Managing the risk of pole failure

Notice of Determination under clause 5.17.4(c) of the National Electricity Rules

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Enquiries regarding this document should be addressed to:

Chris Noye Leader Regulation

PO Box 606

MOONAH TAS 7009

Email: regulation@tasnetworks.com.au

Executive Summary

TasNetworks' distribution network relies on 233,471 poles to support assets and equipment that enable the distribution of electricity to more than 295,000 customers.

Our pole population is facing increasing pressure from bushfire risk and a shortage of high quality wood poles. In response, TasNetworks is applying the Regulatory Investment Test for Distribution (**RIT-D**) to assess whether alternative technologies or approaches to our pole replacement program could result in greater benefits for our customers.

This document is TasNetworks' notice of determination that there are no credible non-network options to address all or part of the need to replace poles in our network. TasNetworks' determination is made under clause 5.17.4(c) of the National Electricity Rules (**NER**) and is published pursuant to clause 5.17.4(d). In accordance with those provisions, TasNetworks will not be publishing a non-network options report in relation to the proposed works.

In summary, our reasons for this conclusion are:

1. No non-network option is likely to be commercially feasible;
2. No non-network option is expected to avoid the need to replace network assets.

This notice of determination is the first stage of the RIT-D TasNetworks is applying to our pole replacement program. We have published a Draft Project Assessment Report (**DPAR**) concurrently with this Notice outlining our assessment of the credible network options that are capable of addressing the identified need.

TasNetworks has assessed the following potential credible network options to address the identified need against a 'business-as-usual' base case. The base case is also considered a credible option (i.e. continuing the current pole replacement program). The credible options are:

- **Base Case -** replacing poles on condition deterioration with the best available grade of wooden pole.
- **Option 1** – Hybrid replacement strategy on condition deterioration with either Titan poles or the highest grade wooden pole.
- **Option 2** – Replace on condition deterioration with lowest suitable grade of wooden pole.

Option 1 was identified as the option that maximises net present benefits to all those that produce, consume and transport electricity in the National Electricity Market (NEM). This analysis is available in our DPAR.

Contents

Glossary

CCA	Copper-Chrome-Arsenate
DPAR	Draft Project Assessment Report
FRP	Fibre Reinforced Polymer
NER	National Electricity Rules
RIT-D	Regulatory Investment Test for Distribution
NEM	National Electricity Market

1 Identified Need

The first stage of a RIT-D requires TasNetworks to determine whether any non-network options could address the identified need. An identified need is the objective TasNetworks seeks to achieve by investing in our network.

> *"The identified need for this RIT-D is to increase overall net market benefits in the National Electricity Market by improving the resilience and service life of our pole population."*

TasNetworks has historically replaced poles with the highest available grade of suitable wood pole. However, bushfires significantly reduce the supply and average service life of wood poles making any fire resistant non-wood alternatives increasingly viable.

Investment is required in future years to sustain the performance of TasNetworks' wood pole population and to ensure the number of poles at, or exceeding their service life remains manageable. In particular, there will be a need to progressively increase the number of staked pole replacements as they reach the end of their service life. Wood poles make up the vast majority of our pole population and are prone to natural deterioration.

As wood poles age, cracks, splits and holes increase the availability of moisture in the wood accelerating the rate of decay. Wood decay results in the need to condemn and replace the pole.

The impact or consequences of a pole failure may include:

- Network outages
- Injury or fatalities
- Damage to other TasNetworks' plant and equipment
- Damage to third party assets
- Starting a fire
- Financial impacts for outage penalties
- Emergency replacements
- Toxic waste disposal and environmental remediation costs

2 Current Pole Management Practices

There are four main types of poles in our distribution network:

1. Wood poles: natural and Copper-Chrome-Arsenate (**CCA**) treated
2. Steel and concrete poles: commonly known as Stobie poles[1]
3. Tested fire resistant, high voltage insulated poles: spun concrete, pre-stressed concrete and fibre reinforced polymer (**FRP**) composite concrete
4. Steel structures: steel lattice poles and lattice towers; iron railway section iron poles, thin-walled round and square steel service poles.

Wood poles make up approximately 90% of TasNetworks' distribution pole fleet because they have historically represented the least cost whole of-life option for the majority of circumstances. Wood poles are rated by durability classes from S1 (most durable) to S4 (least durable). The Tasmanian grown native species hardwood wood poles are rated as Class S3 or S4.

Approximately ten percent of the pole fleet historically was/is non-wood, mostly in major town centres and, more recently, bushfire prone areas. Titan poles are the current alternative for non-wood poles.

Titan poles are a FRP spun concrete composite pole. They are type tested electrically insulated, weigh approximately two thirds of the weight of a wood pole equivalent, require less maintenance over a longer service life and are capable of helicopter lift installation in remote locations.

The various pole structure types and quantities in our distribution network are shown in Table 1.

Table 1 Overhead line support structures installed in TasNetworks' distribution system (at end of FY2022/23)

Support structure type	Count
Wood pole (CCA TN and untreated)	209,509
Steel reinforced concrete pole	159
Steel lattice tower (ex-Transmission)	176
Steel structure (incl. steel lattice poles)	16,690
Steel A-frame concrete infill (Stobie) pole	6,154
FRP reinforced concrete composite (Titan) pole*	783
Total	**233,471**

The average service life for poles in our network are:

1. S4 species wooden poles = 25 years
2. S3 species wooden poles = 44 years
3. FRP concrete/steel = 65 years.

[1] TasNetworks uses a Tasmanian made Stobie pole with higher average service life than other jurisdictions.

The average service age of the pole population is approximately 32 years. The age profile of our distribution pole population is shown in Figure 1. Note that the large spike in stakes installed at 22 years is because TN did not record staking dates for the first three years. The oldest possible staking date was then assumed for these once TN started recording this data.

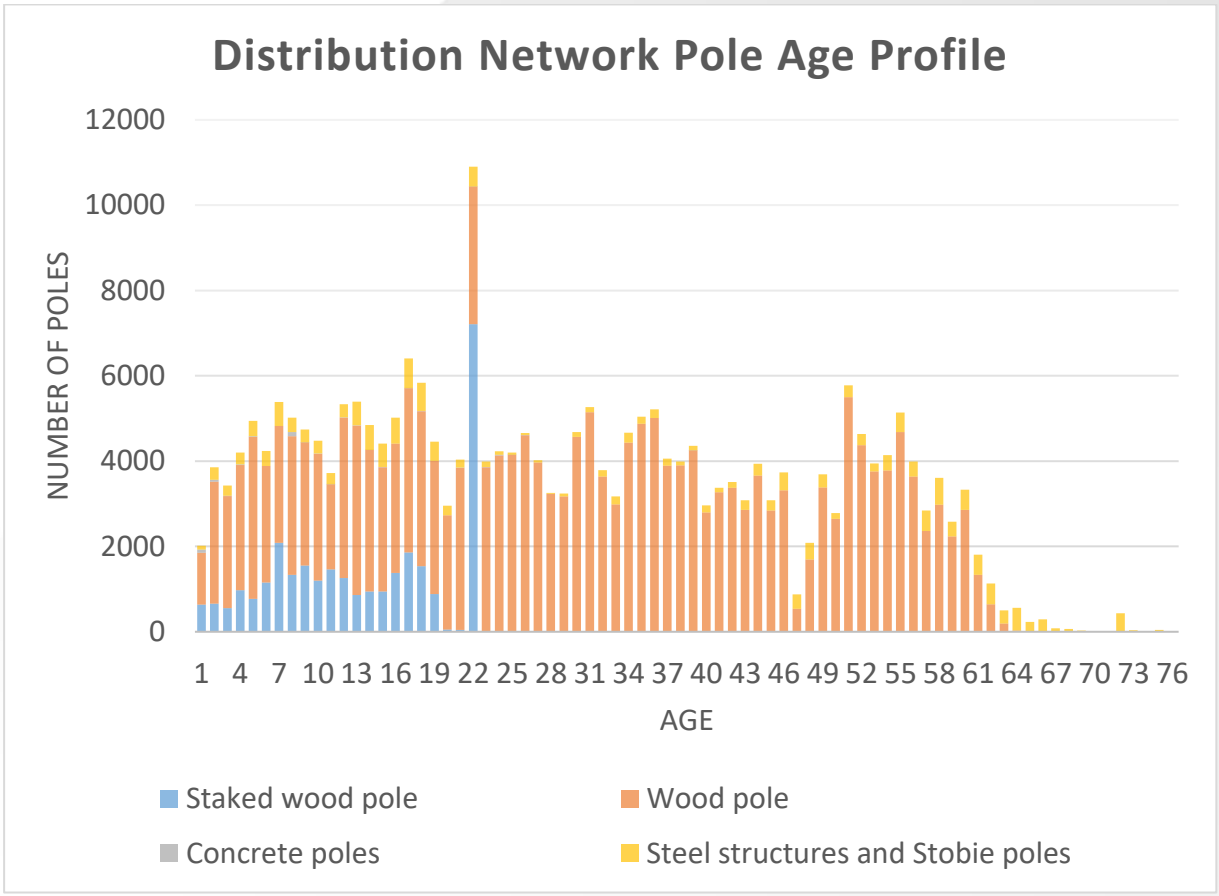

Figure 1 Pole population service age

Note that the large spike in stakes installed at 22 years in Figure 1 is because TN did not record staking dates for the first three years. The oldest possible staking date was then assumed for these once TN started recording this data.

2.1 Asset Management Strategy

TasNetworks develops its pole replacement program taking into consideration asset condition, legal and regulatory obligations, performance and reliability requirements, safety and environmental risks, business strategies and synergies with other work programs.

Condition monitoring of poles allows for risk assessments of that asset's ability to operate reliably and efficiently. These risk assessments determine the optimal timing for treatment and replacement.

Pole management activities are proactively planned to mitigate the risk of in-service failure due to the critical and extensive nature of these assets. Routine maintenance includes five yearly inspections to critically assess whether a pole condition is:

- Serviceable – considered to be in adequate condition to safely remain in service until next inspection.
- Impaired – not considered to be in adequate condition but suitable to be considered for staking.
- Condemned – not considered to be in adequate condition to safely remain in service until next inspection and not suitable for staking.

TasNetworks undertakes both planned replacement works on condemned poles and unplanned replacement work on failed poles. Planned replacement is generally more economical than unplanned replacement and avoids potential safety, bushfire, and reliability impacts (and associated costs).

TasNetworks considers the following factors when replacing poles:

- Availability of suitable poles
    - The availability of suitably durable wooden poles that can withstand the stresses in Tasmania is decreasing, resulting in a reduction in the serviceable life (there has been a decrease in the average service life of S3 poles from 48 years to 44 years since 2014)
    - There are currently a limited numbers of pole suppliers, resulting in diversity and competition constraints in the market
- Environmental impact
    - Greater levels of CCA treatment are being required to protect wood poles from fungi that cause rot, resulting in additional costs for treatment and toxic waste disposal[2]
- Complexity of the existing site, either due to the loading forces at that location, restrictions around the footprint of the replacement or other assets located on the pole
- Climate change resilience and adaptation
    - High bushfire loss consequence areas
    - Increased maximum wind gusts and temperature
    - Storm intensity
    - Flooding
    - Damage from bushfires
    - More frequent drought and dry lightning bushfires
- Criticality of the asset (or co-located assets) and site to network security and reliability.

Recently, the following factors have emerged leading to re-evaluation of TasNetworks pole replacement strategy:

- Increasing bushfire risk;
- Diminishing availability of suitable wood poles; and

[2] Disposal costs increase significantly if CCA wood gets burnt/carbonised. There are increasingly limited dump sites for toxic CCA waste disposal meaning level 5 toxic waste must now be exported for disposal in Victoria.

- Emergence of new technologies

More information on current pole management practices can be found in section 2 of the DPAR published alongside this document.

3 Credible Options

A credible option is an option that:

- addresses the identified need.
- is commercially and technically feasible; and
- can be implemented in sufficient time to meet the identified need.

TasNetworks has identified three credible options that meet these criteria including a base case reflecting our current business practices.

Table *2* describes the merits of each of these options.

Table 2 Potential credible options

Option	Description	Assessment
Base Case	TasNetworks continues with the current pole condition inspection and replacement program and uses S3 wood poles in condition based planned works replacement.	• Current business as usual position • Average 44 year service life • Reducing availability of supply • Higher risks for fire ignition and poorer resilience outcomes.
1	TasNetworks replaces deteriorated poles with Titan poles in condition based planned works (if available) and then with S3 wood poles.	• Expected service life 65 years + (for titan poles) • Addresses risk for critical support structures in high bushfire frequency areas. • Availability of supply still an issue but reduced.
2	TasNetworks continues with the current pole condition inspection and replacement program but uses S4 wood poles in condition based planned works replacement.	• Average 25 year service life • Higher risks for fire ignition and poorer resilience outcomes. • Increasing fire toxic waste disposal costs and environmental remediation costs

The DPAR published concurrently with this report identifies Option 1 as the option that maximises net present value to all those that produce, consume and transport electricity in the NEM.

4 Consideration of non-network options

TasNetworks has determined that there is unlikely to be a non-network option that could form a potential credible option on a standalone basis, or that could form a significant part of a potential credible option for this RIT-D. Specifically, we do not consider any non-network option would meet the criteria of being commercially and technically feasible.

We expected the costs of non-network options that enable poles to be decommissioned rather than replaced to be excessively expensive with minimal additional benefits compared to the proposed network option.

Furthermore, given poles are integral to ensuring the conveyance of electricity to customers in our distribution network we do not consider any non-network option capable of avoiding the need to undertake replacement expenditure.

5 Next Steps

For the reasons set out in Section 4, TasNetworks has determined that no non-network option can form part of a credible option that addresses the identified need. Therefore, in accordance with clause 5.17.4(c) of the NER, we will not be publishing a non-network options report as part of this RIT-D.

TasNetworks has published a DPAR, which includes the information set out in clause 5.17.4(j) of the NER, namely:

- The assumptions used in identifying the need for investment
- A description of each credible option assessed, and their costs, that TasNetworks considers could potentially address the identified need.
- The results of our net present value analysis and accompanying explanatory statements regarding the results.
- Identification of the proposed preferred option that meets the identified need and the RIT-D requirements.

TasNetworks published the DPAR on 1 December 2023 and consultation on this report is open until 12 January 2024.

TasNetworks intends to publish a final project assessment report as soon as practical after the DPAR consultation period. The final project assessment report will include a summary and commentary on submissions received.

For further information, please contact:

Chris Noye

Leader Regulation

TasNetworks

Regulation@TasNetworks.com.au

Submissions or queries in relation to the DPAR can be sent directly to: regulation@tasnetworks.com.au.