

Network Standard

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Vegetation Management

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Revision

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0	6/09/2017	Rewrite of the 2010 version	Mark Thomson	Head of AEP&S
1	19/09/2017	Following amendments were carried out: Table 1 Defect Rectification times and MRPA 101/15 Defect Categories, Amendments to Table 3 Overhead Power Lines maximum grow-in defect rectification times,	Mark Thomson	Head of AEP&S
2	15/01/2020	Many changes to several clauses have taken place. It's basically a rewrite of the standard.	Mark Thomson	Head of AEP&S
3	6/08/2024	Revision of Clearance Requirements tables and conversion to new template	Duminda Thenuwara	Murray Chandler

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Scope

This document contains the requirements regarding vegetation management associated with Ausgrid's Network Assets. It applies to all persons with responsibility for managing vegetation in the vicinity of Ausgrid's network assets including Ausgrid employees, Contractors and Accredited Service Providers.

Reference Documents

All work covered in this document shall conform to all relevant Legislation, Standards, Codes of Practice and Network Standards.

Ausgrid Documents

- NS181 Approval of Materials and Equipment and Network Standard Variations
- NS166 Routine Overhead Line Inspection

Other Standards and Documents

- ISSC3 - 2016 Guide for the Management of Vegetation in the Vicinity of Electricity Assets

Clause Standard Requirements**1 General**

- 1.1 Except as otherwise provided by this document, all vegetation associated with Ausgrid's Network Assets shall be managed in accordance with ISSC3 - 2016 Guide for the Management of Vegetation in the Vicinity of Electricity Assets.
- 1.2 The requirements specified in this document are supplementary to those in ISSC3 – 2016 or clarify the requirements of ISSC3 – 2016 as they specifically relate to Ausgrid. Where there is a conflict between this document and ISSC3 - 2016, this document shall take precedence.
- 1.3 Vegetation clearance and hazard categories to be maintained shall include the following as defined and discussed in ISSC3 - 2016:
- Grow-in vegetation hazard;
 - Fall-in vegetation hazard;
 - Clear-to-the-sky vegetation hazard.

2 Regrowth Management

- 2.1 Regrowth allowances shall be generally in accordance with the principles of ISSC3 – 2016, except where Clear-to-the-sky requirements apply above the network (clause 3). Vegetation is to be cut in a manner that minimises the potential for regrowth.
- 2.2 Branches may be cut back to a point outside of the determined Regrowth Allowance where:
- both future cutting will be reduced, the aesthetics of the vegetation will be maintained or enhanced (this is particularly important for vegetation directly under overhead mains), or
 - for vegetation health and structural integrity.
- 2.3 The extent of Regrowth Allowances and determination of appropriate methods for achieving minimal potential for regrowth for individual vegetation species will be determined by a suitably experienced and competent person.
- 2.4 No allowance for regrowth is to be applied for vegetation growing directly above the network, unless the vegetation is assessed as posing a risk of growing downwards e.g. a species that has a weeping habit, a palm tree (with fronds that sag as they grow), or long overhanging branches heavy with foliage. Where vegetation located directly above the network is determined to pose a risk of breaching clearances, the Regrowth Allowance to be applied shall suit the site specific conditions with due regard for the requirements of ISSC3 – 2016, minimising the potential for regrowth, the amount of future cutting, maintaining or enhancing aesthetics, or vegetation health and structural integrity.
- 2.5 Although the Minimum Vegetation Clearance is to be kept clear of all vegetation as far as reasonably practicable, only vegetation that is actually expected to grow into the Minimum Vegetation Clearance during the cutting cycle should be removed from the Regrowth Allowance.

3 Clear-to-the-sky

- 3.1 Where Clear-to-the-sky clearances have already been implemented in bushfire prone areas, these clearances shall be maintained.
- 3.2 Clear-to-the-sky clearances at locations where Clear-to-the-sky does not presently exist shall be implemented only in high risk bushfire prone areas and when specifically identified by Ausgrid Asset Management on the basis of a bushfire risk assessment in accordance with ISSC3 – 2016 Section S1-3.7.
- 3.3 Where Clear-to-the-sky has previously been implemented in locations where Clear-to-the-sky is not appropriate, regrowth above the conductors shall be permitted in accordance with ISSC3 and this document.

4 Fall-in Vegetation Hazards

- 4.1 Fall-in vegetation hazards are to be assessed as part of the routine inspection cycle. Where Fall-in hazards are identified, they are to be removed in accordance with Table 2.

5 Risk assessment methodology

- 5.1 Any risk assessment required to be carried out pursuant to this document shall be in accordance with Ausgrid's Risk Management Policy GV000-Y0014, Risk Management Procedure GV000-P0023 and the Risk-Ranking Matrix technique which ranks risks qualitatively by combining qualitative scales for consequence and likelihood as shown in those documents. In particular, refer to the risk matrix, and likelihood and consequence assessment tables shown in Annexure A of Board Policy - Risk Management Policy (GV000-Y0014).

6 Exceptions - General

- 6.1 Exceptions to the Minimum Vegetation Clearances for overhead line conductors defined in ISSC3 – 2016 Schedule 1 are permitted in accordance with clause 6, 7, 8 and 9.
 - 6.2 Where Exceptions are applied, consideration should be given on a case-by-case basis to risk mitigation measures such as installation of Insulated Mains, installation of LV spreaders, negotiated tree removal and network relocation (i.e. service take off).
 - 6.3 The locations at which vegetation clearance Exceptions are applied shall be documented and recorded in Ausgrid's ERP system.
 - 6.4 All Exceptions are to be validated as part of routine vegetation scoping activities in accordance with existing cutting cycles. Where Exceptions are located within bushfire areas they are to be inspected and validated annually in the three-month period prior to the start of the declared bushfire danger period.
 - 6.5 Where vegetation exists within the Minimum Vegetation Clearances but does not comply with the criteria outline below and removal is considered not practicable (heritage / significant trees, community impacts, threatened species etc) an investigation should be undertaken to determine the appropriate risk mitigation strategy such as a network augmentation solution (including installation of LV spreaders) or negotiated tree replacement. These instances are to be managed in accordance with the NS181 exemption process and require a case-by-case risk assessment and approval.
 - 6.6 Where defective XLPE insulation or communications cable sheath is found, the matter shall be referred to the Supervisor for the raising of a defect in SAP which is to be categorised and prioritised in accordance with NS166.
 - 6.7 Where signs of climbing (i.e. cubby houses, rope swings, ladders etc) are present that may enable contact, or reduced clearances with the overhead network they are to be recorded as a defect in SAP and investigated on a case-by-case basis between Ausgrid and the tree owner to determine the appropriate remedial action.
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7 Insulated Mains (including Communications) Exceptions within non-bushfire prone land areas

7.1 For Insulated Mains (i.e. HV ABC and LV ABC distribution mains, LV ABC (i.e. XLPE) service mains) and Ausgrid communications cables, blowout of the conductor or cable and movement of the vegetation under wind need not be taken into account and the Minimum Vegetation Clearance to vegetation may be 0.1m provided that all of the following conditions apply:

- any contact between Insulated Mains and vegetation between cutting cycles is sustained (but not permanent) contact with foliage (i.e. leaves) and limbs/branches that are not thicker than approximately 25mm diameter (i.e. "your thumb") but only intermittent contact for branches thicker than 25mm diameter; and
- any contact between communications cables and vegetation between cutting cycles is sustained (but not permanent) contact with foliage (i.e. leaves) but only intermittent contact with limbs/branches (this will necessitate a suitable Regrowth Allowance); and
- there is low risk of the mains or cable becoming entangled and semi-permanently vertically or horizontally displaced by contact with the vegetation under wind conditions up to 500Pa / 103km/h wind pressure which equates to Category 1 cyclone conditions; and
- a visual inspection confirms that the XLPE insulation or communications cable sheath is intact and not damaged by abrasion, degraded by ultraviolet (UV) exposure (discoloured, crazed, missing), damage by wildlife (cockatoos, etc.) (refer Annexure A for examples of LV ABC in unacceptable condition); and
- where defective XLPE insulation or communications cable sheath is found the matter shall be referred to the Supervisor for the raising of a defect in SAP which is to be categorised and prioritised in accordance with NS166.

8 LV Bare or Covered Exceptions within non-bushfire prone land areas

8.1 For LV Bare or Covered Mains, the minimum clearance to vegetation above and beneath the mains may be reduced to 0.5m and intermittent contact with foliage growing from beneath is permitted between cutting cycles provided that all of the following apply:

- any contact between LV Bare or Covered Mains and vegetation between cutting cycles is limited to intermittent contact with foliage; and
- an allowance for vegetation regrowth is to be applied; and
- span length is no greater than 50m; and
- there is low risk of conductor clashing during intermittent contact between the mains and vegetation under any likely wind pressures at maximum sag and minimum sag conditions (note: this may be achieved through the installation of LV spreaders); and
- there is low risk of conductors becoming entangled and semi-permanently vertically or horizontally displaced by contact with the vegetation under any wind conditions up to the maximum wind pressure for which the mains are designed (typically 500Pa / 103km/h which equates to Category 1 cyclone conditions) (considering movement of both mains and vegetation under wind).

Minimum Vegetation Clearance and an allowance for vegetation regrowth in accordance with ISSC3 – 2016 is to be applied beside and above the mains, subject to the presence of any Significant Limbs as discussed in Clause 9.

9 Significant limbs exception within non-bushfire prone lands

9.1 Significant Limbs may be within the Minimum Vegetation Clearance in the following situations:

- for Insulated Mains the criteria for a vegetation clearance exception as discussed in Clause 6 must apply;
- for LV Bare or Covered Mains, the following criteria must apply:
 - minimum clearance between Bare or Covered LV conductors and Significant Limbs is no less than 0.1m under no wind, and all conductor temperature (i.e. sag) conditions;
 - any contact between LV Bare or Covered Mains and Significant Limbs is limited to intermittent contact; and
 - span length is no greater than 50m; and
 - there is low risk of conductor clashing during intermittent contact between the mains and Significant Limbs under any likely wind pressures at maximum sag and minimum sag conditions (note: this may be achieved through the installation of LV spreaders); and
 - there is low risk of conductors becoming entangled and semi-permanently vertically or horizontally displaced by contact with the Significant Limbs under any wind conditions up to the maximum wind pressure for which the mains are designed (typically 500Pa / 103km/h which equates to Category 1 cyclone conditions) (considering movement of both mains and vegetation under wind); and
 - intermittent contact between conductors and Significant Limbs at wind pressures for which the mains are designed (typically 500Pa / 103km/h which equates to Category 1 cyclone conditions) is not causing damage to the conductors e.g. conductor discolouration, frayed conductors, damaged conductor covering, repairs to conductors; and
 - intermittent contact between conductors and Significant Limbs is not causing a reduction in the strength of the limbs through scarring, etc.

Where Significant Limbs are within the Minimum Vegetation Clearance but do not comply with the criteria discussed above an investigation should be undertaken to determine the appropriate risk mitigation strategy such as a network augmentation solution (including installation of LV spreaders) or negotiated tree replacement.

10 Kiosk Substations

10.1 Vegetation associated with kiosk substations shall be managed in accordance with NS141.

11 Communication Cables

11.1 Ausgrid communication cables

- Vegetation associated with Ausgrid communication cables shall be managed in accordance with ISSC3-2016 except where Exceptions apply as outlined in this Standard.

11.2 Third-party communications cables

- Vegetation associated with communications cables owned by third parties shall not be included in any Ausgrid vegetation management programs except in specific situations where the interaction between the third- party communications cables and vegetation represents a risk to the safety of Ausgrid's assets (for example: a tree limb leaning on a third-party cable which is threatening to overload an Ausgrid pole). In these situations, the vegetation may be cut to remove the risk to the Ausgrid asset, provided that:
 - only the minimum amount of vegetation necessary to remove the risk to Ausgrid's assets is to be cut. The amount of cutting shall not extend to removing any adverse effects on the third-party's cable or associated assets.

- the vegetation cutting must not adversely impact community expectations or the objective of implementing any Exceptions discussed in Clauses 6, 7, 8 and 9. If any necessary vegetation cutting is likely to adversely impact community expectations or the objective of implementing any of these Exceptions, the matter is to be referred to the owner of the third-party cables for their urgent attention and remedial action.

11.3 This does not preclude Ausgrid entering into commercial agreements with third-party communications cable owners to manage vegetation associated with their assets on their behalf.

12 Other Situations

12.1 A request may be made to consider appropriate vegetation clearances in situations including but not limited to where:

- this document does not provide guidance in relation to allowing a reduction in clearance; or
- ISSC3 – 2016 does not provide guidance in relation to the voltage, construction or span length for a given span within the network.

12.2 Such requests should be made in accordance with the requirements of NS181 regarding approval of Network Standard variations, and will be assessed on a risk based, case-by-case basis.

13 Defect Prioritisation

13.1 The defect prioritisation Tables below apply to vegetation hazard defects which are identified between routine cutting cycles. They are not intended to apply to defects identified immediately after cutting, which are to be considered and addressed under the contractual performance framework in the first instance.

Table 1 is to be read in conjunction with Table 2, Table 3 and Table 4 below and shows vegetation defect rectification times and how these relate to the Defect Categories.

Vegetation Defect Maximum Rectification Times
Emergency
1 month
3 months
6 months
Reinspect (reinspect prior to next planned maintenance – nominally 18 months)
Unrestricted (may include next maintenance)

Table 1 – Defect Maximum Rectification Times

Asset Type	Vegetation Defect	Rectification Time
Overhead Power Lines	Grow-in vegetation	Refer to Table 4
	Clear-to-the-Sky vegetation	Subject to risk assessment up to a maximum of 6 months.
	Fall-in vegetation	1 month unless subject to risk assessment up to a maximum of 6 months (see Note 1) below.

Poles	All Vegetation Defects	Subject to risk assessment up to a maximum of next maintenance.
Towers		
Kiosk Substation/switching station		
Zone/Transmission Substation		
Street Lighting Lantern		
Waterway Crossing Sign (visibility of face of sign)		1 month
Notes to Table 2: 1) Any Fall-in vegetation defects in bushfire prone areas are to be rectified as soon as reasonably practicable within the allowed time frame of 1 month, or within a maximum of 6 months if subject to a risk assessment, as determined by a suitably experienced and competent person.		

Table 2 – Defect Rectification Times

Conductor Type	Voltage Level	Grow-in Defects ISSC3 - 2016 Tables 1 & 3		Maximum Defect Rectification Times	Private Vegetation
		Encroachment into Minimum Vegetation Clearance (%)	Class (see Note 3)	Bushfire Prone Area	
Insulated	LV ABC / HV ABC / Comms	<25%	A4	Unrestricted	Maintenance Advice
		≥25% and <50%	A3		
		≥50% and <75%	A2	3 months	Defect Advice
		≥75%	A1		
Bare / Covered	LV	<25%	A4	Reinspect (see Note 4)	Maintenance Advice
		≥25% and <50%	A3		
		≥50% and <75%	A2	3 months	Defect Advice
		≥75%	A1		
	HV	<25%	A4	Reinspect (see Note 4)	N/A (Ausgrid Responsibility)
		≥25% and <50%	A3		
		≥50% and <75%	A2	1 months	
		≥75% but not touching	A1	Emergency or 1 month (see Note 2)	
		Touching	A1	Emergency	

Table 3 - Encroachments found during LiDAR inspections

Conductor Type	Voltage Level	Vegetation Encroachment to Mains	Maximum Defect Rectification Times			
			Bushfire Prone Area		Non-Bushfire Prone Area	
			Ausgrid Responsibility	Private Vegetation	Ausgrid Responsibility	Private Vegetation
Insulated	LV ABC / HV ABC / Comms	< 0.5m	No defect	Maintenance Advice	No defect	
		Deflecting	3 months	Defect Advice	3 months	Maintenance Advice
Bare / Covered	LV	0.5 – 1m	No defect	Maintenance Advice	No defect	
		< 0.5m	3 months	Defect Advice		
		Deflecting			3 months	Maintenance Advice
	11-22kV	< 0.7m	3 months			
	33-66kV	< 1.0m				
	132kV	< 1.5m				
	All		Visible signs of burning / charring or insulation damage	48hrs ⁶		

Table 4 - Encroachments found during ground based visual inspections

Notes to above Tables:

- 1) In bushfire prone areas all A1 and A2 Class Grow-in defects are to be prioritised and rectified within the maximum periods shown or before the start of the bushfire season, whichever comes first.
- 2) Bare HV A1 (not touching) Class defects are considered emergency work if identified in a bushfire prone area during the declared bushfire season.
- 3) Defect Classes (A1, A2, A3 or A4) are to be used to categorise the degree of encroachment when entering the defect into SAP in the notification description or long text fields.
- 4) One-off follow-up reinspection within 3 months of the start of bushfire season to check growth and health of vegetation. If these defects have become or are likely to become A1 or A2 during the bushfire danger period, the defects shall be rectified in accordance with the revised defect Class.
- 5) During bushfire season deflecting mains have a 1-month priority.
- 6) Any defect that poses a direct and immediate risk to the safety of the public, and or network, including visible signs of burning / charring, the defect shall be reported to Ausgrid's Hazard Alert Line by phoning 13 13 88. A defect notice is required for outstanding defects in bushfire prone areas. A maintenance advice is required for outstanding defects in non bushfire prone areas.

Annexure A: ABC Insulation Reportable Defects

A1 The following figures show various reportable defects affecting ABC cables.



Figure 1



This photo shows damage to a tree branch and the repairs made to an LVABC cable following abrasion (a new piece of cable has been spliced in for the phase that was damaged). The insulation on LVABC is very tough, but can eventually wear through, damaging the cable, the tree, and having potential impacts on safety and reliability.

Figure 2



This photo shows grey LVABC insulation that has cracked and split as a result of UV degradation. The split is evident on the neutral conductor (i.e. ribbed) although the other phases could be split for the same reason. Because there is no evidence of the conductor being exposed then assign a timeframe of 18 months.

If there was evidence that the conductor has been exposed then assign a timeframe of 1 month.

Figure 3

Note: examples shown are for LV ABC only, but valid for HV ABC too.

Annexure B: Example Clearance Diagrams

B1 Note: The diagrams and the clearances depicted in Table 5 are provided for information only and do not form part of the technical requirements of this Standard.

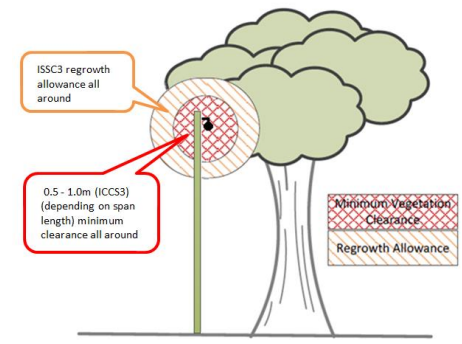
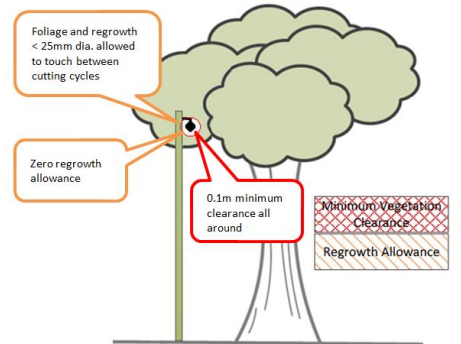
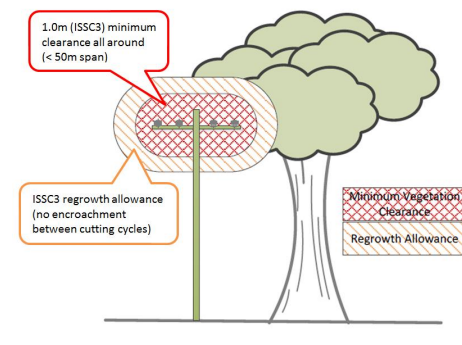
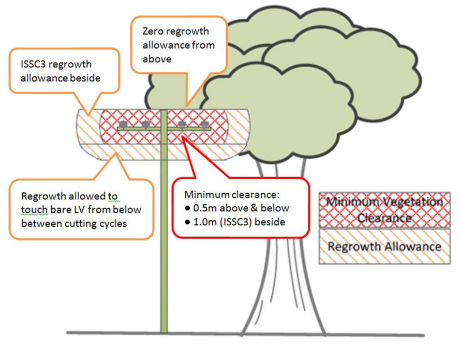
Situation	Non-Exception	Exception
LV ABC, all span lengths.		
Bare LV, spans < 50m		

Table 5 - Example Vegetation Clearances

