CENTRALINES
LIMITED

REGULATORY ASSET MANAGEMENT PLAN 2020-30

This Regulatory Asset Management Plan (RAMP) is available for public disclosure and applies for the period 1 April 2020 to 31 March 2030.

The Regulatory Asset Management Plan (RAMP) was prepared on a business as usual basis, and prior to the emergence of COVID-19 as a significant forecast risk. At this point, it is difficult to determine the impacts of COVID-19 on Centralines' asset management plan over the short to medium term, with the impacts dependent on the scale, depth and timeframes for managing the event and subsequent recovery. Centralines Limited is planning for a significant divergence of plans compared with a business as usual scenario.

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SUMMARY OF THE PLAN

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1. SUMMARY OF THE PLAN

1.1 New Zealand Electricity Sector Context

Electricity Distribution Businesses (EDBs) are an integral part of New Zealand's electrical infrastructure, forming the physical link between the transmission network and electricity consumers' premises. Centralines owns the distribution network that serves Central Hawke's Bay consumers. The network is managed and operated by Unison Networks Limited under a Management Services Agreement (MSA) with Centralines.

Electricity supply is provided to Centralines predominantly at 33kV from a single Transpower grid exit point (GXP) and is connected by Centralines' sub-transmission network to zone substations. At zone substations, the voltage is converted to 11kV for distribution. Distribution transformers throughout the network then reduce the voltage to 400V for end use. Centralines' role in the New Zealand electricity industry is shown in Figure 1-1.

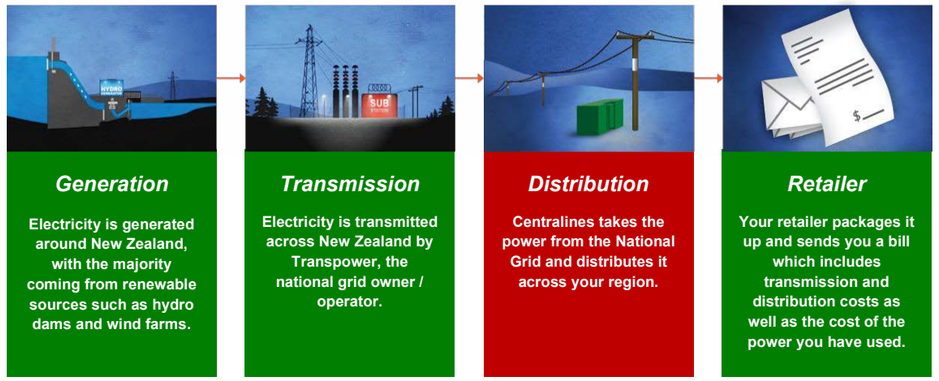

Figure 1-1: New Zealand Electricity Industry Diagram

When taking a supply of electricity, customers deal with electricity retailers like Contact, Genesis, Meridian and Mercury. The bill that customers receive includes the cost of the energy as well as a contribution to the cost of maintaining the electricity distribution network and the National Grid. The electricity distribution component of the typical consumer's bill is around 27%[1].

1.2 About Centralines

Centralines is in the business of providing a safe, reliable and cost-effective supply of electricity to their customers throughout the Central Hawke's Bay region. This is achieved through the provision, operation and long-term management of their electricity distribution infrastructure, including overhead lines, underground cables, transformers and substations. Centralines currently supplies electricity to over 8,600 consumers. Centralines' supply area is shown in Figure 1-2.

[1] https://www.ea.govt.nz/consumers/my-electricity-bill/

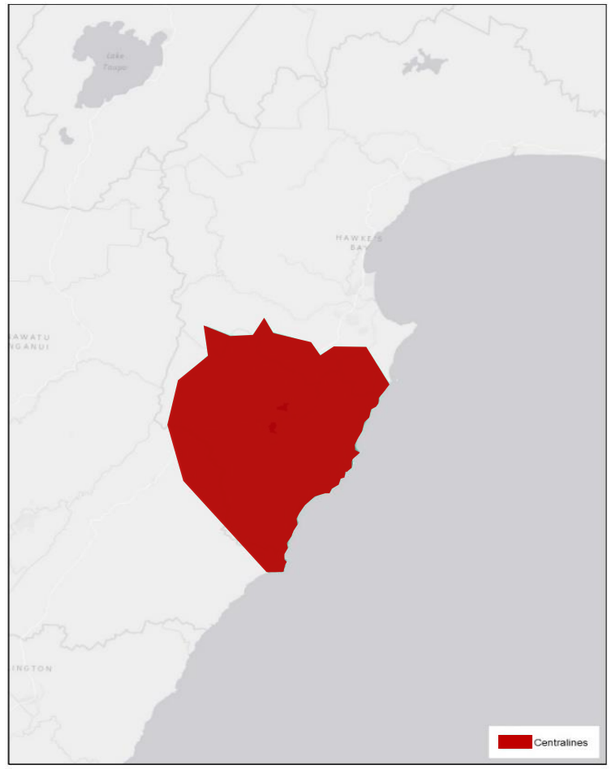

Figure 1-2: Map of Centralines' Network

1.2.1 Ownership and Governance

Centralines is wholly owned by the Central Hawke's Bay Consumers Power Trust (CHBCPT) on behalf of Central Hawke's Bay's electricity consumers. Centralines' Board of Directors is appointed by the CHBCPT.

The electricity distribution sector is regulated by the Commerce Commission to ensure that the long-term interests of consumers are protected. This regulation means that EDBs:

- are limited to what they can charge their customers
- must meet prescribed customer service levels, and
- must regularly disclose certain information about their operations.

Beyond Centralines' customers, shareholders, primary service providers and the Commerce Commission, Centralines has many other stakeholders. Centralines is committed to understanding the interests of these stakeholders and ensuring that key requirements are met. The processes Centralines uses to achieve this are discussed further in Section 2.

1.2.2 Purpose Vision and Values

Centralines' Vision and Values have recently been refreshed and a purpose added. These changes are detailed below.

Centralines' purpose is ***"to enable long-term prosperity for Central Hawke's Bay through dynamic energy and infrastructure solutions"***.

Centralines' corporate vision is ***"a collaborative partner that enables growth and delivers in the new energy economy***".

The Values are the things that really matter to Centralines and are what defines Centralines as an organisation. They underpin Centralines' organisational culture and inform the behaviours that are expected of employees.

Centralines' Values are:

- ***Safety*** *— Is part of our lives*
- ***Teamwork*** *— We are one team*
- ***Integrity*** *— Truth, honesty, respect*
- ***Openness*** *— We are approachable*
- ***Passion*** *— In everything we do*

Centralines' Purpose, Vision and Values have an influence on all components of the Asset Management System (AMS).

1.2.3 Organisational Structure

Centralines has adopted the organisation structure outlined in Figure 1-3. This structure reflects the significant number of services that are outsourced to Centralines' management services provider.

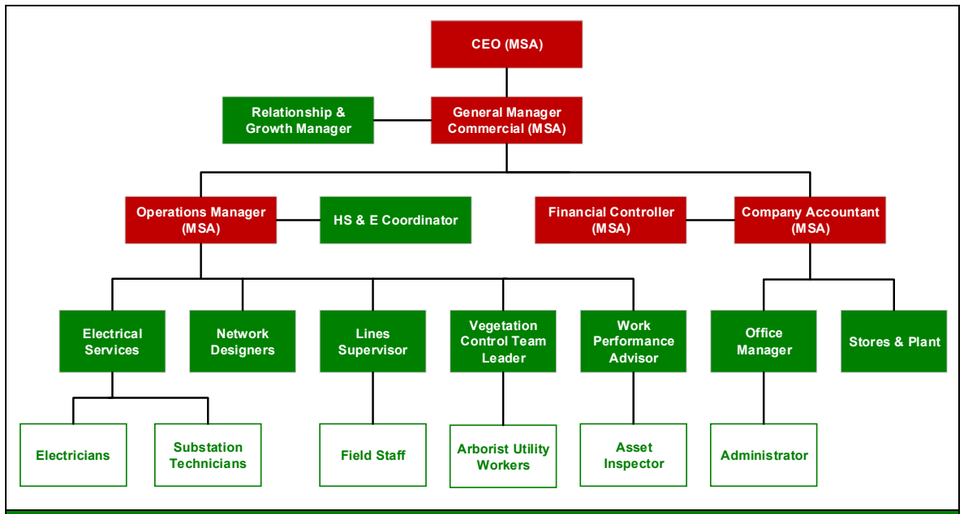

Figure 1-3: Centralines' Organisation Structure

1.2.4 Centralines' Asset Portfolio & Industry Comparison

Centralines' suite of assets is referred to as the Asset Portfolio. Table 1-1 outlines some of the key statistics associated with Centralines' Asset Portfolio, along with a comparison against the industry median for context.

Metric	Description	Value 2018/19	Industry Median
Consumers Connected	Total installation control points (ICP) connected to the network.	8,623	32,156
System Length	Total length of all energised circuits.	1,817km	3,949km
Sub-Transmission System Length	Total length of all energised 33kV circuits.	96km	269km
Distribution System Length	Total length of all energised 11kV circuits.	1,429km	2,127km
Low Voltage System Length	Total length of all energised LV circuits.	282km	824km
Percentage Underground	The proportion of total system length that is undergrounded.	6.6%	21.8%
Asset Value	Centralines Regulatory Asset Base.	$57,858,000	$206,316,437
SAIDI	System Average Interruption Duration Index. A measure of the (raw, non-normalised) number of minutes per year the average consumer is without electricity supply.	158.4 minutes	182.2 minutes
SAIFI	System Average Interruption Frequency Index. A measure of the (raw, non-normalised) number of interruptions per year that affect the average consumer.	2.36	1.77
Electricity Supplied	Electricity entering system for supply to consumers.	109 GWh	560 GWh
Loss Ratio	Proportion of electricity lost on the high voltage network.	8.0%	5.0%

Table 1-1: Network Comparison between Centralines and Industry Median of NZ EDBs

1.3 About the Regulatory Asset Management Plan (RAMP)

The Regulatory Asset Management Plan (this document) is Centralines' key external asset management publication. It is designed to meet the requirements of the Commerce Commission's electricity distribution information disclosure framework.

The RAMP is a composite of the many documents that form part of Centralines' AMS and includes the:

- Asset Management Policy — principles that Centralines commits to in asset management
- Asset Management Strategy and Objectives — Centralines' Asset Management Objectives (AMOs), and the strategy to ensure those objectives will be met, and
- Asset Management Plan (AMP) — register of asset risks and project proposals to be implemented within the ten-year planning period to manage down those risks.

1.3.1 Structure of the RAMP

The structure of the RAMP is set out in Table 1-2, and includes reference to applicable sections of the information disclosure determination to assist in the assessment of compliance.

Section Name	Description	Determination Reference
1. Summary of the Plan	Overview of the RAMP and Centralines' company profile.	3.1
2. Background and Objectives	Centralines' AMOs and the strategy employed to meet them.	3.3 – 3.17
3. Service Levels	The performance measures used to evaluate Centralines' performance against its AMOs.	5. - 10.
4. Network Development Plans	Overview of the assumptions, processes and systems that Centralines employs to formulate network development plans. Provides a detailed breakdown of network development projects for the planning period.	11.1 – 11.12 4.1 - 4.3 excluding 4.2.6
5. Lifecycle Asset Management Planning	Overview of the assumptions, processes and systems that Centralines employs to formulate its asset maintenance and renewal plans. Provides a detailed breakdown of maintenance plans and renewal projects for the planning period.	12.1 – 12.4 4.2.6, 4.4 - 4.5
6. Non-Network Development, Maintenance and Renewal	Overview of Centralines' approach to management of non-network assets, including vehicles and buildings.	13.
7. Risk Management	Overview of risk processes of the AMS.	14.
8. Evaluation of Performance	Evaluation of Centralines' asset management performance against the Service Levels disclosed in the 2016 RAMP.	15.
9. Capability to Deliver	Explains how Centralines assures itself that the AMP can be delivered.	16.
10. Schedules	Completed schedules containing required asset management information.	2.6.1 (1) (d), 2.6.1 (1) (e), 2.6.1 (2)
Appendix A: Glossary of Terms	Key technical and industry terms and acronyms.	-

Table 1-2: Structure of the RAMP

1.4 Asset Management at Centralines

Centralines, under provisions of a Management Services Agreement (MSA), contracts Unison Networks Limited (Unison) to provide asset management services.

Managing electricity networks is Centralines' Asset Management service provider's core skill set. The service provider sees Asset Management as a long-term undertaking, as a result of the:

- high dependence that Centralines' customers have on the electrical infrastructure now, and for the foreseeable future, and
- the long-lived nature of assets that are managed.

At the heart of Centralines' Asset Management service provider's philosophy is the goal of balancing cost, risk and performance according to stakeholder requirements. To ensure that this idea is embedded at all levels of asset management, an Asset Management System (AMS) has been developed. The AMS ties together and aligns all asset management activities.

Core components of the AMS include the Asset Management Policy, AMOs and three key asset management processes:

- Asset Management Planning — development of plans that ensure AMOs will be met, including asset renewal and asset capability improvement
- Lifecycle Delivery — the safe execution of asset management plans, to ensure work is delivered efficiently and in conformance to quality standards, and
- Continual Improvement — to monitor, measure and evaluate the performance of assets and asset management, and actions taken to continually improve how things get done.

1.4.1 *ISO 55001 Certification*

ISO 55001:2014 is an international standard that specifies the requirements for AMS. It builds on the management systems approaches utilised in ISO 9001 for quality management and ISO 14001 for environmental management.

Centralines' service provider Unison is the first company in New Zealand to be certified to this standard which was confirmed in March 2018 through accredited auditor, British Standards Institute (BSI). This certification provides further external scrutiny and validation of their AMS and means, they can measure themselves up to the best asset managers globally. While the ISO 55001 is specific to the Unison network, key frameworks and processes developed as part of the certification processes will be adopted to manage the Centralines' network.

1.4.2 *Asset Management Policy*

Centralines' Asset Management Policy is detailed in Table 1-3. The policy containing five principles, is developed and approved by the Management Team.

Asset Management Policy
1. No-Compromise on Health and Safety — Zero Harm Create and maintain a culture of strong health and safety awareness and strive for zero harm by: • developing the skills and knowledge of all staff, and • ensuring that accountabilities are well-defined and clearly understood.
2. Quality Customer Service *Customer Focus* Thoroughly understand and respond to our customers' requirements. *Quality and Reliability* Meet or exceed customer and regulatory requirements for reliability and quality of supply. *Resilience following a Catastrophic Event* Understand and respond to our customers' expectations regarding the reinstatement of services after low-likelihood, high-impact events.
3. People are Special Achieve and uphold a culture where people are valued, and achievements are recognised. We will comprehensively invest in the skills and knowledge of our people to ensure staff and contractors' capabilities, understanding and attitudes, enable and empower us all to perform best-practice asset management.
4. Innovation and Continuous Improvement Embed a culture of innovation and continuous improvement in the business. *Leadership* Be an industry leader nationally and in targeted areas, and internationally in the development and application of innovative means to improve our asset management practices. *Embrace Change* Continuously compare ourselves to national and international leaders in asset management to identify opportunities for improvement, and encourage a positive attitude towards beneficial change. *Clarity* Progressively and proactively transform our asset management practices so that we all have a common understanding of the organisation's goals, and instinctively use high-quality, fact-driven knowledge as the central basis for our decision-making. To do this we will keep our eyes open to new ways of doing things and find new technologies that we can apply so that we are continuously improving.
5. Balance Performance, Risk and Cost Asset management requires us to balance these three competing factors: • maximising asset performance • minimising risk, and • minimising lifecycle cost. At the same time, we must consider legislative compliance, regulatory requirements and the preferences of our communities.

Table 1-3: Asset Management Policy

1.5 Overview of Centralines' Asset Management Plan (AMP)

The AMP is Centralines' ten-year forward plan of major work on the asset portfolio to ensure that risks are managed, and opportunities are secured. The AMP is covered in detail in Section 4 and 5, however an overview of key information is provided below.

1.6 Key Stakeholder Information

Centralines firmly believes the RAMP should be accessible to readers of varying levels of technical understanding, and that all stakeholders should be able to extract the information they require. From experience, Centralines recognises that for many stakeholders (including the majority of Centralines' customers), the information of most interest is:

- the level of service that can be expected, and
- projects that have been initiated to improve the quality of electricity supplied.

To this end, this section provides an executive summary of these areas.

1.6.1 *Level of Service*

Centralines' AMOs provide the ability to report on whether the needs and expectations of stakeholders of the AMS are met.

The current measures that enable Centralines to monitor and improve performance in relation to these AMOs is provided in Table 1-4. More detail on Centralines' Customer Service Performance objectives and associated measures is provided in Section 3 – Service Levels.

Asset Management Objective	Service Level	Unit/Type	Service Level Targets				
			2020/21	2021/22	2022/23	2023/24	2024/25
Health and Safety Performance	Accidents Causing Harm to a Member of the Public	Number of accidents	0	0	0	0	0
	Serious Harm or Lost-Time Injury to Employees or Contractors	Number of injuries	0	0	0	0	0
	Injuries to Employees requiring Medical Treatment	Number of injuries	< 2	< 2	< 2	< 2	< 2
Customer Service Performance	Surveyed Customer Satisfaction	%	> 95%	> 95%	> 95%	> 95%	> 95%
	SAIDI (Planned)	Minutes	<70.96	<70.96	<70.96	<70.96	<70.96
	SAIDI (Unplanned)	Minutes	< 62.83	< 62.83	< 62.83	< 62.83	< 62.83
	SAIFI (Planned)	Interruptions	<1.17	<1.17	<1.17	<1.17	<1.17
	SAIFI (Unplanned)	Interruptions	<3.1616	<3.1616	<3.1616	<3.1616	<3.1616
	Revenue per ICP	$ (nominal)	$1,628	$1,628	$1,628	$1,628	$1,628
	Restoration of Supply for Unplanned Interruptions	Urban	≤ 20 events ≥ 3 hours	≤ 20 events ≥ 3 hours	≤ 20 events ≥ 3 hours	≤ 20 events ≥ 3 hours	≤ 20 events ≥ 3 hours
		Rural	≤ 10 events ≥ 6 hours	≤ 10 events ≥ 6 hours	≤ 10 events ≥ 6 hours	≤ 10 events ≥ 6 hours	≤ 10 events ≥ 6 hours
		Remote rural	≤ 5 events ≥ 12 hours	≤ 5 events ≥ 12 hours	≤ 5 events ≥ 12 hours	≤ 5 events ≥ 12 hours	≤ 5 events ≥ 12 hours

Asset Management Objective	Service Level	Unit/Type	Service Level Targets				
			2020/21	2021/22	2022/23	2023/24	2024/25
Cost and Efficiency Performance	Forward Work Planning Horizon	Years	≥ 2 rolling	≥ 2 rolling	≥ 2 rolling	≥ 2 rolling	≥ 2 rolling
	Operating Expenditure per ICP	$ (nominal)	$474	$485	$494	$504	$514-$557
	Faults per 100km of network	Overhead	6.4	6.4	6.4	6.4	6.4

Table 1-4: Service Level Framework

1.7 Programmes and Projects to Improve Customer Service

The lifecycle asset management and network development plans and options presented in Sections 4 and 5 of the RAMP reflect an asset management philosophy that attempts to balance customer service with other considerations including the management of risk and cost. The planning period considered by this RAMP sees a continuation of capital investment in the network to:

- manage any risks associated with Centralines' network assets
- meet customer-driven growth
- maintain network security
- meet customer service levels and network reliability targets, and
- ensure compliance with regulatory requirements, e.g. health, safety and environmental.

Year	Project Name	Description
2020/2021	Feeder 91 - Replace ABS 629 with a Remote-Control Switch (RCS) on Pole 919191	Network Automation
	Feeder 91 - Install a new Sectionaliser on Pole 906318	Network Automation
	Feeder 86 - Install a Remote-Control Switch (RCS) on Pole 905083	Network Automation
	Feeder 91 - Replace ABS 459 with a Remote-Control Switch (RCS) on Pole 905143	Network Automation
	Feeder 86 - Replace ABS 462 with a Remote-Control Switch (RCS) on Pole 905419	Network Automation
	Feeder 86 - Replace ABS 461 with a Current Sectionaliser on Pole 905281	Network Automation
	Feeder 91 - Replace ABS 463 with a Remote-Control Switch (RCS) on Pole 906104	Network Automation

Table 1-5: Projects that will Improve Customer Experience

1.8 Changing Energy Landscape

Like in many other developed countries, the electricity landscape in New Zealand is beginning to change. This is being brought about by advancing technology, including the improved economics of solar photovoltaics (PV) and batteries, as well as electric vehicles. Increasing levels of locally generated electricity and the complexity that this can create on a distribution network, as well as the potential for greater electricity demand from electric vehicles, represent important risks and opportunities for Centralines. Centralines is closely monitoring these trends and technologies.

As well as the risks directly presented by technology uptake, there are also potential risks to Centralines in how regulators choose to respond. Centralines will continue to engage with the Commerce Commission and Electricity Authority as to how the regulatory environment can be developed to accommodate changing technology without compromising incentives for excellent asset management.

1.9 Upgrades & Replacements to Key Enabling Systems

1.9.1 Enterprise Asset Management System (EAMS)

Centralines' service provider Unison has numerous systems that enable and support asset management at Centralines. Their current Enterprise Asset Management System (EAMS) Activa, is in the process of being replaced as part of the implementation of their Asset Management service provider's companywide Enterprise Resource Planning (ERP) System.

The new One Energy (EAMS) module will enable the following asset management related benefits:

- improved asset condition information and work history, forecasting of risks, forward visibility for resource and material planning, material procurement and availability, and integration with related systems
- automated decision-making
- better information to field staff on work required and asset details, and
- enhanced systems to capture field information through tightly integrated mobility solutions.

The new system is currently scheduled to be implemented by October 2020.

1.9.2 Advanced Distribution Management System (ADMS)

Unison in the 2021 financial year has scheduled an upgrade to its Advanced Distribution Management System (ADMS) which is the key system utilised to operate Centralines' network.

The key drivers for this upgrade are:

- enhanced functionality
- a technical platform upgrade to maintain operating system support, and
- the integration of complementary business systems.

1.10 Network Reliability

Network reliability is an important indicator of the quality of service being received by customers from their EDB. A large variety of indices have been developed by industry to provide an indication of network reliability and performance. The most commonly applied measures which are industry referenced and used by the regulator are:

- SAIDI (System Average Interruption Duration Index) — measures, on average, the total number of minutes a customer is without power per annum, and
- SAIFI (System Average Interruption Frequency Index) — measures, on average the total number of interruptions of over a minute, a customer experiences per annum.

In 2020/21 Unison will move into a new five-year regulatory period, Default Price Path Three (DPP3). There have been several changes applied to historical methodologies in the new determination including:

- Planned SAIDI has been separated from unplanned SAIDI as the regulator recognises that this will facilitate the renewal of aging assets without unduly impacting on EDBs achieving quality targets.
- The threshold has been moved from an annual total SAIDI (unplanned and planned), to a five-yearly limit for planned SAIDI.
- The five-yearly limit has been set at three times the historical average. This allows Centralines to renew assets without the significant and costly use of temporary generation to reduce the impacts of planned shutdowns.
- Where quality targets are exceeded in any given year, this constitutes a breach, whereas previously a breach only occurred if targets were exceeded twice in any three-year period.

1.11 Stakeholder Feedback

Centralines encourages feedback on all aspects of the AMP to enable continued improvement in meeting the needs of consumers and stakeholders. Feedback should be addressed to:

Grant Hogan
Asset Manager
c/o Centralines Limited
2 Peel Street
PO Box 59
Waipukurau 4200
New Zealand

grant.hogan@unison.co.nz

1.12 Determination Reference Mapping Table

Section 1 Reference		Determination Reference
1.1	New Zealand Electricity Sector Context	3.1
1.2	About Centralines	
1.3	About the Regulatory Asset Management Plan (RAMP)	
1.4	Asset Management at Centralines	
1.5	Overview of Centralines' Asset Management Plan (AMP)	
1.6	Key Stakeholder Information	
1.7	Programmes and Projects to Improve Customer Service	
1.8	Changing Energy Landscape	
1.9	Upgrades & Replacements to Key Enabling Systems	
1.10	Network Reliability	
1.11	Stakeholder Feedback	

Table 1-6: Determination Reference Mapping Table

2

BACKGROUND & OBJECTIVES

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2. BACKGROUND AND OBJECTIVES

2.1 Introduction to this Section

Section 2: Background and Objectives provides an overview of the organisation and the Asset Management System (AMS), including the Asset Management Policy and the Asset Management Objectives (AMOs). A statement of Centralines' Asset Management Strategy is provided, along with a summary of the three key processes that ensure the strategy will be delivered effectively.

A table that maps the requirements of the Electricity Distribution Information Disclosure Determination to the information provided is available at the end of the section to support assessment of compliance.

2.2 Context of the Organisation

2.2.1 About Centralines

Centralines is the electricity distribution business (EDB) that serves the communities of Central Hawke's Bay. Centralines is owned by the Central Hawke's Bay Consumers Power Trust (CHBCPT) on behalf of the power consumers it supplies. It is responsible for connecting homes and businesses to its network, safely distributing electricity, and sustainably managing its infrastructure.

Centralines generates revenue by distributing electricity to over 8,600 consumers. The organisation also provides other services to its customers including:

- providing new connections to homes and businesses
- cutting and trimming trees near lines, and
- locating underground cables to ensure safe excavation.

Centralines works in partnership with all members of the electricity supply chain including generators, Transpower and retailers to meet the needs of electricity consumers. It also collaborates closely with other stakeholders including councils, government authorities and owners of other infrastructure to promote the effective management of community resources.

Electricity Distribution Businesses (EDBs) are natural monopolies and are regulated by the Commerce Commission, under the Default Price-Quality Path (DPP). The DPP places an upper limit on EDB revenues and sets minimum network performance standards according to the frequency and duration of outages. The Commerce Commission also requires Centralines to disclose certain information including this Regulatory Asset Management Plan (RAMP).

Centralines' infrastructure includes a network of lines, cables, transformers, switchgear and other distribution equipment across the region it serves. These assets are used to distribute electricity to homes and businesses.

Centralines, under provisions of a Management Services Agreement (MSA), contracts Unison Networks Limited (Unison) to provide asset management services including:

- planning
- acquisition and construction
- livening
- operation and maintenance
- renewal and modification, and
- disposal.

A broad range of people with diverse skills are engaged in carrying out these asset management activities.

In March 2018, Unison became the first New Zealand organisation to be certified to ISO 55001. ISO 55001 is the international global benchmark for asset management capability and contains the requirements specification for an integrated, effective management system for asset management. While the ISO 55001 certification is specific to Unison and its own distribution network, key frameworks and processes associated with their Asset Management System (AMS), including asset management planning, developed as part of this certification process will over time be fully adopted to manage Centralines' distribution asset fleet.

Centralines typically undertakes the majority of its own capital projects, asset maintenance and vegetation management activities through a small team of in-house resources. Some large, technically complex projects mainly associated with zone substations are managed on Centralines behalf by Unison.

Centralines is a responsible corporate citizen and responds to customer feedback. It takes a proactive stance on health and safety of employees, contractors and the public, and takes responsibility for the effective management of environmental impacts of its operations.

2.2.2 Purpose Vision and Values

Centralines' purpose is ***"to enable long-term prosperity for Central Hawke's Bay through dynamic energy and infrastructure solutions"***.

Centralines' corporate vision is ***"a collaborative partner that enables growth and delivers in the new energy economy***".

Centralines is instrumental to the region's social and economic wellbeing, by ensuring one of the country's most sparsely populated regions has access to affordable and reliable electricity. Through the safe distribution of electricity to homes and businesses in Central Hawke's Bay, Centralines enables its community to prosper.

As a collaborative partner in the developing energy economy, it is essential that Centralines continues to evolve to meet its customers and wider stakeholders' changing needs, while embracing major changes in the strategic environment. This includes climate concerns and advances in technology which look to change the way energy is produced, stored and used.

The energy value chain is in the early stages of a significant transformation from a system that was "centrally planned" to an "internet of energy", which sees consumers in control. With policy and regulation response, Centralines will shape the scope of its regulated business while opening opportunities for new services and business models.

By remaining close to its customers, Centralines will continue to build insights and understanding of their changing needs. At the same time, it is crucial that Centralines engages the diverse talents of its people and the wider community to harness new ideas. With a focus on delivery, Centralines will do whatever it takes to find solutions for its customers and the community it serves.

A realistic view of the future is being developed to determine where and in what role(s) Centralines is going to play. Incremental changes in what Centralines does and how it invests will form part of this journey, which is not without risk. Centralines will explore and assess opportunities relating to the new energy economy and infrastructure services in other markets.

Continued provision of a valued and evolving customer service proposition will see Centralines play its part in enabling long-term prosperity and success for the community it serves.

Centralines understands the importance of people, culture and climate to enable effective asset management. The behaviours and attitudes that Centralines is committed to and expects of its people are encapsulated within its five organisational values presented in Figure 2-1. Asset management is aligned with these values through the Asset Management Policy.

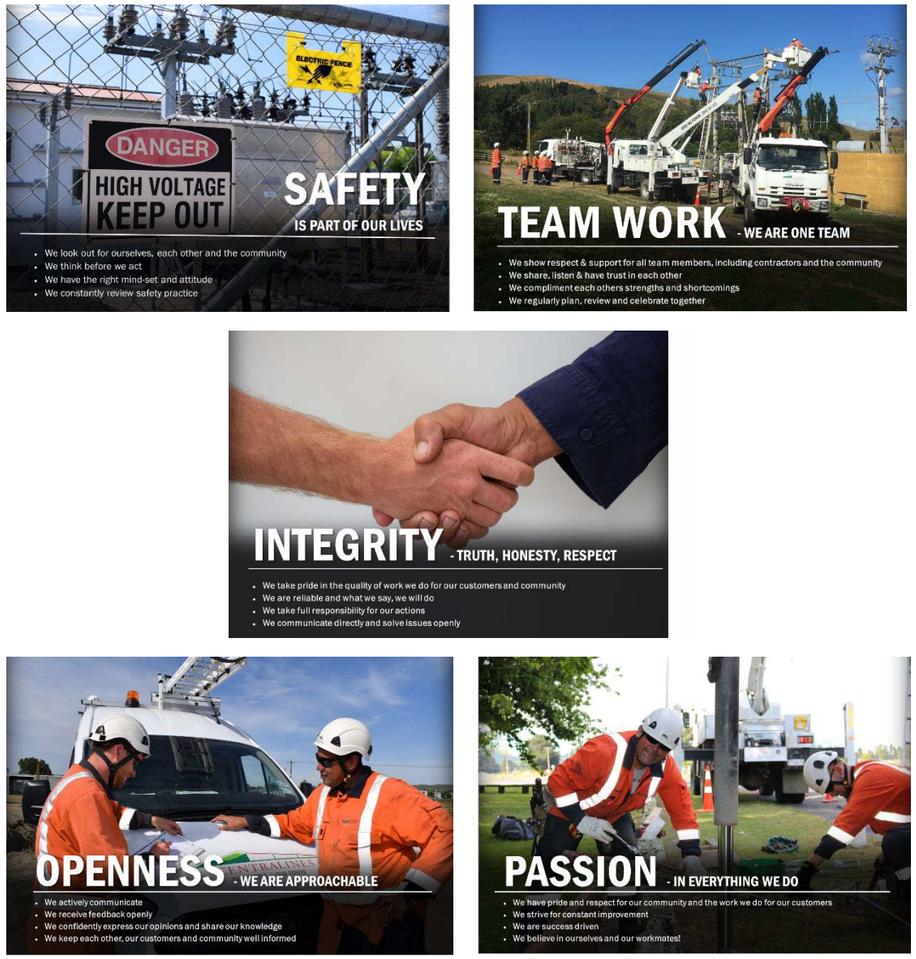


Figure 2-1: Centralines' Values

Centralines' people understand that the term 'best practice' is context-dependent, and is influenced by factors including the demographics, economies and geographies of the region it serves and the scale of the business. For Centralines, in the asset management domain, best practice is about making optimal trade-offs between asset lifecycle cost, performance and risk that best reflect the needs of their customers and other stakeholders.

2.3 Overview of Centralines' Asset Management System (AMS)

A key pillar of Centralines' Asset Management service provider's corporate strategy, is to establish a strong competence in asset management. This is supported through the implementation of an Asset Management System (AMS). Through this process they are committed to:

- developing asset management plans that optimise investment on a total lifecycle basis
- ensuring all teams are clear in their responsibilities and are appropriately empowered
- making decisions about priorities through consideration of relative risk
- using data and information to support fact-based decision-making
- communicating to all stakeholders on asset management issues relevant to their role
- continually improving in all facets of asset management, and
- implementing novel and innovative asset management solutions where this will best support achievement of the Asset Management Objectives (AMOs).

Centralines' AMS has been established based upon existing:

- asset management capabilities
- processes and procedures
- standards
- practices, and
- institutional knowledge in the management of electricity distribution networks and assets.

Its primary function is to provide structure and connectivity to ensure that asset management is in all cases delivered in alignment with:

- stakeholder requirements
- Corporate Strategic Objectives, and
- the Asset Management Policy.

An overview of the key elements of Centralines' current and future AMS, which is yet to be fully developed to the ISO 55001 standard, is provided in Figure 2-2 and the following sections.

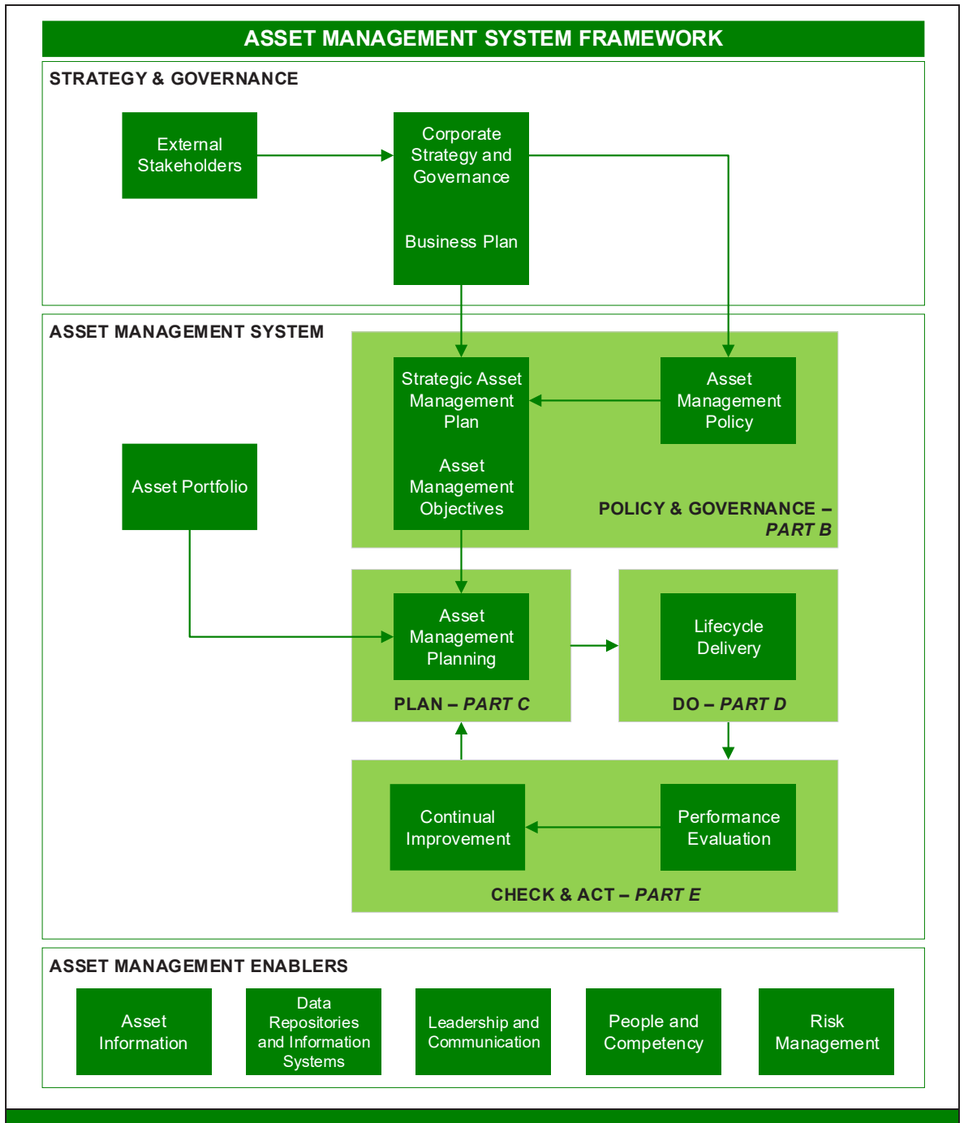


Figure 2-2: AMS Framework

2.3.1 Corporate Strategy

Centralines' strategy and corporate governance processes integrate strategic decision-making with the requirements and expectations of external stakeholders. This results in the annual development and Board ratification of the Business Plan which contains Centralines' Corporate Strategic Objectives.

The AMS is one of the key organisational systems supporting the delivery of the portfolio of Corporate Strategic Objectives. Other systems include customer service processes, environmental management processes, and health and safety management processes. These business systems are supported by the Integrated Management System (IMS) which includes specification of processes that are

applicable across the business, such as documentation control, internal audit and risk management (refer to Figure 2-4).

2.3.2 Asset Management Policy

The Asset Management Policy is the document that articulates Centralines' commitment to principles-based asset management. In this way it can be thought of as a translation of Centralines' purpose, vision and values into an asset management context. The policy containing five principles, is developed and approved by the Management Team, and is set out in Table 2-1.

Asset Management Policy
1. No-Compromise on Health and Safety – Zero Harm Create and maintain a culture of strong health and safety awareness and strive for zero harm by: • developing the skills and knowledge of all staff, and • ensuring that accountabilities are well-defined and clearly understood.
2. Quality Customer Service *Customer Focus* Thoroughly understand and respond to our customers' requirements. *Quality and Reliability* Meet or exceed customer and regulatory requirements for reliability and quality of supply. *Resilience following a Catastrophic Event* Understand and respond to our customers' expectations regarding the reinstatement of services after low-likelihood, high-impact events.
3. People are Special Achieve and uphold a culture where people are valued, and achievements are recognised. We will comprehensively invest in the skills and knowledge of our people to ensure staff and contractors' capabilities, understanding and attitudes, enable and empower us all to perform best-practice asset management.
4. Innovation and Continuous Improvement Embed a culture of innovation and continuous improvement in the business. *Leadership* Be an industry leader nationally and in targeted areas, internationally in the development and application of innovative means to improve our asset management practices. *Embrace Change* Continuously compare ourselves to national and international leaders in asset management to identify opportunities for improvement, and encourage a positive attitude towards beneficial change. *Clarity*

Asset Management Policy
Progressively and proactively transform our asset management practices so that we all have a common understanding of the organisation's goals, and instinctively use high-quality, fact-driven knowledge as the central basis for our decision-making. To do this we will keep our eyes open to new ways of doing things and find new technologies that we can apply so that we are continuously improving.
5. Balance Performance, Risk and Cost Asset management requires us to balance these three competing factors: • maximising asset performance • minimising risk, and • minimising lifecycle cost. At the same time, we must consider legislative compliance, regulatory requirements and the preferences of our communities.

Table 2-1: Asset Management Policy

2.3.3 Asset Portfolio

The Asset Portfolio is the comprehensive inventory of assets which must be managed in accordance with the AMS. Asset information associated with individual assets and asset systems comprising the Asset Portfolio is a key enabler of decision-making processes throughout the AMS. The Asset Portfolio is defined below.

Inclusions (the Asset Portfolio)	Exclusions
• All assets comprising Centralines' electricity distribution networks. • Assets comprising Centralines' Regulatory Asset Base (RAB). • Conductive assets, e.g. wires, cables, switchgear and transformers. • Non-conductive assets, e.g. poles, stay wires and substation buildings. • Assets permanently installed to monitor the operating environment, condition and other information relating to the asset, e.g. weather stations, oil condition monitors and meters. • Overhead assets, e.g. conductors, insulators and crossarms), ground mounted assets, e.g. ring-main units and pedestals, and underground assets, e.g. cables. • Operational land holdings used for electricity distribution.	• Personal Protective Equipment (PPE) used by Centralines' employees. • Vehicles and tools owned by Centralines. • Non-network buildings and land owned by Centralines. • Portable test equipment that is not permanently installed on the network, e.g. power quality loggers, distributed temperature sensing equipment and oil spectroscopy testers. • Customer service mains, i.e. electrical infrastructure beyond the fuse located inside pedestals and on private property (not within council owned road reserve). • Electricity meters, smart meters and ripple relays at customer premises. • Some assets energised at 11kV located on customer premises as defined in relevant schedules of Line Function Services

Inclusions (the Asset Portfolio)	Exclusions
• Asset information systems and supporting IT infrastructure. • Some assets located on customer premises as defined within Line Function Services Agreements. • Low voltage streetlight circuits, fuses and ripple relays up to the base of streetlight poles where these are owned by Centralines.	Agreements, ownership agreements or Memorandum of Understandings (MOUs). • Streetlight poles and associated hardware.

Table 2-2: Asset Portfolio

2.3.4 Asset Management Strategy and Objectives

The Asset Management Strategy includes Centralines' Asset Management Objectives (AMOs), as well as the documents that record the Centralines' strategies for achieving the objectives. The objectives are aligned to the outcomes desired from the Organisational Strategic Plan and tested for consistency with the Asset Management Policy.

Centralines has three core AMOs which are detailed in Table 2-3.

Asset Management Objectives
1. Health and Safety Performance Centralines' objective is to achieve an incident free workplace by creating a culture where each person truly believes that "Safety — is part of our lives" is a core value, and that working safely is part of all employees' everyday activities. Centralines is committed to the health and safety of its employees, contractors, customers and community.
2. Customer Service Performance Deliver great customer service through provision of a reliable and resilient network at a reasonable price.
3. Cost and Efficiency Performance Improve the efficiency and effectiveness of asset management practices through innovative network and energy solutions.

Table 2-3: Asset Management Objectives

The current measures that enable Centralines to monitor and improve performance in relation to these AMOs are provided in Table 2-4. More detail on Centralines' Customer Service Performance objective and associated measures is provided in Section 3: Service Levels.

Asset Management Objective	Measure		Current Target 2020/21
Health and Safety Performance	Accidents causing harm to a member of the public or significant damage to public property		0
	Serious harm or lost-time injury to employees or contractors		0
	Injuries to employees or contractors requiring medical treatment		< 2
Customer Service Performance	Surveyed Customer Satisfaction with delivery of customer works		> 95%
	Average annual number of planned minutes a customer is without supply (SAIDI)		<70.96
	Average annual number of unplanned minutes a customer is without supply (SAIDI)		< 62.83
	Average annual number of planned supply interruptions a customer experiences (SAIFI)		<1.17
	Average annual number of unplanned supply interruptions a customer experiences (SAIFI)		<3.1616
	Revenue per ICP (nominal)		$1,628
	Restoration of supply for unplanned interruptions	Urban	≤ 20 events ≥ 3 hours
		Rural	≤ 10 events ≥ 6 hours
		Remote rural	≤ 5 events ≥ 12 hours
Cost and Efficiency Performance	Forward work planning horizon at a project level provided to contracting services providers		≥ 2 rolling
	Operating expenditure per ICP (nominal)		$474
	Faults per 100km of network		6.4

Table 2-4: Asset Management Objective Performance Measurements

2.3.5 Asset Management Plan

The Asset Management Plan (AMP) is the specification of major work to be undertaken on or in association with the assets over a ten-year period to enable AMOs to be achieved. Decisions about priorities are enabled through application of the risk management processes defined in the Unison Group Risk Management Framework and translated for specific use in asset management in the AMS Risk Management Guidelines discussed in Section 7 – Risk Management.

2.3.6 Lifecycle Delivery Processes

Centralines' Lifecycle Delivery processes include:

- the real-time network management performed by Unison's Network Operations Centre (NOC)
- management of the capital works programme
- asset maintenance and inspection programmes
- construction and livening of new assets
- vegetation management, and
- associated configuration management and transactional processes essential to ensure assets are safe and fit to deliver the AMOs.

2.3.7 Performance Evaluation

Evaluation of the performance of the AMS is accomplished through:

- measurement against performance indicators related to AMOs
- the achievement of specified business outcomes, and
- the internal audit of processes and systems of the AMS to assure conformance to requirements.

2.3.8 Continual Improvement Process

The feedback generated through the processes specified above is a primary input into Continual Improvement (CI) processes, and includes feedback on:

- both asset capability and condition, and
- the organisation's asset management capability.

The CI processes utilised by the AMS are consistent with the organisational approach to continual improvement provided in Centralines' IMS.

2.3.9 Asset Management Enablers

All asset management processes are enabled by:

- appropriate asset management information which is stored and accessible from fit for purpose data repositories and information systems
- effective leadership and communication processes
- a well-defined organisational design
- people who have appropriate skills, competencies and qualifications, and
- processes that utilise risk management concepts and principles to support effective decision-making.

2.4 Purpose of the Regulatory Asset Management Plan (RAMP)

2.4.1 Purpose Statement

The purpose of this Regulatory Asset Management Plan (RAMP) is to publish information about Centralines' AMS and the asset management plans that are developed to manage down risks and secure opportunities, in support of the AMOs. This enables interested stakeholders to make an informed judgement about the appropriateness of Centralines overall approach to asset management and to learn of changes in the Asset Portfolio that may impact them. In addition to this, the RAMP ensures that Centralines is compliant with the requirements of the Electricity Distribution Information Disclosure Amendments Determination 2017.

The purpose of asset management planning is to ensure that the AMOs specified in Table 2-3 are achieved by the organisation for the benefit of all stakeholders.

2.4.2 Documented Plans

Figure 2-3 provides a hierarchical view of the documented plans produced as outputs of the annual business planning processes utilised by Centralines, and their relationship with the RAMP.

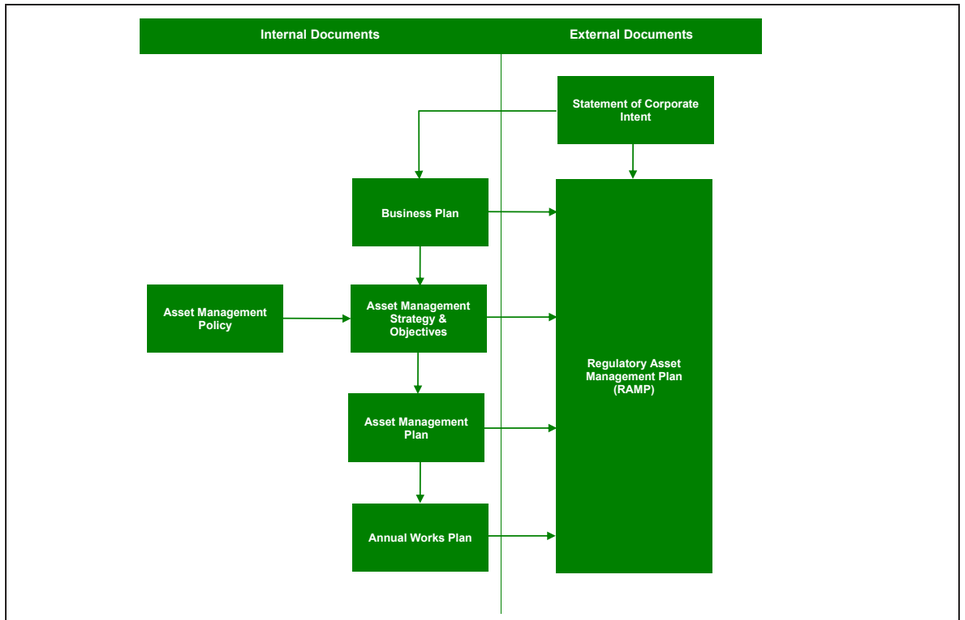


Figure 2-3: Consolidation of Asset Management Information in the RAMP

2.4.2.1 Statement of Corporate Intent

The Statement of Corporate Intent (SCI) sets out the Centralines scope of activities and strategic aims as well as the key performance targets for the next three financial years. It is a requirement of the Energy Companies Act 1992 and is refreshed and published annually on Centralines' website. The SCI provides top-level guidance to the development of the Asset Management Policy and strategy, and although rare, significant changes to the SCI requires a detailed review of subordinate plans.

2.4.2.2 Business Plan

The Business Plan is Centralines' key strategic plan and therefore is highly influential in driving the Asset Management Strategy. The Business Plan contains the following elements:

- a review of Centralines' strategic context both internally and externally
- Centralines' Corporate Strategic Objectives
- a review of Centralines' performance in past periods against Corporate Strategic Objectives, and other goals and targets
- financial information including capital and operating expenditure forecasts, revenue forecasts and a summary of the company's financial position, and
- an overview of key strategic initiatives for the organisation in the next period.

The Business Plan is reviewed and approved annually by Centralines' Board of Directors.

2.4.2.3 Asset Management Policy

The Asset Management Policy specifies Centralines' commitments in the delivery of asset management. It is reviewed annually to ensure continued alignment with the SCI and Business Plan.

2.4.2.4 Asset Management Strategy and Objectives

The Asset Management Strategy is a container for Centralines' AMOs, as well as the documents that record Centralines' strategies for achieving the objectives.

2.4.2.5 Asset Management Plan

The Asset Management Plan (AMP) is the register of the major work required in the Asset Portfolio to ensure that AMOs are met. Most of the work registered in the AMP is capital work, however major non-routine maintenance programmes may be included. It has a ten-year horizon, where:

- the first two-years are well-defined proposals of work ready to be actioned
- the next three-years are plans with high levels of confidence, and

- the remaining five-years are speculative, but represent the best plan based upon available information.

For all work registered in the AMP the following information must be provided:

- the assets to be worked on
- the issue driving the requirement for work
- an assessment of the level of risk associated with the issue utilising the Risk Management Framework, and
- the proposal of work required to manage down the risk, including:
  - the recommended timing and estimated cost
  - any risks in delivering the work
  - shutdown windows required, and
  - contractor resource requirements.

2.4.2.6 *Annual Works Plan*

The Annual Works Plan (AWP) is the consolidated programme of work to be conducted on the Asset Portfolio in a given financial year. This includes the following types of work:

- major capital projects from the AMP, including any large customer driven projects
- preventive maintenance programmes including inspections
- provisions for small scale customer driven projects
- provisions for minor asset replacements, e.g. pole replacements following inspections, and
- provisions for reactive maintenance, e.g. fault response.

The AWP is compiled and scheduled collaboratively by both Unison and Centralines' Operations Team.

2.4.3 Business Management System

The AMS is aligned with Centralines' Business Management System Framework (BMSF) which has been adopted from Centralines' service provider to enable its effective implementation and sustainment. The BMSF supports Centralines' three primary management systems. The supporting processes within the IMS are outside the scope of the AMS but must be available to enable the AMS to function as required. These include:

- Controlled Document System and associated processes
- Internal Assurance Framework
- Legislative Compliance Programme
- Emergency/crisis management processes
- Competency management systems and processes
- Complaints management processes
- Records management systems and processes
- Incident management processes, and
- Continual improvement.

Centralines' BMSF is represented in Figure 2-4: Business Management System Framework with the red outline representing the scope of the AMS in this context.

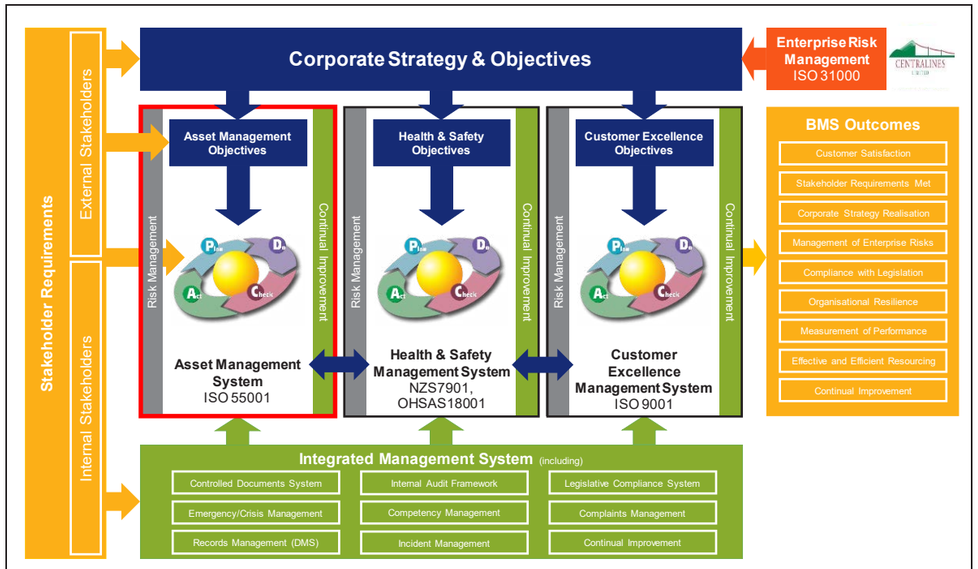


Figure 2-4: Business Management System Framework

2.5 Planning Period of the Regulatory Asset Management Plan

The RAMP update covers the period from 1 April 2020 to 31 March 2030. Necessarily all prospective information is provided based upon the currently best assumed future. As for any long-term planning exercise, uncertainty increases the further forward in the future Unison looks. This is due to factors including the condition of assets, growth of demand, the cost and availability of contracting resources, technology changes, and stakeholder expectations.

Accordingly, for the first five-years of the planning period, more detailed information in respect of asset management plans is provided. In the second half of the planning period, plans are presented in less detail reflecting increasing uncertainty.

2.6 Date of Director Approval

The RAMP was approved by Centralines' Board of Directors on 24 March 2020.

2.7 Centralines' Stakeholders

The requirements and expectations of stakeholders are strongly influential in Centralines' Asset Management Strategy and decision-making processes.

Table 2-5 and Table 2-6 set out Centralines' key external and internal stakeholders respectively. The Stakeholder Interests column provides the key expectations of the stakeholder in relation to

Centralines' operations, including the information, notification and coordination required by the stakeholder from Centralines.

2.7.1 *External Stakeholders*

Table 2-5 summarises Centralines key external stakeholders, how their interests are identified, and what their interests are.

External Stakeholder	Role/Relationship	How Stakeholder Interests are Identified	Stakeholder Interests
Electricity consumers	Customers of the overall electricity supply chain	• Customer surveys • Customer enquiries • Customer feedback and complaints	• A reasonably priced service that meets performance expectations. • Infrastructure is safe, environmentally sustainable and supports local amenity. • Information about changes to prices is effectively communicated. • Notification of planned outage windows and conformance to these windows by Centralines. • Planned outages minimised on especially cold days of the year. • Information about restoration following unplanned outages is available.
Household consumers	End recipient of distribution service. Pay costs of service	• Customer surveys • Customer enquiries • Customer feedback and complaints	• On demand and reliable access to as much electricity as they need – 24/7. • Infrastructure that keeps their families, home, possessions and streets safe from harm. • Minimal disruption to their daily lives — including from planned or unplanned electricity outages or field works. • Energy and infrastructure that is environmentally sustainable and supports the drive for zero carbon. • A network that anticipates, is ready for, and incentivises their future energy and technology needs.

External Stakeholder	Role/Relationship	How Stakeholder Interests are Identified	Stakeholder Interests
			• Empathetic and customer centric handling of any complaints. • Simple, convenient operational processes for contacting and dealing with their distributor. • Assistance in upgrading/changing the energy infrastructure at their homes. • Pricing where all customers can afford power they reasonably need without causing physical deprivation or financial duress. • Information that gives them transparency and certainty about network actions and expectations, especially during times of outage.
Major customers	Industrial customers supplied at HV who have a contract with Centralines	• Customer surveys • Customer enquiries • Customer feedback and complaints • Relationship Meetings	• Expectations as for general electricity consumers. • Changes to Line Function Service Agreements are well managed. • Engagement around planned outage requirements.
Electricity retailers	Customers, downstream participant in electricity supply chain	• Relationship meetings	• Effective communication on transactional matters, including new connections, outages and billing submissions. • Effective engagement and negotiation of changes to pricing structures, tariffs and Use of System Agreements. • Centralines meeting its requirements under Use of System Agreements, including network performance requirements.
Transpower	Upstream asset owner in the electricity supply chain	• Relationship meetings • Engagement through projects	• Effective communication on transactional matters, including planned work, billing submissions and account management.

External Stakeholder	Role/Relationship	How Stakeholder Interests are Identified	Stakeholder Interests
		• Transpower disclosures and planning documents	• Sharing of long-term planning information including demand forecasts. • Coordination of planned work and associated outage management. • Coordination between service provider's Network Operations Centre and Transpower System Operator, especially in grid emergency situations.
Councils (District, City and Regional)	Territorial authorities, local government, local infrastructure owner	• Relationship meetings • Engagement through projects • Planning documents issued by Councils	• Infrastructure is sensitive to local amenity, compliant to planning requirements, such as District Plans, and are environmentally sound. • Sharing of long-term planning information to support synergies. • Project coordination to ensure effective service corridor management and minimal disruption to communities. • Coordination of civil defence and emergency management. • Notification of environmental issues.
Landowners	Individuals, iwi and businesses with interests in land	• Engagement through projects • Enquiries, feedback or complaints	• Engagement and negotiation on access requirements and the location of new infrastructure. • Local infrastructure is safe, tidy and well-maintained. • Notification of vegetation management issues and plans to address these issues. • Engagement on asset related issues in proximity to land holdings. • Understanding, sensitivity and respect towards cultural issues in relation to land.

External Stakeholder	Role/Relationship	How Stakeholder Interests are Identified	Stakeholder Interests
Electricity Networks' Association	Industry association	• Involvement and participation	• Regular management engagement with the Association and its members to support industry collaboration and advance the interests of the industry. • Involvement and support in regulatory submissions. • Participation on industry working groups.
Other electricity distribution businesses	Industry peers	• Information sharing forums • Asset Management Plans	• Collaboration on issues of mutual interest, including information sharing, joint projects and trials, and associated commercial arrangements. • Contracting resource support for businesses affected by major events such as storms and natural disasters.
Electricity Engineers' Association	Industry association	• Involvement and participation on working groups	• Involvement in working groups, sharing of knowledge and best practices. • Funding support for initiatives including research and working groups. • Promotion of Electrical Engineering as a career pathway for young New Zealanders.
Commerce Commission	Economic regulator	• Regulatory requirements • Documents issued by the Commission • Engagement processes coordinated by the Commission	• Disclosure of information including Regulatory Asset Management Plans in conformance with requirements. • Compliance with the Default Price Path. • Submissions and feedback on proposed changes to regulatory framework.
Electricity Authority	Electricity market regulator	• Regulatory requirements	• Compliance with market rules, associated electricity industry

External Stakeholder	Role/Relationship	How Stakeholder Interests are Identified	Stakeholder Interests
		• Documents issued by the Authority	legislation, regulation and codes. • Consultation and issues-based correspondence. • Participation and cooperation with investigations.
WorkSafe New Zealand	Health and safety regulator	• Regulatory requirements • Engagement on specific issues • Documents issued by the Authority	• Engagement in working groups and consultation processes. • Notification of incidents and near misses. • Compliance with legislative and regulatory requirements.
Office of the Auditor-General	Independent regulator	• Engagement during audits • Review of documents issued by the OAG	• Efficient use of electricity bill payers' funds through effective asset management. • Participation and cooperation with audit processes initiated from time to time.
Utilities Disputes Commissioner	Industry regulator	• Cooperation in any investigations • Review of decisions by the Commissioner	• Participation in dispute resolution processes. • Provision of information and records to support dispute resolution processes. • Adherence to rulings not found in Centralines' favour.
New Zealand Police	Partner agency	• Relationship meetings • Information sharing	• Notification of accidents involving Centralines' assets. • Coordination of responses to incidents and compliance with incident management processes. • Response capability from Centralines' first responders.
Fire and Emergency Response New Zealand	Partner agency	• Relationship meetings • Information sharing	• Notification of fires and emergencies involving Centralines' assets. • Coordination of responses to incidents and compliance with incident management processes.

External Stakeholder	Role/Relationship	How Stakeholder Interests are Identified	Stakeholder Interests
			• Response capability from Centralines' first responders.

Table 2-5: Centralines' External Stakeholders and their Interests

2.7.2 Internal Stakeholders

Table 2-6 summarises Centralines' key internal stakeholders, how their interests are identified, and what their interests are.

Internal Stakeholder	Role/Relationship	How Stakeholder Interests are Identified	Stakeholder Interests
Central Hawke's Bay Consumers Power Trust (CHBCPT)	Owner of Centralines on behalf of power consumers	• Annual General meeting • Meetings between Trustees, Directors and Executive Management	• Reporting of performance against Statement of Corporate Intent (SCI). • Effective and efficient asset management performance. • Prompt resolution of issues raised by Centralines' power consumers.
Board of Directors	Corporate governance Strategic direction	• Monthly Board meetings	• Performance against the Corporate Strategic Objectives. • Regular reporting on the health of the AMS and performance against AMOs. • Effective management of the organisation, especially relating to health and safety performance.
Executive Management	Governance Policy and strategy Enterprise risk management	• Business Plan • Communication and engagement with staff	• Regular management review of the health of the AMS and performance against AMOs. • Escalation of strategic risks in the Asset Portfolio and the AMS where necessary, especially relating to the impact of DER. • Quarterly reports on progress towards the implementation of the AMS.
Centralines employees	Internal customers Users and advocates Implementers	• One-on-one discussions with managers	• Awareness of the AMS and its implications for roles and responsibilities, and how teams work together. Providing a basis for

Internal Stakeholder	Role/Relationship	How Stakeholder Interests are Identified	Stakeholder Interests
		• Satisfaction surveys • Training and development processes	understanding why certain actions are important. • Awareness of significant risks and potential consequences of deviating from defined asset management practices. • Training and education on asset management, the AMS and role specific skills and competencies. Professional development. • A secure role in a respected and professionally managed organisation. • Information about asset management risks, particularly relating to health and safety.
Centralines Operation Teams	Primary supplier of contracting services	• Relationship meetings • Collaboration on projects	• Awareness of the AMS and why particular actions are important. • Visibility of the asset management plan to support business planning. • Information about asset management risks, particularly relating to health and safety. • Effective collaboration in work management including project delivery. • Two-way feedback on performance and areas for improvement. • Minimised churn in the work programme to drive efficiency and support schedule compliance. • Quality technical standards and operating procedures.
Other contractors and vendors	Supplier of goods and services	• Relationship meetings • Contract negotiation processes	• Information about asset management risks, particularly relating to health and safety. • Adherence to terms and conditions of trade and contractual obligations. • Two-way feedback on performance and areas for improvement. • Quality technical standards and operating procedures.

Table 2-6: Centralines' Internal Stakeholders and their Interests

2.7.3 How Stakeholder Interests are Accommodated in Asset Management Practices

The importance of accommodating stakeholder interests in asset management is recognised in the Asset Management Policy, and this flows through into the AMOs and the design of the business processes utilised in the AMS.

Centralines' performance against the AMOs is measured and reported monthly to provide an overview of how effective Centralines is in meeting stakeholder interests. Where gaps are identified between actual and targeted levels of performance, opportunities for improvement are considered through management review meetings, and actions are put into place through the continual improvement process of the AMS.

2.7.4 How Conflicting Interests are Managed

Situations sometimes arise where Centralines must make asset management decisions that bring interests of different stakeholders into conflict. Once such a situation has been identified, Centralines endeavours to work with each of the parties to ensure that their respective interests have been properly and fully understood. Often through this process a solution that is acceptable to each party can be identified. If such an outcome is not possible however, Centralines uses a set of guidelines and principles of natural justice, fairness and equity to come to a decision. The guidelines applied in order of importance are:

- health and safety of Centralines' employees, contractors and the public
- compliance with statutory and regulatory requirements
- congruence with the SCI
- congruence with Centralines' Asset Management Policy
- reasonable needs of customers
- synergy with asset management plans
- lowest lifecycle cost, and
- congruence with other stakeholder interests.

In all cases the reasons for the decision will be communicated openly with all parties.

2.8 Accountabilities and Responsibilities for Asset Management

2.8.1 Corporate Governance

Leadership and commitment to the AMS starts at the corporate governance level of the organisation. Centralines' governance level is represented by the Board of Directors. Directors have ultimate accountability for approving the strategic direction of the business as proposed by the Chief Executive and the Management Team. Once the Organisational Strategic Plan is approved, it is the responsibility of the Management level to implement it. The Organisational Strategic Plan has a strong influence on Centralines' Asset Management Strategy and Objectives and the *line of sight* that runs through the AMS.

2.8.1.1 *Approval for Asset Management Decisions*

Enterprise-wide strategic initiatives relating to asset management are approved by Directors as part of the Business Plan in Centralines' annual planning processes.

As well as asset management strategic initiatives, approval from Directors is also required in respect of network projects costing in excess of $1M. When the need for such a project has been identified through asset management planning processes, a Board Report is compiled. The structure of the report includes:

- an explanation of the constraint motivating the project
- the possible options for addressing the constraint
- selection of the optimum option with justification from both a technical and commercial perspective
- identification of any risks associated with the selected option, and
- a disaggregated costing for the project, and an estimated timeframe for delivery.

2.8.1.2 *Reporting on Asset Management Outcomes*

Performance against the AMOs specified earlier are reported to Directors at the monthly Board meeting. Explanations are provided by senior management in respect of deviations from expected performance.

Asset management related outcomes including network reliability, progress in the execution of asset management plans, network CapEx and OpEx budget management and health and safety outcomes are all reported on.

Progress against asset management strategic initiatives is typically reported quarterly. At the conclusion of these initiatives an internal review of the organisation's performance in executing the project is furnished to the Board with opportunities for improvement identified.

Performance against measures underpinning the AMOs that are not part of standard Board reporting are reported at the end of the financial year as part of the annual business planning process.

Each year a detailed Board report is prepared on network performance. This report includes in-depth analysis that:

- examines network performance from a range of perspectives
- critically probes underlying trends
- highlights areas where improvement is required, and
- provides an update on changes to the quality regulatory framework.

2.8.2 *Leadership Processes*

Unison's Executive Management Team (EMT) initiate and lead the implementation, utilisation and sustainment of Centralines' AMS. These are driven by the following top-level processes:

- establishment and communication of Centralines' Asset Management Policy
- annual management review of Asset Management Strategy and Objectives

- communication to all members of the organisation on asset management performance, and the extent to which this supports the Corporate Strategic Objectives
- consolidation of all legacy asset management processes, practices, plans and other material into the AMS
- annual delivery and disclosure of either a full Regulatory Asset Management Plan (RAMP) or RAMP Update documents that are compliant with the Electricity Distribution Information Disclosure Amendments Determination 2017
- planning and implementation of AMS Capability Projects by Centralines' Management service provider to drive continual improvement and build asset management capability
- ongoing internal assurance, management review and external audit of the AMS, and
- engagement by Centralines' Management service provider with external groups and subject matter experts in certain domains to augment and grow capabilities, including:
  - the Institute of Asset Management (IAM)
  - the Electricity Engineers' Association (EEA)
  - the New Zealand Organisation for Quality (NZOQ)
  - the EPECentre of the University of Canterbury
  - Covaris, and
  - Gatland Consulting.

2.8.3 *Leadership Responsibilities*

In accordance with their defined Position Descriptions and authorities, all Centralines' executive managers, line managers and team leaders are required to:

- model the company values in leadership actions, decisions and communications
- encourage and coach people to apply the company values in their day-to-day work and challenge behaviours that do not match Centralines' values
- communicate clear performance expectations to people so that they understand how their role contributes to the achievement of Centralines' vision
- coach and support people to:
  - identify their personal development needs
  - formulate and implement an individual development plan, and
  - assess its impact on results and relationships;
- inspire and motivate teams by leading, guiding and providing motivational and developmental feedback to build a high performing team and individuals
- cultivate an environment of continuous improvement, innovation and initiative by facilitating an open exchange of ideas
- take a long-term view and formulate effective strategies consistent with the business strategy, and
- develop and build relationships, engage in cross-functional activities, collaborate across boundaries, and utilise contacts to build and strengthen internal processes.

2.8.4 *Organisational Structure*

Centralines' asset management organisation is led by Centralines' Asset Management service provider, which includes six groups tasked with managing the functional activities required to deliver Centralines' corporate objectives. Each group is led by an Executive Manager reporting to the Group CEO, as shown in Figure 2-5.

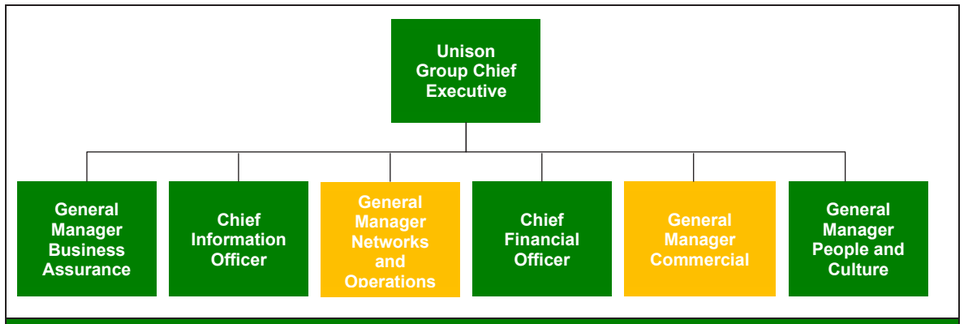


Figure 2-5: Management Structure of the Asset Management Organisation

2.8.4.1 *General Manager Commercial*

The General Manager Commercial ensures that the Management service provider delivers the asset management outcomes as outlined in the Management Services Agreement.

2.8.4.2 *General Manager Networks and Operations*

The General Manager Networks and Operations is assigned responsibility for the AMS, which includes:

- coordinating review of the Asset Management Policy
- aligning the AMOs with the Corporate Strategic Objectives
- overseeing and coordinating the asset management plans, and
- organising management review and external assessment of the AMS.

2.8.4.3 *Management Responsibilities*

The Board delegates financial approval of up to $1M to the Chief Executive and the General Manager Commercial in respect of network CapEx projects.

While the Management service provider's General Manager Networks and Operations has primary responsibility for implementation of the AMS, each of the other Management service provider's

General Managers has an important role to play in the asset management organisation, as shown in Table 2-7.

General Manager	Key Accountabilities
Business Assurance	• Risk management and review • Internal audit • Legal and regulatory compliance • Pricing
Information Management	• Enterprise asset management systems (information systems) • Infrastructure and communications hardware • Business analysis
Networks and Operations	• Facilitate development of Asset Management Strategy and Objectives • Lead execution of asset management strategies • Asset management planning including network development planning • Asset information management • Real-time operation of the network
Chief Financial Officer	• Treasury and financial control • Procurement and logistics
Commercial	• Customer projects • Customer engagement and service levels • Billing
People and Culture	• Human resources and organisational culture • Health and safety

Table 2-7: General Manager Key Accountabilities within Asset Management System

2.8.4.4 *Responsibility for Asset Management System Processes*

The service provider's Networks and Operations Group, reporting to the General Manager Networks and Operations has the primary responsibility for the AMS. The structure of the group is represented in Figure 2-6. It indicates the primary areas of responsibility of each Line Manager in the key processes of the AMS.

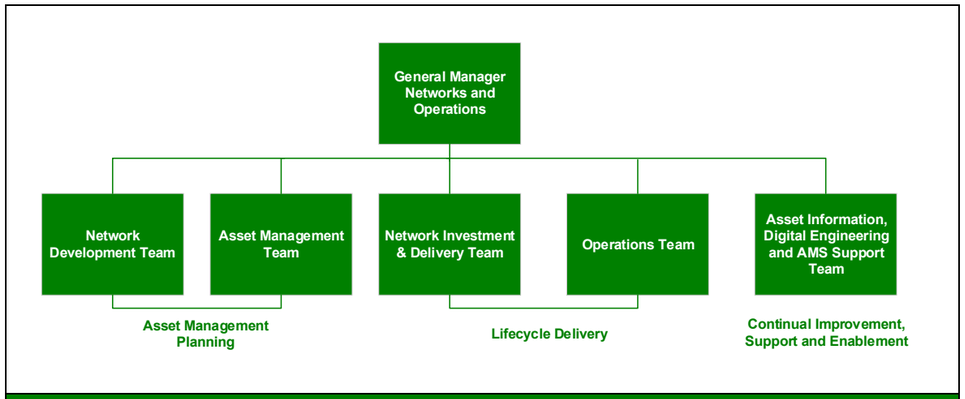


Figure 2-6: Management of the Asset Management System

Further detail on the key processes that each team is responsible for is provided in the following tables.

Planning Processes	Responsible Team
Network Development Planning	Network Development
Contingency Planning	Asset Management
Asset Renewal Planning	Asset Management
Maintenance Planning	Asset Management
Works Planning and Consolidation	Network Investment and Delivery
CapEx Programme Establishment	Network Investment and Delivery

Table 2-8: Responsible Teams for Planning Processes

Lifecycle Delivery Processes	Responsible Team
Work Management	Network Investment and Delivery with field work undertaken by Centralines
Switching and Outage Management	Operations with field work undertaken by Centralines
Asset Portfolio Control	Asset Management
Asset Information Management	Asset Management

Table 2-9: Responsible Teams for Lifecycle Delivery Processes

Continual Improvement Processes	Responsible Team
Performance Evaluation	Asset Management
Internal Audit	AMS Support Team
Coordination of Management Review	AMS Support Team
Coordination of Capability Projects	AMS Support Team
Continual Improvement	AMS Support Team

Table 2-10: Continual Improvement Processes

2.8.4.5 *Responsibility for Field Operations*

The field delivery of asset lifecycle activities that are specified in the RAMP including design, construction, inspection, maintenance, refurbishment, fault response and repair, vegetation management, replacement and disposal is the responsibility of the Centralines' Operations Manager.

The vast majority of this work is carried out by Centralines' field staff who work out of the Centralines' Waipukurau depot. The field staff report to the Centralines' Operations Manager who in turn reports to the Management service provider's General Manager Commercial, as shown in Figure 2-7. Collaboration takes place between Centralines staff and the Management service provider's Networks and Operations Teams to ensure the efficient and effective delivery of projects.

An example of this is the close collaboration for work taking place in the field between the Operations Manager and the Management service provider's Network Operations Centre (NOC). This collaboration ensures:

- the network is configured in a way that allows work to proceed
- the impact of outages is minimised
- safety protocols relating to access to the network are observed, and
- Centralines' field staff have the information that they require about the state of the network to work safely.

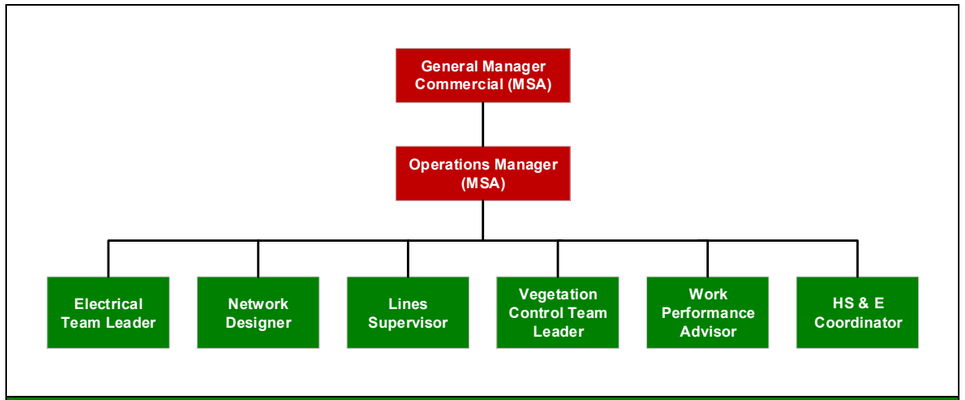


Figure 2-7: Field Leadership Structure of Centralines

2.8.4.6 *Outsourcing of Field Operations*

Centralines on occasions subcontracts work during times when demands on contracting resources cannot be met by the company's existing capacity. From time-to-time Centralines also directly engages other contractors when specialist capabilities are required. An example of this is substation design and related project engineering functions which are performed by the Management service provider's Network Investment and Delivery Team, as required.

2.9 Significant Assumptions made in the AMP

In preparing the AMP for a ten-year planning period it is necessary for a number of assumptions to be made. Centralines' planning assumptions fall into five main categories:

- macro-environmental assumptions
- assumptions about actions of regulatory bodies and other external entities
- governance and ownership assumptions
- asset management planning assumptions, and
- price inflator assumptions.

The significant assumptions under each of these categories are described below.

2.9.1 Macro-environmental Assumptions

Assumption	Significance of the Assumption
No change to the structure of the electricity industry	Centralines' Organisational Strategic Plan and AMS are premised upon the assumption that the current industry structure will not change and that Centralines will remain a regulated electricity distribution business. Change to the structure of the industry could alter one or more of the input parameters to the AMP which would have a fundamental impact on the plans disclosed.
No discontinuous change in customer demands for power quality and reliability	Centralines' Customer Service Levels are an important input into the AMP. They have been formulated based upon Centralines' understanding of customer needs through quality regulation and Centralines own customer engagement. Discontinuous change in the needs of customers in relation to power quality and reliability due to a societal or technological shift could result in Centralines' AMOs and Customer Service Levels becoming out-of-date. A change to these would necessarily have an impact on the AMP.

Assumption	Significance of the Assumption
No material uptake of distributed energy resources on Centralines' networks over the planning period	Technologies such as solar photovoltaic (PV) cells and batteries have the potential to reshape the electricity industry if they reach a level of efficiency that makes them complementary to or even a credible alternative to centralised generation, transmission and distribution. Research on these technologies strongly suggests that they will have an impact on the business, but that material uptake will occur beyond the planning period of the AMP within Centralines' network footprint. Most of the assets that will be installed during the ten-year planning period will however last far beyond that time (some assets have a life of up to 80 years). It is therefore essential that the asset investment decisions being made now take into account the prospect of future uptake of distributed energy resources. Research in this area is discussed further in the context of constraint forecasting in Section 4: Network Development Plans.

Table 2-11: Macro-Environmental Assumptions

2.9.2 Assumptions About Actions of Regulatory Bodies and Other External Entities

Assumption	Significance of the Assumption
Industry regulators employ and strengthen incentives for innovation and excellence in asset management	Centralines strongly believes that best-practice asset management combined with an appropriate regulatory framework will lead to long-term benefits for electricity consumers. Industry regulators should therefore incentivise EDBs to innovate and continuously improve asset management outcomes. Centralines continues to invest in innovation which will generate long-term asset management benefits in the form of reduced capital expenditure with the potential for improvements in service quality for consumers. Current regulatory settings and approaches are ineffective in promoting businesses to take a long-term view. Additional short-term costs associated with innovation and research and development are not rewarded by long-term payoffs to the regulated business. Accordingly, Centralines' innovation and research and development activities are undertaken in spite of regulation, not because of it.
The regulatory environment provides sufficient investment certainty for Centralines	To make the decision to invest, Centralines requires sufficient certainty that we will be able to make a return on that investment over the asset life (up to 80-years). Industry regulators have an important role to play in balancing the long-term interests of consumers with creation of a regulatory environment that is sufficiently certain for businesses to invest. The AMP assumes that the regulatory environment will adapt to threats posed by consumer uptake of alternatives, such that this uptake does not result in undue risk to Centralines.

Assumption	Significance of the Assumption
Availability of field personnel capability and capacity to deliver the AMP	Suitably resourced and competent field personnel, both in-house and external, will be necessary for the delivery of the AMP. It is assumed that such a resource will continue to exist within Centralines' network footprint during the planning period. In Centralines' estimation there are two main sources of uncertainty relating to this assumption. Firstly, will the industry continue to be able to attract people into electrical, line mechanic, fitting and technician apprenticeships at a rate that keeps up with people leaving the workforce? Secondly, will contracting businesses be able to match the pace of change in electricity distribution network technology and upskill and supplement their existing workforce?

Table 2-12: Assumptions about Actions of Regulatory Bodies and other External Entities

2.9.3 Governance and Ownership Assumptions

Assumption	Significance of the Assumption
Centralines remains wholly owned by the Central Hawke's Bay Consumers Power Trust (CHBCPT)	A key assumption in Centralines' Organisational Strategic Plan is that the business remains wholly-owned by the CHBCPT. This assumption is therefore also relevant in the AMS and asset management planning. A change in ownership or ownership structure could alter key input parameters to the AMS including the: • Asset Management Strategy and Objectives, • availability of funding to deliver on asset management plans, and • risk appetite. It is likely that asset management plans would need to be re-formulated entirely. Under the Trust Deed of the CHBCPT, every five-years the Trustees are required to initiate a review of ownership of shares in Centralines. The next review will be required in 2024.

Assumption	Significance of the Assumption
Constant appetite for risk at a corporate level	Risk to the business is an input into all decision-making. Risk associated with particular decisions is assessed against the Company's risk appetite which is managed across the following categories: • financial • legal and contractual • reputational and customer • business operations and disruption, and • people, staff and contractors. Centralines' risk appetite is premised upon the Company's internal and external environments. Changes in these environments could result in a shift to a more aggressive or conservative stance. A material change to Centralines' risk appetite would systematically affect Centralines' asset management plans.

Table 2-13: Governance and Ownership Assumptions

2.9.4 Asset Management Planning Assumptions

Assumption	Significance of the Assumption
Accuracy of constraint forecasts	Constraint forecasting provides a view of the expected future outputs required of Centralines' assets. It is therefore a fundamental part of both the Asset Management Strategy and Objectives, and asset management planning elements of the AMS. Traditionally, the key uncertainty in constraint forecasting has been the rate of growth in the number of dwellings and businesses of different types connected to the network. To address this type of growth Centralines has drawn upon demographic and economic data and projections to create constraint forecasts down to the level of 11kV feeders to enable development of robust asset management plans. This is the approach that has been taken in formulating the AMP and it is assumed that this will be fit-for-purpose for the first half of the planning period. Centralines believes that uptake of distributed energy resources (DER) and electric vehicles and ongoing improvements in energy efficiency will render such constraint forecasting approaches incomplete beyond 2020. Future demand forecasting will need to be able to forecast not only the quantity of consumers, but also their energy use intensity by segment, degree of distributed energy resource uptake, and be able to provide information down to the level of low voltage (400V) reticulation.
Situational awareness of the network continues to improve, and this delivers opportunities to defer, curtail or otherwise reduce network	Centralines has been installing sensors and automated switches on the network for some time, and the transition of Centralines' network onto their service provider's, Advanced Distribution Management System (ADMS) was completed in 2017. As a result, Centralines' situational awareness has improved. This, coupled with Unison's maturing asset management

Assumption	Significance of the Assumption
expenditure without resulting in increased network risk	capability, is enabling better asset management decisions to be made, and ultimately will result in more efficient and effective asset management. The theme of improved situational awareness leading to better asset management remains a key plank in Centralines' Asset Management Strategy, and it is assumed that progress will continue to be made. The network expenditure forecasts in this RAMP assume that Centralines improved situational awareness does continue to enable the managed deferral of investment. The key factor that could lead to a difference between the expenditure forecasts disclosed and actual information recorded in future disclosures is if the situational awareness developed reveals that Centralines earlier understanding of the condition of a material quantity of assets was optimistic. In such a situation, this would in fact require investment to be brought forward, rather than deferred. Although this would have an unfavourable financial impact, it would mean that underlying network risk would be reduced.

Table 2-14: Asset Management Planning Assumptions

2.9.5 Price Inflator Assumptions

Capital and operational expenditure forecasts reported in the RAMP have been indexed for future years to take into account wage and material price inflation.

The inflation rates for 2019 and 2020 were provided by the Commerce Commission. The rates for the years thereafter are an average rate based on the previous period. The rates used are provided in Table 2-15, presented as a forecast annual rate of inflation.

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Capex	2.32%	2.09%	1.98%	1.92%	1.89%	2.00%	2.00%	2.00%	2.00%	2.00%
Opex	2.39%	2.71%	2.42%	2.46%	2.51%	2.29%	2.29%	2.29%	2.29%	2.29%

Table 2-15: Price Inflator Assumptions

2.10 Overview of the Asset Management Strategy and Delivery

2.10.1 Strategic Context

The macro-environment that Centralines operates within is changing and this is influencing the organisation's strategy. The key drivers of change and the strategic risk implications are summarised in the PESTEL analysis below.

Category	Driver	Risks and Implications
Political	Increasing requirement to assure a secure electricity supply to customers, retailers and industry.	Significant external attention would be directed towards any major power interruption or increasing frequencies.
	Prices for power are retained as low as practicable to enable the local economy to grow.	Centralines has external constraints to ensure price efficiencies for delivery of its services and these constraints may be increased over time. Centralines must continue to be, and be perceived to be, prudent in its expenditure and asset management.
	New Zealand's planning for the transition to 100% renewable electricity by 2035, while considering factors including security of supply and affordability.	Centralines must ensure DER have competitive access to the network at a reasonable cost.
	The Electricity Price review found that the electricity market is not working for everyone and many households are struggling to pay their bills.	Centralines must ensure distribution cost structures remain affordable and transparent.
Economic	Electricity consumption is flattening and reducing in some parts of Centralines' network which is believed to be driven by energy efficiency and increasing cost relative to incomes.	Capital available for network development and enhancement is constrained. Downstream revenue pressures on funding available to sustain existing assets.
	Low inflation outlook.	Increases in costs to sustain the network are primarily driven by aging equipment, not the unit cost of work, although this may be challenged by skills shortages and increasing resilience requirements in future.
	New Zealand economy performing well relative to many other developed nations.	Expectations of reliable power supply are high to ensure economy performance is maintained. Businesses expanding. Potential for pressure on contracting resources.

Category	Driver	Risks and Implications
	High net migration. While most migrants are seeking to settle in Auckland there is spill over to Centralines' regions.	Increasing cost of acquiring land affecting new zone substation builds. Growth in new connections. Potential for pressure on contracting resources.
Social	General societal concerns about a lack of affordability of basics including housing, food and energy.	Substantive price increases even if allowed under the Default Price Path (DPP) will be deeply unpopular.
	Increasing expectations of society for businesses to make decisions that accord with environmental sentiments, whether rational from Centralines' frame of reference.	Effective stakeholder management on decisions that affect or are perceived to affect the environment is necessary in all cases.
	Reducing numbers of young people taking on trades apprenticeships in the electricity industry.	Aging contracting workforce putting pressure on the availability of skilled people to undertake field-based work.
	Engineering skills shortages in New Zealand due to high demand to support economic growth.	Difficulty of attracting skilled and experienced engineers to replace employees retiring or relocating.
Technological	Advancement in technologies that can affect electricity consumption and demand including solar PV, batteries, electric vehicles and home energy management.	The range of choice for consumers about how to meet their energy needs are increasing, meaning increased competition for EDBs. Widespread uptake of electric vehicles could increase peak demand and consumption.
	The discipline of asset management is maturing rapidly, particularly in the UK, Japan and Australia. Case studies of excellence emerging.	There is a wealth of information and good practice available to support Centralines in improving its practices and performance in this business area.
	Information security and cybercrime are increasing risks to Centralines.	Loss of control of the service provider's NOC could have major business disruption and health and safety implications, and this risk is costly to manage.
Environmental	Some indications from climate scientists that the frequency and severity of storm events will increase in coming decades.	Increasing likelihood of damage to Centralines' network due to weather events. Increasing cost of infrastructure to ensure resilience.
	Lack of regulatory mechanisms to enable the removal of trees within falling distance of lines.	Impact of severe weather events compounded by vegetation resulting in repair costs, network performance issues, and safety risks.

Category	Driver	Risks and Implications
Legal / Regulatory	Electricity Authority is pushing for more cost-reflective electricity distribution pricing. There are currently some regulatory and technical hurdles to achieving this.	Greater focus on bottom up understanding of cost drivers enabling justification of costs based on specific work and risks. Demonstration of asset management competence essential to maintain confidence in Centralines by external stakeholders.
	Internationally economic regulators and governments are becoming increasingly interested in ISO 55001. Distribution network operators in UK already required to be PAS55 certified.	Alignment and certification to ISO 55001 represents a significant outward indicator that Centralines' Management service provider is competent in all aspects of asset management. Certification would enhance Centralines' position in justifying expenditure and pricing its services to all stakeholders.
	Commerce Commission open letter to the electricity distribution sector outlining its priorities of: • improving its understanding about the performance of infrastructure industries • making information about infrastructure industries more accessible, and • improving the process for assessing customised price-path proposals.	Centralines must demonstrate competency and effectiveness in asset management and engagement with consumers to understand their preferences.
	Health and safety legislative reform occurring in New Zealand due to perceived poor performance in several industries.	Higher compliance costs likely for Centralines. Greatly reduced ability to carry out work live-line, meaning: • more outages for planned work affecting customers, and • increased pressure on regulatory SAIDI and SAIFI performance metrics. Greater scrutiny of the broader organisational context for dangerous work, including the management systems the work is initiated through.

Table 2-16: PESTEL Analysis

2.10.2 Strategy Overview

The focus of Centralines' strategy is aligning and keeping abreast of the changing energy landscape. The improving economics of DERs, such as solar photovoltaics and batteries as well as managing the organisation sustainably are the key factors on which Centralines' strategy is based. Centralines believes that the timing and magnitude of the impact that DER will have is inherently unknowable. However, it is clear widespread uptake of these technologies would impact the organisation's existing business model.

Centralines' Management service provider has aligned their business with ISO 50001 through the developed of an AMS. In their view this represents best practice and will support Centralines' overall asset management aspiration of delivering best practice asset management decisions. This will allow Centralines to respond to the changing environment with flexibility and ease.

The Strategy Framework presented in Figure 2-8 represents the current practice, which:

- AMOs are established based upon external and internal context and alignment with the principles of the Asset Management Policy is ensured.
- Measures are developed to quantify the gap between where current asset performance and asset management capability levels lie in relation to where they must be for the AMOs to be realised.
- Asset management strategies are developed to close gaps, taking into account the lifecycle of the assets.
- Strategies are implemented in asset management plans as well as through separate improvement initiatives.
- Implementation progress is reported on as required, and major projects are reviewed upon completion. Externally conducted assessments of asset management maturity against good practice standards (formerly PAS 55:2008; now ISO 55001:2014), and expert review of key pieces of work are employed as quality assurance mechanisms.

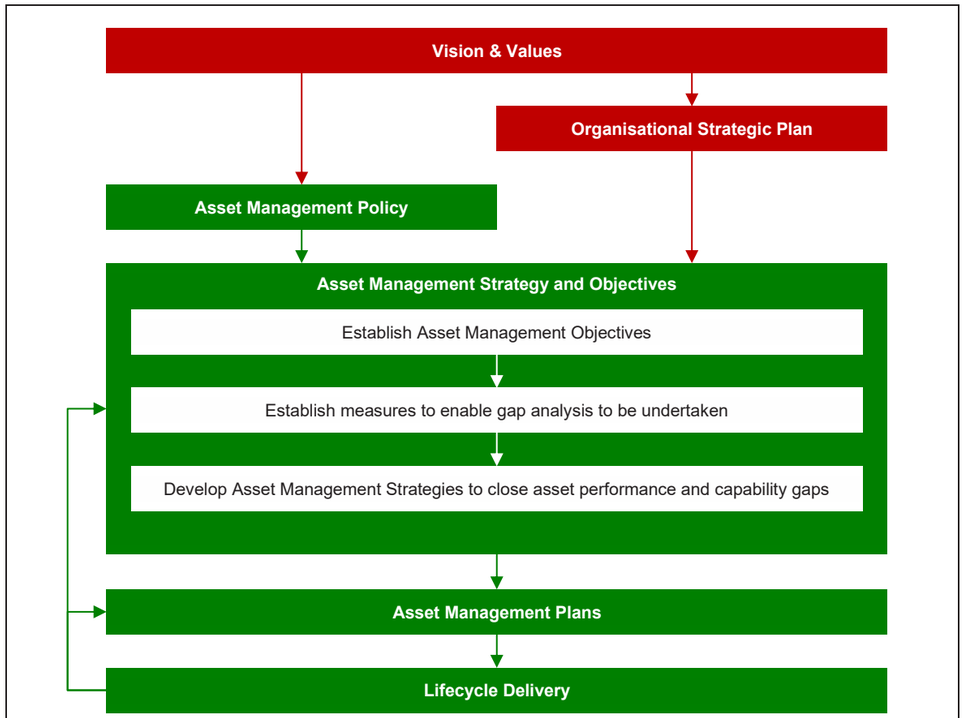


Figure 2-8: Asset Management Strategy and Objectives in the Asset Management System

2.10.3 Processes of the Asset Management System

The AMS ensures the effective implementation of the Asset Management Strategy. As shown in Figure 2-2, the AMS comprises three primary processes:

- Asset Management Planning
- Lifecycle Delivery, and
- Continual Improvement.

These processes ensure:

- the asset strategy considers the lifecycle of the assets
- the AMOs drive investment programmes, including the AMP, and
- costs, risks and system performance are controlled through the implementation of the AMP.

2.10.3.1 Asset Management Planning

Planning within the AMS is required to provide assurance that:

- risks to the Asset Portfolio are managed, and
- opportunities for improvement are realised.

Centralines' planning processes are well-defined and embedded in the business. They utilise asset information and apply risk management principles to ensure that decision-making is robust and fact-based. The outputs are plans that specify clear tasks and projects to be initiated and scheduled to maximise the efficiency of resource utilisation.

The desired outcome of Centralines' asset management planning is the achievement of the AMOs specified in Table 2-3.

The desired outcome of Unison's asset management planning is the achievement of the AMOs specified in Section 2.3.4. Because the AMOs are explicitly selected to align the:

- Asset Management Policy
- Corporate Strategic Objectives, and
- asset management planning processes.

The key output of the planning process is the Asset Management Plan (AMP). This contains the details of all major work required on the Asset Portfolio over a ten-year planning horizon. This work includes:

- Specialist and Complex capital projects
- asset refurbishments, and
- long lead-time corrective work including pole replacements.

All work proposals submitted to the AMP must meet certain information requirements, including assessment against the AMP risk schema. This ensures that an acceptable balance between cost, risk and performance can be reached, and therefore resources are efficiently and prudently deployed.

The AMP is supplemented with other plans including:

- plans for routine asset maintenance and vegetation management, and
- contingency plans that are developed collaboratively by Centralines' service providers Networks and Operations and Business Assurance groups.

Centralines utilises the majority of their asset management service providers asset planning system which is represented in Figure 2-9 below.

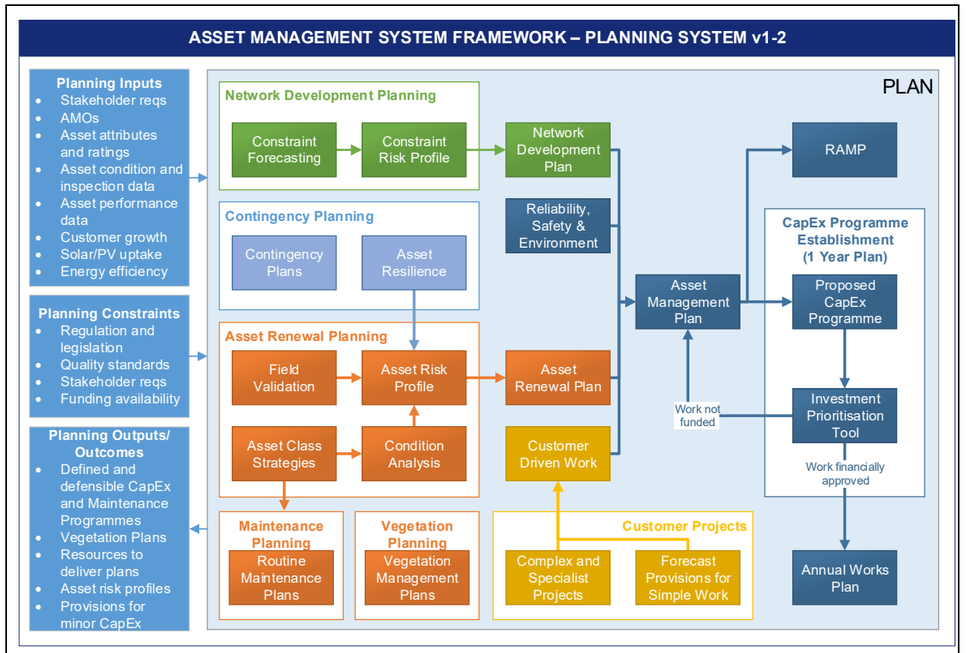


Figure 2-9: AMS Planning Systems

Figure 2-9 identifies eight sub-processes of the planning system, and these are outlined in Table 2-17.

Process	Description
Network Development Planning	• Model a range of possible future demand scenarios and identify the most plausible ones to utilise for planning. • Quantify the risk associated with capability constraints in the asset relating to capacity, security and voltage compliance over a ten-year planning horizon based upon selected demand scenario(s). • Specify project proposals to address high priority risks and submit these proposals to the AMP.
Asset Renewal Planning	• Identify and quantify risks in the Asset Portfolio relating to asset condition. • Specify project proposals to address high priority asset condition risks and submit these proposals to the AMP. • Specify project proposals to improve the resilience of the Asset Portfolio based upon requirements from enterprise risk management and contingency planning processes.
Customer Projects	• Forecast the volume of customer simple work over the planning period and submit proposed provisions to the AMP. • Identify any Complex and Specialist projects requested by customers and submit these proposals to the AMP.

Process	Description
Works Planning and Consolidation	• Coordinate the Annual Works Planning and Consolidation process. • Manage the AMP including supporting teams to provide submissions and closing out completed work. • Quality assure submissions to the AMP to ensure submissions are complete and technically sound. • Manage the optimisation of the AMP to ensure efficiencies in the plan are realised. • Coordinate reporting, management review and approval processes, and provide information to support the formulation of the RAMP. • Provide contracting service providers with a forward view on the required resources and capabilities to deliver the AMP.

CapEx Programme Establishment	• Establish the annual CapEx programme for the following financial year by identifying the CapEx projects and budget provisions required.
	• Introduce fiscal constraints (if any) and strategic investment criteria.
	• Initiate the project scoping process to ensure that work requests are available on a timely basis to:
	  ○ Centralines Operations Team, and
	  ○ other contracting service providers.

Maintenance Planning	• Establish annual routine maintenance plans including:
	  ○ preventive maintenance programmes, and
	  ○ asset inspection and monitoring programmes.

Vegetation Planning	• Establish the annual plan for the management of vegetation, including trees encroaching on the line corridor, that represent a risk to the Asset Portfolio.
Contingency Planning	• Establish contingency plans to mitigate the impact of high impact, low probability (HILP) events, should they occur. • Through Enterprise Risk Management (ERM) processes supported by AMS stakeholders, identify and quantify resilience risks in the Asset Portfolio.

Table 2-17: Planning System Sub Processes

2.10.3.2 Lifecycle Delivery

Lifecycle Delivery comprises activities required to support the:

- sustainable operation and technical integrity of Centralines' network, and
- effective and efficient implementation of asset management plans.

In this way, Lifecycle Delivery can be thought of as '*assets doing things and things being done to assets*' through the asset lifecycle. There are three key issues dealt with in Lifecycle Delivery:

1. Specification and Control of Work — the key activities that support network operations and implementation of asset management plans, and how they are controlled, and risks are managed to ensure consistent quality outcomes.
2. Technical Change Management — how change in the Asset Portfolio is controlled and technical integrity is maintained so that assets remain safe and fit to deliver the operational outcomes specified in the AMOs.
3. Outsourcing — the framework by which Centralines assures itself that the Lifecycle Delivery activities that are conducted either in house or in part by third parties meet the quality requirements of the AMS.

Centralines utilises the majority of their Asset Management service provider's Lifecycle Delivery Framework which is shown in Figure 2-10 below.

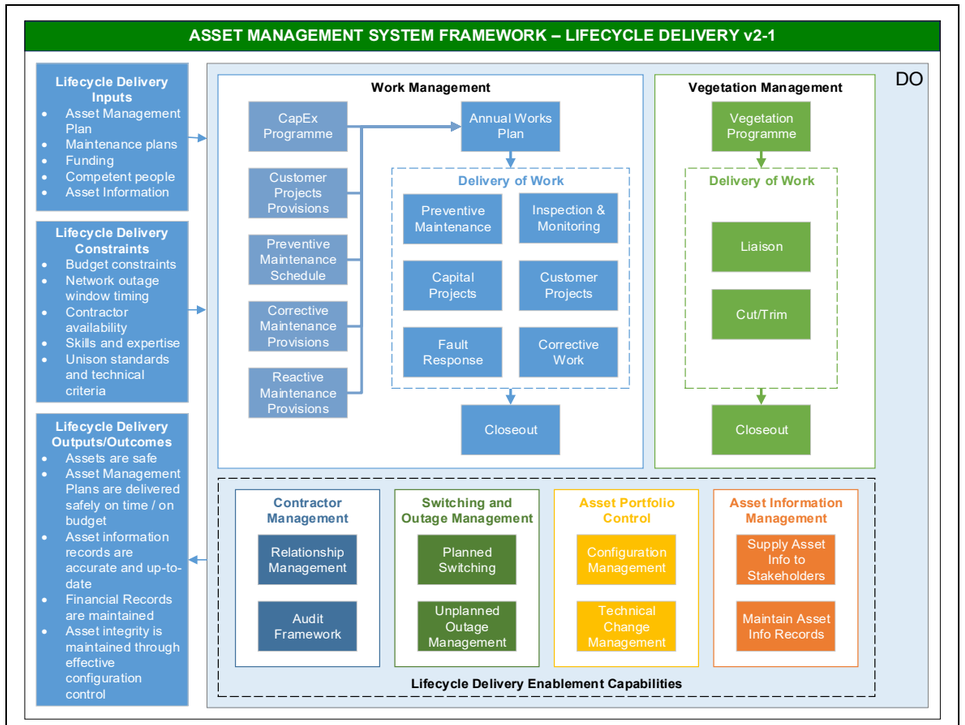


Figure 2-10: Lifecycle Delivery Framework

Further detail on the key processes within the Lifecycle Delivery Framework is provided in Table 2-18.

Process	Description
Work Management	• The process by which project and maintenance work is undertaken across the network. It assists resources to be productive and effective in maximising equipment safety and reliability.
Vegetation Management	• Identification of vegetation issues and securing of landowner consent for cutting work through the liaison process. • Cutting and trimming of vegetation to ensure line corridors are clear.
Contractor Management	• Utilise existing in-house resources or engage appropriately competent and cost-effective, outsourced contracting service providers to undertake work on assets. • Issue work to internal resources or contracting service providers. • Measure performance of contracting service providers under contractual frameworks.
Switching and Outage Management	• Develop switching plans to enable work on the network to proceed. • Identify the occurrence of unplanned outages and coordinate the response, including dispatch of first responder.
Asset Portfolio Control	• Maintenance of the configuration of the Asset Portfolio to ensure integrity. • Technical Change Management processes to ensure that risk of change in the Asset Portfolio is effectively managed.
Asset Information Management	• Record asset information generated from Lifecycle Delivery activities within asset information systems including Activa and GIS. • Respond to requests for asset information from Centralines teams, contracting service providers, and third parties such as other utilities.

Table 2-18: Key Processes in the Lifecycle Delivery Framework

2.10.4 Continual Improvement

To ensure Centralines is well positioned to support the organisation to respond to the possibility of disruption in the electricity sector, continual improvement in all facets of asset management is vital.

The Continual Improvement Framework encompasses the 'Check' and 'Act' of the PDCA cycle within the AMS. Therefore, the purpose of these processes is to:

- monitor and evaluate the performance of assets, asset management, and the AMS
- deliver corrective action to respond to non-conformity and provide clear guidance on requirements for preventive action, and
- ensure that changes made to the AMS are controlled and result in sustained improvement.

The Continual Improvement Framework developed by their Management service provider has been adopted by Centralines and is shown in Figure 2-11 below.

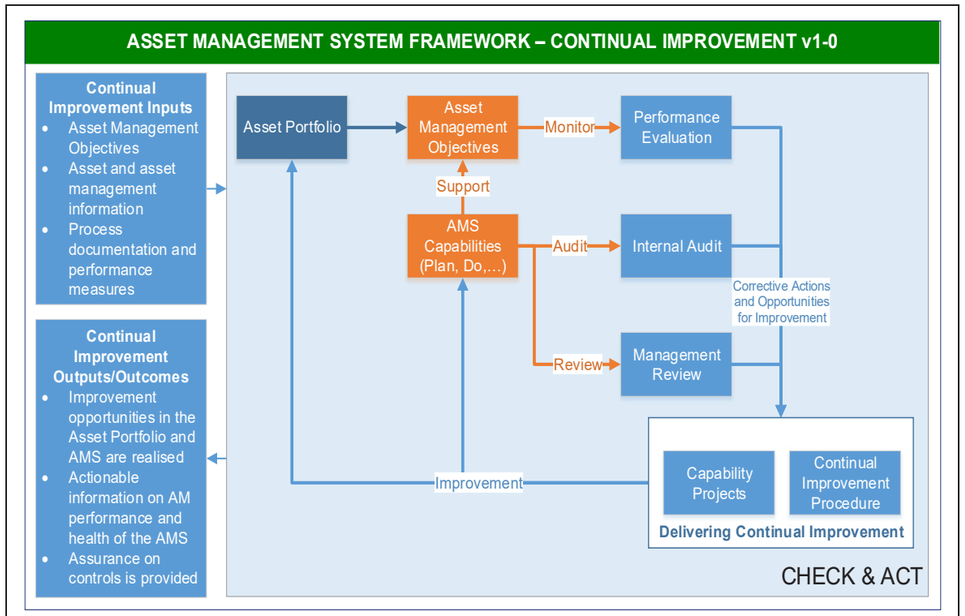


Figure 2-11: Continual Improvement Framework

Further detail on the processes supporting continual improvement are set out in Table 2-19.

Process	Description
Performance Evaluation	• Establish SMART performance indicators based upon the AMOs. • Manage the Performance Evaluation Framework to measure performance against the performance indicators over time. • Report on performance to stakeholders.
Internal Audit	• Deliver a risk-based Internal Audit Programme against the processes of the AMS to ensure that risk controls are effective. • Provide feedback to teams on the alignment of processes with ISO 55001, asset management strategy, and the effectiveness of controls. • Identify corrective actions that are required. • Identify opportunities for improvement.
Management Review	• Systematic periodic review of the status and performance of key elements of the AMS to ensure situational awareness of the management team.

Process	Description

Capability Projects	• Deliver strategic change projects to establish and enhance the capabilities within the AMS.
	• Deliver effective change management including:
	  ○ engagement of people and teams
	  ○ training and competency development
	  ○ controlled documentation, and
	  ○ change to information systems.

Continual Improvement Procedure	• Provide and manage a register of required corrective actions and opportunities for improvement (CI Register).
	• Risk prioritise work to be undertaken and provide a planning function.
	• Commission solutions to improve the Asset Portfolio and AMS and close-out projects in the CI Register, including:
	  ○ improving identification of non-conformity and targeting of corrective action, and
	  ○ implementing preventive actions to avoid non-conformity in the first place.
	• Quality assure the work undertaken and verify its effectiveness in addressing the non-conformity or opportunity for improvement.

Table 2-19: Key Processes Supporting Continual Improvement

2.11 Overview of Systems and Information Data Management

2.11.1 Introduction to Asset Information Strategy

Information, including asset information is a key enabler of the AMS, as shown in Figure 2-2. Information is utilised by Centralines to support:

- the delivery of the key processes of the AMS, being
  - planning
  - lifecycle delivery
  - continual improvement, and
  - consequential reporting requirements,
- communication to a range of stakeholders including both internal employees and contractors, and
- awareness of all internal stakeholders of the current performance of both the Asset Portfolio and the AMS, allowing them to be effective in their role as it is relevant to asset management.

Alignment between the key types of information and the asset management processes specified in Figure 2-20 is shown in Table 2-20.

AM Processes	Information Available
Policy and Governance	Corporate Strategic Objectives Capital Investment Strategy Risk Management Framework Regulatory requirements Asset Management Policy principles Communication Plans
Asset Management Planning	Asset Management Objectives Proposals for work within the Asset Management Plan Asset class strategies including technical standards Asset health reporting and asset risk information
Lifecycle Delivery	Asset work histories Geospatial information about assets Asset risks Schedules for work on assets Maintenance programmes and procedures Asset master data and information generated through technical change management processes Budgets for work to be done and project cost information Work delivery reports
Continual Improvement	Continual improvement opportunities registered Performance against Asset Management Objectives Results of internal audits and external assessments Outcomes from management reviews Project Plans for Capability Projects

Table 2-20: Asset Management Processes Alignment to Information Requirements

To ensure that information is fit for purpose to meet the requirements above, Centralines asset management service provider has developed **AMS-0007 AMS Asset Information Strategy**. The strategy has four top-level goals:

1. Know what asset information is important to achieving which business goals.
2. Know what asset information is held and where it is stored.
3. Know the state (quality, completeness, etc) of the asset information held.
4. Make informed decisions about asset information that appropriately balance the trade-off between asset performance, cost and risk.

There are two main areas that are currently being targeted in the implementation of the strategy:

- identifying and documenting the specific data requirements of key asset management processes, clarifying roles and responsibilities and establishing a Data Quality Dashboard in respect of these, and
- providing a data assurance framework to Capability Projects to support their successful implementation and sustainment.

2.11.2 Responsibility for Asset Information

Centralines' Management service provider's Asset Information Governance Group (AIGG) is a committee established to implement the Asset Information Strategy. They set direction and priorities for asset information improvement. The AIGG is primarily composed of Centralines' Management service provider's Networks and Operations Managers and is chaired by their Asset Management Systems Manager.

The transactional processes for managing asset information are the responsibility of the Asset Information Team within the Asset Management Team. This includes:

- the maintenance of asset attribute information following asset change, and
- management of asset location and connectivity data within Unison's geo-spatial information system (GIS).

The responsibility for the maintenance and management of asset information systems and the supporting hardware resides with Centralines' Management service provider's Information Management Group (IMG). There is close collaboration between the Asset Information team and IMG to ensure alignment between the teams. IMG has a representative on the Asset Information Governance Group (AIGG).

2.11.3 Identification of Asset Information requirements

Subordinate to the Asset Information Strategy are the Asset Information Management procedures. These procedures are summarised in Figure 2-12, where each block represents a procedure implemented in the organisation. Together the Asset Information Strategy and procedures represent a well-integrated system for managing asset information to support the achievement of Centralines' AMOs.

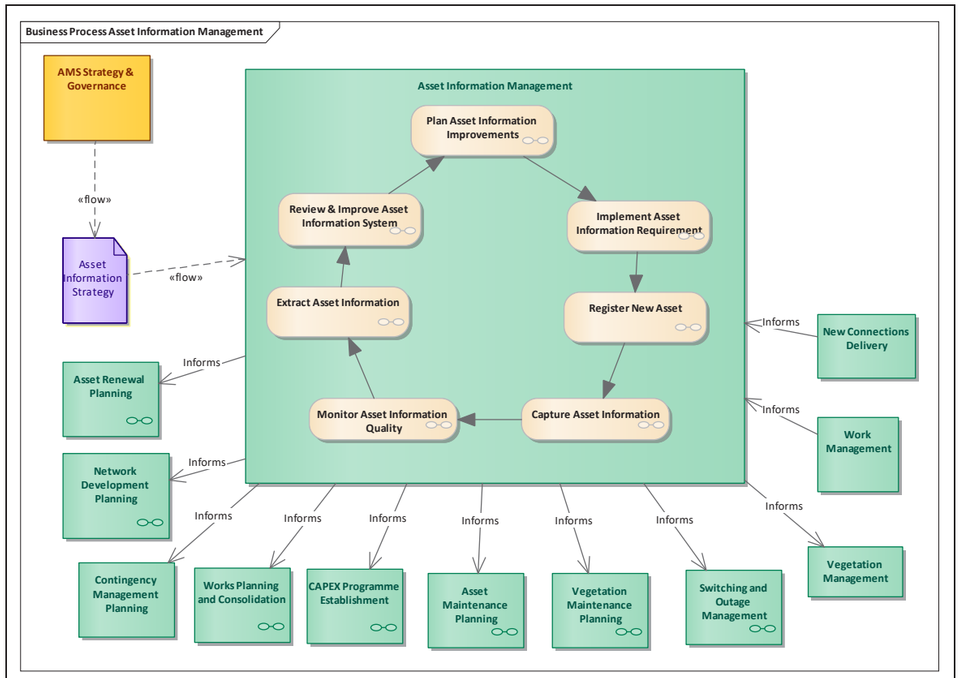


Figure 2-12: Asset Information Management Procedures

The 'Plan Asset Information Improvements' procedure is utilised to identify new asset information requirements to support the lifecycle management of assets. Diagrams for this procedure, and the following procedure that sees new requirements implemented are provided in Figure 2-13 and Figure 2-14.

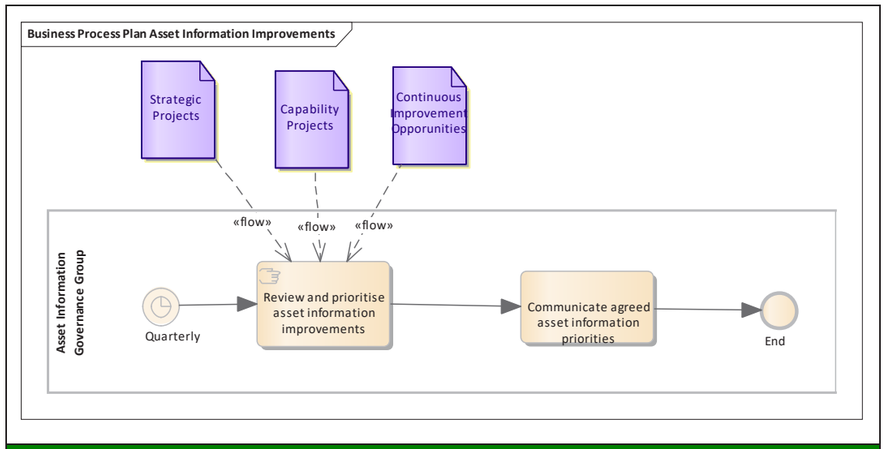


Figure 2-13: Plan Asset Information Improvements

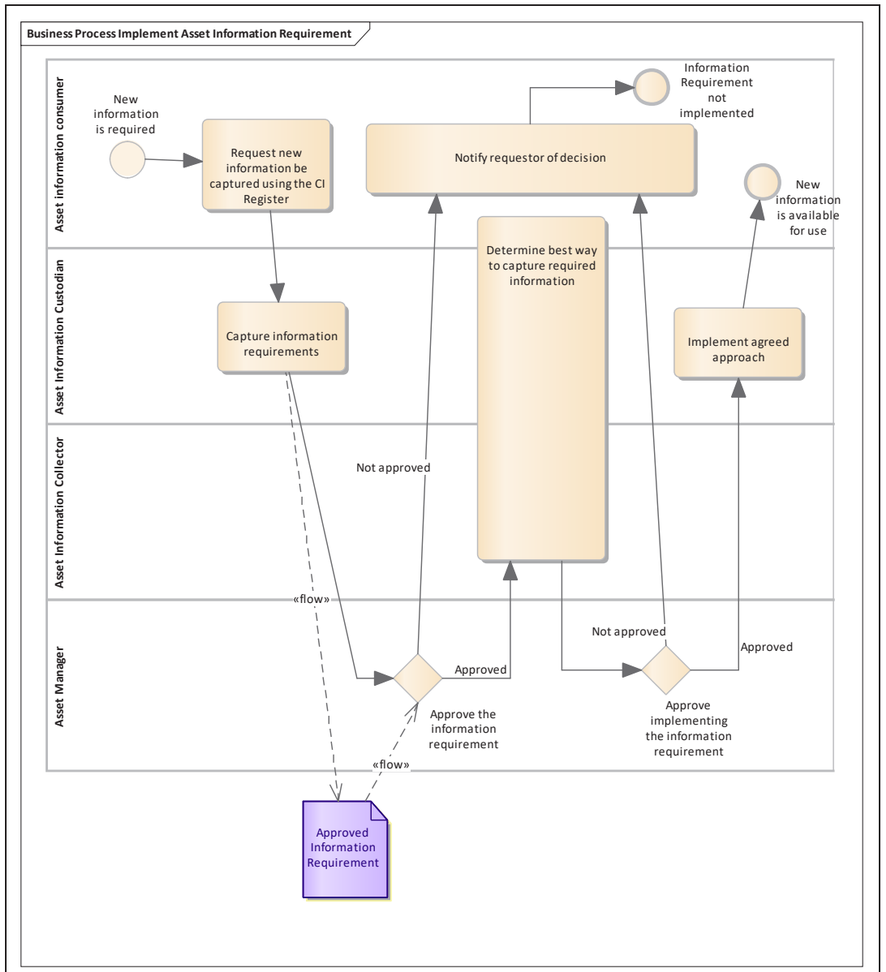


Figure 2-14: Implement Asset Information Requirement

2.11.4 Information Systems

Centralines and their Management service provider utilises a number of systems as repositories for information relevant to asset management, as set out in Table 2-21.

Name of System	Description
Activa EAMS	Activa is Centralines' Management service provider's Enterprise Asset Management System (EAMS). It is built on the BASIX platform provided by EMS solutions. Activa houses asset register which is the master repository for asset data and stores both current attributes as well as historical information. The asset data that Activa masters is available for viewing within the GIS. Activa also provides works management functionality. This integrates with the asset register module of Activa allowing the recording of asset management interventions against asset records. Finally, Activa masters the interface and interactions with the mobile inspection platform Kern Mobile. Note: This system is being replaced with One Energy in 2020.
GE Smallworld GIS	The Geo-spatial Information System (GIS) stores records of network assets according to their location and electrical connectivity. This includes the electrical connectivity within substations. Design and estimation of CapEx projects is mastered in the Design Manager module of the GIS.
Schneider ADMS	The Advanced Distribution Management System (ADMS) integrates SCADA with a suite of advanced distribution management and grid optimisation applications. Network operation and control includes managing and communicating with assets in the field along with tools to enable operators to make informed decisions based on the current network status. ADMS also provides a platform to activate self-healing network schemes. Network optimisation and analysis provides the ability to optimise the state of the network. It identifies the optimal configuration to reduce electrical losses and maximise asset utilisation.
Bentley and Meridian Drawing Management	The Meridian drawing management system integrates with the Bentley Microstation Computer-Aided Design (CAD) tool to manage the versioning and renditions of CAD drawings. It gives CAD technicians the functionality to work on projects and then publish finished drawings. The drawings are discoverable to the business via the Meridian web client.
Master Data Services	Microsoft Master Data Services (MDS) is a system for storing relatively static but important information used by key downstream systems and processes. It is primarily used for storing manufacturers' specifications of electrical and physical characteristics of equipment models.
SharePoint DocStore	Document management system used to track, manage and store documents while keeping a record of the various versions created and modified by different users. DocStore houses all controlled documents including standards, and capital project files.

Name of System	Description
OSISoft PI Historian	PI is the primary tool used for the storage and analysis of time series data generated by telemetered network devices. Each data point for each piece of equipment is assigned a unique reference tag against which data is recorded and can be accessed. Interfaces are developed between PI and other applications in use in the business. Examples of data recorded in PI include switching events, transformer oil temperature, and current and voltage values at measuring points.
Exonet	Centralines stand-alone financial system which is totally independent from Centralines' Management service provider's financial system.
Gentrack	Gentrack is Centralines' Management service provider's Customer Relationship Management (CRM) information system. It provides a platform for consumption and ICP based network billing. Gentrack also manages the new connections and decommissioning process, network tariffs and registry updates.

Table 2-21: Information Systems

These systems provide essential data for risk assessments, investment decision-making and performance monitoring functions in the AMS. A range of tools are used to both report from these data sources and to extract data for further analysis. This data and information are of particular importance for Capability Projects.

In addition, staff also manage a number of key spreadsheets with essential asset data, such as issues and future projects to address those issues. Where such spreadsheets are considered critical for the business, then the spreadsheet will:

- have a nominated owner to manage input into the document, and
- be managed within the DocStore system to allow universal internal access to view the data.

2.11.4.1 Integration of Information Systems

The integration of the key information systems set out above is shown in Figure 2-15. The arrows represent the flow of data and information from one system to another.

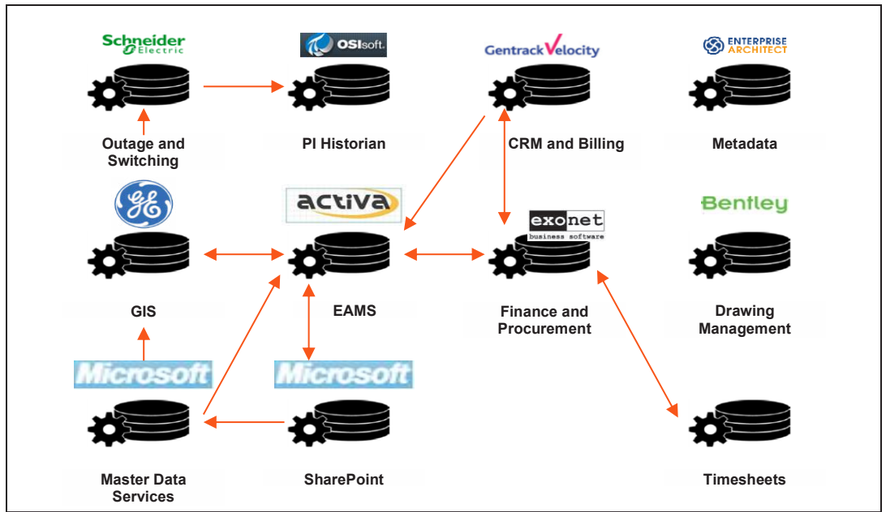


Figure 2-15 Integration of Information Systems

2.11.5 Assuring the Quality and Accuracy of Asset Management Information

To assure that data is suitable for achieving Centralines' business goals, from time-to-time it is necessary to review the state of the data required to support those goals. This requires a series of activities to check, and if necessary, remedy the data quality. Figure 2-16 provides a generic process for completing this data assurance.

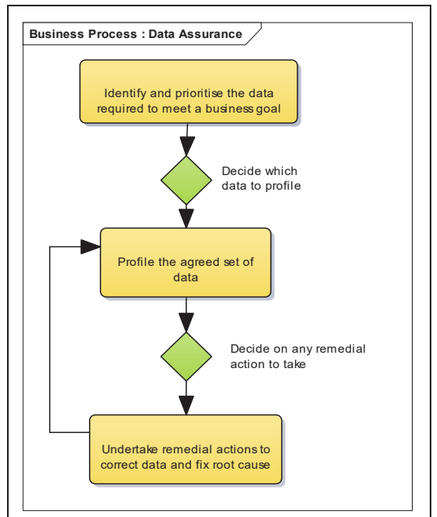


Figure 2-16: Data Assurance Process

When new data requirements are established, part of the procedure for implementing these new requirements is to establish a means of monitoring the quality of the information on an ongoing basis. This is part of the 'Determine best way to capture required information' block in Figure 2-14.

2.11.6 Limitations of Asset Management Data

In order to provide a top-level view of the health of asset information in terms of quality and accuracy, a Data Quality Dashboard (DQD) has been developed. This tool is available on the service provider's intranet and provides a view of the quality of the information supporting each element of the AMS.

The state of asset information is only known for seven of the 14 capabilities under the 'Plan' and 'Do' sections of the AMS. Once all capability areas are completed, then a holistic view of asset information quality will be available to inform decisions about where to focus improvement efforts.

2.12 Asset Management Processes

2.12.1 Asset Inspections

Inspections and Monitoring Programmes involve the acquisition of information about the condition of assets to enable informed, risk-based decisions about their ongoing maintenance and eventual replacement to be made. As well as this, physical inspections are in some cases required by legislation to provide assurance of the safety and integrity of Centralines' network.

The primary objectives of Inspection and Monitoring Programmes are to:

- Ensure the safety of assets:
  - many of Centralines' assets are situated in public areas, meaning regular inspection is required to ensure that assets are free from damage and are secure, and
  - meet legislative requirements.
- Improve network reliability:
  - reduce unplanned/forced outages affecting customers
  - enable planned repairs or replacement prior to an asset failing in service, and
  - improve network performance.
- Extend asset life:
  - reduce permanent damage to parts, components and equipment, and
  - detect and correct problems as they occur.
- Optimise lifecycle costs and increase return on capital invested:
  - reduce repair and operating costs
  - prevent catastrophic costs
  - reduce overtime
  - reduce parts inventory requirements, and
  - reduce insurance premiums.

Inspections and Monitoring Programmes generate both measurement data as well as metadata, i.e. data about the measurement data. The measurement data may be:

- qualitative data, e.g. condition grades
- single measurements
- tables of measurements, e.g. over an observation period
- commentary about what was observed, e.g. a patch of rust, or
- photographs and other digital imagery.

The metadata may include:

- where the measurements were collected from — this can be either where samples were obtained from or where direct measurements were taken
- when the measurements were collected — the date and time and ambient conditions, and
- who collected the information — the individual, the monitoring device, the specific measurement instrument utilised.

An overview of how an Inspection and Monitoring Programme is developed is provided in Figure 2-17.

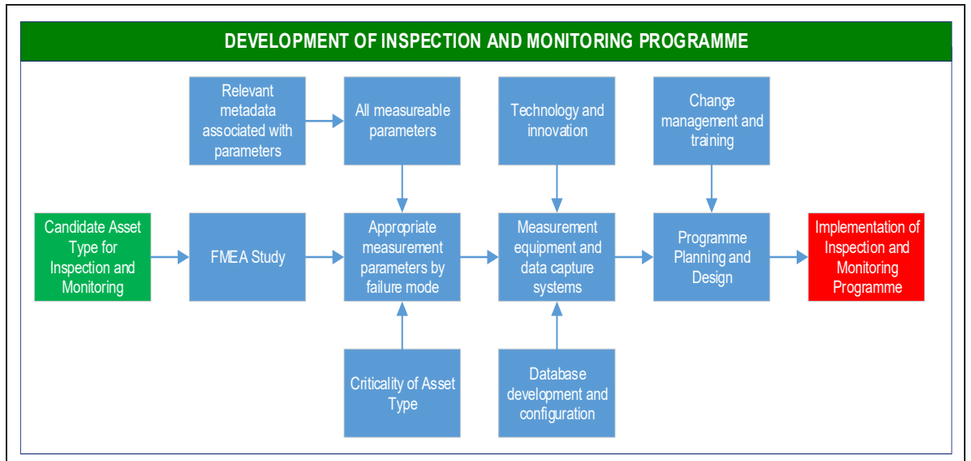


Figure 2-17: Development of Inspection and Monitoring Programme

The Inspection and Monitoring approach for a class of equipment should consider:

- the design and characteristics of the asset, including
  - why inspection and monitoring are required, and
  - what should be monitored in terms of failure modes and consequences
- information about techniques and methodologies that can be used for advanced inspection and condition monitoring, including library information and what is available in the marketplace
- how measurements can be utilised to support
  - condition assessment and
  - estimation of remaining life, and
- the benefits of the overall approach in terms of
  - return on investment, and
  - savings associated with prevention of failure.

Where people are required to obtain data, they require Standard Maintenance Procedures (SMPs) which specify the:

- tasks
- quality to be achieved, and
- expectations of what they will deliver when undertaking these tasks.

Examples include the need for cleanliness when taking oil samples for dissolved gas analysis and where to position probes for partial discharge assessment.

Centralines' current Inspections and Monitoring Programmes are summarised in Table 2-22.

Programme	Description
Cable Testing	Tan delta equipment is utilised for diagnostic testing of cables.
Earth Testing	Testing of earthing to ensure the safety and compliance of Centralines' installations.
Feeder Patrols	Inspections of 33kV and 11kV feeders to identify asset degradation as well as vegetation encroachment. Feeder patrols may: • utilise thermo-vision and acoustic technology to supplement visual methods, and • be undertaken from the ground (by vehicle or on foot) or from the air by helicopter.
Ground Mounted Inspections (GMIs)	Inspection of ground mounted assets including distribution transformers and ring main units, including partial discharge testing.
Pedestal Inspections	Inspection of pedestals which may house fuses, joints, communications equipment or sensors to ensure safety and security.
Power Transformer Condition Monitoring	A combination of online monitoring and field-based tests and inspections to maintain awareness of the condition of power transformers.
Zone Substation Inspections	Regular checks of zone substations. There are two levels of inspection that differ in frequency and degree of invasiveness. Techniques including partial discharge testing are utilised.

Table 2-22: Inspections and Monitoring Programmes

2.12.2 Preventative Maintenance

Preventive maintenance is work to ensure that assets continue to fulfil their intended functions in their present operating context, resulting in their service life being optimised. Preventive maintenance procedures are developed through a well-defined analysis involving considerations of the equipment, how it is being operated, and its environment. The successful implementation of preventive maintenance programmes results in the following benefits:

- assets perform consistently through their service lives
- the rate of unexpected failures is minimised
- the service life of assets is optimised
- safety performance is improved with workplace injuries avoided
- SAIDI and SAIFI performance impacts are minimised, and
- legislative requirements are satisfied, including safety, environment and sustainability.

The last benefit is a function of not only avoiding unscheduled downtime but also optimising the percentage of time an asset is in downtime.

Preventive maintenance procedures and their application are an essential means for Unison to assure safe and reliable operations.

The development of preventive maintenance procedures requires:

- an assessment of asset criticality that ranks the criticality of individual assets and components, based on relevant financial and non-financial business consequences of failure modes
- a routine means of identifying which procedures need review or assets are missing appropriate tactics, based on the consequences of equipment failure modes
- the ability to track progress on completing and implementing the procedures needed
- an adequate level of expertise to undertake reviews of the procedures
- engagement with field resources and equipment specialists to cross-check and advise improvements to preventive maintenance procedures, and
- a timely and efficient process to update systems with improved procedures.

The effectiveness of preventive maintenance procedures is assessed by equipment work history and considers the:

- rate of urgent repairs and frequency and duration of scheduled downtime
- availability of condition information so that condition-based actions may be triggered as needed, and
- proportion of preventive maintenance is adequate when compared to the need for repairs and condition-based interventions.

2.12.3 Network Development Projects Processes

2.12.3.1 Planning Network Development Projects

The role of Network Development Planning (NDP) is to:

- identify and prioritise risks and opportunities in the network associated with changes in demand, and other customer behaviours and expectations, and
- propose projects to respond in a way that balances these risks and opportunities with cost and performance over the long term.

Network Development Planning (NDP) has both a strategic and tactical dimension.

Strategically NDP ensures:

- the network is developed according to architectural standards that are robust to uncertainty in future electricity use scenarios and balance cost, risk and performance based upon available information
- customer expectations relating to resilience, quality and demand are understood and translated into appropriate planning criteria, and
- demand-side technology trends are understood along with the implications for the network.

Tactically NDP ensures:

- customer demand at peak periods is met without compromising asset integrity, i.e. thermal overload
- Centralines' security standards are met
- customers receive conforming power quality (including both under and over voltage, power factor and harmonics), and
- prudent project proposals are identified and specified according to the information requirements of the AMP including:
    - the work to be done on the assets
    - the timing of the work
    - the estimated cost of the work, and
    - the justification for the work, both tactically and strategically.

NDP has two key components:

- Constraint Forecasting, and
- Solution Development.

Constraint forecasting estimates the timing of one or more constraints arising in assets and asset systems and quantifies the impact of the constraint in financial terms. The resulting risk profile supports the Network Planning Team to develop appropriate project proposals to mitigate risks identified.

Solution development is the process for addressing forecast constraints to ensure the Asset Portfolio can continue to meet stakeholder requirements. The process includes:

- verification of the constraint
- root cause analysis, and
- identification, selection and costing of a suitable solution.

Solutions may be:

- network-based, i.e. acquiring new assets or upgrading existing assets, or
- non-network, i.e. identifying alternative means of addressing constraints.

Non-network solutions may include network reconfiguration or demand-side management.

An overview of the Network Development Planning process is provided in Figure 2-18, showing the two key components. This process is discussed in further detail in the Network Development Planning Section.

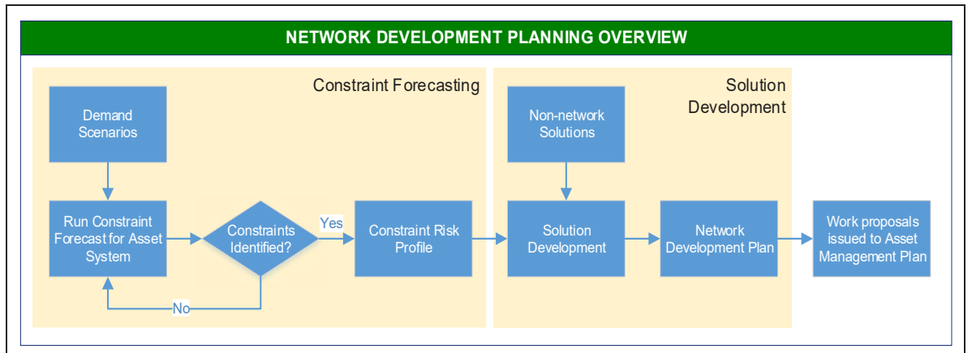


Figure 2-18: Network Development Planning Overview

2.12.3.2 Process for Delivery of Capital Projects

The implementation of Centralines' Capital Projects follows the generic process shown in Figure 2-19.

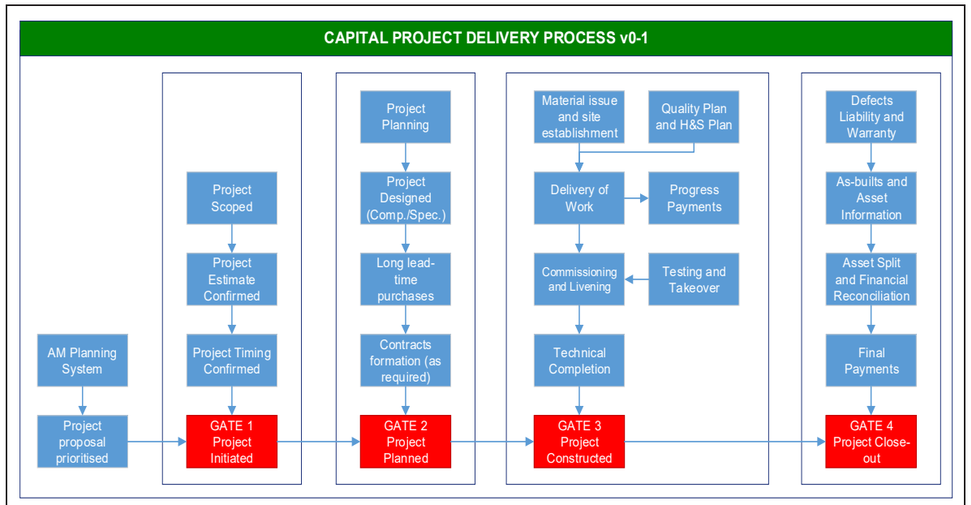


Figure 2-19: Process for Delivery of Capital Projects

This process requires:

- A project estimate be registered in the AMP with a reasonable estimate of scope, costs, resources and time frame. The project benefits must be quantified and be credible/justified before being technically approved.
- A project may only proceed to detailed planning once the requirement has been approved by delegated managers of Centralines' Management service provider.
- Resources to plan a project may be internal or external but, will represent a cost incurred in the project budget.

- The project be planned and approved before the budget period in which it starts, or special approval to expedite the work must be approved by the General Manager Commercial. When a project is expedited, a risk assessment is required to determine potential problems with its scope, budget or timeframe for delivery. Once project costs are approved, the project forms part of the budget for the site in the year in which it commences, and the detailed scope must cover the potential impact on operations.
- The project has an appointed Project Manager. The Project Manager is:
    - required to resource the project, secure resources, confirm the budget and the project schedule
    - accountable for the safety of the project, its environmental compliance and management of the Safety Plan
    - accountable for the quality of the project and the strategy for commissioning the works at the completion of technical work
    - to develop a communications plan, advising stakeholders of the progress of the work plus any requirement for their involvement, and
    - is accountable for keeping the risk register up-to-date and recording all risks and their controls as they become known. This can include all environmental, operations and sustainability risks.
- A Commissioning Plan be communicated to all relevant stakeholders well before the scheduled time of commissioning, to seek their feedback and agreement. When the project requires change to the configuration of the site, the Commissioning Plan will cover how the information systems and site procedures will be updated.
- Review of the quality of the project, including its planning and delivery plus the outcomes in terms of assets and systems commissioned, before the project can be closed out.

2.12.4 Measuring Network Performance

During 2016/17 the Schneider Advanced Distribution Management System (ADMS) was livened for the Centralines' network. The process for measuring network performance utilising this system is set out in Figure 2-20.

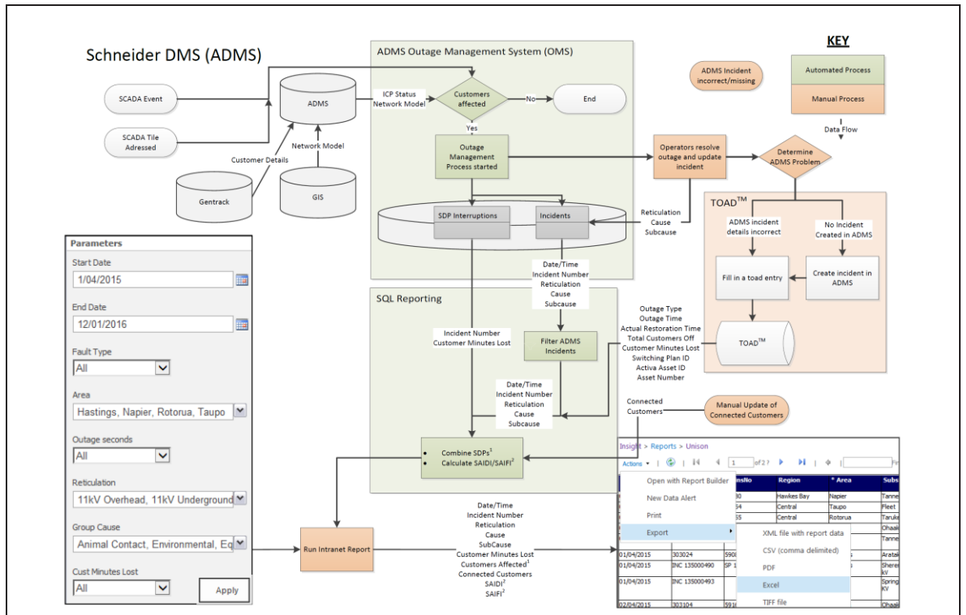


Figure 2-20: Measuring Network Performance

2.13 Documentation, Controls and Review Processes

2.13.1 Documentation

Centralines has adopted and utilises the majority of their Management service provider's suite of controlled documents to support effective management of the organisation. The Controlled Document System and associated processes ensure that documents are accessible, current and appropriate for use. The Controlled Document System is a specially managed environment within the Document Management System, DocStore. This system is managed by the Centralines' Management service provider's Technical Documentation Specialist within the Business Assurance Group.

A controlled document may be modified, or a new one added when a gap is identified to define a specific asset management process or procedure.

Internal audit processes require access to these documents. They are used to baseline any difference between what Centralines intends by way of asset management, and what is actually happening within the organisation.

Corporate documented information is held within the Controlled Document System in the following categories:

- Asset Management System governance (AMS series)
- Commercial (CM series)
- Contracting (SD series)
- Corporate (FC series)
- Emergency Plans
- Health and Safety (HS series)
- Information Management (IT series)

- Network Standards (NK series)
- Operating Standards (OS series), and
- Standard Operating Procedures (SOPs).

Key asset management documents are managed within the AMS series including the:

- Asset Management Policy
- SAMP, and
- subordinate documents that specify AMS processes, such as Asset Management Planning.

These documents along with key technical standards, plans and reports are set out in the AMS document framework in Figure 2-21.

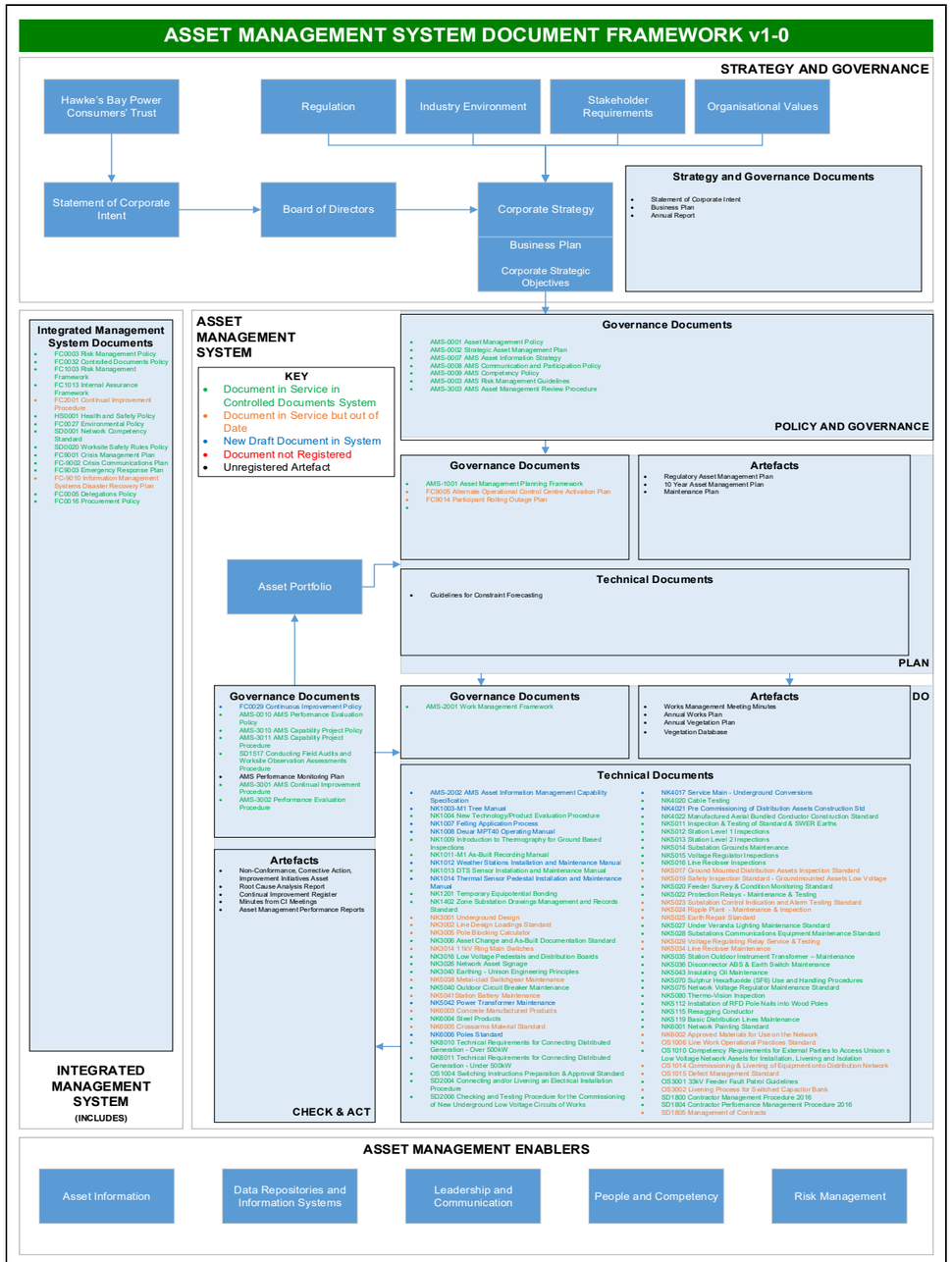


Figure 2-21: AMS Documentation Framework

Technical documents including network policies, standards and operating standards are managed within the NK, OS and SD series. These documents are supplemented with SOPs and Safety Alerts, which are often issued as an interim measure before changes are incorporated within primary technical documentation.

The Centralines' Management service provider's Networks Standards Team, within the Asset Management Team is responsible for supporting and enabling Networks and Operations to produce efficient documentation. They assist to develop associated communication and training requirements, as required.

The Networks Standards Team work in close collaboration with the Technical Documentation Specialist to ensure conformance of technical documents with **FC0032 Controlled Documents Policy**.

The Centralines' Management service provider's Asset Performance Manager chairs the AMS Controlled Document Governance Group. This group ensures AMS controlled documents are fit for purpose and resources are efficiently deployed to manage these documents.

Registration of issues in the Continual Improvement (CI) Register is the process by which the Network Standards Team is notified of a requirement to add or adjust technical documents.

Documents of external origin relevant to the AMS fall into four main categories. The management process for each category is specified in Table 2-23.

Document Category	Management Process
External standards	Managed through a subscription with SAIGlobal for the standards required by the Centralines' Management service provider's Networks Standards Team.
Legislation, regulation and codes of practice	Managed through a subscription with LexisNexus by the Management service providers' Senior Legal Counsel. Centralines' employees are advised to access current legislation and subordinate regulation through the New Zealand Government service at www.legislation.co.nz.
Contracts, consents, easements and other binding documents	Managed through service providers contracts register by the Administration Team.
Original equipment manufacturer (OEM) documentation	Electronic records are stored with the project file on DocStore by the responsible Project Engineer. New hardcopy and legacy documentation are filed in the East Wing of the service provider's offices by the service provider's Asset Specialists Technical Lead.

Table 2-23: Documents of External Origin

2.13.2 Control of Processes

Control of processes within the AMS is achieved as follows:

- Each process has an assigned Process Owner who is accountable to the General Manager Networks and Operations for its:
  - specification and documentation
  - implementation
  - monitoring for compliance, and
  - continual improvement.
- The Process Owner is supported through delegation to the management representative for the AMS.
- Subject Matter Experts (SMEs) who are people who work in the process, are called upon to develop, review and improve controls such as standards and procedures, training materials and performance measures.
- The Process Owner has the mandate to initiate a review of process controls as well as internal audit of processes. Each of these tasks is delegated to the management representative for the AMS, for coordination. A review of process controls involves an evaluation of whether the controls are appropriate, given the risk profile of the process. Internal audit involves an assessment of how well the process is performing and whether procedures are being conformed to. The approaches to review of process controls and internal audit is set out in a simplified form in Figure 2-22.

These processes apply both to internal and outsourced processes of the AMS.

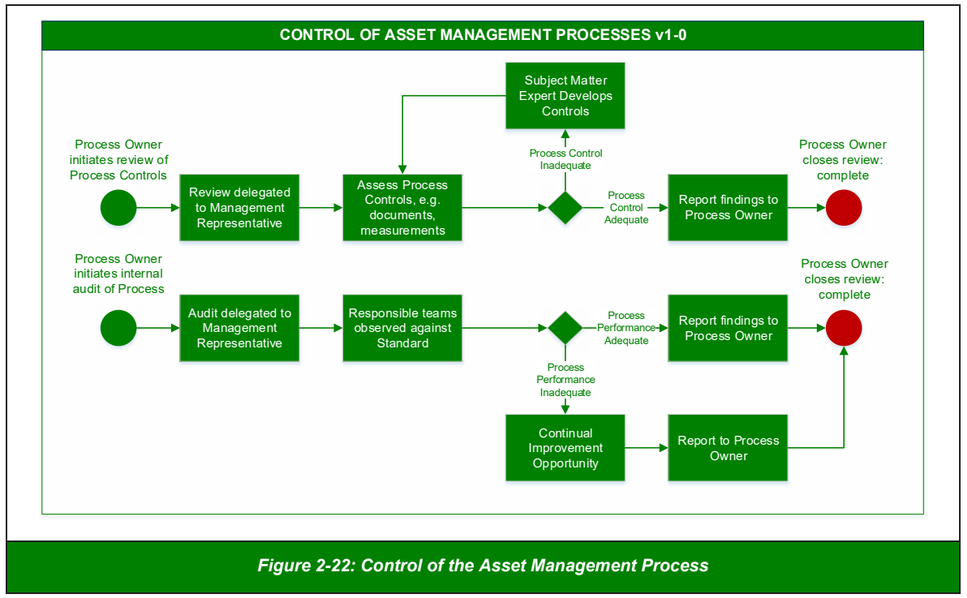


Figure 2-22: Control of the Asset Management Process

Where conformance issues or other process performance shortcomings are identified, then a Continual Improvement Opportunity may be raised in the CI Register.

2.13.3 Management Review

Regular top management review of the various components of the AMS is undertaken to assure its ongoing fitness-for-purpose and effectiveness. The Management service provider's General Manager Networks and Operations is responsible for management review, with coordination delegated to the service provider's AMS Manager. The process for management review is documented in **AMS-3003 AMS Management Review Procedure**.

The following items are subject to management review:

1. The health of the AMS.
2. Continuing suitability of the Asset Management Policy.
3. Continuing suitability of the AMOs.
4. The Asset Management Strategy
5. Changes in external and internal issues and risks relevant to the AMS.
6. Incidents that have occurred and remedial actions that have been taken.
7. The Asset Management Plan.
8. Lifecycle Delivery performance, including the quality of, and progress through works programmes.
9. The CI Register.
10. The performance of active Capability Projects.
11. Outcomes from recent internal audits.
12. Assessments and audits by external bodies.
13. Customer and other stakeholder feedback, including complaints.
14. Recommendations for improvement including other factors, such as resources and training.
15. The performance of the Asset Portfolio, asset systems and individual assets.

The 15 items listed above are addressed through five management review meetings of varying frequency, as specified in Table 2-24.

Meeting	Frequency	Chair	Items Covered
AMS Governance Meeting	Annually	General Manager Networks and Operations	1, 2, 3, 4
AMP Review Meeting	Six-monthly	Network Investment and Delivery Manager	7
N&O Strategic Risk Committee Meeting	Quarterly	Asset Management System Manager	5, 6
Work Management Monthly Meeting	Monthly	Network Investment and Delivery Manager	8
Continual Improvement Meeting	Monthly	Asset Management System Manager	1, 9, 10, 11, 12, 13, 14
Network Performance Meeting	Monthly	General Manager Networks & Operations	5, 6, 14, 15

Table 2-24: Summary of Management Reviews

Meeting documents including briefing notes, performance information and minutes are stored within the Management Review SharePoint library at the address provided under Other References below.

2.13.4 Internal Audit

The Centralines' Business Management System Framework (BMSF) referred to earlier includes a strong audit capability within the Internal Assurance Framework. This framework from Centralines' Management service provider is applied to some of the key business processes that have been adopted and are being used by the organisation. In the AMS, this capability has three main purposes.

1. Assess the competency of the various teams in their functional roles within the AMS.
2. Test conformance to planning and decision-making processes and the execution of activities.
3. Provide a basis for identification of corrective actions and continual improvement opportunities.

The Internal Audit process is set out in Figure 2-23.

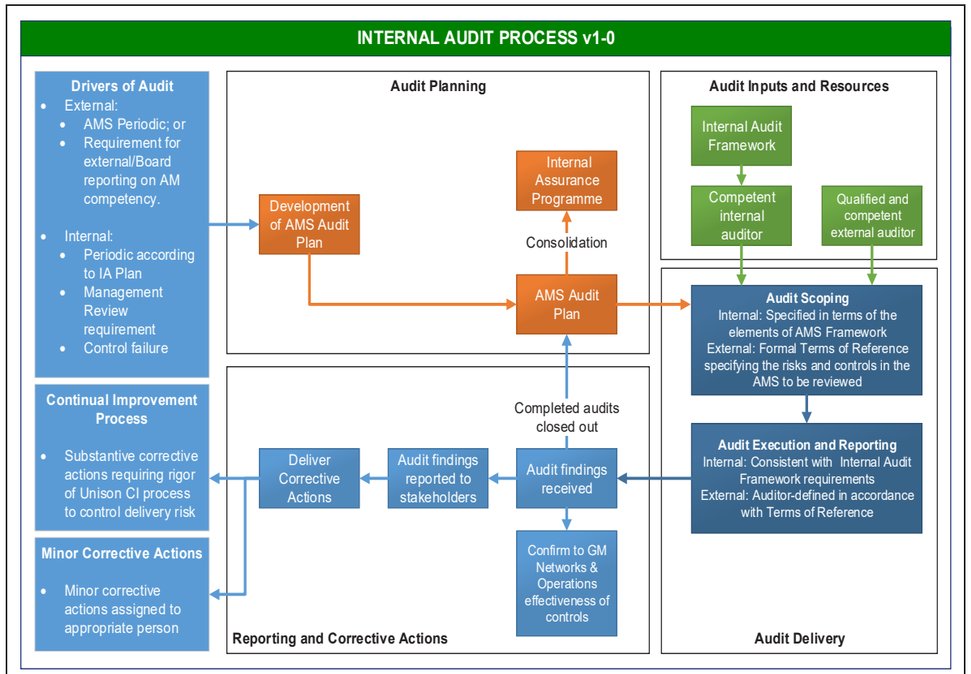


Figure 2-23: Internal Audit Process

A three-year Internal Audit Plan has been developed collaboratively between the service providers. The Group Risk Manager is responsible for enterprise internal assurance, and the Asset Management System Manager is the management representative for the AMS.

This plan links planned internal audits to the controlled documentation specifying processes of the AMS, and the relevant clause of ISO 55001.

Internal audits are scheduled based on risk with those processes most at risk audited more often than those a less risk. The likelihood of a process being at risk is based on the results of the previous audit of that process. The consequence of the process being at risk is based on the criticality to the overall AMS and the Unison's strategy. Other information is also included in the risk assessment where relevant.

The scope of the periodic internal audit is limited to conformance of teams with the specified processes. This is appropriate given that the processes have been developed to meet the requirements of ISO 55001, and that this is tested through the External Audit process for certification to the standard.

For each of the internal audits specified in the plan, audit tools are progressively being developed. The audit tools include checklists and open-ended questions that probe the effectiveness of the implementation of processes and systems, and support capabilities, including training and resourcing.

2.13.4.2 Reporting of Internal Audit Outcomes

The outputs of all internal audits are presented to the Asset Management System Manager. If the Asset Management System Manager is satisfied that the audit has fulfilled the Audit Plan or Terms of Reference the report will be issued to relevant stakeholders, including the Group Risk Manager. Where the driver for the audit has been Executive Management, the Board or external stakeholders, the Asset Management System Manager will engage with the General Manager Networks and Operations to establish the next steps for reporting.

Process Owners of the process being audited are responsible for raising corrective actions and opportunities for improvement in the CI Register.

2.14 Communication of Asset Management Strategy and Objectives

Asset management outcomes are communicated formally at Centralines through the mechanisms listed below.

- The Business Plan is made available to all employees. This document contains a comprehensive review of asset management outcomes for the previous financial year.
- On a quarterly basis a business-wide performance brief is delivered by Management.
- The Operations Manager holds a monthly Team Brief where topical asset management outcomes are presented and discussed.
- Automated network performance and reliability reports are sent to key employees daily detailing year-end targets, current performance, and forecasts for SAIDI and SAIFI, as well as recent outages.
- Incidents and urgent changes to SOPs are drawn to the attention of all employees through Safety Alert bulletins. These are sent to all employees by email, pinned up in visible locations around the office and managers are required to communicate details to employees.
- Relevant asset management outcomes are included within employee performance frameworks which are reviewed and discussed six-monthly with their manager.
- Favourable and important asset management outcomes are celebrated within the organisation.

2.15 Determination Reference Mapping Table

Section 2 Reference		Determination Reference
2	Background and Objectives	3.2
2.1	Introduction to this Section	
2.2	Context of the Organisation	
2.3	Overview of Centralines' Asset Management System	
2.4	Purpose of the Regulatory Asset Management Plan (RAMP)	3.3 including 3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5
2.5	Planning Period of the Regulatory Asset Management Plan The RAMP update covers the period from 1 April 2020 to 31 March 2030. Necessarily all prospective information is provided based upon the currently best assumed future. As for any long-term planning exercise, uncertainty increases the further forward in the future Unison looks. This is due to factors including the condition of assets, growth of demand, the cost and availability of contracting resources, technology changes, and stakeholder expectations. Accordingly, for the first five-years of the planning period, more details information in respect of asset management plans is provided. In the second half of the planning period, plans are presented in less detail reflecting increasing uncertainty.	3.4
2.6	Date of Director Approval	3.5
2.7	Centralines' Stakeholders	3.6 including 3.6.1, 3.6.2, 3.6.3, 3.6.4
2.8	Accountabilities and Responsibilities for Asset Management	3.7 including 3.7.1, 3.7.2, 3.7.3
2.9	Significant Assumptions made in the AMP	3.8 including 3.8.1, 3.8.2, 3.8.3, 3.8.4, 3.8.5, 3.9
2.10	Overview of the Asset Management Strategy and Delivery	3.10
2.11	Overview of Systems and Information Data Management	3.11 3.12
2.12	Asset Management Processes	3.13 including 3.13.1, 3.13.2, 3.13.3
2.13	Documentation, Controls and Review Processes	3.14, (i), (ii), (iii), (iv), (v)

Section 2 Reference	Determination Reference
2.14 Communication of Asset Management Strategy and Objectives	3.15, (i), (ii)

Table 2-25: Determination Reference Mapping Table

3

SERVICE LEVELS

CENTRALINES
LIMITED

CONTENTS

3. SERVICE LEVELS

3.1 Introduction to this Section

Centralines uses monitoring, measurement and analysis processes to evaluate its performance as an asset manager. This provides a check on whether stakeholder requirements are being met, and therefore value is being realised from the Asset Portfolio. It also supports continual improvement of the Asset Portfolio and asset management.

The Asset Management Objectives (AMOs) and associated performance measures specified in Section 2 provide coverage of stakeholder requirements and expectations. They are therefore utilised as the basis for identifying what must be measured and monitored to ensure performance levels are appropriate.

3.2 Performance Evaluation Overview

The purpose of performance evaluation is to determine:

- what needs to be monitored and measured
- the best frequency and method of measurement, and
- how and when the results will be analysed and evaluated.

Performance evaluation covers the evaluation and reporting of:

- asset performance
- asset management performance, and
- the effectiveness of the Asset Management System (AMS).

In summary, performance evaluation reports on whether the needs and expectations of stakeholders of the AMS are met.

3.3 Service Levels Overview

Service levels are objective indicators of performance that allow Centralines' stakeholders to understand how well Centralines is conducting asset management, and provides a framework to guide internal continuous improvement initiatives. Service levels form part of the Asset Management Strategy and Objectives element of the AMS, as shown in Figure 3-1.

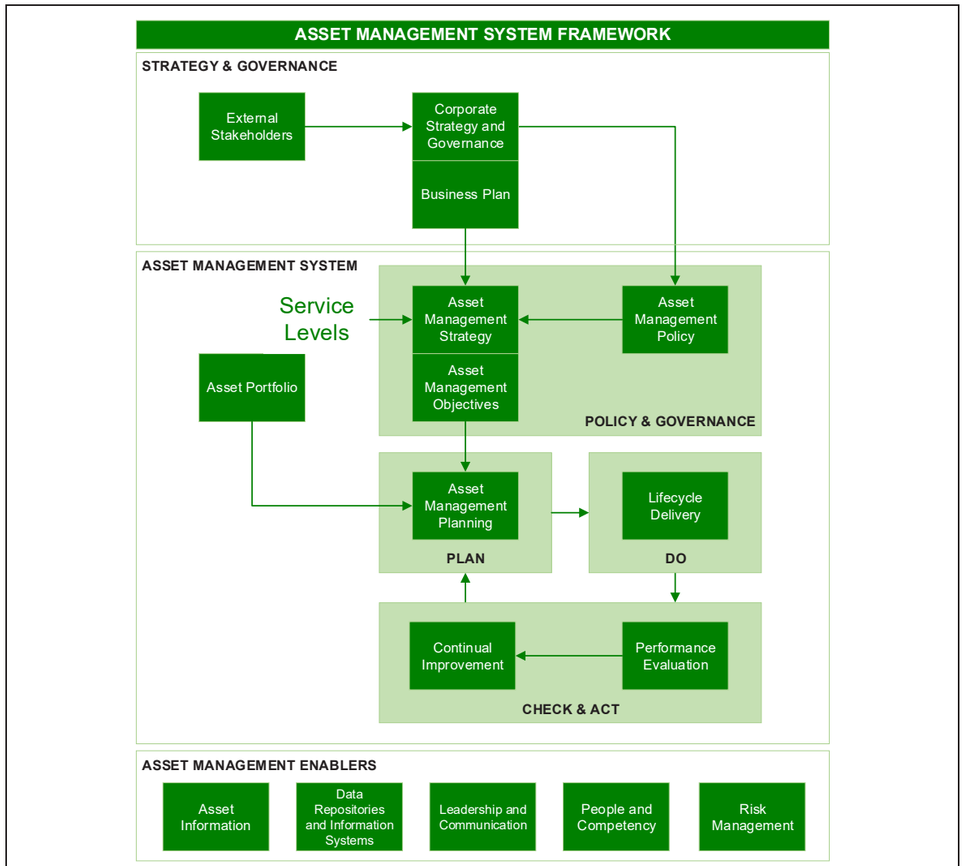


Figure 3-1: AMS Framework

Centralines' Service Level Framework has been developed with reference to a set of guiding criteria. Service levels should be:

- objectively measurable, with meaningful targets
- consistently applied with clear business rules for measurement
- possible to monitor efficiently over a period of time
- directly aligned to Centralines' Asset Management Strategy and Objectives
- possible to explain simply to stakeholders
- set in such a way that avoids creating unintended consequences
- where possible, comparable with the service levels of other electricity distribution businesses (EDBs) in New Zealand and abroad, and
- compliant with any requirements contained within the Electricity Distribution Information Disclosure Amendments Determination 2017.

3.4 Service Level Planning and Development

The cycle depicted in Figure 3-2 below shows how:

- stakeholder interests give rise to service levels that are aligned with AMOs, and
- service levels are used to drive continuous improvement in asset management.

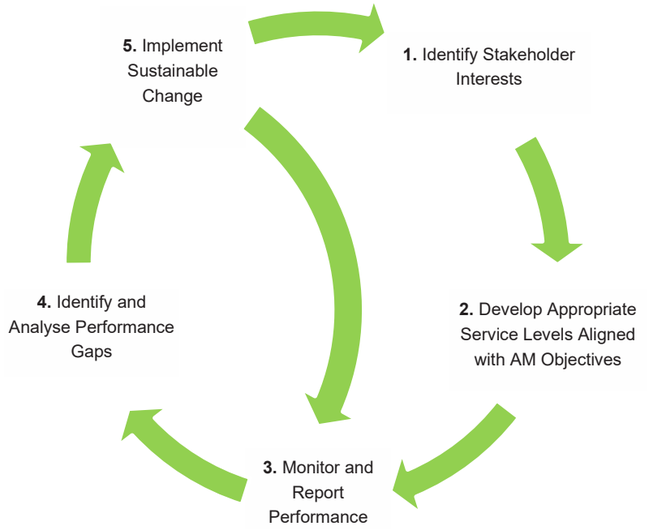


Figure 3-2: Service Level Planning and Development

3.5 Service Level Framework

Asset Management Objective	Service Level	Unit/Type	Service Level Targets				
			2020/21	2021/22	2022/23	2023/24	2024/25
Health and Safety Performance	Accidents causing harm to a member of the public	Number of Accidents	0	0	0	0	0
	Serious harm or lost-time injury to employees or contractors	Number of Injuries	0	0	0	0	0

Asset Management Objective	Service Level	Unit/Type	Service Level Targets				
			2020/21	2021/22	2022/23	2023/24	2024/25
	Injuries to employees or contractors requiring medical treatment	Number of Injuries	< 2	< 2	< 2	< 2	< 2
Customer Service Performance	Surveyed Customer Satisfaction	Percentage of Satisfied Customers	> 95%	> 95%	> 95%	> 95%	> 95%
	SAIDI Planned	Minutes	<70.96	<70.96	<70.96	<70.96	<70.96
	SAIDI Unplanned		<62.83	<62.83	<62.83	<62.83	<62.83
	SAIFI Planned	Interruptions	<1.17	<1.17	<1.17	<1.17	<1.17
	SAIFI Unplanned		<3.1616	<3.1616	<3.1616	<3.1616	<3.1616
	Revenue per ICP	$ (nominal)	$1,683	$1,683	$1,683	$1,683	$1,683
	Restoration of Supply for unplanned interruptions	Urban	≤ 20 events ≥ 3 hours	≤ 20 events ≥ 3 hours	≤ 20 events ≥ 3 hours	≤ 20 events ≥ 3 hours	≤ 20 events ≥ 3 hours
		Rural	≤ 10 events ≥ 6 hours	≤ 10 events ≥ 6 hours	≤ 10 events ≥ 6 hours	≤ 10 events ≥ 6 hours	≤ 10 events ≥ 6 hours
		Remote Rural	≤ 5 events ≥ 12 hours	≤ 5 events ≥ 12 hours	≤ 5 events ≥ 12 hours	≤ 5 events ≥ 12 hours	≤ 5 events ≥ 12 hours
Cost and Efficiency Performance	Forward work planning horizon	Years	≥ 2 rolling	≥ 2 rolling	≥ 2 rolling	≥ 2 rolling	≥ 2 rolling
	Operating expenditure per ICP	$ (nominal)	$474	$485	$494	$504	$514-$557
	Faults per 100km of network	Total	6.4	6.4	6.4	6.4	6.4

Table 3-1: Service Level Framework

3.6 Further Detail on Service Levels

In the following subsections, further detail is provided on each of the service levels in Table 3-1, as well as a justification for the targets assigned. Also, each service level target is contextualised against Centralines' historical performance.

As shown in Table 3-1, the service levels can be readily mapped to Centralines' AMOs. Because the objectives themselves overlap in places, in practice, some service levels measure performance for multiple aspects of the asset management organisation.

3.6.1 Accidents Causing Harm to a Member of the Public

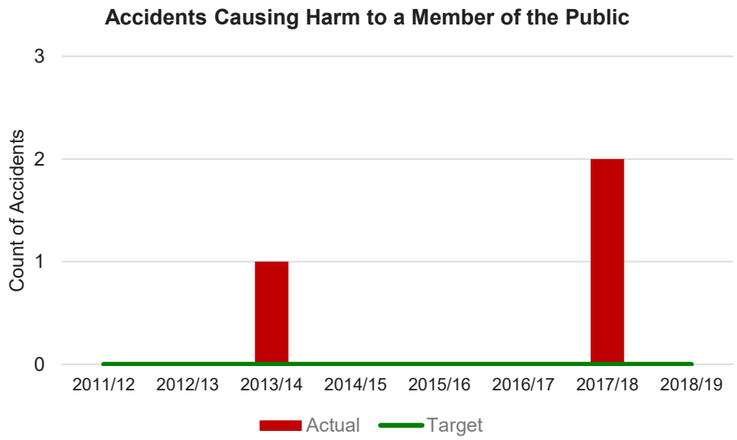
Type of Service Level	Health and Safety
Description	Health and safety is Centralines foremost consideration, and the business is constantly striving to improve its performance in this area through initiatives including: • the upgrading of its health and safety management systems • training of employees and contractors, and • public awareness campaigns. This service level has been implemented to measure the number of accidents per annum that have occurred that resulted in harm to a member of the public or damage to property.
Justification for targets	Causing harm to a member of the public or damaging their property is and will always be an unacceptable outcome, therefore the target for this service level will remain 0.
Historical context	 *Figure 3-3: Historical Context for Accidents Causing Harm to Member of Public Service Level Target*

Table 3-2: Accidents Causing Harm to a Member of the Public

3.6.2 Serious Harm or Lost-time Injury to Employees or Contractors

Type of Service Level	Health and Safety
Description	This service level has been implemented to measure the number of serious harm or lost-time injuries (LTIs) incurred by Centralines' employees or contractors.
Justification for targets	Centralines strives to provide a safe and healthy workplace for its employees, contractors and their families. Serious harm and lost-time injuries will always represent an unacceptable outcome, and therefore the target for this service level will remain 0.
Historical context	 *Figure 3-4: Historical Context Serious Harm or Lost-time Injury to Employees/Contractors Service Level*

Table 3-3: Serious Harm or Lost-time Injury to Employees or Contractors

3.6.3 Injuries to Employees Requiring Medical Treatment

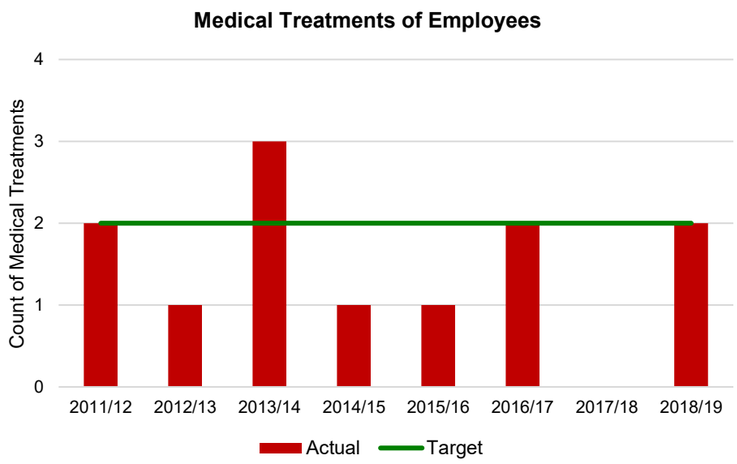
Type of Service Level	Health and Safety
Description	Where a work-related injury or illness requires ongoing treatment by a medical practitioner, then the injury will be recorded as a medical treatment injury (MTI). Ongoing treatment could be prescribed medication, returning visits to a medical practitioner or referral to another medical practitioner or specialist. Examples of medical treatment injuries might include: • removal of embedded foreign material • multiple treatments for an infection • removal of foreign material embedded in eye, or • use of prescription medications (except a single dose administered on the first visit for minor injury or discomfort). The definition of medical treatments in the Centralines' context is recorded in the controlled document **HS5000 Incident Accident Management Procedure**.
Justification for targets	The targets for this service level are based upon Centralines' corporate goal of zero LTIs and in keeping with Worksafe's national target of reducing work-related fatalities and serious injuries by 25% by 2020. Noting the definition of MTIs, statistically Centralines does not want to exceed two per financial year.
Historical context	

Figure 3-5: Historical Context for Medical Treatments of Employees or Contractors Service Level

3.6.4 Surveyed Customer Satisfaction

Type of Service Level	Consumer Oriented
Description	Following the completion of customer-requested capital works, or non-regulatory works, Centralines undertakes a sample-based approach to gaining an understanding of perceptions of its performance via a short customer survey, conducted over the phone. This is monitored by graphing the results and reviewing them monthly, enabling timely identification of any issues and opportunities for improvements.
Justification for targets	Customer satisfaction targets are set, based upon historical performance and have historically exceeded the targeted 95%.

Table 3-4: Surveyed Customer Satisfaction

3.6.5 SAIDI

Type of Service Level	Consumer Oriented and Asset Performance, Efficiency and Effectiveness
Description	System Average Interruption Duration Index (SAIDI) is a measure of the total duration of interruptions experienced by the average consumer connected to Centralines' network each year. SAIDI is measured in minutes. A SAIDI value of 100 means that the average customer would experience 100 minutes of interruptions per annum. SAIDI is one of two performance metrics used by the Commerce Commission to regulate network performance. Under the new regulatory framework, SAIDI measures have been split between planned and unplanned. For planned outages Centralines has a five-year limit of 354.8 minutes which equates to an average of 70.96 minutes per year. For unplanned outages the Commerce Commission has set a target of 62.83 minutes with the limit of 83.61 minutes.
Justification for targets	Centralines targets a performance range. The top of the selected range is the regulatory limit, while the bottom of the range is the regulatory target. Centralines justifies this approach on the basis that the incentives regime provides a degree of guidance on the trade-off between price and quality that the Commission is seeking to establish. SAIDI in excess of the limit means that customers are receiving poorer network performance than they require. On the other hand, SAIDI performance consistently below the target might imply that the EDB is overinvesting to deliver performance in excess of what customers require.
Historical context	The beginning of the new regulatory period in 2015/16 saw a number of changes to the Default Price Path (DPP) in relation to quality regulation. One of these changes was that the impact of planned outages was de-weighted by 50% in relation to unplanned outages.

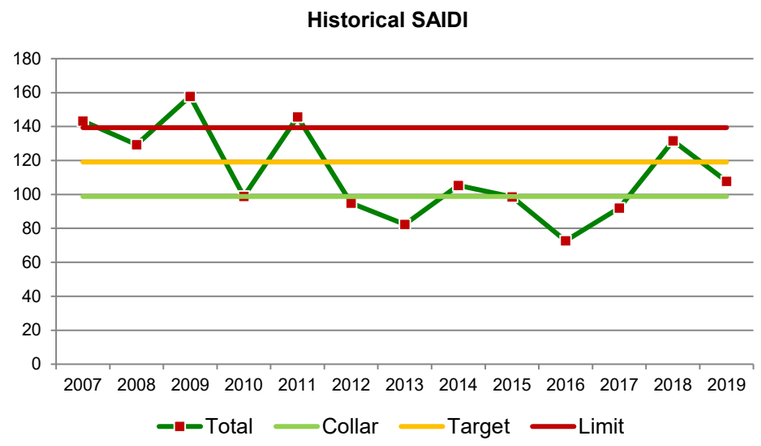
Type of Service Level	Consumer Oriented and Asset Performance, Efficiency and Effectiveness
	Centralines' historical SAIDI performance has been recalculated on this basis and is presented alongside the historical service level targets in Figure 3-6.  *Figure 3-6: Historical Context for SAIDI Service Level*

Table 3-5: SAIDI

3.6.6 SAIFI

Type of Service Level	Consumer Oriented and Asset Performance, Efficiency and Effectiveness
Description	System Average Interruption Frequency Index (SAIFI) is a measure of the number of interruptions experienced by the average consumer connected to Centralines' network each year. A SAIFI value of 2 would mean that the average consumer would experience two interruptions per annum. SAIFI is the second of two metrics used by the Commerce Commission to regulate network performance. Under the new regulatory framework, SAIFI measures have been split between planned and unplanned. Centralines' regulatory limit for unplanned SAIFI is 3.16 interruptions per annum. Centralines' regulatory limit for planned SAIFI is 1.17 interruptions per annum.
Justification for targets	Under the new regulatory framework there are no incentives for achieving SAIFI figures below the regulatory limit. Therefore, Centralines has reverted to targeting performance below the regulatory limit.

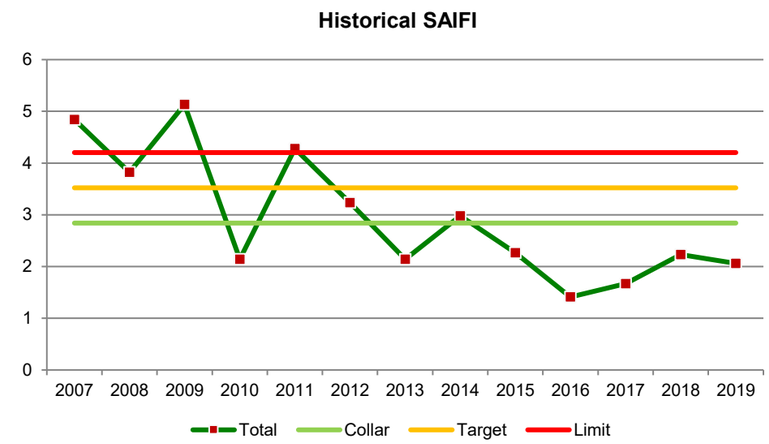
Type of Service Level	Consumer Oriented and Asset Performance, Efficiency and Effectiveness
Historical context	The beginning of the new regulatory period in 2015/16 saw a number of changes to the DPP in relation to quality regulation. One of these changes was that the impact of planned outages was de-weighted by 50% in relation to unplanned outages. Centralines' historical SAIFI performance has been recalculated on this basis and is presented alongside historical service level targets in Figure 3-7.  *Figure 3-7: Historical Context for SAIFI Service Level*

Table 3-6: SAIFI

3.6.7 Revenue per ICP

Type of Service Level	Consumer Oriented and Asset Performance, Efficiency and Effectiveness
Description	This service level provides an overall picture of the price that Centralines' customers are paying for electricity distribution services. The service level provides not only insights in terms of affordability, but also the cost-effectiveness of how assets are being managed. This measure can readily be compared across the industry making it valuable for benchmarking Centralines' performance.
Justification for targets	Centralines' long-term objective is to provide lines services for an affordable price. Understanding what an affordable price is in the future will be achieved through comparison with industry peers (adjusted for variances in customer density and any pricing anomalies amongst distributors).
Historical context	Centralines' current revenue per ICP is above the industry median unadjusted for density and any distributor pricing anomalies (noting some distributors aim not to achieve their WACC in setting prices).

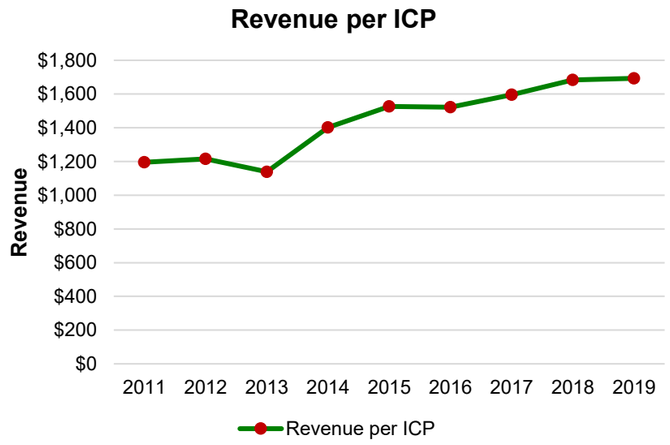


Figure 3-8: Historical Context for Revenue per ICP Service Level

Table 3-7: Revenue per ICP

3.6.8 Restoration of Supply for Unplanned Interruptions

Type of Service Level	Consumer Oriented
Description	This service level is a measure of the speed of Centralines' response to unplanned interruptions that do occur. The service level considers the number of outages that exceed a certain duration threshold per annum. It forms part of the KPI framework within Centralines' Use of System Agreements with electricity retailers. The targets for this service level distinguish between different groups of Centralines' customers based upon their proximity to urban areas. The zones are shown in Figure 3-9.
Justification for targets	In general, Centralines expects that restoration of supply from interruptions originating within urban areas will occur more quickly than for interruptions originating in rural or remote rural areas. This is predominately due to the fact that in urban areas the network has greater interconnectivity, meaning that either remote control or manual switching can restore supply prior to repair. Other contributing factors include proximity to the Centralines' depot for attending fault personnel, and ease of fault location. Targeted values themselves were selected through a combination of: • negotiation with retailers • historical performance and understanding of the capability of the network, and views expressed by consumers of different types through Customer Satisfaction Surveys.

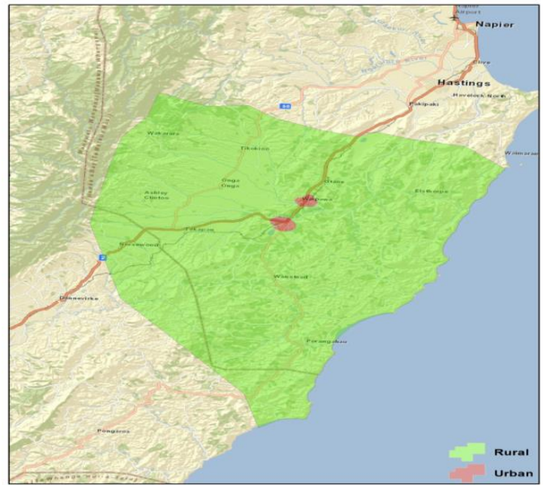


Figure 3-9: Service Level Zones

Table 3-8: Restoration of Supply for Unplanned Interruptions

3.6.9 Forward Work Planning Horizon

Type of Service Level	Asset Performance, Efficiency and Effectiveness
Description	A key means of driving performance in Centralines' contracting relationship is provision of a longer forward work planning horizon. This service level has been introduced to ensure that performance against this goal is measured and reported.
Justification for targets	The long-term target is for a confirmed two-year rolling forward work planning horizon to be provided to its contractors. This length strikes a balance that is currently believed by all parties to be optimal. This balance takes into account the efficiencies that can be gained through extending the period from the current one-year horizon, but enables Centralines to retain some flexibility to allow shorter-term innovation, and as Centralines' asset information quality improves, to ensure that the best information is being used in asset management decision-making processes.
Historical context	Historically, Centralines has provided its contractors with a committed forward work planning horizon for one year on an annual basis, with indicative forecasts for the remainder of the planning period.

Table 3-9: Forward Work Planning Horizon

3.6.10 Operating Expenditure per ICP

Type of Service Level	Asset Performance, Efficiency and Effectiveness
Description	In order to drive toward maximum efficiency, support fit-for-purpose asset management and to extract the best value from our data, Centralines' systems and processes have evolved as technology and changing business needs demand. Centralines' core processes continue to be tested to ensure waste is eliminated and to allow employees to perform effective value-added tasks. An indicator of financial efficiency is 'cost per ICP'. This indicator can be benchmarked to other NZ distributors and assessed against the industry median and average.
Justification for targets	Economic effectiveness reflects the level of operational efficiency to provide network services to customers and the overall costs (operating expenses, plus investment in network) associated with asset management. Centralines expects cost per ICP to be neutral (excluding sponsorship and business development costs) over the short-term to allow sufficient lead-time to realise the benefits from recent investments. The medium to long-term target is delivery of an improved industry position in cost efficiency. This is a reflection of Centralines realising the investment benefits in terms of material values of avoided or deferred investment and reduced maintenance requirements.

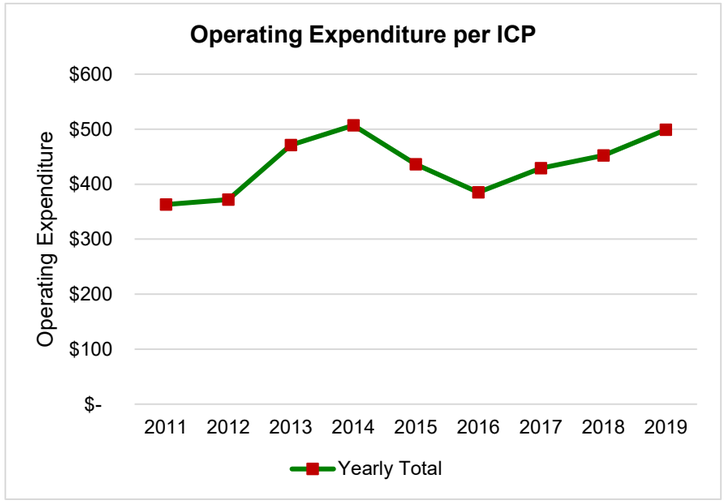
Type of Service Level	Asset Performance, Efficiency and Effectiveness
Historical context	Over the last five-years, Centralines has invested in additional activities that will produce longer-term cost efficiencies. For example, the accelerated vegetation programme which should enable improved network performance. These additional activities have generated higher short-term costs reflected in Centralines' cost per ICP.  *Figure 3-10: Historical Context for Operating Expenditure per ICP Service Level*

Table 3-10: Operating Expenditure per ICP

3.6.11 Faults per 100km of Network

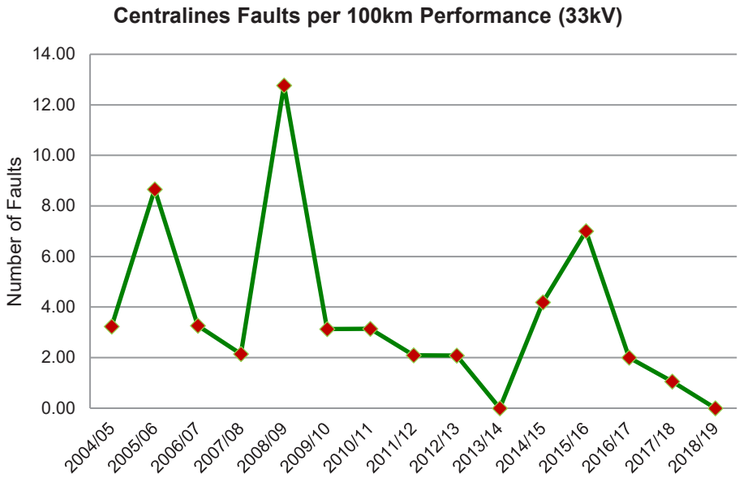
Type of Service Level	Asset Performance, Efficiency and Effectiveness
Description	Faults per 100km of network is a service level that provides a measure of the reliability of Centralines' networks, and therefore the quality of its asset management practices. Reducing the number of faults occurring directly improves customer experience, but also reduces wear and tear on assets and eliminates costs incurred for fault response and repair. Targets are provided for the 33kV overhead portion of the network.
Justification for targets	Faults per 100km of the 33kV network are set based upon historical performance and industry benchmarking.
Historical context	 *Figure 3-11: Historical Context for Faults per 100km of Network Service Level*

Table 3-11: Faults per 100km of Network

3.7 Determination Reference Mapping Table

Section 3 Reference		Determination Reference
3.1	Introduction to this Section	5, 6, 7 including 7.1, 7.2
3.2	Performance Evaluation Overview	
3.3	Service Levels Overview	
3.4	Service Level Planning and Development	
3.5	Service Level Framework	
3.6	Further Detail on Service Levels	8, 9, 10

Table 3-12: Determination Reference Mapping Table

4

NETWORK DEVELOPMENT PLANS

CENTRALINES
LIMITED

CONTENTS

4. NETWORK DEVELOPMENT PLANS

4.1 Introduction to this Section

This section provides an overview of how Centralines conducts network development planning and continually improves its network development programme. It demonstrates how the various elements of network development planning fit together to achieve Centralines' Network Development Objectives, informed by the Asset Management Objectives (AMOs) detailed in Section 2.

4.1.1 Network Overview

Centralines owns and operates network assets across the Central Hawke's Bay region. These assets cover an area of 3,334 km^2, aligning with the boundaries of the Central Hawke's Bay District Council, and serve approximately 8,500 customers. Supply is received via a single Transpower grid exit point (GXP) at Ongaonga. This site is scheduled to have the 33kV switchgear replaced sometime between 2021 and 2025.

Figure 4-1: Map of the Centralines' Network

4.1.1.1 *Load Characteristics*

The load is a mix of agricultural, industrial, residential and commercial. Because of the hot dry summers, the system experiences a summer peak, driven by irrigation load. The winter peak is lower but not significantly.

Approximately 1% of customers currently have distributed generation connected to the grid. At these levels it does not have a material impact on the load.

4.1.1.2 *Large Customers*

Large customers are those with a peak load greater than 1MVA. These customers often have unique network configurations, and in these cases Centralines takes special measures to ensure compatibility with network operations. Centralines also works with these customers to ensure that maintenance is scheduled at appropriate times.

Centralines has two large customers that represent approximately 25% of the demand on the network. These are Silver Fern Farms at Takapau and Ovation Limited at Waipukurau.

4.1.1.3 *Supply Points and Embedded Generation*

There is no embedded generation and the network is supplied from a single GXP at Ongaonga.

The GXP is connected by four separate overhead 110kV lines, two from Dannevirke to the south and two from Fernhill to the north. The GXP is normally supplied by the lines from Dannevirke. A single 110kV bus supplies a 20MVA and a 30MVA transformer bank.

At the same site an 11kV supply is provided by a single Transpower-owned transformer. The supply point is the terminals of the 11kV switchgear owned by Transpower.

4.1.1.4 *Peak Demand, Total Energy Delivered and Firm Capacity*

Peak demand and total energy delivered is measured at the GXP. As there is only one GXP it also represents total network demand.

Supply	Peak Demand (MVA)	Total Energy Delivered (GWh)	Firm Capacity Winter (MVA)
Waipawa GXP	20	119	26

Table 4-1: Peak Demand and Total Energy Delivered Measured at GXP

4.1.1.5 *Sub-transmission Network*

Urban areas are supplied by a meshed sub-transmission network that provides a high level of security (n-1). Rural areas are supplied by a radial sub-transmission network providing an acceptable level of security (n).

Figure 4-2 provides geographical views of the sub-transmission network. Table 4-2 lists the capacity and security of the zone substations across the network.

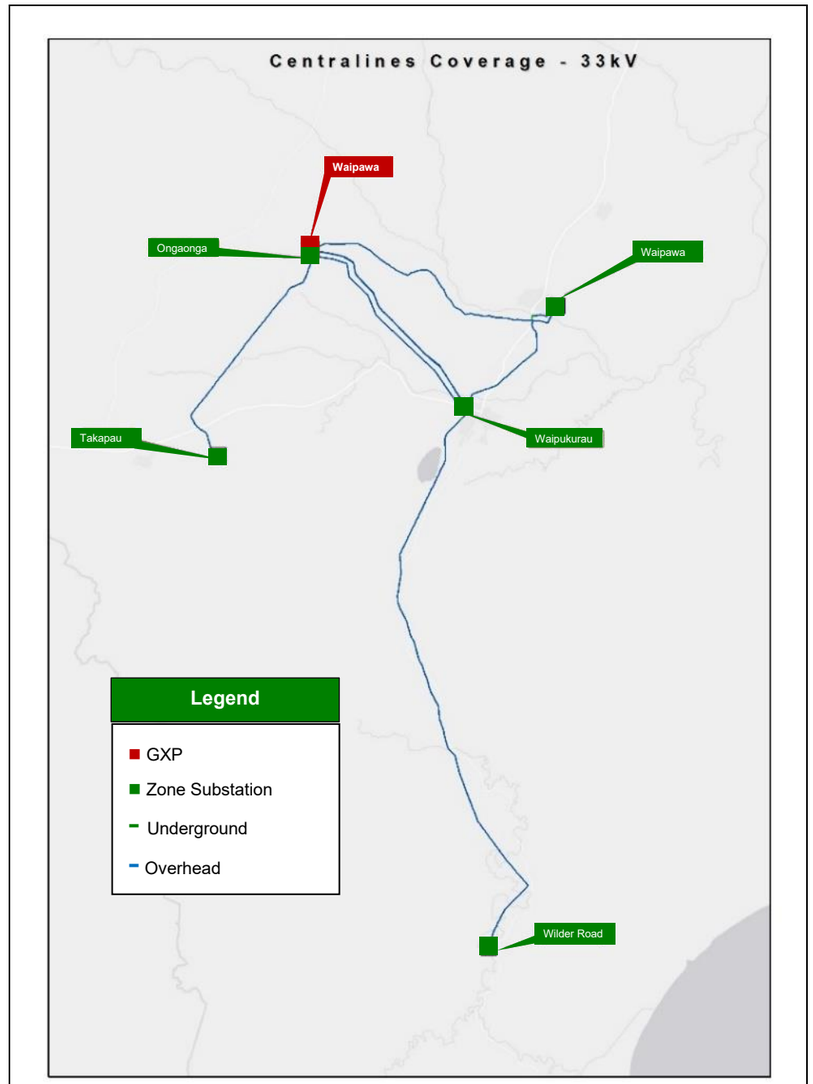


Figure 4-2: 33kV Sub-transmission and Point of Supply Network

Zone Substation	Supply Voltage	Sub–transmission Security	Installed Capacity (MVA)	Power Transformer Security
Waipukurau	33kV	n-1	15	n-1
Waipawa	33kV	n-1	15	n-1
Wilder Road	33kV	n	2	n
Takapau	33kV	n(1)	15	n-1

Table 4-2: Zone Substation Capacity and Security

(1) Two transformer substation, supplied by a single 33kV circuit.

4.1.1.6 Distribution Network

Undergrounding across the distribution (11kV and 400V) networks is undertaken when appropriate as part of Centralines' Lifecycle Asset Management Process. Table 4-3 details the current portion of the networks that are underground.

Network Type	Portion of the Network Underground
11kV Network	2.4%
400V Network	27.3%

Table 4-3: Portion of Distribution Network which is Underground

4.1.1.7 11kV Network

The 11kV network in urban areas has a high level of interconnectivity and provides considerable flexibility during contingency events. This results in a high level of security in these areas.

The 11kV network in rural areas is predominantly overhead radial feeders with concrete poles and timber crossarms. 11kV interconnectivity is limited and supply could be compromised during a single contingency event.

The network loads are generally small and spread across a large geographical area. Distribution transformer arrangements are covered in Section 5.

4.1.1.8 400V Network

The 400V network in the urban area has interconnectivity between adjacent distribution transformers.

The 400V network in the rural and remote rural areas is predominately radial overhead conductors with concrete poles and timber crossarms and the transformers are sized to the customers' requirements unless a subdivision is connected.

4.2 Network Development Planning Objectives and Criteria

Centralines' network development objectives are informed and translated directly from the AMOs in Section 2. The network development objectives are to:

- meet customer driven needs
- maintain network security and service levels
- be within the band (between the collar and the target) of the network reliability targets
- meet power quality requirements, and
- meet regulatory and legislative requirements.

These objectives are distilled into the following network development criteria:

- network reliability
- power quality
- security of supply, and
- network equipment ratings.

These criteria are discussed further below.

4.2.1 Network Reliability

Network reliability is an important indicator of quality of service being received by customers from their electricity distribution businesses (EDBs). A large variety of indices have been developed to provide indications of network reliability, the most commonly applied of these are:

- SAIDI (System Average Interruption Duration Index), and
- SAIFI (System Average Interruption Frequency Index).

For EDBs, the Commerce Commission has set regulatory limits for both SAIDI and SAIFI based on the network's performance during the last regulatory period. These limits are re-set every five-years with the intent that EDBs maintain network reliability. The current limits are applicable for the 2020/2021 to 2025/26 period.

Centralines' network is maintained within the regulatory limits by applying sound asset management practices and utilising new technologies.

4.2.2 *Power Quality*

Power quality is considered over both short and long-term planning horizons to ensure solutions to current power quality constraints are appropriate long-term solutions.

As quality of supply issues can result from both Centralines' network and their customers own installations or equipment designs, Centralines has published a Network Connection Standard on its website. This standard outlines the responsibilities of both Centralines and the customer, to ensure all connection parties receive electricity supply to appropriate quality and performance standards. The standard is also referenced in Centralines' Use of System Agreement with all retailers and in the Customer Connection Agreement with each customer.

Centralines' Quality of Supply Standard and asset design standards specify the limits of key power quality parameters on voltage regulation, voltage unbalance, harmonic distortion, flicker, and voltage fluctuation. The specified limits are summarised in Table 4-4.

Power Quality	Specified Limits
Voltage regulation	230V +/- 6%
Voltage unbalance	Less than 2%
Total harmonic distortion voltage	Less than or equal to 5%
Flicker	Short term – less than 1.0 Long term – less than 0.8
Voltage fluctuation	Various limits specified in respective design standards

Table 4-4: Power Quality Parameters and Limits

4.2.2.1 *Voltage Regulation*

Centralines designs and operates the network to ensure supply voltage to customers in accordance with the regulatory limit of 230V +/-6% when measured at the Point of Supply. Voltage regulation constraints are identified through network modelling, network monitoring using sensors, and through customer contact. When potential issues are identified, their investigation and any required resolution is treated as a matter of priority.

4.2.2.2 *Voltage Unbalance*

Centralines endeavours to keep voltage unbalance on all voltage levels of its network to 2%. Voltage unbalance occurs where the voltages of each phase in a system are not equal. Such issues are more commonly identified through customer contact, mainly due to unanticipated changes in customer load, installation/s and altered equipment design. When potential issues are identified, their investigation and any required resolution is treated as a matter of priority.

4.2.2.3 *Harmonic Distortion*

Centralines specifies 5% as the allowable level of voltage harmonic distortion supplied to customers. Identifying and tracking the source or cause of harmonic distortion is generally very difficult and often involves investigation of several customers' installations, as well as network configuration. Centralines works with all affected parties to identify the cause of harmonic distortion and determine the most cost-effective solution. If a single installation is identified as the cause, Centralines reserves the right to disconnect that installation as a last resort to protect other installations from damage.

4.2.2.4 *Flicker and Voltage Fluctuation*

Occasionally, specific customer installations can cause interference due to the use of equipment such as large motors or power factor correction capacitors. This interference can arise in many forms such as flicker, voltage sags and surges, and absorption of Centralines' load control signals. To ensure this equipment does not cause problems, the Network Connection Standard provides guidelines for customers to notify Centralines before connecting this type of equipment. This allows Centralines to assist the customer by assessing whether a problem is likely to occur before significant investment decisions are made.

4.2.3 *Security of Supply*

To ensure the network meets its agreed performance targets and obligations, Centralines applies a set of security of supply criteria based on the established framework set out in Table 4-5 and Table 4-6. The framework defines the level of security for different customer load types and load sizes. The criteria are used to identify network security constraints when contingency events occur and to guide the selection of solutions to mitigate these constraints.

Centralines reviews these criteria and adjusts in its network restoration approach using smart network technologies, network demand profiles and customer expectations (as identified in customer surveys). This is to ensure these criteria remain appropriate and continue to meet network performance targets.

Security of Supply Restoration Times	
Class D – Single large customer	Agreed individually with customer
Class C – CBD	N-1 – 50% restored within 15 minutes remainder within 45 mins N-2 – 50% restored within 60 minutes remainder within 3 hours Bus fault – 50% restored within 60 minutes remainder within 3 hours
Class B – Urban	N-1 – 50% restored within 45 minutes remainder within 2 hours N-2 – 50% restored within 3 hours
Class A2 – Rural up to 1MVA	N-1 – 50% restored within 2 hours
Class A1 – Rural up to 500kVA	No targets

Table 4-5: Summary of Non-Regulatory Planning Criteria and Standards

Substation	Target	Compliant	Comments
Waipukurau Urban	Class C	Yes	
Waipukurau Rural	Class B	Yes	Possible from back-feeding or transferring load
Waipawa Urban	Class C	Yes	
Waipawa Rural	Class B	Yes	Possible from back-feeding or transferring load
Takapau	Class A2 Class D	Yes	Substation supplies one large customer and the surrounding rural area
Ongaonga 11kV	Class A2	Yes	Due to automation in the area
Wilder Road	Class A1	Yes	Due to automation in the area

Table 4-6: Security of Supply Classification and Compliance by Substation

4.2.4 System Performance in Contingency Events

Centralines accepts different levels of performance during contingency events in order to ensure that a balance is maintained between performance and cost. This is to ensure an optimal balance between customer expectation and performance targets without adverse effects on assets or the incurring of additional cost.

Criteria	Target
Voltage	Highest system voltage shall not be exceeded at any point on the network
	Zone substation 11kV bus voltages shall not be allowed to fall below 95% of rated voltage
Capacity	No individual element shall carry a sustained load beyond its design rating for the ambient conditions that apply
Reliability	Protection relays shall not be used to keep loads within operational limits
	Alternative feeds permit restoration of supply after switching has been undertaken
	Radial feeds envisage restoration time dependent on defect repair time
	Substation busbar fault is considered abnormal
Safety	All possible steps are taken to ensure the safety of people and to eliminate damage to the network equipment

Table 4-7: Summary of Contingency Event Performance Standards

4.2.5 Network Equipment Ratings

Centralines' network equipment is selected for its current interruption and current carrying ratings to ensure sufficient capacity exists for routine operations and under fault conditions. This is a critical requirement for the safe and efficient operation of the network. As part of the network development planning process, these ratings are regularly reviewed and assessed under normal network configuration and alternative supply arrangement.

4.3 Macro-environmental and Future Network Context

Today, Centralines provides and maintains the distribution network used to transport electricity from the national transmission grid to homes and business in the Central Hawke's Bay region. To effectively plan for the future, Centralines needs to understand the impact of changing demand and alternative supply solutions on the network. While it is impossible to predict the future, a high degree of awareness of key uncertainties is essential. Centralines' strategic scenario planning work has identified two key elements that pose the greatest uncertainty to the network, technology advancement and customer savvy and engagement. The impact of these two key elements on planning the network for the future is illustrated in Figure 4-3.

Macro Environment

Improving economics of disruptive technologies, with lowering prices and increasing affordability, are enabling load reduction and customer defection.

Disruptive technologies will exponentially increase the complexity of distribution network management, from a traditional centrally managed model, to passive operation with a high degree of distribution and complexity.

Availability of advanced technologies is enabling better utilisation of assets and the network.

Technology will enable far more interaction with, and by Centralines' customers and provide them with more choices.

Impact on Centralines

Analysis has shown that although disruptive technologies will have an impact on the amount of load carried by the distribution network, the distribution network will remain, and will play an important role in providing customers with a reliable energy source.

Improving affordability of disruptive technologies provides Centralines with an opportunity to provide Centralines' remote rural customers with more affordable supply alternatives.

Centralines needs to ensure electricity prices provide enough flexibility to avoid cross-subsidisation through an alternative pricing structure.

Centralines needs to deploy advanced technologies as alternatives to conventional solutions to achieve much greater efficiency of the network.

The network will need to be expanded where Centralines is more certain of future needs, to ensure the network remains resilient and robust in more dynamic future.

Advanced technologies will assist in integrating and managing the complexities of multi-directional flow of electricity, and likely power quality issues introduced by disruptive technologies.

Greater deployment of technologies across assets and the network will change the skills required for Centralines' workforce.

Centralines' customers will demand great service, and the availability of data and communication enhancement will assist Centralines to meet this expectation.

Figure 4-3: Macro-environmental and Future Network Impact for Centralines

4.3.1 *Electricity in Everyday Life*

In Centralines' network electricity peak demand and overall energy consumption has started growing over the last two-years as the area is seen as an affordable alternative to the Napier/Hastings housing market. Electricity-based energy solutions are replacing some traditional fossil fuel-based solutions. This is primarily driven by local government policy and by-laws to reduce the impact on the environment. Electricity usage for land-based production has intensified with changes in land use and processing strategies to produce higher value products.

Looking to the future, as technologies advance, the improving economics of disruptive technologies such as solar photovoltaic (PV) and batteries will result in load reduction and customer defection. Along with electric vehicles, these disruptive technologies will also change the network load profile. Disruptive technologies connecting to the distribution network will exponentially increase the complexity of network management and necessitate the change from traditional centralised management to passive operation of a distributed and complex network. Technology advancement is also opening up new ways to better utilise Centralines' assets and network. Centralines' customers have more choices from a wider range of service offerings, and demand far more interaction through technology-enabled channels.

4.3.2 *Disruptive Technologies: Network Impact and Opportunities*

Solar PV is the most common choice of disruptive technology installed by Centralines' customers. The solar PV uptake on Centralines' network is approximately 1% of its customer base. This is well within the 'early adopter' stage of the innovative technology uptake scale and does not materially impact the network.

In terms of distribution network impact, disruptive technologies will change the total energy use at individual installations. The aggregated impact will see flattening of the network load profile depending on the uptake rate and type of disruptive technologies. Although disruptive technologies will have an impact on the load profile, the distribution network will remain and will continue to play an important role in providing customers with reliable energy sources. Further analysis on different uptake scenarios confirmed the continued need for the distribution network. It also identified the increasing complexity from multi-directional electricity flow and power quality issues that disruptive technologies will introduce.

The improving economics of disruptive technologies may also provide more affordable alternatives to supply Centralines' remote rural customers. Installation of a solar PV, battery and generator modular system is a lower-cost alternative to the construction of a long feeder section over difficult terrain under the conventional approach.

4.3.3 *Customer Savvy and Engagement*

Historically, customers have enjoyed a reliable electricity supply at a given price based on their electricity consumption. This 'one size fits all' approach does not cater for when customers use electricity or *how much* capacity is provided. Technology innovation and advancement has transformed the way customers use electricity. Centralines' customers are becoming active participants demanding great service with an increasing range of choices and an increased level of

interaction. Centralines needs to ensure the electricity pricing structure has enough flexibility to avoid cross-subsidisation. The data and communication platform will also be integral to meeting the expectations of Centralines' customers.

4.4 Network Development Planning Assumptions

Centralines' network development planning assumptions are informed by the macro-environmental assumptions detailed in Section 4.3. Network planning assumptions are:

- potential impact of uncertainties from distributed energy resources (DER) and technologies, and
- expected level of customer load growth in the future.

4.4.1 Potential Impact of Uncertainties

Potential impacts of distributed generation resources and disruptive technologies are well recognised by EDBs in New Zealand and overseas. Distributed generation resources and technologies such as solar PV, energy storage, and electric vehicles could have a substantial impact on the network.

Centralines anticipates the material uptake within its network footprint will only occur beyond the planning period. As technologies advance, the improving economics of distributed generation resources and technologies will facilitate load reduction and customer defection, as well as changing the customer demand profile. Centralines is continuing to keep an active watch on the possible impacts of such developments by investigating the technicalities and likely impacts, and exploring opportunities from both the network and customer perspectives. Supporting policy for distributed generation and the initiative on disruptive technologies are discussed below.

4.4.2 Distributed Generation Policy

While the uptake of distributed generation (DG) resources is uncertain, the connection of currently available and viable technologies must be well-accommodated on the network. Centralines continues to support the objectives of customers wishing to utilise DG by ensuring any potential detrimental effects are prevented or mitigated. The regulations categorise DG into two categories - 10kW or less, and above 10kW. There are different processes and requirements for each category. The Distributed Generation Policy, process information, and application form are available on Centralines' website www.centralines.co.nz. The key principles of Centralines' distributed generation policy are:

- DG can be connected to Centralines' electricity distribution network on fair and equitable terms which do not discriminate between different DG schemes
- Centralines will make the terms under which DG can be connected and operated within its electricity distribution network as clear and as straightforward as possible, and will progress all applications to connect DG to its electricity distribution network as quickly as possible

- technical and safety standards for the DG connection and operation on Centralines' electricity distribution network will be based on best practice, and will aim to meet the needs and protect the interests of DG schemes, other customers and Centralines, and
- Centralines will comply with legislation and regulatory requirements regarding the DG connection and application on its electricity distribution network.

Centralines recognises the value of DG in a number of ways and encourages the development of DG where it will provide real benefits to both the generator and Centralines. Centralines also recognises that DG can have undesirable effects on the network. Any new DG is modelled and analysed to ensure key policies in the connection documents are met.

4.4.3 Disruptive Technology Initiative

Centralines has recognised that a range of new and emerging technologies have the potential to impact how electricity is delivered to and used by consumers. These technologies include DG and solar PV in particular, energy storage, electric vehicles and home energy management systems. The uptake and integration of these technologies has implications for asset management planning, with the potential for enhancing efficiency and performance. However, an unmanaged or unanticipated uptake could also result in inefficient investments by Centralines as well as consumers. Centralines, supported by its Management services provider, is building an understanding of this range of technologies by carrying out analysis, scenario development, and where opportunities are identified, targeted trials. These trials focus on the potential value for Centralines and its customers, that are available from deploying DG and energy storage, both as:

- an alternative solution for supplying customers on low density lines (so-called 'uneconomic' lines), and
- a tool to offset periodic peaks on rural feeders affected by variable irrigation loads, with the objective of maintaining voltage and deferring investment.

4.4.4 Expected Level of Customer Load Growth

Centralines' Management services provider utilises its Load Forecast Tool (LFT) to forecast the expected customer load growth on the Centralines' network. This tool is described in detail in Section 4.5.1.

4.5 Network Development Planning Process

Network Development Planning (NDP) is an important part of Centralines' Asset Management System (AMS).

The purpose of network development planning is to ensure that Centralines' AMOs are achieved on an ongoing basis by:

- identifying risks in the network associated with changes in demand and how customers utilise electricity, and
- proposing projects to address these risks.

This will ensure:

- customer demand at peak periods is met without compromising asset integrity, i.e. thermal overload, and
- customers receive compliant voltage (avoiding both over and under voltage).

With the central objective of striking an optimal balance between risk, performance and value.

The Network Development Planning process is completed twice a year and incorporates improvement measures to ensure the best possible balance is achieved. The process is reviewed regularly, and possible improvements identified, scoped and developed.

The diagram below Figure 4-4 outlines the key elements of Network Development Planning. This section will be structured in line with this diagram. References to the sections for each process stage are included in the diagram.

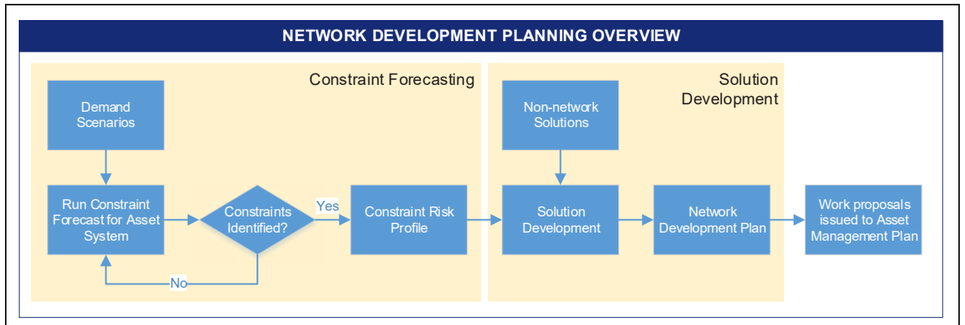


Figure 4-4: Overview of Network Development Planning Process

Constraint Forecasting (CF) is an engineering framework for:

- estimating the timing of one or more constraints arising in the asset, and
- quantifying the impact of the constraint in financial terms.

The resulting risk profile supports the Network Planning Team to develop appropriate project proposals to mitigate risks identified.

Solution Development (SD) is the process for addressing any identified constraints to ensure the network can meet its expected requirements. The process includes:

- verification of the constraint
- Root Cause Analysis, and
- the identification, selection and costing of a suitable solution.

4.5.1 Constraint Forecasting

Constraint Forecasting involves the development and application of a network model that defines the capabilities of assets and asset systems, catering to the complexities inherent in a network with meshed configurations. The model is tested against a range of future demand scenarios.

Power flow modelling is undertaken in DigSilent Power Factory, a software package that supports electricity load flow and contingency analysis. The results of the power flow modelling provide both the timing and magnitude of potential constraints. Each constraint is assessed in terms of its likelihood (timing) and consequence to form a wholistic risk profile on the issue. This risk profile can then be used to justify investment.

Constraint Forecasting (CF) is used in the Network Development Team on an ongoing basis to manage risk in the Asset Portfolio. It is also available to be used for ad-hoc requests, e.g. analysing the impact of particular types of technology uptake. The CF process is complete when:

- constraints on a specific asset system have been identified
- the risks associated with the constraints are quantified, and
- the expected timing is confirmed.

Figure 4-5 outlines the key elements of the CF process.

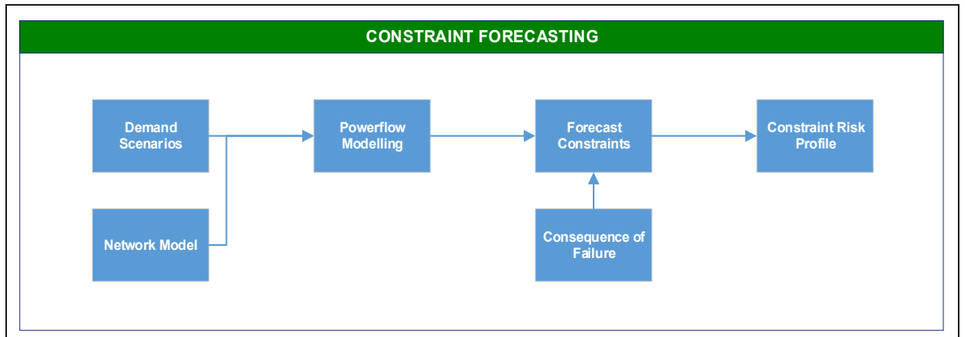


Figure 4-5: Overview of Constraint Forecasting Process

The key inputs into CF are set out in Table 4-8.

Input Category	Input
Historical Load Data	• ICP demand • Feeder loads
Network Model	• Connection of assets • Open points
Asset Attribute Information and Master Data	• Impedance • Maximum rating
Economic Projections	• GDP • Population • Number of dwellings
Consequence of Failure	• Financial information about assets and potential penalties

Table 4-8: Constraint Forecasting Input Categories

The key output of CF is a risk profile of all network development constraints, enabling the Network Planning Team to prioritise the development of solutions to resolve these constraints.

The four core elements of network planning inputs are:

1. Network Overview — the topology and characteristics of the network.
2. Demand Analysis — the collective electricity demands that customers are expected to place on the networks.
3. Capacity — the amount of load that the system can deliver at all relevant points on the network.
4. System Impedance — the effective resistance to electricity flow between source and load.

4.5.1.1 Demand Analysis

Centralines' Load Forecast Tool (LFT) is updated annually and estimates the expected demand over the planning period. The tool calculates future peak demand based on historic demand and several key economic indicators to a 20-year horizon. Projections are made for each 11kV feeder based on simplified models of the domestic, commercial and industrial sectors. These are then aggregated to zone substation and grid exit point (GXP) levels. Figure 4-6 outlines this process at a high level. The assumptions inherent in the tool and the stages of the framework are discussed further in the remainder of Section 4.5.

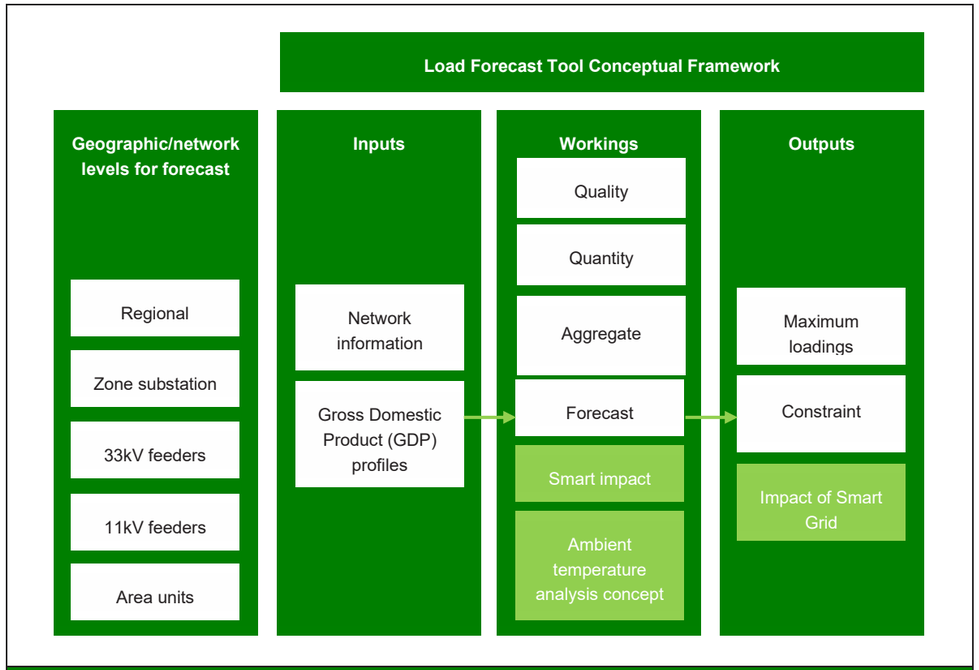


Figure 4-6: Load Forecast Tool

4.5.1.2 Demand Assumptions

The key assumptions behind the plan are detailed below.

Residential Demand Will Be in Proportion with Population

Residential load is assumed to be in proportion to population, which is represented by using independent forecasts for population and household numbers provided by New Zealand Institute for Economic Research (NZIER), using the latest available census data. This data is updated every three to five-years.

Industrial and Commercial Will Grow in Proportion with Economic Activity

Industrial and Commercial load is assumed to be in proportion to economic activity, which is represented by Gross Domestic Product (GDP) as part of the independent forecasts provided by NZIER, using the latest available census data. This data is updated every three to five-years.

Distributed Generation Impact is Assumed to Be Constant

Distributed generation (DG) is incorporated within the historical peak demand values. A small number of industrial customers have larger scale DG installed which tends to match the peak on-site demand. As these resources have limited availability, they are not considered a substitute for capacity.

Small scale DG uptake per annum has been constant since 2013 and it is assumed that the DG impact on the peak demand in the future will be similar to that in the past and no further adjustments are made.

When reliable DG is connected to Centralines' network, it is considered a viable substitute for network capacity and is included in calculations. When actual feeder loads are measured and updated annually in the LFT, DG is captured and reviewed in terms of its reliability prior to inclusion in calculations. Additional allowance for DG is only made when significant new DG is contracted to be commissioned and there is confidence in its availability.

Only DG with reliable energy resources and multiple units are included for planning purposes. This is because DGs using such resources as wind, solar, and hydro as their fuel source are intermittent. All of these, along with single unit generator sites, have output levels that cannot be guaranteed.

Embedded generation impact is assumed to be constant

There are no large-scale embedded generators on Centralines' network. Residential scale distributed generators do not materially impact the load forecast, as they are *de facto* included already in historical actual feeder loads.

Developments and large customer projects are included

Any substantial activity that Centralines is notified of by councils, developers, and existing or new large customers that is scheduled for completion within the planning period is included. From experience, the loading levels provided for these projects are typically accurate, though timing can vary. The projects are reviewed and updated annually by consultation with respective parties. The plan will be adjusted to include or exclude these projects dependent on the project staging.

The list of large customer developments (over 1MVA) from committed projects is currently included in the plan. Centralines is also aware of the impact from potential projects, but these are excluded from the plan at this stage.

Committed projects

There are currently no customer-initiated projects where a contract has been signed.

Potential projects

These are projects where the customer has expressed an intention to complete a development, but no formal agreement is yet in place. These projects are included in the planning process to assess the possible impact, but not included in the ten-year plan as they will require formal agreement to proceed and be substantially funded by the customer.

Load transfer projects are included in the load forecast

Load transfer projects impact the long-term projected peak demand for both the feeder they are removed from, and the one they are added to. These changes are incorporated into the plan in the year in which they are expected to be completed. This information is reviewed annually during the planning process.

Demand-side management impact is assumed to be constant

Centralines' load control capability is currently predominantly via a legacy ripple control system, operated with several relatively old ripple injection and load control sets. Centralines does not, however, own the ripple control receivers at the customers' premises and has limited ability to ensure they remain fully functional. As a result, ripple control effectiveness has been slowly reducing. Centralines recognises the potential of demand-side management in achieving more benefit.

For planning purposes, it is assumed that the present level of contribution and influence by demand-side load control on load forecast will be maintained.

No demand change for households

There are conflicting drivers affecting household load. The increasing efficiency of devices (e.g. LED TVs and lights) and improved household insulation have been decreasing demand per connection by approximately 0.5% per annum. However, the increasing affordability of devices (resulting in more devices per household) and the conversion of open fires to heat pumps is also increasing demand. Overall at this stage Centralines does not consider the net impact to be material.

Constant power factor over the planning period

Centralines assumes a constant power factor of 0.95 at all points of the network where specific data is unavailable. Centralines utilises the sensors installed across its network to monitor the reactive power flow (VAr) in its 11kV and 400V networks and reassess this assumption.

4.5.1.3 Load Inputs

Network

Household data, network connectivity, peak loads for the last 12 months, and installation capacity are extracted from various Centralines' databases. This data is combined to become what is known as the network information in the LFT and is updated annually prior to the running of the tool.

Demand profiles

GDP projections and population forecasts for the next 20-years are the mid-point projection provided by NZIER using the latest census data from 2013. This data is updated every three to five-years.

GDP forecasts are further split by regions, areas and industrial types. Primary and manufacturing categories are grouped into the industrial category for LFT processing. Residential demand is calculated from population projections. The industrial, commercial and residential forecasts are combined to form the demand profile.

4.5.1.4 Demand Calculation Workings

The network information is combined with the industrial, commercial and residential profiles, based on the current proportion of each load type for the different feeders on Centralines' network, and the proportion of the feeder in each area unit. Installation capacity is used as a proxy for load to determine these proportions. This results in a unique demand projection for each 11kV feeder.

Zone substation demand projections are calculated by applying a diversity factor to the sum of the 11kV feeder projections. Similarly, the GXP/POS demand projection are calculated by applying a diversity factor to the sum of the zone substation projections. It is at this stage that large customer projects and the load transfer projects are added to produce final results.

4.5.1.5 Load Forecasting Tool Outputs

The LFT forecast extends out to a 20-year horizon for each month on each 11kV feeder. The Network Development Planning process considers the first ten-year outlook of load forecast for planning purposes and the ten-year-plus outlook for longer term trend consideration.

Below are the expected zone substation loads for Centralines.

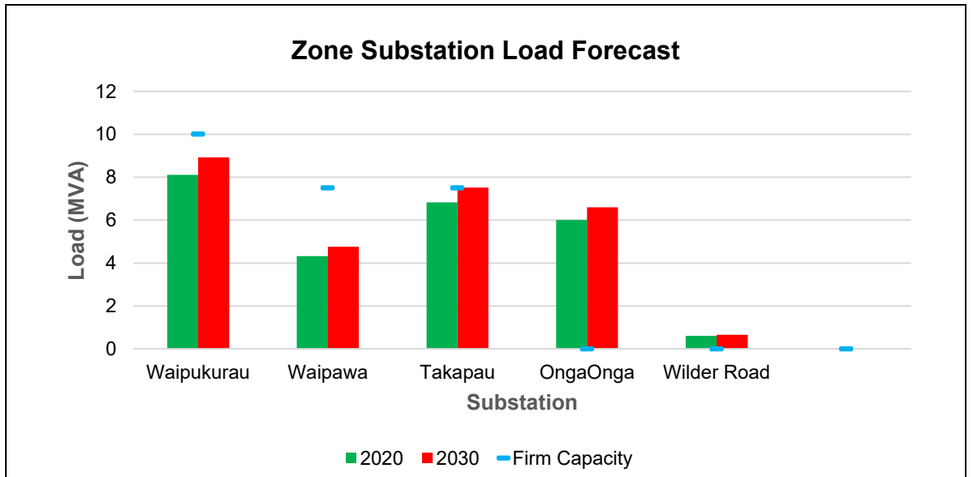


Figure 4-7: Zone Substation Load Forecast

4.5.1.6 *Load Forecasting Review*

Centralines has recently enhanced the load forecasting methodology, input, workings, and output. This re-evaluated the previous load forecast methodology, identified factors with material impact on load forecasting and developed a new approach along with supporting tools and systems. This new system allows the potential impact from disruptive technologies to be considered under numerous scenarios to determine the level of risk resulting from various levels of adoption of these technologies.

4.5.2 Solution Development

The purpose of Solution Development (SD) is to identify and specify optimal solutions that address the risks in the network. These risks are identified by the Constraint Forecasting process for inclusion in the AMP. Solution Development commences when:

- a constraint has been identified
- the risk has been quantified, and
- the risk is sufficient that action should be taken to control it.

Solution Development involves identifying the most optimal control for the risk, considering the key asset management drivers of cost, risk and performance.

Solution Development is completed when an appropriate solution has been identified and this solution has been proposed as a capital project to the AMP, or work has been issued out of an OpEx provision.

Figure 4-8 outlines the key elements of Solution Development.

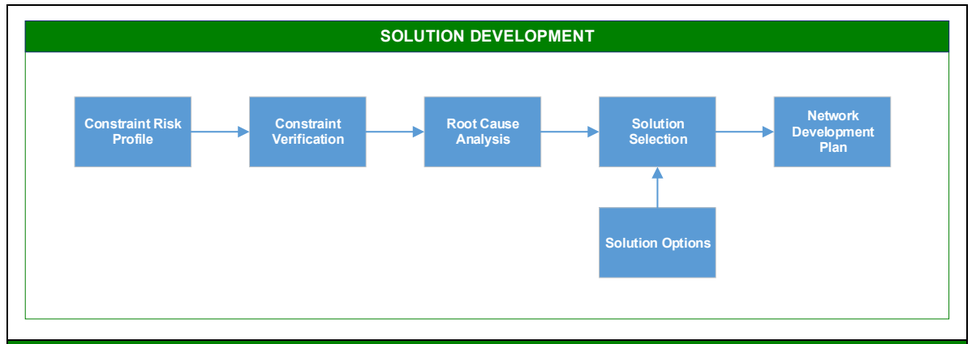


Figure 4-8: Overview of Solution Development Process

The key inputs to Solution Development are set out below.

Input Category	Input
Constraint Forecast	ICP demand Feeder loads
Network Model	Connection of assets Open points
Asset Attribute Information and Master Data	Impedance Maximum rating
Solution Options	Approved equipment Rating methodologies Accurate template costs
Network Field Data	Voltages and currents at key locations

Table 4-9: Overview of Solution Development Process

The key output of SD is the Network Development Plan. This plan represents the Network Development Team's proposed work programme over the ten-year planning horizon to manage the risk of:

- thermally overloading assets, and
- breaching voltage compliance limits.

While ensuring:

- efficient deployment of capital to manage network development risks
- realisation of opportunities to utilise Non-network solutions, to support the organisation to manage broader strategic risks of industry disruption
- the completion of work at the right time to avoid hazards, such as assets failing and disrupting supply, and customer equipment being damaged, and
- clear specification and planning of required work so resources can be mobilised.

For any given network constraint, a range of potential solutions are selected from the Solutions Toolbox. Solutions fall into the following categories:

- Do nothing – A quantified risk-based approach that considers whether risk is manageable using existing processes and techniques.
- Network option – Traditional network reinforcement approach, which typically provides a technically sound long-term solution. These solutions may require greater initial expenditure but generally provide a high level of security and capacity.
- Non-network option – Utilising new technology, which in some cases is only applicable in the short term. These solutions typically incur lower initial cost and provide Centralines with time to plan and optimise more complex network solutions, while deferring investment and mitigating risk.

Engineering analysis is undertaken on the potential options to evaluate the engineering merits in addressing the identified need. Economic analysis is completed on the selected options to ensure cost-effective network development. As part of the engineering analysis, network planning engineers will collaborate with asset specialists to discuss any asset renewal needs in the vicinity of the constraint.

4.5.2.1 *Solutions Toolbox*

The available solutions in the 'solutions toolbox' to address the identified network constraints are summarised in Table 4-10. Centralines is actively exploring possible expansion of the solutions toolbox using new technologies to further enhance the efficiency of the network.

Constraint	Network Solution	Non-network Solution
Voltage	Upgrade conductor Install feeder Install Voltage Regulator	Reactive VAr compensation Fast transfer scheme Network reconfiguration (existing asset)
Continuous current capacity	Upgrade conductor Install feeder Install transformer Establish substation Install embedded generation	Reactive VAr compensation Fast transfer scheme Demand-side management Real-time monitoring Cyclic ratings (selected asset classes) Network reconfiguration (existing asset)
Fault current capacity	Asset upgrade	Decrease fault rating by: • substation earthing compensation, and • network reconfiguration (existing asset).
Quality of supply, e.g. dips harmonics flicker	Install feeder Install transformer	Network reconfiguration (existing asset) Behind the meter solutions Distributed generation Energy storage
Network security	Install feeder Install transformer Establish substation Install recloser Install embedded generation	Dynamic ratings (selected asset classes) Fast transfer scheme Reactive VAr compensation Demand-side management Network reconfiguration (existing asset) Self-healing scheme Distributed generation Energy storage
Network reliability	Install feeder Install recloser Overhead to Underground asset conversion Install embedded generation	Network reconfiguration (existing asset) Substation earthing compensation Fast protection Ground fault neutraliser Self-healing scheme Distributed generation Energy storage

Table 4-10: Solutions Toolbox

4.5.2.2 *Network Options*

Network solutions are based on a traditional network reinforcement approach and typically provide technically sound long-term solutions. Examples are power transformer, pole and cable upgrades. To ensure traditional network solutions are designed to be as energy and economically efficient as possible, direct effect of heat losses and energy efficiency, voltage and reactive power optimisation, and network configuration are considered. Standardised designs are applied to specify equipment and installation details. Where possible, cost estimates are based on typical costings based on engineering knowledge or actual costing from completed works.

Standardised designs

Where possible, Centralines utilises standardised designs for assets to maximise cost efficiencies throughout the asset management lifecycle. Standardisation of design in different asset types are summarised below.

Asset	Standardisation
33kV overhead lines	Standard drawings, design and construction methodologies are in place. Standard materials used include concrete Busck poles and ACSR, AAC or AAAC conductor. These are available as standard designs in Design Manager for planners' cost estimates and for designers.
33kV underground cables	Standard drawings, design and construction methodologies are in place. Standard materials used include different sizes of XLPE cable. These are available as standard designs in Design Manager for planners' cost estimates and designers.
Power transformers	Due to the value of this asset, Centralines tenders each one to ensure cost efficiency.
33kV circuit breakers	Standard drawings, design and construction methodologies are in place. The standard outdoor circuit breaker used is an Alstom GL107 unit.
11kV circuit breakers and switchboards	Standard drawings, design and construction methodologies are in place. Standard equipment used includes Reyrolle Pacific (RPS) 11kV indoor boards and the Cooper Nova recloser for outdoor use.
Zone substation buildings and equipment	Due to the value and low number of new constructions of zone substations Centralines designs each one specifically for the site and the network's technical requirements.
Ripple injection plants	Standard drawings, design and construction methodologies are in place. Standard equipment used is Landis+Gyr (L+G).
Poles	Standard drawings, design and construction methodologies are in place. Standard materials used include concrete Busck poles used across the industry for maximum cost efficiency. These are available as standard designs in Design Manager for planners' cost estimates and for designers.
11kV and 400V lines	Standard drawings, design and construction methodologies are in place. Standard materials used include ACSR, AAC, AAAC, ABC conductors and Busck poles. These are available as standard designs in Design Manager for planners' cost estimates and for designers.
11kV and 400V cables	Standard drawings, design and construction methodologies are in place. Standard material used is PVC-coated XLPE cable. These are available as standard designs in Design Manager for planners cost estimates and for designers.
Distribution Transformers	Standard drawings, design and construction methodologies are in place. Standard equipment used includes pole-mount 15-300kVA and ground-mount 30-1000kVA ETEL transformers. These are available as standard designs in Design Manager for planners' cost estimates and for designers.
Distribution Switchgear – Air Break Switches, 11kV Fuses and Reclosers/ Sectionalisers	Standard drawings, design and construction methodologies are in place. Standard equipment used includes Cooper Nova reclosers, ENTEC RCS, Schneider ABSs, S&C 11kV fuses (DDOs). These are available as standard designs in Design Manager for planners' cost estimates and for designers.

Asset	Standardisation
Distribution Switchgear – Ground Mounted Switches and Ring Main Units	Standard drawings, design and construction methodologies are in place. Standard equipment used is the ABB Safelink RMU. These are available as standard designs in Design Manager for planners' cost estimates and for designers.
Voltage Regulators	Standard drawings, design and construction methodologies are in place. Standard equipment used is the Cooper Voltage Regulator. These are available as standard designs in Design Manager for planners' cost estimates and for designers.
Pedestals	Standard drawings, design and construction methodologies are in place. Six different pedestals are available to cater for varied site and technical requirements. Most are available as standard designs in Design Manager for planners' cost estimates and for designers.
Sensors	Standard drawings, design and construction methodologies are in place. Many different sensors are available to cater for varied technical requirements. Most are available as standard designs in Design Manager for planners' cost estimates and for designers.
Communications	Standard equipment used includes Silver Springs mesh radio, Tait/MiMOMax UHF (rural). Mesh radio is available as standard designs in Design Manager for planners' cost estimates and for designers.

Table 4-11: Standardisation Across Assets

4.5.2.3 Non-network Options

Centralines has recognised the significant benefits from Non-network solutions by utilising new technologies to increase the overall network efficiencies and effectiveness. Several legacy network and monitoring (SCADA) applications have been replaced with the Advanced Distribution Management System (ADMS) operating on a ubiquitous communications platform. This is a key enabler to realise the full benefits from Non-network solutions implemented to date and into the future.

Non-network solutions utilise new technologies to provide cost-effective alternatives to traditional network solutions. Technical aspects include reduction in system losses, no detrimental impact on fault level, improvement in asset utilisation, and in voltage profile. Where possible, cost estimates are based on typical costing based on engineering knowledge or actual costing from completed works.

4.5.2.4 Solution Toolbox Enhancement Initiatives

Centralines is continuing its proactive approach to realise significant benefits from new technologies as potential solutions to identified constraints. This enhancement initiative is to explore, investigate and trial new demand-side response solutions to expand the Non-network solutions toolbox. There are two key elements to this initiative - ripple control of hot water and off-grid systems.

Ripple control

Centralines has utilised ripple control of hot water demand as a demand-side response for many years. It has historically been used primarily to manage regional peak demand. This initiative will explore and trial this and other demand-response technologies to define and develop Centralines' demand response philosophy, policy and strategy.

Off-grid systems

Centralines recognises off-grid systems as a disruptive technology with the potential to reduce the cost of serving its remote rural customers. This is considered as a high priority opportunity due to the increasing maturity of the technology and the potential benefits from their application on the network. This initiative will explore and trial off-grid systems, medium to large scale energy storage systems, mobile and fixed DG. Supporting management philosophy, operation and maintenance policies and strategies will also be developed.

4.5.2.5 Selecting the Preferred Solution

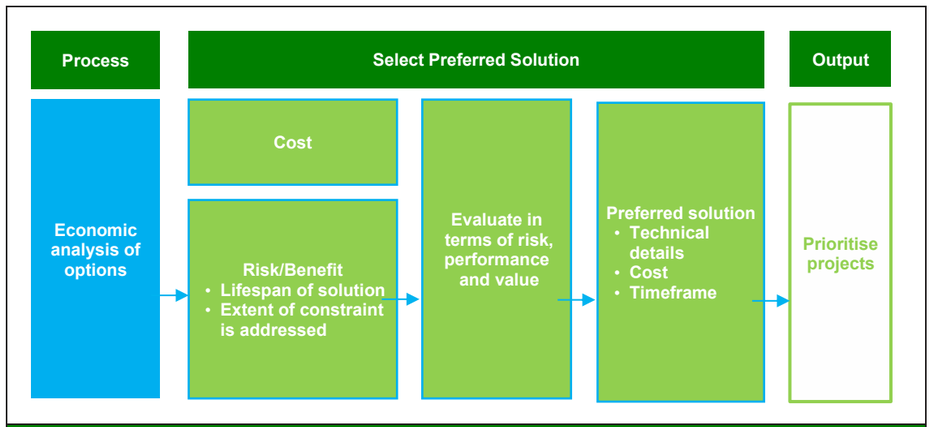


Figure 4-9: Select Preferred Solution Process Stage

Network planners apply professional engineering judgement to the identified set of options, and the quantified costs and benefits to select the preferred solution. This centres on the objective to strike an optimal balance of risk, performance and value to ensure the cost-effective selection of network development solutions. A list of potential projects provides a consolidated set of preferred solutions to address the identified constraints.

4.6 Network Development Projects

Projects greater than $250k are considered material and will be discussed to a greater level of detail. For completeness, all projects (material and non-material) planned for 2020/2021 and all material projects proposed for 2021/2022-2029/2030 have been included.

Customer-driven projects where a contract is not in place are not included.

Details of projects for the ten-year planning period are outlined below.

Project Number	Constraint	Category	Cost	Section
2020/21 Material				
	None			
2020/21 Non-Material				
1165	Feeder 91 - Replace ABS 629 with a Remote-Control Switch (RCS) on Pole 919191	Quality of Supply	$65k	4.6.2
1166	Feeder 91 - Install a new Sectionaliser on Pole 906318	Quality of Supply	$65k	4.6.2
1188	Feeder 86 - Install a Remote-Control Switch (RCS) on Pole 905083	Quality of Supply	$65k	4.6.2
1195	Feeder 91 - Replace ABS 459 with a Remote-Control Switch (RCS) on Pole 905143	Quality of Supply	$65k	4.6.2
1197	Feeder 86 - Replace ABS 462 with a Remote-Control Switch (RCS) on Pole 905419	Quality of Supply	$65k	4.6.2
1198	Feeder 86 - Replace ABS 461 with a Current Sectionaliser on Pole 905281	Quality of Supply	$65k	4.6.2
1199	Feeder 91 - Replace ABS 463 with a Remote-Control Switch (RCS) on Pole 906104	Quality of Supply	$65k	4.6.2

Table 4-12: Material and Non-Material Projects for 2020/2021

Project Number	Constraint	Category	Cost	Section
2021/22 to 2024/25 Material				
1183	Voltage constraint on Feeder 86	Quality of Supply	$350k	4.6.3
1156	Voltage constraint Feeder 2 North	Quality of Supply	$350k	4.6.3
1189	Voltage constraint Feeder 19	Quality of Supply	$350k	4.6.3

Table 4-13: Material Projects for 2021/22 to 2024/25

Project Number	Constraint	Category	Cost	Section
2025/2026 to 2029/2030 Material				
10136	Install alternative supply to Takapau Zone Substation	Quality of Supply	$1.6M	4.6.4
1145	Install 14.3km ADSS Arial Fibre circuit between Waipawa GXP and Takapau	Quality of Supply	$475k	4.6.4
1194	Voltage constraint Feeder 46	Quality of Supply	$350k	4.6.4
10586	Feeder 4 - Voltage constraint when back feeding	Quality of Supply	$350k	4.6.4
1157	Voltage constraint Feeder 18	Quality of Supply	$350k	4.6.4
10587	Feeder 1 - Voltage constraint when back feeding	Quality of Supply	$350k	4.6.4
1200	Voltage constraint Feeder 88	Quality of Supply	$350k	4.6.4
1180	Voltage constraint on Feeder 4	Quality of Supply	$360k	4.6.4
10590	Establish a Zone Substation at Ongaonga	System Growth	$3.5M	4.6.4
10286	Install second transformer at Waipawa GXP	System Growth	$500k	4.6.4
1205	11kV Extension - Link Feeders 74 & 75 along SH2	System Growth	$450k	4.6.4

Table 4-14: Material Projects for 2025/2026 to 2029/2030

4.6.1 Material Projects for 2020/2021

There are no material projects for 2020/2021

4.6.2 Non-Material Projects for 2020/2021

A summary table describing the confirmed non-material projects for the 2020/2021 year is included in Section 4.6.

Project No	Project	Constraint Description	Options	Cost	Preferred Solution
1165	Feeder 91 - Replace ABS 629 with a Remote-Control Switch (RCS) on Pole 919191	Manual switches with long drive time required for restoration. Inflates reliability risk during faults.	Install Recloser, RCS, RMU or do nothing.	$65k	Install RCS
1166	Feeder 91 - Install a new Sectionaliser on Pole 906318	Manual switches with long drive time required for restoration. Inflates reliability risk during faults.	Install Recloser, RCS, RMU or do nothing.	$65k	Install RCS
1188	Feeder 86 - Install a Remote-Control Switch (RCS) on Pole 905083	Manual switches with long drive time required for restoration. Inflates reliability risk during faults.	Install Recloser, RCS, RMU or do nothing.	$65k	Install RCS
1195	Feeder 91 - Replace ABS 459 with a Remote-Control Switch (RCS) on Pole 905143	Manual switches with long drive time required for restoration. Inflates reliability risk during faults.	Install Recloser, RCS, RMU or do nothing.	$65k	Install RCS
1197	Feeder 86 - Replace ABS 462 with a Remote-Control Switch (RCS) on Pole 905419	Manual switches with long drive time required for restoration. Inflates reliability risk during faults.	Install Recloser, RCS, RMU or do nothing.	$65k	Install RCS
1198	Feeder 86 - Replace ABS 461 with a Current Sectionaliser on Pole 905281	Manual switches with long drive time required for restoration. Inflates reliability risk during faults.	Install Recloser, RCS, RMU or do nothing.	$65k	Install RCS
1199	Feeder 91 - Replace ABS 463 with a Remote-Control Switch (RCS) on Pole 906104	Manual switches with long drive time required for restoration. Inflates reliability risk during faults.	Install Recloser, RCS, RMU or do nothing.	$65k	Install RCS

Table 4-15: Non-Material Projects for 2020/2021

4.6.3 Material Projects for 2021/2022 to 2024/2025

Project Number	Constraint	Constraint Description	Options	Cost	Solution
1156	Voltage constraint on Feeder 2, North	Under-voltage indicated on Feeder 2 North - SH50 (Tikokino), Holden Road, Matheson Road and Smedley Road: The report indicated that 92 transformers (239 ICP's) are at risk of breaching the regulatory voltage levels in the next ten years. Annual risk for area, $108,000.	Network: Voltage Regulator. Network Reconductor. Non-network. Do nothing.	$350k	Voltage Regulator
1183	Voltage constraint on Feeder 86	Constraint - Under-voltage indicated in constraint report. The report indicated that 26 transformers (248 ICP's) on Feeder 86 are already breaching or will breach the LV regulatory voltage levels in the next ten-years.	Network: Voltage Regulator. Network Reconductor. Non-network. Do nothing.	$350k	Voltage Regulator
1189	Voltage constraint Feeder 19	Constraint - Under-voltage indicated in constraint report.	Network: Reconductor Network: Voltage Regulator Non-network Do nothing	$350k	Voltage Regulator

Table 4-16: Material Projects for 2021/2022 to 2024/2025

4.6.4 Material Projects for 2025/2026 to 2029/2030

All projects for 2025/2026 to 2029/2030 are in the initial identification stage. High level solutions have been identified and costs have been estimated for the solutions identified as preferred. However, all constraints and possible solutions will be reviewed during annual planning to confirm the constraints still exist and the timing of the constraints have not changed. More detailed investigation into the solutions will be undertaken closer to the planned commencement of the project.

Network development works for this period will be dependent on the energy demand growth experienced on the network. Most energy demand growth on the Centralines' network for the planning period is expected to be driven by customer-driven works and are not included here.

Customers have indicated that the trade-off between reliability and price are appropriate and as a result it is suggested that further investment will generally be limited to relatively minor upgrades to the worst-performing feeders to ensure that customers currently experiencing poor reliability on feeders are progressively upgraded.

Safety-driven upgrades are expected to remain relatively minor during the planning period, due to the relatively robust nature of the network, age profiles of the assets and the relatively high levels of investment in renewals and replacements that are discussed in Section 5.

Project Number	Title	Constraint Description	Options	Cost
1157	Voltage constraint Feeder 18	Issue 23D2B61BBA Under-voltage indicated in constraint report. Feeder 18 - Farm Road. The report indicated that 38 transformers (72 ICP's) are at risk of breaching the regulatory voltage levels in the next ten-years. Total risk for the area, $43,215.	Network: Voltage Regulator. Network: reconductor. Do nothing.	$350k
1194	Voltage constraint Feeder 46	Issue F2BB2193E7 Voltage constraint predicted on Feeder 46.	Network: Reconductor. Network: Voltage Regulator. Do nothing.	$0-$350k
1200	Voltage constraint Feeder 88	Issue C68983F2B8 Voltage constraint predicted on Feeder 88.	Network: Reconductor. Network: Voltage Regulator. Do nothing.	$0-$350k
1145	Communications between Waipawa GXP and Takapau Zone Substation	Issue C55E54C967 Communication to Takapau Substation is not reliable enough for modern protection and SCADA systems.	Network: Fibre to site. Do nothing.	$475k
1205	11kV Extension - Link Feeders 74 & 75 along SH2	To accommodate future growth in the rural areas a provisional sum has been proposed for network reconfiguration.	Network: New feeder. Non-network: Load Balance. Non-network: Demand side response. Do nothing.	$450k
10136	Install alternative supply to Takapau Zone Substation	Takapau Zone Substation is Centralines second largest substation by demand and supplies the largest single customer. It is currently supplied via one 15km line with limited backup available through the 11kV network.	Network: Alternative 33kV connection. Network: Install embedded generation. Non-network:11kV transfer scheme. Do Nothing.	$1.6M

Project Number	Title	Constraint Description	Options	Cost
10286	Install second transformer (2.5MVA) at Wilder Road, including Voltage Regulator as tap changer	Wilder Road is supplied by one transformer with long outages predicted for a transformer failure.	Network: Install transformer. Network: Install embedded generation. Non-network:11kV transfer scheme. Do Nothing.	$500k
10586	Feeder 4 - Voltage constraint when backfeeding	Feeder 4 is predicted to incur voltage constraints when used to backfeed neighbouring feeders.	Network: Install embedded generation. Non-network:11kV transfer scheme. Do Nothing.	$350k
10587	Feeder 1 - Voltage constraint when backfeeding	Feeder 1 is predicted to incur voltage constraints when used to backfeed neighbouring feeders	Network: Install embedded generation. Non-network:11kV transfer scheme. Do Nothing.	$350k
10590	Establish a Zone Substation at Ongaonga	The 11kV in Ongonga is predicted to grow beyond current network supply capabilities.	Network: Establish zone substation. Network: Install embedded generation. Non-network:11kV transfer scheme. Do Nothing.	$3.5M
1180	Voltage constraint on Feeder 4	Under-voltage indicated in constraint report. Feeder 4 – State Highway 2 area. The report indicated that 26 transformers (72 ICP's) are at risk of breaching the regulatory voltage levels in the next ten-years. Annual risk for the area, $26,850.	Network: Voltage Regulator. Network: Reconductor. Do Nothing.	$360k

Table 4-17: Material Projects for 2025/2026 to 2029/2030

4.7 Determination Reference Mapping Table

Section 4 Reference		Determination Reference
4.1	Introduction to this Section	11
4.2	Network Development Planning Objectives and Criteria	11.1, 11.2
4.3	Macro-environmental and Future Network Context	11.1, 11.2
4.4	Network Development Planning Assumptions	4.1 including 4.1.1-4.1.4, 4.2 including 4.2.1-4.2.5, 4.3, 11.1, 11.6, 11.8 including 11.8.1, 11.8.2, 11.8.4, 11.11
4.5	Network Development Planning Process	11, 11.3, 11.4, 11.4.1, 11.4.2,11.5, 11.6, 11.7. 11.8.3, 11.12, 11.12.1, 11.12.2
4.6	Network Development Projects	11.7, 11.8.3, 11.9 including 11.9.1 to 11.9.3, 11.10, including 11.10.1 to 11.10.3, 11.12.1 to 11.12.2

Table 4-18: Determination Reference Mapping Table

5

ASSET MANAGEMENT PLANNING

CENTRALINES
LIMITED

CONTENTS

5. ASSET MANAGEMENT PLANNING

5.1 Introduction to this Section

Section 5: This section provides an overview of Centralines' approach to Asset Management Planning. The specific planning processes covered within this section are:

- Asset Renewal Planning
- Maintenance Planning, and
- Vegetation Planning.

These planning processes are critical to provide assurance that risks to the Asset Portfolio are effectively managed and opportunities for improvement are realised.

This section also contains summary information on assets including:

- asset descriptions
- asset condition and performance assessments
- age profile graphs
- maintenance plans
- relevant Asset Management Objectives (AMOs) and associated replacement and refurbishment drivers
- tables detailing asset maintenance and renewal expenditure projections, and
- lists of known renewal projects over the planning period.

A table that maps the requirements of the Electricity Distribution Information Disclosure Determination to the information provided is available at the end of the section to support assessment of compliance.

Centralines' Asset Management service provider Unison, is certified to ISO 55001 which is the international standard that contains the requirements specification for an integrated, effective management system for asset management. Key processes and continuous improvements associated with asset management planning, including asset renewal and maintenance planning, developed as part of this certification, will be fully adopted over time to manage Centralines' asset fleet. This will result in the enhancement of processes described in this section.

5.2 Overview of Asset Management Planning

5.2.1 What is Asset Management Planning?

Asset Management Planning is the process that develops and manages the plans that specify future work on the Asset Portfolio over a ten-year planning horizon. These processes utilise asset information and apply risk management principles to ensure that decision-making is robust and fact-based.

All work proposals submitted to the Asset Management Plan (AMP) must meet certain information requirements, including assessment against the AMP Risk Schema. This ensures that an acceptable balance between cost, risk and performance can be reached and therefore, resources are efficiently and prudently deployed. The outputs are plans that specify clear tasks and projects to be initiated and scheduled to maximise the efficiency of resource utilisation and capitalise on any synergies to effectively manage asset related risks.

The desired outcome of Asset Management Planning is to achieve Centralines' AMOs (Refer 2.3.4).

Centralines' Asset Management Planning System is represented in Figure 5-1. The planning processes covered in this section are highlighted in orange.

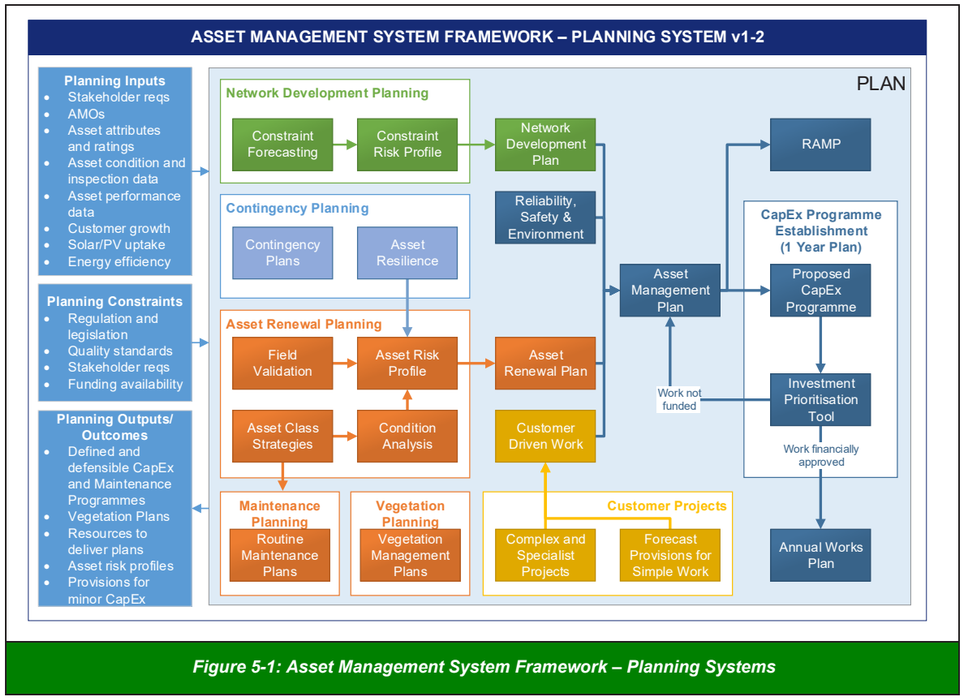


Figure 5-1: Asset Management System Framework – Planning Systems

5.2.2 Key Elements of Asset Management Planning

Table 5-1 below provides a brief description of the key elements of the Asset Management Planning processes covered in this section.

Asset Management Planning Process	Key Elements
Maintenance Planning	Establishment of annual routine maintenance plans including preventive maintenance programmes, and asset inspection and monitoring programmes.
Asset Renewal Planning	Identify and quantify risks in the Asset Portfolio relating to asset condition and capture these as constraints in the AMP. Consider options, develop solutions and specify project proposals (including asset risk profiles and associated risk costs) to address high priority asset condition risks and submit these proposals to the AMP. These project proposals may include solutions to other types of identified constraints, i.e. capacity related issues in the same geographical confines. Specify project proposals to improve the resilience of the Asset Portfolio based upon requirements from enterprise risk management and contingency planning processes.

Asset Management Planning Process	Key Elements
Vegetation Planning	Establishment of annual plans for the management of vegetation, including trees encroaching the line corridor, that represent risk to the Asset Portfolio.

Table 5-1: Asset Management Planning – Key Elements

5.2.3 Key Asset Management Planning Objectives and Drivers

The purpose of Asset Management Planning is to ensure that assets can perform their intended functions safely, reliably, and at lowest cost, throughout their lives in order to meet Centralines' AMOs.

To achieve this purpose, Centralines aims to optimise the cost of asset management while meeting network performance service levels, and not increasing the risk profile to the business. Centralines' objectives are to:

- ensure no assets cause health and safety risks to the public, employees or contractors
- optimise Asset Renewal CAPEX over the planning period
- optimise Network OPEX over the planning period, and
- meet network performance targets for SAIDI and SAIFI in line with the regulatory collar.

5.2.4 Asset Management System (AMS)

Figure 5-2 depicts at a high level Centralines' Asset Management System (AMS) which ensures "line of sight" and alignment across the organisation.

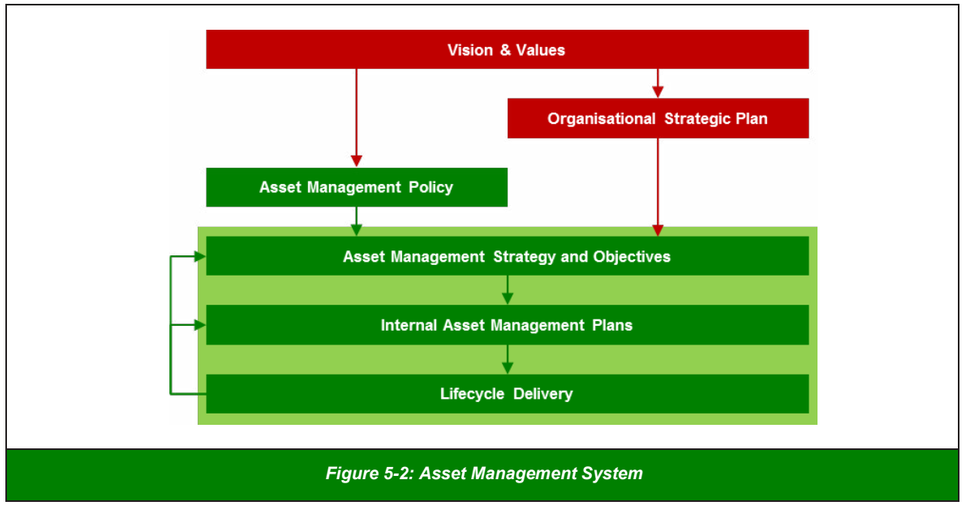


Figure 5-2: Asset Management System

5.3 Maintenance Planning

5.3.1 Maintenance Overview

Maintenance planning at Centralines is undertaken to ensure that Centralines' assets can support the achievement of its AMOs. Maintenance activities are designed to support an asset effectively continuing to perform its intended function until it requires renewal. This is achieved by understanding the condition of assets and how this changes over time by inspecting and testing, preventatively maintaining the assets and correcting defects as they are identified.

5.3.2 Maintenance Planning Drivers

Maintenance is targeted to ensure that Centralines' assets can support the achievement of AMOs while optimising the balance between cost, risk and performance. Supplementary, aligned, maintenance drivers are outlined in Table 5-2. Many of these drivers are integral and encompassed in Centralines' AMO's.

Driver	Driver Descriptions
Public, Employee and Contractor Health and Safety	Ensuring assets are fit for purpose and in a condition that allows them to be safely operated by Centralines' staff.
	Ensuring assets are physically secure and will not cause harm or be easily accessed under normal circumstances by Centralines' customers or members of the public.
	Taking all practicable steps to ensure any asset failures do not cause harm to our customers, contractors, members of the public and environment or cause damage to third party property.
	Taking all practicable steps to ensure Centralines' assets operate as intended and designed, e.g. a recloser or circuit breaker will operate correctly in the event of a fault and safely isolate the faulted section of network.
	Ensuring maintenance policies, programmes and practices align and are consistent with Centralines' Public Safety Management System.
Legislative and Regulatory Compliance	Ensuring Centralines' maintenance planning, policies and programmes meet all legislative and regulatory requirements.
	Where appropriate, ensuring Centralines' maintenance planning practices as a minimum conform to industry best practice, relevant standards and guidelines and original equipment manufacturers' (OEM) specifications.
Asset Information Gathering	Invasive and non-invasive testing, inspections and diagnostics of assets to ascertain their status and condition. This information is essential in asset management decision-making and drives much of the asset renewal programme, as well as the planned and corrective maintenance programmes.
Managing Risks of In-service Failures	Ensuring assets are fit for purpose and are adequately maintained to function as intended, over their useful lives.
	Ensuring Centralines' maintenance practices keep assets functioning at a level that meets current regulatory network reliability performance targets.
	Extracting optimal value (including life extension) from Centralines' assets by timely, efficient and cost-effective maintenance interventions.
	Ensuring asset testing and maintenance inspections are effective by obtaining relevant, accurate, and reliable, fit-for-purpose condition assessment data and information that can be transformed into knowledge thereby enabling optimal asset management decision-making.
Cost/Efficiency	Focusing on optimising costs by implementing appropriate maintenance strategies that proactively identify and address potential asset/network issues before they become faults, i.e. planned and proactive versus reactive maintenance.
	Ensuring the best decisions are made between different modes of maintenance (repair, refurbish, or replacement) using sound engineering judgement, existing tools, and the development and enhancement of expert decision support systems.
	Working with Centralines' Management service provider to identify and monitor efficiency measures, and make continuous improvements to procedures, processes and practices, to improve the efficiency and delivery of the maintenance programme.
Manufacturer Specifications and Recommendations	Ensuring published guidelines on the maintenance of equipment are met (where appropriate) to ensure best practice.

Table 5-2: Centralines' Detailed Maintenance Drivers and Descriptions

5.3.3 Maintenance Planning Assumptions

Centralines' current maintenance strategies and plans have been developed and are being executed based on the assumptions detailed in Table 5-3.

Centralines' Maintenance Planning Assumptions
Data being used in asset management decision making is fit for purpose.
No significant changes in legislative, regulatory or statutory requirements, e.g. Health and Safety, will transpire requiring major changes in focus or priorities.
Current network reliability performance targets are maintained, i.e. there is no material change to SAIDI/SAIFI targets.

Table 5-3: Centralines' Maintenance Planning Assumptions

5.3.4 Maintenance Planning Process

Centralines' current maintenance planning approach is shown and explained in the Figure 5-3 and Table 5-4Table 5-4.

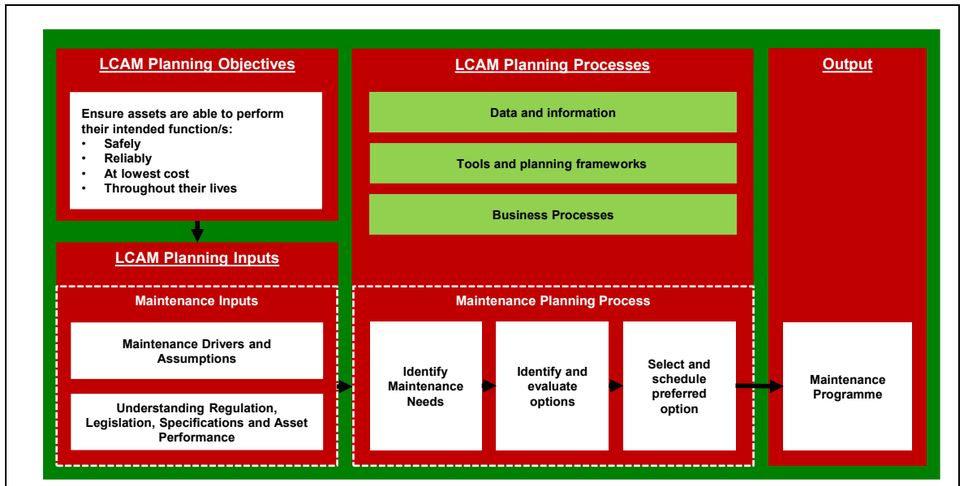


Figure 5-3: Maintenance Planning Approach

Group	Element	Description
Maintenance Inputs	Drivers and Assumptions	Maintenance drivers and assumptions are balanced qualitatively by asset engineers to form recommended, planned maintenance activities for each asset class.
	Regulations, Legislation, Specifications and Asset Performance Expectations	Asset engineers review relevant regulations and legislation as well as manufacturers' specifications / recommendations for asset maintenance. The asset engineers weigh these requirements against the performance expectations of the assets and any associated risks to determine the required maintenance types and levels.
Maintenance Planning Process	Identify Maintenance Needs	Maintenance requirements are identified by asset engineers. The asset engineers are tasked with assessing relevant regulation and legislation and the manufacturers' specifications for recommended maintenance types/levels. These 'base' requirements are then blended with the asset engineers' requirements for information gathering on the asset, the assets' individual performance requirements and history.
	Identify and Evaluate Options	The types of maintenance activities performed are driven primarily by the requirements of the maintenance programme and the availability of technology/equipment

Group	Element	Description
		and contractor resources. The asset engineers determine what type of maintenance will best meet the requirements and will be able to be delivered.
	Select and Schedule Preferred Option	A formal process of recommendations, challenge, review and finalisation is followed to ensure outputs are optimal and deliverable. It is during this challenge and review process that contractor resourcing and budgeting is taken into consideration.
Maintenance Output	Maintenance Programme	The maintenance programme is the combined output of the maintenance planning process. It is an annually updated programme of work to maintain assets over the coming ten-year period. Types of maintenance included in the Maintenance Programme are described in Section 5.3.5.

Table 5-4: Centralines' Maintenance Planning Process

5.3.5 Maintenance Approaches

Centralines employs a combination of methods to maintain, inspect and test its portfolio of assets through its planned and reactive/corrective maintenance programmes. These include age, time, condition, reliability and risk-based approaches.

5.3.5.1 Age Based Maintenance

Asset age is gradually becoming less of a driver in determining when a maintenance intervention should occur. However, age-related factors such as insulating materials in circuit breakers, e.g. oil vs vacuum or gas, cost and availability of spares and asset functionality will continue to impact on maintenance regimes and influence renewal programmes.

5.3.5.2 Time Based Maintenance

Time based maintenance is maintenance including inspections and testing conducted at a predetermined frequency or interval. This frequency is influenced by drivers such as regulatory and statutory requirements, industry guidelines and best practice, Centralines' engineering experience and original equipment manufacturers' (OEM) specifications.

5.3.5.3 *Condition Based Maintenance*

This maintenance occurs where it has been determined the most effective action is a maintenance intervention based on an asset's current condition. Condition based maintenance occurs through effective asset condition monitoring including inspections and testing, or as identified by other means such as Centralines' asset defect process (refer 5.3.7).

5.3.5.4 *Risk Based Maintenance*

Centralines is continuing to move towards Condition Based Risk Management (CBRM) which not only considers the condition of an asset but also the consequences and associated risks of that asset failing. CBRM over time will become more influential in the identification and prioritisation of maintenance and renewal programmes and tasks.

5.3.5.5 *Reliability Centred Maintenance*

This is maintenance that focuses on maintaining system reliability and performance. In a Centralines context this includes the identification of failure modes through Failure Mode and Effects Analysis (FMEA) or analysis of reported defects and the subsequent identification of maintenance or potential renewal strategies to mitigate these failures.

5.3.6 Maintenance Categories

Centralines' asset specific maintenance programmes and related activities incorporating the above approaches are classified into the following categories which are aligned to determination definitions.

5.3.6.1 *Service Interruption and Emergency Maintenance (Urgent Reactive Maintenance)*

This is reactive maintenance undertaken in the immediate or short-term in response to an unplanned event. Typically, these events relate to network faults caused by asset failures, vegetation, adverse weather and third-party damage, etc.

Centralines generally breaks this category down into two levels of response.

1. First Response
   This is categorised as the initial response to find and isolate the fault, mitigate any health and safety risks and to subsequently fully or partially restore supply if possible.

2. Second Response
   This is further reactive maintenance work required beyond the scope of First Response to undertake either temporary or permanent repairs and restore supply. All the above relate to operational expenditure. A reasonable portion of second response activities will involve renewal of capital items, and as such will be carried out as capital expenditure under Asset Replacement and Renewal.

5.3.6.2 *Vegetation Management*

Vegetation Management includes the inspection, liaison and cutting activities (planned and reactive) associated with the control of vegetation for the primary purpose of compliance with the Electricity (Hazards from Trees) Regulations 2003. Centralines' vegetation control programme is determined by the outputs of a Vegetation Prioritisation Programme (VPP), the outputs of routine feeder inspection programmes, and vegetation-related defects identified on the network through any other means.

The VPP was developed to improve the efficiency and effectiveness of the vegetation programme. The tool assists with prioritising feeder sections for targeted vegetation control based on multiple drivers including customer numbers, history of vegetation related faults and current programme status. Centralines is constantly reviewing and developing its vegetation control programme in an effort to improve the efficiency of the cutting programme and to mitigate the issues created by vegetation both within and outside the powerline corridor. An example of this is the introduction of a herbicide application programme and the optimisation of the programme utilising aerial feeder inspections.

5.3.6.3 *Routine and Corrective Maintenance and Inspection (Planned/Preventative Maintenance)*

This category encompasses prescribed, budgeted maintenance tasks (maintenance baseline) carried out to an agreed schedule and typically includes routine asset maintenance and servicing, inspections, testing and condition assessments. A significant portion of this maintenance is prescribed by maintenance standards and related service codes adopted by Centralines.

This category also includes non-urgent remedial work carried out as planned activities subsequent to service interruption and emergency work or maintenance identified by Centralines' defect process, asset condition assessments, testing, inspections and field observations.

5.3.6.4 *Asset Replacement and Renewal*

Asset replacement and renewal maintenance relates to the replacement or renewal of non-capital items. This covers planned remedial work on assets including replacement of asset components and asset refurbishment. Typically, this maintenance is initiated as a result of asset inspections and testing, condition assessments and defect reporting.

5.3.7 Defect Process

Centralines has a defect management standard which details the process by which identified network asset defects are reported, prioritised and remediated. All identified defects are categorised in terms of:

- urgency based on criteria such as public and employee safety, and
- consequences of the asset failing including potential network reliability and performance considerations.

Critical defects are those that affect operational security or are a safety hazard. These types of defects must be actioned immediately.

Urgent defects are those which must be addressed with a minimum of delay, generally no later than three months from date of reporting. These defects do not compromise safety or asset security. They may have an operational constraint, but with switching can be left out of service until the repair can be made.

Non-urgent defects are those found that do not affect the operational security of the network nor present an immediate safety hazard. These defects are generally addressed as planned work.

All defects are coded to allow subsequent analysis of reported defects, including the specific asset type and detailed cause of the defect.

5.4 Asset Renewal Planning (ARP)

5.4.1 ARP Overview

The purpose of Asset Renewal Planning (ARP) is to identify and prioritise assets for replacement or corrective maintenance. This planning is based on the condition-related risk of in-service failure and the likely consequences should a failure occur.

The ARP process culminates in the creation of a risk-based, ten-year asset renewal plan. Years one and two are very detailed in terms of specific, verified constraints, risk scoring, options analysis, optimal solution, project scope and cost.

Years three to five are less detailed and while constraints may be identified with defined risks, not all will be verified or specific solutions identified, and costings will be high level.

Years five to ten are again less detailed and all constraints are reviewed and updated on an annual basis to incorporate the latest asset information and ensure any new constraints are identified and appropriately managed.

5.4.2 ARP Overview

ARP involves balancing the risk of assets failing in service and the subsequent consequences, against the cost of renewal or other life extending interventions. ARP accesses diverse sources of information and is reliant on determining and understanding the physical condition of assets. This information is transformed into knowledge and actionable priorities by decision support tools such as CBRM. The outputs of these models are supplemented by the application of expert engineering judgements and verification by experienced field and specialist personnel who have detailed knowledge and experience of specific asset classes.

Where possible and available, standard information relevant to asset attributes and lifecycle information is stored in asset fleet strategies. These strategies recommend:

- the monitoring and inspections required to ascertain asset health, and
- asset specific considerations for the scope and timing of asset renewals.

Asset attribute and condition information, including the majority of inspection results and test data is predominantly recorded within Activa, Centralines' service providers current Enterprise Asset Management System (EAMS). This information supports the establishment of asset condition indices, which represents the likelihood of an asset failing within a given timeframe.

Another important risk factor to be considered is the consequence should an asset fail. A Consequence Framework has been developed which provides an output for each identified asset constraint and is combined with the likelihood factor (asset condition indices). This enables the establishment of a holistic risk assessment for each asset constraint, which facilitates the prioritisation of issues across the Asset Portfolio within the AMP. A risk cost can also be derived to support the justification of the work.

Centralines' has adopted Unison's **AMS-0003 AMS Risk Management Guidelines** which provides guidance to managing risk within the AMS. This document describes four key activities:

- identify risk
- analyse risk
- evaluate risk, and
- treat risk.

The ARP process is set out in Figure 5-4 and shows the mapping to AMS-0003 activities. Submitting asset risks to the AMP is not considered part of risk analysis but is an important part of the process that culminates in projects being developed and included in agreed AMP work programmes.

ARP has four key components:

- Asset Condition Analysis (identify risk)
- Asset Risk Analysis (analyse and evaluate risk)
- Solution Development (treat risk), and
- AMP Submission.

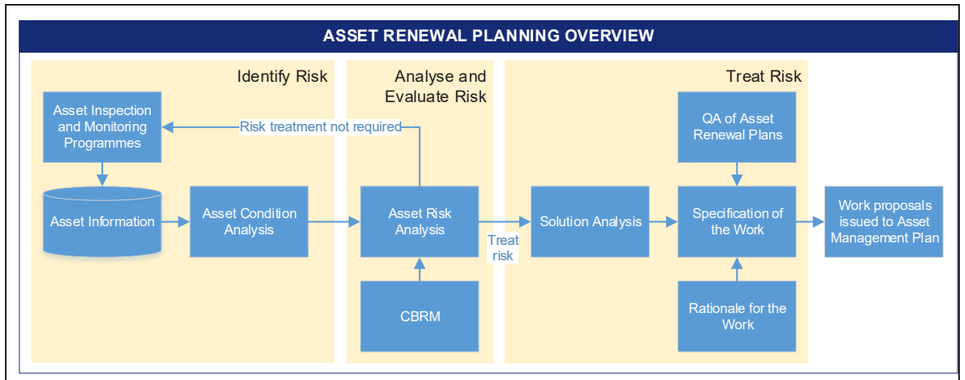


Figure 5-4: Asset Renewal Planning Process

5.4.3 Planned Improvements to ARP

It was recognised that current fleet strategy documentation is not comprehensive and requires improvement. Consequently, a capability project has been established to develop a template to aggregate and summarise fleet strategy information. This information is currently housed in disparate systems which can limit the ability for robust conversations between stakeholders and those responsible for management of the fleets when considering decisions for maintenance or renewal strategies. The solution is to be software based and dynamic, pulling information from various sources and summarised in a templated dashboard view which will be made available to all relevant stakeholders. The first stage of this capability project is to produce improved fleet strategies for cables, transformers and switchgear as well as a roadmap to cover all other major asset classes.

Activa is in the process of being replaced with One Energy. It is expected One Energy will consolidate information currently housed in various systems and spreadsheets resulting in an increase in the quality and accessibility of asset information. Mobile information gathering solutions will also be included which will increase efficiencies and reduce data errors. Many current continuous improvement opportunities in the CI register will be addressed by the implementation of One Energy.

5.4.4 Asset Condition Analysis

5.4.4.1 Purpose

The purpose of Asset Condition Analysis is to identify risks based on asset condition. On completion of the condition analysis, a likelihood of failure is derived which is used to rank assets based on condition within each asset class and across Centralines' Asset Portfolio.

5.4.4.2 Overview

Fundamental to ARP is the assessment of asset condition. Assets in poor condition have an increased likelihood of in-service failure, and therefore present an elevated risk to the business. Once identified, these assets are 'tagged' for replacement or corrective maintenance. This stage is completed by an Asset Engineer, aided by decision support tools such as Condition Based Risk Management (CBRM).

Figure 5-5 outlines the Asset Condition Analysis process.

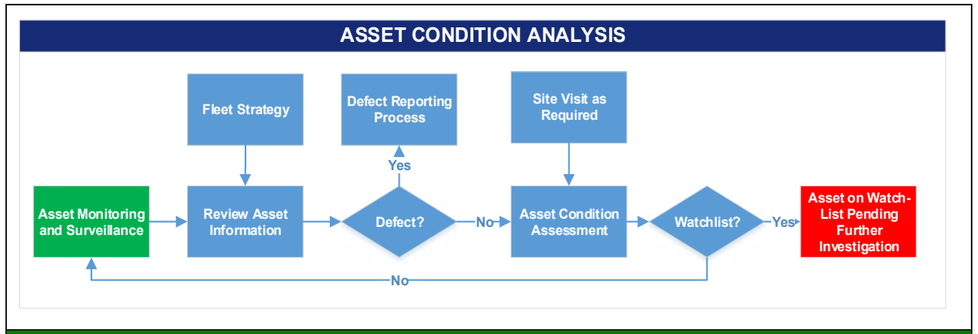


Figure 5-5: Asset Condition Analysis Process

Critical inputs to determine asset condition are:

- the asset's age, type, inspection/test results, work/defect, operational history, and
- any relevant environmental factors.

Figure 5-6 identifies the range of acceptable methodologies for performing Asset Condition Analysis to support ARP. Asset engineers are accountable for completing:

- the Asset Condition Analysis, and
- at least one of the methods below.

Where models or other decision support tools such as CBRM are available, these will be used and supplemented by field visits to verify constraints where applicable.

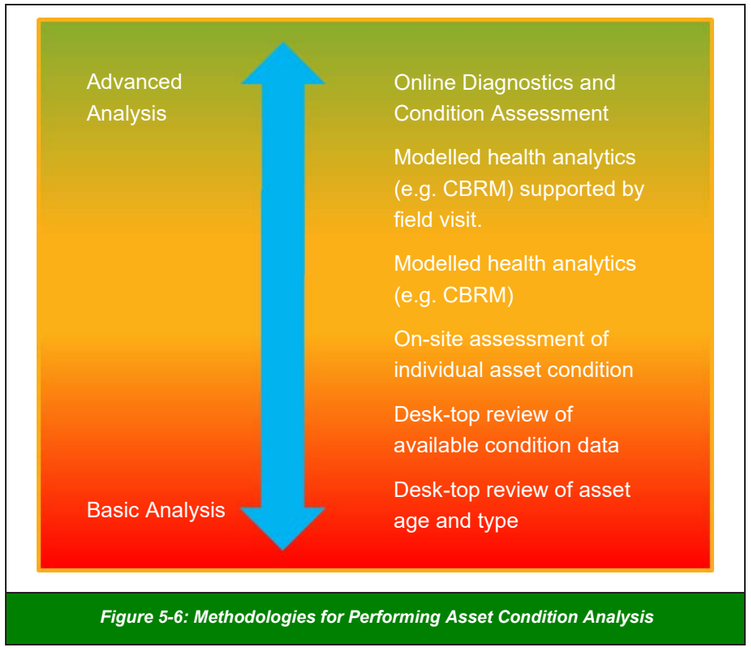


Figure 5-6: Methodologies for Performing Asset Condition Analysis

The output of the completed Asset Condition Analysis is an asset constraint/watchlist. The watchlist represents a formalised summary assessment on the condition of each asset determined by an asset engineer to have an unacceptably high risk of failure. It is a requirement that all assets within the same asset class are listed together to allow comparison between them. Each asset must display master and attribute data relevant to the completed condition assessment.

It must be demonstrable how asset condition information has been used to form the final condition assessment for each asset in the constraint/watchlist.

5.4.5 Asset Risk Analysis

5.4.5.1 Purpose

The purpose of Asset Risk Analysis is to determine the total asset risk. Asset risk is used to support the justification of assets for replacement and prioritise projects in the AMP.

5.4.5.2 Overview

Asset Risk Analysis involves determining the consequences of an asset failing in-service and combining this information with the likelihood (asset health indicator) of the asset failing to identify the total risk associated with the asset.

Where decision support models such as CBRM are used, likelihood and consequence outputs are mapped to the AMP Risk Schema 1-5 score and for asset classes where models are yet to be implemented, a subjective score is determined using the AMP risk schema definitions.

The output of the completed Asset Risk Analysis process is a total view of risk for each asset that:

- meets the requirements of the AMP, and
- provides sufficient detail to support the development and justification of proposals for work.

The key outcome of the Asset Risk Analysis process is the universal visualisation of asset risk (likelihood and consequence). This visualisation can be understood and utilised by the business to:

- compare work proposals, and
- promote and justify projects and programmes of work in the AMP.

5.4.6 Solution Development

5.4.6.1 Purpose

The purpose of solution development is to identify and articulate the preferred engineering solution to mitigate asset risk.

5.4.6.2 Overview

Solution development involves selecting an engineering solution (project) to mitigate asset risk as detailed in the Asset Risk Analysis process.

Solution development requires an understanding of the risk, the physical asset and its surrounds, awareness of all network constraints in the vicinity, available mitigation options, other planned work and the costs associated with any identified options.

The following are considered the minimum requirements for solution development as it is defined to support ARP. These steps are the accountability of the Solution Engineering Team, and all criteria must be met:

- a solution (project) is provided for each asset constraint on the watchlist with relevant project details (work specification, timing, budget, etc.), and
- a completed checklist containing evidence of the following considerations:
    - alternative solutions including new technology, refurbishment, relocation, retrofitting or derating and consideration if the asset is still required
    - stakeholder engagement and any requirements incorporated, e.g. network development, operational, protection, communications
    - contracting resource requirements
    - synergies and dependencies with all other identified network constraints in the vicinity, and
    - project risks.

The output of completed solution development is a proposal of work ready for submission to the AMP.

Key outcomes of the Solution Development process are:

- a list of optimal, integrated, documented solutions required to address known risks, and
- a business understanding of the required expenditure and resource levels to manage this risk.

5.4.7 Asset Renewal Planning Drivers

Asset renewal planning is undertaken to ensure that Centralines' assets can support the achievement of its AMOs.

Centralines' renewal drivers incorporate cost, risk and performance aspects. The challenge of quantifying and combining all relevant variables is in many cases complex. In practice, Centralines' renewal plan is regularly influenced by a combination of the drivers outlined in Table 5-5.

Centralines' Renewal Drivers
Reducing the likelihood of in-service failures (generally based on asset condition).
Mitigating or reducing the consequences and risks (staff and public safety, environmental, reputational damage, etc.) associated with an in-service failure and any cost-effective non-renewal mitigations that may be available.
Consideration of the availability and cost of spares and skilled resources.
The benefits of increased functionality, i.e. ability to provide network or asset condition information, etc., lower maintenance costs and increased performance of modern equivalents.
The difference in cost between a planned vs reactive asset replacement.
Synergies including both practical and economic considerations with other renewal projects which may result in the acceleration or deferral of asset renewals.
Integration synergies of asset renewal projects with other programmes of work including system growth, reliability, safety and environment and customer-driven projects.

Table 5-5: Centralines' Renewal Drivers

5.4.8 Renewal Expenditure Modelling Assumptions

The key assumptions underlying Centralines approach to modelling renewals are outlined in Table 5-6.

Renewal Expenditure Modelling Assumptions
Network assets become less reliable as they age.
There is a risk: Cost trade-off between replacing assets preventatively, i.e. pre-failure, and replacing assets reactively, i.e. post-failure.

Table 5-6: Renewal Expenditure Modelling Assumptions

5.4.9 Top-down Planning (Renewal Envelope)

Centralines uses the Renewal Envelope (RE) as a top-down budgeting tool to determine the optimal level of renewal relative to the total asset base. In practice, Centralines uses the RE each year to provide this top-down budget view which is then combined and compared with the bottom-up list of constraints (projects). An exercise is then undertaken as part of the asset management planning process to integrate and optimise these two views by balancing cost, risk and performance drivers in alignment with Centralines' Business and Asset Management Objectives.

The RE looks at individual assets extracted from Centralines' GIS and calculates a benefit:cost ratio of renewal for each year on the planning horizon. Where this ratio exceeds one, the asset is flagged for renewal. The benefit:cost ratio in turn is strongly dependent on the ratio of reactive to preventative replacement cost for assets, by asset class. A recent exercise in Centralines has seen key input data for the RE reviewed and updated, including reactive to preventative replacement cost ratios, replacement cost values and remaining life expectancies. The latter values were informed by all available information on asset condition.

The RE offers two additional modes of operation which are sometimes used for top-down renewal budgeting purposes, namely:

- fixed annual renewal investment, in which case the RE calculates the aggregate network remaining life expectancy over the planning horizon, and
- fixed aggregate remaining life expectancy for the network, in which case the RE calculates the annual renewal investment required over the planning horizon.

5.5 Asset Lifecycle Management by Asset Category

5.5.1 General Section Overview and Format

The assets which Centralines manages throughout their lifecycle are summarised in this section. The classes of assets covered in this section are listed in Table 5-7. These categories are consistent with the minimum requirements prescribed by the determination. Asset categories have been expanded in some instances to provide further clarity on lifecycle activities undertaken on groups of assets in each category.

Asset Class	Section Reference
Sub-transmission: 33kV Overhead Lines	5.7
Sub-transmission: 33kV Underground Cables	5.8
Zone Substation: Power Transformers	5.10
Zone Substation: 33kV Circuit Breakers	5.11
Zone Substation: 11kV Circuit Breakers and Switchboards	5.12
Zone Substation: Buildings	5.13
Zone Substation: Ripple Injection/Load Control Plants	5.14
Poles: All Voltages	5.15
Distribution and Low Voltage Overhead Lines	5.16
Distribution and Low Voltage Underground Cables	5.17
Distribution Transformers	5.18
Voltage Regulators	5.19
Overhead Distribution Switchgear	5.20
Ground Mounted Distribution Switchgear	5.21

Table 5-7: Asset Class Descriptions and Section References

Detailed information is provided on each of the above asset categories. Table 5-8 summarises the sub-sections included and describes the information provided under those sub-sections.

<table>
<tr><th>Sub-section Heading</th><th>Information Provided</th></tr>
<tr><td>Asset Group Category Description</td><td>Where a group of assets has been broken down, a general description of the high-level category is provided.</td></tr>
<tr><td>Asset Description and Quantity</td><td>Describes at a high-level each asset class, its function and voltage and provides details on the total number or length of assets included in the asset category.</td></tr>
<tr><td>Asset Condition and Performance</td><td>A high-level commentary is provided on the overall condition and performance of the asset category. Any systemic issues which have led to the premature replacement of assets are identified as well as mitigations to address these issues.</td></tr>
<tr><td>Asset Condition Assessment</td><td>For each asset category, the relevant excerpt from Schedule 12A has been included. This provides a general asset category condition overview based on 2020 information.
The condition grade of an asset is as described in the determination and detailed in the table below.
<table>
<tr><th>Condition Grade</th><th>Condition Description</th></tr>
<tr><td>H1</td><td>Replacement recommended.</td></tr>
<tr><td>H2</td><td>End of life drivers for replacement present, high asset related risk.</td></tr>
<tr><td>H3</td><td>End of life drivers for replacement present, increasing asset related risk.</td></tr>
<tr><td>H4</td><td>No drivers for replacement, normal in-service deterioration.</td></tr>
<tr><td>H5</td><td>As new condition – no drivers for replacement.</td></tr>
</table>
In addition, an assessment on the accuracy of the data used to grade the asset condition is included based on the determination descriptions in the table below.
<table>
<tr><th>Data Accuracy</th><th>Data Accuracy Description</th></tr>
<tr><td>1</td><td>Good quality data is not available for any of the assets in the category and estimates are likely to contain significant error.</td></tr>
<tr><td>2</td><td>Good quality data is available for some assets but not for others and the data provided includes estimates of uncounted assets within the category.</td></tr>
<tr><td>3</td><td>Data is available for all assets but includes a level of estimation where there is understood to be some poor-quality data for some of the assets within the category.</td></tr>
<tr><td>4</td><td>Good quality data is available for all of the assets in the category.</td></tr>
</table></td></tr>
</table>

Sub-section Heading	Information Provided
Asset Age Profiles	Asset age profile graphs based largely on 2019 disclosure information are included. These graphs identify the quantity or length of assets and their corresponding installation or manufacture dates. There may be minor differences between the disclosure information and the graphs provided. This is due to data improvements which have enhanced the accuracy of the original information.
Maintenance Plan	Centralines' general approach to inspecting and maintaining each asset category is outlined together with a detailed description of the types of inspections, tests, and condition monitoring undertaken including the frequency. It can be assumed for all asset classes that corrective maintenance is carried out on an 'as required' basis following condition monitoring, tests and inspections or as a result of Centralines' defect process.
Asset Replacement and Refurbishment	Renewal and refurbishment drivers are discussed.
Innovations	A description of any asset specific innovations that have deferred asset replacements is provided.
Controlled Documents	A table listing the relevant controlled documents for each asset class is provided in this sub-section. LCAM activities and tasks for each asset class are governed by a suite of controlled documents. These documents include design, construction and operational standards, service codes and procedures. They specify the asset specific requirements of tasks and activities that need to be undertaken throughout the lifecycle of the asset including the collection of relevant asset condition information.

Table 5-8: Asset Sub-Section Headings and Information Provided

5.6 Sub-transmission: Asset Group Overview

Centralines' sub-transmission network carries electricity from Transpower's Waipawa Grid Exit Point (GXP) in Ongaonga to Centralines' zone substations. This network also provides the interconnectivity between substations utilising a combination of predominantly overhead lines and some underground cables. Centralines' standard sub-transmission voltage is 33kV. Supply is also taken at 11kV (four feeders) directly from Transpower's Waipawa GXP.

Centralines has a number of 33kV sub-transmission lines and cables installed on Transpower sites. These assets are covered by Centralines' Access and Occupation Schedule Agreement which sets out the terms and conditions associated with Centralines' assets on Transpower sites.

5.7 Sub-transmission: 33kV Overhead Lines

5.7.1 Asset Description: 33kV Overhead Lines

Centralines' sub-transmission network incorporates 94 kilometres of 33kV overhead lines. These sub-transmission lines are predominately ACSR Dog (100mm^2) conductor with some copper conductor in zone substation switch yards.

5.7.2 Asset Condition and Performance: 33kV Overhead Lines

The overhead sub-transmission system is generally reliable, and current levels of maintenance are supporting favourable network performance. The relatively dry Central Hawke's Bay environment combined with low levels of airborne pollution provide for very low levels of natural degradation of the overhead network. The majority of the network is well insulated from the effects of coastal salt spray. No systemic issues have been identified with this asset class.

5.7.3 Asset Condition Assessment: 33kV Overhead Lines

Asset Type	Grade H1	Grade H2	Grade H3	Grade H4	Grade H5	Data Accuracy	% Forecast to be Replaced in next 5 Years
Sub-transmission: 33kV conductor			47%	47%	6%	2	

Table 5-9: Asset Condition Assessment: 33kV Overhead Lines

5.7.4 Asset Age Profile: 33kV Overhead Lines

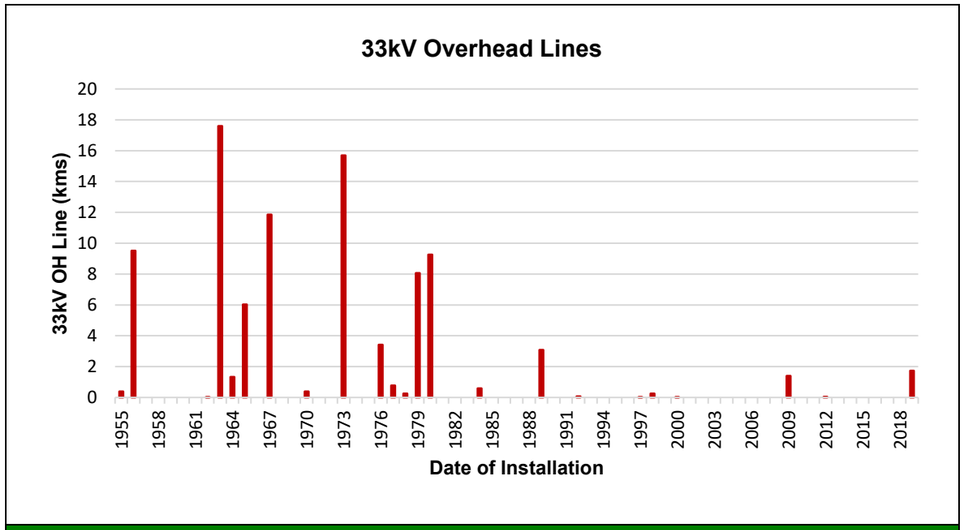


Figure 5-7: Asset Age Profile: 33kV Overhead Lines

5.7.5 Maintenance Plan: 33kV Overhead Lines

Centralines takes a proactive approach to inspecting and maintaining overhead sub-transmission lines. Table 5-10 details the maintenance undertaken on this asset class.

Condition Monitoring/Testing	Frequency
Aerial based visual inspection of all 33kV overhead lines.	Annually
Centralines' feeder surveys cover all overhead network assets and are a combination of aerial and ground based visual inspections depending on access and terrain.	5-year cycle

Table 5-10: Maintenance Plan: 33kV Overhead Lines

5.7.6 Asset Replacement and Refurbishment: 33kV Overhead Lines

33kV line renewals are primarily based on known asset condition. Current non-invasive technologies and methods to cost effectively and accurately determine the condition of overhead conductors are inconclusive and still evolving. Centralines will continue to work with the industry to develop and adopt best practice in this area. Current replacement and refurbishment drivers are outlined in Table 5-11.

Replacement/Refurbishment Drivers
• Asset condition based primarily on feeder inspection data. • Conductor type, design, age and criticality. • Historical conductor performance records and trend analysis. • Results of specially commissioned laboratory conductor analysis. • Specific asset location and environmental considerations. • Condition Based Risk Management (CBRM) is being used to inform and assist in the identification and prioritisation of sub-transmission conductor replacement programmes.

Table 5-11: Asset Replacement and Refurbishment Drivers: 33kV Overhead Lines

5.7.7 Controlled Documents: 33kV Overhead Lines

Controlled Document Reference	Controlled Document Description
NK1003	Vegetation Control Guidelines
NK3002	Line Design Loadings Standard
NK3019	Overhead Line Conductor and Fittings Standard
NK3022	Network Fusing Standard
NK3024	Overhead Line Standard Assemblies
NK3025	Overhead Line Design Standard
NK3030	Design Requirements for Public Safety
NK3041	Earth Manual — Standard Earths
NK5011	Inspection and Testing of Standard and SWER Earths
NK5020	Feeder Survey Condition Monitoring Standard
NK5080	Thermo-Vision Inspection Standard
NK5115	Re-Sagging Conductor Standard
NK5119	Basic Distribution Line Maintenance Standard
OS1004	Switching Instructions — Preparations and Approval
OS1006	Live Line Work Operational Practices
OS1014	Commissioning and Livening of Equipment Standard
OS1015	Defect Management Standard
SC5081	Service Code — Transmission Line Thermo-Vision Inspection
SOP-112	SOP — Testing Corrosion on Conductors

Table 5-12: Controlled Documents: 33kV Overhead Lines

5.8 Sub-transmission: 33kV Underground Cables

5.8.1 Asset Description: 33kV Underground Cables

The sub-transmission cable network consists of 1.8 kilometres of cross-linked polyethylene (XLPE) insulated, aluminium underground cable located at Transpower's Waipawa GXP, at the

- connection between the 33kV overhead network, and
- 33kV switchgear for Feeder Nine at the Waipawa Zone Substation, and
- railway crossing at Waipukurau on the Wilder Road 33kV circuit.

Sizes range from 35mm² to 400mm² and include both single and three core cables.

5.8.2 Asset Condition and Performance: 33kV Underground Cables

Centralines' sub-transmission underground cable is in good condition and no systemic issues have been identified.

5.8.3 Asset Condition Assessment: 33kV Underground Cables

Asset Type	Grade H1	Grade H2	Grade H3	Grade H4	Grade H5	Data Accuracy	% Forecast to be Replaced in next 5 Years
Sub-transmission: 33kV XLPE cable					100%	3	

Table 5-13: Asset Condition Assessment: 33kV Underground Cables

5.8.4 Age Profile: 33kV Underground Cables

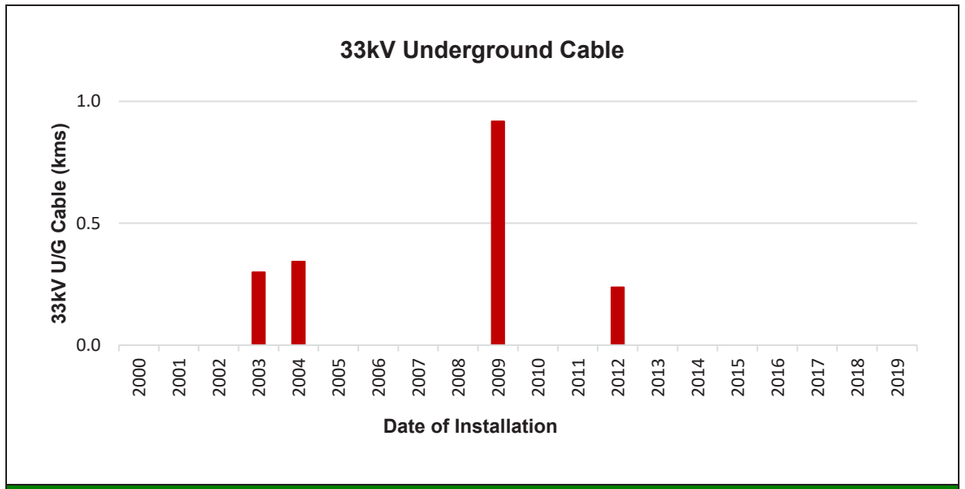


Figure 5-8: Asset Age Profile: 33kV Underground Cables

5.8.5 Maintenance Plan: 33kV Underground Cables

Table 5-14 details the maintenance undertaken on 33kV cables.

Condition Monitoring/Testing	Frequency
Visual inspections, corona detection, thermo scanning and non-invasive partial discharge testing of 33kV cable terminations within zone substations.	Annually
Aerial based visual inspection of all above ground 33kV cabling including pole cable risers and terminations.	Annually
Visual inspection of accessible, above ground cabling including pole cable risers as part of overhead line feeder surveys.	5-year cycle
Diagnostic cable testing is currently being undertaken on 33kV underground cables to determine baseline condition for future comparison and to determine frequency for future testing.	TBD

Table 5-14: Maintenance Plan: 33kV Underground Cables

5.8.6 Asset Replacement and Refurbishment: 33kV Underground Cables

Due to the 33kV sub-transmission cable on the Centralines' network being reasonably new and in good condition, no cable replacements are planned in the current RAMP planning period. Any future 33kV cable renewals will be based on the drivers detailed in Table 5-15.

Replacement/Refurbishment Drivers
• Cable type, design, age and criticality.
• Historical cable performance records and trend analysis.
• Asset condition based on diagnostic test results and inspection data.
• Condition Based Risk Management (CBRM) to be introduced in future to inform and assist in the identification and prioritisation of sub-transmission cable replacement programmes.

Table 5-15: Asset Replacement and Refurbishment Drivers: 33kV Underground Cables

5.8.7 Controlled Documents: 33kV Underground Cables

Controlled Document Reference	Controlled Document Description
NK3001	Underground Design Standard
NK3022	Network Fusing Standard
NK3023	Underground Cable Specifications and Standards
NK3030	Design Requirements for Public Safety
NK3040	Earthing — Engineering Principles
NK3041	Earthing Manual — Standard Earths
NK4001	Underground Construction Standard
NK4015	Underground Cable Installation
NK4020	Cable Testing Standard
NK5011	Inspection and Testing of Standard and SWER Earths
NK5020	Feeder Survey Condition Monitoring Standard
NK6103	Material Specification — Polymeric Insulated HV Cable
NK8001	Current Ratings of Cables
OS1004	Switching Instructions — Preparations and Approval
OS1014	Commissioning and Livening of Equipment Standard
OS1015	Defect Management Standard
OS1016	Close Approach Consent Process

Controlled Document Reference	Controlled Document Description
SC4022	Service Code — Cable Insulation Resistance Test
SC4023	Service Code — Cable Sheath Test
SC4024	Service Code — Cable VLF Test
SC4025	Service Code — Cable Tan Delta Test
SC4026	Service Code — New Cable Acceptance Test
SC4027	Service Code — Testing New Cables
SC4028	Service Code — Condition Monitoring In-Service Cables
SOP-101	SOP — Identifying HV Cables prior to Spiking

Table 5-16: Controlled Documents: 33kV Underground Cables

5.9 Zone Substations: Asset Group Overview

Zone substations encompass a range of network assets including buildings, power transformers, 33kV and 11kV switchgear, load control plant and associated control, protection and communications equipment. The key function of a zone substation is to house the required network assets to convert sub-transmission voltage (33kV) to distribution voltage (11kV), allowing the safe and efficient distribution of electricity to Centralines' customers. Centralines has four zone substations situated at Waipukurau, Waipawa, Takapau and Wilder Road as well as an 11kV switching station (four, pole mounted reclosers and two, ring main units) outside Transpower's Waipawa GXP.

5.10 Zone Substation: Power Transformers

5.10.1 Asset Description: Zone Substation Power Transformers

Power transformers convert the 33kV sub-transmission voltage to 11kV which is more suitable for network distribution. They are filled with mineral insulating oil which provides both insulation and cooling for the transformer. Transformer cooling is enhanced by cooling fans fitted to radiators and some transformers also have oil pumps to more effectively circulate the oil to increase the transformer's rating. All Centralines' substations incorporate bunded transformer foundations to mitigate failures which may result in significant oil spills.

Substation power transformers typically include an automatic on-load tap changer which maintains the output voltage within defined limits. Most of the older tap changers operate in a separate oil filled compartment within the transformer. As the tap changer operates to keep the output voltage constant, the contacts arc in the oil and therefore the oil and the contacts require frequent maintenance. Modern transformers are supplied with vacuum insulated tap changers which are virtually maintenance free.

Centralines has a total of seven three phase power transformers. The two power transformers installed at each of the Waipukurau, Waipawa and Takapau zone substations are all rated at 7.5MVA, with a single 2MVA transformer installed at the Wilder Road site.

5.10.2 Asset Condition and Performance: Zone Substation Power Transformers

Centralines' fleet of power transformers are relatively modern or have been fully refurbished. Both transformers at Waipukurau were manufactured in 2007. The transformers at Takapau were manufactured in 1977 and were fully refurbished in 2009. The Waipawa transformers were manufactured in 1965 and were fully refurbished in 2010, and the Wilder Road unit was manufactured and installed in 1994.

Effective condition monitoring, maintenance and load management practices over the years have ensured they all remain in good condition and are providing reliable performance.

5.10.3 Asset Condition Assessment: Zone Substation Power Transformers

Asset Type	Grade H1	Grade H2	Grade H3	Grade H4	Grade H5	Data Accuracy	% Forecast to be Replaced in next 5 Years
Zone Substation: Power Transformers			14.3%		85.7%	4	

Table 5-17: Asset Condition Assessment: Zone Substation Power Transformers

5.10.4 Asset Age Profile: Zone Substation Power Transformers

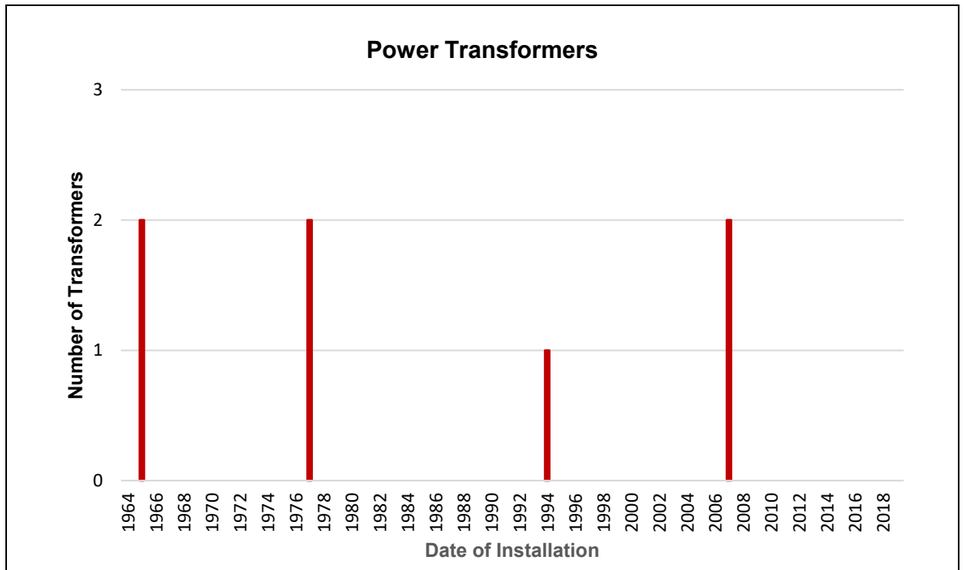


Figure 5-9: Asset Age Profile: Zone Substation Power Transformers

5.10.5 Maintenance Plan: Zone Substation Power Transformers

Due to the criticality of these assets, Centralines employs a range of inspection, testing, condition monitoring and maintenance programmes to ensure this asset fleet continues to perform reliably.

This includes dielectric frequency response testing which measures the amount of moisture in transformer winding paper insulation. If not remedied, high moisture levels can reduce the dielectric strength or accelerate the aging of the cellulose, and lead to eventual failure. In addition, dynamic resistance testing of selected tap changers is carried out to test for abnormal or high resistance connections.

Oil samples are taken from each transformer annually for analysis. Dissolved Gas Analysis (DGA) testing is providing information on any build-up of dissolved gases. Furan Analysis is also undertaken to enable an estimation of the degree of polymerisation (DP) of insulation paper in Centralines' transformers.

Table 5-18 details the maintenance activities currently undertaken on power transformers.

Condition Monitoring/Testing	Frequency
Detailed visual inspection looking for oil leaks or any unusual noises or vibration etc. This inspection also includes minor maintenance work including silica gel checks, tap changer operational checks and counts. This maintenance occurs weekly at the three major substations and monthly at Wilder Road.	Weekly
Preventative maintenance on power transformers and associated protective devices (Buchholz relays and temperature sensors) including insulation resistance and dielectric frequency response testing.	2-year cycle
Preventive maintenance is undertaken on all tap changers with frequency dependent on the make, type, age, switching insulation medium and OEM specifications. Turns ratio testing post maintenance.	2-10-year cycle
Detailed DGA and oil condition tests including moisture, acidity and dielectric breakdown is undertaken at least annually. More frequent sampling can be carried out subject to any suspected fault within a specific transformer.	As required but at least annually
Furan Analysis to estimate degree of polymerisation (DP) of paper insulation.	2-year cycle
Inspection of transformer and conductor terminations using thermo-vision, and corona cameras and partial discharge sensing technology.	Annually

Table 5-18: Maintenance Plan: Zone Substation Power Transformers

5.10.6 Asset Replacement and Refurbishment: Zone Substation Power Transformers

Given the age profile and based on the current condition of the Centralines' power transformers, there are no planned replacements in the current RAMP planning period. Current and future replacement and refurbishment drivers are outlined in Table 5-19.

Replacement/Refurbishment Drivers
• Transformer age, criticality and asset condition based on diagnostic test results and inspection data. • DGA oil results and outputs of Furan Analysis. • Historical transformer performance records and trend analysis. • DP test results. • The Condition Based Risk Management (CBRM) model to be introduced in future to inform and assist in the identification and prioritisation of transformer replacement programmes.

Table 5-19: Asset Replacement and Refurbishment Drivers: Zone Substation Power Transformers

5.10.7 Controlled Documents: Zone Substation Power Transformers

Controlled Document Reference	Controlled Document Description
NK3030	Design Requirements for Public Safety
NK3050	Zone Substation General Specifications Standard
NK4011	Substation Equipment Installation Standard
NK4013	Pre-Commissioning of Substation Assets Standard
NK4020	Cable Testing Standard
NK5012	Station Level 1 Inspections
NK5013	Station Level 2 Inspections
NK5035	Station Outdoor Instrument Transformer Maintenance Standard
NK5042	Power Transformer Maintenance Standard
NK5043	Insulating Oil Maintenance Standard
OS1013	Station Entry Procedure
OS1014	Commissioning and Livening of Equipment
OS1015	Defect Management Standard
SC2020	Service Code — Transformer Service and Diagnostic Test
SC2021	Service Code — Standard Tap Changer Service
SC2022	Service Code — Special Tap Changer Service
SC2023	Service Code — Transformer Winding Insulation Test
SC2024	Service Code — Transformer Cable Insulation Test
SC2025	Service Code — Transformer DGA and Insulating Oil Test
SC2050	Service Code — Dielectric Breakdown Oil Test
SC2051	Service Code — Acidity Test
SC2052	Service Code — Dissolved Gas Analysis
SC2070	Service Code — Instrument Transformer Service Check Sheet
SOP-10	SOP — Establishing a Permit Area in a Zone Substation

Table 5-20: Controlled Documents: Zone Substation Power Transformers

5.11 Zone Substation: 33kV Circuit Breakers

5.11.1 Asset Description: 33kV Circuit Breakers

Circuit breakers are automatically operated electrical switches. They are designed to interrupt electrical power circuits thus protecting upstream and downstream electrical assets from damage as a result of a shorted or overloaded circuit. Additionally, they ensure the safety of the public and utility employees and provide electrical discrimination on the network reducing the outage impact of faults.

Their basic function is to interrupt power by an initiated control command or automatically by protective sensing devices that detect abnormal or fault conditions. They are designed to interrupt circuits repeatedly and safely both under normal load and fault conditions. A circuit breaker can be reset manually or automatically (and remotely) to resume normal operation after a fault and they can be programmed to auto-reclose under certain circumstances.

Centralines has standardised on 33kV circuit breakers that use sulphur hexafluoride (SF_6) gas as the contact arc quenching medium. Centralines has ten in-service sub-transmission outdoor 33kV circuit breakers, all of which use SF_6 gas as the arc suppressing insulating medium.

5.11.2 Asset Condition and Performance: 33kV Circuit Breakers

Centralines' modern fleet of outdoor 33kV circuit breakers are in good condition with no systemic issues being identified.

5.11.3 Asset Condition Assessment: 33kV Circuit Breakers

Asset Type	Grade H1	Grade H2	Grade H3	Grade H4	Grade H5	Data Accuracy	% Forecast to be Replaced in next 5 Years
Zone substation: 33kV Outdoor CBs					100%	4	

Table 5-21: Asset Condition Assessment: 33kV Circuit Breakers

5.11.4 Asset Age Profile: 33kV Circuit Breakers

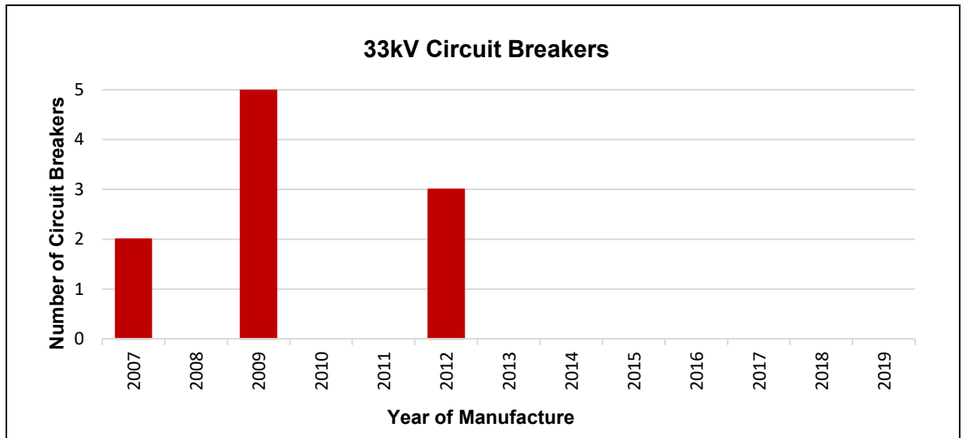


Figure 5-10: Asset Age Profile: 33kV Circuit Breakers

5.11.5 Maintenance Plan: 33kV Circuit Breakers

To ensure reliability, 33kV circuit breakers are subject to a cyclic maintenance programme based on OEM recommendations, industry practice and Centralines' own engineering judgement and operational experience.

Table 5-22 outlines Centralines' current maintenance programme for 33kV circuit breakers.

Condition Monitoring/Testing	Frequency
Visual inspection of all 33kV substation circuit breakers including operational counter checks and any required minor maintenance.	Weekly
Routine inspection, testing and servicing including diagnostic tests and functional operational checks. These encompass cleaning, Ductor^{TM} testing, insulation resistance, circuit breaker timing tests and checking the contact erosion indicators.	Every 3 years
Thermo-vision, corona and partial discharge testing of circuit breakers.	Annually

Table 5-22: Asset Replacement and Refurbishment Drivers: 33kV Circuit Breakers

5.11.6 Asset Replacement and Refurbishment: 33kV Circuit Breakers

Due to the age and condition of this asset fleet, there are no scheduled replacements for the current RAMP planning period. Future replacement and refurbishment drivers are outlined in Table 5-23.

Replacement/Refurbishment Drivers
• Circuit breaker, design, insulating medium, age, condition and criticality. • Historical circuit breaker performance records and trend analysis. • Diagnostic circuit breaker testing. • Health and safety and environmental considerations. • The Condition Based Risk Management (CBRM) model will be introduced in future to inform and assist in the identification and prioritisation of replacement programmes.

Table 5-23: Asset Replacement and Refurbishment Drivers: 33kV Circuit Breakers

5.11.7 Controlled Documents: 33kV Circuit Breakers

Controlled Document Reference	Controlled Document Description
NK3001	Underground Design Standard
NK3030	Design Requirements for Public Safety
NK3040	Earthing — Engineering Principles
NK3041	Earthing Manual — Standard Earths
NK3050	Zone Substation General Specifications Standard
NK4011	Substation Equipment Installation Standard
NK4013	Pre-Commissioning of Substation Assets Standard
NK4020	Cable Testing Standard
NK5012	Station Level 1 Inspections
NK5013	Station Level 2 Inspections
NK5043	Outdoor Circuit Breaker Maintenance Standard
NK5070	Sulphur Hexafluoride (SF_6) Use and Handling Procedures
OS1013	Station Entry Procedure
OS1015	Defect Management Standard
SC2010	Service Code — Outdoor Circuit Breaker Minor Service
SC2013	Service Code — Outdoor SF_6 Circuit Breaker Service

Controlled Document Reference	Controlled Document Description
SOP-10	SOP — Establishing a Permit Area in a Zone Substation
SOP-33	SOP — Areva GL107 Outdoor Circuit Breaker

Table 5-24: Controlled Documents: 33kV Circuit Breakers

5.12 Zone Substation: 11kV Circuit Breakers and Switchboards

5.12.1 Asset Description: 11kV Circuit Breakers and Switchboards

Refer to the asset description for 33kV circuit breakers for details of the function of this asset class.

Centralines has a total of 27 indoor, ground mounted, 11kV circuit breakers installed in zone substations. In addition, there are two pole mounted outdoor units installed at the Wilder Road site. These circuit breakers use either oil or a vacuum as the contact breaking medium.

5.12.2 Asset Condition and Performance: 11kV Circuit Breakers and Switchboards

Centralines' fleet of 11kV substation circuit breakers is generally in good condition. The main condition and performance issues being experienced relate to the deterioration and wear of contacts and mechanical mechanisms and the ongoing requirement for oil treatment in older units.

There are no current systemic issues that have been identified with this asset class. However, it is acknowledged that older indoor oil circuit breakers:

- are maintenance intensive
- have lower fault current ratings, and
- present elevated risks due to the oil and lack of arc flash containment and protection.

Operationally the circuit breakers have been loaded well below their capacity limits and are maintained under a comprehensive maintenance programme. This has ensured ongoing, reliable performance.

5.12.3 Asset Condition Assessment: 11kV Circuit Breakers and Switchboards

Asset Type	Grade H1	Grade H2	Grade H3	Grade H4	Grade H5	Data Accuracy	% Forecast to be Replaced in next 5 Years
ZS: 11kV Ground Mounted CBs		3.7%	44.4%	18.5%	33.4%	4	33.3%
ZS: 11kV Pole Mounted CBs					100%	4	

Table 5-25: Asset Condition Assessment: 11kV Circuit Breakers and Switchboards

5.12.4 Asset Age Profile: 11kV Circuit Breakers and Switchboards

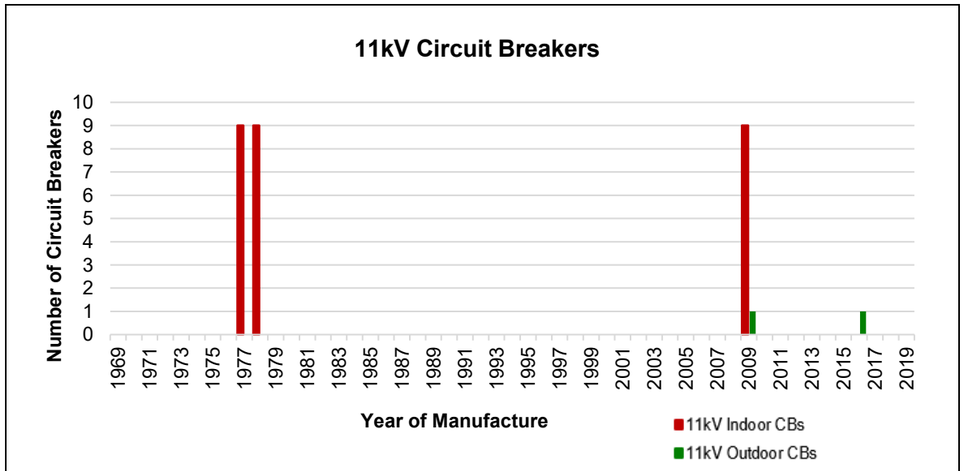


Figure 5-11: Asset Age Profile: 11kV Circuit Breakers and Switchboards

5.12.5 Maintenance Plan: 11kV Circuit Breakers and Switchboards

To ensure reliability, 11kV circuit breakers and switchboards are subject to a cyclic maintenance programme based primarily on the breaking medium (oil or vacuum), OEM recommendations, industry practice and Centralines' own engineering judgement and operational experience. The number of fault operations for oil-insulated circuit breakers, and the location and criticality of the circuit breaker, also influence maintenance practices.

Oil circuit breakers require more intensive maintenance than vacuum insulated circuit breakers because insulating oil in circuit breakers is at risk of contamination from carbon deposits as a result of breaking fault currents and from moisture ingress.

Table 5-26 outlines Centralines' current maintenance programme for 11kV circuit breakers.

Condition Monitoring/Testing	Frequency
Visual condition assessment and asset inspection of all substation circuit breakers including operational counter checks and minor maintenance.	Weekly
Routine inspection, testing and servicing including diagnostic tests and functional operational checks. These encompass cleaning, Ductor™ testing, insulation resistance and circuit breaker timing tests and oil voltage breakdown tests. Vacuum – including checking the contact erosion indicators. Oil – including oil testing and invasive maintenance to inspect the condition of contacts. Oil – fault service.	 Every 3 years Every 2 years After every fault operation
Thermo-vision, corona and partial discharge inspection of outdoor circuit breakers.	Annually
Non-invasive partial discharge testing of indoor circuit breakers.	1 – 2-year cycle depending on previous test results.

Table 5-26: Maintenance Plan: 11kV Circuit Breakers and Switchboards

5.12.6 Asset Replacement and Refurbishment: 11kV Circuit Breakers and Switchboards

Circuit breakers are critical assets and must be replaced if there is an unacceptable risk of an in-service failure due to any factors including deterioration in asset condition. While typically Centralines' 11kV circuit breakers are in good condition, it is currently planned to replace the Waipawa indoor 11kV switchboard and protection relays commencing in the 2025/26 financial year. Current replacement and refurbishment drivers are outlined in Table 5-27.

Replacement/Refurbishment Drivers
• Circuit breaker design, age, insulating medium, condition and criticality. • Historical circuit breaker performance records and trend analysis. • Health and safety considerations. • Current and future maintenance requirements. • Protection considerations. • Availability of spare parts. • Diagnostic circuit breaker testing. • Functionality. • Synergies with other asset replacement or augmentation projects.

Replacement/Refurbishment Drivers
• Specific circuit breaker location and environmental considerations. • The Condition Based Risk Management (CBRM) model will be introduced in future to inform and assist in the identification and prioritisation of replacement programmes.

Table 5-27: Asset Replacement and Refurbishment Drivers: 11kV Circuit Breakers and Switchboards

5.12.7 Controlled Documents: 11kV Circuit Breakers and Switchboards

Controlled Document Reference	Controlled Document Description
NK3001	Underground Design Standard
NK3030	Design Requirements for Public Safety
NK3040	Earthing — Engineering Principles
NK3041	Earthing Manual — Standard Earths
NK3050	Zone Substation General Specifications Standard
NK4011	Substation Equipment Installation Standard
NK4013	Pre-Commissioning of Substation Assets Standard
NK4020	Cable Testing Standard
NK5012	Station Level 1 Inspections
NK5013	Station Level 2 Inspections
NK5038	Metalclad Switchgear Maintenance Standard
NK5043	Insulating Oil Maintenance Standard
OS1013	Station Entry Procedure
OS1015	Defect Management Standard
SC2000	Metalclad Switchgear — Minor Service of Oil Circuit Breakers
SC2001	Metalclad Switchgear — Oil Circuit Breaker Service
SC2002	Metalclad Switchgear — Oil Circuit Breaker Fault Service
SC2004	Metalclad Switchgear — Vacuum Circuit Breaker Service
SC2050	Service Code — Dielectric Breakdown Voltage Test
SC2051	Service Code — Acidity Test
SC2052	Service Code — Dissolved Gas Analysis
SOP-10	SOP — Establishing a Permit Area in a Zone Substation
SOP-21	SOP — AEI/GEC BVP Oil Indoor Circuit Breaker
SOP-25	SOP — Reyrolle Pacific ROS LMVP Indoor Circuit Breaker

Table 5-28: Controlled Documents: 11kV Circuit Breakers and Switchgear

5.13 Zone Substation: Buildings

5.13.1 Asset Description: Zone Substation Buildings

Zone substation 'buildings' include grounds and buildings utilised to securely house the range of electrical and non-electrical equipment required for a fully functional zone substation. Centralines has four zone substations situated at Waipukurau, Waipawa, Takapau and Wilder Road, and with the exception of Wilder Road, all have buildings.

5.13.2 Asset Condition and Performance: Zone Substation Buildings

Following the Canterbury earthquakes and the learnings from this event, a substation building, seismic strengthening programme was completed to strengthen all Centralines' substation buildings to building importance level four of the new building standard. This category relates to structures with special post-disaster recovery functions.

5.13.3 Asset Condition Assessment: Zone Substation Buildings

Asset Type	Grade H1	Grade H2	Grade H3	Grade H4	Grade H5	Data Accuracy	% Forecast to be Replaced in next 5 Years
Zone Substation Buildings				33%	67%	3	

Table 5-29: Asset Condition Assessment: Zone Substation Buildings

5.13.4 Asset Age Profile: Zone Substation Buildings

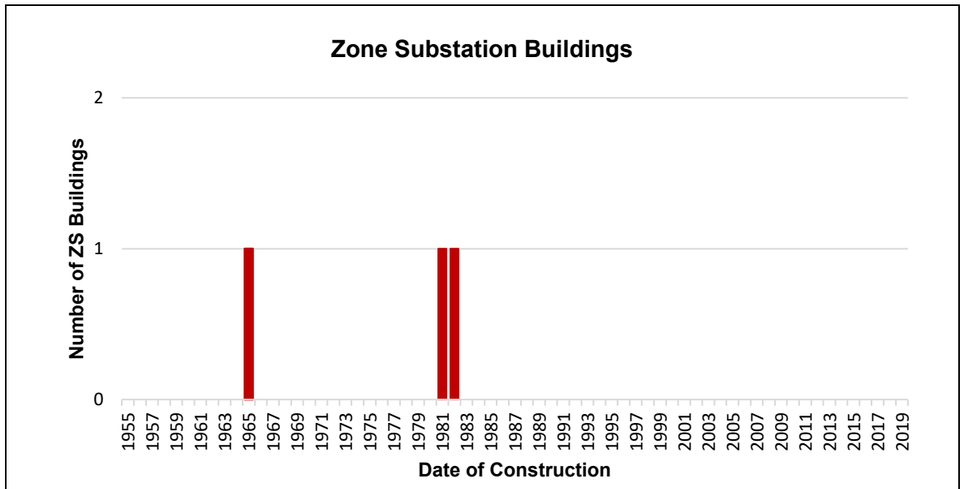


Figure 5-12: Asset Age Profile: Zone Substation Buildings

5.13.5 Maintenance Plan: Zone Substation Buildings

Buildings, fences and grounds are regularly inspected to ensure they remain in good condition in order to maintain site security and asset integrity. Centralines' maintenance standards provide detailed requirements for substation inspections including buildings and other asset condition monitoring, and inspections as described in other sections. Regular maintenance is undertaken to ensure the integrity of Centralines' substation buildings.

It is planned, starting with Waipukurau in the 2021/22 financial year, to upgrade zone substation security. This will include the installation of electric locks controlled by Centralines' personal access cards and codes. This will provide real time information to Centralines' Management service provider's Network Operations Centre (NOC) operators on the personnel accessing substations. The upgrade would also include a new standard substation lock and security system.

Condition Monitoring/Testing	Frequency
A security and detailed visual inspection including any required minor maintenance and housekeeping is completed weekly at all substations (except Wilder Road which is done monthly) to ensure the integrity and security of the substation.	Weekly

Table 5-30: Maintenance Plan: Zone Substation Buildings

5.13.6 Asset Replacement and Refurbishment: Zone Substation Buildings

There are no substation building replacements scheduled during the current RAMP planning period. Current replacement drivers are detailed in Table 5-31.

Replacement/Refurbishment Drivers
• Seismic considerations. • Building code requirements. • Age, condition and criticality. • Health and safety considerations. • Current and future maintenance requirements.

Table 5-31: Asset Replacement and Refurbishment Drivers: Zone Substation Buildings

5.13.7 Controlled Documents: Zone Substation Buildings

Controlled Document Reference	Controlled Document Description
NK1011	Asset Change and As-Built Drawing Documentation Standard
NK1402	Substation Draughting and Records Guidelines
NK3030	Design Requirements for Public Safety
NK3040	Earthing — Engineering Principles
NK3050	Zone Substation General Specification Standard
NK4001	Underground Construction Standard
NK5012	Station Level 1 Inspections
NK5013	Station Level 2 Inspections
NK5014	Substation Grounds Maintenance Standard
NK5023	Substation Control Indication and Alarm Testing Standard
NK5028	Substations Communications Equipment Maintenance Standard
OS1013	Station Entry Procedures
SC4010	Service Code — Substation Control Indication and Alarm Test
SC5500	Service Code — General Communications Equipment Inspection
SC5502	Service Code — Station VHF SCADA Equipment Inspection

Table 5-32: Controlled Documents: Zone Substation Buildings

5.14 Zone Substation: Ripple Injection/Load Control Plants

5.14.1 Asset Description: Ripple Injection/Load Control Plants

A load control ripple injection plant is used within the network to provide load control and management functions for various types of equipment. Load management allows utilities to reduce demand for electricity during peak times, which can in turn defer asset capacity upgrades. Equipment controlled includes:

- customer hot water and heating systems
- Council owned security, street and under-verandah lighting.

Centralines has one ripple injection plant operating on its network. This plant injects a high frequency signal which is superimposed over the high voltage network. This signal can be received by specially tuned relays in the low voltage network to provide specific control activities. The plant consists of:

- a solid state 400-volt frequency generator
- high voltage coupling equipment consisting of voltage transformers and capacitors to tune and inject the frequency signal into the network, and
- control and signal equipment that provides the controls and functions for the signals.

Across its network footprint, Centralines injects a frequency of 475 Hz onto the 33kV network.

Centralines own a number of network load control ripple relay receivers which predominantly control hot water pilot and street lighting. Centralines however does not own ripple control receivers on customer switchboards, and therefore has limited ability to control their installation and maintenance.

5.14.2 Asset Condition and Performance: Ripple Injection/Load Control Plants

The plant was installed new in 2012/13 and is being regularly maintained. Its condition and performance are excellent.

5.14.3 Asset Condition Assessment: Ripple Injection/Load Control Plants

Asset Type	Grade H1	Grade H2	Grade H3	Grade H4	Grade H5	Data Accuracy	% Forecast to be Replaced in next 5 Years
Load Control Plant					100%	4	

Table 5-33: Asset Condition Assessment: Ripple Injection/Load Control Plants

5.14.4 Asset Age Profile: Ripple Injection/Load Control Plants

Centralines has only one ripple injection plant which is located at the Waipukurau Zone Substation. The plant was purchased from the retailer Meridian in 2011/12 and subsequently replaced in 2012/13.

5.14.5 Maintenance Plan: Ripple Injection/Load Control Plant

Centralines' ripple plant is subject to weekly and annual maintenance regimes. Routine inspection of the load control plant is scheduled in conjunction with weekly zone substation maintenance. Annual maintenance is sub-contracted to Landis+Gyr (L+G).

Load control relays in the field are subject to reactive maintenance only. Current ripple plant maintenance is outlined in Table 5-34.

Condition Monitoring	Frequency
A security and functional check of the ripple plant is undertaken as part of weekly substation inspections.	Weekly
Centralines' ripple plant is maintained annually as part of the Landis+Gyr maintenance contract and includes general maintenance and signal strength and capacitor testing.	Annually

Table 5-34: Maintenance Plan: Ripple Injection/Load Control Plant

5.14.6 Asset Replacement and Refurbishment: Ripple Injection/Load Control Plant

Due to this asset being reasonably new, there is no plan to replace it during the current RAMP planning period. Future replacement drivers for and influences on ripple injection and load control plan are outlined in Table 5-35.

Replacement/Refurbishment Drivers
• Asset condition based primarily on inspections and factoring in asset age, criticality, capacity and functionality. • Historical performance. • Availability of spare parts. • Equipment obsolescence.

Table 5-35: Asset Replacement and Refurbishment Drivers: Ripple Injection/Load Control Plant

5.14.7 Controlled Documents: Ripple Injection/Load Control Plant

Controlled Document Reference	Controlled Document Description
NK3021	Hot Water, Street Light and Ripple Control Systems Standard
NK3030	Design Requirements for Public Safety
NK5024	Ripple Plant Inspection and Maintenance Standard
OS1014	Commissioning and Livening of Equipment
OS1015	Defect Management Standard
SC4040	Service Code — Ripple Station Inspection Check Sheet Level 2
SC4041	Service Code — Master Station FPR Maintenance
SC4042	Service Code — Ripple Plant Maintenance

Table 5-36: Controlled Documents: Ripple Control/Load Control Plant

5.15 Poles: All Voltages

5.15.1 Asset Description: Poles

Poles are physical structures used to keep overhead electrical conductors and ancillary equipment a safe distance from each other and from the ground. They are typically made of wood or concrete with a relatively small number manufactured from steel and composite materials. Poles are available in a range of sizes and strengths to cater for site specific requirements factoring in variables such as terrain, required electrical clearances, and the mechanical load (weight, angle and tensions) of conductors and ancillary equipment they need to support.

Centralines has standardised on Busck concrete poles for use on its network. Centralines has approximately 19,650 network poles which are predominantly concrete.

Pole Type	Number
Wood	101
Concrete	19,643

Table 5-37: Pole Types and Numbers

5.15.2 Asset Condition and Performance: Poles

Concrete poles continue to perform reasonably well in the relatively dry Central Hawke's Bay environment. While there have been very few in-service failures, recent inspections have identified approximately 150 poles, on two 11kV feeders, with various degrees of spalling. These poles will need to be replaced and a prioritised replacement plan is being developed and inspection regimes reviewed to ensure this risk is appropriately managed. Historical pole related information is also being examined to try and determine any factors which may be contributing to the accelerated deterioration of these poles concrete.

Systemic Issues	Mitigation
There have been some recent issues of concrete spalling on poles in coastal areas. This occurs when salt corrodes internal metal reinforcing causing the surrounding concrete to break away.	There is no mitigation for spalling. Poles are replaced once it is identified and prior to the structural integrity of the pole being compromised.

Table 5-38: Systemic Issues and Mitigations: Poles

5.15.3 Asset Condition Assessment: Poles

Asset Type	Grade H1	Grade H2	Grade H3	Grade H4	Grade H5	Data Accuracy	% Forecast to be Replaced in next 5 Years
Poles: Concrete and steel structures		0.5%	32.25%	32.25%	33%	3	2%
Poles: Wooden		18%	38%	38%	6%	3	20%

Table 5-39: Asset Condition Assessment: Poles

5.15.4 Age Profile: Poles

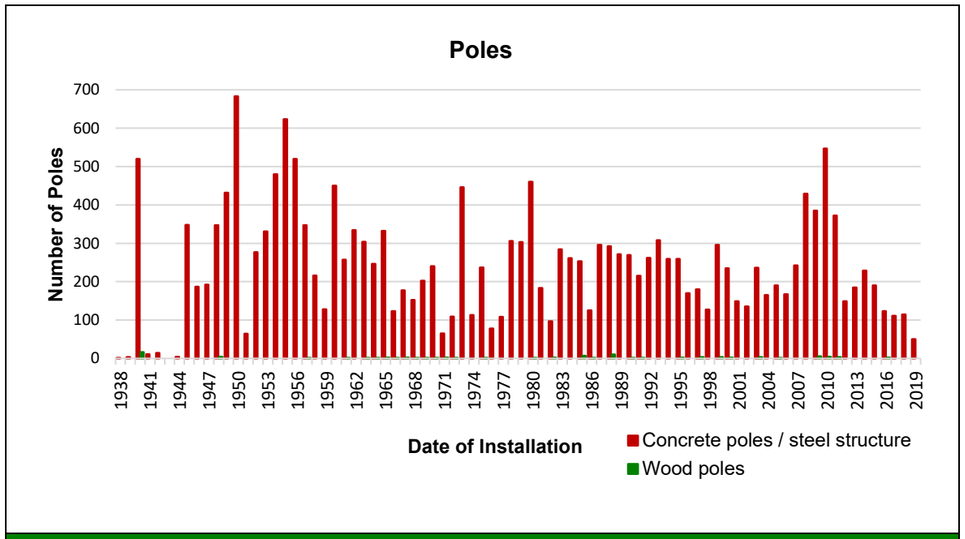


Figure 5-13: Age Profile: Poles

5.15.5 Maintenance Plan: Poles

Safety risks posed to the public and employees by pole failures are recognised by Centralines as significant. Therefore, pole assets are proactively inspected at regular intervals and their condition assessed.

Condition Monitoring/Testing	Frequency
Visual aerial inspection of 33kV poles.	Annually
Feeder surveys cover all overhead network assets including all poles and are a combination of aerial and ground based visual inspections subject to accessibility.	5-year cycle

Table 5-40: Maintenance Plan: Poles

5.15.6 Asset Replacement and Refurbishment: Poles

Poles are replaced when their structural integrity is irrevocably compromised usually due to condition. Reactive replacements of poles are also required as a result of damage from storms, vegetation, motor vehicles, etc. Current pole replacement drivers and influences are outlined in Table 5-41.

Replacement/Refurbishment Drivers
• Asset age, condition and criticality. • Failures as a result of external damage, e.g. storms, trees, vehicles etc. • Defects identified by visual inspections. • Conductor upgrades or replacements that necessitate higher pole top loadings and therefore new poles.

Table 5-41: Asset Replacement and Refurbishment Drivers: Poles

5.15.7 Controlled Documents: Poles

Controlled Document Reference	Controlled Document Description
NK1011	Asset Change and As-Built Drawing Documentation
NK3005	Pole Blocking Calculator and Summary Sheet
NK3030	Design Requirements for Public Safety
NK5020	Feeder Survey Condition Monitoring Standard
NK5100	Re-stabilising In-Line Poles
NK5112	Installation of RFD Pole Nails into Wood Poles Standard
NK5119	Basic Distribution Line Maintenance Standard
NK6005	Crossarms Materials Standard
NK6006	Poles Standard
SOP-65	SOP — Refurbishment of Aged Wooden Pole Tops
SOP-108	SOP — Nailing of Defective Poles

Table 5-42: Controlled Documents: Poles

5.16 Distribution and Low Voltage Overhead Lines

5.16.1 Asset Description: Distribution and Low Voltage Overhead Lines

Centralines has 1,394 kilometres of 11kV distribution lines and approximately 247 kilometres of low voltage lines which includes 151 kilometres of distribution mains, 51.5 kilometres of hot water conductor and 44 kilometres of streetlight conductor. Centralines' overhead network includes Copper, ACSR, AAC and galvanised steel conductor, ranging in size from No.8 (9mm^2) to Dingo (160mm^2).

5.16.2 Asset Condition and Performance: Distribution and Low Voltage Overhead Lines

The ACSR and AAC conductors are generally in good condition. Some of the older smaller copper and galvanised steel conductors are approaching end-of-life. The system is generally reliable, and current levels of maintenance are supporting satisfactory performance levels. No systemic issues have been identified in regard to overhead lines.

5.16.3 Asset Condition Assessment: Distribution and Low Voltage Overhead Lines

Asset Type	Grade H1	Grade H2	Grade H3	Grade H4	Grade H5	Data Accuracy	% Forecast to be Replaced in next 5 Years
Distribution OH Open Wire Conductor		1%	47.5%	47.5%	4%	2	1%
LV OH Conductor		0.5%	44.75%	44.75%	10%	2	0.5%

Table 5-43: Asset Condition Assessment: Distribution and Low Voltage Lines

5.16.4 Asset Age Profile: Distribution and Low Voltage Overhead Lines

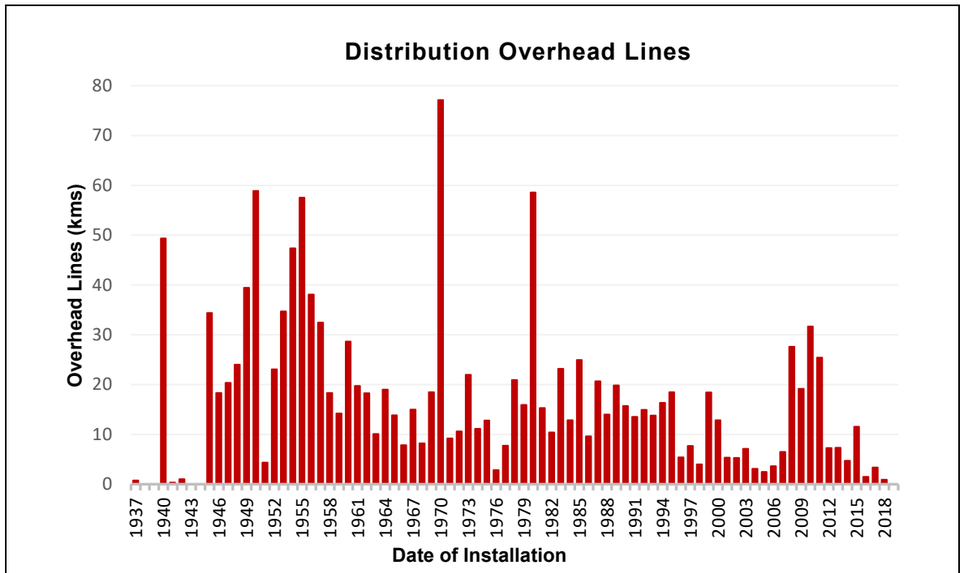


Figure 5-14: Asset Age Profile: Distribution Overhead Lines

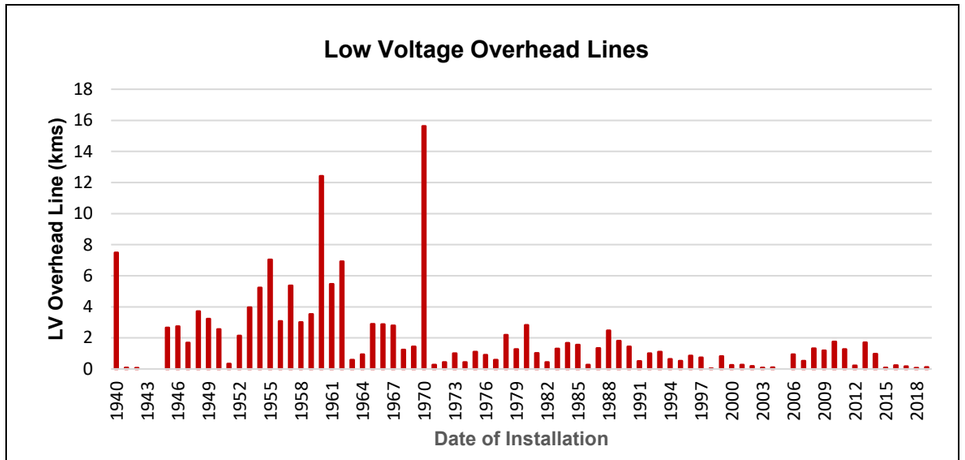


Figure 5-15: Asset Age Profile: Low Voltage Overhead Lines

5.16.5 Maintenance Plan: Distribution and Low Voltage Overhead Lines

The inspection and maintenance of Centralines' distribution and low voltage lines is governed by the Feeder Survey and Condition Monitoring Standard. Maintenance is scheduled based on inspection results. Table 5-44 outlines Centralines' current maintenance programme for this asset class.

Condition Monitoring/Testing	Frequency
Centralines' feeder surveys cover all overhead network assets and are a combination of aerial and ground based visual inspections depending on access and terrain.	5-year cycle

Table 5-44: Maintenance Plan: Distribution and Low Voltage Overhead Lines

5.16.6 Asset Replacement and Refurbishment: Distribution and Low Voltage Overhead Lines

Distribution and low voltage line renewals are primarily based on known asset condition from inspections. Current non-invasive technologies and methods to cost effectively and accurately determine the condition of overhead conductors are inconclusive and reasonably immature. Centralines will continue to work with the industry to develop and adopt best practice in this area. Current replacement drivers and influences are outlined in Table 5-45.

Replacement/Refurbishment Drivers
• Conductor type, design, composition, age and criticality. • Historical conductor performance records and trend analysis. • Asset condition based primarily on feeder inspection data. • Upgrades resulting from system growth initiatives. • Results of specially commissioned laboratory analysis. • Specific conductor location and environmental considerations, i.e. coastal areas. • The Condition Based Risk Management (CBRM) model is used to inform and assist in the identification and prioritisation of future conductor replacement programmes.

Table 5-45: Asset Replacement and Refurbishment Drivers: Distribution and Low Voltage Overhead Lines

5.16.7 Controlled Documents: Distribution and Low Voltage Overhead Lines

Controlled Document Reference	Controlled Document Description
NK1003	Vegetation Control Guidelines
NK3002	Line Design Loadings Standard
NK3019	Overhead Line Conductor and Fittings Standard
NK3022	Network Fusing Standard
NK3024	Overhead Line Standard Assemblies
NK3025	Overhead Line Design Standard
NK3030	Design Requirements for Public Safety
NK3041	Earthing Manual — Standard Earths
NK4022	Manufactured LV Aerial Bundled Conductor Construction Standard
NK5011	Inspection and Testing of Standard and SWER Earths
NK5020	Feeder Survey Condition Monitoring Standard
NK5080	Thermo-Vision Inspection Standard
NK5115	Re-Sagging Conductor Standard
NK5119	Basic Distribution Line Maintenance Standard
OS1004	Switching Instructions — Preparations and Approval
OS1006	Live Line Work Operational Practices
OS1014	Commissioning and Livening of Equipment Standard
OS1015	Defect Management Standard
SOP-112	SOP — Testing Corrosion on Conductors

Table 5-46: Controlled Documents – Distribution and Low Voltage Overhead Lines

5.17 Distribution and Low Voltage Underground Cables

5.17.1 Asset Description: Distribution and Low Voltage Underground Cables

The 11kV distribution network consists of approximately 37 kilometres of both XLPE (34km's) and PILC (2.7km's) cable. Both aluminium and copper conductors are used and are either single or three core. Conductors range in size from approximately 16 mm² to 400mm².

The low voltage network consists of approximately 81 kilometres of cable. Cable sizes vary from 4mm² to 240mm².

5.17.2 Asset Condition and Performance: Distribution and Low Voltage Underground Cables

The condition of the distribution cabling is generally good with very few defects and in-service failures in recent years.

5.17.3 Asset Condition Assessment: Distribution and Low Voltage Underground Cables

Asset Type	Grade H1	Grade H2	Grade H3	Grade H4	Grade H5	Data Accuracy	% Forecast to be Replaced in next 5 Years
Distribution UG XLPE and PVC			2.5%	2.5%	95%	3	
Distribution UG PILC			2.5%	2.5%	95%	3	
LV UG Cable			13.5%	13.5%	73%	2	

Table 5-47: Asset Condition Assessment: Distribution and Low Voltage Underground Cable

5.17.4 Asset Age Profile: Distribution and Low Voltage Underground Cables

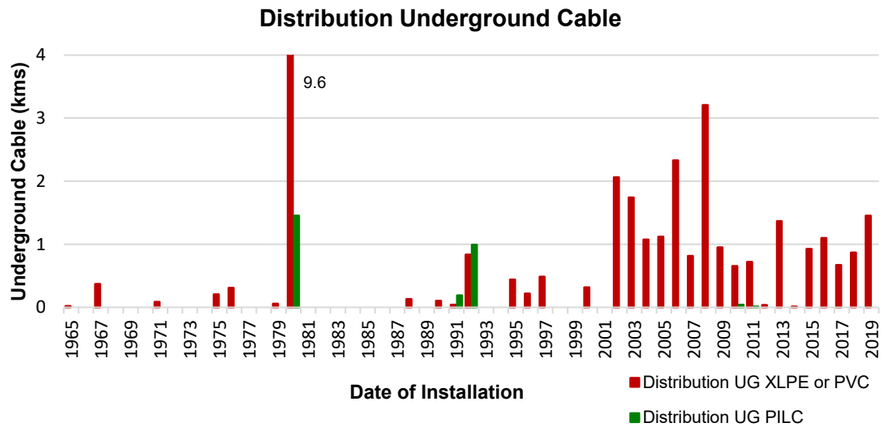


Figure 5-16: Asset Age Profile: Distribution Underground Cable

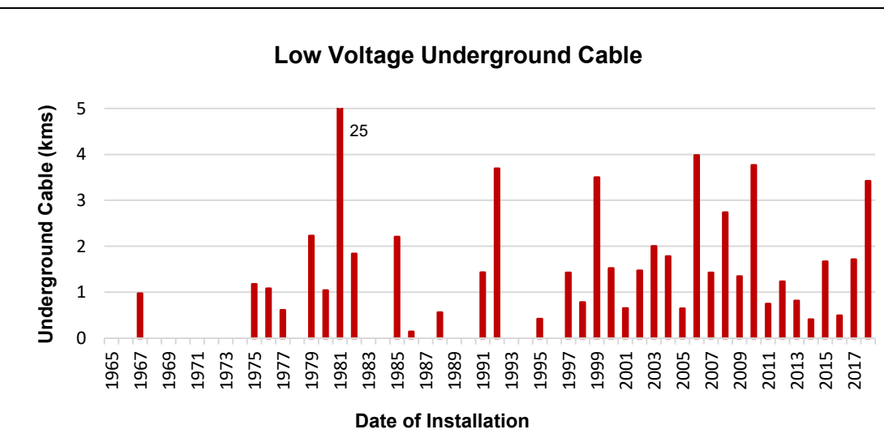


Figure 5-17: Asset Age Profile: Low Voltage Underground Cable

5.17.5 Maintenance Plan: Distribution and Low Voltage Underground Cable

Cable inspections are performed as part of the Ground Mounted Inspection (GMI) and Feeder Survey programmes. This is limited to exposed cable, terminations and connections. Diagnostic cable testing is currently only undertaken as a result of a network fault and on substation incoming 11kV cables during transformer maintenance. Any maintenance requirements identified by inspections are managed by the defect process.

Condition Monitoring/Testing	Frequency
Distribution Cable	
Exposed cable, terminations and connections are inspected as part of the ground mounted distribution equipment inspection.	Annually
Exposed cable, terminations and connections are inspected as part of the overhead feeder survey and condition monitoring inspections.	5-year cycle
Diagnostic testing is undertaken as a result of any network incidents or faults and on 11kV incomer cables during transformer maintenance.	As required
Low Voltage Cabling	
Exposed cable, terminations and connections are inspected as part of the ground mounted distribution equipment inspection.	Annually
Exposed cable, terminations and connections are inspected as part of the overhead feeder survey and condition monitoring inspections.	5-year cycle
No proactive low voltage testing is currently undertaken.	

Table 5-48: Maintenance Plan: Distribution and Low Voltage Underground Cable

5.17.6 Asset Replacement and Refurbishment: Distribution and Low Voltage Underground Cable

Replacement of distribution and low voltage cable is largely condition-based but consideration is always given to future network development before any condition-based renewal project proceeds. Current replacement drivers and influences are outlined in Table 5-49.

Replacement/Refurbishment Drivers
• Cable type, design, composition, age and criticality. • Historical cable performance records and trend analysis. • Results of diagnostic cable testing. • Cable failures. • Results of specially commissioned laboratory cable analysis. • Defects identified by visual inspections. • Specific cable location and environmental considerations. • The Condition Based Risk Management (CBRM) model will be introduced in future to inform and assist in the identification and prioritisation of future cable maintenance and replacement programmes.

Table 5-49: Asset Replacement and Refurbishment Drivers: Distribution Cable and Low Voltage Cable

5.17.7 Controlled Documents: Distribution and Low Voltage Cables

Controlled Document Reference	Controlled Document Description
NK3001	Underground Design Standard
NK3022	Network Fusing Standard
NK3023	Underground Cable Specifications and Standards
NK3030	Design Requirements for Public Safety
NK3040	Earthing — Engineering Principles
NK3041	Earthing Manual – Standard Earths
NK4001	Underground Construction Standard
NK4015	Underground Cable Installation Standard
NK4017	Service Mains Underground Conversions Construction Standard
NK4020	Cable Testing Standard
NK5011	Inspection and Testing of Standard and SWER Earths
NK5020	Feeder Survey Condition Monitoring Standard
NK6103	Material Specification — Polymeric Insulated HV Cable
NK6105	Material Specification — Low Voltage Power Cables
NK8001	Current Ratings of Cables Standard
OS1004	Switching Instructions — Preparations and Approval
OS1014	Commissioning and Livening of Equipment Standard
OS1015	Defect Management Standard
SC4022	Service Code — Cable Insulation Resistance Test
SC4023	Service Code — Cable Sheath Test
SC4024	Service Code — Cable VLF Test
SC4025	Service Code — Cable Tan Delta Test
SC4026	Service Code — New Cable Acceptance Test
SC4027	Service Code — Testing New Cables
SC4028	Service Code — Condition Monitoring In-Service Cables
SOP-101	SOP — Identifying Cables prior to Spiking

Table 5-50: Controlled Documents: Distribution and Low Voltage Cables

5.18 Distribution Transformers

5.18.1 Asset Description: Distribution Transformers

Distribution transformers are used to convert the 11kV distribution voltage to the lower voltage level of 415/230 volts which is suitable for use by the customer. These transformers are installed across the entire network and are either pole or ground mounted. Transformer size is determined by the number of customers connected or their estimated after-diversity load. They range from small pole-mounted 5kVA single phase transformers up to large ground mounted 750kVA three phase units.

The Centralines' network incorporates 2,159 pole mounted and 178 ground mounted distribution transformers.

5.18.2 Asset Condition and Performance: Distribution Transformers

Centralines' fleet of distribution transformers are in good condition and are providing a satisfactory level of performance.

Systemic Issues	Mitigation
In highly corrosive areas including coastal zones, rust in cooling fins has resulted in oil leaks. Rust can also impact the integrity and security of transformers if not detected and treated promptly.	Any rust is proactively remediated when found. Extra zinc coating is being applied to units in highly corrosive environments.

Table 5-51: Systemic Issues and Mitigations: Distribution Transformers

5.18.3 Asset Condition Assessment: Distribution Transformers

Asset Type	Grade H1	Grade H2	Grade H3	Grade H4	Grade H5	Data Accuracy	% Forecast to be Replaced in next 5 Years
Transformers: Pole Mounted		1%	34.5%	34.5%	30%	3	1.5%
Transformers: Ground Mounted		1%	10%	10%	79%	3	1%

Table 5-52: Asset Condition Assessment: Distribution Transformers

5.18.4 Asset Age Profile: Distribution Transformers

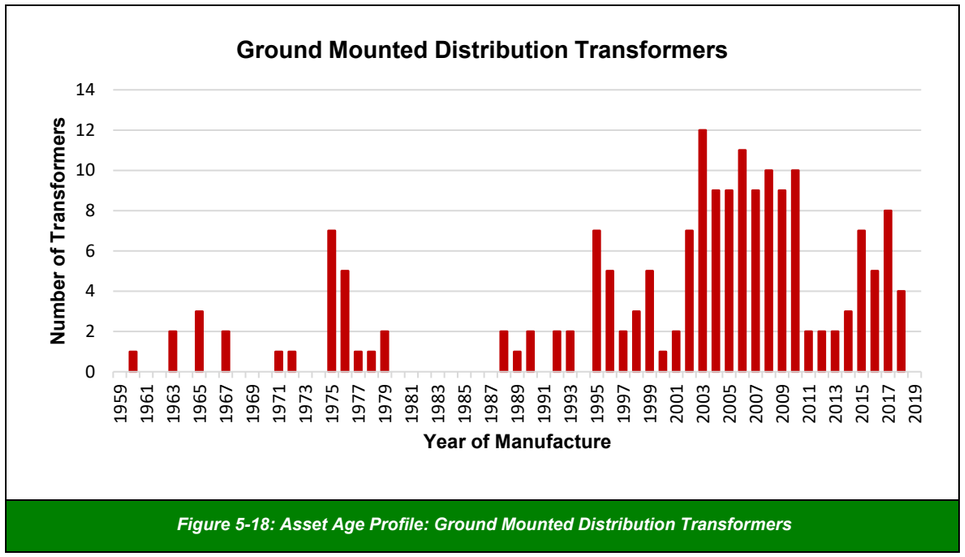


Figure 5-18: Asset Age Profile: Ground Mounted Distribution Transformers

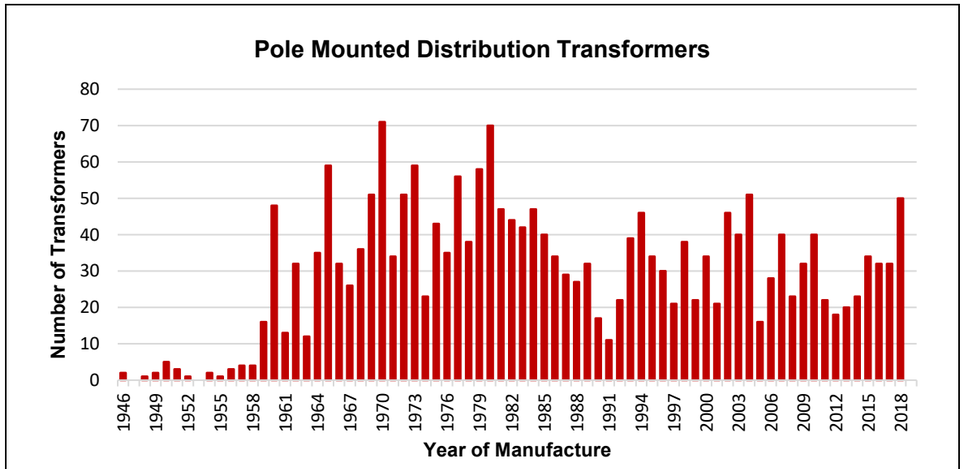


Figure 5-19: Asset Age Profile: Pole Mounted Distribution Transformers

5.18.5 Maintenance Plan: Distribution Transformers

Centralines has programmes in place to inspect its fleet of distribution transformers. Corrective maintenance is carried out on an 'as required' basis following condition-monitoring inspections or as a result of issues identified by the defect process.

Condition Monitoring/Testing: Ground Mounted Transformers	Frequency
All ground mounted transformers are visually inspected as part of Centralines' ground mounted, distribution equipment inspections (GMIs).	Annually
Inspection and testing of all distribution transformer earthing including an earth site inspection and an earth resistance test. In addition, a visual inspection of all associated assets is undertaken while on site.	5-year cycle
A basic oil insulation test to measure dielectric (breakdown voltage) and moisture is carried out on all transformers on all large industrial sites.	5-year cycle

Table 5-53: Maintenance Plan: Ground Mounted Distribution Transformers

Condition Monitoring/Testing: Pole Mounted Transformers	Frequency
A visual inspection of all pole mounted transformers is undertaken as part of Centralines' feeder surveys which cover all overhead network assets and are a combination of aerial and ground based inspections, depending on access and terrain.	5-year cycle
Inspection and testing of all distribution transformer earthing including an earth site inspection and an earth resistance test. In addition, a visual inspection of all associated assets is undertaken while on site.	5-year cycle
The above inspections are conducted independently which means each transformer is visually inspected at least twice within in a five-year period.	

Table 5-54: Maintenance Plan: Ground Mounted Distribution Transformers

5.18.6 Asset Replacement and Refurbishment: Distribution Transformers

A number of distribution transformers are proactively replaced each year due to condition assessments and testing from the various inspection programmes. Additionally, some reactive replacements are undertaken as a result of in-service failures due to third party damage, lightning, storms and age, etc.

The CBRM model is being used to better inform and assist in the identification and prioritisation of future pole and ground mounted transformer replacement programmes. Current replacement drivers are outlined in Table 5-55.

Replacement /Refurbishment Drivers
• Asset condition based primarily on GMI inspections for ground mounted units and feeder inspection data for pole mounted units and factoring in asset age, criticality and any available oil test results for ground mounted transformers. • Replacements resulting from system growth or customer-driven upgrades and as a result of synergies with other renewal projects. • In-service transformer failures resulting from lightning, damage by third parties, other faults etc.

Table 5-55: Replacement and Refurbishment Drivers: Distribution Transformers

5.18.7 Controlled Documents: Distribution Transformers

Controlled Document Reference	Controlled Document Description
NK3001	Underground Design Standard
NK3019	Overhead Line Conductor and Fittings Standard
NK3022	Network Fusing Standard
NK3025	Overhead Line Design Standard
NK3030	Design Requirements for Public Safety
NK3040	Earthing — Engineering Principles
NK3041	Earthing Manual — Standard Earths
NK4001	Underground Construction Standard
NK4014	Ground-Mounted Equipment — General Requirements Standard
NK4015	Underground Cable Installation Standard
NK4020	Cable Testing Standard
NK4021	Pre-Commissioning of Distribution Assets Construction Standard
NK5011	Inspection and Testing of Standard and SWER Earths
NK5017	Ground-Mounted Distribution Equipment Inspection Standard
NK5020	Feeder Survey Condition Monitoring Standard
NK5043	Insulating Oil Maintenance Standard
NK6003	Concrete Manufactured Products Standard
OS1014	Commissioning and Livening of Equipment Standard
OS1015	Defect Management Standard
SC2050	Service Code — Dielectric Breakdown Voltage Test
SC2051	Service Code — Acidity Test
SC2052	Service Code — Dissolved Gas Analysis
SOP-39	SOP — Changing Taps in Distribution Transformers
SOP-50	SOP — Operating NX Fuses
SOP-56	SOP — Overhead Distribution Transformer Meter – Installation and Isolation

Table 5-56: Controlled Documents: Distribution Transformers

5.19 Voltage Regulators

5.19.1 Asset Description: Voltage Regulators

Voltage regulators are electrical equipment designed to automatically maintain compliant voltages to customers irrespective of how much power is being drawn from the line. Typically, they are installed at a substation or on long distribution lines. The output voltage is constantly monitored, and the units automatically change tap settings in order to maintain the output voltage within an acceptable range. Centralines has four, three phase voltage regulators (twelve regulators) installed permanently on the network plus an additional two-phase mobile regulator which is deployed as required across the network.

5.19.2 Asset Condition and Performance: Voltage Regulators

Centralines' fleet of voltage regulators are in good condition and are performing reliably with no systemic issues identified.

5.19.3 Asset Condition Assessment: Voltage Regulators

Asset Type	Grade H1	Grade H2	Grade H3	Grade H4	Grade H5	Data Accuracy	% Forecast to be Replaced in next 5 Years
Voltage Regulators				50%	50%	3	

Table 5-57: Asset Condition Assessment: Voltage Regulators

5.19.4 Asset Age Profile: Voltage Regulators

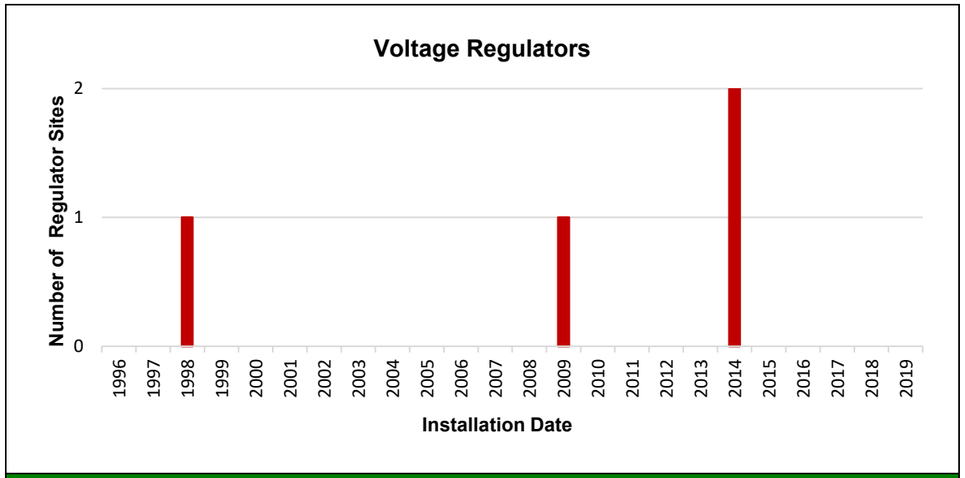


Figure 5-20: Asset Age Profile: Voltage Regulators

5.19.5 Maintenance Plan: Voltage Regulators

Regulators perform a critical operational function on the Centralines' network. To ensure reliable performance, Centralines has a tailored inspection and maintenance programme in place for this asset class. Table 5-58 defines current inspection and maintenance activities.

Condition Monitoring/Testing	Frequency
A visual inspection of all regulators is undertaken as part of Centralines' feeder surveys which cover all overhead network assets and are a combination of aerial and ground based inspections, depending on access and terrain.	5-year cycle
Inspection and testing of all regulators' earthing including an earth site inspection and an earth resistance test. In addition, a visual inspection of all associated assets is undertaken while on site.	5-year cycle
Visual inspections to ensure the integrity and security of the site in addition to battery and operational checks to confirm the equipment is operating correctly.	Quarterly
Centralines plans to adopt tap changer activity signature analysis (TASA) oil testing for its fleet of regulators. This provides a one to four rating of the oil condition. The score attained will dictate required maintenance activities.	A minimum of a 2-yearly cycle after 10 years of operation. Tests will be carried out as part of the inspections above.

Table 5-58: Maintenance Plan: Voltage Regulators

5.19.6 Asset Replacement and Refurbishment: Voltage Regulators

Due to the age profile and good condition of this asset fleet, there are no planned regulator replacements during the current RAMP planning period. Future replacement drivers are outlined in Table 5-59.

Replacement/Refurbishment Drivers
• Asset condition based primarily on inspections and factoring in asset age, criticality capacity and functionality. • TASA oil test results. • Historical performance. • Availability of spare parts.

Table 5-59: Asset Replacement and Refurbishment Drivers: Voltage Regulators

5.19.7 Controlled Documents: Voltage Regulators

Controlled Document Reference	Controlled Document Description
NK3019	Overhead Line Conductor and Fittings Standard
NK4021	Pre-Commissioning of Distribution Assets Construction Standard
NK5015	Voltage Regulator Inspection Standard
NK5020	Feeder Survey Condition Monitoring Standard
NK5043	Insulating Oil Maintenance Standard
NK5075	Voltage Regulator Maintenance Standard
OS1015	Defect Management Standard
SC2301	Service Code — Inspections Regulators

Table 5-60: Controlled Documents: Voltage Regulators

5.20 Overhead Distribution Switchgear

5.20.1 Asset Description: Overhead Distribution Switchgear

Overhead distribution switchgear includes all electrical switching equipment on the medium voltage overhead network. This switchgear is used to protect, isolate and connect sections of the network for operational purposes.

5.20.2 Asset Description: Air Break Switches/Disconnectors

Air break switches (ABS) or disconnectors are manually operated switches used for connecting or disconnecting different sections of 11kV or 33kV circuits. All phases of the switch are mechanically linked so that they operate together. Early model ABS were primarily intended for no-load switching, but modern switches have flicker arc horns and/or load break attachments to allow limited on load switching capability. There are a small number of predominantly 33kV disconnectors installed in zone substations to enable the isolation of equipment. Centralines has approximately 300 ABSs on its network.

5.20.3 Asset Description: Isolation/Fuse Links

Single phase isolation/fuse links are used on the overhead network to provide isolation and or fusing functionality at specific points on the network. These links are manually operated with a 'hot stick' and can be either solid links or incorporate fuse elements. Centralines has approximately 2,700 links on its network, predominantly of the expulsion drop-out fuse type.

5.20.4 Asset Description: Reclosers

Reclosers are automatically operated electrical switches installed on the overhead network. They are designed to interrupt electrical power circuits thus protecting upstream and downstream electrical assets from damage as a result of a shorted or overloaded circuit. Additionally, they ensure the safety of the public and utility employees and provide electrical discrimination on the network reducing the outage impacts of faults.

Their basic function is to interrupt power by an initiated control command or automatically by protective sensing devices that detect abnormal or fault conditions. They are designed to interrupt circuits repeatedly and safely both under normal load and fault conditions.

A recloser can be reset manually or automatically (and remotely) to resume normal operation after a fault. They can be programmed to auto-reclose under certain circumstances until they lock out if the fault remains after a predetermined number of operations.

5.20.5 Asset Description: Sectionalisers/Load Break Switches

Sectionalisers are similar to reclosers in operation but they are not designed to open immediately a fault is detected. Sectionalisers can be remotely operated and are able to switch load. Modern reclosers provide a wealth of network data including voltages, currents, and fault passage information.

Sectionalisers can be programmed to operate autonomously with a recloser and other sectionalisers to isolate a faulty section of line. This allows the recloser to auto reclose limiting the impact of the fault.

Centralines has 81 reclosers and sectionalisers on its network including both three phase and single-phase units.

5.20.6 Asset Condition and Performance: Overhead Distribution Switchgear

Overall the condition of Centralines' overhead distribution switchgear is good, with few in-service failures.

There have been some cracked insulators identified on a certain type of ABS with confirmation from other networks that they too have been experiencing similar issues. Acoustic testing has been used to condition assess these switches, and a prioritised programme to retrofit alternative insulators has been implemented. Centralines is now using an alternative ABS for all new installations.

More recently due to some failures of single phase 11kV reclosers (peanuts) a prioritised replacement programme has been developed and is being implemented.

5.20.7 Asset Condition Assessment: Overhead Distribution Switchgear

Asset Type	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Data Accuracy	% Forecast to be Replaced in next 5 Years
Pole Mounted 11kV Switches and Fuses		1%	23.5%	23.5%	52%	2	1.5%
Reclosers and Sectionalisers		3%	22.5%	22.5%	52%	3	5%

Table 5-61: Asset Condition Assessment: Overhead Distribution Switchgear

5.20.8 Asset Age Profile: Overhead Distribution Switchgear

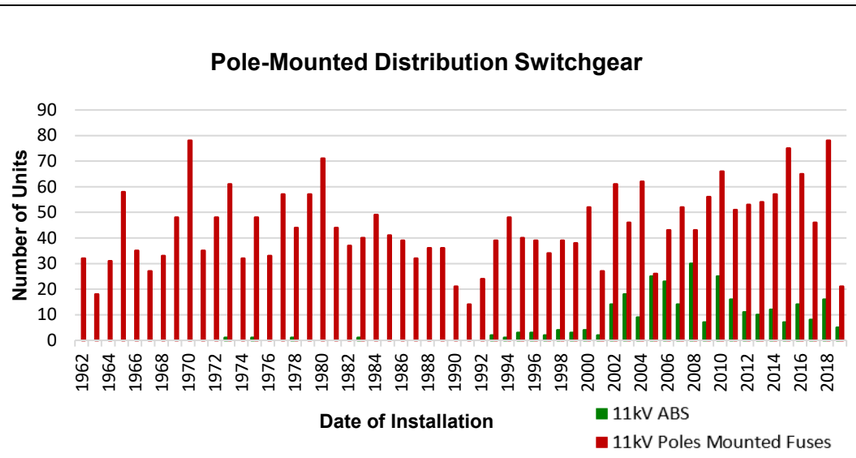


Figure 5-21: Asset Age Profile: Pole Mounted Distribution Switchgear

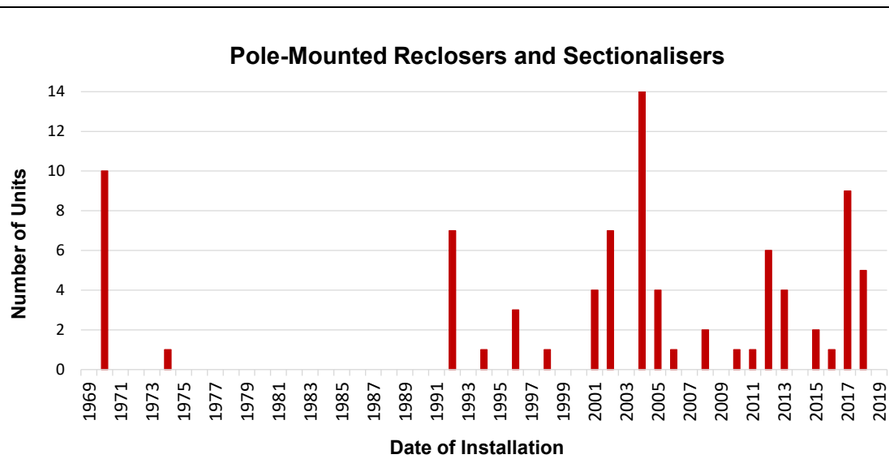


Figure 5-22: Age Profile: Pole Mounted Reclosers and Sectionalisers

5.20.9 Maintenance Plan: Overhead Distribution Switchgear

The following maintenance activities are undertaken on overhead distribution switchgear.

Condition Monitoring/Testing	Frequency
Centralines' feeder surveys cover all overhead network assets including overhead distribution switchgear and are a combination of aerial and ground based visual inspections, depending on access and terrain.	5-year cycle
Inspection and testing of all 11kV earthing installations include an earth site inspection and an earth resistance test. In addition, a visual inspection of all associated assets is undertaken while on site.	5-year cycle
In addition to the above, reclosers and sectionalisers are subject to an inspection and operational testing programme.	Annually with quarterly battery checks
Zone substation disconnectors (ABS) have been included in this section. The following inspections and maintenance are specific to these switches:	
Detailed visual inspection of all switch yard equipment. Included is a check of all insulators to ensure they are in good condition and free of audible discharges or signs of tracking etc.	Weekly
Thermo-vision, corona and partial discharge inspection.	Annually
Complete shutdown with both visual and physical inspection of flexible connections, steel work, bolts and earthing. Contacts, terminations and insulators are all inspected and cleaned. The switches are opened and closed to ensure correct operation and alignment of all moving parts.	10-year cycle

Table 5-62: Maintenance Plan: Overhead Distribution Switchgear

5.20.10 Asset Replacement and Refurbishment: Overhead Distribution Switchgear

Current replacement and refurbishment drivers are essentially the same for all overhead distribution switchgear. These are outlined in Table 5-63.

Replacement/Refurbishment Drivers
• Asset condition based primarily on feeder inspection data, asset specific inspections and testing, factoring in asset age, functionality, capacity and criticality. • In-service failures resulting from corrosion, lightning damage and other faults, etc. • Upgrades resulting from system growth, power quality or customer projects. • Issues identified through the defect process. • Availability of spares.

Table 5-63: Asset Replacement and Refurbishment: Overhead Distribution Switchgear

5.20.11 Controlled Documents: Overhead Distribution Switchgear

Controlled Document Reference	Controlled Document Description
NK1011	Asset Change and As-Built Drawing Documentation Procedure
NK3019	Overhead Line Construction Standard
NK3022	Network Fusing Standard
NK3025	Overhead Line Design Standard
NK3030	Design Requirements for Public Safety
NK3040	Earthing — Engineering Principles
NK3041	Earthing Manual — Standard Earths
NK4021	Pre-Commissioning of Distribution Assets Construction Standard
NK5011	Inspection and Testing of Standard and SWER Earths
NK5016	Line Recloser Inspections Standard
NK5020	Feeder Survey Condition Monitoring Standard
NK5034	Line Recloser Maintenance Standard
NK5036	Disconnector ABS and Earth Maintenance Standard
OS1014	Commissioning and Livening Equipment Standard
OS1015	Defect Management Standard
SC2030	Service Code — Disconnector and Earth Switch Service
SC2031	Service Code — Disconnector with Arc Control Service
SOP-004	SOP — Operating 11kV Fuse Cut Outs
SOP-005	SOP — Operating an Air Break Switch
SOP-006	SOP — Working beyond Sectos and Entec 11kV Switches
SOP-007	SOP — Operating Entec Switches
SOP-16	SOP — McGraw Edison Recloser
SOP-17	SOP — Cooper Nova Recloser
SOP-18	SOP — Nu Lec Recloser
SOP-40	SOP — Operating NX Arc Strangler Fuses

Table 5-64: Controlled Documents: Overhead Distribution Switchgear

5.21 Ground Mounted Distribution Switchgear

5.21.1 Asset Description: Ground Mounted Distribution Switchgear

This switchgear is used to protect, isolate and connect sections of the 11kV network for operational purposes. Typically, ground mounted switchgear, including a combination of three or four 11kV switches and/or fused switches, contained within a standalone unit is referred to as a ring main unit (RMU). An RMU typically can have a maximum of two fused switches.

Ground mounted switchgear that encompasses a single switch or fused switch unit that can be connected to an RMU by way of an 11kV busbar or cable, or be a stand-alone unit is referred to as an 11kV switch.

RMUs and 11kV switches are designed to mechanically operate all three phases simultaneously. Most include earth switches which allow individual switches to be earthed. Centralines' older RMUs have switch contacts immersed in insulating oil to assist with arc suppression on opening. Centralines' has currently standardised on ABB Safelink arc-rated switches with SF_6 insulation with both manual and remote operating capability. Centralines' currently has 19 RMU and seven 11kV switches on its network.

5.21.2 Asset Condition and Performance: Ground Mounted Distribution Switchgear

Centralines' fleet of ground mounted distribution switchgear is in good condition and performing reliably. No systemic issues have been identified.

5.21.3 Asset Condition Assessment: Ground Mounted Distribution Switchgear

Asset Type	Grade H1	Grade H2	Grade H3	Grade H4	Grade H5	Data Accuracy	% Forecast to be Replaced in next 5 Years
11kV Ring Main Units					100%	4	
11kV Switches					100%	4	

Table 5-65: Asset Condition Assessment: Ground Mounted Distribution Switchgear

5.21.4 Asset Age Profile: Ground Mounted Distribution Switchgear

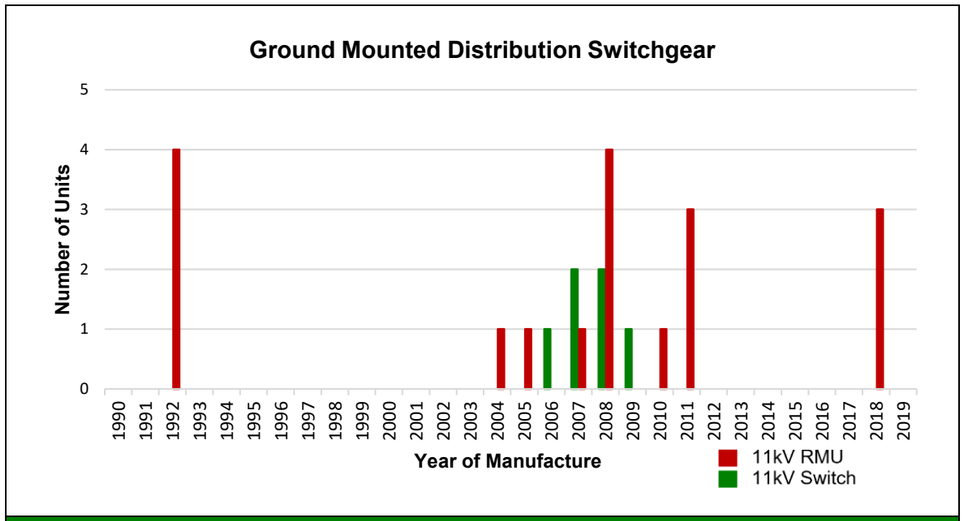


Figure 5-23: Asset Age Profile: Ground Mounted Distribution Switchgear

5.21.5 Maintenance Plan: Ground Mounted Distribution Switchgear

Centralines takes a proactive approach to inspecting and maintaining ground mounted distribution switchgear. Table 5-66 details the maintenance undertaken on this asset class.

Condition Monitoring/Testing	Frequency
All ground mounted distribution switchgear is visually inspected as part of Centralines' ground mounted, distribution equipment inspections (GMIs). These inspections include close visual examination and from this year, will utilise partial discharge, corona and infrared sensing technologies to assist in the detection of potential defects and faults.	Annually
Inspection and testing of all ground mounted distribution switchgear earthing includes an earth site inspection and an earth resistance test. In addition, a visual inspection of all associated assets is undertaken while on site.	5-year cycle

Table 5-66: Maintenance Plan: Ground Mounted Distribution Switchgear

5.21.6 Asset Replacement and Refurbishment: Ground Mounted Distribution Switchgear

Due to the good condition and age profile of this asset class no renewals are planned during the RAMP planning period. Current and future replacement and refurbishment drivers are outlined in Table 5-67.

Replacement/Refurbishment Drivers
• Switch design, insulating medium, age, condition and criticality. • Historical switch performance records and trend analysis. • Results of diagnostic testing and visual inspections. • Health and safety considerations. • Current and future maintenance requirements. • Availability of spare parts. • Specific switch location and environmental considerations. • Manufacturer recommendations. • The Condition Based Risk Management (CBRM) model is used to inform and assist in the identification and prioritisation of maintenance and replacement programmes.

Table 5-67: Asset Replacement and Refurbishment Drivers: Ground Mounted Distribution Switchgear

5.21.7 Controlled Documents: Ground Mounted Distribution Switchgear

Controlled Document Reference	Controlled Document Description
NK1011	Asset Change and As-Built Drawing Documentation Procedure
NK3001	Underground Design Standard
NK3014	11kV Ring Main Switches Standard
NK3022	Network Fusing Standard
NK3023	Underground Cable Specifications and Standards
NK3030	Design Requirements for Public Safety
NK3040	Earthing — Engineering Principles
NK3041	Earthing Manual — Standard Earths
NK4001	Underground Construction Standard
NK4014	Ground Mounted Equipment — General Requirements Standard
NK4015	Underground Cable Installation Standard
NK4020	Cable Testing Standard
NK4021	Pre-Commissioning of Distribution Assets Construction Standard
NK5011	Inspection and Testing of Standard and SWER Earths

Controlled Document Reference	Controlled Document Description
NK5017	Ground Mounted Distribution Equipment Inspection Standard
NK5038	Metalclad Switchgear Maintenance Standard
NK5043	Insulating Oil Maintenance Standard
NK5070	Sulphur Hexafluoride (SF_6) Use and Handling Standard
NK6003	Concrete Manufactured Products Standard
OS1014	Commissioning and Livening Equipment Standard
OS1015	Defect Management Standard
SC2050	Service Code — Dielectric Breakdown Voltage Test
SC2051	Service Code — Acidity Test
SC2052	Service Code — Dissolved Gas Analysis
SOP-09	SOP — Operating SafeLink12kV RMS
SOP-11	SOP — Small Dimension (SD) Ring Main Switches

Table 5-68: Controlled Documents: Ground Mounted Distribution Switchgear

5.22 Overview of Secondary Assets

This section provides descriptions and high-level summaries of lifecycle asset management related information on Centralines' portfolio of secondary assets.

Information is provided on the asset categories detailed in Table 5-69.

Asset Class	Section Reference
Network Communications	5.23
Supervisory Control and Data Acquisition (SCADA)	5.24
Protection Relays	5.25
Zone Substation: Secondary Assets	5.26
Low Voltage Pedestals	5.27

Table 5-69: Asset Class Descriptions and Section References

5.23 Network Communications

5.23.1 Fibre Network (Primary Communication Network)

The primary or backbone medium for Centralines' electricity network communications is a carrier grade fibre optic cable network. This network is a mixture of leased and Centralines-owned circuits. The network links:

- the Centralines' Head Office in Waipukurau
- the Waipukurau and Waipawa Zone Substations
- Transpower's Waipawa GXP, and
- Centralines' service provider's, 24/7 Network Operations Centre in Hastings, from which the Centralines' network is controlled.

The fibre link between Hastings and Waipukurau includes circuits leased from two service providers in the section between Hastings and Ongaonga, and the Centralines owned fibre between Ongaonga and Waipukurau. Redundancy for this communication network is by way of an alternative, leased communication link. In a contingency event, the Centralines' network can also be controlled from the Centralines' Waipukurau offices.

The fibre network between Centralines' Peel Street Head Office, the Waipawa and Waipukurau zone substations and the Waipawa GXP are all radial feeds, and there is currently no redundancy. A break in any of these fibres would result in communications being lost and would require field staff to be dispatched to the zone substations to manually operate equipment.

Service and traffic separation across the SCADA network (via the fibre network) is maintained using industry recognised protocols to prioritise data and maintain system security.

The fibre network enables a range of network related functionality including:

- Supervisory Control and Data Acquisition (SCADA) which allows Centralines' entire electrical network to be monitored and operated from Centralines' Management service provider's head office in Hastings
- the monitoring and enabling of a 33kV sub-transmission ring circuit, differential protection scheme, and
- engineering access to Intelligent Electronic Devices (IEDs) and other equipment installed in substations including protection relays which can be interrogated remotely, including the downloading of fault logs to assist with post-fault analysis.

5.23.2 VHF Radio Communications

VHF is used for the transmission of voice communication between Centralines' Management service provider's NOC in Hastings and Centralines' field staff. Two VHF data channels are also utilised for SCADA functions to control the Wilder Road Substation, pole mounted reclosers, load break switches and some regulators.

5.24 Supervisory Control and Data Acquisition (SCADA)

SCADA is a generic term that covers the system that Centralines' Management service provider uses to monitor and control network operations, obtain system information, and create historical records of events.

Unison utilises an integrated, Advanced Distribution Management System (ADMS) developed and supplied by Schneider Electric.

The ADMS is a software platform that provides SCADA functionality across the distribution network. It includes:

- outage management
- call and dispatch
- automated fault location
- isolation and service restoration (self-healing) capability, and
- integrated network reliability reporting.

It also provides mobile crew management and network visibility to the workforce.

Additional modules within the ADMS enable network optimisation and analysis. This is able to provide Unison with the ability to optimise the state of the network by identifying the optimal configuration which will reduce the number of losses and ensure effective asset utilisation.

The ADMS incorporates a training simulator that is used to:

- test Unison's systems and processes during simulated crisis events, and
- train new and existing operators to maintain required competency standards.

Unison uses the previously described communication platforms for the ADMS to communicate with Remote Terminal Units (RTUs) located in substations and field equipment. The RTUs provide the communication interface that allows for central control commands to be conveyed to appropriate equipment and for network data to be returned.

5.25 Protection Relays

5.25.1 Asset Description: Protection Relays

A protection relay is a device designed to trip a circuit breaker when a fault is detected. The first protection relays were electro-mechanical devices, relying on coils operating on moving parts to provide detection of abnormal operating conditions such as transformer differential, over-current, earth fault and over and under voltage, and frequency.

Modern numeric relays are far superior to these early electromechanical relays. They operate extremely quickly, offer increased functionality and provide detailed information on faults that can be remotely downloaded.

Centralines has standardised on SEL manufactured protection relays due to their high quality, reliability, ten-year warranty period and after sales technical and training services. Standardising on one manufacturer also has some advantages for field technicians who only have to be familiar with

one product range which speeds up and simplifies relay configuration, testing and commissioning and the downloading and interpretation of power system fault logs.

5.25.2 Asset Condition and Performance: Protection Relays

Centralines' relay protection assets have been performing reliably. A fibre enabled 33kV ring circuit differential protection scheme has been installed between the Waipawa and Waipukurau zone substations and Transpower's Waipawa GXP. In addition, five transformer differential schemes have been implemented at Waipawa and Waipukurau zone substations.

Centralines via its substation fibre communication network currently has engineering access to approximately 22 protection relays across its network. This allows protection engineers to remotely download and analyse power system events to gain an understanding of the nature and magnitude of any event.

5.25.3 Maintenance Plan: Protection Relays

Protection relays are regularly checked as part of Centralines' weekly substation maintenance regime. Operational checks are carried out every ten-years.

5.25.4 Fast Protection Benefits: Protection Relays

There are many benefits to the protection upgrades that have been undertaken at Centralines. Some of these benefits are outlined below.

- Health and safety outcomes have improved. Fast protection reduces the risk and potential consequences to employees and the public resulting from network faults.
- Network reliability and security has improved due to unitised protection that reduces fault propagation, eliminates cascade tripping and mitigates loss of discrimination which sometimes occurs due to the slow operation of protection systems.
- Fast protection reduces the potential damage to network equipment as fault durations are significantly reduced.
- The quality of supply to Centralines' customers has been enhanced as fast operating protection significantly reduces voltage dips on Centralines' network.
- Remote engineering access is possible. This allows the remote interrogation of relays to analyse power system faults.
- Numeric relays enable SCADA serialisation which eliminates discreet hard copper connections between equipment.

5.26 Zone Substation: Secondary Assets

In addition to the main zone substation asset classes covered earlier in this section, there are also secondary assets within a zone substation that provide other critical functions. Table 5-70 provides a high-level overview of these assets.

Asset	Asset Description	Maintenance
Voltage Transformers	Voltage transformers (VTs) are used to transform high voltages to lower voltages that can be more safely used for protection, control, indication and metering. VTs may be located on both outdoor and indoor equipment and be either single phase or three phase units.	Visual inspection included in weekly substation inspections. Annual thermo-vision, corona, and partial discharge inspections. Six-yearly service including a clean, lubrication of moving parts, visual inspection, insulating oil maintenance, insulation test, and a check of all LV/HV and earth connections and holding down arrangements.
Current Transformers	Current transformers (CTs) are used to transform high currents to lower levels that can be used for protection, control, indication and metering. Outdoor CTs are generally stand-alone, single phase oil insulated units and usually form part of a circuit breaker. Indoor CTs are generally single phase, solid insulation and located on each phase of a circuit breaker.	Visual inspection included in weekly substation inspections. Annual thermo-vision, corona, and partial discharge inspections. 6-yearly service including a clean, visual inspection, insulation test (HT-E only), and a check of all LV/HV and earth connections and holding down arrangements.
Outdoor Structures	These consist of overhead support structures and conductive busbars constructed of either copper or aluminium. These busbars allow switchgear and power transformers to be connected together. Typically, these structures incorporate disconnectors to provide isolation for maintenance.	Visual inspection included in weekly substation inspections. Annual thermo-vision, corona, and partial discharge inspections.
Direct Current (DC) Systems	DC systems at zone substations are used to provide an independent stand-alone power supply that can function if the main AC supply fails. The general arrangement is to have battery banks on continuous charge connected to critical control, protection and communication equipment.	Visual inspection included in weekly substation inspections. 5-yearly substation battery replacements.
Substation Earthing Systems	Because of the high voltages and currents encountered in zone substations, earthing systems are designed at the time of construction to ensure the safety of personnel and equipment. The earthing systems generally comprise bare copper cables laid in the ground in a grid formation. All substation equipment is bonded to these earth	Visual inspection included in weekly substation inspections. Annual thermos-vision, corona, and partial discharge inspections. Substation earthing systems are independently tested every 5 years.

Asset	Asset Description	Maintenance
	grids and the earth grids in turn are connected to earthing rods that are driven deep into the ground.	
Oil Containment Systems	New substations are designed to include a bunded transformer foundation and oil containment system. Centralines has a programme to install bunding and oil containment systems at all older substation sites where they currently do not exist.	Visual inspection included in weekly substation inspections.

Table 5-70: Zone Substation: Secondary Asset Descriptions and Maintenance

5.27 Low Voltage Pedestals

5.27.1 Asset Description: Low Voltage Pedestals

Pedestals are enclosures for the termination of buried cables and the mounting of fuses, control relays and other electrical equipment. Typically, low voltage pedestals are the isolation/demarcation point between the distribution network and the customer's service main. They are also used as group breaks to enable back feeding capability on the low voltage network. Centralines has approximately 1,200 low voltage pedestals installed on its network.

5.27.2 Asset Condition and Performance: Low Voltage Pedestals

Pedestals are ubiquitous assets that form part of the urban landscape. As such they suffer from motor vehicle damage, vandalism and occasionally unauthorised access.

Ultraviolet (UV) degradation, corrosion, burnt up fuses, voltage tracking and moisture build-up are all issues that impact on this asset class. Recent innovations to defer replacement have included painting fibreglass pedestals to reduce UV damage and prolong the assets' lives. The introduction of new PVC pedestals with replaceable covers has reduced the need to replace the entire asset when the cover alone is damaged.

5.27.3 Maintenance and Replacement Plan: Low Voltage Pedestals

Most pedestal maintenance and replacement are reactive and in response to faults, condition assessments, network upgrades and reported defects.

Pedestals are included in the five-yearly safety inspection programme for low voltage ground mounted assets. These inspections have a public safety emphasis and focus on asset security and guarding against unauthorised public access. Any minor repairs are carried out at the time by asset inspectors and other defects are logged for follow-up action.

5.28 Centralines' Assets installed on Bulk Electricity Supply Points

5.28.1 Transpower GXPs

Centralines has a number of assets installed at Transpower GXP sites. These assets include 33kV sub-transmission and 11kV distribution lines and cables as well as communications equipment and protection relays. These assets are covered by Centralines' Access and Occupation Schedule Agreement which sets out the terms and conditions associated with Centralines' assets on Transpower sites.

5.29 Centralines' Owned Generators

5.29.1 Mobile Generation

Centralines owns a 50kVA mobile generator which is used to temporarily maintain or restore supply to Centralines' customers during both planned and unplanned outages. An external contractor is engaged to maintain this generator.

5.30 Other Generation Plant

5.30.1 Centralines' Peel Street Head Office

Centralines owns a 60kVA on-site diesel generator that maintains supply to its Waipukurau Peel Street office. This generator ensures continuity of supply to Centralines' Head Office complex enabling business continuity when normal supply is lost to the site. Centralines engages an external contractor to maintain this generator.

5.31 Asset Maintenance Expenditure Projections

Centralines' maintenance expenditure projections for the RAMP planning period is presented by asset category in Table 5-71.

Asset Category	Asset Maintenance Expenditure Projections ($000)									
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Overhead Lines	807	787	787	787	787	787	787	787	787	787
Underground Cables	49	49	49	49	49	49	49	49	49	49

Asset Category	Asset Maintenance Expenditure Projections ($000)									
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Circuit Breakers	15	15	15	15	15	15	15	15	15	15
Zone Substation Buildings and Equipment	51	43	43	43	43	43	43	43	43	43
Power Transformers	30	30	30	30	30	30	30	30	30	30
Distribution Transformers and Regulators	44	44	44	44	44	44	44	44	44	44
Distribution Switchgear	42	42	42	42	42	42	42	42	42	42
Vegetation	553	549	549	549	549	549	549	549	549	549
SCADA and Communications	24	24	24	24	24	24	24	24	24	24

Table 5-71: Asset Maintenance Expenditure Projections for RAMP Planning Period

5.32 Asset Renewal Expenditure Projections

Centralines' renewal expenditure projections for the RAMP planning period is presented by asset category in Table 5-72.

Asset Category	Asset Renewal Expenditure Projections ($000)									
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
11kV GM Circuit Breakers			1200			1200				
Concrete Poles	589	375	375	250	250	250	250	250	250	250
11kV PM Reclosers and Sectionalisers	390	65	390	65	260					
11kV PM Switches and Fuses		325	10	335	10	10	10	10	10	15

Asset Category	Asset Renewal Expenditure Projections ($000)									
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Distribution OH Open Wire Conductor	580	611	497	500	500	500	500	500	500	500
Pole Mounted Transformers	107	44								
Zone Substation Transformers		5.2								
Zone Substations	50	35								

Table 5-72: Asset Renewal Expenditure Projections for RAMP Planning Period

5.33 Renewal Project List 2020-2021

Asset	Project Description	Project Budget ($000)
11kV CB Pole Mounted Reclosers and Sectionalisers	Peanut replacement program. RCS23, RCS60, RCS61, RCS63, RCS52.	325
11kV CB Pole Mounted Reclosers and Sectionalisers	Recloser replacement. R38 1305 SH2.	65
Distribution OH Open Wire Conductor	Wilder Road stage 7 of 8.	170
Distribution OH Open Wire Conductor	Oruawharo Road 11kV 7/064 reconductor.	110
Distribution OH Open Wire Conductor	Pole Replacements Specific Projects TBC.	250
Distribution OH Open Wire Conductor	Specific Projects TBC.	300
Zone Substations	Waipukurau ZS 33kV insulator replacement.	50
Pole Mounted Transformer	Feeder 74 Replace 2 pole 200 KVA transformer D3/20 Sydney Street.	32
Pole Mounted Transformer	Replace 2 Pole Structure TX B4/5 with New Pole Mount 300kVA TX - Waverley Street Waipawa.	68

Table 5-73: Renewal Project List 2020-2021

5.34 Renewal Project List 2021/22 to 2024/25

Renewal Project List 2021/22 to 2024/25		
Financial Year	Asset Category	Project Description
2021/22	11kV CB Pole Mounted Reclosers and Sectionalisers	Peanut replacement program. RCS35, RCS34, RCS37, RCS58, RCS62.
2021/22	Distribution OH Open Wire Conductor	Replace 7/0.064 copper 11kV conductor in Paget Road, Feeder 75.
2021/22	Distribution OH Open Wire Conductor	Wilder Road Stage 8 of 8.
2021/22	11kV CB Pole Mounted Reclosers and Sectionalisers	Recloser replacement. R41 Racecourse Road.
2021/22	Pole Mounted Transformer	Replace 2 pole mounted 100kVA transformer C4/108 with a new pole mounted 200kVA transformer structure in Svenson Road, Feeder 15.
2021/22	Zone Substations	Takapau ZS ceiling insulation.
2021/22	Zone Substations	Waipukurau replace existing porcelain lighting arrestors at zone substation.
2022/23	11kV Indoor CB	Takapau ZS 11kV switchboard and protection upgrade.
2022/23	11kV CB Pole Mounted Reclosers and Sectionalisers	Peanut replacement program. RCS96, RCS98, RCS92, RCS54, RCS51.
2022/23	Distribution OH Open Wire Conductor	Smedley Road 2.3km Replace Conductor.
2022/23	11kV CB Pole Mounted Reclosers and Sectionalisers	Recloser replacement. R44 Farm Road.
2023/24	11kV CB Pole Mounted Reclosers and Sectionalisers	Peanut replacement programme. RCS4048, RCS4046, RCS42, RCS48, RCS66.
2023/24	11kV CB Pole Mounted Reclosers and Sectionalisers	Recloser replacement. R155 Maharakeke Road.
2024/25	11kV CB Pole Mounted Reclosers and Sectionalisers	Peanut replacement programme. RCS57, RCS64, RCS68, RCS30.

Table 5-74: Renewal Project List 2021/22-2024/25

5.35 Renewal Project List 2025/26 to 2029/30

Renewal Project List 2025/26 to 2029/30		
Financial Year	**Asset Category**	**Project Description**
2025/26	Zone Substations	Waipawa ZS 11kV Switchboard and Protection Upgrade (Half the Switchboard).

Table 5-75: Renewal Project List 2025/26-2029/30

5.36 Determination Reference Mapping Table

Section 5 Reference	Determination Reference
5.1 Introduction to this Section 5.2 Overview of Lifecycle Asset Management Planning	12
5.3 Maintenance	12.1, 12.2
5.4 Renewal	12.3, including 12.3.1 and 12.3.2
5.5 Asset Lifecycle Management by Asset Category 5.6 Sub-transmission: Asset Group Overview 5.7 Sub–transmission: 33kV Overhead Lines 5.8 Sub–transmission: 33kV Underground Cables 5.9 Zone Substations: Asset Group Overview 5.10 Zone Substation: Power Transformers 5.11 Zone Substations: 33kV Circuit Breakers 5.12 Zone Substation: 11kV Circuit Breakers and Switchboards 5.13 Zone Substation: Buildings 5.14 Zone Substation: Ripple Injection/Load Control Plants 5.15 Poles: All Voltages 5.16 Distribution and Low Voltage Overhead Lines 5.17 Distribution and Low Voltage Underground Cable 5.18 Distribution Transformers 5.19 Voltage Regulators 5.20 Overhead Distribution Switchgear 5.21 Ground Mounted Distribution Switchgear	4.4, including 4.4.1, 4.4.2, 4.4.3 and 4.4.4 12.4, including 12.2.1 and 12.2.2 12.3, including 12.3.1 and 12.3.2

Section 5 Reference	Determination Reference
5.22 Overview of Secondary Assets 5.23 Network Communications 5.24 Supervisory Control and Data Acquisition (SCADA) 5.25 Protection Relays 5.26 Zone Substation Secondary Assets 5.27 Low Voltage Pedestals	4.4 including 4.4.1, 4.4.2, 4.4.3 and 4.4.4 12.2, including 12.2.1 and 12.2.2 12.3, including 12.3.1 and 12.3.2
5.28 Centralines' Assets Installed on Bulk Electricity Supply Sites	4.5.2
5.29 Centralines' Owned Generators 5.30 Other Generation Plant	4.5.2, 4.5.3, 12.2 and 12.3 4.5.4, 12.2 and 12.3
5.31 Asset Maintenance Expenditure Projections	12.2.3
5.32 Asset Renewal Expenditure Projections	12.3
5.33 Renewal Project List 2020-2021 5.34 Renewal Project List 2021/22to 2024/25 5.35 Renewal Project List 2025/26 to 2029/30	12.3.3 12.3.4 12.3.5

Table 5-76: Determination Reference Mapping Table

6

NON-NETWORK DEVELOPMENT MAINTENANCE & RENEWAL

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6. NON-NETWORK DEVELOPMENT MAINTENANCE & RENEWAL

6.1 Introduction to Section

This section summarises and outlines the lifecycle activities of material non-network assets including policies covering the development, maintenance and renewal of these assets. An overview is included of material capital expenditure and maintenance, and renewal projects proposed for the next five-years.

Centralines has two categories of material non-network assets, Property and Vehicles. Each category is detailed separately below.

Centralines does not own any material Information Technology (IT) assets. Operational information systems are provided by Unison Networks Limited (UNL), under the provisions of the Management Services Agreement (MSA).

6.2 Property

For the purposes of the Regulatory Asset Management Plan (RAMP), property assets exclude substations as these are classified as 'Network Assets'.

6.2.1 Description of Assets

Centralines owns a depot in Peel Street, Waipukurau, and a separate storage yard in Coughlan Road, Waipukurau.

6.2.2 Development, Maintenance and Renewal Policies

The development, renewal and maintenance of property assets are on an 'as required' basis. There is an ongoing strategic review of property requirements which identifies any changes that may be necessary to ensure the continued efficient operation of Centralines.

Maintenance contracts are in place for scheduled and reactive maintenance activities on grounds and buildings including air conditioning units, fire alarms and security systems, to ensure Centralines remains compliant with Building Warrant of Fitness requirements.

6.2.3 Material Capital Expenditure Projects Planned for the Next Five Years

Table 6-1 details proposed capital projects.

Project	Description
New Head Office Complex	A new head office site has been purchased, adjacent to the substation in Coughlan Road, Waipukurau. Centralines is now in the process of tendering the construction of the building and expects the building to be complete in 2021, subject to contractor availability.

Table 6-1: Material Capital Expenditure Projects Planned for the Next Five-Years

6.2.4 Material Maintenance Activities Planned for the Next Five Years

Routine property maintenance is planned and budgeted on an annual basis. No material maintenance activities are currently planned.

6.3 Vehicles

6.3.1 Description and Quantity of Vehicle Assets

For the purposes of the RAMP, vehicle assets are divided into three classes. The number of vehicles owned by Centralines is detailed in Table 6-2.

Category	Description	Number
Heavy	All vehicles over 3.5 tonne excluding excavators, trailers and generators.	8 vehicles
Light	All vehicles under 3.5 tonne excluding excavators, trailers and generators.	17 vehicles
Other	Excavators, trailers and generators, etc.	16 assets

Table 6-2: Description and Quantity of Vehicles

6.3.2 *Renewal Policy*

Centralines has a Motor Vehicle Policy (CL-PE-16), which details renewal criteria as outlined in Table 6-3.

Vehicle Type	Replacement Criteria
Heavy	10 years or 300,000km
Light Commercial (Utes and Vans)	5 years or 150,000km
Light	3 years or 80,000km
Other	Specific to equipment type

Table 6-3: Vehicle Type and Replacement Criteria

6.3.3 *Material Capital Expenditure Projects Planned for the Next Five-Years*

Centralines has an annual motor vehicle replacement plan based on their Motor Vehicle Policy.

6.3.4 *Material Maintenance Activities Planned for the Next Five-Years*

Maintenance plans for all vehicles are as per the manufacturer's recommendation.

One of the existing Bucket trucks is scheduled for a rebuild in the upcoming planning period. No other material maintenance activities are planned for this period.

6.4 Determination Reference Mapping Table

Section 6 Reference	Determination Reference
6.1 Introduction to Section	13
6.2 Property 6.3 Vehicles	13 including 13.1-13.4

Table 6-4: Determination Reference Mapping Table

7

RISK MANAGEMENT

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7. RISK MANAGEMENT

7.1 Introduction to Risk Management at Centralines

Risk management is an integral part of Centralines' overall business philosophy and as such, plays a fundamental role in Centralines' asset management process.

Risk at Centralines is defined as ***'the effect of uncertainty on its objectives'***, which may be positive or negative. Centralines' Risk Management Policy and processes provide a disciplined, structured and systematic approach to identifying, prioritising, managing and reporting on the risks to the business.

Centralines' risk vision is to:

'embed a risk culture and practices so all employees take personal ownership for identifying risks and limiting the impacts of unforeseen events.'

Centralines' risk management approaches are clearly specified in corporate controlled documentation which includes a Risk Management Policy, and Risk Management Framework. Both documents are aligned with the principles provided in ISO 31000:2018 Risk Management — Guidelines.

Both the Risk Management Policy and the Risk Management Framework are Centralines Board approved documents. These documents require risks to be aggregated from across the business and then formally reported to the governing body. Enterprise risks are reported at least half yearly:

- to the Audit and Risk Committee (a sub-committee of the Centralines Board), and
- to the Centralines Executive Risk Committee (ERC).

The corporate risk management approaches are translated to become specific to asset management.

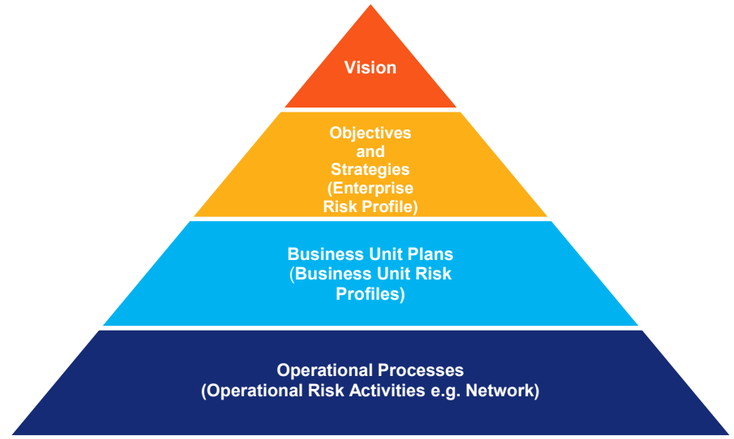

Figure 7-1: Risk Management Hierarchy

Risk management has become increasingly important within asset management at Centralines. This is not only to ensure operational risks to assets are effectively identified and managed but also, given the changing dynamics of the industry, that strategic risks to assets are effectively identified and managed through commercially sound solutions for the benefit of all stakeholders.

7.1.1 *Risk Management Policy*

Centralines' risk management policy is to:

- ensure that risk management is an integral component in developing the Company's strategies
- through business processes, systematically identify and assess risks to objectives including, strategy, assets and key stakeholders
- reduce, avoid, share or accept identified risks, having regard to the Company's Board-approved appetite and tolerance for risk
- contain and minimise the consequences in the event of an identified risk materialising, and
- provide for the continued provision of services through adequate and timely response, restoration and recovery.

This policy uses a single framework for the management of risk as detailed in Centralines' Risk Management Framework.

7.1.2 *Risk Management Governance Structure, Roles and Responsibilities*

Governance can be summarised as the oversight of how risk management practices are conducted. The governance role for Centralines is performed by Centralines' Board of Directors.

The Board, with the assistance of Executive Management:

- provides the mandate for an effective risk management system
- sets boundaries for which risks are acceptable (risk appetite)
- sets the 'tone' and expectations throughout Centralines on the importance of risk management, and
- ensures Centralines' Risk Management Framework and maturity is appropriate for the context of the organisation.

In addition, it is essential everyone at Centralines understands:

- what risks they face
- how they are accountable for them, and
- what actions they must take to manage and mitigate those risks.

The following sections provide information about the designated risk management roles and responsibilities, and what is expected of all staff with regards to risk management.

7.1.2.1 *Board Audit and Risk Committee*

The Centralines' Board maintains overall responsibility for risk management, including setting the mandate, appetite and tolerances for acceptable expectations of risk. The Board delegates to its Audit and Risk Committee (ARC) the responsibility to closely scrutinise and oversee the application and output of Centralines' Risk Management Policy.

7.1.2.2 *Executive Risk Committee*

The Centralines' Executive Risk Committee meet at least six-monthly to formally discuss and challenge Centralines risks. To achieve this the Committee:

- monitor and manage risks
- escalate risks of material significance
- manage the progress of control remediation activities, and
- promote a risk-awareness culture.

7.1.2.3 *All Employees*

All Centralines' employees are responsible for the management of risks. Their responsibilities are to:

- consider risk as part of any decision-making process and part of their day-to-day activities
- carry out all mitigation activities as agreed, and
- take immediate action to report and escalate identified incidents or near-misses across any risk class that could have the potential to result in any loss (both quantitative and or qualitative).

7.1.2.4 *Group Risk Manager*

Unison Networks Limited (UNL) is the management services provider for Centralines. Unison's Group Risk Manager is responsible for the development, coordination and implementation of strategic risk maturity practices.

Unison's Group Risk Manager updates the Enterprise Risk Register and prepares the relevant risk reports for Centralines' Executive Risk Committee, Senior Management and the ARC. In addition, the Group Risk Manager tracks and reports to the ARC progress in all control remediation activities that impact on the enterprise risks.

7.2 Risk Management Framework

7.2.1 *Purpose*

The Risk Management Framework sets out Centralines' processes and procedures to enable the intent of the Risk Management Policy to be carried out. It helps management and the Centralines Board meet their governance obligations with respect to risk management.

The purpose of the framework is to:

- provide clear guidance and instructions on how to identify and manage risks
- standardise and co-ordinate risk activities and risk practices across Centralines
- describe the components of Centralines' risk approach, including the hierarchy for risk recording and reporting
- provide assurance to the Board and other stakeholders that Centralines has appropriate arrangements and practices in place for the identification and management of risk
- inform Centralines employees of their individual and collective responsibilities for managing risk
- ensure consistent and standardised application of risk management across Centralines, and
- assist in ensuring risk management practices are integrated into normal business practices.

7.2.2 *Alignment to Risk Management Standard*

ISO 31000:2018 Risk Management — Guideline is widely recognised as the leading international standard in risk management. Centralines' Risk Management Framework is aligned with ISO 31000:2018.

In addition, the Risk Management Framework is extended to specifically include information security. This component of the risk framework is benchmarked against ISO 27000:2013 — Information Security Management. It contains additional steps in the risk identification process, including identifying critical information assets and vulnerabilities.

ISO 31000:2018 guidelines for managing risk are based on the principles, framework and process illustrated in Figure 7-2 below ('clauses' refers to the reference from the standard).

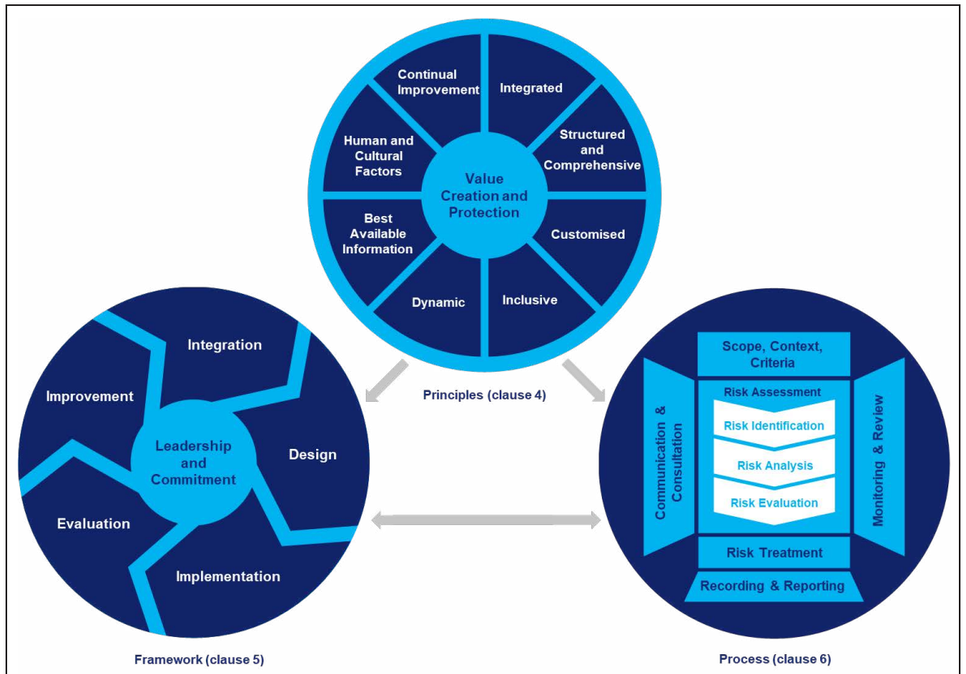

Figure 7-2: ISO 31000:2018 Guidelines for Managing Risk

7.3 Risk Management Process

ISO 31000:2018 provides guidance and a structure for the risk management process. Centralines has adopted this process as an integral part of its Risk Management Framework. The process provides the practical tools and guidance on how to identify, consider, rank and manage risks.

The diagram shown in Figure 7-3 illustrates, at a high-level, Centralines' Risk Management process.

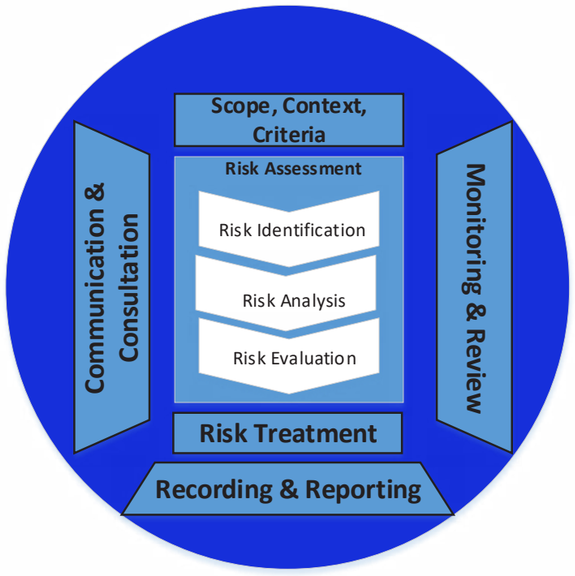

Figure 7-3: Centralines' Risk Management Process

7.3.1 *Stage 1 – Establish the Scope, Context & Criteria*

The first stage in the risk process is to establish the scope, context, and criteria.

7.3.1.1 Scope

Risk management practices can be applied at all levels of the organisation, e.g. strategic, operational, financial, project. Therefore, it is important to be clear on the scope of the risk by understanding at what level of the organisation the risk process is being applied to. This will ensure that risks are associated to the relevant business objectives.

Objectives at all organisational levels should align to Centralines' strategic objectives. Therefore, as risk is defined as 'risk to objectives' it is possible to aggregate most risks into the Enterprise Risk Profile. Through aggregation, every risk can be assessed to ensure the aggregated materiality of the risk is within the Board-approved risk appetite statement.

7.3.1.2 Context

The risk process considers context in two areas, namely the:

- internal environment, and
- external environment.

The internal environment represents features essentially within the direct control of Centralines. Risk management is aligned to Centralines' culture, processes, structure and strategies.

The external environment represents features that are essentially outside the direct control of Centralines.

7.3.1.3 Criteria

Risk assessments should be undertaken consistently across the organisation and at all levels. Therefore, each risk is assessed by considering the:

- uncertainties that can affect the outcomes of objectives
- consequence and likelihood definitions
- time-related factors, i.e. speed at which the issue(s) are emerging
- risk capacity as defined by the Board's risk appetite statement, and
- effect on other risk or the combinations of risks.

7.3.2 *Stage 2 – Identify Risks*

After establishing scope, context and criteria, the next stage of the process is to identify risks. The key to this stage is to:

- understand objectives, and
- develop a list of events or areas of uncertainty that could impact on Centralines achieving their objectives.

There are a number of methods and approaches that can be used to identify risks and controls. One approach Centralines has adopted is Bowtie Analysis, which is outlined in Figure 7-4 below.

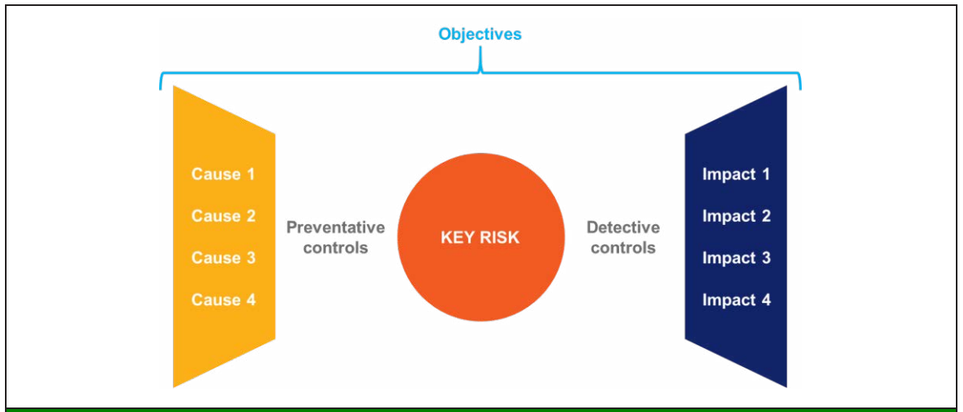

Figure 7-4: Bowtie Analysis

7.3.3 *Stage 3 – Analyse Risks*

The next step in the risk process is to analyse the risks that have been identified. The overall aim of risk analysis is to form a view of the risk rating based on the likelihood and consequence of the risk eventuating. The risk consequence considers both financial and non-financial impacts.

Centralines' Risk Management Heatmap is shown in Figure 7-5. Risk levels are interpreted as the intersection of the consequence and likelihood levels for each risk assessed. Centralines' risk consequences impact may be either financial or non-financial.

		Consequence				
		Negligible	Minor	Moderate	Major	Catastrophic
Likelihood	Almost Certain	Low	Medium	High	Extreme	Extreme
	Probable	Low	Medium	High	Extreme	Extreme
	Likely	Low	Medium	High	Extreme	Extreme
	Possible	Insignificant	Low	Medium	High	Extreme
	Rare	Insignificant	Low	Medium	High	Extreme

Figure 7-5: Risk Management Heat Map

7.3.4 *Stage 4 – Evaluate Risks*

Once risks have been analysed the next stage is to evaluate them. Risk evaluation involves determining whether a risk should be further treated or not. For those risks determined as needing treatment, a broad order of priority is established through action plans.

Risk evaluation options include:

- do nothing further
- consider treatment options
- undertake further analysis
- maintain existing controls, and
- reconsider objectives

Each risk is considered in context of the:

- Board approved risk appetite statement
- impact on Centralines' operations
- strategic impact, and
- importance to operational effectiveness and efficiency, i.e. cost of treatment relative to the benefits of risk reduction.

7.3.5 *Stage 5 – Treat Risks*

Risk treatment involves selecting and implementing the most appropriate options to manage risk. Selection of options involve balancing the potential benefit against the cost of implementation in the context of risk appetite, i.e. risk versus reward. The value is broader than economic considerations and should balance all key stakeholder values and views.

Risk treatment plans are recorded in Centralines' approved risk management software, which includes proposed milestones and who is responsible. Treatment actions must be tracked and reported at the appropriate level until closed.

Agreed treatment plans are monitored and reviewed while being implemented. Once implemented risk treatment plans will form part of the risk controls that are regularly reviewed and monitored.

The options below provide the generic choices for managing/treating risk:

- **Avoid** — by not starting or discontinuing the activity
- **Retain** — accept the risk at its current level through informed or conscious decision-making
- **Reduce** — changing the likelihood or consequence
- **Share/Transfer** — shift part of the risk to suitable and capable counterparties, e.g. insurance, joint ventures
- **Increased Exposure** — consciously taking on more risk to pursue an opportunity, and
- **Remove** — the source of the risk.

7.3.6 *Stage 6 – Monitor & Review*

The risk process at Centralines is structured and iterative. There is a central risk function that oversees and monitors the application of the Board approved risk policy, framework and processes. Centralines also operates a co-sourced internal assurance programme with one of the 'Big 4' audit firms.

7.3.7 *Stage 7 – Recording & Reporting*

A full formal review of risks is undertaken by Centralines' Executive Risk Committee business units at least bi-annually. The Audit and Risk Committee is provided with the resulting enterprise risk report following this review.

Formal risk meetings include all aspects of the Risk Management process, with formal consideration given to:

- whether key controls are effective and efficient in design and operation
- business incidents (including near misses) within Centralines and the wider industry
- any changes to the internal and external environment, including proposed changes to regulations and legislation
- changes to strategy/objectives
- audit reports (internal and external) with medium or high findings, and
- any emerging risks and trends.

7.4 Risk Management in the Asset Management System (AMS)

7.4.1 *Purpose*

The purpose of risk management in the Asset Management System (AMS) is to support people to make effective decisions. These decisions enable cost, risk and performance to be traded off appropriately so that Asset Management Objectives (AMOs) may be achieved.

Risk management in asset management decision making covers:

- identification of assets whose failure will have the most significant consequences for Centralines' business
- determination of the most valuable work in which to invest, and
- semi-quantification of the value of any work in terms of its mitigation of risk.

Work in asset management takes several forms and include:

- engineering investigations
- capital projects, and
- maintenance and operations support.

Decisions taken regarding the assets include:

- timing to renew
- response times to address defects, and
- requirements to provide contingency against failure.

7.4.2 *Nature of Risk*

Risk is a function of three parameters. These are the:

- consequence of failure
- he likelihood of the failure being realised, and
- ability to recognise the risk

The quantification of these parameters in specific instances provides a rational basis for selecting between different courses of action for:

- controlling risk, or
- prioritising improvement opportunities.

Quantification requires two types of analysis:

- monetarisation of the consequence, and
- determination of a probability of failure, which may be a normalised probability, or a time to failure from the current time.

Where possible, quantification is preferred to support the business case for investment. This allows direct comparison of the cost of the intervention and the risk cost, i.e. the cost of doing nothing. The risk cost is the product of the monetarised consequence and the probability of failure. The risk cost may be adjusted if:

- the investment is applied early, and
- there is residual value in the assets being disposed as part of the overall system renewal.

7.4.3 *Principles of AMS Risk Management*

The key principles of risk management as they relate to the AMS are the:

- potential for high consequence failures need to be recognised
- assessed likelihood of assets failing or being unable to deliver their intended level of performance must be regularly revisited
- opportunities for investment and allocation of labour must be compared on a credible risk basis
- awareness of hidden risk which may lead to catastrophic outcomes must be incorporated into asset management strategies, and
- effective risk management depends on accurate information, and therefore data assurance must be implemented for risk related information.

7.4.4 *AMS Risk Management Activities*

There are six primary activities in the AMS where risk is determined and reported. These are set out in the Table 7-1 below.

Activity	Description
Asset Criticality Ranking	Identification of assets and asset systems whose loss of capability or acceptable condition presents a significant risk to Centralines' business, including network operations. High criticality assets may be justified for earlier intervention or renewal over competing demands for investment from lower criticality assets.
Asset Health	The state of assets in terms of their condition and likelihood to deliver requisite capability at any point in time. Assets in a deteriorated state are candidates for renewal. Assets that are underrated or not appropriate for the application will be upgraded. Assets subject to harsh operations, e.g. frequent operation or working in a harsh environment, e.g. corrosive, may have their renewal brought forward.
Project Investment Analysis	Each proposal for expenditure should be ranked according to risk which describes the state where no investment is made, and the asset progresses to a forecast state of deterioration or unacceptable level of capability. Consideration should be given to the certainty of the assessment which typically improves closer to the time of work commencing.
Project Works Delivery	Project risk is a function of deviation from schedule, budget and agreed quality of work. The progress of each project should include reporting of the risks and how they are being managed. Project completion should be accompanied by a risk assessment regarding the residual risk to: • operations • ongoing maintenance as a function of the build quality, and • commissioning.
Works Scheduling	The timing of work should be a function of the risk which it will address. The backlog in work should represent the lowest practicable risk to Centralines' operations and business compliance, as well as customer response. This considers the cost of addressing the risk. It is preferred that the timing is scheduled so that intervention is required well before the risk has advanced to a state which is not acceptable.
Continual Improvement	Each continual improvement opportunity should be ranked according to: • risk, which describes the state where no investment is made, and • performance against the relevant asset management objective progressing to a forecast state which is unacceptable.

Table 7-1: Risk Management Activities of the AMS

7.4.5 *Assessing Consequence Level*

The consequences of risk are the extreme states when an undesirable occurrence has taken place, i.e. an incident. In the asset management context, this often equates to an asset not being able to deliver its desired level of performance. This may be due to:

- an external event such as a storm or traffic accident
- natural deterioration over time. i.e. fair wear and tear, or
- accelerated deterioration due to how the asset has been used or its working environment.

Typical consequences experienced in the asset management domain are specified in Table 7-2 below.

Consequence Category from Risk Management Framework	Asset Management Consequence	Description
Financial	Asset loss	The capital value destroyed with the failure of an asset or its significant impairment. The cost of returning the asset back to an acceptable condition.
	Revenue loss	The revenue lost when an asset fails or requires significant work over and above that budgeted in the maintenance budget. Allowable revenue under the Default Price Path (DPP) incentives/penalties framework jeopardised due to SAIDI and SAIFI impact.
Regulatory/Legal/ Contractual	Environment	Costs, penalties and restrictions imposed because of significant breaches to the operation of the assets in their environment. This can also consider the impact on the local community and its welfare.
Reputation/Customer	Reputation	The loss of confidence in the organisation by both the community and important external stakeholders.
Business Disruption/Operational	Mission	The inability of the organisation to fulfil its mission. such as the safe supply of power owing to the loss of capability of assets.
People/Employees/ Contractors	Safety	Any human who could be impacted by failure of an asset to perform its intended function or through working on an asset.

Table 7-2: Consequence Categories

For a given incident, it is likely that multiple asset management consequences will apply. For example, in a major outage there may be consequences to the mission, reputation and finances of the organisation.

Table 7-3 shows the level of severity of each of these consequences.

Level of Severity	Consideration
Negligible	Event(s) brought to the attention of management - managed within existing resource capability. Does not affect 'business as usual'. Impact dealt with at an operational level.
Minor	Event(s) require limited management attention with priority generally limited to one business unit. Does not affect 'business as usual'.
Moderate	Event(s) do not destabilise core operations or strategic direction. Consequences can be managed under existing structures (existing budgets, insurance coverage and management oversight).
Major	Event(s) require significant Board/Group CEO/senior management to stabilise the core business and reset strategic priorities. Event shapes Centralines' focus over multiple financial periods. Potential for Government/ Regulator appointed oversight.
Catastrophic	Event(s) would make it difficult if not impossible for Centralines to fully recover from - permanent impact may result or long sustained period of instability and rebuild. Potential for Government intervention. Affects all facets of Centralines.

Table 7-3: Consequence Levels

7.4.6 *Assessing Likelihood Level*

Likelihood is the chance that a risk may be realised. It is preferable to stay away from generic terms such as likely or impossible. The use of these terms is subjective and varies depending on the person undertaking the assessment.

The definitions of likelihood, with an asset management descriptor is shown in Table 7-4 below.

Level	Time Based Descriptor	Asset Management Descriptor	Consideration
Rare	Unlikely to occur within a ten-year timeframe.	Not heard of in the industry (but has occurred in other industries).	A catch all for a low probability event which even a HILP (refer below) may consider to be unlikely or for which additional investment is not warranted.
Possible	May occur within a ten-year timeframe.	Has occurred in the industry.	The hazard is unusual and dependent on several factors, e.g. design, utilisation, working environment, all combining which indicates that there should be multiple safeguards in place to prevent the hazard from being realised.
Likely	Likely to occur at least within a five-year timeframe.	Has occurred in the organisation.	The hazard is known to have infrequently occurred but is probably a slow growth issue which will take time to reach a measurable level of deterioration.

Level	Time Based Descriptor	Asset Management Descriptor	Consideration
Probable	Likely to occur within a one-year timeframe.	Has occurred at the local site.	The site is known to have these hazards and is consistent with the modes of deterioration, utilisation and working environment. In such case evidence of deterioration should be measurable.
Almost Certain	Likely to occur immediately or within a short period of time.	Is highly likely given the current level of deterioration.	This assessment considers that the condition of the asset is so poor that imminent failure or loss of capability is a question of when, and not if.

Table 7-4: Likelihood Levels

7.4.7 *Risk Assessment and Risk Treatment in the AMS*

As discussed earlier, there are six key risk management activities in the AMS:

- Asset Criticality Ranking
- Asset Health Reporting
- Project Investment Analysis
- Project Works Delivery
- Works Scheduling, and
- Continual Improvement.

These activities are represented in the context of Centralines' Risk Management Process in Figure 7-6 below.

Note
Continual Improvement is not shown in Figure 7-6 below, as Continual Improvement can relate to any part of the AMS, and may not result in work being done on assets.

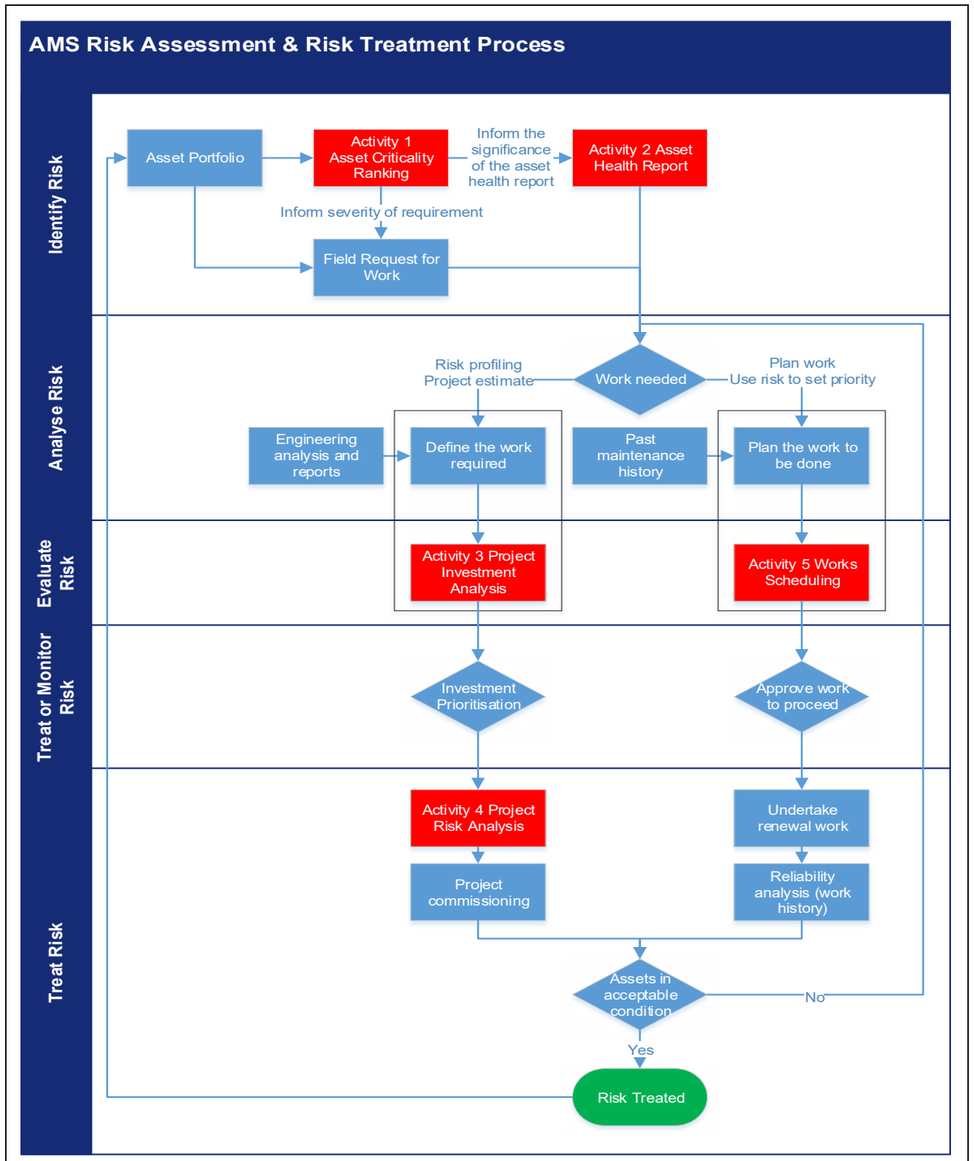

Figure 7-6: AMS Risk Assessment & Risk Treatment Process

The ranking of asset criticalities will influence risk assessments associated with proposed work on assets. For example, proposed work on high criticality assets is often more prudent for investment, than work on lower criticality assets.

Fundamental to effective asset related, risk management is the detailed knowledge of asset health. Both project and maintenance work should rely on credible and current information related to the health of the assets.

The treatment of risk should result in a reassessment of the condition of the assets. In the case of new or refurbished assets, this means good feedback at commissioning to confirm assets in place are safe and fit to operate. Where there are legacy issues associated with asset condition or their installation, then feedback is needed to inform the organisation of residual risks which need to be followed up.

After evaluation of the risk, a decision may be made to do nothing if the risk is within acceptable risk tolerance. For example, a CI which represents a risk may be evaluated and deemed an acceptable risk. In this situation, the decision to do nothing should be recorded, along with the reasons why.

7.4.8 *Control of Risk Assessment*

The outcomes of risk assessment are controlled in three ways:

- proposed risks are validated as being true and then verified as to level of severity
- various reports are issued which communicate risk in the assets and what is being done about it, and
- internal audit is utilised to ensure processes are properly managed and to propose improved methods as well as work to better manage risks.

7.4.9 *Validation & Verification*

Verification activities which inform Centralines of risk in the asset portfolio include:

- asset condition monitoring processes, including online methods such as those implemented under the:
  - standard condition assessment check sheets, and
  - maintenance feedback
- network performance monitoring and reporting, including on standard measures such as SAIDI and SAIFI, and
- asset failure history and trending thereof, including analysis of high priority, short lead-time work (even where no network outage resulted).

Validation of risk assessment undertaken for the five key activities are set out in Table 7-5 below.

Note

Continual Improvement is not included in Table 7-5 below, as Continual Improvement can relate to any part of the AMS and may not be a risk in the asset portfolio.

Activity	Validation Process
Asset Criticality Ranking	• Comparison of mean asset criticalities between fleets of assets. • Assets with high criticalities as an exception to the typical value for their class. For example, based upon high numbers of connected customers.
Asset Health Reporting	• Audit of asset inspections and their results. • Early failures of assets recently inspected. • Validation of asset health as part of project business case development, e.g. is the project worthwhile?
Project Investment Analysis	• Review of project risk profiling in follow up workshops. • Comparison of project estimates with past project history of similar projects.
Project Works Delivery	• Auditing of projects. • Quality assurance in the project closeout.
Works Scheduling	• Effectiveness of the contracting service provider in achieving schedule compliance.

Table 7-5: Risk Validation & Verification

7.4.10 *Performance Assessment*

The effectiveness of risk management is considered based on whether desired business outcomes are being realised. The outcomes desired for the activities considered in this document are specified in Table 7-6 below.

Activity	Validation Process
Asset Criticality Ranking	• Risk profile of assets with high levels of criticality. • High criticality assets with no preventive maintenance or rigorous inspection programmes applied.
Asset Health Reporting	• Recent measurements approaching alert levels which require intervention. • Gaps in the measurement coverage where scheduled measurements have not been taken. • Trend analysis indicating a rate of deterioration.
Project Investment Analysis	• Risk profile of the investment portfolio – are risks being addressed in a timely manner. • Risk profile of work to be done in specific areas – measure of the risk in these areas, and the need to defend the budget.
Project Works Delivery	• Project delivery on time and on budget. • Number of variations within the project.

Activity	Validation Process
	• Quality non-conformances on the project.
Works Scheduling	• Risk associated with work backlog. • High risk work tasks remaining in backlog.
Continual Improvement	• Performance against AMOs as measured through Centralines' Performance Evaluation process

Table 7-6: Performance Measures to Confirm Risk Estimates

7.4.11 *Continual Improvement*

Centralines is committed to consistent processes for the continual improvement of its assets and systems, and the work undertaken to maintain them. It is intended all work utilises knowledge of the health of the assets to propose optimal future work, and the improvement of service delivery.

Continual improvement in the application set out in this document will be achieved through two processes:

- major project review sessions, and
- performance audits.

7.4.12 *Condition Based Risk Management (CBRM)*

The Condition Based Risk Management (CBRM) framework has been implemented for many of Centralines' major asset classes to support asset engineers in making asset renewal decisions. The CBRM models systemise risk management decision making by providing an assessment of:

- asset health, and
- criticality based upon available asset information.

This logic is embedded in the CBRM models which are themselves implemented in Excel spreadsheets.

CBRM is intended to be established as a mature asset management decision support tool. This tool allows risk-based asset management plans for specific asset classes to be developed. The outcome of this is the minimisation of deterioration leading to forced corrective maintenance and unplanned interruptions.

The utilisation of the CBRM tool requires the following:

- efficient presentation of asset data to the tool
- use of the tool to deliver decision-support for the replacement of nominated asset types, e.g. RMUs, and
- assessment of the results to validate that work so the decision-support is credible, and investment can be justified.

Approximately 85% of the data presented to the CBRM tool is automated from corporate systems such as ACTIVA. These data flows need to be tested to ensure they are consistently correct and lead to the right inputs. A further 15% of the data is manually uploaded and efficiencies are continually sought in this process.

Analysis is required to interpret the CBRM outputs as technical proposals for work. This analysis must be adequate to allow an asset engineer to build an asset management plan that can then be actioned. This means that a consistent template for the outputs is available to each engineer. Such stakeholders require that the output can be acted on to lead to a statement of work.

7.4.13 *Asset Management Plan (AMP) Risk Schema*

Centralines takes a risk-based quality systems approach to asset management, and is committed to implement asset management plans that:

- propose efficient levels of investment
- manage risk in the asset portfolio, and
- ensure customer service levels will be met consistently over the long term.

A key means of achieving this goal is to ensure all project proposals are registered in the AMP and prioritised according to risk in a consistent manner. The prioritisation methodology is referred to as the AMP Risk Schema.

The AMP Risk Schema prioritises project proposals using four key drivers:

- Consequence Integer Ranking — the impact of asset failure or functional failure
- Likelihood Integer Ranking — the likelihood of asset failure or functional failure
- Mitigation Multiplier — the proportion of initial risk that will be reduced through the proposed work, and
- Cost of the Work — the estimate of the cost to complete the work, used to create a cost of risk mitigated value to prioritise projects based on cost efficiency.

All work proposed in the AMP must be assessed according to these factors, as shown in Table 7-7.

Asset Information Required	Description
Consequence integer ranking (1-5)	Specify the consequence of the issue being addressed and ensure that this consequence level is reconciled to **Risk Management Framework**.
Likelihood integer ranking (1-5)	Specify the likelihood of the issue being addressed and ensure that this likelihood level is reconciled to **Risk Management Framework**.
Mitigation multiplier (%)	Specify the degree to which the proposed work will mitigate the risk in the assets.
Budget	Budget estimates are required for all projects.

Table 7-7: AMP Data Requirements

7.4.13.1 Likelihood

The Likelihood Integer Ranking schema is specified in Table 7-8.

AMP Likelihood	Health Index (CBRM)	Probability of Failure	Likelihood Descriptor
1	1-3	<1%	Rare — Type of problem has not occurred previously in the industry.
2	4-5	1-2%	Possible — Type of problem has not occurred in Centralines but has occurred in industry.
3	6-7	2-10%	Likely — Type of problem has occurred in Centralines previously.
4	8-9	11-20%	Probable — Has occurred at that location previously or a comparable location (similar environment, utilisation, make and model of equipment, etc).
5	10	>20%	Almost Certain — Almost assured to occur at that location.

Table 7-8: AMP Likelihood

7.4.13.2 Consequence

The Consequence Integer Ranking schema is specified in Table 7-9, and is for issues where CBRM models can be utilised. This schema is mapped to the Consequence Matrix specified in Centralines' Risk Management Framework to ensure consistency.

Consequence Level		Consequence of Failure (CoF) ($000)	Notes
1	Negligible	0-25	Considerations other than CoF will lead to this work being approved. Otherwise the issue will be addressed as an OpEx transaction.
2		25-50	Proposals in this range are high risk and should proceed.
3	Minor	50-100	
4		100-250	
5	Moderate	250+	All work with this level of CoF will receive AMP Consequence 5.

Table 7-9: Consequence Integer Ranking Schema with CBRM

7.4.14 *Asset Criticality Ranking Overview*

Asset criticality ranking involves prioritising assets in:

- terms of potential customer impact, and
- operational losses if they fail and considering safety and environmental issues.

High criticality assets may be justified for earlier intervention or renewal over competing demands for investment from lower criticality assets.

Centralines employs an Asset Criticality Schema (ACS) to enable each asset to be assigned a criticality score. This score can then be utilised by engineers, contracting teams, and other stakeholders to support their decision-making.

Asset criticality scores are currently stored in a spreadsheet maintained within the SharePoint environment. However, this information will be migrated to One Energy by September 2020.

7.4.15 *Asset Criticality Schema*

The Asset Criticality Schema (ACS) is specified in the following tables for:

- customer disruption, and
- safety and environmental respectively.

Each asset is assessed against each table, with scores summed to provide a total score of between two (2) and ten (10).

7.4.15.1 Customer Disruption

Criticality	Score	Descriptor
Very High	5	• 33kV sub-transmission including normally de-energised circuits. • Zone substations including 33kV and 11kV assets. • Network Operations Centre and associated hardware, software and communications systems. • 33kV and 11kV dedicated assets supplying customers with total installed capacity of more than 1MVA.
High	4	• Backbone of 11kV feeders, including RMUs (includes unprotected spurs). • All protection and control systems not already included in zone substations, e.g. reclosers and sectionalisers.
Moderate	3	• 11kV assets not part of the backbone of the feeder, e.g. fused spurs. • 11kV/400V and 33kV/400V distribution transformers.

Criticality	Score	Descriptor
Low	2	• LV circuits and other assets supporting LV infrastructure - all equipment beyond the distribution transformer.
Very Low	1	• Pedestals • Sensors and logging equipment not used in the real-time control of the network.

Table 7-10: Customer Disruption Score

7.4.15.2 Safety & Environmental

Criticality	Score	Descriptor
Very High	5	• 11kV three (3) or four (4) way RMU. • 11kV ground mounted single switch. • Overhead sections of high fire risk feeders.

High	4	• Oil-filled circuit breakers:
		  ○ 33kV CB (outdoor)
		  ○ 11kV CB (ground mounted), or
		  ○ 11kV CB (pole mounted).
		• High risk circuit breakers.
		• Pole mounted transformers on high fire risk feeders.
		• Urban overhead circuits.
		• Ground mounted transformers in road reserve.

Moderate	3	• Un-bunded power transformers. • 11kV overhead switchgear, e.g. air break switches, disconnectors, links, fuses. • Voltage regulators. • LV OH/UG streetlight circuit. • SCADA and communications equipment operating as a single system. • Ground mounted transformers. • Pole mounted transformer. • Rural overhead circuits.

Low	2	• Power transformers.
		• Vacuum circuit breakers:
		  ○ 33kV CB (outdoor)
		  ○ 11kV CB (ground mounted), or
		  ○ 11kV CB (pole mounted).

Criticality	Score	Descriptor
		• 33kV indoor circuit breaker. • Capacitors including controls. • 11kV recloser, load break switch or sectionaliser (not ABS). • 11kV indoor switchgear. • Load control — centralised plant. • Protection relays (electromechanical, solid state and numeric).
Very Low	**1**	• Cable tunnels. • OH/UG consumer service connections. • Distribution UG XLPE or PVC. • Distribution UG PILC. • Distribution submarine cable. • Ground mounted substation housing. • Relays. • LV UG cable. • 33kV cables (PILC, XLPE, oil pressurised or submarine). • Zone substation buildings

Table 7-11: Safety & Environmental Score

7.5 High Impact Low Probability Events

High Impact Low Probability (HILP) studies are important means to protect an organisation from an unforeseen disaster. Such studies consider risks which are 'High' to 'Extreme' in accordance with the risk matrix in Centralines' Risk Management Framework. The outcomes of HILP studies include:

- identification of risks previously considered unlikely but current asset condition suggests may now represent credible threats, and
- proposals for investment to insure against highly unlikely events which are still possible, and if occurred would represent genuine threat to the organisation's survival.

While any investment proposal will need to be tested against candidates which are lower consequence but more certain probability, it is recognised from studies of major mishaps around the world, e.g. Three Mile Island USA, Centralines needs to protect itself from a combination of unforeseen design, operations and asset care decisions, which can combine in a hidden manner to lead to a major catastrophe.

7.5.1 *Natural Hazards*

Greater Hawke's Bay is one of the most seismically active regions in New Zealand. Its location above the subduction boundary between the Pacific and Australian plates results in many earthquakes. Since written records began in 1840, there have been 16 earthquakes with a magnitude greater than M6.0 which have impacted the region. Of these, five have caused significant damage to buildings and infrastructure, with one resulting in fatalities.

Consequently, the following factors add to the vulnerability of the electricity network:

- ground-shaking amplification due to underlying geology
- surface faulting
- liquefaction and lateral spread
- landslide and slope instability
- volcanic ashfall from the Taupo Volcanic Zone, and
- tsunami impacting the coastal network.

There is a significant risk of inundation from either a near-source or distal-sourced tsunami that would impact Centralines' coastal network. Due to the nature of a tsunami and the possible level of inundation, mitigating action plans focus on reducing potential risks to employees and the public through evacuation of staff and the making safe of electrical equipment.

As the Central Hawke's Bay region is reasonably distant from any active volcano, the most serious threat is from a Taupo-style eruption originating from the Taupo Volcanic Zone. Ash from this type of eruption can fall in significant thicknesses at large distances from the active vent.

Other natural hazards events that the Central Hawke's Bay experiences include:

- major storm events
- flooding
- major snowstorms
- windstorms
- rural fire, and
- landslips.

7.5.2 *Network Resilience to HILP Events*

7.5.2.1 GXP Substations

Transpower who own and operate New Zealand's transmission network, has exclusive responsibility for Grid Exit Points (GXPs). Any event, however, that leads to a GXP outage has the potential to impact significantly on the supply of electricity to Centralines' customers.

Unison Networks Limited, Centralines' Management services provider, has quarterly relationship meetings with Transpower where security and quality of supply issues are discussed. Any outage of supply to a GXP is investigated to identify the root cause and corrective measures agreed, to reduce the likelihood of, or impact from, future GXP outages.

7.5.2.2 Zone Substations

Part of Centralines' security criteria (refer Section 4) includes mitigating options for the loss of supply from a zone substation or zone substations.

Due to differing levels of zone substation security, substations supplying critical load areas, such as CBDs and major customers, have a higher level of redundancy than substations that supply remote rural areas, with:

- multiple sub-transmission supply options, and
- good 11kV interconnectivity to ensure sufficient capacity from neighbouring substations.

A detailed operational management plan exists for each of the Centralines' zone substations.

The only zone substation in the Centralines' network where this is not achieved currently is the Takapau Zone Substation. This is considered a critical site as it supplies a large industrial customer. Options to mitigate this are being considered.

A review of the structural integrity of Centralines' zone substation buildings has been undertaken and subsequently seismic strengthening of all zone substation buildings has been completed.

7.6 Lifeline Obligations Overview

As a lifeline utility, Centralines has certain obligations under the Civil Defence and Emergency Management Act 2002 (the Act). These obligations are set out in Section 60 of the Act. Every lifeline utility must:

- ensure that it is able to function to the fullest possible extent, even though this may be at a reduced level, during and after an emergency
- make available to the Director in writing, on request, its plan for functioning during and after an emergency
- participate in the development of the national civil defence emergency management strategy and civil defence emergency management plans
- provide, free of charge, any technical advice to any Civil Defence Emergency Management Group or the Director that may be reasonably required by that Group or the Director, and
- ensure that any information that is disclosed to the lifeline utility is used by the lifeline utility, or disclosed to another person, only for the purposes of this Act.

Centralines is responsible for notifying the CDEM Group Coordinator of the status of the network following any disaster (such as major storms, flooding, snowstorms, earthquakes, etc.) and throughout any declared or non-declared emergency in the region.

As part of its Civil Defence and Emergency Management (CDEM) obligations Centralines participates as required in Regional Lifeline Group meetings as well as regional Civil Defence exercises.

7.7 Business Continuity Management (Emergency Response and Contingency Plans)

7.7.1 *Business Continuity Management*

Business continuity can be described as the capability of an organisation to continue delivery of products or services at acceptable pre-defined levels following a disruptive incident or event.

Business Continuity Management is the process that identifies critical processes, potential threats to those processes, and the impact on the business operation if threats are realised. Systems of prevention and recovery in response to those identified threats and business impacts are created, which aim to, when threats are realised:

- minimise business impact, and
- enable the business to resume to business as usual in the shortest practical time-period.

It provides a framework for building organisational resilience and includes response capability to safeguard the interests of Centralines' key stakeholders, reputation, brand and value-creating activities.

Centralines Business Continuity Management System (BCMS) has at its core the following objectives:

- maintenance and/or timely restoration of supply to Centralines' customers
- satisfying Centralines' legislative and community responsibilities
- preserving Centralines' reputation, and
- ensuring the continued operation of Centralines.

The BCMS framework is available to:

- guide Centralines through the process that will enable the meeting of these commitments, and
- ensure Centralines has a plan which is documented, communicated, regularly reviewed and tested to ensure its continuing suitability.

Centralines has developed a suite of controlled documents and associated plans and processes to ensure it is prepared and able to provide an effective and efficient response should an event materialise and guide its recovery.

Figure 7-7 below provides the key components of Centralines' BCMS, which includes the following plans (described in further detail in Table 7-12):

- Crisis Management Plan
- Emergency Response Plan
- Crisis Communications Plan
- Business Continuity Plans
- Information Systems Disaster Recovery Plan
- Alternative Operational Control Plan, and
- Evacuation Plans/Emergency Procedures.

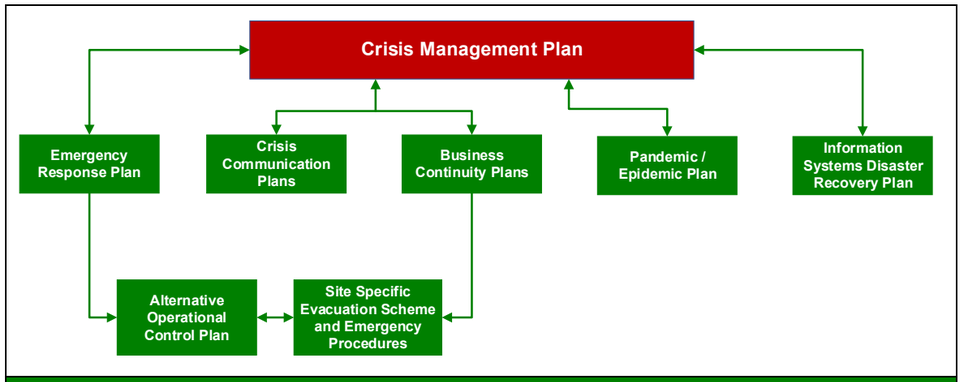

Figure 7-7: Business Continuity Management System

Document / Plan	Overview
Crisis Management Plan	The Crisis Management Plan is a key document in the Business Continuity Management Programme. Under the Management Services Agreement, Centralines is included in Unison's Crisis Management Plan. This provides Centralines with a framework to effectively manage any crisis event. It is focused on time-limited, problem-solving interventions to respond to crisis situations and to facilitate the restoration of core services. The success of the plan is dependent on clearly assigned and understood roles, responsibilities and delegations, as well as escalation procedures and coordinated response activities.
Emergency Response Plan	The Emergency Response Plan ensures Centralines is prepared for, responds to and recovers from any emergency event which causes, or has the potential to cause, a major disruption to the distribution of electricity in the network area. The plan covers: • mechanisms for triggering the emergency response plan (event escalation levels) • management processes for coordinating response/restoration actions • meeting Civil Defence Emergency Management Group Plan requirements • Health and Safety principles governing all actions • the availability of standby resources, and • communications with all interested parties.
Crisis Communications Plan	The Crisis Communications Plan is triggered by the activation of the Crisis Management Plan. The objectives of the Crisis Communications Plan are to ensure Centralines is prepared to handle all communications requirements (both internally and externally) in a timely, relevant and factual manner should an event arise.
Business Continuity Plans	The Business Continuity Plan documents Centralines' key processes and the support tasks and roles which provide continuity to those processes. This ensures Centralines can respond to, recover from, and resume business-as-usual operations as quickly as practical following a significant event.
Information Systems Disaster Recovery (DR) Plan	Centralines' Information Management Systems Disaster Recovery Plan is designed to meet the needs of Centralines' Crisis Management and Emergency Response Plans. It includes a prioritised and time-bound schedule of critical system resumption objectives which are based on key business processes.

Document / Plan	Overview
Pandemic / Epidemic Plan	The purpose of the Pandemic / Epidemic Plan is to manage the impact a pandemic or epidemic on both employees and the business by containment while maintaining critical business activities.
Alternate Operational Control (AOC) Plan	Centralines' Management services provider's, Alternate Operational Control Plan identifies the location and layout of the Alternate Operational Control Centre. It provides a checklist of actions to be followed by NOC staff when operations are transferred, and identifies tasks required to close down the alternate site upon resumption of operations at the Omahu Road NOC.
Site-Specific Emergency Evacuation Plans	Site Emergency Evacuation Plans detail how during an emergency Centralines staff and any visitors will evacuate safety and quickly from Centralines' premises. The plans cover: • roles and responsibilities during an emergency • key personnel • signage • escape routes • assembly areas, and • the location of emergency equipment.

Table 7-12: BCMS Plans

7.8 Health and Safety Risk Management

Given the nature of the industry, both public and workplace Health and Safety practices are taken seriously. There is a separate risk team that continually assesses and reviews this risk for Centralines.

Centralines has several systemised management practices in place to work towards its goal of Zero Harm to staff, third party contractors and the public.

The workplace health and safety system is monitored biennially against the Accident Compensation Commission's (ACC) Workplace Safety Management Practices (WSMP) Programme of which Centralines is at the tertiary level. This process ensures policies, procedures, etc. are in place and being followed.

Monthly Board reporting collates all incidents, accidents and near-miss events to ensure:

- the Centralines Board is fully informed of workplace health and safety performance, and
- current initiatives allow continual improvement within this core value area of the company.

Public safety is of vital importance to Centralines and accordingly it has a Public Safety Management System (PSMS) in place which is compliant with NZS 7901:2008 Electricity and Gas Industries — Safety Management Systems for public safety. In June 2019 Centralines underwent a re-validation audit to seek re-certification to this standard. The outcome of this audit was Centralines was re-certified with no non-conformances or opportunities for improvements raised. Board reporting on public safety issues follows the same format and structure as the workplace health and safety reporting mentioned above.

7.9 Legislative Compliance Programme

Centralines is required to comply with many Regulations and legislative requirements. To ensure employees are aware of specific requirements, Centralines operates a six-monthly Legislative Compliance Programme (LCP). Specific obligations are reviewed by an external law firm to ensure that new obligations are included, and changes to existing obligations are updated. Each obligation is assigned an 'owner' and the obligation owner is required to assess the level of compliance against the Company's operational processes. Areas of non-compliance or partial compliance are required to have remediation plans completed. These plans are then tracked until full implementation. A summary of the responses and remediation plans are reported on a six-monthly basis to the Centralines' ARC.

7.10 Centralines' Insurance Programme

The role of Centralines' Insurance Programme is to provide a financial recovery capability in the event of a significant loss. Policy coverage is included for significant risks, which should they occur, would have a major impact on the company's ability to continue to operate as a going concern. The programme is assessed for suitability on an on-going basis and is renewed annually.

7.11 Determination Reference Mapping Table

Section 7 Reference		Determination Reference
7.1	Introduction to this Section	14
7.2	Risk Management Governance Structure, Roles and Responsibilities	
7.3	Risk Management Overarching Process	
7.4	Health and Safety Risk Management	
7.5	Legislative Compliance Programme	
7.6	Network Risk Identification	14.1, 14.2
7.7	Emergency Response and Contingency Plans	14.3, 14.4

Table 7-13: Determination Reference Mapping Table

8

EVALUATION OF PERFORMANCE

CENTRALINES
LIMITED

CONTENTS

8. EVALUATION OF PERFORMANCE

8.1 Introduction to this Section

Section 8: Evaluation of Performance provides information to enable stakeholders to understand how well Centralines is performing as an asset management organisation. The key performance dimensions covered are:

- physical and financial progress against the plans set out in the last disclosed Regulatory Asset Management Plan (RAMP)
- performance against service level targets, and
- assessment under the Asset Management Maturity Assessment Tool (AMMAT).

The section concludes with an analysis of gaps identified and initiatives that are planned to close these gaps.

Evaluation of performance in respect of the 2019/20 financial year is undertaken using year-end forecast information where this is available.

8.2 Review of Progress Against Plan

In this section Centralines' performance in delivering the plans set out in the RAMP update disclosed in March 2019 is reviewed in terms of physical progress (commissioning of works) and financial progress (cost performance). This evaluation is undertaken for the 2018/19 and 2019/20 financial years, for both capital and maintenance programmes.

8.2.1 Planned Capex

Capital projects proposed for each financial year as published in Centralines' 2018 RAMP are detailed below and include the status of each project as at February 2020.

An update is provided for all 2018/19 projects not completed at the time of the 2019 RAMP Update as well as all 2019/20 projects.

8.2.1.1 Capex Programme of Works 2018/19

Project Number	Constraints and Projects	Category	Status	AMP Budget ($)	Actual Spend ($)	Comments
5647	Ruataniwha Street, Waipawa CBD - Improve LV supply	Quality of Supply	Carryover	80k		Due to resource availability
5627	Wilder Road Stage 6 of 8	Asset Replacement and Renewal	Complete	150k	153k	Over time and on budget
5646	Feeder 15 - 11kV Cable Upgrade	System Growth	Complete	40k	90k	Over time and over budget
1166	11kV Reconductor Mathew Street	Asset Replacement and Renewal	Complete	45K	31k	Over time and under budget
41167	Reconductor 11kV and LV Higginson Street	Asset Replacement and Renewal	Complete	50k	48k	Over time and on budget
41169	Replace 2 Pole Structure TX B4/5 with new Pole Mount 300kVA TX - Waverley Street Waipawa	Asset Replacement and Renewal	Complete	65k	99k	On time and over budget
41170	Replace TX C4/16 with new Pad-mount TX - Jellicoe Street	Asset Replacement and Renewal	Complete	80k	249k	On time and over budget
41171	Wilder Road Substation - Substation upgrade	Other Reliability, Safety, and Environment	Complete	515k	710k	On time and over budget
40721	Proactive replacement of 5 x failing Peanut switches	Asset Replacement and Renewal	Complete	200k	189k	On time and under budget

Table 8-1: Physical Progress of Planned Network Development Projects – 2018/19

8.2.1.2 Capex Programme of Works 2019/20

Project Number	Constraints and Projects	Category	Status	AMP Budget ($)	Actual Spend ($)	Comments
41871	Feeder 74: Replace 2 Pole 200kVA transformer D3/20 Sydney Street with a new Pole Mounted 200kVA Transformer structure	Other Reliability Safety and Environment	Carryover	42k		Due to resource availability
41872	Replace failing Peanut remote controlled switches with ENTEC switches RCS 503 - Porangahau Road RCS 566 - Lake Station Road	Asset Replacement and Renewal	Work in Progress	130k		Expected to complete by 31 March
41873	Replace ABS 507, Sydney Street Takapau	Asset Replacement and Renewal	Carryover	15k		Due to resource availability
41874	Feeder 1 - Prepare site to accommodate mobile Voltage Regulator	Quality of Supply	Cancelled	40k		Alternate solution being investigated
41875	Voltage Constraint Feeder 2 West. Install Voltage Regulator Wakarara Road	Quality of Supply	Work in Progress	350k		Expected to complete by 31 March
41876	Feeder 4 - Upgrade ABS 493 to a Remote Control Switch (RCS) on Pole 918362 - Burnside Road	Quality of Supply	Complete	65k	42k	On time and under budget
41877	Feeder 75 - Upgrade ABS 568 to a Remote Control Switch (RCS) on Pole 908462 - SH 2, at SH 50 Int.	Quality of Supply	Work in Progress	65k		Expected to complete by 31 March
41878	Feeder 78 - Upgrade ABS 531 to a Remote Control Switch (RCS) on Pole 907296 - Hinerangi Road	Quality of Supply	Work in Progress	65k		Expected to complete by 31 March
41879	Feeder 4 - Replace ABS 562 with a (RCS) on Pole 901221 - SH 2 at Ashcott Road	Quality of Supply	Work in Progress	65k		Expected to complete by 31 March

Project Number	Constraints and Projects	Category	Status	AMP Budget ($)	Actual Spend ($)	Comments
41880	Feeder 4 - Upgrade ABS 521 to a Remote Control Switch (RCS) on Pole 901155 - Ongaonga/Waipukurau Road & Ashcott Road Int.	Quality of Supply	Work in Progress	65k		Expected to complete by 31 March
41881	Feeder 4 - Replace ABS 570 with a Remote Control Switch (RCS) on Pole 918161 - SH 2, 1.5kms before Speedy Road	Quality of Supply	Work in Progress	65k		Expected to complete by 31 March
41882	GN3 – RCS538 – SH2/Nancy Street cnr to be replaced. Pole 908435	Quality of Supply	Work in Progress	65k		Expected to complete by 31 March
41883	GN3 – RCS526 – Ngahape Road to be replaced. Pole 919119	Quality of Supply	Work in Progress	65k		Expected to complete by 31 March
41884	GN3 - RCS 502 – Hunter Road, Porangahau to be replaced. Pole 914784	Quality of Supply	Work in Progress	65k		Expected to complete by 31 March
41885	Feeder 85 - Safety issue - Cnr of SH2 and Victoria Street. Install jumpers between circuits. Pole 921281	Other Reliability Safety and Environment	Work in Progress	20k		Expected to complete by 31 March
41886	11kV Reconductor Te Aute College Spur Line	Asset Replacement and Renewal	Complete	105k	101k	On time and on budget
41887	CL 86: Reconductor Drumpeel Road 16mm Copper and Mahanga ABS	Asset Replacement and Renewal	Complete	231k	350k	On time and over budget
41888	Recloser Replacement R41, Racecourse Road / Porangahau Road Int.	Asset Replacement and Renewal	Work in Progress	65k		Expected to complete by 31 March
41889	Wilder Road Stage 7 of 8. Planning and design only.	Asset Replacement and Renewal	Carryover	20k		Due to alignment with council works
41890	Waipawa Zone Substation, Replace existing porcelain Lighting Arrestors	Other Reliability Safety and Environment	Work in Progress	5k		Expected to complete by 31 March

Table 8-2: Physical Progress of Planned Renewal Projects – 2019/120

8.2.2 Planned Opex

Maintenance programmes described in Section 5 – Lifecycle Asset Management are detailed in Table 8-3 and include the status of the programme as at the end of each financial year.

The programmes have remained reasonably consistent so progress for each year is presented in one table to allow a comparison to easily be made between the financial years.

8.2.2.1 Planned Maintenance 2018/19 to 2019/20

Asset Inspection/Condition Assessment	Progress 2018/19	Progress 2019/20
Annual 33kV Line Visual Inspection	Complete	Complete
5-Yearly Overhead Line Feeder Inspections	Complete	Expect to complete by 31 March
Annual Aerial Inspection	Complete	Complete
Annual Ground Mounted Inspection	Complete	Complete
Level 1: Fortnightly Substation Visual Inspections	Complete	Expect to complete by 31 March
Level 2: 3-monthly Substation Detailed Inspections	Complete	Expect to complete by 31 March
Zone Substation Earth Tests — 5-yearly	Complete	Carryover to next year
Zone Substation Thermo-vision — Annually	Complete	Expect to complete by 31 March
Power Transformer — Annual DGA Oil Tests	Complete	Complete
Partial Discharge — 2-yearly Test for Circuit Breakers	Complete	Expect to complete by 31 March
2-monthly Detailed Inspections of Voltage Regulators	Complete	Complete
Recloser and Remote-Control Switch — 2-yearly Detailed Inspection and Operational Tests	Complete	Complete
Distribution Equipment Earth Tests — 5-yearly	Complete	Expect to complete by 31 March

Asset Inspection/Condition Assessment	Progress 2018/19	Progress 2019/20
Distribution Equipment Oil Testing	Complete	Programme not completed due to change in strategy
5-yearly Inspection of Ground-Mounted Low Voltage Distribution Equipment (including Minor Repairs)	Complete	Expect complete by 31 March

Table 8-3: Physical Progress of Asset Inspection/Condition Assessment

Routine and Corrective Maintenance	Progress 2018/19	Progress 2019/20
Vegetation Control	Complete	Progress being made in the area of regrowth maintenance, e.g. spraying; the current programme involving high quantities of herbicide started in 2016. The majority of targeted tree felling sites have been completed.
Transformer — 2-yearly Service	Complete	Incomplete outsourced to UCSL
Tap Changers — 2-yearly or 6-yearly Service, depending on Tap Changer Type	Complete	Incomplete outsourced to UCSL
Station Regulators — 2-yearly, 5-yearly or 10-yearly Service. depending on Make and Model	Complete	Complete
Circuit Breaker SF6 — 3-yearly Service	Complete	Incomplete outsourced to UCSL
Circuit Breaker Vacuum — 3-yearly Service	Complete	Incomplete outsourced to UCSL
Circuit Breaker Oil — 2-yearly Service	Complete	Complete
Circuit Breaker Oil — Fault Service after every Fault Operation	Complete	Expected complete by 31 March
Disconnectors and Earth Switches — 10-yearly	Complete	Expect 90% complete by 31 March
Annual Ripple Plant Service	Complete	Complete
Zone Substation Batteries — 3-monthly General Service, 6-monthly Discharge Tests	Complete	Expect complete by 31 March

Routine and Corrective Maintenance	Progress 2018/19	Progress 2019/20
Zone Substation – Electro-Mechanical (4-yearly), Electronic (6-yearly) and Microprocessor (6-yearly)	Complete	Incomplete outsourced to UCSL
Voltage Regulators, Reclosers and Sectionalisers – 2-yearly or 5-yearly Service depending on Make and Model	Complete	Complete

Table 8-4: Physical Progress of Routine and Corrective Maintenance

8.3 Review of Financial Progress against Plan

In this section, Centralines' performance in delivering the plans set out in the 2018 AMP is reviewed in terms of financial progress (cost performance). This evaluation is undertaken for the 2018/19 and 2019/20 financial years for both capital and maintenance programmes.

Explanations are provided in respect of works programmes with a variance of greater than 10% of budget.

8.3.1 Network Spend Financial Progress 2018/19

Category	Forecasted Expenditure from 2018/19 AMP ($'000s)	Actual Expenditure ($'000s)	Variance %
CapEx			
Consumer Connection	1,070	1,090	2%
System Growth	0	30	100%
Asset Replacement and Renewal	1,820	1,940	7%
Asset Relocations	0	5	100%
Reliability, Safety and Environment	805	1,010	25%
Network Capex	3,700	4,010	8%

Category	Forecasted Expenditure from 2018/19 AMP ($'000s)	Actual Expenditure ($'000s)	Variance %
OpEx			
Service Interruptions and Emergencies	434	340	-22%
Vegetation Management	537	548	21%
Routine and Corrective Maintenance and Inspections	137	125	-9%
Asset Replacement and Renewal	573	604	5%
Network Maintenance	1,590	1,620	2%

Table 8-5: Financial Progress Opex and Capex 2017/18

8.3.1.1 Explanation System Growth

Some projects were re-categorised to System Growth.

8.3.1.2 Variance Explanation Asset Relocations

Some projects were re-categorised to Asset Relocations.

8.3.1.3 Variance Explanation Reliability, Safety and Environment

Costs for the Wilder Road Zone Substation upgrade were higher than forecast.

8.3.1.4 Variance Explanation Service Interruptions and Emergencies

Actual expenditure was lower than forecast due to some projects being re-categorised to Asset Replacement and Renewal.

8.3.1.5 Variance Explanation Vegetation Management

Actual expenditure was higher than forecast due to higher use of external resources.

8.3.2 Network Spend Financial Progress 2019/20

Category	Forecasted Expenditure from 2018/19 AMP ($'000s)	Forecast Expenditure ($'000s)	Variance %
CapEx			
Consumer Connection	408	1,769	334%
System Growth	0	65	100%
Asset Replacement and Renewal	1,445	1,810	25%
Asset Relocations	0	0	0%
Reliability, Safety and Environment	1,350	740	-45%
Network Capex	3,204	4,384	37%
OpEx			
Service Interruptions and Emergencies	325	380	17%
Vegetation Management	564	550	-2%
Routine and Corrective Maintenance and Inspections	200	80	-60%
Asset Replacement and Renewal	495	490	-1%
Network Maintenance	1,584	1,500	5%

Table 8-6: Financial Progress Opex and Capex 2019/20

8.3.2.1 Variance Explanation Consumer Connection

Actual expenditure in 2019/20 was higher than forecasted due to an upturn in growth in the Centralines Region. In particular there has been a significant increase in the volume of subdivisions and dairy units as well as the commencement of the Rural Broadband Imitative connections.

8.3.2.2 Variance Explanation System Growth

Actual expenditure in 2019/20 is due to work to complete a carryover project Feeder 15 - 11kV Cable Upgrade.

8.3.2.3 Variance Explanation Asset Replacement and Renewal - Capex

Actual expenditure in 2018/19 was higher than forecasted due to an increase in the number of faulty switches requiring urgent renewal being completed as carryover from 2018/19.

8.3.2.4 Variance Explanation Reliability Safety and Environment

Forecast expenditure in 2019/20 is lower than expected as no unplanned reliability or power quality projects were completed during the year and the Ruataniwha Street, Waipawa CBD - Improve LV supply is also being carried over to 2020/21.

8.3.2.5 Variance Explanation Service Interruptions and Emergencies

Forecast expenditure in 2019/20 is higher than budget due to a higher number of faults than anticipated. This has been driven by failing peanut switches and an increased amount of vegetation faults over a particularly windy summer period.

8.3.2.6 Variance Explanation Routine and Corrective Maintenance and Inspections

Higher than expected Customer Connections, and Service Interruptions work has necessitated the diversion of resources away from Routine and Corrective Maintenance activities during 2019/20.

8.4 Review of Service Level Performance

In this section, an evaluation of performance against the Service Levels published in Section 3 – Service Levels will be provided.

In all cases, explanations will be provided in respect of variances against expected performance, of greater than 10% unfavourable.

8.4.1 Service Level Performance 2018/19

The table below shows the current service level framework with targets as per Section 3 and the forecast information as per the 2018 AMP compared to actual results for the 2018/19 Financial Year.

Asset Management Objective	Service Level	Unit/Type	Forecast 2018/19	Actual 2018/19	Comments
Health and Safety Performance	Accidents causing harm to a member of the public	Number of accidents	0	0	As forecast
	Serious harm or lost-time injury to employees or contractors	Number of injuries	0	1	LTI 31/5/2018
	Injuries to employees or contractors requiring medical treatment	Number of injuries	1	2	Target of 2 per FY will be initiated in AMP to meet HS KPIs
Customer Service Performance	Surveyed customer satisfaction with delivery of customer works	%	> 95%	100%	As forecast
	SAIDI	Minutes	107.65	107.73	As forecast
	SAIFI	Interruptions	1.86	2.06	Higher than forecast
	Revenue per ICP	$ (nominal)	$1,696	$1,693	As forecast
	Restoration of supply for unplanned interruptions	Urban	0	1	Target of ≤ 20 Met
		Rural	7	15	Target of ≤ 10 Not Met
		Remote rural	0	0	Target of ≤ 5 Met
Cost and Efficiency Performance	Forward work planning horizon at a project level provided to contracting services providers	Years	2 years	2 Years	As forecast
	Operating expenditure per ICP (nominal)	$ (nominal)	$429	$499	Higher spend on corrective maintenance
	Faults per 100km of network	33kV Overhead	0	0	As Forecast

Table 8-7: Service Level performance 2018/19

8.4.1.1 *Variance Explanation - Restoration of supply for unplanned interruptions*

Rural and Urban met the targets for 2017/18.

Service levels performed at or below the targets for both Urban and Remote Rural. Outages breaching the Rural service level in 2017-18, were typically overnight faults where a small number of customers were isolated and restored the following day. The faults often occurred during storms or poor weather.

8.4.2 *Service Level Performance 2019/20*

Table 8-8 shows the current service level framework with targets as per Section 3 and the forecast information as per the 2019 AMP compared to actual results for the 2019/20 Financial Year.

Asset Management Objective	Service Level	Unit/Type	Target 2019/20	Forecast 2019/20	Comments
Health and Safety Performance	Accidents causing harm to a member of the public	Number of accidents	0	0	On Target
	Serious harm or lost-time injury to employees or contractors	Number of injuries	0	1	Not Achieved
	Injuries to employees or contractors requiring medical treatment	Number of injuries	< 2	1	On Target
Customer Service Performance	Surveyed customer satisfaction with delivery of customer works	%	> 95%	> 95%	On Target
	SAIDI	Minutes	98.80 – 119.07	119	On Target
	SAIFI	Interruptions	2.84 – 3.52	2..01	Ahead of Target
	Revenue per ICP	$ (nominal)	$1,710	$1,752	On Target
	Restoration of supply for unplanned interruptions	Urban	≤ 20 events ≥ 3 hours	2	Ahead of Target
		Rural	≤ 10 events ≥ 6 hours	7	On Target
		Remote rural	≤ 5 events ≥ 12 hours	0	Ahead of Target
Cost and Efficiency Performance	Forward work planning horizon at a project level provided to contracting services providers	Years	≥ 2 rolling	2 years	On target
	Operating expenditure per ICP (nominal)	$ (nominal)	$511	$500	On target
	Faults per 100km of network	33kV Overhead	6.4	1	Ahead of Target

Table 8-8: Service Level Performance 2019/20

8.4.2.1 Variance Explanation - Serious harm or lost-time injury to employees or contractors

The lost time injury occurred when a staff member re-aggravated a pre-existing back injury while riding in a light utility vehicle. The injury was not classified as serious harm.

8.4.2.2 Variance Explanation - SAIFI

Centralines has experienced strong SAIFI performance year to date with SAIFI below or equal to historical averages for seven out of nine months. Performance was above historical averages in May and June, due to bird strikes on the CL 18 Feeder.

8.4.2.3 Variance Explanation - Restoration of supply for unplanned interruptions

Service level performance has been similar to 2017/18 year to date. Service level breaches have occurred during overnight faults where it was unsafe to repair at the time, or due to extensive fault finding being required.

8.4.2.4 Variance Explanation - Faults per 100km of network

There have been no sustained faults on the 33kV network year to date, resulting in a strong faults per 100km performance and forecast for the year.

8.5 Evaluation of Asset Management Maturity

8.5.1 Background

In 2012, the Commerce Commission included an Asset Management Maturity Assessment Tool (AMMAT) as part of the information Electricity Distribution Businesses (EDBs) are required to disclose in their annual information disclosures. The AMMAT consists of a self-assessment questionnaire containing 31 questions and accompanying guidance notes. The maturity assessment questions are designed to cover the full range of asset management system components and activities while having regard to information that is already disclosed in AMPs.

Figure 8-1 taken from the Institute of Asset Managements (IAMs) PAS55 Assessment Methodology Guidance Notes, details the maturity scales on which the AMMAT scoring is based.

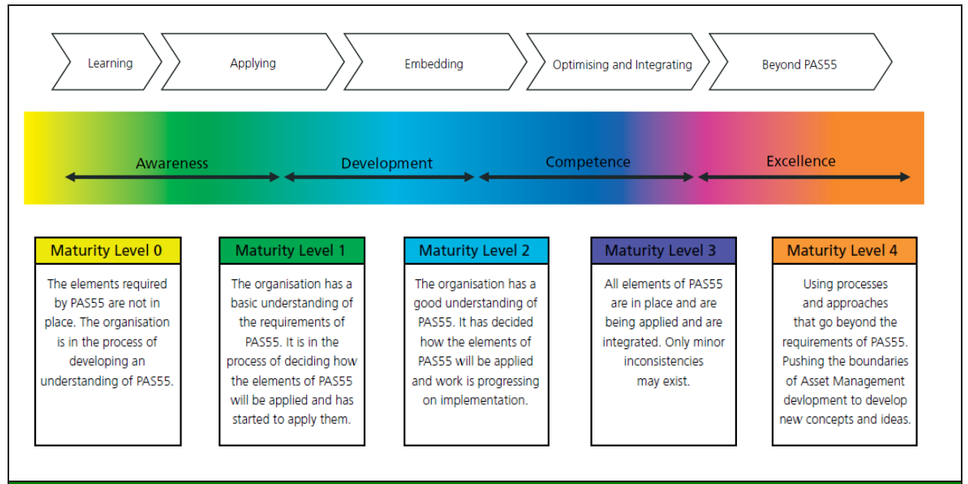

Figure 8-1: PAS55 Maturity Levels

8.5.2 2018 AMMAT Results

Centralines is committed to continually improving its asset management capabilities in all areas. Unison, Centralines' Management service provider in March 2018 was certified to ISO 55001. Some of the improvements made to Unison's asset management practices have been adopted and implemented at Centralines, thereby addressing areas above where improvements were desirable.

Centralines' AMMAT was self-assessed in 2019. The scoring for individual AMMAT questions is provided in Figure 8-2.

Figure 8-2: 2019 Centralines' AMMAT Results

8.5.1 Assessment of Asset Management Practices 2016-2019

An overview of the scores in 2016 and 2019 for each asset management function is provided in Figure 8-3.

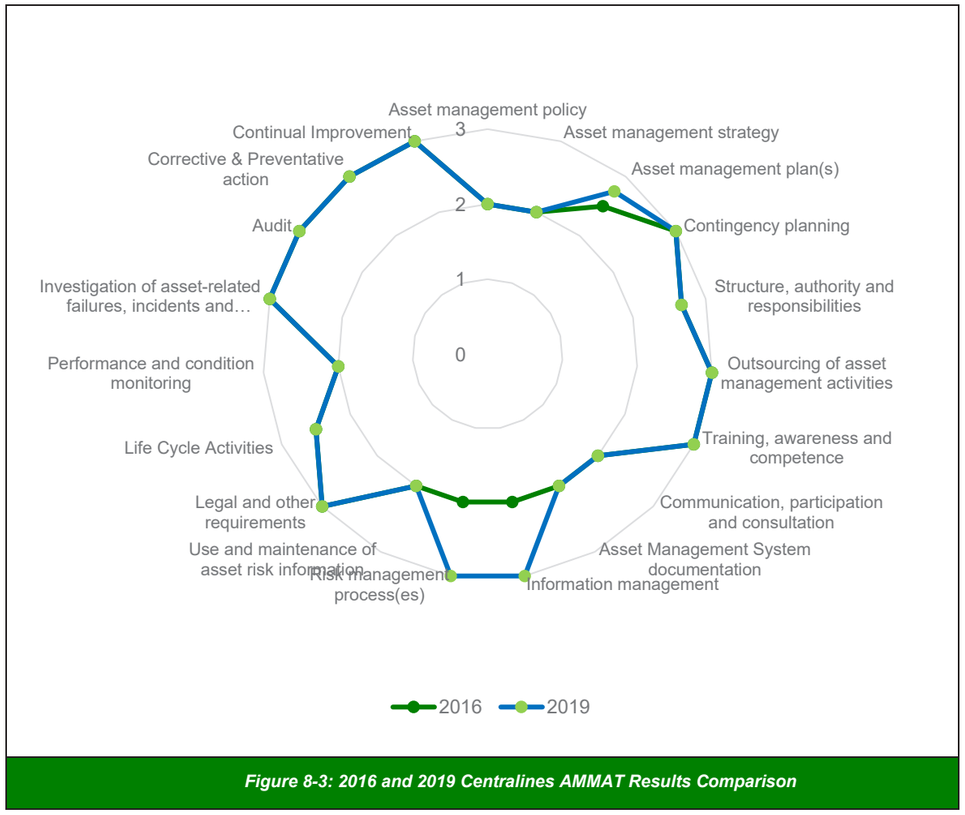

Figure 8-3: 2016 and 2019 Centralines AMMAT Results Comparison

8.5.1.1 Improvement 2016-2018

Consistent improvement from 2016 to 2019 can be seen in Risk and Information Management functions. This is consistent with the effort Centralines and its Management service provider, Unison has put in over the last two-years to improve these functions.

As a result, Centralines has seen improvement in the asset management functions that were not previously meeting acceptable standards. These are:

- risk management processes
- information management, and
- asset management plans.

While improvement has been seen in these areas, Centralines recognises that there is still room for improvement and remains committed to achieving this through Continual Improvement processes.

8.6 Determination Reference Mapping Table

Section 8 Reference	Determination Reference
8.1 Introduction to Section	15
8.2 Review of Progress Against Plan 8.3 Review of Financial Progress Against Plan	15.1
8.4 Review of Service Level Performance	15.2, 15.4
8.5 Evaluation of Asset Management Maturity	15.3, 15.4

Table 8-9: Determination Reference Mapping Table

9

CAPABILITY TO DELIVER

CENTRALINES
LIMITED

CONTENTS

9. CAPABILITY TO DELIVER

9.1 Introduction to this Section

Centralines' Asset Management Plan (AMP) is compiled to ensure that Centralines can build, maintain, renew and operate the network in the most efficient and effective manner possible, while delivering sustainable, reliable services to customers and managing risks in alignment with Centralines' risk appetite.

The following section outlines how Centralines ensures its AMP is realistic, and the objectives are achievable. The organisational structure, processes for authorisation and business capability also support how the AMP is delivered.

9.2 Achieving the Objectives of the Plan

The requirements for the RAMP state that it must describe the processes used by the EDB to ensure that:

- the RAMP is realistic, and the objectives set out in the plan can be achieved, and
- the organisation structure and the processes for authorisation and business capabilities will support the implementation of the RAMP plans.

Centralines interprets these requirements as having an explanation of how Centralines ensures that the plan is reasonable, i.e. is efficient and effective at building, maintaining and operating networks that are neither gold-plated, nor inadequate, to sustainably deliver reliable services to consumers, and that Centralines has business processes and capabilities to actually deliver the plan.

As noted in Section 2 of the RAMP, Centralines operates a mixed model consisting of retaining some capability in-house (field-staff), but outsourcing management services and some capital works to third parties through competitive tenders.

9.2.1 Ensuring the Plan is Realistic

In this context, Centralines defines realistic as having a high level of accuracy as well as being achievable. The processes, systems and associated inputs used to develop the AMP are tested to confirm the outputs are robust and repeatable and the optimal balance between cost, risk and performance is maintained.

Centralines' Asset Management System (AMS) governs the development and execution of the AMP. The main processes that contribute to the AMP and the subsequent achievement of Centralines' Asset Management Objectives (AMOs) are:

- Network Development Planning
- Asset Renewal Planning
- Works Planning and Consolidation
- Annual Works Plan Development, and
- Resource availability.

9.2.2 Network Development Planning

Section Four of the RAMP details Centralines' network development planning processes and the subsequent outputs. The accuracy of this planning depends on the quality of the inputs, such as the demand and capacity components. Centralines draws on external sources of information, e.g. growth forecasts determined through GDP provided by NZIER, to ensure assumptions used within the planning are consistent with independent recommendations.

The tools and associated network models, which use this data as inputs to establish the investment priorities are also outlined in Section Four. These tools have been developed in-house by Centralines' Management service provider and go through rigorous testing, along with continual improvement and upgrades on an annual basis.

9.2.3 Asset Renewal Planning (ARP)

Centralines' approach and processes associated with Asset Renewal Planning (ARP) is detailed in Section 5. The adoption of a risk-based approach to ARP and continual improvement is integral and fundamental within Centralines' AMS. Decision support tools such as condition-based risk management (CBRM) are used to inform maintenance and renewal programmes and ensure the right work is carried out on the right assets at the right time.

This approach, in conjunction with the holistic risk-based approach to all programmes of work, ensures the plan is realistic, achievable and will lead to Centralines meeting its AMOs.

9.2.4 Works Planning and Consolidation (WPC)

The purpose of the Works Planning and Consolidation (WPC) process within Centralines' AMS is to establish and maintain a prudent and efficient AMP, from the proposals for work submitted from the NDP and ARP.

The key requirements of WPC are:

- that quality proposals entering the AMP will support the achievement of Centralines' AMOs
- the AMP supports effective prioritisation of competing proposals of work
- high integrity of the critical information maintained within the AMP
- stakeholders being aware of their requirements in relation to the WPC process and are able to access the information they require, and
- that work completed on the Asset Portfolio is verified and closed out of the AMP in a timely manner.

WPC draws together proposals of work from various sources which are risk-prioritised and organised into a plan that can be delivered by the organisation, at the lowest overall cost, subject to external constraints. The AMP is updated on a six-monthly basis to provide an accurate up-to-date view to the business. The aim of this is to bring about efficiency gains through:

- identification of project synergies, to minimise customer interruptions and increase field staff efficiency
- improved visibility for the organisation on where recruitment or attrition may need to be applied

- improved visibility for field staff capacity to enable forward planning for subcontracting requirements, which may enable refinement of rates and costs
- alignment of business units to this plan — Asset Management, Network Development, Field Resources, Procurement and Logistics, Network Operations Centre and other support functions
- improved financial benefits which include:
  - better debt and cost forecasting
  - ability to organise exchange hedging for large material procurement
  - revenue and cost implications, and
  - analysis of regulatory variations, and
- the ability to respond fast and be agile.

9.2.5 Annual Works Plan Development

The Annual Works Plan Development process produces a one-year network investment plan. This plan addresses the issues identified on network assets through ARP and NDP, as well as required maintenance activities.

To obtain the Annual Works Plan (AWP), the proposed projects identified in the AMP are strategically prioritised as per the risk schema, and financial and resource constraints are applied. Included within the project proposals are provisional allowances for minor capital work that is identified during the financial year.

All defined projects that are confirmed as part of the AWP have a scope of work developed. This scope includes an estimated cost of completion.

9.2.6 Contracting Arrangements

Centralines has a Management Services Agreement (MSA) with Unison Networks Limited (UNL) to provide a broad suite of management services. These services include:

- leadership
- management
- operational control of the network
- commercial
- financial
- regulatory compliance, and
- management of the development and maintenance of the network.

Using decision support tools and processes (outlined in Sections 4 and 5), a risk-based, prioritised 12-month investment (capital and maintenance) plan is developed by Centralines' Management service provider's engineers. This plan is provided to Centralines who then analyse the plan against resource availability and phase the work to smooth out any peaks and troughs that may be experienced. Throughout the year, Centralines has the flexibility to re-prioritise the timing of individual projects to meet resource and network requirements.

Centralines retains in-house capability to carry out field work, in conjunction with the ability to manage competitive tendering for any works not undertaken internally. The majority of work is carried out internally.

Centralines is satisfied that in most instances, through the combination of in-house field staff capability and the use of external contractors, sufficient resources exist or are available to ensure planned works are completed.

In addition, under emergency conditions provision exists with external contractors to complement in-house restoration efforts.

9.3 Organisation Structure, Processes for Authorisation and Business Capabilities

9.3.1 Organisation Structure

Figure 9-1 outlines the organisation structure employed by Centralines. The relatively simple structure reflects that a significant number of services are outsourced to Centralines' Management service provider.

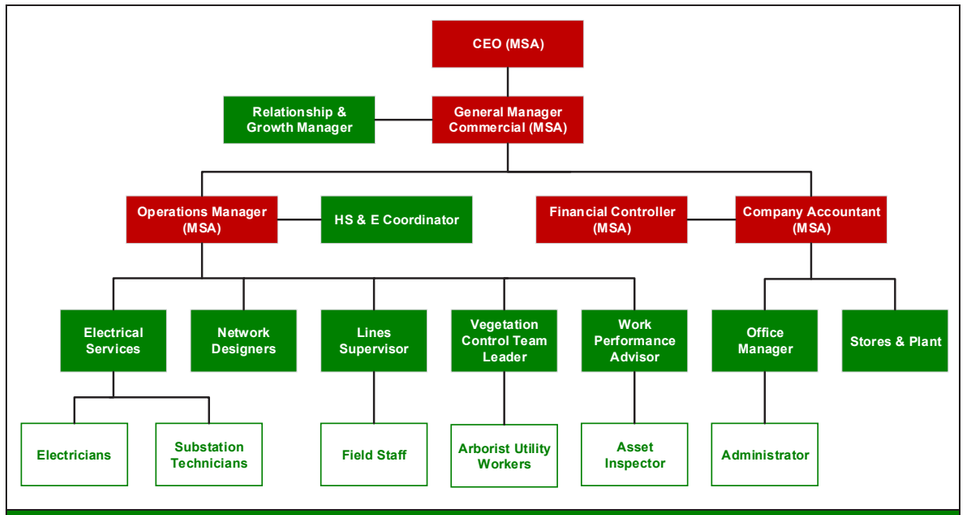

Figure 9-1: Centralines' Organisation Structure

9.3.2 Processes for Authorisation

Various levels of financial authorisation exist in Centralines. The Centralines Delegations Policy is in place which outlines the level of delegated financial authority from the Board to named roles within Centralines and Centralines' Management service provider. Centralines' financial system, coupled with controls and audits ensure that the process for authorisation is adhered to, or should the case arise, detect where non-compliance occurs.

The Centralines' Board approves the overall Centralines' Business Plan, including the AMP, which sets out capital and operating expenditure forecasts.

Should an individual approval be required over the highest level of delegation, a business case is prepared and submitted to the Board for approval.

When there are variations to agreed works contracts, a variation process is followed to authorise changes due to unforeseen circumstances.

9.3.3 Business Capabilities

As a small regional network, Centralines seeks to ensure that there is an efficient and effective business structure in place which ensures that community ownership of the network is not compromised by its small scale.

As stated previously, Centralines seeks to strike a balance between outsourcing specialised functions that would be otherwise unaffordable or provided inefficiently internally, with maintaining an internal capability to ensure resources remain in the region to provide field services.

Outsourcing risks are managed through the method of contracting and exit arrangements, which would provide for an orderly transition in the event that Centralines wished to change their Management service provider.

Figure 9-2 illustrates the business process that Centralines uses to deliver its asset management activities. Each of these activities can be mapped to a required business capability.

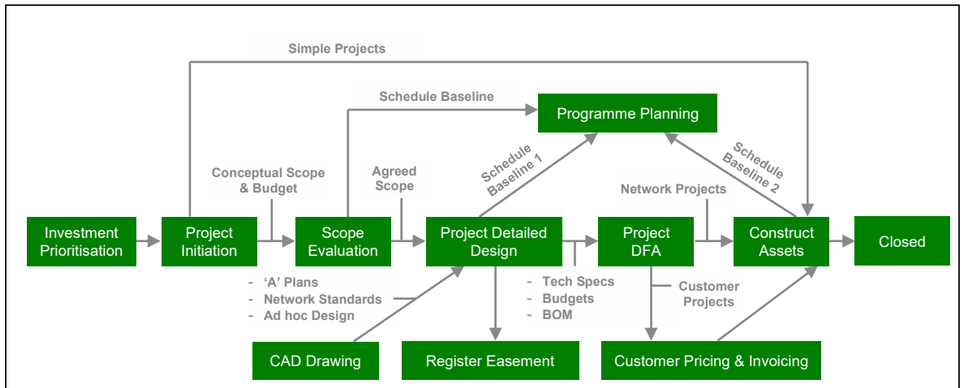

Figure 9-2: Asset Management Business Process

Centralines maintains field services (all customer works, network maintenance activities and the majority of network capital expenditure works) in-house. All other services are provided by Centralines' Management service provider.

9.4 Determination Reference Mapping Table

Section 9 Reference		Determination Reference
9.1	Introduction to this Section	16.1
9.2	Achieving the Objectives of the Plan	
9.3	Organisation Structure, Process for Authorisation and Business Capabilities	16.2

Table 9-1: Determination Reference Mapping Table

10

SCHEDULES

CENTRALINES
LIMITED

CONTENTS

11a: Report on Forecast Capital Expenditure

This schedule requires a breakdown of forecast expenditure on assets for the current disclosure year and a 10 year planning period. The forecasts should be consistent with the supporting information set out in the AMP. The forecast is to be expressed in both constant price and nominal dollar terms. Also required is a forecast of the value of commissioned assets (i.e., the value of RAB additions)

EDBs must provide explanatory comment on the difference between constant price and nominal dollar forecasts of expenditure on assets in Schedule 14a (Mandatory Explanatory Notes).

This information is not part of audited disclosure information.

11a(i): Expenditure on Assets Forecast		*Current Year*	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
for year ended		31 Mar 20	31 Mar 21	31 Mar 22	31 Mar 23	31 Mar 24	31 Mar 25	31 Mar 26	31 Mar 27	31 Mar 28	31 Mar 29	31 Mar 30
		$000 (in nominal dollars)										
Consumer connection		1,769	1,021	1,042	1,063	1,084	1,106	451	460	469	479	488
System growth		65	-	151	159	163	166	406	-	528	599	-
Asset replacement and renewal		1,810	1,752	1,522	2,628	1,247	1,128	2,211	874	892	910	934
Asset relocations		-	-	-	-	-	-	-	-	-	-	-
Reliability, safety and environment:												
Quality of supply		33	832	578	861	857	857	1,196	1,214	346	1,341	2,277
Legislative and regulatory		-	-	-	-	-	-	-	-	-	-	-
Other reliability, safety and environment		707	256	122	181	87	105	90	92	77	126	55
Total reliability, safety and environment		**740**	**1,088**	**700**	**1,042**	**943**	**962**	**1,286**	**1,306**	**423**	**1,466**	**2,332**
Expenditure on network assets		**4,384**	**3,862**	**3,415**	**4,892**	**3,437**	**3,362**	**4,354**	**2,641**	**2,312**	**3,454**	**3,755**
Non-network assets		614	3,375	3,736	569	374	549	598	219	223	227	232
Expenditure on assets		**4,998**	**7,237**	**7,151**	**5,461**	**3,811**	**3,911**	**4,952**	**2,859**	**2,535**	**3,681**	**3,987**
plus	Cost of financing	-	-	-	-	-	-	-	-	-	-	-
less	Value of capital contributions	933	613	625	638	651	664	271	276	282	287	293
plus	Value of vested assets	-	-	-	-	-	-	-	-	-	-	-
Capital expenditure forecast		**4,065**	**6,624**	**6,526**	**4,823**	**3,161**	**3,247**	**4,681**	**2,583**	**2,254**	**3,394**	**3,694**
Value of commissioned assets		4,998	7,237	7,151	5,461	3,811	3,911	4,952	2,859	2,535	3,681	3,987
		$000 (in constant prices)										
Consumer connection		1,769	1,000	1,000	1,000	1,000	1,000	400	400	400	400	400
System growth		65	-	145	150	150	150	360	-	450	500	-
Asset replacement and renewal		1,810	1,716	1,460	2,472	1,150	1,020	1,960	760	760	760	765
Asset relocations		-	-	-	-	-	-	-	-	-	-	-
Reliability, safety and environment:												
Quality of supply		33	815	555	810	790	775	1,060	1,055	295	1,120	1,865
Legislative and regulatory		-	-	-	-	-	-					
Other reliability, safety and environment		707	251	117	170	80	95	80	80	65	105	45
Total reliability, safety and environment		**740**	**1,066**	**672**	**980**	**870**	**870**	**1,140**	**1,135**	**360**	**1,225**	**1,910**
Expenditure on network assets		**4,384**	**3,782**	**3,277**	**4,602**	**3,170**	**3,040**	**3,860**	**2,295**	**1,970**	**2,885**	**3,075**
Non-network assets		614	3,305	3,585	535	345	496	530	190	190	190	190
Expenditure on assets		**4,998**	**7,087**	**6,862**	**5,137**	**3,515**	**3,536**	**4,390**	**2,485**	**2,160**	**3,075**	**3,265**
Subcomponents of expenditure on assets (where known)												
Energy efficiency and demand side management, reduction of energy losses		-	-	-	-	-	-	-	-	-	-	-
Overhead to underground conversion		-	-	-	-	-	-	-	-	-	-	-
Research and development		-	-	-	-	-	-	-	-	-	-	-

	Current Year	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
for year ended	31 Mar 20	31 Mar 21	31 Mar 22	31 Mar 23	31 Mar 24	31 Mar 25	31 Mar 26	31 Mar 27	31 Mar 28	31 Mar 29	31 Mar 30
Difference between nominal and constant price forecasts	$000										
Consumer connection	-	21	42	63	84	106	51	60	69	79	88
System growth	-	-	6	9	13	16	46	-	78	99	-
Asset replacement and renewal	-	36	62	156	97	108	251	114	132	150	169
Asset relocations	-	-	-	-	-	-	-	-	-	-	-
Reliability, safety and environment:											
Quality of supply	-	17	23	51	67	82	136	159	51	221	412
Legislative and regulatory	-	-	-	-	-	-	-	-	-	-	-
Other reliability, safety and environment	-	5	5	11	7	10	10	12	11	21	10
Total reliability, safety and environment	**-**	**22**	**28**	**62**	**73**	**92**	**146**	**171**	**63**	**241**	**422**
Expenditure on network assets	**-**	**80**	**138**	**290**	**267**	**322**	**494**	**346**	**342**	**569**	**680**
Non-network assets	-	70	151	34	29	53	68	29	33	37	42
Expenditure on assets	**-**	**150**	**289**	**324**	**296**	**375**	**562**	**374**	**375**	**606**	**722**

11a(ii): Consumer Connection

	Current Year	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*
for year ended	31 Mar 20	31 Mar 21	31 Mar 22	31 Mar 23	31 Mar 24	31 Mar 25
Consumer types defined by EDB*	$000 (in constant prices)					
All Customers	1,769	1,000	1,000	1,000	1,000	1,000
Consumer connection expenditure	**1,769**	**1,000**	**1,000**	**1,000**	**1,000**	**1,000**
less Capital contributions funding consumer connection	933	600	600	600	600	600
Consumer connection less capital contributions	**836**	**400**	**400**	**400**	**400**	**400**

11a(iii): System Growth

Sub-transmission	-	-	-	-	-	-
Zone substations	-	-	-	-	-	-
Distribution and LV lines	-	-	-	150	150	150
Distribution and LV cables	65	-	-	-	-	-
Distribution substations and transformers	-	-	145	-	-	-
Distribution switchgear	-	-	-	-	-	-
Other network assets	-	-	-	-	-	-
System growth expenditure	**65**	**-**	**145**	**150**	**150**	**150**
less Capital contributions funding system growth	-	-	-	-	-	-
System growth less capital contributions	**65**	**-**	**145**	**150**	**150**	**150**

11a(iv): Asset Replacement and Renewal

Sub-transmission	-	-	-	-	-	-
Zone substations	-	50	40	1,200	-	-
Distribution and LV lines	754	1,169	986	872	750	750
Distribution and LV cables	-	-	-	-	-	-
Distribution substations and transformers	327	99	44	-	-	
Distribution switchgear	728	398	390	400	400	270
Other network assets	-	-	-	-	-	-
Asset replacement and renewal expenditure	**1,810**	**1,716**	**1,460**	**2,472**	**1,150**	**1,020**
less Capital contributions funding asset replacement and renewal	-	-	-	-	-	-
Asset replacement and renewal less capital contributions	**1,810**	**1,716**	**1,460**	**2,472**	**1,150**	**1,020**

11a(v):Asset Relocations

	for year end	Current Year 31 Mar 20	CY+1 31 Mar 21	CY+2 31 Mar 22	CY+3 31 Mar 23	CY+4 31 Mar 24	CY+5 31 Mar 25
	*Project or programme**	$000 (in constant prices)					
	NZTA	-	-	-	-	-	-
	Councils	-	-	-	-	-	-
	Other Customers	-	-	-	-	-	-
	All other asset relocations projects or programmes	-	-	-	-	-	-
	Asset relocations expenditure	**-**	**-**	**-**	**-**	**-**	**-**
less	Capital contributions funding asset relocations	-	-	-	-	-	-
	Asset relocations less capital contributions	**-**	**-**	**-**	**-**	**-**	**-**

11a(vi):Quality of Supply

	*Project or programme**						
		-	-	-	-	-	-
		-	-	-	-	-	-
		-	-	-	-	-	-
		-	-	-	-	-	-
	All other quality of supply projects or programmes	33	815	555	810	790	775
	Quality of supply expenditure	**33**	**815**	**555**	**810**	**790**	**775**
less	Capital contributions funding quality of supply						
	Quality of supply less capital contributions	**33**	**815**	**555**	**810**	**790**	**775**

11a(vii): Legislative and Regulatory

	*Project or programme**						
		-	-	-	-	-	-
		-	-	-	-	-	-
	All other legislative and regulatory projects or programmes	-	-	-	-	-	-
	Legislative and regulatory expenditure	**-**	**-**	**-**	**-**	**-**	**-**
less	Capital contributions funding legislative and regulatory	-	-	-	-	-	-
	Legislative and regulatory less capital contributions	**-**	**-**	**-**	**-**	**-**	**-**

11a(viii): Other Reliability, Safety and Environment

	*Project or programme**						
		-	-	-	-	-	-
		-	-	-	-	-	-
		-	-	-	-	-	-
		-	-	-	-	-	-
		-	-	-	-	-	-
	All other reliability, safety and environment projects or programmes	707	251	117	170	80	95
	Other reliability, safety and environment expenditure	**707**	**251**	**117**	**170**	**80**	**95**
less	Capital contributions funding other reliability, safety and environment	-	-	-	-	-	-
	Other reliability, safety and environment less capital contributions	**707**	**251**	**117**	**170**	**80**	**95**

11a(ix): Non-Network Assets

Routine expenditure *for year end*	*Current Year* 31 Mar 20	*CY+1* 31 Mar 21	*CY+2* 31 Mar 22	*CY+3* 31 Mar 23	*CY+4* 31 Mar 24	*CY+5* 31 Mar 25
Project or programme*	$000 (in constant prices)					
Motor Vehicles	430	200	500	450	260	411
Plant, Equipment and Tools	170	75	70	70	70	70
Office Furniture	14	30	15	15	15	15
Land and Buildings	-	-	-	-	-	-
All other routine expenditure projects or programmes	-	-	-	-	-	-
Routine expenditure	**614**	**305**	**585**	**535**	**345**	**496**
Atypical expenditure						
Project or programme*						
Construction of new office complex and depot	-	3,000	3,000	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
All other atypical projects or programmes						
Atypical expenditure	**-**	**3,000**	**3,000**	**-**	**-**	**-**
Non-network assets expenditure	**614**	**3,305**	**3,585**	**535**	**345**	**496**

11b: Report on Forecast Operational Expenditure

This schedule requires a breakdown of forecast operational expenditure for the disclosure year and a 10 year planning period. The forecasts should be consistent with the supporting information set out in the AMP. The forecast is to be expressed in both constant price and nominal dollar terms.

EDBs must provide explanatory comment on the difference between constant price and nominal dollar operational expenditure forecasts in Schedule 14a (Mandatory Explanatory Notes).

This information is not part of audited disclosure information.

	Current Year	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
for year ended	31 Mar 20	31 Mar 21	31 Mar 22	31 Mar 23	31 Mar 24	31 Mar 25	31 Mar 26	31 Mar 27	31 Mar 28	31 Mar 29	31 Mar 30
Operational Expenditure Forecast	$000 (in nominal dollars)										
Service interruptions and emergencies	380	388	396	404	412	420	429	437	446	455	464
Vegetation management	550	564	573	585	596	608	620	633	645	658	672
Routine and corrective maintenance and inspection	80	200	196	200	204	208	212	216	221	225	230
Asset replacement and renewal	490	495	485	494	504	514	525	535	546	557	568
Network Opex	**1,500**	**1,647**	**1,650**	**1,683**	**1,716**	**1,751**	**1,786**	**1,821**	**1,858**	**1,895**	**1,933**
System operations and network support	230	233	248	253	258	263	268	274	279	285	291
Business support	2,200	2,335	2,293	2,339	2,385	2,433	2,482	2,531	2,582	2,634	2,686
Non-network opex	**2,430**	**2,568**	**2,541**	**2,592**	**2,643**	**2,696**	**2,750**	**2,805**	**2,861**	**2,918**	**2,977**
Operational expenditure	**3,930**	**4,215**	**4,190**	**4,274**	**4,360**	**4,447**	**4,536**	**4,627**	**4,719**	**4,813**	**4,910**
	$000 (in constant prices)										
Service interruptions and emergencies	380	380	380	380	380	380	380	380	380	380	380
Vegetation management	550	552	550	550	550	550	550	550	550	550	550
Routine and corrective maintenance and inspection	80	196	188	188	188	188	188	188	188	188	188
Asset replacement and renewal	490	485	465	465	465	465	465	465	465	465	465
Network Opex	**1,500**	**1,613**	**1,583**	**1,583**	**1,583**	**1,583**	**1,583**	**1,583**	**1,583**	**1,583**	**1,583**
System operations and network support	230	228	238	238	238	238	238	238	238	238	238
Business support	2,200	2,287	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200
Non-network opex	**2,430**	**2,515**	**2,438**	**2,438**	**2,438**	**2,438**	**2,438**	**2,438**	**2,438**	**2,438**	**2,438**
Operational expenditure	**3,930**	**4,128**	**4,021**	**4,021**	**4,021**	**4,021**	**4,021**	**4,021**	**4,021**	**4,021**	**4,021**
Subcomponents of operational expenditure (where known)											
Energy efficiency and demand side management, reduction of energy losses	-	-	-	-	-	-	-	-	-	-	-
Direct billing*	-	-	-	-	-	-	-	-	-	-	-
Research and Development	-	-	-	-	-	-	-	-	-	-	-
Insurance	-	-	-	-	-	-	-	-	-	-	-
Difference between nominal and real forecasts	$000										
Service interruptions and emergencies	-	8	16	24	32	40	49	57	66	75	84
Vegetation management	-	12	23	35	46	58	70	83	95	108	122
Routine and corrective maintenance and inspection	-	4	8	12	16	20	24	28	33	37	42
Asset replacement and renewal	-	10	20	29	39	49	60	70	81	92	103
Network Opex	**-**	**34**	**67**	**100**	**133**	**168**	**203**	**238**	**275**	**312**	**350**
System operations and network support	-	5	10	15	20	25	30	36	41	47	53
Business support	-	48	93	139	185	233	282	331	382	434	486
Non-network opex	**-**	**53**	**103**	**154**	**205**	**258**	**312**	**367**	**423**	**480**	**539**
Operational expenditure	**-**	**87**	**169**	**253**	**339**	**426**	**515**	**606**	**698**	**792**	**889**

*** Direct billing expenditure by suppliers that direct bill the majority of their consumers***

12a: Report on Asset Condition

This schedule requires a breakdown of asset condition by asset class as at the start of the forecast year. The data accuracy assessment relates to the percentage values disclosed in the asset condition columns. Also required is a forecast of the percentage of units to be replaced in the next 5 years. All information should be consistent with the information provided in the AMP and the expenditure on assets forecast in Schedule 11a. All units relating to cable and line assets, that are expressed in km, refer to circuit lengths.

				Asset condition at start of planning period (percentage of units by grade)							
Voltage	Asset category	Asset class	Units	H1	H2	H3	H4	H5	Grade unknown	Data accuracy (1–4)	% of asset forecast to be replaced in next 5 years
All	Overhead Line	Concrete poles / steel structure	No.	-	0.50%	33.25%	33.25%	33.00%	-	3	2.00%
All	Overhead Line	Wood poles	No.	-	18.00%	38.00%	38.00%	6.00%	-	3	20.00%
All	Overhead Line	Other pole types	No.	-	-	-	-	-	-	N/A	-
HV	Subtransmission Line	Subtransmission OH up to 66kV conductor	km	-	-	47.00%	47.00%	6.00%	-	2	-
HV	Subtransmission Line	Subtransmission OH 110kV+ conductor	km	-	-	-	-	-	-	N/A	-
HV	Subtransmission Cable	Subtransmission UG up to 66kV (XLPE)	km	-	-			100.00%	-	3	-
HV	Subtransmission Cable	Subtransmission UG up to 66kV (Oil pressurised)	km	-	-	-	-	-	-	N/A	-
HV	Subtransmission Cable	Subtransmission UG up to 66kV (Gas pressurised)	km	-	-	-	-	-	-	N/A	-
HV	Subtransmission Cable	Subtransmission UG up to 66kV (PILC)	km	-	-	-	-	-	-	N/A	-
HV	Subtransmission Cable	Subtransmission UG 110kV+ (XLPE)	km	-	-	-	-	-	-	N/A	-
HV	Subtransmission Cable	Subtransmission UG 110kV+ (Oil pressurised)	km	-	-	-	-	-	-	N/A	-
HV	Subtransmission Cable	Subtransmission UG 110kV+ (Gas Pressurised)	km	-	-	-	-	-	-	N/A	-
HV	Subtransmission Cable	Subtransmission UG 110kV+ (PILC)	km	-	-	-	-	-	-	N/A	-
HV	Subtransmission Cable	Subtransmission submarine cable	km	-	-	-	-	-	-	N/A	-
HV	Zone substation Buildings	Zone substations up to 66kV	No.	-	-	-	33.00%	67.00%	-	3	-
HV	Zone substation Buildings	Zone substations 110kV+	No.	-	-	-	-	-	-	N/A	-
HV	Zone substation switchgear	22/33kV CB (Indoor)	No.	-	-	-	-	-	-	N/A	-
HV	Zone substation switchgear	22/33kV CB (Outdoor)	No.	-	-	-	-	100.00%	-	4	-
HV	Zone substation switchgear	33kV Switch (Ground Mounted)	No.	-	-	-	-	-	-	N/A	-
HV	Zone substation switchgear	33kV Switch (Pole Mounted)	No.	-	5.00%	20.00%	20.00%	55.00%	-	3	-
HV	Zone substation switchgear	33kV RMU	No.	-	-	-	-	-	-	N/A	-
HV	Zone substation switchgear	50/66/110kV CB (Indoor)	No.	-	-	-	-	-	-	N/A	-
HV	Zone substation switchgear	50/66/110kV CB (Outdoor)	No.	-	-	-	-	-	-	N/A	-
HV	Zone substation switchgear	3.3/6.6/11/22kV CB (ground mounted)	No.	-	3.70%	44.40%	18.50%	33.40%	-	4	33.30%
HV	Zone substation switchgear	3.3/6.6/11/22kV CB (pole mounted)	No.	-	-	-	-	100.00%	-	4	-
HV	Zone Substation Transformer	Zone Substation Transformers	No.	-	-	14.30%		85.70%	-	4	-
HV	Distribution Line	Distribution OH Open Wire Conductor	km	-	1.00%	47.50%	47.50%	4.00%	-	2	1.00%
HV	Distribution Line	Distribution OH Aerial Cable Conductor	km	-	-	-	-	-	-	N/A	-
HV	Distribution Line	SWER conductor	km	-	-	-	-	-	-	N/A	-
HV	Distribution Cable	Distribution UG XLPE or PVC	km	-	-	2.50%	2.50%	95.00%	-	3	0.50%
HV	Distribution Cable	Distribution UG PILC	km	-	-	2.50%	2.50%	95.00%	-	3	0.50%
HV	Distribution Cable	Distribution Submarine Cable	km	-	-	-	-	-	-	N/A	-
HV	Distribution switchgear	3.3/6.6/11/22kV CB (pole mounted) - reclosers and sectionalisers	No.	-	3.00%	22.50%	22.50%	52.00%	-	3	5.00%
HV	Distribution switchgear	3.3/6.6/11/22kV CB (Indoor)	No.	-	-	-	-	-	-	N/A	-
HV	Distribution switchgear	3.3/6.6/11/22kV Switches and fuses (pole mounted)	No.	-	1.00%	23.50%	23.50%	52.00%	-	2	1.50%
HV	Distribution switchgear	3.3/6.6/11/22kV Switch (ground mounted) - except RMU	No.	-	-	-	-	100.00%	-	4	-
HV	Distribution switchgear	3.3/6.6/11/22kV RMU	No.	-				100.00%	-	4	
HV	Distribution Transformer	Pole Mounted Transformer	No.	-	1.00%	34.50%	34.50%	30.00%	-	3	1.50%
HV	Distribution Transformer	Ground Mounted Transformer	No.	-	1.00%	10.00%	10.00%	79.00%	-	3	1.00%
HV	Distribution Transformer	Voltage regulators	No.	-			50.00%	50.00%	-	3	2.00%
HV	Distribution Substations	Ground Mounted Substation Housing	No.	-	-	-	-	100.00%	-	2	-
LV	LV Line	LV OH Conductor	km	-	0.50%	44.75%	44.75%	10.00%	-	2	0.50%
LV	LV Cable	LV UG Cable	km	-	-	13.50%	13.50%	73.00%	-	2	0.50%
LV	LV Streetlighting	LV OH/UG Streetlight circuit	km	-	-	13.50%	13.50%	73.00%	-	2	0.50%
LV	Connections	OH/UG consumer service connections	No.	0.15%	-	-	-	99.85%	-	2	0.50%
All	Protection	Protection relays (electromechanical, solid state and numeric)	No.	-	-	16.67%	16.67%	66.67%	-	2	5.00%
All	SCADA and communications	SCADA and communications equipment operating as a single system	Lot	-	-	-	-	100.00%	-	2	-
All	Capacitor Banks	Capacitors including controls	No.	-	-	-	-	100.00%	-	4	-
All	Load Control	Centralised plant	Lot	-	-	-	-	100.00%	-	4	-
All	Load Control	Relays	No.	-	-	50.00%	50.00%	-	-	1	-
All	Civils	Cable Tunnels	km	-	-	-	-	-	-	N/A	-

12b: Report on Forecast Capacity

This schedule requires a breakdown of current and forecast capacity and utilisation for each zone substation and current distribution transformer capacity. The data provided should be consistent with the information provided in the AMP. Information provided in this table should relate to the operation of the network in its normal steady state configuration.

12b(i): System Growth - Zone Substations

Existing Zone Substations	Current Peak Load (MVA)	Installed Firm Capacity (MVA)	Security of Supply Classification (type)	Transfer Capacity (MVA)	Utilisation of Installed Firm Capacity %		Installed Firm Capacity +5 years (MVA)	Utilisation of Installed Firm Capacity + 5yrs %	Installed Firm Capacity Constraint +5 years (cause)	Explanation
Waipukurau	8.6	10.0	N-1	-	86%		10.0	86%	No constraint within +5 years	-
Waipawa	4.5	7.5	N-1	-	60%		7.5	60%	No constraint within +5 years	-
Takapau	6.5	7.5	N	2.4	87%		7.5	87%	No constraint within +5 years	Two transformer site supplied by single 33kV line
OngaOnga	5.5	-	N-1 Switched	10.0	-		-	-	No constraint within +5 years	Load transfer from adjacent substations available using remote switches.
Wilder Road	0.6	-	N-1 Switched	2.4	-		-	-	No constraint within +5 years	Load transfer from adjacent substations available using remote switches.

[1] *Extend forecast capacity table as necessary to disclose all capacity by each zone substation*

12c: Report on Forecast Network Demand

This schedule requires a forecast of new connections (by consumer type), peak demand and energy volumes for the disclosure year and a 5 year planning period. The forecasts should be consistent with the supporting information set out in the AMP as well as the assumptions used in developing the expenditure forecasts in Schedule 11a and Schedule 11b and the capacity and utilisation forecasts in Schedule 12b.

12c(i): Consumer Connections

Number of ICPs connected in year by consumer type

	Current Year	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*
for year ended	31 Mar 20	31 Mar 21	31 Mar 22	31 Mar 23	31 Mar 24	31 Mar 25
Consumer types defined by EDB*	Number of connections		Number of connections			
Residential	60	40	30	20	20	20
Commercial	8	1	1	1	1	1
Connections total	**68**	**41**	**31**	**21**	**21**	**21**

****include additional rows if needed***

Distributed generation

Number of connections	12	12	12	12	12	12
Installed connection capacity of distributed generation (MVA)	0	0	0	0	0	0

12c(ii) System Demand

Maximum coincident system demand (MW) for year ended	Number of connections		Number of connections			
GXP demand	21	21	22	22	22	22
plus Distributed generation output at HV and above	-	-	-	-	-	-
Maximum coincident system demand	**21**	**21**	**22**	**22**	**22**	**22**
less Net transfers to (from) other EDBs at HV and above	-	-	-	-	-	-
Demand on system for supply to consumers' connection points	**21**	**21**	**22**	**22**	**22**	**22**

Electricity volumes carried (GWh)						
Electricity supplied from GXPs	116	116	116	113	113	113
less Electricity exports to GXPs	-	-	-	-	-	-
plus Electricity supplied from distributed generation	-	-	-	-	-	-
less Net electricity supplied to (from) other EDBs	-	-	-	-	-	-
Electricity entering system for supply to ICPs	**116**	**116**	**116**	**113**	**113**	**113**
less Total energy delivered to ICPs	106	107	106	106	106	106
Losses	**10**	**9**	**10**	**7**	**7**	**7**
Load factor	**63%**	**63%**	**60%**	**59%**	**60%**	**56%**
Loss ratio	**8.6%**	**8.6%**	**8.6%**	**6.2%**	**6.2%**	**6.2%**

12d: Report Forecast Interruptions and Duration

This schedule requires a forecast of SAIFI and SAIDI for disclosure and a 5 year planning period. The forecasts should be consistent with the supporting information set out in the AMP as well as the assumed impact of planned and unplanned SAIFI and SAIDI on the expenditures forecast provided in Schedule 11a and Schedule 11b.

	Current Year	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*
for year ended	**31 Mar 20**	**31 Mar 21**	**31 Mar 22**	**31 Mar 23**	**31 Mar 24**	**31 Mar 25**
SAIDI						
Class B (planned interruptions on the network)	71.0	71.0	71.0	71.0	71.0	71.0
Class C (unplanned interruptions on the network)	81.7	62.8	62.8	62.8	62.8	62.8
SAIFI						
Class B (planned interruptions on the network)	0.34	1.17	1.17	1.17	1.17	1.17
Class C (unplanned interruptions on the network)	1.89	3.16	3.16	3.16	3.16	3.16

13: Report on Asset Management Maturity

This schedule requires information on the EDB'S self-assessment of the maturity of its asset management practices.

Question No.	Function	Question	Score	Evidence—Summary		Why	Who	Record/documented Information	Maturity narrative for assessed score
3	Asset management policy	To what extent has an asset management policy been documented, authorised and communicated?	2	Centralines, under the management of Unison has adopted its Asset Management Policy. The Asset Management Policy has been approved by Unison top management but has limited circulation within Centralines.		Widely used AM practice standards require an organisation to document, authorise and communicate its asset management policy (e.g. as required in PAS 55 para 4.2 i). A key pre-requisite of any robust policy is that the organisation's top management must be seen to endorse and fully support it. Also vital to the effective implementation of the policy, is to tell the appropriate people of its content and their obligations under it. Where an organisation outsources some of its asset-related activities, then these people and their organisations must equally be made aware of the policy's content. Also, there may be other stakeholders, such as regulatory authorities and shareholders who should be made aware of it.	Top management. The management team that has overall responsibility for asset management.	The organisation's asset management policy, its organisational strategic plan, documents indicating how the asset management policy was based upon the needs of the organisation and evidence of communication.	The organisation has an asset management policy, which has been authorised by top management, but it has had limited circulation. It may be in use to influence development of strategy and planning but its effect is limited.
10	Asset management strategy	What has the organisation done to ensure that its asset management strategy is consistent with other appropriate organisational policies and strategies, and the needs of stakeholders?	2	Centralines is in the process of implementing the strategies developed at Unison as appropriate for Centralines. Some of the linkages between the long-term asset management strategy and other organisational policies, strategies and stakeholder requirements are defined. The work is fairly well advanced but still incomplete.		In setting an organisation's asset management strategy, it is important that it is consistent with any other policies and strategies that the organisation has and has taken into account the requirements of relevant stakeholders. This question examines to what extent the asset management strategy is consistent with other organisational policies and strategies (e.g. as required by PAS 55 para 4.3.1b) and has taken account of stakeholder requirements as required by PAS 55 para 4.3.1 c). Generally, this will take into account the same polices, strategies and stakeholder requirements as covered in drafting the asset management policy but at a greater level of detail.	Top management. The organisation's strategic planning team. The management team that has overall responsibility for asset management.	The organisation's asset management strategy document and other related organisational policies and strategies. Other than the organisation's strategic plan, these could include those relating to health and safety, environmental, etc. Results of stakeholder consultation.	Some of the linkages between the long-term asset management strategy and other organisational policies, strategies and stakeholder requirements are defined but the work is fairly well advanced but still incomplete.
11	Asset management strategy	In what way does the organisation's asset management strategy take account of the lifecycle of the assets, asset types and asset systems over which the organisation has stewardship?	2	As part of the Management Services Agreement with Unison, Centralines will be implementing the strategies introduced at Unison at a level appropriate to Centralines. The long-term asset management strategy takes account of the lifecycle of some, but not all, of its assets, asset types and asset systems.		Good asset stewardship is the hallmark of an organisation compliant with widely used AM standards. A key component of this is the need to take account of the lifecycle of the assets, asset types and asset systems. (For example, this requirement is recognised in 4.3.1d of PAS 55). This question explores what an organisation has done to take lifecycle into account in its asset management strategy.	Top management. People in the organisation with expert knowledge of the assets, asset types, asset systems and their associated life-cycles. The management team that has overall responsibility for asset management. Those responsible for developing and adopting methods and processes used in asset management.	The organisation's documented asset management strategy and supporting working documents.	The long-term asset management strategy takes account of the lifecycle of some, but not all, of its assets, asset types and asset systems.
26	Asset management plan(s)	How does the organisation establish and document its asset management plan(s) across the life cycle activities of its assets and asset systems?	2	A strategic driver roadmap (Lifecycle Framework) is in place to establish and document asset management plan(s) across the life cycle activities of assets and asset systems at Centralines. This strategy commences at Unison and will include the documentation of plans for assets and asset systems at Centralines.		The asset management strategy needs to be translated into practical plan(s) so that all parties know how the objectives will be achieved. The development of plan(s) will need to identify the specific tasks and activities required to optimise costs, risks and performance of the assets and/or asset system(s), when they are to be carried out and the resources required.	The management team with overall responsibility for the asset management system. Operations, maintenance and engineering managers.	The organisation's asset management plan(s).	The organisation is in the process of putting in place comprehensive, documented asset management plan(s) that cover all life cycle activities, clearly aligned to asset management objectives and the asset management strategy.

Question No.	Function	Question	Score	Evidence—Summary	Why	Who	Record/documented Information	Maturity narrative for assessed score
27	Asset management plan(s)	How has the organisation communicated its plan(s) to all relevant parties to a level of detail appropriate to the receiver's role in their delivery?	2	The asset management plans at Centralines are communicated to its internal contractor responsible for the delivery of the plans through its Enterprise Asset Management System and other supporting software systems.	Plans will be ineffective unless they are communicated to all those, including contracted suppliers and those who undertake enabling function(s). The plan(s) needs to be communicated in a way that is relevant to those who need to use them.	The management team with overall responsibility for the asset management system. Delivery functions and suppliers.	Distribution lists for plan(s). Documents derived from plan(s) which detail the receivers role in plan delivery. Evidence of communication.	The plan(s) are communicated to most of those responsible for delivery but there are weaknesses in identifying relevant parties resulting in incomplete or inappropriate communication. The organisation recognises improvement is needed as is working towards resolution.
29	Asset management plan(s)	How are designated responsibilities for delivery of asset plan actions documented?	3	Centralines has appropriate documentation in place defining the responsibility for delivery of Capital and Maintenance Plans.	The implementation of asset management plan(s) relies on (1) actions being clearly identified, (2) an owner allocated and (3) that owner having sufficient delegated responsibility and authority to carry out the work required. It also requires alignment of actions across the organisation. This question explores how well the plan(s) set out responsibility for delivery of asset plan actions.	The management team with overall responsibility for the asset management system. Operations, maintenance and engineering managers. If appropriate, the performance management team.	The organisation's asset management plan(s). Documentation defining roles and responsibilities of individuals and organisational departments.	Asset management plan(s) consistently document responsibilities for the delivery actions and there is adequate detail to enable delivery of actions. Designated responsibility and authority for achievement of asset plan actions is appropriate.
31	Asset management plan(s)	What has the organisation done to ensure that appropriate arrangements are made available for the efficient and cost effective implementation of the plan(s)? (Note this is about resources and enabling support)	3	A number of tools have been developed to prioritise and schedule works, which then leads to resource requirement assessments, including gaps to be filled to meet the planned programme of works.	It is essential that the plan(s) are realistic and can be implemented, which requires appropriate resources to be available and enabling mechanisms in place. This question explores how well this is achieved. The plan(s) not only needs to consider the resources directly required and timescales, but also the enabling activities, including for example, training requirements, supply chain capability and procurement timescales.	The management team with overall responsibility for the asset management system. Operations, maintenance and engineering managers. If appropriate, the performance management team. If appropriate, the performance management team. Where appropriate the procurement team and service providers working on the organisation's asset-related activities.	The organisation's asset management plan(s). Documented processes and procedures for the delivery of the asset management plan.	The organisation's arrangements fully cover all the requirements for the efficient and cost effective implementation of asset management plan(s) and realistically address the resources and timescales required, and any changes needed to functional policies, standards, processes and the asset management information system.
33	Contingency planning	What plan(s) and procedure(s) does the organisation have for identifying and responding to incidents and emergency situations and ensuring continuity of critical asset management activities?	3	Unison Management has in place a number of documented processes and procedures in its controlled documents system, which detail roles and responsibilities in emergencies and crises, including escalation points. Unison is undertaking a review and redevelopment of its business continuity management capability (including Centralines), including assessments of DR capability requirements for critical business processes (e.g. information availability, applications, disaster recovery sites).	Widely used AM practice standards require that an organisation has a plan(s) to identify and respond to emergency situations. Emergency plan(s) should outline the actions to be taken to respond to specified emergency situations and ensure continuity of critical asset management activities including the communication to, and involvement of, external agencies. This question assesses if, and how well, these plan(s) triggered, implemented and resolved in the event of an incident. The plan(s) should be appropriate to the level of risk as determined by the organisation's risk assessment methodology. It is also a requirement that relevant personnel are competent and trained.	The manager with responsibility for developing emergency plan(s). The organisation's risk assessment team. People with designated duties within the plan(s) and procedure(s) for dealing with incidents and emergency situations.	The organisation's plan(s) and procedure(s) for dealing with emergencies. The organisation's risk assessments and risk registers.	Appropriate emergency plan(s) and procedure(s) are in place to respond to credible incidents and manage continuity of critical asset management activities consistent with policies and asset management objectives. Training and external agency alignment is in place.

Question No.	Function	Question	Score	Evidence—Summary		Why	Who	Record/documented Information	Maturity narrative for assessed score
37	Structure, authority and responsibilities	What has the organisation done to appoint member(s) of its management team to be responsible for ensuring that the organisation's assets deliver the requirements of the asset management strategy, objectives and plan(s)?	3	Centralines has a Management Services Agreement with Unison. The Centralines Operations Manager and Unison General Manager - Commercial are responsible to ensure that assets deliver the requirements of the asset management strategy, objectives and plans. Further support is provided through Unison's Networks and Operations Team lead by the General Manager who is a member of the Executive Management Team.		In order to ensure that the organisation's assets and asset systems deliver the requirements of the asset management policy, strategy and objectives responsibilities need to be allocated to appropriate people who have the necessary authority to fulfil their responsibilities. (This question, relates to the organisation's assets, e.g. para b), s 4.4.1 of PAS 55, making it therefore distinct from the requirement contained in para a), s 4.4.1 of PAS 55).	Top management. People with management responsibility for the delivery of asset management policy, strategy, objectives and plan(s). People working on asset-related activities.	Evidence that managers with responsibility for the delivery of asset management policy, strategy, objectives and plan(s) have been appointed and have assumed their responsibilities. Evidence may include the organisation's documents relating to its asset management system, organisational charts, job descriptions of post-holders, annual targets/objectives and personal development plan(s) of post-holders as appropriate.	The appointed person or persons have full responsibility for ensuring that the organisation's assets deliver the requirements of the asset management strategy, objectives and plan(s). They have been given the necessary authority to achieve this.
40	Structure, authority and responsibilities	What evidence can the organisation's top management provide to demonstrate that sufficient resources are available for asset management?	2	Centralines uses a basic scheduling tool to evaluate and plan works over time, which links to resource availability and requirements. When work is out-sourced to Unison contracting a software-based scheduling tool is used to evaluate and plan works over time, which links to resource availability and requirements. The tool enables an evaluation of resource gaps, so that priorities can be re-evaluated or additional resources sought.		Optimal asset management requires top management to ensure sufficient resources are available. In this context the term 'resources' includes manpower, materials, funding and service provider support.	Top management. The management team that has overall responsibility for asset management. Risk management team. The organisation's managers involved in day-to-day supervision of asset-related activities, such as frontline managers, engineers, foremen and chargehands as appropriate.	Evidence demonstrating that asset management plan(s) and/or the process(es) for asset management plan implementation consider the provision of adequate resources in both the short and long term. Resources include funding, materials, equipment, services provided by third parties and personnel (internal and service providers) with appropriate skills competencies and knowledge.	A process exists for determining what resources are required for its asset management activities and in most cases these are available but in some instances resources remain insufficient.
42	Structure, authority and responsibilities	To what degree does the organisation's top management communicate the importance of meeting its asset management requirements?	3	The importance of meeting asset management requirements is communicated to select parts of the organisation. There has been significant cross-team collaboration on a service delivery optimisation project in 2012/13 to improve the effectiveness of service delivery, across a wide variety of processes, driven by top management.		Widely used AM practice standards require an organisation to communicate the importance of meeting its asset management requirements such that personnel fully understand, take ownership of, and are fully engaged in the delivery of the asset management requirements (e.g. PAS 55 s 4.4.1 g).	Top management. The management team that has overall responsibility for asset management. People involved in the delivery of the asset management requirements.	Evidence of such activities as road shows, written bulletins, workshops, team talks and management walk-abouts would assist an organisation to demonstrate it is meeting this requirement of PAS 55.	Top management communicates the importance of meeting its asset management requirements to all relevant parts of the organisation.

Question No.	Function	Question	Score	Evidence—Summary		Why	Who	Record/documented Information	Maturity narrative for assessed score
45	Outsourcing of asset management activities	Where the organisation has outsourced some of its asset management activities, how has it ensured that appropriate controls are in place to ensure the compliant delivery of its organisational strategic plan, and its asset management policy and strategy?	3	The majority of network projects are executed by Centralines staff. Centralines "outsources" some network projects to Unison Contracting Services and Scanpower. Regular auditing of work takes place. There is close collaboration over scheduling of works in order to deliver the planned programme.		Where an organisation chooses to outsource some of its asset management activities, the organisation must ensure that these outsourced process(es) are under appropriate control to ensure that all the requirements of widely used AM standards (e.g. PAS 55) are in place, and the asset management policy, strategy objectives and plan(s) are delivered. This includes ensuring capabilities and resources across a time span aligned to life cycle management. The organisation must put arrangements in place to control the outsourced activities, whether it be to external providers or to other in-house departments. This question explores what the organisation does in this regard.	Top management. The management team that has overall responsibility for asset management. The manager(s) responsible for the monitoring and management of the outsourced activities. People involved with the procurement of outsourced activities. The people within the organisations that are performing the outsourced activities. The people impacted by the outsourced activity.	The organisation's arrangements that detail the compliance required of the outsourced activities. For example, this this could form part of a contract or service level agreement between the organisation and the suppliers of its outsourced activities. Evidence that the organisation has demonstrated to itself that it has assurance of compliance of outsourced activities.	Evidence exists to demonstrate that outsourced activities are appropriately controlled to provide for the compliant delivery of the organisational strategic plan, asset management policy and strategy, and that these controls are integrated into the asset management system.
48	Training, awareness and competence	How does the organisation develop plan(s) for the human resources required to undertake asset management activities - including the development and delivery of asset management strategy, process(es), objectives and plan(s)?	3	Centralines identifies by type of resource the requirements to meet the planned programme of works. Skill gaps are identified, including over the longer term, which enables Centralines to address through succession planning, recruitment and/or sub-contracting.		There is a need for an organisation to demonstrate that it has considered what resources are required to develop and implement its asset management system. There is also a need for the organisation to demonstrate that it has assessed what development plan(s) are required to provide its human resources with the skills and competencies to develop and implement its asset management systems. The timescales over which the plan(s) are relevant should be commensurate with the planning horizons within the asset management strategy considers, e.g. if the asset management strategy considers 5, 10 and 15 year time scales then the human resources development plan(s) should align with these. Resources include both 'in house' and external resources who undertake asset management activities.	Senior management responsible for agreement of plan(s). Managers responsible for developing asset management strategy and plan(s). Managers with responsibility for development and recruitment of staff (including HR functions). Staff responsible for training. Procurement officers. Contracted service providers.	Evidence of analysis of future work load plan(s) in terms of human resources. Document(s) containing analysis of the organisation's own direct resources and contractors resource capability over suitable timescales. Evidence, such as minutes of meetings, that suitable management forums are monitoring human resource development plan(s). Training plan(s), personal development plan(s), contract and service level agreements.	The organisation can demonstrate that plan(s) are in place and effective in matching competencies and capabilities to the asset management system including the plan for both internal and contracted activities. Plans are reviewed integral to asset management system process(es).
49	Training, awareness and competence	How does the organisation identify competency requirements and then plan, provide and record the training necessary to achieve the competencies?	3	Centralines uses a "Network Competency Standard" (SD0001) to identify competencies required for task specific functions carried out by staff and contractors engaged to work on the assets. The standard is reviewed regularly with inputs from the SM-EIs and information from othe NZ EDBs. The employer is to submit a declaration that the individual staff member has recieved full training and is fully competent in the tasks they will be required to undertake.		Widely used AM standards require that organisations to undertake a systematic identification of the asset management awareness and competencies required at each level and function within the organisation. Once identified the training required to provide the necessary competencies should be planned for delivery in a timely and systematic way. Any training provided must be recorded and maintained in a suitable format. Where an organisation has contracted service providers in place then it should have a means to demonstrate that this requirement is being met for their employees. (e.g. PAS 55 refers to frameworks suitable for identifying competency requirements).	Senior management responsible for agreement of plan(s). Managers responsible for developing asset management strategy and plan(s). Managers with responsibility for development and recruitment of staff (including HR functions). Staff responsible for training. Procurement officers. Contracted service providers.	Evidence of an established and applied competency requirements assessment process and plan(s) in place to deliver the required training. Evidence that the training programme is part of a wider, co-ordinated asset management activities training and competency programme. Evidence that training activities are recorded and that records are readily available (for both direct and contracted service provider staff) e.g. via organisation wide information system or local records database.	Competency requirements are in place and aligned with asset management plan(s). Plans are in place and effective in providing the training necessary to achieve the competencies. A structured means of recording the competencies achieved is in place.

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Question No.	Function	Question	Score	Evidence—Summary		Why	Who	Record/documented Information	Maturity narrative for assessed score
50	Training, awareness and competence	How does the organisation ensure that persons under its direct control undertaking asset management related activities have an appropriate level of competence in terms of education, training or experience?	3	Centralines uses a software package called "Vault" to track competencies and training/re-training requirements.		A critical success factor for the effective development and implementation of an asset management system is the competence of persons undertaking these activities. organisations should have effective means in place for ensuring the competence of employees to carry out their designated asset management function(s). Where an organisation has contracted service providers undertaking elements of its asset management system then the organisation shall assure itself that the outsourced service provider also has suitable arrangements in place to manage the competencies of its employees. The organisation should ensure that the individual and corporate competencies it requires are in place and actively monitor, develop and maintain an appropriate balance of these competencies.	Managers, supervisors, persons responsible for developing training programmes. Staff responsible for procurement and service agreements. HR staff and those responsible for recruitment.	Evidence of a competency assessment framework that aligns with established frameworks such as the asset management Competencies Requirements Framework (Version 2.0); National Occupational Standards for Management and Leadership; UK Standard for Professional Engineering Competence, Engineering Council, 2005.	Competency requirements are identified and assessed for all persons carrying out asset management related activities - internal and contracted. Requirements are reviewed and staff reassessed at appropriate intervals aligned to asset management requirements.
53	Communication, participation and consultation	How does the organisation ensure that pertinent asset management information is effectively communicated to and from employees and other stakeholders, including contracted service providers?	2	Given the small size of the business, communication at Centralines is effective at all levels of the organisation.		Widely used AM practice standards require that pertinent asset management information is effectively communicated to and from employees and other stakeholders including contracted service providers. Pertinent information refers to information required in order to effectively and efficiently comply with and deliver asset management strategy, plan(s) and objectives. This will include for example the communication of the asset management policy, asset performance information, and planning information as appropriate to contractors.	Top management and senior management representative(s), employees' representative(s), employee's trade union representative(s); contracted service provider management and employee representative(s); representative(s) from the organisation's Health, Safety and Environmental team. Key stakeholder representative(s).	Asset management policy statement prominently displayed on notice boards, intranet and internet; use of organisation's website for displaying asset performance data; evidence of formal briefings to employees, stakeholders and contracted service providers; evidence of inclusion of asset management issues in team meetings and contracted service provider contract meetings; newsletters, etc.	The organisation has determined pertinent information and relevant parties. Some effective two way communication is in place but as yet not all relevant parties are clear on their roles and responsibilities with respect to asset management information.
59	Asset Management System documentation	What documentation has the organisation established to describe the main elements of its asset management system and interactions between them?	2	The main elements of the Asset Management System are documented in the Asset Management Policy, the Regulatory Asset Management Plan, Standards, and are reviewed at prescribed intervals. Gaps still exist.		Widely used AM practice standards require an organisation maintain up to date documentation that ensures that its asset management systems (i.e. the systems the organisation has in place to meet the standards) can be understood, communicated and operated (e.g. s4.5 of PAS 55 requires the maintenance of up to date documentation of the asset management system requirements specified throughout s4 of PAS 55).	The management team that has overall responsibility for asset management. Managers engaged in asset management activities.	The documented information describing the main elements of the asset management system (process(es)) and their interaction.	The organisation in the process of documenting its asset management system and has documentation in place that describes some, but not all, of the main elements of its asset management system and their interaction.

Question No.	Function	Question	Score	Evidence—Summary		Why	Who	Record/documented Information	Maturity narrative for assessed score
62	Information management	What has the organisation done to determine what its asset management information system(s) should contain in order to support its asset management system?	2	There is ongoing analysis based on requirements from key users that lead to projects for significant or minor change. In each case a change request is created to initiate the change. Currently this is as a result of identified requirement rather than a holistic approach to Asset Management requirements.		"Effective asset management requires appropriate information to be available. Widely used AM standards therefore require the organisation to identify the asset management information it requires in order to support its asset management system. Some of the information required may be held by suppliers. The maintenance and development of asset management information systems is a poorly understood specialist activity that is akin to IT management but different from IT management. This group of questions provides some indications as to whether the capability is available and applied. Note: To be effective, an asset information management system requires the mobilisation of technology, people and process(es) that create, secure, make available and destroy the information required to support the asset management system."	The organisation's strategic planning team. The management team that has overall responsibility for asset management. Information management team. Operations, maintenance and engineering managers.	Details of the process the organisation has employed to determine what its asset information system should contain in order to support its asset management system. Evidence that this has been effectively implemented.	The organisation has developed a structured process to determine what its asset information system should contain in order to support its asset management system and has commenced implementation of the process.
63	Information management	How does the organisation maintain its asset management information system(s) and ensure that the data held within it (them) is of the requisite quality and accuracy and is consistent?	2	Controls are in place to ensure that complete and consistent data is maintained in systems such as the GIS. These are applied and regularly maintained. Data quality issues exist.		"The response to the questions is progressive. A higher scale cannot be awarded without achieving the requirements of the lower scale. This question explores how the organisation ensures that information management meets widely used AM practice requirements (eg, s 4.4.6 (a), (c) and (d) of PAS 55)."	The management team that has overall responsibility for asset management. Users of the organisational information systems.	The asset management information system, together with the policies, procedure(s), improvement initiatives and audits regarding information controls.	The organisation has developed a controls that will ensure the data held is of the requisite quality and accuracy and is consistent and is in the process of implementing them.
64	Information management	How has the organisation's ensured its asset management information system is relevant to its needs?	2	The organisation has developed and is implementing a process to ensure its asset management information system is relevant to its needs. Gaps between what the information system provides and the organisation's needs have been identified and action is being taken to close them.		Widely used AM standards need not be prescriptive about the form of the asset management information system, but simply require that the asset management information system is appropriate to the organisations needs, can be effectively used and can supply information which is consistent and of the requisite quality and accuracy.	The organisation's strategic planning team. The management team that has overall responsibility for asset management. Information management team. Users of the organisational information systems.	The documented process the organisation employs to ensure its asset management information system aligns with its asset management requirements. Minutes of information systems review meetings involving users.	The organisation has developed and is implementing a process to ensure its asset management information system is relevant to its needs. Gaps between what the information system provides and the organisations needs have been identified and action is being taken to close them.
69	Risk management process(es)	How has the organisation documented process(es) and/or procedure(s) for the identification and assessment of asset and asset management related risks throughout the asset life cycle?	2	Centralines, in consultation with Unison, is in the process of documenting the identification and assessment of asset related risk across the asset lifecycle but it is incomplete or there are inconsistencies between approaches and a lack of integration.		Risk management is an important foundation for proactive asset management. Its overall purpose is to understand the cause, effect and likelihood of adverse events occurring, to optimally manage such risks to an acceptable level, and to provide an audit trail for the management of risks. Widely used standards require the organisation to have process(es) and/or procedure(s) in place that set out how the organisation identifies and assesses asset and asset management related risks. The risks have to be considered across the four phases of the asset lifecycle (e.g. para 4.3.3 of PAS 55).	The top management team in conjunction with the organisation's senior risk management representatives. There may also be input from the organisation's Safety, Health and Environment team. Staff who carry out risk identification and assessment.	The organisation's risk management framework and/or evidence of specific process(es) and/ or procedure(s) that deal with risk control mechanisms. Evidence that the process(es) and/or procedure(s) are implemented across the business and maintained. Evidence of agendas and minutes from risk management meetings. Evidence of feedback in to process(es) and/or procedure(s) as a result of incident investigation(s). Risk registers and assessments.	The organisation is in the process of documenting the identification and assessment of asset related risk across the asset lifecycle but it is incomplete or there are inconsistencies between approaches and a lack of integration.

Question No.	Function	Question	Score	Evidence—Summary		Why	Who	Record/documented Information	Maturity narrative for assessed score
79	Use and maintenance of asset risk information	How does the organisation ensure that the results of risk assessments provide input into the identification of adequate resources and training and competency needs?	2	The organisation addresses risk management at Strategic, Tactical and Operational levels. Centralines maintains a risk register where risks, appropriate actions to eliminate or mitigate risks, and follow up dates are logged. Inconsistencies do exist and will be addressed through the Lifecycle Asset Management Framework project initiated at Unison.		Widely used AM standards require that the output from risk assessments are considered and that adequate resource (including staff) and training is identified to match the requirements. It is a further requirement that the effects of the control measures are considered, as there may be implications in resources and training required to achieve other objectives.	Staff responsible for risk assessment and those responsible for developing and approving resource and training plan(s). There may also be input from the organisation's Safety, Health and Environment team.	The organisations risk management framework. The organisation's resourcing plan(s) and training and competency plan(s). The organisation should be able to demonstrate appropriate linkages between the content of resource plan(s) and training and competency plan(s) to the risk assessments and risk control measures that have been developed.	The organisation is in the process ensuring that outputs of risk assessment are included in developing requirements for resources and training. The implementation is incomplete and there are gaps and inconsistencies.
82	Legal and other requirements	What procedure does the organisation have to identify and provide access to its legal, regulatory, statutory and other asset management requirements, and how is requirements incorporated into the asset management system?	3	Centralines has in place a comprehensive legal compliance programme that uses a questionnaire that is filled out six-monthly to establish compliance with all applicable legislation and regulations. The content is reviewed at each six-monthly review or updated when we are aware of changes in applicable regulations/ legislations.		In order for an organisation to comply with its legal, regulatory, statutory and other asset management requirements, the organisation first needs to ensure that it knows what they are (e.g. PAS 55 specifies this in s 4.4.8). It is necessary to have systematic and auditable mechanisms in place to identify new and changing requirements. Widely used AM standards also require that requirements are incorporated into the asset management system (e.g. procedure(s) and process(es)).	Top management. The organisations regulatory team. The organisation's legal team or advisors. The management team with overall responsibility for the asset management system. The organisation's health and safety team or advisors. The organisation's policy making team.	The organisational processes and procedures for ensuring information of this type is identified, made accessible to those requiring the information and is incorporated into asset management strategy and objectives.	Evidence exists to demonstrate that the organisation's legal, regulatory, statutory and other asset management requirements are identified and kept up to date. Systematic mechanisms for identifying relevant legal and statutory requirements.
88	Life Cycle Activities	How does the organisation establish implement and maintain process(es) for the implementation of its asset management plan(s) and control of activities across the creation, acquisition or enhancement of assets. This includes design, modification, procurement, construction and commissioning activities?	3	These processes and procedures are addressed through the work being undertaken in the Lifecycle asset managememt framework project initiated at Unison.		Life cycle activities are about the implementation of asset management plan(s) i.e. they are the "doing" phase. They need to be done effectively and well in order for asset management to have any practical meaning. As a consequence, widely used standards (e.g. PAS 55 s 4.5.1) require organisations to have in place appropriate process(es) and procedure(s) for the implementation of asset management plan(s) and control of lifecycle activities. This question explores those aspects relevant to asset creation.	Asset managers, design staff, construction staff and project managers from other impacted areas of the business, e.g. Procurement.	Documented process(es) and procedure(s) which are relevant to demonstrating the effective management and control of life cycle activities during asset creation, acquisition, enhancement including design, modification, procurement, construction and commissioning.	Effective process(es) and procedure(s) are in place to manage and control the implementation of asset management plan(s) during activities related to asset creation including design, modification, procurement, construction and commissioning.

Question No.	Function	Question	Score	Evidence—Summary		Why	Who	Record/documented Information	Maturity narrative for assessed score
91	Life Cycle Activities	How does the organisation ensure that process(es) and/or procedure(s) for the implementation of asset management plan(s) and control of activities during maintenance (and inspection) of assets are sufficient to ensure activities are carried out under specified conditions, are consistent with asset management strategy and control cost, risk and performance?	2	Unison is continually putting in place process(es) and procedure(s) to manage and control the implementation of asset management plan(s) during this life cycle phase. They include a process for confirming the process(es)/ procedure(s) are effective and if necessary carrying out modifications. These improvements will be implemented at Centralines on completion of the project at Unison.		Having documented process(es) which ensure the asset management plan(s) are implemented in accordance with any specified conditions, in a manner consistent with the asset management policy, strategy and objectives and in such a way that cost, risk and asset system performance are appropriately controlled is critical. They are an essential part of turning intention into action (e.g. as required by PAS 55 s 4.5.1).	Asset managers, operations managers, maintenance managers and project managers from other impacted areas of the business.	Documented procedure for review. Documented procedure for audit of process delivery. Records of previous audits, improvement actions and documented confirmation that actions have been carried out.	The organisation is in the process of putting in place process(es) and procedure(s) to manage and control the implementation of asset management plan(s) during this life cycle phase. They include a process for confirming the process(es)/procedure(s) are effective and if necessary carrying out modifications.
95	Performance and condition monitoring	How does the organisation measure the performance and condition of its assets?	2	A number of initiatives are underway at Unison in the areas of development of dynamic rating capability, advanced data processing algorithms, condition monitoring and diagnosis, failure forecasting and remaining life assessment. The outputs of this work will also be implemented on the Centralines Network.		Widely used AM standards require that organisations establish implement and maintain procedure(s) to monitor and measure the performance and/or condition of assets and asset systems. They further set out requirements in some detail for reactive and proactive monitoring, and leading/lagging performance indicators together with the monitoring or results to provide input to corrective actions and continual improvement. There is an expectation that performance and condition monitoring will provide input to improving asset management strategy, objectives and plan(s).	A broad cross-section of the people involved in the organisation's asset-related activities from data input to decision-makers, i.e. an end-to end assessment. This should include contactors and other relevant third parties as appropriate.	Functional policy and/ or strategy documents for performance or condition monitoring and measurement. The organisation's performance monitoring frameworks, balanced scorecards etc. Evidence of the reviews of any appropriate performance indicators and the action lists resulting from these reviews. Reports and trend analysis using performance and condition information. Evidence of the use of performance and condition information shaping improvements and supporting asset management strategy, objectives and plan(s).	The organisation is developing coherent asset performance monitoring linked to asset management objectives. Reactive and proactive measures are in place. Use is being made of leading indicators and analysis. Gaps and inconsistencies remain.
99	Investigation of asset-related failures, incidents and non-conformities	How does the organisation ensure responsibility and the authority for the handling, investigation and mitigation of asset-related failures, incidents and emergency situations and non conformances is clear, unambiguous, understood and communicated?	3	Unison personel, responsible for the management of Centralines, routinely conduct inspections and investigations following any significant asset failures. Non-conformances are documented and reworks actioned and reaudited. Centralines has policies and procedures in place which assign responsibilites for managing emergency or crisis situations.		Widely used AM standards require that the organisation establishes implements and maintains process(es) for the handling and investigation of failures incidents and non-conformities for assets and sets down a number of expectations. Specifically this question examines the requirement to define clearly responsibilities and authorities for these activities, and communicate these unambiguously to relevant people including external stakeholders if appropriate.	The organisation's safety and environment management team. The team with overall responsibility for the management of the assets. People who have appointed roles within the asset-related investigation procedure, from those who carry out the investigations to senior management who review the recommendations. Operational controllers responsible for managing the asset base under fault conditions and maintaining services to consumers. Contractors and other third parties as appropriate.	Process(es) and procedure(s) for the handling, investigation and mitigation of asset-related failures, incidents and emergency situations and non conformances. Documentation of assigned responsibilities and authority to employees. Job Descriptions, Audit reports. Common communication systems i.e. all Job Descriptions on Internet etc.	The organisation have defined the appropriate responsibilities and authorities and evidence is available to show that these are applied across the business and kept up to date.

Question No.	Function	Question	Score	Evidence—Summary		Why	Who	Record/documented Information	Maturity narrative for assessed score
105	Audit	What has the organisation done to establish procedure(s) for the audit of its asset management system (process(es))?	3	The organisation can demonstrate that its audit procedure(s) cover all the appropriate asset-related activities and the associated reporting of audit results. Audits are to an appropriate level of detail and consistently managed.		This question seeks to explore what the organisation has done to comply with the standard practice AM audit requirements (e.g. the associated requirements of PAS 55 s 4.6.4 and its linkages to s 4.7).	The management team responsible for its asset management procedure(s). The team with overall responsibility for the management of the assets. Audit teams, together with key staff responsible for asset management. For example, Asset Management Director, Engineering Director. People with responsibility for carrying out risk assessments.	The organisation's asset-related audit procedure(s). The organisation's methodology(s) by which it determined the scope and frequency of the audits and the criteria by which it identified the appropriate audit personnel. Audit schedules, reports etc. Evidence of the procedure(s) by which the audit results are presented, together with any subsequent communications. The risk assessment schedule or risk registers.	The organisation can demonstrate that its audit procedure(s) cover all the appropriate asset-related activities and the associated reporting of audit results. Audits are to an appropriate level of detail and consistently managed.
109	Corrective & Preventative action	How does the organisation instigate appropriate corrective and/or preventive actions to eliminate or prevent the causes of identified poor performance and non conformance?	3	Managers inspect works and work-sites for both quality and health and safety-related requirements. Audit reports are produced, with non-conformances identified, and rework as required. Where required alerts are communicated widely to address any trends or reinforce required procedures.		Having investigated asset related failures, incidents and non-conformances, and taken action to mitigate their consequences, an organisation is required to implement preventative and corrective actions to address root causes. Incident and failure investigations are only useful if appropriate actions are taken as a result to assess changes to a businesses risk profile and ensure that appropriate arrangements are in place should a recurrence of the incident happen. Widely used AM standards also require that necessary changes arising from preventive or corrective action are made to the asset management system.	The management team responsible for its asset management procedure(s). The team with overall responsibility for the management of the assets. Audit and incident investigation teams. Staff responsible for planning and managing corrective and preventive actions.	Analysis records, meeting notes and minutes, modification records. Asset management plan(s), investigation reports, audit reports, improvement programmes and projects. Recorded changes to asset management procedure(s) and process(es). Condition and performance reviews. Maintenance reviews	Mechanisms are consistently in place and effective for the systematic instigation of preventive and corrective actions to address root causes of non compliance or incidents identified by investigations, compliance evaluation or audit.
113	Continual Improvement	How does the organisation achieve continual improvement in the optimal combination of costs, asset related risks and the performance and condition of assets and asset systems across the whole life cycle?	3	Centralines recognises three competing drivers as the cornerstones of asset management. These are Long-Term Value, Asset Performance and Risk Management. Continual Improvement initiatives will be implemented in collaboration with the work done by Unison in this area.		Widely used AM standards have requirements to establish, implement and maintain process(es)/ procedure(s) for identifying, assessing, prioritising and implementing actions to achieve continual improvement. Specifically there is a requirement to demonstrate continual improvement in optimisation of cost risk and performance/condition of assets across the life cycle. This question explores an organisation's capabilities in this area—looking for systematic improvement mechanisms rather that reviews and audit (which are separately examined).	The top management of the organisation. The manager/team responsible for managing the organisation's asset management system, including its continual improvement. Managers responsible for policy development and implementation.	Records showing systematic exploration of improvement. Evidence of new techniques being explored and implemented. Changes in procedure(s) and process(es) reflecting improved use of optimisation tools/ techniques and available information. Evidence of working parties and research.	There is evidence to show that continuous improvement process(es) which include consideration of cost risk, performance and condition for assets managed across the whole life cycle are being systematically applied.

Question No.	Function	Question	Score	Evidence—Summary		Why	Who	Record/documented Information	Maturity narrative for assessed score
115	Continual Improvement	How does the organisation seek and acquire knowledge about new asset management related technology and practices, and evaluate their potential benefit to the organisation?	3	Under the management of Unison, Centralines has access to a Technology Information Portal which is a suppository for capturing information on new technologies, products and best industry practices. If the new technology is deemed worth progressing with it is then subjected to a detailed new technology and product evaluation process. Unison has also formed strong relationships with other EDBs, both nationally and internationally, and some sharing of IP around technologies has been allowed and formalised.		One important aspect of continual improvement is where an organisation looks beyond its existing boundaries and knowledge base to look at what 'new things are on the market'. These new things can include equipment, process(es), tools, etc. An organisation which does this (eg, by the PAS 55 s 4.6 standards) will be able to demonstrate that it continually seeks to expand its knowledge of all things affecting its asset management approach and capabilities. The organisation will be able to demonstrate that it identifies any such opportunities to improve, evaluates them for suitability to its own organisation and implements them as appropriate. This question explores an organisation's approach to this activity.	The top management of the organisation. The manager/team responsible for managing the organisation's asset management system, including its continual improvement. People who monitor the various items that require monitoring for 'change'. People that implement changes to the organisation's policy, strategy, etc. People within an organisation with responsibility for investigating, evaluating, recommending and implementing new tools and techniques, etc.	Research and development projects and records, benchmarking and participation knowledge exchange professional forums. Evidence of correspondence relating to knowledge acquisition. Examples of change implementation and evaluation of new tools, and techniques linked to asset management strategy and objectives.	The organisation actively engages internally and externally with other asset management practitioners, professional bodies and relevant conferences. Actively investigates and evaluates new practices and evolves its asset management activities using appropriate developments.

A

GLOSSARY OF TERMS

CENTRALINES
LIMITED

CONTENTS

A. GLOSSARY OF TERMS

A	Amperes	**CI**	Continual Improvement
AAAC	All Aluminium Alloy Conductor	**CoC**	Certificate of Competency
AAC	All Aluminium Conductor	**CorMon**	Corrosion Monitoring
ABB	Supplier	**CPI**	Consumer Price Index
ABC	Aerial Bundled Cable	**CRM**	Customer Relationship Management
ABS	Air Break Switch	**CT**	Current Transformer
AC	Alternating Current	**DA**	Distribution Automation
ACC	Accident Compensation Corporation	**DC**	Direct Current
ACSR	Aluminium Conductor Steel Reinforced	**DDO**	Dominion Drop Out
ACS	Asset Criticality Schema	**DER**	Distributed Energy Resources
ACTIVA	Software Package	**Deuar**	Deuar Mechanical Partial Load Deflection Testing
ADMS	Advanced Distribution Management System	**DFA**	Delegated Financial Authority
AE	Augmentation Envelope	**DG**	Distributed Generation
AEI	Associated Electrical Industries	**DGA**	Dissolved Gas Analysis
AIGG	Asset Information Governance Group	**DMAIC**	Define, Measure, Analyse, Improve, Control
AMMAT	Asset Management Maturity Assessment Tool	**DNO**	Distribution Network Operator
AMO	Asset Management Objective	**DNP-3**	Distributed Network Protocol
AMP	Asset Management Plan	**DPP**	Commerce Commission's Default Price Path
AMS	Asset Management System	**DQD**	Data Quality Dashboard
AMSF	Asset Management System Framework	**DR**	Disaster Recovery
AOC	Alternative Operations Centre	**DSO**	Distribution System Operator
ARC	Audit and Risk Committee	**EAMS**	Enterprise Asset Management System
ARP	Asset Renewal Planning	**EDB**	Electricity Distribution Business
ASEA	Merged with Brown Boveri to create ABB	**EDSS**	Expert Decision Support System
BCP	Business Continuity Planning	**EEA**	Electricity Engineers' Association
BMSF	Business Management Framework	**EMT**	Executive Management Team
BSI	British Standards Institute	**ENTEC**	Supplier
CAD	Computer-Aided Design	**ERC**	Executive Risk Committee
CAPEX	Capital Expenditure	**EVA**	Ethylene Vinyl Acetate
CAR	Corridor Access Request	**FAIDI**	Feeder Average Interruption Duration Index
CB	Circuit Breaker	**FAIFI**	Feeder Average Interruption Frequency Index
CBD	Central Business District	**FRS-3**	Financial Reporting Standards
CBRM	Condition Based Risk Management	**GEC**	The General Electric Company
CDEM	Civil Defence Emergency Management	**GIS**	Geo-spatial Information System
CHBCPT	Central Hawke's Bay Consumers Power Trust	**GMI**	Annual Invasive Inspection
CF	Constraint Forecasting	**GPS**	Global Positioning System

CENTRALINES LIMITED REGULATORY ASSET MANAGEMENT PLAN 2020

APPENDIX **GLOSSARY OF TERMS**

GSP	Great Safety Performance	**MV**	Medium Voltage
GWh	Giga Watt-hours	**MVA**	Mega Volt-Amps
GXP	Grid Exit Point	**MW**	Megawatt
H&S	Health and Safety	**NIT**	Network Investment Toolbox
H_2S	Hydrogen Sulphide	**NOC**	Network Operations Centre
HBPCT	Hawke's Bay Power Consumers' Trust	**NPS**	Net Promoter Score
HILP	High Impact Low Probability	**NPV**	Net Present Value
HP	Hewlett Packard	**NZ**	New Zealand
HR	Human Relations	**NZIER**	New Zealand Institute for Economic Research
HV	High Voltage	**NZOQ**	New Zealand Organisation for Quality
IAM	Institute of Asset Management	**OH**	Overhead
ICP	Installation Control Point	**OHUG**	Overhead to Underground
IMG	Information Management Group	**OPEX**	Operational Expenditure
IMP	Insulator Pollution Monitoring	**PA**	Partial Achievement
IMS	Integrted Management System	**PCP**	Pentachlorophenol
IP	Internet Protocol	**PD**	Partial Discharge
IPAG	Innovation & Participation Advisory Group	**PDCA**	Plan, Do, Check, Act
IPT	Investment Prioritisation Tool	**Peanut**	Vacuum Capacitor Switch
IT	Information Technology	**PIF**	Performance Indicator Framework
k	Thousand	**PILC**	Paper Insulated, Lead Covered
kV	Kilovolt	**PLC**	Programmable Logic Controller
kVA	1000 Volt-Amps	**POS**	Point of Supply
kVAr	Reactive power	**PSMS**	Public Safety Management System
L+G	Landis + Gyr	**PV**	Solar Photovoltaic
LCAM	Lifecycle Asset Management	**PVC**	Polyvinyl Chloride
LCP	Legislative Compliance Programme	**R:P**	Reactive to Preventative Cost
LED	Light Emitting Diode	**RAMP**	Regulatory Asset Management Plan
LFT	Load Forecast Tool	**RC**	Replacement Cost
LMVP	Model of Reyrolle Pacific Switchgear	**RCS**	Remote Controlled Switch
LTOS	Live Tank Oil Sampling	**RE**	Renewal Envelope
LV	Low Voltage	**REG D**	A Eberle Voltage Regulating Relay
M	Million	**RFP**	Request for Proposal
MAGTECH	Supplier	**RLE**	Residual Life Expectancy
MCR	Maximum Continuous Rating	**RSP**	Retail Service Provider
MD	Maximum Demand	**RMS**	Ring Main Switchgear
MDS	Master Data Services	**RMU**	Ring Main Unit
MED	Major Event Day	**RPS**	Reyrolle Pacific
MIND	Mineral Insulated Non-Draining	**RTU**	Remote Terminal Unit
MPT40	Deuar Mechanical Partial Load Deflection Testing	**S/S**	Substation
MRP	Mighty River Power	**SAIDI**	System Average Interruption Duration Index

APPENDIX GLOSSARY OF TERMS

SAIFI	System Average Interruption Frequency Index	**TEC**	Technical Evaluation Committee
SAMP	Strategic Asset Management Plan	**TELARCC**	Supplier
SAN	Storage Area Network	**Triple-R**	Repair, Refurbish, Replace
SAP	Software Package	**UCSL**	Unison Contracting Services Limited
SCADA	Supervisory Control and Data Acquisition	**UC**	University of Canterbury
SCI	Statement of Corporate Intent	**UG**	Underground
SF6	Sulphur Hexafluoride	**VoIP**	Voice over Internet Protocol
SH	State Highway	**VPT**	Vegetation Prioritisation Tool
SI	Serviceability Index	**VRR**	Voltage Regulating Relay
SLA	Service Level Agreement	**VT**	Voltage Transformer
SMART	Specific, Measurable, Achievable, Relevant, Timebound	**WPC**	Works Planning and Consolidation
SO2	Sulphur Dioxide	**UHF**	Ultra-High Frequency
SOP	Standard Operating Procedure	**UNISAFE**	A model of ABB switchgear
Stn	Station	**UNL**	Unison Networks Limited
SWER	Single Wire Earth Return	**Var**	Volt Ampere Reactive
TCP	Transmission Control Protocol	**VHF**	Very High Frequency

CENTRALINES
LIMITED

CERTIFICATION FOR YEAR-BEGINNING DISCLOSURES

Pursuant to Schedule 17

We, Jon Edmond Nichols and Derek Neil Walker, being Directors of Centralines Limited certify that, having made all reasonable enquiry, to the best of our knowledge:

a) The following attached information of Centralines Limited prepared for the purposes of clauses 2.4.1, 2.6.1, 2.6.3, 2.6.6 and 2.7.2 of the Electricity Distribution Information Disclosure Determination 2012 in all material respects complies with that determination.

b) The prospective financial or non-financial information included in the attached information has been measured on a basis consistent with regulatory requirements or recognised industry standards.

c) The forecasts in Schedules 11a, 11b, 12a, 12b, 12c and 12d are based on objective and reasonable assumptions which both align with Centralines Limited's corporate vision and strategy and are documented in retained records.

Director Date: 24th March 2020

Director Date: 24th March 2020