Standard

Substation Signage Standard

R517372

Version 1.0, June 2018

Tasmanian Networks Pty Ltd (ABN 24 167 357 299)

Authorisations

Action	Name and title	Date
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Review cycle	30 months	

Responsibilities

This document is the responsibility of the Asset Strategy Team, Tasmanian Networks Pty Ltd, ABN 24 167 357 299 (hereafter referred to as "TasNetworks").

Please contact the Asset Strategy Leader with any queries or suggestions.

- Implementation All TasNetworks staff and contractors.
- Compliance All group managers.

Minimum Requirements

The requirements set out in TasNetworks' documents are minimum requirements that must be complied with by all TasNetworks team members, contractors, and other consultants.

The end user is expected to implement any practices which may not be stated but which can be reasonably regarded as good practices relevant to the objective of this document.

Record of revisions

Section number	Details
Entire doc	Copied over verbatim from superseded Transend to TasNetworks template. Updated Transend to TasNetworks document reference numbers where known including Australian Standards.

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1 General

1.1 Purpose

This standard specifies the minimum requirements for signage present in TasNetworks Transmission substations.

1.2 Scope

This standard applies to information, regulatory, hazard, emergency information and fire equipment signs required in Transmission substations owned by TasNetworks.

1.3 Objective

TasNetworks requires a standard for substation signage to ensure:

- that the relevant Australian legal requirements are met;
- personnel and public safety;
- that the requirements of the TasNetworks Strategic Plan are met; and
- that the exposure of TasNetworks' business to risk is minimised.

1.1 Definitions

Composite sign	A sign comprising numerous symbolic signs
Danger	Applied in the context of signs to a situation which is likely to be life threatening if the message is ignored.
Hazard	A source of potential harm or a situation with potential for harm.
Substation	As defined by AS/NZS 3000. In the context of this document includes Substations, Switching Stations, Terminal Stations and Tee Structures.
Symbol	A graphic or pictorial device used to represent objects or concepts, excluding letters numerals and punctuation.
Symbolic shape	A characteristic shape and safety colour combination used to identify the function of a sign.
Symbolic sign	A sign comprising the combination of a graphic symbol and a symbolic shape

1.2 References

1.2.1 TasNetworks standards

	O&M manual for SAFT125UDC	R02/1251
	Chemical Management Procedure	TNM-PC-809-0088
R502171 in draft	Power and Magnetic Fields Procedure	TNM-GS-809-0069
	Management of SF_6 Gas Procedure	TNM-GS-809-0094
R472616	Asbestos Management and Control in the Workplace Procedure	TNM-GS-809-0316
R112684	Personal Protective Equipment standard	
R565984	AC Distribution System Standard	
R522693	DC Distribution System Standard	
R590634	Substation Civil Design and Construction Standard	
R522687	General Substation Requirements Standard	
R579297	Security Fences and Gates Standard	

1.2.2 Industry Standards

Australian Dangerous Goods Code; Edition 6, National Road Transport Commission

AS 1216 – Class labels for dangerous goods

AS 1319 – Safety Signs for the Occupational Environment

AS 2293 – Emergency evacuation lighting for buildings - Emergency luminaries and exit signs

AS 2342 – Development, testing and implementation of information and safety symbols and symbolic signs (partially superseded by AS 1743 Road Signs)

AS/NZS 3000 – Electrical Wiring Rules

AS 4806.1—Closed Circuit Television (CCTV) Part 1: Management and Operation Code of Practice

Building Code of Australia

Draft National Guidelines for the prevention of unauthorised access to electricity networks; ENA

How to HAZCHEM placard premises; Workplace Standards Tasmania

National Health and Medical Research Council Interim Exposure Guidelines 1989

2 Standard requirements

Signs are designed to convey information of a hazard, a prohibition or emergency risk. All signs must consist of symbols and symbolic shapes in accordance with AS 1319. All signs must be installed in compliance with AS/NZS 3000 and AS 2342. In the event that this standard conflicts with information from other standards, the most stringent requirement will be considered mandatory.

Wording of signs must receive approval from TasNetworks Legal and Contracts Department. Any sign that contains incorrect, irrelevant or misleading information must be removed.

TasNetworks will give consideration to placing signs in languages other than English. Non English signs must still purvey the intended message in a clear concise manner.

2.1 Location

Signs must not be placed in positions that aid inappropriate entry into substations by allowing climbing or placed, constructed and erected so as to produce another hazard. Where signs are placed to warn of a hazard, sufficient room must be given so that the observer can view and understand the sign, and then move safely to avoid the hazard.

Care should be taken when placing several signs close together. Too many signs may result in sensory overload and consequently the observer may not absorb the messages.

2.2 Illumination

Illumination of signs must be considered where the general lighting, either natural or artificial, does not provide adequate visibility of signs. Any illumination must consider the general amenity of the site and any escaping nuisance light from the substation.

2.3 Construction

All substation signs must be:

- indelibly, legibly marked and manufactured on moisture resistant non corrodible, material fit for the service conditions;
- clearly visible from floor/ground level and accessible with the equipment in service;
- in accordance with the drawings and schedules; and
- secured in a permanent manner.

Stickers are acceptable for smaller signs and notices but not accepted for device labels.

3 Information signage

The public, including employees in the electricity supply industry, need to be warned of the hazards associated with electricity and, in particular, the hazards associated with electricity networks. This is good business sense, good corporate citizenship and potentially reduces legal liability. Information type signs provide basic information for personnel in and around the substation. Information signs include (but are not restricted to):

- asset owner contact details;
- equipment labels;
- rating plates;
- electronic surveillance; and
- miscellaneous.

The assessment of the appropriateness of the *signs* to be used *should* include consideration of the following:

Where there are to be words on a *sign*, it is possible that the meaning of the *sign* will need to be conveyed to persons not familiar with the English language. In addition to English, it may be necessary to repeat the message in one or more other languages, particularly if instant recognition of the message may be needed in a critical situation.

Translated messages should adhere as closely as practicable to the intent of the English version. Consideration should be given to engaging in a community consultation program to decide what is likely to be the most effective language other than English.

If a symbol or symbolic sign is used does the meaning for that symbol or sign accurately convey the message, which needs to be conveyed. It may be necessary to add words to support the message. Organisations should consider scheduled periodic maintenance inspections and a periodic review of signage wording and graphics.

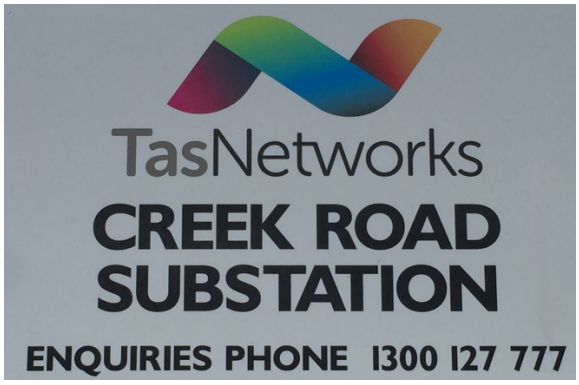
Signs should comply with AS 1319, AS 2342 and AS/NZS 3000.

3.1 Asset owner contact details

A sign will be displayed at the main entrance gate to the substation, or alternatively where it is most visible to the public, detailing:

- TasNetworks company logo;
- substation site name; and
- TasNetworks 24 hour emergency contact details, in case of equipment failure, fault or injury.

The contact details sign must be 900mm x 600mm, with a white background and black lettering. Example illustrated below.



3.1 Equipment labels

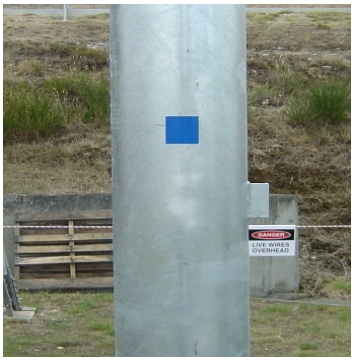
Equipment labels must be of white background with black lettering. Where practical to do so, each panel, cubicle, enclosure or kiosk must be identified at both front and rear.

All panel mounted devices must be identified externally at the front of the panel as well as inside the panel in accordance with their schematic and wiring diagrams.

Phase sequence identification colours of RED-WHITE-BLUE may be provided on:

- First point of connection of incoming circuits;
- Busbars (where practical);
- Power transformers; and
- Last point of connection of the outgoing circuits.

Figure 1 Example of blue phase identifier on an incoming circuit



Blue must be provided as the minimum for phase sequence identification.

3.1 Electronic surveillance

Where electronic surveillance is in use, signs must be placed to warn persons of its presence.

Electronic surveillance signs must be placed at each main access point, and should describe:

- Which areas are being monitored and hours of operation or continuous;
- If the footage is monitored or recorded;
- Who is monitoring; and
- Contact details in the event of any problems with the security system.

Height	400mm
Width	300mm

Australian Standard AS 4806.1—Closed Circuit Television (CCTV) Part 1: Management and Operation Code of Practice, references signage requirements for surveillance equipment. The relevant State Legislation is the Listening Devices Act (Tas.) 1991.

Security warning signs must be erected to warn persons that closed circuit television (CCTV) is in use. The following suggestions from Draft National Guidelines for the prevention of unauthorised access to electricity networks; ENA are made in relation to the use of CCTV:

- *Signs* are placed at each main *access* point to areas which members of the public and staff are reasonably entitled to use, and which are being monitored.
- The *signs* provide members of the public and staff with information about the size of the area being monitored.
- If the CCTV system is not monitored or recorded 24 hours a day, this is reflected in the content of the *signs*.
- The *signs* are easily understood by members of the public and staff, including people who are from non-English speaking backgrounds.
- Signs are clearly visible, distinctive, located in areas with good lighting, placed within normal eye range, and large enough so that any text message can be easily read.

3.1 Miscellaneous

TasNetworks Manager Legal and Contracts must approve all wording on miscellaneous signs prior to installation. Miscellaneous information signs include, but are not limited to, information on:

- staff awareness;
- trespasser prosecution;
- security patrols;
- close the gate; and
- inform operator/network control upon arrival/exit.

4 Regulatory signs

Regulatory signs contain instructions pertaining to maintaining the law, safety procedures and any standing orders. Regulatory signs can be divided into three groups:

1. Prohibition signs where an activity or action is not permitted,
2. Mandatory signs which indicate that an instruction must be carried out, and
3. Restriction signs that place a numerical or other limit on an activity or use of facility.

3.1 Prohibition signs

Prohibition signs are identified by a red circle and slash. Prohibition signs are typically 450mm x 600mm, unless mounted as part of a composite sign. For further details refer to AS 1319, and AS2342.

Examples are illustrated below.

The no smoking and no naked flames prohibition sign symbols are incorporated into the front door sign for substation buildings. This provides coverage for battery rooms within the building (refer to 5.2.3).

3.2 Mandatory signs

Mandatory signs are identified by a blue circle. Mandatory signs typically are 450mm x 600mm unless mounted as part of a composite sign, such as that illustrated in Figure 2.

Figure 1 Example Composite sign (540mm x 250mm)

3.2.1 Personal Protective Equipment (PPE)

Personal Protective Equipment requirements are detailed in TasNetworks' Personal Protective Equipment standard R112684.

Regulatory signs must be placed at all access points to the areas where PPE is required.

Any other specific personal protective equipment requirements should be in accordance with the manufacturers handling instructions, and the TasNetworks PPE Standard.

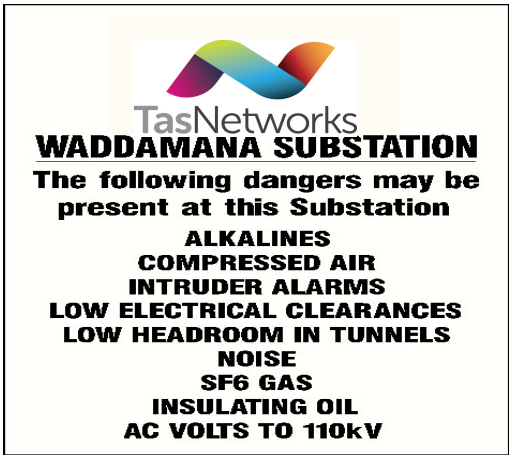
4 Hazard signs

Hazard signs are used to advise of hazards and are described by two categories:

(a) Danger signs that warn of a particular life threatening hazard, and

(b) Warning signs that warn of hazards that are unlikely to be life threatening.

Both Warning and Danger signs may be used to describe the same activity, depending on the severity of the threatening hazard in the particular circumstances.



4.1 Asbestos

Where asbestos has been identified, warning labels shall be placed in accordance with TNM-GS-809-0316 (R472616) Asbestos Management and Control in the Workplace Procedure.

All identified asbestos in a building or other structure must be labelled so that it is clearly visible to persons entering the area, until it is finally removed. This requirement applies equally to asbestos in good condition and to treated asbestos.

A variety of labels may be used, however labels used must comply with AS 1216.

Enclosed areas and areas which contain encapsulated or sealed asbestos must be labelled or otherwise signposted with cautionary warning signs in accordance with AS 1319. The purpose of these cautionary

warning signs is to ensure that the asbestos is not worked upon without correct precautions being taken and to ensure that, in the event of damage; the occurrence is reported immediately so that corrective action can be taken.

Large format signs with the 'Danger" symbol must be 600mm x 450mm. Smaller labels using the international 'a' label are approximately 50mm x 100mm.

Height 450 mm
Width 600 mm

Height 450 mm
Width 600 mm

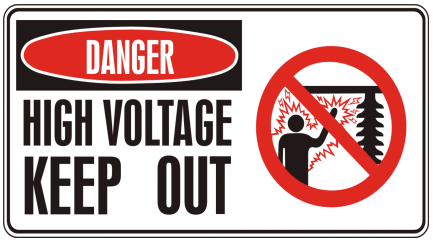
Height 100 mm
Width 50 mm

Small warning signs of the type illustrated may be placed on individual asbestos containing panels and structures.
This may include wall and roof sections of asbestos cement sheet, and zelemite instrument panels which may or may not be obscured.

4.2 Danger signs

4.2.1 Perimeter fencing

'Danger – High Voltage - Keep Out' warning signs must be installed on all substation parameter fences, generally in accordance with AS 1319. The pictogram sign shown below must be used for new security fence installations, unless detailed otherwise in the project specifications. The Contractor must ensure the installation of the warning signs occurs concurrently with the fence installation. Safety *signs should* support any initiative to restrict unauthorised *access* to electrical infrastructure; it does not replace those measures.



Height 350 mm
Width 700 mm

Height 450 mm
Width 600 mm

'Danger Keep Out – High Voltage' warning signs must be installed on the substation fence in accordance with R579297 Security Fences and Gates Standard. A symbolic sign must also be placed to illustrate the message of potential flash over. Signs must be 600mm x 450mm. Signs with pictograms are 700 mm width x 350 mm height.

TasNetworks may also require the installation of *'Danger - High Voltage Wires Overhead'* and *'Danger – Buried Cables and Services in this area'* signs, at nominated locations.

Warning signs must be fixed on the inside of the perimeter fencing and face outwards at intervals not exceeding 15 metres along the fence, including at least one (1) for each change in direction of fence line.

Height	450 mm
Width	600 mm

Height	450 mm. Plinth 105 mm
Width	600 mm. Plinth 150 mm

Fixings points to fence panels must be at all corners and centrally on each side of the sign using two (2) strands of galvanised tie wire looped around the sign and the chainmesh or weldmesh; then twisted firmly and cleanly cut removing sharp edges. All twisted ends must be on the substation side of the fence.

Danger signs are not required to be fitted to insulated fence or earth break fence panel sections. Buried cables and services signs fitted to concrete fence plinths, are sized to 150 x 105 mm.

Where barbed wire, barbed tape or electrified conductors are installed atop perimeter fencing; an intruder protection sign warning of the hazard must be placed on the fence.

Height	450 mm
Width	600 mm

4.2.2 Battery Rooms

All battery cabinets, vented and non vented must be labelled on the front, stating as a minimum the battery designation (as per TasNetworks Device numbering system), battery specifications, cell information and references to battery documentation.

The cabinet door should display short circuit current (amps), and nominal DC voltage (volts).

Where vented cell batteries exist, they must be stored in a separate room with specific signage. Vented batteries have been identified as a significant hazard and have specific signage requirements for battery rooms including:

- no smoking, no naked flame (prohibition); long sleeved clothing (mandatory); these requirements are covered by entry to control building signage ;
- full face shields and goggles (mandatory) when working with batteries; and
- use tools with insulated handles; and rubber gloves, boots, and rubber aprons (mandatory).

Eye wash stations are located in substations where vented lead acid type batteries are present. A symbolic sign must be placed to identify the station. The sign must be 450mm x 600mm.

Height	450 mm
Width	600 mm

4.1 Warning signs

4.1.1 Sulphur hexafluoride gas

All equipment containing Sulphur hexafluoride (SF_6) gas shall have a label affixed, warning that SF_6 gas is installed in the equipment. One label may be used for common equipment installed in the same location. The label must be fitted in a prominent position; with black letters on yellow background (Canary Y11 AS 2700).

Height	100 mm
Width	150 mm

4.1.2 Electromagnetic fields

Typically electromagnetic fields of strengths sufficient to warrant signage are not usually present in accessible areas of substations. Areas that are subject to magnetic fields of between 5000 and 50,000 mill Gauss must be appropriately signposted to indicate that entry or approach is prohibited and exposure limited to no more than two hours per day when plant is in service.

Signs must be placed in accordance with the National Health and Medical Research Council Interim Exposure Guidelines 1989.
Visitors and contractors visiting or working at a site must be warned of possible interference to the operation of implanted cardiac pacemakers. Warning of cardiac pacemaker interference must be accomplished by placement of signs at appropriate and prominent locations.

Height	450 mm
Width	600 mm

4.1.3 Other warnings

Other signs that may warn of identified specific hazards may include, but are not limited to:

- Overhead cranes
- Use of mobile phones in close proximity to electronic equipment;
- Confined spaces
- Mind your head/step
- Look up look out
- Mobile generator input point

5 Emergency information signs

Emergency information signs indicate the location or directions to, emergency related facilities.

5.1 Hazardous Chemicals (HAZCHEM)

HAZCHEM placarding is required on sites where dangerous goods, as defined by the Australian Dangerous Goods Code (ADGC), are stored. Incorrect use of the HAZCHEM placard will result in incorrect response by emergency personnel. HAZCHEM placarding is required on sites where more than 2000 Litres (pure water volume) of hazardous chemicals exists. SF_6 gas is hazardous chemical, insulating oil is not.

HAZCHEM placarding of insulating oil containers is not required as switchgear insulating oil is classed as a combustible liquid, not as a hazardous chemical. Refer to TNM-PC-809-0088 Chemical Management Procedure for further information on chemical classifications.

H-H3V 600X200

Height	150 mm
Width	600 mm

The HAZCHEM placard must be placed at the main entrances to the site in clear view of any approaching emergency response personnel.

Where flammable or corrosive substances are in use in a substation, any relevant HAZCHEM placarding will be in accordance with the Dangerous Goods Code and with the Workplace Standards publication 'How to HAZCHEM Placard Premises'.

5.2 Exits

All emergency exits must be fitted with an EXIT sign illuminated at all times. All emergency exit signs must comply with AS 2293. They must have a self-supported power capacity for 24 hours under a substation blackout condition when the normal AC lighting is interrupted. Emergency lighting must not be supplied from the station DC supply.

Height	180 mm
Width	350 mm

5.3 Oil spill kits

The following label, 200mm along each side, is used to identify the location of oil spill kits.

5.4 Sulphur hexafluoride investigation kits

The following label, 200mm along each side, is used to identify the location of the SF_6 investigation kits.

6 Fire Equipment signs

Fire extinguishers and hydrants must be sign posted in accordance with Tasmania Fire Service Regulations and the Building Code of Australia.

Specifications for Fire extinguishers and hydrants signs are detailed in Tasmania Fire Service Regulations and the Building Code of Australia.