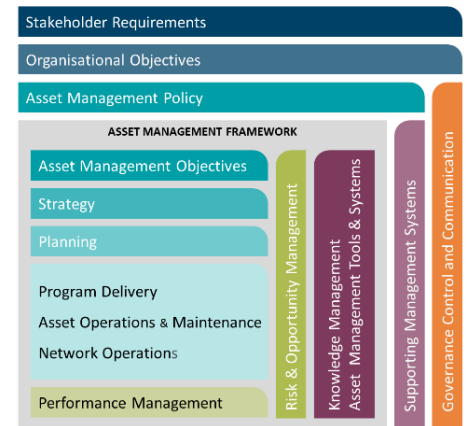


Western Power's Asset Management System

Distribution Substation Plant Manual Chapter 9 – 33kV Substation Installation



Original Issue: December 2021

Content Owner/Custodian: Distribution Design and Standards

This Revision: August 2026

Date for Next Review: May 2028

© Western Power
ABN 18540492861



Uncontrolled document when printed. Printed copy expires one week from print date.

Volt ID ID05-1343104688-372392

Document control

Endorsement approvals

	Name	Title	Signature and Date
Author	Samuel Liau	Senior Distribution Standards Engineer	Signature on file
Checked by	Chris Omodei	Principal Engineer	Signature on file
Endorsed by	Ken Tiong	Engineering Team Leader	Signature on file
Approved by	Pep Ngwenya	Distribution Design & Standards Manager	Signature on file

Record of revisions

Revision No.	Date	Version	Compiled by	Description
0	December 2021	EDM 2	Ken Tiong	Original Issue
1	May 2025	Volt 3	Samuel Liau	3 yearly periodic review
2	20/01/2026	Volt 4	Nory Cerrado	DSPM-9-02 & DSPM-9-04 Updated
3	24/08/2026	Volt 5	Nory Cerrado	Refer to Amendment List

Key documents providing direction and influencing this document

Doc	Title of document
Volt ID ID-005-dc7f342fed83eb7f008777ff0463b876	Asset Management System
Volt ID ID87-1104746466-152109	Safety in Design Guidelines
Volt ID ID-005-5fc14a0c0a2236566dc182c37ccca458	DSPM Governance and 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

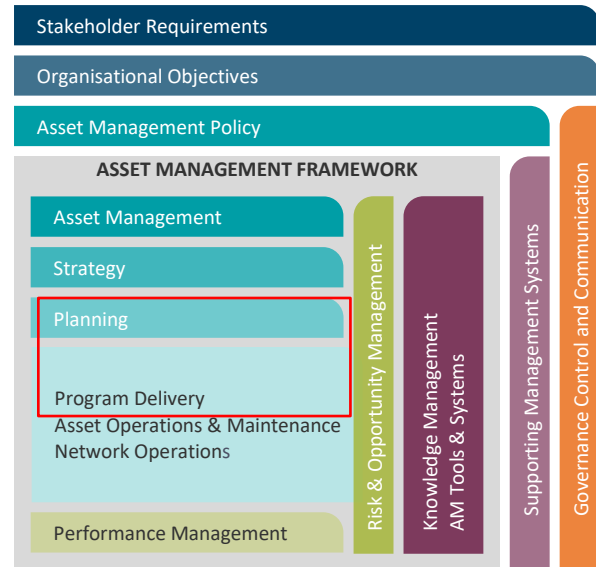
This document must not be made available to personnel outside Western Power without the prior written approval of Western Power.

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 AMS document Volt ID

ID-005-dc7f342fed83eb7f008777ff0463b876.



Contents

List of Drawing	7
1. Introduction	9
2. Disclaimer	9
3. Compliance with this manual	9
4. Information Provided on Drawings	10
4.1 Non - fire rated substations	10
4.1.1 Sheet 1 – Plant Single Line Diagram	10
4.1.2 Sheet 2 - Land Requirements.....	11
4.1.3 Sheet 3 – Plant, Equipment and Substation Layout	11
4.1.4 Sheet 4 - Clearances	12
4.1.5 Sheet 5 – Plant Earthing Single Line Diagram	12
4.1.6 Sheet 6 - Permissible Screening Arrangements	13
4.2 Fire rated substations (to be developed).....	14
5. Drawings - Substation Arrangements	15
5.1 Drawing Legend	16
5.2 DSPM 9-01 Up to 630kVA Modular Package Substation (MPS).....	17
5.2.1 Single Line Diagram	17
5.2.2 Land Requirements and Duct Installation	18
5.2.3 Equipment Selection and Layout	19
5.2.4 Clearances.....	20
5.2.5 Earthing Arrangement	21
5.2.6 Screening Arrangement.....	22
5.3 DSPM 9-02 Up to 630kVA Modular Package Substation (MPS) with HV switchgear	23
5.3.1 Single Line Diagram	23
5.3.2 Land Requirements and Duct Installation	24
5.3.3 Equipment Selection and Layout	25
5.3.4 Non-Fire Rated Clearances	26
5.3.5 Earthing Arrangement	27
5.3.6 Screening Arrangement.....	28
5.4 DSPM 9-03 Up to 1000kVA Non MPS District	29
5.4.1 Single Line Diagram	29
5.4.2 Land Requirements and Duct Installation	30
5.4.3 Equipment Selection and Layout	31

5.4.4	Clearances.....	32
5.4.5	Earthing Arrangement	33
5.4.1	Screening Arrangement.....	34
5.5	DSPM 9-04 Up to 1000kVA Non MPS District with HV Switchgear	35
5.5.1	Single Line Diagram	35
5.5.2	Land Requirements and Duct Installation	36
5.5.3	Equipment Selection and Layout	37
5.5.4	Clearances.....	38
5.5.5	Earthing Arrangement	39
5.5.6	Screening Arrangement.....	40
5.6	DSPM 9-27 33kV SWGR HV Outdoor Ground Mounted SWGR Ormazabal.....	41
5.6.1	Single Line Diagram	41
5.6.2	Land Requirements and Duct Installation	42
5.6.3	Equipment Selection and Layout	43
5.6.4	Clearances.....	44
5.6.5	Earthing Arrangement	45

List of Drawing

Dwg No.	Sheet #	Rev #	Title
DSPM-9-01	1/6	A	33kV District Substation Up To 630 kVA MPS Non-Fire Rated Single Line Diagram
DSPM-9-01	2/6	A	33kV District Substation Up To 630 kVA MPS Non-Fire Rated Land Requirements and Duct Installation
DSPM-9-01	3/6	A	33kV District Substation Up To 630 kVA MPS Non-Fire Rated with HV SWGR Equipment Selection and Layout
DSPM-9-01	4/6	A	33kV District Substation Up To 630 kVA MPS Non-Fire Rated Clearances
DSPM-9-01	5/6	A	33kV District Substation Up To 630 kVA MPS Non-Fire Rated Earthing Arrangement
DSPM-9-01	6/6	A	33kV District Substation Up To 630 kVA MPS Non-Fire Rated Screening Arrangements
DSPM-9-02	1/6	B	33kV District Substation Up To 630 kVA MPS Non-Fire Rated with HV SWGR Single Line Diagram
DSPM-9-02	2/6	B	33kV District Substation Up To 630 kVA MPS Non-Fire Rated with HV SWGR - Land Requirements and Duct Installation
DSPM-9-02	3/6	B	33kV District Substation Up To 630 kVA MPS Non-Fire Rated with HV SWGR Equipment Selection and Layout
DSPM-9-02	4/6	B	33kV District Substation Up To 630 kVA MPS Non-Fire Rated with HV SWGR Clearances
DSPM-9-02	5/6	B	33kV District Substation Up To 630 kVA MPS Non-Fire Rated with HV SWGR Earthing Arrangement
DSPM-9-02	6/6	B	33kV District Substation Up To 630 kVA MPS Non-Fire Rated with HV SWGR Screening Arrangements
DSPM-9-03	1/6	A	33kV District Substation Up To 1000 kVA Non-MPS Non-Fire Rated Single Line Diagram
DSPM-9-03	2/6	A	33kV District Substation Up To 1000 kVA Non-MPS Non-Fire Rated Land Requirements And Duct Installation
DSPM-9-03	3/6	A	33kV District Substation Up To 1000 kVA Non-MPS Non-Fire Rated Equipment Selection and Layout
DSPM-9-03	4/6	A	33kV District Substation Up To 1000 kVA Non-MPS Non-Fire Rated Clearances
DSPM-9-03	5/6	B	33kV District Substation Up To 1000 kVA Non-MPS Non-Fire Rated Earthing Arrangement
DSPM-9-03	6/6	A	33kV District Substation Up To 1000 kVA Non-MPS Non-Fire Rated with HV SWGR Screening Arrangements
DSPM-9-04	1/6	B	33kV District Substation Up To 1000 kVA Non-MPS Non-Fire Rated with HV SWGR Single Line Diagram
DSPM-9-04	2/6	B	33kV District Substation Up To 1000 kVA Non-MPS Non-Fire Rated with HV SWGR Land Requirements And Duct Installation
DSPM-9-04	3/6	B	33kV District Substation Up To 1000 kVA Non-MPS Non-Fire Rated with HV SWGR Equipment Selection and Layout
DSPM-9-04	4/6	B	33kV District Substation Up To 1000 kVA Non-MPS Non-Fire Rated with HV SWGR Clearances
DSPM-9-04	5/6	B	33kV District Substation Up To 1000 kVA Non-MPS Non-Fire Rated with HV SWGR Earthing Arrangement
DSPM-9-04	6/6	B	33kV District Substation Up To 1000 kVA Non-MPS Non-Fire Rated with HV SWGR Screening Arrangements

Dwg No.	Sheet #	Rev #	Title
DSPM-9-27	1/5	A	33kV SWGR HV Outdoor Ground Mounted SWGR Ormazabal Single Line Diagram
DSPM-9-27	2/5	A	33kV SWGR HV Outdoor Ground Mounted SWGR Ormazabal Land Requirements and Ducting Details
DSPM-9-27	3/5	A	33kV SWGR HV Outdoor Ground Mounted SWGR Ormazabal Equipment Selection and Layout
DSPM-9-27	4/5	A	33kV SWGR HV Outdoor Ground Mounted SWGR Ormazabal Clearances
DSPM-9-27	5/5	A	33kV SWGR HV Outdoor Ground Mounted SWGR Ormazabal Earthing Single Line Diagram

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 AS 5577.

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.

3. Compliance with this manual

The project design drawing should include or at least refer to the relevant substation installation drawings from this Chapter of the manual.

Where a customer's site requires a non-standard substation arrangement (e.g., 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.

Any non-standard design must be approved by a Team Leader and a Senior Engineer. The design shall be recorded in the register:

Non-standard drawings register for Distribution Construction Standards Handbook (DCSH) and Distribution Substation Manual (DSM/DSPM) Volt ID ID-005-4d95e1a4af5740a5a102d546c6a258d2.

4. Information Provided on Drawings

The standard substation drawings are grouped into District and Sole Use substations. These drawing sets will consist of the following:

4.1 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

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.

4.1.1 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:

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

General Designer Notes:

Refer DCCR for the HV feeder and customer connection arrangements.

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.

4.1.2 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 installation of the substation. This drawing should be used in conjunction with the relevant customer connection manual to determine a suitable site such as the Underground Distribution Schemes (UDSM) or Western Australian Service Installation and Requirements (WASIR).

This drawing sheet shows:

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

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

3. Additional grading rings or an extension to the substation earthing system.
4. Personnel access, egress, and equipment transport aisles
5. Oil containment methods and collection bunds.
6. Fire clearances and barriers
7. Earth retaining systems
8. Surface treatments and the methods used to retain them within the site
9. Screening walls and doors
10. 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.

4.1.3 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:

- a. The layout of distribution plant that can be used within the site such as transformers, ring main units and low voltage switchgear.
- b. When required, the arrangement of the LV switchgear.
- c. Power cables and connectors that shall be used to interconnect the distribution plant within the site.
- d. 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.

4.1.4 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:

2. The clearances required around items of equipment to the edge of the substation site that allow the equipment to be operated.
3. The clearances required around items of equipment to the edge of the substation site used as access and egress paths.
4. The clearance from the equipment to the earth grading ring to be used by the designer for calculation of the touch voltages.
5. Fire clearances from transformer tank to combustible surfaces in accordance with DSPM Chapter 5 – Table 6.1 which is derived from AS/NZS 2067 Table 6.1.
6. 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.

4.1.5 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:

1. Number of earth electrodes required within the site
2. Number and types of earth bars (e.g. HV, LV)
3. Neutral earthing connections
4. Equipotential bonding connections (e.g. to exposed metal work on the plant)
5. Grading ring connections
6. 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.

4.1.6 Sheet 6 - Permissible Screening Arrangements

The purpose of this drawing is to provide a diagrammatic representation of acceptable screening layout 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:

1. Where screening is permissible (i.e. outside the substation site).
2. The required depth of the screening foundations to allow safe excavation within the substation site
3. 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.
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.
4. All buildings shall meet the requirements of the Local Government and the National Construction Code (NCC).
5. Two-hour fire rated screening may be used to reduce the fire clearance zone. See DSPM Chapter 5 for more guidance on fire clearances.

4.2 Fire rated substations (to be developed)

5. Drawings - Substation Arrangements

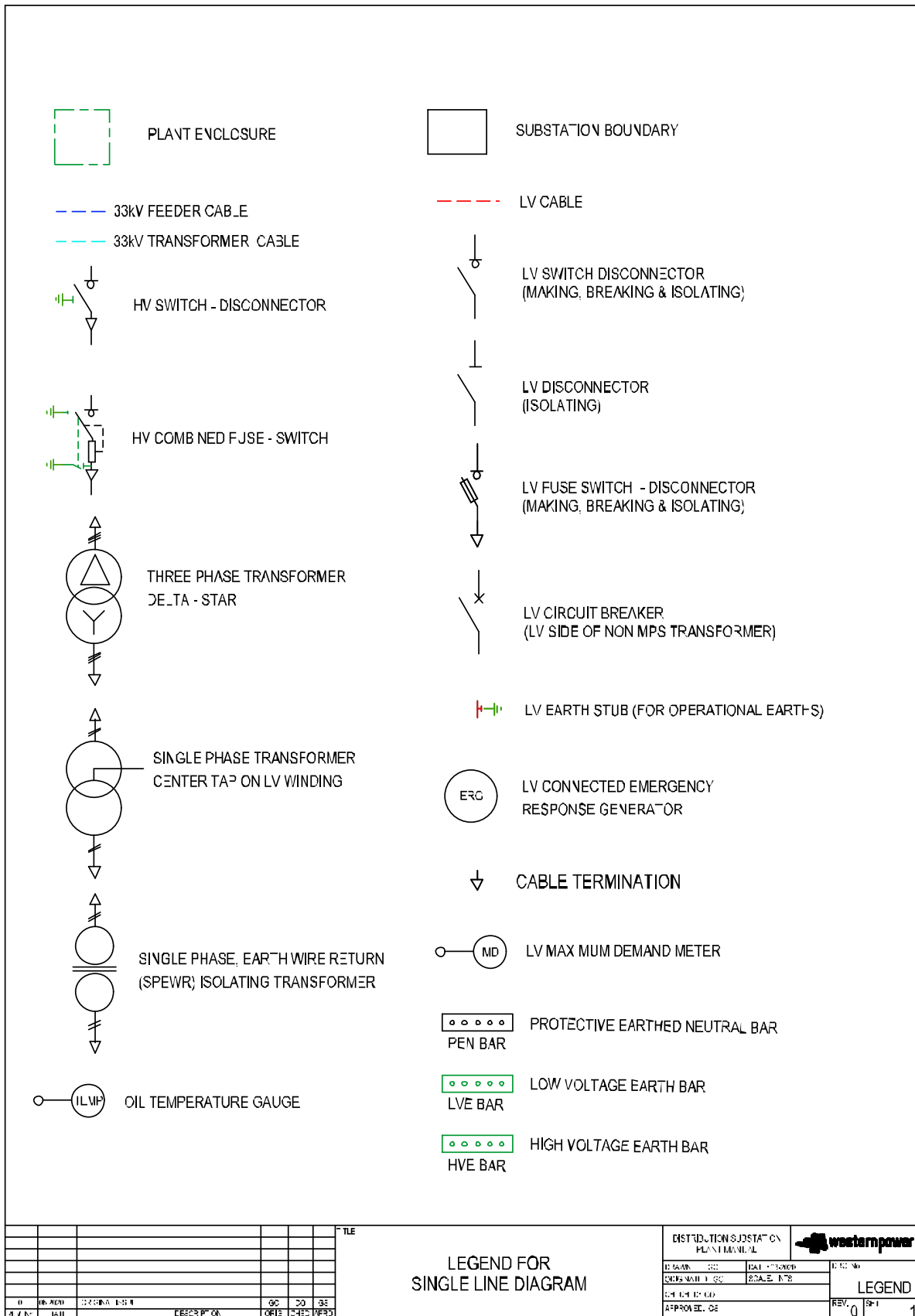
The following section contains the substation arrangement drawings for the following voltage levels:

- a. 33kV three phase
- b. 19.1kV single phase (future)

These drawings are grouped into the following types:

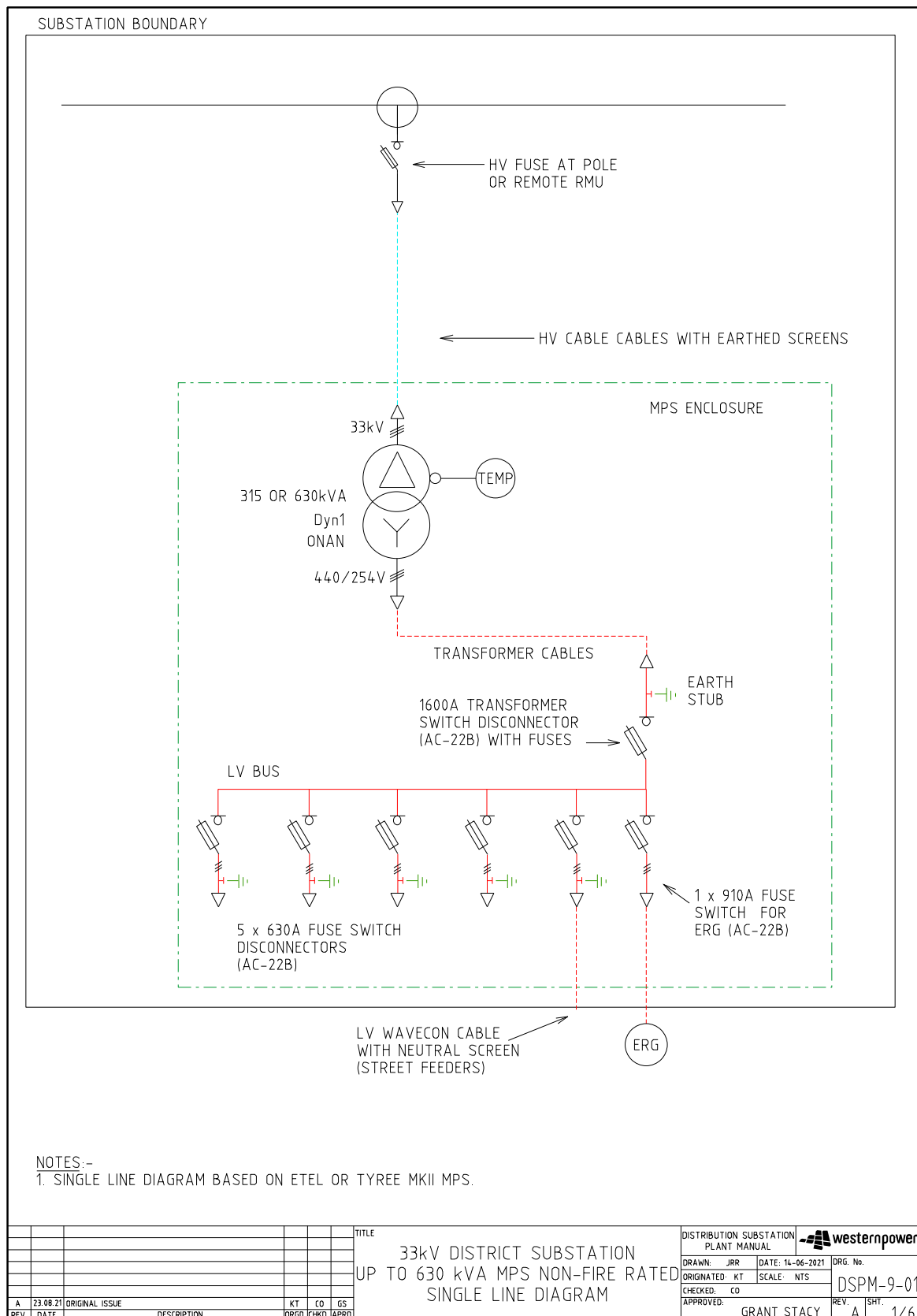
- District Substations, non-fire rated
- Sole Use Substations, non-fire rated (to be developed)
- District Substations, Fire rated (to be developed)
- Sole Use Substations, Fire rated (to be developed)
- Customer Owned Substations, HV metered sites (to be developed)
- Single phase and three phase ground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

5.1 Drawing Legend

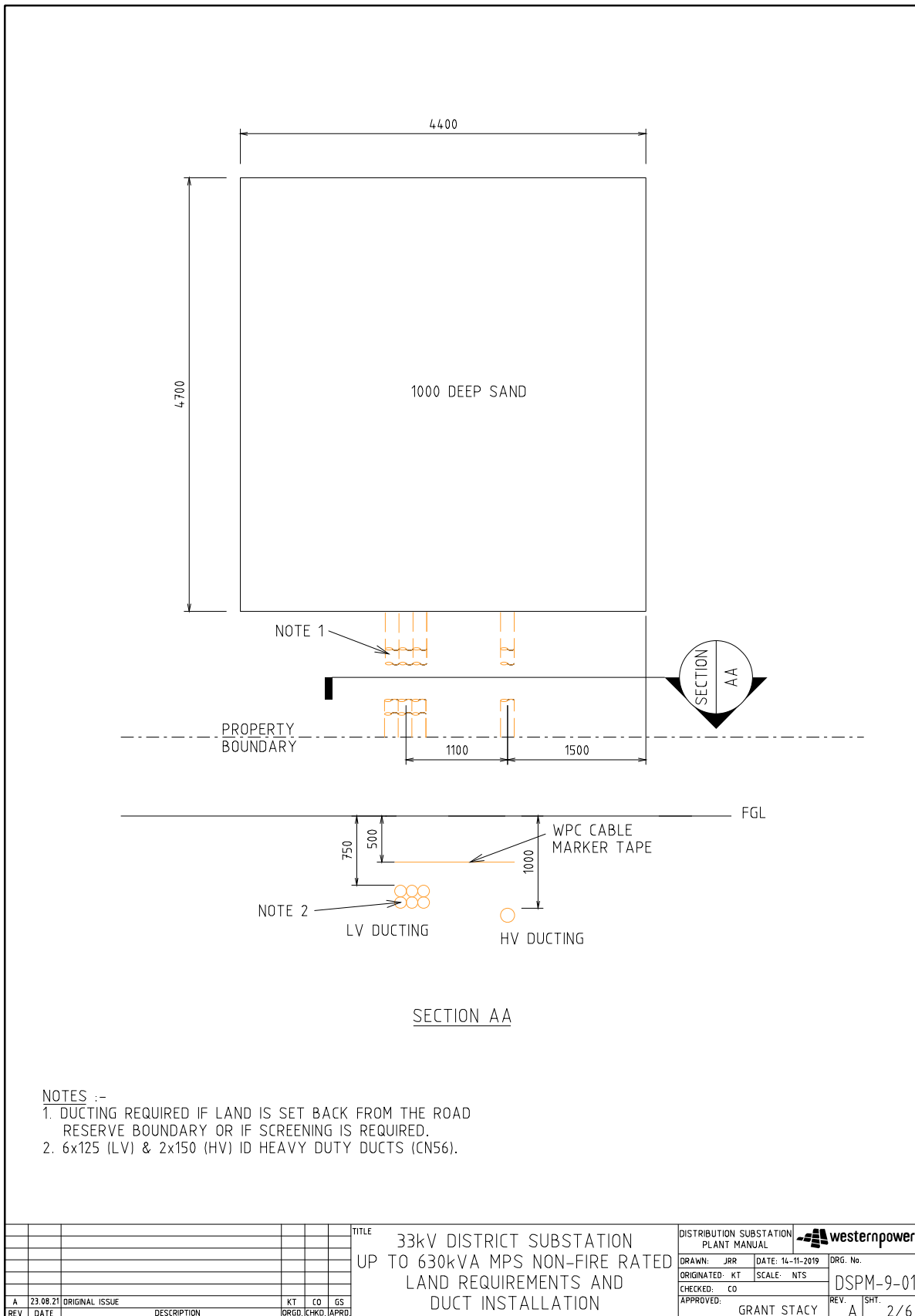


5.2 DSPM 9-01 Up to 630kVA Modular Package Substation (MPS)

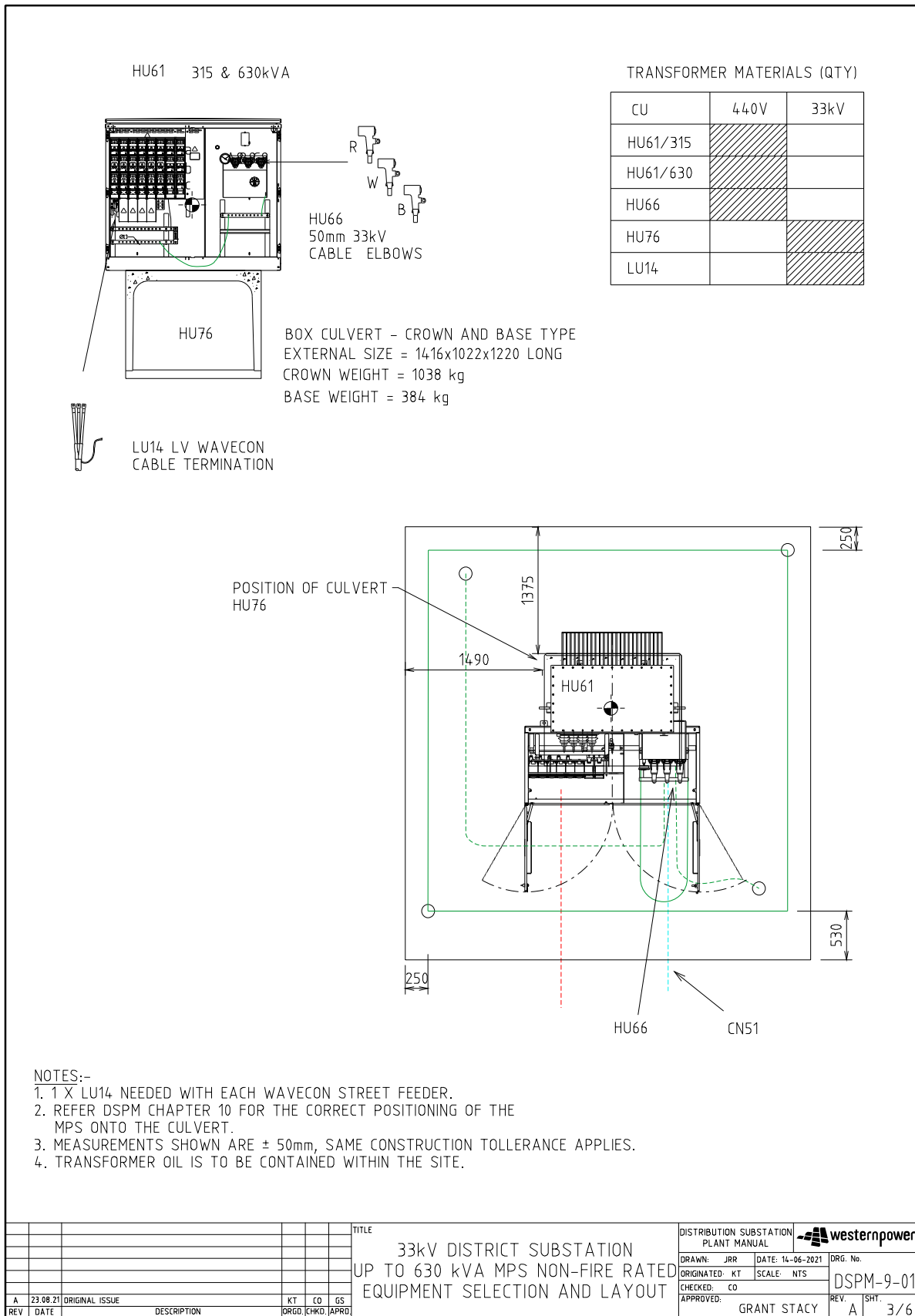
5.2.1 Single Line Diagram



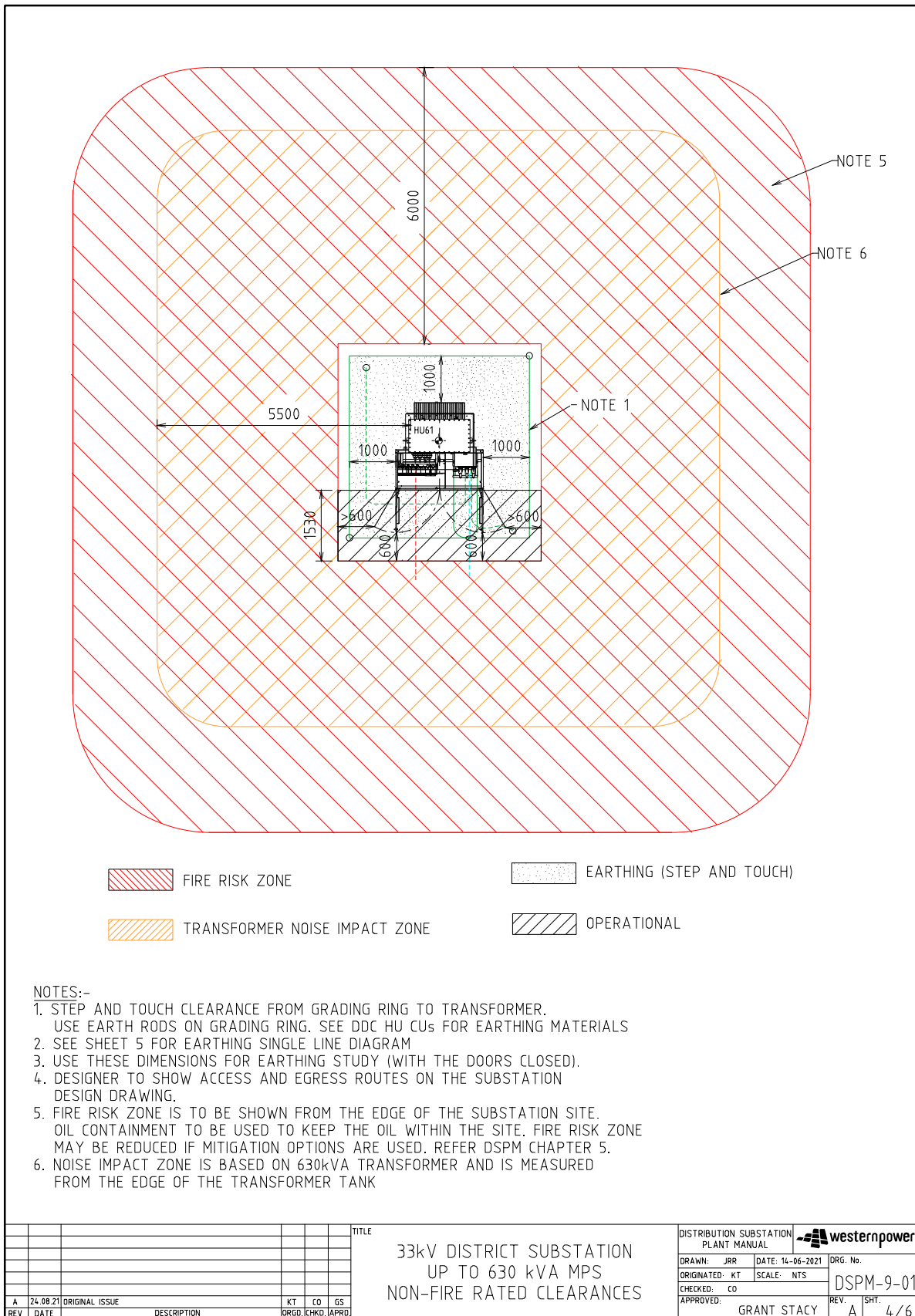
5.2.2 Land Requirements and Duct Installation



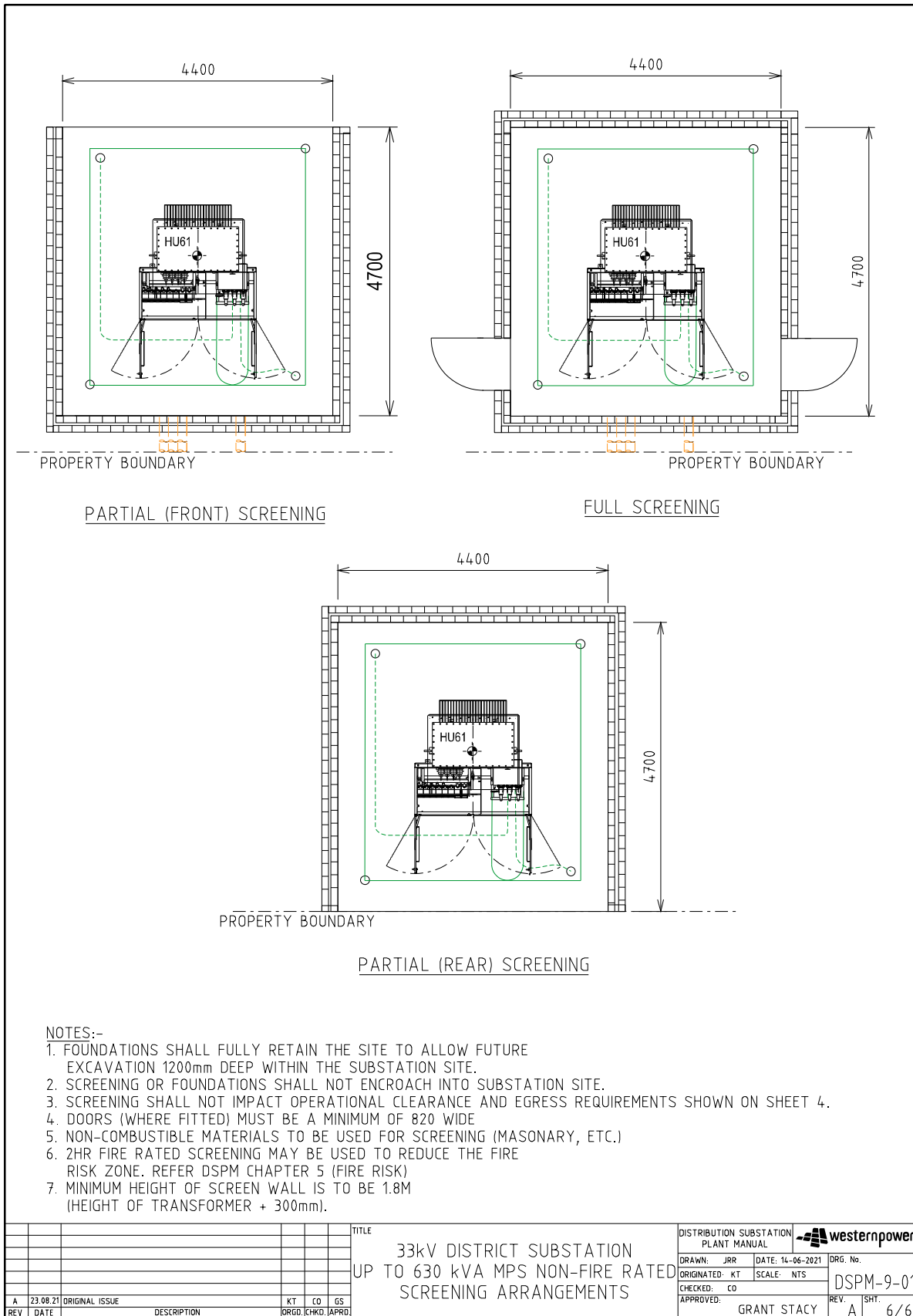
5.2.3 Equipment Selection and Layout



5.2.4 Clearances

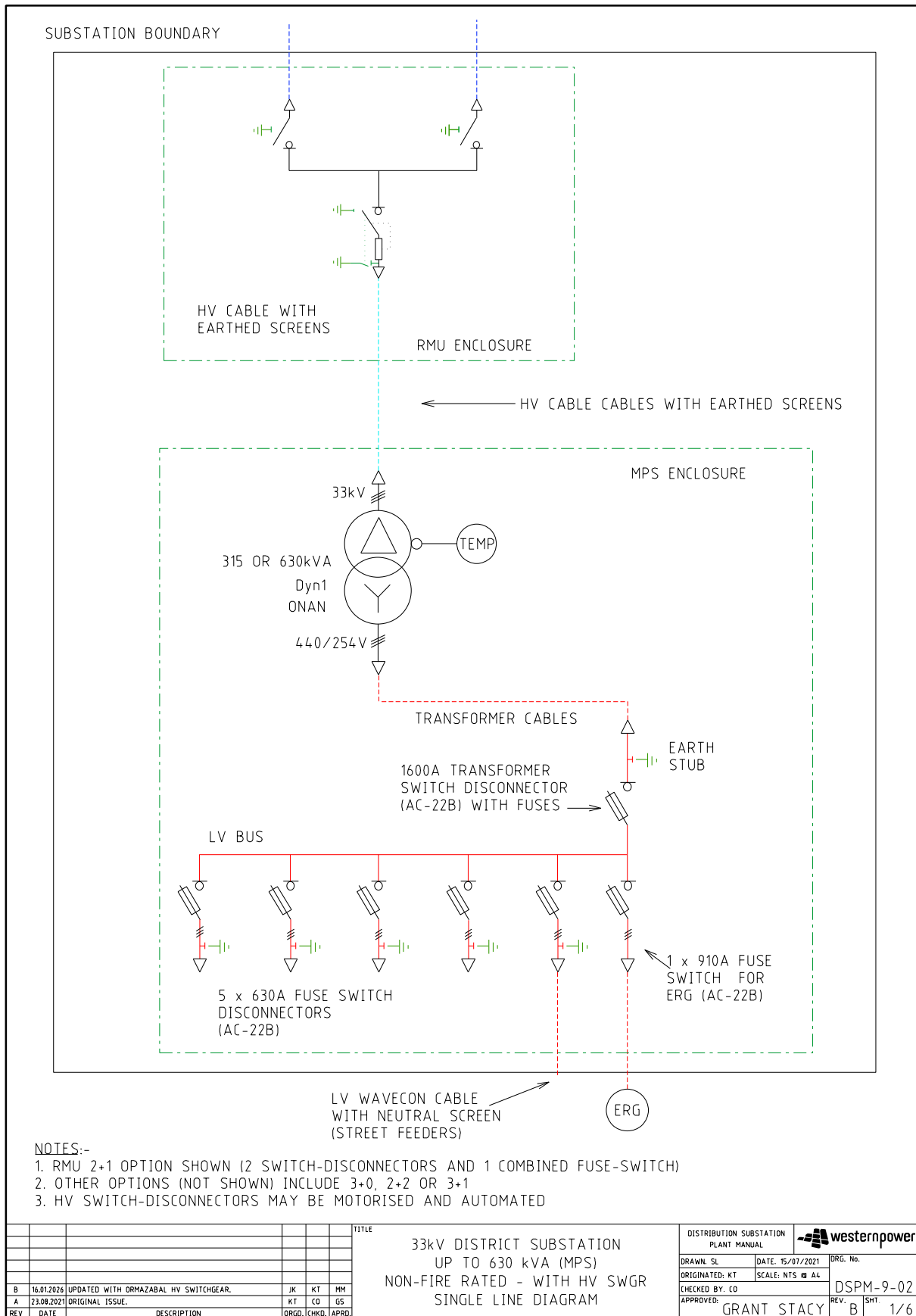


5.2.6 Screening Arrangement

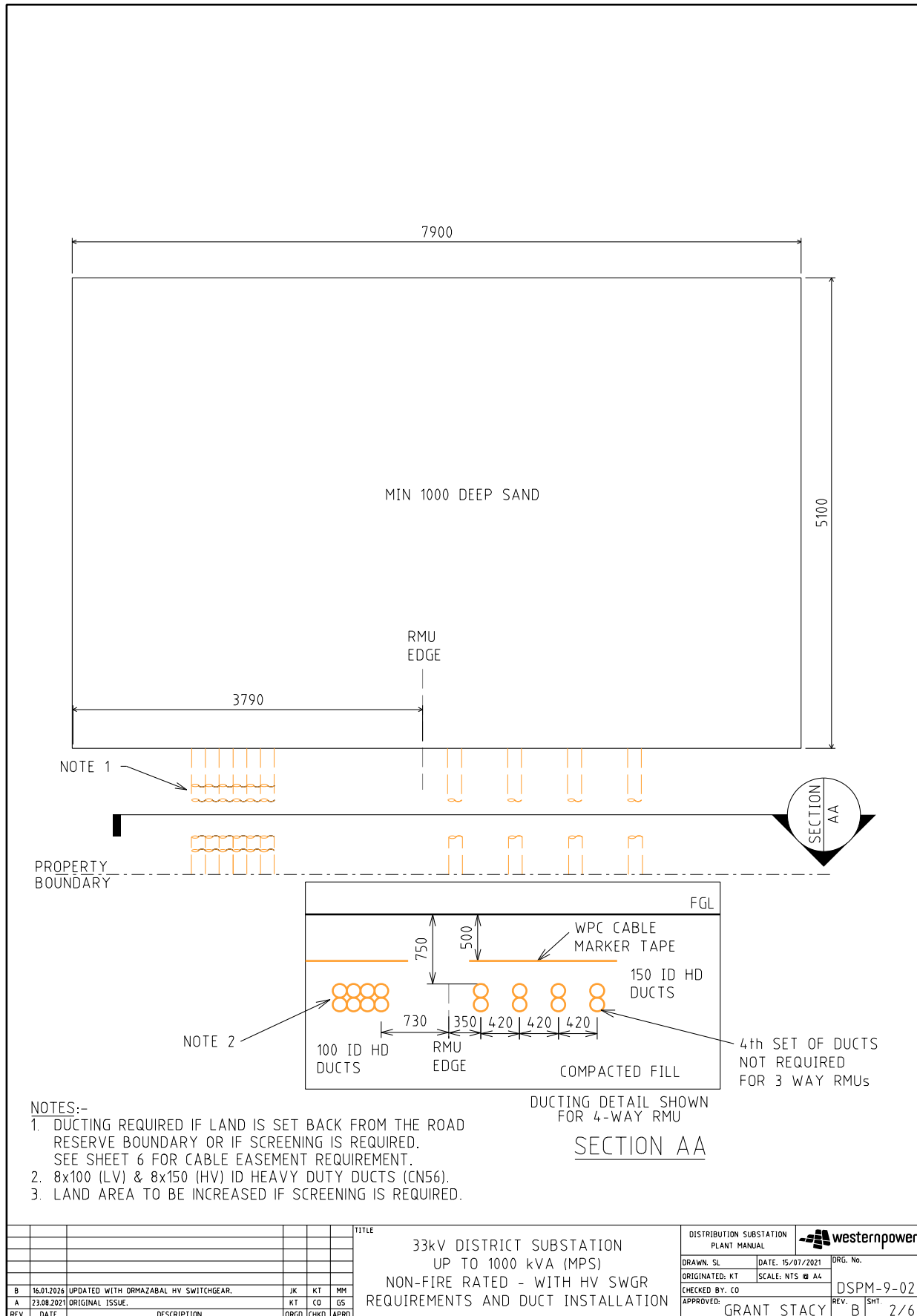


5.3 DSPM 9-02 Up to 630kVA Modular Package Substation (MPS) with HV switchgear

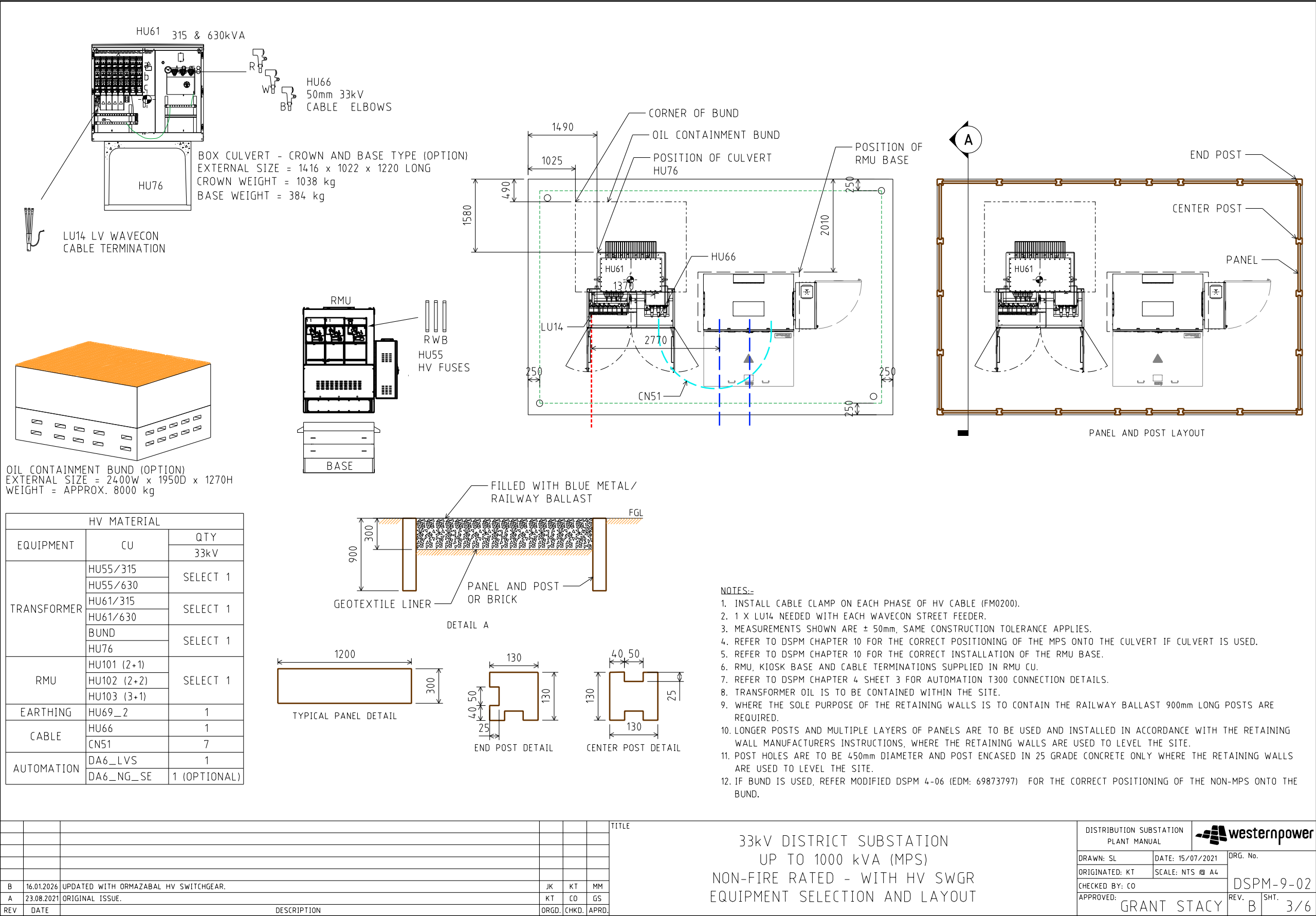
5.3.1 Single Line Diagram



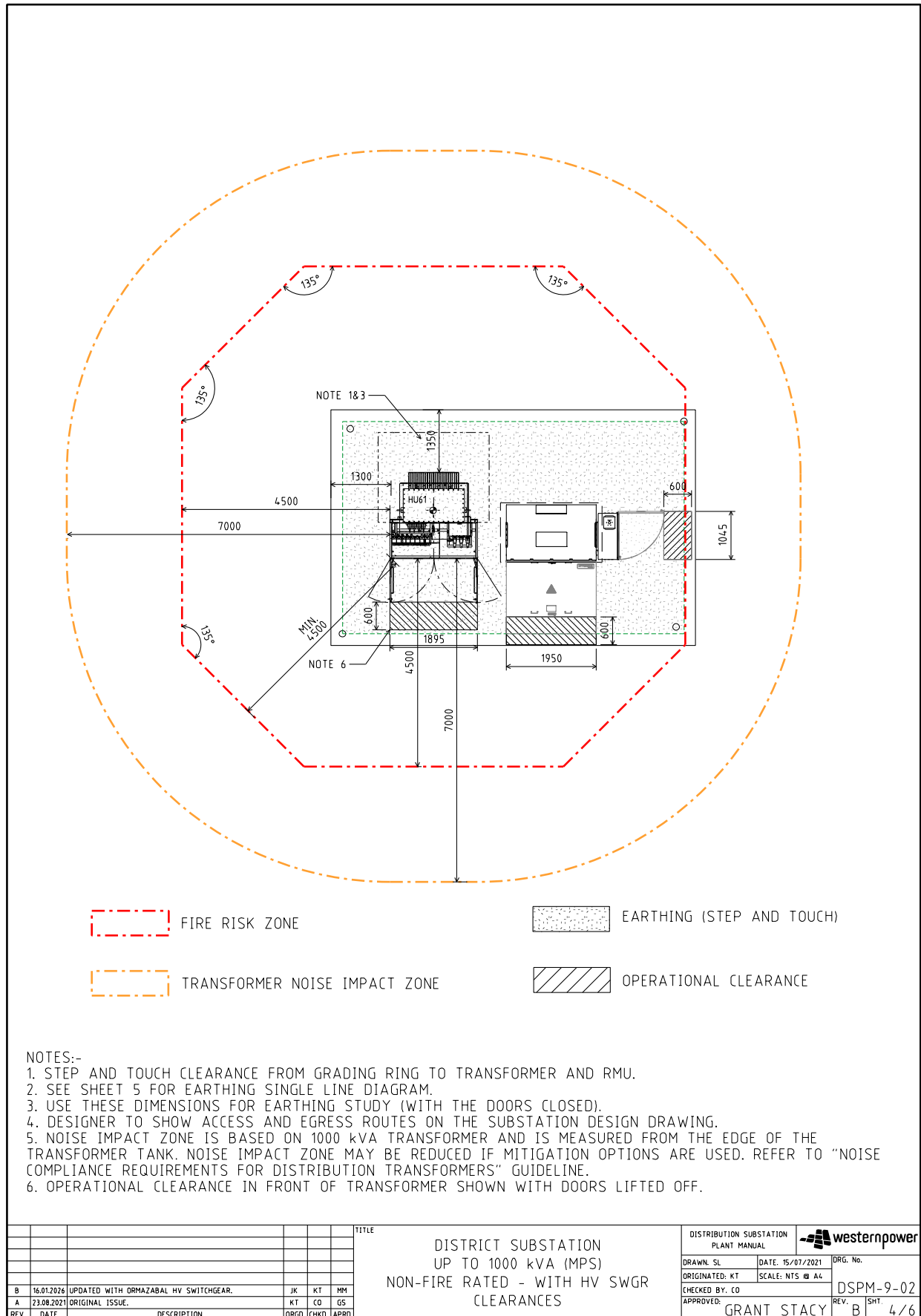
5.3.2 Land Requirements and Duct Installation



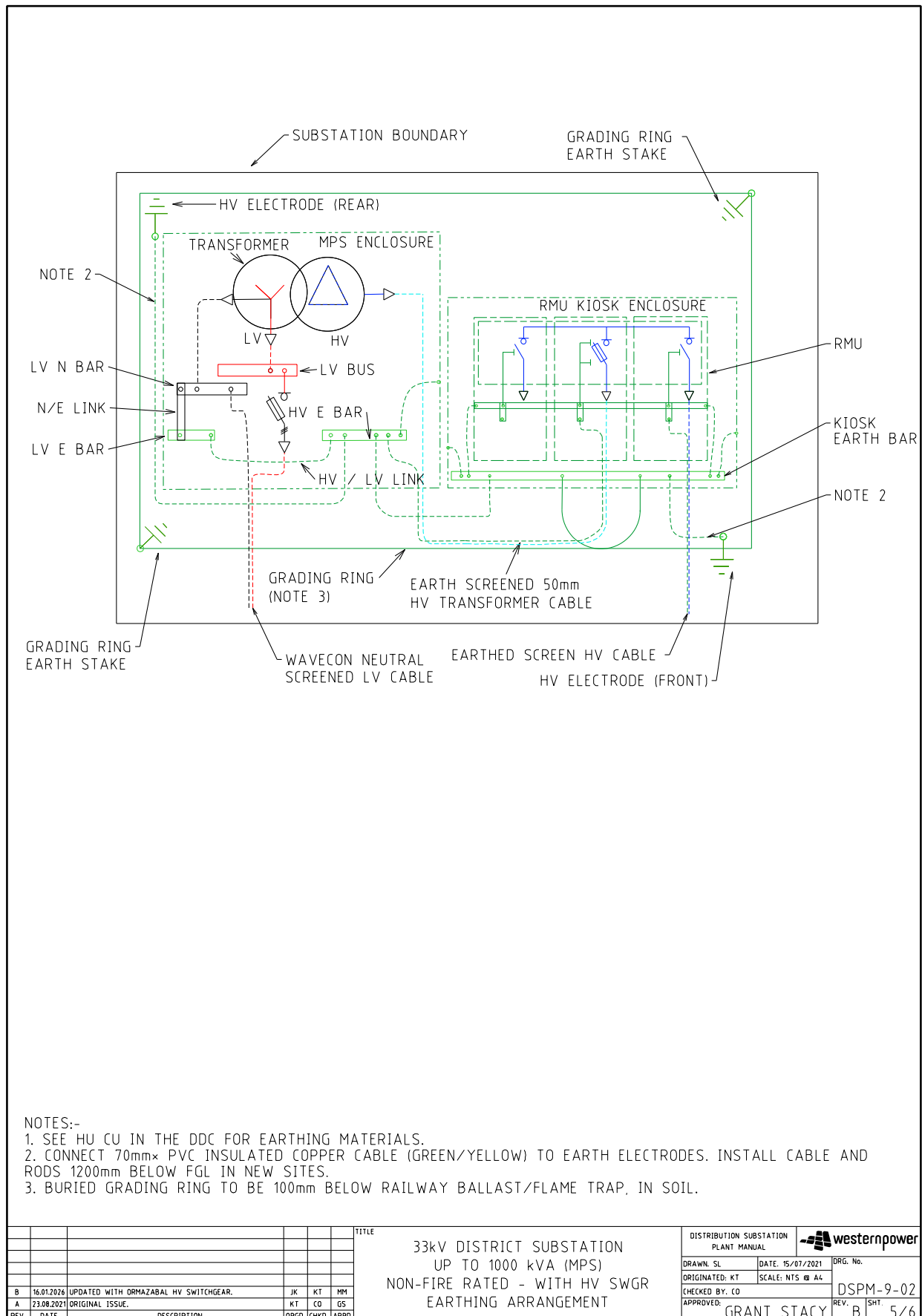
5.3.3 Equipment Selection and Layout



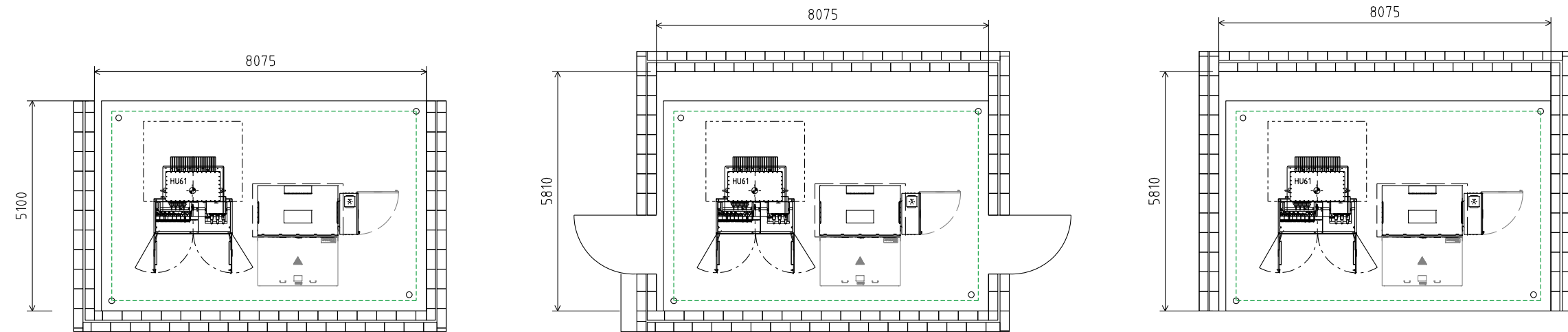
5.3.4 Non-Fire Rated Clearances



5.3.5 Earthing Arrangement



5.3.6 Screening Arrangement



NOTES:-

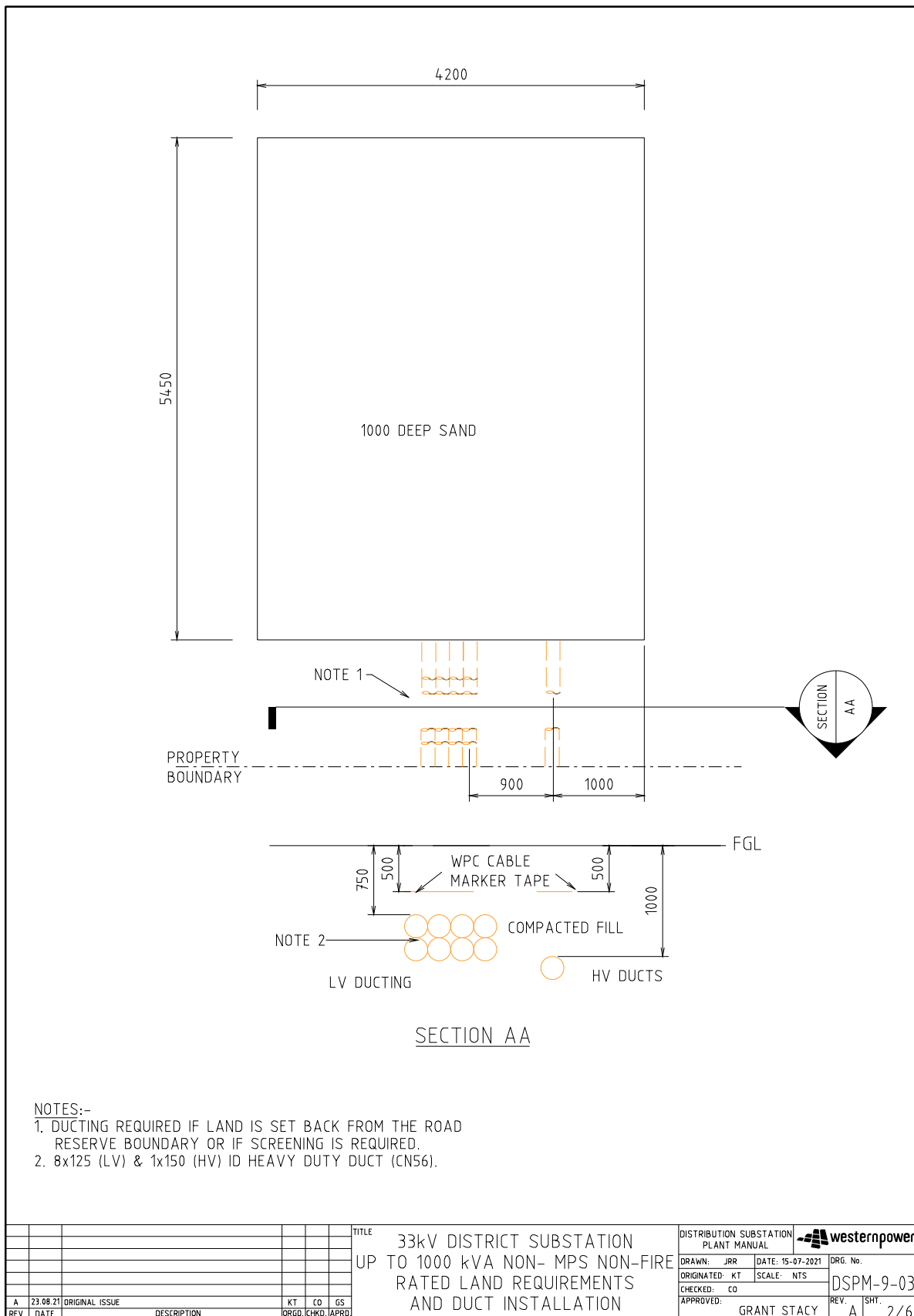
1. FOUNDATIONS SHALL FULLY RETAIN THE SITE TO ALLOW FUTURE EXCAVATION 1200mm DEEP WITHIN THE SUBSTATION SITE.
2. SCREENING OR FOUNDATIONS SHALL NOT ENCROACH INTO SUBSTATION SITE.
3. SCREENING SHALL NOT IMPACT OPERATIONAL CLEARANCE AND EGRESS REQUIREMENTS SHOWN ON SHEET 4.
4. DOORS (WHERE FITTED) MUST 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 TO DSPM CHAPTER 5 (FIRE RISK).
7. MINIMUM HEIGHT OF SCREEN WALL IS TO BE 1.8m (HEIGHT OF TRANSFORMER + 300mm).
8. EXCAVATIONS FOR SCREENING FOOTING GREATER THAN 1.2m NEEDS TO BE ASSESSED BY A COMPETENT CHARTERED CIVIL ENGINEER TO BE COMPLETED BY THE CUSTOMER.

					TITLE
B	16.01.2026	UPDATED WITH ORMZABAL HV SWITCHGEAR.			
A	23.08.2021	ORIGINAL ISSUE.	JK	KT	MM
REV	DATE	DESCRIPTION	KT	CO	GS
			ORGD.	CHKD.	APRD.

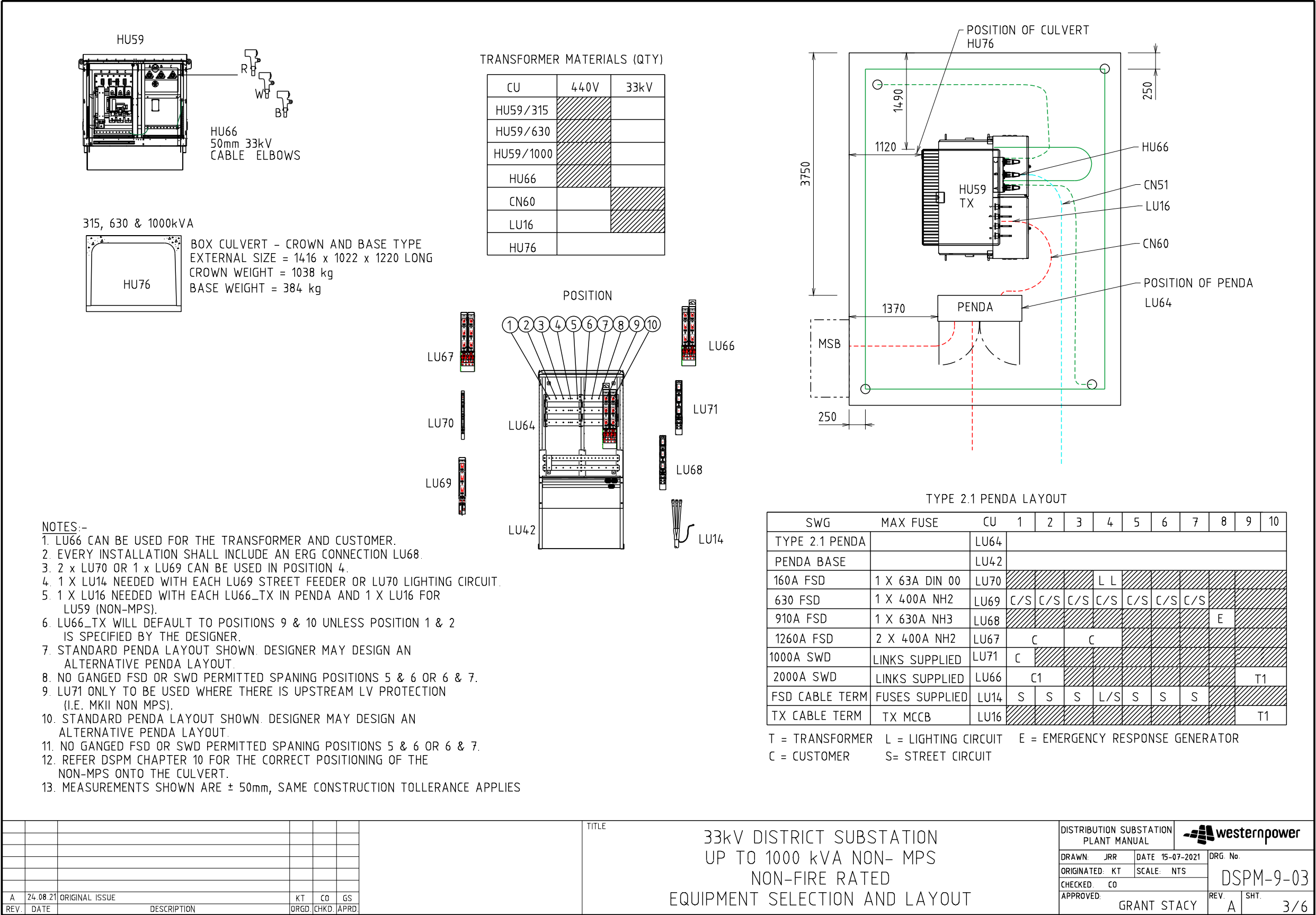
33kV DISTRICT SUBSTATION UP TO 1000 kVA (MPS) NON-FIRE RATED - WITH HV SWGR SCREENING ARRANGEMENTS

DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower	
DRAWN: SL	DATE: 15/07/2021	DRG. No.	
ORIGINATED: KT	SCALE: NTS @ A4		
CHECKED BY: CO			DSPM-9-02
APPROVED:	GRANT STACY	REV. B	SHT. 6/6

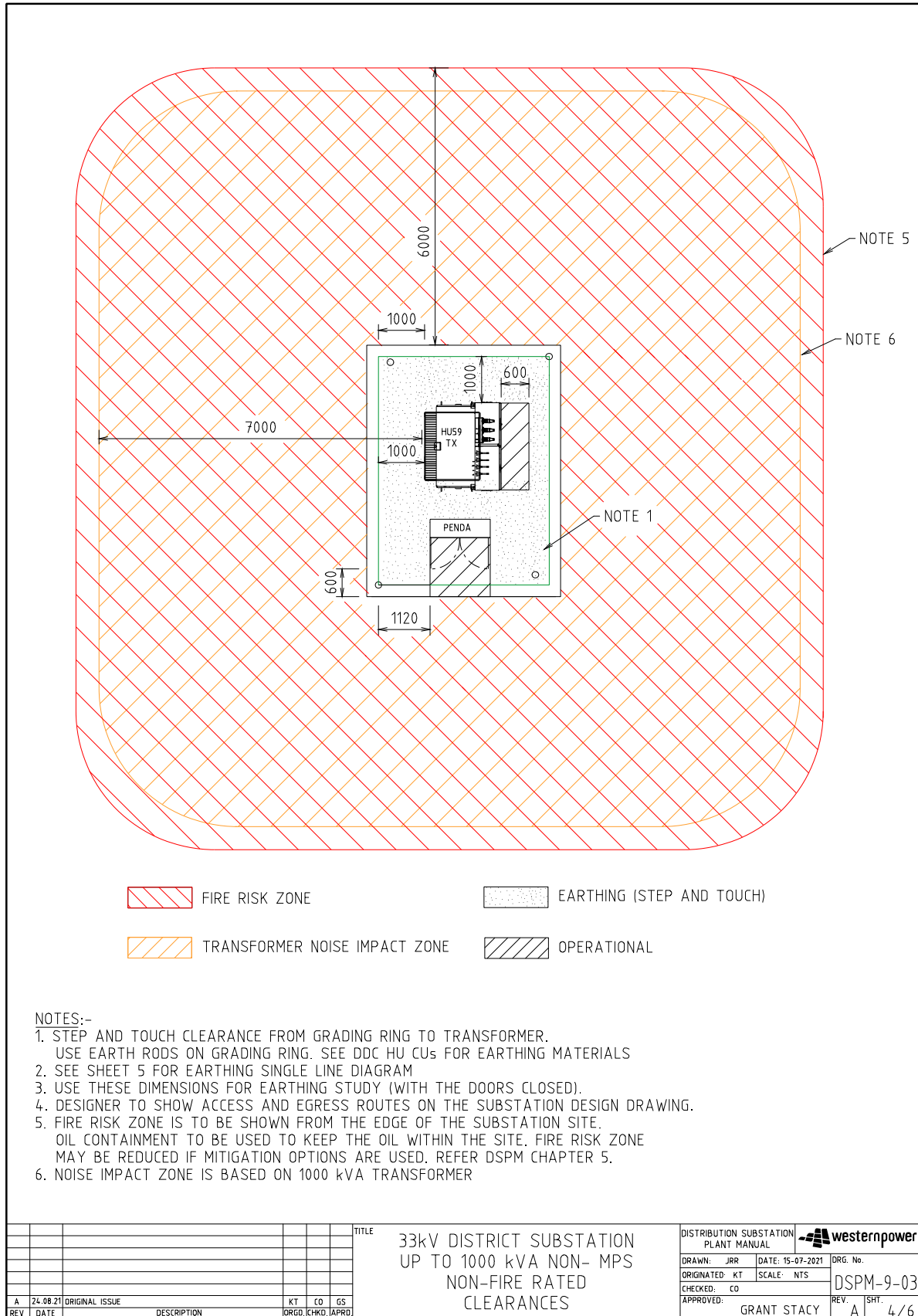
5.4.2 Land Requirements and Duct Installation



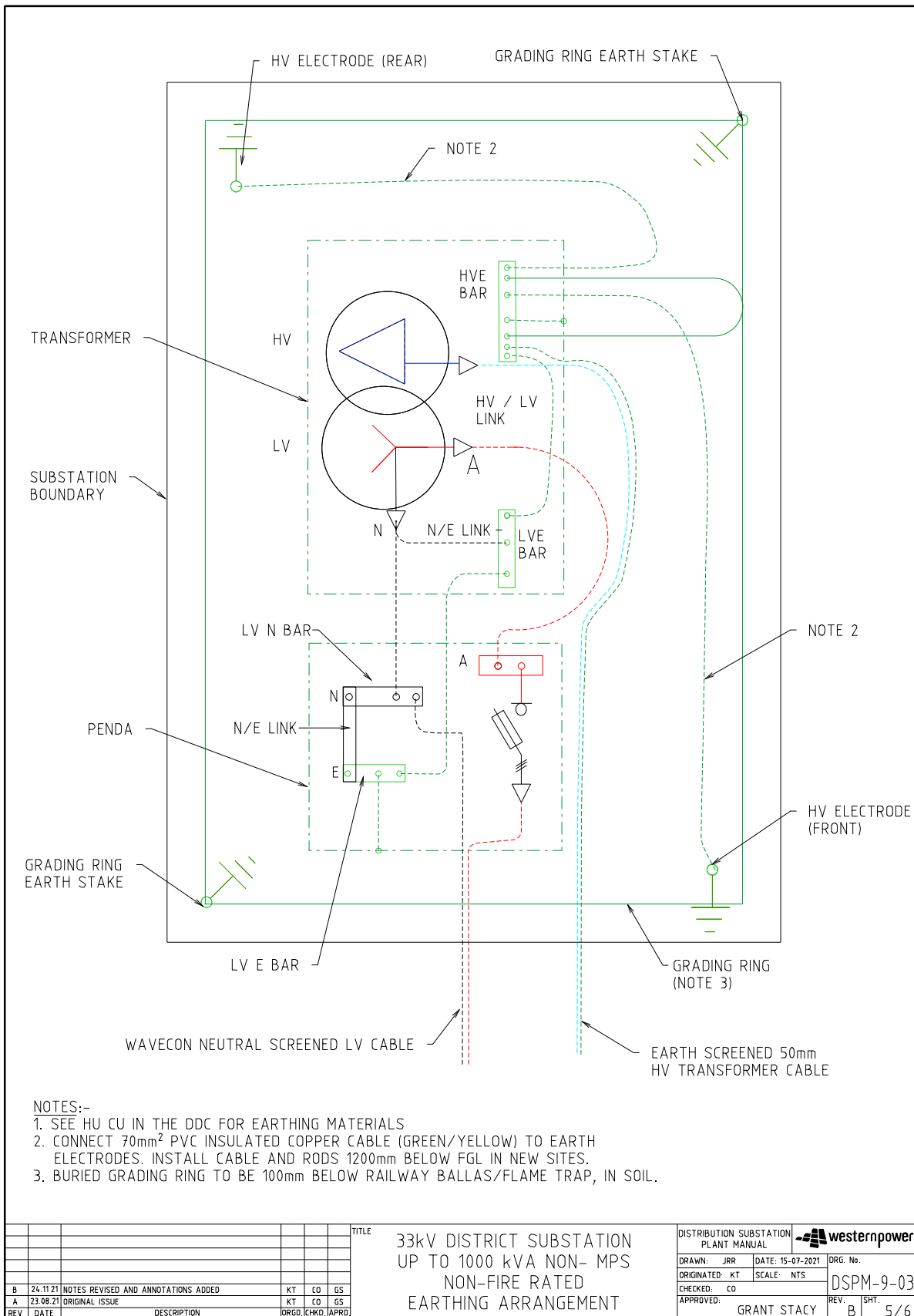
5.4.3 Equipment Selection and Layout



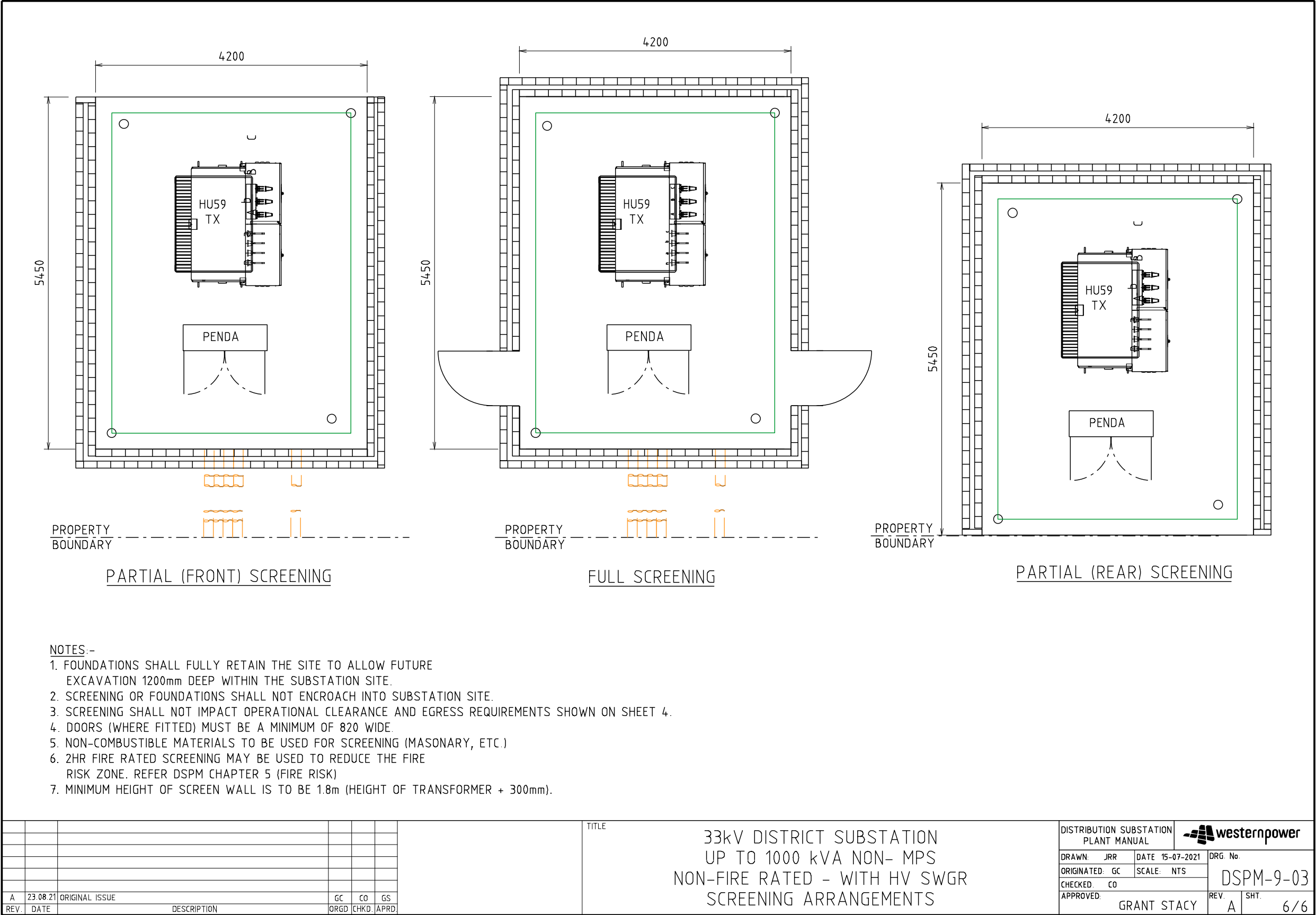
5.4.4 Clearances



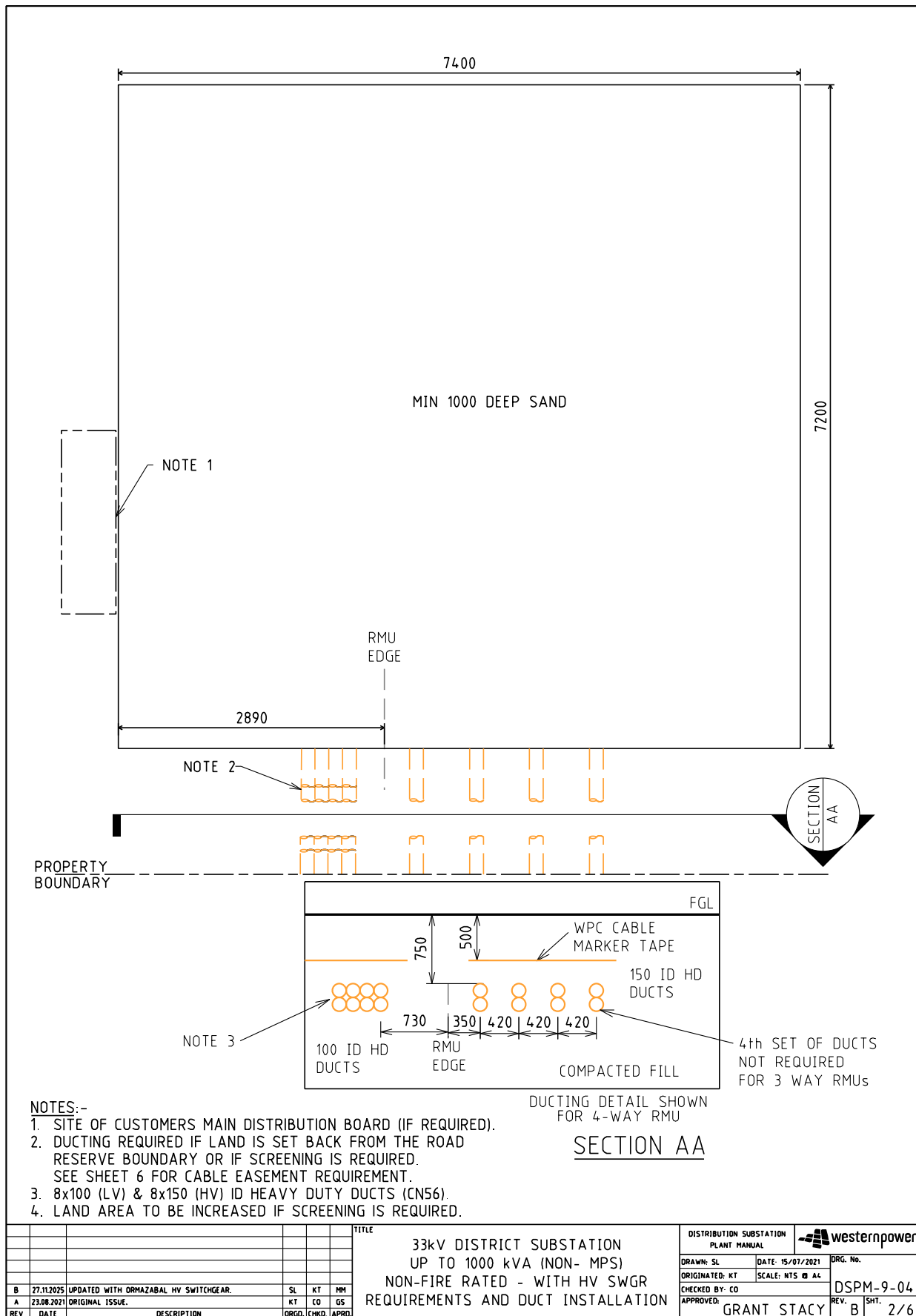
5.4.5 Earthing Arrangement



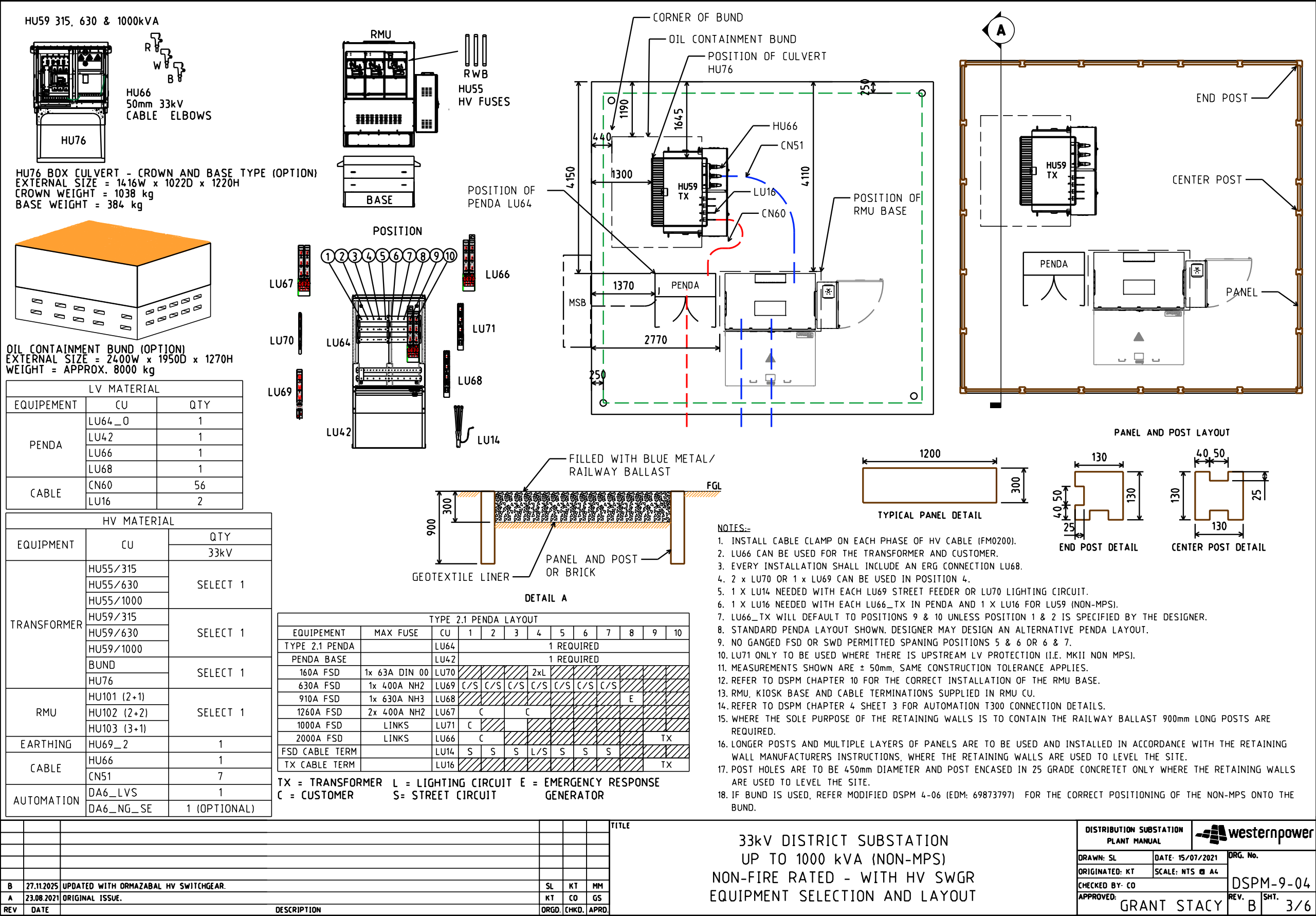
5.4.1 Screening Arrangement



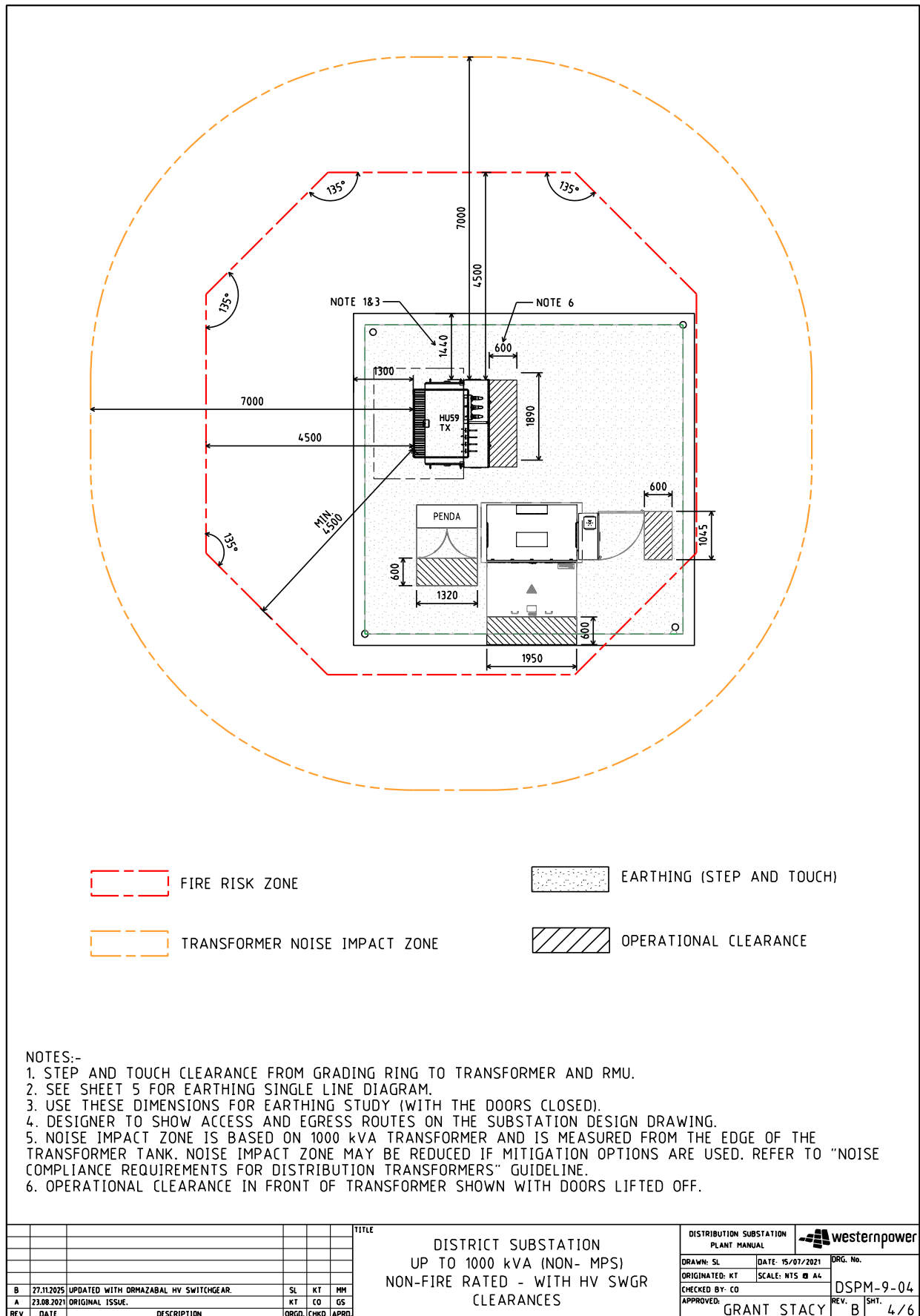
5.5.2 Land Requirements and Duct Installation



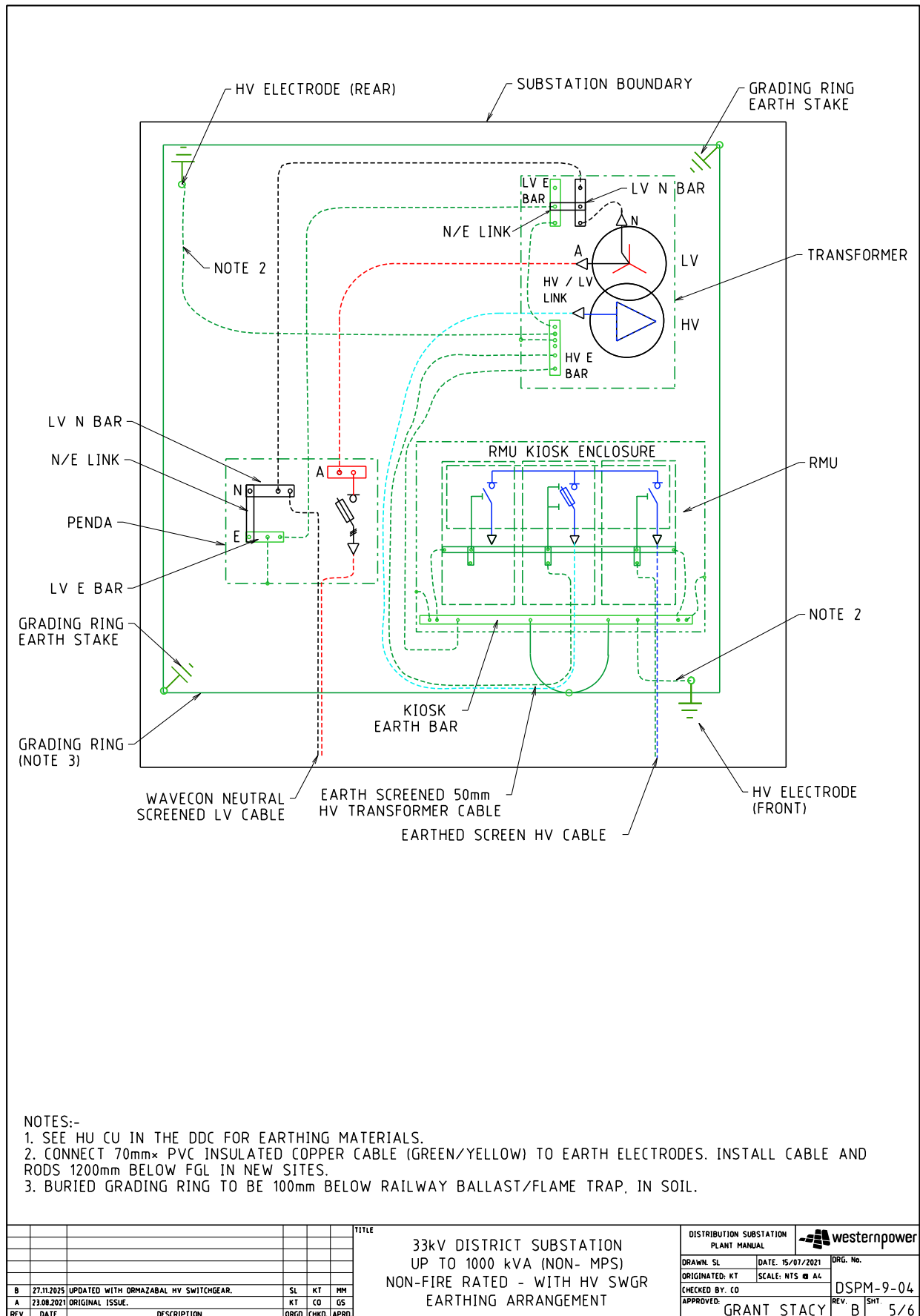
5.5.3 Equipment Selection and Layout



5.5.4 Clearances



5.5.5 Earthing Arrangement



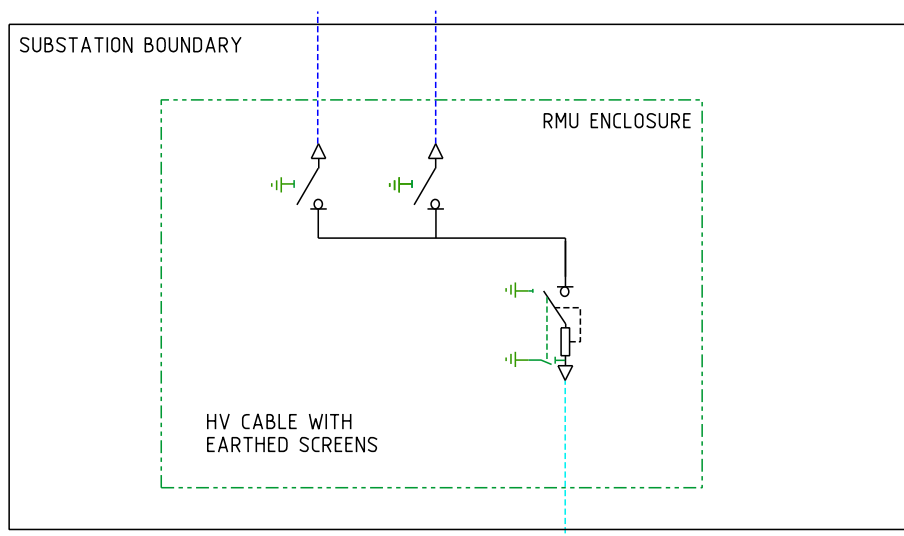


- | | | | | | | |
|-----|------------|---------------------------------------|------|------|------|----|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| B | 27.11.2025 | UPDATED WITH ORMAZABAL HV SWITCHGEAR. | | SL | KT | MM |
| A | 23.08.2021 | ORIGINAL ISSUE. | | KT | CO | GS |
| REV | DATE | DESCRIPTION | ORIG | CHKD | APPR | |

DISTRIBUTION SUBSTATION PLANT MANUAL		 westernpower	
DRAWN: SL	DATE: 15/07/2021	ORG. No.	
ORIGINATED: KT	SCALE: NTS @ A4	DSPM-9-04	
CHECKED BY: CO		REV. B	SHT. 6/6
APPROVED: GRANT STACY			

5.6 DSPM 9-27 33kV SWGR HV Outdoor Ground Mounted SWGR Ormazabal

5.6.1 Single Line Diagram



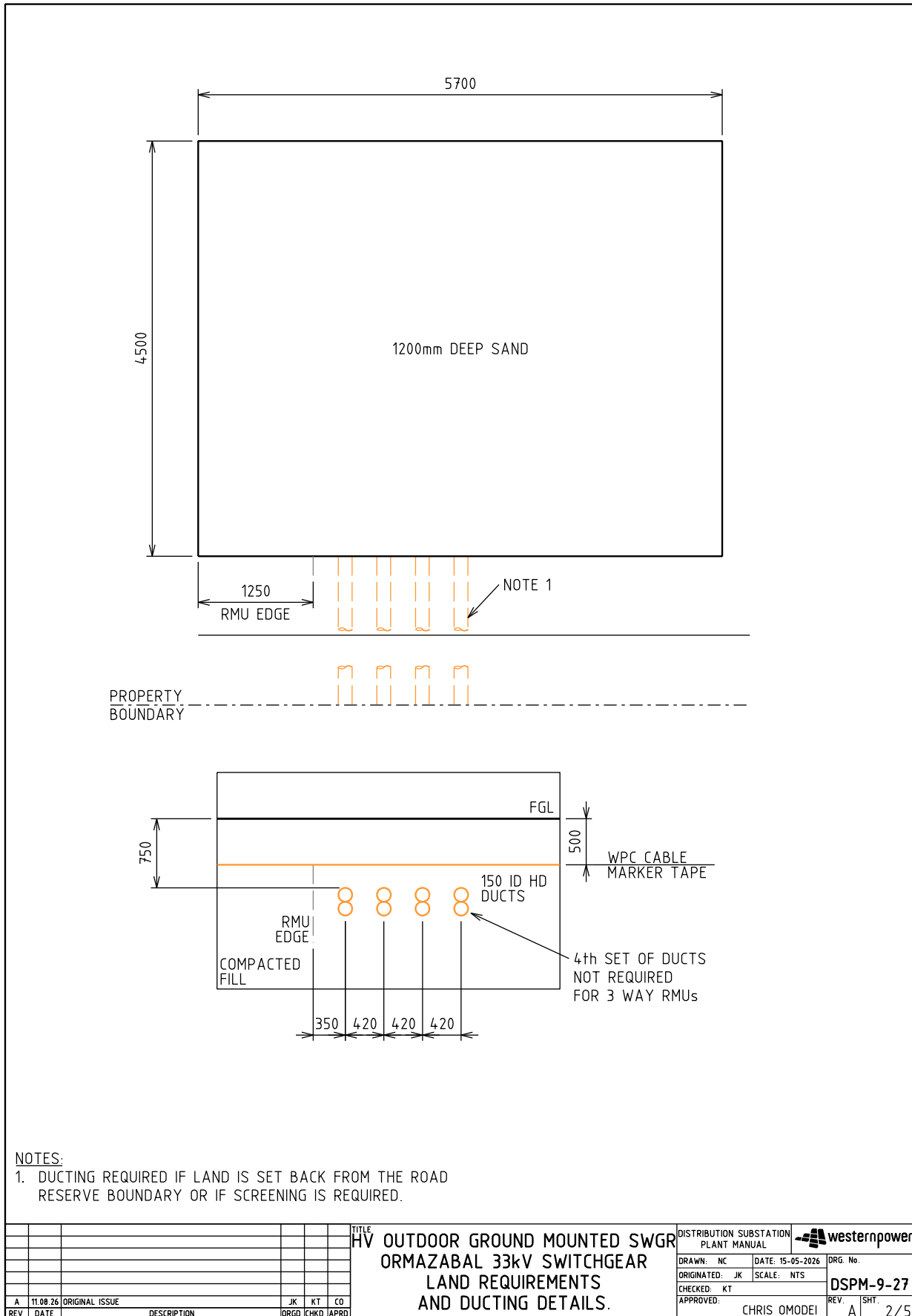
SINGLE LINE DIAGRAM

NOTES:

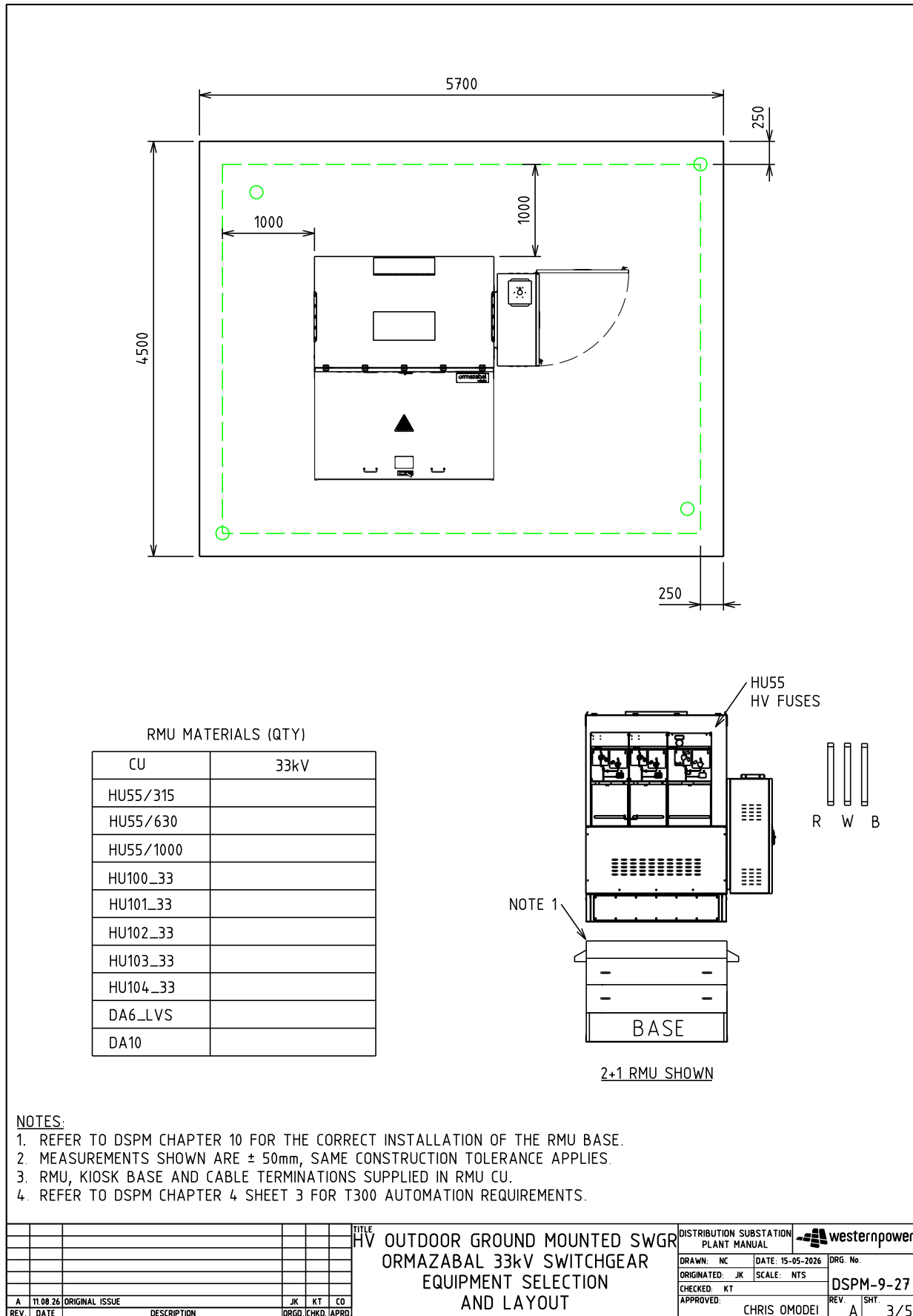
1. RMU 2+1 OPTION SHOWN (2 SWITCH-DISCONNECTORS AND 1 COMBINED FUSE-SWITCH)
2. OTHER OPTIONS (NOT SHOWN) INCLUDE 3+0, 2+2, 3+1, 4+0, 3+1CB
3. HV SWITCH-DISCONNECTORS ARE MOTORISED AND MAY BE AUTOMATED

						TITLE	DISTRIBUTION SUBSTATION PLANT MANUAL		 westernpower			
						HV OUTDOOR GROUND MOUNTED SWGR ORMAZABAL 33kV SWITCHGEAR SINGLE LINE DIAGRAM	DRAWN: NC		DATE: 15-05-2026		DRG. No.	
							ORIGINATED: JK		SCALE: NTS		DSPM-9-27	
							CHECKED: KT					
							APPROVED:		CHRIS OMODEI		REV. A SHT. 1/5	
A	11.08.26	ORIGINAL ISSUE				JK	KT	CO				
REV.	DATE	DESCRIPTION			ORGO	CHKD	APRD					

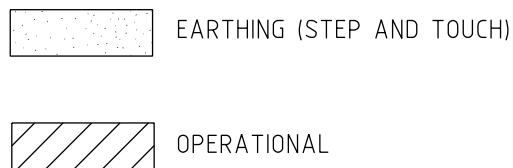
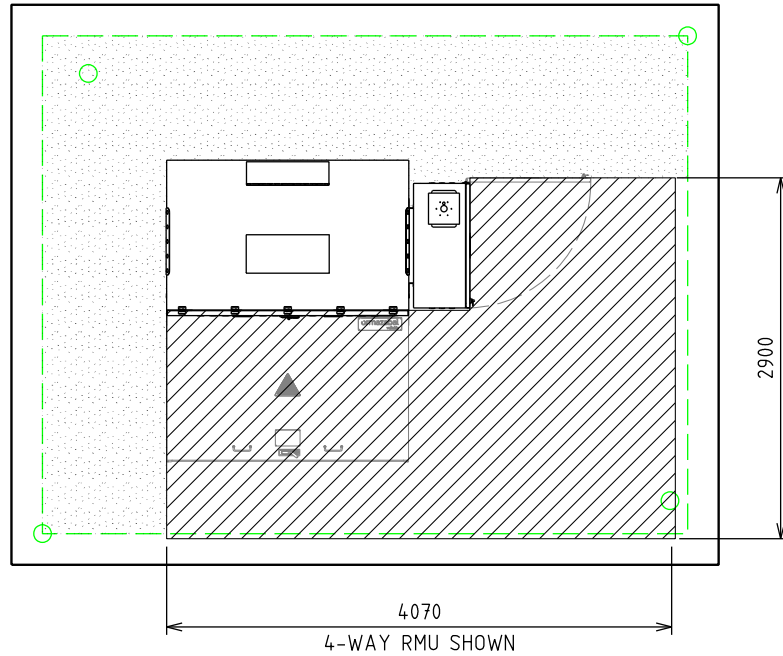
5.6.2 Land Requirements and Duct Installation



5.6.3 Equipment Selection and Layout



5.6.4 Clearances

**NOTES:**

1. STEP AND TOUCH CLEARANCE FROM GRADING RING TO 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.

				TITLE		DISTRIBUTION SUBSTATION PLANT MANUAL		westernpower	
				HV OUTDOOR GROUND MOUNTED SWGR		DRAWN: NC		DATE: 15-05-2026	
				ORMAZABAL 33kV SWITCHGEAR		ORIGINATED: JK		SCALE: NTS	
				CLEARANCES		CHECKED: KT		ORG. No.	
						APPROVED: CHRIS OMODEI		DSPM-9-27	
								REV. A	
								SHT. 4/5	

5.6.5 Earthing Arrangement

