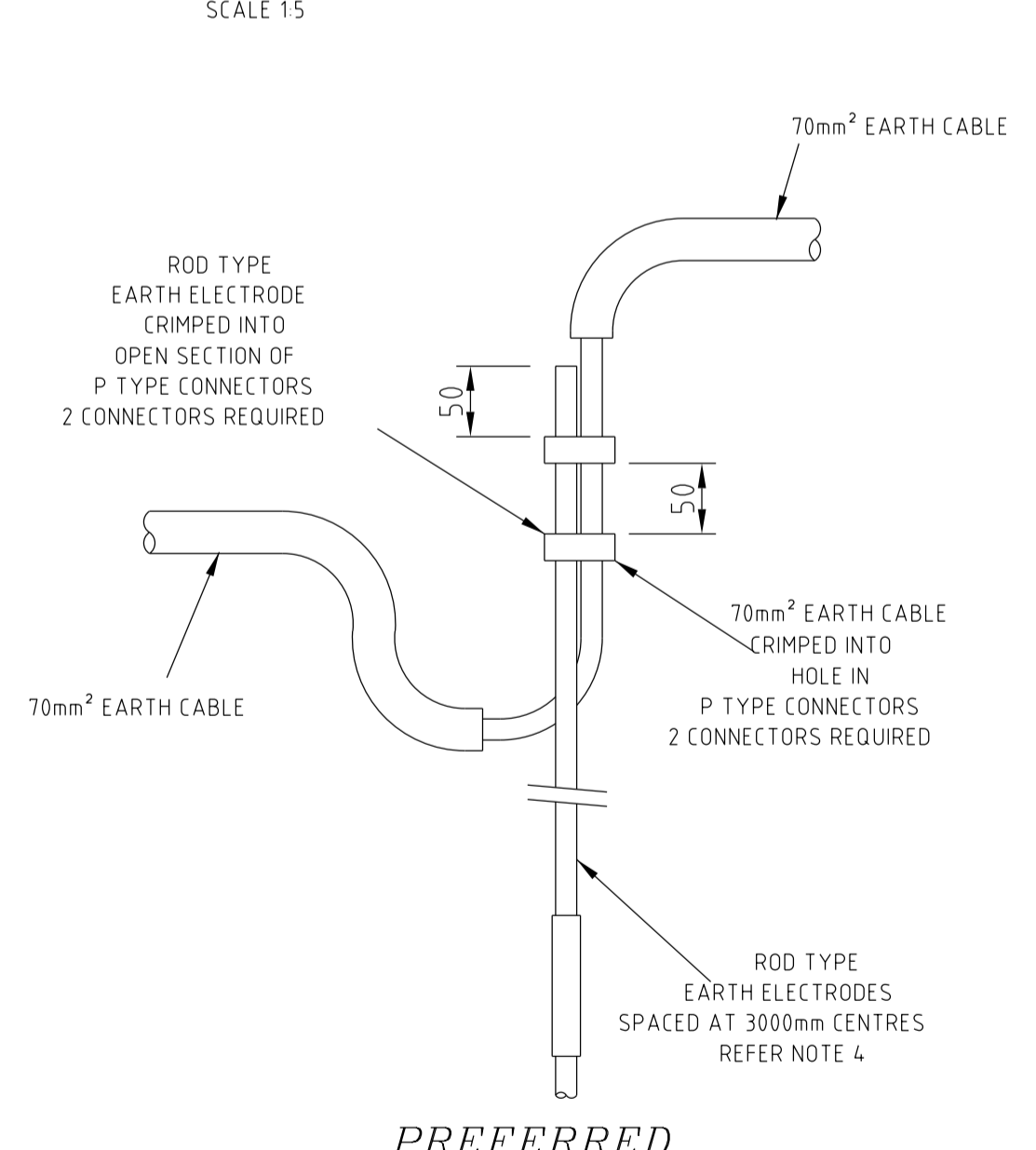
IF THE CHAMBER SUBSTATION SITE DOES NOT MEET THE CRITERIA FOR STANDARD MINIMUM EARTHING, A SITE SPECIFIC EARTHING DESIGN MUST BE UNDERTAKEN



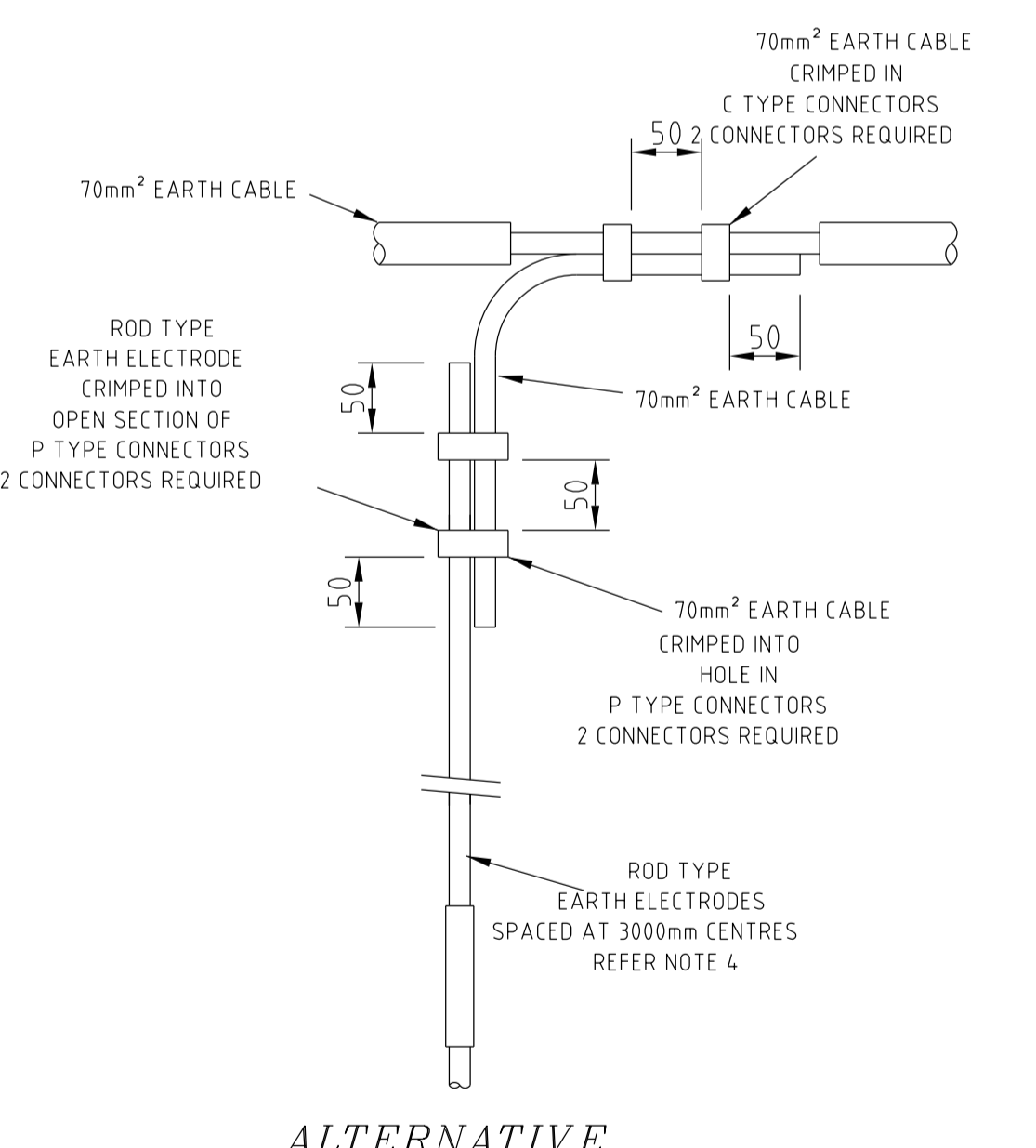
**DETAIL 1 WATER BARRIER PLATE INSTALLATION**  
SCALE 1:2



**CONNECTIONS FOR BORE HOLE CABLE TYPE ELECTRODE**  
SCALE 1:5



**CONNECTIONS FOR DRIVEN ROD TYPE EARTH ELECTRODES**  
SCALE 1:5



**DETAIL 2 CONNECTING EARTH CABLES**  
SCALE 1:5

CAD DRAWING DO NOT MANUALLY AMEND <b>AMENDMENTS</b> SHOW VARIOUS TYPES OF INSTALLATIONS. PWJ 11/2/20 CHECKED DTC APPROVED DGH 13. REF E2, C10 DRAW-IN BOX AND NOTES 6 AND 7 ADDED. PWJ 11/19 CHECKED BJT APPROVED DGH 14. EARTH ROD SPACING AND NOTES ALTERED TO NETWORK STANDARDS. PN 99/10/7/5 PWJ 2/5/01 CHECKED MP APPROVED MP 15. NOTES 1 AND 4 ALTERED. TITLE CHANGED FROM SUBSTATION EARTHING TYPICAL INSTALLATION OF EARTH ELECTRODES. PN ES03/59/1/2 DRAWN MP 18/10/5 CHECKED IWR APPROVED PWJ 16. DETAILS & REFERENCES TO TUBE TYPE COMPRESSION FITTINGS REPLACED BY C AND P TYPE COMPRESSION FITTINGS. NOTE 4 UPDATED. PN ES03/59/1/2 DRAWN PWJ 4/9/06 CHECKED IWR APPROVED IWR 17. NEW DRAWING BORDER TUBE TYPE EARTH ELECTRODES REMOVED. ROD TYPE ELECTRODES DETAIL AMENDED. P/N PM02-02010-1-4-1 C MABBUTT 10/01/2 CHECKED P JARVIS APPROVED P JARVIS 18. DETAIL FOR BORE HOLE EARTHING ADDED. DETAIL '2' ADDED. DETAIL '1', TYPE 'A' & TYPE 'B' AMENDED TO SHOW NEW CABLE CONNECTION METHOD TO COPPER TUBING. NOTES 1, 4, 6 & 8 AMENDED. NOTE 9 & 10 ADDED. P/N PM02-02010-1-4-1 C MABBUTT 14/03/21 CHECKED P JARVIS APPROVED NOKELLY 19. NOTE 1 AND EARTHING DESIGN NOTE ALTERED TO REFLECT CRITERIA FOR STANDARD MINIMUM EARTHING DESIGN. DESIGNS 4568 4.1-6 P JARVIS 24/6/16 CHECKED B JARVIS APPROVED D GRACEY DWN: P. RIDOS CHKD: C. MABBUTT DATE: 04/11/2021 20. NOTE AMENDED ON DETAIL 1. APP'D: P. TURRIN DWN: P.R. CHKD: check_by APP'D: approve DATE: date X: EARTH BAR SPACER CHANGED FROM 4.0mm TO 60mm. 21.	<b>CONSTRUCTION</b>	NETWORK STANDARD <b>Ausgrid</b> ENGINEERING BRANCH PRIMARY SYSTEMS TRANSMISSION & DISTRIBUTION SUBSTATION ENGINEERING 570 GEORGE STREET, SYDNEY	SCALE DESIGNED: AS SHOWN DRAWN: SIGNED ON ORIGINAL CHECKED: J BROOKER APPROVED: SIGNED ON ORIGINAL DATE: 30/11/1961 PROJECT NUMBER: 25121 PROJTRAK NUMBER:	<b>CHAMBER SUBSTATION EARTHING TYPICAL INSTALLATION OF EARTH ELECTRODES</b> SIZE: A1 DRAWING No: 25121 SHEET: 1 AMD: 21
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