Engineering System Integrity
Electrical Network Safety Rules

## Engineering Procedure
## Electrical Distribution Unit

## Working Near or On/Within

# PR D 78506

# Substation – Demarcation Taping

Version 1.1
Date in Force: 2 February 2026

Transport Sydney Trains

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# Document control

| Version | Date | Author/ Prin. Eng. | Summary of change |
|---|---|---|---|
| 1.0 | 1 February 2022 | ENSR Project Team | First issue from Sydney Trains document. Reviewed as part of the ENSR Project. Extracted from PR D 78502 V2.2 Section 13 Electrical Safe Work Area and Demarcation Taping. |
| 1.1 | 2 February 2026 | Nick Loveday | Periodic review, republished with no change. |

# Table of Contents

# 1 Purpose and Scope

To describe the requirements for demarcation taping of Electrical Safe Work Areas associated with Substation Access Permits issued for work near or on/within high voltage equipment in Sydney Trains substations.

# 2 Definitions

Refer to the **Electrical Safety Definitions** page available on the **RailSafe** site.

# 3 Approved Demarcation Tape Equipment to be used

Only the equipment specified in Transport for NSW (TfNSW) standard *T HR EL 15001 SP Substation Electrical Safe Work Area Demarcation Taping Equipment* shall be used to erect demarcation tape barriers for defining the Electrical Safe Work Area in substations.

Tape stands are to be stable in windy conditions. Yellow, 10kg in mass, tape stand weights are provided in the taping equipment kit for this purpose.

Demarcation taping equipment that is damaged, dirty, faded or detracts in any way from its visual impacts shall not be used.

**NOTE**

**The demarcation taping equipment shall not be used for any other purpose in a Sydney Trains Substation.**

**Figure 1: Demarcation tape equipment overview**

# 4 Two Barrier Methods

Two different methods of demarcation taping may be employed. They are the:

1. Barrier In Method Safe work area inside
2. Barrier Out Method Safe work area outside.

Risk assessment of the work site shall determine the most appropriate method of taping to be used.

## 4.1 Barrier In Method

Usually in Sydney Trains' outdoor high voltage yards, the Barrier In Method should be used as it is the most practical method of identifying the equipment to be worked on and establishing an Electrical Safe Work Area, as shown in Figure 2.

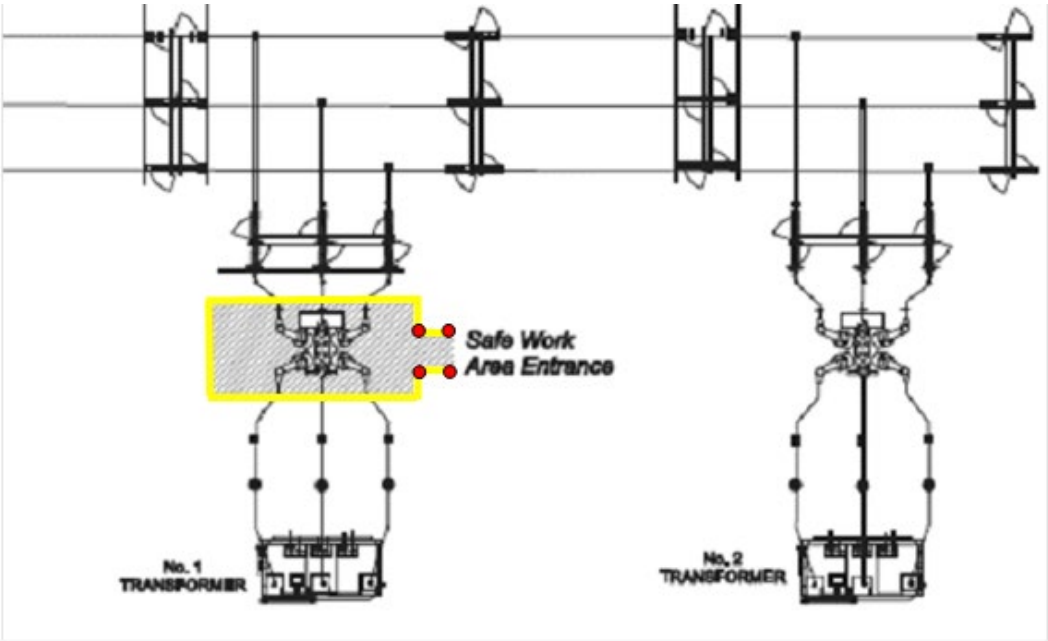


**Figure 2: Barrier In Method**

A demarcation tape barrier is erected around the equipment covered by the Substation Access Permit and inside the taped area becomes the Electrical Safe Work Area. Accordingly, any electrical equipment located within or above the demarcation taped Electrical Safe Work Area shall be safe to work on unless specifically excluded by the Substation Access Permit via a Warning note.

While carrying out the work under the Substation Access Permit, personnel shall be capable of maintaining the appropriate SADs to any exposed electrical equipment, either outside the demarcation tape barrier or excluded from the Electrical Safe Work Area via a Warning note. These SADs are described in *SP D 79049 Safe Approach Distances (SADs)*.

Personnel are not permitted to cross an erected demarcation tape barrier. Personnel shall enter and exit by a single defined entrance corridor as shown in Figure 3.

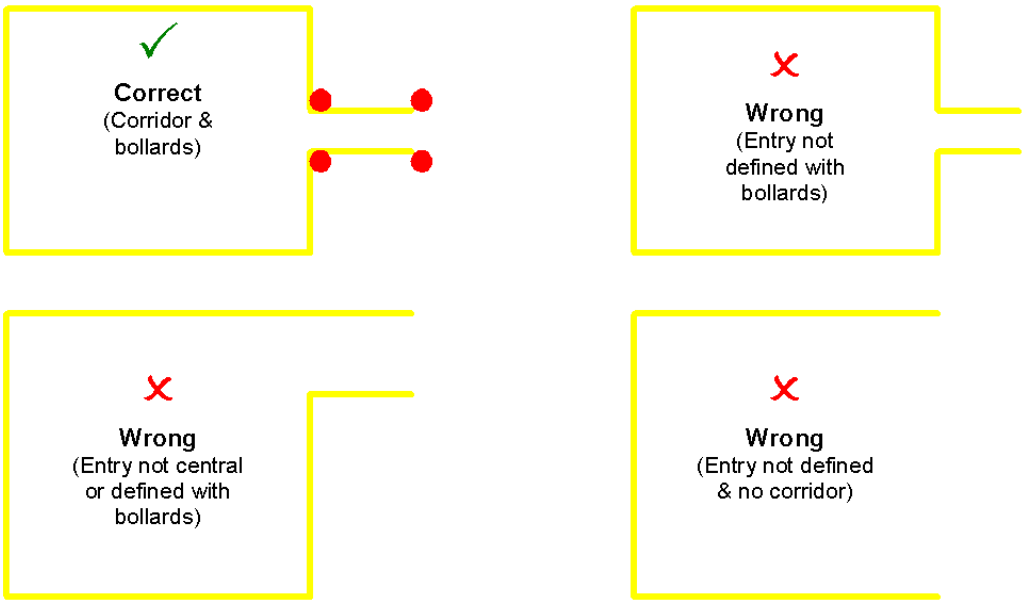


**Figure 3: Defining the entrance for a demarcation taped Electrical Safe Work Area utilising the Barrier In Method**

The defined entry corridor should join the Electrical Safe Work Area at right angles and in the centre of one side so as to provide an additional indicator of the defined entry point.

If, due to the layout of equipment, it is not possible to have the defined entrance corridor at right angles or in the centre of a side:

a. the entrance shall still be defined by four (4) or more of the approved red high visibility bollards,

b. the entrance shall be identified via a Warning note on the Substation Access Permit (item (7)), and

c. all staff shall be made aware of this situation during the pre-work brief.

If a risk assessment reveals that it is necessary, a defined restricted access route may be established by the Substation Access Permit Issuer to control how persons access the Electrical Safe Work Area. Neither yellow tape nor the red high visibility bollards are permitted to be used to establish this defined restricted route and unauthorised persons using this defined restricted route shall be supervised at all times by a person who is authorised as per *PR D 78502 Substation Access Permit* Section 6 Substation Access Permit Holders.

## 4.2 Barrier Out Method

In some situations, due to the layout of the equipment within the high voltage outdoor area or the type of work to be performed, the Barrier Out Method may be used, where all live equipment is fenced out. This is shown in Figure 4.

A demarcation tape barrier is erected between the equipment covered by the Substation Access Permit and all other live equipment in the substation. Other access to the live equipment in the indoor substation or outdoor yard is to be taped off also. Accordingly, any electrical equipment located within or above the demarcation taped Electrical Safe Work Area shall be safe to work on unless specifically excluded by the Substation Access Permit via a Warning note at item (7). While carrying out the work under the Substation

Access Permit, personnel shall be capable of maintaining the appropriate SADs to any exposed electrical equipment either outside the demarcation tape barrier or excluded from the Electrical Safe Work Area via a Warning note at item (7). These SADs are described in SP D 79049.

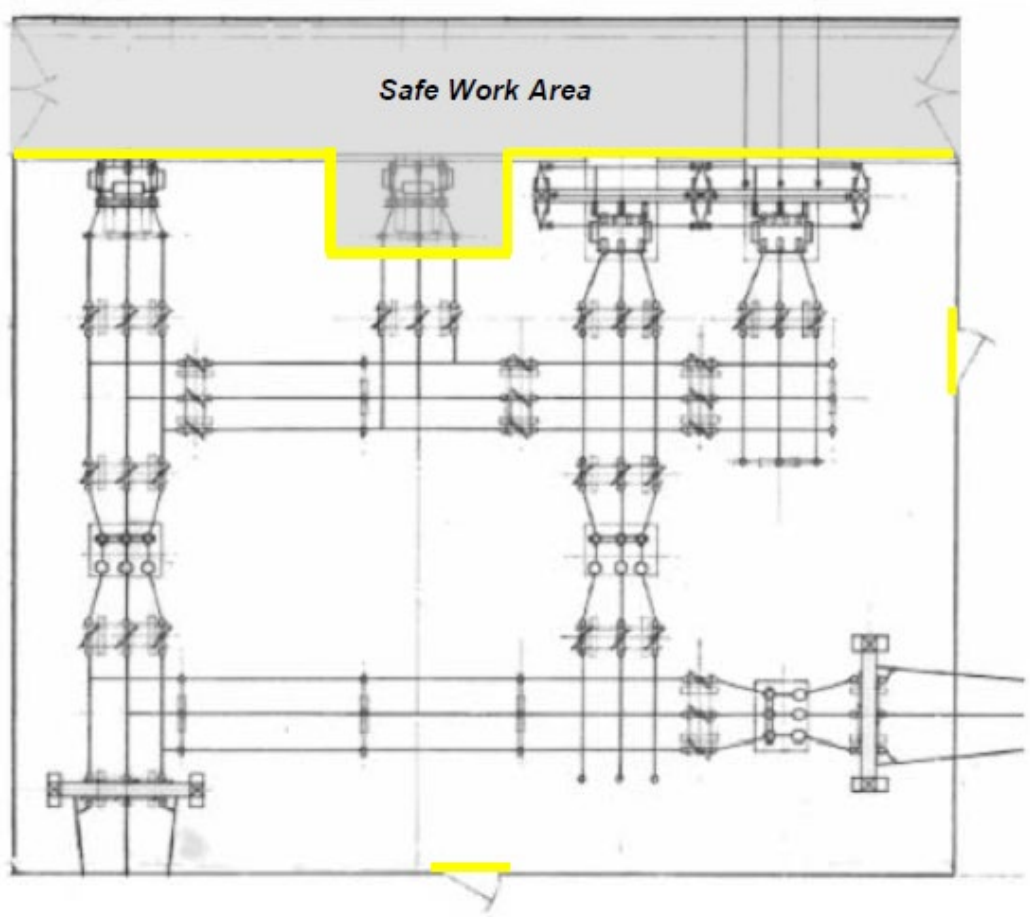


**Figure 4: Barrier Out Method**

When the entry is clearly defined by other means and access is prevented to all other live equipment, red high visibility bollards may not be required at the entrance.

Personnel are not permitted to cross an erected demarcation tape barrier. Personnel shall enter and exit the Electrical Safe Work Area by the defined entrance.

For indoor substations, only the Barrier Out method shall be used. If the Barrier Out Method cannot be safely applied, the substation access permit shall be held by an Authorised Person (Substations).

## 4.3 Example Barrier Methods

Please contact Electrical Distribution Unit RailElectricalSafety@transport.nsw.gov.au for samples of Barrier Methods and demarcation taping arrangements.

# 5 General Requirements of Demarcation Tape Barriers and Electrical Safe Work Area

## 5.1 Erecting Demarcation Tape Barriers

A demarcation tape barrier shall be erected whenever work is to be performed under a Substation Access Permit.

Only persons authorised to issue a Substation Access Permit at that particular location are permitted to either erect/remove or on-site supervise the erection/removal of demarcation tape barriers at that particular location.

The demarcation tape barrier shall only be erected after the completion of isolation, proving de-energised and the short circuiting and earthing of the equipment.

The demarcation tape barrier shall be erected prior to the issue of the Substation Access Permit.

## 5.2 Size of Demarcation Taped Areas

Demarcation taped areas shall be of adequate size to:

a. Allow the work under the Substation Access Permit to be undertaken without crossing over or under the Demarcation tape and

b. Ensure that work to be performed under the Substation Access Permit for which the demarcation tape is to be erected can be carried out while maintaining required SADs to live exposed electrical equipment. Refer to SP D 79049.

## 5.3 Size of the Single Defined Entrance Corridor to the Electrical Safe Work Area

The four (4) red high visibility bollards should form a rectangular defined entrance corridor of approximately 1.5m in width and between 2.0m and 3.0m in length.

## 5.4 Defined Restricted Access Routes

The Authorised Person (Substations) issuing the Substation Access Permit is responsible for conducting the risk assessment to determine if a defined restricted access route to the entrance of an Electrical Safe Work Area is necessary.

If such a defined restricted access route is necessary, then the route:

a. Shall be established, and

b. Referenced on the Substation Access Permit under item (7) Warnings indicating the existence and mandatory use of such a defined restrictive access route.

The Substation Access Permit Issuer shall instruct the Permit Holder as per PR D 78502 Section 7.2 Instructing the Permit Holder. The Permit Holder shall instruct the Work Party members as per PR D 78502 Section 8.1 Instruct Workers.

When a restricted access route is defined utilising tape, the tape shall be:

a. Erected or removed at the same time as the demarcation barrier tape is erected or removed and

b. Erected, modified and used in a similar fashion as to demarcation tape; i.e. the specific requirements of Section 4.1 Barrier In Method, Section 4.2 Barrier Out Method, and the general requirements of Section 5 concerning height, support, stability, modification and crossing of demarcation tape barriers, etc.

Similar to the erection of demarcation tape, structures that support HV equipment are not to be used to support defined restricted access route tape.

## 5.5 Height of Demarcation Tape Above Ground

Demarcation tape barriers shall be erected at a nominal height of 900mm above ground, with sufficient support stands to ensure that the tape does not sag below nominal 700mm above ground.

## 5.6 Supporting Demarcation Tape

The yellow demarcation tape is to be supported as follows:

a. When part of an Electrical Safe Work Area defined entrance – by red high visibility bollards and

b. When not part of an Electrical Safe Work Area defined entrance – by yellow tape stands or by structures that do not support high voltage equipment such as fences, gates or walls.

Structures that support high voltage equipment are not to be used to support demarcation tape. Refer to Figure 5 below.

The demarcation tape shall not pass through a composite member structure that supports a switch being used as a point of isolation for the Substation Access Permit.

**Figure 5: Tape is supported by stands, NOT high voltage structures**

## 5.7 Using Permanent Structures Such as Walls and Fences as Part of the Demarcation Tape Barrier

Structures such as permanent fences, buildings and blast walls that prevent entry and exit of the Electrical Safe Work Area may be used as part of the barrier provided no gaps exist between the structure and the tape. Any locked gate used for this purpose shall have yellow tape erected across it. Sections of permanent fence used as part of the barrier are not required to have yellow tape strung along them.

## 5.8 Climbing Structures Within a Demarcation Tape Barrier Defined Electrical Safe Work Area

Climbing of steel structures which support high voltage electrical equipment and are in an area that is under a Substation Access Permit is not permitted.

To gain access to equipment mounted on these steel structures, appropriate ladders, elevated work platforms, dedicated climbing points, scaffolding and work platforms shall be used in these situations.

Climbing of wooden poles which support high voltage electrical equipment and are in an area that is under a Substation Access Permit is permitted, using pole steps provided as well as appropriate ladders, elevated work platforms, dedicated climbing points, scaffolding and work platforms.

## 5.9 Removing the Demarcation Tape Barrier

A demarcation tape barrier shall be removed immediately after cancellation of the associated Substation Access Permit and prior to removal of earths and restoration of supply.

It is not permissible to leave demarcation tape erected unattended, e.g. overnight or between shifts. Likewise, it is not permissible to leave the stands unattended.

For Extraordinary and Test Substation Access Permits, earths are permitted to be removed and re-applied a number of times without cancellation of the Permit. In this case, a demarcation tape barrier associated with such a Permit shall be removed immediately following cancellation of the Permit.

## 5.10 Modifying the Electrical Safe Work Area/Demarcation Tape Barrier After the Issue of the Associated Substation Access Permit

Once the Permit has been issued, modification of the demarcation tape barrier is not permitted. If it is found that the Electrical Safe Work Area needs to be changed, the permit shall be cancelled according to PR D 78502 Section 9 Cancelling a Permit, and a new Permit shall be issued according to PR D 78502 Section 7 Issuing a Permit.

The Permit Holder can temporarily lower the demarcation tape if plant and equipment cannot pass into the Electrical Safe Work Area via the defined entrance provided it is re-established immediately after the crossing and a Safety Observer is in place while the barrier is lowered.

In the event where the demarcation tape is damaged, no work shall be conducted prior to the re-establishment of the demarcation tape according to the original Permit and revalidation of the original Permit and the Electrical Safe Work Area by an Authorised Person (Substations).

# 6 Signage Associated with Demarcation Tape Barriers

Live exposed high voltage equipment can exist in the vicinity of demarcation taped areas in a number of different scenarios, with each scenario requiring individual consideration of signage requirements. Common signage requirements to all scenarios are that:

d. An adequate number of warning signs shall be utilised to ensure appropriate identification of the live exposed high voltage equipment in the vicinity of the demarcation taped area; and

e. The warning, on the warning sign(s), shall be visible from within the Electrical Safe Work Area.

Three scenarios follow; however, a particular demarcation taped area may require the consideration of a combination of the individual scenarios presented below.

## 6.1 Live Exposed High Voltage Equipment Within 3m of the Demarcation Taped Area

Where live exposed high voltage equipment is within 3m of the demarcation taped area, warning signs shall be used. Refer to Figure 6 for an example of the use and placement of a warning sign used in this context.


**Figure 6: Example use of Warning sign**

Where live exposed high voltage equipment exists vertically above a demarcation taped area, and is supported by a structure located inside the demarcation taped area, then a warning sign shall be placed at the base of this structure. For details of other controls that shall be considered in this situation, see also:

a. PR D 78502 Section 7 Issuing a Permit for the requirement to include a warning on the Substation Access Permit item (7) concerning the existence of this live exposed high voltage equipment, and

b. *PR D 78108 Pre-Work Hazard Assessment and Controls for Work on Poles with Live Exposed Equipment*.


**Figure 7: Warning sign**

## 6.2 Live Exposed High Voltage Equipment Vertically Above the Demarcation Taped Area and Not Supported by a Structure Located Inside the Demarcation Taped Area

Where live exposed high voltage equipment exists vertically above a demarcation taped area but is not supported by a structure located inside the demarcation taped area (for example, a high voltage aerial line), it is not necessary to install signs warning of the presence of this equipment. However, the Substation Access Permit shall include a warning concerning the existence of this live exposed high voltage equipment at item (7) of the Substation Access Permit.

# 7 Location of earths in Relation to the Demarcation Taped Electrical Safe Work Area

High voltage equipment in outdoor yards shall be earthed at locations as described in *PR D 78203 High Voltage Operating Procedure*. The earths are not provided as a visual indicator of the extent of the Electrical Safe Work Area as this is the function of the demarcation tape. It is, for example, conceivable that earths on one or more sides may not be visible to workers inside a demarcation taped area. It is also conceivable that earths will be placed inside the demarcation taped area. It is the responsibility of the Authorised Permit Holder to ensure that the earths have been placed as required by PR D 78203.

# 8 Reference documents

PR D 78108 Pre-Work Hazard Assessment and Controls for Work on Poles with Live Exposed Equipment

PR D 78203 High Voltage Operating Procedure

PR D 78502 Substation Access Permit

SP D 79049 Safe Approach Distances (SADs)

T HR EL 15001 SP Substation Electrical Safe Work Area Demarcation Taping Equipment