Network Standard

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NW000-S0045 NS167 POSITIONING OF POLES AND LIGHTING COLUMNS

ISSUE

For issue to all Ausgrid and Accredited Service Providers' staff involved with positioning poles and lighting columns forming part of Ausgrid's network, 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Where this standard is issued as a controlled document replacing an earlier edition, remove and destroy the superseded document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 ASP/3 designers 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 Workplace 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:

- ☐ Applies to distribution and sub-transmission poles
- ☐ Applies to street lighting column positions
- ☐ Includes selection of positions for all situations where positions are to be selected for poles and columns.
- ☐ Is applicable for new installations, replacements and relocations.
- ☐ Pole mounted substation poles have some additional requirements which are addressed in NS122.
- ☐ NS128 Pole Installation and Removal covers erection and removal of poles.
- ☐ Responsibilities for selection and marking of pole positions are allocated in accordance with Section 6.

Where to for more information?

Section 1, 2, 5, 6

Pole and Column Alignments

The major design requirements relating to pole and column alignments are included as below:

- ☐ Pole and column alignment should generally comply with requirements set out Annexure D of NS130 Laying Underground Cables up to and including 11kV.
- ☐ Special requirements apply to rail crossings and designated main roads.
- ☐ Pole and column positioning along footways is included.
- ☐ In URD areas the requirements differ in Newcastle and Upper Hunter regions.
- ☐ Alternative alignment arrangements are possible if Ausgrid agrees with the proposal to change the alignment for a specific project.
- ☐ Where no kerb exists, the local council must be consulted regarding future levels and alignments.
- ☐ Special requirements exist in the vicinity of survey markers.
- ☐ Special requirements exist for side-arm construction designs and for partial and full undergrounding of existing mains.

Where to for more information?

Section 7

Tools and Forms

Annexure A – Pole positioning for private pole access

Hazardous Locations and Longitudinal Spacing

Some special requirements apply in hazardous locations and longitudinally:

- ☐ For RMS black spots/sections, where practical, Ausgrid will arrange for poles to be relocated. Generally the cost of this work is recoverable from RMS.
- ☐ Some factors contributing to the perceived hazards of locations are presented.
- ☐ In urban areas the nominal longitudinal spacing is 35 metres. Many factors affect the actual spacing of poles.
- ☐ It is appropriate to give some consideration to aesthetic concerns.
- ☐ Generally when a request is received to relocate a pole for aesthetic purposes the person or body requesting the move will be required to pay the entire cost of the move.
- ☐ Special conditions apply to joint use poles.
- ☐ Poles should not be erected through awnings unless no suitable alternative exists.
- ☐ The Code of Practice for Overhead Power and Communication In-span Crossings must be observed for crossings of aerial telecommunications cables

Where to for more information?

Section 8,9

Tools and Forms

None

Replacement and Relocation

The following requirements are included where poles/columns are to be replaced or relocated.

- ☐ When routine work occurs where a pole is in a potentially hazardous location it should be moved as part of the associated works if possible.
- ☐ Generally poles should be replaced as closely as possible to the original location.
- ☐ Where relocation of poles/columns is required in association with roadworks or other statutory work the costs are generally borne by the authority requesting the relocation.
- ☐ Some special conditions apply where relocation costs are borne by Ausgrid.
- ☐ Generally where other parties request a relocation of assets they will be required to pay the entire cost of relocation.
- ☐ In some cases Ausgrid will contribute or pay for the costs.

Where to for more information?

Section 10, 11

Tools and Forms

Annexure B – Sample compliance checklist

Network Standard
NS167
Positioning of Poles and Lighting Columns

Contents

1.0 PURPOSE

This network standard covers the requirements and responsibilities for selecting distribution and sub-transmission pole positions and street lighting column positions.

The primary objectives of this Network Standard are:

- to specify Ausgrid's current requirements for positioning of poles and columns
- to provide some background information on previous pole positioning practices, and on the development of the current requirements
- to indicate the principal constraints which need to be considered when positions are being chosen for poles and columns.

This document is subject to amendment by Ausgrid at any time. Any proposed deviation from this Network Standard must be submitted to Ausgrid for approval before implementation in accordance with NS181.

2.0 SCOPE

This Network Standard applies to all situations where positions are to be selected for poles and columns. It includes selection of positions for poles and columns for new installations, replacements and relocations.

This Network Standard applies to all persons with responsibility for planning and designing pole and column installations, and to all persons with responsibility for selecting positions for poles and columns, including Ausgrid staff and Accredited Service Providers.

Refer also to NS122 Pole Mounted Substation Site Selection and Construction for additional requirements applicable to pole mounted substations.

NS128 Pole Installation and Removal covers erection and removal of poles.

3.0 REFERENCES

All work covered in this document shall conform to all relevant Legislation, Standards, Codes of Practice and Network Standards. Current Network Standards are available on Ausgrid's Internet site at www.ausgrid.com.au.

3.1 Ausgrid documents

- Ausgrid Approved Material List (AML)
- Bush Fire Risk Management Plan
- Connection Policy – Connection Charges
- Customer Installation Safety Plan
- Electrical Safety Rules
- Electricity Network Safety Management System Manual
- Network Asset Relocation and Undergrounding Policy Guidelines
- ES1 Premises Connection Requirements
- ES4 Accredited Service Provider Authorisation
- NS104 Specification for Electrical Network Project Design Plans
- NS110 Design and Construction Standard for Underground Residential Subdivisions
- NS122 Pole Mounted Substation Site Selection and Construction
- NS125 Construction of Low Voltage Overhead Mains
- NS126 Construction of High Voltage Overhead Mains
- NS128 Pole Installation and Removal
- NS130 Laying Underground Cables up to and Including 11kV

- NS135 Construction of 33kV, 66kV and 132kV Overhead Mains
- NS145 Pole Inspection and Treatment
- NS181 Approval of Materials & Equipment and Network Standard Variations
- NS220 Overhead Design Manual
- NS268 Specification for the Design and Construction of Waterway Crossings
- Policy for ASP/1 Premises Connections

3.2 Other standards and documents

- AS/NZS 7000 Overhead line design
- ENA Doc 001-2019 National Electricity Network Safety Code

3.3 Acts and regulations

- Electricity (Consumer Safety) Act 2004 (NSW)
- Electricity Supply (General) Regulation 2014 (NSW)
- Electricity Supply (Safety and Network Management) Regulation 2014 (NSW)
- Electricity Supply Act 1995 (NSW)
- Roads Act 1993 (NSW)
- Service and Installation Rules of NSW
- Work Health and Safety Act 2011 (NSW)
- Work Health and Safety Regulation 2017 (NSW)

4.0 DEFINITIONS

Refer to NS001 Glossary of Terms.

5.0 INTRODUCTION

5.1 Historical background

Since the beginning of electricity distribution and street lighting in the Ausgrid supply area and until recently, poles for the support of electricity reticulation conductors and light fittings, as well as columns solely for lighting, have generally been sited in the footway area just behind the kerb or future kerb alignment. In the Sydney metropolitan area, this alignment for poles and columns had recognition from the Sydney Metropolitan Streets Opening Conference, which was first convened in 1909 to allocate space in public streets for utilities services. Originally, the allocated alignment for the roadside face of poles was 200 mm behind the face of the kerb, but this was varied by the Streets Opening Conference in 1949 to 250 mm. The 250 mm alignment remained in force as the standard pole alignment allocated by the Conference until 1991. The vast majority of poles and columns in the Sydney metropolitan area were erected on this alignment.

In the Central Coast, an agreement between local utility bodies and councils resulted in the selection of an alignment for poles centred 3 metres from the property alignment.

In the Newcastle and Hunter regions, the various local government councils allocated space for utility services within their footpath areas, and the resulting pole alignment allocations varied but were generally close to the kerb lines.

5.2 Original pole alignment suited open-wire construction

The traditional pole alignment was arrived at in the context of open-wire overhead mains construction, and was selected so as to assist in maintaining the statutory clearances between conductors and buildings or structures. Clearances were specified in Regulations (eg Overhead Line Construction and Maintenance Regulations). The pole alignment selection was also influenced by the requirement to avoid mains crossing private land, by the need to maximise footway space for unimpeded use by pedestrians, and by the necessity for the services of other utilities to be accommodated. To satisfy all of these considerations, poles needed to be placed well away from the property alignment. The kerb-side extremity of the footway was the logical choice.

5.3 Traffic hazard reduction

In recent years, increasing traffic density and awareness about traffic hazards has resulted in more consideration being given to the placement of fixed roadside objects and structures, including poles.

Since 1986, where practicable, poles have been placed further back from the kerb than the 250 mm which previously applied in the Sydney metropolitan area. Poles positioned on the original Sydney 250 mm alignment, or similar near kerbside alignments in other parts of the supply area, must remain until replacement is required, unless road reconstruction or other factors dictate earlier relocation.

Recognition of the need for funding and co-ordination of the relocation of existing poles at specific locations with a significant crash history led, in 1980, to enactment of legislation authorising the New South Wales Energy Corporation to direct a supply authority to remove or relocate electricity structures deemed to constitute a traffic hazard. Funding of such work was provided from the Traffic Route Lighting Subsidy Fund.

Section 63K of the Electricity Supply Act 1995 (NSW)provides for the Secretary of the Department of Planning and Environment to direct an electricity distributor to remove or relocate an electricity structure erected on or adjacent to a public road. The current legislation does not state the source of funding for this work.

5.4 The New South Wales streets opening coordination council

In Section 5.1, the historical role of the Sydney Metropolitan Streets Opening Conference was mentioned. In 1995, as a result of the widespread use of the Conference decisions in many locations outside the Sydney metropolitan boundaries; the Conference was reconstituted to cover the whole State, and was named the New South Wales Streets Opening Conference. This is now incorporated as Street Opening Coordination Council.

In some parts of Ausgrid's area, local government allocations still take precedence at this stage over the allocations in the Conference booklet. For this reason the allocations indicated in Annexure D of NS130 are to be followed, wherever reasonably possible, for the regions and local government areas indicated.

6.0 RESPONSIBILITIES

6.1 New projects and relocation projects requiring design plans

For new projects and relocation projects requiring design plans the designer is responsible for choosing the locations for poles and columns as part of the line design or street lighting design process, having regard for any "design information" provided as a monopoly service under the rules for connection contestability. The locations chosen are to be indicated on the network project design plans. Refer to NS104 Specification for Electrical Network Project Design Plans, particularly the section Responsibility for Obtaining Consent from Other Parties, which includes requirements for environmental assessment. Refer also to Section 12 of this Network Standard.

The marking/pegging of the exact location for the pole holes or column holes can be the responsibility of either the designer or the Accredited Service Provider responsible for a contestable construction project, or the nominated Ausgrid officer for a project which is not contestable. Checking for underground services before hole boring is the responsibility of the constructor.

6.2 Replacement poles or columns and minor relocation projects

The selection and marking of the locations for replacement or relocation pole holes or column holes is the responsibility of the Accredited Service Provider responsible for a contestable replacement or relocation project, or the nominated Ausgrid officer for a project which is not contestable.

6.3 All projects

Before marking a pole hole or column hole, the person responsible should ascertain the location of any underground services in the vicinity. It may be necessary for advice to be obtained from the designated underground asset information provider, if there is any doubt about the existence of other services in the vicinity. There may be a need for detailed maps to be obtained from other utilities. Note that stormwater and house drainage lines will need to be located at the site as they are not normally indicated on services plans.

Sinking of holes is to be carried out in accordance with Network Standard NS128 Pole Installation and Removal.

There will be cases where the location selected by a designer proves to be unsuitable owing to the existence of other services or obstructions. In these cases, the designer and the person responsible for marking the pole or column hole will need to confer to determine an appropriate course of action to resolve the situation.

7.0 POLE AND COLUMN ALIGNMENTS

7.1 General

Ausgrid's present overhead and underground mains policy is indicated in the Policy for ASP/1 Premises Connections.

Poles and columns should be located generally in accordance with the footway allocations indicated in Annexure D of Network Standard NS130 Laying Underground Cables up to and Including 11kV. Wherever possible, they should also comply with the additional requirements in the following Sections. Construction must be designed, and poles and columns must be suitably positioned, to ensure that clearances are maintained in accordance with the NS220 Overhead Design Manual, and the Service and Installation Rules of NSW.

All future rail crossings (overhead or underground) should allow for all poles to be located OFF rail property wherever possible.

Poles should be located in the road either side of a rail crossing, provided the Rail authority's technical requirements on maximum span lengths etc permit this.

Where new works on existing crossings permit, advantage should be taken of the opportunity to relocate poles to locations that are off of railway property where this is appropriate.

7.2 Main roads etc

In roads declared to be in the following classifications (as defined in the Roads Act 1993), poles and columns should be located, wherever possible, with their roadside face at least 2.5 metres behind the face of the kerb:

- main roads
- State highways
- freeways
- controlled access roads
- secondary roads.

7.3 Other roads – line poles

For roads other than those listed in Section 7.2, line poles should be located generally in accordance with the footway allocations, and with their roadside face at least 500 mm behind the face of the kerb. Where the construction permits (e.g. insulated or covered conductors, road contours do not result in mains or services crossing private property, adequate building set-backs) poles should be positioned close to the property alignment as shown in Annexure A Diagram 1. Note that approximately 300 mm clearance is required around wood poles to facilitate inspection and maintenance.

7.4 Other roads – lighting poles and columns and road-crossing poles

In footways up to 5 m wide; lighting poles and columns and road-crossing poles should, wherever possible, be fully offset, ie adjacent to the property alignment. Note that approximately 300 mm clearance is required around wood poles to facilitate inspection and maintenance.

In footways wider than 5 m; lighting poles and columns and road-crossing poles should be positioned:

- with the roadside face at least 2.5 m behind the face of the kerb, for Sydney and Central Coast areas
- with the centre line at least 1.5 m behind the face of the kerb, for Newcastle and Hunter areas
- as indicated in the footway allocations for those areas. This will achieve the desired offset without necessitating excessively long street lighting brackets.

If obstructions or other physical constraints prevent a pole or column from being erected in the fully offset position, or with a set-back from the kerb as indicated above; it should, wherever possible, be positioned with its roadside face at least 500 mm behind the face of the kerb.

In commercial areas, it will rarely be possible to position poles or columns in the fully offset position owing to the clearance requirements from structures and the presence of awnings.

Note: the use of road-crossing poles shall be in accordance with Section 3.3 of ES1 2013 which places restrictions on their use. Ausgrid typically only allows the use of street-crossing poles where their use is not reasonably avoidable.

7.5 URD areas

In URD areas, lighting columns or pillar-standards should be centred 400 mm from the property alignment, as indicated in NS130, except in the Newcastle and Upper Hunter regions where they should be positioned in accordance with Network Standard NS110 Design and Construction Standard for URDs.

In URD areas where the developer or Accredited Service Provider considers an alternative alignment to be more practical; full details of the proposed alternative alignment, including

proposals for other services, shall be submitted to Ausgrid for consideration in accordance with NS181. The proposed alternative alignment must not be adopted without approval from Ausgrid. Requests will be considered on a case by case basis.

7.6 Aerial bundled cable (fully offset position)

Usage of low voltage aerial bundled cable facilitates positioning of low voltage only poles in the preferred fully offset position adjacent to the property boundary (300 mm clear of boundary).

The fully offset position with aerial bundled cable is not generally feasible in commercial areas because of windows facing the street, and awnings.

Line design and pole positioning must ensure that the conductors will not encroach across property boundaries, unless suitable easements are obtained. Encroachments will normally be avoided when ABC suspension fittings are erected on the roadside of the poles. However, when the road alignment has a bend, and the ABC is to be erected on the inside of the bend, standoff bracket constructions may be an option to avert the ABC crossing private property. If standoff bracket constructions are not adequate to avert encroachment of ABC onto private property; the poles may need to be positioned on an alignment closer to the kerb, or positioned on the other side of the road, on the outside of the bend. If none of these solutions are practicable Ausgrid may be contacted for advice.

7.7 Practical constraints

Practical constraints will sometimes make it difficult to position poles or columns in accordance with the preferred allocations and alignments.

The following factors must be taken into account:

- safety clearances (see Note below) between aerial conductors and buildings or other structures
- road safety factors such as the likely risk of vehicle impacts, given the road design and speed limits at the location
- the requirement to avoid mains crossing private property, unless suitable easements are obtained
- available footway widths
- street lighting design and available bracket lengths
- existing underground services and structures
- other overhead/aboveground services, structures, trees etc
- costs
- site specific design parameters.

Note: Refer to:

- Ausgrid Network Standard NS220 Overhead Design Manual
- Service and Installation Rules of NSW,
- Ausgrid Network Standard NS125 Construction of Low Voltage Overhead Mains,
- Ausgrid Network Standard NS126 Construction of High Voltage Overhead Mains,
- Ausgrid Network Standard NS128 Pole Installation and Removal.

In narrow streets or where footpaths are congested by obstructions or services of other utilities, and it is not possible to position poles or columns on the alignments detailed above, poles or columns may be erected so that their roadside face is not less than 250 mm behind the face of the kerb. This requirement is to apply to the entire above ground face of the pole ie. No pole, once loaded and in its final settled position, is to have any above ground portion closer than 250 mm to a line extending vertically from the face of the kerb. In situations where the road camber is adverse this distance must be increased to no closer than 250 mm to a line which is at right angles (ie 90^{o}) from the surface of the road and extending from the face of the kerb and to a height of 4.6m – see Section 8.2 for further information.

Except in footways considerably wider than the old standard 3.6 metres, it is not normally possible for line poles carrying open-wire construction to be positioned with their roadside face greater than 2.5 metres behind the face of the kerb. The roadside face alignment 500 mm behind the face of the

kerb was originally selected for 3.6 metre wide footways as a compromise, affording some degree of offset while still allowing open wire construction.

Poles must not be installed in close proximity to structures which could restrict access to excavate around the pole for below ground inspection. Although a minimum clearance of 300 mm is required, a greater clearance may be appropriate depending on the ability to excavate and inspect with standard tools (ie shovel, drill, etc) in the particular situation.

Poles must not be installed in close proximity to structures, street signs, awnings, telephone boxes, walls or similar elevated objects or reasonably provide a means of unauthorised access to parts of the pole above normal ground level.

The use of low voltage aerial bundled cable may facilitate the preferred positioning of poles adjacent to the property alignment as may offset arm open wire construction.

Notes:

- Use of the roadside face alignment 500 mm behind the face of the kerb frequently involves interference with the space traditionally allocated for water mains. Before positioning poles on this alignment, it is necessary to ensure that there is adequate clearance from existing water mains, and that the local Water Board has no objection.
- Before positioning a pole or column in the space allocated by the Streets Opening Conference to any other utility body, the agreement of that body must be obtained.
- Wood poles erected adjacent to the property alignment must be located 300 mm clear of the property alignment to allow for inspection and preservative treatment.

7.8 Undefined alignments

If no kerb exists, the local council Engineer must be consulted regarding future levels and alignments.

The positioning of a pole or column on the usual alignment in a road with an undefined carriageway will sometimes interfere with vehicular traffic. In this case, the pole or column should be erected in a safe alternative position, after liaison with the local council or Roads and Maritime Services (RMS) if necessary.

The local council or RMS may be requested to have their surveyor peg pole positions when there is any doubt about the position of the property/road alignment.

Before erecting a pole or column at a street corner, even if it is to replace an existing pole or column, the local council Engineer should be consulted to see if there is any plan to splay the corner. Where the corner is on a State or Regional road, the RMS should be consulted.

7.9 Survey marks

Poles or columns should not be positioned within 1 metre of permanent survey markers, or where they would obstruct the line of sight between permanent survey markers. Permanent survey markers are normally bronze or cast iron plaques set in concrete. The plaques may have alignment pin holes or arrow-head indents.

7.10 Other forms of construction

Other forms of construction may be considered where particular difficulties with pole positioning or line positioning require line alterations to be carried out, as specified in NS125 and NS126. The following forms of construction may be considered; however approval in accordance with NS181 must be obtained in each instance from Ausgrid before proceeding with design or marking of pole positions.

7.10.1 Offset arm construction

Offset arm open wire construction (as specified in NS125 and NS126) may be acceptable as an alternative form of construction to allow a line of poles to be located further back from the kerb. However it would normally only be employed for isolated line poles or for a small number of consecutive poles where bare LV aerials are not being changed to aerial bundled cable.

The offset construction can be used to increase the clearance from buildings or to avoid crossing property boundaries (e.g. narrow streets/lanes etc, where the footpath is less than a metre wide). However the application of offset arm construction can be limited because of the difficulty of terminating conductors on offset crossarms, and it becomes difficult to avoid crossing private property on the inside of curves. The moving of open-wire mains closer to the property alignment can also create additional clearance problems with trees on private property.

On the outside of curves, or for a small number of consecutive poles in a straight section of road, offset arm construction may be feasible. Should the need for termination arise; LV offset arms must be stayed, HV mains can be terminated vertically.

Sub-transmission mains are not suitable for offset arm construction, but the use of vertical construction using line-post insulators (all on the road side of the pole), may enable poles to be set-back from kerb lines in some cases.

7.10.2 Partial undergrounding – retaining poles at the property alignment

Partial undergrounding in this context involves undergrounding of all HV and LV distribution cables, together with street lighting cables (where used), while service lines remain overhead. The aerial service lines are supplied from underground to overhead service cables (ie 50 mm^2 Cu UGOHs) at each pole. Either wood poles, or special concrete poles which allow internal installation of the UGOH cables, may be used.

Partial undergrounding may be an option in cases where it is necessary for poles to be offset from the kerb line to reduce traffic hazards, and aerial mains construction on the offset pole line is not feasible owing to trees which cannot be cut, or other obstructions.

Partial undergrounding is generally unsuitable for commercial areas, owing to awnings, etc.

7.10.3 Full undergrounding

Full undergrounding, involving undergrounding of existing aerial services as well as HV and LV distribution mains, is the only remaining option for eliminating ‘hazardous’ roadside poles if physical constraints prevent poles from being erected on an acceptable alternative alignment, such as adjacent to the property alignment.

8.0 HAZARDOUS LOCATIONS

8.1 Black spots

RMS records crashes by location, and lists the locations in order of crash frequency. ‘Black spots’ are locations where significantly above average numbers of crashes are recorded. “Black sections” are sections of road where significantly above average numbers of crashes are recorded. If the crashes at ‘black spots/sections’ have also involved a pole or poles, RMS may request Ausgrid to remove or relocate the poles. If it is practicable, Ausgrid will arrange for the pole or poles to be moved as part of Ausgrid’s Black Spot pole program.

Poles which have been moved under the Black Spot program, shall be recorded as such in SAP via the “BLACKSPOTPOLE” characteristic field. These poles must not be relocated without prior consultation with RMS.

8.2 Hazardous locations - general

Only general guidance can be given for determining ‘hazardous’ locations, as many factors can contribute. More detailed guidance in this regard is available from RMS. The alignment/set-back of poles must take into account all of Ausgrid’s safety and design criteria as well as the requirements of other organisations, such as RMS. RMS requirements do not necessarily take precedence but are to be considered along with all of Ausgrid’s other required design criteria as they apply to each particular situation.

In developed areas, where poles have existed for many years, a clear indication of risk is provided by a pole’s history of vehicle collisions and scrapes.

Poles or columns should not be erected in locations which are clearly hazardous.

Some generally recognised factors contributing to risk of vehicle-pole collisions are as follows:

- curves, particularly for poles positioned close to the kerb line on the outside of a curve
- curves at crests or where sight distances are poor
- narrowing carriageways or changes in kerb alignment
- unusually narrow traffic lanes (especially on curves)
- surfaces which become particularly slippery when wet
- intersections (poles within 20 m are at some risk, mainly of secondary collision)
- tight road configurations, such as roundabouts and S-lanes.

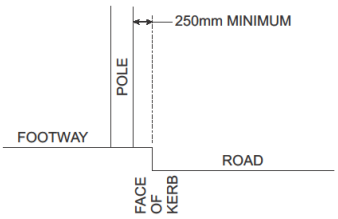
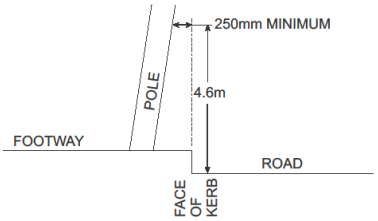
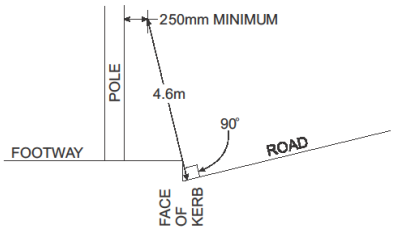
Traffic islands and median strips, particularly within 12 m of the approach end, are also generally regarded as hazardous locations for siting poles or columns (unless protected by guardrails). The outside of a roundabout, especially within 15 m of an 'entry' road is another recognised hazardous location.

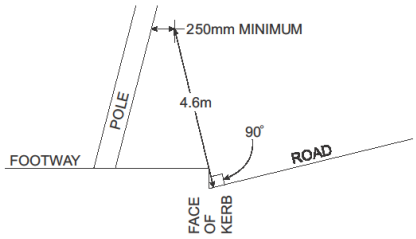
8.2.1 Poles at risk of being grazed by passing vehicles

Poles close behind the kerb can be at risk of vehicle collision even where the vehicle remains on the carriageway under full control. When poles on the traditional alignment, with the roadside face set-back 250 mm behind the face of the kerb, are close to intersections or on the inside of bends, they may be subject to being grazed or bumped by large vehicles, eg container trucks, especially where the road camber is adverse. This risk is increased if poles are incorrectly raked (leaning towards the road).

No pole, once loaded and in its final settled position, is to have any above ground portion closer than 250 mm to a line which is at right angles (ie 90^{o}) from the surface of the road and extending from the face of the kerb and to a height of 4.6m (4.6m being the maximum allowable height of vehicles on NSW roads). This includes vertical poles, poles leaning towards the road and poles where the road camber is adverse as shown in the examples in Table 1.

Table 1 – Examples of hazardous pole locations

Situation	Description
	Vertical pole: roadside face set-back 250mm behind the face of the kerb.
	Pole leaning towards road: the distance from the face of the kerb must be increased such that no above ground portion of the pole is closer than 250mm to a vertical line extending from the face of the kerb and to a height of 4.6m.
	Vertical pole, adverse road camber: the distance from the face of the kerb must be increased such that no above ground portion of the pole is closer than 250mm to a line which is at right angles (ie 90º) from the surface of the road and extends from the face of the kerb to a height of 4.6m.

Situation	Description
	Pole leaning towards road, adverse road camber: the distance from the face of the kerb must be increased such that no above ground portion of the pole is closer than 250mm to a line which is at right angles (ie 90°) from the surface of the road and extends from the face of the kerb to a height of 4.6m.

In situations where a pole is observed to be leaning towards the carriageway or the camber of the road is such that the pole is at risk of being grazed by a passing vehicle, the pole must be reported to Ausgrid for attention.

9.0 LONGITUDINAL SPACING

9.1 Low voltage mains

In urban areas pole spacings and span lengths have varied depending on the historical policies employed in the particular region. In any case any new mains should be designed such that the typical LV span lengths correspond approximately to the width of two properties, so that poles are positioned on alternate boundaries and instances of services crossing property are minimised. However, poles should be spaced to meet the service requirements of existing and future development of the area concerned.

Pole spacing may be increased in rural areas or in areas with an undulating ground profile or abnormal sub-division lot sizes.

9.2 High voltage mains

Where HV mains are erected on the same route as LV mains; both HV and LV will normally be attached to every pole. The HV and LV span lengths will then be equal.

In urban areas where LV mains exist on poles that are evenly spaced, and overhead HV mains are to be erected; the new HV mains can be erected using ‘alternate’ construction, reducing the number of poles to be replaced, provided that line design calculations are carried out and prove that satisfactory clearance can be maintained at the intermediate LV poles when the HV line is at its maximum operating temperature, as specified in NS126 and NS220, unless indicated otherwise in project documentation.

In urban or rural areas span lengths of HV construction on routes where no LV mains exist or are envisaged, must take into consideration factors such as conductor bow-out and encroachment on adjoining properties, obstruction of driveways, appropriate ground clearances, ground profile, road or easement alignments, conductor tensions, and pole and stay loadings.

9.3 Private property access & road-crossing poles

Poles should be positioned opposite the subdivision lines (property side boundaries) of private property, as shown in Annexure A Diagram 1. Any proposed departures from standard positions shown in Diagram 1 must be approved by Ausgrid in accordance with NS181.

There is no legal requirement indicating where to place poles in relation to boundaries, but the established route of access for vehicles to any block of land must not be genuinely obstructed.

Poles should be positioned so as to ensure that existing and future services do not cross neighbouring property. A route crossing neighbouring property is only acceptable when a suitable easement is obtained over the crossed property. (Refer Service and Installation Rules of NSW Clause 2.2.2*)*.

The use of road-crossing poles is to be in accordance with Section 3.3 of ES1 2013 which puts restrictions on their use. However where the use of a road-crossing pole is approved by Ausgrid (typically only where its use is not reasonably avoidable) it should, where possible, be positioned so as to facilitate the future attachment of adjacent services, to thereby avoid the need for any future adjacent road-crossing poles.

9.4 Aesthetic considerations

Where appropriate, consideration should be given to the view from customers' premises when selecting pole and column positions. Obvious encroachments on a customer's outlook should be avoided, especially where balconies or picture windows overlook scenic views. Note however, this is only permissible where it can be achieved while complying with the other requirements of this standard.

Where an existing pole is to be replaced either as a limited life pole or as part of a construction project, the new pole must be placed in accordance with the requirements of this standard. However, where a request is received to leave the pole in (or move the pole to) a non-standard position for aesthetic reasons, such requests may only be complied with where this does not disadvantage and is agreed to by, other affected residents.

Where replacement poles that have already been erected are to be moved under these circumstances, the person or body requesting the move shall fund the entire cost of the move in accordance with the Ausgrid Network Asset Relocation and Undergrounding Policy Guidelines. For example, a property owner may request a pole be placed in front of their own property. In the case of shared title properties, such a request must come from the Body Corporate or equivalent.

9.5 Pole positions involving other parties

9.5.1 Joint use poles

Where it is necessary to erect poles along the existing pole route of another public utility which is party to a joint use or common use of poles agreement with Ausgrid; the poles should be erected in positions suitable for the common or joint use requirements. However, Ausgrid's standard spacing should not be reduced unduly in order to enter into common or joint use arrangements with every pole of the other party. Additional poles required to suit the other party's spacing are normally erected at that party's cost in accordance with the Ausgrid Network Asset Relocation and Undergrounding Policy Guidelines.

9.5.2 Poles through awnings

Poles should not be erected through awnings unless suitable alternative positions are unavailable.

Where it is necessary to erect a pole through an awning, and Ausgrid will be erecting the pole; the local Ausgrid Field Manager must approve the proposal, must discuss the matter with the property owner, and must make arrangements for the awning to be suitably restored. If the property owner objects to the proposal; the Ausgrid Field Manager must forward a report to his local Region Manager requesting that written notice of Ausgrid's intention to erect the pole be forwarded to the property owner and the local council. Unless Ausgrid advises otherwise, the work must not proceed for at least 40 days following the issue of the notice.

Where it is necessary to erect a pole through an awning, and the works are contestable, the designer must first obtain approval for the proposal from Ausgrid. The Accredited Service Provider must then discuss the matter with the property owner, and must make arrangements for the awning to be suitably restored. If the property owner objects to the proposal; the Accredited Service Provider must forward a report to Ausgrid requesting that written notice of the intention to erect the pole be forwarded to the property owner and the local council. Unless Ausgrid advises otherwise, the work must not proceed for at least 40 days following the issue of the notice.

9.5.3 Crossings of telecommunication cables

The Code of Practice for Overhead Power and Communication In-Span Crossings must be observed for crossings of aerial telecommunication cables.

When it is proposed to erect a pole carrying high voltage mains which will cross an aerial telecommunication cable, the pole should be positioned so that the crossing will be as near as practicable to a right angle. In any case, the included angle must not be less than 45°. There is no such restriction regarding low voltage mains.

10.0 REPLACEMENT OF INDIVIDUAL POLES AND COLUMNS

10.1 General

Where an existing pole or column, which requires routine replacement, is in a position considered to be potentially hazardous (see Section 8), the new pole or column should, if possible, be offset back from the kerb.

If the use of non-standard construction (see Section 7.10) is the only way to position a replacement pole in a less hazardous location, additional costs will normally be incurred. For contestable work, the non-standard construction must first be approved by Ausgrid in accordance with NS181 and any additional costs must be borne by the proponent in accordance with the Ausgrid Network Asset Relocation and Undergrounding Policy Guidelines.

Replacement line poles should generally be positioned with the roadside face at least 500 mm behind the face of the kerb unless full offset is justified.

Where the existing pole is located in accordance with this Network Standard, the general approach taken to locate replacement poles is to position them as close as practicable to the original pole, transfer the conductors from the old pole to the new pole, and remove the old pole. This practice minimises the cost of the replacement and often avoids lengthy and inconvenient customer interruptions. Where an existing pole is located in a non-standard location (eg the middle of a block) the opportunity should be taken to bring it into line with the preferred locations as shown in Annexure A Diagram 1 and Section 10.2.

Where the pole being replaced is opposite the property dividing line, and any other position would cause obstruction to a driveway, the new pole should be placed in the same position as the old pole. Note that “in and out” pole replacements (i.e. installing the new pole into the same hole from which the old pole is removed) can be difficult and time consuming, and so a separate hole for the new pole is always desirable where possible.

Replacement road-crossing or street lighting poles should generally be fully offset if possible, or failing that, should be positioned with the roadside face at least 500 mm behind the face of the kerb.

Replacement lighting columns should be fully offset if possible, or else positioned with their roadside face at least 500 mm behind the face of the kerb. The feasibility of re-positioning replacement columns will depend largely on the location and type of existing UG supply cabling. If the cabling does not allow the replacement column to be fully offset without ‘piecing-in’ or additional jointing work, the replacement column should preferably be positioned with the roadside face at least 500 mm behind the face of the kerb. If this is not feasible, the original alignment may be retained, unless the location is definitely hazardous.

If a planned subdivision retains an existing pole without the need for its relocation, any proposed driveway should be located so as to maintain a minimum clearance of 1.5 m from the nearest face of the pole to any part of the driveway, including the layback, to allow room for future pole replacements Ausgrid should be consulted for any deviation to this norm.

Note: An “in and out” replacement may be required in some circumstances. For example:

- The pole is located between two driveways, and
- LV ABC is attached, and

- The pole requires replacement

10.2 Existing overhead reticulation in areas where rounded gutters are installed

In some areas, in minor streets without original kerbing and guttering, local councils are installing rounded gutters or “roll-backs” instead of kerbing and guttering. The footpath area is commonly widened and the road pavement narrowed when the rounded gutter is installed. These rounded gutters provide an easy access for vehicles to mount and park on the footpath area. In most cases, poles have already been installed on an alignment which anticipated one of the standard footpath widths. The rounded gutter alignment is frequently variable, and the set-back from the rounded gutter to the existing pole alignment is likewise variable, but is commonly up to 3 metres. In these cases, single replacement line poles for open-wire construction should normally be installed in the existing pole alignment, provided the roadside face of the pole is at least 500 mm behind the pole side edge of the rounded gutter, and provided the location is not clearly hazardous.

11.0 RELOCATION OF POLES AND COLUMNS

11.1 Relocation in association with roadworks

Under the Roads Act 1993, the roads authority has the power to fix or alter road alignments and levels. Where Ausgrid network construction is affected by an alteration in road alignment or levels, and the network construction requires relocation or modification, the local council or RMS as appropriate, is required to bear the associated costs in accordance with the Ausgrid Network Asset Relocation and Undergrounding Policy Guidelines.

Where road widening, reconstruction or realignment works require the relocation of poles, Ausgrid should negotiate with the road construction authority (eg RMS or local council) to determine the most suitable pole or column alignment.

The road construction authority must agree to meet the relocation costs in accordance with the Ausgrid Network Asset Relocation and Undergrounding Policy Guidelines, and must also meet the additional cost of any non-standard construction required by that authority to allow offsetting of poles, or other agreed alternative construction arrangements. In general, if this work is contestable in accordance with Ausgrid’s Connection Policy – Connection Charges, the road construction authority may select its own Accredited Service Provider.

Before erecting new poles or columns on a road undergoing reconstruction, an officer from the road construction authority should be asked to physically mark the proposed new kerb or street alignment (using pegs or similar), to ensure the new poles or columns are correctly positioned. This is especially important if the kerb or road alignment is curved or irregular.

11.2 Relocation of poles for members of the public

Requests for relocation of individual poles should be submitted via Ausgrid’s Asset Relocation form available on Ausgrid’s website. If there is no valid reason why a pole should be relocated, the request for relocation may be refused. The usual valid reason is that the pole constitutes a genuine obstruction to access. If the work is contestable, Ausgrid must determine whether the pole can be relocated or not.

If a pole is to be relocated at someone’s request and it is not already opposite the property dividing line, then it should be moved to a position opposite the dividing line if possible.

Notes:

- Where an old pole due for routine replacement is opposite the property dividing line and any other position would cause obstruction to a driveway, the new pole should be placed in the same position (ie in the old hole) if practicable.
- If a pole is obstructing access to one of two garages situated on opposite sides of a dividing line and it is impracticable to place it opposite the dividing line, the pole should be moved in front of

the property of the person making the request, subject to satisfactory spacing between other poles.

- If it is proposed to relocate a pole to a position in front of a property which is not owned by the applicant, then the applicant must obtain written agreement from the owner of that property for the pole to be placed in that position.
- An old pole requested to be relocated should not be replaced without charge purely because it is old.

11.3 Charges

The funding of the relocation (including undergrounding) of Ausgrid's network assets shall be in accordance with the Ausgrid Network Asset Relocation and Undergrounding Policy Guidelines. This generally requires that if Ausgrid network assets are to be relocated then the proponent is responsible for the cost of that relocation.

12.0 ADDITIONAL FACTORS AFFECTING POLE AND COLUMN POSITIONING

In addition to the requirement for environmental assessment, as indicated in Section 6.1, and the practical constraints affecting allocations and alignments, as indicated in Section 7.7; the following additional factors must be considered and complied with, where applicable, when positions are being selected for new or replacement poles and columns:

- Positions for rail crossings or waterway crossings must satisfy the requirements of the relevant authority.
- Refer to Section 8.1. General, paragraphs 3 and 4 for special requirements in crossing rail property.
- Refer to NS268 regarding requirements for waterway crossings.
- Positions such as in or adjacent to protected areas, as referred to in Section 48 (7) of the Electricity Supply Act 1995 (NSW), where restrictions would apply to any present or future need for line clearance tree trimming, must be avoided.
- Positions which would contravene a heritage order restriction, or historic site restriction, or similar legal restriction on the placement of poles or structures, must be avoided.
- Positions at designated aboriginal sites, or positions which would require construction or maintenance access through designated aboriginal sites, must be avoided.
- Positions in the vicinity of an airport or aerodrome must comply with any legal or reasonable height restrictions on structures.
- For sub-transmission poles, and other poles where step and touch potentials and earth potential rise need to be considered; clearance requirements from installations such as telecommunications pits, pipelines, etc., and structures such as swimming pools and metallic fences, must be considered. (Refer also to NS135 Construction of 33kV, 66kV and 132kV Overhead Mains).
- The impact, on street lighting effectiveness, of trees below or close to proposed street lighting poles and columns must be considered.
- Present and likely future access availability for poles in easements, must be considered.

13.0 RECORDKEEPING

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

Table 2 – 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	Work Folder for Network Standards (Trim ref. 2014/21250/256)	Unlimited
Working documents (emails, memos, impact assessment reports, etc.)	Records management system Work Folder for Network Standards (Trim ref. 2014/21250/256)	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.

14.0 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.

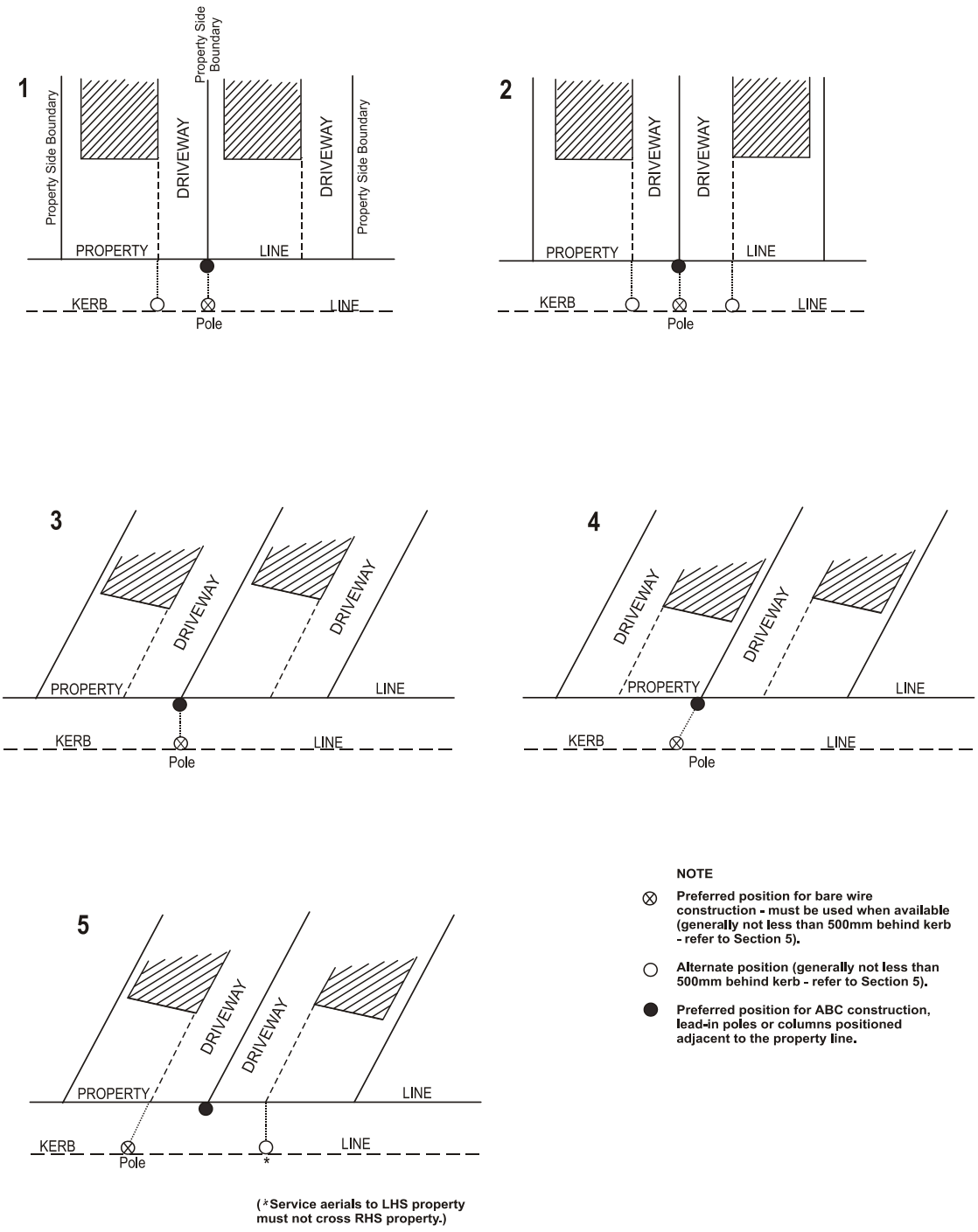
15.0 DOCUMENT CONTROL

Content Coordinator : Mains Engineering Manager

Distribution Coordinator : Manager Asset Standards

Annexure A – Pole Positioning for Private Pole Access

Diagram 1 Pole Positioning for Private Property Access



Annexure B – Sample Compliance Checklist

Network Standard Checklist Form

NS167 Positioning of Poles and Street Lighting Columns

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		
	This network standard covers the requirements and responsibilities for selecting distribution and sub-transmission pole positions and street lighting column positions.		
	Poles and Column Alignments		
1	Responsibilities for selection of pole and column positions have been undertaken as attributed in the Section 6.	6.0	Yes/No/NA
2	Dial Before You Dig enquiries have been made in association with marking desired pole/column locations.	6.3	Yes/No/NA
3	Sinking of holes conducted in accordance with requirements of NS128 Specification for Pole Installation and Removal.	6.3	Yes/No/NA
4	Poles and columns located generally in accordance with footpath allocations as identified in Annexure C, NS130 Specification for Laying Underground Cables up to and including 11kV.	7.1	Yes/No/NA
5	Special requirements applying to rail crossings and rail corridors have been met.	7.1	Yes/No/NA
6	Selection requirements for pole positions for designated main roads as defined in Clause 7.2 have been met.	7.2	Yes/No/NA
7	Line poles along other roads are in accordance with requirements.	7.3	Yes/No/NA
8	Lighting poles and columns and lead-in poles are positioned as required by the clause. Different conditions apply between Sydney/Central Coast and Newcastle/hunter areas.	7.4	Yes/No/NA

Item	Description	Refer Clause	Completed/ Actioned
9	For URD areas lighting columns or pillar standards have been located in accordance with the requirements of NS130.	7.5	Yes/No/NA
10	The special conditions applying the the construction of Aerial Bundled Cable have been met.	7.6	Yes/No/NA
11	Where no kerb exists the local council engineer has been consulted in relation to future levels and alignments.	7.8	Yes/No/NA
12	Poles and columns not positioned within 1 metre of a survey mark.	7.9	Yes/No/NA
13	Where non-standard construction has been used or in the case of partial or full undergrounding of assets the requirements of the clause have been applied.	7.10	Yes/No/NA
	Hazardous Locations and Longitudinal Spacing		
14	Poles or columns not erected in positions which are hazardous.	8.2	Yes/No/NA
15	In urban areas, LV pole shave a nominal 35m longitudinal spacing.	9.1	Yes/No/NA
16	In urban areas HV poles have a nominal 70m longitudinal spacing.	9.2	Yes/No/NA
17	Poles positioned to ensure existing and future service lines do not cross neighbouring property.	9.3	Yes/No/NA
18	Poles not erected through awnings unless no alternative is available.	9.5.2	Yes/No/NA
19	Code of Practice for Overhead Power and Communication In-Span crossing followed for crossings of aerial telecommunication cables.	9.5.3	Yes/No/NA
20	Crossings of aerial telecommunications cables with HV mains cross nominally at 90degrees to the telecommunications route and never at an angle less than 45 degrees.	9.5.3	Yes/No/NA
	Replacement and Relocation		
21	Pole replacement generally done with the new pole at least 50mm behind the kerb unless full-offset is justified.	10.1	Yes/No/NA
22	New poles to be generally positioned as close as possible to the exiting pole to allow transfer of assets.	10.1	Yes/No/NA
23	Where existing pole positions do not comply with current practice the new pole is located in accordance with this standard (Ns167).	10.1	Yes/No/NA
24	Poles only relocated at Ausgrid's cost where the conditions listed in Clause 11.3.1 are met.	11.3.1	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.