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MMI 0001 Pole and line inspection and treatment procedures

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- **Annexure 11**: Telecommunications Asset Identification Requirements
1.0 PURPOSE
To set out the minimum requirements of the inspection and treatment of poles and the associated lines in the Endeavour Energy network.

2.0 SCOPE
This instruction covers all of the processes associated with the inspection and treatment of both poles (timber, concrete, steel and composite) and lines. Inpections of transmission poles covered in this standard are in addition to the inspections covered in MMI 0012 - Overhead transmission line routine inspection. This standard does not include transmission towers, which is covered by MMI 0012 - Overhead transmission line routine inspection.

3.0 REFERENCES
Internal
- Company Policy 9.9.1 - Network asset maintenance
- Company Procedure (Network Asset Management) GAM 0006 – Notifying, reporting and conducting a post mortem on failed poles
- Company Procedure (Network Asset Management) GAM 0089 – Authorisations governance and management
- Company Procedure (Network Asset Management) GAM 0090 – Authorisation to carry out overhead and ground line inspections
- Company Procedure (Environment) GPE 0004 - Pesticide Use
- Company Procedure (Health & Safety) GSY0067 - Personal Protective Equipment
- Branch Procedure PAE 1027 - Initial and ongoing training of pole and line asset inspectors for compliance to maintenance standards
- Division Workplace Instruction WNV 1012 – Aerial patrol and analysis
- Branch Workplace Instruction WAE 2034 – Treatment of termites in wood poles
- Environmental Management Standard EMS 0007 - Waste Management
- Mains Construction Instruction MCI 0002 – Attachment of Broadband communication cables to Endeavour Energy poles
- Mains Construction Instruction MCI 0005 – Overhead construction manual
- Mains Design Instruction MDI 0024 – Attachment of non-network items to poles and streetlight columns
- Mains Design Instruction MDI 0031 – Overhead distribution, design standards manual
- Mains Design Instruction MDI 0047 – Overhead transmission mains design
- Mains Maintenance Instruction MMI 0003 – Routine external structural inspection of streetlight columns and LV pillars
- Mains Maintenance Instruction MMI 0012 – Overhead transmission line routine inspection
- Mains Maintenance Instruction MMI 0013 – Clearances to be maintained between power lines and trees
- Mains Maintenance Instruction MMI 0015 – Management of Endeavour Energy’s electricity easements
- Mains Maintenance Instruction MMI 0022 – Routine electrical inspection of streetlight columns and LV pillars and associated electrical terminations
- Mains Maintenance Instruction MMI 0034 – Pre-summer Bushfire Inspection
- Substation Maintainacne Instruction SMI 113 – Distribution data entry - asset structure and details
- Substation Maintainacne Instruction SMI 124 – Maintenance data entry and defect prioritisation
- Company Form FSY 0118 – Worksite Coordination/Hazard & Risk Assessment
- Company Form FPE 0004 – Record of Pesticide Application
4.0 DEFINITIONS AND ABBREVIATIONS

Authorised pole/line inspector  
person with pole and line inspection qualifications, trained, accredited and authorised by Endeavour Energy to carry out inspection duties in accordance with this instruction. Hereafter is referred to as “inspector”.

ADSS  
all-dielectric self-supporting cable (used for pilot and communication systems)

Bushfire prone area  
areas are defined by maps prepared by local councils (in accordance with the requirements of the Rural Fires and Environmental Assessment Legislation Amendment Act, 2002). Maps prepared by local councils are reviewed by the Rural Fire Service prior to being certified by the Commissioner for the Rural Fire Service.
Endeavour Energy uses these certified maps to determine bushfire prone areas within its network franchise area.

Caisson/sliding sleeve  
galvanised steel sleeve used to join a wooden pole to a concrete butt (the caisson is used in rebutted poles)

CCA  
copper chrome arsenic
CCT covered conductor thick
Contractor company that employs the inspector
Coring taking of timber samples by drilling a pole to determine the species and strength of the timber
Date tape date marked tape placed at the bottom of excavation under drill hole
Defective assets that are likely to deteriorate to a failed condition and impact on safety, HV system reliability or the environment, or impose unacceptable operational constraints on the network
De-sapped durable (DD) pole pole that has its sapwood fully or substantially removed by a machining process and which relies upon natural durability for protection from termites or fungal infection
DECCW Department of Environment, Climate Change and Water (NSW)
Double insulation Insulation comprising both basic insulation and supplementary insulation. Refer to AS 3000 for further information.
Ellipse Endeavour Energy’s asset management database
F category pole high voltage customer or private property pole that was located within the former Nepean River County Council area prior to 1980
Fire prone area as defined by the NSW Rural Fire Service and specified on the Bushfire Prone Land Maps stored on the Endeavour Energy GIS
Full length preservative treated (FPT) pole pole that has been protected by either a chemical introduced by pressure or applied by the thermal dip (PI) method
GLI groundline inspection. The GLI will require excavation to assess the condition of the pole at and below the groundline.
High wind event A wind with speeds greater than 100km/h.
HV High voltage - a voltage exceeding or equal to 1000V AC. Refers to 11kV, 12.7kV and 22kV in this instruction.
HV operational pole pole with HV links, dropout fuses or air break switches
Inspection cycle period between two (2) consecutive inspections
LV Low voltage - a voltage not exceeding or equal to 1000V AC.
SDS safety data sheet, previously refered to as the material safety data sheet (MSDS)
Natural round (NR) pole pole whose sapwood has not been preserved by chemical treatment
Neutral axis the direction through a pole which has no compression and tension forces. Refer to Annexure 1 for examples.
OLI overhead line inspection. In this document OLI refers to the inspection of the pole above groundline and all of the pole hardware (for example, crossarm, conductors and insulators).
OLI/GLI combined overhead, ground and below ground inspection
OLI/GLI Manager person assigned by Endeavour Energy to manage the inspection contract
PI pole pressure impregnated pole
Reinstated pole pole that has had additional supports attached to increase its strength to an acceptably safe level
ROI report of inspections
SF6 sulphur hexafluoride
Splint/nail galvanised steel section used to reinforce a decayed pole at the groundline area

Square sawn pole sawn beam of suitable wood that complies with AS 3000

Transmission asset asset with a nominal voltage of 33kV and above

SWER single wire earth return overhead line system

Termite tag tag nailed to a pole when termites are found

Urban area where the majority of available land is zoned for residential and/or industrial use, or a town or city area that is adjacent to other similar town or city areas

Leakage detector combined high and low impedance multimeter, for example, Fluke 117

5.0 ACTIONS

5.1 Authorisation, accreditation and training

The contents of this instruction must only be carried out by persons with suitable qualifications and certifications in accordance with Company Procedures GAM 0089 - Authorisations governance and management, and GAM 0090 - Authorisation to carry out overhead and ground line inspections. This includes the following inspections:

- Pole and line inspection and treatment;
- Pre-summer bushfire inspection;
- Aerial inspections (for example, helicopter and LIDAR);
- Waterway crossings; and
- Pole-top (EWP) inspection of wood poles.

Persons undertaking any sub tasks must also comply with the relevant requirements in GAM 0089 - Authorisations governance and management, and GAM 0090 - Authorisation to carry out overhead and ground line inspections.

5.2 Inspection requirements

5.2.1 Inspection intervals

The inspection intervals for all poles and overhead lines must be as shown below:

<table>
<thead>
<tr>
<th>Description</th>
<th>Inspection interval</th>
</tr>
</thead>
</table>
| Full length preservative treated (FPT) poles (including private). | First three (3) inspections  
OLI only every 4.5 years  
Fourth (4th) and subsequent inspections  
Full OLI and GLI every 4.5 years. |
| Natural round (NR)/des-sapped durable (DD) poles | Full OLI and GLI every 4.5 years.                       |
| All reinstated poles                             | Full OLI and GLI every 4.5 years.                       |
| All square sawn poles                            | Full OLI and GLI every 4.5 years.                       |
| Steel poles¹                                    | Sureline and Ingal steel mains poles  
OLI only every 4.5 years.  
See clause 5.11.4 for additional details.  
Other steel poles  
Full OLI and GLI every 4.5 years. |
| Concrete and composite poles                     | Poles with distribution assets (22kV and below)  
Full OLI every 4.5 years, no GLI required         |
Transmission only poles (33kV and above) | Inspection covered by MMI 0012.

**Waterway crossings – refer GIS for details of all river crossings**

<table>
<thead>
<tr>
<th>Inspection covered by MMI 0012.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspect condition of warning signs and vegetation encroachment</td>
</tr>
<tr>
<td>Overhead line inspection</td>
</tr>
<tr>
<td>Measurement of line clearances</td>
</tr>
</tbody>
</table>

**Fire prone areas (refer to Endeavour Energy)**

<table>
<thead>
<tr>
<th>Refer to MMI0034 Pre-summer Bushfire Inspection.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-summer patrol of all network and private lines in bushfire prone areas</td>
</tr>
</tbody>
</table>

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1. Does not include street light columns. The inspection of street light columns is covered by MMI 0003 - Routine external structural inspection of streetlight columns and LV pillars and MMI 0022 - Routine electrical inspection of streetlight columns and LV pillars and associated electrical terminations.

### 5.2.2 Inspection notification

**Private property access**

<table>
<thead>
<tr>
<th>Mains/poles owned by Endeavour Energy on private property</th>
<th>Reasonable effort must be made at the time of the inspection to inform the customer that their property is to be entered. If the property owner cannot be contacted, the inspection should continue.</th>
</tr>
</thead>
</table>

| Mains/poles owned by customers | The customer must be contacted and approval obtained before commencing the inspection. |

---

### 5.2.3 Pole identification categories and inspection requirements

<table>
<thead>
<tr>
<th>Pole owned by</th>
<th>Endeavour Energy Transmission mains on pole?</th>
<th>Other details</th>
<th>Code</th>
<th>OLI</th>
<th>GLI</th>
<th>Treat</th>
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<tbody>
<tr>
<td>Endeavour Energy</td>
<td>Yes</td>
<td>No Telstra or other assets on pole</td>
<td>A</td>
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<tr>
<td>Endeavour Energy</td>
<td>Yes</td>
<td>Telco joint use²</td>
<td>B</td>
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<td>✓</td>
<td>✓</td>
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<tr>
<td>Customer</td>
<td>No</td>
<td>Private LV lines¹</td>
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<td>✓¹</td>
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<tr>
<td>Endeavour Energy</td>
<td>No</td>
<td>Private LV lines⁴</td>
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<td>✓</td>
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<tr>
<td>Telstra</td>
<td>No</td>
<td>Common use³</td>
<td>G</td>
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</tr>
<tr>
<td>Customer</td>
<td>Yes</td>
<td>Private transmission line⁵</td>
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<tr>
<td>Endeavour Energy</td>
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<td>Telco joint use²</td>
<td>J</td>
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<td></td>
<td>✓</td>
</tr>
<tr>
<td>Endeavour Energy</td>
<td>No</td>
<td>Ausgrid mains on pole</td>
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<tr>
<td>SRA</td>
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<tr>
<td>Transgrid</td>
<td>Yes</td>
<td>Endeavour Energy’s mains on pole</td>
<td>M</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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### Extent of pole inspection and treatment

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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Poles owned by Endeavour Energy on public property</td>
<td>Poles must be inspected and treated.</td>
</tr>
<tr>
<td>Poles owned by Endeavour Energy on private property</td>
<td>Attempts must be made to contact the customer prior to the inspection. The customer must agree to allow the inspection and treatment. If the customer cannot be contacted, the inspection must still be performed, but no treatment is to be used.</td>
</tr>
<tr>
<td>Poles owned by customers (excluding poles owned by other authorities below)</td>
<td>All poles must be inspected up to the main switchboard, except for Code Q poles, which are to be inspected up to and including the high voltage metering point or the first point of protection (for example, dropout fuses, circuit breaker or switch fuse), whichever is first. If there is no high voltage metering point, all poles must be inspected for the entire line length. The customer must be contacted prior to the inspection. Treatment must only be applied to steel poles.</td>
</tr>
<tr>
<td>Fire hose poles</td>
<td>Poles must be inspected and treated. This applies to poles owned by fire brigades and Endeavour Energy</td>
</tr>
<tr>
<td>Poles located within Endeavour Energy’s depots and substations</td>
<td>Poles must be inspected and treated. Access to live switchyards must take place only while the inspector is accompanied by authorised staff.</td>
</tr>
<tr>
<td>Poles located in water catchment areas, national parks, organic farms, and Cattle Care areas</td>
<td>Poles must be inspected however no groundline treatment or termiticide is to be applied.</td>
</tr>
<tr>
<td>Poles owned by other authorities</td>
<td>Poles owned by other authorities are to be inspected by the owner only. Examples of other authorities are Essential Energy, Ausgrid, Rail Corp, Telstra, Transgrid.</td>
</tr>
</tbody>
</table>
Note: Out of service Endeavour Energy poles must also be inspected and treated in accordance with the above.

5.2.5 Extent of mains inspection

<table>
<thead>
<tr>
<th>Mains inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mains owned by Endeavour Energy</td>
</tr>
<tr>
<td>Mains owned by customers</td>
</tr>
</tbody>
</table>

5.2.6 Defect management

<table>
<thead>
<tr>
<th>Defects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mains/poles owned by customers</td>
</tr>
<tr>
<td>Mains/poles owned by Endeavour Energy</td>
</tr>
</tbody>
</table>

5.3 Emergency situations and contact arrangements

Under normal circumstances, if a hazardous condition and/or unsafe situation, such as a live or failed pole is found, it must be reported immediately to the local Depot Operations Manager.

If the hazardous condition is related to a customer installation, contact the OLI/GLI support employees.

In an emergency, call the System Operator, System Control on 131 003.

5.4 Precautions before commencing any work

5.4.1 Safety standards

The contractor, their employees, and any subcontractors, must abide by the Endeavour Energy Safety Rules, and any amendments to these documents, for the duration of the works to be carried out as a result of this instruction.

5.4.2 Worksite hazard and risk assessment and Safe Work Method Statements

Prior to commencing any work on site, a Worksite Hazard and Risk Assessment (FSY 0118) is to be completed.

Safe Work Method Statements to be used are:

- SWM 1.010 – Overhead and Ground Line Inspection and Audit;
- SWM 1.005 – Patrol of Overhead Mains Inspection
- SWM 6.026 – Pole Treatment (OLI/GLI) when using chemicals to treat poles for termites and fungal decay;
- SWM 6.002 – Handling burnt or burning CCA treated timber;
- SWM 6.014 – Removal of Foreign Objects from Conductors & Apparatus

5.4.3 Duty of care

The contractor, their employees, and any subcontractors, must display a duty of care to
the public, other Endeavour Energy contractors and Endeavour Energy employees, during the course of their work.

If a potential safety issue is identified, the inspector must correct the problem, make the problem safe, or advise the responsible person to repair it at a later date.

5.4.4 Clothing

All employees, contractors or subcontractors must be appropriately dressed at all times in accordance with Company Procedure GSY0067 – Personal Protective Equipment.

5.4.5 Tools

All tools and equipment must be kept in reasonable working condition so that they are safe to use at all times. Any tools and equipment that require inspection must be current in their period of inspection and tagged/logged accordingly.

5.4.6 Environment

All noise, waste materials/run off/cleaning solvents, such as water and oil, must be controlled to meet DECCW and local council guidelines.

5.4.7 Pole treatment chemicals

It is the pole inspector's responsibility to check that the chemicals used for the preservative treatment of poles are approved for use by the relevant environmental body and Endeavour Energy.

Pole inspectors must also have a copy of the current SDS for all chemicals carried.

The public must be notified of pesticide use and an environmental risk assessment must be carried out according to Company Procedure GPE 0004 – Pesticide Use.

5.4.8 Pole Inspections involving burnt CCA poles

Staff performing pole inspections on burnt CCA poles must:

- Record the location on the pole of the burnt sections.
- Report the pole as having been burnt to the relevant depot.

A strength determination is to be carried out in accordance with MDI 0031 – Overhead distribution, Design standards manual, and clause 5.12.3 of this document where the timber burnt away is treated as a defect, causing either a general reduction in diameter, or a bite, as appropriate.

The charred material must be removed in accordance with SWM 6.002, so that the extent of the reduction in diameter of the pole can be measured. Only depot staff trained in the removal of charred material must carry out the material removal. Regional design staff will be required to determine if the pole is suitable to remain in service.

If the pole remains serviceable, all charred material is to be removed and any raw timber coated with copper naphthenate (CN) paint. All free ash must be collected, placed in sealed plastic bags and transported back to the pole depot for assessment to EMS 0007, followed by disposal using the appropriate method.

5.4.9 Visual preliminary overhead inspection

Before any excavation, sounding, boring or dressing of a pole takes place, the inspector must commence each inspection by visually checking the above ground portion of the pole for any serious defects, as set out in clause 5.10.

If, for example, a high voltage conductor is dislodged from an insulator, or if any component is so loose that it could fall during the inspection, the pole is to be bypassed and reported to Endeavour Energy on the number indicated in clause 5.3, for further action. A 48 hour defect is to be raised and the full pole inspection delayed until the
defect is repaired.

Any unauthorised advertising signs and any protruding fixing nails or screws that can be effectively reached from ground level must be removed from the pole. These must be removed immediately after the voltage leakage test (refer clause 5.4.10). Unauthorised advertising signs that are unable to be reached are to be reported for removal. Further detail of unauthorised material is set out in MDI 0024 - Attachment of non-network items to poles and streetlight columns.

Following remedial safety work, the normal inspection/assessment may proceed.

5.4.10 Voltage leakage check

Before commencing any related inspection activities of any pole, such as excavation and sounding, the inspector must carry out a voltage leakage check on the pole.

The inspector must be suitably attired with low voltage insulating gloves worn on both hands to perform the voltage leakage test and to prove the pole safe to touch before direct contact is made with the pole and attachments.

The integrity of the meter must be checked in accordance with clause 5.4.10.1. After each pole check, the functionality of the device must be re-checked in accordance with the manufacturer’s instructions.

5.4.10.1 Multimeter check

The multimeter used to perform the voltage check must have a function to measure both LOW and HIGH impedance (proximity test), for example, Fluke 117.

Prior to and after checking any pole for voltage leakage, the multimeter must be checked for integrity. This test must be performed in accordance with the manufacturer’s instructions by either:

- using a known voltage point such as a power point or another known live circuit; or,
- as this meter is sensitive to static electricity, it can be checked for functionality by vigorously rubbing the meter on a cotton shirt sleeve.

When used as a proximity tester (Volt Alert setting), the multimeter will indicate the presence of an electrical field with a light and an audible buzz.

A spare 9v alkaline battery must be carried by the inspector as a back-up for the meter as replacement of the battery may be required at any time.

5.4.10.2 High impedance check

Approach the pole and visually inspect for burnt grass, electrical tracking on pole, or any other indication of an electrical failure.

Using a high impedance (Z) capacitively coupled measuring device, such as a Fluke 117 meter on the Volt Alert setting and on Lo RANGE, stand approx one (1) metre from the pole.
pole and extend at elbow height, moving towards the pole, and touch the surface.

- Repeat for all metal (conductive) surfaces.
- A positive indication (light and buzz sound) must be treated with caution and the voltage level confirmed using the *Fluke 117* meter set to the *AUTO-V LoZ* setting, as described in the voltage test below.

5.4.10.3 Voltage test

Upon receiving a positive high impedance indication, perform a voltage test measurement using a low impedance resistively coupled device, such as the *Fluke 117* set to *AUTO-V LoZ*. Probes are to be connected between an earth/ground stake or similar driven into the ground a minimum of approximately one (1) metre from the pole and the pole surface. Where available, the test is to be performed at a metallic fitting, such as a pole disk indicator or pole number aluminium plate tag.

If the voltage on the *AUTO-V LoZ* setting is less than 5V, no further action is required and work may proceed on the pole.

If the voltage on *AUTO-V LoZ* is equal to or greater than 5V, guard the pole and immediately report the problem for attention by qualified personnel.

If a hazardous condition and/or an unsafe situation is found, such as a live or failed steel pole, it must be reported immediately as set out in section 5.3.
In addition, the following action must be taken:

### The inspector must:
- cordon off the area where the hazardous conditions exists;
- prevent the public from entering the area;
- notify the supervisor that a hazardous condition has been found;
- stand by until emergency staff have arrived; and,
- not proceed with any further work on the pole until advised that it is safe by an authorised person, and a further voltage leakage check confirms that the pole is safe.

### 5.5 Termite infestations

#### 5.5.1 General

Following the safety checks indicated in clause 5.4, the pole and the adjacent soil must be carefully examined for evidence of termite infestation.

See Annexure 2: Typical termite pictures, to assist in termite identification.

**Special note 1:** If Glyptotermes are detected, the pole must be marked and condemned with no treatment carried out. Regardless of the previous statement not to disturb the soil, the inspector should look for flight holes at the area 300mm below groundline (most cases) and up to two (2) metres above groundline (extreme cases). The flight holes should be cut with a sharp axe to disclose cross grain galleries. Poles with evidence of brown rot fungus infection can be prone to these termites.

**Special note 2:** Nasutitermes detected in the pole can generally be eradicated by destroying the nest and spreading it across the ground. An effort is to be made to locate and kill the queen. Termite affected sapwood must be removed to 300mm above ground to discourage further attack.

Subterranean termites are generally the most destructive of Australian termites. If, when checking a pole, the inspector is unsure of a species, advice should be sought from a specialist.

#### 5.5.2 Procedure upon finding termites

If termite infestation is found, the normal inspection is to continue, however the pole must not be treated with preservative.

The pole is to be reported for a follow-up approved termite treatment and appropriate defects must be entered into Ellipse. Poles must be appropriately marked with a termite tag (see clause 5.15.4) and the defect is to be assigned a three (3) month priority. Each treatment is to be recorded into the one Ellipse work order as a separate Task, and the date of treatment is to be recorded into the Task Completed Date field. The first treatment must be completed and recorded into Ellipse within one (1) month of the defect raised date.

**Note:** Details of the application of an approved termiticide where termite infestation is detected are given in Branch Workplace Instruction WAE 2034 – Treatment of Termites in Wood Poles.

#### 5.5.2.1 Hazardous pole replacements

If the pole is found to be in a hazardous condition, it must be reported immediately to Endeavour Energy on the number indicated in clause 5.3 for necessary action.
Replacement of a hazardous pole is to proceed immediately without waiting for further treatment. Treatment must be applied (in accordance with Branch Workplace Instruction WAE 2034 – Treatment of Termites in Wood Poles) to the replacement pole in order to eradicate any termite colonies still present and also prevent possible re-infestation.

5.5.2.2 Non-hazardous pole replacements

If the termite infested pole is not immediately hazardous and awaiting replacement, it must be treated in accordance with Branch Workplace Instruction WAE 2034 – Treatment of Termites in Wood Poles, to eradicate the colony and prevent possible re-infestation. This treatment must be carried out only by authorised persons.

5.6 Sounding of poles

5.6.1 Above groundline sounding

Inspectors must sound the pole in order to get a general indication of the pole's condition. The strength assessment of the pole is determined in section 5.12.

For wood poles, use the flat side of a hammer, and for steel poles, use the round end of a ball pein hammer. Sufficient force should be used to give an indication of the pole condition, but not enough to dent the steel pole or affect a timber pole's sapwood layer.

Sounding must be done by striking the pole with the hammer from several directions, beginning at its base, as close as possible to the groundline. A sound pole should produce a ringing sound.

For steel poles, work upwards to 100mm above groundline listening for the sound of any internal rust falling down the inside of the pole dislodged by sounding. For wood poles, work as high as can be effectively reached until the full circumference of the pole (360°) has been checked.

5.6.2 Below groundline sounding

After excavation around the pole is complete, the underground section of the pole must also be sounded to check for possible decay/rust.

This must be done by striking the pole from several directions with the hammer, beginning at the base of the excavation, and then upwards to approximately 100mm above groundline until the full circumference of the pole (360°) has been checked.

In steel poles, a measure of the amount of internal rust can be gained by listening for the sound of any rust falling down inside the pole.

5.6.3 Sounding result

If by sounding, the pole’s condition is doubtful, the process that must be followed is:

Wood poles – An internal inspection at the location of possible decay must also be carried out in addition to the usual internal inspection process. Above ground internal inspections are to be done according to 5.10.1.1 and below ground internal inspections are to be done according to 5.12.1.4. The allowable wall thickness and safety factor for this inspection is given in the Assessment of serviceability flowchart (clause 5.9.3).

Steel poles – If the inspector considers the pole to be hazardous, it is to be reported for rectification.

The local Operations Manager is to be contacted to arrange temporary pole support and the OLI/GLI Manager notified. Private steel poles found in this condition are to be reported to the customer (if available) at the time of inspection.
5.7 Easements and access tracks

Property developments, structures and swimming pools that encroach onto Endeavour Energy easements must be recorded for follow-up by Endeavour Energy. Easement widths are, generally:

<table>
<thead>
<tr>
<th>Description</th>
<th>Voltage</th>
<th>Nominal easement width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerial bundled conductors</td>
<td>230/400V</td>
<td>6m</td>
</tr>
<tr>
<td>Aerial bundled conductors (NMS)</td>
<td>11kV - 22kV</td>
<td>6m</td>
</tr>
<tr>
<td>CCT – vertical construction</td>
<td>400V - 22kV</td>
<td>6m</td>
</tr>
<tr>
<td>Bare conductor and CCT horizontal construction</td>
<td>400V - 22kV</td>
<td>9m</td>
</tr>
<tr>
<td>Single pole with cross arm construction</td>
<td>33kV</td>
<td>18m</td>
</tr>
<tr>
<td>Single pole with cross arm construction</td>
<td>66kV</td>
<td>25m</td>
</tr>
<tr>
<td>Double pole/H-pole</td>
<td>33kV - 132kV</td>
<td>30m</td>
</tr>
<tr>
<td>Single pole vertical/delta post insulators</td>
<td>66kV</td>
<td>18m</td>
</tr>
<tr>
<td>Single pole vertical/delta post insulators</td>
<td>132kV</td>
<td>25m</td>
</tr>
<tr>
<td>Steel tower twin circuit</td>
<td>132kV</td>
<td>30m</td>
</tr>
<tr>
<td>Pole stays/ground stays</td>
<td>N/A</td>
<td>6m</td>
</tr>
</tbody>
</table>

Inspect access tracks and associated infrastructure for excessive damage, degradation, and obstruction to assets. If access to assets is not possible or unsafe, OLI/GLI must be notified immediately (before completion of the map).

5.8 Pole identification disc information and data capture

It is important that pole disc information is recorded correctly. Where poles are fitted with an identification disc, the details must be checked against those recorded in the data capture tool and updated where required.

This check and update must also apply to all circuit option fields in the data capture tool. Shown below are examples of the type of information that may be found on wood pole discs however this may vary depending on suppliers and specific contracts.

The latest layout used by Endeavour Energy is Option 1 (modified), Figure 5.8, AS 2209-1994 shown as Example 4.

The identification plate for concrete and steel poles is shown in Drawing no. 053999. Concrete and steel poles must have the following updated: Name of manufacturer, month and year of manufacture, length of pole and pole strength (both ultimate and working).

A pole strength conversion table is given in Annexure 3. Details of manufacturers’ codes and plant locations are given in Annexure 4. Timber species and durability classifications and identification brands are given in Annexure 5.
5.8.1 Example 1 – about 1970 to 1979 (EA of NSW)

- Year of felling (untreated poles) or month and year of treatment
- Pole length (m)
- Species of timber (abbr.)
- Timber area (untreated) or treatment location
- Strength classification (P1) (kN) – type
- Pole supplier's identification

5.8.2 Example 2 – about 1979 to 1994 (AS 2209 - 1979)

- Month and year of treatment
- Pole length (feet), Strength (L-4kN, M-8kN, H-12kN), Species of timber (abbr.)
- Batch or charge number
- Pressure impregnated pole

5.8.3 Example 3 – about 1994 to 2009 (AS 2209-1994)

- Registered plant number
- Individual pole identification number/charge number and month treated
- Pole length (m)/maximum permissible loads (ultimate - working)
- Species identification and year treated
5.8.4  Example 4 – October 2009 to present (AS 3818 – 2009)

5.9  Assessment of the serviceability of poles

The inspector must follow the procedures set out in this instruction and the computer data entry manual for the assessment of the serviceability of wood poles.

5.9.1  Altering the decision to pass or condemn a pole

The officers below may alter the original decision to pass or condemn a pole:

1. Inspector in conjunction with his Manager and the OLI/GLI Manager/Representative.

In the case of a pole being designated as serviceable after condemnation by an inspector, the following additional processes must be undertaken:

1. The officer changing the decision must undertake a full re-inspection in accordance with this instruction. Whenever practical, this should be carried out in conjunction with the inspector who made the original inspection.
2. Reasons for changing the decision, including the serviceability criteria, are to be given in writing to the inspector and a copy forwarded to the contractor and the OLI/GLI Manager.
3. Status of the pole is then to be amended in Ellipse.

5.9.2  Removal of condemned pole markings

Wherever practical, the markings on a condemned pole must be removed only by the inspector who condemned the pole after he has received the written advice required in clause 5.9. If for any reason this proves impossible, the matter must be referred to the OLI/GLI Manager for final arbitration.
5.9.3 Assessment of serviceability flowchart

Start

- **Inspection**: Visually inspect above ground conditions before commencing any work – Cl 5.4
- All poles shall have a voltage check carried out before commencing any work – Cl 5.4.9

Examine for termites – Cl 5.5

- **Sound pole – Cl 5.6**: No → Go to A
- **Termite infestation – Cl 5.5**: Yes → Glyptotermes

- **Glyptotermes**: Yes → Treat pole WAE 2034
- **Termite infestation**: No → Go to A

**Report all pole details CI 5.21**

- **Check easements Cl 5.7**
- **Carry out OLI routine inspection procedures Cl 5.10**
- **Steel or wood pole**: Yes → GLI inspection Cl 5.11 and Cl 5.12

**Standard timber pole**

- Carry out additional procedures if required Cl 5.12.3, 5.12.4

**Enter pole details**

1. Pole outside diameter new
2. Pole outside diameter current
3. Pole min. wall thickness
4. Size of rot pocket Cl 5.12.1.13

**Go to A**

**Steel pole Cl 5.11**

- **No**: Go to A
- **Yes**: Go to A

**Pole reinstatement is a splint/nail Cl 5.12.5**

- **No**: Go to A
- **Yes**: Go to A

**Pole reinstatement is a rebut Cl 5.12.6**

- **No**: Go to A
- **Yes**: Go to A

**Steel pole fail test Cl 5.11.1**

- **No**: Go to A
- **Yes**: Go to A

**Do not bore hole Check serviceability Cl 5.12.2**

- **No**: Go to A
- **Yes**: Go to A

**Check % remaining strength Cl 5.11.3**

- **No**: Go to A
- **Yes**: Go to A

**Steel pole Cl 5.12.2**

- **No**: Go to A
- **Yes**: Go to A

**Square saw property pole Cl 5.12**

- **No**: Go to A
- **Yes**: Go to A

**Pole wood wall in caisson > 70mm Cl 5.12**

- **No**: Go to A
- **Yes**: Go to A

**Nailed by UAM Cl 5.12**

- **No**: Go to A
- **Yes**: Go to A

**Drill top nail band. Check 2 walls of pole wood > 30mm Cl 5.12.7**

- **No**: Go to A
- **Yes**: Go to A

**Check walls.**

- **No**: Go to A
- **Yes**: Go to A

**Drill second hole at 90º to nail/splint if required.**

- **No**: Go to A
- **Yes**: Go to A

**Drill bottom nail band. Check 2 walls of pole wood > 30mm Cl 5.12.5**

- **No**: Go to A
- **Yes**: Go to A

**Check walls.**

- **No**: Go to A
- **Yes**: Go to A

**Drill up to 2 holes at 50-100mm below ground line. Check 2 walls of pole wood > 10mm Cl 5.12.5**

- **No**: Go to A
- **Yes**: Go to A

**Note**

- Drill first hole opposite splint/nail.
- Check walls.
- Drill second hole at 90º to nail/splint if required.
- Check walls.

**Note 2**

Existing drill holes in this area shall be used to minimise damage to the pole.

The pole shall also be sounded along the top 700mm of the nail; any areas that are identified to be significantly unsound (compared to where the existing holes are located) shall be drilled for further assessment.

If there are no existing drill holes present, the pole shall be drilled at the most unsound area in the top 700mm of the nail, or between the bolts if no significantly unsound areas are identified.
Pole and line inspection and treatment procedures

Amendment no. 17

**Legend**
- SF: Safety factor – based on initial SF of 4
- Wall: Thickness of wood at groundline
- Disc: Marker with an X or N painted on it.
- CI: Relevant clause in this document
- A: Link to another section of flowchart
- B: Pole condemned due to above ground condition
- C: Pole internal decay hole

**Notes**
Note 1 - “Non-nailable” pole = LV UGOH (not including service mains), HV UGOH, HV operational, substation, railway crossing.
Note 2 - Refer to Clause 5.16 for priority requirements

**Flowchart**

**A**
- Cut X in pole Cl 5.15
- SF < 0.8 or 2 walls < 20mm (below ground)
- Condition is immediately dangerous

**B**
- Pole condemned due to above ground condition Cl 5.10.1
- “Non-nailable” pole and SF < 2 or 2 walls < 50mm (Note 1)
- SL pole or cross-road service pole SF < 2 or 2 walls < 50mm

**C**
- SF < 2 or 2 walls < 30mm
- 2 walls ≥ 45mm at 900mm above ground
- N nail pole within 48hrs / 4 days Cl 5.15.3, Cl 5.15
- SF < 0.8 or 2 walls < 20mm (below ground)

- Cut X in pole Cl 5.15
- Attach N disc to pole Cl 5.15
- Replace or support pole within 48hrs / 4 days - Cl 5.15.2, Cl 5.16
- Inform Endeavour Energy immediately (See Note 2)
- Replace Private pole within 3 months Cl 5.16
- Pole is an Endeavour Energy responsibility
- Replace Endeavour Energy pole within 6 months Cl 5.15.2, Cl 5.16
- Attach condemned sticker to pole Cl 5.15
- Nail pole within 48hrs / 4 days Cl 5.15.3, Cl 5.15
- Inform OLI/GLI immediately (See Note 2)

- Report all pole and splint/nail details, Cl 5.20
- Apply wood preservative treatment Cl 5.13 or steel pole treatment Cl 5.14
- Nail pole within 6 months Cl 5.15.3, Cl 5.15

- Pole condemned due to above ground condition Cl 5.10.1
- SF < 2 or 2 walls < 30mm
- 2 walls ≥ 45mm at 900mm above ground
- SF < 0.8 or 2 walls < 20mm (below ground)
- Condition is immediately dangerous
### 5.9.4 Standard measurements for pole and rot pocket details

#### LEGEND
- **DORIG** = Original pole diameter
- **DCURR** = Current pole diameter
- **W1** = Measured thickness
- **XROT** = Measured depth
- **W2** = DCURR – XROT DEPTH
- **W3** = Measured thickness
- **YROT** = Measured depth
- **W4** = DCURR – YROT DEPTH
- **WMIN** = Min of W1,2,3 or 4
- **DROT** = Largest rot pocket diameter (XROT - W1) or (YROT - W3)
- **SF** = Safety factor

Refer to clause 5.12.3 for additional details of measuring natural round poles.

### 5.9.5 Sample calculations

<table>
<thead>
<tr>
<th>Example 1: 2 small rot pockets = effectively 1 large pocket</th>
<th>Example 2: 1 rot pocket and minimum wall at 1 side</th>
<th>Example 3: 1 rot pocket and 2 walls below size</th>
<th>Example 4: Excessive external decay and small rot pocket</th>
</tr>
</thead>
<tbody>
<tr>
<td>DORIG</td>
<td>DCURR</td>
<td>W1</td>
<td>XROT DEPTH</td>
</tr>
<tr>
<td>360</td>
<td>360</td>
<td>70</td>
<td>320</td>
</tr>
<tr>
<td>360</td>
<td>360</td>
<td>75</td>
<td>285</td>
</tr>
<tr>
<td>25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion**
- Pole serviceable
- Pole serviceable
- Suitable - nailing
- Suitable - nailing

**Reason**
- SF ≥ 2 and 2 walls > 30mm (3 walls are >30mm)
- SF ≥ 2 and 2 walls > 30mm (3 walls are >30mm)
- SF ≥ 2 but 2 walls < 30mm
- SF < 2 and 2 walls > 20mm
- Check if wall @ 900mm ≥ 45mm
- Check if wall @ 900mm ≥ 45mm
5.10 Procedures for above ground inspection of all poles (OLI)

All defects identified during inspections must be recorded as set out in section 5.20. Inspection and observation must be carried out with the aid of stabilised binoculars from a minimum of three (3) directions for all poles and all visible line components.

If practical, an additional inspection from above the pole top (helicopter, telescopic pole mounted camera, unmanned aerial vehicle, or other methods) will provide a more thorough examination, particularly for the top surface of crossarms and pole head decay.

Particular attention must be given to the correct alignment and fitting of the installed pole top attachments along with the specific requirements listed in this section.

5.10.1 Pole condition- wood/concrete/steel/composite

5.10.1.1 Above ground internal inspection of wood poles

All poles are to be sounded as described in section 5.6 and if by sounding doubt exist as to the pole condition above ground an internal inspection at the location of possible decay must also be carried out, in addition to the groundline internal inspection in section 5.12.

Where possible, all the above ground bore holes should be angled slightly upwards (10°) to prevent ingress of water to the holes, sterilised (as set out in clause 5.12.1.6) and sealed with plastic plugs.

Subsequent bore holes should be bored 50mm above or below previous inspection holes.

To determine the internal condition of the pole, the pole must be drilled as follows:

- Using a 12mm auger, the first hole is to be drilled directly into the area of concern. If a pocket/hole is found that extends beyond the centre of the pole, a second drill hole will be required at 90° to the first hole. The thickness of sound timber must be measured with an approved measuring gauge, suitable for 10°-15° drilled holes (do not use the 45° calibrated gauge).

- The wall thickness must be determined from the holes drilled. Where only one (1) hole is drilled, consider both walls, and where two (2) holes are drilled, consider the four (4) walls (see clause 5.9.4). The minimum wall thickness must be as indicated in the assessment of serviceability flowchart details.

5.10.1.2 Above ground external inspection of all poles

The general condition of the pole must be observed with the aid of stabilised binoculars for the following:

a) Vertical alignment. Check if the pole is leaning or bending. A pole that is vertical in ground but bending due to structural pole top loading is not considered serious unless there are knot holes or splitting of the timber. Consider whether the pole alignment compromises conductor clearances or obstructs traffic on a road or driveway.

Inspect pole foundation for signs of degradation, subsidence or altered ground level.
b) Damage as a result of vehicle impact.
c) Excessive splits or evidence of rot, particularly at the pole top.
d) Open knot holes allowing water penetration and possible fungal decay.
e) Lightning damage.
f) Pole-top fire.
g) Loose or missing pole caps (refer to SMI 101 – Section 3.8 for repair details).
h) Depth altered due to filling or excavation.
i) External fungal attack or loose sapwood (refer to 5.10.1.3 for FPT poles).
j) Concrete or steel structures must be inspected for surface damage or deterioration (rust, spalling, holes or impact damage) together with a visual inspection of exposed earthing/bonding.
k) Composite poles must be inspected for cracking, fibreglass blooming, and any other signs of major surface degradation. As composite poles are on trial in Endeavour Energy, any pole found with major surface degradation is to be reported to the Manager Asset Standards & Design for a detailed investigation.
l) Termite infestation
An assessment of the pole’s serviceability must be undertaken with consideration given to the above conditions. Depending upon the severity of the above ground condition of the pole, the inspector may condemn the pole and assign a suitable priority for replacement. Where a priority less than six (6) months is assigned, the relevant depot must be notified immediately.

Where doubt exists to the condition of the pole top or fittings in respect to fungal decay or splitting, the pole must be reported for a close inspection with the use of an EWP by Regional staff as detailed in Annexure 8.

5.10.1.3 Full length preservative treated (FPT) poles

All FPT poles that have loose sapwood, as shown in Figure 4 to Figure 6, must have the words “CCA Sapwood Failure” added to the comments of the inspection work order field in the data capture tool.

![Figure 4: Loose sapwood on FPT pole](image4)

![Figure 5: Loose sapwood on FPT pole](image5)

![Figure 6: Loose sapwood on FPT pole](image6)

If the deteriorated condition of the sapwood indicates that the structural integrity of the pole has been compromised, a strength calculation must be performed to determine the suitability of the pole to remain in service. The original diameter used in this calculation must include the sapwood layer and the current diameter will be the diameter of the remaining sound heartwood.
5.10.1.4 Above ground inspection of steel poles

The presence of rust holes or significant vehicle impact damage may require the replacement of the pole. Examples of steel poles that require replacement is shown in Figure 7 to Figure 9.

5.10.2 Crossarms

The crossarms must be inspected for signs of rotting, termites, splitting, distortion or burning. Alignment of the crossarm is to be observed to identify braces that are buckled or loose, or have coach screws missing. Braces, kingbolts, and other fittings must be inspected for corrosion. Note: Where defective crossarms are found on raiser brackets, the pole may be replaced as well to bring the construction to standard.

5.10.3 Insulators

An inspection must be carried out for broken or chipped insulators or any sign of flashover. Bent, rusted or obviously loose insulator pins are also to be noted. Particular attention is to be given to the evidence of rust stains on the insulator surface indicating the deterioration of steel conductor, tie wires, dead-ends and the like.

An example of elongation of the crossarm pin mounting holes is shown in Figure 10. This condition is more prevalent where a large conductor at high tension and some angle of deviation exists. Where possible, check if the suspension insulator bolt is slipping through the crossarm, as shown in Figure 12. It may be necessary to observe this from an adjacent pole with the aid of stabilised binoculars.

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Figure 7: Rust penetration at base of pole - coating flaking and pitted

Figure 8: Vehicle Impact damage

Figure 9: Vehicle Impact damage

Figure 10: Loose insulator pin

Figure 11: Damaged HV pin insulator (possibly caused by firearm) and broken tie wire
Polymer insulators, as shown in Figure 13, must be inspected for damaged sheds, sheath damage, exposed fibreglass rods, electrical tracking, flashover damage, loose corona rings (where fitted) and corrosion on metal end fittings.

5.10.4 Conductor clearances

Conductor clearances must be in accordance with Drawing no’s 011985, sheets 1 and 2, 086232, and 086242.

Factors that should be considered in deciding whether to have the line referred for assessment are:

- High ambient temperature.
- Low wind speed.
- High conductor load.

Depending upon span length, the above conditions will have a varying effect of increasing conductor sag.

If the clearances will not be maintained whilst considering these conditions, a low ground clearance defect must be raised. Defects are to be referred to the OLI/GLI Manager who will obtain an accurate measurement from the associated Regional design office.
If the clearances calculated by Regional design staff are less than regulation clearances set out in AS 7000, the line poses a safety hazard to the public and the Regional Manager is responsible for raising an appropriate defect to rectify the problem as a matter of urgency.

For specific requirements for river crossings, refer to clause 5.21.

5.10.4.1 Ground clearance

Attention must be given to the ground clearances of the various conductors, particularly in locations where the original ground level may have changed due, for example, to filling or road surfacing activities. Where doubt exists regarding ground clearances, measurement of clearances must be made by the use of a telescopic insulated height stick, or similar.

5.10.4.2 Clearance to structures

Attention is to be given to buildings, structures, signs and the like, that are erected over or adjacent to the footpath and that may interfere with any overhead mains. The location of flagpoles must be checked to confirm that a suitable allowance has been made for clearance of the flag, with an allowance for conductors to move under wind conditions.

5.10.4.3 Clearance to other services

The clearances between Endeavour Energy’s mains and those of, for example, NBN, Telstra, Optus, Transgrid, Energy Australia, and the State Rail Authority, must be observed, and where doubt exists, measured and referred to the OLI/GLI Manager for action (see Annexure 7 for communication cable clearances).

5.10.4.4 Conductor separation of different circuits

Conductor separation between different circuits must be observed and where it is considered that a non-compliant separation exists, a defect is to be raised to restrain the appropriate circuit. Allowable separations are specified in AS/NZS 7000.

5.10.4.5 Clearance to vegetation

Vegetation clearances must be inspected as set out in the Vegetation Maintenance Common Requirements (VMCR) or MMI 0013 – Clearances to be maintained between network assets and vegetation, whichever is more current.

Pole top equipment

5.10.4.6 Earths

For safety reasons, no attempt is to be made to repair any broken earths. All broken earths must be reported immediately for repair by suitably authorised persons. An immediate defect is to be raised and the full pole inspection delayed until the earth conductor is repaired.

All earthing conductors must be inspected for vandalism, mechanical damage, loose connections, and that mechanical protection (earth cover batten) is installed and in good condition.

5.10.4.7 Air break switches

The general condition of air break switches is to be observed, including the operating handle, shaft, joints, pivots and insulators. The contact alignment must be inspected to verify that contacts are correctly engaged.

Stabilised binoculars must be used to check contact alignments. Any bi-metal connections must be examined for damage. Connections must be examined for discolouration or other signs of deterioration.
5.10.4.8 Load break switches

The general condition of load break switches, including operating arm, pivots and insulators, must be examined for signs of wear or damage. Corrosion or significant rust is to be reported and particular importance is placed on this in coastal environments.

The SF6 gas level indicator, where applicable, must be viewed through stabilised binoculars to check correct levels.

5.10.4.9 Isolating links and fuse links

Isolating links must be checked to confirm no looseness of the fitting in the attachment to the crossarm and that supporting insulators are not cracked and are in good order.

5.10.4.10 High voltage dropout fuses

An inspection must be carried out to confirm that the contacts are correctly engaged, that there is no sign of poor contact, and there is no distortion of the fuse carrier. Stabilised binoculars must be used to check contact alignments.

Connections must be examined for discolouration or other signs of deterioration.

Where spark arrestors are installed on the fuses, the complete fuse assembly is likely to be an older style and must be defected and recorded for replacement (refer to Figure 14).

5.10.4.11 Surge diverters

The general condition of all surge diverters must be observed, including the condition of the insulator and the line and earth connections.

An earth lead hanging down from the base of the surge diverter will indicate a failure of a unit that has been fitted with a disconnector and is to be defected for replacement.

Porcelain surge diverters that are brown in colour, or porcelain surge diverters that have been in service prior to 1990, must be defected and recorded for replacement.

5.10.4.12 Pole mounted transformers and automatic switching devices

A visual inspection (with the aid of stabilised binoculars) must be carried out of pole mounted transformers, reclosers, sectionalisers, voltage regulators and similar automatic switching devices, with particular attention to:

- Legibility of labels/signs;
- Presence of oil/gas leaks, major tank corrosion, or poor paintwork;

![Spark arrestor](image-url)
• Damage/dirty bushings or insulators;
• Condition of shrouds;
• Damaged insulation or loose connections of bonds;
• Loose or damaged earth connections; and,
• Security of framework, safety chain or u-bolt connection to the unit and pole, refer to Figure 15.

5.10.4.13 Cable ends, down earths and pole steps

A visual inspection is required, and any mechanical deterioration, looseness of fittings or signs of heavy rust is to be reported. Underground to overhead connections must be inspected for oil leaks and the general integrity of the connections.

5.10.4.14 Streetlights

Streetlights must be checked for any sign of loose brackets, broken or loose fittings or damaged wiring, particularly where it enters conduits, brackets and similar fittings. Particular attention is to be given to the security of any visor fitted to a streetlight.

Brackets or fittings that foul mains or stay wires, and excessive vegetation interfering with the effectiveness of the streetlight, are to be reported.

5.10.5 Stay poles and ground stays

Pole stays must be inspected to verify that the stay has not slipped, slackened, or crushed the pole, or is otherwise in need of adjustment, and that stay insulators are correctly installed. Staywires must also be inspected for excessive corrosion.

Check for deteriorated, loose or missing u-bolt clamps.

The presence, position and condition of stay guards must be checked to confirm that all ground stays located in public areas are effectively guarded.

Ground stays in rural areas should be checked for cattle guards. Also check for stay condition at ground level for any deterioration.

Low voltage spreaders should be fitted where stay wires pass between low voltage or streetlight mains.

Figure 15: Pole mounted transformer safety chain eyenut location
5.10.6 Conductors

Using stabilised binoculars, the conductors must be inspected throughout their length for broken, burnt or unravelled strands, or foreign objects such as kites, sneakers or fence wire. Particular attention is to be given to the evidence of rust on steel and steel cored conductors, the associated tie wires, armour rods and dead-ends. Rust stains on supporting insulators and hardware are an indication that the conductor protection (galvanising) has deteriorated to the extent that the conductor strength has been compromised and is to be reported.

For overhead steel conductor inspections, particular attention should be given to the colour and pitting of the metal as well as fraying or broken strands. Other contributory factors such as the location of the overhead mains (e.g. bush fire prone area), and the criticality of the feeder may be included in a risk assessment. The risk assessment may necessitate a more immediate defect prioritisation than those given in the table below.

The following figure and table provides guidance on the prioritisation of defects for the condition of overhead steel wires:

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Defect Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>• No corrosion, 100% galvanized</td>
<td>No action required</td>
</tr>
<tr>
<td>2</td>
<td>• Light surface corrosion with negligible pitting</td>
<td>No action required</td>
</tr>
<tr>
<td>3</td>
<td>• Medium surface corrosion with mild pitting</td>
<td>Reassess next inspection</td>
</tr>
</tbody>
</table>
| 4        | • Heavy surface corrosion with mild to medium pitting  
          • Annealing or thinning of conductor | Replace within 1 year |
| 5        | • Heavy surface corrosion with medium to heavy pitting  
          • Heavy surface corrosion as well as a history of conductor failure | Replace within 3 months or prior to the commencement of the bushfire season, whichever is earliest |

Note – This applies to overhead steel conductors with any number of strands.
The Regional Distribution Manager must verify the condition of the conductor using the photos of the defect. If the photo is not clear enough to confirm the extent of the defect, a closer inspection such as by using an EWP or climbing, and the like, must be carried out to further inspect the affected conductor section in detail.

In particular, note the following:

- Signs of corrosion at conductor / insulator interface points.
- Any excessive sagging or unravelling of the conductors.
- Any visible flaking, pitting or heavy discolouration of the conductors.

The condition of the conductor must be properly assessed with photos taken from the closer inspection by the Regional Distribution Manager, and replaced if the mechanical strength of the conductor is compromised.

The Regional Distribution Manager must notify CAT 4 and CAT 5 defects to Asset Strategy & Planning and Program Control for endorsement and inclusion in the relevant replacement programs. CAT 3 defects must also be forwarded to Asset Strategy & Planning for consideration in future replacement programs. The Regional Distribution Manager may also provide feedback to Asset Strategy & Planning for existing items on the replacement program, particularly where the condition of the conductor does not warrant urgent or short-term replacement.

Note that if any conductor strand is found to be broken due to corrosion or other deterioration mechanism, the conductor span is unsuitable for service. The mechanical damage of the conductor may be repaired using a conductor splice.

The pole must be inspected to determine whether the conductors are correctly located on the insulators and if there is any evidence of breakage, wear, burning or corrosion of the conductor ties.

Connections and bolts at the pole top must be inspected for signs of looseness, and that all bonds are securely attached to supporting pin insulators where required.

![Figure 17: Missing nuts and washers on suspension clamp](image-url)
Conductor terminations are to be closely inspected to verify the correct fitment of the helical termination (dead-end) such that it is free to move with any movement of the conductor.

Figure 18: Incorrectly fitted helical termination

Figure 19: Broken HV tie wire

5.10.6.1 Aerial marker balls

Aerial marker balls are installed on overhead mains to provide a visual warning to aircraft and river craft, and act as a general warning to plant and vehicles that overhead powerlines are nearby.

Aerial marker balls must be installed near aircraft landing fields, on all new and refurbished river crossings, and on property where high vehicles/plant operate. Refer to MDI 0047 – Overhead Transmission Mains Design and MDI 0031 – Overhead Distribution Design Standards Manual, for details of locations where aerial marker balls are required to be installed. They are red or orange in colour and 300mm in diameter (previous design standard), or yellow or white in colour and 600mm in diameter (current design standard).

The condition of marker balls is to be observed through stabilised binoculars. Particular attention to the mounting of the balls is required to verify they are securely fastened and the colour of the ball has not faded.

The location of the ball is to be compared with that shown on the printed maps from GIS and the data capture tool. Any marker ball that is found in the field and not shown on GIS is to be recorded on the Notification of Network Alteration Sheet, FAD 2001 and
submitted to the Network Asset Information group for inclusion in GIS.

If any marker ball is found to be not securely fastened, faded, damaged, in the wrong location, or missing, it is to be defected for replacement within one (1) month.

5.10.6.2 Over crossing markers

In locations where overhead lines (including Endeavour Energy and private) cross (over or under) each other in bushfire prone areas, over crossing markers are to be installed on the second and third structures either side of the crossing location. If any crossing marker is found to be not securely fastened, faded, damaged, in the wrong location, or missing, it is to be defected for replacement within one (1) month.

Over crossing markers are yellow discs, approximately 300-500mm diameter and mounted just below the HV/LV crossarm.

5.10.6.3 Vibration dampers

Vibration dampers are required to be fitted to all spans in excess of 300m. Span lengths are to be measured with the use of a rangefinder and a defect raised against each pole found supporting a span length greater than 300m not fitted with vibration damping. The two images below are typical examples of vibration dampers in use throughout the Endeavour Energy franchise area.

![Vibration dampers](image)

Figure 20: Vibration dampers

5.10.6.4 Low voltage spreaders

The condition of LV spreaders must be inspected. Particular attention is to be given to the security of the spreader fastening clips and the overall condition of the spreader rod.

The initial installation of LV spreaders throughout the franchise area were made of fibreglass and over time, ultra violet exposure causes splintering of the surface. Spreaders found with severe splintering, as shown in Figure 21, are to be reported for replacement.
The inspector must also identify missing or incorrectly installed spreaders. Low voltage spreaders must be fitted to bare low voltage (230/400V) Endeavour Energy and private customer spans as set out below:

- **In designated bushfire prone areas**, where spans are greater than 45 metres. Spreadsers in designated bushfire prone areas must be fitted as given in the table below:

<table>
<thead>
<tr>
<th>Minimum crossarm length in span</th>
<th>One spreader</th>
<th>Two spreaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1m</td>
<td>45 to 90m</td>
<td>&gt;90m</td>
</tr>
<tr>
<td>2.4m</td>
<td>45 to 110m</td>
<td>&gt;110m</td>
</tr>
</tbody>
</table>

- **In all areas** (including spans less than 45m) where any of the following conditions are met:
  a) There is a significant difference in sag of the individual conductors within the span;
  b) The conductors in the span are within 1.5m of vegetation; or,
  c) The span is below overhanging trees;

Spans that fall under one of these categories must have spreaders fitted as given in the table below:

<table>
<thead>
<tr>
<th>Minimum crossarm length in span</th>
<th>One spreader</th>
<th>Two spreaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1m</td>
<td>0 to 90m</td>
<td>&gt;90m</td>
</tr>
<tr>
<td>2.4m</td>
<td>0 to 110m</td>
<td>&gt;110m</td>
</tr>
</tbody>
</table>

5.10.7 Overhead cable systems

Examples of cable systems include pilot cables, CCT, ABC and ADSS. Where applicable, the condition of the overhead cable system must be inspected and reported, including:

- Damage to the outer serving.
- Cracked cable insulation.
- Broken or loose mounting brackets.
- Twisting and/or bird caging on the conductors.
- Loose support on both conductor and joint box.
- Low conductor clearance.
- Rusty, corroded or broken strand on catenary wire.
- Broken conductor.

5.10.8 Low voltage aerial services

Any defect that could result in a loose neutral connection, burning, or live metallic structures must regarded as an emergency hazardous situation. Refer to clause 5.3 for what to do in an emergency situation.

Effort must be made to contact the customer regarding any defect that could impact safety on a customer connection. The customer must be informed what they can do to minimise any potential safety risk.

**Note:** A customer defect must be raised (e.g. to relocate the point of attachment) if an overhead service or consumers mains is found to be crossing directly over or within three and a half (3.5) meters from the edge of a swimming pool.

5.10.8.1 Point of attachment

Points of attachment must be inspected to check that porcelain insulators and service attachment brackets, timber blocks, and other fittings, are in good condition. Adequate clearances of service tails and service attachment brackets from gutters, metallic fascias, and other objects are to be verified.

**Note:** If a point attachment is obstructed (cannot be accessed by via a ladder) by structures or objects such as a verandah, the customer must be notified to remove the obstruction or relocate the point of attachment so that it complies with AS/NZ3000.

5.10.8.2 Connection points

Low voltage service connections must be checked for any visible sign of a defect and, if any are found, recorded for replacement.

Typical defects experienced with particular types of connectors are listed below.

- **Insulinks**

![Figure 22: Faulty insulink](image)
Points to observe in the identification of faulty or potentially faulty insulinks are:

- Insulink and/or cable insulation burnt or melted.
- Bare conductor observable at the point of entry into the insulink.
- Ultra-violet affected insulation resulting in fading, cracking, or holes in the insulation between the end caps.
- Insulinks not crimped or crimped incorrectly, for example, inadequate indentation marks, incorrect number of crimps – two (2) crimps on either side of the insulink – or not crimped in the correct location.
- Check the insulinks are orientated vertically, with the aluminium service cable on top and the customer's copper consumer mains below.

- **Blue point connectors**

![Image of Blue point connector]

*Figure 23: Blue point connector*

In some locations throughout the Blue Mountains and outer western areas, Blue point connectors are in use.

These connectors are to be examined for deterioration and cracking of the outer insulation covering along with evidence of any bare conductor at the entry to the connector. Such conditions will require the connectors to be reported for replacement.

- **Bare aluminium sleeves**

On some installations, the use of bare aluminium sleeves insulated with various coloured PVC insulation tape have been installed.

These installations must be recorded for replacement, irrespective of their condition.

- **Mains connection boxes (MCBs)**

Mains connection boxes are to be examined for evidence of the following and recorded for follow-up as appropriate:

- Any sign of physical damage.
- Burn marks on or around the MCB.
- Bare conductor observable at the point of entry into the MCB.
- Cable insulation melted.
- Loose conductor at terminal connection point – report to OLIGLI Manager immediately.

Care is required when inspecting MCB’s to prevent equipment such as an insulated height stick/mirror from coming into contact with the box or the associated service mains.
• **Copper line taps**

Line taps are to be examined for evidence of the following and recorded for follow-up as appropriate:

- External pitch and bitumastic (P and B) tape used to protect the insulation tape from the elements is loose, unravelled, missing or deteriorated.
- Internal insulation tape, where observable, is loose, unravelled, missing or deteriorated.
- Burn marks on the insulation of the line tap.
- Bare conductor observable at the point of entry into the line tap.
- Cable insulation melted.

5.10.8.3 **Consumer mains**

Any visible sections of the insulation of consumers’ mains are to be carefully observed. Wherever practical, the top of all consumer mains must be examined for their entire length, using a magnifying mirror, or similar.

Where deterioration of the insulation is detected, the mains must be recorded for repair or replacement.

5.10.8.4 **Overhead insulated service cable**

- **Earthing**

Conductive supports (for example, poles, posts, struts, brackets and stay wires) do not need to be earthed when they are effectively and permanently separated from all conductors by double insulation. This would be the case following an upgrade to double insulated mains, such as LVABC, on a steel customer service pole.

- **Bare copper cable**

These types of cables are to be recorded as a defect, regardless of their condition.

- **Other insulated service cable types**

The condition of the insulation of service cables should be carefully observed.

Where possible, the top of the service cable must be examined for UV degradation at the point of attachment and for at least two (2) metres immediately before the point of attachment, using a magnifying mirror on an insulated link stick. Insulated mains that have deteriorated to the extent that bare conductor is exposed are to be repaired within a month (the customer must be notified of the defect immediately).

5.10.8.5 **Distribution connection point**

The distribution connection points must be inspected for damage and loose fittings.

5.10.9 **Prevention of unauthorised climbing**

The pole or structure and adjacent area must be assessed to verify that effective measures have been employed to prevent, as far as reasonably practicable, access (other than access obtained by the use of a ladder or other device) by any member of the public to a position near any line aerial conductor or apparatus, where injury from electric shock may be possible.

Basically, this requires that all live parts must be inaccessible without the use of a ladder.

**Note:** Pole steps and pole plates for portable steps, up to a height of three (3) metres, are considered to afford access and are to be recorded for removal within one (1) month.

5.10.10 **Waterway crossing warning signs**

Waterway crossing warning signs must be checked in accordance with clause 5.21.
5.11 Procedures for groundline inspection of steel poles (GLI)

The above ground inspection in clause 5.10 must be completed before proceeding with the groundline inspection.

5.11.1 Fail test

The following table indicates whether a full groundline inspection should be performed based on defects found during the visual inspection in 5.10.1. All defects identified must be reported as indicated in clause 5.20.

<table>
<thead>
<tr>
<th>Pole defect</th>
<th>Information</th>
<th>Groundline inspection to be performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rust holes</td>
<td>One (1) hole only - smaller than 10mm</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Multiple holes – in a ring at ground level</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>One (1) hole only – greater than 10mm but less than 75mm</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>One (1) or more holes greater than 75 mm</td>
<td>No</td>
</tr>
<tr>
<td>Distortion</td>
<td>Pole folds or has impact impressions deeper than 25% of the pole diameter</td>
<td>No</td>
</tr>
<tr>
<td>Leaning</td>
<td>Pole leans more than 10 degrees in any direction</td>
<td>No</td>
</tr>
<tr>
<td>Loose</td>
<td>Pole is loose in ground</td>
<td>No</td>
</tr>
<tr>
<td>Pole live</td>
<td>According to voltage check in 5.4.9</td>
<td>No</td>
</tr>
</tbody>
</table>

Note: A full groundline inspection must be performed if no defects are found above ground.

5.11.2 Excavation of steel poles

Start excavation in one quadrant of the pole in the neutral axis. This is to allow examination of the pole below ground and determine whether it is safe to carry out the full excavation. Check for significant rust before continuing around the rest of the pole. Caution must be taken when excavating around the pole, particularly if there are cables attached to the pole.

Excavate the pole to a depth sufficient to reveal the extent of any existing rust (minimum of 200mm – continue excavating if there is pitting or there is evidence that the rust is more severe beyond this point); to the depth of any existing concrete footing; or, to a maximum depth of 350mm, whichever is the least of these three scenarios.

The pole must then be checked for the full extent of rust degradation.

Redo the fail test in 5.11.1 to verify whether the pole is stable in the ground.

Figure 24: Rusted and flaked below groundline section of a steel pole
Where steel poles have concrete footings, the concrete must finish:

- **For private steel poles:** not less than 300mm below ground and at 100 mm above ground level for a steel pole and shaped to shed water (Australian Standard AS 3000).
- **For Endeavour Energy’s steel poles:** Not less than 450mm from the groundline (Industry Standard).

### 5.11.3 Strength assessment of steel poles

The inspection must include a strength assessment by direct wall thickness measurement using an ultra sonic thickness gauge that is fitted with a 6mm diameter (or less) dual element probe. Ultrasonic testing must be carried out in accordance with the testing procedures in AS 2452.3 (Non-destructive testing – Determination of thickness – Part 3: Use of ultrasonic testing).

The area with the worst damage in the above ground region and again in the below ground region, is to be assessed by comparing its remaining wall thickness value with an original condition above ground sample reading. This test cannot be performed on steel poles which have a spray-on polyurethane/polyuria protective coating (Polco) and thus these poles do not require this test. Under no circumstances should this coating be removed or damaged.

Any variation in wall thickness is expressed as a percentage and related directly as a remaining strength value.

The nominal (original) wall thickness of the pole must be measured 300mm above groundline, (this measurement is also to be used as the reference for the below groundline inspection).

Where visible above ground corrosion is present, it must be completely removed and a wall thickness measurement taken. A smooth, level surface is required to obtain an accurate reading with an ultrasonic meter.

A wire brush, an angle grinder with a sanding disc or metal grinding disc will typically be required to clean the surface to a suitable state. Only the minimum amount of material should be removed in order to achieve a contact patch for the meter. Use of any brushing or grinding attachment must be confined to spot cleaning the localised areas for measurement. General grinding of the pole face is not acceptable. Pole treatment as described in section 5.14 will be necessary following any surface grinding or sanding.

When measuring the nominal wall thickness, the area on, or immediately around the access cover if fitted, must not be used because the steel wall in this area is reinforced and may be thicker than normal.

A minimum of four (4) measurements must be taken, evenly spaced (approximately 90° apart) around the pole at 300mm above groundline to establish the nominal wall...
thickness and the minimum of these four measurements used as the nominal wall thickness.

Any individual measurement of wall thickness greater than 5.5mm must be ignored. If all measurements taken are greater than 5.5mm, the average of these readings must be recorded as the nominal wall thickness.

A further four (4) measurements must be taken 200mm below groundline.

Perform a strength calculation and determine defect priority (if required) in accordance with Annexure 6.

5.11.4 Groundline Inspection of Sureline and Ingal steel mains poles

Sureline and Ingal steel mains poles do not require below groundline inspection until nine (9) years after installation.

These poles were first installed in 2005 and Asset Standards & Design will convene a working group to sample both types of poles. They will be excavated to 350mm and have their external mechanical protection removed to allow for any evidence of rust to be observed, together with the condition of the inner epoxy paint anti-corrosion layer.

5.12 Procedures for groundline inspection of timber poles (GLI)

The above ground inspection in clause 5.10 must be completed before proceeding with the groundline inspection.

All poles are to be sounded as described in section 5.6. If doubt exists as to the pole condition below ground an internal inspection at the location of possible decay must also be carried out, in addition to the normal groundline internal inspection.
5.12.1 General inspection procedures for all timber poles

The requirements of this section of the instruction apply to all wooden poles. Additional sections set out extra inspection procedures to be followed for square sawn, NR/DD, FPT and reinstated poles.

**Note:** All poles must be inspected in accordance with the details for that specific type of pole, as set out in the following sections (refer to clauses 5.12.2 to 5.12.6)

5.12.1.1 Excavation of timber poles

Start excavation in one quadrant of the pole in the neutral axis. This is to allow examination of the pole below ground and determine whether it is safe to carry out the full excavation. Check for significant rot or decay before continuing around the rest of the pole. Caution must be taken when excavating around the pole, particularly if there are cables attached.

Excavation of the pole is to be carried out to a depth of 350mm below groundline. Should there be significant degradation at the 350mm depth, a more searching inspection is required, and excavation is to be conducted to a depth of 450mm.

Where timber poles have concrete footings, the concrete must finish:

- **For private timber poles:** Not less than 300mm from the groundline (Service and Installation Rules NSW).
- **For Endeavour Energy’s timber poles:** Not less than 450mm from the groundline (Industry Standard).

Check for rot or decay by applying a screwdriver between the wood pole and concrete. Additionally, an internal inspection by drilling at groundline (50mm above ground at an angle of 45 degrees) is to be carried out. If the above checks do not indicate that the pole must be condemned, the customer must be notified that Endeavour Energy’s normal pole condition assessment could not be carried out due to the presence of the concrete footing. The customer must be given indication on the condition of the pole (at groundline) upon notifying the customer.

Note that the above is not applicable to square sawn poles with concrete footings as an internal inspection is not required (refer to 5.12.2). However, test for the presence of rot by applying a screwdriver in between the wood pole and concrete.

5.12.1.2 Removal of decayed timber

After excavating around the pole, any soil adhering to the pole must be scraped off and any old preservative bandages or paper removed. Carefully examine and probe the outer surface of the wood for degradation at and below groundline.

When examining the pole, any fungus or termite attack, particularly Glyptotermes attack, is to be carefully observed and reported.

Any rotted or degraded timber, from 300mm above groundline to the bottom of the excavation, must be removed to expose the sound surface of the pole. This must be done without removing excessive amounts of sound timber.

5.12.1.3 Sterilisation of tools

Before using an auger bit to bore any pole during its inspection, the auger tip is to be cleared of any shavings to prevent transfer of active fungus into sound wood. **The auger bit must be sterilised using methylated spirit as a dip or spray.**
5.12.1.4 Below ground internal inspection of wood poles

All poles are to have their first drill hole in the neutral axis at groundline. The drilling pattern is shown in Figure 28. The below ground internal inspection is not required for square sawn or rebutted poles. There are additional drilling requirements for reinstated poles, which is described in clause 5.12.5.

The auger should be directed downwards at an angle of 45° to the horizontal and the drilling continued until the hole extends to the pole centre and, if necessary, beyond it to the sound wood on the opposite side of any pipe or rot pocket. If a pocket/hole is found that extends beyond the centre of the pole, a second drill hole will be required. Otherwise, a single drill hole only is required.

The wall thickness must be determined from the holes drilled. Where only one (1) hole is drilled, consider both walls, and where two (2) holes are drilled, consider the four (4) walls (see example drilling sketches).

As set out earlier for poles having significant internal decay, a second hole must be drilled. The second hole must be drilled at 90° to the first drill hole and at approximately 200mm below groundline.

The pole may also be drilled a third time in the area of the worst degradation, or at the inspector’s discretion, and the smallest wall thickness obtained is to be entered into the data capture tool.

Where possible, successive inspection bore holes should be positioned vertically above or below the existing holes. However, it is acceptable to drill holes alongside each other provided this is restricted to four (4) holes in the load axis, two (2) on either side of the pole in any one horizontal plane (refer to the example drilling pattern drawing below).

Note: For private timber poles, existing inspection holes must be used for measuring the wall thickness to minimise further damage to the pole. However, if the pole is suspected to be more degraded in other areas of the inspection zone, the pole must be drilled to assess the pole at the location of the worst degradation.

Generally, a 12mm auger bit should be used with an electric power drill. For inaccessible areas, a suitable battery drill may be used. A petrol powered drill must not be used under any circumstances.

Note: Where doubt exists as to a pole’s internal condition, a carpenter’s hand brace or a suitable battery drill must always be used.
The boring technique described below must be used to measure the thickness of sound timber and generally gives a reliable and accurate indication of when timber condition changes:

- The sound of the bit cutting into the timber is much reduced as soon as degraded timber is reached.
- As soon as a reduction in sound is heard, the bit is to be withdrawn from the hole to assess the condition of borings.
- Similar action is to be taken if the resistance to rotation of the drill bit changes.
- Whilst boring, the appearance of borings must be constantly watched for colour change, breaking up, or other differences. A colour change may indicate fungal decay has been encountered and close examination of the shavings is required. The auger is to be periodically withdrawn from the hole to allow clean cutting and to check the condition of borings.

**Note:** Small sap veins or growth rings, where colour change or breaking up occurs, should be ignored for the purposes of wall thickness if the drill continues into sound timber.

- A piece of white paper or other suitable material must be placed under the hole being bored to catch the borings. The paper should be moved periodically so that later borings are separated from earlier ones.
- Measurements must be taken with a suitable gauge (as approved by Endeavour Energy) of the depth at which cutting sound, colour or rotation resistance changes occur before recommencing boring.

**Figure 28: Below groundline drilling pattern of wood pole**

The boring technique described below must be used to measure the thickness of sound timber and generally gives a reliable and accurate indication of when timber condition changes:

- The sound of the bit cutting into the timber is much reduced as soon as degraded timber is reached.
- As soon as a reduction in sound is heard, the bit is to be withdrawn from the hole to assess the condition of borings.
- Similar action is to be taken if the resistance to rotation of the drill bit changes.
- Whilst boring, the appearance of borings must be constantly watched for colour change, breaking up, or other differences. A colour change may indicate fungal decay has been encountered and close examination of the shavings is required. The auger is to be periodically withdrawn from the hole to allow clean cutting and to check the condition of borings.

**Note:** Small sap veins or growth rings, where colour change or breaking up occurs, should be ignored for the purposes of wall thickness if the drill continues into sound timber.

- A piece of white paper or other suitable material must be placed under the hole being bored to catch the borings. The paper should be moved periodically so that later borings are separated from earlier ones.
- Measurements must be taken with a suitable gauge (as approved by Endeavour Energy) of the depth at which cutting sound, colour or rotation resistance changes occur before recommencing boring.
To confirm the results of boring, and to measure directly the depth of sound timber, probing must be carried out in every case where a hole is drilled. This must be done with the hooked end of the depth gauge.

Where doubt exists with boring results, a second opinion must be sought before determining the serviceability or otherwise of the pole.

5.12.1.5 Disposal of wood shavings and decayed sapwood

Any shavings, wood chips or decayed sapwood are to be removed from the site and must not be buried in the pole backfill. This is an important precaution for preventing further fungal attack on poles that have been inspected and maintained.

5.12.1.6 Sterilisation of inspection holes

Methylated spirit is to be used to sterilise any inspection holes drilled in a pole and such holes are to be plugged with a tapered coloured plastic plug. Methylated spirit must also be applied to holes bored in private poles.

Note: Pole saver rods are not to be used as a method to sterilise bore holes.

5.12.1.7 Preservative treatment

Having completed the inspection procedures described above, all Endeavour Energy and F category poles must be treated with preservative in accordance with clause 5.13.

Note: Records of pesticide use must be kept in accordance with Company Procedure GPE 0004 – Pesticide Use and Company Form FPE 0004 - Record of Pesticide Application.

5.12.1.8 Date tape

Following the inspection, assessment and preservative treatment of all poles, polymeric date tape, marked with the year of inspection, must be placed at the bottom of the excavation, directly below the current inspection hole.

This tape serves a two-fold purpose, indicating:

- The year of inspection.
- The depth of excavation.

Remove any previously installed date tape from the excavation around the pole.

5.12.1.9 Footpath restoration

Where pole excavation involves disturbing footpath surfaces, restoration must be made by means of a 50mm layer of cold mix bitumen to a distance of 400mm around the pole, unless other reinstatement methods are agreed to by Endeavour Energy and the local council.
5.12.1.10 Backfilling

Following assessment and preservative treatment, poles will usually be backfilled to a point approximately 50mm above normal groundline; backfill should be slightly tapered away from the pole base.

Backfill material must be clean fill (no concrete, wood chips, shavings or decayed sapwood).

5.12.1.11 Site restoration

All areas adjacent to pole sites are to be swept clean on completion of the pole inspection and treatment work. Adjacent areas, such as lawns, must be restored as close as possible to original condition.

5.12.1.12 Trial poles

Poles that are being used in various chemical trials are marked according to clause 5.15.5 and still require OLI and data collection to be performed.

5.12.1.13 Collection of data for strength calculation

Every timber pole must have the following data collected and used in the pole strength calculation program.

The diameter readings may be taken with a vernier calliper or a tape as it is an approximate measure:

- Pole outside diameter original – for NR poles, this is the diameter excluding sapwood, but for FPT poles, it is the diameter including sapwood. This measurement must be taken at approximately 100mm above groundline in the neutral axis.
- Pole outside diameter current – this is the smallest diameter of the pole where wood has been removed for any reason. If no wood has been removed, for NR only the diameter would be less the sapwood. This measurement must generally be taken at or below groundline.
- Pole minimum wall thickness – for NR poles, this is the wood thickness excluding sapwood, but for FPT poles it is the thickness of wood including sapwood.
• Size of rot pocket – this is the pole internal void/rot or pipe diameter.
• Safety factor – this calculation is based on the assumption that the pole was designed and installed with an initial safety factor of four (4) or greater.
• If it is considered that the conductor loading is in excess to the poles rated load, the pole may need to be reassessed and is to be referred to the OLI/GLI Manager.

5.12.2 Additional procedures for square sawn property poles

After excavation to the correct depth, the pole must be thoroughly examined for external rot attack. **Do not bore or push the pole.**

Any rot that is found must be closely examined using a screwdriver to determine the extent and depth of the rot and a determination must be made as to the serviceability of the pole. Poles with no, or minor rot must be held and hand pressure applied to gauge the security of the pole and to confirm that it is not broken further in ground.

If the pole is in danger of failing (or fails), it must be reported immediately to Endeavour Energy on the number indicated in clause 5.3.

**Note:** These poles do not need to be measured or bored for strength analysis.

5.12.3 Additional procedures for NR only

5.12.3.1 Measurement of natural round poles

Natural round (NR) pole strength is calculated as the outside diameter of the pole minus the sapwood (sapwood is generally considered to be about 20mm thick). This means for a 340mm diameter NR pole, the real wood diameter is about 300mm.

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**Figure 30: Pole outside diameter measurement**

[Diagram showing measurement of pole diameter with annotations for NR and FPT poles, sapwood, groundline, and excavation.]
5.12.4 Additional procedures for FPT poles only

5.12.4.1 Creosote FPT poles

Where the pole disc identifies a creosote FPT pole as a PI POLE, it must be checked for decayed sapwood (white rot under the surface layer of treated sapwood) by taking particular note of the condition of the shavings from the first 50mm of the drilling.

If degraded sapwood is found under a sound outer skin, remove all the sapwood at the affected section, in the area from 300mm above groundline to 350/450mm below the groundline with a sharp tomahawk. The pole must then be inspected for its full length. If the rot extends up the pole, a further above ground inspection must be organised with the OLI/GLI Manager. The pole must then be treated with preservatives in accordance with the requirements of clause 5.13.

5.12.4.2 Checking for soft rot

A carroty fracture of sapwood fibres indicates the presence of this type of fungal attack. All FPT (but particularly CCA treated) poles are to be checked for soft rot by the use of a screwdriver.

The screwdriver should be 150mm long with a 5mm wide blade. The inspector should attempt to force the screwdriver into the pole surface, by hand, using moderate pressure. This is to be done in at least four (4) directions around the pole, at groundline and at a depth of 100mm above the bottom of the excavation.

Soft rot is to be recorded as a defect as follows:

<table>
<thead>
<tr>
<th>Depth of penetration</th>
<th>Defect comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 5mm</td>
<td>Light attack</td>
</tr>
<tr>
<td>6 – 15mm</td>
<td>Medium attack</td>
</tr>
<tr>
<td>16 – 25mm</td>
<td>Heavy attack</td>
</tr>
</tbody>
</table>

Remove any rot affected sapwood with a de-sapping bar (see below) and treat with preservative as described in clause 5.13.

5.12.4.3 Soft rot affected pole

Where removal of an area of the full thickness of treated sapwood on the FPT poles is necessary below ground, the pole must be treated with preservatives in accordance with the requirements of clause 5.13.

5.12.4.4 Internal collapse pole

Certain species of timber (for example Blackbutt) exhibit internal collapse, that is, star...
shakes or cup shakes. Inspectors are not required to drill such poles as a follow-up to a
dead or hollow sounding. Drilling below the groundline is still required, and when such
poles are drilled, the inspector is to select an area of the pole clear of such collapse,
even if it is contrary to the normal drilling directions.

Figure 32: Cup shakes (left) and star shakes (right)

5.12.5 Additional procedures for reinstated poles (UAM nailed, Eltek nailed, OZ-C
splinted, Pole Foundations MultiTube and MultiRib)

5.12.5.1 Nail/splint condition – above and below ground
Poles must be checked visually from the top of the nails to the bottom of the excavation
below groundline. The inspector is to look for the following:

- Heavy rusting on the steel nails/splints. If heavy rust is found, knock it off with a
  hammer and check if there is visible loss of metal, or holes appear on the metal
  surface. If rust extends beyond the bottom of the hole, the excavation should be
  extended to a maximum 450mm. Rust is to be treated as in clause 5.14.
  
  If heavy rust or pitting is to a level that holes are evident, or significant metal loss has
  occurred, the pole must be marked for reinstatement, provided the minimum
  requirements set out in the Assessment of serviceability flowchart (clause 5.9.3)
  have been met.

- Evidence of rust on the ferrules of Eltek nails, the banding strips of the OZ-C splint
  system or bolts, nuts and washers of the UAM or Pole Foundations
  MultiTube/MultiRib nails. Light surface rust on the bands is to be removed using a
  wire brush and the area treated as in section 5.14. If heavily rusted nail components
  are found (holes or significant metal loss) the pole must be marked for reinstatement
  provided the minimum requirements detailed in the Assessment of serviceability
  flowchart (clause 5.9.3) have been met.

- Whether bolts or banding straps are pulling the nails/splints tightly against the pole.
  If not, they should be entered in the computer as a defect. It is not a requirement for
  MultiTube and MultiRib nails to have the web or body of the nail against the pole in
  all bolt positions. Inspectors must check that all bolts and nuts are tight.

5.12.5.2 Sounding of poles
All nailed and splinted poles are to be sounded as described in section 5.6. Special
attention is to be paid to the area of the upper 600-1200mm of the nail/splint.

5.12.5.3 Assessment of pole condition
Carefully examine and probe the outer surface of the wood, starting from the bottom of
the excavation to the top of the nails/splints, for evidence of degradation.

**UAM nailed poles**
Poles reinstated by UAM must be assessed for serviceability by measuring the wall
thickness (with an approved measuring gauge) within the top 700mm of the nail. The wall
thickness must be greater or equal to 30mm to remain in service.
To minimise further damage to the pole, existing drilled hole(s) in this area must be utilised (for example, holes that were previously drilled at the time that the pole was determined to be suitable for reinstatement). However, the pole must also be sounded along the top 700mm of the nail; any areas that are identified to be significantly unsound (compared to where the existing hole(s) are located) must be drilled for further assessment. The smallest set of wall thickness measurements must be entered into the data capture tool.

**Note:** If there are no existing drill holes present, the pole must be drilled at the most unsound area in the top 700mm of the nail, or between the bolts if no significantly unsound areas can be identified.

**All other nail/splinted poles**

Where possible, all the above ground bore holes should be angled slightly upwards (10°) to prevent further ingress of water to the holes, sterilised (as set out in clause 5.12.1.6) and sealed with plastic plugs. Subsequent bore holes should be bored 50mm above or below previous inspection holes. To assess the integrity of the inspection holes, they should be drilled a minimum of 100mm from nail bands and bolts.

The first hole is to be drilled directly opposite the nail/splint and the second, if required, at 90° to the first. The pole must be drilled in three (3) different locations:

- At ground level, or 50mm-100mm below ground level, drill up to two (2) holes with a 12mm auger. The thickness of sound timber must be measured with an approved measuring gauge suitable for 45° drilled holes.

- Above ground level, in the bottom area of the nail band (typically 300 mm), drill up to two (2) holes and with a 12mm auger. The thickness of sound timber must be measured with an approved measuring gauge suitable for 10°-15° drilled holes.

- Above ground level, in the top area of the nail band (typically 1200 mm), drill up to two (2) holes and with a 12mm auger. The thickness of sound timber must be measured with an approved measuring gauge suitable for 10°-15° drilled holes.

**Figure 33** shows an example of the drilling pattern for a nailed/splinted (excluding UAM) pole. The minimum wall thickness for each location must be as indicated in the flowchart in section 5.9.
5.12.5.4 Example of drilling a nailed/splinted (excluding UAM) pole

Notes
1) Dimensions indicated are a minimum, as in flowchart.
2) Dimensions indicated are for poles with nails already installed.
3) Dimension A to be $\geq 30$mm to stay in service.
4) Dimension B to be $\geq 30$mm to stay in service.
5.12.6 Additional procedures for reinstated poles (rebutted)

5.12.6.1 Caisson/sliding sleeve condition – above and below ground

Poles must be checked visually from the top of the steel caisson/sliding sleeve to the bottom of the excavation below groundline. The inspector should look for the following:

- Heavy rusting on the caisson/sliding sleeve. If heavy rust is found, knock off the rust with a hammer and check if there is visible loss of metal, or holes appear on the metal surface. If rust extends beyond the bottom of the hole, the excavation should be extended to a maximum of 450mm. Rust is to be treated as set out in section 5.14.

- Evidence of termites and fungal activities. If termites are noted as active, carry out inspection as detailed previously in section 5.5.

- Condition of supporting coach screws on sliding sleeve.

5.12.6.2 Assessment of pole condition

Carefully examine and probe the outer surface of the wood in the area 150mm above the top of the caisson/sliding sleeve for evidence of degradation. Remove any decayed wood from the surface of the pole.

To assess the internal decay of the pole, the following drill holes are required:

- Bore into the test hole provided in the caisson, located at 450mm below the top.

- If evidence of advanced internal deterioration is found, further drills are required to be carried out at the levels of 650mm below the top of the caisson, where the test holes are located, and/or at the top of the caisson, dependant upon pole condition.

- For sliding sleeves, it may be necessary to drill the pole at 45° from the top of sleeve.

To be considered acceptable, the good wood layer internal to the caisson must be equal to or greater than 70mm.

Where possible, all the bore holes should be angled slightly upwards to prevent the ingress of water, sterilised with preservative, and sealed with plastic plugs. After completing each drilling, the wall thickness is to be measured and recorded.

If there is any doubt of the condition of the pole, contact the OLI/GLI Manager.

5.13 Methods of wood pole preservative treatment

5.13.1 Preservative treatments to be used

Having completed the pole inspection as described previously, the poles must be treated with an approved preservative, as nominated by Endeavour Energy:

- All heart rot affected and nailed poles must be treated internally with pole saver rods. Pole saver rods are to be recharged at subsequent inspections.

- In general, there is no chemical treatment required for a rebutted pole.

- For Eltek nailed, OZ-C splinted poles and Pole Foundation nails, external preservative treatment is required on exposed timber. The use of pole saver rods is also required, as set out above.

- All exposed metal surfaces affected by rust must be cleaned with a wire brush and treated as in section 5.14.
5.13.2 Ausplast preservative timber treatment

5.13.2.1 Application method

With the pole excavated to the required depth (as set out previously), remove any soil, loose splinters, surface decay, old preservative bandages or paper adhering to the pole. Ausplast comes on a roll and can be cut to any shape to suit the installation.

Where the treatment is cut into multiple sheets, an overlap of at least 25mm is required between each sheet.

The following steps are to be used when applying the treatment:

**Step 1:** Preferably, leave the Ausplast in original box. Cut to a manageable length (two [2] pieces recommended) to correspond to the girth and any obstructions. – Photo 21

**Step 2:** Remove plastic film backing prior to installation. Photo 22

**Step 3:** Place each piece of Ausplast 50mm below surface and cover entire circumference. Photo 23

**Step 4:** Ausplast must not wrap around obstructions. Butt against edges or underneath conduits. Photo 24

**Step 5:** Total coverage is to be achieved. Photo 25

**Step 6:** Waste to be collected in plastic bag provided. Photo 26
Ausplast wrap is not to extend above ground level.

Backfill must be heaped around the pole to totally cover the preservative to a level of at least 50mm above groundline. Some allowance must be made for settling of backfill.

**Note:** Ausplast is classified as a poisonous and hazardous material. It must be handled with the correct safe working procedures (SWM 6.026) and disposed of in accordance with the requirements set by the Environmental Protection Authority (EPA).

### 5.13.3 Pole saver rod treatment

For pole saver rod treatment, the following procedures are to be followed.

#### 5.13.3.1 Number and location of holes

For poles with a circumference measuring up to 960mm (diameter 300mm), drill three (3) holes at 250mm above groundline.

The first of these holes should be bored above the bore hole used to assess the pole’s internal condition, as described previously.

The additional holes will be drilled at intervals of approximately 320mm apart from the first in a clockwise direction, and will need to be approximately 450mm in length to accommodate the 3 x 125mm rods plus the tapered plastic plug.

For poles of larger than 960mm circumference, additional holes will be required. These should be at about 320mm intervals. For example, a pole with about 1600mm circumference (diameter 510mm) would need five (5) pole saver rod holes.

Where heart rot is found at less than 450mm – **STOP** – and insert enough rods to fill the hole and allow 75mm for the plug and expansion.

#### 5.13.3.2 Angle of holes

Holes should be drilled steeply downwards and directed slightly off centre (20° off the vertical) to give a better protection to the pole wall area and not just the centre of the pole.
5.13.3.3 Insertion of pole saver rods

Having completed the drilling, three (3) pole saver rods are to be inserted into each of the holes and all the holes sealed with a tapered coloured plastic plug fully inserted.

5.13.3.4 Eltek nailed, OZ-C splinted or Pole Foundations MultiTube and MultiRib poles

If heart rot is found in nailed or splinted pole, pole saver rods are to be used as the standard treatment. The drilling pattern and the location of the holes should, in general, agree with the above number and location details.

However, due to the presence of the steel nails/splints, in most cases, some of the proposed drill holes may be obstructed. In these cases, inspectors must use their discretion to position the hole as close as possible to the nails/splints.

Poles that are suitable for reinstatement must be treated with both Ausplast and pole saver rods at the time of inspection.

5.13.3.5 Special situations

Where the internal condition of the pole cannot be ascertained due to the presence of electrical cables and cable guards, or substation poles with multiple earth wires, or poles that have been positioned hard against the kerb and gutter, they should be treated by the pole saver rod method. Where doubt exists, refer to the OLIGLI Manager.

Notes:

- No attempt must be made to remove any electrical cables or earth wires.
- Any broken or damaged earth or cable wires must be reported immediately to Endeavour Energy on the number indicated in clause 5.3. Do not attempt to join broken earth conductors, as this may be hazardous.

5.13.3.6 Poles not suitable for pole saver rod treatment

Rebutted poles and hollow poles with voids are not suitable for pole saver rod treatment.

5.13.4 Safety and precautions

Note: Records of pesticide use must be kept in accordance with Company Procedure GPE 0004 – Pesticide Use and Company Form FPE 0004 - Record of Pesticide Application.
5.13.4.1 Protective clothing and equipment

When applying any of the approved preservatives, inspectors must always wear and use the protective clothing and equipment as described in the relevant Safety Data Sheet (SDS), published by the preservative manufacturer. Inspectors must use the latest issued SDS.

5.13.4.2 Mixing of chemicals

Precautions must be taken to not mix chemicals that have not been approved by the manufacturer as compatible. Pumps and related equipment are to be also flushed before being used with different chemicals.

5.13.4.3 Disposal of chemicals

It is the inspector’s responsibility to properly dispose of all waste affected material and chemicals, in accordance with current DECCW guidelines.

5.14 Steel poles, splints/nails, and cable guard rust treatment

The exposed surfaces of the steel pole, splint/nail, and cable guard must be thoroughly cleaned of all dirt. Where any loose rust is evident, and to retard the formation of corrosion, it must be removed using a wire brush and the surfaces treated with a polymeric rust converter (Chelade) or other approved product. Particular attention should be given to the exposed section below ground level to 100mm above ground level.

After treating the pole, wait 20 minutes before refilling the dirt around the pole. This will allow the converter to cure in accordance with the manufacturer’s specifications.

5.15 Marking of poles

5.15.1 Numbering of new poles found in field

Endeavour Energy will issue a block of permanent numbers to inspectors. When the inspector finds new or unnumbered poles, they are to first check if the pole is on the map. If the pole is on the map and has a permanent number issued, this number is to be applied to the pole in accordance with MCI 0005 section 3.4 (above 2 metres from groundline and fixed to the pole with two [2] nails at the top, two [2] at the bottom and one [1] in the centre of the slide). Note that for concrete poles, the slide must be fixed to the pole using silicon or permanent adhesive.

If the pole is not on the map, a permanent number should be issued using the next available number from the block of permanent numbers. The details of the pole are to be recorded and the pole map marked up in accordance with this document. This number must be applied to the pole in accordance with MCI 0005, section 3.4.

On completion of the map, the inspector will return the marked-up map to the contractor. The contractor will forward the marked-up map to Endeavour Energy for amendment, and retain copies for record purposes.

Endeavour Energy will amend the maps and advise the contractor when amendments on a pole map have been completed. It is the responsibility of the OLI/GLI manager to retain the original inspector’s working pole map in records for seven (7) years, as indicated in clause 6.0.

5.15.2 Poles to be replaced (condemned poles)

5.15.2.1 Immediate – within 4 days (notify depot immediately)

These poles must be marked with an X, cut into the pole at 1.5m to 2.0m above ground level. The mark must then be sprayed with high visibility red paint. Concrete, composite or steel poles are to have an X sprayed with high visibility paint only.
5.15.2.2 Within six (6) months (private pole 3 months)

These poles must have a high visibility self-adhesive tape attached at least two (2) meters above ground (see clause 5.15.6). Concrete, composite or steel poles are to have an X sprayed with high visibility paint only.

5.15.2.3 Private steel poles

These poles must have a high visibility self-adhesive tape attached at least two (2) meters above ground (see clause 5.15.6).

5.15.3 Poles to be reinstated

These poles must have a suitable for nailing pole disc (N) attached to the pole in a prominent position facing the roadside, 2m above ground level (see clause 5.15.6).

The disc must be removed immediately after the pole has been successfully reinstated.

Note: No stay pole or termite damaged pole, either high or low voltage, are to be marked for reinstatement.

5.15.4 Termite poles

Poles that have been identified as having termites must be marked with a tag (see Figure 37) as indicated in clause 5.5.

<table>
<thead>
<tr>
<th>Termite tag description details</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
</tr>
<tr>
<td>T2</td>
</tr>
<tr>
<td>T1</td>
</tr>
</tbody>
</table>

Figure 37: Typical termite tag
5.15.5 Chemical trial poles

Poles that are currently being used in chemical treatment trials are marked as shown in Figure 38. The trial for poles marked with a 50mm aluminium disc marked OS (attached 1.5m above ground) has finished and the poles are to be inspected normally.

![Figure 38: Trial pole marking](image)

5.15.6 Condemned pole tape and suitable for nailing pole disc

Condemned poles must have a high visibility self-adhesive tape attached at least two (2) meters above ground. The tape must be wrapped around at least two (2) times the full circumference of the pole to reduce the possibility of becoming loose. Details of the tape are shown below.

![Figure 39: Condemned pole tape](image)
The suitable for nailing pole disc identification must be an N as set out below.

### 5.15.6.1 Nails for fixing of pole disc
Due to the importance of these discs, they must be securely fixed to the pole. Nails used must be long enough to provide at least 15mm of penetration into solid wood. Sapwood is about 25mm thick and therefore a minimum 40mm long x 4.5mm thick nail is required.

### 5.15.7 Telstra joint use poles
A practice used throughout Endeavour Energy to identify those poles that were classified as joint use (poles used to support Telstra communication cables) involved the attachment of JU signs to the particular poles.

This practice is no longer a requirement and all existing JU signs are to be removed from Endeavour Energy poles.

### 5.16 Replacement of condemned poles
Condemned poles can have varying priorities, depending on the type of defect and defect severity, which are defined in 5.9.3 and Annexure 8.

Where an Endeavour Energy pole is to have a priority of ‘up to 4 days’, this is based on the following controls:

- The condemned pole does not present any imminent safety/failure (including bushfire) risk (for example, only being held up by the wires);
The Bureau of Meteorology (BOM) website is checked and no high wind (>100km/h) wind events are forecast for the area;
  - If a high wind event is forecasted, the pole is to be replaced/held in place prior to the wind event occurring;
  - If a high wind event is not forecasted, the rectification period shall be ‘up to four days’ from the time of inspection;
- In the event that the BOM issue a ‘Severe Weather Event’ and the pole has yet to be replaced, the pole shall be held/replaced prior to the event occurring.

Condemned private poles are to be replaced by the customer within a maximum period of three (3) months. Action is to be taken to manage replacement within the required period.

Any condemned pole on which Telstra, Optus, State Rail or other authority assets exist is to be reported to the OLI/GLI Manager, who will advise the asset owners. The period in which the pole must be replaced is to be indicated and a statement included advising the deadline for the removal of the assets owned by the other authority.

5.17 Reinstatement of poles

All poles identified for reinstatement will be reinstated by a method approved by Endeavour Energy.

Any poles identified as having a low safety factor, or wall thickness must be firstly considered for pole nailing before replacement as detailed in Clause 5.9. This applies to all defect priority categories including 48 hours/4days, 2 months and 6 months.

To assess a pole for reinstatement, a single inspection hole must be drilled into the neutral axis at 900mm above ground level as per the Assessment of Serviceability flowchart in 5.9.3. If the thicknesses of the two wall measurements are equal to or greater than 45mm, then the pole’s above ground condition must be evaluated.

The general above ground condition of the pole must be closely inspected however, and only those poles in good order marked for reinstatement. An excessive number of knot holes, open knot holes and severe pole head degrade would normally require the pole to be replaced. Also, poles must not be reinstated if there is evidence of termites.

The example below is a pole that although it may have passed the safety factor requirement for nailing, it should be considered for replacement due to the above ground condition.

Figure 41: Example of poles considered for replacement due to the above ground condition
The method of reinstatement must be in accordance with an Endeavour Energy specification. All methods will need to be substantiated with documentation from the NSW Office of Fair Trading indicating that the method of pole reinstatement is approved for use in NSW.

5.18 Coring of poles

Poles identified as needing coring must be reported to Endeavour Energy immediately. Coring is required in some situations to determine or verify the species and strength of timber poles.

Coring must be carried out by Endeavour Energy. The sample must be analysed by a registered laboratory. Once a pole has been cored and tested, a new identification disc must be applied to the pole with the following information:

- Species
- Strength
- Test date
- Laboratory number

5.19 Auditing and grading of inspectors

Branch procedure PAE 1027 – Initial and Ongoing Training of Pole Inspectors for Compliance to Maintenance Standards.

5.19.1 Auditing by the OLI/GLI Manager

The OLI/GLI Manager is required to audit each inspector. The audit period will depend on the inspector’s current grading level, as follows:

- A grade 1 in 300 poles
- B grade 1 in 100 poles
- C grade 1 in 50 poles

On completion of each 80 poles, the inspector must submit documentation indicating the inspection maps and pole numbers covered for the 80 poles inspected.

The OLI/GLI Manager must audit the inspector’s work to verify compliance with this and all related instructions. The results of these audits, and the inspector’s documentation, must be retained by the OLI/GLI Manager and submitted for review by Endeavour Energy as required.

5.19.2 Initial grading of inspectors

Each inspector will be graded by Endeavour Energy. All new inspectors not previously graded by Endeavour Energy must undergo the following before they can work on Endeavour Energy’s network:

- Completion of the appropriate registered inspector’s course for OLI and GLI tasks.
- Completion of Endeavour Energy’s classroom assessment.
- Completion of Endeavour Energy’s field assessment.

On completion of these tasks, and if the inspector passes the required assessment, the inspector must be initially graded as a C inspector. Endeavour Energy also reserves the right to grade an inspector higher than C where satisfactory evidence of previous experience can be provided.
5.19.3 Re-grading of inspectors

A pass for re-grading will always be greater than 85% on assessment.

5.19.4 Initial grading path

- Re-grading of a C grade inspector to a higher level will be reviewed after the initial 150 poles.
- Re-grading of a B grade inspector to a higher level will be reviewed after the initial 300 poles as a B grade inspector.

5.19.5 Downgrading criteria

Where an inspector has been assessed and does not meet the required 85% pass level in the audits indicated above, re-grading/down grading to a lower level will occur.

Once downgraded, an inspector will remain at that level for a minimum of three (3) months or a suitable period, as determined by Endeavour Energy.

If a C graded inspector fails to meet the 85% pass level, Endeavour Energy will ask to show why the inspector should continue to be engaged.

5.19.6 Grading after a pole failure

An inspector will be asked to show cause for continued engagement by Endeavour Energy in the event of a pole failure within 12 months of inspection, determined as an inspection failure.

5.20 Reporting

5.20.1 General

The *Pole and Line Inspection Defect Prioritisation Photo Handbook* (Annexure 10) must be used in conjunction with Annexure 9 as a guide to determine defect priority for rectification. If doubt exists regarding a defect condition; the OLI/GLI Manager must be contacted for further assessment.

5.20.2 Ellipse database

Reporting and recording of all the details of the pole inspection, treatment and defects are to be entered into ELLIPSE. When the new system is implemented that automatically links photos to the defect workorder, pole inspectors must upload data into Ellipse within 48 hours of the inspection to allow prompter visibility of more urgent defects so that they can be attended to as soon as possible.

Details of how to enter maintenance-related activities are given in SMI 112 – Distribution data entry - maintenance and defect prioritisation, while the entry of asset structure details is documented in SMI 113 – Distribution data entry - asset structure and details.

For each pole inspected, records must include:

- All pole disc details, - such as strength, height, year of treatment.
- Physical and calculated details of pole – such as diameters, rot pocket details, safety factor. All defects found and the priority (as detailed in SMI 112) for rectification, as determined by the inspector.
- Cancellation of defects which no longer exist on the structure. The inspector must also include reasons for the cancellation in the defect comments. For example:
  - No longer identified as a defect as per this standard;
  - Defect has already been repaired but has not been closed.

**Note:** Open Endeavour Energy network defects that still exist (including those from previous OLI/GLI inspections) must not be cancelled and re-raised. Only the priority
of the defect must be reset where applicable. If an existing defect has progressed to an immediate risk at the time of the inspection, OLI/GLI must be notified. Further instructions for reassessing open defects will be given in the future. Existing open customer defects must be cancelled and re-raised with a new defect notice issued to the customer.

- Details of reasons for condemning poles including the area of the pole that is unacceptable (e.g. rot below ground, large cracks above ground, etc...). In cases where the pole is condemned due to its poor condition below ground, reasons for not reinstating the pole must also be included (e.g. insufficient wall thickness above ground, excessive splitting in the pole head, etc...).
- Details of all hardware and circuits on the pole. This also includes identifying telecommunications components as detailed in Annexure 11.
- Details of any alterations to the pole map that may be required to improve its accuracy.
- **Backup paper forms** – FAE 3032, FAE 3033, FAE 3034, FAE 3035, FAE 3036, FAE 3037 and FAE 3042.
- Records of pesticide use must be kept in accordance with Company Procedure GPE 0004 - Pesticide Use and Company Form FPE 0004 – Record of Pesticide Application.

### 5.20.3 Defect recording

Each identified defect must be recorded along with three digital photographs. In order for the inspector to accurately identify the photos when transferring the images to computer and then portable hard drive, a photo is to be first taken of the associated pole number eg PL502402. Two photographic images of each defect are then to be taken from two directions. The photos submitted must accurate depict the defect such that it is clearly identifiable and its severity can be assessed. Refer to the photo handbook for further guidance.

**Note:** When the new work order linking system is implemented, photos must be captured and stored in a manner that they can be easily associated with the relevant defect workorder. If the defect work order is linked to the photo automatically, a photo of the pole number is no longer required.

The photographic images related to each defect are to be saved to a separate directory on a personal computer and titled by the pole number eg PL502402. On the completion of the inspection map all images are to be then stored on a portable hard drive and must accompany the submitted final inspection map to the OL/GLI Manager. All photos must be transferred into an Endeavour Energy server which can be accessed via the following link/directory: \148.195.214.241\OLIGLI

To capture suitable images, a 5 megapixel digital camera with a 20 times optical zoom is the minimum acceptable standard.

The photographic images will provide depot maintenance staff with a better understanding on the deterioration of the asset and provide a clear picture of the defective asset to facilitate the prioritisation of repairs.

### 5.20.4 Pole failures

All **UNASSISTED POLE FAILURES** must be notified, reported, and have a full investigation (post mortem) performed in accordance with Company Procedure GAM 0006 – Notifying, Reporting and Conducting a Post Mortem on Failed Poles.

Any functional failure of the pole itself or where only conductors or stays are supporting
the pole will be classified as an unassisted failure unless it can be shown that the pole was:

1. Subject to sufficient force to exceed the design strength requirements set out by the relevant Utility’s standards at the time of construction;
2. Burned by a fire ignited by any source;
3. Compromised by vandalism;
4. Struck by lightning; or
5. Otherwise subjected to a failure mechanism demonstrated by evidence to be outside the control of the Utility.

5.20.5 Map irregularities

The inspector is responsible for reporting any map discrepancies found during inspections by marking up the respective pole map in accordance with clause 5.20.6.1, and section 5.15.

The inspector is responsible for the correct marking of poles with pole numbers as shown on the respective pole map (refer to MCI 0005 – Overhead distribution construction standards manual).

5.20.6 Customer defect reporting

The inspector is to inform the customer of the defect in writing and a copy of the written defect is to be forwarded to the OLI/GLI Manager.

The OLI/GLI Manager must close the defect in Ellipse with a defect resolution of customer informed.
5.20.6.1 Sample of map amendment requirements

Notes:

a) Use red ink, with clear letters, numbers and notes.

b) Use arrows and enlargements, where possible.

c) Information on features and notes can be added to assist inspectors, for example, access tracks, locked gates.

d) New numbers must be taken from the official allocation list.
5.21 Requirements for the inspection of waterway crossings

An OLI inspection of the crossing span and supporting poles and a GLI inspection and treatment of the supporting poles must be carried out every 4.5 years (refer to clause 5.2.1). All other inspections of waterway crossing are covered in MMI 0012.

5.22 Fire-prone areas

For all fire-prone areas, a pre-summer patrol and defect rectification must be completed each year, prior to the onset of the bushfire season.

The general purpose of the pre-summer patrol is to identify any factors associated with the overhead mains that could lead to the initiation of a bush fire. These may include inadequate tree clearances, impact damage, lightning damage, or any other defect.

The minimum requirements of this pre-summer patrol are set out in MMI0034 Pre-summer Bushfire Inspection.

5.23 Drawings

Drawings appropriate to this instruction are listed below:

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<tr>
<th>Drawing no.</th>
<th>Am. no.</th>
<th>Title</th>
</tr>
</thead>
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<tr>
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<td>J</td>
<td>Sheet 1 – Overhead construction insulated aerial service mains minimum clearances near structures</td>
</tr>
<tr>
<td>011985S2</td>
<td>E</td>
<td>Sheet 2 – Overhead construction insulated aerial service mains minimum clearances near structures</td>
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<td>086232</td>
<td>K</td>
<td>Endeavour Energy overhead lines minimum clearances near structures</td>
</tr>
<tr>
<td>086242</td>
<td>G</td>
<td>Overhead construction aerial consumer mains minimum clearances</td>
</tr>
<tr>
<td>060592</td>
<td>B</td>
<td>Inspectors pole probe type 1 &amp; 2, fabrication detail</td>
</tr>
<tr>
<td>064521</td>
<td>E</td>
<td>Condemned pole tape and Nailed pole identification disc detail</td>
</tr>
<tr>
<td>053999</td>
<td>K</td>
<td>Overhead construction identification plate for concrete and steel poles</td>
</tr>
</tbody>
</table>

6.0 AUTHORITIES AND RESPONSIBILITIES

General Manager Asset Management has the authority and responsibility for approving this instruction.

Manager Asset Standards & Design has the delegated authority and responsibility for approving this instruction.

Mains Assets Manager, Asset Standards & Design has the authority and responsibility for keeping the content of this instruction up to date.

Regional Managers have the authority and responsibility for checking the conductor clearance for river crossings.

Manager Asset & Metering Data has the authority and responsibility for capturing the locations of assets (including marker balls) in GIS.

OLI/GLI Manager has the authority and responsibility for:

- confirming that the inspectors are aware of their responsibilities under this instruction;
- achieving copies of signed maps for a period of seven (7) years;
• verifying that all inspectors have been suitably trained;
• maintaining an effective quality auditing system;
• implementing this instruction keeping the Mains Assets Manager, Asset Standards & Design, informed of any factors that may prevent the acceptance of responsibility for its full implementation;
• managing the pre-summer bushfire inspection in accordance with this instruction;
• initiating the process to update the data capture tool in accordance with any changes specified in this standard;
• verifying that the inspection details are entered into Ellipse, as set out in the contract; and
• conducting and recording the results of full inspections of any failed poles.

**IC&T Program Delivery Manager** has the authority and responsibility for:

• updating the data capture tool in accordance with any changes specified in this standard; and

• keeping the training documentation associated with the data capture tool up to date.

The **Inspector** has the authority and responsibility for:

• carrying out all of the procedures of this instruction, appropriate to each pole examined;
• seeking clarification of this instruction, as required, from the OLI/GLI Manager;
• confirming that all poles covered by each map are fully inspected in accordance with this instruction. Upon commencement and on completion, each map must be signed and dated by the responsible inspector and forwarded to the OLI/GLI Manager; and
• referring poles to the OLI/GLI Manager for a second opinion in the event of uncertainty about serviceability.

All **Endeavour Energy employees and contractors** have the authority and responsibility for:

• working in accordance with local and statutory requirements;
• upholding a high level of public safety;
• working in accordance with Endeavour Energy’s Electrical Safety Rules;
• recording maintenance and test data in Endeavour Energy’s electronic databases;

### 7.0 DOCUMENT CONTROL

**Documentation content coordinator:** Mains Assets Manager  
**Documentation process coordinator:** Branch Process Coordinator
Annexure 1: Neutral axis examples

LEGEND

- Preferred drilling direction (Neutral axis)
- Pole
- Power line directions
Annexure 2: Typical termite pictures

- Soldier of the ringant termite
  Neotermes insularis

- Soldier of the native drywood termite
  Cryptotermes primus

- Soldier of the giant northern termite
  Mastotermes darwiniensis

- Soldier of Heterotermes sp.

- Soldier of Coptotermes acinaciformis

- Alate of Coptotermes lacteous

- Major soldier of Schedorhinotermes sp.

- Minor soldier of Schedorhinotermes sp.

- Soldier of Microcerotermes turneri

- Soldier of Nasutitermes walkeri

- Glyptotermes

- Glyptotermes bore holes
### Annexure 3: Pole strength conversion table

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<tr>
<th>Imperial</th>
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<th>Current metric</th>
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<td>8/4</td>
<td>1.4</td>
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<td>7.6H</td>
<td>8/15</td>
<td>2.4</td>
</tr>
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<td>9.5/4</td>
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<td>9M</td>
<td>9.5/8</td>
<td>1.55</td>
</tr>
<tr>
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<td>9H</td>
<td>9.5/12</td>
<td>1.55</td>
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<td>11/4</td>
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<td>1.7</td>
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All imperial figures are in feet. All metric figures are in metres. Depth in the ground is in metres.

**Strength in kilo Newtons.**

## Annexure 4: Pole supplier table

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<thead>
<tr>
<th>Company name</th>
<th>Plant location</th>
<th>Location symbol</th>
<th>Company symbol</th>
<th>Company registration no.</th>
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### Annexure 5: Timber species durability classifications and identification brands

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<tr>
<th>Standard trade common name</th>
<th>Softwood (S) or hardwood (H)</th>
<th>Durability class</th>
<th>Species brand</th>
</tr>
</thead>
<tbody>
<tr>
<td>ash, alpine</td>
<td>H</td>
<td>4</td>
<td>AA</td>
</tr>
<tr>
<td>ash, Crow’s</td>
<td>H</td>
<td>2*</td>
<td>CR</td>
</tr>
<tr>
<td>ash, hickory</td>
<td>H</td>
<td>2*</td>
<td>HA</td>
</tr>
<tr>
<td>ash, mountain</td>
<td>H</td>
<td>4</td>
<td>MA</td>
</tr>
<tr>
<td>ash, silvertop</td>
<td>H</td>
<td>3</td>
<td>ST</td>
</tr>
<tr>
<td>Blackbutt</td>
<td>H</td>
<td>2</td>
<td>BB</td>
</tr>
<tr>
<td>blackbutt, New England</td>
<td>H</td>
<td>2</td>
<td>NA</td>
</tr>
<tr>
<td>blackbutt, WA</td>
<td>H</td>
<td>2</td>
<td>BA</td>
</tr>
<tr>
<td>bloodwood, brown</td>
<td>H</td>
<td>2*</td>
<td>BD</td>
</tr>
<tr>
<td>bloodwood, red</td>
<td>H</td>
<td>1*</td>
<td>RW</td>
</tr>
<tr>
<td>box, black</td>
<td>H</td>
<td>1*</td>
<td>BX</td>
</tr>
<tr>
<td>box, brush</td>
<td>H</td>
<td>3</td>
<td>BH</td>
</tr>
<tr>
<td>box, coast grey</td>
<td>H</td>
<td>1</td>
<td>CB</td>
</tr>
<tr>
<td>box, grey</td>
<td>H</td>
<td>1*</td>
<td>GB</td>
</tr>
<tr>
<td>box, red</td>
<td>H</td>
<td>2*</td>
<td>RX</td>
</tr>
<tr>
<td>box, white</td>
<td>H</td>
<td>2*</td>
<td>WX</td>
</tr>
<tr>
<td>box, white topped</td>
<td>H</td>
<td>2*</td>
<td>WT</td>
</tr>
<tr>
<td>box, yellow</td>
<td>H</td>
<td>1</td>
<td>YB</td>
</tr>
<tr>
<td>brownbarrel</td>
<td>H</td>
<td>4</td>
<td>BL</td>
</tr>
<tr>
<td>cadaga</td>
<td>H</td>
<td>3*</td>
<td>CG</td>
</tr>
<tr>
<td>candlebark</td>
<td>H</td>
<td>3</td>
<td>CD</td>
</tr>
<tr>
<td>fir, Douglas (oregon)</td>
<td>S</td>
<td>4</td>
<td>DF</td>
</tr>
<tr>
<td>gidgee</td>
<td>H</td>
<td>1*</td>
<td>G</td>
</tr>
<tr>
<td>gum, blue, Tasmanian or southern</td>
<td>H</td>
<td>3</td>
<td>BG</td>
</tr>
<tr>
<td>gum, forest red</td>
<td>H</td>
<td>2</td>
<td>FR</td>
</tr>
<tr>
<td>gum, grey</td>
<td>H</td>
<td>1</td>
<td>GG</td>
</tr>
<tr>
<td>gum, lemon-scented</td>
<td>H</td>
<td>2*</td>
<td>LG</td>
</tr>
<tr>
<td>gum, Maiden's</td>
<td>H</td>
<td>3*</td>
<td>MG</td>
</tr>
<tr>
<td>gum, manna</td>
<td>H</td>
<td>4</td>
<td>MN</td>
</tr>
<tr>
<td>gum, mountain</td>
<td>H</td>
<td>4</td>
<td>MO</td>
</tr>
<tr>
<td>gum, mountain grey</td>
<td>H</td>
<td>3</td>
<td>MT</td>
</tr>
<tr>
<td>gum, poplar</td>
<td>H</td>
<td>3*</td>
<td>PG</td>
</tr>
<tr>
<td>gum, river red</td>
<td>H</td>
<td>2</td>
<td>RR</td>
</tr>
<tr>
<td>gum, rose</td>
<td>H</td>
<td>3</td>
<td>RO</td>
</tr>
<tr>
<td>gum, salmon</td>
<td>H</td>
<td>3*</td>
<td>SA</td>
</tr>
<tr>
<td>gum, spotted</td>
<td>H</td>
<td>2</td>
<td>SG</td>
</tr>
<tr>
<td>gum, Sydney blue</td>
<td>H</td>
<td>3*</td>
<td>SY</td>
</tr>
<tr>
<td>Standard trade common name</td>
<td>Softwood (S) or hardwood (H)</td>
<td>Durability class</td>
<td>Species brand</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>------------------------------</td>
<td>------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>ironbark, broad-leaved red</td>
<td>H</td>
<td>1</td>
<td>BI</td>
</tr>
<tr>
<td>ironbark, grey</td>
<td>H</td>
<td>1</td>
<td>GI</td>
</tr>
<tr>
<td>ironbark, narrow-leaved red</td>
<td>H</td>
<td>1</td>
<td>NI</td>
</tr>
<tr>
<td>ironbark, red</td>
<td>H</td>
<td>1</td>
<td>RI</td>
</tr>
<tr>
<td>ironwood, Cooktown</td>
<td>H</td>
<td>1</td>
<td>IW</td>
</tr>
<tr>
<td>Jarrah</td>
<td>H</td>
<td>2</td>
<td>J</td>
</tr>
<tr>
<td>Karri</td>
<td>H</td>
<td>3</td>
<td>K</td>
</tr>
<tr>
<td>mahogany, red</td>
<td>H</td>
<td>2</td>
<td>RM</td>
</tr>
<tr>
<td>mahogany, southern</td>
<td>H</td>
<td>2</td>
<td>SM</td>
</tr>
<tr>
<td>mahogany, white</td>
<td>H</td>
<td>1</td>
<td>WM</td>
</tr>
<tr>
<td>marri</td>
<td>H</td>
<td>3</td>
<td>MR</td>
</tr>
<tr>
<td>messmate</td>
<td>H</td>
<td>3</td>
<td>MD</td>
</tr>
<tr>
<td>messmate, Gympie</td>
<td>H</td>
<td>3*</td>
<td>GM</td>
</tr>
<tr>
<td>penda, brown</td>
<td>H</td>
<td>2</td>
<td>PN</td>
</tr>
<tr>
<td>penda, red</td>
<td>H</td>
<td>2</td>
<td>PD</td>
</tr>
<tr>
<td>peppermint, black</td>
<td>H</td>
<td>3*</td>
<td>BP</td>
</tr>
<tr>
<td>peppermint, narrow-leaved</td>
<td>H</td>
<td>3</td>
<td>NL</td>
</tr>
<tr>
<td>pine, bunya</td>
<td>H</td>
<td>4*</td>
<td>YP</td>
</tr>
<tr>
<td>pine, Canary Island</td>
<td>S</td>
<td>4*</td>
<td>PI</td>
</tr>
<tr>
<td>pine, Caribbean</td>
<td>S</td>
<td>4</td>
<td>PB</td>
</tr>
<tr>
<td>pine, celery-top</td>
<td>S</td>
<td>3*</td>
<td>CT</td>
</tr>
<tr>
<td>pine, Corsican</td>
<td>S</td>
<td>4*</td>
<td>PC</td>
</tr>
<tr>
<td>pine, cypress, black</td>
<td>S</td>
<td>2*</td>
<td>BC</td>
</tr>
<tr>
<td>pine, cypress, white</td>
<td>S</td>
<td>1*</td>
<td>WC</td>
</tr>
<tr>
<td>pine, hoop</td>
<td>S</td>
<td>4</td>
<td>HP</td>
</tr>
<tr>
<td>pine, kauri</td>
<td>S</td>
<td>4*</td>
<td>KN</td>
</tr>
<tr>
<td>pine, loblolly</td>
<td>S</td>
<td>4</td>
<td>PL</td>
</tr>
<tr>
<td>pine, long-leaf</td>
<td>S</td>
<td>4*</td>
<td>PF</td>
</tr>
<tr>
<td>pine, maritime</td>
<td>S</td>
<td>4</td>
<td>PM</td>
</tr>
<tr>
<td>pine, patula</td>
<td>S</td>
<td>4*</td>
<td>PP</td>
</tr>
<tr>
<td>pine, radiata</td>
<td>S</td>
<td>4</td>
<td>PR</td>
</tr>
<tr>
<td>pine, slash</td>
<td>S</td>
<td>4</td>
<td>PS</td>
</tr>
<tr>
<td>pine, ponderosa</td>
<td>S</td>
<td>4*</td>
<td>PW</td>
</tr>
<tr>
<td>pine, western white</td>
<td>S</td>
<td>4*</td>
<td>PO</td>
</tr>
<tr>
<td>satinay</td>
<td>H</td>
<td>1</td>
<td>S</td>
</tr>
<tr>
<td>satinbox</td>
<td>H</td>
<td>2*</td>
<td>SN</td>
</tr>
<tr>
<td>stringybark, blue-leaved</td>
<td>H</td>
<td>3*</td>
<td>SL</td>
</tr>
<tr>
<td>stringybark, brown</td>
<td>H</td>
<td>3</td>
<td>BS</td>
</tr>
<tr>
<td>stringybark, red</td>
<td>H</td>
<td>3</td>
<td>RS</td>
</tr>
<tr>
<td>Standard trade common name</td>
<td>Softwood (S) or hardwood (H)</td>
<td>Durability class</td>
<td>Species brand</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-----------------------------</td>
<td>------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>stringybark, silvertop</td>
<td>H</td>
<td>3</td>
<td>SS</td>
</tr>
<tr>
<td>stringybark, white</td>
<td>H</td>
<td>2</td>
<td>WS</td>
</tr>
<tr>
<td>stringybark, yellow</td>
<td>H</td>
<td>2</td>
<td>YS</td>
</tr>
<tr>
<td>tallowwood</td>
<td>H</td>
<td>1</td>
<td>TW</td>
</tr>
<tr>
<td>tingle, red</td>
<td>H</td>
<td>3*</td>
<td>RT</td>
</tr>
<tr>
<td>turpentine</td>
<td>H</td>
<td>1</td>
<td>TP</td>
</tr>
<tr>
<td>wandoo</td>
<td>H</td>
<td>1</td>
<td>WG</td>
</tr>
<tr>
<td>wandoo, powder bark</td>
<td>H</td>
<td>1*</td>
<td>PW</td>
</tr>
</tbody>
</table>

Notes:

1) See AS 1720.2 for definition of durability class.
2) The durability classes in this table are as given in AS 1720.2, except for those species marked with an asterisk (*). These are as listed in the previous edition of AS 2209.
3) For information on species not listed, refer to CSIRO, Division of Forest Products, or to State forestry services.
Annexure 6: Steel pole remaining strength calculation and defect prioritisation

The residual above ground wall thickness shall be measured and the percentage remaining strength calculated using the following formulae:

$$\frac{T1a + T2a + T3a + T4a}{4} + \frac{T1n + T2n + T3n + T4n}{4} \times 100 = \%$$

Where:

$T1n$ – is the first wall thickness reading taken 300mm above groundline for determining nominal wall thickness (section of column unaffected by rust degradation).

$T2n$ – $T4n$ – are the remaining three wall thickness readings taken in the same horizontal plane as $T1n$, but spaced around the pole approximately 90° apart.

$T1a$ – is the first wall thickness reading taken at or below groundline directly below $T1n$.

$T2a$ – $T4a$ – are the remaining three wall thickness readings taken in the same horizontal plane as $T1a$, but spaced around the pole approximately 90° apart.

Note: In using the above formulae, the addition of measurements above groundline must never be less than the addition of measurements at or below groundline.

Insufficient wall thickness may require the replacement of the pole. The percentage of original wall thickness remaining will determine the time frame in which this shall be done (refer to defect prioritisation in Annexure 9).
Annexure 7: Communication cable separation

A summary of required separations between communication infrastructure and Endeavour Energy’s infrastructure measured at the pole is set out below.

Table 1: Separations between BCC and Endeavour Energy equipment

<table>
<thead>
<tr>
<th>On joint use poles - bracketed figures are mid-span between poles</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Endeavour Energy equipment</strong></td>
</tr>
<tr>
<td>SL or LV</td>
</tr>
<tr>
<td>Note, the lowest conductor on the pole determines the clearance to comms equipment</td>
</tr>
</tbody>
</table>

| **BCC equipment**                                            | 1.5m           | 1.5m                   | 1.5m                                           | 50mm | 600mm | 3.0m                             | On application |
| Conductive comm’s cable sets                                 | (1m)           | (1m)                   | (1m)                                           |      |       | (2.7m)                          |                |
| Non-conductive comm’s cable sets                             | 0.5m           | 0.3                   | 0.3                                            | 50mm | 300mm | 2.0m                             | On application |
| (0.3m)                                                       | (0.3m)         | (0.3m)                |                                                |      |       | (0.3m)                          |                |

| **Telstra**                                                  | 1.2m           | 0.55m                 | 1.2m                                           | 50mm | 600mm | 3.0m                             | On application |
| Twisted telephone cable                                      |               |                       |                                                |      |       | (2.7m)                          |                |
Annexure 8: Pole-top Inspection Procedure of Wood Poles

A pole-top inspection may be requested if there is uncertainty about the condition of the wood pole above two (2) metres, for example, where there is the presence of open knot holes, cracking, splitting, or external decay. This procedure details the processes for assessing the serviceability of the pole through visually inspecting, sounding, and drilling the pole as required (with the use of an elevated work platform).

Training and qualifications

This procedure must only be carried out by electrically qualified staff who has received the appropriate training and demonstrated competency. This will include demonstrated competency at using a drill to internally inspect a wood pole.

Live Work Practices

If 500mm clearance cannot be maintained from live low voltage, energised work practices must apply.

Preliminary visual inspection

Before any sounding or boring of a pole takes place, the pole inspector must commence each inspection by visually checking the above ground portion of the pole for any serious defects. Defects may include the condition of all high voltage conductors and fittings on the pole, extensive splitting, sapwood decay, lightning damage, vehicle impact damage, and evidence of termites or their flight holes.

If Glyptotermes are detected, the pole must be marked and condemned with no treatment carried out. Regardless of the previous statement not to disturb the soil, the inspector should look for flight holes at the area 300mm below groundline (most cases) and up to two (2) metres above groundline (extreme cases). The flight holes should be cut with a sharp axe to disclose cross grain galleries. Poles with evidence of brown rot fungus infection can be prone to these termites.

Nasutitermes detected in the pole can generally be eradicated by destroying the nest and spreading it across the ground. An effort is to be made to locate and kill the queen. Termite affected sapwood must be removed to 300mm above ground to discourage further attack.

Subterranean termites are generally the most destructive of Australian termites. If, when checking a pole, the inspector is unsure of a species, advice should be sought from a specialist.

Visual inspection – head of pole

If there is a suspected defect at the head of the pole, the pole must be visually inspected closely to assess its serviceability. If any of the following conditions are met, then the pole must be condemned.

(a) Where a split exists in the head that
   • extends across the full diameter,
   • and passes through the centre of the pole
   • and is in line with the axis of the attaching bolts
   • and extends to any attachment bolt with which it aligns,
   • and is at least 10 mm wide at some point (you will generally be able to see daylight through such a split)
   - (see Fig 1)
(b) Where a split or defect exists in the head that is caused by degradation – termite damage and / or fungal decay (this clause does not refer to a simple split in the timber)

- and extends across the full diameter,
- and passes approximately through the centre of the pole,
- and is roughly at right angle to the axis of the attaching bolts,
- and extends a minimum of 300 mm beyond any attachment bolt,
- and is at least 10 mm wide at some point (you will generally be able to see daylight through such a split)
  - (see Fig 2)

(c) Where there is a pipe in the head of the pole with a diameter half the diameter of the pole or greater, and

- there are multiple splits that extend through the full width of the sound timber wall (not just checks in the pole), and
- these splits extend from the head to or beyond any attaching bolts.

In the above situations where conductor clearances allow and lowering of the crossarm/conductors and cropping and capping of the pole is a practical alternative, then this is preferable to pole replacement.

Sounding the pole

The inspector must sound the pole in order to get a general indication of the pole’s internal condition. For wood poles, use the flat side of a hammer. Sufficient force should be used to give an indication of the pole condition, but not enough to affect a timber pole’s sapwood layer. Sounding must be done by striking the pole with the hammer from several directions. A sound pole should produce a ringing sound, while an unsound or decaying pole will give a dead/dull sound.
Drilling the pole

The pole is to be drilled to further assess the internal condition of the pole as described in the table below. The pole must be drilled in the area of greatest concern as indicated by sounding the pole. All holes must be drilled using a battery drill with a 12mm auger bit, at an angle slight upwards (10°) to prevent ingress of water into the hole. Additionally, the hole must extend beyond half the diameter of the pole.

**Note:** Before using an auger bit to bore any pole during its inspection, the auger tip is to be cleared of any shavings to prevent transfer of active fungus into sound wood. **The auger bit is to be sterilised using methylated spirit as a dip or spray. This must be done away from live mains (e.g. on the ground) as products can be flammable.**

<table>
<thead>
<tr>
<th>Pole issue</th>
<th>Drilling procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open knot hole</td>
<td>1. Drill a hole slightly underneath (50mm) the knot hole.</td>
</tr>
<tr>
<td></td>
<td>2. Cut a V into the bottom of the knot hole with a tomahawk (and apply a coat of copper naphthenate [CN] paint) to facilitate water drainage.</td>
</tr>
<tr>
<td>Cracking / splitting</td>
<td>1. Drill a hole 90 degrees (perpendicular) to the crack/split</td>
</tr>
<tr>
<td>External rot</td>
<td>1. Using a tomahawk, chip away the external rot until sound wood is reached.</td>
</tr>
<tr>
<td></td>
<td>2. Sound the pole in this area.</td>
</tr>
<tr>
<td></td>
<td>3. Drill a hole directly into the area of concern.</td>
</tr>
<tr>
<td></td>
<td>4. Apply a coat of copper naphthenate (CN) paint to where external rot has been removed (in step 1).</td>
</tr>
<tr>
<td>Fungal spore / fruiting body</td>
<td>1. Scrape off the fungal spore.</td>
</tr>
<tr>
<td></td>
<td>2. Sound the pole in this area.</td>
</tr>
<tr>
<td></td>
<td>3. Drill a hole directly into the area of concern.</td>
</tr>
<tr>
<td></td>
<td>4. Apply a coat of copper naphthenate (CN) paint to where fungal spore has been removed (in step 1).</td>
</tr>
</tbody>
</table>

- If there is less than 40mm of sound timber, the pole must be condemned and replaced within six (6) months.
- If there is evidence of white rot (usually indicated by a powdery substance) in the drill shavings, the pole must be condemned.

Holes are to be plugged with a tapered coloured plastic plug.

**Note:** Any subsequent bore holes should be bored 50mm above or below previous inspection holes.
Guidelines for prioritisation of pole-top condemned poles

The following criteria can be used for prioritising pole-top-condemned poles.

<table>
<thead>
<tr>
<th>Inspection</th>
<th>Condemn Criteria</th>
<th>Replacement Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drilling</td>
<td>Presence of white rot</td>
<td>48hour/4days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– 3 months ¹</td>
</tr>
<tr>
<td></td>
<td>Wall thickness less than 20mm</td>
<td>48hour/4days</td>
</tr>
<tr>
<td></td>
<td>Wall thickness less than 40mm</td>
<td>6 months ³</td>
</tr>
<tr>
<td>Pole head visual inspection</td>
<td>Pole head condition is unacceptable (refer to Visual Inspection section of the manual for further details)</td>
<td>6 months ³</td>
</tr>
</tbody>
</table>

Notes:

1. If there is insufficient good wood remaining (i.e. the wall thickness is less than 40mm) then replace within 4 days. Otherwise, replace within 3 months.
2. Wall thickness measurement should exclude any sapwood present.
3. A priority less than 6 months may be given if it is believed that the risk warrants greater urgency.

Reporting

Form FAE3057 must be filled out when a pole-top inspection of a wood pole is carried out. This form must be scanned and stored in the following network location:

G:Share\FAE3057 Pole-top Inspection of Wood Pole
Annexure 9: Defect prioritisation

This annexure must be used in conjunction with the Pole and Line Inspection Defect Prioritisation Photo Handbook.

**IMPORTANT**

Any emergency situation or imminent failure that impacts on: safety; the environment; loss of supply to customers; or, imposing unacceptable operational constraints on the network, must be raised with a 48 hour priority. These defects must be reported immediately to OLI/GLI. OLI/GLI must in turn notify the relevant work group or depot. Note that a condemned pole with a priority of 48hr/4day must be reported directly to the local Depot Operations Manager.

If the inspector considers the defect requires a more urgent priority than stated in this document, the inspector must photograph the defect and the information must be forwarded to the local operations manager.

In the event of uncertainty over the prioritisation of a defect, clarification must be sought from the OLI/GLI support staff and the Mains Assets Manager.

**Note:** the corresponding defect categorisation has been included with each defect priority, as set out in SMI124 - Maintenance Data Entry and Defect Prioritisation.

Refer to MMI0034 – Pre-summer Bushfire Inspection for details regarding bushfire defect identification and prioritisation for the PSBI.

Note in the table below, a priority of “48hr/4days” refers to a defect which can be rectified within 4 days (provided the controls stated in Clause 5.16 are met), however, if a failure is imminent, this shall be replaced within 48hrs.

### a. Pole defects

<table>
<thead>
<tr>
<th>Defect description</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrical defects</strong></td>
<td></td>
</tr>
<tr>
<td>Pole live – pole leakage detector indicates potential greater than five (5) volts.</td>
<td>Refer cl 5.4.9</td>
</tr>
<tr>
<td><strong>Vertical Alignment</strong></td>
<td></td>
</tr>
<tr>
<td>Any pole lean or bend, where the vehicle or electrical clearance has been compromised introducing a bushfire or safety risk.</td>
<td>48 Hour Category 1</td>
</tr>
<tr>
<td>Any pole lean or bend, where the vehicle or electrical clearance has been compromised that does not introduce a bushfire or safety risk.</td>
<td>1 month Category 2</td>
</tr>
<tr>
<td>Evidence of pole foundation failure or imminent pole failure. Refer to 5.16 for further details on prioritisation.</td>
<td>48 hour/4days Category 1</td>
</tr>
<tr>
<td>Pole lean or bend greater than 10 degrees, but does not compromise vehicle or electrical clearance.</td>
<td>3 month Category 3</td>
</tr>
<tr>
<td>Pole leans less than 10 degrees without compromising electrical or vehicle clearance.</td>
<td>No defect</td>
</tr>
</tbody>
</table>
### Pole label

Pole number label missing or incorrect.  
Note: for concrete poles, the slide is to be fixed to the pole using silicon or permanent adhesive.  

**Rectify onsite**

### Pole steps

<table>
<thead>
<tr>
<th>Pole step(s)</th>
<th>3 month</th>
<th>Category 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pole step(s) are present three (3) meters from ground line.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pole step(s) missing or damaged.</td>
<td>No defect</td>
<td></td>
</tr>
</tbody>
</table>

b. Concrete and composite pole defects

<table>
<thead>
<tr>
<th>Defect description</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Concrete pole specific defects</strong></td>
<td></td>
</tr>
<tr>
<td>Major vehicle damage</td>
<td>1 month Category 2</td>
</tr>
<tr>
<td>Fractures/Spalling. Test.</td>
<td>6 month Category 3</td>
</tr>
</tbody>
</table>

**Composite pole specific defects**

- Cracking, fibreglass blooming, and any other signs of major surface degradation. Contact **OLIGLI support staff**, who must report details to **Manager Asset Standards & Design**.

**Note:** Customers may only install private composite poles with the approval of Endeavour Energy. At present, no customer composite poles have been accepted by Endeavour Energy. Therefore, private composite poles must be defected unless documentation is provided in the future (e.g. technical bulletin) detailing any composite poles that have been approved.

Refer cl 5.10.1.2

c. Steel pole defects

<table>
<thead>
<tr>
<th>Defect description</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rust hole defects (in pole)</strong></td>
<td></td>
</tr>
<tr>
<td>Rust hole or holes greater than 75mm in total length in any direction. Refer to 5.16 for further details on prioritisation.</td>
<td>48 hour/4 days Category 1 - 2</td>
</tr>
<tr>
<td>Wall thickness less than 60%.</td>
<td>48hour/4 days Category 1</td>
</tr>
<tr>
<td>Severe rust such that the pole is unstable or corrosion extends beyond 350mm below ground level.</td>
<td>3 month Category 3</td>
</tr>
<tr>
<td>Rust hole or holes greater than 10mm but less than 75mm in total length in any direction</td>
<td>3 month Category 3</td>
</tr>
<tr>
<td>Doubt exists as to the integrity of the pole after performing the sounding check.</td>
<td>3 month Category 3</td>
</tr>
<tr>
<td>Corrosion of the galvanizing and into the steel for more than 10% of the circumference.</td>
<td>3 month Category 3</td>
</tr>
<tr>
<td>Wall thickness less than 80% but greater than 60%.</td>
<td>6 month Category 3</td>
</tr>
<tr>
<td>Rust hole or holes less than 10mm in total length in any direction.</td>
<td></td>
</tr>
</tbody>
</table>

---

**Note:**

- [MMI 0001 Copyright © Endeavour Energy 2016 Page 83 of 101](#)
### Pole distorted, leaning or loose

<table>
<thead>
<tr>
<th>Description</th>
<th>Service Poles</th>
<th>Other poles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pole folds or has impact impressions deeper than 25% of the pole diameter.</td>
<td>48 hours/4 days – 1 month Category 1 - 2</td>
<td>48 hours/4 days Category 1</td>
</tr>
<tr>
<td>Pole folds or has impact impressions less than 25% of the pole diameter.</td>
<td>1 month Category 2</td>
<td>1 month Category 2</td>
</tr>
<tr>
<td>Combination of folds or impact impression and the pole is loose in the ground.</td>
<td>48 hours/4 days – 1 month Category 1 - 2</td>
<td>48 hours/4 days Category 1</td>
</tr>
</tbody>
</table>

### Corrosion (surface rust)

<table>
<thead>
<tr>
<th>Description</th>
<th>Service Poles</th>
<th>Other poles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface rust on pole including corrosion of the galvanizing and into the steel for less than 10% of the circumference.</td>
<td>Treatment</td>
<td>Treatment</td>
</tr>
</tbody>
</table>

### d. Timber pole defects

<table>
<thead>
<tr>
<th>Defect description</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rot damage or Decay</strong></td>
<td></td>
</tr>
<tr>
<td>Pole with significant rot damage and the visual inspection indicates that the pole could be in danger of failure. If possible carry out drilling inspection to confirm safety factor and wall thickness. Refer to 5.16 for further details on prioritisation.</td>
<td>48 hours/4 days – 1 month Category 1 - 2</td>
</tr>
<tr>
<td>Drilling inspection. Acceptable limits and priority assigned are according to the Assessment of serviceability flowchart (clause 5.9.3).</td>
<td>Refer to serviceability flowchart</td>
</tr>
<tr>
<td>Fruiting bodies below two (2) meters from groundline - Internal drilling inspection to confirm serviceability.</td>
<td>Refer to serviceability flowchart</td>
</tr>
<tr>
<td>Fruiting bodies above two (2) meters from groundline. Refer to 5.16 for further details on prioritisation.</td>
<td>48 hours/4 days – 1 month Category 1 - 2</td>
</tr>
</tbody>
</table>

### Termites

<table>
<thead>
<tr>
<th>Description</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Termite damage. Drilling and/or sounding inspection to determine priority.</td>
<td>Refer to serviceability flowchart</td>
</tr>
<tr>
<td>Active termites are present (not including Glyptotermes).</td>
<td>3 months Category 3</td>
</tr>
<tr>
<td>Glyptotermes termites are present. Drilling and/or sounding inspection to determine priority.</td>
<td>Refer to serviceability flowchart</td>
</tr>
<tr>
<td>Pole cap</td>
<td>Priority</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Loose polecap that is compromising clearances.</td>
<td>3 months</td>
</tr>
<tr>
<td>Missing or loose polecap (but not compromising clearances).</td>
<td>12 month</td>
</tr>
</tbody>
</table>

**Note:** Pole cap defects are to be bundled and rectified in an efficient and cost effective manner by developing a pole cap defect management process.

<table>
<thead>
<tr>
<th>Sapwood</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sapwood is in contact with conductors.</td>
<td>48 hour</td>
</tr>
<tr>
<td>Loose sapwood that is compromising clearances.</td>
<td>3 months</td>
</tr>
<tr>
<td>Sapwood is loose but not compromising clearances.</td>
<td>No defect</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knot holes</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knot hole(s) with significant rot damage and the visual inspection indicates that the pole could be in danger of failure. Possible indicators are fruiting bodies and rot. Refer to 5.16 for further details on prioritisation.</td>
<td>48hour/4 days</td>
</tr>
<tr>
<td>Knot hole(s) which allows water penetration. Follow up pole-top inspection required to determine the serviceability of the pole.</td>
<td>3 month</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reinstated poles</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Note:</strong> Where the steel hardware of a reinstated pole is defective, the pole must be reassessed for suitability of re-nailing the pole. Poles cannot be re-banded – only re-nailed.</td>
<td>48hour</td>
</tr>
<tr>
<td>Pole reinstatement is at risk of imminent failure.</td>
<td>Category 1</td>
</tr>
<tr>
<td>Rusted components.</td>
<td>6 month</td>
</tr>
<tr>
<td>Slipping pole band. <strong>Note:</strong> Not a defect if the pole band is loose but has not moved down significantly from the original position (i.e. less than 5mm).</td>
<td>6 month</td>
</tr>
</tbody>
</table>

**e. Pole hardware defects**

<table>
<thead>
<tr>
<th>Defect description</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Crossarm</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Note:</strong> Where a defective crossarm is installed on a raiser bracket, this must be shown in the defect photo and also noted in the workorder comments. In such cases, the pole may be replaced as well to bring the construction to standard.</td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td>Category</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Significant decay with holes that can be seen through or major splitting that compromises mechanical strength. Failure is imminent.</td>
<td>1 Week Category 2</td>
</tr>
<tr>
<td>Crossarm deterioration or splitting and the insulator has the potential to slip out. <strong>Lateral strain</strong> on the insulator.</td>
<td>3 months Category 3</td>
</tr>
<tr>
<td>Crossarm deterioration or splitting and the insulator has the potential to slip out. <strong>No lateral strain</strong> on the insulator.</td>
<td>6 months Category 3</td>
</tr>
<tr>
<td>Crossarm deterioration. The top condition of the crossarm is difficult to determine from ground level, but it is likely that the deterioration seen from ground level warrants replacement.</td>
<td>6 months – 12 months Category 3 – 4</td>
</tr>
<tr>
<td>Crossarm deterioration. The top condition of the crossarm is difficult to determine from ground level, but it is likely that the deterioration does not warrant replacement.</td>
<td>12 months Category 4</td>
</tr>
<tr>
<td>Crossarm has rotated and insulator is under strain, for:</td>
<td></td>
</tr>
<tr>
<td>• A single brace construction, where the brace is buckled, loose or missing.</td>
<td>6 months Category 3</td>
</tr>
<tr>
<td>• A two brace crossarm construction, where both braces are buckled, loose or missing.</td>
<td></td>
</tr>
<tr>
<td>A two brace crossarm, where one brace is buckled, loose or missing.</td>
<td>6 months Category 3</td>
</tr>
<tr>
<td><strong>LV porcelain insulator</strong></td>
<td></td>
</tr>
<tr>
<td>Failed insulator/tie and conductor is resting on crossarm.</td>
<td>48 hour Category 1</td>
</tr>
<tr>
<td>LV ties are loose</td>
<td>Next Maintenance Category 4</td>
</tr>
<tr>
<td>Major cracks</td>
<td>6 month Category 3</td>
</tr>
<tr>
<td>Minor to moderate cracks or chips, which is unlikely to compromise conductor security.</td>
<td>No defect</td>
</tr>
<tr>
<td>Leaning insulator, <strong>compromising electrical clearance.</strong></td>
<td>1 month - 6 month Category 3</td>
</tr>
<tr>
<td><strong>Moderate insulator lean that is not compromising electrical clearance</strong></td>
<td>Next Maintenance Category 4</td>
</tr>
<tr>
<td>Minor insulator lean that is not compromising electrical clearance, nut is still fastened and no elongation of the bolt/pin hole.</td>
<td>No defect</td>
</tr>
<tr>
<td>Deadend dislodged LV shackle insulator</td>
<td>6 months Category 3</td>
</tr>
<tr>
<td><strong>HV and transmission porcelain insulator</strong></td>
<td></td>
</tr>
<tr>
<td>Failed insulator/tie and conductor is resting on crossarm.</td>
<td>48 hour Category 1</td>
</tr>
<tr>
<td>Issue Description</td>
<td>Inspection Period</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>HV ties are loose</td>
<td>6 month</td>
</tr>
<tr>
<td>Major cracks</td>
<td>1 month</td>
</tr>
<tr>
<td>Minor to moderate cracks or chips, which is unlikely to compromise conductor security.</td>
<td>No defect</td>
</tr>
<tr>
<td>Leaning insulator, compromising electrical clearance.</td>
<td>1 month - 6 month</td>
</tr>
<tr>
<td>Minor insulator lean that is not compromising electrical clearance, nut is still fastened and no elongation of the bolt/pin hole</td>
<td>No defect</td>
</tr>
<tr>
<td><strong>Polymer insulator</strong></td>
<td></td>
</tr>
<tr>
<td>Polymer insulator with complete shed reduction.</td>
<td>48 hour</td>
</tr>
<tr>
<td>Polymer insulator with 20% or greater reduction in electrical creepage distance due to shed damage.</td>
<td>6 month</td>
</tr>
<tr>
<td>Polymer insulator with less than 20% reduction in electrical creepage distance due to shed damage.</td>
<td>No defect</td>
</tr>
<tr>
<td>Polymer insulator with electrical tracking</td>
<td>48 hour</td>
</tr>
<tr>
<td>Polymer insulator with exposed fibreglass rod</td>
<td>48 hour</td>
</tr>
<tr>
<td>Polymer insulator with sheath damage</td>
<td>1 month</td>
</tr>
<tr>
<td>Polymer insulator with mould, fungus or insect activity</td>
<td>No defect</td>
</tr>
<tr>
<td><strong>Nuts, bolts and pins</strong></td>
<td></td>
</tr>
<tr>
<td>Kingbolt nut is missing and there is a gap between the crossarm and the pole.</td>
<td>48 hour</td>
</tr>
<tr>
<td>Kingbolt nut is missing and there is no gap between the crossarm and the pole.</td>
<td>1 month</td>
</tr>
<tr>
<td>Brace bolt is loose but crossarm has not moved, brace has not buckled.</td>
<td>No defect</td>
</tr>
<tr>
<td>Pin insulator with missing nut</td>
<td>6 month</td>
</tr>
<tr>
<td>Nut missing on LV shackle insulator and brace has come loose</td>
<td>1 months</td>
</tr>
<tr>
<td>Nut missing on LV shackle insulator but brace still in position</td>
<td>6 months</td>
</tr>
<tr>
<td>Pole and line inspection and treatment procedures Amendment no. 17</td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Nut is loose and the thread of the bolt cannot be seen past the nut.</td>
<td>Next Maintenance Category 4</td>
</tr>
<tr>
<td>Nut is loose and there is minimal amount of thread remaining past the nut.</td>
<td>Next Maintenance Category 4</td>
</tr>
<tr>
<td>LV shackle brace rusted</td>
<td>Pitted 6 months Category 3</td>
</tr>
<tr>
<td>Surface rust only Next Maintenance Category 4</td>
<td></td>
</tr>
<tr>
<td>Nut heavily rusted but still intact</td>
<td>Next Maintenance Category 4</td>
</tr>
<tr>
<td>Nut rusted but no signs of pitting</td>
<td>No defect</td>
</tr>
<tr>
<td>Nut is loose, but there is significant thread remaining and the security of the hardware has not been compromised.</td>
<td>No defect</td>
</tr>
<tr>
<td>Insufficient thread remaining past the nut due incorrect installation.</td>
<td>Next Maintenance Category 4</td>
</tr>
<tr>
<td><strong>Cable guard</strong></td>
<td></td>
</tr>
<tr>
<td>Major damage to cable guard, and the cable is exposed.</td>
<td>1 month Category 2</td>
</tr>
<tr>
<td>Major damage to cable guard, which has potentially caused damaged to the cable.</td>
<td>6 months Category 3</td>
</tr>
<tr>
<td>Minor damage to cable guard, and damage to the cable is unlikely.</td>
<td>No defect</td>
</tr>
<tr>
<td>Cable guard missing two (2) or more securing bolt.</td>
<td>6 month Category 3</td>
</tr>
<tr>
<td>Cable guard missing one (1) securing bolt.</td>
<td>No defect</td>
</tr>
<tr>
<td>Severe corrosion</td>
<td>Next Inspection Category 4</td>
</tr>
<tr>
<td><strong>Cables</strong></td>
<td></td>
</tr>
<tr>
<td>Loose or heavily rusted fittings.</td>
<td>3 month Category 3</td>
</tr>
<tr>
<td><strong>Earthing</strong></td>
<td></td>
</tr>
<tr>
<td>Frayed or broken earth wire for regulator, pole substation, SWER or air break switch.</td>
<td>48 hour Category 1</td>
</tr>
</tbody>
</table>
### Pole and line inspection and treatment procedures

**Amendment no. 17**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple stolen <strong>over head earth wires</strong> stolen on the same feeder.</td>
<td>48 hour Category 1</td>
</tr>
<tr>
<td>Frayed or broken earth wire for <strong>UGOH, recloser, load break switch</strong> or <strong>over head earth wire</strong>.</td>
<td>3 month Category 2</td>
</tr>
<tr>
<td>Contact with earth wire is possible.</td>
<td>6 month Category 2</td>
</tr>
<tr>
<td>Major batten damage, but contact with earth wire is unlikely.</td>
<td>No defect</td>
</tr>
<tr>
<td>Minor batten damage, and human contact with earth wire is unlikely</td>
<td>No defect</td>
</tr>
<tr>
<td>Bare line taps on earth bonds</td>
<td>No defect</td>
</tr>
</tbody>
</table>

**Street light**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel light will not function (for example, due to broken street light wire).</td>
<td>1 week Category 2</td>
</tr>
<tr>
<td>Hanging streetlight cover in danger of falling.</td>
<td>1 month Category 2</td>
</tr>
<tr>
<td>Hanging wire has come loose from all clips.</td>
<td>Next Inspection Category 4</td>
</tr>
<tr>
<td>Cracked streetlight cover.</td>
<td>Next Inspection Category 4</td>
</tr>
<tr>
<td>Missing streetlight cover.</td>
<td>Next Inspection Category 4</td>
</tr>
<tr>
<td>Coach screw on outreach arm is missing.</td>
<td>1 month Category 2</td>
</tr>
<tr>
<td>Coach screw on outreach arm is loose.</td>
<td>No defect</td>
</tr>
</tbody>
</table>

**Surge Diverter**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown porcelain surge diverter.</td>
<td>6 month Category 3</td>
</tr>
<tr>
<td>Loose earth or line connection.</td>
<td>1 month Category 2</td>
</tr>
<tr>
<td>Earth lead hanging down from base of the surge diverted, indicating unit failure.</td>
<td>1 month Category 2</td>
</tr>
<tr>
<td>Cracked, chipped or evidence of electrical tracking – refer to insulator defects under pole mains and hardware defects.</td>
<td>As per insulator defects</td>
</tr>
</tbody>
</table>
### Stay pole, ground stay and stay wire

| Stay wire has slipped, slackened or crushed the pole, and the alignment of the pole indicates that failure could be imminent. | 48 hour Category 1 |
| Stay wire has slipped, slackened or crushed the pole, and the pole foundation is not compromised. | 6 months Category 3 |
| Redundant stay wire left hanging on the pole. Pole is not leaning and there is no indication that the stay-wire is required. If stay wire hangs dangerously a more urgent priority is required. | Situation dependant |
| Stay pole defects. | As per pole defects |
| Stay insulator incorrectly installed/damaged. | 6 month Category 3 |
| Missing cattle guard in rural area (where required). | 6 month Category 3 |

### Conductors defects

<table>
<thead>
<tr>
<th>Defect description</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Insulated mains</strong></td>
<td></td>
</tr>
<tr>
<td>Insulation (including for LV service and consumer mains) has degraded and bare conductor can be seen.</td>
<td>1 month Category 2</td>
</tr>
<tr>
<td>Insulation showing signs of degradation.</td>
<td>6 month Category 3</td>
</tr>
<tr>
<td><strong>Bare mains</strong></td>
<td></td>
</tr>
<tr>
<td>Broken, frayed, bird caged or split conductors.</td>
<td>48 hour</td>
</tr>
</tbody>
</table>
Rusted steel conductor.
Refer to 5.10.6 and the
defect photo handbook for
further details.

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No corrosion, 100% galvanized</td>
<td>No defect</td>
</tr>
<tr>
<td>2</td>
<td>Light surface corrosion with negligible pitting</td>
<td>Reassess next inspection (workorder raised to bring to attention next inspection) Consider planning to replace if work is carried out in the area.</td>
</tr>
<tr>
<td>3</td>
<td>Medium surface corrosion with mild pitting</td>
<td>Reassess next inspection</td>
</tr>
<tr>
<td>4</td>
<td>Heavy surface corrosion with mild to medium pitting, Annealing or thinning of conductor</td>
<td>Replace within 1 year</td>
</tr>
<tr>
<td>5</td>
<td>Heavy surface corrosion with medium to heavy pitting, Heavy surface corrosion as well as a history of conductor failure</td>
<td>Replace within 3 months or prior to the commencement of the bushfire season, whichever is earliest</td>
</tr>
</tbody>
</table>

Incorrectly fitted helical termination that is free to move under wind conditions.
6 month Category 3

**Foreign objects (see SWM 6.014)**

<table>
<thead>
<tr>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign objects on mains which is compromising public safety.</td>
<td>48 hour Category 1</td>
</tr>
<tr>
<td>Foreign objects on mains which are compromising electrical clearance between one (1) conductor and a timber crossarm and/or pole.</td>
<td>48 hour Category 1</td>
</tr>
<tr>
<td>Foreign objects on mains which is compromising electrical clearance between phases. Examples include kites, sneakers, fence wire and animals. Public safety is not compromised.</td>
<td>1 month Category 2</td>
</tr>
<tr>
<td>Objects on mains which: a) Pose no safety risk b) Does not compromise electrical clearance. For example, shoes on mains.</td>
<td>No defect</td>
</tr>
</tbody>
</table>
### Vibration damper

<table>
<thead>
<tr>
<th>Defect description</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missing or incorrectly fitted.</td>
<td>6 month Category 3</td>
</tr>
</tbody>
</table>

### Low voltage spreaders

<table>
<thead>
<tr>
<th>Defect description</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low voltage spreader missing.</td>
<td>1 month Category 2</td>
</tr>
<tr>
<td>Low voltage spreader with splintering.</td>
<td>Next inspection Category</td>
</tr>
</tbody>
</table>

### Markables (for example, aerial ball marker and waterway crossing signs)

<table>
<thead>
<tr>
<th>Defect description</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crossing marker/signage faded, damaged, in the wrong location or missing.</td>
<td>1 month Category 2</td>
</tr>
</tbody>
</table>

### Vegetation and clearances

| Vegetation defects | Refer to MMI 0013 or VMCR, whichever is more current. |

### g. Pole substation defects

<table>
<thead>
<tr>
<th>Defect description</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Device identification</strong></td>
<td></td>
</tr>
<tr>
<td>Switching label not legible/missing.</td>
<td>3 month Category 3</td>
</tr>
<tr>
<td><strong>Securing device</strong></td>
<td></td>
</tr>
<tr>
<td>Security U-bolt to the transformer compromised.</td>
<td>1 month Category 2</td>
</tr>
<tr>
<td>Security of safety chain compromised.</td>
<td>1 month Category 2</td>
</tr>
<tr>
<td>Safety chain is missing (Ellipse indicates if a safety chain is required).</td>
<td>1 month Category 2</td>
</tr>
<tr>
<td><strong>Bushings</strong></td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Cracked, chipped or evidence of electrical tracking on bushing – treat as per insulator defects under e) Pole and Hardware defects.</td>
<td>As per insulator defects</td>
</tr>
<tr>
<td>Shroud missing or deteriorated.</td>
<td>6 month Category 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Tank</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Major oil leak, signs that a significant amount of oil has been lost (for example, oil on ground, or a dead patch of grass).</td>
<td>48 hour Category 1</td>
</tr>
<tr>
<td>Active oil leak, indicated by a shiny appearance of the leak.</td>
<td>1 month Category 2</td>
</tr>
<tr>
<td>Old or inactive oil leak, indicated by a dull appearance of the leak.</td>
<td>No defect</td>
</tr>
<tr>
<td>Pitting, flaking or major corrosion.</td>
<td>6 month Category 3</td>
</tr>
<tr>
<td>Surface rust.</td>
<td>No defect</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Jib-arm and box-arm</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Split or deteriorated – treat as set out by the crossarm defects under e) Pole and Hardware defects.</td>
<td>As set out by crossarm defects</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>MDI unit (Maximum Demand Indicator)</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MDI unit is dislodged from pole (and at risk of falling).</td>
<td>6 month Category 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Dropout fuse</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dropout fuse assembly is broken.</td>
<td>48 hour Category 1</td>
</tr>
<tr>
<td>Dropout fuse has spark arrestor.</td>
<td>6 month Category 3</td>
</tr>
<tr>
<td>Signs of overheating on fuse holder</td>
<td>6 month Category 3</td>
</tr>
<tr>
<td>Fibreglass fuse holder external deterioration / frayed</td>
<td>No defect</td>
</tr>
</tbody>
</table>
## Pole and line inspection and treatment procedures

### Amendment no. 17

#### Air Break Switch/Underslung isolating links

<table>
<thead>
<tr>
<th>Defect description</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Insulators</strong></td>
<td></td>
</tr>
<tr>
<td>Cracked, chipped or evidence of electrical tracking on insulators – refer to insulator defects under e) Pole and Hardware defects.</td>
<td>As per insulator defects</td>
</tr>
<tr>
<td><strong>Bonds/Connections</strong></td>
<td></td>
</tr>
<tr>
<td>Loose connection.</td>
<td>1 month Category 2</td>
</tr>
<tr>
<td>Broken strand with minimal impact on electrical properties. The bond is not under tension so failure is unlikely.</td>
<td>6 month Category 3</td>
</tr>
<tr>
<td><strong>Air break switch specific defects</strong></td>
<td></td>
</tr>
<tr>
<td>Device label not legible/missing.</td>
<td>No defect</td>
</tr>
<tr>
<td>Visual or audible arcing is present.</td>
<td>48 hour Category 1</td>
</tr>
<tr>
<td>Flexible earthing braid to operating handle is damaged.</td>
<td>1 month Category 2</td>
</tr>
<tr>
<td>Operating handle is severely damaged, rusted or not correctly attached to pole.</td>
<td>48 hour Category 1</td>
</tr>
<tr>
<td>Contacts are not aligned correctly.</td>
<td>48 hour Category 1</td>
</tr>
<tr>
<td>Incorrect position of arcing horn.</td>
<td>3 months Category 3</td>
</tr>
<tr>
<td>Connecting rods or down-rods are damaged, decaying, twisting.</td>
<td>6 month Category 3</td>
</tr>
<tr>
<td><strong>Isolating link specific defects</strong></td>
<td></td>
</tr>
<tr>
<td>Isolating link not attached correctly and is free to move.</td>
<td>1 month Category 2</td>
</tr>
</tbody>
</table>

#### Load break switches

<table>
<thead>
<tr>
<th>Defect description</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Device identification</strong></td>
<td></td>
</tr>
<tr>
<td>Device label not legible/missing.</td>
<td>No defect</td>
</tr>
</tbody>
</table>
### Bushings
Cracked, chipped or evidence of electrical tracking on bushing – treat as per insulator defects under e) Pole and Hardware defects.

As per insulator defects

### Tank
Pitting, flaking or major corrosion.

6 month Category 3

### Load break with low gas
Red low gas interlock disc is visible through view port.

48 hour Category 1

Semaphore cover has corroded and the spot welds have failed.

Switch is still safe to operate as the low gas mechanical lockout has not been activated)

6 months Category 3

### Point of attachment (POA) defects

<table>
<thead>
<tr>
<th>Defect description</th>
<th>Reporting details:</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>All POA defects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burning or burn marks.</td>
<td>Phone OLI/GLI immediately</td>
<td>48 hour Category 1</td>
</tr>
<tr>
<td>Potential for metal structures to become live, for example, gutters, metal fascias.</td>
<td>Phone OLI/GLI immediately</td>
<td>48 hour Category 1</td>
</tr>
<tr>
<td>Loose conductor at terminal connection point</td>
<td>Phone OLI/GLI immediately</td>
<td>48 hour Category 1</td>
</tr>
<tr>
<td>Insulation is completely bare and there is immediate danger of contact, for example,</td>
<td>Phone OLI/GLI immediately</td>
<td>48 hour Category 1</td>
</tr>
<tr>
<td>work/renovations are being carried out;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POA is obstructed/inaccessible (e.g. located over awnings, etc…) – customer defect³</td>
<td>Notify customer immediately</td>
<td>3 month Category 3</td>
</tr>
</tbody>
</table>

### Line taps

<table>
<thead>
<tr>
<th>Defect description</th>
<th>Reporting details:</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completely bare, no insulation visible</td>
<td>Notify customer immediately</td>
<td>1 month Category 2</td>
</tr>
<tr>
<td>Insulation deterioration, metal visible</td>
<td>Notify customer immediately</td>
<td>1 month Category 2</td>
</tr>
</tbody>
</table>
### Pole and line inspection and treatment procedures

#### Amendment no. 17

<table>
<thead>
<tr>
<th><strong>Insulinks</strong></th>
<th>Action</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caps cracked/missing</td>
<td>Notify customer immediately</td>
<td>No defect</td>
</tr>
<tr>
<td>Completely bare, damaged or heat effected</td>
<td>Notify customer immediately</td>
<td>1 month</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Category 2</td>
</tr>
<tr>
<td><strong>Crimp links</strong></td>
<td>Action</td>
<td>Category</td>
</tr>
<tr>
<td>Completely bare, heat effected,</td>
<td>Notify customer immediately</td>
<td>1 month</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Category 2</td>
</tr>
<tr>
<td>Insulation deteriorating – metal visible, minor heat effected</td>
<td>Notify customer immediately</td>
<td>1 month</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Category 2</td>
</tr>
<tr>
<td>Insulation tape coming off, no metal visible</td>
<td>Notify customer immediately</td>
<td>3 month</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Category 3</td>
</tr>
<tr>
<td><strong>Consumers mains – customer</strong></td>
<td>Action</td>
<td>Category</td>
</tr>
<tr>
<td>UV damaged or completely bare</td>
<td>Notify customer immediately</td>
<td>1 month</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Category 2</td>
</tr>
<tr>
<td>Mains crossing over a swimming pool (see 5.10.8)</td>
<td>Notify customer immediately</td>
<td>3 month</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Category 3</td>
</tr>
<tr>
<td><strong>Service mains</strong></td>
<td>Action</td>
<td>Category</td>
</tr>
<tr>
<td>Completely bare</td>
<td>Notify customer immediately</td>
<td>1 month</td>
</tr>
<tr>
<td>UV damaged – cracked insulation, tie coming off</td>
<td>Notify customer immediately</td>
<td>1 month</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Category 2</td>
</tr>
<tr>
<td>Mains crossing over a swimming pool (see 5.10.8) - customer defect</td>
<td>Notify customer immediately</td>
<td>3 month</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Category 3</td>
</tr>
</tbody>
</table>

### Notes

1. **Completely bare** is when physical contact with the bare live metal can easily be made by anyone working in the vicinity.
2. **Insulation deteriorated or metal visible** is when metal can be seen through the cracked insulation but physical contact cannot be easily made without using force or tools.
3. Customer defect must be issued to relocate the point of attachment or remove the obstruction.
k. Clearance defects

The following tables provide guidance for the prioritisation of low mains for various types of conductors. Refer to SMI124 for further guidance in prioritising defects within defect categories.

**Note:** With the exception of immediate defects (which are to be rung in), the inspector must assign the clearance defect with a R2 priority (reassess within 2 months) for regional staff to confirm and/or reprioritise the defect.

Also note that where clearance defects are identified for conductors that were constructed prior to 1976 (which may be in compliance with the standard of the day), an additional risk assessment may be carried out to determine if the conductor clearance is acceptable at the present time and environment.

Clearance defects that are prioritised as “MA to reassess” shall be sent to the Mains Assets Manager for review.

### LV Bare / Insulated / Covered & HV ABC

<table>
<thead>
<tr>
<th>Conductor Clearance</th>
<th>Over the carriageway of designated 4.6 m roads</th>
<th>Over the carriageway of all other roads</th>
<th>Over land other than the carriageway of roads</th>
<th>Over land which due to its steepness or swampiness is not traversable by vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 3.2 m</td>
<td>Immediate</td>
<td>Immediate</td>
<td>Immediate</td>
<td>Immediate (Min. Clearance 4.5 m)</td>
</tr>
<tr>
<td>&gt; 3.2 m and ≤ 4.7 m</td>
<td>Immediate</td>
<td>Immediate</td>
<td>3 Months</td>
<td>MA to reassess (Min. Clearance 4.5 m)</td>
</tr>
<tr>
<td>&gt; 4.7 m and ≤ 5.0 m</td>
<td>Immediate</td>
<td>Before next inspection</td>
<td>Before next inspection</td>
<td>MA to reassess (Min. Clearance 4.5 m)</td>
</tr>
<tr>
<td>&gt; 5.0 m and &lt; 5.5 m</td>
<td>3 Months</td>
<td>Before next inspection</td>
<td>Before next inspection</td>
<td>N/A</td>
</tr>
<tr>
<td>Conductor Clearance</td>
<td>Over the carriageway of arterial road or freeways or the centre of a public road</td>
<td>Any other part of a public carriageway / road</td>
<td>Vehicular Crossing of a road verge (other than an urban residential dwelling)</td>
<td>All Other Vehicular Crossing or Land likely to be used by a vehicle</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>-----------------------------------------------</td>
<td>-------------------------------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>≤ 2.7 m</td>
<td>Immediate</td>
<td>Immediate</td>
<td>Immediate</td>
<td>Immediate</td>
</tr>
<tr>
<td>&gt; 2.7 m and ≤ 3.0 m</td>
<td>Immediate</td>
<td>3 Months</td>
<td>3 Months</td>
<td>Before next inspection</td>
</tr>
<tr>
<td>&gt; 3.0 m and ≤ 4.5 m</td>
<td>Immediate</td>
<td>3 Months</td>
<td>Before next inspection</td>
<td>N/A</td>
</tr>
<tr>
<td>&gt; 4.5 m and ≤ 4.9 m</td>
<td>3 Months</td>
<td>Before next inspection</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>&gt; 4.9 m and ≤ 5.5 m</td>
<td>Before next inspection</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
### 11, 22 or 33 kV Bare Conductor or CCT

<table>
<thead>
<tr>
<th>Conductor Clearance</th>
<th>Over the carriageway of designated 4.6 m roads</th>
<th>Over the carriageway of all other roads</th>
<th>Over land other than the carriageway of roads</th>
<th>Over land which due to its steepness or swampiness is not traversable by vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 3.3 m</td>
<td>Immediate</td>
<td>Immediate</td>
<td>Immediate</td>
<td>Immediate</td>
</tr>
<tr>
<td>&gt; 3.3 m and ≤ 5.1 m</td>
<td>Immediate</td>
<td>Immediate</td>
<td>3 Months</td>
<td>MA to reassess (Min. Clearance 4.5 m)</td>
</tr>
<tr>
<td>&gt; 5.1 m and ≤ 5.4 m</td>
<td>Immediate</td>
<td>Before next inspection</td>
<td>Before next inspection</td>
<td>MA to reassess (Min. Clearance 4.5 m)</td>
</tr>
<tr>
<td>&gt; 5.4 m and &lt; 6.7 m</td>
<td>3 Months</td>
<td>Before next inspection</td>
<td>Before next inspection</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### 66 or 132 kV Bare Conductor

<table>
<thead>
<tr>
<th>Conductor Clearance</th>
<th>Over the carriageway of designated 4.6 m roads</th>
<th>Over the carriageway of all other roads</th>
<th>Over land other than the carriageway of roads</th>
<th>Over land which due to its steepness or swampiness is not traversable by vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 3.6 m</td>
<td>Immediate</td>
<td>Immediate</td>
<td>Immediate</td>
<td>Immediate</td>
</tr>
<tr>
<td>&gt; 3.6 m and ≤ 5.7 m</td>
<td>Immediate</td>
<td>Immediate</td>
<td>3 Months</td>
<td>MA to reassess (Min. Clearance 5.5 m)</td>
</tr>
<tr>
<td>&gt; 5.7 m and ≤ 6.0 m</td>
<td>Immediate</td>
<td>Before next inspection</td>
<td>Before next inspection</td>
<td>MA to reassess (Min. Clearance 5.5 m)</td>
</tr>
<tr>
<td>&gt; 6.0 m and &lt; 6.7 m</td>
<td>3 Months</td>
<td>Before next inspection</td>
<td>Before next inspection</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Annexure 10: Pole and Line Inspection Defect Prioritisation Photo Handbook

Annexure 10 has been loaded as a separate document.
Annexure 11: Telecommunications Asset Identification Requirements

Annexure 11 has been loaded as a separate document.