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NOTE 1:
DRAWINGS ARE TO BE READ IN CONJUNCTION WITH EIRGRID GENERAL FUNCTIONAL SPECIFICATION XDS–GFS–12–001.

REV	DESC	DRAWN	CHECKED	APPROVED	DATE
04	INDEX SHEET UPDATED, NEW DRAWINGS ADDED AND REVISION TO EXISTING DRAWINGS	DA	NK/ NMcM	AG	02/10/2020
03	MINOR REVISION	JB	KF/RB	PM	23/07/13
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PROJECT
STATION DESIGN STANDARD

DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
TITLE SHEET

No of Shts 39 | SIZE A3 | SCALE N/A

DRAWING NUMBER
XDS DGA–00–004

SHEET 001 | REV 04

NOTES

1. THESE DRAWINGS APPLY TO NEW SUBSTATIONS AND TO NEW EQUIPMENT IN EXISTING SUBSTATIONS. ALL DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE FUNCTIONAL SPECIFICATION FOR EARTHING AND LIGHTNING PROTECTION XDS–GFS–12–001.

2. THE DRAWINGS PRESENT MINIMUM REQUIREMENTS, AND SHOULD BE VERIFIED FOR THEIR SUITABILITY BY THE EARTHING SYSTEM DESIGNER ON A CASE–BY–CASE BASIS.

3. CONDUCTOR FOR MAIN EARTHGRID SHALL BE 95mm^2 COPPER CONDUCTOR, UNLESS OTHERWISE AGREED.

4. ALL TAILS SHALL BE GREEN PVC INSULATED 95mm^2 COPPER, UNLESS OTHERWISE AGREED.

5. TAILS FROM DOUBLE CONNECTIONS SHALL BE CONNECTED TO SEPARATE CONDUCTORS WITHIN THE OVERALL INTERCONNECTED EARTHING SYSTEM WHERE INDICATED IN THE BAY EARTH GRID DRAWINGS (SHEETS 22 AND 23).

6. REFER TO XDS–GFS–12–001 FOR FULL REQUIREMENTS RELATING TO THE DESIGN AND CONSTRUCTION OF TAILS – E.G. LENGTH, AVOIDANCE OF TRIP HAZARDS, AVOIDANCE OF CONTACT BETWEEN COOPER AND STEEL STRUCTURES ETC.

7. A SINGLE CRIMP MAY BE USED AT CROSS SECTIONS. ALL IN–LINE (OR SPLICE) CONNECTIONS SHALL BE ACHIEVED BY OVERLAPPING THE 2 CONDUCTORS AND USING 2 CRIMPS SPACED AT LEAST 300mm APART.

8. DETAILS OF THE DIFFERENT TYPES/ARRANGEMENT OF EARTHING CONNECTIONS ARE SHOWN ON SHEETS 3 & 4.

9. CLEAR PVC INSULATED STRANDED COPPER CABLES SHALL BE USED FOR ALL BONDS REQUIRING FLEXBILITY.

REV	DESC	DRAWN	CHECKED	APPROVED	DATE
04	DRAWING DETAILS UPDATED WITH REFERENCE TO ESBN DRAWING: PG406–D010	DA	NK/ NMcM	AG	02/10/2020
03	MINOR REVISION	JB	KF/RB	PM	23/07/13
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PROJECT
STATION DESIGN STANDARD

DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
NOTES

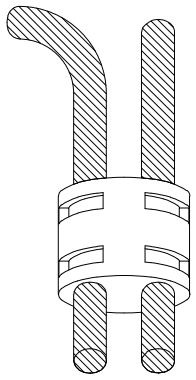
No of Shts 39 | SIZE A3 | SCALE NTS

DRAWING NUMBER
XDS DGA–00–004

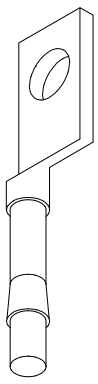
SHEET 002 | REV 04

INSTALLATION DETAILS 1 / 2

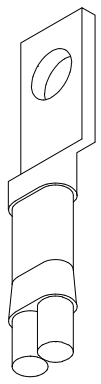
TYPES OF EARTHING CONNECTIONS



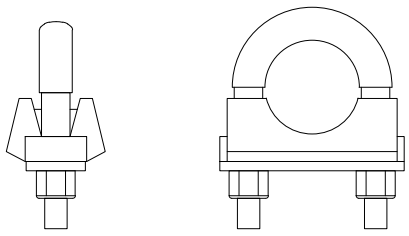
TYPE 1
H FORM COMPRESSION
FOR 95 – 95mm^2 Cu



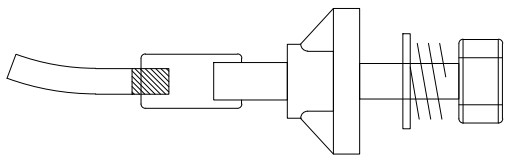
TYPE 2
COMPRESSION LUG M12
FOR SINGLE 95mm^2 Cu



TYPE 3
COMPRESSION LUG M12
FOR DOUBLE 95mm^2 Cu

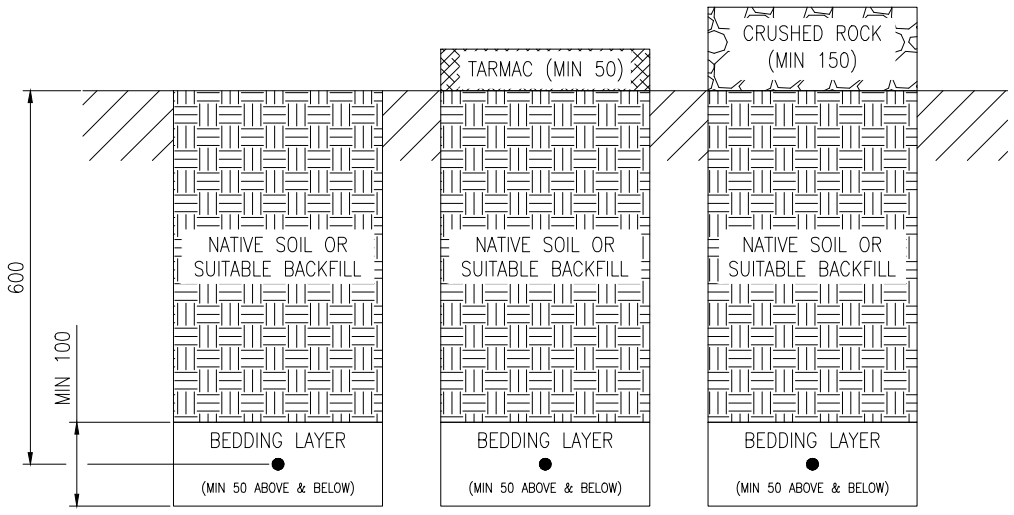


TYPE 4
CROSBY CLAMP
REBAR / HF SCREEN EARTHING

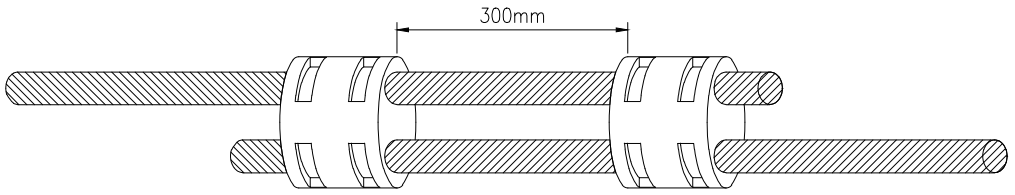


DETAIL 5
CAST–IN EARTH POINT
WITH 50mm^2 INSULATED Cu CABLE

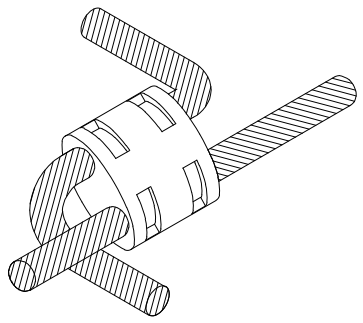
EARTHING DETAILS



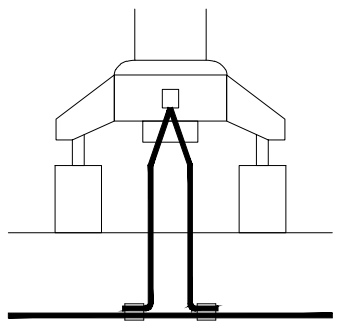
DETAIL 1
ELECTRODE DEPTH
NOTE: ALL DIMENSIONS IN mm



DETAIL 2
SPLICE DETAIL



DETAIL 3
CROSS CONNECTION



DETAIL 4
EARTHING OF EQUIPMENT / STRUCTURE
(DOUBLE DIRECT CONNECTION TYPE)

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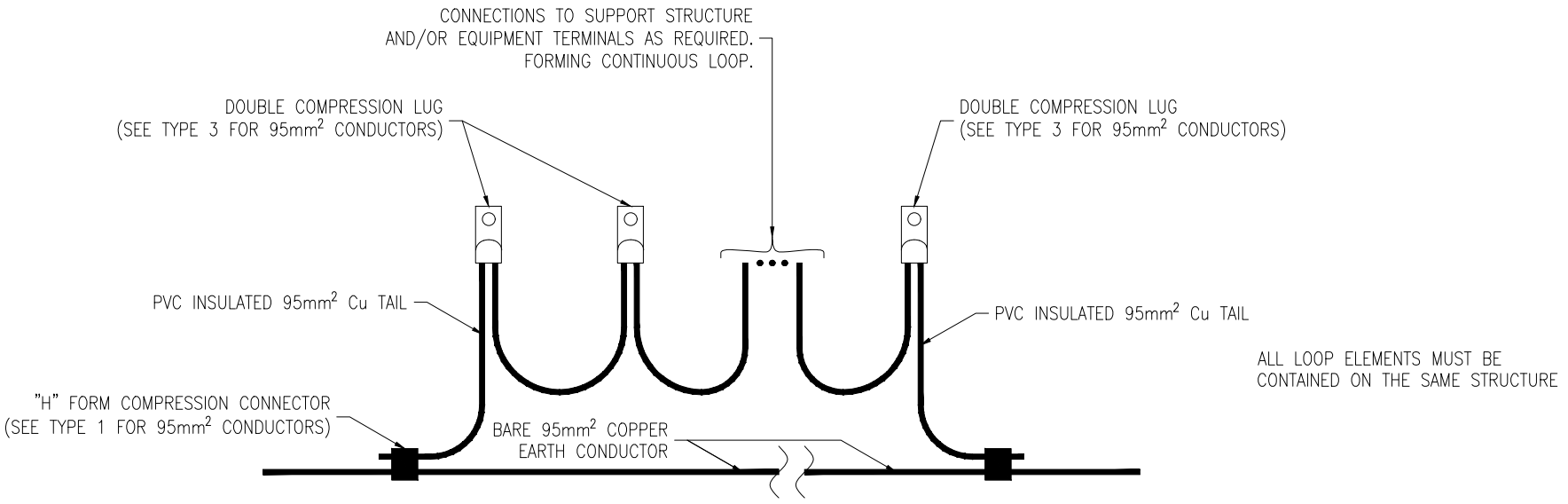
PROJECT
STATION DESIGN STANDARD

DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
INSTALLATION DETAILS – 1/2

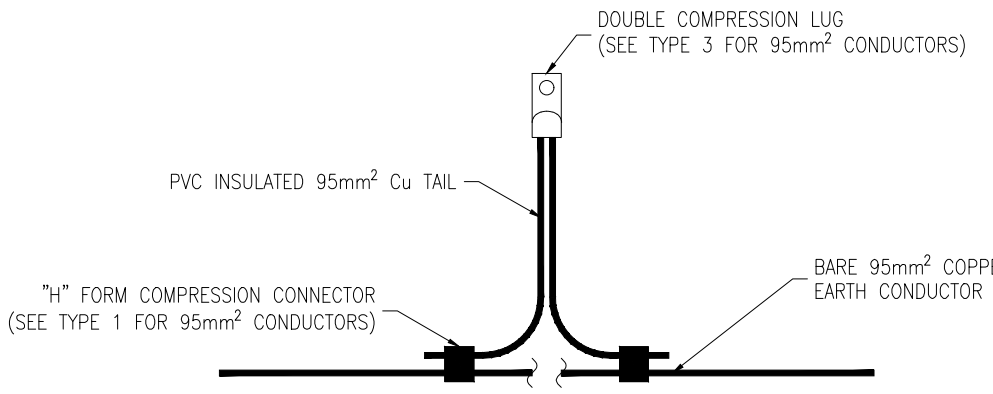
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39	A3	NTS

DRAWING NUMBER	SHEET	REV
XDS DGA–00–004	003	00

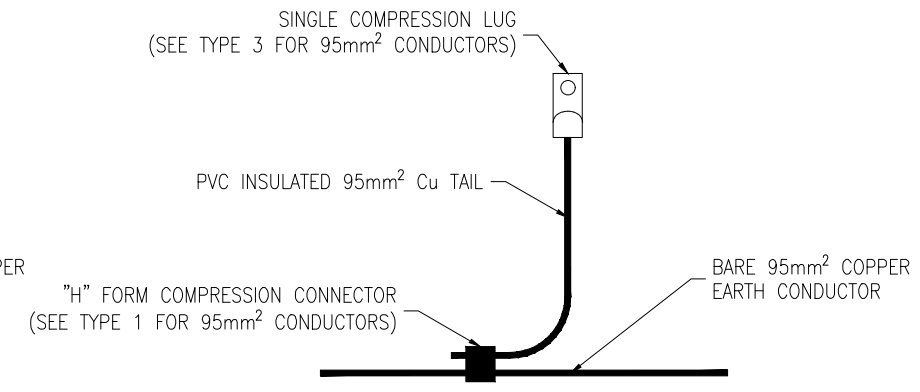
INSTALLATION DETAILS 2 / 2



DETAIL 5
GENERIC DOUBLE LOOPED CONNECTION TYPE



DETAIL 6
GENERIC DOUBLE "DIRECT" CONNECTION TYPE



DETAIL 7
GENERIC SINGLE CONNECTION TYPE

NOTES

1. REFER TO TABLE 3 OF XDS-GFS-12-001 FOR APPLICATION OF DIFFERENT CONNECTION TYPES.

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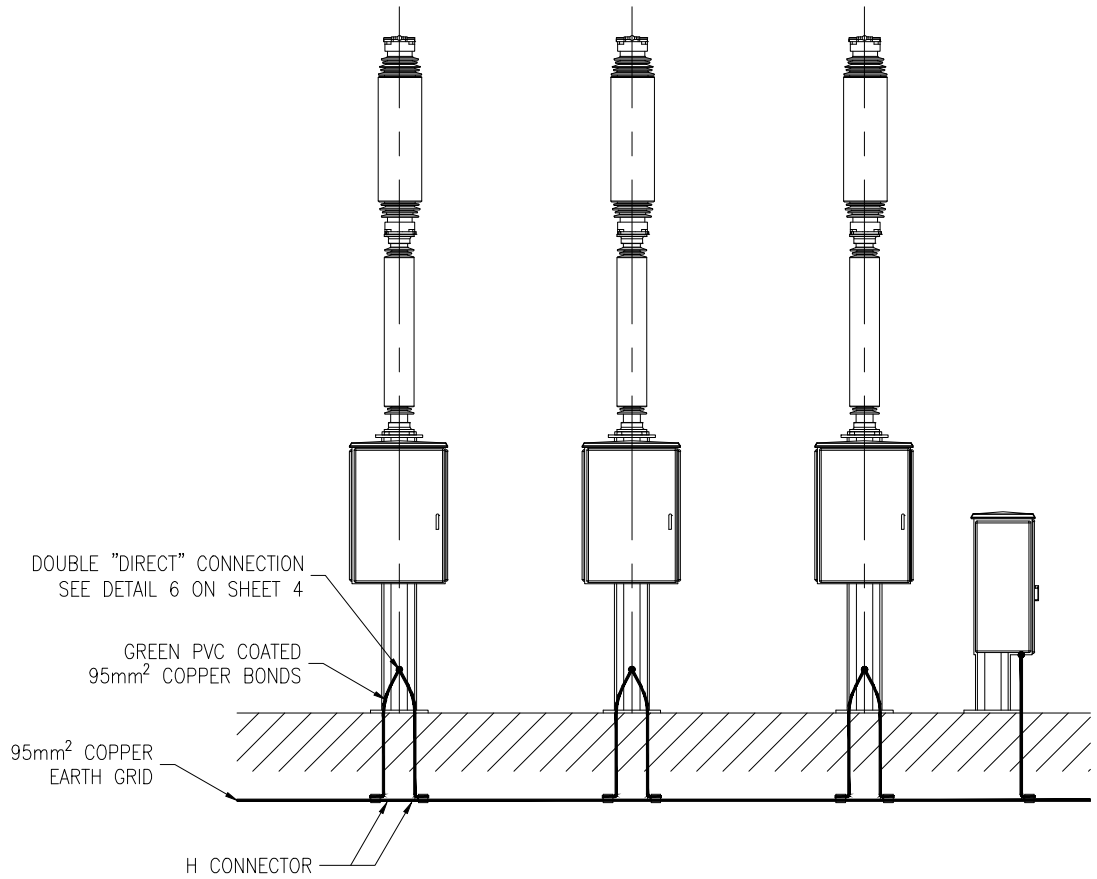
PROJECT
STATION DESIGN STANDARD

DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
INSTALLATION DETAILS – 2/2

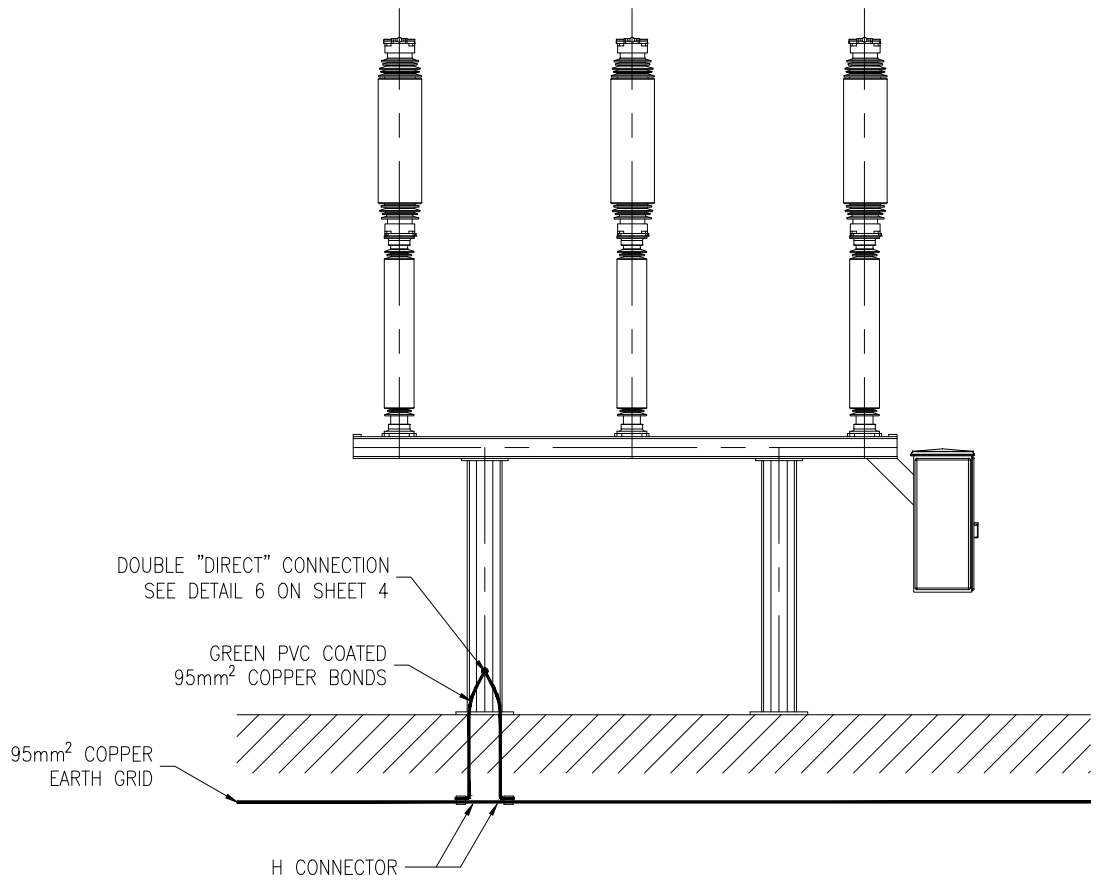
No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER	SHEET	REV
XDS DGA-00-004	004	00

CIRCUIT BREAKERS 1 PHASE



CIRCUIT BREAKERS 3 PHASE



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03	MINOR REVISION	JB	KF/RB	PM	23/07/13
02	MINOR REVISION	JB	CC	PM	24/05/11
01	MINOR REVISION	JB	CC	KD	04/03/11
00	FIRST ISSUE	CMN	KD	EF	22/08/08

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PROJECT
STATION DESIGN STANDARD

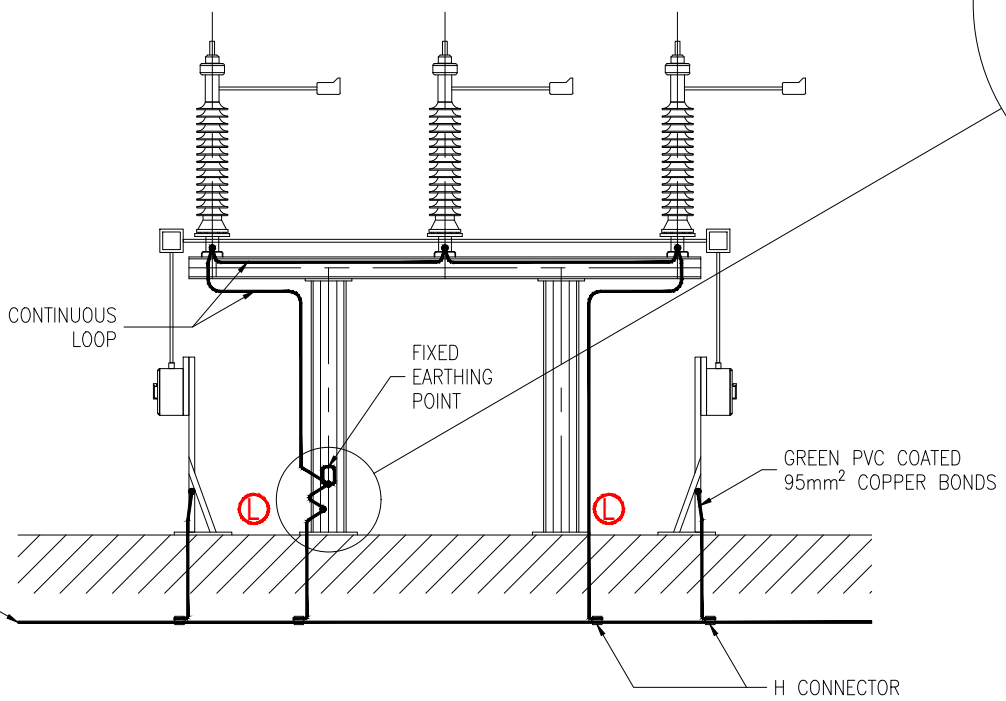
DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
CIRCUIT BREAKERS

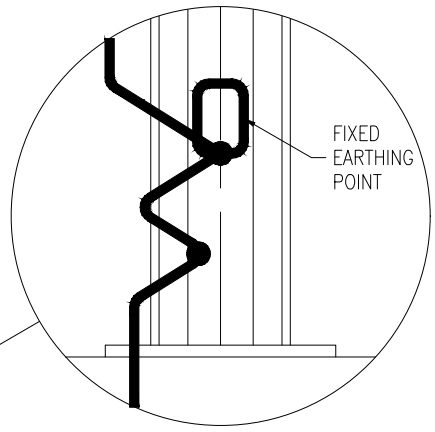
No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER
XDS DGA–00–004

SHEET	REV
005	04

LINE EARTH DISCONNECTOR





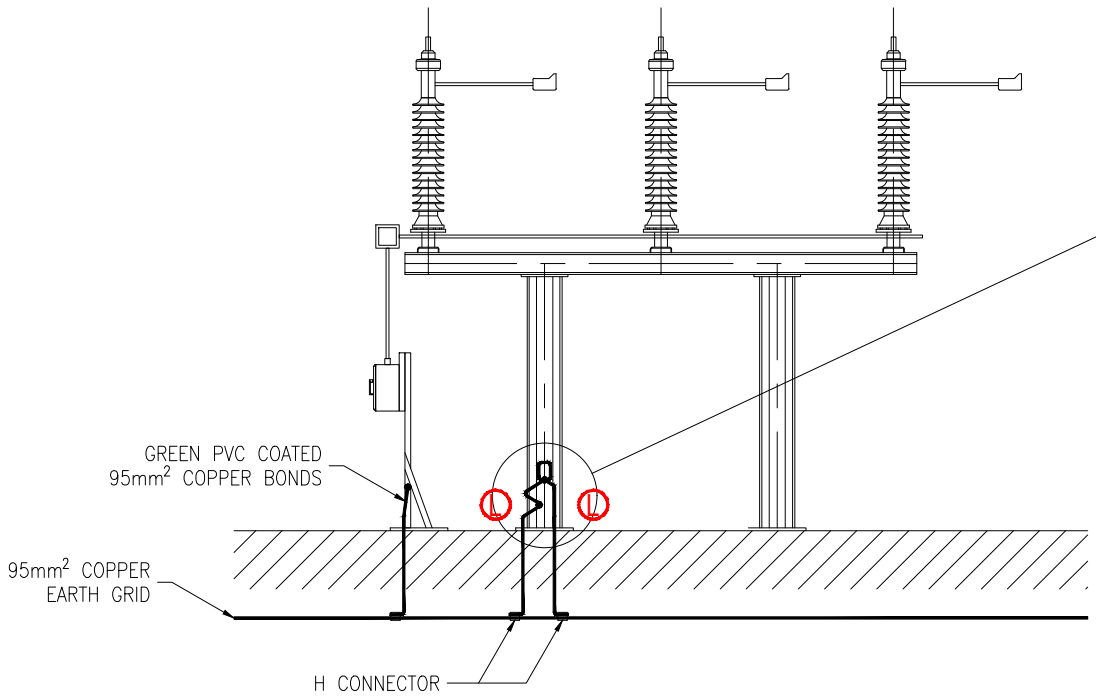
DETAIL 1
FIXED EARTH POINT DETAIL

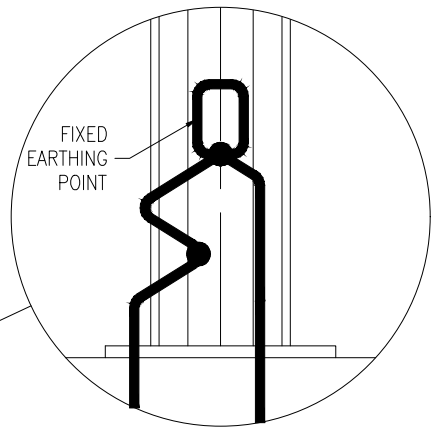
NOTES:

DETAILS OF THE EARTHING OF MOVING EARTH BLADES HAS NOT BEEN SHOWN.
REFER TO XDS-GFS-12-001 FOR REQUIREMENTS.

Ⓛ LOOPED CONNECTION

BUSBAR DISCONNECTOR





DETAIL 2
FIXED EARTH POINT DETAIL

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04	DRAWING DETAILS UPDATED WITH REFERENCE TO ESBN DRAWING: PG406-D010	DA	NK/ NMcM	AG	02/10/2020
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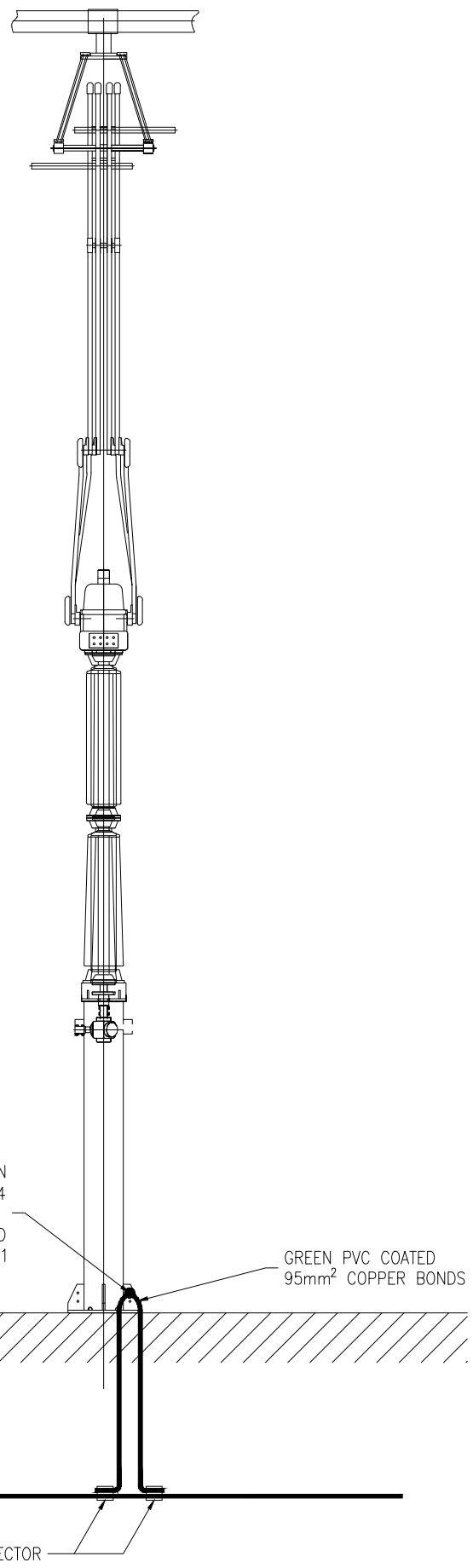
PROJECT
STATION DESIGN STANDARD

DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
LINE EARTH / BUSBAR DISCONNECTORS

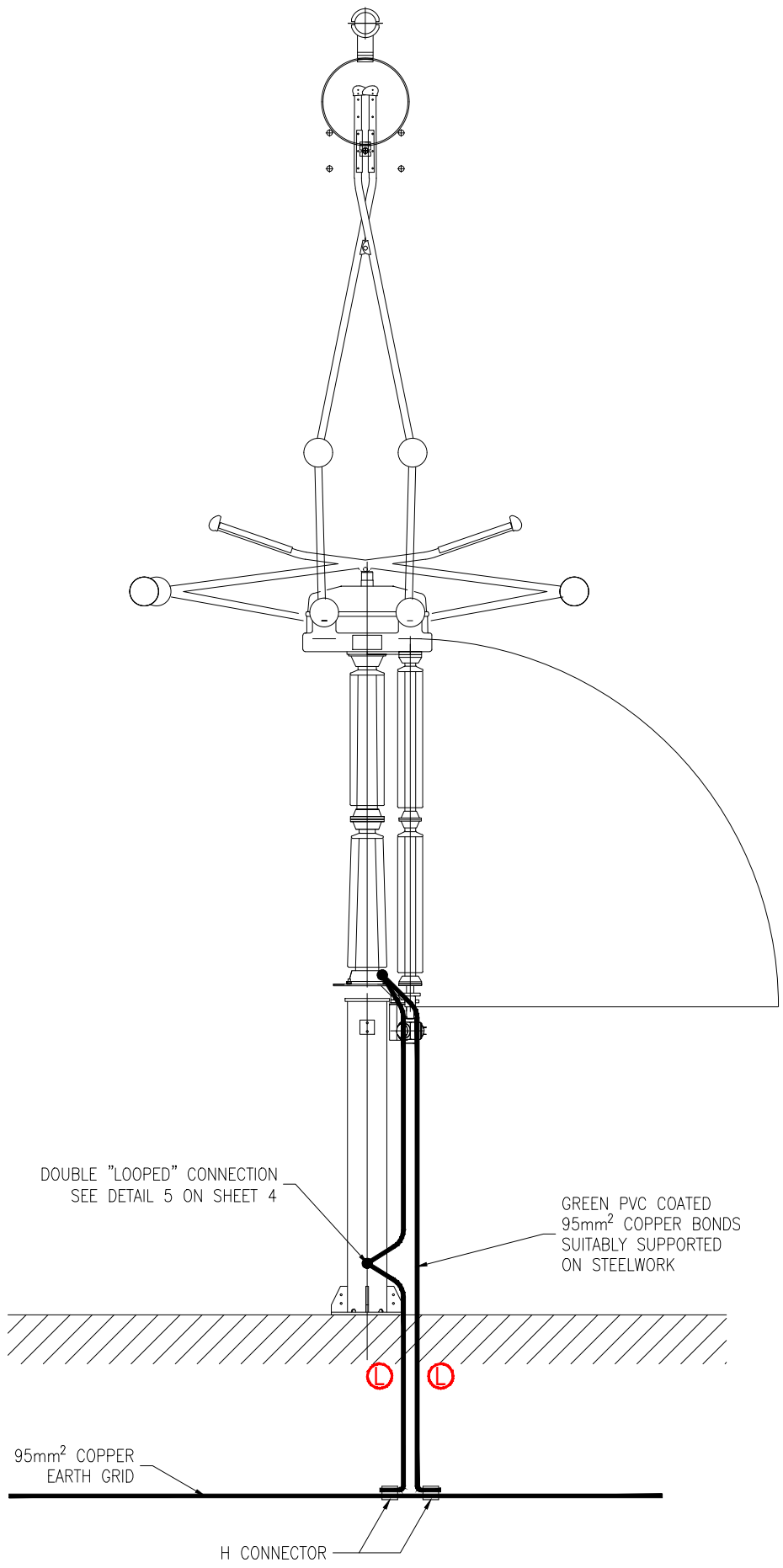
No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER	SHEET	REV
XDS DGA-00-004	006	04

PANTOGRAPH DISCONNECT



PANTOGRAPH DISCONNECT WITH EARTHING BLADE



NOTES:

DETAILS OF THE EARTHING OF MOVING EARTH BLADES HAS NOT BEEN SHOWN.
REFER TO XDS-GFS-12-001 FOR REQUIREMENTS.

LEGEND

L LOOPED CONNECTION

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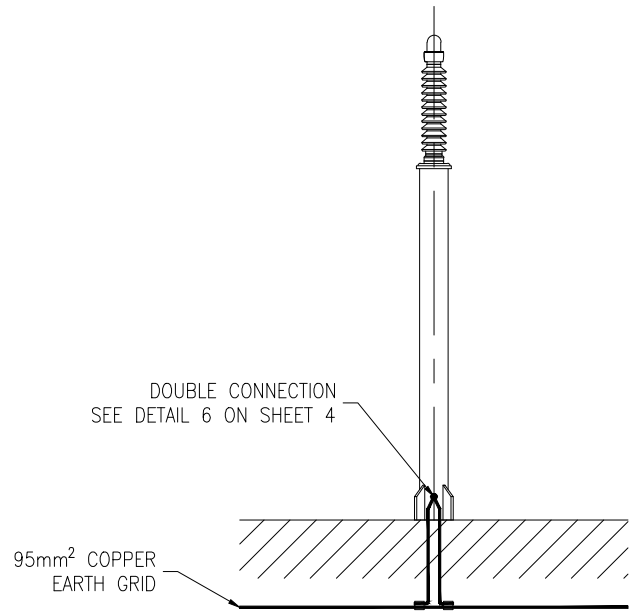
PROJECT
STATION DESIGN STANDARD

DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
PANTOGRAPH DISCONNECTS

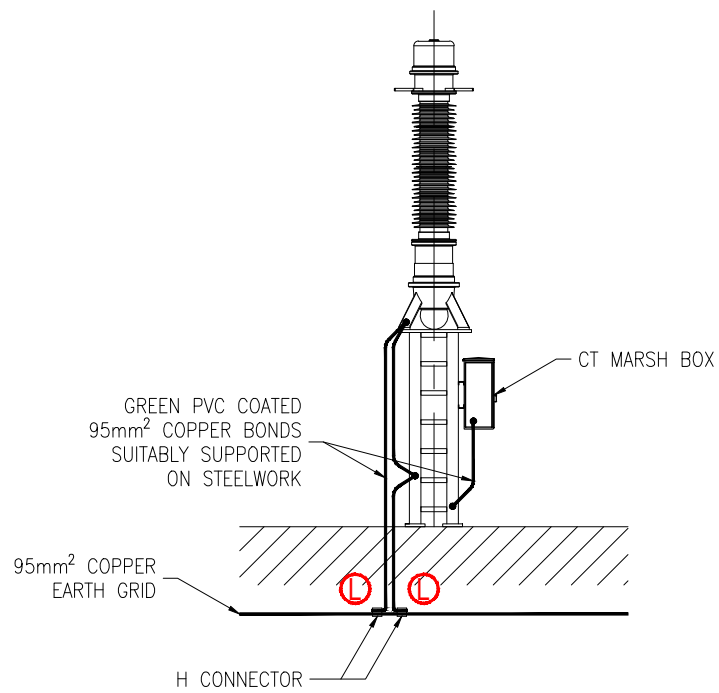
No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER	SHEET	REV
XDS DGA-00-004	007	00

POST INSULATORS



CTs, VTs & CVTs



NOTES:

L LOOPED CONNECTION

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PROJECT
STATION DESIGN STANDARD

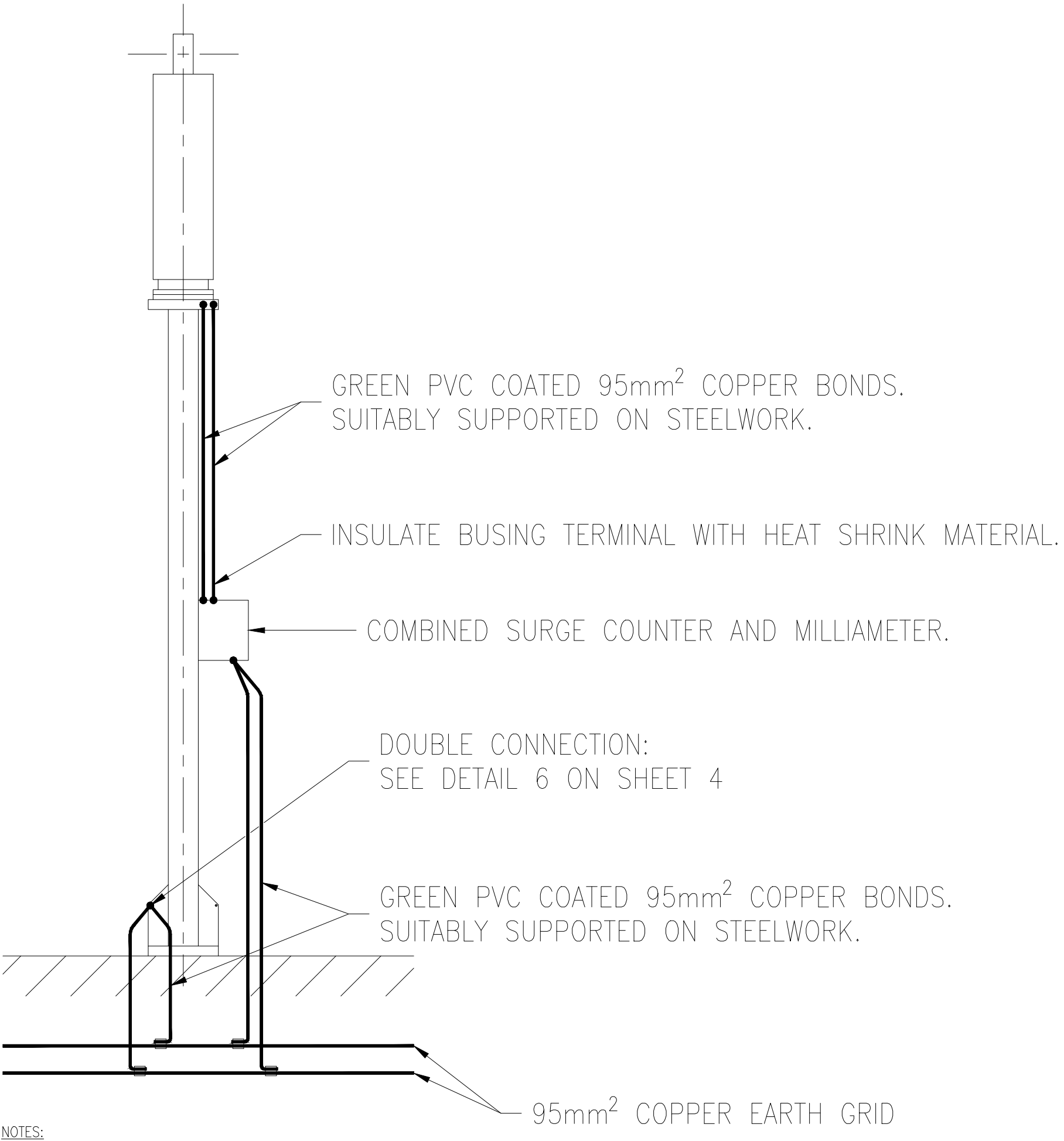
DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
POST INSULATORS / CTs, VTs & CVTs

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER
XDS DGA-00-004

SHEET	REV
008	04

SURGE ARRESTORS



NOTES:

EARTHING CONDUCTORS SHALL BE AS SHORT AND STRAIGHT AS POSSIBLE.

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00	FIRST ISSUE	CMN	KD	EF	22/08/08

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PROJECT
STATION DESIGN STANDARD

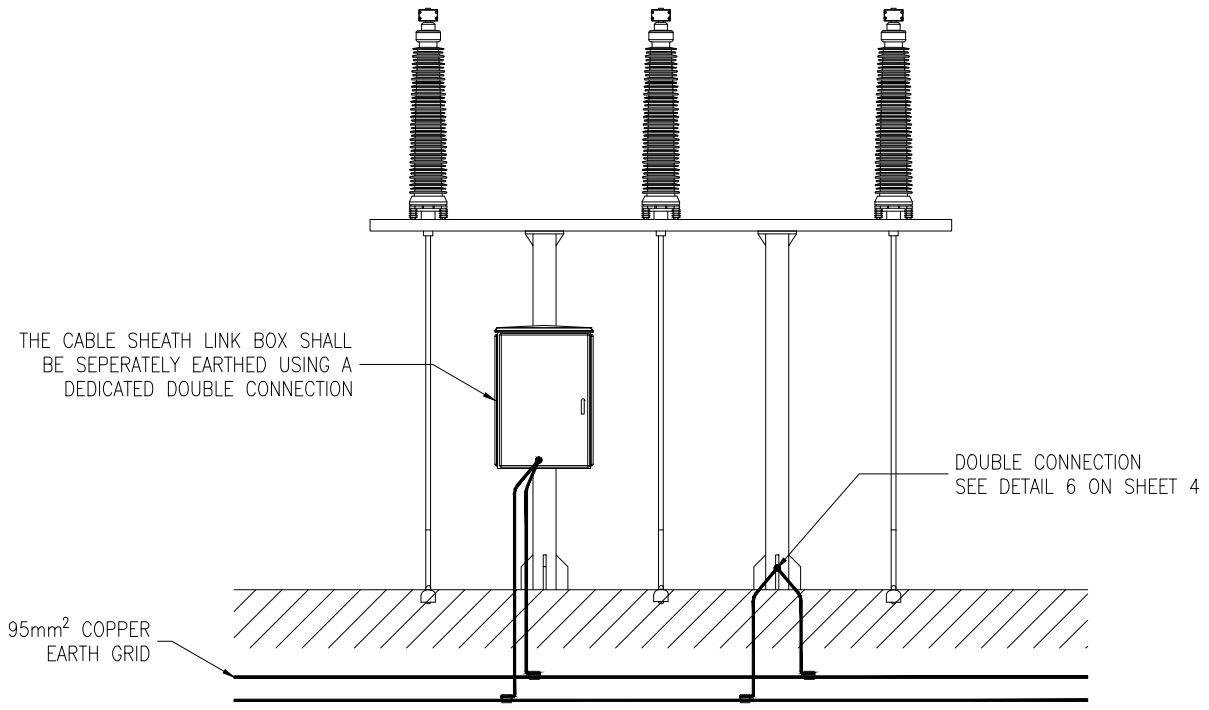
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110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
SURGE ARRESTORS

No of Shts	SIZE	SCALE
39	A3	NTS

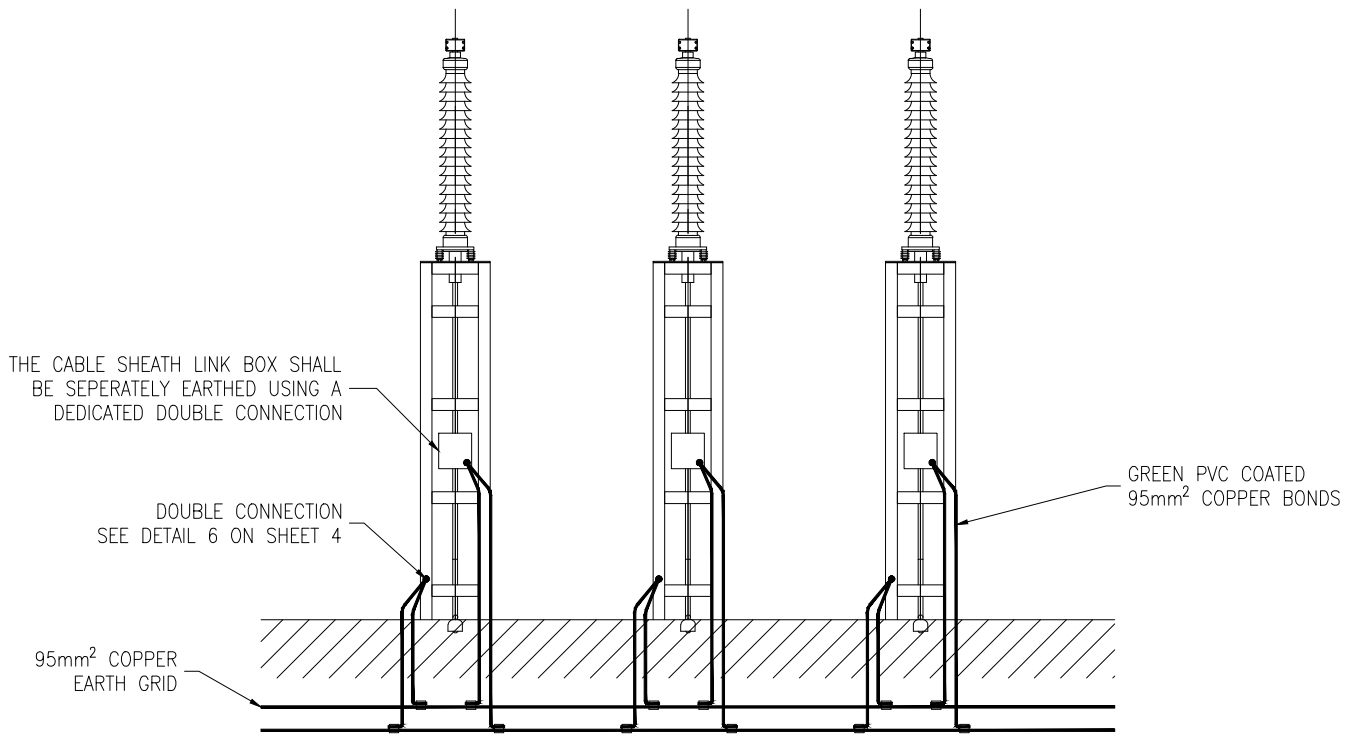
DRAWING NUMBER
XDS DGA-00-004

SHEET	REV
009	04

110kV – CABLE SEALING ENDS



220kV – CABLE SEALING ENDS



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01	MINOR REVISION	JB	CC	KD	04/03/11
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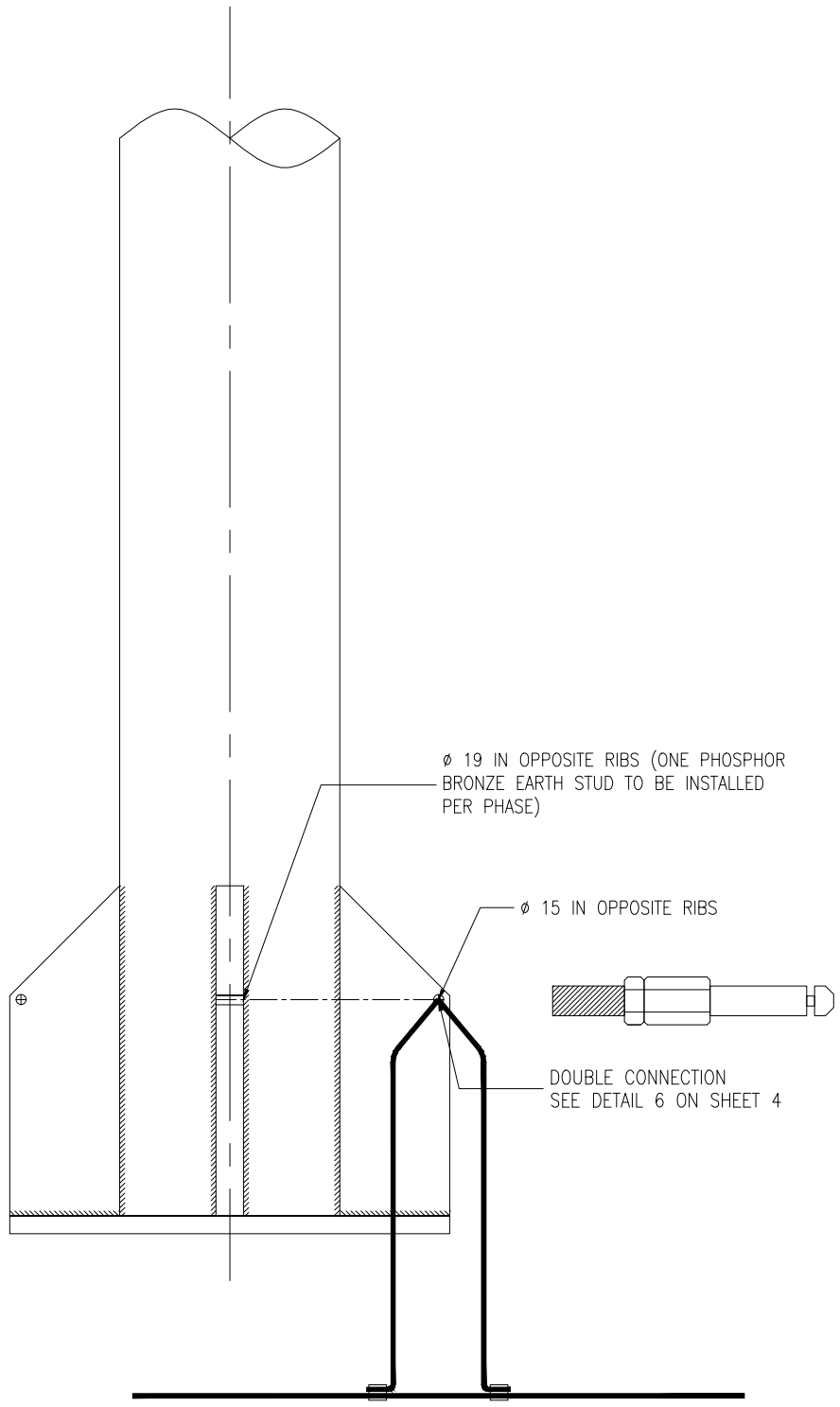
PROJECT
STATION DESIGN STANDARD

DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
CABLE SEALING ENDS

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER	SHEET	REV
XDS DGA–00–004	010	04

220kV STEELWORK BASE CONNECTION METHOD



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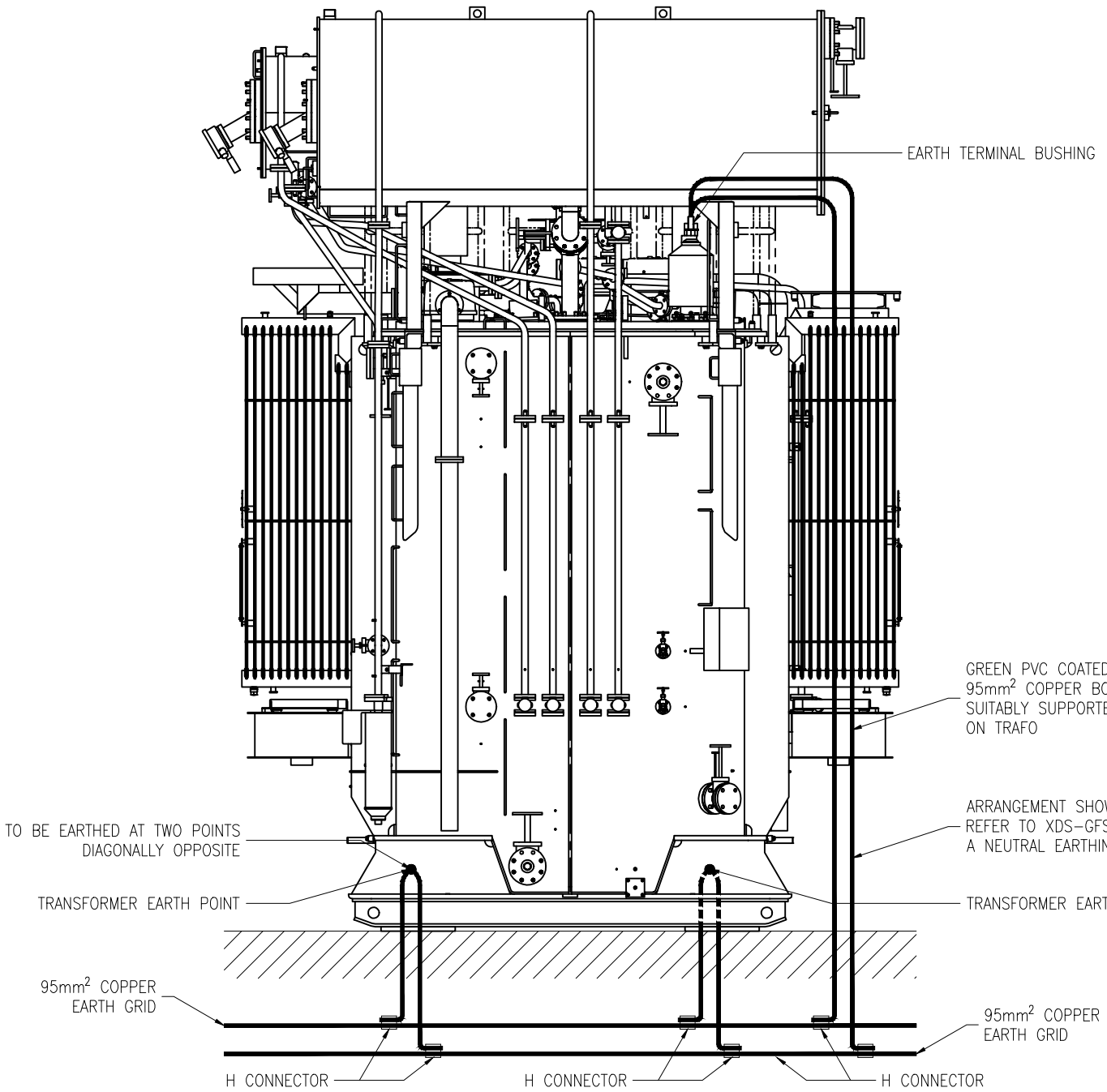
PROJECT
STATION DESIGN STANDARD

DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
STEELWORK BASE CONNECTION METHOD

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER	SHEET	REV
XDS DGA-00-004	011	00

TRANSFORMER



REV	DESC	DRAWN	CHECKED	APPROVED	DATE
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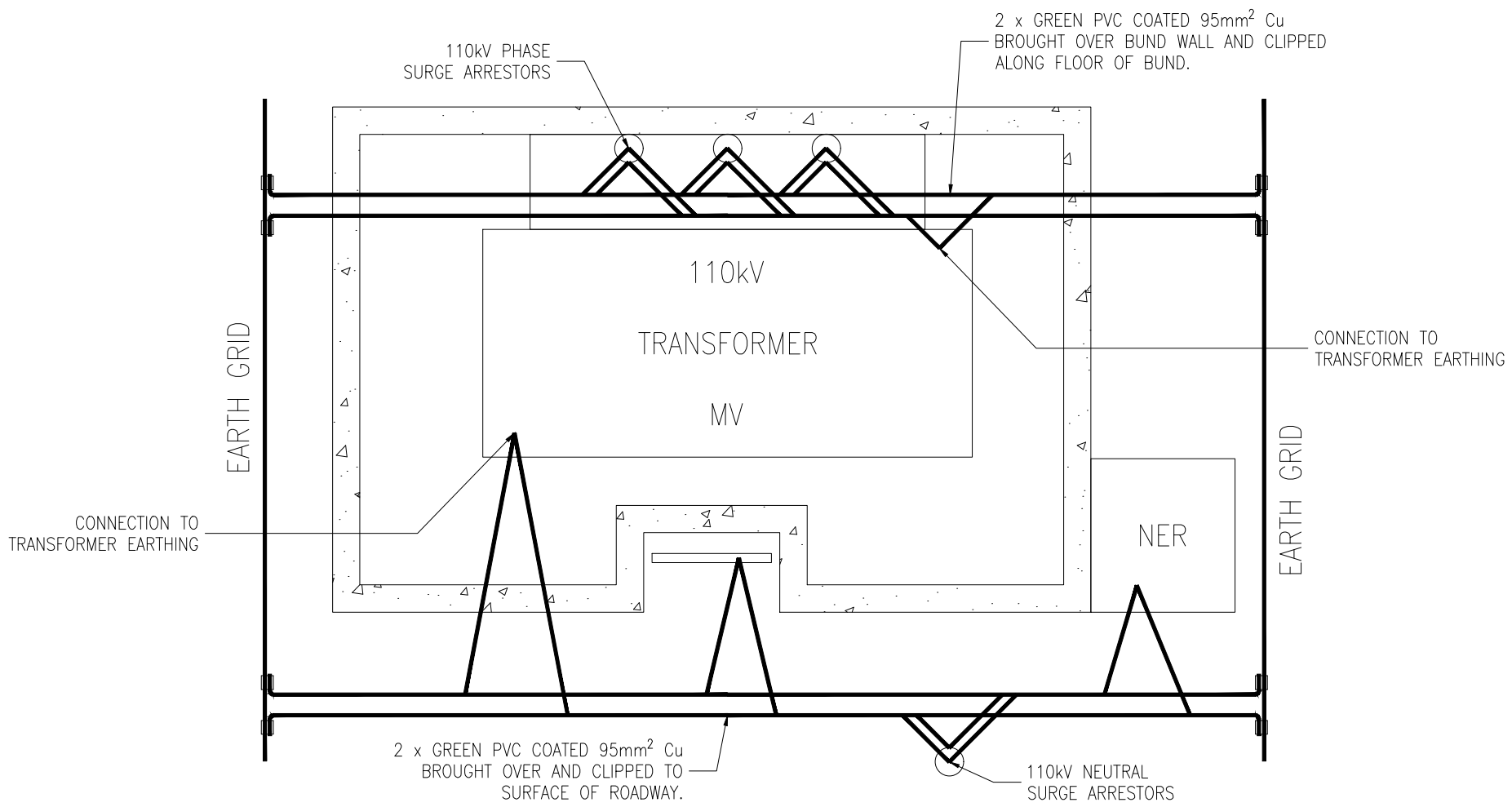
PROJECT
STATION DESIGN STANDARD

DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
TRANSFORMER

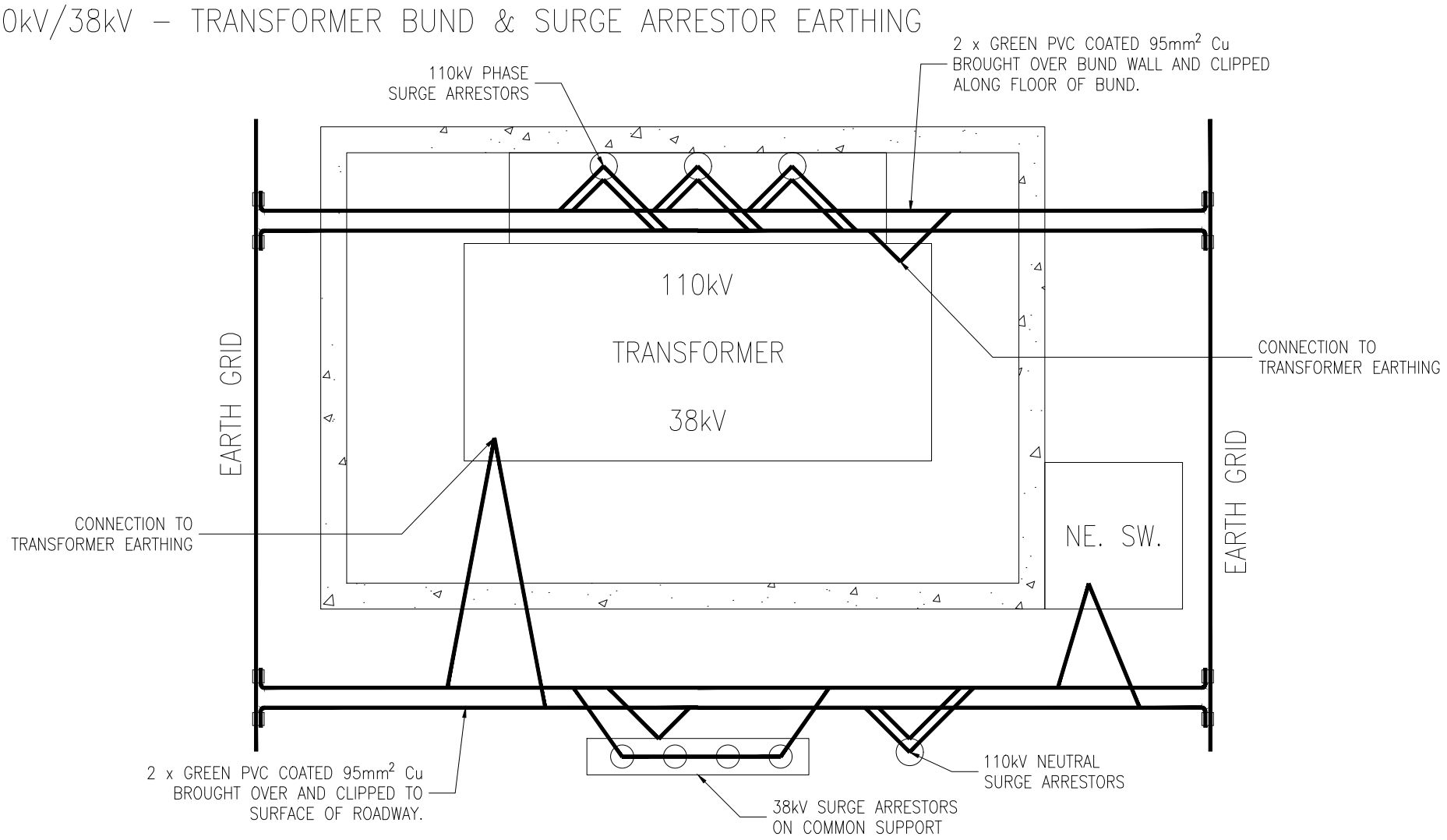
No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER	SHEET	REV
XDS DGA-00-004	012	04

110kV/MV – TRANSFORMER BUND & SURGE ARRESTOR EARTHING



110kV/38kV – TRANSFORMER BUND & SURGE ARRESTOR EARTHING



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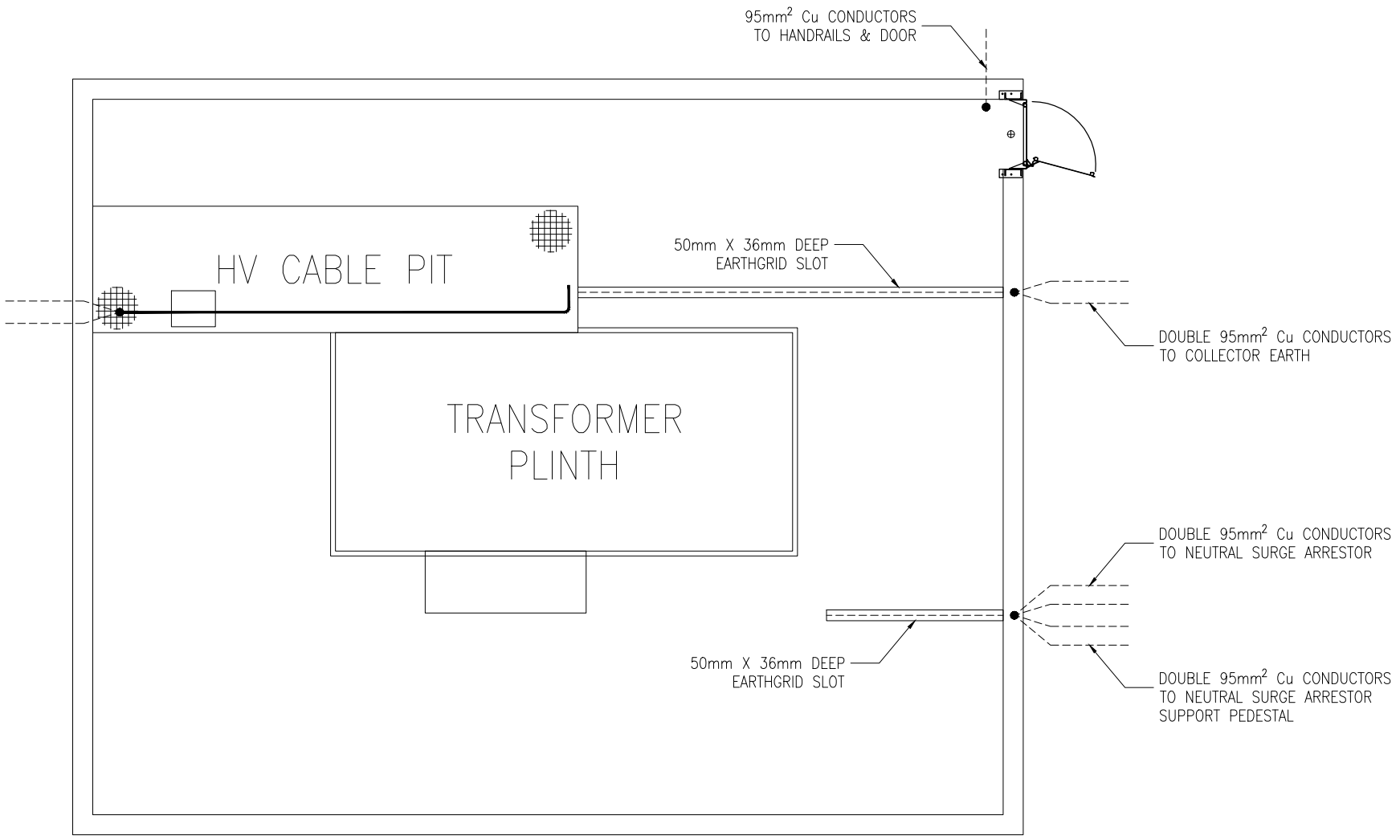
PROJECT
STATION DESIGN STANDARD

DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
TRANSFORMER BUND AND SA EARTHING

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER	SHEET	REV
XDS DGA-00-004	013	00

TRANSFORMER ENCLOSURE WITH HV CABLE PIT



EARTHING LEGEND:

50mm X 6mm SOLID COPPER COLLECTOR BAR (FIXED TO PIT WALL)

1 X 95mm² COPPER

2 X 95mm² COPPER

NOTES:

1. STEEL SUPPORT FOR CABLE PIT FLOOR BONDED TO COLLECTOR EARTH BAR WITH PVC COATED 95mm² Cu CONDUCTOR.
2. NO RISERS TO BE BROUGHT THROUGH WATER TIGHT BUND WALLS/FLOORS
3. FOR TRANSFORMER EARTHING REFER TO SHEET 12 & 13
4. FOR SURGE ARRESTOR EARTHING REFER TO SHEET 9 & 13
5. FOR DOOR EARTHS REFER TO SHEET 21
6. STAINLESS STEEL FIXING BOLTS TO BE USED IN HV CABLE PIT

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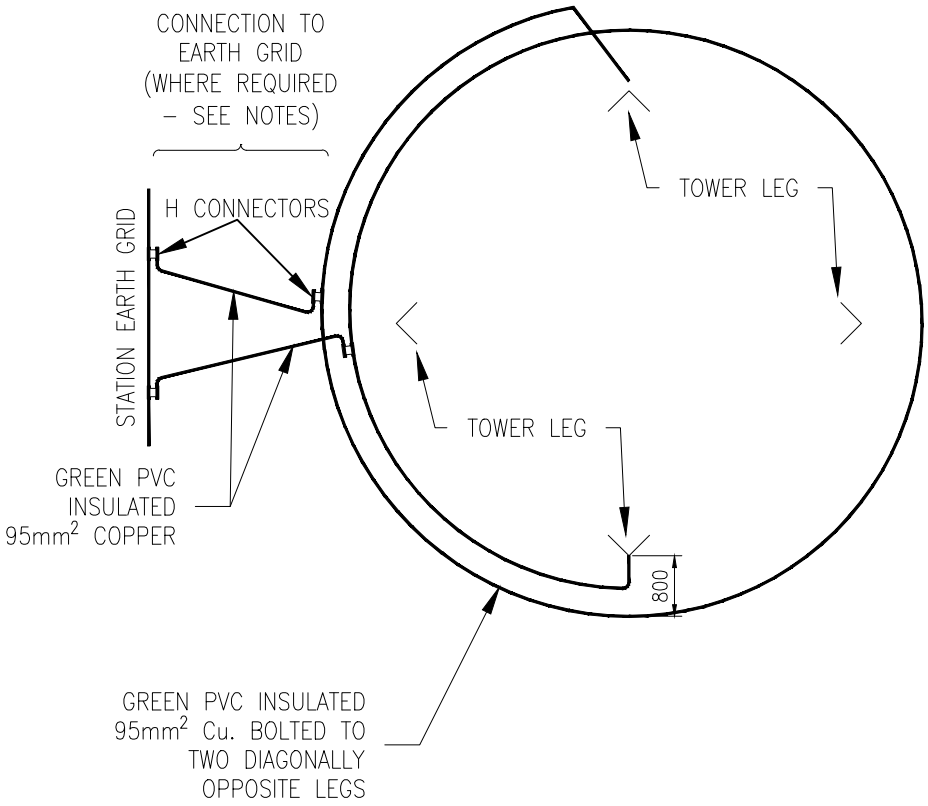
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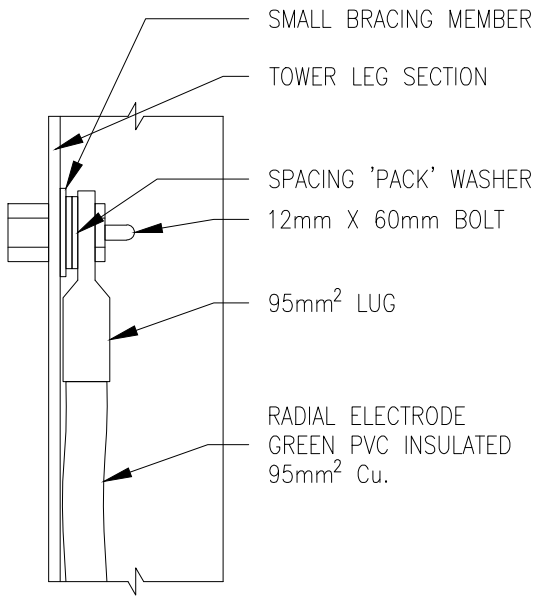
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STATION DESIGN STANDARD

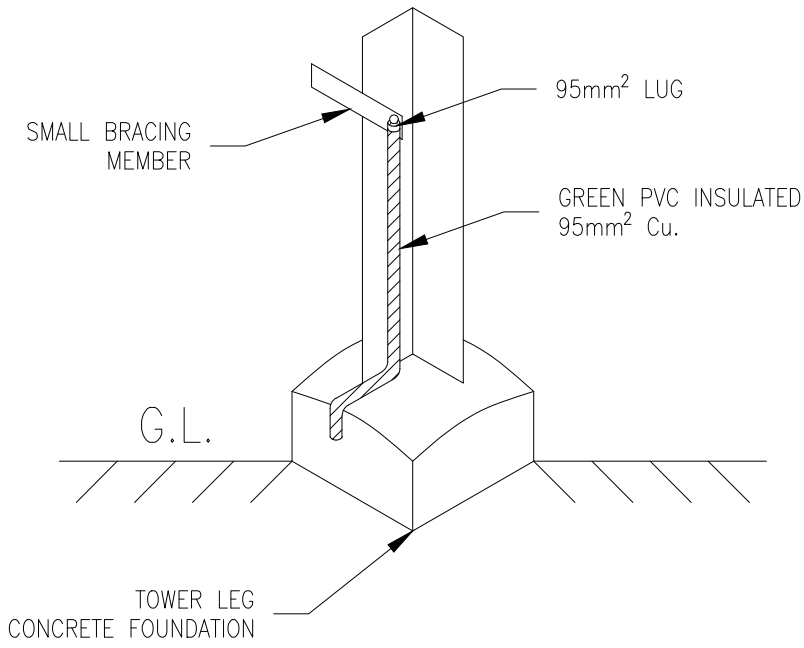
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110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
TRANSFORMER ENCLOSURE WITH HV CABLE PIT

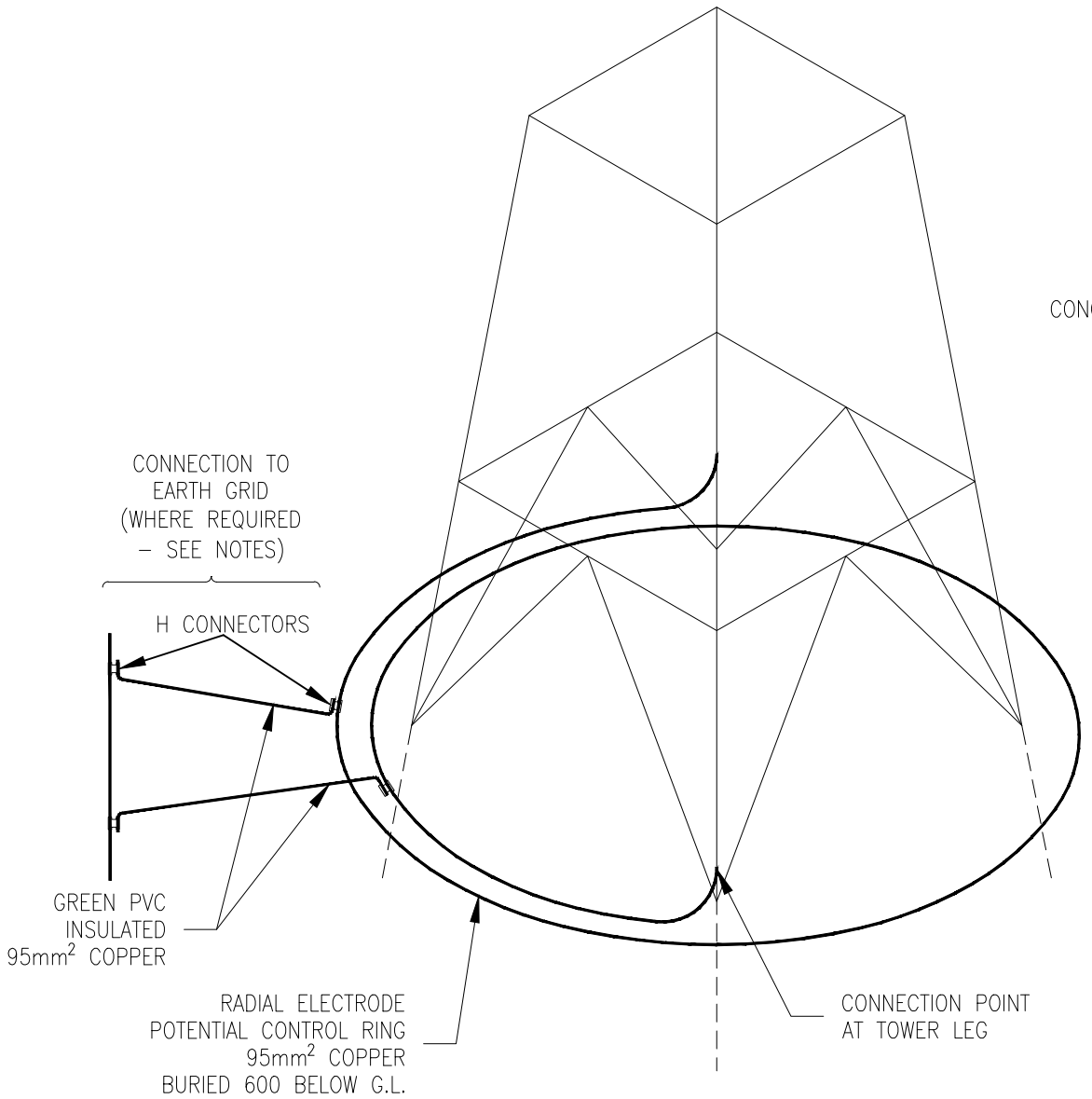
No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER	SHEET	REV
XDS DGA-00-004	014	00









CONNECT GREEN PVC INSULATED 95mm² Cu AS SHOWN

NOTES:

CONNECTION OF POTENTIAL CONTROL RING TO EARTH GRID IS REQUIRED IN THE FOLLOWING CASES:

1. WHERE THERE IS A SHIELD WIRE TERMINATED ON THE MAST.
2. WHERE THE POTENTIAL CONTROL RING IS LESS THAN 2m FROM THE EARTH GRID.
3. WHERE THE MAST IS LESS THAN 2m FROM ACCESSIBLE METALLIC PARTS WHICH ARE BONDED TO THE EARTH GRID.

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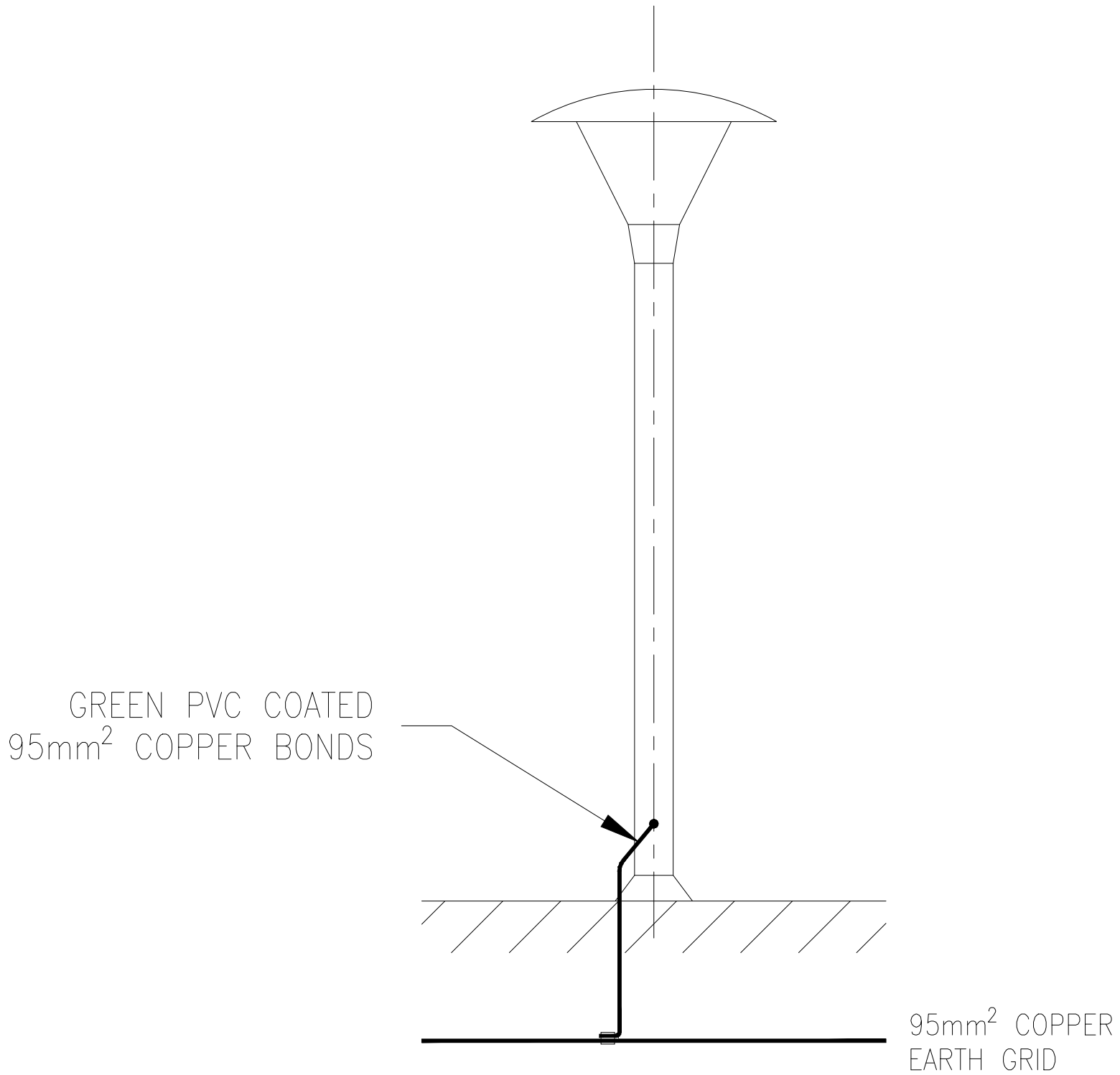
DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
STEEL MAST AND PORTAL

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER
XDS DGA-00-004

SHEET	REV
015	04

LIGHTING COLUMN



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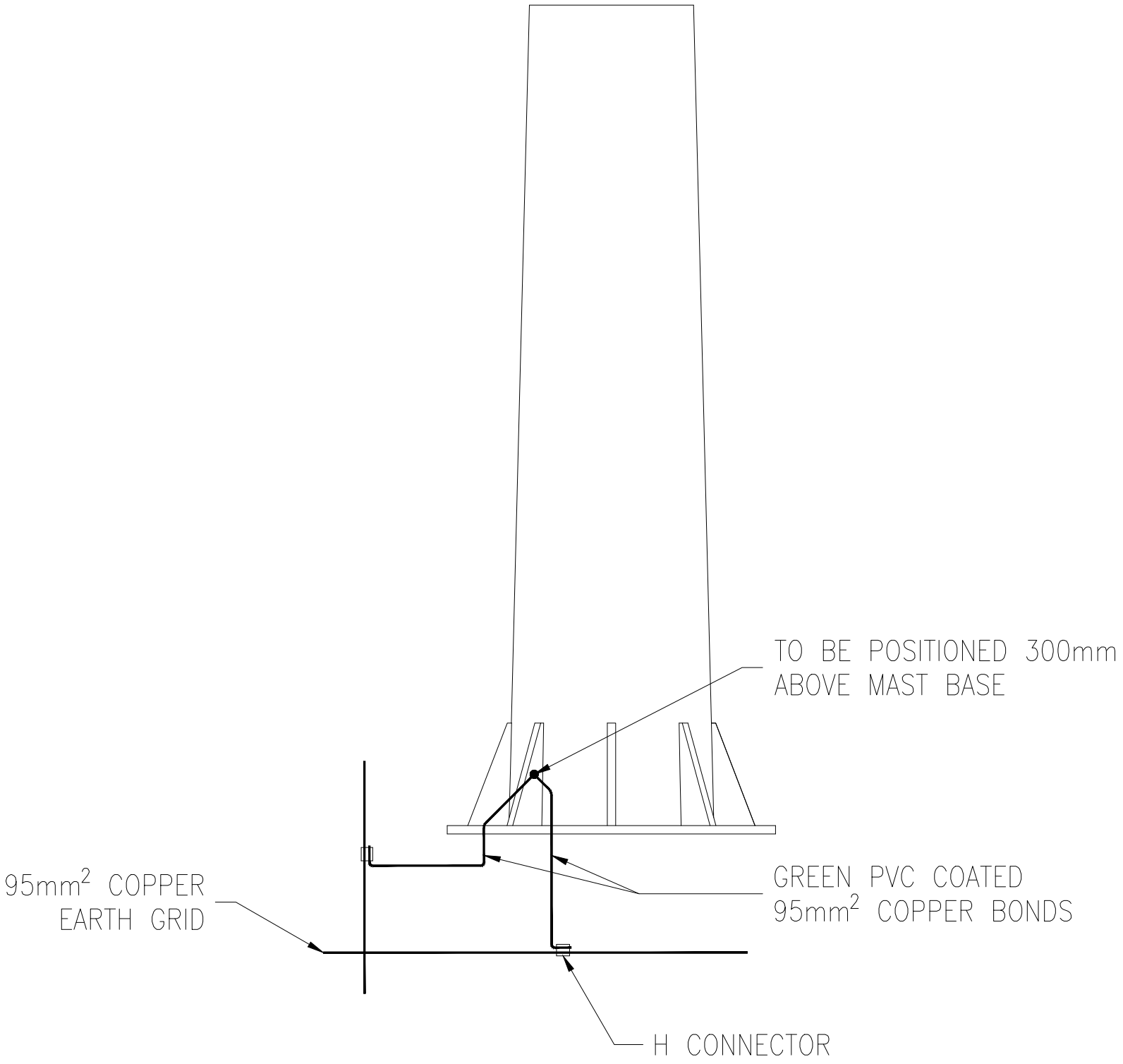
DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
STATION LIGHTING COLUMN

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER
XDS DGA–00–004

SHEET	REV
016	04

MONOPOLE LIGHTNING MAST



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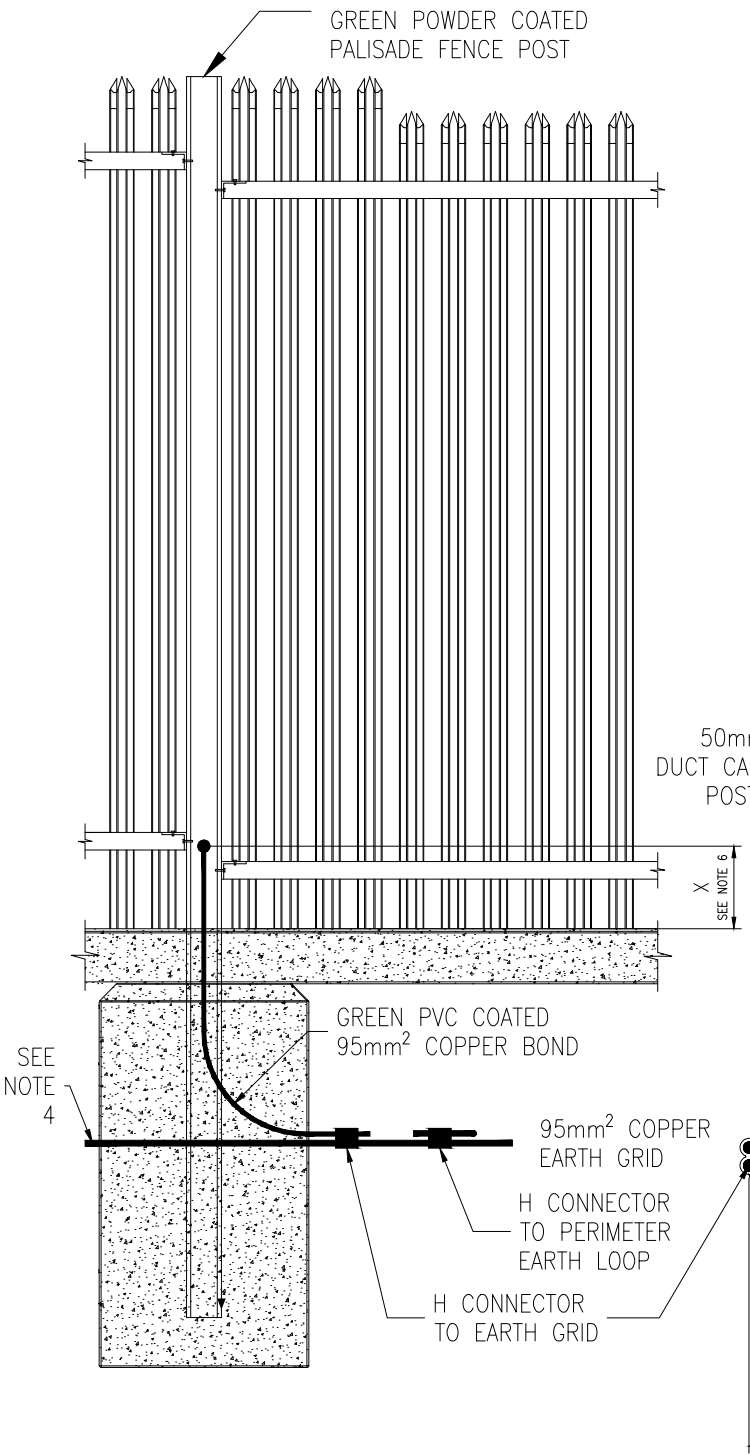
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EARTHING PRACTICE
MONOPOLE LIGHTNING MAST

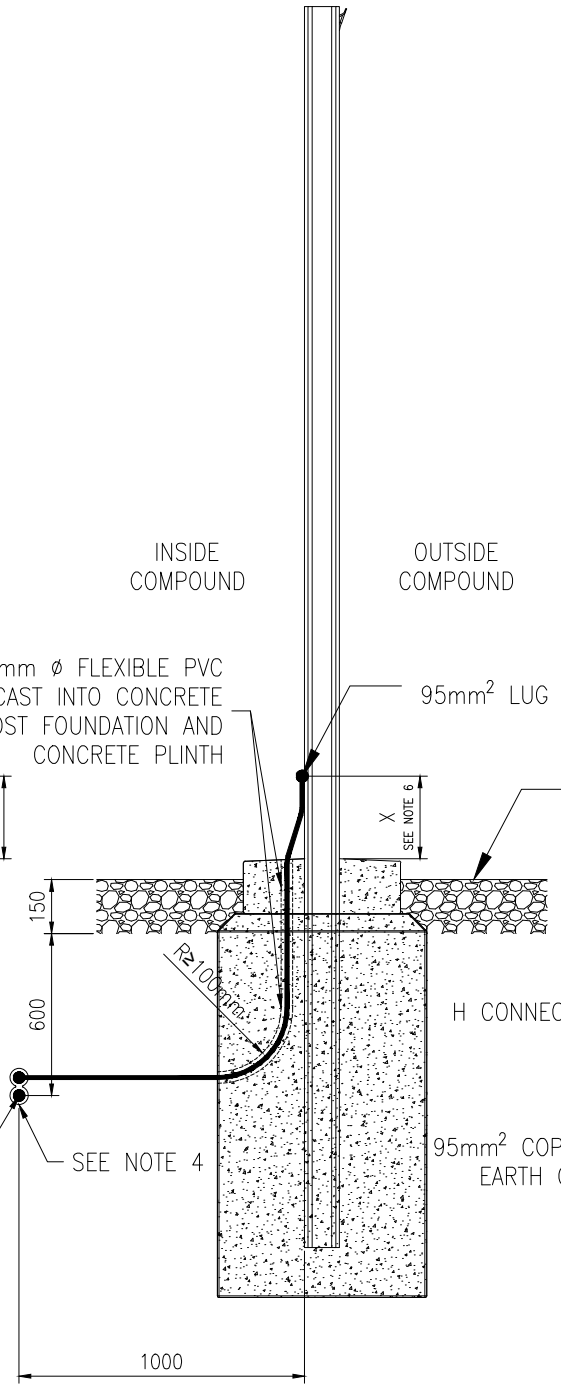
No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER	SHEET	REV
XDS DGA-00-004	017	00

EARTH GRID EXTENDS OUTSIDE PALISADE FENCE (TYPICAL EXAMPLE)

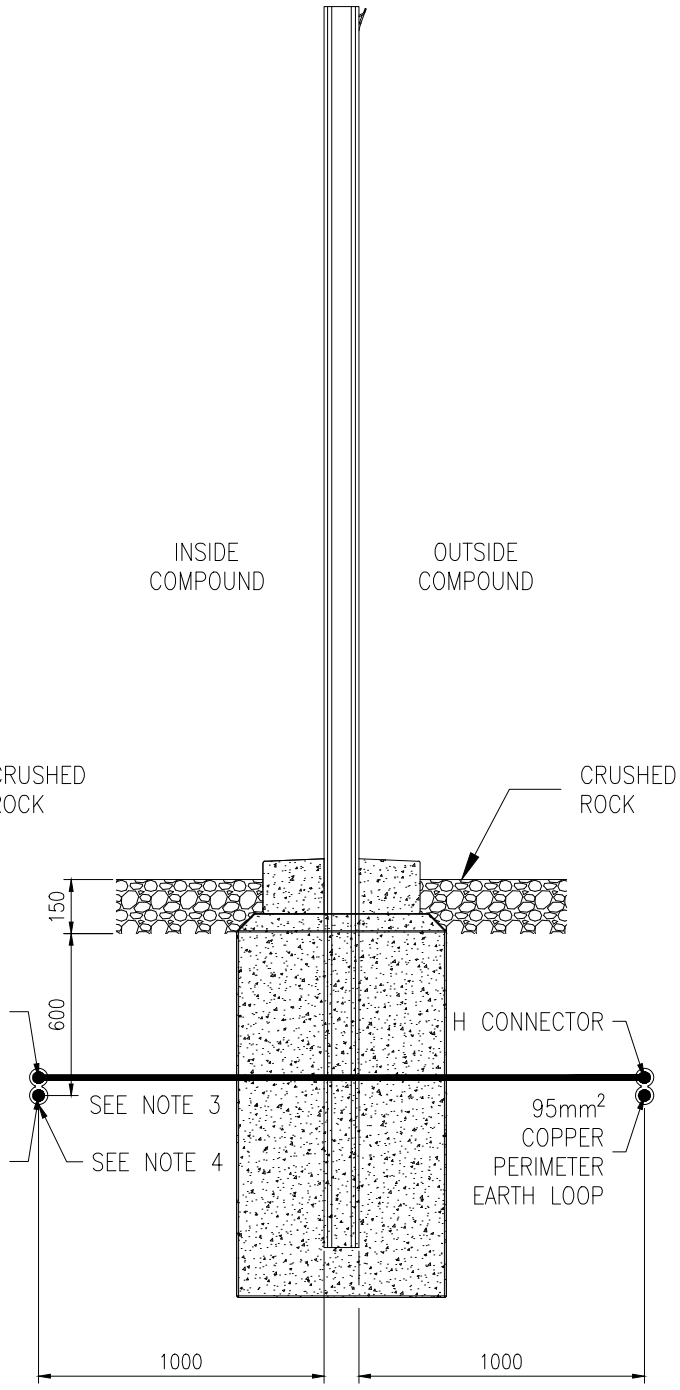


VIEW FROM INSIDE



DETAIL 1

BONDING BETWEEN FENCE AND EARTH GRID
(BONDING OF EARTH GRID TO
PERIMETER EARTH LOOP NOT SHOWN)



DETAIL 2

BONDING BETWEEN PERIMETER EARTH LOOP AND EARTH GRID
(FENCE BONDING NOT SHOWN)

NOTES:

1. THE FENCE SHALL BE CONNECTED TO THE SUBSTATION EARTH ELECTRODE AT EVERY CORNER AND REGULAR INTERVALS (TYPICALLY EVERY 10m) BY A SINGLE 95mm² COPPER TAIL. FOR 2.75m FENCE SECTIONS, FOR EXAMPLE, A CONNECTION TO EVERY 4TH POST (EVERY 11m) IS ACCEPTABLE.
2. WHERE RESTRICTIONS DO NOT PERMIT THE PERIMETER EARTH LOOP OF THE GRID TO BE PLACED 1m OUTSIDE THE SAFETY FENCE, ALTERNATIVE ARRANGEMENTS MAY BE REQUIRED
3. FREQUENCY OF BONDING FROM EARTH GRID TO PERIMETER EARTH LOOP TO BE DETERMINED AS PART OF THE EARTH GRID DESIGN.
4. THIS DRAWING SHOWS AN EARTH GRID CONDUCTOR RUNNING 1m INSIDE THE FENCE LINE. THIS MAY NOT BE PRESENT IN EXISTING STATIONS OR MAY NOT BE POSSIBLE IN SOME NEW STATIONS. IN SUCH CASES, ALTERNATIVE ARRANGEMENTS MAY BE REQUIRED.
5. ALL DESIGNS ARE SUBJECT TO CONFIRMATION OF PERMISSIBLE TOUCH AND STEP VOLTAGES.
6. HEIGHT 'X' SHALL BE CHOSEN TO ENSURE SUFFICIENT SPACE TO MAKE OFF THE LUG AND KEEP BASE OF LUG ABOVE THE HIGHEST POINT OF THE CONCRETE. IT SHALL NOT BE LESS THAN 150mm.
7. REFER TO SHEET 19 FOR THE CASE WHERE THE PERIMETER OF THE EARTH GRID IS LOCATED INSIDE THE FENCE LINE RATHER THAN OUTSIDE THE FENCE LINE.

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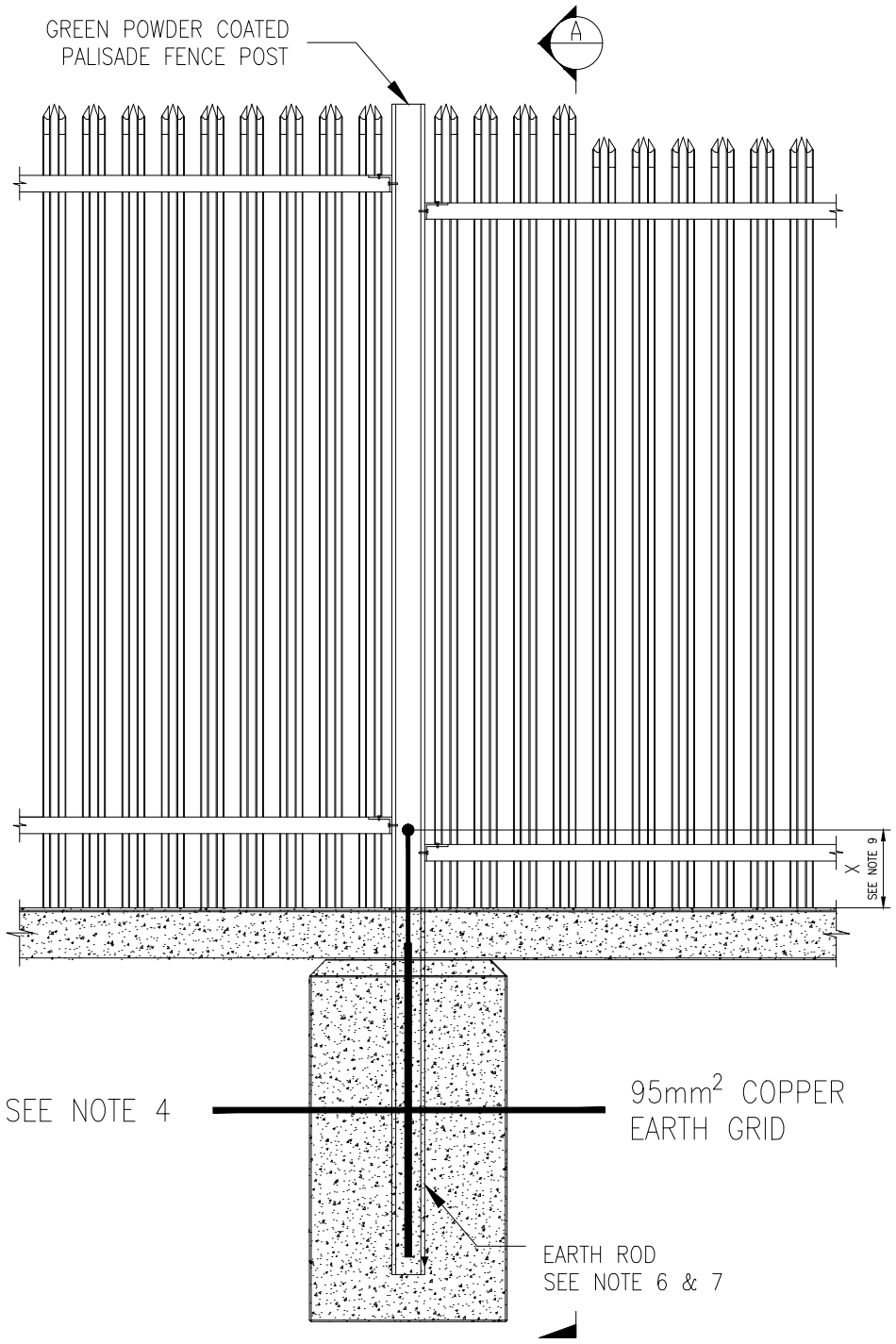
PROJECT
STATION DESIGN STANDARD

DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
EARTH GRID EXTENDS OUTSIDE PALISADE FENCE

No of Shts 39 | SIZE A3 | SCALE NTS

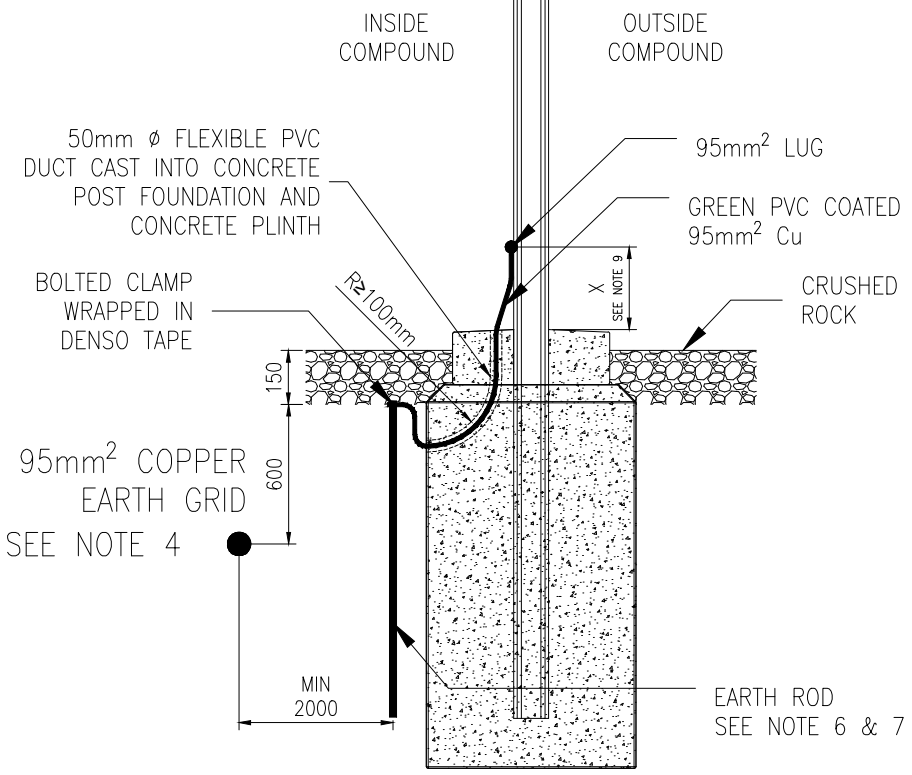
DRAWING NUMBER XDS DGA-00-004 | SHEET 018 | REV 04

EARTH GRID INSIDE PALISADE FENCE (EXAMPLE)



VIEW FROM INSIDE

SECTION
A–A



SECTION A–A

NOTES:

1. INDEPENDENT EARTHING, AS SHOWN ON THIS DRAWING, SHALL ONLY BE INSTALLED BY EXPLICIT AGREEMENT WITH EIRGRID. REFER TO FUNCTIONAL SPECIFICATION XDS–GFS–012–001.
2. ALL ITEMS EARTHED TO THE EARTH GRID SHALL BE A MINIMUM OF 2m FROM THE PALISADE FENCE.
3. THE FENCE SHALL BE CONNECTED TO LOCAL EARTH RODS AT EVERY CORNER AND REGULAR INTERVALS (TYPICALLY EVERY 10m) BY A SINGLE 95mm² COPPER TAIL. FOR 2.75m FENCE SECTIONS, FOR EXAMPLE, A CONNECTION TO EVERY 4TH POST (EVERY 11m) IS ACCEPTABLE.
4. THE DRAWING SHOWS AN EARTH GRID CONDUCTOR RUNNING 2m INSIDE THE FENCE. THIS IS FOR ILLUSTRATIVE PURPOSES TO SHOW THE MINIMUM SPACING TO THE EARTH GRID.
5. REFER TO SHEET 18 FOR STANDARD ARRANGEMENT WHERE EARTH GRID EXTENDS BEYOND THE PALISADE FENCE.
6. REFER TO EIRGRID FUNCTIONAL SPECIFICATION XDS–GFS–12–001 FOR MINIMUM EARTH ROD REQUIREMENTS.
7. THE DEPTH AND NO. OF EARTH RODS NEED TO BE ESTABLISHED ON A CASE BY CASE STUDY.
8. ALL DESIGNS ARE SUBJECT TO CONFIRMATION OF PERMISSIBLE TOUCH AND STEP VOLTAGES.
9. HEIGHT 'X' SHALL BE CHOSEN TO ENSURE SUFFICIENT SPACE TO MAKE OFF THE LUG AND KEEP BASE OF LUG ABOVE THE HIGHEST POINT OF THE CONCRETE. IT SHALL NOT BE LESS THAN 150mm.

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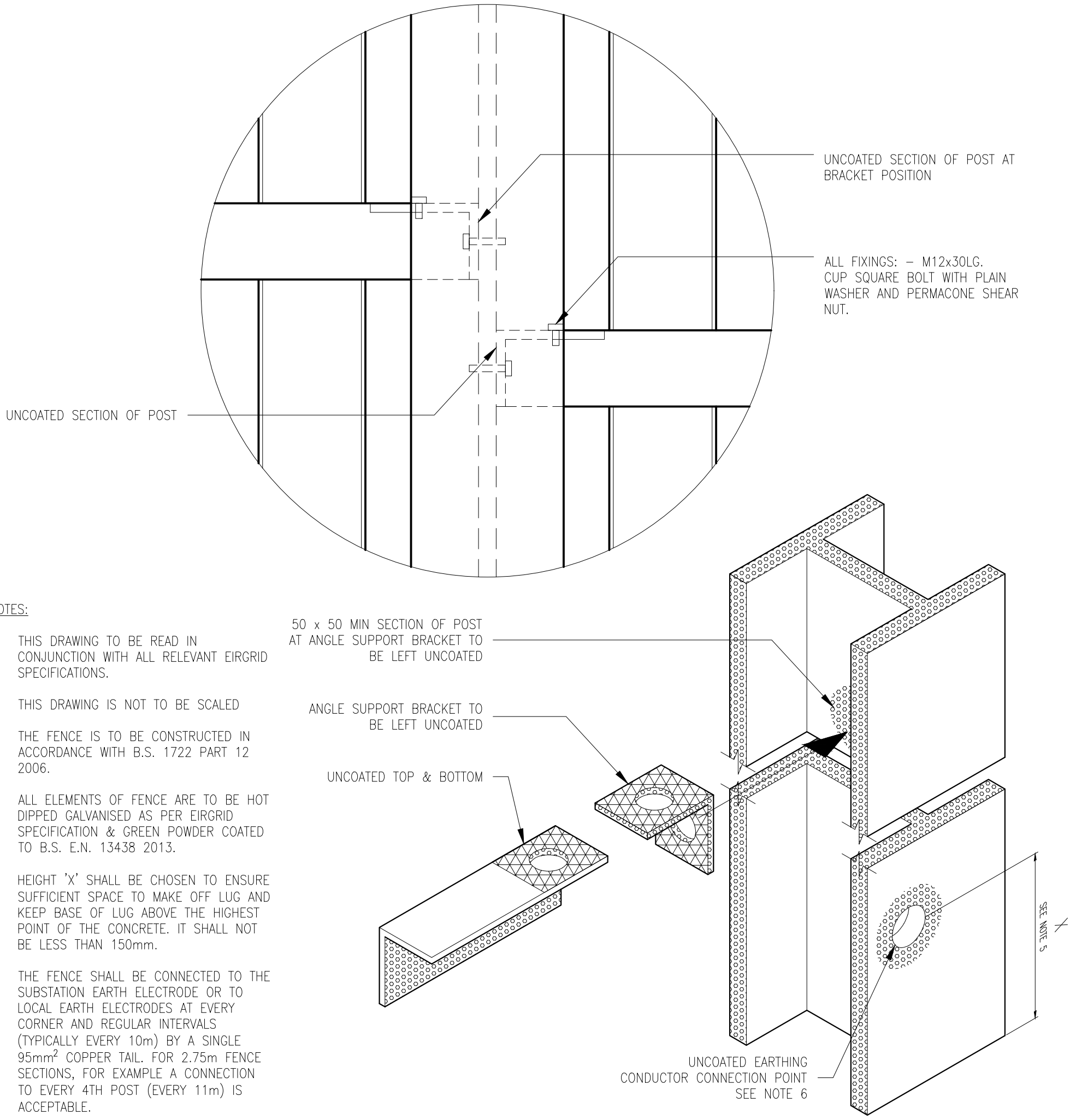
PROJECT
STATION DESIGN STANDARD

DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
EARTH GRID INSIDE PALISADE FENCE

No of Shts 39 | SIZE A3 | SCALE NTS

DRAWING NUMBER XDS DGA–00–004 | SHEET 019 | REV 04

PALISADE FENCE LATERAL SUPPORT (TYPICAL EXAMPLE)



NOTES:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT EIRGRID SPECIFICATIONS.
2. THIS DRAWING IS NOT TO BE SCALED
3. THE FENCE IS TO BE CONSTRUCTED IN ACCORDANCE WITH B.S. 1722 PART 12 2006.
4. ALL ELEMENTS OF FENCE ARE TO BE HOT DIPPED GALVANISED AS PER EIRGRID SPECIFICATION & GREEN POWDER COATED TO B.S. E.N. 13438 2013.
5. HEIGHT 'X' SHALL BE CHOSEN TO ENSURE SUFFICIENT SPACE TO MAKE OFF LUG AND KEEP BASE OF LUG ABOVE THE HIGHEST POINT OF THE CONCRETE. IT SHALL NOT BE LESS THAN 150mm.
6. THE FENCE SHALL BE CONNECTED TO THE SUBSTATION EARTH ELECTRODE OR TO LOCAL EARTH ELECTRODES AT EVERY CORNER AND REGULAR INTERVALS (TYPICALLY EVERY 10m) BY A SINGLE 95mm^2 COPPER TAIL. FOR 2.75m FENCE SECTIONS, FOR EXAMPLE A CONNECTION TO EVERY 4TH POST (EVERY 11m) IS ACCEPTABLE.

UNCOATED SECTIONS SHOWN, ENSURE PROPER EARTHING REQUIREMENT OF FIXTURES.

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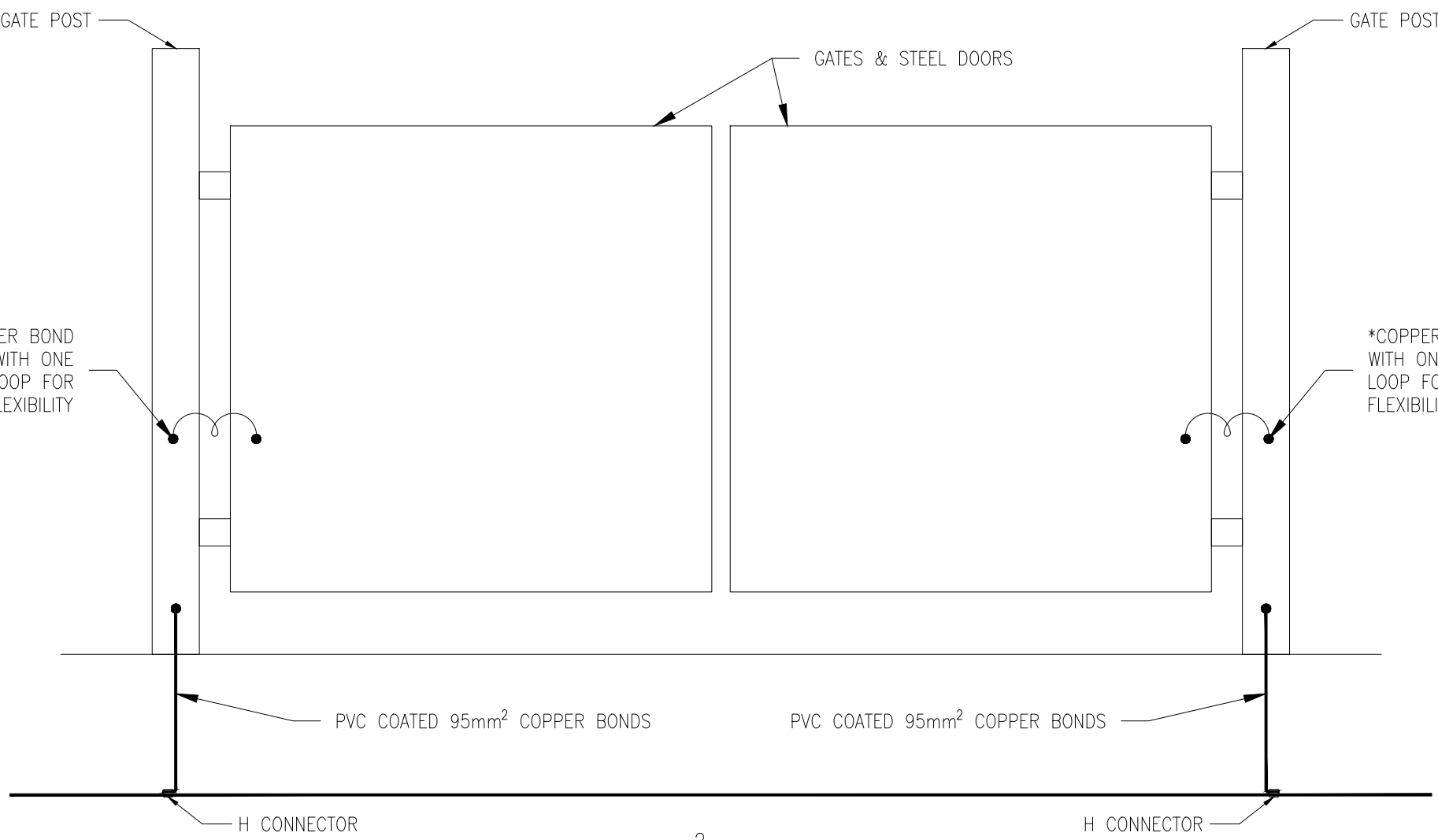
PROJECT
STATION DESIGN STANDARD

DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
PALISADE FENCE – LATERAL SUPPORT

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER	SHEET	REV
XDS DGA-00-004	020	00

COMPOUND / PERIMETER GATES & STEEL DOORS



95mm² COPPER
EARTH GRID

* FLEXIBLE BOND COMPRISES:

1. 50 sq.mm CLEAR PVC SHEATHED FLEXIBLE COPPER CONDUCTOR.
2. COMPRESSION CABLE LUG FOR 50 sq.mm FLEXIBLE COPPER.

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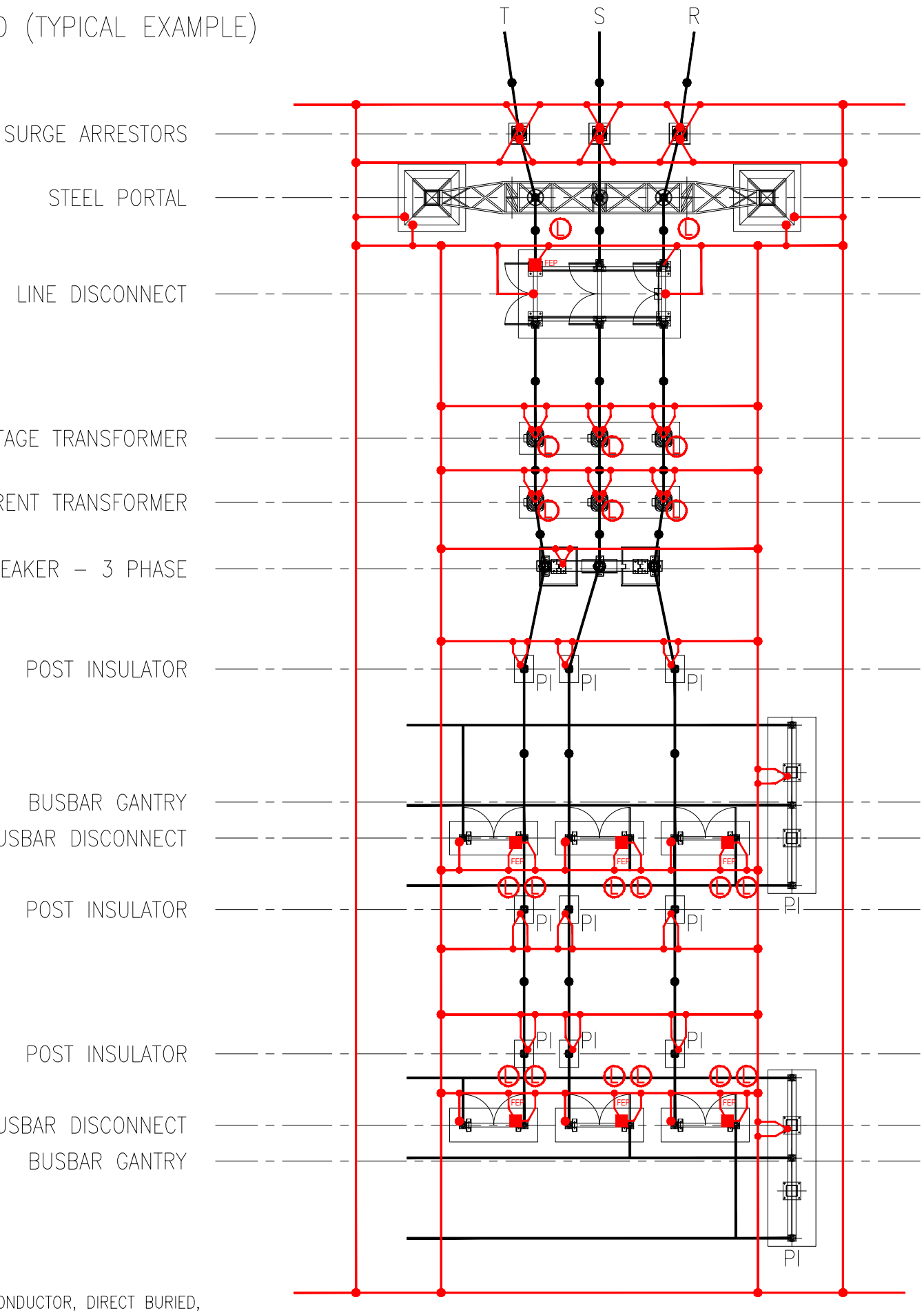
PROJECT
STATION DESIGN STANDARD

DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
COMPOUND/PERIMETER GATES & STEEL DOORS

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER	SHEET	REV
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110kV BAY EARTH GRID (TYPICAL EXAMPLE)



EARTHING LEGEND:

- 95mm² COPPER CONDUCTOR, DIRECT BURIED, & ASSOCIATED TAILS
- DOUBLE (LOOPED) CONNECTION
- DOUBLE "DIRECT" CONNECTION
- FEP — FIXED EARTHING POINT
- PI — POST INSULATOR
- EARTHING STIRUPS
- MULTIPLE EARTH TO STRUCTURE

NOTES:

1. THIS DRAWING SHOULD BE PRINTED IN COLOUR.
2. THIS DRAWING DOES NOT SHOW DETAILS OF LOOPING CONDUCTORS OR OTHER CONDUCTORS ON EACH STRUCTURE.
3. REFER TO EACH EQUIPMENT EARTHING DRAWING FOR DETAILS.

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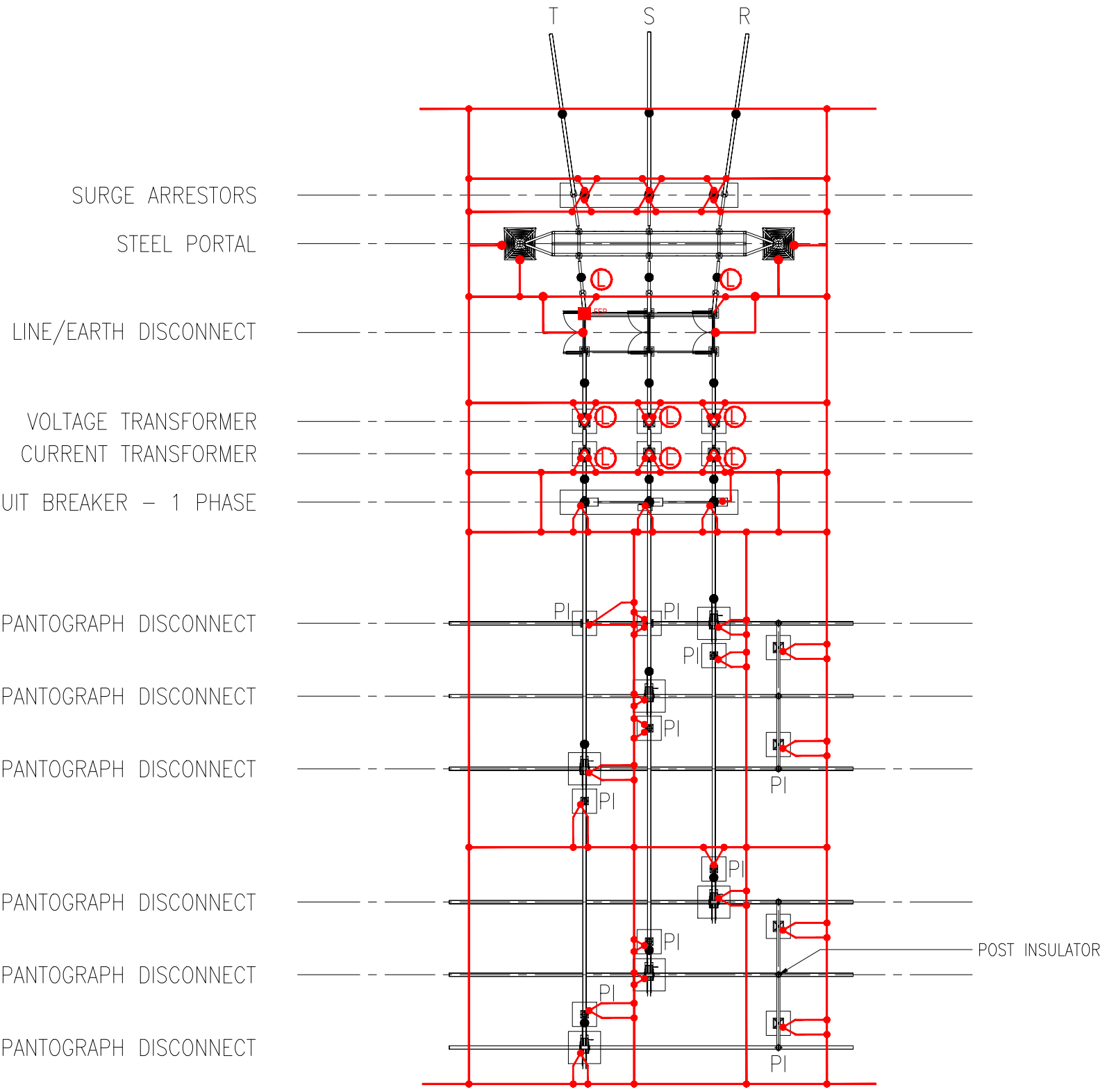
DRAWING TITLE: 110kV/220kV/400kV GENERAL ARRANGEMENT EARTHING PRACTICE 110kV BAY EARTH GRID (EXAMPLE)

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER: XDS DGA-00-004

SHEET	REV
022	00

220kV BAY EARTH GRID (TYPICAL EXAMPLE)



EARTHING LEGEND:

———	95mm² COPPER CONDUCTOR, DIRECT BURIED, & ASSOCIATED TAILS
L	DOUBLE (LOOPED) CONNECTION
	DOUBLE "DIRECT" CONNECTION
FEP	FIXED EARTHING POINT
PI	POST INSULATOR
●	EARTHING STIRUPS
■	MULTIPLE EARTH TO STRUCTURE

NOTES:

1. THIS DRAWING SHOULD BE PRINTED IN COLOUR.
2. THIS DRAWING DOES NOT SHOW DETAILS OF LOOPING CONDUCTORS OR OTHER CONDUCTORS ON EACH STRUCTURE.
3. REFER TO EACH EQUIPMENT EARTHING DRAWING FOR DETAILS.

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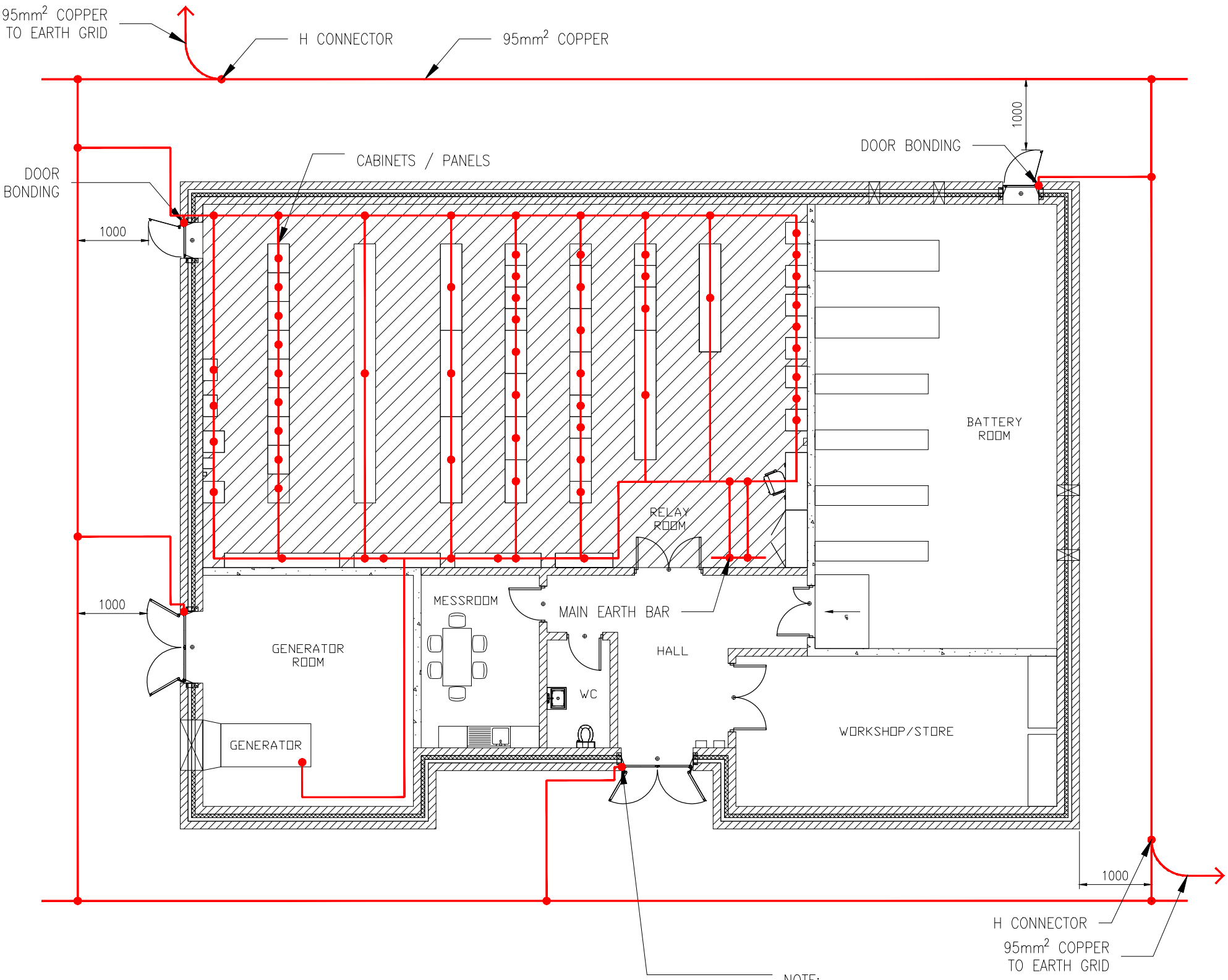
DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
220kV BAY EARTH GRID (EXAMPLE)

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER: XDS DGA-00-004

SHEET	REV
023	00

CONTROL BUILDING EARTHING



NOTES:

THE CONTROL ROOM EARTH GRID MUST AT LEAST CONSIST OF SINGLE 95mm² CROSS SECTION CONDUCTORS LAID UNDER EACH ROOM OR CABINETS AND CONNECTED TO EACH OTHER AT THE END OF ROWS.

THE CONTROL ROOM EARTH GRID MUST BE CONNECTED TO THE STATION EARTH GRID AT TWO OR MORE POINTS BY 95mm² COPPER.
THE POINTS OF INTERSECTION SHOULD BE AT OPPOSITE SIDES OF THE CONTROL ROOM IF POSSIBLE.

THE SUPPORT STRUCTURES FOR THE RAISED FLOOR MUST BE BONDED TO THE GRID BY A 95mm² COPPER CONNECTOR.

ALL RELAY CABINETS INSIDE THE CONTROL ROOM SHALL BE EARTHED WITH A SINGLE CONNECTION TO THE COLLECTOR. CONDUCTOR TO BE USED FOR THIS SHALL BE A MINIMUM OF 35mm².

RAISED FLOOR AREA

NOTE:
A SINGLE 95mm² COPPER CONNECTION IS TO BE USED TO EARTH THE FRAME OF THE DOOR.
BOTH DOORS ARE TO BE EARTHED BY MEAN OF A BRAIDED CONNECTION TO THE FRAME.

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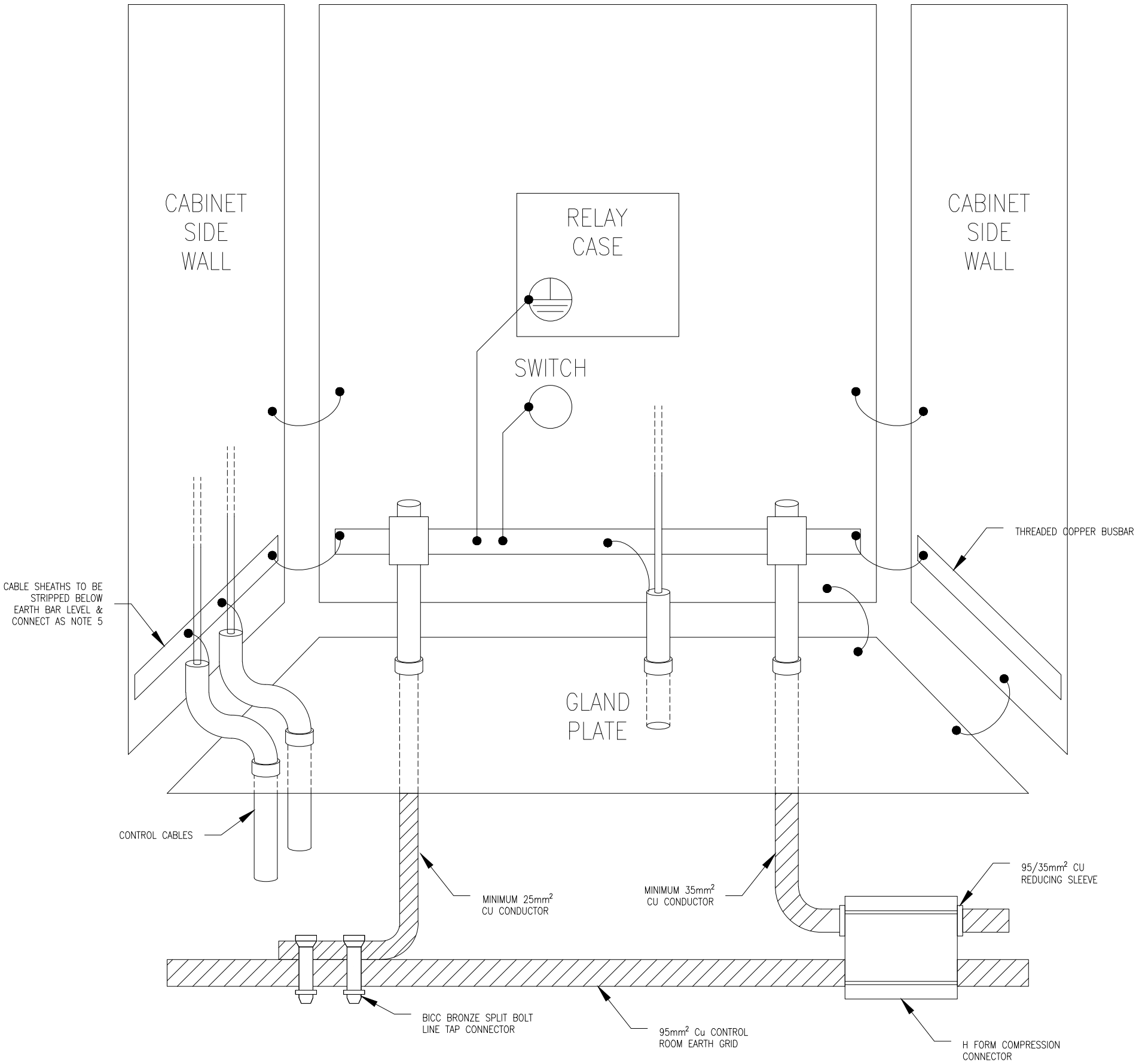
PROJECT
STATION DESIGN STANDARD

DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
CONTROL BUILDING EARTHING

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER	SHEET	REV
XDS DGA-00-004	024	00

INDOOR CABINET EARTHING



METHOD 1

METHOD 2

NOTES:

1. BOTH METHODS DETAILED IN THIS DRAWING ARE ACCEPTABLE FOR EARTHING OF CABINETS TO THE CONTROL ROOM EARTH GRID.
2. FLEXIBLE BONDING TO BE PROVIDED BETWEEN CABINET DOOR & REST OF CABINET. REFER TO XDS-GFS-12-001.

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STATION DESIGN STANDARD

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110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
INDOOR CABINET EARTHING

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER	SHEET	REV
XDS DGA-00-004	025	00

GIS ROOM EARTHING

EARTHING LEGEND:

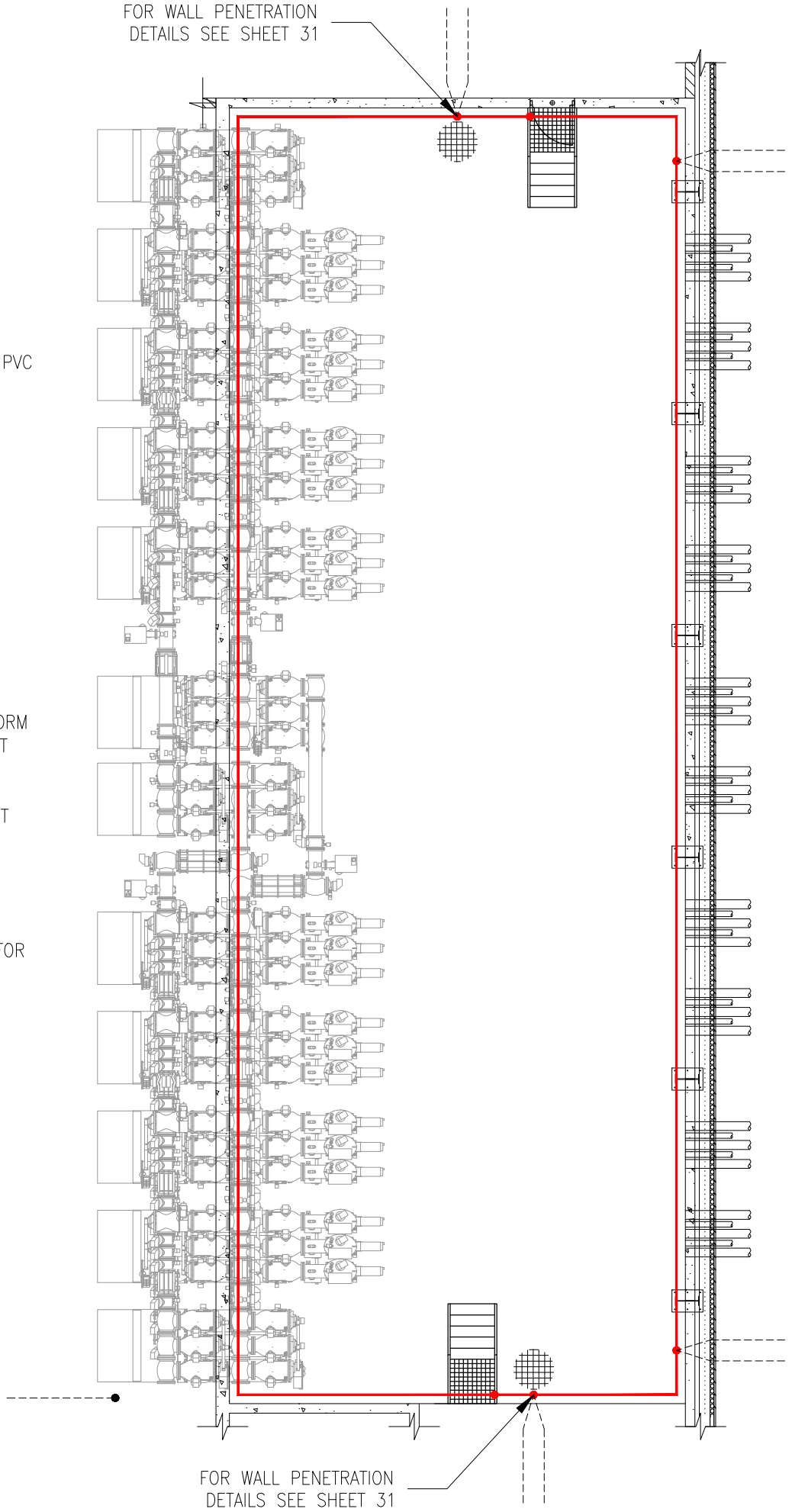
50mm X 6mm SOLID COPPER COLLECTOR BAR (FIXED TO BASEMENT WALL)

1 X 95mm^2 COPPER

2 X 95mm^2 COPPER

NOTES:

1. BASEMENT ACCESS STAIRS BONDED TO EARTH COLLECTOR BAR WITH PVC COATED 95mm^2 Cu CONDUCTOR.
2. STEEL BONDED TO COLLECTOR BAR WITH PVC COVERED 95mm^2 Cu CONDUCTOR.
3. FOR CABIN EARTHING REFER TO SHEET 28
4. FOR DOOR EARTHS REFER TO SHEET 21
5. THE HV CABLE ROOM / CABLE BASEMENT SHALL CONTAIN A MAIN EARTHING BAR CONDUCTOR ALONG THE LENGTH OF THE ROOM. THIS SHALL BE MINIMUM 50 X 6 mm COPPER STRIP, WALL MOUNTED ON SUITABLE BUSHINGS AND LOCATED TO MINIMISE THE LENGTH OF CONNECTIONS TO THE BAR (I.E. TYPICALLY NEAR CEILING LEVEL).
6. SWITCH ROOM FLOOR REBAR SHALL BE BONDED AT INTERVALS TO FORM A MESH, AND BONDED TO THE COPPER COLLECTOR BAR. (SEE SHEET 27).
7. REBAR MESH SIZE SHALL BE DETERMINED BY THE DESIGNER TO MEET DESIGN REQUIREMENTS FOR TOUCH AND STEP VOLTAGES AND HIGH FREQUENCY IMPEDANCE, AND SHALL NOT BE GREATER THAN 3m.
8. BUILDING EARTHING ARRANGEMENT SHALL BE AGREED AND CO-ORDINATED IN ACCORDANCE WITH THE GIS EQUIPMENT MANUFACTURER'S RECOMMENDATIONS. REFER TO XDS-GFS-12-001 FOR FURTHER REQUIREMENTS.
9. ALL SWITCHROOM STRUCTURAL ELEMENTS MUST BE EARTHED.



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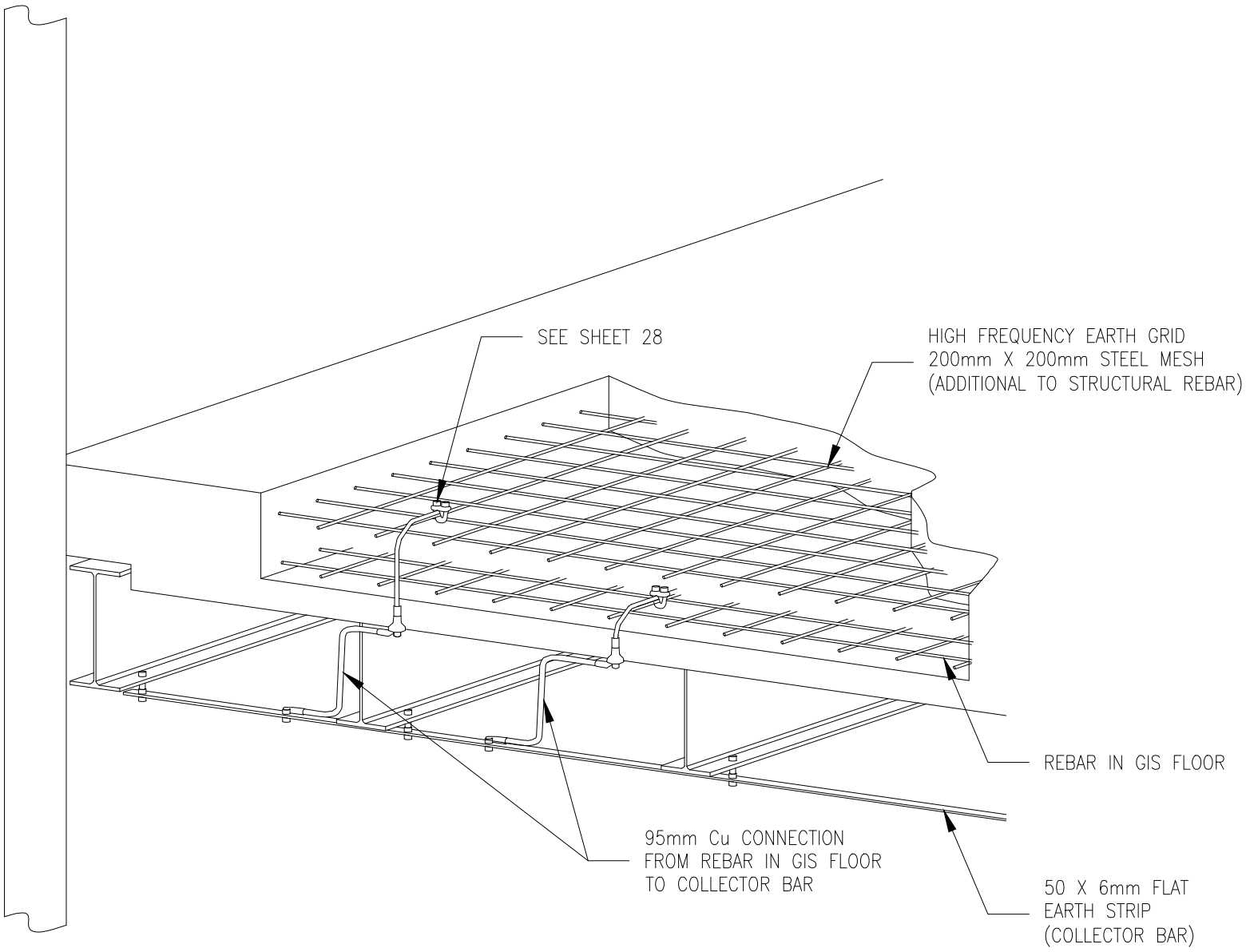
DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
GIS ROOM EARTHING

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER
XDS DGA-00-004

SHEET	REV
026	00

GIS HIGH FREQUENCY MESH / REBAR



NOTES:

1. HIGH FREQUENCY MESH, GRID DIMENSIONS AND STEEL DIAMETER AS PER SPECIFIC SWITCHGEAR MANUFACTURER'S REQUIREMENTS.

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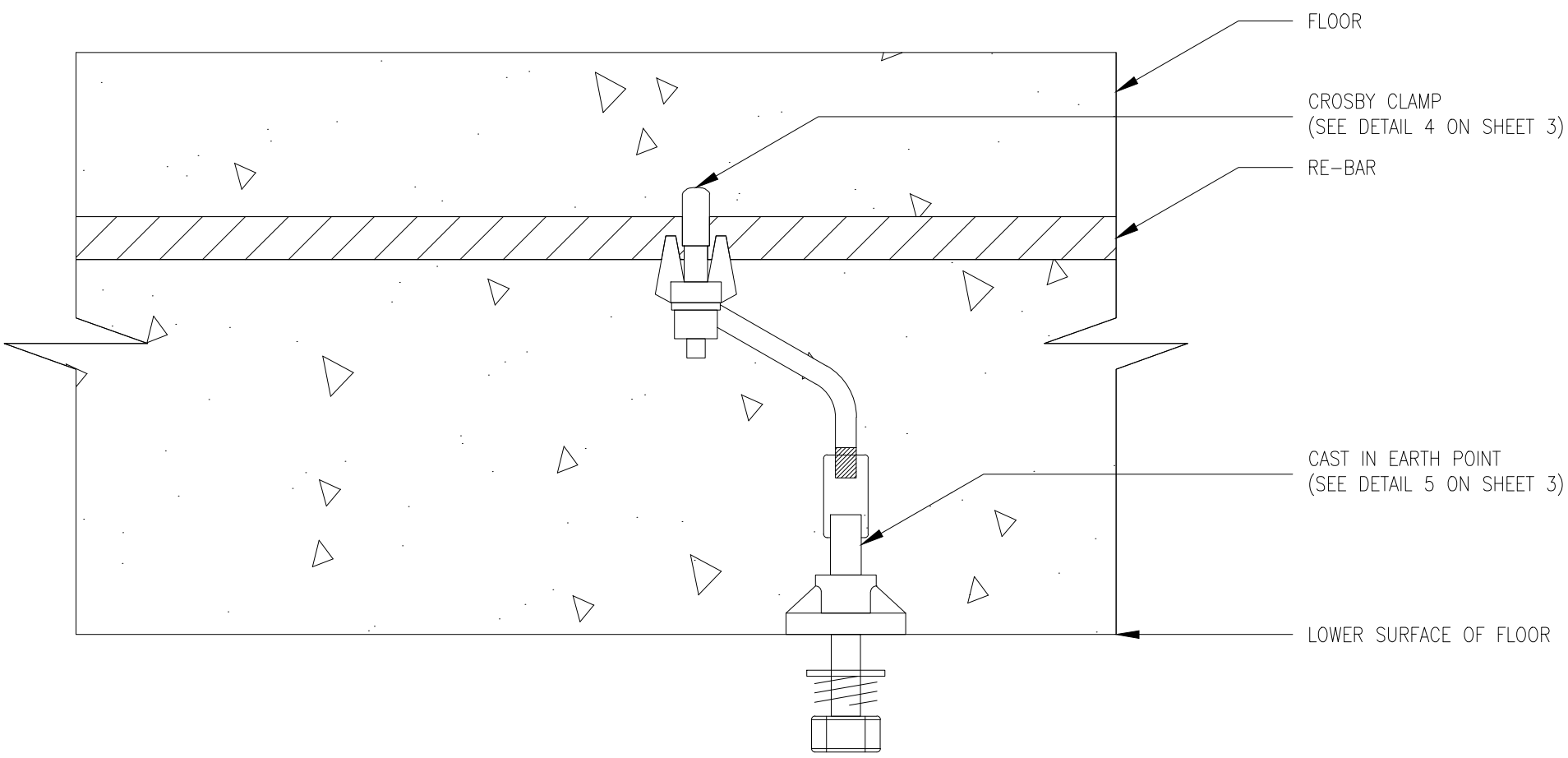
DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
GIS HIGH FREQUENCY MESH / REBAR

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER
XDS DGA-00-004

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027	00

GIS FLOOR REBAR EARTHING



NOTES:

1. THE EARTH CONNECTION POINT TO BE MADE TO ONE OF THE THICKEST WELDED REBARS.
2. SCRAPE AND WIRE BRUSH THE BAR AT THIS POINT TO REMOVE ALL LOOSE SCALE AND RUST.
3. STRIP OFF APPROX 50mm OF INSULATION AND CLAMP THE COPPER TO REBAR USING STEEL CLAMP. THE SIZE OF CLAMP IS TO BE CHOSEN TO BE AS CLOSE A FIT AS POSSIBLE TO THE RE-BAR DIAMETER. INSULATED WIRE TO BE USED THROUGH THE CONCRETE
4. STAINLESS STEEL CLAMP TO BE USED OR HIGH TENSILE 6mm-8mm U BOLT CLAMPS (STAINLESS STEEL). IF NOT READILY AVAILABLE, STANDARD ZINC PLATED U BOLT CLAMPS ARE ACCEPTABLE. CARE TO BE TAKEN NOT TO OVER TIGHTEN THE PLAIN U BOLTS. TYPICAL TORQUE VALUE FOR THIS STEEL 6-8mm IS 18-20NM.
5. FINISH OFF JOINT BY WRAPPING IT COMPLETELY IN A MINIMUM OF TWO LAYERS OF DENSO TAPE.
6. SEE SHEET 27 FOR DETAILS OF THE GIS ROOM HIGH FREQUENCY MESH / REBAR.

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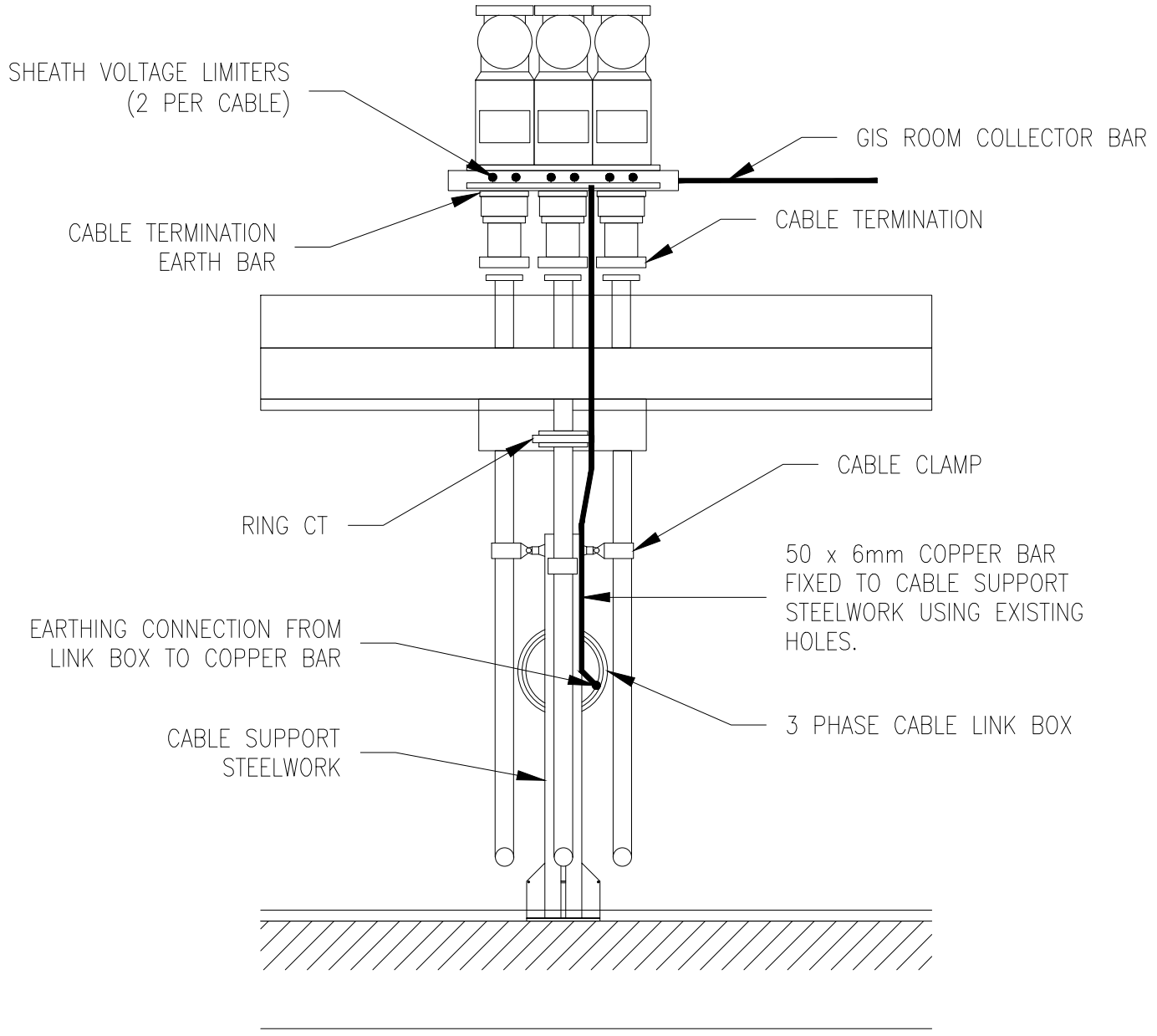
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110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
GIS FLOOR REBAR EARTHING DETAIL

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER
XDS DGA-00-004

SHEET	REV
028	00

220kV GIS HV CABLE & RING CTs EARTHING



NOTES:

1. FULL DETAILS OF BONDING ARE NOT SHOWN. FINAL BONDING ARRANGEMENTS TO BE DETERMINED IN CONJUNCTION WITH DETAILED DESIGN OF CABLES AND PROTECTION SYSTEMS.

2. AS A MINIMUM, SUITABLE SURGE VOLTAGE LIMITERS (SVLs) ARE TO BE INSTALLED BETWEEN THE GIS ENCLOSURE AND CABLE TERMINATIONS ON EACH FEEDER AND TRANSFORMER BAY.

3. 2 No. SVLs PER PHASE ARE TO BE FITTED DIAMETRICALLY OPPOSITE TO ONE ANOTHER.

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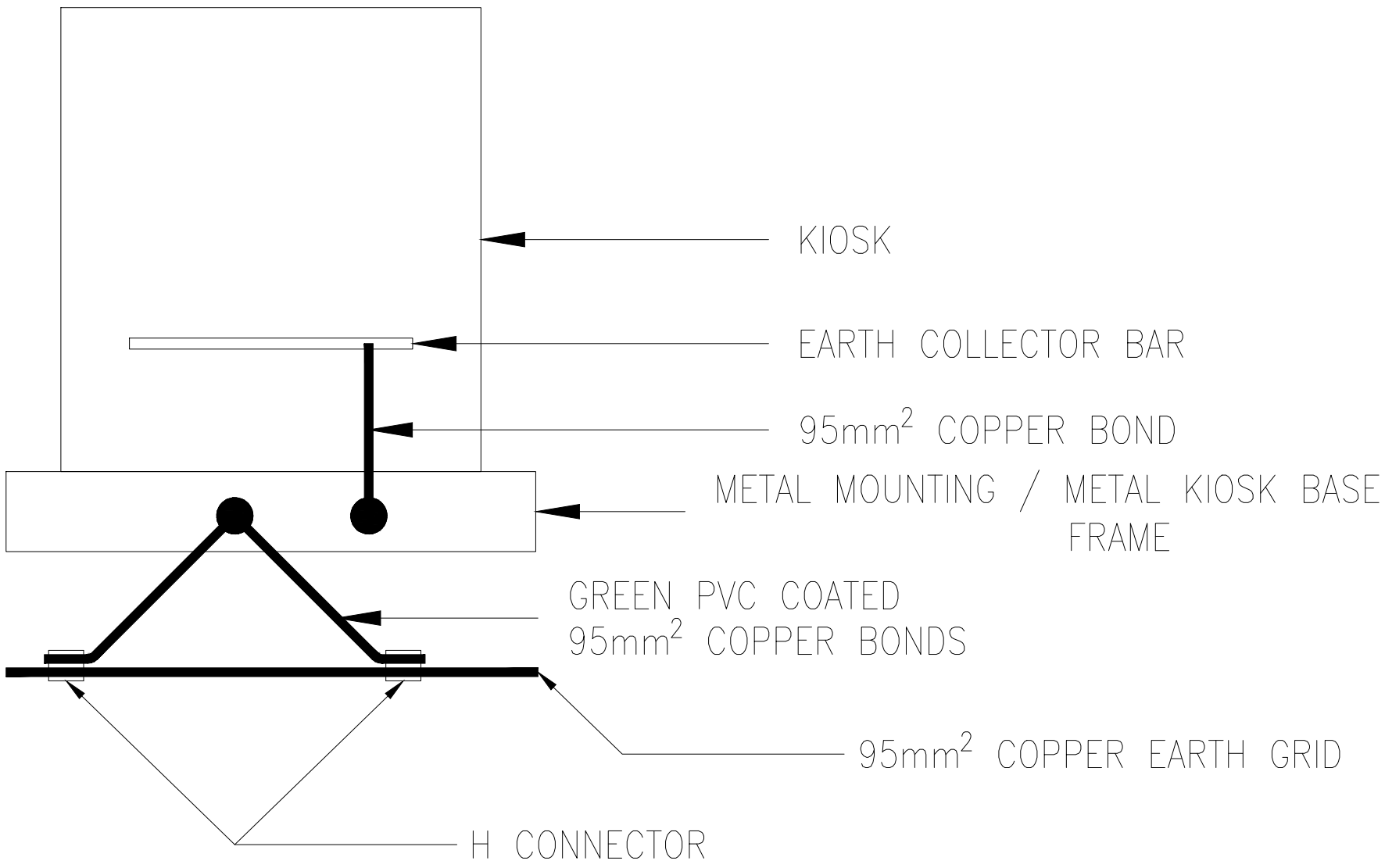
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110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
220kV GIS HV CABLE & RING CTs EARTHING

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER
XDS DGA-00-004

SHEET	REV
029	00

MARSHALLING KIOSK & MARSHALLING BOX



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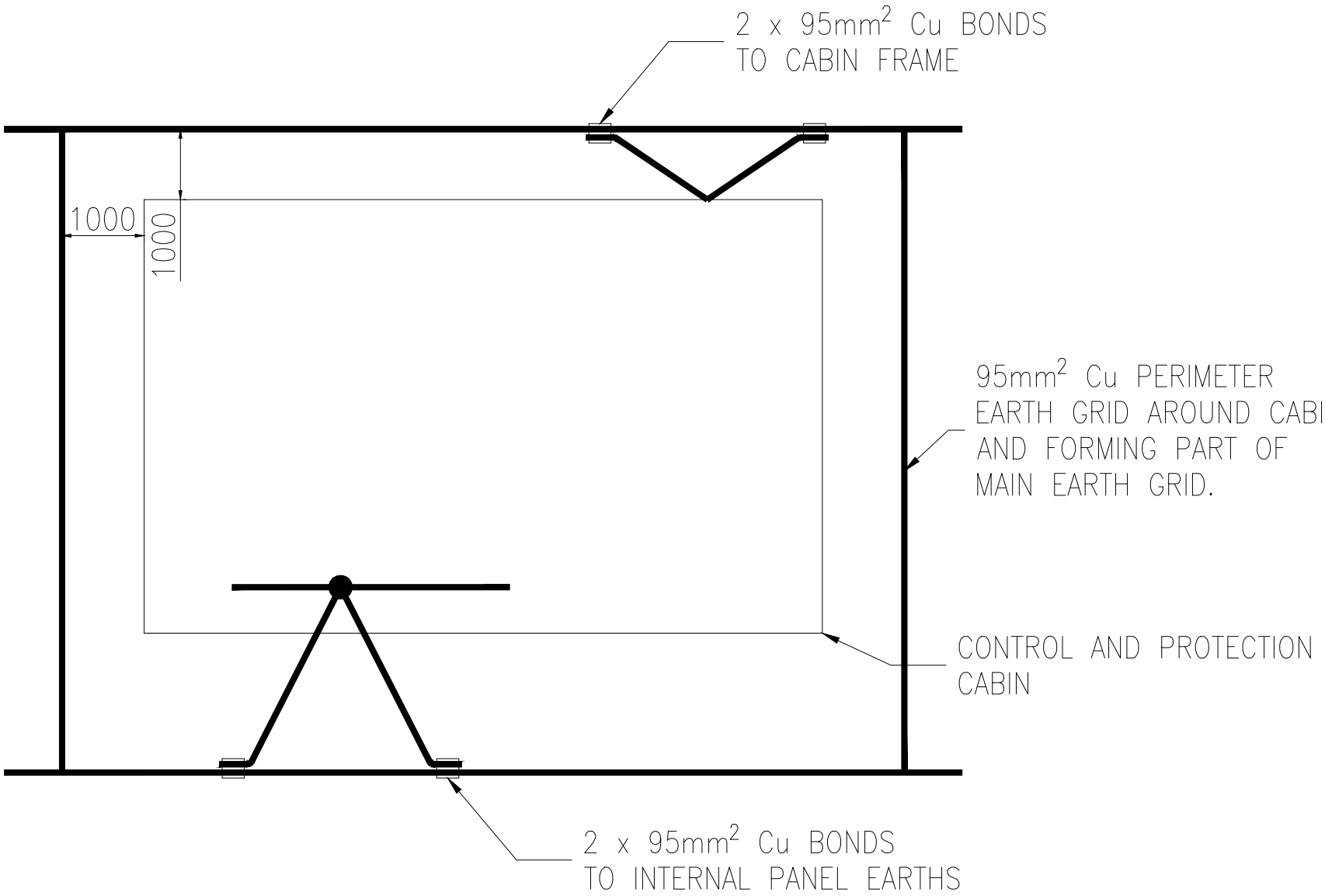
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DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
MARSHALLING KIOSK & MARSHALLING BOX

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER	SHEET	REV
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CONTROL & PROTECTION CABIN



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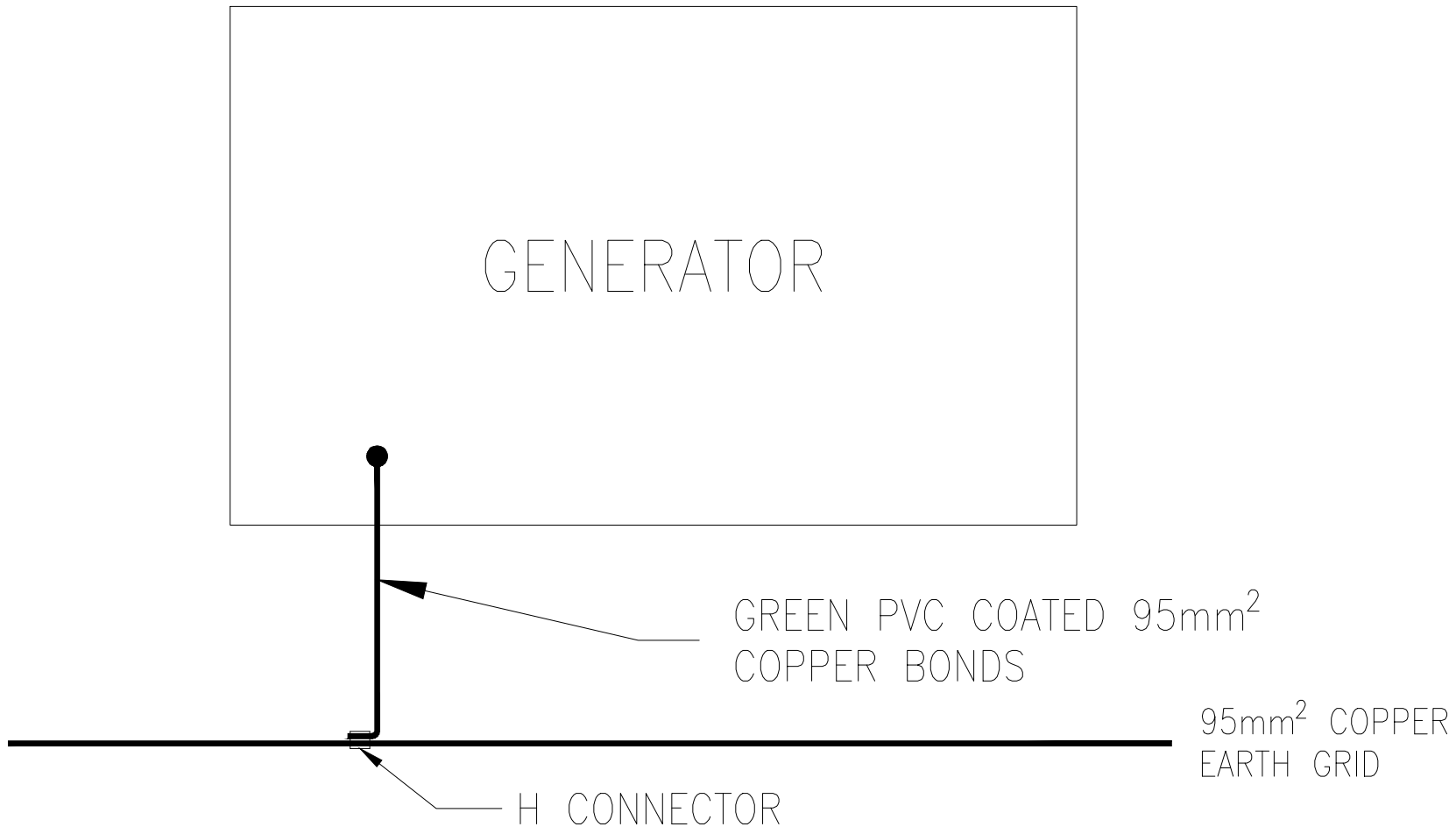
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GENERAL ARRANGEMENT
EARTHING PRACTICE
CONTROL & PROTECTION CABIN

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER	SHEET	REV
XDS DGA-00-004	031	00

INTERNAL STANDBY GENERATOR



NOTES:

PIPE DUCT TO BE FILLED APPROX 75% WITH EXPANDING FOAM, AND CAPPED AT BOTH ENDS USING A SILICONE BASED SEALER.

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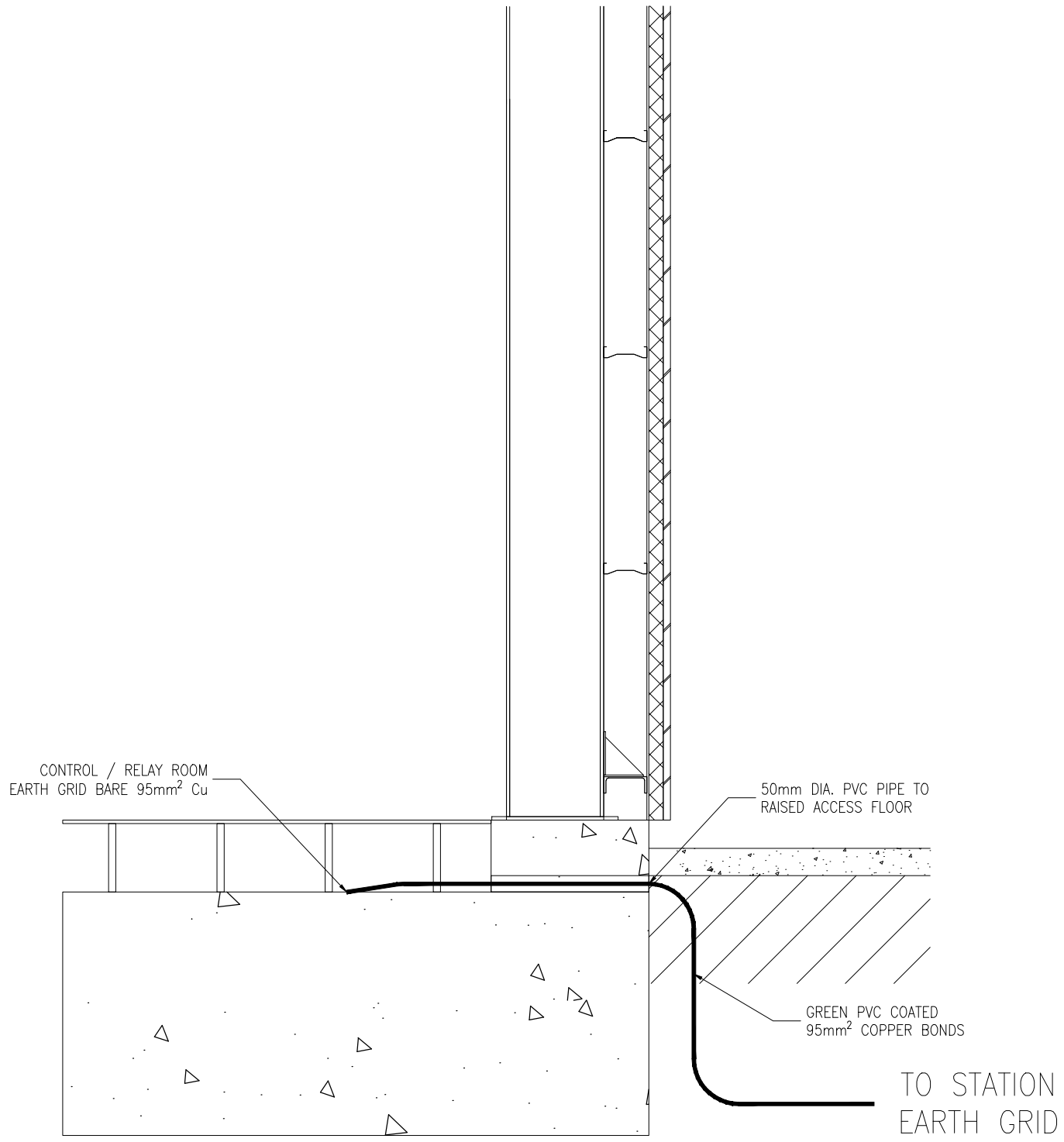
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GENERAL ARRANGEMENT
EARTHING PRACTICE
INTERNAL STANDBY GENERATOR

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER	SHEET	REV
XDS DGA-00-004	032	00

EARTH TAIL ENTERING RAISED FLOOR



NOTES:

PIPE DUCT TO BE FILLED APPROX 75% WITH EXPANDING FOAM, AND CAPPED AT BOTH ENDS USING A SILICONE BASED SEALER.

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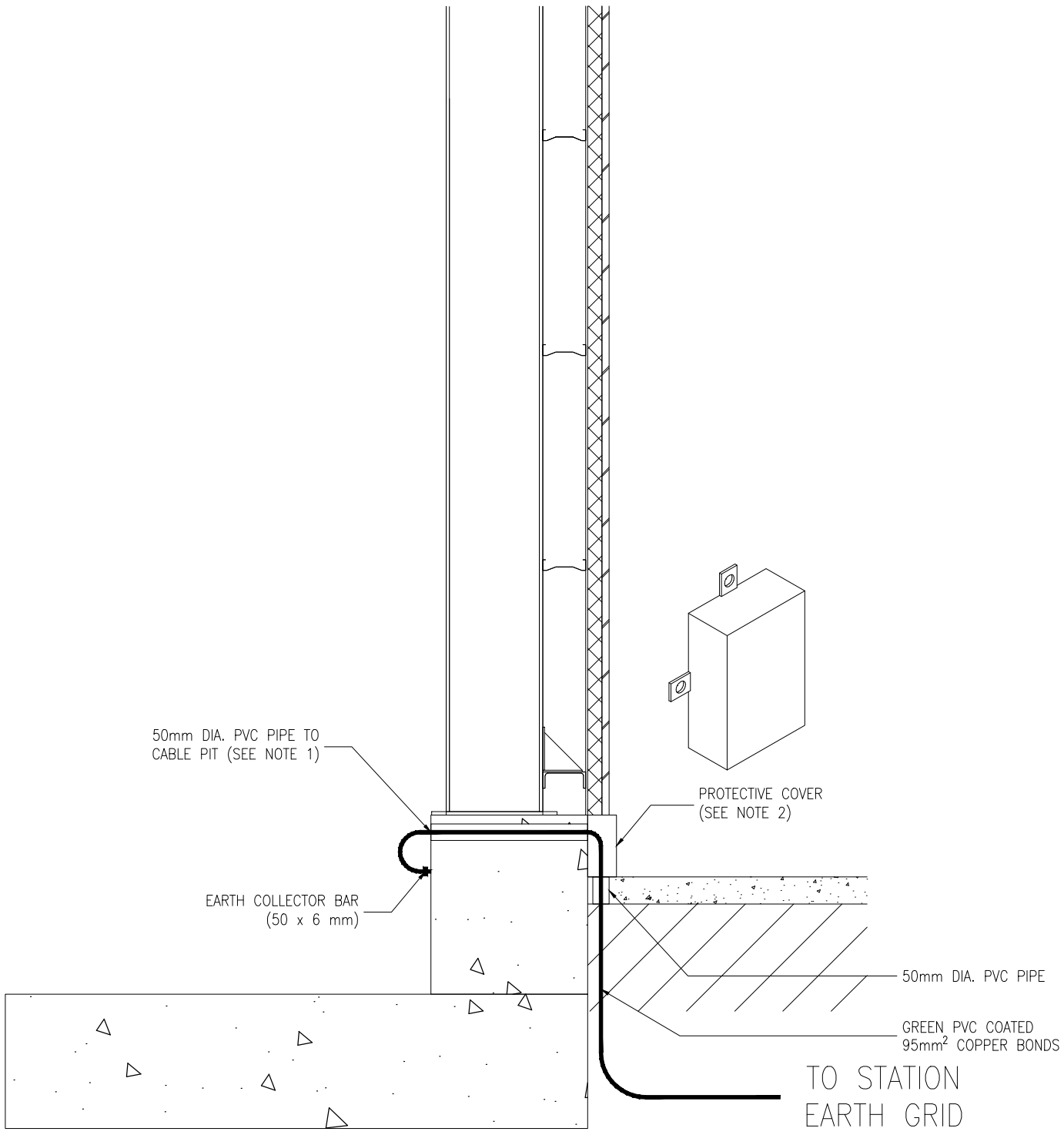
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110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
EARTH TAIL ENTERING RAISED FLOOR

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER	SHEET	REV
XDS DGA-00-004	033	00

EARTH TAIL ENTERING CABLE PIT



NOTES:

1. PIPE DUCT TO BE FILLED APPROX 75% WITH EXPANDING FOAM, AND CAPPED AT BOTH ENDS USING A SILICONE BASED SEALER.

2. GALVANISED MS PLATE 1.6mm THICK, PROTECTIVE COVER. BONDED USING 25mm² Cu CLAMPED TO GREEN PVC COATED 95mm² Cu AT ENTRY POINT TO BUILDING.

REV	DESC	DRAWN	CHECKED	APPROVED	DATE
00	FIRST ISSUE	DA	NK/ NMcM	AG	02/10/2020

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PROJECT
STATION DESIGN STANDARD

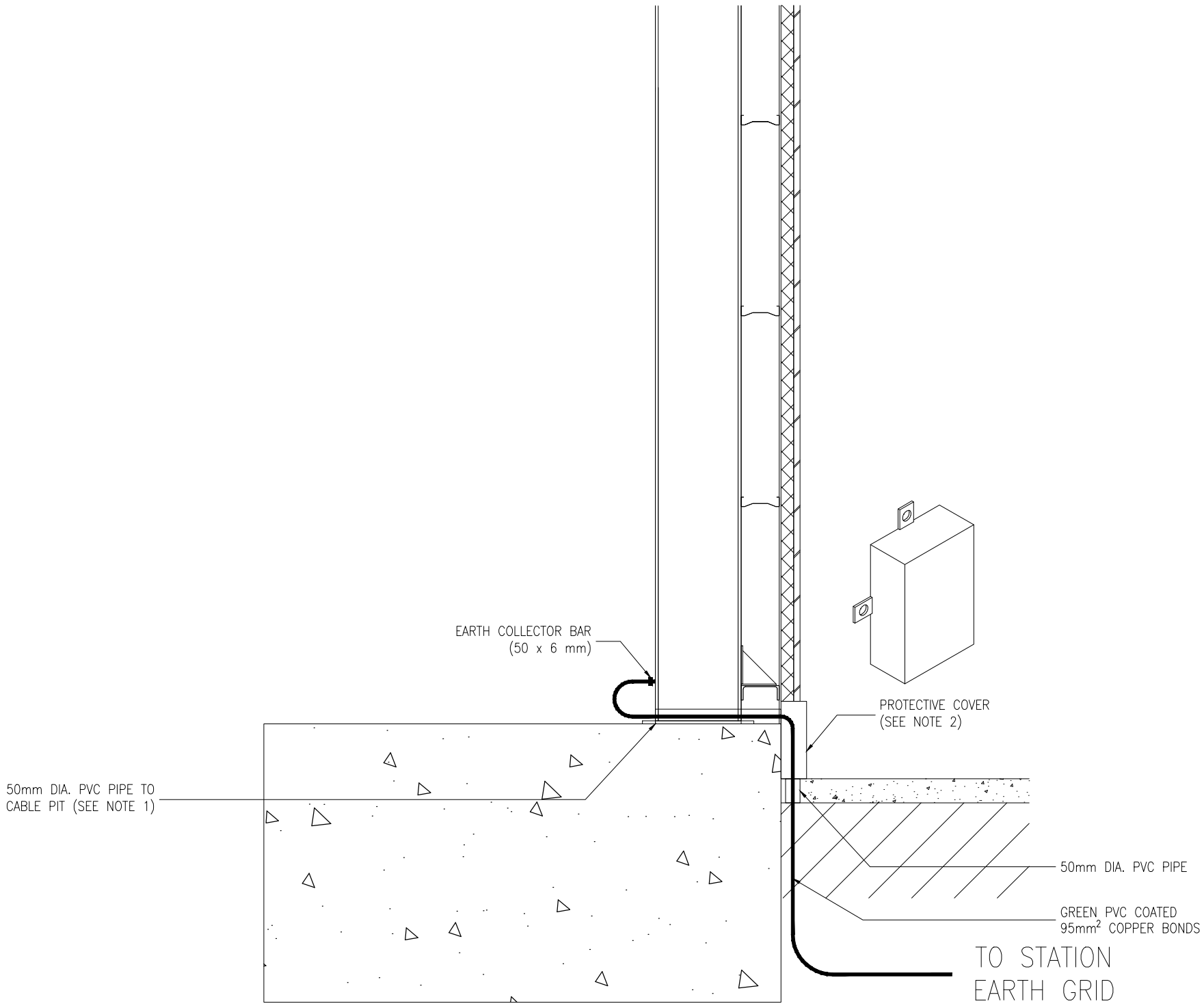
DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
EARTH TAIL ENTERING CABLE PIT

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER
XDS DGA-00-004

SHEET	REV
034	00

EARTH TAIL ENTERING GROUND FLOOR LEVEL



NOTES:

1. PIPE DUCT TO BE FILLED APPROX 75% WITH EXPANDING FOAM, AND CAPPED AT BOTH ENDS USING A SILICONE BASED SEALER.

2. GALVANISED MS PLATE 1.6mm THICK, PROTECTIVE COVER. BONDED USING 25mm² Cu CLAMPED TO GREEN PVC COATED 95mm² Cu AT ENTRY POINT TO BUILDING.

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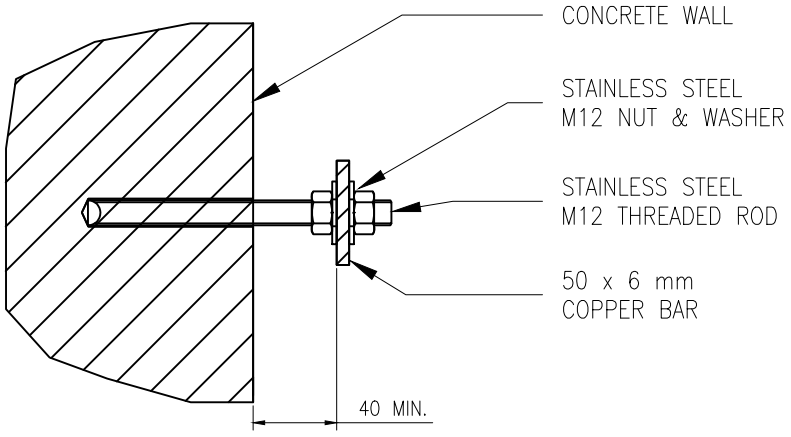
PROJECT
STATION DESIGN STANDARD

DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
EARTH TAIL ENTERING GROUND FLOOR LEVEL

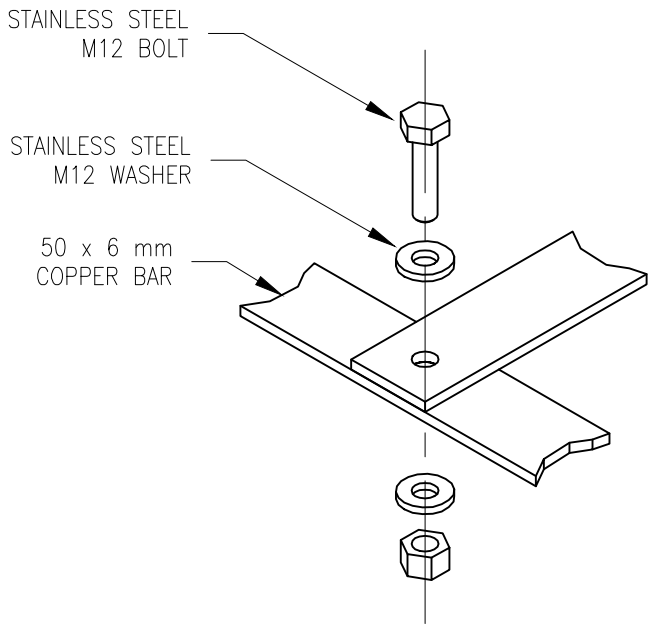
No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER	SHEET	REV
XDS DGA-00-004	035	00

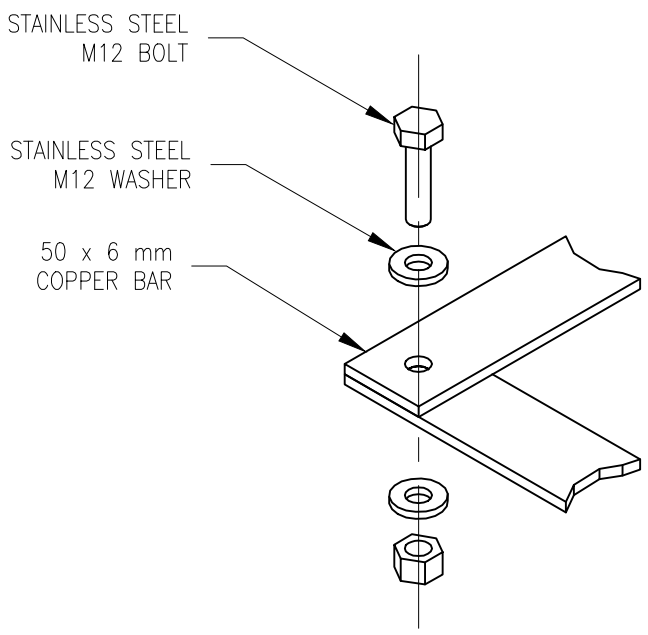
DETAIL A



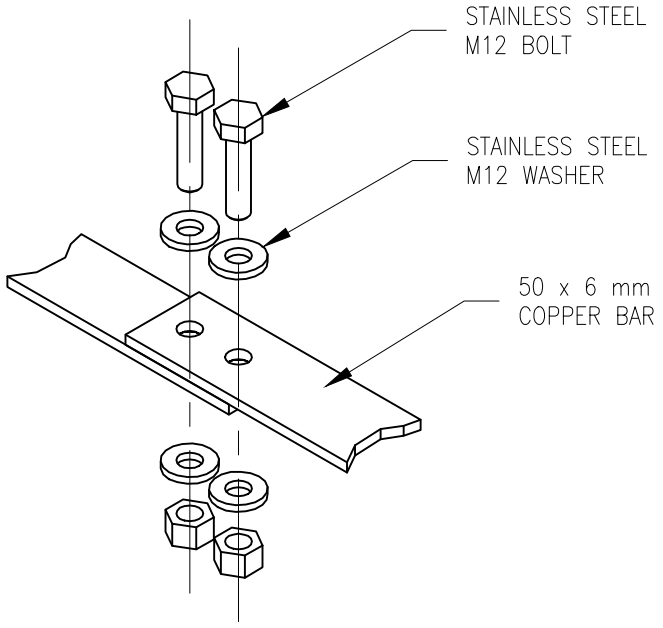
DETAIL B



DETAIL C



DETAIL D



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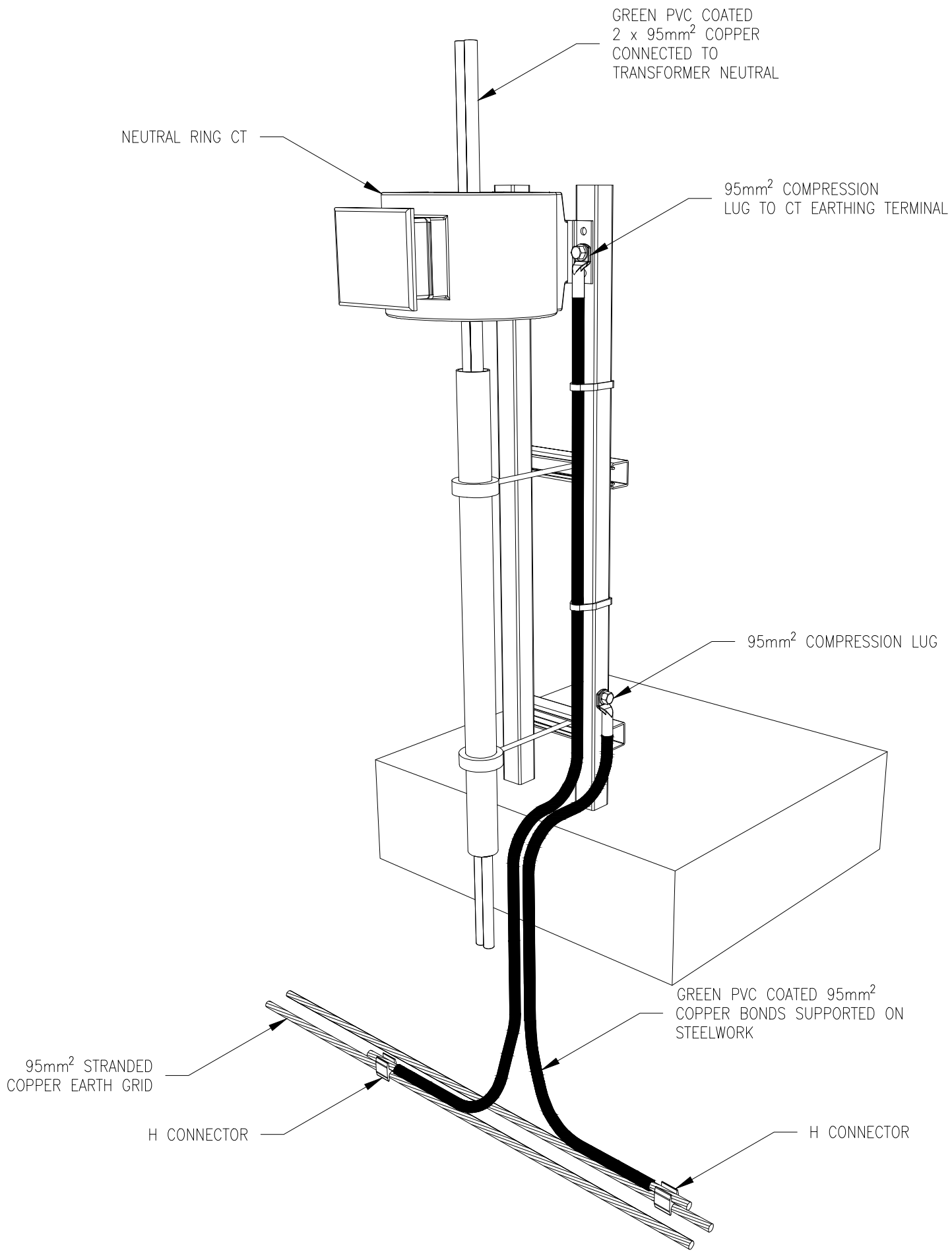
PROJECT
STATION DESIGN STANDARD

DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
COLLECTOR BAR DETAILS

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER	SHEET	REV
XDS DGA-00-004	036	00

NEUTRAL RING CTs



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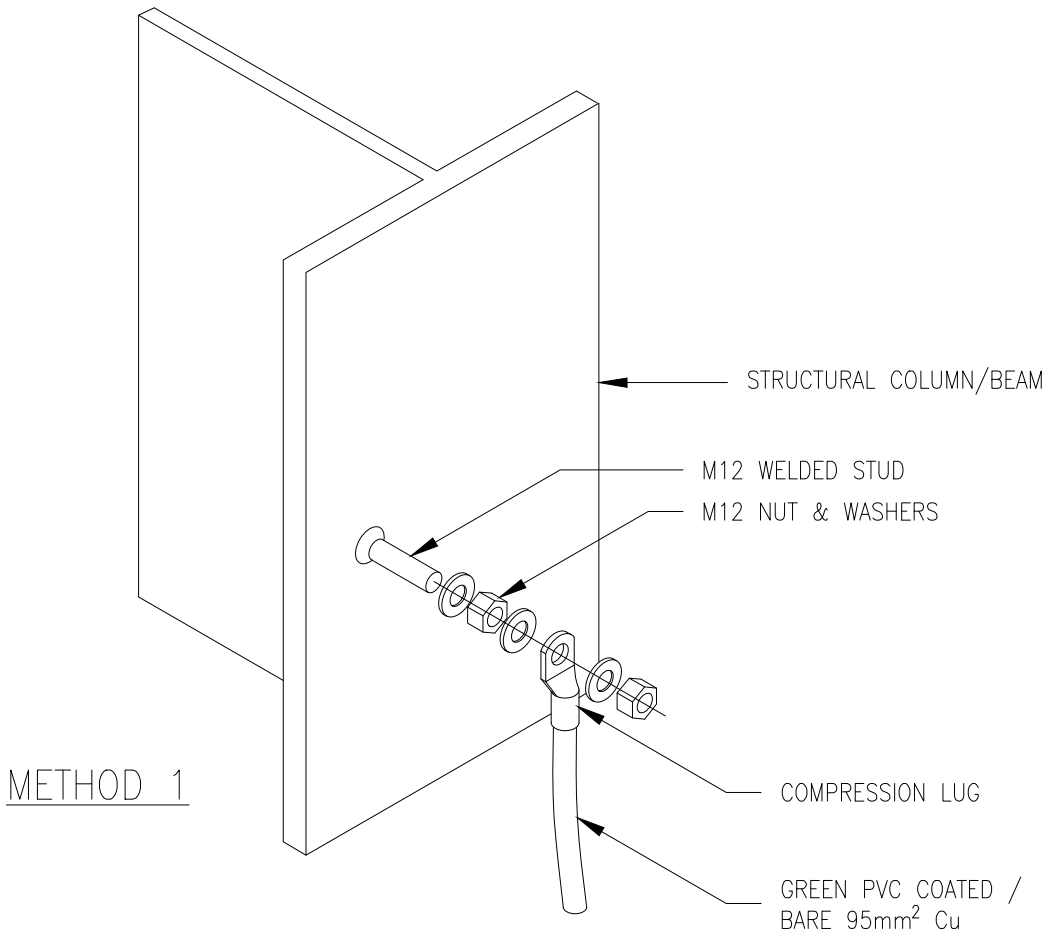
DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
NEUTRAL RING CTs

No of Shts	SIZE	SCALE
39	A3	NTS

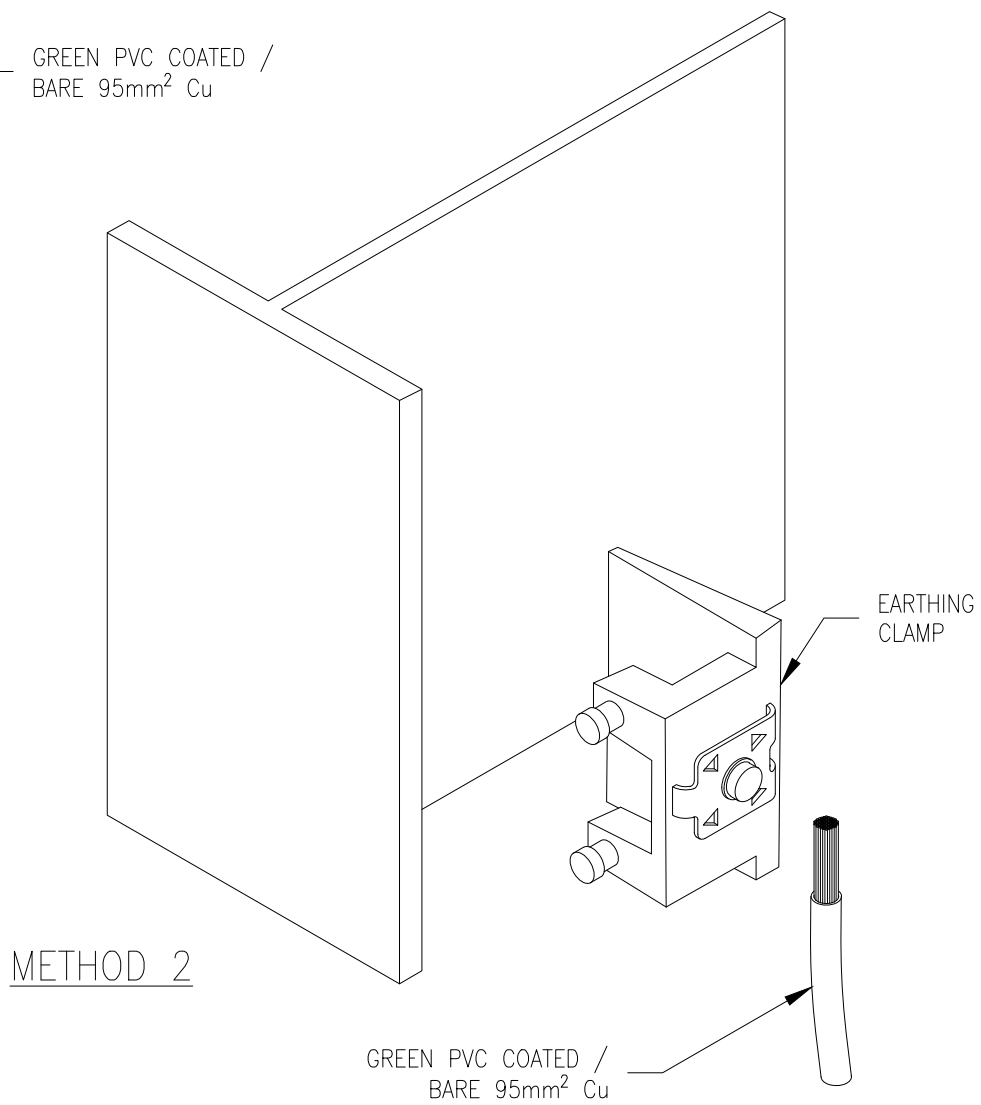
DRAWING NUMBER
XDS DGA-00-004

SHEET	REV
037	00

STRUCTURAL STEEL EARTHING



METHOD 1



METHOD 2

NOTES:

STRUCTURAL STEEL COLUMNS / BEAMS TO BE BONDED BY 95mm² Cu TO THE 50 x 6mm Cu COLLECTOR BAR (WHERE AVAILABLE), OR VIA AN EARTH TAIL FROM THE MAIN BURIED EARTH GRID.

METHOD 1:
WELDED M12 x 50 THREADED STUD TO STEELWORK WEB OR FLANGE. (FIXED USING CAPACITOR DISCHARGE WELDING)

METHOD 2:
AS AN ALTERNATIVE METHOD TO A WELDING STUD, USE CAST BRONZE BEAM / PURLIN FLANGE EARTHING CLAMP. THE AREA OF CONTACT ON THE STEELWORK IS TO BE CLEANED AND COATED WITH PROTECTIVE GREASE.

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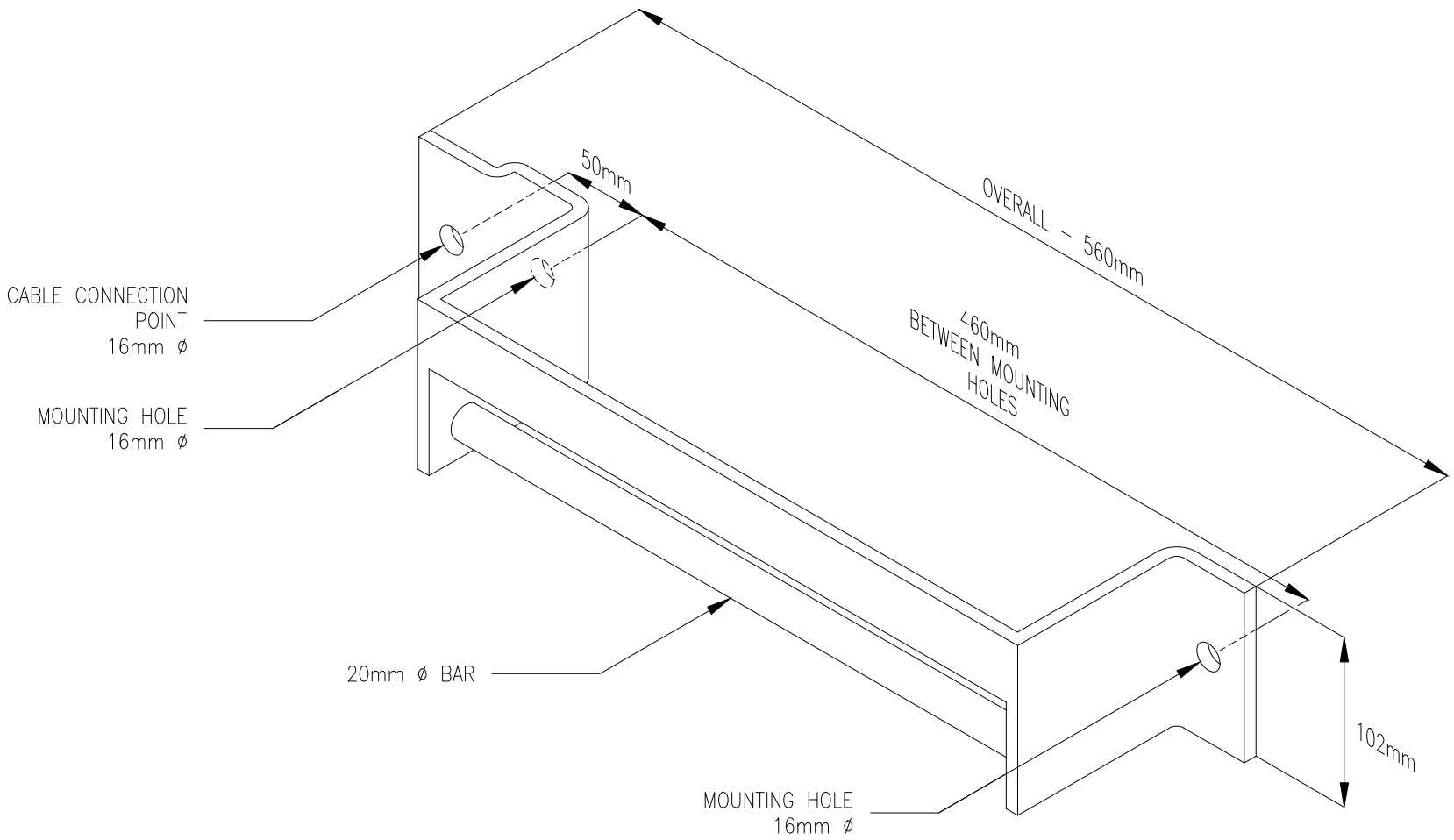
PROJECT
STATION DESIGN STANDARD

DRAWING TITLE
110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
STRUCTURAL STEEL EARTHING

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER	SHEET	REV
XDS DGA-00-004	038	00

FIXED EARTHING POINT AND PARKING BAR



NOTES:

1. DETAILS PROVIDED ARE FOR INFORMATION ONLY. CUSTOMERS SHALL PROCURE THIS ITEM FROM THE CURRENT ESB TERM CONTRACT HOLDER.

2. COMBINED FEP & PARKING BAR TO BE MANUFACTURED FROM COPPER ALLOY MATERIAL. IT SHOULD COMPRISE OF A SINGLE COMPONENT.

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PROJECT
STATION DESIGN STANDARD

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110kV/220kV/400kV
GENERAL ARRANGEMENT
EARTHING PRACTICE
FIXED EARTHING POINT AND PARKING BAR

No of Shts	SIZE	SCALE
39	A3	NTS

DRAWING NUMBER	SHEET	REV
XDS DGA-00-004	039	00