PWC Asset Class Management Plan

Conductors

January 2023

PowerWater

Version control

This document has been approved in accordance with the Delegation of Authority (DoA) as evidenced by signatures and dates contained herein.

Rev	Date	Description	Author	Endorsed	Approved
1	17/01/2023	Revised and moved to new template	M Van Doornik Asset Engineer	B Kaye Manager Asset Strategy and Risk	S Eassie Senior Manager Asset Management

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1. Introduction

ISO 55000 defines an Asset Management Plan (AMP) as documented information that specifies the activities, resources and timescales required for an individual asset, or a grouping of assets, to achieve the organisation's asset management objectives.

1.1 Purpose and context

The purpose of this Asset Management Plan (AMP) is aligned to the requirements specified in ISO 55000. This AMP:

- Defines what is included and excluded from its scope
- Describes the asset class being managed
- Defines how this asset class will contribute to achieving the Asset Management Objectives that are defined in the Strategic Asset Management Plan (SAMP)
- Identifies the challenges we are expecting to encounter over the AMP planning horizon
- Sets out the projects and programs that we will invest in to ensure we achieve the AM Objectives and address the identified challenges
- Quantifies the risk posed by this asset class with and without the proposed projects and programs of work.

By reviewing this AMP and reassessing asset performance on an annual basis, we will ensure that any emerging issues are identified and can be addressed prior to becoming a significant risk. The outcome of the annual review will support the annual update of the Statement of Corporate Intent (SCI) and provide an input into the annual Transmission and Distribution Annual Planning Report (TDAPR).

1.2 Scope of the AMP

This AMP covers overhead conductors, including transmission, high-voltage (HV), low-voltage (LV), and service conductors.

The AMP excludes:

- Non-regulated assets that are managed by Power and Water, noting the performance and emerging issues are similar across both populations and improvement plans are applicable to both.
- Poles and towers, and poletop structures such as crossarms and insulators

This AMP will avoid, as far as practicable, repeating information that is contained in other documentation. Instead, it will provide a reference to the relevant document or data source.

1.3 Timeframe of the AMP

This AMP is focused on a 10-year planning horizon, with respect to expenditure forecasts, that aligns with the requirements of the SCI and TDAPR. However, when assessing future challenges and emerging trends we may consider longer timeframes and will comment by exception if any longer-term issues are expected to arise.

1.4 Asset management framework

Power and Water has a Strategic Asset Management System[1] which sets out the framework for asset management and the hierarchy of documents. This provides line of sight from the corporate objectives through to the asset objectives and how management of this asset class will contribute to achieving those objectives. Figure 1 highlights how the AMP fits in with the overall asset management system.

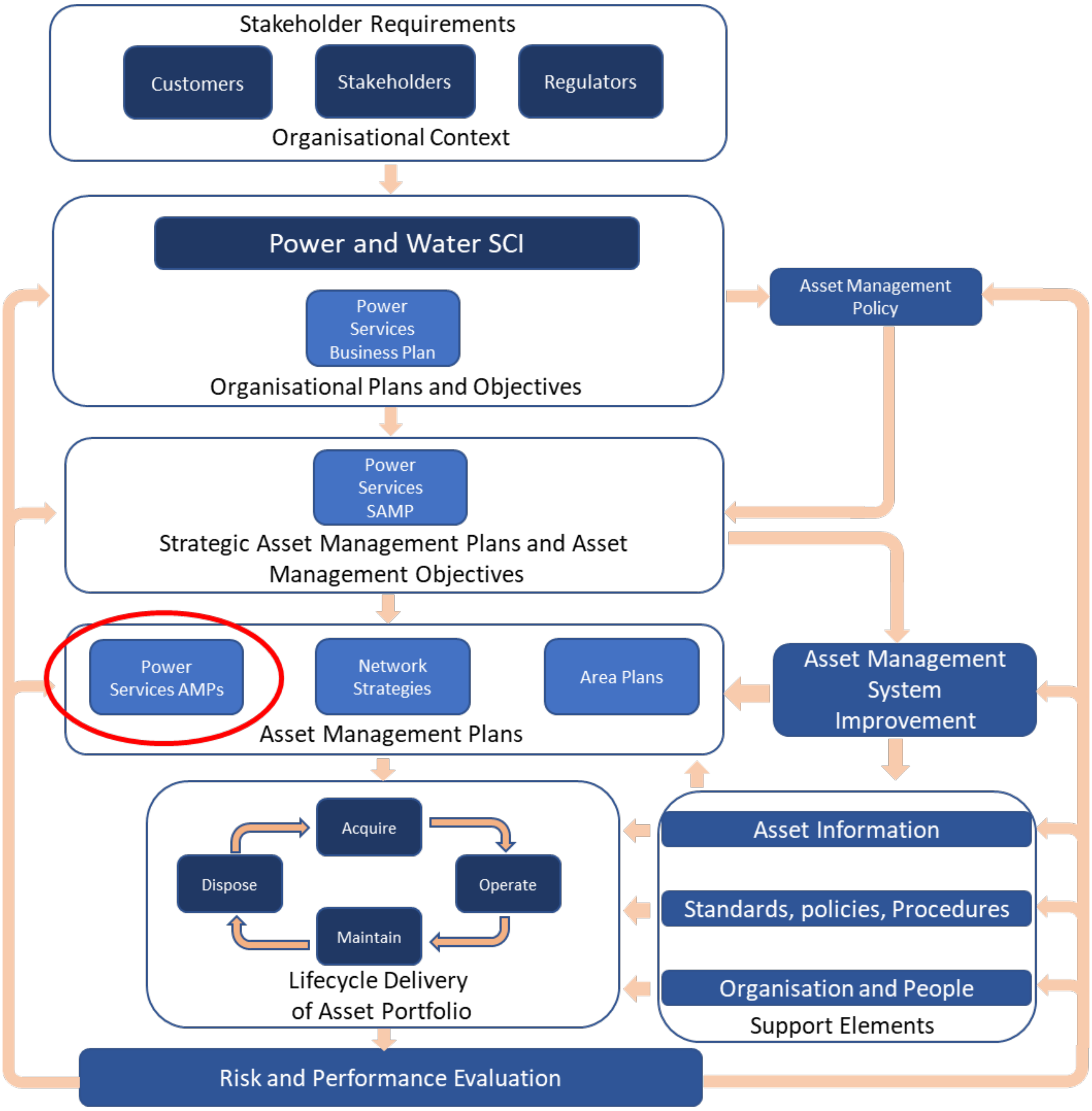

Figure 1: The AMP within the context of the Asset Management System

[1] CONTROL0548

1.5 Document structure

This document has been structured to align with the Power and Water Asset Management Standard and fits under the SAMP in the hierarchy of documentation. The document has been designed to be concise and provide the outcomes of detailed analysis with references, and not repeat the analysis in this document.

The purpose of each section is described below:

- **Asset profile** provides an overview of what the asset is to provide context to the reader of the asset's role in the electricity transmission and distribution network. It provides a breakdown by asset characteristics and volumes as well as the age profile which is an important input to asset management.
- **Asset objectives and performance** sets out the asset objectives and how they apply to this asset class. Any gaps or emerging trends are identified and linked to a project or program, if relevant, to address the issue and ensure the asset objectives are achieved.
- **Asset challenges and emerging issues** outlines any existing or emerging challenges that may impact the performance of the asset class or may otherwise impact the management of, or need for, the asset class.
- **Implementation plan** sets out the project and programs with expenditure per year for the 10 year planning horizon. This is a point in time assessment that is updated periodically so it may not align fully to the SCI and TDAPR if additional analysis has been completed subsequent to the AMP update.
- **Risk quantification and mitigation** describes the approach to risk-based investment decision-making and demonstrates the risk mitigated by the proposed implementation plan.
- **Asset lifecycle management** describes the asset management approach at each stage in the asset lifecycle.
- **Continuous Improvement** outlines the improvement plans related to the asset class.

2. Asset Profile

Power and Water owns and maintains a portfolio of 6,008km of overhead transmission and distribution conductors distributed across the four regions of Alice Springs, Darwin, Katherine and Tennant Creek, with the largest population in the Darwin Region. These operate at voltages including LV (230V, 400V), HV (SWER, 11kV, 22kV), and transmission (66kV, 132kV). The population includes feeders of entirely overhead conductor as well as mixed overhead and underground feeders.

Overhead power lines are generally the lowest-cost method of power transmission and distribution and as a result, the conductor asset class makes up a significant proportion of Power and Water's assets and activities. Compared to underground distribution, overhead lines are less reliable, less resilient to severe weather and pose higher risk to public and worker safety. Overhead remains the preferred construction in rural and commercial areas.

2.1 Fleet characteristics

In-scope assets include Power and Water's transmission, high-voltage (HV), low-voltage (LV), and service conductors. Table 1 provides an overview of the asset class.

Asset type[1]	Quantity	Voltage	Average age	Nominal lifespan
Transmission Conductor	742km	132, 66kV	33 years	60 years
HV Conductor	3,471km	SWER, 11kV, 22kV	32 years	60 years
LV Conductor	1184km	400V	36 years	60 years
Service Conductor	611km	230/400V	37 years	35 years
Total	**6,008km**	-	-	-

Table 1 - Overview of in-scope assets

2.2 Age profile

The age profile provides an early indication of expected asset condition and potential life extension or renewal investment requirements. The asset age profile for conductors is shown in Figure 2.

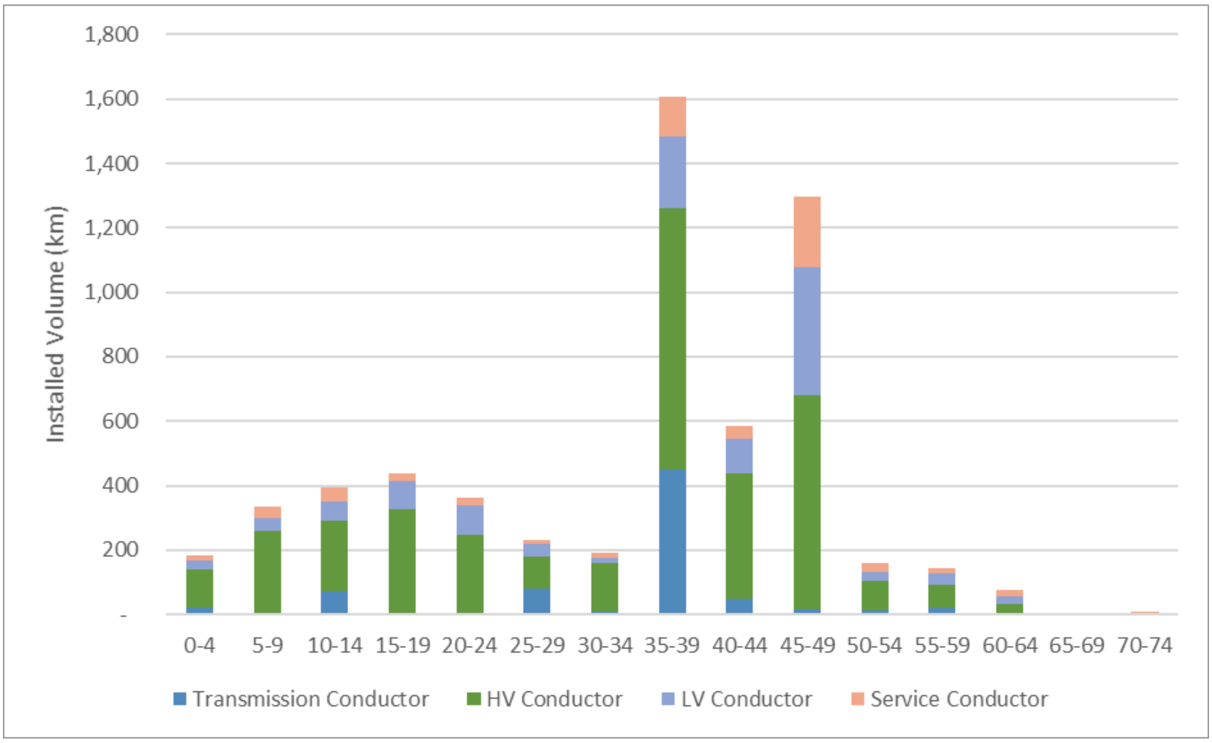

Figure 2 – Age profile by conductor type

The conductor age profile shows a large peak of conductor assets in the 35 to 50 year age bracket, coinciding with the replacement activity in the wake of cyclone Tracy, as well as the establishment of the Darwin to Katherine 132kV transmission system. Growth since then has been at much lower levels, although there was a smaller peak in the 10 to 20 year age bracket, largely due to the establishment of a long HV feeder to Dundee and significant growth in the rural areas around Darwin.

With the exception of service conductors, there are relatively few assets currently exceeding the nominal life of 60 years, however, in the next 10 to 15 years the cyclone Tracy peak will begin to reach end of life and we expect a corresponding increase in the need for conductor replacements. The service conductor asset data is lower quality due to the number of historical replacements that have happened during faults that were not recorded in our systems. As such, the actual service conductor age is expected to be significantly lower.

2.3 Criticality

Power and Water has established a Risk Quantification Procedure for Investment Decision Making to assess the overall risk posed by the asset fleet. However, when undertaking detailed scheduling and prioritisation of assets within the fleet for specific tasks, such as testing and inspection or replacement, we consider more localised characteristics of individual assets to account for relative criticality within the fleet.

The criticality assessment considers the diversity of the network including various topographies with varying degree of service conditions and risk. Failure of assets may result in public safety, service disruption (reliability) or environmental incidents. The location of an asset has a significant impact on the likelihood and severity of the consequences.

Details of the criticality assessment approach can be found in our Health and Criticality Method (D2018/72550).

3. Asset objectives and performance

The Strategic Asset Management Plan (SAMP) defines the Asset Objectives and how they support Power and Water achieving the corporate objectives. This section shows how the Asset Objectives are supported by this asset class by establishing the measures and targets to assess if the Asset Objectives are being achieved, and any gap in performance that needs to be addressed.

Table 2 states the asset management objectives from the SAMP, identifies whether they are relevant to this asset class, and defines the measures of success, targets and performance gaps. This provides a 'line of sight' between the discrete asset targets and Power and Water corporate Key Result Areas.

The performance shown here represents the historical performance of the asset class to date. It is expected that benefits from investments proposed in the next regulatory period will manifest as benefits in these key objectives.

Objectives	Measures	Targets	Performance
Ensure appropriately skilled and qualified staff are employed to meet the current and future needs of the network. Embed a fit for purpose Asset Management System across the business that is consistent across Regulated, Non-Regulated and IES.	A capability development plan will include the requirements to ensure each asset class has defined capability requirements to enable effective management and performance. The development of our Capital and Operational Works Plan (COWP) will define capacity requirements across different capabilities to achieve asset management objectives.		
Maintain the safety of customers, community and staff demonstrated by reducing worker and public safety incidents and implementing public incident reporting metrics into asset plans.	Public injuries	0	0
	Worker injuries	0	0
	Electric shock incidents	0	Average 3.4pa
Reduce by 50% the number of feeders and communities exceeding performance targets by more than 100% by 2025. Enable greater visibility of planned and unplanned interruptions to customers through improved online services for all networks and improve accuracy and transparency of	SAIDI and SAIFI targets.	Target by feeder type as set by the Utilities Commission.	Targets achieved. Refer to section 3.2

reliability performance metrics for isolated remote communities.			
Implement risk quantification for all regulated network (system) capital investment decisions by Jan 2023, and extend for remote generation and networks by 2025.	Implementation of risk quantification for decision making.	Use of Risk Quantification to assess investment needs for all aspects of the asset fleet.	Achieved.
Implement by EOFY 2023 asset criticality process to support granular prioritisation of corrective works based on public safety, reliability, security and other factors, and implement in the AMS and supporting systems by 2025	A quantitative criticality assessment criterion that can be integrated into defect management processes and supported by our ICT systems to be developed for all asset classes.		
Preparing our network and systems to be ready for the future, including building in flexibility for future uncertainty, maximising hosting capacity for customer DERs and enabling the energy transition to reviewable energy according to the governments targets.	Development of specific capability requirements for various asset classes is a key focus of our Future Networks Strategy to support increased utilisation of DER while maintaining safety and reliability performance.		

Table 2 - Asset Management Objectives

3.1 Reliability performance

The Utilities Commission requires Power and Water to report performance against targets for SAIDI and SAIFI, by feeder category and network region. We do not disaggregate the feeder category targets by asset class. Instead we assess the performance of each asset class to identify trends that require further analysis, and to determine if a specific program of works is required to support achievement of our targets at the feeder category level.

From a whole of system perspective, Power and Water has continued to improve its performance, although there has been mixed performance in each feeder category and region. These trends are discussed in the SAMP and are the subject of the network reliability performance improvement strategy.

Figure 3 shows the historical and forecast performance of the conductor asset class. The data shows that the average duration of interruptions experienced by customers due to conductor failures has decreased over time. There has been one noticeable increase in SAIDI to 36 minutes in FY16, due to a series of conductor drops and bridging failures during the storm season, likely due to lightning activity and vegetation. Note the impact from Cyclone Marcus in March 2017 are excluded from these results.

Although there is some year-to-year variation, the SAIDI contribution of conductors has stabilised in the last three years. This is a result of our ongoing feeder improvement programs which aim to target the worst performing feeders with reliability improvements such as increased network automation, segregation and new HV feeder ties. We forecast a consistent reliability performance going forward.

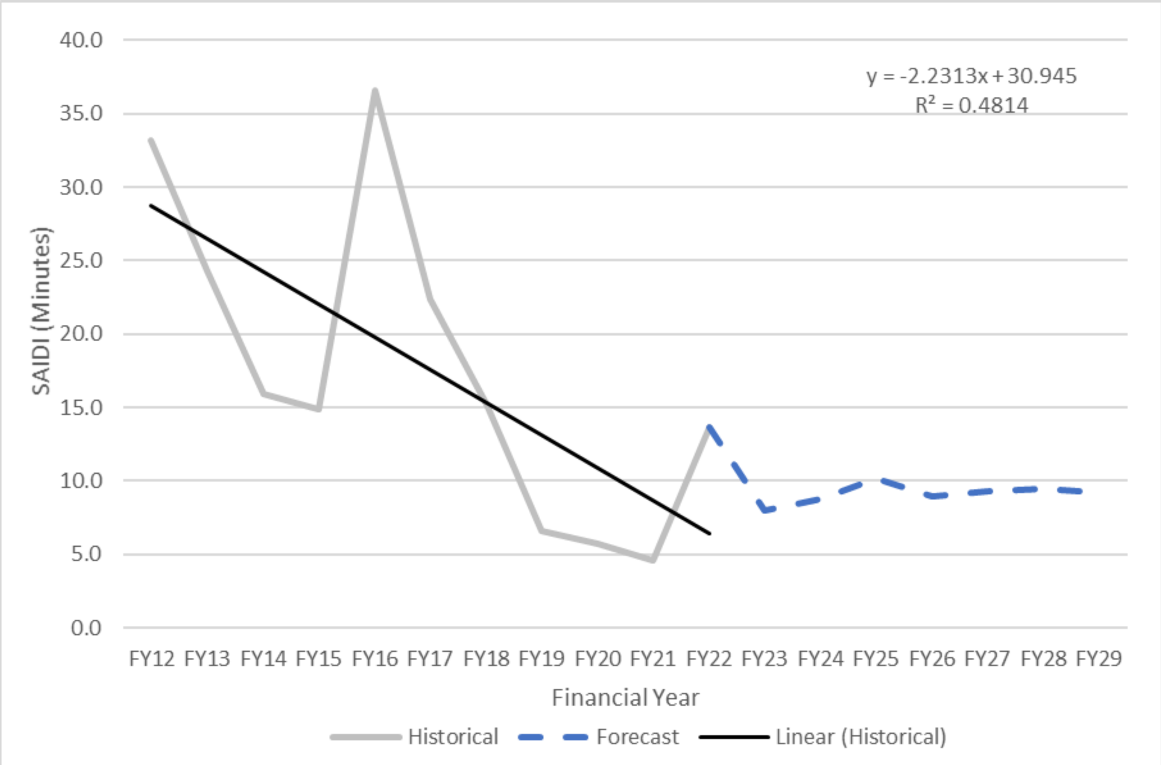

Figure 3 - SAIDI performance of the conductor asset class

3.2 Asset safety

One of the priority areas for public safety related to conductors is service wire condition. There have been a number of public safety incidents caused by deteriorated service wires as discussed in section 4.1. Power and Water has established a new maintenance strategy for low voltage service wires that will mitigate this risk, as well as a service replacement program to replace assets as identified during the maintenance.

Failures on conductor connectors due to ageing, high resistance connections and fault currents can also cause hazardous situations. When it occurs on a neutral conductor it can lead to loss of neutral integrity and increase the risk of electric shock to members of the public, both in their residences or when contacting our assets. To mitigate this safety risk we have begun a review into testing and condition assessment requirements for neutral bonding, this is expected to result in the implementation of a new maintenance strategy.

Conductor drops are also a common cause of public safety hazards. Common causes include failure conductor dead ends/wraps which can fail due to corrosion or lightning surges. The risk for LV services is mitigated by the service inspection and replacement programs, however, the risk for LV mains and HV conductors is not as well understood. One of our identified asset improvements relates to improving our understanding of conductor and connector condition and end of life to ensure this risk is maintained within tolerable levels. The other significant cause of conductor drops is vegetation, which is discussed further in section 4.6.

Failure to meet safe ground clearances has been identified as a key concern associated with conductor assets. We have established a program to address low clearance conductor spans as discussed in section 4.5.

Reported safety incidents and/or asset failures that created a safety hazard for the past 10 years are documented in Table 3. Most conductor drops are related to service conductors.

Category	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	Total
Shock / Tingles	0	0	0	6	6	8	2	6	0	6	**34**
Vehicle / impact damage	1	3	2	1	1	2	0	0	1	0	**11**
Conductor Drop	41	109	107	135	124	213	123	101	105	137	**1195**

Table 3 - Safety incidents in the last 10 years

4. Asset challenges and emerging issues

Power and Water has undertaken a review of the asset class including asset age and condition, condition deterioration drivers, economic drivers, assessed trend in the asset population and trends in the operating environment. Identified challenges are described below.

4.1 Low voltage service conductors

Recent incidents have led to a significant focus on the management of LV service conductors. In 2018, a fault in Alice Springs caused by a failed termination resulted in a service with an insulation defect touching a pole on the line side of the service fuse. The pole did not have a neutral bond installed, and the combination of these issues resulted in a pole becoming energised and a member of the public receiving an electric shock, along with their dog. In 2020, a service line with significant insulation degradation contacted the metallic anchor point and roof of a residential property that was inadequately earthed. A member of the public climbed into the roof structure and was electrocuted. The service was very degraded despite being well below expected service life and was confirmed to be part of a small unique batch of conductors installed between 1995 and 1997.

As a result of this incident, NT WorkSafe directed Power and Water to initiate an inspection program for the remote community where the event occurred, all other remote communities and services installed on the regulated network between 1995 and 1998. A review of maintenance strategies and construction standards was also directed.

Upon completing the inspections and review, Power and Water found a significant number of defects and other batch issues. It was determined that the existing strategy of inspecting service wires from outside of the property was insufficient. The maintenance strategy has since been revised to include visual inspection of the complete service wire using a camera mounted on an insulated stick. We have also established a capital program to replace all defective service wires identified during the inspections.

4.2 Asset replacement wall

As shown in the age profile (Section 2.2) a significant portion of our conductors were installed between 1975 and 1985. With a nominal life of 60 years, we expect an increasing volume of these assets to require replacement during the next 10 years. This is supported by Table 4, which demonstrates that across the network the volume of conductors exceeding their expected functional life will increase from 1% to 5%. In 2035, just beyond the capital planning horizon, all of the assets installed following Cyclone Tracy will reach their nominal life.

Asset type[1]	Total Quantity	Exceeding Nominal (2022)	Exceeding Nominal (2032)
Transmission Conductor	742km	0km (0%)	32km (4%)
HV Conductor	3,471km	34km (1%)	199km (6%)
LV Conductor	1,184km	27km (2%)	91km (8%)
Total	**5,397km**	**61km (1%)**	**321km (6%)**

Table 4 – Assets exceeding nominal life in 2022 and 2032

4.3 Cockatoo conductor replacement program

Cockatoo type conductors were installed on the 22kV overhead network in the Manton zone substation area in the mid-1970s. This includes the Lake Bennett feeder, Manton Feeder, Acacia Feeder and Town feeder. This conductor has been identified as having reached the end of its serviceable life due to condition, obsolescence, and maintainability, indicated by:

- Severe breaches of the minimum ground clearance limits prescribed in the Electricity Reform (Safety and Technical) Regulation and the AS7000:2016 Standard on multiple segments/spans along the entire route. This is a result of the type of conductor and the long spans between poles and poses compliance and safety risks.
- The reliability of the asset is decreasing. Widespread defects and deteriorating condition of the conductor have been identified, causing higher than average rates of failure, which in turn has resulted in long duration customer outages. The affected feeders are amongst the worst performing on the network, providing poor service to our customers.
- The conductor is a non-standard imperial gauge type that was installed using non-standard high-tension techniques. Hence, it is difficult to maintain as specialist equipment, tools and field crew training is required. This results in extended outage durations when there is an asset failure.
- The high tension installation means that when it fails, the force of the conductor failure can create secondary assets to fail such as poles and pole tops, as well as being a significant safety hazard to field crews.

This type of conductor therefore poses a risk to continued maintenance and the ability to rectify faults efficiently, both due to the lack of spare parts and the specialised equipment required to be mobilised. Additional risks to the safe and reliable operation of the network are present, and will continue to increase if left unmitigated.

4.4 SY-HD 66kV line conductor clearance

The 66 kV Transmission Line from Strangways to Humpty Doo is around 22 km long, and was constructed in late 1970s. It is a radial transmission line feeding Humpty Doo Zone Substation and extends 44 km further to Marrakai and Mary River Zone substations. The conductor used between Strangways and Humpty Doo is GREYLING (26.65/4.247 ACSR 6/1 Compacted). The line is thermally rated to carry maximum load of 15 MVA, but line to ground clearances are not sufficient to operate at this rating.

The current peak demand load on this transmission line is close to 7 MVA. At this load the line has 35 spans that do not meet current standard clearance requirements and very low clearance on to 48 spans identified based on LiDAR survey conducted in 2017. Most of the transmission poles are I-beam or welded poles (a very old standard), with some bolted poles. The old I-beam and welded poles are typically 12-14 meters high with suspension arrangement and an average span of around 200 meters that has resulted in low clearance issues at some locations.

4.5 Compliance

There are spans of conductor in the HV and LV network that do not comply with minimum clearance requirements. These are typically identified through visual inspection or by reports from customers. The affected spans are assessed on a risk basis to determine whether the cost of replacement is justified by the risk presented. Generally such clearance breaches are not addressed if the breaches are low risk – i.e. they are infrequently accessed locations, and not crossing roads or driveways.

4.6 Severe weather resilience

The severe storm season in the northern region causes damage to conductors, primarily due to trees falling or blowing into lines. During Cyclone Marcus in 2017, the vast majority of damage was caused by trees and not asset failure due to wind loading. More recently severe intense storms have caused significant damage in the southern regions as well, particularly around Alice Springs. These cause significant interruptions due to the remoteness and small workforce.

Public safety during the severe storm season has always been a high focus for Power and Water. Awareness campaigns have recently been refreshed and higher presence on social media assists with this. One of the most difficult to manage risks is fallen conductors. HV protection systems are highly reliable and rapidly clear these faults. LV conductor failures are much less likely to be detected, and even fusing can be ineffective due to low fault currents. During Cyclone Marcus, no injuries to people occurred, however several live LV lines on the ground were found by crews during initial damage assessment.

A review of the protection philosophy for LV conductors is in progress to develop a risk-based approach with a goal to mitigating the risk as far as practicable in higher public exposure areas. In addition to this, Aerial Bundled Conductor (ABC) is increasingly being used for LV conductor replacement to eliminate hazards of fallen bare conductors and improve restoration time after tree damage. ABC has a potentially shorter lifespan than bare conductors, and batch issues have affected insulation life, similar to service conductors. Analysis to inform a clear strategy for any future targeted conductor replacement programs is required.

5. Implementation plan

The following set of projects and programs have been developed to address the gaps in asset performance compared to the asset objectives and our long-term view to start planning for forthcoming asset challenges.

5.1 Replacement expenditure

Replacement expenditure is defined as work to replace an asset with its modern equivalent where the asset has reached the end of its useful life. Capex has a primary driver of replacement expenditure if the factor determining the expenditure is the existing asset's inability to efficiently maintain its service performance requirement.

The identified projects and programs are listed below. The indicative cost (real FY22) of the project or program for the 10-year horizon is provided and includes the entire project, not only the conductor component:

- All regions condition and failure based replacement program ($55.6 million)
- Cockatoo conductor replacement program ($7.9 million)
- SY-HD line conductor clearance rectification ($4.4 million)
- Service conductor replacement program ($8.0 million)

5.2 Augmentation expenditure

Augmentation expenditure is defined as work to enlarge the system or to increase its capacity to transmit or distribute electricity. It also includes work relating to improving the quality of the network, for example, to meet regulatory obligations.

The identified projects and programs are listed below. The indicative cost (real FY22) of the project or program for the 10-year horizon is provided and includes the entire project, not only the cable component:

- Transmission line uprating ($7.9 million)
- Overloaded feeders / distribution augmentation program ($6.1 million)
- Low clearance or easement compliance program ($3.5 million)

5.3 Operational expenditure

The forecast annual expenditure on maintenance activities is outlined in Table 5 below.

Maintenance Type	All Assets	Conductors
Routine Maintenance	$7.0	$0.2
Non-Routine Maintenance	$7.7	$0.3
Emergency Response	$7.6	$0.5
Total	**$22.3**	**$1.0**

Table 5 - Forecast annual maintenance expenditure ($ Million FY22)

5.4 Delivery plan

There have been a number of challenges during the current regulatory period that have resulted in under-delivery of capital plans. We have undertaken a detailed analysis of our internal processes and activities to identify the causes and compiled a detailed plan to address this issue. The analysis and resulting plan to enable delivery of the proposed program of works is described in our Capital Delivery Plan.

6. Risk quantification and mitigation

Power and Water has established a Risk Quantification Procedure for Investment Decision Making to assess the overall risk posed by the asset fleet. Our procedure considers the asset's condition and failure modes, the likely risks of failure on safety, security and reliability of services to customers, and the relative maintenance and capital costs. In some cases, our decision making will be influenced by demand growth or customer upgrade requirements. Essentially, our decision making is based on an economic assessment of risks, costs, and benefits.

Figure 4 below shows our forecast of risk on the network that is contributed by the overhead conductors asset fleet. The unmitigated risk shows increasing risk cost if no actions are taken to address known issues. The risk in the unmitigated case decreases until 2024 due to programs that are currently underway and have been incorporated in the risk forecast. The mitigated risk shows the decreasing risk cost incurred if the suite of proposed programs is implemented. The current risk level provides a reference to the current level of risk.

The service conductor replacement, cockatoo conductor replacement and worst performing feeders programs are the key drivers of increasing risk in the unmitigated case. By addressing the known defects, we are able to reduce network risk for this asset class. Approximately half the risk cost is contributed by the services, which we consider to be appropriate given the generally poor condition of the portion of the fleet that has been inspected and the recent fatality that was caused by a service.

Our risk based economic analysis demonstrates that implementing the cockatoo conductor replacement program and reducing the contribution of risk cost is efficient and has a net benefit to our customers.

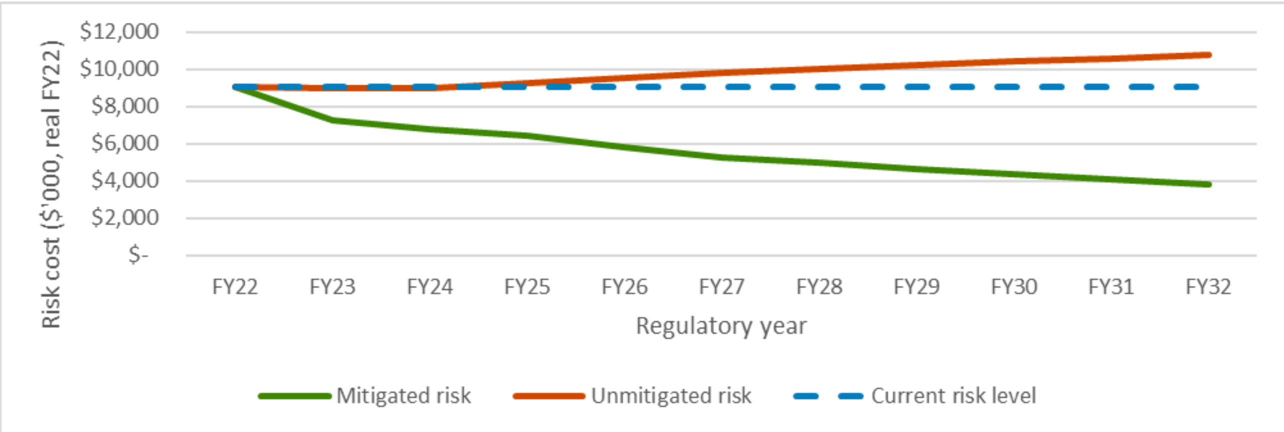

Figure 4 - Forecast total unmitigated and mitigated risk compared to the current risk level

7. Lifecycle asset management

Power and Water's asset management approach considers the entire asset lifecycle. This approach supports prudent asset management decision making to effectively balance risk, cost and performance over the life of the asset. The intended outcomes of a lifecycle approach are to:

- Maximise asset utilisation
- Minimise asset lifecycle costs
- Keep asset risk as low as reasonably practical
- Review and continuously improve asset management practices

The following sections detail Power and Water's lifecycle management activities

7.1 Planning

Asset planning identifies the need for an asset, outlines its functional requirements, and identifies the lowest cost solution that maintains risk within tolerable levels. Key planning inputs include asset condition, performance, criticality, and forecast demand.

For conductor assets, other planning considerations are route selection, capacity requirements and environmental and cultural heritage constraints.

7.2 Design

The design phase involves the detailed specification of the asset function and physical characteristics.

Power and Water develops and maintains standard designs and technical specifications for most distribution assets, including distribution conductor, all new distribution assets installed in the Power and Water network must comply. Standardisation has many benefits, including staff familiarity, asset and component interchangeability, increased production and productivity, and standardisation of construction equipment and processes. This is especially the case for assets with a high volume of installation and replacement.

Transmission conductors have a relatively low volume and new assets are installed infrequently. As a result, Power and Water does not have standard designs for transmission assets and relies on industry standards and bespoke detailed designs for new transmission lines.

7.3 Maintenance

Asset maintenance involves the upkeep of assets to ensure they will function to their required capability in a safe and reliable manner from their commissioning through to their disposal. Maintenance requirements can evolve as the condition and performance requirements of the assets change throughout its life.

Maintenance activities can be classified into three distinct areas:

- **Preventative maintenance** involves the activities carried out to reduce the probability of failure or degradation of asset performance. It includes routine inspection and monitoring, upkeep and repair, testing and component replacements. Preventative maintenance requirements are documented in our Asset Strategies Procedure. For conductor assets we do regular visual inspection of transmission, HV and LV mains. We also perform detailed inspection of service wires, including inspection of the top the

service, to identify any insulation degradation or connection issues that could pose a risk to public safety.
- **Corrective maintenance** involves planned activities to repair defects or restore asset condition. Defects are typically identified during preventative maintenance and are prioritised for rectification based on the risk they pose to the network.
- **Unplanned maintenance** involves activities to immediately restore supply or make a site safe in response to asset functional failure.

7.4 Renewal

Asset renewal is the establishment of a new asset in response to an existing asset's condition, or the extension of life of an existing asset. The need for asset renewal is typically identified during maintenance, and is verified in the asset planning stage. Asset renewal aims to optimise the utilisation of an asset whilst managing the safety and reliability risk associated with the failure of the asset.

Where it is practical to do so, Power and Water has targeted asset replacement programs which aim to proactively replace assets when the risk of asset failure is higher than the cost of the replacement. In some cases proactive replacement is not justified and the asset is replaced upon failure.

Section 5 outlines the implementation plans relevant to conductor assets.

7.5 Disposal

Assets are assessed for potential reuse prior to disposal. Where it is economical to do so, assets may be retained as essential spares or components of the asset salvaged for spare parts. This is particularly the case for legacy assets since like-for-like replacements may not be available. Assets with remaining value are offered for sale prior to disposal.

Power and Water ensures that all assets identified for disposal are disposed of in an environmentally responsible manner.

8. Continuous improvement

Table 7 below outlines the improvement plans related to the asset class.

Improvement Area	Today	Tomorrow / In Development	Future
Vegetation strategy	New strategy implemented in 2020	Vegetation strategy performance review	Vegetation growth forecasts utilising satellite or other technology
Network resilience to severe weather	Robust design and construction standards	LV ABC strategy Mature strategic spares strategy for key transmission lines	Investigation of HV ABC or alternative options to improve resilience in heavy vegetation areas
Condition monitoring	Focus on high-risk LV service conductors	Improved understanding of conductor condition and failure modes	Risk and evidence-based conductor replacement program
Defect prioritisation	Prioritisation using high level risk assessment and staff experience	Systemisation of asset criticality and improved failure codes	Risk based defect prioritisation supported by asset systems

Table 6 - Asset improvement plan

Power and Water Corporation

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powerwater.com.au

PowerWater