Network Standard

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Supersedes Network Standard (Network) NW000-S0005 Amendment No.1

NW000-S0005 NS232 TELECOMMUNICATIONS CABLES ON AUSGRID POLES

ISSUE

For issue to all Ausgrid and Accredited Service Providers' staff involved with design and installation of third-party telecommunications cable equipment and is for reference by field, technical and engineering staff.

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Where this standard is issued as a controlled document replacing an earlier edition, remove and destroy the superseded document.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

Notes: 1. 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 Work Health and Safety Regulation 2017 (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.

2. Where the procedural requirements of this document conflict with contestable project procedures, the contestable project procedures shall take precedent for the whole project or part thereof which is classified as contestable. Any external contact with Ausgrid for contestable works projects is to be made via the Ausgrid officer responsible for facilitating the contestable project. The Contestable Ausgrid officer will liaise with Ausgrid internal departments and specialists as necessary to fulfil the requirements of this standard. All other technical aspects of this document which are not procedural in nature shall apply to contestable works projects.

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

Scope and Risks Addressed

This standard is limited to scope identified below and provides controls for associated risks as listed below:

- ☐ Limited to telecommunications cable attachments on Ausgrid overhead assets up to 22 kV (installation on higher voltage assets requires special approval)
- ☐ The cable shall be completely non-metallic and non-conductive
- ☐ Ausgrid overhead design must comply with NS220 Overhead Design Manual
- ☐ Assessment of loading of affected poles to occur before and after installation of telecommunications cable.
- ☐ Assessment to be made using original design standard
- ☐ Any remediation of any existing Ausgrid installation to current standards must comply with AS/NZS 7000:2016 and NS220
- ☐ Attachment of telecommunications assets on privately owned poles is outside scope of this document

Where to for more information?

Section 3.1

Design Parameters

Design considerations include:

- ☐ Operating temperatures for ground clearance and clearance between cables.
- ☐ Clearance to ground.
- ☐ Clearances to Ausgrid assets.
- ☐ Preferred attachment points to maintain the EWP access corridor.
- ☐ Special attachment conditions on poles where the existing EWP corridor is compromised.
- ☐ Special attachment conditions for equipment poles.

Where to for more information?

Section 3.1-3.4

Methods of Attachment

The method of attaching the telecommunications cable to the pole shall be carried out in accordance with:

- ☐ Ausgrid's requirements
- ☐ The carrier's technical manual.

Where to for more information?

Section 3.1.4, 3.5-3.10

Restricted Situations

The following situations specify where restricted access applies:

- ☐ Equipment poles have restrictions
- ☐ Transmission and sub-transmission poles are assessed on a case-by-case basis
- ☐ Streetlight columns – telecommunications equipment not permitted
- ☐ Private Poles – carrier must negotiate with owners
- ☐ No splices permitted on OH network
- ☐ Hazardous locations – restrictions may apply
- ☐ No extensions of conductive networks

Where to for more information?

Section 3.4.5, 3.11

Network Standard
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Contents

1 PURPOSE

This standard specifies the requirements for attachment of third-party telecommunications cable equipment to Ausgrid's overhead electrical network.

Ausgrid recognises that telecommunications carriers will sometimes want access to its assets, and this standard has been written to control access in a way that allows the overhead distribution network to operate in a safe, efficient and reliable manner.

2 SCOPE

This standard specifies the acceptable positioning of a carrier's telecommunications cable equipment on Ausgrid's overhead network. It does not cover the work practices required to build or maintain the carrier's network, or those required to build, maintain or operate the electrical network with telecommunications cable equipment present. While mainly concerned with new equipment, some coverage of existing equipment and assets, such as the HFC and PSTN networks, is included.

This standard applies to telecommunications cable equipment installed on poles excluding:

a) any pole which supports electrical wires or cables with an operating voltage of 33 kV and above (unless that pole also supports low voltage cables) or Ausgrid consents, in its discretion, on a case-by-case basis, to the use of that pole; or

b) any privately owned pole.

Communications cables owned by Ausgrid are not covered by this standard.

The installation of antennas is not covered by this standard. Instead, refer to NS183 for the requirements relating to attachment of antennas to Ausgrid's poles.

Clearances, pole loadings and all other conditions must also continue to meet the requirements of this standard for the entire life cycle of the carrier's equipment, including during maintenance and removal.

3 GENERAL REQUIREMENTS

3.1 Design parameters

3.1.1 General

The design shall be prepared for all telecommunications cables installations on Ausgrid poles and this shall be in accordance with all Ausgrid's Network Standards, in particular NS220 Overhead Design Manual.

Adding telecommunications cables to Ausgrid's poles has the potential to alter the overhead line such that it will become overloaded or overstressed beyond the original design standard.

The designer may first assess whether the addition of the telecommunications cable overloads the pole according to the original design standard. As details on the original design may not be available, the earliest standard that may be used is ESAA HB C(b)1–1999 (that is, designs prior to 1999 shall be assessed to ESAA HB C(b)1–1999).

Where the pole is overloaded or overstressed according to the original design standard, AS/NZS 7000:2016 shall be used for any remediation work. In this regard a full overhead line analysis will be need to be undertaken in the design phase to prove compliance with Ausgrid's standards and AS/NZS 7000:2016.

All designs shall include assessment of the loading of all poles before and after the installation of the telecommunications cable. Detailed calculations are required for every pole based on its pole disc strength rating. If the pole does not have a pole disc, the equation in NS220 (in the "Timber Pole Strength" section) should be used to determine the pole strength based on pole girth.

Loading calculations shall be provided for both the sustained load condition and the ultimate wind load condition in the format shown below:

Sustained load:

$$Total\ load = Existing\ load + Load\ increase$$

$$\%\ utilisation = 100 \times \frac{Total\ load}{Structure\ capacity}$$

Ultimate wind load:

$$Total\ load = Existing\ load + Load\ increase$$

$$\%\ utilisation = 100 \times \frac{Total\ load}{Structure\ capacity}$$

Design plans must be prepared in accordance with NS104 Specification for Network Project Design Plans.

3.1.2 Design temperatures

Ground clearance shall be calculated with the telecommunications cable at its maximum operating temperature, which shall be at least 50 °C.

Circuit-to-circuit separation (midspan clearance) shall be calculated with the telecommunications cable at 15 °C and Ausgrid's conductor at the maximum design temperature. This will vary with the conductor type and voltage level, but bare low voltage mains are generally designed for operation at 75 °C and LVABC is designed for operation at 80 °C. Refer to NS220 for more information.

3.1.3 Cable diameter

A cable or bundle of cables used in a design shall not exceed the following diameters:

a) For cables or bundles of cables other than service drops: 30 mm

b) For service drops:

   i. Attached to a single-unit building: 14 mm

   ii. Attached to multi-unit buildings: 30 mm.

The diameter of a cable or bundle of cables is defined as that of a circle circumscribing all components of the cable, including the bearer, catenary, telecommunications cables and lashing wires.

3.1.4 Technical and operations manual

Carriers installing telecommunications cables on Ausgrid poles shall produce a technical and operations manual for Ausgrid's endorsement. The intent is to provide information to Ausgrid on the equipment used and how it will interface with Ausgrid's network, as well as to provide information to the carrier's contractors and subcontractors on how they are expected to work with Ausgrid.

At a minimum, the manual shall include technical information such as:

- A list of approved materials for construction of the telecommunications network.
- Details of the method of attachment for all equipment onto the pole.
- Construction drawings for each type of arrangement or configuration that may be used, such as cable terminations, intermediate supports, and risers.
- Details of the cable and technology to be installed, including mechanical and electrical characteristics.

As a minimum, the manual shall address operational matters such as:

- Information on how Safety in Design principles are managed at all stages of the asset's life.
- The carrier's maintenance and operations procedures when interfacing with the electrical network, and differences when working in this environment compared to the carrier's (or their subcontractor's) normal environment.
- Accreditation requirements of the carrier's ASPs.
- A list of emergency contacts, and the asset isolation procedures.
- Details on how records are managed and updated, and how "as-built" data is managed.

3.2 Ground clearance

3.2.1 General

In general, ground clearance shall be as high as practicable, while maintaining clearance to cables and other assets. No part of the telecommunications cable shall be at a height where it may be struck by a vehicle, causing consequential damage to Ausgrid's network.

3.2.2 Ground clearance for cables between Ausgrid poles

For any telecommunications cables installed between two Ausgrid poles, or between an Ausgrid pole and another pole on publicly accessible land, the minimum clearances from the cable to ground are shown in Table 1 below.

Where the telecommunications cable could swing to a position over the carriageway of roads, that ground clearance shall apply.

Table 1 - Ground clearance for telecommunications cables

Location	Minimum clearance
Over designated high load routes	6.0 metres
Over the carriageway of roads	5.5 metres
Over commercial driveways	5.0 metres
Over all other land, including footpaths and residential driveways	4.6 metres

3.2.3 Ground clearance for service drops

For service drops from Ausgrid poles to a premise, the minimum clearances from the cable to ground are shown in Table 2 below.

Table 2 - Ground clearance for service drops

Location	Minimum clearance
Over designated high load routes	5.5 metres
Over the carriageway of roads	4.9 metres
Over commercial driveways	4.9 metres
Over footpaths, residential driveways, or land associated with dwellings	4.0 metres
On customer premises, or over land not traversable by vehicles	2.7 metres

For other types of land (besides roads, footpaths and customer land) Ausgrid will provide site-specific clearances on request.

3.3 Clearance from electricity network infrastructure

Table 3 shows the clearance required between Ausgrid assets and telecommunications cable equipment. The lowest conductor on the pole determines the clearance to telecommunications equipment.

Table 3 - Clearance between non-conductive telecommunications cable equipment and electricity assets

Equipment	Clearance at pole (mm)	Midspan clearance (mm)
Bare streetlight conductor	500	100
Bare low voltage conductor	500	100
Insulated streetlight conductor	500	100
Low voltage ABC conductor	500	100
High voltage ABC conductor (11 kV and 22 kV)	2000**	2000**
Covered conductor (CCT) (11 kV, 22 kV)	2000**	2000**
Bare conductor (11 kV, 22 kV)	2000**	2000**
Bare conductor in Live Line areas (11 kV, 22 kV)	2500	2500
Bare conductor (33 kV and above)	By request only	
Low voltage ABC service cables	300	100
Low voltage service cables (bare or PVC covered)	500	100
Ausgrid's ADSS cable	300	100
LVABC link boxes (in all directions)	500	N/A
HV switch control boxes	300	N/A
Unearthed metallic fittings (except pole steps and conduit saddles)	50	N/A
Low voltage and high voltage cables on pole (insulated, leading to UGOH)	100	N/A
Bare earthing conductor attached to pole	50	N/A
Streetlight supply wiring (single insulated)	300	N/A

* This is the minimum clearance permitted, but some existing installations may be 750 mm. Refer clause 3.4.5.

** For poles with only high voltage attached (11 kV or 22 kV), this clearance may be reduced to 1500 mm if Ausgrid confirms in writing that no low voltage conductors will be installed in the future.

3.4 Cable attachment points

3.4.1 General

At poles a 1500 mm high window is required for EWP access. This may be achieved by having no attachments in the zone between the LV mains and 1500 mm below the LV mains, or by having no attachments in the zone between 500 mm and 2000 mm below the LV mains. Where the window for EWP access is already less than or equal to 1050 mm, the telecommunications cable may be attached 500 mm below the LV mains (between the low voltage mains and the cable causing the obstruction).

3.4.2 Preferred attachment point

The preferred attachment point for the telecommunications cables is 500 mm below the lowest low voltage mounting point. Usually this will be the kingbolt for the low voltage mains crossarm, but also

includes the kingbolt for street lighting crossarms, or the bolt for directly mounted streetlight conductors.

Where bare links, bonds or underslung conductors exist, 500 mm shall be measured from the lowest vertical projection of the LV asset (including links in the open position).

Where a crossarm is used to provide a service (such as industrial or commercial services), the attachment point for the telecommunications cable is 500 mm below that crossarm kingbolt.

The telecommunications cable shall not pass between the crossarm brace, pole and crossarm. Note the requirements of Clause 3.5.1 regarding the separation between bolt holes.

3.4.3 Alternative attachment point

Where the highest existing carrier is attached 1800 mm below the LV kingbolt, the new telecommunications cable shall be attached 1500 mm below the LV kingbolt.

3.4.4 Future relocation of telecommunications cables

At Ausgrid's discretion, approval for an exemption may be given to attach the telecommunications cable in a location other than those described in Clauses 3.4.2 or 3.4.3, if they are unsuitable due to the presence of an existing carrier's cable. This is based on the agreement that the new carrier will relocate its cable to one of the standard attachment points in the future upon Ausgrid's request.

An exemption may be considered when the impact of Make Ready Work on Ausgrid or its customers would be significantly greater than the impact of a non-standard attachment point. This may include Make Ready Work such as pole replacements. Note that this exemption only applies to the attachment point, and not other requirements such as pole loading or ground clearance.

An exemption may be denied in situations where attachment at that location may block the only remaining access to a pole.

3.4.5 Extensions of an existing telecommunications cable network

Extensions of existing networks are no longer permitted using conductive cables, catenaries or lashing.

Where a carrier proposes to extend an existing HFC or PSTN network built using a fibre cable, the attachment point occupied by the existing installation may be used for the first pole of the extension (that is, the last pole of the existing telecommunications network). All subsequent poles must use the attachment points described in Clauses 3.4.2 or 3.4.3, to preserve or create the window for EWP access.

An exemption may be considered where the impact of continuing to use the existing attachment point is minor, such as extensions of one or two spans.

3.4.6 Pole replacement or relocation

Where Ausgrid poles are replaced or relocated due to other work, consideration should be given to improving access to meet the requirements of Clauses 3.4.2 or 3.4.3 above. This may require the use of a taller pole. Where it is not practicable to reposition a telecommunications cable (such as where work would be required on other poles), it may be placed in the same position provided the clearances in Table 3 are maintained.

3.4.7 Transformer poles

Where a telecommunications cable passes by a pole transformer, it must be attached to a horizontal outreach crossarm (refer to NS122, "Communications Arm"), and installed further away from the pole than any existing telecommunications cable. That is, it cannot further reduce the climbing corridor or EWP access.

3.5 Method of attachment for telecommunications cables

3.5.1 Wood poles

When attaching telecommunications cables to wood poles, only through-bolts are permitted at the carrier's suspension and termination poles. Coach screw hooks and the like shall not be used for supporting the cable. Service drops may be attached as described in Clause 3.6.5.

Bolt holes shall not exceed the size of the bolt by more than 2mm. Washers shall be fitted on both sides of the pole. The carrier's technical manual shall include details of the mechanism to accommodate shrinkage and compression of the pole over time, such as locking nuts or conical/volute washers.

No holes are allowed to be drilled within 150 mm of another hole, and attachments cannot be made above pole steps such that their use is impeded.

Stainless steel strapping is not permitted on wood poles.

3.5.2 Other pole types

On poles other than wood poles (including steel, concrete, fibreglass and fibre-cement poles), no holes shall be drilled in the pole. Instead, stainless steel strapping shall be used.

On steel poles, a layer of mastic tape shall be installed between the pole and the strap to prevent ingress and trapping of moisture. This will also isolate dissimilar metals, preventing galvanic corrosion.

3.5.3 Face of pole

The telecommunications cable shall be attached to the same side of the pole as any existing cables mounted directly to the pole. This includes LVABC and other telecommunications cables. This is to prevent "boxing-in" of a pole, where cables on each side of the pole impede the replacement of poles.

Where there are no other assets on a single side of the pole, the road side of the pole shall be used. If LVABC or an Ausgrid communication cable is on a different side of the pole to any existing carrier's assets, the new telecommunications cable shall be attached to the same side as the LVABC or the Ausgrid communication cable.

If a pole with bare mains is already "boxed-in" by existing telecommunications cables on both sides of the pole, the new telecommunications cable may be attached to either side of the pole.

Where an LVABC link box (fuse switch unit) is installed, the telecommunications cable may be installed on the opposite side of the pole. This will avoid any obstruction to the operation of the switch, and allow more ground clearance for the telecommunications cable if necessary.

For poles where a pole mounted transformer or other substation equipment has been installed, refer to Clause 3.11.1 for details on attaching the telecommunications cable.

3.6 Ancillary equipment

3.6.1 General

In addition to the deployment of aerial cables and risers on the Ausgrid pole, carriers will normally need to install ancillary equipment. The ancillary equipment will perform a variety of different network functions, and can be classified as powered or unpowered. Each type of powered and unpowered equipment deployed on Ausgrid poles must be approved prior to deployment.

The only ancillary equipment permitted on Ausgrid poles is the service transition enclosure associated with service drops. Joints, splices and terminations for the main cable shall be located in pits and not on the pole.

Ausgrid may require the relocation of the carrier's equipment to a different pole or location on the pole if Ausgrid requires a location for its own purposes.

3.6.2 Attachment location

Where service transition enclosures are installed on the pole, they shall be placed perpendicular to and facing away from the road. They shall be mounted a minimum of 3000 mm and a maximum of 3800 mm above ground. Where an existing aerial joint for the PSTN network is more than 3800 mm above ground, the new transition enclosure may be installed up to the same height. In no case can the enclosure be mounted within 1500 mm of low voltage mains, or 2500 mm of high voltage mains. Where two enclosures are installed on the same pole, they shall be mounted with one directly below the other. If this restricts the operation of the enclosure, a minimal radial offset may be permitted if shown in the technical and operations manual endorsed by Ausgrid.

3.6.3 Obstruction of pole details

Carrier's equipment, such as risers and service transition enclosures, must not obscure signage and labelling on the pole. This includes pole numbering and the pole disc.

3.6.4 Unauthorised climbing

To prevent climbing of poles by unauthorised persons, all attachments must meet the requirements of section F.3 of NS128. To summarise, attachments must be at least 3000 mm above ground. Alternatively, a minimum of 2400 mm of clear pole starting at a minimum height above ground of 2400 mm shall be provided, with an additional clearance of 1200 mm between the mains and the top of the clear zone.

3.6.5 Service drops

Service drops are the cables that run aerially from an Ausgrid pole to a premise. They may be either Fibre Cable, Coaxial Cable, or PSTN.

Service drops shall be attached to the pole using a hook bolt or coach screw hook 500 mm below the lowest low voltage conductors on a pole for non-conductive service drops, or 600 mm below the lowest low voltage conductors on a pole for conductive service drops. Under no circumstances shall service drops be attached in a position above the low voltage mains or services. Carrier's service drops shall not be attached to the crossarm. While it is unlikely that a service drop would be required where there is no low voltage on a pole, service drops shall be attached outside the clearances given in Table 3 in such cases.

Where a barley/coach screw hook is attached to a pole, the direction of pull of the service drop should not be less than 45 degrees with respect to the hook as shown in Figure 1. Where more than one service drop is attached to the same hook, this applies to the resultant load.

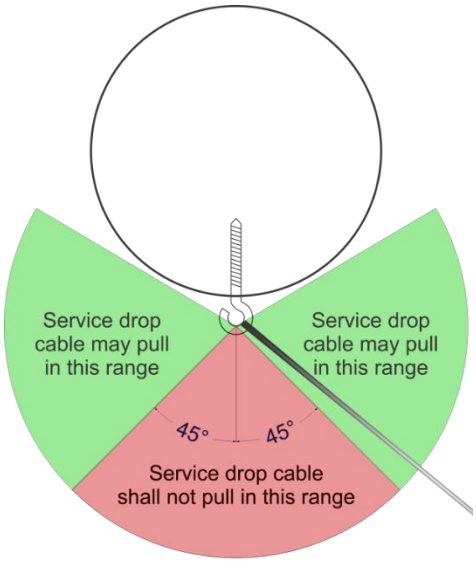

Figure 1 - Angle of attachment on coach screws

To minimise the impacts on pole access, the route of the carrier's service drop shall, where possible, follow the same route as the corresponding overhead electrical service at a minimum clearance as specified in Table 3.

Service drops shall not be attached to poles supporting transformers and other pole mounted plant such as regulators and capacitors.

Service drops may be attached to poles supporting high voltage switches, including air-break switches, reclosers, enclosed load-break switches, IntelliRupters (smart switches) etc, but must not interfere with the operation and required maintenance practices of the switch in any way, including impeding the motion of handles, rods, and impeding access for operating sticks.

3.6.5.1 Out-of-service equipment

Service drops attached to out-of-service telecommunications networks shall be removed.

3.6.6 Risers

Risers are used to transition between overhead and underground portions of the carrier's network. Only one telecommunications cable riser, which may contain multiple cables, may be installed on a pole. The mechanical protection described in NS127 Clause 6.3.1 for Customer UGOHs shall be used.

The maximum number of underground to overhead services that can be attached to a distribution network pole is described in the Service and Installation Rules of New South Wales (Clause 2.10.4). This clause of the Service and Installation Rules explicitly includes all telecommunication cabling, and the group of telecommunication cables under the single mechanical cover shall count as one Customer UGOH for the purposes of that clause. The placement requirements of NS127 Specification for Low Voltage Cable Joints and Terminations (Clause 6.4) shall apply.

The cables above the groundline cover must be protected from damage by ladders and the chain and spikes of pole platforms. The covers and their location must not impede the safe use of pole platforms or ladders.

Risers shall not be attached to poles containing transformers and other pole mounted plant such as regulators and capacitors.

Risers may be attached to poles containing high voltage switches, including air-break switches, reclosers, enclosed load-break switches, IntelliRupters (smart switches) etc, but must not interfere with the operation and required maintenance practices of the switch in any way, including impeding the motion of handles, rods, and impeding access for operating sticks.

To allow safe climbing of poles via ladder, telecommunications cable service risers (from the Service Transition Enclosure to the service drop take off point) shall not be positioned on the down or up-traffic side of the pole at heights where a ladder may be placed against the pole. Rather, risers at that height shall be positioned on the side of the pole facing the property or road.

3.7 Earthing and neutral bonding of conductive cables

The following information is provided for reference only; new installations of conductive telecommunications cables are not permitted.

The type of earthing or bonding used for extensions or alterations of the existing broadband cable networks will depend on the infrastructure used. The Optus and Telstra-style broadband cables each have different requirements, and new work should match those requirements.

In general, Optus used a Multiple Earth Neutral system, periodically bonding to Ausgrid's neutral. Telstra was isolated from the Ausgrid network, periodically installing earth electrodes. There are exceptions in both cases.

The earthing and neutral bonding systems of conductive cables shall never be mixed, and connections to Ausgrid's neutral conductor shall not be made except for maintenance or repair of the Optus network.

Refer to the carrier for further details.

3.8 Overlashing

Overlashing of new fibre cable onto the HFC network is not permitted.

The replacement of an existing lashed fibre cable will only be permitted in an emergency. The fibre cable must be replaced “like-for-like” with the same characteristics; that is, the fibre cable shall not have a higher fibre-count or larger diameter.

Any lashing that is installed shall be non-conductive. This includes network augmentations, and emergency and maintenance replacement of damaged or failed conductive lashing.

3.9 Make-ready work

3.9.1 General

Sometimes Ausgrid’s network will require upgrading or replacement before it is suitable for attachment of telecommunications equipment. Where any of the requirements of this standard cannot be achieved, the carrier shall provide Ausgrid with detailed designs of any make-ready works that are required to enable installation of their equipment.

Taller poles, stronger poles, re-tensioning of mains, conductor replacement and service alterations are some of the options designers may consider in order to achieve compliance with this standard.

3.9.2 Streetlight mains

Where a street lighting conductor or conductors run below the low voltage mains and impede the telecommunications cable attachment location (either due to restricted ground clearance or EWP access) the carrier may seek to remove the existing street lighting circuit and convert the existing luminaires to photoelectric cell control.

3.9.3 Aerial service cables

Ausgrid’s aerial service cables are generally attached to the pole below LV mains, but may also be attached to crossarms or part of a box construction. The following situations will require attention by those installing the telecommunications cables if it is anticipated that the carrier will be required to work within 500 mm of such wiring:

1. If there is exposed live metal, such as uninsulated split bolt connections between mains and aerial service cables, those installing the telecommunications cable shall cover the exposed metal with a suitable insulating tape and a weatherproofing tape.

2. If the insulation on the service cables has deteriorated to the point that conductors are exposed, the overhead service to the customer will need to be replaced with a multi-core aerial bundled conductor. This type of insulation failure must be reported to Ausgrid’s Project Officer who will advise the appropriate depot to arrange the necessary replacement. Communication cable work within 500 mm of deteriorated service cables is not to be performed unless suitable temporary insulating covering is applied to the affected cables.

3. If the number of services taken from a pole is large, and/or the connections between service conductors and the mains are untidy, the aerial service cables may impact upon the desired cable location. If practical, those installing the telecommunications cable may rearrange the services and tidy up the construction.

In the determination of the make-ready work, the quality of the insulation on the aerial service cable is to be considered.

3.10 Mitigation of cable oscillations

The carrier shall prevent or mitigate the wind induced mechanical oscillations of the communications cable. This may be achieved by complying with the manufacturer’s specifications and installation instructions. Where there is no such information, the carrier shall determine an appropriate means of controlling oscillations in consultation with the manufacturer.

3.11 Restricted constructions

3.11.1 Pole-mounted transformers and switchgear

Pole-mounted substation equipment is installed throughout Ausgrid's network, and congestion, access and complex construction are key issues. On these poles, the carrier cable may pass by the substation only, and no other equipment is to be attached. This includes service drops, risers (UGOHs), and equipment such as junctions or enclosures. Strand-mounted equipment such as amplifiers and taps are also prohibited from being attached near the transformer pole.

See Clauses 3.6.5 and 3.6.6 for specific information on restrictions relating to service drops and risers.

3.11.2 Air Break Switches

Where an Air Break Switch (ABS) is installed, the carrier must allow for the future replacement of the ABS with an enclosed switch. The control box for this equipment is located on the down-traffic side of the pole, and if the carrier has used this location for any of its equipment, it must be moved to the property side of the pole before the new enclosed switch is installed.

3.11.3 Transmission and subtransmission poles

Telecommunications cables and other equipment shall not be attached to subtransmission or transmission poles (33 kV to 132 kV inclusive) unless that pole also supports low voltage cables. Dispensations from this clause may be permitted on a case-by-case basis, and written approval for exemption from Ausgrid is required.

Lines built for transmission or subtransmission but operating at lower voltages shall be treated as transmission or subtransmission lines for the purposes of this standard.

Refer to NS169 for the technical requirements of attaching telecommunications installations to high voltage steel transmission towers.

3.11.4 Streetlight columns

Telecommunications cables and other equipment shall not be attached to steel streetlight columns, or other columns solely dedicated to supporting street lighting luminaires. These structures are not designed to carry this type of load, and are usually in an area with underground reticulation for all services.

3.11.5 Private poles

Sometimes Ausgrid's assets are installed on poles owned by other parties. Ausgrid cannot give approval to the carrier to use these poles, and the carrier must negotiate directly with the owner of the pole to arrange access.

Notwithstanding this, the requirements of this standard still apply with respect to clearances and positioning of telecommunications equipment relative to Ausgrid's distribution mains.

3.11.6 Aerial splices

All splices will be located in underground pits. No splices shall be installed on the overhead network, due to the large additional loads on the poles, the visual impact of such large objects, and the impediment to access for maintenance and operation of Ausgrid's network.

3.11.7 Hazardous and other inappropriate locations

In addition to all clauses above, Ausgrid may refuse to allow, or may restrict, the attachment of telecommunications equipment to its network at any location that it may deem inappropriate, whether or not it is due to the proposed attachment. This may be due to:

- Safety hazard(s). This includes condemned or nailed poles (see Note), poles in a less than satisfactory state of repair or condition, and termite affected poles.
- Access, maintenance or operational difficulty

- Environmental risk
- Visual amenity or other community impact
- Future capital works
- Future customer connection or relocation works

Make-ready work as described in Clause 3.9 may address some or all of these restrictions.

Note: Reinforced poles may be used if a full structural assessment of the pole and reinforcement demonstrates that the change in load is within the rating of the reinforcement under all loading conditions. This information shall be provided to Ausgrid with the design.

4 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 Engineering Technical Documents within BMS. 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.

5 RELATED DOCUMENTS

5.1 General

The design and construction of telecommunications cable networks on Ausgrid's poles shall be in accordance with the references listed below.

Where differences exist between Ausgrid's documentation, including this standard, and that of the carrier, Ausgrid's documentation shall prevail to the extent of any inconsistency.

5.2 Ausgrid documents

- Company Form (Governance) - Network Technical Document Endorsement and Approval
- Company Procedure (Governance) - Network Technical Document Endorsement and Approval
- Company Procedure (Network) – Network Standards Compliance
- Company Procedure (Network) - Production / Review of Engineering Technical Documents within BMS
- Division Workplace Instruction (Network) – Production /review of Network Standards
- Electrical Safety Rules
- Electricity Network Safety Management System Manual
- NS104 Specification for Network Project Design Plans
- NS122 Pole Mounted Substation Construction
- NS125 Specifications for Low Voltage Overhead Conductors
- NS126 Construction of High Voltage Overhead Mains
- NS127 Specification for Low Voltage Cable Joints and Terminations
- NS128 Specification for Pole Installation and Removal
- NS145 Appendix M Private Poles in Ausgrid's Franchise Area
- NS146 Inspection Procedure for Working on Poles
- NS169 Telecommunications Installations of Ausgrid HV Transmission Towers
- NS181 Approval of Materials and Equipment and Network Standard Variations
- NS183 Installation of Private Attachments on Ausgrid Poles
- NS212 Integrated Support Requirements for Ausgrid Network Assets
- NS220 Overhead Design Manual

5.3 Other standards and documents

- AS/NZS 7000:2016 – Overhead Line Design – Detailed Procedures
- HB 331–2012 – Overhead line design
- ENA Doc 001-2008 National Electricity Network Safety Code
- ESAA HB C(b)1 – 1999
- IEEE 1222-2011 testing and performance for ADSS fibre optic cable for use on electric utility power lines
- Service and Installation Rules of New South Wales

5.4 Acts and regulations

- Electricity Supply (General) Regulation 2014 (NSW)
- Electricity Supply (Safety and Network Management) Regulation 2014 (NSW)
- Work Health and Safety Act 2011 (NSW)
- Work Health and Safety Regulation 2017 (NSW)

6 DEFINITIONS

Accredited Service Provider (ASP)	An individual or entity accredited by the NSW Department of Planning and Environment, Energy, Water and Portfolio Strategy Division, in accordance with the Electricity Supply (Safety and Network Management) Regulation 2014 (NSW).
ABC	Aerial Bundled Cable
ADSS	All-dielectric, self-supporting cable, that has electrical properties consistent with those specified for cables set out in IEEE 1222-2011.
Cable	As the context requires, a Fibre Cable, a Coaxial Cable or a PSTN Cable. Cables may be classified as conductive or non-conductive.
Carrier	In the context of this document, refers to the holder of a Facilities Access Agreement with Ausgrid. While they may typically hold a carrier license under the Telecommunications Act, this is not necessarily the case.
Coaxial cable	A coaxial (“coax”) cable and supporting catenary excluding any fibre optic cable.
Telecommunications cable	Unless otherwise noted, refers to a cable owned by a carrier, and used for transmitting information (rather than power).
Conductive cable	Any telecommunications cable that contains conductive elements will be classified as conductive cables, whether covered or not. This includes coaxial cables, catenary wires, and metallic lashing wires. Bundles that contain both conductive and non-conductive cables will be considered conductive.
Fibre cable	A single multicore, sheathed, non-conductive fibre optic cable or a bundle of multicore, sheathed, non-conductive fibre optic cables. ADSS cable is an example of Fibre Cable.
HFC network	Hybrid Fibre Coaxial cable network
LV	Low voltage
Non-conductive cable	Cables that do not contain any metallic components. Only Fibre or ADSS cables are considered non-conductive for the purposes of this standard.

PSTN cable	A multicore copper cable, originally part of the (Public Switched Telephone Network). In the context of this standard it applies to the aerial case, however it can transit through a riser from a pit.
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.
Service drop	The carrier's cable – either Fibre Cable, Coaxial Cable, or PSTN – that runs aerially from an Ausgrid pole to a premise.
Service transition enclosure	A box mounted on the pole that is used to transition from the carrier's distribution cable to a service drop.
UGOH	Underground to overhead transition

7 RECORDKEEPING

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

Table 4 – Recordkeeping

Type of Record	Storage Location	Retention Period*
Approved copy of the network standard	Document repository Network sub process Standard – Company	Unlimited
Draft Copies of the network standard during amendment/creation	HPRM Work Folder for Network Standards (HPRM ref. 2014/21250/230)	Unlimited
Working documents (emails, memos, impact assessment reports, etc.)	HPRM Work Folder for Network Standards (HPRM ref. 2014/21250/230)	Unlimited

* Content Coordinator must liaise with the Records Manager to validate the retention period is compliant with the relevant disposal authority.

8 DOCUMENT CONTROL

Content Coordinator : Head of Asset Engineering Policy & Standards

Distribution Coordinator : Manager Asset Engineering Standards