

Network Standard

NETWORK

Document No	:	NW000-S0053
Amendment No	:	0
Approved By	:	Chief Engineer
Approval Date	:	19/06/2015
Review Date	:	01/03/2017

NW000-S0053

NS128 SPECIFICATION FOR POLE INSTALLATION AND REMOVAL



ISSUE

For issue to all Ausgrid and Accredited Service Providers' staff performing work associated with the handling, positioning, erection and removal of concrete, fibre cement, fibre plastic, steel and wood poles, 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Where this standard is issued as a controlled document replacing an earlier edition, remove and destroy the superseded document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 Workplace Health and Safety Regulation 2011 (NSW - Part 6.2 Duties of designer of structure and person who commissions construction work) which requires the designer to provide a written safety report to the person who commissioned the design. This report must be provided to Ausgrid in all instances, including where the design was commissioned by or on behalf of a person who proposes to connect premises to Ausgrid's network, and will form part of the Designer Safety Report which must also be presented to Ausgrid. Further information is provided in Network Standard (NS) 212 Integrated Support Requirements for Ausgrid Network Assets.

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.

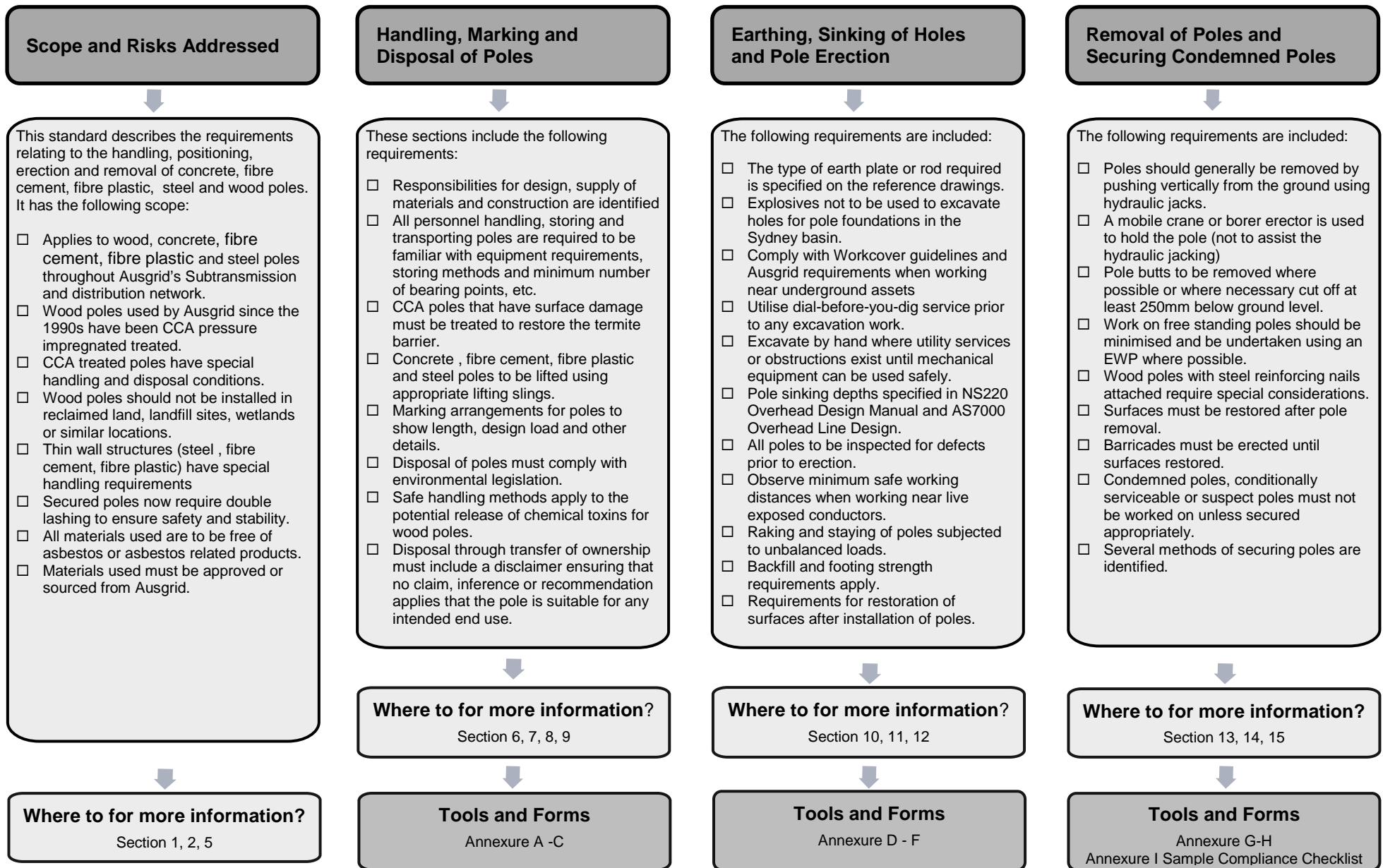
KEYPOINTS

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



Network Standard NS128 Specification for Pole Installation and Removal

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1.0 PURPOSE

NS128 describes the requirements relating to the handling, positioning, erection and removal of concrete, steel and wood poles.

2.0 SCOPE

This network standard applies throughout the Ausgrid distribution network including work on poles that are part of the network and poles that will become part of Ausgrid's network.

This network standard does not apply to poles on private property (Service poles). The Service and Installation Rules of New South Wales apply to Private poles.

3.0 REFERENCES

3.1 General

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.

3.2 Ausgrid documents

- ASP Level 1 Authorisation Agreement
- Bush Fire Risk Management Plan
- Company Form (Governance) - Network Document Endorsement and Approval
- Company Procedure (Governance) - Network Document Endorsement and Approval
- Company Procedure (Network) - Production / Review of Network Standards
- Customer Installation Safety Plan
- Design Contract – Connection Assets
- Electrical Safety Rules
- Electricity Network Safety Management System Manual
- Model Standing Offer (MSO) – Standard Connection Services for Contestable ASP/1 Premises Connection no greater than 11kV
- NS104 Specification for Electrical Network Project Design Plans
- NS119 Street Lighting Design and Construction
- NS122 Pole Mounted Substation Construction
- NS145 Pole Inspection and Treatment Procedures
- NS146 Safe Inspection Procedure for Working on Poles
- NS156 Working Near or Around Underground Cables
- NS167 Positioning of Poles and Lighting Columns
- NS174 Environmental Procedures
- NS174C Environmental Handbook for Construction and Maintenance Work
- NS181 Approval of Materials and Equipment and Network Standard Variations
- NS212 Integrated Support Requirements for Ausgrid Network Assets
- NS220 Overhead Design Manual
- NS261 Requirement for Design Compliance Framework for Network Standards
- Policies for Developments
- Public Electrical Safety Awareness Plan
- Public Lighting Management Plan
- Supply Policy - Electrical Standards (ES range of documentation) and NECF Connection documentation
- Tree Safety Management Plan

3.3 Other standards and documents

- AS/NZ1289 Soil Testing - Compaction on Density
- AS/NZ1605 Methods for sampling & analysing Timber Preservative – treated timber
- AS 3818.11 Timber – Heavy Structural Products – Utility Poles
- AS/NZ 4065 Concrete Utility Services Poles
- AS/NZ 4676 Structural design requirements for Utility Service Poles
- AS/NS 4677 Steel Utility Service Poles
- AS/NZ 7000 Overhead line design
- AS/NZ 9000 Quality Management System
- AS/NZ 60300 Dependability Management
- ENA Doc 001-2008 National Electricity Network Safety Code
- ENA DOC 015–2006 National Guidelines for Prevention of Unauthorised Access to Electricity Infrastructure
- ISSC 3 Guideline for Managing Vegetation near Power Lines
- NENS 09 Guide for the Selection, Use & Maintenance of Personal Protective Equipment for Electrical Hazards
- Relevant Industry (including ENA NENS and ISSC documentation), WorkCover Guides and Codes of Practice
- Service and Installation Rules of New South Wales

3.4 Acts and regulations

- All pertinent Environmental Regulations and Acts.
- Electricity Consumer Safety Act 2004
- Electricity Supply Act 1995
- Electricity Supply (General) Regulation 2014 (NSW)
- Electricity Supply (Safety and Network Management) Regulation 2014
- Protection of Environment Operations Act 1997
- Protection of Environment Operations Regulations
- Work Health and Safety Act 2011 and Regulation 2011

3.5 Drawings

- 118306: Overhead Construction 33 kV, 66 kV and 132 kV Spun Concrete Poles. Single Pole Structures Location of Pole Dressing Fixtures.
- 21852: Overhead Construction Pole Cap – Details
- 514087 Standard Construction Street Light Column Pole Footing Details)
- 515278: Standard dressing for 15.5m timber poles
- 515279: Standard dressing for 17.0m to 21.5m timber poles
- 515280: Standard dressing for 12.5m timber poles
- 515281: Standard dressing for 14.0m timber poles
- 515282: Standard dressing for 9.5m timber poles
- 515283: Standard dressing for 8.0m timber poles
- 61501: Overhead Stays & Stay Poles anchorages, Footings & Termination Arrangements

4.0 DEFINITIONS

Accredited Service Provider (ASP)	The individual or entity accredited by the NSW Government Trade & Investment in accordance with the Electricity Supply (Safety and Network Management) Regulation 2014 (NSW).
Business Management System (BMS)	An Ausgrid internal integrated policy and procedure framework that contains the approved version of documents.
CCA Treated Poles	A wood pole with full length CCA (Copper Chrome Arsenate) Pressure Impregnation treatment applied to the pole to raise the durability. The treatment fully penetrates the sapwood making it highly durable and therefore allowing it to be included in the pole's strength calculation.
Concrete Poles	A concrete pole manufactured to an Australian Standard for use on overhead electrical transmission lines.
Customer	The customer is defined as the individual or entity presenting to Ausgrid for business dealings related to the connection and supply of electricity.
Desapped Durable Species Timber Poles	Wood poles that have all their sapwood removed and are Durability Class 1 species only. Their durability comes from the chemical qualities of their heartwood, any remaining sapwood is not naturally protected.
Document control	Ausgrid employees who work with printed copies of document must check the BMS regularly to monitor version control. Documents are considered "UNCONTROLLED IF PRINTED", as indicated in the footer.
Earthing System	Shall mean and include all conductors, piping, electrodes, clamps and other connections whereby an electrical transmission line or pole transformer is earthed within the easement specified.
Fibre Cement Pole	Fibre composite pole manufactured from fibreglass and cement, spun on a mandrel into a tapered tubular shape.
Fibre Composite Poles	Ausgrid has two types of manufactured fibre composite poles found on its network. They are fibre cement poles and fibre plastics poles.
Fibre Plastics Pole	Fibre composite pole manufactured from fibreglass and polymer resin.
Network Standard	A document, including Network Planning Standards, that describes the Company's minimum requirements for planning, design, construction, maintenance, technical specification, environmental, property and metering activities on the distribution and transmission network. These documents are stored in the Network Category of the BMS repository.
Nominal Ground Line	A plane at right angles to the axis of a pole located a distance of 600 mm plus 10 percent of the nominal length, from the butt end (AS3818.1 – 2009).
Raking	Is defined by an angle at which the pole is installed to offset the resultant force which tends to pull the pole to the vertical.
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.
Steel Poles	A steel pole manufactured ASCE Manual No.72 "Design of Steel Transmission Pole Structures" and relevant Australian Standards.

Wood Poles	Wood poles suitable for electricity transmission and distribution purposes which are hardwood poles of either full length CCA Pressure Impregnated timber poles or Desapped Durable Species timber poles as detailed by Australian Standards. For more details on wood poles refer to NS145 – Annexure “A”.
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5.0 INTRODUCTION

5.1 General

In general, Ausgrid uses CCA treated poles (wood poles that are copper-chrome-arsenate pressure impregnated). They are generally to be installed for supporting circuits which don't have an overhead earthwire.

Generally, transmission and subtransmission circuits will be protected by overhead earthwire and be suitable for the preferred concrete pole construction. However, in some circumstances wood or steel poles may be preferable. For these projects the construction type will be specified on an individual basis.

Desapped durable species timber poles were the most common pole used by Ausgrid pre-early 1990's. Almost all timber poles purchased since the early 1990's have been full length CCA pressure impregnated treated. Many desapped durable species timber poles can still be found in Ausgrid network but now they are generally only purchased for bushfire areas.

The following precautions must be observed when working with CCA treated poles:

- The handling, drilling and cutting of all CCA treated poles requires special consideration to ensure that the outer treated surface is not damaged.
- Burning CCA treated poles emit toxic arsenic and chromium laden smoke and ash. If you are not required in the area of operations, while burnt or burning material is being handled, stay out of the immediate area and up wind. In general no employee or contractor is to handle or disturb burnt CCA treated material unless:
 - the burnt material must be moved or contained at that time (this may be either for safety reasons or work requirements), and
 - they have received the necessary training, and
 - they have the required personal protective equipment.
- Only appropriately trained workers should disturb CCA treated timber that is burning or has been burnt. However all burnt or partially burnt CCA treated poles must be immediately reported to the Ausgrid Supervisor / Contract Officer / Customer Operations Officer to ensure appropriate action is taken (ie containment / removal). For the handling of Burnt and Burning CCA treated timber poles refer to NS145 Pole Inspection and Treatment Procedures-“Annexure C”.

Where no distinction has been made between wood, steel, fibre cement, fibre plastic or concrete poles by a subheading in this standard, the information contained under that heading is common to all types of poles.

The durability class of wood poles must be as specified in Section 15.

Wood poles should not be installed in reclaimed land, landfill sites, wetlands or similar locations. Also, note the requirements of NS145, and consider the cost of pole inspection and maintenance when installing poles in difficult locations.

Refer to Section 15 regarding restrictions on timber species used for pole mounted distribution substations and underground to overhead connection poles.

Note: Poles that have been lashed with only one lashing prior to the issue of this Network Standard do not have to have the second lashing added.

5.2 WorkCover - Code of Practice: Work near overhead power lines

Work on Ausgrid's electricity network assets where the work is carried out in accordance with the requirements of the Electricity Supply (Safety and Network Management) Regulation 2014 and the work is either:

- by or for an electricity network operator, or
- by an Accredited Service Provider, or
- by a telecommunications network operator is excluded from this code of practice.

This WorkCover code of practice applies to other work which is carried out near overhead power lines and associated electrical apparatus.

6.0 RESPONSIBILITIES

During the course of supply negotiations the Accredited Service Provider shall provide all information to allow Ausgrid to determine the most appropriate method of supply. Ausgrid will prepare and provide design information sufficient to enable design and construction drawings to be completed.

The customer/applicant for connection services is responsible for the design, supply of some materials and construction of the contestable connection work (including substations) to supply the new industrial/commercial development generally as detailed in Ausgrid's 'Policy for ASP/1 Premises' Connections'. The customer/applicant for connection services can use either Ausgrid staff or Accredited Service Providers to complete the electrical design and construction for which he/she is responsible, as specified in the Design Information provided by Ausgrid for each particular project. Reference should be made to the three Ausgrid documents, 'Model Standing Offer (MSO) – Standard Connection Services for Contestable ASP/1 Premises Connection no greater than 11kV', 'ASP Level 1 Authorisation Agreement' as well as 'Design Contract – Connection Assets'. The customer/applicant for connection services or the accredited designer is also responsible for providing local authorities and the RMS (as appropriate) with copies of the proposed construction plans at least 40 days before work is to commence, and must comply with any special requirements of these authorities. Refer also to NS104 Specification for Electrical Network Project Design Plans.

The customer (end user) is responsible for supplying and installing the portion of service mains from the street alignment to the customer's terminals in accordance with the Service and Installation Rules of NSW.

7.0 HANDLING PRECAUTIONS

7.1 Asbestos

All materials and equipment used for construction of Ausgrid's assets are to be free from Asbestos and or Asbestos related products. Suppliers are expected to comply with the Work Health and Safety Act 2011 (NSW) together with the Work Health and Safety Regulation 2011 (NSW) and confirm in writing that all products supplied to Ausgrid contain no Asbestos related materials.

7.2 Handling, storing or transporting poles

All poles must be unloaded at the site under controlled conditions using a pole loader or a crane. In extreme circumstances where a pole loader or a crane cannot be used a risk analysis approach utilising Ausgrid's safety management risk assessment process should be followed, ensuring the safety of all workers and that there is no damage to the pole.

Handling and transporting methods used for poles must be equivalent or better than Ausgrid's guidelines outlined in NEG-OH20 Handling and Transporting of Utility Poles.

All personnel handling, storing or transporting poles, including Accredited Service Provider's will be required to be familiar with the details of preferred lifting and handling techniques, including any special equipment required, recommended storing methods, the minimum number of bearing points for each particular type of pole (for transporting and storage) and the minimum dimension recommended for each bearer, together with the maximum unsupported overhang permitted during transportation.

Note: Do not use "scissor grips" when handling poles.

7.2.1 Slinging poles

Slinging is considered high risk work and must be performed by experienced qualified Dogman staff. Slinging work must be done in accordance WorkCover Dogging Guide 2003 – 6th Edition and Ausgrid's guideline NEG NEG-OH20 Handling and Transporting of Utility Poles.

All reasonable precautions/controls identified in the pre-work risk assessment processes need to be taken with the slinging work associated with the installation, removal and correcting alignment of poles.

When a Crane is taking the strain of the load there must be NO hand contact with the slings or chains eg when rotating a pole using a sling/chain.

7.3 Wood poles

If a CCA treated pole is damaged in a way that involves significant loss of the chemical barrier, appropriate action as detailed in this specification (see Clause 12.1) must be undertaken. The supervisor must also be advised as to the extent of the damage.

Standard leather gloves must be worn when handling CCA treated poles. When drilling holes for a kingbolt, or mounting a street-lighting bracket, additional eye and airway protection is required in the form of safety glasses and disposable half-face particulate filter respirators.

For the handling of fire-damage and burning CCA treated timber poles refer to NS145 Pole Inspection and Treatment Procedures - "Appendix H". Ausgrid's staff can find additional information in NEG-SE09 Management of CCA Impregnated Wood - Including Burning/Fire-Damaged CCA Poles).

7.4 Concrete poles

Appropriate lifting slings should be used when handling a concrete pole such as Pole Strop slings or synthetic slings so as not to damage the concrete surface and reduce the concrete coverage of the reinforcing steel.

Information on inspection and treatment of concrete poles refer to Clause [12.2 Concrete Pole Inspections and Treatment](#).

7.5 Steel poles

Steel poles are thin walled structures, and as such are highly susceptible to being damaged from excessive wall pressure. Therefore, care must be exercised during handling as these poles are not solid and cannot be handled like timber poles.

Appropriate lifting slings should be used when handling a steel pole such as Pole Strop slings or synthetic slings so as not to damage the outer surface and reduce the protective coating.

Information on inspection and treatment of steel poles refer to Clause 12.3 [Steel Pole Inspections and Treatment](#)

7.6 Fibre cement poles

The fibre cement poles are used in Ausgrid's network.

Appropriate lifting slings should be used when handling fibre cement poles such as synthetic slings so as not to damage the outer surface.

Fibre cement poles are thin walled structures, and as such are highly susceptible to being damaged from excessive wall pressure. Therefore, care must be exercised during handling as these poles are not solid and cannot be handled like timber poles

Information on inspection and treatment of fibre cement poles refer to Clause 12.4 [Fibre Cement Pole Inspections and Treatment](#).

7.7 Fibre plastics poles

There are only a few fibre plastics poles found in Ausgrid's network as part of an industry trial. These poles are not suitable for bushfire prone areas and the poles are not recommended to be used in Ausgrid's network unless approved by Transmission and Distribution Mains Engineering (T & DME).

Fibre plastic poles are thin walled structures, and as such are highly susceptible to being damaged from excessive wall pressure. Therefore, care must be exercised during handling as these poles are not solid and cannot be handled like timber poles

Appropriate lifting slings should be used when handling a composite fibre pole such as synthetic slings so as not to damage the outer surface.

Information on inspection and treatment of fibre plastic poles refer to Clause 12.5 [Fibre Pastics Pole Inspections and Treatment](#).

8.0 MARKING OF POLES

8.1 Wood poles

Wood poles are identified in two ways:

- With an aluminium disc fixed 2 metres above the nominal ground line which gives the length, design load (kN rating), timber species, treatment type, treatment date;
- With the length, design load and timber-type painted on the butt by the supplier. The colour of the paint denotes the supplier.

For wood poles greater than 20 metres in length, the location of the aluminium disc will be specified.

Note: Ausgrid still have some older poles with no disc and other poles installed pre-2015 with the disc located 4 metres from the butt.

Ausgrid's Timber Inspector or deputy will stamp the pole butt with the initials "AG" if the pole is acceptable.

8.2 Concrete poles

The permanent marking must be impressed on a metal plate affixed to the pole to the requirements of Clause 1.6 of AS 4065. The plate, plaque or indentations will appear on the pole at a point 1.5 metres above the nominal ground line of the pole unless otherwise specified. A depth indication mark representing a ground line reference mark will be provided at an Ausgrid specified distance from the pole butt.

The required information to be provided on the plate will include, name of the manufacturer, location of plant, year and month of manufacture, pole length (m), ultimate strength (kN), pole mass (kg), serial number, Purchaser's name and pole code.

8.3 Steel poles

All steel poles will have a permanent marking impressed on a metal plate affixed to each pole section which will include the mass for that section to the requirements Clause 1.6 of AS 4677 or an equivalent to the satisfaction of Ausgrid. The most critical pole marker will appear at a height between 0.8m and 2m above ground level, which should indicate other separable sections as well as details of its own section. Because the ground level can vary from pole to pole, Ausgrid will nominate a distance from the pole tip for the nameplate to be installed. The required information to be provided on the plate will include, name of the manufacturer, year of manufacture, length (m), mass (kg) of pole, load capacity (kN), and identification reference number.

All nameplates should remain visible and legible for the intended life of the pole and should have reasonable resistance to vandalism and removal.

Poles to be direct buried are to be provided with a depth indication mark welded into the pole.

8.4 Fibre cement poles

All fibre cement poles will have a metal plate affixed to each pole 2 metres above the nominal ground line. The required information to be provided on the plate will include, name of the manufacturer, month/year of manufacture, length (m), mass (kg) of pole, load capacity (kN) and identification reference number.

All nameplates should remain visible and legible for the intended life of the pole and should have reasonable resistance to vandalism and removal.

8.5 Fibre plastic poles

All fibre plastic poles should have an aluminium ID tag affixed to each pole 2 metres above the nominal ground line. The required information to be provided on the ID tag will include, name of the manufacturer, month/year of manufacture, length (m), mass (kg) of pole, load capacity (kN), class and identification reference number. When a series of modular pole sections is being supplied to meet a specific pole length and class each module will be identified with pertinent information including module number, production serial number and module mass.

A pole marker may appear at a height 0.91 metre above ground level for existing composite poles.

All nameplates should remain visible and legible for the intended life of the pole and should have reasonable resistance to vandalism and removal.

9.0 DISPOSAL OF POLES

Disposal of poles should comply with the Protection of Environment Operations Act and Regulations, and Work Health and Safety Regulations, and any current guidelines relevant to the activities involved.

The disposal of poles must be in accordance with Ausgrid's any Ausgrid requirements NS174 Environment Procedures, eg. EG 120 Waste and Waste database. If additional information is required please contact Ausgrid's Environmental Services.

The disposal of poles including transfer of ownership by sale or donation is organised by the Warehouse and Distribution Management.

10.0 EARTHING

The type of earth plate or rod will be specified on the reference drawings.

IMPORTANT: All concrete poles must be earthed.

11.0 SINKING OF HOLES

11.1 General

When working near underground assets comply with WorkCover's Guideline to Work near Underground Assets and all Ausgrid requirements (eg NS156 Working Near or Around Underground Cables).

Maximum use should be made of the mechanical plant available for sinking holes for poles. However, hand excavation must be used where utility services or obstructions exist; at least until it is clear that mechanical boring equipment can be safely employed.

In paved or concreted surfaces or where poles have been concreted in, a rectangular area of 200mm from the pole which extends down to a depth of no less than 350mm below ground level is to be maintained free from concrete or pavers to facilitate inspections.

11.2 Rock excavation

Explosives are not used in the Sydney Basin to excavate for pole foundation.

Where rock is encountered and excavation is difficult and the borer is inadequate to cut the required hole, a vertical borer or a specialist contractor may be used. Outside the Sydney Basin where there is no other option a specialist contractor may consider using explosives to excavate difficult rock.

11.3 Utility services and obstructions

Be aware of the possibility of underground pipes, cables etc, belonging not only to Ausgrid but also to other utilities. Before digging into unknown ground it is essential to check on the location of any underground services in the vicinity.

To determine if underground service assets exist in a particular location, contact the Dial Before You Dig Service, telephone 1100 (business hours), or internet www.dialbeforeyoudig.com.au. This is a free service, providing information on which utility has an interest in a particular location and the relevant contact details.

In all locations in Ausgrid's network franchise area the requirements of NS156, (especially Clause 2.1, to determine the presence of cables before commencing work), apply for routine/urgent/emergency pole hole sinking. When plans are not sourced via a DialBeforeYouDig enquiry, they are to be obtained directly from the asset owner, or other precautions taken to determine the presence of underground assets.

Where doubt exists as to the presence and location of obstructions, pipes, or cables, sinking should be carried out by hand to a depth of at least 900 mm, or until rock or shale is encountered.

Before boring, check all the necessary utilities' underground construction plans, to identify where the underground construction is located, before hole sinking begins.

11.4 Pole sinking depths

Please refer to NS220, Overhead Design Manual and AS/NZS 7000, Overhead Line Design – Detailed Procedures.

11.4.1 Street lighting poles

In general Ausgrid streetlights should be direct buried to minimise costs (eg. installation and maintenance costs). In new subdivision developments (eg. Greenfield sites) the preferred method shall be the rag-bolt mounted type. For additional information refer NS119 Street Lighting Design

and Construction (eg rag-bolt foundation construction requirements – Drawing No 514087 Standard Construction Street Light Column Pole Footing Details).

12.0 POLE ERECTION

12.1 Wood pole inspection and treatment

Should there be damage of the sapwood which is impregnated with a chemical barrier or large pole butts that require trimming such as to expose untreated timber in the "below ground - line " section, then special treatment of the exposed area will be required. Exposed areas on CCA treated poles will be treated by hand painting with a preservative surface - treatment compound (copper naphthenate oil - CN timber oil).

For non CCA treated poles, bioguard wrap is to be installed externally around the pole 50 mm below the groundline at the same time the pole is erected.

12.2 Concrete pole inspections and treatment

All concrete poles will be inspected and found to be free from any defects such as transport damage or surface cracks, honeycombing. Depressions or bulges must not exceed 2 mm in height or depth provided that the maximum cover is maintained and the depressions or bulges do not exceed in any direction for more than 100 mm.

Drilling, cutting or grinding of a concrete pole will not be permitted unless specifically approved by a designated Ausgrid representative who is in attendance during the procedure.

12.3 Steel pole inspections and treatment

All steel poles will be inspected and found to be free from any defects such as general transport damage, dents, surface cracks or coating defects.

Should there be damage to the galvanised coating of the pole the exposed area will be treated by hand painting with GALMET or equivalent.

Steel poles can have epoxy mastic paint coverage or an insulated cover in the groundline region and great care should be taken not to damage the coating/cover.

Drilling, cutting or grinding of a steel pole will not be permitted unless specifically approved by a designated Ausgrid representative who is in attendance during the procedure.

12.4 Fibre cement pole inspections and treatment

All fibre cement poles will be inspected and found to be free from any defects such as general transport damage, dents, surface cracks or defects.

Drilling fibre cement pole need to be pre-approved by Ausgrid.

12.5 Fibre plastics pole inspections and treatment

All fibre plastics poles will be inspected and found to be free from any defects such as general transport damage, dents, surface cracks or defects.

Drilling fibre plastic pole need to be pre-approved by Ausgrid.

12.6 Erecting poles or columns in proximity to mains

(a) Minimum safe distances for working near overhead power lines

The minimum safe working distances are distances which must be maintained by people, and their tools and equipment, when they are near live exposed conductors. Work on or near Ausgrid's mains and apparatus may only be carried out in accordance with the Ausgrid's Electrical Safety Rules (ESR).

(b) Erecting poles through bare live LV mains

For work on the ground or in an earthed situation, where there is a reasonable risk of the pole contacting exposed live low voltage conductors, precautions such as applying temporary insulation to the pole and/or the low voltage conductors and wearing insulating gloves as described in the ESR's should be taken by personnel handling or touching the pole.

Risk assessment precautions for electrical leakages hazards are recommended for new *wood poles* or impregnated (e.g. CCA treated) poles.

(c) Erecting poles in proximity to HV mains

Minimum Safe working distances must always be maintained.

12.7 Raking and staying of poles with unbalanced loads

A pole which is to be subjected to a resultant horizontal force (e.g. angle or termination pole) should be raked (not more than 2 heads) so that the resultant force tends to pull the pole to the vertical. The vertical position is to be established by sighting with a plumb bob and the pole is then erected at an angle to the vertical.

A pole which is to be subjected to unbalanced loads which would exceed the permissible design load limits of the pole it must be stayed in accordance with Ausgrid drawing B-61501, prior to attaching the unbalanced loads to the pole. If a concrete, fibre cement, fibre plastic or steel pole is used, this must be reported to Ausgrid in advance, so that any additional precautions to protect the concrete from crushing by the stay wire can be determined.

12.8 Back filling

To ensure the stability of erected poles, approved type back filling is to be used.

The compaction level for the layered backfill is to be 98% of Standard Compaction, with 1-2% optimum moisture content. Refer to AS 1289 Method of testing soils for engineering purposes (Soil compaction and Density tests).

Should backfilling be carried out using hole spoil a final bearing capacity in excess of 300 kPa/m² is required around the backfilled area.

Alternatively, the hole is to be layer back filled with DGB-10 Roadbase or other approved type of back filling.

Back filling should be ram compacted every 150 mm thick to ground line and shall fill the hole. The 350 mm below ground level to the actual ground level should be filled with loamy type soil to facilitate future inspections.

Poles for pole mounted distribution substations must be back-filled as specified in NS122 Specification for Pole Mounted Distribution Substation Construction.

12.9 Footing strength

For lines designed to a standard pre-dating AS7000-2010 poles sunk to Ausgrid's standard sinking depth will have adequate footing strength in medium bearing strength soils (300kPa/m²).

Where poor bearing strength soils are encountered, an increase in sinking depth will significantly increase footing strength, and is the preferred method of increasing footing strength where required. For example a 25% increases in sinking depth will almost double the footing strength.

Where increased sinking cannot be accomplished, baulking is effective, but requires plenty of room - free from services, obstructions, kerbs, etc see Clause 12.10 Baulking.

Concreting of the butt has little effect on footing strength, compared to increasing sinking depth. For example, to double the footing strength of a pole using concrete backfill requires the effective diameter of the in-ground section of the pole to be doubled - meaning that a pole with an in-ground diameter of 220 mm must have 110 mm of concrete placed evenly around the pole down to butt level so the diameter below ground now becomes 440 mm.

Poles must be backfilled in accordance with Clause 12.8 to ensure pole stability. Concrete must not be used as a substitute for poor pole stabilisation practises.

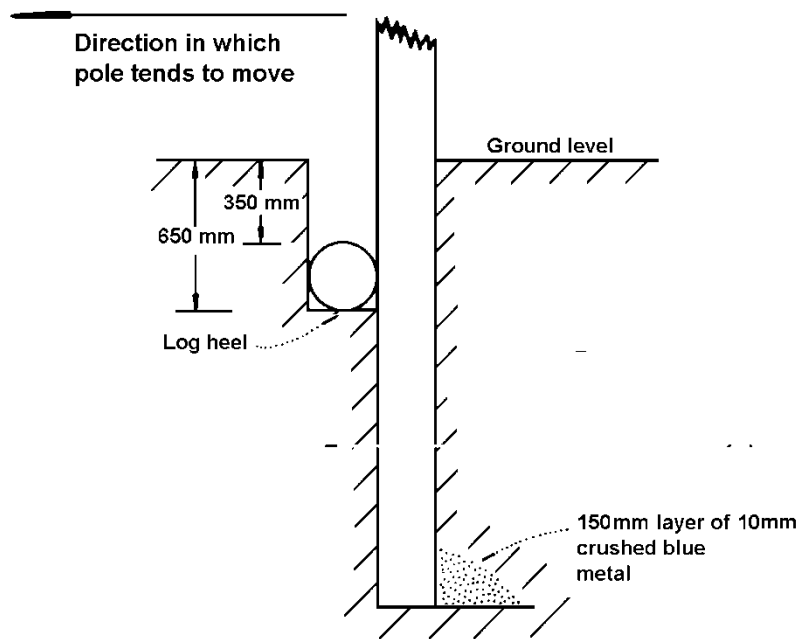
Concreting should only be used where:-

- quick stabilisation of the soil is required such as for Pole Transformer poles; or
- lines designed to AS 7000 need to overcome unusually poor foundation condition.

Note: The concreting must cease at 350 mm below ground line to allow pole inspection to wood and steel poles.

12.10 Baulking

The figure below shows baulking using a log heel and a stone toe.



Baulking

12.11 Concreting butt

Concreting should extend from the butt to a point 350 mm below final ground line. Poles must not be concreted to ground level.

Except in special circumstances poles will not be concreted in rock. Where an obstruction (eg water pipe) is also close to the butt of a pole, the obstruction should be shielded from concrete encasement by a suitable barrier.

Poles for pole mounted distribution substations must be concreted as specified in NS122.

12.12 Vegetation clearing for new poles and lines

Accredited Service Providers designing new overhead lines and poles must comply with the requirements of the Industry Safety Steering Committee document ISSC 3 – Guideline for Managing Vegetation Near Power Lines.

Prior to erecting any new or replacement pole, vegetation clearances must be in accordance with the requirements of ISSC3, Guideline for Managing Vegetation Near Power Lines and NEG-OH21, Vegetation Safety Clearances.

Vegetation clearance work must be carried out in accordance with Ausgrid's Electrical Safety Rules.

12.13 Restoration of surfaces after installation of poles

Ground surfaces which have been disturbed during excavation of pole holes and during installation of poles must be restored in accordance with this clause. This clause applies to the final backfill

top-up and surface restoration after the pole hole has been backfilled in accordance Clauses 12.8, 12.9, 12.10 and 12.11, where applicable. All spoil that needs to be removed from the site shall be managed as per NS174C Environmental Procedures – Environmental Handbook for construction and maintenance.

Methods adopted for backfilling and restoring excavated areas around poles must achieve a clean and tidy result. This will reduce the number of customer complaints. Any complaint about the condition of a site must be attended within 24 hours of notification. If work has been performed by an Accredited Service Provider the costs incurred in rectifying any complaint are to be borne by the Accredited Service Provider.

12.13.1 Unpaved areas

In unpaved areas, the depression around the pole is to be restored firstly with approved backfill material complying with Clause 12.8. Stones and vegetation must be removed from the backfill material. The backfill material is to be firmly tamped down with a suitable tool so that it finishes slightly below the general ground level. The top surface is then to be filled with clean stone-free sandy loam. The sandy loam is to be tamped down and sloped away from the pole so that the finished level at the pole is 20 mm above the surrounding general ground level. The work area is to be cleaned with a broom and all surplus material is to be removed from the site.

12.13.2 Paved areas

Any concrete or decorative paving must terminate a minimum of 200 mm from the face of a timber pole, to facilitate pole inspection and maintenance.

In paved areas, the depression around the pole is to be restored firstly with approved backfill material complying with Clause 12.8. Stones and vegetation must be removed from the backfill material. The backfill material is to be firmly tamped with a suitable tool so that it finishes approximately 50 mm below the level of the pavement. All excess backfill material is to be cleaned from the surface of the pole and from the edges of the surrounding paving.

Where the pavement is paving tiles, the tiles are to be cut as required and placed to fit neatly around the pole. The tiles are to be laid on a sand bed and the finished surface is to join level with the surrounding undisturbed paving tiles and be slightly higher at the pole. Any small gaps between the paving tiles are to be filled with sand.

Where the paved surface is other than paving tiles, the top surface of the inspection area around the pole is to be reinstated with cold bituminous pre-mix material. The bituminous pre-mix material is to be tamped down and sloped away from the pole so that the finished level at the pole is 20 mm above the surrounding pavement level. The bituminous pre-mix material is to be finished slightly above the level of the surrounding paving to allow for settling, but not to the extent that a trip hazard would be created. The work area is to be cleaned with a broom and all surplus material is to be removed from the site.

The reinstatement of paved areas is to be completed as detailed above within 24 hours of the installation being carried out.

Permanent restoration of the affected paved areas will also be in accordance with the requirements of the local road authority.

Part of the work performed by an *Accredited Service Provider* includes the permanent reinstatement and restoration of the paved areas.

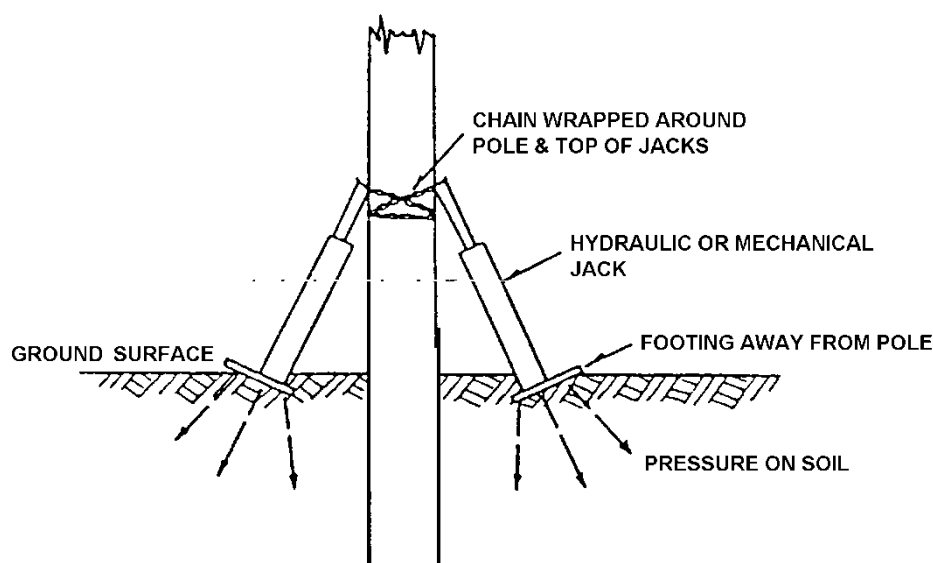
13.0 REMOVAL OF POLES

13.1 General

When a pole is to be removed, it should be "pushed" from the ground by two hydraulic extraction jacks, while a mobile crane or borer erector vehicle is attached at or just above the point of balance. Two jacks, installed diametrically opposite, are used to ensure that the pole emerges vertically out of the ground and can be easily lifted directly onto a pole jinker. The mobile crane or borer erector vehicle must not attempt to assist the hydraulic jacks in the removal of the pole. The mobile crane or borer erector vehicle function is to steady the pole and receive it after extraction from the ground.

Note: Mobile cranes are not permitted to pull against unknown extraction forces.

Before extracting a pole whose butt has been concreted, a check should be made for possible underground utility construction close to the pole. Damage to pipes or cables will result if they are encased in concrete and pulled up with the pole butt.



Correct Use of Hydraulic Jacks

13.2 Removal of pole butts

All pole butts are to be removed where practicable. When removal of the butt is not practicable (eg. a pole concreted in rock) the butt is to be cut off not less than 250 mm below ground level. If the butt is infested with termites, Ausgrid Contract Operations (telephone: (02) 9410 5466) is to be notified so a suitable treatment can be carried out.

13.3 Removal of pole attachments

The normal risk management process must be undertaken. Work on free-standing poles should be kept to a minimum. In some circumstances all attachments will be removed while working from an EWP and possibly the head of the pole sawn-off below the existing conductors; and in other circumstances as many attachments as possible would be left on the pole with the removal of the remaining attachments done after the pole has been removed. There are many variables that could affect the safety of the work and each circumstance needs to be carefully assessed before a decision is made on the procedure for the removal of the pole's attachments. When a borer erector is used for the removal of a pole (see Clause 13.1) consideration should be given to the removal of all attachments so as not to foul the jaws of the borer erector.

Note: The pole identification number MUST remain with the pole, and any new pole has a new identification label installed.

The strength of the pole and the loads which are applied to that pole is critical and must be assessed. Before a pole, is made free-standing it must be inspected in accordance with NS146

Safe Inspection Procedure for Working on Poles. If an authorised person is dissatisfied with the pole condition, or the pole is shown by the inspection to be unsound, or if the pole is suspect, or condemned, the pole must not be climbed and stripped unless it is stayed or supported in accordance with Section 14.

13.4 Disposal of wood poles with steel reinforcing ‘nails’ attached

This clause provides information on pole reinforcement with steel ‘nails’ and outlines the procedures which must be followed when poles with steel reinforcing nails attached are recovered from service.

13.4.1 Pole reinforcement

Ausgrid currently reinforces all wood poles where timber degradation at or below groundline has reduced the residual strength of the pole to 50% or less, and the condition of the above ground section of the pole is suitable for a minimum of 10 years’ service. Poles suitable for reinforcement are nominated by Network Contracts for the Pole Reinforcement Contractor to attach steel reinforcing nails.

Occasionally, the presence of below ground obstructions, such as baulks, concrete or rock, may prevent pole reinforcement nailing from being completed after the task has commenced. The Pole Reinforcement Contractor has been instructed to not remove any reinforcing nails that cannot be driven to the required depth, because removal could destabilise the pole. When the nailing is unsuccessful, the Pole Reinforcement Contractor must notify the relevant Network Contracts Officer who will arrange to have the nail removed and the pole replaced. The Pole Reinforcement Contractor can be present at the removal to collect the nail, or the nail can be stored for collection later by the Contractor. In these cases, Ausgrid is not charged, however the nail remains the property of the Pole Reinforcement Contractor and Ausgrid is obliged to provide for its collection.

13.4.2 Reinforced poles removed from service

When the above ground condition of a reinforced pole deteriorates to the point where replacement is required, the pole and reinforcing nail are removed from the ground as a unit, where possible. The bolts are not to be removed. Reinforcing nails are designed to last 20 years with no maintenance, and may last considerably longer when corrosion prevention maintenance has been carried out. They may be re-used a number of times depending on environmental and other conditions, and therefore must not be discarded when removed from service.

In situations where the pole cannot be jacked out of the ground, it may be necessary to cut the pole below ground and use oxy-acetylene equipment to cut the nail below ground. Where the nails are cut off, the cut piece should be discarded.

13.4.3 Notification of reinforced poles removed

When a reinforced pole is removed, notification must be sent to the relevant Contracts Officer. The notification should include the date of removal, the reason for replacement, the pole number and the location of the pole. The Contracts Officer is to notify the Pole Reinforcement Contractor of the reinforced poles removed so that arrangements can be made by the Pole Reinforcement Contractor to detach and collect the nails.

13.4.4 Storage of poles with reinforcing ‘nails’ attached

Poles removed from service with reinforcing nails attached, are to be stored in a designated storage area where the Pole Reinforcement Contractor can attend and safely remove the nails from the poles.

After the nails have been removed from poles, the poles can then be disposed of in the usual manner.

13.5 Restoration of surfaces after removal of poles

Pole holes and ground surfaces which have been disturbed during removal of poles, or where poles have been cut off, must be restored in accordance with this clause.

To prevent danger to the public, barricades must be placed at sites where poles have been removed or cut off, until the surfaces are restored in accordance with this clause.

Methods adopted for backfilling pole holes and restoring excavated areas around pole holes must achieve a clean and tidy result. This will reduce the number of customer complaints. Any complaint about the condition of a site must be attended to within 24 hours of notification. If the work has been done by an Accredited Service Provider the costs incurred in rectifying any complaint are to be borne by the Accredited Service Provider.

Backfill material must comply with Clause 12.8.

13.5.1 Unpaved areas

In unpaved areas, the pole hole is to be restored firstly with approved backfill material. The backfill material is to be firmly tamped down with a suitable tool so that it finishes slightly below the general ground level. The top surface is then to be filled with clean stone-free sandy loam. The sandy loam is to be tamped down and finished level with the surrounding general ground level. The work area is to be cleaned with a broom and all surplus material is to be removed from the site.

The reinstatement of unpaved areas is to be completed as detailed above within 24 hours of pole removal.

13.5.2 Paved areas

In paved areas, the pole hole is to be restored firstly with approved backfill material. The backfill material is to be firmly tamped with a suitable tool so that it finishes approximately 50 mm below the level of the pavement. All excess backfill material is to be cleaned from the surrounding paving.

The top surface is to be reinstated with cold bituminous pre-mix material. The bituminous pre-mix material is to be tamped down and finished slightly above the surrounding pavement level to allow for settling, but not to the extent that a trip hazard would be created. The work area is to be cleaned with a broom and all surplus material is to be removed from the site.

The reinstatement of paved areas is to be completed as detailed above within 24 hours of pole removal.

Permanent restoration of the affected paved areas will also be in accordance with the requirements of the local road authority.

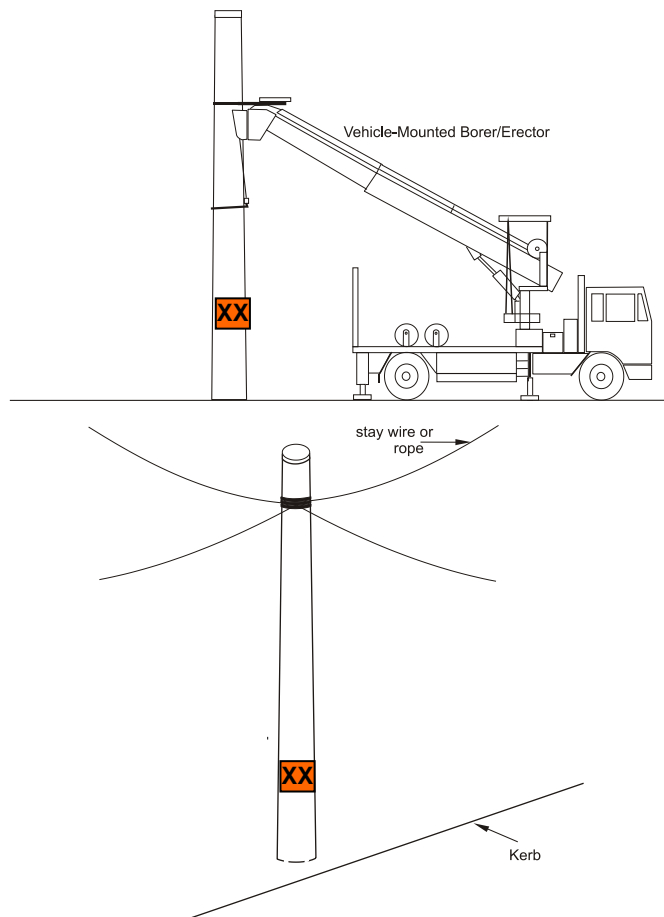
Part of the work performed by an Accredited Service Provider includes the permanent reinstatement and restoration of the paved areas.

14.0 METHOD OF SECURING CONDEMNED POLES

Condemned, conditionally serviceable or suspect poles must not be climbed or worked on unless secured in an approved manner (Methods 1 and 2 or a combination).

Condemned poles should be replaced as soon as practicable. Some factors which can restrict the removal of a condemned pole, is the existence of telecommunications infrastructure, availability of lineworkers and safety concerns (e.g. vehicle/pedestrian traffic, school zones etc).

Poles must be secured using one of the following methods suitable to the prevailing conditions:



Method 1

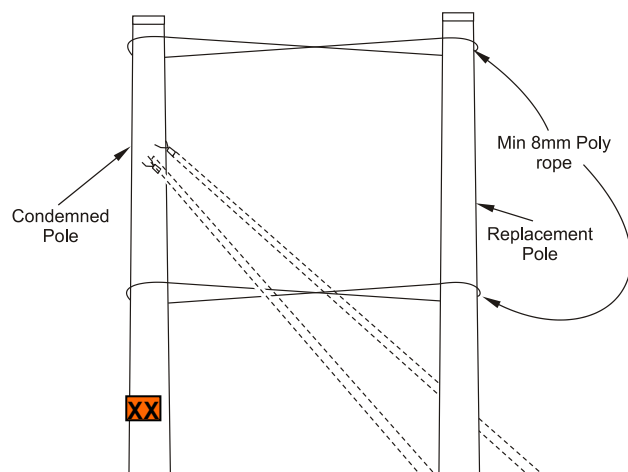
Hold the pole above the point of balance using a mobile crane or pole erecting vehicle.

Method 2

Erect a minimum of 3 stays to the top of the pole above the point of balance. The stays should consist of stay wire or rope and be solidly fixed to the pole and adjacent solid objects such as large trees or heavy vehicles. The stays must be placed at an angle of approximately 120 degrees apart for 3 stays or 90 degrees apart for 4 stays, and in such a manner that the pole cannot move under load.

In difficult locations where the normal risk assessment process allows a combination of stays and pole pikes may be used to secure the pole.

Note: A condemned, conditionally serviceable or suspect pole must be stabilised by one of the above methods before being climbed or worked upon. A combination of the above methods may be necessary in some circumstances.

**Method 3** (Not for climbing or working on)

Working from an Elevated Working Platform (EWP) or from the new replacement pole, lash the condemned pole with polypropylene rope to prevent the condemned pole falling. (Refer to Annexure G and H for details.)

Method 1 or temporary stay(s) may be used for securing the pole to make safe before lashing.

In certain situations pole pikes may be utilised to make the pole safe but not secure to work on (Refer to Annexure H for using pikes).

Note: At difficult locations the normal risk assessment risk management process must be undertaken and a combination of stays, pole lashings and pikes will need to be used for “making safe” condemned poles.

15.0 STORES AND MATERIALS

Contractors must only use approved products on the network. Ausgrid should be contacted regarding approved products. Alternative products may be submitted to Ausgrid for approval. A fee for the approval of alternative products for use on the network will be negotiated.

To purchase materials from Ausgrid, the project officer must contact the "Manager – Customer Services Logistics" on telephone number (02) 9394 6001. The "Manager – Customer Services Logistics" will provide information on Ausgrid's requirements, material availability and alternate sourcing plus pick-up processes and locations.

Alternatively, the Accredited Service Provider may obtain material from other sources provided the quality assurance and environmental management system requirements are met. Materials must comply with Ausgrid's relevant specifications and be approved.

Wood poles must be as specified in Ausgrid's Specification for Overhead Line Supports (Poles). The specification and acceptance procedures for wood poles are included as Appendix E.

Particular attention is drawn to the requirement for pre-acceptance inspection by Ausgrid's Timber Inspector at the point of supply. If the wood pole supplier does not ensure that this requirement is complied with, the reasonable cost of any subsequent pole inspection that Ausgrid may deem necessary shall be charged to the Accredited Service Provider. Any poles erected which do not comply with Ausgrid's requirements will be defected and must be replaced at the Accredited Service Provider's cost prior to being connected into Ausgrid's network.

16.0 RECORDKEEPING

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

Table 1 – Recordkeeping

Type of Record	Storage Location	Retention Period*
Approved copy of the network standard	BMS Network sub process Standard – Company	Unlimited
Draft Copies of the network standard during amendment/creation	TRIM Work Folder for Network Standards (Trim ref. 2014/21250/98)	Unlimited
Working documents (emails, memos, impact assessment reports, etc.)	TRIM Work Folder for Network Standards (Trim ref. 2014/21250/98)	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.

17.0 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.

18.0 DOCUMENT CONTROL

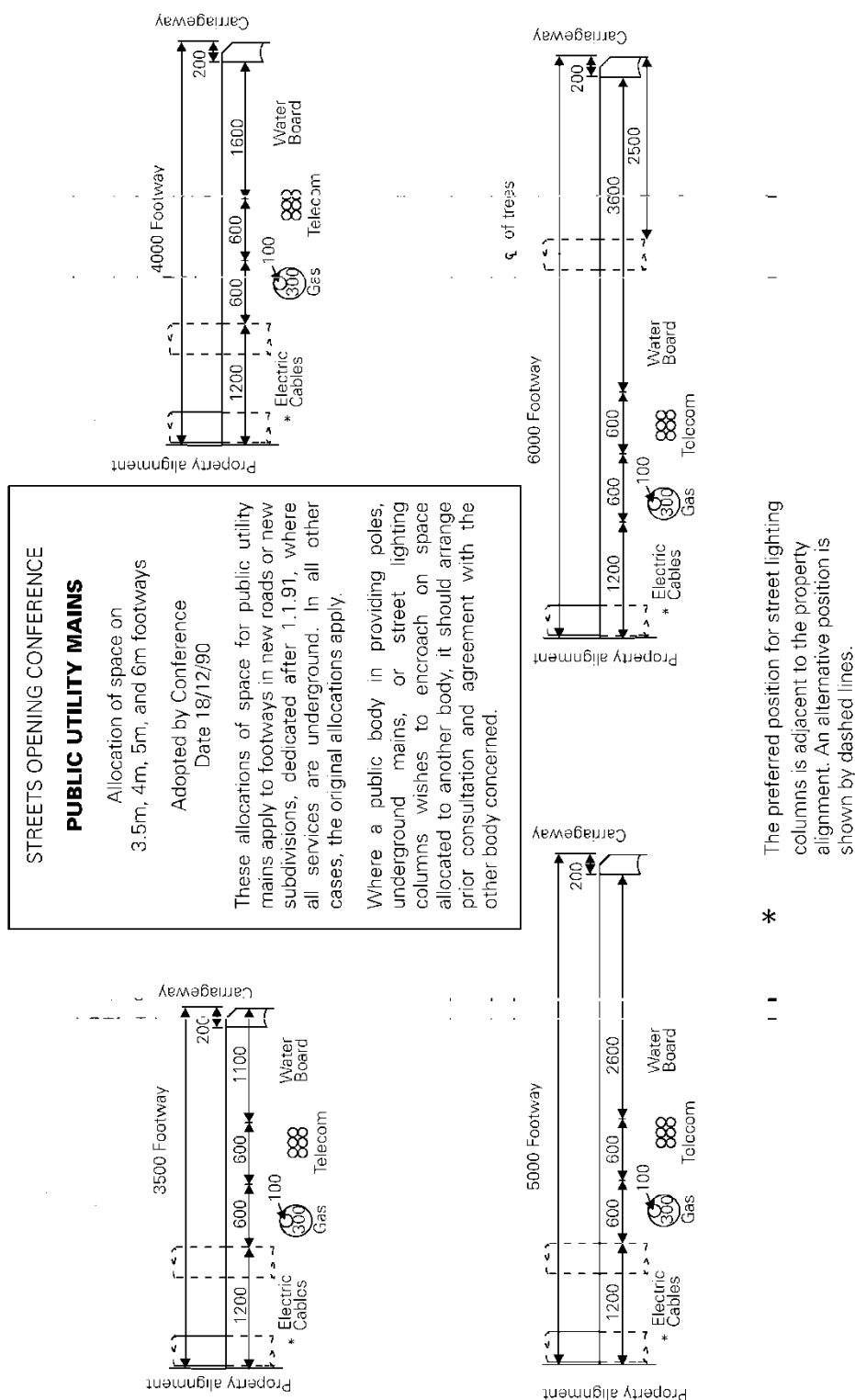
Content Coordinator : Transmission and Distribution Mains Engineering Manager
Distribution Coordinator : Engineering Information and Services Manager

Annexure A – Material Stock Code Numbers

Table A1

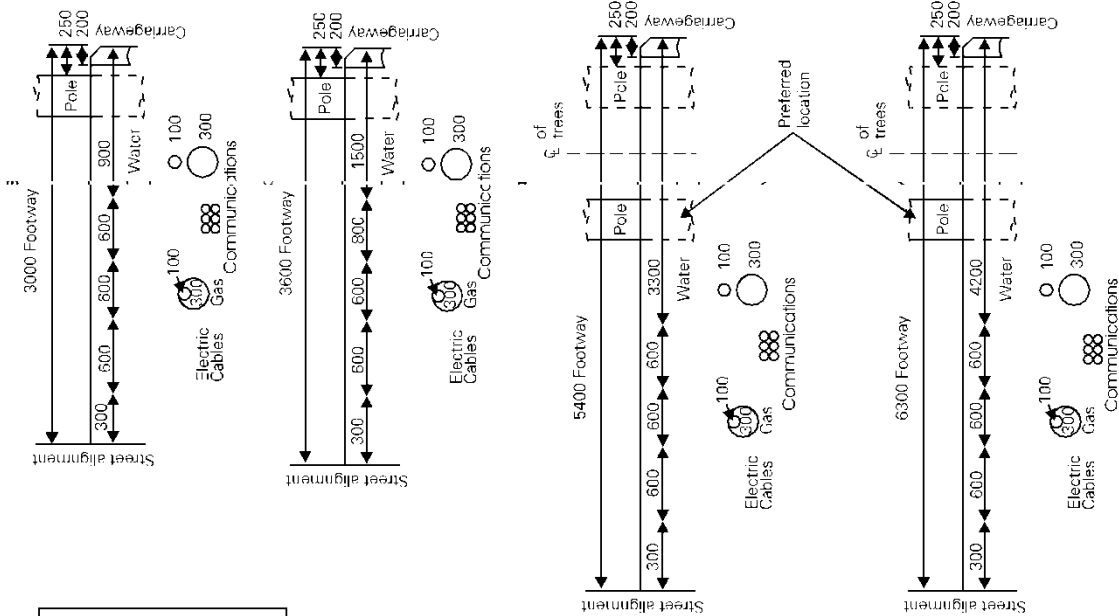
Item	Stockcode Number
Poles, line construction wood, preservative treated (Height/ tipload):	
8 m/4 kN	146654
9.5 m/4 kN	146662
9.5 m/8 kN	146670
11 m/6 kN	146688
11 m/8 kN	146696
11 m/12 kN	146704
12.5 m/6 kN	146712
12.5 m/8 kN	146720
12.5 m/12 kN	146738
14 m/8 kN	146746
14 m/12 kN	146753
Poles, line construction Fibre Cement (Height/ tipload-(Ultimate strength)):	
9.5 m/12kN (Ult. Strength)	
9.5 m/24kN (Ult. Strength)	
11 m/12kN (Ult. Strength)	
11 m/24kN (Ult. Strength)	
12.5 m/12kN (Ult. Strength)	
12.5 m/24kN (Ult. Strength)	
14 m/12kN (Ult. Strength)	
14 m/24kN (Ult. Strength)	
Surface coating repairs:	
Copper napthenate base paint 2 litres	146332
Disposable bag, plastic (Length 1200 mm, Width 700 mm, Thickness 200 microns)	147645

Annexure B – Footway Allocations



Existing Footway Areas before 1.1.91 - Sydney Region

For streets outside city boundary

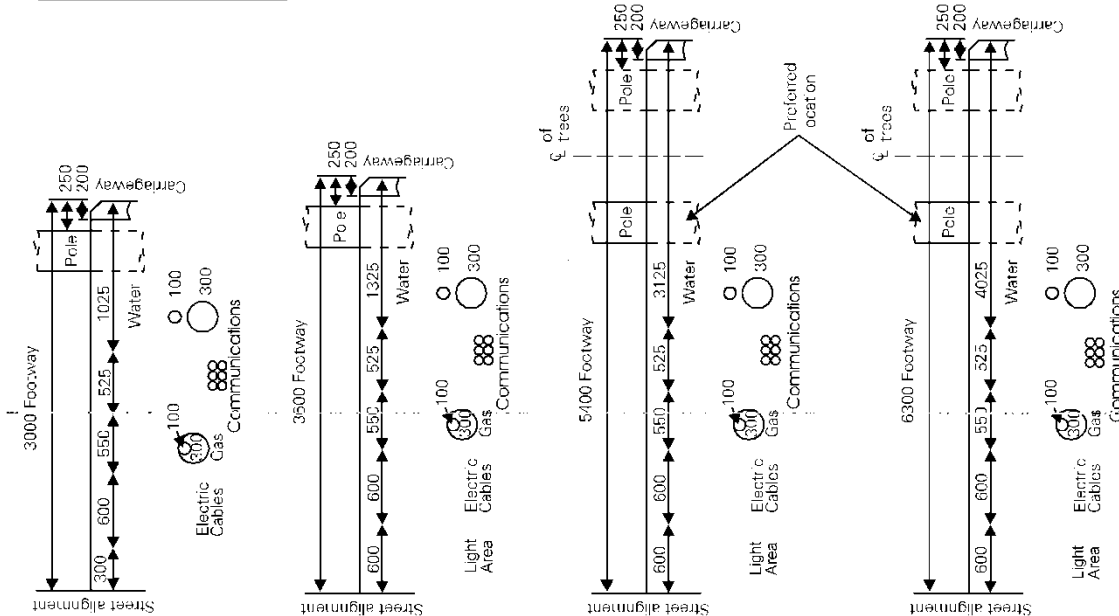


STREETS OPENING CONFERENCE

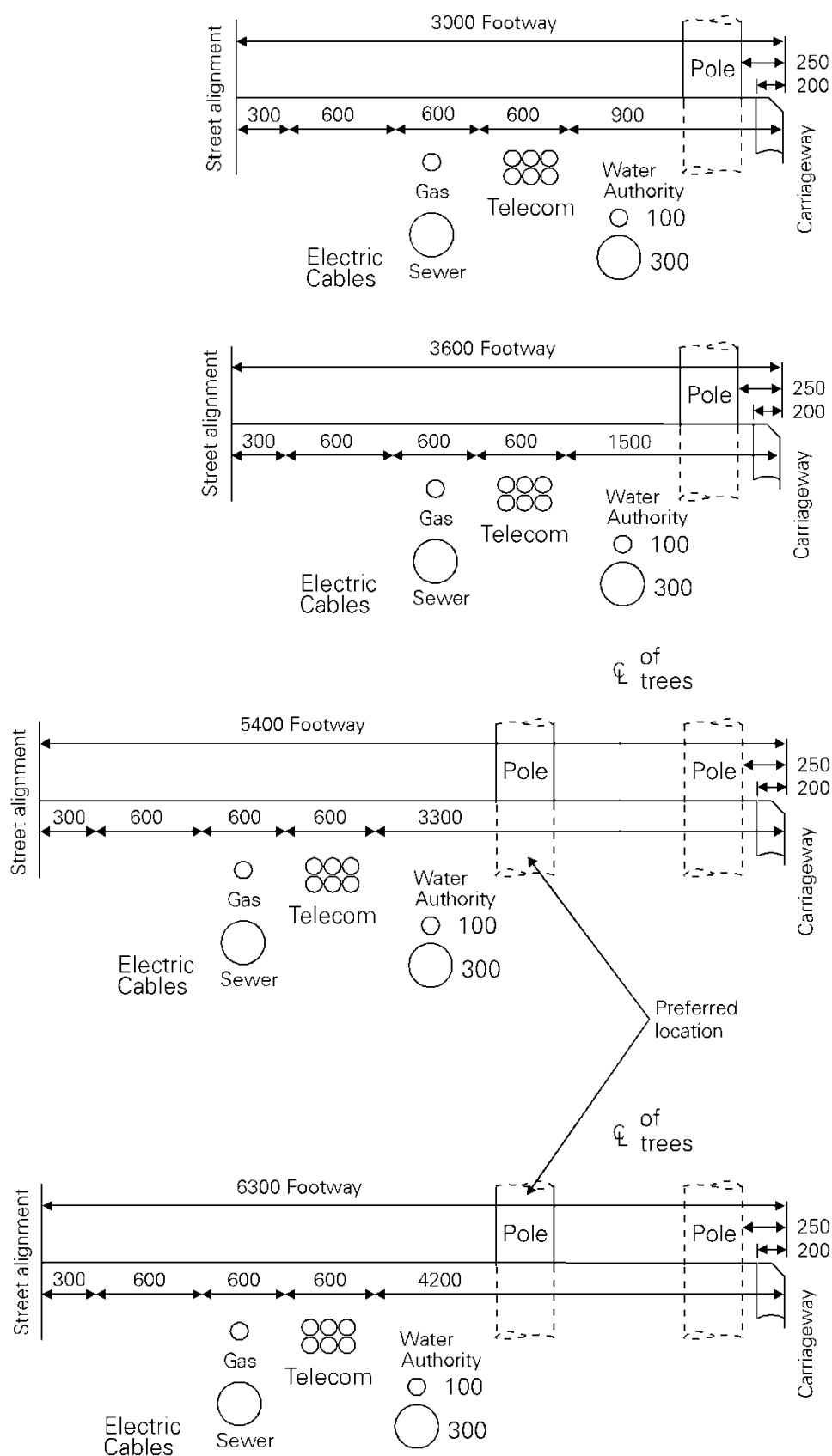
PUBLIC UTILITY MAINS

Allocation of space on 3m, 3.6m, 5.4m, and 6.3m footways

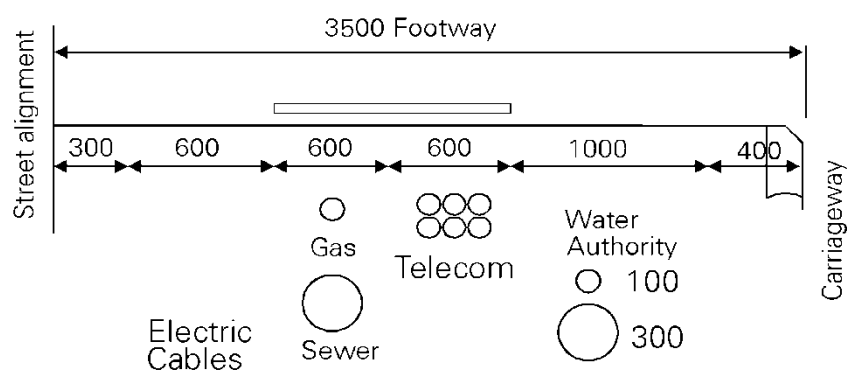
For streets within city boundary



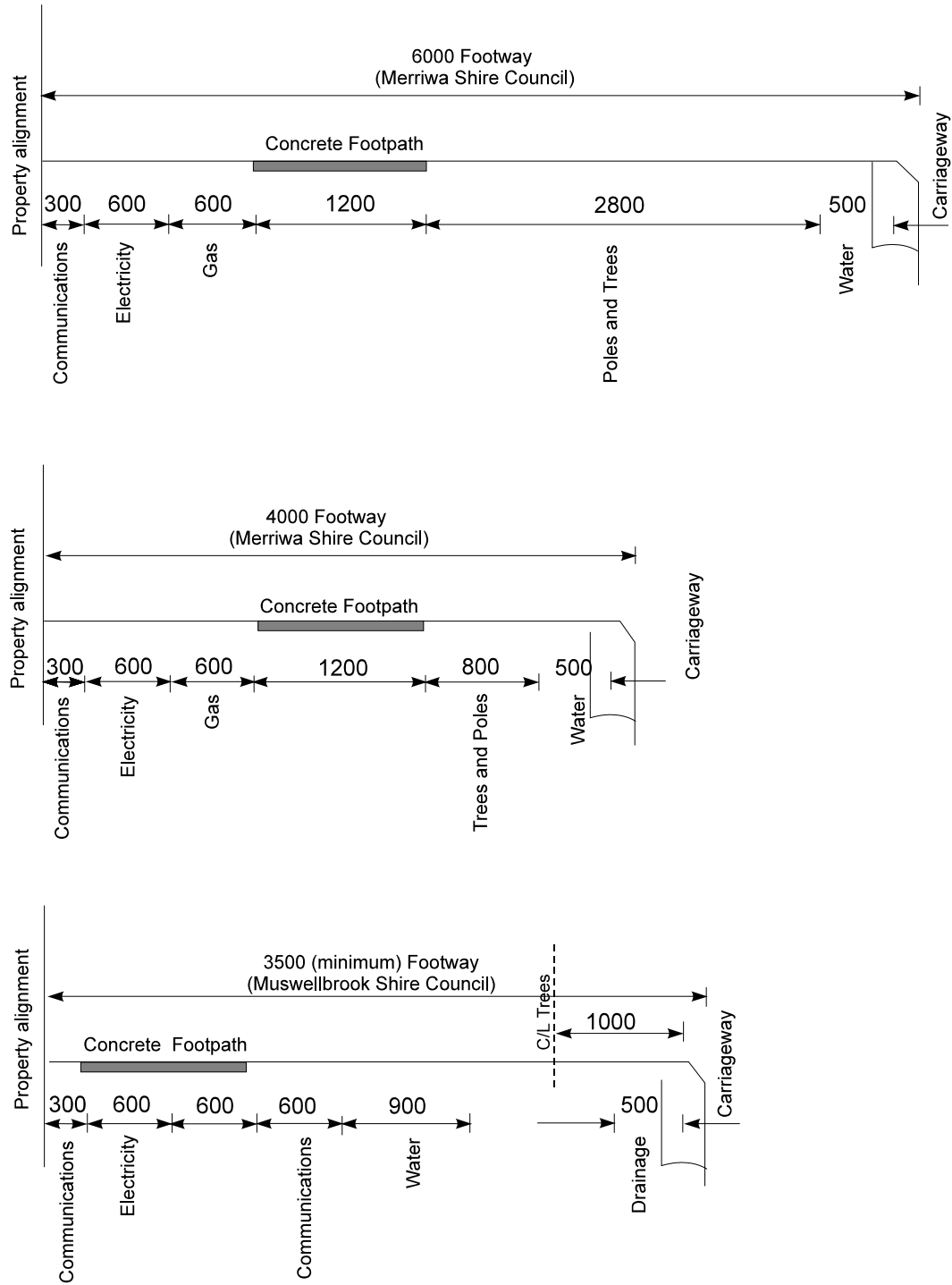
Footway Allocations - Central Coast Region



Footway Allocations- Maitland and Cessnock City Councils



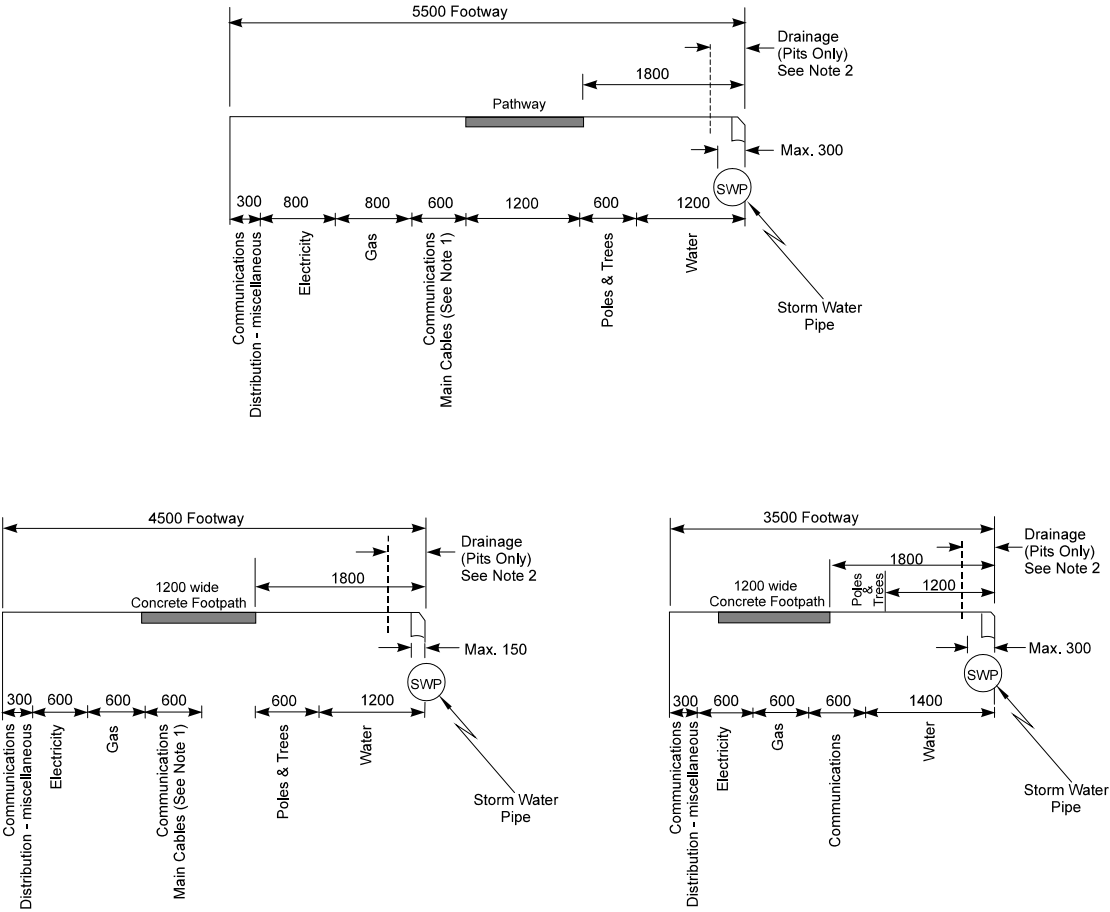
Footway Allocations - Muswellbrook, Merriwa and Scone Shire Councils



Note: For Scone Shire Council the electricity allocation is between 300 and 900 mm from the boundry location.

All dimensions are in millimetres.

Footway Allocations - Lake Macquarie and Newcastle City Councils and Port Stephens Shire Council

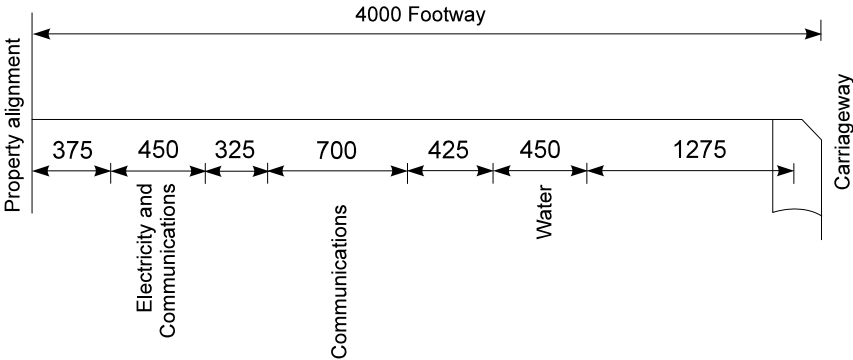


Note 1: Pathway allocation available to accommodate telecommunication main cables and access holes.

Note 2: Should be in roadway and should not encroach in footpath more than 380mm.

All dimensions are in millimetres.

Footway Allocations - Singleton Shire Council



All dimensions are in millimetres.

Annexure C – Checklist for Poles

C1	Site	Yes	No	N/A
1	Has the site been surveyed and pegged?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Has the site been checked against 'Streets Opening' drawing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Has the site been checked for any services within 300 mm of the position of the proposed hole?	<input type="checkbox"/>	<input type="checkbox"/>	
4	If the hole is in proximity of an underground service, has that relevant authority been contacted for an inspection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	Have all relevant acts, laws, standards and instructions been complied with?	<input type="checkbox"/>	<input type="checkbox"/>	
C2	Installation	Yes	No	N/A
1	Is access to the pole available?	<input type="checkbox"/>	<input type="checkbox"/>	
2	Have relevant Ausgrid permits been issued?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Have all required drawings and details for these works been issued for approval?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	Has a full parts list including hardware been issued for approval?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Has the pole been inspected, butt stamped and disked?	<input type="checkbox"/>	<input type="checkbox"/>	
6	Has the pole been inspected prior to erection?	<input type="checkbox"/>	<input type="checkbox"/>	
7	Does the LV OH wiring require Torapoli piping?	<input type="checkbox"/>	<input type="checkbox"/>	
8	Is HV or LV isolation required?	<input type="checkbox"/>	<input type="checkbox"/>	
10	Has the correct pole rake been set?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	Has the pole been back filled with DGB-10 road base or approved back fill from the butt to within 350 mm of ground level?	<input type="checkbox"/>	<input type="checkbox"/>	
12	Has specified staged compaction been achieved?	<input type="checkbox"/>	<input type="checkbox"/>	
13	Has the final 350 mm of hole been fitted with approved fine material (e.g. sand)?	<input type="checkbox"/>	<input type="checkbox"/>	
14	Was a pole required to be removed in conjunction with this new pole installation?	<input type="checkbox"/>	<input type="checkbox"/>	
15	Was pole removal carried out according to specification?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Accredited Service Provider: _____ Signature: _____

Date: _____

Annexure D – Vegetation Clearance Requirements

Refer to and comply with ISSC 3, Guideline for Managing Vegetation Near Power Lines and NEG-OH21, Vegetation Safety Clearances.

Vegetation clearance work must be carried out in accordance with Ausgrid's Electrical Safety Rules and ENA DOC 023-2009 ENA Guideline for Safe Vegetation Management Work near Live Overhead Lines.

Annexure E – Wood Pole Specification and Acceptance Procedures

E.1.0 AUSGRID'S REQUIREMENTS

E.1.1 Extent of these specifications

To specify the requirements for timber poles for use on Ausgrid's electrical networks.

The requirements for drawings and schedules for the supply of preservative treated hardwood poles and untreated de-sapped hardwood poles, including pre-drilled and un-drilled, complying with the requirements of Sections 1, 2, 3 and 5 of AS 3818.11. Where the specification and AS 3818.11 vary, these specifications will take precedence.

Terms used throughout this Appendix "E" relating to timber poles are in accordance with AS/NZS 4491.

E.1.2 Purpose of equipment

The poles are required for the construction of overhead electric power lines.

These requirements cover the supply of full length preservative treated hardwood poles and untreated de-sapped hardwood poles to be installed as part of Ausgrid's overhead networks.

E.1.3 References

All items shall be designed and manufactured in accordance with the following Australian Standards:

AS 1604.1-2012	Specification for preservative treatment- Sawn and round timber
AS 1720.2-2006	Timber Structures – Part 2: Timber Properties
AS/NZS 2878-2000	Timber – Classification into strength groups
AS 3566.2-2002	Self-drilling screws for the building and construction industries Part 2: Corrosion resistance requirements
AS 3818.11-2009	Timber- heavy structural products-Visually graded Part 1:General requirements Part 11: Utility poles
AS/NZS 4491-1997	Timber- Glossary of terms in timber related Standards
AS/NZS 4676-2000	Structural design requirements for utility service poles
AS 5604-2005	Timber – Natural durability ratings

E.1.4 Definitions and abbreviations

AS	Australian Standard
ASP	An accredited service provider (ASP) is either an individual or a company with current accreditation under the Department of Trade and Investment, Regional Infrastructure and Services - Accredited Service Provider scheme. There are three levels of accreditation.
CCA	copper chromium arsenic, a chemical compound used to preserve wood
critical zone	1000mm above and 600mm below the ground line
FPT	full length preservative treated
nominal ground line	assumed to be 10% of the pole length plus 0.6m
NZS	New Zealand Standard
Dry side	A strip of exposed deadwood, bordered by callus and formed by injury to the living tree

E.1.5 Quality assurance

a) General

Suppliers of poles to Accredited Service Providers (ASP) shall operate a certified quality system to AS/NZS 9000 series.

The objectives are to ensure that materials or equipment used on the job consistently meet Ausgrid's requirements and do not give rise to expensive field reworking, materials wastage or lost time.

The need for, and the cost of, inspecting and testing of goods received is minimised. The level of quality system must be in accordance with AS 9000 series.

b) Quality documentation submission requirements

The ASP must ensure that they or their suppliers submit the following documentation:

- A current copy of the supplier's Quality manual unless previously supplied.
- A preliminary Quality Plan for the production of the Electrical Poles. A final Quality Plan shall be submitted and approved prior to commencement of production.
- A Statement of Conformance, or details of any area of non- conformance, with this specification.
- Where a supplier is accredited by Standards Australia or any other independent party of a copy of the Certificate of Accreditation.

E.1.6 Requirements exceeding Australian Standards

The following specifications are above those contained in AS3818:

- Clause 6.9 Barrel and end splits – maximum 500mm end split length in the butt.
- Clause 6.10 Mechanical damage – no damage allowed in the critical zone. Damage not to exceed 1000mm in length and a minimum of 10mm thick sapwood for Durability 2 species following any trimming of an area affected by mechanical damage.
- Clause 6.11 Dry side – Not permitted in Durability 2 and not to exceed 5% of the pole circumference and 1000mm in length for Durability 1 poles.

E.1.7 Materials and workmanship

The timber shall be of approved species, of quality consistent with the provisions of AS 3818.1 Timber – Heavy structural products – Visually graded Part 1: General requirements - Table “C” (with the exceptions or additions contained in this appendix) and in every respect to the satisfaction of the Ausgrid’s Timber Inspector.

E.1.8 Inspection

When sufficient poles are ready for inspection, they will be inspected at the point of supply by Ausgrid’s Timber Inspector or deputy, of whom the *ASP* or their supplier will be duly notified by Ausgrid. The *ASP* and their supplier may be represented at all inspections and shall provide all labour and equipment necessary to move the poles for the purpose of inspection. Such inspection shall not prejudice the right of Ausgrid to reject any poles which, on delivery, are found to be defective or do not comply with this specification. Ausgrid’s Timber Inspector or deputy will stamp the pole butt with the initials “Ag” if the pole is acceptable.

E.1.9 Rejection and replacement

Any pole which fails to pass inspection or test, either at the supplier’s works or after delivery, will be rejected.

All poles rejected in terms of this clause shall be replaced by the *ASP* without cost to Ausgrid, and any cost of double handling due to rejections of poles shall be met by the *ASP*.

E.2.0 TECHNICAL REQUIREMENTS

E.2.1 Pole dimensions

Pole dimensions shall be in accordance with the following Table E1.

Poles shall not be less than the lengths specified however they may exceed the lengths specified by a maximum of 100mm.

Pole dimensions shall not be less than the diameters specified. Poles having diameters greater than those specified will be accepted provided that the actual diameters do not exceed the specified diameters by more than 50mm at the top and 80mm at the ground line.

The deviation in the diameter of the pole, when measured at the pole butt and the ground line, shall be less than 5%.

E.2.2 Description of goods

The poles are required for the construction of overhead electric power lines.

Table E1 General Purpose Poles.

Item No.	Pole size (Length/ working load)	Nominal depth in ground (m)	Minimum diameters of poles - Strength Group 1 (100MPa)				Minimum diameters of poles - Strength Group 2 (85MPa)				Code
			Top (mm)	Groundline (mm)	Butt (mm)	Average weight (kg)	Top (mm)	Groundline (mm)	Butt (mm)	Average weight (kg)	
1	8m/4kN	1.4	164	230	241	390	177	243	255	390	146654
2	8m/6kN	1.4	194	260	272	490	210	276	287	490	H23070*
3	8m/8kN	1.4	219	285	297	590	236	302	313	590	H23088*
4	8m/12kN	1.4	259	325	336	780	277	343	355	780	H23096*
5	9.5m/4kN	1.55	166	246	259	490	181	261	274	490	146662
6	9.5m/6kN	1.55	199	279	292	640	215	295	308	640	H23135*
7	9.5m/8kN	1.55	225	305	318	780	243	323	336	780	146670
8	9.5m/12kN	1.55	267	347	360	1030	287	367	380	1030	H23151*
9	10m/25kN	1.6	362	442	459	1690	386	466	483	1690	150565**
10	10m/35kN	1.6	412	492	509	2140	439	519	536	2140	150938**
11	10m/45kN	1.6	362	442	459	2980	386	466	483	2980	175401**
12	11m/4kN	1.7	169	262	276	620	185	278	292	620	182441
13	11m/6kN	1.7	203	296	310	820	221	314	328	820	146688
14	11m/8kN	1.7	231	324	338	1000	250	343	357	1000	146696
15	11m/12kN	1.7	274	367	382	1310	295	388	403	1310	146704
16	12.5m/4kN	1.85	170	277	292	770	187	294	309	770	H23240*
14	12.5m/6kN	1.85	205	312	328	1010	224	331	346	1010	146712
15	12.5m/8kN	1.85	234	341	356	1230	254	361	376	1230	146720
16	12.5m/12kN	1.85	279	386	402	1620	302	409	424	1620	146738
17	12.5m/25kN	1.85	378	480	499	2330	403	505	524	2330	177481**
18	12.5m/35kN	1.85	433	535	554	2940	458	560	579	2940	177482**
19	12.5m/45kN	1.85	478	580	599	3500	508	610	629	3500	177483**
20	14m/6kN	2	208	328	344	1220	227	347	364	1220	H23313*
21	14m/8kN	2	237	357	374	1480	258	378	395	1480	146746
22	14m/12kN	2	284	404	421	1950	308	428	444	1950	146753
20	15.5m/6kN	2.15	208	342	360	1450	229	363	381	1450	H23371*
21	15.5m/8kN	2.15	238	372	390	1750	261	395	413	1750	H23389*
22	15.5m/12kN	2.15	287	421	439	2310	312	446	464	2310	152868
23	15.5m/16kN	2.15	317	447	468	2700	342	472	493	2700	174607**
24	17m/6kN	2.3	209	356	376	1690	231	378	397	1690	H23559*
25	17m/8kN	2.3	241	388	407	2050	264	411	430	2050	H23567*
26	17m/12kN	2.3	290	437	456	2690	316	463	482	2690	157206
27	18.5m/6kN	2.45	208	370	390	1940	231	393	413	1940	H23575*
28	18.5m/8kN	2.45	240	402	422	2350	264	426	447	2350	150490
29	18.5m/12kN	2.45	291	453	473	3090	318	480	500	3090	152876
30	18.5m/25kN	2.45	395	552	575	4830	426	583	606	4830	127258**
31	20m/8kN	2.6	241	416	437	2680	266	441	463	2680	176343
32	20m/12kN	2.6	293	468	489	3520	321	496	517	3520	150508
33	21.5m/8kN	2.75	240	429	452	3030	267	456	479	3030	176344
34	21.5m/12kN	2.75	293	482	505	3960	322	511	534	3960	150559
35	23m/12kN	2.9	294	495	520	4029	322	523	548	4029	174557

Notes:

1. * are pre-drilled poles - drawings 515278, 515279 and 515280 for details. All other poles are un-drilled.
** are Stay Poles
2. Ground line pole dimensions are the minimum required to meet strength rating for timber. Pole top diameter is nominal. Pole diameter at any point below nominal ground line must not be less than the ground line dimension, and must not exceed the ground line dimension by more than 5%.
3. Nominal ground line assumed to be 0.6 of a metre plus 10% of pole length.
4. Average Weight – allow for a Maximum Deviation from Average Weight of 10%.

E.2.3 Average pole weights

The ASP must provide, or must ensure that their supplier provides, Ausgrid's Timber Inspector with a list of the weight of all poles, and maximum weight deviations.

E.2.3 Timber species

The acceptable hardwood timber species are shown in below.

a) Approved timbers

Wooden poles supplied shall be of the following approved timber species:

AS 1720.2 ref.no.	Standard trade common name	Botanical name	AS3818.1 species brand	AS5604 durability rating	AS/NZS 2878 strength group (unseasoned)
84	Blackbutt	E.pilularis	BB	2	S2
126	Box, Grey	E.microcarpa E.moluccana E.woolsiana	GB	1	S2
127	Box, Coast Grey	E.bosistoana	CB	1	S1
266	Gum, Grey	E.canaliculata E.propinqua E.punctata	GG	1	S1
293	Gum, Spotted	C.citriodora C.henryi C.maculata	SG	2	S2
326	Ironbark, Broad-leaved Red	E.fibrosa	BI	1	S1
322	Ironbark, Grey	E.drepanophylla E.paniculata E.siderphloia	GI	1	S1
325	Ironbark, Red	E.sideroxylon	RI	1	S2
327	Ironbark, Narrow-leaved Red	E.crebra	NI	1	S2
391	Mahogany, White	E.acmenioides E.tenuipes E.umbra	WM	1	S2

688	Tallowwood	E.microcorys	TW	1	S2
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Notes:

1. The New England sub species of Blackbutt is a class 3 timber and is not acceptable. Any New England subspecies poles will be rejected and must be replaced by the *ASP* – refer Clause E.1.9.
2. The requirements of Clause E.1.8 that all poles for use on Ausgrid's network **MUST** be inspected by Ausgrid's timber inspector at the point of supply prior to delivery, and in the case of Blackbutt poles, prior to CCA treatment.

E.2.4 Species identification

Each pole shall be clearly branded on the butt with the species identification letters (see Table 1, AS 1720.2 and E.2.3) by painting, branding or other acceptable means to ensure legibility until a permanent brand is applied.

A permanent species identification brand shall be applied to the pole butt after preservative treatment and prior to delivery. This permanent brand shall be by means of painting species identification code letters with white paint in lettering 75mm high.

E.2.5 Grade description

The requirements of clause 2.2 and 3.2, AS 3818.11, shall apply to all hardwood poles.

E.2.6 Straightness

The straightness of poles shall be to Select grade in accordance with clause 1.5.4, Table 1.5 and Figure 1.5, AS 3818.11. In addition, it must be possible to erect the poles in a circular hole of diameter 760mm drilled out by a post-hole borer, without further alteration to the hole.

E.2.7 Ovality

In accordance with clause 1.5.3 in AS 3818.11, the least diameter of a pole shall be not less than eighty (80) percent of the greatest diameter at any cross-section over a maximum of eighty (80) percent of the length of the pole.

E.2.8 Trimming

All limbs and projections are to be neatly trimmed, care being taken that no downward cuts are made in the poles. The trimming shall be carried out by means of a portable planning machine before treatment and the tops and butts of poles shall be sawn square.

Poles which have had *large* limbs, knots and the like planed off shall not be accepted. For the purpose of this clause, *large* is defined as a diameter exceeding 20% of the circumference of the pole measured at the position of the limb or knot. The diameter of the limb or knot is the distance measured between two lines parallel to the longitudinal axis of the pole.

Trimming at the butt end of poles is to be kept to a minimum to enable the sapwood band measurement to be carried out.

E.2.9 Barrel checks and end splits

Barrel checks and end splits shall be assessed by comparison with the ratings given in Tables E2 and E3 – reference Table 1.7.1 & 1.7.2 from AS 3818.11. Poles shall only be accepted that meet the requirements for both barrel check and end split for poles rated as "A" in accordance with AS3818.11 and the following tables:

Table E2- End splits rating

Specified ground line diameter	Width of end split (measured at the circumference)	Maximum limit of all end splits at each end
Not exceeding 300mm	No exceeding 6mm	Unlimited
	Exceeding 6mm, but not exceeding 10mm	Aggregate width (measured at the circumference) not exceeding 10% of the circumference
	Exceeding 10mm	Not permitted
Exceeding 300mm	Not exceeding 6mm	Unlimited
	Exceeding 6mm, but not exceeding 15mm	Aggregate width (measured at the circumference) not exceeding 15% of the circumference
	Exceeding 15mm	Not permitted

Table E3– Barrel checks rating

Specified ground line diameter	Width of barrel check	Maximum limit of all barrel checks at any cross section
Not exceeding 300mm	Not exceeding 3mm	Unlimited
	Exceeding 3mm, but not exceeding 7mm	Aggregate width not exceeding 10% of the circumference
	Exceeding 7mm	Not permitted
Exceeding 300mm	Not exceeding 3mm	Unlimited
	Exceeding 3mm, but not exceeding 10mm	Aggregate width not exceeding 10% of the circumference
	Exceeding 10mm	Not permitted

- Barrel checks in preservative treated poles shall have a maximum depth of 10mm for Durability 1 species timber and a maximum depth of 15mm for Durability 2 species timber.
- End splits in the butt of the pole shall not exceed 500mm in length.

Anti-split plates at the butt end shall be annular galvanised steel gang nails of a diameter as can be accommodated without projection beyond the circumference of the pole. To avoid splitting at the top of the pole, a 125mm x 100mm galvanised steel gang nail shall be fitted to the top of all poles. The fitting of gang nails to the butt and top of poles must take place immediately after poles are sawn to length and before any full length preservative treatment process.

To prevent end splitting the Supplier shall coat the top and butt of each pole with a brushable wax after the CCA treatment. The use of an alternative end seal product may be considered upon application by the Supplier.

E.2.10 Mechanical damage

Mechanical damage will only be allowed as described below:

a) Preservative treated poles-

- Axe marks
 - Across the grain – radial depth not exceeding 5mm with none in the critical zone
 - Parallel with the grain – depth not exceeding 5mm and not in a continuous line
- Tong and cant-hook punctures
 - Not allowed in the critical zone. Elsewhere, few and individual areas not to exceed an area equivalent to 40mm x 40mm and not extending into the heartwood.
- Other mechanical damage
 - Not allowed in the critical zone. Elsewhere, width not exceeding 10% of the pole circumference and not extending into the heartwood. Damage not to exceed one (1) metre in length. After trimming areas affected by mechanical damage, the remaining sapwood of Durability 2 species shall not be less than 10mm thick.

b) Untreated fully de-sapped poles -

Mechanical damage will only be allowed where it does not adversely affect the appearance or strength of the pole.

E.2.11 Dry side

Dry side is permitted in poles of Durability 1 species provided it does not occur in the critical zone, the width does not exceed 5% of pole circumference and length is not more than one (1) metre.

Dry side is not permitted in Durability 2 species poles.

E.2.12 Borer holes

All timbers susceptible to borers, especially Spotted Gum, must be treated with a suitable insecticide as soon as practicable after cutting to prevent infestation during seasoning.

Poles with borer holes will only be accepted where they are not clustered in a manner liable to impair the strength or integrity of the sapwood. For the purpose of this clause, the integrity of the sapwood should be assessed by any or all, as appropriate, of the following methods:

- (a) Probing with a sharp implement.
- (b) Sounding with a hammer.
- (c) Taking core samples to full sapwood depth to ascertain the extent of larval tunnel damage.

This assessment may be carried out in conjunction with the inspector.

E.2.13 Glyptotermes holes

All poles shall be free of Glyptotermes attack.

E.2.14 Sapwood and dressing

The poles shall be debarked, free of mud and dirt and the sapwood shall be intact from the butt to one (1) metre above the nominal ground line. Only the permissible sapwood defects referred to above will be accepted elsewhere.

The minimum depth of sapwood for both Durability 1 and 2 species, measured at the pole butt shall be 12mm.

All butts and tops must be cut square and any end coating shall be removed unless it can be shown that the coating material does not inhibit penetration of preservatives, in accordance with Section 5 of AS 3818.11.

E.2.15 Special poles

Minimum tolerance 12.5/12kN and 14/12kN poles are included in these specifications and such poles shall have no minus tolerance on either the top or butt diameter. In addition, poles shall have

a minimum diameter of 300mm at 5.0 m from the head for a 14/12kN pole, and at 4.0m from the head for a 12.5/12kN pole.

Only poles of exceptional straightness will be considered and deviations shall not exceed 3L, 2L, 1L and 0.75L for Fig 1.5(a), 1.5(b), 1.5(c) and 1.5(d) respectively in AS 3818.11.

E.2.16 Pre-drilled poles

Pre-drilled poles are included in this specification.

Hole placement and sizes for pre-drilled poles as required by Ausgrid are detailed in drawings listed in E.2.2.

E.2.17 Pole cap

A galvanised steel pole cap shall be tightly fitted to the top of each pole using a minimum of three (3) 40mm x 12-11 gauge, galvanised (Table1: Class 3, AS 3566.2), hexagon head, self-tapping screws.

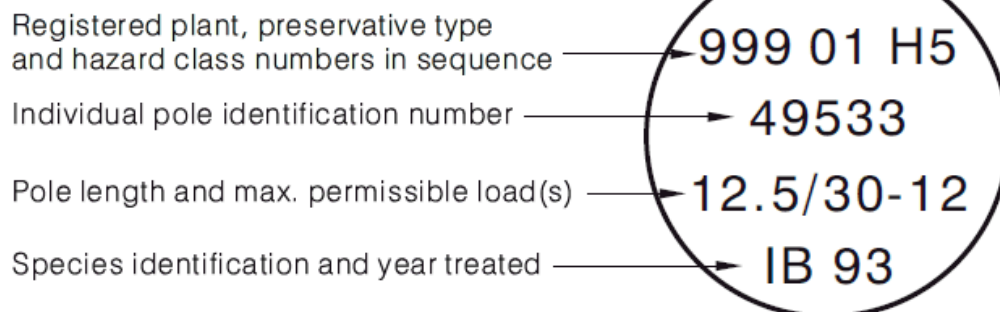
In fitting the pole cap to the pole, trimming shall be kept to an absolute minimum and carried out prior to treatment to ensure adequate protection of the top of the pole (for example, a 230mm cap will fit poles with a top diameter in the range of 230mm to 250mm).

Drawing A4-21852/8 - Overhead Construction Pole Cap – Details, forms part of, and must be read in conjunction with these requirements.

E.2.18 Identification disc

Every pole shall have the information listed below stamped on a 50mm diameter corrosion resistant disc. The disc layout shall be in accordance with clause 5.6, AS 3818.11 and "Option 1" set out below. No other disc layout options will be considered.

OPTION ONE



The ASP or their supplier shall supply and fit an information disc recessed into the pole at two (2) metres above the nominal ground line and located so that it is readily accessible for inspection when the pole is in service.

The layout of information proposed by the ASP shall be submitted to Ausgrid for approval prior to insertion. Discs not inserted in the correct position will be removed and relocated at the ASP's cost.

The maximum permissible loads shall be stated in terms of both Working Strength and Ultimate Load Capacity (the value of the concentrated load which, if applied at the pole tip, would produce at ground level the design bending moments and shear forces for the strength limit state in accordance with AS/NZS 4676).

E.2.19 Full length preservative treated poles

E.2.19.1 Treatment type

The ASP or their suppliers shall submit full details of the methods of impregnation and treatment together with a guarantee of durability.

All poles shall be treated with CCA timber preservative in accordance with the requirements of section 5, AS 3818.11. The preservative penetration shall be in accordance with the requirements for hazard class H5 specified in Clause 6.2, AS 1604.1.

The CCA formulation shall be in accordance with the requirements of Table B2, AS 1604.1. The pole supplier shall submit full details of the method of treatment, the CCA formulation used together with a guarantee of durability. The CCA formulation used to treat the poles shall not be changed unless approved by the Ausgrid.

The ASP shall provide two copies of all test reports carried out at an Ausgrid approved laboratory to verify the preservative retention in poles supplied. The qualification of the testing laboratory to carry out this work shall be provided, together with the limits of accuracy which are achieved.

Ausgrid may audit the test procedures. ASPs must submit, or must ensure that their suppliers submit, a record of similar treatment for similar poles of the same species from the same supplier and treater, which have been carried out within three months of the time of supply and prior to the completion of the ASPs work, showing:

- (i) Date of treatment and charge number
- (ii) Contents of charge
- (iii) Number of poles
- (iv) Type and size of poles
- (v) Timber species
- (vi) Estimated total volume, treatable volume or sapwood volume in the charge
- (vii) Moisture content of poles
- (viii) Preservative and preservative concentration
- (ix) Treatment schedule:
 - o Period
 - o Temperature
 - o Vacuum
 - o Pressure
- (x) Working tank levels and temperatures at significant steps in the treatment
- (xi) Calculation of absorption and net retention, corrected for temperature

Records of each charge shall be kept by the ASP's treater. When requested by Ausgrid, a charge sheet showing the detail above shall be made available.

E.2.19.2 Preservative retention

Preservative retention shall be in accordance with the requirements of Table H5, AS 1604.1.

E.2.19.3 Surface condition

The surface of FPT poles shall be in accordance with the requirements of clause 5.4, AS 3818.11. The surface shall be free of preservative residues, exudates, efflorescence and sawdust likely to result in:

- ingestion or inhalation of chemical
- contamination of skin, clothing or equipment
- reduced safety in handling and transport.

E.2.20 Sampling methods

Poles shall be tested for the preservative penetration and preservative retention. These test results shall be determined by using any of the approved methods described in AS 3818.11, Appendix C. These methods include:

- a) Assessment by means of statistical sampling
- b) The use of a product certification scheme
- c) Assurance using the acceptability of the Supplier's quality system
- d) Other such means proposed by the Manufacturer or Supplier and acceptable to the purchaser.

The procedure for determining the treatment results using any one of the above methods are given in AS 3818.11, clause's 5.3 and 5.5.

The ASP shall describe the sampling method and test method their Supplier employed. There must demonstrate compliance and test records.

The sampling rate, core sampling procedures and assessment of results processes described in AS 3818.11, Appendix C, Clause C1, C2 and C3 are acceptable.

Ausgrid reserves the right to carry out various tests, including taking of solid core samples at any time from poles consigned to for use on Ausgrid's network at the supplier's premises or at the Ausgrid's storage locations.

E.2.21 Inspection

Ausgrid reserves the right to inspect the manufacturing facilities of poles prior to acceptance.

Ausgrid reserves the right to inspect and approve all poles to be used on its network. This inspection may take place at either the Supplier's works or at point of delivery.

Annexure F – Pole Steps, Permanent Attachments and Prevention of Unauthorised Access

F.1 General

Installations must comply with the anti-climbing measures in the Energy Networks Association publication ENA DOC 015-2006 National Guidelines for Prevention of Unauthorised Access to Electricity Infrastructure, with special attention given to the presence of nearby objects, poles spaced closer than 1.5m apart, etc.

The following sections specify Ausgrid's additional requirements and restrictions on pole steps and other permanent attachments.

Permission for third party attachments to Ausgrid's poles is not implied or covered by this Annexure. This Annexure refers only to requirements and restrictions on the positioning of attachments.

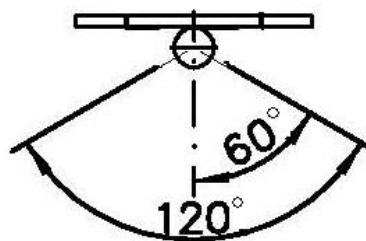
F.2 Pole steps

With the exception of permanently installed fixed pole steps, facilities to assist climbing such as holes or plates for pole steps are not to be installed on any poles.

Poles of length 11 m or less are not normally to be fitted with pole steps. Poles of length 11 m or less which are not accessible from elevating work platforms, and which will need to be climbed (e.g. for attachment of services) may have pole steps fitted.

Where pole steps are fitted, they are to have a 450mm vertical spacing on the same axis as the King Bolt, with the lowest step approximately 3600 mm above ground level, and 900mm below the highest HV king bolt position.

The poles steps should be positioned on alternate sides of the axis positioned 120 degrees apart. One pole step will be 60 degrees off-centre on the right of the axis and the next pole step will be 60 degrees off-centre on the left of the axis. That is, pole steps on the right of the axis will be at 900 mm intervals.



For poles greater than 11 m in length, pole steps are to be installed as follows:

- **Pole mounted distribution substations** – Pole steps are to be installed in accordance with relevant drawings in NS122, or other relevant drawings.
- **11 kV link poles and link stick operated air break switch poles** – Pole steps are to be 450 mm apart, with the lowest step approximately 3600 mm above ground level, and the highest step not less than 1200 mm below the lowest high voltage crossarm or conductor.
- **11 kV down-rod operated air break switch poles** – Pole steps are not to be installed on poles which are readily accessible from elevating work platforms. On poles where climbing access is necessary, pole steps are to be installed as indicated below for 'other poles'.
- **Sub-transmission poles** – Except where indicated otherwise on line design drawings or sub-transmission pole drawings, pole steps are to be 450 mm apart, with the lowest step approximately 6000 mm above ground level.
- **Other poles** – Pole steps are to be 450 mm apart, with the lowest step approximately 6000 mm above ground level, and the highest step 1200 mm below the lowest high voltage crossarm or conductor.

The requirements specified above for pole steps may need to be varied to comply with Notes 1, 2 and 3 of Clause F.3.

F.3 Other permanent attachments

Unless already existing prior to CIA 1139 A (dated 29/01/2001), third party attachments such as street signs, neighbourhood watch signs, meter boxes, waste bins, etc are not permitted on poles that may have to be climbed to operate equipment. This includes 11 kV link poles, link stick operated air break switch poles, low voltage link poles and distribution substation poles.

On other poles; street signs, neighbourhood watch signs and similar sign type attachments must be not less than 3 metres vertically above the ground. Poles with meter boxes or waste bins or other similar projections attached must comply with Clause (b) below.

Subject to the specific exceptions indicated below, attachments in general (including pole steps) must comply with the following minimum requirements.

A projection or device capable of providing a person with a means of ascent shall not be attached to a pole or other support forming part of an overhead line unless:

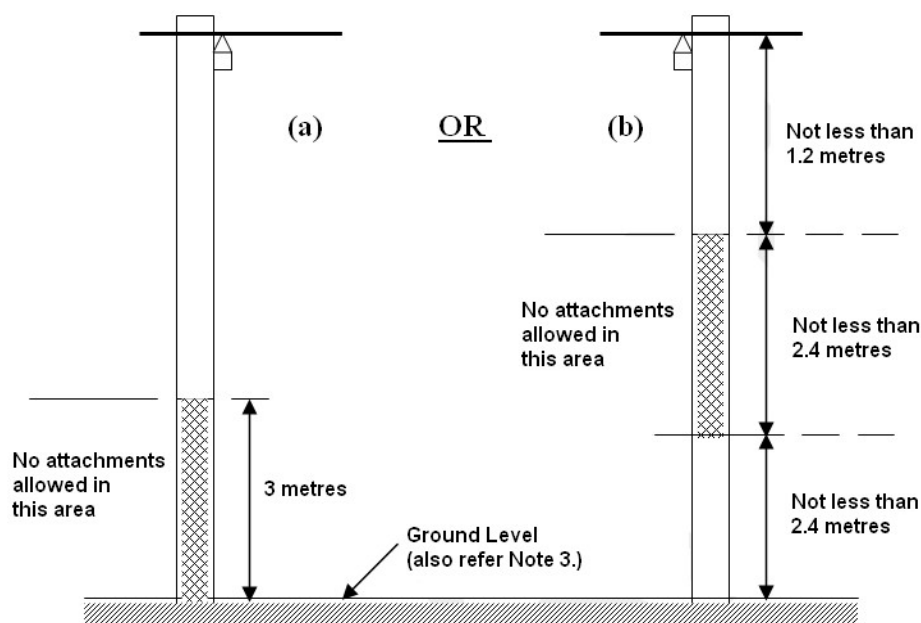
- (a) the projection or device is attached to a point not less than 3 metres above the ground (measured vertically); or
- (b) a minimum 2.4 m length of the pole or other support is free from any such projection or device, and

the minimum 2.4 metre length that is free of any projection or device must not be less than 2.4 metres above the ground, and

the minimum 2.4 metre length that is free of any projection or device must be not less than 1.2 metres below the lowest aerial conductor.

Note: In this Clause, all distances are measured vertically and 'conductor' includes communications cables and / or catenary wires."

The diagram below illustrates the requirements of Clauses (a) and (b).



Exceptions:

- (i) A projection or device may be attached within the zones indicated in Clauses (a) or (b) if the pole or support is fitted with an approved guard preventing climbing.

- (ii) Operating handles and rods of approved air break switch installations and approved locked collapsible ladders that are not capable of providing a means of ascent, may be attached within the zones indicated in Clauses (a) or (b).

In Exceptions (i) and (ii), 'approved' means approved by the Manager – Network Assets.

Notes:

1. Combinations of attachments, including combinations of pole steps and other attachments, must comply with the above requirements.
2. Relocation or removal of attachments may be necessary to ensure continuing compliance with Clause (a) or (b). eg; the attachment of a communications cable may necessitate relocation of other attachments.
3. Where poles are located close to structures, street signs, awnings, telephone boxes, rockwalls or similar elevated objects which could reasonably provide a means of access to part of the pole above normal ground level, the requirements of Clause (b) apply, with the nominal ground level then being the highest elevated reasonable point of access.

Annexure G – Lashing Condemned Poles using Polypropylene Rope

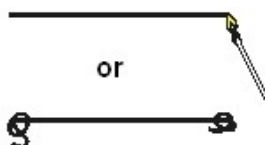
The lashing of condemned poles using polypropylene rope is one of the approved methods for supporting a condemned pole to make it safe.

CAUTION

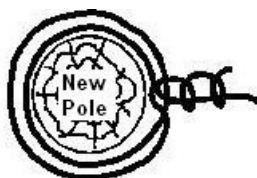
Condemned poles lashed with polypropylene rope are not to be worked on and should be replaced as soon as practicable.

Lash condemned poles using polypropylene rope as follows:

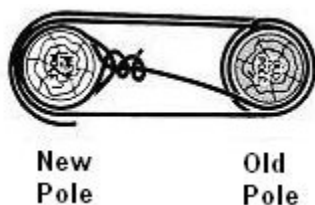
1. Cut the rope to the correct length and burn the ends or use the thumb knots to stop fraying.



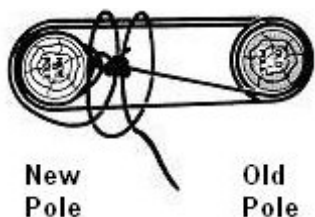
2. Tie the rope to the new pole 4 metres above ground using a clove hitch and two half hitches.



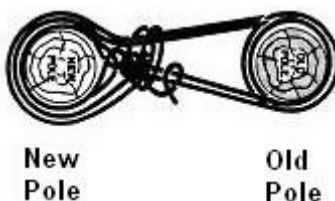
3. Wrap the standing part of the rope around the poles as shown (minimum of two full turns around the old pole, and always finish on the new pole).



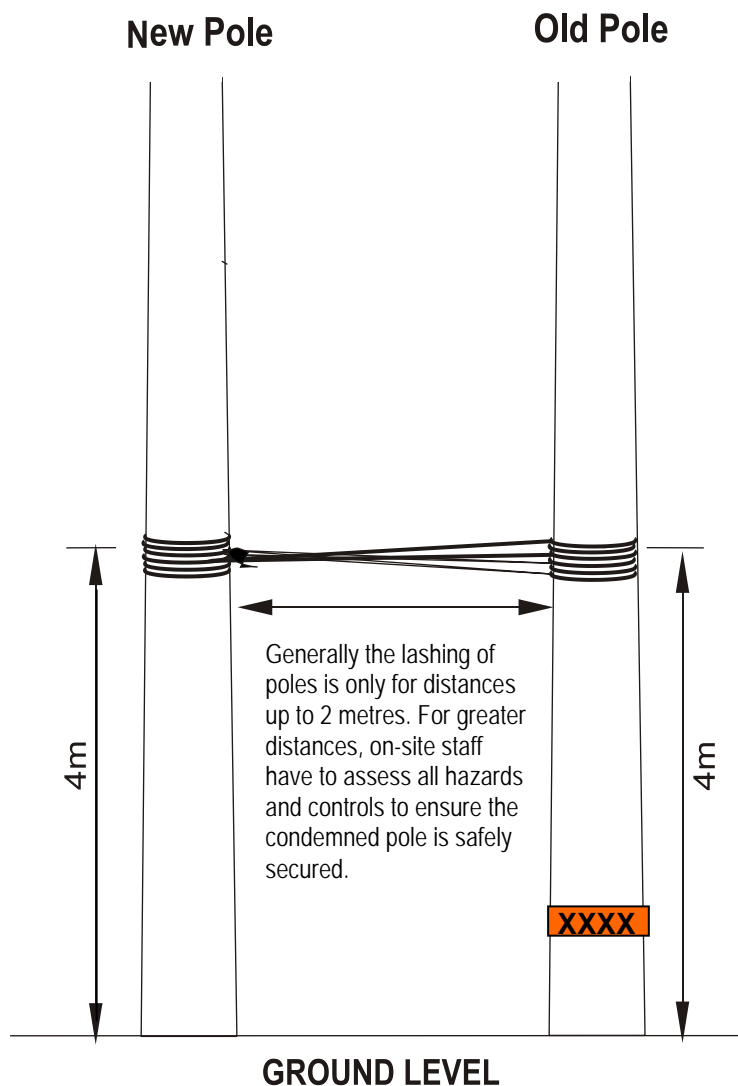
4. Tie the tail of the rope with a clove hitch as shown.



5. Tighten the clove hitch but do not stress the poles. Finally lock the tail of the rope with a half hitch as shown.

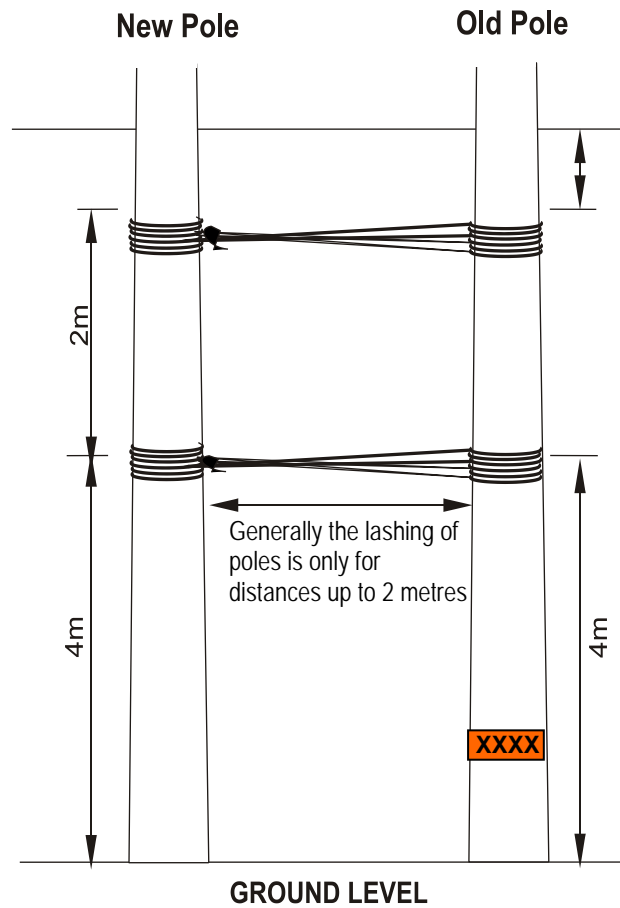


6. First lashing is completed.



7. Repeat steps 1-5 for the second lashing. The second lashing should be as high as practical maintaining minimum safe working distance from any live exposed conductors (details found in Ausgrid's Electrical Safety Rules). The aim is to achieve 2 metre separation between lashings where possible.

Note: More than two lashings can be utilised. The placement of the lashings will depend on the size of the pole, the construction configuration and the pole's position/situations. The diagram below is typical of how a lashed pole is left for the pole crew.



Note: To "make safe" condemned poles the use of stays and pikes may be needed in conjunction with pole lashings.

The old pole can be secured by either one or a combination of methods described in Section 14.

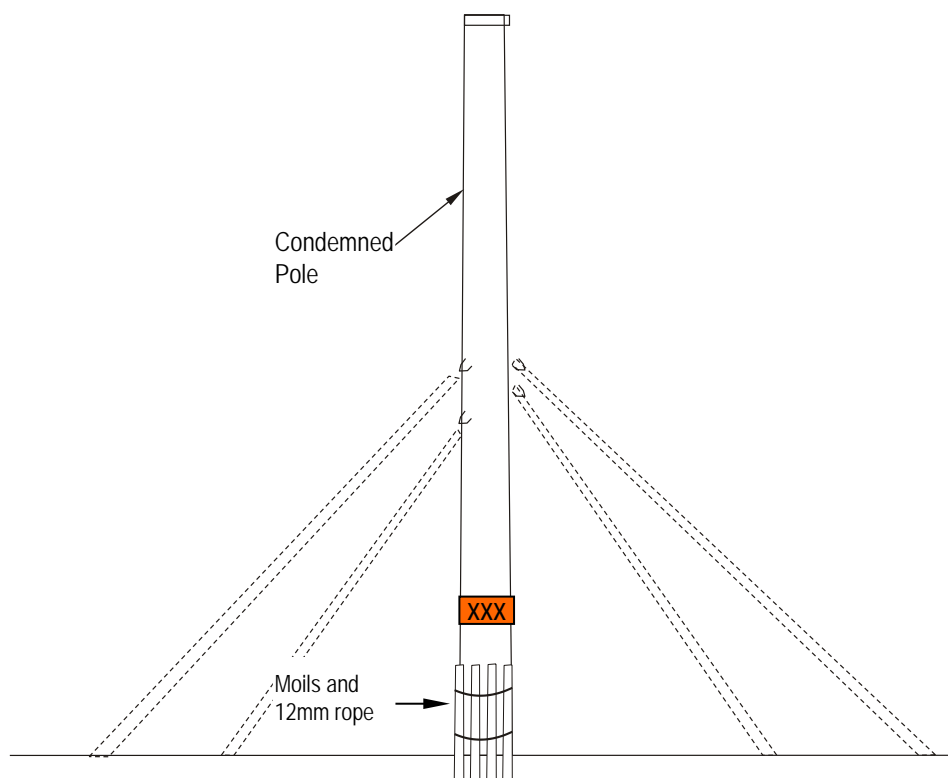
Annexure H – “Making Safe” Condemned Poles using Pikes

The “making safe” of a condemned pole using pikes is only to be used when methods of securing condemned poles in Section 14 can not be used. A documented risk assessment is to be completed when using pikes which considers:

- public safety;
- the risk of interference to the pikes;
- stability at the head of the pole and at the ground line;
- the load on the pole;
- the position of the defective section of the pole;
- the height of the pole;
- positioning of the pikes; and
- stability of the ground.

Pikes must be fixed to the pole and secured to ensure the pole doesn’t move or twist under load. Appropriate steps must be taken to ensure the pikes can perform their intended use. Steps could include but are not limited to, tying the pike’s spikes to the pole, tying/choking the pikes at groundline.

Note: These condemned poles should be replaced as soon as practicable.

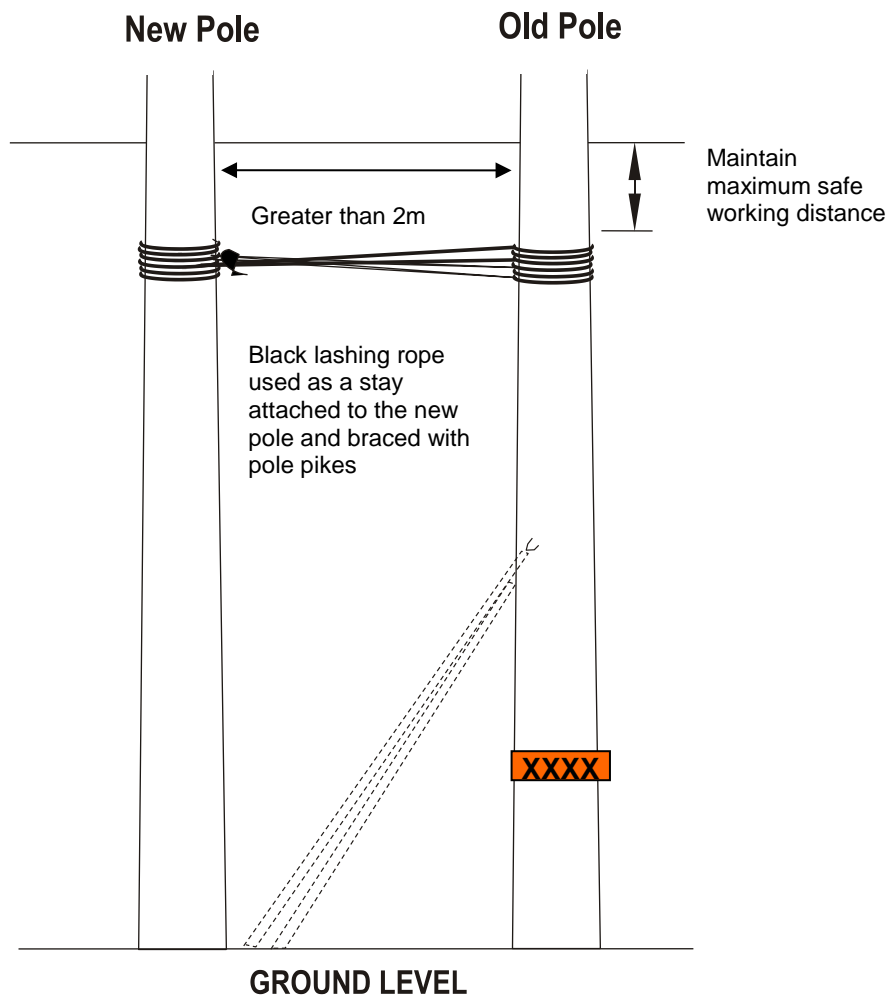


Typically moils are driven a minimum 350mm below groundline

Sufficient pikes must be used in appropriately positions to ensure the stability of the pole. When required the base of the pole should be stabilised with such items as moils. Moils may take the form of star stakes or any other robust metal rods used in sufficient numbers (minimum 3) and lashed to the pole with rope. The depth of the moils will depend on the bearing strength of the soil and the moil is typically driven into the ground a minimum of 350 mm. The strength of the soil can be assessed while performing the below ground pole inspection as per NS146 Safe Inspection

Procedure for Working on Poles. The depth of the moils should be deeper than 350mm in poor bearing strength soils.

The risk assessment process used in “making safe” condemned poles should identify the most appropriated hazard risk controls to achieve the safest result for each individual condition and location. The on-site staff are required to perform the risk assessment and then identify the best method or combination of methods to ensure the safest outcome is achieved.



The above pole is secured using a combination of a stay and two pole pikes. Different combinations using stays, lashings, pikes and moils can be utilised to achieve the safest result (eg all stays, two stays and a number of pikes etc).

Annexure I – Sample Compliance Checklist



Network Standard Checklist Form

NS128 Specification for Pole Installation and Removal

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 standard describes the requirements relating to the handling, positioning, erection and removal of concrete, steel and wood poles.		
	Handling, Marking and Disposal of Poles		
1	Wood poles not installed in reclaimed land, landfill sites, wetlands or similar locations.	5.1	Yes/No/NA
2	Only appropriately trained workers handle CCA impregnated wood poles.	5.1	Yes/No/NA
3	Only wood poles of durability class 1 used for poles used for pole-mounted substations and UGOH connection poles.	15	Yes/No/NA
4	Work undertaken in accordance with Workcover Code of Practice: Work near overhead power lines.	5.2	Yes/No/NA
5	All materials used free of asbestos and asbestos related material.	7.1	Yes/No/NA
6	All poles unloaded under controlled conditions.	7.2	Yes/No/NA
7	All personnel working with pole storage, transport, and off-loading familiar with appropriate handling techniques and the minimum number of bearing points required during storage and transport.	7.2	Yes/No/NA
8	Damage to the CCA chemical barrier on impregnated wood poles is repaired in accordance with requirements.	7.3	Yes/No/NA
9	Appropriate type of slings used on concrete and steel poles so as not to	7.4-7.5	Yes/No/NA

Item	Description	Refer- Clause	Completed/ Actioned
	damage the poles.		
10	Marking on poles in accordance with requirements.	8	Yes/No/NA
11	Disposal of poles in accordance with environmental legislation and using appropriate handling practices.	9	Yes/No/NA
	Earthing, Sinking of Holes and Pole Erection		
12	Earthing of poles in accordance with reference drawings.	10	Yes/No/NA
13	Rectangular area around poles 200mm from the pole extending down 350mm below ground level is free from concrete or pavers.	11.1	Yes/No/NA
14	Explosives not used to excavate rock in the Sydney Basin.	11.2	Yes/No/NA
15	Dial-before-you-dig (DBYD) service used prior to construction commencing.	11.3	Yes/No/NA
16	Pole sinking depths in accordance with requirements of NS220 and AS7000.	11.4	Yes/No/NA
17	Poles inspected prior to erection for surface damage and repaired if required.	12.1-12.3	Yes/No/NA
18	Minimum safe working distances maintained as required by Electrical Safety Rules.	12.4	Yes/No/NA
19	Raking and staying of poles in accordance with the design.	12.5	Yes/No/NA
20	Back filling of pole holes in accordance with requirements.	12.6	Yes/No/NA
21	Footing strength achieved using recommended methods.	12.7	Yes/No/NA
22	Where baulking used the design is in accordance with requirements.	12.8	Yes/No/NA
23	Concrete butts stop at least 350mm below ground level.	12.9	Yes/No/NA
24	Vegetation clearing in accordance with ISSC3 and NEG-OH21	12.10	Yes/No/NA
25	Restoration of surfaces in accordance with requirements.	12.11	Yes/No/NA
	Removal of Poles and Securing Condemned Poles		
24	Removal of poles undertaken with approved methods.	13.1	Yes/No/NA
25	Where pole butts not removed from ground they have been cut at least 250mm below ground level.	13.2	Yes/No/NA
26	Use of steel reinforcing nails in accordance with requirements.	13.4	Yes/No/NA
27	Following removal of poles the surface is restored in accordance with requirements.	13.5	Yes/No/NA
28	Condemned poles secured using one of the approved methods.	14	Yes/No/NA

Notes:-

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