

Western Power's Asset Management System

Distribution Substation Plant Manual Chapter 3 – Substation Installation, up to 22kV



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Document control

Endorsement & approvals

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Approved	Mohsin Miyanji	Distribution Design & Standards Manager	Signature on file

Record of revisions

Revision No.	Date	Version	Revised by	Description
0	August 2019	EDM 0	Gareth Chadwick	Original
1	December 2019	EDM 1	Gareth Chadwick	Updated to include New PENDA
2	May 2023	EDM 2	Ken Tiong	Non-fire rated arrangements up to 1MVA updated to DSPM, Earthing SLD added for up to 2MVA layouts, Clearance Updates, Multiple notes and layout changes. Refer to individual drawings.
3	22/12/2025	Volt 1	Sam Liau	Changes made to DSM-3-07, DSM-3-08 DSM-3-09, DSM-3-10, DSM-3-17, DSM-3-18, DSM-3-19, DSM-3-20 & DSM-3-21

Key documents providing direction and influencing this document

Doc #	Title of document
EDM# 40304923	Asset Management System
EDM# 41965928	Safety in Design Guidelines
EDM# 50473207	DSPM Governance & Supporting Technical Documents Register

This document gives direction to and influences the following documents

Doc #	Title of document
Various DQM documents	Distribution Substation Design Projects

Stakeholders (people that were consulted when document was updated)

Business Unit / Function

Asset Management - Asset Performance

Asset Management – Safety Environment Quality and Training

Asset Management - Grid Transformation

Asset Operations – Network Operations

Asset Operations – Operational Services

Asset Operations – Customer Connection Services

Business and Customer Service – Customer Service

Notification list (people to be notified when document is updated)

Business Unit / Function

Asset Management - Asset Performance

Asset Management – Safety Environment Quality and Training

Asset Management - Grid Transformation

Asset Operations – Network Operations

Asset Operations – Operational Services

Asset Operations – Customer Connection Services

Business and Customer Service – Customer Service

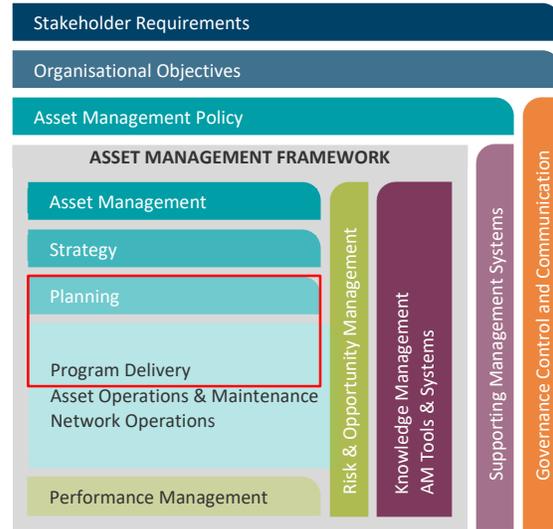
This document must not be made available to personnel outside Western Power without the prior written approval of Western Power.

Document classification and hierarchy

A key requirement of the Western Power Asset Management Policy (AMP) is to develop and maintain an Asset Management System (AMS). This Distribution Substation Plant Manual is defined as a technical document within the AMS document classification and structure and sits within the planning and Program Delivery components of the AMS.

The AMS and the interrelationships between the collection of documents, tools and systems that are used for asset management are described in the AMS document Volt ID

ID-005-dc7f342fed83eb7f008777ff0463b876.



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1. Introduction

This Chapter of the Distribution Substation Plant Manual (DSPM) contains substation plant related information and drawings showing the standard plant arrangements used within Western Power's distribution substations with Tyree and ETEL transformers. This Chapter is being updated progressively as the plant procurement process is being undertaken. As an interim measure this Chapter may contain Distribution Substation Manual (DSM) drawings where legacy plant is still being used and the drawing set has not been updated to demonstrate Western Power's compliance with AS5577.

2. Disclaimer

The information contained within these drawings shall not be used for anything other than their intended purpose (as stated within this Chapter). Other documents that refer to these drawings shall not change the intended purpose whether it is written or inferred.

This Chapter alone does not claim to demonstrate compliance with any Government Regulations or Industry Standards. These drawings are to be read in conjunction with the following Western Power documents:

- i. Western Australian Service and Installation Requirements (WASIR)
- ii. Underground Distribution Schemes Manual (UDSM)
- iii. Distribution Customer Connection Requirements (DCCR)
- iv. Distribution Design Catalogue (DDC)

The drawings within this Chapter are generic in nature and may not be suitable for all substation sites. It is the designer's responsibility to make sure that these drawings are suitable for the proposed substation site prior to use.

2.1 Compliance with this manual

The project design drawing shall include the layout design of the substation site and its proposed location on the lot. The standard designs in this chapter can be used as the basis for the project design.

Where a customer's site requires a non-standard substation arrangement (for example: where an alternative plant layout is required or where only an odd sized piece of land is available for a substation site), the drawings within this section can be made available to the customer. It is then the customer's responsibility, in conjunction with their architect and Civil / Structural Engineers and Western Power's Designer / Design Manager, to prepare an alternative design. This design must meet all Western Power's requirements and any relevant Australian Standards.

The non-standard substation or bespoke design must be submitted to Western Power for approval by Western Powers Designer or Design manager with an explanation of how the proposed substation design is safe, fit for purpose and will facilitate installation of "standardised Western Power distribution equipment". Where there is a non-standard layout of a substation building / room or site, the approval process should be undertaken prior to any construction work.

The non-standard drawings register for Distribution Construction Standards Handbook (DCSH) and Distribution Substation Manual (DSM / DSPM) is EDM# [34163616](#). Any non-standard design must be approved by a Team Leader and a Senior Engineer, and added to this register.

3. Information Provided on Drawings

The standard substation drawings are grouped into two main substation types (drawing sets), Non-Fire Rated substations (outdoor) and Fire Rated substations (indoor). These drawing sets will consist of the following:

3.1 Non - fire rated substations

Each Non-Fire Rated substation will typically have six standard drawing sheets.

1. Plant Single line diagram
2. Land requirements
3. Plant, equipment and substation layout
4. Clearances
5. Plant earthing single line diagram
6. Permissible screening arrangements
7. Oil containment (to be developed)

Some drawings may contain additional sheets where information needs to be communicated about the plant that may affect the installation. As previously mentioned, not all substations will have a complete drawing set until Western Power has finalised the plant procurement process. As an interim measure some substation drawings may still contain DSM drawings.

The following sections explain the purpose of, and the typical information that is contained within each drawing sheet.

3.1.1 Sheet 1 – Plant Single Line Diagram

The purpose of this drawing is to provide a diagrammatic representation of the electrical circuit of the substation equipment.

This drawing sheet shows the following information:

- Location of isolation switches and disconnectors. This includes the utilisation categories of the switches and their nominal ratings.
- Operational earthing points
- Electrical protection
- Voltage levels
- Transformer vector group
- Number of incoming and outgoing circuits

General Designer Notes:

1. Refer to the DCCR for HV feeder and customer connection arrangements.
2. The protection requirements and fuse chart are published within the Distribution Customer Connection Requirements (DCCR) manual and should be used to select the correct fuse size.

3.1.2 Sheet 2 - Land Requirements

The purpose of this drawing sheet is to show a diagrammatic representation of a piece of land that is to be provided by the landowner for the design and installation of the substation. This drawing should be used in conjunction with the relevant customer connection manual such as the Underground Distribution Schemes (UDSM) or Western Australian Service Installation and Requirements (WASIR).

This drawing sheet shows:

- Cable ducting requirements.
- The minimum size land area required for the substation.

The designer may need the land owner to provide additional land to facilitate the following items that are site specific and not shown on the standard substation drawings:

- Additional grading rings or an extension to the substation earthing system.
- Personnel access, egress, and equipment transport aisles
- Oil containment methods and collection bunds.
- Fire clearances and barriers
- Earth retaining systems
- Surface treatments and the methods used to retain them within the site
- Screening walls and doors
- Impact protection bollards

Designer Notes:

1. Where these non-standard items are required, they shall be included on the substation design drawing with dimensions to ensure Western Power's unrestricted access to this land is maintained in the future.
2. The designer is to ensure that the substation site is in a position that does not pose a safety risk and allows unrestricted access for Western Power personnel and operational vehicles.

3.1.3 Sheet 3 – Plant, Equipment and Substation Layout

The purpose of this drawing is to show what equipment is required within the substation and its physical arrangement on the site. All equipment shown is based on standard Western Power equipment contained in the Distribution Design Catalogue (DDC).

This sheet serves three purposes:

1. To enable the designer to build up an assembly list for the substation (for cost estimating and creating work orders).
2. To assist in defining construction information to other groups - for example, a marked-up copy can be issued to Kewdale Electrical Workshop for the construction of equipment such as an LV kiosk or automated ring main unit and another copy can be issued to field staff for site installation requirements.
3. To allow "standard substation equipment" to be procured by Western Power reducing the overall cost of a substation. In the event of future equipment failure, the "standard substation equipment" will facilitate like for like replacement where these standard drawings have been used for the design and construction of the original substation site.

This drawing sheet shows:

- The layout of distribution plant that can be used within the site such as transformers, ring main units and low voltage switchgear.
- When required, the arrangement of the LV switchgear.
- Power cables and connectors that shall be used to interconnect the distribution plant within the site.
- The dimensions from the edge of the site to the culvert and / or equipment base within the site.

Designer Notes:

1. All dimensions shown on drawings have been rounded up to the nearest 50mm. An equivalent building tolerance of $\pm 50\text{mm}$ should be permitted.

3.1.4 Sheet 4 - Clearances

The purpose of this drawing is to provide a diagrammatic representation of the clearances that have been provided within the substation site.

This drawings sheet shows:

- The clearances required around items of equipment to the edge of the substation site that allow the equipment to be operated.
- The clearances required around items of equipment to the edge of the substation site used as access and egress paths.
- The clearance from the equipment to the earth grading ring to be used by the designer for calculation of the touch voltages.
- Fire clearances from transformer tank or inside edge of the oil containment bund to combustible surfaces in accordance with WASIR Clause 14.4.3 (AS/NZS 2067 Table 6.1).
- Noise clearance zones in accordance with UDSM, Clause 5.3.18.

Designer Notes:

1. Where additional clearances are required that are not shown on the standard layout drawing, they shall be included on the substation design drawing and dimensioned to ensure clearances to substation equipment is maintained.
2. The designer is to complete a fire risk assessment as per AS/NZS 2067 Clause 6.7.4.4 to demonstrate how these clearances have been met or the fire risk has been mitigated. Refer DSPM Chapter 5 – Fire Clearances for additional guidance.

3.1.5 Sheet 5 – Plant Earthing Single Line Diagram

The purpose of this drawing is to provide a diagrammatic representation of the earthing circuit. The equipment used for earthing of distribution substations is shown on the compatible unit drawing for the plant within the Distribution Design Catalogue (DDC). The DDC provides details and quantities of the equipment used to make earth connections onto the plant and between pieces of plant within the substation site.

The standard earthing arrangement is based on a combined HV & LV system of earthing. Where an alternative earthing arrangement is used (e.g. separate HV & LV earthing system) the standard earthing arrangement can be modified and shown on the substation design drawings. The design drawings shall show the equipment used for the LV earthing system and its location in relation to the substation.

This drawing shows:

- Number of earth electrodes required within the site
- Number and types of earth bars (e.g. HV, LV)
- Neutral earthing connections
- Equipotential bonding connections (e.g. to exposed metal work on the plant)
- Grading ring connections
- Connection points for cable screens

Designer Notes:

1. The Earthing FAQ provides additional information on Western Power's network earthing requirements. This document will be replaced with Western Power's earthing guideline in the near future.

3.1.6 Sheet 6 - Permissible Screening Arrangements

The purpose of this drawing is to provide a diagrammatic representation of acceptable screening around the substation site. This sheet is intended to be issued to the customer to allow preparation of architectural drawings that are to be submitted back to Western Power's substation designer for approval.

This drawing shows:

- Where screening is permissible (i.e. outside the substation site).
- The required depth of the screening foundations to allow safe excavation within the substation site
- The additional land that is required (when screening is used) to ensure operational clearances shown on sheet 3 can be maintained.

Designer Notes:

1. Access and egress routes are required to be maintained when screening is used. The land area may need to be increased to facilitate screening so that operational clearances and access routes can be maintained.
2. Where screening is used the designer should include the architectural drawings into the substation design drawing. The landowner becomes the owner of any screening structure. Refer to DSPM Chapter 5.
3. This drawing should be read in conjunction with the Substation Installation Requirements within the UDSM Clause 6.2.8.25 or WASIR 14.5.4, and DSPM Chapter 5.
4. The customer becomes the owner of any screening structure.
5. All buildings shall meet the requirements of the Local Government and the National Construction Code (NCC)

3.2 Fire Rated Substations

Each fire rated substation will typically have six standard drawing sheets.

1. Plant single line diagram
2. Substation building requirements
3. Plant, equipment and substation layout
4. Clearances
5. Plant, earthing single line diagram
6. Switchgear fixing details

Some drawings may contain additional sheets where information needs to be communicated about the plant that may affect the installation.

The following sections explain the purpose of, and the typical information that is contained within each drawing sheet.

3.2.1 Sheet 1 – Plant Single Line Diagram

The purpose of this drawing is to provide a diagrammatic representation of the electrical circuit of the substation equipment.

This drawing sheet shows the following:

- Location of isolation switches and disconnectors. This includes the utilisation categories of the switches and their and nominal ratings.
- Operational earthing points
- Electrical protection
- Voltage levels
- Transformer vector group
- Number of incoming and outgoing circuits

General Designer Notes:

1. The customer connection arrangements and protection requirements / fuse chart are published within the Distribution Customer Connection Requirements Manual (DCCR).

3.2.2 Sheet 2 – Substation Building Requirements

The purpose of this drawing sheet is to show a diagrammatic representation of a substation building. This building is to be designed to be suitable for the installation of Western Power's standard substation equipment. This drawing should be read in conjunction with the relevant customer connection manual such as the Underground Distribution Schemes (UDSM) or Western Australian Service and Installation Requirements (WASIR). This sheet should be issued to the customer to allow preparation of architectural drawings that are to be submitted back to Western Power's substation designer for approval.

This drawing sheet shows:

- The size of the fire rated enclosure
- Cable ducting requirements (but no civil design details).
- Layout and size of cable trenches and trench covers
- Size and position of doors
- Layout of small light and power within the room
- Position of wall mounted air vents

Designer Notes:

1. The designer should include the architectural drawings onto the substation design drawing.
2. The designer is to ensure that the substation site is in a position that does not pose a safety risk and allows unrestricted access for Western Power personnel and operational vehicles.
3. All buildings shall meet the requirements of the Local Council and the National Construction Code (NCC)

3.2.3 Sheet 3 – Plant, Equipment and Substation Layout

The purpose of this drawing sheet is to show a diagrammatic representation of what equipment is required within the substation building and its physical layout. All equipment shown is based on standard Western Power equipment assemblies contained in the Distribution Design Catalogue (DDC).

This sheet also serves the following purposes:

1. To enable the designer to build up an assembly list in DQM for the substation (for cost estimating and creating work orders). A copy of this sheet can be retained on the design file for future reference.

2. To assist in defining construction information to other groups - for example, a marked-up copy can be issued to Kewdale Electrical Workshop for the construction of equipment such as an LV kiosk or automation of RMUs and another copy can be issued to field staff for site installation requirements.
3. To allow “standard substation equipment” to be procured by Western Power reducing the overall cost of a substation. In the event of future equipment failure, the “standard substation equipment” will facilitate like for like replacement where these standard drawings have been used for the design and construction of the original substation site.

This drawing sheet shows:

- The layout of distribution plant that can be used within the substation room such as transformers, ring main units and low voltage switchgear.
- When required, the arrangement of the LV switchgear.
- Power cables and connectors that should be used to interconnect the distribution plant within the room.
- The position of any other equipment within the substation room.

3.2.4 Sheet 4 - Operational and Earthing Clearances

The purpose of this drawing sheet is to provide a diagrammatic representation of the clearances that have been provided within the substation room.

This drawings sheet shows

- The clearances around items of equipment that allow the equipment to be operated.
- The clearances required around items of equipment to the walls of the substation room used as access and egress paths.

3.2.5 Sheet 5 – Plant Earthing Single Line Diagram

The purpose of this drawing is to provide a diagrammatic representation of the earthing circuit. The equipment used for earthing of distribution substations is shown on the compatible unit drawing for the plant within the Distribution Design Catalogue (DDC). It provides details and quantities of the equipment used to make earth connections onto the plant and between pieces of plant within the substation site.

The standard earthing arrangement is based on a combined HV & LV system of earthing. Where an alternative earthing arrangement is used (e.g. separate HV & LV earthing system) the standard earthing arrangement can be modified and shown on the substation design drawings. The design drawings shall show the equipment used for the LV earthing system and its location in relation to the substation.

This drawing shows:

- Number of earth electrodes required within the site
- Number and types of earth bars (e.g. HV, LV)
- Neutral earthing connections
- Equipotential bonding connections (e.g. to exposed metal work on the plant)
- Connection points for cable screens

Designer Notes:

1. The Earthing FAQ provides additional information on Western Power’s network earthing requirements. This document is to be replaced with Western Power’s earthing guideline in the near future.

3.2.6 Sheet 6 – Switchgear Fixing Details

The purpose of this drawing sheet is to provide a diagrammatic representation of the following:

- Where to position the switchgear over the trench.
- How to install the cantilever support brackets.
- How to install the cable trench covers

This sheet is intended for the installer of the ring main unit (HV switchgear).

4. Drawings - Substation Arrangements

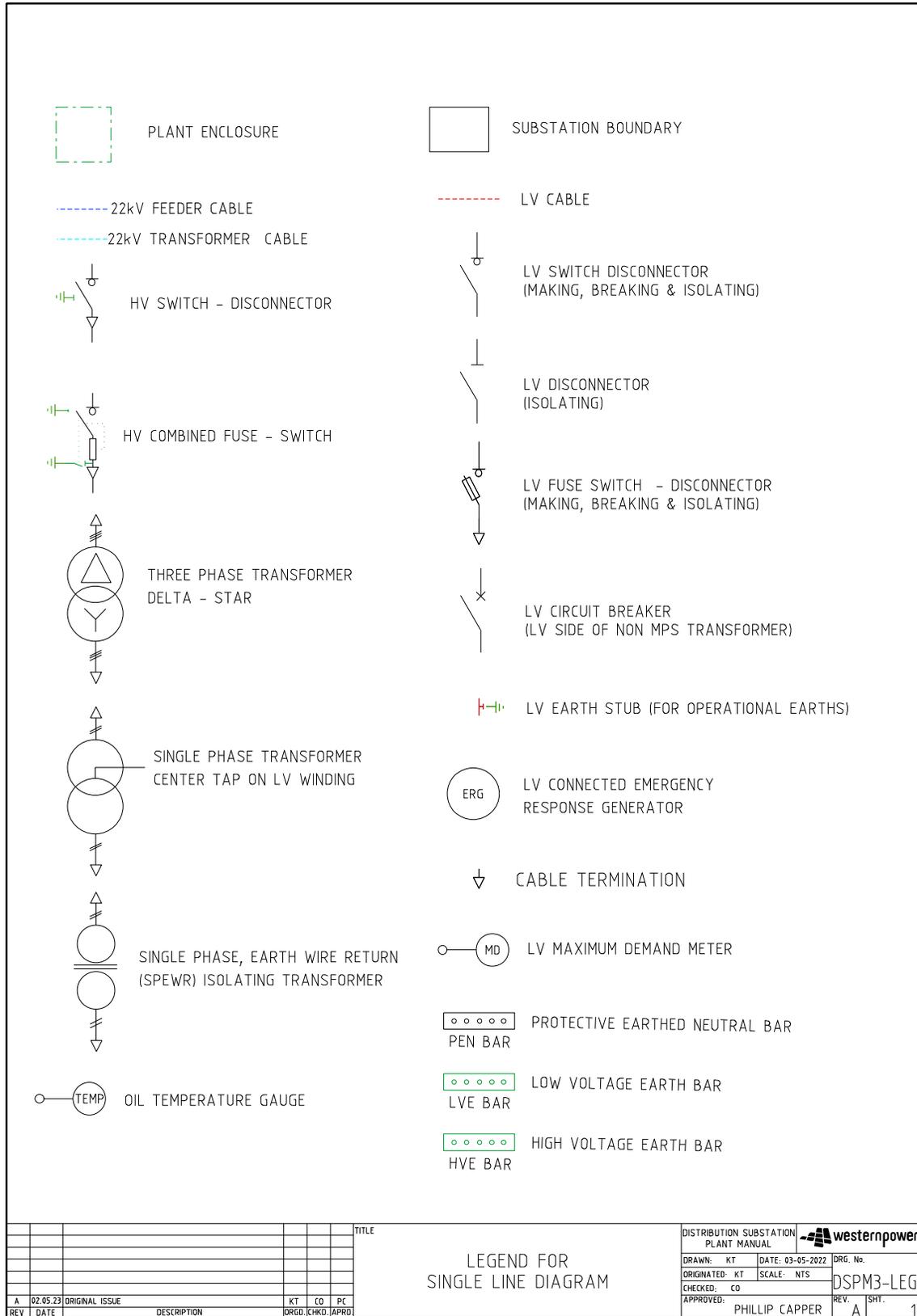
The following section contains the substation arrangement drawings for the following voltage levels:

- a. 6.6kV three phase
- b. 11kV three phase
- c. 12.7kV single phase
- d. 22kV three phase

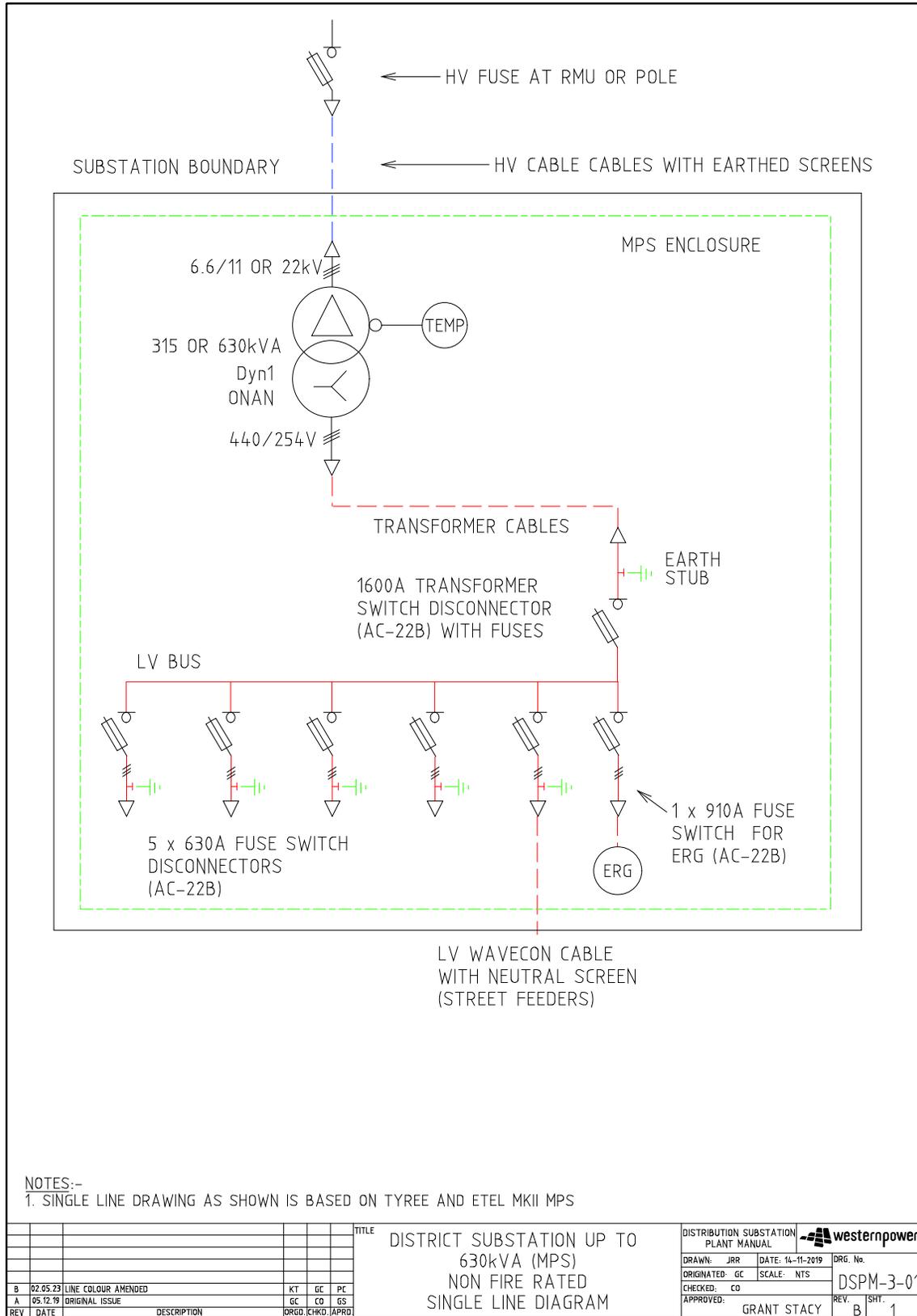
These drawings are grouped into the following types:

- District Substations, non-fire rated
- District Substations, fire rated
- Sole Use Substations, non-fire rated
- Sole Use Substations, fire rated
- Customer Owned Substations (HV metered sites)
- Single phase and three phase ground mounted rural substations (SPUD & THUD)
- Standalone HV switchgear
- Isolating Transformer

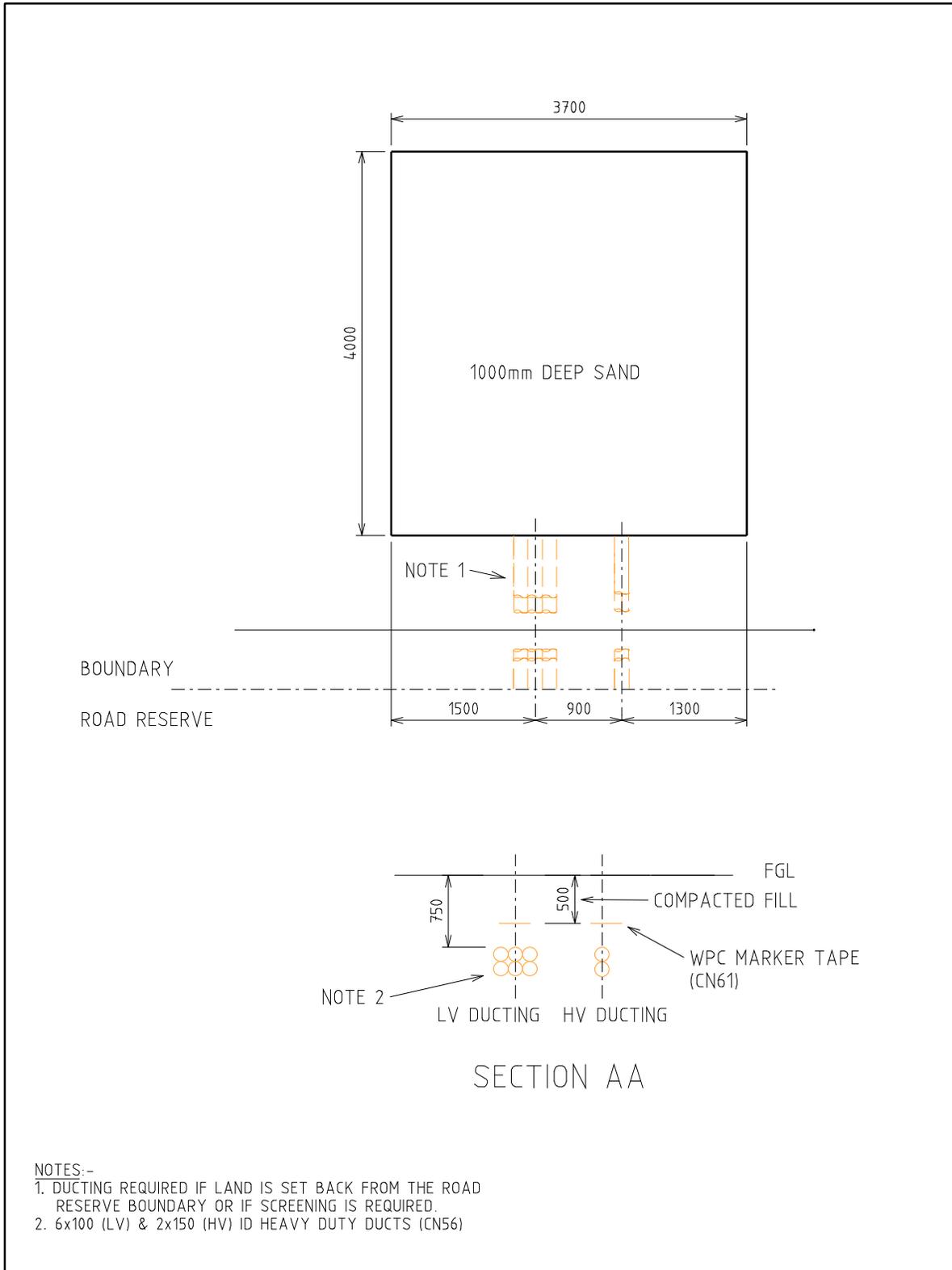
4.1 Drawing Legend



4.2 District Substations - Non-Fire Rated

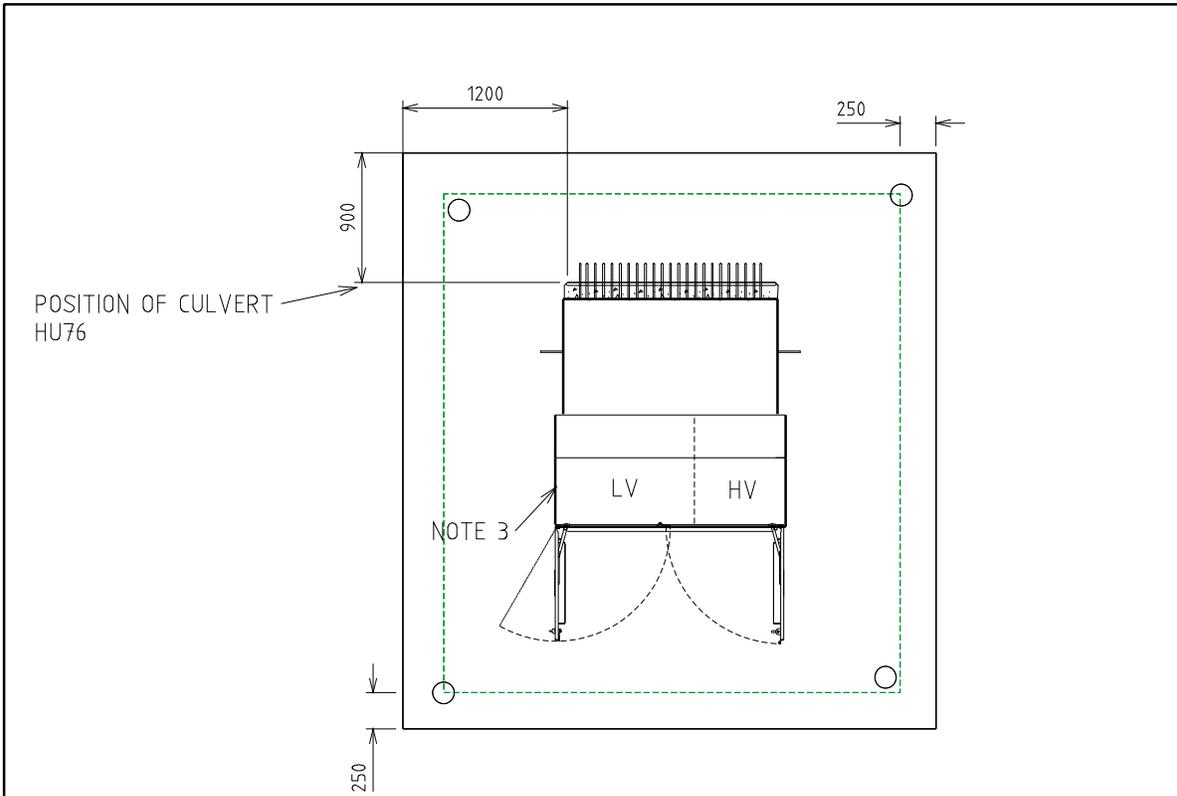


4.2.1 DSPM-3-01 Up to 630kVA (MPS)



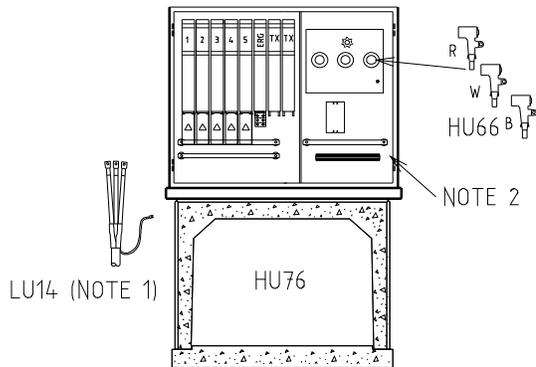
- NOTES:-
1. DUCTING REQUIRED IF LAND IS SET BACK FROM THE ROAD RESERVE BOUNDARY OR IF SCREENING IS REQUIRED.
 2. 6x100 (LV) & 2x150 (HV) ID HEAVY DUTY DUCTS (CN56)

				TITLE			DISTRIBUTION SUBSTATION		westernpower		
				DISTRICT SUBSTATION			PLANT MANUAL		DRG. No.		
				UP TO 630kVA (MPS)			DRAWN: JRR		DATE: 14-11-2019		
				NON FIRE RATED			ORIGINATED: GC		SCALE: NTS		
				LAND REQUIREMENTS & CABLE DUCTS			CHECKED: CO		DSPM-3-01		
							APPROVED: GRANT STACY		REV. B		
									SHT. 2		
REV	DATE	DESCRIPTION	DRG.	CHKD.	APRD.						
B	02.05.23	NOTES AMENDED		KT	GC	PC					
A	05.12.19	ORIGINAL ISSUE		GC	CO	GS					



TRANSFORMER MATERIALS (QTY)

CU	6/11kV	22kV
HU61/315		
HU61/630		
LU14		
HU66		
HU76		

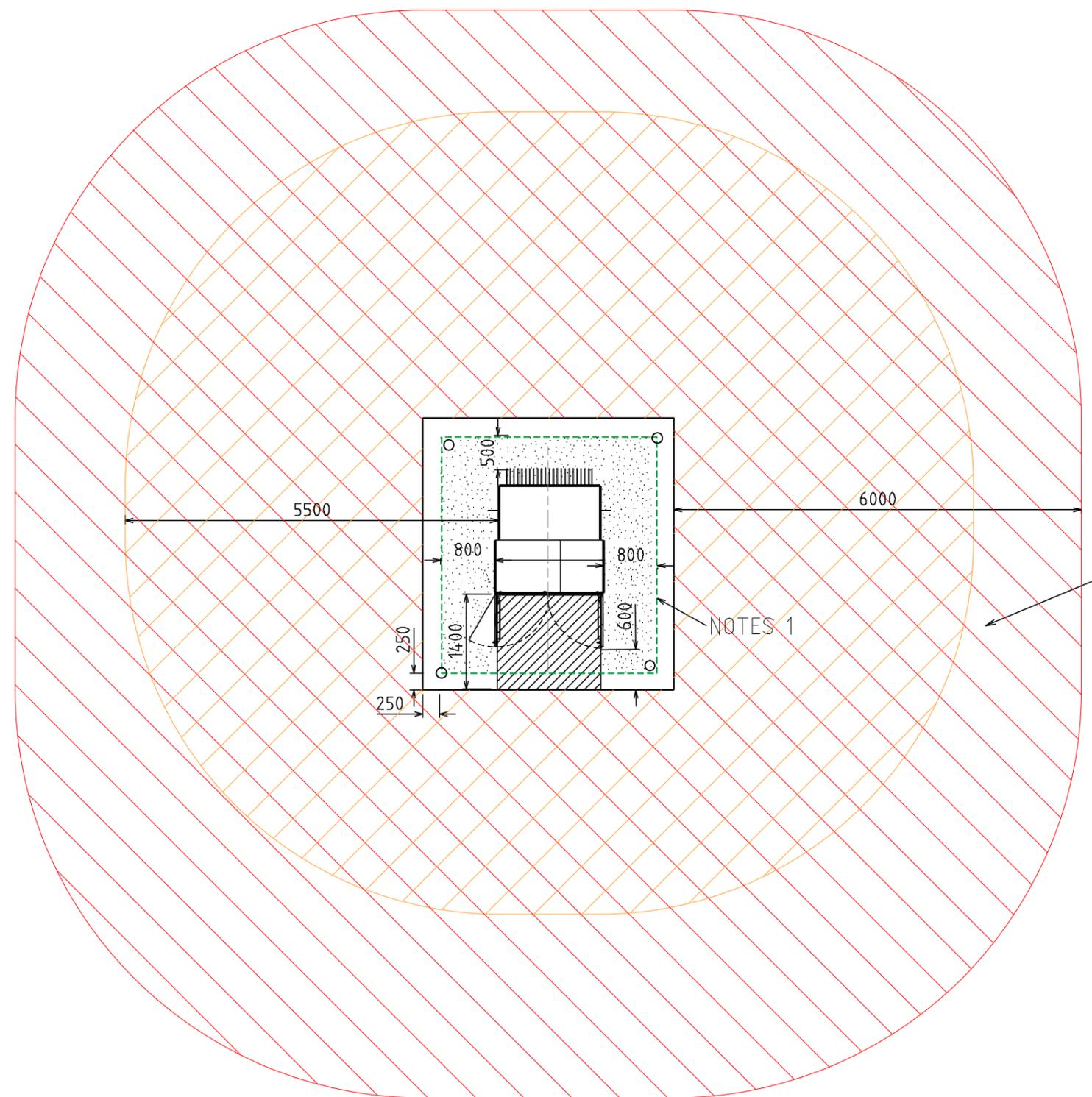


BOX CULVERT – CROWN AND BASE TYPE
 EXTERNAL SIZE = 1416x1022x1220 LONG
 CROWN WEIGHT = 1038 kg
 BASE WEIGHT = 384 kg

NOTES:-

- 1 X LU14 NEEDED WITH EACH WAVECON STREET FEEDER.
- INSTALL CABLE CLAMP ON EACH PHASE OF HV CABLE (FM0200).
- REFER TO DSPM CHAPTER 4 FOR THE CORRECT POSITIONING OF THE MPS ONTO THE CULVERT.
- MEASUREMENTS SHOW ARE ± 50mm, SAME CONSTRUCTION TOLERANCE APPLIES.
- TRANSFORMER OIL IS TO BE CONTAINED WITHIN THE SITE.

				TITLE			DISTRIBUTION SUBSTATION UP TO 630kVA (MPS) NON FIRE RATED EQUIPMENT & SITE LAYOUT			DISTRIBUTION SUBSTATION PLANT MANUAL			westernpower		
										DRAWN: JRR		DATE: 14-11-2019		DRG. No.	
										ORIGINATED: GC		SCALE: NTS		DSPM-3-01	
										CHECKED: CO					
										APPROVED:		GRANT STACY		REV. B SH. 3	
REV	DATE	DESCRIPTION		ORGO	CHKD	APRD									
B	02.05.23	NOTES AMENDED		KT	GC	PC									
A	05.02.19	ORIGINAL ISSUE		GC	CO	GS									



- FIRE RISK ZONE
- TRANSFORMER NOISE IMPACT ZONE
- EARTHING (STEP AND TOUCH)
- OPERATIONAL

NOTES:-
 1. STEP AND TOUCH CLEARANCE FROM GRADING RING TO TRANSFORMER. USE EARTH RODS ON GRADING RING. SEE DDC HU CU_s FOR EARTHING MATERIALS
 2. SEE SHEET 5 FOR EARTHING SINGLE LINE DIAGRAM
 3. USE THESE DIMENSIONS FOR EARTHING STUDY (WITH THE DOORS CLOSED).
 4. DESIGNER TO SHOW ACCESS AND EGRESS ROUTES ON THE SUBSTATION DESIGN DRAWING.
 5. FIRE RISK ZONE IS TO BE SHOWN FROM THE EDGE OF THE SUBSTATION SITE. OIL CONTAINMENT TO BE USED TO KEEP THE OIL WITHIN THE SITE. FIRE RISK ZONE MAY BE REDUCED IF MITIGATION OPTIONS ARE USED. REFER DSPM CHAPTER 5.
 6. NOISE IMPACT ZONE IS BASED ON 630kVA TRANSFORMER AND IS MEASURED FROM THE EDGE OF THE TRANSFORMER TANK. NOISE IMPACT ZONE MAY BE REDUCED IF MITIGATION OPTIONS ARE USED. REFER TO "NOISE COMPLIANCE REQUIREMENTS FOR DISTRIBUTION TRANSFORMERS" GUIDELINE.

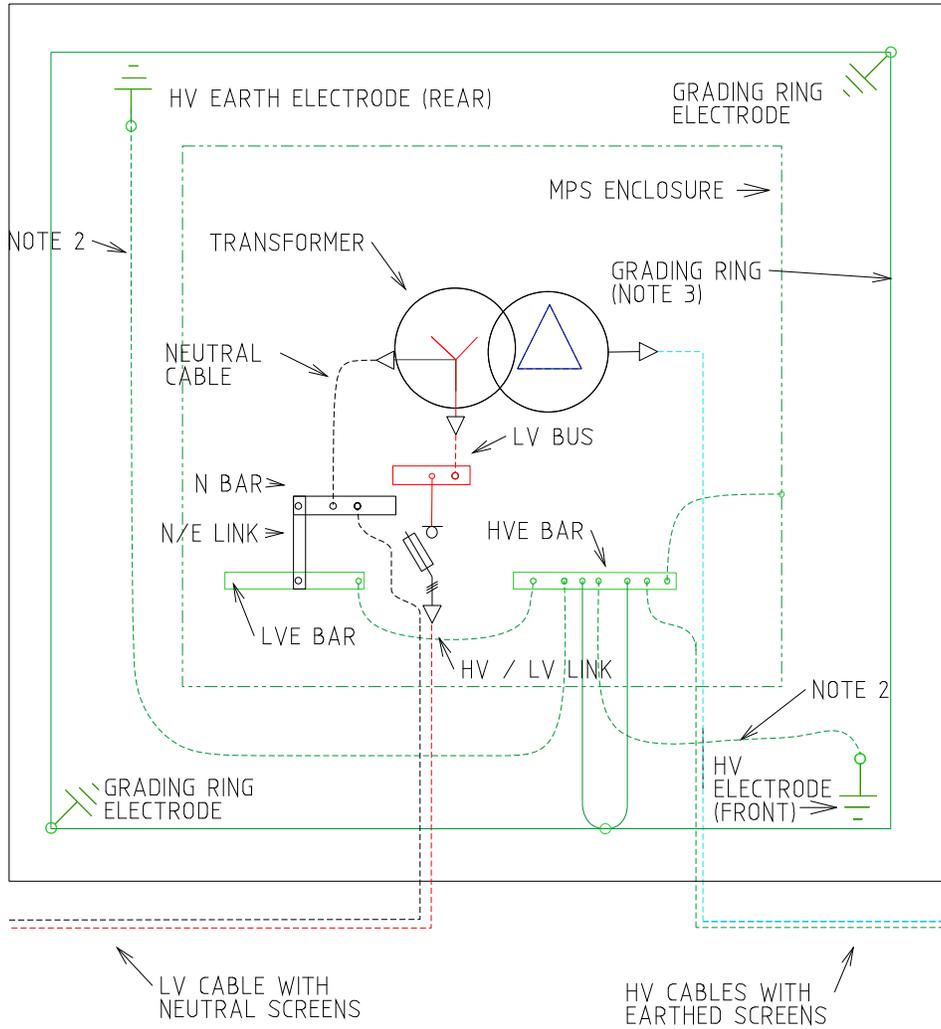
REV.	DATE	DESCRIPTION	ORGD	CHKD	APRD
B	02.05.23	FIRE RISK ZONE CONTOUR MODIFIED AND NOTES AMENDED	KT	GC	PC
A	06.12.19	ORIGINAL ISSUE	AK	AT	GS

TITLE
**DISTRICT SUBSTATION
 UP TO 630kVA (MPS)
 NON-FIRE RATED
 CLEARANCES**

DRAWN: JRR		DATE: 14-11-2019		DRG. No.	
ORIGINATED: GC		SCALE: NTS		DPSM-3-01	
CHECKED: CO		APPROVED: GRANT STACY		REV. B	SHT. 4



SUBSTATION SITE BOUNDARY



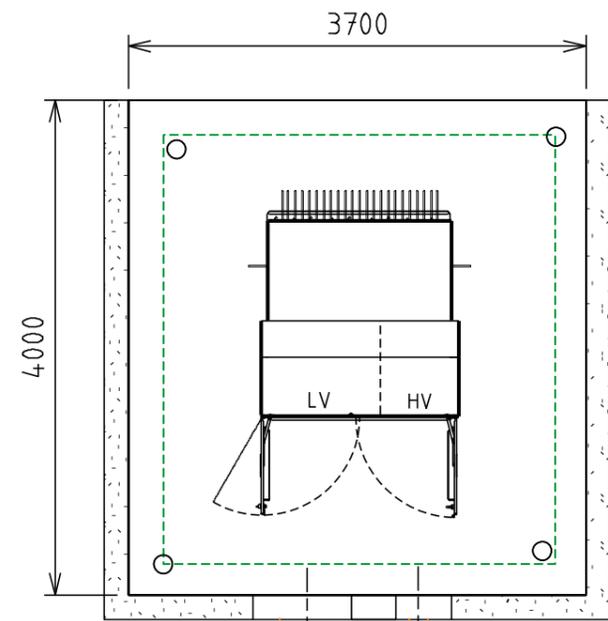
NOTES:-

1. SEE HU CU IN THE DDC FOR EARTHING MATERIALS.
2. CONNECT 70mm² PVC INSULATED COPPER CABLE (GREEN/YELLOW) TO EARTH ELECTRODES. INSTALL CABLE AND RODS 1200mm BELOW FGL IN NEW SITES.
3. BURIED GRADING RING TO BE 100mm BELOW RAILWAY BALLAST/FLAME TRAP, IN SOIL.

REV	DATE	DESCRIPTION	DRG	CHKD	APRD
B	02.05.23	NOTES AMENDED	KT	GC	PC
A	06.12.19	ORIGINAL ISSUE	GC	CO	GS

TITLE
 DISTRICT SUBSTATION
 UP TO 630kVA (MPS)
 NON FIRE RATED
 EARTHING SINGLE LINE DIAGRAM

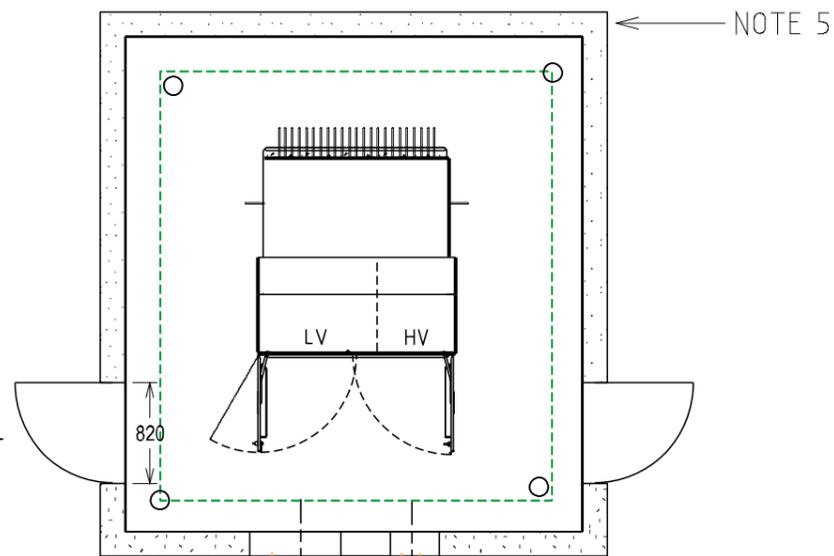
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ORIGINATED: GC		SCALE: NTS		DSPM-3-01	
CHECKED: CO		APPROVED: GRANT STACY		REV. B	
				SHT. 5	



NOTE 1 & 2

PROPERTY
BOUNDARY

PARTIAL (FRONT) SCREENING



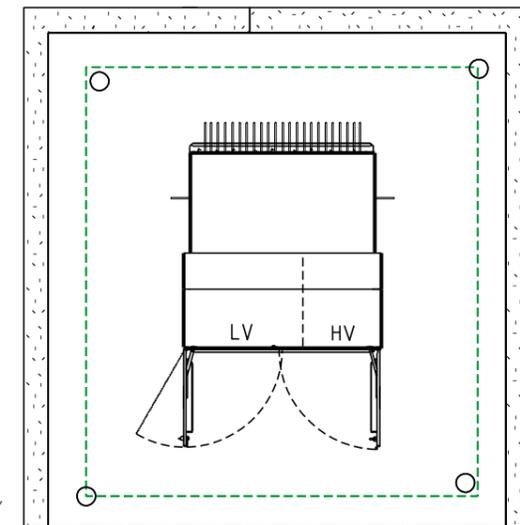
NOTE 3

NOTE 5

820

PROPERTY
BOUNDARY

FULL SCREENING



PARTIAL (REAR) SCREENING

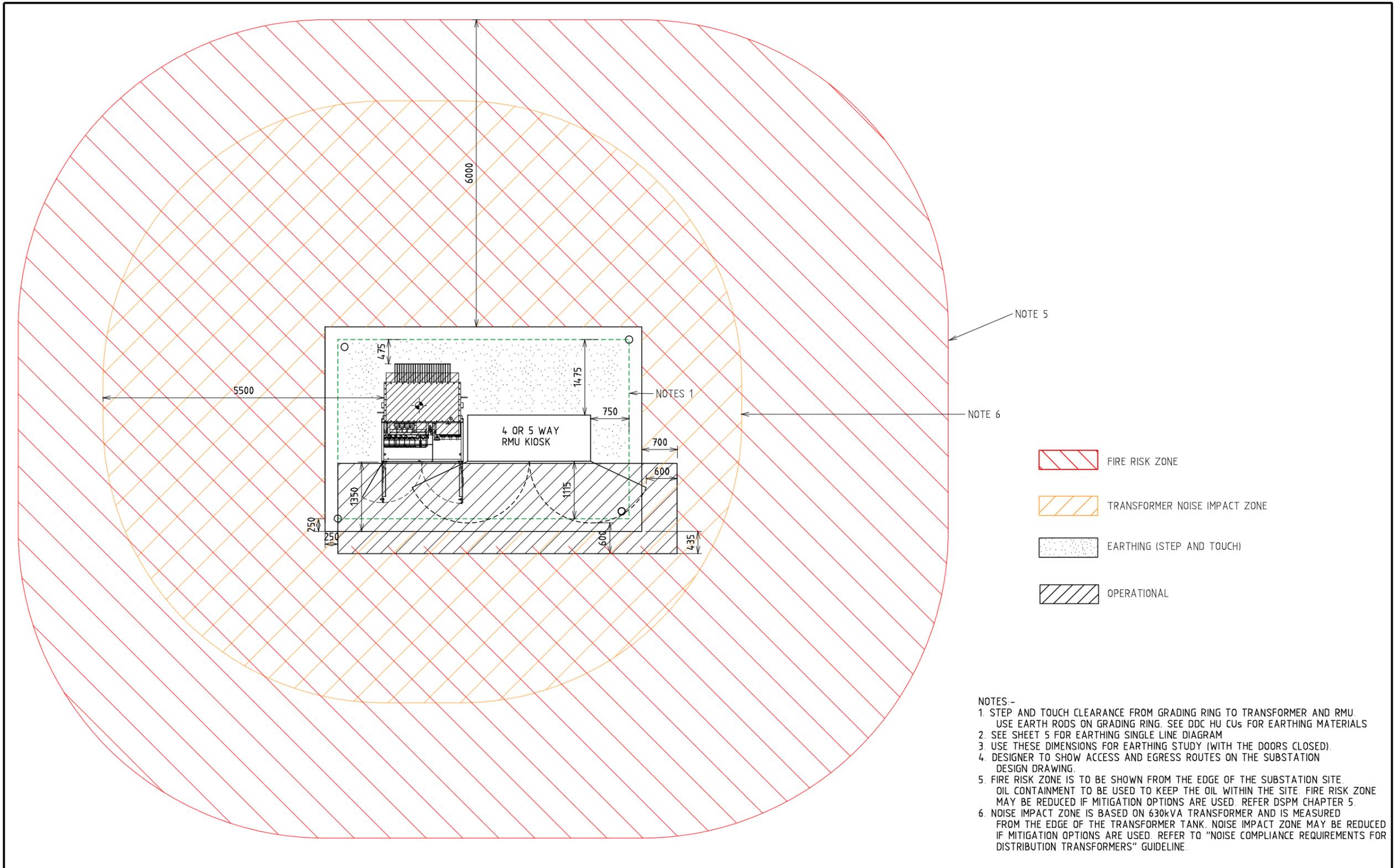
NOTES:-

1. FOUNDATIONS SHALL FULLY RETAIN THE SITE TO ALLOW FUTURE EXCAVATION 1200mm DEEP WITHIN THE SUBSTATION SITE.
2. SCREENING OR FOUNDATIONS SHALL NOT ENCRoACH INTO SUBSTATION SITE.
3. SCREENING SHALL NOT IMPACT OPERATIONAL CLEARANCE AND EGRESS REQUIREMENTS SHOWN ON SHEET 4.
4. DOORS (WHERE FITTED) MUST BE A MINIMUM OF 820 WIDE
5. NON-COMBUSTIBLE MATERIALS TO BE USED FOR SCREENING WITHIN FIRE RISK ZONE (MASONARY, ETC.)
6. 2 HR FIRE RATED SCREENING MAY BE USED TO REDUCE THE FIRE RISK ZONE. REFER TO DSPM CHAPTER 5 (FIRE RISK).
7. MINIMUM HEIGHT OF SCREEN WALL IS TO BE 1.8m (HEIGHT OF TRANSFORMER + 300mm).
8. DUCTS ARE REQUIRED WHERE CABLES PASS THROUGH WALL OR FOUNDATIONS. REFER TO SHEET 2 FOR DUCTING DETAILS.

REV.	DATE	DESCRIPTION	ORGD	CHKD	APRD
B	02.05.23	NOTES AMENDED	KT	GC	PC
A	06.12.19	ORIGINAL ISSUE	GC	CO	GS

TITLE	DISTRICT SUBSTATION UP TO 630kVA (MPS) NON FIRE RATED PERMISSIBLE SCREENING ARRANGEMENTS
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DISTRIBUTION SUBSTATION PLANT MANUAL			
DRAWN: JRR	DATE 14-11-2019	DRG. No.	
ORIGINATED: GC	SCALE: NTS	DSPM-3-01	
CHECKED: CO	APPROVED: GRANT STACY	REV. B	SHT. 6



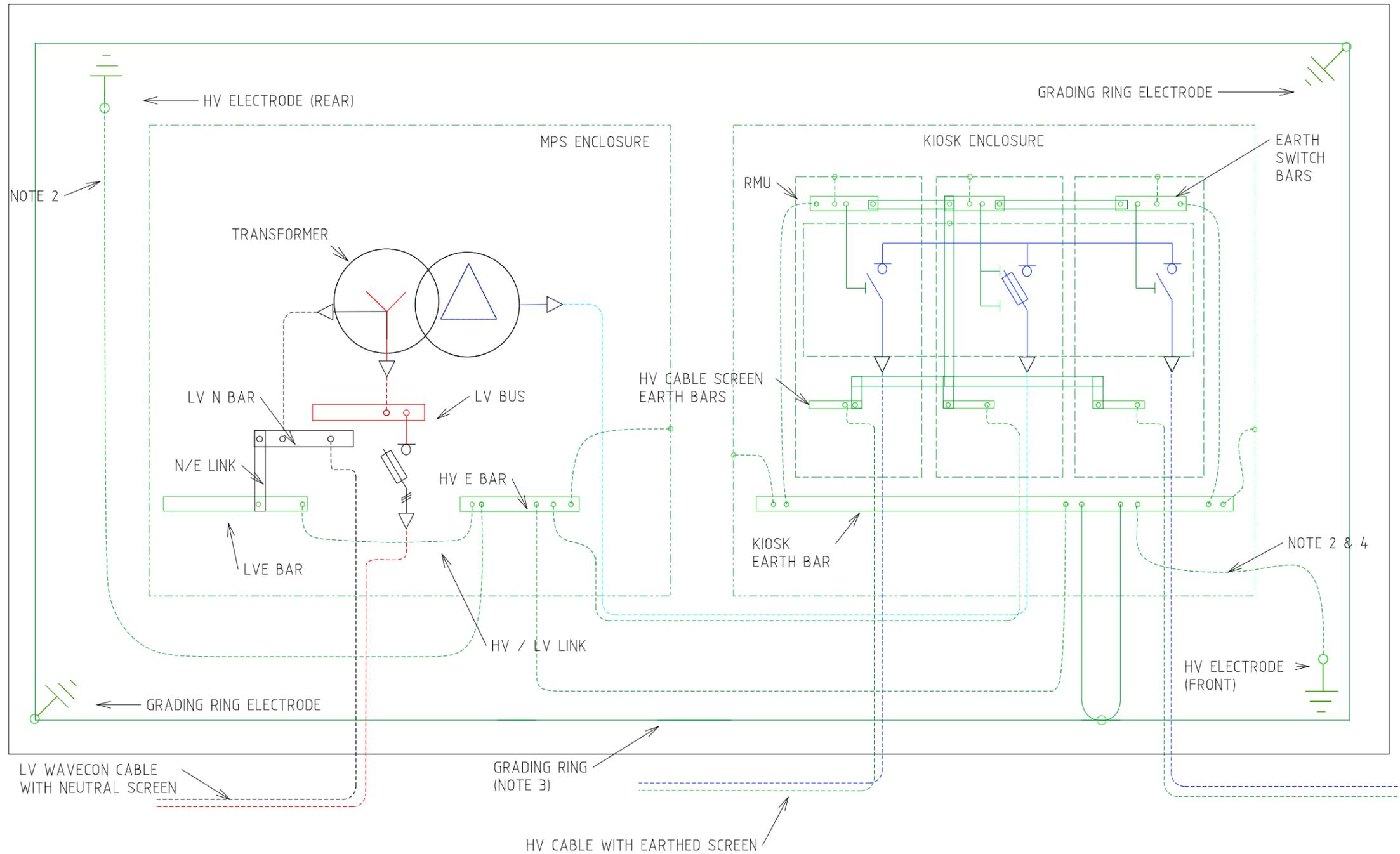
-  FIRE RISK ZONE
-  TRANSFORMER NOISE IMPACT ZONE
-  EARTHING (STEP AND TOUCH)
-  OPERATIONAL

- NOTES:-
1. STEP AND TOUCH CLEARANCE FROM GRADING RING TO TRANSFORMER AND RMU. USE EARTH RODS ON GRADING RING. SEE DDC HU CUs FOR EARTHING MATERIALS
 2. SEE SHEET 5 FOR EARTHING SINGLE LINE DIAGRAM
 3. USE THESE DIMENSIONS FOR EARTHING STUDY (WITH THE DOORS CLOSED).
 4. DESIGNER TO SHOW ACCESS AND EGRESS ROUTES ON THE SUBSTATION DESIGN DRAWING.
 5. FIRE RISK ZONE IS TO BE SHOWN FROM THE EDGE OF THE SUBSTATION SITE. OIL CONTAINMENT TO BE USED TO KEEP THE OIL WITHIN THE SITE. FIRE RISK ZONE MAY BE REDUCED IF MITIGATION OPTIONS ARE USED. REFER DSPM CHAPTER 5.
 6. NOISE IMPACT ZONE IS BASED ON 630kVA TRANSFORMER AND IS MEASURED FROM THE EDGE OF THE TRANSFORMER TANK. NOISE IMPACT ZONE MAY BE REDUCED IF MITIGATION OPTIONS ARE USED. REFER TO "NOISE COMPLIANCE REQUIREMENTS FOR DISTRIBUTION TRANSFORMERS" GUIDELINE.

REV.	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.
B	02.05.23	FIRE RISK ZONE CONTOUR MODIFIED AND NOTES AMENDED	KT	GC	PC
A	06.12.19	ORIGINAL ISSUE	GC	CO	GS

TITLE
**DISTRICT SUBSTATION
 UP TO 630kVA (MPS)
 NON-FIRE RATED - WITH HV SWGR
 CLEARANCES**

DRAWN: JRR		DATE: 14-11-2019	DRG. No.
ORIGINATED: GC		SCALE: NTS	DSPM-3-02
CHECKED: CO		APPROVED:	
GRANT STACY		REV. B	SHT. 4



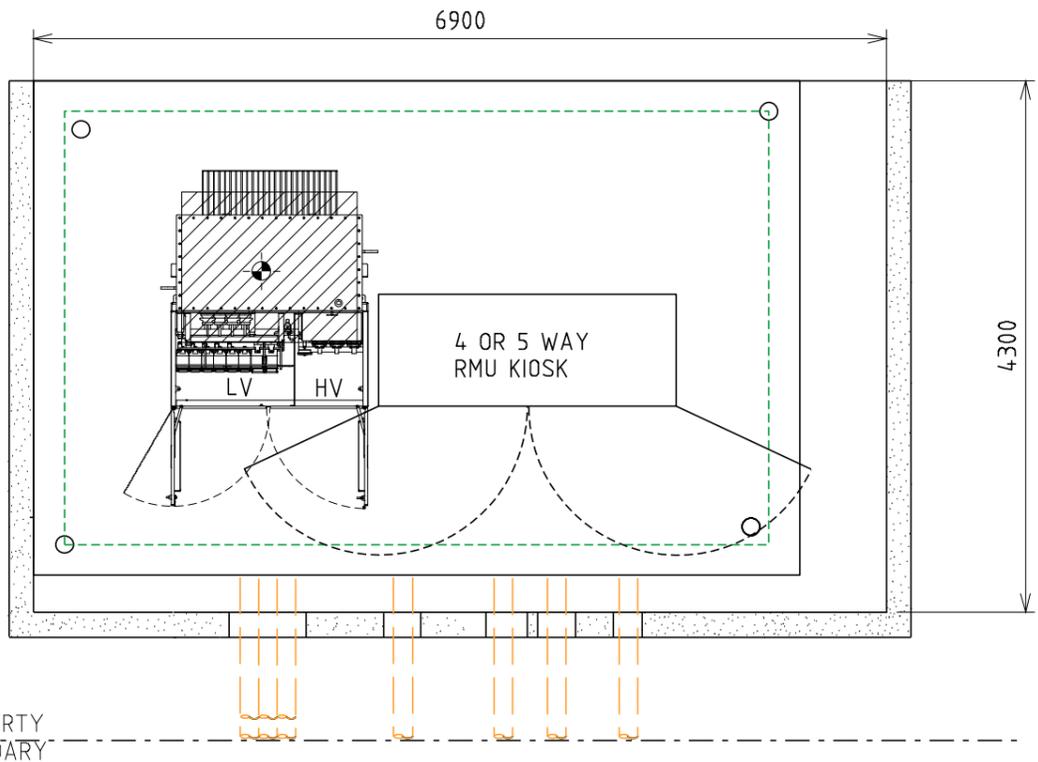
- NOTES:-
1. SEE HU CU IN THE DDC FOR EARTHING MATERIALS.
 2. CONNECT 70mm² PVC INSULATED COPPER CABLE (GREEN/YELLOW) TO EARTH ELECTRODES. INSTALL CABLE AND RODS 1200mm BELOW FGL IN NEW SITES.
 3. BURIED GRADING RING TO BE 100mm BELOW RAILWAY BALLAS/FLAME TRAP, IN SOIL.
 4. LOOP EARTH CABLES TO EARTH RODS INSIDE KIOSK FOR EASE OF TESTING.

REV.	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.
B	02.05.23	NOTES AMENDED	KT	GC	PC
A	06.12.19	ORIGINAL ISSUE	GC	CO	GS

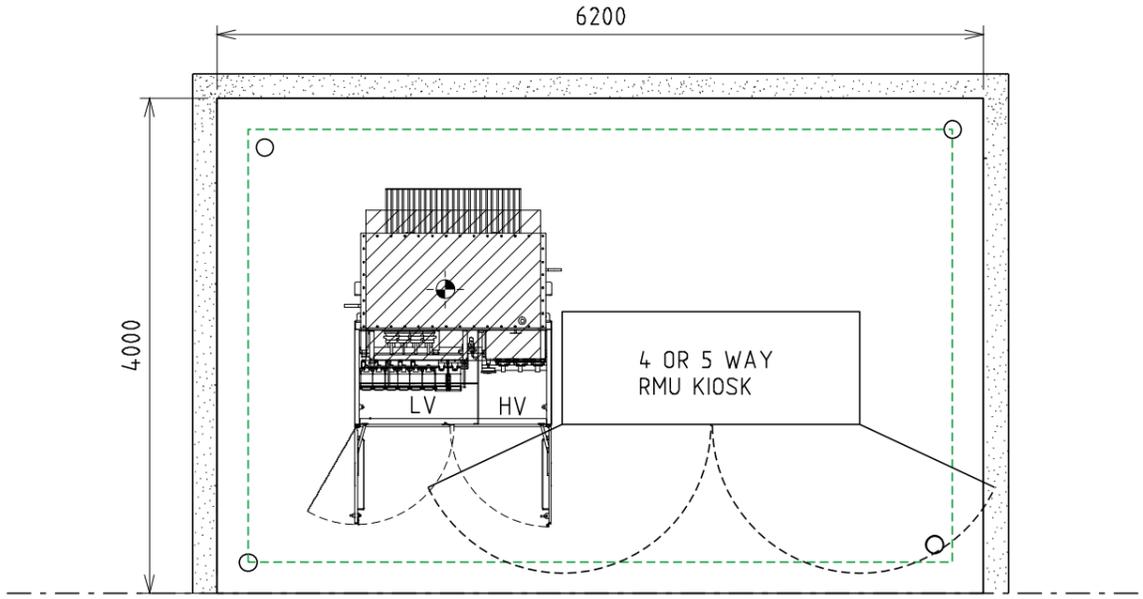
TITLE

**DISTRICT SUBSTATION
UP TO 630kVA (MPS)
NON-FIRE RATED - WITH HV SWGR
EARTHING SINGLE LINE DIAGRAM**

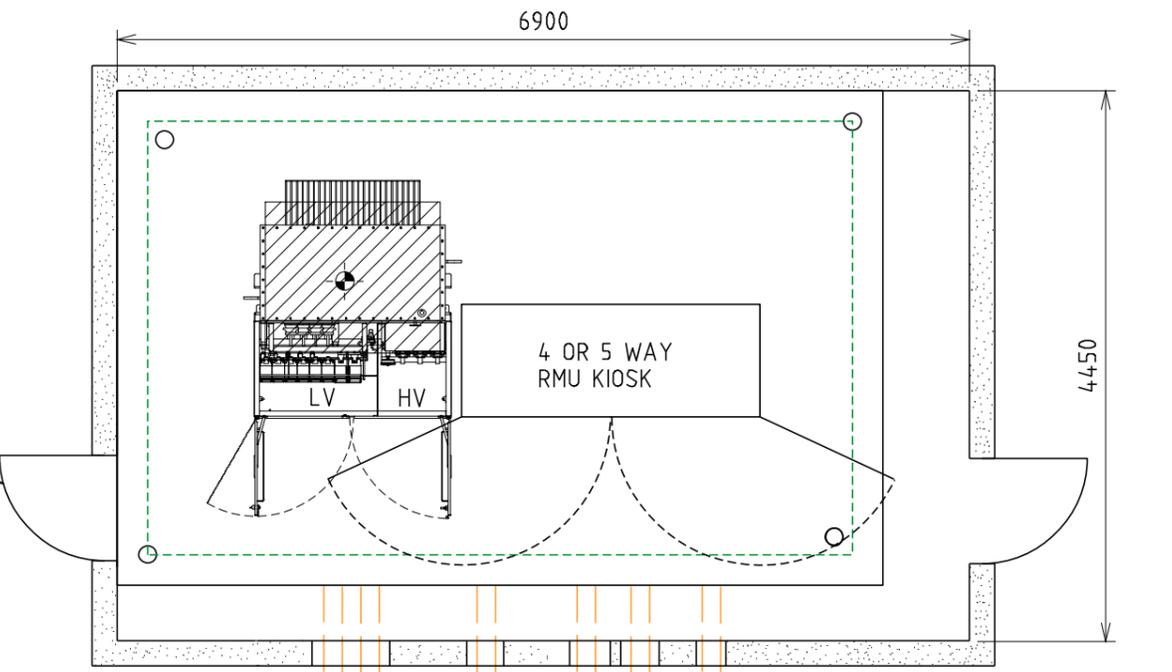
DISTRIBUTION SUBSTATION PLANT MANUAL			
DRAWN: JRR	DATE: 14-11-2019	DRG. No.	
ORIGINATED: GC	SCALE: NTS	DSPM-3-02	
CHECKED: CO	APPROVED:		
GRANT STACY		REV. B	SHT. 5



PARTIAL SCREENING (FRONT)



PARTIAL SCREENING (REAR)



FULL SCREENING

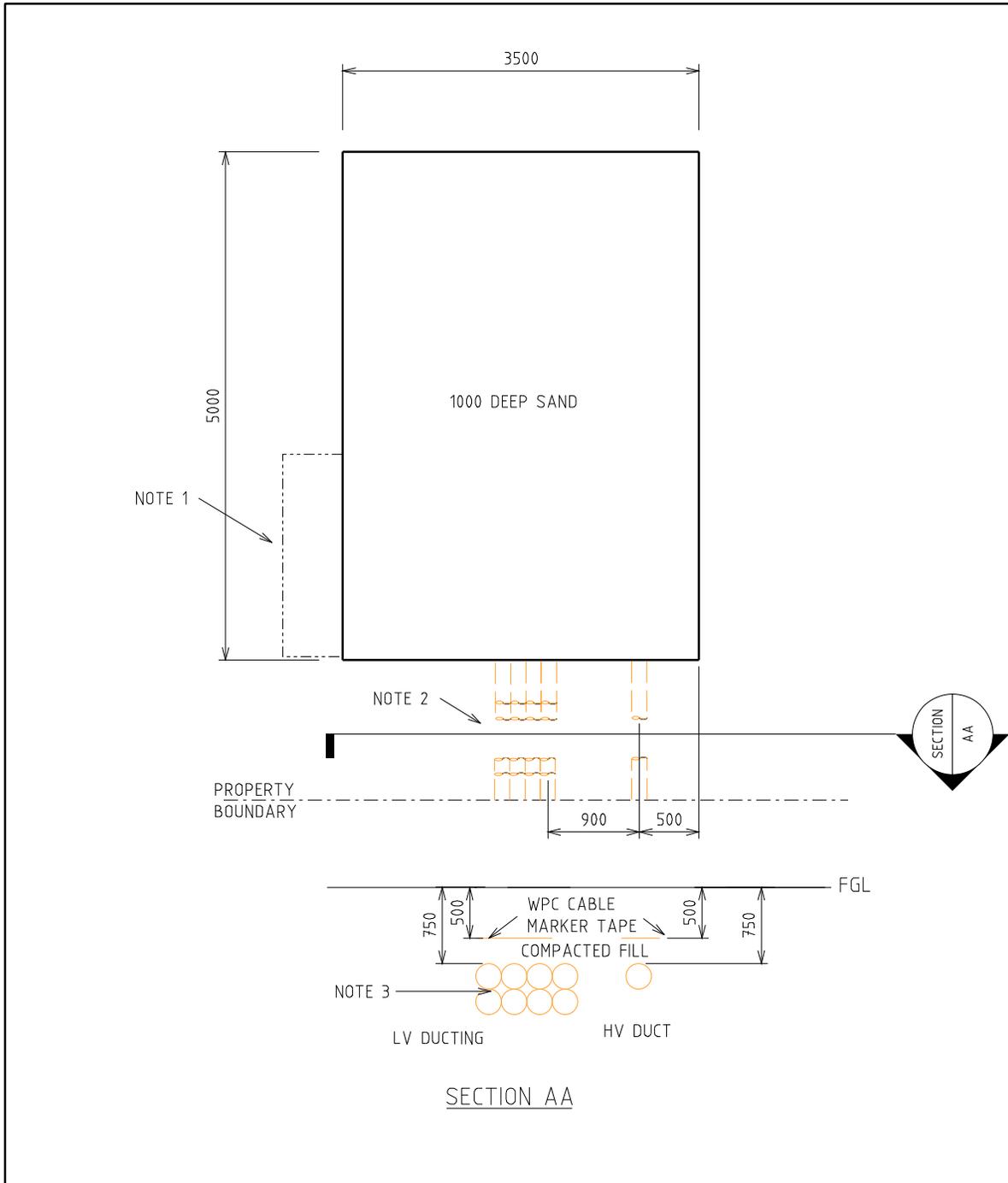
- NOTES:-
1. FOUNDATIONS SHALL FULLY RETAIN THE SITE TO ALLOW FUTURE EXCAVATION 1200mm DEEP WITHIN THE SUBSTATION SITE.
 2. SCREENING OR FOUNDATIONS SHALL NOT ENCROACH INTO SUBSTATION SITE.
 3. SCREENING SHALL NOT IMPACT OPERATIONAL CLEARANCE AND EGRESS REQUIREMENTS SHOWN ON SHEET 4.
 4. DOORS (WHERE FITTED) MUST BE A MINIMUM OF 820 WIDE
 5. NON-COMBUSTIBLE MATERIALS TO BE USED FOR SCREENING WITHIN FIRE RISK ZONE (MASONARY, ETC.)
 6. 2 HR FIRE RATED SCREENING MAY BE USED TO REDUCE THE FIRE RISK ZONE. REFER TO DSPM CHAPTER 5 (FIRE RISK).
 7. MINIMUM HEIGHT OF SCREEN WALL IS TO BE 1.8m (HEIGHT OF TRANSFORMER + 300mm).
 8. DUCTS ARE REQUIRED WHERE CABLES PASS THROUGH WALL OR FOUNDATIONS. REFER TO SHEET 2 FOR DUCTING DETAILS.

REV.	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.
B	02.05.23	NOTES AMENDED			
A	06.12.19	ORIGINAL ISSUE			

TITLE

DISTRICT SUBSTATION
UP TO 630kVA (MPS)
NON FIRE RATED WITH HV SWGR
PERMISSIBLE SCREENING ARRANGEMENTS

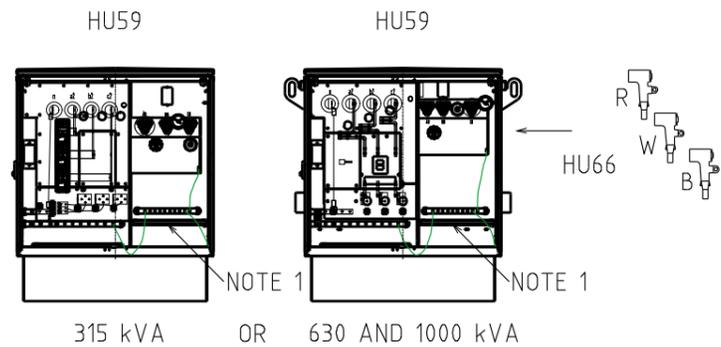
DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower	
DRAWN: JRR	DATE: 14-11-2019	DRG. No.	
ORIGINATED: GC	SCALE: NTS	DSPM-3-02	
CHECKED: CO	APPROVED:	REV. B	SHT. 6
GRANT STACY			



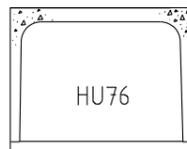
NOTES:-

1. SITE OF CUSTOMERS MAIN DISTRIBUTION BOARD (IF REQUIRED).
2. DUCTING REQUIRED IF LAND REQUIREMENT IS SET BACK FROM ROAD RESERVE BOUNDARY.
3. 8x100 (LV) & 1x150 (HV) ID HEAVY DUTY DUCT (CN56).

				TITLE			DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower		
				DISTRICT SUBSTATION UP TO 1000kVA (NON-MPS) NON FIRE RATED DUCTS & LAND REQUIREMENTS						DRG. No.	
				DRAWN: KT		DATE: 21-03-2022		DSPM-3-03			
				ORIGINATED: KT		SCALE: NTS					
				CHECKED: GC		APPROVED:		REV. A			
				APPROVED:		PHIL CAPPER		SH. 2			
A	02.05.23	ORIGINAL ISSUE		KT	GC	PC					
REV	DATE	DESCRIPTION		DRG.	CHKD.	APRD.					



315, 630 & 1000 kVA



BOX CULVERT - CROWN AND BASE TYPE
EXTERNAL SIZE = 1416 x 1022 x 1220 LONG
CROWN WEIGHT = 1038 kg
BASE WEIGHT = 384 kg

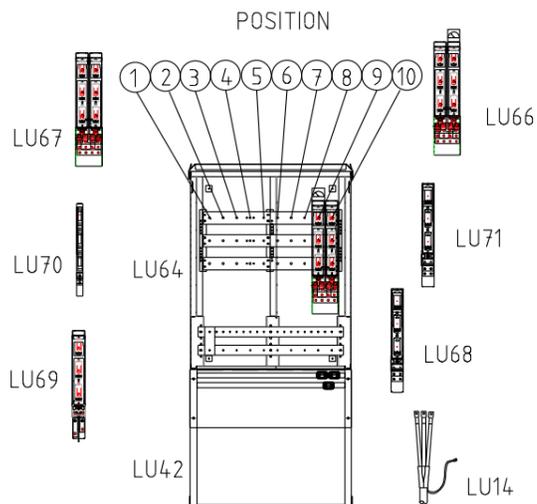
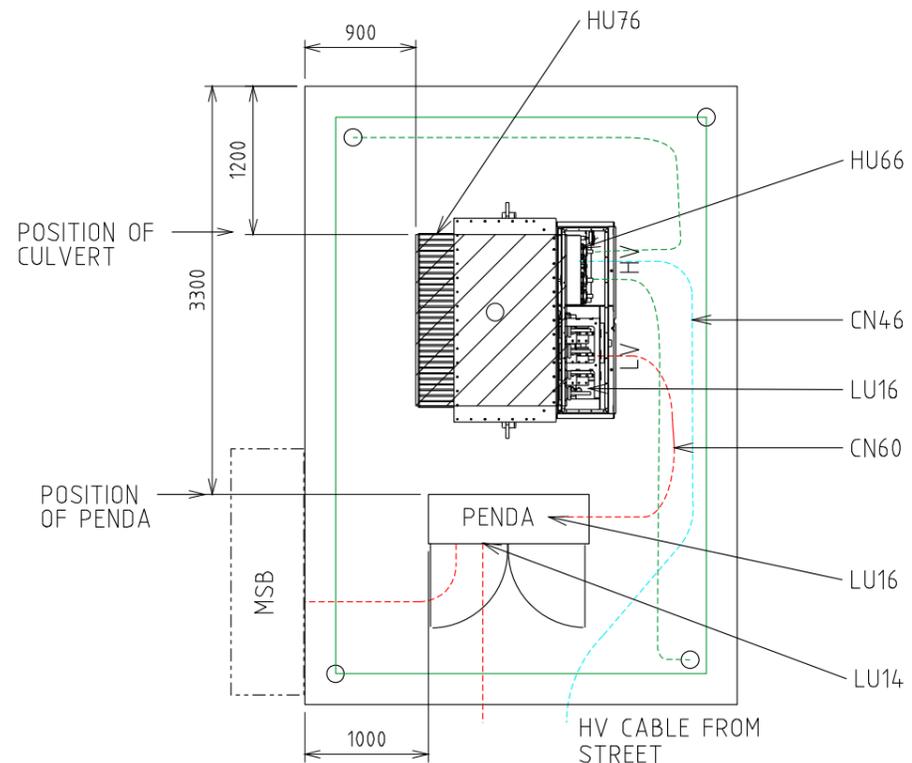
TRANSFORMER MATERIALS (QTY)

CU	440V	6/11kV	22kV
HU59/315			
HU59/630			
HU59/1000			
HU66			
CN60			
LU16			
HU76			

TYPE 2.1 PENDA LAYOUT

SWG	MAX FUSE	CU	1	2	3	4	5	6	7	8	9	10
TYPE 2.1 PENDA		LU64										
PENDA BASE		LU42										
160A FSD	1 X 63A DIN 00	LU70				L L						
630 FSD	1 X 400A NH2	LU69	C/S									
910A FSD	1 X 630A NH3	LU68									E	
1260A FSD	2 X 400A NH2	LU67		C		C						
1000A SWD	LINKS SUPPLIED	LU71	C									
2000A SWD	LINKS SUPPLIED	LU66		C1								T1
FSD CABLE TERM	FUSES SUPPLIED	LU14	S	S	S	L/S	S	S	S			
TX CABLE TERM	TX MCCB	LU16										T1

T = TRANSFORMER L = LIGHTING CIRCUIT E = EMERGENCY RESPONSE GENERATOR
C = CUSTOMER S = STREET CIRCUIT

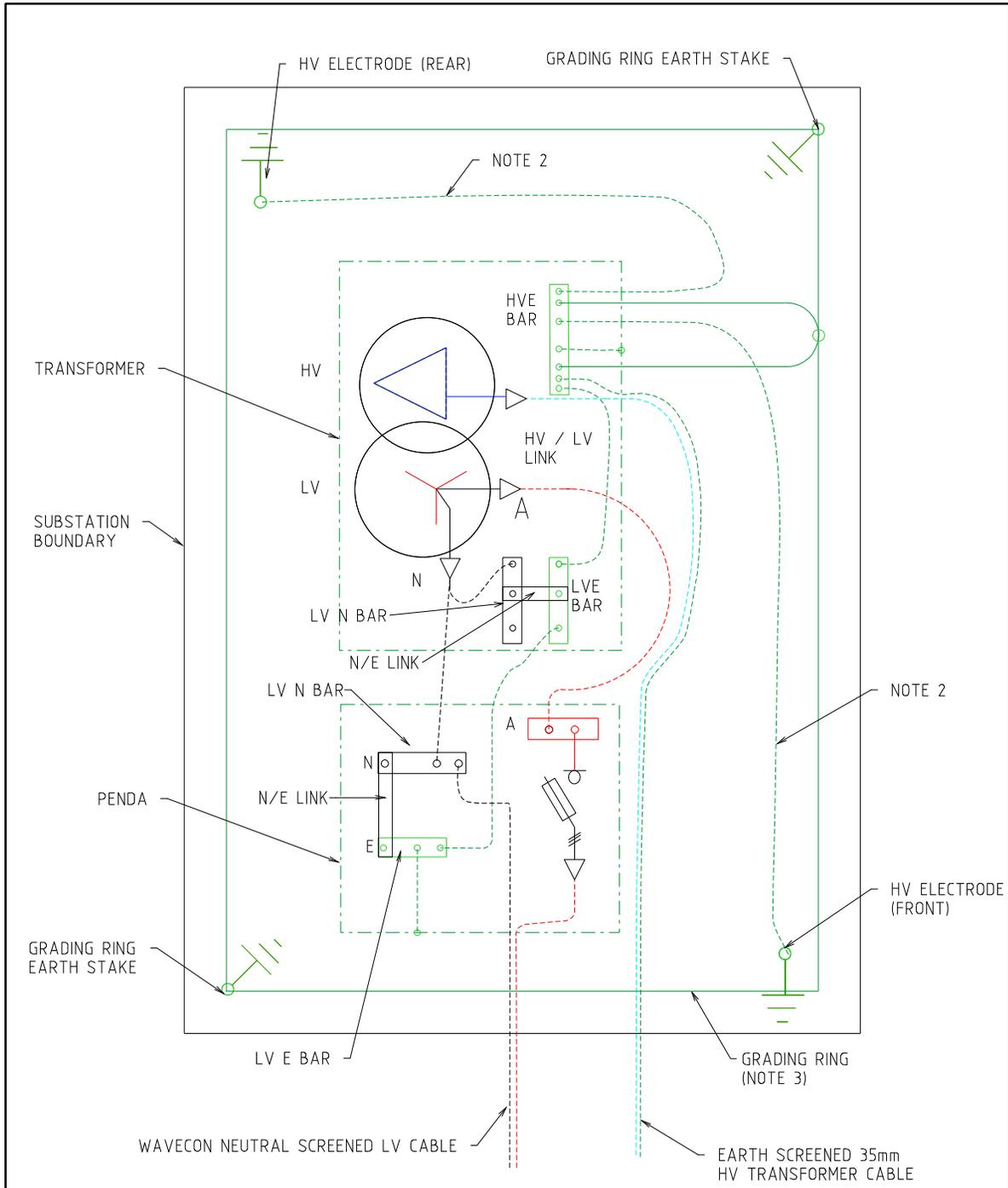


NOTES:-

1. INSTALL CABLE CLAMP ON EACH PHASE OF HV CABLE (FM0200).
2. LU66 CAN BE USED FOR THE TRANSFORMER AND CUSTOMER.
3. EVERY INSTALLATION SHALL INCLUDE AN ERG CONNECTION LU68.
4. 2 x LU70 OR 1 x LU69 CAN BE USED IN POSITION 4.
5. 1 X LU14 NEEDED WITH EACH LU69 STREET FEEDER OR LU70 LIGHTING CIRCUIT.
6. 1 X LU16 NEEDED WITH EACH LU66_TX IN PENDA AND 1 X LU16 FOR LU59 (NON-MPS).
7. LU66_TX WILL DEFAULT TO POSITIONS 9 & 10 UNLESS POSITION 1 & 2 IS SPECIFIED BY THE DESIGNER.
8. STANDARD PENDA LAYOUT SHOWN. DESIGNER MAY DESIGN AN ALTERNATIVE PENDA LAYOUT.
9. NO GANGED FSD OR SWD PERMITTED SPANING POSITIONS 5 & 6 OR 6 & 7.
10. LU71 ONLY TO BE USED WHERE THERE IS UPSTREAM LV PROTECTION (I.E. MKII NON MPS).
11. NO GANGED FSD OR SWD PERMITTED SPANING POSITIONS 5 & 6 OR 6 & 7.
12. REFER DSPM CHAPTER 4 FOR THE CORRECT POSITIONING OF THE NON-MPS ONTO THE CULVERT.
13. MEASUREMENTS SHOWN ARE ± 50mm, SAME CONSTRUCTION TOLERANCE APPLIES.
14. TRANSFORMER OIL IS TO BE CONTAINED WITHIN THE SITE.

REV.	DATE	DESCRIPTION	KT	GC	PC	ORGD.	CHKD.	APRD.
A	02.05.23	ORIGINAL ISSUE						

TITLE		DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower	
DISTRICT SUBSTATION UP TO 1000kVA (NON MPS) NON FIRE RATED EQUIPMENT & SITE LAYOUT		DRAWN: KT		DATE: 23-03-2022	
		ORIGINATED: KT		SCALE: NTS	
		CHECKED: PC		ORG. No.	
		APPROVED: PHIL CAPPER		DSPM-3-03	
				REV. A	
				SHT. 3	



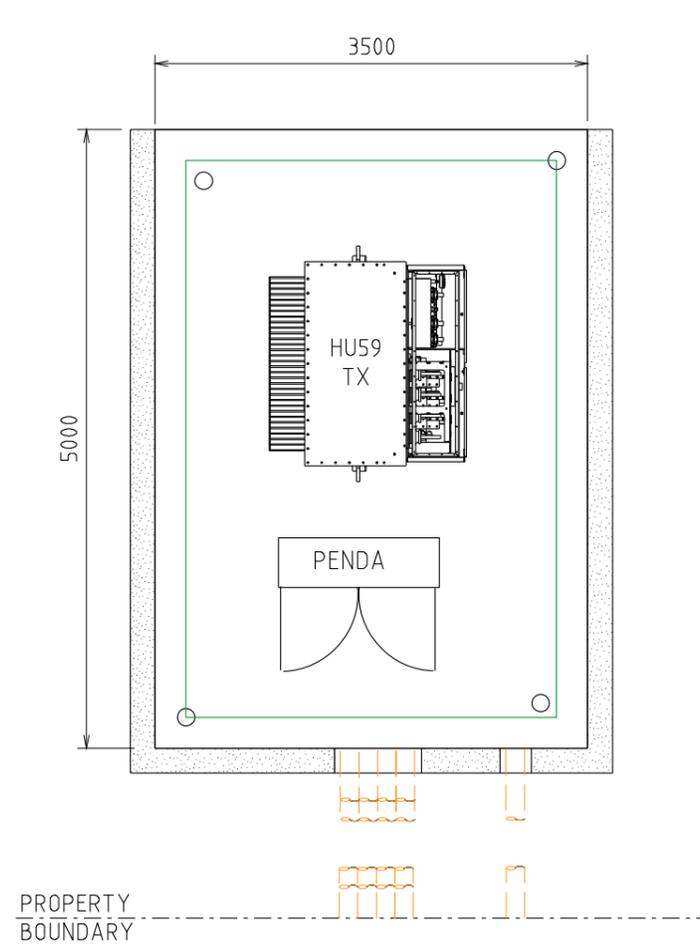
NOTES:-

1. SEE HU CU IN THE DDC FOR EARTHING MATERIALS
2. CONNECT 70mm² PVC INSULATED COPPER CABLE (GREEN/YELLOW) TO EARTH ELECTRODES. INSTALL CABLE AND RODS 1200mm BELOW FGL IN NEW SITES.
3. BURIED GRADING RING TO BE 100mm BELOW RAILWAY BALLAST/FLAME TRAP, IN SOIL.

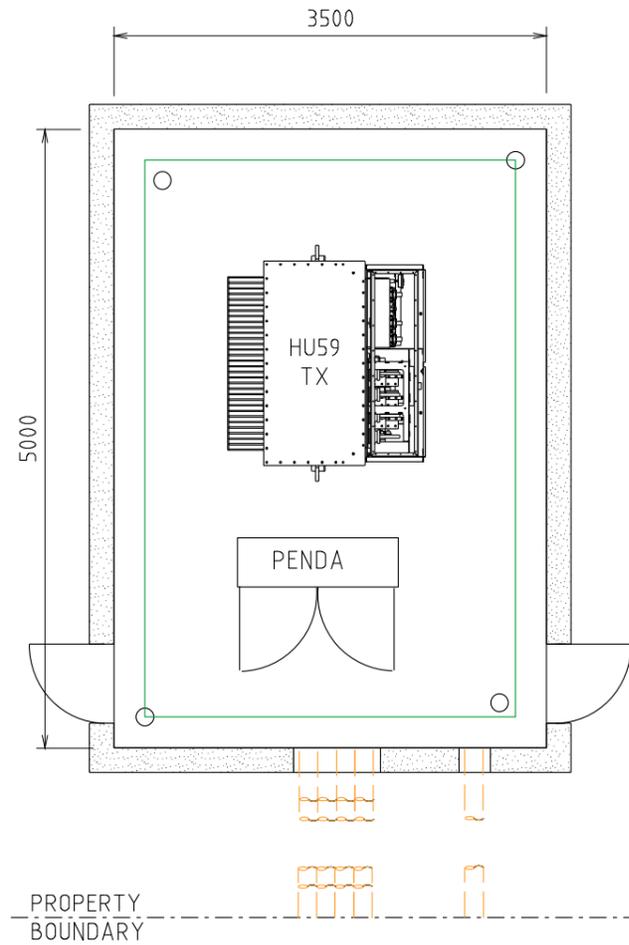
REV	DATE	DESCRIPTION	KT	GC	PC
A	02.05.23	ORIGINAL ISSUE			

**DISTRICT SUBSTATION
UP TO 1000 kVA (NON-MPS)
NON-FIRE RATED
EARTHING ARRANGEMENT**

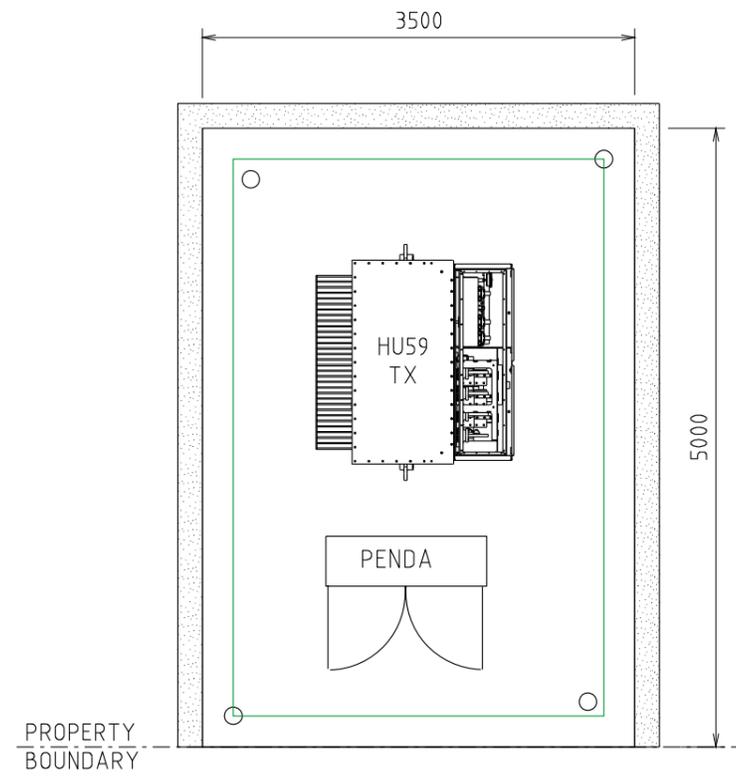
DISTRIBUTION SUBSTATION PLANT MANUAL			
DRAWN: KT	DATE: 23-03-2022	DRG. No.	
ORIGINATED: KT	SCALE: NTS	DSPM-3-03	
CHECKED: PC	APPROVED: PHIL CAPPER	REV. A	SHT. 5



PARTIAL (FRONT) SCREENING



FULL SCREENING



PARTIAL (REAR) SCREENING

NOTES:-

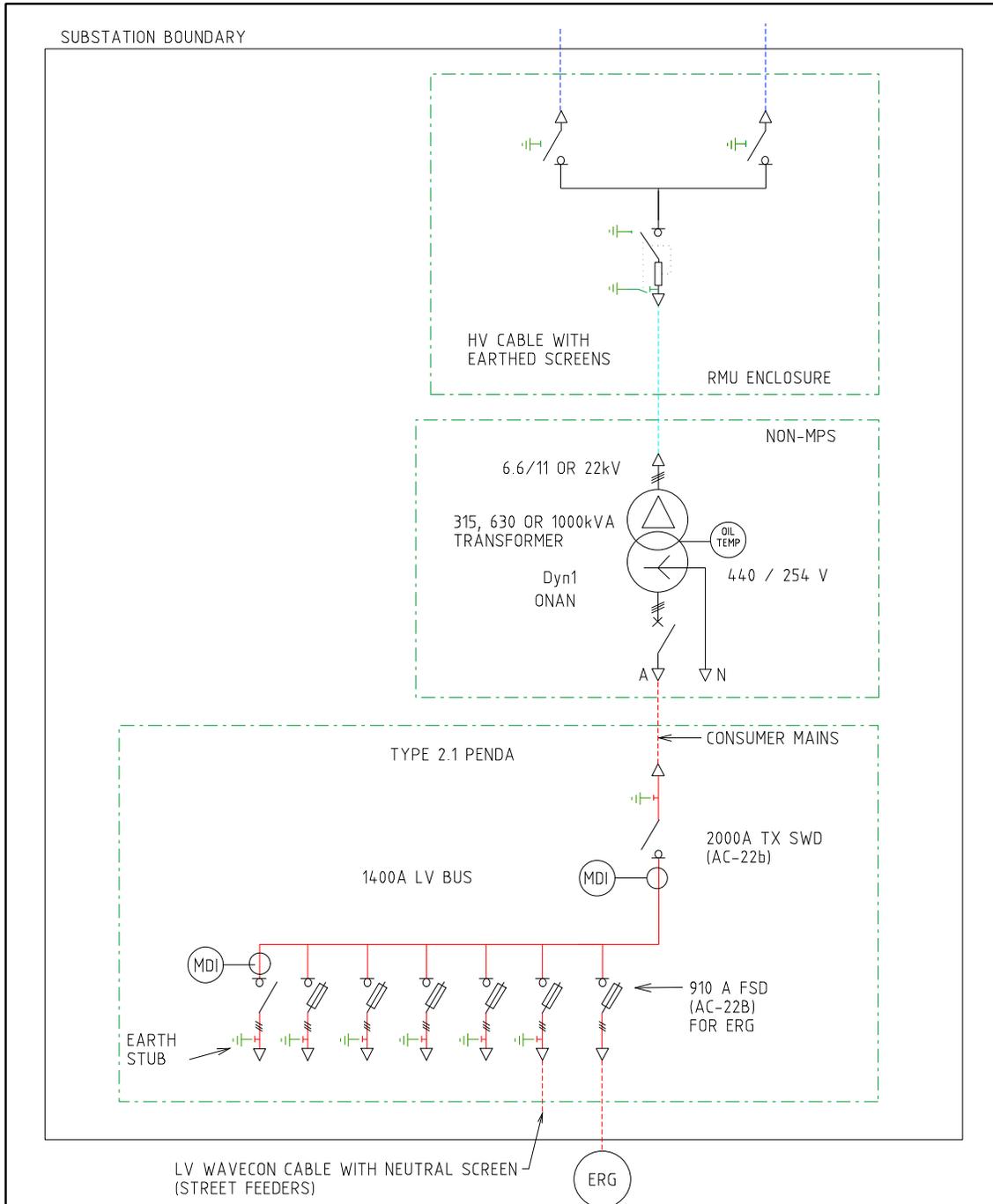
1. FOUNDATIONS SHALL FULLY RETAIN THE SITE TO ALLOW FUTURE EXCAVATION 1200mm DEEP WITHIN THE SUBSTATION SITE.
2. SCREENING OR FOUNDATIONS SHALL NOT ENCR OACH INTO SUBSTATION SITE.
3. SCREENING SHALL NOT IMPACT OPERATIONAL CLEARANCE AND EGRESS REQUIREMENTS SHOWN ON SHEET 4.
4. DOORS (WHERE FITTED) MUST BE A MINIMUM OF 820 WIDE.
5. NON-COMBUSTIBLE MATERIALS TO BE USED FOR SCREENING (MASONARY, ETC.)
6. 2HR FIRE RATED SCREENING MAY BE USED TO REDUCE THE FIRE RISK ZONE. REFER DSPM CHAPTER 5 (FIRE RISK)
7. MINIMUM HEIGHT OF SCREEN WALL IS TO BE 1.8m (HEIGHT OF TRANSFORMER + 300mm).
8. DUCTS ARE REQUIRED WHERE CABLES PASS THROUGH WALL OR FOUNDATIONS. REFER TO SHEET 2 FOR DUCTING DETAILS.

REV.	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.
A	02.05.23	ORIGINAL ISSUE	KT	GC	PC

TITLE	DISTRICT SUBSTATION UP TO 1000 kVA (NON-MPS) NON-FIRE RATED SCREENING ARRANGEMENTS
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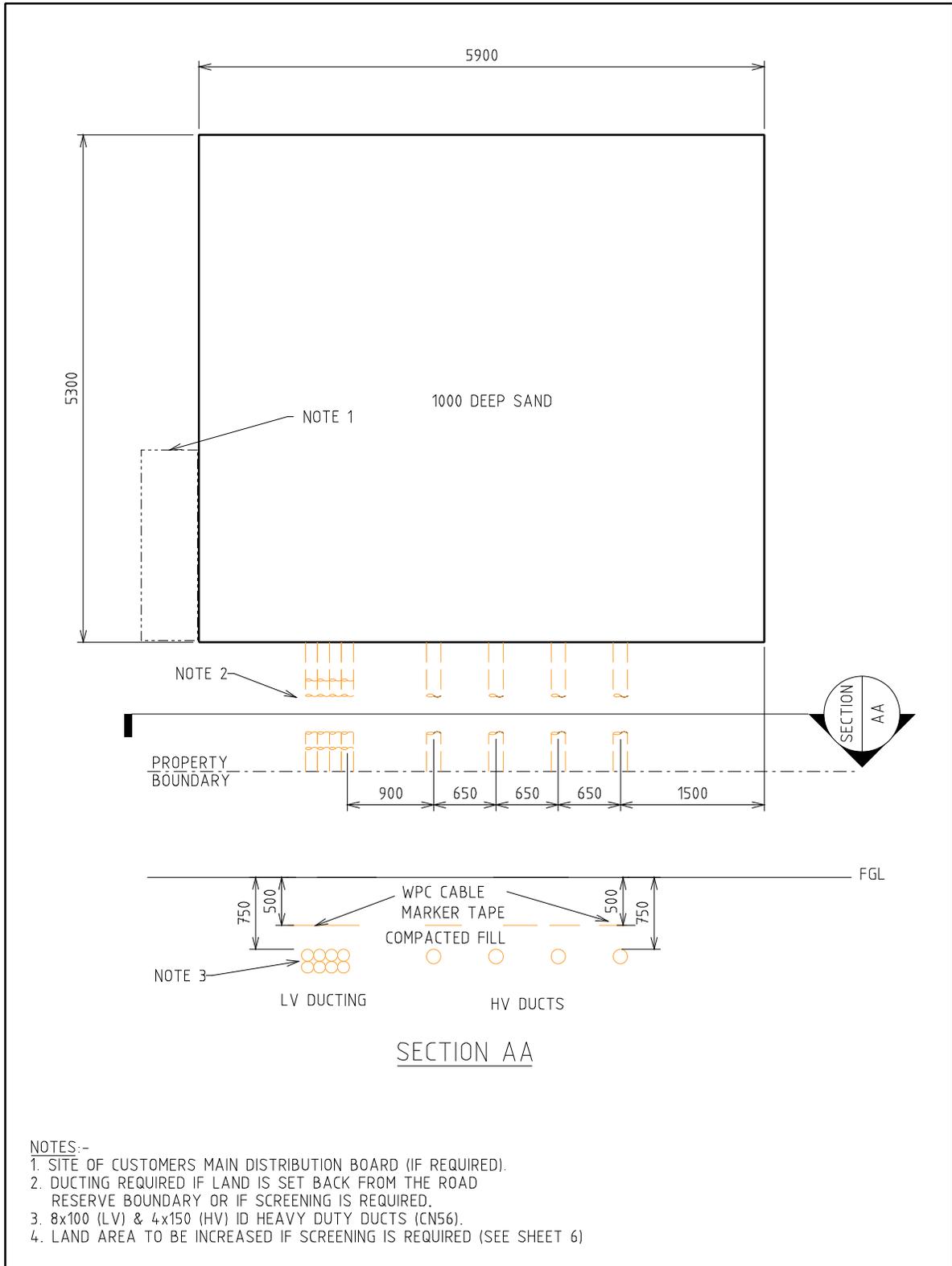
DISTRIBUTION SUBSTATION PLANT MANUAL			
DRAWN: KT	DATE: 23-03-2022	DRG. No.	
ORIGINATED: KT	SCALE: NTS	DSPM-3-03	
CHECKED: GC	APPROVED: PHIL CAPPER	REV. A	SHT. 6

4.2.4 DSPM-3-04 Up to 1000kVA (Non-MPS) with HV SWGR



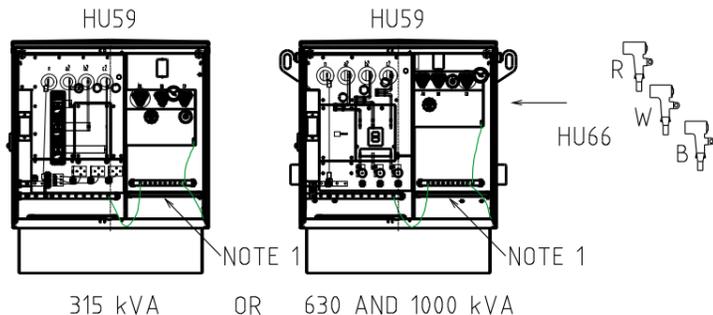
- NOTES:-
1. 2+1 RMU OPTION SHOWN (2 SWITCH-DISCONNECTORS AND 1 COMBINED FUSE-SWITCH)
 2. OTHER OPTIONS (NOT SHOWN) INCLUDE 3+0, 2+2 OR 3+1
 3. HV SWITCH-DISCONNECTORS MAY BE MOTORISED AND AUTOMATED
 4. PENDA LAYOUT TO BE DETERMINED BY THE DESIGNER, SEE SHEET 3 AND DSPM CHAPTER 4.

				TITLE		DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower			
				DISTRICT SUBSTATION UP TO 1000 kVA (NON- MPS) NON-FIRE RATED - WITH HV SWGR SINGLE LINE DIAGRAM						DRG. No.	
				DRAWN: KT		DATE: 28-03-2022		SCALE: NTS		DSPM-3-04	
				ORIGINATED: KT		CHECKED: GC		APPROVED: PHIL CAPPER		REV. SHY. 1	
				A 02.05.23 ORIGINAL ISSUE		KT GC PC					
				REV DATE		DESCRIPTION		ORGO,CHKD,APRD			



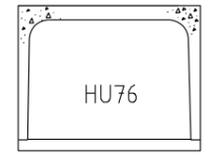
- NOTES:-
1. SITE OF CUSTOMERS MAIN DISTRIBUTION BOARD (IF REQUIRED).
 2. DUCTING REQUIRED IF LAND IS SET BACK FROM THE ROAD RESERVE BOUNDARY OR IF SCREENING IS REQUIRED.
 3. 8x100 (LV) & 4x150 (HV) ID HEAVY DUTY DUCTS (CN56).
 4. LAND AREA TO BE INCREASED IF SCREENING IS REQUIRED (SEE SHEET 6)

				TITLE			DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower		
				DISTRICT SUBSTATION UP TO 1000 kVA (NON-MPS) NON-FIRE RATED - WITH HV SWGR REQUIREMENTS AND DUCT INSTALLATION						DRG. No.	
				DRAWN: KT		DATE: 28-03-2022		DSPM-3-04			
				ORIGINATED: KT		SCALE: NTS					
				CHECKED: GC		APPROVED: PHIL CAPPER		REV. A SHT. 2			
A	02.05.23	ORIGINAL ISSUE		KT	GC	PC					
REV	DATE	DESCRIPTION		DRGD.	CHKD.	APROD					



315 kVA OR 630 AND 1000 kVA

315, 630 & 1000 kVA



BOX CULVERT - CROWN AND BASE TYPE
EXTERNAL SIZE = 1416 x 1022 x 1220 LONG
CROWN WEIGHT = 1038 kg
BASE WEIGHT = 384 kg

TRANSFORMER MATERIALS (QTY)

CU	440V	6/11kV	22kV
HU59/315			
HU59/630			
HU59/1000			
HU66			
CN60			
LU16			
HU76			

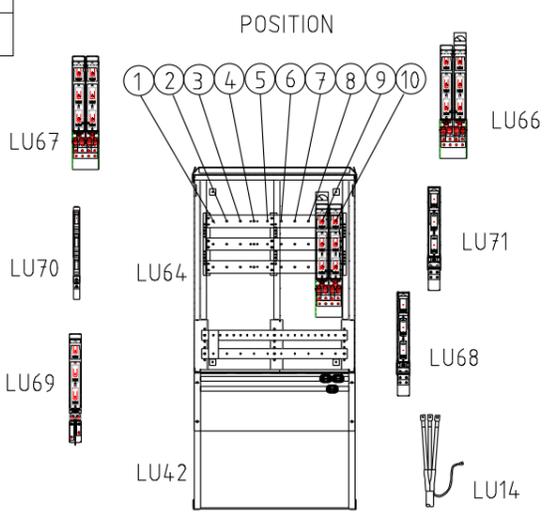
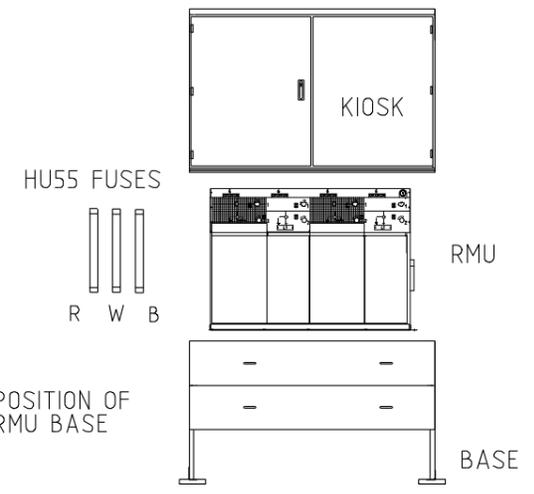
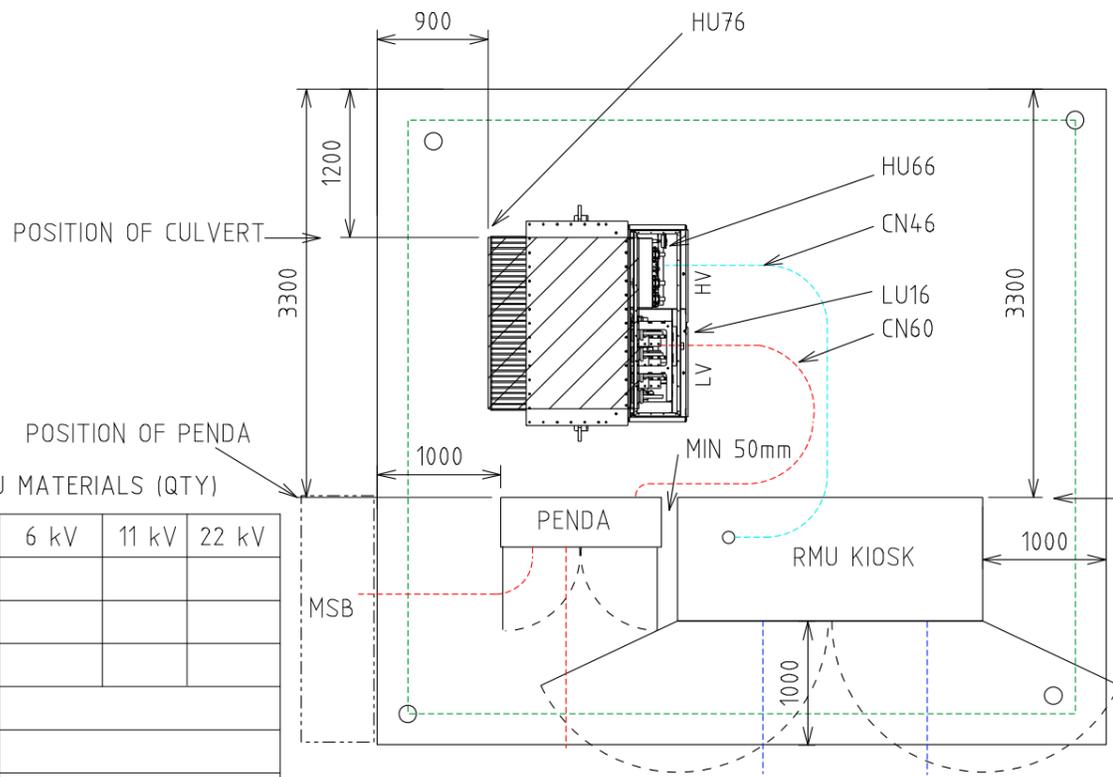
RMU MATERIALS (QTY)

CU	6 kV	11 kV	22 kV
HU55/315			
HU55/630			
HU55/1000			
HU6			
HU7			
HU8			
HU80			
HU81			
CN46			
DA6			
DA10			

TYPE 2.1 PENDA LAYOUT

SWG	MAX FUSE	CU	1	2	3	4	5	6	7	8	9	10
TYPE 2.1 PENDA		LU64										
PENDA BASE		LU42										
160A FSD	1 X 63A DIN 00	LU70										
630 FSD	1 X 400A NH2	LU69	C/S									
910A FSD	1 X 630A NH3	LU68									E	
1260A FSD	2 X 400A NH2	LU67	C		C							
1000A SWD	LINKS SUPPLIED	LU71	C									
2000A SWD	LINKS SUPPLIED	LU66	C1									T1
FSD CABLE TERM	FUSES SUPPLIED	LU14	S	S	S	L/S	S	S	S			
TX CABLE TERM	TX MCCB	LU16										T1

T = TRANSFORMER L = LIGHTING CIRCUIT E = EMERGENCY RESPONSE GENERATOR
C = CUSTOMER S = STREET CIRCUIT

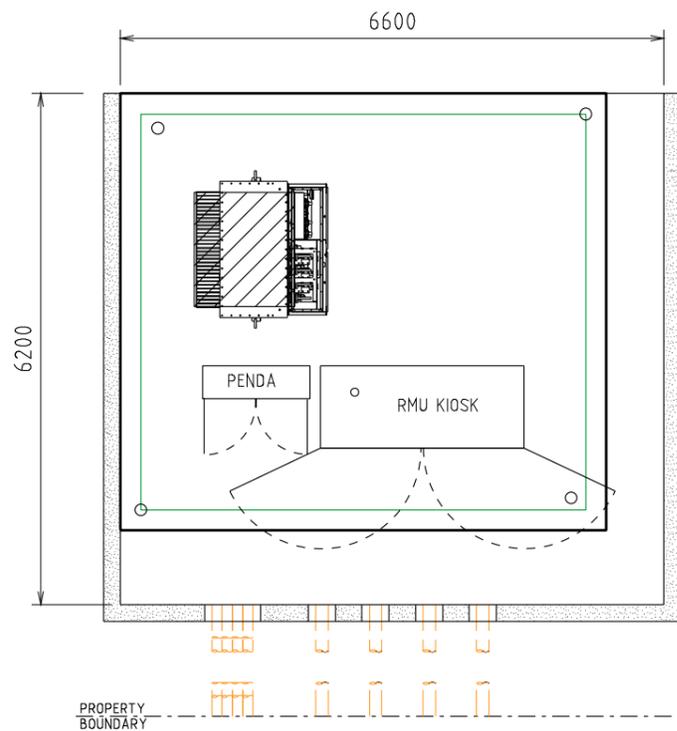


- NOTES:-
1. INSTALL CABLE CLAMP ON EACH PHASE OF HV CABLE (FM0200).
 2. LU66 CAN BE USED FOR THE TRANSFORMER AND CUSTOMER.
 3. EVERY INSTALLATION SHALL INCLUDE AN ERG CONNECTION LU68.
 4. 2 X LU70 OR 1 X LU69 CAN BE USED IN POSITION 4.
 5. 1 X LU14 NEEDED WITH EACH LU69 STREET FEEDER OR LU70 LIGHTING CIRCUIT.
 6. 1 X LU16 NEEDED WITH EACH LU66_TX IN PENDA AND 1 X LU16 FOR LU59 (NON-MPS).
 7. LU66_TX WILL DEFAULT TO POSITIONS 9 & 10 UNLESS POSITION 1 & 2 IS SPECIFIED BY THE DESIGNER.
 8. STANDARD PENDA LAYOUT SHOWN. DESIGNER MAY DESIGN AN ALTERNATIVE PENDA LAYOUT.
 9. NO GANGED FSD OR SWD PERMITTED SPANING POSITIONS 5 & 6 OR 6 & 7.
 10. LU71 ONLY TO BE USED WHERE THERE IS UPSTREAM LV PROTECTION (I.E. MKII NON MPS).
 11. NO GANGED FSD OR SWD PERMITTED SPANING POSITIONS 5 & 6 OR 6 & 7.
 12. REFER DSPM CHAPTER 4 FOR THE CORRECT POSITIONING OF THE NON-MPS ONTO THE CULVERT.
 13. REFER TO DSPM CHAPTER 4 FOR THE CORRECT INSTALLATION OF THE RMU BASE.
 14. MEASUREMENTS SHOWN ARE ± 50mm, SAME CONSTRUCTION TOLERANCE APPLIES.
 15. RMU, KIOSK BASE AND CABLE TERMINATIONS SUPPLIED IN RMU CU.
 16. TRANSFORMER OIL IS TO BE CONTAINED WITHIN THE SITE.
 17. REFER TO DSPM CHAPTER 4 FOR AUTOMATION DETAILS.

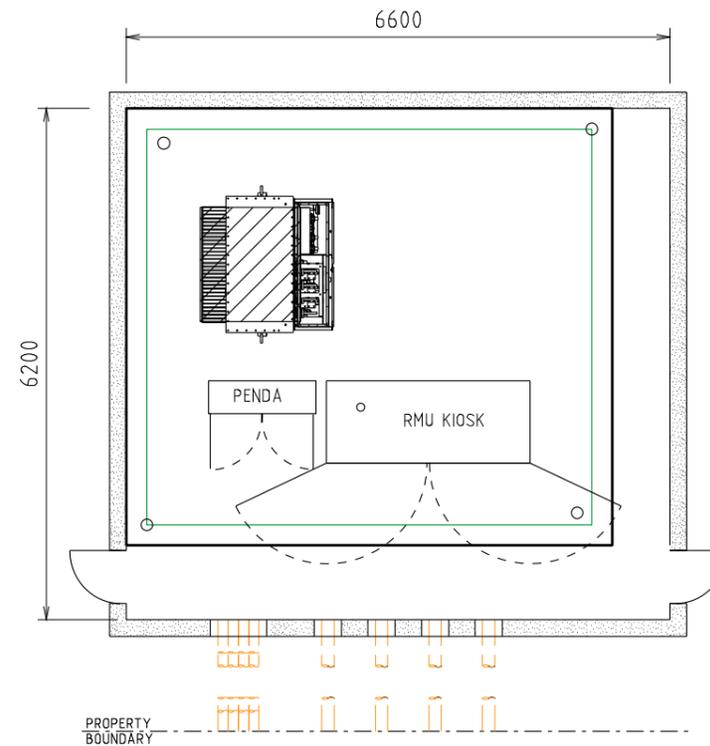
REV.	DATE	DESCRIPTION	KT	GC	PC
A	02.05.23	ORIGINAL ISSUE			

TITLE
DISTRICT SUBSTATION
UP TO 1000 kVA (NON-MPS)
NON-FIRE RATED - WITH HV SWGR
EQUIPMENT SELECTION AND LAYOUT

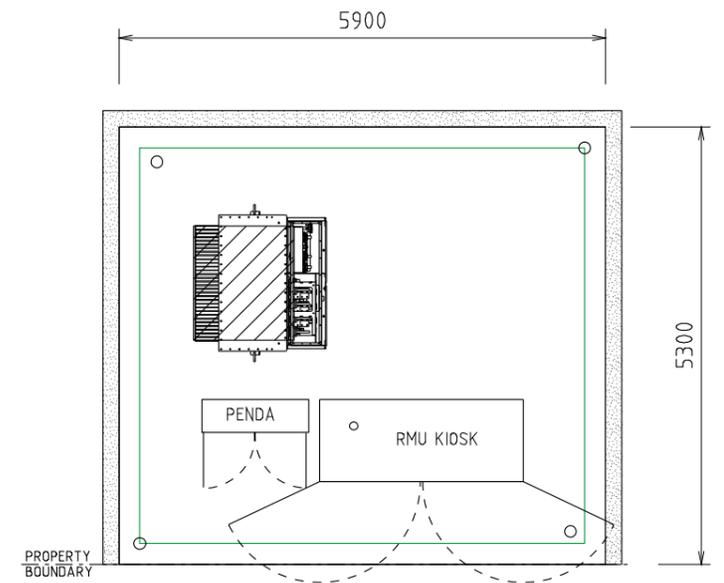
DISTRIBUTION SUBSTATION PLANT MANUAL			
DRAWN: KT	DATE: 28-03-2022	DRG. No.	
ORIGINATED: KT	SCALE: NTS	DSPM-3-04	
CHECKED: GC	APPROVED: PHIL CAPPER	REV. A	SHT. 3



PARTIAL (FRONT) SCREENING



FULL SCREENING



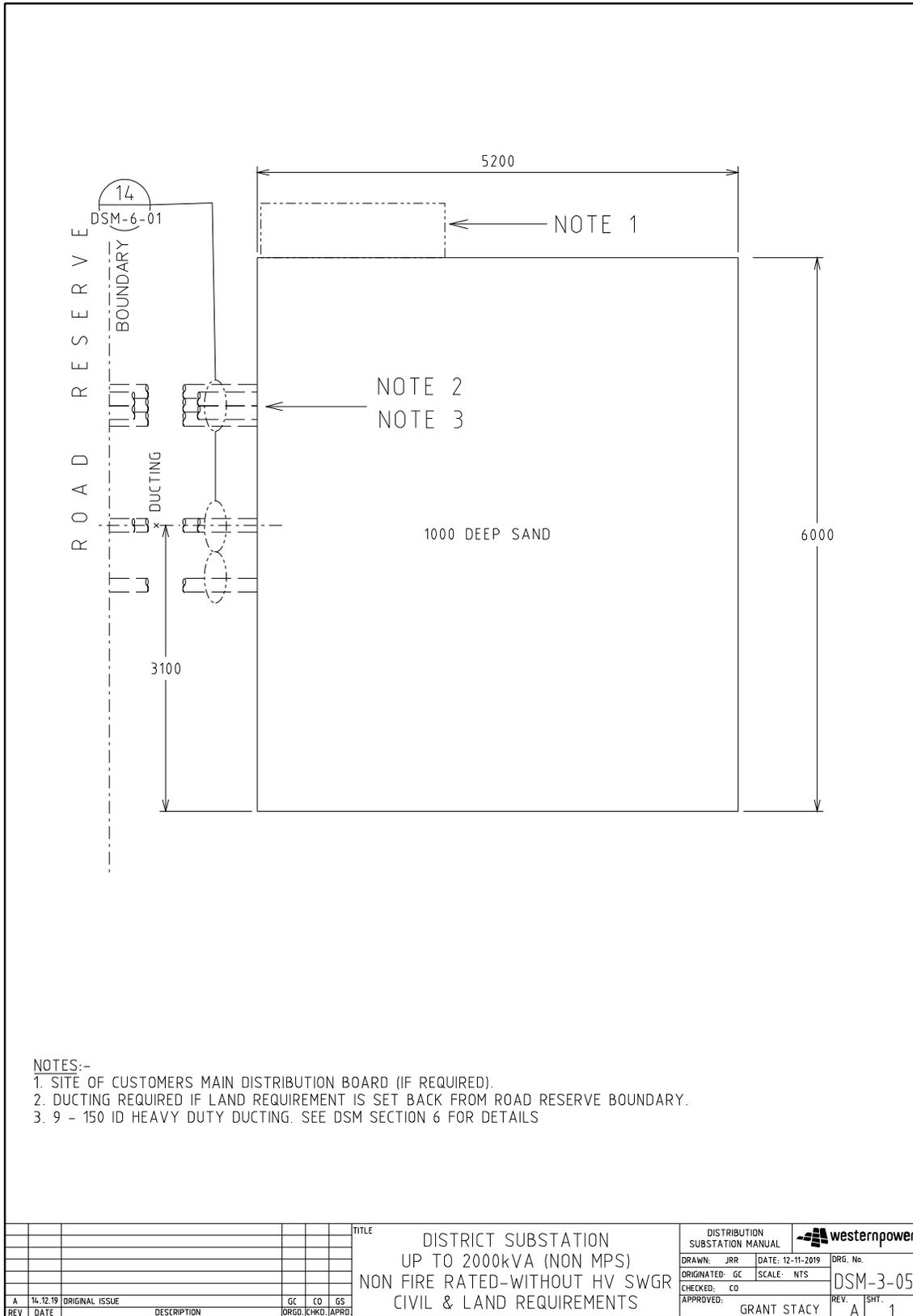
PARTIAL (REAR) SCREENING

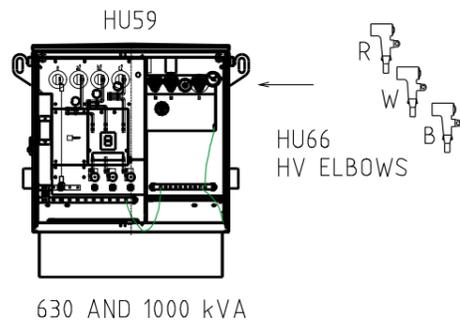
NOTES:-

1. FOUNDATIONS SHALL FULLY RETAIN THE SITE TO ALLOW FUTURE EXCAVATION 1200mm DEEP WITHIN THE SUBSTATION SITE.
2. SCREENING OR FOUNDATIONS SHALL NOT ENCROACH INTO SUBSTATION SITE.
3. SCREENING SHALL NOT IMPACT OPERATIONAL CLEARANCE AND EGRESS REQUIREMENTS SHOWN ON SHEET 4.
4. DOORS (WHERE FITTED) MUST BE A MINIMUM OF 820 WIDE
5. NON-COMBUSTIBLE MATERIALS TO BE USED FOR SCREENING (MASONARY, ETC.)
6. 2HR FIRE RATED SCREENING MAY BE USED TO REDUCE THE FIRE RISK ZONE. REFER DSPM CHAPTER 5 (FIRE RISK)
7. MINIMUM HEIGHT OF SCREEN WALL IS TO BE 1.8M (HEIGHT OF TRANSFORMER + 300mm).
8. DUCTS ARE REQUIRED WHERE CABLES PASS THROUGH WALL OR FOUNDATIONS. REFER TO SHEET 2 FOR DUCTING DETAILS.

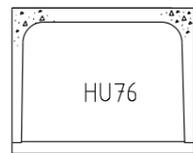
					TITLE			DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower	
					DISTRICT SUBSTATION UP TO 1000 kVA NON- MPS NON-FIRE RATED - WITH HV SWGR SCREENING ARRANGEMENTS			DRAWN: KT		DATE: 30-03-2022	
								ORIGINATED: KT		SCALE: NTS	
								CHECKED: GC		DSPM-3-04	
								APPROVED: PHIL CAPPER		REV. A SHT. 6	
A	02.05.23	ORIGINAL ISSUE			KT	GC	PC				
REV.	DATE	DESCRIPTION			ORGD.	CHKD.	APRD.				

4.2.5 DSM-3-05 Up to 2000kVA (Non-MPS)





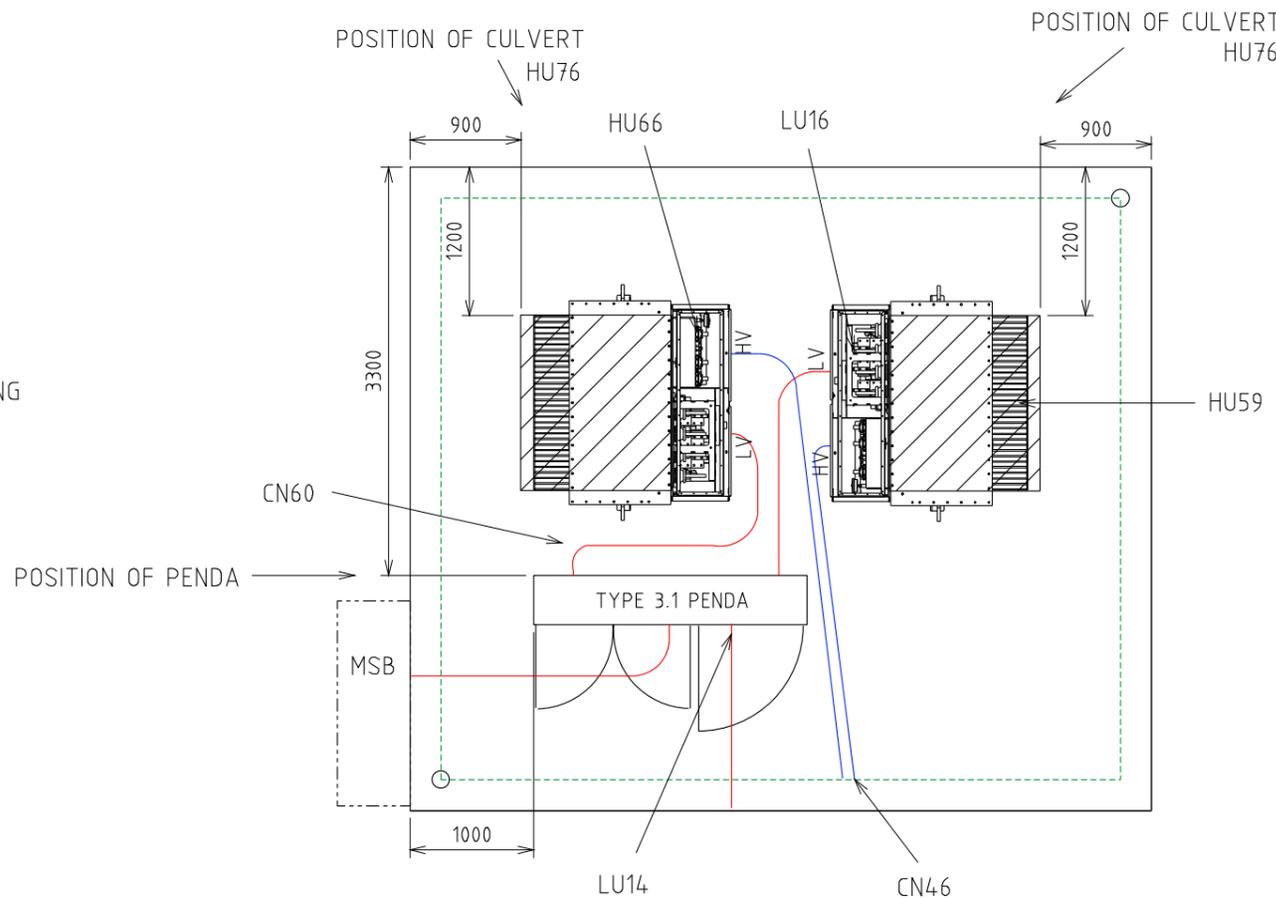
630 AND 1000 kVA



BOX CULVERT - CROWN AND BASE TYPE
 EXTERNAL SIZE = 1416 x 1022 x 1220 LONG
 CROWN WEIGHT = 1038 kg
 BASE WEIGHT = 384 kg

TRANSFORMER MATERIALS (QTY)

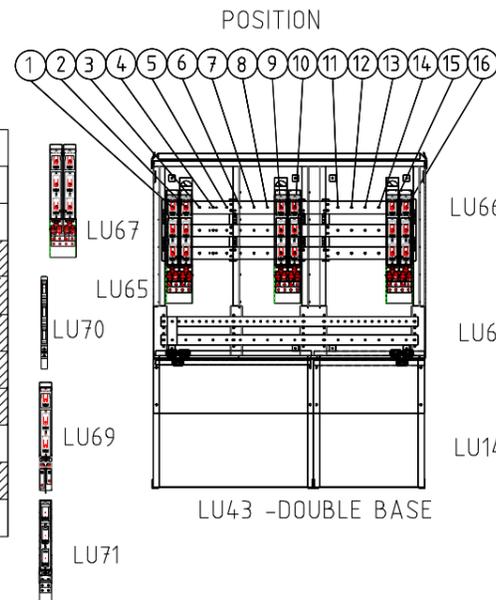
CU	440V	6/11kV	22kV
HU59/630		NOTE 11	NOTE 11
HU59/1000			
HU66			
CN60			
LU16			
HU76			



TYPE 3.1 PENDA LAYOUT AND MATERIALS QTY

SWG	MAX FUSE	CU	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
TYPE 3.1 PENDA		LU65																
PENDA BASE		LU43																
160A FSD	1 X 63A DIN 00	LU70				L	L											
630 FSD	1 X 400A NH2	LU69				C/S												
910A FSD	1 X 630A NH3	LU68			E											E		
1260A FSD	2 X 400A NH2	LU67				C			C		C		C					
1000A SWD	LINKS SUPPLIED	LU71	C															
2000A SWD	LINKS SUPPLIED	LU66	T2									C1						T1
FSD CABLE TERM	FUSES SUPPLIED	LU14				L/S	S	S	S	S	S	S	S	S	S			
TX CABLE TERM	TX MCCB	LU16	T2															T1

T = TRANSFORMER L = LIGHTING CIRCUIT E = EMERGENCY RESPONSE GENERATOR
 C = CUSTOMER S = STREET CIRCUIT



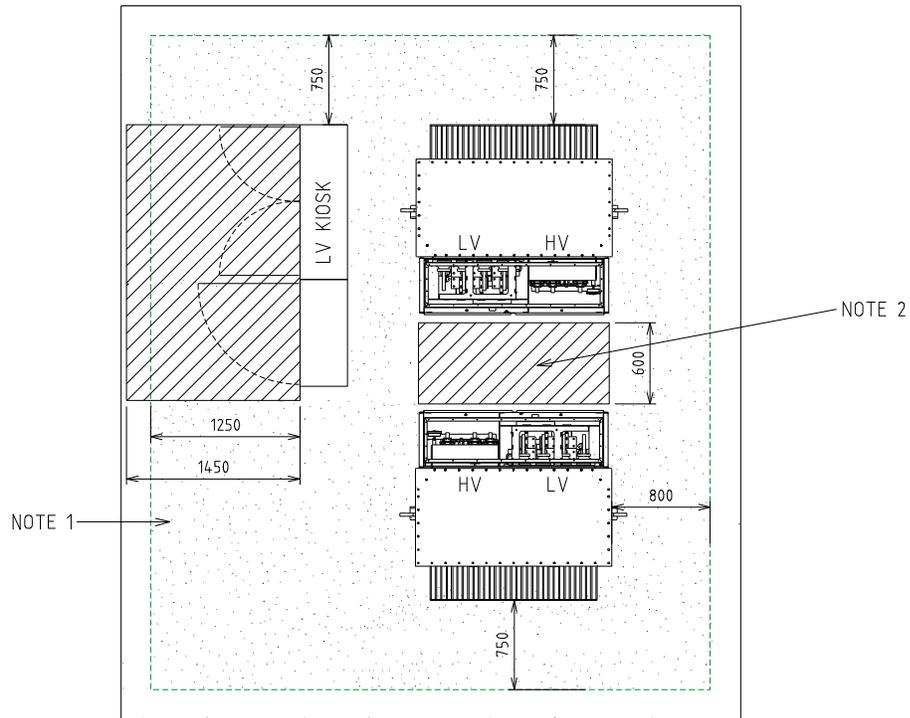
NOTES:-

1. LU66 CAN BE USED FOR THE TRANSFORMER AND CONTIGUOS CUSTOMER.
2. EVERY INSTALLATION SHALL INCLUDE AN ERG CONNECTION 2 x LU68.
3. 2 x LU70 OR 1 x LU69 CAN BE USED IN POSITION 4.
4. 1 x LU14 NEEDED WITH EACH LU69 STREET FEEDER OR LU70 LIGHTING CIRCUIT.
5. 1 x LU16 NEEDED WITH EACH LU66_TX IN PENDA AND 1 x LU16 FOR EACH LU59 (NON-MPS).
6. LARGE CUSTOMER CONNECTED VIA A 2000A SWITCH (LU66) MUST ALWAYS BE IN POSITIONS 7 & 8 OR 9 & 10.
7. STANDARD PENDA LAYOUT SHOWN. DESIGNER MAY DESIGN AN ALTERNATIVE PENDA LAYOUT.
8. NO GANGED FSD OR SWD PERMITTED SPANNING POSITIONS 5 & 6, 6 & 7 OR 10 & 11.
9. REFER DSPM CHAPTER 4 FOR THE CORRECT INSTALLATION OF THE PENDA BASE.
10. REFER DSPM CHAPTER 4 FOR THE CORRECT POSITIONING OF THE NON-MPS ONTO THE CULVERT.
11. DESIGNER TO REQUEST FOR 2 x ETEL TRANSFORMERS FOR DUAL 630kVA LAYOUT.
12. TRANSFORMER OIL IS TO BE CONTAINED WITHIN THE SITE.

REV.	DATE	DESCRIPTION	KT	GC	PC
A	02.05.23	ORIGINAL ISSUE			

TITLE
 DISTRICT SUBSTATION
 UP TO 2000 kVA (NON- MPS)
 NON FIRE RATED - WITHOUT HV SWGR
 EQUIPMENT SELECTION & LAYOUT

DRAWN: JRR		DATE: 12-11-2019		DRG. No.	
ORIGINATED: GC		SCALE: NTS		DSM-3-05	
CHECKED: CO		APPROVED: GRANT STACY		REV. A	SHT. 2



MINIMUM CLEARANCE REQUIRED FOR EARTHING PURPOSES.
(STEP AND TOUCH POTENTIAL)

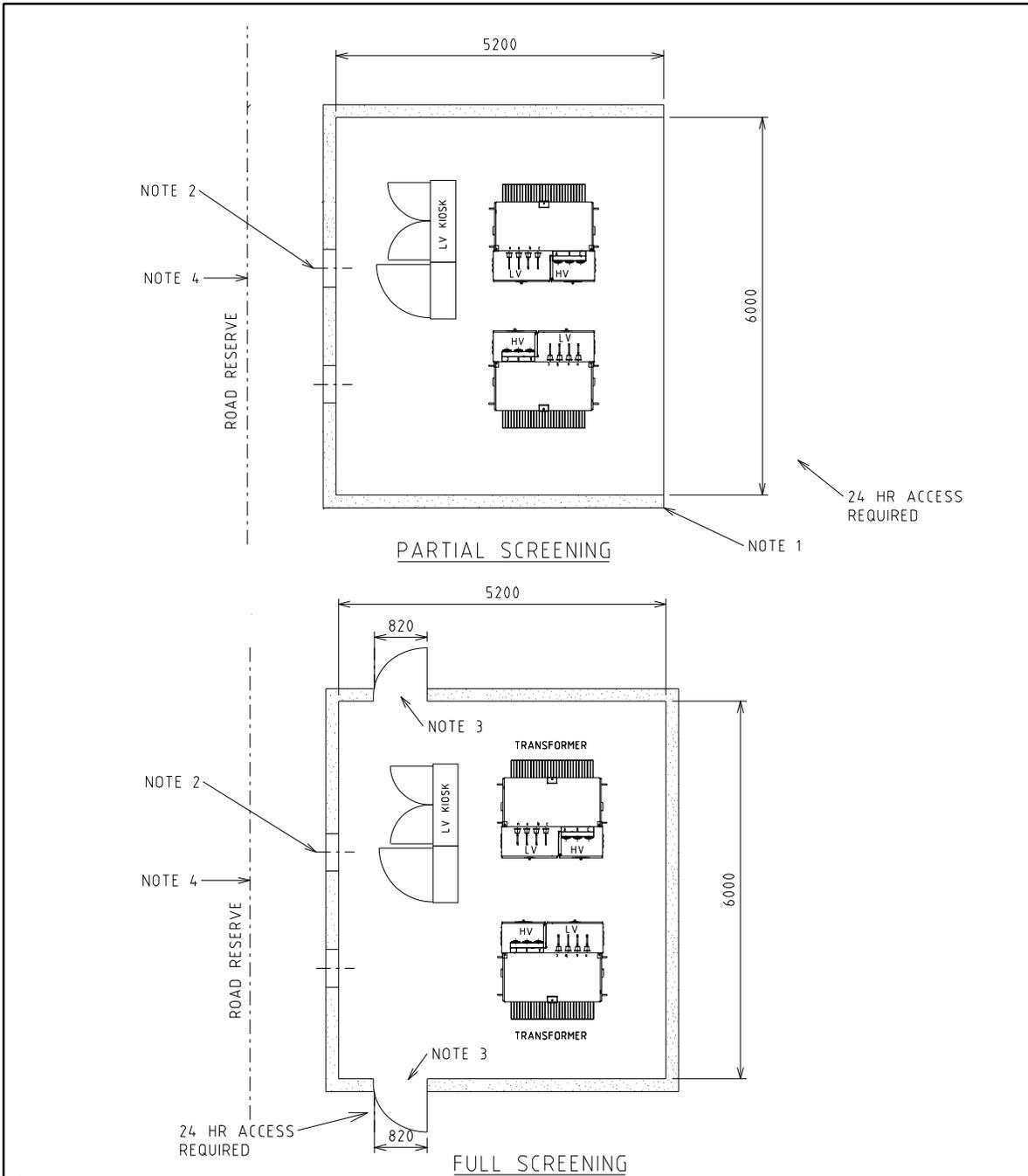


MINIMUM CLEARANCE REQUIRED FOR OPERATIONAL PURPOSES

NOTES:-

1. CLEARANCES TO BE USED FOR EARTHING STUDY / CALCULATION OF TOUCH VOLTAGES (WITH DOORS CLOSED)
2. OPERATIONAL CLEARANCES IN FRONT OF TRANSFORMERS SHOWN WITH DOORS LIFTED OFF

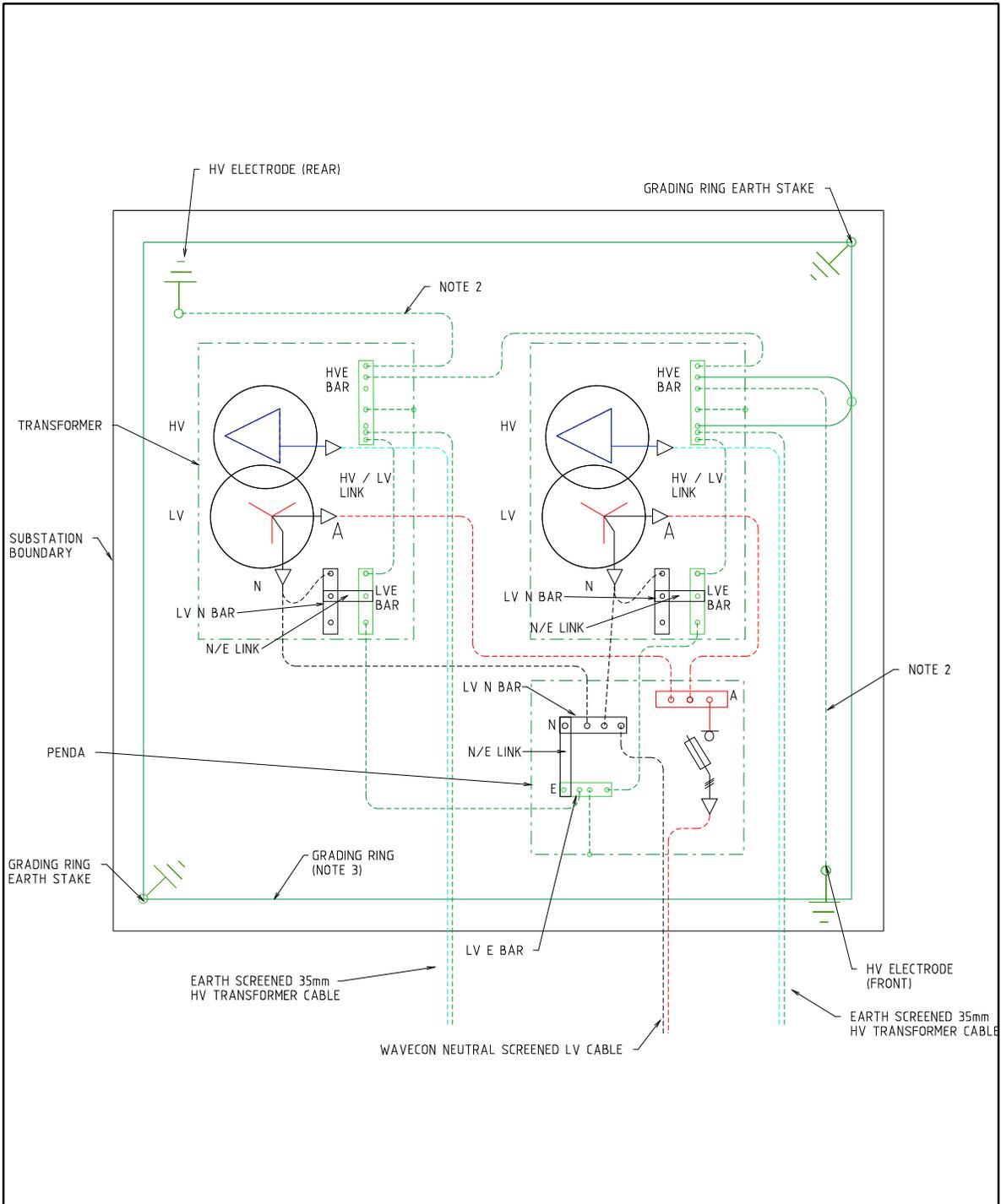
				TITLE				DISTRIBUTION SUBSTATION MANUAL		westernpower	
				DISTRICT SUBSTATION UP TO 2000kVA (NON MPS) NON FIRE RATED-WITHOUT HV SWGR OPERATIONAL CLEARANCES				DRAWN: JRR	DATE: 12-11-2019	DRG. No.	
								ORIGINATED: GC	SCALE: NTS	DSM-3-05	
								CHECKED: CO			
								APPROVED:	GRANT STACY	REV. A	SHT. 3
A	02.05.23	ORIGINAL ISSUE		KT	GC	PC					
REV	DATE	DESCRIPTION		DRGD	CHKD	APRD					



NOTES:-

1. FOUNDATIONS SHALL FULLY RETAIN THE SITE TO ALLOW SAFE EXCAVATION 1200 DEEP. SCREENING NOT TO ENCRoACH INTO SUBSTATION LAND REQUIREMENTS. SCREENING TYPES SHALL BE NON-COMBUSTIBLE, FENCING, MASONRY WALLS etc.
2. INDICATIVE OF DUCTING ONLY, FOR DETAILS REFER TO SECTION 6.
3. OPENINGS MUST BE A MINIMUM OF 820 WIDE. OPEN DOORS SHOULD NOT BLOCK EXIT WAY. DOORS ARE OPTIONAL.
4. VEHICLE ACCESS. CLEARANCES MUST BE MAINTAINED. AREA TO BE KEPT CLEAR TO ENSURE ACCESS. SITE SPECIFIC REQUIREMENTS TO BE DETERMINED BY DESIGNER.
5. SCREENING DESIGN TO BE APPROVED BY SUBSTATION DESIGNER PRIOR TO CONSTRUCTION. OPERATIONAL AND EARTHING CLEARANCES SHOWN ON SHEET 3 MUST BE MAINTAINED WITH SCREENING INSTALLED.

				TITLE		DISTRIBUTION SUBSTATION MANUAL		westernpower	
				DISTRICT SUBSTATION UP TO 2000kVA (NON MPS) NON FIRE RATED-WITHOUT HV SWGR PERMISSABLE SCREENING ARRANGEMENTS					
				DRAWN: JRR		DATE: 12-11-2019		DRG. No.	
				ORIGINATED: GC		SCALE: NTS		DSM-3-05	
				CHECKED: CO		APPROVED:		REV. A	
				APPROVED: GRANT STACY				SHT. 4	
A	04.12.19	ORIGINAL ISSUE		GC	CO	GS			
REV	DATE	DESCRIPTION		DRG	CHKD.	APRD.			



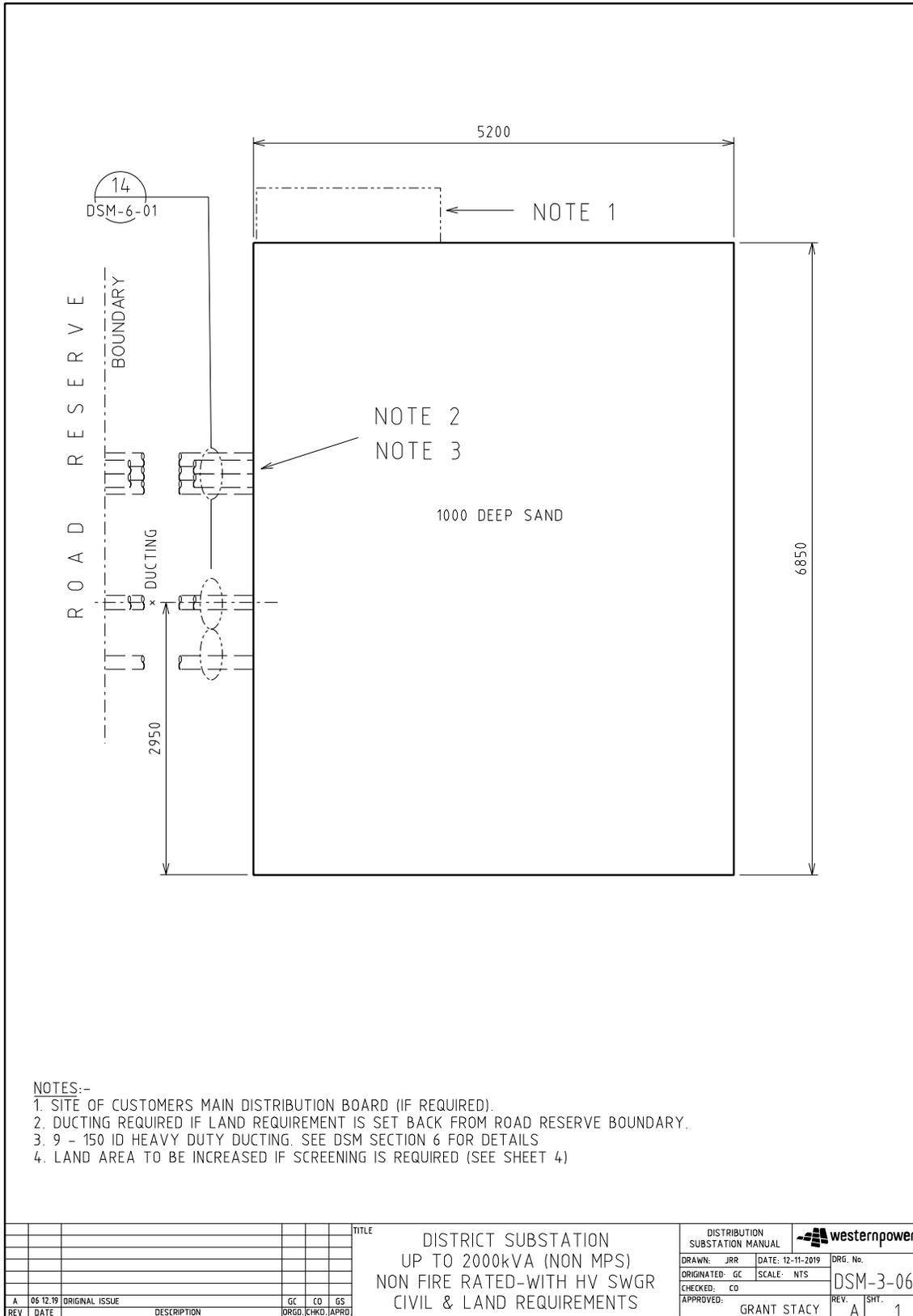
- NOTES:-
1. SEE HU CU IN THE DDC FOR EARTHING MATERIALS
 2. CONNECT 70mm² PVC INSULATED COPPER CABLE (GREEN/YELLOW) TO EARTH ELECTRODES. INSTALL CABLE AND RODS 1200mm BELOW FGL IN NEW SITES.
 3. BURIED GRADING RING TO BE 100mm BELOW RAILWAY BALLAST/FLAME TRAP, IN SOIL.

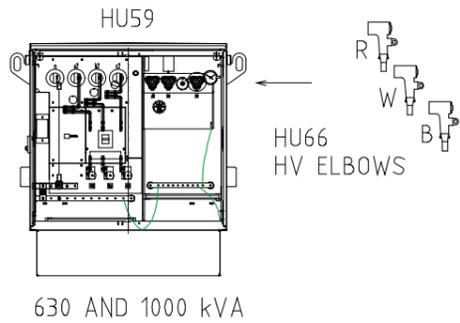
REV	DATE	DESCRIPTION	DRG	CHKD	APRD
A	02.05.23	ORIGINAL ISSUE			

DISTRICT SUBSTATION
UP TO 2000 kVA (NON-MPS)
NON-FIRE RATED
EARTHING ARRANGEMENT

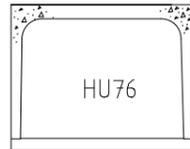
DRAWN: KT		DATE: 22-08-2022	DRG. No.
ORIGINATED: KT		SCALE: NTS	DSM-3-05
CHECKED: GC		APPROVED:	
		PHIL CAPPER	REV. A SH. 5

4.2.6 DSM-3-06 Up to 2000kVA (Non-MPS) with HV SWGR





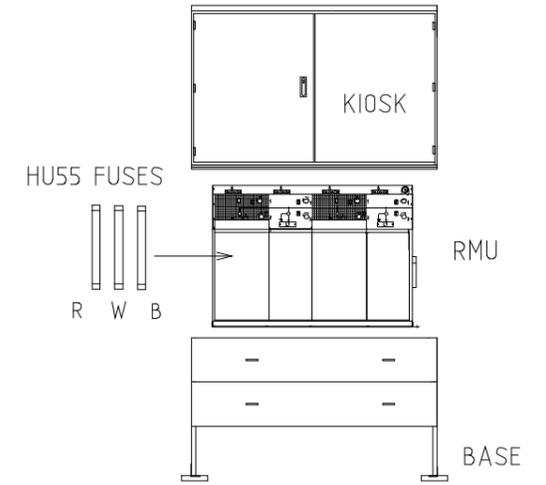
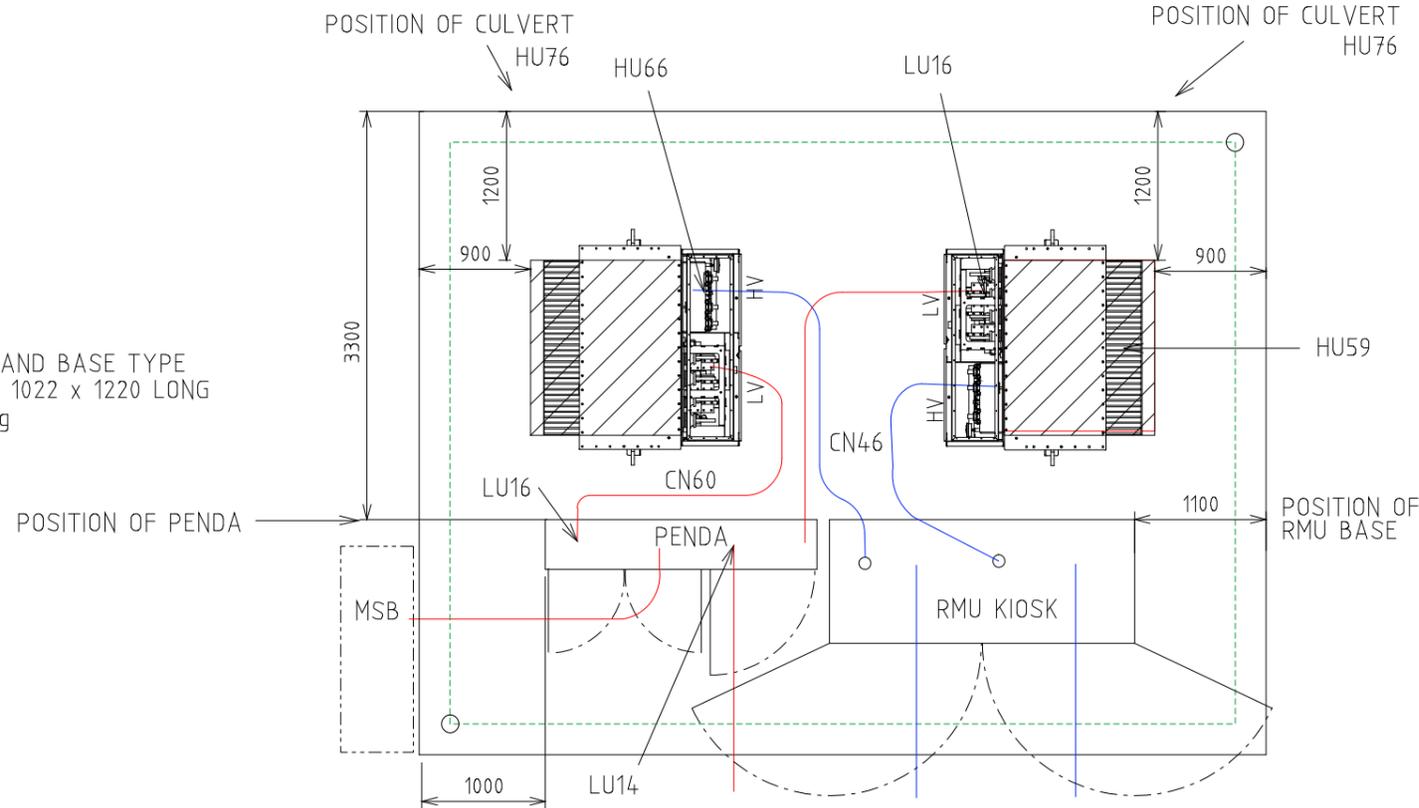
630 AND 1000 kVA



BOX CULVERT - CROWN AND BASE TYPE
EXTERNAL SIZE = 1416 x 1022 x 1220 LONG
CROWN WEIGHT = 1038 kg
BASE WEIGHT = 384 kg

TRANSFORMER MATERIALS (QTY)

CU	440V	6/11kV	22kV
HU59/630		NOTE 13	NOTE 13
HU59/1000			
HU66			
CN60			
LU16			
HU76			



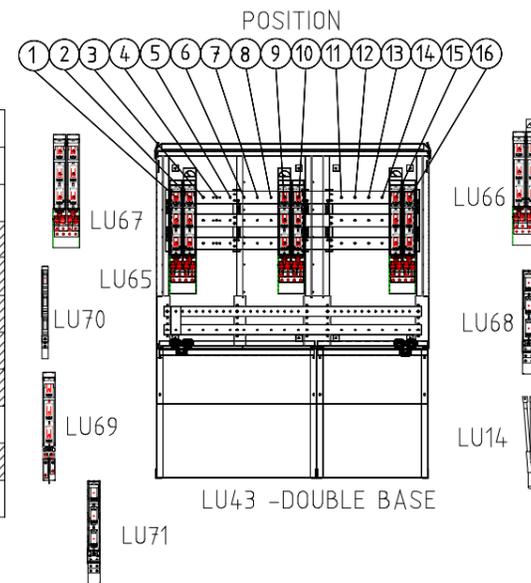
RMU MATERIALS (QTY)

CU	6 kV	11 kV	22 kV
HU55/315			
HU55/630			
HU55/1000			
HU7			
HU80			
HU81			
CN46			
DA6			
DA10			

TYPE 3.1 PENDA LAYOUT AND MATERIALS QTY

SWG	MAX FUSE	CU	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
TYPE 3.1 PENDA		LU65																
PENDA BASE		LU43																
160A FSD	1 X 63A DIN 0	LU70				L	L											
630 FSD	1 X 400A NH2	LU69				C/S												
910A FSD	1 X 630A NH3	LU68			E												E	
1260A FSD	2 X 400A NH2	LU67				C			C		C		C					
1000A SWD	LINKS SUPPLIED	LU71	C															T1
2000A SWD	LINKS SUPPLIED	LU66	T2									C1						
FSD CABLE TERM	FUSES SUPPLIED	LU14				L/S	S	S	S	S	S	S	S	S	S			
TX CABLE TERM	TX MCCB	LU16	T2															T1

T = TRANSFORMER L = LIGHTING CIRCUIT E = EMERGENCY RESPONSE GENERATOR
C = CUSTOMER S = STREET CIRCUIT



NOTES

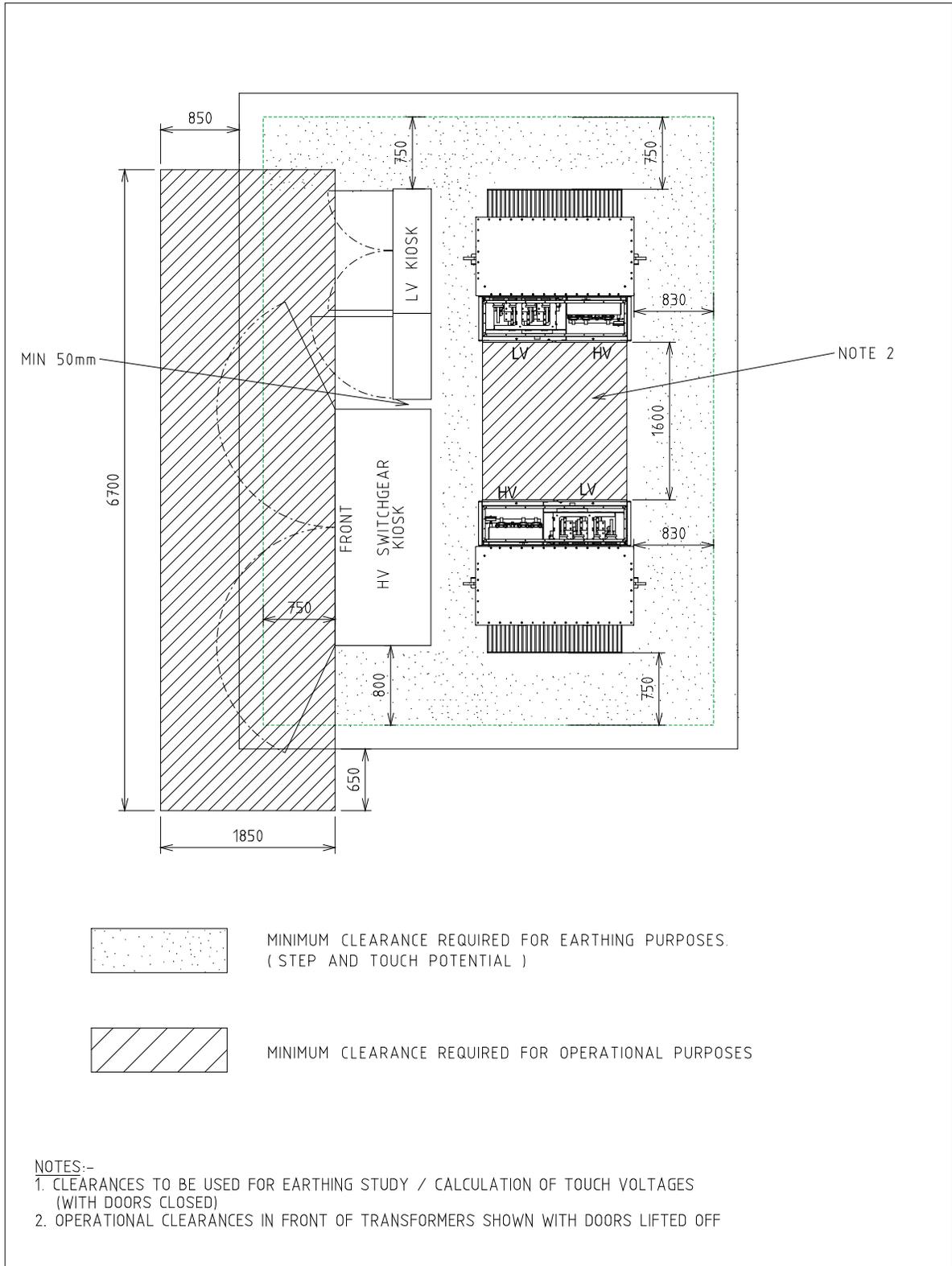
1. LU66 CAN BE USED FOR THE TRANSFORMER AND CONTIGUOUS CUSTOMER.
2. EVERY INSTALLATION SHALL INCLUDE AN ERG CONNECTION 2 x LU68.
3. 2 x LU70 OR 1 x LU69 CAN BE USED IN POSITION 4.
4. 1 x LU14 NEEDED WITH EACH LU69 STREET FEEDER OR LU70 LIGHTING CIRCUIT.
5. 1 x LU16 NEEDED WITH EACH LU66_TX IN PENDA AND 1 x LU16 FOR EACH LU59 (NON-MPS).
6. LARGE CUSTOMER CONNECTED VIA A 2000A SWITCH (LU66) MUST ALWAYS BE IN POSITIONS 7 & 8 OR 9 & 10.
7. STANDARD PENDA LAYOUT SHOWN. DESIGNER MAY DESIGN AN ALTERNATIVE PENDA LAYOUT.
8. NO GANGED FSD OR SWD PERMITTED SPANNING POSITIONS 5 & 6, 6 & 7 OR 10 & 11.
9. RMU, KIOSK, BASE AND HV CABLE TERMINATIONS SUPPLIED IN HV SWG CU.
10. REFER DSPM CHAPTER 4 FOR THE CORRECT INSTALLATION OF THE PENDA BASE.
11. REFER DSPM CHAPTER 4 FOR THE CORRECT POSITIONING OF THE NON-MPS ONTO THE CULVERT.
12. REFER TO DSPM CHAPTER 4 FOR CORRECT INSTALLATION OF THE RMU BASE.
13. DESIGNER TO REQUEST FOR 2 x ETEL TRANSFORMERS FOR DUAL 630kVA LAYOUT.
14. REFER TO DSPM CHAPTER 4 FOR AUTOMATION DETAILS.
15. TRANSFORMER OIL IS TO BE CONTAINED WITHIN THE SITE.

REV.	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.
B	02.05.23	NOTES AND MATERIAL LIST AMENDED			
A	10.12.19	ORIGINAL ISSUE			

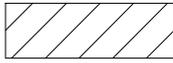
TITLE

DISTRICT SUBSTATION
UP TO 2000kVA (NON MPS)
NON FIRE RATED-WITH HV SWGR
EQUIPMENT & INSTALLATION DETAILS

DISTRIBUTION SUBSTATION MANUAL		westernpower	
DRAWN: JRR	DATE: 12-11-2019	DRG. No.	
ORIGINATED: GC	SCALE: NTS	DSM-3-06	
CHECKED: CO	APPROVED:	REV. B	SHT. 2
GRANT STACY			



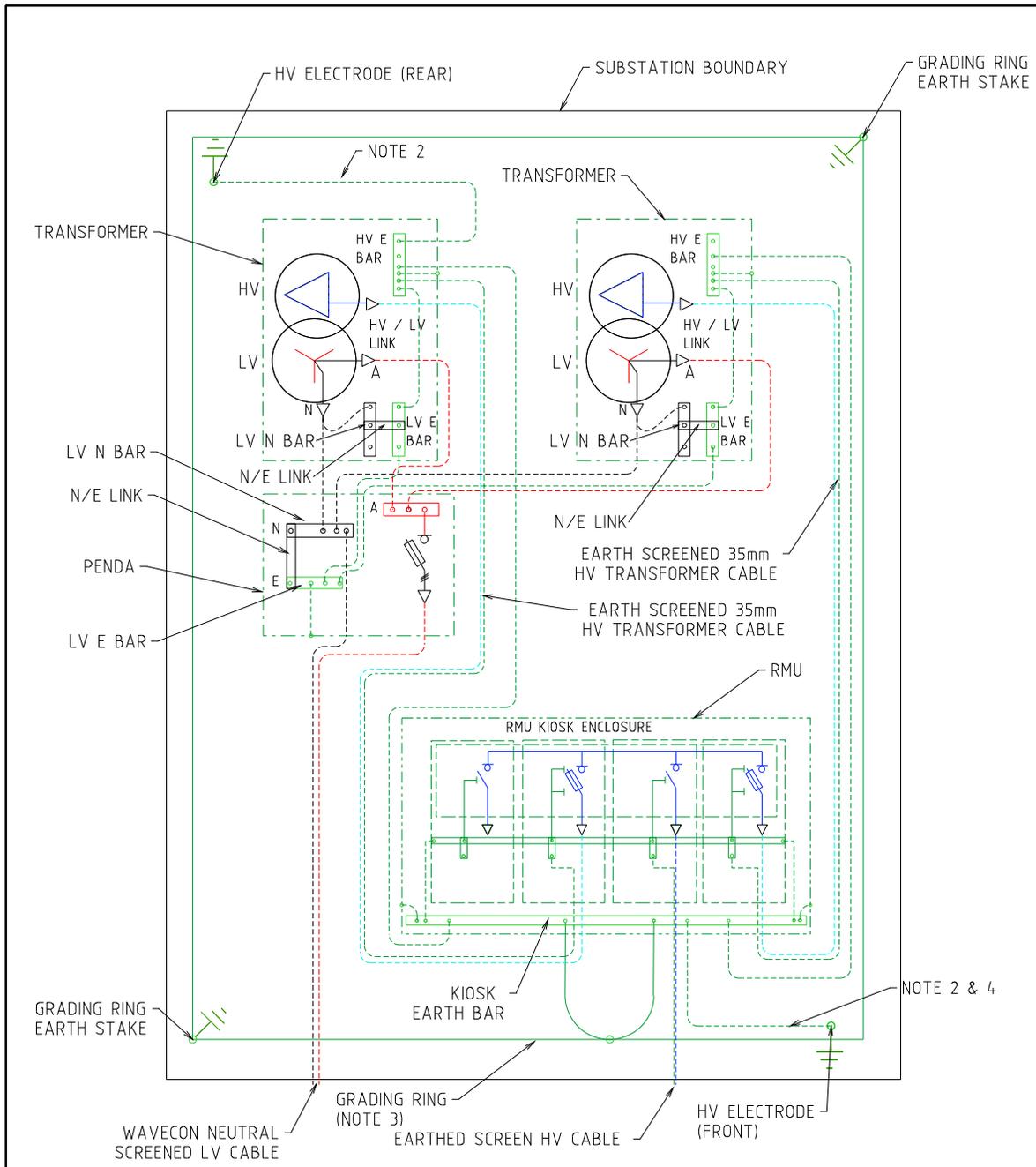
MINIMUM CLEARANCE REQUIRED FOR EARTHING PURPOSES.
(STEP AND TOUCH POTENTIAL)



MINIMUM CLEARANCE REQUIRED FOR OPERATIONAL PURPOSES

- NOTES:-
1. CLEARANCES TO BE USED FOR EARTHING STUDY / CALCULATION OF TOUCH VOLTAGES (WITH DOORS CLOSED)
 2. OPERATIONAL CLEARANCES IN FRONT OF TRANSFORMERS SHOWN WITH DOORS LIFTED OFF

				TITLE		DISTRIBUTION SUBSTATION MANUAL		westernpower	
				DISTRICT SUBSTATION UP TO 2000kVA (NON MPS) NON FIRE RATED-WITH HV SWGR OPERATIONAL CLEARANCES		DRAWN: JRR DATE: 13-11-2019		DRG. No.	
B 02.05.23		DIMENSIONS AND NOTES AMENDED		KT	GC	PC	ORIGINATED: GC		SCALE: NTS
A 04.06.19		ORIGINAL ISSUE		GC	CD	GS	CHECKED: CO		DSM-3-06
REV.	DATE	DESCRIPTION		DRGD.	CHKD.	APRD.	APPROVED: GRANT STACY		REV. B SHY. 3

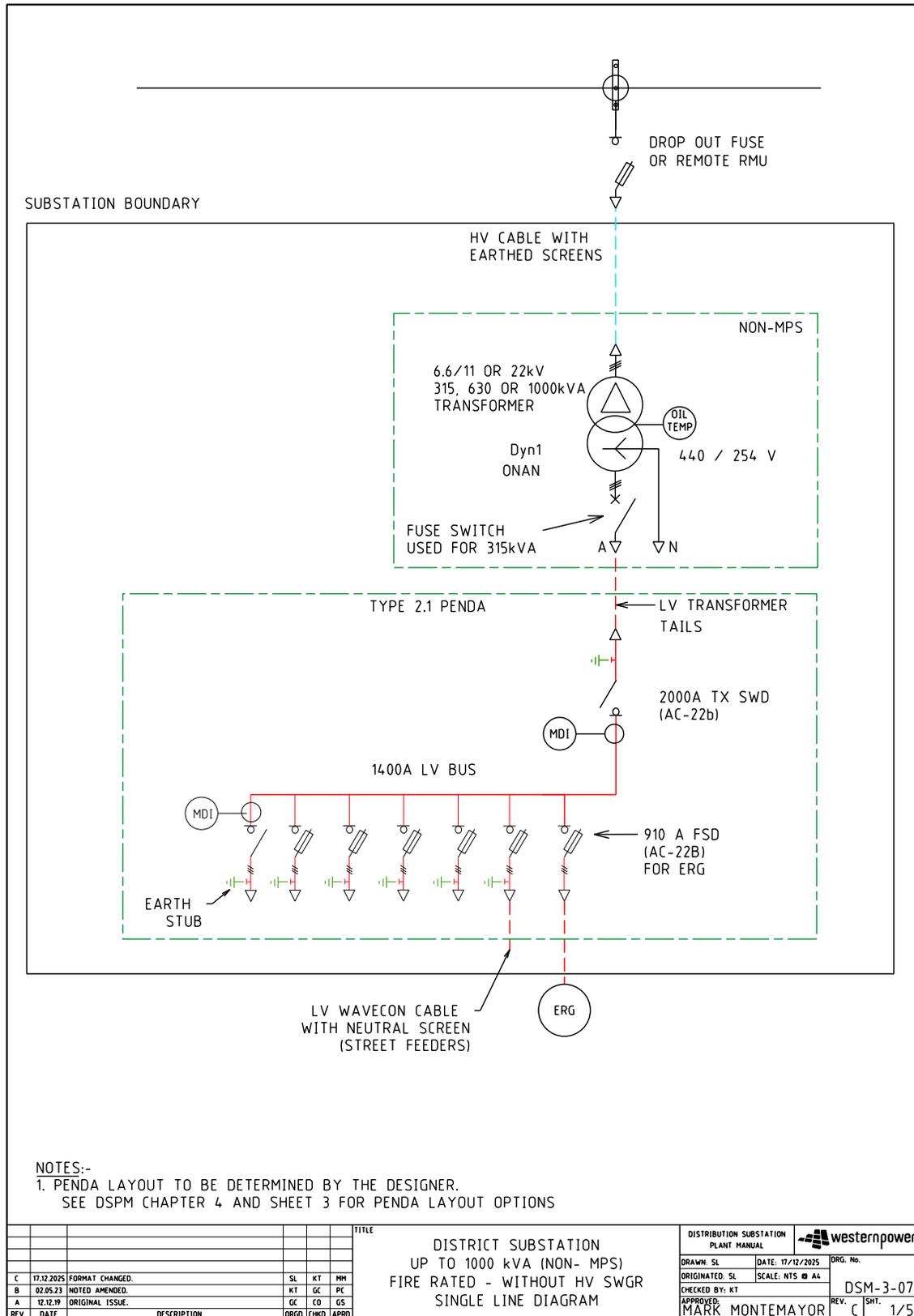


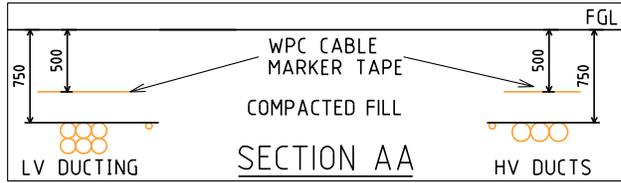
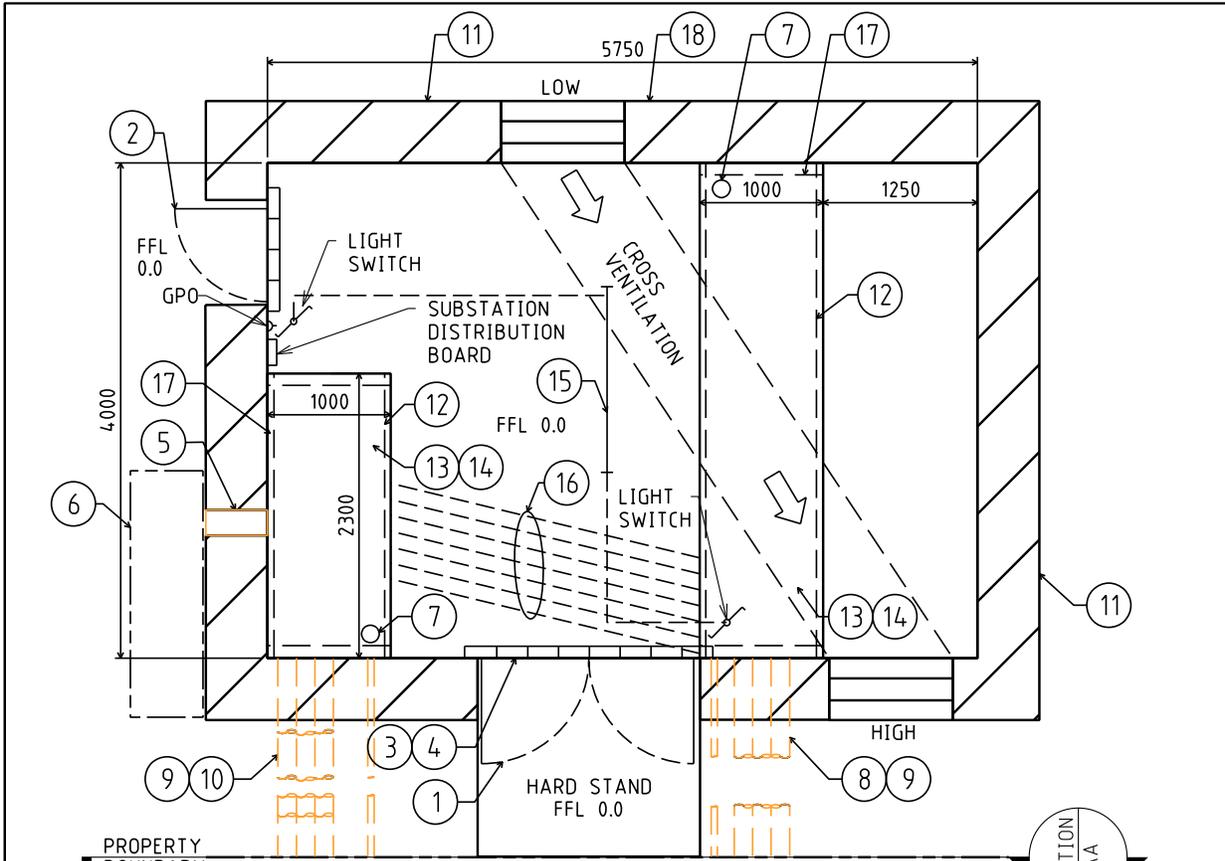
- NOTES:-
1. SEE HU CU IN THE DDC FOR EARTHING MATERIALS.
 2. CONNECT 70mm² PVC INSULATED COPPER CABLE (GREEN/YELLOW) TO EARTH ELECTRODES. INSTALL CABLE AND RODS 1200mm BELOW FGL IN NEW SITES.
 3. BURIED GRADING RING TO BE 100mm BELOW RAILWAY BALLAST/FLAME TRAP, IN SOIL.
 4. LOOP EARTH CABLES TO EARTH RODS INSIDE KIOSK FOR EASE OF TESTING.

				TITLE			DISTRICT SUBSTATION UP TO 2000 kVA NON- MPS NON-FIRE RATED - WITH HV SWGR EARTHING ARRANGEMENT			DISTRIBUTION SUBSTATION MANUAL		westernpower	
							DRAWN: KT		DATE: 24-08-2022		DRG. No.		
							ORIGINATED: KT		SCALE: NTS		DSM-3-06		
							CHECKED: GC				REV. A		
							APPROVED: PHIL CAPPER				SHT. 5		
A	02.05.23	ORIGINAL ISSUE		KT	GC	PC							
REV	DATE	DESCRIPTION		DRGD.	CHKD.	APRO							

4.3 District Substations - Fire Rated

4.3.1 DSM-3-07 Up to 1000kVA (Non-MPS)





1	DOUBLE DOORS 2340x1720 CLEAR OPENING.
2	DOOR 2040x820 CLEAR OPENING.
3	75 HIGH BRICK BUND.
4	BUND LAID AFTER EQUIPMENT INSTALLED.
5	CUSTOMERS DUCT(S) AT FLOOR OF TRENCH.
6	CUSTOMERS MAIN DISTRIBUTION BOARD.
7	75 DIA PENETRATION THROUGH SLAB FOR EARTHING - TO BE SEALED WITH CN81.
8	3-150 & 1-50 ID HEAVY DUTY DUCTS - TO BE SEALED WITH CN81.
9	750 COVER AT BOUNDARY.
10	6-150 & 1-50 ID HEAVY DUTY DUCTS - TO BE SEALED WITH CN81.
11	600x800 WIDE FIRE DAMPERED VENT AT HIGH (TOP 200 MAX BELOW CEILING) & LOW (BOTTOM MAX 200 ABOVE FINISHED FLOOR LEVEL) LEVELS.
12	50mm WIDE x 38mm DEEP REBATE FOR TRENCH COVERS.
13	TRENCH COVER 35mm THICK x 26kg/m ² FRP SLAB PANEL FRONT OF HV SWITCHGEAR ONLY. 38mm THICK x 18.2kg/m ² MESH GRATING ELSEWHERE. REFER TO DSM-6-04 AND DSM-6-08.
14	1200 DEEP TRENCH WALLS & FLOOR OF TRENCH TO BE PAINTED WITH SILICONE GLAZE S50.
15	LED LIGHTS BATTEN FITTING (2 WAY SWITCH WITH NEON INDICATOR).
16	6-150 ID HEAVY DUCTS INSTALLED AT FLOOR OF TRENCH - TO BE SEALED WITH CN81.
17	COVER SUPPORTS - 100x75x6 UA (H.D.G.) FIXED TO WALL OF TRENCH.
18	WALLS, CEILING & DOORS TO BE 2HR FIRE RATED, CEILING HEIGHT TO BE MIN 2500mm.

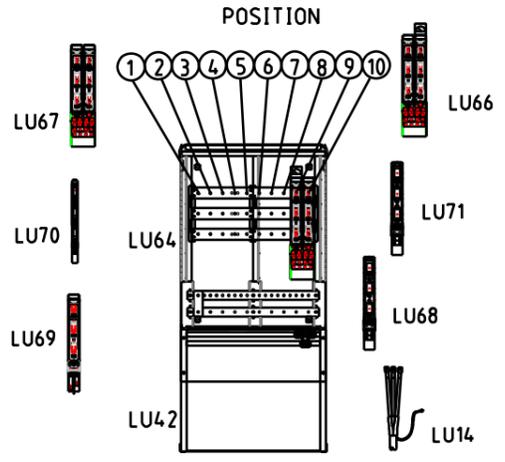
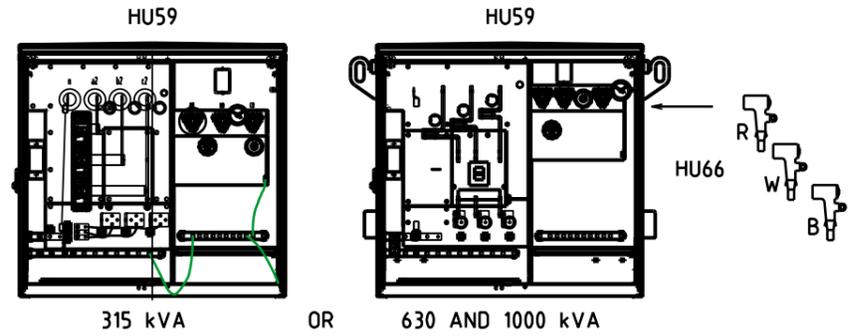
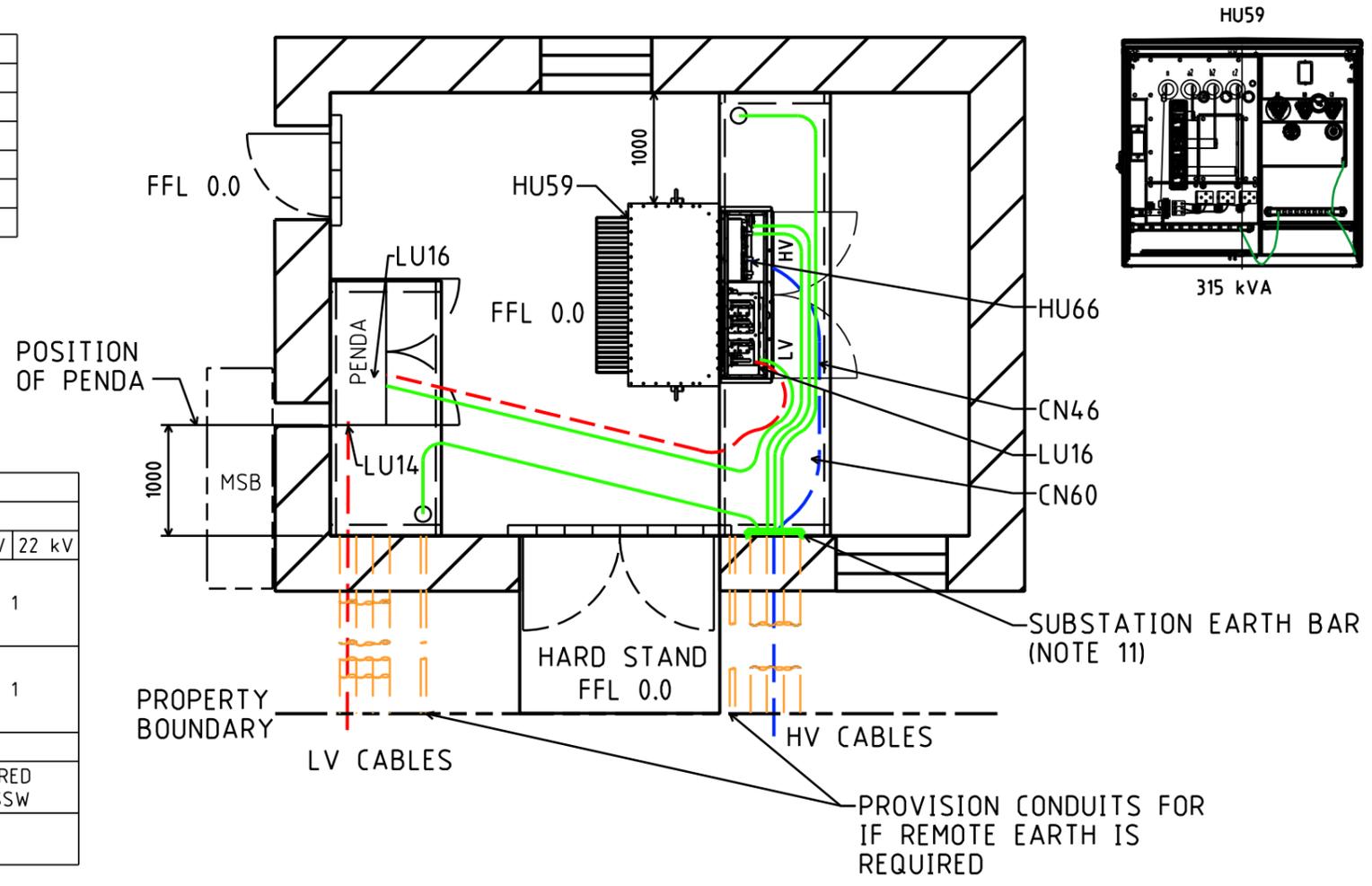
				TITTLE				DISTRIBUTION SUBSTATION PLANT MANUAL				westernpower		
				DISTRICT SUBSTATION UP TO 1000 kVA (NON-MPS) FIRE RATED - WITHOUT HV SWGR REQUIREMENTS AND DUCT INSTALLATION				DRAWN: SL		DATE: 17/12/2025		DRG. No.		
								ORIGINATED: SL		SCALE: NTS @ A4		DSM-3-07		
								CHECKED BY: KT		APPROVED: MARK MONTEMAYOR		REV. C		
												SHT. 2/5		
REV	DATE	DESCRIPTION	DRG.	CHKD.	APRD.	SL	KT	MM	KT	GC	PC	GC	CO	GS
C	17.12.2025	FORMAT CHANGED.												
B	02.05.23	NOTED AMENDED.												
A	12.12.19	ORIGINAL ISSUE.												

LV MATERIAL		
EQUIPEMENT	CU	QTY
PENDA	LU64_I	1
	LU66	1
	LU68	1
CABLE	CN60	56
	LU16	2

HV MATERIAL				
EQUIPEMENT	CU	QTY		
		6 kV	11 kV	22 kV
TRANSFORMER	HU55/315	SELECT 1		
	HU55/630			
	HU55/1000			
	HU59/315	SELECT 1		
	HU59/630			
	HU59/1000			
CABLE	HU66	1		
	CN46	AS REQUIRED FROM FSSW		
EARTHING	HU70_1	1		

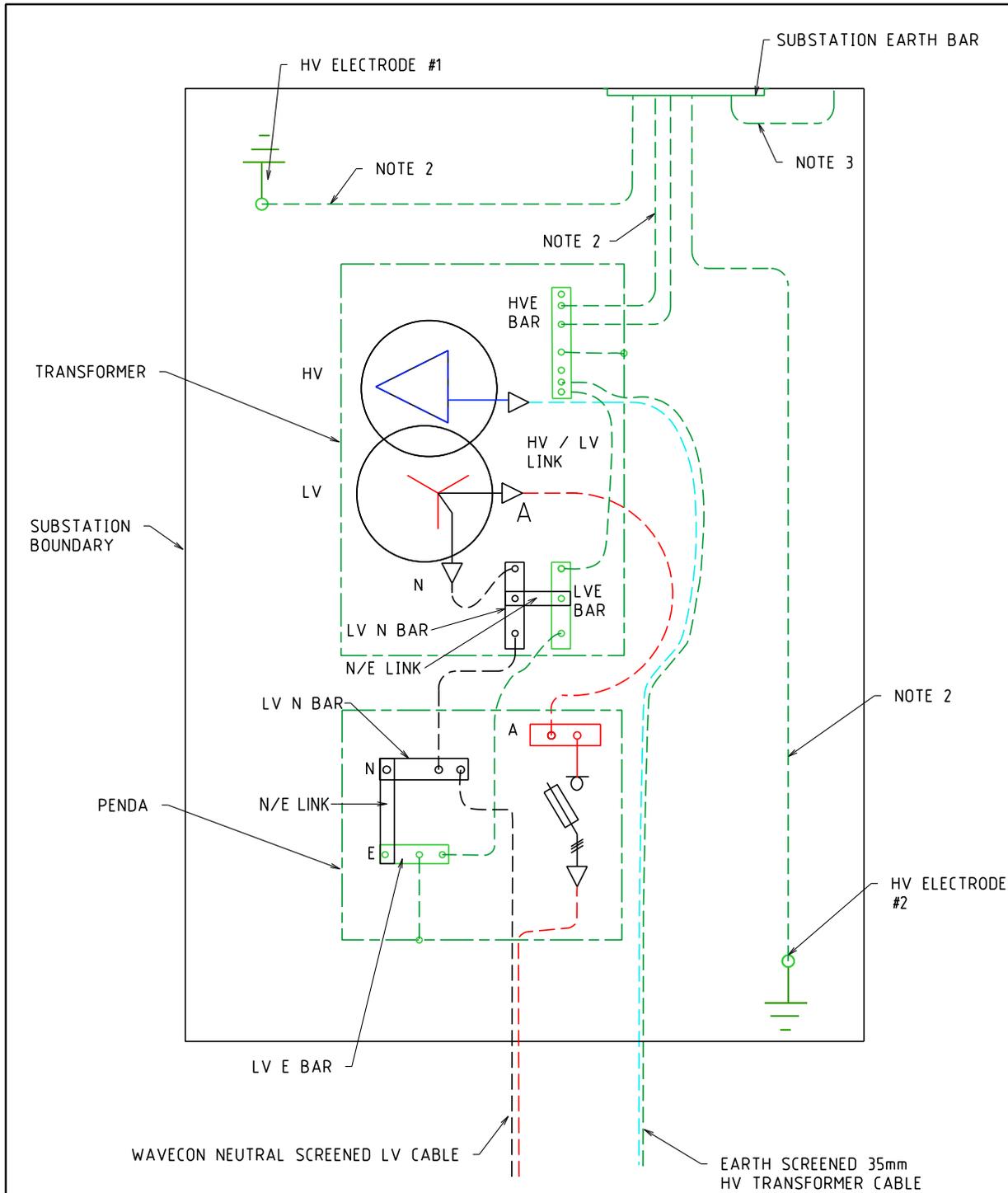
TYPE 2.1 PENDA LAYOUT												
EQUIPEMENT	MAX FUSE	CU	1	2	3	4	5	6	7	8	9	10
TYPE 2.1 PENDA		LU64	1 REQUIRED									
PENDA BASE		LU42	1 REQUIRED									
160A FSD	1x 63A DIN 00	LU70				2xL						
630A FSD	1x 400A NH2	LU69	C/S	C/S	C/S	C/S	C/S	C/S	C/S			
910A FSD	1x 630A NH3	LU68									E	
1260A FSD	2x 400A NH2	LU67	C									
1000A FSD	LINKS	LU71	C									
2000A FSD	LINKS	LU66	C									TX
FSD CABLE TERM		LU14	S	S	S	L/S	S	S	S			
TX CABLE TERM		LU16										TX

TX = TRANSFORMER L = LIGHTING CIRCUIT E = EMERGENCY RESPONSE
 C = CUSTOMER S = STREET CIRCUIT G = GENERATOR



- NOTES:-
1. LU66 CAN BE USED FOR THE TRANSFORMER AND CUSTOMER.
 2. EVERY INSTALLATION SHALL INCLUDE AN ERG CONNECTION LU68.
 3. 2 x LU70 OR 1 x LU69 CAN BE USED IN POSITION 4.
 4. 1 x LU14 NEEDED WITH EACH LU69 STREET FEEDER OR LU70 LIGHTING CIRCUIT.
 5. 1 x LU16 NEEDED WITH EACH LU66_TX IN PENDA AND 1 x LU16 FOR LU59 (NON-MPS).
 6. LU66_TX WILL DEFAULT TO POSITIONS 9 & 10 UNLESS POSITION 1 & 2 IS SPECIFIED BY THE DESIGNER.
 7. STANDARD PENDA LAYOUT SHOWN. DESIGNER MAY DESIGN AN ALTERNATIVE PENDA LAYOUT.
 8. NO GANGED FSD OR SWD PERMITTED SPANING POSITIONS 5 & 6 OR 6 & 7.
 9. REFER TO DSPM CHAPTER 4 FOR THE CORRECT INSTALLATION OF THE PENDA.
 10. CABLE TRENCH TO BE WATER/OIL TIGHT.
 11. INDICATIVE LOCATION OF EARTH BAR SHOWN. EXACT LOCATION TO BE CONFIRMED IN DESIGN.

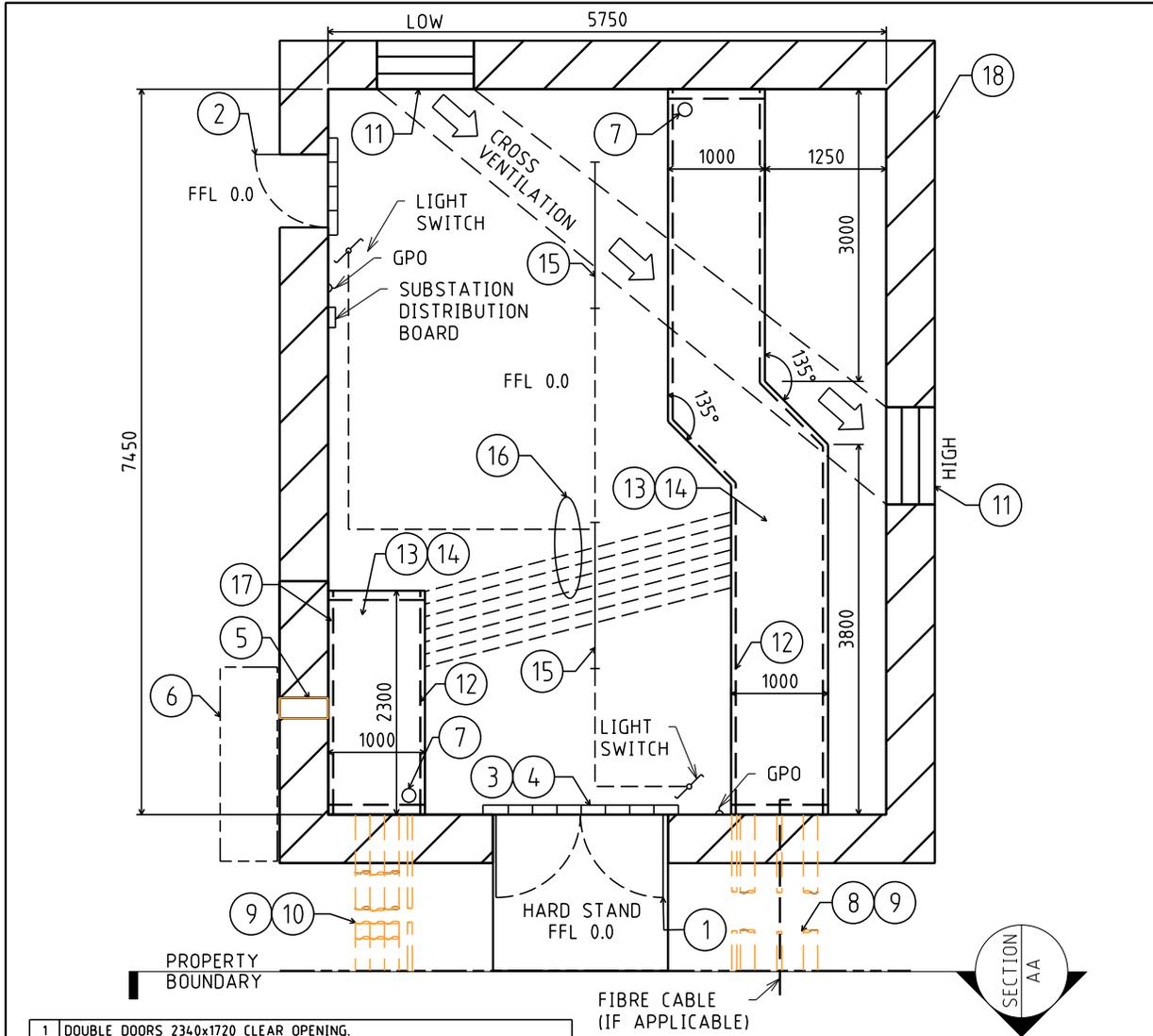
<table border="1"> <tr> <th>REV</th> <th>DATE</th> <th>DESCRIPTION</th> </tr> <tr> <td>C</td> <td>17.12.2025</td> <td>FORMAT CHANGED.</td> </tr> <tr> <td>B</td> <td>02.05.23</td> <td>NOTED AMENDED.</td> </tr> <tr> <td>A</td> <td>12.12.19</td> <td>ORIGINAL ISSUE.</td> </tr> </table>			REV	DATE	DESCRIPTION	C	17.12.2025	FORMAT CHANGED.	B	02.05.23	NOTED AMENDED.	A	12.12.19	ORIGINAL ISSUE.	<table border="1"> <tr> <th>ORGD.</th> <th>CHKD.</th> <th>APRD.</th> </tr> <tr> <td>SL</td> <td>KT</td> <td>MM</td> </tr> <tr> <td>KT</td> <td>GC</td> <td>PC</td> </tr> <tr> <td>GC</td> <td>CO</td> <td>GS</td> </tr> </table>			ORGD.	CHKD.	APRD.	SL	KT	MM	KT	GC	PC	GC	CO	GS	<p style="text-align: center;">TITLE</p> <p style="text-align: center;">DISTRICT SUBSTATION UP TO 1000 kVA (NON- MPS) NON-FIRE RATED - WITH HV SWGR EQUIPMENT SELECTION AND LAYOUT</p>			<p style="text-align: center;">DISTRIBUTION SUBSTATION PLANT MANUAL</p> <p style="text-align: right;">westernpower</p>		
REV	DATE	DESCRIPTION																																	
C	17.12.2025	FORMAT CHANGED.																																	
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ORGD.	CHKD.	APRD.																																	
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<table border="1"> <tr> <td>DRAWN: SL</td> <td>DATE: 17/12/2025</td> <td>DRG. No.</td> </tr> <tr> <td>ORIGINATED: SL</td> <td>SCALE: NTS @ A4</td> <td rowspan="2">DSM-3-07</td> </tr> <tr> <td>CHECKED BY: KT</td> <td>APPROVED:</td> </tr> <tr> <td colspan="2">MARK MONTEMAYOR</td> <td>REV. C SHT. 3/5</td> </tr> </table>			DRAWN: SL	DATE: 17/12/2025	DRG. No.	ORIGINATED: SL	SCALE: NTS @ A4	DSM-3-07	CHECKED BY: KT	APPROVED:	MARK MONTEMAYOR		REV. C SHT. 3/5																						
DRAWN: SL	DATE: 17/12/2025	DRG. No.																																	
ORIGINATED: SL	SCALE: NTS @ A4	DSM-3-07																																	
CHECKED BY: KT	APPROVED:																																		
MARK MONTEMAYOR		REV. C SHT. 3/5																																	



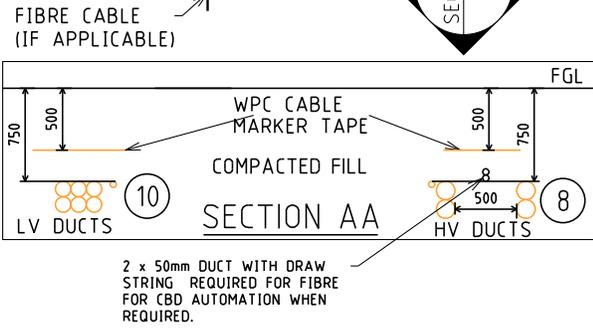
NOTES:-

1. SEE HU CU IN THE DDC FOR EARTHING MATERIALS
2. CONNECT 70mm' PVC INSULATED COPPER CABLE (GREEN/YELLOW) TO EARTH ELECTRODES AS PER ITEM 7 ON SHEET 2 - TO BE SEALED WITH CN81.
3. BUILDING EARTH CABLE BOND IS TO BE PROVIDED BY THE CUSTOMER.

						TITLE		DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower	
						DISTRICT SUBSTATION UP TO 1000 kVA (NON- MPS) NON-FIRE RATED - WITH HV SWGR EARTHING ARRANGEMENT		DRAWN: SL		DATE: 17/12/2025	
								ORIGINATED: SL		SCALE: NTS A4	
								CHECKED BY: KT		ORG. No. DSM-3-07	
								APPROVED: MARK MONTEMAYOR		REV. C SHT. 5/5	
REV	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.	SL	KT	MM	KT	GC	PC
C	17.12.2025	FORMAT CHANGED.									
B	02.05.23	NOTED AMENDED.									
A	12.12.19	ORIGINAL ISSUE.									



1	DOUBLE DOORS 2340x1720 CLEAR OPENING.
2	DOOR 2040x820 CLEAR OPENING.
3	75 HIGH BRICK BUND.
4	BUND LAID AFTER EQUIPMENT INSTALLED.
5	CUSTOMERS DUCT(S) AT FLOOR OF TRENCH.
6	CUSTOMERS MAIN DISTRIBUTION BOARD.
7	75 DIA PENETRATION THROUGH SLAB FOR EARTHING - TO BE SEALED WITH CN81.
8	4-150 & 1-50 ID HEAVY DUTY DUCTS - TO BE SEALED WITH CN81.
9	750 COVER AT BOUNDARY.
10	6-150 & 1-50 ID HEAVY DUTY DUCTS - TO BE SEALED WITH CN81.
11	600x800 WIDE FIRE DAMPERED VENT AT HIGH (TOP 200 MAX BELOW CEILING) & LOW (BOTTOM MAX 200 ABOVE FINISHED FLOOR LEVEL) LEVELS.
12	50mm WIDE x 38mm DEEP REBATE FOR TRENCH COVERS.
13	TRENCH COVER 35mm THICK x 26kg/m ² FRP SLAB PANEL FRONT OF HV SWITCHGEAR ONLY. 38mm THICK x 18.2kg/m ² MESH GRATING ELSEWHERE.
14	1200 DEEP TRENCH WALLS & FLOOR OF TRENCH TO BE PAINTED WITH SILICONE GLAZE S50.
15	LED LIGHTS BATTEN FITTING (2 WAY SWITCH WITH NEON INDICATOR).
16	6-150 ID HEAVY DUCTS INSTALLED AT FLOOR OF TRENCH - TO BE SEALED WITH CN81.
17	COVER SUPPORTS - 100x75x6 UA (H.D.G.) FIXED TO WALL OF TRENCH.
18	WALLS, CEILING & DOORS TO BE 2HR FIRE RATED, CEILING HEIGHT TO BE MIN 2500mm.



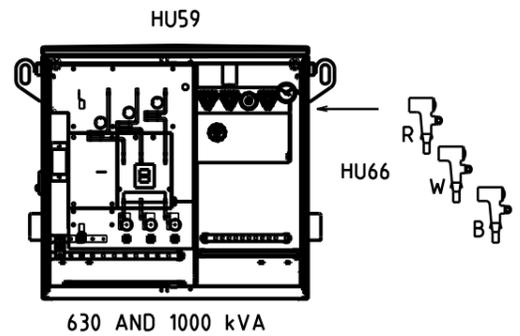
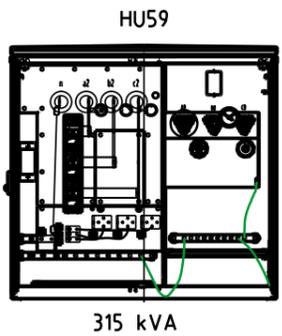
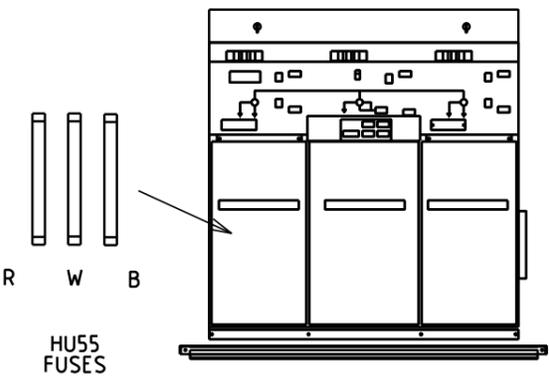
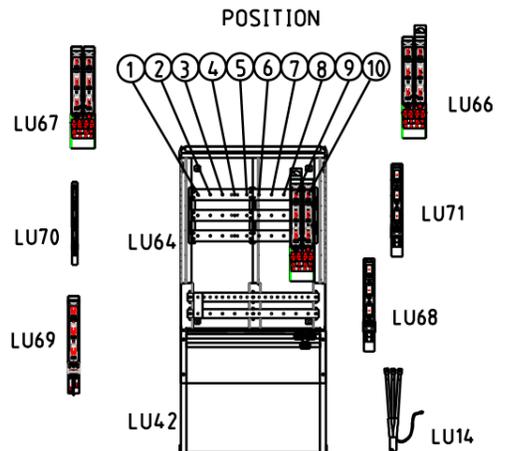
REV	DATE	DESCRIPTION	DRG.	CHKD.	APPR.
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B	02.05.23	NOTED AMENDED.	KT	GC	PC
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS

TITLE
**DISTRICT SUBSTATION
 UP TO 1000 kVA (NON-MPS)
 FIRE RATED - WITH HV SWGR
 REQUIREMENTS AND DUCT INSTALLATION**

DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower	
DRAWN: SL	DATE: 17/12/2025	DRG. No.	
ORIGINATED: SL	SCALE: NTS A4	DSM-3-08	
CHECKED BY: KT	APPROVED: MARK MONTEMAYOR	REV. C	SHT. 2/6

TYPE 2.1 PENDA LAYOUT												
EQUIPEMENT	MAX FUSE	CU	1	2	3	4	5	6	7	8	9	10
TYPE 2.1 PENDA		LU64	1 REQUIRED									
PENDA BASE		LU42	1 REQUIRED									
160A FSD	1x 63A DIN 00	LU70	2xL									
630A FSD	1x 400A NH2	LU69	C/S	C/S	C/S	C/S	C/S	C/S	C/S			
910A FSD	1x 630A NH3	LU68								E		
1260A FSD	2x 400A NH2	LU67	C		C							
1000A FSD	LINKS	LU71	C									
2000A FSD	LINKS	LU66	C									TX
FSD CABLE TERM		LU14	S	S	S	L/S	S	S	S			TX
TX CABLE TERM		LU16										TX

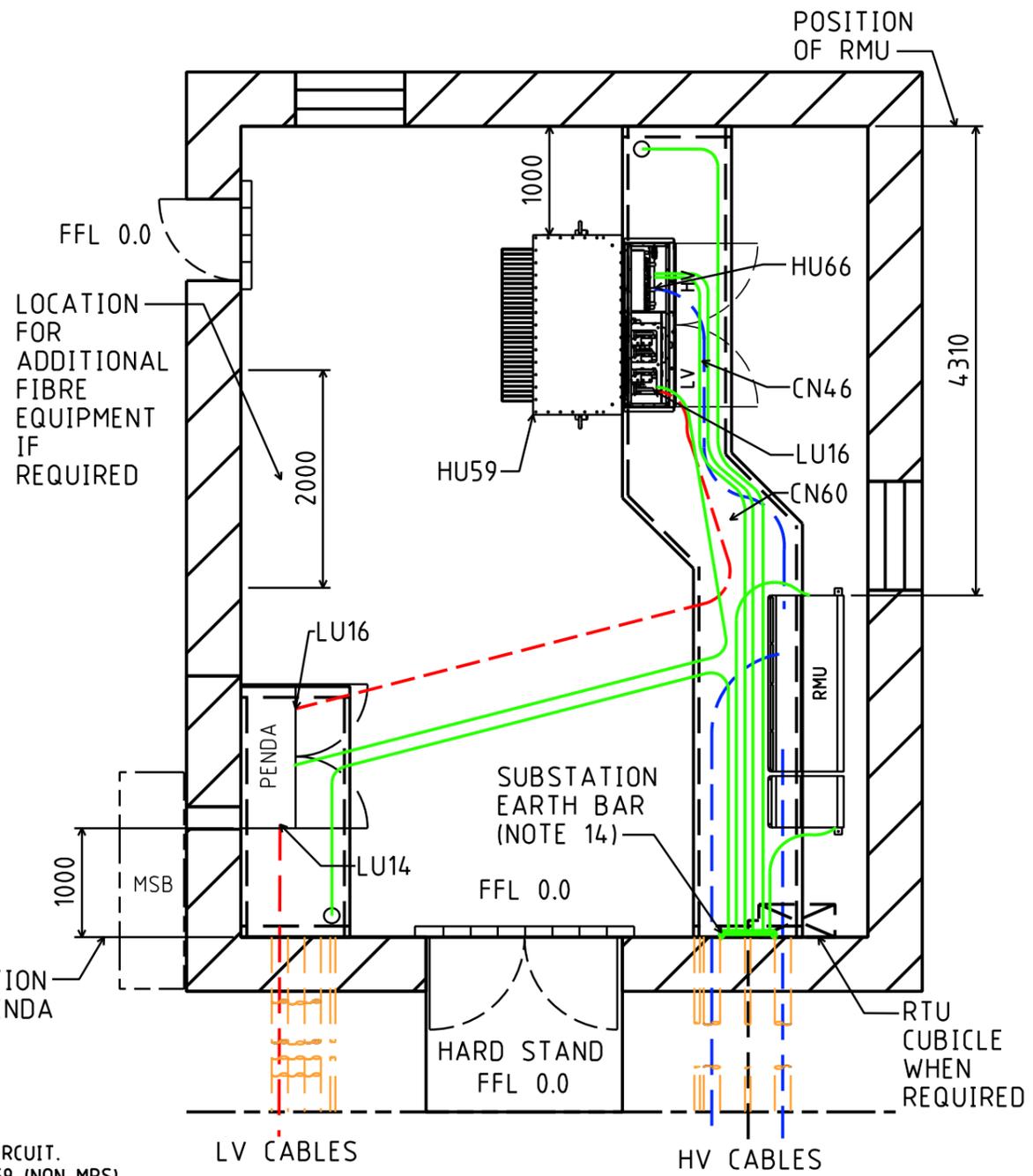
TX = TRANSFORMER L = LIGHTING CIRCUIT E = EMERGENCY RESPONSE
 C = CUSTOMER S = STREET CIRCUIT G = GENERATOR



HV MATERIAL				
EQUIPEMENT	CU	QTY		
		6 kV	11 kV	22 kV
TRANSFORMER	HU55/315	SELECT 1		
	HU55/630			
	HU55/1000	SELECT 1		
	HU59/315			
	HU59/630			
HU59/1000				
RMU	HU22	SELECT 1		
	HU23			
	HU24			
	HU25_2S			
	HU25_3S			
EARTHING	HU70_2	1		
	HU66	1		
CABLE	CN46	7		
	DA6_LVS	1		
AUTOMATION	DA6_NG_SE	1 (OPTIONAL)		

LV MATERIAL		
EQUIPEMENT	CU	QTY
PENDA	LU64_I	1
	LU66	1
	LU68	1
CABLE	CN60	56
	LU16	2

- NOTES:-
1. LU66 CAN BE USED FOR THE TRANSFORMER AND CUSTOMER.
 2. EVERY INSTALLATION SHALL INCLUDE AN ERG CONNECTION LU68.
 3. 2 x LU70 OR 1 x LU69 CAN BE USED IN POSITION 4.
 4. 1 x LU14 NEEDED WITH EACH LU69 STREET FEEDER OR LU70 LIGHTING CIRCUIT.
 5. 1 x LU16 NEEDED WITH EACH LU66_TX IN PENDA AND 1 x LU16 FOR LU59 (NON-MPS).
 6. LU66_TX WILL DEFAULT TO POSITIONS 9 & 10 UNLESS POSITION 1 & 2 IS SPECIFIED BY THE DESIGNER.
 7. STANDARD PENDA LAYOUT SHOWN. DESIGNER MAY DESIGN AN ALTERNATIVE PENDA LAYOUT.
 8. NO GANGED FSD OR SWD PERMITTED SPANING POSITIONS 5 & 6 OR 6 & 7.
 9. REFER TO DSPM CHAPTER 4 FOR THE CORRECT INSTALLATION OF THE PENDA.
 10. RMU SUPPLIED WITH BASE AND HV CABLE TERMINATIONS.
 11. REFER TO SHEET 6 FOR THE CORRECT INSTALLATION OF THE RMU.
 12. REFER TO DSPM CHAPTER 4 FOR AUTOMATION DETAILS.
 13. CABLE TRENCH TO BE WATER/OIL TIGHT.
 14. INDICATIVE LOCATION OF EARTH BAR SHOWN. EXACT LOCATION TO BE CONFIRMED IN DESIGN.

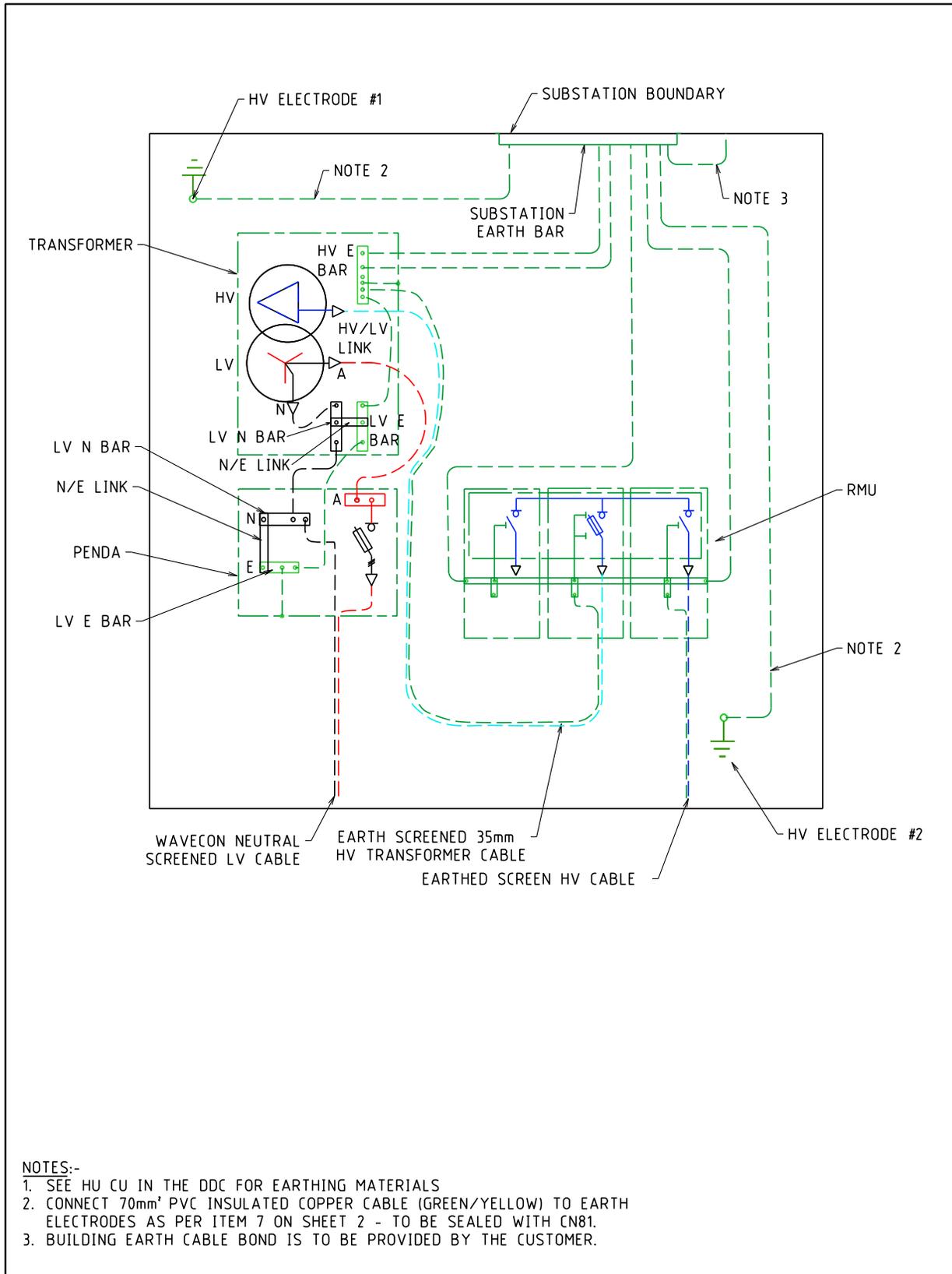


REV	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.
C	17.12.2025	FORMAT CHANGED.	SL	KT	MM
B	02.05.23	NOTED AMENDED.	KT	GC	PC
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS

DISTRICT SUBSTATION
 UP TO 1000 kVA (NON- MPS)
 FIRE RATED - WITH HV SWGR
 EQUIPMENT SELECTION AND LAYOUT

DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower	
DRAWN: SL	DATE: 17/12/2025	DRG. No.	
ORIGINATED: SL	SCALE: NTS A4	DSM-3-08	
CHECKED BY: KT	APPROVED:	REV. C	SHT. 3/6
MARK MONTEMAYOR			



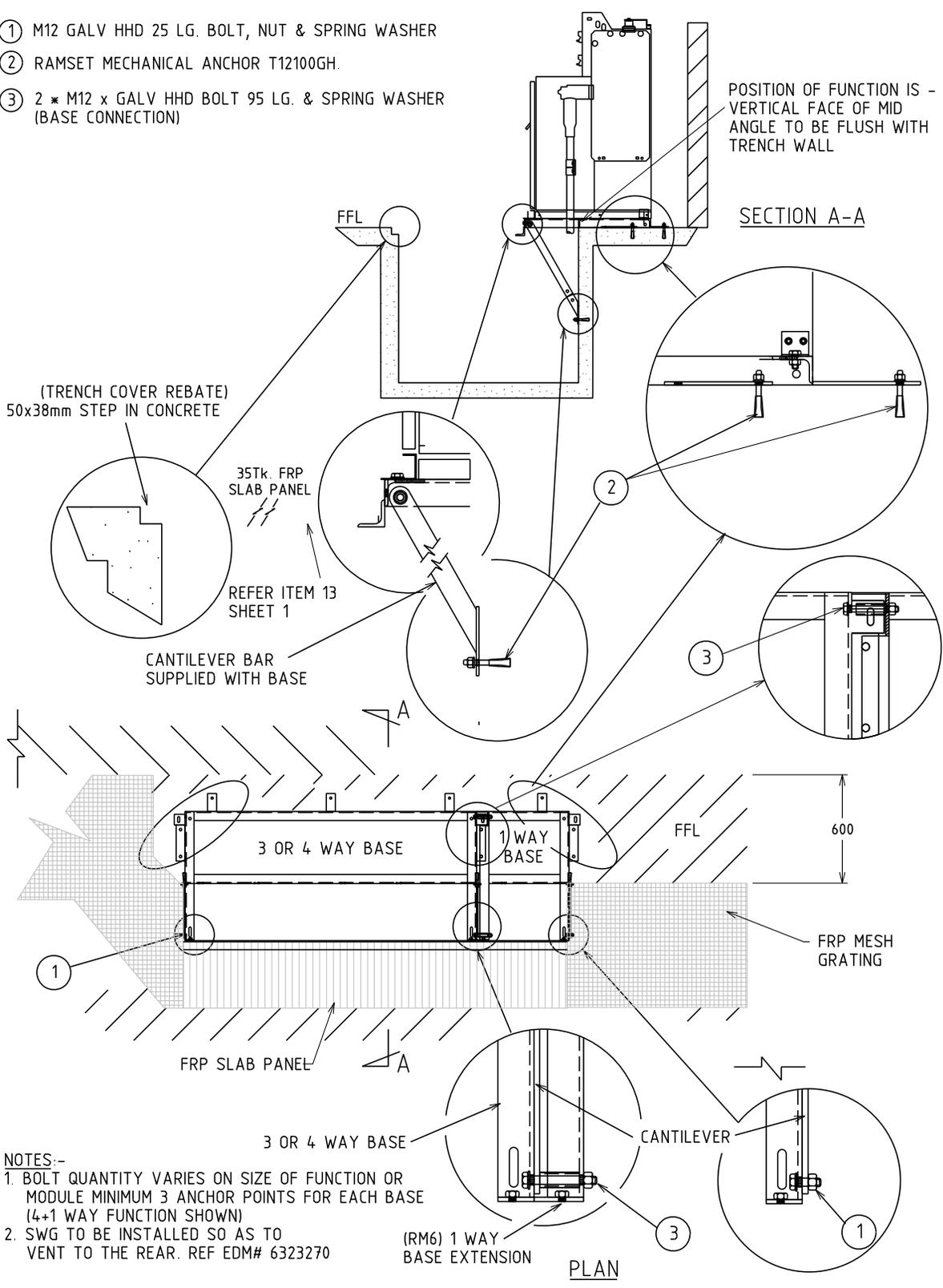


NOTES:-

1. SEE HU CU IN THE DDC FOR EARTHING MATERIALS
2. CONNECT 70mm' PVC INSULATED COPPER CABLE (GREEN/YELLOW) TO EARTH ELECTRODES AS PER ITEM 7 ON SHEET 2 - TO BE SEALED WITH CN81.
3. BUILDING EARTH CABLE BOND IS TO BE PROVIDED BY THE CUSTOMER.

			TITLE			DISTRIBUTION SUBSTATION PLANT MANUAL			westernpower		
DISTRICT SUBSTATION UP TO 1000 kVA (NON- MPS) FIRE RATED - WITH HV SWGR EARTHING ARRANGEMENT						DRAWN: SL			DATE: 17/12/2025		
						ORIGINATED: SL			SCALE: NTS @ A4		
						CHECKED BY: KT			DSM-3-08		
						APPROVED: MARK MONTEMAYOR			REV. C SHT. 5/6		
REV	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.						
C	17.12.2025	FORMAT CHANGED.	SL	KT	MM						
B	02.05.23	NOTED AMENDED.	KT	GC	PC						
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS						

- ① M12 GALV HDD 25 LG. BOLT, NUT & SPRING WASHER
- ② RAMSET MECHANICAL ANCHOR T12100GH.
- ③ 2 * M12 x GALV HDD BOLT 95 LG. & SPRING WASHER (BASE CONNECTION)



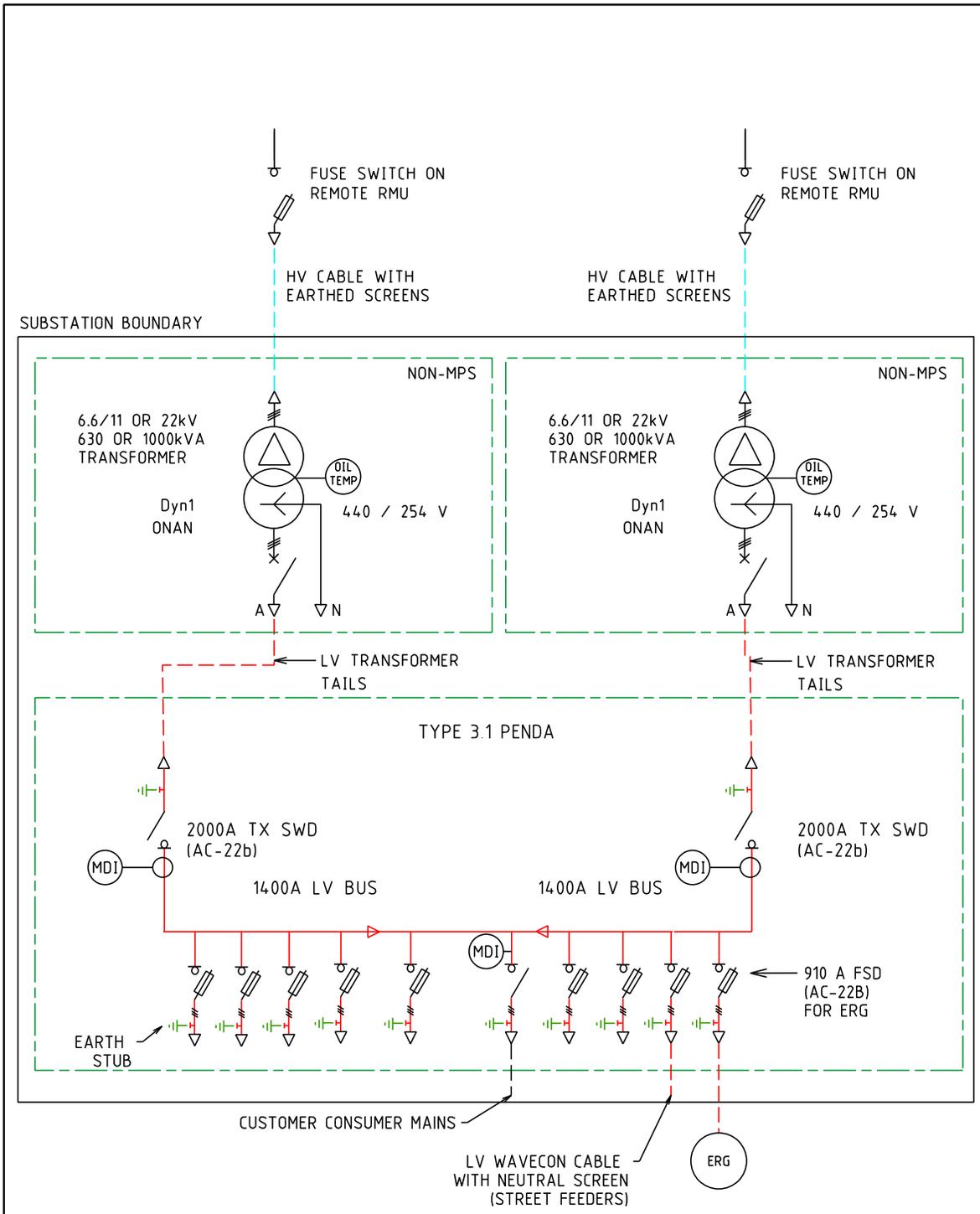
NOTES:-
 1. BOLT QUANTITY VARIES ON SIZE OF FUNCTION OR MODULE MINIMUM 3 ANCHOR POINTS FOR EACH BASE (4+1 WAY FUNCTION SHOWN)
 2. SWG TO BE INSTALLED SO AS TO VENT TO THE REAR. REF EDM# 6323270

REV	DATE	DESCRIPTION	DRG.	CHKD.	APPR.
C	17.12.2025	FORMAT CHANGED.	SL	KT	MM
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TITLE
 SCHNEIDER SWITCHGEAR
 3 & 4 WAY WITH 1 WAY EXTENSION
 FIXING DETAILS

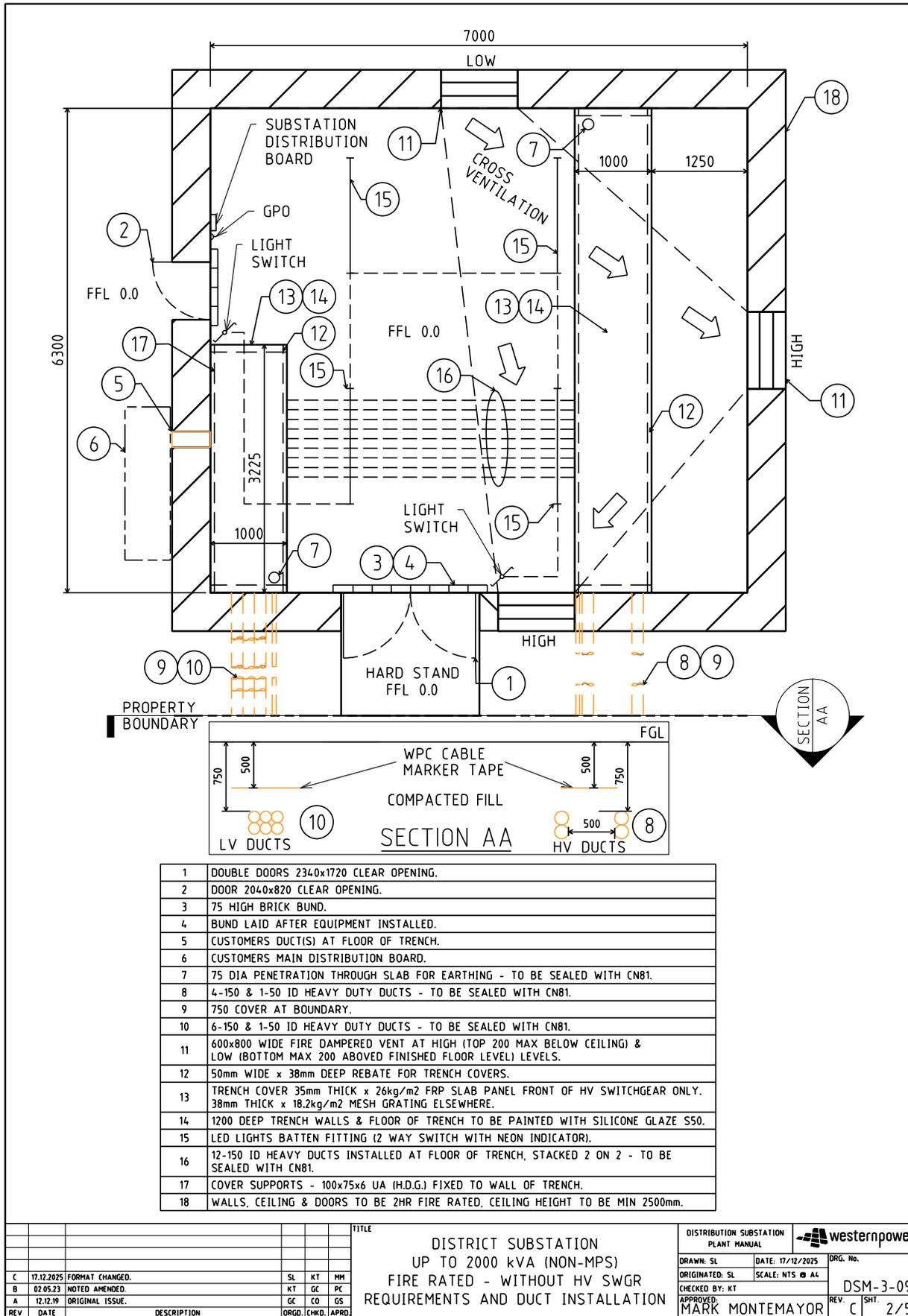
DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower	
DRAWN: SL	DATE: 17/12/2025	DRG. No.	
ORIGINATED: SL	SCALE: NTS @ A4	DSM-3-08	
CHECKED BY: KT	APPROVED: MARK MONTEMAYOR	REV. C	SHT. 6/6

4.3.3 DSM-3-09 Up to 2000kVA (Non-MPS)



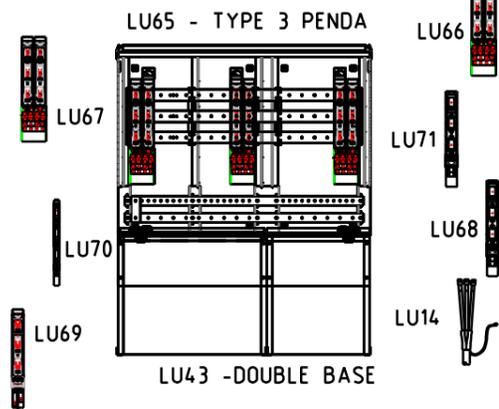
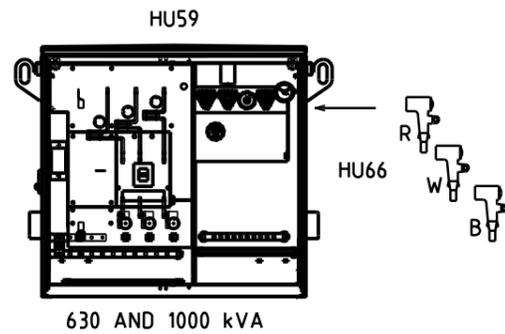
NOTES:-
 1. PENDA LAYOUT TO BE DETERMINED BY THE DESIGNER.
 SEE DSPM CHAPTER 4 AND SHEET 3 FOR PENDA LAYOUT OPTIONS.

			TITLE			DISTRIBUTION SUBSTATION PLANT MANUAL			westernpower		
DISTRICT SUBSTATION UP TO 2000 kVA (NON- MPS) FIRE RATED - WITHOUT HV SWGR SINGLE LINE DIAGRAM						DRAWN: SL			DATE: 17/12/2025		
						ORIGINATED: SL			SCALE: NTS @ AL		
						CHECKED BY: KT			ORG. No.		
						APPROVED:			DSM-3-09		
						MARK MONTEMAYOR			REV. C SH. 1/5		
REV	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.						
C	17.12.2025	FORMAT CHANGED.		SL	KT	MM					
B	02.05.23	NOTED AMENDED.		KT	GC	PC					
A	12.12.19	ORIGINAL ISSUE.		GC	CO	GS					



TYPE 3.1 PENDA LAYOUT																		
EQUIPMENT	MAX FUSE	CU	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
TYPE 3.1 PENDA		LU65																
PENDA BASE		LU42																
160A FSD	1x 63A DIN 00	LU70				L	L											
630A FSD	1x 400A NH2	LU69				C/S												
910A FSD	1x 630A NH3	LU68				E										E		
1260A FSD	2x 400A NH2	LU67				C				C		C		C				
1000A FSD	LINKS	LU71				C	C	C	C	C	C	C	C	C	C	C	C	C
2000A FSD	LINKS	LU66	T2									C1						T1
FSD CABLE TERM		LU14				L/S	S	S	S	S	S	S	S	S	S			
TX CABLE TERM		LU16	T2															T1

TX = TRANSFORMER L = LIGHTING CIRCUIT E = EMERGENCY RESPONSE
 C = CUSTOMER S= STREET CIRCUIT GENERATOR

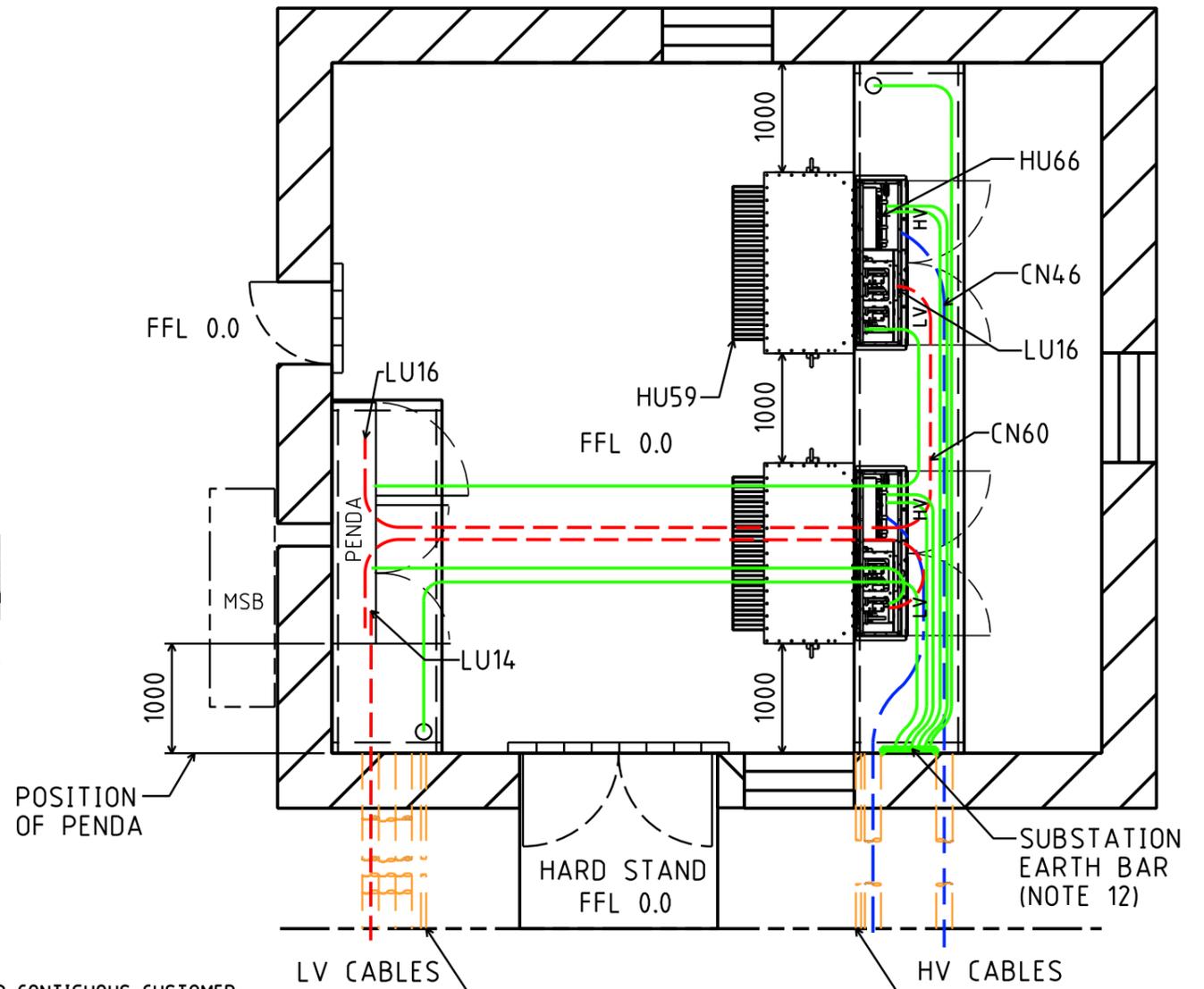


LV MATERIAL		
EQUIPMENT	CU	QTY
PENDA	LU65_0	1
	LU43	1
	LU66	2
CABLE	CN60	112
	LU16	4

HV MATERIAL				
EQUIPMENT	CU	QTY		
		6 kV	11 kV	22 kV
	HU55/630	SELECT 2 OF THE SAME TYPE		
	HU55/1000	SELECT 2 OF THE SAME TYPE		
	HU59/630	SELECT 2 OF THE SAME TYPE		
	HU59/1000	SELECT 2 OF THE SAME TYPE		
CABLE	HU66	1		
	CN46	AS REQUIRED FROM FSSW		
EARTHING	HU70_1	1		

NOTES:-

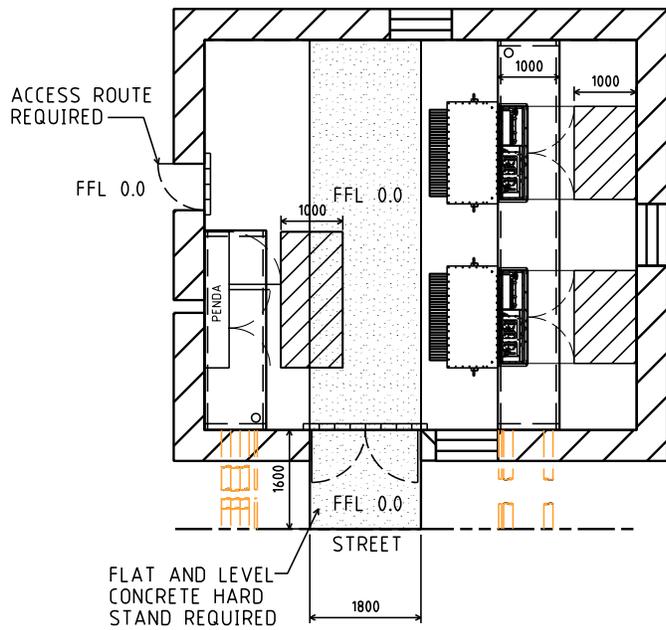
1. LU66 CAN BE USED FOR THE TRANSFORMER AND CONTIGUOUS CUSTOMER.
2. EVERY INSTALLATION SHALL INCLUDE AN ERG CONNECTION 2 x LU68.
3. 2 x LU70 OR 1 x LU69 CAN BE USED IN POSITION 4.
4. 1 x LU14 NEEDED WITH EACH LU69 STREET FEEDER OR LU70 LIGHTING CIRCUIT.
5. 1 x LU16 NEEDED WITH EACH LU66_TX IN PENDA AND 1 x LU16 FOR LU59 (NON-MPS).
6. LARGE CUSTOMER CONNECTED VIA A 2000A SWITCH (LU66) MUST ALWAYS BE IN POSITIONS 7 & 8 OR 9 & 10
7. STANDARD PENDA LAYOUT SHOWN. DESIGNER MAY DESIGN AN ALTERNATIVE PENDA LAYOUT.
8. NO GANGED FSD OR SWD PERMITTED SPANING POSITIONS 5 & 6, 6 & 7 OR 10 & 11.
9. REFER TO DSPM CHAPTER 4 FOR THE CORRECT INSTALLATION OF THE PENDA.
10. CABLE TRENCH TO BE WATER/OIL TIGHT.
11. DESIGNER TO REQUEST FOR 2 x ETEL TRANSFORMERS FOR DUAL 630kVA LAYOUT.
12. INDICATIVE LOCATION OF EARTH BAR SHOWN. EXACT LOCATION TO BE CONFIRMED IN DESIGN.



REV	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.
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TITLE
 DISTRICT SUBSTATION
 UP TO 2000 kVA (NON- MPS)
 FIRE RATED - WITHOUT HV SWGR
 EQUIPMENT SELECTION AND LAYOUT

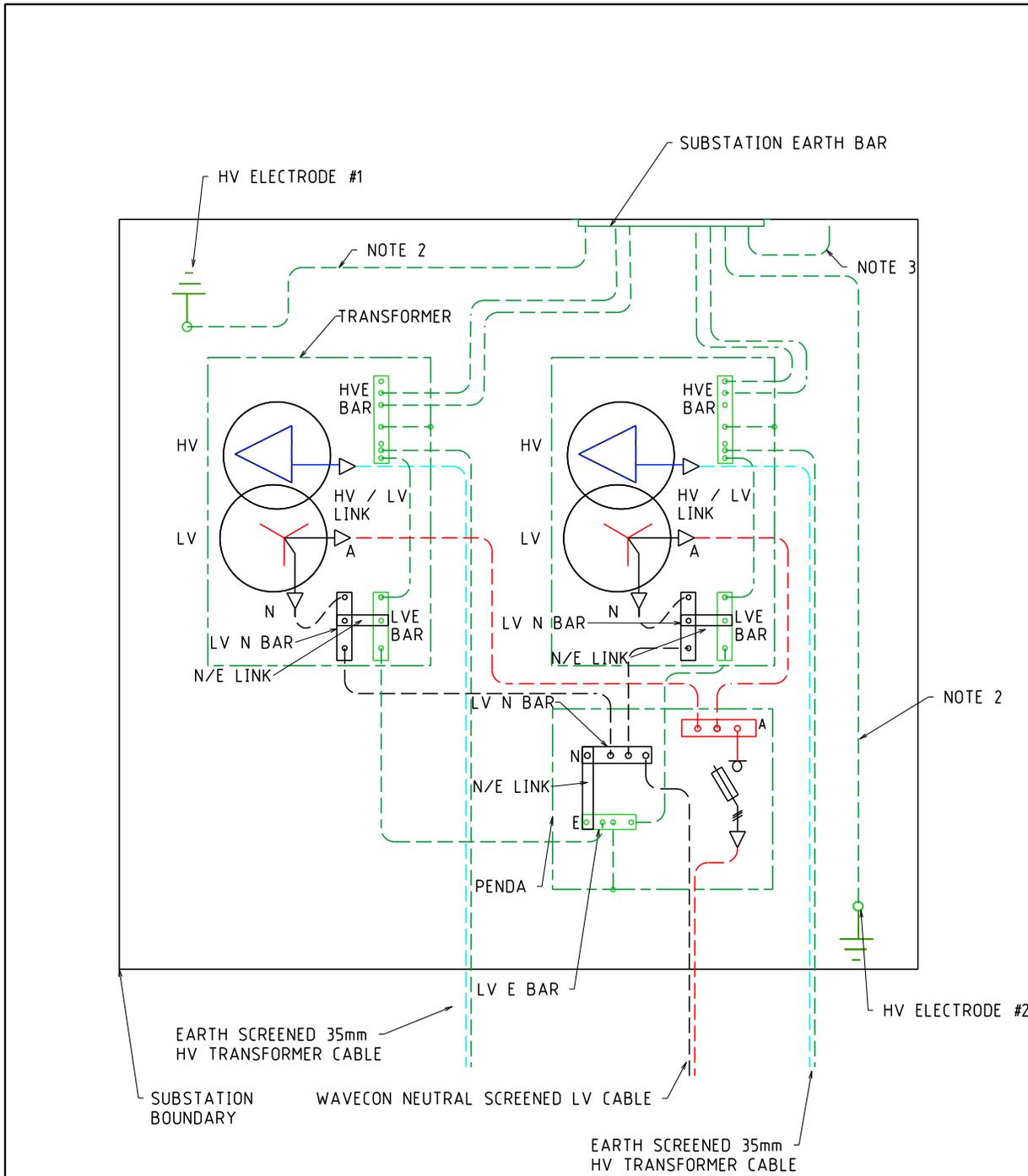
DISTRIBUTION SUBSTATION PLANT MANUAL			westernpower	
DRAWN: SL	DATE: 17/12/2025	DRG. No.	DSM-3-09	
ORIGINATED: SL	SCALE: NTS A4	CHECKED BY: KT	REV. C	SHT. 3/5
APPROVED: MARK MONTEMAYOR				



 INSTALLATION AND MAINTENANCE CLEARANCE
 OPERATIONAL CLEARANCE

NOTES:-
 1. DESIGNER TO ENSURE SAFE ACCESS AND EGRESS ROUTES ARE PROVIDED.
 2. WHERE THE SITE IS SET BACK FROM THE STREET, CRANE ACCESS IS REQUIRED.

			TITLE			DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower	
			DISTRICT SUBSTATION UP TO 2000 kVA (NON- MPS) FIRE RATED - WITHOUT HV SWGR CLEARANCES			DRAWN: SL		DATE: 17/12/2025	
						ORIGINATED: SL		SCALE: NTS @ A4	
						CHECKED BY: KT		DSM-3-09	
						APPROVED: MARK MONTEMAYOR		REV. C	
								SHT. 4/5	
REV	DATE	DESCRIPTION	DRG.	CHKD.	APPR.				
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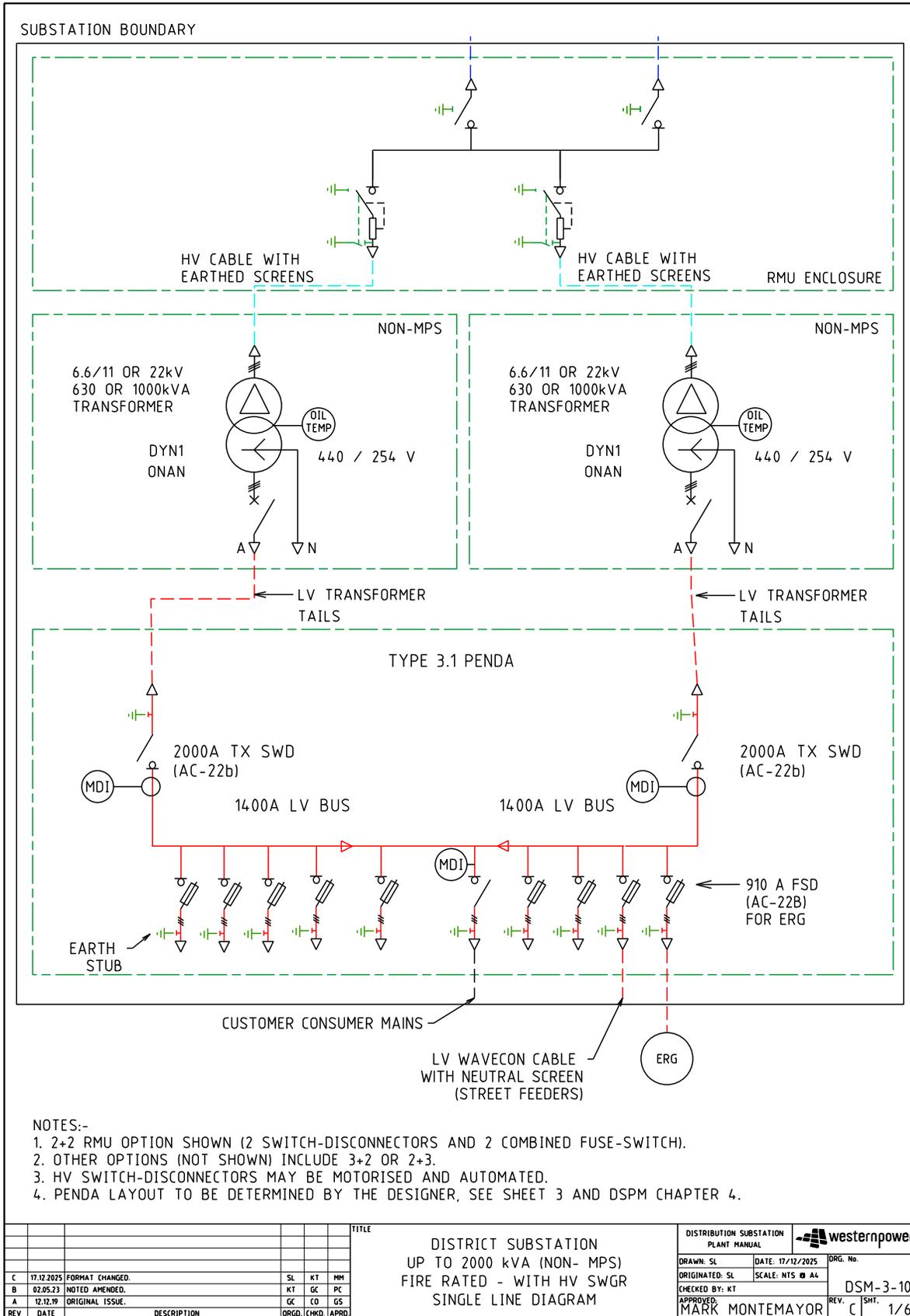


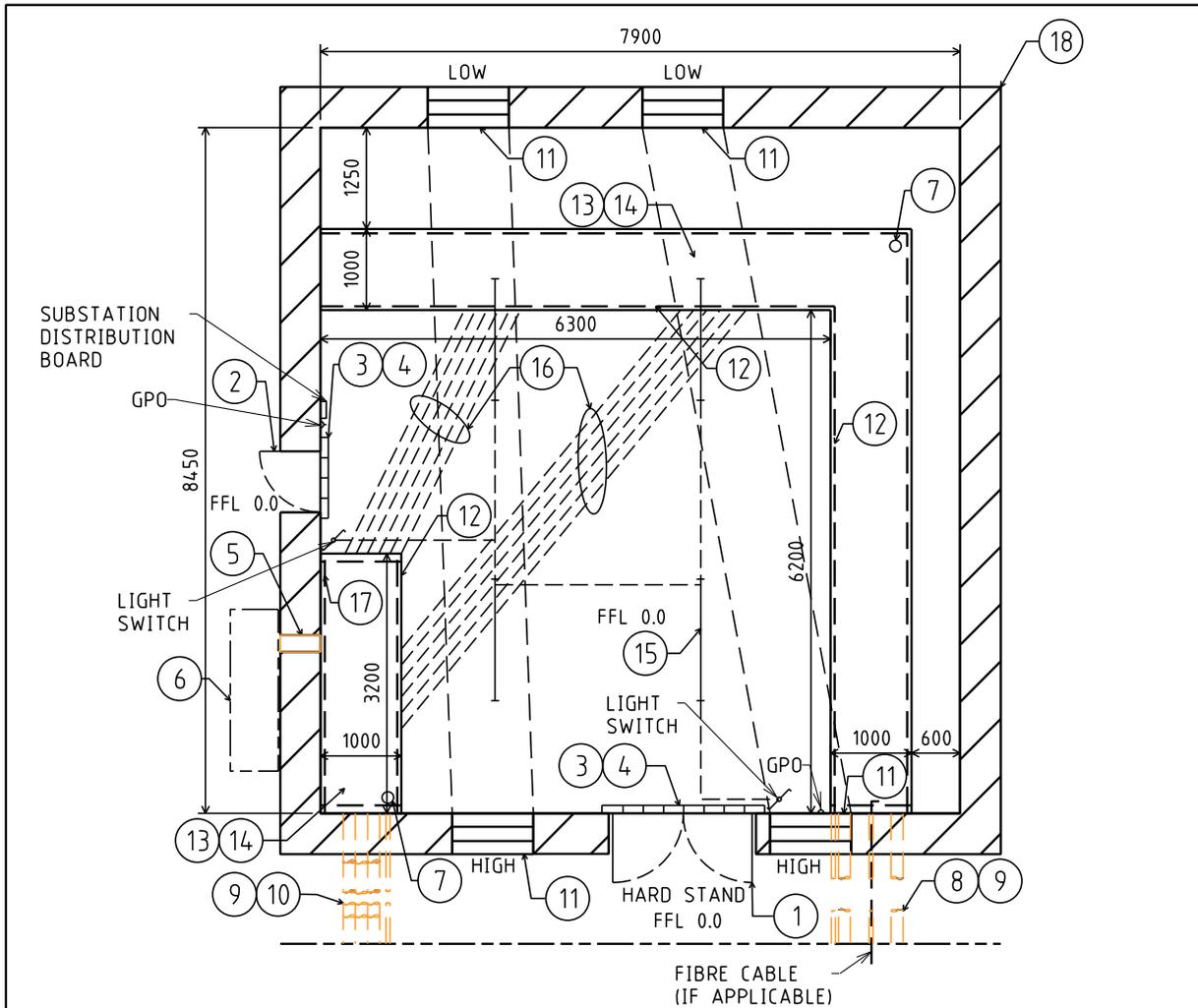
NOTES:-

1. SEE HU CU IN THE DDC FOR EARTHING MATERIALS
2. CONNECT 70mm' PVC INSULATED COPPER CABLE (GREEN/YELLOW) TO EARTH ELECTRODES AS PER ITEM 7 ON SHEET 2 - TO BE SEALED WITH CN81.
3. BUILDING EARTH CABLE BOND IS TO BE PROVIDED BY THE CUSTOMER.

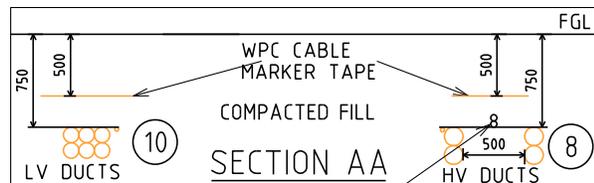
			TITLE			DISTRIBUTION SUBSTATION PLANT MANUAL			westernpower			
DISTRICT SUBSTATION UP TO 2000 kVA (NON- MPS) FIRE RATED - WITHOUT HV SWGR EARTHING ARRANGEMENT						DRAWN: SL			DATE: 17/12/2025			
						ORIGINATED: SL			SCALE: NTS @ A4			
						CHECKED BY: KT			DSM-3-09			
						APPROVED: MARK MONTEMAYOR			REV. C SHT. 5/5			
REV	DATE	DESCRIPTION	ORGD	CHKD	APRD							
C	17.12.2025	FORMAT CHANGED.		SL	KT	MM						
B	02.05.23	NOTED AMENDED.		KT	GC	PC						
A	12.12.19	ORIGINAL ISSUE.		GC	CD	GS						

4.3.4 DSM-3-10 Up to 2000kVA (Non-MPS) with HV SWGR





1	DOUBLE DOORS 2340x1720 CLEAR OPENING.
2	DOOR 2040x820 CLEAR OPENING.
3	75 HIGH BRICK BUND.
4	BUND LAID AFTER EQUIPMENT INSTALLED.
5	CUSTOMERS DUCT(S) AT FLOOR OF TRENCH.
6	CUSTOMERS MAIN DISTRIBUTION BOARD.
7	75 DIA PENETRATION THROUGH SLAB FOR EARTHING - TO BE SEALED WITH CN81.
8	4-150 & 1-50 ID HEAVY DUTY DUCTS - TO BE SEALED WITH CN81.
9	750 COVER AT BOUNDARY.
10	6-150 & 1-50 ID HEAVY DUTY DUCTS - TO BE SEALED WITH CN81.
11	600x800 WIDE FIRE DAMPERED VENT AT HIGH (TOP 200 MAX BELOW CEILING) & LOW (BOTTOM MAX 200 ABOVE FINISHED FLOOR LEVEL) LEVELS.
12	50mm WIDE x 38mm DEEP REBATE FOR TRENCH COVERS.
13	TRENCH COVER 35mm THICK x 26kg/m2 FRP SLAB PANEL FRONT OF HV SWITCHGEAR ONLY. 38mm THICK x 18.2kg/m2 MESH GRATING ELSEWHERE.
14	1200 DEEP TRENCH WALLS & FLOOR OF TRENCH TO BE PAINTED WITH SILICONE GLAZE S50.
15	LED LIGHTS BATTEN FITTING (2 WAY SWITCH WITH NEON INDICATOR).
16	10-150 ID HEAVY DUCTS INSTALLED AT FLOOR OF TRENCH - TO BE SEALED WITH CN81.
17	COVER SUPPORTS - 100x75x6 UA (H.D.G.) FIXED TO WALL OF TRENCH.
18	WALLS, CEILING & DOORS TO BE 2HR FIRE RATED, CEILING HEIGHT TO BE MIN 2500mm.

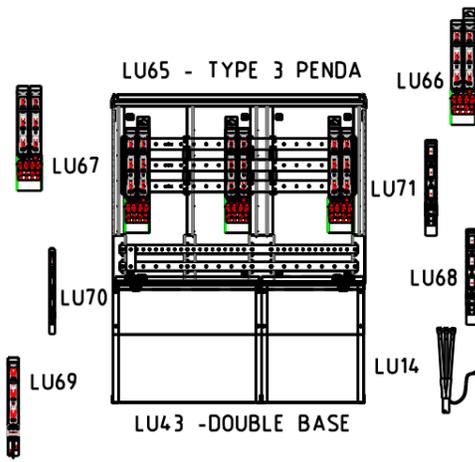


2 x 50mm DUCT WITH DRAW STRING REQUIRED FOR FIBRE FOR CBD AUTOMATION WHEN REQUIRED.

REV	DATE	DESCRIPTION	DRG	CHKD	APRD
C	17.12.2025	FORMAT CHANGED.	SL	KT	MM
B	02.05.23	NOTED AMENDED.	KT	GC	PC
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS

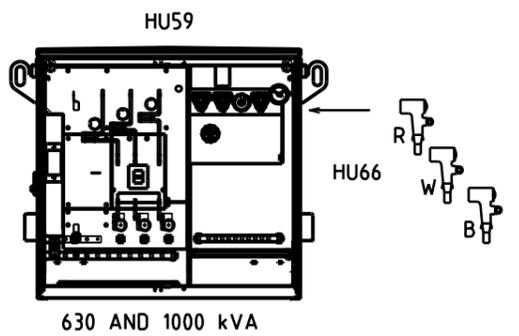
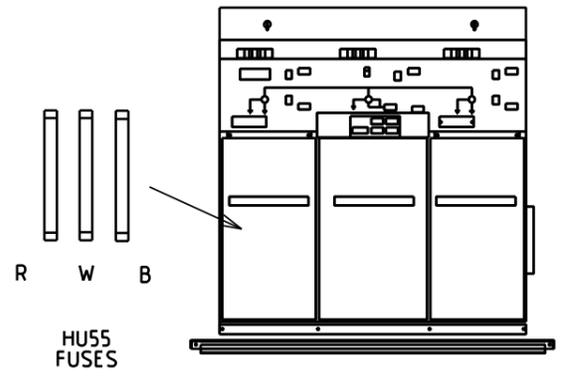
TITLE
**DISTRICT SUBSTATION
 UP TO 2000 kVA (NON-MPS)
 FIRE RATED - WITH HV SWGR
 REQUIREMENTS AND DUCT INSTALLATION**

DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower	
DRAWN: SL	DATE: 17/12/2025	DRG. No.	
ORIGINATED: SL	SCALE: NTS A4	DSM-3-10	
CHECKED BY: KT	APPROVED: MARK MONTEMAYOR	REV. C	SHT. 2/6



TYPE 3.1 PENDA LAYOUT																		
EQUIPEMENT	MAX FUSE	CU	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
TYPE 3.1 PENDA		LU65																
PENDA BASE		LU42																
160A FSD	1x 63A DIN 00	LU70			L	L												
630A FSD	1x 400A NH2	LU69			C/S													
910A FSD	1x 630A NH3	LU68			E											E		
1260A FSD	2x 400A NH2	LU67			C				C		C		C		C			
1000A FSD	LINKS	LU71			C	C	C	C	C	C	C	C	C	C	C	C	C	
2000A FSD	LINKS	LU66	T2									C1						T1
FSD CABLE TERM		LU14			L/S	S	S	S	S	S	S	S	S	S	S	S	S	
TX CABLE TERM		LU16	T2															T1

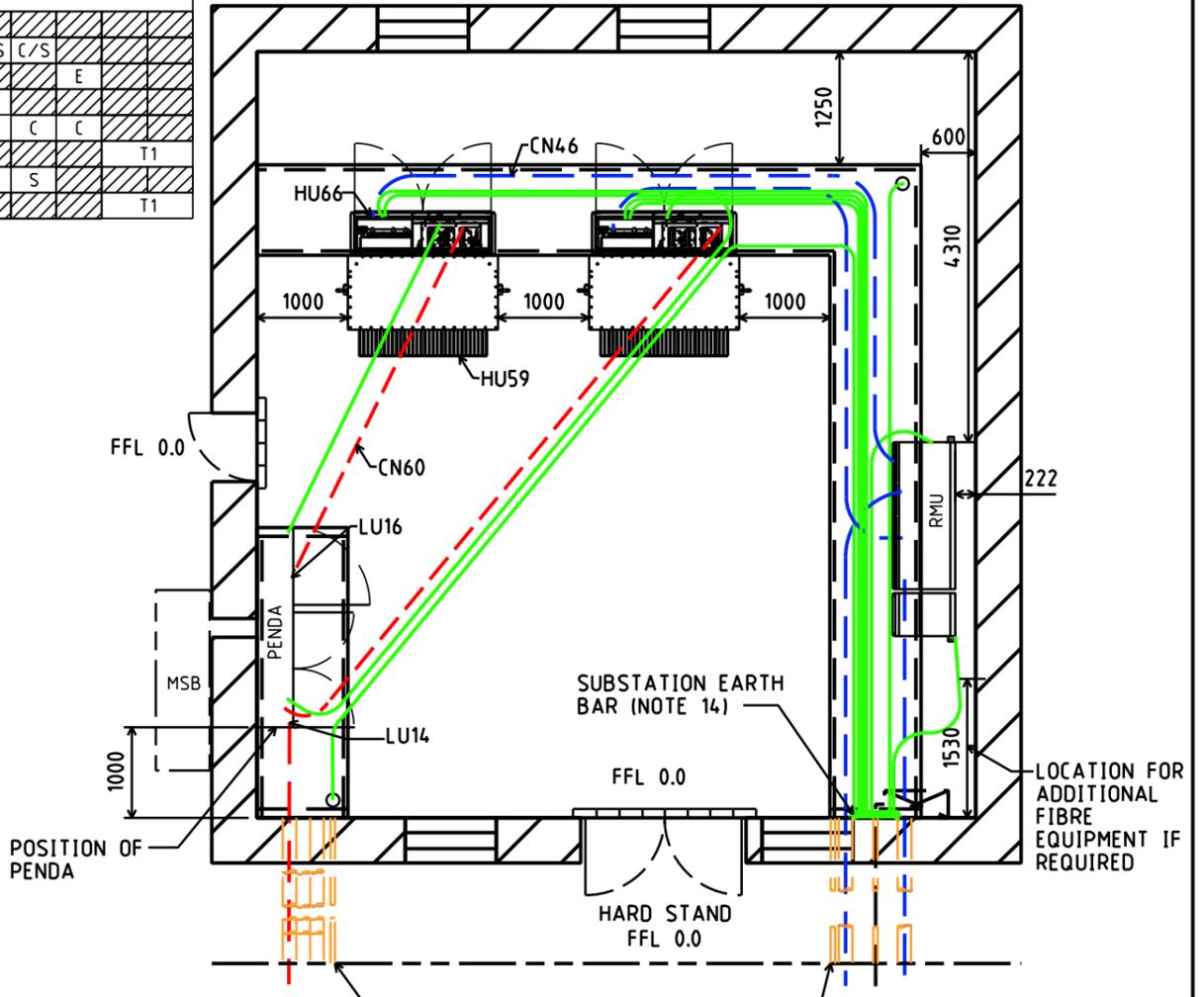
TX = TRANSFORMER L = LIGHTING CIRCUIT E = EMERGENCY RESPONSE
 C = CUSTOMER S = STREET CIRCUIT G = GENERATOR



HV MATERIAL				
EQUIPEMENT	CU	QTY		
		6 kV	11 kV	22 kV
TRANSFORMER	HU55/630	SELECT 2 OF THE SAME TYPE		
	HU55/1000			
	HU59/630	SELECT 2 OF THE SAME TYPE		
	HU59/1000			
RMU	HU24	SELECT 1		
	HU25_2S			
	HU25_3S			
EARTHING	HU70_3	1		
	CABLE	HU66	2	
AUTOMATION	CN46	14		
	DA6_LVS	1		
	DA6_NG_SE	1 (OPTIONAL)		

LV MATERIAL		
EQUIPEMENT	CU	QTY
PENDA	LU64_I	1
	LU66	1
	LU68	1
CABLE	CN60	56
	LU16	2

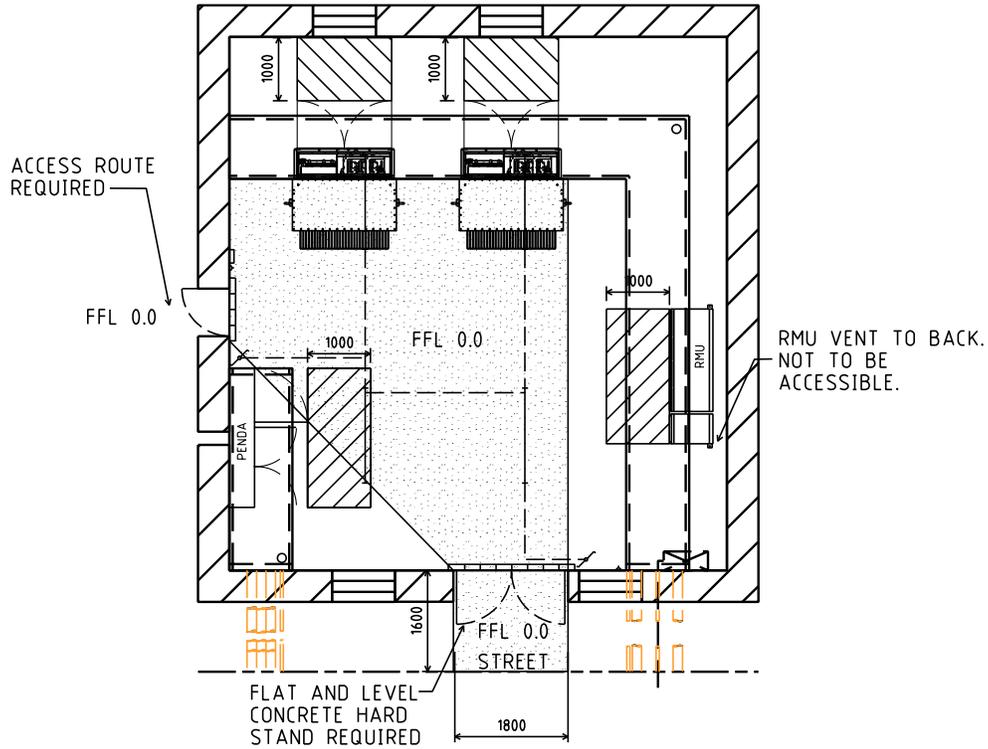
- NOTES:-
1. LU66 CAN BE USED FOR THE TRANSFORMER AND CUSTOMER.
 2. EVERY INSTALLATION SHALL INCLUDE AN ERG CONNECTION LU68.
 3. 2 x LU70 OR 1 x LU69 CAN BE USED IN POSITION 4.
 4. 1 X LU14 NEEDED WITH EACH LU69 STREET FEEDER OR LU70 LIGHTING CIRCUIT.
 5. 1 X LU16 NEEDED WITH EACH LU66_TX IN PENDA AND 1 X LU16 FOR LU59 (NON-MPS).
 6. LU66_TX WILL DEFAULT TO POSITIONS 9 & 10 UNLESS POSITION 1 & 2 IS SPECIFIED BY THE DESIGNER.
 7. STANDARD PENDA LAYOUT SHOWN. DESIGNER MAY DESIGN AN ALTERNATIVE PENDA LAYOUT.
 8. NO GANGED FSD OR SWD PERMITTED SPANING POSITIONS 5 & 6 OR 6 & 7.
 9. REFER TO DSPM CHAPTER 4 FOR THE CORRECT INSTALLATION OF THE PENDA.
 10. RMU SUPPLIED WITH BASE AND HV CABLE TERMINATIONS.
 11. REFER TO SHEET 6 FOR THE CORRECT INSTALLATION OF THE RMU.
 12. REFER TO DSPM CHAPTER 4 FOR AUTOMATION DETAILS.
 13. CABLE TRENCH TO BE WATER/OIL TIGHT.
 14. INDICATIVE LOCATION OF EARTH BAR SHOWN. EXACT LOCATION TO BE CONFIRMED IN DESIGN.



REV	DATE	DESCRIPTION	ORGO.	CHKD.	APRD.
C	17.12.2025	FORMAT CHANGED.		SL	KT
B	02.05.23	NOTED AMENDED.		KT	GC
A	12.12.19	ORIGINAL ISSUE.		GC	CO

DISTRICT SUBSTATION
 UP TO 2000 kVA (NON- MPS)
 FIRE RATED - WITH HV SWGR
 EQUIPMENT SELECTION AND LAYOUT

DISTRIBUTION SUBSTATION PLANT MANUAL			
DRAWN: SL	DATE: 17/12/2025	DRG. No.	
ORIGINATED: SL	SCALE: NTS @ A4	DSM-3-10	
CHECKED BY: KT		APPROVED:	REV. C
MARK MONTEMAYOR			SHT. 3/6



- INSTALLATION AND MAINTENANCE CLEARANCE
- OPERATIONAL CLEARANCE

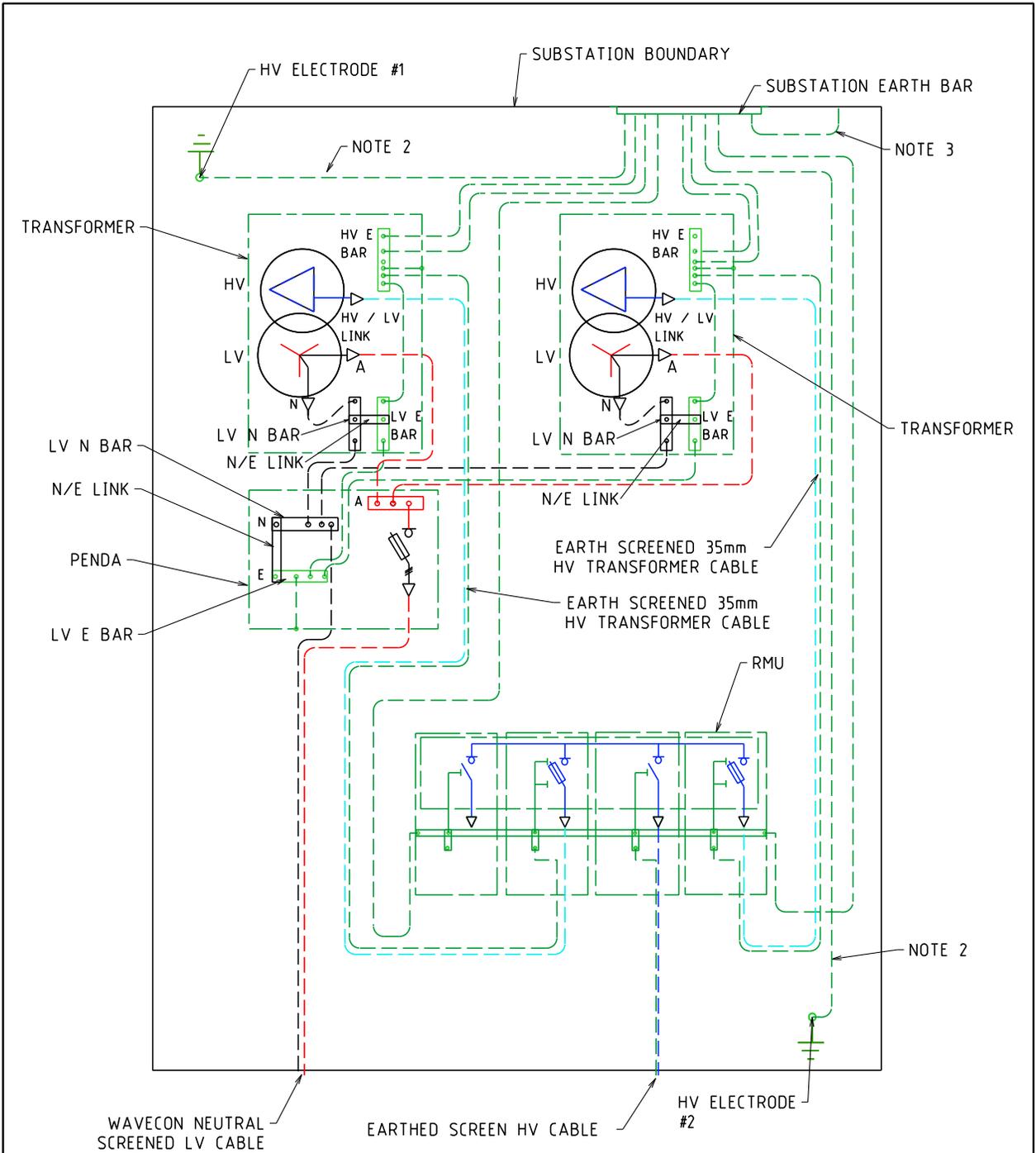
- NOTES:-
1. DESIGNER TO ENSURE SAFE ACCESS AND EGRESS ROUTES ARE PROVIDED.
 2. WHERE THE SITE IS SET BACK FROM THE STREET, CRANE ACCESS IS REQUIRED.

REV	DATE	DESCRIPTION	ORGD.	CHKD.	APPRD.
C	17.12.2025	FORMAT CHANGED.	SL	KT	MM
B	02.05.23	NOTED AMENDED.	KT	GC	PC
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS

TITLE

**DISTRICT SUBSTATION
UP TO 2000 kVA (NON- MPS)
FIRE RATED - WITH HV SWGR
CLEARANCES**

DISTRIBUTION SUBSTATION PLANT MANUAL		
DRAWN: SL	DATE: 17/12/2025	ORG. No.
ORIGINATED: SL	SCALE: NTS A4	DSM-3-10
CHECKED BY: KT	APPROVED:	
MARK MONTEMAYOR	REV. C	SHT. 4/6



NOTES:-

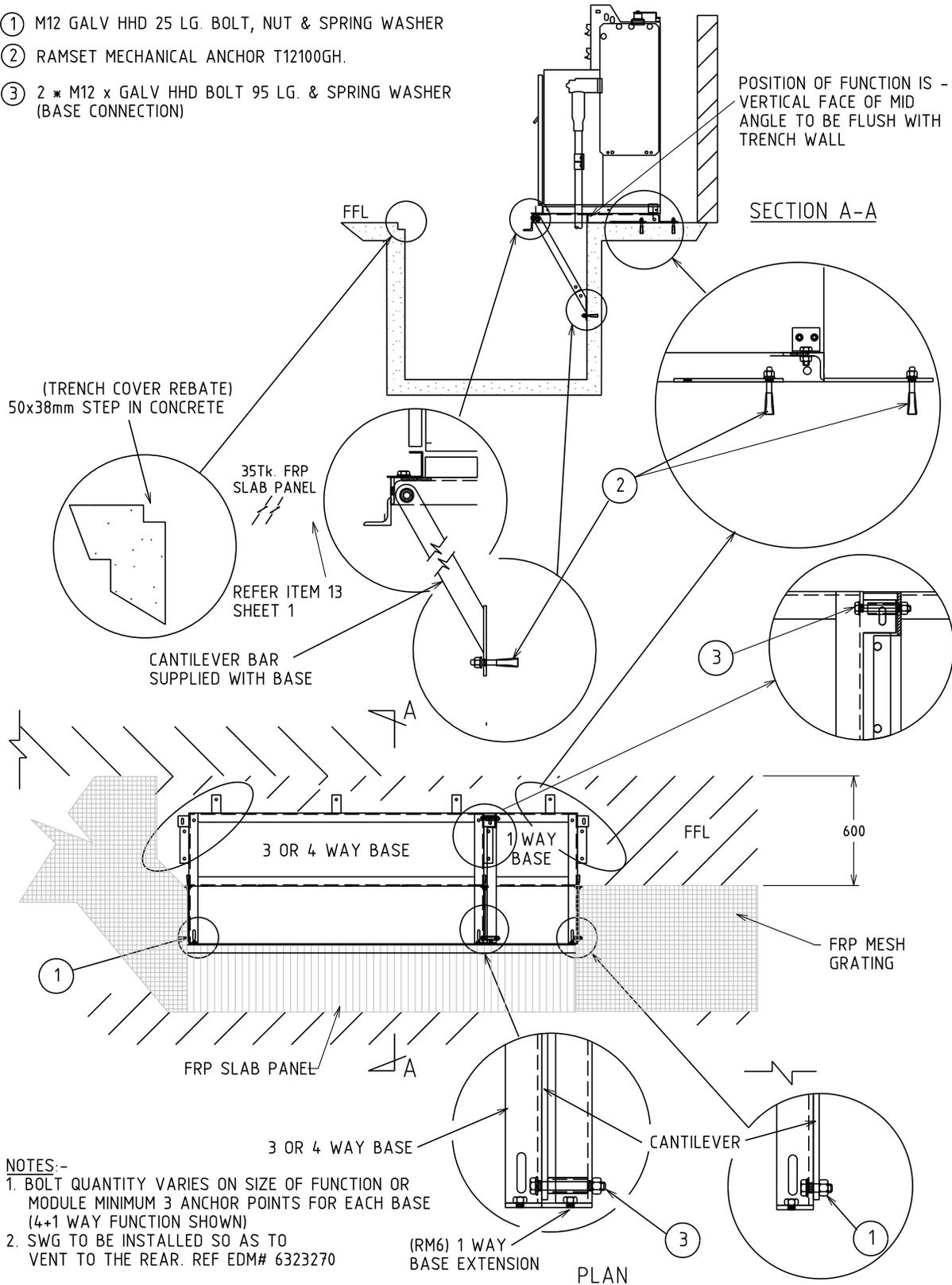
1. SEE HU CU IN THE DDC FOR EARTHING MATERIALS
2. CONNECT 70mm² PVC INSULATED COPPER CABLE (GREEN/YELLOW) TO EARTH ELECTRODES AS PER ITEM 7 ON SHEET 2 - TO BE SEALED WITH CN81.
3. BUILDING EARTH CABLE BOND IS TO BE PROVIDED BY THE CUSTOMER.

REV	DATE	DESCRIPTION	ORGD.	CHKD.	APPRD.
C	17.12.2025	FORMAT CHANGED.	SL	KT	MM
B	02.05.23	NOTED AMENDED.	KT	GC	PC
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS

DISTRICT SUBSTATION
UP TO 2000 kVA (NON- MPS)
FIRE RATED - WITH HV SWGR
EARTHING ARRANGEMENT

DISTRIBUTION SUBSTATION PLANT MANUAL			
DRAWN: SL	DATE: 17/12/2025	ORG. No.	
ORIGINATED: SL	SCALE: NTS @ A4	DSM-3-10	
CHECKED BY: KT	APPROVED: MARK MONTEMAYOR	REV. C	SHT. 5/6

- ① M12 GALV HHD 25 LG. BOLT, NUT & SPRING WASHER
- ② RAMSET MECHANICAL ANCHOR T12100GH.
- ③ 2 * M12 x GALV HHD BOLT 95 LG. & SPRING WASHER (BASE CONNECTION)



NOTES:-

- 1. BOLT QUANTITY VARIES ON SIZE OF FUNCTION OR MODULE MINIMUM 3 ANCHOR POINTS FOR EACH BASE (4+1 WAY FUNCTION SHOWN)
- 2. SWG TO BE INSTALLED SO AS TO VENT TO THE REAR. REF EDM# 6323270

REV	DATE	DESCRIPTION	ORGD.	CHKD.	APPRD.
C	17.12.2025	FORMAT CHANGED.	SL	KT	MM
B	02.05.23	NOTED AMENDED.	KT	GC	PC
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS

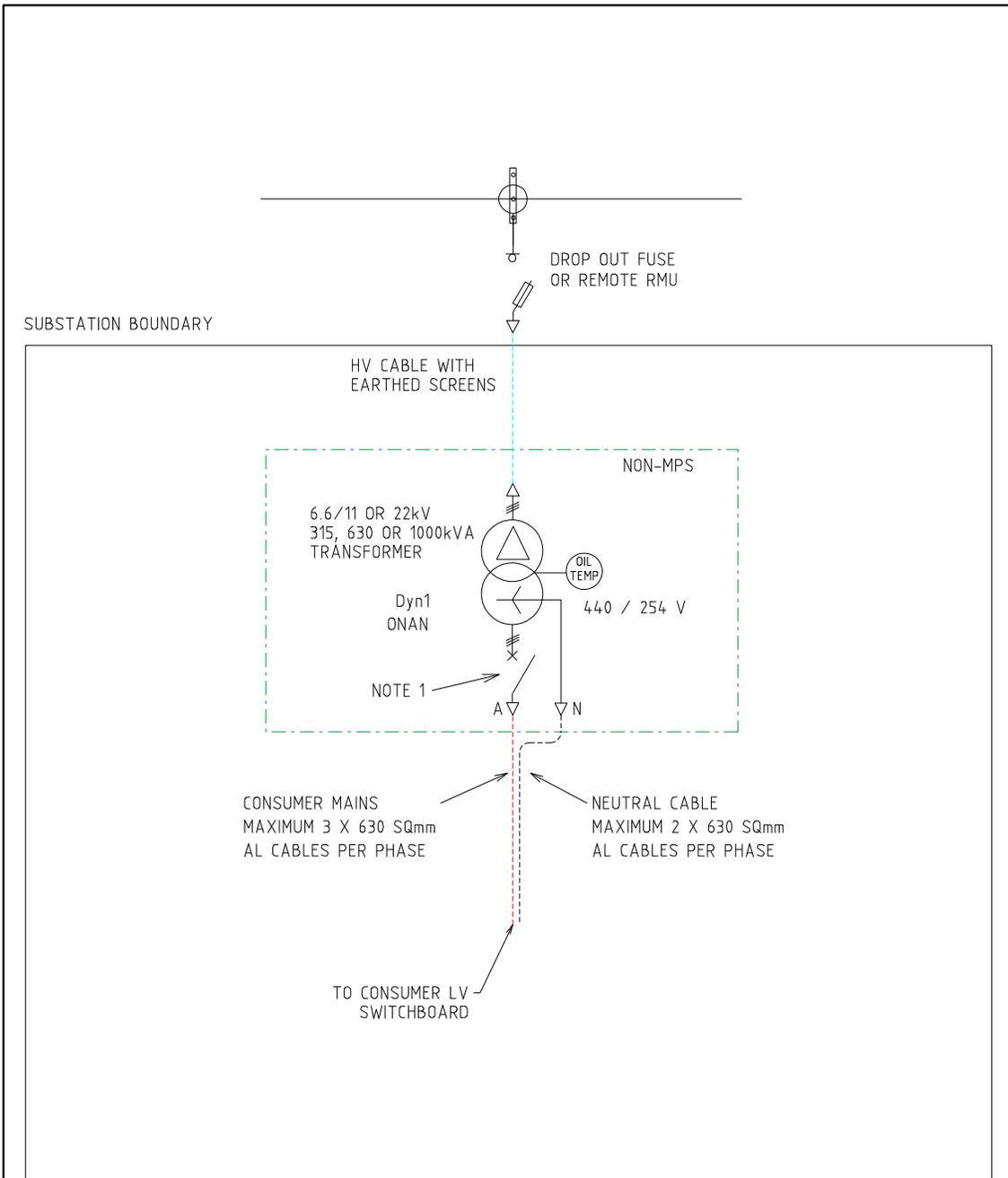
TITLE

SCHNEIDER SWITCHGEAR
3 & 4 WAY WITH 1 WAY EXTENSION
FIXING DETAILS

DISTRIBUTION SUBSTATION PLANT MANUAL			
DRAWN: SL	DATE: 17/12/2025	ORG. No.	
ORIGINATED: SL	SCALE: NTS @ A4	DSM-3-10	
CHECKED BY: KT	APPROVED:	REV. C	SHT. 6/6
MARK MONTEMAYOR			

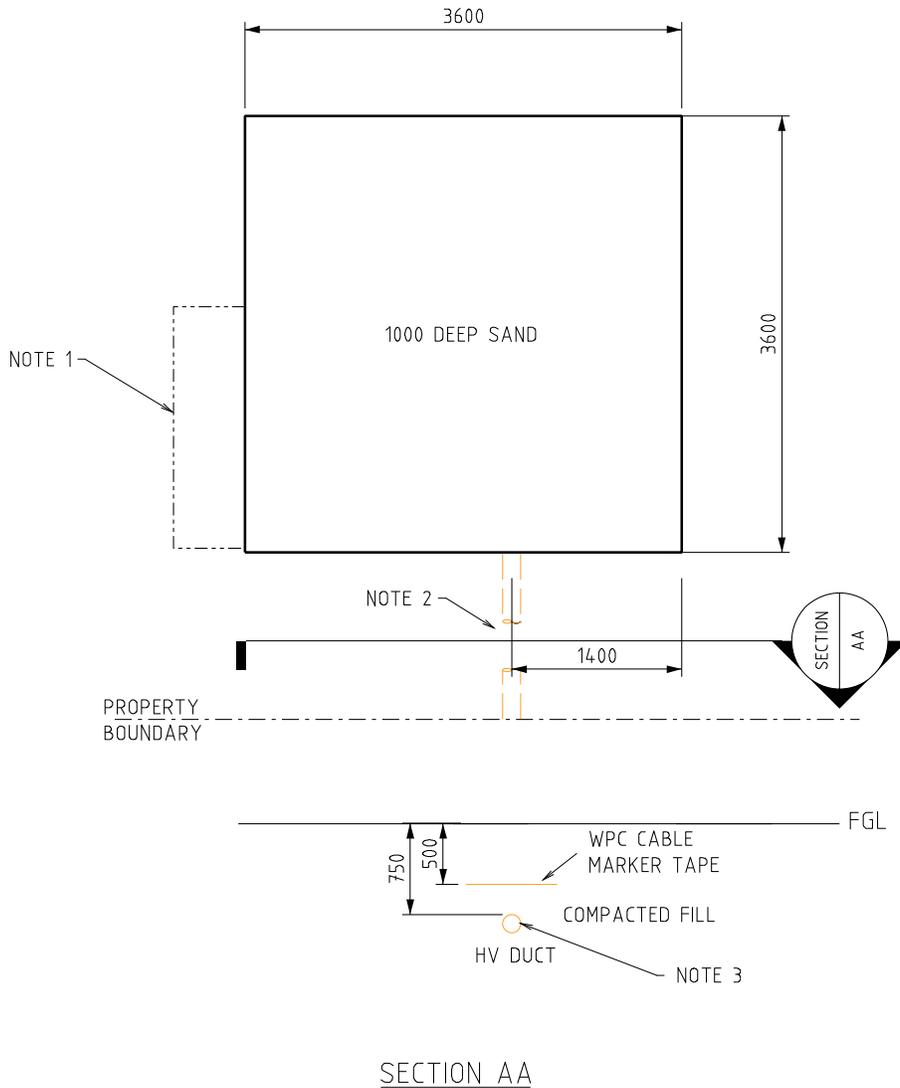
4.4 Sole Use Substations – Non-Fire Rated

4.4.1 DSPM-3-13 Up to 1000kVA (Non-MPS)



NOTES:-
1. FUSE SWITCH USED FOR 315kVA TRANSFORMER. REFER TO THE DCCR FOR MCCB SETTINGS.

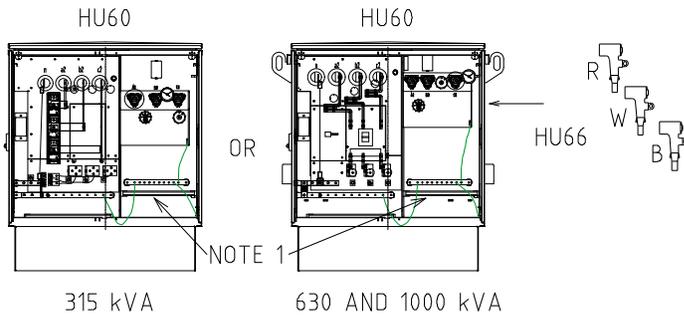
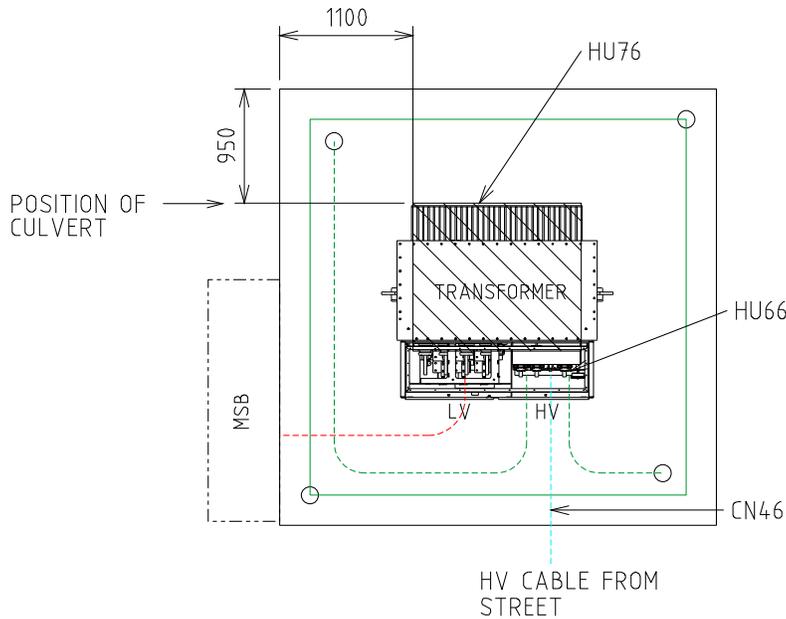
REV	DATE	DESCRIPTION	DRGD.	CHKD.	APPRD.	TITLE	DISTRIBUTION SUBSTATION PLANT MANUAL	westernpower	DRG. No.
A	02.05.23	ORIGINAL ISSUE		KT	GC	PC	SOLE USE SUBSTATION UP TO 1000 kVA (NON-MPS) NON-FIRE RATED SINGLE LINE DIAGRAM		DSPM-3-13
									REV. A
									1
								PHIL CAPPER	



NOTES:-

1. SITE OF CUSTOMERS MAIN DISTRIBUTION BOARD (IF REQUIRED).
2. DUCTING REQUIRED IF LAND REQUIREMENT IS SET BACK FROM ROAD RESERVE BOUNDARY.
3. 1x150 (HV) ID HEAVY DUTY DUCT (CN56).

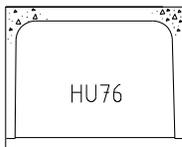
				TITLE			DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower		
				SOLE-USE SUBSTATION UP TO 1000kVA (NON-MPS) NON FIRE RATED DUCTS & LAND REQUIREMENTS						DRG. No.	
				DRAWN: KT		DATE: 31-03-2022		DSPM-3-13			
				ORIGINATED: KT		SCALE: NTS		REV. A			
				CHECKED: GC		APPROVED: PHIL CAPPER		SHT. 2			
A	02.05.23	ORIGINAL ISSUE		KT	GC	PC					
REV	DATE	DESCRIPTION		ORGD.	CHKD.	APRD.					



TRANSFORMER MATERIALS (QTY)

CU	440V	6/11kV	22kV
HU60/315			
HU60/630			
HU60/1000			
HU66			
HU68			
HU76			

315, 630 & 1000 kVA

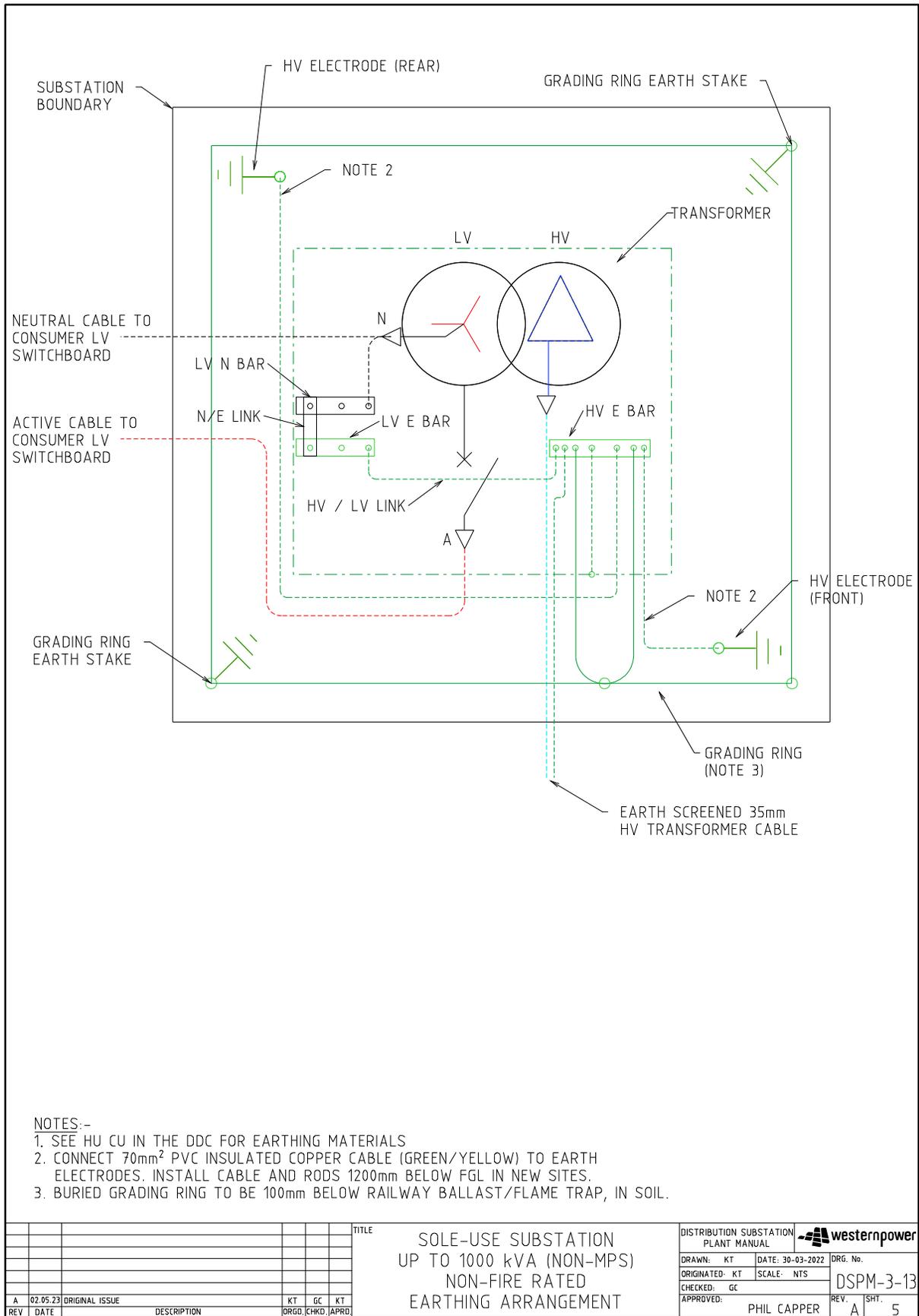


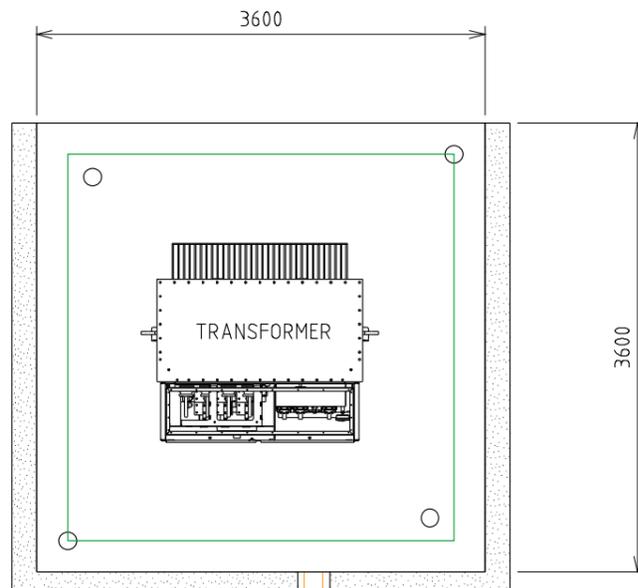
BOX CULVERT - CROWN AND BASE TYPE
 EXTERNAL SIZE = 1416 x 1022 x 1220 LONG
 CROWN WEIGHT = 1038 kg
 BASE WEIGHT = 384 kg

NOTES:-

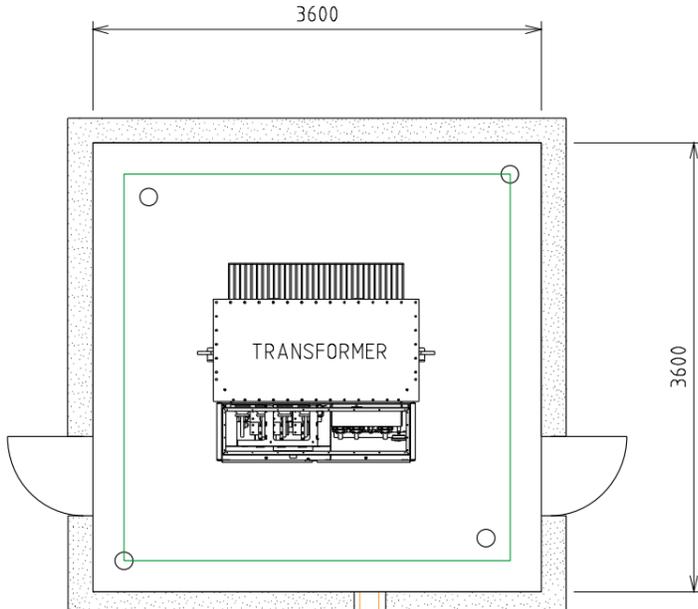
1. INSTALL CABLE CLAMP ON EACH PHASE OF HV CABLE (FM0200)
2. REFER DSPM CHAPTER 4 FOR THE CORRECT POSITIONING OF THE NON-MPS ONTO THE CULVERT.
3. MEASUREMENTS SHOWN ARE ± 50mm, SAME CONSTRUCTION TOLERANCE APPLIES.
4. TRANSFORMER OIL IS TO BE CONTAINED WITHIN THE SITE.

REV	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.	TITLE	DISTRIBUTION SUBSTATION PLANT MANUAL	westernpower	
A	02.05.23	ORIGINAL ISSUE	KT	GC	PC	SOLE USE SUBSTATION UP TO 1000kVA (NON-MPS) NON FIRE RATED EQUIPMENT & SITE LAYOUT	DRAWN: KT	DATE: 31-03-2022	DRG. No.
							ORIGINATED: KT	SCALE: NTS	DSPM-3-13
							CHECKED: GC		
							APPROVED: PHIL CAPPER	REV. A	SHT. 3

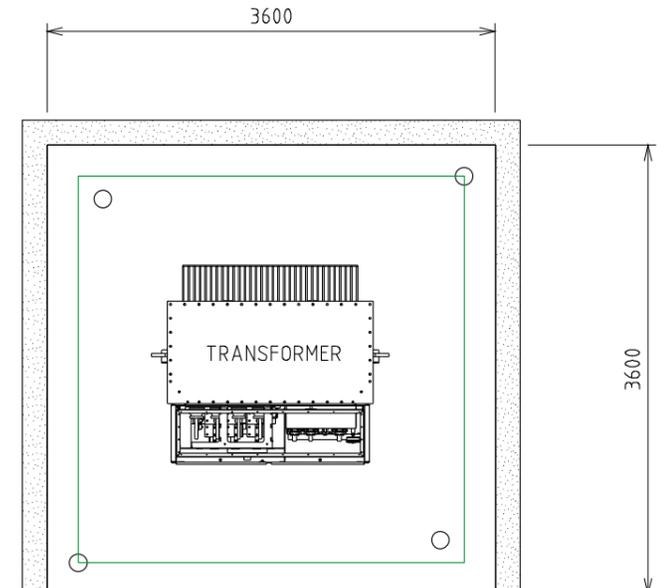




PARTIAL (FRONT) SCREENING



FULL SCREENING

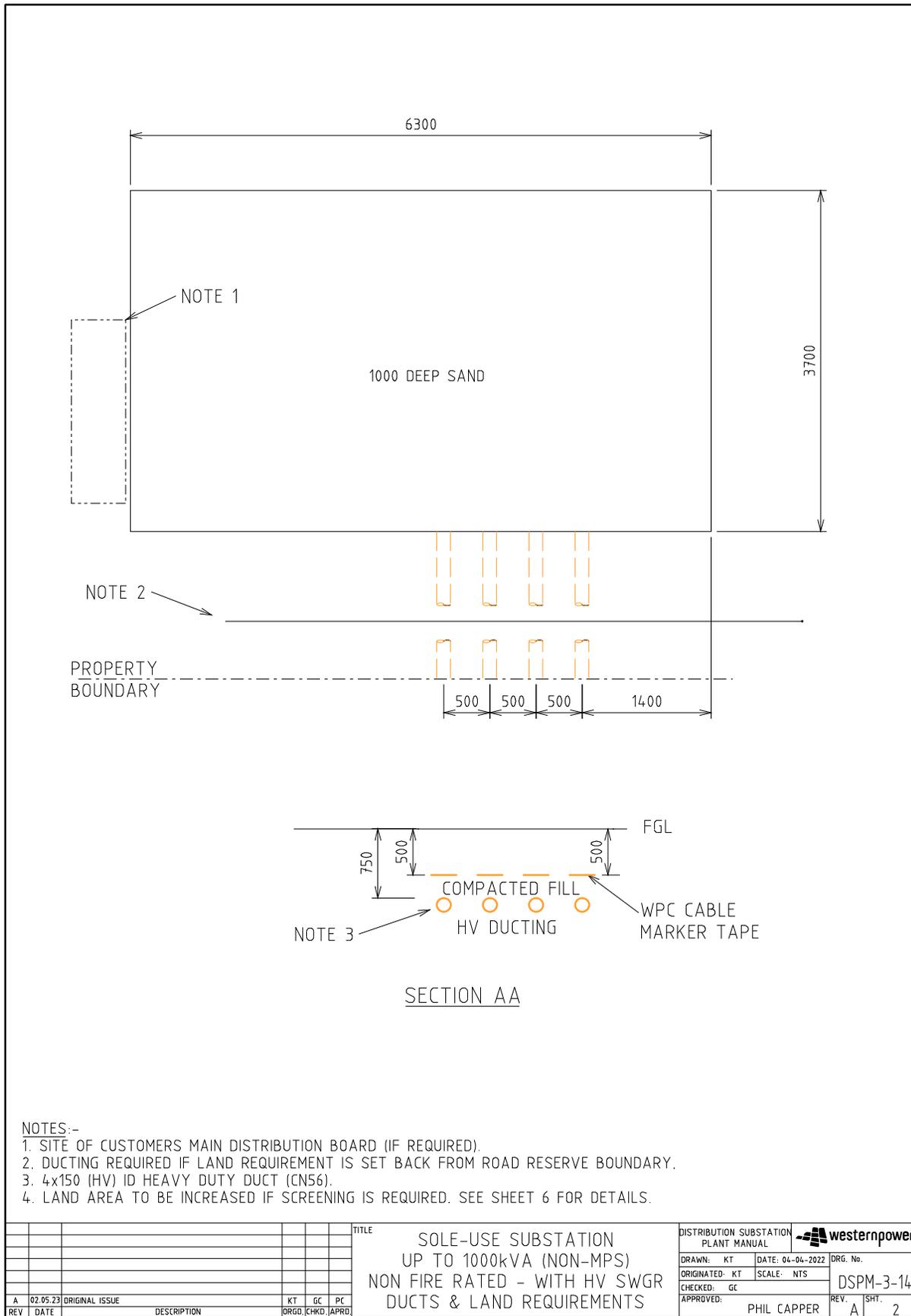


PARTIAL (REAR) SCREENING

NOTES:-

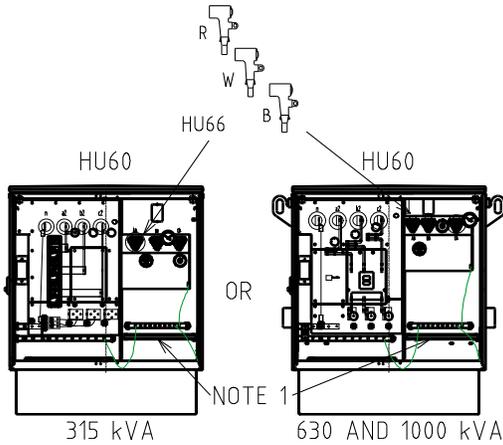
1. FOUNDATIONS SHALL FULLY RETAIN THE SITE TO ALLOW FUTURE EXCAVATION 1200mm DEEP WITHIN THE SUBSTATION SITE.
2. SCREENING OR FOUNDATIONS SHALL NOT ENCR OACH INTO SUBSTATION SITE.
3. SCREENING SHALL NOT IMPACT OPERATIONAL CLEARANCE AND EGRESS REQUIREMENTS SHOWN ON SHEET 4.
4. DOORS (WHERE FITTED) MUST BE A MINIMUM OF 820 WIDE.
5. NON-COMBUSTIBLE MATERIALS TO BE USED FOR SCREENING (MASONARY, ETC.)
6. 2HR FIRE RATED SCREENING MAY BE USED TO REDUCE THE FIRE RISK ZONE. REFER DSPM CHAPTER 5 (FIRE RISK)
7. MINIMUM HEIGHT OF SCREEN WALL IS TO BE 1.8m (HEIGHT OF TRANSFORMER + 300mm).
8. DUCTS ARE REQUIRED WHERE CABLES PASS THROUGH WALL OR FOUNDATIONS. REFER TO SHEET 2 FOR DUCTING DETAILS.

				TITLE			DISTRIBUTION SUBSTATION PLANT MANUAL				
				SOLE-USE SUBSTATION UP TO 1000 kVA (NON-MPS) NON-FIRE RATED SCREENING ARRANGEMENTS						DRG. No.	
							DRAWN: KT		DATE: 31-03-2022		DSPM-3-13
							ORIGINATED: KT		SCALE: NTS		
							CHECKED: GC				
							APPROVED:		PHIL CAPPER		REV. A
A	02.05.23	ORIGINAL ISSUE		KT	GC	PC					SHT. 6
REV.	DATE	DESCRIPTION		ORGD.	CHKD.	APRD.					

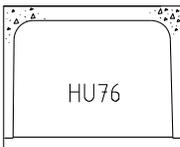


TRANSFORMER MATERIALS (QTY)

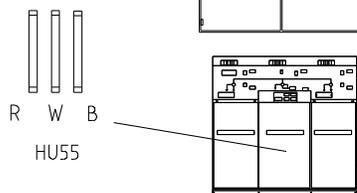
CU	440V	6/11kV	22kV
HU60/315			
HU60/630			
HU60/1000			
HU66			
HU68			
HU76			



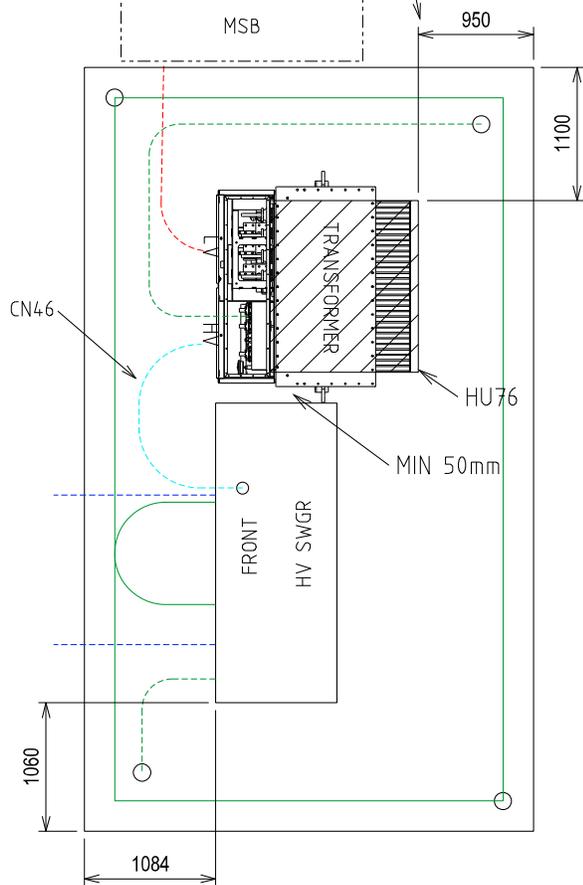
315, 630 & 1000 kVA



BOX CULVERT - CROWN AND BASE TYPE
EXTERNAL SIZE = 1416 x 1022 x 1220 LONG
CROWN WEIGHT = 1038 kg
BASE WEIGHT = 384 kg



POSITION OF CULVERT



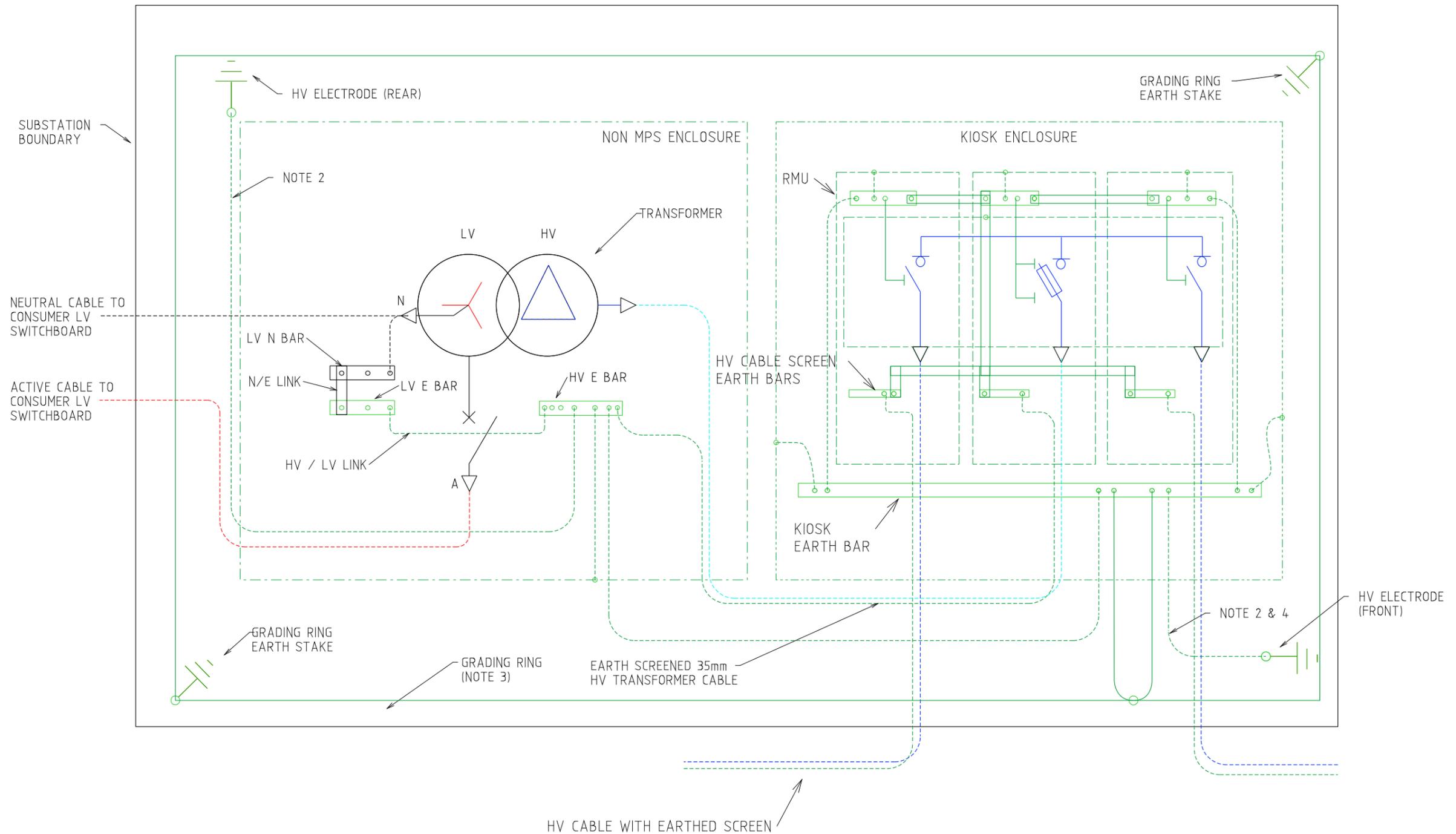
RMU MATERIALS (QTY)

CU	6 kV	11 kV	22 kV
HU55/315			
HU55/630			
HU55/1000			
HU6			
HU7			
HU8			
HU80			
HU81			
CN46			
DA6			
DA10			

NOTES:-

1. INSTALL CABLE CLAMP ON EACH PHASE OF HV CABLE (FM0200)
2. REFER DSPM CHAPTER 4 FOR THE CORRECT POSITIONING OF THE NON-MPS ONTO THE CULVERT.
3. REFER TO DSPM CHAPTER 4 FOR THE CORRECT INSTALLATION OF THE RMU BASE.
4. MEASUREMENTS SHOWN ARE ± 50mm, SAME CONSTRUCTION TOLERANCE APPLIES.
5. RMU, KIOSK BASE AND CABLE TERMINATIONS SUPPLIED IN RMU CU.
6. TRANSFORMER OIL IS TO BE CONTAINED WITHIN THE SITE.
7. REFER TO DSPM CHAPTER 4 FOR AUTOMATION REQUIREMENTS.

TITLE				DISTRIBUTION SUBSTATION PLANT MANUAL			
SOLE USE SUBSTATION UP TO 1000kVA (NON-MPS) NON FIRE RATED - WITH HV SWGR EQUIPMENT & SITE LAYOUT				DRAWN: KT		DATE: 04-04-2022	
				ORIGINATED: KT		SCALE: NTS	
A 02.05.23 ORIGINAL ISSUE				APPROVED: GC		DRG. No. DSPM-3-14	
REV. DATE DESCRIPTION				PHIL CAPPER		REV. A SH. 3	



NOTES:-

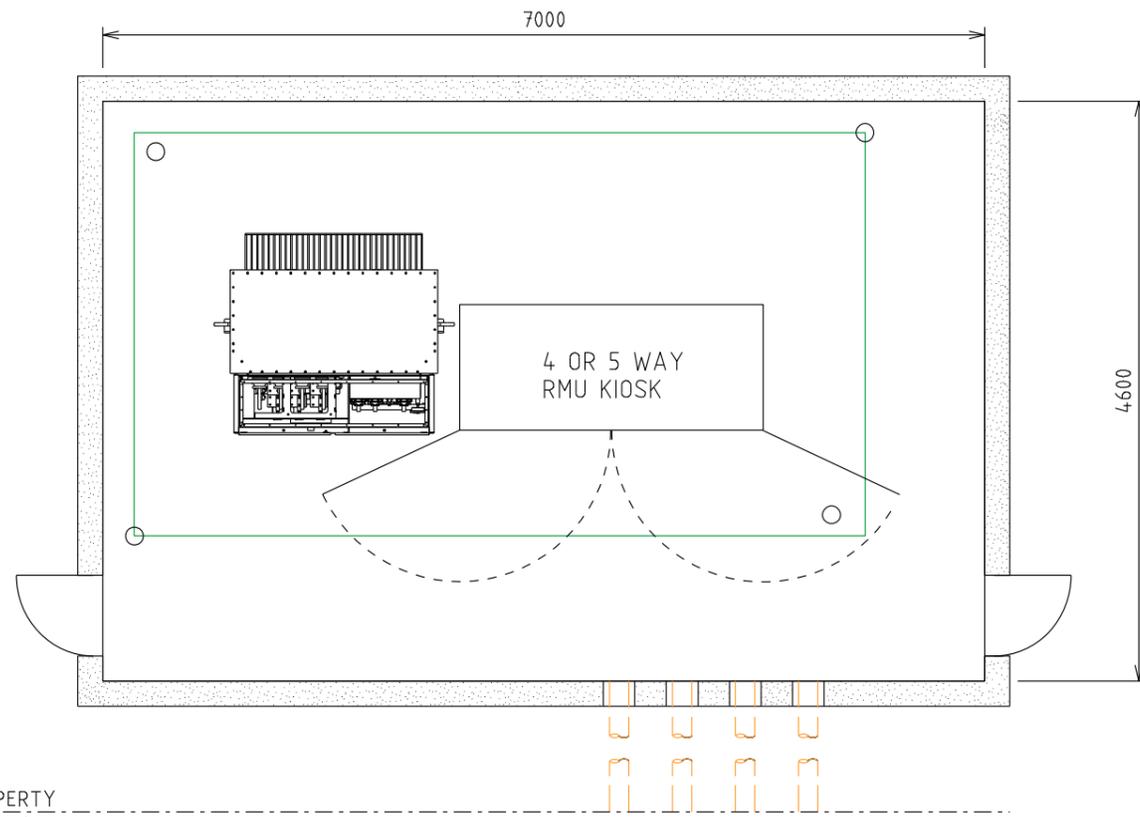
1. SEE HU CU IN THE DDC FOR EARTHING MATERIALS.
2. CONNECT 70mm² PVC INSULATED COPPER CABLE (GREEN/YELLOW) TO EARTH ELECTRODES. INSTALL CABLE AND RODS 1200mm BELOW FGL IN NEW SITES.
3. BURIED GRADING RING TO BE 100mm BELOW RAILWAY BALLAST/FLAME TRAP, IN SOIL.
4. LOOP EARTH CABLES TO EARTH RODS INSIDE KIOSK FOR EASE OF TESTING.

REV.	DATE	DESCRIPTION	KT	GC	PC
			ORGD.	CHKD.	APRD.
A	02.05.23	ORIGINAL ISSUE			

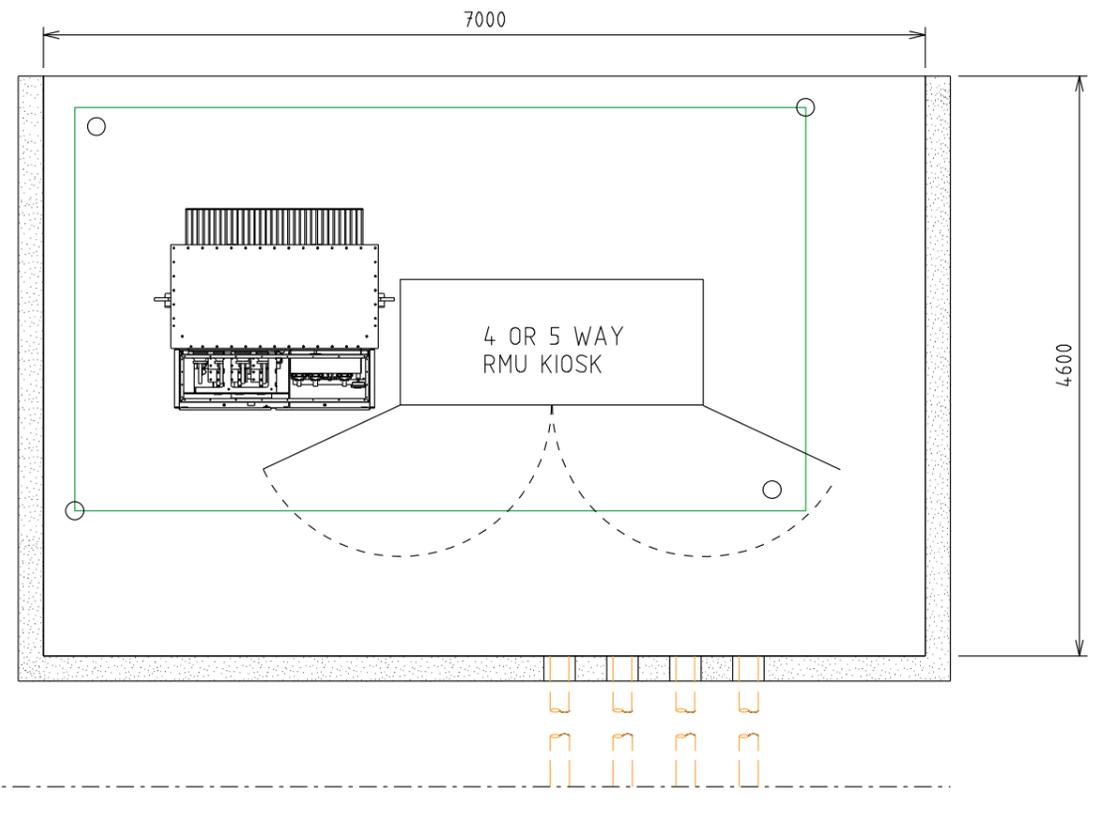
TITLE

SOLE-USE SUBSTATION
UP TO 1000 kVA (NON-MPS)
NON-FIRE RATED - WITH HV SWGR
EARTHING ARRANGEMENT

DISTRIBUTION SUBSTATION PLANT MANUAL				
DRAWN: KT	DATE: 04-04-2022	DRG. No.		
ORIGINATED: KT	SCALE: NTS	DSPM-3-14		
CHECKED: GC	APPROVED:	REV. A	SHT. 5	



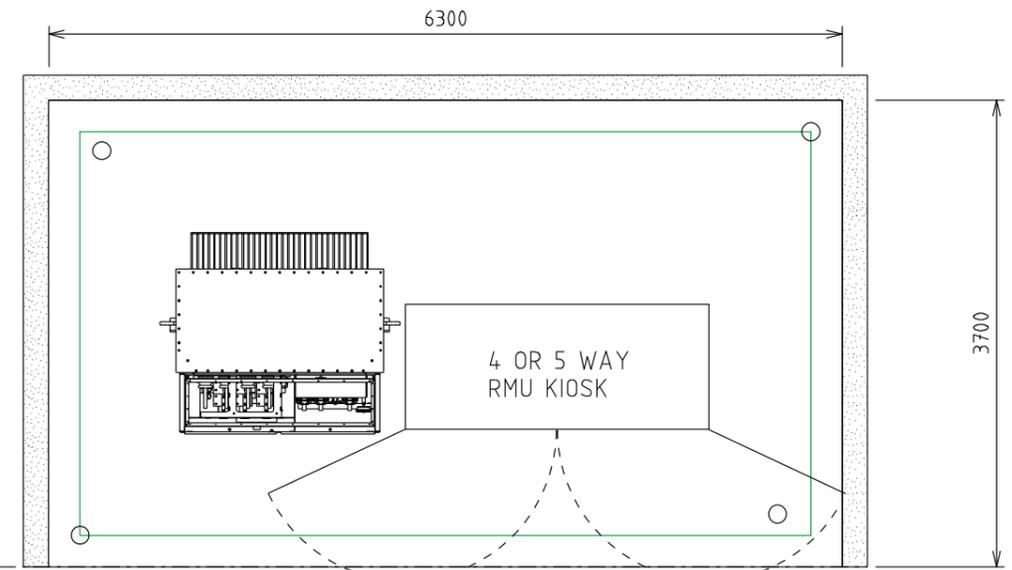
PARTIAL (FRONT) SCREENING



PARTIAL (FRONT) SCREENING

PROPERTY BOUNDARY

PROPERTY BOUNDARY



PARTIAL (REAR) SCREENING

NOTES:-

1. FOUNDATIONS SHALL FULLY RETAIN THE SITE TO ALLOW FUTURE EXCAVATION 1200mm DEEP WITHIN THE SUBSTATION SITE.
2. SCREENING OR FOUNDATIONS SHALL NOT ENCROACH INTO SUBSTATION SITE.
3. SCREENING SHALL NOT IMPACT OPERATIONAL CLEARANCE AND EGRESS REQUIREMENTS SHOWN ON SHEET 4.
4. DOORS (WHERE FITTED) MUST BE A MINIMUM OF 820 WIDE.
5. NON-COMBUSTIBLE MATERIALS TO BE USED FOR SCREENING (MASONARY, ETC.)
6. 2HR FIRE RATED SCREENING MAY BE USED TO REDUCE THE FIRE RISK ZONE. REFER DSPM CHAPTER 5 (FIRE RISK)
7. MINIMUM HEIGHT OF SCREEN WALL IS TO BE 1.8m (HEIGHT OF TRANSFORMER + 300mm).
8. DUCTS ARE REQUIRED WHERE CABLES PASS THROUGH WALL OR FOUNDATIONS. REFER TO SHEET 2 FOR DUCTING DETAILS.

REV.	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.
A	02.05.23	ORIGINAL ISSUE	KT	GC	PC

TITLE

SOLE-USE SUBSTATION
UP TO 1000 kVA (NON-MPS)
NON-FIRE RATED - WITH HV SWGR
SCREENING ARRANGEMENTS

DISTRIBUTION SUBSTATION
PLANT MANUAL



DRAWN: KT DATE: 05-04-2022 DRG. No.

ORIGINATED: KT SCALE: NTS

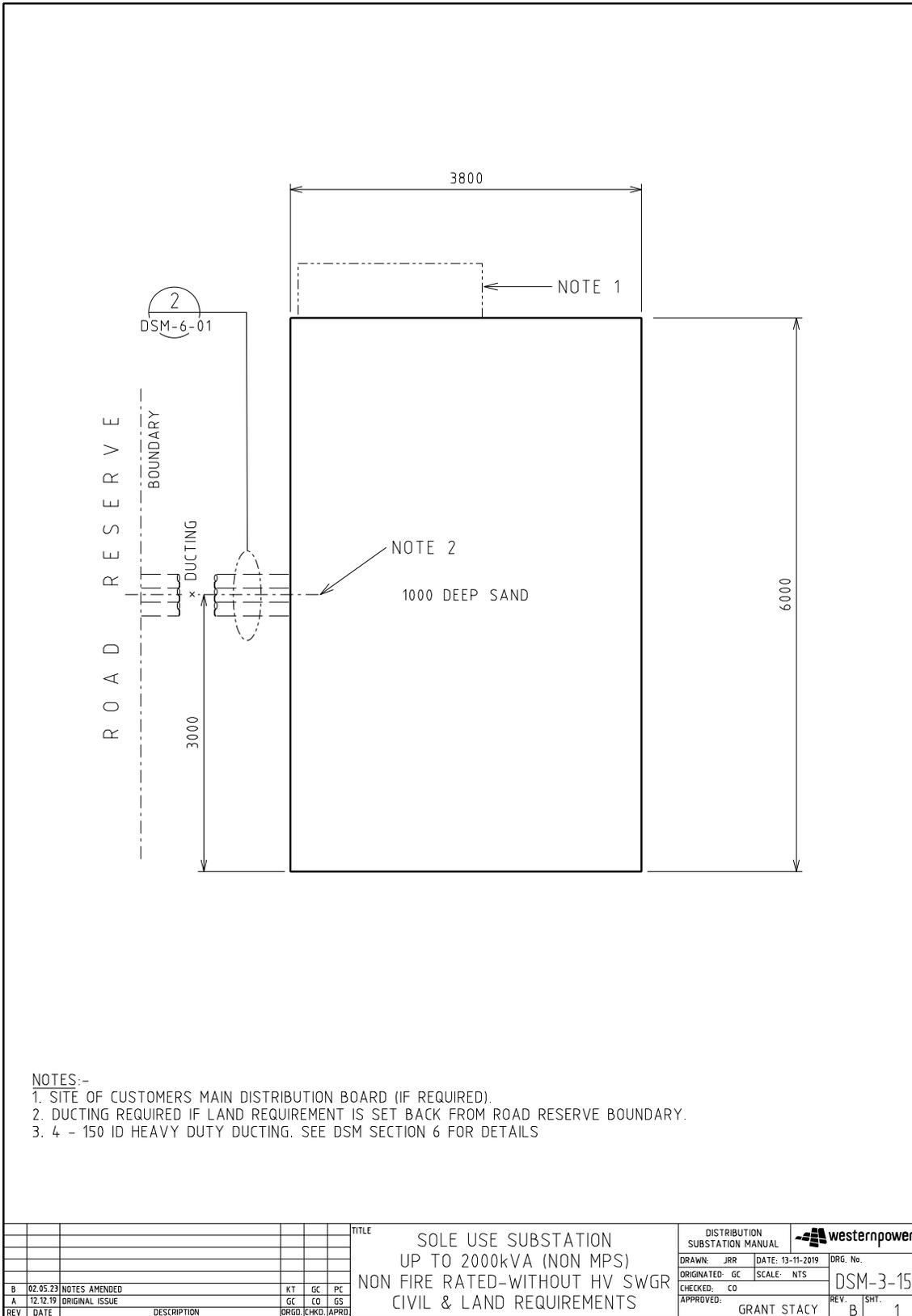
CHECKED: GC

APPROVED:

DSPM-3-14

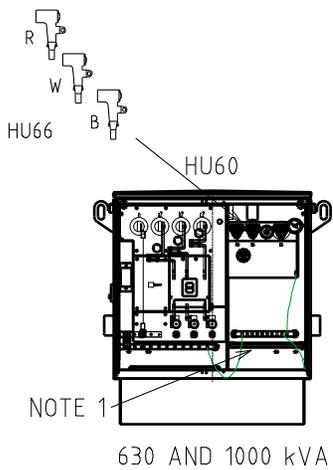
REV. A SHT. 6
PHIL CAPPER

4.4.3 DSM-3-15 Up to 2000kVA (Non-MPS)

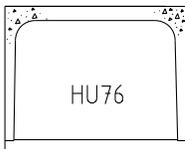


TRANSFORMER MATERIALS (QTY)

CU	6/11KV	22KV
HU60/630	NOTE 3	NOTE 3
HU60/1000		
HU66		
HU76		
LU16		



630 & 1000 kVA

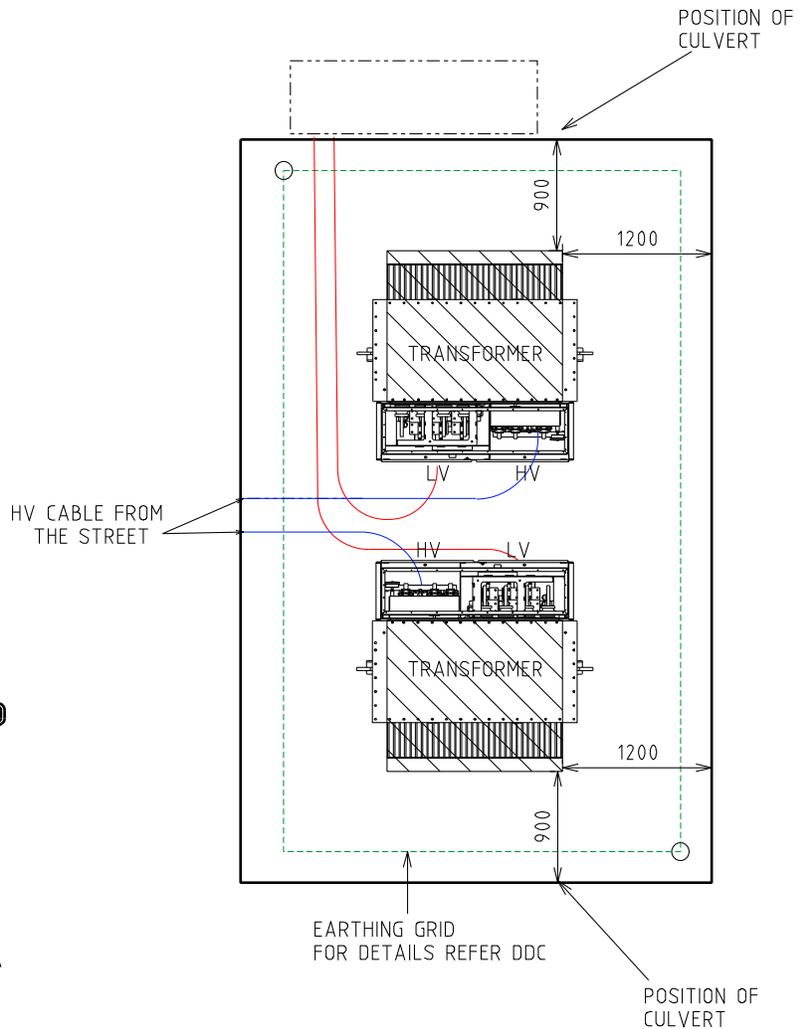


BOX CULVERT - CROWN AND BASE TYPE
 EXTERNAL SIZE = 1416 x 1022 x 1220 LONG
 CROWN WEIGHT = 1038 kg
 BASE WEIGHT = 384 kg

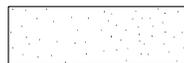
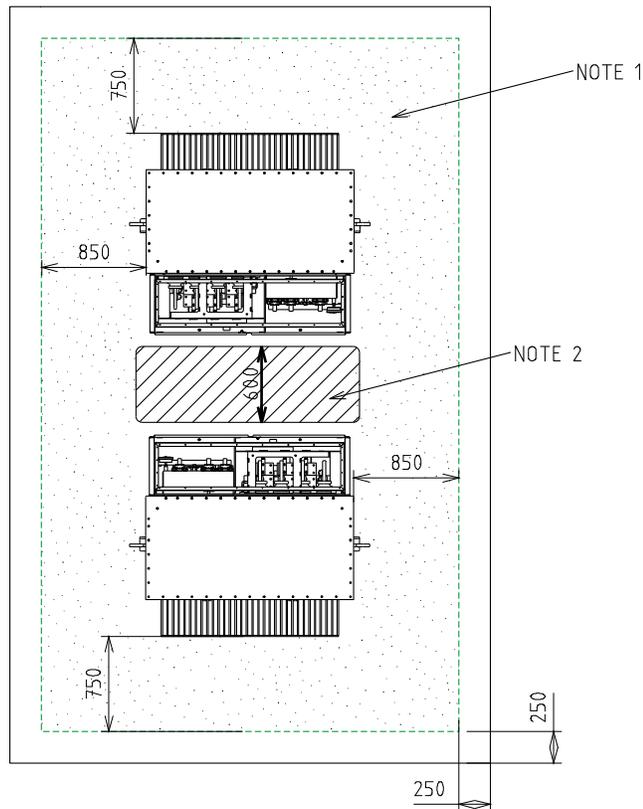
SEE DRAWING DSM-4-06 SHT 2 OF 2
 FOR INSTALLATION DETAILS

NOTES:-

1. CABLE CLAMP REQUIRED FOR EACH PHASE OF THE HV AND LV CABLES (PROVIDED IN HU60 CU IN THE DDC)
2. SEE DDC FOR EARTHING MATERIALS
3. DESIGNER TO REQUEST FOR 2 x ETEL TRANSFORMERS FOR DUAL 630kVA LAYOUT.
4. TRANSFORMER OIL IS TO BE CONTAINED WITHIN THE SITE.



				TITLE		DISTRIBUTION SUBSTATION MANUAL		westernpower	
				SOLE USE SUBSTATION UP TO 2000kVA (NON MPS)					
				NON FIRE RATED-WITHOUT HV SWGR EQUIPMENT & INSTALLATION DETAILS					
				DRWN:	JRR	DATE:	13-11-2019	DRG. No.	
				ORIGNATED:	GC	SCALE:	NTS	DSM-3-15	
				CHECKED:	CO	APPROVED:	GRANT STACY	REV.	B
				REV.	DATE	DESCRIPTION	ORGO.	CHKD.	APRD.
B	02.05.23	NOTES AND MATERIAL LIST AMENDED		KT	GC	PC			
A	12.12.19	ORIGINAL ISSUE		GC	CO	GS			
								SHT.	2



MINIMUM CLEARANCE REQUIRED FOR EARTHING PURPOSES.
(STEP AND TOUCH POTENTIAL)



CLEARANCE REQUIRED FOR OPERATIONAL PURPOSES

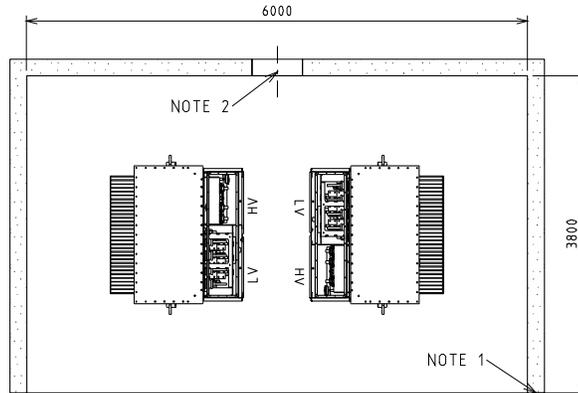
NOTES:-

1. CLEARANCES TO BE USED FOR EARTHING STUDY / CALCULATION OF TOUCH VOLTAGES
2. OPERATIONAL CLEARANCES IN FRONT OF TRANSFORMERS SHOWN WITH DOORS LIFTED OFF

				TITLE			DISTRIBUTION SUBSTATION MANUAL		westernpower	
				SOLE USE SUBSTATION UP TO 2000kVA (NON MPS) NON FIRE RATED-WITHOUT HV SWGR OPERATIONAL CLEARANCES			DRAWN: JRR	DATE: 13-11-2019	DRG. No.	
							ORIGINATED: GC	SCALE: NTS	DSM-3-15	
							CHECKED: CD			
							APPROVED: GRANT STACY	REV. B	SHT. 3	
B	02.05.23	NOTES AMENDED		KT	GC	PC				
A	12.12.19	ORIGINAL ISSUE		GC	CO	GS				
REV	DATE	DESCRIPTION		DRG.	CHKD.	APRD.				

ROAD RESERVE

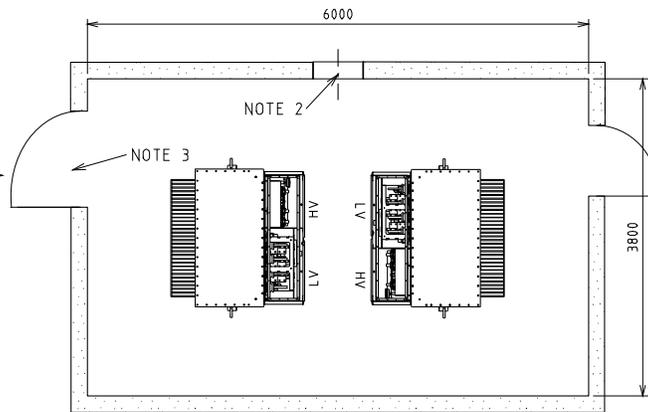
24 HR ACCESS
REQUIRED



PARTIAL SCREENING

NOTE 4
ROAD RESERVE

24 HR ACCESS
REQUIRED

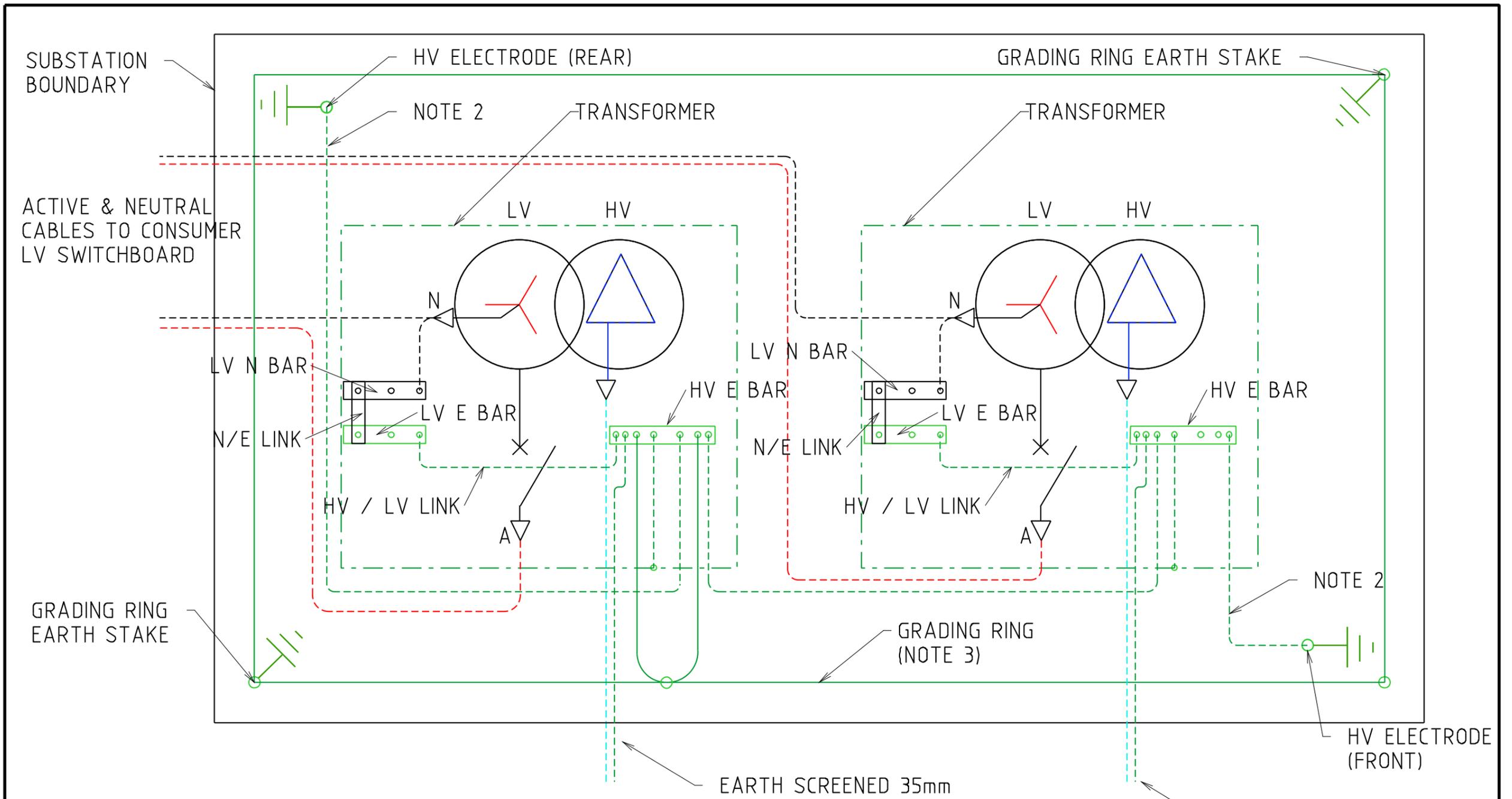


FULL SCREENING

NOTES:-

1. FOUNDATIONS SHALL FULLY RETAIN THE SITE TO ALLOW SAFE EXCAVATION 1200 DEEP. SCREENING NOT TO ENCRANCH INTO SUBSTATION LAND REQUIREMENTS. SCREENING TYPES SHALL BE NON-COMBUSTIBLE, FENCING, MASONARY WALLS etc...
2. INDICATIVE OF DUCTING ONLY, FOR DETAILS REFER TO SECTION 6.
3. OPENINGS MUST BE A MINIMUM OF 820 WIDE.
4. VEHICLE ACCESS. CLEARANCES MUST BE MAINTAINED. AREA TO BE KEPT CLEAR TO ENSURE ACCESS. SITE SPECIFIC REQUIREMENTS TO BE DETERMINED BY DESIGNER.
5. SCREENING DESIGN TO BE APPROVED BY SUBSTATION DESIGNER PRIOR TO CONSTRUCTION. OPERATIONAL AND EARTHING CLEARANCES SHOWN ON SHEET 3 MUST BE MAINTAINED WITH SCREENING INSTALLED

			TITLE			DISTRIBUTION SUBSTATION MANUAL			
			SOLE USE SUBSTATION UP TO 2000kVA (NON MPS) NON FIRE RATED-WITHOUT HV SWGR PERMISSABLE SCREENING ARRANGEMENTS			DRAWN: JRR DATE: 13-11-2019		ORG. No.	
						ORIGINATED: GC SCALE: NTS		DSM-3-15	
						CHECKED: CO		REV. SHT.	
						APPROVED: GRANT STACY		B 4	
REV	DATE	DESCRIPTION	ORGO	CHKD	APRD				
B	02.05.23	EQUIPMENT DRAWING UPDATED AND DIMENSIONS ADDED	KT	GC	PC				
A	12.12.19	ORIGINAL ISSUE	GC	CO	GS				



- NOTES:-
1. SEE HU CU IN THE DDC FOR EARTHING MATERIALS
 2. CONNECT 70mm² PVC INSULATED COPPER CABLE (GREEN/YELLOW) TO EARTH ELECTRODES. INSTALL CABLE AND RODS 1200mm BELOW FGL IN NEW SITES.
 3. BURIED GRADING RING TO BE 100mm BELOW RAILWAY BALLAST/FLAME TRAP, IN SOIL.

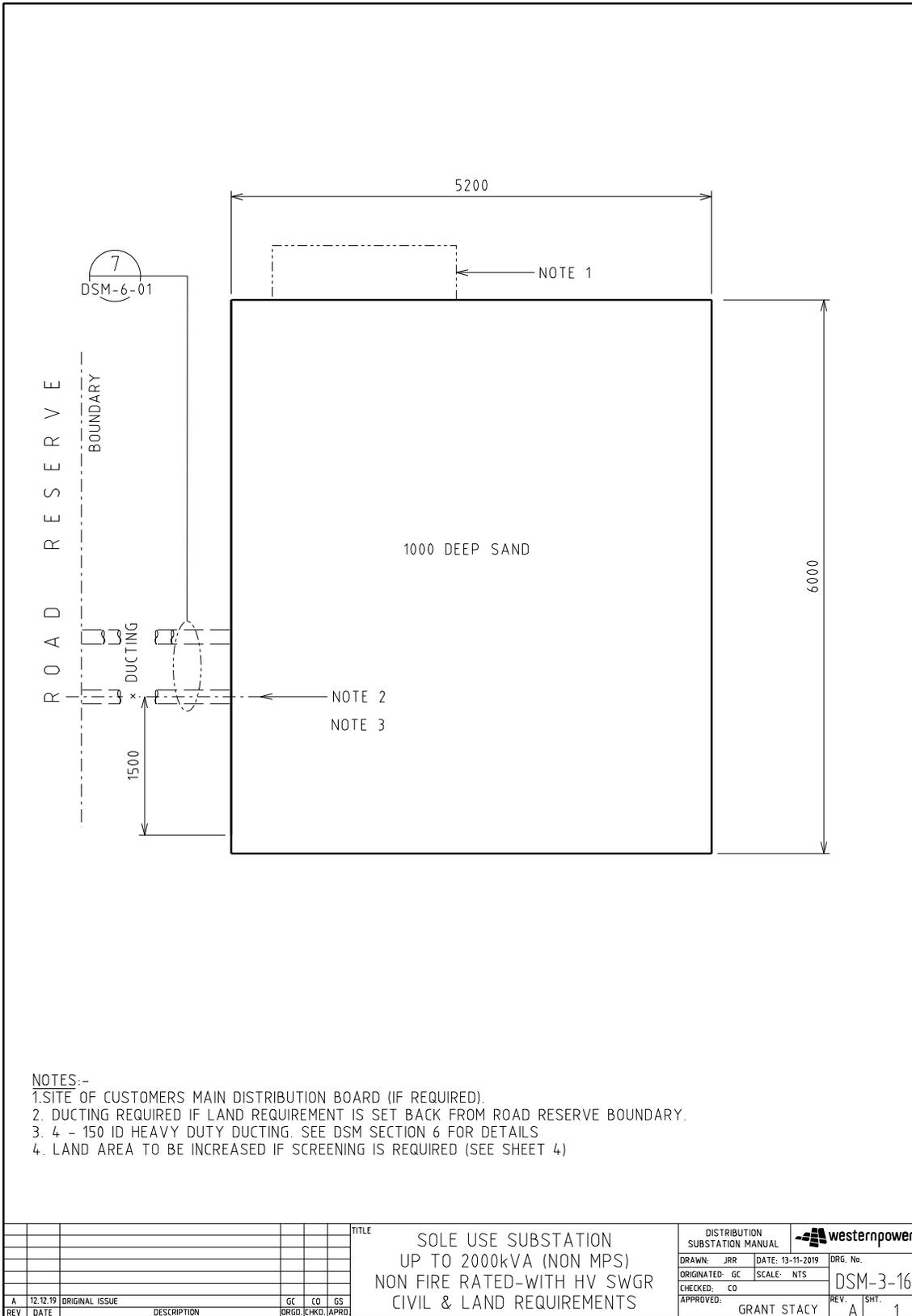
REV	DATE	DESCRIPTION	KT ORGD	GC CHKD	PC APRD
A	02.05.23	ORIGINAL ISSUE			

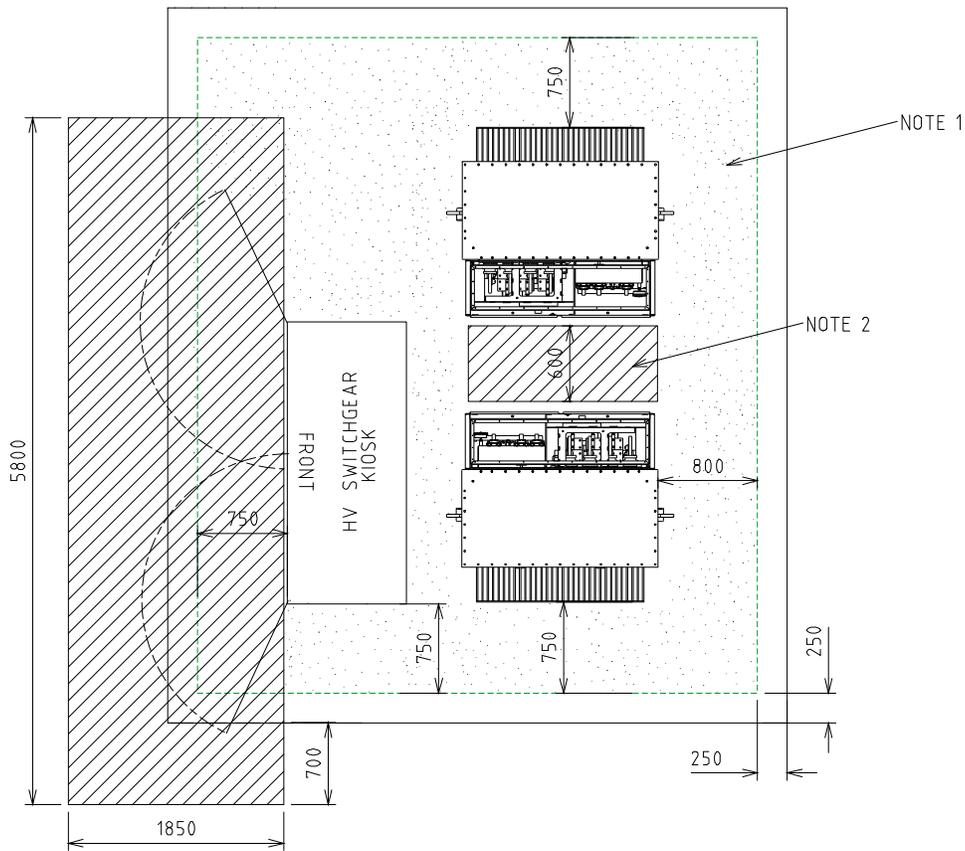
TITLE

SOLE-USE SUBSTATION
UP TO 2000 kVA (NON-MPS)
NON-FIRE RATED
EARTHING ARRANGEMENT

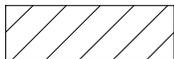
DISTRIBUTION SUBSTATION MANUAL		westernpower	
DRAWN: KT	DATE: 24-08-2022	DRG No.	
ORIGINATED: KT	SCALE: NTS	DSM-3-15	
CHECKED: GC		REV. A	SHT. 5
APPROVED:	PHIL CAPPER		

4.4.4 DSM-3-16 Up to 2000kVA (Non-MPS) with HV SWGR





MINIMUM CLEARANCE REQUIRED FOR EARTHING PURPOSES.
(STEP AND TOUCH POTENTIAL)

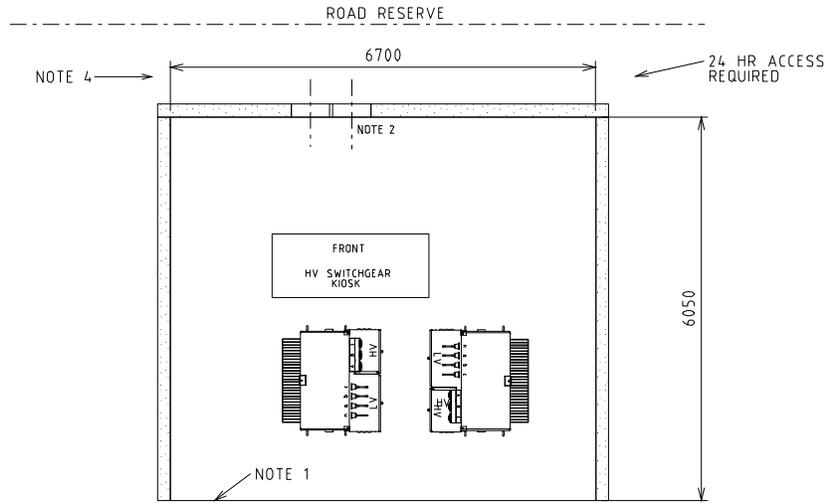


MINIMUM CLEARANCE REQUIRED FOR OPERATIONAL PURPOSES

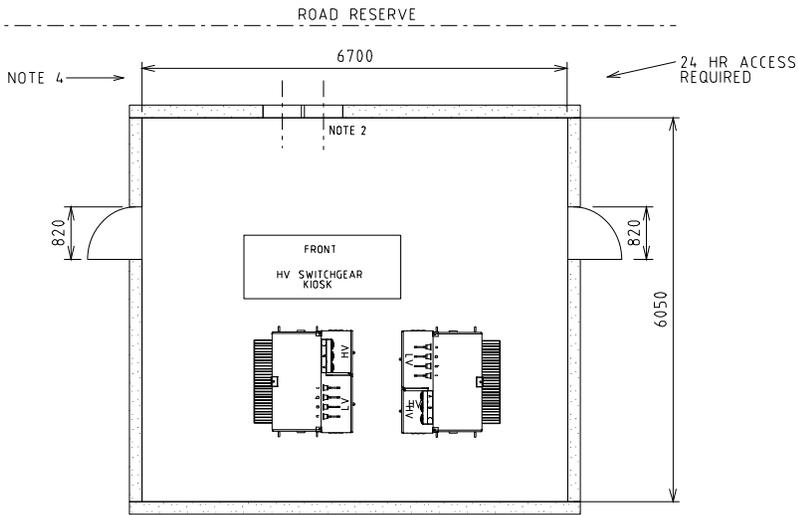
NOTES:-

1. CLEARANCES TO BE USED FOR EARTHING STUDY / CALCULATION OF TOUCH VOLTAGES (WITH DOORS CLOSED)
2. OPERATIONAL CLEARANCES IN FRONT OF TRANSFORMERS SHOWN WITH DOORS LIFTED OFF

				TITLE			DISTRIBUTION SUBSTATION MANUAL		westernpower		
				SOLE USE SUBSTATION UP TO 2000kVA (NON MPS) NON FIRE RATED-WITH HV SWGR OPERATIONAL CLEARANCES						ORG. No.	
B	02.05.23	NOTES AMENDED		KT	GC	PC	DRAWN:	JRR	DATE: 13-11-2019	DSM-3-16	
A	12.12.19	ORIGINAL ISSUE		GC	CO	GS	ORIGINATED:	GC	SCALE: NTS		
REV	DATE	DESCRIPTION		ORGO	CHKD.	APROD	CHECKED:	CO	APPROVED:		
							GRANT STACY		REV. B	SHT. 3	



PARTIAL SCREENING

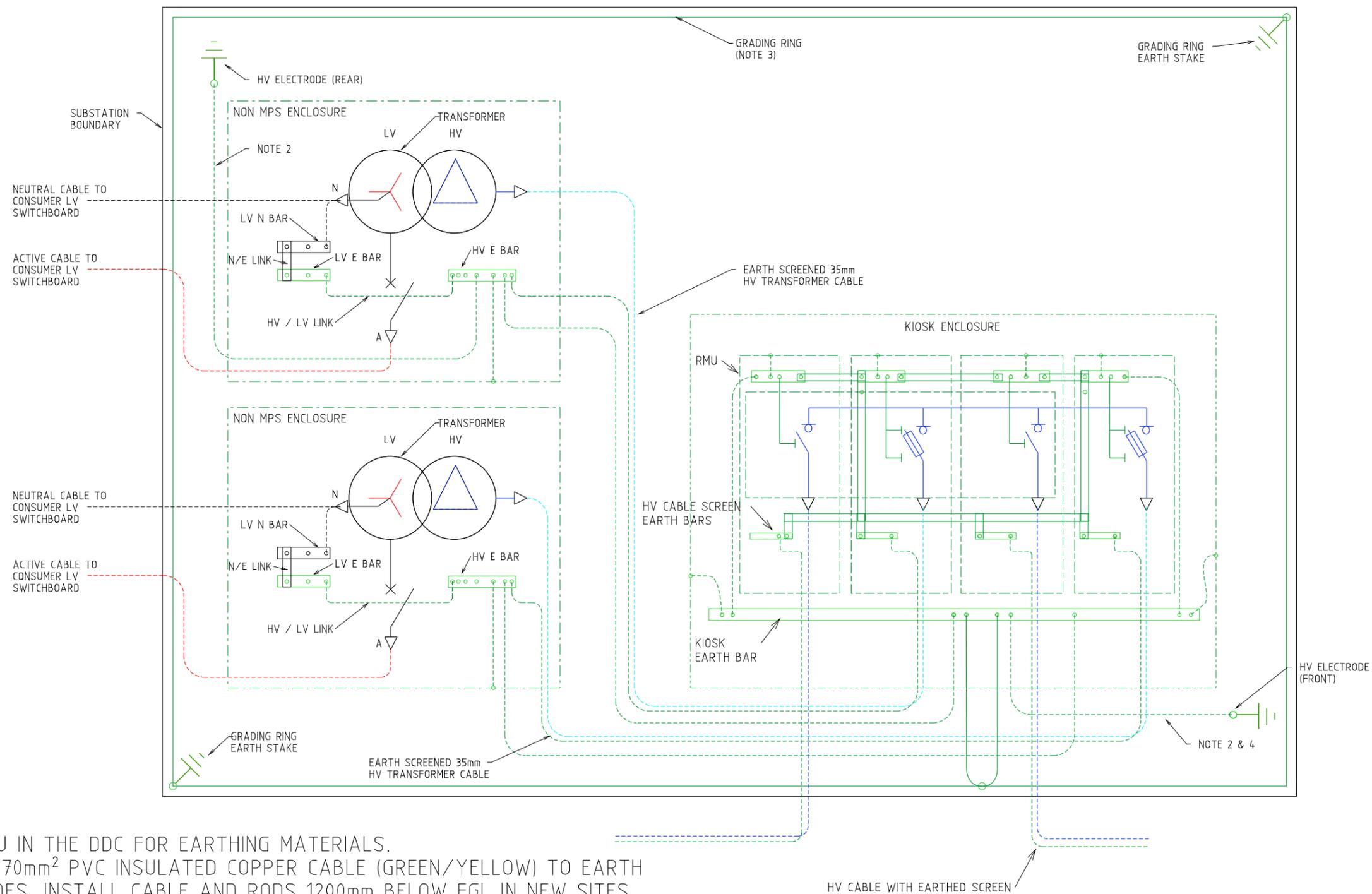


FULL SCREENING

NOTES:-

1. FOUNDATIONS SHALL FULLY RETAIN THE SITE TO ALLOW SAFE EXCAVATION 1200 DEEP. SCREENING NOT TO ENCROACH INTO SUBSTATION LAND REQUIREMENTS. SCREENING TYPES SHALL BE NON-COMBUSTIBLE, FENCING, MASONARY WALLS etc...
2. INDICATIVE OF DUCTING ONLY, FOR DETAILS REFER TO SECTION 6.
3. OPENINGS MUST BE A MINIMUM OF 820 WIDE.
4. VEHICLE ACCESS. CLEARANCES MUST BE MAINTAINED. AREA TO BE KEPT CLEAR TO ENSURE ACCESS. SITE SPECIFIC REQUIREMENTS TO BE DETERMINED BY DESIGNER.
5. SCREENING DESIGN TO BE APPROVED BY SUBSTATION DESIGNER PRIOR TO CONSTRUCTION. OPERATIONAL AND EARTHING CLEARANCES SHOWN ON SHEET 3 MUST BE MAINTAINED WITH SCREENING INSTALLED

				TITLE			DISTRIBUTION SUBSTATION MANUAL		westernpower		
				SOLE USE SUBSTATION UP TO 2000kVA (NON MPS) NON FIRE RATED-WITHOUT HV SWGR PERMISSABLE SCREENING ARRANGEMENTS						ORG. No.	
B	02.05.23	LAYOUT AMENDED AND DIMENSIONS ADDED		KT	GC	PC	GC	CO	SCALE: NTS	DSM-3-16	
A	12.12.19	ORIGINAL ISSUE		GC	CO	GS	GC	CO	CHECKED: CO	REV. B	
REV	DATE	DESCRIPTION		DRGD	CHKD	APRD	APPROVED: GRANT STACY	REV. B	SHT. 4		



- NOTES:-
1. SEE HU CU IN THE DDC FOR EARTHING MATERIALS.
 2. CONNECT 70mm² PVC INSULATED COPPER CABLE (GREEN/YELLOW) TO EARTH ELECTRODES. INSTALL CABLE AND RODS 1200mm BELOW FGL IN NEW SITES.
 3. BURIED GRADING RING TO BE 100mm BELOW RAILWAY BALLAST/FLAME TRAP, IN SOIL.
 4. LOOP EARTH CABLES TO EARTH RODS INSIDE KIOSK FOR EASE OF TESTING.

REV.	DATE	DESCRIPTION	KT	GC	PC
A	02.05.23	ORIGINAL ISSUE			
			KT	GC	PC
			ORGD.	CHKD.	APRD.

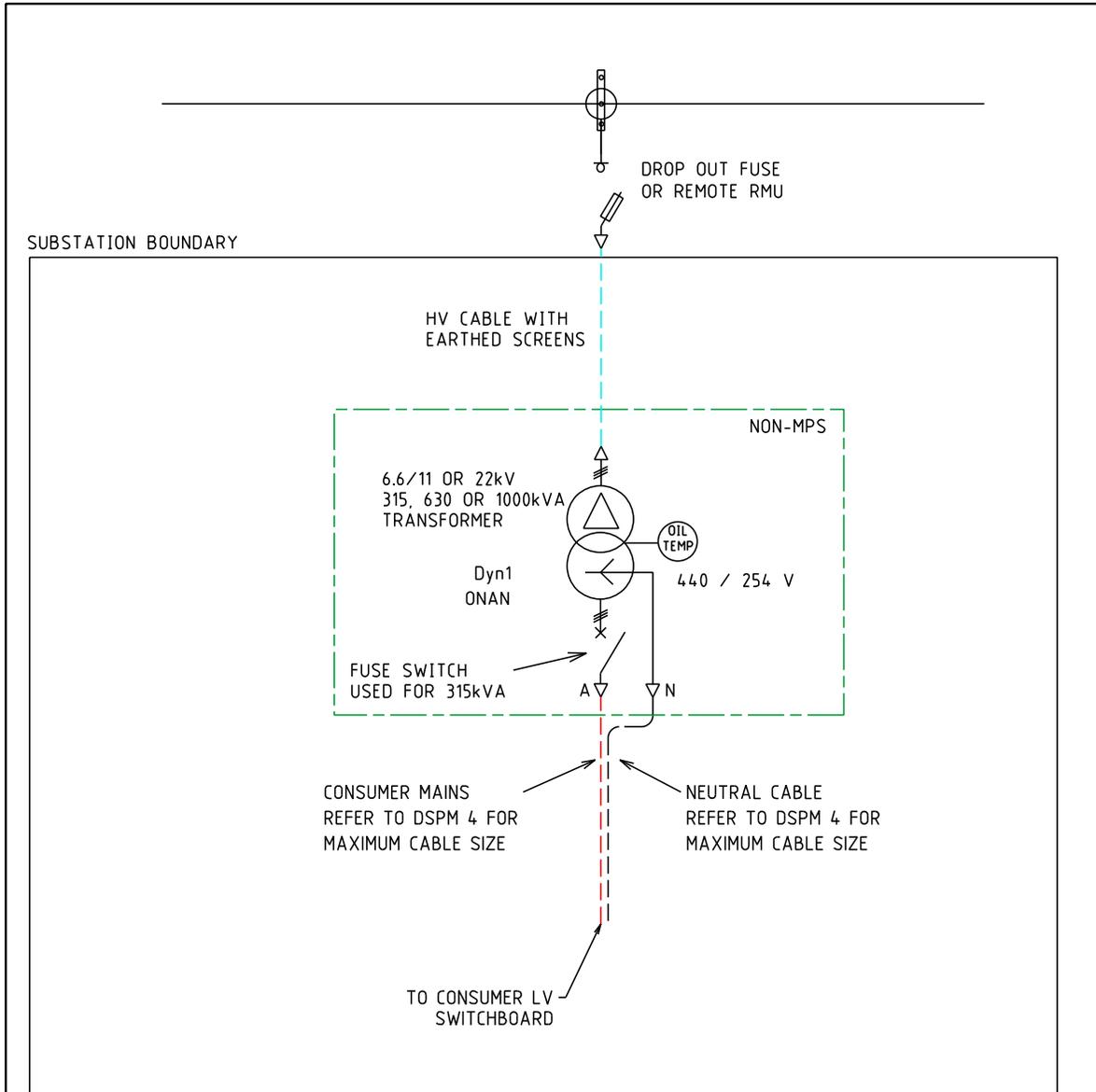
TITLE

SOLE-USE SUBSTATION
UP TO 2000 kVA (NON-MPS)
NON-FIRE RATED - WITH HV SWGR
EARTHING ARRANGEMENT

DISTRIBUTION SUBSTATION MANUAL			
DRAWN: KT	DATE: 24-08-2022	DRG. No.	
ORIGINATED: KT	SCALE: NTS	DSM-3-16	
CHECKED: GC		REV. A	SHT. 5
APPROVED:	PHIL CAPPER		

4.5 Sole Use Substations - Fire Rated

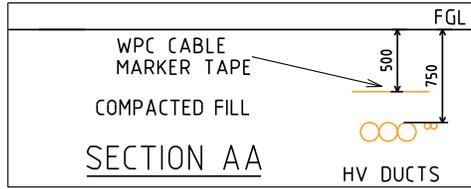
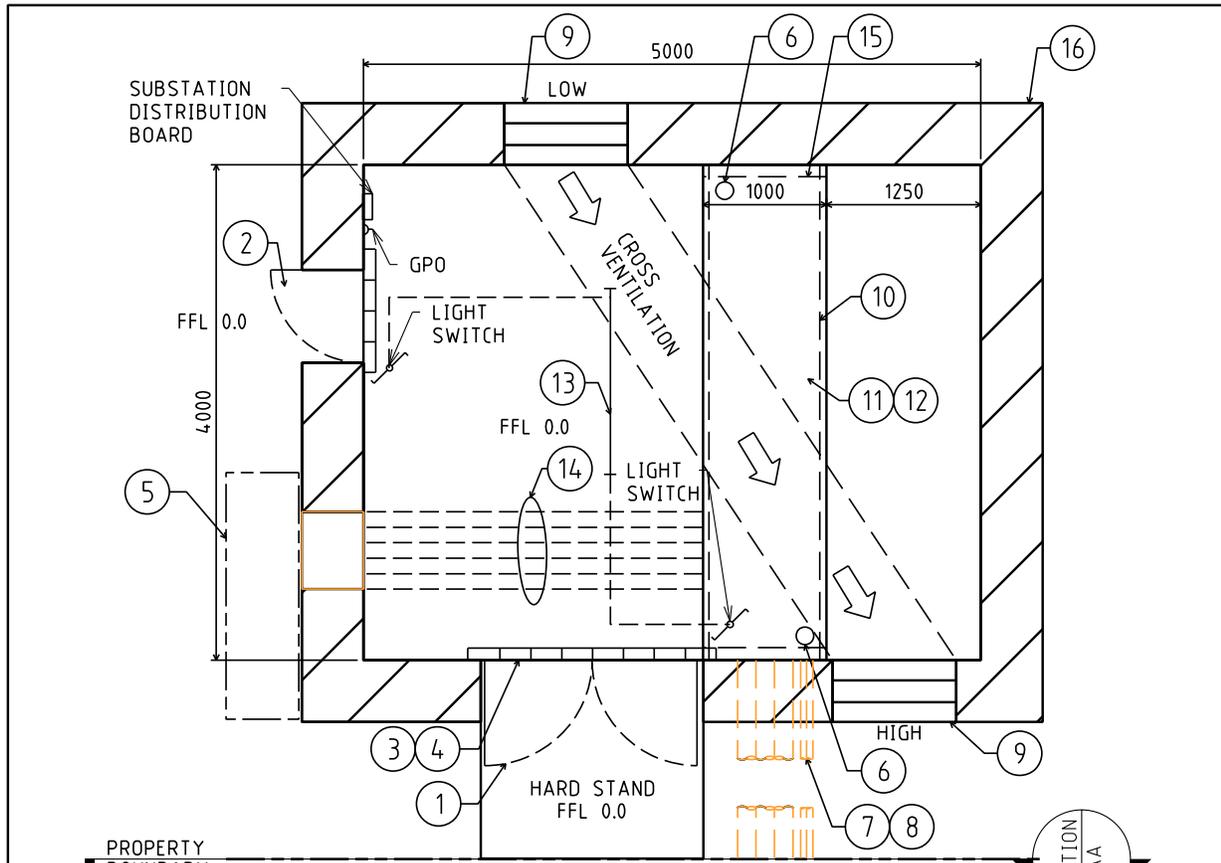
4.5.1 DSM-3-17 Up to 1000kVA (Non-MPS)



NOTES:-

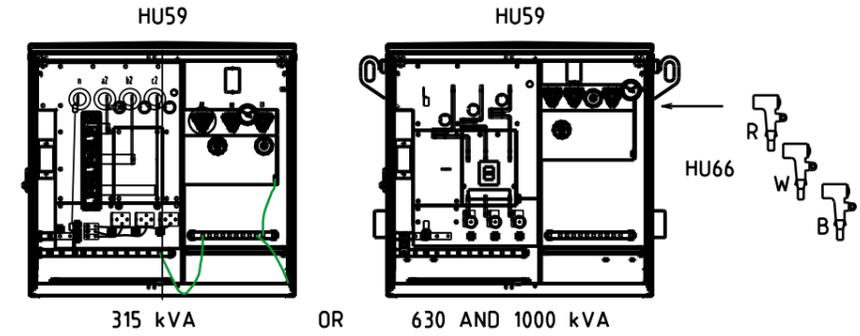
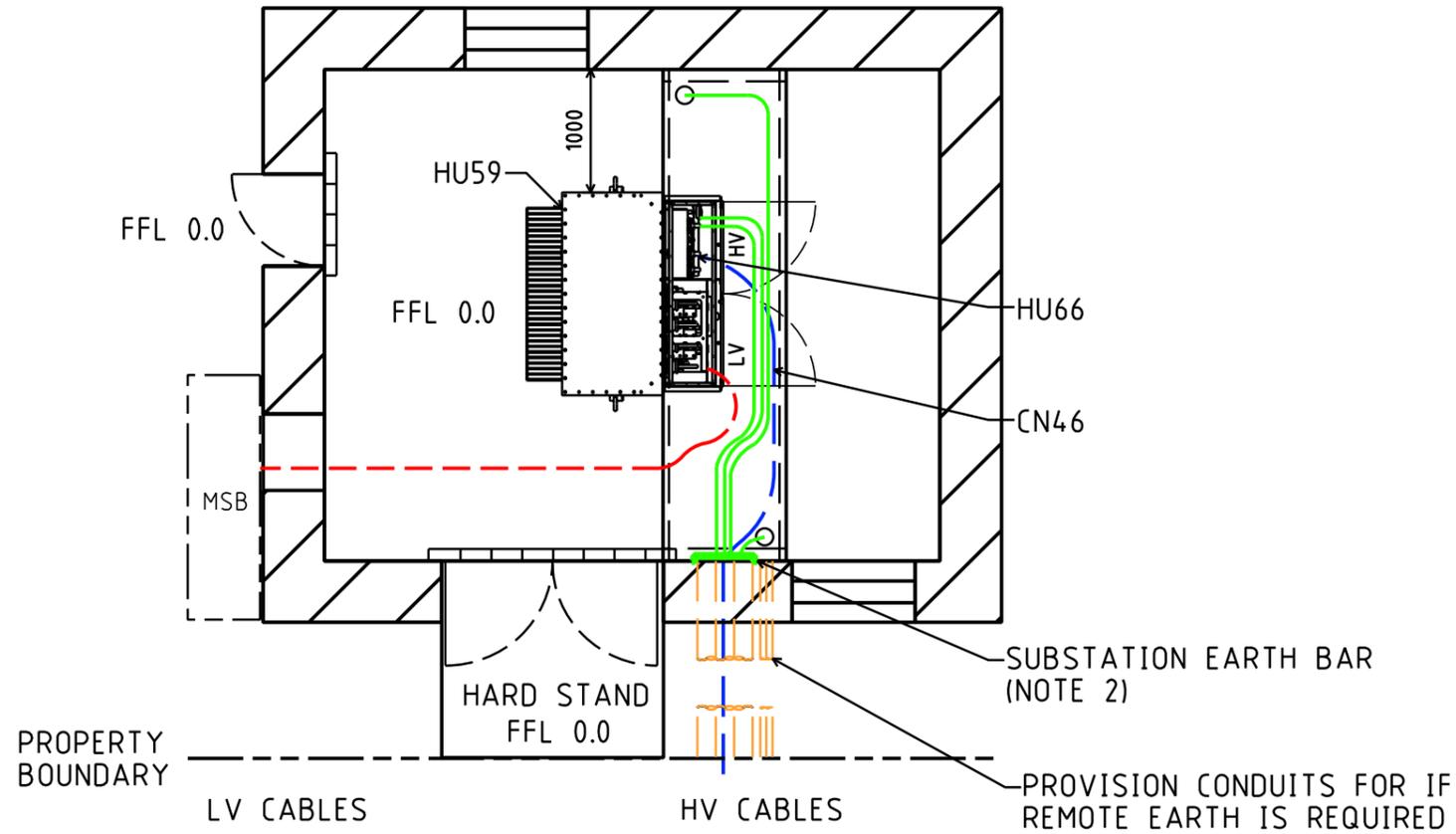
1. FUSE SWITCH USED FOR 315kVA TRANSFORMER. REFER TO THE DCCR FOR MCCB SETTINGS.

REV	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.	TITLE	DISTRIBUTION SUBSTATION PLANT MANUAL	westernpower
C	17.12.2025	FORMAT CHANGED.	SL	KT	MM	SOLE USE SUBSTATION UP TO 1000 kVA (NON- MPS) FIRE RATED - WITHOUT HV SWGR SINGLE LINE DIAGRAM	DRAWN: SL	DATE: 17/12/2025
B	02.05.23	NOTED AMENDED.	KT	GC	PC		ORIGINATED: SL	SCALE: NTS @ A4
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS		CHECKED BY: KT	APPROVED: MARK MONTEMAYOR
								DRG. No. DSM-3-17
								REV. C SHT. 1/5



1	DOUBLE DOORS 2340x1720 CLEAR OPENING.
2	DOOR 2040x820 CLEAR OPENING.
3	75 HIGH BRICK BUND.
4	BUND LAID AFTER EQUIPMENT INSTALLED.
5	CUSTOMERS MAIN DISTRIBUTION BOARD.
6	75 DIA PENETRATION THROUGH SLAB FOR EARTHING - TO BE SEALED WITH CN81.
7	3-150 & 2-50 ID HEAVY DUTY DUCTS - TO BE SEALED WITH CN81.
8	750 COVER AT BOUNDARY.
9	600x800 WIDE FIRE DAMPERED VENT AT HIGH (TOP 200 MAX BELOW CEILING) & LOW (BOTTOM MAX 200 ABOVE FINISHED FLOOR LEVEL) LEVELS.
10	50mm WIDE x 38mm DEEP REBATE FOR TRENCH COVERS.
11	TRENCH COVER 35mm THICK x 26kg/m ² FRP SLAB PANEL FRONT OF HV SWITCHGEAR ONLY. 38mm THICK x 18.2kg/m ² MESH GRATING ELSEWHERE. REFER TO DSM-6-04 AND DSM-6-08.
12	1200 DEEP TRENCH WALLS & FLOOR OF TRENCH TO BE PAINTED WITH SILICONE GLAZE S50.
13	LED LIGHTS BATTEN FITTING (2 WAY SWITCH WITH NEON INDICATOR).
14	6-150 ID HEAVY DUCTS INSTALLED AT FLOOR OF TRENCH - TO BE SEALED WITH CN81.
15	COVER SUPPORTS - 100x75x6 UA (H.D.G.) FIXED TO WALL OF TRENCH.
16	WALLS, CEILING & DOORS TO BE 2HR FIRE RATED, CEILING HEIGHT TO BE MIN 2500mm.

				TITLE				DISTRIBUTION SUBSTATION PLANT MANUAL				westernpower	
				SOLE USE SUBSTATION UP TO 1000 kVA (NON-MPS) FIRE RATED - WITHOUT HV SWGR REQUIREMENTS AND DUCT INSTALLATION				DRAWN: SL		DATE: 17/12/2025		DRG. No.	
								ORIGINATED: SL		SCALE: NTS @ A4		DSM-3-17	
								CHECKED BY: KT		APPROVED: MARK MONTEMAYOR		REV. C	
												SHT. 2/5	
REV	DATE	DESCRIPTION	DRG	CHKD	APRD								
C	17.12.2025	FORMAT CHANGED.	SL	KT	MM								
B	02.05.23	NOTED AMENDED.	KT	GC	PC								
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS								



		HV MATERIAL		
EQUIPEMENT	CU	QTY		
		6 kV	11 kV	22 kV
TRANSFORMER	HU55/315	SELECT 1		
	HU55/630			
	HU55/1000			
	HU59/315	SELECT 1		
	HU59/630			
HU59/1000				
CABLE	HU66	1		
	CN46	AS REQUIRED FROM FSSW		
EARTHING	HU70_1	1		

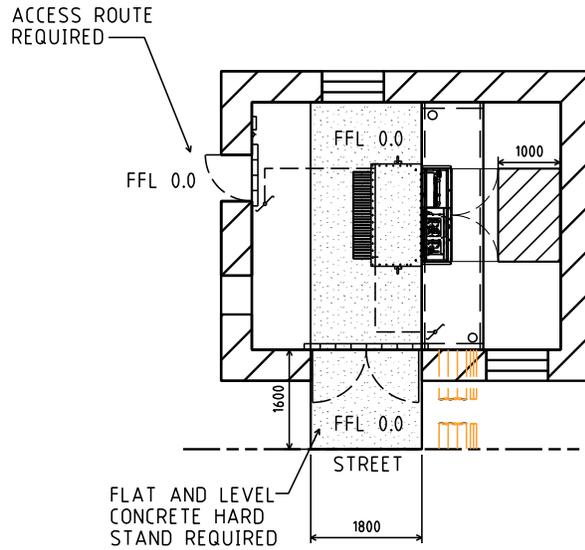
- NOTES:-
1. CABLE TRENCH TO BE WATER/OIL TIGHT.
 2. INDICATIVE LOCATION OF EARTH BAR SHOWN. EXACT LOCATION TO BE CONFIRMED IN DESIGN.

REV	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.
C	17.12.2025	FORMAT CHANGED.	SL	KT	MM
B	02.05.23	NOTED AMENDED.	KT	GC	PC
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS

TITLE

SOLE USE SUBSTATION
UP TO 1000 kVA (NON- MPS)
NON-FIRE RATED - WITH HV SWGR
EQUIPMENT SELECTION AND LAYOUT

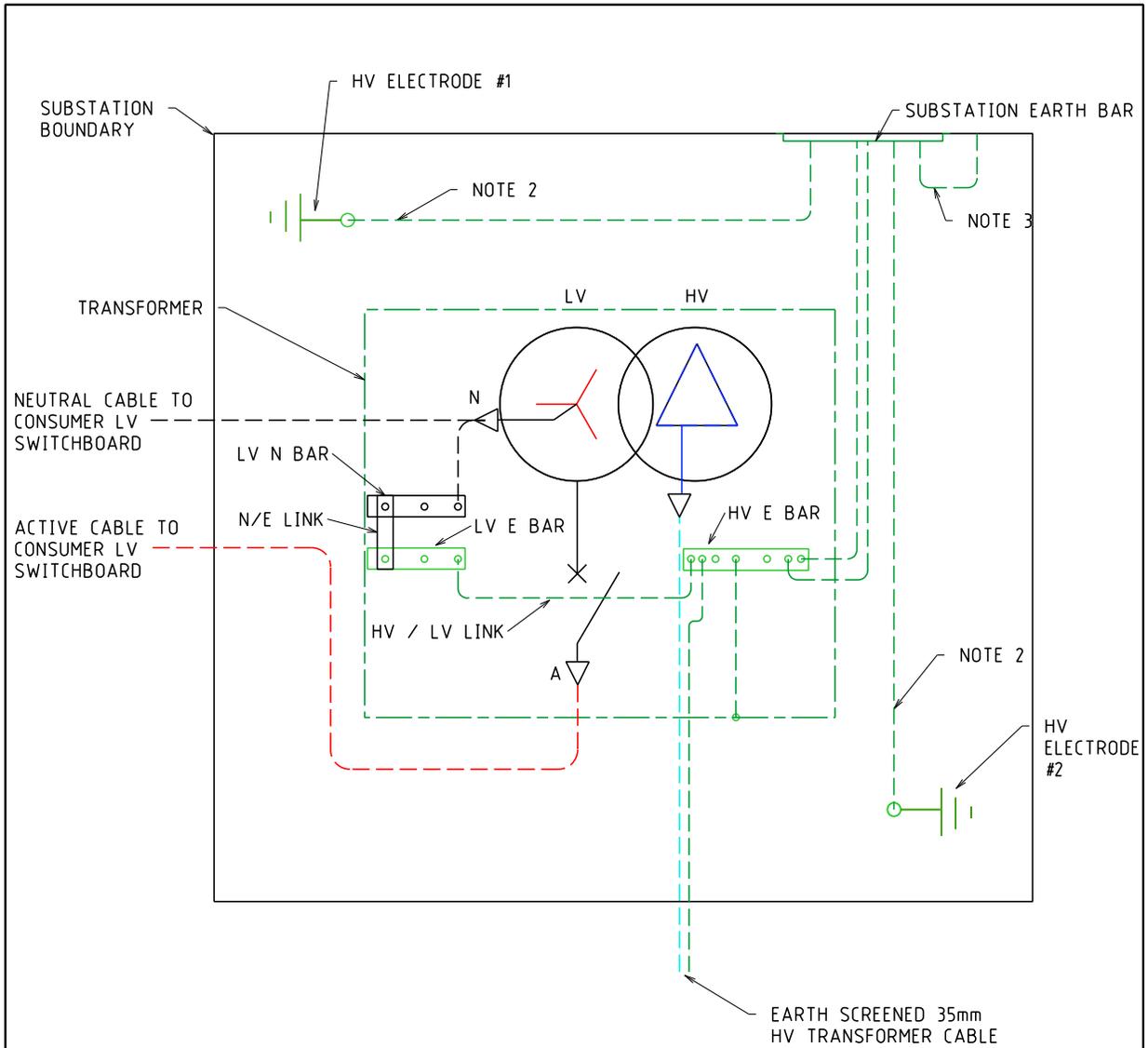
DRAWN: SL		DATE: 17/12/2025		DRG. No.
ORIGINATED: SL		SCALE: NTS @ A4		DSM-3-17
CHECKED BY: KT				
APPROVED: MARK MONTEMAYOR				REV. C
				SHT. 3/5



- INSTALLATION AND MAINTENANCE CLEARANCE
- OPERATIONAL CLEARANCE

NOTES:-
 1. DESIGNER TO ENSURE SAFE ACCESS AND EGRESS ROUTES ARE PROVIDED.
 2. WHERE THE SITE IS SET BACK FROM THE STREET, CRANE ACCESS IS REQUIRED.

REV	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.	TITLE	DISTRIBUTION SUBSTATION PLANT MANUAL	
C	17.12.2025	FORMAT CHANGED.	SL	KT	MM	SOLE USE SUBSTATION UP TO 1000 kVA (NON- MPS) FIRE RATED - WITHOUT HV SWGR CLEARANCES	DATE: 17/12/2025	DRG. No.
B	02.05.23	NOTED AMENDED.	KT	GC	PC		SCALE: NTS A4	DSM-3-17
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS		CHECKED BY: KT	REV. C
							APPROVED: MARK MONTEMAYOR	SHT. 4/5

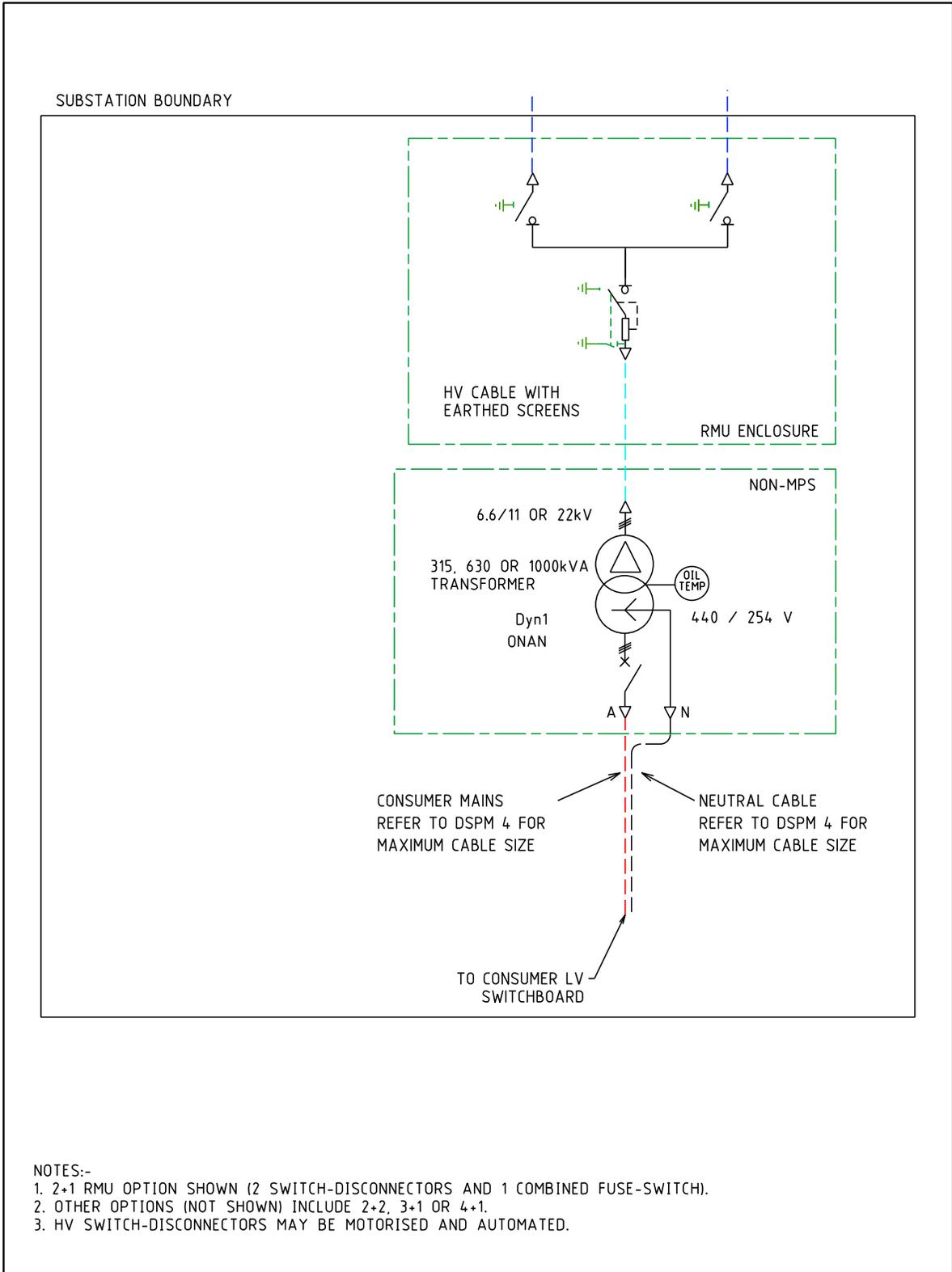


NOTES:-

1. SEE HU CU IN THE DDC FOR EARTHING MATERIALS
2. CONNECT 70mm² PVC INSULATED COPPER CABLE (GREEN/YELLOW) TO EARTH ELECTRODES AS PER ITEM 7 ON SHEET 2 - TO BE SEALED WITH CN81.
3. BUILDING EARTH CABLE BOND IS TO BE PROVIDED BY THE CUSTOMER.

REV	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.	TITLE	DISTRIBUTION SUBSTATION PLANT MANUAL	westernpower
C	17.12.2025	FORMAT CHANGED.	SL	KT	MM	SOLE USE SUBSTATION UP TO 1000 kVA (NON- MPS) NON-FIRE RATED - WITHOUT HV SWGR EARTHING ARRANGEMENT	DATE: 17/12/2025	DRG. No.
B	02.05.23	NOTED AMENDED.	KT	GC	PC		SCALE: NTS A4	DSM-3-17
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS		CHECKED BY: KT	APPROVED:
							MARK MONTEMAYOR	REV. C SHT. 5/5

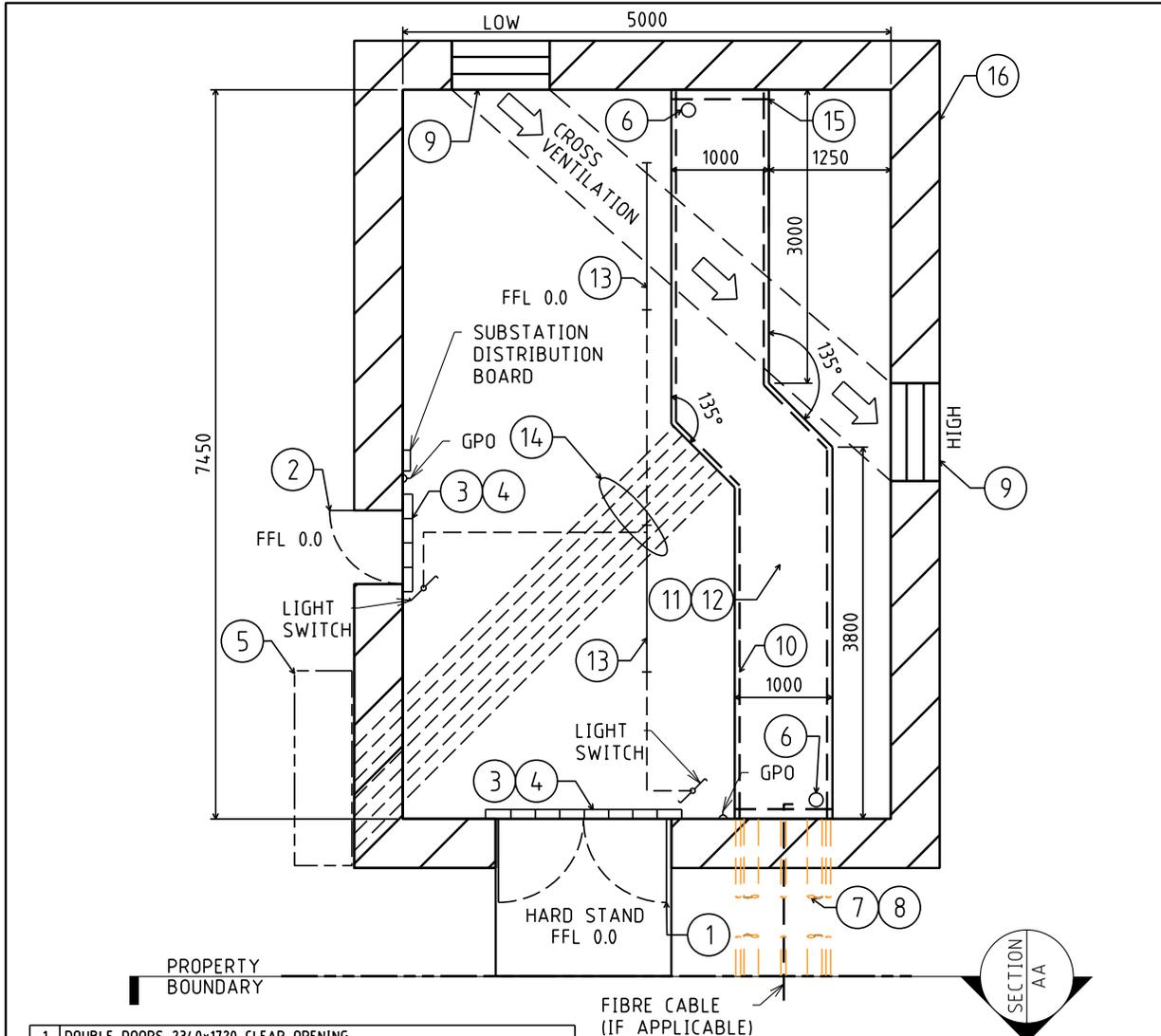
4.5.2 DSM-3-18 Up to 1000kVA (Non-MPS) with HV SWGR



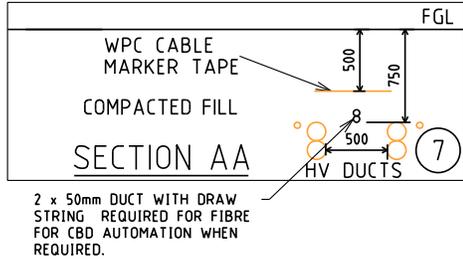
NOTES:-

1. 2+1 RMU OPTION SHOWN (2 SWITCH-DISCONNECTORS AND 1 COMBINED FUSE-SWITCH).
2. OTHER OPTIONS (NOT SHOWN) INCLUDE 2+2, 3+1 OR 4+1.
3. HV SWITCH-DISCONNECTORS MAY BE MOTORISED AND AUTOMATED.

				TITLE			DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower	
SOLE USE SUBSTATION UP TO 1000 kVA (NON- MPS) FIRE RATED - WITH HV SWGR SINGLE LINE DIAGRAM							DRAWN: SL	DATE: 17/12/2025	DRG. No.	
							ORIGINATED: SL	SCALE: NTS A4	DSM-3-18	
							CHECKED BY: KT		REV. C SHT. 1/6	
							APPROVED: MARK MONTEMAYOR			
REV	DATE	DESCRIPTION	DRGN	CHKD.	APRD.					
C	17.12.2025	FORMAT CHANGED.	SL	KT	MM					
B	02.05.23	NOTED AMENDED.	KT	GC	PC					
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS					



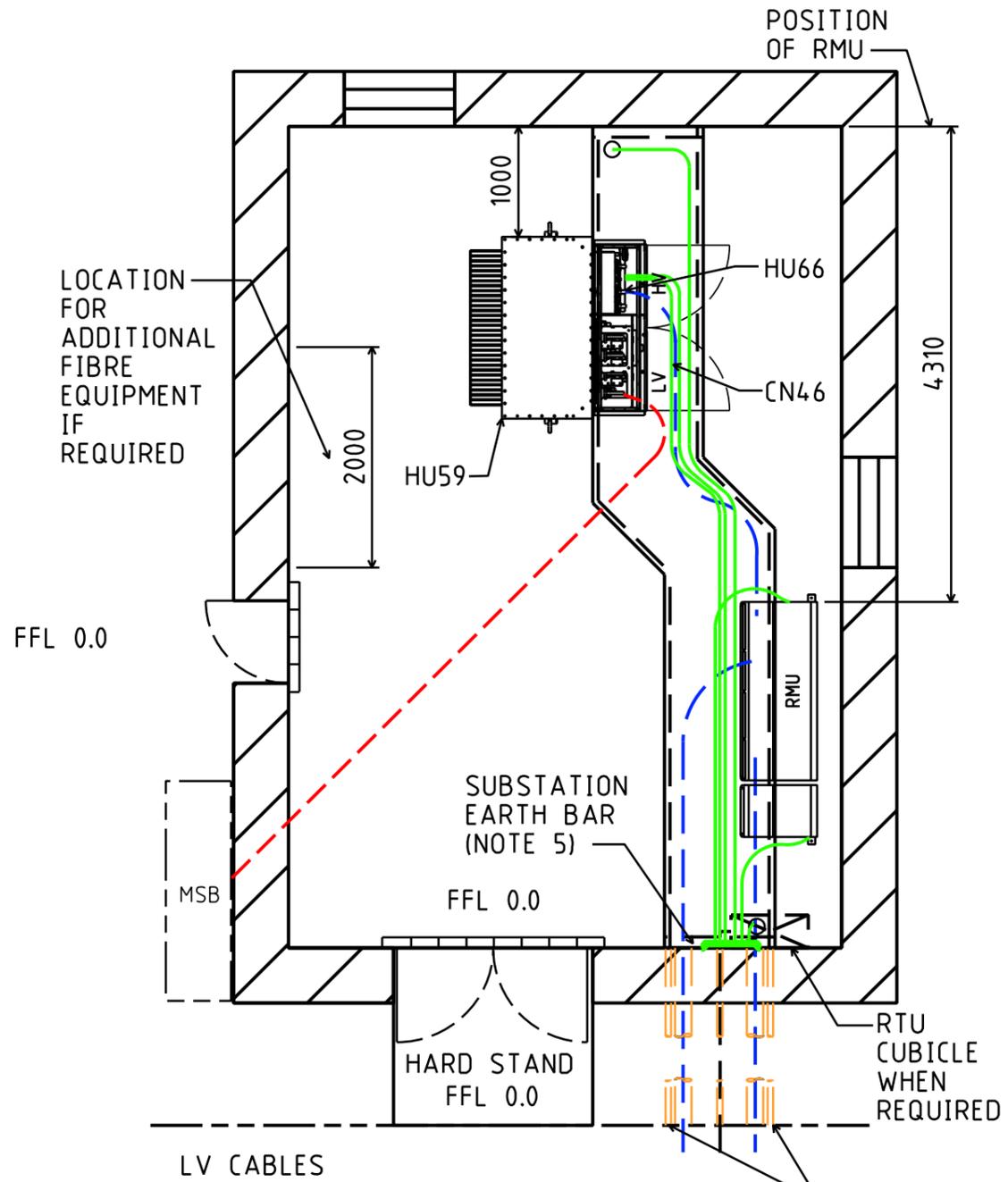
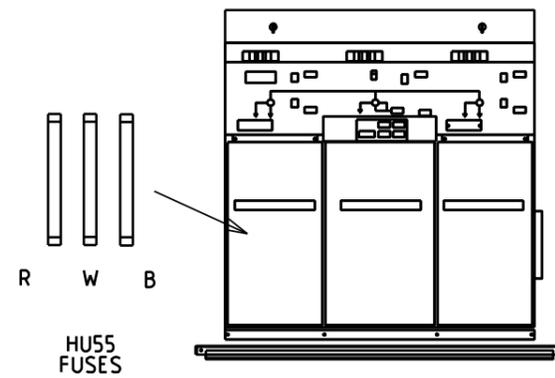
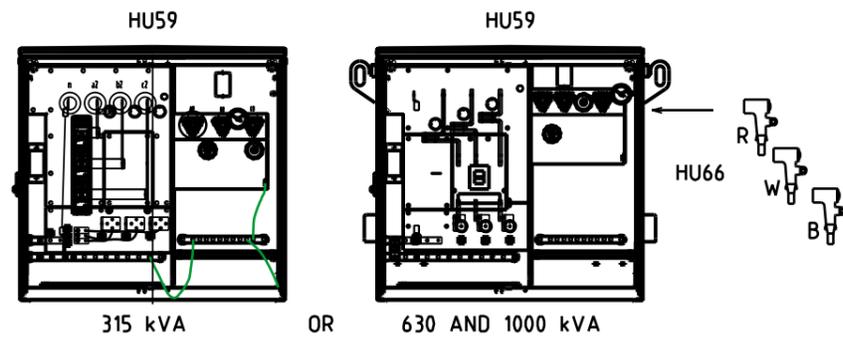
1	DOUBLE DOORS 2340x1720 CLEAR OPENING.
2	DOOR 2040x820 CLEAR OPENING.
3	75 HIGH BRICK BUND.
4	BUND LAID AFTER EQUIPMENT INSTALLED.
5	CUSTOMERS MAIN DISTRIBUTION BOARD.
6	75 DIA PENETRATION THROUGH SLAB FOR EARTHING - TO BE SEALED WITH CN81.
7	4-150 & 2-50 ID HEAVY DUTY DUCTS - TO BE SEALED WITH CN81.
8	750 COVER AT BOUNDARY.
9	600x800 WIDE FIRE DAMPERED VENT AT HIGH (TOP 200 MAX BELOW CEILING) & LOW (BOTTOM MAX 200 ABOVE FINISHED FLOOR LEVEL) LEVELS.
10	50mm WIDE x 38mm DEEP REBATE FOR TRENCH COVERS.
11	TRENCH COVER 35mm THICK x 26kg/m ² FRP SLAB PANEL FRONT OF HV SWITCHGEAR ONLY. 38mm THICK x 18.2kg/m ² MESH GRATING ELSEWHERE.
12	1200 DEEP TRENCH WALLS & FLOOR OF TRENCH TO BE PAINTED WITH SILICONE GLAZE S50.
13	LED LIGHTS BATTEN FITTING (2 WAY SWITCH WITH NEON INDICATOR).
14	6-150 ID HEAVY DUCTS INSTALLED AT FLOOR OF TRENCH - TO BE SEALED WITH CN81.
15	COVER SUPPORTS - 100x75x6 UA (H.D.G.) FIXED TO WALL OF TRENCH.
16	WALLS, CEILING & DOORS TO BE 2HR FIRE RATED, CEILING HEIGHT TO BE MIN 2500mm.



REV.	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.	
C	17.12.2025	FORMAT CHANGED.		SL	KT	MM
B	02.05.23	NOTED AMENDED.		KT	GC	PC
A	12.12.19	ORIGINAL ISSUE.		GC	CO	GS

TITLE
**SOLE USE SUBSTATION
 UP TO 1000 kVA (NON-MPS)
 FIRE RATED - WITH HV SWGR
 REQUIREMENTS AND DUCT INSTALLATION**

DISTRIBUTION SUBSTATION PLANT MANUAL			
DRAWN: SL	DATE: 17/12/2025	DRG. No.	
ORIGINATED: SL	SCALE: NTS @ A4	DSM-3-18	
CHECKED BY: KT	APPROVED: MARK MONTEMAYOR	REV. C	SHT. 2/6



HV MATERIAL				
EQUIPEMENT	CU	QTY		
		6 kV	11 kV	22 kV
TRANSFORMER	HU55/315	SELECT 1		
	HU55/630			
	HU55/1000			
	HU59/315	SELECT 1		
	HU59/630			
HU59/1000				
RMU	HU22	SELECT 1		
	HU23			
	HU24			
	HU25_2S			
	HU25_3S			
EARTHING	HU70_2	1		
CABLE	HU66	1		
	CN46	7		
AUTOMATION	DA6_LVS	1		
	DA6_NG_SE	1 (OPTIONAL)		

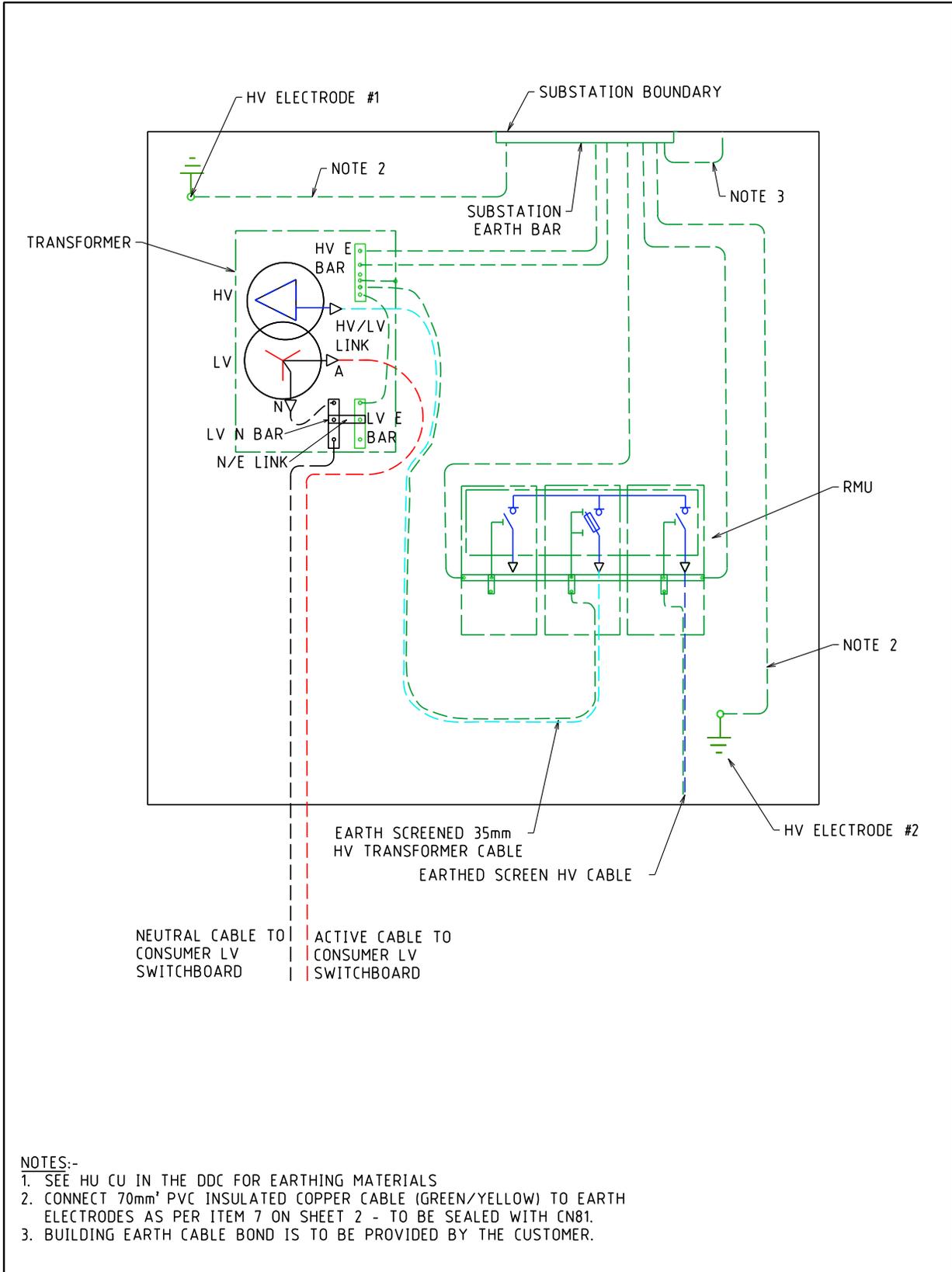
- NOTES:-
1. RMU SUPPLIED WITH BASE AND HV CABLE TERMINATIONS.
 2. REFER TO SHEET 6 FOR THE CORRECT INSTALLATION OF THE RMU.
 3. REFER TO DSPM CHAPTER 4 FOR AUTOMATION DETAILS.
 4. CABLE TRENCH TO BE WATER/OIL TIGHT.
 5. INDICATIVE LOCATION OF EARTH BAR SHOWN. EXACT LOCATION TO BE CONFIRMED IN DESIGN.

REV	DATE	DESCRIPTION	ORGO.	CHKD.	APRD.
C	17.12.2025	FORMAT CHANGED.	SL	KT	MM
B	02.05.23	NOTED AMENDED.	KT	GC	PC
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS

TITLE

SOLE USE SUBSTATION
UP TO 1000 kVA (NON- MPS)
FIRE RATED - WITH HV SWGR
EQUIPMENT SELECTION AND LAYOUT

DRAWN: SL		DATE: 17/12/2025		DRG. No.	
ORIGINATED: SL		SCALE: NTS @ A4		DSM-3-18	
CHECKED BY: KT		APPROVED: MARK MONTEMAYOR		REV. C SHT. 3/6	

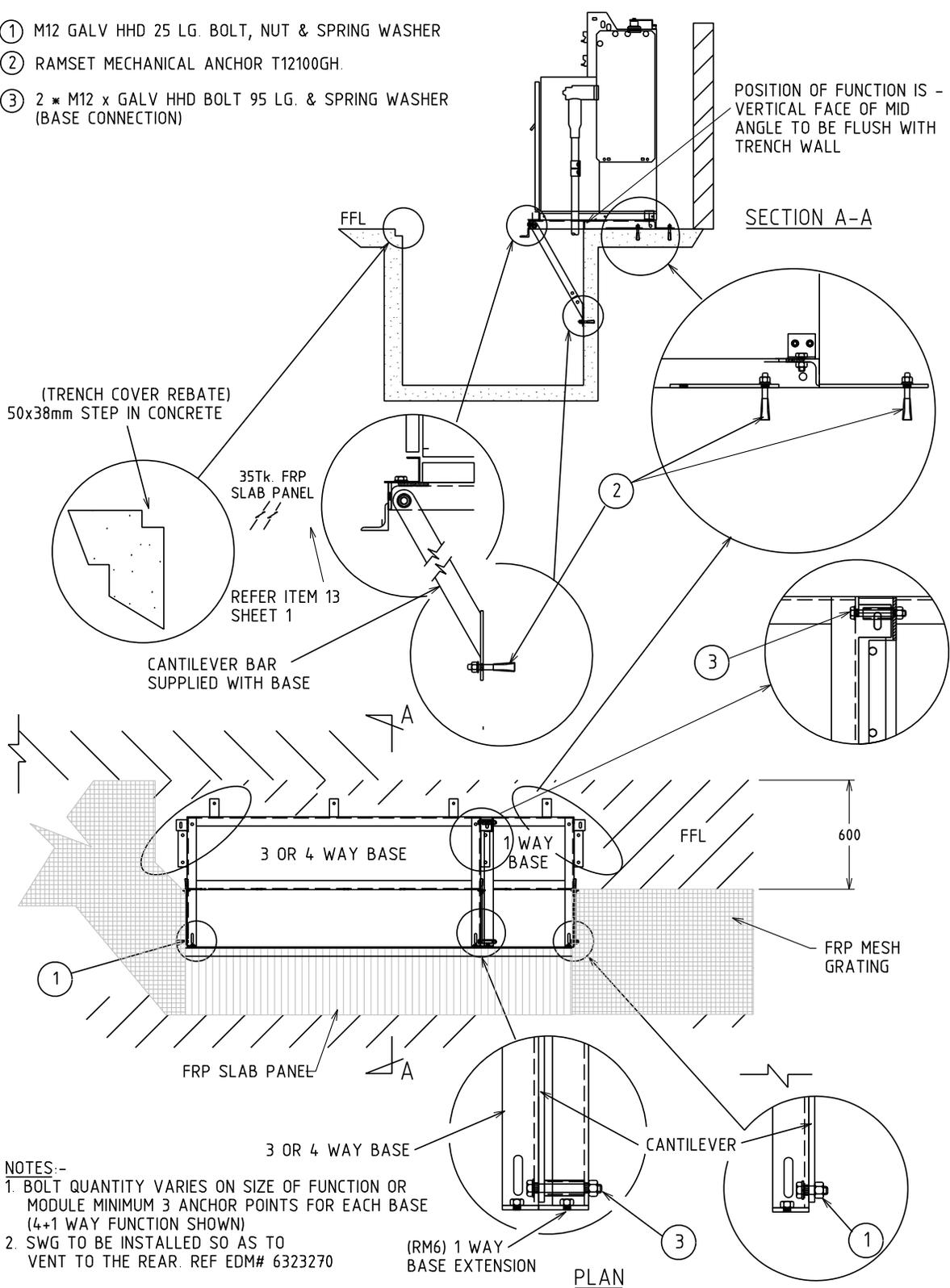


NEUTRAL CABLE TO CONSUMER LV SWITCHBOARD
 ACTIVE CABLE TO CONSUMER LV SWITCHBOARD

- NOTES:-
1. SEE HU CU IN THE DDC FOR EARTHING MATERIALS
 2. CONNECT 70mm² PVC INSULATED COPPER CABLE (GREEN/YELLOW) TO EARTH ELECTRODES AS PER ITEM 7 ON SHEET 2 - TO BE SEALED WITH CN81.
 3. BUILDING EARTH CABLE BOND IS TO BE PROVIDED BY THE CUSTOMER.

				TITLE			DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower		
				SOLE USE SUBSTATION UP TO 1000 kVA (NON- MPS) FIRE RATED - WITH HV SWGR EARTHING ARRANGEMENT						ORG. No.	
C 17.12.2025				FORMAT CHANGED.		SL		KT		MH	
B 02.05.23				NOTED AMENDED.		KT		GC		PC	
A 12.12.19				ORIGINAL ISSUE.		GC		CO		GS	
REV.	DATE	DESCRIPTION		ORGD.	CHKD.	APRD.		APPROVED:	MARK MONTEMAYOR	REV. C	SHT. 5/6

- ① M12 GALV HHD 25 LG. BOLT, NUT & SPRING WASHER
- ② RAMSET MECHANICAL ANCHOR T12100GH.
- ③ 2 * M12 x GALV HHD BOLT 95 LG. & SPRING WASHER (BASE CONNECTION)



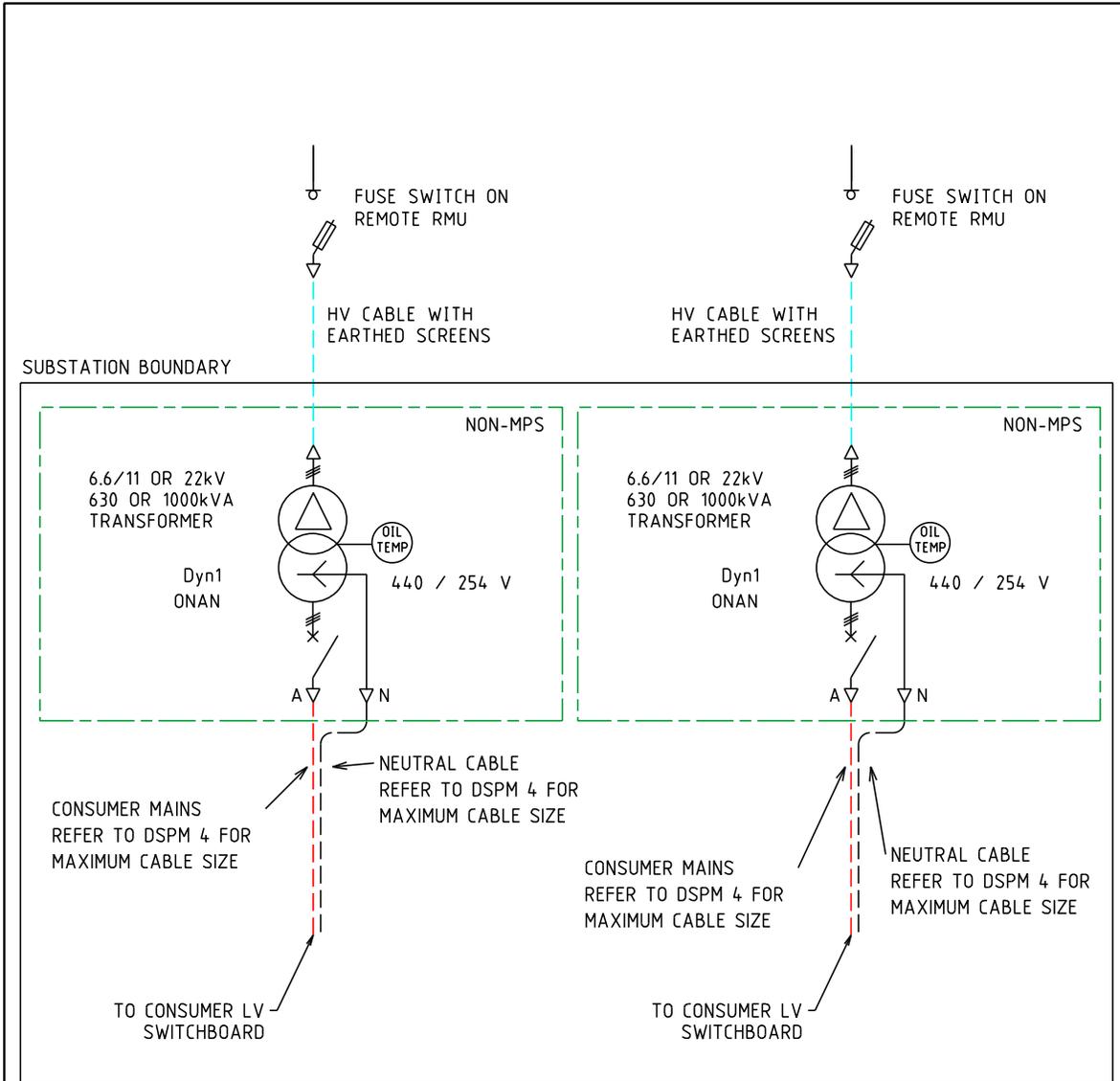
REV.	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.
C	17.12.2025	FORMAT CHANGED.	SL	KT	MM
B	02.05.23	NOTED AMENDED.	KT	GC	PC
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS

TITLE

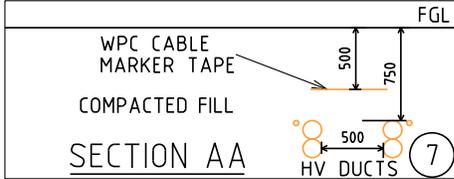
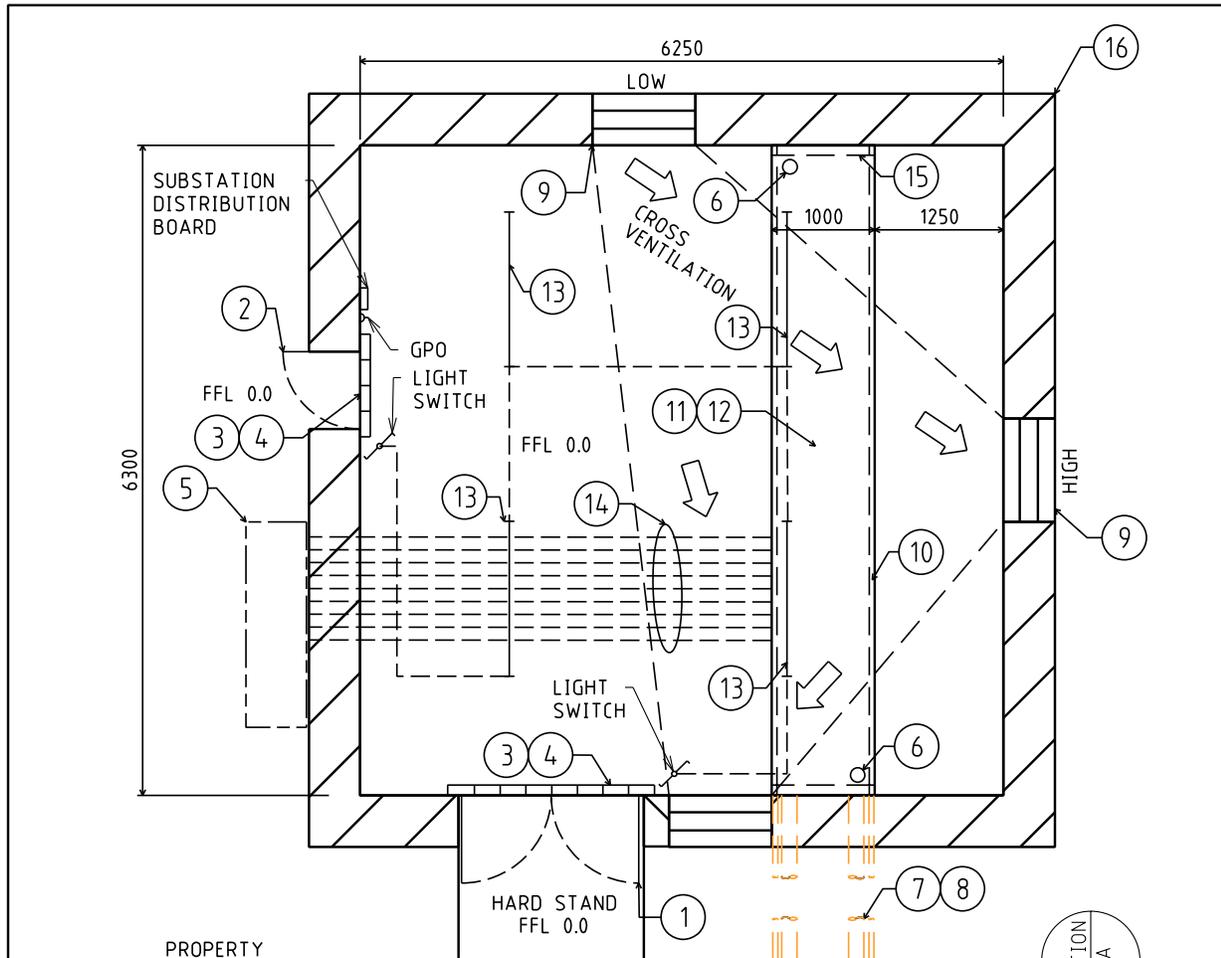
**SCHNEIDER SWITCHGEAR
3 & 4 WAY WITH 1 WAY EXTENSION
FIXING DETAILS**

DISTRIBUTION SUBSTATION PLANT MANUAL			
DRAWN: SL	DATE: 17/12/2025	DRG. No.	
ORIGINATED: SL	SCALE: NTS @ A4	DSM-3-18	
CHECKED BY: KT	APPROVED: MARK MONTE MAYOR	REV. C	SHT. 6/6

4.5.3 DSM-3-19 Up to 2000kVA (Non-MPS)

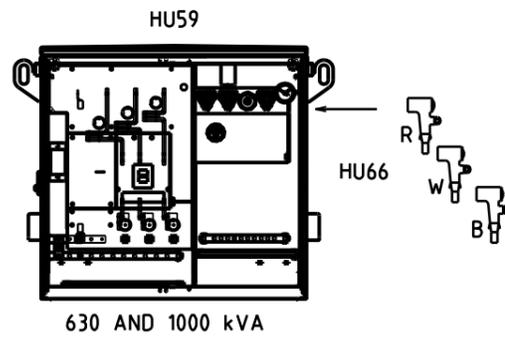


				TITLE			DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower		
				SOLE USE SUBSTATION UP TO 2000 kVA (NON- MPS) FIRE RATED - WITHOUT HV SWGR SINGLE LINE DIAGRAM						ORG. No.	
C 17.12.2025 FORMAT CHANGED.				SL	KT	MM	DRAWN: SL		DATE: 17/12/2025	DSM-3-19	
B 02.05.23 NOTED AMENDED.				KT	GC	PC	ORIGINATED: SL		SCALE: NTS A4		
A 12.12.19 ORIGINAL ISSUE.				GC	CO	GS	CHECKED BY: KT		APPROVED:		
REV	DATE	DESCRIPTION		ORGO	CHKD.	APRD.	MARK MONTEMAYOR		REV. C	SHT. 1/5	

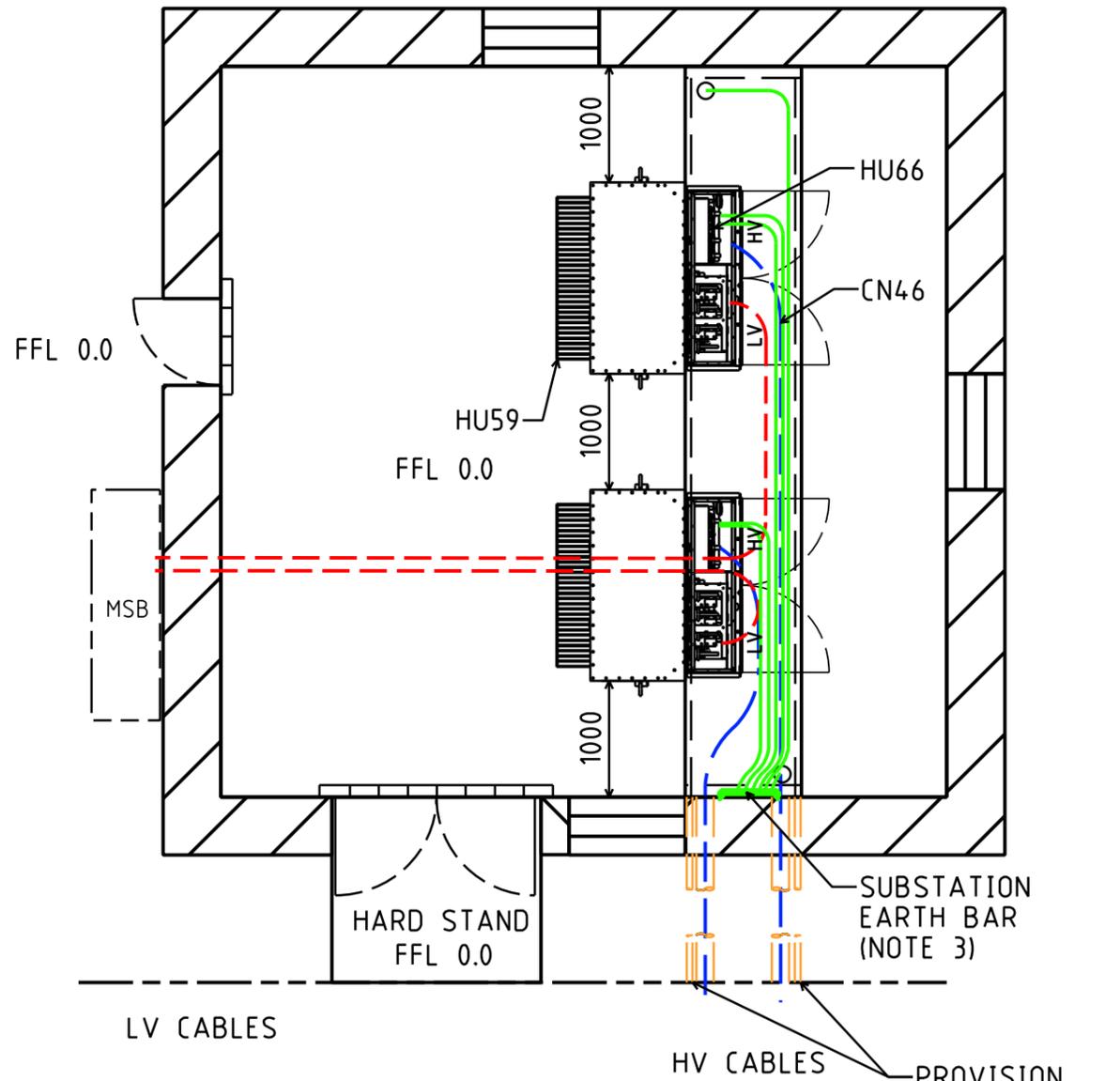


1	DOUBLE DOORS 2340x1720 CLEAR OPENING.
2	DOOR 2040x820 CLEAR OPENING.
3	75 HIGH BRICK BUND.
4	BUND LAID AFTER EQUIPMENT INSTALLED.
5	CUSTOMERS MAIN DISTRIBUTION BOARD.
6	75 DIA PENETRATION THROUGH SLAB FOR EARTHING - TO BE SEALED WITH CN81.
7	4-150 & 2-50 ID HEAVY DUTY DUCTS - TO BE SEALED WITH CN81.
8	750 COVER AT BOUNDARY.
9	600x800 WIDE FIRE DAMPERED VENT AT HIGH (TOP 200 MAX BELOW CEILING) & LOW (BOTTOM MAX 200 ABOVE FINISHED FLOOR LEVEL) LEVELS.
10	50mm WIDE x 38mm DEEP REBATE FOR TRENCH COVERS.
11	TRENCH COVER 35mm THICK x 26kg/m ² FRP SLAB PANEL FRONT OF HV SWITCHGEAR ONLY. 38mm THICK x 18.2kg/m ² MESH GRATING ELSEWHERE.
12	1200 DEEP TRENCH WALLS & FLOOR OF TRENCH TO BE PAINTED WITH SILICONE GLAZE S50.
13	LED LIGHTS BATTEN FITTING (2 WAY SWITCH WITH NEON INDICATOR).
14	12-150 ID HEAVY DUCTS INSTALLED AT FLOOR OF TRENCH, STACKED 2 ON 2 - TO BE SEALED WITH CN81.
15	COVER SUPPORTS - 100x75x6 UA (H.D.G.) FIXED TO WALL OF TRENCH.
16	WALLS, CEILING & DOORS TO BE 2HR FIRE RATED, CEILING HEIGHT TO BE MIN 2500mm.

				TITLE			DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower		
				SOLE USE SUBSTATION UP TO 2000 kVA (NON-MPS) FIRE RATED - WITHOUT HV SWGR REQUIREMENTS AND DUCT INSTALLATION						DRAWN: SL DATE: 17/12/2025 ORG. No.	
										ORIGINATED: SL SCALE: NTS @ A4	
										CHECKED BY: KT DSM-3-19	
										APPROVED: MARK MONTEMAYOR REV: C SHT: 2/5	
REV	DATE	DESCRIPTION	ORGD	CHKD	APRD						
C	17.12.2025	FORMAT CHANGED.		SL	KT	MM					
B	02.05.23	NOTED AMENDED		KT	GC	PC					
A	12.12.19	ORIGINAL ISSUE.		GC	CO	GS					



HV MATERIAL				
EQUIPEMENT	CU	QTY		
		6 kV	11 kV	22 kV
TRANSFORMER	HU55/630	SELECT 2 OF THE SAME TYPE		
	HU55/1000			
	HU59/630	SELECT 2 OF THE SAME TYPE		
	HU59/1000			
CABLE	HU66	1		
	CN46	AS REQUIRED FROM FSSW		
EARTHING	HU70_1	1		



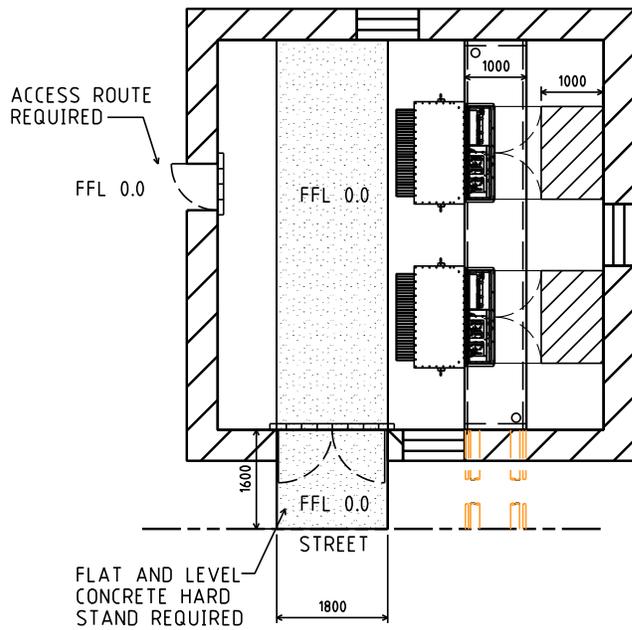
- NOTES:-
- 1 DESIGNER TO REQUEST FOR 2 x ETEL TRANSFORMERS FOR DUAL 630kVA LAYOUT.
 2. TRENCH TO BE WATER AND OIL TIGHT.
 3. INDICATIVE LOCATION OF EARTH BAR SHOWN. EXACT LOCATION TO BE CONFIRMED IN DESIGN.

REV	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.
C	17.12.2025	FORMAT CHANGED.	SL	KT	MM
B	02.05.23	NOTED AMENDED.	KT	GC	PC
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS

TITLE

SOLE USE SUBSTATION
UP TO 2000 kVA (NON- MPS)
FIRE RATED - WITHOUT HV SWGR
EQUIPMENT SELECTION AND LAYOUT

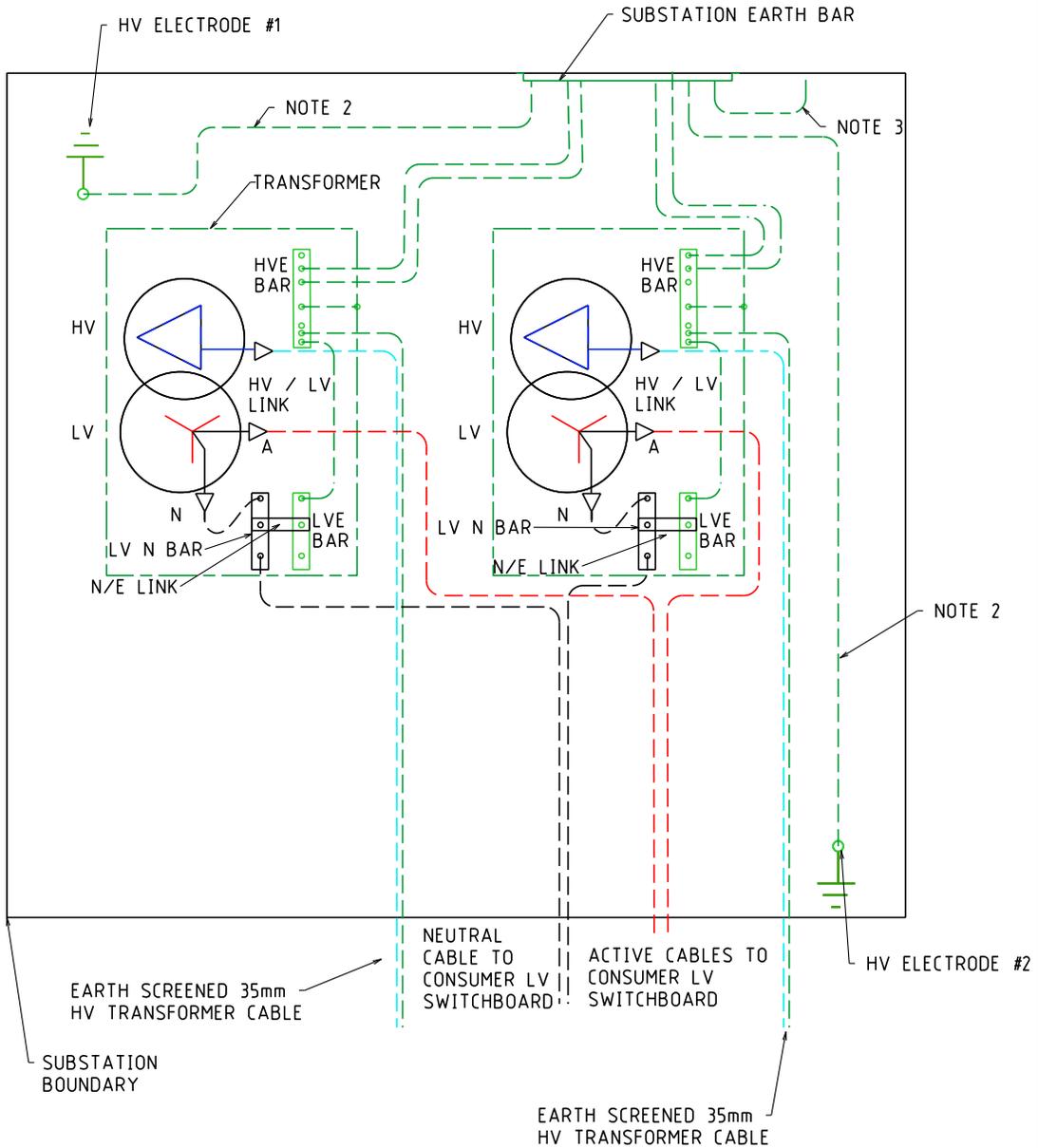
DRAWN: SL		DATE: 17/12/2025		DRG. No.
ORIGINATED: SL		SCALE: NTS @ A4		DSM-3-19
CHECKED BY: KT				
APPROVED: MARK MONTEMAYOR				REV. C
				SHT. 3/5



-  INSTALLATION AND MAINTENANCE CLEARANCE
-  OPERATIONAL CLEARANCE

NOTES:-
 1. DESIGNER TO ENSURE SAFE ACCESS AND EGRESS ROUTES ARE PROVIDED.
 2. WHERE THE SITE IS SET BACK FROM THE STREET, CRANE ACCESS IS REQUIRED.

REV	DATE	DESCRIPTION	DRG.	CHKD.	APRD.	TITLE	DISTRIBUTION SUBSTATION PLANT MANUAL	
C	17.12.2025	FORMAT CHANGED.	SL	KT	MM	SOLE USE SUBSTATION UP TO 2000 kVA (NON- MPS) FIRE RATED - WITHOUT HV SWGR CLEARANCES	DRAWN: SL	DATE: 17/12/2025
B	02.05.23	NOTED AMENDED.	KT	GC	PC		ORIGINATED: SL	SCALE: NTS A4
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS		CHECKED BY: KT	DSM-3-19
							APPROVED: MARK MONTEMAYOR	REV. C
								SHT. 4/5



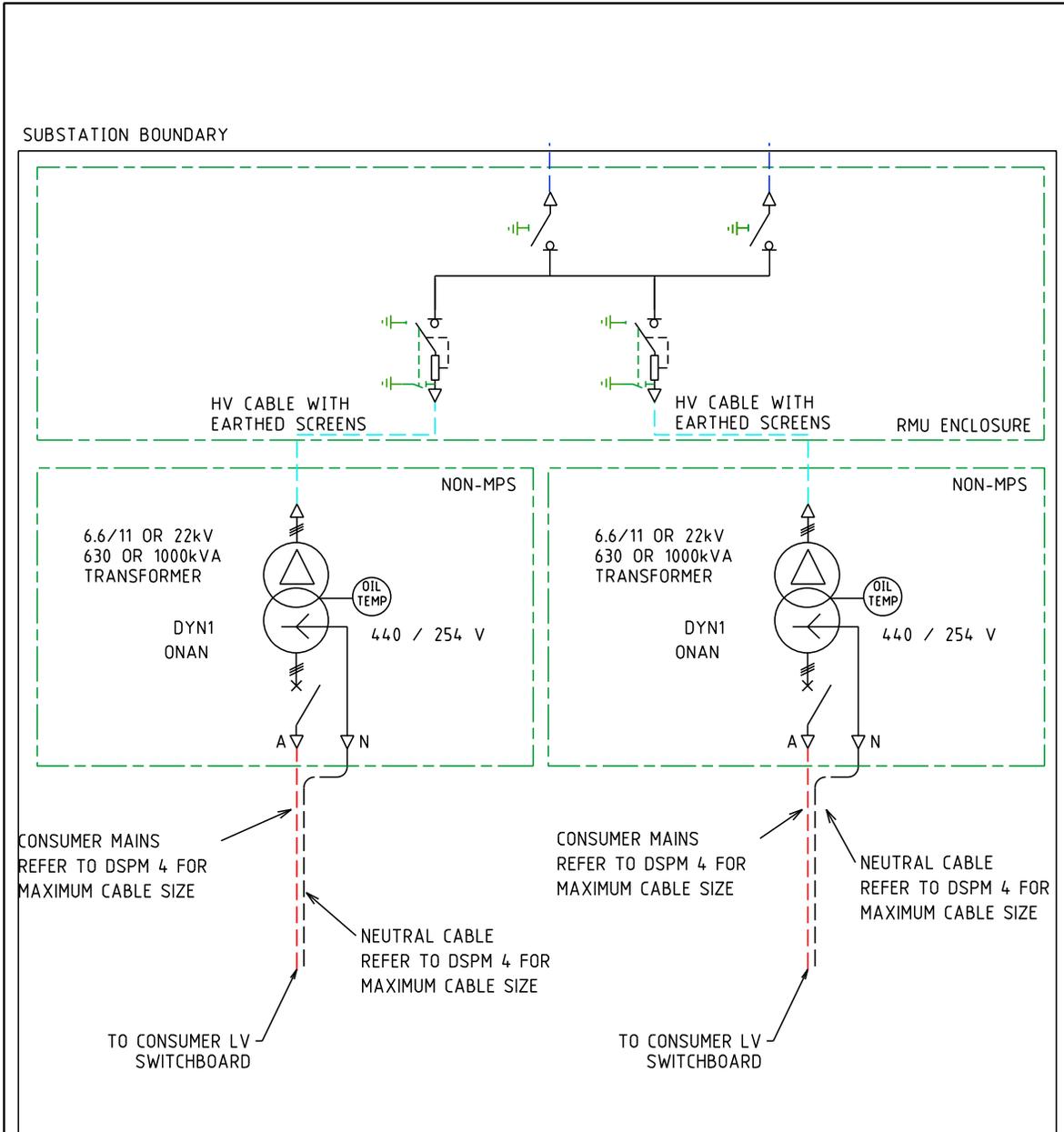
NOTES:-

1. SEE HU CU IN THE DDC FOR EARTHING MATERIALS
2. CONNECT 70mm² PVC INSULATED COPPER CABLE (GREEN/YELLOW) TO EARTH ELECTRODES AS PER ITEM 7 ON SHEET 2 - TO BE SEALED WITH CN81.
3. BUILDING EARTH CABLE BOND IS TO BE PROVIDED BY THE CUSTOMER.

REV	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.	TITLE	DISTRIBUTION SUBSTATION PLANT MANUAL	westernpower
C	17.12.2025	FORMAT CHANGED.		SL	KT	MM	DATE: 17/12/2025	DRG. No.
B	02.05.23	NOTED AMENDED.		KT	GC	PC	SCALE: NTS A4	DSM-3-19
A	12.12.19	ORIGINAL ISSUE.		GC	CO	GS	CHECKED BY: KT	REV. C
							APPROVED: MARK MONTEMAYOR	SHT. 5/5

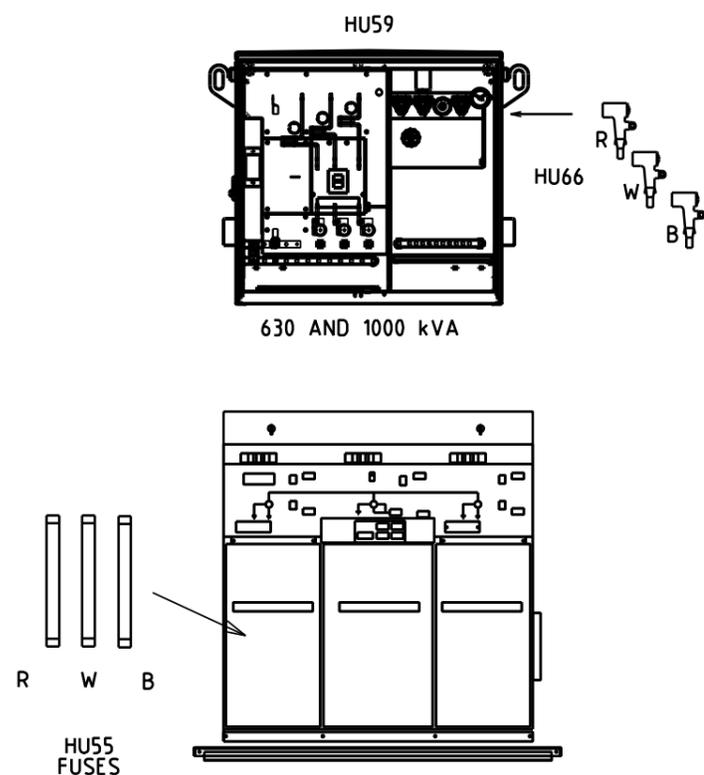
SOLE USE SUBSTATION
UP TO 2000 kVA (NON- MPS)
FIRE RATED - WITHOUT HV SWGR
EARTHING ARRANGEMENT

4.5.4 DSM-3-20 Up to 2000kVA (Non-MPS) with HV SWGR

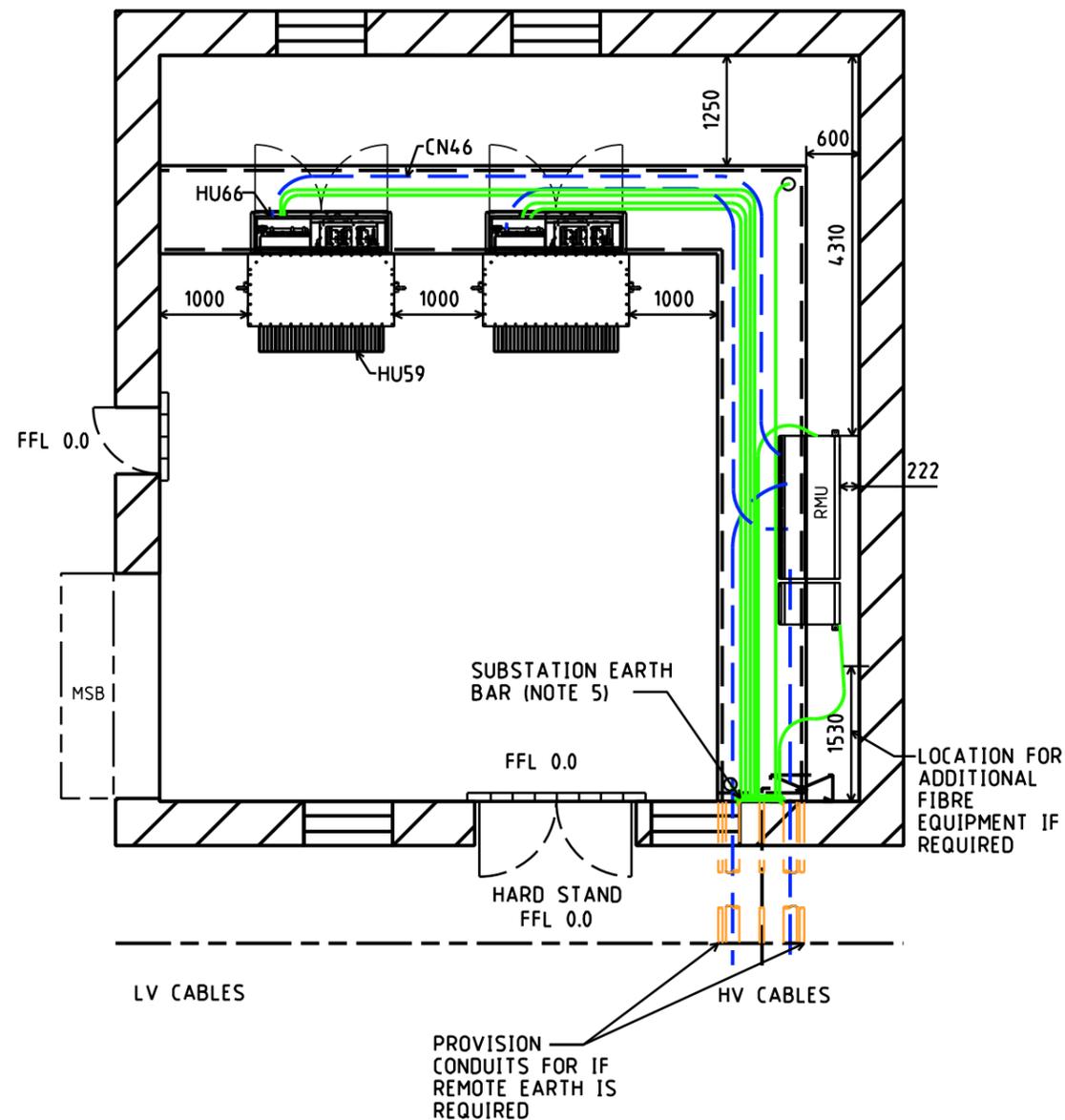


- NOTES:-
1. 2+2 RMU OPTION SHOWN (2 SWITCH-DISCONNECTORS AND 2 COMBINED FUSE-SWITCH).
 2. OTHER OPTIONS (NOT SHOWN) INCLUDE 3+2 OR 2+3.
 3. HV SWITCH-DISCONNECTORS MAY BE MOTORISED AND AUTOMATED.

				TITLE			DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower			
SOLE USE SUBSTATION UP TO 2000 kVA (NON- MPS) FIRE RATED - WITH HV SWGR SINGLE LINE DIAGRAM							DRAWN: SL		DATE: 17/12/2025		DRG. No.	
							ORIGINATED: SL		SCALE: NTS A4		DSM-3-20	
							CHECKED BY: KT				REV. C	
							APPROVED: MARK MONTEMAYOR				SHT. 1/6	
REV	DATE	DESCRIPTION	DRG	CHKD	APRD							
C	17.12.2025	FORMAT CHANGED.	SL	KT	MM							
B	02.05.23	NOTED AMENDED.	KT	GC	PC							
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS							



HV MATERIAL				
EQUIPEMENT	CU	QTY		
		6 kV	11 kV	22 kV
TRANSFORMER	HU55/630	SELECT 2 OF THE SAME TYPE		
	HU55/1000			
	HU59/630	SELECT 2 OF THE SAME TYPE		
	HU59/1000			
RMU	HU24	SELECT 1		
	HU25_2S			
	HU25_3S			
EARTHING	HU70_3	1		
CABLE	HU66	2		
	CN46	14		
AUTOMATION	DA6_LVS	1		
	DA6_NG_SE	1 (OPTIONAL)		



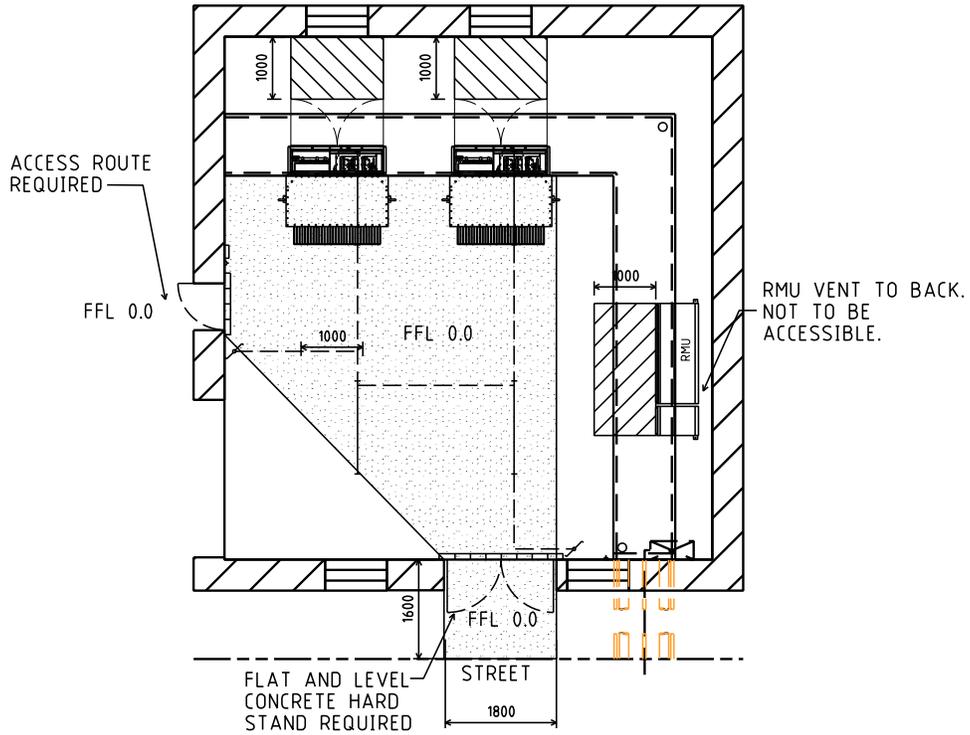
- NOTES:-
1. RMU SUPPLIED WITH BASE AND HV CABLE TERMINATIONS.
 2. REFER TO SHEET 6 FOR THE CORRECT INSTALLATION OF THE RMU.
 3. REFER TO DSPM CHAPTER 4 FOR AUTOMATION DETAILS.
 4. CABLE TRENCH TO BE WATER/OIL TIGHT.
 5. INDICATIVE LOCATION OF EARTH BAR SHOWN. EXACT LOCATION TO BE CONFIRMED IN DESIGN.

REV	DATE	DESCRIPTION	ORGO.	CHKD.	APRD.
C	17.12.2025	FORMAT CHANGED.	SL	KT	MM
B	02.05.23	NOTED AMENDED.	KT	GC	PC
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS

TITLE

SOLE USE SUBSTATION
UP TO 2000 kVA (NON- MPS)
FIRE RATED - WITH HV SWGR
EQUIPMENT SELECTION AND LAYOUT

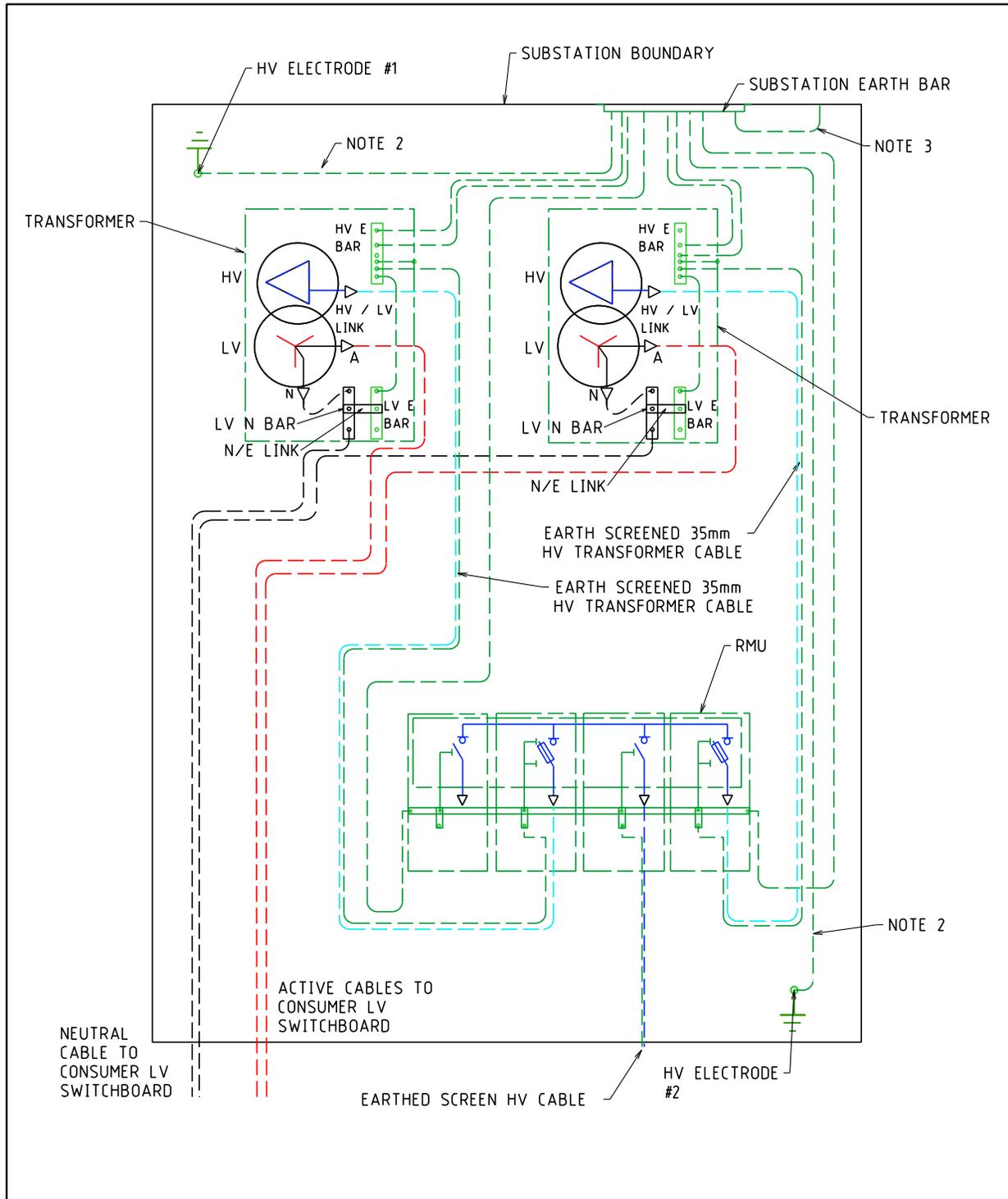
DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower	
DRAWN: SL	DATE: 17/12/2025	DRG. No.	
ORIGINATED: SL	SCALE: NTS @ A4	DSM-3-20	
CHECKED BY: KT	APPROVED: MARK MONTEMAYOR	REV. C	SHT. 3/6



- INSTALLATION AND MAINTENANCE CLEARANCE
- OPERATIONAL CLEARANCE

NOTES:-
 1. DESIGNER TO ENSURE SAFE ACCESS AND EGRESS ROUTES ARE PROVIDED.
 2. WHERE THE SITE IS SET BACK FROM THE STREET, CRANE ACCESS IS REQUIRED.

				TITLE			DISTRIBUTION SUBSTATION PLANT MANUAL				
				SOLE USE SUBSTATION UP TO 2000 kVA (NON- MPS) FIRE RATED - WITH HV SWGR CLEARANCES						DRG. No.	
						DRAWN: SL		DATE: 17/12/2025		DSM-3-20	
						ORIGINATED: SL		SCALE: NTS A4			
						CHECKED BY: KT				REV. C SHT. 4/6	
						APPROVED: MARK MONTEMAYOR					
REV.	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.						
C	17.12.2025	FORMAT CHANGED.		SL	KT	MM					
B	02.05.23	NOTED AMENDED.		KT	GC	PC					
A	12.12.19	ORIGINAL ISSUE.		GC	CO	GS					

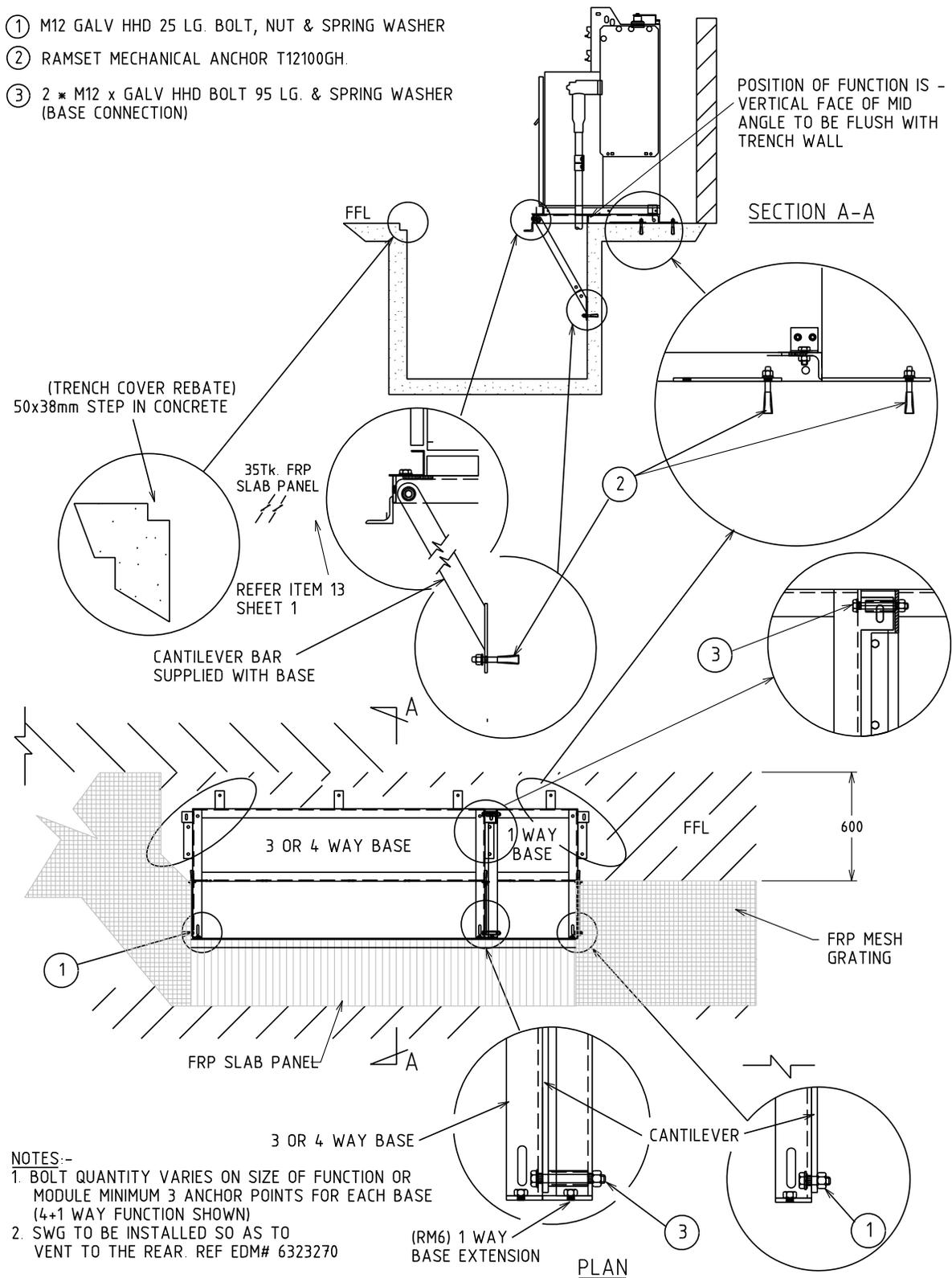


NOTES:-

1. SEE HU CU IN THE DDC FOR EARTHING MATERIALS
2. CONNECT 70mm² PVC INSULATED COPPER CABLE (GREEN/YELLOW) TO EARTH ELECTRODES AS PER ITEM 7 ON SHEET 2 - TO BE SEALED WITH CN81.
3. BUILDING EARTH CABLE BOND IS TO BE PROVIDED BY THE CUSTOMER.

				TITLE		DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower	
				SOLE USE SUBSTATION UP TO 2000 kVA (NON- MPS) FIRE RATED - WITH HV SWGR EARTHING ARRANGEMENT				DSM-3-20	
C	17.12.2025	FORMAT CHANGED.	SL	KT	MH	DRAWN: SL	DATE: 17/12/2025	ORG. No.	
B	02.05.23	NOTED AMENDED.	KT	GC	PC	ORIGINATED: SL	SCALE: NTS A4		
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS	CHECKED BY: KT			
REV.	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.	APPROVED: MARK MONTEMAYOR	REV. C	SHT. 5/6	

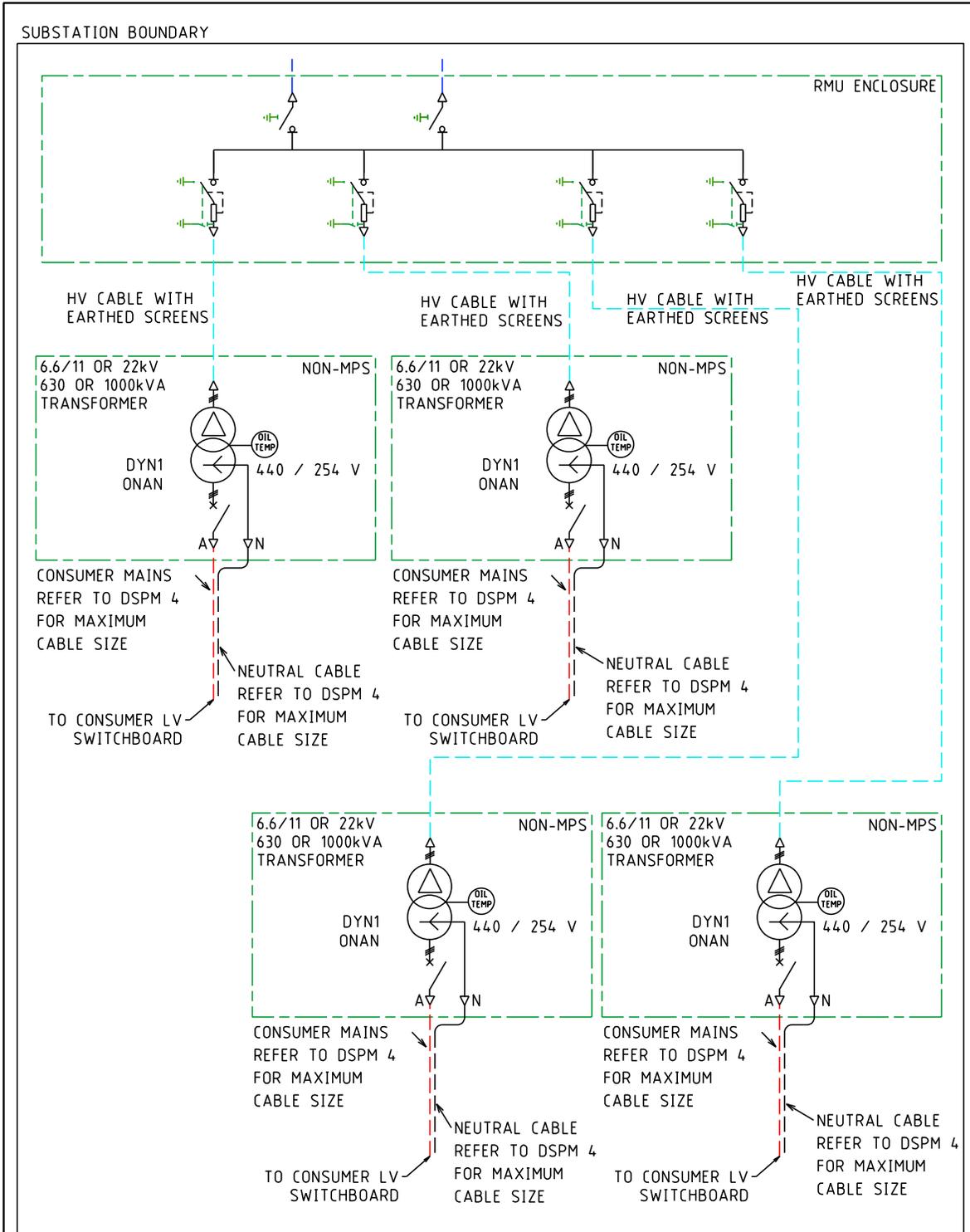
- ① M12 GALV HHD 25 LG. BOLT, NUT & SPRING WASHER
- ② RAMSET MECHANICAL ANCHOR T12100GH.
- ③ 2 * M12 x GALV HHD BOLT 95 LG. & SPRING WASHER (BASE CONNECTION)



- NOTES:-
1. BOLT QUANTITY VARIES ON SIZE OF FUNCTION OR MODULE MINIMUM 3 ANCHOR POINTS FOR EACH BASE (4+1 WAY FUNCTION SHOWN)
 2. SWG TO BE INSTALLED SO AS TO VENT TO THE REAR. REF EDM# 6323270

				TITLE			DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower		
				SCHNEIDER SWITCHGEAR 3 & 4 WAY WITH 1 WAY EXTENSION FIXING DETAILS						ORG. No.	
C	17.12.2025	FORMAT CHANGED.		SL	KT	MM	DRAWN: SL	DATE: 17/12/2025	DSM-3-20		
B	02.05.23	NOTED AMENDED.		KT	GC	PC	ORIGINATED: SL	SCALE: NTS A4	REV. C		
A	12.12.19	ORIGINAL ISSUE.		GC	CO	GS	CHECKED BY: KT		SHT. 6/6		
REV.	DATE	DESCRIPTION		ORGD.	CHKD.	APRD.	APPROVED: MARK MONTE MAYOR				

4.5.5 DSM-3-21 Up to 4000kVA (Non-MPS) with HV SWGR

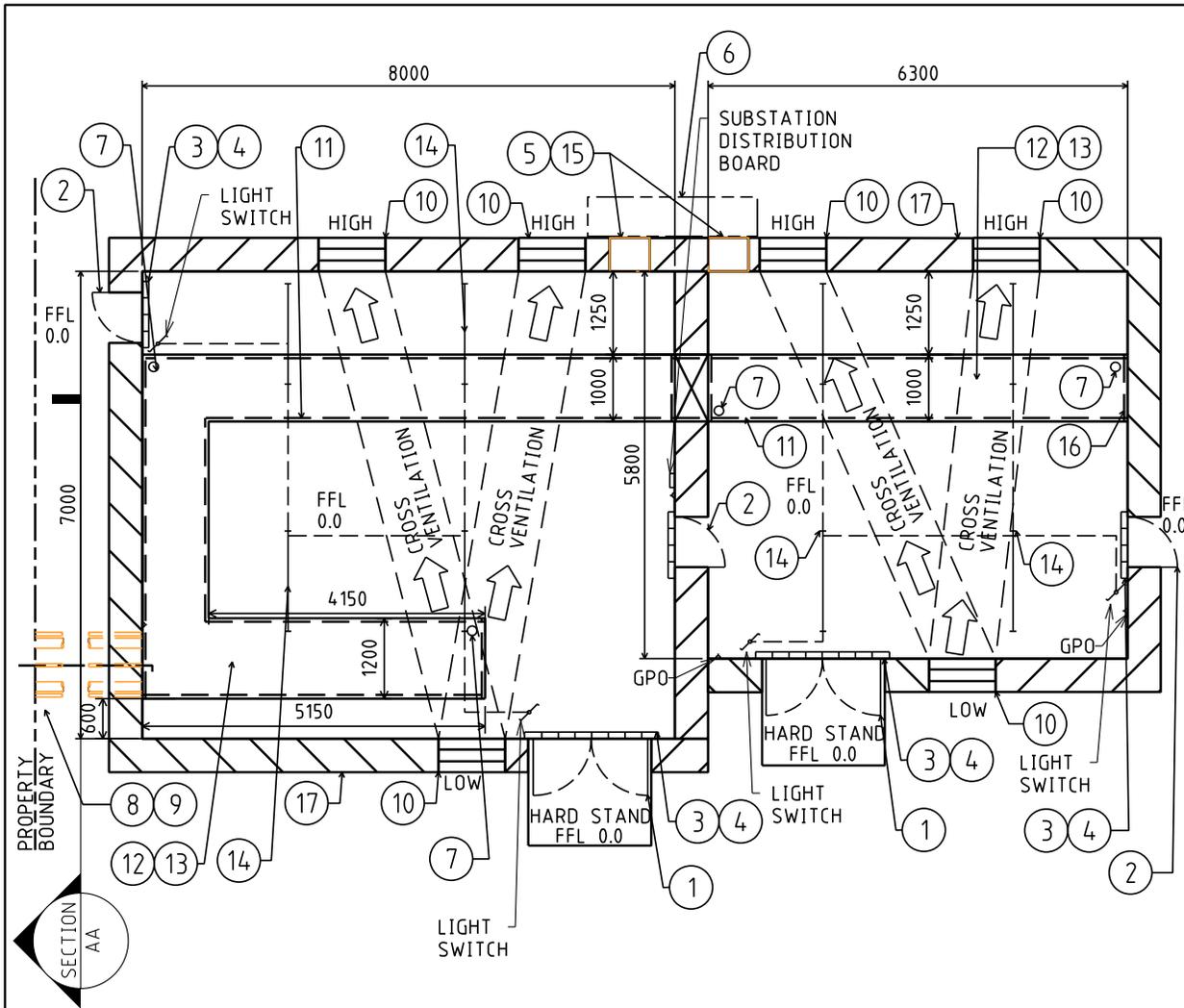


NOTES:-
 1. HV SWITCH-DISCONNECTORS MAY BE MOTORISED AND AUTOMATED.

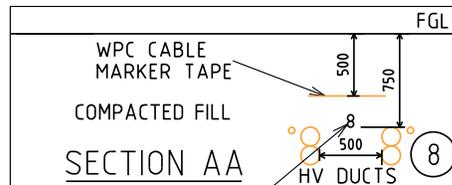
REV	DATE	DESCRIPTION	ORGO	CHKD.	APRD.
C	17.12.2025	FORMAT CHANGED.	SL	KT	MM
B	02.05.23	NOTED AMENDED.	KT	GC	PC
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS

SOLE USE SUBSTATION
 UP TO 4000 kVA (NON- MPS)
 FIRE RATED - WITH HV SWGR
 SINGLE LINE DIAGRAM

DISTRIBUTION SUBSTATION PLANT MANUAL			
DRAWN: SL	DATE: 17/12/2025	DRG. No.	
ORIGINATED: SL	SCALE: NTS A4	DSM-3-21	
CHECKED BY: KT	APPROVED: MARK MONTEMAYOR	REV. C	SHT. 1/6



1	DOUBLE DOORS 2340x1720 CLEAR OPENING.
2	DOOR 2040x820 CLEAR OPENING.
3	75 HIGH BRICK BUND.
4	BUND LAID AFTER EQUIPMENT INSTALLED.
5	CUSTOMERS DUCT(S) AT FLOOR OF TRENCH.
6	CUSTOMERS MAIN DISTRIBUTION BOARD.
7	75 DIA PENETRATION THROUGH SLAB FOR EARTHING - TO BE SEALED WITH CN81.
8	4-150 ID & 2-50 HEAVY DUTY DUCTS - TO BE SEALED WITH CN81.
9	750 COVER AT BOUNDARY.
10	600x800 WIDE FIRE DAMPERED VENT AT HIGH (TOP 200 MAX BELOW CEILING) & LOW (BOTTOM MAX 200 ABOVE FINISHED FLOOR LEVEL) LEVELS.
11	50mm WIDE x 38mm DEEP REBATE FOR TRENCH COVERS.
12	TRENCH COVER 35mm THICK x 26kg/m2 FRP SLAB PANEL FRONT OF HV SWITCHGEAR ONLY. 38mm THICK x 18.2kg/m2 MESH GRATING ELSEWHERE.
13	1200 DEEP TRENCH WALLS & FLOOR OF TRENCH TO BE PAINTED WITH SILICONE GLAZE S50.
14	LED LIGHTS BATTEN FITTING (2 WAY SWITCH WITH NEON INDICATOR).
15	2 x 10-150 ID HEAVY DUCTS INSTALLED AT FLOOR OF TRENCH - TO BE SEALED WITH CN81.
16	COVER SUPPORTS - 100x75x6 UA (H.D.G.) FIXED TO WALL OF TRENCH.
17	WALLS, CEILING & DOORS TO BE 2HR FIRE RATED, CEILING HEIGHT TO BE MIN 2500mm.

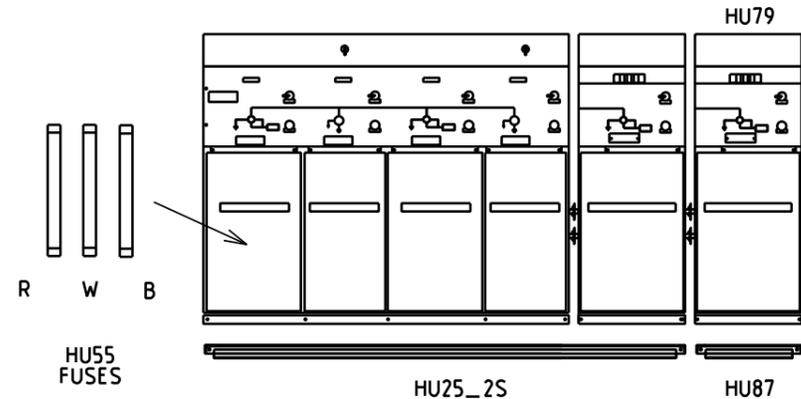
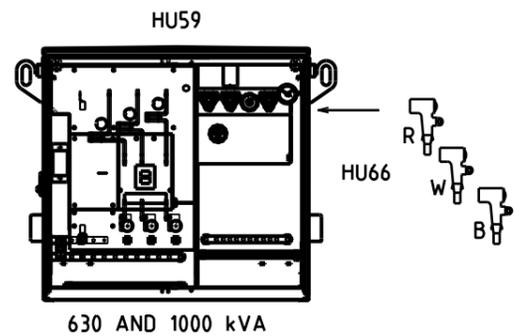


2 x 50mm DUCT WITH DRAW STRING REQUIRED FOR FIBRE FOR CBD AUTOMATION WHEN REQUIRED.

REV	DATE	DESCRIPTION	DRG	CHKD	APRD
C	17.12.2025	FORMAT CHANGED.	SL	KT	MM
B	02.05.23	NOTED AMENDED.	KT	GC	PC
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS

TITLE
**SOLE USE SUBSTATION
 UP TO 4000 kVA (NON-MPS)
 FIRE RATED - WITH HV SWGR
 REQUIREMENTS AND DUCT INSTALLATION**

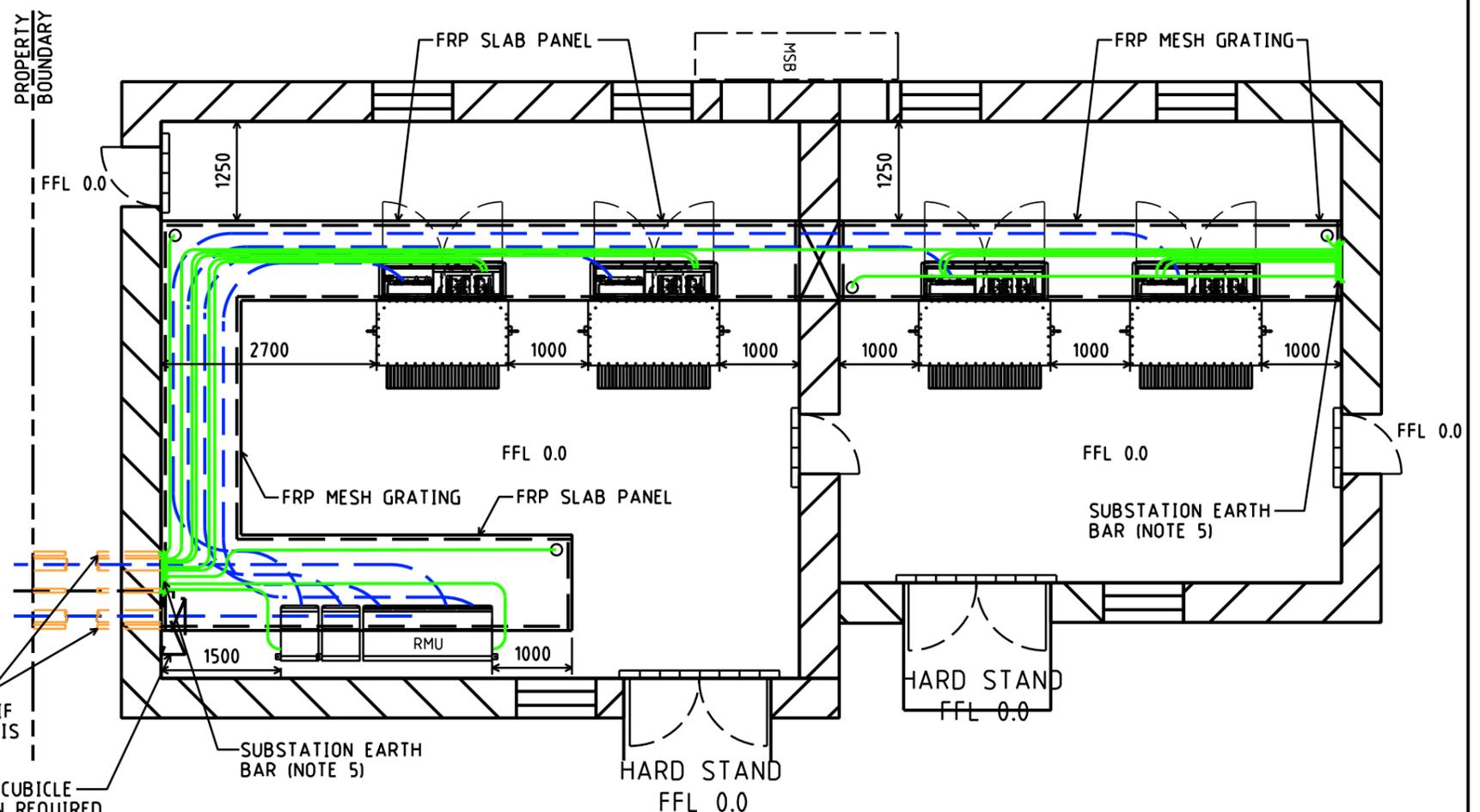
DISTRIBUTION SUBSTATION PLANT MANUAL			
DRAWN: SL	DATE: 17/12/2025	DRG. No.	
ORIGINATED: SL	SCALE: NTS @ A4	DSM-3-21	
CHECKED BY: KT	APPROVED: MARK MONTEMAYOR	REV: C	SHT: 2/6



EQUIPEMENT	CU	QTY		
		6 kV	11 kV	22 kV
TRANSFORMER	HU55/630	SELECT 4 OF THE SAME TYPE		
	HU55/1000	SELECT 4 OF THE SAME TYPE		
	HU59/630	SELECT 4 OF THE SAME TYPE		
	HU59/1000	SELECT 4 OF THE SAME TYPE		
RMU	HU79	1		
	HU25_2S	1		
	HU87	1		
EARTHING	HU70_3	1		
	HU70_2	1		
CABLE	HU66	4		
	CN46	125		
AUTOMATION	DA6_LVS	1		
	DA6_NG_SE	1 (OPTIONAL)		

PROVISION CONDUITS FOR IF REMOTE EARTH IS REQUIRED

RTU CUBICLE WHEN REQUIRED



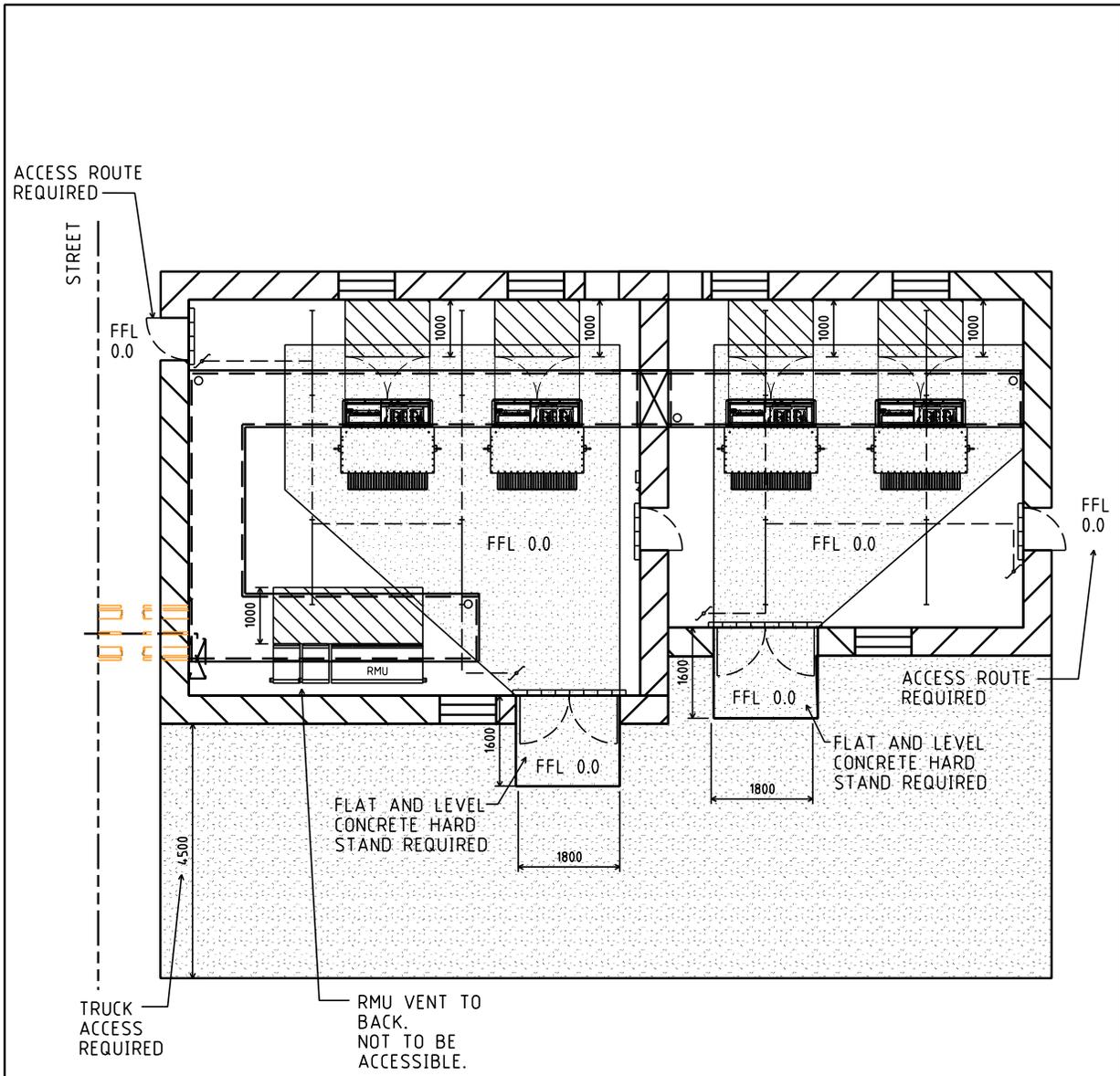
- NOTES:-
1. RMU SUPPLIED WITH BASE AND HV CABLE TERMINATIONS.
 2. REFER TO SHEET 6 FOR THE CORRECT INSTALLATION OF THE RMU.
 3. REFER TO DSPM CHAPTER 4 FOR AUTOMATION DETAILS.
 4. CABLE TRENCH TO BE WATER/OIL TIGHT.
 5. INDICATIVE LOCATION OF EARTH BAR SHOWN. EXACT LOCATION TO BE CONFIRMED IN DESIGN.

REV	DATE	DESCRIPTION	ORGO.	CHKD.	APRD.
C	17.12.2025	FORMAT CHANGED.	SL	KT	MM
B	02.05.23	NOTED AMENDED.	KT	GC	PC
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS

TITLE

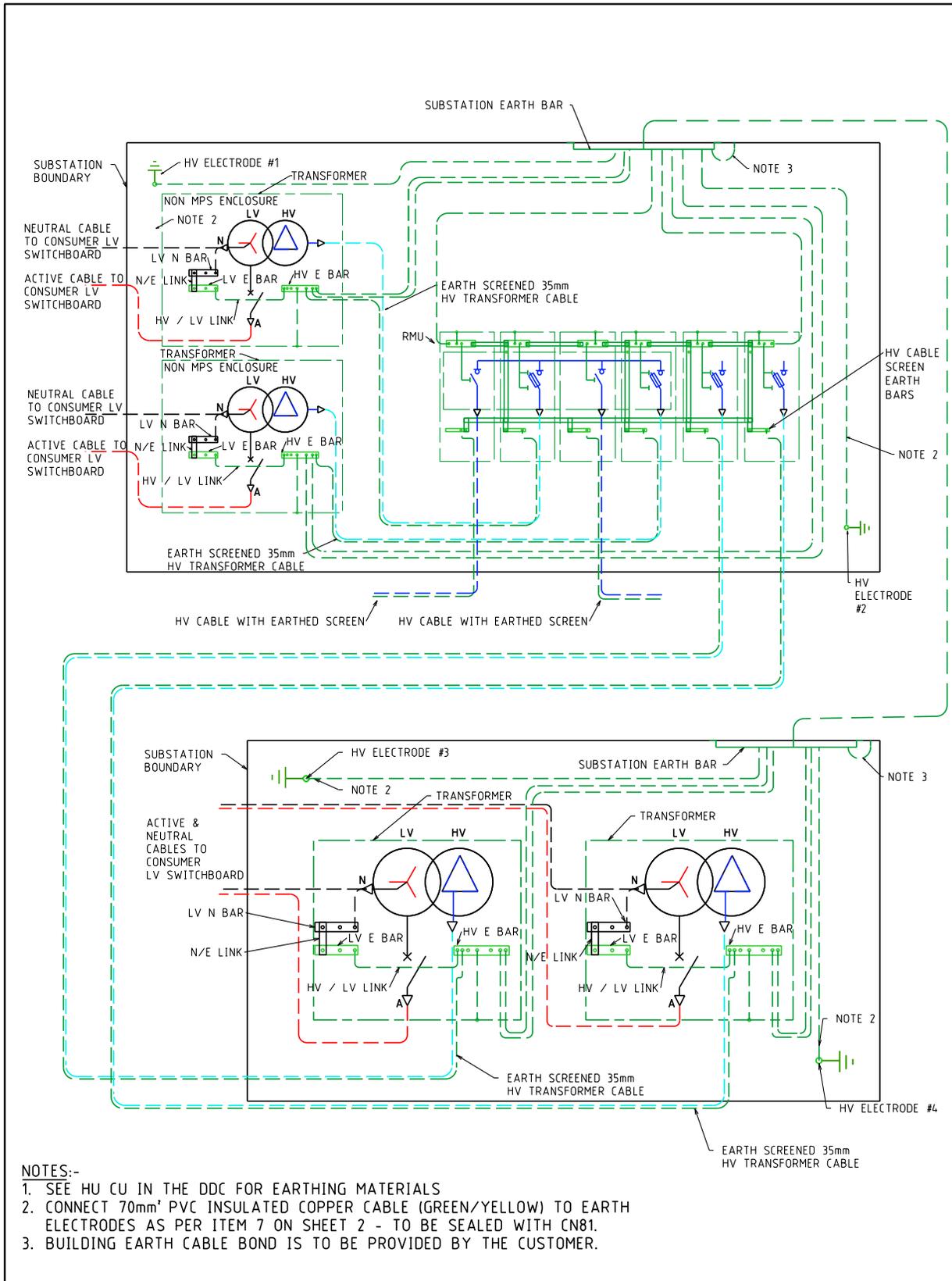
SOLE USE SUBSTATION
UP TO 4000 kVA (NON- MPS)
FIRE RATED - WITH HV SWGR
EQUIPMENT SELECTION AND LAYOUT

DRAWN: SL		DATE: 17/12/2025		DRG. No.	
ORIGINATED: SL		SCALE: NTS @ A4		DSM-3-21	
CHECKED BY: KT		APPROVED:		REV. C	
MARK MONTEMAYOR		SHT. 3/6			



NOTES:-
 1. DESIGNER TO ENSURE SAFE ACCESS AND EGRESS ROUTES ARE PROVIDED.
 2. WHERE THE SITE IS SET BACK FROM THE STREET, CRANE ACCESS IS REQUIRED.

				TITLE			DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower		
				SOLE USE SUBSTATION UP TO 2000 kVA (NON- MPS) FIRE RATED - WITH HV SWGR CLEARANCES			DRAWN: SL		DATE: 17/12/2025		
							ORIGINATED: SL		SCALE: NTS A4		
							CHECKED BY: KT		DSM-3-21		
							APPROVED: MARK MONTE MAYOR		REV. C		
									SHT. 4/6		
REV	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.						
C	17.12.2025	FORMAT CHANGED.		SL	KT	MM					
B	02.05.23	NOTED AMENDED.		KT	GC	PC					
A	12.12.19	ORIGINAL ISSUE.		GC	CO	GS					

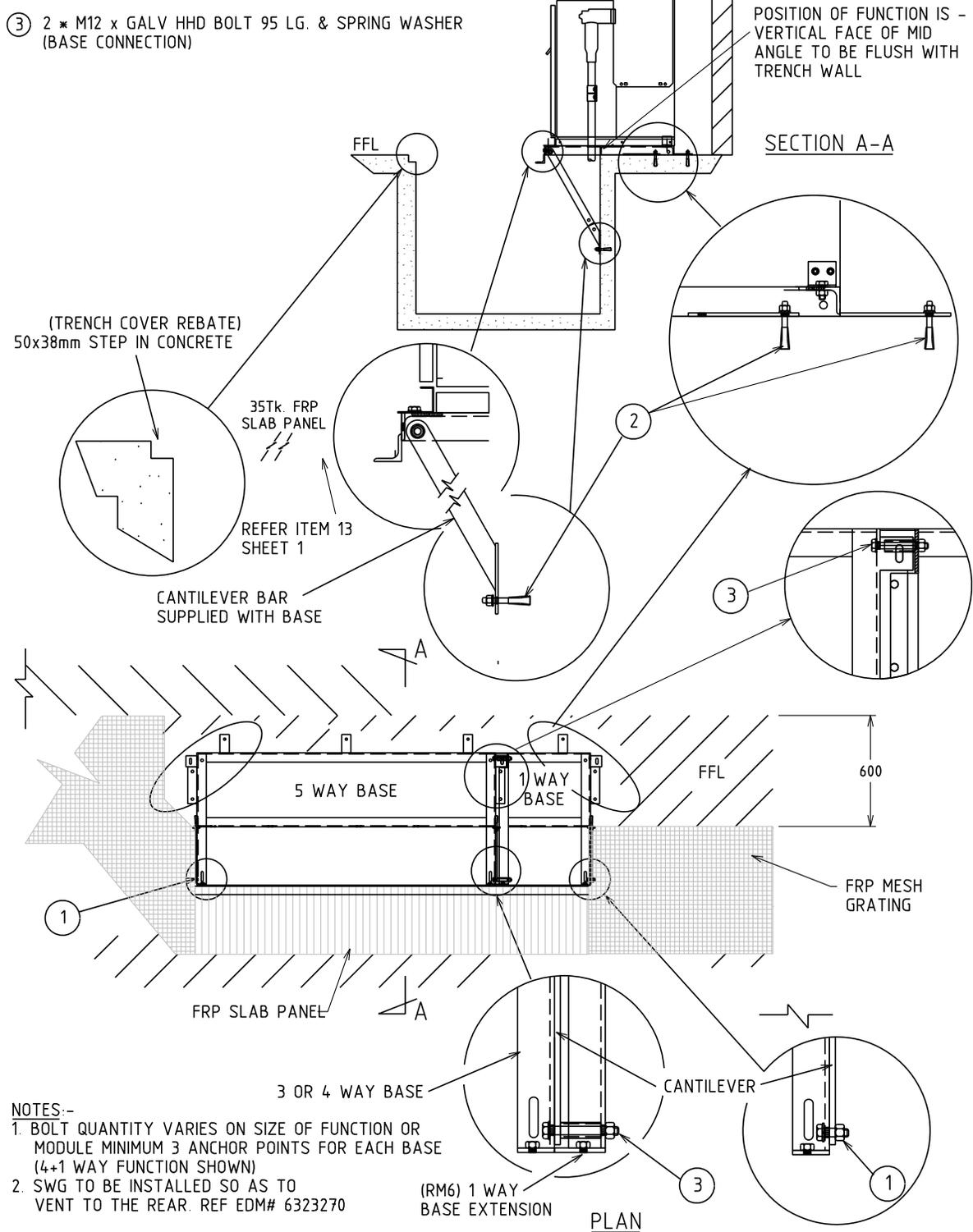


NOTES:-

1. SEE HU CU IN THE DDC FOR EARTHING MATERIALS
2. CONNECT 70mm² PVC INSULATED COPPER CABLE (GREEN/YELLOW) TO EARTH ELECTRODES AS PER ITEM 7 ON SHEET 2 - TO BE SEALED WITH CN81.
3. BUILDING EARTH CABLE BOND IS TO BE PROVIDED BY THE CUSTOMER.

REV	DATE	DESCRIPTION	ORGD	CHKD	APRD	TITLE	DISTRIBUTION SUBSTATION PLANT MANUAL	westernpower
C	17.12.2025	FORMAT CHANGED.		SL	KT	MM	DATE: 17/12/2025	DRG. No.
B	02.05.23	NOTED AMENDED.		KT	GC	PC	SCALE: NTS @ A4	DSM-3-21
A	12.12.19	ORIGINAL ISSUE.		GC	CO	GS	CHECKED BY: KT	REV. C
							APPROVED: MARK MONTEMAYOR	SHT. 5/6

- ① M12 GALV HHD 25 LG. BOLT, NUT & SPRING WASHER
- ② RAMSET MECHANICAL ANCHOR T12100GH.
- ③ 2 * M12 x GALV HHD BOLT 95 LG. & SPRING WASHER (BASE CONNECTION)

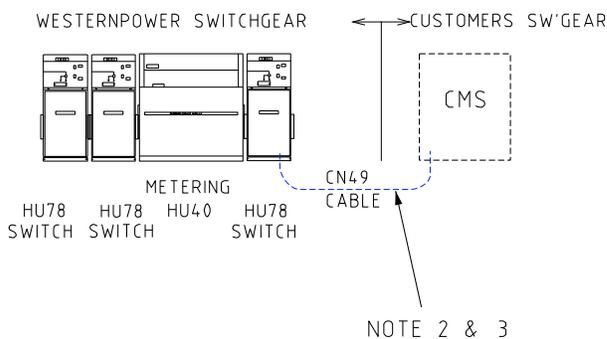
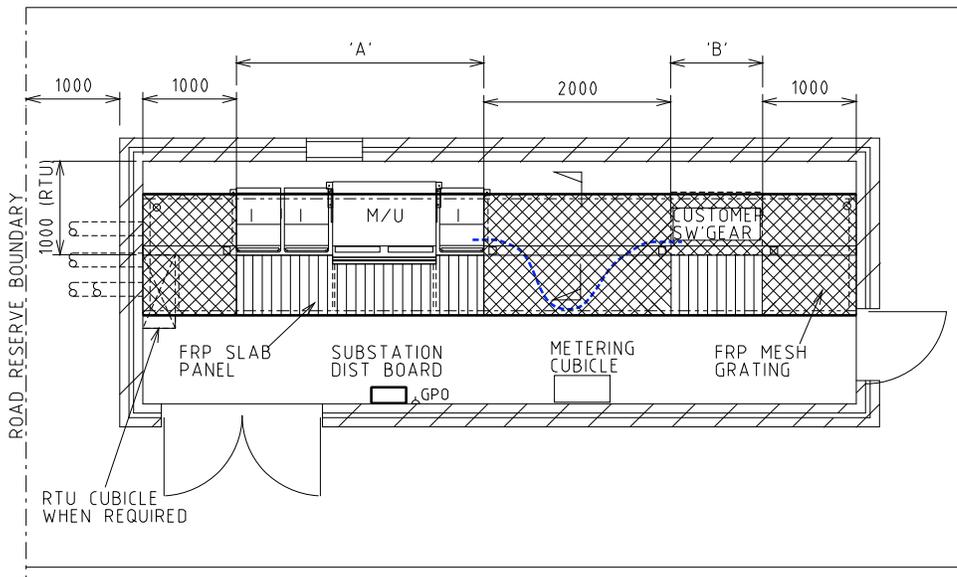


- NOTES:-
1. BOLT QUANTITY VARIES ON SIZE OF FUNCTION OR MODULE MINIMUM 3 ANCHOR POINTS FOR EACH BASE (4+1 WAY FUNCTION SHOWN)
 2. SWG TO BE INSTALLED SO AS TO VENT TO THE REAR. REF EDM# 6323270

REV.	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.
C	17.12.2025	FORMAT CHANGED.	SL	KT	MM
B	02.05.23	NOTED AMENDED.	KT	GC	PC
A	12.12.19	ORIGINAL ISSUE.	GC	CO	GS

SCHNEIDER SWITCHGEAR
5 WAY WITH 1 WAY EXTENSION
FIXING DETAILS

DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower	
DRAWN: SL	DATE: 17/12/2025	DRG. No.	
ORIGINATED: SL	SCALE: NTS @ A4	DSM-3-21	
CHECKED BY: KT	APPROVED: MARK MONTE MAYOR	REV. C	SHT. 6/6



RMU MATERIALS (QTY) AND DIMENSIONS

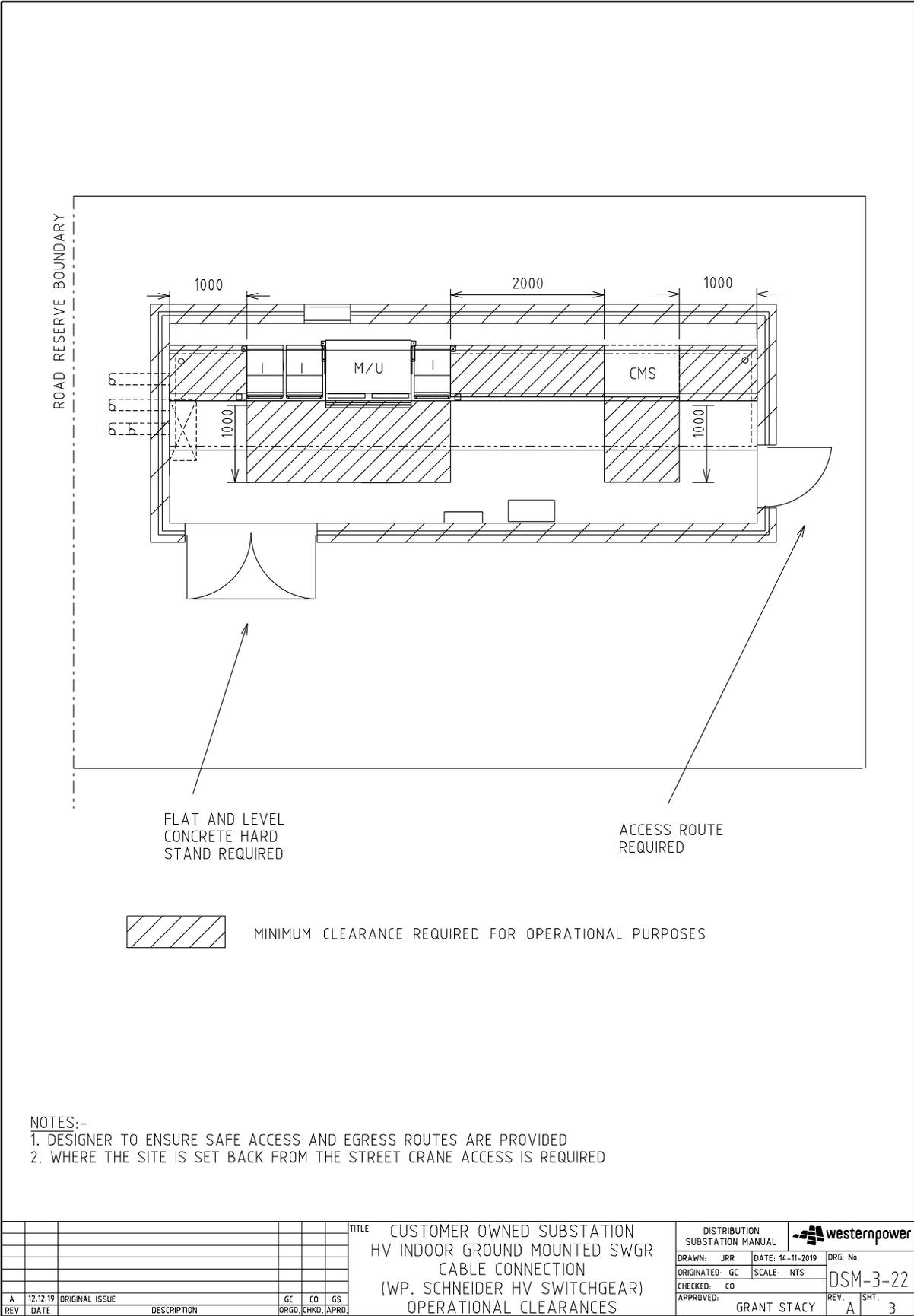
CU	DESCRIPTION	DIMENSION (W)	QTY REQUIRED	TOTAL WIDTH(mm)
HU78	ISOLATOR (I)	515		
HU40	METERING UNIT (M/U)	1149		
HU79	FUSE SWITCH (Q)	515		
CN49	240mm Cu HV CABLE	PER METRE		
DA6	RTU			
DA10	RTU ANTENNA			
CN81	CABLE DUCT SEAL			
WESTERN POWER EQUIPMENT DIMENSION 'A'				
CUSTOMER EQUIPMENT DIMENSION 'B'				
WESTERN POWER CABLE INSTALLATION SPACE REQUIRED				4000
CUSTOMER CABLE INSTALLATION SPACE REQUIRED				
TOTAL SWITCH ROOM LENGTH				

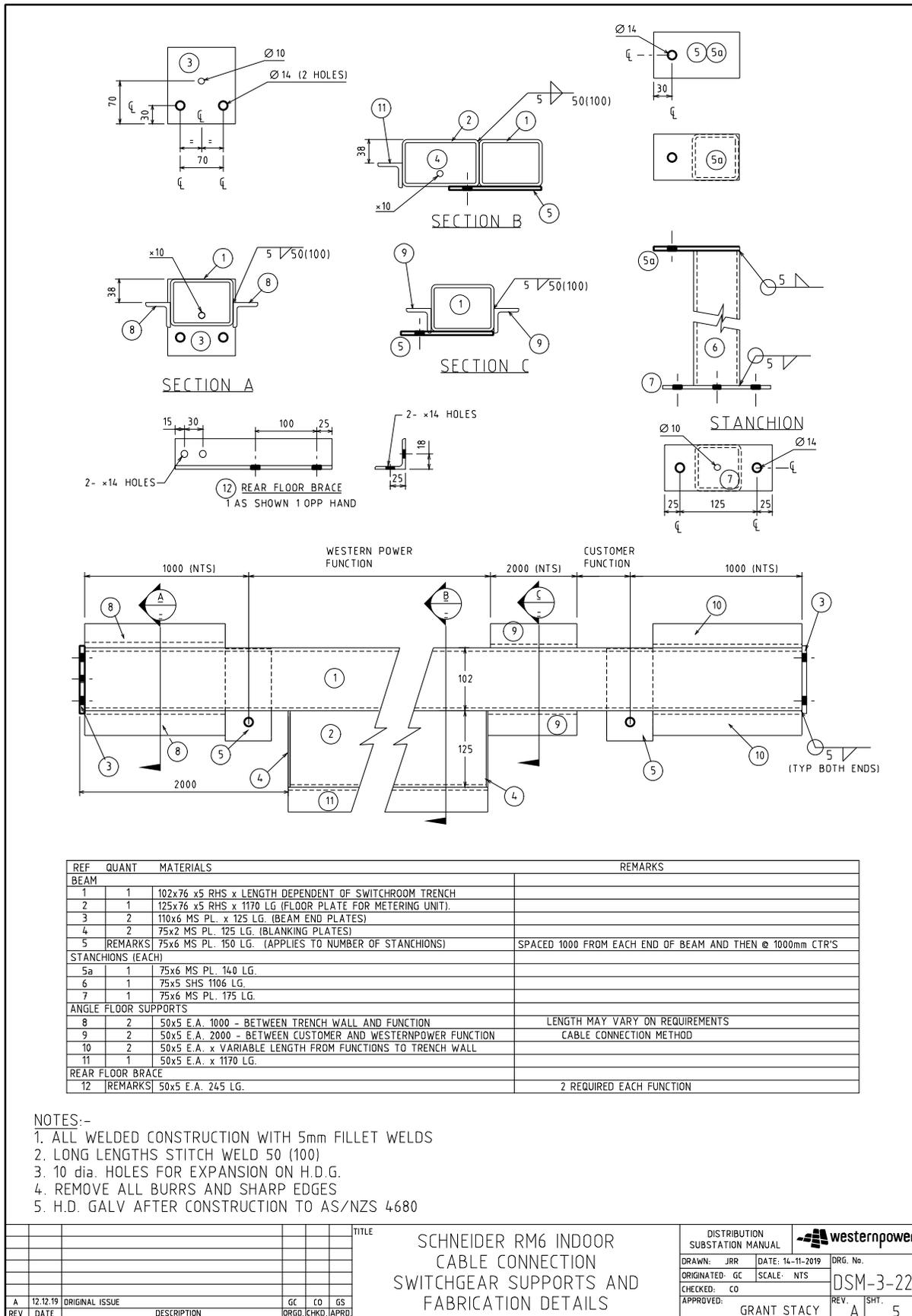
DIMENSIONS (W) INCLUDES 43mm FOR COUPLING EACH FUNCTION

NOTES:-

1. FOR EARTHING ARRANGEMENTS SEE SHEET 6
2. CUSTOMER POINT OF SUPPLY IS AT WESTERN POWER'S ISOLATOR UPSTREAM OF CMS
3. 240mm 22kV XLPE CABLE AND TERMINATION KIT SUPPLIED AND INSTALLED BY WESTERN POWER ONTO WESTERN POWER ISOLATOR CUSTOMER RESPONSIBLE FOR SUPPLY OF THEIR TERMINATION KIT AND TERMINATING CABLE ONTO THEIR CMS
4. TRENCH TO BE OIL AND WATER RIGHT
5. REFER TO DSPM CHAPTER 4 FOR AUTOMATION REQUIREMENTS

				TITLE CUSTOMER OWNED SUBSTATION HV INDOOR GROUND MOUNTED SWGR CABLE CONNECTION (WP. SCHNEIDER HV SWITCHGEAR) EQUIPMENT & INSTALLATION DETAILS				DISTRIBUTION SUBSTATION MANUAL	
B 02.05.23		NOTES AND MATERIAL LIST AMENDED		KT	GC	PC	DRAWN: JRR DATE: 14-11-2019 DRG. No.		
A 12.12.19		ORIGINAL ISSUE		GC	CO	GS	ORIGINATED: GC SCALE: NTS		
REV		DATE		DESCRIPTION		DRGD.	CHKD.	APRD.	
						CHECKED: CO		DSM-3-22	
						APPROVED: GRANT STACY		REV. B SHIT. 2	

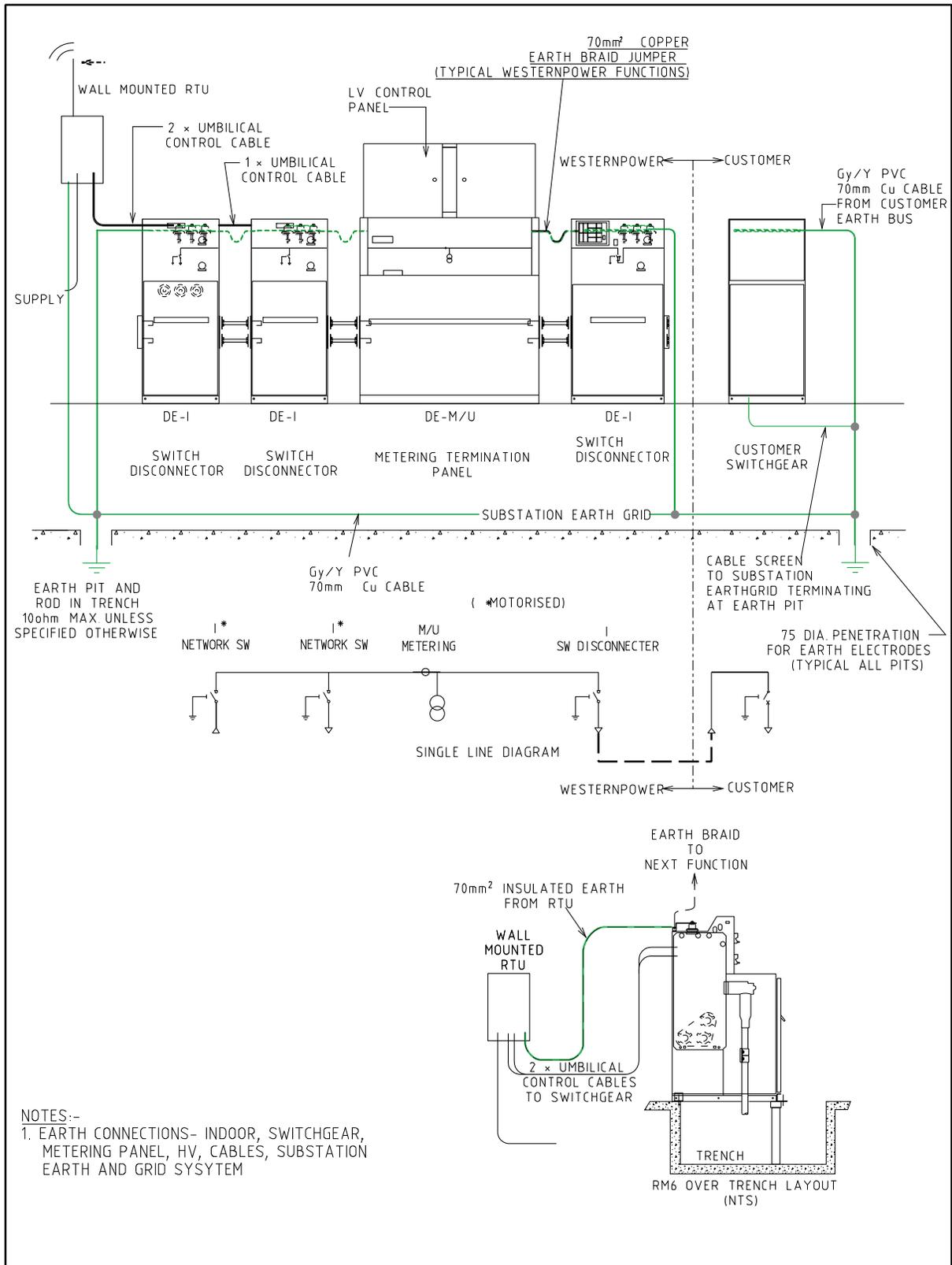




REF	QUANT	MATERIALS	REMARKS
BEAM			
1	1	102x76 x5 RHS x LENGTH DEPENDENT OF SWITCHROOM TRENCH	
2	1	125x76 x5 RHS x 1170 LG (FLOOR PLATE FOR METERING UNIT).	
3	2	110x6 MS PL. x 125 LG. (BEAM END PLATES)	
4	2	75x2 MS PL. 125 LG. (BLANKING PLATES)	
5	[REMARKS]	75x6 MS PL. 150 LG. (APPLIES TO NUMBER OF STANCHIONS)	SPACED 1000 FROM EACH END OF BEAM AND THEN @ 1000mm CTR'S
STANCHIONS (EACH)			
5a	1	75x6 MS PL. 140 LG.	
6	1	75x5 SHS 1106 LG.	
7	1	75x6 MS PL. 175 LG.	
ANGLE FLOOR SUPPORTS			
8	2	50x5 E.A. 1000 - BETWEEN TRENCH WALL AND FUNCTION	LENGTH MAY VARY ON REQUIREMENTS
9	2	50x5 E.A. 2000 - BETWEEN CUSTOMER AND WESTERNPOWER FUNCTION	CABLE CONNECTION METHOD
10	2	50x5 E.A. x VARIABLE LENGTH FROM FUNCTIONS TO TRENCH WALL	
11	1	50x5 E.A. x 1170 LG.	
REAR FLOOR BRACE			
12	[REMARKS]	50x5 E.A. 245 LG.	2 REQUIRED EACH FUNCTION

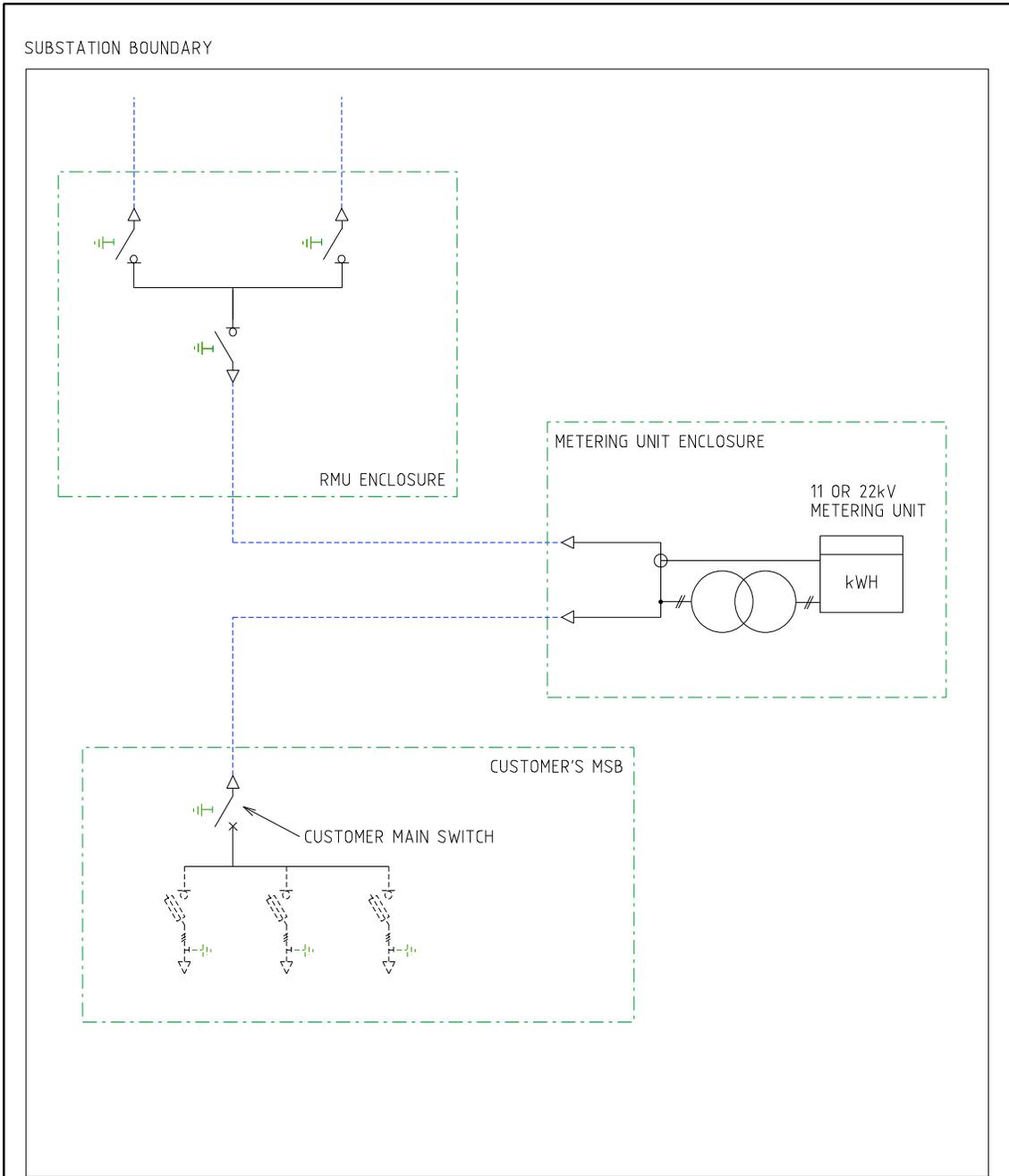
- NOTES:-
1. ALL WELDED CONSTRUCTION WITH 5mm FILLET WELDS
 2. LONG LENGTHS STITCH WELD 50 (100)
 3. 10 dia. HOLES FOR EXPANSION ON H.D.G.
 4. REMOVE ALL BURRS AND SHARP EDGES
 5. H.D. GALV AFTER CONSTRUCTION TO AS/NZS 4680

TITLE				DISTRIBUTION SUBSTATION MANUAL		westernpower	
SCHEIDER RM6 INDOOR CABLE CONNECTION SWITCHGEAR SUPPORTS AND FABRICATION DETAILS				DRAWN: JRR	DATE: 14-11-2019	DRG. No.	
				ORIGINATED: GC	SCALE: NTS	DSM-3-22	
				CHECKED: CO		REV. SHT.	
				APPROVED:		GRANT STACY A 5	
A	12.12.19	ORIGINAL ISSUE		GC	CO	GS	
REV	DATE	DESCRIPTION		DRGD.	CHKD.	APRD.	



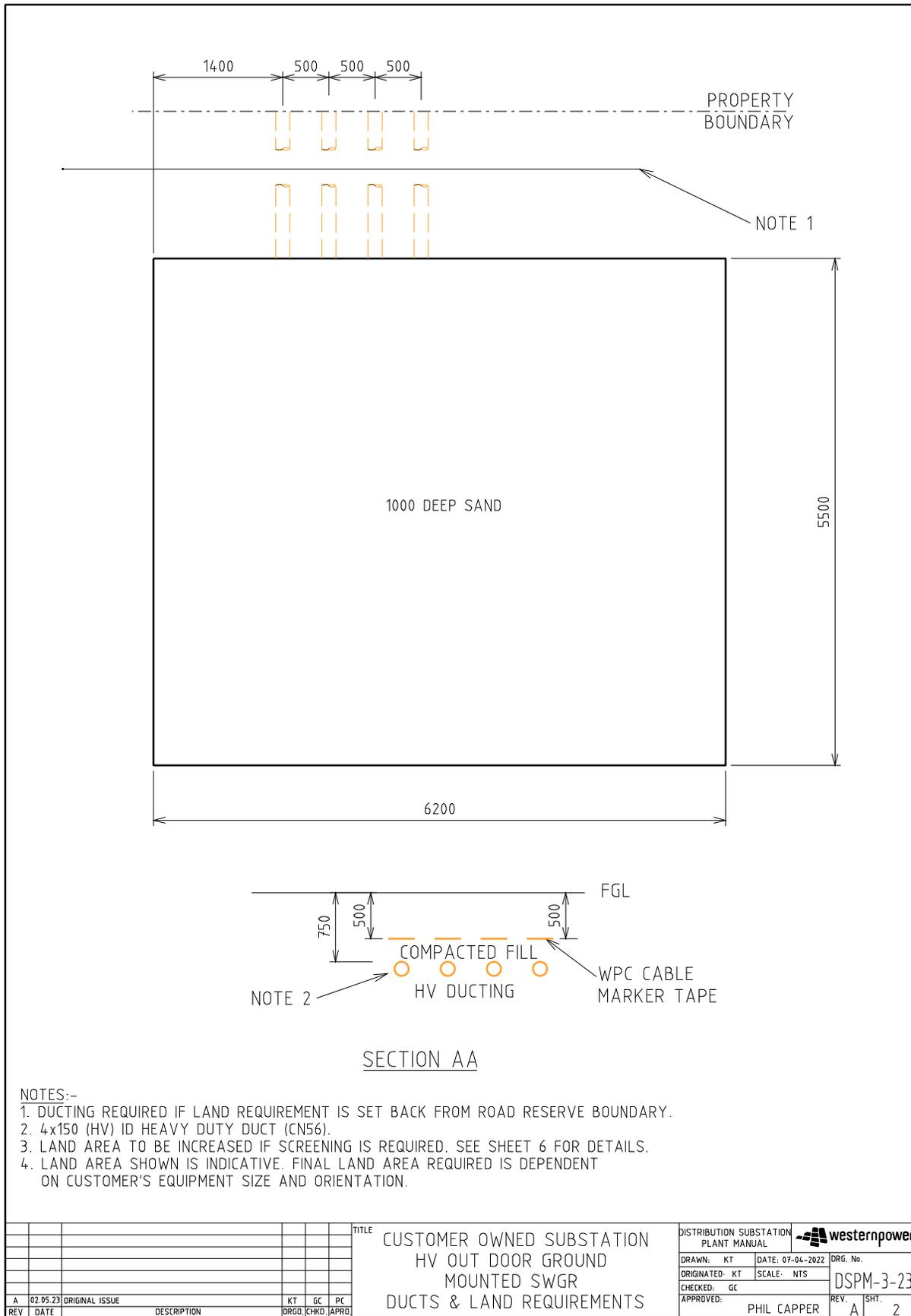
				TITLE			DISTRIBUTION SUBSTATION MANUAL			westernpower	
				SCHNEIDER RM6 INDOOR CABLE CONNECTION EARTH ARRANGEMENT AND CONNECTIONS						DRAWN: JRR DATE: 14-11-2019 DRG. No.	
										ORIGINATED: GC SCALE: NTS DSM-3-22	
										CHECKED: CO	
										APPROVED: GRANT STACY REV. B	
										SHT. 6	
B	02.05.23	DETAILS AMENDED		KT	GC	PC					
A	12.12.19	ORIGINAL ISSUE		GC	CO	GS					
REV	DATE	DESCRIPTION		DRGD.	CHKD.	APRD.					

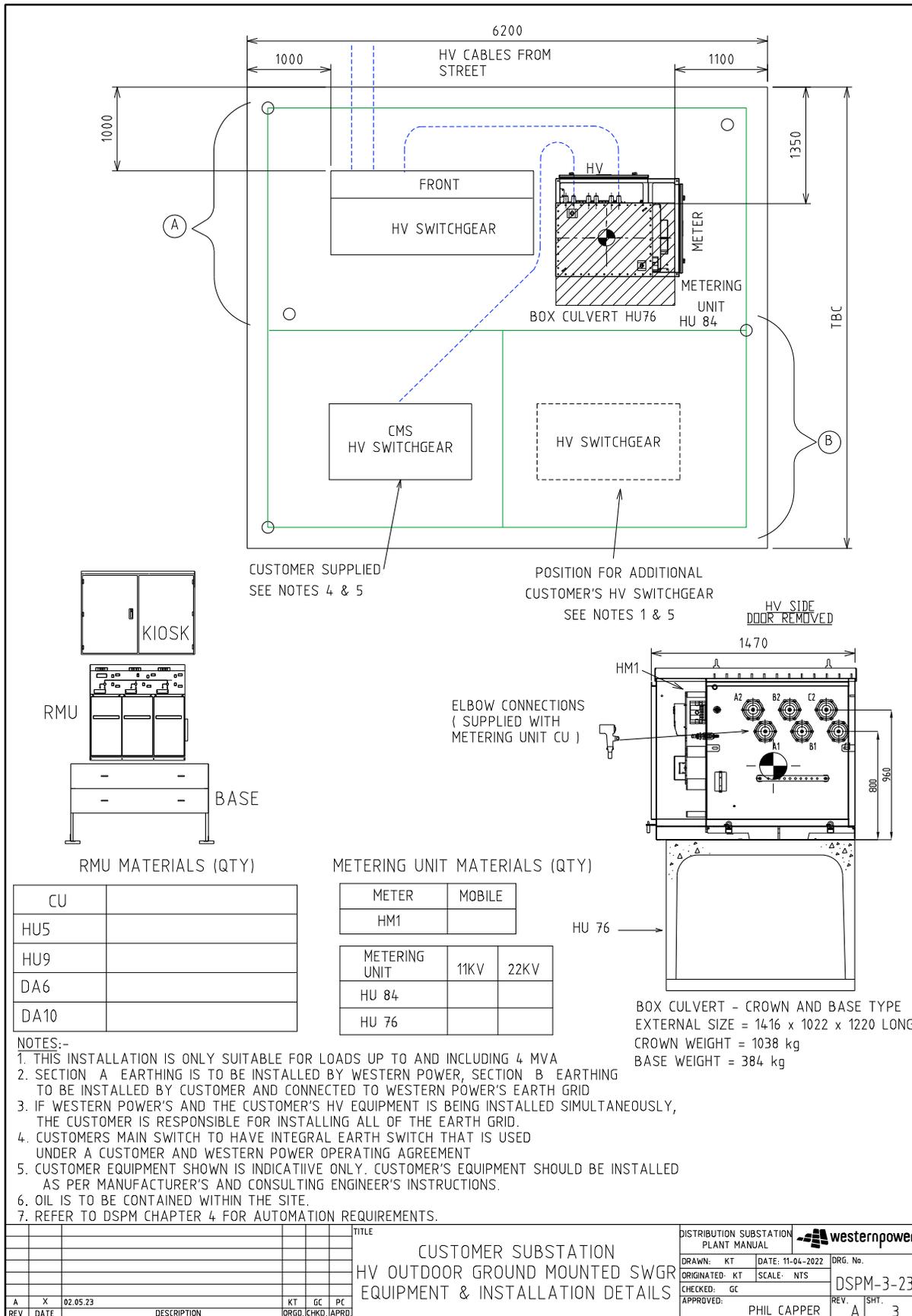
4.6.2 DSPM-3-23 Up to 4000kVA HV Outdoor Ground Mount SWGR

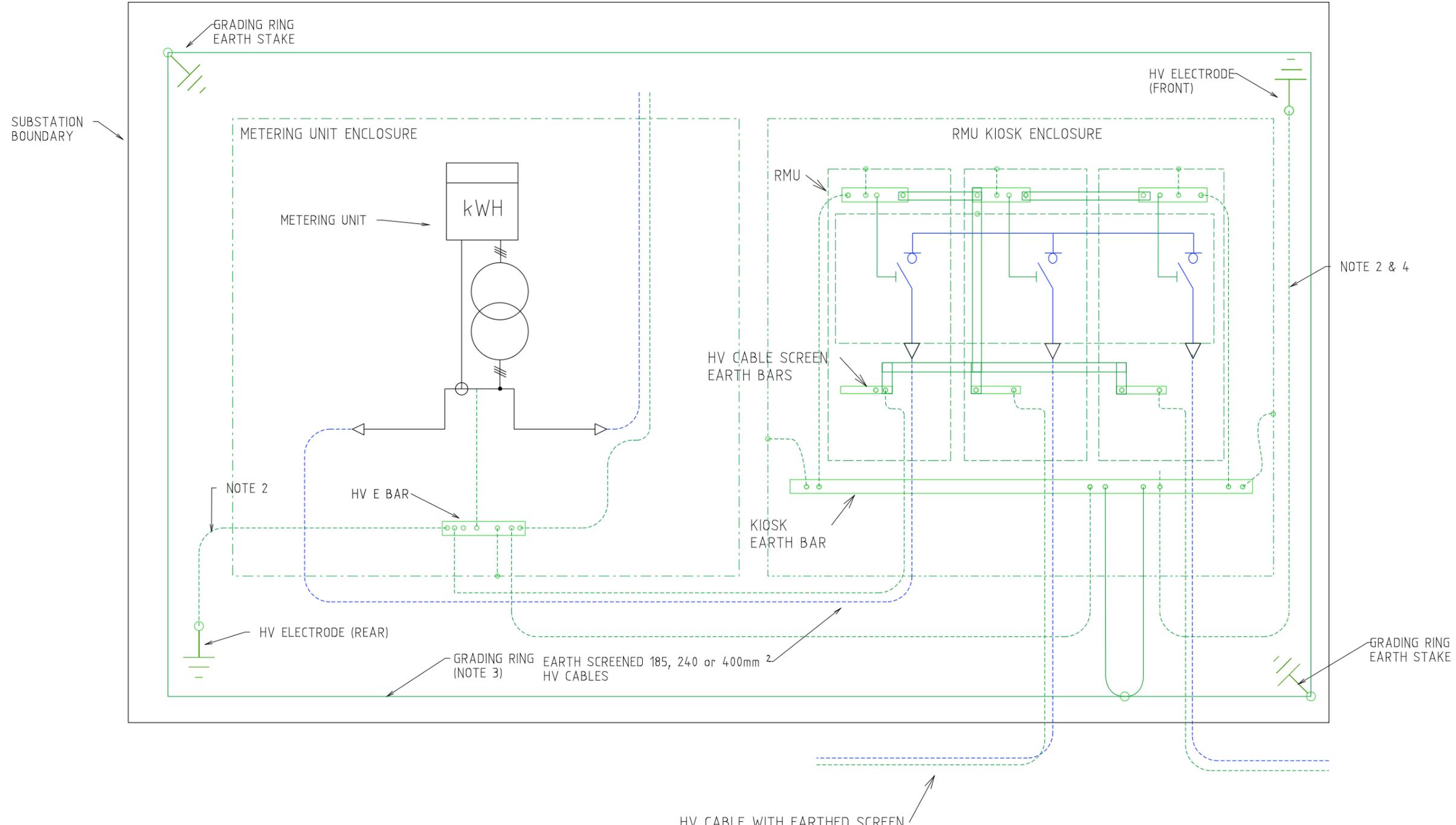


- NOTES:-
1. 3+0 RMU OPTION SHOWN (3 SWITCH-DISCONNECTORS)
 2. OTHER OPTIONS NOT SHOWN
 3. HV SWITCH-DISCONNECTORS MAY BE MOTORISED AND AUTOMATED

				TITLE		DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower	
				CUSTOMER SUBSTATION HV OUTDOOR GROUND MOUNTED SWGR SINGLE LINE DIAGRAM		DRAWN: KT DATE: 06-04-2022		DRG. No.	
						ORIGINATED: KT SCALE: NTS		DSPM-3-23	
						CHECKED: GC		APPROVED:	
						APPROVED: PHIL CAPPER		REV. A SH. 1	
A	02.05.23	ORIGINAL ISSUE		KT	GC	PC			
REV	DATE	DESCRIPTION		ORGD.	CHKD.	APRD.			







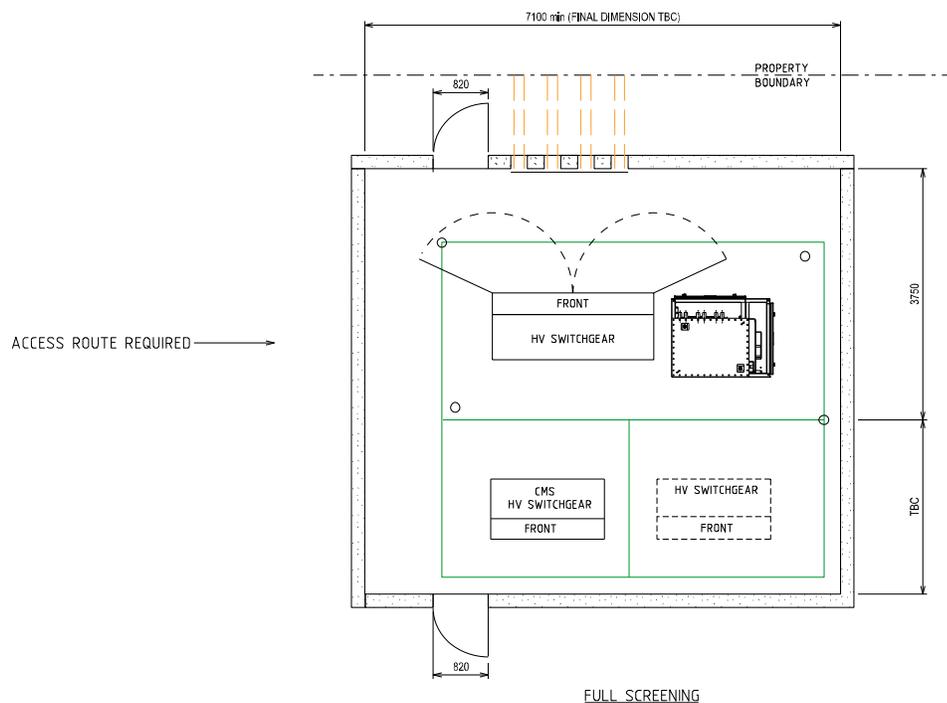
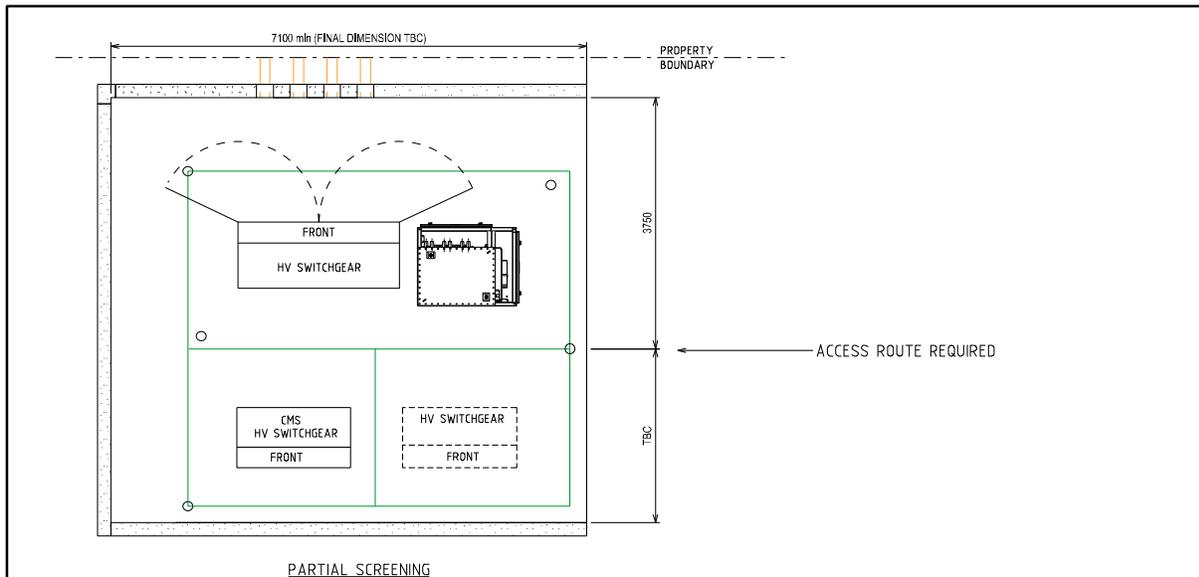
NOTES:-

1. SEE HU CU IN THE DDC FOR EARTHING MATERIALS.
2. CONNECT 70mm² PVC INSULATED COPPER CABLE (GREEN/YELLOW) TO EARTH ELECTRODES. INSTALL CABLE AND RODS 1200mm BELOW FGL IN NEW SITES.
3. BURIED GRADING RING TO BE 100mm BELOW RAILWAY BALLAST/FLAME TRAP, IN SOIL.
4. LOOP EARTH CABLES TO EARTH RODS INSIDE KIOSK FOR EASE OF TESTING.

REV.	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.
A	02.05.23	ORIGINAL ISSUE	GC	GC	PC

TITLE	
CUSTOMER SUBSTATION HV OUTDOOR GROUND MOUNTED SWGR EARTHING ARRANGEMENT	

DISTRIBUTION SUBSTATION PLANT MANUAL			
DRAWN: KT	DATE: 06-04-2022	DRG. No.	
ORIGINATED: KT	SCALE: NTS	DSPM-3-23	
CHECKED: GC	APPROVED:	REV. A	SHT. 5
		PHIL CAPPER	



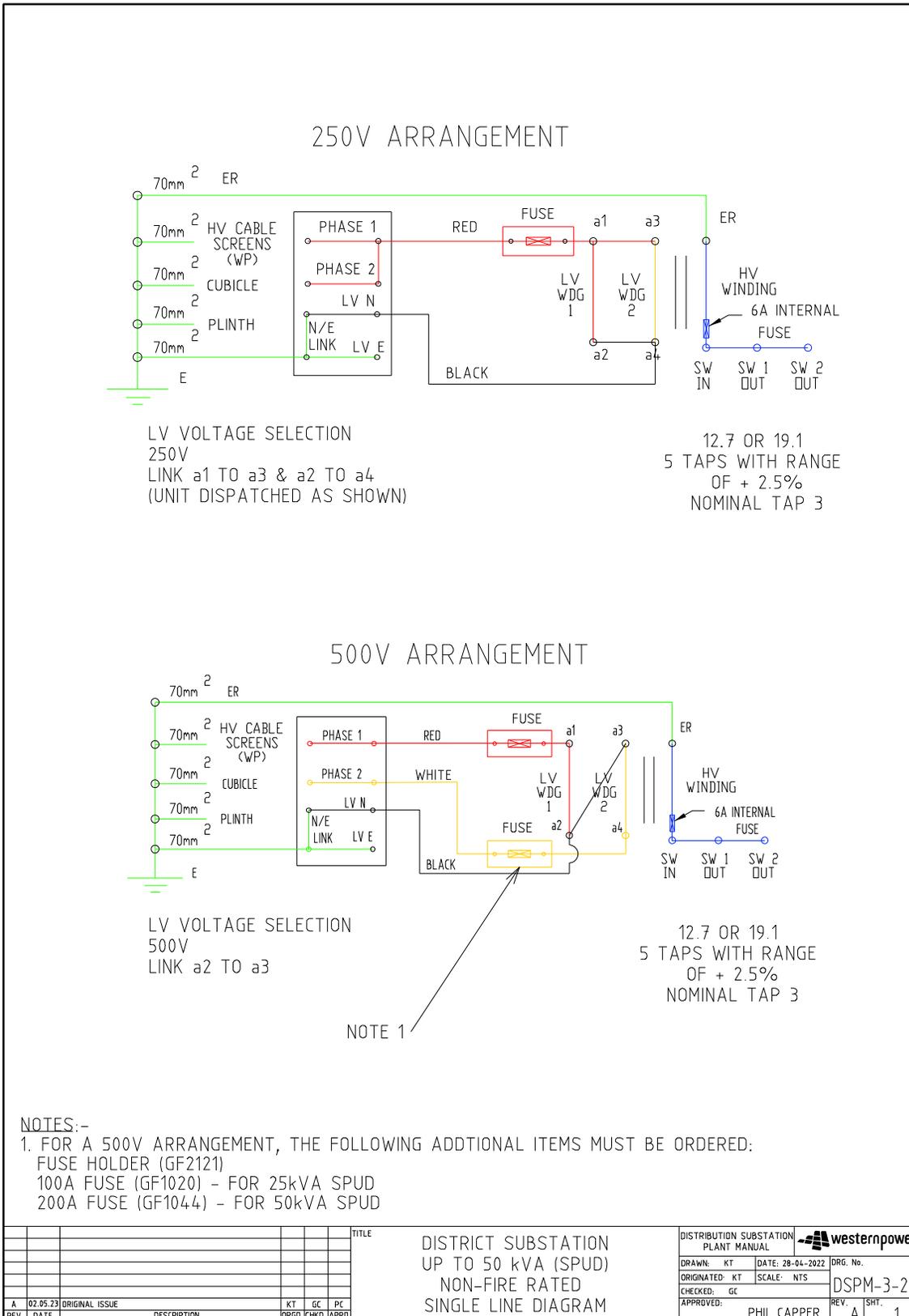
NOTES:-

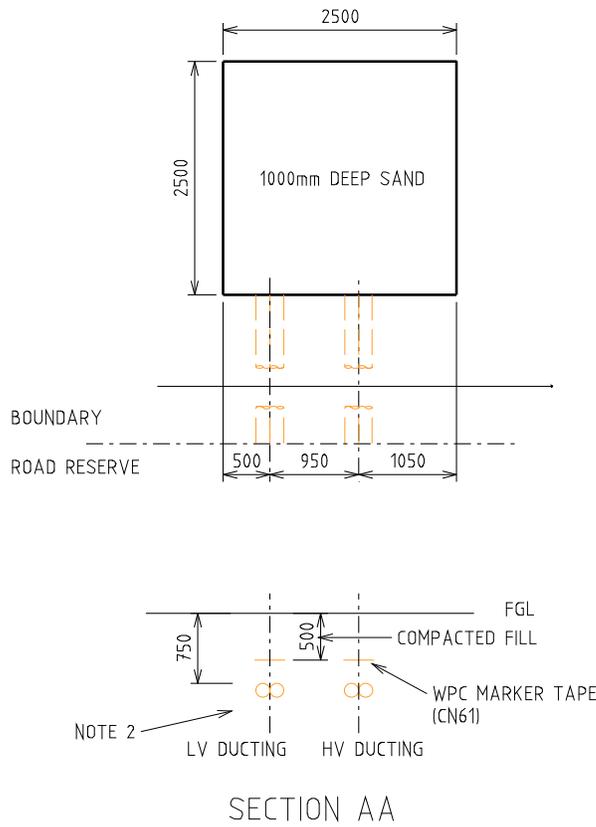
1. FOUNDATIONS SHALL FULLY RETAIN THE SITE TO ALLOW FUTURE EXCAVATION 1200mm DEEP WITHIN THE SUBSTATION SITE.
2. SCREENING OR FOUNDATIONS SHALL NOT ENCR OACH INTO SUBSTATION SITE.
3. SCREENING SHALL NOT IMPACT OPERATIONAL CLEARANCE AND EGRESS REQUIREMENTS SHOWN ON SHEET 4.
4. DOORS (WHERE FITTED) MUST BE A MINIMUM OF 820 WIDE.
5. NON-COMBUSTIBLE MATERIALS TO BE USED FOR SCREENING (MASONARY, ETC.)
6. 2HR FIRE RATED SCREENING MAY BE USED TO REDUCE THE FIRE RISK ZONE. REFER DSPM CHAPTER 5 (FIRE RISK)
7. MINIMUM HEIGHT OF SCREEN WALL IS TO BE 1.8m (HEIGHT OF TRANSFORMER + 300mm).
8. VEHICLE ACCESS. CLEARANCES MUST BE MAINTAINED. AREA TO BE KEPT CLEAR TO ENSURE ACCESS. SITE SPECIFIC REQUIREMENTS TO BE DETERMINED BY THE DESIGNER.
9. LAND REQUIREMENTS SHOWN ONLY FOR WESTERN POWER EQUIPMENT. THE FINAL DIMENSION OF THE LAND IS DEPENDENT ON CUSTOMER EQUIPMENT. THIS IS TO BE DETERMINED BY THE DESIGNER.
10. DUCTS ARE REQUIRED WHERE CABLES PASS THROUGH WALL OR FOUNDATIONS. REFER TO SHEET 2 FOR DUCTING DETAILS.

				TITLE		DISTRIBUTION SUBSTATION MANUAL			
				CUSTOMER OWNED SUBSTATION HV OUTDOOR GROUND MOUNTED SWGR PERMISSABLE SCREENING ARRANGEMENTS					
				DRAWN: KT		DATE: 11-04-2022		DRG. No.	
				ORIGINATED: KT		SCALE: NTS		DSPM-3-23	
				CHECKED: GC		APPROVED:			
						PHIL CAPPER		REV. A SHY. 6	
A	02.05.23	ORIGINAL ISSUE	KT	GC	PC				
REV	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.				

4.7 Single Phase & Three Phase Ground Mounted Rural Substations (SPUDS & THUDS)

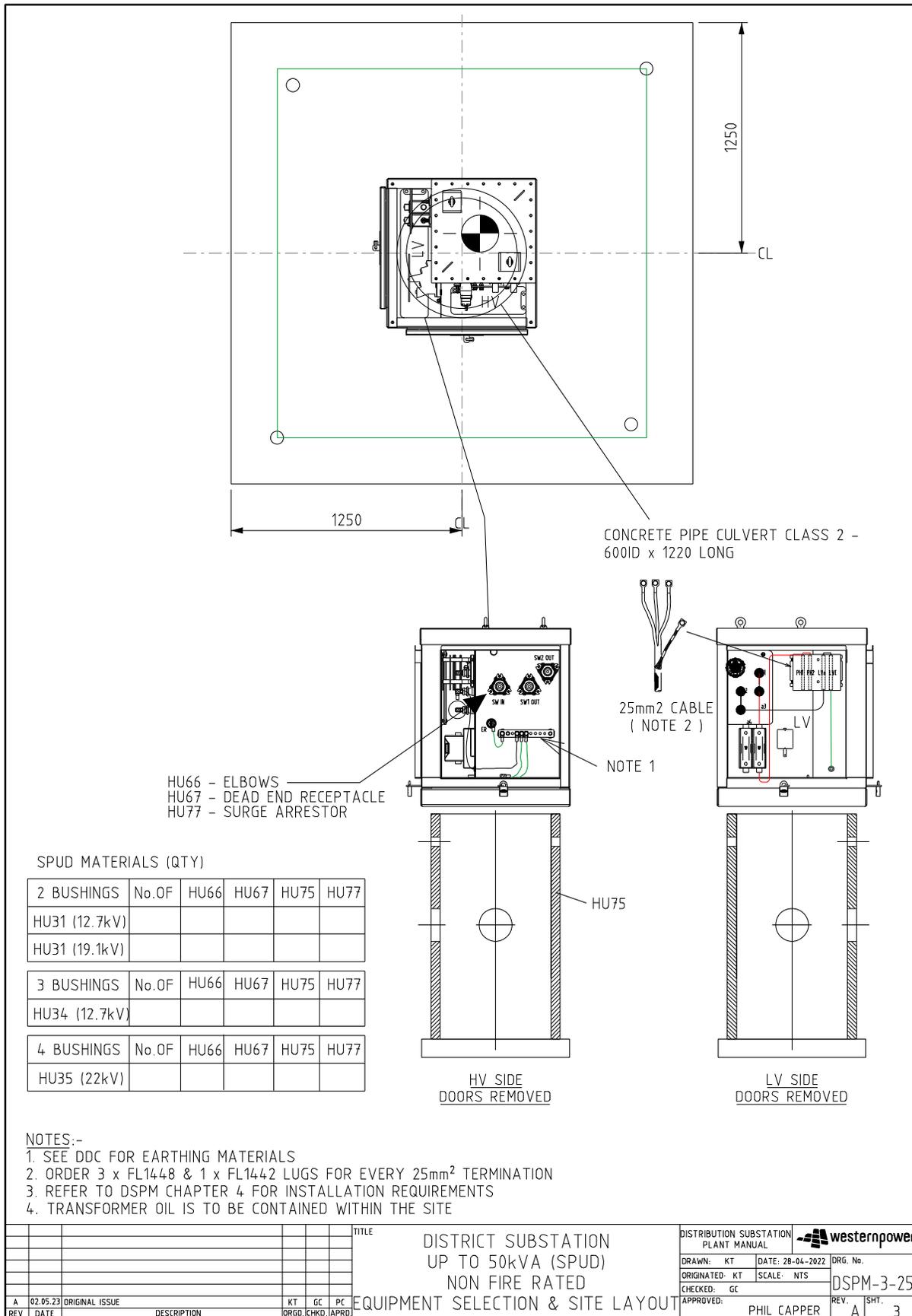
4.7.1 DSPM-3-25 Up to 50kVA

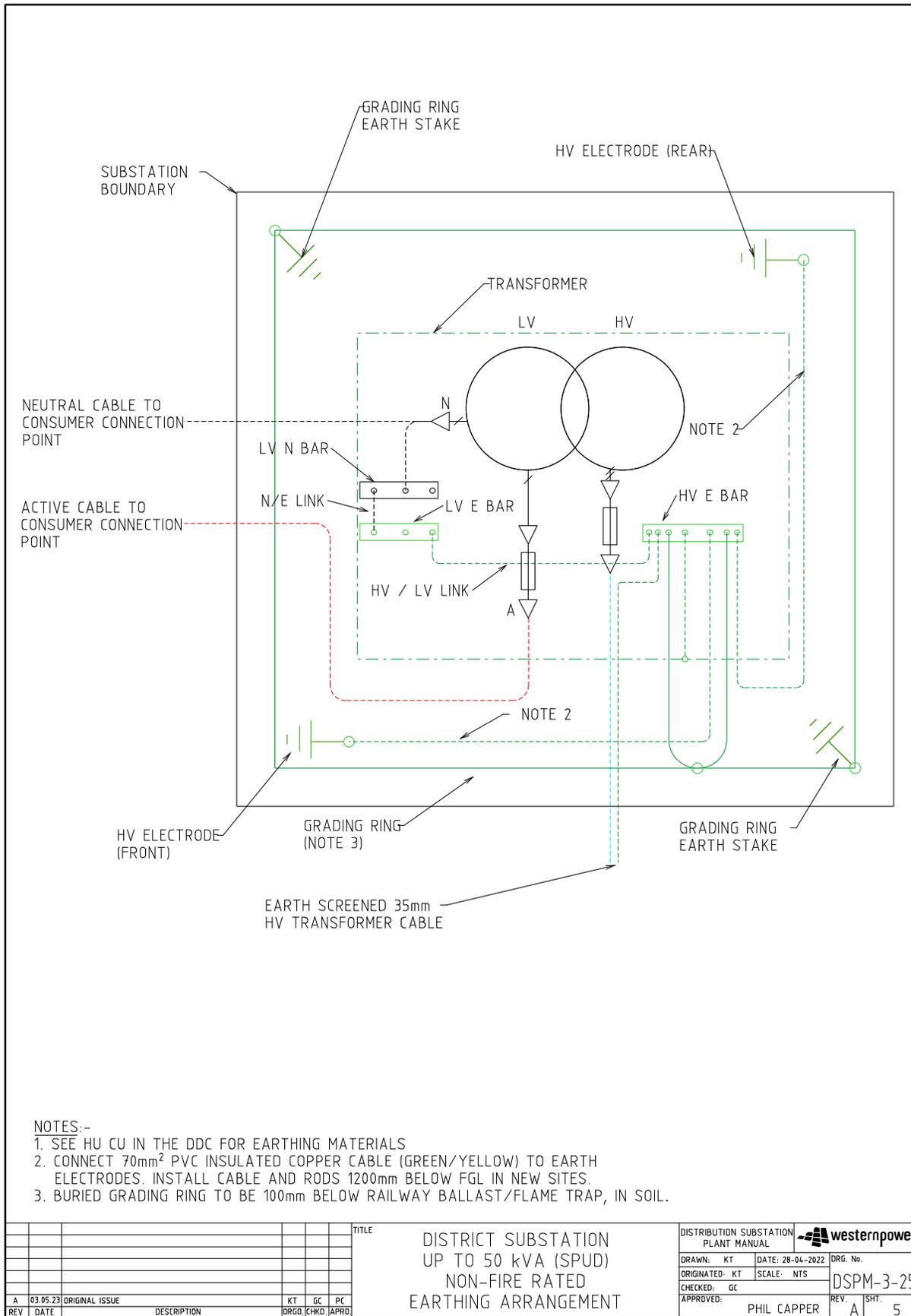




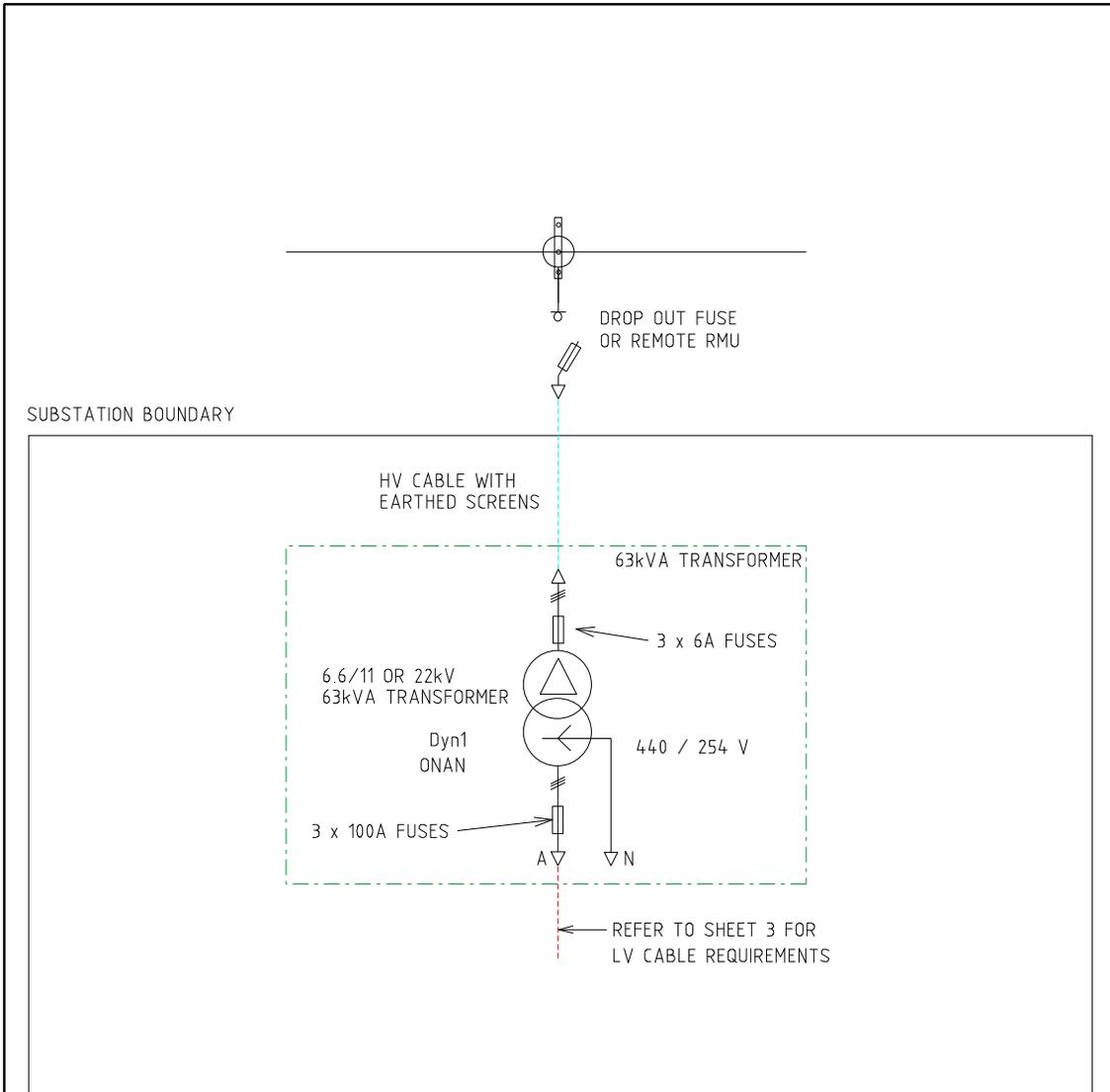
- NOTES:-
1. DUCTING REQUIRED IF LAND REQUIREMENT IS SET BACK FROM ROAD RESERVE BOUNDARY.
 2. 2x100 (LV) & 2x150 (HV) ID HEAVY DUTY DUCT (CN56).

				TITLE		DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower	
				DISTRICT SUBSTATION UP TO 50kVA (SPUD) NON FIRE RATED DUCTS & LAND REQUIREMENTS		DRAWN: KT	DATE: 28-04-2022	DRG. No.	
						ORIGINATED: KT	SCALE: NTS	DSM-3-25	
						CHECKED: GC			
						APPROVED:	PHIL CAPPER	REV. A	SHT. 2
A	02.05.23	ORIGINAL ISSUE		KT	GC	PC			
REV	DATE	DESCRIPTION		ORGD.	CHKD.	APRD.			

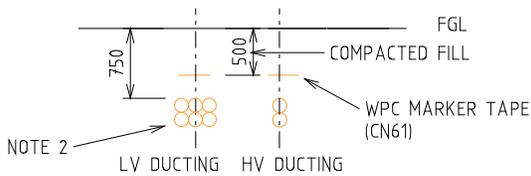
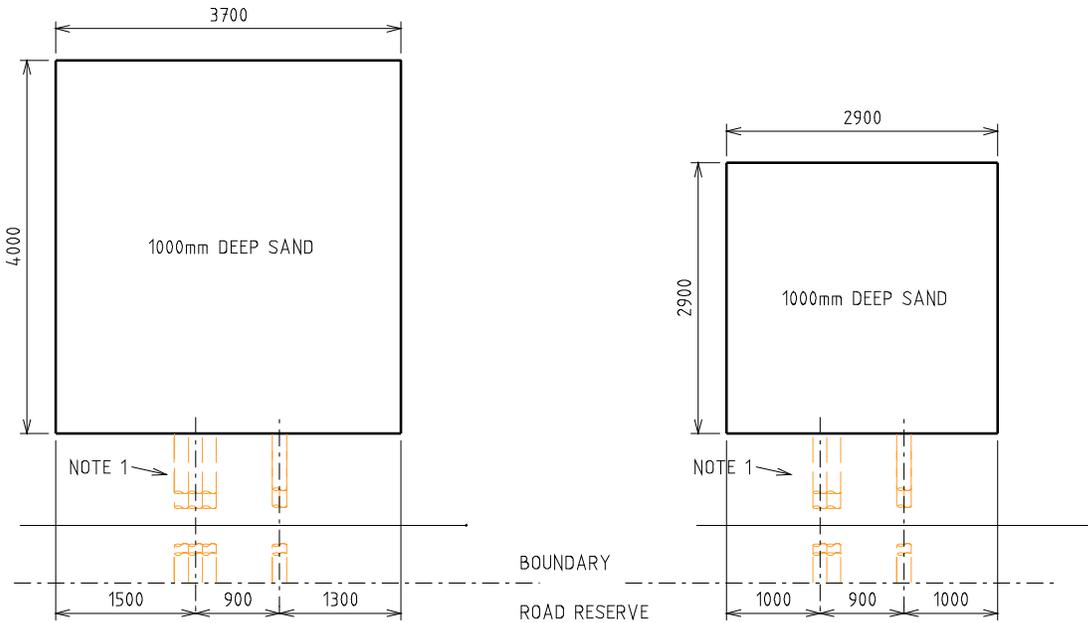




4.7.2 DSPM-3-26 Up to 63kVA

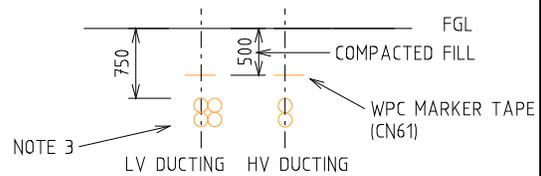


				TITLE		DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower		
				DISTRICT SUBSTATION UP TO 63 kVA (THUD) NON-FIRE RATED SINGLE LINE DIAGRAM		DRWN: KT	DATE: 26-04-2022	DRG. No.		
						ORIGINATED: KT	SCALE: NTS	DSPM-3-26		
						CHECKED: GC		REV. SHT.		
						APPROVED:	PHIL CAPPER	A	1	
REV	DATE	DESCRIPTION	ORGD.	CHKD.	APPRD.					
A	03.05.23	ORIGINAL ISSUE		KT	GC	PC				



SECTION AA

LAND FOR FUTURE CONVERSION TO MPS



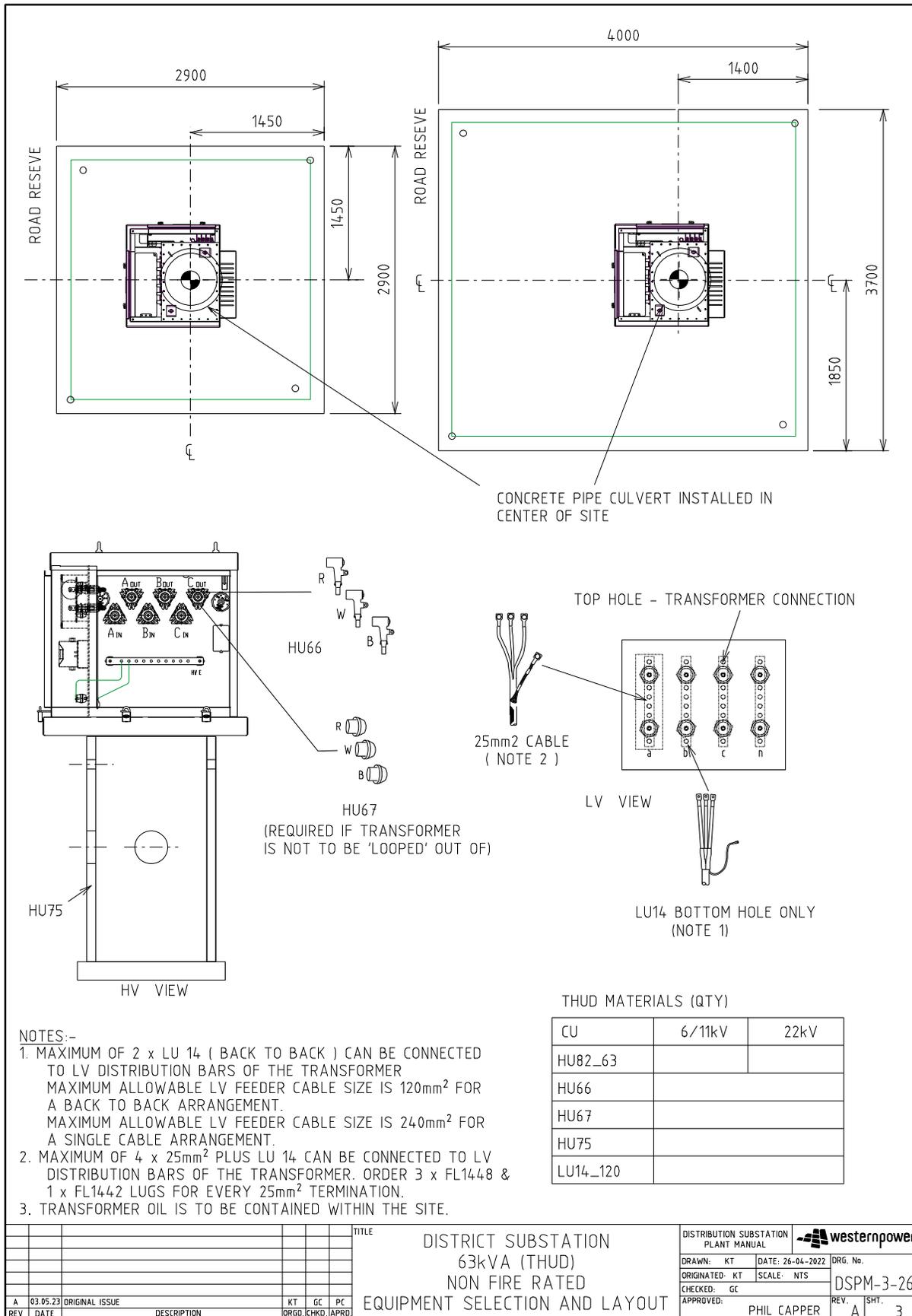
SECTION BB

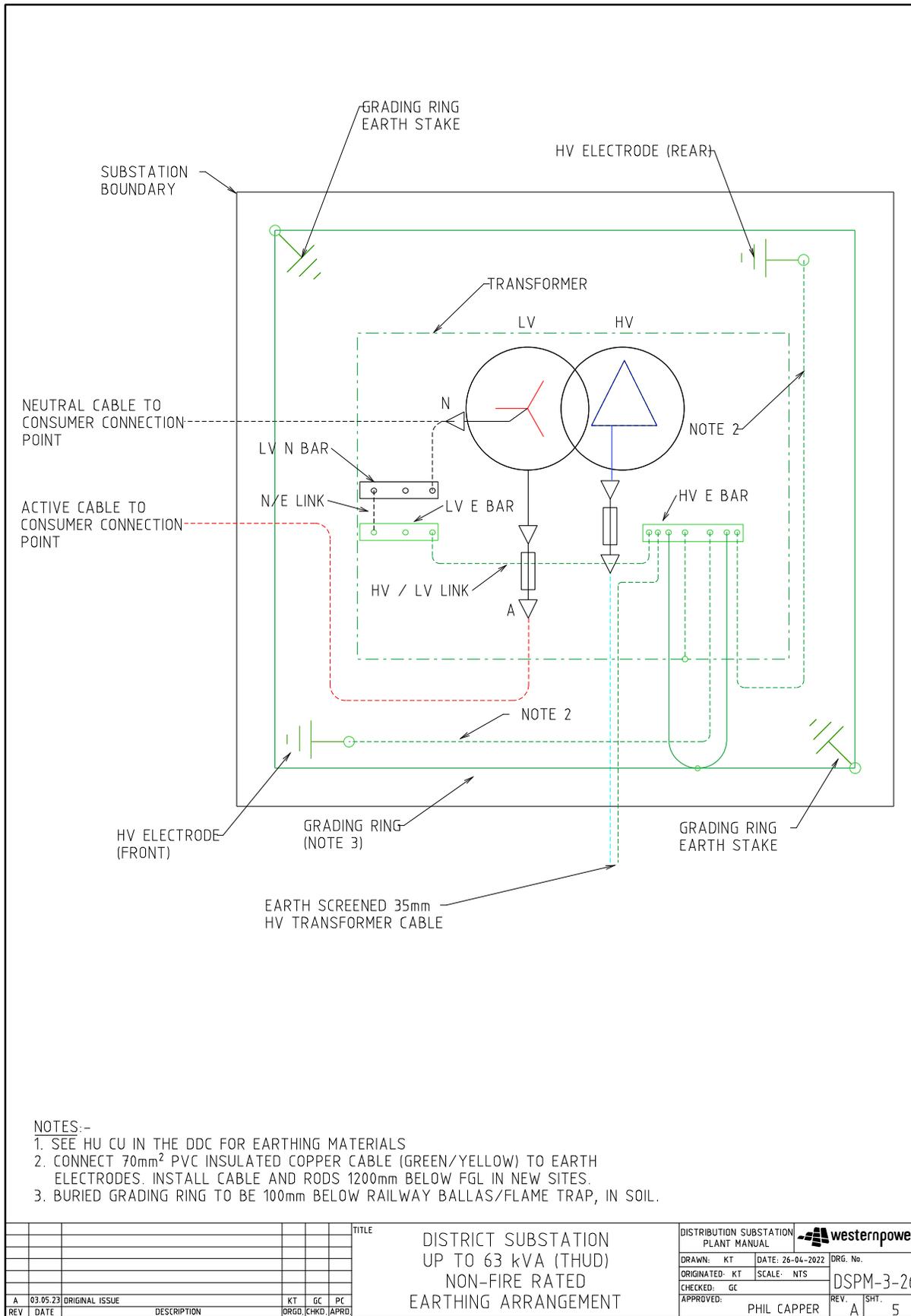
LAND FOR 63kVA ONLY

NOTES:-

1. DUCTING REQUIRED IF LAND REQUIREMENT IS SET BACK FROM ROAD RESERVE BOUNDARY.
2. 6x100 (LV) & 2x150 (HV) ID HEAVY DUTY DUCT (CN56).
3. 4x100 (LV) & 2x150 (HV) ID HEAVY DUTY DUCT (CN56).
4. LAND AREA TO BE INCREASED IF SCREENING IS REQUIRED (SEE SHEET 6)

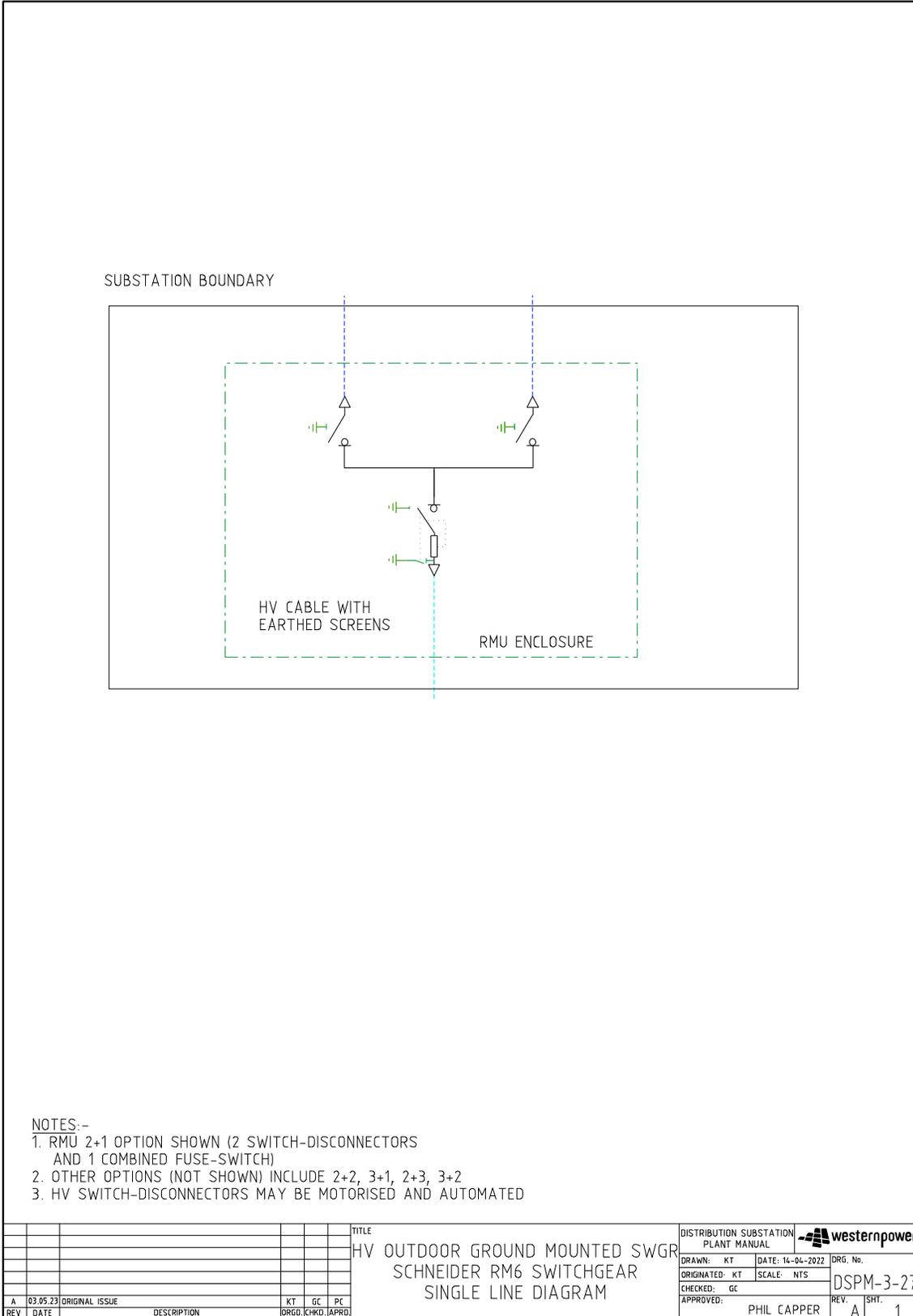
				TITLE		DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower	
				DISTRICT SUBSTATION UP TO 63kVA (THUD) NON FIRE RATED DUCTS & LAND REQUIREMENTS		DRAWN: KT DATE: 26-04-2022		DRG. No.	
						ORIGINATED: KT SCALE: NTS		DSPM-3-26	
						CHECKED: GC		REV. A	
						APPROVED: PHIL CAPPER		SHT. 2	
A	03.05.23	ORIGINAL ISSUE		KT	GC	PC			
REV	DATE	DESCRIPTION		ORGD.	CHKD.	APRD.			

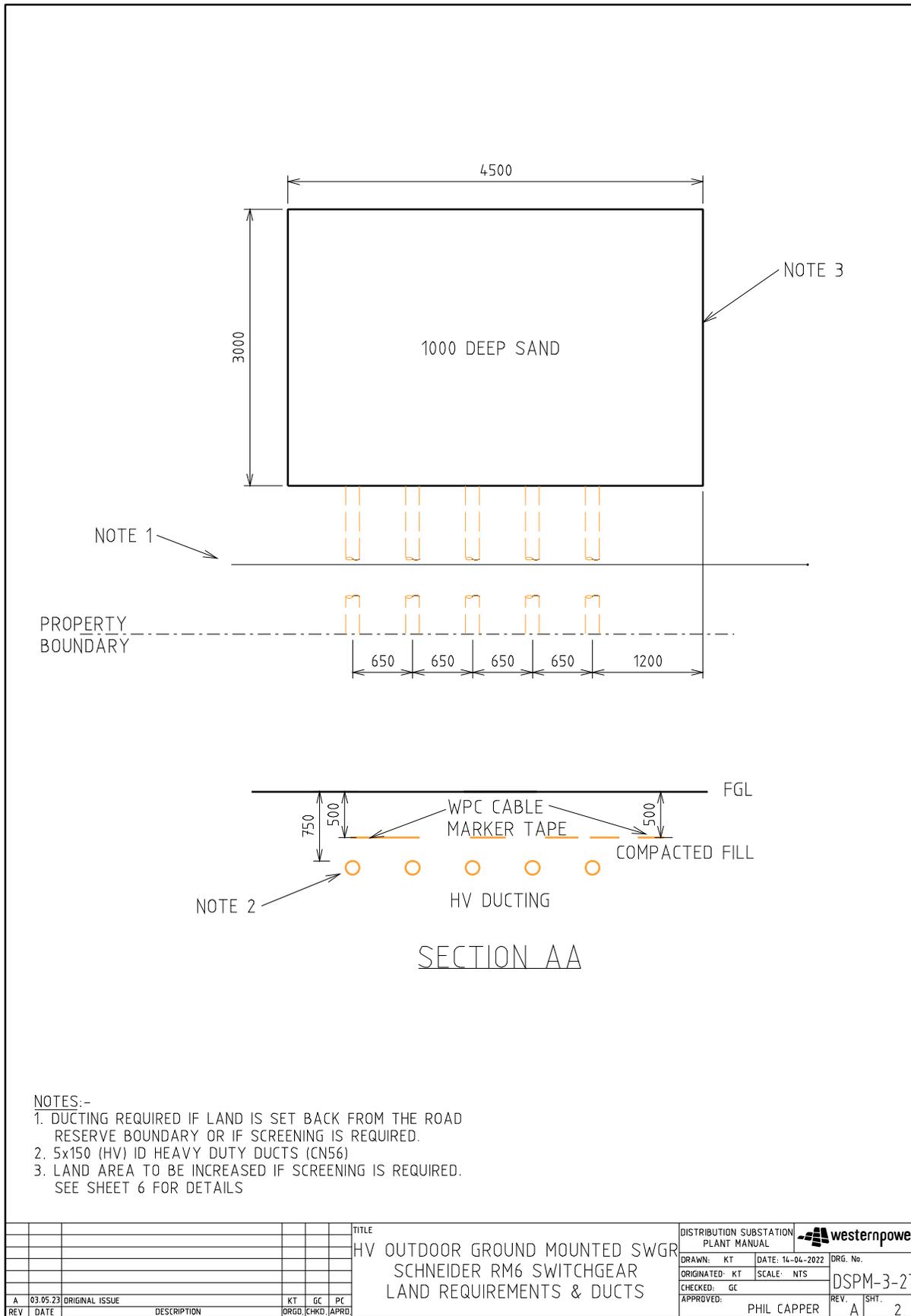


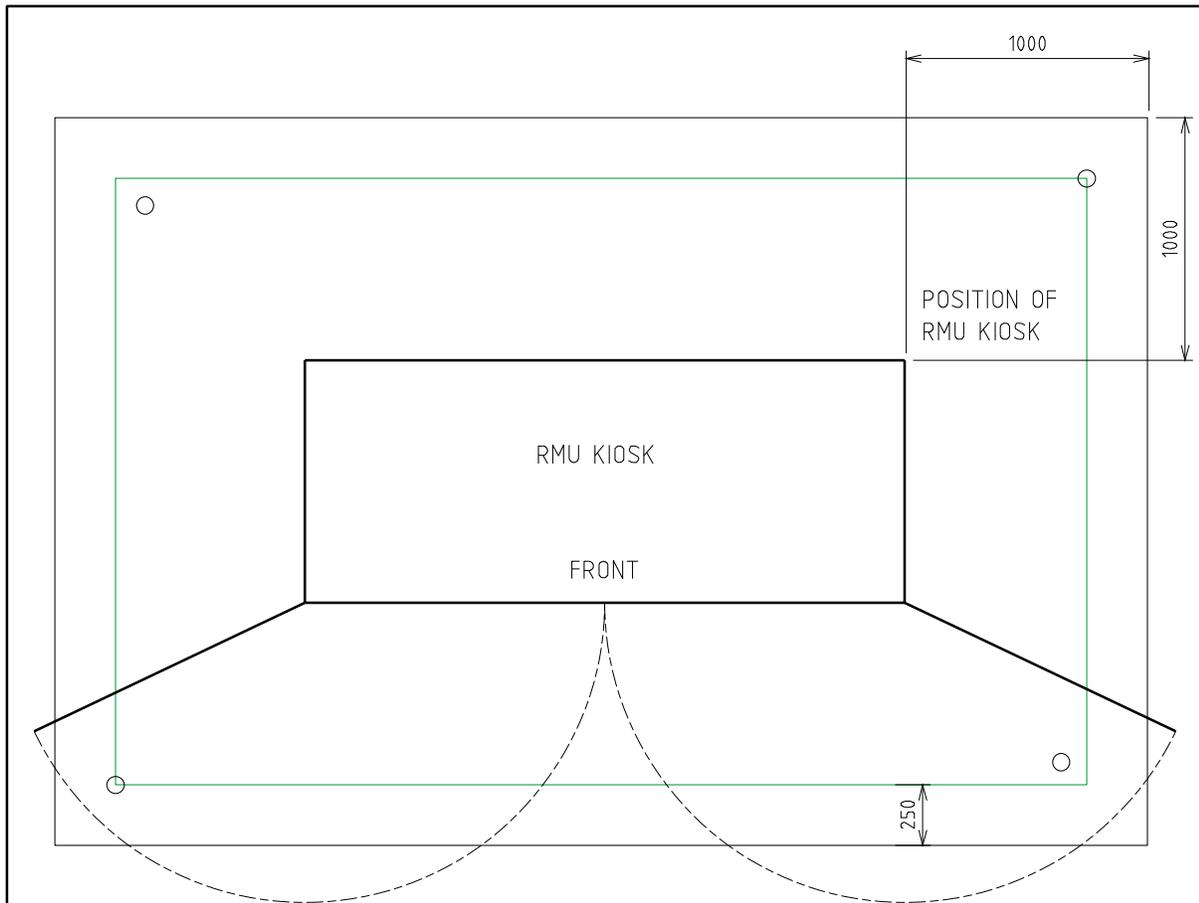


4.8 Standalone HV Switchgear

4.8.1 DSPM-3-27 – Schneider RM6 Outdoor in a Kiosk

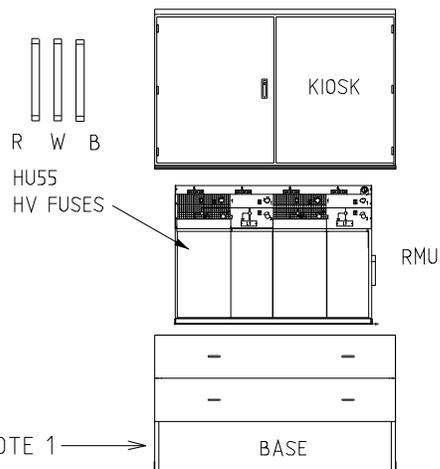






RMU MATERIALS (QTY)

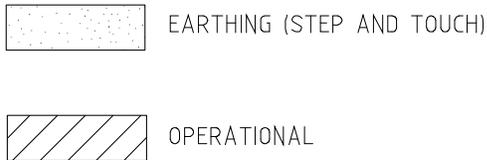
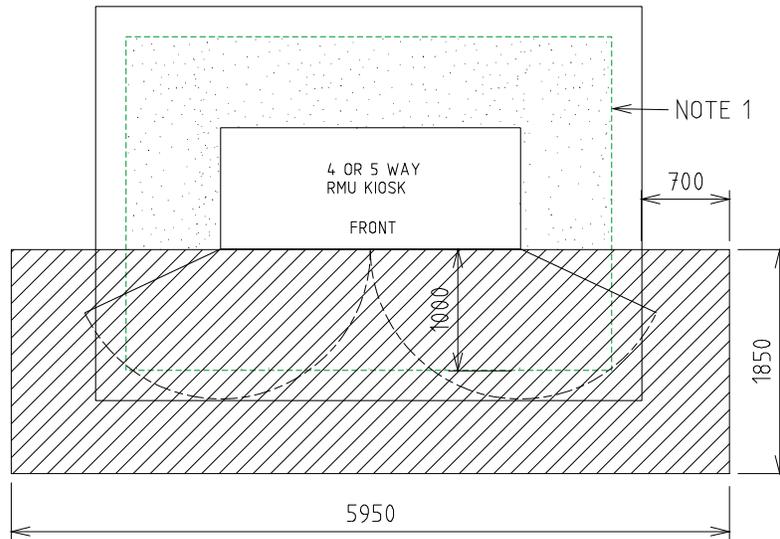
CU	6KV	11KV	22KV
HU55/315			
HU55/630			
HU55/1000			
HU5			
HU6			
HU7			
HU8			
HU9			
HU80			
HU81			
CN46			
DA6			
DA10			



NOTES:-

1. REFER TO DSPM CHAPTER 4 FOR THE CORRECT INSTALLATION OF THE RMU BASE.
2. MEASUREMENTS SHOWN ARE $\pm 50\text{mm}$, SAME CONSTRUCTION TOLERANCE APPLIES.
3. RMU, KIOSK BASE AND CABLE TERMINATIONS SUPPLIED IN RMU CU.
4. REFER TO DSPM CHAPTER 4 FOR AUTOMATION REQUIREMENTS.

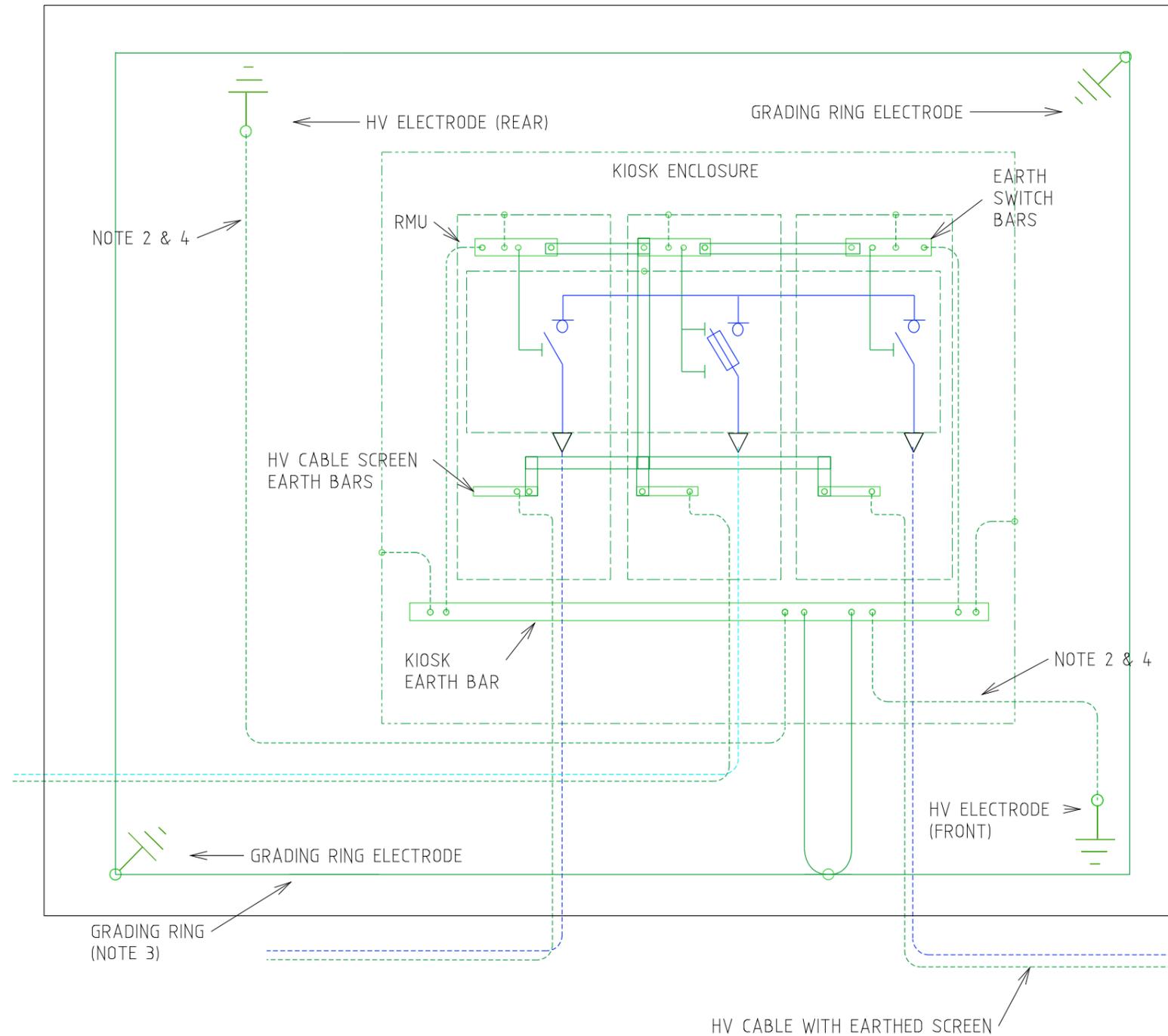
TITLE				DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower	
HV OUTDOOR GROUND MOUNTED SWGR SCHNEIDER RM6 SWITCHGEAR EQUIPMENT SELECTION AND LAYOUT				DRAWN: KT	DATE: 14-04-2022	DRG. No.	
				ORIGINATED: KT	SCALE: NTS	DSPM-3-27	
				CHECKED: GC		REV.	SHT.
				APPROVED:	PHIL CAPPER	A	3
A	03.05.23	ORIGINAL ISSUE		KT	GC	PC	
REV	DATE	DESCRIPTION		ORGD.	CHKD.	APRD.	



NOTES:-

1. STEP AND TOUCH CLEARANCE FROM GRADING RING TO RMU.
USE EARTH RODS ON GRADING RING. SEE DDC HU CU₅ FOR EARTHING MATERIALS
2. SEE SHEET 5 FOR EARTHING SINGLE LINE DIAGRAM
3. USE THESE DIMENSIONS FOR EARTHING STUDY (WITH THE DOORS CLOSED).
4. DESIGNER TO SHOW ACCESS AND EGRESS ROUTES ON THE SUBSTATION DESIGN DRAWING.

REV	DATE	DESCRIPTION	ORGD.	CHKD.	APRD.	TITLE	DISTRIBUTION SUBSTATION PLANT MANUAL	westernpower	DRG. No.
A	03.05.23	ORIGINAL ISSUE	KT	GC	PC	HV OUTDOOR GROUND MOUNTED SCHNEIDER SWITCHGEAR CLEARANCES	DRAWN: KT	DATE: 14-04-2022	DSPM-3-27
							ORIGINATED: KT	SCALE: NTS	
							CHECKED: GC		
							APPROVED:	PHIL CAPPER	REV. A
									SHT. 4



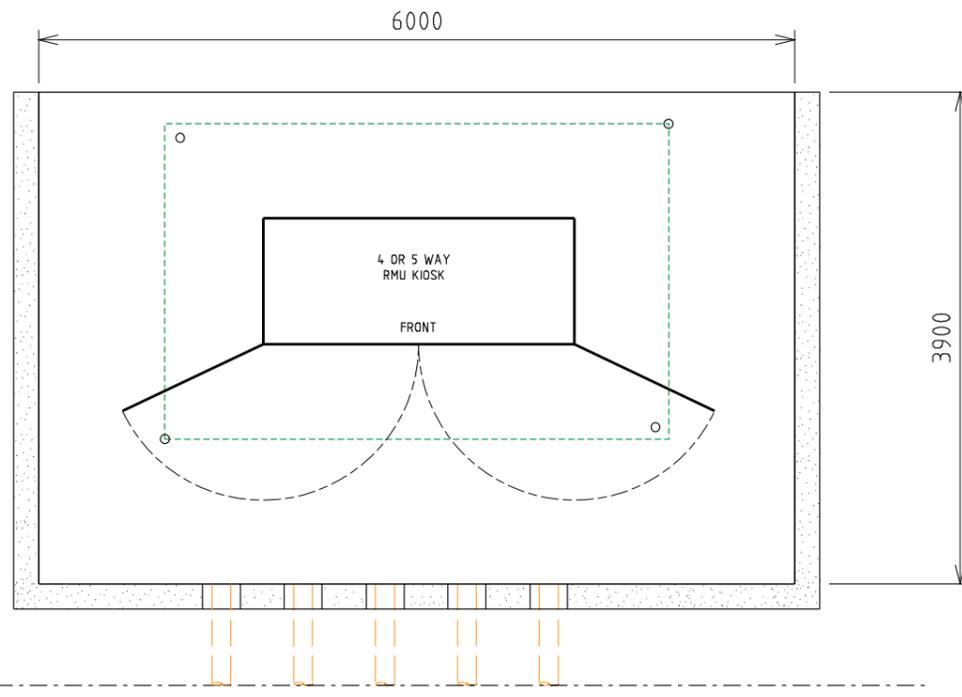
NOTES:-

1. SEE HU CU IN THE DDC FOR EARTHING MATERIALS.
2. CONNECT 70mm² PVC INSULATED COPPER CABLE (GREEN/YELLOW) TO EARTH ELECTRODES. INSTALL CABLE AND RODS 1200mm BELOW FGL IN NEW SITES.
3. BURIED GRADING RING TO BE 100mm BELOW RAILWAY BALLAS/FLAME TRAP, IN SOIL.
4. LOOP EARTH CABLES TO EARTH RODS INSIDE KIOSK FOR EASE OF TESTING.

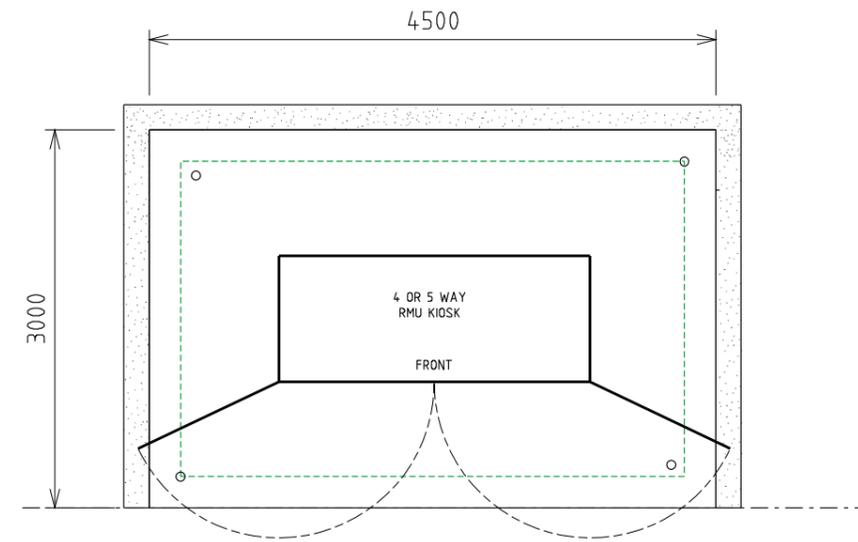
REV.	DATE	DESCRIPTION	KT	GC	PC
			DRGD.	CHKD.	APRD.
A	03.05.23	ORIGINAL ISSUE			

TITLE	
HV OUTDOOR GROUND MOUNTED SCHNEIDER RM6 SWITCHGEAR EARTHING SINGLE LINE DIAGRAM	

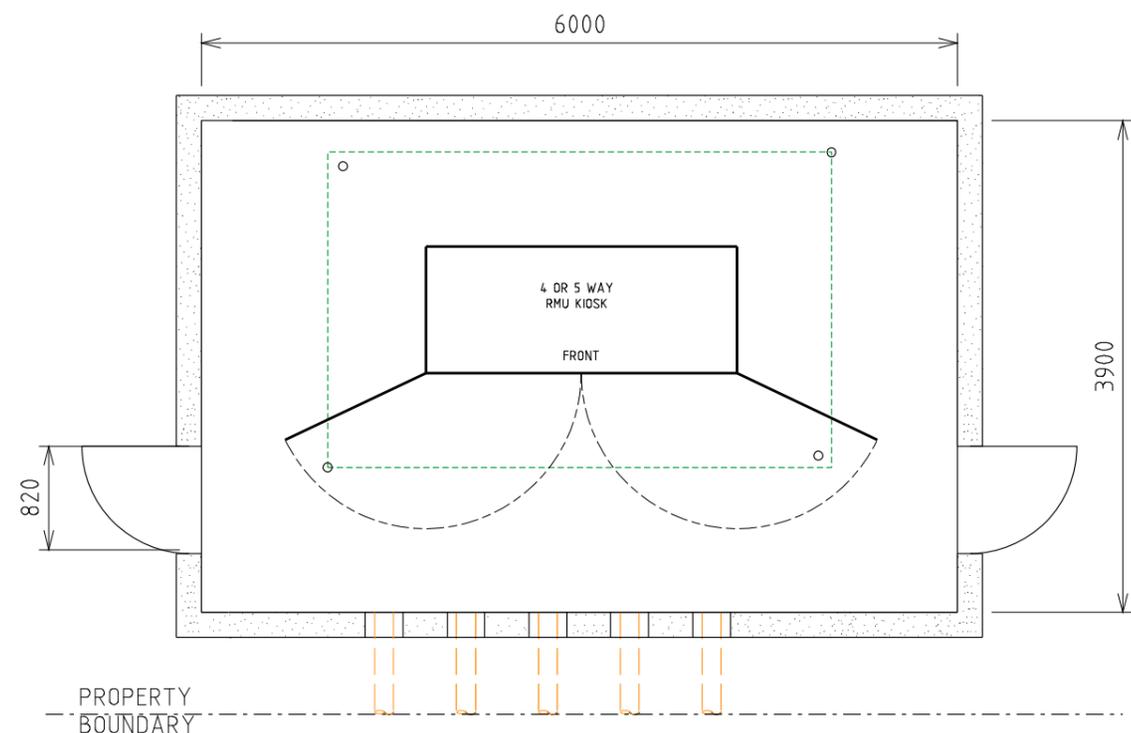
DISTRIBUTION SUBSTATION PLANT MANUAL			
DRAWN: KT	DATE: 14-04-2022	DRG. No.	
ORIGINATED: KT	SCALE: NTS	DSPM-3-27	
CHECKED: GC	APPROVED:	REV. A	SHT. 5



PARTIAL SCREENING (FRONT)



PARTIAL SCREENING (REAR)



FULL SCREENING

NOTES:-

1. FOUNDATIONS SHALL FULLY RETAIN THE SITE TO ALLOW FUTURE EXCAVATION 1200mm DEEP WITHIN THE SUBSTATION SITE.
2. SCREENING OR FOUNDATIONS SHALL NOT ENCR OACH INTO SUBSTATION SITE.
3. SCREENING SHALL NOT IMPACT OPERATIONAL CLEARANCE AND EGRESS REQUIREMENTS SHOWN ON SHEET 4.
4. DOORS (WHERE FITTED) MUST BE A MINIMUM OF 820 WIDE
5. NON-COMBUSTIBLE MATERIALS TO BE USED FOR SCREENING WITHIN FIRE RISK ZONE (MASONARY, ETC.)
6. 2 HR FIRE RATED SCREENING MAY BE USED TO REDUCE THE FIRE RISK ZONE. REFER TO DSPM CHAPTER 5 (FIRE RISK).
7. MINIMUM HEIGHT OF SCREEN WALL IS TO BE 1.8m (HEIGHT OF TRANSFORMER + 300mm).
8. DUCTS ARE REQUIRED WHERE CABLES PASS THROUGH WALL OR FOUNDATIONS. REFER TO SHEET 2 FOR DUCTING DETAILS.

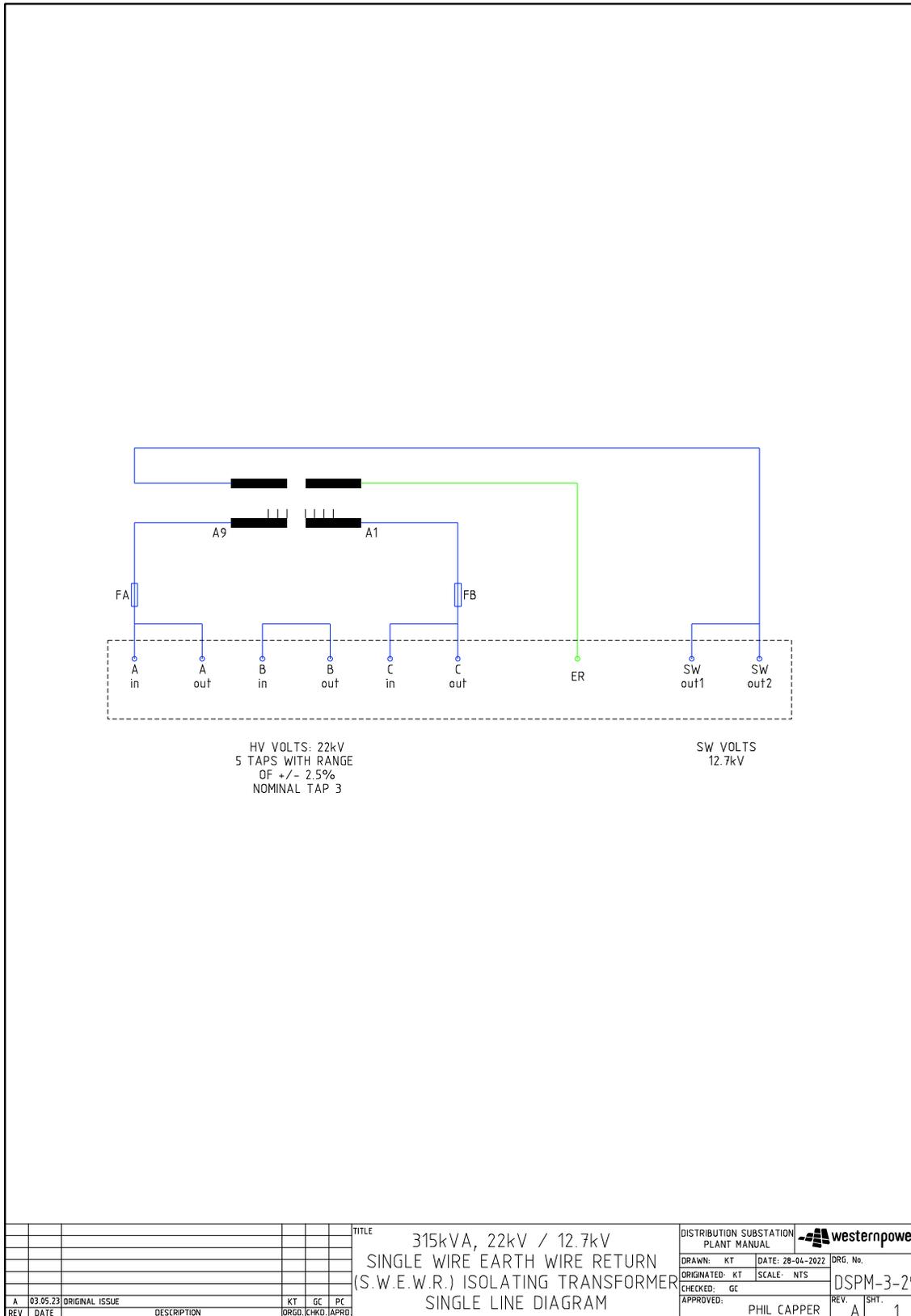
REV.	DATE	DESCRIPTION	KT	GC	PC
A	03.05.23	ORIGINAL ISSUE			

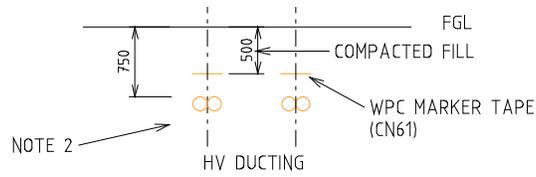
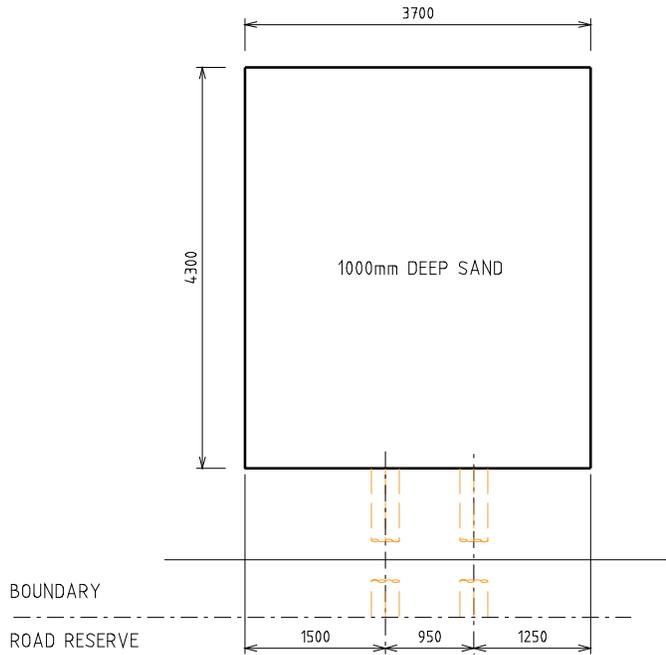
TITLE	
HV OUTDOOR GROUND MOUNTED SWGR SCHNEIDER RM6 SWITCHGEAR PERMISSIBLE SCREENING ARRANGEMENTS	

DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower	
DRAWN: KT	DATE: 14-04-2022	DRG. No.	
ORIGINATED: KT	SCALE: NTS	DSPM-3-27	
CHECKED: GC		REV.	SHT.
APPROVED:	PHIL CAPPER	A	6

4.9 Isolating Transformer

4.9.1 DSPM-3-29 315kVA, 22kV / 12.7kV Single Phase Earth Wire Return Isolating Transformer

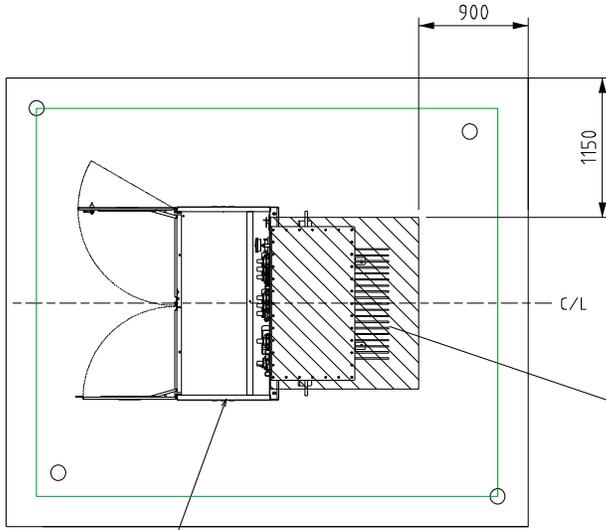




SECTION AA

- NOTES:-
 1. DUCTING REQUIRED IF LAND REQUIREMENT IS SET BACK FROM ROAD RESERVE BOUNDARY.
 2. 4x150 (HV) ID HEAVY DUTY DUCT (CN56).

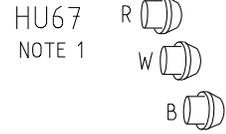
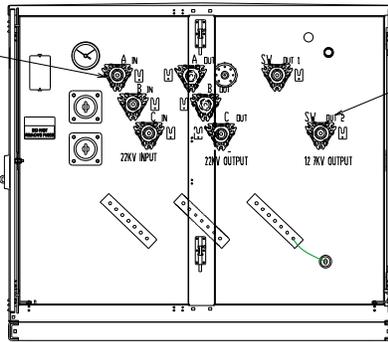
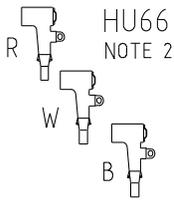
				TITLE		DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower	
				315kVA, 22kV / 12.7kV		DRAWN: KT	DATE: 29-04-2022	DRG. No.	
				SINGLE WIRE EARTH WIRE RETURN (S.W.E.W.R.) ISOLATING TRANSFORMER		ORIGINATED: KT	SCALE: NTS	DSPM-3-29	
				DUCTS & LAND REQUIREMENTS		CHECKED: GC	APPROVED: PHIL CAPPER		REV. A
A	03.05.23	ORIGINAL ISSUE		KT	GC	PC			2
REV	DATE	DESCRIPTION		ORGD.	CHKD.	APRD.			



BOX CULVERT - CROWN AND BASE TYPE
 EXTERNAL SIZE = 1416 x 1022 x 1220 LONG
 CROWN WEIGHT = 1038 kg
 BASE WEIGHT = 384 kg

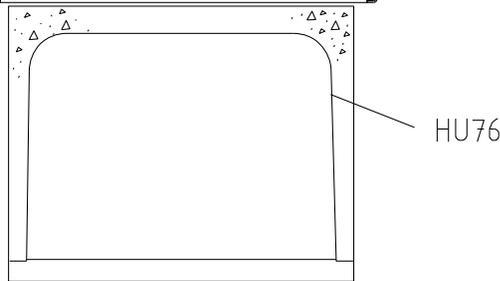
SEE DSPM-4-06
 FOR INSTALLATION DETAILS

HU27/315
 TRANSFORMER



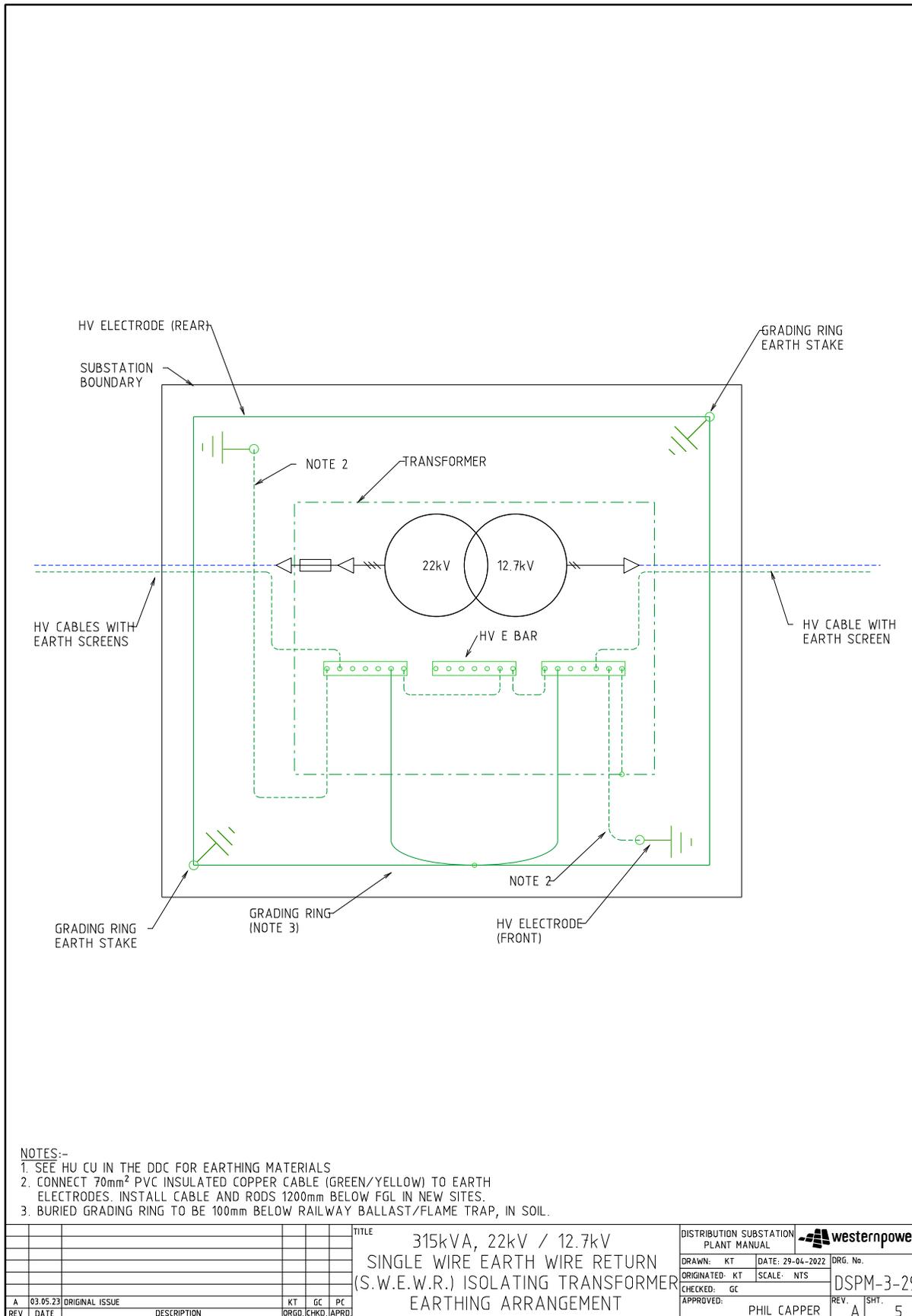
ISOLATION TX MATERIALS (QTY)

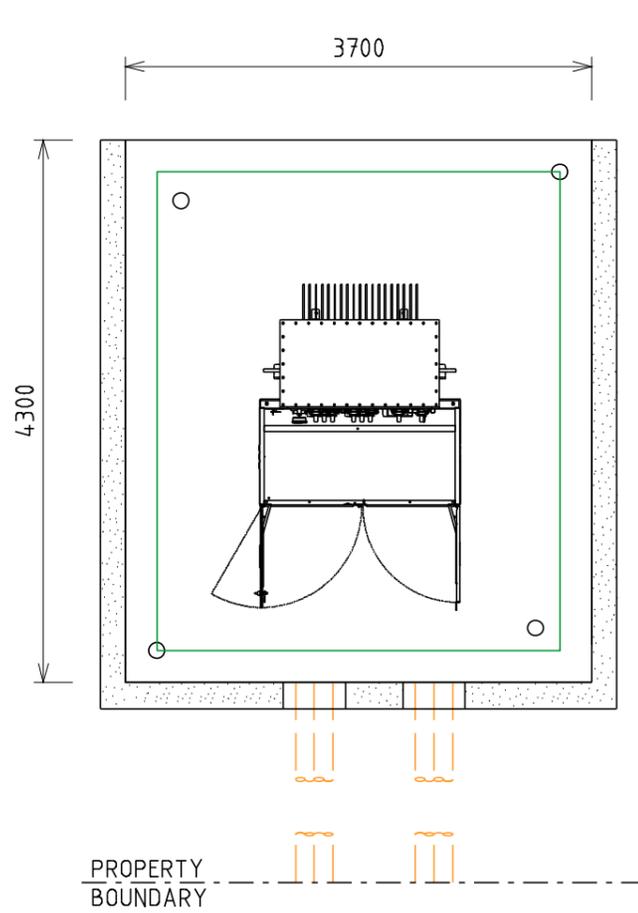
CU	22KV
HU27_315	
HU66	
HU67	
HU76	



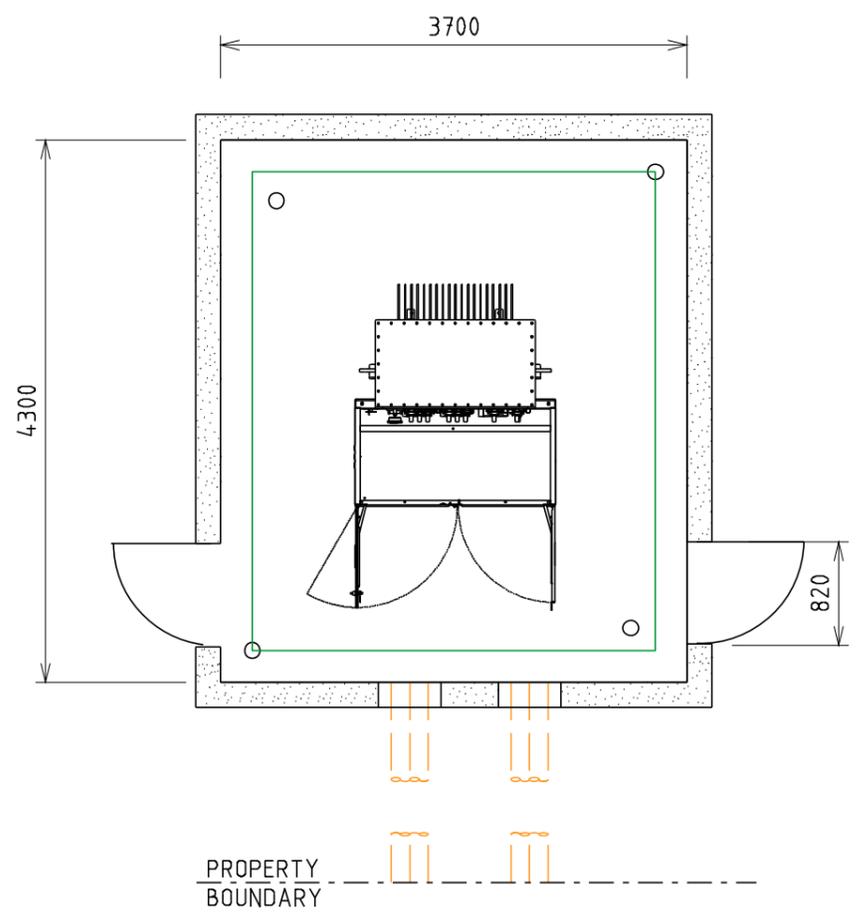
- NOTES:-
1. DEAD END RECEPTACLES MUST BE USED TO INSULATE UNUSED TRANSFORMER HV BUSHINGS.
 2. HV ELBOWS TO BE USED ON WHERE CABLES ARE TO BE CONNECTED TO ALL INCOMING OR OUTGOING BUSHINGS
 3. REFER TO DDC FOR EARTHING LAYOUT
 4. TRANSFORMER OIL IS TO BE CONTAINED WITHIN THE SITE

				TITLE		DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower	
				315kVA, 22kV / 12.7kV		DRAWN: KT		DATE: 29-04-2022	
				SINGLE WIRE EARTH WIRE RETURN (S.W.E.W.R.) ISOLATING TRANSFORMER		ORIGINATED: KT		SCALE: NTS	
				EQUIPMENT SELECTION & SITE LAYOUT		CHECKED: GC		DRG. No. DSPM-3-29	
						APPROVED: PHIL CAPPER		REV. A	
								SHT. 3	
A		03.05.23		ORIGINAL ISSUE		KT		GC	
REV		DATE		DESCRIPTION		ORGD.		CHKD.	
						APRD			

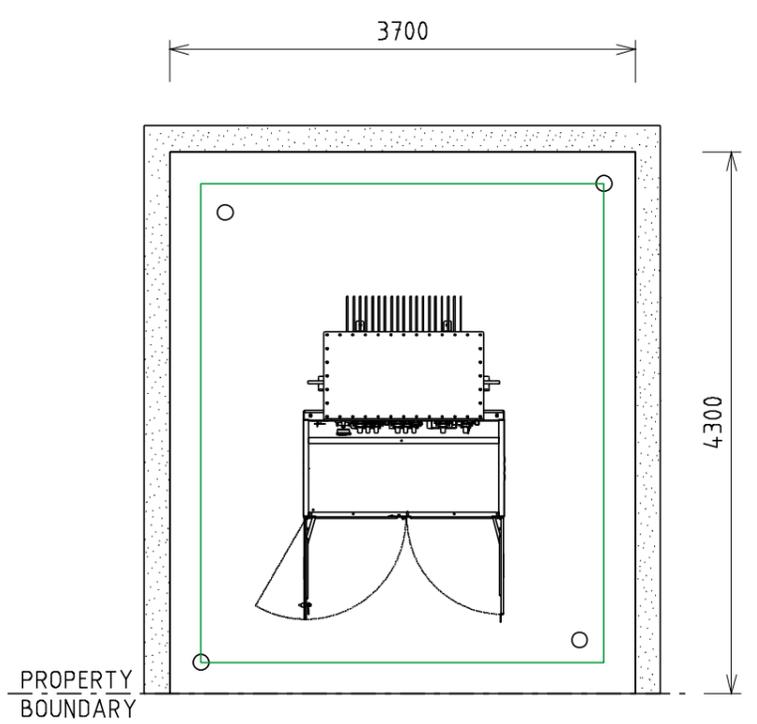




PARTIAL (FRONT) SCREENING



FULL SCREENING



PARTIAL (REAR) SCREENING

NOTES:-

1. FOUNDATIONS SHALL FULLY RETAIN THE SITE TO ALLOW FUTURE EXCAVATION 1200mm DEEP WITHIN THE SUBSTATION SITE.
2. SCREENING OR FOUNDATIONS SHALL NOT ENCROACH INTO SUBSTATION SITE.
3. SCREENING SHALL NOT IMPACT OPERATIONAL CLEARANCE AND EGRESS REQUIREMENTS SHOWN ON SHEET 4.
4. DOORS (WHERE FITTED) MUST BE A MINIMUM OF 820 WIDE.
5. NON-COMBUSTIBLE MATERIALS TO BE USED FOR SCREENING (MASONRY, ETC.)
6. 2HR FIRE RATED SCREENING MAY BE USED TO REDUCE THE FIRE RISK ZONE. REFER DSPM CHAPTER 5 (FIRE RISK)
7. MINIMUM HEIGHT OF SCREEN WALL IS TO BE 1.8m (HEIGHT OF TRANSFORMER + 300mm).
8. DUCTS ARE REQUIRED WHERE CABLES PASS THROUGH WALL OR FOUNDATIONS. REFER TO SHEET 2 FOR DUCTING DETAILS.

						TITLE			315kVA, 22kV / 12.7kV SINGLE WIRE EARTH WIRE RETURN (S.W.E.W.R.) ISOLATING TRANSFORMER SCREENING ARRANGEMENTS			DISTRIBUTION SUBSTATION PLANT MANUAL			
									DRAWN: KT		DATE 29-04-2022		DRG. No.		
									ORIGINATED: KT		SCALE: NTS		DSPM-3-29		
									CHECKED: GC		APPROVED:		REV. A SHT. 6		
									PHIL CAPPER						
A	03.05.23	ORIGINAL ISSUE	KT	GC	PC										
REV.	DATE	DESCRIPTION	ORGD	CHKD	APRD										