WAIPA NETWORKS LIMITED

Asset Management Plan

1 April 2017 to 31 March 2027

WAIPA NETWORKS

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Waipa Networks Limited Asset Management Plan was

Certified by:	The Board	Directors, Waipa Networks Limited
Authorised by:	Adam Fletcher	Chief Executive Officer, Waipa Networks Limited
Prepared by:	Pete Armstrong	Network Asset Manager, Waipa Networks Limited

Certification Date

This Asset Management Plan was certified by The Board that it describes actual processes and practices on 28 March 2017.

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1.0 Abbreviations

A, kA	Ampere, kilo-Ampere
ABS	Air Break Switch
AMD	Anytime Maximum Demand
ADSS	All Di-Electric Self Supporting Fibre Cable
AMMAT	Asset Management Maturity Assessment Tool
AMP	Asset Management Plan
CAIDI	Consumer Average Interruption Duration Index
CAD	Computer Aided Design
CBG GXP	Transpower New Zealand Cambridge GXP
CIC	Transpower New Zealand Customer Investment Contract
DCDB	Digital Cadastral Database
DDO	High Voltage Drop Out Fuses
Disconnector	ABS, Gas Switch, Knife Switch
DSD	Transpower New Zealand Detailed Solution Development
EDB	Electricity Distribution Business
GPS	Global positioning system
GXP	Grid Exit Point
ICP	Installation Control Point
IT	Information Technology
KPI	Key Performance Indicator
LINZ	Land Information New Zealand
MD	Maximum Demand
MVA	Mega-Volt-Ampere
MW	Megawatt
MBIE	Ministry of Business, Innovation and Employment
NCP	Network Connection Point
NCS	Napier Computer System
NIC	New Investment Contract
NZTA	New Zealand Transport Agency
ODAF	Oil Directed Air Forced
ODV	Optimised Deprival Value
PILC	Paper Insulated Lead Cover
POS	Point of Supply
RMA	Resource Management Act
RMU	Ring Main Unit
RTU	Remote Terminal Unit
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SCADA	Supervisory Control and Data Acquisition
SCI	Statement of Corporate Intent
SSR	Transpower New Zealand Solution Study Report
TOU	Time of Use
TMU GXP	Transpower New Zealand Te Awamutu GXP
Transpower	Transpower New Zealand Ltd
V, kV	Volt, kilo-Volt
Waipa	Waipa Networks Ltd
XLPE	Cross Linked Polyethylene

2.0 Summary of Asset Management Plan

This summary provides an overview of the content of Waipa Networks' AMP.

Waipa Networks Limited (Waipa) owns and operates the electricity distribution assets in Cambridge and Te Awamutu and their surrounding rural areas in the Waikato region. Waipa's distribution system covers 1,865 square kilometres. The Company is owned by the Waipa Networks Trust (the shareholder who represents all connected consumers).

Waipa conveys electricity on behalf of 11 energy retailers from Transpower's Cambridge and Te Awamutu GXPs via 27 radial 11kV feeders, 11kV/400 transformers and associated 400V/230V reticulation to 25,328 ICPs (as at 31 March 2016).

The AMP is a key document that provides a systematic governance and management framework for managing Waipa's assets. It informs Waipa's stakeholders of the Company's policies for: investment; maintenance and retirement of assets; operating the network safely and in a prudent manner; ensuring security of supply and setting network reliability targets for different consumer groups. The AMP also meets the Commerce Commission's Electricity Distribution Information Disclosure Determination 2012.

The document describes the Company's business planning cycle, its relationship and interaction with Waipa's Purpose, annual business plan, capital and operational budgets and Statement of Corporate Intent (SCI).

The AMP was approved by Waipa's Board of Directors on 28 March 2017. It discusses new investments with Transpower and all network capital and maintenance works together with their associated budgets that are reasonably expected to be undertaken over the next 10 years.

The document identifies Waipa's stakeholders and their interests in the Company. It discusses the Company's priorities for managing stakeholder conflicts to ensure; that public and employee safety is not compromised, the solutions are financially and operationally viable, compliance with best EDB practice and quality of supply is not compromised.

The Waipa Network Trust and the Company business aspirations are aligned through the SCI and as a consequence there have been no conflicts between the Company and shareholder.

The AMP describes who is responsible and accountable for asset management from the governance, executive management and operational perspectives.

The document describes the Company's asset management process, systems and quality of information. Waipa believes it has developed three robust asset management information systems (SCADA system, geographical information system and an integrated data warehouse system) that are appropriate for the size of the network, number and type of distribution assets, its financial and administrative business needs, consumer needs and other stakeholder requirements.

The AMP describes the network configuration and the location, numbers and types of distribution assets owned by the Company. Waipa has gathered comprehensive information on the physical attributes and condition of its assets through routine visual and thermal surveys and specific partial discharge and corona surveys as required. Based on Waipa's asset age profiles the Company does not expect any "wall-of-wire" issues over the next 10 years.

The document specifies Waipa's service level targets for various segments of the network and other business performance targets. These targets have been set through analysis of customer satisfaction surveys and consultation with stakeholders and as outcomes of the Company's Purpose. Waipa believes that its customers are satisfied with the current reliability of the network as a result of independent surveys and notes the fact the Company has some of the lowest line charges in New Zealand.

Te Awamutu GXP is supplied by one Transpower 110kV transmission line from Karapiro and from July 2016, a second 110kV transmission line from Hangatiki GXP constructed and owned by Waipa Networks. The new line from Hangatiki to Te Awamutu provides the needed security of supply (n-1) and will improve reliability, avoiding frequent unplanned outages and a regular four yearly planned maintenance shutdown to the Te Awamutu GXP. The Hangatiki – Te Awamutu line will be operated by the Transpower System Operator as part of the national grid but is owned and maintained by Waipa.

Transpower commissioned a new switchboard at Cambridge GXP in December 2013. The new switchboard allowed them to replace aging equipment which faulted in April 2013, remove a busbar constraint and provide additional circuit breakers for four new feeders (St Kilda, Monavale, Pencarrow and Ripple Plant) for Waipa. These feeders were progressively commissioned from 2014. St Kilda feeder now supplies a new subdivision. The Cambridge Ripple Plant was previously fed from another feeder but now has its own independent supply. The works to split the new Pencarrow feeder from the Tamahere feeder and the new Monavale feeder from the Kaipaki feeder were completed in 2016 to improve reliability and supply new loads.

Over the past 13 years Waipa has executed a number of Customer Investment Contracts with Transpower to remove all capacity constrained and aged equipment at Cambridge and Te Awamutu GXPs and to provide connections for the new 110kV line for Te Awamutu. Further Transpower enhancement work will be required at Cambridge GXP by circa 2022/23 when due to a combination of spot load increases and ongoing load growth, the supply transformer firm capacity will be exceeded. The Te Awamutu GXP supply transformer firm capacity is forecast to be exceeded from 2023/24. Load forecasts will be monitored in the interim and network development planning for Cambridge and Te Awamutu will continue to determine the optimal method to increase GXP transformer capacity.

The AMP discusses the Waipa's asset management criteria (quality, capacity, reliability and security of supply) and the planning assumptions (rate of GXP and Company feeder load growth) and the methods adopted to prioritise projects.

Analysis of group feeder cable ratings in the Te Awamutu GXP driveway indicates that depth of laying, soil thermal resistivity and mutual heating of cables is producing de-rated cable capacity insufficient for current feeder loadings, particularly for the original paper insulated 1966 cables. A thermal cable rating investigation will confirm the extent of the issue and design new feeder cable installation to achieve the required network cable capacity at the exit of the Te Awamutu GXP. This work is expected to be completed in 2017/18.

Subject to actual load growth aligning with predictions the only other constraint likely to occur within the next 10 years will be on the Company's longest feeder supplying Kawhia. Waipa plans to commission a diesel generator at Lake Road near Kawhia if and when required for voltage support at peak times.

Waipa will continue its strategies of splitting feeders, installing reclosers to segment feeders, automating feeder open points with load break switches to reduce restoration times and installing dropout fuses on spur lines where improvement of reliability can be achieved.

The AMP describes Waipa's life-cycle maintenance criteria (is the asset safe and "fit for purpose") and asset physical condition surveys which drive the Company's maintenance works. Waipa commenced its second asset condition survey in 2010. There were 404 11kV and 400V identified defects remaining on the network as at 31 March 2016. All identified defects will be eliminated on a prioritised basis.

The Company has a vegetation management programme to minimise interference from trees and maintain reliability. A routine earth testing and repair programme is used to ensure system safety. Waipa employs an external service provider to carry out an annual thermal survey. Any thermal defects identified will be removed as a matter of priority. The Company will engage external service providers for partial discharge and corona surveys if and when required.

Waipa has a number of aged ABSs on its 11kV feeders whose operation is becoming unreliable. These ABSs will be progressively replaced by vacuum interrupting load break switches as these are expected to have greater reliability and lower life cycle costs than conventional ABS.

The Company has a number of two pole transformer substation structures comprising hardwood platforms that are over 40 years old and at the end of their economic life. These will be replaced on a condition prioritised basis by either a single pole transformer substation or a modern pad mounted substation in a programme to be complete by 2018/19.

The Company removed its last oil-filled Ring Main Unit early in 2014/15. Oil filled switchgear has caused a number of safety issues for the industry over the years.

The risk of widespread outages due to faults on multi-circuit overhead lines that supply adjoining areas on the network (hence limiting back feed capacity to the affected areas) has been evaluated, with the primary risk arising from car versus pole incidents. Projects to mitigate this risk have been included in the budget, for the multi-circuit section of the Te Awamutu West feeder, Kiokio/Waikeria feeder and Pokuru feeder and the Factory Rd multi-circuit section of the Pirongia feeder, Kawhia feeder and Paterangi feeder.

Waipa has assessed the risk from physical threats to its network posed by naturally occurring hazards (wind, lightning, floods, land erosion, earthquakes, volcanic eruptions and geothermal activity and adverse weather) and concludes that the risk is minimal and any damage to assets can be dealt with using Company and contracted resources. Waipa has a simple radial network and is confident it can restore power safely in an orderly manner after a major event. Waipa has back-up systems for its business systems and SCADA system to continue operating the business in the event of a major incident.

Transpower's new Te Awamutu switchboard partially failed in 2010 and Transpower's aged switchboard in Cambridge catastrophically failed in 2013. As a consequence of these significant incidents the Company has prepared comprehensive contingency feeder switching plans to mitigate the extent of outages resulting from any future bus-bar fault.

The Company has prepared a Participant Rolling Outage Plan for immediate and developing system events as required by the System Operator.

Although Waipa encourages distributed generation on its network the Company continues to have only a few, small capacity connections each year. Waipa's strategy to respond to potential disruptive technologies is to maintain a fast follower approach and hold a shorter 10-15 year network development horizon to reduce the risk of network over investment and possible stranding of assets. The fast follower approach will involve trialling new technologies to gain experience prior to possible full scale deployment, including monitoring the network effects of St Kilda, a high PV penetration subdivision in Cambridge. The overall objective is to maintain a watching brief on new technologies and position for the likely impacts/opportunities these present for our business.

The Company believes its asset management process, predictions on load growth, procedures to identify future network constraints, routine network assets surveys and commitment to improve network reliability, will enable Waipa to make informed asset management decisions regarding existing assets, non-asset solutions, procuring new assets and retiring assets. Waipa believes that any "incompleteness" of asset data will not be material when making asset management decisions.

While the Company continually improves its existing information systems no radical changes of systems is contemplated.

Waipa is confident that; providing security of supply to Te Awamutu, continually improving reliability, completing network development plans and practicing life cycle management of assets, will preserve the value of the network for the Company's shareholders and will provide our connected consumers and public with a network which has capacity for growth, is secure, reliable and safe.

3.0 Background and Objectives

3.1 Purpose of the Plan

The primary purpose of this AMP is to provide a governance and management framework that implements Waipa Networks' Asset Management Policy:

Asset Management Policy

Waipa Networks is committed to maintaining, operating and developing its electrical distribution system and supporting management structures to convey electricity to connected customers in a safe, reliable, efficient and sustainable manner.

This will be achieved through the regular review, continuous development and application of an Asset Management Plan.

The Asset Management Plan provides a governance and management framework that ensures Waipa Networks:

- Sets service levels for its electricity network that reflect safety, customer, community and regulatory requirements.
- Based on those expected service levels, understands what network capacity, reliability and security of supply will be required both now and in the future and what issues drive these requirements.
- Has a robust and transparent process in place for managing all phases of the network lifecycle from concept to disposal.
- Has adequately considered the classes of risk implicit in all of the network lifecycle activities and that it has systematic processes in place to mitigate identified risks.
- Has made adequate provision for funding and resourcing all phases of the network lifecycle for incorporating into the Company's annual and ten year budgeting cycles.
- Makes decisions within systematic and structured frameworks at each level within the business eliminating ad-hoc decisions.
- Has an ever increasing knowledge of its asset locations, ages, conditions and the networks likely future behaviour as it ages or is required to perform at different levels.

The secondary purpose of this AMP is to inform Waipa's stakeholders of the Company's:

- policies for investment in construction, maintenance and retirement of assets,
- policies for operating the network in a safe and prudent manner,
- security of supply and network reliability targets for different consumer segments,
- areas of asset management where improvements are required,
- major network developments and enhancements over the next 10 years and
- annual capital and maintenance expenditure forecasts.

This AMP endeavours to meet the legislative requirements of the Electricity Distribution Disclosure Determination 2012.

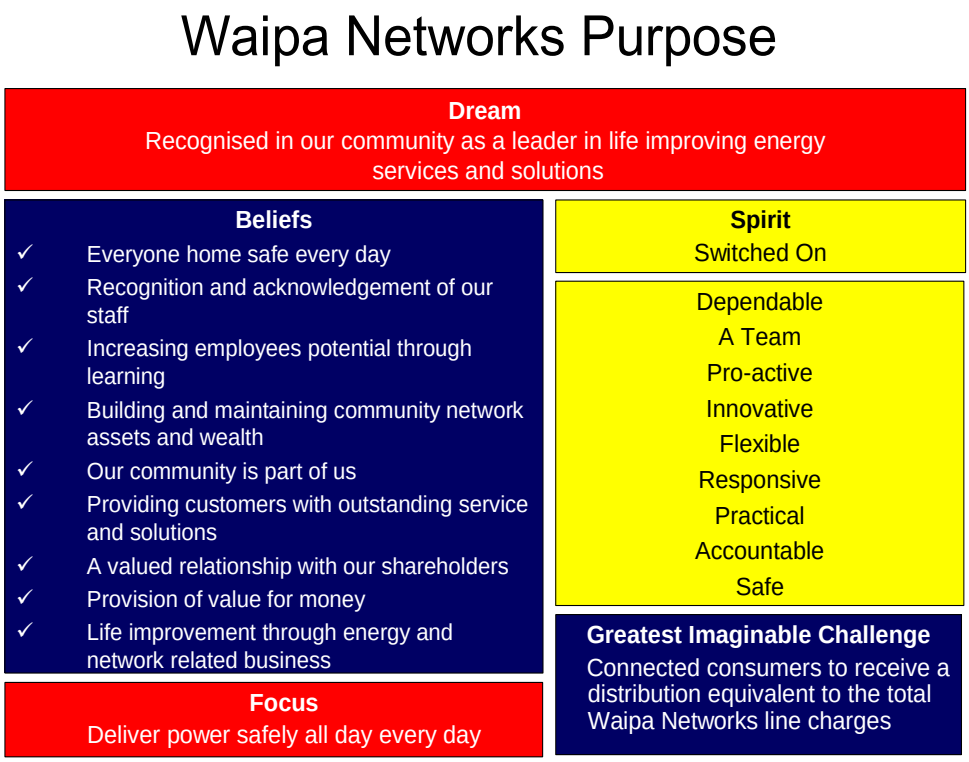
This AMP endeavours to meet the needs of external users and addresses information gaps to enhance the transparency of disclosure by identifying deficiencies and promoting improvements.

3.2 Interaction with Corporate Goals, Business Planning Process and Plans

Waipa's Business Planning Process is outlined as follows.

Waipa Networks Purpose

At the annual Strategic Planning Meeting Company Directors and Executive Management review Waipa's Purpose statement which is summarised in the following chart.



Asset Management Plan

At an annual Strategic Planning Meeting Company Directors and the Executive Management reviewed the AMP taking into account past network physical and financial performance, the current SCI and information affecting future network performance and expenditure.

This AMP is predicated on Waipa's Focus:

Deliver power safely all day every day

This AMP maintains a high level focus on Waipa's Beliefs:

Building and maintaining community network assets and wealth

Our community is part of us

Provision of value for money

Life improvement through energy and network related business

This AMP focuses on network asset management related matters. It does not discuss business or financial matters related to the non-network asset management aspects of the Company.

Annual Business Plan and Budgets

The Annual Business Plan and Budgets are informed by the AMP and provide implementation details and the financial ability to achieve the outcomes of the AMP. The Annual Business Plan, Network Capital and Operational Budgets are approved by Directors at Waipa's March Board meeting.

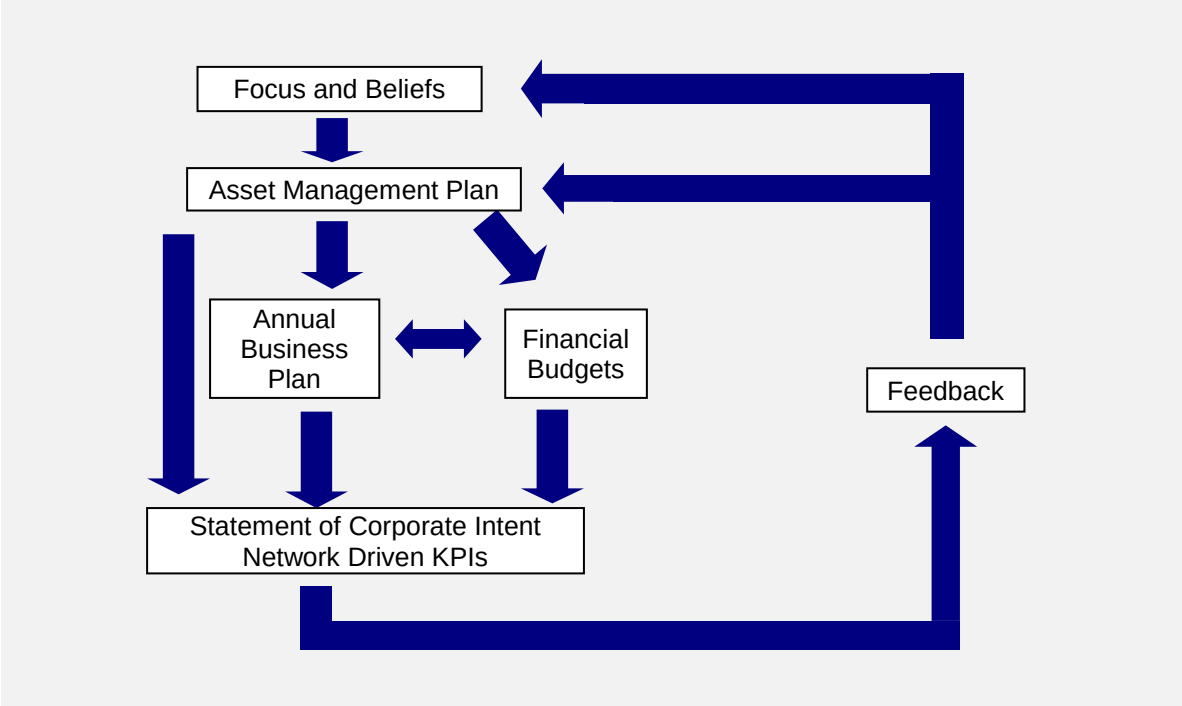
Statement of Corporate Intent

The SCI is derived from the AMP, Annual Plan and full financial budgets. The SCI sets agreed KPIs for the Company's key physical and financial performance targets for 3 financial years. The SCI is approved and adopted by the Waipa Networks Trust (Waipa's shareholder) by 31 May each year.

Company Directors report to Waipa Networks Trust in June and December on Waipa's actual physical and financial performance against the SCI targets. A gap analysis on significant variances provides an important input for Directors and Executive Management at their annual Strategic Planning Meeting.

This feedback closes the Business Planning Process cycle shown below.

Business Planning Process Cycle



3.3 Period Covered by Plan and Date Certified

This AMP identifies all new investments with Transpower and capital and maintenance works on the network that are reasonably expected to be undertaken over the next 10 years between 1 April 2017 and 31 March 2027.

This AMP was certified by Waipa's Board of Directors that it describes the Company's actual processes and practices on 28 March 2017.

3.4 Stakeholder Interests

The following table identifies Waipa's stakeholders, how they relate to Company and their reasons for doing so.

Stakeholders	Relationship / Interface	Nature of Interest
Electricity consumers	Beneficiaries of Waipa Networks Trust Independent surveys Consultation meetings Daily direct and indirect feedback	Fault services, Network reliability Quality of supply, Controlled supply New connections, Safety disconnects Service requests, Bi-annual discount Cost of supply
Fonterra	Conveyance agreement Ad-hoc meetings	Network capacity, Network reliability Quality of supply, Cost of supply
Waipa Networks Trust	Shareholder Six monthly meetings	Return on investment Bi-annual discount Sustainable business Responsible corporate behaviour KPIs
Electricity Retailers	Interposed use-of-system agreements Ad-hoc meetings	Line charges and methodology Line losses, Revenue protection Billing accuracy and timeliness Retailer services Quality of supply and reliability
Waipa, Otorohanga, Waikato & Waitomo District Councils, Waikato Regional Council	Utility service provider Road requirements Regular meetings RMA / Planning	District & Regional planning Traffic management Utility services locations Co-ordinated street openings
Transit NZ, KiwiRail	Road user requirements Rail asset owner requirements Correspondence, ad-hoc meetings	Traffic management Street lighting Utility services locations Electrical interference & safety clearances
Other utility operators	Road user requirements Ad-hoc meetings	Utility services locations
Transpower	Transmission Pricing Agreement Customer Investment Contracts Quarterly meetings System Operator regarding operation of HTI-TMU 110kV line	Capacity, reliability and maintenance of grid transmission and connection assets including HTI-TMU 110kV line Security of transmission lines Code compliance at GXP interface
Electricity Authority Commerce Commission MBIE Auditor General Inland Revenue	Electricity Distribution Business Legal operating framework Ad-hoc meetings, discussions and correspondence	Information Disclosure compliance Threshold compliance Compliant business practices Submissions on proposals
Industry Suppliers	Goods & services provider	Products and services
Waipa Employees	In house Company work force	Zero injuries Healthy employment environment Remuneration Individual training plans Personal growth opportunities
Utility Disputes (formerly the Electricity & Gas Complaints Commission)	Customer complaints	Customer complaints
Waikato Networks Limited (Ultra Fast Fibre)	Shared use of Assets	Attachment of ADSS fibre cable to poles Part ownership of Waikato Networks Limited

Waipa Networks is an EDB owned by Waipa Networks Trust whose beneficiaries are the electricity consumers connected to the Company's network.

Consumer interests are ascertained by independent surveys, consultation meetings, direct and indirect feedback on the Company's plans, performance and service delivery.

Other stakeholders include energy retailers, by virtue of interposed use-of-system agreements, Waipa, Otorohanga, Waikato and Waitomo District Councils with district planning issues, Waikato Regional Council, Transit NZ, KiwiRail and other utility operators with common reticulation concerns and various government agencies with monopoly business and information disclosure requirements.

Waipa's commercial, energy efficiency, customer service, security and reliability of supply, compliance, staff and social and community objectives are outlined in the SCI, the essence of which is expressed in the Company's Purpose and Focus;

Recognised in our community as a leader in life improving energy services and solutions

Deliver power safely all day every day

The interests of stakeholders are recognised and conveyed to the Company by Waipa Networks Trust, Waipa Networks Board of Directors and by the Company's customers, connected consumers and employees.

From an asset management perspective, the interests of Waipa's stakeholders are addressed by ensuring:

- Creation and maintenance of a safe and reliable distribution network,
- Quality of supply performance meeting consumers' needs,
- Optimisation of capital and operational expenditure,
- Maintaining a sustainable business that caters for consumer's growth requirements,
- Comprehensive risk management strategies and planning for contingencies,
- Due consideration to the environmental impact of Waipa's operations,
- Regulatory and legal compliance,
- Economically efficient pricing methodologies,
- Technically efficient selection of network equipment to optimise electrical losses
- Security standards reflecting consumers' needs,
- Robust network growth and development plans are prepared,
- Comprehensive asset replacement strategies are developed,
- Surveying and monitoring asset condition,
- Identifying critical assets,
- Maintaining network assets in good condition and "fit for purpose".

No material conflicts of interest have arisen between the Company and the Waipa Networks Trust who represent the consumer owners of the Company.

However, where conflicts arise between other Stakeholders defined in the above table Waipa's priorities for managing these conflicts are to ensure that;

- public and employee safety is not compromised,
- the solution is financially and operationally viable,
- the quality of supply is not compromised,
- the solution is in compliance with best EDB practice and
- customers' reasonable expectations are met.

3.5 Accountabilities and Responsibilities for Asset Management

Waipa's Network Management team determines the network enhancement and asset maintenance programmes, the various security of supply levels and the standards for automation and system operations that will improve network reliability and technical and economic efficiency.

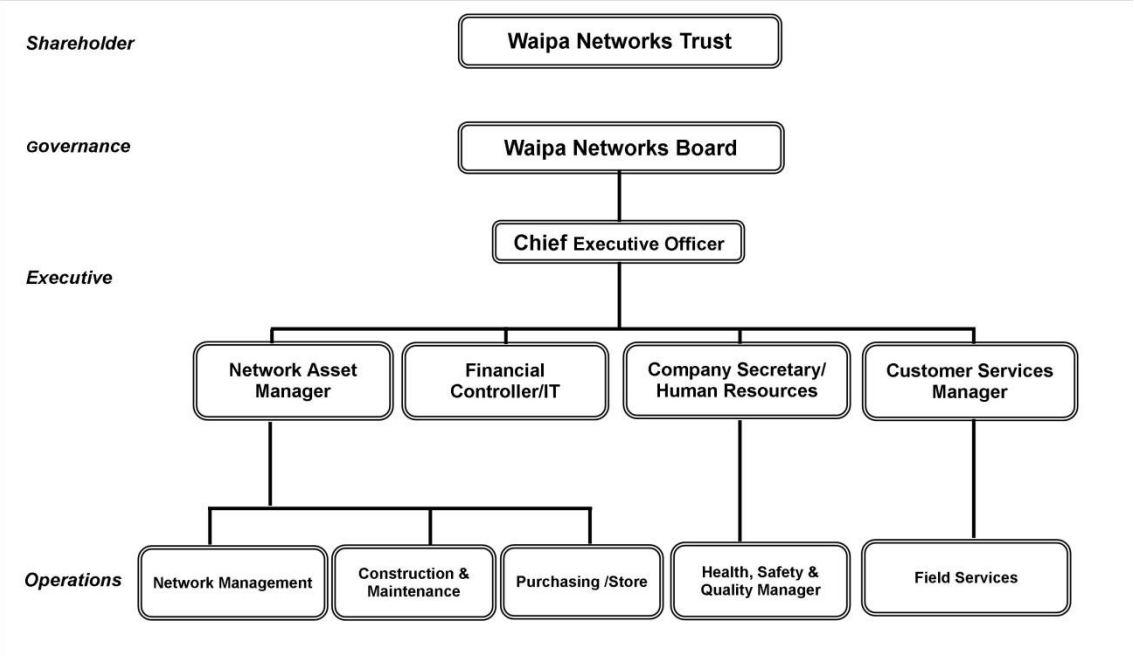
Major network capital works identified by the Network Management team with indicative budgets are tabled at the Company's September Strategic Planning meeting for Director's information, evaluation and appropriate approval.

The AMP is prepared by the Network Asset Manager, authorised by the Chief Executive and certified by the Company's Directors the following March.

Waipa's Network Asset Manager provides monthly reports to the Company's Directors on progress against targets of the annual capital and maintenance plans, system reliability and performance targets.

Waipa's Board reports to Waipa Networks Trust bi-annually on progress against the targets and plans agreed in the SCI.

An organisation chart depicting Waipa Networks Trust, Waipa's Board of Directors, Executive Management and Operational positions responsible for asset management planning and disclosure is shown below.



The Network Asset Manager holds the prime responsibility for preparing the AMP.

The Network Asset Manager chairs the Company's Operations Committee comprising; Customer Services Manager, Field Services Supervisor, Customer Connections Supervisor, Construction & Maintenance Supervisor, Vegetation Supervisor, Health, Safety & Quality Manager, Purchasing Officer, Network Information Officer and Planners all of whom have a significant input into the AMP by identifying the required capital projects and operational works.

The Network Information Officer is responsible for managing records of system assets.

The Financial Controller is responsible for assembling the budgets and reporting expenditure, all business systems and IT functions within Waipa Networks. The Company Secretary/HR Manager is responsible for recruitment and training of staff. The Health, Safety & Quality Manager is responsible

for WorkSafe NZ and industry compliance and Waipa's Public Safety Management System and Workplace Safety Management Practices accreditation.

The Network Asset Manager, Company Secretary/HR Manager, Health, Safety & Quality Manager and Financial Controller/IT Manager have significant input into the AMMAT assessment.

Waipa's AMP is produced within the Company and all information used in it is determined by the Company's management team. The CEO authorises the AMP and the Board certify it.

Resourcing Asset Management

The Company currently has the ability to carry out the majority of all planned and unplanned cable and pole line work and vegetation management. Waipa continually reviews the performance and cost effectiveness of its field crew services by contracting in external service providers when work load demands and contracting out its own field crews to ensure construction and maintenance costs remain competitive.

Waipa uses independent contractors as required to carry out thermal surveys, partial discharge surveys. This information is used by the Company's Network Management team for condition-based maintenance and replacement of electricity assets and network enhancements.

The Company has contracted out Control Room and Call Centre services, SCADA and communication work, main road directional drilling and traffic management on State Highways.

Waipa has also contracted out the condition assessment and maintenance of the new Hangatiki to Te Awamutu 110kV line because the Company does not have these skill sets internally. Waipa will use its own fault staff to carry out fault patrols of the line as required.

3.6 Asset Management Systems, Processes and Information

Asset Management Systems

Waipa operates three primary asset management systems to manage its existing assets, plan network development and measure network performance. These systems comprise an Abbey SCADA system for network supervisory control and data acquisition, an AutoCAD system for geographic asset information and a Napier Computer System which provides an integrated data warehouse.

The Company also uses a network modelling tool, ETAP, to predict current and future network performance under steady state and fault conditions and model the impact of proposed system enhancements and future demand.

The Company's uses of these asset management systems are shown in the following table.

Asset Management System	Uses
Abbey SCADA Supervisory Control & Data Acquisition	• System control • Load control • Operational status • Load flow data • Voltage data • Alarm and fault data • Reliability data
AutoCAD Geographic Asset Information	• Asset geographical location data • System schematics and reticulation plans • System operations • Construction plans • Design standards • Owner, road and property boundary data

Napier Computer System Integrated Data Warehouse	• Installation Control Point data • Call centre enquiries • Planned outage notification • Outage (planned and unplanned) data • Asset data (type, number/length, age, asset value) • Network condition and vegetation data • Financial applications (General Ledger, Creditors Ledger, Debtors Ledger, Banking Transaction processing, Payroll, Human Resources, Stores, Purchase Orders, Asset Register (Financial and taxation) • Disclosure
ETAP Network Modelling Software	• Electrical network modelling • Load flow analysis • Short circuit fault current analysis • Electrical network design

Supervisory Control and Data Acquisition System

The prime function of SCADA is to provide a real time interface with the network which enables the safe operation and management of; network assets, reliability of supply and system peaks.

Data and alarms from field assets are brought back via Waipa's radio communication links to the Control Centre and displayed for the System Operators to remotely monitor and control equipment for optimal network performance.

The data collected includes feeder currents, voltages, real and reactive power, power factor and asset operational status. Relevant data is archived in the Integrated Data Warehouse. This information is used to establish network asset maintenance programs, plan network developments and measure and disclose network performance.

The SCADA system manages ripple injection plants at both Te Awamutu and Cambridge to control the load over peak times at GXP and/or feeder level.

Geographic Information System

The prime function of the Geographic Information System is to provide the physical location and electrical connectivity of all Waipa's network assets so that they are safely operated by the System Operators and field crews and effectively managed by the Network Information Officer and Planners.

All the Company's assets have been surveyed. The data collected included asset locations, their physical and electrical attributes and condition (serviceable/defected). The spatial information has been overlaid with property boundaries within the geographic information system. The electrical connectivity from each ICP through to the Transpower GXP has been proven. The asset physical and electrical attributes and equipment defect condition status (where applicable) is archived in the Integrated Data Warehouse.

The on-going focus of the Network Information Officer is to ensure that network asset information is updated in a timely manner in the Geographic Information System and Integrated Data Warehouse System.

Asset geographical, physical and electrical attribute data is used for network development, design and consumer connections. The asset condition information is used to establish prioritised network asset maintenance programs.

Integrated Data Warehouse System

The key function of the Integrated Data Warehouse System is to provide a single repository for all data which is held in specific data bases and all the necessary applications for Waipa to operate and manage its EDB. All the data bases and applications can be accessed through a web browser.

The salient data bases are:

- ICP
- Call Centre Enquiry
- Outages (Planned and Unplanned)
- Asset Equipment including Substation and Site
- Asset Condition
- Financials

ICP Database

The ICP database is used by the Call Centre for their daily operations and to provide information to the Outage database for the calculation of network reliability performance. The ICP database contains a complete history of all outages and recorded customer comments.

ICP data comes from the customer, retailers, electrical inspectors and Waipa itself. Some of the data transferred between these parties relies on manual processes and routine checks are in place to ensure data integrity. The ICP database is continually updated with new and disconnected customers.

Call Centre Database

Waipa has contracted its call answering and dispatch activities to a remotely located Call Centre. The Call Centre logs all incoming and outgoing dispatch calls in the Call Centre database. The Call Centre relies on the ICP Database information for its operation.

SCADA information is used in an Avalanche Outage Communication Platform which updates customers with known outage information and expected restoration times.

Outage Database

Waipa operates a manual planned and unplanned Outage Database.

For planned outages switching instruction sheets are prepared identifying areas of the network affected. These are used to prepare shutdown advertising sheets to notify retailers and customers of the planned outage. The details of the intended shutdown are recorded in the Outage database. Actual switching times on the switching instruction sheets are used to update the Outage database.

For unplanned outages the details are recorded on an emergency switching instruction sheet by the System Operator. This information is used to compile an unplanned outage report. These reports are checked by the Network Asset Manager before the details are entered into the Outage database.
Customer numbers for both planned and unplanned outages are sourced from the ICP database. Customer numbers can be obtained by feeder, module (section of network between 11kV switching points) or individual transformer level. The ICP database is continually updated with new and disconnected customers.

This data enables the calculation of SAIDI and SAIFI for each outage. The impact of each outage is summed to generate the outage statistics for measuring network performance for disclosure purposes. This information is also used to identify potential problems on the network and is used in the planning process.

Asset Equipment Database

Waipa's Asset Equipment Database comprises a number of subset databases which contain comprehensive physical, electrical, location and valuation information on substations, transformers, switchgear, voltage regulators and sites.

This Asset information is used for network design, asset valuation and disclosure.

Asset Condition Database

The asset condition survey information is linked to the Asset databases and is used to establish and prioritise Waipa's preventive maintenance program.

Financial Systems

Waipa has the following interlinked financial applications within the Integrated Data Warehouse essential for the operation of an EDB;

- General Ledger,
- Creditors Ledger,
- Debtors Ledger,
- Banking Transaction processing,
- Payroll,
- Human Resources,
- Stores,
- Purchase Orders and
- Asset Register (Financial and taxation).

Asset Management Process

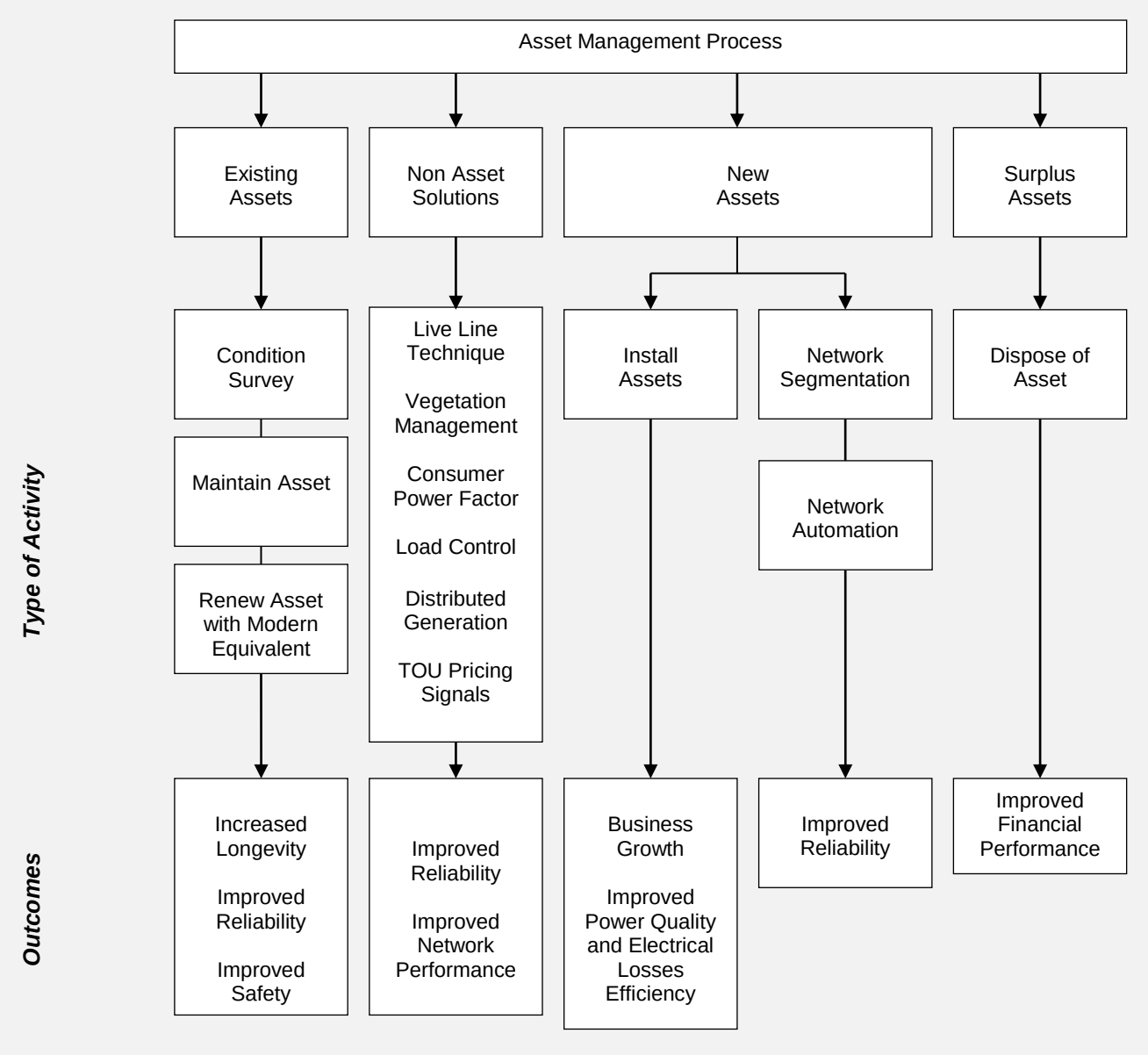
Waipa's asset management process covers the activity associated with the management of:

- existing assets through their life cycle,
- non-asset solutions to address network issues,
- the creation of new assets and
- disposal of surplus or end of life assets.

The Company's desired outcomes of these asset management activities:

- increased asset longevity,
- improved network reliability,
- improved network safety,
- improved power quality,
- technically efficient equipment to optimise electrical losses,
- improved financial performance and
- business growth

are shown in the following diagram.



Asset Management Information

Waipa's network surveys provide the Company with comprehensive information on all of its assets' locations, physical and electrical attributes and their condition at the time of survey.

This initial data obtained during the first survey completed in 2006 has been supported by subsequent asset condition surveys and construction, equipment replacement and upgrade records.

Waipa has developed and operates robust asset management information systems appropriate for;

- the size of the network and number and type of distribution assets,
- the Company's financial and administrative business needs,
- consumer needs, and
- other stakeholders' requirements.

ETAP Network Modelling Software

Prior to 2001 Waipa's knowledge of the network was only accurate to ±20%. When looking to develop the network to best maintain supply voltages within ±6% as per regulations, it was found that the Company did not hold accurate enough data to use network modelling software for any useful gain.

Waipa employed an independent service provider in 2001 to survey and record data of the entire network. The Company now believes its knowledge of the network to be accurate to within ±5% and that the data needed to accurately model the network is now available.

The Company invested in ETAP network modelling software in 2011 and the initial data input by the Network Information Officer with the assistance of the Planners began in 2012. Completing data models of feeders has continued, with models produced when required to understand the effects of emerging voltage issues or demand from new connections or increased demands.

The software can be utilised to model the network electrically, perform load flows analysis, calculate short circuit current flows and aid electrical network design.

Waipa can position more accurately the locations for voltage regulators, automatic reclosers and their settings and required conductor upgrades and model their effect on the network. Network development studies to plan connection of new loads to the network and to test the back feed performance of feeders can be completed.

4 Assets Covered

4.1 Distribution Area

Waipa owns and manages electricity distribution assets in Cambridge, Te Awamutu and surrounding areas, which are predominately in the local authority areas of Waipa and Otorohanga Districts, with minor reticulation in part of the Waikato District south of Hamilton and Waitomo District south of Kawhia.

In the urban and suburban areas of Cambridge, Leamington, Te Awamutu, Hairini, Kihikihi, Ohaupo, Pirongia and Kawhia the Company's distribution assets are generally located within road reserve.

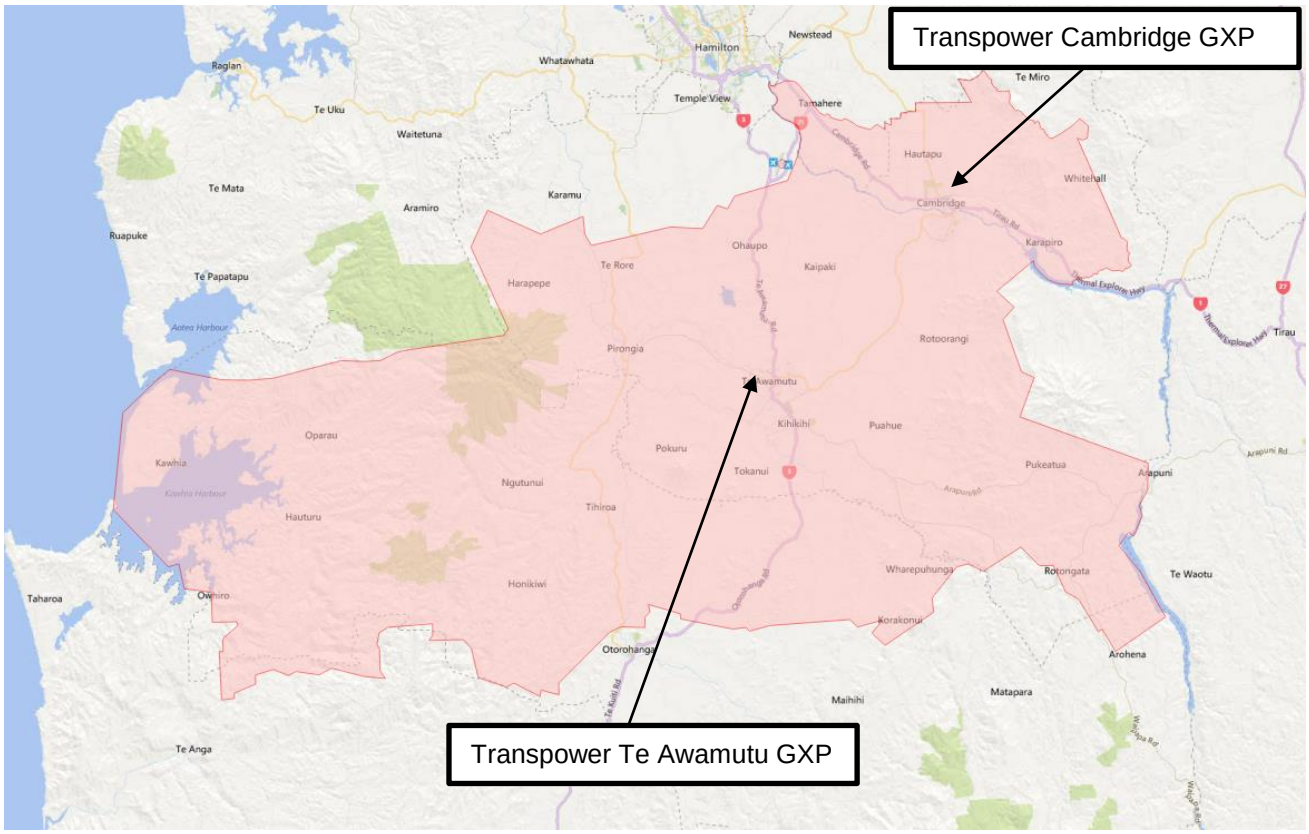
In the rural areas of Tamahere, French Pass, Roto-O-Rangi and Kaipaki that surround Cambridge and in Paterangi, Pirongia, Pokuru, Kiokio, Waikeria, Pukeatua and Mystery Creek that surround Te Awamutu, whilst the Company's distribution assets are generally located within road reserve, there are areas where these assets traverse private property as the most economical way to reticulate the area.

In the remote rural areas of Kawhia and Hauturu with low population densities there are significant areas where the Company's assets traverse private property.

Waipa takes supply from Transpower's Cambridge and Te Awamutu GXPs at 11kV. The Company has no 33kV or higher voltages operating as a sub-transmission system or zone substations. The Hangatiki to Te Awamutu 110kV line is a transmission asset to provide the required n-1 security for Te Awamutu GXP, and was commissioned in 2016.

Waipa conveys electricity on behalf of 11 retailers (operating under 13 brand names) from both Cambridge and Te Awamutu GXPs via 27 radial 11kV circuits, 11kV/400V transformers and associated 400V/230V reticulation to 25,326 consumer installations (as at 31 March 2016).

Waipa's distribution system covers 1,865 square kilometres. The area reticulated is shown on the following map.



Larger Consumers

Waipa supplies two large Fonterra dairy factories located at Hautapu and Te Awamutu. The Hautapu factory is 3.5 km from Cambridge GXP and is supplied via two dedicated 11kV overhead line feeders. The Te Awamutu factory is located 1km from Te Awamutu GXP and is supplied via two dedicated 11kV cable feeders. Fonterra contracts every year with Waipa for each factory's MD requirement. Currently, Hautapu MD does not exceed 10MW and Te Awamutu MD does not exceed 4.5MW.

Fonterra's MD requirements have a significant impact on Waipa's system peak load control regime and available capacity at Transpower's Cambridge and Te Awamutu GXPs.

There are no other large consumers that have a significant impact on Waipa's network operations or asset management priorities.

Load Characteristics

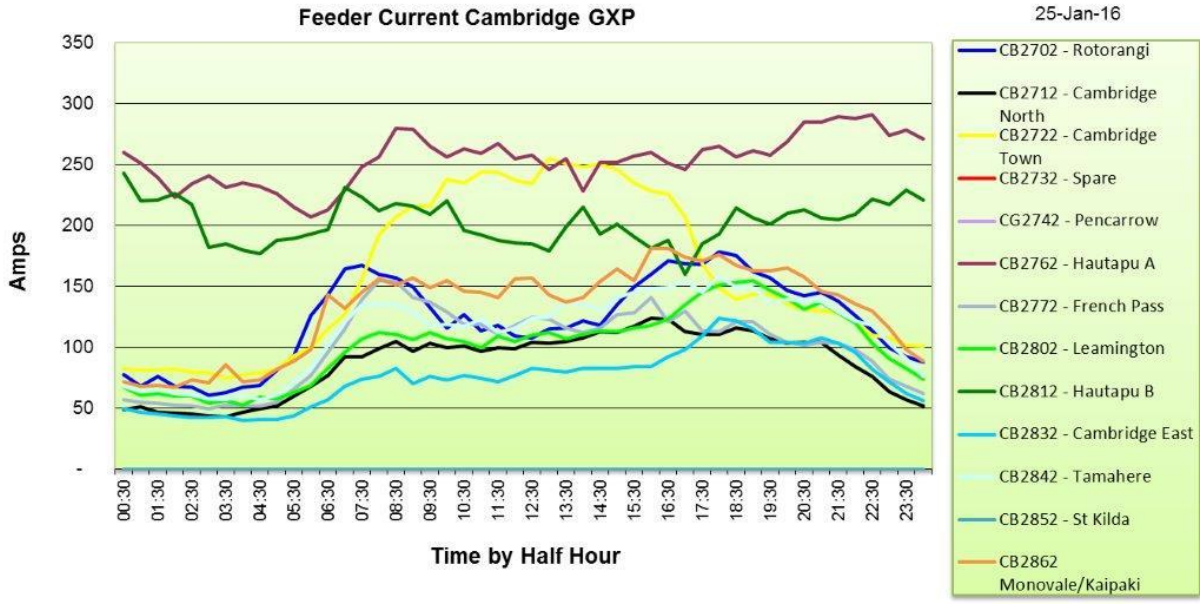
Waipa's urban and suburban feeders exhibit a typical EDB load profile where there are morning and evening peaks caused by residential demand super imposed over the commercial demand through the normal business day.

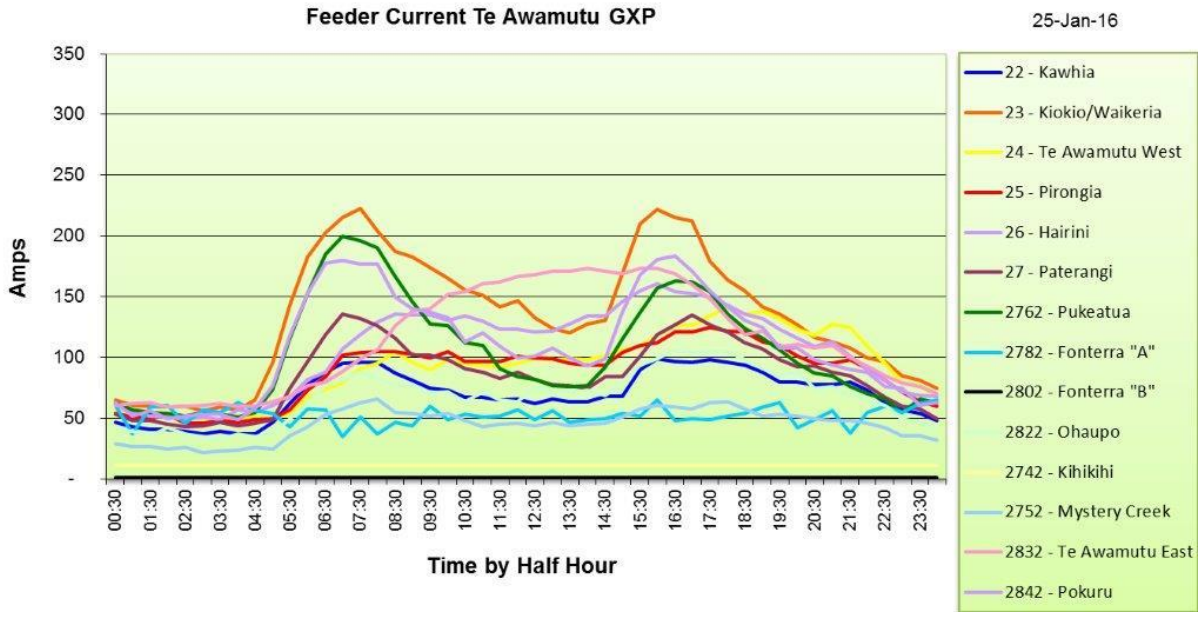
Waipa's rural feeders exhibit the same residential characteristics but with much higher early morning and afternoon demands during the dairy milking season.

The Fonterra loads are characterised by high demand with fluctuations occurring with process demands throughout each twenty four hour period over the dairy season.

Transpower's GXP maximum demands and Waipa's 11kV feeder load profiles for a typical week day in January are shown in the following graphs.


M.D. By GXP
25-Jan-16
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
24:00
02:00
04:00
06:00
08:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
Time by Half Hour
CBG
TMU


Feeder Current Cambridge GXP
25-Jan-16
Amps
350
300
250
200
150
100
50
-
00:30
01:30
02:30
03:30
04:30
05:30
06:30
07:30
08:30
09:30
10:30
11:30
12:30
13:30
14:30
15:30
16:30
17:30
18:30
19:30
20:30
21:30
22:30
23:30
Time by Half Hour
CB2702 - Rotorangi
CB2712 - Cambridge North
CB2722 - Cambridge Town
CB2732 - Spare
CG2742 - Pencarrow
CB2762 - Hautapu A
CB2772 - French Pass
CB2802 - Leamington
CB2812 - Hautapu B
CB2832 - Cambridge East
CB2842 - Tamahere
CB2852 - St Kilda
CB2862 Monovale/Kaipaki


Feeder Current Te Awamutu GXP
25-Jan-16
Amps
350
300
250
200
150
100
50
-
00:30
01:30
02:30
03:30
04:30
05:30
06:30
07:30
08:30
09:30
10:30
11:30
12:30
13:30
14:30
15:30
16:30
17:30
18:30
19:30
20:30
21:30
22:30
23:30
Time by Half Hour
22 - Kawhia
23 - Kiokio/Waikeria
24 - Te Awamutu West
25 - Pirongia
26 - Hairini
27 - Paterangi
2762 - Pukeatua
2782 - Fonterra "A"
2802 - Fonterra "B"
2822 - Ohaupo
2742 - Kihikihi
2752 - Mystery Creek
2832 - Te Awamutu East
2842 - Pokuru

Peak Demand and Energy Delivered

Historical Anytime Maximum Demands (AMD) and total energy conveyed through Transpower's Cambridge and Te Awamutu GXPs are shown in the following table.

Year	Cambridge GXP		Te Awamutu GXP	
	Units (kWh)	AMD (kW)	Units (kWh)	AMD (kW)
1995	129,835,090	25,105	124,729,310	29,115
1996	129,543,203	26,537	143,477,389	28,197
1997	139,742,516	25,425	144,369,441	29,262
1998	144,743,967	29,050	145,116,050	29,964
1999	146,322,063	27,842	142,734,374	25,962
2000	154,095,403	30,068	141,435,801	26,834
2001	159,942,281	30,486	142,337,330	26,208
2002	170,428,577	29,302	149,946,322	27,376
2003	170,920,235	28,102	152,079,931	27,378
2004	169,953,151	27,930	153,399,618	28,112
2005	178,858,670	30,938	155,851,860	30,014
2006	180,610,404	31,842	155,772,430	28,480
2007	186,489,039	30,064	156,541,457	28,872
2008	183,332,147	32,672	158,883,194	28,698
2009	183,139,815	33,196	158,767,196	29,400
2010	195,076,504	38,984	166,399,952	37,300
2011	188,699,806	36,934	167,856,983	35,518
2012	199,208,652	36,110	171,289,917	34,050
2013	202,244,060	34,870	174,116,811	33,378
2014	197,457,434	39,224	172,796,973	33,730
2015	213,145,392	39,382	177,032,989	34,826
2016	212,958,596	39,358	182,323,745	35,188

4.2 Network Configuration

Waipa's radial 11kV distribution network receives power at 11kV from two Transpower's GXPs located at Cambridge and Te Awamutu. The Company does not have any 66kV, 33kV or 22kV commissioned substation or reticulation assets.

On some occasions a small amount of electricity is imported at 11kV from the embedded generator at Fonterra dairy factory in Te Awamutu.

The 11kV supplies from Cambridge and Te Awamutu GXPs are not configured to be interconnected.

Waipa's legacy distribution substations are predominately pole mounted transformers (up to 200kVA on two pole structures or up to 75 kVA on single pole structures) and metal clad pad mount substations (up to 500kVA) in the urban and suburban areas.

Newly commissioned substations are either metal clad pad mounted (typically 50kVA up to 300kVA) or pole mounted up to 100kVA as permitted by the respective District Council Plan requirements.

Waipa's legacy 400V reticulation is predominately overhead except for urban areas. New 400V reticulation is generally underground as required by the respective District Council Plans with the exception of rural and remote rural areas where overhead reticulation is permitted on economic grounds.

Waipa's distribution system comprises (as at 31 March 2016):

Cambridge Area

- 13 11kV feeder circuits connected to Cambridge GXP,
- 425km 11kV circuit (340km overhead line, 85km underground cable),
- 311km 400V circuit (149km overhead line, 162km underground cable),
- 1,346 11kV/400V transformers (110,876kVA capacity) and
- 11,715 ICPs.

Te Awamutu Area

- 14 11kV feeder circuits connected to Te Awamutu GXP,
- 927km 11kV circuit (888km overhead line, 39km underground cable),
- 472km 400V circuit (357km overhead line, 115km underground cable),
- 2,073 11kV/400V transformers (122,802kVA capacity) and
- 13,613 ICPs.

System switching, isolation and protection are achieved via Transpower's GXP circuit breakers and Waipa's ring main units, line auto reclosers and sectionalisers, disconnectors, 11kV dropout fuses and 400V fuses.

A SCADA system and radio communication system enables remote monitoring and control of distribution switchgear and voltage regulators, and remote monitoring and control of GXP feeder circuit breakers.

Two 11kV ripple injection plants and receiving relays at consumers' installations enable implementation of energy retailers' tariffs, control of street lighting and management of feeder loads and GXP maximum demands.

Cambridge Network Configuration

Transpower owns the 110kV line assets, the 110kV/11kV transformers and 11kV switchboard to which Waipa's 11kV feeders are connected.

Cambridge GXP is supplied via a double circuit 110kV line from Karapiro to Hamilton and has an n-1 security of supply.

There are two 40MVA ODAF transformers at Cambridge giving a total installed capacity of 80MVA and a firm capacity of 40MVA. These transformers operate in parallel and supply an 11kV bus bar via two incoming circuit breakers. However, the 11kV incomers and bus bar are only rated at 2500A or 47.9MVA.

There are thirteen 800A rated 11kV circuit breakers supplying radial urban and rural feeders including two feeders supplying a Fonterra dairy factory at Hautapu.

The thirteen 11kV radial urban and rural feeders are predominately concrete pole lines. These lines, in conjunction with their associated 400V reticulation, supply Cambridge, its suburbs and rural areas adjacent to the Waikato River from Lake Karapiro to Tamahere on the outskirts of Hamilton.

In the urban and suburban areas there is a moderate amount of underground reticulation with pad mounted transformers and pad mounted switchgear.

Te Awamutu Network Configuration

Transpower owns the 110kV line assets, the 110kV/11kV transformers and 11kV switchboards to which Waipa Networks Te Awamutu 11kV feeders are connected.

Te Awamutu GXP is supplied via a single circuit Transpower 110kV transmission line from Karapiro and a single circuit 110kV transmission line from Hangatiki owned by Waipa Networks.

Te Awamutu also has 7.5MVA of embedded generation at the Fonterra dairy factory site which is connected to the Transpower's Te Awamutu GXP via 11kV supply cables.

There are two 40MVA OFAF transformers at Te Awamutu giving a total installed capacity of 80MVA and a firm capacity of 40MVA. These transformers operate in parallel and supply two 11kV bus bars via four incoming circuit breakers.

There are twelve 630A rated 11kV circuit breakers supplying radial urban and rural feeders and two 1250A rated 11kV circuit breakers supplying Fonterra dairy factory site in Te Awamutu.

The twelve 11kV radial urban and rural feeders are predominately concrete pole lines. These lines, in conjunction with their associated 400V reticulation, supply Te Awamutu's urban, suburban and rural areas north to Mystery Creek, south-east to Arapuni, south towards Otorohanga and west to Paterangi, Pirongia, Pokuru and Kawhia.

Two underground cable circuits supply the Fonterra dairy factory.

In the urban and suburban areas there is a moderate amount of underground reticulation with pad mounted transformers and pad mounted switchgear.

4.3 Network Assets, Age and Condition

Network Feeder Assets

Waipa's primary assets are the 11kV feeders supplying town, rural and remote rural consumer ICPs.

Appendix A shows the Company's 11kV feeder attributes as at 31 March 2016.

Supervisory Control and Data Acquisition System Assets

Waipa owns a SCADA system to operate its feeder network and control load, street lighting and metering tariffs. SCADA system remote terminal units are fitted to Transpower's circuit breakers at Cambridge GXP and Te Awamutu GXP, Waipa's ripple injection plants and various voltage regulators, 11kV line auto reclosers and automated air break switches on the distribution network.

The SCADA comprise a master and hot standby located in Waipa's control room at 240 Harrison Drive, Te Awamutu and two remote operating terminals located in WEL Networks Control Centre in Te Rapa. The SCADA network configuration and operating schematics are backed up daily onto Waipa's central server.

Ripple Injection Plants Assets

Waipa owns and operates two ripple injection plants located at Cambridge GXP and Te Awamutu GXP respectively. The Cambridge ripple injection plant is located in Waipa Networks' building at the GXP, which was refurbished and seismically strengthened in 2016. The Te Awamutu ripple injection plant is located in a separate room in Transpower's Te Awamutu GXP switchroom. Ripple injection signals are initiated by the SCADA system via these plants to control load, street lighting and metering tariffs. The Company also owns the receiving relays in consumers' installations.

Radio Communication Network Assets

Waipa owns separate analogue radio voice and data communication networks comprising;

- Radio repeater sites located at Pukekura in Cambridge, Te Rauamoa on the south western slope of Mt Pirongia, Wharepuhunga near Lake Arapuni and Mount Oue near Kawhia,
- Base stations are located at the Harrison Drive depot in Te Awamutu and at the premises of the Company's Control Room service provider,
- Vehicle mounted radios and hand held units used by the Company's field crews and
- Radios in remote terminal units at Transpower's GXPs and on automated voltage regulators, auto reclosers and disconnector switches.

Network Asset Age

Waipa's distribution asset type and age profiles as at 31 March 2016 are shown in Appendix G.

The Company uses the weighted average age of the poles to determine the age of its primary pole line assets because there is no other reliable information on the age of conductors and cross arms available.

The 11kV Line Age Profile indicates that the Company rebuilt the majority of its network during the 1980s. Hardwood poles were changed for concrete poles and it is assumed that the pole hardware was renewed in the majority of cases. In most cases the existing overhead copper conductor was re-used.

From the initial asset condition survey completed in January 2006, subsequent asset condition surveys and the number of defect forms generated, a view of the general condition of network equipment is formed. This suggests that the Company does not expect to be confronted with an unmanageable "wall-of-wire" issue within the 10 year horizon of this AMP.

Network Asset Value

Waipa's distribution regulated asset base (RAB) as disclosed as at 31 March 2016 are shown in the following table, (in $,000). This is more up to date and relevant than the 2004 ODV valuation provided previously. Note that the 2016 RAB excludes the then un-commissioned Hangatiki – Te Awamutu 110kV line.

Regulated Asset Base Value

	Distribution & LV Lines	Distribution & LV Cables	Distribution Substations	Distribution Switchgear	Other Network Assets	Non-network Assets	Total
Total Opening RAB Value	30,006	18,294	23,968	12,269	4,730	1,942	91,209
less Total depreciation	1,088	614	802	474	268	184	3,430
plus Total revaluations	176	107	140	72	28	11	534
plus Assets commissioned	214	686	1,487	969	109	158	3,623
less Asset disposals	-	-	186	-	-	3	189
Total Closing RAB Value	29,308	18,473	24,607	12,836	4,599	1,924	91,747

Asset Condition

Feeder Assets

Waipa engaged an independent contractor in 2001 to visually inspect the condition of the Company's assets. This survey was completed in 2006. The Company has used internal resources for its second visual asset condition survey which commenced in 2010/2011. The asset types surveyed include; conductors, poles, stay wires, cross arms, insulators, arm braces, binders, dead ends, transformers, reclosers, disconnectors, drop out fuses, cable terminations, surge arrestors, earthing and matters of public safety. Asset defects are prioritised into the following categories for remedial work; Urgent (3 months); 1 year and within 5 years.

An urgent priority is assigned to asset defects that presented a safety hazard to the public, field crews, livestock or property. The 1 year and within 5 year priorities are assigned to asset defects on a diminishing probability of causing loss of supply. However, in practice when a shutdown area is identified for defect repairs, all defects regardless of priority are remedied at the same time, in order to make most efficient use of resources once the line crew is deployed to an area and a shutdown is planned.

The total number of 11kV and 400V defects awaiting repair (as at 31 March 2016) are shown in the following table. Total defects remaining have increased from 274 in 31 March 2015 to 404 and defects identified since has further increased the defect stock. This reflects the effort in catching up the uncompleted network surveys of the past few years. Focus on defect repairs has continued, with 2456 defects being repaired during 2015/16. An additional $100k has been budgeted in 2016/17 and 2017/18 for Maintenance – Survey Defects to address outstanding defects and prevent a bow-wave of defects accumulating as the survey back log is worked through.

	Totals	**1 year**	**5 year**
Total defects remaining	404	365	39
11kV defects remaining	386	349	37
400V defects remaining	18	16	2

The second survey is expected to take 8 years to complete and feeders will be surveyed in the same order as the first survey. The programme is based on an even spread of kilometres of line being surveyed each year.

Waipa gains further asset condition information from;

- A vegetation management programme,
- An earth testing and repair programme,
- Asset thermal surveys,
- Partial discharge surveys and
- Corona surveys.

The vegetation programme is based on even spread of kilometres of line being surveyed each year modified by known growth trends on specific feeders. The programme results in each feeder being systematically cleared every 4 years and reactive trimming being required depending on the type, growth rate and quantity of vegetation menacing our power lines. Tree "hot-spots" are dealt with as required.

The earth testing and repair programme which is now coordinated with the visual asset defect survey is based on an even spread of earth banks requiring testing each year. The programme results each system earth being checked every 8 years.

Waipa engages an external service provider to carry out an annual thermal survey of arterial feeder disconnectors, line and transformer, dropout fuses, cable pothead terminations and line connections during high load periods. Thermal defects are treated as urgent and are repaired as soon as possible.

Waipa was cognisant of the industry's concern about oil-filled switchgear and had a program to completely replace all of its oil-filled RMUs with SF_6 RMUs as a public safety initiative. The last oil filled RMU was replaced in 2013/14.

The Company had 57 (as at 31 March 2016) ageing two pole hardwood platform transformer structures. While the hardwood platforms have been maintained as required over the years these assets are approaching the end of their economic life. Furthermore, this type of substation structure no longer conforms to modern industry standards. All of these two pole transformer structures will be replaced on a public risk and condition prioritised basis by either a single pole transformer substation or a pad mounted substation for staff and public safety by the end of 2018/19.

The Company had 622 (as at 31 March 2016) air break switches in service. Their most common mode of failure is to "freeze up" through infrequent use or their contacts weld together when they pass fault current. Defective air break switches are replaced when they fail in service or at the time the pole line is reconstructed with Entec Ecoswitch vacuum interrupting load break switches. The decision to replace open air break switches with enclosed load break switches was made in 2016 given that the capital cost increase for the enclosed type was modest, and better reliability, longer life and lower maintenance costs are expected.

Waipa had 4,402 (as at 31 March 2016) sets of 11kV pole fuses in service. The older "Vulcan" sets comprise varnished paper insulating tubes which continue to deteriorate over time. Some newer sets were constructed using stainless steel brackets and galvanised nuts and bolts which have corroded and need replacing. The Company will continue to replace these defective 11kV pole fuses with stainless steel assemblies when they fail in service and when they are identified as a defect during the programmed visual feeder asset surveys.

The Company had 2,662 (as at 31 March 2016) single pole transformer structures on the network. The visual asset condition survey is used to initiate maintenance or condition based replacement for this type of asset.

Waipa had 703 (as at 31 March 2016) pad mounted transformer substations on the network. While minor remedial work is carried out when a defect is detected, the asset is only replaced when it fails in service or load growth requires larger capacity to be installed.

As at 31 March 2016 the network had 1,675 wooden poles. The risk of failure posed by these structures is managed by the asset condition survey criteria, which requires all hardwood poles supporting HV lines and all larch wood poles to be defected and replaced, as well as any poles in poor condition not expected to last until the next survey.

Supervisory Control and Data Acquisition

In 2006/07 the Company replaced Waipa's aged SCADA system remote terminal units located at Transpower's Cambridge GXP and Te Awamutu GXP with modern equivalent assets to obtain additional data.

In 2007/08 the Company replaced Waipa's aged SCADA system remote terminal units located at Cambridge GXP used for Waipa's ripple injection plant with modern equivalent assets to ensure reliability of load management system.

A new centralised SCADA system was commissioned (using recycled equipment) at Waipa's new depot 240 Harrison Drive, Te Awamutu in 2010/2011. The SCADA software was upgraded in 2011/2012 as the previous version was no longer supported by the vendor.

The SCADA system remote terminal units fitted to various voltage regulators, 11kV auto reclosers and automated air break switches on the distribution network will be replaced as required.

Cambridge Ripple Injection Plant

Waipa installed a new 283Hz Enermet static ripple injection plant in 1999/2000 to avoid propagation problems when the Cambridge GXP transformers were upgraded from two 20MVA to two 40MVA in July 2002.

All 7000 492Hz relays in consumers' premises were replaced over the period 2002-2004.

Waipa has retired the new 297Hz coupling cell at Te Awamutu. In 2015/16 a project was completed to retune this coupling cell to 283Hz and use it to replace the existing 283Hz coupling cell at Cambridge which is nearing its full capacity.

The recovered Cambridge 283Hz coupling cell will be retained for use if the Ngutunui POS is established at some time in the future which is outside the 10 year planning period of this AMP.

Te Awamutu Ripple Injection Plant

In 2007/08 Waipa installed a new 283Hz Enermet coupling cell for the Te Awamutu relay change programme and a new 297Hz Enermet coupling cell to replace the old 297Hz Landis and Gyr coupling cell.

The Te Awamutu relay change out program involving 9,301 relays was completed during March 2015. All the existing 297Hz relays in the field have been replaced with new 283Hz ripple relays thus avoiding further degradation of signal strength for correct relay operation.

Radio Network Communication Assets

Voice Network

The Company intended replacing all of its older technology analogue voice radios with modern digital radios and equipment. The Company proposed linking its repeaters site with digital IP microwave which will permit IP addressing of voice, data and other services in future. However, the scope was re-evaluated to achieve a more economic outcome, reducing the budget from $500k to $130k.

Replacement of obsolete analogue repeaters and some analogue radios due for replacement with digital units was completed. Further digital radio replacements will be completed in a phased manner over the next three years.

Data Network

Waipa intends extending its analogue data radio network used by SCADA to communicate with remote terminal units for reclosers, voltage regulators, automated ABS and Transpower GXPs. This network currently manages 200 sites and is constrained prohibiting the connection of 12 new reclosers in 2015/16 and future additions. To overcome this Waipa installed another analogue data channel and reallocated a proportion of CBG RTUs including CBG GXP RTU, and upgraded the existing Abbey SCADA serial Modulink communication modules with a new digital IP gateway communication module.

WEL Control Room Link

The Company replaced the leased Kordia Waipa-WEL Network link used for remote control room operations by WEL which is no longer supported by Kordia. The preferred solution of a fibre data link from 240 Harrison Drive to WEL control room in Te Rapa was implemented.

4.4 Justification for Assets

Waipa does not currently have any 66kV or 33kV sub-transmission line or zone substation assets. The Company believes that directly transforming a transmission voltage of 110kV to a distribution voltage of 11kV is inherently more efficient than introducing sub-transmission voltages such as 66kV or 33kV for Waipa's geographical area. A relatively small and compact network does not justify the cost of a sub-transmission system and zone substations, provided that voltage limitations do not constrain the ability to meet demand at 11kV.

Stakeholders have continuously expressed their dissatisfaction with the need for 9 hour planned outages every 4 years by Transpower to maintain the assets used for the single 110kV transmission supply to Te Awamutu. In addition the frequent unplanned interruptions to power supply on this line also causes significant impacts on the local economy and operations of the dairy factory. Transpower's Quality Performance Report 2010/2011 (page 20) records the poor performance of this line over 5 years with an average of 2.6 interruptions per year and the fourth highest percentage of un-served energy.

This poor performance coupled with Transpower's need for a 9 hour planned outage every 4 years to maintain equipment at the Karapiro and Te Awamutu GXPs is unacceptable to Waipa's 13,600 Te Awamutu consumers.

Transpower was unwilling to address the need for a second line to Te Awamutu as it did not meet their grid investment criteria.

Waipa completed comprehensive consultation with all of its stakeholders comprising directly affected landowners, adjacent landowners, three affected District Councils, Waikato Regional Council, all affected utility asset owners, community business associations, and, consumer representatives. Subsequently Waipa completed the design and construction of a second 110kV line from Transpower's Te Awamutu GXP to Transpower's Hangatiki GXP, connected to new 110kV switchgear owned by Transpower and with associated upgraded protection systems at other surrounding Transpower GXPs that are required to operate the new line.

The new line from Te Awamutu to Hangatiki will provide the needed security of supply (n-1) and improve reliability. This line will be operated by the Transpower System Operator as part of the national grid but will be owned by Waipa.

Feeder Assets

All the Company's 11kV and 400V feeders are constructed from commonly manufactured industry proven components that are essential for effective and efficient conveyance of electricity from Transpower's GXPs to the NCPs connecting consumer owned assets.

The distribution asset types that comprise the Company's 11kV and 400V feeders are;

- 11kV lines on concrete or wooden poles,
- 11kV cables either XLPE or PILC,
- 400V lines on concrete or wooden poles,
- 400V cables either XLPE or PILC,
- street lighting lines and cables,
- ring main units, SF_6 or vacuum switches and fuse switches,
- auto reclosers and sectionalisers,
- disconnectors and load break switches,
- dropout fuses,
- transformers (pole or pad mounted ranging from 1kVA to 1500kVA),
- substations (pole or pad mounted or in customers premises),

- voltage regulators and
- consumer service connections, either underground pillars or overhead cutout fuses.

There are no redundant assets and no areas of the network that are uneconomic using the ODV criteria.

SCADA, Ripple Injection Plants and Radio Communication Equipment

Other system fixed assets used by the Company to control and operate its 11kV feeders effectively and efficiently are;

- SCADA system,
- radio voice and data communication network and equipment and
- ripple injection plants and receivers.

None of these assets are redundant or inappropriate for their role.

Asset Selection Policy

Waipa owns and operates a basic interconnected radial 11kV pole line network that has satisfactorily delivered power safely and efficiently to consumers over a number of years.

The Company is confident that the type of network assets installed will continue to provide a safe and reliable service to consumers over the 10 year horizon of this AMP.

Waipa's asset selection policy is to use only tried and proven products. The Company adopts a position of being "leading edge not bleeding edge". When new modern equivalent assets are considered, their performance and life-cycle cost are evaluated by Waipa's Operations Committee comprising the Network Asset Manager, Field Services Supervisor, Customer Connections Supervisor, Construction & Maintenance Supervisor, Vegetation Supervisor, Health, Safety & Quality Manager, Purchasing Officer, Network Information Officer, with consultation with the Planning Engineer and Planning Officers before they are installed on the network. All new assets are sized and specified appropriately for their intended use and life.

Redundant assets

No assets were found to be redundant as part of the 31 March 2004 ODV process, subsequent reviews or during the March 2014 stock take. In contrast, more automation of 11kV switching points and feeder segmentation by line auto reclosers and sectionalisers, disconnectors and dropout fuses will be required to enable reliability targets to be achieved or bettered.

5 Service Levels

5.1 Price Quality Expectations

Waipa has employed a number of mediums to consult with customers:

- Annual customer survey
- Public meetings
- Customer Helpdesk and Website feedback forms, and
- Complaints Resolution Process

Annual Customer Survey

The primary method of consultation with customers is our annual customer survey. The survey takes place midyear and consists of 400 telephone interviews with randomly selected customers. The overall results have a margin of error of +/- 4.8% at the 95% confidence level.

For analysis, each customer/ICP is assigned a category from each of the four customer groups:

- Grid Exit Point (Te Awamutu, Cambridge)
- Feeder Type (Urban Te Awamutu, Rural Te Awamutu, Urban Cambridge, Rural Cambridge)
- Tariff Type (Domestic, Non-Domestic)

GXP / Feeder Type have been identified as the key indicators and so quotas are enforced for the survey to ensure the survey sample reflects the population mix.

Some key results from the surveys:

- Customer satisfaction consistently exceeds 90%.
- On Price versus Quality, the 2016 survey found the following:
- When customers were asked to think of the last time they had a power cut, 63% were not prepared to pay any extra to reduce the likelihood of it happening again. Only 12% were prepared to pay extra, while 25% were unsure.
- For a number of years we asked customers for their preference regarding price parity between urban and rural properties. Consistently customers preferred that all customers pay the same regardless of the fact it costs more to supply rural customers than urban ones.

Public Meetings

Waipa Networks organises public meetings on an ‘as required’ basis. Examples in recent years have been for:

- Planned Transpower maintenance affecting over half the customers on our network and explaining the Company’s rationale and route selection process for the second 110kV line from Te Awamutu to Hangatiki.
- Tamahere community meeting to explain network performance, the network supply characteristics for their area and tree trimming and feeder splitting initiatives to improve network reliability.

Customer Helpdesk and Website Feedback Forms

Waipa maintains toll free numbers for customers to contact us regarding any issue of our operations. We also maintain e-mail contact details of key staff on our corporate website, and a feedback form for customers to use.

Fault calls and their resolution are recorded in the Company database. Network faults are analysed and reported to the Board

Complaints Resolution Process

The Company operates a Complaints Resolution Process in accordance with the Utilities Disputes (formerly the Electricity & Gas Complaints Commissioner) requirements. All complaints are assigned a case manager and complainants are fully involved and informed on the progress of their complaint.

Complaints are analysed by complaint type and customer type. The Company receives very few complaints. For the 3 years (ending 31 March 2016), the average number of complaints registered per year represented only 0.03% of the total ICPs. 98% of complaints were able to be resolved using our in-house Complaints Resolution Process. Any feedback provided is used to improve the quality of our service going forward.

Customer Price/Quality Expectations & Waipa Networks Pricing

The results of consultation suggest Waipa's strategy of providing a good level of service and low lines charges should continue. With customers supporting price parity, there is little mandate to offer a pricing structure more diverse than we already offer. It should be noted that the high retail margins, enabled by our low charges, attract a large number of retailers and provide customers with choice. The large number of retailers operating in our area mean our prices, and changes, are largely obscured by the retail market.

The one project where customers have expressed a need for increased quality and a willingness to pay for it is the Te Awamutu 110kV reinforcement project and we have used the feedback received when incorporating the Hangatiki – Te Awamutu 110kV.line in our distribution pricing.

5.2 Customer Consultation

Waipa Networks has two types of consultation; Customer-initiated and Company-initiated.

Customer-Initiated

Customer-initiated consultation usually occurs due to a specific need of a customer, or after a Network event affecting one or more customers. This is summarised in the following table.

Customer Need or Event	Method of Consultation	Desired Planning Outcome
Company-Initiated: New connection to Network or upgrade of existing connection	Network Connection Application and capital contributions processes	Approvals take network load and growth into consideration. Trends in new connections help plan network income and investment.
Company-Initiated: Vegetation management	Processes under the Electricity (Hazards From Trees) Regulations 2003	Vegetation management programme addresses all geographic areas according to their specific species growth rates.
Company-Initiated: Faults	Customer faults number, call centre and field service	Immediate response to resolve fault. Faults individually and collectively analysed to identify medium and long term investment needs.
Company-Initiated: Complaints	Use of the customer Disputes Resolution Process	Registered complaints are analysed for trends. Service trends are used to assist network investment decisions.

Waipa consults with the following groups regarding significant projects and medium/long term Network planning.

Customer Group	Method of Consultation	Desired Planning Outcome
Large Customers	Individual meetings /correspondence as required.	Consideration of larger customers given for key network investments.
Customer Advocacy / Interest Groups	Public meetings/individual meetings /correspondence as required.	Consideration of customer advocacy / interest groups given for key network investments.
Customer Groups (Residential/ Commercial / Urban / Rural)	Annual Customer Survey	Refer below.
Local District Councils, Regional Council & National Regulatory Bodies	Local Council planning cycles and District Plan updates. Meetings with Council officers as required for specific projects. Public meetings / correspondence as required.	Consideration of local and national regulatory bodies given for key network investments.
All	Public and Stakeholder meetings	Agreement on Transpower outage requirements for Te Awamutu supply maintenance

Annual Customer Survey

The Waipa Networks annual customer survey is the predominant method by which Waipa Networks consults with customers. The independent phone survey of 400 randomly selected customers covers a wide range of operational and public relations aspects of the Company's work with a particular focus on supply satisfaction.

The July 2016 survey reduced the number of questions from six in 2014 to three, and revealed the results shown in the following table.

Customer Satisfaction	Result
Overall	93%
Length of Shutdowns	88%
Number of Shutdowns	86%

Note – for the purposes of this report, customers who responded as "No Opinion" or "Don't Know" were considered to be "Satisfied".

The annual customer survey is used as the means of assessing performance with regards to Consumer Oriented Performance Targets.

5.3 Consumer Oriented Performance Targets

The following table indicates the Consumer Oriented Performance categories and targets the Company has deemed appropriate based on customer feedback. The % target figures listed are the results returned in each category for the respective customer survey year.

Performance Indices	Target 2017/2018	Target 2018/2019	Target 2019/2020	Target 2020/2021	Target 20121/2022	Target 2023/2023	Target 2023/2024	Target 2024/2025	Target 2025/2026	Target 2026/2027
Overall	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
Length of Shutdowns	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Number of Shutdowns	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%

Waipa recognises achievement of these satisfaction performance targets is dependent upon fulfilling our Purpose Statement and seeking continued improvement in the Company's security and reliability targets.

Waipa Networks Purpose

The Company intends to build on its good relationship with its customers and other stakeholders by continually improving the network performance costs and efficiency consistent with the Company's Purpose Statement to;

Deliver power safely all day every day

Provision of value for money

Provide customers with outstanding service and solutions

Security Targets

Security of supply is assessed by reference to a level of in-built asset redundancy.

An "n" security level implies no alternative means of supply. If a component fails then supply is lost. An "n-1" security level is one in which supply is not lost in the event of any single component failure. An "n-1 switched" security level is one in which supply is lost until the faulty asset is isolated. Power is restored by closing interconnecting switches between feeders. Waipa's system is not operated in a "closed ring" manner. Therefore, the best feeder security level offered is n-1 switched.

Waipa has adopted the deterministic rather than the probabilistic approach to specifying security of supply for Transpower's and the Company's distribution assets.

Waipa's network security objective is to strive for the following security levels to be achieved for Transpower's Transmission Grid and GXP assets and specific parts of the Company's distribution network.

Transpower / Waipa Asset	Security Level
Transpower transmission lines supplying GXPs	n-1
Transpower GXP transformers	n-1
11kV urban lines	n-1 switched
Other 11kV lines	n-1 switched where interconnection is economic
Remote rural 11kV lines	n
All 400V lines	n

Reliability Targets

Network supply reliability is measured using;

- SAIDI – the system average interruption duration index (minutes)
- SAIFI – the system average interruption frequency index
- Faults per 100km of 11kV line

from which CAIDI the consumer average interruption duration index is calculated, where CAIDI = SAIDI / SAIFI.

Waipa's target is to continually improve network reliability over the ten year planning horizon of this AMP. The following table shows the targets that have been set in the SCI for the next three years and extrapolated for the AMP horizon of 10 years for reliability.

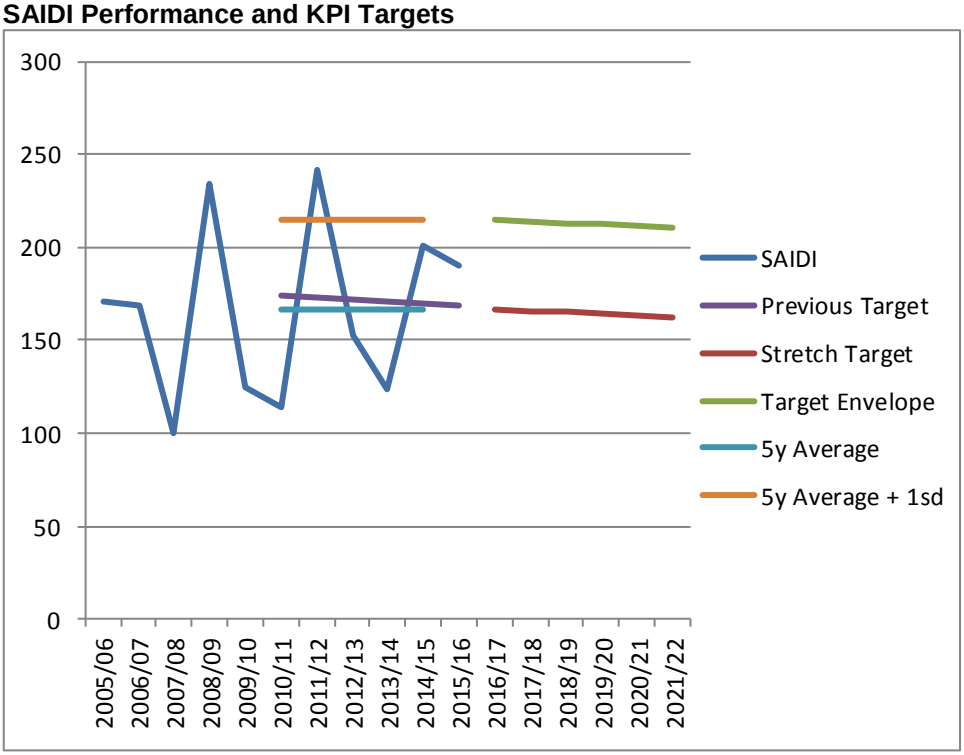
Stretch Target
The targets have been derived by setting a stretch target for each KPI starting from the average of the last five years actual performance, and setting a gradual improvement (in the case of SAIDI and SAIFI) or maintaining performance over the ten year period (in the case of Faults per 100km of 11kV line).

Target Envelope
Natural variation occurs in the network reliability KPIs, and results year to year may be quite volatile given storm conditions, uncontrollable incidents like third party interference and out of zone tree contacts. A KPI target envelope has been set by adding one standard deviation of the past five years actual performance to the target KPI. This means that the target envelope will be achieved in approximately 84% of annual outcomes, assuming that the KPI performance is a normal distribution about the mean. This target envelope is calculated in the same way as the quality path regulation targets imposed by the Commerce Commission.

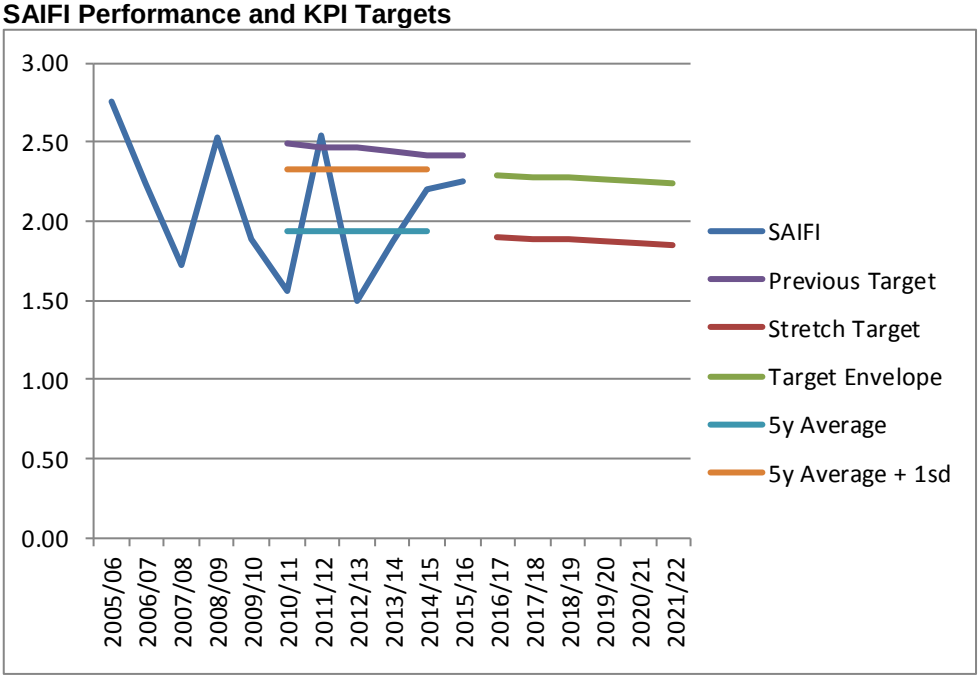
The use of a Stretch Target maintains a continuous improvement discipline for network supply reliability. The Target Envelope provides a realistic bound for the majority of outcomes given volatility in network reliability, and provides a signal for investigation if outcomes exceed the Target Envelope.

The following graphs show the past ten years actual results, the five year average and five year average plus one standard deviation, previous targets and the new stretch targets and target envelopes.

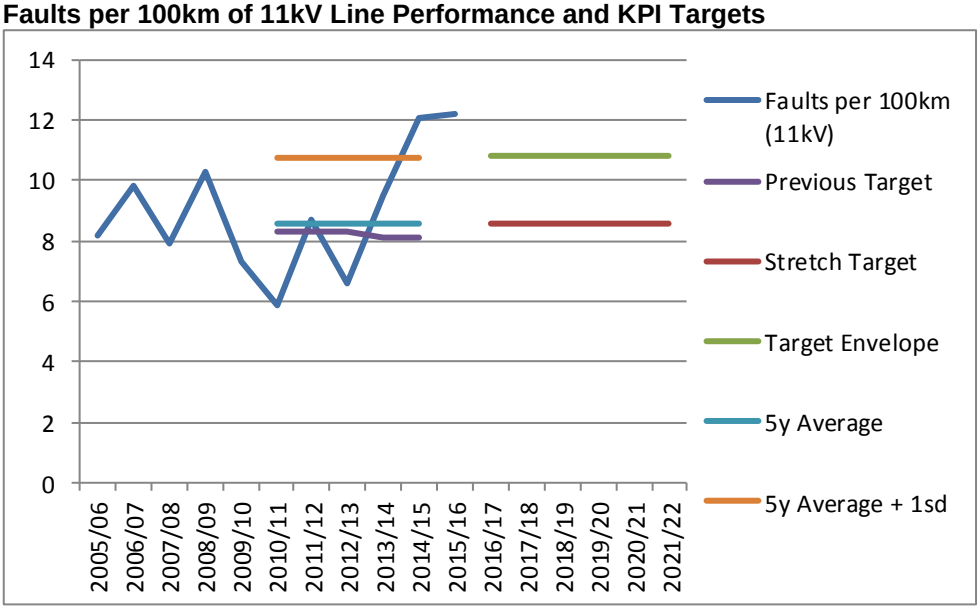
SAIDI Performance and KPI Targets



SAIFI Performance and KPI Targets



Faults per 100km of 11kV Line Performance and KPI Targets



Live-Line Techniques

Every opportunity will be taken to use live-line techniques where it is safe and cost effective. An on-going target of 35 SAIDI minutes per year of planned outages for asset renewal, refurbishment and maintenance is proving a significant challenge, given the volume of network work occurring.

Reliability Targets

Network Reliability Performance Indices	Target 2017/18	Target 2018/19	Target 2019/20	Target 2020/21	Target 2021/22	Target 2022/23	Target 2023/24	Target 2024/25	Target 2025/26	Target 2026/27
SAIDI Stretch Target	166	165	164	163	162	161	160	159	158	158
SAIDI Target Envelope	214	213	212	211	210	209	208	207	206	206
SAIFI Stretch Target	1.89	1.88	1.87	1.86	1.85	1.84	1.83	1.82	1.81	1.80
SAIFI Target Envelope	2.28	2.27	2.26	2.25	2.24	2.23	2.22	2.21	2.20	2.22
Faults/100km 11kV Stretch Target	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6
Faults/100km 11kV Target Envelope	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8	10.8

5.4 Targets for Asset and Electricity Distribution Business Performance

Asset Delivery Efficiency Targets

Waipa uses the performance indicators of Loss Ratio to measure network asset delivery efficiency.

Loss Ratio

Loss Ratio measures the ratio of kWh lost on the distribution network to kWh conveyed per year. Lost units are the difference between metered sales to consumers and metered purchases at each Transpower GXP and distributed generation supplied to the network.

Losses are composed of physical losses due to the heating of distribution assets, un-metered supply and theft. Losses are difficult to measure accurately because all unit sales through retailers' meters would need to be read instantaneously at year-end to calculate the difference between conveyed and sold energy. Currently only Time-of-Use meters in consumers' installations can supply the required accuracy for sales.

Load Factor

Load Factor measures the ratio of kWh conveyed per year to the kW MD multiplied by the number of hours in a year. Improvement in this performance indicator requires minimisation of MDs via a fully functional load management system whilst delivering contracted service levels. Load Factor can also be improved by increasing the kWh conveyed over the distribution network. Because network assets are built to meet MD a good Load Factor is essential to obtain economic use of assets.

Load control is used to control MDs to:

- Defer capital investment in larger assets
- Reduce Transpower charges
- Reduce network losses

In the short term the dominant reason to minimise the MD of a network is to minimise Transpower charges. In the medium term it is to defer capital investment. Its impact on losses is minor and ignored in all practical respects.

When Transpower's charging methodology changed from being based on a network's 12 highest anytime MDs to its contribution to a region's 100 anytime MDs there was no reason to manage a networks MD at times of low regional demand. From 2010/2011 Waipa's practice changed from the former to the latter and Load Factor is no longer used as a key performance measure for the network.

Asset Delivery Efficiency Targets

Asset Delivery Efficiency Performance %	Target 2017/18	Target 2018/19	Target 2019/20	Target 2020/21	Target 2021/22	Target 2022/23	Target 2023/24	Target 2024/25	Target 2025/26	Target 2026/27
Loss Ratio	<6.5	<6.5	<6.5	<6.5	<6.5	<6.5	<6.5	<6.5	<6.5	<6.5

Business Efficiency Targets

Waipa uses the performance indicator Total Operational Expenditure per ICP as a measure of the Company's financial efficiency. The following table shows the targets that have been set in the SCI for the next 2 years and extrapolated for the AMP horizon of 10 years for Business Efficiency.

Business Efficiency Targets

Business Efficiency Performance %	Target 2017/18	Target 2018/19	Target 2019/20	Target 2020/21	Target 2021/22	Target 2022/23	Target 2023/24	Target 2024/25	Target 2025/26	Target 2026/27
Total Operational Expenditure per ICP	<235	<235	<235	<235	<235	<235	<235	<235	<235	<235

These targets are consistent with the Company's belief of:

Provision of value for money

Public Safety, Amenity Values and EDB Performance Goals

Waipa will take all steps to eliminate the risk of injury to people, animals and damage to property by ensuring that;

- All electrified assets are secure from inadvertent or accidental contact by the public,
- all equipment earthing complies with industry standards,
- all network assets are maintained in good, safe working order,
- all faults are detected and disconnected from supply automatically and made safe.

These objectives are consistent with the first element of the Company's Focus of:

Deliver power safely all day every day

The Company will be cognisant of the requirements of the Resource Management Act, Waipa District Council Plans, Waikato District Council Plans, Otorohanga District Council Plans, Waitomo District Council Plans, Land Transport Safety Authority requirements and On Track requirements when constructing new lines.

These objectives are consistent with the Company's belief;

Our community is part of us

Waipa will comply with the regulatory obligations applicable to EDBs. The following table identifies Waipa's corporate responsibilities.

Safety	Amenity Values	Consumer, Commercial and Employee	Electricity Distribution Industry
Health and Safety at Work Act 2015	Resource Management Act 1991	Consumer Guarantee Act 1993 Electricity and Gas Complaints Commissioner Scheme	Electricity Act 1992
Fire Safety and Evacuation of Buildings Regulations 2006	Waipa District Council Plans	Fair Trading Act 1986	Electricity (Safety) Regulations 2010
Building Act 2004	Waikato District Council Plans	Privacy Act 1993	Electricity Industry Reform Act 1998
Civil Defence Emergency Management Act 2001	Otorohanga District Council Plans	Companies Act 1993 Energy Companies Act 1992	Energy Companies Act 1992
Fire Service Act 1975 Forest and Rural Fires Act 1977	Waitomo District Council Plans	Contract (Privity) Act 1982	Electricity (Hazards from Trees) Regulations 2003
	Land Transport Safety Authority requirements Land Transport Act 1998 Road User Charges Act 2012 Road User Charges Regulations 2012	Employment Relations Act 2000 Holidays Act 2003 Minimum Wage Act 1983 Wages Protection Act 1983	Electricity Disclosure Requirements 2004 Electricity Industry (Statistics) Regulations 1996
	KiwiRail Requirements	Financial Reporting Act 2013	Commerce Act (Electricity Distribution Thresholds) Notice 2004
	National Code of Practice for Utility Operators' Access to the Transport Corridors and the Utility Access Act 2010	Commerce Act 1986	Electricity Governance Regulations 2003
	Heritage New Zealand Pouhere Taonga Act 2014	Accident Compensation Act 2001	Electricity Industry Act 2010 Electricity Industry (Enforcement) Regulations 2010
		Child Support Act 1991 Criminal Records (Clean Slate) Act 2004 Human Rights Act 1993 Immigration Act 2009	Safety Management Systems for Public Safety – Electricity and Gas industries – NZS 7901:2014

		Immigration Advisors Licencing Act 2007 Parental Leave and Employment Protection Act 1987 Smoke-free Environments Act 1990	
		Goods and Services Tax Act 1985 Income Tax Act 2007 KiwiSaver Act 2006 Student Loan Scheme Act 2011 Tax Administration Act 1994	Electricity Governance (Security of Supply) Regulations 2008
		Occupier's Liability Act 1962	Electricity Industry Participation Code 2010
			Plumbers, Gasfitters and Drainlayers Act 2006

Quality of Supply Goals

Voltage

Waipa will endeavour to provide supply at each NCP to meet regulatory voltage requirements consistent with the Company's Focus;

Deliver power safely all day every day

Power Factor

Waipa will continue to work with electricity retailers and electrical contractors to ensure consumers' installations are maintained with a power factor of better than 0.95 to maximise electricity conveyance through its assets by reducing network reactive load and losses consistent with the Company's Belief;

Provision of value for money

Interference

Waipa will continue to work with electricity retailers to ensure as far as possible that one consumer's installation does not cause interference for any other consumer and that consumers' installations does not adversely impact on ripple injection signal strength or quality consistent with the Company's Belief:

Provision of value for money

Load Management Goals

Waipa will continue to operate its load management system to minimise the Lower North Island Maximum Demand interconnection charges from Transpower and to minimise capital investment on the distribution network.

Waipa will price load control services so that they are attractive for electricity retailers to implement with their customers. Both objectives are consistent with the Company's Belief:

Provision of value for money

Prudent Operator Goals

Waipa is committed to being a good employer and responsible EDB network operator consistent with the Company's Beliefs:

Everyone home safe everyday

Recognition and acknowledgement of our staff

Increasing employees potential through learning

Building and maintaining community assets and wealth

Our Community are a part of us

Providing customers with outstanding service and solutions

Provision of value for money

Life improvement through energy and network related business

and the Company's Focus:

Deliver power safely all day every day

Reliability Goals

The Company aims to continually improve the quality and reliability of its service consistent with the Company's Beliefs:

Providing customers with outstanding service and solutions

Life improvement through energy and network related business

Reliability will be improved and the risk of outage to consumers reduced by implementing the Company's segmentation programme and continuing a preventative maintenance programme based on asset condition surveys and vegetation management of trees menacing lines consistent with the Company's Focus:

Deliver power safely all day every day

Work Practice Goals

The Company seeks to use best work practices and continually upgrade skills for all staff consistent with the Company's Spirit and Belief:

Safe

Increasing employees potential through learning

The risk of injury to employees or contractors will be reduced by ensuring that all contractors and employees are suitably trained, qualified and meet minimum auditable standards for health and safety procedures, design standards and operating standards before being permitted to work on the distribution network.

The Company encourages safe working practices, provides high quality tools, plant and personal protective equipment. Both of these initiatives are consistent with the Company's Spirit and Belief:

Safe

Increasing employees potential through learning

Environmental Goals

The risk of Company operations adversely impacting on the environment will be reduced by ensuring the use and disposal of any hazardous materials such as transformer oil is in accordance with good industry practice. The Company seeks to consistently achieve the best environmental outcomes from all its activities and holds Gold Enviro-Mark certification. Waipa's on-going environmental initiatives are consistent with the Company's Belief:

Our community is part of us

Providing customers with outstanding service and solutions

Asset Record Goals

Waipa will maintain accurate records locating all overhead and underground plant and equipment in the field owned by the Company. Standard construction design drawings from Waipa's Design Manual will be used for most new construction and for maintenance requirements. Full construction drawings will be maintained for any non-standard installations operated by the Company in accordance with its following Beliefs:

Building and maintaining community network assets and wealth

Providing customers with outstanding service and solutions

5.5 Justification for Service Level, Asset and EDB Targets

The Company has set its service level and asset performance targets after analysing the historical performance of other EDBs and wishing to position itself consistently in the top ten achievers.

Waipa Networks Purpose

Waipa intends to build upon its good relationship with its customers and other stakeholders by continually improving the network performance cost effectively consistent with the Company's Purpose;

Deliver power safely all day every day

Provision of value for money

Provide customers with outstanding service and solutions

Customer Satisfaction Targets

The customer satisfaction categories were chosen based on analysis of typical customer issues: planned/unplanned outages, the number and length of those outages and voltage fluctuations. Overall satisfaction was also included as a general indicator of performance.

The percentage targets were chosen using the following methodology:

Overall satisfaction: for a number of years this has been in the mid-high 90s. The target has been set at 95% as a minimum realistic target given historic performance.

The number of voltage fluctuations: the 2015/16 target of 80% was set based on historical performance and has been increased to 90% in 2016/17. 90% was set taking into consideration the rural nature of a significant portion of the Network.

Outages: the 2016/17 target of 90% was set taking into consideration the rural nature of a significant portion of the Network.

Refer to Section 5.3 for Consumer Oriented Performance Targets table.

Security

Waipa has set future security level targets for Transpower assets and its own distribution assets as a consequence of customer consultation.

The Company undertakes annual Customer Surveys conducted by an independent service provider. It has held Public Consultation meetings in Cambridge, Te Awamutu and Kawhia to gain feedback from consumers on the service it provides as well as security and reliability of their supply.

While generally consumers continue to be satisfied with Waipa's service and the reliability of the Cambridge and Te Awamutu networks they also support the provision of a second line providing n-1 security of supply to the Te Awamutu network.

Waipa has surveyed consumers over a number of years regarding the provision of a second supply line for Te Awamutu. Consistently 40% or more of the Company's consumers are willing to pay $1 or $2 per week for this increased security of supply. About 50% have preferred to stay with one line while less than 10% had no opinion.

The Company considers the 40% of consumers willing to pay more for their electricity represent significant support for the proposal at a time when general perception is that electricity is expensive.

During 2011/2012 the Company made a commitment to construct a 110kV line from Hangatiki GXP to Te Awamutu GXP which will provide n-1 level of security of supply and improved reliability for Te Awamutu. The line will also provide a connection to an alternative transmission system source.

Reliability

Supply reliability including response targets should be established taking into account consumer needs and their willingness to pay for an improved service. Given the complexity of quantifying all of our customer requirements and relating them to network performance, targets are normally set on a qualitative and generic basis.

From recent consumer surveys it is not evident that Waipa's customer base supports heightened (or reduced) levels of supply reliability, especially where these would involve increased (or decreased) line charges.

However, from a telephone survey of 400 customers in July 2014, 59% of respondents were in favour of customers paying extra for improved reliability and security of supply for Te Awamutu.

Under the previous regulatory regime the Company's reliability thresholds were prescribed by the Commerce Commission. The regulatory targets were based on historical network performance and it is likely that even in the absence of regulatory intervention, Waipa's reliability targets and performance would have been similar to those achieved under the regime.

Waipa has set future reliability targets to continually improve the quality and reliability of its network performance. These targets have been established in light of the recent good network performance and reflect the Company's perception of growing expectations of our community.

Asset Delivery Efficiency Targets

Loss Ratio

The use of this loss ratio as a service level is justified as it indicates, at a high level that asset selection and operation decisions have been appropriate and whether the network is operating at an optimum level of efficiency in terms of losses, given physical constraints.

Waipa intends to run its distribution network to its fully rated capacity without thermally damaging or prematurely aging the network assets. This will increase the network technical losses over time for existing assets. New assets will be sized to meet future load growth and have lower initial losses. It is expected that future total network losses will remain at close to current levels.

Business Efficiency Targets

The use of Operational Expenditure per Network Connection Point as a service level, particularly when comparison with peers is undertaken, is justified as it enables an understanding as to whether operating expenditures are appropriate and efficient given the operating parameters of the company.

The Business Efficiency Targets adopted by the Company (Executive Management, Directors and Trust) will ensure that Waipa can continue to offer low network line charges while continually striving to improve reliability of service.

Safety

Waipa has set its future asset, energy delivery, efficiency, and reliability and safety performance targets after consultation with stakeholders and in accordance with the Company's Spirit, Focus and Beliefs.

To be safe

Deliver power safely all day every day

Provision of value for money

Provide customers with outstanding service and solutions

Waipa's health and safety goal is to achieve zero accidents and lost time injuries in accordance with its Belief.

Everyone home safe every day

Environmental

Waipa's environmental goal is to fully comply with all reasonable requirements of the Waipa, Otorohanga, Waikato and Waitomo District Councils and the Waikato Regional Council and to avoid incidents that would cause environmental harm in accordance with the Company's Belief.

Our community is part of us

Voltage

Waipa along with other EDBs has a regulatory obligation to provide supply within statutory voltage limits. The Company will continually strive to ensure that regulatory voltage standards are not breached.

Power Factor

Waipa has set future power factor limits to avoid potential Transpower kVAr penalty payments incurred if power factor is less than 0.95 and to reduce network reactive load and losses.

6 Network Development Plans

6.1 Planning Criteria and Assumptions

Waipa planning criteria for network development plans takes into consideration;

- capacity of an asset to convey electricity,
- quality of supply (voltage within regulatory limits),
- reliability (SAIDI, SAIFI, CAIDI) and
- security of supply (n-1 or n).

As the Company has a number of long radial rural feeders there is a need to provide conductors of adequate cross-sectional area to maintain satisfactory voltage levels along and at the extremities of these feeders. Typically, the initial sections of all feeders radiating out from Transpower's Cambridge and Te Awamutu GXP require 300mm^2 Al cables and heavy line for adequate fault rating, back feed capacity and voltage support.

Waipa takes its 11kV supply directly from Transpower's 110kV/11kV 40MVA 15% impedance transformers at Cambridge and Te Awamutu. Transpower's 11kV fault duty is now such that Waipa feeder cables radiating out from these GXPs require a 500MVA or 26kA fault duty screen for the first few kilometres before the fault duty diminishes sufficiently for normal distribution switchgear with a fault duty rating of 250MVA or 13.1kA.

As the network comprises 11kV and 400V reticulation assets only, the Company need only buy a limited scope of assets. The assets chosen comply with the load requirements and fault duty of the network.

The Company's main assets comprise: cables, lines, reclosers, ring main units, gas switches/ABS and dropout fuses. Their performance ratings are described in the following table. Due to the radial configuration and simplicity of the network it is cost effective to limit the number of models of reclosers, ring main units, gas switches /ABS and dropout fuses to one model for each asset.

Asset Ratings / Distance from GXP	TPNZ Circuit Breaker	Waipa Cable	Waipa Line	Waipa Recloser	Waipa RMU	Waipa ABS	Waipa DDO
<3km	800A / 400A, 26kA CBG GXP 1250A / 630A 26kA TMU GXP	400A, 26kA 3c300mm^2 Al XLPE Cu Screen	490A AAAC Krypton 158mm^2	630A 16kA 4sec	630A 20kA 3sec	630A 12kA 1sec	100A 12kA 1sec
3km-10km		400A, 13.1kA 3c300mm^2 Al XLPE Cu Screen					
10km-25km		300A, 10.6kA 3c185mm^2 Al XLPE Cu Screen	410A AAAC Hydrogen 111mm^2 333A AAAC Helium 77mm^2				
>25km		200A, 9.1kA 3c95mm^2 Al XLPE Cu Screen	250A AAAC Fluorine 49mm^2				
spur		100A, 3.3kA 3c35mm^2 Al XLPE Cu Screen	140A ACSR Squirrel 21mm^2				

Note abbreviations:

Al: Aluminium
Cu: Copper
ACSR: Al Conductor Steel Reinforced
AAAC: All Al Alloy Conductor

Waipa procured ETAP software in 2011/2012 to use for accurately calculating and determining the requirements of new assets. Input of network information commenced into the programs models and has been used for design and planning purposes.

Other inputs to the Company's network development plans come from District Councils, Waikato Regional Council, property developers, Fonterra and other major industrial consumers.

The District Councils in Waipa's reticulation area have adopted a 10 year planning horizon for local development. The Company regularly assesses the impact of these developments on the network and makes submissions on these plans as appropriate. Given the growth in the Cambridge area and recent interest from industrial customers in the area, a more comprehensive feeder development plan will be devised over the next several years, to address the longer term capacity needs of the area.

The impact of developers subdividing existing properties is assessed from year to year.

The two Fonterra dairy factories, Waipa's largest consumers, keep the Company informed of their maximum demand (MD) requirements on an annual basis. Any significant increase in the long term capacity requirements are discussed as they arise and a solution agreed between the parties.

Waipa intends to continue to supply remote connected consumers' installations beyond April 2013 provided it remains economic for the Company to do so.

Maximum Demand Growth on Waipa Feeders

MD growth predictions for all Waipa's feeders were established using half hourly load data. The underlying MDs on Waipa's feeders were determined by analysing each half hour load and eliminating abnormal loads caused by total or partial switching of feeders for capital and maintenance works and for restoration of supply after a fault. Development of a load forecasting tool using a projection of historical feeder maximum demands will be completed during 2017, in order to more accurately assess future growth on feeders.

Network Analysis to Identify Constraints

Waipa Networks has previously predicted when its feeders would become capacity or voltage or security constrained as determined by applying approximate criteria. This was used in the absence of a full set of load flow models for accurate analysis of feeder capacity, voltage performance and the ability to back feed feeders.

Prior to and during 2016 load flow models for all but two of the 27 11kV feeders were developed. Load flow analysis of Cambridge feeders was completed to assess capacity, voltage and security of supply via adequate back feed from alternative feeders. This work identified a number of voltage support investments required to ensure voltage performance during peak loads and during back feeding. Analysis of the Te Awamutu feeders will be completed in 2017.

Capacity Constrained Feeders

Waipa deems that a feeder has reached its capacity constraint when its 10^{th} MD exceeds its switchgear, cable or overhead line maximum thermal rating.

Voltage Constrained Feeders

Waipa deems that a feeder reaches its voltage constraint when the delivered voltage levels anywhere along the length of the feeder fall below the minimum prescribed regulatory voltage of 0.94pu (that is, 6% voltage drop).

Security of Supply Constrained Feeders

The Company's stated security of supply objective for 11kV urban and suburban areas and other 11kV lines where interconnection can be provided economically is n-1 switched. This provides security of supply in the event of a fault close to the GXP, or the feeder circuit breaker being removed from service for maintenance This objective can be best tested by actual load flow analysis of feeders in a back feeding configuration. The previous practice of limiting 11kV feeders to be loaded up to 66% of their rating so that there is the ability to switch load to two (or more) adjacent feeders accounts only for thermal capacity, when the load flow analysis of back feeding Cambridge feeders showed clearly that voltage was often a key limiting factor for back feeding.

Investment in voltage regulators and capacitors to achieve security of supply through back feeding is relatively much less than providing feeder interconnections or constructing new feeders. Solutions to security issues will be economically tested where the cost is excessive or the security benefit provided is modest.

Maximum Demand Growth on Feeders

Previously a growth rate of 3.0% per year has been applied to individual feeders reflecting actual experience on high growth feeders over the past 5 years. In addition, allowance has been made for known or expected developments. This was an effective "stress test" on feeders to identify potential future constraints, but was not realistic in terms of when capacity issues may occur. The development of a feeder load forecast tool based on historical growth on each feeder will provide a more realistic forecast of demand growth in order to predict when constraints will occur. the likely network asset enhancement, refurbishment, or replacement for the next 5 years and with a lesser degree of certainty predict asset enhancement, refurbishment, or replacement for the next 10 years.

6.2 Prioritisation Methodology Adopted for Development Projects

Waipa prioritises Transpower new investments and the Company network development projects by a combination of the number of customers affected and predicting when Transpower transmission, GXP assets and the Company's feeder assets become constrained. The following table shows the priority that the Company places on these constraints.

Constraint	Priority Level*
Low Voltage	First Priority
Lack of Capacity	Second Priority
Poor Reliability	Third Priority
An Unacceptable Level of Security of Supply	Fourth Priority

Where finite resources constrain the completion of multiple projects.

These predictions are made by analysing;

- Transpower's transmission line security level,
- Transpower's GXP underlying maximum demand growth,
- the Company's underlying feeder load trends,
- customer driven work,
- the Company's feeder reliability (SAIDI, SAIFI, CAIDI) performance and
- the Company's feeder security level.

Transpower's new investments and Waipa's network development projects are evaluated using network development analysis including load flows which identifies when an asset is predicted to become constrained. Waipa then prioritises and schedules projects so that the assets are not constrained and solutions are implemented in a timely manner.

Over the past 8 years Waipa has been able to schedule and implement all the Company's development projects in good time to avoid the assets becoming constrained, without incurring any conflicts of resources.

6.3 Demand Forecasting

Maximum Demand Growth at Transpower's GXPs

Cambridge GXP

Over the past 5 years the underlying average growth in energy (kWh of electricity) imported through Cambridge GXP was +2.45% per year.

Over the same period the 5 year average growth in MD at Cambridge GXP (with full load control) was 1.25%, and has ranged between -5.3% and +12.5% per year.

Te Awamutu GXP

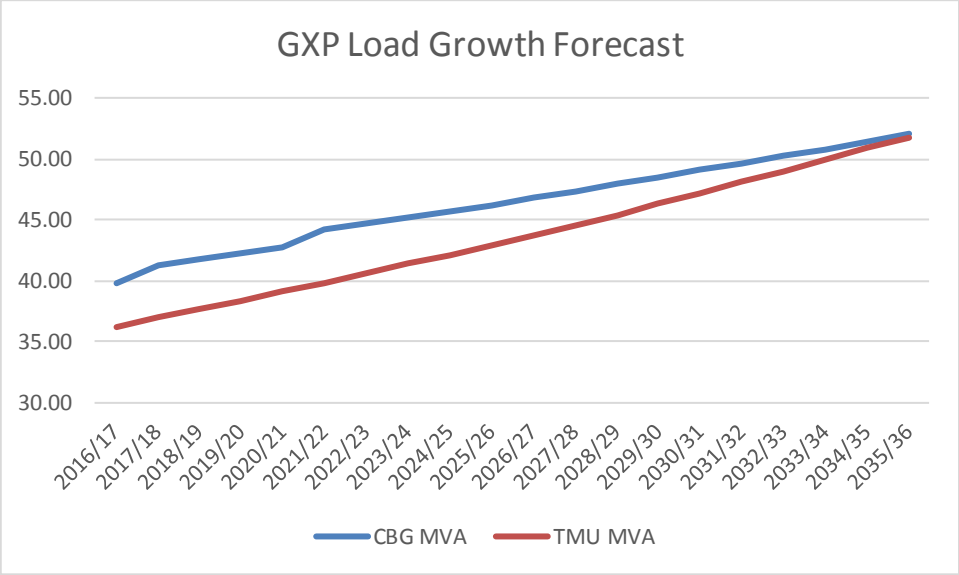
Over the past 5 years the underlying average growth in energy (kWh of electricity) imported through Te Awamutu GXP was +1.67% per year.

Over the same period the 5 year average growth in MD at Te Awamutu GXP (with full load control) was -0.19%, and has ranged between -4.8% and +3.2% per year.

Maximum Demand Growth at Transpower GXPs

The historical large step increases in MD at both Te Awamutu and Cambridge (5.07% and 5.20% respectively) were associated with a change in load control policy. The Company places less emphasis on controlling its own anytime MD instead it focuses on controlling its contribution to the 100 Lower North Island Coincident Peaks. Fluctuations since reflect annual seasonal differences and annual changes in Fonterra demand/Te Awamutu dairy factory internal generation.

Waipa uses the historical trends to forecast future MDs. The Company forecast MDs using Transpower MD data for both CBG and TMU GXPs are shown in the 'graph below. Waipa predicts a forecast of 1.5% increase at CBG GXP and 1.9% increase at TMU GXP over the 10-year planning horizon, with predicted step load increases in Cambridge based on committed or likely developments.



Impact of Substantial Projects or Developments on Maximum Demand

The load forecast allows for the 1.1MVA load increase associated with the Lakewood development, a combined hotel, apartment and commercial development on the northern edge of the Cambridge CBD. Allowance is also made for a potential 1 MVA industrial processing development in the Cambridge area within the next five years. Historical new developments comprise; subdivisions, dairy farms and small retail outlets. Waipa has recently connected two fast moving consumable goods outlets which the Company considers large loads. However, it is predicted that this type of load can be connected to the network without dramatically increasing the MD beyond forecast predictions because of load diversity on the respective GXP and the Company's ability to manage controlled load.

Impact of Distributed Generation on Maximum Demand

Waipa continues to have very low levels of distributed generation on its network and has assumed for the purpose of forecasting MD that any existing or future distributed generation will have minimal effect on MD. Distributed generation, by nature, is not available 100% of the time, particularly for the most common form, solar PV. This is caused by periods of low generation, faults or maintenance on distributed generation or lines connecting it to the Company's network. These assumptions will be reviewed once distributed generation connections become more significant and if battery storage costs significantly decline and adoption rates become more mainstream.

Impact of Demand Management on the Maximum Demand

The Company has assumed for the purpose of forecasting MD that any form of Demand Side Management will not have any material effect on reducing the MD. Currently, there is no quantitative evidence retailer demand side management initiatives have been adopted by their respective consumers.

Waipa has a ripple control load management system that controls 10MW of connected load in Cambridge and 12MW of connected load in Te Awamutu over peak periods. The Company has assumed for the purpose of forecasting MD that its load control system is fully functional and that full load control is being exercised over peak load periods.

The Company assumes that for the immediate future smart meters and smart tariffs introduced by retailers will continue to offer load control to connected consumers.

Security of Transpower's GXPs

Cambridge GXP Transformers and 11kV Switchboard Assets

Two 40MVA (continuous) ODAF transformers were installed in July 2002 and provide a firm transformer capacity of 40 MVA continuous with 24 hour contingency ratings of 44.3MVA at Cambridge GXP. This is a protection limit and it may be able to be increased slightly, allowing a larger short term contingency overload of the transformers. Both transformer 11kV incomers and busbar are rated at 47.9MVA.

The highest AMD on these transformers on this GXP was 39.382 MW, in 2015. This corresponds to 39.78 MVA at typical peak load power factor of 0.99.

The total number of outgoing feeders supplied from Cambridge GXP 11kV switchboard is thirteen excluding the ripple plant supply.

In January 2007 the Fonterra Hautapu dairy factory contracted for 10MW for 2007/2008 and has given no further indication of future load growth.

Assuming the dairy factory requires no more than 10MW and there is a 1.5% per year growth in underlying MD at Cambridge GXP and step load increases occur as forecast, the firm capacity of 44.3MVA will be exceeded in 2022/23, also assuming that load control tariffs or their equivalent continue to be offered and used by consumers.

Cambridge GXP is deeply embedded in Transpower's Grid and has experienced only two unplanned transmission system outages during the past 10 years (Otahuhu "D" shackle 12 June 2006 and lightning 9 July 2011). A circuit breaker failure on the 11kV switchboard caused a complete loss of supply in 2013, leading to the switchboard replacement.

The Company's n-1 security level for Transpower's transmission lines and assets at Cambridge GXP has been met.

Development planning will commence in 2017 to investigate solutions to provide additional GXP capacity, with options including:

- Replace the GXP transformers with 2 x 60MVA 110/11kV transformers and add an additional switchboard to overcome the 11kV busbar limitation of 47.9 MVA.
- Replace the GXP transformers with 2 x 70/30/40MVA 110/33/11kV transformers and a new 33kV switchboard. This would introduce a 33kV subtransmission voltage in Cambridge. The Hautapu feeders could be converted to 33kV and a 33/11kV zone substation established a Hautapu for the Fonterra diary factory supply. In the longer term this would allow a 33kV subtransmission supply to be established to the south side of Cambridge if industrial load and residential demand develops beyond the capacity of 11kV feeders.
- Consider the role of 22kV as a distribution voltage where voltage limitations at 11kV may need to be overcome.

Care is required in selecting the best long term solution for GXP capacity, because of the relatively large investments required and the long time frame and uncertainty related to demand forecasts that is involved, particularly with the influence of PV distributed generation and the possible future penetration of batteries. The cost savings that Waipa Networks have been able to deliver to consumers by avoiding a subtransmission network because of the GXP delivery voltage being the distribution voltage has been a long-standing benefit. The decision to adopt 33kV as subtransmission voltage needs to be robustly investigated.

Te Awamutu GXP Transformers and 11kV Switchboard Assets

Two new 40MVA (continuous) OFAF transformers installed in July 2004 provide a firm capacity of 40MVA continuous with 24 hour contingency ratings of 40.7 MVA at Te Awamutu GXP. This is a protection limit and it may be able to be increased, allowing a larger short term contingency overload of the transformers.

The highest AMD on these transformers on this GXP was 35.188 MW in 2016. This corresponds to 36.28 MVA at typical peak power factor of 0.97.

The transformers feed two 11kV switchboards in parallel. The first 11kV switchboard installed in 1997 is in good order and currently supplies six feeders. The switchboard incomers, bus-coupler and bus bars are rated at 1250A, limiting the board to 24MVA under an n-1 contingency. The second 11kV switchboard rated at 47.9MVA was installed in June 2004 to supply four existing feeders. A further four additional feeders were installed on this parallel switchboard in March 2007.

The total number of outgoing feeders supplied from Te Awamutu GXP 11kV switchboard is fourteen excluding a ripple plant supply. In January 2007 the Fonterra Te Awamutu dairy factory contracted for 4.5MW for 2007/2008 and has given no further indication of future load growth.

Assuming this requires no more than 4.5MW and there is a 1.9% per annum growth in underlying MD at Te Awamutu GXP, the firm capacity of 40.7MVA 24 hour post contingency rating will be exceeded in 2023/24, also assuming that load control tariffs or their equivalent continue to be offered and used by consumers.

There was a partial failure of the 11kV switchboard in 2010.

The Company's n-1 security level for Transpower's substation assets at Te Awamutu GXP has been met.

Development planning will commence in 2017 to consider solutions for GXP capacity in Te Awamutu. The same options of larger 110/11kV transformers or introducing a 33kV subtransmission voltage are available. The adoption of 22kV for the longer voltage limited feeders in the Te Awamutu area (e.g. Kawhia, Pukeatua, Kiokio/Waikeria is a further option. The possibility of establishing a new 110/11kV point of supply from the Hangatiki – Te Awamutu 110kV line in the vicinity of Ngutunui to take load off the Te Awamutu GXP will also be considered, however this on the face of it comprises a large investment to supply a relatively small amount of load.

Transpower GXP Assets Longevity

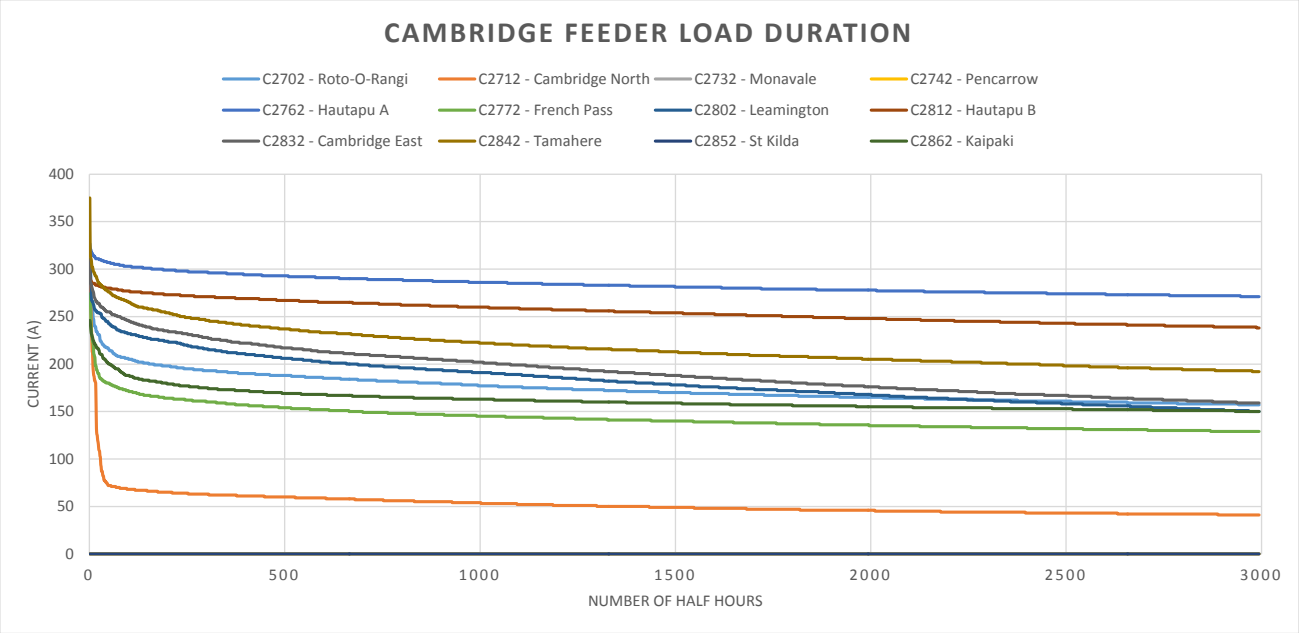
Using the firm transformer capacity and n-1 security criteria the longevity of Transpower's GXP assets has been predicted assuming an MD growth of 1.5% per annum at Cambridge GXP and 1.9% per annum at Te Awamutu GXP.

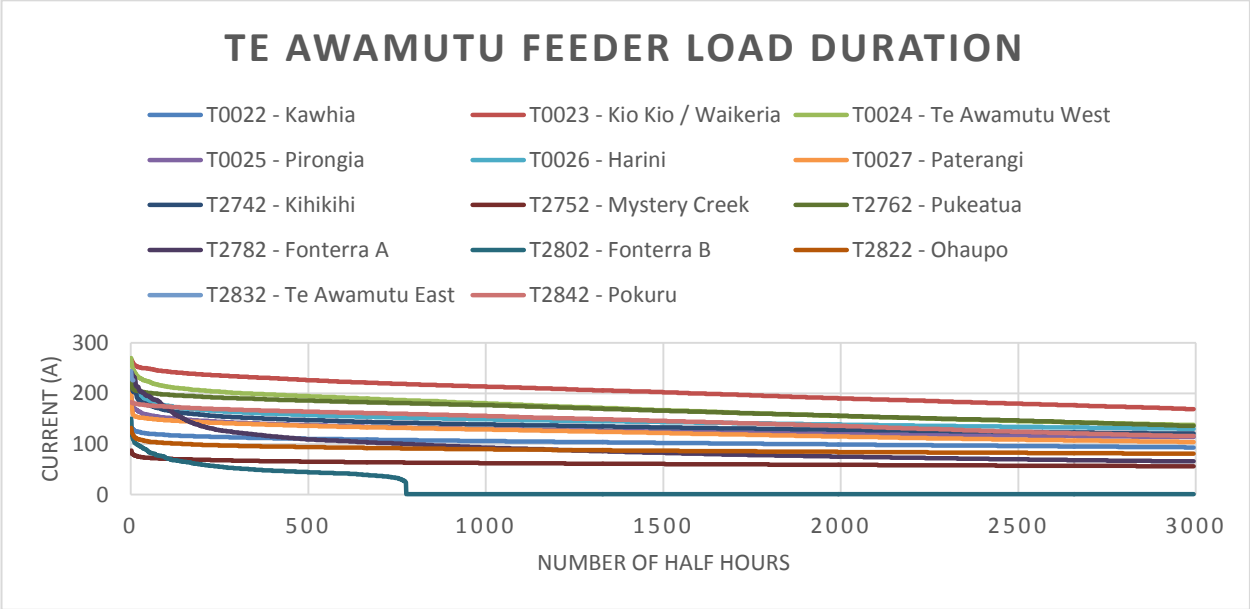
Waipa predicts Transpower's transformer firm capacity at Cambridge GXP will be reached in 2022/23. The Te Awamutu GXP transformer firm capacity is predicted to be reached in 2023/24.

Waipa Feeder Load Duration Analysis

Using data collected over a period of 1 year between 1 April 2014 to 31 March 2015 the underlying MDs on all Waipa's feeders were determined by analysing each half hour load and eliminating abnormal loads caused by total or partial switching of feeders for capital and maintenance works and for restoration of supply after a fault.

The underlying feeder MDs frequencies are shown on the following load duration graphs.





Te Awamutu GXP Transmission Supply

With the commissioning of the Hangatiki – Te Awamutu 110kV line in July 2016 Te Awamutu has a secure n-1 transmission line supply, including diversity of route and transmission system source. Waipa Networks sought a second transmission supply to Te Awamutu given longstanding issues with unplanned and planned transmission outages on the single Karapiro – Te Awamutu pole line. The unreliability of the transmission supply was unacceptable to Waipa's Te Awamutu customers.

The Hangatiki – Te Awamutu line route was preferred over a second circuit between Karapiro and Te Awamutu, in order to provide diversity of route and to avoid potential common mode failures from lightning strikes, burn-off faults and ground liquification post-earthquake. Transpower was unwilling to construct the 110kV line for Waipa Networks, so Waipa Networks embarked on the project, seeking to achieve the following objectives:

- Provide a permanent (non-switched) n-1 supply to TMU,
- Improve reliability,
- Provide physical diversity of line route,

- Provide diversity of transmission source, and
- Reduce existing transmission line constraints in the Waikato region.

The project involved significant community and local authority consultation, consenting and designation of the line route and landowner negotiations to obtain easements. The line was constructed and commissioned in July 2016 and has operated without incident since.

The new line from Hangatiki to Te Awamutu provides the needed security of supply (n-1) and will improve reliability. This line will be operated by the Transpower System Operator as part of the national grid but is owned by Waipa.

6.4 Policies on Distributed Generation

Waipa has welcomed all enquiries from consumers and other interested parties regarding the commercial and technical viability of a variety of distributed generation (coal/diesel, micro-hydro, wind and photo-voltaic, etc.) proposals.

Waipa's connection policy requires distributed generators to contribute to any network enhancements that are required to eliminate any input constraints caused by the distributed generator.

Applications and a description of the consenting process and associated legislation and technical requirements for distributed generation are available on the Company's website.

The Company's salient requirements for new generators are:

- Operators must ensure their generator operates safely and does not produce any adverse effects on the network or any other network consumers.
- Generators must not produce any voltages or harmonics outside regulatory limits, interfere with network protection systems or inject fault currents above network capabilities.
- Generator owners must provide protection against over and under frequency, overcurrent, phase to phase faults and phase to earth faults.
- Generators must comply with all relevant regulations, standards and codes of practice.
- Applicants who reduce the net kVAr supplied to Waipa's network by Transpower will be encouraged, while those who require additional kVAr support will be declined.
- Generators must be tested fully before being connected.
- Connected generators will be disconnected; in emergency situations, if the generator has failed to pay any fees or charges, if there is a change or increase in distributed generation without Waipa's prior consent or if the generator fails to have an electricity retailer.
- Standard fees apply for applications and inspections.

Most of the distributed generation installations have been downstream of the consumer's metering point and generally photovoltaic applications. This type of distributed generation has had little effect on the network given low levels of penetration to date.

The existing 7.5MVA co-generator at Fonterra Te Awamutu dairy factory is directly connected to the Te Awamutu GXP via two 11kV dedicated feeder cables. This generator has no effect on other Company network assets, but it does impact on Transpower's Te Awamutu GXP assets and MD.

Although Waipa encourages distributed generation on its network the Company continues to have only a few, small capacity connections each year, although the rate of connection is increasing. Currently, there is less than 600kW of predominately photovoltaic distributed generation connected to the network excluding Fonterra's cogeneration.

To date Waipa's experience has been that no committed distributed generation projects have had any impact on the Company's reticulation assets or network development plans.

Impact of Distributed Generation on Maximum Demand

Waipa has assumed for the purpose of forecasting MD that any existing or future distributed generation will have minimal effect on MD. Distributed generation, by nature, is not available 100% of the time. This is caused by periods of low generation, faults or maintenance on distributed generation or lines connecting it to the Company's network.

6.5 Policies on Non-network Solutions

Waipa encourages all forms of non-network solutions that are economically feasible and practical alternatives to conventional network augmentation, to address network constraints such as energy efficient lamps and heat pumps, for reducing network MD and energy consumption by consumers within their installations.

When potential non-network solutions are identified, they are reviewed by the Operations Committee, a group of Company representatives who meet monthly to discuss operational and technical matters that have arisen.

The Operations Committee assigns the potential non-network solution to the relevant staff member for further research on cost/benefits of the proposal. The findings are reported back to the Operations Committee and if they are endorsed onto Management for appropriate action.

To further investigate the potential impact of new technologies on the network, the following Business Plan initiative commenced in 2016/17:

- Monitor the impact of the 100% PV St Kilda subdivision via metering the distribution transformers and analysing the effect on demand consumption, export, voltage and harmonic content from inverters. The St Kilda subdivision has covenants requiring the installation of at least 3kW of PV solar panels on every house. A similar aged subdivision will be monitored to provide a comparison for the analysis.

Line Pricing Incentives

The Company offers all retailers controlled load, day/night and 8 hour supply kWh line pricing to encourage consumers to reduce network MD at peak times. From 2016 new pricing has been phased in to provide for peak, shoulder and night periods as a pricing signal to reflect the impact on the network of demand at different times of the day. This pricing will fully take effect from 2019.

Embedded Generation

Waipa will consider using non-network solutions such as diesel generation to reduce network MD to delay capital expenditure where economic.

Consumer Advice

The Company's web-site (Info for Customers/Energy Efficiency) contains suggestions for consumers to save power without adversely impacting on their lifestyle.

Virtual Smart Home

Waipa launched a new website late 2010 which can be found at www.virtualsmarthome.co.nz. The Company's aim was to provide ready access to the latest in smart and energy efficient home technologies for its customers. Waipa therefore developed the concept of a 'virtual' smart home on the internet where customers could easily access the technology and interact with it. The smart home website goes beyond a typical demonstration of smart technology by also providing users with tips regarding energy safety and efficiency.

Power Factor

Waipa will continue to require consumers to install sufficient power factor correction at their installations to maintain a minimum power factor of 0.95 to reduce reactive power loading on the Company's feeders. Transpower has not at this point enforced reactive power penalty charges related to off take power factor at Cambridge or Te Awamutu GXPs.

Transpower routinely advises the Company each year what the power factor at Cambridge GXP and Te Awamutu GXP has been during the previous year. To date Transpower has advised that power factor at both GXPs remain satisfactory. However, there may be a need for an on-going education programme for electricity retailers, electrical contractors and consumers.

Impact of Demand Management on the Maximum Demand

Waipa has a ripple control load management system that is able to control 10MW of connected load in Cambridge and 12MW of connected load in Te Awamutu over peak periods. The Company has assumed for the purpose of forecasting MD that its load control system is fully functional and that full load control is being exercised over lower North Island peak load periods as required.

The Company has assumed for the purpose of forecasting MD that any form of additional Demand Side Management will not have any material effect on reducing the MD. Currently, there is no quantitative evidence that retailer demand side management initiatives have been adopted.

6.6 Network Development Plan

Network Development Options Identified

As there is no significant Distributed Generation on Waipa's network and as there is no significant additional Demand Side Management initiatives driven by electricity retailers for consumers to take advantage of, the Company's pragmatic option is to pursue network solutions.

11kV Feeder Reinforcement

The majority of Cambridge GXP and Te Awamutu GXP urban/suburban and rural feeders can be future proofed by normal 11kV reinforcement techniques.

Normal 11kV reinforcement techniques are economic and involve:

- upgrading all under sized feeder conductors to remove capacity constraints and improve delivered voltage;
- relocating, enhancing, adding or removing voltage regulators or capacitors to ensure regulatory voltage is maintained at all times;
- establishing new 11kV feeders and reallocating load between the new and existing feeders; and
- relocating, adding or removing line auto reclosers, sectionalisers, disconnectors and dropout fuses to satisfy system operating needs.

Normal 11kV reinforcement strategies can be applied to most of Waipa's 11kV feeders if required to meet future capacity and voltage constraints that arise from the predicted growth rate in MD.

Customer Connection

General Extensions

The quantity of subdivisions and other developments and the timing of their reticulation are driven by the developers of each site.

Over the past few years expenditure on reticulating subdivisions and new developments has been less compared to previous years primarily due to the on-going constrained economic environment.

However, recently customer driven activity has increased in Cambridge and Te Awamutu and their surrounding environs which is reflected in this AMP forecasts. This activity is balanced by an expected downturn in dairy related network development, resulting from the fiscal constraints of poor dairy commodity pricing.

Investment in new network extensions, driven by developer and consumer requirements will continue as required.

Cambridge North Supply to Lakewood Development

The Lakewood Development plans to develop a vacant area of land between Queen St and Te Koutu Domain. On the north side of the Cambridge CBD area. This will be a combined hotel, apartment and commercial area, representing 1.15 MVA of load. A customer contribution will fund the installation of 1.6km of 300mm Al cable down Victoria St to connect this development to the Cambridge North feeder, since there is insufficient capacity on the much closer Cambridge Town feeder and Cambridge East feeder. A short cable and RMU connection to provide back up to and from the Cambridge Town feeder will be installed to improve security of supply.

The cost associated with this activity is identified as customer connection expenditure of the Capital Expenditure Budget in Section 10 of this AMP.

Transformer and Substation Additions

Installation of new transformers and substations, essential for network extensions, will continue to be driven by developer and consumer demand.

The cost associated with this activity is identified as customer connection expenditure of the Capital Expenditure Budget in Section 10 of this AMP.

Ring Main Unit Switchgear Additions

Installation of new ring main units, essential for network extensions, will continue to be driven by developer and consumer demand.

The cost associated with this activity is identified as customer connection expenditure of the Capital Expenditure Budget in Section 10 of this AMP.

Disconnector Switchgear Additions

Installation of new disconnectors, essential for network extensions, will continue to be driven by developer and consumer demand.

The cost associated with this activity is identified as customer connection expenditure of the Capital Expenditure Budget in Section 10 of this AMP.

Dropout Fuse Switchgear Additions

Installation of new drop out fuses, essential for network extensions, will continue to be driven by developer and consumer demand.

The cost associated with this activity is identified as customer connection expenditure of the Capital Expenditure Budget in Section 10 of this AMP.

General Relays Additions

Waipa will install additional ripple control relays each year for new customers or existing customers seeking a tariff change.

The cost associated with this activity is identified as customer connections expenditure of the Capital Expenditure Budget in Section 10 of this AMP.

System Growth

Waipa's feeder load flow analysis of Cambridge feeders completed in 2016 has identified some low voltage constraints, under normal configuration at peak load and in back feed situations. Solutions to resolve these voltage constraints have been phased into the capital programme in order of priority. The Kawhia feeder voltage constraint is now forecast from 2025/2026, however we have not seen the growth in Kawhia that would cause the voltage constraint so the need for investment is indefinite.

New Voltage Regulators

Waipa has a regulatory obligation to supply consumers' NCP within specified voltage limits not withstanding momentary fluctuations.

The Company's load profile is typical of most EDBs' with morning and evening peaks which occur for 6-8 hours each day.

For the remaining 16 to 18 hours Waipa's urban and suburban pole line feeders operate well within their current rating capacity and deliver statutory voltage.

However during peak loading periods the Company's rural pole line feeders without enhancement cannot deliver regulatory voltage. The cost effective solution is to install voltage regulators on these rural lines so that regulatory voltage is maintained at NCPs over peak periods. The use of capacitors as an alternative method of voltage support to augment voltage regulators has also been introduced.

Waipa has established a programme for installing 3 can, 200A, 32 step, 0.625% per step type voltage regulators. Appendix A shows the proposed Voltage Regulator Programme. The need and timing of voltage regulator installations proposed from 2016/2017 onward will be confirmed by the Company's ETAP network modelling software and actual load growth.

Pukeatua

The Company completed installation of the new overhead front end for Pukeatua feeder in 2012/2013. The location of the two existing voltage regulators on the feeder will need to be adjusted to optimise the voltage profile of the feeder. An ETAP analysis was completed in 2015/2016, determining the locations to reposition an existing voltage regulator, confirming that a third voltage regulator should be installed in 2016/17 (VR37, completed), an upgrade to VR12 is required in 2017/18 and a voltage support capacitor is required in 2017/18.

The cost associated with voltage regulator and capacitor installations is identified as system growth expenditure of the Capital Expenditure Budget in Section 10 of this AMP.

Kaipaki

Following the split of the Monavale and Kaipaki feeders in 2016/17, reconductoring of 1.5km of overhead line on Racecourse Rd is required to configure the Kaipaki feeder in its final form. This will be completed in 2017/18.

In order to back feed the Monavale feeder, including the existing industrial load at Aotearoa Park, a 200A voltage regulator is required after ABS 936, to be installed in 2017/18.

Roto-O-Rangi

Low voltage has been modelled on the Roto-O-Rangi feeder at peak load. To solve this and to assist in back feeding either the Leamington feeder or portions of the Monavale feeder, a 200 A voltage regulator and two 750kVAr capacitors will be installed in 2018/19.

Leamington

Load flow modelling shows low voltage beyond X547, requiring a new 300A voltage regulator before A840 to be installed in 2019/20. The option of installed two capacitors was considered, while this is less cost, the superior back feed capacity for supplying the Roto-O-Rangi feeder makes the larger investment in a voltage regulator the preferred option.

Pencarrow

A 750kVAr capacitor has been budgeted for 2019/20 to support off-loaded sections of the Kaipaki and Monavale feeder when the Monavale feeder requires back feeding from Kaipaki.

French Pass

The French Pass feeder has been modelled with low voltage at peak load. The solution is to install a 200A voltage regulator before A971, installing a 750kVAr capacitor before A920 and shifting VR021 to after A945, budgeted for 2020/21.

Kiokio/Waikeria

The Company's Kiokio/Waikeria feeder has two voltage regulators installed on it. However, the feeder voltage is beginning to sag mid-way along the feeder. An ETAP analysis will be carried out in 2017/18 to determine the optimum position to relocate one of the regulators or if another voltage regulator is required to be installed on this feeder. At 150A voltage regulator has been budgeted for 2019/20.

This plan is on hold pending further details of the recently announced Waikeria Prison upgrade. Corrections has announced a new 1,500 bed facility at Waikeria to be developed by 2018. Since the Kiokio/Waikeria feeder is essentially at capacity, it is expected that a new feeder to supply this load will be required. A request for more details of the development is with Corrections, and network planning to design a solution will be completed in 2017/18.

The cost associated with voltage regulator and capacitor installations is identified as system growth expenditure of the Capital Expenditure Budget in Section 10 of this AMP.

Matos Segedin Drive Industrial Subdivision

This industrial subdivision is supplied by the Monavale feeder and was reticulated over 13 years ago. New industrial consumer connections have been steady. Adjoining this industrial subdivision is the long established Waipa District Council's potable and waste water treatment plant. The water treatment plant is also supplied by Monavale feeder but from the other end via a small overhead line along Pukerimu Lane which is significantly further down the Monvale feeder. The treatment plant is a significant load and the Waipa District Council intends to develop further water treatment processing which will require additional capacity. The existing network is unable to connect additional load because of the line constraint. The appropriate solution is to reinforce the Matos Segedin Drive reticulation and supply the Waipa District Council load via Matos Segedin Drive with an interconnecting back up supply from Pukerimu Lane.

The cost associated with this project was included in the 2015/16 budget and was completed in 2016/17 after delays due to obtaining an easement for the cable route.

Te Awamutu GXP Cable Upgrade

Preliminary investigation into the cable capacity of cables exiting the Te Awamutu GXP down the driveway and crossing the bridge on Racecourse Rd to multicircuit cable termination poles has revealed that a number of cables are under rated for the feeder loadings. There are eleven cables in close proximity and at below normal depth of burial, contributing to mutual heating that de-rates the cables. A conservative assumption about the dried out soil thermal resistivity also contributes to the loss of cable capacity. In particular the circa 1966 paper insulated lead coated (PILC) copper cables are expected to be significantly derated under these installation conditions. Given the uncertainty around the actual cable ratings, there is some risk that cable failure may occur due to thermal stress,

Given that most of the cables have peak loadings in winter when soil conditions are expected to be moist and hence thermal resistivity would be lower, this risk is mitigated somewhat. The original circa 1966 PILC cables are fifty years old, compared to the PILC cable standard life of 70 years. A recent partial discharge test on the feeder cables indicated only one cable with elevated partial discharge activity, so that is reassuring. The cable with elevated partial discharge will be tested further to determine where the discharge is occurring, it may be within the cable or in the cable termination.

To address the cable capacity issue, a full cable thermal design will be completed for the feeder cables exiting the GXP, including testing of the soil thermal resistivity and dry-out characteristics early in 2017/18. It is likely that the cables exiting down the driveway will need to be installed with a thermally stabilised backfill to achieve a reliable cable capacity. Anticipating that the cables will need to be replaced to achieve the desired feeder rating and for feeders to be capable of backing up other feeders, a provisional sum to replace the feeder cables exiting the GXP has been included in the 2017/18 budget.

Transformer & Substation Enhancements

Enhancements of existing transformers and substations will continue to be driven by consumer demand.

The cost associated with this activity is identified as system growth expenditure of the Capital Expenditure Budget in Section 10 of this AMP.

Kawhia Generator

Kawhia feeder is the Company's longest rural feeder. It is supplied from Te Awamutu GXP having an arterial length of 81kms. It consists of two legs, Hauturu and Kawhia, each of which has effectively two voltage regulators in series. Should load growth increase by 3.0% per year normal 11kV reinforcement techniques will be inappropriate to maintain regulatory voltage on this long rural feeder.

An option considered in the study titled "Future Network Voltage(s)" dated 26 March 2002 for voltage support of Kawhia feeder in 2008 was to install a diesel generator in the vicinity of Kawhia town. However, the predicted load growth on Kawhia feeder has not eventuated to date. Currently, the load has reached a plateau.

The present indication is that Kawhia feeder will not become voltage constrained until at least 2025/2026. Kawhia is a holiday resort and the Company monitors feeder load and voltages over the Christmas and New Year summer period and Anniversary and Waitangi weekends to corroborate MD predictions. At present the winter Queens Birthday weekend peak is not as high as the summer holiday peak periods.

Based on current MD load growth predictions a "firm" 500kVA diesel generator may need to be commissioned on Kawhia feeder in 2024-2026. The actual load growth will be monitored and this prediction will be updated as necessary.

The cost associated with installing generation at Kawhia is identified as system growth expenditure of the Capital Expenditure Budget in Section 10 of this AMP.

Communications

<u>Voice Network</u>

The Company has opted for a progressive replacement of its older technology analogue voice radios with modern digital radios and equipment, and has installed analogue/digital capable repeater equipment for future proofing. Budget has been included for a progressive replacement of the analogue voice radios over the next three years, 2017/18 to 2019/20.

<u>Data Network</u>

A new repeater is required in 2017/18 to relieve congestion on existing repeaters and allow future automated open point switches to be rolled out. If landowner negotiations are favourable a new repeater will be installed in 2017/18.

The cost associated with the communication system is identified as system growth expenditure of the Capital Expenditure Budget in Section 10 of this AMP.

Asset Replacement and Renewal

One Pole Transformer and Substation Structure Replacement

Waipa had 2,662 (as at 31 March 2016) single pole transformer structures on the network. The visual asset condition survey is used to initiate maintenance or condition based replacement for this type of asset.

The Company's experience is that the service life of pole mounted transformers is generally well in excess of the ODV 45 standard life years. While minor remedial work is carried out when a defect is detected, the asset is only replaced when it fails in service. This excludes replacing transformers due to load growth and replacing transformers during major line alterations.

This is an on-going activity and a budget provision based on the number of annual failures has been made to replace 15 per year.

The cost associated with this activity is identified as asset replacement and renewal expenditure of the Capital Expenditure Budget in Section 10 of this AMP.

Disconnector (ABS) Switchgear Replacement

Waipa had 622 (as at 31 March 2016) air break switches in service on the distribution network. These air break switches are used to segment and isolate lines and provide inter-ties between feeders.

Previously these disconnectors were removed from service and refurbished. However, the Company prefers to replace them because their most common mode of failure is to "freeze up" through infrequent use or their contacts weld together when they pass fault current.

When a defective disconnector is identified a rigorous process is used to determine if the ABS disconnector is still required for network operations.

It is intended to replace deteriorated air break switches at the time the pole line is reconstructed or when they fail in service. This is an on-going activity and a budget provision has been made to replace 12 per year.

The cost associated with this project is identified as asset replacement and renewal expenditure of the Capital Expenditure Budget in Section 10 of this AMP.

Pad Mount Transformer Substation Structure Replacement

Waipa had 703 (as at 31 March 2016) pad mounted transformer substations on the network. The visual asset condition survey is used to initiate maintenance or condition based replacement for this type of asset.

The Company's experience is that the service life of pad mounted transformers is generally well in excess of the ODV 45 standard life years. While minor remedial work is carried out when a defect is detected, the asset is only replaced when it fails in service or defects related to its condition require replacement.

This is an on-going activity and a budget provision has been made to replace up to 7 per year.

The cost associated with this activity is identified as asset replacement and renewal expenditure of the Capital Expenditure Budget in Section 10 of this AMP.

Underground Overhead Line

This expenditure has been applied at locations on the network which have ageing overhead reticulation where it is cost effective and more appropriate (due to tree interference, carriageway constraints, high load route or unsatisfactory building clearances) to replace the overhead reticulation by installing underground cables.
Previous locations where overhead lines have been replaced by underground cables are;

- Wilson St Cambridge (undergrounded in 2010/2011)
- Albert Park Drive Te Awamutu (undergrounded in 2010/2011)
- Hall St Cambridge (undergrounded in 2011/2012)
- Milicich Place, Cambridge (undergrounded in 2013/14)
- Swayne Road, Cambridge from Taylor Street to Cambridge High School (undergrounded in 2016-17)
- Lamb St, Cambridge where green belt trees consistently caused out-of-zone tree faults on the line (undergrounded in 2016/17)

No further projects were identified for this expenditure in 2016/17. It is considered that the risk to quality of supply posed by multi-circuit overhead lines particularly in the urban areas of Te Awamutu are of greater concern than expenditure in this category, so Underground Overhead Line will be discontinued until the risk of multi-circuit lines has been adequately mitigated.

Te Awamutu Ripple Plant Coupling Cell Relocation to Cambridge

Waipa has retired the new 297Hz coupling cell at Te Awamutu. In 2015/16 a project is in progress to retune this coupling cell to 283Hz and reuse it at Cambridge GXP to replace the existing 283Hz coupling cell at Cambridge which is nearing its full capacity.

The recovered Cambridge 283Hz coupling cell will be reused if Ngutunui POS is established at some time in the future which is outside the 10 planning period of this AMP.

This project was completed within 2015/16.

Quality of Supply

Multi-circuit Single Mode Failure Risk Mitigation
In a number of locations on the network multiple feeder circuits have been erected on a single pole line. This has been driven by congested routes exiting the vicinity of GXPs and the desire to reduce cost. However, in a number of cases the feeders on a single pole line serve adjoining areas, restricting the ability to back feed significant network areas during planned maintenance or forced outages. The risk of being unable to supply a significant number of customers following a single car versus pole accident that takes out up to three feeders is real and concerning.

The Te Awamutu West, Pokuru and Kiokio Waikeria feeders are on a single pole line running from the Factory Rd/Racecourse Rd intersection up Tawhiao Street, College Street, Downes Street and Fairview Road to Puniu Road where the feeders disaggregate. Recent experience taking a planned outage overnight on this multi-circuit feeder to change a cracked pole illustrates how difficult it is to back feed all of the load with acceptable voltage even on a weekend overnight. Back feeding the Te Awamutu West feeder is not too difficult but the Pokuru and Kiokio Waikeria feeders cover large, adjoining rural areas and back feeding them following an unplanned outage on the multi-circuit section would involve significant loss of supply at peak times. To mitigate this risk the first sections of the Pokuru and Kiokio Waikeria feeders will be converted to cable (requiring thrusted cable installation due to the urban brownfields environment) and the multi-circuit overhead rationalised to a single overhead circuit serving the existing Te Awamutu West feeder. This project has been budgeted for 2017/18. The cost associated with this network development is identified as quality of supply expenditure of the Capital Expenditure Budget in Section 10 of this AMP.

The Paterangi, Pirongia and Kawhia feeders are on a single pole line along Factory Road, including a number of spans on the 110kV Hangatiki – Te Awamutu line. Maintenance on the 110kV line above these circuits in future will require all three feeders to be removed from service. A single car versus pole incident would require all circuits to be isolated. The three feeders serve adjoining, large rural areas and have limited back feed capacity from other feeders. The planned outage to install the circuits onto the 110kV poles in 2016 resulted in voltage problems, indicating that back feeding all customers for a fault or planned maintenance on the multi-circuit feeder section will not be possible in future. To mitigate this risk cables will be thrust along Factory Rd to appropriate points in the Alexandra St area to bypass the multi-circuit line for the Pirongia and Kawhia feeders, and the multi-circuit section rationalised to a single overhead circuit. This project has been budgeted for 2018/19. The cost associated with this network development is identified as quality of supply expenditure of the Capital Expenditure Budget in Section 10 of this AMP.

These two multi-circuit sections are considered the highest risk. Other multi-circuit feeder sections on the network will be evaluated in terms of the ability to back feed around a common-mode fault, and if justified, further projects will be scoped to manage the risk.

Install Remote Controlled Auto Reclosers

The installation of remote controlled 11kV auto reclosers will increase feeder segmentation which will reduce the number of consumers impacted by faults and enable quicker supply restoration thereby improving reliability performance.

Waipa's target of no more than 200-300 consumers or 15-20km of 11kV line between remote controlled 11kV auto reclosers has been completed within the 2015/16 programme to install additional NOJA pole mounted remote controlled 11kV auto reclosers.

The final configuration of the Kaipaki feeder will be assessed once the Racecourse Rd reconductoring is complete. It is possible that installing a recloser will be appropriate in the final feeder configuration, if so this will be budgeted for in 2018/19.

Install Recloser Bypass Disconnectors

Installation of new disconnectors, essential for recloser structures, was completed in 2015/16 with the completion of the recloser installation program.

Install Automated Open Point Switches

With the completion of the recloser programme, the next step in improving reliability through automated network devices is to increase the speed of sectionalising faults and restoring sections of the network through remote controlled open point switches. This programme will install modern enclosed and motorised load break switches equipped for remote control at feeder open points and logical points for fault sectionalising. The programme will be designed to target the highest SAIDI feeders, where greatest benefit of remote restoration will be obtained and fault staff attendance is delayed due to distance.

The annual expenditure of $420k previously allocated to recloser and bypass disconnectors has been allocated to automated open point switches. The programme has been estimated at 14 switches per annum for four years; initial analysis during 2016/17 found that circa 32 switches could be found with reasonable reliability benefit. The performance of the switches installed in the first two years of the programme will be assessed, and the overall programme revised in accordance with the findings.

The cost associated with installing automated open point switches is identified as quality of supply expenditure of the Capital Expenditure Budget in Section 10 of this AMP.

Install 11kV Dropout Isolation Fuses on Spurs & Services

Waipa's Cambridge and Te Awamutu pole lines were historically constructed with a minimum of isolation points installed between the main 11kV distribution lines and either 11kV distribution network spur lines or consumers' 11kV service mains.

As a consequence, when a fault occurs on an 11kV distribution network spur line or consumer 11kV service main all the distribution network up to the nearest protective isolation device is without power.

Continuing the installation of 11kV dropout fuse isolation points on network spurs and consumers' service mains will reduce the number of consumers impacted by phase to phase faults on these spur lines and provide easier disconnect points enabling quicker supply restoration to other consumers thereby improving reliability performance indices.

Approximately 35 additional two or three phase 11kV dropout isolation fuses will be installed on network feeder spurs and 35 additional two or three phase 11kV dropout isolation fuses will be installed on consumers' service mains each year to minimise the number of consumers affected by faults and improve fault isolation and restoration of supply times. This is an on-going activity and a budget provision has been made to install 70 per year.

The costs associated with installing dropout fuses are identified as quality of supply expenditure of the Capital Expenditure Budget in Section 10 of this AMP.

Waipa Feeder Reliability

Waipa has a semi-rural network with relatively high consumer density on rural feeders. As a result faults on rural feeders affect a larger numbers of consumers than other more typical rural and semi-rural networks. At the same time travel times to these faults can be longer than for urban networks.

Analysis has shown the average number of consumers affected by a fault on Waipa's network is substantially higher than for most other networks.

Waipa's objective is to continually improve the reliability performance of its network feeder assets to meet the Company's understanding of the growing expectations of consumers.

From 2006 the Company has exploited opportunities often created by customer driven works to split feeders at minimal cost to improve SAIDI minutes and reduce SAIFI. However, these opportunities are now diminishing as the majority of feasible splits have been completed.

Split Tamahere Feeder into Tamahere and Pencarrow Feeders

Tamahere is a long predominately rural feeder whose fault history is dominated by trees and tree borne wind debris interfering with the power lines. Whilst we have a vegetation management programme in place, tree interference before the feeder splits into two major legs continues to be disruptive to the entire feeder.

Tamahere is a predominantly life style area where customers are reluctant to have their trees trimmed beyond the minimum requirement. The existing Tamahere feeder is also predicted to be capacity constrained by 2026.

The available solution comprises installing another feeder from Cambridge GXP to split the existing Tamahere feeder into Tamahere and Pencarrow feeders.

By splitting the feeder into two feeders the resultant SAIDI from a tree incident on the front end is statistically halved and the predicted capacity constraint in 2026 will be removed.

To enable the feeder splitting Waipa installed 1.5km of 300mm^2 Aluminium 11kV 26 kA screened cable for the new "Hautapu Road leg" of Tamahere feeder in a swale drain in the newly formed Cambridge Bypass corridor from Swayne Rd to Victoria Rd.

The remaining portion of Tamahere feeder will become the new Pencarrow feeder.

The splitting of Tamahere feeder into Tamahere and Pencarrow feeders was completed during 2016/17.

Split Kaipaki Feeder into Kaipaki and Monavale Feeders

Kaipaki is a long predominately rural feeder whose fault history is dominated by third party vehicle versus pole accidents occurring before the feeder splits into two major legs so that power is disrupted to the entire feeder.

The available solution comprises installing another feeder from Cambridge GXP to split the existing Kaipaki feeder into new Kaipaki and Monavale feeders.

By splitting the feeder into two feeders the resultant SAIDI from a vehicle accident on the front end is statistically halved.

To enable the feeder splitting Waipa installed 2km of 300mm^2 Aluminium 11kV 26 kA screened cable for the new "Racecourse Rd leg" of the new Kaipaki feeder in a swale drain in the newly formed Cambridge Bypass corridor from Swayne Rd to Hannon Rd.

The remaining portion of Kaipaki feeder along the "Cambridge – Te Awamutu Rd leg" will become the new Monavale feeder.

The Monavale feeder will also be inter-tied to Leamington feeder through an existing gas switch, thereby increasing the security of Leamington feeder.

The splitting of Kaipaki feeder into new Kaipaki and Monavale feeders was completed during 2016/17.

St Kilda Feeder to Offload Roto-O-Rangi and French Pass

The St Kilda feeder will be under-utilised in terms of capacity and ICPs once the reticulation of the subdivision is complete, with only the residential area, the small commercial zone and the Bupa retirement village being served by this feeder. Options were evaluated to make more use of this feeder. Other objectives include off-loading the Roto-O-Rangi feeder to free up capacity for the future residential zone C5 to the east of Leamington, to have more capacity available for back feed into the highly loaded Leamington feeder, and take some ICPs off the French Pass feeder, which has a high number of ICPs and suffers from high SAIDI.

The selected option is to extend the St Kilda feeder south down St Kilda Road, across Thornton Road and follow the Waikato Expressway southeast to the Tirau Road interchange. To prevent rural faults impinging on the reliability of the urban St Kilda subdivision, recloser 595 would be relocated to the end of the new cable to segregate the cable network from the rural overhead network. This would allow a section of the Roto-O-Rangi feeder beyond T20691 to be transferred to the St Kilda feeder. ABS 813 would be closed and recloser 568 would be opened, transferring the most remote section of the French Pass feeder to the extended St Kilda feeder. This will improve reliability for this formerly French Pass feeder section.

Investigation of the feasibility of the route and obtaining approval from NZTA to run the feeder cable in the Waikato Expressway corridor is required. This project has been budgeted for 2018/19. The cost associated with this network development is identified as quality of supply expenditure of the Capital Expenditure Budget in Section 10 of this AMP.

Legislative and Regulatory

Waipa has not identified any capital expenditure on assets required to address any new legislator or legal requirements.

Other Reliability, Safety & Environment

Waipa Asset Safety & Environment

In reviewing the impact of existing distribution assets on safety and the environment and the requirements of the Electricity (Safety) Regulations 2010, the Public Safety Management System based on NZS 7901:2008 and the Electricity (Hazard from Trees) Regulations 2003 the Company had identified 3 major asset types that presented a significant public safety hazard.

These were oil-filled ring main units, non-compliant transformer substation enclosures and two pole transformer substation structures.

The last oil filled ring main unit was removed from service in 2014/15.
The last non-compliant transformer enclosure was removed from service in 2014/15.

Two Pole Transformer Substation Replacements

Waipa had 57 (as at 31 March 2016) two pole hardwood platform transformer structures that are over 40 years old. While the hardwood platforms have been maintained as required over the years these assets are approaching the end of their economic life.

Furthermore, this type of substation structure no longer conforms to modern industry standards and present an operating and maintenance risk for staff and contractors.

All of these two pole transformer structures will be replaced on a condition prioritised basis by either a single pole transformer substation or a pad mounted substation for staff and public safety in a programme to be complete by 2018/19. A recent review identified two installations that because of their location posed a higher risk to the public, one next to the primary school in Pukeatua and one next to a sports facility and children's playground in Pirongia. Both were scheduled for priority replacement and are now completed.

The cost associated with this activity is identified as other reliability, safety & environment expenditure of the Capital Expenditure Budget in Section 10 of this AMP.

Cambridge Ripple Plant Building Seismic Strengthening

In 2014/15 Waipa commissioned a structural engineer to report on the seismic adequacy of our Ripple Plant Building located on a Transpower GXP site in Watkins Road Cambridge.

The structural engineer concluded that the building could be brought up to modern earthquake standards by installing external columns to brace the existing block wall structure.

The seismic strengthening of the existing Ripple Plant building at Transpower's Watkins Road GXP was completed in 2015/16.

Cambridge High Load Route Undergrounding
A project to finish undergrounding all road crossing spans on the Cambridge Rd high load route is planned for 2017/18. This will remove the requirement for fault staff to isolate overhead spans and escort high loads through the network and make the passage of high loads easier and safer.

The cost associated with this activity is identified as other reliability, safety & environment expenditure of the Capital Expenditure Budget in Section 10 of this AMP.

Relocation

Additional Switches at Cambridge GXP

Transpower commissioned a new 11kV switchboard at Cambridge GXP in December 2013 after the existing switchboard busbars failed on 19 April 2013. The opportunity was taken because of the cost effectiveness to add four new feeder switches on this switchboard for Waipa's future use.

All of the additional switches are now in service. One switch supplies St Kilda feeder and provides power to a new subdivision development. Eventually, this feeder will be interconnected to the French Pass feeder to improve security for French Pass.

The second switch provides a direct supply to the existing ripple plant for improved operational safety. The ripple plant was previously supplied from Cambridge Town feeder via a RMU with constrained capacitive switching rating which presents a safety hazard. The feasibility of providing an inter-tie to a feeder on the adjoining bus bar for n-1 switched security of supply to the ripple plant in the event of a GXP bus bar failure is being investigated.

The third switch has allowed the new Pencarrow feeder to be installed, enabling the Tamahere feeder to be split for improved reliability and security,

The fourth switch has allowed the new Monavale feeder to be installed, enabling the Kaipaki feeder to be split for improved reliability and security and additional security for Leamington feeder,

Payment for the four additional switches is made through a Transpower CIC which does not contribute to any capital expenditure on network assets.

Non-Network Assets

Capital expenditure on Non-networks assets category covers: IT systems, asset management systems, office buildings, depots and workshops, office furniture and equipment, motor vehicles, tools, plant and machinery, and other items treated as non-system fixed assets under GAAP.

A provision has been made reflecting current levels of capital expenditure on non-network assets.

7 Life Cycle Asset Management Planning

Whilst standard asset lives prescribed in the fourth edition Handbook for Optimised Deprival Valuation of System Fixed Assets of Electricity Lines Businesses March 2004 (ODV) range between 15 years for SCADA systems and 70 years for PILC cable, Waipa's experience is that in most cases a specific asset's "fitness for purpose" is reviewed several times during the course of its life.

Generally asset enhancement or replacement is driven by increased load demand, the need to deliver electricity within statutory voltage limits, physical deterioration, or the discovery of a significant staff, contractor or public safety hazard.

Waipa prioritises network maintenance works by assessing the adverse impact of the respective network assets on:

Adverse Asset Impact	Priority Level*
Staff, Contractor or Public Safety	First Priority
Reliability	Second Priority
Fitness for Purpose	Third Priority

***Where finite Company and contracted resources constrain the completion of multiple projects.*

7.1 Maintenance Planning Criteria and Assumptions

Waipa manages its distribution assets through their various lifecycles to ensure the network:

- will not present a significant safety hazard,
- will be "fit for purpose" during the next 10 year planning period,
- will deliver voltage within statutory limits,
- will meet the security levels as determined by the Company in consultation with the shareholder and consumers,
- are maintained in accordance with the Company's investment and maintenance policies,
- will continually improve on targets for SAIDI and SAIFI, and
- are operated in a safe and prudent manner.

The Company will ensure that its staff, contractors and the public are safe from "step and touch" potential rise by complying with earthing standards.

Waipa will continue to drive distribution network maintenance from asset condition surveys and by the eliminating or mitigating the causes of faults and hazards.

The Company's main non-asset solutions to improve network SAIDI and SAIFI reliability performance are to:

- continue to use live-line techniques and
- encourage tree owners to manage vegetation menacing power lines.

7.2 Routine and Corrective Maintenance Policies and Procedures

Maintenance programmes are driven by the Waipa's objective to provide a safe and reliable supply.

Identifying and completing preventative maintenance works on the network will also preserve the value of the Company's distribution lines.

Waipa will continue to maintain its 11kV and 400V distribution feeders, voltage regulators, line auto reclosers, SF_6 ring main units, disconnectors, distribution transformers and substation structures in accordance with the maintenance planning criteria and assumptions set out in section 7.1.

Asset Condition Surveys

Waipa has adopted the asset condition approach to prioritise routine and corrective maintenance expenditure.

Visual Survey

An independent contractor completed a visual survey of Waipa's pole line assets in January 2006. The assessment of network pole lines included:

- adequacy of pole structure,
- condition of transformers, cross arms and all line hardware,
- conductor tension, sagging and attachments,
- regulatory clearances, and
- menacing vegetation.

The external condition of 11kV and 400V distribution lines, transformers, voltage regulators, line auto reclosers and sectionalisers, disconnectors, 11kV dropout fuses, 400V fuse links, lightning arrestors and cable terminations has also been assessed.

This information was used by the Company to prioritise maintenance works to ensure:

- safety of staff, contractors, the public, live stock and property,
- regulatory requirements are maintained, and
- network supplying important consumers are ranked accordingly.

Waipa has monitored the causes of system faults over recent years and has found that very few identified asset defects have caused unplanned outages. Asset defects which have caused faults have generally been unidentifiable by survey, such as insulator or surge arrestor failures.

The Company commenced the second visual asset condition survey in 2010/2011 using internal resources. The second survey is expected to take 8 years to complete and feeders will be surveyed in the same order as the first survey. The programme is based on an even spread of kilometres of line being surveyed each year.

Preventative maintenance work packages and capital asset replacement work packages are developed by the surveyor to address equipment found to be defective or in poor condition and assessed as likely to fail within a five year period.

Appendix C shows the proposed Visual Asset Condition Survey Programme.

The costs associated with these activities are identified as routine and corrective maintenance and inspection expenditure in the Operational Expenditure Budget, and, asset replacement and renewal expenditure in the Operational and Capital Expenditure Budgets in Section 10 of this AMP.

Waipa gains further asset condition information from;

- Asset thermal surveys,
- Partial discharge surveys,
- Corona discharge surveys,
- A vegetation management programme,
- An earth testing and repair programme, and
- Planned maintenance programmes for ground mounted transformers, ring main units, reclosers, remote controlled load break switches and voltage regulators.

Thermal Surveys

Waipa will continue to engage an external service provider to carry out an annual thermal survey at times of high load of arterial feeder disconnectors, lines, transformers, dropout fuses, cable pothead terminations and line connections. Thermal “hot spots” are treated as urgent and are repaired as soon as possible.

The cost associated with this activity is identified as system management & operations expenditure in the Operational Expenditure Budget in Section 10 of this AMP.

Partial Discharge Surveys

In 2005/2006 Waipa engaged an external service provider to carry out partial discharge surveys of all RMU equipment after two RMU units failed in service. The survey revealed that a number of RMUs had varying degrees of partial discharge originating from heat shrink cable terminations.
All switchgear partial discharge defects were treated as urgent and were repaired soon after.

The survey led to Magnefix, Andelect and ABB Series 1 RMUs being replaced as the safe and most cost effective solution as these RMUs were no longer supported by their manufacturers.

No further partial discharge surveys are contemplated in this AMP. This does not preclude future partial discharge surveys as the need arises.

Corona Discharge

In 2005/2006 Waipa engaged an external service provider to carry out a corona survey by helicopter of Kawhia feeder which was plagued by persistent unidentified faults. This resulted in 33 contaminated polymer resin strain insulators being replaced. There has been no recurrence of the problem on Kawhia feeder or any other feeder to date.

No further corona surveys are contemplated in this AMP. This does not exclude future corona surveys as the need arises.

Planned Maintenance Programme

Planned maintenance programmes have been defined for more complex equipment requiring more frequent checks to commence from 2017/18 for the following equipment:

- Ground mounted transformers; three yearly inspections to ensure transformers are secure, read the maximum demand indicators and to identify defects.
- Ring main units; three yearly inspections to ensure RMUs are secure and to identify defects.
- Reclosers and remove controlled Load Break Switches; annual inspections to control pests (as necessary) in control boxes, identify defects, check batteries and test RTU and communications.
- Voltage regulators; annual inspections to control pests (as necessary) in control boxes, identify defects, check batteries and test RTU and communications.

Earthing Testing and Repair

Waipa will ensure that all its system earthing and bonding comply with AS/NZS 3000:2007 earthing standards and NZECP 35 New Zealand Electrical Code of Practice for Power System Earthing to ensure that Company personnel, contractors and the public are safe from “step and touch” potential rise.

The earth testing and repair programme is based on an even spread of earth banks requiring testing each year. The programme results in each system earth being checked every 8 years.

The Company has experienced a growing number of copper earth thefts consistent with recent industry trends. Stolen copper earths are replaced immediately once they are discovered. Waipa is investigating alternative materials for earthing that will have a lower scrap value.

In 2011/2012 Waipa began installing Copper Clad Steel Conductor on new sites in vulnerable areas and replacing stolen copper earths with Copper Clad Steel Conductor.

The cost of installing Copper Clad Steel Conductor earths is comparable with pure copper earths, but has significantly lower scrap value. Freshly cut Copper Clad Steel Conductor is visually similar to pure copper conductor and is likely to be identifiable by scrap metal dealers only, which it is hoped will act as a deterrent to thieves.

Appendix E shows the proposed Earth Testing and Repair Programme.

The cost associated with this activity is identified as routine and corrective maintenance and inspection expenditure in the Operational Expenditure Budget in Section 10 of this AMP.

7.3 Asset Replacement and Renewal Policies and Procedures

Waipa has established the following policies for asset replacement and renewal in accordance with the maintenance planning criteria and assumptions set out in section 7.1.

Acquisition of New Assets

Equipment will be purchased on the basis of its potential impact on public safety and its life-cycle costs including the capitalisation of electricity losses.

Conductor upgrading to reduce distribution losses will be based on an individual feeder cost/benefit analysis over 30 years (half of ODV specified life).

Waipa generally acquires all assets through a competitive tender process. Suppliers’ offers are assessed on asset functionality, technical attributes, safety compliance, delivery times, product support and product price.

The purchase of “one off” or “orphan” assets is avoided where possible.

Adoption of New Technology

Waipa will employ new technology once it has become proven and provides an economic solution to a distribution problem or will improve the reliability of the distribution system.

New technology will be employed where it can economically increase productivity, improve safety or demonstrate other tangible benefits.

Disposal of Existing Assets

Waipa disposes of old assets in compliance with all environmental requirements.

Critical Spares and Surplus Assets

Waipa has established an inventory of critical distribution system spares. The inventory comprises stock with long delivery lead times, stock no longer manufactured and minimum level of stock required to re-establish supply. No significant assets were found to be redundant as part of the March 2004 ODV process, subsequent reviews or March 2011 stock take.

Redeployment and Upgrade of Existing Assets

Pole Line Hardware Policy

Waipa will continue its policy of not reinstalling recovered pole line hardware on the network. The Company's experience has been that reused cross arms pin and strain insulators and disconnectors fail within a relatively short period of time compared to the 60 years useful life of a concrete pole line.

Concrete Pole Policy

Waipa will continue installing only pre-stressed concrete poles on the network unless site access is extremely difficult and installation costs are considered excessive. The Company's 11kV and 400V feeders are predominately concrete pole lines.

Steel Cross Arms Policy

Waipa has adopted a policy to install only hot dipped galvanised steel cross arms on the network. As the only remaining organic pole line hardware, wooden cross arms were providing a "weak link" requiring replacement after just a portion of the useful life of a concrete pole line. It was observed that hot dipped galvanised steel cross arms on neighbouring networks had lasted well, with no signs of rust. Waipa considers hot dipped galvanised steel cross arms to be "tried and proven" technology.

Pole Line Reconstruction

Waipa intends to reconstruct sections of 11kV and 400V pole lines identified by visual survey as being not fit for purpose and expected to potentially fail before the next survey.

The cost associated with this activity is identified as either asset replacement and renewal expenditure in the Operational Expenditure Budget or asset replacement and renewal expenditure in the Capital Expenditure Budget in Section 10 of this AMP depending on the extent of work required.

Wooden Pole Replacement

Waipa intends to replace deteriorating hardwood and larch poles identified by the visual surveys as being not fit for purpose and expected to potentially fail before the next scheduled survey, preferably with concrete poles if access permits.

The cost associated with this activity is identified as asset replacement and renewal expenditure in the Operational Expenditure Budget in Section 10 of this AMP.

Cross Arm Replacement

Waipa intends to replace defective wooden cross arms and pole hardware identified by the visual surveys as being not fit for purpose and expected to fail before the next scheduled survey.

The cost associated with this activity is identified as asset replacement and renewal expenditure in the Operational Expenditure Budget in Section 10 of this AMP.

Auto Reclosers & Sectionalisers

Noja Auto Reclosers

Because auto reclosers have a significant impact on network operations they will be inspected for external corrosion and damage every year in addition to the asset condition survey of pole lines.

Repairs on existing Noja installations will be completed in a timely manner after deterioration is detected. Routine maintenance will be conducted in accordance with the manufacturer's recommendations and wear indication.

The cost associated with this activity is identified as asset replacement and renewal expenditure in the Operational Expenditure Budget in Section 10 of this AMP.

Ring Main Units

Waipa installs only SF_6 switchgear currently. The company expects that these RMUs will not require major maintenance over their useful lives. Waipa will install vacuum RMUs or solid dielectric RMUs if cost effective in the future.

"Solid insulated" vacuum Ring Main Units are becoming more readily available in New Zealand. However, their prices are not currently competitive. Waipa has installed a trial Halo Ring Main Unit in 2015/16 and this unit will be evaluated according to its on-going performance.

The cost associated with this activity is identified as asset replacement and renewal expenditure in the Operational Expenditure Budget in Section 10 of this AMP.

Disconnectors

The most common mode of failure for air break switch disconnectors is to "freeze up" through infrequent use or their contacts weld together when they pass fault current.

The Company intends to replace defective air break switches when they fail in service or at the time the pole line is reconstructed. If they can be refurbished economically they are redeployed in areas of the network with a lower fault rating.

Waipa has successfully trialled G&W SF_6 disconnectors on the network over the past 6 years. A recent cost review identified the Entec Ecoswitch with vacuum load break interrupters and solid resin insulation as being more cost effective than the SF_6 type. These types of disconnectors will be installed in place of air break switches in future, since the incremental capital cost is not large and enclosed load break switches are expected to be more reliable and have longer life with less maintenance costs.

The cost associated with this activity is identified as asset replacement and renewal expenditure of the Capital Expenditure Budget or asset replacement & renewal expenditure of the Operational Expenditure Budget in Section 10 of this AMP depending on the extent of the works.

Transformers

Ground mounted transformers will be routinely inspected at three yearly intervals to ensure they are safe, secure and free of defects. Pole mounted transformer will not be routinely inspected, however, their external condition is assessed at the time of the visual asset condition survey. Subsequent repair and maintenance will be undertaken in a timely manner.

The pad mount transformers in urban areas are subject to vandalism. The Company will repair vandalism and remove graffiti as required.

The costs associated with these activities are identified as asset replacement & renewal expenditure of the Operational Expenditure Budget in Section 10 of this AMP.

Voltage Regulators

Waipa does not have 66kV, 33kV sub-transmission lines or zone substations. To maintain regulatory 11kV voltage on its feeders Waipa has a significant number of voltage regulator units in service on the distribution network.

Because of their significant impact on network operations if they malfunction voltage regulators will be inspected for external corrosion and damage and SCADA and communications will be inspected every year in addition to the asset condition survey of pole lines.

Repairs on existing voltage regulator installations will be completed in a timely manner after deterioration is detected. Routine maintenance will be conducted in accordance with the manufacturer's recommendations and operations counter. Voltage regulator refurbishments have not been keeping pace with the number of tap change operations units have been completing and a backlog has built up. The cost budgeted for refurbishments have been increased for the five year period commencing 2016/17 to clear the backlog.

The cost associated with this activity is identified as asset replacement and renewal expenditure in the Operational Expenditure Budget in Section 10 of this AMP.

Ripple Injection Plant and Relays

Waipa completed the Te Awamutu ripple relay change out program during 2015/16. All the 297Hz relays have been removed and replaced with 283Hz ripple relays. The Company has retuned the Te Awamutu 297Hhz coupling cell to 283Hz and has installed this coupling cell to replace the existing Cambridge coupling cell which is slightly overloaded. The replaced Cambridge ripple plant coupling cell will be put into storage and used at the future Ngutunui point of supply if required.

Waipa owns all the ripple relays installed at ICPs on the network. In compliance with the Electricity Participation Code 2010 a provision has been made for the 10 year inspection and recertification of Cambridge ripple relays. A similar provision has also been made for the inspection and recertification of Te Awamutu ripple relays commencing in 2022/23.

The cost associated with this activity is identified as routine and corrective maintenance expenditure in the Operational Expenditure Budget in Section 10 of this AMP.

7.4 Service Interruptions and Emergencies Policy and Procedures

Waipa has established the following policies and procedures for providing continual line services and dealing with emergencies in accordance with the maintenance planning criteria and assumptions set out in section 7.1.

24/7 Fault Response Service

Waipa will continue to provide a 24/7 service to attend to:

- all distribution line and equipment faults,
- service main faults (if customer accepts cost of repairs),
- all water heating relay faults,
- faults caused by third party interference and wildlife,
- faults caused by lightning, adverse weather and adverse environment, and
- faults caused by trees.

The cost associated with this activity is identified as service interruption and emergencies expenditure of the Operational Expenditure Budget in Section 10 of this AMP.

Oil Leak Containment

All pad mounted transformers with capacity in excess of 750kVA will be constructed with bunding for oil containment as required by the Resource Management Act 1991.

Waipa's fault crews carry emergency oil containment and clean up kits. Larger kits and replacement materials are located at Waipa's Te Awamutu depot and at Transpower's Cambridge GXP and are available 24 hours per day.

The cost associated with this activity is identified as service interruption and emergencies expenditure of the Operational Expenditure Budget in Section 10 of this AMP.

Buildings, Fences and Grounds

Waipa owns buildings and grounds in or on which a variety of distribution network assets are installed. These buildings and grounds will be kept secure from inadvertent public entry, safe for Waipa's staff and contractors and neat and tidy as an expression of our good citizenship. Repair and maintenance work will be undertaken as required.

The cost associated with this activity is identified as service interruption and emergencies expenditure of the Operational Expenditure Budget in Section 10 of this AMP.

7.5 Vegetation Management Policy and Procedures

Waipa has established the following policies and procedures for vegetation management in accordance with the maintenance planning criteria and assumptions set out in section 7.1.

The Company has had an active vegetation management programme in place since 2001 whereby an entire feeder is surveyed and all trees menacing the distribution lines are either removed or trimmed depending on consultation with their owner.

Waipa established an internal vegetation management crew in 2007 to bring an added focus on clearing vegetation from its 11kV pole lines.

The Company offers tree owners an initial free cut/trim but insist that any tree contractor engaged by the tree owner is approved by Waipa Networks to ensure appropriate safety competency when working in proximity to the network.

Waipa's experience is that the new Electricity (Hazard from Trees) Regulations 2003 has resulted in the Company incurring additional compliance costs and the maintenance budget reflects the increase in cost. The clearing of trees menacing service mains remains the responsibility of the tree owner. The Company offers free temporary disconnection of a service main for the tree owner to clear the vegetation safely.

Waipa will either remove or attempt to trim trees so that they will not grow back into the Notice Zone (2.6m) between surveys. Tree "hot-spots" are dealt with as required.

Up until 2016/17 the vegetation programme was based on even spread of kilometres of line being surveyed and historical incidents of tree interference each year. The programme results in each feeder being systematically cleared either every 4, 6 or 8 years depending on growth rates and tree species on specific feeders. However, indications from the amount of reactive tree trimming required outside of the programme and reliability issues caused by tree faults are that the vegetation management expenditure is not sufficient for the high tree growth rates experienced. As a result, the annual expenditure on vegetation management has been increased from $500k to $1,000k (AMP dollars) from 2016/17, to be resourced by an expansion of Waipa's internal vegetation management team, augmented by contractors where required. At this level of expenditure, a four year rotational trimming programme is planned and is expected to reduce the volume of reactive trimming required over time.

Appendix E shows the proposed Vegetation Management Programme.

The cost associated with this activity is identified as vegetation management expenditure in the Operational Expenditure Budget in Section 10 of this AMP.

8 Risk Management

8.1 Disaster Risk Management Assessment

Waipa is an active participant in the Waikato Lifeline Utilities Group and through consultation with other members of the group the Company has assessed the potential physical threats to its network assets posed by naturally occurring hazards of wind, lightning, floods, land erosion, earthquakes, volcanic eruptions, geothermal activity and adverse weather. The methods used to assess the risk of each natural hazard are listed in their respective sections.

Wind

Waipa's reticulation is in an area of New Zealand that has one of the lowest recorded average wind speeds. However, there are seasonal storms with winds that blow debris into the 11kV pole lines from time to time. Because of this trees tend to be weak and easily damaged by stronger winds. The Company's vegetation management programme is intended to reduce the number of the incidents caused by wind-blown vegetation. The Company concludes that wind presents a minimal threat to network assets and that any damage caused by wind borne debris is easily fixed.

Lightning

Waipa's reticulation assets are regularly subjected to lightning strike. The majority of network assets affected by lightning are rural 11kV pole lines on which normal 11kV lightning protection devices are used to localise and minimise lightning damage. The Company considers lightning is not a major threat to the network.

Floods and Land Erosion

Waipa's reticulation area is subjected to frequent and often heavy rainfalls. There are numerous streams and rivers whose flow-paths change over time. The effect of such erosion on network assets is minimal affecting only one or two poles at any time which are relatively easy to reinstate. The Company is a member of the Waikato Lifeline Utilities Group and through participating in the group's risk assessment exercise considers floods and land erosion are not major threats to the network.

Earthquakes

Transpower have assessed the probability and consequences of earthquakes damaging their assets for all areas in New Zealand. Transpower have defined three seismic risk zones: Zone A (high risk), Zone B (medium risk) and Zone C (low risk).

Transpower have developed the following range of seismic risk factors that reflect the financial loading on construction works that will ensure the integrity of their equipment:

- the seismic risk factor for Zone C (low risk) is 1.00,
- the seismic risk factor range for Zone B (medium risk) is 1.01 to 1.06 and
- the seismic risk factor range for Zone A (high risk) is 1.02 to 1.14, depending on the equipment type.

Waipa's distribution networks are located entirely within a Zone B (medium risk) area. The Company's network assets are predominantly long rural 11kV pole lines. Waipa considers these assets fall into the category defined by Transpower as "Other Plant" and as such have a seismic risk factor of 1.01.

The Company considers this is an acceptable risk to manage because rural 11kV pole lines are relatively easy and an inexpensive network asset to repair if damaged by an earthquake. Based on the experience of Orion in the Christchurch earthquakes, in a severe earthquake cable assets are likely to be extensively damaged, requiring a lot of time and effort to repair, and increased failures and reduced useful life thereafter.

In 2014/15 Waipa engaged a structural engineer to assess the seismic adequacy of the Company's ripple plant building located at Transpower GXP site in Watkins Road Cambridge. The structural engineer recommended that the building's block walls should be strengthened by external pillars to make it comply with current seismic standards. Strengthening works to the building were completed in 2015/16.

Volcanic Eruption

There are no known active volcanoes in Waipa distribution area. The Mount Ruapehu eruption in 1995 had no adverse impact on the Company assets. If volcanic ash had been deposited over the rural 11kV pole lines then the Company would have continued to operate the distribution networks until there was clear evidence of insulation failure. A shortage of water to wash insulators from an ash fall is an expected risk, given that many parties will be attempting to wash plant and equipment at the same time.

Tsunami

The risk of network inundation from a tsunami event effecting the West Coast has been assessed, from the West Coast Tsunami Risk Study commissioned by Waikato District Council and WEL Networks.

The water level rise at the Aotea Harbour mouth resulting from the worst case event is generated from an earthquake on the Puyseger Trench to the south and west of the South Island. The sea level rise at the heads of Aotea Harbour is a maximum of 2.5m, but it is attenuated to around 1.5m at the Aotea settlement. To gauge the risk to Waipa Networks equipment, the elevation of supply areas was checked using an online mapping application. Areas along Lawton Drive in Aotea are between 2m and 3m of sea level, so inundation shouldn't result even if the tsunami occurred at high tide, unless the event is larger than modelled. The network along Lawton Drive is overhead with pole mounted transformers and mostly overhead service main entry, so the likelihood of network issues if inundation occurred is unlikely. The water level rise is expected to be similar to a fast rising tide not a "wall of water" so damage and erosion from the inrush of water is not expected.

Other tsunami events from the New Hebrides and Tonga-Kermadec trenches would produce a water level rise of 1 to 1.5m outside the harbour and 0.5m or less inside the harbour, so these are not expected to pose any risk to the network.

The West Coast tsunami risk study did not cover the Kawhia Harbour, but it could be reasonable assumed that the water level rise at the Kawhia Harbour heads would be similar to the 2.5m rise at Aotea for the Puyseger Trench event. The study author Jose Borrero commented that the maximum water level rise in Kawhia Harbour would be 2m, and could be less. In that case, there is a risk to network supplying Kaora St, Omimiti St and Motutara St on the Kawhia settlement waterfront. In these areas there are some pad mounted transformers and the LV reticulation is underground with pillar connections for consumers. Hence some flooding of pillars and pad mounted transformers may cause some supply disruption, requiring isolation until the event is over, then inspection and possibly cleaning or repair before relivening. There are also some low lying areas on Kawhia Road and Kawhia Harbour Road that experience water level rise, depending on how much the water level rise is attenuated by the harbour mouth. However, the network in these areas is overhead distribution, so no supply issues are expected.

In terms of access for fault staff and repair crews, a number of road sections around Kawhia Harbour and Aotea Harbour are low lying and could be affected with rising water levels washing across the road. Depending on depth, this may delay access but damage to the road surface is not anticipated.

The impact on the network if this event was to occur is considered to be relatively minor, only a small number of connected customers on these waterfronts would be affected and it isn't clear if the water level rise will reach the network assets. When the likelihood of the tsunami event is also factored in (the return period for the Puyseger event cannot be determined but is considered very unlikely), the risk posed by tsunami to the Waipa network is not considered to be significant.

Geothermal

There is no significant geothermal activity in Waipa's reticulation area other than a hot water beach at Kawhia. Therefore, there is no corrosive atmosphere to contaminate the overhead lines or hot ground, gases or liquids constraining cable ratings or corrosive liquids damaging cable insulation and conductors. The Company concludes that there is minimal risk to the network from geothermal activity.

8.2 Details of Emergency Response and Contingency Plans

Network Operation

Waipa operates two relatively simple interconnected radial 11kV, predominately pole line, distribution systems extending out from Transpower's Cambridge and Te Awamutu GXPs.

Under normal conditions network operations are initiated through a control room and work is dispatched through a call centre. System switch status is recorded on a single line computer mimic diagram.

Under extraordinary conditions the Company expects the control room and call centre functions may be disrupted. During these emergencies network operations and fault dispatch functions will need to be performed by Waipa's own administrative staff and field crews.

In circumstances where the Company's SCADA, financial and business computer systems also fail, Waipa is confident that there is sufficient network information held in printed form for the Company's Fault Staff and Field Supervisors to isolate, repair and operate the networks safely. During these emergencies Waipa expects normal telephone services will be disrupted and direct communications with consumers will be reduced due to the abnormal nature of the operation.

Waipa operates its own independent radio telephone system. Should one or more repeaters fail the system is capable of short range point–to-point communications which will continue to function.

Power restoration will be inherently slow under these circumstances. The majority of repairs required on the networks would be identified by physically patrolling the pole line feeders.

The Company is a participant in the Waikato Lifelines Utilities Group and the Hamilton City Council Emergency Management Group and expects that Civil Defence in conjunction with other utility owners and local authorities will prioritise Installation Control Points for power restoration.

Emergency Response Capability

Waipa has not experienced storms of significance since Cyclone Drena 1997 and the "weather bomb" of June 2002. During both these events the Company contracted external resources to help repair the network. Since that time Waipa has built up its internal field crews and successfully reinstated the network during the February 2004 and April 2011 storms. The Company has also formed a liaison with three other local Electricity Distribution Businesses and one contractor to make use of their field resources if required.

The Company carries sufficient spares in its store to construct several kilometres of pole line and is confident that it can assemble sufficient internal and external resources to repair and continue to operate its network in emergency situations.

Security of Supply Participant Rolling Outage Plan

Waipa has prepared a Security of Supply Participant Rolling Outage Plan in accordance with the Grid System Operator requirements.
The Security of Supply Participant Rolling Outage Plan is publicly available on the Company's internet web site.

Busbar Failure Contingency Plans

Te Awamutu

In January 2010, Waipa experienced an outage caused by a busbar fault at Transpower's Te Awamutu GXP simultaneously occurring while maintenance was being carried out on one of the GXP's transformers. This outage affected half of the Te Awamutu feeders.

Power was restored by emergency switching, with the network being placed at risk of damage or overloading by operators needing to make "on the spot" decisions during such a large switching operation.

The Company has developed detailed switching plans for any section of busbar at Te Awamutu GXP, should there be a similar busbar event in future. The Te Awamutu busbar contingency plans are internally available and form part of Waipa's Business Contingency Plan.

Cambridge

The Company has developed a detailed contingency switching plan for either section of busbar of the newly commissioned 11kV switchgear at Cambridge. This busbar contingency plan will be modified to include the two new Pencarrow and Monavale feeders.

Business Systems Contingency

Waipa runs its financial and business systems (NCS Integrated Data Warehouse) on one server and runs its Windows based programs including AutoCAD (Geographic Asset Information) on another server which are located at the Company's depot at 240 Harrison Drive Te Awamutu.

The Company holds sufficient spare IT hardware to reinstate financial and business systems and Windows based programs including AutoCAD in the event of a catastrophic event.

The financial and business systems and geographic asset information data is copied across from administration servers onto backup servers each day. A daily backup tape of financial and business information and Windows based AutoCAD information is held off site. The Company can recreate the information databases and business functionality after a catastrophic event.

Instructions for staff members to reinstate Waipa's computer systems are held in a fireproof cabinet in the Company's Te Awamutu depot.

Should Waipa's Te Awamutu depot be uninhabitable the Company's business systems can be recreated at Plan B's (an external service provider) premises in Hamilton.

Supervisory Control and Data Acquisition System Contingency

Waipa's SCADA system comprises a master station and a "hot standby" backup station located in the Company's Waipa's control room located at 240 Harrison Drive Te Awamutu and two remote operating terminals located in WEL Networks Control Centre at 114 Maui Street, Te Rapa, Hamilton.

The SCADA network configuration and operating schematics are copied across onto the Company's administration servers and back up servers each day. A daily backup tape of SCADA network configuration and operating schematics information is held off site.

The SCADA configuration is copied across onto the backup servers each day. A daily back up tape of the SCADA configuration is held off site. Waipa can recreate the SCADA network configuration and operating schematics after a catastrophic event.

The Company can purchase all component parts for the SCADA system from its SCADA supplier located in Wellington. Waipa moved into new premises several years ago and has demonstrated it can assemble and re-commission the master station, the "hot standby" backup station and communications hub equipment within 5 working days.

Should Waipa's Te Awamutu depot be uninhabitable the Company's SCADA systems can be recreated at WEL Network Control Centre at 114 Maui Street, Te Rapa, Hamilton or any other temporary location within a similar period of time.

9.0 Evaluation of Performance

9.1 Financial and Physical Progress

Physical Progress Network Development

The following network enhancements, replacements and refurbishments proposed in AMP 2015 to be completed during 2015/16 were completed:

- The Hangatiki – Te Awamutu 110kV line was constructed and commissioned in July 2016.
- The installation of the final 12 additional remote controlled 11kV auto reclosers to further segment 11kV feeders to minimise the number of consumers affected by faults and improve fault isolation and restoration of supply times were completed in 2016/17.
- Installation of recloser bypass disconnectors was completed in 2015/16.
- The reticulation of the St Kilda subdivision has continued as various stages were developed. The connection of the full subdivision to the new St Kilda feeder will be completed in 2017/18 when Stage 5 is completed.
- The new Pukeatua voltage regulator was installed in 2016/17 and the relocation of an existing Pukeatua voltage regulator is planned in 2017/18.
- Reinforcement of Matos Segedin Drive to supply the Waipa District Council water treatment plant commenced in 2015/16 and was completed in 2016/17.
- The undergrounding of Swayne Road Cambridge and removal of aged distribution lines and equipment and service mains was completed in 2016/17.
- Splitting Tamahere feeder into Tamahere and Pencarrow feeders was completed in 2016/17.
- Splitting Kaipaki feeder into Kaipaki and Monavale feeders was completed in 2016/17.
- The relocation of the Te Awamutu ripple plant coupling cell to Cambridge sand the seismic upgrade of the Cambridge Ripple Plant building was completed in 2015/16.
- The digital radio upgrade, upgrading the data network and WEL Control Room link were completed in 2016/17.
- The on-going installation of additional 11kV dropout isolation fuses on feeder spurs and consumers' service mains to minimise the number of consumers affected by faults and improve fault isolation and restoration of supply times was achieved,
- The on-going installation of ripple relays at consumers' installations to ensure that load management and tariff switching remains effective was achieved,
- The on-going installation of new transformers, substation structures and switchgear to meet consumers' requirements was achieved, and
- The on-going installation of new network extensions were installed to meet developers' requirements was achieved.

The following network enhancements proposed in the AMP 2015 are on-going:

- install new Cambridge and Te Awamutu ripple relays (2015-2025),
- install 11kV fuses on network spur lines and service mains (2015-2025),
- install new voltage regulators as required (2015-2025),
- install additional 11kV switchgear as required (2015-2025),
- install new transformer substations and switchgear as required (2015-2025),

- install general network extensions as required (2015-2025),
- replace two pole substation structures (2015–2019),
- replace pole and pad mount transformer substations as required (2015-2025),
- replace 11kV disconnectors as required (2015-2025) and,
- underground overhead lines as required (2015-2025).

Physical Progress Network Maintenance

Asset Condition Survey Program

The Company began its second asset condition survey in 2014/15.

Asset Condition Survey	Proposed 2015/16	Actual 2015/16
Hautapu A&B	2nd Survey	0 of 1 module completed
Pokuru	2nd Survey	39 of 40 modules completed
Leamington	2nd Survey	1 of 35 modules completed
Cambridge Town	2nd Survey	0 of 16 modules completed
Cambridge East	2nd Survey	1 of 20 modules completed
Paterangi	2nd Survey	2 of 40 modules completed

Waipa completed only 28% of the asset condition survey program for 2015/2016 due to the Asset Surveyor being redeployed on customer driven live line works throughout the year and the carried survey programme uncompleted from 2014/15. During 2016/17 additional resources have been allocated to bring the asset condition survey back on track, with a much smaller back log expected to be carried into 2017/18, and the programme is expected to be back up to date by March 2018.

The following table shows the number of outstanding 11kV and 400V defects remaining on distribution assets as at 31 March 2016.

Asset Defects	Total as at 31 March 2016
Balance	404
11kV remaining	365
400V remaining	39

The number of defects has risen during 2015/16 due to line resources being allocated to contracting work.

Earth Testing and Repair Programme

Progress against targets for Waipa's 2015/16 earth testing and repair program is shown in the following table.

Earth Testing and Repair	Proposed 2015/16	Actual 2015/16
Kaipaki	2nd Test & Repair	29of 29 modules completed
Kihikihi	2nd Test & Repair	25 of 25 modules completed

Hautapu A & B	2nd Test & Repair	0 of 1 module completed
Cambridge North	2nd Test & Repair	9 of 9 modules completed
Pokuru	2nd Test & Repair	35 of 40 modules completed
Leamington	2nd Test & Repair	35 of 35 modules completed
Cambridge Town	2nd Test & Repair	16 of 16 modules completed
Cambridge East	2nd Test & Repair	20 of 20 modules completed
Paterangi	2nd Test & Repair	39 of 40 modules completed

Waipa completed 96% of its earth testing and repair program for 2015/16 including a substantial back log from 2014/15 by engaging an external resource.

Vegetation Management Programme

Progress against targets for Waipa's vegetation programme is shown in the following table. The tree legislation requiring EDBs to offer tree owners a 1st free cut then on the second cut the landowner meets the costs has resulted in an increasing number of trees being declared "no interest" by landowners on the second cut. At that point Waipa has a preference to completely remove the tree at our cost to avoid future issues rather than trimming the tree. The cost and time taken to remove a tree exceeds that taken to trim it and reduces the amount of network that can be cleared of trees without an increase in resources.

Removal has proven to be more costly and time consuming than trimming. However, the Company believes vegetation removal is a better long term solution for improving network reliability.

Vegetation Management	Proposed 2015/16	Actual 2015/16
Tamahere	Cut 4	42 of 50 modules completed
Mystery Creek	Cut 2	2 of 18 modules completed
Leamington	Cut 2	35 of 35 modules completed
Cambridge Town	Cut 2	16 of 16 modules completed
Cambridge East	Cut 2	20 of 21 modules completed
Pukeatua	Cut 3	46 of 46 modules completed
KioKio/Waikeria	Cut 3	0 of 44 modules completed
Paterangi	Cut 2	0 of 40 modules completed

Waipa's completed only 50% of its vegetation management program for 2015/16 due to carry over of works not completed in 2014/15 and despite a change of strategy commencing in 2015/16 to pursue higher value contract work in larger jobs from corporate clients rather than small private landowner jobs, seeking more focus on the network programme. Resources applied were still insufficient to complete the programme including the incomplete work carried from the previous year.

Financial Progress

The following table shows actual financial performance KPI over the past 8 years compared to Statement of Corporate Intent targets set for 2015/16.

Business Efficiency Performance %	Actual 2007/8	Actual 2008/9	Actual 2009/10	Actual 2010/11	Actual 2011/12	Actual 2012/13	Actual 2013/14	Actual 2014/15	Actual 2015/16	Target 2015/16
Total Operational Expenditure per ICP	174	203	218	230	196	202	190	213	235	<235

Waipa's financial business efficiency KPI exactly equalled the target in 2015/16.

9.2 Service Level and Asset Performance

Customer Satisfaction Performance

The July 2015 consumer survey indicated an overall satisfaction rating of 93% (Target 95%). The results for length of shutdowns were 88% (Target 90%) and number of shutdowns was 86% (Target 90%).

These results include those who responded with "No Opinion" or Don't Know", which in the case of supply quality the Company believes to equate to satisfaction.

Waipa did not achieve the overall satisfaction and length and number of shutdowns satisfaction targets.

Reliability Performance

Waipa's actual SAIDI and SAIFI performance over the past 8 years compared with the Commerce Commission reliability threshold levels of 273 SAIDI minutes and 3.23 SAIFI set in 2003 is shown in the following table.

Network Reliability Performance Indices	Actual 2007/08	Actual 2008/09	Actual 2009/10	Actual 2010/11	Actual 2011/12	Actual 2012/13	Actual 2013/14	Actual 2014/15	Actual 2015/16	Target 2015/16
SAIDI total	113	235	126	114	242	153	123	201	190	170
SAIFI total	1.88	2.53	1.91	1.56	2.54	1.50	1.87	2.20	2.25	2.43

Waipa did not achieve the reliability target for SAIDI and did achieve the reliability target for SAIFI for 2015/16. There was no exceptional weather or other operational events occurring during the disclosure year.

Asset Delivery Performance

The following table shows actual asset delivery performance over the past 8 years compared to Statement of Corporate Intent targets set for 2014/15.

Asset Delivery Efficiency Performance %	Actual 2007/8	Actual 2008/9	Actual 2009/10	Actual 2010/11	Actual 2011/12	Actual 2012/13	Actual 2013/14	Actual 2014/15	Actual 2015/16	Target 2015/16
Loss Ratio	6.42	6.43	6.38	6.44	6.37	6.36	6.1	5.72	5.45	<6.5

Waipa's loss ratio asset delivery KPI was achieved in 2015/16.

9.3 Gap Analysis and Identification of Improvement Initiatives

Security

Waipa's objective of establishing n-1 security of supply for Te Awamutu GXP set in AMP 2013 was achieved in July 2016.

Non-Network Solutions

The project to replace the Cambridge coupling cell with the re-tuned former Te Awamutu coupling cell to improve ripple injection capacity was completed in March 2016.

Asset Defects

The Company only completed 28% of the asset condition survey program for 2015/16 due to the large back log of survey work carried into the year from previous years, when the Asset Surveyor was redeployed on customer driven line works. Work on eliminating the backlog has continued in 2016/17 and the programme is expected to be up to date by the end of 2017/18.

Earth Testing and Repair

Waipa completed only 96% of its earth testing and repair program for 2015/16 including a significant amount of backlog testing from the previous year, with external resources used to complete testing and repair works due to internal resources being already committed.

Vegetation Management

The Company completed only 50% of its vegetation management program for 2015/16 due the arborists being redeployed on reactive network trimming and off networks works through the year.

Financial Performance

Waipa's financial business efficiency KPIs for 2015/16 were achieved.

Customer Satisfaction - Service Level and Asset Performance

The Company did not achieve Overall Satisfaction, Number of Outages and Length of Outages targets for 2015/16.

Reliability

Waipa did not achieve its reliability target for SAIDI and achieved its reliability target for SAIFI in 2015/16.

Asset Delivery Performance

The Company's asset delivery KPIs for 2015/16 for Loss Ratio was achieved.

Constraints

The Company's objective of eliminating predicted feeder constraints were achieved by the timely implementation of network feeder enhancements identified in the network development projects of previous AMPs.

Quality of Supply

Voltage

Waipa's obligation to ensure regulatory voltage can be delivered was achieved by the timely implementation of network feeder enhancements identified in the network development programme of previous AMPs and the timely installation of voltage regulators. Waipa also acts promptly to resolve proven voltage complaints received form consumers.

Power Factor

The Company's network power factor has been greater than 0.95 at times when Transpower has experienced its 100 lower north island peaks and when Waipa has incurred its 12 anytime maximum demands.

Interference

Waipa has not received any complaints of interference from connected consumers.

AMP Improvements

Asset Management Process

Waipa is confident that its:

- commitment to improve network safety and reliability,
- predictions on load growth,
- procedures to identify future network constraints and
- routine network assets surveys,

will provide the Company with adequate information to make appropriate asset management decisions regarding existing assets, non-asset solutions, additional asset and surplus assets. The Company believes that any "incompleteness" of asset data will not be material when making these asset management decisions.

Asset Management Systems

Waipa is confident that its:

- Abbey SCADA system,
- AutoCAD Geographic Asset Information system,
- Napier Computer Integrated Data Warehouse system and
- ETAP network modelling software,

are configured and used in a manner that provides the Company with robust information for managing network assets. Waipa believes its asset management process and systems are appropriate for:

- the size of the network,
- Company financial and administrative business needs,
- consumer needs and
- other stakeholders requirements.

Stakeholders Input

Waipa welcomes any stakeholder feedback on the quality, clarity and completeness of its AMP. To date feedback has been received from Fonterra, engineering consultants and contractors who are interested in becoming involved in some of the projects and the Commerce Commission (or their agents). Waipa awaits a report from the Office of the Auditor General, who visited Waipa Networks during 2016 to review our asset management practices.

10.0 Expenditure Forecasts, Reconciliations and Assumptions

10.1 Expenditure Forecast

Appendices H and I shows Waipa's Capital Expenditure projects and forecasts proposed over the next 10 years.
Appendix J shows the Company's Operational Expenditure forecasts proposed over the next 10 years.

10.2 Reconciliations

Appendix K shows the Company's Capital and Operational Expenditure Reconciliations for 2015/16.

Capital Expenditure

Waipa's materiality threshold is 10% for capital expenditure on any category of networks assets capital expenditure exceeding $250,000. Material projects are also those that span multiple years.

Projects are not normally individually identified for capital expenditure of less than $50k (with the exception of relay additions driven by customer connections and discreet assets types of disconnectors and drop out fuses).

Capital Expenditure on network asset was $16,431k which was $3,500k (18%) below the forecast of $19,931k set for the disclosure year (March 2016) due primarily to delays in commencing construction on the Hangatiki to Te Awamutu 110kV line from landowner access negotiations. There was also less expenditure on consumer connection, but this was offset to a degree by higher expenditure on asset replacement and renewal.

Consumer Connections: Expenditure was $1,757k which was 24% below the forecast of $2,314k.
System Growth: Expenditure was $754k which was 26% above the forecast of $598k.

Asset Replacement and Renewal: Expenditure was $1,109k which was 10% below the forecast of $1,237k.

Asset Relocation: Expenditure was $103k which exceeded forecast of $97k by $6k (7%) due to Local Council and NZTA road redevelopment and deviations.

Reliability, Safety and Environment (Quality of Supply): Expenditure was $11,983k which fell short of the forecast of $15,393k by $3,410k (22%) due primarily to protracted progress on securing property rights for the Hangatiki to Te Awamutu 110kV line delaying the start of construction.

Reliability, Safety and Environment (Other Reliability, Safety and Environment): Expenditure was $725k which exceeded the forecast of $292k by $433k (148%). This included $80k of undergrounding feeder sections that crossed the Hangatiki – Te Awamutu 110kV line route, and $80k of undergrounding high load route road crossings to improve safety.

Expenditure on Non-Network Assets: Annual budget $158k, actual expenditure was $158k. $100k was budgeted for the seismic reinforcement of Cambridge Ripple Plant building, of which $43k was classified as capital and the balance was classified as maintenance. A new vehicle was purchased ($37k) that had not been allowed for in the budget.

Operational Expenditure

Overall Operational Expenditure was $5,729k which was $610k (12%) above forecast of $5,119k set for the disclosure year (March 2016). Additional expenditure of $182k was incurred in the Service Interruptions and Emergencies category due to more storms than usual. None of these storms qualified as exceptional weather events. Additional expenditure of $139k on Routine and Corrective Maintenance and Inspection was mainly related to increased earth testing required to clear a backlog.

Service Interruptions and Emergencies: Expenditure was $817k which exceeded the forecast of $635k by $182k (29%) primarily due to more storms than usual.

Vegetation Management: Expenditure of $560k exceeded the forecast of $501k by $59k (12%) due to reactive tree trimming.

Routine and Corrective Maintenance and Inspection: Expenditure was $949k which exceeded the forecast of $810k by $139k (17%) due to increased earth testing.

Asset replacement and Renewal: Expenditure was $461k which exceeded the forecast of $355k by $106k (30%) due to more voltage regulator and switchgear maintenance.

Non-Network Operational Expenditure: Expenditure was $2,942k which was within 4% of forecast of $2,818k.

10.3 AMP Assumptions

A number of significant assumptions have been made in order to determine likely outcomes of Waipa's AMP. The key factors, assumptions, the basis on which they are made and the impact of their uncertainty is discussed in the following table.

Factor	Assumption	Basis for the Assumption	Potential Impact of Uncertainty	Potential Risk of Uncertainty
Legislative Environment Legislative and regulatory requirements could change, requiring the Company to achieve different service, design or security standards. Regulatory changes could also impact on the availability of funds for asset management.	The existing external legislative and regulatory requirements are assumed to remain unchanged throughout the planning period. Therefore, the external drivers which influence reliability targets, design, environmental, health and safety standards and industry codes of practice are assumed not to change.	Although the industry's regulatory and legislative environment has and will continually change the Company has no ability to predict future changes in regulatory requirements.	It is unlikely that the legislative and regulatory requirements will reduce. The most likely impact is an increase in forecast expenditure to meet increased overheads which will add costs with potentially no consumer benefits. It is not possible to quantify this potential impact.	High Probability Medium Impact
Business Ownership Waipa's ownership could change. New owners may have different service and financial objectives than those set out in this AMP.	For the purposes of this AMP it is assumed that Waipa will remain in Trust ownership. The thrust of Waipa's Purpose, Beliefs, Focus and Greatest Imaginable Challenge continues for the planning period.	No changes are proposed to the existing ownership of Waipa and therefore all prospective information has been prepared consistent with the existing Waipa business ownership, structure and purpose Waipa's strategic planning documents, including the 2016/2017 Statement of Corporate Intent and the 2016/2017 Annual Business Plan and Budgets.	Different owners could have different service and expenditure objectives than those set out in the AMP, resulting in either higher or lower service targets and associated expenditures. Different owners could change development and maintenance requirements currently practiced which could impact on forecast expenditure.	Low Probability High Impact
Price/Quality Trade Off Connected consumers could change their demands for reliability or quality of supply or their willingness to pay for different levels of service.	Future levels of customer satisfaction and willingness to pay for improved reliability and quality of supply are consistent with those identified by customer surveys since 1996.	Interaction with customers and the community in relation to future developments within Waipa's network area. Bi-annual Waipa Customer Surveys (1996–2007) and annual Waipa Customer Surveys (2009-2016).	Customers could change their demands for service and willingness to pay resulting in either higher or lower service targets and associated expenditures.	Low Probability Medium Impact
Load Growth The magnitude of Waipa's underlying load (made up of predominately dairy, supporting industry and farming community) is expected to change over the planning period but the extent is not known with certainty. Connected consumers load patterns could change by the use of heat-pumps for example resulting in a movement from traditional winter peaks to higher summer peaks. Significant new loads not yet identified may require supply within the planning period of this AMP These drivers will affect the timing of network enhancements.	Underlying demand growth at each GXP is predicted to continue throughout the planning period at a rate consistent with the historical rate of growth. Dairy load will remain dominant in the region. Seasonal load profiles remain consistent with recent historical trends. The number of new consumers connecting to Waipa's network is predicted to continue at a similar level to historical rates over the planning period. Development of distributed generation is slow.	These assumptions were made by analysing historical half-hourly maximum electricity demand at each GXP (excluding Fonterra), historical half-hourly maximum electricity demand on each feeder from Waipa's SCADA, population data and demographic forecasts from Statistics New Zealand Distributed generation is likely to be small PV in the Waikato due to poor wind resource. PV remains expensive but with falling prices increasing number are connecting, albeit off a low base. PV is not coincident with the network peak.	Higher demands require greater capacity across the system earlier than projected, requiring an acceleration of forecast expenditure. Seasonal shifts in demand could require planned capacity upgrades to be accelerated. The rate of new connections will impact on demand growth. Specific new investments may also be required to meet large new loads. Cost reflective pricing including TOU components may be necessary to send appropriate price signals to consumers.	Low Probability Low Impact

Factor	Assumption	Basis for the Assumption	Potential Impact of Uncertainty	Potential Risk of Uncertainty
Hazard Management It is recognised that some network assets are inherently hazardous. The Regulator and Company stakeholders may alter their views on the importance and value of mitigating hazards presented by network assets. Regulator opposition to live line work methods may result in increased levels of planned outages to complete work de-energised.	The Company and Stakeholders want a network that does not present an unacceptable level of exposure to hazards to the general public, staff, property or animals. The network was originally designed and built to minimise exposure to these inherent hazards. The Company will readily identify new hazards as they arise. Waipa will not operate in a way that exposes the business to the liabilities associated with not taking all practicable steps to minimise and eliminate hazards.	The hazard assumption is based on people not wanting to get shocked or electrocuted or harmed – the human instinct of self-preservation. Waipa has renewal maintenance programmes in place to ensure that it operates a network with acceptable low levels of exposure to hazards. Waipa has identified a number of potentially significant hazardous assets on its network and has scheduled their removal. Waipa has on-going plans to monitor and reduce minor network hazards over the planning period.	Altering the importance of eliminating or mitigating exposure to hazardous assets will affect the amount of work and expenditure in the AMP Altering the importance of eliminating or mitigating exposure to hazardous assets will impact on the risk of injury or damage. Planned SAIDI would increase if live line work is restricted or banned. Customer complaints may increase as a result.	Low Probability High Impact
Mass Premature Failure Similarly manufactured assets generally have similar life expectancies. If a significant group of similar assets fail prematurely this will impact on Waipa's asset renewal strategy.	Forecasts for the remaining life of assets are correct and mass premature failure of similar assets does not occur.	Any known group of assets that fail prematurely have been identified for remedial action or removal. The extent of unknown groups of assets that are going to fail prematurely in future is impossible to predict. Waipa uses only tried and proven assets, adopting a "leading edge, not bleeding edge" approach to new technologies.	If a significant group of widely used assets fail prematurely they may have a significant impact on the reliability of the network.	Low Probability High Impact
Grid Catastrophe Waipa's network and/or Transpower's local Grid could experience a major natural disaster during the planning period.	Neither Waipa's network nor Transpower's local Grid will experience a major natural disaster during the planning period.	As described in Section 8.1 Disaster Risk Assessment Methodology, the Company has assessed the potential physical threats to its network posed by naturally occurring hazards of wind, lightning, floods, land erosion, earthquakes, volcanic eruptions, tsunami, geothermal activity and adverse weather and concluded that the network is built in a benign region.	High volume equipment repairs and replacements are not provided for.	Low Probability High Impact
Local Body Requirements Changes in the District Plans could require Waipa to alter its current reticulation practices (example installing new rural circuits underground rather than reticulating overhead)	Waipa assumes that current District Plans will not change significantly as to the Company's method of reticulation.	Local Body District Plans have been relatively stable over the past 10 years regarding reticulation practices. Changes are notified with the ability for Waipa to make submissions on proposed changes.	Changes are likely to result in higher costs for the Company and consumers.	Low Probability Medium Impact

Factor	Assumption	Basis for the Assumption	Potential Impact of Uncertainty	Potential Risk of Uncertainty
Inflation / Value of NZ dollar The value of the New Zealand Dollar and the cost of procuring resources are almost certain to change over the planning period.	All projections of expenditure are presented in real New Zealand Dollar terms as at 1 April 2016. In reality, over time input costs (including those sourced from outside New Zealand) for asset management activities will change at rates greater or less than the rate of general inflation.	As expenditure forecasts are updated annually, this approach is assumed acceptable and consistent with that prescribed. Experience of times when high copper and steel commodity prices in international markets pushing up equipment costs at a rate above NZ inflation. Inflation will remain at moderate levels as required by the Reserve Bank.	Forward estimates are based without an inflation rate. Inflation will mean higher costs in dollar terms. Deflation will give the reverse. (The inflation referred to is that associated with the renewal and construction of distribution networks, not general inflation.	Medium Probability Medium Impact
Demand Side Management Significant demand side management may be commissioned or decommissioned in Waipa's network. This would impact on network design and timing of network enhancements.	No new significant demand side management is commissioned or decommissioned during the planning period.	There is no evidence of significant future customer demand side management initiatives being commissioned or decommissioned.	Changes to significant demand side management will impact on network design and timing of network enhancements. .	Low Probability Low Impact
Distributed Generation Significant distributed generation may be commissioned or decommissioned in Waipa's network. This would impact on network design and timing of network enhancements.	No new significant demand side management or significant distributed generation is commissioned or decommissioned during the planning period.	There has been only one application for significant hydro distributed generation within the last 5 years which did not eventuate. All other distributed generation commissioned have been small photo-voltaic installations behind the meter.	Changes to significant distributed generation will impact on network design and timing of network enhancements. Network enhancement to accommodate distributed generation will be funded by proponents.	Medium Probability Medium Impact
Land Use The District Councils may implement significant land zoning changes which could have a positive or negative impact on new developments in the region.	District Council zoning land use remains unchanged during the planning period.	Waipa, Otorohanga and Waitomo District Councils and the Waikato Regional Council planning information.	Land use zoning changes will impact either positively or negatively on new developments and demand. Network enhancement to accommodate distributed generation will be funded by developers.	Medium Probability Low Impact

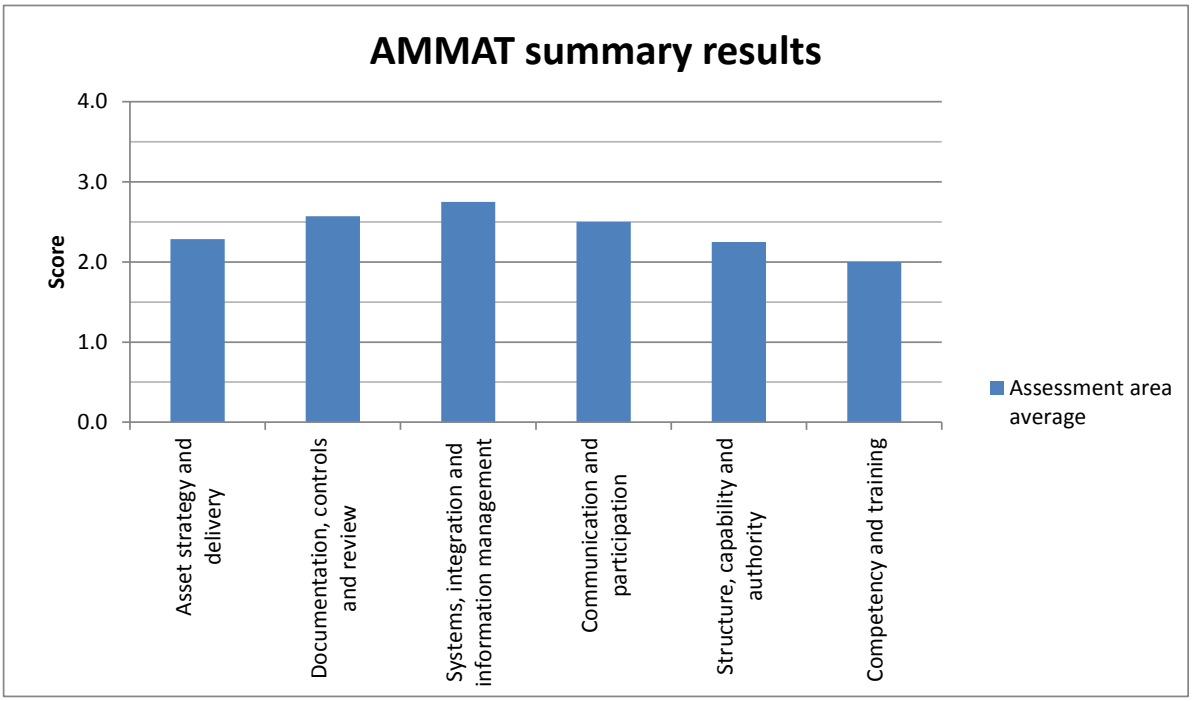
10.4 Changes Proposed where Information is not based on Existing Business

No changes are proposed to the existing business of Waipa. Therefore, all prospective information has been prepared consistent with the existing Waipa business ownership, structure and purpose.

11.0 Asset Management Maturity Assessment

In 2015/16 Waipa completed a third internal assessment of its asset management processes in accordance with the AMMAT in Schedule 13: Report on Asset Management Maturity attached. The Company did not reassess in 2016/17 since no major changes were undertaken. Waipa intends to reassess its asset management competency again in 2017/18.

The following graph shows the Company's performance as determined by the AMMAT in 2015/16.



Waipa considers its current asset management processes are adequate for its stakeholder's requirements and are provided at a cost acceptable to them. That said, there are areas identified within the AMMAT results that illustrate potential for improvement that would be of benefit to Waipa's asset management practice. Action plans will be implemented over the next several years to put in place enhancements to asset management practices and systems and lift selected AMMAT scores.

12.0 Conclusion

Waipa believes its asset management process, predictions on load growth, procedures to identify future network constraints and routine network assets surveys will enable the Company to make informed asset management decisions regarding existing assets, non-asset solutions, procuring new assets and retiring assets.

The Company believes that any “incompleteness” of asset data will not be material when making asset management decisions. Whilst Waipa continually improves its existing information systems no radical changes of these systems is contemplated.

Waipa is confident that its:

- commitment to provide n-1 security of supply to Te Awamutu,
- commitment to continually improve network reliability,
- proposed network development plans and
- life cycle management of existing assets,

over the next 10 years will preserve the value of the network for the Company’s shareholders and will provide our connected consumers and public with a network which has capacity for growth, is secure, reliable and safe.

13.0 APPENDICES

Appendix A:	Network Feeder Asset Attributes (as at 31 March 2015)
Appendix B:	Voltage Regulator Programme
Appendix C:	Automated Open Point Switches Programme
Appendix D:	Visual Asset Condition Survey Programme
Appendix E:	Vegetation Management Programme
Appendix F:	Earth Testing and Repair Programme
Appendix G:	Asset Age Profile
Appendix H:	Capital Works
Appendix I:	Capital Expenditure Forecast
Appendix J:	Operational Expenditure Forecast
Appendix K:	Capital and Operational Expenditure Reconciliations for 2014/2015

Appendix A: Network Feeder Asset Attributes (as at 31 March 2016)

Transpower GXP	TPNZ CB	Feeder type	Waipa Feeder Assets	Total 11kV km	Overhead 11kV km	Underground 11kV km	Total 400V km	Overhead 400V km	Underground 400V km	Number concrete poles	Number wooden poles	Number transformers	Transformer capacity kVA	Number ICPs
Cambridge	C2702	rural	Roto-O-Rangi	95.69	81.83	13.86	48.80	28.54	20.26	1,287	235	273	14,427	1,658
Cambridge	C2712	urban	Cambridge North	33.53	23.53	10.00	34.33	14.02	20.31	465	70	124	14,740	1,132
Cambridge	C2722	urban	Cambridge Town	10.57	3.57	7.00	20.28	5.52	14.76	176	40	47	12,800	1,062
Cambridge	C2732	rural	Kaipaki	0.14	0.06	0.08								
Cambridge	C2742	rural	Pencarrow	0.46	0.38	0.08								
Cambridge	C2762	urban	Hautapu A	7.63	6.57	1.06				41				1
Cambridge	C2772	rural	French Pass	99.40	89.15	10.25	46.49	29.99	16.51	1,271	256	329	17,019	1,174
Cambridge	C2802	urban	Leamington	19.36	12.53	6.82	42.30	14.76	27.54	399	113	58	10,530	2,249
Cambridge	C2812	urban	Hautapu B	7.64	5.86	1.78				42				
Cambridge	C2832	urban	Cambridge East	14.94	7.26	7.68	36.93	15.53	21.40	395	133	35	7,800	1,920
Cambridge	C2842	rural	Tamahere	76.70	61.15	15.55	51.12	23.66	27.46	1,069	147	270	15,870	1,449
Cambridge	C2852	urban	St Kilda	0.23		0.23						1	200	1
Cambridge	C2862	rural	Monavale	59.15	48.80	10.35	30.85	16.57	14.29	823	42	209	17,490	1,069
			Subtotal	425.44	340.68	84.76	311.10	148.58	162.52	5,968	1,036	1,346	110,876	11,715
Te Awamutu	T0022	rural	Kawhia	198.71	195.61	3.10	52.98	43.02	9.96	2,367	180	296	11,657	1,285
Te Awamutu	T0023	rural	Kio Kio / Waikeria	110.95	108.32	2.63	42.20	37.57	4.62	1,727	14	267	14,140	871
Te Awamutu	T0024	urban	Te Awamutu West	19.72	14.93	4.79	49.11	24.39	24.71	452	94	63	9,200	2,074
Te Awamutu	T0025	rural	Pirongia	64.50	59.40	5.09	46.66	29.72	16.94	975	45	165	10,380	1,388
Te Awamutu	T2762	rural	Pukeatua	139.34	134.73	4.61	48.68	44.74	3.94	2,183	34	322	13,448	960
Te Awamutu	T0027	rural	Paterangi	101.32	99.98	1.34	46.32	42.91	3.40	1,699	30	254	10,822	836
Te Awamutu	T2742	rural	Kihikihi	39.76	37.94	1.81	41.16	31.38	9.79	948	91	109	9,578	1,724
Te Awamutu	T2752	rural	Mystery Creek	42.14	40.99	1.15	21.61	18.72	2.89	700	23	101	5,940	497
Te Awamutu	T0026	urban	Hairini	27.51	23.07	4.45	34.05	15.27	19	469	46	77	10,335	1,349
Te Awamutu	T2782	urban	Fonterra A	2.00	0.00	2.00								1
Te Awamutu	T2802	urban	Fonterra B	2.04	0.00	2.04								
Te Awamutu	T2822	rural	Ohaupo	43.87	41.77	2.10	30.02	23.18	6.84	832	16	102	6,930	811
Te Awamutu	T2832	urban	Te Awamutu East	6.00	3.24	2.76	16.41	4.43	11.98	106	39	26	7,700	937
Te Awamutu	T2842	rural	Pokuru	129.15	128.38	0.77	43.04	41.71	1.34	1,954	27	291	12,673	880
			Subtotal	927.01	888.37	38.64	472.22	357.05	115.17	14,412	639	2,073	122,802	13,613
			Total	1,352.45	1,229.05	123.40	783.33	505.63	277.69	20,380	1,675	3,419	233,678	25,328

Appendix B: Voltage Regulator Programme

TPNZ GXP	TPNZ CB	Feeder Type	Waipa Feeder Asset	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Cambridge	C2702	rural	Roto-O-Rangi		200A VR & 2 Caps								
Cambridge	C2712	urban	Cambridge North										
Cambridge	C2722	urban	Cambridge Town										
Cambridge	C2862	rural	Monavale										
Cambridge	C2742	rural	Pencarrow			750kVAr Cap							
Cambridge	C2762	urban	Hautapu A										
Cambridge	C2772	rural	French Pass				200A VR 1Cap						
Cambridge	C2802	urban	Leamington			300A VR							
Cambridge	C2812	urban	Hautapu B										
Cambridge	C2832	urban	Cambridge East										
Cambridge	C2842	rural	Tamahere										
Cambridge	C2852	urban	St Kilda										
Cambridge	C2732	rural	Kaipaki	200A VR									
Te Awamutu	T0022	rural	Kawhia										
Te Awamutu	T0023	rural	Kio Kio / Waikeria			150A VR		100A VR					
Te Awamutu	T0024	urban	Te Awamutu West										
Te Awamutu	T0025	rural	Pirongia										
Te Awamutu	T0026	urban	Hairini										
Te Awamutu	T0027	rural	Paterangi										
Te Awamutu	T2742	rural	Kihikihi										
Te Awamutu	T2752	rural	Mystery Creek										
Te Awamutu	T2762	rural	Pukeatua	VR12 Upgrade 1Cap									
Te Awamutu	T2782	urban	Fonterra A										
Te Awamutu	T2802	urban	Fonterra B										
Te Awamutu	T2822	rural	Ohaupo										
Te Awamutu	T2832	urban	Te Awamutu East										
Te Awamutu	T2842	rural	Pokuru										

Appendix C: Automated Open Point Switches Programme

The Automated Open Point Switches Programme consists of 14 switches at a cost of $420k per annum, with an expected total of 60 switches over the entire network. Analysis in 2016/17 has identified 33 locations of the switches forming the first part of the programme. The performance of the automated open point switches as installed will be evaluated and used to determine if further automated switches are appropriate.

Appendix D: Visual Asset Condition Survey Programme

TPNZ GXP	TPNZ CB	Feeder Type	Waipa Feeder Asset	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Cambridge	C2702	rural	Roto-O-Rangi				3rd						
Cambridge	C2712	urban	Cambridge North						2nd				
Cambridge	C2722	urban	Cambridge Town							3rd			
Cambridge	C2862	rural	Monavale					3rd					
Cambridge	C2742	rural	Pencarrow		3rd								4th
Cambridge	C2762	urban	Hautapu A						3rd				
Cambridge	C2772	rural	French Pass		3rd								4th
Cambridge	C2802	urban	Leamington	Carry-over						3rd			
Cambridge	C2812	urban	Hautapu B						3rd				
Cambridge	C2832	urban	Cambridge East	Carry-over						3rd			
Cambridge	C2842	rural	Tamahere		3rd								4th
Cambridge	C2852	urban	St Kilda							1st			
Cambridge	C2732	rural	Kaipaki					3rd					
Te Awamutu	T0022	rural	Kawhia			3rd							
Te Awamutu	T0023	rural	Kio Kio / Waikeria				3rd						
Te Awamutu	T0024	urban	Te Awamutu West	2nd								3rd	
Te Awamutu	T0025	rural	Pirongia	2nd								3rd	
Te Awamutu	T0026	urban	Hairini	Carry-over							3rd		
Te Awamutu	T0027	rural	Paterangi	Carry-over						3rd			
Te Awamutu	T2742	rural	Kihikihi					3rd					
Te Awamutu	T2752	rural	Mystery Creek	Carry-over							3rd		
Te Awamutu	T2762	rural	Pukeatua	2nd							3rd		
Te Awamutu	T2782	urban	Fonterra A										
Te Awamutu	T2802	urban	Fonterra B										
Te Awamutu	T2822	rural	Ohaupo					3rd					
Te Awamutu	T2832	urban	Te Awamutu East	2nd								3rd	
Te Awamutu	T2842	rural	Pokuru						3rd				

Appendix E: Vegetation Management Programme

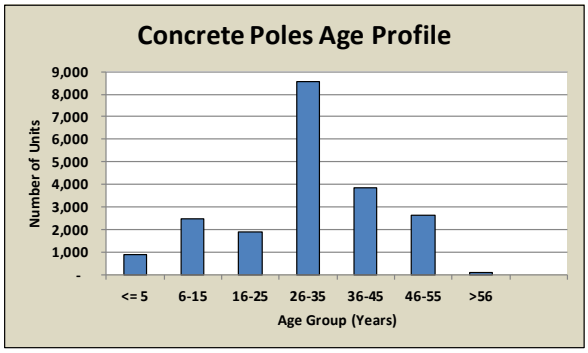
(Note: This programme has been advanced to 4 year rotational trimming. Green denotes previous cut timing under 8 year rotational trimming)

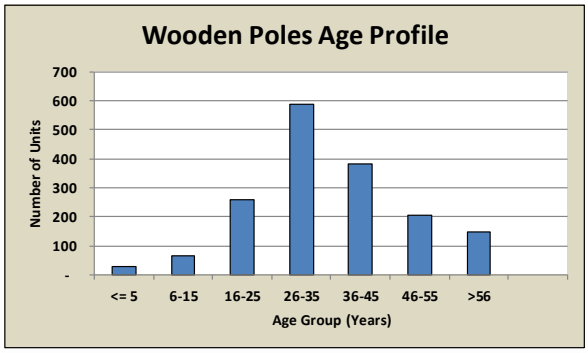
TPNZ GXP	TPNZ CB	Feeder Type	Waipa Feeder Asset	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Cambridge	C2702	rural	Roto-O-Rangi		Cut 3				Cut 4				Cut 5
Cambridge	C2712	urban	Cambridge North			Cut 2				Cut 3			
Cambridge	C2722	urban	Cambridge Town			Cut 3				Cut 4			
Cambridge	C2862	rural	Monavale		Cut 3			Cut 4				Cut 5	
Cambridge	C2742	rural	Pencarrow	Cut 5			Cut 6				Cut 7		
Cambridge	C2762	urban	Hautapu A			Cut 3				Cut 4			
Cambridge	C2772	rural	French Pass	Cut 4				Cut 5				Cut 6	
Cambridge	C2802	urban	Leamington			Cut 3				Cut 4			
Cambridge	C2812	urban	Hautapu B		Cut 3				Cut 4				Cut 5
Cambridge	C2832	urban	Cambridge East			Cut 3				Cut 4			
Cambridge	C2842	rural	Tamahere	Cut 5			Cut 6				Cut 7		
Cambridge	C2852	urban	St Kilda										
Cambridge	C2732	rural	Kaipaki		Cut 3			Cut 4				Cut 5	
Te Awamutu	T0022	rural	Kawhia	0.5 Cut 3	0.5 Cut 3			0.5 Cut 4	0.5 Cut 4			0.5 Cut 5	0.5 Cut 5
Te Awamutu	T0023	rural	Kio Kio / Waikeria			Cut 4				Cut 5			
Te Awamutu	T0024	urban	Te Awamutu West		Cut 2				Cut 3				Cut 4
Te Awamutu	T0025	rural	Pirongia	Cut 2				Cut 3				Cut 4	
Te Awamutu	T0026	urban	Hairini			Cut 4				Cut 5			
Te Awamutu	T0027	rural	Paterangi				Cut 3				Cut 4		
Te Awamutu	T2742	rural	Kihikihi		Cut 3				Cut 4				Cut 5
Te Awamutu	T2752	rural	Mystery Creek			Cut 3				Cut 4			
Te Awamutu	T2762	rural	Pukeatua		Cut 2				Cut 4				Cut 5
Te Awamutu	T2782	urban	Fonterra A										
Te Awamutu	T2802	urban	Fonterra B										
Te Awamutu	T2822	rural	Ohaupo		Cut 3				Cut 4				Cut 5
Te Awamutu	T2832	urban	Te Awamutu East		Cut 2				Cut 3				Cut 4
Te Awamutu	T2842	rural	Pokuru				Cut 4				Cut 5		

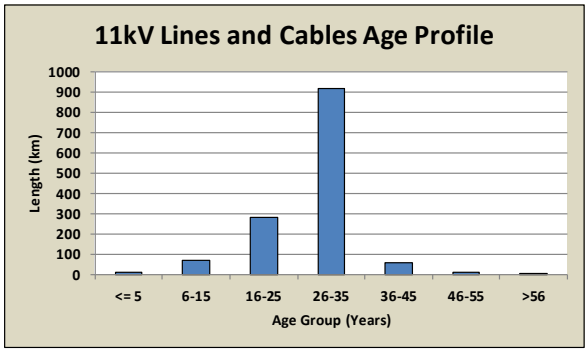
Appendix F: Earth Testing and Repair Programme

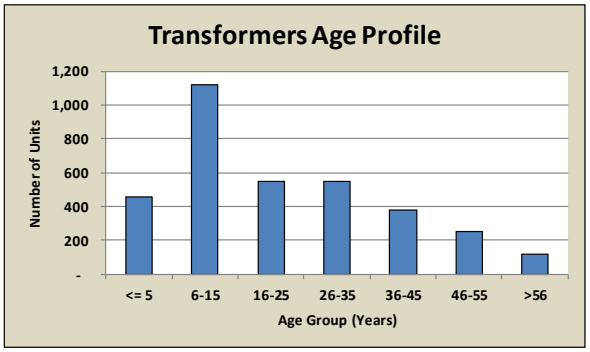
TPNZ GXP	TPNZ CB	Feeder Type	Waipa Feeder Asset	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Cambridge	C2702	rural	Roto-O-Rangi				T&R3						
Cambridge	C2712	urban	Cambridge North						T&R2				
Cambridge	C2722	urban	Cambridge Town							T&R3			
Cambridge	C2862	rural	Monavale					T&R3					
Cambridge	C2742	rural	Pencarrow		T&R2								T&R3
Cambridge	C2762	urban	Hautapu A						T&R3				
Cambridge	C2772	rural	French Pass		T&R2								T&R3
Cambridge	C2802	urban	Leamington							T&R3			
Cambridge	C2812	urban	Hautapu B						T&R3				
Cambridge	C2832	urban	Cambridge East							T&R3			
Cambridge	C2842	rural	Tamahere		T&R2								T&R3
Cambridge	C2852	urban	St Kilda							T&R1			
Cambridge	C2732	rural	Kaipaki					T&R3					
Te Awamutu	T0022	rural	Kawhia			T&R2							
Te Awamutu	T0023	rural	Kio Kio / Waikeria				T&R2						
Te Awamutu	T0024	urban	Te Awamutu West	T&R2								T&R3	
Te Awamutu	T0025	rural	Pirongia	T&R2								T&R3	
Te Awamutu	T0026	urban	Hairini								T&R3		
Te Awamutu	T0027	rural	Paterangi							T&R3			
Te Awamutu	T2742	rural	Kihikihi					T&R3					
Te Awamutu	T2752	rural	Mystery Creek								T&R3		
Te Awamutu	T2762	rural	Pukeatua	T&R2								T&R3	
Te Awamutu	T2782	urban	Fonterra A										
Te Awamutu	T2802	urban	Fonterra B										
Te Awamutu	T2822	rural	Ohaupo					T&R3					
Te Awamutu	T2832	urban	Te Awamutu East	T&R2								T&R3	
Te Awamutu	T2842	rural	Pokuru						T&R3				

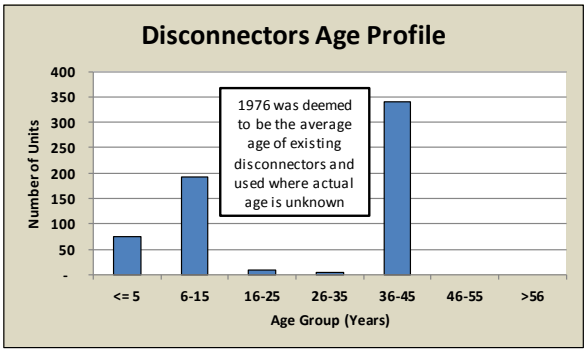
Appendix G: Asset Age Profiles

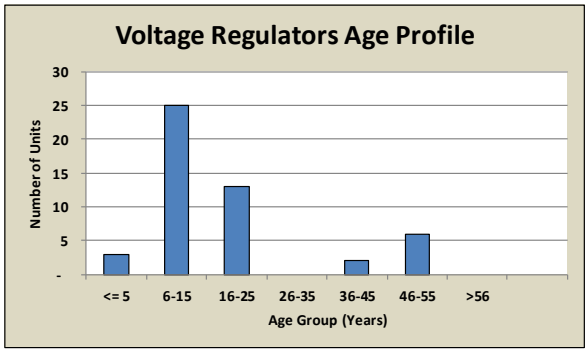


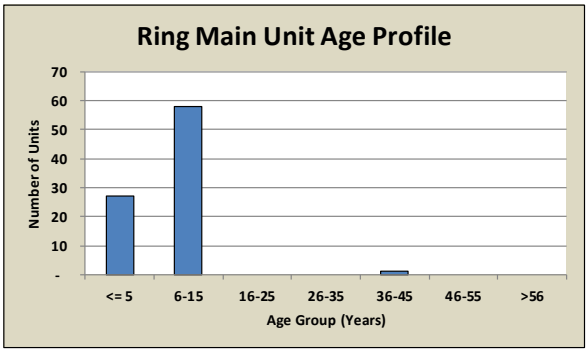


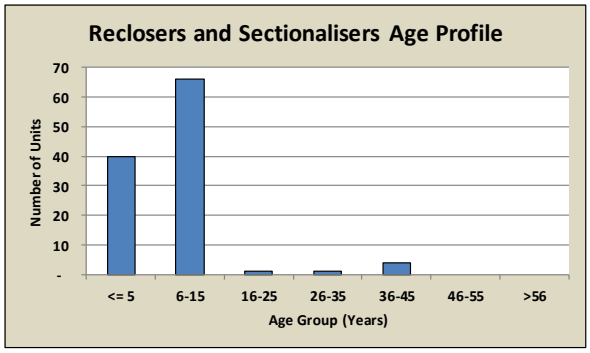


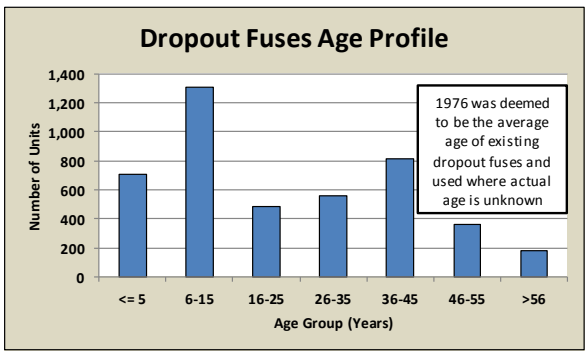


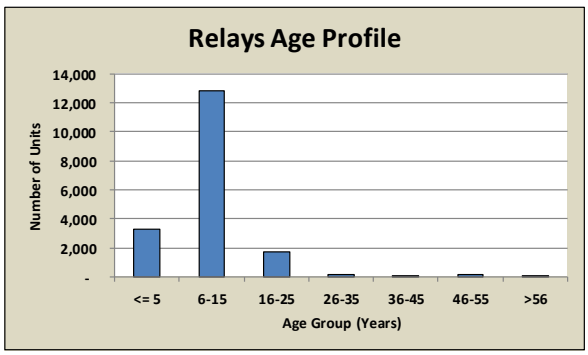












Appendix H: Capital Works

Capital Works	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
General Relays Additions	10	10	10	10	10	10	10	10	10	10
Transformer & Sub Additions	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077	1,077
General Extensions	1,404	1,404	1,404	1,404	1,404	1,104	1,104	1,104	1,104	1,104
Ring Main Unit Switchgear Additions	97	97	97	97	97	97	97	97	97	97
Disconnector Switchgear Additions	19	19	19	19	19	19	19	19	19	19
Dropout Fuse Switchgear Additions	55	55	55	55	55	55	55	55	55	55
New Voltage Regulators & Capacitors	351	306	491	330	195	-	195	-	195	-
Transformer & Sub Enhancements	257	257	257	257	221	221	221	221	221	221
Kaipaki Racecourse Rd Reconductoring	192	-	-	-	-	-	-	-	-	-
Te Awamutu GXP Feeder Cable Upgrade	649	-	-	-	-	-	-	-	-	-
New Comms UHF Repeater Site	19	-	-	-	-	-	-	-	-	-
Install Kawhia Generator	-	-	-	-	-	-	-	169	674	-
Replace One Pole Transformers and Sub Structures	227	227	227	227	227	227	227	227	227	227
Switchgear Replacement Disconnectors	29	29	29	29	29	29	29	29	29	29
Replace Ground Mounted Transformer Sub Structures	286	286	286	286	286	286	286	286	286	286
Replace analogue radios	26	26	23	-	-	-	-	-	-	-
Install 11kV Dropout Fuses Spurs & Services	117	117	117	117	117	117	117	117	117	117
Install Remote Control Switches	545	545	156	-	-	-	-	-	-	-
Multicircuit Undergrounding	1,249	971	-	-	-	-	-	-	-	-
St Kilda Feeder Reconfiguration	-	844	-	-	-	-	-	-	-	-
Replace Two Pole Transformers and Sub Structures	292	292	-	-	-	-	-	-	-	-
Cambridge Rd High Load Route Road Crossings	145	-	-	-	-	-	-	-	-	-
NZTA & District Council relocations	97	97	97	97	97	97	97	97	97	97
Total Capital Budget	7,143	6,659	4,345	4,005	3,834	3,469	4,053	3,759	4,459	3,590
Motor vehicles, fleet and plant	50	50	50	50	50	50	50	50	50	50
Office furniture and plant	-	5	5	5	5	5	5	5	5	5
Computer equipment	60	50	50	50	50	50	50	50	50	50
Total Non-network Capital										

Appendix I: Capital Expenditure Forecast

Capital Expenditure Forecast	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Customer connection	2,662	2,662	2,662	2,662	2,662	2,362	2,362	2,362	2,362	2,362
System growth	1,494	589	771	587	416	351	935	641	1,341	472
Asset replacement and renewal	542	542	542	542	542	542	542	542	542	542
Asset relocation	97	97	97	97	97	97	97	97	97	97
Reliability, safety and environment										
Quality of Supply	1,911	2,477	273	117	117	117	117	117	117	117
Legislative and regulatory	0	0	0	0	0	0	0	0	0	0
Other Reliability, Safety & Environment	437	292	0	0	0	0	0	0	0	0
Total Reliability, safety and environment	2,348	2,769	273	117	117	117	117	117	117	117
Expenditure on network assets	7,143	6,659	4,345	4,005	3,834	3,469	4,053	3,759	4,459	3,590
Non-network assets	110	105	105	105	105	105	105	105	105	105
Expenditure on assets	7,253	6,764	4,450	4,110	3,939	3,574	4,158	3,864	4,564	3,695

Appendix J: Operational Expenditure Forecast

Operational Expenditure Forecast	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Service interruption and emergencies	690,000	690,000	690,000	690,000	690,000	690,000	690,000	690,000	690,000	690,000
Vegetation management	1,003,000	1,003,000	1,003,000	1,003,000	716,000	716,000	716,000	716,000	716,000	716,000
Routine and corrective maintenance and inspection	992,000	793,000	793,000	743,000	743,000	826,000	826,000	826,000	743,000	743,000
Asset replacement and renewal	431,000	431,000	431,000	431,000	396,000	396,000	396,000	396,000	396,000	396,000
Network Opex	3,116,000	2,917,000	2,917,000	2,867,000	2,545,000	2,628,000	2,628,000	2,628,000	2,545,000	2,545,000
System operations and network support	1,099,000	1,099,000	1,099,000	1,099,000	1,099,000	1,099,000	1,099,000	1,099,000	1,099,000	1,099,000
Business Support	2,198,000	2,198,000	2,198,000	2,198,000	2,198,000	2,198,000	2,198,000	2,198,000	2,198,000	2,198,000
Non-network Opex	3,297,000	3,297,000	3,297,000	3,297,000	3,297,000	3,297,000	3,297,000	3,297,000	3,297,000	3,297,000
Operational Expenditure	6,413,000	6,214,000	6,214,000	6,164,000	5,842,000	5,925,000	5,925,000	5,925,000	5,842,000	5,842,000

Company Name	Waipa Networks Limited
For Year Ended	31 March 2016

SCHEDULE 7: COMPARISON OF FORECASTS TO ACTUAL EXPENDITURE

This schedule compares actual revenue and expenditure to the previous forecasts that were made for the disclosure year. Accordingly, this schedule requires the forecast revenue and expenditure information from previous disclosures to be inserted.
EDBs must provide explanatory comment on the variance between actual and target revenue and forecast expenditure in Schedule 14 (Mandatory Explanatory Notes). This information is part of the audited disclosure information (as defined in section 1.4 of the ID determination), and so is subject to the assurance report required by section 2.8. For the purpose of this audit, target revenue and forecast expenditures only need to be verified back to previous disclosures.

sch ref

		Target ($000) [1]	Actual ($000)	% variance
7	**7(i): Revenue**			
8	Line charge revenue	24,526	23,956	(2%)
		Forecast ($000) [2]	**Actual ($000)**	**% variance**
9	**7(ii): Expenditure on Assets**			
10	Consumer connection	2,314	1,757	(24%)
11	System growth	598	754	26%
12	Asset replacement and renewal	1,237	1,109	(10%)
13	Asset relocations	97	103	7%
14	Reliability, safety and environment:			
15	Quality of supply	15,393	11,619	(25%)
16	Legislative and regulatory	–	–	–
17	Other reliability, safety and environment	292	725	148%
18	**Total reliability, safety and environment**	15,685	12,344	(21%)
19	**Expenditure on network assets**	19,931	16,066	(19%)
20	Expenditure on non-network assets	158	158	–
21	Expenditure on assets	20,089	16,224	(19%)
22	**7(iii): Operational Expenditure**			
23	Service interruptions and emergencies	635	817	29%
24	Vegetation management	501	560	12%
25	Routine and corrective maintenance and inspection	810	949	17%
26	Asset replacement and renewal	355	461	30%
27	**Network opex**	2,301	2,787	21%
28	System operations and network support	1,160	1,098	(5%)
29	Business support	1,658	1,851	12%
30	**Non-network opex**	2,818	2,949	5%
31	**Operational expenditure**	5,119	5,736	12%
32	**7(iv): Subcomponents of Expenditure on Assets (where known)**			
33	Energy efficiency and demand side management, reduction of energy losses	–	–	–
34	Overhead to underground conversion	195	664	241%
35	Research and development	–	–	–
36				
37	**7(v): Subcomponents of Operational Expenditure (where known)**			
38	Energy efficiency and demand side management, reduction of energy losses	–	–	–
39	Direct billing	–	N/A	–
40	Research and development	–	N/A	–
41	Insurance	–	–	–
42				

43 *1 From the nominal dollar target revenue for the disclosure year disclosed under clause 2.4.3(3) of this determination*

44 *2 From the CY+1 nominal dollar expenditure forecasts disclosed in accordance with clause 2.6.6 for the forecast period starting at the beginning of the disclosure year (the second to last disclosure of Schedules 11a and 11b)*

14.0 SCHEDULES

Schedule 11a: Report on Forecast Capital Expenditure

Schedule 11b: Report on Forecast Operational Expenditure

Schedule 12a: Report on Asset Condition

Schedule 12b: Report on Asset Capacity

Schedule 12c: Report on Forecast Network Demand

Schedule 12d: Report on Forecast Interruptions and Duration

Schedule 13: Report on Asset Management Maturity

Schedule 17: Certification for Year-beginning Disclosures

Company Name	**Waipa Networks Limited**
AMP Planning Period	**1 April 2017 – 31 March 2027**

SCHEDULE 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.

sch ref			*Current Year CY*	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
8		for year ended	**31 Mar 17**	**31 Mar 18**	**31 Mar 19**	**31 Mar 20**	**31 Mar 21**	**31 Mar 22**	**31 Mar 23**	**31 Mar 24**	**31 Mar 25**	**31 Mar 26**	**31 Mar 27**
9	**11a(i): Expenditure on Assets Forecast**		**$000 (in nominal dollars)**										
10		Consumer connection	2,314	2,662	2,715	2,770	2,825	2,881	2,608	2,660	2,713	2,767	2,823
11		System growth	432	1,494	601	802	623	450	388	1,053	736	1,571	564
12		Asset replacement and renewal	737	542	553	564	575	587	598	610	623	635	648
13		Asset relocations	97	97	99	101	103	105	107	109	111	114	116
14		Reliability, safety and environment:											
15		Quality of supply	2,213	1,911	2,527	284	124	127	129	132	134	137	140
16		Legislative and regulatory											
17		Other reliability, safety and environment	292	437	298	-	-	-	-	-	-	-	-
18		**Total reliability, safety and environment**	2,505	2,348	2,824	284	124	127	129	132	134	137	140
19		**Expenditure on network assets**	6,085	7,143	6,792	4,521	4,250	4,150	3,830	4,564	4,318	5,224	4,290
20		Expenditure on non-network assets	97	110	107	109	111	114	116	118	121	123	125
21		**Expenditure on assets**	6,182	7,253	6,899	4,630	4,362	4,264	3,946	4,683	4,439	5,347	4,416
22													
23	*plus*	Cost of financing											
24	*less*	Value of capital contributions	1,462	1,947	1,985	2,025	2,066	2,107	2,149	2,192	2,236	2,281	2,326
25	*plus*	Value of vested assets											
26													
27		**Capital expenditure forecast**	4,720	5,307	4,914	2,605	2,296	2,157	1,797	2,491	2,203	3,067	2,090
28													
29		Assets commissioned	23,313	5,307	4,914	2,605	2,296	2,157	1,797	2,491	2,203	3,067	2,090

			Current Year CY	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
31		for year ended	**31 Mar 17**	**31 Mar 18**	**31 Mar 19**	**31 Mar 20**	**31 Mar 21**	**31 Mar 22**	**31 Mar 23**	**31 Mar 24**	**31 Mar 25**	**31 Mar 26**	**31 Mar 27**
32			**$000 (in constant prices)**										
33		Consumer connection	2,314	2,662	2,662	2,662	2,662	2,662	2,362	2,362	2,362	2,362	2,362
34		System growth	432	1,494	589	771	587	416	351	935	641	1,341	472
35		Asset replacement and renewal	737	542	542	542	542	542	542	542	542	542	542
36		Asset relocations	97	97	97	97	97	97	97	97	97	97	97
37		Reliability, safety and environment:											
38		Quality of supply	2,213	1,911	2,477	273	117	117	117	117	117	117	117
39		Legislative and regulatory	-	-	-	-	-	-	-	-	-	-	-
40		Other reliability, safety and environment	292	437	292	-	-	-	-	-	-	-	-
41		**Total reliability, safety and environment**	2,505	2,348	2,769	273	117	117	117	117	117	117	117
42		**Expenditure on network assets**	6,085	7,143	6,659	4,345	4,005	3,834	3,469	4,053	3,759	4,459	3,590
43		Expenditure on non-network assets	97	110	105	105	105	105	105	105	105	105	105
44		**Expenditure on assets**	6,182	7,253	6,764	4,450	4,110	3,939	3,574	4,158	3,864	4,564	3,695
45													
46		**Subcomponents of expenditure on assets (where known)**											
47		Energy efficiency and demand side management, reduction of energy losses	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
48		Overhead to underground conversion	195	1,249	971	-	-	-	-	-	-	-	-
49		Research and development	103	-	-	-	-	-	-	-	-	-	-

Company Name	**Waipa Networks Limited**
AMP Planning Period	**1 April 2017 – 31 March 2027**

SCHEDULE 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.

sch ref			Current Year CY	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 17	31 Mar 18	31 Mar 19	31 Mar 20	31 Mar 21	31 Mar 22	31 Mar 23	31 Mar 24	31 Mar 25	31 Mar 26	31 Mar 27
	Difference between nominal and constant price forecasts		**$000**										
	Consumer connection		-	-	53	108	163	219	246	298	351	405	461
	System growth		-	-	12	31	36	34	37	118	95	230	92
	Asset replacement and renewal		-	-	11	22	33	45	56	68	81	93	106
	Asset relocations		-	-	2	4	6	8	10	12	14	17	19
	Reliability, safety and environment:												
	Quality of supply		-	-	50	11	7	10	12	15	17	20	23
	Legislative and regulatory		-	-	-	-	-	-	-	-	-	-	-
	Other reliability, safety and environment		-	-	6	-	-	-	-	-	-	-	-
	Total reliability, safety and environment		-	-	55	11	7	10	12	15	17	20	23
	Expenditure on network assets		-	-	133	176	245	316	361	511	559	765	700
	Expenditure on non-network assets		-	-	2	4	6	9	11	13	16	18	20
	Expenditure on assets		-	-	135	180	252	325	372	525	575	783	721

			Current Year CY	CY+1	CY+2	CY+3	CY+4	CY+5
		for year ended	31 Mar 17	31 Mar 18	31 Mar 19	31 Mar 20	31 Mar 21	31 Mar 22
	11a(ii): Consumer Connection							
	*Consumer types defined by EDB**		**$000 (in constant prices)**					
	Customer connection		2,314	2,662	2,662	2,662	2,662	2,662
	**Consumer connection expenditure*		2,314	2,662	2,662	2,662	2,662	2,662
less	Capital contributions funding consumer connection		1,365	1,898	1,898	1,898	1,898	1,898
	Consumer connection less capital contributions		949	764	764	764	764	764
	11a(iii): System Growth							
	Subtransmission							
	Zone substations							
	Distribution and LV lines			192				
	Distribution and LV cables			649				
	Distribution substations and transformers		432	257	257	257	257	221
	Distribution switchgear							
	Other network assets			396	332	514	330	195
	System growth expenditure		432	1,494	589	771	587	416
less	Capital contributions funding system growth							
	System growth less capital contributions		432	1,494	589	771	587	416

*include additional rows if needed

Company Name	**Waipa Networks Limited**
AMP Planning Period	**1 April 2017 – 31 March 2027**

SCHEDULE 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.

sch ref

11a(iv): Asset Replacement and Renewal

			Current Year CY	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*
		for year ended	**31 Mar 17**	**31 Mar 18**	**31 Mar 19**	**31 Mar 20**	**31 Mar 21**	**31 Mar 22**
		$000 (in constant prices)						
	Subtransmission							
	Zone substations							
	Distribution and LV lines		195					
	Distribution and LV cables							
	Distribution substations and transformers		513	513	513	513	513	513
	Distribution switchgear		29	29	29	29	29	29
	Other network assets							
	Asset replacement and renewal expenditure		737	542	542	542	542	542
less	Capital contributions funding asset replacement and renewal		-	-	-	-	-	-
	Asset replacement and renewal less capital contributions		737	542	542	542	542	542

11a(v):Asset Relocations

		Current Year CY	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*
	for year ended	**31 Mar 17**	**31 Mar 18**	**31 Mar 19**	**31 Mar 20**	**31 Mar 21**	**31 Mar 22**
	*Project or programme**	**$000 (in constant prices)**					
	NZTA and District Council Relocations	97	97	97	97	97	97
	**include additional rows if needed*						
	All other project or programmes - asset relocations						
	Asset relocations expenditure	97	97	97	97	97	97
less	Capital contributions funding asset relocations	97	49	49	49	49	49
	Asset relocations less capital contributions	-	49	49	49	49	49

11a(vi):Quality of Supply

		Current Year CY	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*
	for year ended	**31 Mar 17**	**31 Mar 18**	**31 Mar 19**	**31 Mar 20**	**31 Mar 21**	**31 Mar 22**
	*Project or programme**	**$000 (in constant prices)**					
	Install 11kV Dropout Fuses Spurs & Services	117	117	117	117	117	117
	Install Remote Control Switches	545	545	545	156		
	Split Tamahere into Tamahere and Pencarrow	62					
	Split Kaipaki into Kaipaki and Monavale	61					
	Install TMU-HTI 110kV line	1,389					
	Multicircuit undergrounding		1,249	971			
	St Kilda feeder reconfiguration		-	844			
	**include additional rows if needed*						
	All other projects or programmes - quality of supply	39					
	Quality of supply expenditure	2,213	1,911	2,477	273	117	117
less	Capital contributions funding quality of supply	-	-	-	-	-	-
	Quality of supply less capital contributions	2,213	1,911	2,477	273	117	117

Company Name	**Waipa Networks Limited**
AMP Planning Period	**1 April 2017 – 31 March 2027**

SCHEDULE 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.

sch ref

11a(vii): Legislative and Regulatory

			Current Year CY	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*
		for year ended	**31 Mar 17**	**31 Mar 18**	**31 Mar 19**	**31 Mar 20**	**31 Mar 21**	**31 Mar 22**
	*Project or programme**	**$000 (in constant prices)**						
	Nil							
	**include additional rows if needed*							
	All other projects or programmes - legislative and regulatory							
	Legislative and regulatory expenditure		-	-	-	-	-	-
less	Capital contributions funding legislative and regulatory		-	-	-	-	-	-
	Legislative and regulatory less capital contributions		-	-	-	-	-	-

11a(viii): Other Reliability, Safety and Environment

			Current Year CY	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*
		for year ended	**31 Mar 17**	**31 Mar 18**	**31 Mar 19**	**31 Mar 20**	**31 Mar 21**	**31 Mar 22**
	*Project or programme**	**$000 (in constant prices)**						
	Replace Two Pole Transformers and Sub Structures		292	292	292			
	Cambridge Rd High Load Route Road Crossings			145				
	**include additional rows if needed*							
	All other projects or programmes - other reliability, safety and environment							
	Other reliability, safety and environment expenditure		292	437	292	-	-	-
less	Capital contributions funding other reliability, safety and environment							
	Other reliability, safety and environment less capital contributions		292	437	292	-	-	-

11a(ix): Non-Network Assets

			Current Year CY	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*
		for year ended	**31 Mar 17**	**31 Mar 18**	**31 Mar 19**	**31 Mar 20**	**31 Mar 21**	**31 Mar 22**
	Routine expenditure							
	*Project or programme**	**$000 (in constant prices)**						
	Motor vehicles, fleet and plant		50	50	50	50	50	50
	Office furniture and plant			-	5	5	5	5
	Computer equipment		47	60	50	50	50	50
	**include additional rows if needed*							
	All other projects or programmes - routine expenditure							
	Routine expenditure		97	110	105	105	105	105
	Atypical expenditure							
	*Project or programme**							
	**include additional rows if needed*							
	All other projects or programmes - atypical expenditure							
	Atypical expenditure		-	-	-	-	-	-
	Expenditure on non-network assets		97	110	105	105	105	105

Company Name	**Waipa Networks Limited**
AMP Planning Period	**1 April 2017 – 31 March 2027**

SCHEDULE 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.

sch ref

		Current Year CY	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
8	for year ended	**31 Mar 17**	**31 Mar 18**	**31 Mar 19**	**31 Mar 20**	**31 Mar 21**	**31 Mar 22**	**31 Mar 23**	**31 Mar 24**	**31 Mar 25**	**31 Mar 26**	**31 Mar 27**
9	**Operational Expenditure Forecast**	**$000 (in nominal dollars)**										
10	Service interruptions and emergencies	635	690	704	718	732	747	762	777	793	808	825
11	Vegetation management	1,003	1,003	1,023	1,044	1,064	775	791	806	822	839	856
12	Routine and corrective maintenance and inspection	976	992	809	825	788	804	912	930	949	871	888
13	Asset replacement and renewal	403	431	440	448	457	429	437	446	455	464	473
14	**Network Opex**	3,017	3,116	2,975	3,035	3,042	2,755	2,902	2,960	3,019	2,982	3,042
15	System operations and network support	1,160	1,099	1,121	1,143	1,166	1,190	1,213	1,238	1,262	1,288	1,313
16	Business support	1,966	2,198	2,242	2,287	2,333	2,379	2,427	2,475	2,525	2,575	2,627
17	**Non-network opex**	3,126	3,297	3,363	3,430	3,499	3,569	3,640	3,713	3,787	3,863	3,940
18	**Operational expenditure**	6,143	6,413	6,338	6,465	6,541	6,324	6,542	6,673	6,806	6,845	6,982

		Current Year CY	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
20	for year ended	**31 Mar 17**	**31 Mar 18**	**31 Mar 19**	**31 Mar 20**	**31 Mar 21**	**31 Mar 22**	**31 Mar 23**	**31 Mar 24**	**31 Mar 25**	**31 Mar 26**	**31 Mar 27**
21		**$000 (in constant prices)**										
22	Service interruptions and emergencies	635	690	690	690	690	690	690	690	690	690	690
23	Vegetation management	1,003	1,003	1,003	1,003	1,003	716	716	716	716	716	716
24	Routine and corrective maintenance and inspection	976	992	793	793	743	743	826	826	826	743	743
25	Asset replacement and renewal	403	431	431	431	431	396	396	396	396	396	396
26	**Network Opex**	3,017	3,116	2,917	2,917	2,867	2,545	2,628	2,628	2,628	2,545	2,545
27	System operations and network support	1,160	1,099	1,099	1,099	1,099	1,099	1,099	1,099	1,099	1,099	1,099
28	Business support	1,966	2,198	2,198	2,198	2,198	2,198	2,198	2,198	2,198	2,198	2,198
29	**Non-network opex**	3,126	3,297	3,297	3,297	3,297	3,297	3,297	3,297	3,297	3,297	3,297
30	**Operational expenditure**	6,143	6,413	6,214	6,214	6,164	5,842	5,925	5,925	5,925	5,842	5,842
31	**Subcomponents of operational expenditure (where known)**											
32	Energy efficiency and demand side management, reduction of											
33	energy losses	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
34	Direct billing*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
35	Research and Development	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
36	Insurance	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

37 ** Direct billing expenditure by suppliers that direct bill the majority of their consumers*

38

		Current Year CY	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*	*CY+6*	*CY+7*	*CY+8*	*CY+9*	*CY+10*
40	for year ended	**31 Mar 17**	**31 Mar 18**	**31 Mar 19**	**31 Mar 20**	**31 Mar 21**	**31 Mar 22**	**31 Mar 23**	**31 Mar 24**	**31 Mar 25**	**31 Mar 26**	**31 Mar 27**
41	**Difference between nominal and real forecasts**	**$000**										
42	Service interruptions and emergencies	-	-	14	28	42	57	72	87	103	118	135
43	Vegetation management	-	-	20	41	61	59	75	90	106	123	140
44	Routine and corrective maintenance and inspection	-	-	16	32	45	61	86	104	123	128	145
45	Asset replacement and renewal	-	-	9	17	26	33	41	50	59	68	77
46	**Network Opex**	-	-	58	118	175	210	274	332	391	437	497
47	System operations and network support	-	-	22	44	67	91	114	139	163	189	214
48	Business support	-	-	44	89	135	181	229	277	327	377	429
49	**Non-network opex**	-	-	66	133	202	272	343	416	490	566	643
50	**Operational expenditure**	-	-	124	251	377	482	617	748	881	1,003	1,140

Company Name	**Waipa Networks Limited**
AMP Planning Period	**1 April 2017 – 31 March 2027**

SCHEDULE 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.

sch ref					Asset condition at start of planning period (percentage of units by grade)						
	Voltage	**Asset category**	**Asset class**	**Units**	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade unknown**	**Data accuracy (1–4)**	**% of asset forecast to be replaced in next 5 years**
10	All	Overhead Line	Concrete poles / steel structure	No.	-	0.50%	83.00%	16.50%	-	3	4.90%
11	All	Overhead Line	Wood poles	No.	-	8.80%	85.60%	5.60%	-	3	1.70%
12	All	Overhead Line	Other pole types	No.	-	-	-	-	-	N/A	-
13	HV	Subtransmission Line	Subtransmission OH up to 66kV conductor	km	-	-	-	-	-	N/A	-
14	HV	Subtransmission Line	Subtransmission OH 110kV+ conductor	km	-	-	-	-	-	N/A	-
15	HV	Subtransmission Cable	Subtransmission UG up to 66kV (XLPE)	km	-	-	-	-	-	N/A	-
16	HV	Subtransmission Cable	Subtransmission UG up to 66kV (Oil pressurised)	km	-	-	-	-	-	N/A	-
17	HV	Subtransmission Cable	Subtransmission UG up to 66kV (Gas pressurised)	km	-	-	-	-	-	N/A	-
18	HV	Subtransmission Cable	Subtransmission UG up to 66kV (PILC)	km	-	-	-	-	-	N/A	-
19	HV	Subtransmission Cable	Subtransmission UG 110kV+ (XLPE)	km	-	-	-	-	-	N/A	-
20	HV	Subtransmission Cable	Subtransmission UG 110kV+ (Oil pressurised)	km	-	-	-	-	-	N/A	-
21	HV	Subtransmission Cable	Subtransmission UG 110kV+ (Gas Pressurised)	km	-	-	-	-	-	N/A	-
22	HV	Subtransmission Cable	Subtransmission UG 110kV+ (PILC)	km	-	-	-	-	-	N/A	-
23	HV	Subtransmission Cable	Subtransmission submarine cable	km	-	-	-	-	-	N/A	-
24	HV	Zone substation Buildings	Zone substations up to 66kV	No.	-	-	-	-	-	N/A	-
25	HV	Zone substation Buildings	Zone substations 110kV+	No.	-	-	-	-	-	N/A	-
26	HV	Zone substation switchgear	22/33kV CB (Indoor)	No.	-	-	-	-	-	N/A	-
27	HV	Zone substation switchgear	22/33kV CB (Outdoor)	No.	-	-	-	-	-	N/A	-
28	HV	Zone substation switchgear	33kV Switch (Ground Mounted)	No.	-	-	-	-	-	N/A	-
29	HV	Zone substation switchgear	33kV Switch (Pole Mounted)	No.	-	-	-	-	-	N/A	-
30	HV	Zone substation switchgear	33kV RMU	No.	-	-	-	-	-	N/A	-
31	HV	Zone substation switchgear	50/66/110kV CB (Indoor)	No.	-	-	-	-	-	N/A	-
32	HV	Zone substation switchgear	50/66/110kV CB (Outdoor)	No.	-	-	-	-	-	N/A	-
33	HV	Zone substation switchgear	3.3/6.6/11/22kV CB (ground mounted)	No.	-	-	-	-	-	N/A	-
34	HV	Zone substation switchgear	3.3/6.6/11/22kV CB (pole mounted)	No.	-	-	-	-	-	N/A	-

Company Name	**Waipa Networks Limited**
AMP Planning Period	**1 April 2017 – 31 March 2027**

SCHEDULE 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.

sch ref						Asset condition at start of planning period (percentage of units by grade)						
37	Voltage	Asset category	Asset class	Units	Grade 1	Grade 2	Grade 3	Grade 4	Grade unknown	Data accuracy (1–4)	% of asset forecast to be replaced in next 5 years
39	HV	Zone Substation Transformer	Zone Substation Transformers	No.	-	-	-	-	-	N/A	-
40	HV	Distribution Line	Distribution OH Open Wire Conductor	km	-	0.50%	98.20%	1.30%	-	3	0.50%
41	HV	Distribution Line	Distribution OH Aerial Cable Conductor	km	-	-	-	-	-	N/A	-
42	HV	Distribution Line	SWER conductor	km	-	-	-	-	-	N/A	-
43	HV	Distribution Cable	Distribution UG XLPE or PVC	km	-	2.40%	87.10%	10.50%	-	1	-
44	HV	Distribution Cable	Distribution UG PILC	km	-	-	100.00%	-	-	1	40.00%
45	HV	Distribution Cable	Distribution Submarine Cable	km	-	-	-	-	-	N/A	-
46	HV	Distribution switchgear	3.3/6.6/11/22kV CB (pole mounted) - reclosers and sectionalisers	No.	-	5.40%	58.90%	35.70%	-	3	5.40%
47	HV	Distribution switchgear	3.3/6.6/11/22kV CB (Indoor)	No.	-	-	-	-	-	N/A	-
48	HV	Distribution switchgear	3.3/6.6/11/22kV Switches and fuses (pole mounted)	No.	-	3.60%	80.80%	15.60%	-	1	3.60%
49	HV	Distribution switchgear	3.3/6.6/11/22kV Switch (ground mounted) - except RMU	No.	-	-	-	-	-	N/A	-
50	HV	Distribution switchgear	3.3/6.6/11/22kV RMU	No.	-	-	68.60%	31.40%	-	3	-
51	HV	Distribution Transformer	Pole Mounted Transformer	No.	-	4.20%	84.40%	11.40%	-	3	4.20%
52	HV	Distribution Transformer	Ground Mounted Transformer	No.	-	0.10%	79.30%	20.60%	-	3	0.10%
53	HV	Distribution Transformer	Voltage regulators	No.	-	12.20%	81.70%	6.10%	-	3	6.38%
54	HV	Distribution Substations	Ground Mounted Substation Housing	No.	-	-	-	-	-	N/A	-
55	LV	LV Line	LV OH Conductor	km	-	0.50%	98.20%	1.30%	-	3	0.50%
56	LV	LV Cable	LV UG Cable	km	-	-	-	-	100.00%	1	-
57	LV	LV Streetlighting	LV OH/UG Streetlight circuit	km	-	0.20%	99.80%	-	-	1	0.20%
58	LV	Connections	OH/UG consumer service connections	No.	-	0.82%	99.18%	-	-	1	0.82%
59	All	Protection	Protection relays (electromechanical, solid state and numeric)	No.	-	-	-	-	-	N/A	-
60	All	SCADA and communications	SCADA and communications equipment operating as a single system	Lot	-	-	100.00%	-	-	3	-
61	All	Capacitor Banks	Capacitors including controls	No.	-	-	-	-	-	N/A	-
62	All	Load Control	Centralised plant	Lot	-	-	100.00%	-	-	3	-
63	All	Load Control	Relays	No.	-	2.00%	80.00%	18.00%	-	3	2.00%
64	All	Civils	Cable Tunnels	km	-	-	-	-	-	N/A	-

Company Name	**Waipa Networks Limited**
AMP Planning Period	**1 April 2017 – 31 March 2027**

SCHEDULE 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.

sch ref

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
Transpower GXP Cambridge (AMD 2016/17)	40	40	N-1	-	99%	40	107%	Transpower	Firm capacity is exceeded in <5 years. Fonterra have used all their contracted 10MW MD but are continually implementing energy efficiency inititiatives. Transpower's transformers have a short term overload rating of 44.3MVA which will cope with any unanticipated extraordinary sustained peak demands until 2022/23.
Transpower GXP Te Awamutu (AMD 2016/17)	36	40	N-1	-	91%	40	98%	No constraint within +5 years	Firm capacity is exceeded in 8 years. Fonterra have used all their contracted 4.5MW MD but are continually implementing energy efficiency inititiatives. Transpower's transformers have a short term overload rating of 40.7MVA which will cope with any unaticipated extraordinary sustained peak demands until 2023/24.
					-				
					-				
					-				
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					-				
					-				
					-				
					-				
					-				
					-				
					-				

[1] *Extend forecast capacity table as necessary to disclose all capacity by each zone substation*

Company Name	**Waipa Networks Limited**
AMP Planning Period	**1 April 2017 – 31 March 2027**

SCHEDULE 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.

sch ref

12c(i): Consumer Connections

Number of ICPs connected in year by consumer type

Number of connections

		Current Year CY	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*
	for year ended	**31 Mar 17**	**31 Mar 18**	**31 Mar 19**	**31 Mar 20**	**31 Mar 21**	**31 Mar 22**
	*Consumer types defined by EDB**						
	Residential	374	374	374	374	374	374
	General	123	123	123	123	123	123
	Unmetered	60	60	60	60	60	60
	11kV		-	-	-	-	-
	Connections total	557	557	557	557	557	557
	**include additional rows if needed*						
	Distributed generation						
	Number of connections	40	40	40	40	40	40
	Capacity of distributed generation installed in year (MVA)	0	0	0	0	0	0

12c(ii) System Demand

		Current Year CY	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*
	Maximum coincident system demand (MW) for year ended	**31 Mar 17**	**31 Mar 18**	**31 Mar 19**	**31 Mar 20**	**31 Mar 21**	**31 Mar 22**
	GXP demand	74	75	76	77	78	80
plus	Distributed generation output at HV and above	-	-	-	-	-	-
	Maximum coincident system demand	74	75	76	77	78	80
less	Net transfers to (from) other EDBs at HV and above	-	-	-	-	-	-
	Demand on system for supply to consumers' connection points	74	75	76	77	78	80
	Electricity volumes carried (GWh)						
	Electricity supplied from GXPs	402	408	414	420	427	433
less	Electricity exports to GXPs	-	-	-	-	-	-
plus	Electricity supplied from distributed generation	1	1	1	1	1	1
less	Net electricity supplied to (from) other EDBs	1	1	1	1	1	1
	Electricity entering system for supply to ICPs	402	408	414	420	427	433
less	Total energy delivered to ICPs	378	384	389	395	401	407
	Losses	24	24	25	25	25	26
	Load factor	62%	62%	62%	62%	62%	62%
	Loss ratio	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%

Company Name	**Waipa Networks Limited**
AMP Planning Period	**1 April 2017 – 31 March 2027**
Network / Sub-network Name	

SCHEDULE 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.

sch ref							
8		*Current Year CY*	*CY+1*	*CY+2*	*CY+3*	*CY+4*	*CY+5*
9	for year ended	**31 Mar 17**	**31 Mar 18**	**31 Mar 19**	**31 Mar 20**	**31 Mar 21**	**31 Mar 22**
10	**SAIDI**						
11	Class B (planned interruptions on the network)	35.0	35.0	35.0	35.0	35.0	35.0
12	Class C (unplanned interruptions on the network)	180.3	179.3	178.3	177.3	176.3	175.3
13	**SAIFI**						
14	Class B (planned interruptions on the network)	0.14	0.14	0.14	0.14	0.14	0.14
15	Class C (unplanned interruptions on the network)	2.15	2.14	2.13	2.12	2.11	2.10

Company Name	**Waipa Networks Limited**
AMP Planning Period	**1 April 2016 – 31 March 2026**
Asset Management Standard Applied	**Based on PAS 55**

SCHEDULE 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.	Question	Score	Evidence—Summary	User Guidance	Why	Who	Record/documented Information
3	To what extent has an asset management policy been documented, authorised and communicated?	3	The Asset Management Policy was developed and authorised by the CEO as the overriding statement on asset management of Waipa Networks for reference when preparing the Asset Management Plan. This policy has been promulgated by placement in reception for visitors, Company intranet and internal notice boards for all staff, web-site for other stakeholders, interested parties and Commerce Commission.	The Network Asset Manager was responsible for completing this question assessment. Organisational respondents included input from; Management Team comprising CEO, Finance Controller/IT Manager, Company Secretary/Human Resources Manager, Customer Services Manager, Network Asset Manager, Health, Safety and Quality Manager (11% of Company personnel), Operations Committee comprising Network Asset Manager, Customer Services Manager, Field Services Supervisor, Customer Connections Supervisor, Construction & Maintenance Supervisor, Vegetation Supervisor, Health, Safety & Quality Manager, Purchasing Officer, Network Information Officer and Planners (18% of Company personnel), and the	Widely used AM practice standards require an organisation to document, authorise and communicate its asset management policy (eg, 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.
10	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?	3	The annual SCI and KPIs form the "contract" between Company Directors and Consumer Trust. The AMP is borne out of the Company's Annual Strategic Planning Meeting where Directors and Executive Management construct an Annual Business Plan and strategies to achieve specified outcomes in the SCI. The outcomes of the Strategic Planning Meeting and Business Plan are promulgated to staff and available on the Intranet. The AMP ("blue print" of capital and maintenance activity) is promulgated as appropriate to relevant staff. Refer AMP 2014 Sec 3.0 Background and Objectives, Sec 3.1 Purpose of Plan, Sec 3.2 Interaction with Corporate Goals, Business Planning Process and Plans, Sec 3.3 Period Covered by Plan and Date Certified, Sec 3.4 Stakeholder Interests, Sec 5 Service Levels, Sec 3.5 Accountabilities and Responsibilities for Asset Management. Refer Sec 7.2 Routinue and Corrective Maintenance Policies and Proceures and Sec 7.3 Asset Replacement and Renewal Policies and Procedures. Refer SCI 2012 the contract between Company Directors and Consumer Trust. Refer KPIs 2013 auditable performance reported at the monthly Directors' Meeting and in Company's Annual Report.		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 (eg, as required by PAS 55 para 4.3.1 b) 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.
11	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	Refer to AMP 2016, Sec 7.0 Life Cycle Asset Management Planning, Sec 7.1 Maintenance Planning Criteria and Assumptions, Sec 7.2 Routine and Corrective Maintenance Policies and Procedures, Sec 7.4 Service Interruptions and Emergencies Policy and Procedures, Sec 7.5 Vegetation Management Policy and Procedures, Sec 9.1 Financial and Physical Progress (Review of previous AMP).		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 4.3.1 d) 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.
26	How does the organisation establish and document its asset management plan(s) across the life cycle activities of its assets and asset systems?	3	Refer to AMP 2016, Sec 13.2 Appendix B: Voltage Regulator Programme, Sec 13.3 Appendix C: Remote Controlled Auto Recloser Programme, Sec 13.4 Appendix D: Asset Condition Survey Programme, Sec 13.5 Appendix E: Vegetation Management Programme, Sec 13.6 Appendix F: Earth Testing and Repair Programme, Sec 13.8 Appendix H: Capital Works and Expenditure Forecast, Sec 13.9 Appendix I: Operational Expenditure Forecast.		The asset management strategy need 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 optimize 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).

Company Name	**Waipa Networks Limited**
AMP Planning Period	**1 April 2017 – 31 March 2027**
Asset Management Standard Applied	**PAS55**

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
3	Asset management policy	To what extent has an asset management policy been documented, authorised and communicated?	The organisation does not have a documented asset management policy.	The organisation has an asset management policy, but it has not been authorised by top management, or it is not influencing the management of the assets.	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.	The asset management policy is authorised by top management, is widely and effectively communicated to all relevant employees and stakeholders, and used to make these persons aware of their asset related obligations.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
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?	The organisation has not considered the need to ensure that its asset management strategy is appropriately aligned with the organisation's other organisational policies and strategies or with stakeholder requirements. OR The organisation does not have an asset management strategy.	The need to align the asset management strategy with other organisational policies and strategies as well as stakeholder requirements is understood and work has started to identify the linkages or to incorporate them in the drafting of asset management strategy.	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.	All linkages are in place and evidence is available to demonstrate that, where appropriate, the organisation's asset management strategy is consistent with its other organisational policies and strategies. The organisation has also identified and considered the requirements of relevant stakeholders.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
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?	The organisation has not considered the need to ensure that its asset management strategy is produced with due regard to the lifecycle of the assets, asset types or asset systems that it manages. OR The organisation does not have an asset management strategy.	The need is understood, and the organisation is drafting its asset management strategy to address the lifecycle of its assets, asset types and asset systems.	The long-term asset management strategy takes account of the lifecycle of some, but not all, of its assets, asset types and asset systems.	The asset management strategy takes account of the lifecycle of all of its assets, asset types and asset systems.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
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?	The organisation does not have an identifiable asset management plan(s) covering asset systems and critical assets.	The organisation has asset management plan(s) but they are not aligned with the asset management strategy and objectives and do not take into consideration the full asset life cycle (including asset creation, acquisition, enhancement, utilisation, maintenance decommissioning and disposal).	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.	Asset management plan(s) are established, documented, implemented and maintained for asset systems and critical assets to achieve the asset management strategy and asset management objectives across all life cycle phases.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

Company Name	**Waipa Networks Limited**
AMP Planning Period	**1 April 2016 – 31 March 2026**
Asset Management Standard Applied	**Based on PAS 55**

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Question	Score	Evidence—Summary	User Guidance	Why	Who	Record/documented Information
27	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?	3	AMP Service Levels, Financial Targets and works programmes are communicated to Company Trust members, Directors, Managers and Supervisors by way of hard copy. The AMP is accessible on the Company intranet for all staff and web-site for other stakeholders, interested parties and Commerce Commission. The Company has internal planning, procurement, stores and field crew resources. Planners prepare "Orange" project folders for all capital and maintenance works identified in the current AMP. Materials are procured by the stores team. Work is undertaken by the field crews. Project quality and costs are audited and reported on when jobs are completed. The financials of network projects are reported on at Directors' monthly Board Meetings. SCADA, radio, directional drilling and traffic management works are performed by external service providers under contract.		Plans will be ineffective unless they are communicated to all those, including contracted suppliers and those who undertake enabling function(s). The plan(s) need 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.
29	How are designated responsibilities for delivery of asset plan actions documented?	2	Refer Sec 3.5 Accountabilities and Responsibilities for Asset Mangement. The Network Asset Manager has overall responsibility for the Asset Management Plan implemenataion. The Network Asset Manager delegates appropriate sections of the AMP works program to appropriate planning and engineering staff and supervisors for implementation.		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.
31	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)	2	Refer AMP 2016 Sec 3.2 Business Planning Process Cycle, Sec 3.5 Accountabilities and Responsibilities for Asset Management, Sec 3.6 Asset Management Process diagram. The "iterative" Business Planning Process Cycle sets and prioritizes all AMP works within the annual and medium term funding available and the availability of adequately skilled labour resources. The availability and cost of contracted services are considered in the Business Planning Process Cycle. A work vs resource balance is assessed and the stated Company strategy of supplementing internal resources with contracted services is followed if required.		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 need 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.
33	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?	2	Refer to Business Contingency Plan; AMP 2014 Sec 8.1 and 8.2; Company Health and Safety Manual Sec 7.0, Emergency Planning and Readiness, Sec 7.1, Emergency Readiness, Sec 7.1.1 Responsibilities, Sec 7.1.2 Emergency Service, Sec 7.1.3 Field Work Site Evacuation, Sec 7.1.4 Fire Evacuation Procedure, Sec 7.1.5 Earthquake Evacuation Procedure, Sec 7.1.6 Hazardous Substances Spills or Leaks, Sec 7.1.7 Urgent Medical Emergencies, Sec 7.1.8 Post Incident Review, Sec 7.1.9 Review of Policy. Refer to Public Safety Management System Sec 2 Safety Management System, Sec 3 Asset Description, Sec 4 Identification and Control of Significant Hazards, Sec 5 Safety and Operating Processes and Information, Sec 6 Performance Monitoring. Refer to Business Systems IT "Plan B" contingency arrangements.		Widely used AM practice standards require that an organisation has 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.

Company Name	**Waipa Networks Limited**
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Asset Management Standard Applied	

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
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?	The organisation does not have plan(s) or their distribution is limited to the authors.	The plan(s) are communicated to some of those responsible for delivery of the plan(s). OR Communicated to those responsible for delivery is either irregular or ad-hoc.	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.	The plan(s) are communicated to all relevant employees, stakeholders and contracted service providers to a level of detail appropriate to their participation or business interests in the delivery of the plan(s) and there is confirmation that they are being used effectively.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
29	Asset management plan(s)	How are designated responsibilities for delivery of asset plan actions documented?	The organisation has not documented responsibilities for delivery of asset plan actions.	Asset management plan(s) inconsistently document responsibilities for delivery of plan actions and activities and/or responsibilities and authorities for implementation inadequate and/or delegation level inadequate to ensure effective delivery and/or contain misalignments with organisational accountability.	Asset management plan(s) consistently document responsibilities for the delivery of actions but responsibility/authority levels are inappropriate/ inadequate, and/or there are misalignments within the organisation.	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.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
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)	The organisation has not considered the arrangements needed for the effective implementation of plan(s).	The organisation recognises the need to ensure appropriate arrangements are in place for implementation of asset management plan(s) and is in the process of determining an appropriate approach for achieving this.	The organisation has arrangements in place for the implementation of asset management plan(s) but the arrangements are not yet adequately efficient and/or effective. The organisation is working to resolve existing weaknesses.	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.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
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?	The organisation has not considered the need to establish plan(s) and procedure(s) to identify and respond to incidents and emergency situations.	The organisation has some ad-hoc arrangements to deal with incidents and emergency situations, but these have been developed on a reactive basis in response to specific events that have occurred in the past.	Most credible incidents and emergency situations are identified. Either appropriate plan(s) and procedure(s) are incomplete for critical activities or they are inadequate. Training/ external alignment may be incomplete.	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.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

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Asset Management Standard Applied	**Based on PAS 55**

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Question	Score	Evidence—Summary	User Guidance	Why	Who	Record/documented Information
37	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)?	2	Refer Sec 3.5 Accountabilities and Responsibilities for Asset Mangement. The Network Asset Manager has overall responsibility for the Asset Management Plan implemenataion. The Network Asset Manager delegates appropriate Sections of the AMP works program to appropriate planning and engineering staff and supervisors for implementation. The Network Asset Manager's Position Description includes the responsibilitly for implementation of the Asset Management Plan and KPIs. The Network Asset Manager reports at all Board Meetings on progress against the Asset Management Plan.		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 eg, 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.
40	What evidence can the organisation's top management provide to demonstrate that sufficient resources are available for asset management?	2	Refer to AMP 2016 Sec 3.5. Resourcing Asset Management. The Company believes there is a national shortage of experienced personnel with asset management skills. It has recruited a number of staff who had potential for this role all of whom have left the Company over the past 5 years. The Company has appointed a graduate Planning Engineer who is in the process of being trained with the appropriate asset management skills. All other functions of the Company are currently adequately resourced. Detailed programming of AMP works have not been rigorously resource forecast in terms of human resource.		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.
42	To what degree does the organisation's top management communicate the importance of meeting its asset management requirements?	2	The Network Asset Manager delegates appropriate Sections of the AMP works program to planners. The Company holds monthly Operational Meetings for all Supervisors to co-ordinate implementation of the Asset Management Plan . Planners prepare "Orange" project folders for all capital and maintenance works identified in the current AMP. Project folders are implemented by field staff through the Supervisors.		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 (eg, 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.
45	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	Refer AMP 2014 Sec 3.5 Resourcing Asset Management. WEL Networks for Control Room Services, Call Care for customer enquiry and dispatch services and Abbey for SCADA services have contracts which include performance KPI's. All works performed by service providers for SCADA, Radio Systems, Traffic Management on State Highways and directional drilling are contracted on an as required basis and are managed directly by Company Supervisors.		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 (eg, 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.

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Asset Management Standard Applied	

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
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)?	Top management has not considered the need to appoint a person or persons to ensure that the organisation's assets deliver the requirements of the asset management strategy, objectives and plan(s).	Top management understands the need to appoint a person or persons to ensure that the organisation's assets deliver the requirements of the asset management strategy, objectives and plan(s).	Top management has appointed an appropriate people to ensure the assets deliver the requirements of the asset management strategy, objectives and plan(s) but their areas of responsibility are not fully defined and/or they have insufficient delegated authority to fully execute their responsibilities.	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.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
40	Structure, authority and responsibilities	What evidence can the organisation's top management provide to demonstrate that sufficient resources are available for asset management?	The organisation's top management has not considered the resources required to deliver asset management.	The organisations top management understands the need for sufficient resources but there are no effective mechanisms in place to ensure this is the case.	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.	An effective process exists for determining the resources needed for asset management and sufficient resources are available. It can be demonstrated that resources are matched to asset management requirements.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
42	Structure, authority and responsibilities	To what degree does the organisation's top management communicate the importance of meeting its asset management requirements?	The organisation's top management has not considered the need to communicate the importance of meeting asset management requirements.	The organisations top management understands the need to communicate the importance of meeting its asset management requirements but does not do so.	Top management communicates the importance of meeting its asset management requirements but only to parts of the organisation.	Top management communicates the importance of meeting its asset management requirements to all relevant parts of the organisation.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
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?	The organisation has not considered the need to put controls in place.	The organisation controls its outsourced activities on an ad-hoc basis, with little regard for ensuring for the compliant delivery of the organisational strategic plan and/or its asset management policy and strategy.	Controls systematically considered but currently only provide for the compliant delivery of some, but not all, aspects of the organisational strategic plan and/or its asset management policy and strategy. Gaps exist.	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	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

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Asset Management Standard Applied	**Based on PAS 55**

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Question	Score	Evidence—Summary	User Guidance	Why	Who	Record/documented Information
48	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)?	2	During the budget process a GAP anaylsis is completed to ensure appropriate resouces are available either internal or external. The Company Training Matrix and Individual Personal Development Plans are used to increase skills of current staff as a first option and secondly employing additional staff for long term needs or contractors for short term.		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.
49	How does the organisation identify competency requirements and then plan, provide and record the training necessary to achieve the competencies?	2	The Company Training Matrix and Individual Personal Development Plans are used to identify maintain and increase skills of current staff. However, an Asset Management competency framework has not been developed to guide training requirements.		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. (eg, 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.
50	How does the organization 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?	2	As per our Heath, Safety and Environmental requirements all contractors are inducted to work on our network. The Company does not assess the competence of service providers under its direct control in any other way other than observing the quality of the work performed. Competencies for fault staff to operate on the network are defined and new fault staff are assessed and signed off.		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.

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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
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)?	The organisation has not recognised the need for assessing human resources requirements to develop and implement its asset management system.	The organisation has recognised the need to assess its human resources requirements and to develop a plan(s). There is limited recognition of the need to align these with the development and implementation of its asset management system.	The organisation has developed a strategic approach to aligning competencies and human resources to the asset management system including the asset management plan but the work is incomplete or has not been consistently implemented.	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).	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
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?	The organisation does not have any means in place to identify competency requirements.	The organisation has recognised the need to identify competency requirements and then plan, provide and record the training necessary to achieve the competencies.	The organisation is the process of identifying competency requirements aligned to the asset management plan(s) and then plan, provide and record appropriate training. It is incomplete or inconsistently applied.	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.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
50	Training, awareness and competence	How does the organization 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?	The organization has not recognised the need to assess the competence of person(s) undertaking asset management related activities.	Competency of staff undertaking asset management related activities is not managed or assessed in a structured way, other than formal requirements for legal compliance and safety management.	The organization is in the process of putting in place a means for assessing the competence of person(s) involved in asset management activities including contractors. There are gaps and inconsistencies.	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.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Question	Score	Evidence—Summary	User Guidance	Why	Who	Record/documented Information
53	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	AMP Service Levels, Financial Targets and works programmes are communicated to Company Trust members, Directors, Managers and Supervisors by way of hard copy. The AMP is accessible on the Company intranet for all staff and web-site for other stakeholders, interested parties and Commerce Commission. The Company has internal planning, procurement, stores and field crew resources. Planners prepare "Orange" project folders for all capital and maintenance works identified in the AMP. Materials are procured by the stores team. Work is undertaken by the field crews. Project quality and costs are audited and reported on when jobs are completed. The financials of network projects are reported on at Directors' monthly Board Meetings. SCADA, radio, directional drilling and traffic management works are performed by external service providers under contract. All these methods of communication inform and allow for staff, contracted service providers and other stakeholder feedback.		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), employee's 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.
59	What documentation has the organisation established to describe the main elements of its asset management system and interactions between them?	3	Refer to whole of AMP 2016. The Design Manual which has been issued in hard copy to all Manager, Supervisors, Planners and Foreman and has been placed on the intranet for all staff and on the web-site for contracted services providers, other stakeholders, interested parties and Commerce Commission. The Health and Safety at Work and Environmental Management System, and the Public Safety Management System are used to document those aspects of the management system and interactions with asset management.		Widely used AM practice standards require an organisation maintain up to date documentation that ensures that its asset management systems (ie, the systems the organisation has in place to meet the standards) can be understood, communicated and operated. (eg, s 4.5 of PAS 55 requires the maintenance of up to date documentation of the asset management system requirements specified throughout s 4 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.
62	What has the organisation done to determine what its asset management information system(s) should contain in order to support its asset management system?	3	Refer AMP 2015 Sec 3.6 Asset Management Systems, Processes and Information. The Network Asset Manager and Network Information Officer determine the data that is held in the Asset Managementment Information Systems. When new requirements are identified the Network Asset Manager and Network Information Officer request improvements that are designed and implemented by IT and the Operations Committee offers feedback in this iterative process.		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.
63	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?	3	Refer AMP 2016 Sec 3.6 Asset Management Systems, Processes and Information. The Network Information Officer populates the Asset Equipment Data Bases and inputs are audited for errors and irregularities. The Network Asset Manager and Network Information Officer request improvements that are designed and implemented by IT and the Operations Committee offers feedback in this iterative process.		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.

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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
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?	The organisation has not recognised the need to formally communicate any asset management information.	There is evidence that the pertinent asset management information to be shared along with those to share it with is being determined.	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.	Two way communication is in place between all relevant parties, ensuring that information is effectively communicated to match the requirements of asset management strategy, plan(s) and process(es). Pertinent asset information requirements are regularly reviewed.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
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?	The organisation has not established documentation that describes the main elements of the asset management system.	The organisation is aware of the need to put documentation in place and is in the process of determining how to document the main elements of its asset management system.	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.	The organisation has established documentation that comprehensively describes all the main elements of its asset management system and the interactions between them. The documentation is kept up to date.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
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?	The organisation has not considered what asset management information is required.	The organisation is aware of the need to determine in a structured manner what its asset information system should contain in order to support its asset management system and is in the process of deciding how to do this.	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.	The organisation has determined what its asset information system should contain in order to support its asset management system. The requirements relate to the whole life cycle and cover information originating from both internal and external sources.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
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?	There are no formal controls in place or controls are extremely limited in scope and/or effectiveness.	The organisation is aware of the need for effective controls and is in the process of developing an appropriate control process(es).	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.	The organisation has effective controls in place that ensure the data held is of the requisite quality and accuracy and is consistent. The controls are regularly reviewed and improved where necessary.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Question	Score	Evidence—Summary	User Guidance	Why	Who	Record/documented Information
64	How has the organisation's ensured its asset management information system is relevant to its needs?	3	Refer AMP 2016 Sec 3.6 Asset Management Systems, Processes and Information. The Network Asset Manager and Network Information Officer request improvements that are designed and implemented by IT and the Operations Committee offers feedback in this iterative process.		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.
69	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	Refer to AMP 2016 Sec 8.1. Disaster Risk Management Assessment, Sec 8.2 Details of Emergency Response and Contingency Plans. Refer to AMP 2016 Sec 7 Life Cycle Asset Management Planning, Sec 7.1 Maintenance Planning Criteria and Assumptions, Sec 7.2 Routine and Corrective Maintenance Policies and Procedures, Sec 7.3 Asset Replacement and Renewal Policies and Procedures. Refer to Public Safety Management System Sec 2 Safety Management System, Sec 3 Asset Description, Sec 4 Identification and Control of Significant Hazards, Sec 5 Safety and Operating Processes and Information, Sec 6 Performance Monitoring. Refer to "minutes" of Health, Safety & Environment Committee monthly meetings where incidents and accidents are analysed (E,I,M). Refer to "minutes" of Operations Team monthly meeting where incidents and accidents are analysed (E,I,M). Refer to Company Hazard Register. Refer to relevant Board Meeting "minutes" example accelerated removal of oil filled switchgear.		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 (eg, 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.
79	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	Refer AMP 2016 Sec 7. Life Cycle Asset Management Planning, Sec 7.1 Maintenance Planning Criteria and Assumptions, Sec 7.2 Routine and Corrective Maintenance Policies and Procedures, Sec 7.3 Asset replacement and Renewal Policies and Procedures, Sec 7.4 Service Interruptions and Emergencies Policy and Procedures, Sec 7.5 Vegetation Management Policy and Procedures. Refer to Company Training Matrix and Personal Development Plans. Refer to Company Hazard Register. Refer to Health and Safety at Work and Environmental Management System. Refer to "minutes" of Health, Safety & Environmental Committee (20% of Company personnel monthly meetings. Refer to "minutes" of Operations Committee monthly meetings. Refer to regular Field Crew Safety Refresher Training. During the budget process a GAP anaylsis is completed to ensure appropriate resouces are avaialble either internal or external. The Company Training Matrix and Individual Personal Development Plans are used to increase skills of current staff as a first option and secondly employing additional staff for long term needs or contractors for short term.		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.
82	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?	2	Refer AMP 2016 Sec 3.4 Stakeholder Interests, Sec 5.4 Targets for Asset and Electricity Distribution Business Performance (containing legislative and regulatory requirements). We rely on industry organisations and regulatory bodies to keep us informed of changes. Waipa Networks has started using ComplyWith web enabled software to assess compliance with legislative and regulatory requirements, involving questionaires completed by a variety of staff determined by a matrix of the registry of requirements within the ComplyWith software. This produces a six-monthly declaration of compliance that is reported to the Board.		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 (eg, 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

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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
64	Information management	How has the organisation's ensured its asset management information system is relevant to its needs?	The organisation has not considered the need to determine the relevance of its management information system. At present there are major gaps between what the information system provides and the organisations needs.	The organisation understands the need to ensure its asset management information system is relevant to its needs and is determining an appropriate means by which it will achieve this. At present there are significant gaps between what the information system provides and the organisations needs.	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.	The organisation's asset management information system aligns with its asset management requirements. Users can confirm that it is relevant to their needs.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
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?	The organisation has not considered the need to document process(es) and/or procedure(s) for the identification and assessment of asset and asset management related risks throughout the asset life cycle.	The organisation is aware of the need to document the management of asset related risk across the asset lifecycle. The organisation has plan(s) to formally document all relevant process(es) and procedure(s) or has already commenced this activity.	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.	Identification and assessment of asset related risk across the asset lifecycle is fully documented. The organisation can demonstrate that appropriate documented mechanisms are integrated across life cycle phases and are being consistently applied.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
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?	The organisation has not considered the need to conduct risk assessments.	The organisation is aware of the need to consider the results of risk assessments and effects of risk control measures to provide input into reviews of resources, training and competency needs. Current input is typically ad-hoc and reactive.	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.	Outputs from risk assessments are consistently and systematically used as inputs to develop resources, training and competency requirements. Examples and evidence is available.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
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?	The organisation has not considered the need to identify its legal, regulatory, statutory and other asset management requirements.	The organisation identifies some its legal, regulatory, statutory and other asset management requirements, but this is done in an ad-hoc manner in the absence of a procedure.	The organisation has procedure(s) to identify its legal, regulatory, statutory and other asset management requirements, but the information is not kept up to date, inadequate or inconsistently managed.	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.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Question	Score	Evidence—Summary	User Guidance	Why	Who	Record/documented Information
88	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	Refer AMP 2016 Sec 4.4 Asset Selection Policy. Waipa's asset selection policy is to use only tried and proven products. The Company adopts a position of being "leading edge not bleeding edge". When new modern equivalent assets are considered, their performance and lifecycle cost are evaluated by Waipa's Operations Committee before they are installed on the network. All new assets are sized appropriate for their intended use and life. Refer Design Manual for construction and commissioning policies and procedures.		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 (eg, 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.
91	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	Refer AMP 2016 Sec 9.1. Financial and Physical Progress, Sec 9.3 Gap Analysis and Identification of Improvement Initiatives. Safety and Quality audits are conducted on a sample basis to monitor performance. Progress against AMP and Finances is a standard report to the Board. Progress with programmes is reported monthly and annually in the AMP including Appendix D Visual Asset Condition Survey Programme, Appendix E Vegetation Management Programme, Appendix F Earth Testing and Repair Programme. Defects raised and closed out are tracked and reported.		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 (eg, 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.
95	How does the organisation measure the performance and condition of its assets?	2	The Company monitors network performance and reports monthly on SAIDI, SAIFI, CAIDI, planned and unplanned outage causes. Refer to AMP 2016 Sec 7.2 Routine and Corrective Maintenance Policies and Procedures Asset Condition Surveys and Earth Testing and Repair. Sec 9.1 Financial and Physical Progress shows progress with asset condition survey programme, defects outstanding, earth testing and repair, vegetation management. Sec 9.2 Service Level and Asset Performance, Sec 9.3 Gap Analysis and Identification of Improvement Initiatives.		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).
99	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?	2	Incidents and emergency situations are managed by the Control Room Operators who are authorised and responsible for assigning staff to respond by making safe and carry out repairs. Contracts with 3rd parties describe responsibilities and performance measures. The Network Asset Manager is reponsible for investigating all network asset failures and performance of the network as per job description. The Public Safety Management System and the Health, Safety and Environmental Manual ensure Identification and Control of Significant Hazards which are included in the Company Hazard Register. Duty Supervisors and HSQ Manager respond immediately to safety incidents, and the HSQ Manager investigates the incidents. Recommendations related to network equipment and asset management are communicated to the Network Asset Manager. Any equipment or design hazards identified are replaced in a planned controlled manner through the asset management plan process. The Network Asset Manager is accountable to CEO and Board.		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.

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SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
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?	The organisation does not have process(es) 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.	The organisation is aware of the need to have process(es) and procedure(s) 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 but currently do not have these in place (note: procedure(s) may exist but they are inconsistent/incomplete).	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 activities related to asset creation including design, modification, procurement, construction and commissioning. Gaps and inconsistencies are being addressed.	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.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
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?	The organisation does not have process(es)/procedure(s) in place to control or manage the implementation of asset management plan(s) during this life cycle phase.	The organisation is aware of the need to have process(es) and procedure(s) in place to manage and control the implementation of asset management plan(s) during this life cycle phase but currently do not have these in place and/or there is no mechanism for confirming they are effective and where needed modifying them.	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.	The organisation has 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, which is itself regularly reviewed to ensure it is effective, for confirming the process(es)/ procedure(s) are effective and if necessary carrying out modifications.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
95	Performance and condition monitoring	How does the organisation measure the performance and condition of its assets?	The organisation has not considered how to monitor the performance and condition of its assets.	The organisation recognises the need for monitoring asset performance but has not developed a coherent approach. Measures are incomplete, predominantly reactive and lagging. There is no linkage to asset management objectives.	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.	Consistent asset performance monitoring linked to asset management objectives is in place and universally used including reactive and proactive measures. Data quality management and review process are appropriate. Evidence of leading indicators and analysis.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
99	Investigation of asset-related failures, incidents and nonconformities	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?	The organisation has not considered the need to define the appropriate responsibilities and the authorities.	The organisation understands the requirements and is in the process of determining how to define them.	The organisation are in the process of defining the responsibilities and authorities with evidence. Alternatively there are some gaps or inconsistencies in the identified responsibilities/authorities.	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.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

Company Name	**Waipa Networks Limited**
AMP Planning Period	**1 April 2016 – 31 March 2026**
Asset Management Standard Applied	**Based on PAS 55**

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Question	Score	Evidence—Summary	User Guidance	Why	Who	Record/documented Information
105	What has the organisation done to establish procedure(s) for the audit of its asset management system (process(es))?	2	Waipa's AMP's asset management systems and processes developed by the Network Asset Manager, the Financial Controller and the Network Information Officer are subject to internal review by Executive Management. Waipa's Health, Safety and Quality Manager audits Waipa's feild crews and contractor's for work site safety and compliance with Waipa's design criteria. Paperwork audits are completed to assess quality and compliance with requirements for work management, equipment and testing records and documentation. Telarc routinely audit a selection of Waipa's works for public safety and compliance with industry best practice. Enviro-Mark audit Waipa's environmental policies and practices. ACC have audited Waipa's Workplace Safety Management Practices. TELARC have audited Waipa's Safety Management Sytems for managing public safety risks.		This question seeks to explore what the organisation has done to comply with the standard practice AM audit requirements (eg, 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.
109	How does the organisation instigate appropriate corrective and/or preventive actions to eliminate or prevent the causes of identified poor performance and non conformance?	2	The Network Asset Manager is reponsible for investigating all network asset failures and performance of the network as per job description. The Public Safety Management System and the Health, Safety and Environmental Manual ensure Identification and Control of Significant Hazards which are included in the Company Hazard Register. Any equipment or design hazards identified and assessed as requiring replacement to manage network risk are replaced in a planned controlled manner through the asset management plan process. The Network Asset Manager is accountable to CEO and Board. Compliance reporting against legislative and regulatory requirements are assessed in detail every six months using the ComplyWith software.		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
113	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	Refer AMP 2016 Sec 7. Life Cycle Asset Management Planning, Sec 7.1 Maintenance Planning Criteria and Assumptions, Sec 7.2 Routine and Corrective Maintenance Policies and Procedures, Sec 7.3 Asset replacement and Renewal Policies and Procedures, Sec 7.4 Service Interruptions and Emergencies Policy and Procedures, Sec 7.5 Vegetation Management Policy and Procedures. These AMP Sections set the Company's criteria of risk and performance against which optimal (the cost of) continual improvement is measured. Sec 9.1 Financial and Physical Progress and Sec 9.2 Service Levels and Asset Performance assesses performance against AMP objectives.		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.
115	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	Company Management and Supervisors who manage and operate network assets regularly participate in EEA, ESAA, ESITO and Transpower conferences, exhibitions and industry forums at which they are able to update themselves on new asset options and experiences others have had with existing network assets. The work of the EEA Asset Management Group is monitored for developments. Company Management and Supervisors regularly liaise with other EDBs and the Suppliers of assets concerning the adoption of new products and problems with existing assets. New equipment is evaluated on a cost and quality basis with life cycle performance in mind. Pilots to trial new equipmnet and gain experience with new technology are used in some cases before a wholesale adoption is contemplated.		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.

Company Name	**Waipa Networks Limited**
AMP Planning Period	**1 April 2017 – 31 March 2027**
Asset Management Standard Applied	

SCHEDULE 13: REPORT ON ASSET MANAGEMENT MATURITY (cont)

Question No.	Function	Question	Maturity Level 0	Maturity Level 1	Maturity Level 2	Maturity Level 3	Maturity Level 4
105	Audit	What has the organisation done to establish procedure(s) for the audit of its asset management system (process(es))?	The organisation has not recognised the need to establish procedure(s) for the audit of its asset management system.	The organisation understands the need for audit procedure(s) and is determining the appropriate scope, frequency and methodology(s).	The organisation is establishing its audit procedure(s) but they do not yet cover all the appropriate asset-related activities.	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.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
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?	The organisation does not recognise the need to have systematic approaches to instigating corrective or preventive actions.	The organisation recognises the need to have systematic approaches to instigating corrective or preventive actions. There is ad-hoc implementation for corrective actions to address failures of assets but not the asset management system.	The need is recognized for systematic instigation of preventive and corrective actions to address root causes of non compliance or incidents identified by investigations, compliance evaluation or audit. It is only partially or inconsistently in place.	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.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
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?	The organisation does not consider continual improvement of these factors to be a requirement, or has not considered the issue.	A Continual Improvement ethos is recognised as beneficial, however it has just been started, and or covers partially the asset drivers.	Continuous improvement process(es) are set out and include consideration of cost risk, performance and condition for assets managed across the whole life cycle but it is not yet being systematically applied.	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.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.
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?	The organisation makes no attempt to seek knowledge about new asset management related technology or practices.	The organisation is inward looking, however it recognises that asset management is not sector specific and other sectors have developed good practice and new ideas that could apply. Ad-hoc approach.	The organisation has initiated asset management communication within sector to share and, or identify 'new' to sector asset management practices and seeks to evaluate them.	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.	The organisation's process(es) surpass the standard required to comply with requirements set out in a recognised standard. The assessor is advised to note in the Evidence section why this is the case and the evidence seen.

Schedule 17: Certification for Year-beginning Disclosures

Clause 2.9.1 of section 2.9

We, Diane Mary Reed and Robert Corbett Western, being directors of Waipa Networks Limited certify that, having made all reasonable enquiry, to the best of our knowledge –

The following attached information of Waipa Networks Limited prepared for the purposes of clause 2.4.1, clause 2.6.1 and sub clauses 2.6.3(4) and 2.6.5(3) of the Electricity Distribution Information Disclosure Determination 2012 in all material respects complies with that determination.

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.

Diane Mary Reed

Robert Corbett Western

28 March 2017