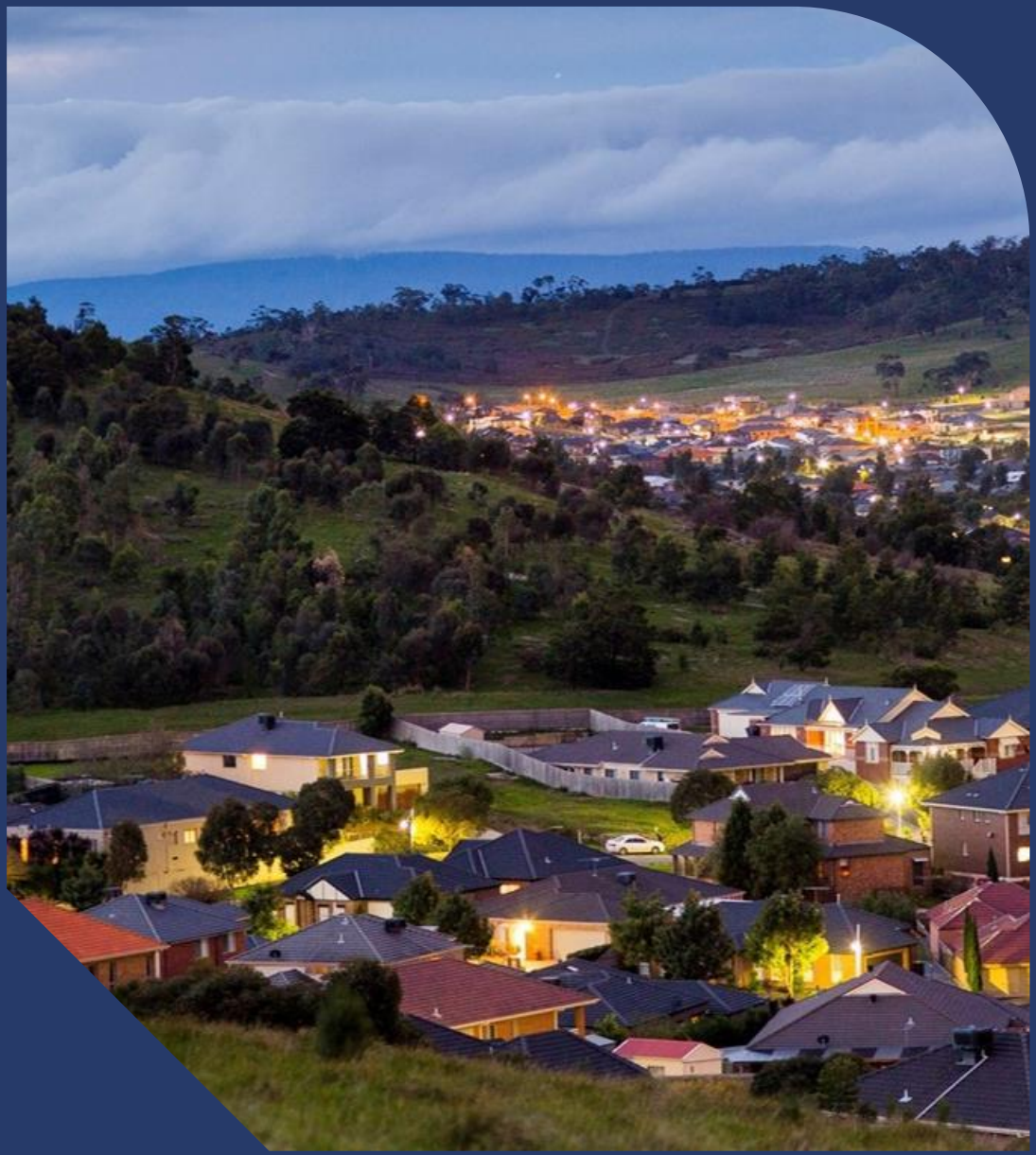
AusNet

# 2027-32 Revised Asset Replacement and Compliance Programs

## Asset Management Strategy



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# Table of Contents

# Abbreviations and Definitions

| TERM | DEFINITION |
|---|---|
| **ACSR** | Aluminium Conductor Steel Reinforced |
| **ADSS** | All Dielectric Self Supporting |
| **AEMO** | Australian Energy Market Operator |
| **AER** | Australian Energy Regulator |
| **AMS** | Asset Management Strategy |
| **CAPEX** | Capital expenditure |
| **CB** | Circuit Breaker |
| **DIC** | Digital Interface Cubicle |
| **EXCH** | Exchange |
| **OPGW** | Optical Fibre Ground Wire |
| **OIP** | Oil Impregnated Paper |
| **PIB** | Phase Insulated Bus |
| **SCADA** | Supervisory Control and Data Acquisition |
| **SDH** | Synchronous Digital Hierarchy |
| **TMS** | Transformer Management System |
| **TS** | Terminal Station |
| **WTI** | Winding Temperature Indicator |

# 1. Executive Summary

This document sets out AusNet's revised 2027-32 asset replacement and compliance capital expenditure (capex) programs, in response to the Australian Energy Regulatory (AER) Draft Decision. The revised proposal addresses the AER's key concerns regarding economic timing, bundling, financial consequence modelling, defect-based evidence, and risk allowances, while maintaining a risk-based approach to managing safety, reliability, compliance and asset integrity outcomes across the transmission network.

It presents key updates to the following revised programs:

- Asset replacement capex programs
  - Power transformers and oil filled reactors replacement program
  - Circuit breakers (CBs) replacement program
  - Communication systems replacement program
  - Transmission line insulators replacement program
  - Transmission line ground wires condition-based replacement program
- Asset compliance capex programs
  - Transmission line ground wires rating-based replacement program
  - Tranche 1 Rectification Low Spans
  - Management of transmission line ground clearances

AusNet's initial proposal included $433.6 million for asset replacement and compliance programs. The AER's Draft Decision reduced this to $208.9 million, a reduction of $224.7 million, or 51.8%. The most significant reductions related to transmission line insulators, ground clearance compliance works, ground wire programs and communication systems.

In response, AusNet has reviewed the scope, justification and economic modelling for the relevant programs. Key updates include:

- adopting annualised unplanned replacement costs in the financial consequence modelling
- removing risk allowances except where specifically justified
- refining replacement volumes
- providing stronger asset-condition evidence
- clarifying where bundled delivery remains prudent and efficient, and
- incorporating additional risk considerations where appropriate, including bushfire and collateral damage risks for relevant transmission line assets.

The revised proposal reflects reduced overall forecast volumes across both asset replacement and compliance programs compared with the initial proposal, while retaining works that are required to manage material asset safety, reliability and compliance risks. The revised scope focuses on assets with demonstrated condition deterioration, end-of-life risk, compliance obligations or clear economic justification within the 2027–32 regulatory period.

The document provides the supporting rationale for each revised program, including power transformers and reactors, circuit breakers, communication systems, insulators, ground wires and line ground clearance programs. It demonstrates that AusNet has responded to the AER's concerns while preserving the minimum prudent scope needed to manage risk and maintain the long-term performance and safety of the transmission network.

# 2. Introduction

This section outlines the purpose and scope of this document in relation to AusNet's revised 2027-32 asset replacement and compliance programs, following the AER's Draft Decision

## 2.1. Purpose

This document sets out AusNet's revised 2027-32 proposal for network asset replacement and compliance capex programs. It presents key updates AusNet has made since the initial proposal in response to AER's draft decision, including revisions to forecast volumes, economic modelling, risk treatment and supporting justification.

The document should be read in conjunction with the Asset Management Strategies included with AusNet's initial proposal.

## 2.2. Scope

This document only presents revised network asset replacement and compliance capex programs, which includes:

- Asset replacement capex programs
  - Power transformers and oil filled reactors replacement program
  - Circuit breakers (CBs) replacement program
  - Communication systems replacement program
  - Transmission line insulators replacement program
  - Transmission line ground wires condition-based replacement program
- Asset compliance capex programs
  - Transmission line ground wires capacity-based replacement program
  - Tranche 1 Rectification Low Spans
  - Management of transmission line ground clearances

It focuses on demonstrating the prudency and efficiency of the revised forecast volumes, including the updated modelling assumptions, additional evidence and program-specific risk assessments used to support the revised scope. For the ground wire programs, this includes a more detailed assessment of condition, capacity, bushfire and collateral damage risks.

# 3. Background

This section provides background on AusNet's initial proposal for asset replacement and compliance programs listed in section 2.2, the AER's draft decision and the key reasons for the AER's alternative forecast.

## 3.1. AusNet's Initial Proposal

On 31 October 2025, AusNet submitted its initial proposal for the 2027-32 regulatory period. The proposal included $433.6 million for risk-based asset replacement and risk-based compliance programs comprising:

- $303.7m for asset replacement programs
- $129.9m for asset compliance programs.

The proposed programs were intended to manage safety, reliability, compliance and asset integrity risks across AusNet's transmission network. The scope of each program is summarised in Table 1, with further detail provided in AusNet's initial proposal and supporting Asset Management Strategies.

**Table 1: Asset replacement and compliance programs in AusNet's initial proposal**

| Program | Brief description of program scope |
|---|---|
| **Asset replacement programs** | |
| Power transformers and oil filled reactors replacement program | Replace the following components of 44 power transformers and 2 reactors:<br>• 81 deteriorated bushings<br>• 18 faulty winding temperature indicators (WTIs)<br>• 23 obsolete and unreliable electronic transformer management systems (TMS)<br>• three deteriorated outdoor phase insulated bus (PIB) systems. |
| CBs replacement program | Replace 35 deteriorated CBs across 13 terminal stations. |
| Communication system replacement program | Replace:<br>• 5 All Dielectric Self Supporting (ADSS) cables<br>• 24 point-to-point radio links<br>• 255 equipment across six network technologies<br>• operational telephony network across 39 transmission network sites. |
| Insulators replacement program | Replacement of 1,551 deteriorated insulator equipment locations, which represents 9% of the insulator fleet. Majority of these insulators are 500kV insulators at 1,229 (or 79%) insulator equipment locations. |
| Ground wires condition-based replacement program | 116km of like-for-like ground wire replacement and 22km of steel ground wire conversion to optical fibre ground wire (OPGW). |
| **Asset compliance programs** | |
| Ground wires rating-based compliance replacement program | Replace 149km of steel under-rated ground wire with larger sized aluminium conductor steel reinforced (ACSR) ground wire to increase fault current capacity. |
| Tranche 1 Rectification Low Spans | Raise 16 high priority low spans with very low clearance and high risk land use. Six of these spans were highlighted as a priority to Energy Safe Victoria. These 16 spans will be rectified across 2022-27 and 2027-32 regulatory periods. |

| Program | Brief description of program scope |
|---|---|
| Management of transmission line ground clearances | The remaining 80[1] high risk low spans have been proposed to be rectified in the 2027-32 regulatory period. Majority of these spans are concentrated on four key transmission lines. |

# 3.2. AER Draft Decision

On 30 June 2026, AER published its Draft Decision and reduced the total capex for these programs to $208.9m. This represents a $224.7m reduction, or 51.8% from AusNet's initial proposal. The reduction comprises of:

- $131.9m (or 43.4%) reduction for the asset replacement programs
- $92.8m (or 71.4%) reduction for the asset compliance programs

The AER's alternative forecast is summarised in Table 3.

## 3.2.1. AER alternative capex forecast

Table 2 compares AusNet's initial proposal with the AER's Draft Decision for each asset replacement and compliance program. The largest reductions relate to transmission line insulators, management of transmission line ground clearances, communication systems and ground wires.

**Table 2: AusNet's initial proposal and AER's draft decision ($m, real 2026-27)[2]**

| Program | Initial proposal | Draft decision | Difference ($) | Difference (%) |
|---|---|---|---|---|
| **Asset replacement programs** | | | | |
| Power transformers and oil filled reactors | 21.8 | 13.2 | -8.6 | -39.5% |
| CBs | 21.2 | 11.3 | -9.8 | -46.5% |
| Communication systems | 80.9 | 58.2 | -22.6 | -28.0% |
| Transmission line insulators | 158.0 | 79.6 | -78.3 | -49.6% |
| Transmission lines conductors (ground wires) | 21.8 | 9.5 | -12.3 | -56.5% |
| ***Subtotal*** | ***303.7*** | ***171.8*** | ***-131.9*** | ***-43.4%*** |
| **Asset compliance programs** | | | | |
| Transmission lines conductors (ground wires) | 31.9 | 13.5 | -18.4 | -57.7% |
| Tranche 1 rectification low spans | 22.6 | 13.7 | -9.0 | -39.6% |
| Management of transmission line ground clearances | 75.4 | 9.9 | -65.4 | -86.8% |
| ***Subtotal*** | ***129.9*** | ***37.1*** | ***-92.8*** | ***-71.4%*** |
| **TOTAL** | **433.6** | **208.9** | **-224.7** | **-51.8%** |

[1] As set out in AusNet's initial proposal and accompanying AMS 10-79 Line Conductors and Ground Wires, there is a total of 114 high risk spans, of which 16 spans will be addressed as part of the Priority 1 Spans and 18 spans will be addressed by VicGrid's Transmission Plan, leaving 80 high risk spans to be addressed in the 2027-32 regulatory period.
[2] AER, AusNet Services transmission determination 2027-32 Draft Decision Attachment 2 – capital expenditure, June 2026, Table A-2 and Table A-3, pg. 29 and 35, Draft decision | Australian Energy Regulator (AER)

## 3.2.2. AER's reasons for its Draft Decision

The AER outlined its reasons for these reductions in Appendix A.2 and A.3 of Attachment 2 capital expenditure AusNet 2027-32 draft decision for asset replacement and compliance programs respectively.[3] The key themes are summarised below.

### 3.2.2.1. Bundling of asset replacements that are not economic in the 2027-32 period

AusNet's economic modelling identifies the first year in which asset replacement becomes economic by comparing the expected cost of failure with the planned asset replacement cost.

The AER accepted that constructability, delivery efficiency, asset integrity and reliability are relevant considerations in determining replacement timing. However, it considered that departures from economic timing should be limited and supported by case-by-case evidence demonstrating that bundled delivery is more efficient than returning to site in later years.

### 3.2.2.2. Inconsistent treatment of replacement costs in financial consequence modelling

Financial consequence includes the costs that arise when an asset fails, including expenditure required to replace the failed asset and restore service.

The AER considered that AusNet's use of full unplanned replacement cost in the financial consequence of failure, compared with annualised planned replacement cost, could overstate failure costs and create a bias towards earlier replacement.

The AER's alternative forecast applied annualised unplanned replacement costs to provide a more consistent comparison with planned replacement costs.

### 3.2.2.3. Lack of evidence of overall network deterioration

The AER had provided the feedback below;

Assessments of network and asset condition rely heavily on inspection and testing outcomes, which are reflected in defect notifications. AusNet has provided data on reported defects over time for most asset classes. This information does not indicate a broad deterioration in network condition, which is used as a proxy for future reliability. Based on the information before us, we consider that AusNet has not demonstrated a deterioration in overall network condition that would justify replacement activity materially above historical levels.

### 3.2.2.4. Inclusion of unjustified and inefficient risk allowances

The AER considered that AusNet had included risk allowances in its capex that had not been sufficiently justified and did not represent efficient costs. The AER removed risk allowances for all relevant projects in its alternative forecasts.

Chapter 4 sets out how AusNet has responded to these concerns in its revised proposal, with program-specific detail provided in Chapters 5 to 10.

[3] AER, AusNet Services transmission determination 2027-32 Draft Decision Attachment 2 – capital expenditure, June 2026, Appendix A.2 and A.3, pg. 22 to 35, Draft decision | Australian Energy Regulator (AER)

# 4. Revised asset replacement and compliance programs

AusNet has revised its asset replacement and compliance programs in response to the AER's Draft Decision. The revised proposal updates forecast volumes, economic modelling, risk treatment and supporting evidence, while retaining the scope required to manage safety, reliability, compliance and asset integrity risks across the transmission network.

Section 4.1 summarises AusNet's response to the common issues raised by the AER with section 4.2 summarising the revised forecast volumes for these programs. Program-specific responses and revised forecast volumes are provided in Chapters 5 to 10.

## 4.1. AusNet's approach to AER Draft Decision

This section outlines AusNet's response to the key themes raised by the AER across asset replacement and compliance programs as set out in section 3.2.2. These themes include bundling, financial consequence modelling, defect-based evidence and risk allowances.

### 4.1.1. Bundling of asset replacements that are not economic in the 2027-32 period

AusNet has reviewed the use of bundled delivery across the relevant asset replacement and compliance programs. In the revised proposal, AusNet has either removed bundled scope where it is no longer justified, or provided further evidence where bundled delivery remains prudent and efficient.

Bundled delivery has been retained where returning to site in later years would increase cost, delivery risk, safety exposure or outage requirements. This includes programs where a complete system, line section or coordinated delivery approach is necessary to efficiently manage asset integrity, compliance or reliability risks.

For the revised proposal, AusNet has:

- included only economic bundled asset replacement volumes
- provided further justification for complete or section-based replacement approaches for communication systems and ground wire rating-based compliance replacement programs as it is not technically feasible to replace individual assets or spans
- clarified the cost efficiency of bundled delivery for ground wire condition-based replacement works
- included additional risk considerations, where relevant, including bushfire and collateral damage risks for transmission line assets.

**Bushfire and collateral damage risks**

Bushfire and collateral damage risks were previously conservatively excluded for transmission line assets in the initial proposal. These risks have now been incorporated where relevant to better reflect the consequences of asset failure.

Bushfire risk reflects the likelihood and consequence of an asset failure initiating a bushfire. Collateral damage risk reflects the likelihood and cost of a transmission asset failure damaging surrounding assets, resulting in the need to repair or replace the damaged asset. These risks have been considered in the revised assessment of the insulator, ground wire and low span programs, with program-specific details provided in Chapters 8 to 10.

Refer to 4.4.09 AusNet - AMS 01-09 Asset Risk Assessment Overview for further details on these risks.

### 4.1.2. Financial consequences

AusNet has updated the treatment of unplanned asset replacement costs in response to the AER's concern about inconsistent financial consequence modelling.

The revised economic models now apply annualised unplanned replacement cost across the relevant asset replacement and compliance programs, providing a more consistent comparison with annualised planned replacement costs. Although unplanned replacement costs are typically higher than planned replacement costs, AusNet has conservatively used the same annualised cost for both unplanned and planned replacements.

AusNet has also reviewed the inclusion of emergency works costs associated with asset failure, including costs required to make safe, restore service and reinstate damaged assets. These costs have been included where they are relevant and supported by the failure consequence assessment for the program.

### 4.1.3. Asset condition deterioration

AusNet uses asset health and condition assessments as the primary indicators of asset deterioration and replacement need, whereas defect notifications identify specific unserviceable asset issues requiring corrective maintenance. Defect notifications, therefore, represent a lagging indicator of asset deterioration and are not, in isolation, a reliable measure of overall asset condition or future replacement trend requirements. While defect notifications are an important output of inspection and testing programs, they identify specific unserviceable asset issues requiring corrective maintenance and are not, in isolation, a reliable indicator of overall asset condition or future replacement requirements

For many transmission asset classes, condition deterioration occurs progressively over an extended period before an asset becomes unserviceable or generates a defect notification. Consequently, the absence of increasing defect notifications should not be interpreted as evidence that asset condition has remained stable or that replacement requirements should remain at historical levels.

AusNet's replacement forecasts are therefore based on observed and modelled asset condition, asset health indices, risk assessments and engineering analysis. Consistent with prudent asset management practice, these approaches are designed to identify and address deteriorating asset condition before assets become unserviceable or experience in-service failure.

Evidence supporting this assessment is provided in Section 5 (Asset Health) of each submitted Asset Management Plant Strategy and has been a longstanding component of AusNet's Asset Management Strategies submitted in previous regulatory periods. Asset condition trends reflect both the underlying rate of asset deterioration and the level of replacement investment undertaken over time.

Program-specific evidence is provided in the relevant subsequent chapters. These assessments demonstrate why the forecast replacement programs are driven by emerging condition and risk profiles, rather than historical defect notification trends alone.

### 4.1.4. Risk allowances

AusNet has accepted the AER's Draft Decision to remove risk allowances from relevant programs, except where a specific allowance remains justified.

The only retained risk allowance relates to the Portland tower replacement Stage 2 project, which is addressed separately. All other relevant risk allowances have been removed from the revised proposal.

## 4.2. AusNet's revised forecast volumes

Based on the approach outlined in section 4.1, AusNet has revised the forecast volumes for asset replacement and compliance programs. The revised volumes are summarised in Table 3.

Overall, the revised proposal reduces forecast volumes across both asset replacement and compliance programs compared with the initial proposal. The retained scope reflects updated modelling assumptions, refined program scope, additional evidence and program-specific risk assessments.

The remainder of this document set outs the prudency and cost efficiency of the revised forecast volumes for each program.

**Table 3: Revised forecast volumes for asset replacement and compliance programs**

| Program | Initial proposal, A (number / km) | Revised proposal, B (number / km) | Change from Initial Proposal, B-A (number / km) |
|---|---|---|---|
| **Asset replacement programs** | | | |
| Power transformers and oil filled reactors | 125 | 64 | -61 |
| CBs | 35 | 31 | -4 |
| Communication systems | 121 | 121 | 0 |
| Transmission line insulators | 1,551 | 1,514 | -37 |
| Transmission lines ground wires | 138 | 133 | -5 |
| **Asset compliance programs** | | | |
| Transmission lines ground wires | 149 | 101 | -48 |
| Tranche 1 rectification low spans[4] | 16 | 16 | 0 |
| Management of transmission line ground clearances | 80 | 19 | -61 |

[4] Tranche 1 is an inflight project that will address 16 low spans, and straddles the current and next regulatory periods. The project is on track to complete 3 of the 16 low spans, prior to April 2027 with the remainder in the 2027-32 regulatory period. This is reflected in the forecast capex.

# 5. Power transformers and reactors

This section sets out the AER draft decision specific to power transformers and oil filled reactors replacement programs, AusNet's updates since the initial proposal, and the resulting revised volume forecast.

## 5.1. AER Draft Decision

After the publication of the Draft Decision on 30 June 2026, AusNet sought clarification from the AER on its treatment of the power transformers and oil filled reactor replacement program.

In addition to the broader adjustments for unplanned replacement cost and risk allowance outlined in Chapter 3, the AER clarified that it had applied age-based adjustments to bushing replacement volumes as follows:

- accepted replacement cost of bushings installed in 1962
- accepted half the replacement cost of bushings installed between 1979 to 1992, reflecting replacements over two regulatory periods
- did not accept replacement cost of bushings installed after 2002.

## 5.2. AusNet's updates

This section outlines the updates AusNet has made in response to the AER Draft Decision, including updates to financial consequence modelling, removal of risk allowance, revised bushing evidence, corrected installation dates and updated unit rates. Refer to 4.4.07 AusNet – Power Transformers Economic Model for details.

### 5.2.1. AusNet's response to AER Draft Decision

In response to AER's Draft Decision, AusNet has:

- updated the financial consequence modelling to annualise unplanned replacement costs, consistent with section 4.1.23.2.2.2
- removed the risk allowance, consistent with section 4.1.4
- reviewed the bushing replacement forecast to reflect asset condition and corrected installation dates.

#### 5.2.1.1. Bushings

In response to AER's age-based adjustments for bushings, AusNet has reviewed the bushing replacement scope and supporting evidence. The revised proposal:

- clarifies that bushing probability of failure is based on asset condition, not age, by adding asset health index in the economic model
- corrects installation date errors identified in SAP
- updated safety risks
- updated unit rates.

**2027-32 bushing replacement program is part of a wider long-term bushing replacement program**

The 2027–32 bushing replacement scope forms part of a wider long-term replacement program spanning the 2022–27, 2027–32 and 2032–37 regulatory periods.

The revised 2027–32 scope prioritises bushings in poorer condition and with higher service risk. Deferring these bushings on the basis of age alone would increase the likelihood of bushing failure, with potential consequences including transformer or reactor failure, safety impacts, supply interruptions and long repair or replacement lead times.

**Bushing probability of failure has been based on asset condition**

AusNet's bushing probability of failure is informed by asset condition, including mechanical and electrical condition indicators, rather than age alone.

An age-based approach does not fully reflect bushing deterioration because condition can be affected by factors such as transformer vibration, oil leaks, corrosion, seal deterioration, insulation condition, manufacturer-specific issues and environmental exposure. These factors are captured through AusNet's bushing health assessment, which combines mechanical and electrical condition indicators to assess service risk.

The revised proposal provides additional supporting information on bushing condition, including health index, where relevant to the retained scope.

The two youngest [C-I-C] and [C-I-C] bushings, as shown in figure 1 and 2 below, which are retained in the revised forecast and initial proposal, were installed in 1992 and 1989 respectively. Both groups show the condition issues that support replacement within the 2027-32 period.

- The 1992 [C-I-C] bushings show signs of advanced internal oil degradation and oil leaks with no available spare bushings. See Figure 1
- The 1989 [C-I-C] bushings have mechanical issues, including broken oil seals and oil leaks, and some cannot be tested because the test tap cover cannot be opened. See Figure 2.

Continued deterioration of these bushings could increase the likelihood of failure, safety risk and collateral damage to adjacent equipment.

**Figure 1: 1992 [C-I-C] bushings with oil leak**

**Figure 2: 1989 [C-I-C] bushings with oil leak and corrosion**

For further details, refer to AMS 10-67 Power Transformers and Oil Filled Reactors, which was submitted with the initial proposal.

**Updated safety risks**

Oil impregnated paper (OIP) type bushing failures can present a significant safety risk due to the potential for catastrophic dielectric failure, resulting in violent equipment rupture, fire, projectile hazards, and the release of hot oil in proximity to personnel and critical substation equipment.

AusNet has updated the safety-risk inputs to the economic model to better reflect the risks associated with materials used in different technology bushings and the greater potential consequences of failure at higher voltage. Refer to 4.4.09 AusNet - AMS 01-09 Asset Risk Assessment Overview for further details.

**Updated incorrect installation dates**

AusNet identified errors in the SAP installation dates for five sets of bushings, which were incorrectly recorded as having been installed after 2002. These incorrect dates were incorporated into the initial proposal. The dates have now been corrected in SAP and the economic model 4.4.07 AusNet – Power Transformers Economic Model to reflect their actual installation in the early 1980s.

## 5.2.2. Updates to unit rates for TMS and bushings

AusNet has updated the unit rates for TMS and bushing replacements from those used in the initial proposal. There has been an increase in the unit rate primarily driven by higher material and installation costs. Material costs are based on the latest market reference pricing, while installation costs are derived from contractor quotations for current in-flight projects. Both cost assumptions have been independently validated by AMCL. Refer to AusNet - Appendix 3A Revised Unit Rates document.

As a result, the revised proposal reduces TMS and bushing replacement volumes while remaining within the AER Draft Decision capex allowance for these asset groups. The revised volumes prioritise higher-risk assets and do not materially increase overall network risk.

# 5.3. AusNet's revised volume forecast

The impact of the updates outlined in section 5.2 on revised replacement volumes are shown in Table 4. Overall, the revised forecast reduces the TMS and bushing replacement volumes compared with the initial proposed, reflecting updated unit rates, corrected asset data and prioritisation of assets with the strongest condition-based justification.

**Table 4: Power transformers and reactors initial and revised replacement volumes**

| Assets | Initial volume (number) | Revised volume (number) |
|---|---|---|
| Bushing | 81 | 34 |
| WTI | 18 | 18 |
| TMS | 23 | 9 |
| PIB | 3 | 3 |
| **Total** | **125** | **64** |

# 6. Circuit Breakers

This section sets out the updates AusNet has made to the circuit breaker replacement program in response to the AER Draft Decision, and the resulting revised volume forecast.

## 6.1. AER Draft Decision

AER has not made specific adjustments to the circuit breaker asset class, besides the broader adjustments for unplanned replacement cost and risk allowance outlined in Chapter 3.

## 6.2. AusNet's updates

This section outlines the updates AusNet has made in response to AER draft decision and updates to the economic model inputs since the initial proposal. Refer to economic model 4.4.06 AusNet – Circuit Breakers Economic Model for details.

### 6.2.1. AusNet's response to AER Draft Decision

In response to AER's Draft Decision, AusNet has reviewed the circuit breaker proposed replacement program to ensure the revised forecast is focused on circuit breakers with demonstrated condition, reliability or end-of-life drivers within the 2027–32 regulatory and updated the economic modelling consistent with Chapter 4. This includes:

- updated the financial consequence modelling to annualise unplanned replacement costs, consistent with section 4.1.2
- removed the risk allowance, consistent with section 4.1.4

### 6.2.2. Updates to economic model inputs

In addition, AusNet has updated the inputs to the economic model for safety risks. Safety risks have been updated to more accurately reflect the safety risks associated with materials used in the different technology CBs, and particularly the greater likelihood of consequences based on higher CB voltage. Refer to 4.4.09 AusNet - AMS 01-09 Asset Risk Assessment Overview for further details.

## 6.3. AusNet's revised volume forecast

The impact of the updates outlined in section 6.2 on revised replacement volumes are shown in Table 5. AusNet's revised forecast reduces the circuit breaker replacement volume from 35 circuit breakers in the initial proposal to 31 circuit breakers.

The revised forecast represents a reduction of four circuit breakers compared with the initial proposal. The retained scope prioritises assets with the strongest condition-based and risk-based justification, while aligning the program with the updated modelling assumptions adopted in the revised proposal.

**Table 5: CBs initial and revised replacement volumes**

| Assets | Initial volume (number) | Revised volume (number) |
|---|---|---|
| 220kV CBs | 14 | 12 |
| 66kV CBs | 20 | 18 |
| 22kV CB | 1 | 1 |

| Assets | Initial volume (number) | Revised volume (number) |
|---|---|---|
| **Total** | **35** | **31** |

# 7. Communication Systems

This section sets out the updates AusNet has made to the communication systems replacement program in response to the AER Draft Decision, and the resulting revised volume forecast.

The communication systems asset class comprises of disparate asset types, which can be grouped into two asset types – system asset and discrete asset. The revised proposal continues to distinguish the replacement approach for these two asset types:

- **complete system replacement for system assets**, where it is not technically feasible to replace individual assets due to inability to maintain interoperability, operational functionality and vendor support for the system. This is because system assets operate as an integrated network, where:
  - asset obsolescence or end-of-support risks affects the entire system
  - partial replacement would result in incompatibility of equipment.
- **individual asset replacement for discrete assets**, where it is technically feasible to replace individual assets.

## 7.1. AER Draft Decision

AER has not made specific adjustments to the communication system asset class, besides the broader adjustments for bundling, unplanned replacement cost and risk allowance outlined in Chapter 3.

## 7.2. AusNet's updates

This section outlines the updates AusNet has made in response to AER draft decision and updates to the economic model since the initial proposal. Refer to economic model 4.4.08 AusNet – Communication Systems Economic Model for details.

In response to AER's Draft Decision, AusNet has reviewed the communication systems replacement program and updated the economic modelling consistent with Chapter 4. This includes:

- updated the financial consequence modelling to annualise unplanned replacement costs and include emergency works costs, consistent with section 4.1.2
- removed risk allowance, consistent with section 4.1.4.

The updated economic assessment confirms that most of the communication systems assets included in the initial proposal remain economic to replace and are, therefore, replaced within the 2027-32 regulatory period. A small number of assets, across the following equipment categories, have been retained within the revised scope following consideration of broader network and operational requirements:

- system asset type, which require complete system replacement[5]:
  - Exchange (EXCH)
  - Synchronous Digital Hierarchy (SDH)
- discrete asset type, which could be replaced individually
  - Digital Interface Cubicle (DIC)

The remainder of this section focuses on the small number of assets that are not economic on a standalone basis within the 2027–32 period but are retained because their inclusion is prudent and efficient.

[5] Bundled system replacement has been shown in the economic model 4.4.08 AusNet – Communication Systems Economic Model based on project ID, where EXCH and SDH system bundled replacements are grouped under project ID TD-0009910 and TD-00101116 respectively.

## 7.2.1. A complete replacement approach must be taken for operational telephony network (EXCH assets) and SDH assets

AusNet has retained a complete replacement approach for EXCH and SDH assets where this is necessary to maintain end-to-end functionality and avoid creating stranded, unsupported or incompatible components.

This approach is particularly relevant for systems that provide crucial operational communications, protection signalling, monitoring, control or site connectivity across the transmission network. These systems rely on compatibility between equipment, software, configuration, vendor support and cyber security requirements. Thus, replacing only the components that are individually economic within the 2027-32 period is not technically feasible.

The revised scope, therefore, reflects a system-based assessment of replacement need, rather than a purely component-level assessment.

### 7.2.1.1. The operational telephony EXCH network must be completely replaced

AusNet owns, operates and maintains its own telephone network for critical operational communications, including System Black events. It provides highly reliable telephone (voice) capability between terminal stations and the control room to enable the safe operation and maintenance of the electricity network.

This critical operational telephony network spans across 39 transmission network sites and is underpinned by the legacy exchange network (EXCH). The analogue EXCH technology is obsolete with no vendor support and can no longer be purchased.

The existing operational telephony network (with EXCH assets) functions as a single network. It is not technically feasible to operate a single network with a mix of legacy EXCH assets and modern assets due to interoperability issues. This means all 39 EXCH assets must be replaced simultaneously (i.e. no partial replacement). Further, it is economic to replace these 39 EXCH as a bundle in the 2027-32 regulatory period.

### 7.2.1.2. The looped SDH system must be completely replaced

The SDH technology is one of the communication technologies that underpins network operational capabilities, including protection schemes, Supervisory Control and Data Acquisition (SCADA), weather monitoring systems, dynamic line ratings and the transfer of operational information to the Australian Energy Market Operator (AEMO). Failure of these communication assets would, therefore, impact broader network operation capabilities beyond telecommunication functions.

This legacy SDH technology is obsolete with no vendor support and can no longer be purchased. Decommissioned assets have been retained as spares for the remaining fleet.

As the SDH operates as a looped system, all SDH assets within a loop must be replaced simultaneously (i.e. no piecemeal replacement). The proposed 2027-32 SDH replacement program is the continuation of the current 2022-27 SDH replacement program. It proposes to replace the two SDH loops comprising of 38 SDH assets in the Metro and Gippsland regions, which are economic to replace as bundles in the 2027-32 regulatory period.

## 7.2.2. Only economic replacement of DIC discrete assets has been proposed

Unlike EXCH and SDH assets, DIC are discrete assets that could be replaced individually without impacting communication functionality. The revised scope only includes DIC assets that are economic to be replaced in the 2027-32 regulatory period.

There are 124 DIC assets that are economic to be replaced in the 2027-32 regulatory period. However, in light of customer affordability and deliverability, AusNet has prudently planned the replacement of these DIC assets over three regulatory periods and has only proposed 44 out of 124 (or 35%) of these economic DIC assets to be replaced in the 2027-32 regulatory period as shown in Table 6.

As a result of the economic modelling update, four of the initially proposed DIC assets have become uneconomic to be replaced in the 2027-32 period. These four uneconomic DIC assets have been swapped with four assets that are economic to be replaced in the 2027-32 period. Thus, the proposed volume of DIC asset replacements in the 2027-32 regulatory period remains unchanged.

**Table 6: Economic DIC asset replacements in the 2027-32 regulatory period**

| Communication system assets | Number of economic asset replacements in 2027-32 period | Proposed number of economic asset replacements in 2027-32 period |
|---|---|---|
| DIC | 124 | 44 (35%) |

# 7.3. AusNet's revised volume forecast

The impact of the updates outlined in section 7.2 on revised replacement volumes are shown in Table 7. AusNet's revised forecast retains the communication systems replacement volume from the initial proposal, with no change in total forecast volume.

**Table 7: Communication system initial and revised replacement volumes**

| Assets | Initial volume (number) | Revised volume (number) |
|---|---|---|
| EXCH | 39 | 39 |
| SDH | 38 | 38 |
| DIC | 44 | 44 |
| **Total** | **121** | **121** |

# 8. Insulators

This section sets out the updates AusNet has made to the insulator program in response to the AER Draft Decision, and the resulting revised volume forecast.

## 8.1. AER Draft Decision

AER has not made specific adjustments to the insulator asset class, besides the broader adjustments for unplanned replacement cost and risk allowance as outlined in Chapter 3.

## 8.2. AusNet's updates

In response to AER's Draft Decision, AusNet has:

- included bushfire risks and collateral damage risks, consistent with section 4.1.1, which had been conservatively neglected in the initial proposal
- updated the financial consequence modelling to annualise unplanned replacement costs, consistent with section 4.1.2
- removed risk allowance, consistent with section 4.1.4.

**Only included insulator replacements that are economic to be replaced in the 2027-32 regulatory period**

As a result of these updates, 90 insulators have been identified as uneconomic to be replaced in the 2027-32 regulatory period as shown in Table 8. As insulators on different towers could be replaced separately (i.e. bundling is not required), these 90 insulators have been removed from the revised insulator replacement program.

**Table 8: Initially proposed uneconomic insulator replacements in the 2027-32 regulatory period**

| Transmission lines | 220kV insulators | 330kV insulators | 500kV insulators | Total |
|---|---|---|---|---|
| DDTS-SHTS | 2 | | | 2 |
| HWTS-SMTS 2 | | | 20 | 20 |
| MOPS-HYTS 2 | | | 2 | 2 |
| SMTS-SYTS 2 | | | 61 | 61 |
| SYTS-KTS | | | 5 | 5 |
| **Total** | **2** | **0** | **88** | **90** |

However, the updates resulted in additional 55 insulators becoming economic in the 2027-32 regulatory period as shown in Table 9. These insulators have been included in AusNet's revised insulator replacement program, which now only includes economic insulator replacements for the 2027-32 period. Refer to economic model 4.4.01 AusNet – Insulators Economic Model for details.

**Table 9: Additional economic insulator replacements in the 2027-32 regulatory period**

| Transmission lines | 220kV insulators | 275kV insulators | 330kV insulators | 500kV insulators | Total |
|---|---|---|---|---|---|
| DDTS-SMTS 1 | | | 2 | | 2 |
| DDTS-SMTS 2 | | | 2 | | 2 |
| HWPS-ROTS 1 | 1 | | | | 1 |
| HYTS-SESS 1 | | 19 | | | 19 |
| SMTS-TTS 2 | 10 | | | | 10 |

| Transmission lines | 220kV insulators | 275kV insulators | 330kV insulators | 500kV insulators | Total |
|---|---|---|---|---|---|
| TRTS-HYTS 1 | | | | 21 | 21 |
| **Total** | **11** | **20** | **4** | **21** | **55** |

# 8.3. AusNet's revised volume forecast

The impact of the updates outlined in section 8.2 on revised replacement volumes are shown in Table 10. It shows the revised volume forecast has decreased by 37 insulators.

**Table 10: Insulator initial and revised replacement volumes**

| Assets | Initial volume (number) | Revised volume (number) |
|---|---|---|
| 220kV insulators | 65 | 73 |
| 275kV insulators | 255 | 274 |
| 330kV insulators | 2 | 6 |
| 500kV insulators | 1,229 | 1,161 |
| **Total** | **1,551** | **1,514** |

Since the initial proposal, AusNet has published the Project Specification Consultation Report (PSCR)[6] on 7 August 2026 for the Regulatory Investment Test for Transmission (RIT-T) to manage the risks posed by deteriorated 500kV insulators on the 500kV HWTS-SMTS No. 1 and No. 2 transmission lines in the Gippsland region. These insulators are part of the revised insulator replacement program. They have been prioritised over other insulators in the revised insulator replacement program due to their accelerated deterioration and the timelines to meet the investment need.

[6] AusNet, Managing risks from deteriorated 500kV insulators in the Gippsland region RIT-T PSCR, Aug 2026, RIT-T PSCR

# 9. Ground wires

This section sets out the updates AusNet has made to the transmission line ground wire programs in response to the AER Draft Decision, and the resulting revised volume forecasts.

The ground wire programs include:

- condition-based replacement of deteriorated ground wires
- rating-based replacement of under-rated ground wires.

## 9.1. AER Draft Decision

The AER has not made specific adjustments to the ground wire asset class, besides the broader adjustments for bundling, unplanned replacement cost and risk allowance outlined in Chapter 3.

## 9.2. AusNet's updates

In response to the AER Draft Decision, AusNet has reviewed the ground wire programs and updated the economic modelling consistent with Chapter 4. This includes applying annualised unplanned replacement costs and removing risk allowances and updating the likelihood of ground wire failure in the ratings bases replacement program.

AusNet has also undertaken a more detailed risk assessment for the ground wire programs. This assessment considers the specific condition, capacity, bushfire and collateral damage risks associated with the retained scope.

The revised proposal continues to distinguish between two drivers for ground wire replacement:

- **condition-based replacement**, where ground wires are deteriorated and replacement is required to manage asset integrity, safety, reliability, bushfire and collateral damage risks
- **rating-based replacement**, where ground wires are under-rated for forecast fault levels and replacement is required to maintain compliance and network performance.

These different drivers also influence the technically feasible solution required to address the different needs of each programs. The condition-based replacement program could technically be addressed by single span replacements, but, this would not be a practical or efficient approach. By contrast, single span replacement is not a technically feasible solution for the rating-based replacement program. Replacing only a single span within an underrated line section would introduce ground wires with different fault current capacity across that section and will further constrain the ground wire's overall rating. The rationale for the different approaches adopted for the two programs is set out in the following subsections.

In terms of likelihood of ground wire failure, the original rating-based replacement submission applied a network-average probability of failure of ground wire derived from historical line fault occurrence data across the transmission network. The revised assessment adopts a more line-specific approach by using historical fault occurrence data for individual transmission lines to derive line-specific estimates. This approach better reflects the observed operating experience of each line, rather than assuming all lines have the same likelihood of exposure. As a result, some lines were assessed with a higher likelihood than the network average, while others were assessed with a lower likelihood. The revised methodology, therefore, does not systematically increase or decrease failure likelihoods across the portfolio. Rather, it improves the accuracy of the assessment by aligning the estimated likelihood of failure with the historical performance of each individual line. Details have been included in the economic model 4.4.03 AusNet – Groundwire Ratings Compliance Economic Model.

### 9.2.1. Condition-based replacement program

AusNet has reviewed the condition-based ground wire replacement scope to confirm where replacement remains justified within the 2027–32 regulatory period.

The retained scope is supported by observed deterioration, asset condition evidence and failure consequence assessment, noting that it is typical for ground wire conditions to differ along a line. The revised assessment incorporates bushfire and collateral damage risks where relevant, recognising that ground wire failure can result in network faults, conductor interaction, fire ignition risk or damage to adjacent transmission assets.

**Practical delivery of ground wire span replacements by strain-to-strain sections**

Ground wire replacement is most practically and efficiently delivered across strain-to-strain sections. These sections are bounded by strain structures, which provide the termination points needed to safely tension and replace the ground wire. This approach:

- avoids mid-span joints, consistent with AusNet's asset management approach. Joints introduce additional failure points, increase construction complexity and ongoing inspection and maintenance requirements and may reduce long term asset integrity and reliability.
- reduces installation costs by allowing the existing ground wire, where safe and practicable, to be used to pull through the replacement wire and enabling the work to be undertaken under live-line delivery hence minimising outages on an already constrained network; and
- minimises modifications to existing towers, generally limiting the scope to ground wire replacement with minimal strengthening of towers and foundations.

By contrast, replacing individual ground wire spans, or only selected spans within an existing strain-to-strain section, would require new strain points at each end of the span or new section. This would add terminations and fittings, require further structural assessments and potentially necessitate tower modifications, materially increasing the scope, complexity and cost of the works.

For these reasons, replacement by strain-to-strain section is the prudent and efficient delivery approach for the retained ground wire scope.

**Clarification on the unit rate used in the initial proposal**

The unit rate replacement costs shown in the initial proposal reflected the cost efficiency from the strain-to-strain section delivery approach. It is the unitised bundled costs and not the cost to replace individual spans separately.

This unitised bundled cost is lower than the cost to replace an individual span because it combines multiple consecutive spans within a strain-to-strain section into a single delivery program, allowing fixed costs such as mobilisation and outage management to be shared across the multiple spans and minimising the number and costs associated with creating new strain points.

Table 11 shows these fixed costs associated with a single span replacement. The fixed costs do not include the variable cost of the ground wire conductor, which depends on the length of the ground wire to be replaced.

**Table 11: Single span replacement costs**

| Fixed cost description | Cost (2026 $) |
|---|---|
| Mobilisation and demobilisation | [C-I-C] |
| Outage costs for two days | [C-I-C] |
| Creating new strain/tension points | [C-I-C] |
| **Total** | **336,106** |

**Replacing bundled strain-to-strain sections will cost less than replacing only the economic spans**

The AER draft decision noted AusNet has not provided sufficient detail on bundled scopes nor analysis that bringing forward additional works is more efficient than returning to the site in later years.

In response, AusNet has selected two strain-to-strain sections to demonstrate replacing the bundled strain-to-strain sections will cost less than replacing only the spans that are economic in the 2027-32 regulatory period. These strain-to-strain sections have been selected as they represent the full range of proposed strain section replacements.

While Table 12 presents two representative examples, AusNet has undertaken the same assessment for all economical bundled sections in the ground-wire condition-based replacement program. In each case, replacing the relevant section as a strain-to-strain section is more cost efficient than replacing only the spans that become economic during the 2027–32 regulatory period and returning to complete the remaining works in later regulatory periods.

Table 12 compares the cost to replace the bundled section against the cost to only replace spans that are economic in the 2027-32 period. It shows replacing only the economic spans costs 80% to 116% more than replacing the corresponding bundled strain-to-strain section. Refer to 4.4.11 AusNet – Groundwire Single Span vs. Bundled Replacement for more information.

**Table 12: Cost comparison of bundled strain-to-strain section replacement and economic spans replacement**

| Transmission line | Towers | Number of spans in bundled section | Number of 2027-32 economic spans within the bundled section[7] | Total bundled section replacement cost, A (2026 $) | Cost to only replace economic spans, B (2026 $) | Difference in costs (B-A) |
|---|---|---|---|---|---|---|
| CBTS-ERTS-LYD | T006-T017 | 11 | 4 | 567,065 | 1,021,715 | 454,650 (80%) |
| ROTS-YPS 7 | T177 – T267 | 76 | 35 | 3,515,343 | 7,596,638 | 4,081,296 (116%) |

Further, the costs estimate in Table 12 for replacing only the economic spans conservatively excludes the costs of replacing the uneconomic spans within the strain-to-strain section in future years.[8] When assessed at the strain-to-strain section level, the strategy of replacing only the economic spans will incur a substantially higher total strain-to-strain section cost compared with AusNet's bundled strain-to-strain section replacement approach.

This demonstrates AusNet's bundled strain section replacement approach delivers a more cost-efficient outcome than replacing only the economic spans in 2027-32 regulatory period.

**Proposed bundled replacements that are economic to be replaced in the 2027-32 regulatory period**

AusNet has only proposed in our revised proposal bundled replacements that are economic to replace in the 2027-32 regulatory period.

Refer to economic model 4.4.02 AusNet – Groundwire Condition Economic Model for details.

## 9.2.2. Rating-based replacement program

Ground wire thermal rating constraints are concentrated within the oldest parts of the transmission network, where present-day fault levels have significantly exceeded the original system design assumptions. The majority of the affected assets are located on the legacy 220 kV and 330 kV network, which was largely developed during the early 1960s when the network was designed for fault levels of approximately 7.5 GVA (19.7 kA at 220 kV). Ground wire design at the time predominantly focused on providing lightning shielding, with single or twin steel ground wires typically installed near terminal stations and single steel ground wires used along the remainder of the line. Consequently, the thermal ratings of these ground wires were not intended to accommodate the substantially higher fault current levels that have progressively emerged as the transmission network has expanded and fault levels have increased since the 2000s.

Conversely, when the 500 kV network was developed during the 1970s and 1980s, greater consideration was given to fault current carrying capability, resulting in the adoption of larger and higher-rated ground wires. As a result, ground wire thermal capacity is generally not a constraint on the 500 kV network. The current issue is, therefore, largely confined to sections of the legacy 220 kV and 330 kV network, where present-day fault levels now exceed the thermal capability of the original ground wire design. This has created a legacy risk that has emerged progressively over time as network fault levels have increased beyond the assumptions underpinning the original design. Looking forward, increasing renewable generation connections and associated network developments are expected to further increase fault levels in parts of the network, resulting in the need for additional ground wire replacement and uprating works. This will be addressed by VicGrid and customer projects

The rating-based ground wire replacement program addresses existing steel ground wires that are under-rated for current and forecast fault current levels. The program is compliance-driven and is required to ensure ground wires can safely perform their function under credible network fault conditions.

The overhead ground wire rating-based replacement program is therefore intended to maintain fault current rating compliance by increasing the fault current capacity of under-rated ground wires. Section 3.2 of AS/NZS 7000:2016 – Design of Overhead Lines requires overhead lines and earthing systems to be designed to withstand the mechanical and thermal effects of fault currents and associated fault durations, and to remain serviceable. This means ground wires must be rated to withstand the fault currents they are expected to experience.

AusNet's initial proposal included replacement of 149 km of under-rated steel ground wire with larger aluminium conductor steel reinforced (ACSR) ground wire to increase fault current capacity and maintain required network performance standards.

**The criticality of not exceeding ground wire fault current rating**

[7] The unitised bundled cost has been conservatively used to determine the economic timing of span replacement.
[8] The cost to replace uneconomic spans in the future is difficult to forecast due to the difficulty in predicting ground wire condition deterioration and hence, the economic replacement year, the appropriate replacement solution and associated cost.

AusNet has safety obligations under the Electricity Safety Act 1998 to manage the risk of conductor or ground wire failure resulting in a line drop. Replacing under-rated ground wires supports these obligations by reducing the risk that ground wires will fail to perform safely under credible fault conditions.

Ground wire fault current rating is the maximum return current the ground wire can safely carry during a fault without annealing or breaking. If the fault current flowing through a ground wire exceeds its rating, the ground wire may anneal, lose mechanical strength and experience a shortened service life. Over time, this may result in ground wire failure or breakage, with potential consequences including:

- public safety risk, including the potential for serious injury or fatality from contact with, or proximity to, an energised fallen ground wire
- public and personnel safety risk due to unsafe step and touch potential at towers
- bushfire ignition risk due to sparks from ground wire breakage and/or fallen ground wire
- compromised lightning protection for phase conductors
- supply interruption.

**Increasing ground wire rating requires all spans to be upgraded, including uneconomic spans**

Unlike condition-based replacement program, the ground wire rating-based replacement program must be assessed on a line-by-line basis and not on individual span basis.

Fault currents are safely dissipated into the ground by flowing through ground wires and the earthing systems of towers. This gradual dissipation of fault currents over ground wires and tower earthing results in decreasing fault currents experienced with increasing distance from the source of the fault, which is typically the terminal station.

The distribution of fault currents flowing through the ground wires and the tower earthing systems depends on the ground wire and tower earthing impedances, which will impact ground wire fault current rating and extent of any under-rating.

Increasing the rating of a ground wire span will increase the fault current flowing through the ground wire span instead of down into the tower earthing due to the lower impedance of higher rated ground wire compared to the impedance of the tower earthing. This will increase the fault current flowing through subsequent ground wire spans further down the line and thus, exacerbate or result in under-rating of ground wire spans further down the line away from the terminal station.

For these reasons, replacing only ground wire spans that are economic on a standalone basis will not address the fault level limitation of the ground wire line. Introducing isolated higher-rated spans which are economical would alter how fault current is distributed along the line, transferring a greater share of the fault current to the remaining lower-rated spans along the under rated line. This could worsen the existing under-rating and extend the constraint further along the line. A replacement of the entire under-rated section is required to remove the rating limitation without creating additional constraint.

AusNet has updated the economic model to reflect the analysis at ground wire line level and not ground wire span level, which was presented in the initial proposal.

**More detailed assessments have determined the full extent of remediation required**

For the initial proposal, AusNet undertook a desktop comparison of the existing fault current ratings of ground wires within 3km of terminal stations against the forecast fault current ratings from Australian Energy Market Operator (AEMO). This desktop analysis identified locations where ground wires may be under-rated and, therefore, at risk during fault events. It informed the initial proposed rating-based program.

As foreshadowed in the initial proposal, the desktop findings have necessitated detailed technical evaluations and modelling to determine the full extent of the remediation required.

AusNet first undertook a detailed risk assessment of each ground wire line. This assessment considered:

- historical incidents of ground wire failure
- safety risk based on ground wire location, including whether the line crosses roads or railways
- line length
- protection clearing time
- calculated thermal capacity of ground wire
- the difference between existing and required ground wire ratings.

Only medium and high-risk ground wire lines were then modelled to determine the required remediation scope. These lines have been included in the revised economic assessment. Low risk under rated ground wire lines have been excluded from the revised proposal for economic reasons.

This more detailed assessment has determined the actual length of ground wire required to be upgraded, which is different from the 3km length used in the initial proposal. These ground wires will need to be replaced with large sized ground wires to increase its fault current rating.

As these larger ground wires will pose additional mechanical forces on the existing towers and tower foundations, strengthening of existing towers and foundations to AS/NZS 7000 will also be required to withstand these additional forces.

**Better understanding of required remediation has led to increased costs**

The detailed assessments have led to increased scopes and costs compared to the initial proposal. The costs now include AS/NZS 7000 tower strengthening costs.

The tower strengthening costs had been previously conservatively excluded in the initial proposal because the scopes of tower strengthening works were unknown at the time of the initial proposal as it is site specific and dependant on the length of ground wire upgrade. The detailed assessments undertaken since the initial proposal included analysis of the impact of larger sized ground wire on the existing towers of the ground wire lines. The outcomes of this analysis have been extrapolated for the entire program to provide an estimated tower strengthening cost for the program.

**Included condition-based risks to reflect deteriorated ground wire condition**

The economic model submitted with the initial proposal only assessed the risks associated with ground wire failure due to insufficient capacity (i.e. under-rating).

AusNet has updated the model to include the condition-based risks associated with deteriorated ground wire condition, in the economic model. This risk has been applied conservatively only to the YPS-ROTS 7 transmission line, where inspections have identified some ground wire spans are in poor condition.

The revised economic assessment, therefore, better reflects the combined rating and condition-related risks relevant to the retained rating-based replacement scope.

Refer to economic model 4.4.03 AusNet – Groundwire Ratings Compliance Economic Model for details.

# 9.3. AusNet's revised volume forecast

The impact of the updates outlined in section 9.2 on revised replacement volumes are shown in Table 13.

For the **condition-based ground wire replacement program**, AusNet's revised forecast reduces the replacement volume from **138 km** in the initial proposal to **133 km**. The retained scope reflects the practical delivery of ground wire replacement by strain-to-strain section, updated economic modelling, and the inclusion of relevant condition, bushfire and collateral damage risks.

For the **rating-based ground wire replacement program**, AusNet's revised forecast reduces the replacement volume from **149 km** in the initial proposal to **101 km**. The retained scope reflects the more detailed line-level assessment of fault current under-rating, updated remediation requirements, tower strengthening costs, and relevant safety, compliance and condition-based risks.

Overall, the revised proposal reduces total ground wire replacement volumes from **287 km** to **234 km**, a reduction of **53 km** compared with the initial proposal.

The retained scope is focused on ground wire sections with the strongest condition, capacity, safety, compliance and consequence-based justification for delivery in the 2027–32 regulatory control period. It reflects a targeted program that responds to the AER's Draft Decision while maintaining the works required to manage material ground wire risks across the transmission network.

**Table 13: Ground wire initial and revised replacement volumes**

| Assets | Initial volume (km) | Revised volume (km) |
|---|---|---|
| **Condition-based replacements** | | |
| Like-for-like ground wire replacement | 116 | 111 |
| Steel ground wire conversion to OPGW | 22 | 22 |

| Assets | Initial volume (km) | Revised volume (km) |
|---|---|---|
| **Rating-based replacements (compliance)** | | |
| Steel ground wire conversion to ACSR ground wire | 149 | 101 |
| **Total** | **287** | **234** |

# 10. Line ground clearances

This section sets out the AER Draft Decision for AusNet's line ground clearance compliance programs, the updates AusNet has made in response, and the resulting revised volume forecast.

The line ground clearance programs include:

- Tranche 1 Rectification Low Spans
- Management of transmission line ground clearances (Tranche 2)

## 10.1. AER Draft Decision

The AER noted in its Draft Decision that AusNet's economic model assessed 103 spans across the network with a risk of failure rate classed as 'high-risk'[9] under AusNet's internal risk framework. The model identified 20 spans as economic to replace in the 2027–32 regulatory control period and did not identify any further spans as economic to remediate over the remaining modelling period to 2036.

AusNet's proposed expenditure across both Tranche 1 Rectification Low Spans and Management of Transmission Line Ground Clearances (Tranche 2) includes the cost of raising all 103 spans assessed in the model, rather than only the 20 spans identified as economic in the 2027–32 period. The AER's Draft Decision, therefore, included allowance for rectification of the 20 low spans identified as economic, including the six spans Energy Safe Victoria considered critical for AusNet to address.

Where AusNet considers additional works are required, including work needed to rectify the identified spans, the AER expects AusNet to provide information at an individual asset level in its revised proposal. Any such proposed works would need to be assessed on a case-by-case basis.

## 10.2. AusNet's updates

This section outlines the updates AusNet has made in response to AER Draft Decision and updates to the economic model since the initial proposal. Refer to economic model 4.4.04 AusNet – Low Spans Economic Model for details.

### 10.2.1. AusNet's response to AER Draft Decision

AusNet has reviewed the line ground clearance compliance programs in response to the AER Draft Decision and updated the economic modelling consistent with Chapter 4, including applying annualised unplanned replacement costs and emergency work costs, removing risk allowances and proposing only economic bundled low spans.

The revised proposal retains the 16 Tranche 1 low spans and reduces the Tranche 2, Management of transmission line ground clearances program from 80 spans to 19 spans.

The retained scope is focused on spans with the strongest compliance, safety and risk justification. AusNet has also reviewed adjacent span works and retained these only where they are required to efficiently resolve the identified clearance issue or avoid inefficient rework, additional outages, access impacts or increased safety exposure.

For low span rectification, the engineering solution often needs to consider the affected span in the context of the adjoining line section. In some cases, adjacent span works are required to achieve a compliant and enduring line profile. The retained bundled scope is, therefore, limited to locations where adjacent works are directly linked to the clearance rectification need.

[9] High-risk sites are categorised as intolerable under the ENA risk framework and must be addressed as far as practicable (AFAP). See AMS 10-79, Section 6.2.2 Detailed Risk Assessment Framework.

### 10.2.1.1. Both programs minimise safety and bushfire risks as far as practicable in accordance with Victoria safety regulations

AusNet's safety regulations are set out in the *Electricity Safety Act 1998 (Vic)* (**Act**) and subordinate regulations. AusNet has an overarching General Duty to minimise safety risk to a 'as far as practicable'. Compliance with the General Duty is subject to the highest penalties with regulated safety requirements.

Namely, under Section 98 of the Act to:

*design, construct, operate, maintain and decommission its supply network to minimise as far as practicable:*

- *the hazards and risks to the safety of any person arising from the supply network; and*
- *the hazards and risks of damage to the property of any person arising from the supply network; and*
- *the bushfire danger arising from the supply network.*

Practicable is defined in the Act as having regard to:

- severity of the hazard or risk in question; and
- the state of knowledge about the hazard or risk and any ways of removing or mitigating the hazard or risk; and
- the availability and suitability of ways to remove or mitigate the hazard or risk; and
- the cost of removing or mitigating the hazard or risk.

AusNet's risks assessment submitted as part of the revised proposal demonstrates compliance with Section 98 of the Act for Tranches 1 and 2, i.e., minimising risk to a level that is 'as far as practicable'.

Further, AusNet has other controls in place to manage the safety risks from low spans that will not be remediated under these programs, including:

- landowner engagement communication to increase their awareness and understanding,
- require permits to work for landowner activities beyond AusNet's general guidance
- periodic monitoring of land use changes and action accordingly
- periodic ground clearance checks and action accordingly.

### 10.2.1.2. Prudent low span remediation solutions based on low span types

AusNet has reviewed the low span scope in response to the AER's Draft Decision and developed remediation solutions based on the specific characteristics of each low span. This provides an asset-specific basis for the revised proposal and avoids applying a single standard treatment across all spans.

Adjacent span works are retained only where rectifying the identified low span alone would not resolve the clearance issue or would result in a suboptimal and less enduring solution. This ensures the retained scope is limited to works required to deliver a practical, compliant and efficient remediation outcome.

All low spans in the Tranche 1 and 2 programs could be classified into the following two types of low span cases:

- Multiple low spans within an existing strain-to-strain section such as consecutive adjacent low spans
- Single low span (i.e. adjacent spans are not low spans)

Based on these two types of low span cases, AusNet has prudently proposed different remediation solutions to meet the ground clearances required in AS/NZS 700: 2016 – Design of Overhead Lines as set out in Table 14.

**Table 14: Low span remediation solutions based on the two types of low span cases**

| Low span case type | Proposed remediation solution |
|---|---|
| Single low span within an existing strain-to-strain section | As only one low span requires remediation, it will be raised by converting the existing suspension insulator into a floating strain at the tower and adjusting the insulators on the adjacent structures to become vertical, if necessary. |
| Multiple low spans within an existing strain-to-strain section | In the initial proposal, AusNet had only proposed the lower cost remediation solution. However, this remediation solution was found in Tranche 1 to be suitable only for raising a single low span and did not provide sufficient lifting height for multiple low spans within an existing strain-to-strain section. It was thus deemed not a technically feasible solution for these low spans. |

| Low span case type | Proposed remediation solution |
|---|---|
| | This means new taller transmission poles is the only technically feasible solution to lift these low spans. It will require existing towers to be replaced with new taller poles. These new poles could be suspension or strain poles depending on the site-specific design requirements.<br><br>If new strain poles are used, it will break up the existing strain-to-strain section and create a new strain-to-strain section. |

This tailored case-by-case approach is prudent and cost efficient because it is technically feasible and minimises the remediation scope and thereby, remediation costs by:

- breaking up an existing long strain-to-strain section as it is not prudent nor cost efficient to lift long strain-to-strain sections for consecutive low spans
- avoiding the creation of unnecessary short strain-to strain sections to lift single low spans.

These remediation solutions have underpinned the revised costs of both Tranche 1 and 2 low span remediation programs.

### 10.2.1.3. Strain-to-Strain Remediation Represents a Practical Means of Reducing Risk to AFAP

Bundling the remediation of multiple low spans within a strain-to-strain section is both practical and consistent with AusNet's obligation to reduce safety risks to as far as practicable. A strain-to-strain section is typically the appropriate basis for remediation because conductor tensions and clearances are interdependent across the section. Addressing one or more low spans may require adjustment of conductor tensions and clearances across the section, meaning adjacent spans must be assessed concurrently.

The economic assessment is performed on a strain-to-strain section basis, comparing the total section safety benefits delivered by remediating all identified low spans within the section against the total cost of the bundled works package. Assessing costs and benefits at the section level ensures the evaluation reflects the practical unit of remediation and captures the full risk reduction achieved by the works.

AusNet has, nonetheless, proposed only those bundled strain-to-strain packages that are economic within the 2027-32 regulatory period. This approach targets efficient risk reduction while remaining consistent with AusNet's obligation to minimise safety risks to as far as practicable.

### 10.2.1.4. Clarification on Tranche 1 low spans program

**Tranche 1 only includes 16 low spans and not 23 spans**

The Tranche 1 low span rectification program comprises 16 high-risk low spans, rather than the 23 spans shown in the economic model submitted with AusNet's initial proposal. The additional seven spans included in the economic model have clearances below 7.5 metres, however, they are not a high-risk and they are assessed to be low risk. Accordingly, the total number of low spans referenced in the AER's Draft Decision should be corrected from 103 to 96 spans.

AusNet has now updated the economic model to reflect only 16 low spans in the Tranche 1 program with three of these 16 low spans expected to be completed in the 2022-27 regulatory period.

**Only a portion of Tranche 1 cost has been included in the 2027-32 regulatory period**

As the Tranche 1 low span program spans across both the 2022-27 and 2027-32 regulatory periods, only a portion of Tranche 1 cost has been included in the 2027-32 regulatory period.

As Tranche 1 is already in delivery, AusNet has retained the project cost from the approved business case 4.4.12 AusNet - Low Spans Tranche 1 Business Case rather than updating the unit rate.

## 10.2.2. Updates to the economic model

AusNet has updated the economic model inputs for the line ground clearance programs in response to the AER's Draft Decision. The updates align the modelling with the common assumptions outlined in Chapter 4 and reflect the asset-specific review undertaken for the revised proposal.

The key updates include:

1. applying annualised unplanned replacement costs and annualised emergency work costs, consistent with the revised treatment of financial consequences in section 4.1.2

2. removing risk allowances, consistent with section 4.1.4
3. updating remediation costs based on the selected low span solution type
4. incorporating bushfire and collateral damage risks where relevant to better reflect the consequences of clearance non-compliance.
5. including market impact benefits to reflect the likely sequence of events should a safety incident occur due to a low span. It reflects the cost of the transmission line remaining out of service until site investigations of the safety incident by relevant authorities such as Energy Safe Victoria, WorkSafe and Victoria Police have been completed.

These updates have reduced the retained scope for the management of transmission line ground clearances program from the 80 spans included in the initial proposal to 19 spans in the revised proposal. The revised model therefore reflects a more targeted program focused on the highest-priority clearance risks and the specific works required to resolve them efficiently.

# 10.3. AusNet's revised volume forecast

The impact of the updates outlined in section 10.2 on revised replacement volumes are shown in Table 15.

AusNet's revised forecast retains the 16 spans in the Tranche 1 Rectification Low Spans program and reduces the Management of transmission line ground clearances program from **80 spans to 19 spans**.

This represents a reduction of **61 spans** compared with the initial proposal. The retained scope prioritises spans with the strongest compliance, safety and risk justification.

**Table 15: Low spans initial and revised replacement volumes**

| Assets | Initial volume (number of spans) | Revised total volume (number of spans) | Revised volume in 2027-32 regulatory period (number of spans) |
|---|---|---|---|
| Tranche 1 low spans (delivered across 2022-27 and 2027-32 regulatory periods) | 16 | 16 | 13[10] |
| Management of transmission line ground clearances (Tranche 2) | 80 | 19 | 19 |
| **Total** | **96** | **35** | **32** |

[10] Three of Tranche 1 high risk low spans are anticipated to be remediated in the 2022-27 regulatory period.

# 11. Resource References

| NO. | DOCUMENT TITLE |
|---|---|
| 1 | Electricity Safety Act 1998 |
| 2 | National Electricity Rule |
| 3 | AER AusNet Services transmission determination 2027-32 Draft Decision Attachment 2 – capital expenditure, June 2026 |
| 4 | AS/NZS 7000: Overhead line design |
| 5 | AMS 01-05 Strategic Asset Management Plan |
| 6 | AMS 10-67 Power Transformers and Oil Filled Reactors |
| 7 | AMS 10-79 Line Conductors and Ground Wires |
| 8 | AusNet - Appendix 3A Unit Rates – 1 Sep 2026 |
| 9 | 4.4.01 AusNet – Insulators Economic Model – 1 Sep 2026 |
| 10 | 4.4.02 AusNet – Groundwire Condition Economic Model – 1 Sep 2026 |
| 11 | 4.4.03 AusNet – Groundwire Ratings Compliance Economic Model – 1 Sep 2026 |
| 12 | 4.4.04 AusNet – Low Spans Economic Model – 1 Sep 2026 |
| 13 | 4.4.06 AusNet – Circuit Breakers Economic Model – 1 Sep 2026 |
| 14 | 4.4.07 AusNet – Power Transformers Economic Model – 1 Sep 2026 |
| 15 | 4.4.08 AusNet – Communication Systems Economic Model – 1 Sep 2026 |
| 16 | 4.4.09 AusNet - AMS 01-09 Asset Risk Assessment Overview – 1 Sep 2026 |
| 17 | 4.4.10 AusNet - AMS 01-09-02 Event Trees – 1 Sep 2026 |
| 19 | 4.4.11 AusNet - Groundwire Single Span vs. Bundled Replacement - 1 Sep 2026 |
| 20 | 4.4.12 AusNet - Low Spans Tranche 1 Business Case - 1 Sep 2026 |

# 12. Schedule of Revisions

| ISSUE NUMBER | DATE | DESCRIPTION | AUTHOR | APPROVED BY |
|---|---|---|---|---|
| 1 | 28 August 2026 | TRR 2027-32 Revised Proposal | [C-I-C] | [C-I-C] |
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