

Network Standard

NETWORK

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NW000-S0063

NS219 TELECOMMUNICATIONS - TELEPHONE ALLOCATION AND ISOLATION



ISSUE

For issue to all Ausgrid and Accredited Service Providers' staff involved in the design, review and approval of the creation and modification of telephone infrastructure at major substations; and supervising or carrying out of works associated with those installations.

Ausgrid maintains a copy of this and other Network Standards together with updates and amendments on www.ausgrid.com.au.

Where this standard is issued as a controlled document replacing an earlier edition, remove and destroy the superseded document

DISCLAIMER

As Ausgrid's standards are subject to ongoing review, the information contained in this document may be amended by Ausgrid at any time.

It is possible that conflict may exist between standard documents. In this event, the most recent standard shall prevail.

This document has been developed using information available from field and other sources and is suitable for most situations encountered in Ausgrid. Particular conditions, projects or localities may require special or different practices. It is the responsibility of the local manager, supervisor, assured quality contractor and the individuals involved to make sure that a safe system of work is employed and that statutory requirements are met.

Ausgrid disclaims any and all liability to any person or persons for any procedure, process or any other thing done or not done, as a result of this Standard.

All design work, and the associated supply of materials and equipment, must be undertaken in accordance with and consideration of relevant legislative and regulatory requirements, latest revision of Ausgrid's Network Standards and specifications and Australian Standards. Designs submitted shall be declared as fit for purpose. Where the designer wishes to include a variation to a network standard or an alternative material or equipment to that currently approved the designer must obtain authorisation from the Network Standard owner before incorporating a variation to a Network Standard in a design.

External designers including those authorised as Accredited Service Providers will seek approval through the approved process as outlined in NS181 Approval of Materials and Equipment and Network Standard Variations. Seeking approval will ensure Network Standards are appropriately updated and that a consistent interpretation of the legislative framework is employed.

Note that compliance with this Network Standard does not automatically satisfy the requirements of a Designer Safety Report. The designer must comply with the provisions of the Workplace Health and Safety Regulation 2011 (NSW - Part 6.2 Duties of designer of structure and person who commissions construction work) which requires the designer to provide a written safety report to the person who commissioned the design. This report must be provided to Ausgrid in all instances, including where the design was commissioned by or on behalf of a person who proposes to connect premises to Ausgrid's network, and will form part of the Designer Safety Report which must also be presented to Ausgrid. Further information is provided in Network Standard (NS) 212 Integrated Support Requirements for Ausgrid Network Assets.

INTERPRETATION

In the event that any user of this Standard considers that any of its provisions is uncertain, ambiguous or otherwise in need of interpretation, the user should request Ausgrid to clarify the provision. Ausgrid's interpretation shall then apply as though it was included in the Standard, and is final and binding. No correspondence will be entered into with any person disputing the meaning of the provision published in the Standard or the accuracy of Ausgrid's interpretation.

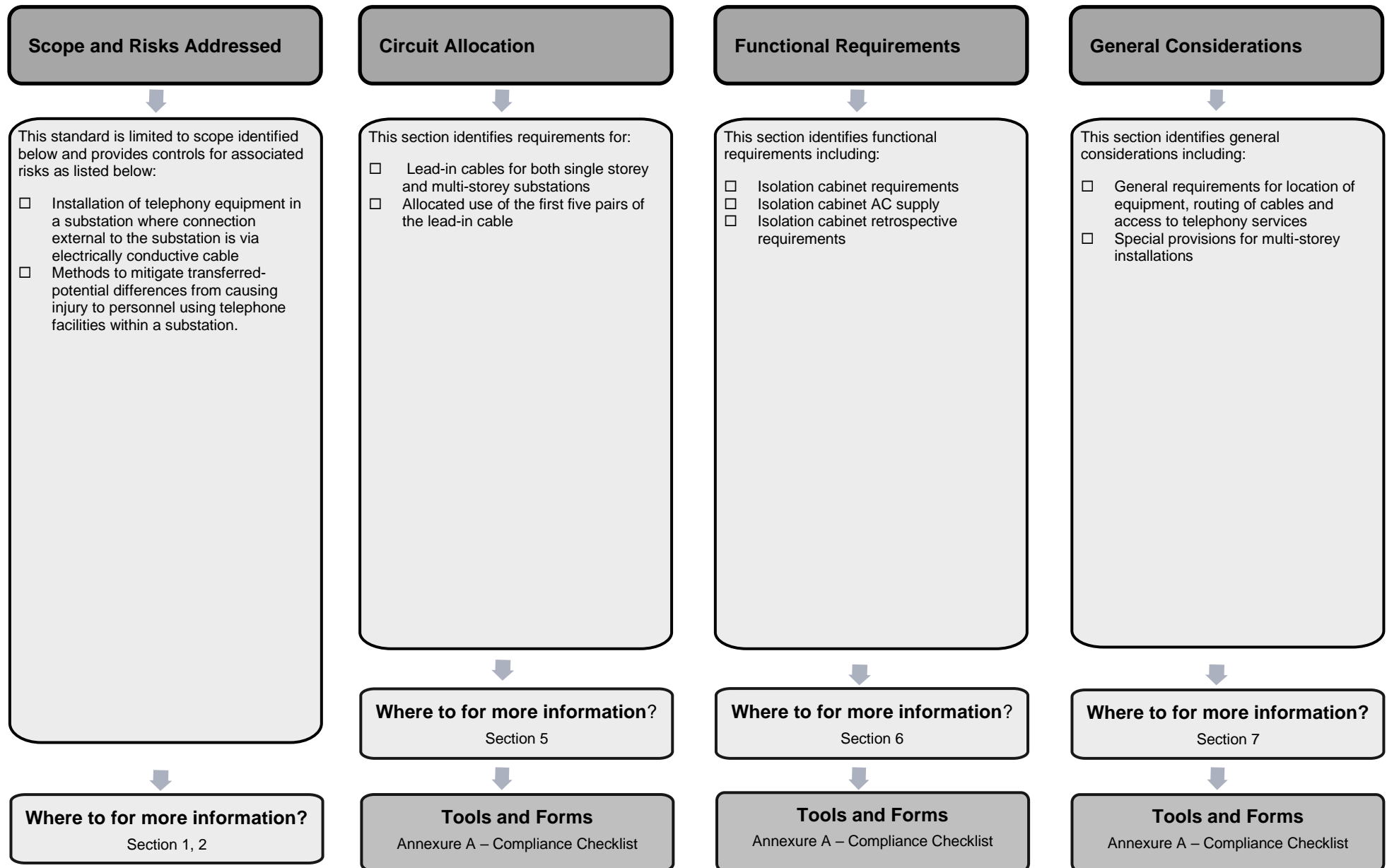
KEYPOINTS

This standard has a summary of content labelled "KEYPOINTS FOR THIS STANDARD". The inclusion or omission of items in this summary does not signify any specific importance or criticality to the items described. It is meant to simply provide the reader with a quick assessment of some of the major issues addressed by the standard. To fully appreciate the content and the requirements of the standard it must be read in its entirety.

AMENDMENTS TO THIS STANDARD

Where there are changes to this standard from the previously approved version, any previous shading is removed and the newly affected paragraphs are shaded with a grey background. Where the document changes exceed 25% of the document content, any grey background in the document is to be removed and the following words should be shown below the title block on the right hand side of the page in bold and italic, for example, Supersedes – document details (for example, "Supersedes Document Type (Category) Document No. Amendment No.").

KEY POINTS OF THIS STANDARD



Network Standard
NS219
Telecommunications Telephone Allocation and Isolation
Design Work Instruction

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1.0 PURPOSE

This Network Standard details the ways in which the transferred-potential difference hazards as listed below should be mitigated to reduce the risk of injury to personnel and equipment.

A hazardous situation can arise whereby a telephone or modem located inside a substation is connected via conductive cable to the external environment. Such hazards include:

- Conduction of remote earth potential to the substation, therefore presenting a potential difference between local earth and remote earth under power system fault conditions (and potentially exposing personnel to high potential difference hazards)
- Conduction of lightning strikes through the incoming conductive line, via personnel (who are using a telephone) to earth

2.0 SCOPE

This document outlines the requirements to be met when installing telephony equipment in a substation where connection external to the substation is via electrically conductive cable.

3.0 REFERENCES

All work covered in this document shall conform to all relevant Legislation, Standards, Codes of Practice and Network Standards including but not limited to:

3.1 Ausgrid documents

- Company Form (Governance) - Network Document Endorsement and Approval
- Company Procedure (Governance) - Production / Review of Network Standards
- Company Procedure (Governance) - Network Document Endorsement and Approval
- Electrical Safety Rules
- Electricity Network Safety Management System Manual
- NEG TC08.1.1 Telecommunications Dictionary
- NEG TC08.1.2 Telecommunications Reference
- NS181 Approval of Materials and Equipment and Network Standard Variations
- NS203 Telecommunications Network: Master Policy Document
- NS212 Integrated Support Requirements for Ausgrid Network Assets

3.2 Other standards and documents

- AS-3835.1:2006 Earth Potential Rise – Protection of telecommunications network users, personnel and plant – Code of practice
- AS-3835.2:2006 Earth Potential Rise – Protection of telecommunications network users, personnel and plant – Application guide
- ENA Doc 001-2008 National Electricity Network Safety Code.

3.3 Acts and regulations

- Electricity Supply (General) Regulation 2014 (NSW).
- Electricity Supply (Safety and Network Management) Regulation 2014.
- Work Health and Safety Act 2011 and Regulation 2011

4.0 DEFINITIONS

Accredited Service Provider (ASP)	An individual or entity accredited by the NSW Government Trade & Investment in accordance with the Electricity Supply (Safety and Network Management) Regulation 2014 (NSW).
Business Management System (BMS)	The integrated policy and procedure framework that contains the approved version of documents.
Document control	Employees who work with printed copies of document must check the BMS regularly to monitor version control. Documents are considered "UNCONTROLLED IF PRINTED", as indicated in the footer.
Network Standard	A document, including Network Planning Standards, that describes the Company's minimum requirements for planning, design, construction, maintenance, technical specification, environmental, property and metering activities on the distribution and transmission network. These documents are stored in the Network Category of the BMS repository.
Review date	The review date displayed in the header of the document is the future date for review of a document. The default period is three years from the date of approval however a review may be mandated at any time where a need is identified. Potential needs for a review include changes in legislation, organisational changes, restructures, occurrence of an incident or changes in technology or work practice and/or identification of efficiency improvements.

5.0 CIRCUIT ALLOCATION

A 10 pair PSTN lead in cable shall be installed in single storey substations. A 30 pair PSTN lead in cable shall be installed in multi storey substations. All pairs of the lead in PSTN cable shall be terminated. The first five pairs shall be reserved for the following phone circuits:

1. Control Room
2. Fire
3. Security
4. Substation telephone
5. Additional Mess

6.0 FUNCTIONAL REQUIREMENTS

6.1 Isolation cabinet – general requirements

Three analogue telephone services shall be ordered from the telecommunications provider as follows:

- Phone line for the SCADA desk
- Phone line for fire system communication
- Phone line for security communication

The cable from the telecommunications exchange to the isolation enclosure shall be run in such a manner that personnel inside the substation cannot be exposed to the potentially lethal voltages on the conductors. Location of the pit outside the substation which connects the incoming line to the cable supplied by the telecommunications provider shall take account of earth potential rise and shall be determined by the senior engineer responsible for routing of physical communications bearers.

The cabinet(s) housing the isolation equipment shall be wall mounted, shall have key-locked door keyed alike to all other Ausgrid substation isolation cabinets.

Internally, isolation cabinets shall be fitted out with the following equipment:

- (a) High voltage isolation links or other provision for the connection and isolation of 10 circuits such that facility is provided for all exposed conductors to be de-energised and isolated from all potential sources of energy external to the substation as follows:
 - (i) In a small single story substation, high voltage isolation links or other provision shall be made for 10 circuits
 - (ii) In large and multi story substations, high voltage isolation links or other provision shall be made for 20 circuits.
- (b) Wiring shall be provided and card bins shall be installed with a capacity to house isolation card sets for PSTN lines as follows:
 - (i) In a small single story substation 10 PSTN lines
 - (ii) In large and multi story substations 20 PSTN lines.
- (c) Installed isolation card sets and associated optical fibres shall be installed for 5 PSTN lines, with provision to readily expand to the following:
 - (i) In a small single story substation 10 PSTN lines
 - (ii) In large and multi story substations 20 PSTN lines.
- (d) 240VAC to 27.6VDC Power Supply and wiring for associated 24Volt 7.2AHC Back-up Battery
- (e) Connection and circuitry for loud sounding remote ringer alarm, sounding when the phone line for the SCADA desk rings.
- (f) Battery isolate switches for each PSTN circuit
- (g) Two krone termination strips for connection of sub-station side cabling

Telephone isolation is required to be installed in substations where the earth potential rise exceeds 1000 volts or 430 volts where fault clearance time is greater than 0.5 seconds, in order to comply with Australian Standard AS3835.

Telephone isolation shall be installed in all new substations.

6.2 Isolation cabinet – AC supply

A 240VAC 10A GPO shall be supplied above the telephone isolation cabinet to supply AC to the cabinet battery charger.

6.3 Isolation cabinet – retrospective requirements

Sources of local earth include, but are not limited to:

- The earth connection of a GPO
- Metal structural steel (which should be assumed to be earthed), including but not limited to steel columns, steel I beams
- Concrete floors (which may potentially contain earthed reinforcing)
- Substation battery connections
- DC/DC converter outputs, where the input to output isolation has not been specified or proven

Mitigating measures to prevent contact with the local earth potential shall include, but not be limited to:

- Rubber floor mats
- Wooden barriers proven to withstand the earth potential difference, providing physical barrier to earthed objects sufficient to prevent a reasonable person from touching the local earth and the incoming (exchange side) conductors concurrently

The requirements of this clause are mandatory irrespective of whether the substation is energised or not.

7.0 GENERAL CONSIDERATIONS

7.1 General requirements

In terms of timeline:

- (a) The location of the telephone isolation cabinet and the location of other telephone apparatus (both present and planned) shall be determined by the manager responsible for substation layout, and shall be in compliance with AS3835.
- (b) The senior engineer responsible for routing of physical communications bearers shall advise optimal routing of the exchange side cabling into the substation, including but not limited to specification of routing and size of communications conduits.
- (c) The senior engineer responsible for routing of physical communications bearers shall advise considerations that are required for telecommunications requirements during construction and fitout of substations, including but not limited to:
 - Allowance for facsimile connections
 - Allowance for telephone services
 - Allowance for connection to the corporate network

7.2 Multi storey installations

Substations and installations which house multiple floors require special consideration. Specific advice regarding these installations shall be obtained from the manager responsible for design of communication systems. Notwithstanding that advice, a 10 pair cable shall be allocated for each floor and run and terminated between the substation MDF and the IDF located on the floor.

8.0 RECORDKEEPING

The table below identifies the types of records relating to the process, their storage location and retention period.

Table 1 – Recordkeeping

Type of Record	Storage Location	Retention Period*
Approved copy of the network standard	BMS Network sub process Standard – Company	Unlimited
Draft Copies of the network standard during amendment/creation	TRIM Work Folder for Network Standards (Trim ref. 2014/21250/104)	Unlimited
Working documents (emails, memos, impact assessment reports, etc.)	TRIM Work Folder for Network Standards (Trim ref. 2014/21250/104)	Unlimited

* The following retention periods are subject to change eg if the records are required for legal matters or legislative changes. Before disposal, retention periods should be checked and authorised by the Records Manager.

9.0 AUTHORITIES AND RESPONSIBILITIES

For this network standard the authorities and responsibilities of Ausgrid employees and managers in relation to content, management and document control of this network standard can be obtained from the Company Procedure (Network) – Production/Review of Network Standards. The responsibilities of persons for the design or construction work detailed in this network standard are identified throughout this standard in the context of the requirements to which they apply.

10.0 DOCUMENT CONTROL

- Content Coordinator** : Communications Engineering Manager
- Distribution Coordinator** : Engineering Information and Services Manager

Annexure A – Sample Compliance Checklist



Network Standard Checklist Form

NS219 Telecommunications - Telephone Allocation And Isolation

Project Identification:	
Prepared by: <Name & Position Title>	Date:

This checklist is for internal Ausgrid use only and does not apply to ASPs or contractors who have specific compliance requirements in relation to Contestable project works. The checklist is unique for each network standard and is available within BALIN and the BMS as a separate form that can be amended as required, completed and saved in TRIM with the other project documentation.

This section is used to identify compliance checks that when applied to the work associated with this Network Standard will satisfy an audit process to establish that the requirements of the standard have been followed. It is expected that applicable items would normally be checked as Comply (Yes) as non-compliance is generally not tolerated.

Where non-compliance is the result of specific site conditions or design decisions this needs to be identified in the notes section of the form for each non-compliance and approval sought from an appropriately authorised Ausgrid manager responsible for design approval per NS261 Compliance Framework for Network Standards.

Should additional information be available to document non-compliance decisions, these can be attached to the checklist form. The checklist and any attached explanatory notes should be saved in the project document repository.

Item	Description	Refer Clause	Completed/ Actioned
	Scope		
	The requirements to be met when installing telephony equipment in a substation where connection external to the substation is via electrically conductive cable.		
	Circuit Allocation		
1	Single storey substations use 10-pair lead-in cable	5.0	Yes/No/NA
2	Multi storey substations use 30-pair lead-in cable	5.0	Yes/No/NA
3	All pairs of lead-in cables terminated	5.0	Yes/No/NA
4	Circuit allocation of first five pairs of lead-in cable as listed	5.0	Yes/No/NA
	Functional Requirements		
5	Provision of analogue services – SCADA desk, fire system communications and security communication	6.1	Yes/No/NA
6	Telephony Cables run to prevent exposure of personnel to lethal voltages on the cable conductors	6.1	Yes/No/NA
7	Location of pits outside substation sited to minimise earth potential rise	6.1	Yes/No/NA
8	Location, equipment provisions and locking of isolation cabinets as specified	6.1	Yes/No/NA
9	Telephone isolation provided where earth potential rise exceeds 1000volts or 430volts where fault clearance time is greater than 0.5 seconds	6.1	Yes/No/NA

Item	Description	Refer Clause	Completed/ Actioned
10	Telephone isolation installed on all new substations	6.1	Yes/No/NA
11	240VAC 10A GPO installed above isolation cabinet	6.2	Yes/No/NA
12	Provision of rubber mats and wooden isolation panels as required	6.3	Yes/No/NA
General Considerations			
13	Location of telephone isolation cabinet and other telephone apparatus determined by manager responsible for substation layout	7.1	Yes/No/NA
14	Routing of exchange-side cabling into substation determined by senior engineer responsible for routing of physical communications bearers	7.1	Yes/No/NA
15	Senior engineer responsible for routing of physical communications bearers has advised telecommunications requirements (e.g. facsimile, telephone and corporate network connection) during substation construction and fitout	7.1	Yes/No/NA
16	Special provisions for multi-storey substations advised by manager responsible for design of communication systems.	7.2	Yes/No/NA
17	10-pair cable run on each floor between substation MDF and IDF	7.2	Yes/No/NA

Notes:

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The signatures panel of this document has been removed for privacy considerations. The remainder of the document is unchanged.